

**SUZUKI**

***RMX450Z***

**SERVICE MANUAL**



## FOREWORD

*This manual contains an introductory description on the SUZUKI RMX450Z and procedures for its inspection/service and overhaul of its main components.*

*Other information considered as generally known is not included.*

*Read the GENERAL INFORMATION section to familiarize yourself with the motorcycle and its maintenance. Use this section as well as other sections to use as a guide for proper inspection and service.*

*This manual will help you know the motorcycle better so that you can assure your customers of fast and reliable service.*

*\* This manual has been prepared on the basis of the latest specifications at the time of publication. If modifications have been made since then, differences may exist between the content of this manual and the actual motorcycle.*

*\* Illustrations in this manual are used to show the basic principles of operation and work procedures. They may not represent the actual motorcycle exactly in detail.*

*\* This manual is written for persons who have enough knowledge, skills and tools, including special tools, for servicing SUZUKI motorcycles. If you do not have the proper knowledge and tools, ask your authorized SUZUKI motorcycle dealer to help you.*

### **▲ WARNING**

**Inexperienced mechanics or mechanics without the proper tools and equipment may not be able to properly perform the services described in this manual.**

**Improper repair may result in injury to the mechanic and may render the motorcycle unsafe for the rider and passenger.**

**SUZUKI MOTOR CORPORATION**

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Section 00

# Precautions

## CONTENTS

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# Precautions

## Precautions

### Warning / Caution / Note

BA02J2000001

Please read this manual and follow its instructions carefully. To emphasize special information, the symbol and the words WARNING, CAUTION and NOTE have special meanings. Pay special attention to the messages highlighted by these signal words.

#### **⚠ WARNING**

Indicates a potential hazard that could result in death or injury.

#### **⚠ CAUTION**

Indicates a potential hazard that could result in motorcycle damage.

#### **NOTE**

Indicates special information to make maintenance easier or instructions clearer.

Please note, however, that the warnings and cautions contained in this manual cannot possibly cover all potential hazards relating to the servicing, or lack of servicing, of the motorcycle. In addition to the WARNINGS and CAUTIONS stated, you must use good judgement and basic mechanical safety principles. If you are unsure about how to perform a particular service operation, ask a more experienced mechanic for advice.

### General Precautions

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#### **⚠ WARNING**

- Proper service and repair procedures are important for the safety of the service mechanic and the safety and reliability of the motorcycle.
- When 2 or more persons work together, pay attention to the safety of each other.
- When it is necessary to run the engine indoors, make sure that exhaust gas is forced outdoors.
- When working with toxic or flammable materials, make sure that the area you work in is well ventilated and that you follow all of the material manufacturer's instructions.
- Never use gasoline as a cleaning solvent.
- To avoid getting burned, do not touch the engine, engine oil, radiator and exhaust system until they have cooled.

- After servicing the fuel, oil, water, exhaust or brake systems, check all lines and fittings related to the system for leaks.

#### **⚠ CAUTION**

- If parts replacement is necessary, replace the parts with Suzuki Genuine Parts or their equivalent.
- When removing parts that are to be reused, keep them arranged in an orderly manner so that they may be reinstalled in the proper order and orientation.
- Be sure to use special tools when instructed.
- Make sure that all parts used in reassembly are clean. Lubricate them when specified.
- Use the specified lubricant, bond, or sealant.
- When removing the battery, disconnect the negative (–) cable first and then the positive (+) cable.
- When reconnecting the battery, connect the positive (+) cable first and then the negative (–) cable, and replace the terminal cover on the positive (+) terminal.
- When performing service to electrical parts, if the service procedures do not require use of battery power, disconnect the negative (–) cable the battery.
- When tightening the cylinder head or case bolts and nuts, tighten the larger sizes first. Always tighten the bolts and nuts diagonally from the inside toward outside and to the specified tightening torque.
- Whenever you remove oil seals, gaskets, packing, O-rings, locking washers, self-locking nuts, cotter pins, circlips and certain other parts as specified, be sure to replace them with new ones. Also, before installing these new parts, be sure to remove any left over material from the mating surfaces.
- Never reuse a circlip. When installing a new circlip, take care not to expand the end gap larger than required to slip the circlip over the shaft. After installing a circlip, always ensure that it is completely seated in its groove and securely fitted.

- Use a torque wrench to tighten fasteners to the specified torque. Wipe off grease and oil if a thread is smeared with them.
- After reassembling, check parts for tightness and proper operation.
- To protect the environment, do not unlawfully dispose of used motor oil, engine coolant and other fluids: batteries, and tires.
- To protect Earth's natural resources, properly dispose of used motorcycle and parts.

### Precautions for Electrical Circuit Service

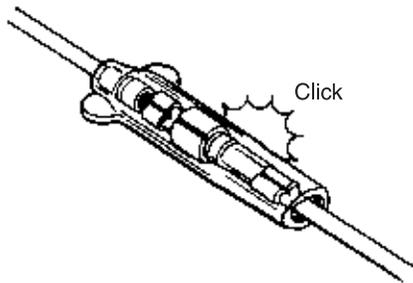
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When handling the electrical parts or servicing the FI systems, observe the following points for the safety of the systems.

#### Electrical Parts

##### Connector / Coupler

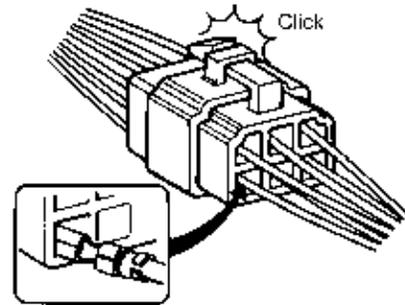
- Faulty FI system is often related to poor electrical contact of connector/coupler. Before servicing individual electronic part, check electrical contact of the connector/coupler.
- When connecting a connector, be sure to push it in until a click is felt.



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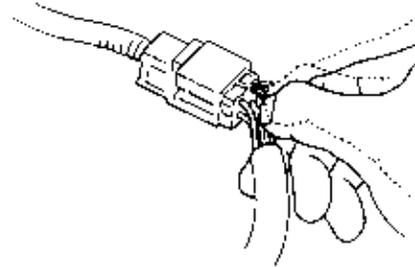
- With a lock type coupler, be sure to release the lock when disconnecting, and push it in fully to engage the lock when connecting.
- When disconnecting the coupler, be sure to hold the coupler body and do not pull the lead wires.
- Inspect each terminal on the connector/coupler for looseness or bending.
- Push in the coupler straightly. An angled or skewed insertion may cause the terminal to be deformed, possibly resulting in poor electrical contact.
- Inspect each terminal for corrosion and contamination. The terminals must be clean and free of any foreign material which could impede proper terminal contact.

- Before refitting the sealed coupler, make sure its seal rubber is positioned properly. The seal rubber may possibly come off the position during disconnecting work and if the coupler is refitted with the seal rubber improperly positioned, it may result in poor water sealing.



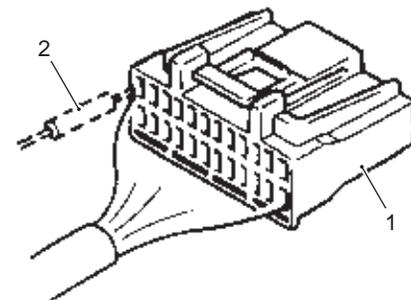
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- Inspect each lead wire circuit for poor connection by shaking it by hand lightly. If any abnormal condition is found, repair or replace.



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- When taking measurements at electrical connectors using a tester probe, be sure to insert the probe from the wire harness side (rear) of the connector/coupler.

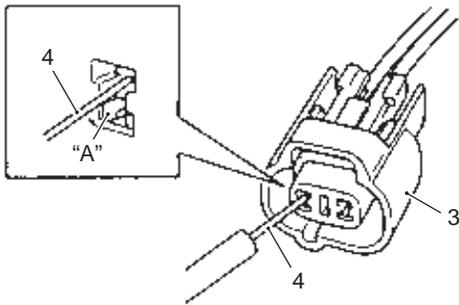


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1. Coupler	2. Probe
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### 00-3 Precautions:

- When connecting meter probe from the terminal side of the coupler (where connection from harness side not being possible), use extra care not to force and cause the male terminal to bend or the female terminal to open. Connect the probe as shown to avoid opening of female terminal. Never push in the probe where male terminal is supposed to fit.
- Check the male connector for bend and female connector for excessive opening. Also check the coupler for locking (looseness), corrosion, dust, etc.



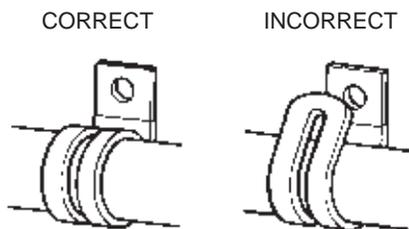
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3. Coupler	4. Probe	"A": Where male terminal fits
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- Avoid applying grease or other similar material to connector/coupler terminals to prevent electric trouble.

#### Clamp

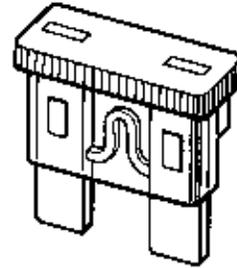
- Clamp the wire harness at such positions as indicated in "Wiring Harness Routing Diagram" in Section 9A (Page 9A-2).
- Bend the clamp properly so that the wire harness is clamped securely.
- In clamping the wire harness, use care not to allow it to hang down.
- Do not use wire or any other substitute for the band type clamp.



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#### Fuse

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



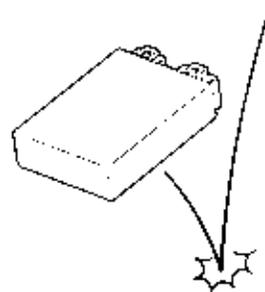
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#### Switch

Never apply grease material to switch contact points to prevent damage.

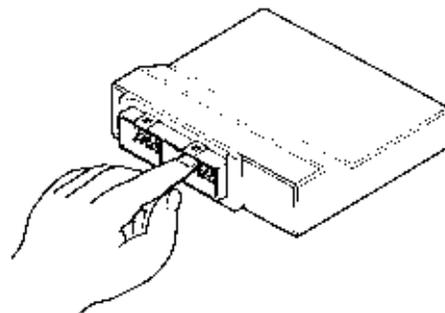
#### ECM / Various sensors

- Since each component is a high-precision part, great care should be taken not to apply any severe impacts during removal and installation.



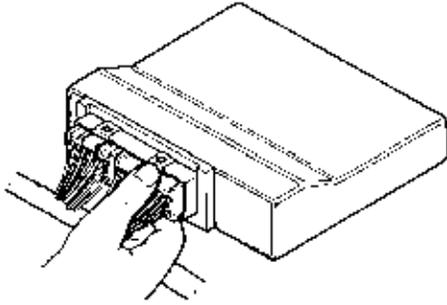
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- Be careful not to touch the electrical terminals of the electronic parts (ECM, etc.). The static electricity from your body may damage them.



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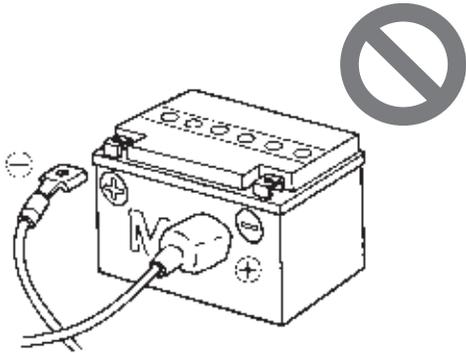
- When disconnecting and connecting the coupler, make sure to turn OFF the ignition switch, or electronic parts may get damaged.



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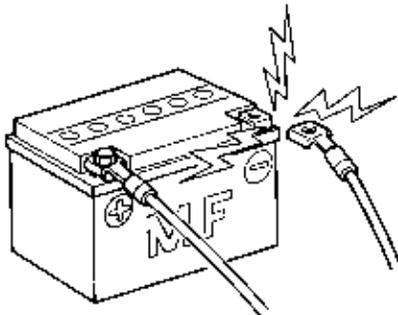
**Battery**

- Battery connection in reverse polarity is strictly prohibited. Such a wrong connection will damage the components of the FI system instantly when reverse power is applied.



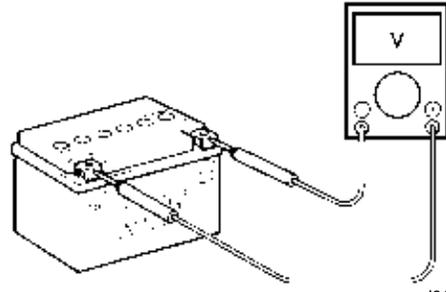
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- Removing any battery terminal of a running engine is strictly prohibited. The moment such removal is made, damaging counter electromotive force will be applied to the electronic unit which may result in serious damage.



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- Before measuring voltage at each terminal, check to make sure that battery voltage is 11 V or higher. Terminal voltage check with a low battery voltage will lead to erroneous diagnosis.



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- Never connect any tester (voltmeter, ohmmeter, or whatever) to the electronic unit when its coupler is disconnected. Otherwise, damage to electronic unit may result.
- Never connect an ohmmeter to the electronic unit with its coupler connected. If attempted, damage to ECM or sensors may result.
- Be sure to use a specified voltmeter/ohmmeter. Otherwise, accurate measurements may not be obtained and personal injury may result.

**Electrical Circuit Inspection Procedure**

While there are various methods for electrical circuit inspection, described here is a general method to check for open and short circuit using an ohmmeter and a voltmeter.

**Open circuit check**

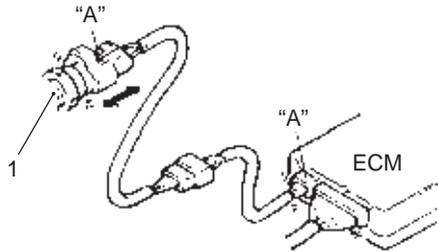
Possible causes for the open circuit are as follows. As the cause can exist in the connector/coupler or terminal, they need to be checked carefully.

- Loose connection of connector/coupler
- Poor contact of terminal (due to dirt, corrosion or rust, poor contact tension, entry of foreign object etc.)
- Wire harness being open.
- Poor terminal-to-wire connection.

## 00-5 Precautions:

When checking system circuits including an electronic control unit such as ECM, etc., it is important to perform careful check, starting with items which are easier to check.

- 1) Disconnect the negative (-) cable from the battery.
- 2) Check each connector/coupler at both ends of the circuit being checked for loose connection. Also check for condition of the coupler lock if equipped.



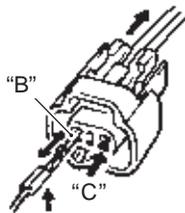
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1. Sensor	"A": Check for loose connection
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- 3) Using a test male terminal, check the female terminals of the circuit being checked for contact tension.

Check each terminal visually for poor contact (possibly caused by dirt, corrosion, rust, entry of foreign object, etc.). At the same time, check to make sure that each terminal is fully inserted in the coupler and locked.

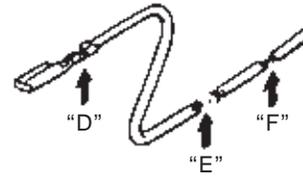
If contact tension is not enough, rectify the contact to increase tension or replace. The terminals must be clean and free of any foreign material which could impede proper terminal contact.



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"B": Check contact tension by inserting and removing.
"C": Check each terminal for bend and proper alignment.

- 4) Using continuity inspect or voltage check procedure as described below, inspect the wire harness terminals for open circuit and poor connection. Locate abnormality, if any.



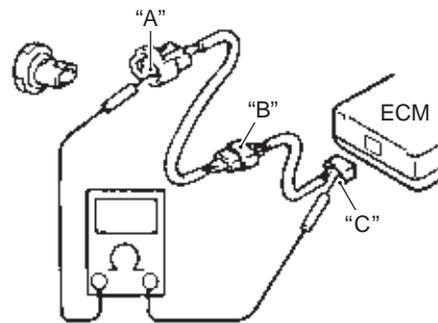
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"D": Looseness of crimping
"E": Open
"F": Thin wire (A few strands left)

### Continuity check

- 1) Measure resistance across coupler "B" (between "A" and "C" in the figure).

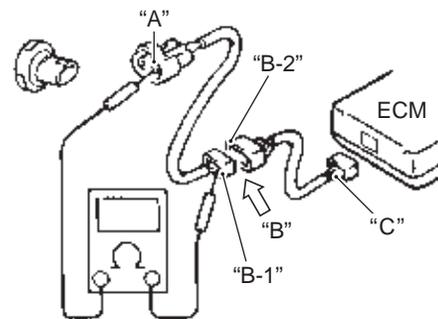
If no continuity is indicated (infinity or over limit), the circuit is open between terminals "A" and "C".



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- 2) Disconnect the coupler "B" and measure resistance between couplers "A" and "B-1".

If no continuity is indicated, the circuit is open between couplers "A" and "B-1". If continuity is indicated, there is an open circuit between couplers "B-2" and "C" or an abnormality in coupler "B-2" or coupler "C".



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**Voltage check**

If voltage is supplied to the circuit being checked, voltage check can be used as circuit check.

- 1) With all connectors/couplers connected and voltage applied to the circuit being checked, measure voltage between each terminal and body ground.
- 2) If measurements were taken as shown in the figure and results were listed in the following, it means that the circuit is open between terminals "A" and "B".

**Voltage between**

"A" and body ground: Approx. 5 V

"B" and body ground: Approx. 5 V

"C" and body ground: 0 V

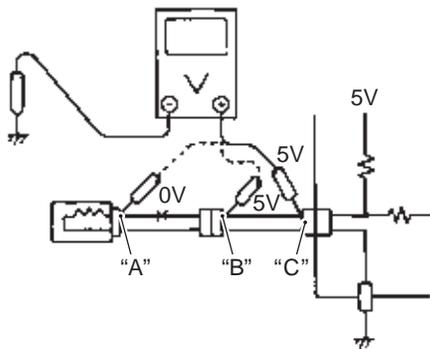
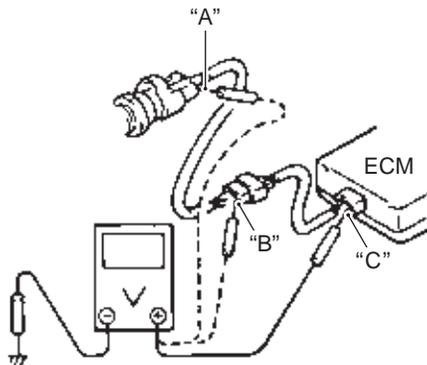
- 3) Also, if measured values are as listed following, a resistance (abnormality) exists which causes the voltage drop in the circuit between terminals "A" and "B".

**Voltage between**

"A" and body ground: Approx. 5 V

"B" and body ground: Approx. 5 V – 2 V voltage drop

"C" and body ground: 3 V – 2 V voltage drop



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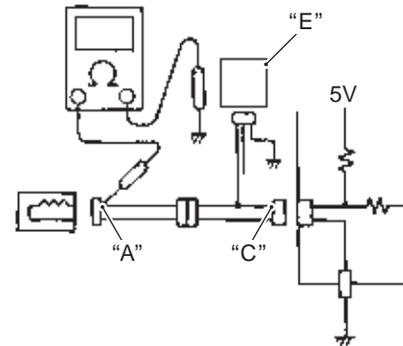
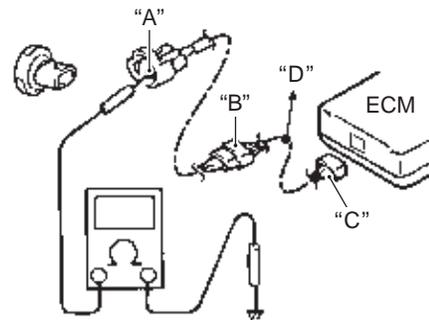
**Short circuit check (Wire harness to ground)**

- 1) Disconnect the negative (-) cable from the battery.
- 2) Disconnect the connectors/couplers at both ends of the circuit to be checked.

**NOTE**

**If the circuit to be checked branches to other parts as shown, disconnect all connectors/couplers of those parts. Otherwise, diagnosis will be misled.**

- 3) Measure resistance between terminal at one end of circuit ("A" terminal in the figure) and body ground. If continuity is indicated, there is a short circuit to ground between terminals "A" and "C".

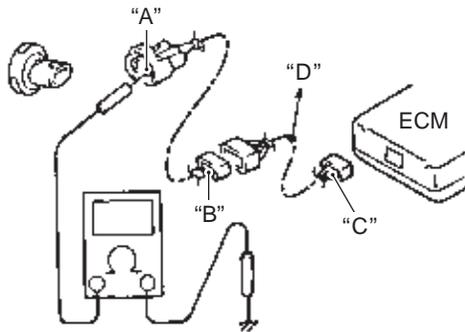


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"D": To other parts	"E": Other parts
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## 00-7 Precautions:

- 4) Disconnect the connector/coupler included in circuit (coupler "B") and measure resistance between terminal "A" and body ground. If continuity is indicated, the circuit is shorted to the ground between terminals "A" and "B".



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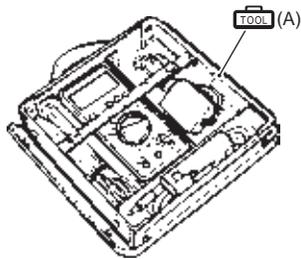
"D": To other parts

### Using The Multi Circuit Testers

- Use the Suzuki multi circuit tester set.
- Use well-charged batteries in the tester.
- Be sure to set the tester to the correct testing range.

#### Special tool

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



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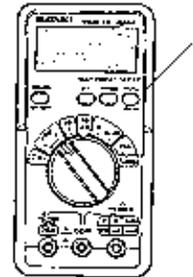
### Using the testers

- Incorrectly connecting the (+) and (-) probes may cause the inside of the tester to be burned.
- If the voltage and current are not known, make measurements using the highest range.
- When measuring the resistance with the multi circuit tester (1),  $\infty$  will be shown as 10.00 M $\Omega$  and "1" flashes in the display.
- Check that no voltage is applied before making the measurement. If voltage is applied the tester may be damaged.

- After using the tester, turn the power off.

#### Special tool

 : 09900-25008 (Multi circuit tester set)



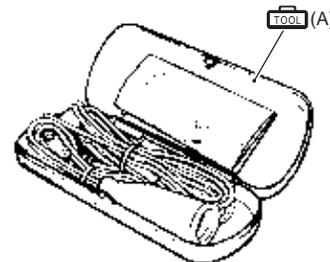
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### NOTE

- When connecting the multi circuit tester, use the needle-point probe to the back side of the lead wire coupler and connect the probes of tester to them.
- Use the needle-point probe to prevent the rubber of the water proof coupler from damage.
- When using the multi circuit tester, do not strongly touch the terminal of the ECM coupler with a needle-point tester probe to prevent the terminal damage.

#### Special tool

 (A): 09900-25009 (Needle-point probe set)



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## Section 0

## General Information

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# General Information

## General Description

### Symbols

BA02J20101001

Listed in the table below are the symbols indicating instructions and other information necessary for servicing.  
The meaning of each symbol is also included in the table.

Symbol	Definition
	Torque control required. Data beside it indicate specified torque.
	Apply oil. Use engine oil unless otherwise specified.
	Apply molybdenum oil solution. (Mixture of engine oil and SUZUKI MOLY PASTE in a ratio of 1 : 1)
	Apply SUZUKI SUPER GREASE "A" or equivalent. 99000-25010
	Apply SUZUKI MOLY PASTE or equivalent. 99000-25140
	Apply SUZUKI SILICONE GREASE or equivalent. 99000-25100
	Apply SUZUKI BOND "1207B" or equivalent. 99000-31140
	Apply SUZUKI BOND "1215" or equivalent. 99000-31110
	Apply THREAD LOCK SUPER "1303" or equivalent. 99000-32030
	Apply THREAD LOCK SUPER "1322" or equivalent. 99000-32110
	Apply THREAD LOCK SUPER "1360" or equivalent. 99000-32130
	Use fork oil SS-19 or equivalent.
	Use rear suspension oil SS-25 or equivalent.
	Use engine coolant or equivalent. 99000-99032-11X
	Apply or use brake fluid.
	Use special tool.
	Do not reuse.
	Note on reassembly.

### Abbreviations

BA02J20101002

**A:**  
**ABDC:** After Bottom Dead Center  
**AC:** Alternating Current  
**ACL:** Air Cleaner, Air Cleaner Box  
**API:** American Petroleum Institute  
**ATDC:** After Top Dead Center  
**A/F:** Air Fuel Mixture  
**B:**  
**BBDC:** Before Bottom Dead Center  
**BTDC:** Before Top Dead Center  
**B+:** Battery Positive Voltage  
**C:**  
**CKP Sensor:** Crankshaft Position Sensor (CKPS)  
**CKT:** Circuit

**CLP Switch:** Clutch Lever Position Switch (Clutch Switch)  
**CO:** Carbon Monoxide  
**CPU:** Central Processing Unit  
**D:**  
**DC:** Direct Current  
**DMC:** Dealer Mode Coupler  
**DOHC:** Double Over Head Camshaft  
**DRL:** Daytime Running Light  
**DTC:** Diagnostic Trouble Code  
**E:**  
**ECM:** Engine Control Module Engine Control Unit (ECU) (FI Control Unit)  
**ECT Sensor:** Engine Coolant Temperature Sensor (ECTS)  
 Water Temp. Sensor (WTS)

**F:**  
**FI:** Fuel Injection, Fuel Injector  
**FP:** Fuel pump  
**FPR:** Fuel Pressure Regulator  
**FP Relay:** Fuel Pump Relay  
**G:**  
**GEN:** Generator  
**GND:** Ground  
**GP Switch:** Gear Position Switch  
**H:**  
**HC:** Hydrocarbons  
**I:**  
**IAP Sensor:** Intake Air Pressure Sensor (IAPS)  
**IAT Sensor:** Intake Air Temperature Sensor (IATS)  
**IG:** Ignition  
**IAS:** Idle Air Screw  
**J:**  
**JASO:** Japanese Automobile Standards Organization  
**L:**  
**LH:** Left Hand  
**M:**  
**MAL-CODE:** Malfunction Code (Diagnostic Code)  
**Max:** Maximum  
**MIL:** Malfunction Indicator Lamp  
**Min:** Minimum  
**N:**  
**NOx:** Nitrogen Oxides  
**O:**  
**OHC:** Over Head Camshaft  
**P:**  
**PCV:** Positive Crankcase Ventilation (Crankcase Breather)  
**R:**  
**RH:** Right Hand  
**ROM:** Read Only Memory  
**S:**  
**SAE:** Society of Automotive Engineers  
**SDS:** Suzuki Diagnosis System  
**T:**  
**TO Sensor:** Tip-over Sensor (TOS)  
**TP Sensor:** Throttle Position Sensor (TPS)

### SAE-to-Former SUZUKI Term

BA02J20101003

This list shows SAE (Society of Automotive Engineers) J1930 terms and abbreviations which may be used in this manual in compliance with SAE recommendations, as well as their former SUZUKI names.

Ex. SAE term (Abbreviation): Former SUZUKI term

**A:**  
**Air Cleaner (ACL):** Air Cleaner, Air Cleaner Box  
**B:**  
**Battery Positive Voltage (B+):** Battery Voltage, +B  
**C:**  
**Crankshaft Position Sensor (CKP Sensor):**  
 Crankshaft Position Sensor (CKPS), Crank Angle

**D:**  
**Data Link Connector (DLC):** Dealer Mode Coupler  
**Diagnostic Test Mode (DTM):** —  
**Diagnostic Trouble Code (DTC):** Diagnostic Code, Malfunction Code  
**E:**  
**Electronic Ignition (EI):** —  
**Engine Control Module (ECM):** Engine Control Module (ECM), FI Control Unit, Engine Control Unit (ECU)  
**Engine Coolant Level (ECL):** Coolant Level  
**Engine Coolant Temperature (ECT):** Coolant Temperature, Engine Coolant Temperature, Water Temperature  
**Engine Speed (RPM):** Engine Speed (RPM)  
**F:**  
**Fuel Level Sensor:** Fuel Level Sensor, Fuel Level Gauge  
**Fuel Pump (FP):** Fuel Pump (FP)  
**G:**  
**Generator (GEN):** Generator  
**Ground (GND):** Ground (GND, GRD)  
**I:**  
**Ignition Control (IC):** Electronic Spark Advance (ESA)  
**Ignition Control Module (ICM):** —  
**Intake Air Temperature (IAT):** Intake Air Temperature (IAT), Air Temperature  
**M:**  
**Malfunction Indicator Lamp (MIL):** Malfunction Indicator Lamp (MIL)  
**Manifold Absolute Pressure (MAP):** Intake Air Pressure (IAP), Intake Vacuum  
**O:**  
**On-Board Diagnostic (OBD):** Self-Diagnosis Function, Diagnostic  
**P:**  
**Programmable Read Only Memory (PROM):** —  
**R:**  
**Random Access Memory (RAM):** —  
**Read Only Memory (ROM):** ROM  
**T:**  
**Throttle Body (TB):** Throttle Body (TB)  
**Throttle Body Fuel Injection (TBI):** Throttle Body Fuel Injection (TBI)  
**Throttle Position Sensor (TP Sensor):** TP Sensor (TPS)  
**V:**  
**Voltage Regulator (VR):** Voltage Regulator



**Brake Fluid**

Specification and classification: DOT 4

**⚠ WARNING**

Since the brake system of this motorcycle is filled with a glycol-based brake fluid by the manufacturer, do not use or mix different types of fluid such as silicone-based and petroleum-based fluid for refilling the system, otherwise serious damage will result.

Do not use any brake fluid taken from old or used or unsealed containers.

Never reuse brake fluid left over from a previous servicing, which has been stored for a long period.

**Front Fork Oil**

Use fork oil SS-19 or equivalent.

**Rear Suspension Oil**

Use rear suspension oil SS-25 or equivalent.

**Engine Coolant Recommendation**

BA02J20101007

**Engine Coolant**

Use an anti-freeze/engine coolant compatible with an aluminum radiator, mixed with distilled water only.

**Water for Mixing**

Use distilled water only. Water other than distilled water can corrode and clog the aluminum radiator.

**Anti-freeze / Engine Coolant**

The engine coolant perform as a corrosion and rust inhibitor as well as anti-freeze. Therefore, the engine coolant should be used at all times even though the atmospheric temperature in your area does not go down to freezing point.

Suzuki recommends the use of SUZUKI COOLANT anti-freeze/engine coolant. If this is not available, use an equivalent which is compatible with an aluminum radiator.

**Liquid Amount of Water / Engine Coolant**

**Solution capacity (total)**

1 200 ml (1.3/1.1 US/Imp qt)

For engine coolant mixture information, refer to “Engine Coolant Description” in Section 1F (Page 1F-2).

**⚠ CAUTION**

Mixing of anti-freeze/engine coolant should be limited to 60%. Mixing beyond it would reduce its efficiency. If the anti-freeze/engine coolant mixing ratio is below 50%, rust inhabiting performance is greatly reduced.

Be sure to mix it above 50% even though the atmospheric temperature does not go down to the freezing point.

**BREAK-IN Procedures**

BA02J20101008

During manufacture only the best possible materials are used and all machined parts are finished to a very high standard but it is still necessary to allow the moving parts to “BREAK-IN” before subjecting the engine to maximum stresses. The future performance and reliability of the engine depends on the care and restraint exercised during its early life. The general rules are as follows.

1) Keep to these break-in engine speed limits:

**Speed limits**

**Initial 800 km (500 miles): Less than 1/2 throttle  
Up to 1 600 km (1 000 miles): Less than 3/4 throttle**

2) Upon reaching the odometer reading of 1 600 km (1 000 miles), you can subject the engine to full throttle operation, for short periods of time.

**Country and Area Codes**

BA02J20101009

The following codes stand for the applicable country(-ies) and area(-s).

Code	Country or area	Effective frame No.
RMX450ZL0 (E-28)	Canada	JS1PL41A A2100001-
RMX450ZL0 (E-33)	U.S.A.	

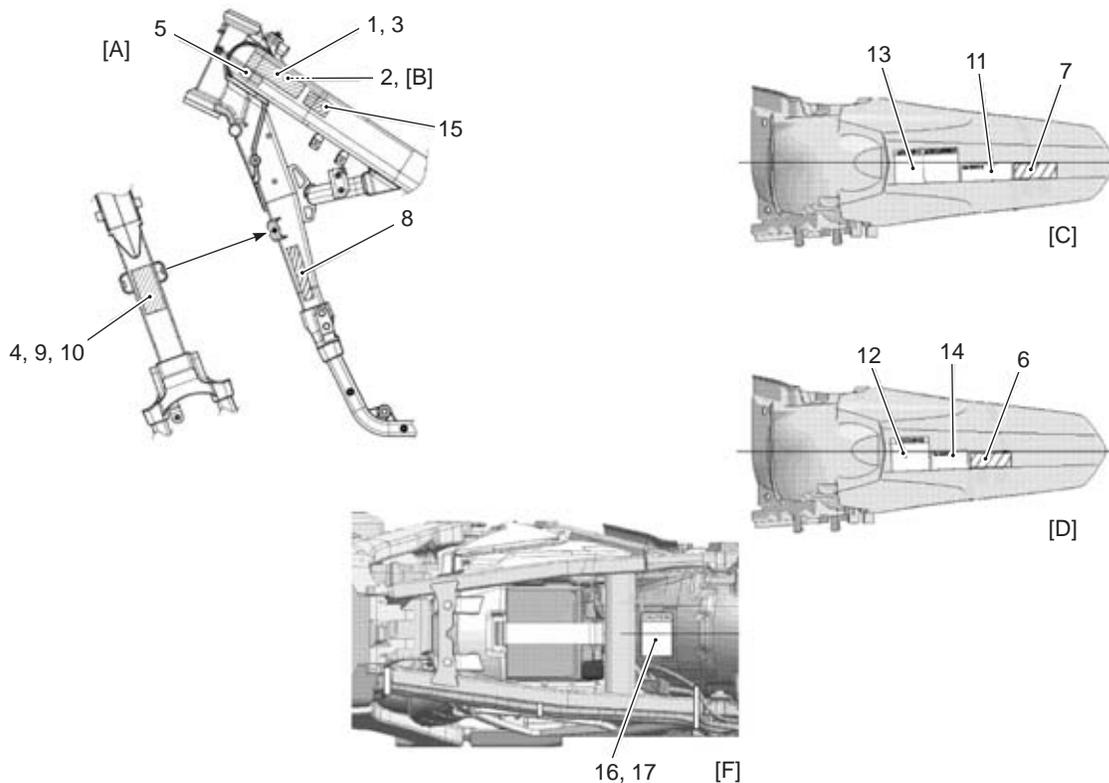
Wire Color Symbols

BA02J20101010

Symbol	Wire color	Symbol	Wire color
B	Black	B/Y	Black with Yellow tracer
Bl	Blue	Bl/B	Blue with Black tracer
Br	Brown	Bl/R	Blue with Red tracer
Dg	Dark green	Br/W	Brown with White tracer
G	Green	G/B	Green with Black tracer
Gr	Gray	G/W	Green with White tracer
O	Orange	G/R	Green with Red tracer
P	Pink	Gr/W	Gray with White tracer
R	Red	O/G	Orange with Green tracer
W	White	O/W	Orange with White tracer
Y	Yellow	O/Y	Orange with Yellow tracer
B/Bl	Black with Blue tracer	O/B	Orange with Black tracer
B/Br	Black with Brown tracer	R/Y	Red with Yellow tracer
B/O	Black with Orange tracer	W/B	White with Black tracer
B/R	Black with Red tracer	W/R	White with Red tracer
B/W	Black with White tracer	Y/B	Yellow with Black tracer

Warning, Caution and Information Labels Location

BA02J20101011



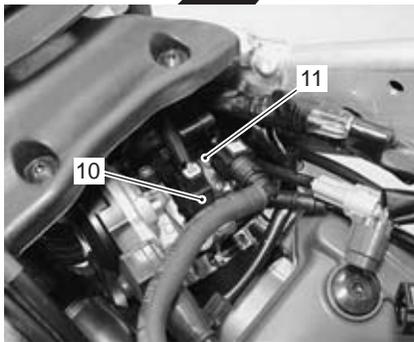
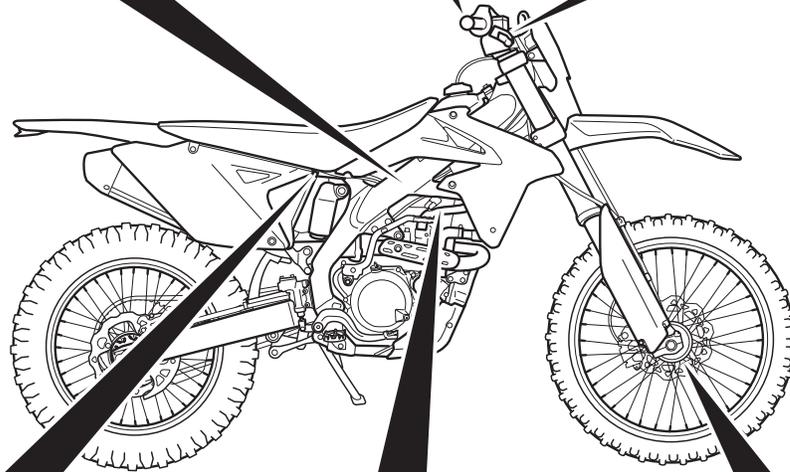
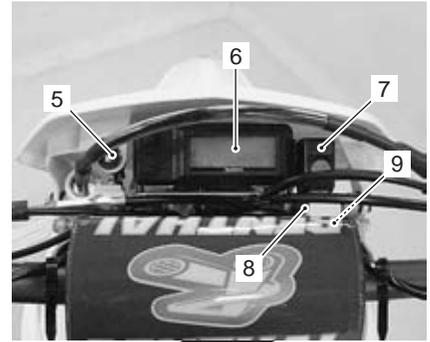
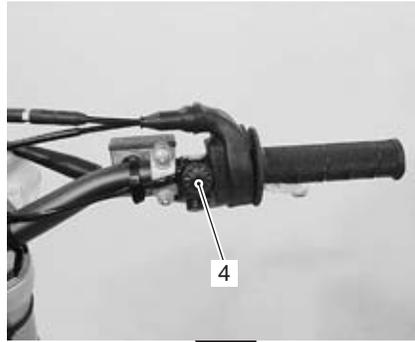
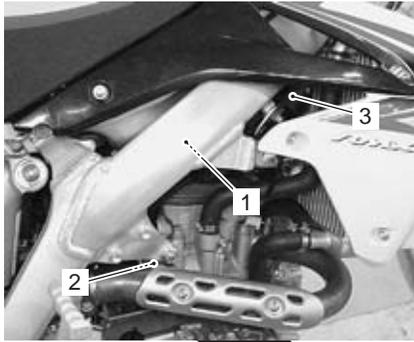
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2. Information label [EPA] (French) (For E-28)	13. General warning label (French/English) (For E-28)
3. Information label [EPA & CARB] (For E-33)	14. Manual notice label (English) (For E-33)
4. Noise label [EPA] (English) (For E-33)	15. EC approval mark label (For E-28)
5. Manufacturing date label (English) (For E-33)	16. Lead wire caution label (English) (For E-33)
6. Fuel information label (90 octane) (English) (For E-33)	17. Lead wire caution label (French/English) (For E-28)
7. Fuel information label (90 octane) (French/English) (For E-28)	[A]: Left side of frame
8. ICES Canada label (French/English) (For E-28)	[B]: Right side of frame
9. Manufacture label (English) (For E-33)	[C]: Rear fender (For E-28)
10. Compliance label (English) (For E-28)	[D]: Rear fender (For E-33)
11. Compliance label (French/English) (For E-28)	[E]: Rear fender, front

# Component Location

## Electrical Components Location

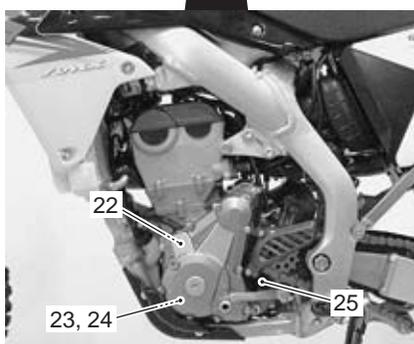
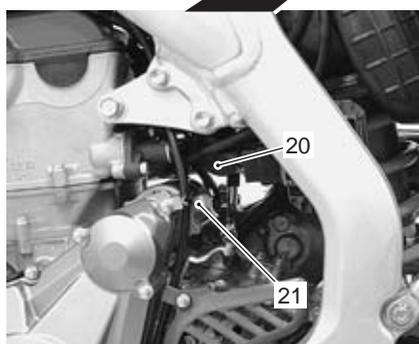
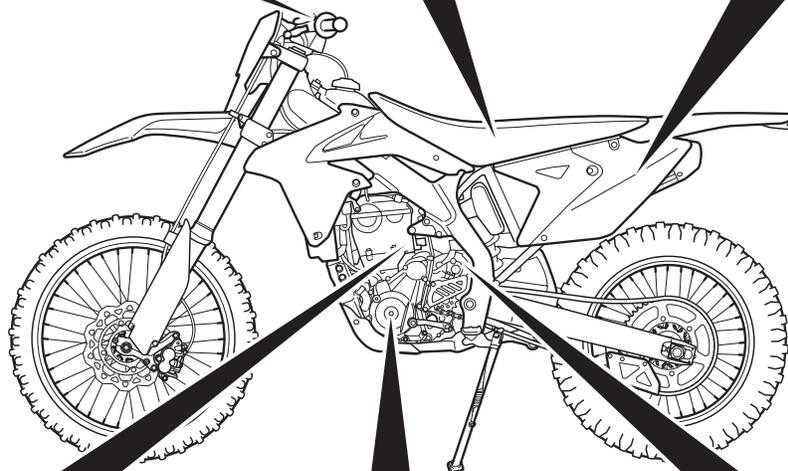
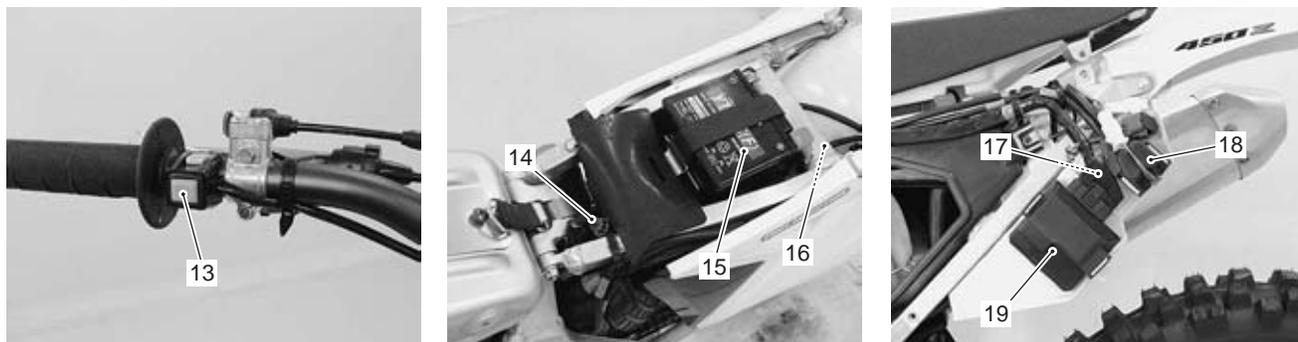
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IA02J1010005-07

1. Fuel pump	6. Speedometer	11. IAP sensor
2. ECT sensor	7. Ignition switch	12. TO sensor
3. Ignition coil	8. Headlight relay	13. Speed sensor
4. Starter button	9. Fuse (Sub/Spare)	
5. Fuel level indicator	10. Fuel injector	

## 0A-7 General Information:



IA02J1010007-09

13. Engine stop switch	18. Starter relay	23. Crankshaft rotation signal sensor
14. IAT sensor	19. ECM	24. Magneto
15. Battery	20. Condenser	25. GP switch
16. Fuse box (Main)	21. Starter motor	26. TP sensor
17. Mode select switch coupler	22. CKP sensor	27. Regulator/rectifier

## Specifications

### Specifications

BA02J20107001

#### NOTE

These specifications are subject to change without notice.

#### Dimensions and curb mass

Item	Specification
Overall length	2 185 mm (86.0 in)
Overall width	840 mm (33.1 in)
Overall height	1 265 mm (49.8 in)
Wheelbase	1 485 mm (58.5 in)
Ground clearance	320 mm (12.6 in)
Seat height	950 mm (37.4 in)
Curb mass	123.5 kg (272 lbs)

#### Engine

Item	Specification
Type	4-stroke, liquid-cooled, DOHC
Number of cylinders	1
Bore	96.0 mm (3.780 in)
Stroke	62.1 mm (2.445 in)
Displacement	449 cm <sup>3</sup> (27.4 cu.in)
Compression ratio	11.6 : 1
Fuel system	Fuel injection
Air cleaner	Polyurethane foam element
Starter system	Electric & kick
Lubrication system	Semi-dry sump
Idle speed	2 000 ± 100 r/min

#### Drive train

Item	Specification	
Clutch	Wet multi-plate type	
Transmission	5 speed contact mesh	
Gearshift pattern	1 down 4 up	
Primary reduction ratio	2.708 (65/24)	
Gear ratios	Low	2.153 (28/13)
	2nd	1.611 (29/18)
	3rd	1.250 (25/20)
	4th	1.000 (19/19)
	Top	0.826 (19/23)
Final reduction ratio	3.923 (51/13)	
Drive chain	DID 520MXV, 114 links	

**0A-9 General Information:****Chassis**

Item	Specification
Front suspension	Telescopic, coil spring, oil damper
Rear suspension	Link type, coil spring, oil damper
Front fork stroke	310 mm (12.2 in)
Rear wheel travel	310 mm (12.2 in)
Caster	28° 10'
Trail	122 mm (4.8 in)
Steering angle	45°
Turning radius	2.3 m (7.5 ft)
Front brake	Disc brake
Rear brake	Disc brake
Front tire size	80/100-21 51M, tube type
Rear tire size	110/100-18 64M, tube type

**Electrical**

Item	Specification
Ignition type	Electronic ignition (CDI)
Ignition timing	4° B.T.D.C. at 2 000 r/min
Spark plug	NGK CR8EIB-10
Battery	12 V 21.6 kC (6 Ah)/10 HR
Generator	Three-phase A.C. generator
Main fuse	15 A
Sub fuse	15 A
Headlight	12 V 35 W
Tail light	LED
Speedometer light	LED
Fuel indicator light	12 V 3.4 W

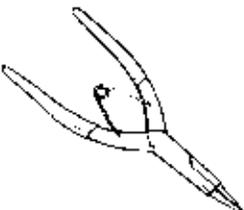
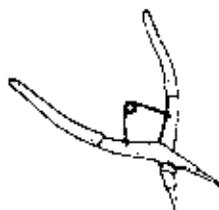
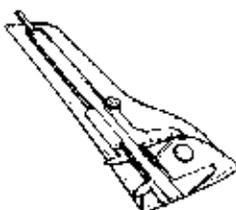
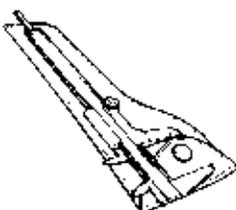
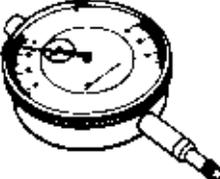
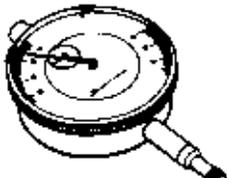
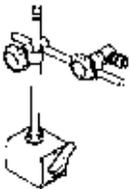
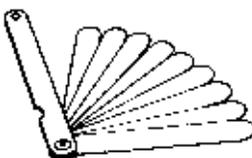
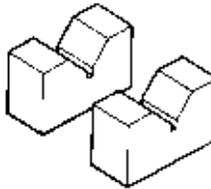
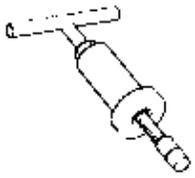
**Capacities**

Item	Specification	
Fuel tank	6.2 L (1.6/1.4 US/lmp gal)	
Engine oil	Oil change	1 050 ml (1.1/0.9 US/lmp qt)
	With filter change	1 100 ml (1.2/1.0 US/lmp qt)
	Overhaul	1 200 ml (1.3/1.1 US/lmp qt)
Coolant	1 200 ml (1.3/1.1 US/lmp qt)	

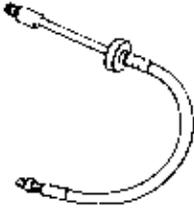
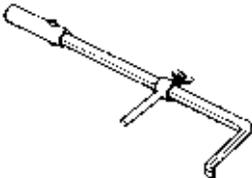
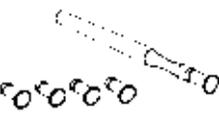
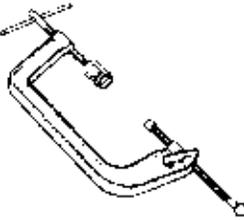
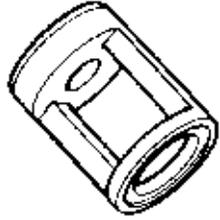
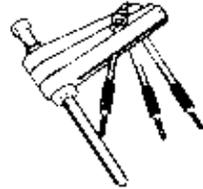
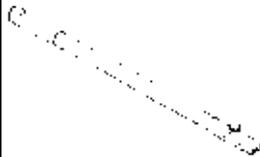
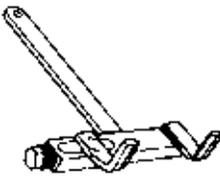
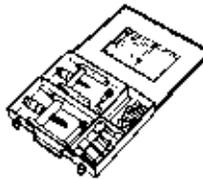
## Special Tools and Equipment

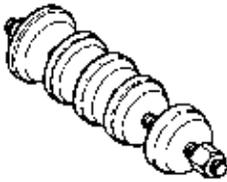
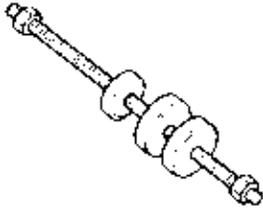
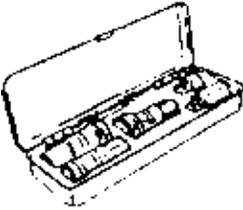
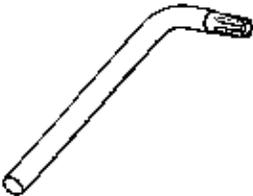
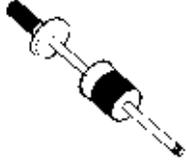
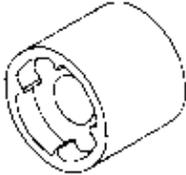
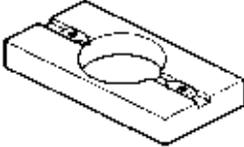
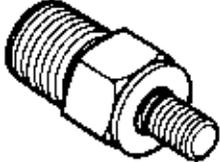
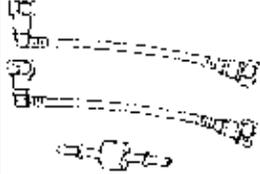
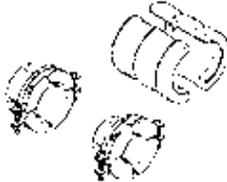
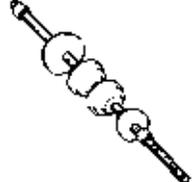
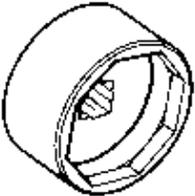
## Special Tool

BA02J20108001

				
<b>09900-06107</b> Snap ring remover (Open type)	<b>09900-06108</b> Snap ring remover (Close type)	<b>09900-20101</b> Vernier calipers (150 mm)	<b>09900-20102</b> Vernier calipers (200 mm)	<b>09900-20202</b> Micrometer (25 – 50 mm)
				
<b>09900-20204</b> Micrometer (75 – 100 mm)	<b>09900-20205</b> Micrometer (0 – 25 mm)	<b>09900-20530</b> Cylinder gauge set	<b>09900-20602</b> Dial gauge	<b>09900-20605</b> Dial calipers (10 – 34 mm)
				
<b>09900-20607</b> Dial gauge	<b>09900-20701</b> Dial gauge chuck	<b>09900-20803</b> Thickness gauge	<b>09900-21304</b> V blocks	<b>09900-22301</b> Plastigage (0.025 – 0.076 mm)
				
<b>09900-22302</b> Plastigage (0.051 – 0.152 mm)	<b>09900-22403</b> Small bore gauge (18 – 35 mm)	<b>09900-25008</b> Multi circuit tester set	<b>09900-25009</b> Needle-point probe set	<b>09900-26006</b> Engine tachometer
				
<b>09904-41010</b> SUZUKI Diagnostic system set	<b>09910-20115</b> Piston holder	<b>09910-32812</b> Crankshaft installer	<b>09910-60611</b> Universal clamp wrench	<b>09911-11310</b> Crankshaft installer attachment C

**0A-11 General Information:**

 <p><b>09913-10750</b> Compression gauge adapter</p>	 <p><b>09913-50121</b> Oil seal remover</p>	 <p><b>09913-70210</b> Bearing installing set (10 – 75 Φ)</p>	 <p><b>09914-61010</b> Gear holder</p>	 <p><b>09915-64512</b> Compression gauge</p>
 <p><b>09915-74511</b> Oil pressure gauge (600 kPa)</p>	 <p><b>09915-74521</b> Adapter hose</p>	 <p><b>09915-77331</b> Oil pressure gauge (1000 kPa)</p>	 <p><b>09916-10911</b> Valve lapper set</p>	 <p><b>09916-14510</b> Valve lifter</p>
 <p><b>09916-14910</b> Valve lifter attachment</p>	 <p><b>09916-34542</b> Reamer handle</p>	 <p><b>09916-34550</b> Valve guide reamer (5.5 mm)</p>	 <p><b>09916-34580</b> Valve guide reamer (10.8 mm)</p>	 <p><b>09916-44310</b> Valve guide installer &amp; remover</p>
 <p><b>09916-53360</b> Valve guide installer attachment</p>	 <p><b>09916-84511</b> Tweezer</p>	 <p><b>09917-47011</b> Vacuum pump gauge set</p>	 <p><b>09919-28610</b> Sleeve protector</p>	 <p><b>09920-13120</b> Crankshaft remover</p>
 <p><b>09920-31020</b> Extension handle</p>	 <p><b>09920-53740</b> Clutch sleeve hub holder</p>	 <p><b>09921-20200</b> Bearing remover (10 mm)</p>	 <p><b>09921-20240</b> Bearing remover set</p>	 <p><b>09922-22711</b> Drive chain cutting and joint tool set</p>

				
<b>09924-84510</b> Bearing installer set	<b>09924-84521</b> Bearing installer set	<b>09925-18011</b> Bearing installer	<b>09930-10121</b> Spark plug wrench set	<b>09930-11950</b> Torx wrench (T25H)
				
<b>09930-30104</b> Rotor remover sliding shaft	<b>09930-34932</b> Rotor remover	<b>09930-35010</b> Rotor remover	<b>09930-40210</b> Rotor holder	<b>09930-70220</b> Starter torque limiter socket
				
<b>09930-73170</b> Starter torque limiter holder	<b>09940-14911</b> Steering stem nut socket wrench	<b>09940-14960</b> Steering stem nut socket wrench	<b>09940-40211</b> Fuel pressure gauge adapter	<b>09940-40220</b> Fuel pressure gauge attachment
				
<b>09940-52861</b> Front fork oil seal installer set	<b>09941-34513</b> Bearing installer	<b>09941-53630</b> Front fork cap socket wrench (50 mm)	<b>09941-53660</b> RCU socket wrench (24 mm)	<b>09944-28321</b> Hexagon socket (19 mm)
				
<b>99565-01010-021</b> CD-ROM Ver.21				

# Maintenance and Lubrication

## Precautions

### Precautions for Maintenance

BA02J20200001

The "Periodic Maintenance Schedule Chart" lists the recommended intervals for all the required periodic service work necessary to keep the motorcycle operating at peak performance and economy. Maintenance intervals are expressed in terms of kilometers, miles and months for your convenience.

#### NOTE

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**More frequent servicing may be required on motorcycles that are used under severe conditions.**

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## General Description

### Recommended Fluids and Lubricants

BA02J20201001

Refer to "Fuel and Oil Recommendation" in Section 0A (Page 0A-3) and "Engine Coolant Recommendation" in Section 0A (Page 0A-4).

## Scheduled Maintenance

### Periodic Maintenance Chart

BA02J20205001

**NOTE**
**I = Inspect and clean, adjust, replace or lubricate as necessary.**
**C = Clean.**
**R = Replace.**
**T = Tighten.**
**L = Lubricate.**

Item	Initial				Remarks
	km	Initial 150	Every 1 000	Every 2 000	
	miles	Initial 100	Every 600	Every 1 200	
	months	Initial 1	Every 6	Every 12	
Spark plug		I	I	I	
Air cleaner element		I	C	C	Inspect and Clean more frequently as necessary, especially after riding in wet and dusty condition. Replace as necessary.
Air cleaner cap gasket	Inspect every 150 km (100 miles)				Replace as necessary.
Air cleaner heat guard	Inspect every 150 km (100 miles)				Retighten screws if necessary.
Engine oil		R	R	R	
Engine oil filter		R	—	R	
Oil strainers		I	—	I	
Cooling system		I	I	I	Replace radiator hose and engine coolant every year.
Clutch		I	I	I	
Throttle cable and clutch cable		I & L	I & L	I & L	
Hot starter		I	I	I	
Throttle body		I	I	I	
Crankcase breather hose		I	I	I	
Fuel hose		I	I	I	Replace every 4 year.
Valve clearance		I	—	I	
Exhaust pipe and muffler bolts and nuts		T	T	T	
Spark arrester		—	C	C	
Drive chain	Clean, lubricate and inspect each time the motorcycle is ridden. Replace as necessary.				
Crankcase driveshaft oil seal		I	I	I	
Engine sprocket		I	I	I	
Rear sprocket		I	Inspect every 300 km (200 miles)		
Drive chain buffer and guide	Inspect each time the motorcycle is ridden.				
Brakes		I	I	I	Replace brake hose and fluid every year.
Front fork		I	I	I	Check front fork inner tube frequently for abnormality. Check the air pressure.
Rear suspension		I	I	I	
Tire		I	I	I	
Spoke nipple		I	I	I	
Steering		I	I	I	
Kick starter lever		I & L	I & L	I & L	
Chassis bolts and nuts		T	T	T	

## 0B-3 Maintenance and Lubrication:

### Lubrication Points

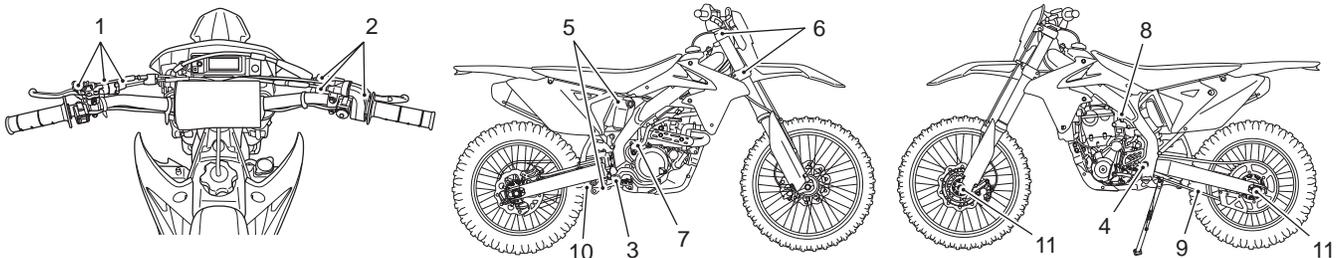
BA02J20205002

Apply grease or oil to the moving parts to increase durability and prevent wear.

No.	ITEM	LUBRICANT	COMMENTS
1	Clutch inner cable, lever Hot starter inner cable, lever	A	Run oil through cables until it exits the lower end. Lube the cable ends where they pivot.
2	Throttle grip, throttle housing, cable	A	Lightly grease the inside of throttle spool. Keep free from dirt.
3	Rear brake pedal pivot	C	Grease the brake pedal pivot.
4	Swingarm pivot	C	Clean and pack the bearings. Keep seals fresh. Grease the seals.
5	Rear suspension linkage pivot points	C	Clean and pack the bearings. Keep seals fresh. Grease the seals.
6	Steering stem bearings	C	Clean and pack the bearings. Keep seals fresh.
7	Kick starter lever	C	Grease the kick starter lever pivot.
8	Starter/idle adjuster shaft	A	Lightly oil the plunger shaft.
9	Drive chain	B	Keep chain thoroughly lubed at all times. Always check wear and alignment.
10	Cushion lever dust seals	A	Grease the seals.
11	Front and rear axles	A	Grease the bearing and seals.

The following materials are necessary:

- A. Lightweight oil such as WD-40 or penetrating oil
- B. Aerosol type Chain Lube
- C. SUZUKI SUPER GREASE "A" (or equivalent grease) or Water-proof wheel bearing grease



IA02J1020001-04

Follow the schedule closely. The disassembly necessary to lubricate many components is in itself valuable preventative maintenance. It allows you to inspect for wear, fatigue, adjustment and fastener tightness and it allows you to clean out the grit which otherwise cannot be gotten out.

## Repair Instructions

### Spark Plug Replacement

BA02J20206001

#### Replace spark plug

**Initially at 150 km (100 miles, 1 month) and every 1 000 km (600 miles, 6 month)**

Refer to “Spark Plug Cap and Spark Plug Removal and Installation” in Section 1H (Page 1H-4).

### Spark Plug Inspection and Cleaning

BA02J20206002

#### Inspect spark plug

**Initially at 150 km (100 miles, 1 month) and every 1 000 km (600 miles, 6 months)**

#### Carbon Deposits

- 1) Remove the spark plug. Refer to “Spark Plug Cap and Spark Plug Removal and Installation” in Section 1H (Page 1H-4).
- 2) Check carbon deposits on the spark plug. If carbon is deposited, remove it using a spark plug cleaner machine.
- 3) After finishing the spark plug inspection, reinstall the removed parts.

#### Spark Plug Gap

- 1) Remove the spark plug. Refer to “Spark Plug Cap and Spark Plug Removal and Installation” in Section 1H (Page 1H-4).
- 2) Measure the spark plug gap using a wire gauge. If it is not within the specification, replace the spark plug.

#### **⚠ CAUTION**

- The standard spark plug is NGK CR8EIB-10.
- To prevent the damage of iridium center electrode, use a wire gauge to check the gap.
- Never adjust the spark plug gap.

#### Spark plug gap

**0.9 – 1.0 mm (0.035 – 0.039 in)**



I831G1020092-01

- 3) After finishing the spark plug inspection, reinstall the removed parts.

### Electrodes Condition

- 1) Remove the spark plug. Refer to “Spark Plug Cap and Spark Plug Removal and Installation” in Section 1H (Page 1H-4).
- 2) Check the worn or burnt condition of the electrodes. If it is extremely worn or burnt, replace the spark plug. And also replace the spark plug if it has a broken insulator, or damaged thread.

#### **⚠ CAUTION**

**Check the thread size and reach when replacing the spark plug. If the reach is too short, carbon will be deposited on the screw portion of the spark plug hole and engine damage may result.**

- 3) After finishing the spark plug inspection, reinstall the removed parts.

### Air Cleaner Element Cleaning

BA02J20206003

#### Air cleaner element inspection

**Initially at 150 km (100 miles, 1 month)**

#### Air cleaner element cleaning

**Every 1 000 km (600 miles, 6 month)**

Inspect and clean the air cleaner element in the following procedures:

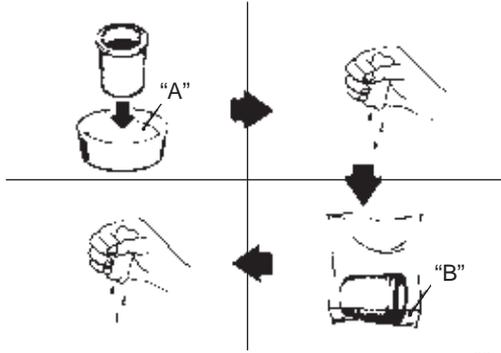
- 1) Remove the air cleaner element. Refer to “Air Cleaner Element Removal and Installation” in Section 1D (Page 1D-8).
- 2) Inspect the air cleaner element for clogging. If it is clogged with dirt, clean or replace it with a new one.

#### **⚠ CAUTION**

- If driving under dusty conditions, clean the air cleaner element more frequently. The surest way to accelerate engine wear is to operate the engine without the element or to use a torn element. Make sure that the air cleaner is in good condition at all times. Life of the engine depends largely on this component.
- Inspect the air cleaner element for tears. A torn element must be replaced.

## 0B-5 Maintenance and Lubrication:

- 3) Fill a washing pan large enough to hold the element with a non-flammable cleaning solvent "A". Immerse the element in the solvent and wash it.
- 4) Squeeze the element by grasping it to remove excess solvent. Do not twist or wring the element or it will develop cracks.
- 5) Dry the element in a plastic bag, pour in some foam filter oil "B" and work the oil into the element.
- 6) Squeeze the element to remove excess oil.

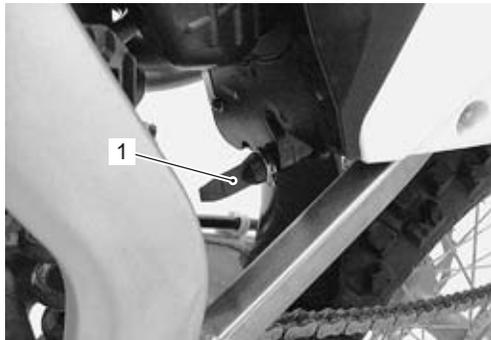


IA02J1020099-01

"A": MOTUL AIR CLEAN or equivalent

"B": MOTUL AIR FILTER OIL or equivalent filter oil

- 7) Reinstall the air cleaner element.
- 8) If necessary, drain out the water through the plug (1).



IA02J1020003-02

### Air Cleaner Heat Guard Inspection

BA02J20206004

#### Inspect air cleaner heat guard Every 150 km (100 miles)

- 1) Inspect the air cleaner heat guard up and down, and back and forward.

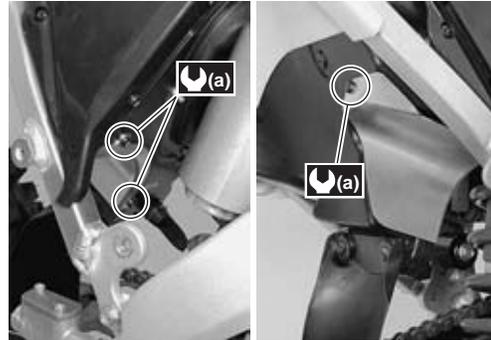


IA02J1020101-01

- 2) If the air cleaner heat guard has play, retighten the air cleaner heat guard mounting screws as following procedures:
  - a) Remove the muffler. Refer to "Muffler / Exhaust Pipe Removal and Installation" in Section 1K (Page 1K-2).
  - b) Tighten the air cleaner heat guard mounting screws to the specified torque.

#### Tightening torque

**Air cleaner heat guard mounting screw (a): 1 N-m (0.1 kgf-m, 0.7 lbf-ft)**



IA02J1020102-01

- 3) After tightening the screws, reinstall the removed parts.

### Engine Oil Inspection and Replacement

BA02J20206005

#### Replace engine oil

**Initially at 150 km (100 miles, 1 month) and every 1 000 km (600 miles, 6 months)**

#### Inspection before Engine Oil Level Check

Before starting the engine, check that there is sufficient oil for operating the engine.

#### **⚠ CAUTION**

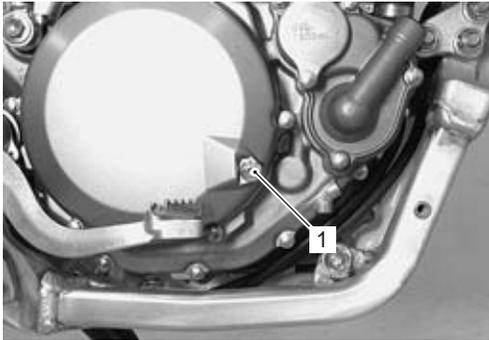
**If the engine is started with insufficient or no oil, the engine components will possibly be damaged.**

- 1) Remove the protector. Refer to "Exterior Parts Removal and Installation" in Section 9D (Page 9D-1).
- 2) Hold the motorcycle in an upright position on a level surface.

#### **NOTE**

**The oil level measurement may become inaccurate unless the motorcycle is held upright as the motorcycle inclination affects the oil level.**

- Remove the engine oil level check bolt (1). At this time, if oil comes out from this bolt hole, the engine can be started for oil level check.



IA02J1020081-04

### Engine Oil Level Check

- Remove the protector. Refer to "Exterior Parts Removal and Installation" in Section 9D (Page 9D-1).
- Hold the motorcycle in an upright position on a level surface.

#### NOTE

**The oil level measurement may become inaccurate unless the motorcycle is held upright as the motorcycle inclination affects the oil level.**

- Start and run the engine at idling speed for three minutes.

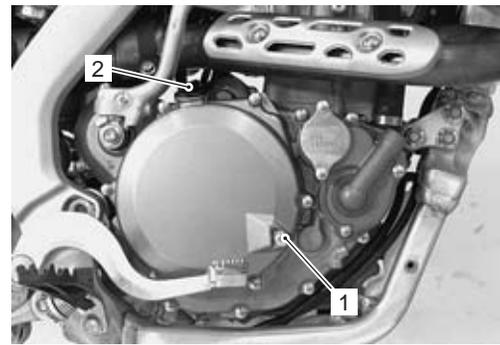
#### NOTE

**Do not run the engine at a speed higher than idling, otherwise the oil level to be inspected may be affected.**

- Stop and leave the engine standstill for two minutes. Thereafter if oil flows out when the engine oil level check bolt (1) is removed, the oil level is appropriate. If oil is excessive, let oil flows out of the oil level hole. If oil still does not come out, tighten the oil check bolt, remove the filler cap (2) and pour an adequate amount of recommended oil.

#### **▲ WARNING**

**When removing the oil filler cap to avoid the risk of being burned, do not touch the exhaust system when the system is hot.**



IA02J1020004-03

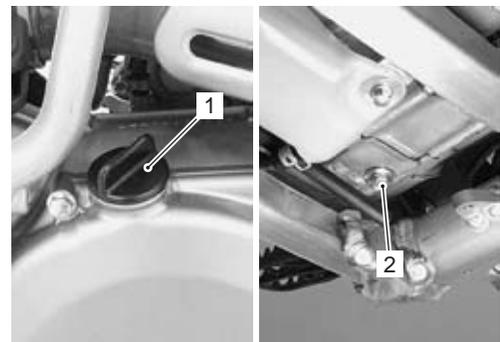
- Repeat the procedures from 2) to 3).
- Tighten the oil check bolt to the specified torque.

#### Tightening torque

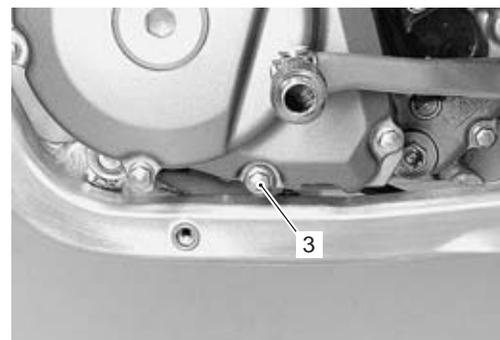
**Engine oil level check bolt (a): 5.5 N·m (0.55 kgf·m, 4.0 lbf·ft)**

### Engine Oil Replacement

- Remove the protector. Refer to "Exterior Parts Removal and Installation" in Section 9D (Page 9D-1).
- Hold the motorcycle in an upright position on a level surface.
- Warm up the engine.
- Remove filler cap (1), drain plug (2) and magneto cover bolt (3). Drain engine oil from the drain plug hole and magneto cover bolt hole.
- Tighten the drain plug (2) and magneto cover bolt (3) temporarily.



IA02J1020005-02



IA02J1020006-02

## 0B-7 Maintenance and Lubrication:

- Depress the kick starter lever 10 times and more or press the starter button to crank the engine for a few seconds.

### NOTE

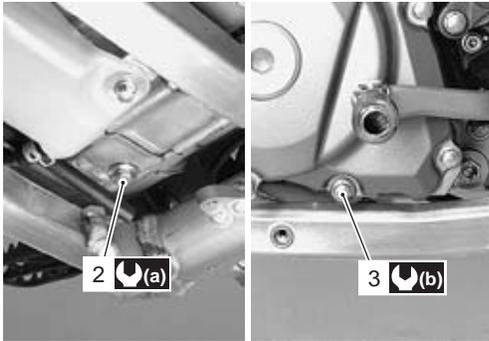
**To avoid turning on the engine, push along the engine stop switch while depressing the kick starter lever or pressing the starter button.**

- Remove the drain plug (2) and magneto cover bolt (3) and drain engine oil. Replace the gasket with a new one and tighten each bolt to the specified torque.

### Tightening torque

**Oil drain plug (a): 12 N·m (1.2 kgf·m, 8.5 lbf·ft)**

**Magneto cover bolt (b): 11 N·m (1.1 kgf·m, 8.0 lbf·ft)**



IA02J1020007-03

- Pour specified amount of motor oil.  
SAE 10W-40, API SG/SH/SJ/SL with JASO MA/MA1/MA2

### Oil change

**1 050 ml (1.1/0.9 US/Imp qt)**

### Filter change

**1 100 ml (1.2/1.0 US/Imp qt)**

### Overhaul

**1 200 ml (1.3/1.1 US/Imp qt)**

- Tighten the filler cap.
- Inspect the oil level.

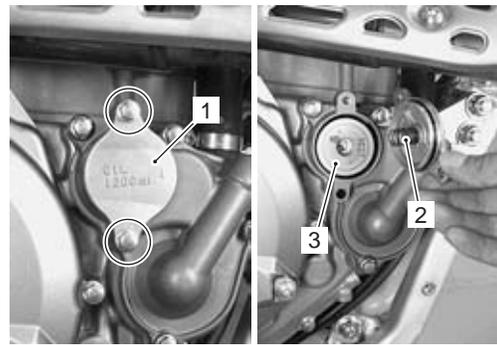
## Engine Oil Filter Replacement

BA02J20206006

### Replace oil filter

**Initially at 150 km (100 miles, 1 month) and every 2 000 km (1 200 miles, 12 months)**

- Drain the engine oil. Refer to "Engine Oil Inspection and Replacement" (Page 0B-5).
- Remove the oil filter cap (1), and spring (2) and oil filter (3).

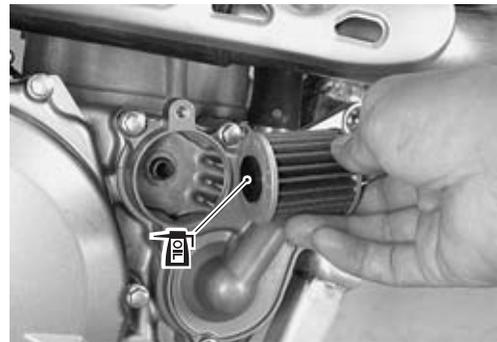


IA02J1020093-02

- Apply engine oil lightly to the gasket of new oil filter before installation.
- Install the new oil filter.

### ⚠ CAUTION

**Make sure that the oil filter is installed properly. If the filter is installed improperly, serious engine damage may result.**



IA02J1020009-03

- Apply engine oil lightly to new O-ring (4).

### ⚠ CAUTION

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

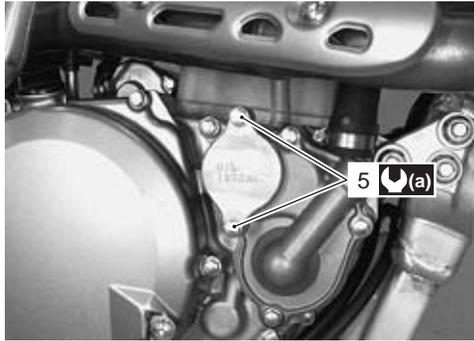


IA02J1020010-03

- 6) Install the oil filter cap and tighten the bolts (5) to the specified torque.

**Tightening torque**

**Oil filler cap bolt (a): 11 N·m (1.1 kgf·m, 8.0 lbf·ft)**



IA02J1020011-02

- 7) Pour new engine oil and check the oil level. Refer to "Engine Oil Inspection and Replacement" (Page 0B-5).

**Oil change**

**1 050 ml (1.1/0.9 US/Imp qt)**

**Filter change**

**1 100 ml (1.2/1.0 US/Imp qt)**

**Overhaul**

**1 200 ml (1.3/1.1 US/Imp qt)**

**Oil Strainer Inspection**

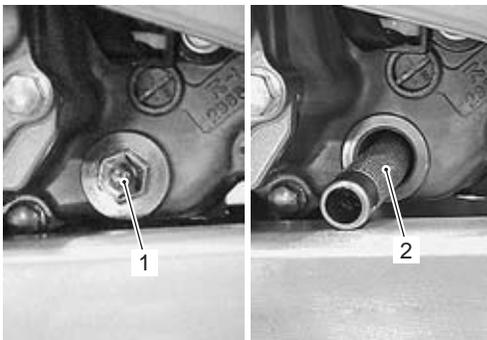
BA02J20206007

**Inspect oil strainers**

**Initially at 150 km (100 miles, 1 month) and every 2 000 km (1 200 miles, 12 months)**

**Oil Strainer No. 1 Inspection**

- 1) Drain engine oil. Refer to "Engine Oil Inspection and Replacement" (Page 0B-5).
- 2) Remove the oil strainer cap (1) and oil strainer No. 1 (2).



IA02J1020012-03

- 3) Inspect the oil strainer No. 1 for clogging or any damage. If necessary, clean it with compressed air or replace it with a new one.



IA02J1020013-01

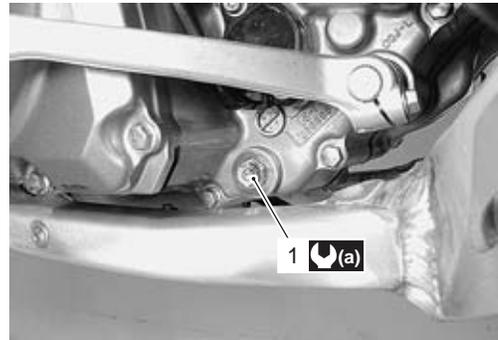
- 4) Install the oil strainer No. 1 and tighten the oil strainer cap (1) to the specified torque.

**⚠ CAUTION**

**Replace the gasket washer with a new one.**

**Tightening torque**

**Oil strainer cap (a): 21 N·m (2.1 kgf·m, 15.0 lbf·ft)**

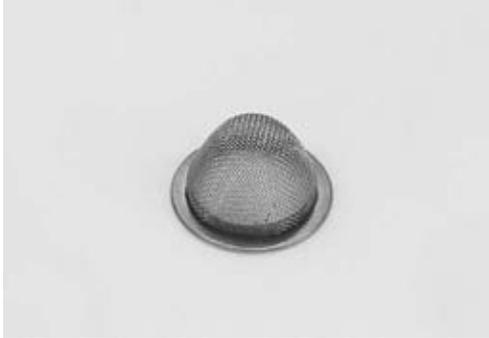


IA02J1020014-02

- 5) Pour new engine oil and inspect the oil level. Refer to "Engine Oil Inspection and Replacement" (Page 0B-5).

**Oil Pump No. 2 Strainer Inspection**

- 1) Remove the oil pump No. 2 strainer. Refer to “Oil Pump No. 2 Removal and Installation” in Section 1E (Page 1E-5).
- 2) Inspect the oil pump No. 2 strainer for clogging or any damage. If necessary, clean it with compressed air or replace it with a new one.



IA02J1020015-01

- 3) Install the oil pump No. 2 strainer and oil pump No. 2. Refer to “Oil Pump No. 2 Removal and Installation” in Section 1E (Page 1E-5).

**Cooling System Inspection**

BA02J20206008

**Inspect engine coolant**

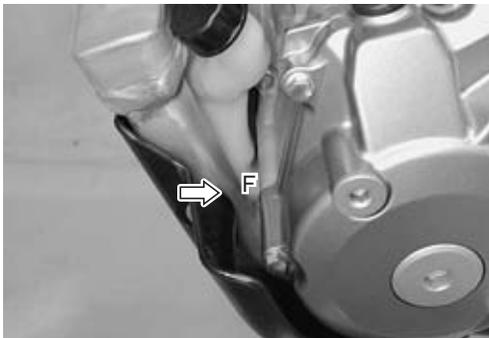
**Initially at 150 km (100 miles, 1 month) and every 2 000 km (1 200 miles, 12 months)**

**Replace engine coolant**

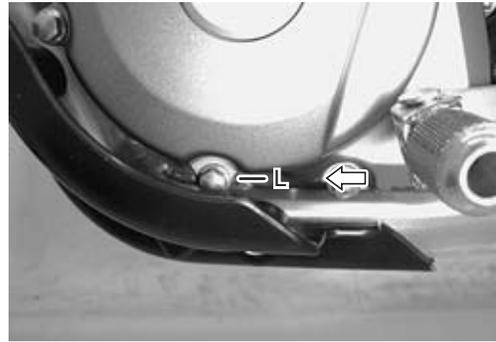
**Every years**

**Engine Coolant Level Inspection**

- 1) Hold the motorcycle in an upright position on a level surface.
- 2) Check the engine coolant level by observing the full and lower lines on the engine coolant reservoir tank. If the level is below the lower line, add engine coolant to the full line.



IA02J1020095-02



IA02J1020096-01

**Engine Coolant Replacement**

Refer to “Engine Coolant Description” in Section 1F (Page 1F-2).

**▲ WARNING**

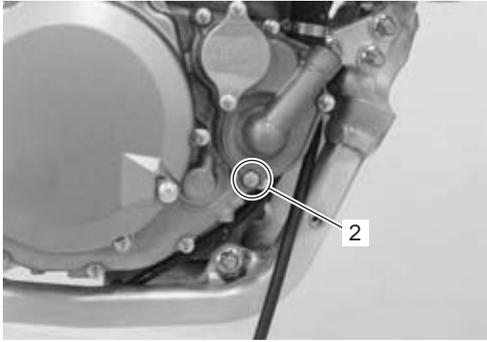
**Do not open the radiator cap when the engine is hot, as you may be injured by escaping hot liquid or vapor. Engine coolant may be harmful if swallowed or if it comes in contact with skin or eyes. If engine coolant gets into the eyes or in contact with the skin, flush thoroughly with plenty of water. If swallowed, induce vomiting and call physician immediately.**

- 1) Hold the motorcycle in an upright position on a level surface.
- 2) Remove the protector. Refer to “Exterior Parts Removal and Installation” in Section 9D (Page 9D-1).
- 3) Remove the radiator cap (1).



IA02J1020017-01

- Place a pan below the water pump, and then drain the engine coolant by removing the drain plug (2).



IA02J1020018-01

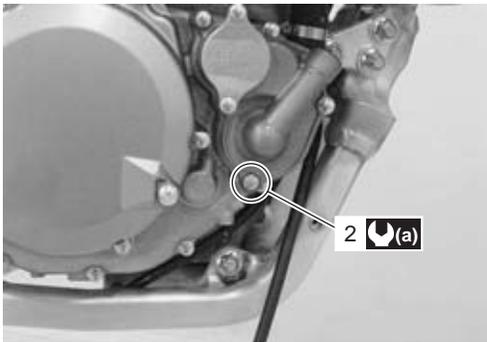
- Flush the radiator with fresh water if necessary.
- Tighten the drain plug (2) to the specified torque.

**⚠ CAUTION**

**Replace the gasket with a new one.**

**Tightening torque**

**Engine coolant drain plug (a): 11 N·m (1.1 kgf·m, 8.0 lbf·ft)**



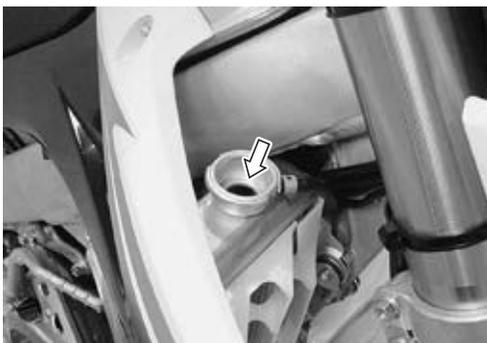
IA02J1020019-01

- Pour the specified engine coolant up to the radiator inlet.

**Engine coolant capacity**

**Reservoir side: 250 ml (0.3/0.2 US/Imp qt)**

**Engine side: 950 ml (1.0/0.8 US/Imp qt)**

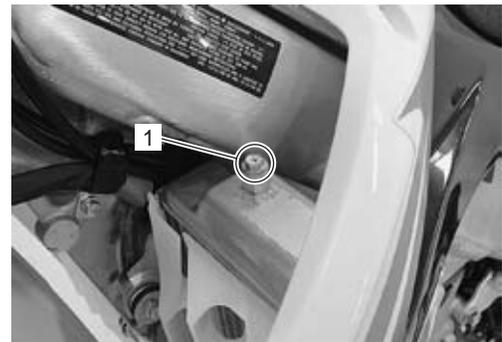


IA02J1020020-01

- Bleed air from the cooling circuit.
- After changing engine coolant, reinstall the removed parts.

**Air Bleeding from the Cooling Circuit**

- Hold the motorcycle in an upright position on a level surface.
- Pour engine coolant up to the radiator inlet.
- Slowly swing the motorcycle, right and left, to bleed the air trapped in the cooling circuit.
- Add engine coolant up to the radiator inlet.
- Start up the engine and bleed air from the radiator inlet completely.
- Repeat the procedures 4) to 5) until no air bleeds from the radiator inlet.
- Loosen the air bleeder bolt (1) and check the engine coolant flows out.



IA02J1020021-01

- Tighten the air bleeder bolt.

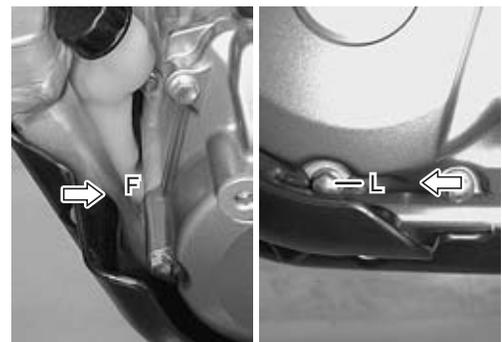
**Tightening torque**

**Radiator air bleeder bolt: 6 N·m (0.6 kgf·m, 4.5 lbf·ft)**

- Close the radiator cap securely.
- After warming up and cooling down the engine several times, add the engine coolant up to the full level of the reservoir tank.

**⚠ CAUTION**

**Make sure that the radiator is filled with engine coolant up to the reservoir tank full level.**



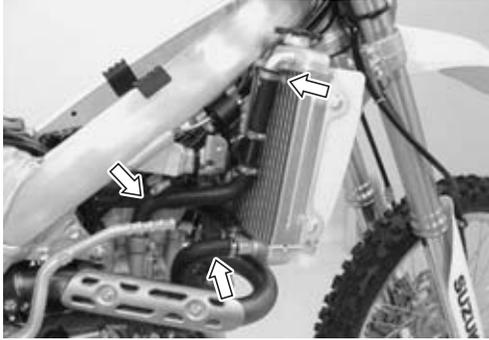
IA02J1020022-03

## Radiator Hose Inspection

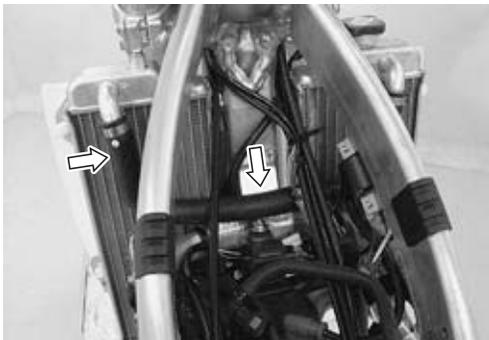
### Inspect radiator hoses

Initially at 150 km (100 miles, 1 month) and every 1 000 km (600 miles, 6 months)

- 1) Remove the fuel tank. Refer to “Fuel Tank Removal and Installation” in Section 1G (Page 1G-5).
- 2) Inspect the radiator hoses for damage and engine coolant leakage. If any defects are found, replace them with new ones.



IA02J1020023-01



IA02J1020024-01

- 3) After finishing the radiator hose inspection, reinstall the removed parts.

## Radiator Hose Replacement

### Replace radiator hoses

Every years

Refer to “Water Hose Removal and Installation” in Section 1F (Page 1F-6).

## Clutch Lever Clearance Inspection and Adjustment

BA02J20206009

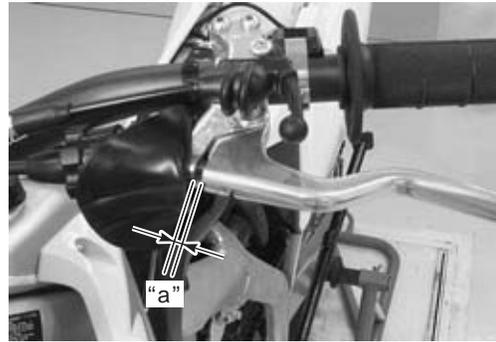
### Inspect lever clearance play and Lubricate clutch lever

Initially at 150 km (100 miles, 1 month) and every 1 000 km (600 miles, 6 months)

Inspect and adjust the clutch lever clearance “a” as follows.

### Clutch lever clearance

2 – 3 mm (0.08 – 0.12 in)



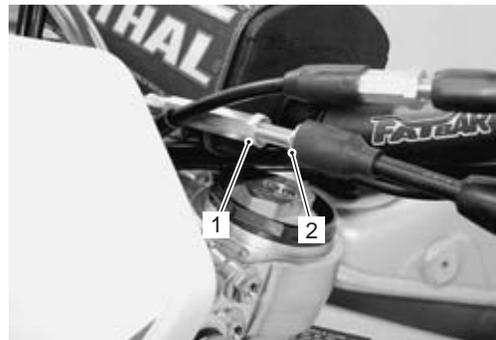
IA02J1020025-01

## Major Adjustment

- 1) Loosen the lock-nut (1).
- 2) Turn adjuster (2) so the clutch lever clearance measured at the lever holder obtains 2 – 3 mm (0.08 – 0.12 in) when squeezing the lever until pressure is felt.
- 3) Tighten the lock-nut (1) to the specified torque.

### Tightening torque

**Cable adjuster lock-nut: 2.1 N·m (0.21 kgf·m, 1.5 lbf·ft)**



IA02J1020026-01

## Minor Adjustment

Turn adjuster (1) so the clutch lever clearance measured at the lever holder obtains 2 – 3 mm (0.08 – 0.12 in) when squeezing the lever until pressure is felt.



IA02J1020027-01

## Clutch Lever Lubrication

Refer to “Lubrication Points” (Page 0B-3).

## Throttle Cable Play Inspection and Adjustment

BA02J20206010

### Inspect throttle cable play

Initially at 150 km (100 miles, 1 month) and every 1 000 km (600 miles, 6 months) thereafter

Inspect and adjust the throttle cable play “a” as follows:

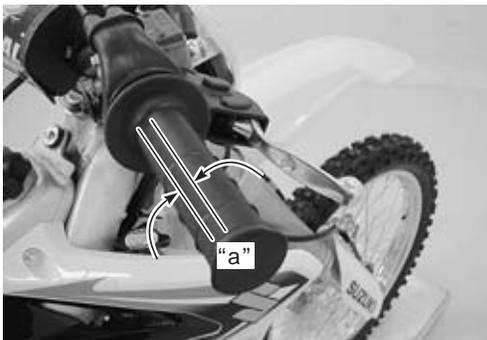
### Throttle cable play “a”

2.0 – 4.0 mm (0.08 – 0.16 in)

#### **▲ WARNING**

Inadequate throttle cable play can cause engine speed to rise suddenly when you turn the handlebars. This can lead to loss of rider control.

Adjust the throttle cable play so that engine speed does not rise due to handlebars movement.



IA02J1020028-01

### Throttle Cable Adjustment

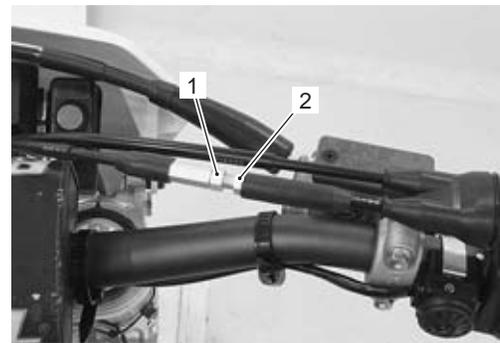
- 1) Loosen the lock-nut (1).
- 2) Turn adjuster (2) so the throttle grip has 2 – 4 mm (0.08 – 0.16 in) play in circumference.
- 3) Tighten the lock-nut (1) to the specified torque.

#### Tightening torque

Cable adjuster lock-nut: 2.1 N·m (0.21 kgf·m, 1.5 lbf·ft)

#### **▲ WARNING**

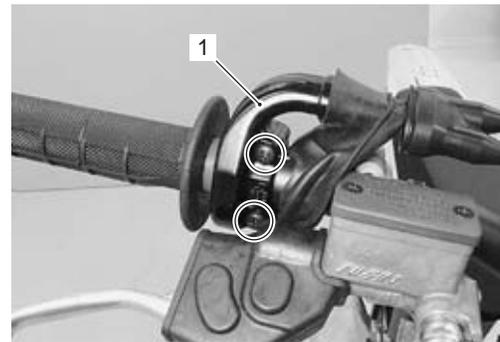
After the adjustment is completed, check that handlebars movement does not raise the engine idle speed and that the throttle grip returns smoothly and automatically.



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### Throttle Cable Lubrication

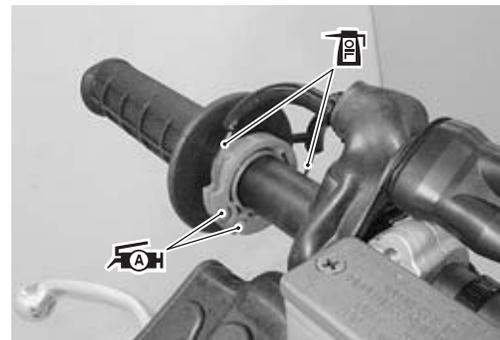
- 1) Remove the throttle case (1).



IA02J1020082-01

- 2) Apply oil to the throttle cable.
- 3) Apply grease to the throttle cable spool.

 : Grease 99000–25010 (SUZUKI SUPER GREASE “A” or equivalent)



IA02J1020083-01

- 4) Install the throttle case. Refer to “Handlebars Removal and Installation” in Section 6B (Page 6B-3).

## Hot Starter Lever Clearance Inspection and Adjustment

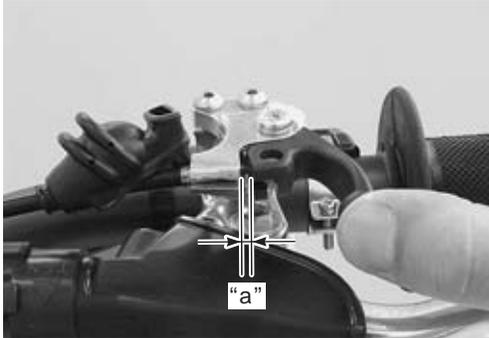
BA02J20206011

### Inspect hot starter lever clearance

**Initially at 150 km (100 miles, 1 month) and every 1 000 km (600 miles, 6 months)**

Inspect and adjust the hot starter lever clearance “a” as follows:

**Hot starter clearance “a”  
2 – 3 mm (0.08 – 0.12 in)**

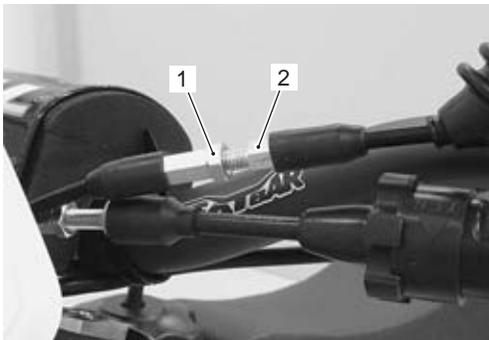


IA02J1020030-01

- 1) Loosen the lock-nut (1).
- 2) Turn adjuster (2) so the hot starter lever clearance measured at the lever holder obtains 2 – 3 mm (0.08 – 0.12 in) when squeezing the lever until pressure is felt.
- 3) Tighten the lock-nut (1) to the specified torque.

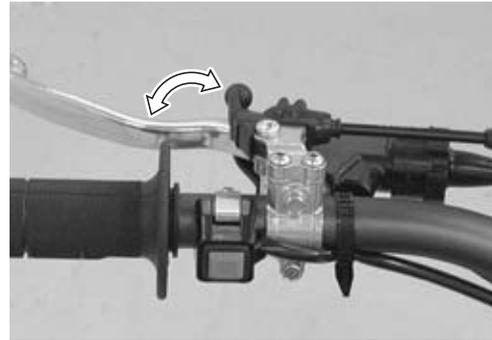
### **Tightening torque**

**Cable adjuster lock-nut: 2.1 N·m (0.21 kgf·m, 1.5 lbf·ft)**



IA02J1020031-01

- 4) Check that the hot starter lever moves smoothly from full open to full close. If it does not move smoothly, lubricate the hot starter cable.



IA02J1020032-01

## Throttle Body Inspection

BA02J20206012

### Inspect throttle body

**Initially at 150 km (100 miles, 1 month) and every 1 000 km (600 miles, 6 months)**

- 1) Remove the fuel tank. Refer to “Fuel Tank Removal and Installation” in Section 1G (Page 1G-5).
- 2) Inspect the throttle body for dirt or mud. If any dirt or mud is found, clean the throttle body. Refer to “Throttle Body Inspection and Cleaning” in Section 1D (Page 1D-20).



IA02J1020084-02

## Crankcase Breather (PCV) Hose Inspection

BA02J20206013

### Inspect crankcase breather (PCV) hose

**Initially 150 km (100 miles, 1 month) and every 1 000 km (600 miles, 6 months)**

Inspect the crankcase breather (PCV) hose for damage, clogging and bend. If any defects are found, the breather hose must be replaced. Refer to “Crankcase Breather (PCV) Hose Removal and Installation” in Section 1B (Page 1B-1).

## Fuel Hose Inspection

BA02J20206014

### Inspect fuel hose

Initially 150 km (100 miles, 1 month) and every 1 000 km (600 miles, 6 months)

### Replace fuel hose

Every 4 years

Inspect the fuel hose in the following procedures:

- 1) Remove the fuel tank. Refer to "Fuel Tank Removal and Installation" in Section 1G (Page 1G-5).
- 2) Inspect the fuel feed hose (1) for damage and fuel leakage. If any defects are found, the fuel feed hose must be replaced.



IA02J1020034-02

- 3) After finishing the fuel feed hose inspection, reinstall the removed parts.

## Valve Clearance Inspection and Adjustment

BA02J20206015

### Inspect valve clearance

Initially at 150 km (100 miles, 1 month) and every 2 000 km (1 200 miles, 12 months)

### Inspection

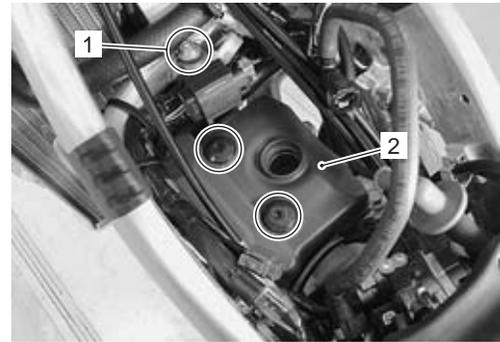
Valve clearance adjustment must be checked and adjusted, a) at the time of periodic inspection, b) when the valve mechanism is serviced, and c) when the camshafts are removed for servicing.

### NOTE

**The valve clearance should only be checked when the engine is cold.**

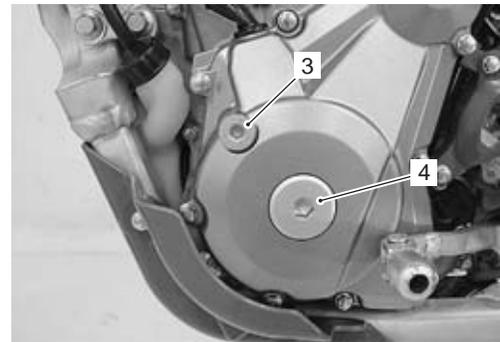
- 1) Remove the fuel tank. Refer to "Fuel Tank Removal and Installation" in Section 1G (Page 1G-5).
- 2) Remove the spark plug. Refer to "Spark Plug Cap and Spark Plug Removal and Installation" in Section 1H (Page 1H-4).

- 3) Remove the TO sensor bracket bolt and nut (1).
- 4) Remove the cylinder head cover (2).



IA02J1020035-02

- 5) Remove the TDC plug (3) and crankshaft hole plug (4).

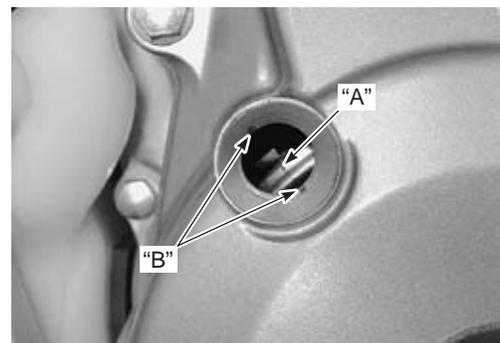


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- 6) Turn the crankshaft counterclockwise to bring the line "A" on the generator rotor to the grooves "B" on the cap hole thread.

### NOTE

**The piston must be at top dead center (TDC) on the compression stroke in order to check or adjust the valve clearance.**



IA02J1020037-01

## 0B-15 Maintenance and Lubrication:

- 7) Insert the thickness gauge between each tappet and cam. If the clearance is out of specification, adjust it to the specified range.

### NOTE

The valve clearance specification is different for both intake and exhaust valves.

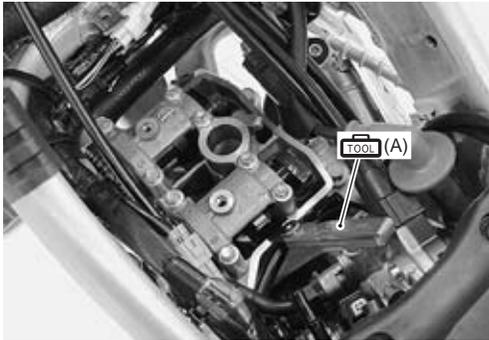
### Special tool

 (A): 09900-20803 (Thickness gauge)

### Valve clearance (When cold)

IN.: 0.09 – 0.16 mm (0.004 – 0.006 in)

EX.: 0.17 – 0.24 mm (0.007 – 0.009 in)

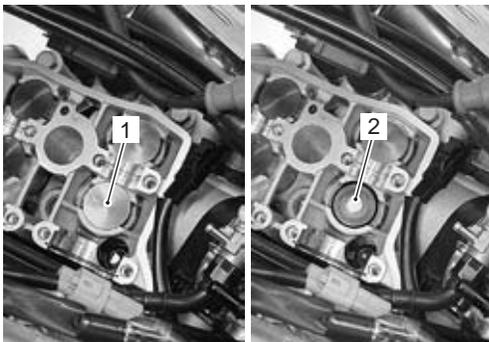


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### Adjustment

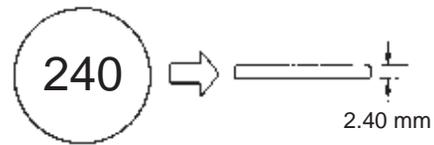
The clearance is adjusted by replacing the existing tappet shim with a thicker or thinner one.

- 1) Remove the intake or exhaust camshaft. Refer to "Engine Top Side Disassembly" in Section 1D (Page 1D-27).
- 2) Remove the tappet (1) and shim (2) by fingers or magnetic hand.



IA02J1020039-01

- 3) Check the figures printed on the shim. These figures indicate the thickness of the shim, as illustrated.



IA02J1020040-01

- 4) Select a replacement shim that will provide a clearance within the specified range. For the purpose of this adjustment, a total of 61 sizes of tappet shim are available ranging from 1.500 to 3.000 mm in steps of 0.025 mm.

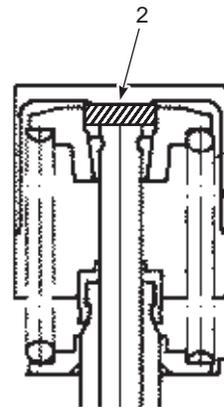
### ⚠ CAUTION

Both the right and left valve clearances should be as closely as possible.

- 5) Fit the selected shim (2) to the valve stem end, with numbers toward tappet. Be sure to check shim size with micrometer to ensure its size.

### NOTE

- Be sure to apply engine oil to tappet shim top and bottom faces.
- When seating the tappet shim, be sure the figure printed surface faces the tappet.



IA02J1020041-01



(EXHAUST SIDE)

TAPPET SHIM SELECTION TABLE [EXHAUST]

MEASURED VALVE CLEARANCE (mm)	TAPPET SHIM SET (12800-35820)																				
	TAPPET SHIM NO. (12892-35G00-XXX)							TAPPET SHIM NO. (12892-41C00-XXX)													
0.000 - 0.024	1.500	1.525	1.550	1.575	1.600	1.625	1.650	1.675	1.700	1.725	1.750	1.775	1.800	1.825	1.850	1.875	1.900	1.925	1.950	1.975	2.000
0.025 - 0.049	1.500	1.525	1.550	1.575	1.600	1.625	1.650	1.675	1.700	1.725	1.750	1.775	1.800	1.825	1.850	1.875	1.900	1.925	1.950	1.975	2.000
0.050 - 0.075	1.500	1.525	1.550	1.575	1.600	1.625	1.650	1.675	1.700	1.725	1.750	1.775	1.800	1.825	1.850	1.875	1.900	1.925	1.950	1.975	2.000
0.076 - 0.100	1.500	1.525	1.550	1.575	1.600	1.625	1.650	1.675	1.700	1.725	1.750	1.775	1.800	1.825	1.850	1.875	1.900	1.925	1.950	1.975	2.000
0.101 - 0.125	1.500	1.525	1.550	1.575	1.600	1.625	1.650	1.675	1.700	1.725	1.750	1.775	1.800	1.825	1.850	1.875	1.900	1.925	1.950	1.975	2.000
0.126 - 0.150	1.500	1.525	1.550	1.575	1.600	1.625	1.650	1.675	1.700	1.725	1.750	1.775	1.800	1.825	1.850	1.875	1.900	1.925	1.950	1.975	2.000
0.151 - 0.169	1.500	1.525	1.550	1.575	1.600	1.625	1.650	1.675	1.700	1.725	1.750	1.775	1.800	1.825	1.850	1.875	1.900	1.925	1.950	1.975	2.000
0.170 - 0.240	1.500	1.525	1.550	1.575	1.600	1.625	1.650	1.675	1.700	1.725	1.750	1.775	1.800	1.825	1.850	1.875	1.900	1.925	1.950	1.975	2.000
0.241 - 0.265	1.550	1.575	1.600	1.625	1.650	1.675	1.700	1.725	1.750	1.775	1.800	1.825	1.850	1.875	1.900	1.925	1.950	1.975	2.000	2.025	2.050
0.266 - 0.290	1.550	1.575	1.600	1.625	1.650	1.675	1.700	1.725	1.750	1.775	1.800	1.825	1.850	1.875	1.900	1.925	1.950	1.975	2.000	2.025	2.050
0.291 - 0.315	1.600	1.625	1.650	1.675	1.700	1.725	1.750	1.775	1.800	1.825	1.850	1.875	1.900	1.925	1.950	1.975	2.000	2.025	2.050	2.075	2.100
0.316 - 0.340	1.625	1.650	1.675	1.700	1.725	1.750	1.775	1.800	1.825	1.850	1.875	1.900	1.925	1.950	1.975	2.000	2.025	2.050	2.075	2.100	2.125
0.341 - 0.365	1.650	1.675	1.700	1.725	1.750	1.775	1.800	1.825	1.850	1.875	1.900	1.925	1.950	1.975	2.000	2.025	2.050	2.075	2.100	2.125	2.150
0.366 - 0.390	1.675	1.700	1.725	1.750	1.775	1.800	1.825	1.850	1.875	1.900	1.925	1.950	1.975	2.000	2.025	2.050	2.075	2.100	2.125	2.150	2.175
0.391 - 0.415	1.700	1.725	1.750	1.775	1.800	1.825	1.850	1.875	1.900	1.925	1.950	1.975	2.000	2.025	2.050	2.075	2.100	2.125	2.150	2.175	2.200
0.416 - 0.440	1.725	1.750	1.775	1.800	1.825	1.850	1.875	1.900	1.925	1.950	1.975	2.000	2.025	2.050	2.075	2.100	2.125	2.150	2.175	2.200	2.225
0.441 - 0.465	1.750	1.775	1.800	1.825	1.850	1.875	1.900	1.925	1.950	1.975	2.000	2.025	2.050	2.075	2.100	2.125	2.150	2.175	2.200	2.225	2.250
0.466 - 0.490	1.775	1.800	1.825	1.850	1.875	1.900	1.925	1.950	1.975	2.000	2.025	2.050	2.075	2.100	2.125	2.150	2.175	2.200	2.225	2.250	2.275
0.491 - 0.515	1.800	1.825	1.850	1.875	1.900	1.925	1.950	1.975	2.000	2.025	2.050	2.075	2.100	2.125	2.150	2.175	2.200	2.225	2.250	2.275	2.300
0.516 - 0.540	1.825	1.850	1.875	1.900	1.925	1.950	1.975	2.000	2.025	2.050	2.075	2.100	2.125	2.150	2.175	2.200	2.225	2.250	2.275	2.300	2.325
0.541 - 0.565	1.850	1.875	1.900	1.925	1.950	1.975	2.000	2.025	2.050	2.075	2.100	2.125	2.150	2.175	2.200	2.225	2.250	2.275	2.300	2.325	2.350
0.566 - 0.590	1.875	1.900	1.925	1.950	1.975	2.000	2.025	2.050	2.075	2.100	2.125	2.150	2.175	2.200	2.225	2.250	2.275	2.300	2.325	2.350	2.375
0.591 - 0.615	1.900	1.925	1.950	1.975	2.000	2.025	2.050	2.075	2.100	2.125	2.150	2.175	2.200	2.225	2.250	2.275	2.300	2.325	2.350	2.375	2.400
0.616 - 0.640	1.925	1.950	1.975	2.000	2.025	2.050	2.075	2.100	2.125	2.150	2.175	2.200	2.225	2.250	2.275	2.300	2.325	2.350	2.375	2.400	2.425
0.641 - 0.665	1.950	1.975	2.000	2.025	2.050	2.075	2.100	2.125	2.150	2.175	2.200	2.225	2.250	2.275	2.300	2.325	2.350	2.375	2.400	2.425	2.450
0.666 - 0.690	1.975	2.000	2.025	2.050	2.075	2.100	2.125	2.150	2.175	2.200	2.225	2.250	2.275	2.300	2.325	2.350	2.375	2.400	2.425	2.450	2.475
0.691 - 0.715	2.000	2.025	2.050	2.075	2.100	2.125	2.150	2.175	2.200	2.225	2.250	2.275	2.300	2.325	2.350	2.375	2.400	2.425	2.450	2.475	2.500
0.716 - 0.740	2.025	2.050	2.075	2.100	2.125	2.150	2.175	2.200	2.225	2.250	2.275	2.300	2.325	2.350	2.375	2.400	2.425	2.450	2.475	2.500	2.525
0.741 - 0.765	2.050	2.075	2.100	2.125	2.150	2.175	2.200	2.225	2.250	2.275	2.300	2.325	2.350	2.375	2.400	2.425	2.450	2.475	2.500	2.525	2.550
0.766 - 0.790	2.075	2.100	2.125	2.150	2.175	2.200	2.225	2.250	2.275	2.300	2.325	2.350	2.375	2.400	2.425	2.450	2.475	2.500	2.525	2.550	2.575

SPECIFIED CLEARANCE/NO ADJUSTMENT REQUIRED

HOW TO USE THIS CHART:  
 I. Measure valve clearance. "ENGINE IS COLD"  
 II. Measure present shim size.  
 III. Match clearance in vertical column with present shim size in horizontal column.  
 EXAMPLE  
 Valve clearance is 0.250 mm  
 Present shim size 2.400 mm  
 Shim size to be used 2.450 mm

- 6) Install the intake or exhaust camshaft. Refer to "Engine Top Side Assembly" in Section 1D (Page 1D-30).
- 7) Rotate the engine so that the tappet is depressed fully. This will squeeze out oil trapped between the shim and the tappet that could cause an incorrect measurement, then check the clearance again to confirm that it is within the specified range.
- 8) After finishing the tappet clearance adjustment, reinstall the removed parts. Refer to "Engine Top Side Assembly" in Section 1D (Page 1D-30).

### Exhaust Pipe Bolt and Muffler Bolt Inspection

BA02J20206016

**Tighten exhaust pipe bolts, muffler bolt and nut**  
Initially at 150 km (100 miles, 1 month) and every 1 000 km (600 miles, 6 months) thereafter

Check the exhaust pipe bolts, muffler bolts and nut to the specified torque.

#### Tightening torque

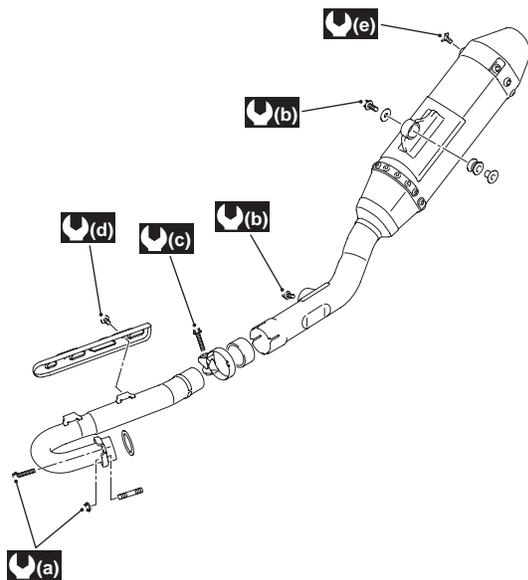
Exhaust pipe bolt and nut (a): 23 N-m (2.3 kgf-m, 16.5 lbf-ft)

Muffler mounting bolt (b): 23 N-m (2.3 kgf-m, 16.5 lbf-ft)

Muffler connector clamp bolt (c): 19 N-m (1.9 kgf-m, 13.5 lbf-ft)

Exhaust pipe cover bolt (d): 11 N-m (1.1 kgf-m, 8.0 lbf-ft)

Muffler tail cover screw (e): 10 N-m (1.0 kgf-m, 7.0 lbf-ft)



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### Spark Arrester Cleaning

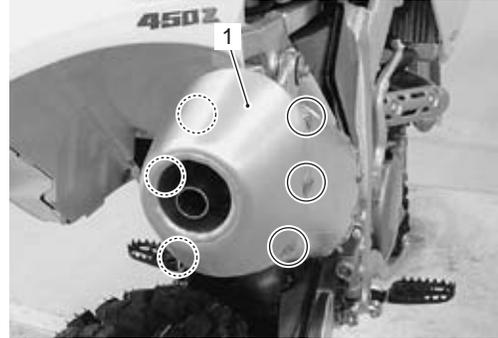
BA02J20206017

#### Clean spark arrester

Every 1 000 km (600 miles, 6 months) thereafter

Clean the spark arrester in the following procedures:

- 1) Remove the right frame cover. Refer to "Exterior Parts Removal and Installation" in Section 9D (Page 9D-1).
- 2) Remove the rear muffler tail cover (1).



IA02J1020042-04

- 3) Remove the spark arrester (2).



IA02J1020043-02

- 4) Clean the spark arrester (2) with a brush.

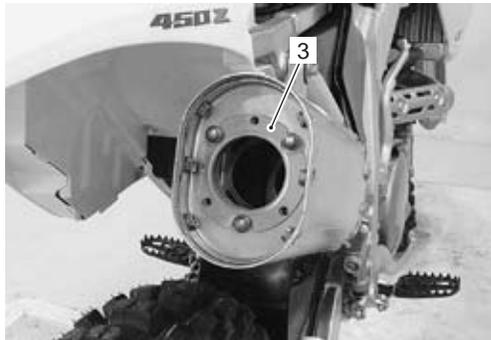


IA02J1020044-03

5) Install new gasket (3).

**⚠ CAUTION**

**Use new gasket to prevent exhaust gas leakage.**

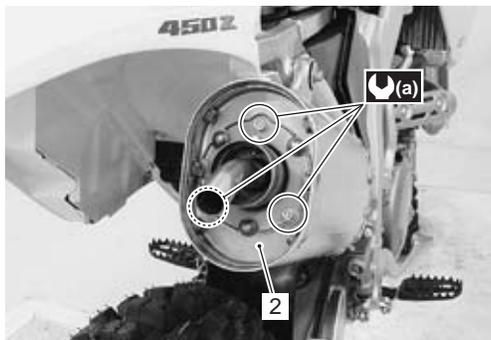


IA02J1020045-03

6) Install the spark arrester (2) and tighten the spark arrester mounting bolts to the specified torque.

**Tightening torque**

**Spark arrester mounting bolt (a): 5.5 N·m (0.55 kgf·m, 4.0 lbf·ft)**



IA02J1020097-01

7) Install the muffler tail cover (1).

8) Apply bond to the holes of the muffler body as shown.

**⚠ CAUTION**

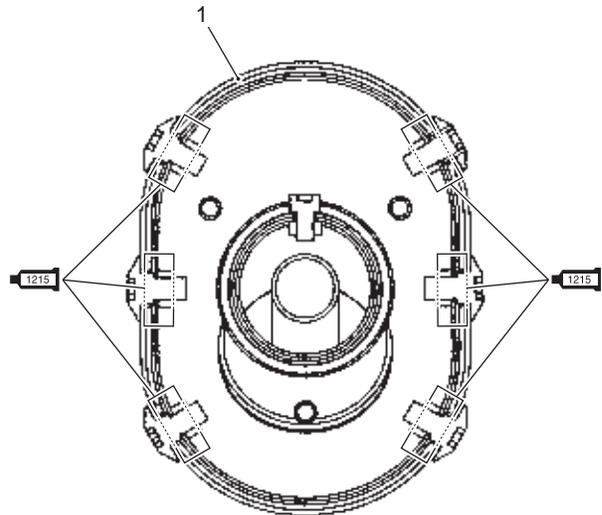
**Dry the adhesive completely.**

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

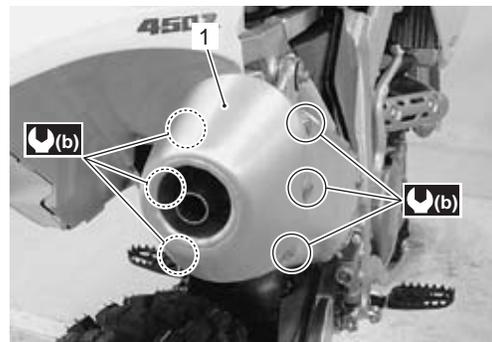
9) Tighten the muffler tail cover bolts to the specified torque.

**Tightening torque**

**Muffler tail cover screw (b): 10 N·m (1.0 kgf·m, 7.0 lbf·ft)**



IA02J1020100-04



IA02J1020098-03

## Drive Chain Inspection and Adjustment

BA02J20206018

### Inspect drive chain

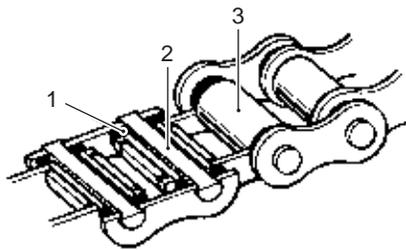
Clean lubricate and inspect each time the motorcycle is ridden

### Drive Chain Visual Check

- 1) With the transmission in neutral, support the motorcycle using a jack.
- 2) Visually check the drive chain for the possible defects listed as follows. If any defects are found, the drive chain must be replaced. Refer to "Drive Chain Replacement" in Section 3A (Page 3A-6).
  - Loose pins
  - Damaged rollers
  - Dry or rusted links
  - Kinked or binding links
  - Excessive wear
  - Missing O-ring seals

### NOTE

When replacing the drive chain, replace the drive chain and sprockets as a set.



IA02J1020046-01

1. O-ring seal	3. Roller
2. Grease	

### Drive Chain Plate Wear Inspection

Measure the height of the inner "A" and outer "B" plates using the vernier calipers. If any of the measurements exceeds the service limit, replace the drive chain with a new one.

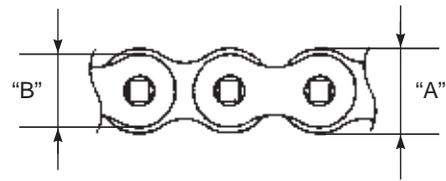
### Chain plate height

Service limit: (Inner "A"): 12.75 mm (0.502 in)

Service limit: (Inner "B"): 11.20 mm (0.441 in)

### Special tool

: 09900-20101 (Vernier calipers (150 mm))



IA02J1020047-01

### Drive Chain Slack Adjustment

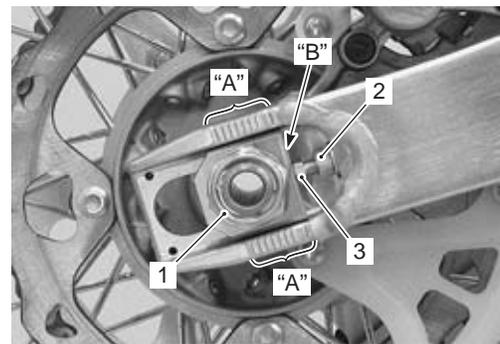
- 1) Place the motorcycle on the side-stand.
- 2) Loosen the axle nut (1).
- 3) Loosen the left and right chain adjuster lock-nuts (2).
- 4) Loosen or tighten both chain adjuster bolts (3) until there is 40 – 50 mm (1.6 – 2.0 in) of slack "a" at the middle of the chain between the engine and rear sprockets as shown in the figure.

### ⚠ CAUTION

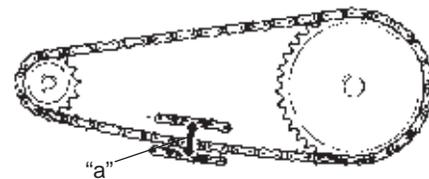
The reference marks "A" on both sides of the swingarm and the grooved line "B" of each chain adjuster must be aligned to ensure that the front and rear wheels are correctly aligned.

### Drive chain slack "a"

Standard 40 – 50 mm (1.6 – 2.0 in)



IA02J1020048-01



I649G1020036-02

## 0B-21 Maintenance and Lubrication:

- 5) After adjusting the drive chain, tighten the axle nut (1) to the specified torque.

### Tightening torque

Rear axle nut: 100 N·m (10.0 kgf·m, 72.5 lbf·ft)

- 6) Tighten both chain adjuster lock-nuts (2) securely.
- 7) Recheck the drive chain slack after tightening the axle nut.

## Drive Chain Cleaning and Lubricating

BA02J20206019

### Clean and lubricate drive chain

Clean lubricate and inspect each time the motorcycle is ridden

Clean and lubricate the drive chain in the following procedures:

- 1) Clean the drive chain with kerosine.

### ⚠ CAUTION

Do not use trichloroethylene, gasoline or any similar solvent. These fluids will damage the O-ring seals. Use only kerosine to clean the drive chain.

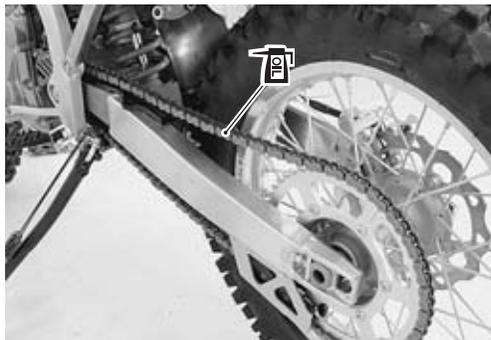
- 2) After washing and drying the chain, oil it with a heavyweight motor oil.

### ⚠ CAUTION

Do not use any oil sold commercially as "drive chain oil". Such oil can damage the O-ring seals.

### NOTE

The standard drive chain is DID520MXV.



IA02J1020094-01

- 3) Adjust the drive chain slack.

## Crankcase Driveshaft Oil Seal Inspection

BA02J20206020

### Inspect crankcase driveshaft oil seal

Initially 150 km (100 miles, 1 month) and every 1 000 km (600 miles, 6 months) thereafter

Inspect the crankcase driveshaft oil seal in the following procedures:

- 1) Remove the engine sprocket. Refer to "Engine Sprocket Removal and Installation" in Section 3A (Page 3A-3).
- 2) Inspect the oil seal for abnormality (dust, stone or foreign materials). If necessary, replace it with a new one. Refer to "Transmission Oil Seal / Bearing Removal and Installation" in Section 5B (Page 5B-8).



IA02J1020052-03

## Sprocket Inspection

BA02J20206021

### Inspect the engine and rear sprockets

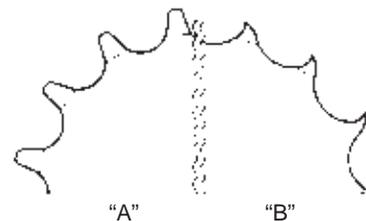
Engine sprocket: Initially 150 km (100 miles, 1 month) and every 1 000 km (600 miles, 6 months) thereafter

Rear sprocket: Initially 150 km (100 miles, 1 month) and every 300 km (200 miles) thereafter

Inspect the engine sprocket and rear sprocket for wear and cracks. If any defects are found, replace the sprocket with a new one.

### NOTE

When replacing a worn sprocket, it is likely that the drive chain will need to be replaced as well.



IA02J1020085-01

"A": Normal wear

"B": Excessive wear

**Drive Chain Buffer, Guide and Roller Inspection**

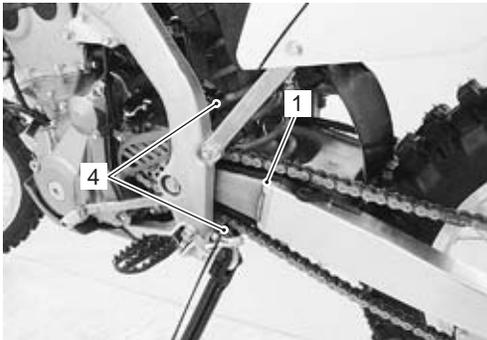
BA02J20206022

**Inspect drive chain buffer, guide and roller**  
**Inspect each time the motorcycle is ridden**

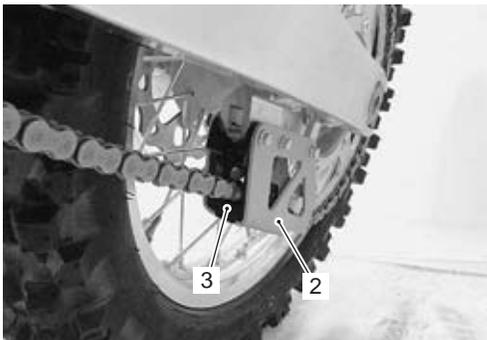
Replace the chain buffer (1), guide (2), guide defence (3) and rollers (4) periodically. Refer to "Swingarm Removal and Installation" in Section 2C (Page 2C-20) and "Drive Chain Roller Removal and Installation" in Section 3A (Page 3A-5).

**NOTE**

- The drive chain can hit a bent guide causing noise and drive chain wear.
- The drive chain can hit the swingarm directly if the chain guide buffer is worn out. This will cause drive chain and swingarm damage.



IA02J1020053-01



IA02J1020054-01

**Brake System Inspection**

BA02J20206023

**Inspect brake system**

Initially at 150 km (100 miles, 1 month) and every 1 000 km (600 miles, 6 months) thereafter

**Replace brake hose and brake fluid**

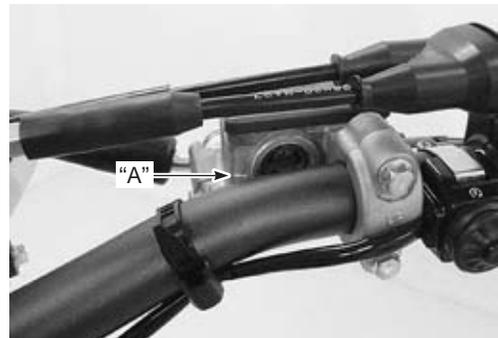
Every year

**⚠ WARNING**

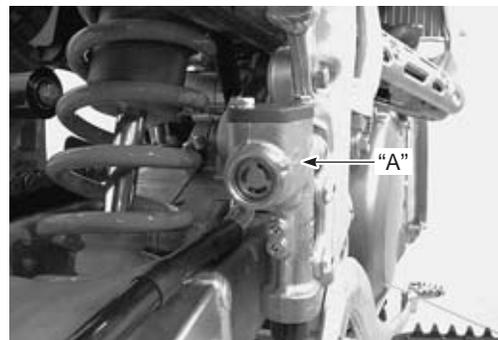
- The brake system of this motorcycle is filled with a glycol-based brake fluid. Do not use or mix different types of fluid such as silicone-based and petroleum-based fluids. Do not use any brake fluid taken from old, used or unsealed containers. Never reuse brake fluid left over from the last servicing or stored for a long period of time.
- Brake fluid, if it leaks, will interfere with safe running and immediately discolor painted surfaces. Check the brake hoses and hose joints for cracks and oil leakage before riding.

**Brake Fluid Level Check**

- 1) Keep the motorcycle upright and place the handlebars straight.
- 2) Check the brake fluid level by observing the lower limit line "A" on the front and rear brake fluid reservoirs. When the brake fluid level is below the lower limit line "A", replenish with brake fluid that meets the following specification.

**BF: Brake fluid (DOT 4)**

IA02J1020055-01



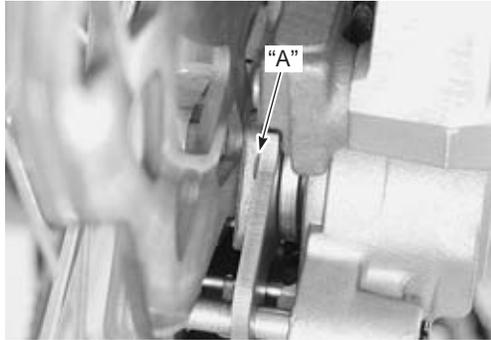
IA02J1020056-02

**Brake Pad Check**

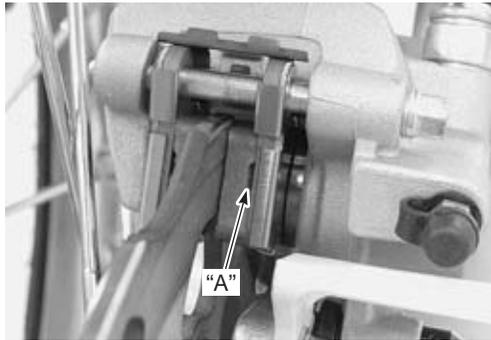
The extent of brake pad wear can be checked by observing the grooved limit line “A” on the pads. When the wear exceeds the grooved limit line, replace the pads with new ones. Refer to “Front Brake Pad Replacement” in Section 4B (Page 4B-2) and “Rear Brake Pad Replacement” in Section 4C (Page 4C-1).

**⚠ CAUTION**

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



IA02J1020057-01



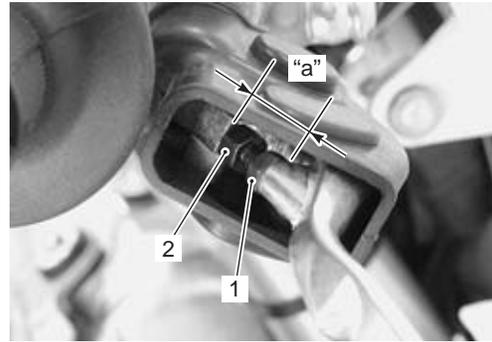
IA02J1020058-01

**Front Brake Lever Adjustment**

Adjust the brake lever position as follows:

- 1) Loosen the lock-nut (1).
- 2) Turn in or out the adjuster (2) to obtain the standard adjuster length “a”.
- 3) Tighten the lock-nut (1).

**Adjuster length “a”**  
**11 – 15 mm (0.4 – 0.6 in)**



IA02J1020059-02

**Brake Pedal Height Adjustment**

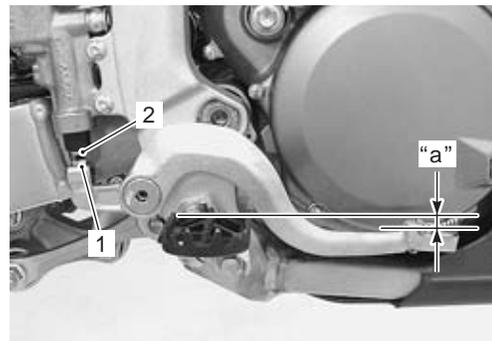
Adjust the rear brake pedal height as follows:

- 1) Loosen the lock-nut (1).
- 2) Adjust the brake pedal height “A” by turning the adjuster (2) to locate the pedal 0 – 10 mm (0 – 0.39 in) below the top face of the footrest.
- 3) Tighten the lock-nut (1) to the specified torque.

**Brake pedal height “a”**  
**0 – 10 mm (0 – 0.4 in)**

**Tightening torque**

**Rear brake master cylinder rod lock-nut: 6 N·m (0.6 kgf·m, 4.5 lbf·ft)**



IA02J1020060-02

**Brake Hose Replacement**

**Replace brake hose**  
**Every years**

Refer to “Front Brake Hose Removal and Installation” in Section 4A (Page 4A-7) and “Rear Brake Hose Removal and Installation” in Section 4A (Page 4A-7).

**Brake Fluid Replacement**

**Replace brake fluid**  
**Every years**

Refer to “Brake Fluid Replacement” in Section 4A (Page 4A-5).

**Air Bleeding from Brake Fluid Circuit**

Refer to "Air Bleeding from Brake Fluid Circuit" in Section 4A (Page 4A-3).

**Front Fork Inspection**

BA02J20206024

**Inspect front fork**

**Initially at 150 km (100 miles, 1 month) and every 1 000 km (600 miles, 6 months) thereafter**

**Front Fork Visual Inspection**

Inspect the front forks for oil leakage, scoring or scratches on the outer surface of the inner tubes. Replace the defective parts, if necessary. Refer to "Front Fork Disassembly" in Section 2B (Page 2B-3) and "Front Fork Assembly" in Section 2B (Page 2B-7).



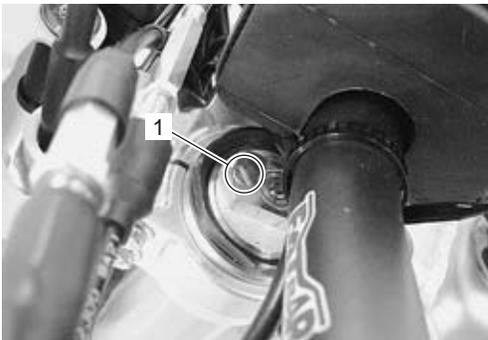
IA02J1020062-01

**Front Fork Air Pressure Adjustment**

- 1) Place a stand under the chassis tube to lift the front wheel off the ground.
- 2) Remove the left and right air bleeder valves (1) and equalize the air pressure in the front forks to atmospheric pressure.
- 3) Tighten the air bleeder valves to the specified torque.

**Tightening torque**

**Front fork air bleeder valve : 1.3 N·m (0.13 kgf·m, 1.0 lbf·ft)**



IA02J1020086-01

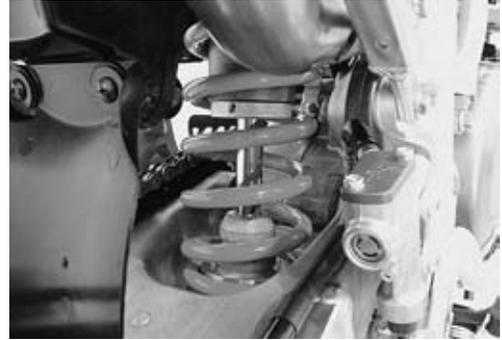
**Rear Suspension Inspection**

BA02J20206025

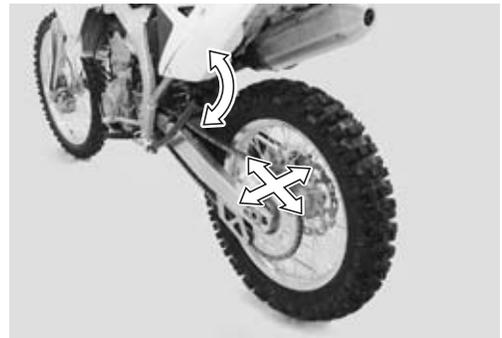
**Inspect rear suspension**

**Initially at 150 km (100 miles, 1 month) and every 1 000 km (600 miles, 6 month) thereafter**

Inspect the rear shock absorber for oil leakage and check that there is no play in the swingarm. Replace any defective parts, if necessary. Refer to "Rear Shock Absorber Removal and Installation" in Section 2C (Page 2C-5), "Cushion Lever Removal and Installation" in Section 2C (Page 2C-15) and "Swingarm Removal and Installation" in Section 2C (Page 2C-20).



IA02J1020066-01



IA02J1020067-01

**Wheel and Tire Inspection**

BA02J20206026

**Inspect tires**

**Initially at 150 km (100 miles, 1 month) and every 1 000 km (600 miles, 6 month) thereafter**

**Wheel Rim and Tire Inspection**

- 1) Inspect the wheels, tires and wheel bearings for damage. Replace the defective parts, if necessary.

## 0B-25 Maintenance and Lubrication:

- 2) Inspect the wheel rim runout. Refer to "Front Wheel Related Parts Inspection" in Section 2D (Page 2D-5) and "Rear Wheel Related Parts Inspection" in Section 2D (Page 2D-12).



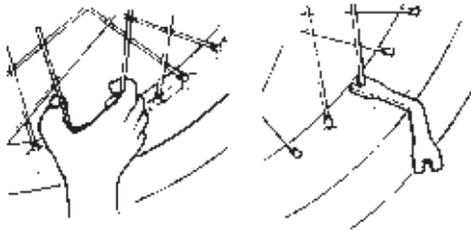
IA02J1020068-03

### Spoke Nipple and Rim Lock Inspection

#### Inspect spoke nipples

Initially at 150 km (100 miles, 1 month) and every 1 000 km (600 miles, 6 month) thereafter

- 1) Inspect the spokes for tension by squeezing the spoke nipples.



IA02J1020090-01

- 2) Retighten the spoke nipples with a spoke nipple wrench so as all spokes have same tension.

#### **⚠ CAUTION**

**Improperly tightening the spoke nipples can damage the wheel. Tighten the spoke nipples less than 1/2 turn at a time. Inspect the spoke tension and then the spoke nipple.**

#### Tightening torque

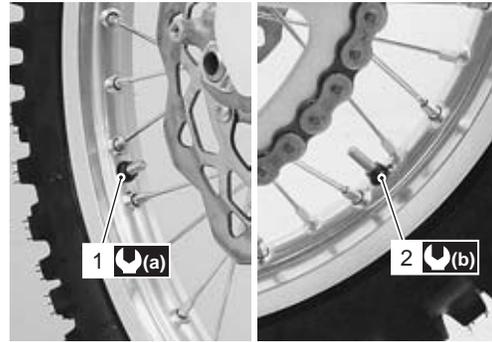
**Spoke nipple: 6 N-m (0.6 kgf-m, 4.5 lbf-ft)**

- 3) Tighten the rim locks (1) and (2) to the specified torque.

#### Tightening torque

**Wheel rim lock (Front) (a): 14 N-m (1.4 kgf-m, 10.0 lbf-ft)**

**Wheel rim lock (Rear) (b): 14 N-m (1.4 kgf-m, 10.0 lbf-ft)**



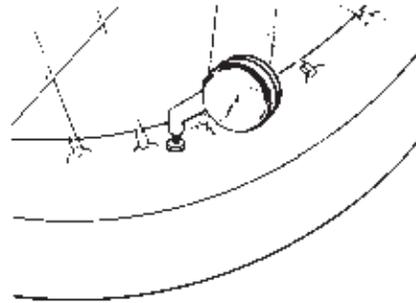
IA02J1020089-01

### Tire Pressure Inspection

Inspect front and rear tire pressure.

#### Tire pressure (cold)

**70 – 110 kPa (0.7 – 1.1 kgf/cm<sup>2</sup>, 10 – 16 psi)**



IA02J1020091-01

### Steering System Inspection

BA02J20206027

#### Inspect steering system

Initially at 150 km (100 miles, 1 month) and every 1 000 km (600 miles, 6 months) thereafter

Inspect the steering by moving the front forks up and down, and back and forward. If the steering has play or binds, inspect steering stem head nut tightness and steering bearings. Refer to "Steering Related Parts Inspection" in Section 6B (Page 6B-9).



IA02J1020070-03

### Kick Starter Lever Inspection and Lubrication

BA02J20206028

#### Inspect kick starter lever

Initially at 150 km (100 miles, 1 month) and every 1 000 km (600 miles, 6 months) thereafter

#### Lubricate kick starter lever

Initially at 150 km (100 miles, 1 month) and every 1 000 km (600 miles, 6 months) thereafter

Inspect the kick starter lever for smooth movement and lubricate it periodically.



IA02J1020071-01

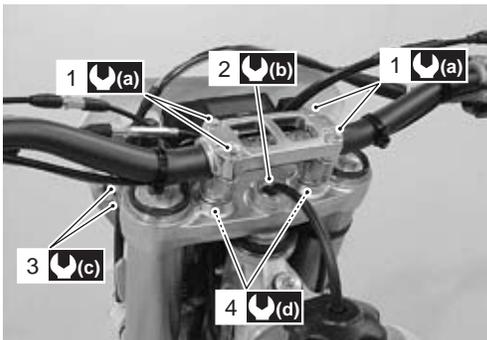
### Chassis Bolt and Nut Inspection

BA02J20206029

#### Tighten chassis bolt and nut

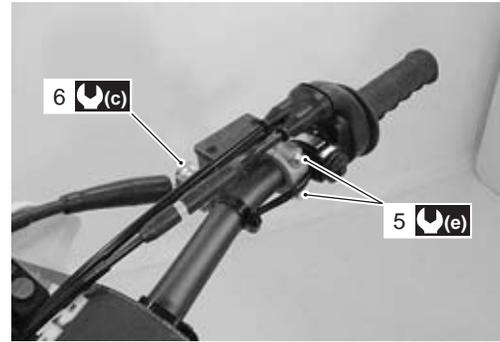
Initially at 150 km (100 miles, 1 month) and every 1 000 km (600 miles, 6 months) thereafter

Check that all chassis bolts and nuts are tightened to their specified torque.



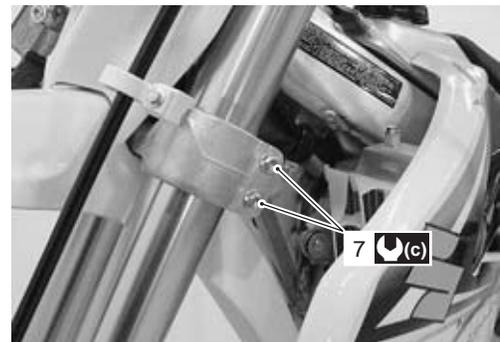
IA02J1020072-01

1		Handlebar clamp bolt 25 N-m (2.5 kgf-m, 18.0 lbf-ft)
2		Steering stem head nut 100 N-m (10.0 kgf-m, 72.5 lbf-ft)
3		Front fork upper clamp bolt 23 N-m (2.3 kgf-m, 16.5 lbf-ft)
4		Handlebar holder set nut 45 N-m (4.5 kgf-m, 32.5 lbf-ft)



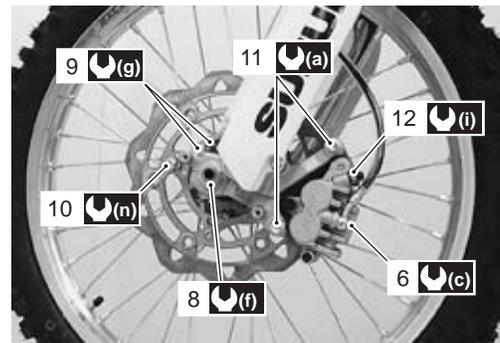
IA02J1020073-01

5		Front brake master cylinder mounting bolt 10 N-m (1.0 kgf-m, 7.0 lbf-ft)
6		Brake hose union bolt 23 N-m (2.3 kgf-m, 16.5 lbf-ft)



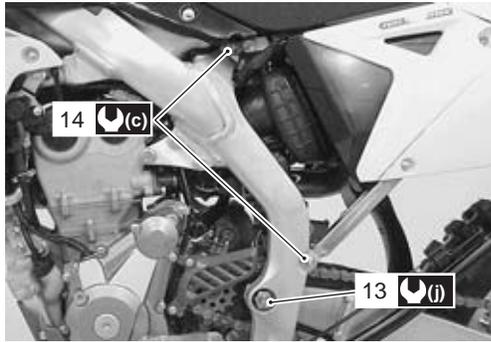
IA02J1020074-01

7		Front fork lower clamp bolt 23 N-m (2.3 kgf-m, 16.5 lbf-ft)
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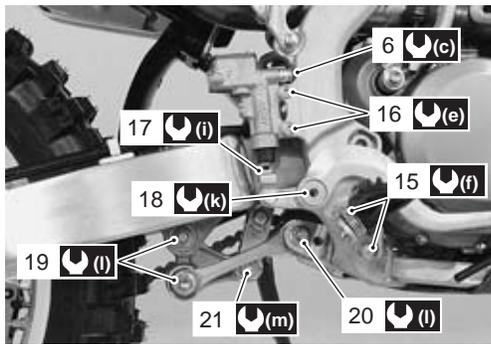
IA02J1020075-04

6		Brake hose union bolt 23 N-m (2.3 kgf-m, 16.5 lbf-ft)
8		Front axle nut 35 N-m (3.5 kgf-m, 25.5 lbf-ft)
9		Front axle pinch bolt 18 N-m (1.8 kgf-m, 13.0 lbf-ft)
10		Front brake disc bolt 11 N-m (1.1 kgf-m, 8.0 lbf-ft)
11		Front brake caliper mounting bolt 25 N-m (2.5 kgf-m, 18.0 lbf-ft)
12		Brake caliper air bleeder valve (Front) 6 N-m (0.6 kgf-m, 4.5 lbf-ft)



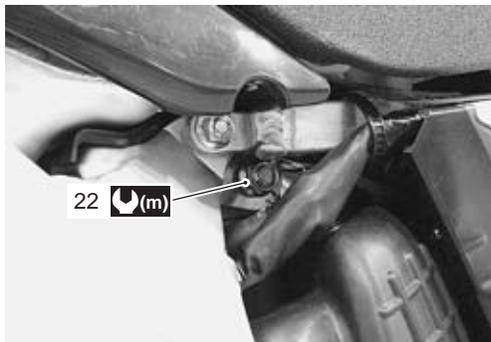
IA02J1020076-01

13	(i)	Swingarm pivot nut 70 N-m (7.0 kgf-m, 50.5 lbf-ft)
14	(c)	Seat rail bolt/nut (Upper and Lower) 23 N-m (2.3 kgf-m, 16.5 lbf-ft)



IA02J1020077-02

6	(c)	Brake hose union bolt 23 N-m (2.3 kgf-m, 16.5 lbf-ft)
15	(f)	Footrest bolt 35 N-m (3.5 kgf-m, 25.5 lbf-ft)
16	(e)	Rear brake master cylinder mounting bolt 10 N-m (1.0 kgf-m, 7.0 lbf-ft)
17	(i)	Rear brake master cylinder rod lock-nut 6 N-m (0.6 kgf-m, 4.5 lbf-ft)
18	(k)	Rear brake pedal pivot bolt 29 N-m (2.9 kgf-m, 21.0 lbf-ft)
19	(l)	Cushion lever nut (Upper and Lower) 8 N-m (8.0 kgf-m, 58.0 lbf-ft)
20	(l)	Cushion rod nut 80 N-m (8.0 kgf-m, 58.0 lbf-ft)
21	(m)	Rear shock absorber mounting nut (Lower) 50 N-m (5.0 kgf-m, 36.0 lbf-ft)



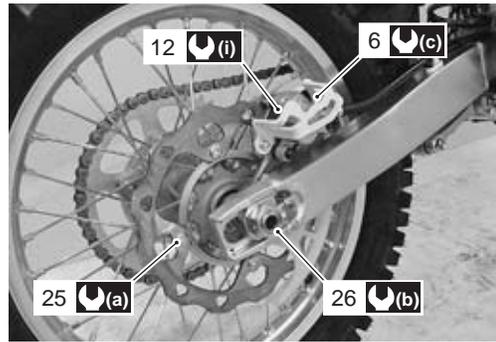
IA02J1020078-01

22	(m)	Rear shock absorber mounting nut (Upper) 50 N-m (5.0 kgf-m, 36.0 lbf-ft)
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IA02J1020079-01

23	(n)	Rear sprocket nut 30 N-m (3.0 kgf-m, 21.5 lbf-ft)
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IA02J1020080-01

6	(c)	Brake hose union bolt 23 N-m (2.3 kgf-m, 16.5 lbf-ft)
12	(i)	Brake caliper air bleeder valve (Rear) 6 N-m (0.6 kgf-m, 4.5 lbf-ft)
25	(a)	Rear brake disc bolt 25 N-m (2.5 kgf-m, 18.0 lbf-ft)
26	(b)	Rear axle nut 100 N-m (10.0 kgf-m, 72.5 lbf-ft)

### Compression Pressure Check

BA02J20206030

Refer to "Compression Pressure Check" in Section 1D (Page 1D-4).

### Oil Pressure Check

BA02J20206031

Refer to "Oil Pressure Check" in Section 1E (Page 1E-2).

### SDS Check

BA02J20206032

Refer to "SDS Check" in Section 1A (Page 1A-15).

## Specifications

### Tightening Torque Specifications

BA02J20207001

Fastening part	Tightening torque			Note
	N·m	kgf·m	lbf·ft	
Air cleaner heat guard mounting screw	1	0.1	0.7	☞ (Page 0B-5)
Engine oil level check bolt	5.5	0.55	4.0	☞ (Page 0B-6)
Oil drain plug	12	1.2	8.5	☞ (Page 0B-7)
Magneto cover bolt	11	1.1	8.0	☞ (Page 0B-7)
Oil filler cap bolt	11	1.1	8.0	☞ (Page 0B-8)
Oil strainer cap	21	2.1	15.0	☞ (Page 0B-8)
Engine coolant drain plug	11	1.1	8.0	☞ (Page 0B-10)
Radiator air bleeder bolt	6	0.6	4.5	☞ (Page 0B-10)
Cable adjuster lock-nut	2.1	0.21	1.5	☞ (Page 0B-11) / ☞ (Page 0B-12) / ☞ (Page 0B-13)
Exhaust pipe bolt and nut	23	2.3	16.5	☞ (Page 0B-18)
Muffler mounting bolt	23	2.3	16.5	☞ (Page 0B-18)
Muffler connector clamp bolt	19	1.9	13.5	☞ (Page 0B-18)
Exhaust pipe cover bolt	11	1.1	8.0	☞ (Page 0B-18)
Muffler tail cover screw	10	1.0	7.0	☞ (Page 0B-18) / ☞ (Page 0B-19)
Spark arrester mounting bolt	5.5	0.55	4.0	☞ (Page 0B-19)
Rear axle nut	100	10.0	72.5	☞ (Page 0B-21)
Rear brake master cylinder rod lock-nut	6	0.6	4.5	☞ (Page 0B-23)
Front fork air bleeder valve	1.3	0.13	1.0	☞ (Page 0B-24)
Spoke nipple	6	0.6	4.5	☞ (Page 0B-25)
Wheel rim lock (Front)	14	1.4	10.0	☞ (Page 0B-25)
Wheel rim lock (Rear)	14	1.4	10.0	☞ (Page 0B-25)

#### NOTE

The specified tightening torque is described in the following.  
 “Chassis Bolt and Nut Inspection” (Page 0B-26)

#### Reference:

For the tightening torque of fastener not specified in this section, refer to “Tightening Torque List” in Section 0C (Page 0C-8).

## Special Tools and Equipment

### Recommended Service Material

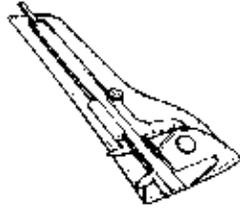
BA02J20208001

Material	SUZUKI recommended product or Specification		Note
Brake fluid	DOT 4	—	☞ (Page 0B-22)
Grease	SUZUKI SUPER GREASE “A” or equivalent	P/No.: 99000–25010	☞ (Page 0B-12)
Sealant	SUZUKI BOND No.1215 or equivalent	P/No.: 99000–31110	☞ (Page 0B-19)

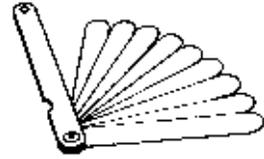
Special Tool

BA02J20208002

09900-20101  
Vernier calipers (150 mm)  
☞ (Page 0B-20)



09900-20803  
Thickness gauge  
☞ (Page 0B-15)



# Service Data

## Specifications

### Service Data

BA02J20307001

#### Valve + Valve Guide

Unit: mm (in)

Item	Standard		Limit
Valve diam.	IN.	36.0 (1.42)	—
	EX.	31.0 (1.22)	—
Valve clearance (When cold)	IN.	0.09 – 0.16 (0.004 – 0.006)	—
	EX.	0.17 – 0.24 (0.007 – 0.009)	—
Valve guide to valve stem clearance	IN.	0.010 – 0.037 (0.0004 – 0.0015)	—
	EX.	0.030 – 0.057 (0.0012 – 0.0022)	—
Valve stem deflection	IN. & EX.	—	0.25 (0.010)
Valve guide I.D.	IN. & EX.	5.500 – 5.512 (0.2165 – 0.2170)	—
Valve stem O.D.	IN.	5.475 – 5.490 (0.2156 – 0.2161)	—
	EX.	5.455 – 5.470 (0.2148 – 0.2154)	—
Valve stem runout	IN. & EX.	—	0.05 (0.002)
Valve seat width	IN. & EX.	0.9 – 1.1 (0.035 – 0.043)	—
Valve head radial runout	IN. & EX.	—	0.03 (0.001)
Valve spring free length	IN.	—	35.8 (1.41)
	EX.	—	35.2 (1.39)
Valve spring tension	IN.	146 – 168 N (14.9 – 17.1 kgf, 32.8 – 37.7 lbs) at length 30.9 mm (12.2 in)	—
	EX.	105 – 121 N (10.7 – 12.3 kgf, 23.6 – 27.2 lbs) at length 30.9 mm (12.2 in)	—

#### Camshaft + Cylinder Head

Unit: mm (in)

Item	Standard		Limit
Cam height	IN.	34.52 – 34.57 (1.359 – 1.361)	34.22 (1.347)
	EX.	34.28 – 34.33 (1.350 – 1.352)	33.98 (1.338)
Camshaft journal oil clearance	IN. & EX.	0.032 – 0.066 (0.001 – 0.002)	0.150 (0.0059)
Camshaft journal holder I.D.	IN. & EX.	22.012 – 22.025 (0.8667 – 0.8671)	—
Camshaft journal O.D.	IN. & EX.	21.959 – 21.980 (0.8645 – 0.8654)	—
Camshaft runout	—		0.10 (0.004)
Cam chain pin	14th pin		—
Cylinder head distortion	—		0.05 (0.002)

**0C-2 Service Data:****Cylinder + Piston + Piston Ring**

Unit: mm (in)

Item	Standard		Limit
Compression pressure (Automatic decomp. actuated)	Approx. 400 kPa (4.0 kgf/cm <sup>2</sup> , 57 psi) and more		—
Piston to cylinder clearance	0.035 – 0.045 (0.0014 – 0.0018)		0.120 (0.0047)
Cylinder bore	96.000 – 96.015 (3.7795 – 3.7801)		Nicks or Scratches
Piston diam.	95.960 – 95.975 (3.7779 – 3.7785) Measure at 16 mm (0.63 in) from the skirt end.		95.880 (3.7748)
Cylinder distortion	—		0.05 (0.002)
Piston ring free end gap	1st	Approx. 8.7 (0.34)	7.0 (0.28)
Piston ring end gap	1st	0.20 – 0.30 (0.008 – 0.012)	0.50 (0.020)
Piston ring to groove clearance	1st	—	0.180 (0.007)
Piston ring groove width	1st	0.78 – 0.80 (0.0307 – 0.0315)	—
		1.30 – 1.32 (0.0512 – 0.0520)	—
Piston ring thickness	1st	2.01 – 2.03 (0.0791 – 0.0799)	—
		0.71 – 0.76 (0.0279 – 0.0299)	—
Piston pin bore	19.002 – 19.008 (0.7425 – 0.7433)		19.030 (0.7492)
Piston pin O.D.	18.995 – 19.000 (0.7478 – 0.7480)		18.980 (0.7472)

**Conrod + Crankshaft**

Unit: mm (in)

Item	Standard		Limit
Conrod small end I.D.	19.010 – 19.018 (0.7484 – 0.7487)		19.040 (0.7496)
Conrod deflection	—		3.0 (0.12)
Conrod big end side clearance	0.20 – 0.65 (0.008 – 0.026)		1.0 (0.04)
Conrod big end width	19.75 – 19.80 (0.778 – 0.780)		—
Crank web to web width	61.9 – 62.1 (2.437 – 2.445)		—
Crankshaft runout	—		0.08 (0.003)

**Oil Pump**

Item	Standard		Limit
Oil pressure (at 50 °C, 122 °F)	50 kPa (0.5 kgf/cm <sup>2</sup> , 7.1 psi) at 4 000 r/min		—

**Clutch**

Unit: mm (in)

Item	Standard		Limit
Clutch lever clearance	2.0 – 3.0 (0.08 – 0.12)		—
Drive plate thickness (No. 1 & No. 2)	3.07 – 3.23 (0.121 – 0.127)		2.77 (0.109)
Drive plate claw width (No. 1 & No. 2)	13.85 – 13.95 (0.545 – 0.549)		13.05 (0.514)
Driven plate distortion	—		0.10 (0.004)
Clutch spring free length	45.22 (1.780)		49.4 (1.945)

**Radiator + Engine Coolant**

Unit: mm (in) Except ratio

Item	Standard		Limit
ECT sensor resistance	20 °C (68 °F)	Approx. 2.58 kΩ	—
	50 °C (122 °F)	Approx. 0.77 kΩ	—
	80 °C (176 °F)	Approx. 0.28 kΩ	—
	110 °C (230 °F)	Approx. 0.12 kΩ	—
Radiator cap valve opening pressure	95 – 125 kPa (0.95 – 1.25 kgf/cm <sup>2</sup> , 14 – 18 psi)		—
Engine coolant type	Use an anti-freeze/coolant compatible with aluminum radiator, mixed with distilled water only, at the ratio of 50:50.		—
Engine coolant capacity	Reserve tank side	250 ml (0.3/0.2 US/Imp qt)	—
	Engine side	950 ml (1.0/0.8 US/Imp qt)	—

**Transmission + Drive Chain**

Unit: mm (in) Except ratio

Item	Standard		Limit
Primary reduction ratio	2.708 (65/24)		—
Final reduction ratio	3.923 (51/13)		—
Gear ratios	Low	2.153 (28/13)	—
	2nd	1.611 (29/18)	—
	3rd	1.250 (25/20)	—
	4th	1.000 (19/19)	—
	Top	0.826 (19/23)	—
Gear shift fork to groove clearance	No. 1, 2, 3	0.1 – 0.3 (0.004 – 0.012)	0.5 (0.02)
Gear shift fork groove width	No. 1, 2, 3	5.0 – 5.1 (0.197 – 0.201)	—
Shift fork thickness	No. 1, 2, 3	4.8 – 4.9 (0.189 – 0.193)	—
Drive chain	Type	DID 520MXV	—
	Links	114	—
Drive chain plate height	Inner	15.0 (0.59)	12.75 (0.502)
	Outer	12.8 (0.50)	11.20 (0.441)
Drive chain slack	40 – 50 (1.6 – 2.0)		—

**Injector + Fuel Pump + Fuel Pressure Regulator**

Item	Specification	Note
Injector resistance	10.5 ± 0.53 Ω at 24 °C (75.2 °F)	
Fuel pump discharge amount	Approx. 240 ml (8.1/8.4 US/Imp oz) /10 sec.	
Fuel pressure regulator operating set pressure	Approx. 294 kPa (2.94 kgf/cm <sup>2</sup> , 41.81 psi)	

**0C-4 Service Data:****FI Sensors**

Item	Specification		Note
CKP sensor resistance	150 – 280 $\Omega$		
CKP sensor peak voltage	5.0 V and more		
Crankshaft rotation signal sensor resistance	0.2 – 0.6 $\Omega$		
Crankshaft rotation signal sensor peak voltage	3.0 V and more		
IAP sensor input voltage	4.5 – 5.5 V		
IAP sensor output voltage	0.89 – 1.17 V at idle speed		
TP sensor input voltage	4.5 – 5.5 V		
TP sensor output voltage	Closed	Approx. 0.6 V	
	Opened	Approx. 1.89 V	
ECT sensor input voltage	4.5 – 5.5 V		
ECT sensor output voltage	0.2 – 4.9 V		
ECT sensor resistance	Approx. 2.58 k $\Omega$ at 20 °C (68 °F)		
IAT sensor input voltage	4.5 – 5.5 V		
IAT sensor output voltage	0.15 – 4.85 V		
IAT sensor resistance	Approx. 2.58 k $\Omega$ at 20 °C (68 °F)		
TO sensor resistance	16.5 – 22.3 k $\Omega$		
TO sensor voltage	Normal	0.4 – 1.4 V	
	Leaning	3.7 – 4.4 V	When leaning 65°
GP switch voltage	0.6 V and more		From 1st to Top
Injector voltage	Battery voltage		

**Throttle Body**

Item	Specification
Bore size	41 mm (1.61 in)
I.D. No.	02J0
Idle r/min	2 000 $\pm$ 100 r/min
Throttle cable play	2.0 – 4.0 mm (0.08 – 0.16 in)
Hot starter lever clearance	2.0 – 3.0 mm (0.08 – 0.12 in)

**Electrical**

Unit: mm (in)

Item		Specification	Note
Ignition timing		4° B.T.D.C. at 2 000 r/min.	
Spark plug	Type	NGK: CR8EIB-10	
	Gap	0.9 – 1.0 (0.035 – 0.039)	
Spark performance		Over 8 (0.3) at 1 atm.	
CKP sensor resistance		150 – 280 Ω	R – G
Crankshaft rotation signal sensor resistance		0.2 – 0.6 Ω	B/R – R/W
Generator coil resistance		0.2 – 0.6 Ω	Y – Y
CKP sensor peak voltage		5.0 V and more	(+): R, (-): G
Crankshaft rotation signal sensor peak voltage		3.0 V and more	(+): B/R, (-): R/W
Ignition coil resistance	Primary	0.17 – 0.23 Ω	W/BI – B/W
	Secondary	5.04 – 7.56 kΩ	Plug cap – B/W
Ignition coil primary peak voltage		175 V and more	(+): B/W, (-): W/BI
Generator no-load voltage (When engine is cold)		60 V (AC) and more at 5 000 r/min	
Generator maximum output		Approx. 230 W at 5 000 r/min	
Regulated voltage		13.5 – 15.0 V at 5 000 r/min	
Engine stop switch resistance		Under 1 Ω	B/Y – B/W
Starter motor blush length	Standard	12.05 (0.47)	
	Limit	6.55 (0.26)	
Starter torque limiter slip torque	Standard	9 – 24 N·m (0.9 – 2.4 kgf-m, 6.5 – 17.5 lbf-ft)	
Starter relay resistance		3 – 5 Ω	
Battery	Type designation	YTZ7S	
	Capacity	12 V 21.6 kC (6 Ah)/10HR	
Fuse size	Main	15 A	
	Sub	15 A	

**Wattage**

Unit: W

Item	Standard
Headlight	35
Tail light	LED

**0C-6 Service Data:****Brake + Wheel**

Unit: mm (in)

Item	Standard		Limit
Brake lever adjuster length	11 – 15 (0.4 – 0.6)		—
Rear brake pedal height	0 – 10 (0 – 0.4)		—
Brake disc thickness	Front	3.0 ± 0.2 (0.118 – 0.008)	2.5 (0.10)
	Rear	4.0 ± 0.15 (0.157 – 0.006)	3.5 (0.14)
Brake disc distortion	Front & Rear	—	0.3 (0.012)
Master cylinder bore	Front	11.000 – 11.043 (0.4331 – 0.4348)	—
	Rear	11.000 – 11.043 (0.4331 – 0.4348)	—
Master cylinder piston diam.	Front	10.957 – 10.984 (0.4314 – 0.4324)	—
	Rear	10.957 – 10.984 (0.4314 – 0.4324)	—
Brake caliper cylinder bore	Front	27.000 – 27.050 (1.0630 – 1.0650)	—
	Rear	25.400 – 25.450 (1.0000 – 1.0020)	—
Brake caliper cylinder piston diam.	Front	26.918 – 26.968 (1.0598 – 1.0617)	—
	Rear	25.318 – 25.368 (0.9968 – 0.9987)	—
Brake fluid type	DOT 4		—
Wheel rim runout	Axial	—	2.0 (0.08)
	Rear	—	2.0 (0.08)
Wheel rim size	Front	21 x 1.60	—
	Rear	18 x 2.15	—
Wheel axle runout	Front	—	0.25 (0.010)
	Rear	—	0.25 (0.010)

**Tire**

Unit: mm (in)

Item	Standard		Limit
Cold inflation tire pressure	Front & Rear	100 kPa (1.0 kgf/cm <sup>2</sup> , 14 psi)	
Tire size	Front	80/100-21 51M	—
	Rear	110/100-18 64M	—
Tire type	Front	DUNLOP SPORTS D742FA	—
	Rear	DUNLOP SPORTS D756	—
Tire tread depth (Recommend depth)	Front & Rear	—	4.0 (0.16)

**Suspension**

Unit: mm (in)

Item	Standard		Limit	Note
Front fork stroke	310 (12.2)		—	
Front fork inner tube O.D.	47 (18.5)		—	
Front fork spring free length	495 (19.48)		485 (19.09)	
Front fork damping force adjuster	Rebound	MAX – 8 clicks turn back	—	
	Compression	MAX – 8 clicks turn back	—	
Front fork air pressure	0 kPa (0 kgf/cm <sup>2</sup> , 0 psi)		—	
Front fork spring rate	4.61 N/mm (0.47 kgf/mm)		—	
Rear shock absorber gas pressure	784 kPa (8.0 kgf/cm <sup>2</sup> , 113.8 psi)		—	
Rear shock absorber spring set length	256.5 (10.10)		—	8.5 mm (0.34 in) compressed from spring free length
Rear shock absorber spring rate	53.9 N/mm (5.5 kgf/mm)		—	
Rear wheel travel	310 (12.2)			
Swingarm pivot shaft runout	—		0.3 (0.01)	

**Fuel + Oil**

Item	Specification	Note
Fuel type	Use only unleaded gasoline of at least 90 pump octane (R/2 + M/2 method).	
Fuel tank capacity	6.2 L (1.6/1.4 US/Imp gal)	
Engine oil type	SAE 10W-40, API SF/SG or SH/SJ with JASO MA	E-33
	SAE 10W-40, API SF/SG or SH/SJ with JASO MA	E-28
Engine oil capacity	Change	1 050 ml (1.1/0.9 US/Imp qt)
	Filter change	1 100 ml (1.2/1.0 US/Imp qt)
	Overhaul	1 200 ml (1.3/1.1 US/Imp qt)
Air cleaner element oil type	MOTUL Air Filter Oil or equivalent oil	
Front fork oil type	FORK OIL SS-19 or an equivalent fork oil	
Front fork oil capacity (each leg)	320 ml (10.8/11.3 US/Imp oz)	Outer tube oil quantity
	193 ml (6.5/6.8 US/Imp oz)	Damper rod oil quantity
Rear shock absorber oil type	SUZUKI REAR SUSPENSION OIL SS-25 or an equivalent suspension oil	
Rear shock absorber oil capacity	383 ml (13.0/13.5 US/Imp oz)	

## Tightening Torque List

## Engine

Item	N·m	kgf·m	lbf·ft
Cylinder head cover bolt	14	1.4	10.0
Spark plug	11	1.1	8.0
Cylinder head bolt	Initial	25	18.0
	Final	51	37.0
Cylinder head base bolt	10	1.0	7.0
Cylinder base bolt	10	1.0	7.0
Camshaft journal holder bolt (L45 & L45)	10	1.0	7.0
Oil gallery bolt (Journal holder)	10	1.0	7.0
Primary drive gear nut	90	9.0	65.0
Magneto rotor nut	100	10.0	72.5
Clutch sleeve hub nut	90	9.0	65.0
Clutch spring set bolt	10	1.0	7.0
Gearshift arm stopper	23	2.3	16.5
Gearshift cam driven gear pin	24	2.4	17.5
Pawl lifter screw	8.5	0.85	6.0
Bearing retainer screw	8.5	0.85	6.0
Cam chain tension adjuster mounting bolt	10	1.0	7.0
Cam chain tension adjuster cap bolt	23	2.3	16.5
Cam chain tensioner bolt	10	1.0	7.0
Cam chain guide retainer bolt	10	1.0	7.0
Engine oil drain plug	12	1.2	8.5
Intake pipe mounting screw	8.5	0.85	6.0
Engine oil level check bolt	5.5	0.55	4.0
Oil filter cap bolt	11	1.1	8.0
Oil gallery plug (Cylinder head)	10	1.0	7.0
Oil pump No. 1 bolt	5.5	0.55	4.0
Oil pump No. 2 bolt	11	1.1	8.0
Oil strainer cap	21	2.1	15.0
Crankcase bolt	11	1.1	8.0
Right crankcase cover bolt	11	1.1	8.0
Starter clutch bolt	13	1.3	9.5
Clutch cover bolt	11	1.1	8.0
TDC plug	14	1.4	10.0
Magneto cover bolt	11	1.1	8.0
Crankshaft hole plug	11	1.1	8.0
Generator stator bolt	5.5	0.55	4.0
Ignition coil mounting bolt	5.5	0.55	4.0
Condenser bracket bolt	10	1.0	7.0
Engine mounting bolt and nut (L125 & L120)	66	6.6	47.5
Engine mounting bolt (L43 & L40)	55	5.5	40.0
Engine mounting bracket nut (Front)	60	6.0	43.5
Upper engine mounting bracket bolt	40	4.0	29.0
Intake pipe mounting screw	8.5	0.85	6.0
Engine sprocket cover bolt	11	1.1	8.0
Kick starter guide bolt	10	1.0	7.0
Kick starter lever bolt	29	2.9	21.0
kick starter lever screw	10	1.0	7.0
Air cleaner heat guard mounting screw	1	0.1	0.7
Exhaust pipe bolt and nut	23	2.3	16.5
Muffler connector clamp bolt	19	1.9	13.5
Muffler mounting bolt (Front and Rear)	23	2.3	16.5
Exhaust pipe cover bolt	11	1.1	8.0
Muffler tail cover screw	10	1.0	7.0
Spark arrester mounting bolt	5.5	0.55	4.0
Starter motor mounting bolt	10	1.0	7.0
Starter motor lead wire nut	6	0.6	4.5

**FI system and Intake Air System**

Item	N·m	kgf·m	lbf·ft
Throttle cover screw	3	0.3	2.0
CKP sensor mounting bolt	5.5	0.55	4.0
IAP sensor mounting screw	1.5	0.15	1.0
IAT sensor mounting screw	1.3	0.13	0.95
TP sensor mounting screw	3.5	0.35	2.5
GP switch mounting bolt	6.5	0.65	4.7
Fuel pump mounting bolt	10	1.0	7.0
Fuel pipe mounting screw	3.5	0.35	2.5
L-joint mounting screw	3.5	0.35	2.5
ECT sensor	12	1.2	8.5

**Cooling System**

Item	N·m	kgf·m	lbf·ft
Impeller	8	0.8	6.0
Water pump case bolt	11	1.1	8.0
Engine coolant drain plug	11	1.1	8.0
Radiator air bleeder bolt	6	0.6	4.5
Water hose clamp screw	1.5	0.15	1.0

**Chassis**

Item	N·m	kgf·m	lbf·ft
Handlebar clamp bolt	25	2.5	18.0
Handlebar holder nut	45	4.5	32.5
Front fork clamp bolt (Upper & Lower)	23	2.3	16.5
Steering stem head nut	100	10.0	72.5
Steering stem nut	45 N·m (4.5 kgf·m, 32.5 lbf·ft) then turn back 1/4 –1/2		
Clutch lever pivot bolt	4	0.4	3.0
Clutch lever pivot bolt lock-nut	4	0.4	3.0
Front fork cap bolt	34	3.4	24.5
Lock-nut/Center bolt	22	2.2	16.0
Front fork center bolt	69	6.9	50.0
Front fork compression damper unit	30	3.0	21.5
Front fork air bleeder valve	1.3	0.13	1.0
Front fork protector bolt	4.9	0.49	3.5
Front brake master cylinder holder bolt	10	1.0	7.0
Rear brake master cylinder mounting bolt	10	1.0	7.0
Rear brake master cylinder rod lock-nut	6	0.6	4.5
Brake lever pivot bolt	6	0.6	4.5
Brake lever pivot bolt lock-nut	6	0.6	4.5
Brake pedal pivot bolt	29	2.9	21.0
Brake hose union bolt (Front and Rear)	23	2.3	16.5
Brake hose guide bolt (Front)	3	0.3	2.0
Brake caliper mounting bolt (Front)	25	2.5	18.0
Brake pad mounting pin (Front and Rear)	17	1.7	12.5
Front brake caliper axle bolt (Caliper)	25	2.5	18.0
Front brake caliper axle bolt (Bracket)	23	2.3	16.5
Rear brake caliper axle bolt (Caliper)	43	4.3	31.0
Rear brake caliper axle bolt (Bracket)	12	1.2	8.5
Brake caliper air bleeder valve (Front and Rear)	6	0.6	4.5
Brake disc bolt (Front)	11	1.1	8.0
Brake disc bolt (Rear)	25	2.5	18.0
Front axle nut	35	3.5	25.0
Front axle holder bolt	18	1.8	13.0
Rear axle nut	100	10.0	72.5
Rear sprocket nut	30	3.0	21.5
Chain roller bolt and nut	23	2.3	16.5
Spoke nipple	6	0.6	4.5
Front wheel rim lock	14	1.4	10.0

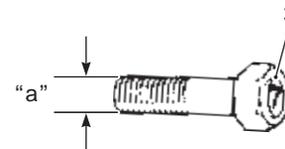
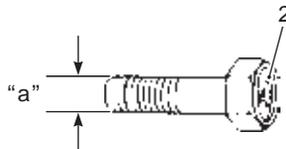
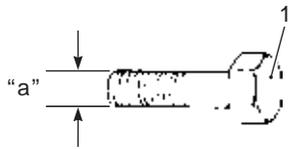
**0C-10 Service Data:**

Item	N-m	kgf-m	lbf-ft
Rear wheel rim lock	14	1.4	10.0
Swingarm pivot nut (engine mounting)	70	7.0	50.5
Rear shock absorber mounting nut (Upper and Lower)	50	5.0	36.0
Rear shock absorber compression adjuster assembly	29	2.9	21.0
Rear cushion lever nut (Upper and Lower)	80	8.0	58.0
Rear cushion rod nut (Front and Rear)	80	8.0	58.0
Rear shock absorber spring adjuster lock-nut	44	4.4	32.0
Seat rail bolt/nut (Upper and Lower)	23	2.3	16.5
Footrest bracket bolt	40	4.0	29.0
Footrest bolt	35	3.5	25.5
Cable adjuster lock-nut (throttle, clutch and hot starter)	2.1	0.21	1.5
Speedometer bracket bolt	10	1.0	7.0
Speedometer mounting nut	4.5	0.45	3.5

**Tightening Torque Chart**

For other nuts and bolts not listed in the preceding page, refer to this chart:

Bolt diameter "a" (mm)	Conventional or "4" marked bolt			"7" marked bolt		
	N-m	kgf-m	lbf-ft	N-m	kgf-m	lbf-ft
4	1.5	0.15	1.0	2.3	0.23	1.5
5	3	0.3	2.0	4.5	0.45	3.0
6	5.5	0.55	4.0	10	1.0	7.0
8	13	1.3	9.5	23	2.3	16.5
10	29	2.9	21.0	50	5.0	36.0
12	45	4.5	32.5	85	8.5	61.5
14	65	6.5	47.0	135	13.5	97.5
16	105	10.5	76.0	210	21.0	152.0
18	160	16.0	115.5	240	24.0	173.5



1. Conventional bolt	2. "4" marked bolt	3. "7" marked bolt
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1649G1030001-04

## Section 1

# Engine

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# Precautions

## Precautions

### Precautions for Engine

BA02J2100001

Refer to "General Precautions" in Section 00 (Page 00-1) and "Precautions for Electrical Circuit Service" in Section 00 (Page 00-2).

# Engine General Information and Diagnosis

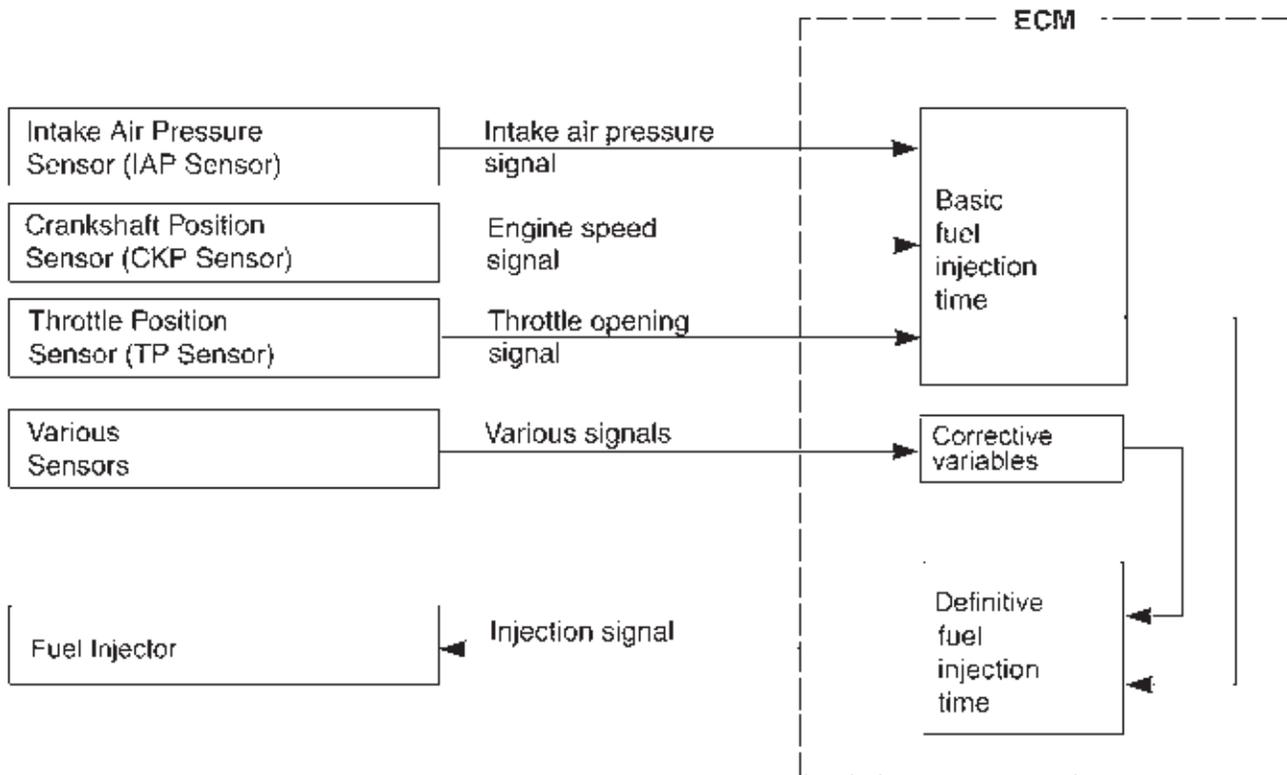
## General Description

### Injection Timing Description

BA02J21101001

#### Injection Time (Injection Volume)

The factors to determine the injection time include the basic fuel injection time, which is calculated on the basis of the intake air pressure, engine speed and throttle opening angle, and various compensations. These compensations are determined according to the signals from various sensors that detect the engine and driving conditions.



IA02J1110001-02

**Compensation of Injection Time (Volume)**

The following different signals are output from the respective sensors for compensation of the fuel injection time (volume).

Signal	Descriptions
ENGINE COOLANT TEMPERATURE SENSOR SIGNAL	When engine coolant temperature is low, injection time (volume) is increased.
INTAKE AIR TEMPERATURE SENSOR SIGNAL	When intake air temperature is low, injection time (volume) is increased.
BATTERY VOLTAGE SIGNAL	ECM operates on the battery voltage and at the same time, it monitors the voltage signal for compensation of the fuel injection time (volume). A longer injection time is needed to adjust injection volume in the case of low voltage.
POWER SUPPLY VOLTAGE SIGNAL	ECM operates on the power generation voltage and at the same time, it monitors the voltage signal for compensation of the fuel injection time (volume). A longer injection time is needed to adjust injection volume in the case of low voltage.
STARTING SIGNAL	When starting engine, additional fuel is injected during cranking engine.
ACCELERATION SIGNAL/ DECELERATION SIGNAL	During acceleration, the fuel injection time (volume) is increased in accordance with the throttle opening speed and engine rpm. During deceleration, the fuel injection time (volume) is decreased.

**Injection Stop Control**

Signal	Descriptions
TIP-OVER SENSOR SIGNAL (FUEL SHUT-OFF)	When the vehicle tips over, the tip-over sensor sends a signal to the ECM. Then, this signal cuts OFF current supplied to the fuel pump, fuel injector and ignition coil.
OVER-REV. LIMITER SIGNAL	<p>The fuel injector stops operation when engine rpm reaches rev. limit rpm.</p> <p><b>NOTE</b></p> <p><b>The fuel cut-off circuit is incorporated in this ECM in order to prevent over-running of engine. When engine speed reaches 12 000 r/min, this circuit cuts off fuel at the fuel injector.</b></p>

## 1A-3 Engine General Information and Diagnosis:

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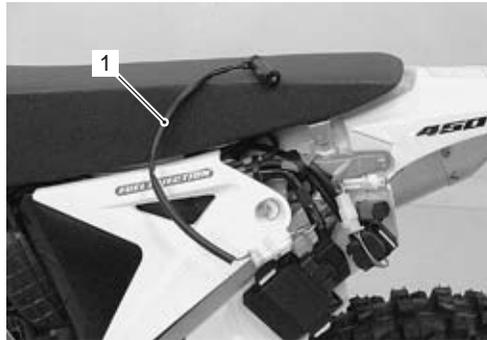
### Self-diagnosis Function

The self-diagnosis function is incorporated in the ECM. It can be notified by using the FI indicator light assy (option). To check the function of the individual FI system devices, the dealer mode is provided. In this check, the tool is necessary to read the DTC (Diagnostic Trouble Code) that identify malfunction location.

### Dealer mode

Connect the FI indicator light assy (1) to the dealer mode coupler. The DTC is displayed by flashing pattern of FI indicator light when turning on the ignition switch. This means that the ECM has not received signals indicating a correct condition from the sensors or device concerned.

### 36380-28H00: FI indicator light assy (option)



IA02J1110002-01

### **⚠ CAUTION**

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**Before checking the DTC, do not disconnect the ECM lead wire coupler. If the coupler from the ECM is disconnected, the DTC is erased and the DTC can not be checked.**

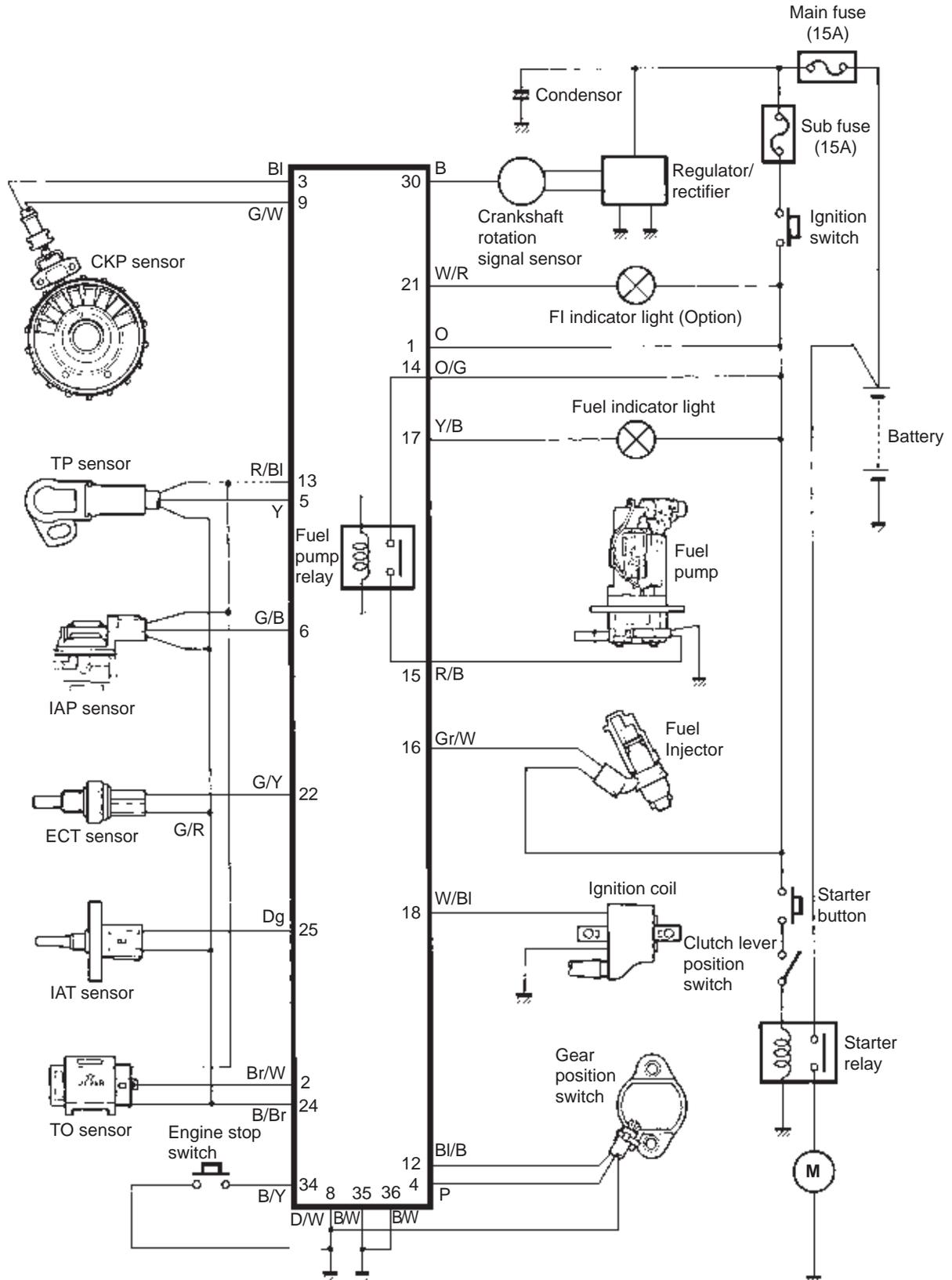
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Malfunction	FI indicator light indication
"NO"	FI indicator light turns OFF.
"YES"	FI indicator light turns ON and blinks. (Code is indicated from small numeral to large one.)

# Schematic and Routing Diagram

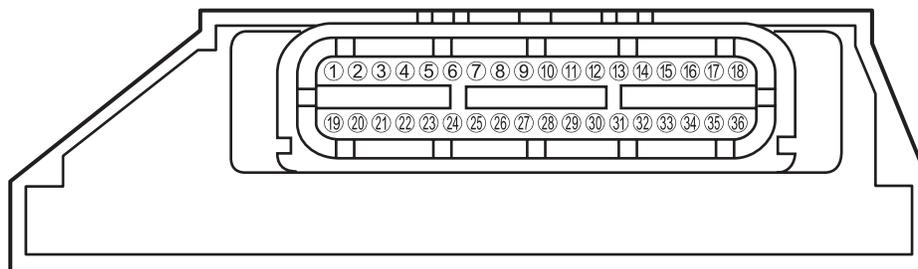
## FI System Wiring Diagram

BA02J21102001



## ECM Terminal

BA02J21102002



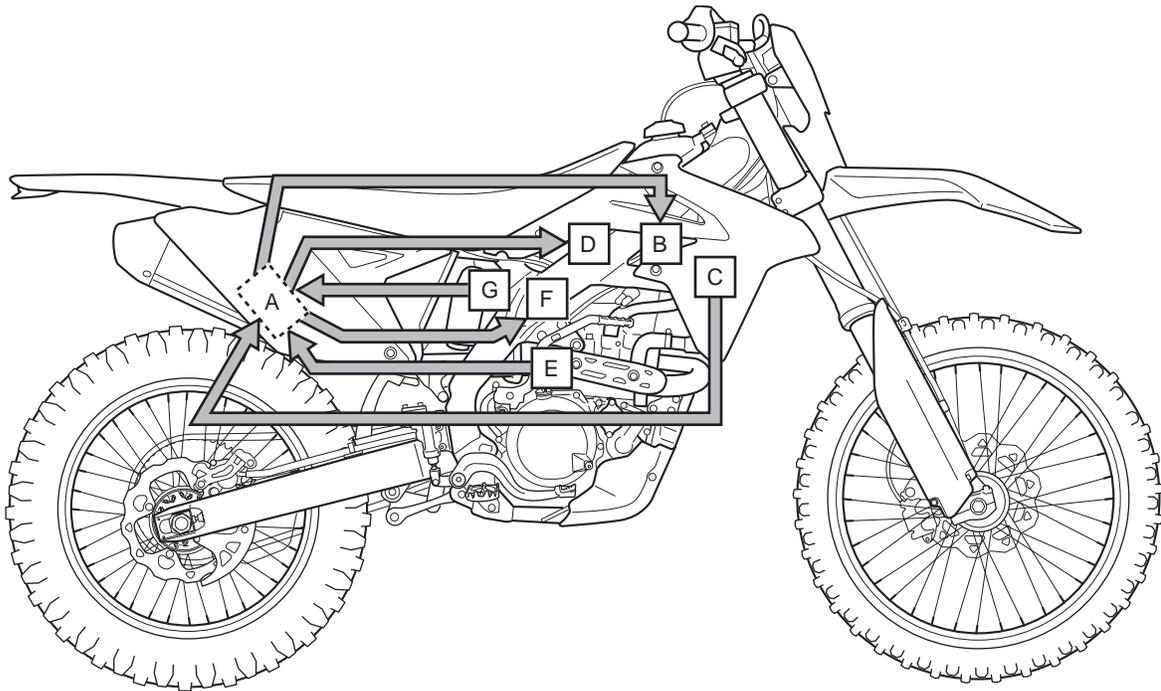
IA02J1110005-01

Terminal No.	Circuit	Terminal No.	Circuit
1	Power source (+B)	19	—
2	TO sensor signal (TOS)	20	Map select 1 (MAP1)
3	CKP sensor signal (CKP+)	21	FI indicator
4	GP switch signal (GP)	22	ECT sensor signal (ECT)
5	TP sensor signal (TPS)	23	—
6	IAP sensor signal (IAPS)	24	Sensor ground (E2)
7	—	25	IAT sensor signal (IAT)
8	Ground (E1)	26	—
9	CKP sensor signal (CKPS-)	27	—
10	Serial data of self-diagnosis	28	—
11	Blank	29	—
12	Neutral switch (NT)	30	Crankshaft rotation signal
13	Sensor power source (VCC)	31	Blank
14	Fuel pump power source (FPP)	32	Blank
15	Fuel pump (FP)	33	Blank
16	Fuel Injector	34	Engine stop switch
17	Fuel indicator	35	Ground (E01)
18	Ignition coil	36	Ground (E02)

## Component Location

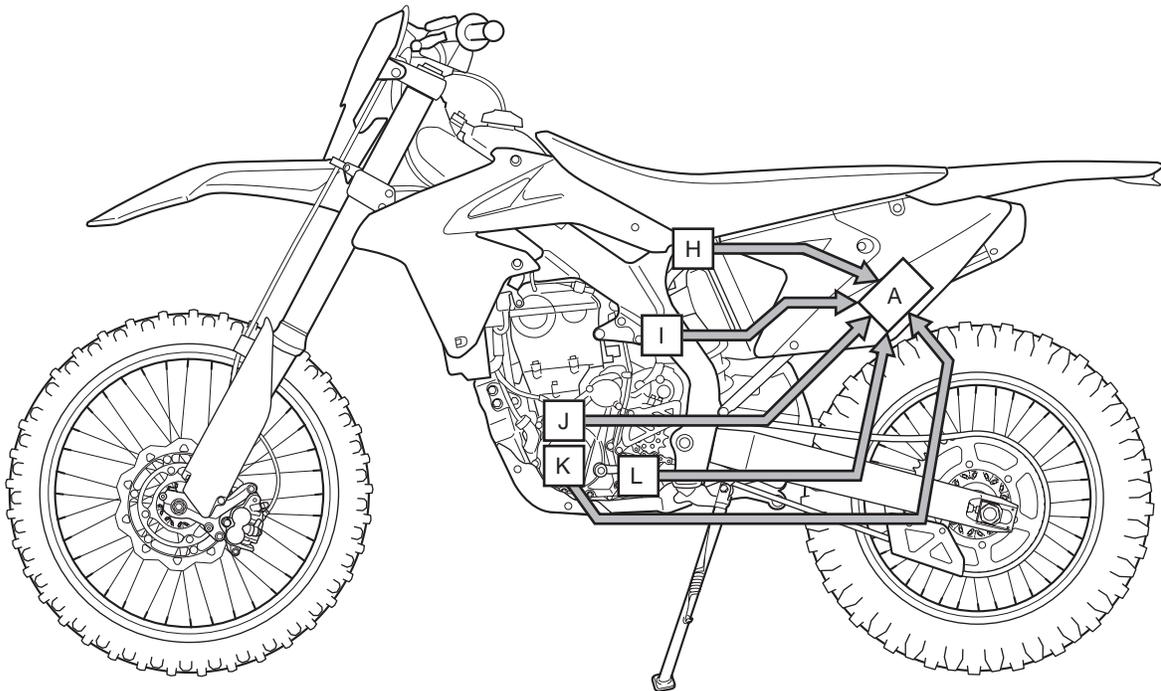
### FI System Parts Location

BA02J21103001



IA02J1110006-06

"A": ECM	"D": Fuel pump	"G": IAP sensor
"B": Ignition coil	"E": ECT sensor	
"C": TO sensor	"F": Fuel injector	



IA02J1110007-04

"A": ECM	"I": TP sensor	"K": Crankshaft rotation signal sensor
"H": IAT sensor	"J": CKP sensor	"L": GP switch

## Diagnostic Information and Procedures

### Engine Symptom Diagnosis

BA02J21104001

Condition	Possible cause	Correction / Reference Item
<b>Engine will not start or is hard to start (Compression too low)</b>	Valve clearance out of adjustment.	<i>Adjust.</i>
	Worn valve guides or poor seating of valves.	<i>Repair or replace.</i>
	Mistimed valves.	<i>Adjust.</i>
	Excessively worn piston rings.	<i>Replace.</i>
	Worn-down cylinder bore.	<i>Replace.</i>
	Starter motor cranks too slowly.	<i>Refer to "Starting System Diagram" in Section 1I (Page 1I-1).</i>
	Poor seating of spark plug.	<i>Retighten.</i>
	Broken, cracked, or damaged piston.	<i>Replace.</i>
	Defective automatic decomp.	<i>Clean or replace.</i>
<b>Engine will not start or is hard to start (Plug not sparking)</b>	Fouled spark plug.	<i>Clean.</i>
	Wet spark plug.	<i>Clean and dry.</i>
	Incorrect spark plug gap.	<i>Replace.</i>
	Defective spark plug cap.	<i>Replace.</i>
	Defective ignition coil.	<i>Replace.</i>
	Open or short in high-tension cord.	<i>Replace.</i>
	Defective CKP sensor.	<i>Replace.</i>
	Defective ECM.	<i>Replace.</i>
	Open-circuited wiring connections.	<i>Repair or replace.</i>
Defective magneto.	<i>Replace.</i>	
<b>Engine will not start or is hard to start (No fuel reaching the intake manifold)</b>	Clogged fuel feed hose or fuel delivery pipe.	<i>Clean or replace.</i>
	Defective fuel pump.	<i>Replace.</i>
	Defective fuel injector.	<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 TO sensor.	<i>Replace.</i>
	Defective fuel pump.	<i>Replace.</i>
	TP sensor out of adjustment.	<i>Adjust.</i>
	Defective TP sensor.	<i>Replace.</i>
	Defective CKP sensor.	<i>Replace.</i>
	Defective IAP sensor.	<i>Replace.</i>
<b>Engine idles poorly</b>	Defective ECM.	<i>Replace.</i>
	Defective ECT sensor.	<i>Replace.</i>
	Defective IAT sensor.	<i>Replace.</i>
	Valve clearance out of adjustment.	<i>Adjust.</i>
	Valve timing out of adjustment.	<i>Adjust.</i>
	Poor seating of valves.	<i>Replace or repair.</i>
	Worn valve guides.	<i>Replace.</i>
	Worn camshaft.	<i>Replace.</i>
	Incorrect spark plug gap.	<i>Replace.</i>
	Defective ignition coil.	<i>Replace.</i>
	Defective fuel pump.	<i>Replace.</i>
	Defective CKP sensor.	<i>Replace.</i>
	Defective ECM.	<i>Replace.</i>
Defective TP sensor.	<i>Replace.</i>	
Insufficient throttle cable play.	<i>Adjust.</i>	
<b>Engine stalls often (Incorrect fuel/air mixture)</b>	Defective IAP sensor or circuit.	<i>Repair or replace.</i>
	Defective fuel pump.	<i>Replace.</i>
	Defective ECT sensor.	<i>Replace.</i>
	Defective IAT sensor.	<i>Replace.</i>

Condition	Possible cause	Correction / Reference Item
<b>Engine stalls often (Fuel injector improperly operating)</b>	Defective fuel injector.	<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 magneto.	<i>Replace.</i>
	Defective battery or low battery voltage.	<i>Replace or recharge.</i>
<b>Engine stalls often (Control circuit or sensor improperly operating)</b>	Defective ECM.	<i>Replace.</i>
	Defective fuel pump.	<i>Replace.</i>
	Defective TP sensor.	<i>Replace.</i>
	Defective IAT sensor.	<i>Replace.</i>
	Defective CKP sensor.	<i>Replace.</i>
	Defective ECT sensor.	<i>Replace.</i>
	Defective TO sensor.	<i>Replace.</i>
<b>Engine stalls often (Engine parts improperly operating)</b>	Fouled spark plug.	<i>Clean.</i>
	Defective CKP sensor or ECM.	<i>Replace.</i>
	Clogged fuel feed hose or fuel delivery pipe.	<i>Clean.</i>
	Valve clearance out of adjustment.	<i>Adjust.</i>
<b>Engine noisy (Excessive valve chatter)</b>	Too large valve clearance.	<i>Adjust.</i>
	Weakened or broken valve springs.	<i>Replace.</i>
	Worn tappet or cam surface.	<i>Replace.</i>
	Worn or burnt camshaft journal.	<i>Replace.</i>
<b>Engine noisy (Noise seems to come from piston)</b>	Worn down piston or cylinder.	<i>Replace.</i>
	Combustion chamber fouled with carbon.	<i>Clean.</i>
	Worn piston pin or piston pin bore.	<i>Replace.</i>
	Worn piston ring or ring groove.	<i>Replace.</i>
<b>Engine noisy (Noise seems to come from cam chain)</b>	Stretched cam chain.	<i>Replace.</i>
	Worn sprockets.	<i>Replace.</i>
	Cam chain tension adjuster not working.	<i>Repair or replace.</i>
<b>Engine noisy (Noise seems to come from crankshaft)</b>	Rattling bearings due to wear.	<i>Replace.</i>
	Worn and burnt journal bearings.	<i>Replace.</i>
	Worn and burnt crank pin bearing.	<i>Replace.</i>
<b>Engine noisy (Noise seems to come from clutch)</b>	Worn or splines of countershaft or clutch sleeve hub.	<i>Replace.</i>
	Worn teeth of clutch plates.	<i>Replace.</i>
	Distorted clutch plates.	<i>Replace.</i>
	Worn clutch release bearing.	<i>Replace.</i>
<b>Engine noisy (Noise seems to come from transmission)</b>	Worn or rubbing gears.	<i>Replace.</i>
	Worn splines.	<i>Replace.</i>
	Worn or rubbing primary gears.	<i>Replace.</i>
	Worn bearings.	<i>Replace.</i>
<b>Engine noisy (Noise seems to come from water pump)</b>	Worn or damaged impeller shaft.	<i>Replace.</i>
	Worn or damaged mechanical seal.	<i>Replace.</i>
	Contact between pump case and impeller.	<i>Replace.</i>

**1A-9 Engine General Information and Diagnosis:**

<b>Condition</b>	<b>Possible cause</b>	<b>Correction / Reference Item</b>
<b>Engine runs poorly in high speed range (Defective engine internal electrical parts)</b>	Weakened valve springs.	<i>Replace.</i>
	Worn camshaft.	<i>Replace.</i>
	Valve timing out of adjustment.	<i>Adjust.</i>
	Incorrect spark plug gap.	<i>Replace.</i>
	Ignition not advanced sufficiently due to poorly working timing advance circuit.	<i>Replace ECM.</i>
	Defective ignition coil.	<i>Replace.</i>
	Defective CKP sensor.	<i>Replace.</i>
	Defective ECM.	<i>Replace.</i>
	Clogged air cleaner element.	<i>Clean.</i>
	Clogged fuel feed hose or fuel delivery pipe, resulting in inadequate fuel supply to injector.	<i>Clean and prime.</i>
	Defective fuel pump.	<i>Replace.</i>
Defective TP sensor.	<i>Replace.</i>	
<b>Engine runs poorly in high speed range (Defective air flow system)</b>	Clogged air cleaner element.	<i>Clean or replace.</i>
	Defective throttle valve.	<i>Adjust or replace.</i>
	Sucking air from throttle body or intake pipe joint.	<i>Repair or replace.</i>
	Defective ECM.	<i>Replace.</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 sensors.	<i>Replace.</i>
	Defective IAP sensor.	<i>Replace.</i>
	Defective CKP sensor.	<i>Replace.</i>
	Defective ECM.	<i>Replace.</i>
	Defective GP sensor.	<i>Replace.</i>
	TP sensor out of adjustment.	<i>Adjust.</i>
<b>Engine lacks power (Defective engine internal electrical parts)</b>	Loss of valve clearance.	<i>Adjust.</i>
	Weakened valve springs.	<i>Replace.</i>
	Valve timing out of adjustment.	<i>Adjust.</i>
	Worn piston rings or cylinder.	<i>Replace.</i>
	Poor seating of valves.	<i>Repair.</i>
	Fouled spark plug.	<i>Clean or replace.</i>
	Incorrect spark plug.	<i>Adjust or replace.</i>
	Clogged fuel injector.	<i>Clean.</i>
	TP sensor out of adjustment.	<i>Adjust.</i>
	Clogged air cleaner element.	<i>Clean.</i>
	Sucking air from throttle body or intake pipe joint.	<i>Retighten or replace.</i>
	Too much engine oil.	<i>Drain out excess oil.</i>
	Defective fuel pump or ECM.	<i>Replace.</i>
Defective CKP sensor and ignition coil.	<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 IAP sensor.	<i>Replace.</i>
	Defective GP sensor.	<i>Replace.</i>
	Defective ECM.	<i>Replace.</i>
	TP sensor out of adjustment.	<i>Adjust.</i>
<b>Engine overheats (Defective engine internal parts)</b>	Heavy carbon deposit on piston crown.	<i>Clean.</i>
	Not enough oil in the engine.	<i>Add oil.</i>
	Defective oil pump or clogged oil circuit.	<i>Replace or clean.</i>
	Use of incorrect engine oil.	<i>Change.</i>
	Sucking air from throttle body or intake pipe joint.	<i>Retighten or replace.</i>
	Defective cooling system.	<i>Refer to "Engine Cooling Symptom Diagnosis" in Section 1F (Page 1F-3).</i>

Condition	Possible cause	Correction / Reference Item
<b>Engine overheats (Lean fuel/air mixture)</b>	Short-circuited IAP sensor/lead wire.	<i>Repair or replace.</i>
	Short-circuited IAT sensor/lead wire.	<i>Repair or replace.</i>
	Sucking air from throttle body or intake pipe joint.	<i>Repair or replace.</i>
	Defective fuel injector.	<i>Replace.</i>
	Defective ECT sensor.	<i>Replace.</i>
<b>Engine overheats (The other factors)</b>	Ignition timing too advanced due to defective timing advance system (ECT sensor, GP sensor, CKP sensor and ECM.)	<i>Replace.</i>
	Drive chain is too tight.	<i>Adjust.</i>
<b>Dirty or heavy exhaust smoke</b>	Worn piston rings or cylinder.	<i>Replace.</i>
	Too much engine oil in the engine.	<i>Check and drain excess oil.</i>
	Worn valve guides.	<i>Replace.</i>
	Scored or scuffed cylinder wall.	<i>Replace.</i>
	Worn valve stems.	<i>Replace.</i>
	Defective valve stem seals.	<i>Replace.</i>
	Worn oil ring side rails.	<i>Replace.</i>

### Self-Diagnostic Procedures

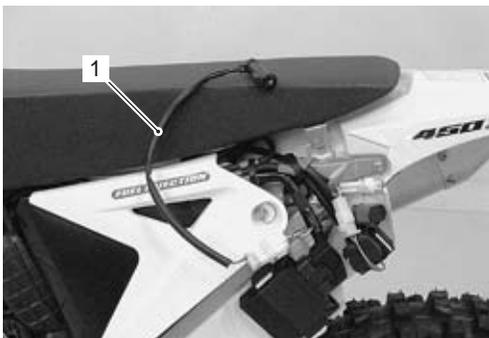
BA02J21104002

#### Use of FI Indicator Light

##### NOTE

- Do not disconnect the ECM coupler or battery lead wire before checking the DTC (Diagnostic Trouble Code). Such disconnection may erase the DTC.
- DTC can be checked by the FI indicator light assy.
- Before checking DTC, read self-diagnosis function carefully to have good understanding of the functions available and how to use them.
- Be sure to read "Precautions for Electrical Circuit Service" in Section 00 (Page 00-2) before inspection and observe what is written there.

- 1) Remove the left frame cover. Refer to "Exterior Parts Removal and Installation" in Section 9D (Page 9D-1).
- 2) Connect the FI indicator light assy (1) to the mode select coupler on the wiring harness.  
**36380-28H00: FI indicator light assy (option)**



IA02J1110008-01

- 3) Start the engine or crank the engine for more than 4 seconds.

##### NOTE

**ECM detects the malfunction part by the cranking or the engine start.**

- 4) Check the DTC to determine the malfunction part.
- 5) After repairing the trouble, turn off the ignition switch and turn on again. If the DTC does not indicate, the malfunction is cleared.
- 6) Disconnect the FI indicator light assy and install the left side cover.

#### Use of SDS

##### NOTE

- Do not disconnect the coupler from ECM, the battery cable from the battery, ECM ground wire harness from the engine or main fuse before confirming DTC (Diagnostic Trouble Code) stored in memory. Such disconnection will erase the memorized information in ECM memory.
- DTC stored in ECM memory can be checked by the SDS.
- Be sure to read "Precautions for Electrical Circuit Service" in Section 00 (Page 00-2) before inspection and observe what is written there.

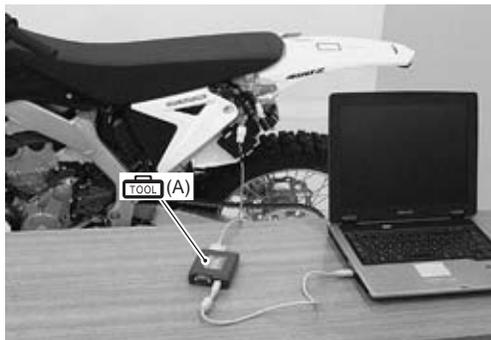
## 1A-11 Engine General Information and Diagnosis:

- 1) Remove the left frame cover. Refer to “Exterior Parts Removal and Installation” in Section 9D (Page 9D-1).
- 2) Set up the SDS tools. (Refer to the SDS operation manual for further details.)

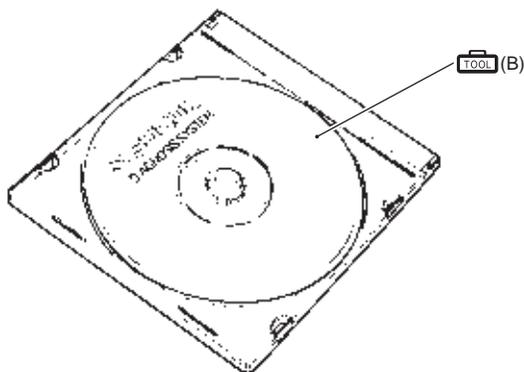
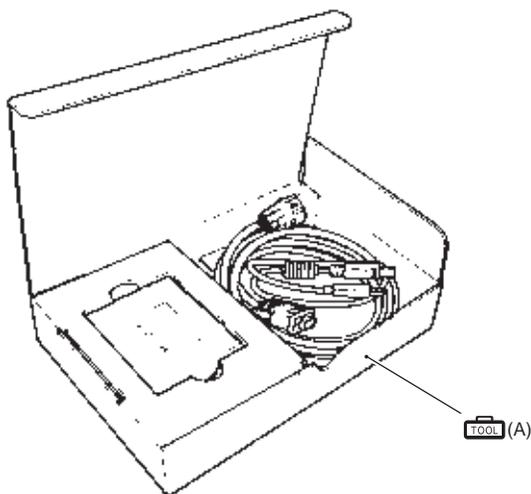
### Special tool

 (A): 09904-41010 (SUZUKI Diagnostic system set)

 (B): 99565-01010-021 (CD-ROM Ver.21)



IA02J1110009-01



I705H1110116-03

- 3) Click the DTC inspection button (1).



IA02J1110089-01

- 4) Start the engine or crank the engine for more than 4 seconds.
- 5) Check the DTC to determine the malfunction part. Refer to “DTC Table” (Page 1A-19).

### NOTE

- Read the DTC (Diagnostic Trouble Code) and show data when trouble (displaying data at the time of DTC) according to instructions displayed on SDS.
- Not only SDS is used for detecting Diagnostic Trouble Codes but also for reproducing and checking on screen the failure condition as described by customers using the trigger. (Refer to “Show Data When Trouble (Displaying Data at the Time of DTC)” (Page 1A-13).)
- How to use trigger. (Refer to the SDS operation manual for further details.)

- 6) After repairing the trouble, clear to delete history code (Past DTC). Refer to “Use of SDS Diagnosis Reset Procedures” (Page 1A-12).
- 7) Close the SDS tool and turn the ignition switch OFF.
- 8) Disconnect the SDS tool and install the left side cover.

**Use of SDS Diagnosis Reset Procedures**

BA02J21104003

**NOTE**

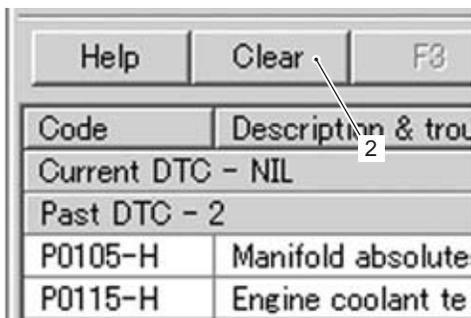
The malfunction code is memorized in the ECM also when the wire coupler of any sensor is disconnected. Therefore, when a wire coupler has been disconnected at the time of diagnosis, erase the stored malfunction history code using SDS.

- 1) After repairing the trouble, turn OFF the ignition switch and turn ON again.
- 2) Click the DTC inspection button (1).



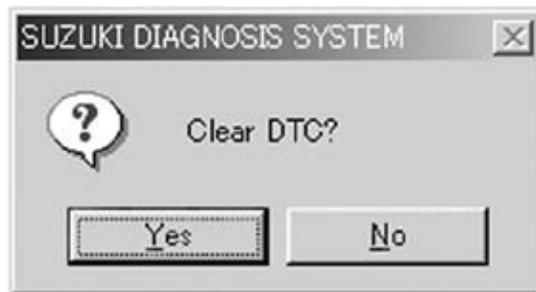
IA02J1110089-01

- 3) Check the DTC.
- 4) The previous malfunction history code (Past DTC) still remains stored in the ECM. Therefore, erase the history code memorized in the ECM using SDS tool.
- 5) Click "Clear" (2) to delete history code (Past DTC).



I705H1110005-01

- 6) Follow the displayed instructions.

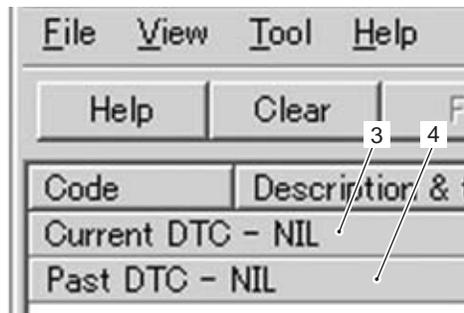


I705H1110006-01



I705H1110009-01

- 7) Check that both "Current DTC" (3) and "Past DTC" (4) are deleted (NIL).



I705H1110008-01

- 8) Close the SDS tool and turn the ignition switch OFF.
- 9) Disconnect the SDS tool and install the left side cover.

**Show Data When Trouble (Displaying Data at the Time of DTC)**

**Use of SDS**

ECM stores the engine and driving conditions (in the form of data as shown in the figure) at the moment of the detection of a malfunction in its memory. This data is called “Show data when trouble”.

Therefore, it is possible to know engine and driving conditions (e.g., whether the engine was warm or not, where the vehicle was running or stopped) when a malfunction was detected by checking the show data when trouble. This show data when trouble function can record the maximum of two Diagnostic Trouble Codes in the ECM.

Also, ECM has a function to store each show data when trouble for two different malfunctions in the order of occurrence as the malfunction is detected. Utilizing this function, it is possible to know the order of malfunctions that have been detected. Its use is helpful when rechecking or diagnosing a trouble.

Failure #1

P0110-H Intake air temperature circuit malfunction

Item	Pre-detect	Detect poi...	Post-dete...
Engine speed	1082	1327	1175
Throttle position	32.4	32.4	32.4
Manifold absolute pressure 1	98.1	93.5	98.1
Engine coolant / oil temperature	37.8	37.8	37.8
Gear position	N	N	N

I831G1110016-02

1) Click “Show data when trouble” (1) to display the data.



IA02J1110090-01

2) Click the drop down button (2), either "Failure #1" or "Failure #2" can be selected.

The screenshot shows a diagnostic tool interface. At the top, there is a dropdown menu currently displaying "Failure #2". A small white box with the number "2" and an arrow points to the dropdown arrow. Below the dropdown, the text "P0110-H Intake air temperature circuit malfunction" is visible. Underneath is a table with two columns: "Item" and "Pre-d".

Item	Pre-d
Engine speed	
Throttle position	
Manifold absolute pressure 1	
Engine coolant / oil temperature	
Gear position	

## SDS Check

Using SDS, sample the data at the time of new and periodic inspections.

After saving the sampled data in the computer, file them by model and by user.

The periodically filed data helps to improve the accuracy of troubleshooting since they can indicate the condition of motorcycle functions that has changed with time.

For example, when a motorcycle is brought in for service but the troubleshooting of a failure is not easy, comparing the current data value to past filed data value at time of normal condition can allow the specific engine failure to be determined.

Also, in the case of a customer's motorcycle which is not periodically brought in for service with no past data value having been saved, if the data value of a good condition one have been already saved as a master (STD), comparison between the same models helps to facilitate the troubleshooting.

- 1) Remove the left frame cover. Refer to "Exterior Parts Removal and Installation" in Section 9D (Page 9D-1).
- 2) Set up the SDS tool. (Refer to the SDS operation manual for further details.)

### Special tool

 : 09904-41010 (SDS set)

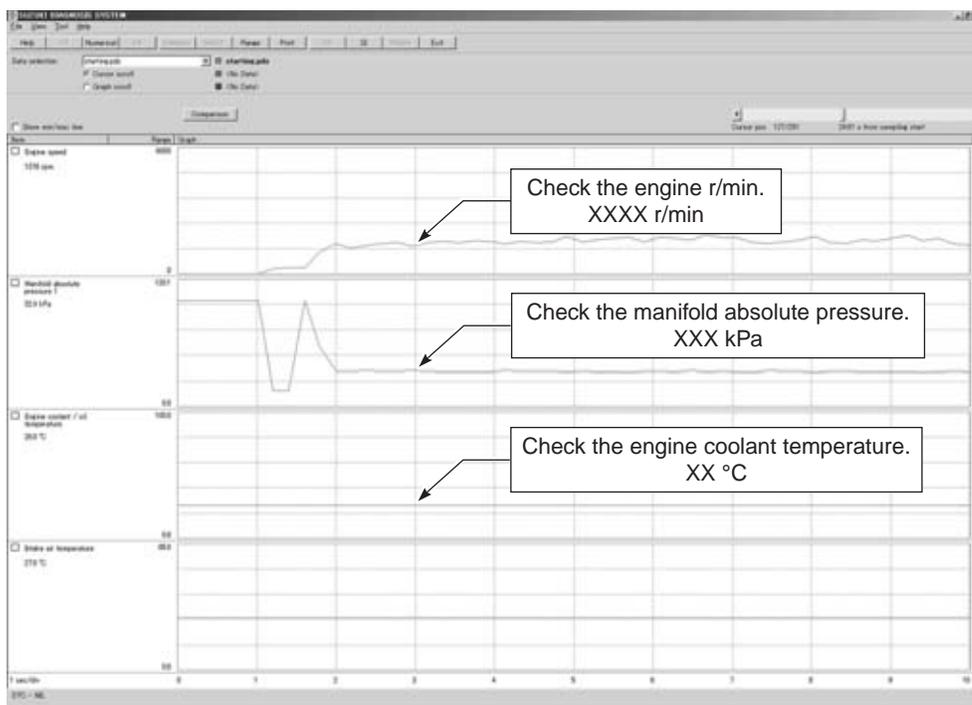
 : 99565-01010-021 (CD-ROM Ver.21)

### NOTE

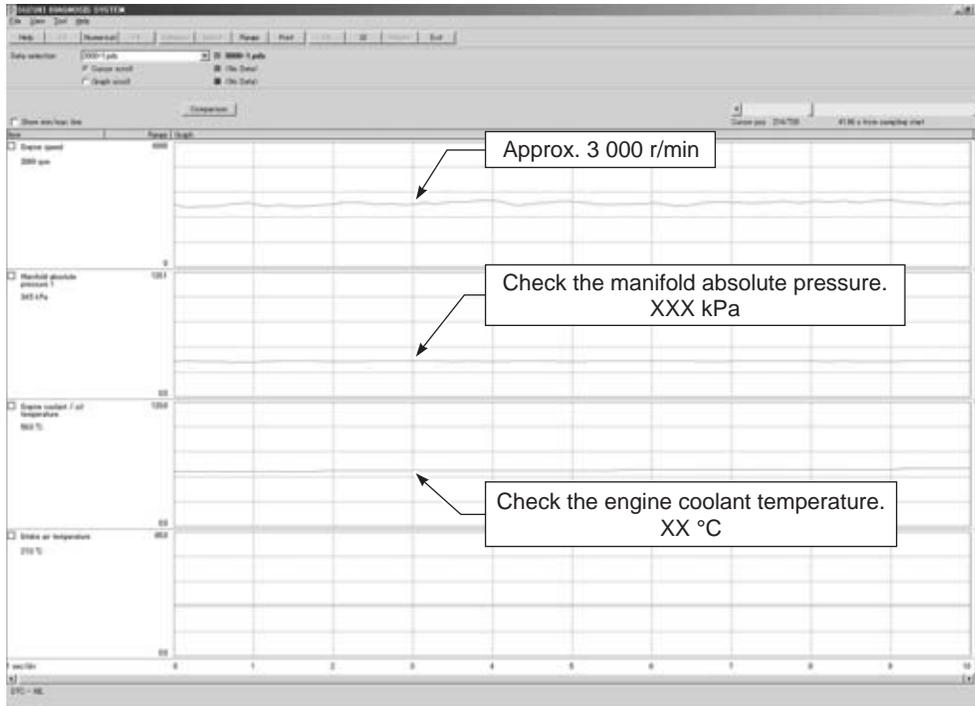
- Before taking the sample of data, check and clear the Past DTC.
- A number of different data under a fixed condition as shown below should be saved or filed as sample.

### Sample

Data sampled from cold starting through warm-up

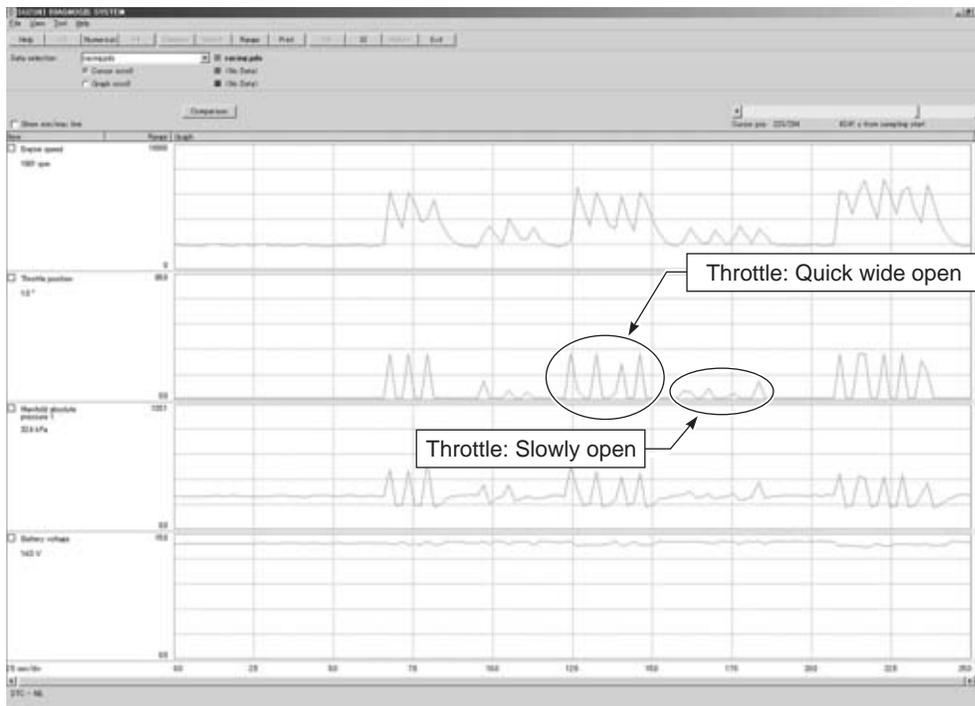


Data at 3 000 r/min under no load



IA02J1110077-03

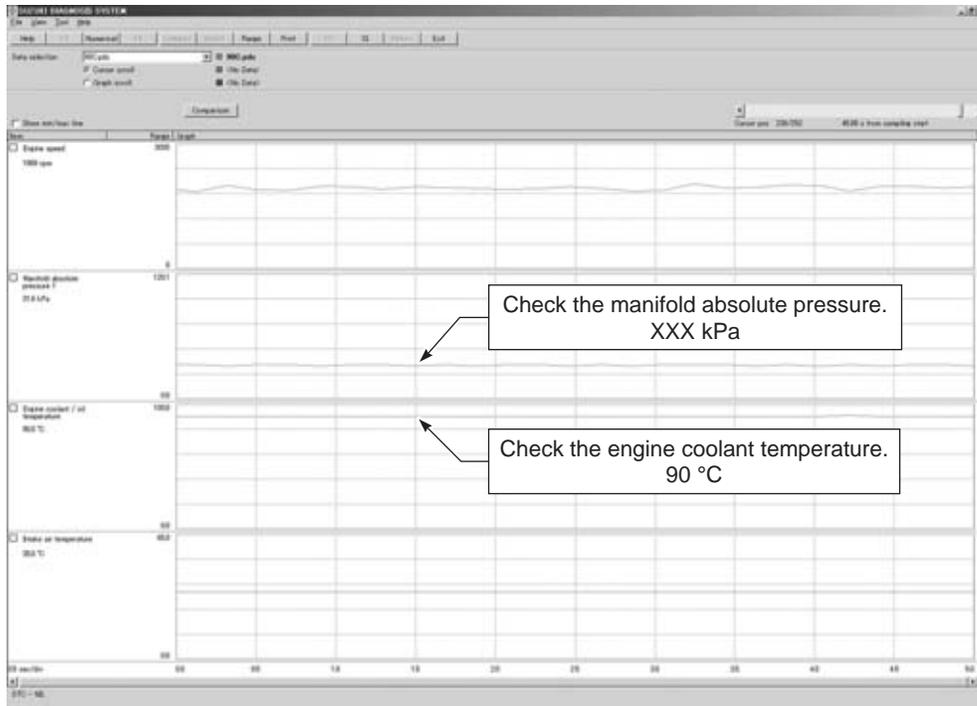
Data at the time of racing



IA02J1110078-03

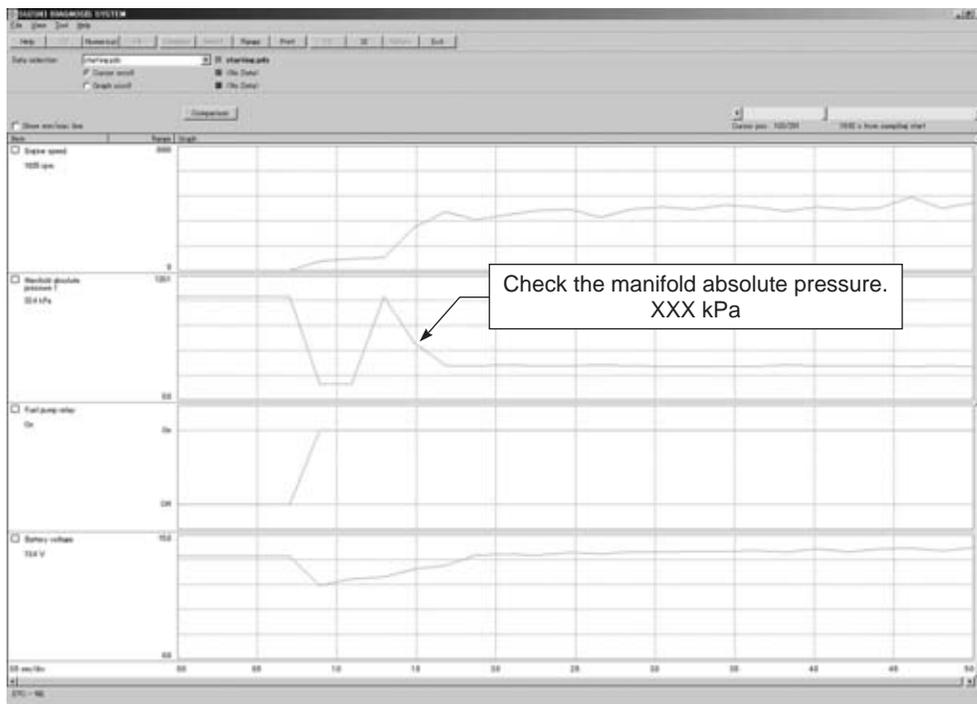
## 1A-17 Engine General Information and Diagnosis:

### Data of intake negative pressure during idling (90 °C)



IA02J1110079-03

### Data of manifold absolute pressure operation at the time of starting



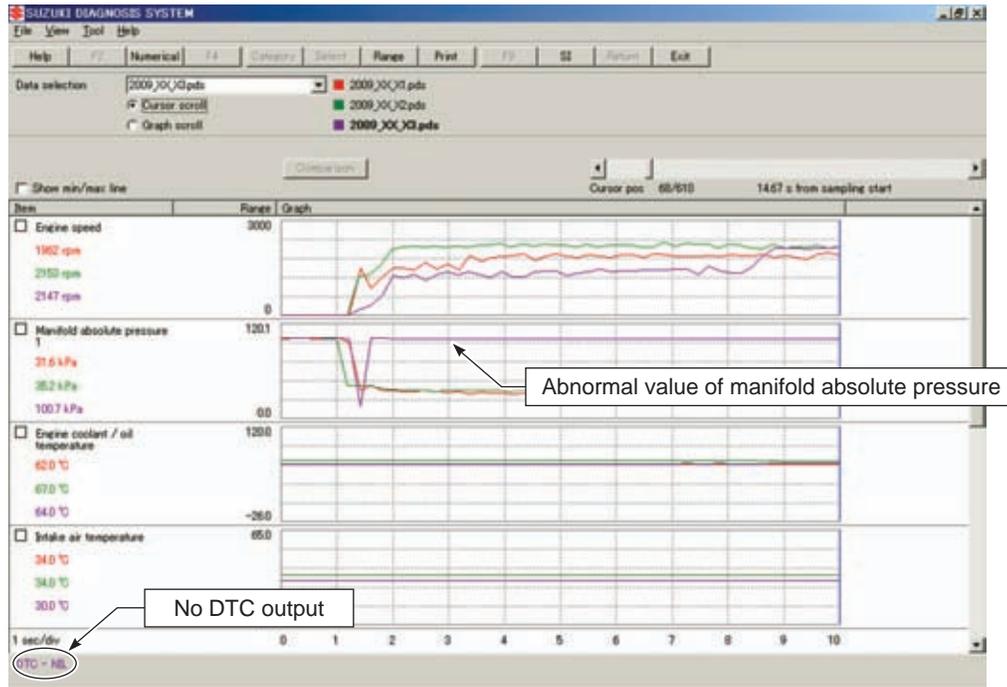
IA02J1110080-03

**Example of Trouble**

Three data (one current data and two past data) can be made in comparison by showing them in the graph. Read the change of value by comparing the current data to the past data that have been saved under the same condition, then you may determine how changes have occurred with the pass of time and identify what problem is currently occurring.

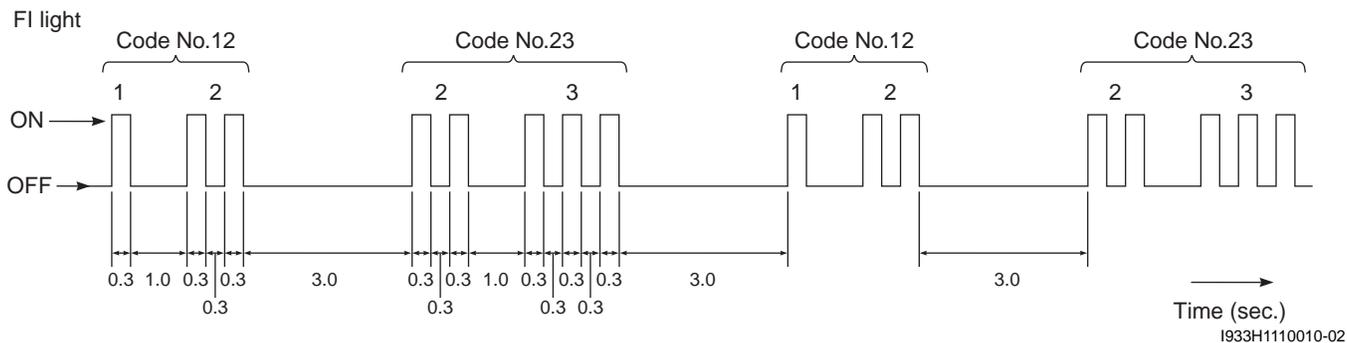
**NOTE**

With DTC not output. if the intake negative pressure is found to be higher than the data saved previously, the possible cause may probably lie in the hardware side such as O-ring damage, etc.



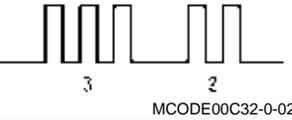
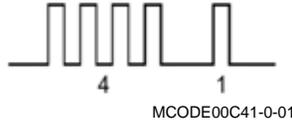
DTC Table

EXAMPLE: When CKP sensor and TO sensor defective (DTC No.12 and 23)



In the FI light, the DTC is indicated from small code to large code.

Code	FI light flashing pattern	Malfunction part	Remarks
00	 MCODE00C00-0-03	None	
12 ☞ (Page 1A-24)	 MCODE00C12-0-02	Crankshaft position sensor (CKPS)	Pick-up coil signal, signal generator
14 ☞ (Page 1A-27)	 MCODE00C14-0-02	Throttle position sensor (TPS)	
15 ☞ (Page 1A-34)	 MCODE00C15-0-02	Engine coolant temperature sensor (ECTS)	
17 ☞ (Page 1A-40)	 MCODE00C17-0-01	Intake air pressure sensor (IAPS)	
21 ☞ (Page 1A-48)	 MCODE00C21-0-03	Intake air temperature sensor (IATS)	
23 ☞ (Page 1A-53)	 MCODE00C23-0-02	Tip-over sensor (TOS)	
24 ☞ (Page 1A-60)	 MCODE00C24-0-01	Ignition signal (IG coil)	IG coil
31 ☞ (Page 1A-60)	 MCODE00C31-0-01	Gear position signal (GP switch)	GP switch

Code	FI light flashing pattern	Malfunction part	Remarks
32 ☞ (Page 1A-62)		Injector signal (FI)	Fuel injector
41 ☞ (Page 1A-65)		Fuel pump control system (FP control system)	ECM
63 ☞ (Page 1A-67)		Crankshaft rotation signal sensor	

### Fail-Safe Function Table

BA02J21104007

FI system is provided with fail-safe function to allow the engine to start and the motorcycle to run in a minimum performance necessary even under malfunction condition.

Item	Fail-Safe mode	Starting ability	Running ability
IAP sensor	Intake air pressure is fixed to 106 kPa (795 mmHg).	“YES”	“YES”
TP sensor	The throttle opening is fixed to full close position. Ignition timing is also fixed.	“YES”	“YES”
ECT sensor	Engine coolant temperature value is fixed to 80 °C (176 °F).	“YES”	“YES”
IAT sensor	Intake air temperature value is fixed to 15 °C (59 °F).	“YES”	“YES”
Gear position signal	Gear position signal is fixed to 1st gear.	“YES”	“YES”

The engine can start and can run even if the above signal is not received from each sensor. But, the engine running condition is not complete, providing only emergency help (by fail-safe circuit). In this case, it is necessary to bring the motorcycle to the workshop for complete repair.

**FI System Troubleshooting**

**Customer Complaint Analysis**

Record details of the problem (failure, complaint) and how it occurred as described by the customer. For this purpose, use of an inspection form such as below will facilitate collecting information required for proper analysis and diagnosis.

**EXAMPLE: CUSTOMER PROBLEM INSPECTION FORM**

<b>User name:</b>	<b>Model:</b>	<b>VIN:</b>	
<b>Date of issue:</b>	<b>Date Reg.:</b>	<b>Date of problem:</b>	<b>Mileage:</b>

PROBLEM SYMPTOMS	
<input type="checkbox"/> Difficult Starting <input type="checkbox"/> No cranking <input type="checkbox"/> No initial combustion <input type="checkbox"/> No combustion <input type="checkbox"/> Poor starting at ( <input type="checkbox"/> cold / <input type="checkbox"/> warm / <input type="checkbox"/> always) <input type="checkbox"/> Other	<input type="checkbox"/> Poor Driveability <input type="checkbox"/> Hesitation on acceleration <input type="checkbox"/> Back fire / <input type="checkbox"/> After fire <input type="checkbox"/> Lack of power <input type="checkbox"/> Surging <input type="checkbox"/> Abnormal knocking <input type="checkbox"/> Engine rpm jumps briefly <input type="checkbox"/> Other
<input type="checkbox"/> Poor Idling <input type="checkbox"/> Poor fast Idle <input type="checkbox"/> Abnormal idling speed ( <input type="checkbox"/> High / <input type="checkbox"/> Low) (     r/min) <input type="checkbox"/> Unstable <input type="checkbox"/> Hunting (     r/min to     r/min) <input type="checkbox"/> Other  <input type="checkbox"/> OTHERS:	<input type="checkbox"/> Engine Stall when <input type="checkbox"/> Immediately after start <input type="checkbox"/> Throttle valve is opened <input type="checkbox"/> Throttle valve is closed <input type="checkbox"/> Load is applied <input type="checkbox"/> Other

VEHICLE/ENVIRONMENTAL CONDITION WHEN PROBLEM OCCURS	
<b>Environmental condition</b>	
Weather	<input type="checkbox"/> Fair / <input type="checkbox"/> Cloudy / <input type="checkbox"/> Rain / <input type="checkbox"/> Snow / <input type="checkbox"/> Always / <input type="checkbox"/> Other
Temperature	<input type="checkbox"/> Hot / <input type="checkbox"/> Warm / <input type="checkbox"/> Cool / <input type="checkbox"/> Cold ( °C / °F) / <input type="checkbox"/> Always
Frequency	<input type="checkbox"/> Always / <input type="checkbox"/> Sometimes (times / day, month) / <input type="checkbox"/> Only once <input type="checkbox"/> Under certain condition
Road	<input type="checkbox"/> Mountainous ( <input type="checkbox"/> Uphill / <input type="checkbox"/> Downhill) / <input type="checkbox"/> Gravel / <input type="checkbox"/> Other
<b>Vehicle condition</b>	
Engine condition	<input type="checkbox"/> Cold / <input type="checkbox"/> Warming up phase / <input type="checkbox"/> Warmed up / <input type="checkbox"/> Always / <input type="checkbox"/> Other at starting <input type="checkbox"/> Immediately after start / <input type="checkbox"/> Racing without load / <input type="checkbox"/> Engine speed (     r/min)
Vehicle condition	During driving: <input type="checkbox"/> Constant speed / <input type="checkbox"/> Accelerating / <input type="checkbox"/> Decelerating <input type="checkbox"/> Right hand corner / <input type="checkbox"/> Left hand corner <input type="checkbox"/> At stop / <input type="checkbox"/> Vehicle speed when problem occurs (     km/h,     mile/h) <input type="checkbox"/> Other:

**NOTE**

The above form is a standard sample. The form should be modified according to condition and characteristics of each market.

### Visual Inspection

Prior to diagnosis using the FI indicator light assy or SDS, perform the following visual inspections. The reason for visual inspection is that mechanical failures (such as oil leakage) cannot be displayed on the screen with the use of FI indicator light assy or SDS.

- Engine oil level and leakage. Refer to “Engine Oil Filter Replacement” in Section 0B (Page 0B-7).
- Engine coolant level and leakage. Refer to “Cooling Circuit Inspection” in Section 1F (Page 1F-4).
- Fuel level and leakage. Refer to “Fuel Hose Inspection” in Section 0B (Page 0B-14).
- Clogged air cleaner element. Refer to “Air Cleaner Element Cleaning” in Section 0B (Page 0B-4).
- Battery condition.
- Throttle cable play. Refer to “Throttle Cable Play Inspection and Adjustment” in Section 0B (Page 0B-12).
- Broken fuse.
- Exhaust gas leakage and noise. Refer to “Exhaust System Inspection” in Section 1K (Page 1K-3).
- Each coupler disconnection.
- Clogged radiator fins. Refer to “Radiator Inspection and Cleaning” in Section 1F (Page 1F-4).

### Malfunction Code and Defective Condition Table

BA02J21104009

DTC No.	Detected Item		Detected Failure Condition	Check For			
12	CKP sensor		The signal does not reach ECM for 1 sec. or more, after receiving the IAP sensor input signal.	CKP sensor wiring and mechanical parts. CKP sensor, lead wire/coupler connection.			
P0335							
14	TP sensor		The sensor should produce following voltage. $0.5\text{ V} \leq \text{sensor voltage} < 4.8\text{ V}$ In other than the above range, 14 (P0120) is indicated.	TP sensor, lead wire/coupler connection.			
P0120					H	Sensor voltage is higher than specified value.	TP sensor circuit shorted to VCC or ground circuit open.
					L	Sensor voltage is lower than specified value.	TP sensor circuit open or shorted to the ground or VCC circuit open.
15	ECT sensor		The sensor voltage should be the following. $0.1\text{ V} \leq \text{sensor voltage} < 4.8\text{ V}$ In other than the above range, 15 (P0115) is indicated.	ECT sensor, lead wire/coupler connection.			
P0115					H	Sensor voltage is higher than specified value.	ECT sensor circuit open or ground circuit open.
					L	Sensor voltage is lower than specified value.	ECT sensor circuit shorted to the ground.
17	IAP sensor		The sensor should produce following voltage. $0.5\text{ V} \leq \text{sensor voltage} < 4.4\text{ V}$ In other than the above range, 17 (P0105) is indicated.	IAP sensor, lead wire/coupler connection.			
P0105					H	Sensor voltage is higher than specified value.	IAP sensor circuit shorted to VCC or ground circuit open.
					L	Sensor voltage is lower than specified value.	IAP sensor circuit open or shorted to ground or VCC circuit open.
21	IAT sensor		The sensor voltage should be the following. $0.2\text{ V} \leq \text{sensor voltage} < 4.8\text{ V}$ In other than the above range, 21 (P0110) is indicated.	IAT sensor, lead wire/coupler connection.			
P0110					H	Sensor voltage is higher than specified value.	IAT sensor circuit open or ground circuit open.
					L	Sensor voltage is lower than specified value.	IAT sensor circuit shorted to the ground.

**1A-23 Engine General Information and Diagnosis:**

DTC No.		Detected Item	Detected Failure Condition	Check For
23		TO sensor	The sensor voltage should be the following for 5 seconds. and more. $0.3\text{ V} \leq \text{sensor voltage} < 4.5\text{ V}$ In other than the above value, 23 (P1651) is indicated.	TO sensor, lead wire/coupler connection.
P1651	H		Sensor voltage is higher than specified value.	TO sensor circuit shorted to VCC or ground circuit open.
	L		Sensor voltage is lower than specified value.	TO sensor circuit open or shorted to the ground or VCC circuit open.
24		Ignition signal	CKP sensor (pick-up coil) signal is produced, but signal from ignition coil is interrupted 5 times or more continuously. In this case, the code 24 (P0351) is indicated.	Ignition coil, wiring/coupler connection, power supply from the battery.
P0351				
31		Gear position signal	Gear position signal voltage should be higher than the following for 30 seconds and more. Gear position sensor voltage $\geq 0.6\text{ V}$ . If lower than the above value, 31 (P0705) is indicated.	GP switch, wiring/coupler connection, gearshift cam, etc.
P0705				
32		Fuel injector	CKP sensor (pick-up coil) signal is produced, but fuel injector signal is interrupted 8 times or more continuously. In this case, the code 32 (P0201) is indicated.	Fuel injector, wiring/coupler connection, power supply to the injector.
P0201				
41		Fuel pump relay	No voltage is applied to the fuel pump, although FP relay is turned ON.  <b>NOTE</b> <hr/> <b>The FP relay is incorporated in the ECM.</b>	FP relay, lead wire/coupler connection, power source to FP relay.
P0230				
63		Crankshaft rotation signal sensor	The signal does not reach ECM for 30 seconds. or more.	Crankshaft rotation signal sensor wiring and mechanical parts. Crankshaft rotation signal sensor, lead wire/coupler connection.
P1771				

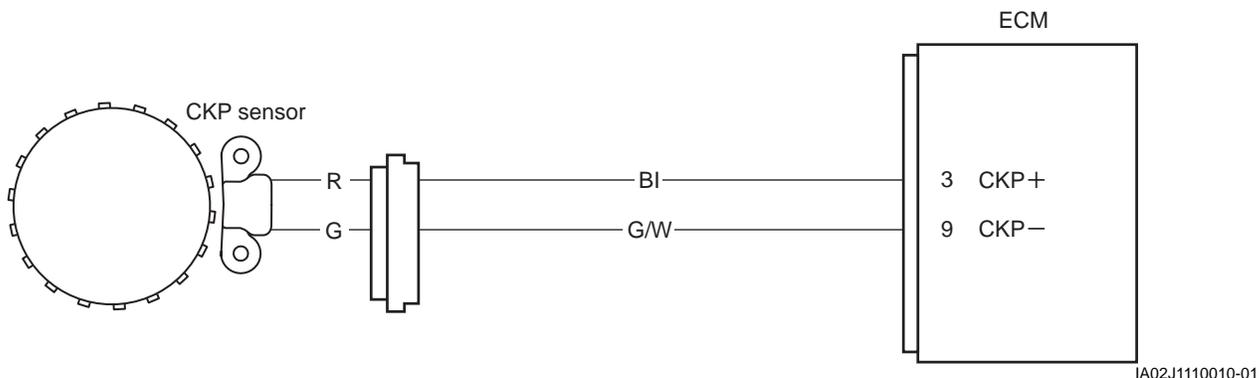
**DTC “12” (P0335): CKP Sensor Circuit Malfunction**

BA02J21104010

**Detected Condition and Possible Cause**

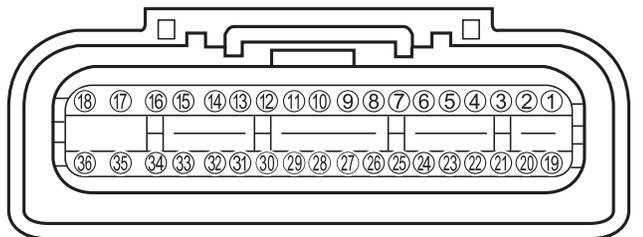
Detected condition	Possible cause
The signal does not reach ECM for 1 second or more, after receiving the IAP sensor input signal.	<ul style="list-style-type: none"> <li>• Metal particles or foreign material being stuck on the CKP sensor and rotor tip.</li> <li>• CKP sensor circuit open or short.</li> <li>• CKP sensor malfunction.</li> <li>• ECM malfunction.</li> </ul>

**Wiring Diagram**



IA02J1110010-01

**ECM coupler (Harness side)**



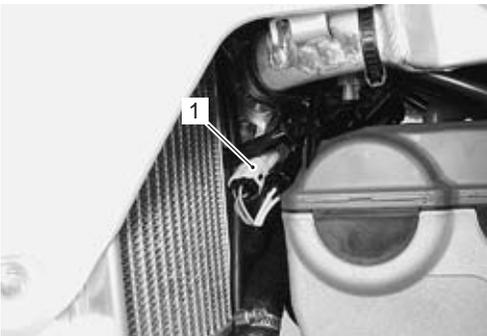
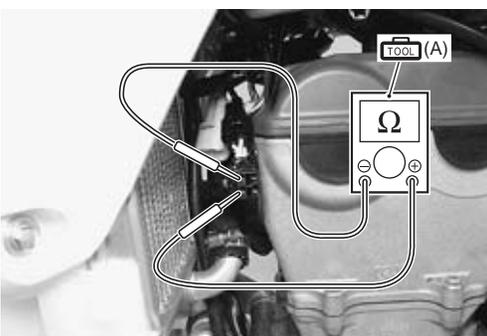
I933H1110012-02

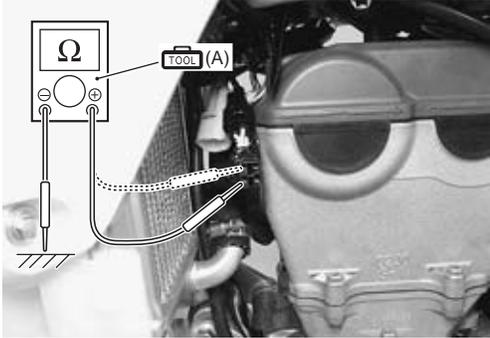
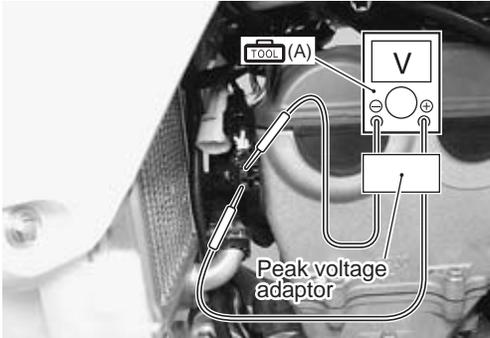
**Troubleshooting**

**NOTE**

After repairing the trouble, clear the DTC using SDS tool. Refer to “Use of SDS Diagnosis Reset Procedures” (Page 1A-12).

1A-25 Engine General Information and Diagnosis:

Step	Action	Yes	No
1	<p>1) Turn off the ignition switch.</p> <p>2) Check the CKP sensor/crankshaft rotation signal sensor lead wire coupler (1) for loose or poor contacts. If OK, then measure the CKP sensor resistance.</p>  <p style="text-align: right; font-size: small;">IA02J1110011-01</p> <p>3) Disconnect the CKP sensor/crankshaft rotation signal sensor lead wire coupler and measure the resistance.</p> <p><b>Special tool</b>  <b>TOOL (A): 09900-25008 (Multi circuit tester set)</b></p> <p><b>Tester knob indication</b>  <b>Resistance (<math>\Omega</math>)</b></p> <p><b>CKP sensor resistance</b>  <b>150 – 280 <math>\Omega</math> (R – G)</b></p>  <p style="text-align: right; font-size: small;">IA02J1110012-01</p>	Go to Step 2.	Replace the CKP sensor with a new one.

Step	Action	Yes	No
1	<p>4) If OK, then check the continuity between each terminal and ground.</p> <p><b>Special tool</b>   (A): 09900–25008 (Multi circuit tester set)</p> <p><b>CKP sensor continuity</b>  <math>\infty \Omega</math> (Infinity) (R – Ground, G – Ground)</p>  <p style="text-align: right; font-size: small;">IA02J1110083-02</p> <p><i>Are the resistance and continuity OK?</i></p>	<p>Go to Step 2.</p>	<p>Replace the CKP sensor with a new one.</p>
2	<p>1) Press the starter button and allow the engine to crank for a few seconds, and measure the CKP sensor peak voltage at the coupler.</p> <p><b>Special tool</b>   (A): 09900–25008 (Multi circuit tester set)</p> <p><b>Tester knob indication</b>  <b>Voltage (---)</b></p> <p><b>CKP sensor peak voltage</b>  <b>5.0 V and more</b>  <b>((+) terminal: R – (–) terminal: G)</b></p>  <p style="text-align: right; font-size: small;">IA02J1110013-02</p> <p>2) Repeat the 1) test procedures a few times and measure the highest peak voltage.</p> <p><i>Is the voltage OK?</i></p>	<ul style="list-style-type: none"> <li>• Bl or G/W wire open or shorted to the ground.</li> <li>• Loose or poor contacts on the CKP sensor/crankshaft rotation signal sensor lead wire coupler or ECM coupler (terminal “3” or “9”).</li> <li>• If wire and connection are OK, intermittent trouble or faulty ECM.</li> <li>• Recheck each terminal and wire harness for open circuit and poor connection.</li> <li>• Replace the ECM with a known good one, and inspect it again. Refer to “ECM Removal and Installation” in Section 1C (Page 1C-1).</li> </ul>	<ul style="list-style-type: none"> <li>• Inspect that metal particles or foreign material stuck on the CKP sensor and rotor tip.</li> <li>• If there are no metal particles and foreign material, then replace the CKP sensor with a new one. Refer to “CKP Sensor / Crankshaft Rotation Signal Sensor Removal and Installation” in Section 1C (Page 1C-1).</li> </ul>

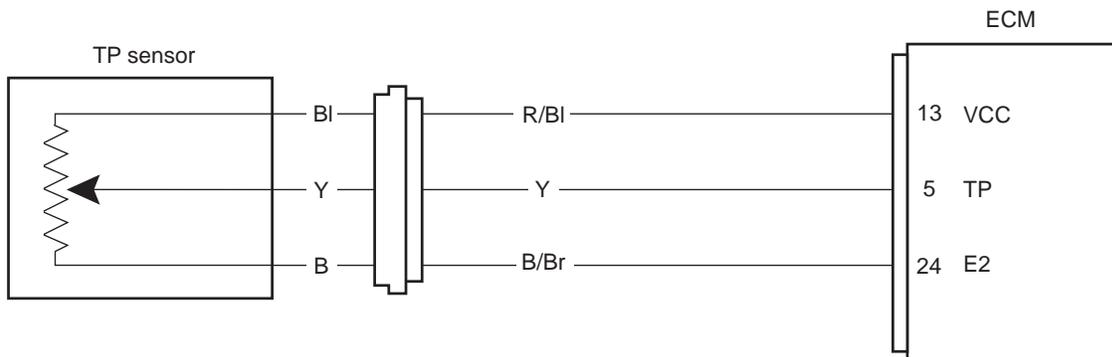
**DTC “14” (P0120-H/L): TP Sensor Circuit Malfunction**

BA02J21104011

**Detected Condition and Possible Cause**

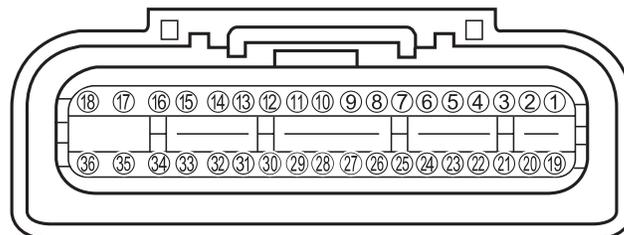
Detected condition		Possible cause
14	Output voltage is not within the following range. Difference between actual throttle opening and opening calculated by ECM is larger than specified value. $0.5\text{ V} \leq \text{Sensor voltage} < 4.8\text{ V}$	<ul style="list-style-type: none"> <li>TP sensor maladjusted.</li> <li>TP sensor circuit open or short.</li> <li>TP sensor malfunction.</li> <li>ECM malfunction.</li> </ul>
P0120	H Sensor voltage is higher than specified value.	<ul style="list-style-type: none"> <li>TP sensor circuit is shorted to VCC or ground circuit is open.</li> </ul>
	L Sensor voltage is lower than specified value.	<ul style="list-style-type: none"> <li>TP sensor circuit is open or shorted to ground or VCC circuit open.</li> </ul>

**Wiring Diagram**



IA02J1110014-01

**ECM coupler (Harness side)**



I933H1110012-02

**Troubleshooting**

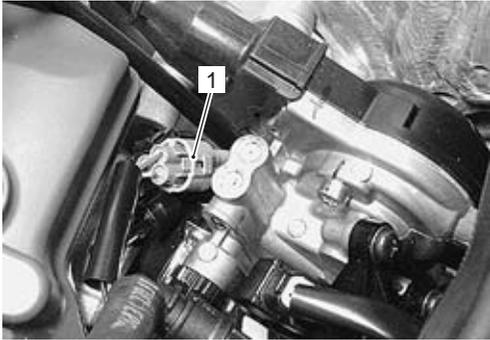
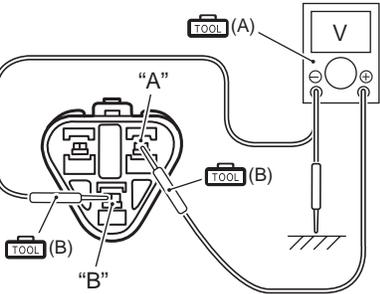
**⚠ CAUTION**

When using the multi circuit tester, do not strongly touch the terminal of the ECM coupler with a needle-point tester probe to prevent the terminal damage or terminal bend.

**NOTE**

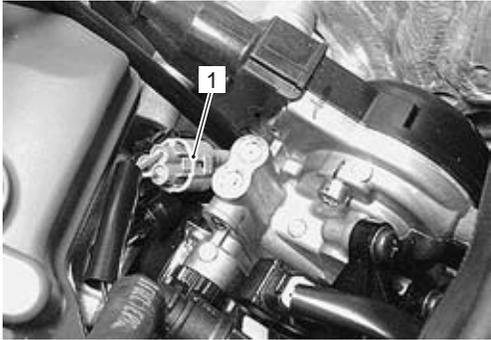
After repairing the trouble, clear the DTC using SDS tool. Refer to “Use of SDS Diagnosis Reset Procedures” (Page 1A-12).

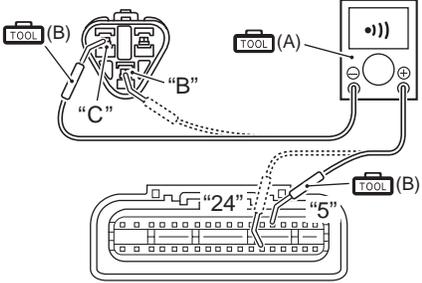
14 (Use of FI indicator light)

Step	Action	Yes	No
1	<p>1) Turn off the ignition switch.</p> <p>2) Remove the fuel tank. Refer to "Fuel Tank Removal and Installation" in Section 1G (Page 1G-5).</p> <p>3) Check the TP sensor lead wire coupler (1) for loose or poor contacts. If OK, then check the TP sensor input voltage.</p>  <p style="text-align: right; font-size: small;">IA02J1110015-02</p> <p>4) Disconnect the TP sensor lead wire coupler.</p> <p>5) Turn on the ignition switch.</p> <p>6) Measure the input voltage at the R/BI wire "A" and ground. If OK, then measure the input voltage at the R/BI wire "A" and B/Br wire "B".</p> <p><b>Special tool</b>   (A): 09900-25008 (Multi circuit tester set)   (B): 09900-25009 (Needle-point probe set)</p> <p><b>Tester knob indication</b>  <b>Voltage ( --- )</b></p> <p><b>TP sensor input voltage</b>  <b>4.5 – 5.5 V</b>  <b>((+) terminal: R/BI – (–) terminal: Ground, (+) terminal: R/BI – (–) terminal: B/Br)</b></p>  <p style="text-align: right; font-size: small;">IA02J1110016-01</p> <p><i>Is the voltage OK?</i></p>	<p>Go to Step 3.</p>	<ul style="list-style-type: none"> <li>Loose or poor contacts on the ECM coupler (terminal "13" or "24").</li> <li>Open or short circuit in the R/BI wire or B/Br wire.</li> </ul>

# 1A-29 Engine General Information and Diagnosis:

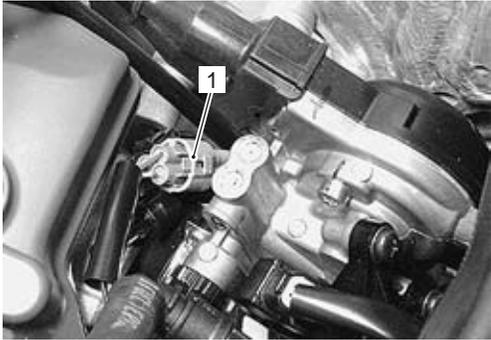
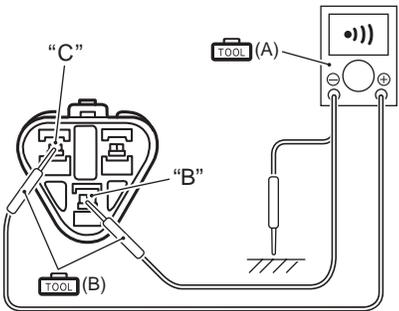
## P0120-H (Use of SDS)

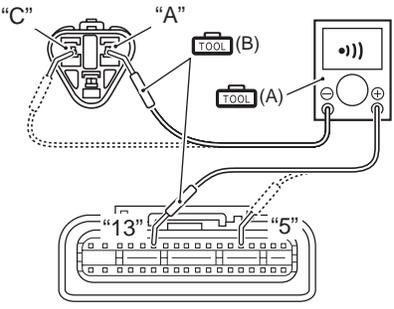
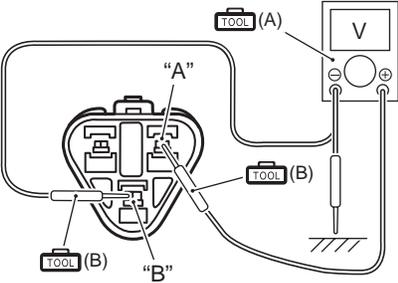
Step	Action	Yes	No
1	<p>1) Turn off the ignition switch.</p> <p>2) Remove the fuel tank. Refer to "Fuel Tank Removal and Installation" in Section 1G (Page 1G-5).</p> <p>3) Check the TP sensor lead wire coupler (1) for loose or poor contacts. If OK, then check the TP sensor lead wire continuity.</p>  <p style="text-align: right; font-size: small;">IA02J1110015-02</p> <p>4) Disconnect the TP sensor lead wire coupler.</p> <p>5) Check the continuity between R/BI wire "A" and Y wire "C". If sound is not heard from the tester, the circuit condition is OK.</p> <p><b>Special tool</b>  <b>TOOL (A): 09900-25008 (Multi circuit tester set)</b>  <b>TOOL (B): 09900-25009 (Needle-point probe set)</b></p> <p><b>Tester knob indication</b>  <b>Continuity (•))]</b></p> <p style="text-align: right; font-size: small;">IA02J1110018-02</p>	Go to Step 2.	Y wire shorted to VCC or B/Br wire open.

Step	Action	Yes	No
1	<p>6) Disconnect the ECM coupler. Refer to "ECM Removal and Installation" in Section 1C (Page 1C-1).</p> <p>7) Check the continuity between Y wire "C" and terminal "5". Also, check the continuity between B/Br wire "B" and terminal "24".</p> <p><b>Tester knob indication</b>  <b>Continuity (•))]</b></p> <p><b>ECM coupler (Harness side)</b></p>  <p style="text-align: right;">IA02J1110019-02</p> <p><i>Is the continuity OK?</i></p>	Go to Step 2.	Y wire shorted to VCC or B/Br wire open.

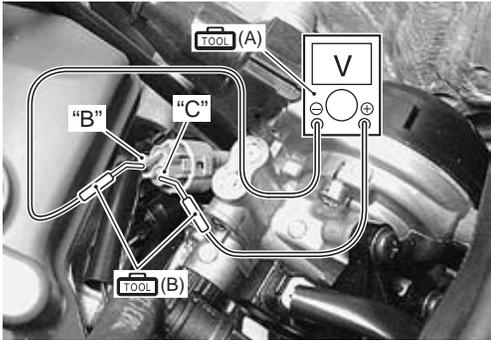
# 1A-31 Engine General Information and Diagnosis:

## P0120-L (Use of SDS)

Step	Action	Yes	No
1	<p>1) Turn off the ignition switch.</p> <p>2) Remove the fuel tank. Refer to "Fuel Tank Removal and Installation" in Section 1G (Page 1G-5).</p> <p>3) Check the TP sensor lead wire coupler (1) for loose or poor contacts. If OK, then check the TP sensor lead wire continuity.</p>  <p style="text-align: right; font-size: small;">IA02J1110015-02</p> <p>4) Disconnect the TP sensor lead wire coupler.</p> <p>5) Check the continuity between Y wire "C" and ground. Also, check the continuity between Y wire "C" and B/Br wire "B". If sound is not heard from the tester, the circuit condition is OK.</p> <p><b>Special tool</b>  <b>TOOL (A): 09900-25008 (Multi circuit tester set)</b>  <b>TOOL (B): 09900-25009 (Needle-point probe set)</b></p> <p><b>Tester knob indication</b>  <b>Continuity test (•))]</b></p>  <p style="text-align: right; font-size: small;">IA02J1110021-01</p> <p>6) Disconnect the ECM coupler. Refer to "ECM Removal and Installation" in Section 1C (Page 1C-1).</p>	Go to Step 2.	Y or R/BI wire open, or Y wire shorted to ground.

Step	Action	Yes	No
1	<p>7) Check the continuity between Y wire "C" and terminal "5". Also, check the continuity between R/BI wire "A" and terminal "13".</p> <p><b>Special tool</b>  <b>TOOL (A): 09900-25008 (Multi circuit tester set)</b>  <b>TOOL (B): 09900-25009 (Needle-point probe set)</b></p> <p><b>Tester knob indication</b>  <b>Continuity test (• ) )</b></p> <p><b>ECM coupler (Harness side)</b></p>  <p style="text-align: right;">IA02J1110022-03</p> <p><i>Is the continuity OK?</i></p>	Go to Step 2.	Y or R/BI wire open, or Y wire shorted to ground.
2	<p>1) Connect the ECM coupler. 2) Turn on the ignition switch. 3) Measure the input voltage between the R/BI wire "A" and ground. If OK, the measure the input voltage between the R/BI wire "A" and B/Br wire "B".</p> <p><b>Special tool</b>  <b>TOOL (A): 09900-25008 (Multi circuit tester set)</b>  <b>TOOL (B): 09900-25009 (Needle-point probe set)</b></p> <p><b>Tester knob indication</b>  <b>Voltage (---)</b></p> <p><b>TP sensor input voltage</b>  <b>4.5 – 5.5 V</b>  <b>(+) terminal: R/BI – (-) terminal: Ground, (+) terminal: R/BI – (-) terminal: B/Br)</b></p>  <p style="text-align: right;">IA02J1110023-01</p> <p><i>In the voltage OK?</i></p>	Go to Step 3.	Open or short circuit in the R/BI wire or B/Br wire.

**1A-33 Engine General Information and Diagnosis:**

Step	Action	Yes	No
3	<p>1) Connect the ECM coupler and TP sensor lead wire coupler.</p> <p>2) Turn on the ignition switch.</p> <p>3) Insert the needle-point probes into the lead wire coupler.</p> <p>4) Measure the TP sensor output voltage at the coupler (between Y wire "C" (+) and B/Br wire "B" (-)) with turning the throttle grip open and close.</p> <p><b>Special tool</b>   (A): 09900-25008 (Multi circuit tester set)   (B): 09900-25009 (Needle-point probe set)</p> <p><b>Tester knob indication</b>  <b>Voltage (---)</b></p> <p><b>TP sensor output voltage</b>  <b>Throttle valve is closed: Approx. 0.6 V</b>  <b>Throttle valve is opened: Approx. 1.8 V</b>  <b>(+) terminal: Y – (-) terminal: B/Br)</b></p>  <p style="text-align: right; font-size: small;">IA02J1110024-04</p> <p><i>Is the voltage OK?</i></p>	<ul style="list-style-type: none"> <li>• Y, R/Bl or B/Br wire open or shorted to ground, or poor "5", "13" or "24" connection.</li> <li>• If wire and connection are OK, intermittent trouble or faulty ECM.</li> <li>• Recheck each terminal and wire harness for open circuit and poor connection.</li> <li>• Replace the ECM with a known good one, and inspect it again. Refer to "ECM Removal and Installation" in Section 1C (Page 1C-1).</li> </ul>	<p>If check result is not satisfactory, replace TP sensor with a new one. Refer to "Throttle Body Disassembly and Assembly" in Section 1D (Page 1D-17).</p>

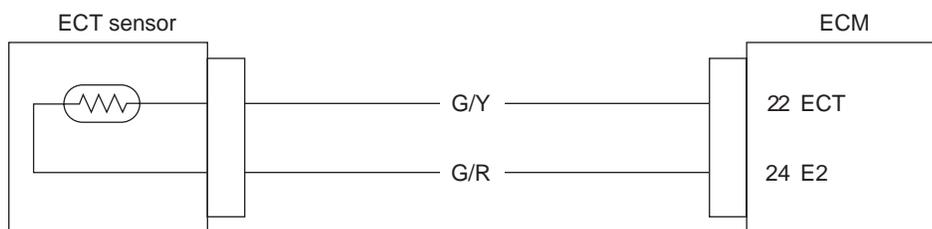
**DTC “15” (P0115-H/L): ECT Sensor Circuit Malfunction**

BA02J21104012

**Detected Condition And Possible Cause**

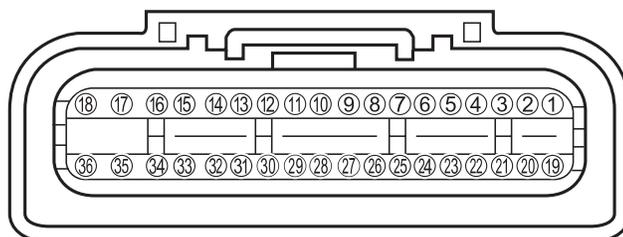
Detected condition		Possible cause
15	Output voltage is not with in the following range. 0.1 V ≤ Sensor voltage < 4.8 V	<ul style="list-style-type: none"> <li>ECT sensor circuit open or short.</li> <li>ECT sensor malfunction.</li> <li>ECM malfunction.</li> <li>ECT sensor circuit is open or ground circuit open.</li> <li>ECT sensor circuit shorted to the ground.</li> </ul>
P0115	H Sensor voltage is higher than specified value.	
	L Sensor voltage is lower than specified value.	

**Wiring Diagram**



IA02J1110088-01

**ECM coupler (Harness side)**



I933H1110012-02

**Troubleshooting**

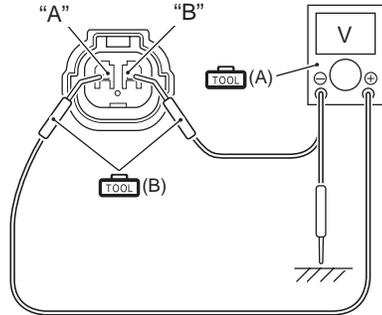
**⚠ CAUTION**

When using the multi circuit tester, do not strongly touch the terminal of the ECM coupler with a needle-point tester probe to prevent the terminal damage or terminal bend.

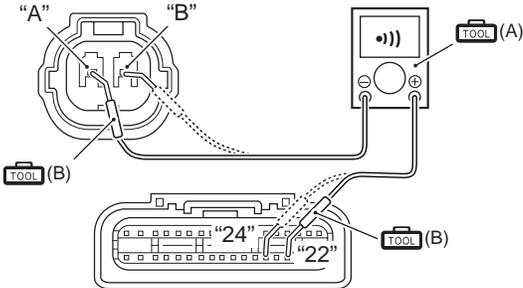
**NOTE**

After repairing the trouble, clear the DTC using SDS tool. Refer to “Use of SDS Diagnosis Reset Procedures” (Page 1A-12).

15 (Use of FI indicator light)

Step	Action	Yes	No
1	<p>1) Turn off the ignition switch.</p> <p>2) Remove the exhaust pipe. Refer to "Muffler / Exhaust Pipe Removal and Installation" in Section 1K (Page 1K-2).</p> <p>3) Check the ECT sensor coupler (1) for loose or poor contacts. If OK, then measure the ECT sensor voltage at the coupler.</p>  <p style="text-align: right; font-size: small;">IA02J1110025-01</p> <p>4) Disconnect the coupler and turn on the ignition switch.</p> <p>5) Measure the voltage between the G/Y wire "A" and ground. If OK, then measure the input voltage between G/Y wire "A" and G/R wire "B".</p> <p><b>Special tool</b>   (A): 09900-25008 (Multi circuit tester set)   (B): 09900-25009 (Needle-point probe set)</p> <p><b>Tester knob indication</b>  <b>Voltage ( --- )</b></p> <p><b>ECT sensor voltage</b>  <b>4.5 – 5.5 V</b>  <b>(+) terminal: G/Y – (-) terminal: Ground, (+) terminal: G/Y – (-) terminal: G/R)</b></p>  <p style="text-align: right; font-size: small;">IA02J1110026-01</p> <p>Is the voltage OK?</p>	Go to Step 2.	<ul style="list-style-type: none"> <li>• Loose or poor contacts on the ECM coupler.</li> <li>• Open or short circuit in the G/Y or G/R wire.</li> </ul>

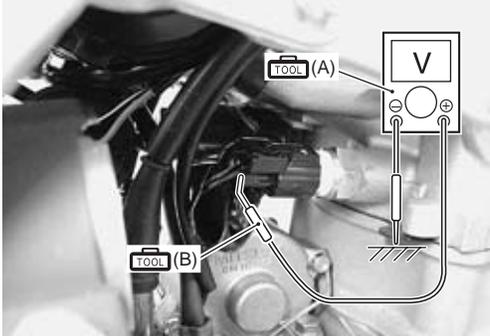
P0115-H (Use of SDS)

Step	Action	Yes	No
1	<p>1) Turn off the ignition switch.</p> <p>2) Remove the exhaust pipe. Refer to "Muffler / Exhaust Pipe Removal and Installation" in Section 1K (Page 1K-2).</p> <p>3) Check the ECT sensor coupler (1) for loose or poor contacts. If OK, then check the ECT sensor lead wire continuity.</p>  <p style="text-align: right; font-size: small;">IA02J1110025-01</p> <p>4) Disconnect the ECT sensor coupler.</p> <p>5) Disconnect the ECM coupler. Refer to "ECM Removal and Installation" in Section 1C (Page 1C-1).</p> <p>6) Check the continuity between G/Y wire "A" and terminal "22". Also, check the continuity between G/R wire "B" and terminal "24".</p> <p><b>Special tool</b>   (A): 09900-25008 (Multi circuit tester set)   (B): 09900-25009 (Needle-point probe set)</p> <p><b>Tester knob indication</b>  <b>Continuity test ( •• )</b></p> <p style="text-align: center;"><b>ECM coupler (Harness side)</b></p>  <p style="text-align: right; font-size: small;">IA02J1110028-02</p> <p><i>Is the continuity OK?</i></p>	Go to Step 2.	G/Y or G/R wire open.

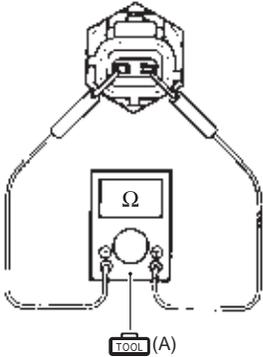
# 1A-37 Engine General Information and Diagnosis:

## P0115-L (Use of SDS)

Step	Action	Yes	No
1	<p>1) Turn off the ignition switch.</p> <p>2) Remove the exhaust pipe. Refer to "Muffler / Exhaust Pipe Removal and Installation" in Section 1K (Page 1K-2).</p> <p>3) Check the ECT sensor coupler (1) for loose or poor contacts. If OK, then check the ECT sensor lead wire continuity.</p>  <p style="text-align: right; font-size: small;">IA02J1110025-01</p> <p>4) Disconnect the ECT sensor coupler.</p> <p>5) Check the continuity between G/Y wire "A" and ground. If sound is not heard from the tester, the circuit condition is OK.</p> <p><b>Special tool</b>  <b>TOOL (A): 09900-25008 (Multi circuit tester set)</b>  <b>TOOL (B): 09900-25009 (Needle-point probe set)</b></p> <p><b>Tester knob indication</b>  <b>Continuity test (•))]</b></p> <p style="text-align: right; font-size: small;">IA02J1110030-01</p>	Go to Step 2.	<ul style="list-style-type: none"> <li>• G/Y wire shorted to ground.</li> <li>• If wire is OK, go to Step 2.</li> </ul>

Step	Action	Yes	No
1	<p>6) Connect the ECT sensor coupler.</p> <p>7) Insert the needle-point probes to the lead wire coupler.</p> <p>8) Turn on the ignition switch.</p> <p>9) Measure the output voltage between G/Y wire and ground.</p> <p><b>Special tool</b></p> <p> (A): 09900-25008 (Multi circuit tester set)</p> <p> (B): 09900-25009 (Needle-point probe set)</p> <p><b>Tester knob indication</b></p> <p><b>Voltage ( --- )</b></p> <p><b>ECT sensor output voltage</b></p> <p><b>0.2 – 4.9 V</b></p> <p><b>(+) terminal: G/Y – (-) terminal: Ground)</b></p>  <p style="text-align: right; font-size: small;">IA02J1110031-01</p> <p><i>Are the continuity and voltage OK?</i></p>	<p>Go to Step 2.</p>	<ul style="list-style-type: none"> <li>• G/Y wire shorted to ground.</li> <li>• If wire is OK, go to Step 2.</li> </ul>

**1A-39 Engine General Information and Diagnosis:**

Step	Action	Yes	No
2	<p>1) Turn off the ignition switch.</p> <p>2) Connect the ECM coupler and disconnect the ECT sensor coupler.</p> <p>3) Measure the ECT sensor resistance. Refer to “ECT Sensor Inspection” in Section 1C (Page 1C-6) for details.</p> <p><b>Special tool</b>   (A): 09900–25008 (Multi circuit tester set)</p> <p><b>Tester knob indication</b>  <b>Resistance (<math>\Omega</math>)</b></p> <p><b>ECT sensor resistance</b>  <b>Approx 2.58 k<math>\Omega</math> at 20 °C (68 °F)</b>  <b>(Terminal – Terminal)</b></p>  <p style="text-align: right;">I933H1110044-01</p> <p><b>NOTE</b></p> <p><b>Refer to “ECT Sensor Inspection” in Section 1C (Page 1C-6) for details.</b></p> <hr/> <p><i>Is the resistance OK?</i></p>	<ul style="list-style-type: none"> <li>• G/Y or G/R wire open or shorted to ground, or poor “22” or “24” connection.</li> <li>• If wire and connection are OK, intermittent trouble or faulty ECM.</li> <li>• Recheck each terminal and wire harness for open circuit and poor connection.</li> <li>• Replace the ECM with a known good one, and inspect it again. Refer to “ECM Removal and Installation” in Section 1C (Page 1C-1).</li> </ul>	<p>Replace the ECT sensor with a new one. Refer to “ECT Sensor Removal and Installation” in Section 1C (Page 1C-5).</p>

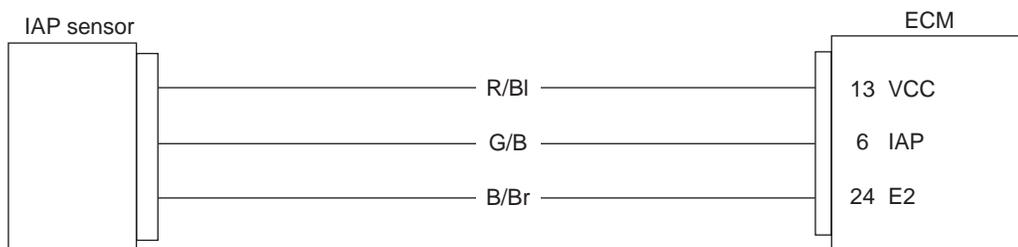
**DTC “17” (P0105-H/L): IAP Sensor Circuit Malfunction**

BA02J21104013

**Detected Condition and Possible Cause**

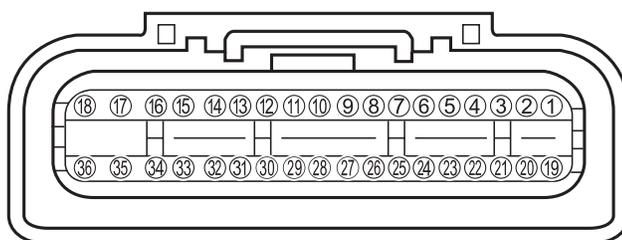
Detected condition		Possible cause
17	IAP sensor voltage is not within the following range. 0.5 V ≤ Sensor voltage < 4.4 V	<ul style="list-style-type: none"> <li>• Clogged vacuum passage between throttle body and IAP sensor.</li> <li>• Air being drawn from vacuum passage between throttle body and IAP sensor.</li> <li>• IAP sensor circuit open or shorted to the ground.</li> <li>• IAP sensor malfunction.</li> <li>• ECM malfunction.</li> </ul>
	<p><b>NOTE</b></p> <p><b>Note that atmospheric pressure varies depending on weather conditions as well as altitude. Take that into consideration when inspecting voltage.</b></p>	
P0105	H Sensor voltage is higher than specified value.	<ul style="list-style-type: none"> <li>• IAP sensor circuit is open or shorted to VCC or ground circuit open.</li> <li>• IAP sensor circuit is shorted to the ground or VCC circuit open.</li> </ul>
	L Sensor voltage is lower than specified value.	

**Wiring Diagram**



IA02J1110032-01

**ECM coupler (Harness side)**



I933H1110012-02

**Troubleshooting**

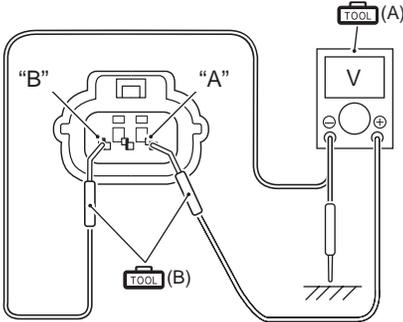
**⚠ CAUTION**

When using the multi circuit tester, do not strongly touch the terminal of the ECM coupler with a needle-point tester probe to prevent the terminal damage or terminal bend.

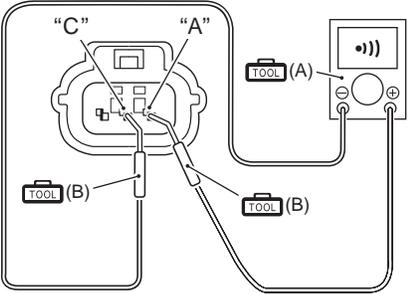
**NOTE**

After repairing the trouble, clear the DTC using SDS tool. Refer to “Use of SDS Diagnosis Reset Procedures” (Page 1A-12).

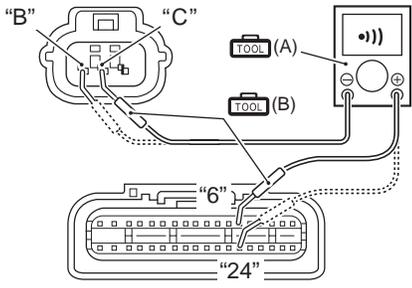
17 (Use of FI indicator light)

Step	Action	Yes	No
1	<p>1) Turn off the ignition switch.</p> <p>2) Remove the fuel tank. Refer to "Fuel Tank Removal and Installation" in Section 1G (Page 1G-5).</p> <p>3) Check the IAP sensor coupler (1) for loose or poor contacts. If OK, then measure the IAP sensor input voltage.</p>  <p style="text-align: right; font-size: small;">IA02J1110033-01</p> <p>4) Disconnect the IAP sensor coupler.</p> <p>5) Turn on the ignition switch.</p> <p>6) Measure the voltage at the R/BI wire "A" and ground. If OK, then measure the input voltage between the R/BI wire "A" and B/Br wire "B".</p> <p><b>Special tool</b>   (A): 09900-25008 (Multi circuit tester set)   (B): 09900-25009 (Needle-point probe set)</p> <p><b>Tester knob indication</b>  <b>Voltage ( --- )</b></p> <p><b>IAP sensor input voltage</b>  <b>4.5 – 5.5 V</b>  <b>(+) terminal: R/BI – (-) terminal: Ground, (+) terminal: R/BI – (-) terminal: B/Br</b></p>  <p style="text-align: right; font-size: small;">IA02J1110034-01</p> <p><i>Is the voltage OK?</i></p>	<p>Go to Step 3.</p>	<ul style="list-style-type: none"> <li>• Loose or poor contacts on the ECM coupler.</li> <li>• Open or short circuit in the R/BI wire or B/Br wire.</li> </ul>

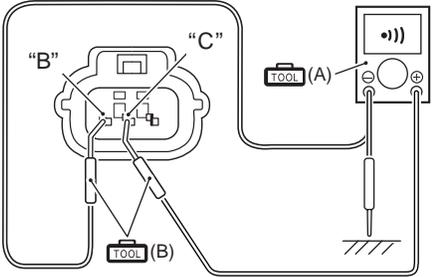
P0105-H (Use of SDS)

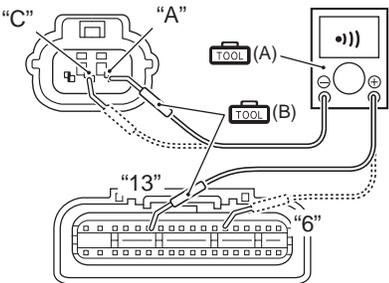
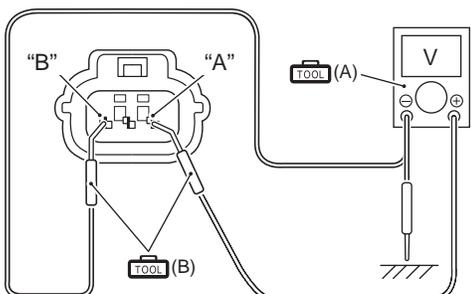
Step	Action	Yes	No
1	<p>1) Turn off the ignition switch.</p> <p>2) Remove the fuel tank. Refer to "Fuel Tank Removal and Installation" in Section 1G (Page 1G-5).</p> <p>3) Check the IAP sensor coupler (1) for loose or poor contacts. If OK, then check the IAP sensor lead wire continuity.</p>  <p style="text-align: right; font-size: small;">IA02J1110033-01</p> <p>4) Disconnect the IAP sensor coupler.</p> <p>5) Check the continuity between the R/BI wire "A" and G/B wire "C". If the sound is not heard from the tester, the circuit condition is OK.</p> <p><b>Special tool</b>   (A): 09900-25008 (Multi circuit tester set)   (B): 09900-25009 (Needle-point probe set)</p> <p><b>Tester knob indication</b>  <b>Continuity ( ♪ )</b></p>  <p style="text-align: right; font-size: small;">IA02J1110036-01</p> <p>6) Disconnect the ECM coupler. Refer to "ECM Removal and Installation" in Section 1C (Page 1C-1).</p>	Go to Step 3.	G/B wire shorted to VCC, or B/Br wire open.

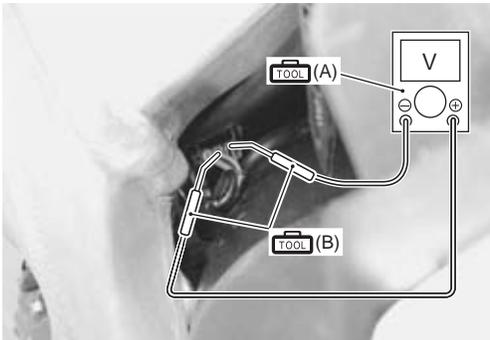
1A-43 Engine General Information and Diagnosis:

Step	Action	Yes	No
1	<p>7) Check the continuity between the G/B wire "C" and terminal "6". If OK, then check the continuity between the B/Br wire "B" and terminal "24".</p> <p><b>Special tool</b>   (A): 09900-25008 (Multi circuit tester set)   (B): 09900-25009 (Needle-point probe set)</p> <p><b>Tester knob indication</b>            Continuity test (•)] )</p> <p><b>ECM coupler (Harness side)</b></p>  <p style="text-align: right;">IA02J1110037-02</p> <p><i>Is the continuity OK?</i></p>	Go to Step 3.	G/B wire shorted to VCC, or B/Br wire open.

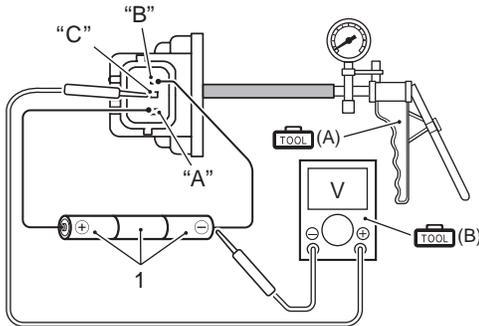
P0105-L (Use of SDS)

Step	Action	Yes	No
1	<p>1) Turn off the ignition switch.</p> <p>2) Remove the fuel tank. Refer to "Fuel Tank Removal and Installation" in Section 1G (Page 1G-5).</p> <p>3) Check the IAP sensor coupler (1) for loose or poor contacts. If OK, then check the IAP sensor lead wire continuity.</p>  <p style="text-align: right; font-size: small;">IA02J1110033-01</p> <p>4) Disconnect the IAP sensor coupler.</p> <p>5) Check the continuity between the G/B wire "C" and ground. Also, check the continuity between the G/B wire "C" and B/Br wire "B". If the sound is not heard from the tester, the circuit condition is OK.</p> <p><b>Special tool</b>   (A): 09900-25008 (Multi circuit tester set)   (B): 09900-25009 (Needle-point probe set)</p> <p><b>Tester knob indication</b>  <b>Continuity ( • ) ] )</b></p>  <p style="text-align: right; font-size: small;">IA02J1110039-01</p> <p>6) Disconnect the ECM coupler. Refer to "ECM Removal and Installation" in Section 1C (Page 1C-1).</p>	Go to Step 2.	R/BI and G/B wire open, G/B wire shorted to the ground.

Step	Action	Yes	No
1	<p>7) Check the continuity between the R/BI wire "A" and terminal "13". Also, check the continuity between the G/B wire "C" and terminal "6".</p> <p><b>Tester knob indication</b> Continuity (• ) )</p> <p><b>ECM coupler (Harness side)</b></p>  <p style="text-align: right; font-size: small;">IA02J1110040-02</p> <p><i>Is the continuity OK?</i></p>	Go to Step 2.	R/BI and G/B wire open, G/B wire shorted to the ground.
2	<p>1) Connect the ECM coupler. 2) Turn on the ignition switch. 3) Measure the input voltage at the R/BI wire "A" and ground. If OK, the measure the input voltage at the R/BI wire "A" and B/Br wire "B".</p> <p><b>Special tool</b>  <b>TOOL (A): 09900-25008 (Multi circuit tester set)</b>  <b>TOOL (B): 09900-25009 (Needle-point probe set)</b></p> <p><b>Tester knob indication</b> Voltage (---)</p> <p><b>IAP sensor input voltage</b> 4.5 – 5.5 V  <b>(+) terminal: R/BI – (-) terminal: Ground, (+) terminal: R/BI – (-) terminal: B/Br)</b></p>  <p style="text-align: right; font-size: small;">IA02J1110041-02</p> <p><i>Is the voltage OK?</i></p>	Go to Step 3.	Open or short circuit in the B wire or B/Br wire.

Step	Action	Yes	No
3	<p>1) Turn off the ignition switch.</p> <p>2) Connect the ECM coupler and IAP sensor coupler.</p> <p>3) Insert the needle-point probes to the lead wire coupler.</p> <p>4) Run the engine at idle speed and measure the IAP sensor output voltage between G/B wire and B/Br wire.</p> <p><b>Special tool</b></p> <p> (A): 09900-25008 (Multi circuit tester set)</p> <p> (B): 09900-25009 (Needle-point probe set)</p> <p><b>Tester knob indication</b></p> <p><b>Voltage ( --- )</b></p> <p><b>IAP sensor output voltage</b></p> <p>Approx. 0.89 – 1.17 V at idle speed</p> <p>(+) terminal: G/B – (-) terminal: B/Br</p>  <p style="text-align: right; font-size: small;">IA02J1110042-01</p> <p><i>Is the voltage OK?</i></p>	<p>Go to Step 4.</p>	<ul style="list-style-type: none"> <li>• Open or short circuit in the G/B wire.</li> <li>• If the wire is OK, replace the IAP sensor with a new one. Refer to “IAP Sensor Removal and Installation” in Section 1C (Page 1C-2).</li> </ul>

**1A-47 Engine General Information and Diagnosis:**

Step	Action	Yes	No																														
4	<p>1) Turn off the ignition switch.</p> <p>2) Remove the IAP sensor. Refer to "IAP Sensor Removal and Installation" in Section 1C (Page 1C-2).</p> <p>3) Connect the vacuum pump gauge to the vacuum port of the IAP sensor.</p> <p>4) Arrange 3 new 1.5 V batteries (1) in series (check that total voltage is 4.5 – 5.5 V) and connect (-) terminal to the ground terminal "B" and (+) terminal to the VCC terminal "A".</p> <p>5) Check the voltage between Vout "C" and ground. Also, check if voltage reduces when vacuum is applied using vacuum pump gauge.</p> <p><b>Special tool</b></p> <p> (A): 09917-47011 (Vacuum pump gauge)</p> <p> (B): 09900-25008 (Multi circuit tester set)</p> <p><b>Tester knob indication</b></p> <p><b>Voltage ( --- )</b></p>  <p style="text-align: right;">IA02J1110043-01</p> <table border="1"> <thead> <tr> <th colspan="2">ALTITUDE (Reference)</th> <th colspan="2">ATMOSPHERIC PRESSURE</th> <th>OUTPUT VOLTAGE</th> </tr> <tr> <th>ft</th> <th>m</th> <th>mmHg</th> <th>kPa</th> <th>V</th> </tr> </thead> <tbody> <tr> <td>0 – 2 000</td> <td>0 – 610</td> <td>760 – 707</td> <td>100 – 94</td> <td>3.1 – 3.6</td> </tr> <tr> <td>2 001 – 5 000</td> <td>611 – 1 524</td> <td>707 – 634</td> <td>94 – 85</td> <td>2.8 – 3.4</td> </tr> <tr> <td>5 001 – 8 000</td> <td>1 525 – 2 438</td> <td>634 – 567</td> <td>85 – 76</td> <td>2.6 – 3.1</td> </tr> <tr> <td>8 001 – 10 000</td> <td>2 439 – 3 048</td> <td>567 – 526</td> <td>76 – 70</td> <td>2.4 – 2.9</td> </tr> </tbody> </table> <p style="text-align: right;">I831G1110033-01</p> <p><i>Is the voltage OK?</i></p>	ALTITUDE (Reference)		ATMOSPHERIC PRESSURE		OUTPUT VOLTAGE	ft	m	mmHg	kPa	V	0 – 2 000	0 – 610	760 – 707	100 – 94	3.1 – 3.6	2 001 – 5 000	611 – 1 524	707 – 634	94 – 85	2.8 – 3.4	5 001 – 8 000	1 525 – 2 438	634 – 567	85 – 76	2.6 – 3.1	8 001 – 10 000	2 439 – 3 048	567 – 526	76 – 70	2.4 – 2.9	<ul style="list-style-type: none"> <li>• G/B, R/BI or B/Br wire open or shorted to ground, or poor "6", "13" or "24" connection.</li> <li>• If wire and connection are OK, intermittent trouble or faulty ECM.</li> <li>• Recheck each terminal and wire harness for open circuit and poor connection.</li> <li>• Replace the ECM with a known good one, and inspect it again. Refer to "ECM Removal and Installation" in Section 1C (Page 1C-1).</li> </ul>	<p>If check result is not satisfactory, replace IAP sensor with a new one. Refer to "IAP Sensor Removal and Installation" in Section 1C (Page 1C-2).</p>
ALTITUDE (Reference)		ATMOSPHERIC PRESSURE		OUTPUT VOLTAGE																													
ft	m	mmHg	kPa	V																													
0 – 2 000	0 – 610	760 – 707	100 – 94	3.1 – 3.6																													
2 001 – 5 000	611 – 1 524	707 – 634	94 – 85	2.8 – 3.4																													
5 001 – 8 000	1 525 – 2 438	634 – 567	85 – 76	2.6 – 3.1																													
8 001 – 10 000	2 439 – 3 048	567 – 526	76 – 70	2.4 – 2.9																													

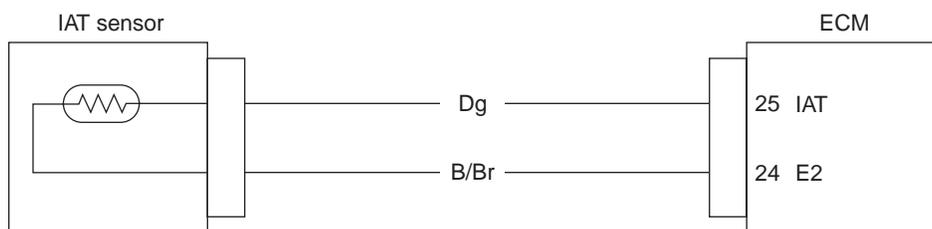
**DTC “21” (P0110-H/L): IAT Sensor Circuit Malfunction**

BA02J21104014

**Detected Condition and Possible Cause**

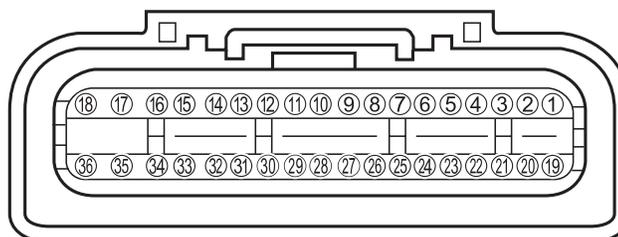
Detected condition		Possible cause
21	Output voltage is not with in the following range. $0.2\text{ V} \leq \text{Sensor voltage} < 4.8\text{ V}$	<ul style="list-style-type: none"> <li>• IAT sensor circuit open or short.</li> <li>• IAT sensor malfunction.</li> <li>• ECM malfunction.</li> <li>• IAT sensor circuit open or ground circuit open.</li> </ul>
P0110	H Sensor voltage is higher than specified value.	
	L Sensor voltage is lower than specified value.	

**Wiring Diagram**



I933H1110045-01

**ECM coupler (Harness side)**



I933H1110012-02

**Troubleshooting**

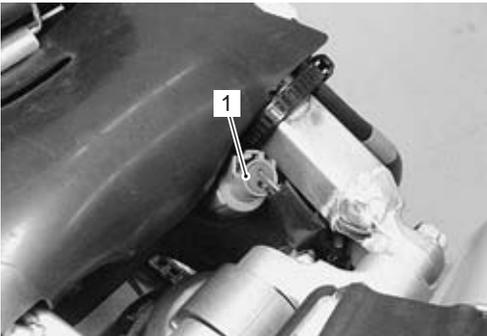
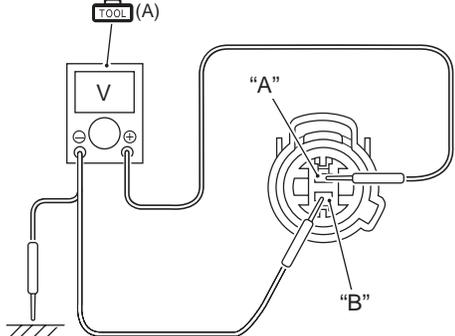
**⚠ CAUTION**

When using the multi circuit tester, do not strongly touch the terminal of the ECM coupler with a needle-point tester probe to prevent the terminal damage or terminal bend.

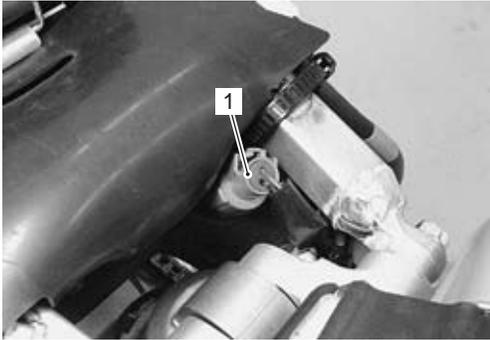
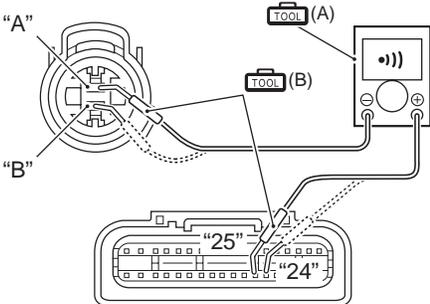
**NOTE**

After repairing the trouble, clear the DTC using SDS tool. Refer to “Use of SDS Diagnosis Reset Procedures” (Page 1A-12).

21 (Use of FI indicator light)

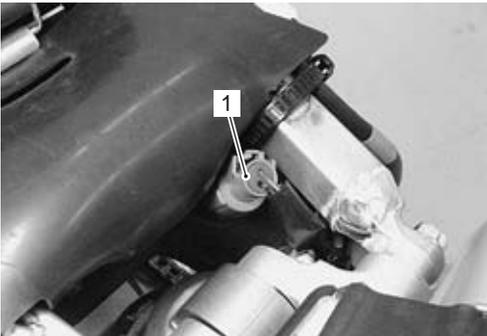
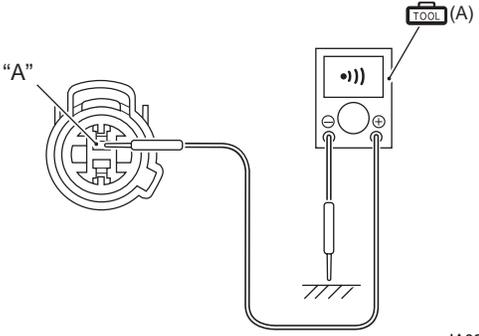
Step	Action	Yes	No
1	<p>1) Turn off the ignition switch.</p> <p>2) Remove the seat. Refer to "Exterior Parts Removal and Installation" in Section 9D (Page 9D-1).</p> <p>3) Check the IAT sensor coupler (1) for loose or poor contacts. If OK, then measure the IAT sensor voltage.</p>  <p style="text-align: right; font-size: small;">IA02J1110044-01</p> <p>4) Disconnect the IAT sensor coupler and turn on the ignition switch.</p> <p>5) Measure the voltage between the Dg wire "A" and ground. If OK, then measure the input voltage between Dg wire "A" and B/Br wire "B".</p> <p><b>Special tool</b>   (A): 09900-25008 (Multi circuit tester set)</p> <p><b>Tester knob indication</b>  <b>Voltage ( --- )</b></p> <p><b>IAT sensor input voltage</b>  <b>4.5 – 5.5 V</b>  <b>(+) terminal: Dg – (-) terminal: Ground, (+) terminal: Dg – (-) terminal: B/Br)</b></p>  <p style="text-align: right; font-size: small;">IA02J1110045-01</p> <p><i>Is the voltage OK?</i></p>	Go to Step 2.	<ul style="list-style-type: none"> <li>• Loose or poor contacts on the ECM coupler.</li> <li>• Open or short circuit in the Dg wire or B/Br wire.</li> </ul>

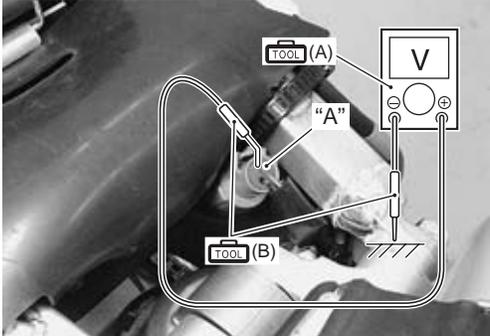
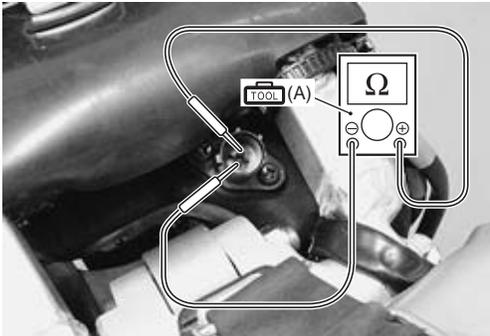
P0110-H (Use of SDS)

Step	Action	Yes	No
1	<p>1) Turn off the ignition switch.</p> <p>2) Remove the seat. Refer to "Exterior Parts Removal and Installation" in Section 9D (Page 9D-1).</p> <p>3) Check the IAT sensor coupler (1) for loose or poor contacts. If OK, then check the IAT sensor lead wire continuity.</p>  <p style="text-align: right; font-size: small;">IA02J1110044-01</p> <p>4) Disconnect the IAT sensor coupler.</p> <p>5) Disconnect the ECM coupler. Refer to "ECM Removal and Installation" in Section 1C (Page 1C-1).</p> <p>6) Check the continuity between the Dg wire "A" and terminal "25". Also, check the continuity between the B/Br wire "B" and terminal "24".</p> <p><b>Special tool</b></p> <p> (A): 09900-25008 (Multi circuit tester set)</p> <p> (B): 09900-25009 (Needle-point probe set)</p> <p><b>Tester knob indication</b></p> <p><b>Continuity test ( · ) )</b></p> <p style="text-align: center;"><b>ECM coupler (Harness side)</b></p>  <p style="text-align: right; font-size: small;">IA02J1110084-04</p> <p><i>Is the continuity OK?</i></p>	<p>Connect the ECM coupler and go to step 2.</p>	<p>Dg or B/Br wire open.</p>

# 1A-51 Engine General Information and Diagnosis:

## P0110-L (Use of SDS)

Step	Action	Yes	No
1	<p>1) Turn off the ignition switch.</p> <p>2) Remove the seat. Refer to “Exterior Parts Removal and Installation” in Section 9D (Page 9D-1).</p> <p>3) Check the IAT sensor coupler (1) for loose or poor contacts. If OK, then check the IAT sensor lead wire continuity.</p>  <p style="text-align: right; font-size: small;">IA02J1110044-01</p> <p>4) Disconnect the IAT sensor coupler.</p> <p>5) Check the continuity between the Dg wire “A” and ground. If the sound is not heard from the tester, the circuit condition is OK.</p> <p><b>Special tool</b>   (A): 09900-25008 (Multi circuit tester set)</p> <p><b>Tester knob indication</b>  <b>Continuity test (••)])</b></p>  <p style="text-align: right; font-size: small;">IA02J1110048-01</p> <p>6) Connect the IAT sensor coupler.</p> <p>7) Turn the ignition switch ON.</p> <p>8) Insert the needle-point probes to the lead wire coupler.</p>	Go to Step 2.	<ul style="list-style-type: none"> <li>• Dg wire shorted to ground.</li> <li>• If wire is OK, go to Step 2.</li> </ul>

Step	Action	Yes	No
1	<p>9) Measure the output voltage between the Dg wire "A" and ground.</p> <p><b>Special tool</b>   (A): 09900-25008 (Multi circuit tester set)   (B): 09900-25009 (Needle-point probe set)</p> <p><b>Tester knob indication</b>                      Voltage ( --- )</p> <p><b>IAT sensor output voltage</b>                      0.15 – 4.85 V                      ((+) terminal: Dg – (-) terminal: Ground)</p>  <p style="text-align: right; font-size: small;">IA02J1110049-02</p> <p><i>Are the continuity and voltage OK?</i></p>	<p>Go to Step 2.</p>	<ul style="list-style-type: none"> <li>• Dg wire shorted to ground.</li> <li>• If wire is OK, go to Step 2.</li> </ul>
2	<p>1) Turn off the ignition switch.                      2) Disconnect the IAT sensor coupler.                      3) Measure the IAT sensor resistance.</p> <p><b>Special tool</b>   (A): 09900-25008 (Multi circuit tester set)</p> <p><b>Tester knob indication</b>                      Resistance (<math>\Omega</math>)</p> <p><b>IAT sensor resistance</b>                      Approx. 2.58 k<math>\Omega</math> at 20 °C (68 °F)                      (Terminal – Terminal)</p>  <p style="text-align: right; font-size: small;">IA02J1110050-02</p> <p><b>NOTE</b>                      IAT sensor resistance measurement method is the same way as that of the ECT sensor. Refer to "ECT Sensor Inspection" in Section 1C (Page 1C-6).</p> <p><i>Is the resistance OK?</i></p>	<ul style="list-style-type: none"> <li>• B/Br or Dg wire open or shorted to ground, or poor "24" or "25" connection.</li> <li>• If wire and connection are OK, intermittent trouble or faulty ECM.</li> <li>• Recheck each terminal and wire harness for open circuit and poor connection.</li> <li>• Replace the ECM with a known good one, and inspect it again. Refer to "ECM Removal and Installation" in Section 1C (Page 1C-1).</li> </ul>	<p>Replace the IAT sensor with a new one. Refer to "IAT Sensor Removal and Installation" in Section 1C (Page 1C-4).</p>

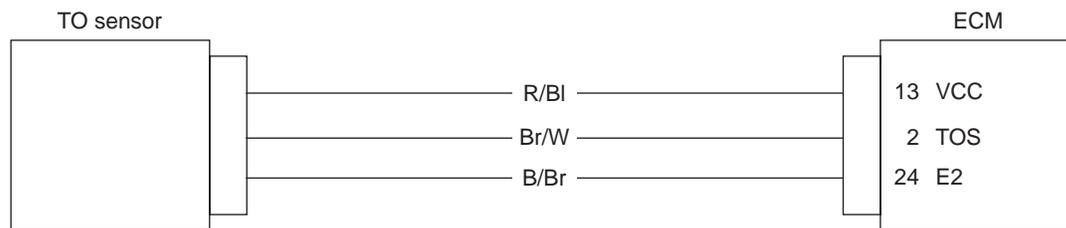
DTC “23” (P1651-H/L): TO Sensor Circuit Malfunction

BA02J21104015

Detected Condition and Possible Cause

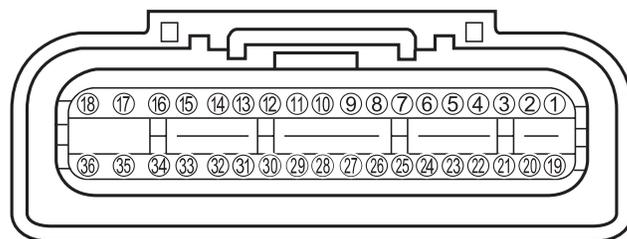
Detected condition		Possible cause
23	The sensor voltage should be the following for 2 seconds and more, after ignition switch is turned ON. 0.3 V ≤ Sensor voltage < 4.5 V	<ul style="list-style-type: none"> <li>• TO sensor circuit open or short.</li> <li>• TO sensor malfunction.</li> <li>• ECM malfunction.</li> </ul>
P1651	H Sensor voltage is higher than specified value.	• TO sensor circuit open or shorted to VCC or ground
	L Sensor voltage is lower than specified value.	• TO sensor circuit shorted to ground or VCC circuit open.

Wiring Diagram



IA02J1110051-01

ECM coupler (Harness side)



I933H1110012-02

Troubleshooting

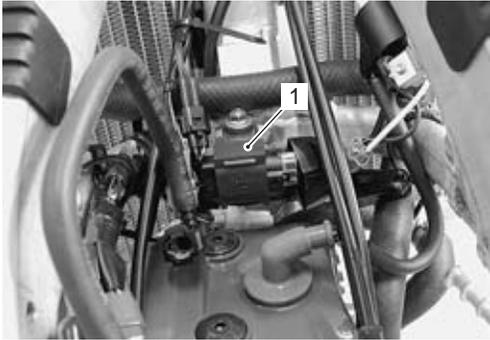
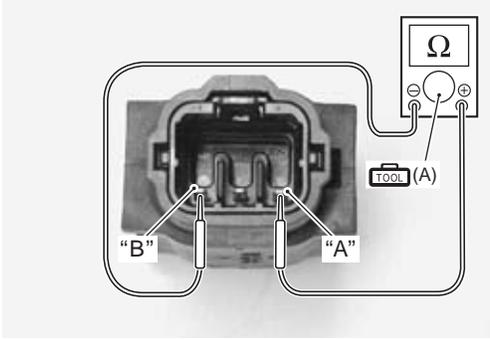
**⚠ CAUTION**

When using the multi circuit tester, do not strongly touch the terminal of the ECM coupler with a needle-point tester probe to prevent the terminal damage or terminal bend.

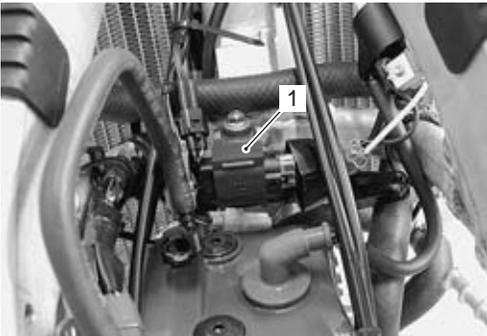
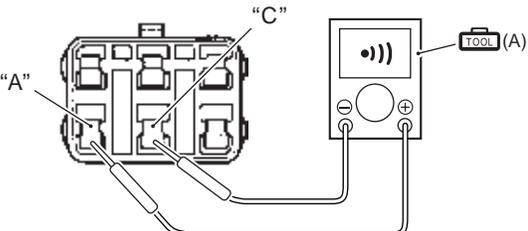
**NOTE**

After repairing the trouble, clear the DTC using SDS tool. Refer to “Use of SDS Diagnosis Reset Procedures” (Page 1A-12).

**C23 (Use of FI indicator light)**

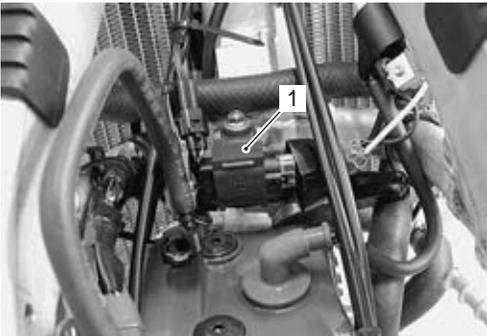
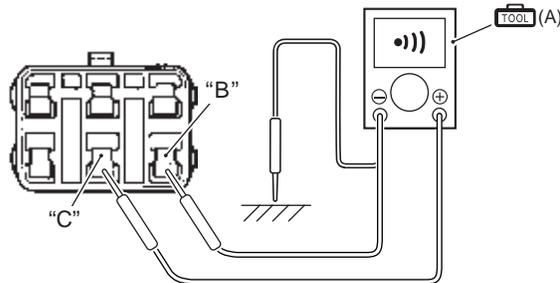
Step	Action	Yes	No
1	<p>1) Turn off the ignition switch.</p> <p>2) Remove the fuel tank. Refer to "Fuel Tank Removal and Installation" in Section 1G (Page 1G-5).</p> <p>3) Check the TO sensor coupler (1) for loose or poor contacts. If OK, then measure the TO sensor resistance.</p>  <p style="text-align: right; font-size: small;">IA02J1110052-02</p> <p>4) Remove the TO sensor.</p> <p>5) Measure the resistance between terminal "A" and terminal "B".</p> <p><b>Special tool</b>   (A): 09900-25008 (Multi circuit tester set)</p> <p><b>Tester knob indication</b>  <u>Resistance (<math>\Omega</math>)</u></p> <p><b>TO sensor resistance</b>  <b>16.5 – 22.3 k<math>\Omega</math></b>  <b>(Terminal "A" – Terminal "B")</b></p>  <p style="text-align: right; font-size: small;">IA02J1110053-01</p> <p><i>Is the resistance OK?</i></p>	Go to Step 2.	Replace the TO sensor with a new one. Refer to "TO Sensor Removal and Installation" in Section 1C (Page 1C-6).

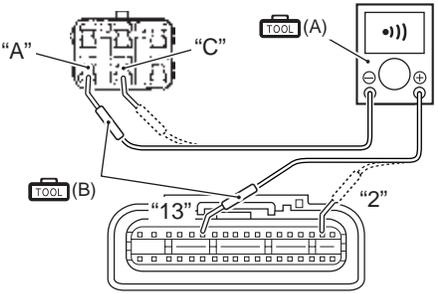
P1651-H (Use of SDS)

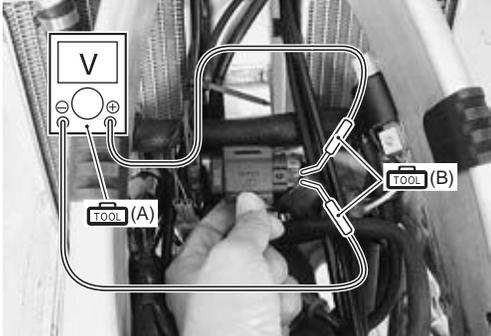
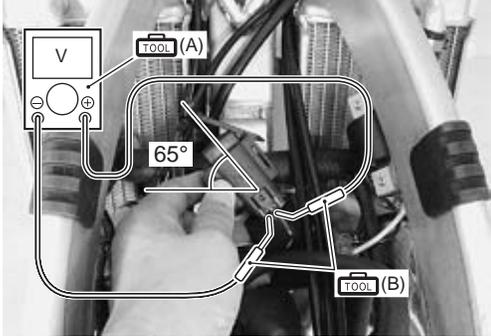
Step	Action	Yes	No
1	<p>1) Turn off the ignition switch.</p> <p>2) Remove the fuel tank. Refer to "Fuel Tank Removal and Installation" in Section 1G (Page 1G-5).</p> <p>3) Check the TO sensor coupler (1) for loose or poor contacts. If OK, then check the TO sensor lead wire continuity.</p>  <p style="text-align: right; font-size: small;">IA02J1110052-02</p> <p>4) Remove the TO sensor.</p> <p>5) Check the continuity between the R/BI wire "A" and B/Br wire "C". If the sound is not heard from the tester, the circuit condition is OK.</p> <p><b>Special tool</b>   (A): 09900-25008 (Multi circuit tester set)</p> <p><b>Tester knob indication</b>  <b>Continuity test (•))])</b></p>  <p style="text-align: right; font-size: small;">IA02J1110055-01</p> <p>6) Disconnect the ECM coupler. Refer to "ECM Removal and Installation" in Section 1C (Page 1C-1).</p>	Go to Step 2.	Br/W wire shorted to VCC, or B/Br wire open.

Step	Action	Yes	No
1	<p>7) Check the continuity between Br/W wire "C" and terminal "2". Also, check the continuity between B/Br wire "B" and terminal "24".</p> <p><b>Special tool</b>  <b>TOOL (A): 09900-25008 (Multi circuit tester set)</b>  <b>TOOL (B): 09900-25009 (Needle-point probe set)</b></p> <p><b>Tester knob indication</b>  <b>Continuity test (•))]</b></p> <p><b>ECM coupler (Harness side)</b></p> <p style="text-align: right;">IA02J1110056-03</p> <p><i>Is the continuity OK?</i></p>	Go to Step 2.	Br/W wire shorted to VCC, or B/Br wire open.

P1651-L (Use of SDS)

Step	Action	Yes	No
1	<p>1) Turn off the ignition switch.</p> <p>2) Remove the fuel tank. Refer to "Fuel Tank Removal and Installation" in Section 1G (Page 1G-5).</p> <p>3) Check the TO sensor coupler (1) for loose or poor contacts. If OK, then check the TO sensor lead wire continuity.</p>  <p style="text-align: right; font-size: small;">IA02J1110052-02</p> <p>4) Remove the TO sensor.</p> <p>5) Check the continuity between Br/W wire "C" and ground. Also, check the continuity between Br/W wire "C" and B/Br wire "B". If sound is not heard from the tester, the circuit condition is OK.</p> <p><b>Special tool</b>   (A): 09900-25008 (Multi circuit tester set)</p> <p><b>Tester knob indication</b>  <b>Continuity test (•))</b></p>  <p style="text-align: right; font-size: small;">IA02J1110058-01</p> <p>6) Disconnect the ECM coupler. Refer to "ECM Removal and Installation" in Section 1C (Page 1C-1).</p>	Go to Step 2.	R/BI or B wire open, or Br/W wire shorted to the ground.

Step	Action	Yes	No
1	<p>7) Check the continuity between R/Bl wire "A" and terminal "13". Also, then check the continuity between Br/W wire "C" and terminal "2".</p> <p><b>Special tool</b>  <b>TOOL (A): 09900-25008 (Multi circuit tester set)</b>  <b>TOOL (B): 09900-25009 (Needle-point probe set)</b></p> <p><b>Tester knob indication</b>  <b>Continuity test (•)]])</b></p>  <p style="text-align: right;">IA02J1110059-02</p> <p><i>Is the continuity OK?</i></p>	Go to Step 2.	R/Bl or B wire open, or Br/W wire shorted to the ground.

Step	Action	Yes	No
2	<p>1) Connect the ECM coupler and TO sensor coupler.</p> <p>2) Insert the needle-point probes to the lead wire coupler.</p> <p>3) Turn on the ignition switch.</p> <p>4) Measure the voltage at the coupler between Br/W and B/Br wires.</p> <p><b>Special tool</b>   (A): 09900-25008 (Multi circuit tester set)   (B): 09900-25009 (Needle-point probe set)</p> <p><b>Tester knob indication</b>  <b>Voltage (---)</b></p> <p><b>TO sensor voltage (Normal)</b>  <b>0.4 – 1.4 V</b>  <b>(+) terminal: Br/W – (-) terminal: B/Br)</b></p>  <p style="text-align: right; font-size: small;">IA02J1110060-01</p> <p>5) Measure the voltage when TO sensor is leaned 65° and more, left and right, from the horizontal level.</p> <p><b>Special tool</b>   (A): 09900-25008 (Multi circuit tester set)   (B): 09900-25009 (Needle-point probe set)</p> <p><b>Tester knob indication</b>  <b>Voltage (---)</b></p> <p><b>TO sensor voltage (Leaning)</b>  <b>3.7 – 4.4 V</b>  <b>(+) terminal: Br/W – (-) terminal: B/Br)</b></p>  <p style="text-align: right; font-size: small;">IA02J1110061-01</p> <p><i>Is the voltage OK?</i></p>	<ul style="list-style-type: none"> <li>• Br/W, R/BI or B/Br wire open or shorted to ground, or poor “2”, “13” or “24” connection.</li> <li>• If wire and connection are OK, intermittent trouble or faulty ECM.</li> <li>• Recheck each terminal and wire harness for open circuit and poor connection.</li> <li>• Replace the ECM with a known good one, and inspect it again. Refer to “ECM Removal and Installation” in Section 1C (Page 1C-1).</li> </ul>	<ul style="list-style-type: none"> <li>• Loose or poor contacts on the ECM coupler.</li> <li>• Open or short circuit.</li> <li>• Replace the TO sensor with a new one. Refer to “TO Sensor Removal and Installation” in Section 1C (Page 1C-6).</li> </ul>

**DTC “24” (P0351): Ignition Coil Circuit Malfunction**

BA02J21104016

**NOTE**

Refer to “No Spark or Poor Spark” in Section 1H (Page 1H-3) for details.

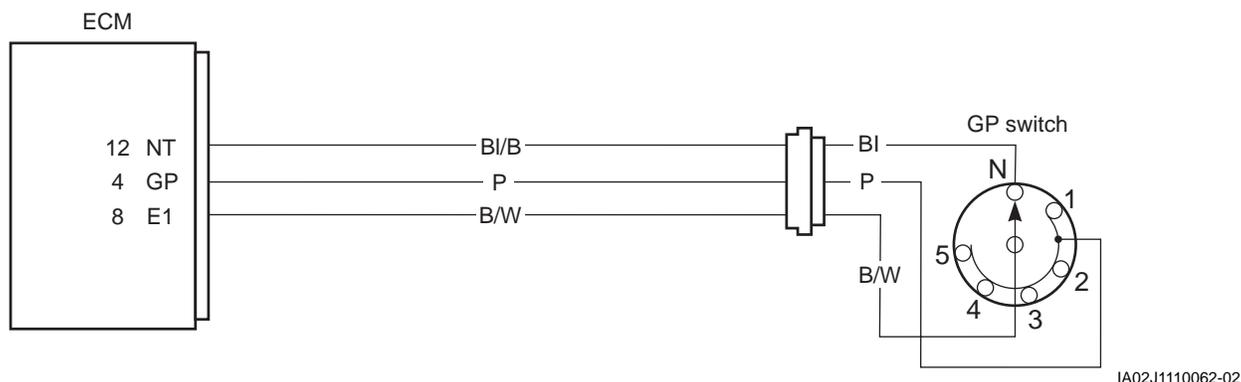
**DTC “31” (P0705): GP Switch Circuit Malfunction**

BA02J21104017

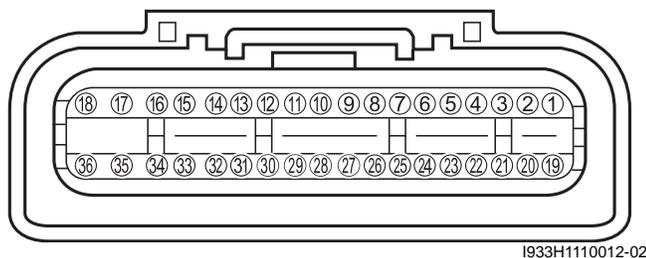
**Detected Condition and Possible Cause**

Detected condition	Possible cause
No GP switch voltage Switch voltage is not within the following range. Switch voltage $\geq 0.89$ V	<ul style="list-style-type: none"> <li>• GP switch circuit open or short.</li> <li>• GP switch malfunction.</li> <li>• ECM malfunction.</li> </ul>

**Wiring Diagram**



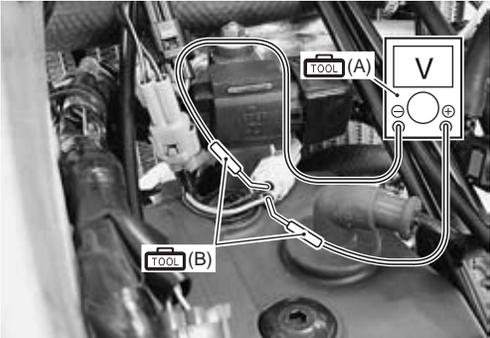
**ECM coupler (Harness side)**



**Troubleshooting**

**NOTE**

After repairing the trouble, clear the DTC using SDS tool. Refer to “Use of SDS Diagnosis Reset Procedures” (Page 1A-12).

Step	Action	Yes	No
1	<p>1) Turn off the ignition switch.</p> <p>2) Remove the fuel tank. Refer to "Fuel Tank Removal and Installation" in Section 1G (Page 1G-5).</p> <p>3) Check the GP switch lead wire coupler (1) for loose or poor contacts. If OK, then measure the GP switch voltage.</p>  <p style="text-align: right; font-size: small;">IA02J1110065-01</p> <p>4) Insert the needle-point probes to the lead wire coupler.</p> <p>5) Turn on the ignition switch.</p> <p>6) Measure the voltage between P wire and B/W wire, when shifting the gearshift lever from 1st to Top.</p> <p><b>Special tool</b>   (A): 09900-25008 (Multi circuit tester set)   (B): 09900-25009 (Needle-point probe set)</p> <p><b>Tester knob indication</b>  <b>Voltage (---)</b></p> <p><b>GP switch voltage</b>  <b>0.6 V and more</b>  <b>(+) terminal: P – (-) terminal: B/W)</b></p>  <p style="text-align: right; font-size: small;">IA02J1110066-01</p> <p><i>Is the voltage OK?</i></p>	<ul style="list-style-type: none"> <li>• P wire open or shorted to ground.</li> <li>• If wire and connection are OK, intermittent trouble or faulty ECM.</li> <li>• Recheck each terminal and wire harness for open circuit and poor connection.</li> <li>• Replace the ECM with a known good one, and inspect it again. Refer to "ECM Removal and Installation" in Section 1C (Page 1C-1).</li> </ul>	<ul style="list-style-type: none"> <li>• P or B/W wire open, or P wire shorted to ground.</li> <li>• Loose or poor contacts on the ECM coupler.</li> <li>• If wire and connection are OK, replace the GP switch with a new one. Refer to "Gear Position (GP) Switch Removal and Installation" in Section 5B (Page 5B-11).</li> </ul>

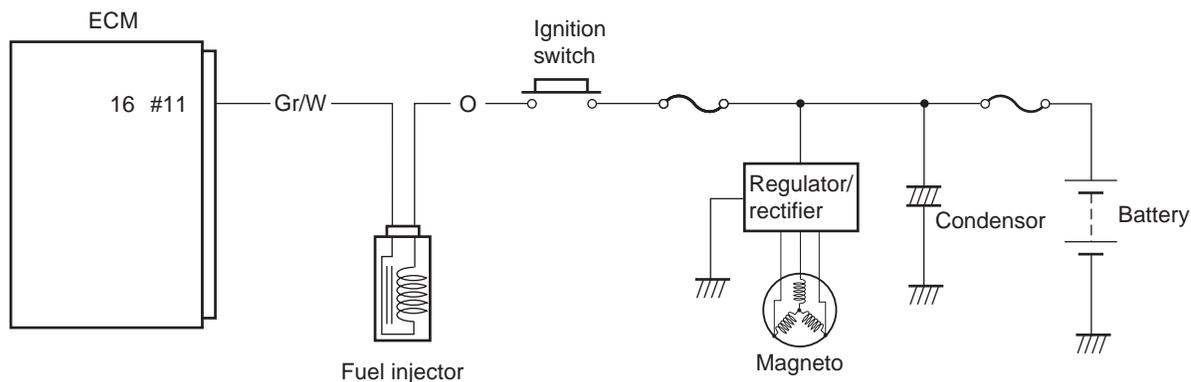
**DTC “32” (P0201): Fuel Injector Circuit Malfunction**

BA02J21104018

**Detected Condition and Possible Cause**

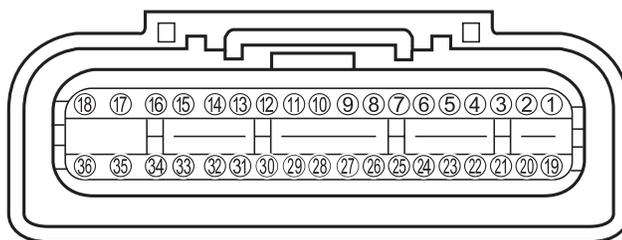
Detected condition	Possible cause
CKP signal is produced but fuel injector signal is interrupted by 8 times or more continuity.	<ul style="list-style-type: none"> <li>Fuel injector circuit open or short.</li> <li>Fuel injector malfunction.</li> <li>ECM malfunction.</li> </ul>

**Wiring Diagram**



IA02J1110085-01

**ECM coupler (Harness side)**

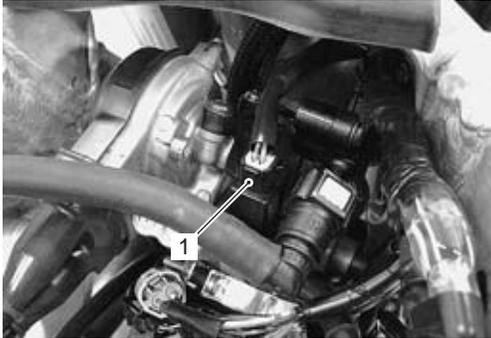
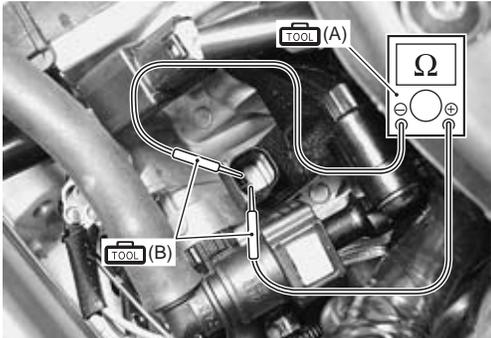


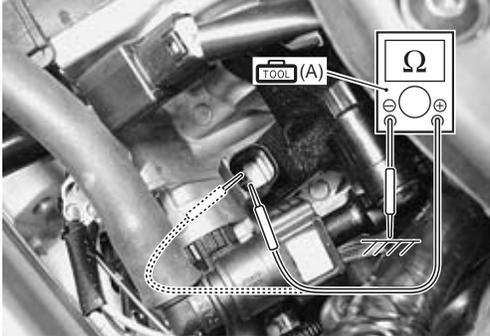
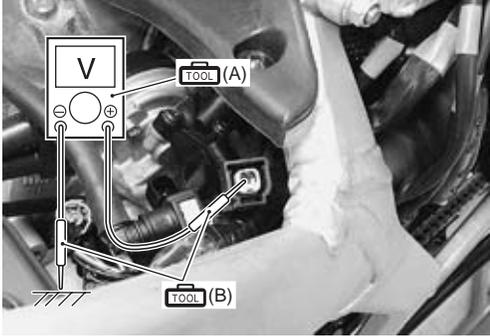
I933H1110012-02

**Troubleshooting**

**NOTE**

- After repairing the trouble, clear the DTC using SDS tool. Refer to “Use of SDS Diagnosis Reset Procedures” (Page 1A-12).
- Fuel injector voltage can be detected only for 2 seconds after ignition switch is turned ON.

Step	Action	Yes	No
1	<p>1) Turn off the ignition switch.</p> <p>2) Remove the fuel tank. Refer to "Fuel Tank Removal and Installation" in Section 1G (Page 1G-5).</p> <p>3) Check the fuel injector coupler (1) for loose or poor contacts. If OK, then measure the fuel injector resistance.</p>  <p style="text-align: right; font-size: small;">IA02J1110086-01</p> <p>4) Disconnect the fuel injector coupler and measure the resistance between terminals.</p> <p><b>Special tool</b>   (A): 09900-25008 (Multi circuit tester set)   (B): 09900-25009 (Needle-point probe set)</p> <p><b>Tester knob indication</b>  <b>Resistance (<math>\Omega</math>)</b></p> <p><b>Fuel injector resistance</b>  <b>9 – 17 <math>\Omega</math> at 20 °C (68 °F)</b>  <b>(Terminal – Terminal)</b></p>  <p style="text-align: right; font-size: small;">IA02J1110087-01</p>	Go to Step 2.	Replace the fuel injector with a new one. Refer to "Fuel Injector / Fuel Delivery Pipe / T-joint Removal and Installation" in Section 1G (Page 1G-6).

Step	Action	Yes	No
1	<p>5) If OK, then check the continuity between each terminal and ground.</p> <p><b>Special tool</b>  <b>TOOL (A): 09900-25008 (Multi circuit tester set)</b></p> <p><b>Tester knob indication</b>  <b>Resistance (<math>\Omega</math>)</b></p> <p><b>Fuel injector continuity</b>  <math>\infty \Omega</math> (Infinity)</p>  <p style="text-align: right; font-size: small;">IA02J1110067-01</p> <p><i>Are the resistance and continuity OK?</i></p>	<p>Go to Step 2.</p>	<p>Replace the fuel injector with a new one. Refer to "Fuel Injector / Fuel Delivery Pipe / T-joint Removal and Installation" in Section 1G (Page 1G-6).</p>
2	<p>1) Turn on the ignition switch.</p> <p>2) Measure the fuel injector voltage between O wire and ground.</p> <p><b>NOTE</b>  <b>Fuel injector voltage can be detected only for 3 seconds after ignition switch is turned ON.</b></p> <p><b>Special tool</b>  <b>TOOL (A): 09900-25008 (Multi circuit tester set)</b>  <b>TOOL (B): 09900-25009 (Needle-point probe set)</b></p> <p><b>Tester knob indication</b>  <b>Voltage (---)</b></p> <p><b>Fuel injector voltage</b>  <b>Battery voltage</b>  <b>(+) terminal: O – (-) terminal: Ground)</b></p>  <p style="text-align: right; font-size: small;">IA02J1110068-01</p> <p><i>Is the voltage OK?</i></p>	<ul style="list-style-type: none"> <li>• Gr/W wire open or shorted to ground, or poor "16" connection.</li> <li>• If wire and connection are OK, intermittent trouble or faulty ECM.</li> <li>• Recheck each terminal and poor connection.</li> <li>• Replace the ECM with a known good one, and inspect it again.</li> </ul>	<p>Open circuit in the O wire.</p>

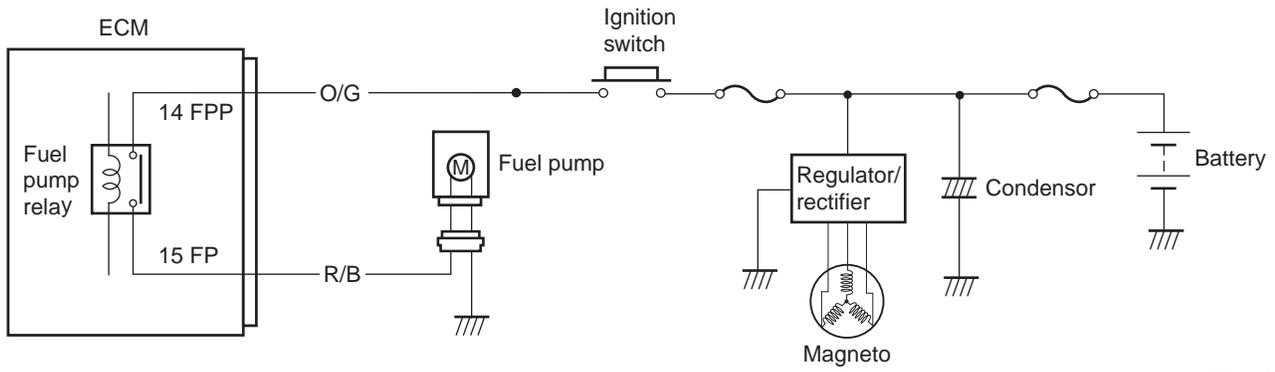
**DTC “41” (P0230): FP Relay Circuit Malfunction**

BA02J21104019

**Detected Condition and Possible Cause**

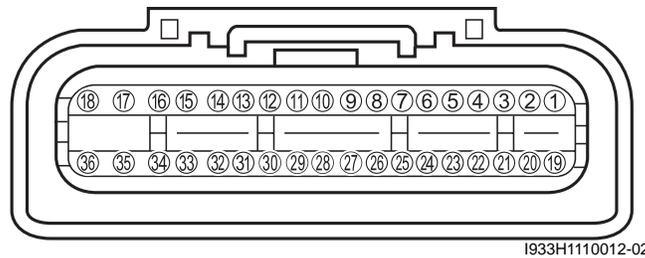
Detected condition	Possible cause
No voltage is applied to fuel pump although FP relay is turned ON.	<ul style="list-style-type: none"> <li>• FP relay circuit open or short.</li> <li>• FP relay (ECM) malfunction.</li> </ul>

**Wiring Diagram**



IA02J1110069-02

**ECM coupler (Harness side)**



I933H1110012-02

**Troubleshooting**

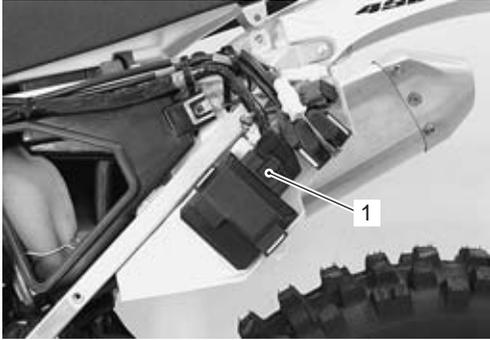
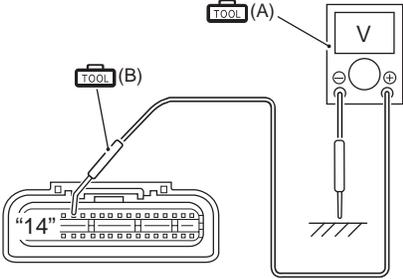
**⚠ CAUTION**

**When using the multi circuit tester, do not strongly touch the terminal of the ECM coupler with a needle-point tester probe to prevent the terminal damage or terminal bend.**

**NOTE**

**After repairing the trouble, clear the DTC using SDS tool. Refer to “Use of SDS Diagnosis Reset Procedures” (Page 1A-12).**

**C41 (Use of FI indicator light)**

Step	Action	Yes	No
1	<p>1) Turn off the ignition switch.</p> <p>2) Remove the left frame cover. Refer to "Exterior Parts Removal and Installation" in Section 9D (Page 9D-1).</p> <p>3) Check the ECM coupler (1) for loose or poor contacts. If OK, then measure the FP relay input voltage.</p>  <p style="text-align: right; font-size: small;">IA02J1110070-02</p> <p>4) Disconnect the ECM coupler.</p> <p>5) Insert the needle-point probe to ECM coupler.</p> <p>6) Measure the voltage between terminal "14" and ground.</p> <p><b>Special tool</b></p> <p> (A): 09900-25008 (Multi circuit tester set)</p> <p> (B): 09900-25009 (Needle-point probe set)</p> <p><b>Tester knob indication</b></p> <p><b>Voltage ( --- )</b></p> <p><b>FP relay input voltage</b></p> <p><b>Battery voltage</b></p>  <p style="text-align: right; font-size: small;">I933H1110070-05</p> <p><i>Is the voltage OK?</i></p>	<ul style="list-style-type: none"> <li>• FP relay (ECM) malfunction.</li> <li>• O/G or R/B wire open or shorted, or poor terminal "14" or "15" connection.</li> <li>• If the wire and connection are OK, intermittent trouble or faulty ECM.</li> <li>• Recheck each terminal and wire harness for open circuit and poor connection.</li> <li>• Replace the ECM with a known good one, and inspect it again.</li> </ul>	<p>Open or short circuit in the O/G wire.</p>

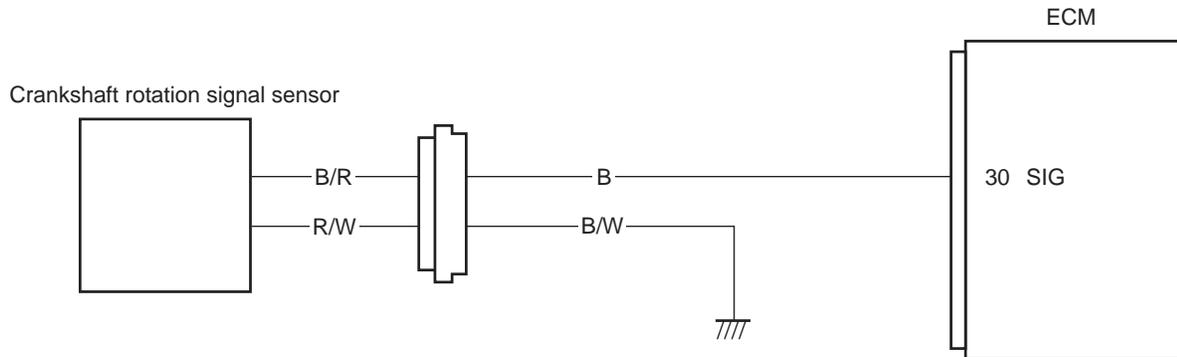
**DTC “63” (P1771): Crankshaft Rotation Signal Circuit Malfunction**

BA02J21104020

**Detected Condition and Possible Cause**

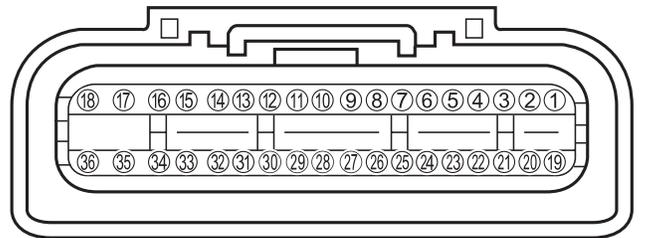
Detected condition	Possible cause
The signal does not reach ECM for 30 seconds and more.	<ul style="list-style-type: none"> <li>• Metal particles or foreign material being stuck on the crankshaft rotation signal sensor and rotor tip.</li> <li>• Crankshaft rotation signal sensor circuit open or short.</li> <li>• Crankshaft rotation signal sensor malfunction.</li> <li>• ECM malfunction.</li> </ul>

**Wiring Diagram**



IA02J1110071-02

**ECM coupler (Harness side)**

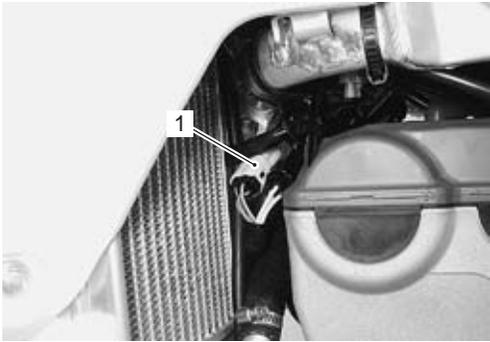
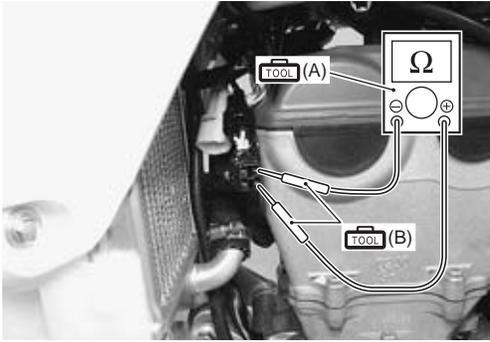


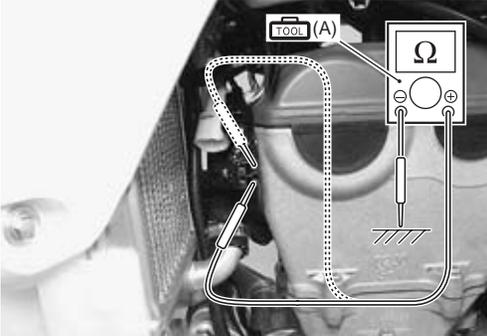
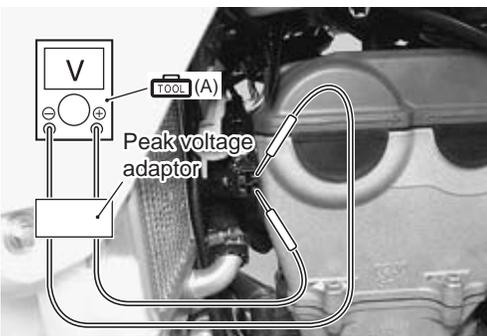
I933H1110012-02

**Troubleshooting**

**NOTE**

After repairing the trouble, clear the DTC using SDS tool. Refer to “Use of SDS Diagnosis Reset Procedures” (Page 1A-12).

Step	Action	Yes	No
1	<p>1) Turn the ignition switch.</p> <p>2) Check the CKP sensor/crankshaft rotation signal sensor lead wire coupler (1) for loose or poor contacts. If OK, then measure the crankshaft rotation signal sensor resistance.</p>  <p style="text-align: right; font-size: small;">IA02J1110072-01</p> <p>3) Disconnect the CKP sensor/crankshaft rotation signal sensor lead wire coupler and measure the resistance.</p> <p><b><u>Crankshaft rotation signal sensor resistance</u></b>  <b>0.2 – 0.6 Ω (B/R – R/W)</b></p> <p><b>Special tool</b>   <b>(A): 09900–25008 (Multi circuit tester set)</b>   <b>(B): 09900–25009 (Needle-point probe set)</b></p>  <p style="text-align: right; font-size: small;">IA02J1110073-01</p>	Go to step 2.	Replace the crankshaft rotation signal sensor with a new one.

Step	Action	Yes	No
1	<p>4) If OK, then check the continuity between each terminal and ground.</p> <p><b>Special tool</b>   (A): 09900–25008 (Multi circuit tester set)</p> <p><b>Crankshaft rotation signal sensor resistance</b>  <math>\infty\Omega</math> (Infinity)                      (B/R – Ground)                      (R/W – Ground)</p> <p><b>Tester knob indication</b>                      Resistance (<math>\Omega</math>)</p>  <p style="text-align: right; font-size: small;">IA02J1110074-01</p> <p><i>Are the resistance and continuity OK?</i></p>	<p>Go to step 2.</p>	<p>Replace the crankshaft rotation signal sensor with a new one.</p>
2	<p>1) Press the starter button and allow the engine to crank for a few seconds, and measure the crankshaft rotation signal sensor peak voltage at the coupler.</p> <p><b>Special tool</b>   (A): 09900–25008 (Multi circuit tester set)</p> <p><b>Tester knob indication</b>                      Voltage (---)</p> <p><b>Crankshaft rotation signal sensor peak voltage</b>                      3.0 V and more                      ((+) terminal: B/R – (–) terminal: R/W)</p>  <p style="text-align: right; font-size: small;">IA02J1110075-02</p> <p>2) Repeat the 1) test procedures a few times and measure the highest peak voltage.</p> <p><i>Is the voltage OK?</i></p>	<ul style="list-style-type: none"> <li>• B/R or R/W wire open or short.</li> <li>• Loose or poor contacts on the crankshaft rotation signal sensor coupler or ECM coupler (terminal “30”).</li> <li>• If wire and connection are OK, intermittent trouble or faulty ECM.</li> <li>• Recheck each terminal and wire harness for open circuit and poor connection.</li> <li>• Replace the ECM with a known good one, and inspect it again.</li> </ul>	<ul style="list-style-type: none"> <li>• Inspect that metal particles or foreign material stuck on the crankshaft rotation signal sensor and rotor tip.</li> <li>• If there are no metal particles and foreign material, then replace the crankshaft rotation signal sensor with a new one.</li> </ul>

## Specifications

### Service Data

BA02J21107001

#### Injector

Item	Specification	Note
Injector resistance	10.5 ± 0.53 Ω at 24 °C (75.2 °F)	

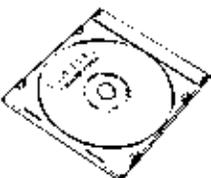
#### FI Sensors

Item	Specification	Note
CKP sensor resistance	150 – 280 Ω	
CKP sensor peak voltage	5.0 V and more	
Crankshaft rotation signal sensor resistance	0.2 – 0.6 Ω	
Crankshaft rotation signal sensor peak voltage	3.0 V and more	
IAP sensor input voltage	4.5 – 5.5 V	
IAP sensor output voltage	0.89 – 1.17 V at idle speed	
TP sensor input voltage	4.5 – 5.5 V	
TP sensor output voltage	Closed	Approx. 0.6 V
	Opened	Approx. 1.89 V
ECT sensor input voltage	4.5 – 5.5 V	
ECT sensor output voltage	0.2 – 4.9 V	
ECT sensor resistance	Approx. 2.58 kΩ at 20 °C (68 °F)	
IAT sensor input voltage	4.5 – 5.5 V	
IAT sensor output voltage	0.15 – 4.85 V	
IAT sensor resistance	Approx. 2.58 kΩ at 20 °C (68 °F)	
TO sensor resistance	16.5 – 22.3 kΩ	
TO sensor voltage	Normal	0.4 – 1.4 V
	Leaning	3.7 – 4.4 V
GP switch voltage	0.6 V and more	When leaning 65°
Injector voltage	Battery voltage	From 1st to Top

## Special Tools and Equipment

### Special Tool

BA02J21108001

<p>09900-25008 Multi circuit tester set ☞ (Page 1A-25) / ☞ (Page 1A-26) / ☞ (Page 1A-26) / ☞ (Page 1A-28) / ☞ (Page 1A-29) / ☞ (Page 1A-31) / ☞ (Page 1A-32) / ☞ (Page 1A-32) / ☞ (Page 1A-33) / ☞ (Page 1A-35) / ☞ (Page 1A-36) / ☞ (Page 1A-37) / ☞ (Page 1A-38) / ☞ (Page 1A-39) / ☞ (Page 1A-41) / ☞ (Page 1A-42) / ☞ (Page 1A-43) / ☞ (Page 1A-44) / ☞ (Page 1A-45) / ☞ (Page 1A-46) / ☞ (Page 1A-47) / ☞ (Page 1A-49) / ☞ (Page 1A-50) / ☞ (Page 1A-51) / ☞ (Page 1A-52) / ☞ (Page 1A-52) / ☞ (Page 1A-54)</p> <div style="text-align: center;">  </div> <p style="text-align: center;">☞ (Page 1A-55) / ☞ (Page 1A-56) / ☞ (Page 1A-57) / ☞ (Page 1A-58) / ☞ (Page 1A-59) / ☞ (Page 1A-59) / ☞ (Page 1A-61) / ☞ (Page 1A-63) / ☞ (Page 1A-64) / ☞ (Page 1A-64) / ☞ (Page 1A-66) / ☞ (Page 1A-68) / ☞ (Page 1A-69) / ☞ (Page 1A-69)</p>	<p>09900-25009 Needle-point probe set ☞ (Page 1A-28) / ☞ (Page 1A-29) / ☞ (Page 1A-31) / ☞ (Page 1A-32) / ☞ (Page 1A-32) / ☞ (Page 1A-33) / ☞ (Page 1A-35) / ☞ (Page 1A-36) / ☞ (Page 1A-37) / ☞ (Page 1A-38) / ☞ (Page 1A-41) / ☞ (Page 1A-42) / ☞ (Page 1A-43) / ☞ (Page 1A-44) / ☞ (Page 1A-45) / ☞ (Page 1A-46) / ☞ (Page 1A-50) / ☞ (Page 1A-52) / ☞ (Page 1A-56) / ☞ (Page 1A-58) / ☞ (Page 1A-59) / ☞ (Page 1A-59) / ☞ (Page 1A-61) / ☞ (Page 1A-63) / ☞ (Page 1A-64) / ☞ (Page 1A-66) / ☞ (Page 1A-68)</p> <div style="text-align: center;">  </div>
<p>09904-41010 SUZUKI Diagnostic system set ☞ (Page 1A-11) / ☞ (Page 1A-15)</p> <div style="text-align: center;">  </div>	<p>09917-47011 Vacuum pump gauge set ☞ (Page 1A-47)</p> <div style="text-align: center;">  </div>
<p>99565-01010-021 CD-ROM Ver.21 ☞ (Page 1A-11) / ☞ (Page 1A-15)</p> <div style="text-align: center;">  </div>	

# Emission Control Devices

## Precautions

### Precautions for Emission Control Devices

BA02J21200001

Refer to "General Precautions" in Section 00 (Page 00-1).

## Repair Instructions

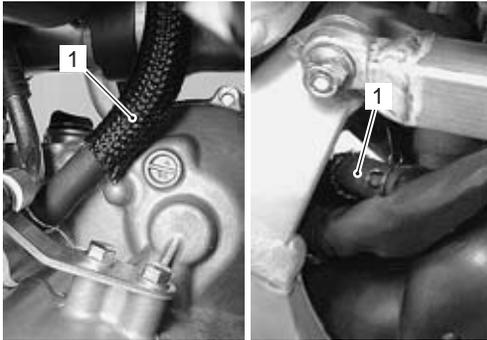
### Crankcase Breather (PCV) Hose Inspection

BA02J21206001

Inspect the crankcase breather (PCV) hose in the following procedures:

Inspect the crankcase breather (PCV) hose (1) for damage, clogging and bend. If any defects are found, replace the crankcase breather (PCV) hoses with a new one.

Check that the crankcase breather (PCV) hose (1) is securely connected.



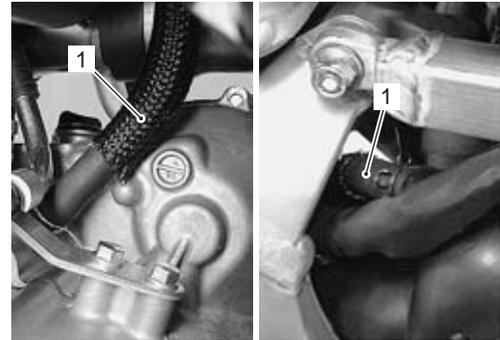
IA02J1120001-01

### Crankcase Breather (PCV) Hose Removal and Installation

BA02J21206002

#### Removal

- 1) Remove the seat. Refer to "Exterior Parts Removal and Installation" in Section 9D (Page 9D-1).
- 2) Disconnect the crankcase breather (PCV) hose (1).



IA02J1120001-01

#### Installation

Install the crankcase breather (PCV) hose in the reverse order of removal.

# Engine Electrical Devices

## Precautions

### Precautions for Engine Electrical Device

Refer to “General Precautions” in Section 00 (Page 00-1) and “Precautions for Electrical Circuit Service” in Section 00 (Page 00-2).

BA02J21300001

## Component Location

### Engine Electrical Components Location

Refer to “Electrical Components Location” in Section 0A (Page 0A-6).

BA02J21303001

## Diagnostic Information and Procedures

### Engine Symptom Diagnosis

Refer to “Engine Symptom Diagnosis” in Section 1A (Page 1A-7).

BA02J21304001

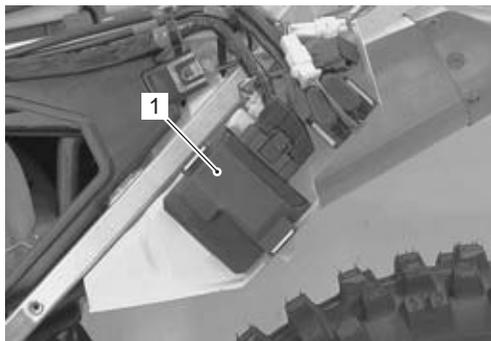
## Repair Instructions

### ECM Removal and Installation

BA02J21306001

#### Removal

- 1) Disconnect the battery (–) lead wire. Refer to “Battery / Battery Protector Removal and Installation” in Section 1J (Page 1J-9).
- 2) Remove the left frame cover. Refer to “Exterior Parts Removal and Installation” in Section 9D (Page 9D-1).
- 3) Disconnect the ECM coupler and remove the ECM (1).



IA02J1130001-03

#### Installation

Install the ECM in the reverse order of removal. Pay attention to the following point:

- Stick the harness clamp on the ECM rubber band. Refer to “Wiring Harness Routing Diagram” in Section 9A (Page 9A-2).

### CKP Sensor Inspection

BA02J21306002

Refer to “DTC “12” (P0335): CKP Sensor Circuit Malfunction” in Section 1A (Page 1A-24).

### Crankshaft Rotation Signal Sensor Inspection

BA02J21306003

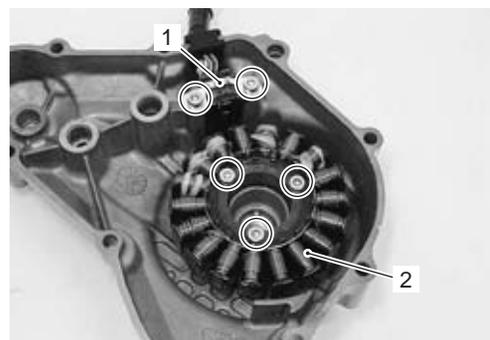
Refer to “DTC “63” (P1771): Crankshaft Rotation Signal Circuit Malfunction” in Section 1A (Page 1A-67).

### CKP Sensor / Crankshaft Rotation Signal Sensor Removal and Installation

BA02J21306004

#### Removal

- 1) Remove the magneto cover. Refer to “Generator Removal and Installation” in Section 1J (Page 1J-5).
- 2) Remove the CKP sensor (1) and crankshaft rotation signal sensor with the magneto stator (2).



IA02J1130002-02

**Installation**

Install the CKP sensor/crankshaft rotation signal sensor in the reverse order of removal. Refer to "Generator Removal and Installation" in Section 1J (Page 1J-5).

**IAP Sensor Inspection**

BA02J21306005

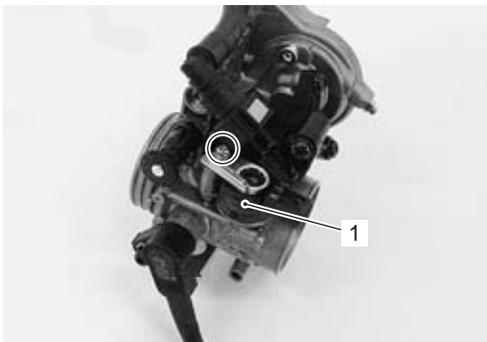
Refer to "DTC "17" (P0105-H/L): IAP Sensor Circuit Malfunction" in Section 1A (Page 1A-40).

**IAP Sensor Removal and Installation**

BA02J21306006

**Removal**

- 1) Remove the throttle body. Refer to "Throttle Body Removal and Installation" in Section 1D (Page 1D-15).
- 2) Remove the IAP sensor (1) from the throttle body.



IA02J1130003-01

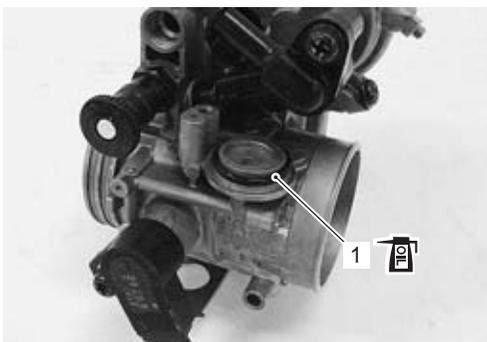
**Installation**

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

- Apply thin coat of engine oil to the new O-ring (1).

**⚠ CAUTION**

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



IA02J1130004-03

**TP Sensor Inspection**

BA02J21306007

Refer to "DTC "14" (P0120-H/L): TP Sensor Circuit Malfunction" in Section 1A (Page 1A-27).

**TP Sensor Removal and Installation**

BA02J21306008

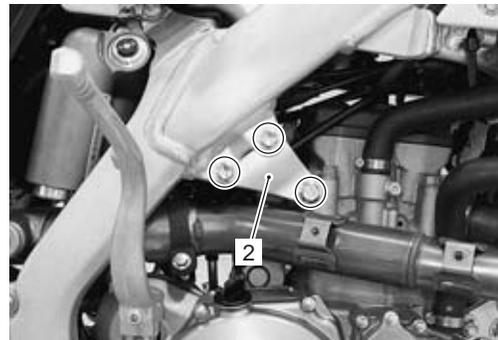
**Removal**

- 1) Remove the exhaust pipe cover (1).



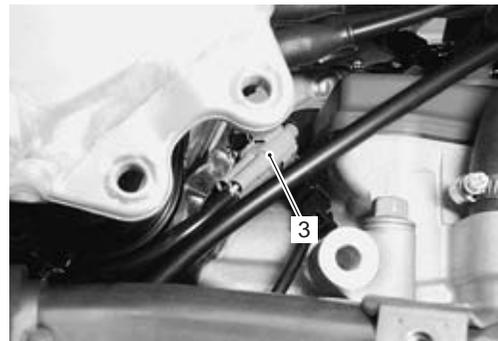
IA02J1130022-01

- 2) Remove the upper engine mounting bracket (2).



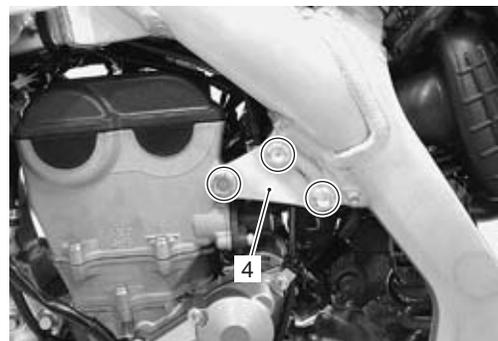
IA02J1130023-01

- 3) Disconnect the TP sensor coupler (3).



IA02J1130021-02

- 4) Remove the upper engine mounting bracket (LH) (4).



IA02J1130006-02

## 1C-3 Engine Electrical Devices:

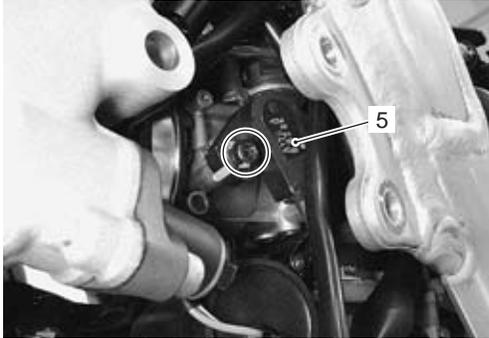
5) Remove the TP sensor (5) with the special tool.

### NOTE

Prior to disassembly, mark the TP sensor original position with a paint or scribe for accurate reinstallation.

### Special tool

 : 09930-11950 (Torx wrench (T25))



IA02J1130007-02

### Installation

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

- Install the TP sensor and tighten the TP sensor mounting screw to the specified torque.

### NOTE

- Apply thin coat of engine oil to the O-ring (1).
- Align the throttle shaft end "A" with the groove "B" of the TP sensor.
- Apply grease to the throttle shaft end "A" if necessary.

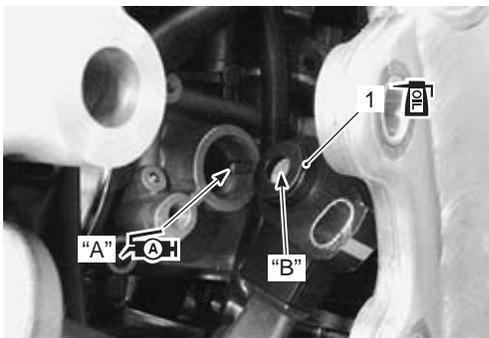
 : Grease 99000-25010 (SUZUKI SUPER GREASE "A" or equivalent)

### Special tool

 : 09930-11950 (Torx wrench (T25))

### Tightening torque

TP sensor mounting screw: 3.5 N·m (0.35 kgf·m, 2.5 lbf·ft)



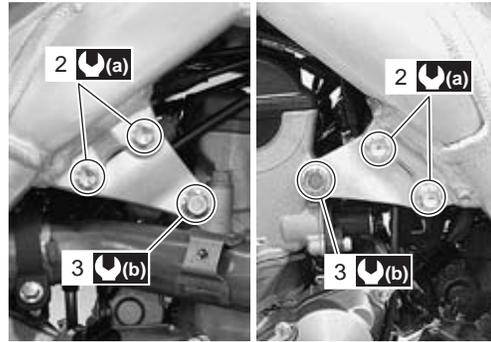
IA02J1130008-02

- Inspect and adjust the TP sensor. Refer to "TP Sensor Adjustment" (Page 1C-3).
- Tighten the engine mounting bracket bolts (LH & RH) (2) and engine mounting bolt (LH & RH) (3) to the specified torque.

### Tightening torque

Engine mounting bracket bolt (a): 40 N·m (4.0 kgf·m, 29.0 lbf·ft)

Engine mounting bolt (b): 55 N·m (5.5 kgf·m, 40.0 lbf·ft)



IA02J1130024-01

- Install the fuel tank. Refer to "Fuel Tank Removal and Installation" in Section 1G (Page 1G-5).

### TP Sensor Adjustment

BA02J21306009

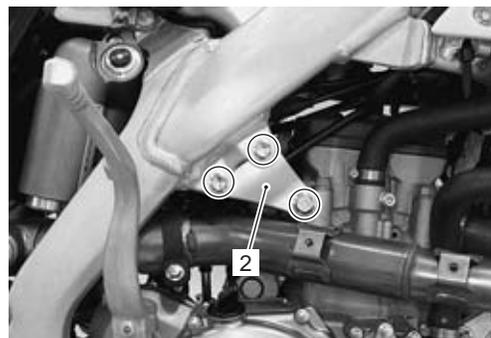
Adjust the TP sensor in the following procedures:

- 1) Remove the exhaust pipe cover (1).



IA02J1130022-01

- 2) Warm up the engine.
- 3) Turn off the ignition switch.
- 4) Remove the upper engine mounting bracket (RH) (2).



IA02J1130025-01

- 5) Turn on the ignition switch.
- 6) Measure the TP sensor output voltage between the Y wire terminal (+) and B wire terminal (-).

**Special tool**

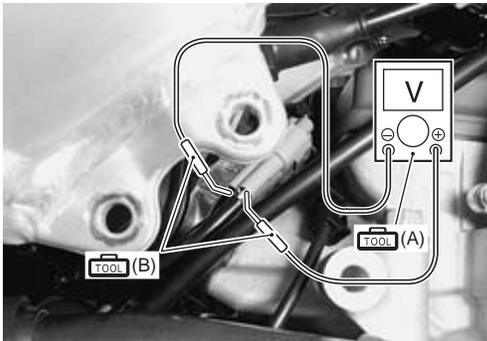
-  (A): 09900-25008 (Multi circuit tester set)
-  (B): 09900-25009 (Needle-point probe set)

**Tester knob indication**

Voltage (  )

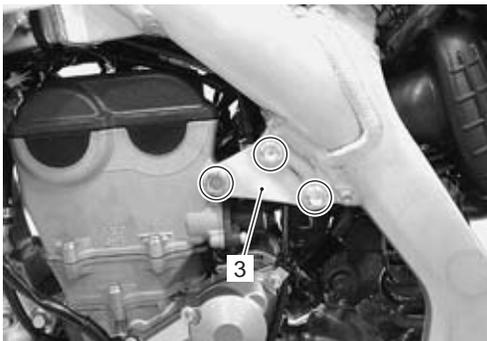
**TP sensor output voltage**

0.53 – 0.68 V ((+) terminal: Y – (-) terminal: B)



IA02J1130026-01

- 7) If the TP sensor adjustment is necessary, remove the upper engine mounting bracket (LH) (3).



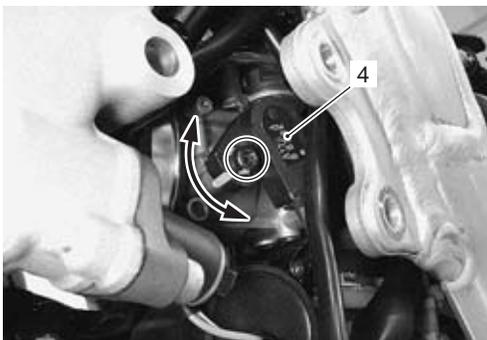
IA02J1130011-02

- 8) Loosen the TP sensor mounting screw with the special tool.

**Special tool**

-  : 09930-11950 (Torx wrench (T25))

- 9) Turn the TP sensor (4) and adjust the TP sensor until the output voltage comes within specified valve.



IA02J1130012-02

- 10) Tighten the TP sensor mounting screw to the specified torque.

**Tightening torque**

TP sensor mounting screw: 3.5 N-m (0.35 kgf-m, 2.5 lbf-ft)

**Special tool**

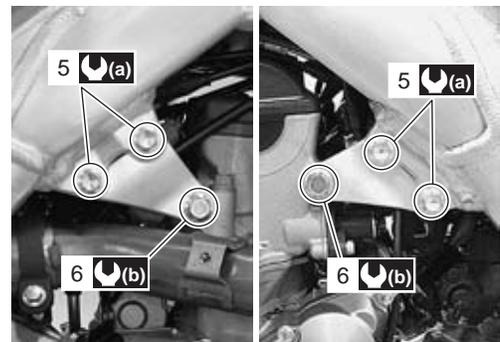
-  : 09930-11950 (Torx wrench (T25))

- 11) Turn off the ignition switch.
- 12) Tighten the engine mounting bracket bolts (LH & RH) (5) and engine mounting bolt (LH & RH) (6) to the specified torque.

**Tightening torque**

Engine mounting bracket bolt (a): 40 N-m (4.0 kgf-m, 29.0 lbf-ft)

Engine mounting bolt (b): 55 N-m (5.5 kgf-m, 40.0 lbf-ft)



IA02J1130027-03

- 13) Install the exhaust pipe cover. Refer to “Exhaust System Components” in Section 1K (Page 1K-1).

**IAT Sensor Inspection**

BA02J21306010

Refer to “DTC “21” (P0110-H/L): IAT Sensor Circuit Malfunction” in Section 1A (Page 1A-48).

**NOTE**

**IAT sensor resistance measurement method is the same way as that of the ECT sensor. Refer to “ECT Sensor Inspection” (Page 1C-6).**

**IAT Sensor Removal and Installation**

BA02J21306011

**Removal**

- 1) Remove the seat. Refer to “Exterior Parts Removal and Installation” in Section 9D (Page 9D-1).
- 2) Remove the air cleaner element. Refer to “Air Cleaner Element Removal and Installation” in Section 1D (Page 1D-8).

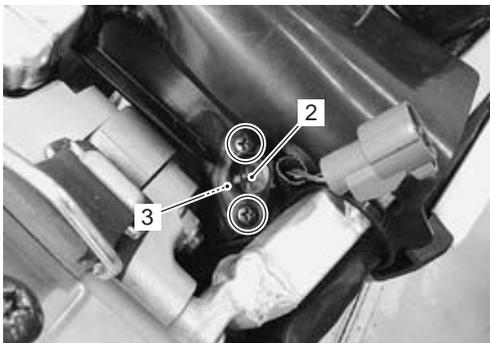
## 1C-5 Engine Electrical Devices:

- 3) Disconnect the IAT sensor coupler (1) under the fuel tank protector.



IA02J1130014-01

- 4) Remove the IAT sensor (2).
- 5) Remove the IAT sensor bracket (3) from the air cleaner box.



IA02J1130020-01

### Installation

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

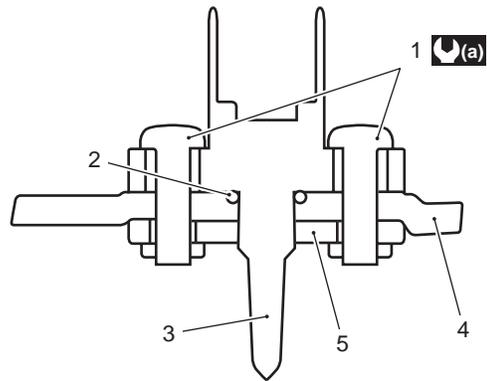
- Tighten the IAT sensor mounting screws (1) to the specified torque.

#### **⚠ CAUTION**

**Replace the O-ring (2) with a new one.**

#### Tightening torque

IAT sensor mounting screw (a): 1.3 N·m (0.13 kgf·m, 0.95 lbf·ft)



IA02J1130015-02

1. IAT sensor mounting screw	4. Air cleaner box
2. O-ring	5. IAT sensor bracket
3. IAT sensor	

- Install the air cleaner element. Refer to "Air Cleaner Element Removal and Installation" in Section 1D (Page 1D-8).

### ECT Sensor Removal and Installation

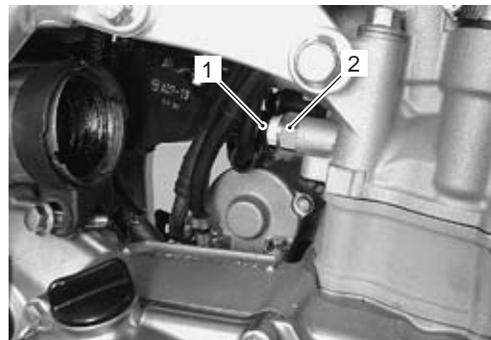
BA02J21306012

#### Removal

- 1) Drain a small amount of engine coolant. Refer to "Cooling System Inspection" in Section 0B (Page 0B-9).
- 2) Remove the exhaust pipe. Refer to "Muffler / Exhaust Pipe Removal and Installation" in Section 1K (Page 1K-2).
- 3) Disconnect the coupler (1) and remove the ECT sensor (2).

#### **⚠ CAUTION**

**Take special care when handling the ECT sensor. It may cause damage if it gets an excessive impact.**



IA02J1130016-01

**Installation**

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

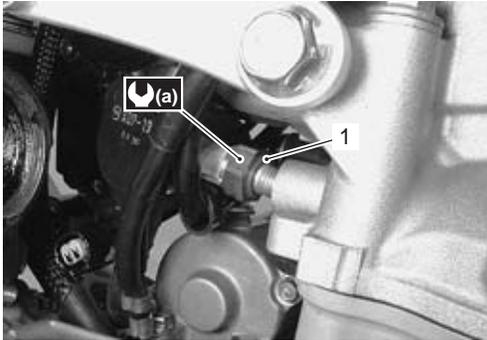
- Tighten the ECT sensor to the specified torque.

**⚠ CAUTION**

**Use new O-ring (1) to prevent engine coolant leakage.**

**Tightening torque**

ECT sensor (a): 12 N·m (1.2 kgf·m, 8.5 lbf·ft)



IA02J1130017-01

- Install the exhaust pipe. Refer to “Muffler / Exhaust Pipe Removal and Installation” in Section 1K (Page 1K-2).
- Pour engine coolant. Refer to “Cooling System Inspection” in Section 0B (Page 0B-9).

**ECT Sensor Inspection**

BA02J21306013

Refer to “DTC “15” (P0115-H/L): ECT Sensor Circuit Malfunction” in Section 1A (Page 1A-34).

Inspect the ECT sensor in the following procedures:

- 1) Remove the ECT sensor. Refer to “ECT Sensor Removal and Installation” (Page 1C-5).
- 2) Connect the ECT sensor (1) to the multi circuit tester and place it in the oil (2) contained in a pan, which is placed on a stove.
- 3) Heat the oil to raise its temperature slowly and read the column thermometer (3) and the ohmmeter. If the ECT sensor ohmic value does not change in the proportion indicated, replace it with a new one.

**⚠ CAUTION**

- Take special care when handling the ECT sensor. It may cause damage if it gets an excessive sharp impact.
- Do not contact the ECT sensor and the column thermometer with a pan.

**Special tool**

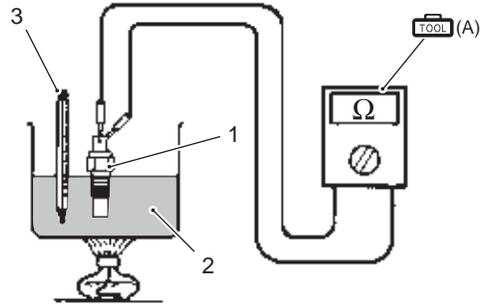
**TOOL (A): 09900–25008 (Multi circuit tester set)**

**Tester knob indication**

Resistance (Ω)

**Temperature sensor specification**

Temperature	Standard resistance
20 °C (68 °F)	Approx. 2.58 kΩ
50 °C (122 °F)	Approx. 0.77 kΩ
80 °C (176 °F)	Approx. 0.28 kΩ
110 °C (230 °F)	Approx. 0.12 kΩ



I718H1130014-01

- 4) Install the ECT sensor. Refer to “ECT Sensor Removal and Installation” (Page 1C-5).

**TO Sensor Inspection**

BA02J21306014

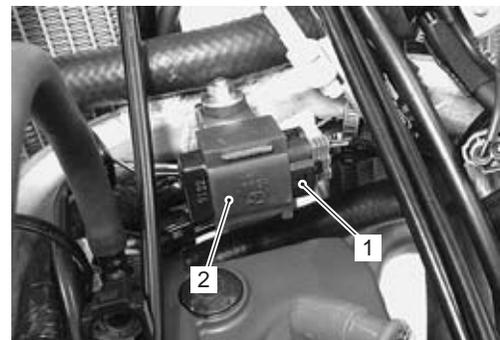
Refer to “DTC “23” (P1651-H/L): TO Sensor Circuit Malfunction” in Section 1A (Page 1A-53).

**TO Sensor Removal and Installation**

BA02J21306015

**Removal**

- 1) Remove the fuel tank. Refer to “Fuel Tank Removal and Installation” in Section 1G (Page 1G-5).
- 2) Disconnect the coupler (1) and remove the TO sensor (2).



IA02J1130018-01

## 1C-7 Engine Electrical Devices:

### Installation

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

- When installing the TO sensor, bring the arrow mark "A" upward.



IA02J1130019-01

- Install the fuel tank. Refer to "Fuel Tank Removal and Installation" in Section 1G (Page 1G-5).

### GP Switch Inspection

BA02J21306016

Refer to "Gear Position (GP) Switch Inspection" in Section 1I (Page 1I-7).

### GP Switch Removal and Installation

BA02J21306017

Refer to "Gear Position (GP) Switch Removal and Installation" in Section 5B (Page 5B-11).

## Specifications

### Service Data

BA02J21307001

#### FI Sensors

Item	Specification		Note
CKP sensor resistance	150 – 280 Ω		R – G
CKP sensor peak voltage	5.0 V and more		(+): R, (-): G
Crankshaft rotation signal sensor resistance	0.2 – 0.6 Ω		B/R – R/W
Crankshaft rotation signal sensor peak voltage	3.0 V and more		(+): B/R, (-): R/W
IAP sensor input voltage	4.5 – 5.5 V		
IAP sensor output voltage	0.89 – 1.17 V at idle speed		
TP sensor input voltage	4.5 – 5.5 V		
TP sensor output voltage	Closed	Approx. 0.6 V	
	Opened	Approx. 1.89 V	
ECT sensor input voltage	4.5 – 5.5 V		
ECT sensor resistance	Approx. 2.58 kΩ at 20 °C (68 °F)		
IAT sensor input voltage	4.5 – 5.5 V		
IAT sensor resistance	Approx. 2.58 kΩ at 20 °C (68 °F)		
TO sensor resistance	16.5 – 22.3 kΩ		
TO sensor voltage	Normal	0.4 – 1.4 V	
	Leaning	3.7 – 4.4 V	When leaning 65°
GP switch voltage	0.6 V and more		From 1st to Top
Injector voltage	Battery voltage		

### Tightening Torque Specifications

BA02J21307002

Fastening part	Tightening torque			Note
	N·m	kgf·m	lbf·ft	
TP sensor mounting screw	3.5	0.35	2.5	☞(Page 1C-3) / ☞(Page 1C-4)
Engine mounting bracket bolt	40	4.0	29.0	☞(Page 1C-3) / ☞(Page 1C-4)
Engine mounting bolt	55	5.5	40.0	☞(Page 1C-3) / ☞(Page 1C-4)
IAT sensor mounting screw	1.3	0.13	0.95	☞(Page 1C-5)
ECT sensor	12	1.2	8.5	☞(Page 1C-6)

**Reference:**

For the tightening torque of fastener not specified in this section, refer to “Tightening Torque List” in Section 0C (Page 0C-8).

## Special Tools and Equipment

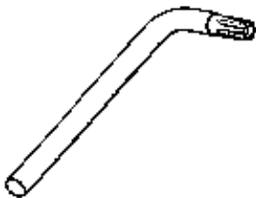
### Recommended Service Material

BA02J21308001

Material	SUZUKI recommended product or Specification		Note
Grease	SUZUKI SUPER GREASE “A” or equivalent	P/No.: 99000–25010	☞(Page 1C-3)

### Special Tool

BA02J21308002

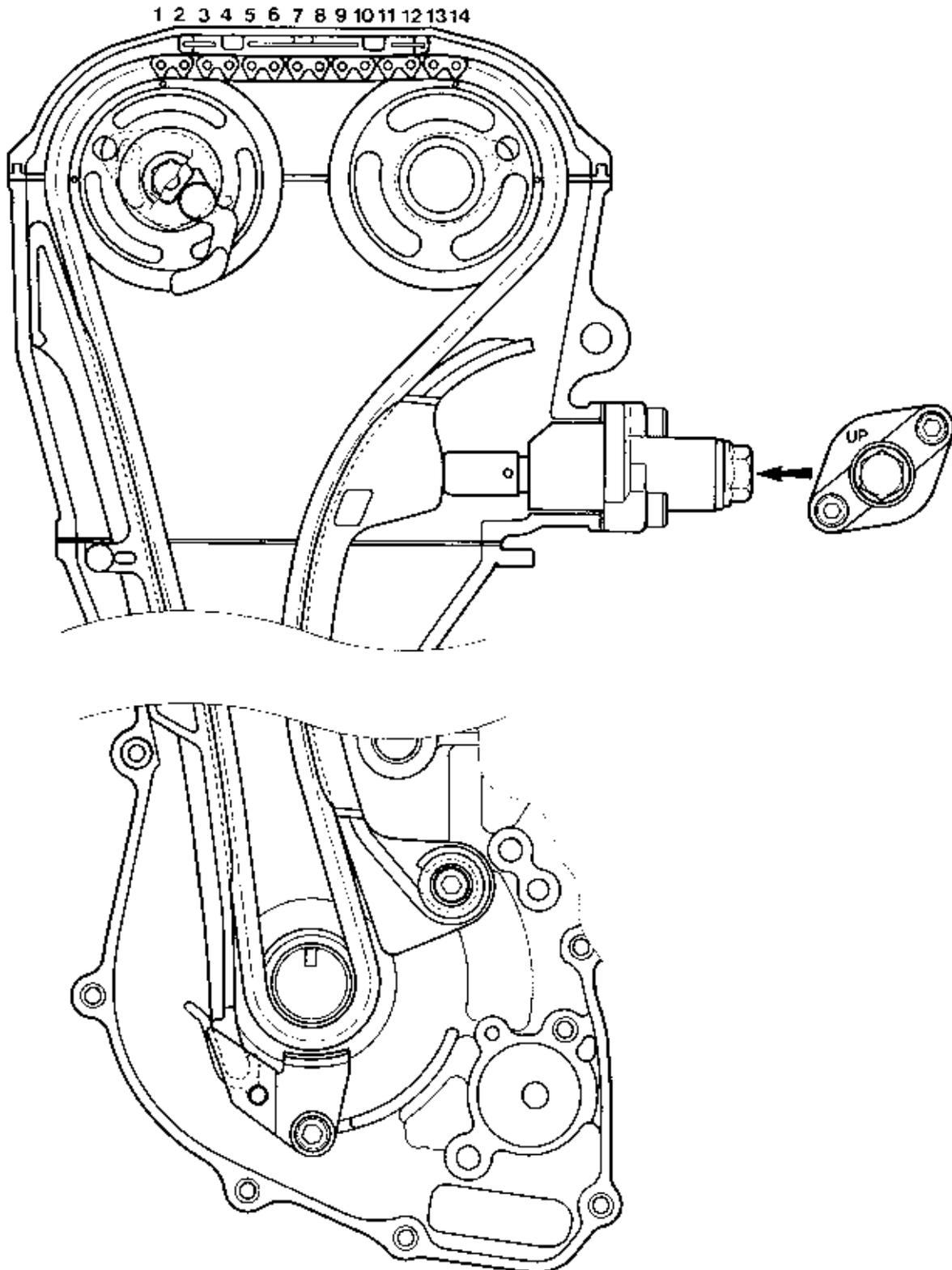
09900–25008 Multi circuit tester set ☞(Page 1C-4) / ☞(Page 1C-6)		09900–25009 Needle-point probe set ☞(Page 1C-4)	
09930–11950 Torx wrench (T25H) ☞(Page 1C-3) / ☞(Page 1C-3) / ☞(Page 1C-4) / ☞(Page 1C-4)			

# Engine Mechanical

## Schematic and Routing Diagram

### Camshaft and Sprocket Assembly Diagram

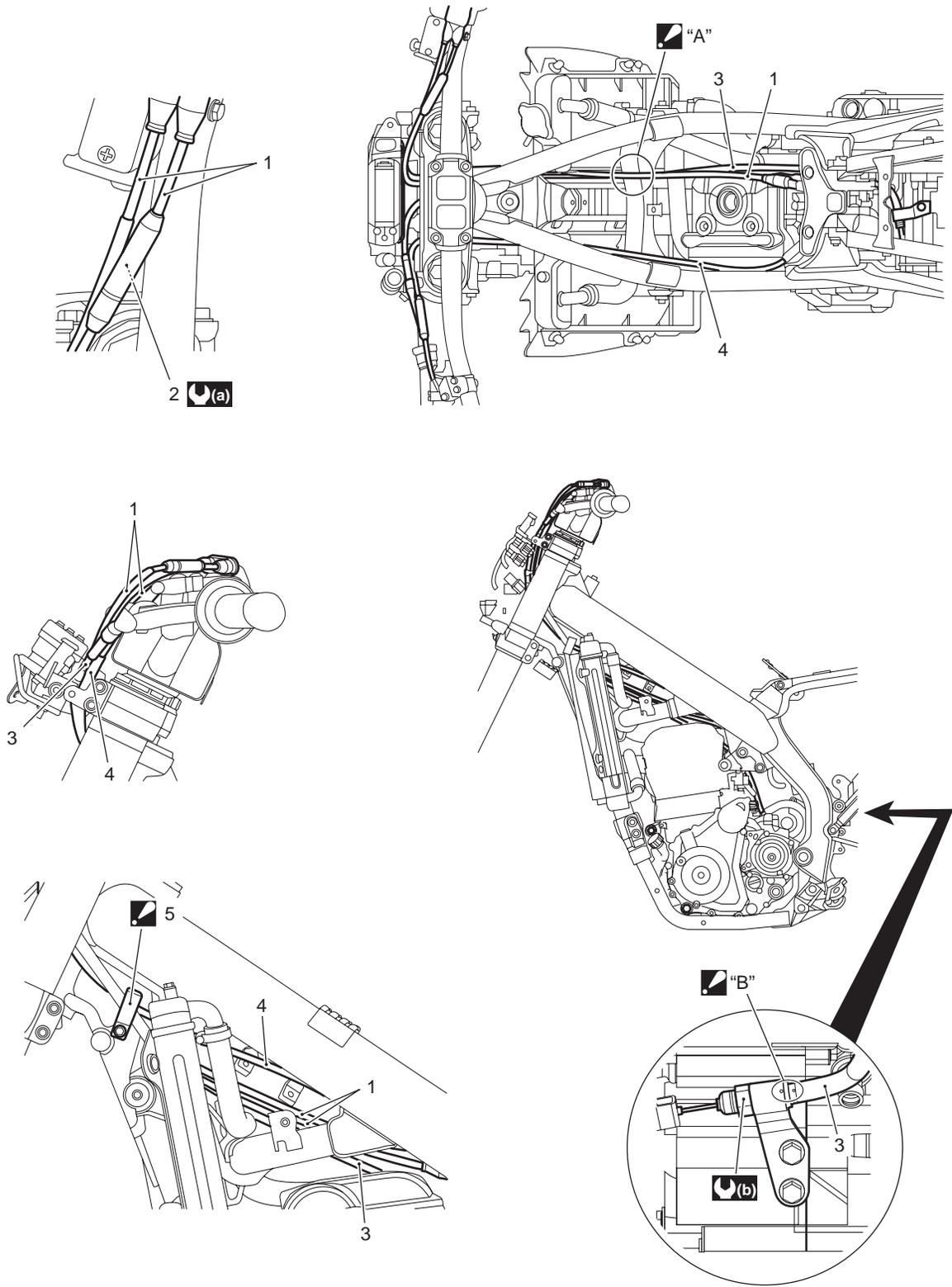
BA02J21402001

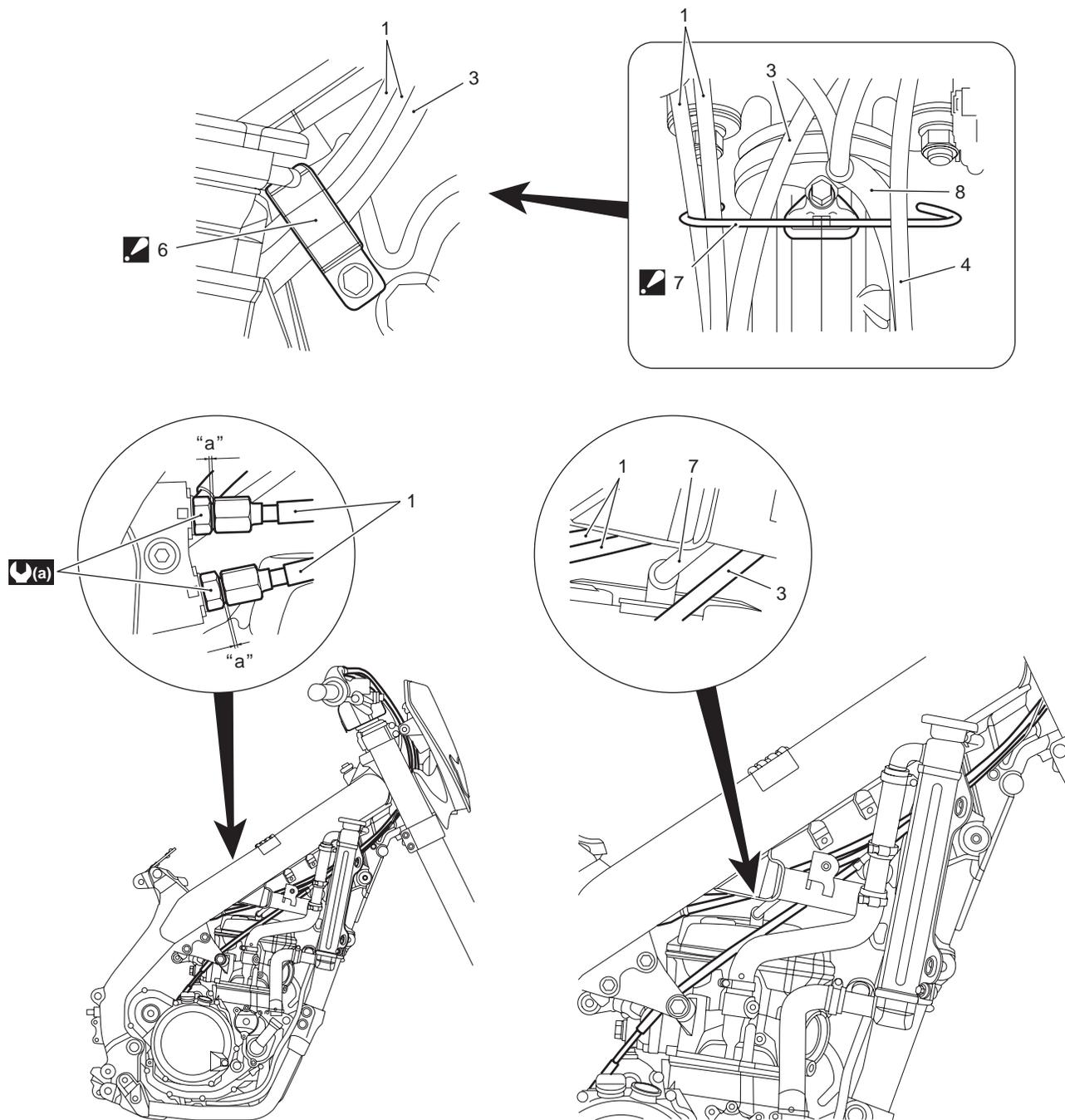


IA02J1140124-01

# Throttle Cable Routing Diagram

BA02J21402002





IA02J1140126-04

1. Throttle cable set	8. Wiring harness.
2. Lock-nut	"A": Pass the clutch, throttle and hot starter cables over the radiator hose.
3. Clutch cable	"B": Align the punch marks before tightening the nut.
4. Hot starter cable	"a": 2.1 N·m (0.21 kgf-m, 1.5 lbf-ft)
5. Clamp: Pass the hot starter cable and wiring harness inside the clamp.	"b": 4.5 N·m (0.45 kgf-m, 3.5 lbf-ft)
6. Cable clamp: Pass the throttle and clutch cables between the frame and right radiator, also under the reservoir hose.	"a": 0 – 1.5 mm (0 – 0.06 in)
7. Cable guide: Pass the wiring harness, clutch and throttle cables inside the cable guide, hot starter cable and clutch lever switch harness outside.	

## Diagnostic Information and Procedures

### Engine Mechanical Symptom Diagnosis

BA02J21404001

Refer to “Engine Symptom Diagnosis” in Section 1A (Page 1A-7).

### Compression Pressure Check

BA02J21404002

The compression pressure reading of the cylinder is a good indicator of its internal condition. The decision to overhaul the cylinder is often based on the results of the compression test.

#### NOTE

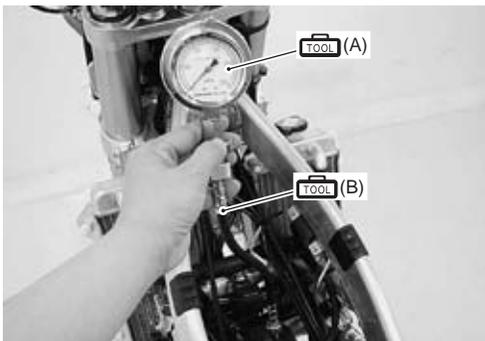
- Before checking the engine for compression pressure, make sure that the cylinder head bolts are tightened to the specified torque values and the valves are properly adjusted.
- Make sure that the battery is in fully-charged condition.

- 1) Warm up the engine.
- 2) Remove the fuel tank. Refer to “Fuel Tank Removal and Installation” in Section 1G (Page 1G-5).
- 3) Remove the spark plug. Refer to “Spark Plug Cap and Spark Plug Removal and Installation” in Section 1H (Page 1H-4).
- 4) Install the compression gauge and adaptor in the spark plug hole. Make sure that the connection is tight.

#### Special tool

 (A): 09915-64512 (Compression gauge)

 (B): 09913-10750 (Compression gauge adaptor)



IA02J1140127-01

- 5) Shift the transmission to the neutral, turn on the ignition switch and grasp the clutch lever.
- 6) Keep the throttle grip in the fully-opened position.



IA02J1140128-01

- 7) Press the starter button and crank the engine for a few seconds. Record the maximum gauge reading as the cylinder compression.

#### Compression pressure specification

Standard
<p><b>Approx. 400 kPa</b>  <b>(4.0 kgf/cm<sup>2</sup>, 57 psi)</b>  <b>(Automatic decompression actuated)</b></p>

#### Low compression pressure can indicate any of the following conditions:

- Excessively worn cylinder wall
  - Worn piston or piston rings
  - Piston rings stuck in grooves
  - Poor valve seating
  - Ruptured or otherwise defective cylinder head gasket
- 8) After checking the compression pressure, reinstall the removed parts.

## Repair Instructions

### Engine Components Removable with the Engine in Place

BA02J21406001

Engine components which can be removed while the engine is installed on the frame are as follows. For the installing and removing procedures, refer to respective paragraphs describing each component.

#### Center of Engine

Item	Removal	Inspection	Installation
Air cleaner element	Refer to "Air Cleaner Element Removal and Installation" (Page 1D-8).	Refer to "Air Cleaner Element Cleaning" in Section 0B (Page 0B-4).	Refer to "Air Cleaner Element Removal and Installation" (Page 1D-8).
Exhaust pipe/Muffler	Refer to "Muffler / Exhaust Pipe Removal and Installation" in Section 1K (Page 1K-2).	Refer to "Exhaust System Inspection" in Section 1K (Page 1K-3).	Refer to "Muffler / Exhaust Pipe Removal and Installation" in Section 1K (Page 1K-2).
Throttle body	Refer to "Throttle Body Removal and Installation" (Page 1D-15).	Refer to "Throttle Body Inspection and Cleaning" (Page 1D-20).	Refer to "Throttle Body Removal and Installation" (Page 1D-15).
Cam chain tension adjuster	Refer to "Engine Top Side Disassembly" (Page 1D-27).	Refer to "Cam Chain Tension Adjuster Inspection" (Page 1D-38).	Refer to "Engine Top Side Assembly" (Page 1D-30).
Cylinder head cover	Refer to "Engine Top Side Disassembly" (Page 1D-27).	—	Refer to "Engine Top Side Assembly" (Page 1D-30).
Cylinder head	Refer to "Engine Top Side Disassembly" (Page 1D-27).	Refer to "Cylinder Head Related Parts Inspection" (Page 1D-43).	Refer to "Engine Top Side Disassembly" (Page 1D-27).
Camshafts	Refer to "Engine Top Side Disassembly" (Page 1D-27).	Refer to "Camshaft Inspection" (Page 1D-36).	Refer to "Engine Top Side Disassembly" (Page 1D-27).
Starter motor	Refer to "Starter Motor Removal and Installation" in Section 1I (Page 1I-4).	Refer to "Starter Motor Related Parts Inspection" in Section 1I (Page 1I-5).	Refer to "Starter Motor Removal and Installation" in Section 1I (Page 1I-4).
Cylinder	Refer to "Engine Top Side Disassembly" (Page 1D-27).	Refer to "Cylinder Inspection" (Page 1D-48).	Refer to "Engine Top Side Disassembly" (Page 1D-27).
Piston	Refer to "Engine Top Side Disassembly" (Page 1D-27).	Refer to "Piston and Piston Ring Inspection" (Page 1D-50).	Refer to "Engine Top Side Disassembly" (Page 1D-27).
Cam chain	Refer to "Engine Top Side Disassembly" (Page 1D-27).	—	Refer to "Engine Top Side Disassembly" (Page 1D-27).
Cam chain guide	Refer to "Engine Top Side Disassembly" (Page 1D-27).	Refer to "Cam Chain Guide Inspection" (Page 1D-38).	Refer to "Engine Top Side Disassembly" (Page 1D-27).
Cam chain tensioner	Refer to "Engine Top Side Disassembly" (Page 1D-27).	Refer to "Cam Chain Tensioner Inspection" (Page 1D-39).	Refer to "Engine Top Side Disassembly" (Page 1D-27).

**Engine Right Side**

<b>Item</b>	<b>Removal</b>	<b>Inspection</b>	<b>Installation</b>
Clutch cover	Refer to "Clutch Removal" in Section 5C (Page 5C-7).	—	Refer to "Clutch Installation" in Section 5C (Page 5C-8).
Clutch plates	Refer to "Clutch Removal" in Section 5C (Page 5C-7).	Refer to "Clutch Parts Inspection" in Section 5C (Page 5C-11).	Refer to "Clutch Installation" in Section 5C (Page 5C-8).
Clutch sleeve hub	Refer to "Clutch Removal" in Section 5C (Page 5C-7).	—	Refer to "Clutch Installation" in Section 5C (Page 5C-8).
Primary driven gear	Refer to "Clutch Removal" in Section 5C (Page 5C-7).	Refer to "Clutch Parts Inspection" in Section 5C (Page 5C-11).	Refer to "Clutch Installation" in Section 5C (Page 5C-8).
Oil pump idle gear and driven gear	Refer to "Oil Pump No. 1 Removal and Installation" in Section 1E (Page 1E-3).	—	Refer to "Oil Pump No. 1 Removal and Installation" in Section 1E (Page 1E-3).
Oil pump	Refer to "Oil Pump No. 1 Removal and Installation" in Section 1E (Page 1E-3).	Refer to "Oil Pump Inspection" in Section 1E (Page 1E-6).	Refer to "Oil Pump No. 1 Removal and Installation" in Section 1E (Page 1E-3).
Oil filter	Refer to "Engine Oil Filter Replacement" in Section 0B (Page 0B-7).	—	Refer to "Engine Oil Filter Replacement" in Section 0B (Page 0B-7).
Gearshift shaft	Refer to "Gearshift Shaft / Gearshift Cam Plate Removal and Installation" in Section 5B (Page 5B-13).	Refer to "Gearshift Linkage Inspection" in Section 5B (Page 5B-16).	Refer to "Gearshift Shaft / Gearshift Cam Plate Removal and Installation" in Section 5B (Page 5B-13).
Gearshift cam driven gear	Refer to "Gearshift Shaft / Gearshift Cam Plate Removal and Installation" in Section 5B (Page 5B-13).	—	Refer to "Gearshift Shaft / Gearshift Cam Plate Removal and Installation" in Section 5B (Page 5B-13).
Water pump	Refer to "Water Pump Removal and Installation" in Section 1F (Page 1F-8).	Refer to "Water Pump Related Parts Inspection" in Section 1F (Page 1F-11).	Refer to "Water Pump Removal and Installation" in Section 1F (Page 1F-8).

**1D-7 Engine Mechanical:****Engine Left Side**

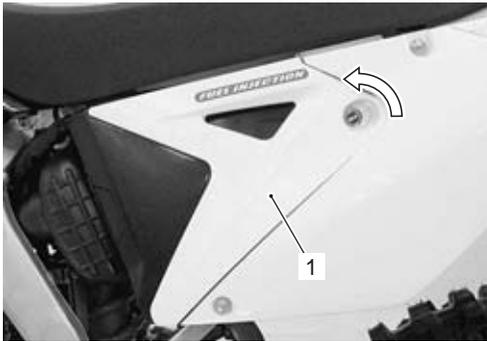
<b>Item</b>	<b>Removal</b>	<b>Inspection</b>	<b>Installation</b>
Generator	Refer to "Generator Removal and Installation" in Section 1J (Page 1J-5).	Refer to "Generator Inspection" in Section 1J (Page 1J-4).	Refer to "Generator Removal and Installation" in Section 1J (Page 1J-5).
Engine sprocket	Refer to "Engine Sprocket Removal and Installation" in Section 3A (Page 3A-3).	Refer to "Drive Chain Related Parts Inspection" in Section 3A (Page 3A-5).	Refer to "Engine Sprocket Removal and Installation" in Section 3A (Page 3A-3).
Driven chain	Refer to "Drive Chain Replacement" in Section 3A (Page 3A-6).	Refer to "Drive Chain Inspection and Adjustment" in Section 0B (Page 0B-20).	Refer to "Drive Chain Replacement" in Section 3A (Page 3A-6).
Gear position switch	Refer to "Gear Position (GP) Switch Removal and Installation" in Section 5B (Page 5B-11).	Refer to "Gear Position (GP) Switch Inspection" in Section 5B (Page 5B-11).	Refer to "Gear Position (GP) Switch Removal and Installation" in Section 5B (Page 5B-11).
Starter idle gear/driven gear	Refer to "Starter Torque Limiter / Starter Idle Gear / Starter Clutch Removal and Installation" in Section 1I (Page 1I-10).	Refer to "Starter Clutch Related Parts Inspection" in Section 1I (Page 1I-12).	Refer to "Starter Torque Limiter / Starter Idle Gear / Starter Clutch Removal and Installation" in Section 1I (Page 1I-10).
Starter clutch	Refer to "Starter Torque Limiter / Starter Idle Gear / Starter Clutch Removal and Installation" in Section 1I (Page 1I-10).	Refer to "Starter Clutch Related Parts Inspection" in Section 1I (Page 1I-12).	Refer to "Starter Torque Limiter / Starter Idle Gear / Starter Clutch Removal and Installation" in Section 1I (Page 1I-10).
CKP sensor	Refer to "Generator Removal and Installation" in Section 1J (Page 1J-5).	Refer to "Crankshaft Rotation Signal Sensor Inspection" in Section 1H (Page 1H-7).	Refer to "Generator Removal and Installation" in Section 1J (Page 1J-5).
Starter torque limiter	Refer to "Starter Torque Limiter / Starter Idle Gear / Starter Clutch Removal and Installation" in Section 1I (Page 1I-10).	Refer to "Starter Torque Limiter Inspection" in Section 1I (Page 1I-11).	Refer to "Starter Torque Limiter / Starter Idle Gear / Starter Clutch Removal and Installation" in Section 1I (Page 1I-10).

## Air Cleaner Element Removal and Installation

BA02J21406002

### Removal

- 1) Open the air cleaner box cover (1).

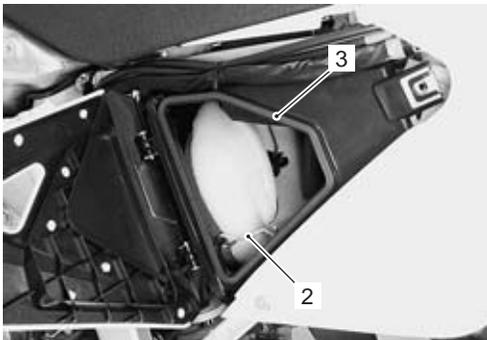


IA02J1140129-03

- 2) Unhook the spring (2) and remove the air cleaner element assembly.

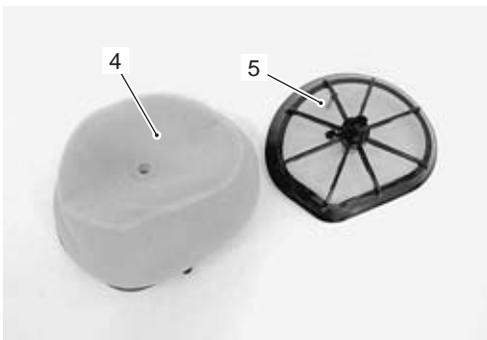
### NOTE

**If the air cleaner cap gasket (3) worn or damaged, replace it with a new one.**



IA02J1140130-03

- 3) Remove the polyurethane foam element (4) from the element frame (5).

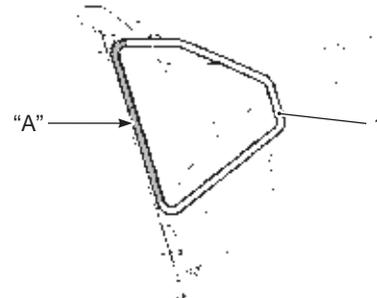


IA02J1140131-03

### Installation

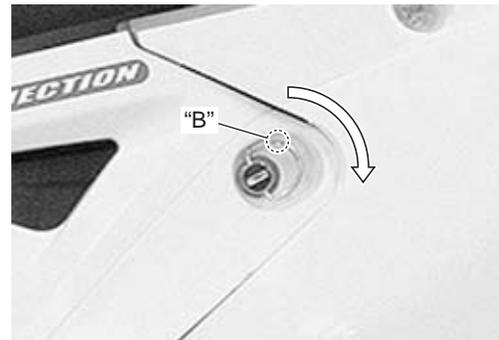
Installation in the reverse order of removal. Pay attention to the following point:

- When installing the new air cleaner cap gasket (1), apply adhesive to position "A" of a new air cleaner cap gasket and install it.



IA02J1140266-01

- Push in the quick fastener and turn it clockwise until it locks. Set the D-ring in to the lock "B".



IA02J1140267-03

### Air Cleaner Element Cleaning

BA02J21406003

Refer to "Air Cleaner Element Cleaning" in Section 0B (Page 0B-4).

### Air Cleaner Box Removal and Installation

BA02J21406004

#### Removal

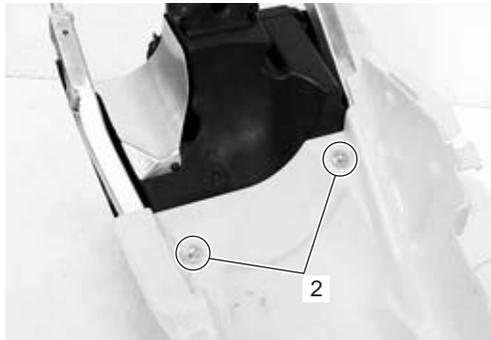
- 1) Remove the seat rail along with the rear fender. Refer to "Rear Shock Absorber Removal and Installation" in Section 2C (Page 2C-5).
- 2) Remove the mud guard (1).



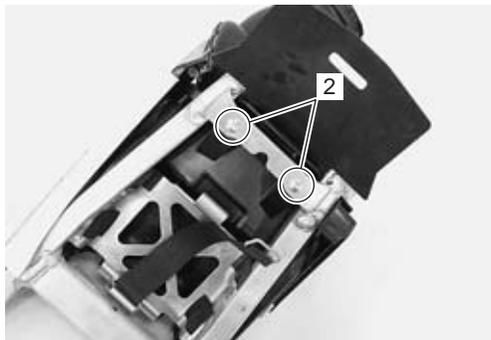
IA02J1140132-02

## 1D-9 Engine Mechanical:

- 3) Remove the air cleaner box mounting bolts (2).

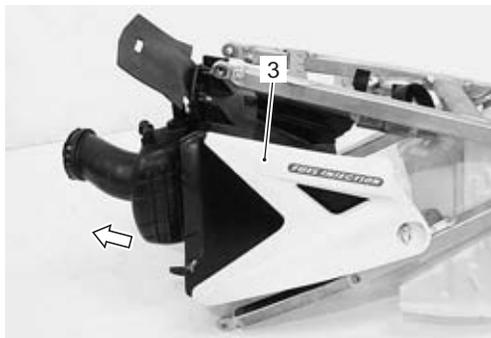


IA02J1140264-01



IA02J1140265-01

- 4) Remove the air cleaner box assembly (3) from the seat rail.



IA02J1140136-03

### Installation

Installation is in the reverse order of removal. Refer to "Rear Shock Absorber Removal and Installation" in Section 2C (Page 2C-5).

## Throttle Cable Removal and Installation

BA02J21406005

### Removal

- 1) Remove the fuel tank. Refer to "Fuel Tank Removal and Installation" in Section 1G (Page 1G-5).
- 2) Remove the throttle cable as shown in the cable routing diagram. Refer to "Throttle Cable Routing Diagram" (Page 1D-2).

### Installation

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

- Install the throttle cable as shown in the cable routing diagram. Refer to "Throttle Cable Routing Diagram" (Page 1D-2).
- Check the throttle cable play and proper operation. Refer to "Throttle Cable Play Inspection and Adjustment" in Section 0B (Page 0B-12).

## Throttle Cable Inspection

BA02J21406006

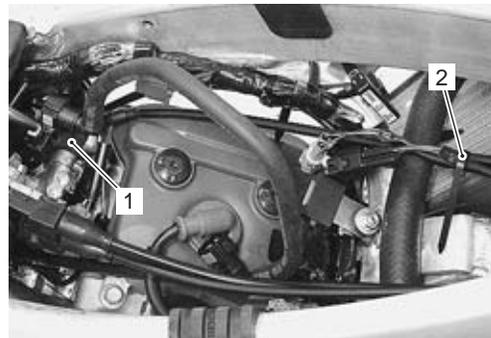
Check that the throttle grip move smoothly from full open to full close. If it does not move smoothly, lubricate the throttle cable. Refer to "Throttle Cable Play Inspection and Adjustment" in Section 0B (Page 0B-12).

## Hot Starter Cable Removal and Installation

BA02J21406007

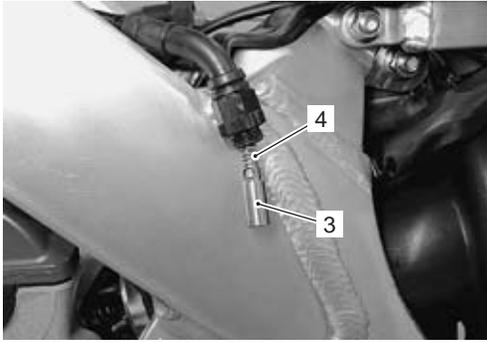
### Removal

- 1) Remove the fuel tank. Refer to "Fuel Tank Removal and Installation" in Section 1G (Page 1G-5).
- 2) Disconnect the hot starter cable end (1) from the throttle body.
- 3) Remove the clamp (2).



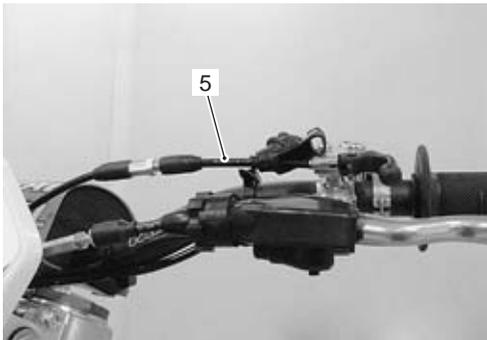
IA02J1140244-01

- 4) Remove the hot starter valve (3) and spring (4) from the hot starter cable.



IA02J1140245-01

- 5) Remove the hot starter cable (5) from its lever.

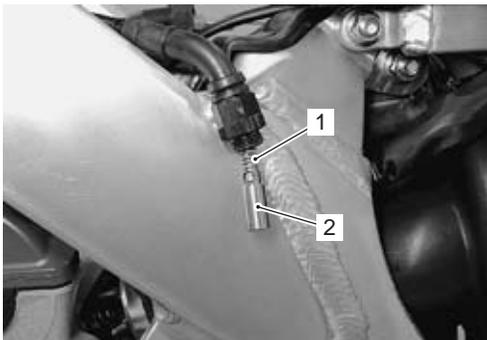


IA02J1140246-01

**Installation**

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

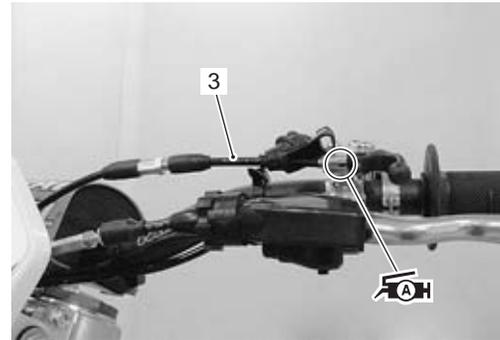
- Install the starter cable as shown in the cable routing diagram. Refer to “Throttle Cable Routing Diagram” (Page 1D-2).
- Install the spring (1) and hot starter valve (2) to the hot starter cable.



IA02J1140247-02

- Connect the hot starter cable (3) to the lever.
- Apply grease to the end of starter cable.

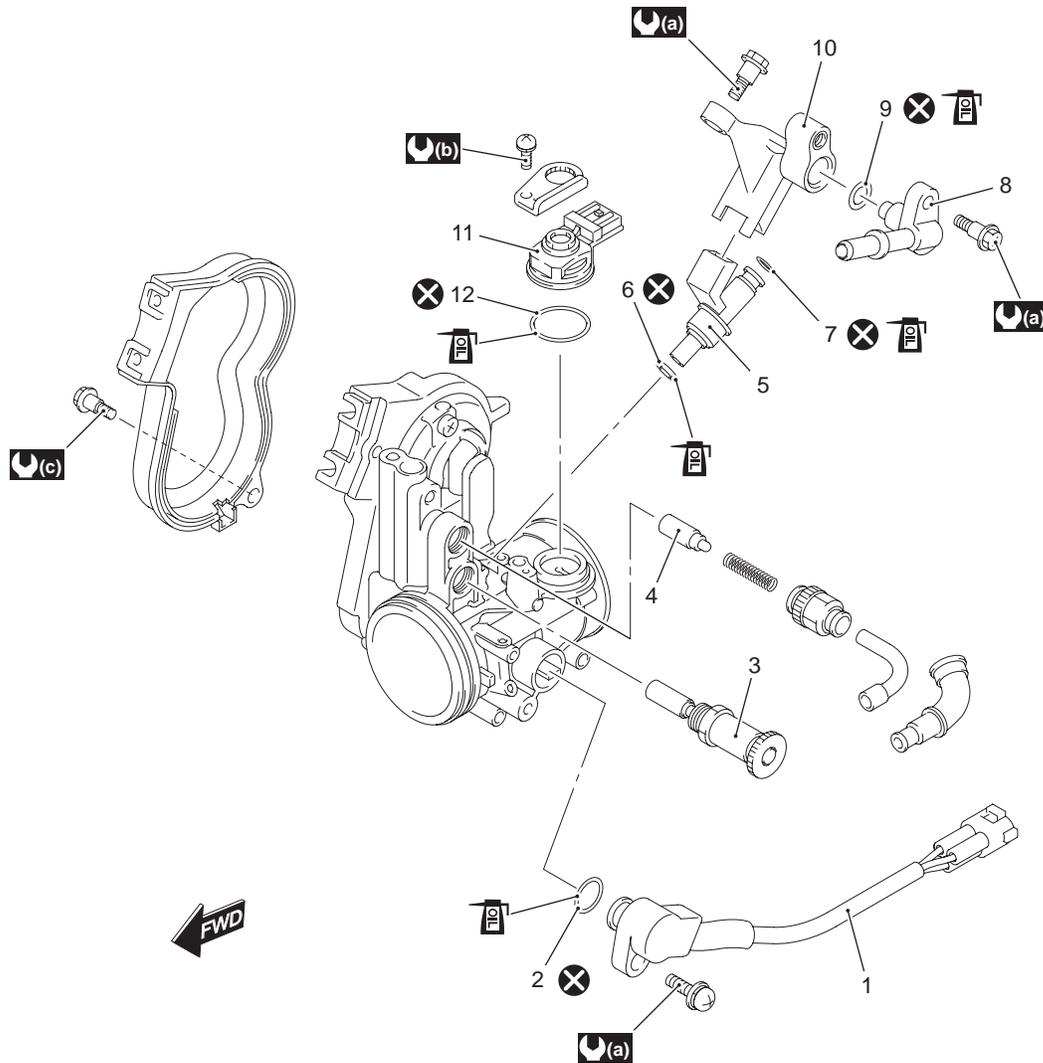
 : Grease 99000-25010 (SUZUKI SUPER GREASE “A” or equivalent)



IA02J1140248-02

- Check that the hot starter lever moves smoothly from full open to full close.
- Inspect the hot starter lever clearance. Refer to “Hot Starter Lever Clearance Inspection and Adjustment” in Section 0B (Page 0B-13).

Throttle Body Components

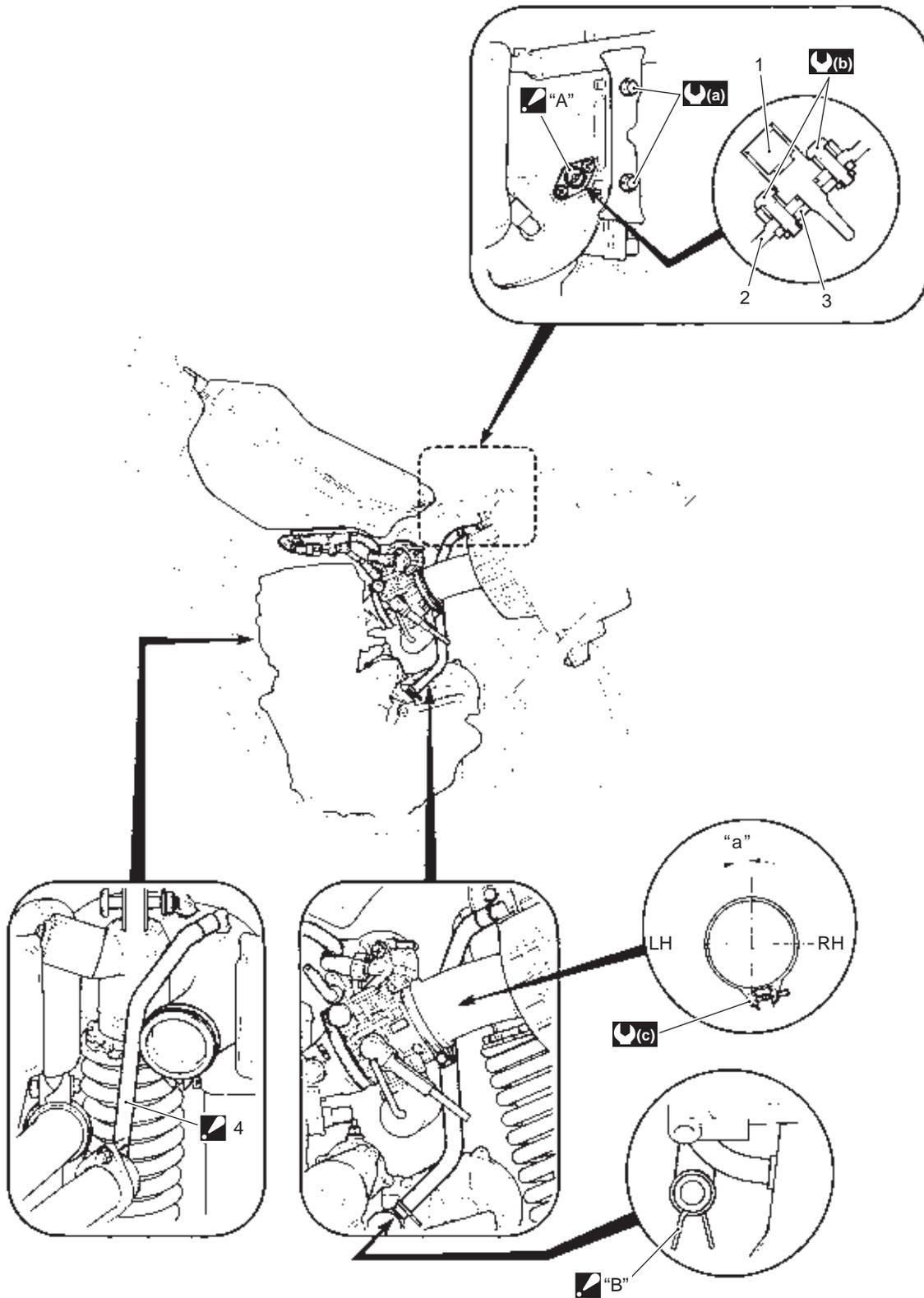


IA02J1140137-02

1. TP sensor	6. Cushion seal	11. IAP sensor	Apply engine oil.
2. O-ring	7. O-ring	12. O-ring	: Do not reuse.
3. Starter knob/idle screw	8. L-joint	: 3.5 N·m (0.35 kgf-m, 2.5 lbf-ft)	
4. Hot starter valve	9. O-ring	: 1.5 N·m (0.15 kgf-m, 1.0 lbf-ft)	
5. Fuel injector	10. Fuel pipe	: 3 N·m (0.3 kgf-m, 2.0 lbf-ft)	

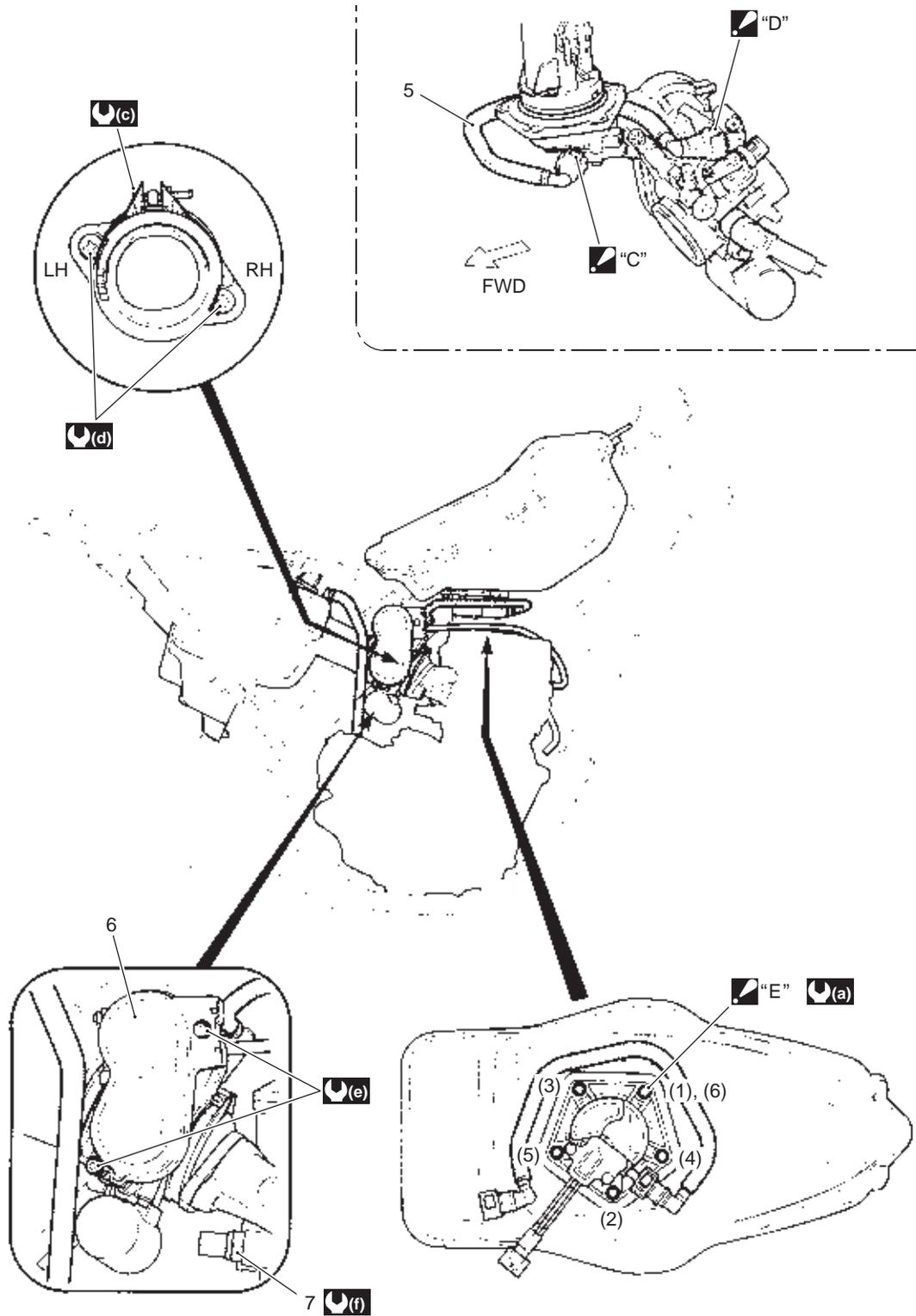
Throttle Body Construction

BA02J21406009



IA02J1140233-02

1. IAT sensor	"A": The claw part of the IAT sensor coupler should face right side.	"c": 1.5 N-m (0.15 kgf-m, 1.0 lbf-ft)
2. Air cleaner box	"B": Clamp end should face downward.	"a": 12.5°
3. IAT sensor bracket	"a": 10 N-m (1.0 kgf-m, 7.0 lbf-ft)	
4. Crankcase breather (PCV) hose : Keep clearance between the PCV hose and exhaust pipe.	"b": 1.3 N-m (0.13 kgf-m, 0.95 lbf-ft)	

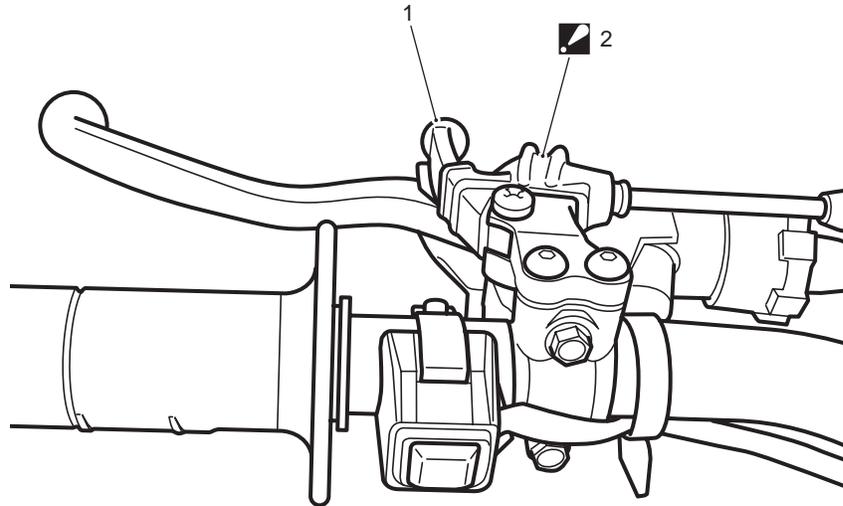


IA02J1140140-03

5. Fuel feed hose	"E": When installing the fuel pump assembly, first tighten all the fuel pump mounting bolts lightly and then to the specified torque in the ascending order of numbers.
6. Throttle cable cover	(d) : 8.5 N·m (0.85 kgf-m, 6.0 lbf-ft)
7. ECT sensor	(e) : 3 N·m (0.3 kgf-m, 2.0 lbf-ft)
"C": Gray button	(f) : 12 N·m (1.2 kgf-m, 8.5 lbf-ft)
"D": Yellow button	

Hot Starter Lever Construction

BA02J21406010



- |                             |  |
|-----------------------------|--|
| <p>1. Hot starter lever</p> | <p>2. Hot starter lever cover<br/>: Fit the cover to the lever positively.</p> |
|-----------------------------|--|

IA02J1140253-03

Throttle Body Inspection

BA02J21406011

Refer to "Throttle Body Inspection" in Section 0B (Page 0B-13).

Engine Idle Speed Inspection and Adjustment

BA02J21406012

Inspect and adjust the engine idle speed in the following procedures:

- 1) Warm up the engine.
- 2) Connect the tachometer to the high-tension cord.

Special tool

**TOOL (A): 09900-26006 (Engine tachometer)**

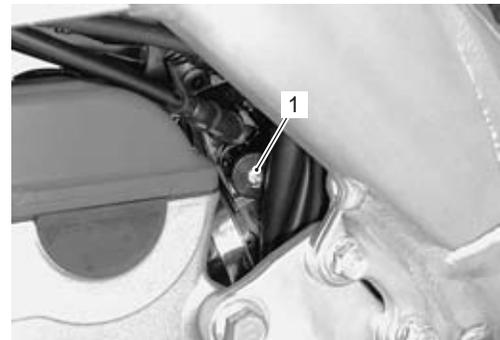


IA02J1140261-01

- 3) Set the engine idle speed sensor between 1 900 and 2 100 r/min by turning the idle air screw (1).

**Engine idle speed**

**2 000 ± 100 r/min**



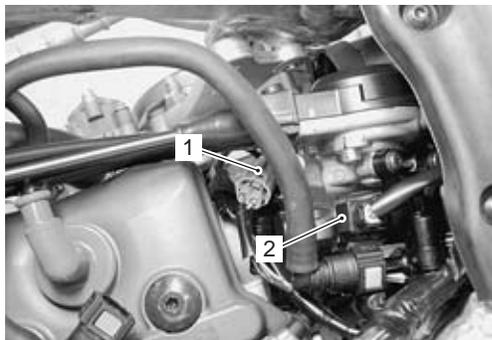
IA02J1140262-01

## Throttle Body Removal and Installation

BA02J21406013

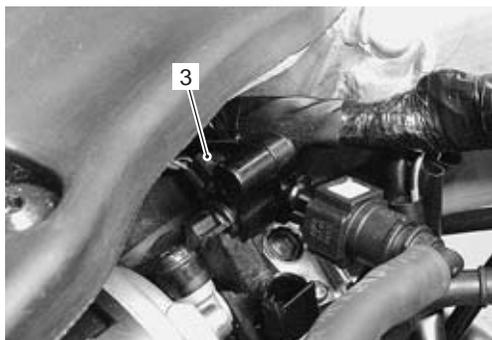
### Removal

- 1) Remove the fuel tank. Refer to "Fuel Tank Removal and Installation" in Section 1G (Page 1G-5).
- 2) Disconnect the TP sensor coupler (1) and fuel injector coupler (2).



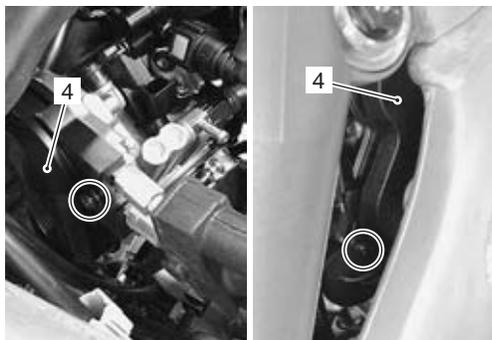
IA02J1140257-01

- 3) Disconnect the IAP sensor coupler (3).



IA02J1140142-01

- 4) Remove the throttle cable cover (4).



IA02J1140143-01

- 5) Disconnect the throttle cables from the pulley.

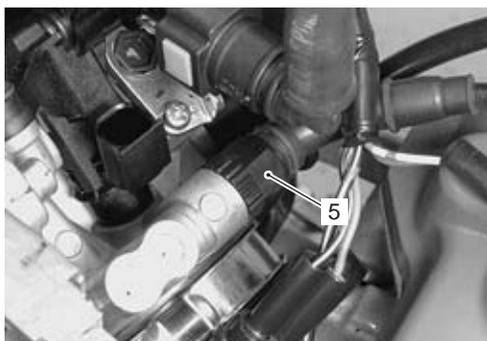
### **⚠ CAUTION**

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



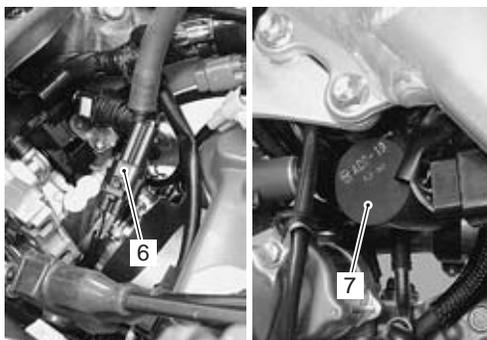
IA02J1140258-01

- 6) Disconnect the hot starter cable (5) from the throttle body.



IA02J1140259-01

- 7) Disconnect the condenser coupler (6) and remove the condenser (7).



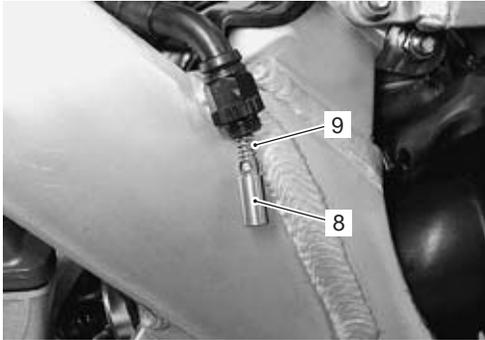
IA02J1140146-01

- 8) Loosen the throttle body clamp screws and remove the throttle body assembly.



IA02J1140147-01

- 9) Remove the hot starter valve (8) and spring (9) from the hot starter cable.



IA02J1140148-01

**Installation**

Install the throttle body assembly in the reverse order of removal. Pay attention to the following points:

- Install the spring and hot starter valve to the hot starter cable.



IA02J1140149-01

- Fit the projection on the throttle body in the depression of the intake pipe.
- Position the throttle body clamps correctly. Refer to "Throttle Body Construction" (Page 1D-12).

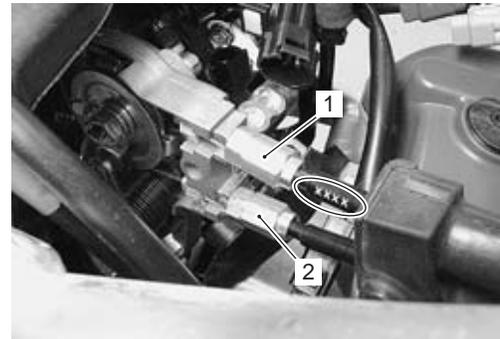


IA02J1140150-01

- Connect the throttle pulling cable (1) and throttle returning cable (2) to the pulley.

**NOTE**

The throttle pulling cable has "xxxx" mark.

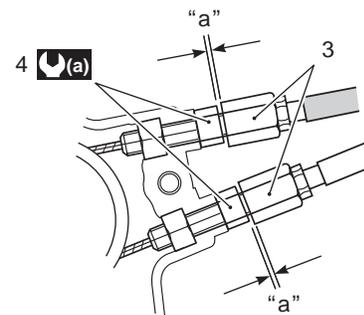


IA02J1140151-01

- Turn in each throttle cable adjuster (3) fully and locate each outer cable so that the clearance is 0 – 1.5 mm (0 – 0.06 in).
- Tighten each lock-nut (4) to the specified torque.

**Tightening torque**

**Cable adjuster lock nut (a): 2.1 N·m (0.21 kgf·m, 1.5 lbf·ft)**



IA02J1140152-03

"a": 0 – 0.15 mm (0 – 0.06 in)

- Route the wiring harness and cables properly. Refer to "Wiring Harness Routing Diagram" in Section 9A (Page 9A-2) and "Throttle Cable Routing Diagram" (Page 1D-2).
- Adjust the cable play. Refer to "Throttle Cable Play Inspection and Adjustment" in Section 0B (Page 0B-12) and "Hot Starter Lever Clearance Inspection and Adjustment" in Section 0B (Page 0B-13).
- Inspect the engine idle speed. Refer to "Engine Idle Speed Inspection and Adjustment" (Page 1D-14).
- Inspect the TP sensor position. Refer to "TP Sensor Adjustment" in Section 1C (Page 1C-3).

## Throttle Body Disassembly and Assembly

BA02J21406014

Refer to "Throttle Body Removal and Installation" (Page 1D-15).

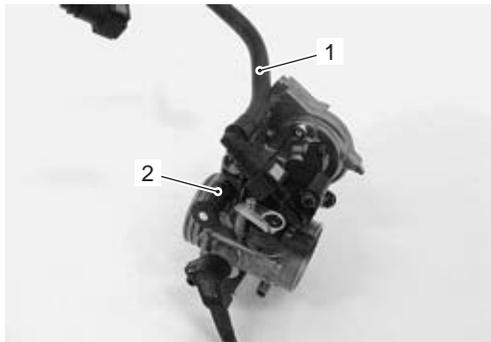
### Disassembly

- 1) Remove the fuel hose (1).
- 2) Remove the starter knob/idle screw (2).

#### ⚠ CAUTION

Be sure to disconnect the fuel hose (1) by hand. Do not disconnect the fuel hose (1) with any tool.

Do not turn the starter knob/idle screw (2) unless it is necessary.



IA02J1140153-01

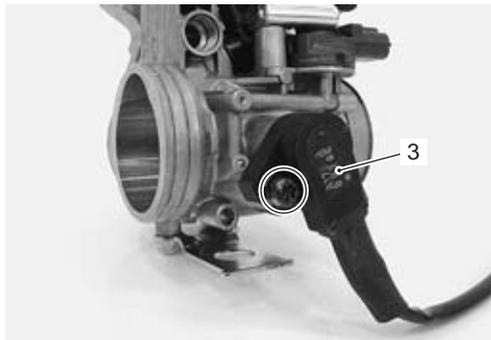
- 3) Remove the TP sensor (3) using the special tool.

#### NOTE

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

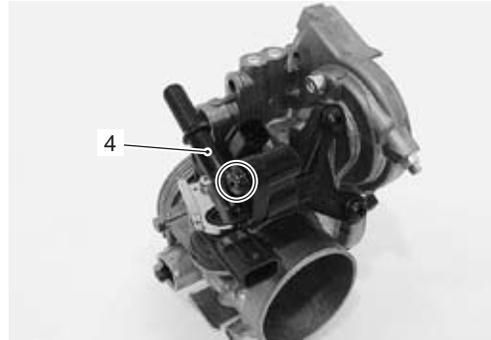
#### Special tool

 : 09930-11950 (Torx wrench (T25H))



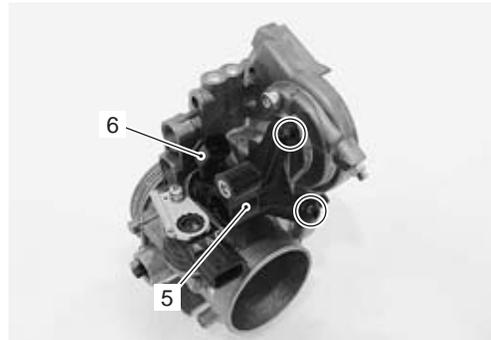
IA02J1140154-01

- 4) Remove the L-joint (4).



IA02J1140155-01

- 5) Remove the fuel pipe (5) along with fuel injector (6).



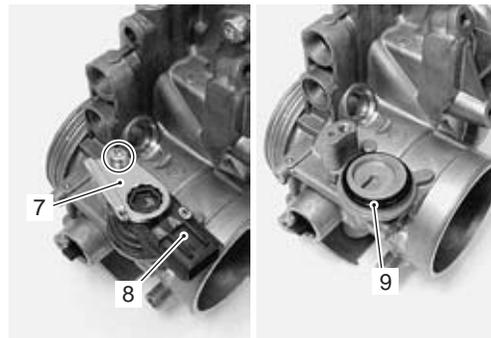
IA02J1140156-01

- 6) Remove the fuel injector (6) from the fuel delivery pipe (5).



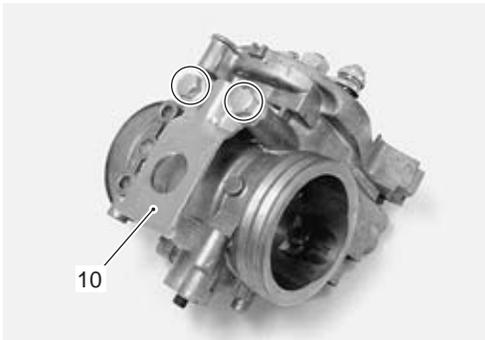
IA02J1140157-01

- 7) Remove the plate (7), IAP sensor (8) and O-ring (9).



IA02J1140158-01

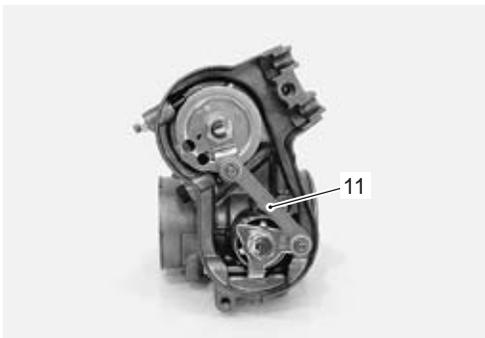
8) Remove the condenser bracket (10).



IA02J1140159-01

**⚠ CAUTION**

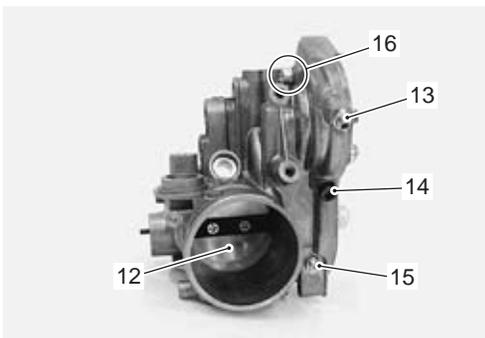
**Never remove the throttle valve linkage (11).**



IA02J1140160-01

**⚠ CAUTION**

- Never remove the throttle valve (12).
- Avoid removing the throttle lever stopper screws (13), (14), (15).
- Never remove the bolt (16).



IA02J1140227-03

**Assembly**

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

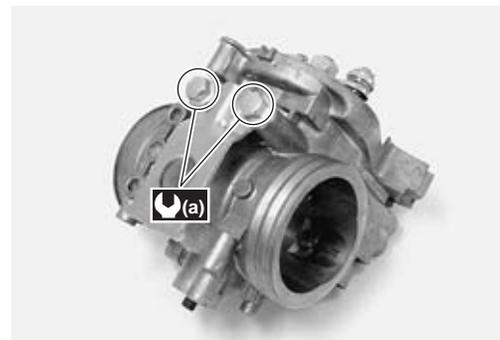
- Tighten the condenser bracket bolts to the specified torque.

**⚠ CAUTION**

**Replace the condenser bracket bolts with new ones.**

**Tightening torque**

**Condenser bracket bolt (a): 10 N-m (1.0 kgf-m, 7.0 lbf-ft)**



IA02J1140161-02

- Apply thin coat of engine oil to new O-ring (1).

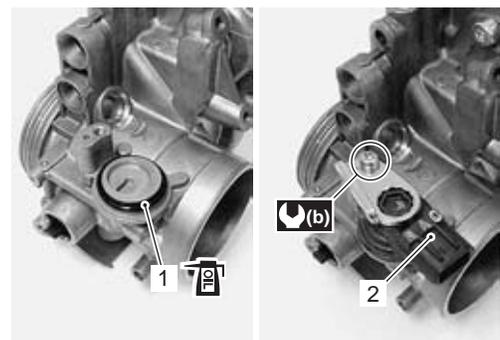
**⚠ CAUTION**

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

- Install the IAP sensor (2) and tighten the mounting screw to the specified torque.

**Tightening torque**

**IAP sensor mounting screw (b): 1.5 N-m (0.15 kgf-m, lbf-ft)**



IA02J1140162-02

## 1D-19 Engine Mechanical:

- Apply thin coat of engine oil to new cushion seal (3) and O-ring (4).

### **⚠ CAUTION**

**Replace the cushion seal and O-ring with new ones.**



IA02J1140163-01

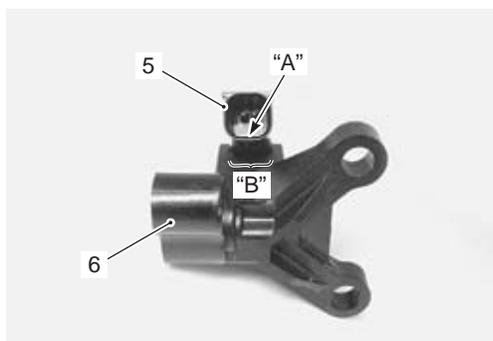
- Install the fuel injector (5) by pushing it straight to the fuel pipe (6).

### **⚠ CAUTION**

**Never turn the injector (5) while pushing it.**

### **NOTE**

**Align the coupler "A" of injector with boss "B" of the delivery pipe.**



IA02J1140164-01

- Install the fuel injector (5) by pushing it straight to throttle body.

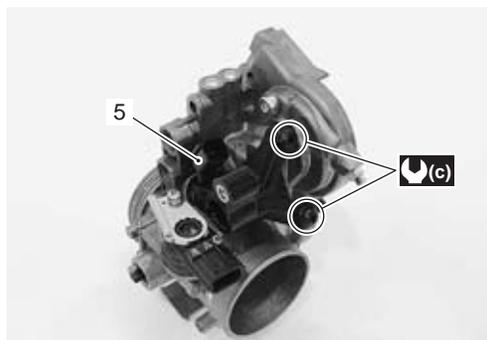
### **⚠ CAUTION**

**Never turn the fuel injector (5) while pushing it.**

- Tighten the fuel pipe mounting bolts to the specified torque.

### **Tightening torque**

**Fuel pipe mounting bolt (c): 3.5 N-m (0.35 kgf-m, 2.5 lbf-ft)**



IA02J1140165-02

- Apply a thin coat of engine oil to new O-ring.

### **⚠ CAUTION**

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

- Install the L-joint (7) by pushing it straight to the fuel pipe (6).

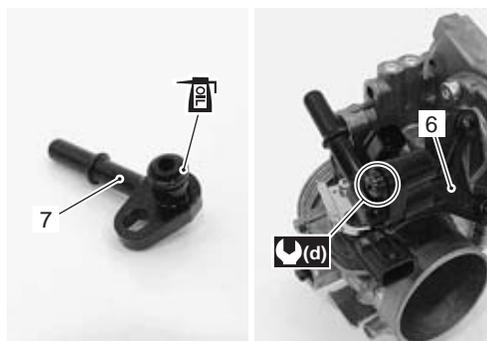
### **⚠ CAUTION**

**Never turn the L-joint (7) while pushing it.**

- Tighten the L-joint mounting screw to the specified torque.

### **Tightening torque**

**L-joint mounting screw (d): 3.5 N-m (0.35 kgf-m, 2.5 lbf-ft)**



IA02J1140166-03

- With the throttle valve fully closed, install the TP sensor (8) and tighten the TP sensor mounting screw to the specified torque.

**NOTE**

- Align the throttle shaft end “C” with the groove “D” of TP sensor.
- Apply grease to the throttle shaft end “C” if necessary.

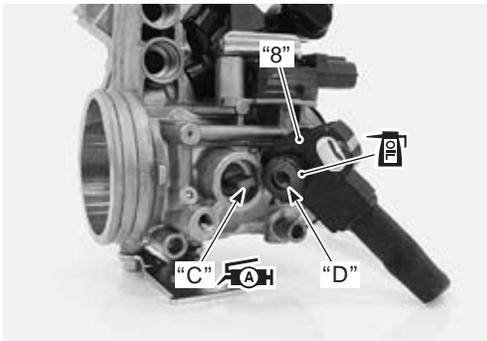
 : Grease 99000–25010 (SUZUKI SUPER GREASE “A” or equivalent)

**Special tool**

 : 09930–11950 (Torx wrench (T25H))

**Tightening torque**

TP sensor mounting screw: 3.5 N·m (0.35 kgf·m, 2.5 lbf·ft)



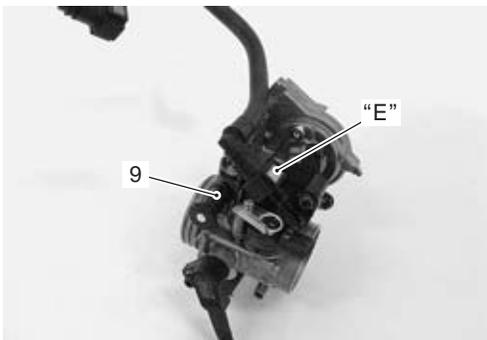
IA02J1140234-01

- Connect the yellow button “E” side of the fuel hose to the throttle body side.

**CAUTION**

Be sure to connect the fuel hose by your hand. You may not connect the fuel hose with any tool.

- Install the starter knob/idle screw (9) to the lower hole.



IA02J1140228-02

**Throttle Body Inspection and Cleaning**

BA02J21406015

Refer to “Throttle Body Disassembly and Assembly” (Page 1D-17).

**Cleaning**

**WARNING**

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

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

**CAUTION**

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

**Inspection**

Check following items for any defects or clogging. Replace the parts or throttle body if necessary.

- O-ring
- Throttle valve
- Fuel pipe
- Cushion seal
- Fuel injector

**Engine Assembly Removal**

BA02J21406016

Before taking the engine out of the frame, wash the engine using a stream cleaner. Engine removal is sequentially explained in the following steps:

- 1) Remove the protector. Refer to “Exterior Parts Removal and Installation” in Section 9D (Page 9D-1).
- 2) Drain engine oil. Refer to “Engine Oil Filter Replacement” in Section 0B (Page 0B-7).
- 3) Drain engine coolant. Refer to “Cooling System Inspection” in Section 0B (Page 0B-9).
- 4) Remove the radiator reservoir tank. Refer to “Radiator Reservoir Tank Removal and Installation” in Section 1F (Page 1F-6).
- 5) Remove the fuel tank. Refer to “Fuel Tank Removal and Installation” in Section 1G (Page 1G-5).

## 1D-21 Engine Mechanical:

- 6) Disconnect the battery (-) lead wire.

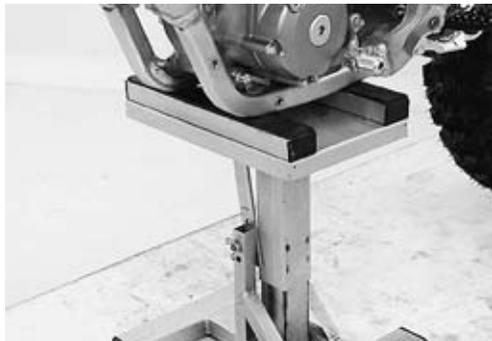


IA02J1140167-02

- 7) Remove the exhaust pipe and muffler. Refer to "Muffler / Exhaust Pipe Removal and Installation" in Section 1K (Page 1K-2).
- 8) Place a jack under the frame to support the motorcycle.

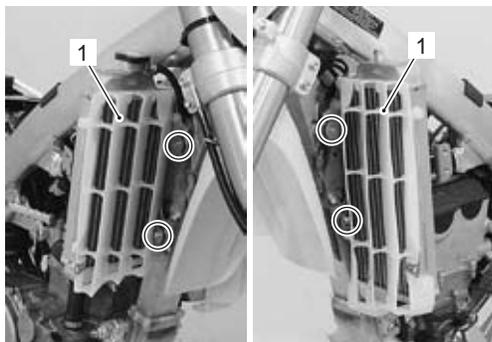
### **⚠ WARNING**

**To prevent the motorcycle from falling, make sure to support the frame with a jack.**



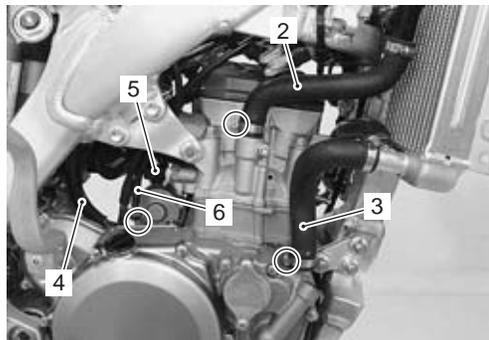
IA02J1140168-01

- 9) Remove the radiator louvers (1), left and right.
- 10) Remove the radiator mounting bolts, left and right.



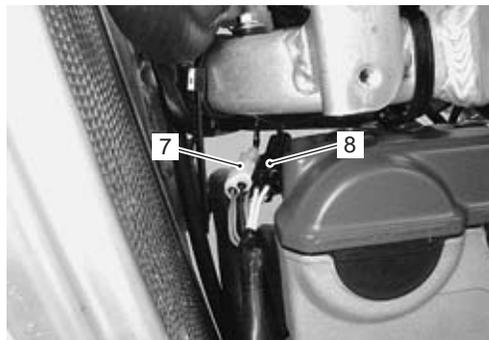
IA02J1140169-01

- 11) Disconnect the radiator hoses (2) and (3).
- 12) Remove the crankcase breather (PCV) hose (4). Refer to "Crankcase Breather (PCV) Hose Removal and Installation" in Section 1B (Page 1B-1).
- 13) Disconnect the ECT sensor coupler (5) and engine ground lead wire (6).



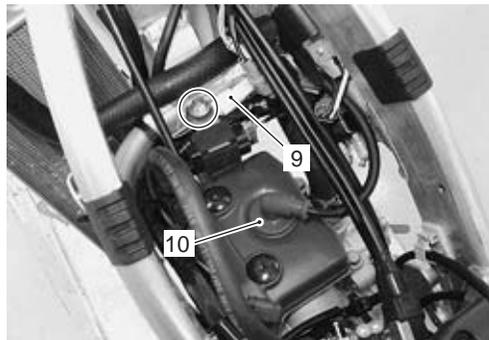
IA02J1140170-01

- 14) Disconnect the CKP sensor/crankshaft position sensor lead wire coupler (7) and magneto lead wire coupler (8).



IA02J1140171-01

- 15) Remove the TO sensor bracket bolt and nut.
- 16) Disconnect the GP switch lead wire coupler (9) and spark plug cap (10).

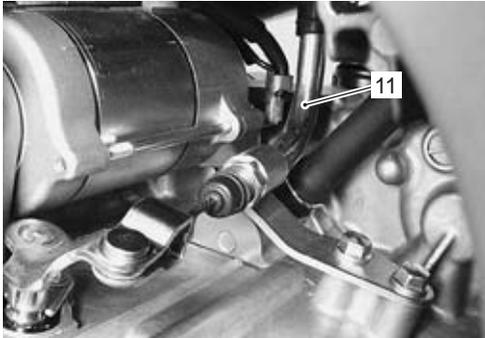


IA02J1140172-01

17) Disconnect the clutch cable (11).

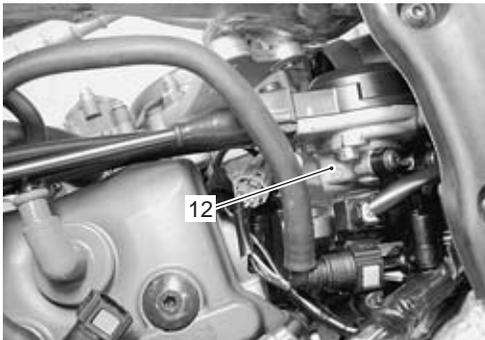
**NOTE**

Loosen the clutch cable adjuster on the clutch lever fully when disconnecting the cable.



IA02J1140173-02

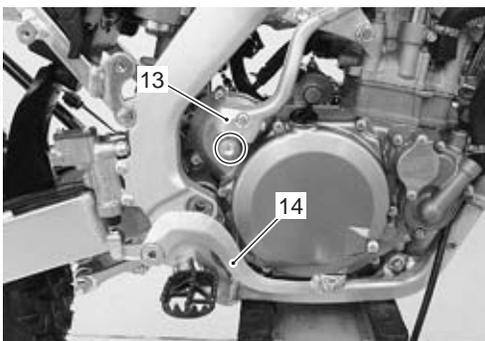
18) Remove the throttle body (12). Refer to "Throttle Body Removal and Installation" (Page 1D-15).



IA02J1140174-02

19) Remove the kick starter lever (13).

20) Remove the brake pedal (14). Refer to "Rear Brake Pedal Removal and Installation" in Section 4A (Page 4A-16).

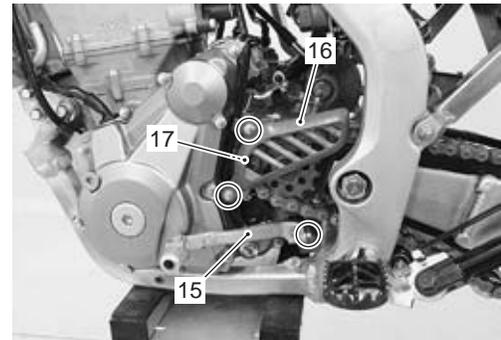


IA02J1140175-02

21) Remove the gearshift lever (15).

**NOTE**

Mark the gearshift shaft head at which the gearshift lever slit set for correct reinstallation.



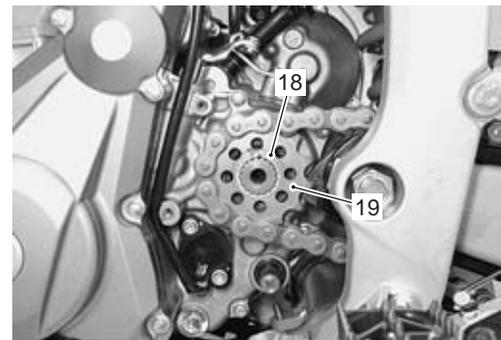
IA02J1140176-01

22) Remove the engine sprocket cover (16) and front chain guide plate (17).

23) Remove the snap ring (18) and engine sprocket (19).

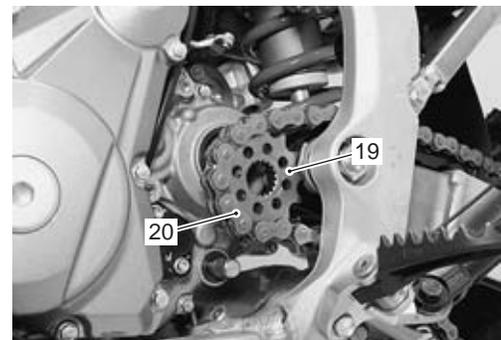
**Special tool**

 : 09900-06107 (Snap ring remover (Open type))



IA02J1140255-01

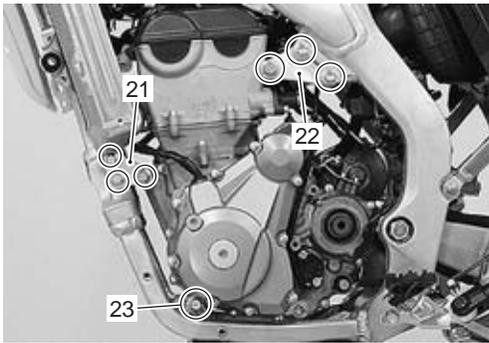
24) Remove the engine sprocket (19) from the drive chain (20).



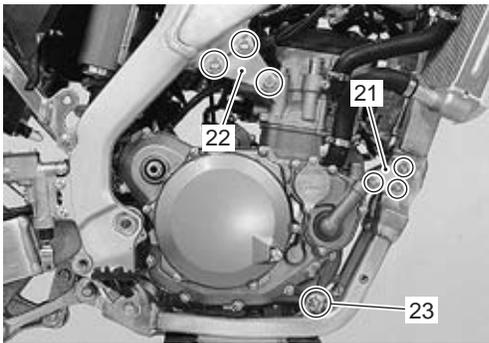
IA02J1140256-01

## 1D-23 Engine Mechanical:

- 25) Remove the front engine mounting brackets (21) and upper engine mounting brackets (22), left and right.
- 26) Remove the engine mounting bolt and nut (23).



IA02J1140179-02



IA02J1140180-02

- 27) Remove the swingarm pivot shaft nut and washer.



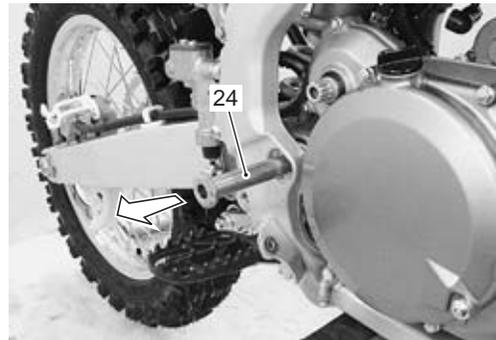
IA02J1140263-02

- 28) Extract three quarters of the swingarm pivot shaft (24) so as to keep the swingarm in position.

### NOTE

**The swingarm will come off when the swingarm pivot shaft is completely removed.**

- 29) Remove the engine from the frame.



IA02J1140183-01

## Engine Assembly Installation

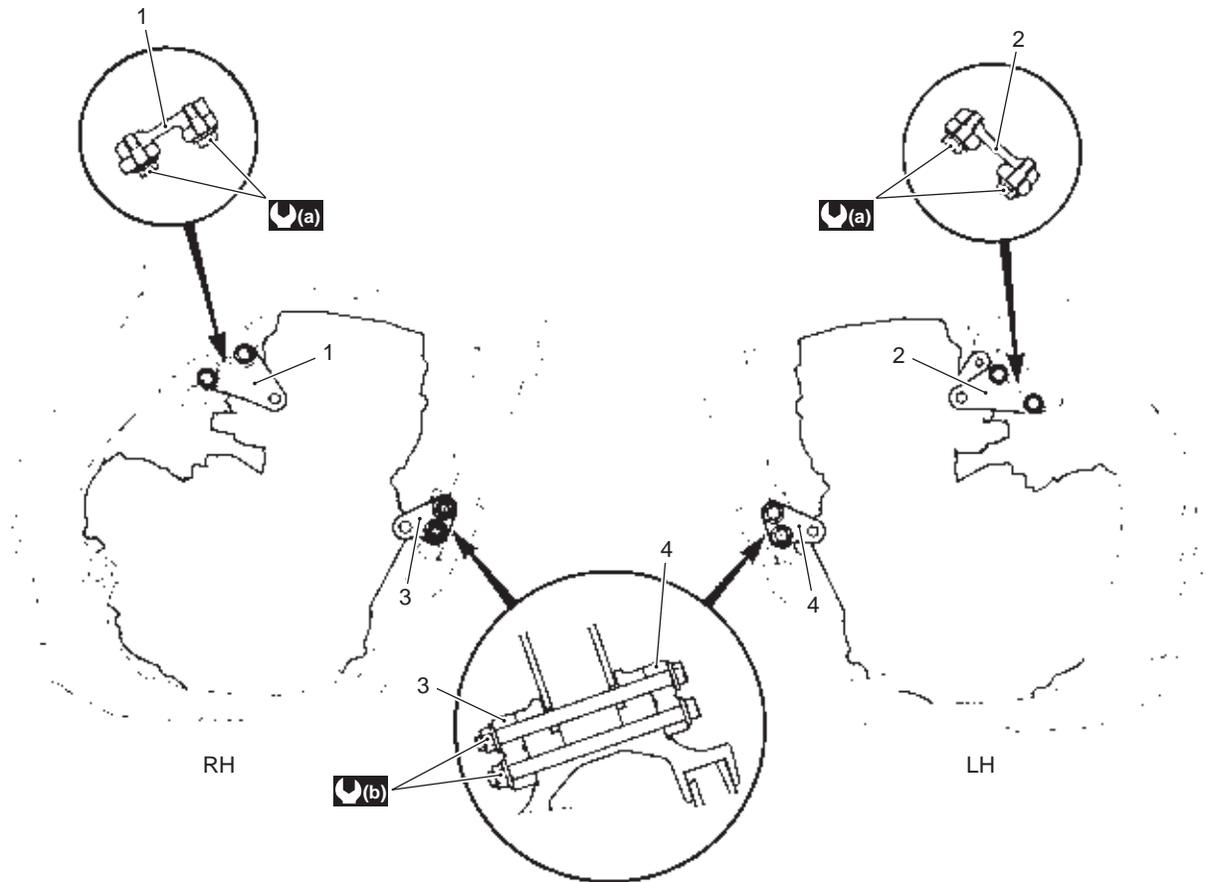
BA02J21406017

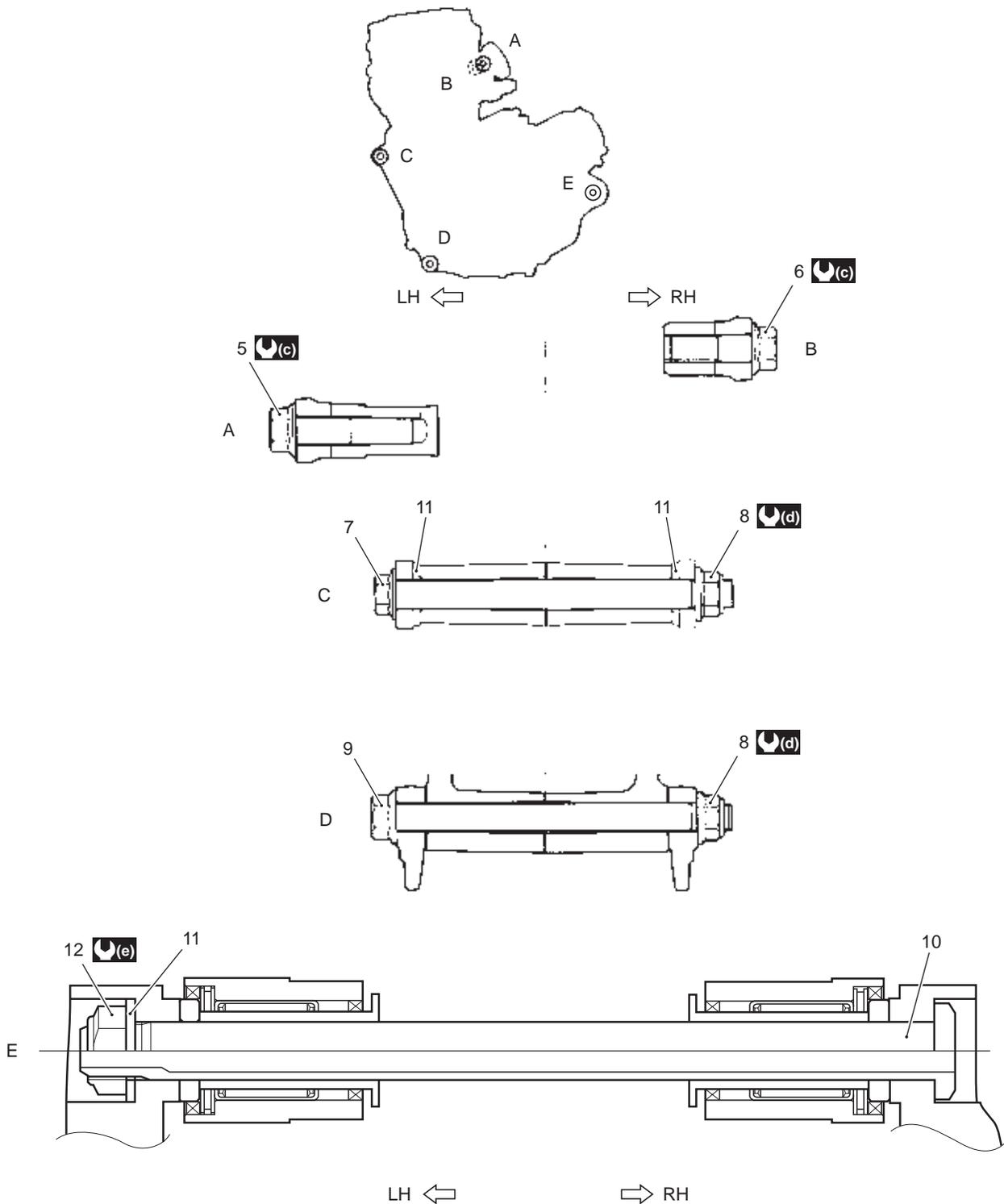
Install the engine in the reverse order of removal. Pay attention to the following points:

- Tighten the engine mounting bolts, nuts and swingarm pivot shaft nut to the specified torque.

### ⚠ CAUTION

The engine mounting nut is the self-lock type and cannot be used repeatedly. If the self-lock effect is lost, replace it with a new one.





IA02J1140229-04

1. Upper engine mounting bracket (RH)	10. Swingarm pivot shaft
2. Upper engine mounting bracket (LH)	11. Washer
3. Front engine mounting bracket (RH)	12. Swingarm pivot nut
4. Front engine mounting bracket (LH)	: 40 N·m (4.0 kgf·m, 29.0 lbf·ft)
5. Engine mounting bolt (L43)	: 60 N·m (6.0 kgf·m, 43.5 lbf·ft)
6. Engine mounting bolt (L30)	: 55 N·m (5.5 kgf·m, 40.0 lbf·ft)
7. Engine mounting bolt (L120)	: 66 N·m (6.6 kgf·m, 47.5 lbf·ft)
8. Engine mounting nut	: 70 N·m (7.0 kgf·m, 50.5 lbf·ft)
9. Engine mounting bolt (L125)	

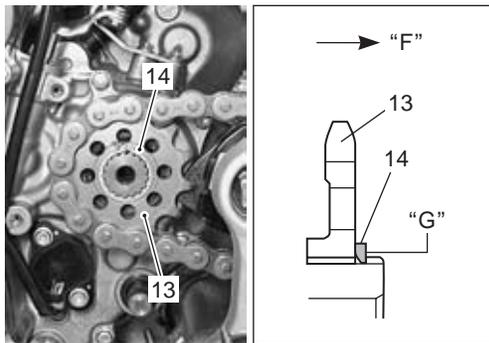
- Install the engine sprocket (13) and snap ring (14).

**⚠ CAUTION**

Replace the snap ring with a new one. Seat the snap ring in the groove and locate its end as shown in the illustration.

**Special tool**

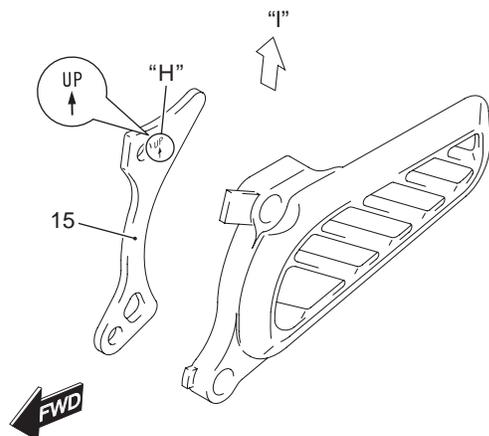
 : 09900-06107 (Snap ring remover (Open type))



IA02J1140185-03

"F": Thrust	"G": Sharp edge
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- When installing the front chain guide (15), bring the "UP" letters and arrow mark "H" upward.



IA02J1140260-02

"H": UP mark	"I": Upward
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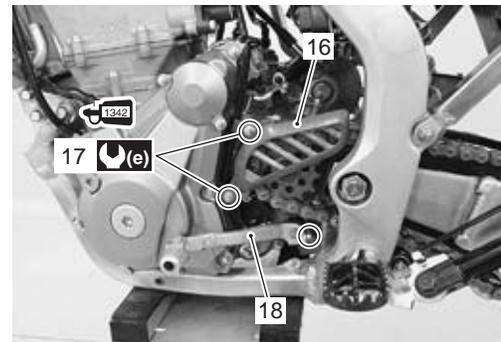
- Route the GP switch lead wire between crankcase and engine sprocket cover (16).
- Apply thread lock to the engine sprocket cover bolts (17) and tighten them to the specified torque.

 : Thread lock cement 99000-32050 (THREAD LOCK CEMENT "1342" or equivalent)

**Tightening torque**

Engine sprocket cover bolt (e): 11 N·m (1.1 kgf·m, 8.0 lbf·ft)

- Install the gearshift lever (18) in the correct position.



IA02J1140187-06

- Install the brake pedal spring and brake pedal. Refer to "Rear Brake Pedal Removal and Installation" in Section 4A (Page 4A-16).
- Install the kick starter lever. Refer to "Kick Starter Removal and Installation" in Section 1I (Page 1I-15).
- Install the throttle body. Refer to "Throttle Body Removal and Installation" (Page 1D-15).
- Install the exhaust pipe. Refer to "Muffler / Exhaust Pipe Removal and Installation" in Section 1K (Page 1K-2).
- Install the fuel tank. Refer to "Fuel Tank Removal and Installation" in Section 1G (Page 1G-5).
- After remounting the engine, route the wiring harness, cable and hoses properly. Refer to "Wiring Harness Routing Diagram" in Section 9A (Page 9A-2), "Throttle Cable Routing Diagram" (Page 1D-2) and "Water Hose Routing Diagram" in Section 1F (Page 1F-3).
- Pour engine coolant and engine oil. Refer to "Cooling System Inspection" in Section 0B (Page 0B-9) and "Engine Oil Filter Replacement" in Section 0B (Page 0B-7).
- After finishing the engine installation, check the following items:
  - Throttle cable play  
Refer to "Throttle Cable Play Inspection and Adjustment" in Section 0B (Page 0B-12).
  - Clutch cable play  
Refer to "Clutch Lever Clearance Inspection and Adjustment" in Section 0B (Page 0B-11).
  - Drive chain slack  
Refer to "Drive Chain Inspection and Adjustment" in Section 0B (Page 0B-20).
  - Engine idle speed  
Refer to "Engine Idle Speed Inspection and Adjustment" (Page 1D-14).
  - Engine oil and coolant leakage  
Refer to "Cooling Circuit Inspection" in Section 1F (Page 1F-4).

## Engine Top Side Disassembly

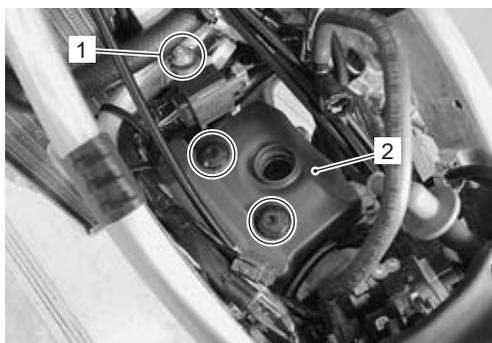
BA02J21406018

### ⚠ CAUTION

Identify the position of each removed part. Organize the parts in their respective groups (e.g., intake, exhaust) so that they can be reinstalled in their original positions.

### Cylinder Head Cover

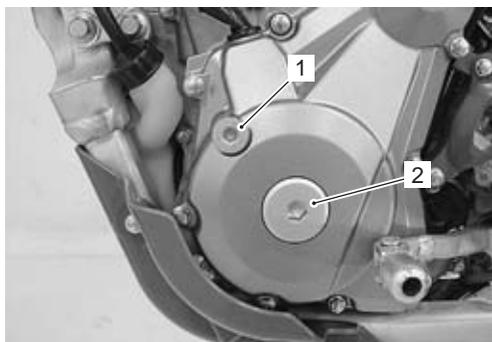
- 1) Remove the fuel tank. Refer to "Fuel Tank Removal and Installation" in Section 1G (Page 1G-5).
- 2) Remove the spark plug. Refer to "Spark Plug Cap and Spark Plug Removal and Installation" in Section 1H (Page 1H-4).
- 3) Remove the TO sensor bracket bolt and nut (1).
- 4) Remove the cylinder head cover (2) and its gasket.



IA02J1020035-02

### Camshaft

- 1) Remove the TDC plug (1) and crankshaft hole plug (2).

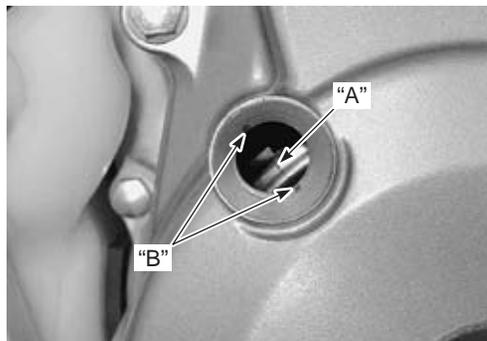


IA02J1140235-01

- 2) Turn the crankshaft counterclockwise to bring the line "A" on the magneto rotor to the grooves "B" on the cap hole thread.

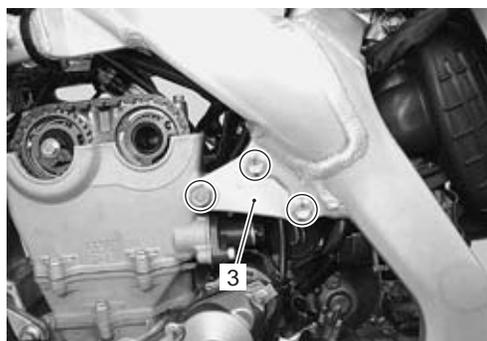
### NOTE

The piston must be at top dead center (TDC) on the compression stroke.



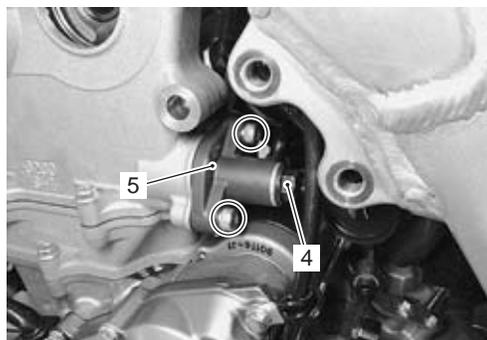
IA02J1020037-01

- 3) Remove the upper engine mounting bracket (LH) (3).



IA02J1140191-02

- 4) Remove the cam chain tension adjuster cap bolt (4), washer and spring.
- 5) Remove the cam chain tension adjuster (5) and its gasket.



IA02J1140192-01

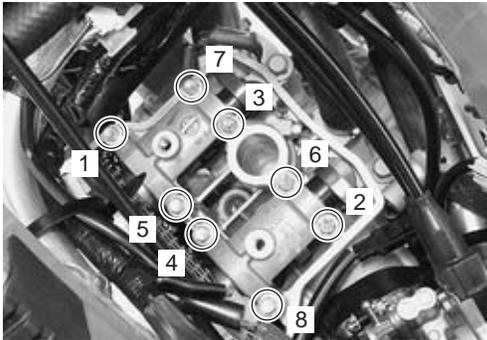
6) Remove the camshaft journal holder.

**⚠ CAUTION**

Be sure to loosen the camshaft journal holder bolts evenly by shifting the wrench in the descending order of numbers.

**NOTE**

The descending order of numbers are indicated on the camshaft journal holder.



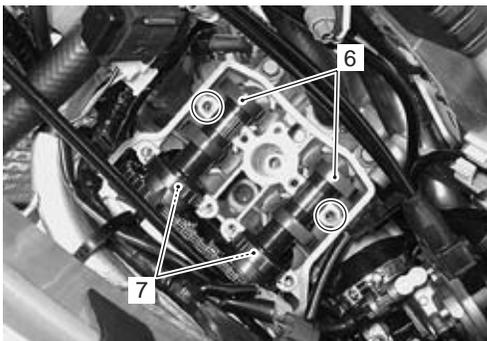
IA02J1140193-01

7) Remove the camshafts (6).

8) Remove the dowel pins and C-rings (7).

**⚠ CAUTION**

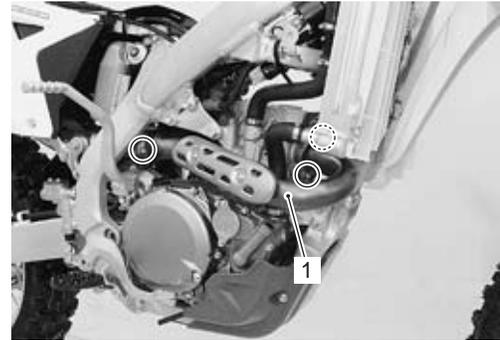
Do not drop the cam chain, dowel pins and C-rings into the crankcase.



IA02J1140194-01

**Cylinder Head**

1) Remove the exhaust pipe (1) and gasket. Refer to "Muffler / Exhaust Pipe Removal and Installation" in Section 1K (Page 1K-2).

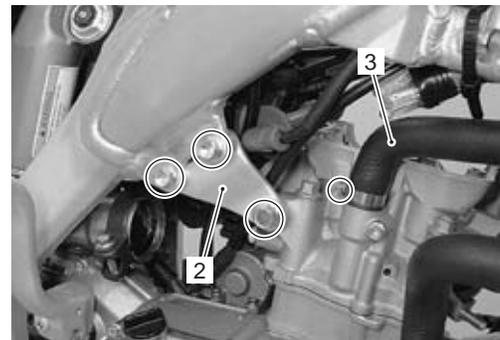


IA02J1140195-01

2) Remove the throttle body. Refer to "Throttle Body Removal and Installation" (Page 1D-15).

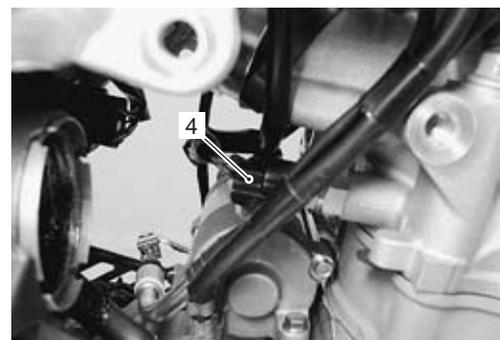
3) Remove the upper engine mounting bracket (RH) (2).

4) Disconnect the radiator hose (3).



IA02J1140196-01

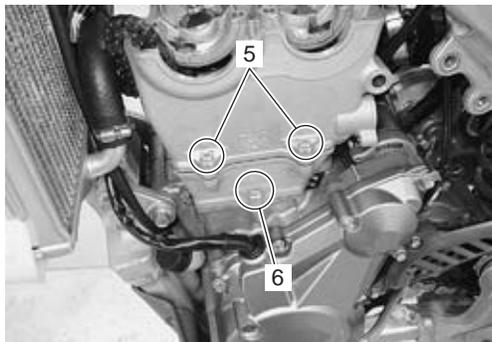
5) Disconnect the ECT sensor coupler (4).



IA02J1140232-01

## 1D-29 Engine Mechanical:

- 6) Remove the cylinder head base bolts (5).
- 7) Loosen the cylinder base bolt (6).

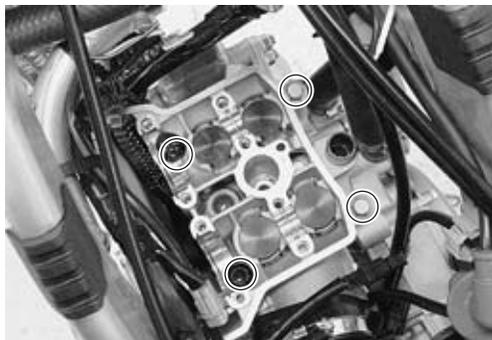


IA02J1140197-01

- 8) Remove the cylinder head.

### NOTE

- When loosening the cylinder head bolts, loosen each bolt little by little diagonally.
- If the cylinder head does not come off easily, lightly tap it with a plastic hammer.

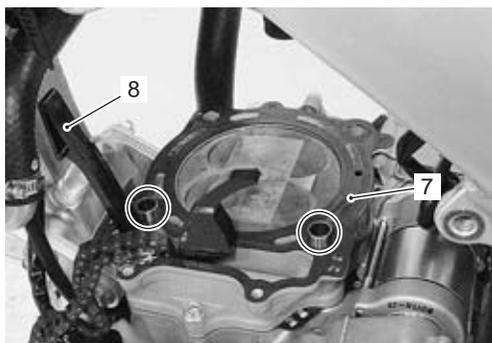


IA02J1140198-01

- 9) Remove the cylinder head gasket (7), dowel pins and cam chain guide No. 1 (8).

### CAUTION

**Do not drop the cam chain and dowel pins into the crankcase.**



IA02J1140199-01

## Cylinder

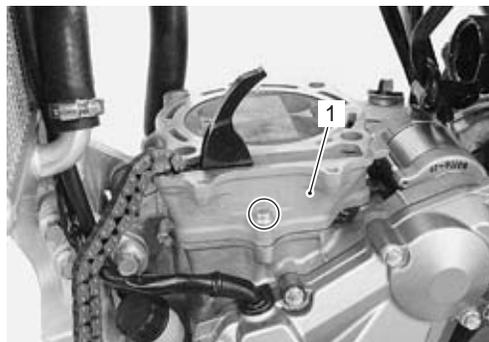
- 1) Remove the cylinder (1) by removing the cylinder base bolt.

### CAUTION

**Do not drop the cam chain into the crankcase.**

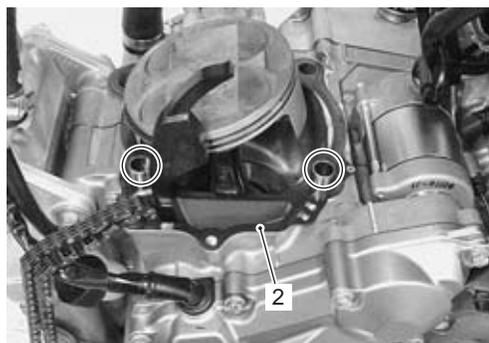
### NOTE

**If the cylinder does not come off easily, lightly tap it with a plastic hammer.**



IA02J1140200-01

- 2) Remove the cylinder gasket (2) and dowel pins.



IA02J1140201-01

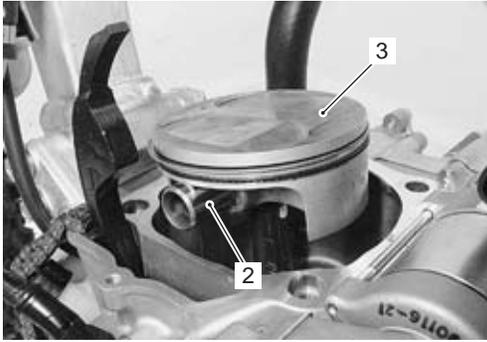
## Piston

- 1) Place a clean rag over the cylinder base to prevent the piston pin circlip from dropping into the crankcase.
- 2) Remove the piston pin circlip (1).



IA02J1140202-01

- 3) Draw out the piston pin (2) and remove the piston (3).



IA02J1140203-01

### Engine Top Side Assembly

BA02J21406019

Assemble the engine top side in the reverse order of disassembly. Pay attention to the following points:

#### Piston

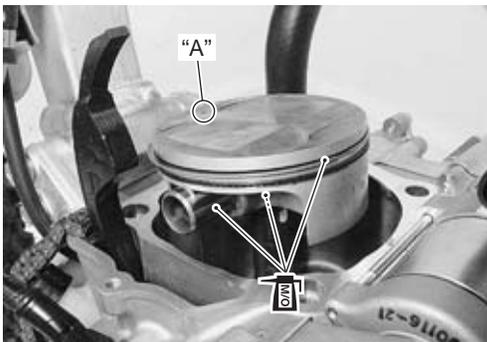
- Apply molybdenum oil solution onto the conrod small end, piston pin and piston rings.

**M/O: Molybdenum oil (MOLYBDENUM OIL SOLUTION)**

- Install the piston and piston pin.

#### NOTE

**When installing the piston, the indent "A" on the piston head must be faced to exhaust side.**



IA02J1140204-01

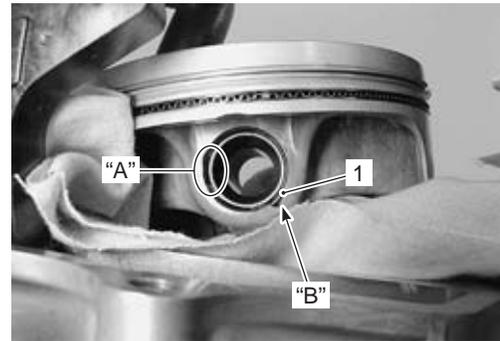
- Place a clean rag over the cylinder base to prevent the piston pin circlip (1) from dropping into the crankcase, and then install new piston pin circlip (1).

#### ⚠ CAUTION

**Use new piston pin circlip to prevent circlip failure which will occur when it is bent.**

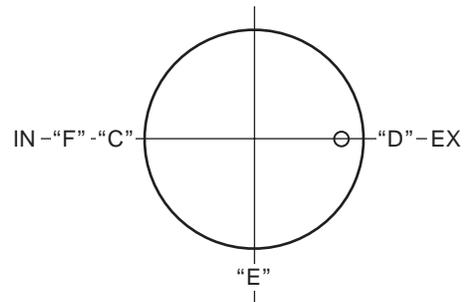
#### NOTE

**End gap of the circlip "A" should not be aligned with the cutaway "B" of the piston pin bore.**



IA02J1140205-01

- Position the gaps of the two rings as shown. Before inserting the piston into the cylinder, check that the gaps are located so.



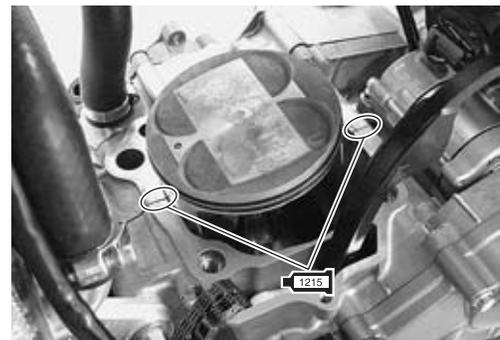
IA02J1140236-01

"C": 1st ring	"E": Spacer
"D": Upper side tail	"F": Lower side rail

#### Cylinder

- Thoroughly wipe off oil from the fitting surface of the crankcase.
- Apply bond to the crankcase as shown in the figure.

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



IA02J1140206-01

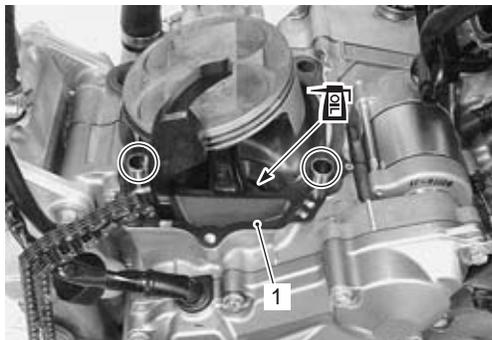
## 1D-31 Engine Mechanical:

- Install the dowel pins and cylinder gasket (1).

### **⚠ CAUTION**

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

- Apply engine oil to the conrod big end.



IA02J1140207-01

- Apply molybdenum oil solution to the sliding surface of the piston and cylinder wall.

**M/O: Molybdenum oil (MOLYBDENUM OIL SOLUTION)**

- Hold each piston ring with the ring gap positioned correctly and insert the piston into the cylinder.
- Fit the cylinder on the crankcase.

### **⚠ CAUTION**

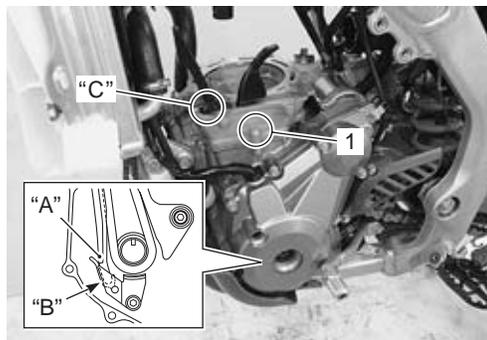
**Do not drop the cam chain into the crankcase.**



IA02J1140208-01

## Cylinder Head

- Temporarily tighten the cylinder base bolt (1).
- Insert the end of cam chain guide No. 1 "A" into the recess "B" of the crankcase securely.
- Fit the projection "C" of the cam chain guide No. 1 in the groove of the cylinder.

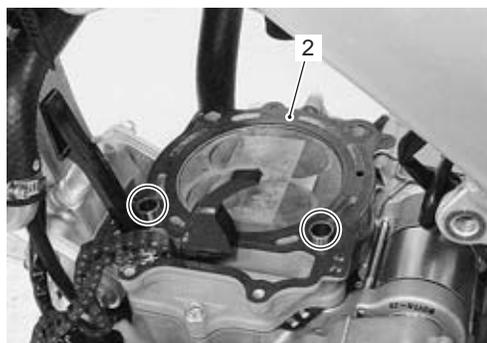


IA02J1140209-01

- Install the dowel pins and cylinder head gasket (2).

### **⚠ CAUTION**

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

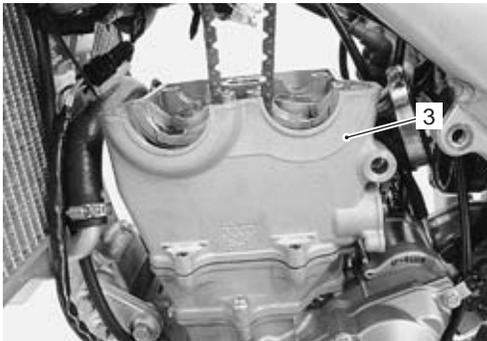


IA02J1140210-01

- Place the cylinder head (3) on the cylinder.

**NOTE**

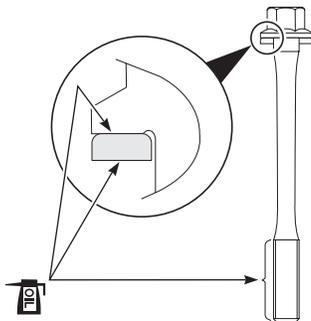
When installing the cylinder head (3), keep the cam chain taut.



IA02J1140211-01

**NOTE**

Apply engine oil to the threaded part of the cylinder head bolts and both sides of its washers.



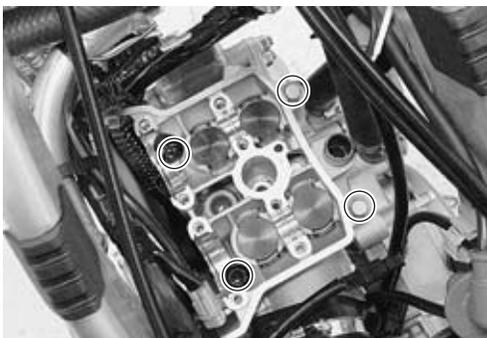
I933H1140081-01

- Tighten the cylinder head bolts to the specified two-step torque with a torque wrench sequentially and diagonally.

**Tightening torque**

Cylinder head bolt (Initial): 25 N·m (2.5 kgf·m, 18.0 lbf·ft)

Cylinder head bolt (Final): 51 N·m (5.1 kgf·m, 37.0 lbf·ft)



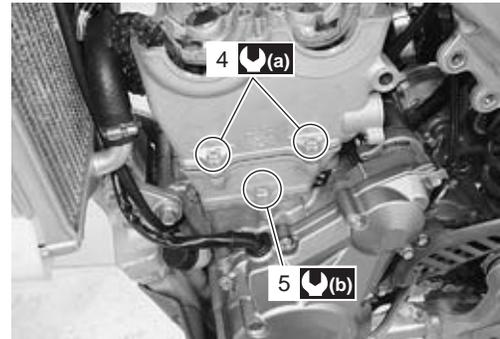
IA02J1140212-01

- After tightening the cylinder head bolts to specification, tighten the cylinder head base bolts (4) and cylinder base bolt (5) to the specified torque.

**Tightening torque**

Cylinder head base bolt (a): 10 N·m (1.0 kgf·m, 7.0 lbf·ft)

Cylinder base bolt (b): 10 N·m (1.0 kgf·m, 7.0 lbf·ft)



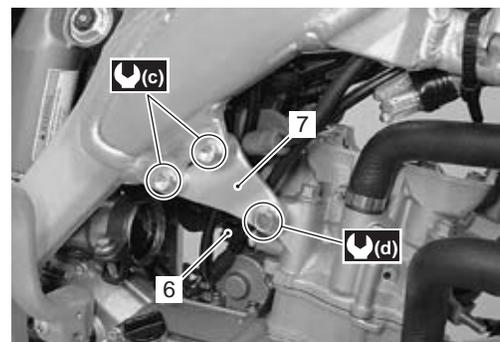
IA02J1140213-01

- Connect the ECT sensor coupler (6).
- Install the upper engine mounting bracket (RH) (7).
- Tighten the bolts to the specified torque.

**Tightening torque**

Upper engine mounting bracket bolt (c): 40 N·m (4.0 kgf·m, 29.0 lbf·ft)

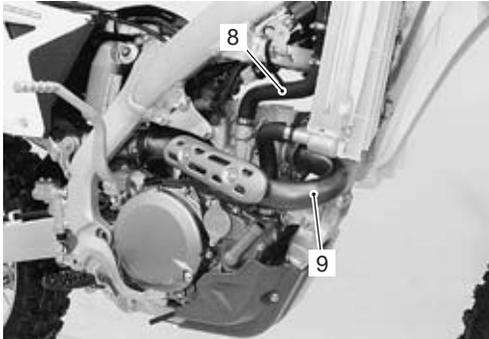
Engine mounting bolt (d): 55 N·m (5.5 kgf·m, 40.0 lbf·ft)



IA02J1140214-01

## 1D-33 Engine Mechanical:

- Install the throttle body. Refer to “Throttle Body Removal and Installation” (Page 1D-15).
- Connect the radiator inlet hose (8).
- Install the exhaust pipe (9). Refer to “Muffler / Exhaust Pipe Removal and Installation” in Section 1K (Page 1K-2).



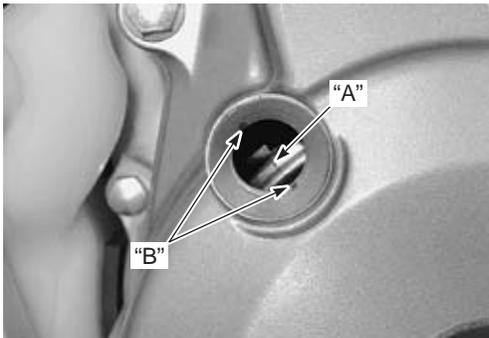
IA02J1140215-01

### Camshaft

- Turn the crankshaft counter clockwise to bring the line “A” on the generator rotor to the grooves “B” on the cap hole thread.

#### **⚠ CAUTION**

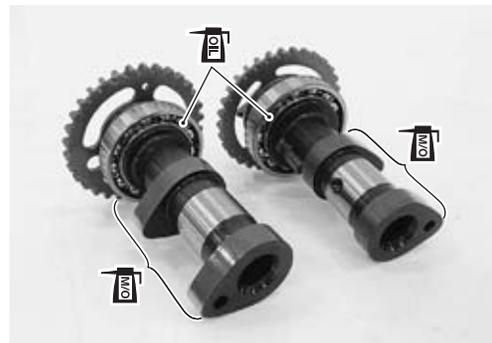
**If the crankshaft is turned without drawing the cam chain upward, the cam chain will catch between crankcase and cam chain drive sprocket.**



IA02J1020037-01

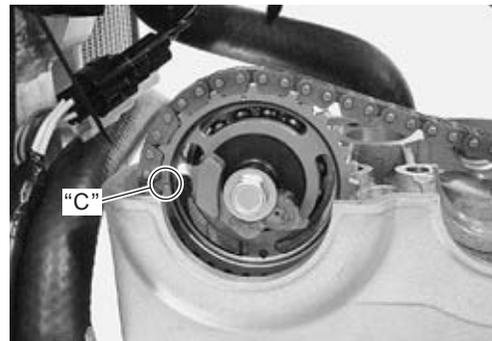
- Before installing the camshafts onto the cylinder head, apply molybdenum oil solution to the camshaft journals and cam faces.
- Apply engine oil to the camshaft bearings.

**M/O: Molybdenum oil (MOLYBDENUM OIL SOLUTION)**



IA02J1140216-01

- Pull the exhaust side of the cam chain taut and install the exhaust camshaft.
- Turn the exhaust camshaft so that the timing mark “C” is aligned with the gasket surface of the cylinder head.
- Engage the cam chain with the exhaust camshaft sprocket.

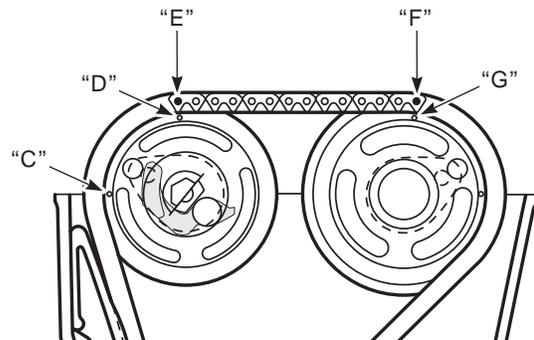


IA02J1140217-02

- The other timing mark “D” should now be pointing upward. Starting from the roller pin “E” that is directly above the timing mark “D”, count out 14 roller pins (from the exhaust camshaft side going towards the intake camshaft side).
- Engage the 14th roller pin “F” on the cam chain with the timing mark “G” on the intake camshaft sprocket.

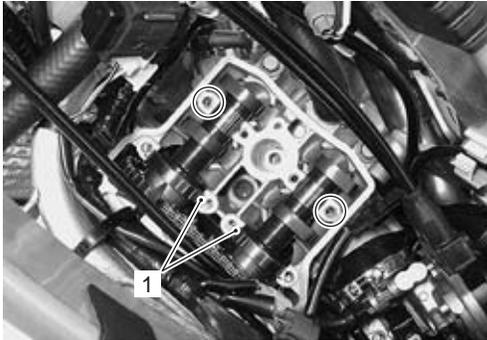
#### **NOTE**

**The cam chain should now be on all three sprockets. Be careful not to move the crankshafts until the camshaft journal holder and cam chain tension adjuster are secured.**



IA02J1140218-01

- Install the dowel pins and C-rings (1).



IA02J1140219-02

- Apply grease to new O-ring and install it to the camshaft journal holder.

**⚠ CAUTION**

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

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



IA02J1140220-01

- Install the camshaft journal holder.
- Have the camshaft journal holder evenly by tightening the camshaft journal holder bolts "a" (L45) and "b" (L40) lightly, in the ascending order of numbers.

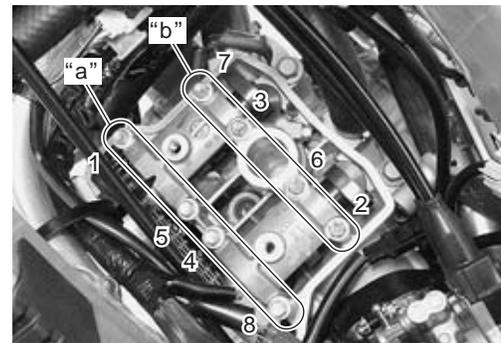
**NOTE**

- **When tightening the camshaft journal holder bolts, the piston position must be at TDC on the compression stroke.**
- **The ascending order of numbers are indicated on the camshaft journal holder.**

**Tightening torque**

**Camshaft journal holder bolt (a) (L45): 10 N-m (1.0 kgf-m, 7.0 lbf-ft)**

**Camshaft journal holder bolt (b) (L40): 10 N-m (1.0 kgf-m, 7.0 lbf-ft)**



IA02J1140249-01

**Cam Chain Tension Adjuster**

- Unlock the ratchet mechanism (1) and push the push rod (2) all the way.



IA02J1140221-01

- Install new gasket (3).

**⚠ CAUTION**

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

- Install the cam chain tension adjuster.

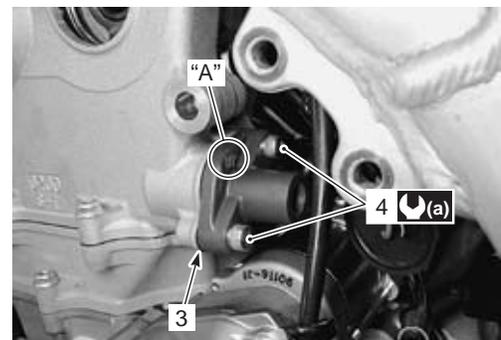
**NOTE**

**Make sure that the "UP" mark "A" comes to the upper side.**

- Tighten the cam chain tension adjuster mounting bolts (4) to the specified torque.

**Tightening torque**

**Cam chain tension adjuster mounting bolt (a): 10 N-m (1.0 kgf-m, 7.0 lbf-ft)**



IA02J1140222-01

## 1D-35 Engine Mechanical:

- Install the spring (5).
- Install the gasket (6) and cam chain tension adjuster cap bolt (7).

### NOTE

**Click sound is heard when the cam chain tension adjuster cap bolt is installed.**

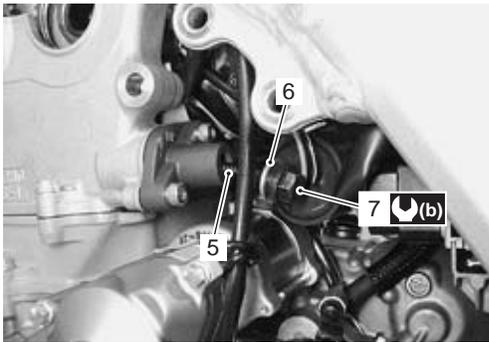
- Tighten the cam chain tension adjuster cap bolt (7) to the specified torque.

### Tightening torque

**Cam chain tension adjuster cap bolt (b): 23 N·m (2.3 kgf·m, 16.5 lbf·ft)**

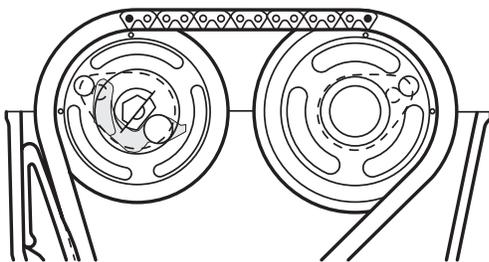
### ⚠ CAUTION

**After installing the cam chain tension adjuster, make sure that the adjuster works properly by checking the slack of cam chain.**



IA02J1140223-01

- After installing the cam chain tension adjuster, rotate the crankshaft (some turns), and recheck the position of camshafts.



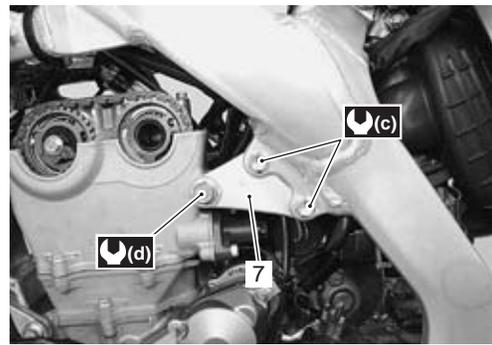
IA02J1140224-01

- Install the upper engine mounting bracket (LH) (7).
- Tighten the bolts to the specified torque.

### Tightening torque

**Upper engine mounting bracket bolt (c): 40 N·m (4.0 kgf·m, 29.0 lbf·ft)**

**Engine mounting bolt (d): 55 N·m (5.5 kgf·m, 40.0 lbf·ft)**



IA02J1140225-01

- Be sure to check and adjust the valve clearance. Refer to "Valve Clearance Inspection and Adjustment" in Section 0B (Page 0B-14).
- Apply grease to new O-rings.

### ⚠ CAUTION

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

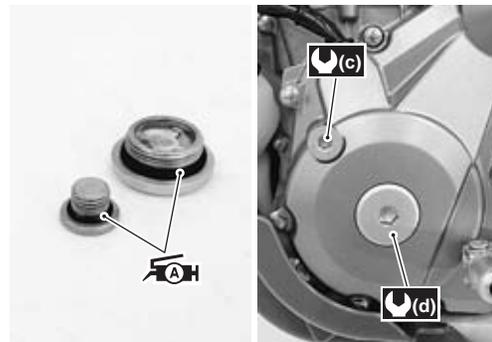
**🔧 : Grease 99000-25010 (SUZUKI SUPER GREASE "A" or equivalent)**

- Tighten each plug to the specified torque.

### Tightening torque

**TDC plug (c): 14 N·m (1.4 kgf·m, 10.0 lbf·ft)**

**Crankshaft hole plug (d): 11 N·m (1.1 kgf·m, 8.0 lbf·ft)**



IA02J1140226-01

### Cylinder Head Cover

- Thoroughly wipe off oil from the fitting surface of the cylinder head and cover.
- Fit the cam chain guide No. 2 (1).



IA02J1140250-01

- Apply bond to the end caps of the cylinder head cover gasket as shown in the figure.

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

**⚠ CAUTION**

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



IA02J1140251-01

- Place the cylinder head cover onto the cylinder head.
- Apply engine oil to both sides of new washers.

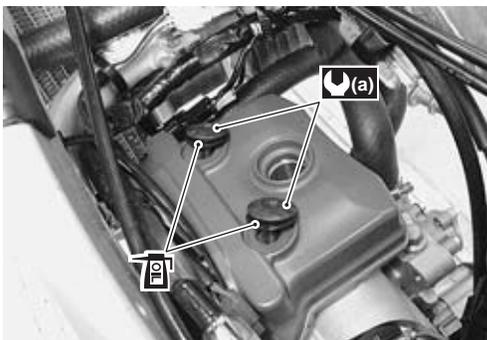
**⚠ CAUTION**

**Use new washers to prevent oil leakage.**

- Tighten the cylinder head cover bolts to the specified torque.

**Tightening torque**

**Cylinder head cover bolt (a): 14 N·m (1.4 kgf·m, 10.0 lbf·ft)**



IA02J1140252-01

- Install the TO sensor bracket.
- Install the spark plug. Refer to “Spark Plug Inspection and Cleaning” in Section 0B (Page 0B-4).
- Install the fuel tank. Refer to “Fuel Tank Removal and Installation” in Section 1G (Page 1G-5).
- Pour engine oil. Refer to “Engine Oil Inspection and Replacement” in Section 0B (Page 0B-5).
- Pour engine coolant. Refer to “Cooling System Inspection” in Section 0B (Page 0B-9).

**Valve Clearance Inspection and Adjustment**

BA02J21406020

Refer to “Valve Clearance Inspection and Adjustment” in Section 0B (Page 0B-14).

**Camshaft Inspection**

BA02J21406021

Refer to “Engine Top Side Disassembly” (Page 1D-27) and “Engine Top Side Assembly” (Page 1D-30).

**⚠ CAUTION**

**Do not attempt to disassemble the camshaft/automatic decompression assembly. It is not serviceable.**

**Camshaft Sprocket**

Inspect the teeth of each camshaft sprocket for wear or damage. If they are worn or damaged, replace the camshaft and cam chain as a set.



IA02J1140002-02

**Automatic Decompression**

Move the automatic decompression weight by hand to inspect if it is operating smoothly. If the automatic decompression weight does not operate smoothly, replace the exhaust camshaft with a new one.



IA02J1140003-01

### Camshaft Bearing

Inspect the bearings for play and smooth movement. If there is anything unusual, replace the camshaft assembly.



IA02J1140004-02

### Cam Wear

Check the camshaft for wear or damage. Measure the cam height "a" with the micrometer. Replace the camshaft if the cams are worn to the service limit.

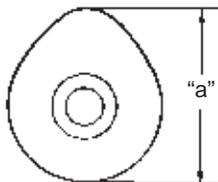
### Special tool

: 09900-20202 (Micrometer (1/100 mm, 25 – 50 mm))

### Cam height "a"

Service limit (IN.): 34.22 mm (1.347 in)

Service limit (EX.): 33.98 mm (1.338 in)



I649G1140199-02

### Camshaft Journal Wear

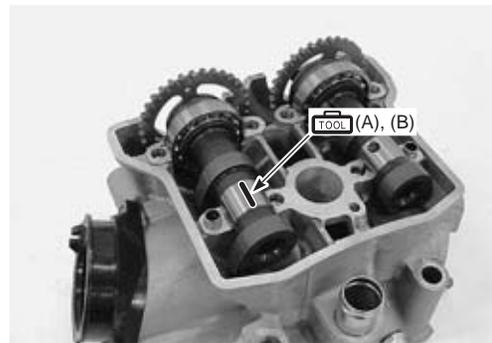
Determine whether or not each journal is worn down to the limit by measuring the oil clearance with the camshaft installed in place.

- 1) Place the plastigauge onto the camshaft journal.

### Special tool

(A): 09900-22301 (Plastigauge (0.025 – 0.076 mm))

(B): 09900-22302 (Plastigauge (0.051 – 0.152 mm))



IA02J1140005-01

- 2) Install the camshaft journal holder.
- 3) Tighten the camshaft journal holder bolts evenly in the ascending order of numbers.

### NOTE

**Do not rotate the camshafts with the plastigauge in place.**

### Tightening torque

Camshaft journal holder bolt (L45) (a): 10 N·m (1.0 kgf·m, 7.0 lbf·ft)

Camshaft journal holder bolt (L40) (b): 10 N·m (1.0 kgf·m, 7.0 lbf·ft)



IA02J1140006-01

- 4) Remove the camshaft journal holder and measure the width of the compressed plastigauge using the envelope scale. This measurement should be taken at the widest part of the compressed plastigauge.

### Camshaft journal oil clearance (IN. & EX.)

**Service limit: 0.150 mm (0.0059 in)**



IA02J1140007-01

- 5) If the camshaft journal oil clearance exceeds the limit, measure the inside diameter of the camshaft journal holder and the outside diameter of the camshaft journal. Replace the camshaft or cylinder head depending upon which one exceeds the specification.

**Special tool**

 (C): 09900-20602 (Dial gauge (1/1000 mm, 1 mm))

 (D): 09900-22403 (Small bore gauge (18 – 35 mm))

**Camshaft journal holder I.D. (IN. & EX.)**

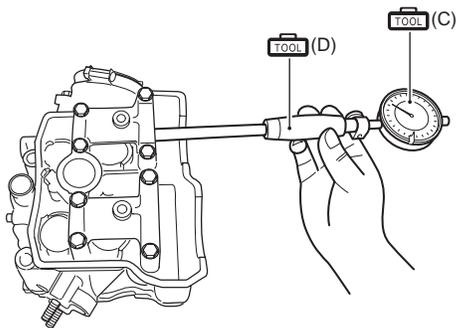
**Standard: 22.012 – 22.025 mm (0.8666 – 0.8671 in)**

**Special tool**

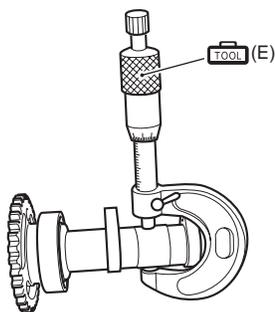
 (E): 09900-20205 (Micrometer (0 – 25 mm))

**Camshaft journal O.D. (IN. & EX.)**

**Standard: 21.959 – 21.980 mm (0.8645 – 0.8654 in)**



IA02J1140008-01



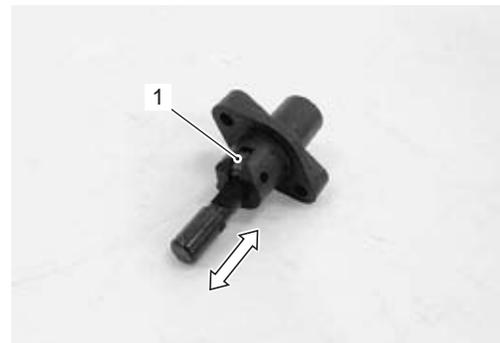
IA02J1140009-01

**Cam Chain Tension Adjuster Inspection**

BA02J21406022

The cam chain tension adjuster is maintained to the proper tension automatically.

- 1) Remove the cam chain tension adjuster. Refer to “Engine Top Side Disassembly” (Page 1D-27).
- 2) Check that the push rod slides smoothly when unlocking the ratchet mechanism (1). If it does not slide smoothly, replace the cam chain tension adjuster with a new one.



IA02J1140010-01

- 3) Install the cam chain tension adjuster. Refer to “Engine Top Side Assembly” (Page 1D-30).

**Cam Chain Guide Inspection**

BA02J21406023

Inspect the cam chain guide No. 1 and No. 2 in the following procedure:

- 1) Remove the cylinder head cover and cam chain guide No. 1. Refer to “Engine Top Side Disassembly” (Page 1D-27).
- 2) Inspect the contacting surface of each cam chain guide. If it is worn or damaged, replace it with a new one.



IA02J1140012-01



IA02J1140013-01

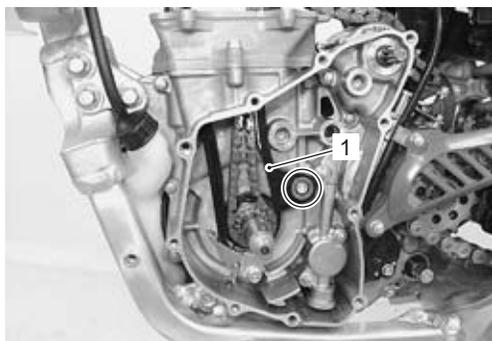
- 3) Install the cam chain guide No. 1 and cylinder head cover. Refer to “Engine Top Side Assembly” (Page 1D-30).

### Cam Chain Tensioner Inspection

BA02J21406024

Inspect the cam chain tensioner in the following procedures:

- 1) Remove the cylinder head. Refer to "Engine Top Side Disassembly" (Page 1D-27).
- 2) Remove the starter idle gears and magneto rotor. Refer to "Starter Torque Limiter / Starter Idle Gear / Starter Clutch Removal and Installation" in Section 11 (Page 11-10).
- 3) Remove the cam chain tensioner (1).



IA02J1140237-01

- 4) Check the contacting surface of the cam chain tensioner. If it is worn or damaged, replace it with a new one.

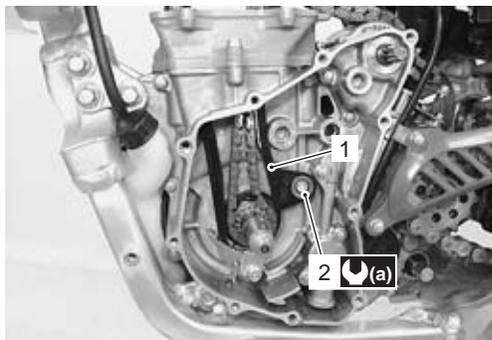


IA02J1140238-01

- 5) Install the cam chain tensioner (1) and tighten the cam chain tensioner mounting bolt (2) to the specified torque.

#### Tightening torque

**Cam chain tensioner bolt (a): 10 N·m (1.0 kgf·m, 7.0 lbf·ft)**



IA02J1140239-01

- 6) Reinstall the magneto rotor and starter idle gears. Refer to "Starter Torque Limiter / Starter Idle Gear / Starter Clutch Removal and Installation" in Section 11 (Page 11-10).
- 7) Reinstall the cylinder head. Refer to "Engine Top Side Assembly" (Page 1D-30).

### Cylinder Head Disassembly and Assembly

BA02J21406025

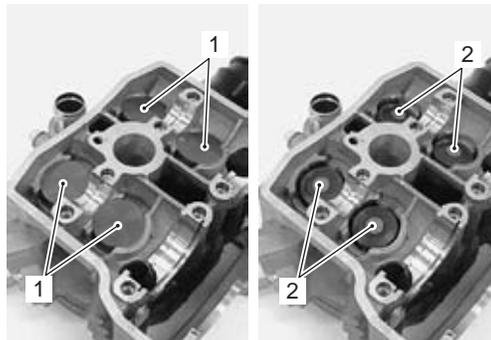
Refer to "Engine Top Side Disassembly" (Page 1D-27) and "Engine Top Side Assembly" (Page 1D-30).

#### ⚠ CAUTION

**Identify the position of each removed part. Organize the parts in their respective groups (i.e., intake, exhaust) so that they can be installed in their original locations.**

#### Disassembly

- 1) Remove the tappets (1) and shims (2) by fingers or magnetic hand.

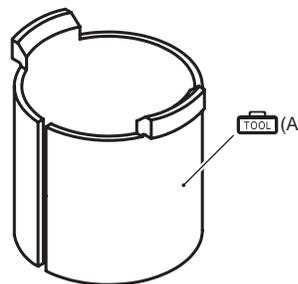


IA02J1140014-01

- 2) When compressing the valve spring, use the sleeve protector. Cut the sleeve protector as shown in the illustration.

#### Special tool

 (A): 09919-28610 (Sleeve protector)



IA02J1140015-01

- 3) Install the sleeve protector between the valve spring and cylinder head.
- 4) Using the special tools, compress the valve spring and remove the two cotter halves (3) from the valve stem.

**⚠ CAUTION**

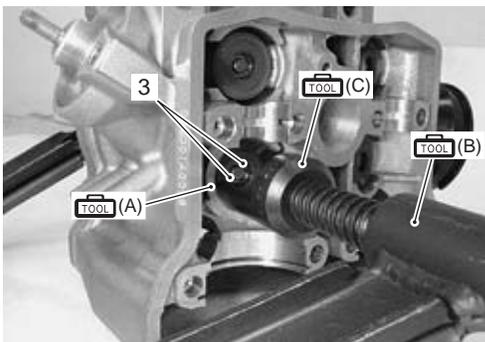
To prevent damage of the tappet sliding surface with the special tool, use the sleeve protector.

**Special tool**

 (B): 09916-14510 (Valve lifter)

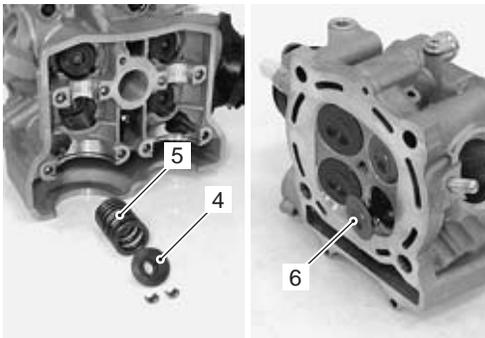
 (C): 09916-14910 (Valve spring compressor attachment)

 : 09916-84511 (Tweezers)



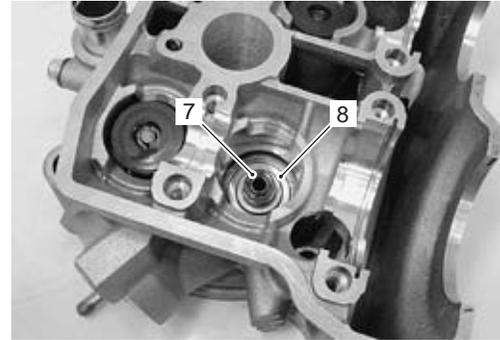
IA02J1140016-01

- 5) Remove the valve spring retainer (4) and valve spring (5).
- 6) Pull out the valve (6) from the combustion chamber side.



IA02J1140017-01

- 7) Remove the valve stem oil seal (7) and spring seat (8).



IA02J1140018-01

- 8) Remove the other valves in the same manner as described previously.
- 9) Remove the ECT sensor (9).



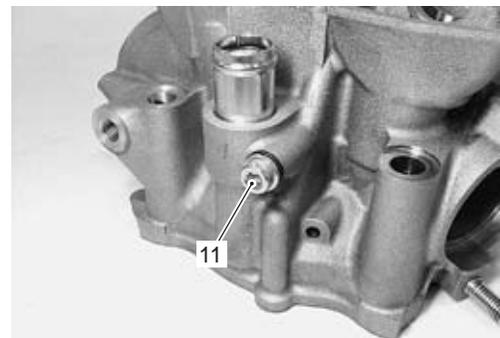
IA02J1140019-01

- 10) Remove the intake pipe (10).



IA02J1140020-01

- 11) Remove the oil gallery plug (cylinder head) (11).



IA02J1140021-01

## 1D-41 Engine Mechanical:

### Assembly

Assembly is in the reverse order of disassembly. Pay attention to the following points:

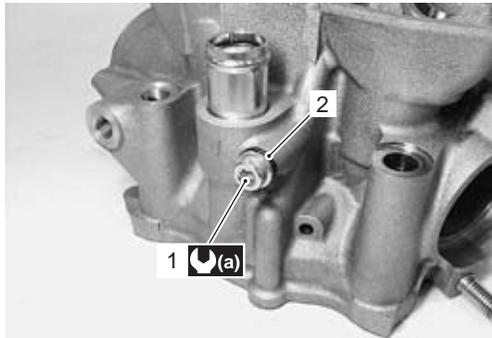
- Tighten the oil gallery plug (1) (cylinder head) to the specified torque.

#### Tightening torque

Oil gallery plug (Cylinder head) (a): 10 N-m (1.0 kgf-m, 7.0 lbf-ft)

#### **⚠ CAUTION**

Replace the gasket (2) with a new one.



IA02J1140022-04

- Apply grease to new O-ring of the intake pipe.

#### **⚠ CAUTION**

Replace the O-ring with new ones.

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



IA02J1140023-01

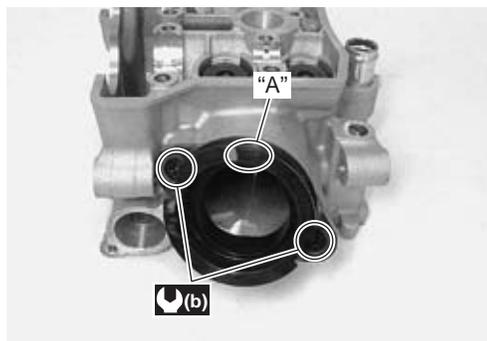
- Tighten the intake pipe mounting screws to the specified torque.

#### **NOTE**

Make sure that the "UP" mark "A" faces up.

#### Tightening torque

Intake pipe mounting screw (b): 8.5 N-m (0.85 kgf-m, 6.0 lbf-ft)



IA02J1140024-04

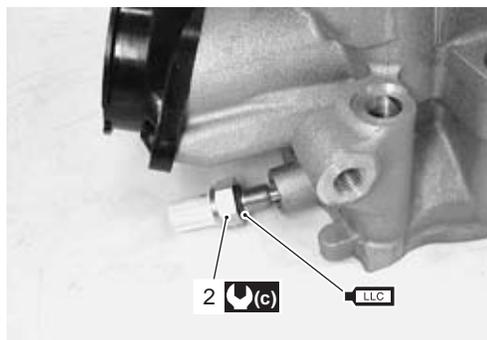
- Apply engine coolant to new O-ring.
- Tighten the ECT sensor (2) to the specified torque.

#### **⚠ CAUTION**

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

#### Tightening torque

ECT sensor (c): 12 N-m (1.2 kgf-m, 8.5 lbf-ft)



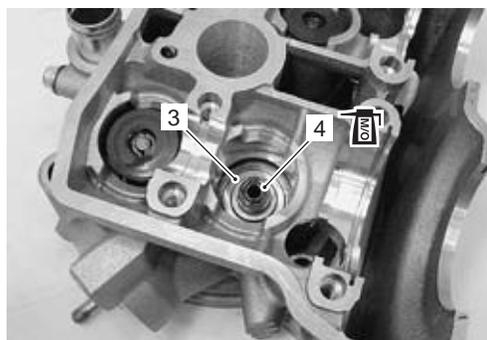
IA02J1140118-01

- Install the valve spring seat (3).
- Apply molybdenum oil to new valve stem oil seal (4), and press-fit it into position.

#### **⚠ CAUTION**

Do not reuse the removed valve stem oil seal.

**M/O: Molybdenum oil (MOLYBDENUM OIL SOLUTION)**



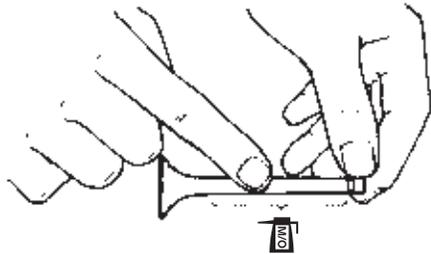
IA02J1140026-03

- Insert the valve, with its stem coated with molybdenum oil all around and along the full stem length without any break.

**⚠ CAUTION**

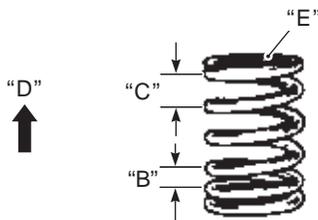
When inserting the valve, take care not to damage the lip of the valve stem oil seal.

M/O: Molybdenum oil (MOLYBDENUM OIL SOLUTION)



I705H1140165-01

- Install the valve spring with the small-pitch portion "B" facing cylinder head.



I718H1140004-01

"B": Small-pitch portion	"D": Upward
"C": Large-pitch portion	"E": Paint

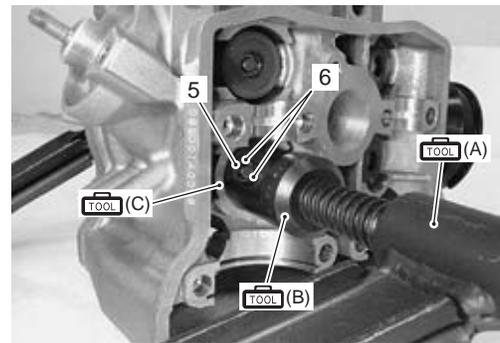
- Put on the valve spring retainer (5), and using the special tools, press down the spring, fit the cotter halves (6) to the stem end, and release the lifter to allow the cotter halves (6) to wedge in between retainer and stem.

**⚠ CAUTION**

- Be sure to restore each spring and valve to their original positions.
- Be careful not to damage the valve and valve stem when handling them.
- To prevent damage of the tappet sliding surface with the special tool, use the sleeve protector.

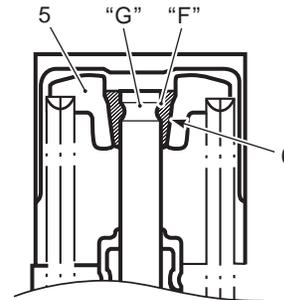
**Special tool**

- (A): 09916-14510 (Valve lifter)
- (B): 09916-14910 (Valve spring compressor attachment)
- : 09916-84511 (Tweezers)
- (C): 09919-28610 (Sleeve protector)



IA02J1140027-01

- Be sure that the rounded lip "F" of the cotter fits snugly into the groove "G" in the stem end.



IA02J1140028-03

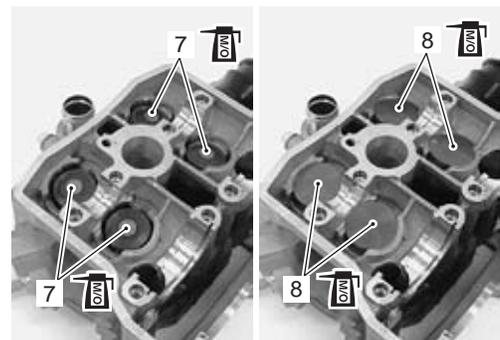
5. Valve spring retainer	6. Cotter
--------------------------	-----------

- Install the other valves and springs in the same manner as described previously.
- Install the tappet shims (7) and the tappets (8) to their original positions.

**NOTE**

- Apply molybdenum oil to the stem end, shim and tappet before fitting them.
- When seating the tappet shim, be sure the figure printed surface faces the tappet.

M/O: Molybdenum oil (MOLYBDENUM OIL SOLUTION)



IA02J1140029-02

**Cylinder Head Related Parts Inspection**

BA02J21406026

Refer to “Cylinder Head Disassembly and Assembly” (Page 1D-39).

**Cylinder Head Distortion**

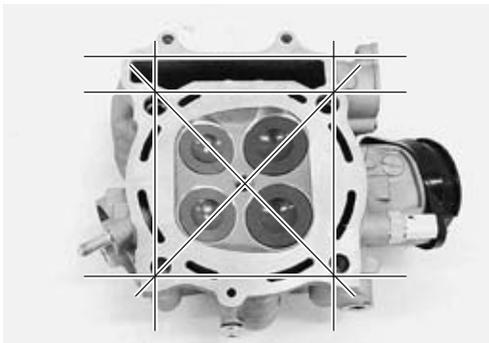
- 1) Decarbonize the combustion chambers.
- 2) Check the gasket surface of the cylinder head for distortion. Use a straightedge and thickness gauge. Take clearance readings at several places. If readings exceed the service limit, replace the cylinder head.

**Special tool**

 : 09900-20803 (Thickness gauge)

**Cylinder head distortion**

**Service limit: 0.05 mm (0.002 in)**



IA02J1140030-02

**Valve Stem Runout**

Support the valve using V-blocks, as shown in the figure, and check its runout using the dial gauge. If the runout exceeds the service limit, replace the valve.

**Special tool**

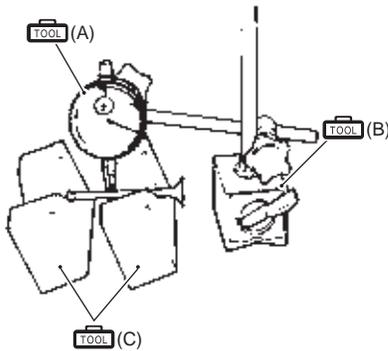
 (A): 09900-20607 (Dial gauge (1/100 mm, 10 mm))

 (B): 09900-20701 (Magnetic stand)

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

**Valve stem runout (IN. & EX.)**

**Service limit: 0.05 mm (0.002 in)**



I649G1140231-03

**Valve Head Radial Runout**

Place the dial gauge at a right angle to the valve head face and measure the valve head radial runout. If it measures more than the service limit, replace the valve.

**Special tool**

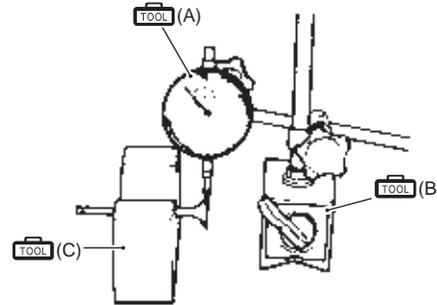
 (A): 09900-20607 (Dial gauge (1/100 mm, 10 mm))

 (B): 09900-20701 (Magnetic stand)

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

**Valve head radial runout (IN. & EX.)**

**Service limit: 0.03 mm (0.001 in)**



I649G1140232-03

**Valve Face Wear**

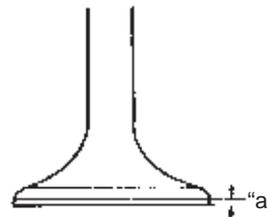
Visually inspect each valve face for wear. Replace any valve with an abnormally worn face. The thickness of the valve face decreases as the face wears. Measure the valve head “a”. If it is out of specification replace the valve with a new one.

**Special tool**

 : 09900-20101 (Vernier calipers (1/15 mm, 150 mm))

**Valve head thickness “a” (IN. & EX.)**

**Service limit: 0.5 mm (0.02 in)**



I649G1140233-02

**Valve Stem and Valve Face Wear Condition**

Visually inspect each valve stem and valve face for wear and pitting. If it is worn or damaged, replace the valve with a new one.



IA02J1140031-01

**Valve Stem Deflection**

Lift the valve about 10 mm (0.39 in) from the valve seat. Measure the valve stem deflection in two directions, "X" and "Y", perpendicular to each other. Position the dial gauge as shown. If the deflection exceeds the service limit, then determine whether the valve or the guide should be replaced with a new one.

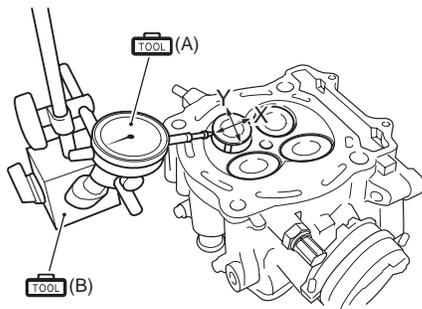
**Special tool**

**TOOL (A): 09900-20607 (Dial gauge (1/100 mm, 10 mm))**

**TOOL (B): 09900-20701 (Magnetic stand)**

**Valve stem deflection (IN. & EX.)**

**Service limit: 0.25 mm (0.010 in)**



IA02J1140032-01

**Valve Stem Wear**

Measure the valve stem O.D. using the micrometer. If it is out of specification, replace the valve with a new one. If the valve stem O.D. is within specification but the valve stem deflection is not, replace the valve guide. After replacing the valve or valve guide, recheck the deflection.

**Special tool**

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

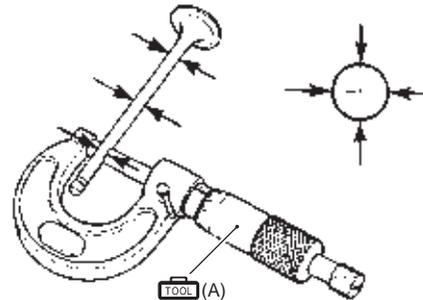
**Valve stem O.D.**

**Standard (IN.): 5.475 – 5.490 mm (0.2156 – 0.2161 in)**

**Standard (EX.): 5.455 – 5.470 mm (0.2148 – 0.2154 in)**

**NOTE**

If valve guides have to be removed for replacement after inspecting related parts, carry out the steps shown in valve guide replacement. Refer to "Valve Guide Replacement" (Page 1D-46).



I718H1140122-01

**Valve Spring**

The force of the coil spring keeps the valve seat tight. A weakened spring results in reduced engine power output and often accounts for the chattering noise coming from the valve mechanism.

Check the valve springs for proper strength by measuring their free length and also by the force required to compress them. If the spring length is less than the service limit or if the force required to compress the spring does not fall within the specified range, replace the valve spring.

**Special tool**

 (A): 09900-20101 (Vernier calipers (1/15 mm, 150 mm))

**Valve spring free length**

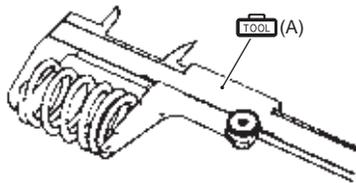
Service limit (IN.): 35.8 mm (1.41 in)

Service limit (EX.): 35.2 mm (1.39 in)

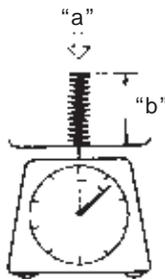
**Valve spring tension (IN. & EX.)**

Standard (IN.): 146 – 168 N (14.9 – 17.1 kgf, 32.8 – 37.7 lbs)/30.9 mm (12.2 in)

Standard (EX.): 105 – 121 N (10.7 – 12.3 kgf, 23.6 – 27.2 lbs)/30.9 mm (12.2 in)



I649G1140237-03



I649G1140238-03

	<b>Tension "a"</b>	<b>Length "b"</b>
IN.	146 – 168 N (14.9 – 17.1 kgf, 32.8 – 37.7 lbs)	30.9 mm (12.2 in)
EX.	105 – 121 N (10.7 – 12.3 kgf, 23.6 – 27.2 lbs)	30.9 mm (12.2 in)

**Valve Seat Width**

- 1) Visually check for valve seat width on each valve face. If the valve face has worn abnormally, replace the valve.
- 2) Coat the valve seat with a red lead (Prussian Blue) and set the valve in place.

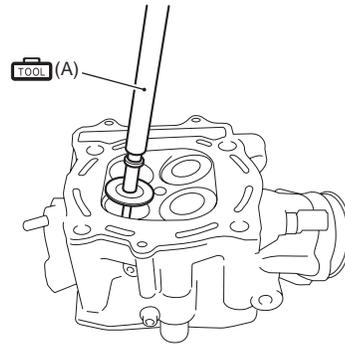
**CAUTION**

**Do not use lapping compound.**

- 3) Rotate the valve with light pressure.

**Special tool**

 (A): 09916-10911 (Valve lapper set)

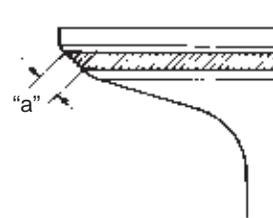


IA02J1140033-02

- 4) Check that the transferred red lead (blue) on the valve face is uniform all around and in center of the valve face. If the seat width "a" measured exceeds the standard value, or seat width is not uniform reface the seat using the seat cutter. Refer to "Valve Seat Repair" (Page 1D-47).

**Valve seat width "a" (IN. & EX.)**

Standard: 0.9 – 1.1 mm (0.035 – 0.043 in)



I649G1140246-02

### Valve Seat Sealing Condition

- 1) Clean and assemble the cylinder head and valve components.
- 2) Fill the intake and exhaust ports with gasoline to check for leaks. If any leaks occur, inspect the valve seat and face for burrs or other things that could prevent the valve from sealing. Refer to "Valve Seat Repair" (Page 1D-47).

**⚠ WARNING**

**Always use extreme caution when handling gasoline.**



IA02J1140034-01

**NOTE**

After servicing the valve seats, be sure to check the valve clearance after the cylinder head has been reinstalled. Refer to "Valve Clearance Inspection and Adjustment" in Section 0B (Page 0B-14).

### Valve Guide Replacement

BA02J21406027

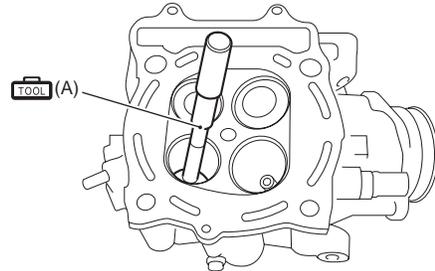
- 1) Remove the cylinder head. Refer to "Engine Top Side Disassembly" (Page 1D-27).
- 2) Remove the valves. Refer to "Cylinder Head Disassembly and Assembly" (Page 1D-39).
- 3) Using the valve guide remover, drive the valve guide out toward the intake or exhaust camshaft side.

**Special tool**

**TOOL (A): 09916-44310 (Valve guide installer & remover)**

**NOTE**

- Discard the removed valve guide sub-assemblies.
- Only oversized valve guides are available as replacement parts. (Part No. 11115-45G70)



IA02J1140035-02

- 4) Refinish the valve guide holes on the cylinder head using the reamer and handle.

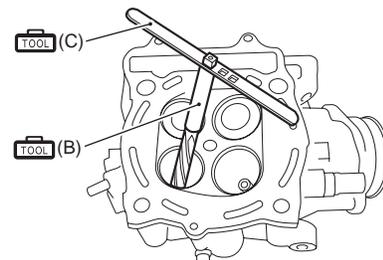
**⚠ CAUTION**

When refinishing or removing the reamer from the valve guide hole, always turn it clockwise.

**Special tool**

**TOOL (B): 09916-34580 (Valve guide reamer (10.8 mm))**

**TOOL (C): 09916-34542 (Reamer handle)**



IA02J1140036-02

- 5) Cool down the new valve guides in a freezer for about one hour and heat the cylinder head to 100 – 150 °C (212 – 302 °F) with a hot plate.

**⚠ CAUTION**

Do not use a burner to heat the valve guide hole to prevent cylinder head distortion.

- 6) Apply engine oil to each valve guide and valve guide hole.

## 1D-47 Engine Mechanical:

- 7) Drive the guide into the guide hole using the valve guide installer.

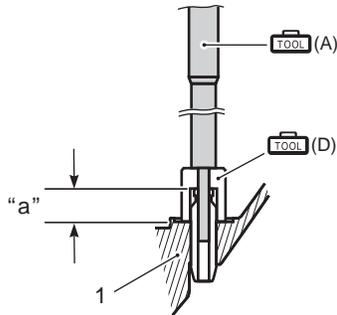
### ⚠ CAUTION

Failure to oil the valve guide hole before driving the new guide into place may result in a damaged guide or head.

### Special tool

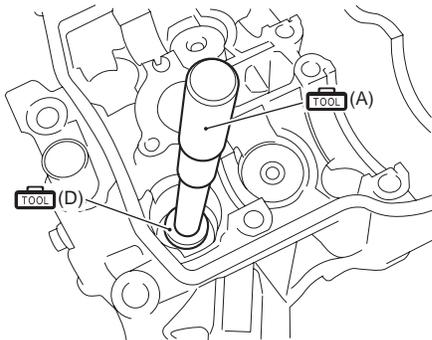
 (A): 09916-44310 (Valve guide remover/installer)

 (D): 09916-53360 (Attachment)



I718H1140127-01

1. Cylinder head	"a": 12.2 mm (0.48 in)
------------------	------------------------



IA02J1140037-01

- 8) After installing the valve guides, refinish their guiding bores using the reamer. Be sure to clean and oil the guides after reaming.

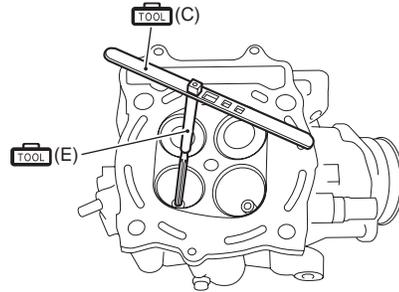
### Special tool

 (C): 09916-34542 (Reamer handle)

 (E): 09916-34550 (Valve guide reamer (5.5 mm))

### NOTE

- Be sure to cool down the cylinder head to ambient air temperature.
- Insert the reamer from the combustion chamber and always turn the reamer handle clockwise.



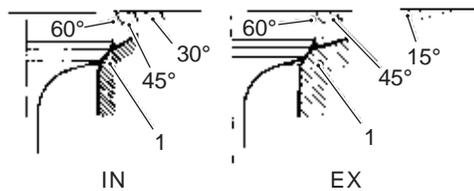
IA02J1140038-02

- 9) Reassemble the cylinder head. Refer to "Cylinder Head Disassembly and Assembly" (Page 1D-39).
- 10) Install the cylinder head assembly. Refer to "Engine Top Side Assembly" (Page 1D-30).

### Valve Seat Repair

BA02J21406028

The valve seats (1) for both the intake and exhaust valves are machined to three different angles. The seat contact surface is cut at 45°.



I831G1140170-02

	Intake	Exhaust
Seat angle	30°/45°/60°	15°/45°/60°
Seat width	0.9 – 1.1 mm (0.035 – 0.043 in)	←
Valve diameter	36 mm (1.42 in)	31 mm (1.22 in)
Valve guide I.D.	5.500 – 5.512 mm (0.2165 – 0.2170 in)	←

**⚠ CAUTION**

- The valve seat contact area must be inspected after each cut.
- Do not use lapping compound. The finished valve seat should have a velvety smooth finish but not a highly polished or shiny finish. This will provide a soft surface for the final seating of the valve which will occur during the first few seconds of engine operation.
- The titanium valves are coated with an oxidized membrane treatment to resist wear but the membrane tend to removed if lapped after valve seat servicing.

**NOTE**

After servicing the valve seats, be sure to check the valve clearance after the cylinder head has been reinstalled. Refer to “Valve Clearance Inspection and Adjustment” in Section 0B (Page 0B-14).

**Cylinder Inspection**

BA02J21406029

Refer to “Engine Top Side Disassembly” (Page 1D-27) and “Engine Top Side Assembly” (Page 1D-30).

**Cylinder Distortion**

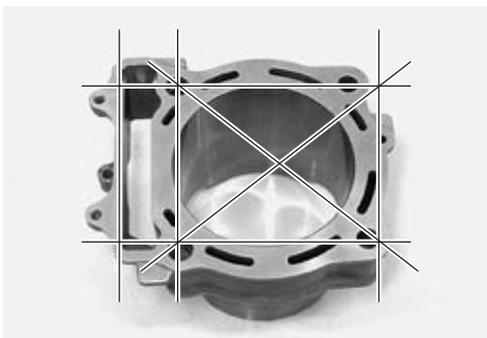
Check the gasket surface of the cylinder for distortion. Use a straightedge and thickness gauge. Take clearance readings at several places. If any reading exceeds the service limit, replace the cylinder.

**Special tool**

 : 09900-20803 (Thickness gauge)

**Cylinder distortion**

Service limit: 0.05 mm (0.002 in)



IA02J1140039-02

**Cylinder Bore**

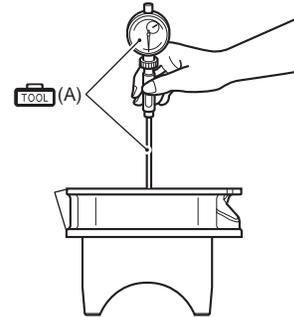
Inspect the cylinder wall for any scratches, nicks or other damage (Measure the cylinder bore diameter at six places). If any defects are found, replace the cylinder with a new one.

**Special tool**

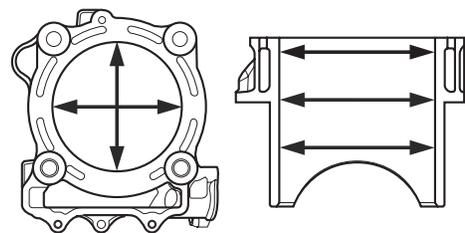
 (A): 09900-20530 (Cylinder gauge set)

**Cylinder bore**

Standard: 96.000 – 96.015 mm (3.7795 – 3.7801 in)



IA02J1140119-02



IA02J1140120-01

**Piston-to-cylinder Clearance**

Refer to “Piston and Piston Ring Inspection” (Page 1D-50).

**Piston Ring Removal and Installation**

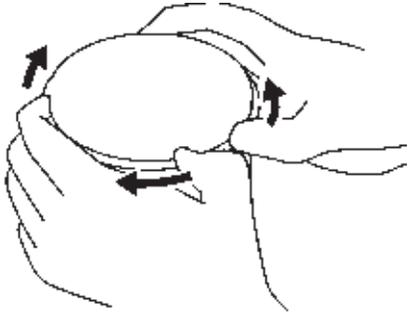
BA02J21406030

**Removal**

- 1) Remove the piston. Refer to "Engine Top Side Disassembly" (Page 1D-27).
- 2) Carefully spread the ring opening with your thumbs and then push up the opposite side of the 1st ring to remove it.

**NOTE**

**Do not expand the piston ring excessively since it is apt to be broken down.**



I831G1140178-01

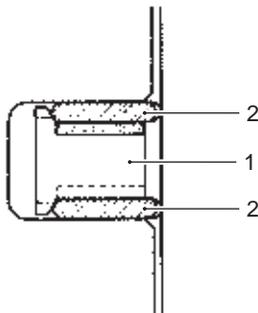
- 3) Remove the oil ring in the same manner.

**Installation**

**NOTE**

- When installing the piston ring, be careful not to damage the piston.
- Do not expand the piston ring excessively since it is apt to be broken down.

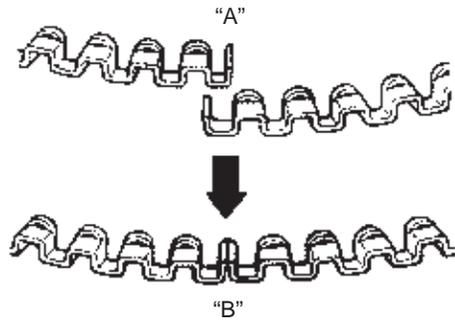
- 1) Install the piston rings in the order of the oil ring and top ring.
  - a) The first member to go into the oil ring groove is the spacer (1). After placing the spacer, fit the two side rails (2).



I718H1140143-02

**⚠ CAUTION**

**When installing the spacer, be careful not to allow its two ends to overlap in the groove.**



I705H1140170-02

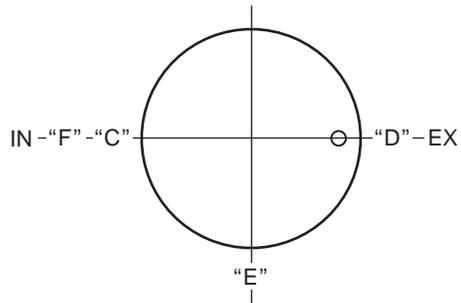
"A": INCORRECT	"B": CORRECT
----------------	--------------

- b) Be sure to bring the concave side of 1st ring to the top when fitting it to the piston.



IA02J1140040-01

- 2) Position the gaps of the two rings and side rails as shown. Before inserting piston into the cylinder, check that the gaps are located so.



IA02J1140041-01

"C": 1st ring
"D": Upper side rail
"E": Spacer
"F": Lower side rail

- 3) Install the piston and piston pin. Refer to "Engine Top Side Assembly" (Page 1D-30).

## Piston and Piston Ring Inspection

BA02J21406031

Refer to "Piston Ring Removal and Installation" (Page 1D-49).

### Piston Diameter

Measure the piston diameter using the micrometer at 16 mm (0.63 in) "a" from the skirt end. If the piston diameter is less than the service limit, replace the piston.

#### Special tool

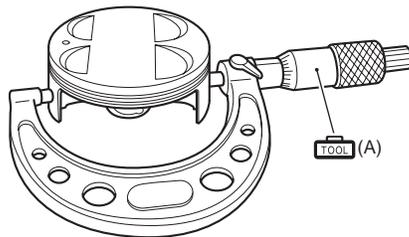
 (A): 09900-20204 (Micrometer (75 – 100 mm))

#### Piston diameter

**Service limit: 95.880 mm (3.7748 in)**



IA02J1140042-02



IA02J1140043-01

### Piston-to-cylinder Clearance

Subtract the piston diameter from the cylinder bore diameter. If the piston-to-cylinder clearance exceeds the service limit, replace both the cylinder and the piston.

#### Piston-to-cylinder clearance

**Service limit: 0.120 mm (0.0047 in)**

### Piston Ring-to-groove Clearance

Measure the side clearances of the 1st ring using the thickness gauge. If any of the clearances exceed the limit, replace both the piston and piston ring.

#### Special tool

 (A): 09900-20803 (Thickness gauge)

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

### Piston ring-to-groove clearance

**Service limit: (1st): 0.180 mm (0.007 in)**

#### Piston ring groove width

"a": **Standard: (1st): 0.78 – 0.80 mm (0.0307 – 0.0315 in)**

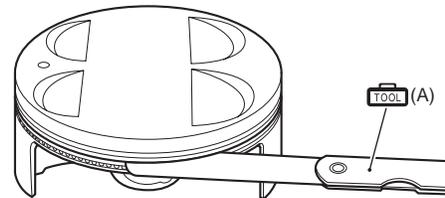
"b": **Standard: (1st): 1.30 – 1.32 mm (0.0512 – 0.0520 in)**

**Standard: (Oil): 2.01 – 2.03 mm (0.0791 – 0.0799 in)**

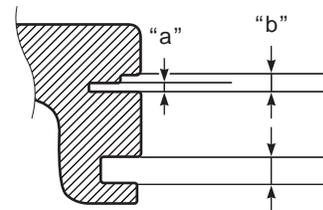
#### Piston ring thickness

**Standard: (1st): 0.71 – 0.76 mm (0.0280 – 0.0299)**

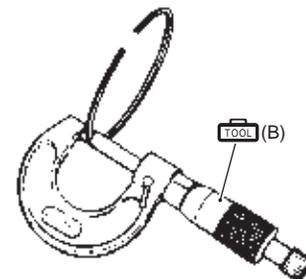
**Standard: (1st): 1.08 – 1.10 mm (0.0425 – 0.0433)**



IA02J1140044-01



IA02J1140045-01



I649G1140264-03

## 1D-51 Engine Mechanical:

### Piston Ring Free End Gap and Piston Ring End Gap

Measure the piston ring free end gap using the vernier calipers. Next, fit the piston ring squarely into the cylinder and measure the piston ring end gap using the thickness gauge. If any of the measurements exceed the service limit, replace the piston ring with a new one.

#### Special tool

 (A): 09900-20101 (Vernier calipers (1/15 mm, 150 mm))

#### Piston ring free end gap

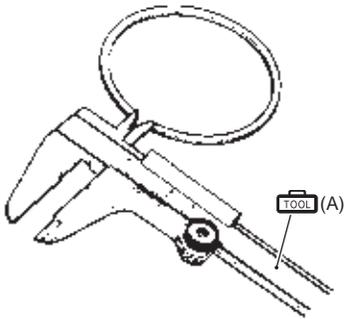
Service limit: (1st): 7.0 mm (0.28 in)

#### Special tool

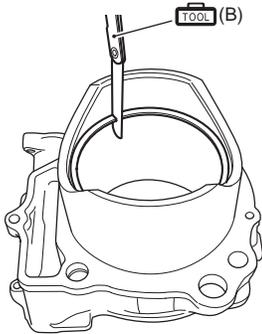
 (B): 09900-20803 (Thickness gauge)

#### Piston ring end gap

Service limit: (1st): 0.50 mm (0.020 in)



I649G1140265-03



IA02J1140046-01

### Piston Pin and Pin Bore

Measure the piston pin bore inside diameter using the small bore gauge. If the measurement is out of specification, replace the piston.

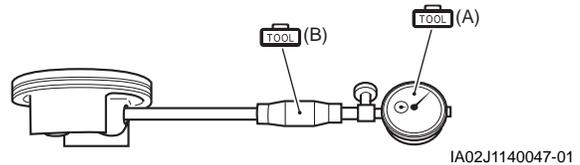
#### Special tool

 (A): 09900-20602 (Dial gauge (1/1000 mm, 1 mm))

 (B): 09900-22403 (Small bore gauge (18 – 35 mm))

#### Piston pin bore

Service limit: 19.030 mm (0.7492 in)



IA02J1140047-01

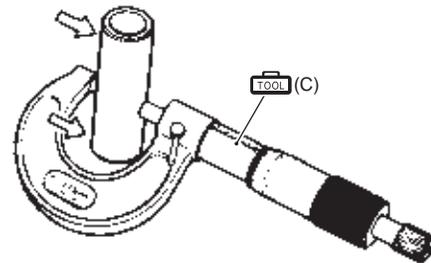
Measure the piston pin outside diameter at three positions using the micrometer. If any of the measurements are out of specification, replace the piston pin.

#### Special tool

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

#### Piston pin O.D.

Service limit: 18.980 mm (0.7472 in)



I649G1140268-03

## Engine Bottom Side Disassembly

BA02J21406032

### NOTE

**The crankcase must be separated to service the crankshaft and conrod.**

- 1) Remove the engine assembly from the frame. Refer to "Engine Assembly Removal" (Page 1D-20).
- 2) Remove the engine top side. Refer to "Engine Top Side Disassembly" (Page 1D-27).

### Starter Motor

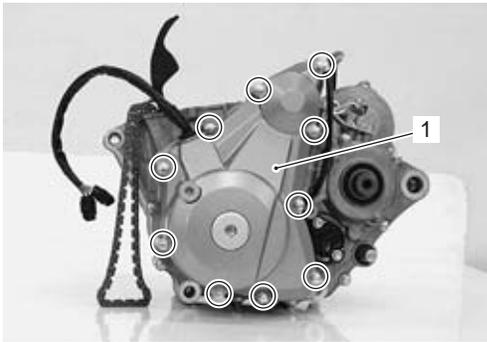
Remove the starter motor (1).



IA02J1140254-04

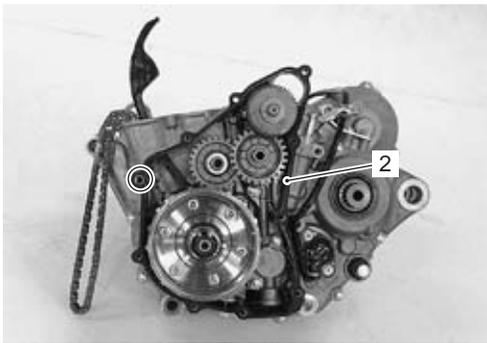
### Magneto Cover

1) Remove the magneto cover (1).



IA02J1140049-01

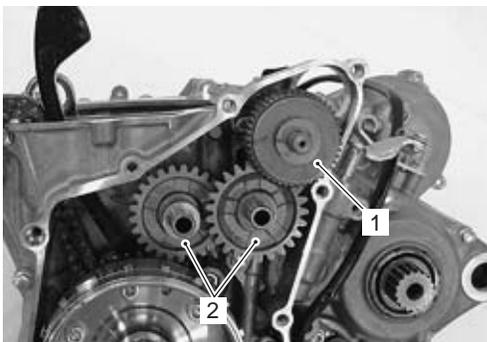
2) Remove the dowel pin and gasket (2).



IA02J1140050-01

### Starter Torque Limiter / Starter Idle Gear

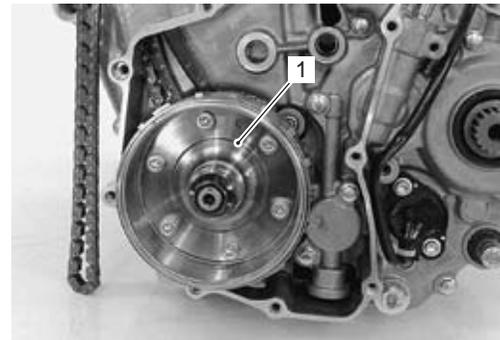
Remove the starter torque limiter (1) and starter idle gears (2). Refer to "Starter Torque Limiter / Starter Idle Gear / Starter Clutch Removal and Installation" in Section 1I (Page 1I-10).



IA02J1140051-01

### Magneto Rotor / Starter Driven Gear

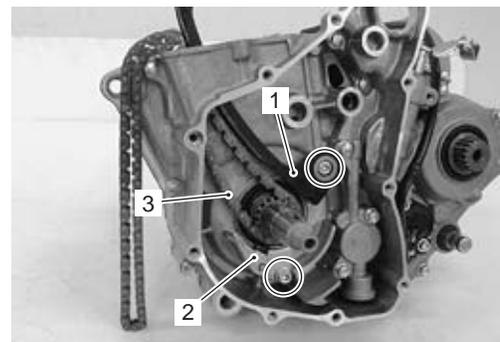
Remove the magneto rotor (1). Refer to "Generator Removal and Installation" in Section 1J (Page 1J-5).



IA02J1140052-01

### Cam Chain Tensioner / Cam Chain

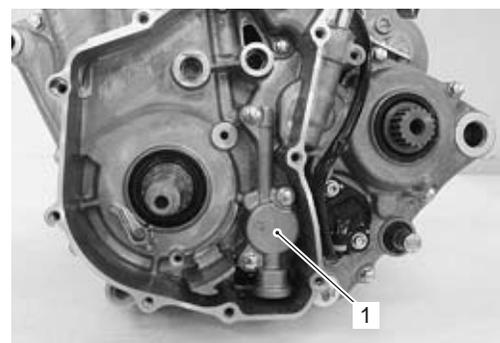
Remove the cam chain tensioner (1), cam chain guide retainer (2) and cam chain (3).



IA02J1140053-01

### Oil Pump No. 2

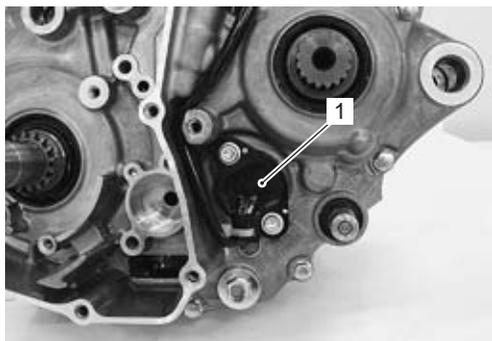
Remove the oil pump No. 2 (1). Refer to "Oil Pump No. 1 Removal and Installation" in Section 1E (Page 1E-3).



IA02J1140054-01

### Gear Position Switch

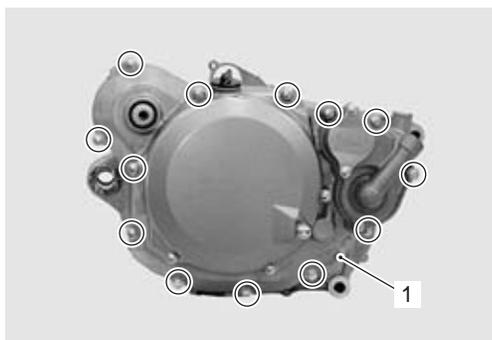
Remove the gear position switch (1). Refer to "Gear Position (GP) Switch Removal and Installation" in Section 5B (Page 5B-11).



IA02J1140123-01

### Right Crankcase Cover

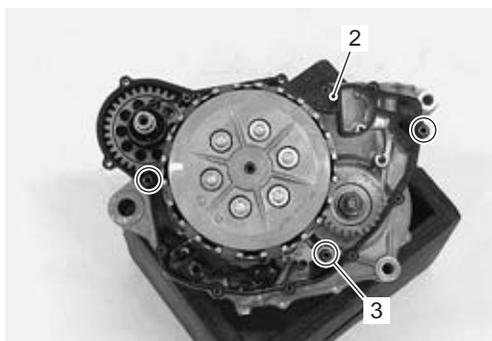
1) Remove the right crankcase cover (1).



IA02J1140055-01

2) Remove the dowel pins and gasket (2).

3) Remove the dowel pin and O-ring (3).



IA02J1140056-02

### Primary Drive Gear / Clutch

1) Hold the crankshaft immovable with the special tool.

#### Special tool

 (A): 09914-61010 (Gear holder)

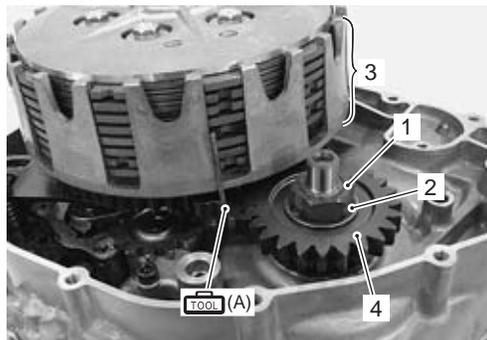
2) Remove the primary drive gear nut (1) and washer (2).

#### ⚠ CAUTION

**The primary drive gear nut has left-hand threads.**

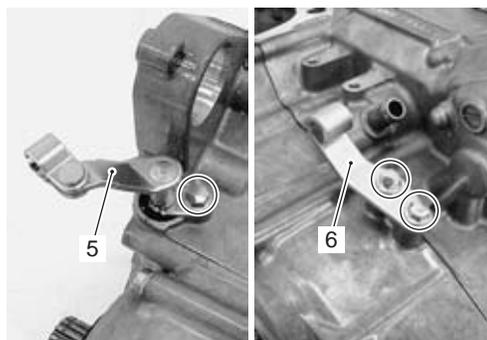
3) Remove the clutch component parts (3). Refer to "Clutch Removal" in Section 5C (Page 5C-7).

4) Remove the primary drive gear (4).



IA02J1140058-01

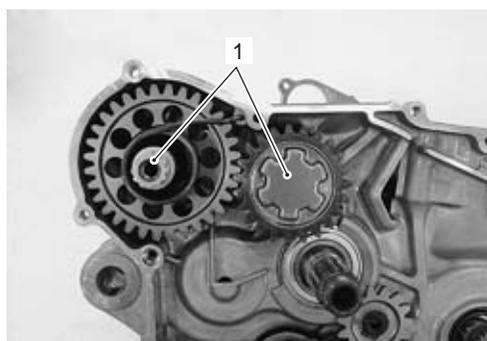
5) Remove the clutch release camshaft (5) and clutch cable stopper (6).



IA02J1140057-01

### Kick Starter

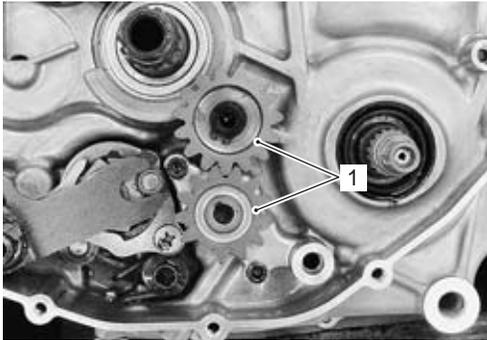
Remove the kick starter component parts (1). Refer to "Kick Starter Removal and Installation" in Section 11 (Page 11-15).



IA02J1140059-01

### Oil Pump No. 1

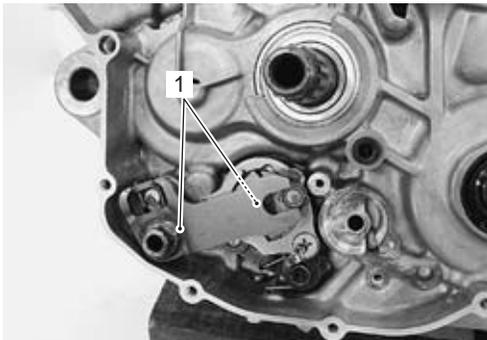
Remove the oil pump No. 1 component parts (1). Refer to "Oil Pump No. 1 Removal and Installation" in Section 1E (Page 1E-3).



IA02J1140121-01

### Gearshift System

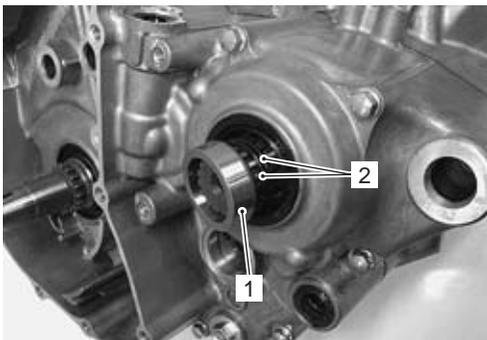
Remove the gearshift system component parts (1). Refer to "Gearshift Shaft / Gearshift Cam Plate Removal and Installation" in Section 5B (Page 5B-13).



IA02J1140060-02

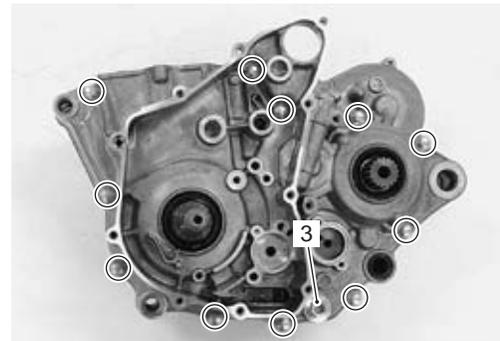
### Crankcase

- 1) Remove the engine sprocket spacer (1) and O-rings (2).



IA02J1140061-02

- 2) Remove the crankcase bolts.
- 3) Remove the oil strainer No. 1 (3). Refer to "Oil Strainer Inspection" in Section 0B (Page 0B-8).



IA02J1140062-01

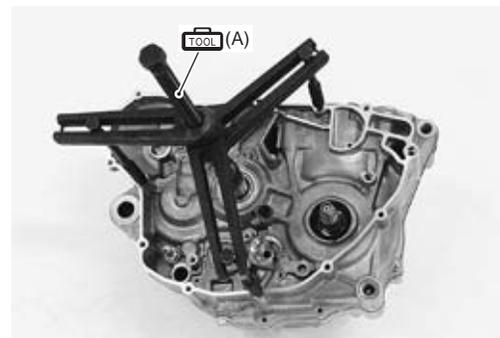
- 4) Separate the crankcase with the special tool.

### Special tool

 (A): 09920-13120 (Crankshaft remover)

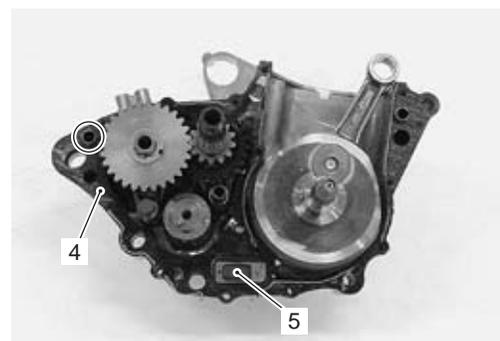
### NOTE

- Set the special tool to the clutch side of the crankcase.
- Separate the crankcase gradually while hitting the crankcase boss and countershaft softly with a plastic hammer.



IA02J1140063-01

- 5) Remove the dowel pins, gasket (4) and oil reed valve (5).



IA02J1140064-01

### Transmission

Remove the transmission component parts. Refer to "Transmission Removal and Installation" in Section 5B (Page 5B-3).



IA02J1140065-01

### Crankshaft

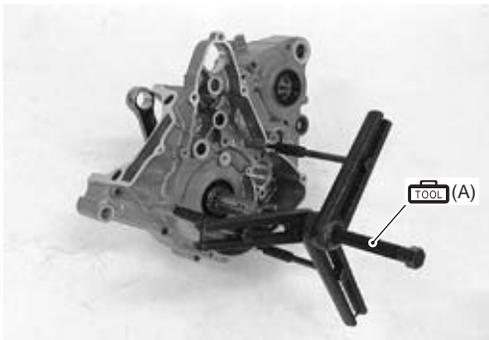
Remove the crankshaft with the special tool.

**⚠ CAUTION**

**Be careful not to damage the thread part of the crankshaft.**

### Special tool

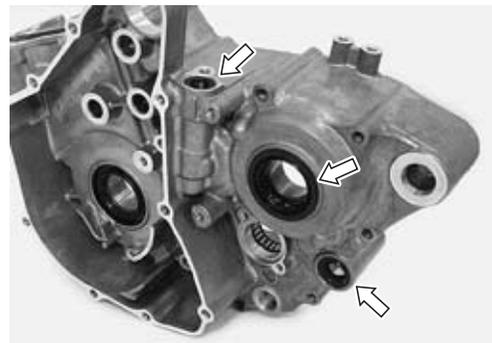
 (A): 09920-13120 (Crankshaft remover)



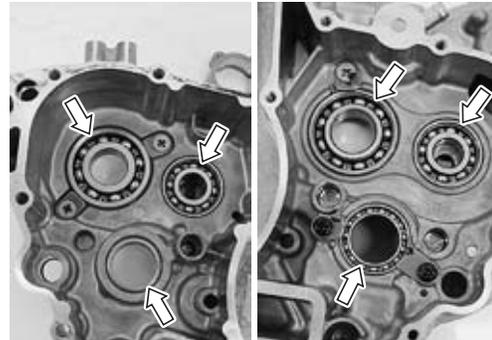
IA02J1140066-01

### Transmission, Gearshift Shaft and Clutch Release Camshaft Oil Seal / Bearing

Remove the oil seals and bearings if necessary. Refer to "Transmission Oil Seal / Bearing Removal and Installation" in Section 5B (Page 5B-8) and "Gearshift Shaft Oil Seal / Removal and Installation" in Section 5B (Page 5B-17) and "Clutch Release Camshaft Oil Seal / Bearing Removal and Installation" (Page 1D-66).



IA02J1140067-01



IA02J1140068-01

### Engine Bottom Side Assembly

BA02J21406033

Assemble the engine bottom side in the reverse order of disassembly. Pay attention to the following points:

**NOTE**

**Apply engine oil to each running and sliding part before reassembling.**

### Transmission Oil Seal / Bearing

Install the transmission bearings and oil seals. Refer to "Transmission Oil Seal / Bearing Removal and Installation" in Section 5B (Page 5B-8) and "Gearshift Shaft Oil Seal / Removal and Installation" in Section 5B (Page 5B-17).

### Crankshaft

When mounting the crankshaft in the crankcase, it is necessary to pull its left end into the crankcase using the special tools.

**⚠ CAUTION**

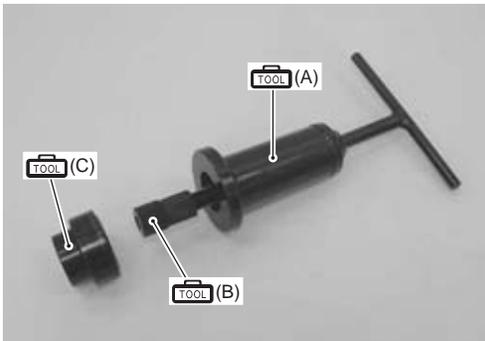
Never fit the crankshaft into the crankcase by striking it with a plastic mallet.  
Always use the special tools, otherwise the accuracy of the crankshaft alignment will be affected.

### Special tool

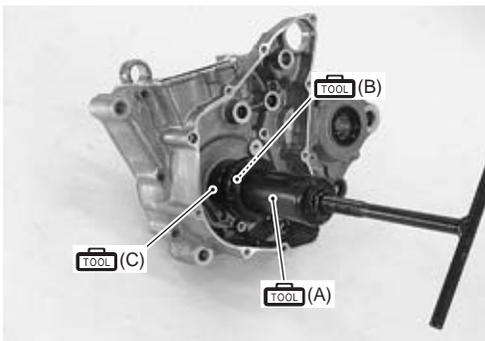
**TOOL (A): 09910-32812 (Crankshaft installer)**

**TOOL (B): 09911-11310 (Crankshaft installer attachment)**

**TOOL (C): 09913-70210 (Bearing installing set (10 – 75 Φ)) (Inner driver attachment 35 mm)**



IA02J1140069-01



IA02J1140070-01

### Left Crankshaft Oil Seal

- Apply grease to new oil seal lip.

**⚠ CAUTION**

Replace the removed oil seal with a new one.

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

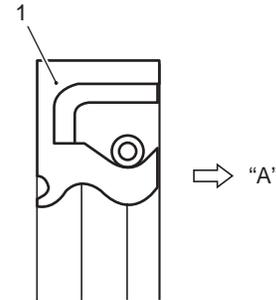
- Install the oil seal (1) using the special tool.

### Special tool

**TOOL (A): 09930-35010 (Rotor remover)**

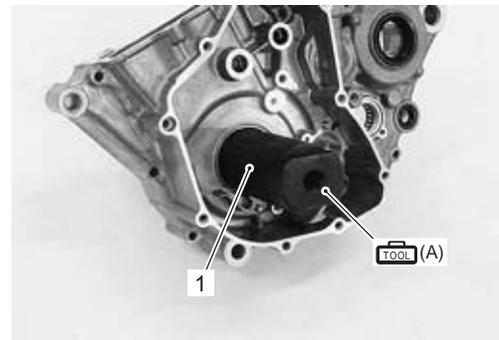
### NOTE

Be sure to check the direction of the crankshaft bearing oil seal (1) before installing them.



"A": Magneto side

IA02J1140071-01



IA02J1140072-01

### Transmission / Gear Shift

Install the transmission component. Refer to "Transmission Removal and Installation" in Section 5B (Page 5B-3).



IA02J1140073-01

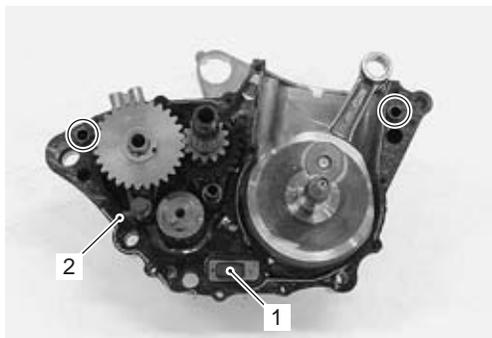
## 1D-57 Engine Mechanical:

### Crankcase

- Install the oil reed valve (1).
- Fit the dowel pins and new gasket (2).

#### **⚠ CAUTION**

**Replace the removed gasket with a new one.**



IA02J1140074-02

- Fit the right crankcase on the left crankcase.
- Tighten the crankcase bolts to the specified torque.

#### Tightening torque

**Crankcase bolt: 11 N-m (1.1 kgf-m, 8.0 lbf-ft)**

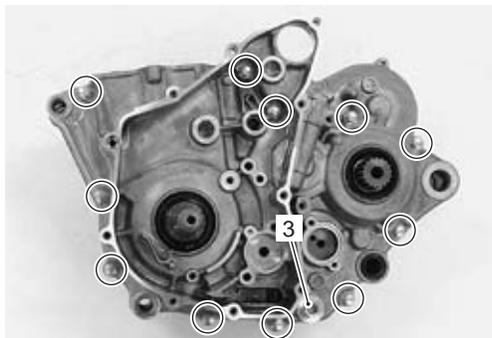
#### NOTE

**If it is hard to tighten the bolts, separate the crankcase and confirm that the transmission parts are assembled correctly.**

- Install the oil strainer (No.1) and oil strainer cap (3).

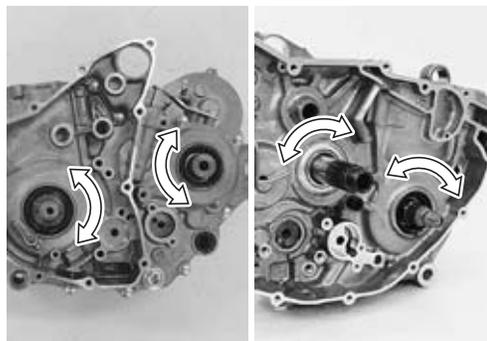
#### Tightening torque

**Oil strainer cap: 21 N-m (2.1 kgf-m, 15.0 lbf-ft)**



IA02J1140075-02

- Inspect the crankshaft, countershaft and driveshaft for smooth rotation.



IA02J1140076-02

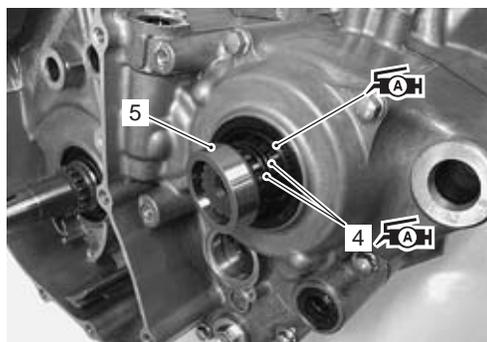
- Apply grease to the oil seal lip and new O-rings (4).

#### **⚠ CAUTION**

**Replace the removed O-rings with new ones.**

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

- Install the engine sprocket spacer (5) to the driveshaft.



IA02J1140077-01

### Gearshift System

Install the gearshift system component parts. Refer to "Gearshift Shaft / Gearshift Cam Plate Removal and Installation" in Section 5B (Page 5B-13).



IA02J1140078-01

### Oil Pump No. 1

Install the oil pump No. 1 component parts. Refer to "Oil Pump No. 1 Removal and Installation" in Section 1E (Page 1E-3).



IA02J1140079-01

### Kick Starter

Install the kick starter component parts. Refer to "Kick Starter Removal and Installation" in Section 1I (Page 1I-15).



IA02J1140080-01

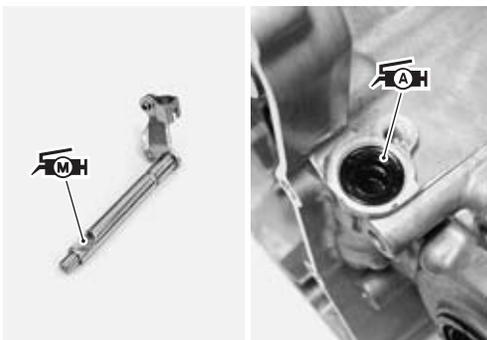
### Primary Drive Gear / Clutch

- Apply SUZUKI moly paste to the clutch release camshaft.

 : Moly paste 99000-25140 (SUZUKI MOLY PASTE or equivalent)

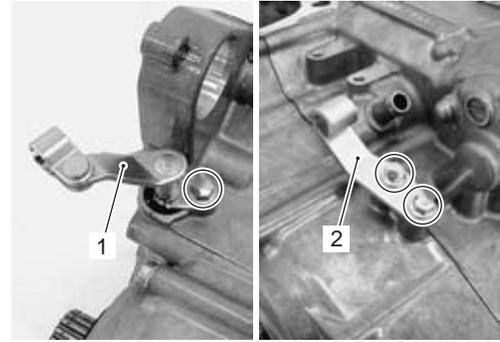
- Apply grease to the oil seal lip.

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



IA02J1140081-03

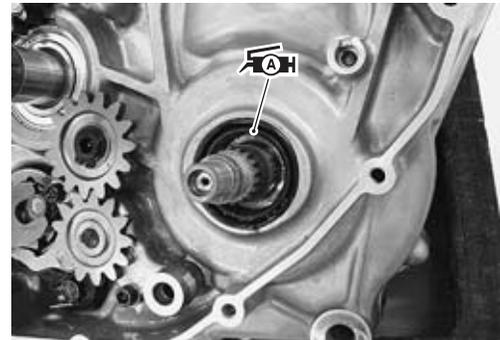
- Install the clutch release camshaft (1) and clutch cable stopper (2) to the crankcase.



IA02J1140083-01

- Apply grease to the oil seal lip.

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



IA02J1140084-01

- Install the primary drive gear (3) and washer (4).

#### NOTE

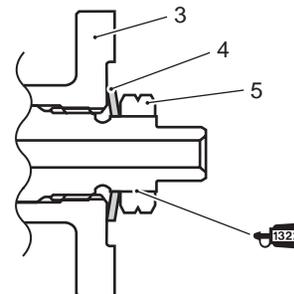
The washer (4) is directional. Assemble the washer (4) as shown in the illustration.

#### CAUTION

The primary drive gear nut has left-hand threads.

- Apply THREAD LOCK SUPER to the primary drive gear nut (5).

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



IA02J1140085-01

## 1D-59 Engine Mechanical:

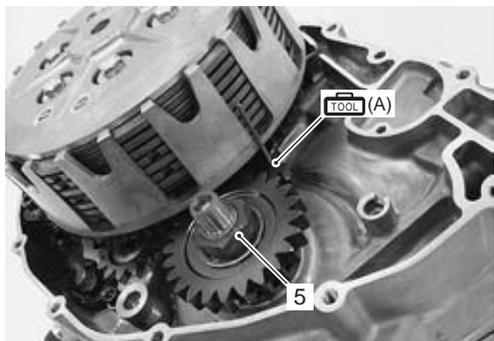
- Install the clutch component parts. Refer to “Clutch Installation” in Section 5C (Page 5C-8).
- Hold the crankshaft immovable with the special tool and tighten the primary drive gear nut (5) to the specified torque.

### Special tool

 (A): 09914-61010 (Gear holder)

### Tightening torque

Primary drive gear nut: 90 N-m (9.0 kgf-m, 65.0 lbf-ft)



IA02J1140086-01

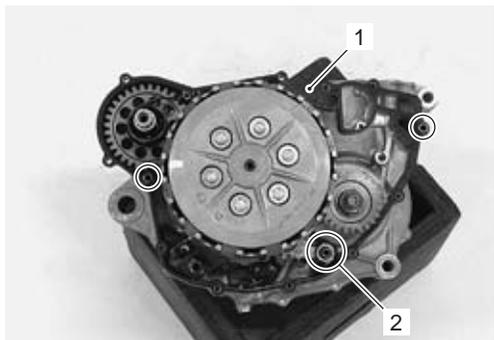
### Right Crankcase Cover

- Install the dowel pins and new gasket (1).

#### CAUTION

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

- Install the dowel pins and O-ring (2).



IA02J1140087-01

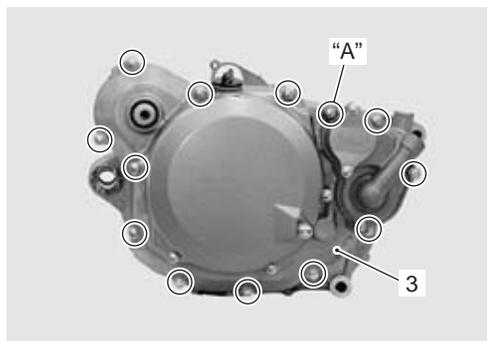
- Install the right crankcase cover (3) and tighten the bolt to the specified torque.

#### CAUTION

**Fit new gasket washer to the bolt “A”.**

### Tightening torque

Right crankcase cover bolt: 11 N-m (1.1 kgf-m, 8.0 lbf-ft)



IA02J1140088-02

### Gear Position Switch

Install the gear position switch. Refer to “Gear Position (GP) Switch Removal and Installation” in Section 5B (Page 5B-11).



IA02J1140089-01

### Oil Pump No. 2

Install the oil pump No. 2. Refer to “Oil Pump No. 2 Removal and Installation” in Section 1E (Page 1E-5).



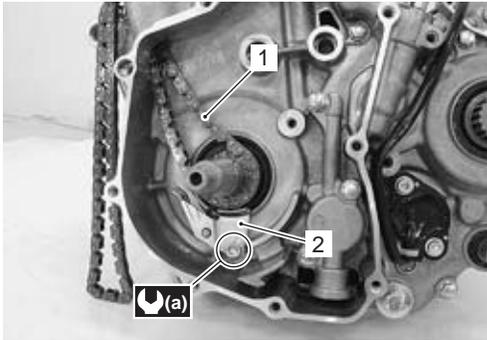
IA02J1140090-01

### Cam Chain / Cam Chain Tensioner

- Install the cam chain (1) to the crankshaft sprocket.
- Install the cam chain guide retainer (2) and tighten the bolt to the specified torque.

#### Tightening torque

**Cam chain guide retainer bolt (a): 10 N·m (1.0 kgf·m, 7.0 lbf·ft)**

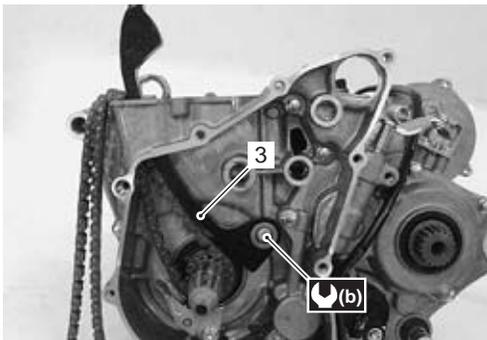


IA02J1140091-02

- Install the cam chain tensioner (3) and tighten the bolt to the specified torque.

#### Tightening torque

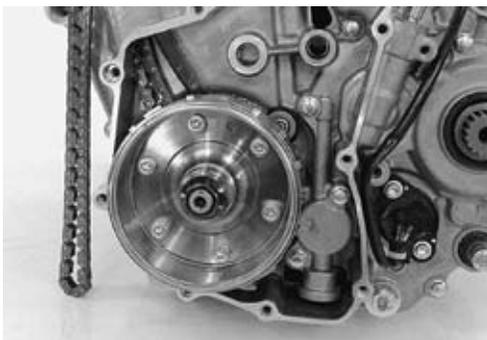
**Cam chain tensioner bolt (b): 10 N·m (1.0 kgf·m, 7.0 lbf·ft)**



IA02J1140092-01

### Magneto Rotor / Starter Driven Gear

Install the magneto rotor/starter driven gear. Refer to "Generator Removal and Installation" in Section 1J (Page 1J-5).



IA02J1140093-01

### Starter Idle Gear / Starter Torque limiter

Install the starter idle gears and starter torque limiter. Refer to "Starter Torque Limiter / Starter Idle Gear / Starter Clutch Removal and Installation" in Section 1I (Page 1I-10).



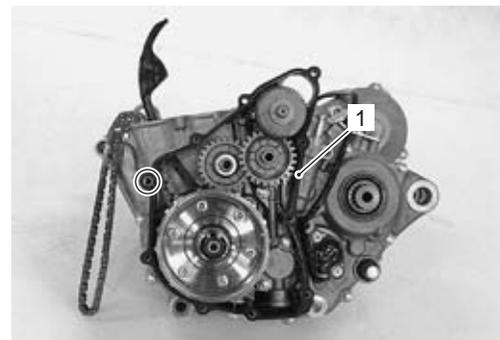
IA02J1140094-01

### Magneto Cover

- Install the dowel pin and new gasket (1).

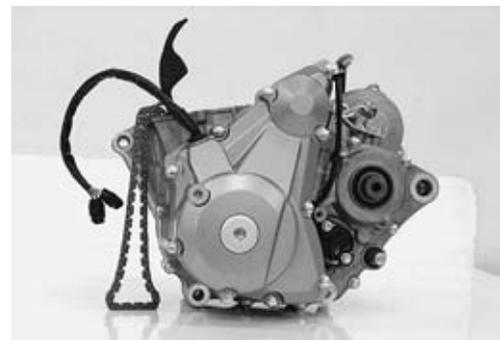
#### ⚠ CAUTION

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



IA02J1140095-02

- Install the magneto cover. Refer to "Starter Torque Limiter / Starter Idle Gear / Starter Clutch Removal and Installation" in Section 1I (Page 1I-10).

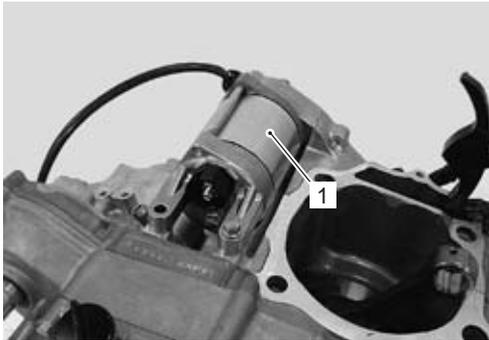


IA02J1140096-01

## 1D-61 Engine Mechanical:

### Starter Motor

Install the starter motor (1). Refer to "Starter Motor Removal and Installation" in Section 1I (Page 1I-4).



IA02J1140254-04

### Engine Top Side / Engine Assembly

Assemble the engine top side. Refer to "Engine Top Side Assembly" (Page 1D-30).

Remount the engine assembly to the frame. Refer to "Engine Assembly Installation" (Page 1D-24).

### Oil Pump No. 1 Inspection

BA02J21406034

Refer to "Oil Pump Inspection" in Section 1E (Page 1E-6).

### Oil Pump No. 2 Inspection

BA02J21406035

Refer to "Oil Pump Inspection" in Section 1E (Page 1E-6).

### Oil Strainer Inspection

BA02J21406036

Refer to "Oil Strainer Inspection" in Section 0B (Page 0B-8).

### Oil Reed Valve Inspection

BA02J21406037

Refer to "Oil Reed Valve Inspection" in Section 1E (Page 1E-8).

### Gearshift Shaft Inspection

BA02J21406038

Refer to "Gearshift Linkage Inspection" in Section 5B (Page 5B-16).

### Conrod and Crankshaft Inspection

BA02J21406039

Refer to "Engine Bottom Side Disassembly" (Page 1D-51) and "Engine Bottom Side Assembly" (Page 1D-55).

### Conrod Small End I.D.

Measure the conrod small end inside diameter with the dial calipers.

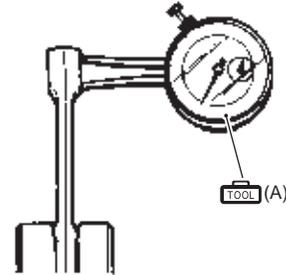
If conrod small end inside diameter exceeds the service limit, replace the conrod.

#### Special tool

 (A): 09900-20605 (Dial calipers (1/100 mm, 10 – 34 mm))

#### Conrod small end I.D.

Service limit: 19.040 mm (0.7496 in)



1831G1140292-02

### Conrod Deflection

Move the small end sideways while holding the big end immovable in thrust direction.

Measure the amount of deflection.

Turn the conrod and see if it moves smoothly without play and noise.

This method can check the extent of wear on the parts of the conrod's big end.

#### Conrod deflection

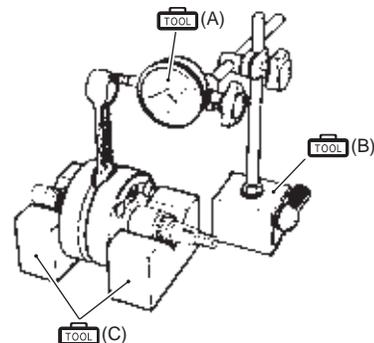
Service limit: 3.0 mm (0.12 in)

#### Special tool

 (A): 09900-20607 (Dial gauge (1/100 mm, 10 mm))

 (B): 09900-20701 (Magnetic stand)

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



IA02J1140099-01

**Conrod Big End Side Clearance**

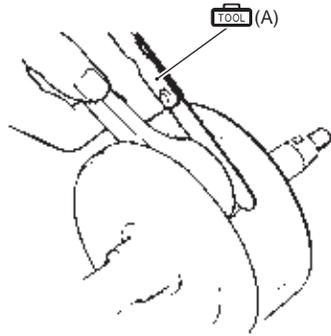
Push the big end of the conrod to one side and measure the side clearance using a thickness gauge. If the clearance exceeds the service limit, replace the crankshaft assembly with a new one or bring the deflection and the side clearance within the service limit by replacing the worn parts (conrod, big end bearing, crank pin, etc.) with new ones.

**Special tool**

 (A): 09900-20803 (Thickness gauge)

**Conrod big end side clearance**

Service limit: 1.0 mm (0.04 in)



I705H1140146-02

**Crankshaft Runout**

Support the crankshaft using V-blocks and measure the crankshaft runout using the dial gauge, as shown. If the runout exceeds the service limit, replace the crankshaft with a new one.

**NOTE**

- Place the crankshaft onto the V-blocks so that it becomes horizontally.
- Measure the runout from the tips of the crankshaft.

**Crankshaft runout**

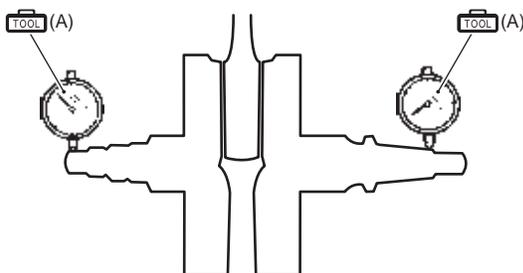
Service limit: 0.08 mm (0.003 in)

**Special tool**

 (A): 09900-20607 (Dial gauge (1/100 mm, 10 mm))

 : 09900-20701 (Magnetic stand)

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



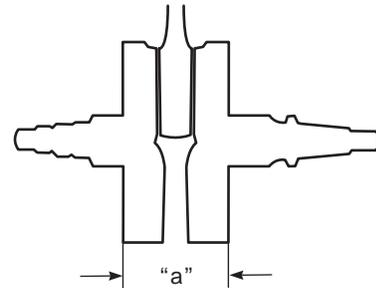
IA02J1140101-01

**Crank Web to Web Width**

Measure the width between crankshaft webs "a".

**Width between crankshaft webs "a"**

Standard: 61.9 – 62.1 mm (2.437 – 2.445 in)



IA02J1140102-01

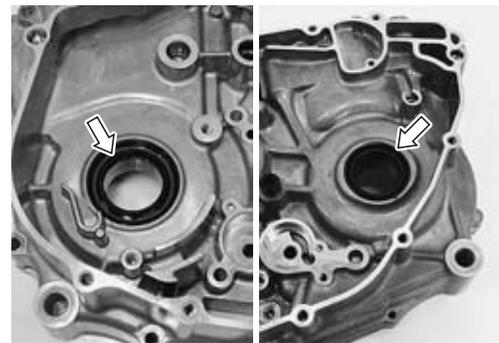
**Crankshaft Oil Seal / Bearing Inspection**

BA02J21406040

Refer to "Engine Bottom Side Disassembly" (Page 1D-51) and "Engine Bottom Side Assembly" (Page 1D-55).

**Oil Seal**

Inspect the oil seal lips for wear or damage. If any defects are found, replace the oil seal with new ones. Refer to "Crankshaft Oil Seal / Bearing Removal and Installation" (Page 1D-63) and "Crankshaft Oil Seal / Bearing Removal and Installation" (Page 1D-63).



IA02J1140103-01

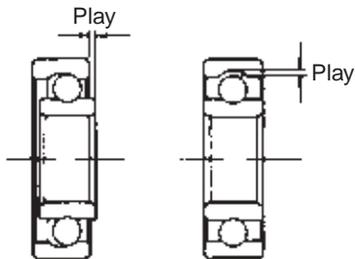


IA02J1140104-01

**Bearing**

Rotate the bearing inner race by finger to inspect for abnormal play, noise and smooth rotation while the bearings are in the crankcase.

Replace the bearing if there is anything unusual. Refer to "Crankshaft Oil Seal / Bearing Removal and Installation" (Page 1D-63).



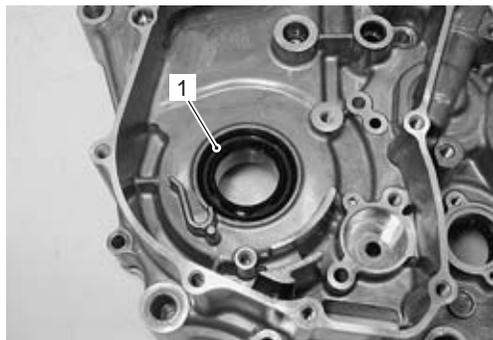
I933H1140230-01

**Crankshaft Oil Seal / Bearing Removal and Installation**

BA02J21406041

**Removal**

- 1) Disassemble the engine bottom side. Refer to "Engine Bottom Side Disassembly" (Page 1D-51).
- 2) Remove the left crankshaft oil seal (1) using a suitable tool.

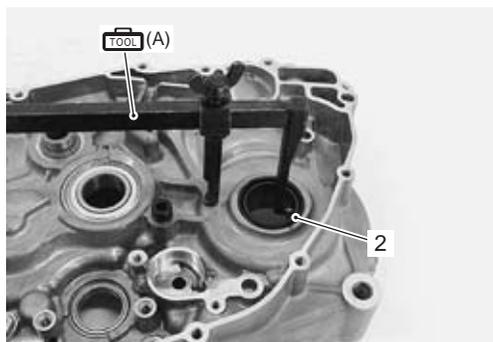


IA02J1140105-01

- 3) Remove the right crankshaft oil seal (2) using the special tool.

**Special tool**

**TOOL (A): 09913-50121 (Oil seal remover)**



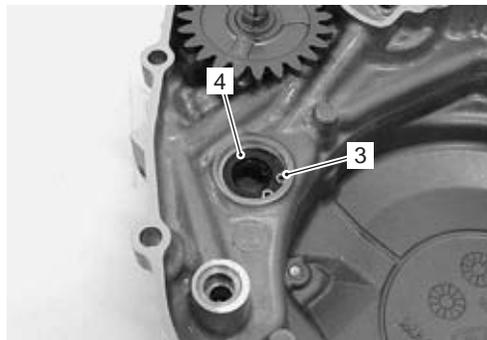
IA02J1140106-01

- 4) Remove the snap ring (3).

**Special tool**

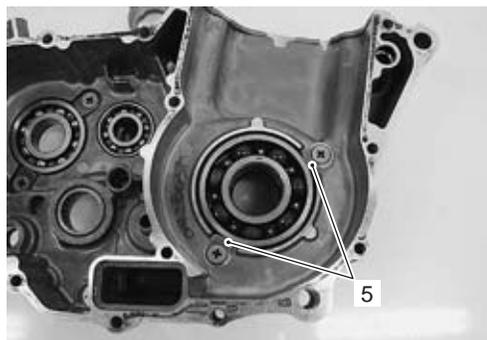
**TOOL : 09900-06108 (Snap ring remover (Close type))**

- 5) Remove the oil gallery oil seal (4) from the right crankcase cover using a suitable tool.

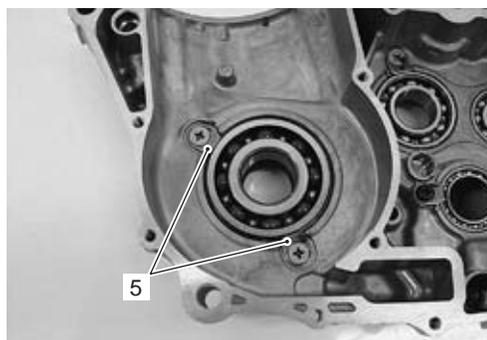


IA02J1140107-01

- 6) Remove the bearing retainers (5).



IA02J1140108-01

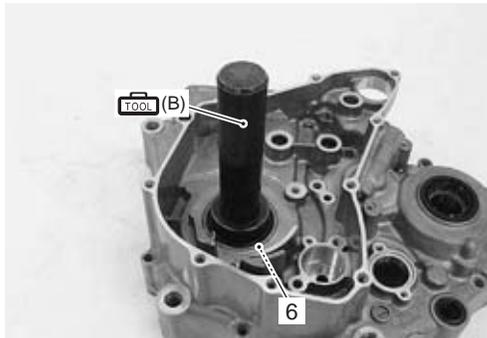


IA02J1140109-01

- 7) Remove the left crankcase bearing (6) using the special tool.

**Special tool**

 (B): 09913-70210 (Bearing installing set (10 - 75 Φ))

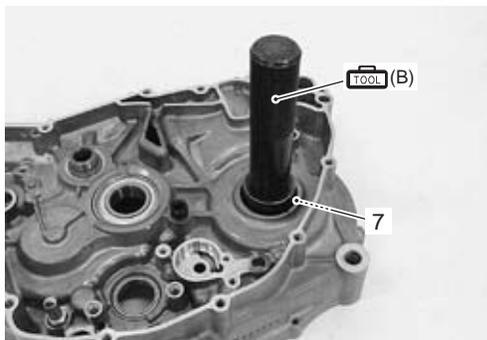


IA02J1140110-02

- 8) Remove the right crankcase bearing (7) using the special tool.

**Special tool**

 (B): 09913-70210 (Bearing installing set (10 - 75 Φ))



IA02J1140122-02

**Installation**

**⚠ CAUTION**

The removed oil seals and bearings must be replaced with new ones.

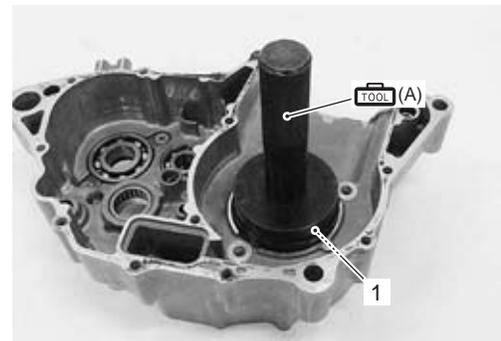
**NOTE**

The stepped side of the bearings face inside.

- 1) Install the left crankcase bearing (1) using the special tool.

**Special tool**

 (A): 09913-70210 (Bearing installing set (10 - 75 Φ))

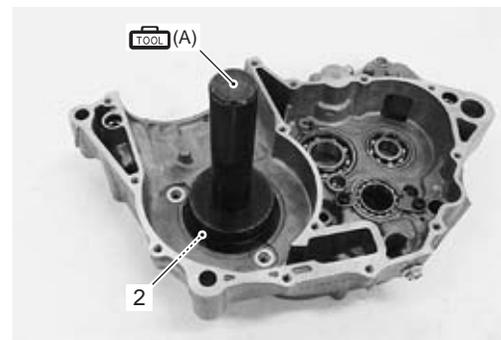


IA02J1140112-01

- 2) Install the right crankcase bearing (2) using the special tool.

**Special tool**

 (A): 09913-70210 (Bearing installing set (10 - 75 Φ))



IA02J1140111-01

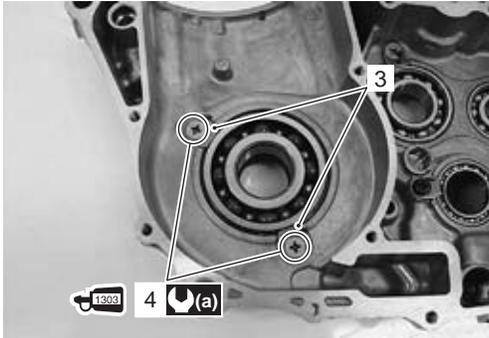
## 1D-65 Engine Mechanical:

- 3) Install the bearing retainers (3).
- 4) Apply a small quantity of thread lock to the bearing retainer screws (4), and tighten them to the specified torque.

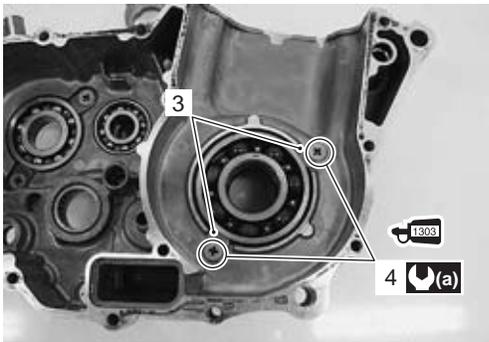
 : Thread lock cement 99000-32030 (THREAD LOCK CEMENT SUPER "1303" or equivalent)

### Tightening torque

Bearing retainer screw (a): 8.5 N-m (0.85 kgf-m, 6.0 lbf-ft)



IA02J1140113-01

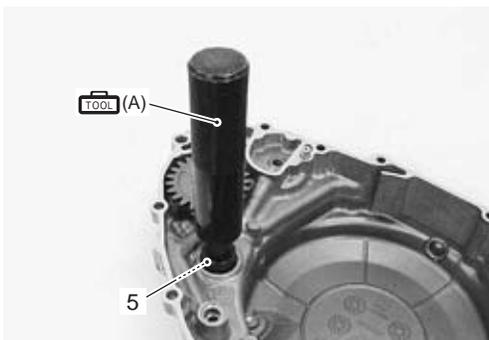


IA02J1140114-01

- 5) Install the oil gallery oil seal (5) to the right crankcase cover using the special tool.

### Special tool

 (A): 09913-70210 (Bearing installing set (10 - 75 Φ))



IA02J1140115-01

- 6) Apply grease to the oil seal lip.

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

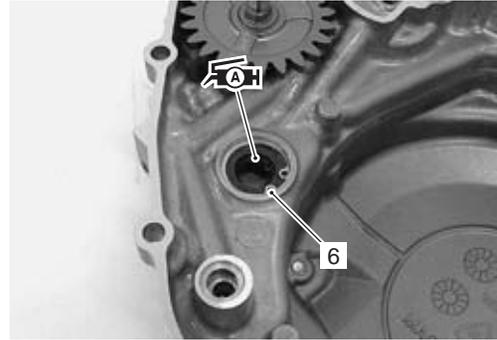
- 7) Install new snap ring (6).

### ⚠ CAUTION

The removed snap ring must be replaced with a new one.

### Special tool

 : 09900-06108 (Snap ring remover (Close type))

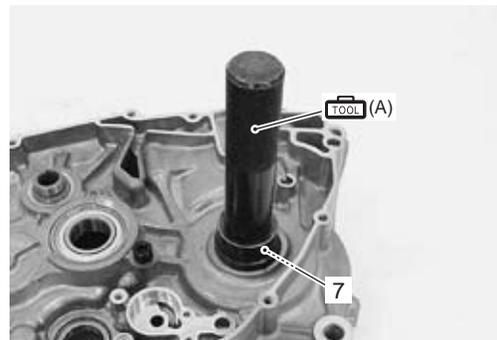


IA02J1140116-02

- 8) Install the right crankshaft oil seal (7) using the special tool.

### Special tool

 (A): 09913-70210 (Bearing installing set (10 - 75 Φ))



IA02J1140117-03

- 9) Install the left crankshaft oil seal after install the crankshaft. Refer to "Engine Bottom Side Assembly" (Page 1D-55).
- 10) Assemble the engine bottom side. Refer to "Engine Bottom Side Assembly" (Page 1D-55).

## Transmission Oil Seal / Bearing Inspection

BA02J21406042

Refer to "Transmission Oil Seal / Bearing Inspection" in Section 5B (Page 5B-8).

## Transmission Oil Seal / Bearing Removal and Installation

BA02J21406043

Refer to "Transmission Oil Seal / Bearing Removal and Installation" in Section 5B (Page 5B-8).

## Clutch Release Camshaft Oil Seal / Bearing Inspection

BA02J21406044

Refer to "Clutch Release Camshaft / Oil Seal / Bearing Inspection" in Section 5C (Page 5C-5).

## Clutch Release Camshaft Oil Seal / Bearing Removal and Installation

BA02J21406045

### Removal

- 1) Dismount the engine from the frame. Refer to "Engine Assembly Removal" (Page 1D-20).
- 2) Remove the clutch release camshaft. Refer to "Engine Bottom Side Disassembly" (Page 1D-51).
- 3) Remove the clutch release camshaft oil seal (1) using a suitable tool.



IA02J1140240-01

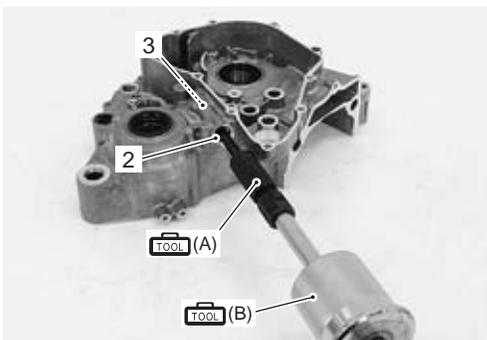
- 4) Remove the bearing (2) with the special tools.

#### Special tool

(A): 09921-20200 (Bearing remover (10 mm))

(B): 09930-30104 (Rotor remover sliding shaft)

- 5) Remove the bearing (3).



IA02J1140241-02

### Installation

- 1) Install new clutch release camshaft bearing (1) using a suitable bar.
- 2) Install new clutch release camshaft bearing (2) using the special tool.

#### Special tool

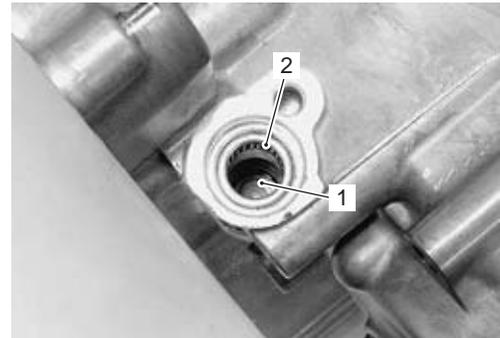
: 09913-70210 (Bearing installing set (10 - 75 Φ))

### ⚠ CAUTION

the removed bearings must be replaced with new ones.

### NOTE

Stamped mark side of the bearings should face upward.



IA02J1140242-01

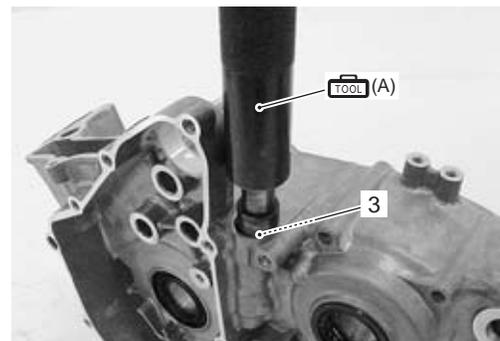
- 3) Install new oil seal (3) using the special tool.

### ⚠ CAUTION

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

#### Special tool

(A): 09913-70210 (Bearing installing set (10 - 75 Φ))



IA02J1140243-02

- 4) Install the clutch release camshaft. Refer to "Engine Bottom Side Assembly" (Page 1D-55).
- 5) install the engine to the frame. Refer to "Engine Assembly Installation" (Page 1D-24).

## Clutch Release Camshaft Removal and Installation

BA02J21406046

Refer to "Clutch Release Camshaft Removal and Installation" in Section 5C (Page 5C-4).

## Specifications

### Service Data

BA02J21407001

#### Valve + Valve Guide

Unit: mm (in)

Item	Standard		Limit
Valve diam.	IN.	36.0 (1.42)	—
	EX.	31.0 (1.22)	—
Valve clearance (When cold)	IN.	0.09 – 0.16 (0.004 – 0.006)	—
	EX.	0.17 – 0.24 (0.007 – 0.009)	—
Valve guide to valve stem clearance	IN.	0.010 – 0.037 (0.0004 – 0.0015)	—
	EX.	0.030 – 0.057 (0.0012 – 0.0022)	—
Valve stem deflection	IN. & EX.	—	0.25 (0.010)
Valve guide I.D.	IN. & EX.	5.500 – 5.512 (0.2165 – 0.2170)	—
Valve stem O.D.	IN.	5.475 – 5.490 (0.2156 – 0.2161)	—
	EX.	5.455 – 5.470 (0.2148 – 0.2154)	—
Valve stem runout	IN. & EX.	—	0.05 (0.002)
Valve head thickness	IN. & EX.	—	0.05 (0.002)
Valve seat width	IN. & EX.	0.9 – 1.1 (0.035 – 0.043)	—
Valve head radial runout	IN. & EX.	—	0.03 (0.001)
Valve spring free length	IN.	—	35.8 (1.41)
	EX.	—	35.2 (1.39)
Valve spring tension	IN.	146 – 168 N (14.9 – 17.1 kgf, 32.8 – 37.7 lbs) at length 30.9 mm (12.2 in)	—
	EX.	105 – 121 N (10.7 – 12.3 kgf, 23.6 – 27.2 lbs) at length 30.9 mm (12.2 in)	—

#### Camshaft + Cylinder Head

Unit: mm (in)

Item	Standard		Limit
Cam height	IN.	34.52 – 34.57 (1.359 – 1.361)	34.22 (1.347)
	EX.	34.28 – 34.33 (1.350 – 1.352)	33.98 (1.338)
Camshaft journal oil clearance	IN. & EX.	0.032 – 0.066 (0.001 – 0.002)	0.150 (0.0059)
Camshaft journal holder I.D.	IN. & EX.	22.012 – 22.025 (0.8667 – 0.8671)	—
Camshaft journal O.D.	IN. & EX.	21.959 – 21.980 (0.8645 – 0.8654)	—
Camshaft runout	—		0.10 (0.004)
Cam chain pin	14th pin		—
Cylinder head distortion	—		0.05 (0.002)

**Cylinder + Piston + Piston Ring**

Unit: mm (in)

Item	Standard		Limit
Compression pressure (Automatic decomp. actuated)	Approx. 400 kPa (4.0 kgf/cm <sup>2</sup> , 57 psi) and more		—
Piston to cylinder clearance	0.035 – 0.045 (0.0014 – 0.0018)		0.120 (0.0047)
Cylinder bore	96.000 – 96.015 (3.7795 – 3.7801)		Nicks or Scratches
Piston diam.	95.960 – 95.975 (3.7779 – 3.7785) Measure at 15 mm (0.6 in) from the skirt end.		95.880 (3.7748)
Cylinder distortion	16		0.05 (0.002)
Piston ring free end gap	1st	Approx. 8.7 (0.34)	7.0 (0.28)
Piston ring end gap	1st	0.20 – 0.30 (0.008 – 0.012)	0.50 (0.020)
Piston ring to groove clearance	1st	—	0.180 (0.007)
Piston ring groove width	1st	0.78 – 0.80 (0.0307 – 0.0315)	—
	Oil	1.30 – 1.32 (0.0512 – 0.0520)	—
Piston ring thickness	1st	2.01 – 2.03 (0.0791 – 0.0799)	—
		0.71 – 0.76 (0.0279 – 0.0299)	—
Piston pin bore	1.08 – 1.10 (0.0425 – 0.0433)		—
Piston pin bore	19.002 – 19.008 (0.7425 – 0.7433)		19.030 (0.7492)
Piston pin O.D.	18.995 – 19.000 (0.7478 – 0.7480)		18.980 (0.7472)

**Conrod + Crankshaft**

Unit: mm (in)

Item	Standard		Limit
Conrod small end I.D.	19.010 – 19.018 (0.7484 – 0.7487)		19.040 (0.7496)
Conrod deflection	—		3.0 (0.12)
Conrod big end side clearance	0.20 – 0.65 (0.008 – 0.026)		1.0 (0.04)
Conrod big end width	19.75 – 19.80 (0.778 – 0.780)		—
Crank web to web width	61.9 – 62.1 (2.437 – 2.445)		—
Crankshaft runout	—		0.08 (0.003)

## Tightening Torque Specifications

Fastening part	Tightening torque			Note
	N-m	kgf-m	lbf-ft	
Cable adjuster lock nut	2.1	0.21	1.5	☞ (Page 1D-16)
Condenser bracket bolt	10	1.0	7.0	☞ (Page 1D-18)
IAP sensor mounting screw	1.5	0.15		☞ (Page 1D-18)
Fuel pipe mounting bolt	3.5	0.35	2.5	☞ (Page 1D-19)
L-joint mounting screw	3.5	0.35	2.5	☞ (Page 1D-19)
TP sensor mounting screw	3.5	0.35	2.5	☞ (Page 1D-20)
Engine sprocket cover bolt	11	1.1	8.0	☞ (Page 1D-26)
Cylinder head bolt (Initial)	25	2.5	18.0	☞ (Page 1D-32)
Cylinder head bolt (Final)	51	5.1	37.0	☞ (Page 1D-32)
Cylinder head base bolt	10	1.0	7.0	☞ (Page 1D-32)
Cylinder base bolt	10	1.0	7.0	☞ (Page 1D-32)
Upper engine mounting bracket bolt	40	4.0	29.0	☞ (Page 1D-32) / ☞ (Page 1D-35)
Engine mounting bolt	55	5.5	40.0	☞ (Page 1D-32) / ☞ (Page 1D-35)
Camshaft journal holder bolt (a) (L45)	10	1.0	7.0	☞ (Page 1D-34)
Camshaft journal holder bolt (b) (L40)	10	1.0	7.0	☞ (Page 1D-34)
Cam chain tension adjuster mounting bolt	10	1.0	7.0	☞ (Page 1D-34)
Cam chain tension adjuster cap bolt	23	2.3	16.5	☞ (Page 1D-35)
TDC plug	14	1.4	10.0	☞ (Page 1D-35)
Crankshaft hole plug	11	1.1	8.0	☞ (Page 1D-35)
Cylinder head cover bolt	14	1.4	10.0	☞ (Page 1D-36)
Camshaft journal holder bolt (L45)	10	1.0	7.0	☞ (Page 1D-37)
Camshaft journal holder bolt (L40)	10	1.0	7.0	☞ (Page 1D-37)
Cam chain tensioner bolt	10	1.0	7.0	☞ (Page 1D-39) / ☞ (Page 1D-60)
Oil gallery plug (Cylinder head)	10	1.0	7.0	☞ (Page 1D-41)
Intake pipe mounting screw	8.5	0.85	6.0	☞ (Page 1D-41)
ECT sensor	12	1.2	8.5	☞ (Page 1D-41)
Crankcase bolt	11	1.1	8.0	☞ (Page 1D-57)
Oil strainer cap	21	2.1	15.0	☞ (Page 1D-57)
Primary drive gear nut	90	9.0	65.0	☞ (Page 1D-59)
Right crankcase cover bolt	11	1.1	8.0	☞ (Page 1D-59)
Cam chain guide retainer bolt	10	1.0	7.0	☞ (Page 1D-60)
Bearing retainer screw	8.5	0.85	6.0	☞ (Page 1D-65)

**NOTE**

The specified tightening torque is described in the following.

“Throttle Cable Routing Diagram” (Page 1D-2)

“Throttle Body Components” (Page 1D-11)

“Throttle Body Construction” (Page 1D-12)

“Engine Assembly Installation” (Page 1D-24)

**Reference:**

For the tightening torque of fastener not specified in this section, refer to “Tightening Torque List” in Section 0C (Page 0C-8).

## Special Tools and Equipment

### Recommended Service Material

BA02J21408001

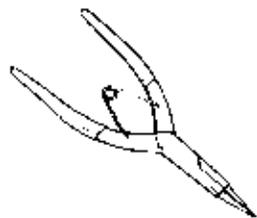
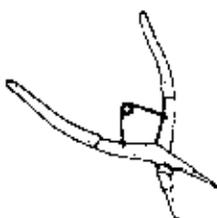
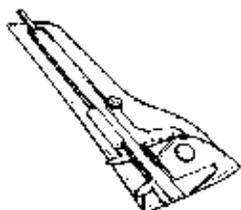
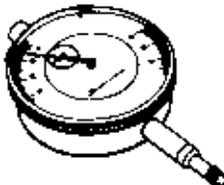
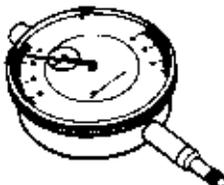
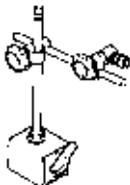
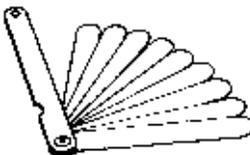
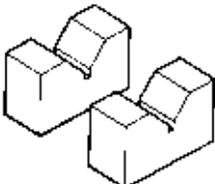
Material	SUZUKI recommended product or Specification		Note
Grease	SUZUKI SUPER GREASE "A" or equivalent	P/No.: 99000-25010	☞ (Page 1D-10) / ☞ (Page 1D-20) / ☞ (Page 1D-34) / ☞ (Page 1D-35) / ☞ (Page 1D-41) / ☞ (Page 1D-56) / ☞ (Page 1D-57) / ☞ (Page 1D-58) / ☞ (Page 1D-58) / ☞ (Page 1D-65)
Moly paste	SUZUKI MOLY PASTE or equivalent	P/No.: 99000-25140	☞ (Page 1D-58)
Molybdenum oil	MOLYBDENUM OIL SOLUTION	—	☞ (Page 1D-30) / ☞ (Page 1D-31) / ☞ (Page 1D-33) / ☞ (Page 1D-41) / ☞ (Page 1D-42) / ☞ (Page 1D-42)
Sealant	SUZUKI BOND No.1215 or equivalent	P/No.: 99000-31110	☞ (Page 1D-30)
	SUZUKI BOND No.1207B or equivalent	P/No.: 99000-31140	☞ (Page 1D-36)
Thread lock cement	THREAD LOCK CEMENT SUPER "1303" or equivalent	P/No.: 99000-32030	☞ (Page 1D-65)
	THREAD LOCK CEMENT "1342" or equivalent	P/No.: 99000-32050	☞ (Page 1D-26)
	THREAD LOCK CEMENT SUPER "1322" or equivalent	P/No.: 99000-32110	☞ (Page 1D-58)

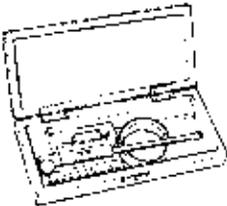
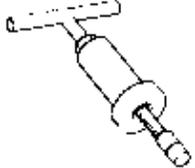
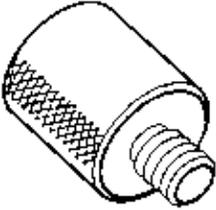
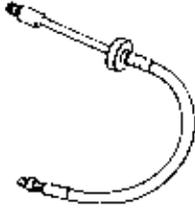
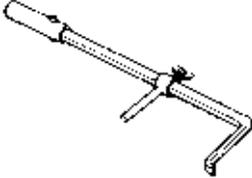
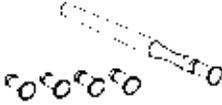
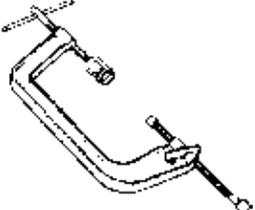
#### NOTE

Required service material is also described in the following.

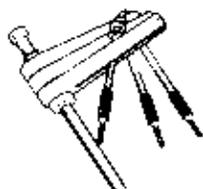
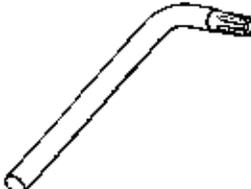
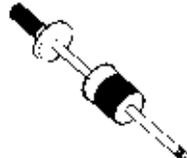
"Throttle Body Components" (Page 1D-11)

Special Tool

<p>09900-06107 Snap ring remover (Open type) ☞ (Page 1D-22) / ☞ (Page 1D-26)</p>		<p>09900-06108 Snap ring remover (Close type) ☞ (Page 1D-63) / ☞ (Page 1D-65)</p>	
<p>09900-20101 Vernier calipers (150 mm) ☞ (Page 1D-43) / ☞ (Page 1D-45) / ☞ (Page 1D-51)</p>		<p>09900-20202 Micrometer (25 – 50 mm) ☞ (Page 1D-37)</p>	
<p>09900-20204 Micrometer (75 – 100 mm) ☞ (Page 1D-50)</p>		<p>09900-20205 Micrometer (0 – 25 mm) ☞ (Page 1D-38) / ☞ (Page 1D-44) / ☞ (Page 1D-50) / ☞ (Page 1D-51)</p>	
<p>09900-20530 Cylinder gauge set ☞ (Page 1D-48)</p>		<p>09900-20602 Dial gauge ☞ (Page 1D-38) / ☞ (Page 1D-51)</p>	
<p>09900-20605 Dial calipers (10 – 34 mm) ☞ (Page 1D-61)</p>		<p>09900-20607 Dial gauge ☞ (Page 1D-43) / ☞ (Page 1D-43) / ☞ (Page 1D-44) / ☞ (Page 1D-61) / ☞ (Page 1D-62)</p>	
<p>09900-20701 Dial gauge chuck ☞ (Page 1D-43) / ☞ (Page 1D-43) / ☞ (Page 1D-44) / ☞ (Page 1D-61) / ☞ (Page 1D-62)</p>		<p>09900-20803 Thickness gauge ☞ (Page 1D-43) / ☞ (Page 1D-48) / ☞ (Page 1D-50) / ☞ (Page 1D-51) / ☞ (Page 1D-62)</p>	
<p>09900-21304 V blocks ☞ (Page 1D-43) / ☞ (Page 1D-43) / ☞ (Page 1D-61) / ☞ (Page 1D-62)</p>		<p>09900-22301 Plastigage (0.025 – 0.076 mm) ☞ (Page 1D-37)</p>	

<p>09900–22302 Plastigage (0.051 – 0.152 mm) ☞ (Page 1D-37)</p> 	<p>09900–22403 Small bore gauge (18 – 35 mm) ☞ (Page 1D-38) / ☞ (Page 1D-51)</p> 
<p>09900–26006 Engine tachometer ☞ (Page 1D-14)</p> 	<p>09910–32812 Crankshaft installer ☞ (Page 1D-56)</p> 
<p>09911–11310 Crankshaft installer attachment C ☞ (Page 1D-56)</p> 	<p>09913–10750 Compression gauge adapter ☞ (Page 1D-4)</p> 
<p>09913–50121 Oil seal remover ☞ (Page 1D-63)</p> 	<p>09913–70210 Bearing installing set (10 – 75 Φ) ☞ (Page 1D-56) / ☞ (Page 1D-64) / ☞ (Page 1D-64) / ☞ (Page 1D-64) / ☞ (Page 1D-64) / ☞ (Page 1D-65) / ☞ (Page 1D-65) / ☞ (Page 1D-66) / ☞ (Page 1D-66)</p> 
<p>09914–61010 Gear holder ☞ (Page 1D-53) / ☞ (Page 1D-59)</p> 	<p>09915–64512 Compression gauge ☞ (Page 1D-4)</p> 
<p>09916–10911 Valve lapper set ☞ (Page 1D-45)</p> 	<p>09916–14510 Valve lifter ☞ (Page 1D-40) / ☞ (Page 1D-42)</p> 
<p>09916–14910 Valve lifter attachment ☞ (Page 1D-40) / ☞ (Page 1D-42)</p> 	<p>09916–34542 Reamer handle ☞ (Page 1D-46) / ☞ (Page 1D-47)</p> 

**1D-73 Engine Mechanical:**

<p>09916-34550 Valve guide reamer (5.5 mm) ☞ (Page 1D-47)</p>	 <p>09916-34580 Valve guide reamer (10.8 mm) ☞ (Page 1D-46)</p> 
<p>09916-44310 Valve guide installer &amp; remover ☞ (Page 1D-46) / ☞ (Page 1D-47)</p>	 <p>09916-53360 Valve guide installer attachment ☞ (Page 1D-47)</p> 
<p>09916-84511 Tweezer ☞ (Page 1D-40) / ☞ (Page 1D-42)</p>	 <p>09919-28610 Sleeve protector ☞ (Page 1D-39) / ☞ (Page 1D-42)</p> 
<p>09920-13120 Crankshaft remover ☞ (Page 1D-54) / ☞ (Page 1D-55)</p>	 <p>09921-20200 Bearing remover (10 mm) ☞ (Page 1D-66)</p> 
<p>09930-11950 Torx wrench (T25H) ☞ (Page 1D-17) / ☞ (Page 1D-20)</p>	 <p>09930-30104 Rotor remover sliding shaft ☞ (Page 1D-66)</p> 
<p>09930-35010 Rotor remover ☞ (Page 1D-56)</p>	

# Engine Lubrication System

## Precautions

### Precautions for Engine Oil

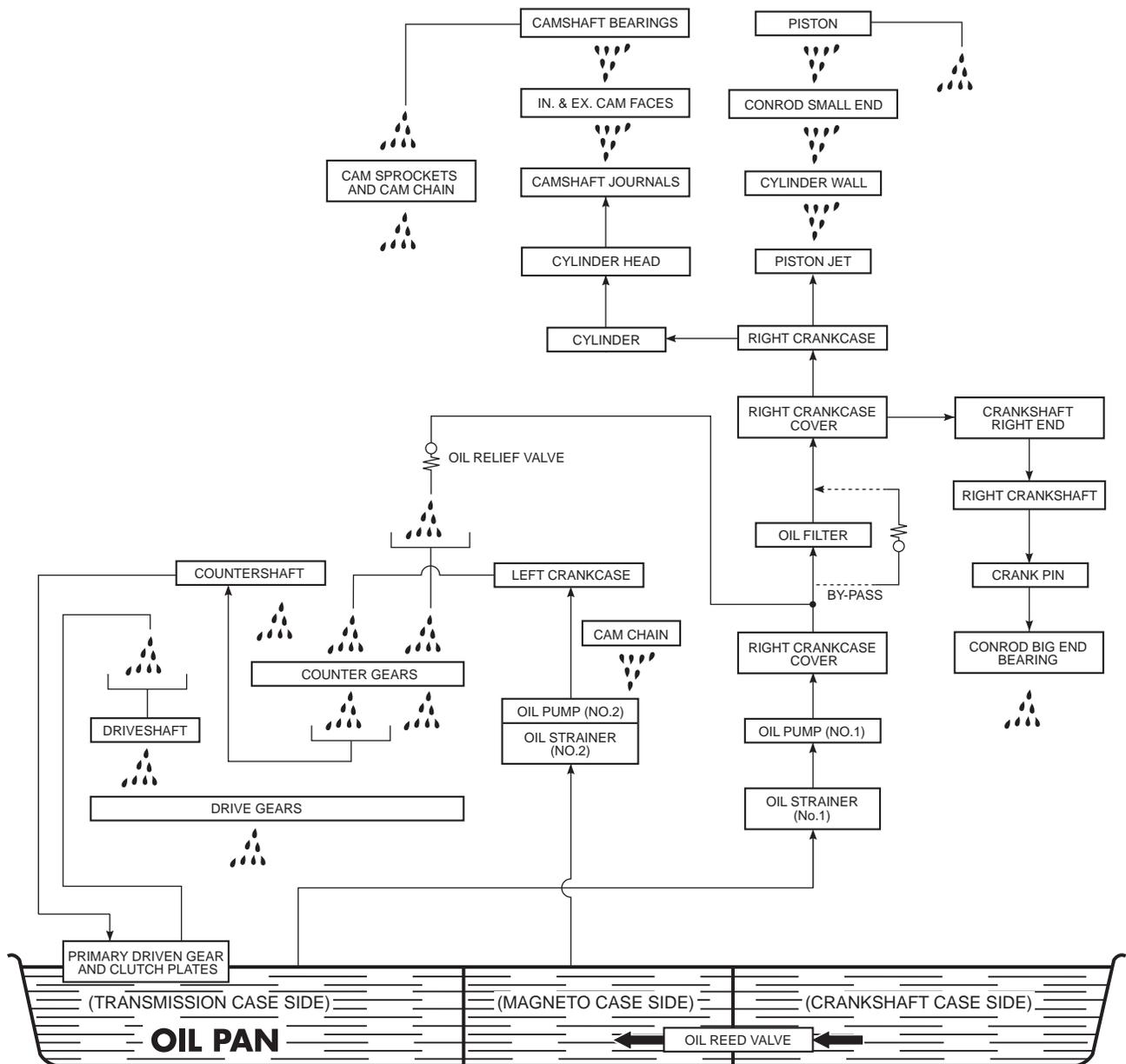
Refer to "Fuel and Oil Recommendation" in Section 0A (Page 0A-3).

BA02J2150001

## Schematic and Routing Diagram

### Engine Lubrication System Chart Diagram

BA02J21502001



IA02J1150030-02

## Diagnostic Information and Procedures

### Engine Lubrication Symptom Diagnosis

BA02J21504001

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.
	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

BA02J21504002

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 Filter Replacement” in Section 0B (Page 0B-7).)
- Oil leaks (If leak is found, repair it.)
- Oil quality (If oil is discolored or deteriorated, replace it.)

- 1) Remove the oil gallery plug (1).

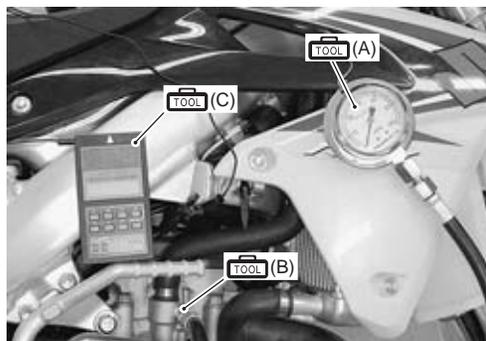


IA02J1150001-01

- 2) Install the oil pressure gauge and attachment into the main oil gallery.
- 3) Connect the multi circuit tester or tachometer to the high-tension cord.

#### Special tool

- (A): 09915-74511 (Oil pressure gauge set)
- (B): 09940-40211 (Fuel pressure gauge adapter)
- (C): 09900-26006 (Engine tachometer)



IA02J1150002-03

- 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 4 000 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

**50 kPa (0.5 kgf/cm<sup>2</sup>, 7.1 psi) at 4 000 r/min, Oil temp. at 50 °C (122 °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>

- 6) Stop the engine and remove the oil pressure gauge and attachment.
- 7) Reinstall the main oil gallery plug (1) and tighten it to the specified torque.

**⚠ CAUTION**

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

**Tightening torque**

**Oil gallery plug (a): 10 N·m (1.0 kgf·m, 7.0 lbf·ft)**



IA02J1150003-01

- 8) Check the engine oil level. Refer to “Engine Oil Filter Replacement” in Section 0B (Page 0B-7).

## Repair Instructions

### Engine Oil and Filter Replacement

BA02J21506001

Refer to “Engine Oil Filter Replacement” in Section 0B (Page 0B-7).

### Engine Oil Level Inspection

BA02J21506002

Refer to “Engine Oil Filter Replacement” in Section 0B (Page 0B-7).

### Oil Strainer No. 1 Removal and Installation

BA02J21506003

Refer to “Oil Strainer Inspection” in Section 0B (Page 0B-8).

### Oil Pump No. 2 Strainer Removal and Installation

BA02J21506004

Refer to “Oil Pump No. 1 Removal and Installation” (Page 1E-3).

### Oil Strainer Inspection and Cleaning

BA02J21506005

Refer to “Oil Strainer Inspection” in Section 0B (Page 0B-8).

**NOTE**

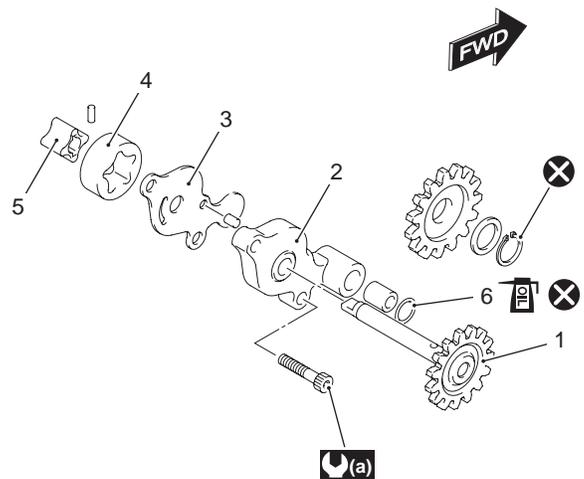
**When the filter is dirtied excessively, replace the oil sump filter with a new one.**



IA02J1150004-01

### Oil Pump No. 1 Components

BA02J21506006



IA02J1150005-01

1. Oil pump driven gear	6. O-ring
2. Oil pump No. 1 cover	: 5.5 N·m (0.55 kgf·m, 4.0 lbf·ft)
3. Oil pump No. 1 plate	: Apply engine oil.
4. Outer rotor	: Do not reuse.
5. Inner rotor	

### Oil Pump No. 1 Removal and Installation

BA02J21506007

#### Removal

- 1) Drain engine oil and coolant. Refer to “Engine Oil Inspection and Replacement” in Section 0B (Page 0B-5) and “Cooling System Inspection” in Section 0B (Page 0B-9).
- 2) Remove the clutch primary driven gear assembly. Refer to “Clutch Removal” in Section 5C (Page 5C-7).

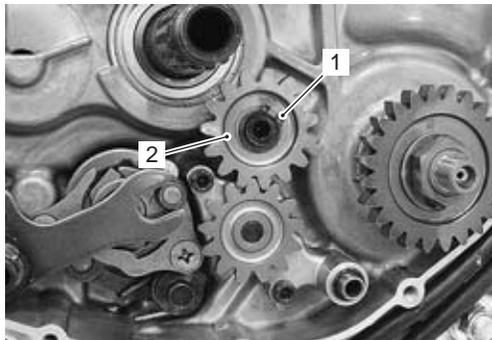
## 1E-4 Engine Lubrication System:

3) Remove the snap ring (1).

### Special tool

 : 09900-06107 (Snap ring remover (Open type))

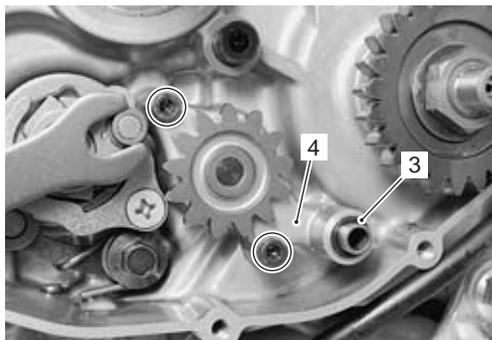
4) Remove the oil pump idle gear (2).



IA02J1150006-01

5) Remove the O-ring (3).

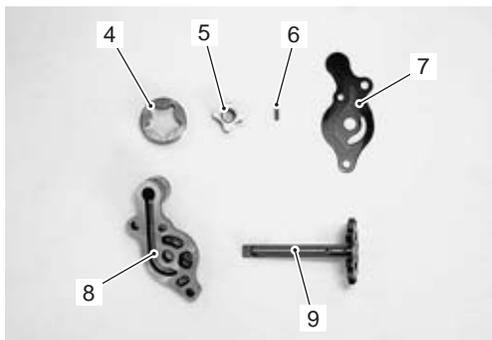
6) Remove the oil pump No. 1 assembly (4).



IA02J1150007-01

7) Remove the following parts from the oil pump No. 1 (3).

- Outer rotor (4)
- Inner rotor (5)
- Pin (6)
- Oil pump No. 1 plate (7)
- Oil pump No. 1 cover (8)
- Oil pump driven gear shaft (9)



IA02J1150008-01

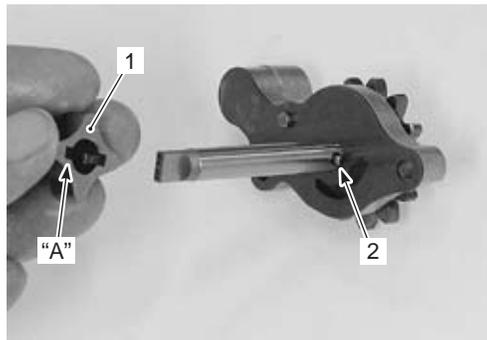
### Installation

Install the oil pump No. 1 in the reverse order of removal. Pay attention to the following points:

#### CAUTION

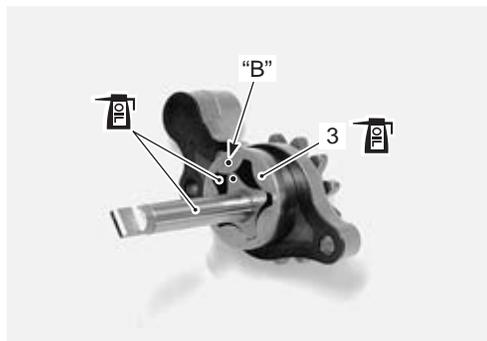
**The removed snap ring and O-ring must be replaced with new ones.**

- When installing the inner rotor (1), align the pin (2) with the groove "A".



IA02J1150009-01

- When installing the outer rotor (3), face the punched mark "B" on the outer rotor (3) to the crankcase side.
- Apply engine oil to the sliding surfaces of the oil pump inner rotor, outer rotor and shaft.



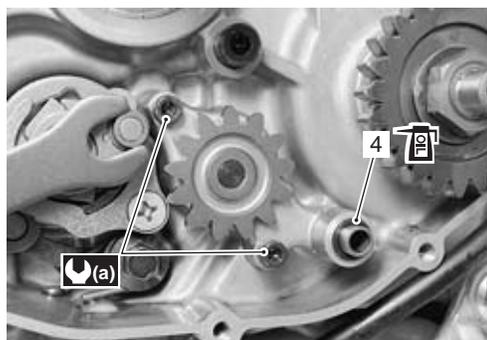
IA02J1150010-02

- Tighten the oil pump No. 1 bolts to the specified torque.

#### Tightening torque

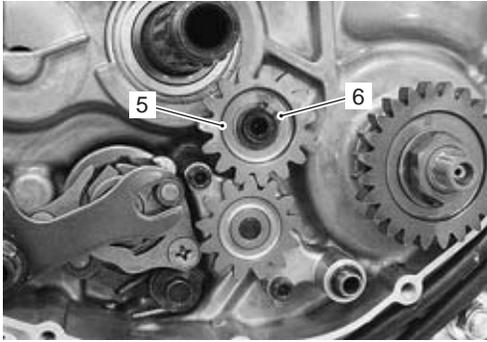
**Oil pump No. 1 bolt (a): 5.5 N-m (0.55 kgf-m, 4.0 lbf-ft)**

- Apply engine oil to the O-ring (4).



IA02J1150011-01

- Install the oil pump idle gear (5) and snap ring (6).

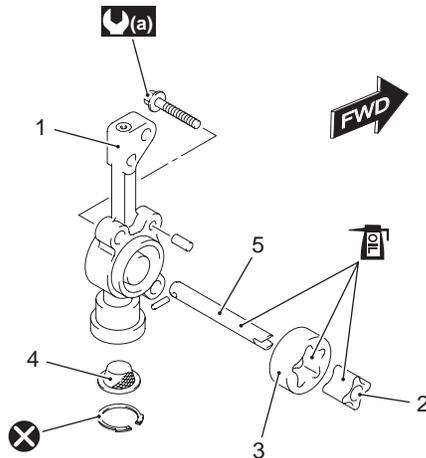


IA02J1150033-01

- Reinstall the clutch. Refer to "Clutch Installation" in Section 5C (Page 5C-8).

### Oil Pump No. 2 Components

BA02J21506008



IA02J1150012-02

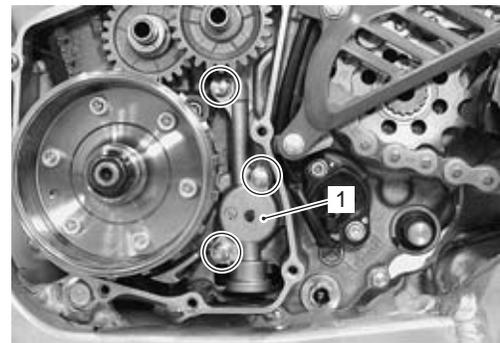
1. Oil pump No. 2	5. Oil pump No. 2 shaft
2. Inner rotor	: 11 N·m (1.1 kgf-m, 8.0 lbf-ft)
3. Outer rotor	: Apply engine oil.
4. Oil pump No. 2 strainer	: Do not reuse.

### Oil Pump No. 2 Removal and Installation

BA02J21506009

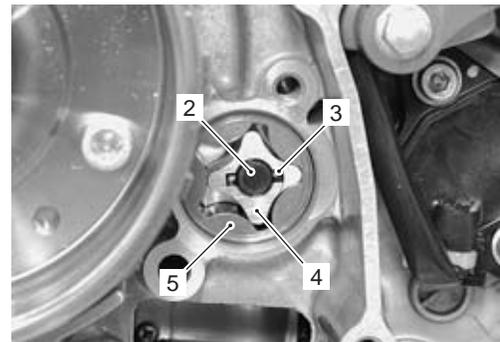
#### Removal

- 1) Drain the engine oil. Refer to "Engine Oil Inspection and Replacement" in Section 0B (Page 0B-5).
- 2) Remove the generator cover. Refer to "Generator Removal and Installation" in Section 1J (Page 1J-5).
- 3) Remove the oil pump No. 2 (1).



IA02J1150013-01

- 4) Remove the oil pump No. 2 shaft (2), pin (3), inner rotor (4) and outer rotor (5).



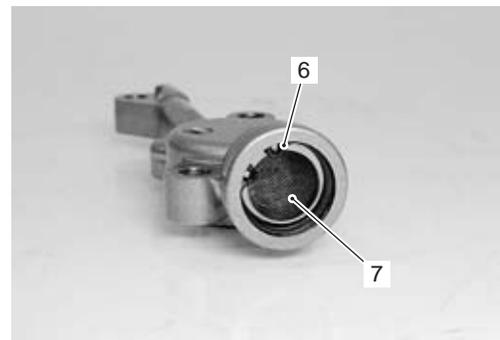
IA02J1150014-01

- 5) Remove the snap ring (6) with the special tool.

#### Special tool

: 09900-06108 (Snap ring remover (Close type))

- 6) Remove the oil pump No. 2 strainer (7).



IA02J1150015-01

## 1E-6 Engine Lubrication System:

### Installation

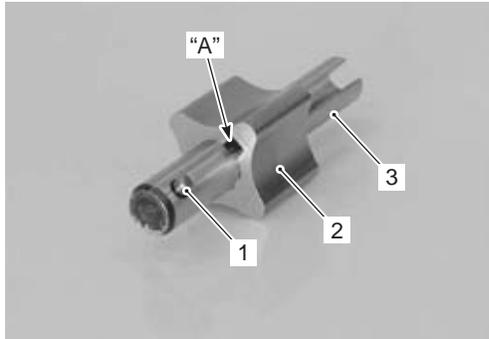
#### ⚠ CAUTION

The removed snap ring must be replaced with a new one.

- Install the pin (1) and inner rotor (2) to the oil pump No. 2 shaft (3).

#### NOTE

Fit the groove "A" of the inner rotor onto the pin (1).

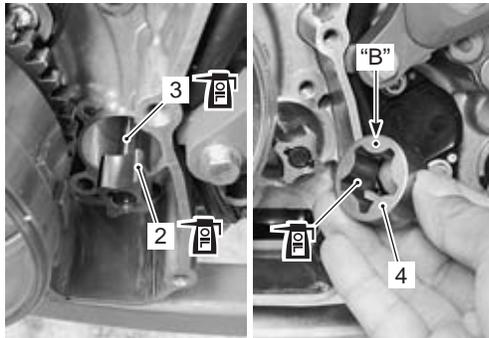


IA02J1150016-01

- Apply engine oil to the oil pump No. 2 shaft (3) and inner rotor (2) and install them.
- Apply engine oil to the outer rotor (4) and install it.

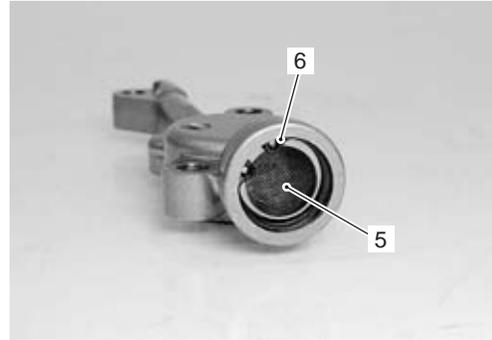
#### NOTE

Face the punch mark "B" to the crankcase side.



IA02J1150017-02

- Install the oil pump No. 2 strainer (5) and snap ring (6).

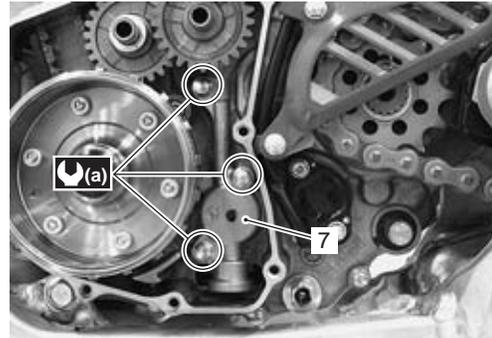


IA02J1150018-01

- Install the oil pump No. 2 (7) and tighten the oil pump No. 2 bolts to the specified torque.

#### Tightening torque

Oil pump No. 2 bolt (a): 11 N·m (1.1 kgf-m, 8.0 lbf-ft)



IA02J1150019-01

- Install the generator cover. Refer to "Generator Removal and Installation" in Section 1J (Page 1J-5).

### Oil Pump Inspection

BA02J21506010

Inspect the oil pump in the following procedures:

#### Oil Pump No. 1

- 1) Remove the oil pump No. 1. Refer to "Oil Pump No. 1 Removal and Installation" (Page 1E-3).
- 2) Inspect the oil pump parts for any defects or wear. If any defects are found, replace the defective parts with a new one.



IA02J1150020-01

### Oil Pump No. 2

- 1) Remove the oil pump No. 2. Refer to "Oil Pump No. 2 Removal and Installation" (Page 1E-5).
- 2) Inspect the oil pump parts for any defects or wear. If any defects are found, replace the defective parts with a new one.



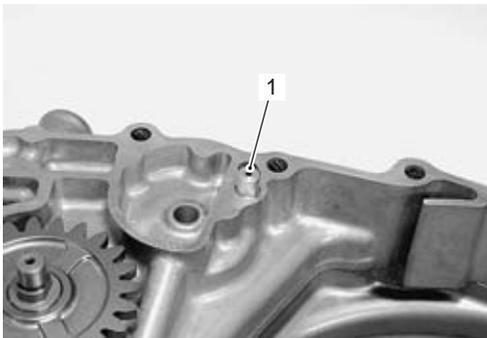
IA02J1150021-01

### Oil Relief Valve Removal and Installation

BA02J21506011

#### Removal

- 1) Remove the right crankcase cover. Refer to "Kick Starter Removal and Installation" in Section 11 (Page 1I-15).
- 2) Remove the oil relief valve (1) from the right crankcase cover.



IA02J1150022-01

#### Installation

- 1) Apply engine oil to the O-ring (1) and press in the oil relief valve to the right crankcase cover.

**⚠ CAUTION**

**Replace the O-ring (1) with a new one.**



IA02J1150023-01

- 2) Install the right crankcase cover. Refer to "Kick Starter Removal and Installation" in Section 11 (Page 1I-15).

### Oil Relief Valve Inspection

BA02J21506012

- Inspect the oil relief valve. Refer to "Oil Relief Valve Removal and Installation" (Page 1E-7).
- Inspect the operation of the oil relief valve by pushing on the piston with a proper bar. If the piston does not operate, replace the oil relief valve with a new one.



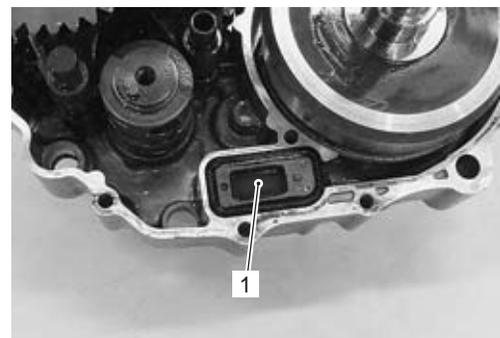
IA02J1150024-01

### Oil Reed Valve Removal and Installation

BA02J21506013

#### Removal

- 1) Separate the left and right crankcase. Refer to "Engine Bottom Side Disassembly" in Section 1D (Page 1D-51).
- 2) Remove the oil reed valve (1).



IA02J1150025-01

## 1E-8 Engine Lubrication System:

### Installation

Install the oil reed valve and assemble the crankcase. Refer to “Engine Bottom Side Assembly” in Section 1D (Page 1D-55).

### Oil Reed Valve Inspection

BA02J21506014

Inspect the oil reed valve in the following procedures:

- Remove the oil reed valve. Refer to “Oil Reed Valve Removal and Installation” (Page 1E-7).
- Inspect the oil reed valve for wear and damage. If any defects are found, replace the oil reed valve with a new one.



IA02J1150026-01

### Oil Gallery Oil Seal Removal and Installation

BA02J21506015

Refer to “Crankshaft Oil Seal / Bearing Inspection” in Section 1D (Page 1D-62).

### Oil Gallery Oil Seal Inspection

BA02J21506016

Refer to “Crankshaft Oil Seal / Bearing Removal and Installation” in Section 1D (Page 1D-63).

## Specifications

### Service Data

BA02J21507001

#### Oil Pump

Item	Standard	Limit
Oil pressure (at 50 °C, 122 °F)	50 kPa (0.5 kgf/cm <sup>2</sup> , 7.1 psi) and more at 4 000 r/min	—

### Tightening Torque Specifications

BA02J21507002

Fastening part	Tightening torque			Note
	N·m	kgf·m	lbf·ft	
Oil gallery plug	10	1.0	7.0	☞ (Page 1E-3)
Oil pump No. 1 bolt	5.5	0.55	4.0	☞ (Page 1E-4)
Oil pump No. 2 bolt	11	1.1	8.0	☞ (Page 1E-6)

### NOTE

The specified tightening torque is described in the following.

“Oil Pump No. 1 Components” (Page 1E-3)

“Oil Pump No. 2 Components” (Page 1E-5)

### Reference:

For the tightening torque of fastener not specified in this section, refer to “Tightening Torque List” in Section 0C (Page 0C-8).

## Special Tools and Equipment

### Recommended Service Material

BA02J21508001

#### NOTE

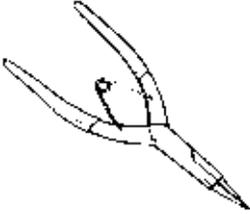
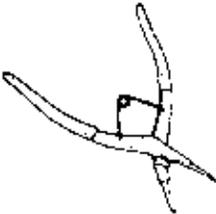
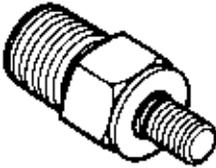
Required service material is also described in the following.

“Oil Pump No. 1 Components” (Page 1E-3)

“Oil Pump No. 2 Components” (Page 1E-5)

### Special Tool

BA02J21508002

<p>09900-06107 Snap ring remover (Open type) ☞ (Page 1E-4)</p> 	<p>09900-06108 Snap ring remover (Close type) ☞ (Page 1E-5)</p> 
<p>09900-26006 Engine tachometer ☞ (Page 1E-2)</p> 	<p>09915-74511 Oil pressure gauge (600 kPa) ☞ (Page 1E-2)</p> 
<p>09940-40211 Fuel pressure gauge adapter ☞ (Page 1E-2)</p> 	

# Engine Cooling System

## Precautions

### Precautions for Engine Cooling System

BA02J2160001

#### **▲ 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

BA02J2160002

Refer to “Engine Coolant Recommendation” in Section 0A (Page 0A-4).

## General Description

### Engine Coolant Description

BA02J21601001

#### ⚠ CAUTION

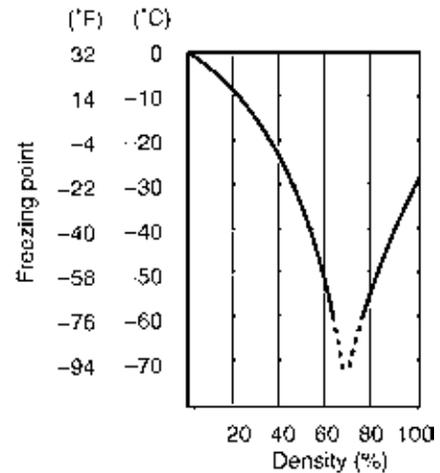
- Use a high quality ethylene glycol base anti-freeze, mixed with distilled water. Do not mix an alcohol base anti-freeze and different brands of anti-freeze.
- Do not put in more than 60% anti-freeze or less than 50%. (Refer to Fig. 1 and 2.)

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

#### Anti-freeze Proportioning Chart

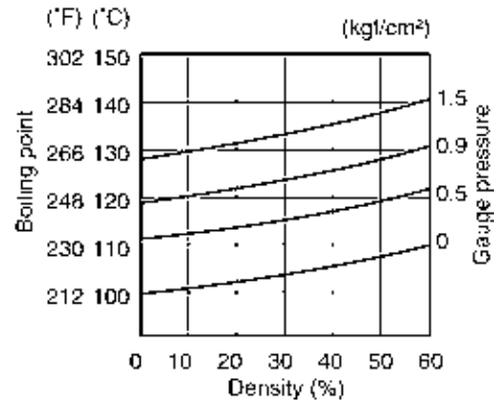
Anti-freeze density	Freezing point
50%	$-31\text{ }^{\circ}\text{C}$ ( $-24\text{ }^{\circ}\text{F}$ )
55%	$-40\text{ }^{\circ}\text{C}$ ( $-40\text{ }^{\circ}\text{F}$ )
60%	$-55\text{ }^{\circ}\text{C}$ ( $-67\text{ }^{\circ}\text{F}$ )

Fig.1: Engine coolant density-freezing point curve



I310G1160001-01

Fig.2: Engine coolant density-boiling point curve

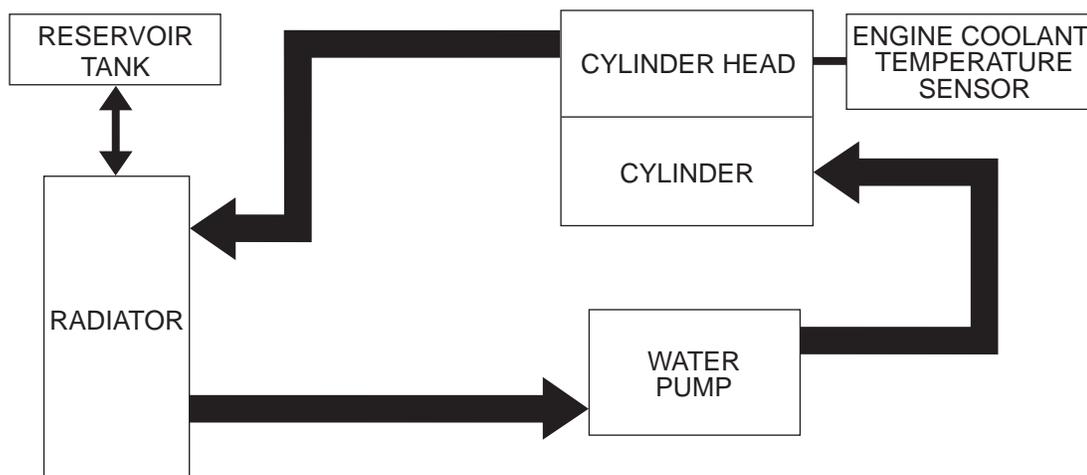


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## Schematic and Routing Diagram

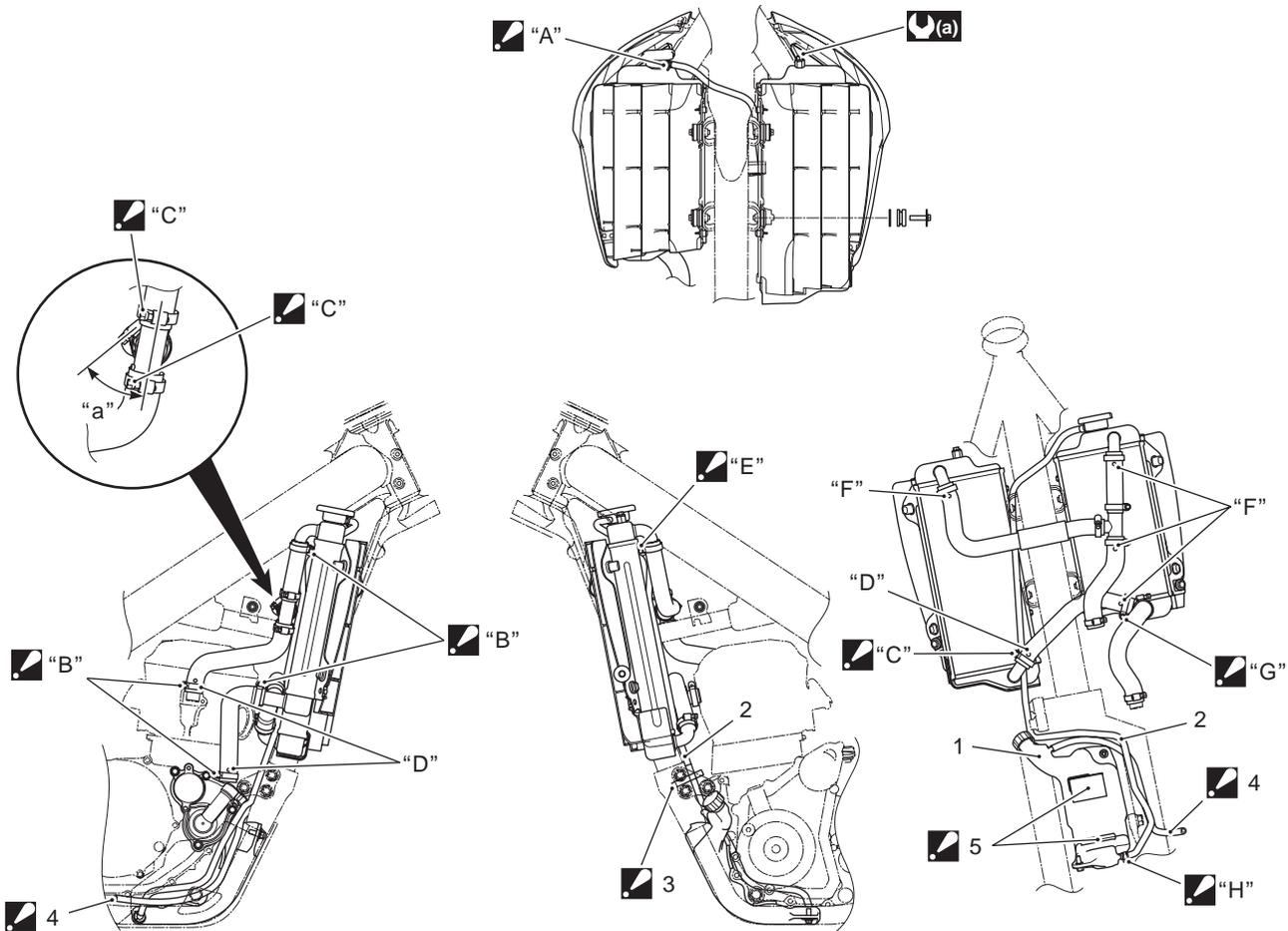
### Cooling Circuit Diagram

BA02J21602001



IA02J1160001-01

Water Hose Routing Diagram



IA02J1160033-04

1. Reservoir tank	▲ "A": Face the hose clamp end forward.	"F": White marking
2. Reservoir tank inlet hose	▲ "B": Face the screw head to the right side.	▲ "G": Face the screw head forward.
▲ 3. Clamp : Bind the reservoir tank inlet hose and magneto lead wire to the front engine mounting bracket (LH) with the clamp.	▲ "C": Face the screw head backward.	▲ "H": Face the clamp end backward.
▲ 4. Put out the end of reservoir tank overflow hose from the protector.	"D": Blue marking	"a": 39°
▲ 5. Cushion : Stick the cushions on the reservoir tank along the lines on the surface.	▲ "E": Face the screw head to the left side.	(a) : 6 N-m (0.6 kgf-m, 4.5 lbf-ft)

## Diagnostic Information and Procedures

### Engine Cooling Symptom Diagnosis

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.
	Clogged engine coolant passage.	Clean.
	Air trapped in the cooling circuit.	Bleed air.
	Defective water pump.	Replace.
	Use of incorrect engine coolant.	Replace.
	Defective ECT sensor.	Replace.
	Defective ECM.	Replace.
<b>Engine over cools</b>	Extremely cold weather.	Put on radiator cover.
	Defective ECT sensor.	Replace.
	Defective ECM.	Replace.

## Repair Instructions

### Cooling Circuit Inspection

BA02J21606001

#### **⚠ WARNING**

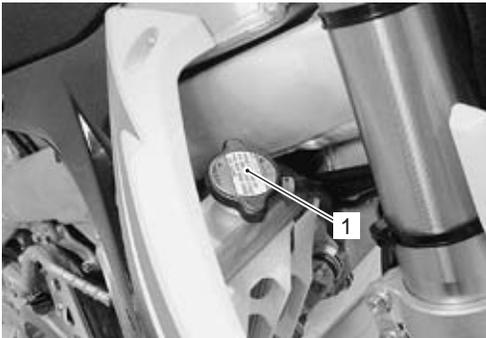
- Do not open the radiator cap when the engine is hot, as you may be injured by escaping hot liquid or vapor.
- When removing the radiator cap tester, put a rag on the filler to prevent the engine coolant from spraying out.

Inspect the cooling circuit in the following procedures:

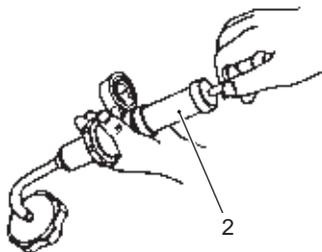
- 1) Remove the radiator cap (1) and connect the radiator tester (2) to the filler.
- 2) Pressurize the cooling system with 120 kPa (1.2 kgf/cm, 17 psi) of pressure, and then check if it holds the pressure for 10 seconds.

#### **⚠ CAUTION**

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



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I933H1160003-02

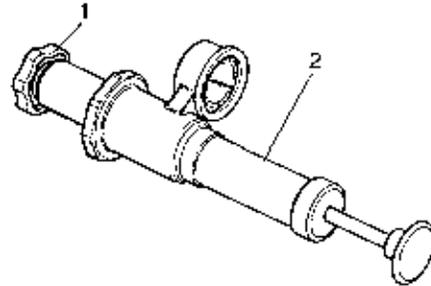
- 3) After finishing the cooling circuit inspection, reinstall the removed parts.

### Radiator Cap Inspection

BA02J21606002

Inspect the radiator cap in the following procedures:

- 1) Remove the radiator cap.
- 2) Attach the radiator cap (1) to the radiator tester (2) as shown in the figure.



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 valve opening pressure**

**95 – 125 kPa (0.95 – 1.25 kgf/cm<sup>2</sup>, 14 – 18 psi)**

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

### Radiator Inspection and Cleaning

BA02J21606003

#### **Radiator Hose**

Refer to “Cooling System Inspection” in Section 0B (Page 0B-9).

#### **Radiator**

- 1) Remove the radiator covers, left and right. Refer to “Exterior Parts Removal and Installation” in Section 9D (Page 9D-1).
- 2) Inspect the radiator for engine coolant 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 with the blade of a small screwdriver.



IA02J1160003-01

## 1F-5 Engine Cooling System:

- 3) Reinstall the radiator covers, left and right.

### Radiator Cleaning

- 1) Remove the radiator covers, left and right. Refer to "Exterior Parts Removal and Installation" in Section 9D (Page 9D-1).
- 2) Blow out any foreign matter that is stuck in the radiator fins using compressed air.

#### **⚠ CAUTION**

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



IA02J1160004-01

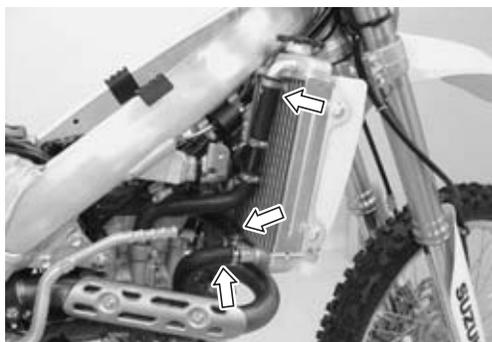
- 3) Reinstall the radiator covers, left and right.

### Radiator Removal and Installation

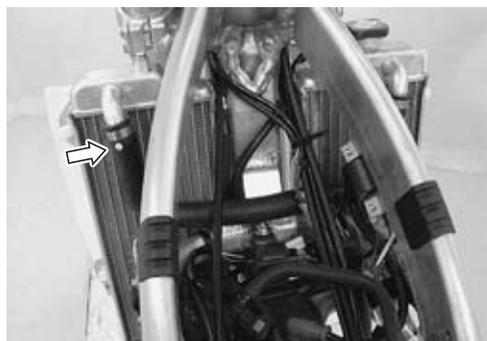
BA02J21606004

#### Removal

- 1) Drain engine coolant. Refer to "Cooling System Inspection" in Section 0B (Page 0B-9).
- 2) Remove the radiator covers, left and right. Refer to "Exterior Parts Removal and Installation" in Section 9D (Page 9D-1).
- 3) Remove the fuel tank. Refer to "Fuel Tank Removal and Installation" in Section 1G (Page 1G-5).
- 4) Disconnect the radiator hoses.

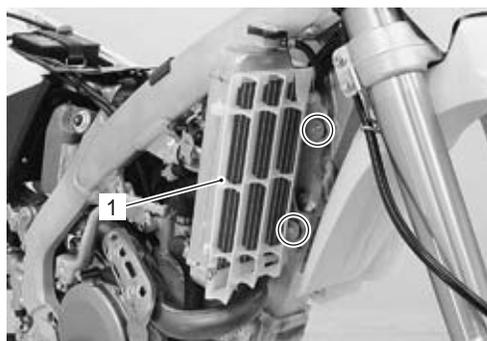


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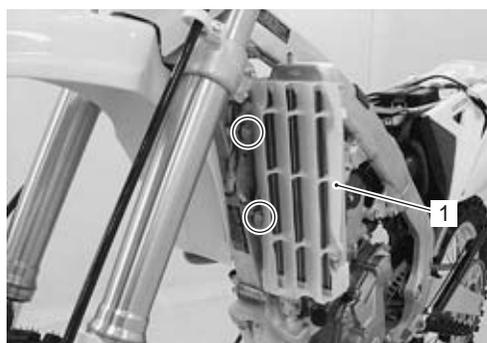


IA02J1160006-01

- 5) Remove the radiator louvers (1) and radiators by removing the bolts.



IA02J1160007-01



IA02J1160008-01

#### Installation

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

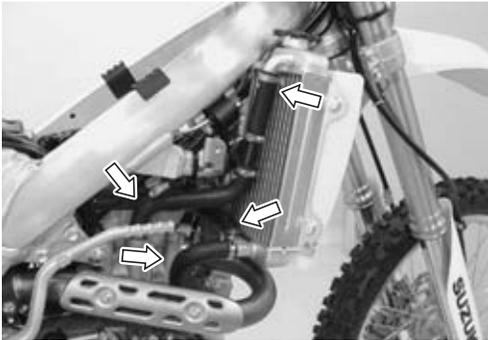
- Connect the radiator hoses as shown in the water hose routing diagram. Refer to "Water Hose Routing Diagram" (Page 1F-3).
- Pour engine coolant and bleed air from the cooling circuit. Refer to "Cooling System Inspection" in Section 0B (Page 0B-9).

## Water Hose Inspection

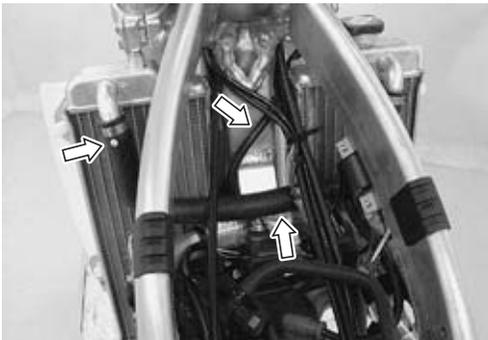
BA02J21606005

Inspect the water hoses in the following procedures:

- 1) Remove the radiator covers, left and right. Refer to "Exterior Parts Removal and Installation" in Section 9D (Page 9D-1).
- 2) Remove the fuel tank. Refer to "Fuel Tank Removal and Installation" in Section 1G (Page 1G-5).
- 3) Check the water hoses for crack, damage or engine coolant leakage. If any defect is found, replace the radiator hose with a new one. Any leakage from the connecting section should be corrected by proper tightening. Refer to "Water Hose Routing Diagram" (Page 1F-3).



IA02J1160009-02



IA02J1160010-01

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

## Water Hose Removal and Installation

BA02J21606006

### Removal

- 1) Drain engine coolant. Refer to "Cooling System Inspection" in Section 0B (Page 0B-9).
- 2) Remove the radiator covers, left and right. Refer to "Exterior Parts Removal and Installation" in Section 9D (Page 9D-1).
- 3) Remove the fuel tank. Refer to "Fuel Tank Removal and Installation" in Section 1G (Page 1G-5).
- 4) 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).
- 2) Pour engine coolant and bleed air from the cooling circuit. Refer to "Cooling System Inspection" in Section 0B (Page 0B-9).
- 3) Reinstall the removed parts.

## Radiator Reservoir Tank Inspection

BA02J21606007

Inspect the radiator reservoir tank in the following procedures:

- 1) Remove the protector. Refer to "Exterior Parts Removal and Installation" in Section 9D (Page 9D-1).
- 2) Inspect the radiator reservoir tank for engine coolant leakage. If any defects are found, replace the radiator reservoir tank with a new one.



IA02J1160011-01

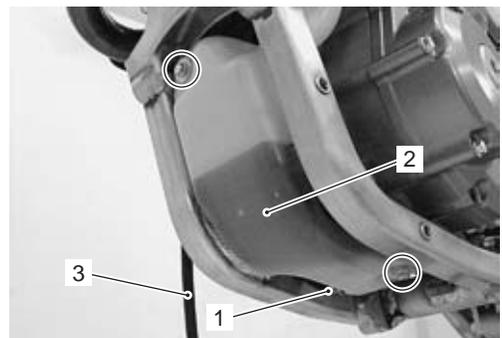
- 3) Install the protector.

## Radiator Reservoir Tank Removal and Installation

BA02J21606008

### Removal

- 1) Remove the protector. Refer to "Exterior Parts Removal and Installation" in Section 9D (Page 9D-1).
- 2) Remove the reservoir tank mounting bolts.
- 3) Disconnect the reservoir tank inlet hose (1) and drain engine coolant.
- 4) Remove the reservoir tank (2) and disconnect the reservoir tank overflow hose (3).



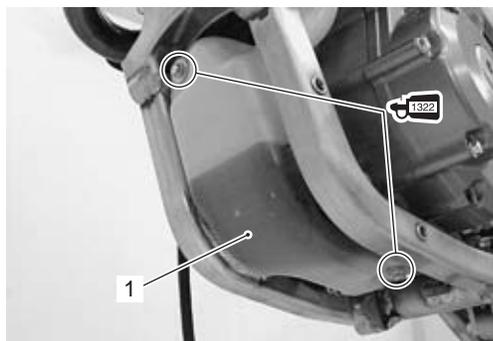
IA02J1160012-01

## 1F-7 Engine Cooling System:

### Installation

- 1) Connect the hoses as shown in the water hose routing diagram. Refer to "Water Hose Routing Diagram" (Page 1F-3).
- 2) Install the reservoir tank (1).
- 3) Apply thread lock to the reservoir tank mounting bolts and tighten them securely.

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



IA02J1160013-01

- 4) Install the protector.

### ECT Sensor Removal and Installation

BA02J21606009

Refer to "ECT Sensor Removal and Installation" in Section 1C (Page 1C-5).

### ECT Sensor Inspection

BA02J21606010

Refer to "ECT Sensor Inspection" in Section 1C (Page 1C-6).

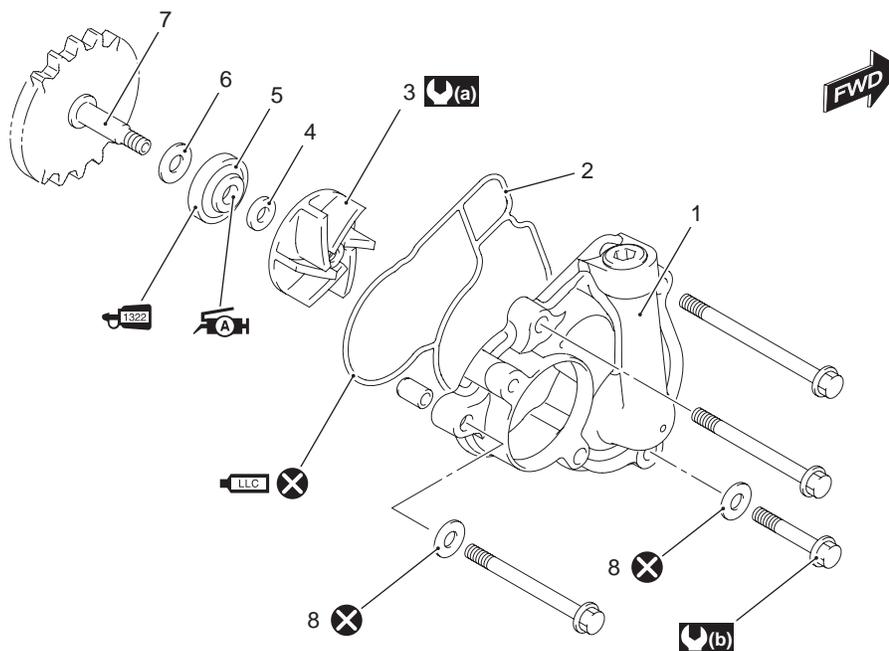
### Engine Coolant Temperature Indicator Inspection

BA02J21606011

Refer to "Speed Sensor Inspection" in Section 9C (Page 9C-4).

### Water Pump Components

BA02J21606012



IA02J1160014-02

1. Water pump case	5. Oil seal	<b>(a)</b> : 8 N-m (0.8 kgf-m, 6.0 lbf-ft)	<b>LLC</b> : Apply engine coolant.
2. Gasket	6. Washer	<b>(b)</b> : 11 N-m (1.1 kgf-m, 8.0 lbf-ft)	<b>X</b> : Do not reuse.
3. Impeller	7. Water pump shaft	<b>AH</b> : Apply grease.	
4. Mechanical seal	8. Gasket	<b>1322</b> : Apply thread lock to the thread part.	

## Water Pump Removal and Installation

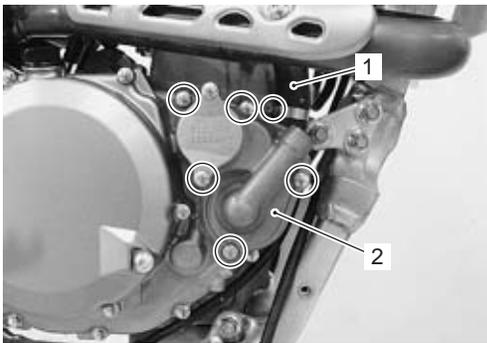
BA02J21606013

### Removal

#### NOTE

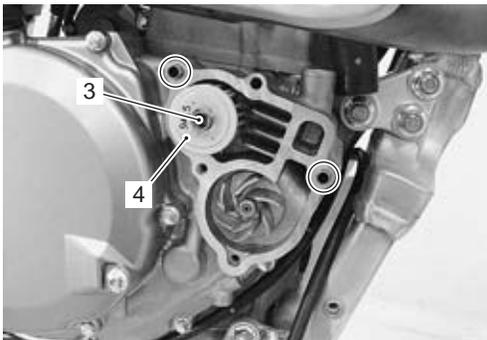
Before draining engine oil and engine coolant, inspect engine oil and coolant leakage between the water pump and crankcase. If engine oil is leaking, visually inspect the oil seal and O-ring. If engine coolant is leaking, visually inspect the mechanical seal and seal washer. Refer to “Water Pump Related Parts Inspection” (Page 1F-11).

- 1) Remove the protector. Refer to “Exterior Parts Removal and Installation” in Section 9D (Page 9D-1).
- 2) Drain engine oil. Refer to “Engine Oil Filter Replacement” in Section 0B (Page 0B-7).
- 3) Drain engine coolant. Refer to “Cooling System Inspection” in Section 0B (Page 0B-9).
- 4) Disconnect the radiator hose (1).
- 5) Remove the water pump case (2).



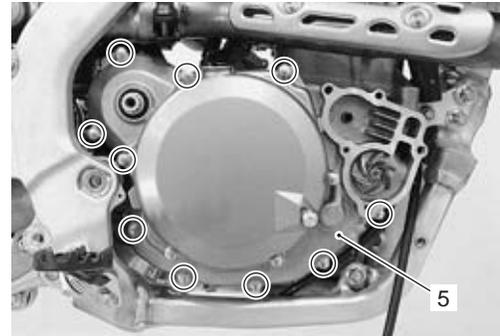
IA02J1160015-01

- 6) Remove the dowel pins, spring (3) and oil filter (4).



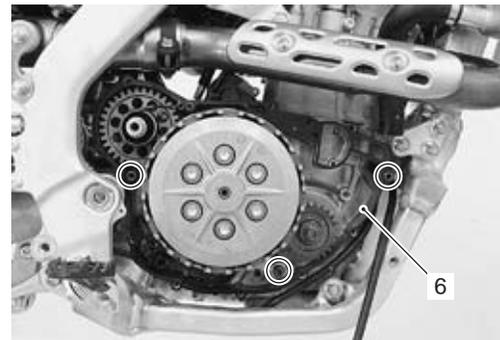
IA02J1160016-01

- 7) Remove the rear brake pedal. Refer to “Rear Brake Pedal Removal and Installation” in Section 4A (Page 4A-16).
- 8) Remove the kick starter lever. Refer to “Kick Starter Removal and Installation” in Section 1I (Page 1I-15).
- 9) Remove the right crankcase cover (5).



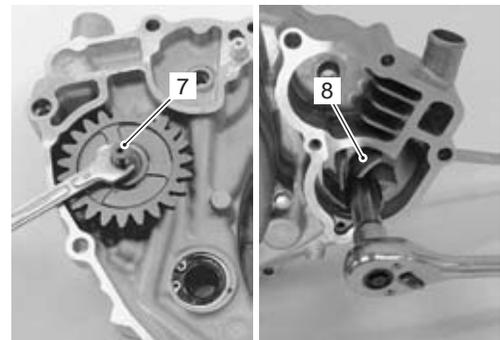
IA02J1160017-01

- 10) Remove the gasket (6), dowel pins and O-ring.



IA02J1160018-01

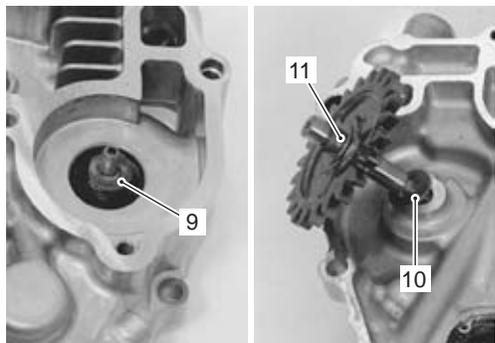
- 11) Hold the water pump shaft (7) with a wrench and remove the impeller (8).



IA02J1160019-01

## 1F-9 Engine Cooling System:

- Remove the washers (9), (10) and water pump shaft (11).



IA02J1160020-01

- Remove the oil seal.

### ⚠ CAUTION

Replace the removed oil seal with a new one.

### NOTE

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



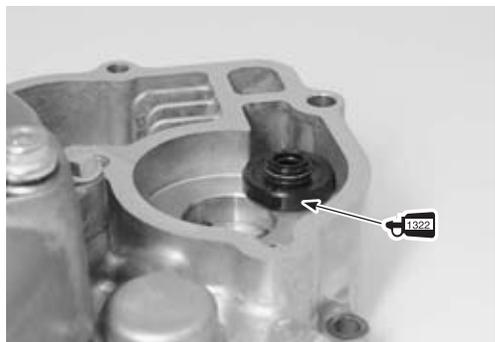
IA02J1160021-01

### Installation

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

- Apply thread lock to the outer surface of new oil seal.

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



IA02J1160022-01

- Press in the oil seal with the suitable size socket wrench.

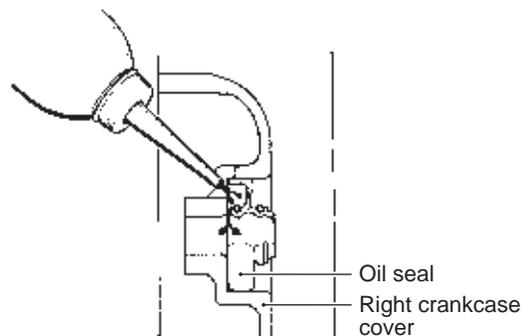


IA02J1160023-01

- Check engine oil flow before installing the water pump shaft.

### ⚠ CAUTION

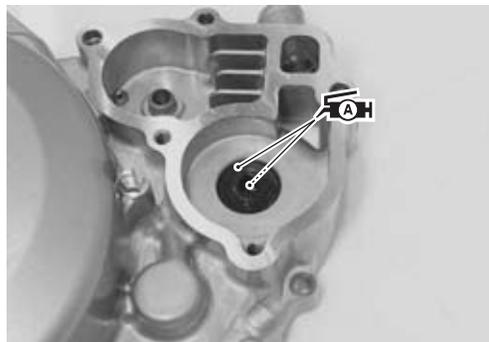
Make sure that engine oil flows to the bearing part of oil seal as shown in the illustration. If the oil does not flow, replace the oil seal with a new one again.



IA02J1160024-02

- Apply grease to the oil seal lips.

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

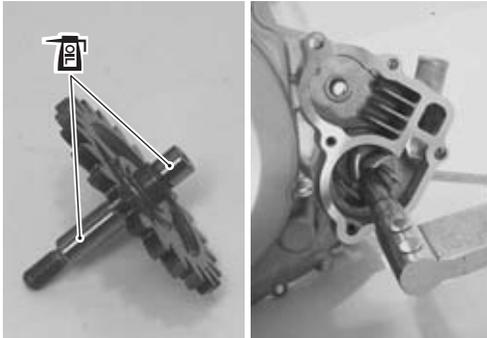


IA02J1160025-01

- Apply engine oil to the water pump shaft.
- Hold the water pump shaft with a wrench and tighten the impeller to the specified torque.

**Tightening torque**

**Impeller: 8 N-m (0.8 kgf-m, 6.0 lbf-ft)**

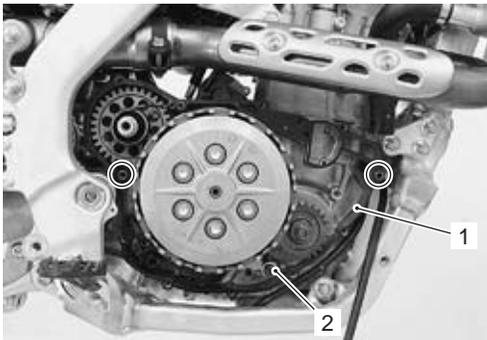


IA02J1160026-01

- Install the dowel pins, new gasket (1) and O-ring (2).

**⚠ CAUTION**

**Use new gasket (1) and O-ring (2) to prevent engine oil leakage.**



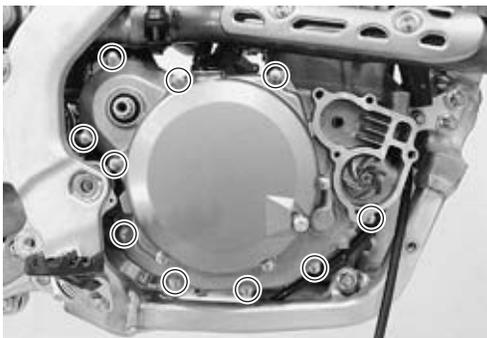
IA02J1160027-01

- Tighten the crankcase cover bolts to the specified torque.

**Tightening torque**

**Right crankcase cover bolt: 11 N-m (1.1 kgf-m, 8.0 lbf-ft)**

- Install the brake pedal. Refer to "Rear Brake Pedal Removal and Installation" in Section 4A (Page 4A-16).
- Install the kick starter lever. Refer to "Kick Starter Removal and Installation" in Section 1I (Page 1I-15).

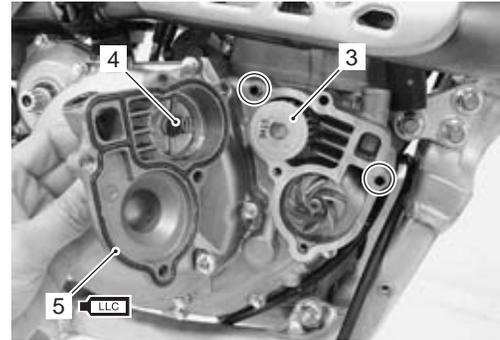


IA02J1160028-02

- Install the dowel pins and oil filter (3).
- Install the spring (4) and a new gasket (5).
- Apply engine coolant to the new gasket (5).

**⚠ CAUTION**

**Use new gasket to prevent engine oil/coolant leakage.**



IA02J1160029-01

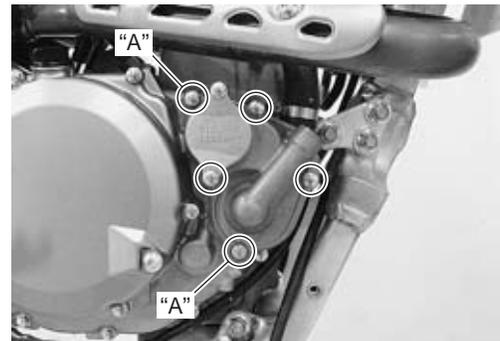
- Tighten the water pump case bolts to the specified torque.

**⚠ CAUTION**

**Use new gasket washers "A" to prevent engine oil/coolant leakage.**

**Tightening torque**

**Water pump case bolt: 11 N-m (1.1 kgf-m, 8.0 lbf-ft)**



IA02J1160030-01

- Connect the radiator hose and pour engine coolant. Refer to "Cooling System Inspection" in Section 0B (Page 0B-9).
- Pour engine oil. Refer to "Engine Oil Filter Replacement" in Section 0B (Page 0B-7).

## 1F-11 Engine Cooling System:

### Water Pump Related Parts Inspection

BA02J21606014

Refer to “Water Pump Removal and Installation” (Page 1F-8).

#### Impeller and Water Pump Shaft

Inspect the impeller and water pump shaft for damage. If necessary, replace the defective parts with a new one.



IA02J1160031-01

### 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.



IA02J1160032-01

## Specifications

### Service Data

BA02J21607001

#### Radiator + Coolant

Item	Standard		Limit
ECT sensor resistance	20 °C (68 °F)	Approx. 2.58 kΩ	—
	50 °C (122 °F)	Approx. 0.77 kΩ	—
	80 °C (176 °F)	Approx. 0.28 kΩ	—
	110 °C (230 °F)	Approx. 0.12 kΩ	—
Radiator cap valve opening pressure	95 – 125 kPa (0.95 – 1.25 kgf/cm <sup>2</sup> , 14 – 18 psi)		—
Engine coolant type	Use an anti-freeze/coolant compatible with aluminum radiator, mixed with distilled water only, at the ratio of 50:50.		—
Engine coolant capacity	Reserve tank side	250 ml (0.3/0.2 US/lmp qt)	—
	Engine side	950 ml (1.0/0.8 US/lmp qt)	—

### Tightening Torque Specifications

BA02J21607002

Fastening part	Tightening torque			Note
	N·m	kgf-m	lbf-ft	
Impeller	8	0.8	6.0	☞ (Page 1F-10)
Right crankcase cover bolt	11	1.1	8.0	☞ (Page 1F-10)
Water pump case bolt	11	1.1	8.0	☞ (Page 1F-10)

#### NOTE

The specified tightening torque is described in the following.

“Water Hose Routing Diagram” (Page 1F-3)

“Water Pump Components” (Page 1F-7)

#### Reference:

For the tightening torque of fastener not specified in this section, refer to “Tightening Torque List” in Section 0C (Page 0C-8).

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## Special Tools and Equipment

### Recommended Service Material

BA02J21608001

Material	SUZUKI recommended product or Specification		Note
Grease	SUZUKI SUPER GREASE "A" or equivalent	P/No.: 99000-25010	☞ (Page 1F-9)
Thread lock cement	THREAD LOCK CEMENT SUPER "1322" or equivalent	P/No.: 99000-32110	☞ (Page 1F-7) / ☞ (Page 1F-9)

#### NOTE

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Required service material is also described in the following.  
"Water Pump Components" (Page 1F-7)

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# Fuel System

## Precautions

### Precautions for Fuel System

BA02J21700001

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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.
-

## Diagnostic Information and Procedures

### Fuel System Diagnosis

BA02J21704001

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 injector.	<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>	TP sensor out of adjustment.	<i>Adjust.</i>
	Defective fuel pump.	<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 sensor.	<i>Replace.</i>
<b>Engine stalls often (Incorrect fuel/air mixture)</b>	Defective IAP sensor or circuit.	<i>Repair or replace.</i>
	Defective fuel pump.	<i>Replace.</i>
	Defective ECT sensor.	<i>Replace.</i>
	Defective IAT sensor.	<i>Replace.</i>
<b>Engine stalls often (Fuel injector improperly operating)</b>	Defective fuel injector.	<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 CKP sensor.	<i>Replace.</i>
	Defective GP switch.	<i>Replace.</i>
	Defective IAP sensor.	<i>Replace.</i>
	Defective ECM.	<i>Replace.</i>
	TP sensor out of adjustment.	<i>Adjust or 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>
	TP sensor out of adjustment.	<i>Adjust.</i>

## Repair Instructions

### Fuel Pressure Inspection

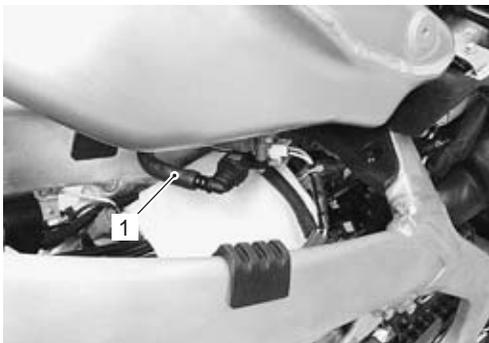
BA02J21706001

#### **▲ 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) Remove the fuel tank bolt and unhook the rubber band. Refer to "Fuel Tank Removal and Installation" (Page 1G-5).
- 2) Place a rag under the fuel feed hose (1) and remove the fuel feed hose (1).



IA02J1170001-01

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

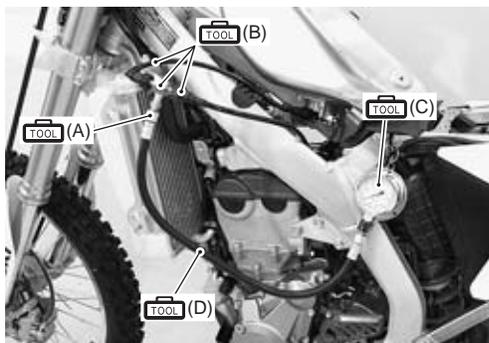
#### Special tool

**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)**



IA02J1170002-02

- 4) Turn on the ignition and check the fuel pressure.

#### **Fuel pressure**

**Approx. 294 kPa (2.94 kgf/cm<sup>2</sup>, 42psi)**

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

- Fuel feed hose leakage
- Fuel pump

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

- Fuel pump

- 5) Remove the special tools.

#### **▲ WARNING**

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

- 6) Reinstall the removed parts.

#### **NOTE**

**Connect the fuel feed hose to the fuel pump and fuel delivery pipe L-joint until it locks securely (a click is heard). Refer to "Throttle Body Construction" in Section 1D (Page 1D-12).**

### Fuel Pump Inspection

BA02J21706002

Turn on the ignition switch 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-4) and "DTC "23" (P1651-H/L): TO Sensor Circuit Malfunction" in Section 1A (Page 1A-53).

If the fuel pump circuit connections and TO sensor are OK, the fuel pump may be faulty, replace the fuel pump with a new one. Refer to "Fuel Pump Removal and Installation" (Page 1G-6).

## Fuel Discharge Amount Inspection

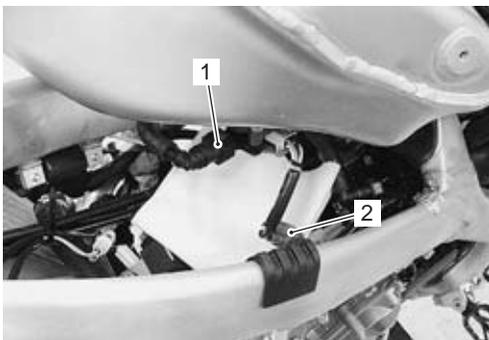
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### **⚠ WARNING**

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

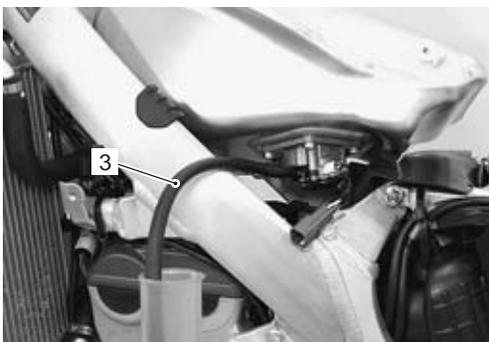
Inspect the fuel discharge amount in the following procedures:

- 1) Remove the fuel tank bolt and unhook the rubber band. Refer to "Fuel Tank Removal and Installation" (Page 1G-5).
- 2) Place a rag under the fuel feed hose (1) and disconnect fuel feed hose (1) from the fuel pump.
- 3) Disconnect the fuel pump lead wire coupler (2).



IA02J1170003-01

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



IA02J1170004-03

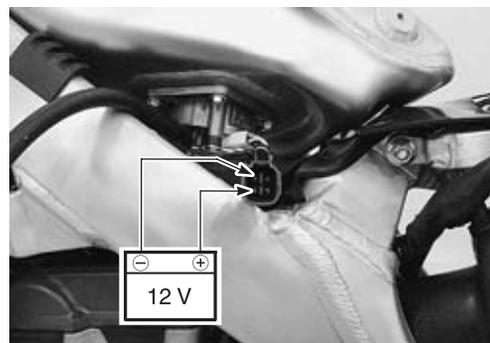
- 6) Connect proper lead wires to the fuel pump lead wire coupler (fuel pump side) and apply 12 V to the fuel pump (between (+) R wire and (-) B wire) for 10 seconds and measure the amount of fuel discharged.

### **NOTE**

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

### **Fuel discharge amount**

**Approx. 240 ml (8.1/8.4 US/Imp oz) /10 sec.**



IA02J1170005-01

- 7) After finishing the fuel discharge inspection, reinstall the removed parts.

### **NOTE**

**Connect the fuel feed hose to the fuel pump until it locks securely (a click is heard).**

## Fuel Pump Relay Inspection

BA02J21706004

Refer to "DTC "41" (P0230): FP Relay Circuit Malfunction" in Section 1A (Page 1A-65).

## Fuel Hose Inspection

BA02J21706005

Refer to "Fuel Hose Inspection" in Section 0B (Page 0B-14).

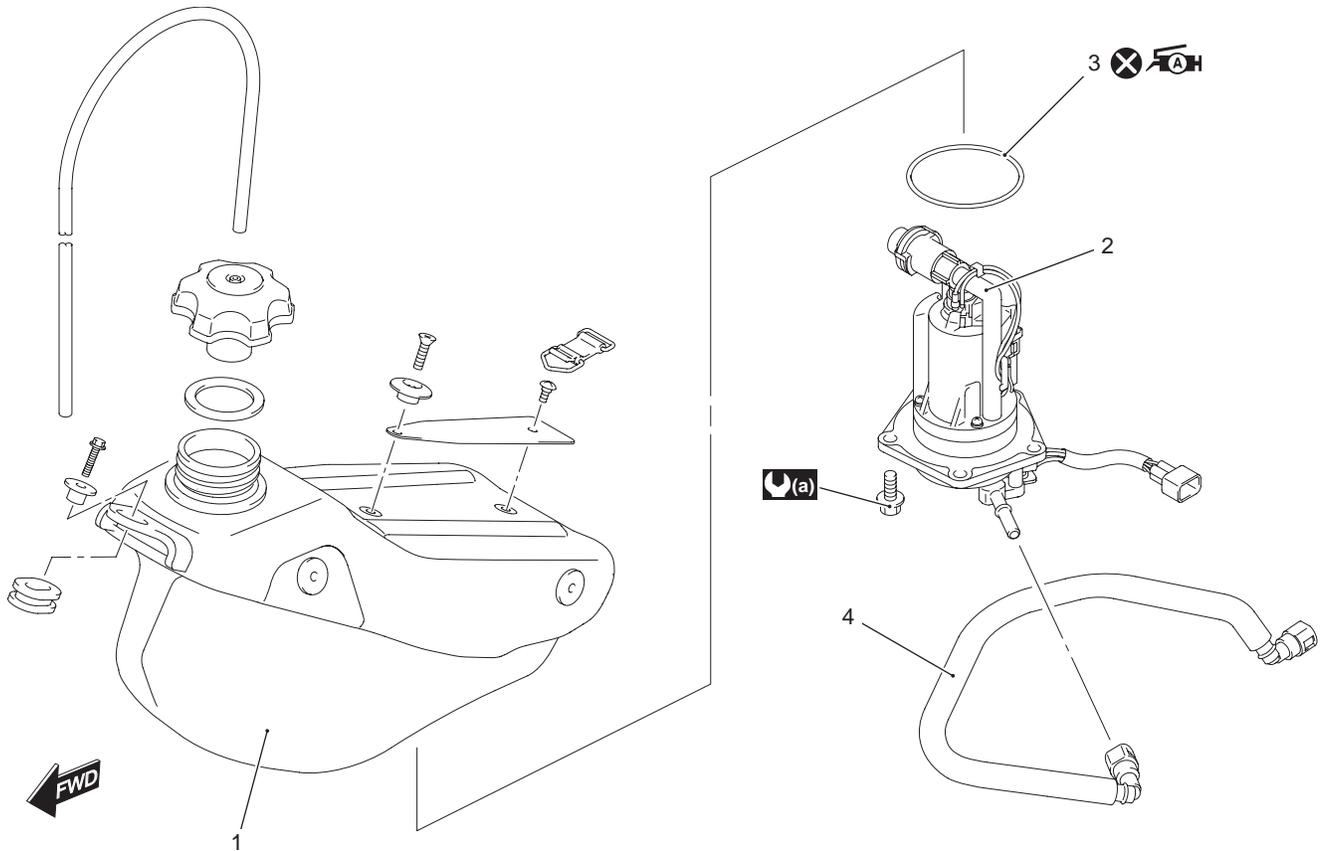
## Fuel Level Indicator Inspection

BA02J21706006

Refer to "Speed Sensor Inspection" in Section 9C (Page 9C-4).

Fuel Tank Components

BA02J21706007



1. Fuel tank	: 10 N·m (1.0 kgf-m, 7.0 lbf-ft)
2. Fuel pump	: Apply grease.
3. O-ring	: Do not reuse.
4. Fuel feed hose	

IA02J1170016-01

Fuel Tank Removal and Installation

BA02J21706008

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-1).
- 2) Remove the radiator covers, left and right. Refer to "Radiator Removal and Installation" in Section 1F (Page 1F-5).
- 3) Remove the fuel tank bolt and unhook the rubber band.



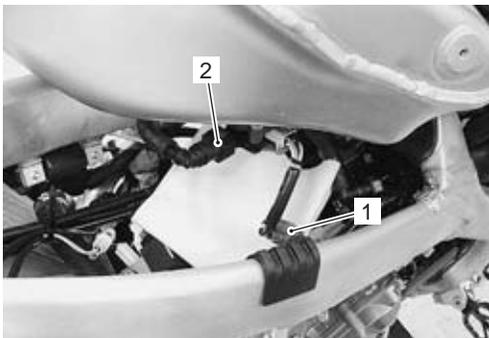
IA02J1170006-01

- 4) Disconnect the fuel pump coupler (1).
- 5) Place a rag under the fuel feed hose (2) and disconnect the fuel feed hose (2) from the fuel pump.

**⚠ CAUTION**

- **Be sure to disconnect the fuel feed hose (2) by hand. Do not disconnect the fuel feed hose (2) with any tool.**
- **When removing the fuel tank, do not leave the fuel feed hose (2) on the fuel tank side.**

- 6) Remove the fuel tank assembly.



IA02J1170007-01

**Installation**

Install the fuel tank in the reverse order of removal.

**NOTE**

**Connect the fuel feed hose to the fuel pump until it locks securely (a click is heard).**

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

BA02J21706009

Refer to “Throttle Body Disassembly and Assembly” in Section 1D (Page 1D-17).

**Fuel Injector Inspection and Cleaning**

BA02J21706010

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-17).
- 2) Check the fuel injector for evidence of dirt and contamination. If present, clean and check for presence of dirt in the fuel line and fuel tank.



IA02J1170010-01

- 3) Install the fuel injector. Refer to “Throttle Body Disassembly and Assembly” in Section 1D (Page 1D-17).

**Fuel Pump Removal and Installation**

BA02J21706011

**Removal**

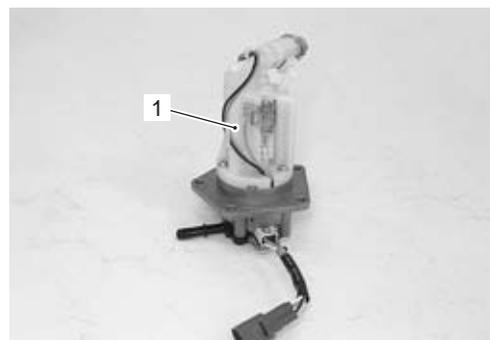
- 1) Remove the fuel tank. Refer to “Fuel Tank Removal and Installation” (Page 1G-5).
- 2) Remove the fuel pump assembly (1) by removing its mounting bolts diagonally.



IA02J1170012-03

**⚠ CAUTION**

**Never disassemble the fuel pump assembly (1).**



IA02J1170013-02

## 1G-7 Fuel System:

### Installation

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

- Install a new O-ring and apply grease to it.

#### ⚠ CAUTION

Replace the O-ring with a new one.

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



IA02J1170014-01

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

#### Tightening torque

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



IA02J1170015-01

## Specifications

### Service Data

BA02J21707001

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

Item	Specification	Note
Injector resistance	10.5 – 0.53 Ω at 24 °C (75.2 °F)	
Fuel pump discharge amount	Approx. 240 ml (8.1/8.4 US/Imp oz) /10 sec.	
Fuel pressure regulator operating set pressure	Approx. 294 kPa (2.94 kgf/cm <sup>2</sup> , 41.81 psi)	

### Fuel

Item	Specification	Note
Fuel type	Use only unleaded gasoline of at least 90 pump octane (R/2 + M/2 method).	
Fuel tank capacity	6.2 L (1.6/1.4 US/Imp gal)	

### Tightening Torque Specifications

BA02J21707002

Fastening part	Tightening torque			Note
	N-m	kgf-m	lbf-ft	
Fuel pump mounting bolt	10	1.0	7.0	 (Page 1G-7)

#### NOTE

The specified tightening torque is described in the following.  
 "Fuel Tank Components" (Page 1G-5)

#### Reference:

For the tightening torque of fastener not specified in this section, refer to "Tightening Torque List" in Section 0C (Page 0C-8).

## Special Tools and Equipment

### Recommended Service Material

BA02J21708001

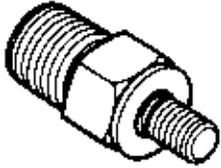
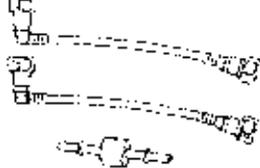
Material	SUZUKI recommended product or Specification		Note
Grease	SUZUKI SUPER GREASE "A" or equivalent	P/No.: 99000-25010	☞ (Page 1G-7)

### NOTE

Required service material is also described in the following.  
 "Fuel Tank Components" (Page 1G-5)

### Special Tool

BA02J21708002

09915-74521 Adapter hose ☞ (Page 1G-3) 	09915-77331 Oil pressure gauge (1000 kPa) ☞ (Page 1G-3) 
09940-40211 Fuel pressure gauge adapter ☞ (Page 1G-3) 	09940-40220 Fuel pressure gauge attachment ☞ (Page 1G-3) 

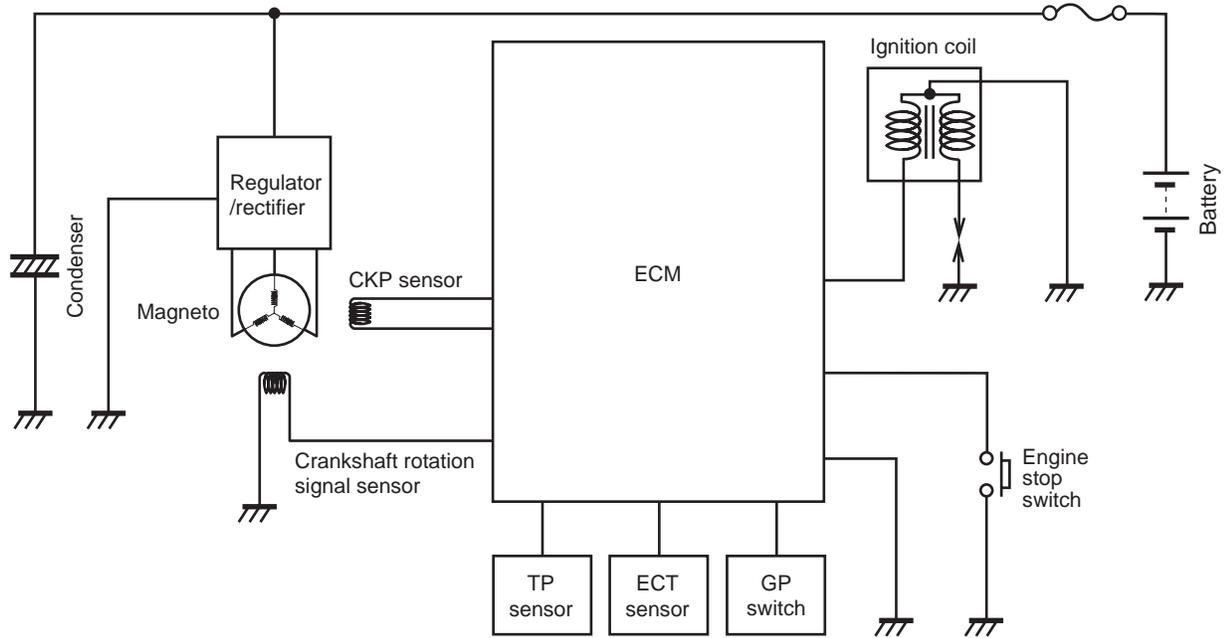
# Ignition System

## Schematic and Routing Diagram

### Ignition System Diagram

BA02J21802001

Refer to "Wire Color Symbols" in Section 0A (Page 0A-5).



IA02J1180018-03

### Ignition System Components Location

Refer to "Electrical Components Location" in Section 0A (Page 0A-6).

BA02J21802002

## Diagnostic Information and Procedures

### Ignition System Symptom Diagnosis

BA02J21804001

Condition	Possible cause	Correction / Reference Item
<b>Spark plug not sparking</b>	Damaged spark plug cap.	<i>Replace.</i>
	Damaged spark plug.	<i>Replace.</i>
	Fouled spark plug.	<i>Clean or replace.</i>
	Wet spark plug.	<i>Clean and dry or replace.</i>
	Defective ignition coil.	<i>Replace.</i>
	Defective CKP sensor.	<i>Replace.</i>
	Defective ECM.	<i>Replace.</i>
	Open-circuited wiring connections.	<i>Repair or replace.</i>
	Open or short in high-tension cord.	<i>Replace.</i>
<b>Engine stalls easily (No spark)</b>	Defective ignition coil.	<i>Replace.</i>
	Fouled spark plug.	<i>Clean or replace.</i>
	Defective CKP sensor.	<i>Replace.</i>
	Defective ECM.	<i>Replace.</i>
	Open-circuited wiring connections.	<i>Repair or 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 standard spark plug.</i>
<b>Spark plug quickly becomes fouled with oil or carbon</b>	Worn piston rings.	<i>Replace.</i>
	Worn piston.	<i>Replace.</i>
	Worn cylinder.	<i>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.	<i>Change to cold type spark plug.</i>
	Overheated engine.	<i>Tune-up.</i>
	Loose spark plug.	<i>Tighten.</i>
	Excessively lean air/fuel mixture.	<i>Inspect FI system.</i>

## 1H-3 Ignition System:

### No Spark or Poor Spark

BA02J21804002

#### Troubleshooting

#### NOTE

**Check that the transmission is in neutral. 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 (O and B/W) at the ECM with the ignition switch in the on position. <i>Is the voltage OK?</i>	Go to Step 3.	<ul style="list-style-type: none"> <li>Faulty ignition switch.</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 and Plug Cap Inspection" (Page 1H-4).  <b>NOTE</b> <b>This inspection method is applicable only with the multi circuit tester and the peak voltage adaptor.</b>  <i>Is the peak voltage OK?</i>	Go to step 4.	Go to step 5.
4	Inspect the spark plug. Refer to "Spark Plug Inspection and Cleaning" in Section 0B (Page 0B-4). <i>Is the spark plug OK?</i>	Go to Step 5.	Faulty spark plug.
5	Inspect the ignition coil. Refer to "Ignition Coil and Plug Cap Inspection" (Page 1H-4). <i>Is the ignition coil OK?</i>	Go to step 6.	Faulty ignition coil.
6	Measure the CKP sensor peak voltage and its resistance. Refer to "Crankshaft Rotation Signal 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 voltage 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 wire harness.</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

### Spark Plug Cap and Spark Plug Removal and Installation

BA02J21806001

#### Removal

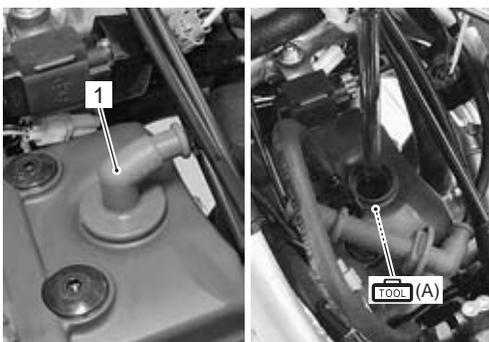
#### **⚠ WARNING**

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

- 1) Turn off the ignition switch.
- 2) Remove the fuel tank. Refer to "Fuel Tank Removal and Installation" in Section 1G (Page 1G-5).
- 3) Disconnect the spark plug cap (1).
- 4) Remove the spark plug with the spark plug wrench.

#### Special tool

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



IA02J1180001-02

#### Installation

Install the spark plug and spark plug cap in the reverse order of removal. Pay attention to the following points:

- Screw the spark plug into the cylinder head with fingers, and then tighten it 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

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

#### Tightening torque

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



IA02J1180002-01

### Spark Plug Inspection and Cleaning

BA02J21806002

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

### Ignition Coil and Plug Cap Inspection

BA02J21806003

#### Ignition Coil Primary Peak Voltage

- 1) Remove the fuel tank. Refer to "Fuel Tank Removal and Installation" in Section 1G (Page 1G-5).
- 2) Disconnect the spark plug cap. Refer to "Spark Plug Cap and Spark Plug Removal and Installation" (Page 1H-4).
- 3) Connect a new spark plug to the spark plug cap and ground it to the cylinder head.

#### **⚠ CAUTION**

**Avoid grounding the spark plug and supplying the electrical shock to the cylinder head cover (magnesium parts) to prevent the magnesium material from damage.**

#### NOTE

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



IA02J1180003-01

## 1H-5 Ignition System:

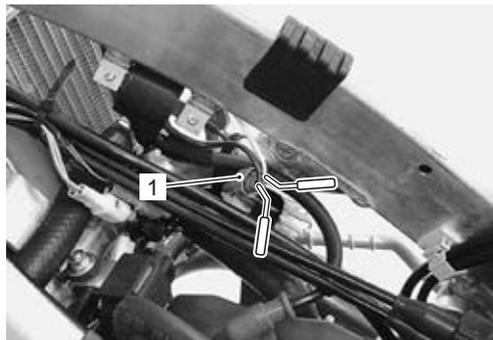
- 4) Insert the needle-point probes to the ignition coil lead wire coupler (1).

### ⚠ CAUTION

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

#### Special tool

 : 09900-25009 (Needle-point probe set)



IA02J1180004-01

- 5) 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.

#### NOTE

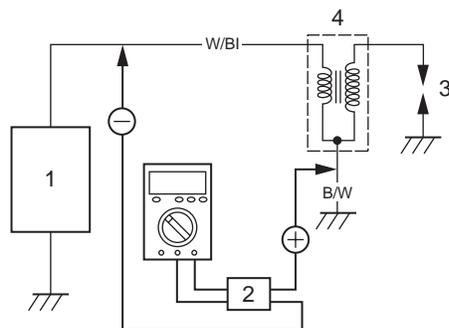
Do not disconnect the ignition coil lead wires.

#### Special tool

 : 09900-25008 (Multi circuit tester set)

Tester knob indication: Voltage (---)

	(+) Probe	(-) Probe
Ignition coil	B/W lead wire terminal	W/BI lead wire terminal



IA02J1180005-02

1. ECM	3. New spark plug
2. Peak voltage adaptor	4. Ignition coil

- 6) Measure the ignition coil primary peak voltage in the following procedures:

### ⚠ WARNING

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

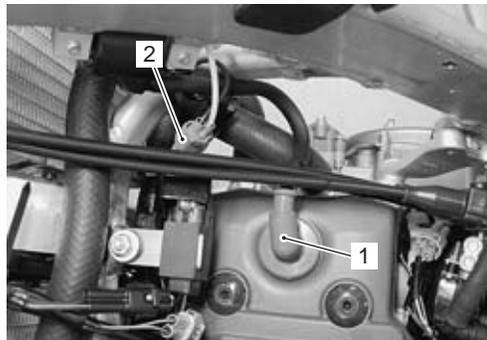
- Shift the transmission into neutral, turn on the ignition switch and grasp the clutch lever.
  - Press the starter button and allow the engine to crank for a few seconds, and then measure the ignition coil primary peak voltage.
- 7) Repeat the b) procedure a few times and measure the highest peak voltage.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

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

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

### Ignition Coil Resistance

- Disconnect the spark plug cap (1). Refer to "Ignition Coil and Plug Cap Inspection" (Page 1H-4).
- Disconnect the ignition coil lead wire coupler (2).



IA02J1180006-03

- 3) Measure the ignition coil resistance in both the primary and secondary coils. If the resistance is not within the standard range, replace the ignition coil with a new one.

**Special tool**

 : 09900-25008 (Multi circuit tester set)

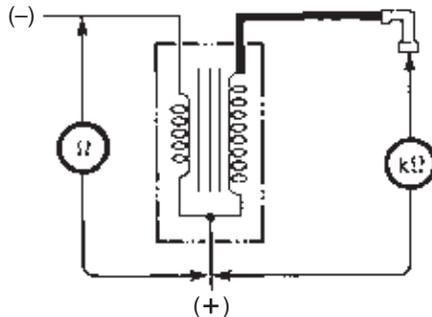
**Tester knob indication**

Resistance ( $\Omega$ )

**Ignition coil resistance**

Primary: 0.17 – 0.23  $\Omega$  (W/B1 – B/W)

Secondary: 5.04 – 7.56 k $\Omega$  (Spark plug cap – B/W)



I933H1180014-01

- 4) After measuring the ignition coil resistance, reinstall the removed parts.

**CKP Sensor Inspection**

BA02J21806004

Refer to “Electrical Components Location” in Section 0A (Page 0A-6).

**CKP Sensor Peak Voltage**

- 1) Disconnect the CKP sensor/crankshaft rotation signal sensor lead wire coupler (1).

**NOTE**

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



IA02J1180007-02

- 2) Connect the multi circuit tester with the peak voltage adaptor as follows:

**⚠ CAUTION**

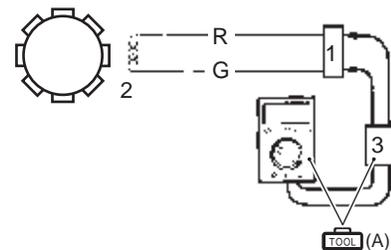
**Before using the multi circuit tester and peak voltage adaptor, refer to the appropriate instruction manual.**

**Special tool**

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

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

CKP sensor	(+) Probe	(-) Probe
	R	G



IA02J1180017-01

1. Coupler	3. Peak voltage adaptor
2. CKP sensor	

- 3) Measure the CKP sensor peak voltage in the following procedures:
  - a) Shift the transmission to the neutral, turn on the ignition switch 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 a few times and measure the highest CKP sensor peak voltage.

**CKP sensor peak voltage**

**5.0 V and more (R – G)**

- 5) If the peak voltage is within the specification, check the continuity between the CKP sensor/crankshaft rotation signal sensor lead wire coupler and ECM coupler.

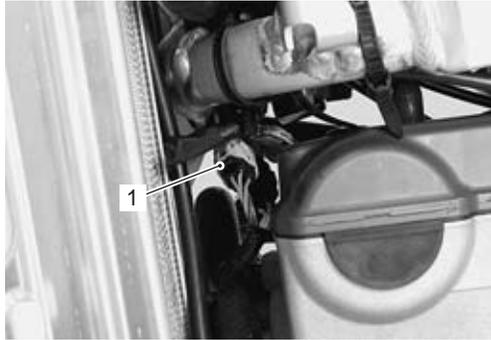
**⚠ CAUTION**

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

## 1H-7 Ignition System:

### CKP Sensor Resistance

- 1) Disconnect the CKP sensor/crankshaft rotation signal sensor lead wire coupler (1).



IA02J1180007-02

- 2) Measure the resistance between the lead wires and ground. If the resistance is not within the standard range, replace the stator assembly with a new one. Refer to "CKP Sensor / Crankshaft Rotation Signal Sensor Removal and Installation" (Page 1H-8).

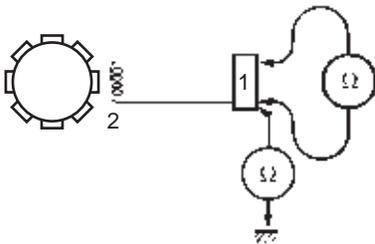
#### Tester knob indication

Resistance ( $\Omega$ )

#### CKP sensor resistance

150 – 280  $\Omega$  (R – G)

$\infty$   $\Omega$  (R – Ground)



IA02J1180010-01

1. Coupler	2. CKP sensor
------------	---------------

### Crankshaft Rotation Signal Sensor Inspection

BA02J21806005

Refer to "Electrical Components Location" in Section 0A (Page 0A-6).

### Crankshaft Rotation Signal Sensor Peak Voltage

- 1) Disconnect the CKP sensor/crankshaft rotation signal sensor lead wire coupler (1).

#### **NOTE**

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



IA02J1180007-02

- 2) Connect the multi circuit tester with the peak voltage adaptor as follows:

#### **CAUTION**

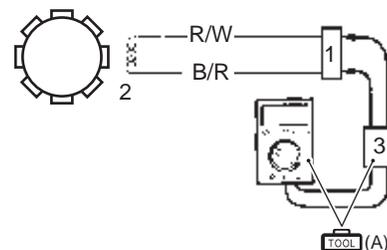
**Before using the multi circuit tester and peak voltage adaptor, refer to the appropriate instruction manual.**

#### Special tool

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

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

Crankshaft rotation signal sensor	(+) Probe	(-) Probe
	B/R	R/W



IA02J1180008-01

1. Coupler	3. Peak voltage adaptor
2. Crankshaft rotation signal sensor	

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

**Crankshaft rotation signal sensor peak voltage**  
**3.0 V and more (B/R – R/W)**

- If the peak voltage is within the specification, check the continuity between the CKP sensor/crankshaft rotation signal sensor lead wire coupler and ECM coupler.

**CAUTION**

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

**Crankshaft Rotation Signal Sensor Resistance**

- Remove the left radiator cover. Refer to "Exterior Parts Removal and Installation" in Section 9D (Page 9D-1).
- Disconnect the CKP sensor/crankshaft rotation signal sensor lead wire coupler (1).

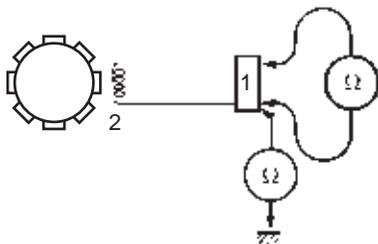


IA02J1180007-02

- Measure the resistance between the lead wires and ground. If the resistance is not within the standard range, replace the stator assembly with a new one. Refer to "CKP Sensor / Crankshaft Rotation Signal Sensor Removal and Installation" (Page 1H-8).

**Tester knob indication Resistance (Ω)**

**Crankshaft rotation signal sensor resistance**  
 0.2 – 0.6 Ω (B/R – R/W)  
 ∞ Ω (B/R – Ground)



IA02J1180010-01

1. Coupler	2. Crankshaft rotation signal sensor
------------	--------------------------------------

- After measuring the crankshaft rotation signal sensor resistance, reinstall the removed parts.

**CKP Sensor / Crankshaft Rotation Signal Sensor Removal and Installation**

BA02J21806006

Refer to "Generator Removal and Installation" in Section 1J (Page 1J-5).

**Engine Stop Switch Inspection**

BA02J21806007

Inspect the engine stop switch in the following procedures:

- Turn off the ignition switch.
- Remove the fuel tank. Refer to "Fuel Tank Removal and Installation" in Section 1G (Page 1G-5).
- Disconnect the engine stop switch lead wire coupler (1).



IA02J1180011-01

- Measure the engine stop switch resistance between B/Y lead wire and B/W lead wire. If any abnormality is found, replace the engine stop switch assembly with a new one. Refer to "Handlebars Removal and Installation" in Section 6B (Page 6B-3).

**Engine stop switch resistance**

**ON: Under 1 Ω (B/Y – B/W)**

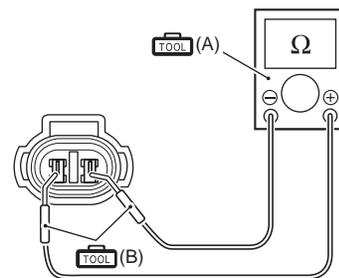
**OFF: ∞Ω (Infinity) (B/Y – B/W)**

**Special tool**

- (A): 09900–25008 (Multi circuit tester set)
- (B): 09900–25009 (Needle-point probe set)

**Tester knob indication**

**Resistance (Ω)**



IA02J1180019-01

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

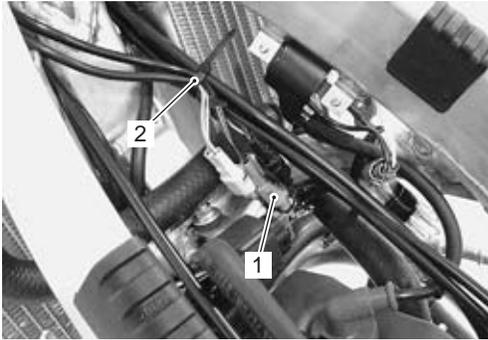
## 1H-9 Ignition System:

### Engine Stop Switch Removal and Installation

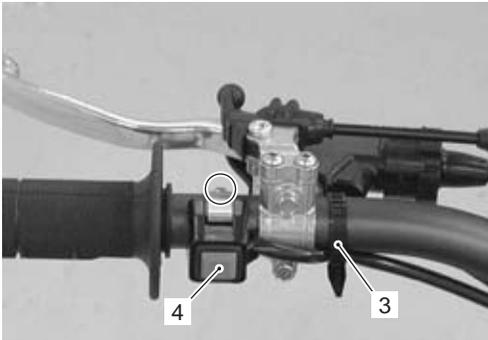
BA02J21806008

#### Removal

- 1) Turn off the ignition switch.
- 2) Remove the fuel tank. Refer to "Fuel Tank Removal and Installation" in Section 1G (Page 1G-5).
- 3) Disconnect the engine stop switch lead wire coupler (1).
- 4) Remove the clamps (2) and (3).
- 5) Remove the engine stop switch (4).



IA02J1180012-01



IA02J1180013-01

#### Installation

Installation is in the reverse order of removal.

### Ignition Switch Inspection

BA02J21806009

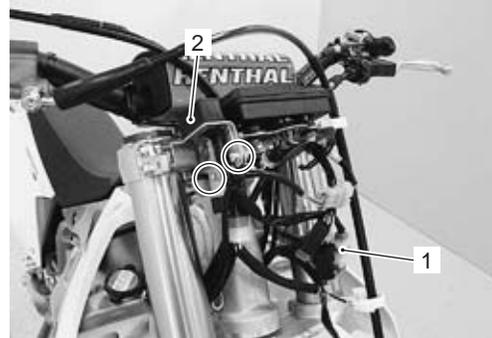
Refer to "Speedometer Construction" in Section 9C (Page 9C-2).

### Ignition Switch Removal and Installation

BA02J21806010

#### Removal

- 1) Remove the headlight cover. Refer to "Headlight Removal and Installation" in Section 9B (Page 9B-2).
- 2) Disconnect the ignition switch lead wire coupler (1) and remove the ignition switch (2).



IA02J1180014-04

#### Installation

Installation is in the reverse order of removal.

## Specifications

### Service Data

BA02J21807001

#### Electrical

Unit: mm (in)

Item	Specification		Note
	Type		
Spark plug	Type	NGK: CR8EIB-10	
	Gap	0.9 – 1.0 (0.035 – 0.039)	
Spark performance	Over 8 (0.3) at 1 atm.		
Crankshaft rotation signal sensor peak voltage	3.0 V and more		(+): B/R, (-): R/W
Crankshaft rotation signal sensor resistance	0.2 – 0.6 $\Omega$		B/R – R/W
Charge coil resistance	0.2 – 0.6 $\Omega$		Y – Y
CKP sensor peak voltage	5.0 V and more		(+): R, (-): G
CKP sensor resistance	150 – 280 $\Omega$		R – G
Ignition coil resistance	Primary	0.17 – 0.23 $\Omega$	W/BI – B/W
	Secondary	5.04 – 7.56 k $\Omega$	Plug cap – B/W
Ignition coil primary peak voltage	175 V and more		(+): B/W, (-): W/BI

### Tightening Torque Specifications

BA02J21807002

Fastening part	Tightening torque			Note
	N·m	kgf·m	lbf·ft	
Spark plug	11	1.1	8.0	☞ (Page 1H-4)

#### Reference:

For the tightening torque of fastener not specified in this section, refer to “Tightening Torque List” in Section 0C (Page 0C-8).

## Special Tools and Equipment

### Special Tool

BA02J21808001

09900–25008 Multi circuit tester set ☞ (Page 1H-5) / ☞ (Page 1H-6) / ☞ (Page 1H-6) / ☞ (Page 1H-7) / ☞ (Page 1H-8)		09900–25009 Needle-point probe set ☞ (Page 1H-5) / ☞ (Page 1H-8)	
09930–10121 Spark plug wrench set ☞ (Page 1H-4) / ☞ (Page 1H-4)			

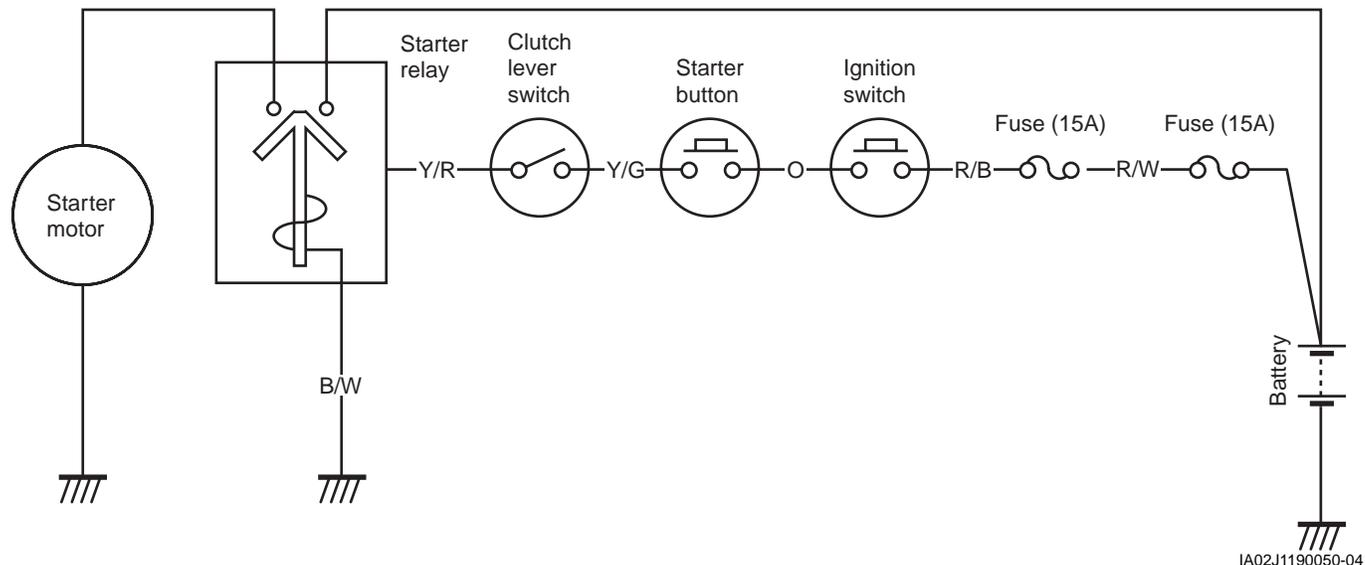
# Starting System

## Schematic and Routing Diagram

### Starting System Diagram

BA02J21902001

Refer to "Wire Color Symbols" in Section 0A (Page 0A-5).



## Component Location

### Starting System Components Location

BA02J21903001

Refer to "Electrical Components Location" in Section 0A (Page 0A-6).

## Diagnostic Information and Procedures

### Starting System Symptom Diagnosis

BA02J21904001

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.	Replace.
	Defective main fuse.	Replace.
	Defective clutch lever position switch.	Replace.

**Starter Motor will not Run**

BA02J21904002

**NOTE**

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

**Troubleshooting**

Step	Action	Yes	No
1	1) Shift the transmission into neutral. 2) Grasp the clutch lever, turn on the ignition switch and listen for a click from the starter relay when the starter button is pushed.  <i>Is a click sound heard?</i>	Go to step 2.	Go to step 3.
2	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.)  <i>Does the starter motor run?</i>	<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	Measure the starter relay voltage at the starter relay connectors (between Y/R (+) and B/W (-)) when the starter button is pushed.  <i>Is the voltage OK?</i>	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 starter button.</li> <li>Poor contact of connector.</li> <li>Open circuit in wire harness.</li> </ul>
4	Check the starter relay. Refer to "Starter Relay Inspection" (Page 11-7).  <i>Is the starter relay OK?</i>	Poor contact of the starter relay.	Faulty starter relay.

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

BA02J21904003

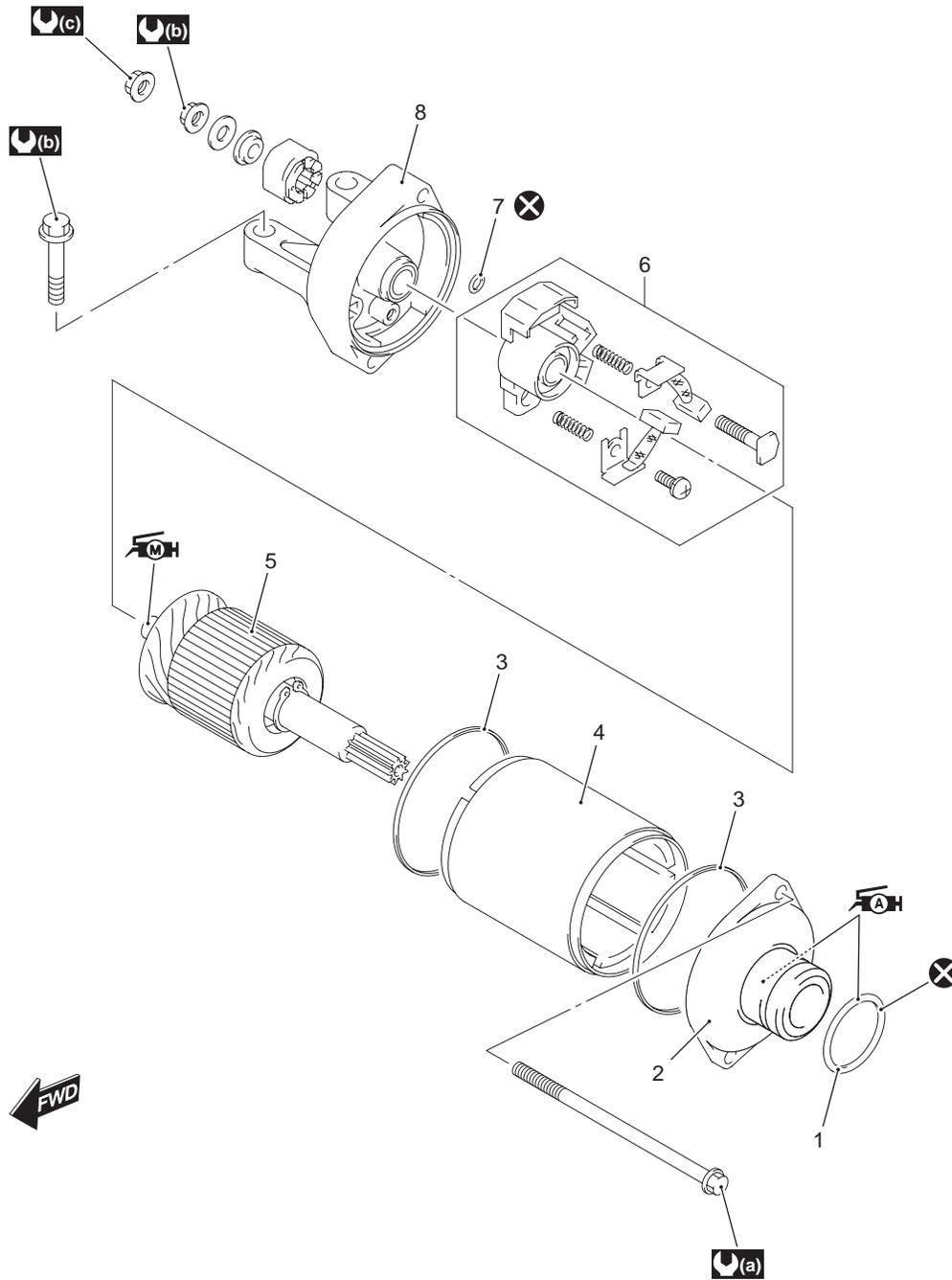
The starter motor runs when the transmission is in neutral, but does not run when the transmission is in any position other than neutral.

Step	Action	Yes	No
1	Check the starter clutch. Refer to "Starter Torque Limiter / Starter Idle Gear / Starter Clutch Removal and Installation" (Page 11-10).  <i>Is the starter clutch OK?</i>	<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

BA02J21906001



IA02J1190069-01

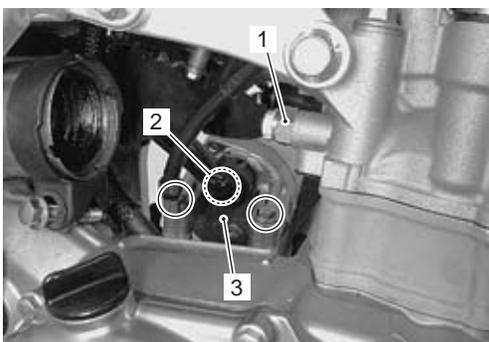
1. O-ring	6. Brush holder set	: 6 N·m (0.6 kgf·m, 4.5 lbf·ft)
2. Housing end (Inside)	7. O-ring	: Apply grease.
3. Square-ring	8. Housing end (Outside)	: Apply moly paste to sliding surface.
4. Starter motor case	: 5 N·m (0.5 kgf·m, 3.5 lbf·ft)	: Do not reuse.
5. Armature	: 11 N·m (1.1 kgf·m, 8.0 lbf·ft)	

## Starter Motor Removal and Installation

BA02J21906002

### Removal

- 1) Turn off the ignition switch.
- 2) Disconnect the battery (–) lead wire. Refer to “Battery / Battery Protector Removal and Installation” in Section 1J (Page 1J-9).
- 3) Remove the exhaust pipe. Refer to “Muffler / Exhaust Pipe Removal and Installation” in Section 1K (Page 1K-2).
- 4) Remove the ECT sensor (1). Refer to “ECT Sensor Removal and Installation” in Section 1C (Page 1C-5).
- 5) Remove the starter motor lead wire (2).
- 6) Remove the starter motor (3).



IA02J1190066-03

### Installation

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

- Apply grease to the O-ring.

 : Grease 99000–25010 (SUZUKI SUPER GREASE “A” or equivalent)

#### CAUTION

Replace the O-ring with a new one.



IA02J1190002-02

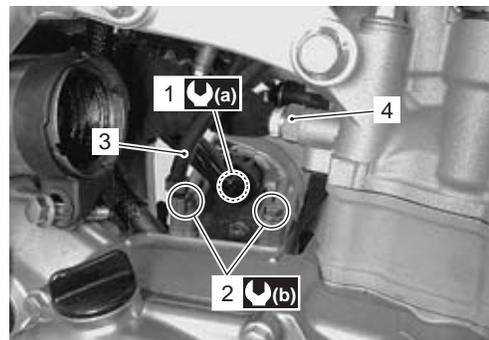
- Tighten the starter motor lead wire nut (1) and starter motor mounting bolts (2) with the battery (–) lead wire (3) to the specified torque. Refer to “Wiring Harness Routing Diagram” in Section 9A (Page 9A-2).

### Tightening torque

**Starter motor mounting bolt (a): 11 N·m (1.1 kgf-m, 8.0 lbf-ft)**

**Starter motor lead wire nut (b): 6 N·m (0.6 kgf-m, 4.5 lbf-ft)**

- Install the ECT sensor (4). Refer to “ECT Sensor Removal and Installation” in Section 1C (Page 1C-5).



IA02J1190067-02

- Install the exhaust pipe. Refer to “Muffler / Exhaust Pipe Removal and Installation” in Section 1K (Page 1K-2).

## Starter Motor Disassembly and Assembly

BA02J21906003

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-ring and square-rings with new ones to prevent oil leakage and moisture.

## 11-5 Starting System:

- Apply grease to the oil seal lip.

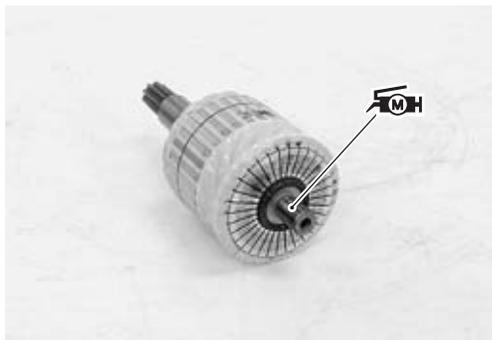
 : Grease 99000-25010 (SUZUKI SUPER GREASE "A" or equivalent)



IA02J1190004-02

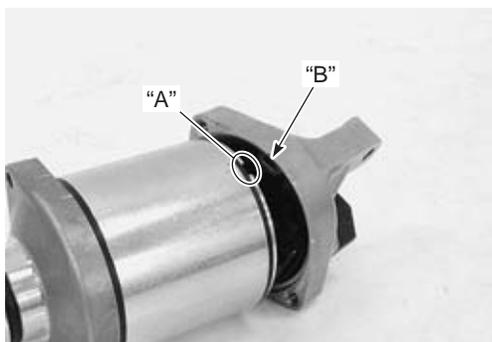
- Apply a small quantity of moly paste to the armature shaft.

 : Moly paste 99000-25140 (SUZUKI MOLY PASTE or equivalent)



IA02J1190006-02

- Fit the depression "A" of the case to the projection "B" on the housing end.

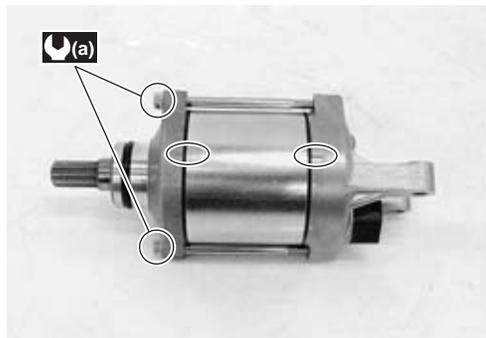


IA02J1190007-02

- Align the matching marks and tighten the starter motor housing bolts to the specified torque.

### Tightening torque

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



IA02J1190008-02

### Starter Motor Related Parts Inspection

BA02J21906004

Refer to "Starter Motor Disassembly and Assembly" (Page 11-4).

### Carbon Brush

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

If either carbon brush is defective, replace the housing end assembly (outside) with a new one.

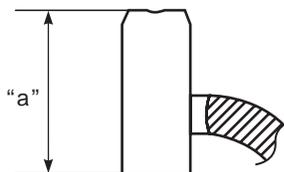
Measure the length "a" of the carbon brushes using a vernier calipers. If the measurement is less than the service limit, replace the housing end assembly (outside) with a new one.

### Brush length "a"

**Service limit: 6.55 mm (0.26 in)**

### Special tool

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



I718H1190013-01

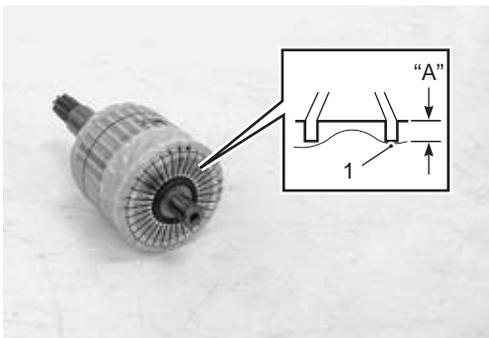
**Commutator**

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.



IA02J1190054-01

**Armature Coil**

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

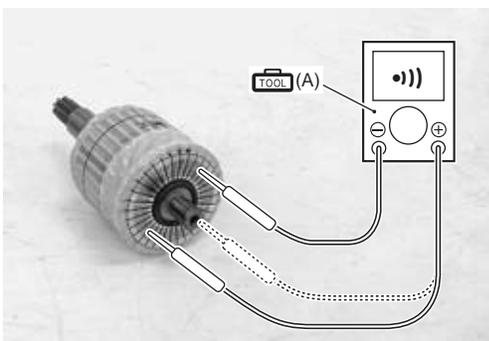
If there is no continuity between the segments or there is continuity between the segments and shaft, replace the armature with a new one.

**Special tool**

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

**Tester knob indication**

Continuity set (•))]

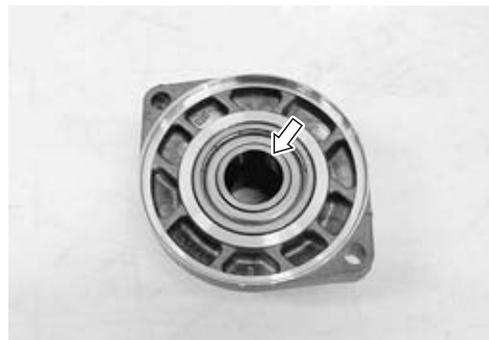


IA02J1190055-02

**Bearing**

Check the bearing of housing end for damage.

If any damage is found, replace the housing end.



IA02J1190056-01

**Oil Seal**

Check the seal lip for damage.

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



IA02J1190057-02

**Starter Relay Removal and Installation**

BA02J21906005

Refer to "Electrical Components Location" in Section 0A (Page 0A-6).

**Removal**

- 1) Turn off the ignition switch.
- 2) Disconnect the battery (-) lead wire from the battery. Refer to "Battery / Battery Protector Removal and Installation" in Section 1J (Page 1J-9).
- 3) Remove the left frame cover. Refer to "Exterior Parts Removal and Installation" in Section 9D (Page 9D-1).

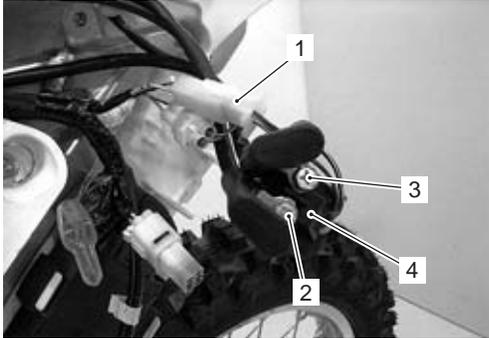
## 11-7 Starting System:

- 4) Disconnect the starter relay lead wire coupler (1), starter motor lead wire (2) and battery (+) lead wire (3).

### NOTE

Be sure to disconnect the starter motor lead wire (2) first, then disconnect the battery (+) lead wire (3).

- 5) Remove the starter relay (4).



IA02J1190010-02

### Installation

Install the starter relay in the reverse order of removal.

### Starter Relay Inspection

BA02J21906006

Inspect the starter relay in the following procedures:

- 1) Remove the starter relay. Refer to "Starter Relay Removal and Installation" (Page 11-6).
- 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

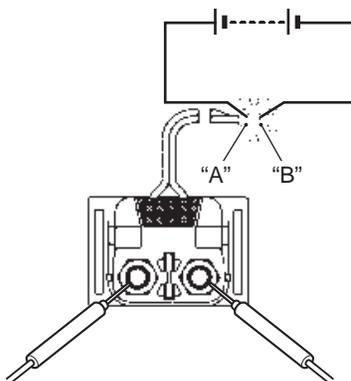
Do not apply battery voltage to the starter relay for five seconds and more, since the relay coil may overheat and get damaged.

### Special tool

 : 09900-25008 (Multi circuit tester set)

### Tester knob indication

Continuity test (  )



IA02J1190011-03

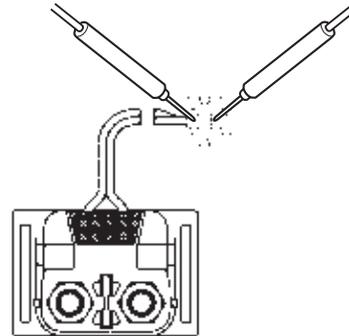
- 3) Measure the relay coil resistance between the terminals using the multi circuit tester. If the resistance is not within the specified value, replace the starter relay with a new one.

### Special tool

 : 09900-25008 (Multi circuit tester set)

### Starter relay resistance

3 – 5  $\Omega$



IA02J1190012-01

- 4) Install the starter relay.

### Gear Position (GP) Switch Inspection

BA02J21906007

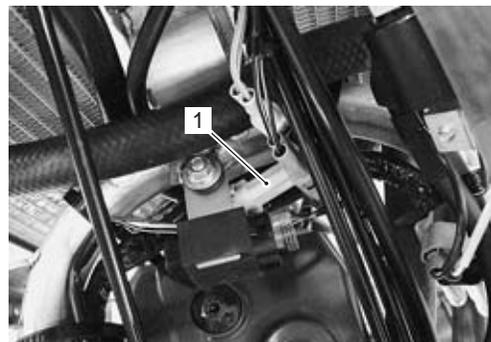
Refer to "DTC "31" (P0705): GP Switch Circuit Malfunction" in Section 1A (Page 1A-60).

Inspect the gear position switch in the following procedures:

- 1) Remove the fuel tank. Refer to "Fuel Tank Removal and Installation" in Section 1G (Page 1G-5).
- 2) Disconnect the gear position switch lead wire coupler (1).

### ⚠ CAUTION

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



IA02J1190013-01

- 3) Check the continuity between BI and B lead wires with the transmission in neutral.

**Special tool**

 : 09900-25008 (Multi circuit tester set)

**Tester knob indication**

**Continuity test (  )**

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

I947H1190030-01

- 4) Connect the gear position switch lead wire coupler to the wiring harness.  
5) Insert the needle-point probes to the lead wire coupler.  
6) Turn on the ignition switch.

- 7) Measure the voltage between P and B/W lead wires using the multi circuit tester when shifting the gearshift lever from 1st to top.

**Special tool**

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

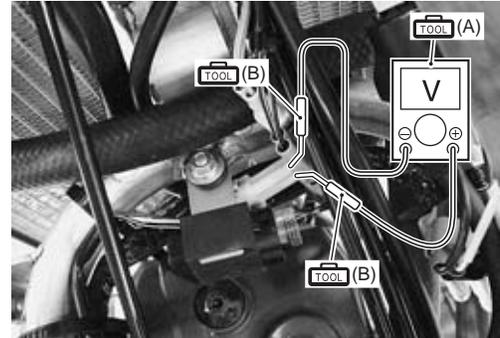
 (B): 09900-25009 (Needle-point probe set)

**Tester knob indication**

**Voltage (  )**

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

**0.6 V and more ((+) P – (-) B/W)**

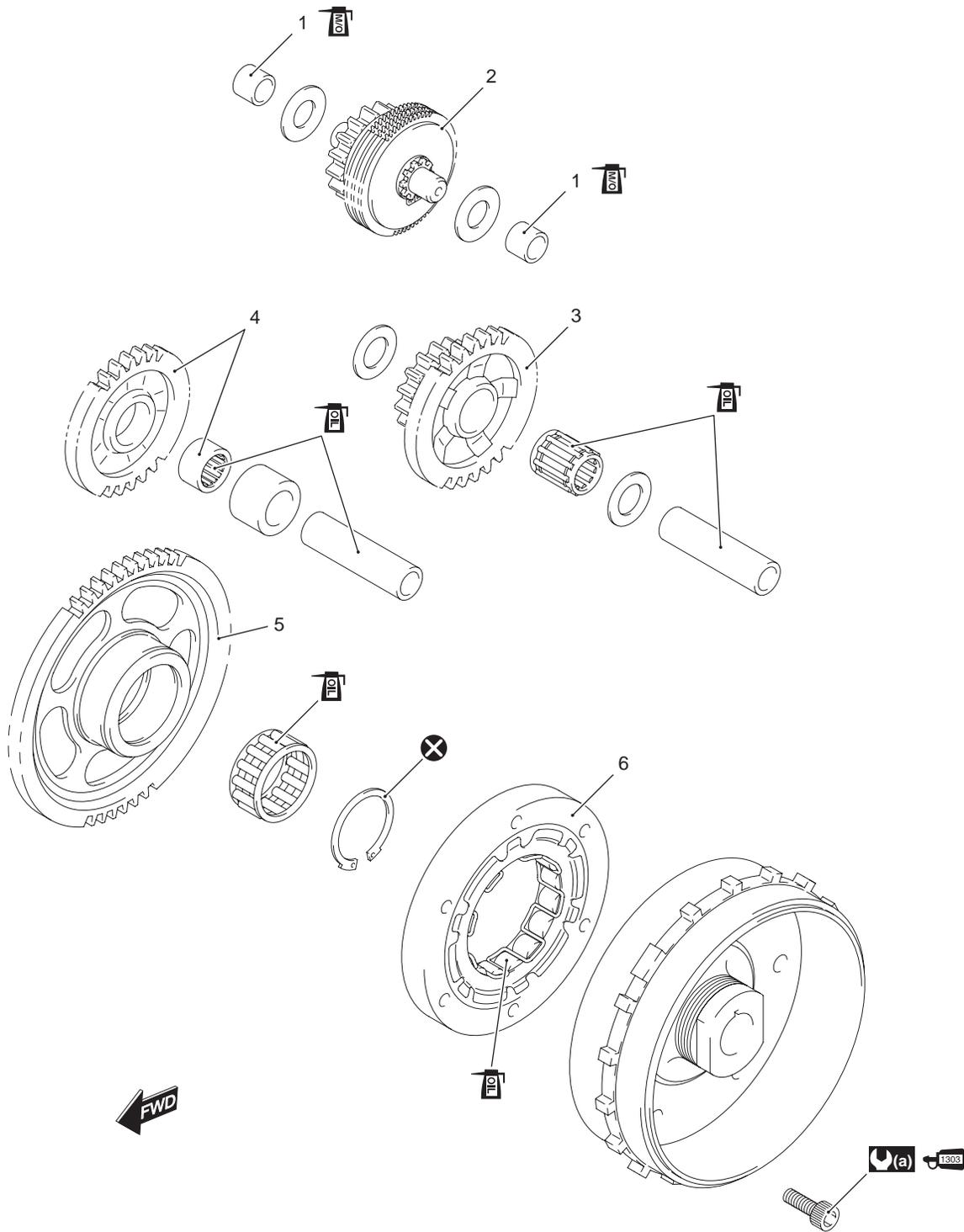


IA02J1190014-02

- 8) Turn off the ignition switch.  
9) Install the removed parts.

Starter Torque Limiter / Starter Idle Gear / Starter Clutch Components

BA02J21906008



IA02J1190058-02

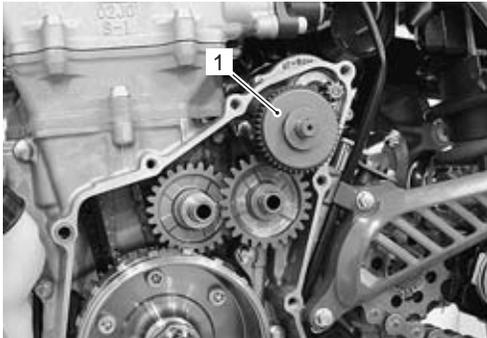
1. Bushing	5. Starter driven gear	: Apply molybdenum oil solution.
2. Starter Torque limiter	6. Starter clutch	: Apply thread lock.
3. Starter Idle gear No. 2	: 13 N-m (1.3 kgf-m, 9.5 lbf-ft)	: Do not reuse.
4. Starter Idle gear No. 3	: Apply engine oil.	

## Starter Torque Limiter / Starter Idle Gear / Starter Clutch Removal and Installation

BA02J21906009

### Removal

- 1) Remove the magneto cover. Refer to "Generator Removal and Installation" in Section 1J (Page 1J-5).
- 2) Remove the starter torque limiter assembly (1) and washers.



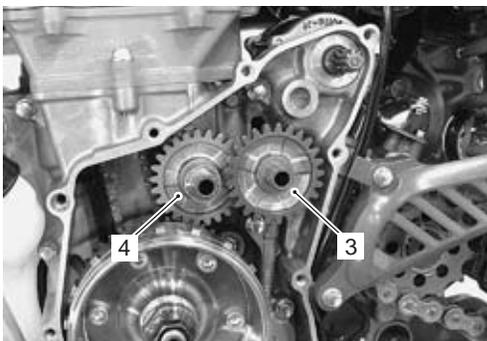
IA02J1190015-01

- 3) Remove the bushings (2) from the crankcase and magneto cover.



IA02J1190016-01

- 4) Remove the starter idle gear No. 2 (3) with its washer, shaft and bearing.
- 5) Remove the starter idle gear No. 3 (4) with its spacer and shaft.

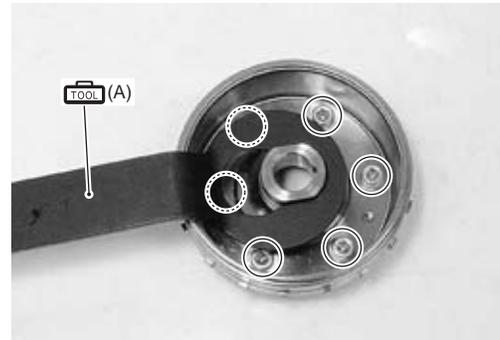


IA02J1190017-02

- 6) Remove the magneto rotor. Refer to "Generator Removal and Installation" in Section 1J (Page 1J-5).
- 7) Hold the magneto rotor with the special tool and remove the starter clutch bolts.

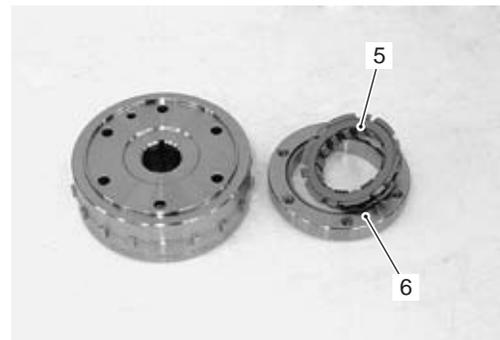
### Special tool

 (A): 09930-40210 (Rotor holder)



IA02J1190060-02

- 8) Remove the one way clutch (5) from the guide (6).



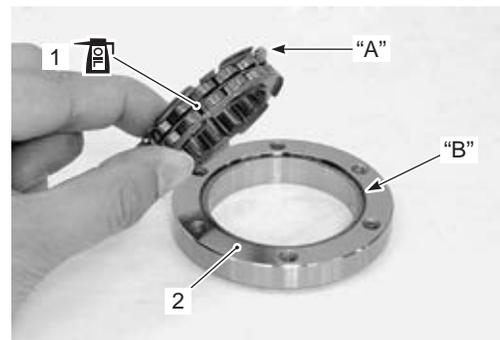
IA02J1190061-01

### Installation

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

### NOTE

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



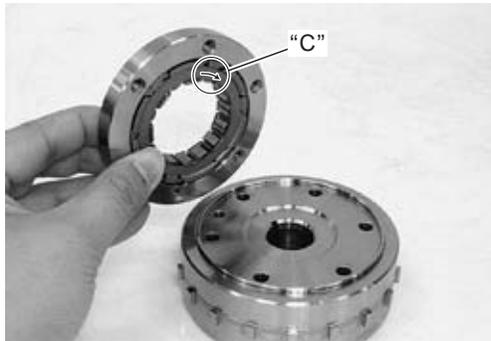
IA02J1190062-01

## 1I-11 Starting System:

- Install the guide to the generator rotor.

### NOTE

The arrow mark "C" must face the generator rotor side.



IA02J1190063-01

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

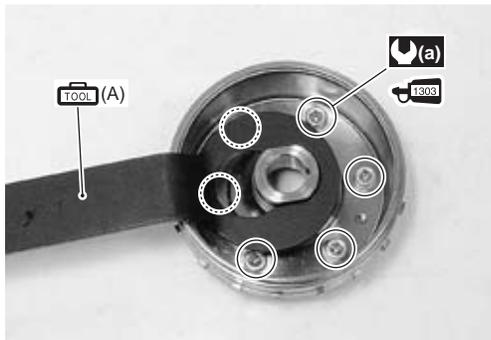
 : Thread lock cement 99000-32030 (THREAD LOCK CEMENT SUPER "1303" or equivalent)

### Special tool

 (A): 09930-40210 (Rotor holder)

### Tightening torque

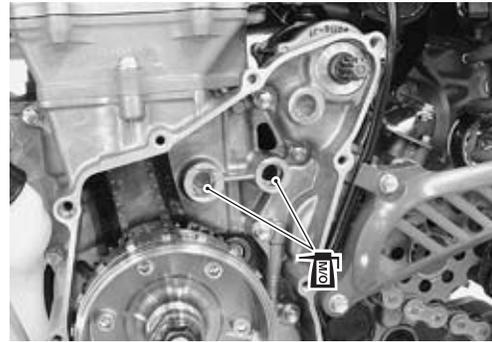
Starter clutch bolt (a): 13 N·m (1.3 kgf·m, 9.5 lbf·ft)



IA02J1190064-01

- Install the generator rotor assembly onto crankshaft. Refer to "Generator Removal and Installation" in Section 1J (Page 1J-5).
- Apply molybdenum oil solution to the starter idle gear shaft holes.

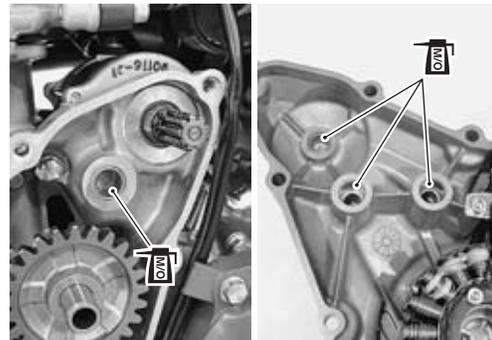
**M/O: Molybdenum oil (MOLYBDENUM OIL SOLUTION)**



IA02J1190018-01

- Install the starter idle gears.
- Apply molybdenum oil solution to the starter torque limiter bushings and idle gear holes on the generator cover.

**M/O: Molybdenum oil (MOLYBDENUM OIL SOLUTION)**



IA02J1190019-01

- Install the starter torque limiter.
- Install the magneto cover. Refer to "Generator Removal and Installation" in Section 1J (Page 1J-5).
- Pour engine oil. Refer to "Engine Oil Inspection and Replacement" in Section 0B (Page 0B-5).

## Starter Torque Limiter Inspection

BA02J21906010

Inspect the starter torque limiter in the following procedures:

### CAUTION

- Do not attempt to disassemble the starter torque limiter.
- The starter torque limiter is available only as an assembly part.

- 1) Hold the starter torque limiter with the special tools and vise as shown in the figure.

### Special tool

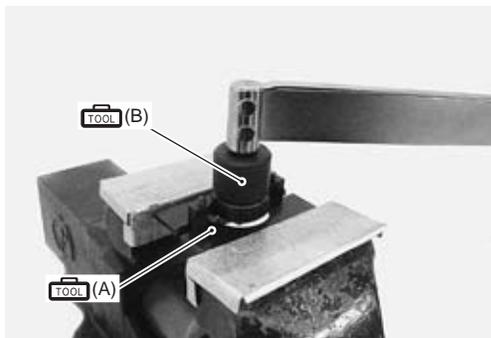
 (A): 09930-73170 (Starter torque limiter holder)

 (B): 09930-70220 (Starter torque limiter socket)

- Turn the starter torque limiter with a torque wrench and check the slip torque. If the slip torque is not within the specification, replace the starter torque limiter with a new one.

#### **Starter torque limiter slip torque**

**Standard: 9 – 24 N·m (0.9 – 2.4 kgf-m, 6.5 – 17.5 lbf-ft)**



IA02J1190065-01

### **Starter Clutch Related Parts Inspection**

BA02J21906011

Refer to “Starter Torque Limiter / Starter Idle Gear / 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 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 the one way clutch with a new one.



IA02J1190020-01

#### **Starter Driven Gear Bearing and Starter Driven Gear**

Inspect the starter driven gear bearing and starter clutch contacting surface on the starter driven gear for wear and damage. If they are found to be damaged, replace them with new ones.



IA02J1190021-01

#### **Starter Idle Gear**

Inspect the starter idle gears and bearings for wear or damage. If any damage is found, replace it with a new one.



IA02J1190022-01

### **Starter Driven Gear Bearing Removal and Installation**

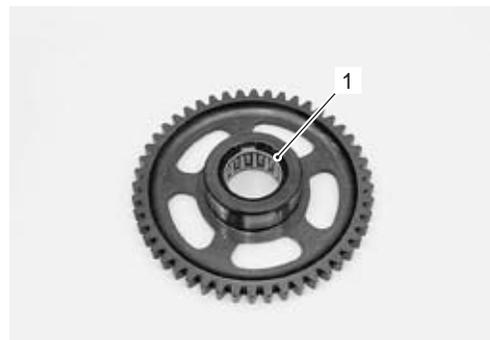
BA02J21906012

#### **Removal**

- Remove the starter driven gear. Refer to “Starter Torque Limiter / Starter Idle Gear / Starter Clutch Removal and Installation” (Page 11-10).
- Remove the bearing by removing the snap ring (1) using the special tool.

#### **Special tool**

**TOOL : 09900-06108 (Snap ring remover (Close type))**



IA02J1190023-01

## 1I-13 Starting System:

### Installation

Install the starter driven gear bearing in the reverse order of removal.

#### **⚠ CAUTION**

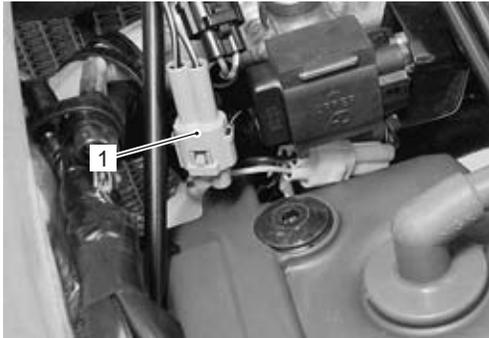
**The removed snap ring must be replaced with a new one.**

### Starter Button Inspection

BA02J21906013

Inspect the starter button in the following procedures:

- 1) Remove the fuel tank. Refer to "Fuel Tank Removal and Installation" in Section 1G (Page 1G-5).
- 2) Disconnect the starter button lead wire coupler (1).



IA02J1190024-02

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

#### **Special tool**

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

#### **Tester knob indication**

**Continuity (↔)]]**

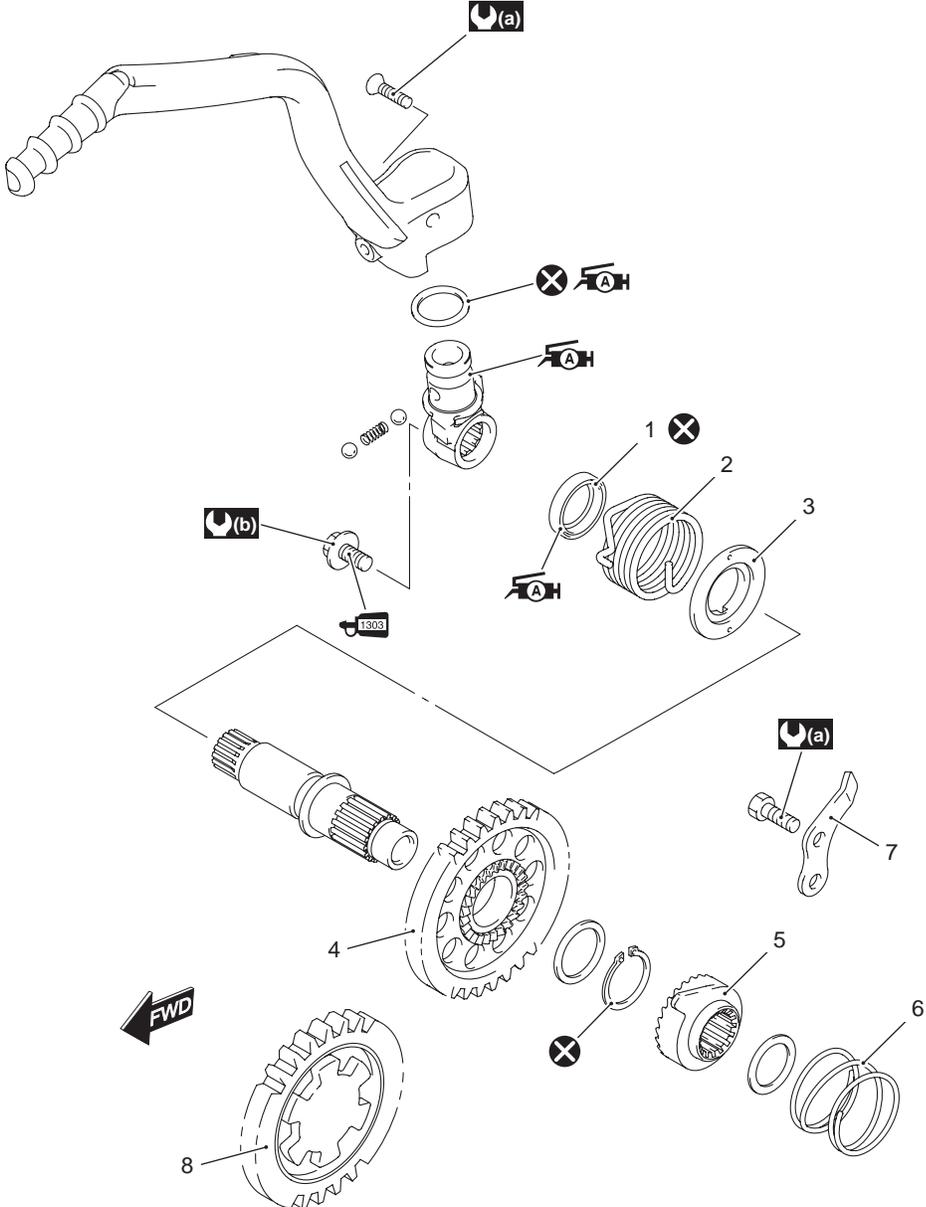
Position \ Color	B/W	B/Y
•		
PUSH	○	○

IA02J1190025-01

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

Kick Starter Components

BA02J21906014



1. Oil seal	8. Kick starter idle gear
2. Return spring	(a): 10 N-m (1.0 kgf-m, 7.0 lbf-ft)
3. Spring guide	(b): 29 N-m (2.9 kgf-m, 21.0 lbf-ft)
4. Kick starter drive gear	(a): Apply grease.
5. Kick starter	(b): Apply thread lock to the thread part.
6. Spring	(X): Do not reuse.
7. Kick starter guide	

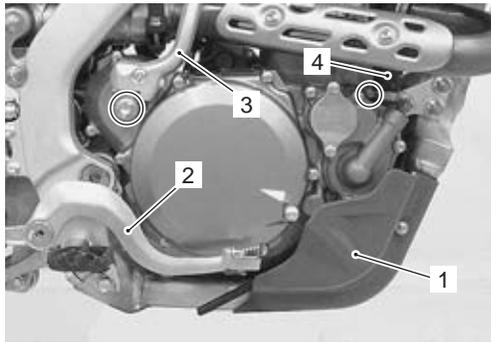
IA02J1190026-02

**Kick Starter Removal and Installation**

BA02J21906015

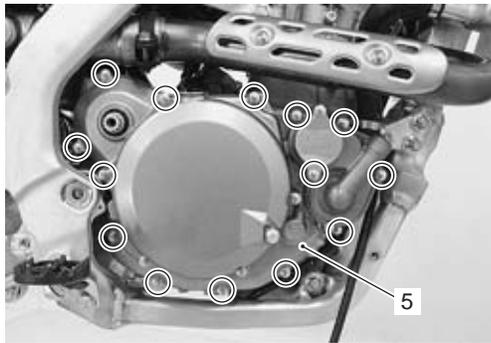
**Removal**

- 1) Drain engine oil. Refer to "Engine Oil Inspection and Replacement" in Section 0B (Page 0B-5).
- 2) Drain engine coolant. Refer to "Cooling System Inspection" in Section 0B (Page 0B-9).
- 3) Remove the protector (1). Refer to "Exterior Parts Removal and Installation" in Section 9D (Page 9D-1).
- 4) Remove the brake pedal (2). Refer to "Rear Brake Pedal Removal and Installation" in Section 4A (Page 4A-16).
- 5) Remove the kick starter lever (3).
- 6) Disconnect the radiator outlet hose (4).



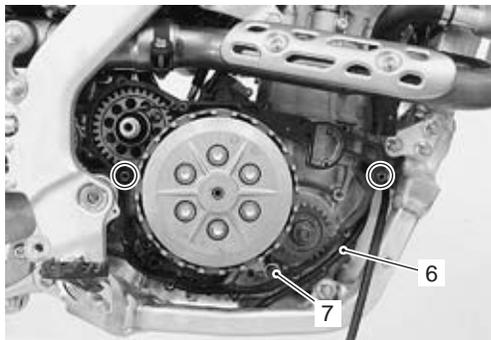
IA02J1190027-01

- 7) Remove the right crankcase cover (5).



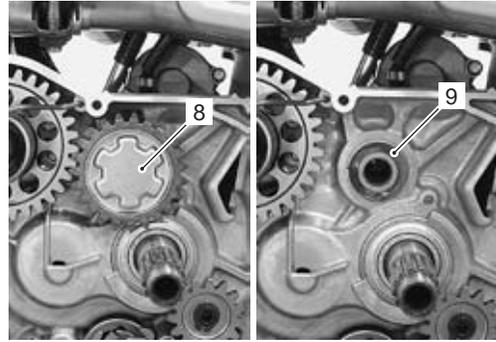
IA02J1190028-01

- 8) Remove the dowel pins, gasket (6) and O-ring (7).
- 9) Remove the clutch component parts. Refer to "Clutch Removal" in Section 5C (Page 5C-7).



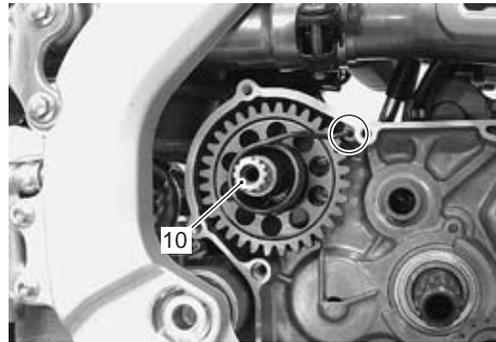
IA02J1190029-01

- 10) Remove the kick starter idle gear (8) and wave washer (9).



IA02J1190030-03

- 11) Unhook the end of return spring and remove the kick starter shaft assembly (10).



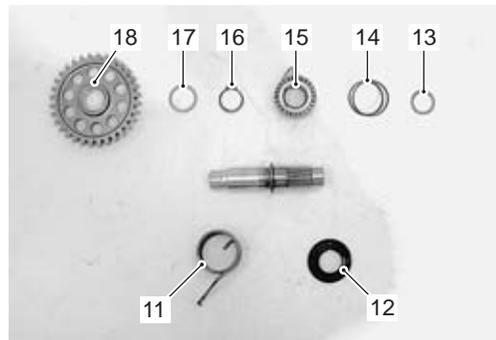
IA02J1190031-02

- 12) Remove the following parts from the kick starter shaft.

- Return spring (11)
- Spring guide (12)
- Washer (13)
- Spring (14)
- Kick starter (15)
- Snap ring (16)
- Washer (17)
- Kick starter drive gear (18)

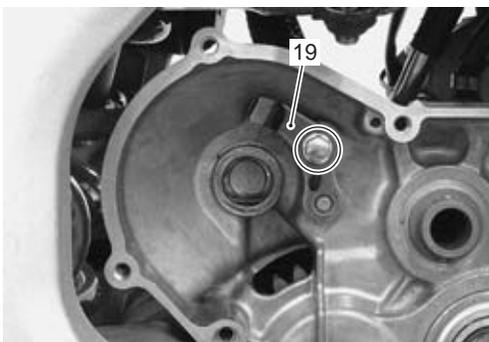
**Special tool**

 : 09900-06107 (Snap ring remover (Open type))



IA02J1190032-02

- 13) Remove the kick starter guide (19).



IA02J1190046-02

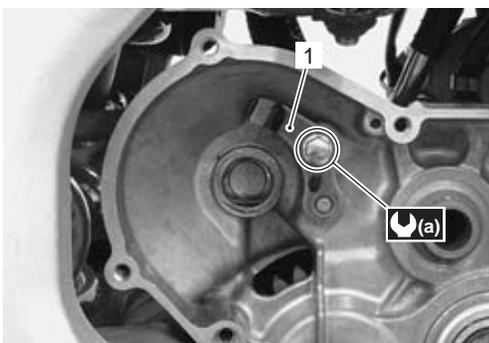
### Installation

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

- Install the kick starter guide (1) and tighten the bolt to the specified torque.

### Tightening torque

**Kick starter guide bolt (a): 10 N·m (1.0 kgf·m, 7.0 lbf·ft)**



IA02J1190033-01

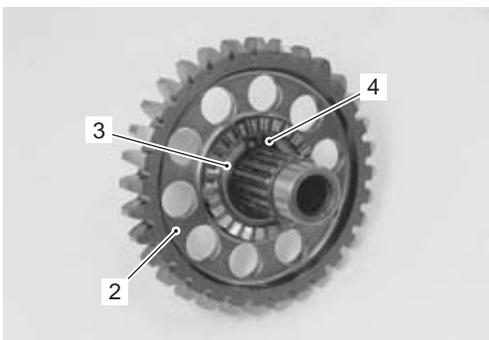
- Install the kick starter drive gear (2), washer (3) and snap ring (4) onto the kick starter shaft.

### ⚠ CAUTION

**Replace the snap ring (4) with a new one.**

### Special tool

 : 09900-06107 (Snap ring remover (Open type))

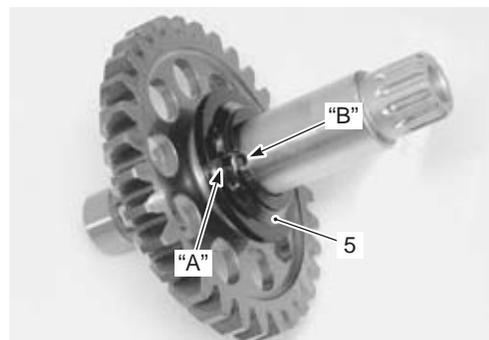


IA02J1190034-01

- Install the spring guide (5) onto the kick starter shaft.

### NOTE

**Align the concave of spring guide "A" with kick starter hole "B".**



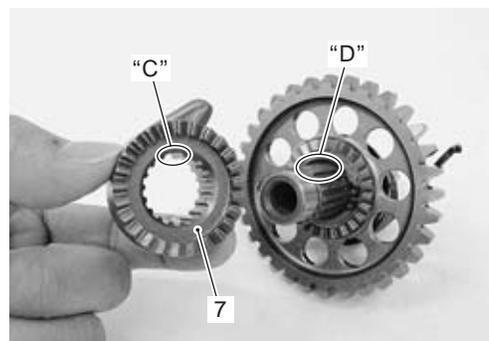
IA02J1190035-01

- Install the return spring (6) into the kick starter shaft hole.



IA02J1190036-01

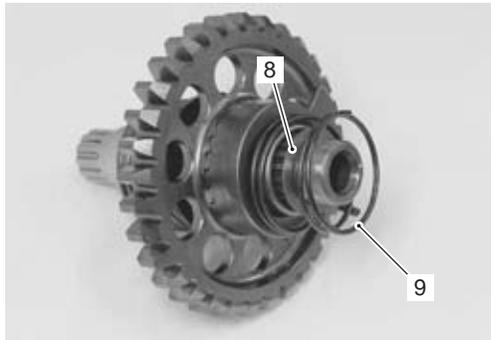
- Aligning the truncated spines "C" and "D", install the kick starter (7) to the kick starter shaft.



IA02J1190037-02

## 11-17 Starting System:

- Install the washer (8) and spring (9) onto the kick starter shaft.

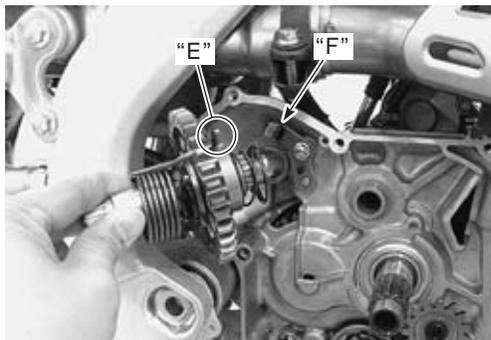


IA02J1190038-03

- Install the kick starter shaft assembly onto the crankcase.

### NOTE

Securely engage the stopper portion "E" of the kick starter with the guide "F".



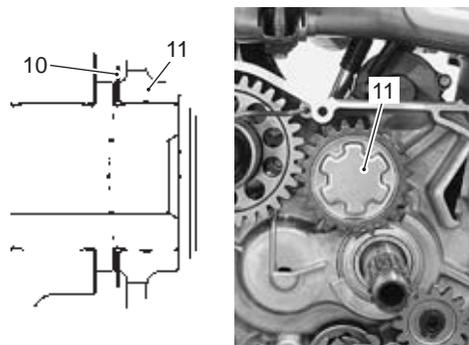
IA02J1190039-01

- Hook the end of return spring to the crankcase.



IA02J1190040-01

- Install the wave washer (10) onto the kick starter idle shaft with convex side facing inside.
- Install the kick starter idle gear (11).

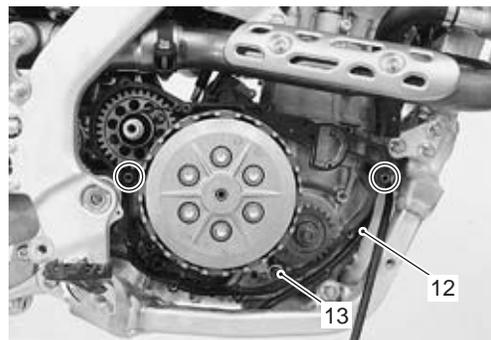


IA02J1190041-04

- Reassemble the clutch component parts. Refer to "Clutch Installation" in Section 5C (Page 5C-8).
- Install the dowel pins, gasket (12) and O-ring (13).

### ⚠ CAUTION

Use the new gasket (12) and O-ring (13) to prevent oil leakage.



IA02J1190042-03

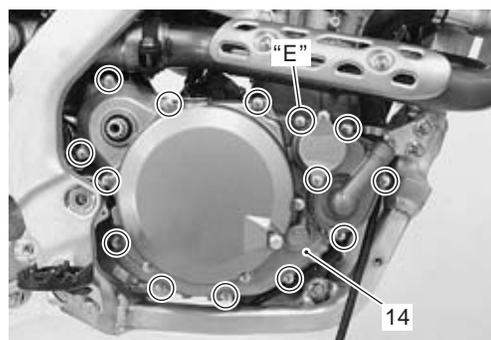
- Install the right crankcase cover (14).

### ⚠ CAUTION

Use the new gasket washer "E" to prevent oil leakage.

### Tightening torque

Right crankcase bolt: 11 N·m (1.1 kgf·m, 8.0 lbf·ft)



IA02J1190043-03

- Align the truncated splines and install the kick starter lever to the shaft.



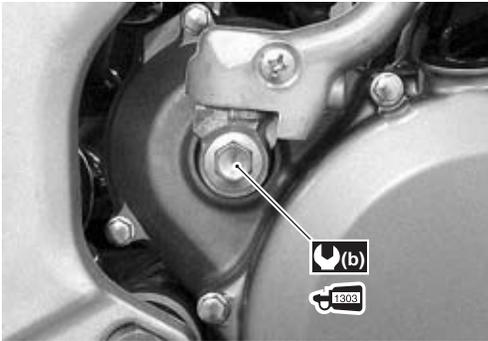
IA02J1190044-01

- Apply thread lock to the kick starter lever hole and tighten it to the specified torque.

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

**Tightening torque**

Kick starter lever bolt (b): 29 N-m (2.9 kgf-m, 21.0 lbf-ft)



IA02J1190045-01

**Kick Starter Related Parts Inspection**

BA02J21906016

Inspect the oil seal lip for wear and damage. If any defects are found, replace the oil seal with a new one.



IA02J1190051-01

Inspect the kick starter component parts for any damage. If necessary, replace the defective parts with a new one.



IA02J1190052-01

Inspect the kick starter idle gear and wave washer for wear and damage. If any defects are found, replace the gear with a new one.



IA02J1190053-01

Inspect the oil seal lip for wear and damage. If any defects are found, replace the oil seal with a new one.



IA02J1190047-01

## Specifications

### Service Data

BA02J21907001

Unit: mm (in)

Item	Specification		Note
	Standard		
Starter motor brush length	Standard	12.05 (0.47)	
	Limit	6.55 (0.26)	
Starter relay resistance	3 – 5 Ω		

### Tightening Torque Specifications

BA02J21907002

Fastening part	Tightening torque			Note
	N-m	kgf-m	lbf-ft	
Starter motor mounting bolt	11	1.1	8.0	☞ (Page 11-4)
Starter motor lead wire nut	6	0.6	4.5	☞ (Page 11-4)
Starter motor housing bolt	5	0.5	3.5	☞ (Page 11-5)
Starter clutch bolt	13	1.3	9.5	☞ (Page 11-11)
Kick starter guide bolt	10	1.0	7.0	☞ (Page 11-16)
Right crankcase bolt	11	1.1	8.0	☞ (Page 11-17)
Kick starter lever bolt	29	2.9	21.0	☞ (Page 11-18)

#### NOTE

The specified tightening torque is described in the following.

“Starter Motor Components” (Page 11-3)

“Starter Torque Limiter / Starter Idle Gear / Starter Clutch Components” (Page 11-9)

“Kick Starter Components” (Page 11-14)

#### Reference:

For the tightening torque of fastener not specified in this section, refer to “Tightening Torque List” in Section 0C (Page 0C-8).

## Special Tools and Equipment

### Recommended Service Material

BA02J21908001

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)
Molybdenum oil	MOLYBDENUM OIL SOLUTION	—	☞ (Page 11-11) / ☞ (Page 11-11)
Thread lock cement	THREAD LOCK CEMENT SUPER “1303” or equivalent	P/No.: 99000–32030	☞ (Page 11-11) / ☞ (Page 11-18)

#### NOTE

Required service material is also described in the following.

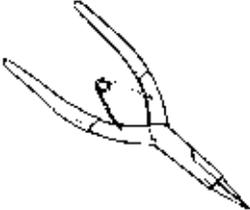
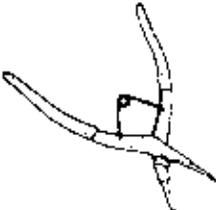
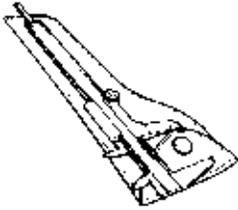
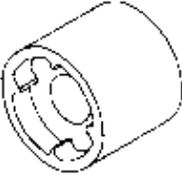
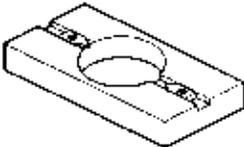
“Starter Motor Components” (Page 11-3)

“Starter Torque Limiter / Starter Idle Gear / Starter Clutch Components” (Page 11-9)

“Kick Starter Components” (Page 11-14)

## Special Tool

BA02J21908002

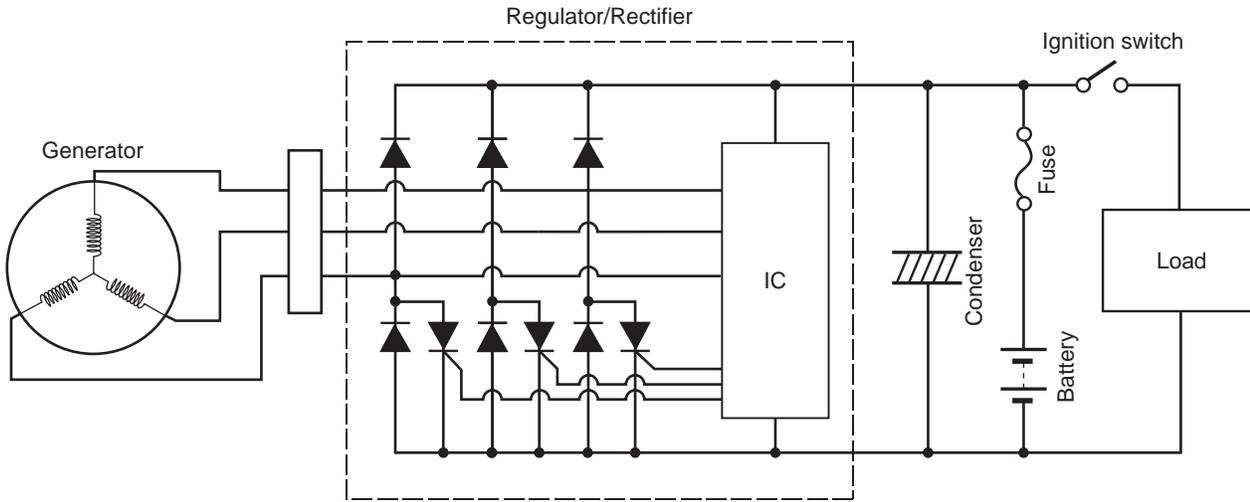
<p>09900-06107 Snap ring remover (Open type) ☞ (Page 11-15) / ☞ (Page 11-16)</p>		<p>09900-06108 Snap ring remover (Close type) ☞ (Page 11-12)</p>	
<p>09900-20102 Vernier calipers (200 mm) ☞ (Page 11-5)</p>		<p>09900-25008 Multi circuit tester set ☞ (Page 11-6) / ☞ (Page 11-7) / ☞ (Page 11-7) / ☞ (Page 11-8) / ☞ (Page 11-8) / ☞ (Page 11-13)</p>	
<p>09900-25009 Needle-point probe set ☞ (Page 11-8)</p>		<p>09930-40210 Rotor holder ☞ (Page 11-10) / ☞ (Page 11-11)</p>	
<p>09930-70220 Starter torque limiter socket ☞ (Page 11-11)</p>		<p>09930-73170 Starter torque limiter holder ☞ (Page 11-11)</p>	

# Charging System

## Schematic and Routing Diagram

### Charging System Diagram

BA02J21A02001



IA02J11A0018-04

## Component Location

### Charging System Components Location

Refer to "Electrical Components Location" in Section 0A (Page 0A-6).

BA02J21A03001

## Diagnostic Information and Procedures

### Charging System Symptom Diagnosis

BA02J21A04001

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>
<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>"Sulfation", acidic white powdery substance or spots on surfaces of cell plates</b>	Cracked battery case.	<i>Replace the battery.</i>
	Battery has been left in a run-down condition for a long time.	<i>Replace the battery.</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 discharged too rapidly</b>	Dirty container top and sides.	<i>Clean.</i>
	Old battery.	<i>Replace.</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**

**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-4). <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-4). <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-4). <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**

BA02J21A06001

Inspect the battery current leakage in the following procedures:

- 1) Turn off the ignition switch.
- 2) Remove the seat. Refer to "Exterior Parts Removal and Installation" in Section 9D (Page 9D-1).
- 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 on the ignition switch when measuring current.

**Special tool**

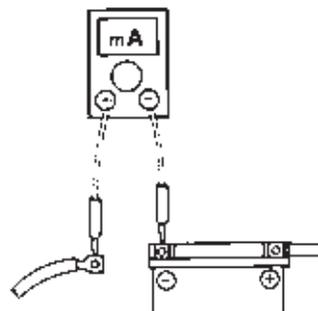
**TOOL : 09900-25008 (Multi circuit tester set)**

**Tester knob indication**

**Current (---, 20 mA)**

**Battery current (Leak)**

**Under 1.0 mA**



I649G11A0002-02

- 5) Connect the (-) battery terminal and install the seat.

## Regulated Voltage Inspection

BA02J21A06002

Inspect the regulated voltage in the following procedures:

- 1) Remove the seat. Refer to "Exterior Parts Removal and Installation" in Section 9D (Page 9D-1).
- 2) Bring the tachometer close to the spark plug high-tension cord.
- 3) Start the engine and keep it running at 5 000 r/min.
- 4) 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-4) and "Regulator / Rectifier Inspection" (Page 1J-8).

### NOTE

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

### Special tool

 : 09900-25008 (Multi circuit tester set)

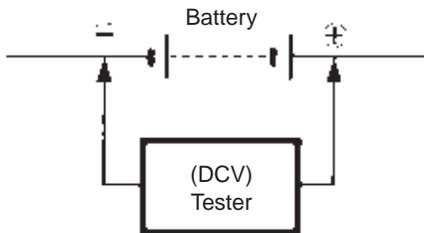
 : 09900-26006 (Engine tachometer)

### Tester knob indication

Voltage ( --- )

### Regulated voltage (Charging output)

Standard: 13.5 – 15.0 V at 5 000 r/min



I649G11A0003-02

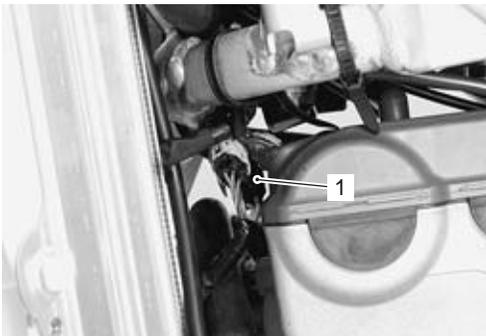
- 5) Install the seat.

## Generator Inspection

BA02J21A06003

### Generator Coil Resistance

- 1) Disconnect the generator lead wire coupler (1).



IA02J11A0001-02

- 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, it is not necessary to remove the generator.

### Special tool

 : 09900-25008 (Multi circuit tester set)

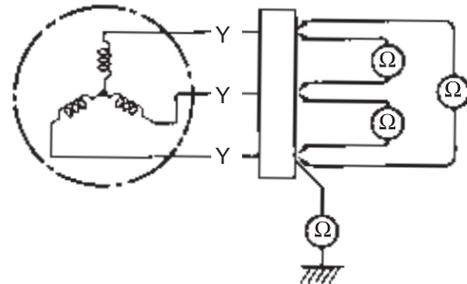
### Tester knob indication

Resistance ( $\Omega$ )

### Generator coil resistance

0.2 – 0.6  $\Omega$  (Y – Y)

$\infty$   $\Omega$  (Y – Ground)

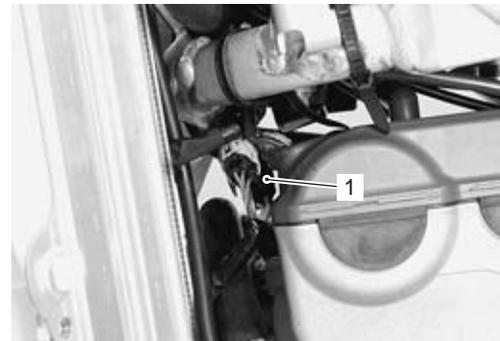


IA02J11A0002-01

- 3) Connect the generator lead wire coupler (1).

### No-load Performance

- 1) Disconnect the generator lead wire coupler (1).



IA02J11A0001-02

- 2) Bring the tachometer close to the spark plug high-tension cord.
- 3) Start the engine and keep it running at 5 000 r/min.

## 1J-5 Charging System:

- 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

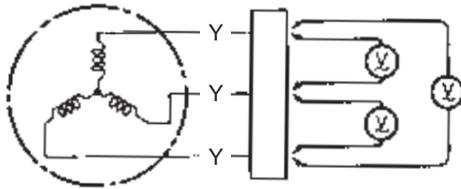
 : 09900-25008 (Multi circuit tester set)

 : 09900-26006 (Engine tachometer)

### Tester knob indication

Voltage (~)

**Generator no-load voltage (When engine is cold)**  
60 V (AC) and more at 5 000 r/min (Y – Y)



IA02J11A0004-01

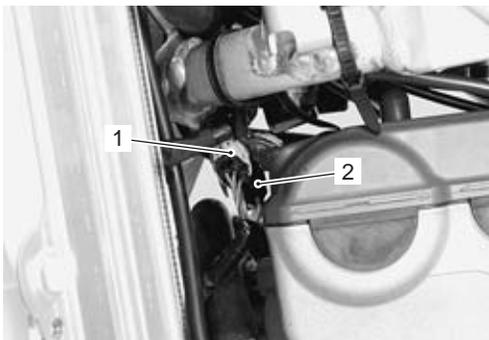
- Connect the generator lead wire coupler (1).

## Generator Removal and Installation

BA02J21A06004

### Removal

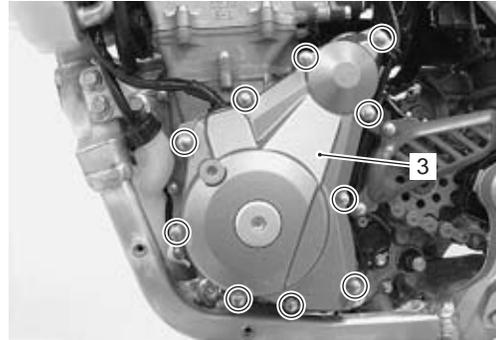
- Remove the protector. Refer to “Exterior Parts Removal and Installation” in Section 9D (Page 9D-1).
- Drain engine oil. Refer to “Engine Oil Filter Replacement” in Section 0B (Page 0B-7).
- Disconnect the CKP/crankshaft rotation signal sensor lead wire coupler (1) and generator lead wire coupler (2).



IA02J11A0005-02

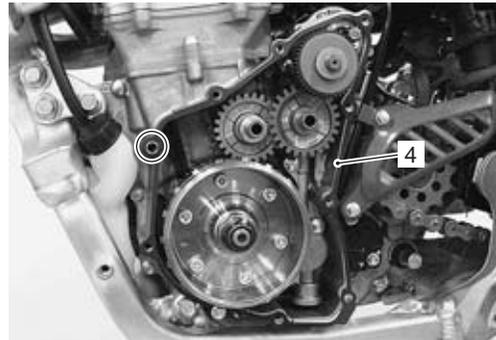
- Remove the gearshift lever. Refer to “Gearshift Shaft / Gearshift Cam Plate Removal and Installation” in Section 5B (Page 5B-13).

- Remove the magneto cover (3).



IA02J11A0006-01

- Remove the gasket (4) and dowel pin.



IA02J11A0007-01

- Hold the magneto rotor with the special tool.

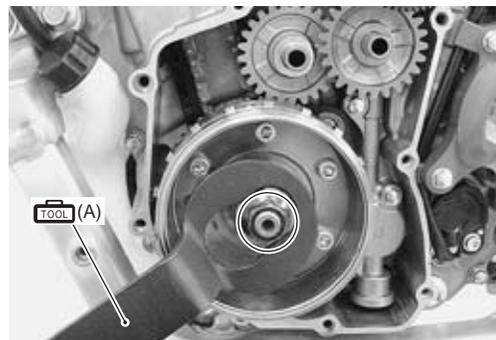
### Special tool

 (A): 09930-40210 (Rotor holder)

- Loosen the magneto rotor nut.

### NOTE

**When loosening the generator rotor nut, do not remove it. The nut is used in conjunction with the rotor remover when removing the rotor.**



IA02J11A0019-01

- 9) Remove the magneto rotor assembly with the special tool.

#### Special tool

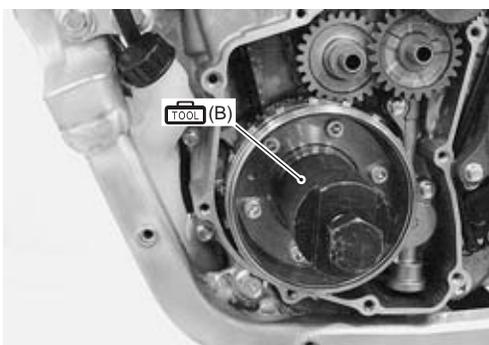
 (B): 09930-34932 (Rotor remover)

#### CAUTION

Do not hit the magneto rotor with a hammer, otherwise the rotor may be damaged.

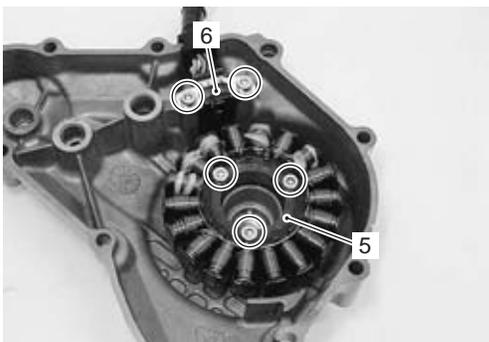
#### NOTE

Remove the starter clutch from the magneto rotor if necessary. Refer to "Starter Torque Limiter / Starter Idle Gear / Starter Clutch Removal and Installation" in Section 11 (Page 11-10).



IA02J11A0008-02

- 10) Remove the magneto stator (5) and CKP sensor (6).



IA02J11A0009-01

#### Installation

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

- When installing the magneto stator and CKP sensor, route the wire properly. Refer to "Wiring Harness Routing Diagram" in Section 9A (Page 9A-2).
- Tighten the magneto stator bolts and CKP sensor mounting bolts to the specified torque. Refer to "Wiring Harness Routing Diagram" in Section 9A (Page 9A-2).

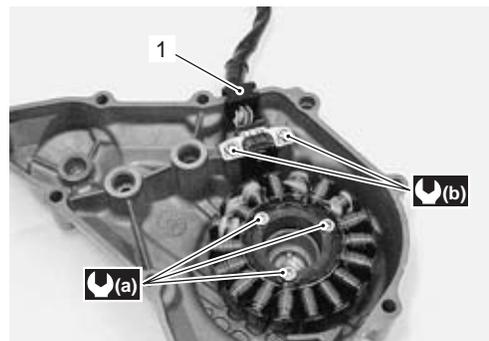
#### NOTE

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

#### Tightening torque

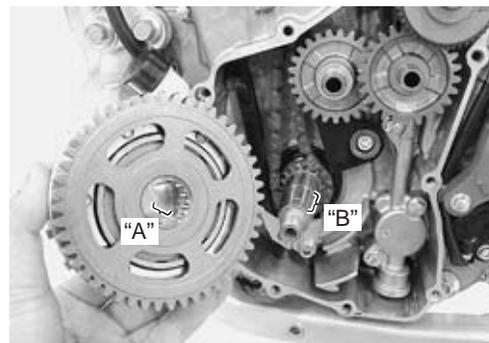
Generator stator bolt (a): 5.5 N-m (0.55 kgf-m, 4.0 lbf-ft)

CKP sensor mounting bolt (b): 5.5 N-m (0.55 kgf-m, 4.0 lbf-ft)



IA02J11A0017-02

- Degrease the tapered portion "A" of magneto rotor and "B" of the crankshaft. Use nonflammable cleaning solvent to wipe off oily or greasy matter and make these surfaces completely dry.
- Install the magneto rotor assembly onto crankshaft.



IA02J11A0020-01

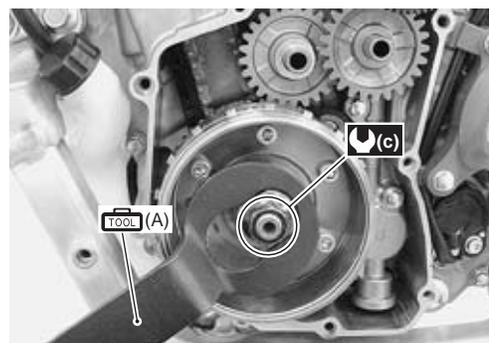
- Hold the magneto rotor with the special tool and tighten the magneto rotor nut to the specified torque.

#### Special tool

 (A): 09930-40210 (Rotor holder)

#### Tightening torque

Magneto rotor nut (c): 100 N-m (10.0 kgf-m, 72.5 lbf-ft)

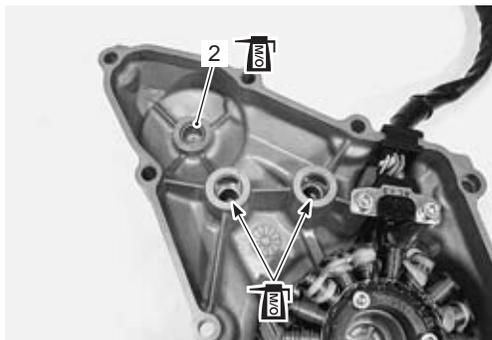


IA02J11A0021-02

## 1J-7 Charging System:

- Apply molybdenum oil solution to the idle gear shaft holes and starter torque limiter bushing (2).

**M/O: Molybdenum oil (MOLYBDENUM OIL SOLUTION)**

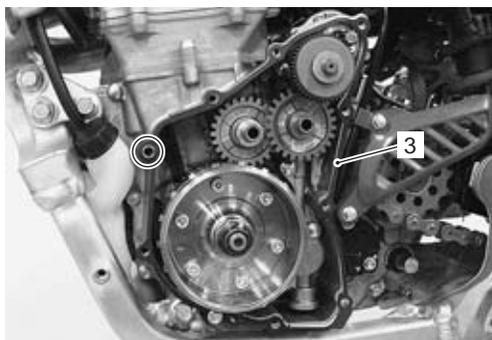


IA02J11A0010-01

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

### **⚠ CAUTION**

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



IA02J11A0011-01

- Install the magneto cover (4) and tighten the bolts to the specified torque.

### **⚠ WARNING**

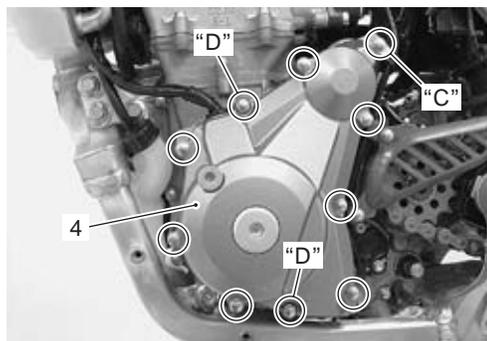
**Be careful not to pinch the finger between the magneto cover and the crankcase.**

### **NOTE**

**Fit the clamp to the bolt "C" and gasket washers to the bolts "D".**

### **Tightening torque**

**Magneto cover bolt: 11 N·m (1.1 kgf·m, 8.0 lbf·ft)**



IA02J11A0012-03

- Route the CKP/crankshaft rotation signal sensor and generator lead wires. Refer to "Wiring Harness Routing Diagram" in Section 9A (Page 9A-2).
- Install the gearshift lever. Refer to "Gearshift Shaft / Gearshift Cam Plate Removal and Installation" in Section 5B (Page 5B-13).
- After installing the removed parts, pour engine oil. Refer to "Engine Oil Filter Replacement" in Section 0B (Page 0B-7).

## **Regulator / Rectifier Removal and Installation**

BA02J21A06005

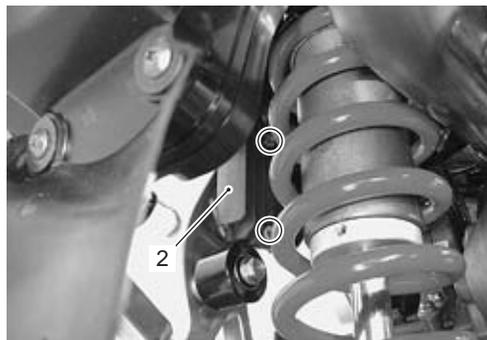
### **Removal**

- 1) Turn off the ignition switch.
- 2) Disconnect the regulator/rectifier coupler (1).



IA02J11A0013-01

- 3) Remove the regulator/rectifier (2).



IA02J11A0014-01

### **Installation**

Installation is in the reverse order of removal.

## Regulator / Rectifier Inspection

BA02J21A06006

Inspect the regulator/rectifier in the following procedures:

- 1) Remove the regulator/rectifier. Refer to "Regulator / Rectifier Removal and Installation" (Page 1J-7).
- 2) 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.

### NOTE

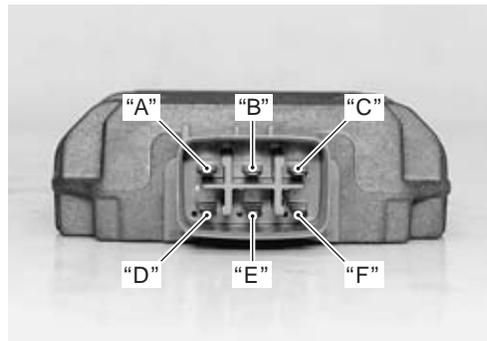
If the tester reads 1.4 V and below when the tester probes are not connected, replace its battery.

### Special tool

 : 09900-25008 (Multi circuit tester set)

### Tester knob indication

Diode test (  )



IA02J11A0022-01

Unit: V

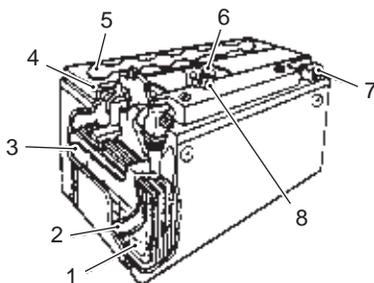
	"A"	"B"	"C"	"D"	"E"	"F"
(-) probe of tester to:	"A"	—	*	0.4 – 1.1	0.1 – 0.8	0.1 – 0.8
	"B"	*	—	*	*	*
	"C"	*	*	—	*	*
	"D"	*	*	0.1 – 0.8	—	*
	"E"	*	*	0.1 – 0.8	*	—
	"F"	*	*	0.1 – 0.8	*	*

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

- 3) Reinstall the regulator/rectifier.

## Battery Components

BA02J21A06007



I649G11A0046-03

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

## Battery Recharging

BA02J21A06008

### ⚠ 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 / Battery Protector Removal and Installation" (Page 1J-9).

## 1J-9 Charging System:

- 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.

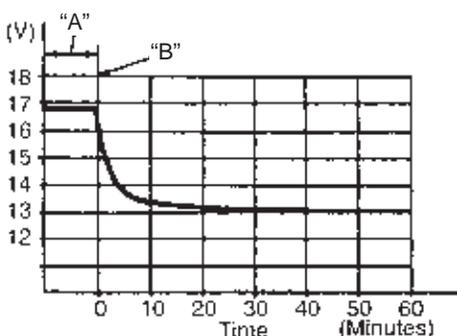
### Recharging time

**0.6 A for 5 to 10 hours or 3 A for 1 hour**

### ⚠ CAUTION

**Be careful not to permit the charging current to exceed 3 A at any time.**

- 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 12.4 V, recharge the battery again.  
If the battery voltage is still less than 12.4 V after recharging, replace the battery with a new one.

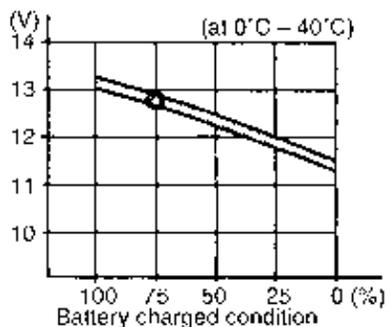


I649G11A0045-02

"A": Charging period

"B": Stop charging

- 4) Install the battery to the motorcycle. Refer to "Battery / Battery Protector Removal and Installation" (Page 1J-9).



I705H11A0029-02

## Battery / Battery Protector Removal and Installation

BA02J21A06009

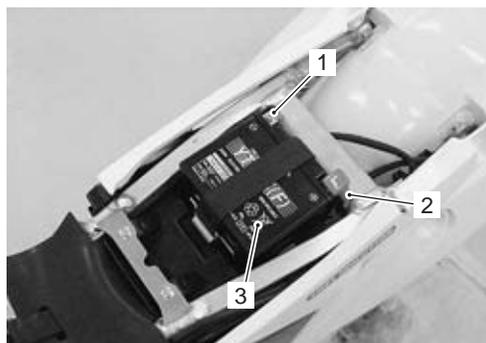
### Removal

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

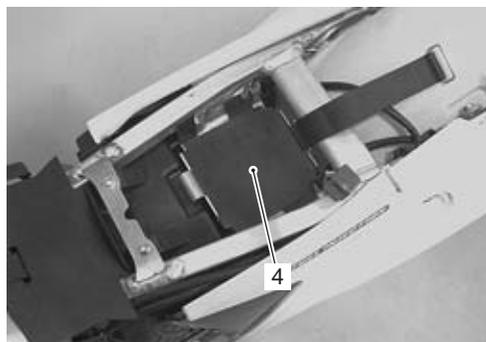


IA02J11A0016-02

- 5) Remove the battery protector (4).

### NOTE

**Check the battery protector (4) for wear or damage. If it is worn or damaged, replace it with a new one.**



IA02J11A0023-03

### Installation

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

### ⚠ CAUTION

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

**Battery Visual Inspection**

BA02J21A06010

Inspect the battery in the following procedures:

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

**Specifications****Service Data**

BA02J21A07001

**Electrical**

Unit: mm

Item		Specification	Note
Generator coil resistance		0.2 – 0.6 Ω	
Generator maximum output		Approx. 230 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		13.5 – 15.0 V at 5 000 r/min	
Battery	Type designation	YTZ7S	
	Capacity	12 V 21.6 kC (6 Ah)/10 HR	

**⚠ CAUTION**

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

**Tightening Torque Specifications**

BA02J21A07002

Fastening part	Tightening torque			Note
	N·m	kgf·m	lbf·ft	
Generator stator bolt	5.5	0.55	4.0	☞ (Page 1J-6)
CKP sensor mounting bolt	5.5	0.55	4.0	☞ (Page 1J-6)
Magneto rotor nut	100	10.0	72.5	☞ (Page 1J-6)
Magneto cover bolt	11	1.1	8.0	☞ (Page 1J-7)

**Reference:**

For the tightening torque of fastener not specified in this section, refer to "Tightening Torque List" in Section 0C (Page 0C-8).

**Special Tools and Equipment****Recommended Service Material**

BA02J21A08001

Material	SUZUKI recommended product or Specification	Note
Molybdenum oil	MOLYBDENUM OIL SOLUTION —	☞ (Page 1J-7)

**Special Tool**

<p>09900-25008 Multi circuit tester set ☞ (Page 1J-3) / ☞ (Page 1J-4) / ☞ (Page 1J-4) / ☞ (Page 1J-5) / ☞ (Page 1J-8)</p>	<p>09900-26006 Engine tachometer ☞ (Page 1J-4) / ☞ (Page 1J-5)</p>
<p>09930-34932 Rotor remover ☞ (Page 1J-6)</p>	<p>09930-40210 Rotor holder ☞ (Page 1J-5) / ☞ (Page 1J-6)</p>



# Exhaust System

## Precautions

### Precautions for Exhaust System

BA02J21B0001

#### ⚠ 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.

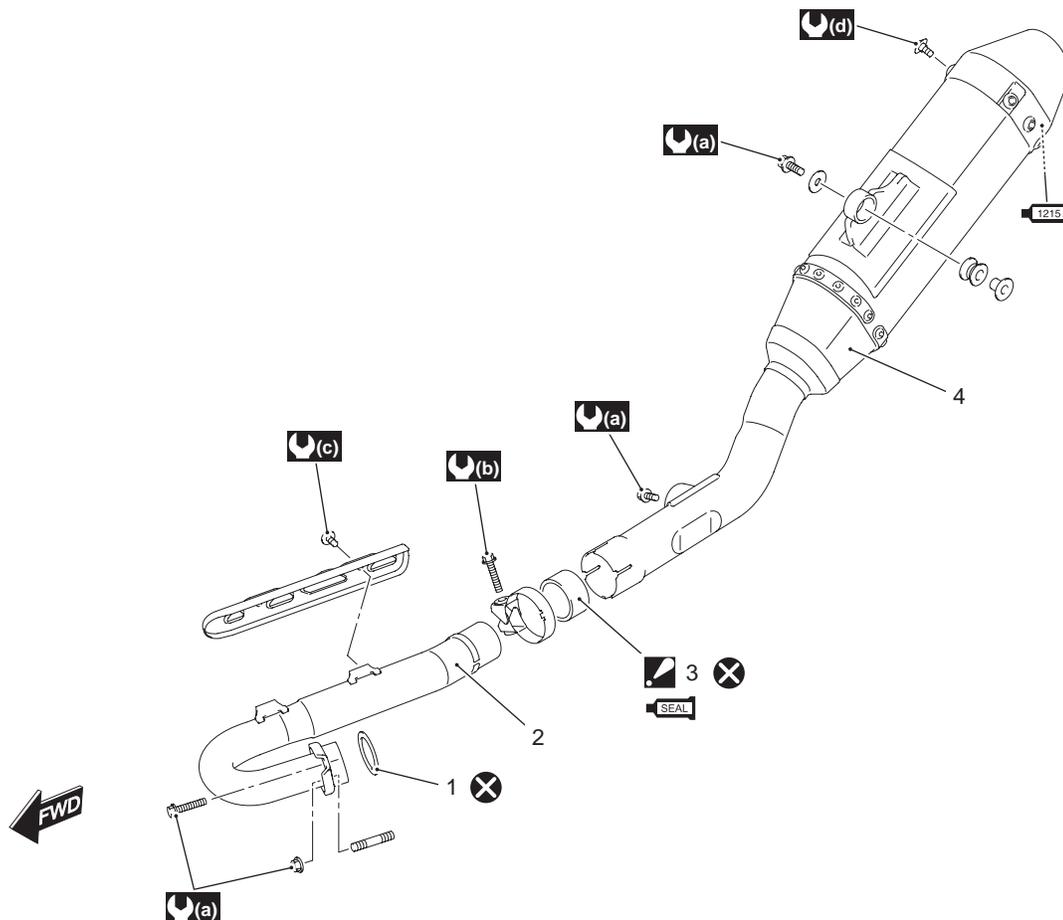
#### ⚠ CAUTION

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

## Repair Instructions

### Exhaust System Components

BA02J21B06001



IA02J11B0011-04

1. Gasket	(a) : 23 N·m (2.3 kgf·m, 16.5 lbf·ft)	: Apply muffler seal.
2. Exhaust pipe	(b) : 19 N·m (1.9 kgf·m, 13.5 lbf·ft)	: Apply bond.
3. Connector : Install the connector so that the chamfer side faces backward.	(c) : 11 N·m (1.1 kgf·m, 8.0 lbf·ft)	: Do not reuse.
4. Muffler	(d) : 10 N·m (1.0 kgf·m, 7.0 lbf·ft)	

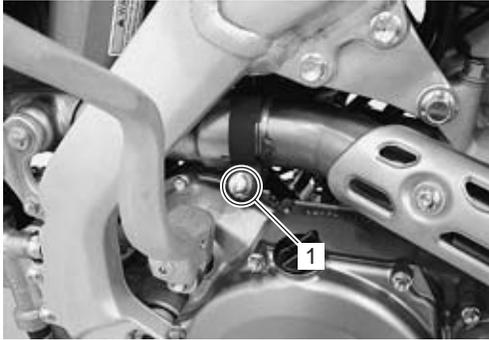
## 1K-2 Exhaust System:

### Muffler / Exhaust Pipe Removal and Installation

BA02J21B06002

#### Removal

- 1) Loosen the muffler connecting bolt (1).

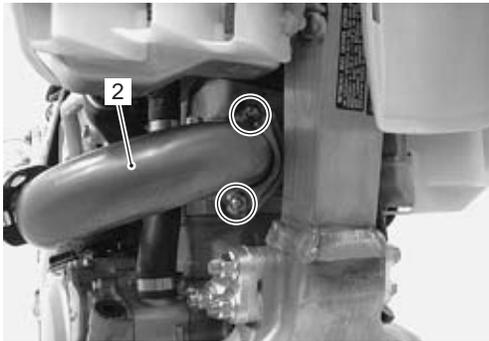


IA02J11B0001-01

- 2) Remove the exhaust pipe (2) by removing the exhaust pipe bolt and nut.

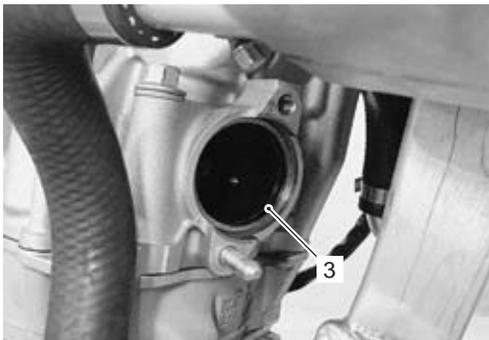
#### NOTE

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



IA02J11B0002-01

- 3) Remove the exhaust pipe gasket (3).



IA02J11B0010-01

- 4) Remove the right frame cover. Refer to "Exterior Parts Removal and Installation" in Section 9D (Page 9D-1).

- 5) Remove the muffler (4) by removing the mounting bolts.

#### NOTE

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



IA02J11B0012-01

#### Installation

Install the muffler/exhaust pipe in the reverse order of removal.

Pay attention to the following points:

#### ⚠ CAUTION

**Replace the gasket and connector with new ones.**

- Tighten the muffler mounting bolts (1) to the specified torque.

#### Tightening torque

**Muffler mounting bolt (a): 23 N·m (2.3 kgf·m, 16.5 lbf·ft)**



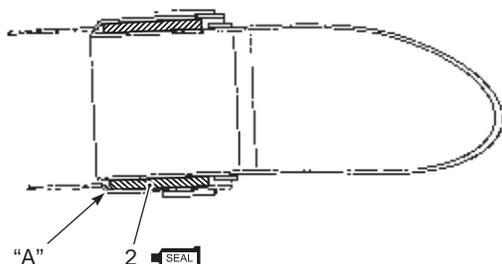
IA02J11B0013-01

- Install new muffler connector (2).

**NOTE**

- When installing new connector, remove the old sealer from the exhaust pipe and muffler. Apply the exhaust gas sealer to both the inside and outside of the new connector.
- Install the muffler connector so that the chamfer side “A” faces backward.

**SEAL**: Muffler seal (MUFFLER SEAL LOCTITE 5920 (commercially available) or equivalent)

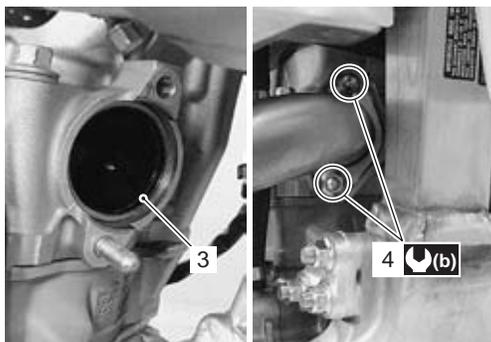


IA02J11B0005-02

- Install the new exhaust pipe gasket (3).
- Tighten the exhaust pipe bolt and nut (4) to the specified torque.

**Tightening torque**

Exhaust pipe bolt/nut (b): 23 N-m (2.3 kgf-m, 16.5 lbf-ft)



IA02J11B0006-04

- Tighten the muffler connecting bolt (5) to the specified torque.

**Tightening torque**

Muffler connecting bolt (c): 19 N-m (1.9 kgf-m, 13.5 lbf-ft)



IA02J11B0007-02

**Exhaust System Inspection**

BA02J21B06003

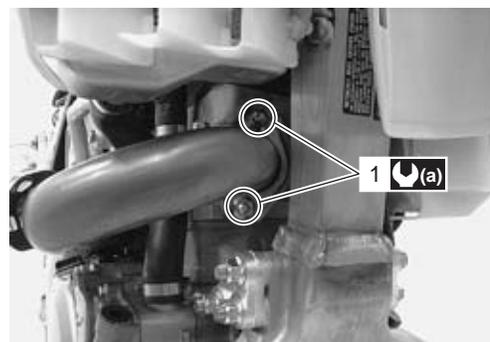
Inspect the exhaust pipe connection and muffler connection for exhaust gas leakage and mounting condition. If any defects are found, replace the exhaust pipe or muffler with a new one. Check the exhaust pipe bolt and nut (1), muffler connecting bolt (2) and muffler mounting bolts (3) are tightened to their specified torque.

**Tightening torque**

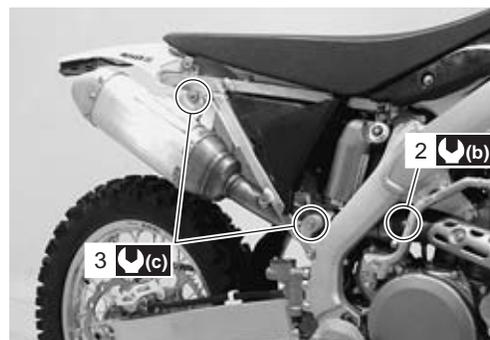
Exhaust pipe bolt/nut (a): 23 N-m (2.3 kgf-m, 16.5 lbf-ft)

Muffler connecting bolt (b): 19 N-m (1.9 kgf-m, 13.5 lbf-ft)

Muffler mounting bolt (c): 23 N-m (2.3 kgf-m, 16.5 lbf-ft)



IA02J11B0008-01



IA02J11B0014-01

**Spark Arrester Inspection**

BA02J21B06004

Refer to “Spark Arrester Cleaning” in Section 0B (Page 0B-18).

## Specifications

### Tightening Torque Specifications

BA02J21B07001

Fastening part	Tightening torque			Note
	N-m	kgf-m	lbf-ft	
Muffler mounting bolt	23	2.3	16.5	☞ (Page 1K-2) / ☞ (Page 1K-3)
Exhaust pipe bolt/nut	23	2.3	16.5	☞ (Page 1K-3) / ☞ (Page 1K-3)
Muffler connecting bolt	19	1.9	13.5	☞ (Page 1K-3) / ☞ (Page 1K-3)

#### NOTE

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

#### Reference:

For the tightening torque of fastener not specified in this section, refer to “Tightening Torque List” in Section 0C (Page 0C-8).

## Special Tools and Equipment

### Recommended Service Material

BA02J21B08001

Material	SUZUKI recommended product or Specification	Note
Muffler seal	MUFFLER SEAL LOCTITE 5920 (commercially available) or equivalent	☞ (Page 1K-3)

#### NOTE

Required service material is also described in the following.  
 “Exhaust System Components” (Page 1K-1)

## Section 2

## Suspension

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# Precautions

## Precautions

### Precautions for Suspension

BA02J2200001

Refer to "General Precautions" in Section 00 (Page 00-1).

---

**⚠ WARNING**

All suspensions, bolts and nuts are an important part in that it could affect the performance of vital parts. They must be tightened to the specified torque periodically and if the suspension effect is lost, replace it with a new one.

---

**⚠ CAUTION**

Never attempt to heat, quench or straighten any suspension part. Replace it with a new one, or damage to the part may result.

---

# Suspension General Diagnosis

## Diagnostic Information and Procedures

### Suspension and Wheel Symptom Diagnosis

BA02J22104001

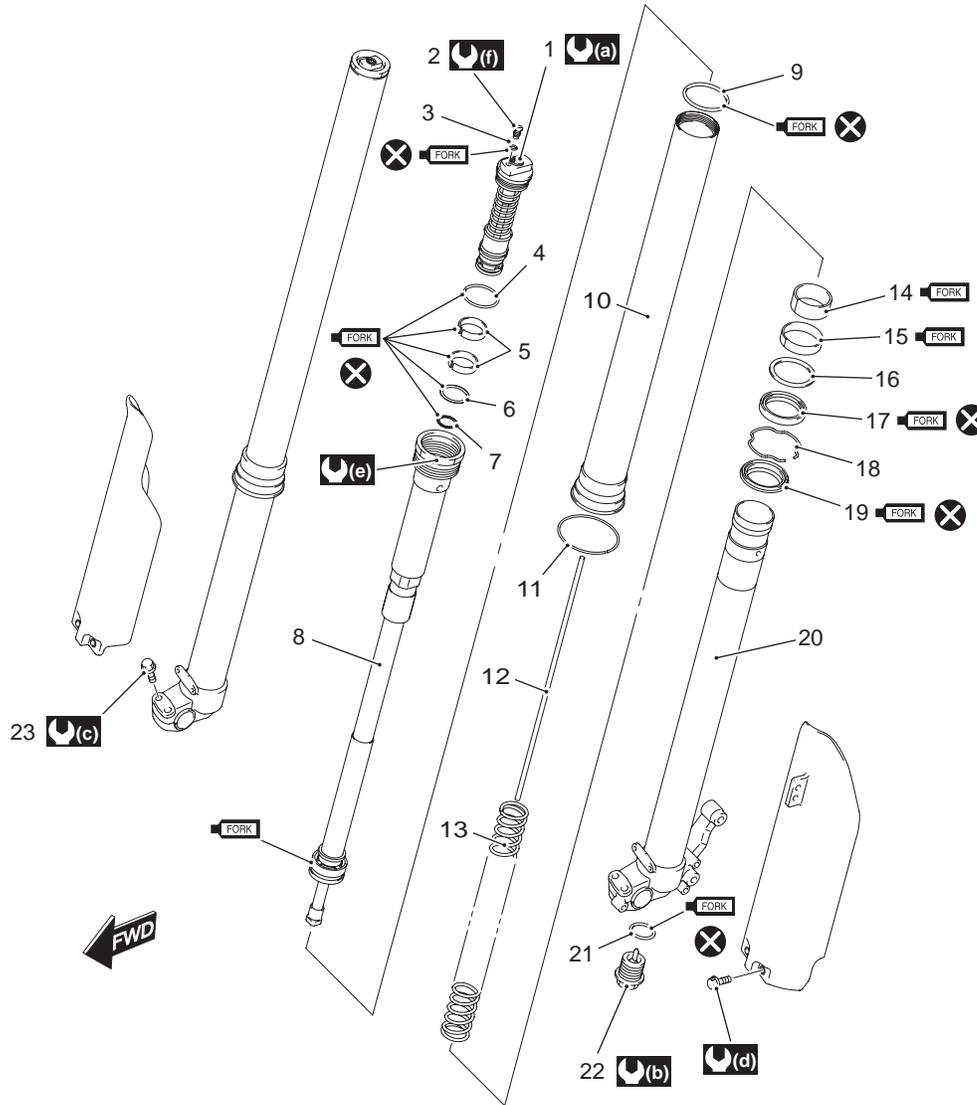
Condition	Possible cause	Correction / Reference Item
<b>Wobbly front wheel</b>	Distorted wheel rim.	<i>Replace.</i>
	Worn front wheel bearings.	<i>Replace.</i>
	Defective or incorrect tire.	<i>Replace.</i>
	Loose axle or axle pinch bolt.	<i>Tighten.</i>
	Loose front axle pinch bolts.	<i>Tighten.</i>
	Incorrect fork oil level.	<i>Adjust.</i>
	Loose spork nipple.	<i>Tighten.</i>
<b>Front suspension too soft</b>	Weakened springs.	<i>Replace.</i>
	Insufficient fork oil.	<i>Check level and add.</i>
	Wrong weight fork oil.	<i>Replace.</i>
	Improperly set front fork damping force adjuster.	<i>Adjust.</i>
<b>Front suspension too stiff</b>	Excessively viscous fork oil.	<i>Replace.</i>
	Excessive fork oil.	<i>Check level and drain.</i>
	Bent front fork.	<i>Replace.</i>
	Improperly set front fork damping force adjuster.	<i>Adjust.</i>
<b>Front suspension too noisy</b>	Insufficient fork oil.	<i>Check level and add.</i>
	Loose bolts on suspension.	<i>Retighten.</i>
	Broken spring.	<i>Replace.</i>
<b>Wobbly rear wheel</b>	Distorted wheel rim.	<i>Replace.</i>
	Worn rear wheel bearing or swingarm bearings.	<i>Replace.</i>
	Defective or incorrect tire.	<i>Replace.</i>
	Worn swingarm and rear suspension bearings.	<i>Replace.</i>
	Loose nuts or bolts on rear suspensions.	<i>Retighten.</i>
	Loose spork nipple.	<i>Tighten.</i>
<b>Rear suspension too soft</b>	Weakened spring of shock absorber.	<i>Replace.</i>
	Improperly set shock absorber spring force adjuster.	<i>Adjust.</i>
	Leakage of oil or gas shock absorber.	<i>Repair or replace.</i>
	Improperly set shock absorber damping force adjuster.	<i>Adjust.</i>
<b>Rear suspension too stiff</b>	Bent shock absorber shaft.	<i>Replace.</i>
	Improperly set shock absorber spring pre-load adjuster.	<i>Adjust.</i>
	Bent swingarm pivot shaft.	<i>Replace.</i>
	Worn swingarm and rear suspension bearings.	<i>Replace.</i>
	Improperly set shock absorber damping force adjuster.	<i>Adjust.</i>
<b>Rear suspension too noisy</b>	Loose nuts or bolts on rear suspension.	<i>Retighten.</i>
	Worn swingarm and suspension bearings.	<i>Replace.</i>

# Front Suspension

## Repair Instructions

### Front Fork Components

BA02J22206001



IA02J1220063-03

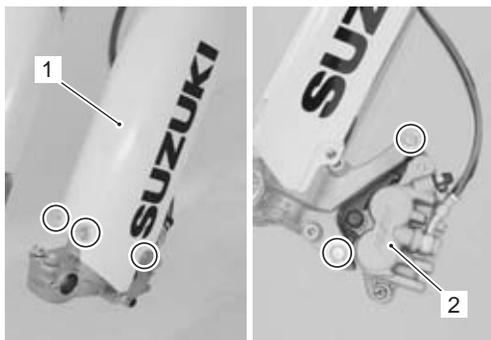
1. Compression damper nut	12. Push rod	23. Axle holder bolt
2. Air bleeder valve	13. Fork spring	(a) : 30 N·m (3.0 kgf·m, 21.5 lbf·ft)
3. O-ring	14. Slide bushing	(b) : 69 N·m (6.9 kgf·m, 50.0 lbf·ft)
4. O-ring	15. Guide bushing	(c) : 18 N·m (1.8 kgf·m, 13.0 lbf·ft)
5. Slide bushing	16. Seal retainer	(d) : 4.9 N·m (0.49 kgf·m, 3.5 lbf·ft)
6. O-ring	17. Oil seal	(e) : 34 N·m (3.4 kgf·m, 24.5 lbf·ft)
7. O-ring	18. Oil seal stopper ring	(f) : 1.3 N·m (0.13 kgf·m, 1.0 lbf·ft)
8. Damper rod	19. Dust seal	: Apply fork oil.
9. O-ring	20. Inner tube	: Do not reuse.
10. Outer tube	21. O-ring	
11. Stopper ring	22. Center bolt	

## Front Fork Removal and Installation

BA02J22206002

### Removal

- 1) Place the motorcycle on a block to lift front wheel off the ground.
- 2) Remove the front wheel. Refer to "Front Wheel Assembly Removal and Installation" in Section 2D (Page 2D-3).
- 3) Remove the speed sensor. Refer to "Speed Sensor Removal and Installation" in Section 9C (Page 9C-4).
- 4) Remove the fork protector (1) by removing the mounting bolts.
- 5) Remove the brake caliper (2) from the left front fork.

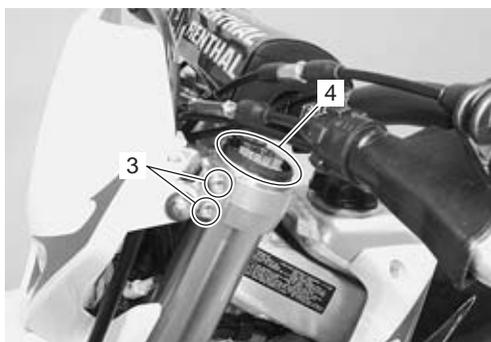


IA02J1220001-01

- 6) Loosen the front fork upper clamp bolts (3).

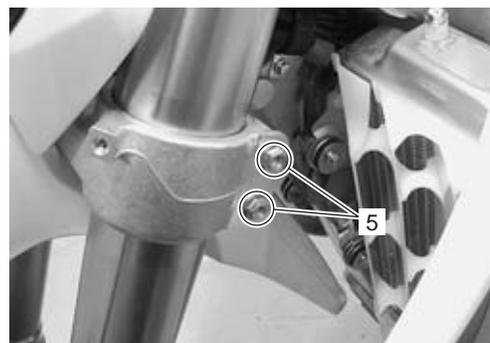
### NOTE

- Slightly loosen the front fork cap bolt (4) to facilitate later disassembly. Refer to "Front Fork Disassembly" (Page 2B-3).
- When loosening the front fork cap bolt (4), it is necessary to remove the handlebars. Refer to "Handlebars Removal and Installation" in Section 6B (Page 6B-3).



IA02J1220002-02

- 7) Hold the fork body and loosen the fork lower clamp bolts (5).
- 8) Remove the front fork.



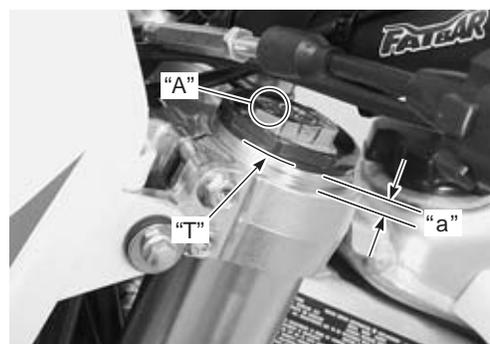
IA02J1220003-01

### Installation

- 1) Set the front fork with the upper surface "T" of the outer tube positioned 4.0 mm (0.16 in) from the upper surface of the upper bracket.

### NOTE

- Check that the air valve "A" is positioned at the front.
- There is a grooved line on the circumference of the fork outer tube. However, do not use this line for reference purpose when installing.



IA02J1220004-01

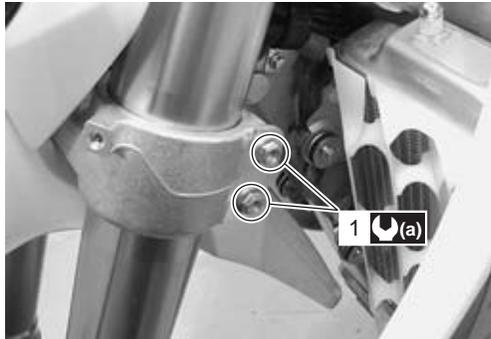
"a": 4.0 mm (0.16 in)

## 2B-3 Front Suspension:

- 2) Tighten the fork lower clamp bolts (1), upper and lower alternately, repeating this procedure in more than two times, to the specified torque.

### Tightening torque

**Fork lower clamp bolt (a): 23 N·m (2.3 kgf·m, 16.5 lbf·ft)**



IA02J1220005-01

- 3) Tighten the fork upper clamp bolts (2), upper and lower alternately, repeating this procedure in more than two times, to the specified torque.

### Tightening torque

**Fork upper clamp bolt (b): 23 N·m (2.3 kgf·m, 16.5 lbf·ft)**

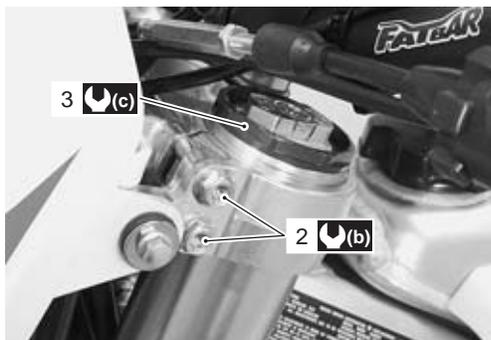
### NOTE

**Check that the air valve is positioned at the front.**

- 4) If the fork cap bolt (3) is loosened, tighten the fork cap bolt (3) to the specified torque.

### Tightening torque

**Front fork cap bolt (c): 34 N·m (3.4 kgf·m, 24.5 lbf·ft)**

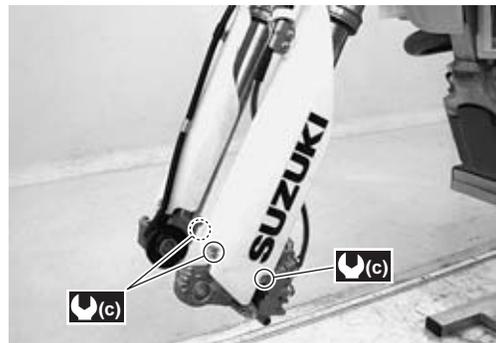


IA02J1220064-02

- 5) Install the handlebars. Refer to "Handlebars Removal and Installation" in Section 6B (Page 6B-3).
- 6) Install the front brake caliper. Refer to "Front Brake Caliper Removal and Installation" in Section 4B (Page 4B-2).
- 7) Install the fork protector.

### Tightening torque

**Fork protector bolt (c): 4.9 N·m (0.49 kgf·m, 3.5 lbf·ft)**



IA02J1220007-04

- 8) Install the front wheel assembly. Refer to "Front Wheel Assembly Removal and Installation" in Section 2D (Page 2D-3).

### NOTE

**Before tightening the front axle and front axle pinch bolts, move the front fork up and down four or five minutes.**

### ▲ WARNING

**After remounting the brake caliper, pump the brake lever until the pistons push the pads correctly.**



IA02J1220006-01

## Front Fork Disassembly

BA02J22206003

Refer to "Front Fork Removal and Installation" (Page 2B-2).

### NOTE

**The right and left front forks are installed symmetrically and therefore the disassembly procedure for one side is the same as that for the other side.**

- 1) Set rebound and compression damper settings to the minimum settings (softest) before disassembling. Record the setting before turning the adjuster.



IA02J1220008-01

- 2) Thoroughly clean the fork before disassembly.

**⚠ CAUTION**

**Scratches or other damage on the inner tube or on the oil seal lip will cause oil leakage. Avoid scratching or damaging the inner tube or the oil seal. Use a mild detergent or car wash soap and sponge out dirt with plenty of water.**

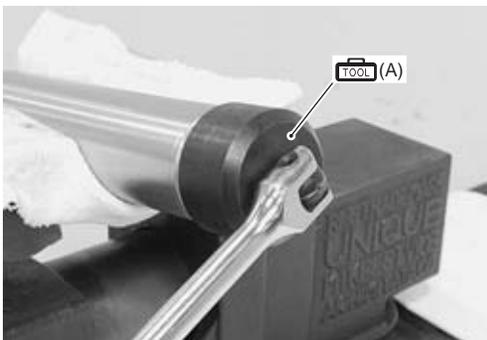
- 3) Clamp the outer tube with a vise. Protect the outer tube with a rag when using a vise.
- 4) Loosen and remove the fork cap bolt (sub-tank) from the outer tube and slowly side down the outer tube.

**Special tool**

**🔧 (A): 09941-53630 (Front fork cap socket wrench (50 mm))**

**⚠ WARNING**

- Clamping the outer tube too tight can damage it which will affect riding stability.
- Do not clamp the outer tube tight.

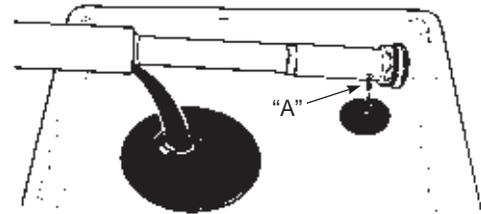


IA02J1220009-01

- 5) Place a drain pan under the front fork and drain fork oil.

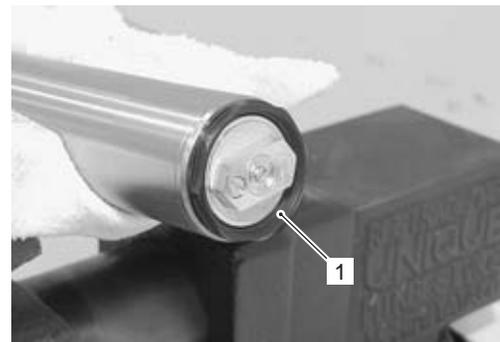
**NOTE**

**Face the oil hole "A" on the sub-tank downward.**



IA02J1220010-01

- 6) Raise the outer tube and temporarily install the fork cap bolt (1) (sub-tank) to the outer tube.

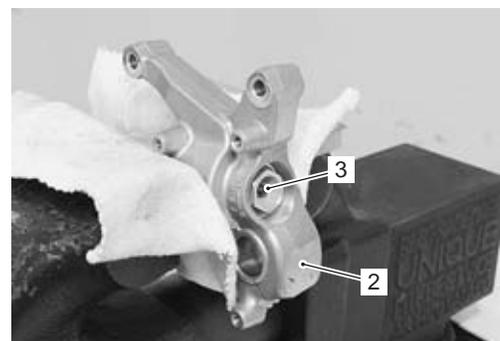


IA02J1220011-01

- 7) Clamp the axle holder (2) with a vise. Protect the axle holder with a rag when using a vise.
- 8) Loosen the center bolt (3).

**⚠ WARNING**

- Clamping the axle holder too tight can damage it which will affect riding stability.
- Do not clamp the axle holder too tight.



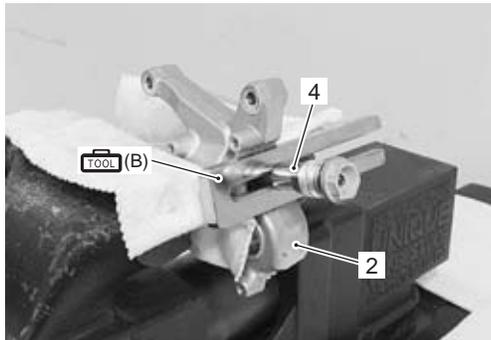
IA02J1220012-03

## 2B-5 Front Suspension:

- 9) Compress the outer tube by hands and install the special tool between the axle holder bottom (2) and lock-nut (4).

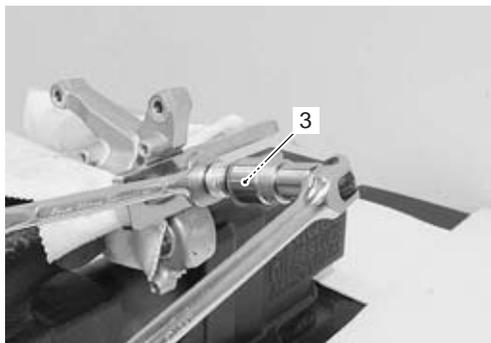
### Special tool

 (B): 09910-20115 (Piston holder)



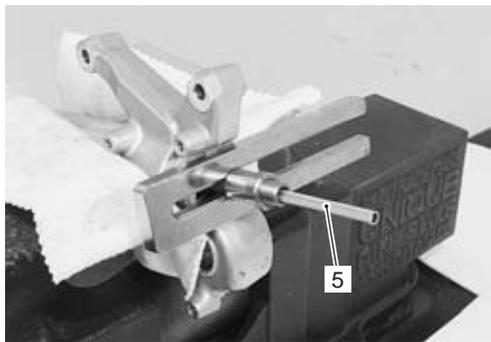
IA02J1220013-01

- 10) Hold the lock-nut and remove the center bolt (3).



IA02J1220014-01

- 11) Remove the push rod (5).

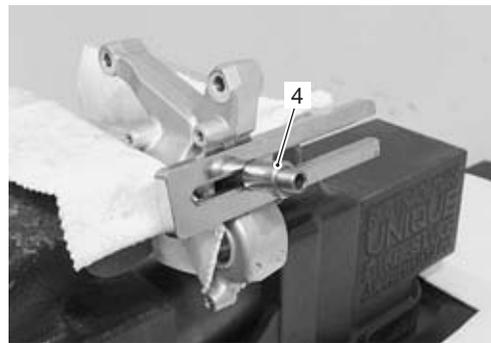


IA02J1220015-01

- 12) With the outer tube compressed by hands, remove the special tool.

### CAUTION

**Do not remove the lock-nut (4). If removed, the inner rod may slip into the damper rod, possibly causing the threaded section to damage the oil seal.**



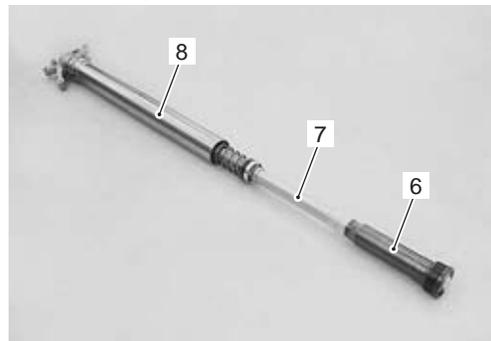
IA02J1220065-01

- 13) Loosen the fork cap bolt (sub-tank) (6) and remove the sub-tank (6) along with the damper and assembly (7).

- 14) Remove the fork spring (8).

### CAUTION

**Do not attempt disassemble the damper rod assembly. The damper rod assembly is available only as an assembly.**



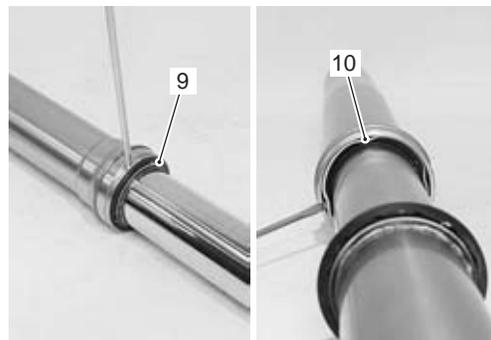
IA02J1220017-01

- 15) Remove the dust seal (9).

- 16) Remove the stopper ring (10).

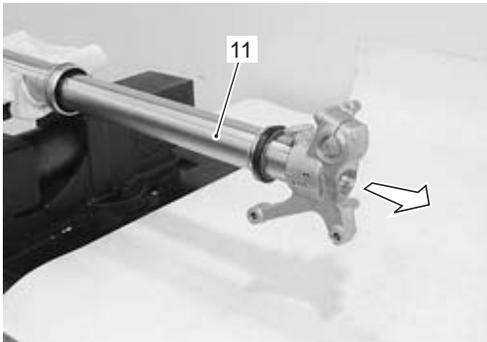
### CAUTION

- **Scratches on the inner tube could cause oil leaks.**
- **Avoid scratching when removing.**



IA02J1220018-01

17) Separate the inner tube (11) out of the outer tube.



IA02J1220016-01

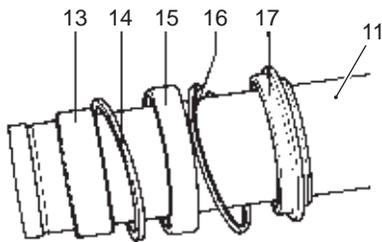
18) Remove the slide bushing (12) from the inner tube (11).



IA02J1220020-01

19) Remove the following parts from the inner tube (11)

- Guide bushing (13)
- Seal retainer (14)
- Oil seal (15)
- Stopper ring (16)
- Dust seal (17)



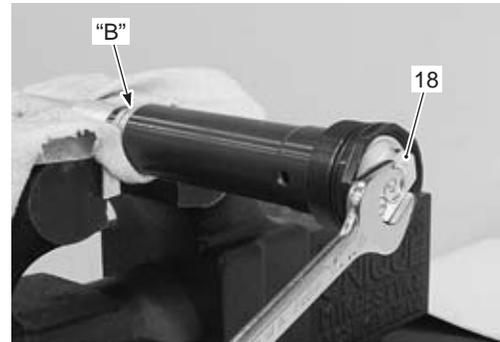
IA02J1220021-01

20) Clamp the bottom (flat part) "B" on the sub-tank with a vise.

**⚠ CAUTION**

**Do not clamp the sub-tank too tight.**

21) Loosen the compression damper unit (18).

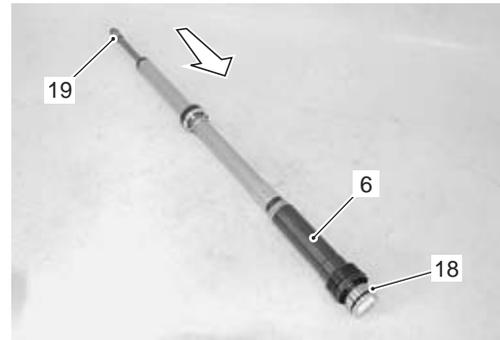


IA02J1220022-02

22) Remove the compression damper unit (18) from the sub-tank (6).

**NOTE**

**Slowly compress the inner rod (19) unit it stops so that the compression damper unit can be removed easily.**



IA02J1220023-01

23) Drain the fork oil from the damper rod assembly.



IA02J1220024-01

Front Fork Assembly

BA02J22206004

**⚠ CAUTION**

Clean all fork parts before reassembling. Replace the O-rings, oil seal and dust seal with new ones. Apply specified front fork oil when installing the O-rings, slide bushing, guide bushing, damper unit and sliding parts.

Inner Tube

1) Apply fork oil to the oil seal lip and the dust seal.

**FORK** : Fork Oil (FORK OIL SS-19 or equivalent)

2) Cover the inner tube with a plastic film.

3) Install the following parts to the inner tube:

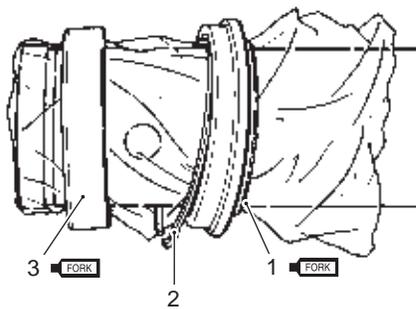
- Dust seal (1)
- Stopper ring (2)
- Oil seal (3)

**⚠ CAUTION**

Scratches on the oil seal lip can cause oil leaks. When installing the seals, place a plastic film over the bushing attachment groove and edges of the inner tube to avoid damaging the seals' lip.

**NOTE**

The side of the oil seal that has a mark should face the dust seal.



IA02J1220025-01

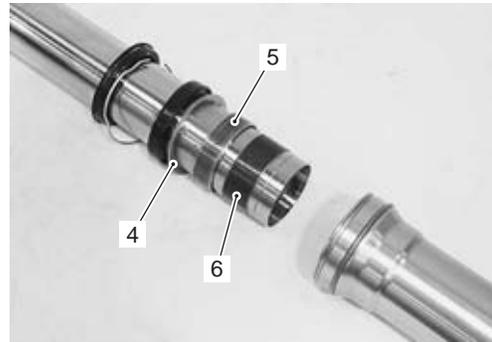
4) Remove the plastic film and then install the seal retainer (4) guide bushing (5) and slide bushing (6).

5) Clean the parts and keep them free from dust.

**NOTE**

Inspect the bushings for burrs. If there is a burr, remove it with a knife, taking care not to peel off the teflon coating. If the bushings have a large crack or excessive play after installing them, replace them with new ones.

6) Insert the inner tube into the outer tube.



IA02J1220026-01

7) Install a new oil seal (3) with the special tool until the stopper ring groove of the outer tube can be seen.

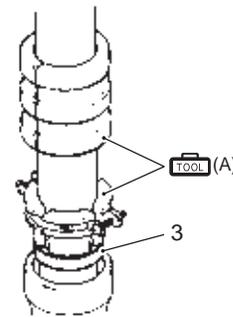
**⚠ CAUTION**

Use of grease as a substitute fork oil when installing the oil seal can result in an oil leak. Applying grease to the dust seal and oil seal can cause dirt to accumulate and damage the dust seal lip and oil seal lip. Use only a thin coat of fork oil on the oil seal.

Special tool

**FORK** (A): 09940-52861 (Front fork oil seal installer set)

8) Attach the stopper ring securely to the stopper ring groove of the outer tube.



IA02J1220070-01

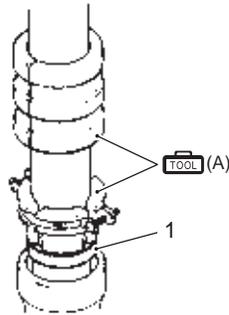
9) Attach the dust seal (1) with the special tool.

**Special tool**

**TOOL (A): 09940-52861 (Front fork oil seal installer set)**

**NOTE**

After attaching the dust seal, make sure that there are no cracks around the circumstance of the seal. Cracks could allow water, mud and the like to enter and cause an oil leak.

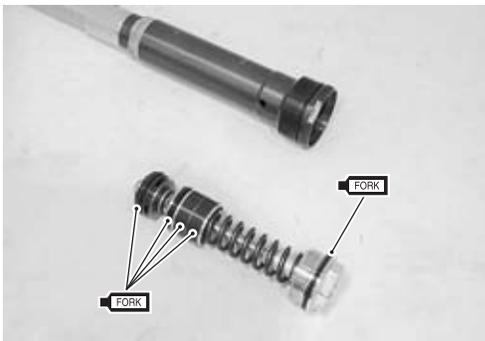


IA02J1220066-04

**Damper Rod and Compression Damper Rod**

1) Apply fork oil to the new O-rings and bushings on the compression damper unit.

**FORK** : Fork Oil (FORK OIL SS-19 or equivalent)



IA02J1220029-01

2) With the damper rod in fully extended position, pour the specified amount of fork oil.

**FORK** : Fork Oil (FORK OIL SS-19 or equivalent)

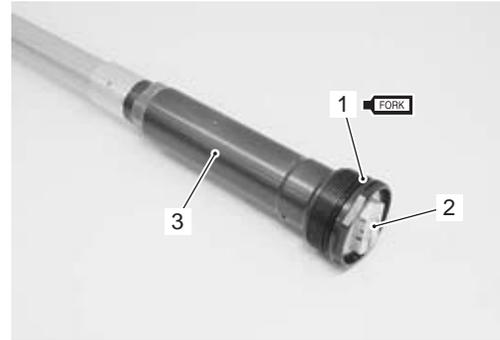
**Front fork oil capacity (inside the damper rod)**  
193 ml (6.5/6.8 US/Imp oz)



IA02J1220030-01

3) Apply fork oil to the O-ring (1).

4) With the damper rod held immovable in fully extended position, gently install the compression damper unit (2) to the sub-tank (3).



IA02J1220031-01

5) Clamp the bottom (flat part) "A" of the sub-tank with a vise.

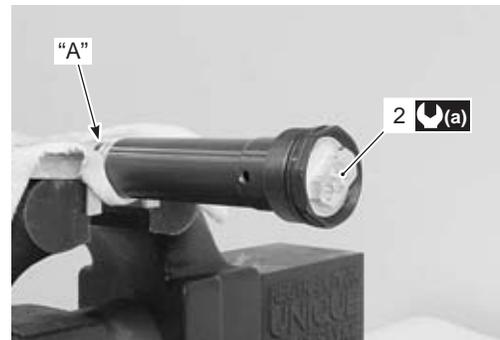
**CAUTION**

**Do not clamp the sub-tank too tight.**

Tighten the compression damper unit (2) to the specified torque.

**Tightening torque**

**Compression damper unit (a): 30 N·m (3.0 kgf-m, 21.5 lbf-ft)**



IA02J1220032-01

6) With the damper rod held in vertical position, slowly move the inner rod several strokes.

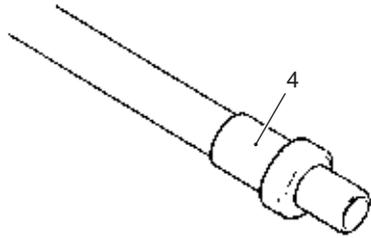
**Inner rod stroke "a"**  
100 mm (3.9 in)



IA02J1220033-01

## 2B-9 Front Suspension:

- 7) Tighten the lock-nut (4) by hand completely.



IA02J1220034-01

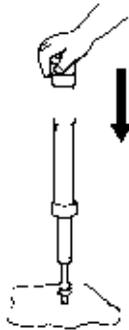
- 8) With the damper rod held in vertical position, compress the damper rod fully to discharge an excess of oil.

### ⚠ CAUTION

Protect the inner rod end with a rag when compressing the damper rod.

### NOTE

Set the compression damper setting to the softest.



IA02J1220035-01

- 9) Force out the remaining oil (discharged oil) using compressed air completely.



IA02J1220036-01

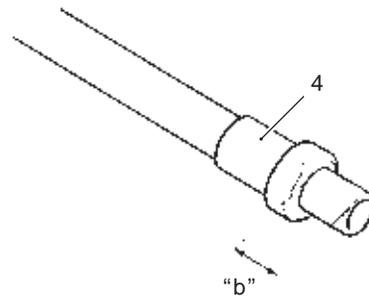
- 10) With the damper rod in horizontal position, move the inner rod by hand to inspect it if operating smoothly.  
11) If the inner rod is not extend, repeat the procedures 1) to 9). (Pour the specified amount fork oil and discharge an excess of oil.)

**Inner rod stroke "a"**  
**100 mm (3.9 in)**



IA02J1220037-01

- 12) Make sure approx. 10 mm (0.39 in) of inner rod thread is exposed on the end.



IA02J1220038-01

4. Lock-nut

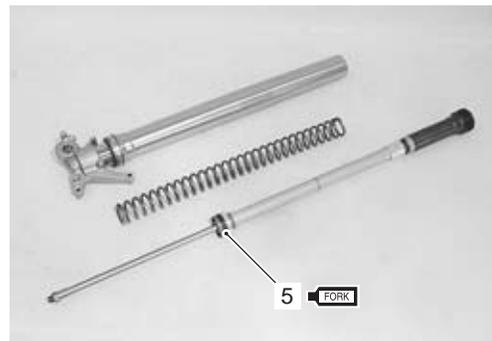
"b": Approx. 10 mm (0.39 in)

- 13) Completely wipe off the fork oil from the spring and damper rod assembly.

**FORK** : Fork Oil (FORK OIL SS-19 or equivalent)

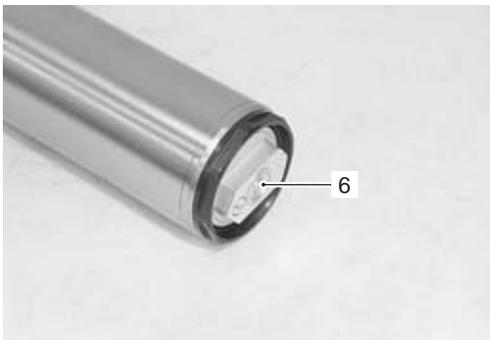
- 14) Apply fork oil to the bushing (5).

- 15) Insert the spring and damper rod assembly into the fork.



IA02J1220039-01

16) Temporarily tighten the fork cap bolt (6) (sub-tank).



IA02J1220040-01

17) Clamp the axle holder with a vise. Protect the axle holder with a rag when using a vise.

**⚠ WARNING**

**Clamping the axle holder too tight can damage it which will affect riding stability. Do not clamp the axle holder too tight.**

Compress the outer tube by hands and install the special tool between the axle holder bottom and lock-nut.

**Special tool**

**TOOL (B): 09910-20115 (Piston holder)**



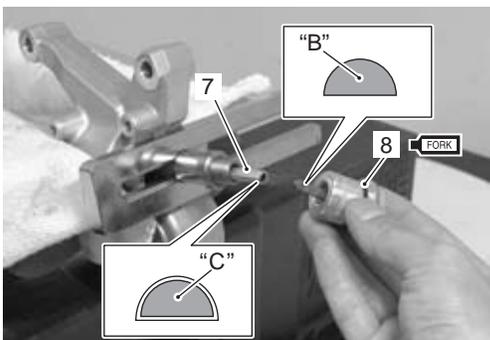
IA02J1220041-01

18) Insert the push rod into the inner rod (7).

19) Apply fork oil to the new O-ring (8).

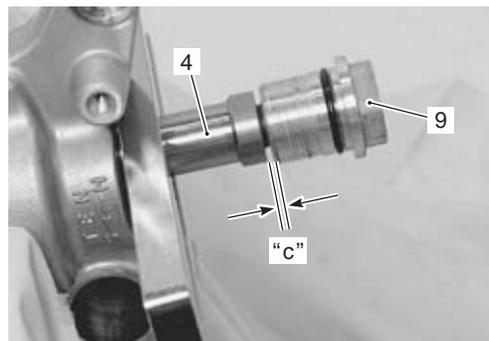
**FORK**: Fork Oil (FORK OIL SS-19 or equivalent)

20) Insert the projection "B" of center bolt into the push rod "C".



IA02J1220042-01

21) Slowly tighten the center bolt (9) until resistance is felt and check the clearance between the lock-nut (4) and center bolt (9) to provide 1 mm (0.04 in) and more.



IA02J1220043-02

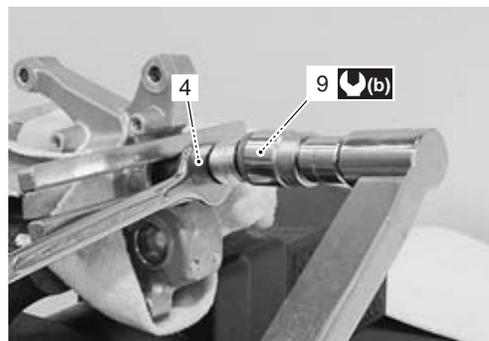
"c": 1 mm (0.04 in) and more

22) Turn the lock-nut (4) counterclockwise until it contacts with the center bolt (9). With the lock-nut held immovably using a wrench, tighten the lock-nut (4) center bolt (9) to the specified torque.

**Tightening torque**

**Lock-nut/center bolt (b): 22 N-m (2.2 kgf-m, 16.0 lbf-ft)**

With the outer tube compressed by hands, remove the special tool.



IA02J1220044-02

23) Tighten the center bolt (9) to the specified torque.

**Tightening torque**

**Center bolt (c): 69 N-m (6.9 kgf-m, 50.0 lbf-ft)**



IA02J1220045-01

## 2B-11 Front Suspension:

- 24) Loosen and remove the fork cap bolt (10) (sub-tank) from the outer tube and slowly slide down the outer tube.

### Special tool

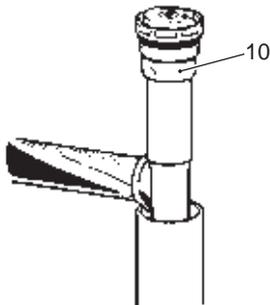
 (C): 09941-53630 (Front fork cap socket wrench (50 mm))

- 25) Pour the specified amount of fork oil into the outer tube.

 : Fork Oil (FORK OIL SS-19 or equivalent)

### Front fork oil capacity

320 ml (10.8/11.3 US/Imp oz)

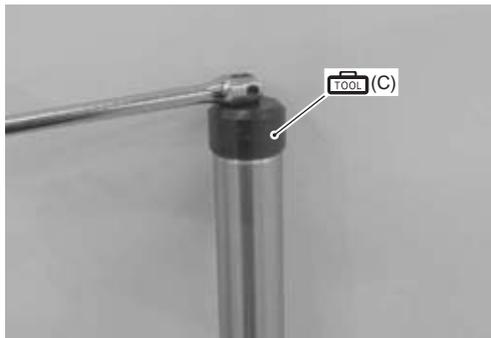


IA02J1220046-01

- 26) Raise the outer tube and temporarily tighten the fork cap bolt (sub-tank) with the special tool.

### Special tool

 (C): 09941-53630 (Front fork cap socket wrench (50 mm))



IA02J1220047-01

- 27) After installing the front fork, tighten the fork cap bolt to the specified torque with the special tool. Refer to "Front Fork Removal and Installation" (Page 2B-2).

### Special tool

 : 09941-53630 (Front fork cap socket wrench (50 mm))

### Tightening torque

Fork cap bolt: 34 N·m (3.4 kgf·m, 24.5 lbf·ft)

## Front Fork Parts Inspection

BA02J22206005

Refer to "Front Fork Disassembly" (Page 2B-3) and "Front Fork Assembly" (Page 2B-7).

### Center Bolt

Inspect the adjuster rod of the center bolt for damage. If it is damaged, replace it with a new one.



IA02J1220048-01

### Compression Damper Unit

Inspect the compression damper unit for damage. If it is damaged, replace it with a new one.

### CAUTION

**Disassembling the compression damper unit can lead to trouble. Do not disassemble the compression damper unit.**



IA02J1220049-01

**Inner and Outer Tube**

- Inspect the inner tube for scratches. If it has scratches, replace it with a new one.
- Inspect the outer tube for dent. If it is dented all the way to the inner side, replace it with a new one.



IA02J1220050-01

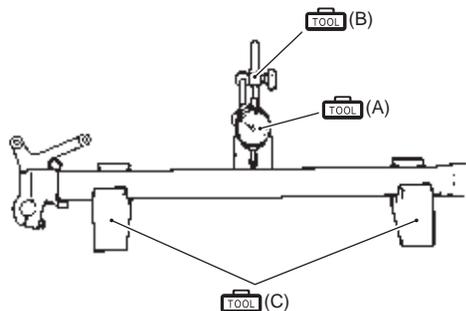
- Using a dial gauge, check the inner tube for runout. If the runout exceeds the limit, replace the inner tube.

**Special tool**

- (A): 09900-20607 (Dial gauge)
- (B): 09900-20701 (Dial gauge chuck)
- (C): 09900-21304 (V blocks)

**Inner tube runout**

**Service limit: 0.4 mm (0.02 in)**



IA02J1220051-01

**Damper Rod Assembly**

Inspect the damper rod assembly for scratches or bending. If it has scratches or is bent, replace it with a new one.



IA02J1220052-01

**Fork Spring**

Measure the fork spring free length. If it is shorter than the service limit, replace it with a new one.

**Front fork spring free length "a"**

**Service limit: 485 mm (19.09 in)**



IA02J1220053-01

**Slide Bushing and Guide Bushing**

- Inspect the teflon coating metals (slide bushing and guide bushing) for wear or damage. If they are worn or damaged, replace them with new ones.
- Inspect the teflon coating metals surface. If they are not clean, clean them with a nylon brush and fork oil.



IA02J1220054-01

**Front Suspension Adjustment**

BA02J22206006

**Compression Damping Force Adjustment**

- Turn the adjust screw clockwise until it stops (full hard position).

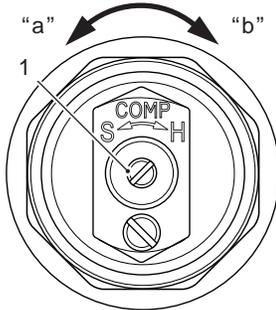
**NOTE**

**To set the adjuster, you must gently turn the adjuster screw clockwise until it stops, then back it out the recommended number of turns. Do not force the adjuster screw past the stopped position or you may damage the adjuster.**

## 2B-13 Front Suspension:

- Turn the adjust screw (1) counterclockwise and the 8th click is the standard position.

### Compression damping force adjuster Standard setting: 8 clicks turn back



IA02J1220055-02



### Rebound Damping Force Adjustment

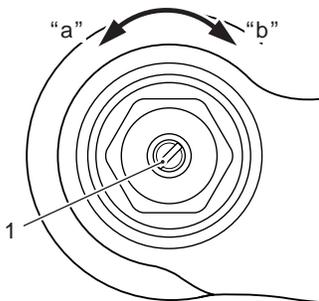
- Turn the adjuster screw clockwise until it stops (full hard position).

#### NOTE

To set the adjuster, you must gently turn the adjuster screw clockwise until it stops, then back it out the recommended number of turns. Do not force the adjuster screw past the stopped position or you may damage the adjuster.

- Turn the adjust screw (1) counterclockwise and the 8th click is the standard position.

### Rebound damping force adjuster Standard setting: 8 clicks turn back



IA02J1220056-02



### Oil Quantity Minor Adjustment

#### CAUTION

The fork oil quantity must be adjusted equally on both fork legs to provide equal performance. Operating the motorcycle with the fork oil quantity unevenly adjusted can cause handling instability. Never mix different types of fork oil. Different oils may cause chemical reaction and deteriorate.

### Adding the fork oil

- Remove the air bleeder valve (1).
- Add the fork oil with an injector from the air bleed hole.

 : Fork Oil (FORK OIL SS-19 or equivalent)



IA02J1220057-01

- Apply fork oil to the O-ring (2) and tighten the air bleeder valve (1) to the specified torque.

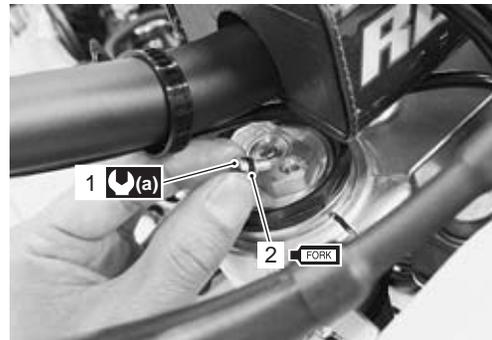
#### CAUTION

Replace the O-ring (2) with a new one.

 : Fork Oil (FORK OIL SS-19 or equivalent)

#### Tightening torque

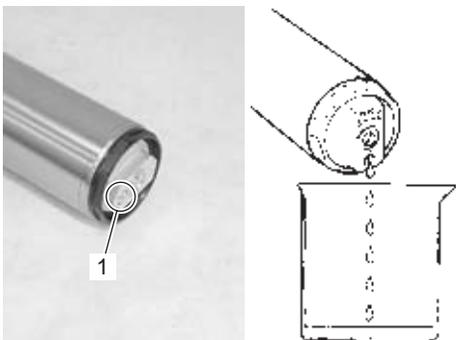
Air bleeder valve (a): 1.3 N-m (0.13 kgf-m, 1.0 lbf-ft)



IA02J1220058-01

**Reducing the fork oil**

- Remove the front forks. Refer to “Front Fork Removal and Installation” (Page 2B-2).
- Remove the air bleeder valve (1).
- Leaning the front fork, reduce the fork oil from the air bleed hole.



IA02J1220059-02

- Apply fork oil to the O-ring (2) and tighten the air bleeder valve (1) to the specified torque.

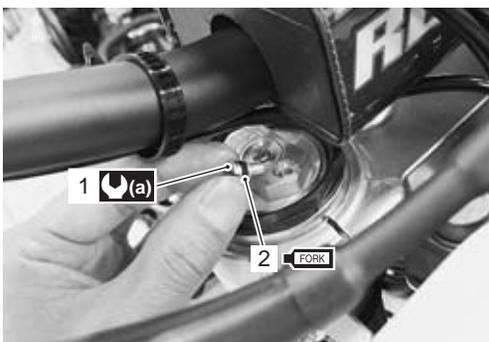
**CAUTION**

Replace the O-ring (2) with a new one.

**FORK** : Fork Oil (FORK OIL SS-19 or equivalent)

**Tightening torque**

Air bleeder valve (a): 1.3 N·m (0.13 kgf·m, 1.0 lbf·ft)



IA02J1220058-01

**Oil Change (Only for outer tube oil chamber)**

- 1) Remove the front forks. Refer to “Front Fork Removal and Installation” (Page 2B-2).
- 2) Thoroughly clean the fork before disassembly.

**CAUTION**

- The fork oil quantity must be adjusted equally on both fork legs to provide equal performance.
- Scratches or other damage on the inner tube or on the oil seal lip will cause oil leak.

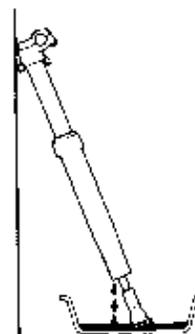
- Avoid scratching or damaging the inner tube or the oil seal. Use a mild detergent or car wash soap and sponge out dirt with plenty of water.

- 3) Clamp the outer tube with a vise. Protect the outer tube with a rag when using a vise. Refer to “Front Fork Disassembly” (Page 2B-3).
- 4) Loosen and remove the fork cap bolt (sub-tank) from the outer tube and slowly slide down the outer tube. Refer to “Front Fork Disassembly” (Page 2B-3).

**Special tool**

**FORK** : 09941-53630 (Front fork cap socket wrench (50 mm))

- 5) Hold the front fork inverted position for more than 20 minutes to allow the fork oil to fully drain.



IA02J1220061-01

- 6) Force out the remaining oil using compressed air completely.



IA02J1220062-01

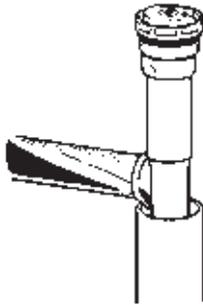
## 2B-15 Front Suspension:

- 7) Slide down the outer tube.
- 8) Pour the specified amount of fork oil into the outer tube as shown in the fork oil quantity table.

**FORK** : Fork Oil (FORK OIL SS-19 or equivalent)

### Fork oil capacity

320 ml (10.8/11.3 US/lmp oz)



IA02J1220067-01

- 9) Raise the outer tube and temporarily tighten the fork cap bolt (sub-tank). Refer to "Front Fork Assembly" (Page 2B-7).

### Special tool

**FORK** : 09941-53630 (Front fork cap socket wrench (50 mm))

- 10) Install the front forks. Refer to "Front Fork Removal and Installation" (Page 2B-2).

## Spring Change

- Remove the damper rod assembly and fork spring. Refer to "Front Fork Disassembly" (Page 2B-3).
- Select the spring as shown in the spring rate table.

### Spring Rate Table

	SPRING/No.	SPRING RATE	IDENTIFICATION
Soft	51171-28H10	4.41 N/mm (0.45 kgf/mm)	3 slits
STD	51171-28H00	4.61 N/mm (0.47 kgf/mm)	5 Slits
Hard	51171-28H20	4.81 N/mm (0.49 kgf/mm)	4 Slits

IA02J1220068-02

- Pour the specified amount fork oil into the outer tube in accordance the following table.

### Oil Quantity Table

	SPRING/No.	STD OIL QUANTITY
Soft	51171-28H10	327 ml (11.06 / 11.51 US/lmp oz)
STD	51171-28H00	320 ml (10.82 / 11.26 US/lmp oz)
Hard	51171-28H20	303 ml (10.25 / 10.67 US/lmp oz)

IA02J1220069-03

- Assemble the front fork. Refer to "Front Fork Assembly" (Page 2B-7).

## Specifications

### Service Data

BA02J22207001

### Suspension

Unit: mm (in)

Item	Standard	Limit	Note
Front fork stroke	310 (12.2)	—	
Front fork spring free length	495 (19.48)	485 (19.09)	
Front fork oil type	FORK OIL SS-19 or an equivalent fork oil	—	
Front fork oil capacity (Each leg)	320 ml (10.8/11.3 US/lmp oz)	—	Outer tube oil quantity
	193 ml (6.5/6.8 US/lmp oz)	—	Damper rod oil quantity
Front fork inner tube O.D.	47 (18.5)	—	
Front fork spring rate	4.61 N/mm (0.47 kgf/mm)	—	
Front fork damping force adjuster	Rebound	MAX – 8 clicks turn back	—
	Compression	MAX – 8 clicks turn back	—
Front fork air pressure	0 kPa (0 kgf/cm <sup>2</sup> , 0 psi)		

## Tightening Torque Specifications

BA02J22207002

Fastening part	Tightening torque			Note
	N·m	kgf·m	lbf·ft	
Fork lower clamp bolt	23	2.3	16.5	☞(Page 2B-3)
Fork upper clamp bolt	23	2.3	16.5	☞(Page 2B-3)
Front fork cap bolt	34	3.4	24.5	☞(Page 2B-3)
Fork protector bolt	4.9	0.49	3.5	☞(Page 2B-3)
Compression damper unit	30	3.0	21.5	☞(Page 2B-8)
Lock-nut/center bolt	22	2.2	16.0	☞(Page 2B-10)
Center bolt	69	6.9	50.0	☞(Page 2B-10)
Fork cap bolt	34	3.4	24.5	☞(Page 2B-11)
Air bleeder valve	1.3	0.13	1.0	☞(Page 2B-13)
Air bleeder valve	1.3	0.13	1.0	☞(Page 2B-14)

**NOTE**

The specified tightening torque is described in the following.  
 “Front Fork Components” (Page 2B-1)

**Reference:**

For the tightening torque of fastener not specified in this section, refer to “Tightening Torque List” in Section 0C (Page 0C-8).

## Special Tools and Equipment

### Recommended Service Material

BA02J22208001

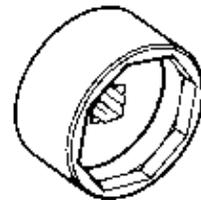
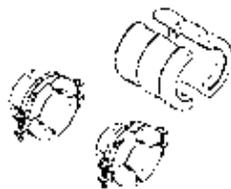
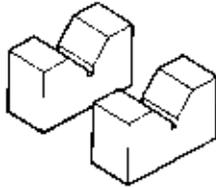
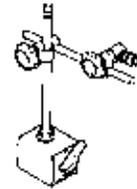
Material	SUZUKI recommended product or Specification	Note
Fork Oil	FORK OIL SS-19 or equivalent	☞(Page 2B-7) / ☞(Page 2B-8) / ☞(Page 2B-8) / ☞(Page 2B-9) / ☞(Page 2B-10) / ☞(Page 2B-11) / ☞(Page 2B-13) / ☞(Page 2B-13) / ☞(Page 2B-14) / ☞(Page 2B-15)

**NOTE**

Required service material is also described in the following.  
 “Front Fork Components” (Page 2B-1)

Special Tool

<p>09900-20607 Dial gauge ☞ (Page 2B-12)</p>	<p>09900-20701 Dial gauge chuck ☞ (Page 2B-12)</p>
<p>09900-21304 V blocks ☞ (Page 2B-12)</p>	<p>09910-20115 Piston holder ☞ (Page 2B-5) / ☞ (Page 2B-10)</p>
<p>09940-52861 Front fork oil seal installer set ☞ (Page 2B-7) / ☞ (Page 2B-8)</p>	<p>09941-53630 Front fork cap socket wrench (50 mm) ☞ (Page 2B-4) / ☞ (Page 2B-11) / ☞ (Page 2B-11) / ☞ (Page 2B-11) / ☞ (Page 2B-14) / ☞ (Page 2B-15)</p>

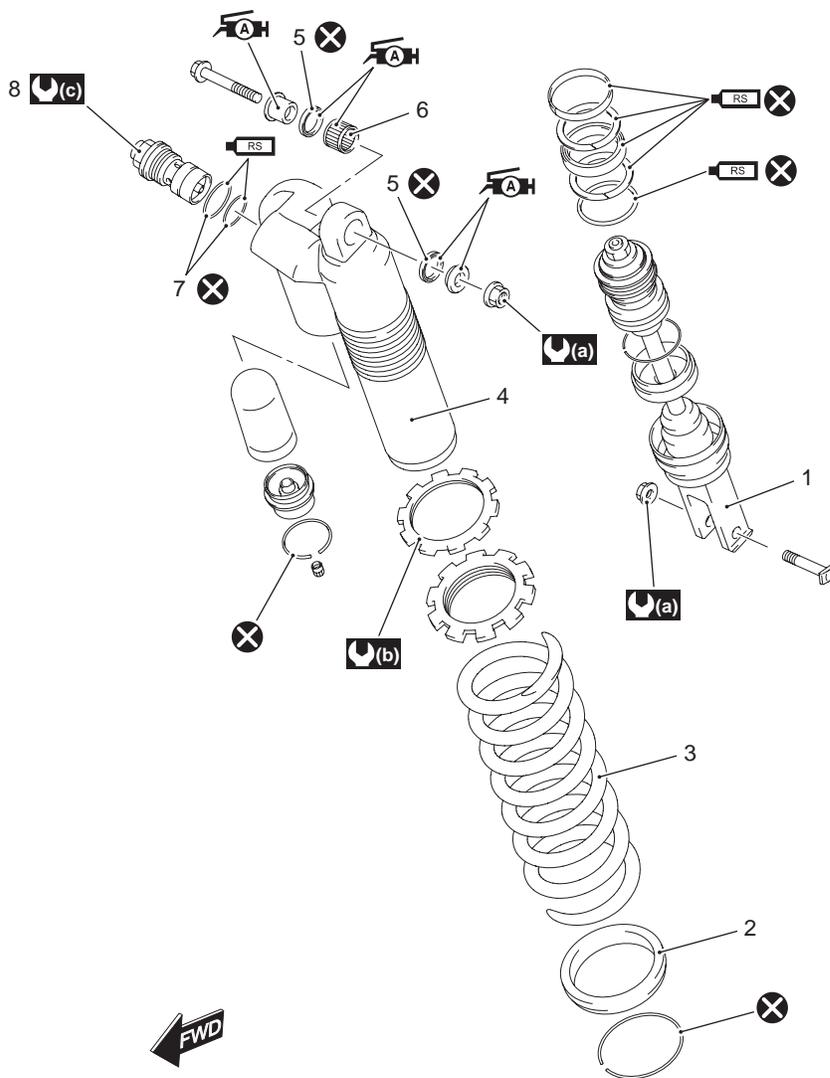


# Rear Suspension

## Repair Instructions

### Rear Shock Absorber Components

BA02J22306001

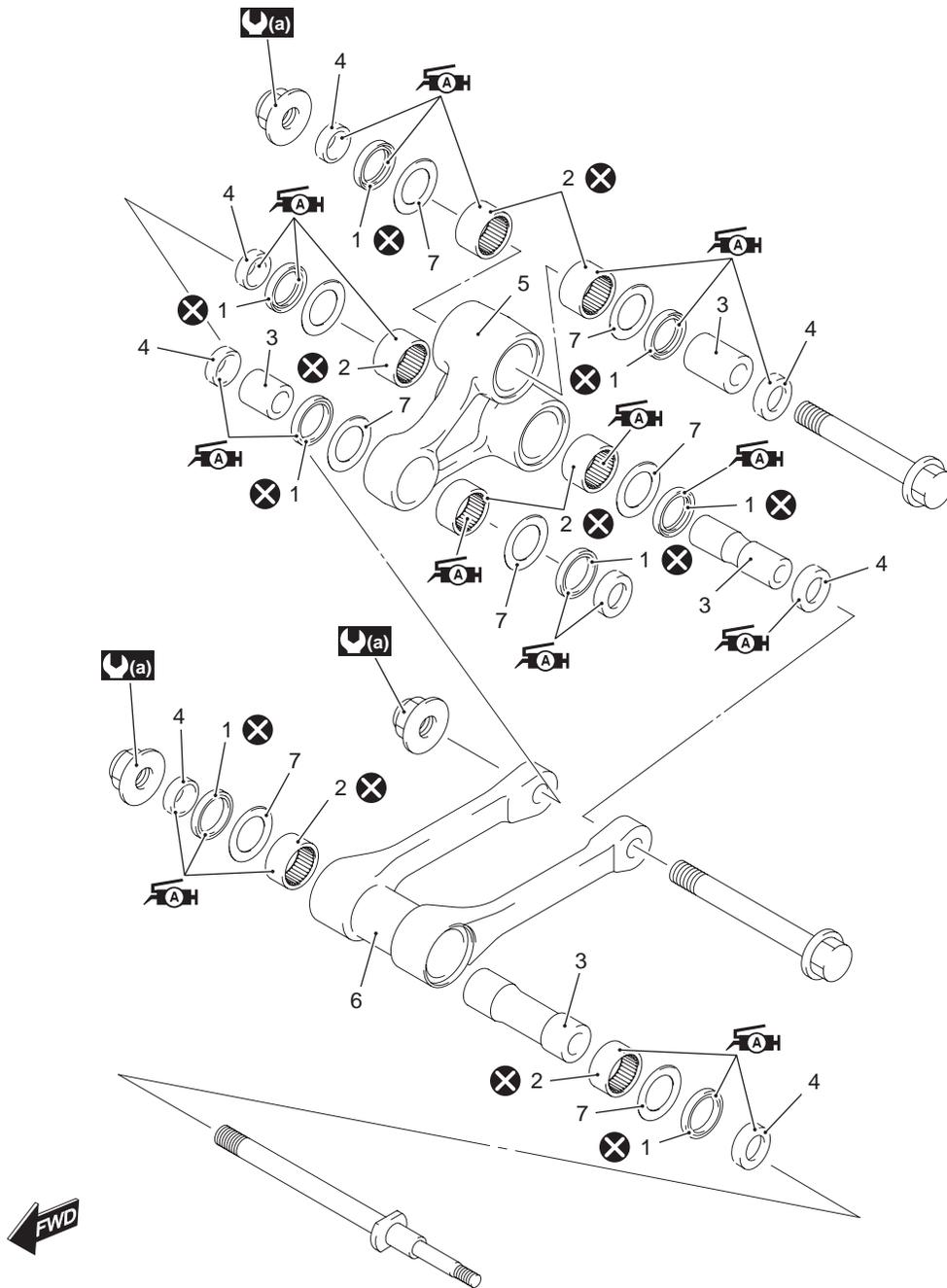


1. Damper rod assembly	8. Compression adjuster assembly
2. Spring seat	(a): 50 N·m (5.0 kgf·m, 36.0 lbf·ft)
3. Spring	(b): 44 N·m (4.4 kgf·m, 32.0 lbf·ft)
4. Rear shock absorber body	(c): 30 N·m (3.0 kgf·m, 21.5 lbf·ft)
5. Dust seal	: Apply grease.
6. Bearing	: Apply rear suspension oil.
7. O-ring	: Do not reuse.

IA02J1230102-02

Cushion Rod / Cushion Lever Components

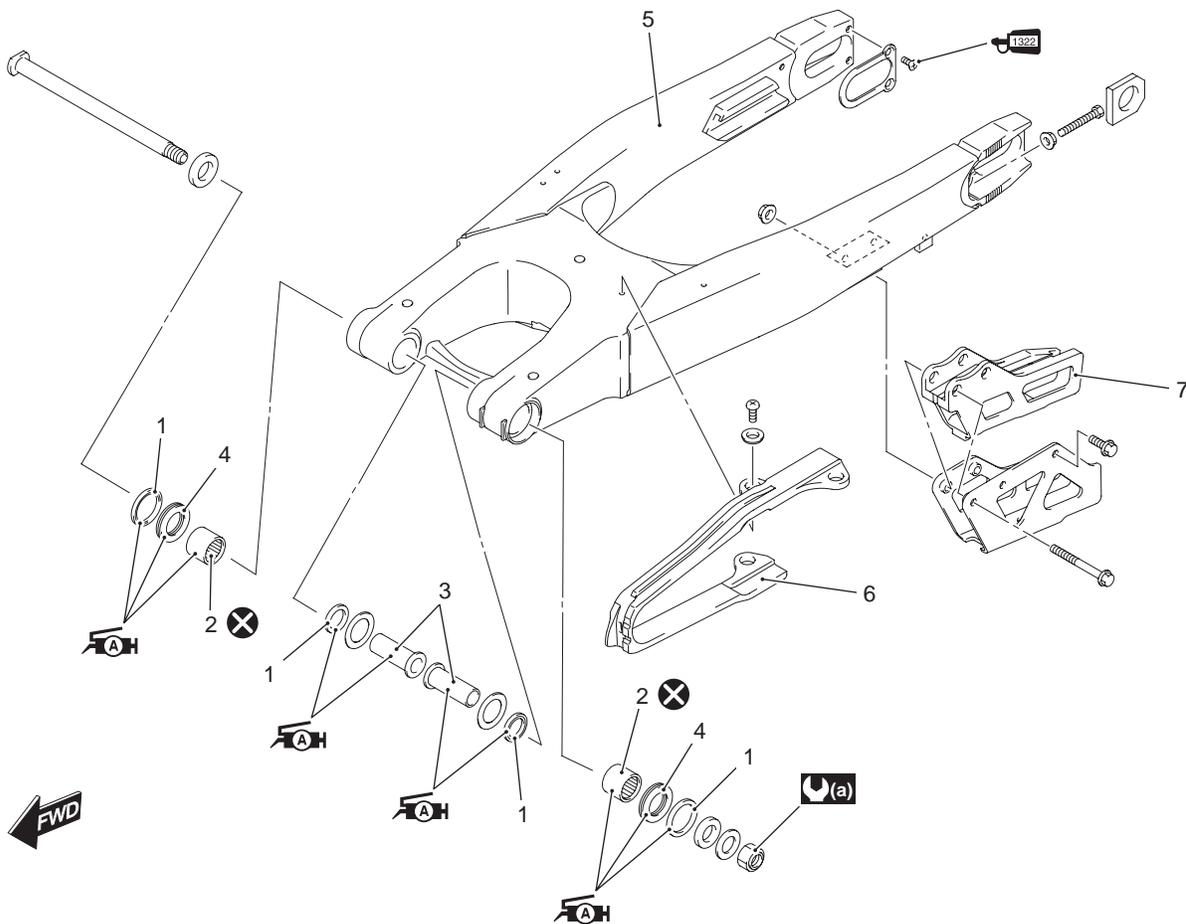
BA02J22306002



1. Dust seal	6. Cushion rod
2. Bearing	7. Washer
3. Spacer	: 80 N·m (8.0 kgf·m, 58.0 lbf·ft)
4. Collar	: Apply grease.
5. Cushion lever	: Do not reuse.

IA02J1230103-02

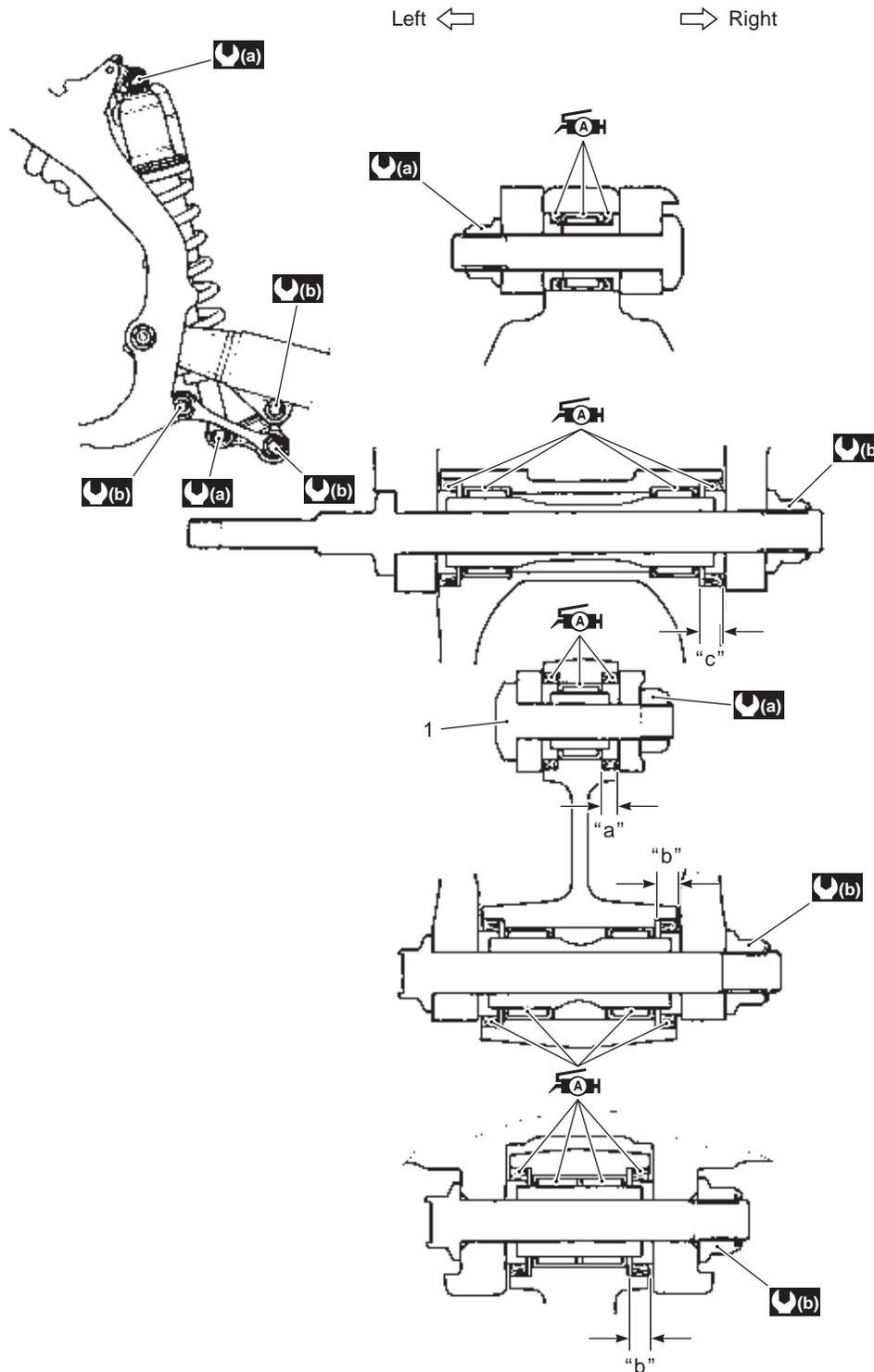
Swingarm Components



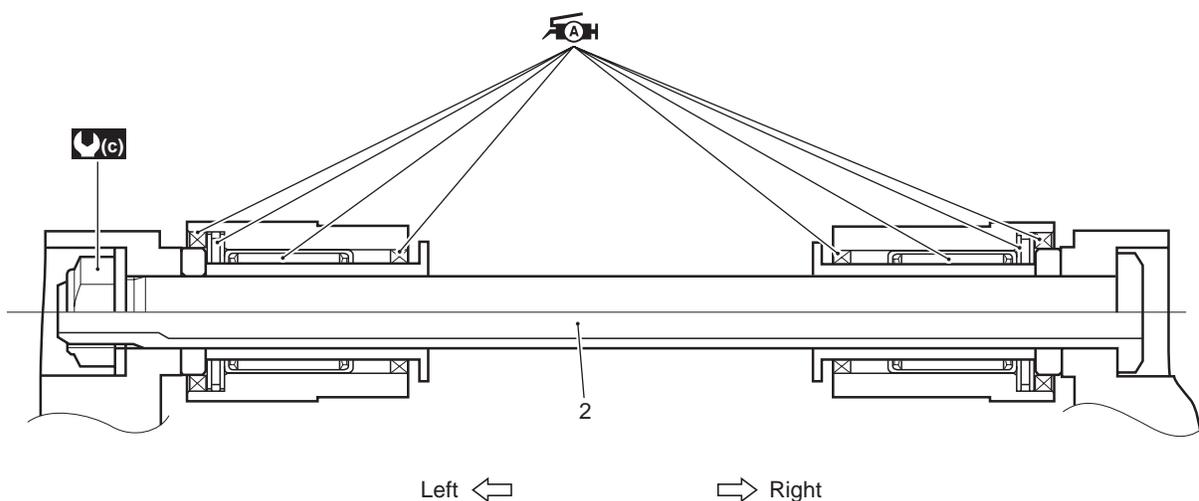
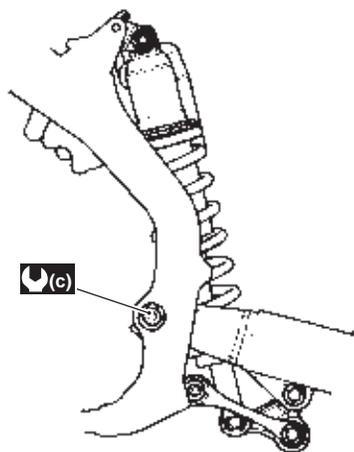
IA02J1230104-01

1. Dust seal	5. Swingarm	: Apply thread lock to the thread part.
2. Bearing	6. Chain buffer	: Apply grease.
3. Spacer	7. Chain guide	: Do not reuse.
4. Bearing/Washer	: 70 N·m (7.0 kgf·m, 50.5 lbf·ft)	

Rear Suspension Assembly Construction



1. Rear suspension linkage bolt	: 50 N-m (5.0 kgf-m, 36.0 lbf-ft)
"a": 4.5 mm (0.18 in)	: 80 N-m (8.0 kgf-m, 58.0 lbf-ft)
"b": 6.0 mm (0.24 in)	: Apply grease.
"c": 6.25 mm (0.25 in)	



IA02J1230105-01

2. Swingarm pivot shaft	: Apply grease.
: 70 N·m (7.0 kgf-m, 50.5 lbf-ft)	

## Rear Shock Absorber Removal and Installation

BA02J22306005

### Removal

- 1) Remove the fuel tank. Refer to "Fuel Tank Removal and Installation" in Section 1G (Page 1G-5).
- 2) Remove the muffler. Refer to "Muffler / Exhaust Pipe Removal and Installation" in Section 1K (Page 1K-2).
- 3) Remove the seat rail. Refer to "Seat Rail Removal and Installation" in Section 9E (Page 9E-2).
- 4) Support the motorcycle with a jack to be no-load for the rear shock absorber.

### CAUTION

**Make sure that the motorcycle is supported securely.**

- 5) Remove the rear shock absorber upper mounting bolt and nut.



IA02J1230005-01

## 2C-6 Rear Suspension:

- 6) Remove the rear shock absorber lower mounting bolt and nut.



IA02J1230006-01

- 7) Remove the rear shock absorber.

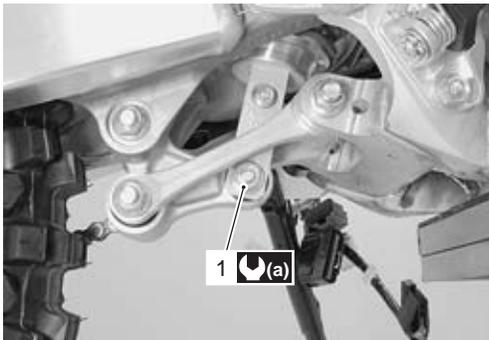
### Installation

Install the rear shock absorber in the reverse order of removal. Pay attention in the following points:

- Tighten the rear shock absorber lower mounting nut (1) to the specified torque.

#### Tightening torque

**Rear shock absorber lower mounting nut (a): 50 N-m (5.0 kgf-m, 36.0 lbf-ft)**



IA02J1230007-01

- Tighten the rear shock absorber upper mounting nut (2) to the specified torque.

#### Tightening torque

**Rear shock absorber upper mounting nut (b): 50 N-m (5.0 kgf-m, 36.0 lbf-ft)**



IA02J1230008-01

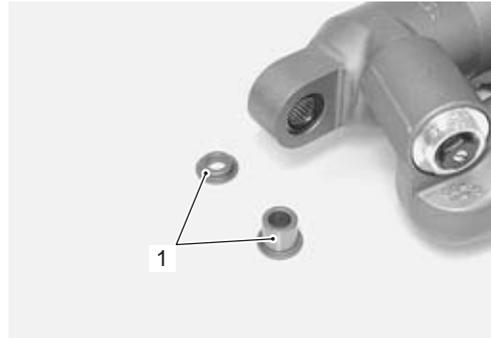
- Pass the wiring harness and clamp them securely. Refer to "Wiring Harness Routing Diagram" in Section 9A (Page 9A-2).

## Rear Shock Absorber Disassembly

BA02J22306006

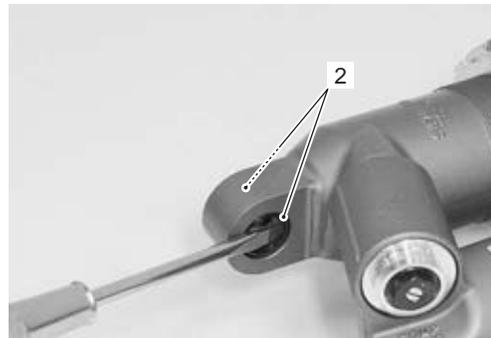
### Bearing

- 1) Remove the spacers (1).



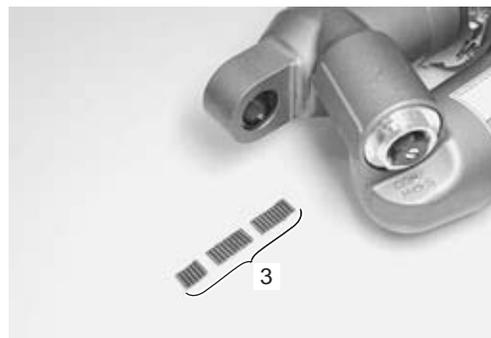
IA02J1230010-01

- 2) Remove the dust seals (2).



IA02J1230011-01

- 3) Remove the needle rollers (26 pcs) (3).

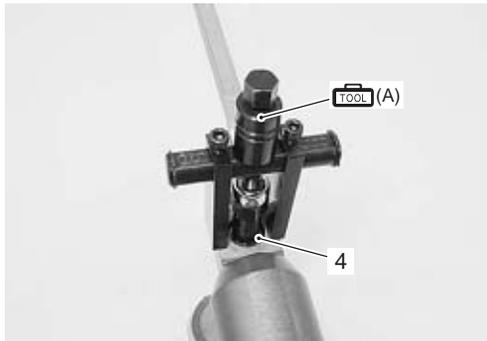


IA02J1230012-01

- 4) Remove the needle roller bearing cage (4) with the special tool.

#### Special tool

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



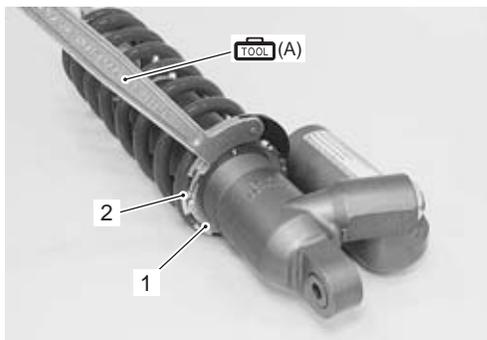
IA02J1230013-01

#### Spring

- 1) Loosen the lock-nut (1) with the special tool and turn it fully to the end of the thread.
- 2) Turn the adjuster (2) as well as the lock-nut (1).

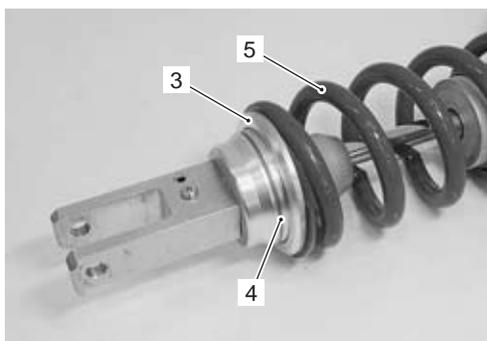
#### Special tool

 (A): 09910-60611 (Universal clamp wrench)



IA02J1230014-02

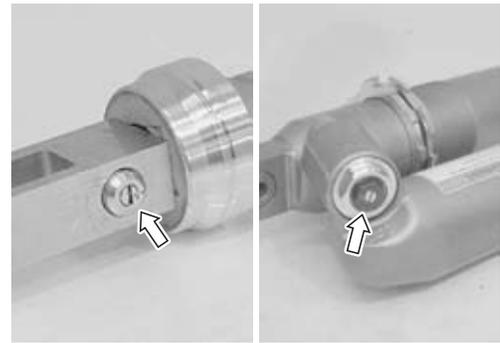
- 3) Depress the spring seat (3) and remove the stopper ring (4).
- 4) Remove the spring seat (3) and the spring (5) from the rear shock absorber.



IA02J1230015-01

#### Damper Rod

- 1) Turn the rebound damping force adjuster and compression adjuster to the softest position.



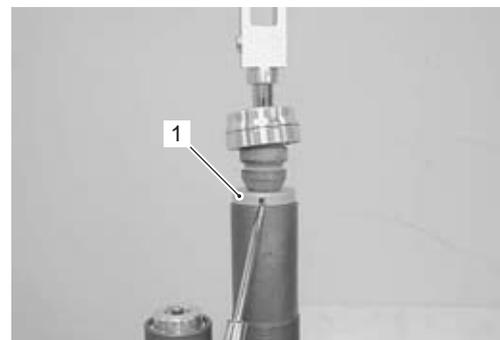
IA02J1230016-01

- 2) Drain the shock absorber oil and bleed out nitrogen gas. Refer to "Rear Suspension Oil Replacement" (Page 2C-11).
- 3) Vise the rear shock absorber unit in inverted position.
- 4) Depress the bump rubber fully to protect the damper rod.



IA02J1230017-01

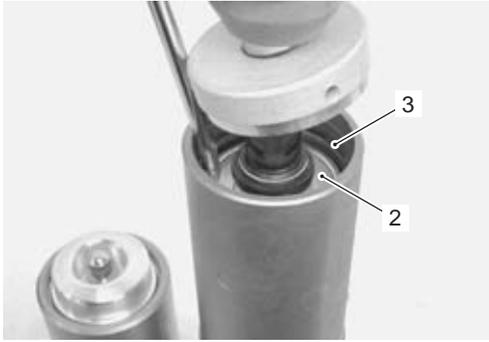
- 5) Evenly hammer the stopper (1) with a screwdriver or equivalent and remove it from the rear shock absorber body.



IA02J1230018-01

## 2C-8 Rear Suspension:

- 6) Depress the seal case (2) with a screwdriver until the circlip (3) is fully exposed.

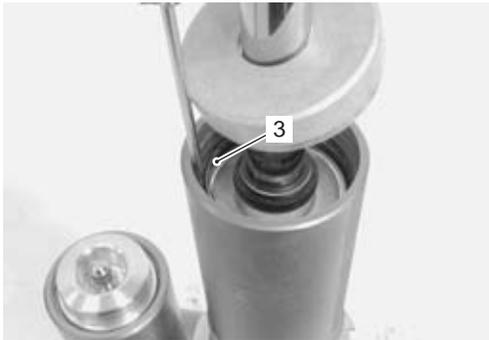


IA02J1230019-01

- 7) Remove the circlip (3).

### NOTE

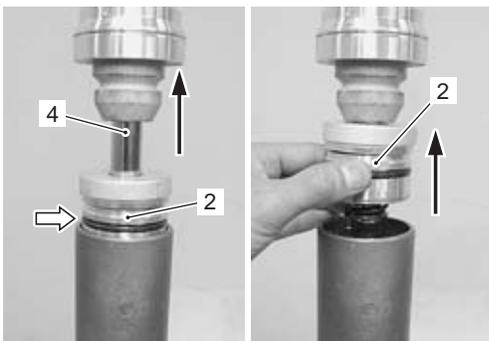
**Do not scratch the inner surface of the shock absorber body to avoid oil leaks.**



IA02J1230020-01

- 8) Slowly draw the damper rod assembly (4) until the O-ring on the seal case is seen.

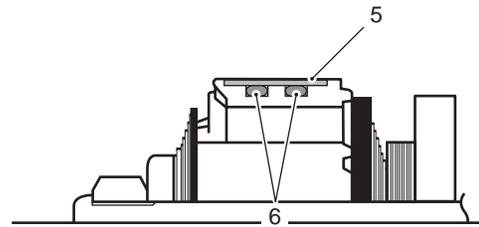
- 9) Draw out the seal case (2).



IA02J1230021-02

- 10) Extract the damper rod assembly from the shock absorber body.

- 11) Remove the piston ring (teflon coating metal) (5) and O-rings (6) if necessary.



IA02J1230107-01

## Rear Shock Absorber Assembly

BA02J22306007

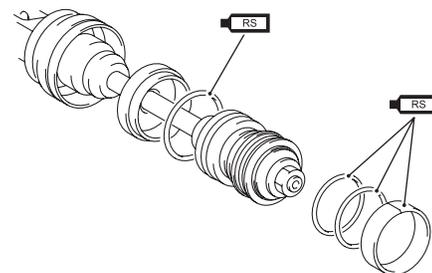
### Damper Rod

- 1) Apply the rear suspension oil to the O-rings and piston ring (teflon coating metal).

### NOTE

**The removed O-rings, piston ring must be replaced with new ones.**

**RS** : Rear suspension oil (Rear suspension oil SS25)



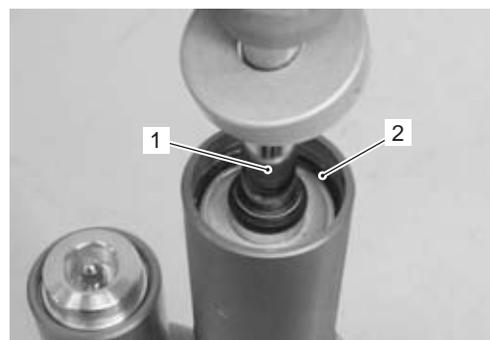
IA02J1230108-01

- 2) Insert the damper rod assembly (1) and fit the circlip (2).

### ⚠ CAUTION

**The circlip (2) must be replaced with a new one.**

- 3) Pull up the damper rod assembly (1) until it is stopped by the circlip (2).



IA02J1230024-01

- 4) Fit the stopper (3) to the shock absorber body.



IA02J1230025-01

- 5) Pour specified rear suspension oil to the shock absorber. Refer to "Rear Suspension Oil Replacement" (Page 2C-11).

 : Rear suspension oil (Rear suspension oil SS25)

#### Capacity

383 ml (13.0/13.5 US/Imp oz)

- 6) Apply rear suspension oil to the O-rings and tighten the compression adjuster assembly (4) to the specified torque with the special tool.

#### ⚠ CAUTION

Use new O-rings to prevent oil leakage.

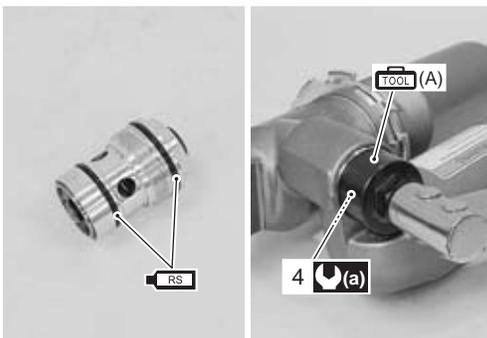
 : Rear suspension oil (Rear suspension oil SS25)

#### Special tool

 (A): 09941-53660 (RCU socket wrench (24 mm))

#### Tightening torque

Compression adjuster assembly (a): 30 N·m (3.0 kgf·m, 21.5 lbf·ft)



IA02J1230026-02

- 7) Pressure the shock absorber unit with nitrogen gas. Refer to "Rear Suspension Oil Replacement" (Page 2C-11).

#### Gas pressure

784 kPa (8.0 kg/cm<sup>2</sup>, 113.8 psi)

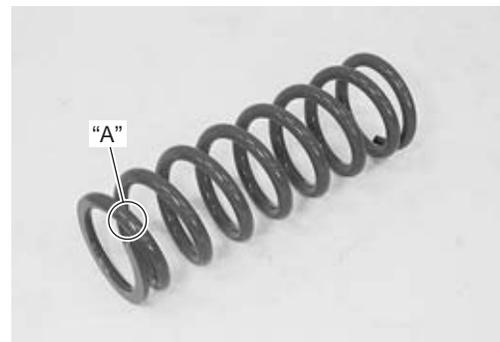
#### Spring

- 1) Install the following parts to the shock absorber.

- Lock-nut
- Adjuster
- Spring

#### NOTE

Install the spring as its painted side "A" (small diameter side) faces bottom.

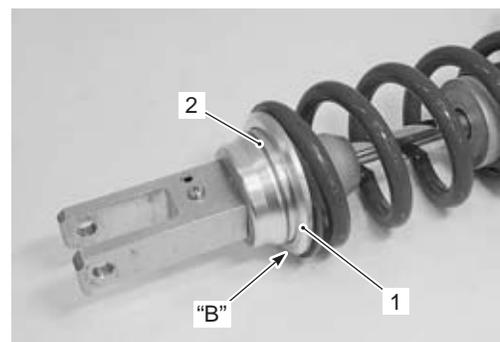


IA02J1230028-02

- 2) Install the spring seat (1) and stopper ring (2).

#### NOTE

When installing the spring seat (1), insert the tapered end "B" of the spring seat to the bottom.



IA02J1230029-02

- 3) Adjust the spring set length. Refer to "Rear Suspension Adjustment" (Page 2C-14).

## 2C-10 Rear Suspension:

### Bearing / Dust Seal

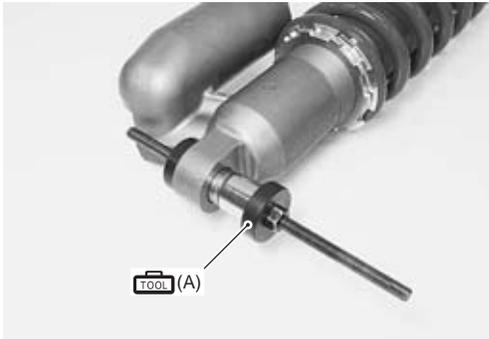
- 1) Press the new needle roller bearing cage with the special tool and a suitable size socket wrench.

#### NOTE

When installing the needle roller bearing cage, the stamped mark on the bearing must left side.

#### Special tool

 (A): 09924-84521 (Bearing installer set)



IA02J1230030-01

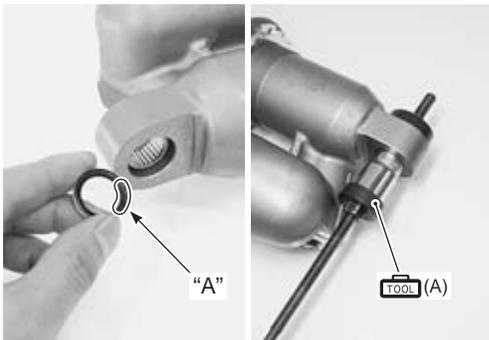
- 2) Press the new dust seals with the special tool and a suitable size socket wrench.

#### NOTE

When installing the dust seal, the stamped mark "A" on the dust seal must face inside.

#### Special tool

 (A): 09924-84521 (Bearing installer set)

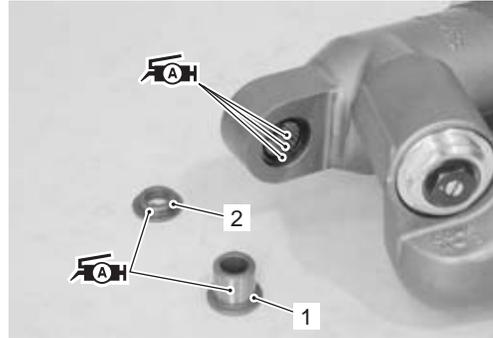


IA02J1230031-01

- 3) Apply grease to the needle roller bearings and install them.
- 4) Apply grease to the dust seals and spacers.

- 5) Install the spacers (1) (right side) and (2) (left side).

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



IA02J1230032-01

### Rear Suspension Inspection

BA02J22306008

Refer to "Rear Suspension Inspection" in Section 0B (Page 0B-24).

### Rear Shock Absorber Inspection

BA02J22306009

Refer to "Rear Shock Absorber Disassembly" (Page 2C-6) and "Rear Shock Absorber Assembly" (Page 2C-8).

### Rear Shock Absorber

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



IA02J1230033-01

**Damper Rod / Shock Absorber Body**

- 1) Inspect the damper rod for bends and smooth movement. If there is anything unusual, replace the damper rod with a new one.



IA02J1230034-01

- 2) Inspect the following parts for wear or damage. If any defects are found, replace defective parts with new ones.

- Oil seal
- O-ring
- Piston ring (teflon coating metal)
- Bump rubber
- Shock absorber body (inner surface)



IA02J1230109-02

**Compression Adjuster Assembly O-ring**

Inspect the O-rings for wear or damage. If any defects are found, replace the defective O-ring with a new one.



IA02J1230038-01

**Spacer / Dust Seal**

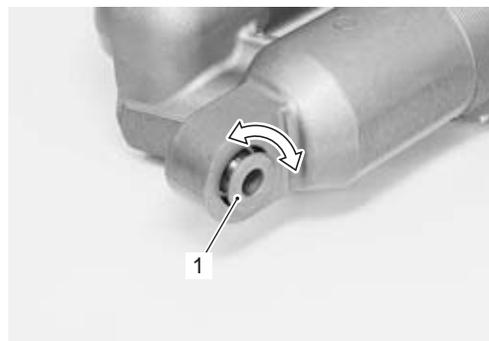
Inspect the spacers and dust seals for damage. If any defects are found, replace the defective parts with a new one.



IA02J1230036-01

**Bearing**

- 1) Remove the spacers and dust seals.
- 2) Insert the spacers (1) into the bearings and inspect them for excessive play and smooth movement. If excessive play is noted, replace the bearing with a new one.



IA02J1230037-02

**Rear Suspension Oil Replacement**

BA02J22306010

**⚠ WARNING**

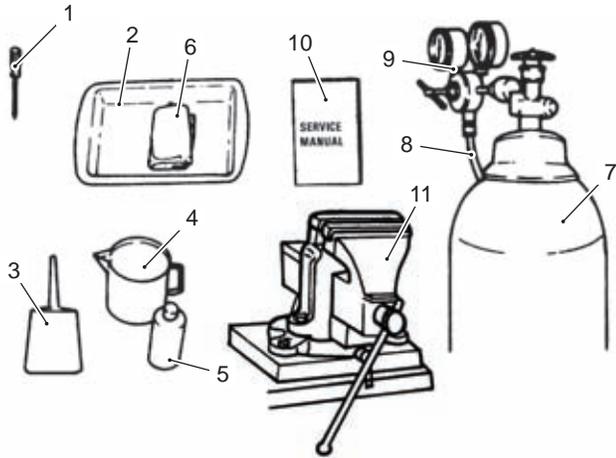
Use of flammable gas for pressuring the rear shock absorber unit can be hazardous. Flammable gas such as gas welding oxygen can cause a fire hazard. Use nitrogen gas. If nitrogen gas is not available, compressed air free from water can be substituted.

**⚠ CAUTION**

Riding the motorcycle with abnormal gas pressure can damage the rear shock absorber unit. Low gas pressure can result in oil leakage. Abnormal gas pressure cannot provide normal rear shock absorber unit performance. Be sure to fill the rear shock absorber unit to the specified pressure.

## 2C-12 Rear Suspension:

- 1) Following tools and equipment are required to perform oil replacement.



IA02J1230039-02

1. Screwdriver or small punch	7. Nitrogen tank
2. Drain pan	8. Filler hose / Nozzle
3. Oil pan	9. Regulator assembly
4. Beaker	10. Service manual
5. Oil (SS25)	11. Vise
6. Rags	

- 2) Remove the rear shock absorber. Refer to “Rear Shock Absorber Removal and Installation” (Page 2C-5).
- 3) Remove the spring from the rear shock absorber. Refer to “Rear Shock Absorber Disassembly” (Page 2C-6).
- 4) Remove the valve cap and press the valve with a screwdriver (small punch) to bleed out nitrogen gas.

### **⚠ WARNING**

**Releasing high pressure gas from the rear shock absorber unit can be hazardous. Never perform any servicing until the nitrogen gas pressure has been released from the rear shock absorber unit. When releasing the gas pressure, place a rag over the gas valve and use the tip of a screw driver etc. to press the valve. Do not use your finger to depress the gas valve, and direct the valve away from your face and body.**

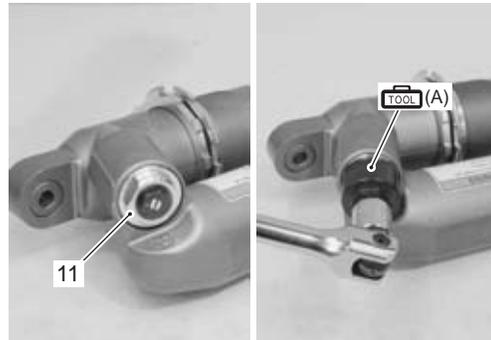


IA02J1230040-01

- 5) Remove the compression adjuster assembly (11) with the special tool from the rear shock absorber.

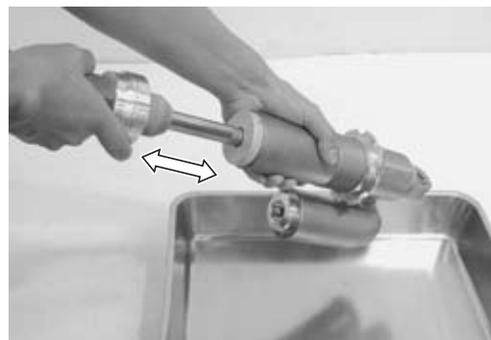
### **Special tool**

**TOOL (A): 09941-53660 (RCU socket wrench (24 mm))**



IA02J1230041-01

- 6) Place a drain pan under the rear shock absorber unit.
- 7) Move the rod and drain the oil completely.
- 8) Push the valve core again to equalize the bladder to atmospheric pressure.



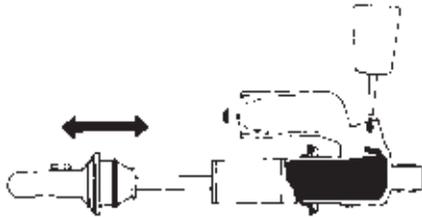
IA02J1230042-01

- 9) Pour the fresh specified rear suspension oil as shown while moving the rod.

**NOTE**

**Be sure to extend the rod after filling the oil.**

Turn the rebound damping force adjuster screw counterclockwise until it stops so that the rear suspension oil can be poured easily.



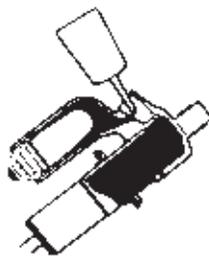
IA02J1230043-01

- 10) Tilt the shock absorber unit as shown and pour the fresh rear suspension oil fully into the reservoir.

**RS** : Rear suspension oil (Rear suspension oil SS25)

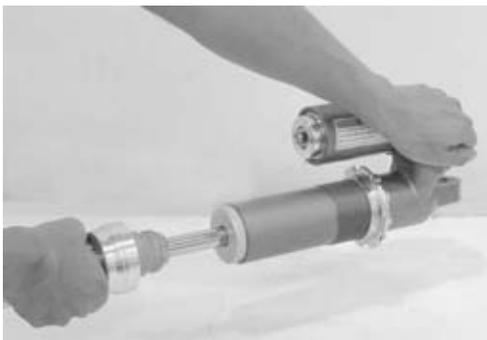
**Oil capacity**

**383 ml (13.0/13.5 US/lmp oz)**



IA02J1230044-01

- 11) Cover the compression adjuster hole with the root of your thumb.  
12) Tilt and shake the rear shock absorber unit to fill the reservoir with the oil.  
13) Add the oil and repeat the above procedure until the reservoir is filled with the oil completely.



IA02J1230045-01

- 14) Apply rear suspension oil to the O-rings and tighten the compression adjuster assembly (12) to the specified torque with the special tool.

**CAUTION**

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

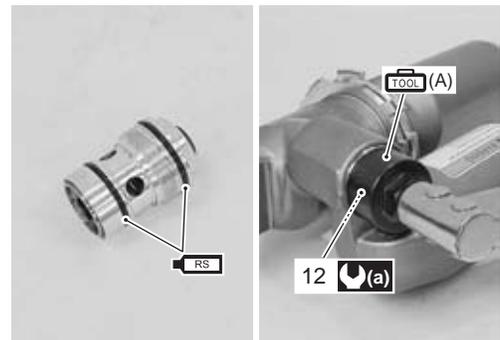
**RS** : Rear suspension oil (Rear suspension oil SS25)

**Special tool**

**TOOL (A)**: 09941-53660 (RCU socket wrench (24 mm))

**Tightening torque**

**Compression adjuster assembly (a): 30 N-m (3.0 kgf-m, 21.5 lbf-ft)**



IA02J1230046-01

- 15) Fill the rear shock absorber unit with nitrogen gas.

**Gas pressure**

**784 kPa (8.0 kgf/cm<sup>2</sup>, 113.8 psi)**

**WARNING**

**Applying too much pressure to the rear shock absorber unit may rupture the rear shock absorber unit. Be sure to fill the rear shock absorber unit to the specified pressure.**

- 16) Reinstall the spring. Refer to "Rear Shock Absorber Assembly" (Page 2C-8).  
17) Adjust the spring set length, compression damping force and rebound damping force. Refer to "Rear Suspension Adjustment" (Page 2C-14).

Rear Suspension Adjustment

BA02J22306011

Compression Damping Force Adjustment

**NOTE**

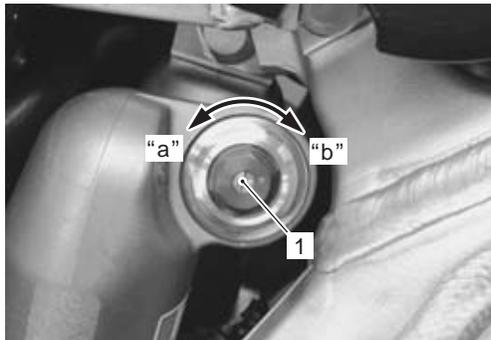
To set the adjuster, you must gently turn the adjust screw or bolt clockwise until it stops, then back it out the recommended number of turns. Do not force the adjust screw or bolt past the stopped position, or you may damage the adjuster.

**Low-side**

- Turn the adjust screw (1) clockwise until it stops (full hard position).
- Turn the adjust screw (1) counterclockwise about 10 clicks.

**Standard setting (Low-side)**

10 clicks turn back



IA02J1230047-01

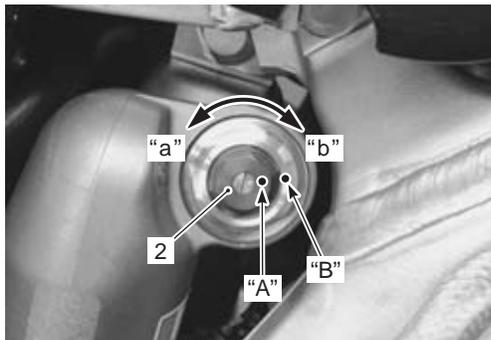
"a": Soft	"b": Hard
-----------	-----------

**High-side**

- Turn the adjust bolt (2) clockwise until it stops (full hard position).
- Turn the adjust bolt (2) counterclockwise about 2 turns until the two punch marks ("A", "B") align.

**Standard setting (High-side)**

2 turns back



IA02J1230048-01

"a": Soft	"b": Hard
-----------	-----------

Rebound Damping Force Adjustment

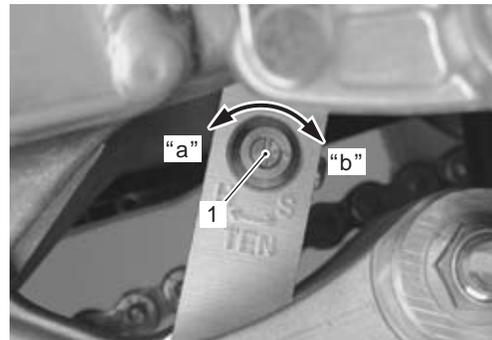
**NOTE**

To set the adjuster, you must gently turn the adjust screw clockwise until it stops, then back it out the recommended number of turns. Do not force the adjust screw past the stopped position, or you may damage the adjuster.

- Turn the adjust screw (1) clockwise until it stops (full hard position).
- Turn the adjust screw (1) counterclockwise about 13 clicks until the two punch marks align.

**Standard setting**

13 clicks turn back



IA02J1230049-01

"a": Soft	"b": Hard
-----------	-----------

### Spring Pre-load (Set Length) Adjustment

- Support the motorcycle with a jack.
- Remove the muffler. Refer to “Muffler / Exhaust Pipe Removal and Installation” in Section 1K (Page 1K-2).
- Remove the seat rail. Refer to “Body Frame Construction” in Section 9E (Page 9E-1).
- Loosen the lock-nut (1) with the special tool.

#### Special tool

 : 09910-60611 (Universal clamp wrench)

- Turn the adjuster (2) clockwise or counterclockwise to change the spring pre-load.
- Tighten the lock-nut (1).

#### Standard spring set length

**8.5 mm (0.34 in) compressed from spring free length**

#### Spring set length adjustable range

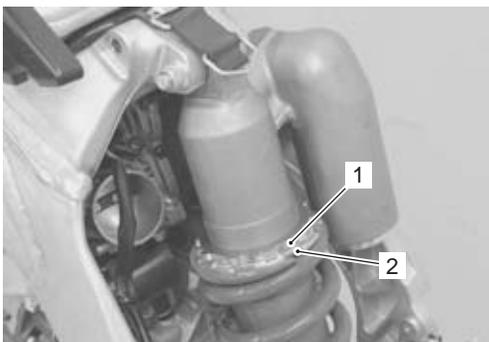
**250 – 263 mm (9.84 – 10.35 in)  
[at spring free length 265 mm (10.43 in)]**

#### Tightening torque

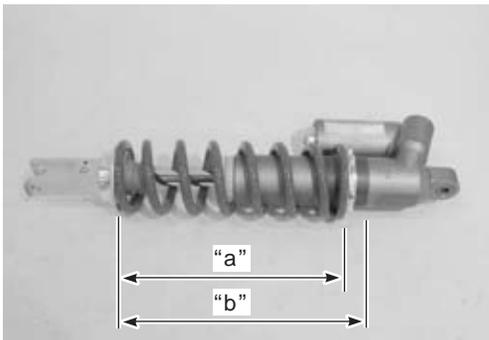
**Spring adjuster lock-nut: 44 N·m (4.4 kgf·m, 32.0 lbf·ft)**

#### NOTE

Turning the adjuster (2) without loosening the lock-nut (1) can damage the rear cushion unit.



IA02J1230050-01



IA02J1230051-01

“a”: Hardest spring setting	“b”: Softest spring setting
-----------------------------	-----------------------------

### Spring Change

- Remove the spring. Refer to “Rear Shock Absorber Disassembly” (Page 2C-6).
- Select the spring as shown in the spring rate table.

#### Spring Rate Table

	Spring/No.	Spring Rate	Marking paint	Set-length adjustable range
Soft	62211-37FJ0	50.0 N (5.1 kgf·m)	Silver	250 – 263 mm (9.84 – 10.35 in) [at spring free length 265 mm (10.43 in)]
Soft	62211-37FK0	52.0 N (5.3 kgf·m)	Orange	
STD	62211-37FL0	53.9 N (5.5 kgf·m)	Red x 2	
Hard	62211-35G30	55.9 N/mm (5.7 kgf·m)	Pink x 2	
Hard	62211-35G40	57.9 N/mm (5.9 kgf·m)	Blue	

IA02J1230111-01

- Assemble the rear shock absorber. Refer to “Rear Shock Absorber Assembly” (Page 2C-8).

### Cushion Lever Removal and Installation

BA02J22306012

#### Removal

#### CAUTION

**Make sure that the motorcycle is supported securely.**

- 1) Support the motorcycle with a jack to be no-load for the cushion lever.
- 2) Remove the cushion lever by removing its related bolts and nuts.



IA02J1230054-01

## 2C-16 Rear Suspension:

### Installation

Install the cushion lever in the reverse order of removal. Pay attention to the following point:

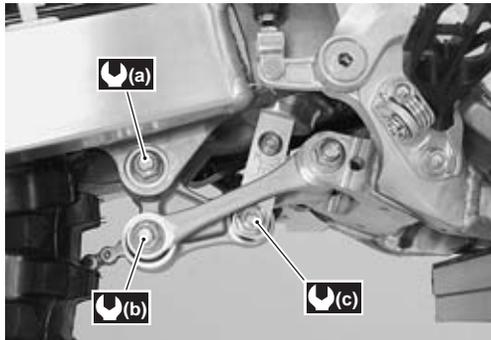
- Tighten each nut to the specified torque.

#### Tightening torque

**Cushion lever nut (a): 80 N·m (8.0 kgf·m, 58.0 lbf·ft)**

**Cushion rod nut (b): 80 N·m (8.0 kgf·m, 58.0 lbf·ft)**

**Rear shock absorber mounting nut (c): 50 N·m (5.0 kgf·m, 36.0 lbf·ft)**



IA02J1230055-01

### Cushion Lever Inspection

BA02J22306013

Refer to "Cushion Lever Removal and Installation" (Page 2C-15).

### Spacer

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



IA02J1230056-01

### Dust Seal

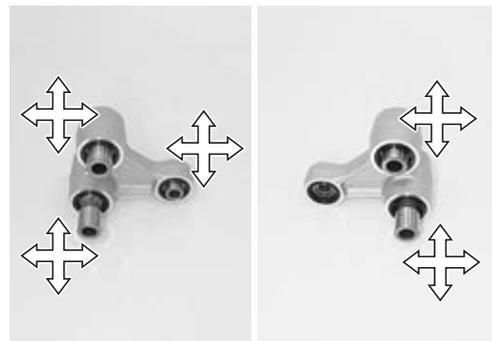
- 1) Remove the collars and spacers.
- 2) Inspect the dust seal lips for wear or damage. If any defects are found, replace the dust seals with the new ones.



IA02J1230057-01

### Cushion Lever Bearing

- 1) Insert the spacers into bearings.
- 2) Check the play by moving the spacers up and down. If excessive play is noted, replace the bearing with a new one. Refer to "Cushion Lever Bearing Removal and Installation" (Page 2C-17).



IA02J1230058-01

### Cushion Lever

Inspect the cushion lever for damage. If any defect is found, replace the cushion lever with a new one.



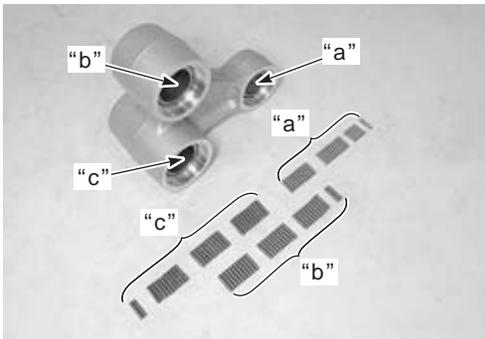
IA02J1230059-01

## Cushion Lever Bearing Removal and Installation

BA02J22306014

### Removal

- 1) Remove the needle roller bearings.



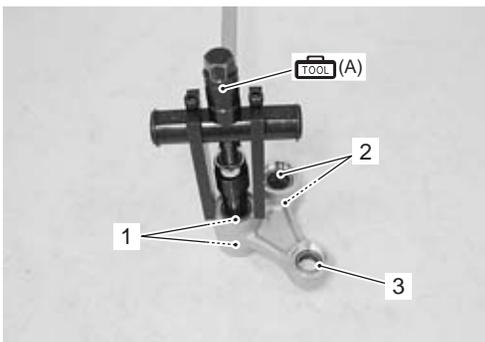
IA02J1230060-01

"a": 26 pcs	"c": 32 pcs (one side)
"b": 32 pcs (one side)	

- 2) Remove the cushion lever bearings (1), (2) and (3) with the special tool.

#### Special tool

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



IA02J1230061-01

### Installation

#### ⚠ CAUTION

The removed bearings and dust seals must be replaced with new ones.

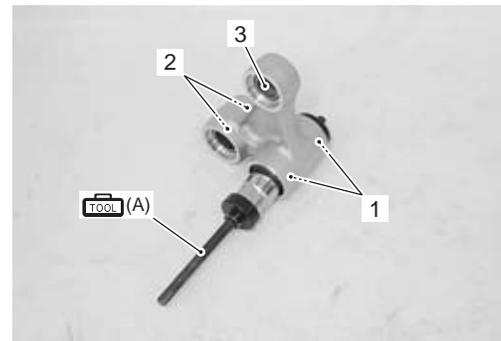
- 1) Press the bearings (1), (2) and (3) into the cushion lever with the special tool.

#### NOTE

When installing the bearing, stamped mark on the bearings (1) and (2) must face outside.  
[(3): right side]

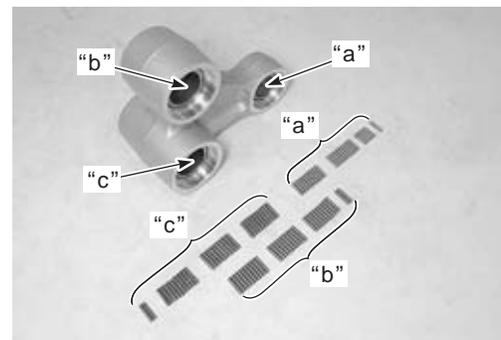
#### Special tool

(A): 09924-84521 (Bearing installer set)



IA02J1230062-01

- 2) Install the needle roller bearings.



IA02J1230060-01

"a": 26 pcs	"c": 32 pcs (one side)
"b": 32 pcs (one side)	

- 3) Install the dust seals with the special tool.

#### Special tool

(B): 09913-70210 (Bearing installing set (10 – 75 Φ))

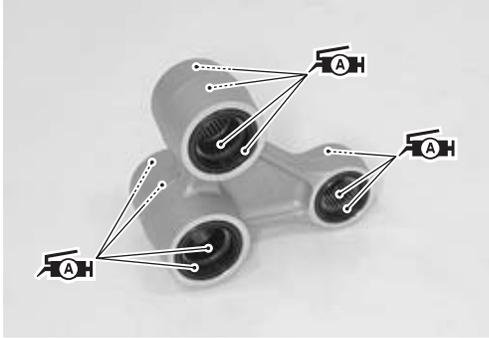


IA02J1230065-01

## 2C-18 Rear Suspension:

4) Apply grease to the bearings and dust seal lips.

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



IA02J1230066-01

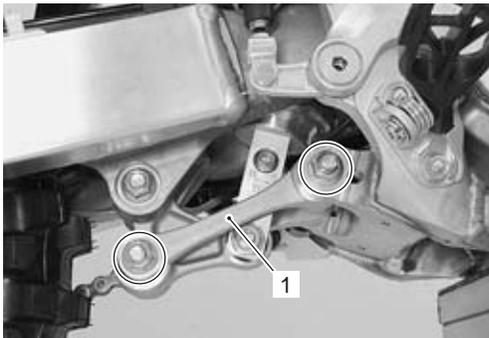
5) Install the cushion lever. Refer to "Cushion Lever Removal and Installation" (Page 2C-15).

### Cushion Rod Removal and Installation

BA02J22306015

#### Removal

- 1) Support the motorcycle with a jack to be no-load for cushion rod.
- 2) Remove the left footrest. Refer to "Footrest Bracket Construction" in Section 9E (Page 9E-3) and "Side-stand Removal and Installation" in Section 9E (Page 9E-4).
- 3) Remove the cushion rod (1) by removing bolts and nuts.



IA02J1230067-01

#### Installation

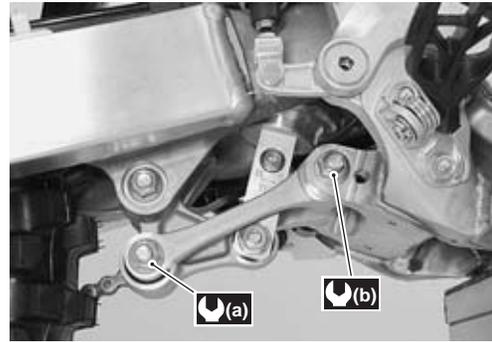
Install the cushion rod in the reverse order of removal. Pay attention to the following points:

- Tighten each bolts and nuts to the specified torque.

#### Tightening torque

**Cushion rod front bolt (a): 80 N-m (8.0 kgf-m, 58.0 lbf-ft)**

**Cushion rod rear nut (b): 80 N-m (8.0 kgf-m, 58.0 lbf-ft)**



IA02J1230068-01

### Cushion Rod Inspection

BA02J22306016

Refer to "Cushion Rod Removal and Installation" (Page 2C-18).

#### Spacer

- 1) Remove the spacer from the cushion rod.
- 2) Inspect the spacer for any flaws or other damage. If any defects are found, replace the spacer with new one.



IA02J1230069-01

### Cushion Rod Bearing

- 1) Insert the spacer into bearing.
- 2) Check the play by moving the spacer up and down. If excessive play is noted, replace the bearing with a new one. Refer to "Cushion Rod Bearing Removal and Installation" (Page 2C-19).



IA02J1230070-01

**Cushion Rod**

Inspect the cushion lever for damage. If any defect is found, replace the cushion rod with a new one.



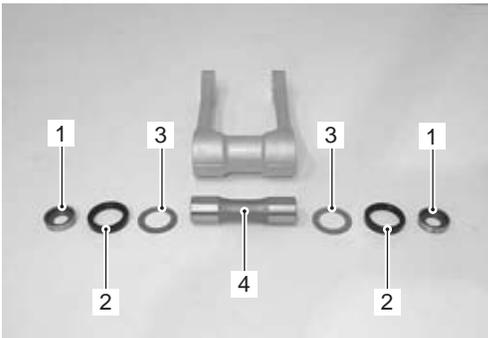
IA02J1230071-01

**Cushion Rod Bearing Removal and Installation**

BA02J22306017

**Removal**

- 1) Remove the following parts from the cushion rod.
  - Collar (1)
  - Dust seal (2)
  - Washer (3)
  - Spacer (4)



IA02J1230072-01

- 2) Remove the needle bearings.

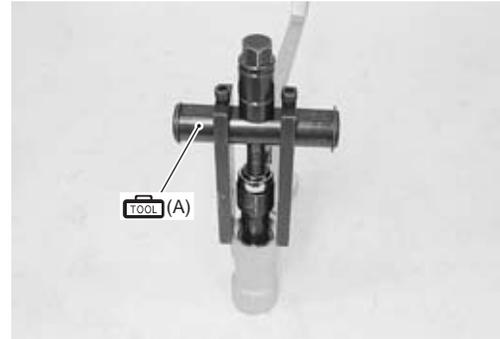


IA02J1230073-01

- 3) Remove the cushion rod bearing with the special tool.

**Special tool**

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



IA02J1230074-02

**Installation****⚠ CAUTION**

**The removed bearings must be replaced with new ones.**

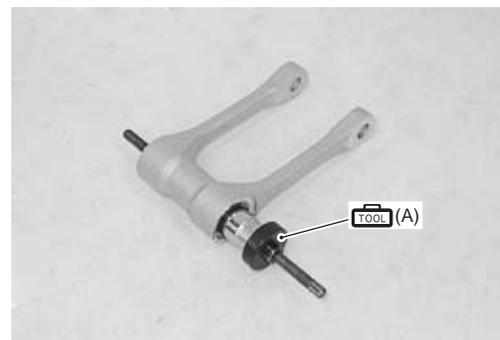
- 1) Press the bearings into the cushion rod with the special tool and suitable size socket wrench.

**NOTE**

**When installing the bearing, stamped mark on the bearing must face outside.**

**Special tool**

 (A): 09924-84521 (Bearing installer set)



IA02J1230075-01

- 2) Install the needle bearings.



IA02J1230076-01

"a": 32 pcs (one sides)

## 2C-20 Rear Suspension:

3) Install the dust seals with the special tool.

### Special tool

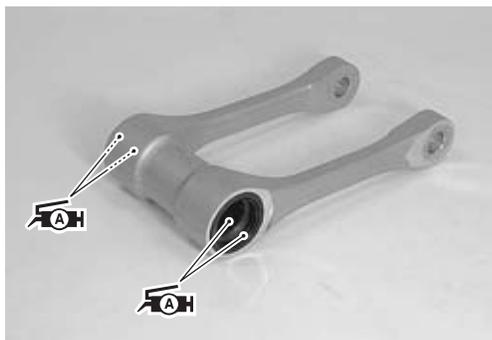
 (B): 09913-70210 (Bearing installing set (10 - 75 Φ))



IA02J1230101-01

4) Apply grease to the bearings and dust seal lips.

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



IA02J1230077-01

5) Install the cushion rod. Refer to "Cushion Rod Bearing Removal and Installation" (Page 2C-19).

## Swingarm Removal and Installation

BA02J22306018

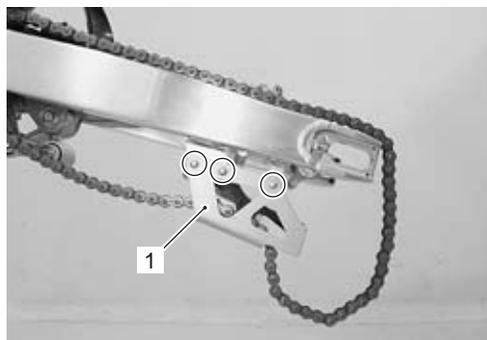
### Removal

#### CAUTION

**Make sure that the motorcycle is supported securely.**

1) Remove the rear wheel assembly. Refer to "Rear Wheel Assembly Removal and Installation" in Section 2D (Page 2D-11).

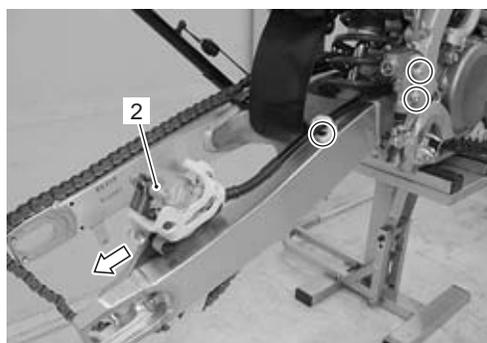
2) Remove the chain guide (1).



IA02J1230078-01

3) Remove the rear master cylinder mounting bolts and brake hose guide bolt.

4) Remove the rear brake caliper (2) from the swing arm.

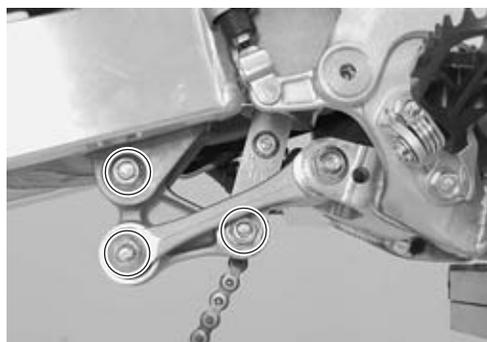


IA02J1230079-01

5) Remove the cushion rod bolt and nut.

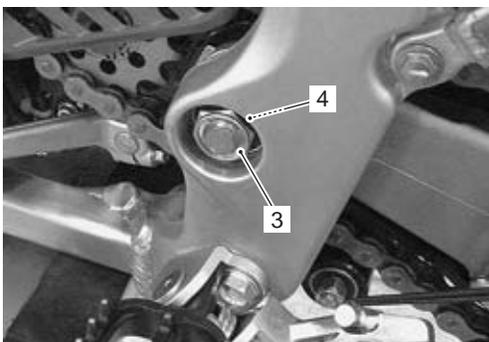
6) Remove the cushion lever bolt and nut.

7) Remove the rear shock absorber mounting bolt and nut.



IA02J1230080-01

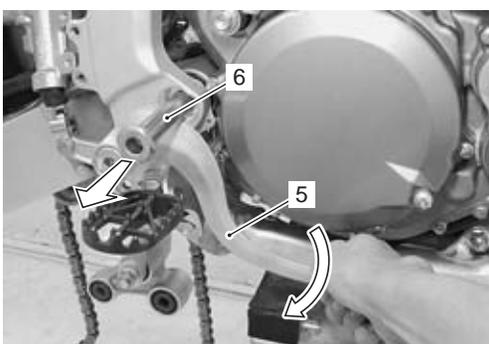
8) Remove the swing arm pivot nut (3) and washer (4).



IA02J1230081-02

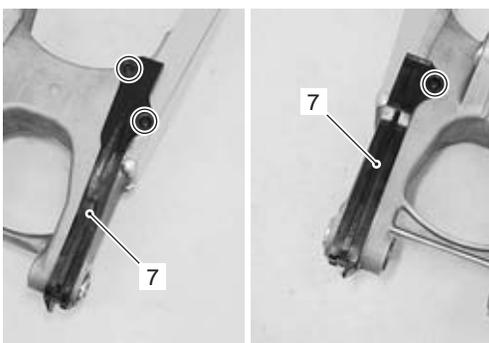
9) Down the rear brake pedal (5) and remove the pivot shaft (6).

10) Remove the swingarm.



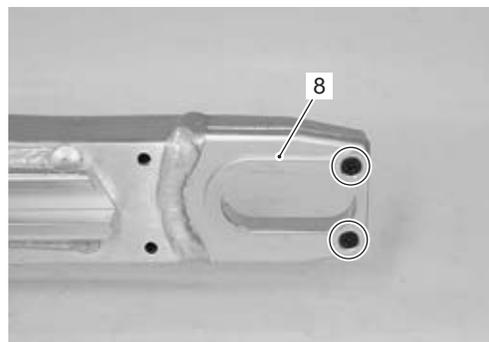
IA02J1230082-01

11) Remove the chain buffer (7).



IA02J1230083-01

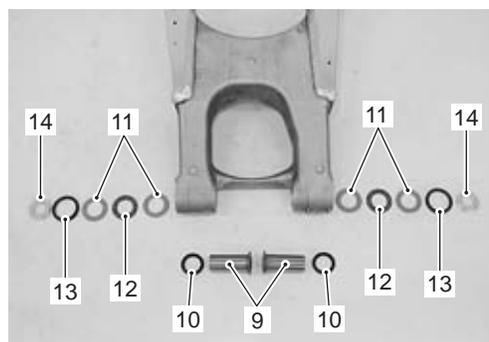
12) Remove the plates (8) left and right.



IA02J1230084-01

13) Remove the following parts from the swingarm.

- Spacer (9)
- Oil seal (10)
- Washer (11)
- Thrust bearing (12)
- Dust seal (13)
- Spacer (14)



IA02J1230085-01

## 2C-22 Rear Suspension:

### Installation

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

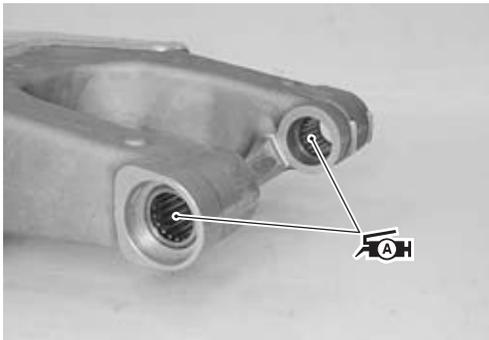
#### **CAUTION**

**The removed oil seals and dust seals must be replaced with new ones.**

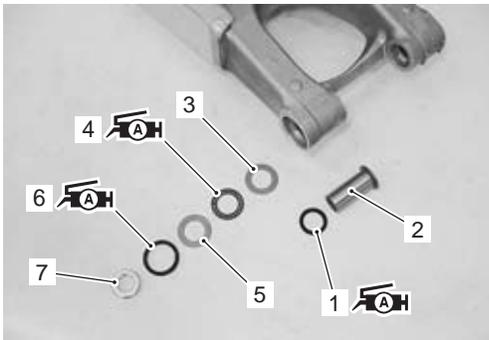
- Apply grease to the dust seals, bearings and oil seals.

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

- Install the following parts into the swingarm.
  - Oil seal (1)
  - Spacer (2)
  - Washer (3)
  - Thrust bearing (4)
  - Washer (5)
  - Dust seal (6)
  - Spacer (7)



IA02J1230086-01



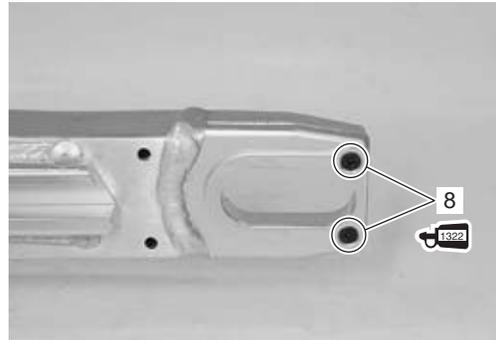
IA02J1230087-01

- Install the plate.

#### **NOTE**

**When reusing the removed screw (8), apply a small quantity of the thread lock to them.**

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

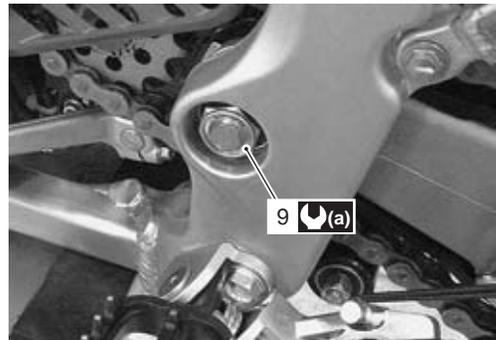


IA02J1230088-01

- Install the swingarm.
- Tighten the swingarm pivot nut (9) to the specified torque.

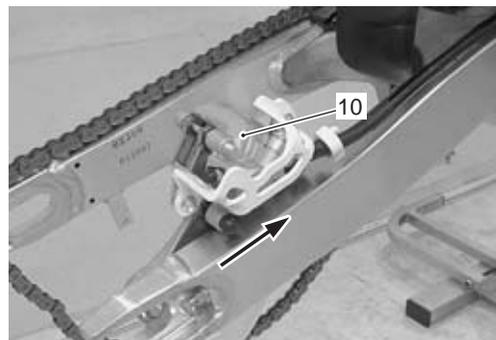
#### **Tightening torque**

**Swingarm pivot nut (a): 70 N-m (7.0 kgf-m, 50.5 lbf-ft)**



IA02J1230089-01

- Install the rear brake caliper (10) to the swing arm.



IA02J1230090-01

- Install the rear brake master cylinder. Refer to "Rear Brake Master Cylinder Assembly Removal and Installation" in Section 4A (Page 4A-12).

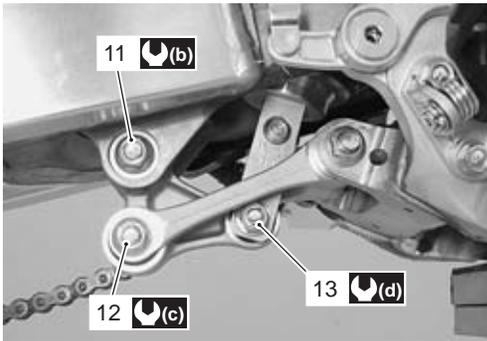
- Tighten the cushion lever nut (11), cushion rod nut (12) and rear shock absorber mounting nut (13) to the specified torque.

#### Tightening torque

**Cushion lever nut (b): 80 N-m (8.0 kgf-m, 58.0 lbf-ft)**

**Cushion rod rear nut (c): 80 N-m (8.0 kgf-m, 58.0 lbf-ft)**

**Rear shock absorber mounting nut (d): 50 N-m (5.0 kgf-m, 36.0 lbf-ft)**



IA02J1230091-02

- Install the rear wheel. Refer to "Rear Wheel Assembly Removal and Installation" in Section 2D (Page 2D-11).
- Adjust the chain slack. Refer to "Drive Chain Inspection and Adjustment" in Section 0B (Page 0B-20).

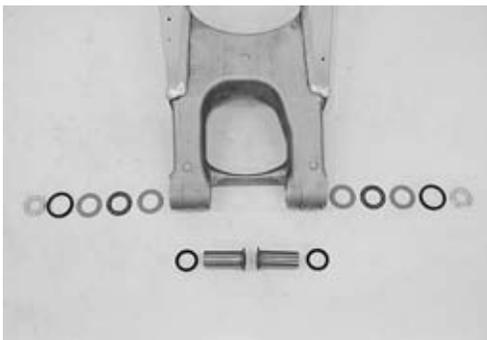
#### Swingarm Related Parts Inspection

BA02J22306019

Refer to "Swingarm Removal and Installation" (Page 2C-20).

#### Spacer, Dust Seal and Oil Seal

Inspect the spacers, dust seals and oil seals for damage. If necessary, replace the defective parts with a new one.



IA02J1230092-01

#### Bearing

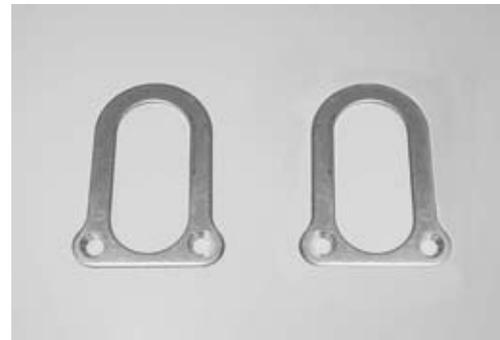
- 1) Insert the spacers into bearings.
- 2) Check the play by moving the spacers up and down. If excessive play is noted, replace the bearing with a new ones. Refer to "Swingarm Bearing Removal and Installation" (Page 2C-24).



IA02J1230093-01

#### Plate

Inspect the plate for damage and excessive bend. If any defect is found, replace the plate with a new one.



IA02J1230094-01

#### Swingarm

Inspect the swingarm for damage. If any defect is found, replace the swingarm with a new one.



IA02J1230095-01

## 2C-24 Rear Suspension:

### Swingarm Pivot Shaft

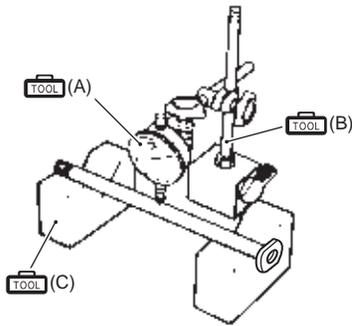
Measure the swingarm pivot shaft runout using the dial gauge. If the runout exceeds the service limit, replace the pivot shaft.

#### Special tool

-  (A): 09900-20607 (Dial gauge)
-  (B): 09900-20701 (Dial gauge chuck)
-  (C): 09900-21304 (V blocks)

#### Swingarm pivot shaft runout

Service limit: 0.3 mm (0.01 in)



IA02J1230096-01

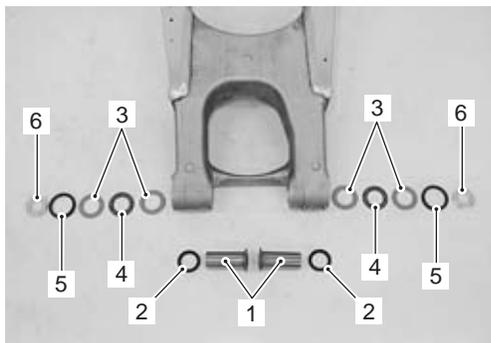
### Swingarm Bearing Removal and Installation

BA02J22306020

Refer to "Swingarm Removal and Installation" (Page 2C-20).

#### Removal

- 1) Remove the following parts from the swingarm.
  - Spacer (1)
  - Oil seal (2)
  - Washer (3)
  - Thrust bearing (4)
  - Dust seal (5)
  - Spacer (6)

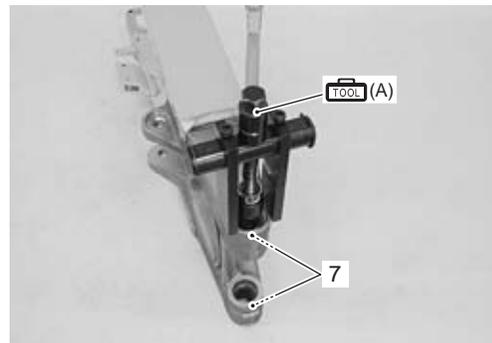


IA02J1230097-01

- 2) Remove the swingarm pivot bearings (7) using the special tool.

#### Special tool

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



IA02J1230098-01

#### Installation

#### CAUTION

The removed bearings must be replaced with new ones.

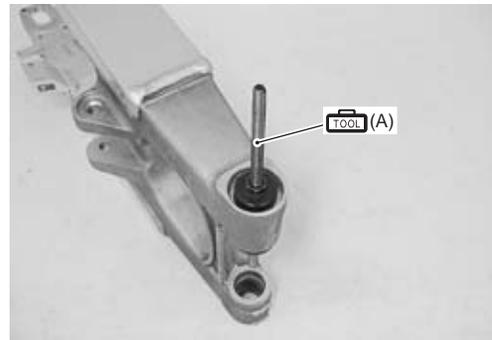
- 1) Press the bearings into the swingarm pivot with the special tool.

#### NOTE

When installing the bearing, stamped mark on the bearing must face outside.

#### Special tool

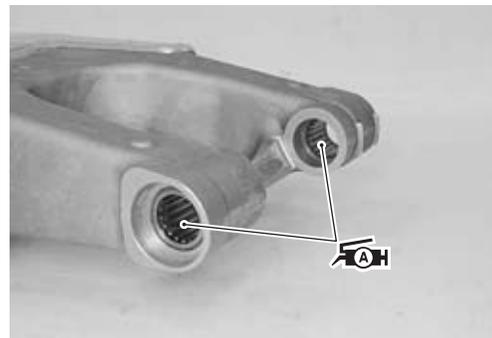
-  (A): 09941-34513 (Bearing installer)



IA02J1230099-01

- 2) Apply grease to the bearings.

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



IA02J1230100-01

- 3) Install the swingarm. Refer to "Swingarm Removal and Installation" (Page 2C-20).

## Specifications

### Service Data

BA02J22307001

#### Suspension

Unit: mm (in)

Item	Standard	Limit	Note
Rear shock absorber spring set length	256.5 (10.10)	—	8.5 mm (0.34 in) compressed from spring free length
Rear shock absorber spring rate	53.9 N/mm (5.5 kgf/mm)	—	
Rear shock absorber damping force adjuster	Rebound	MAX – 13 clicks turn back	—
	Compression (High speed)	MAX – 2 turns back	—
	Compression (Low speed)	MAX – 10 clicks turn back	—
Rear wheel travel	310 (12.2)		
Swingarm pivot shaft runout	—	0.3 (0.01)	
Rear shock absorber gas pressure	784 kPa (8.0 kgf/cm <sup>2</sup> , 113.8 psi)	—	

### Tightening Torque Specifications

BA02J22307002

Fastening part	Tightening torque			Note
	N·m	kgf·m	lbf·ft	
Rear shock absorber lower mounting nut	50	5.0	36.0	☞ (Page 2C-6)
Rear shock absorber upper mounting nut	50	5.0	36.0	☞ (Page 2C-6)
Compression adjuster assembly	30	3.0	21.5	☞ (Page 2C-9) / ☞ (Page 2C-13)
Spring adjuster lock-nut	44	4.4	32.0	☞ (Page 2C-15)
Cushion lever nut	80	8.0	58.0	☞ (Page 2C-16) / ☞ (Page 2C-23)
Cushion rod nut	80	8.0	58.0	☞ (Page 2C-16)
Rear shock absorber mounting nut	50	5.0	36.0	☞ (Page 2C-16) / ☞ (Page 2C-23)
Cushion rod front bolt	80	8.0	58.0	☞ (Page 2C-18)
Cushion rod rear nut	80	8.0	58.0	☞ (Page 2C-18) / ☞ (Page 2C-23)
Swingarm pivot nut	70	7.0	50.5	☞ (Page 2C-22)

#### NOTE

The specified tightening torque is described in the following.

“Rear Shock Absorber Components” (Page 2C-1)

“Cushion Rod / Cushion Lever Components” (Page 2C-2)

“Swingarm Components” (Page 2C-3)

“Rear Suspension Assembly Construction” (Page 2C-4)

#### Reference:

For the tightening torque of fastener not specified in this section, refer to “Tightening Torque List” in Section 0C (Page 0C-8).

## Special Tools and Equipment

### Recommended Service Material

BA02J22308001

Material	SUZUKI recommended product or Specification		Note
Grease	SUZUKI SUPER GREASE "A" or equivalent	P/No.: 99000-25010	☞ (Page 2C-10) / ☞ (Page 2C-18) / ☞ (Page 2C-20) / ☞ (Page 2C-22) / ☞ (Page 2C-24)
Rear suspension oil	Rear suspension oil SS25	—	☞ (Page 2C-8) / ☞ (Page 2C-9) / ☞ (Page 2C-9) / ☞ (Page 2C-13) / ☞ (Page 2C-13)
Thread lock cement	THREAD LOCK CEMENT SUPER "1322" or equivalent	P/No.: 99000-32110	☞ (Page 2C-22)

### NOTE

Required service material is also described in the following.

“Rear Shock Absorber Components” (Page 2C-1)

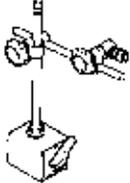
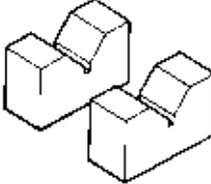
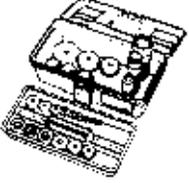
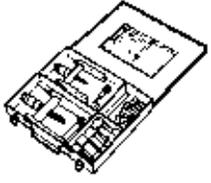
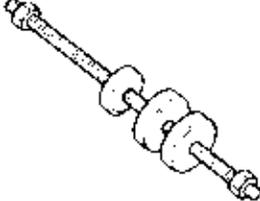
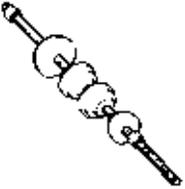
“Cushion Rod / Cushion Lever Components” (Page 2C-2)

“Swingarm Components” (Page 2C-3)

“Rear Suspension Assembly Construction” (Page 2C-4)

### Special Tool

BA02J22308002

09900-20607 Dial gauge ☞ (Page 2C-24)		09900-20701 Dial gauge chuck ☞ (Page 2C-24)	
09900-21304 V blocks ☞ (Page 2C-24)		09910-60611 Universal clamp wrench ☞ (Page 2C-7) / ☞ (Page 2C-15)	
09913-70210 Bearing installing set (10 – 75 Φ) ☞ (Page 2C-17) / ☞ (Page 2C-20)		09921-20240 Bearing remover set ☞ (Page 2C-7) / ☞ (Page 2C-17) / ☞ (Page 2C-19) / ☞ (Page 2C-24)	
09924-84521 Bearing installer set ☞ (Page 2C-10) / ☞ (Page 2C-10) / ☞ (Page 2C-17) / ☞ (Page 2C-19)		09941-34513 Bearing installer ☞ (Page 2C-24)	

09941-53660

RCU socket wrench (24  
mm)

☞ (Page 2C-9) / ☞ (Page 2C-  
12) / ☞ (Page 2C-13)



# Wheels and Tires

## Precautions

### Precautions for Wheel and Tire

BA02J22400001

#### **▲ WARNING**

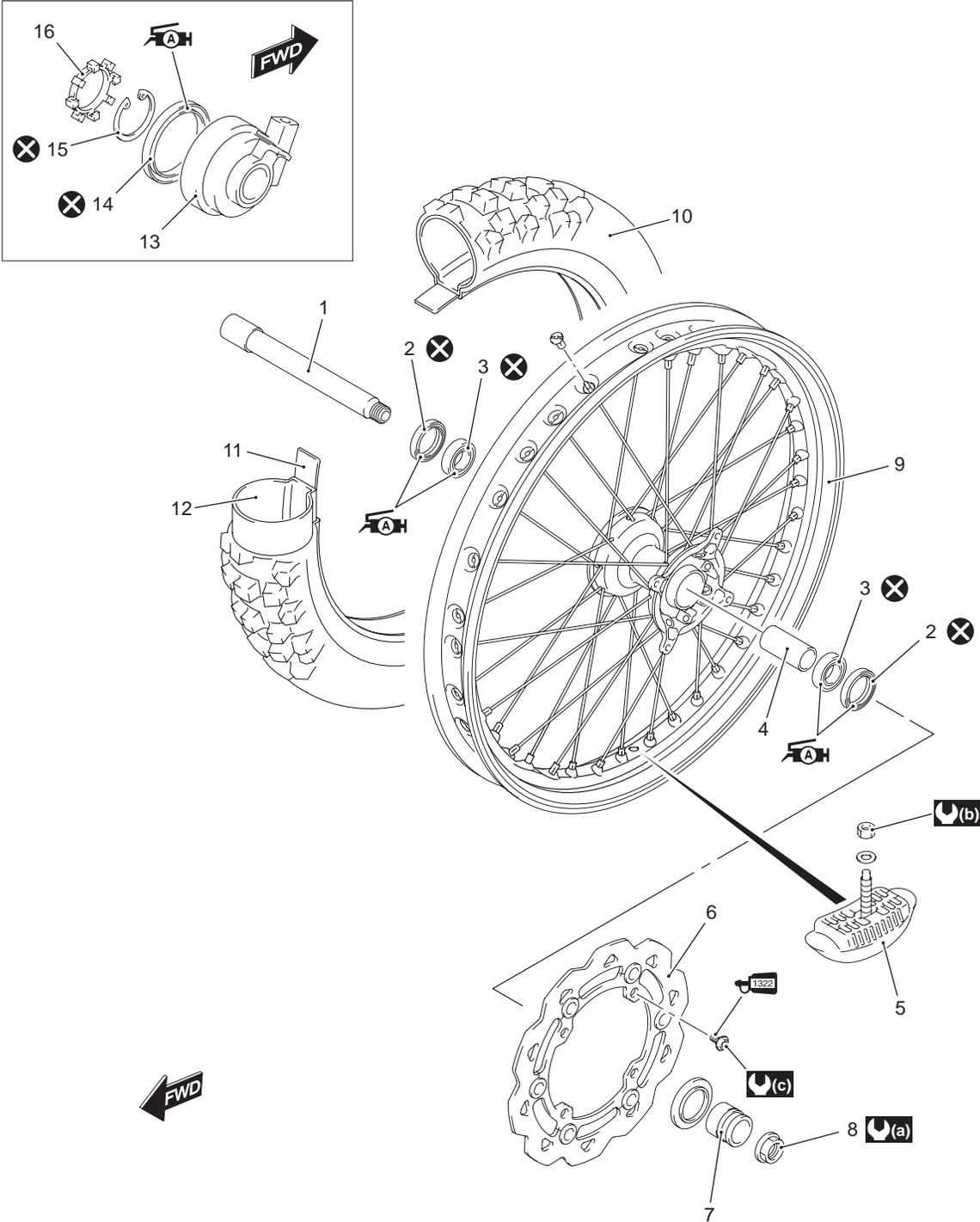
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- Proper tire pressure and proper tire loading are important factors. Over loading tire can lead to tire failure and loss of motorcycle control.
  - Under-inflated tires make smooth cornering difficult, and can result in rapid tire wear.
  - Over-inflated tires have a smaller amount of tire in contact with the load, which can contribute to skidding and loss of control.
  - Replace the wheel when wheel runout exceed the service limit or if find damage such as distortion, crack, nick or scratch.
  - When tire replacement is necessary, the original equipment type tire should be used.
  - Do not mix different types of tires on the same vehicle such as radial and bias-belted tires except in emergencies, because handling may be seriously affected and may result in loss of control.
  - Replacement wheel must be equivalent to the original equivalent wheel.
-

# Repair Instructions

## Front Wheel Components

BA02J22406001

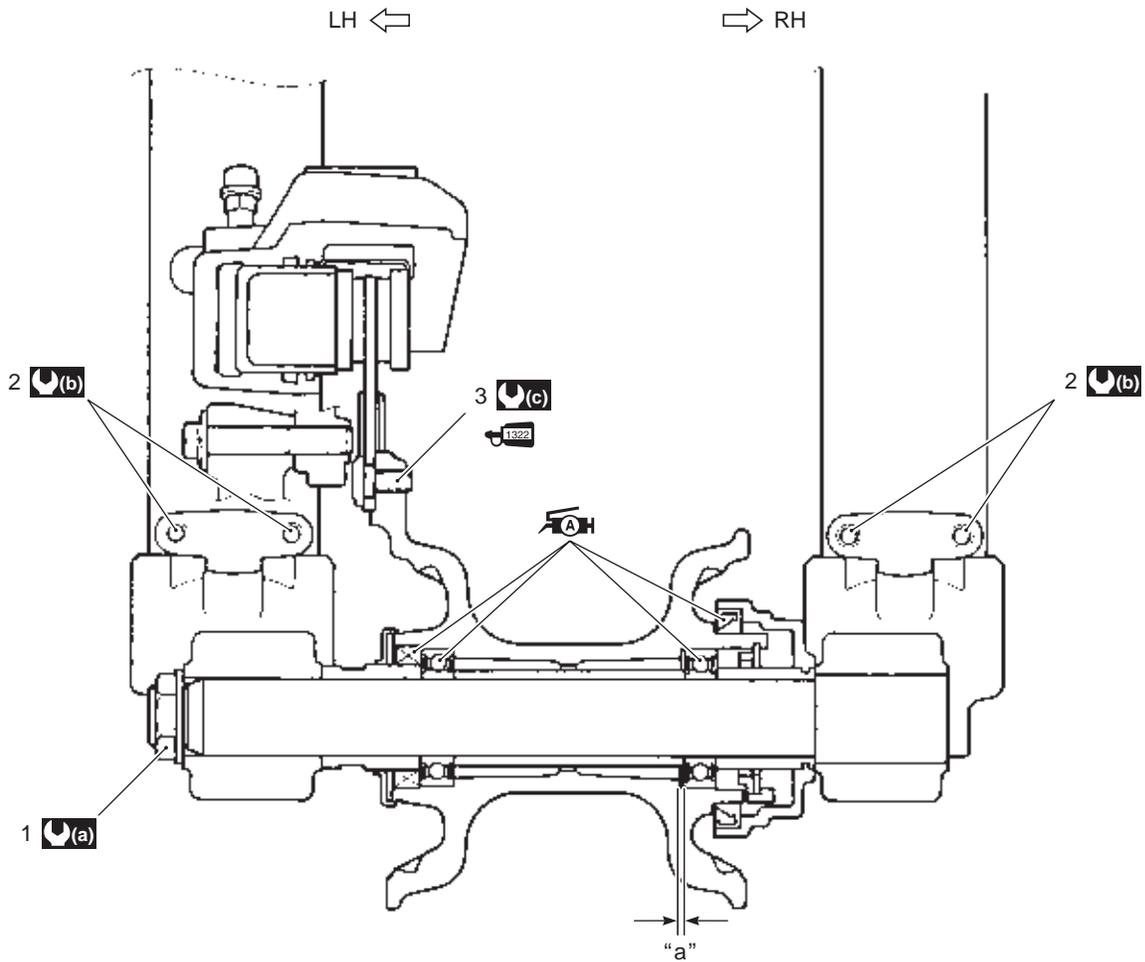


IA02J1240044-02

1. Front axle	7. Collar	13. Speed sensor	: 11 N·m (1.1 kgf·m, 8.0 lbf·ft)
2. Dust seal	8. Front axle nut	14. Dust seal	: Apply grease.
3. Bearing	9. Front wheel	15. Snap ring	: Apply thread lock to the thread part.
4. Spacer	10. Front tire	16. Speed rotor	: Do not reuse.
5. Bead stopper	11. Inner tube protector	: 35 N·m (3.5 kgf·m, 25.0 lbf·ft)	
6. Front brake disc	12. Tube	: 13 N·m (1.3 kgf·m, 9.5 lbf·ft)	

Front Wheel Assembly Construction

BA02J22406002



IA02J1240042-01

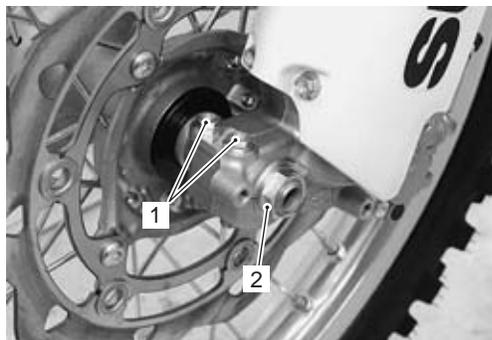
1. Front axle nut	"a": Clearance	: 11 N-m (1.1 kgf-m, 8.0 lbf-ft)
2. Front axle holder bolt	: 35 N-m (3.5 kgf-m, 25.0 lbf-ft)	: Apply grease.
3. Front brake disc bolt	: 18 N-m (1.8 kgf-m, 13.0 lbf-ft)	: Apply thread lock to the thread part.

Front Wheel Assembly Removal and Installation

BA02J22406003

Removal

- 1) Loosen two axle holder bolts (1) on the left front fork leg.
- 2) Remove the front axle nut (2).



IA02J1240029-01

- 3) Raise the front wheel off the ground and support the motorcycle with a jack or a wooden block.

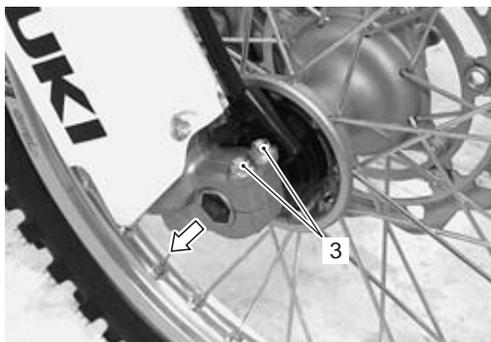
**CAUTION**

**Do not carry out the work with the motorcycle resting on the side-stand. Make sure that the motorcycle is supported securely.**

- 4) Loosen two axle holder bolts (3) on the right front fork leg.
- 5) Draw out the front axle and remove the front wheel.

**NOTE**

After removing the front wheel, fit the calipers temporarily to the original positions.



IA02J1240022-01

- 6) Remove the speed sensor (4) (RH only).



IA02J1240023-03

- 7) Remove the collar (5) (LH only).



IA02J1240030-03

**Installation**

- 1) Install the collar (1) to the left side of the wheel.

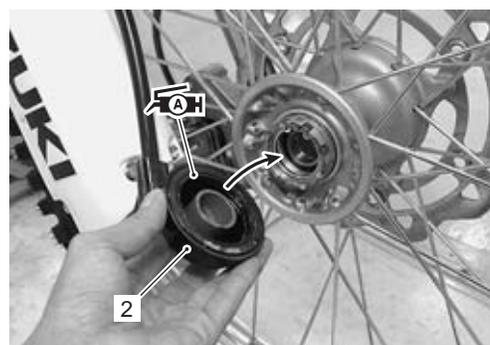


IA02J1240031-01

- 2) Apply grease to the lip of dust seal.

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

- 3) Install the speed sensor (2) to the front wheel.

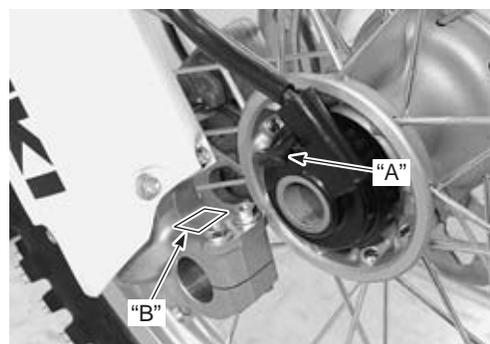


IA02J1240024-02

- 4) Install the front wheel.

**NOTE**

Fit the new projection "A" of the speed sensor with the part "B" of right front fork leg.



IA02J1240025-02

## 2D-5 Wheels and Tires:

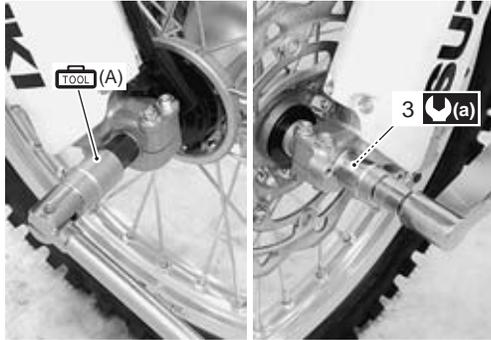
- 5) Hold the front axle with the special tool and tighten the front axle nut (3) to the specified torque.

### Special tool

 (A): 09944-28321 (Hexagon socket (19 mm))

### Tightening torque

Front axle nut (a): 35 N·m (3.5 kgf-m, 25.0 lbf-ft)



IA02J1240045-01

- 6) Move the front fork up and down 4 or 5 times.

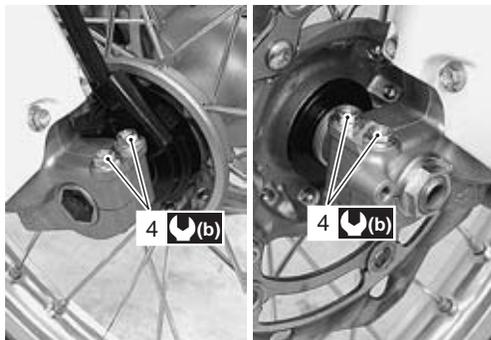


IA02J1240041-01

- 7) Tighten left and right axle pinch bolts (4) on the each fork leg to the specified torque.

### Tightening torque

Front axle holder bolt (b): 18 N·m (1.8 kgf-m, 13.0 lbf-ft)



IA02J1240032-01

## Front Wheel Related Parts Inspection

BA02J22406004

Refer to "Front Wheel Assembly Removal and Installation" (Page 2D-3).

### Tire

Refer to "Wheel and Tire Inspection" in Section 0B (Page 0B-24).

### Front Brake Disc

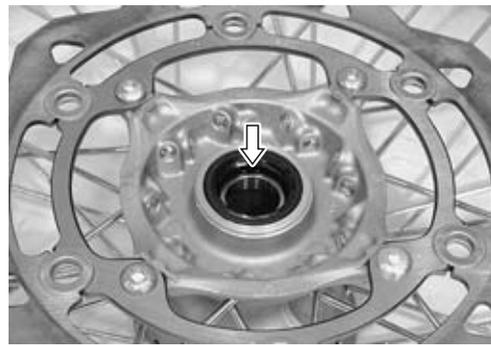
Refer to "Front Brake Disc Inspection" in Section 4B (Page 4B-6).

### Speed Sensor

Refer to "Speed Sensor Inspection" in Section 9C (Page 9C-4).

### Dust Seal

Inspect the dust seal lips for wear or damage. If any defects are found, replace the dust seal with a new ones. Refer to "Front Wheel Dust Seal / Bearing Removal and Installation" (Page 2D-6).



IA02J1240033-01

### Wheel Axle

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

### Special tool

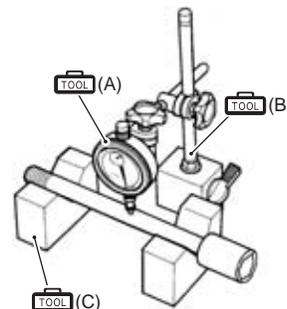
 (A): 09900-20607 (Dial gauge (1/100 mm, 10 mm))

 (B): 09900-20701 (Magnetic stand)

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

### Wheel axle runout

Service limit: 0.25 mm (0.010 in)



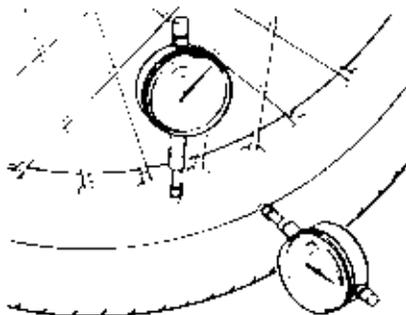
I649G1240054-02

**Wheel**

- 1) Remove the brake pads. Refer to "Front Brake Pad Replacement" in Section 4B (Page 4B-2).
- 2) Make sure that the wheel runout checked as shown in the figure does not exceed the service limit. An excessive runout is usually due to worn or loosened wheel bearings and can be reduced by replacing the bearings. If bearing replacement fails to reduce the runout, replace the wheel.

**Wheel rim runout**

**Service limit (Axial and Radial): 2.0 mm (0.08 in)**

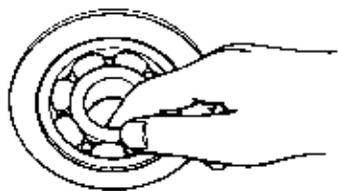


IA02J1240008-01

- 3) Install the brake pads. Refer to "Front Brake Pad Replacement" in Section 4B (Page 4B-2).

**Wheel Bearing**

Inspect the play of the wheel bearings by finger while they are in the wheel. Rotate the inner race by finger to inspect for abnormal noise and smooth rotation. Replace the bearing if there is anything unusual. Refer to "Front Wheel Dust Seal / Bearing Removal and Installation" (Page 2D-6).



I649G1240015-02

**Front Wheel Dust Seal / Bearing Removal and Installation**

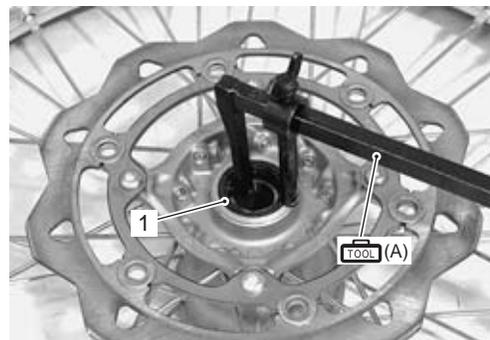
BA02J22406005

**Removal**

- 1) Remove the front wheel assembly. Refer to "Front Wheel Assembly Removal and Installation" (Page 2D-3).
- 2) Remove the dust seals (1) using the special tool.

**Special tool**

**TOOL (A): 09913-50121 (Oil seal remover)**

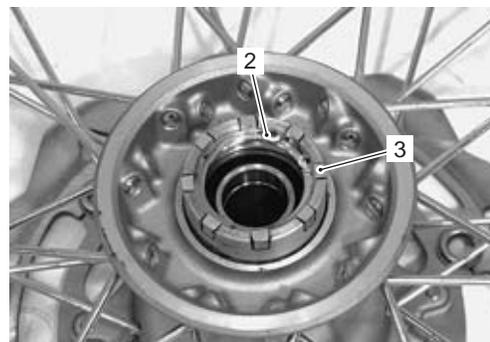


IA02J1240034-01

- 3) Remove the snap ring (2) and speed rotor (3).

**Special tool**

**TOOL : 09900-06108 (Snap ring remover (Close type))**

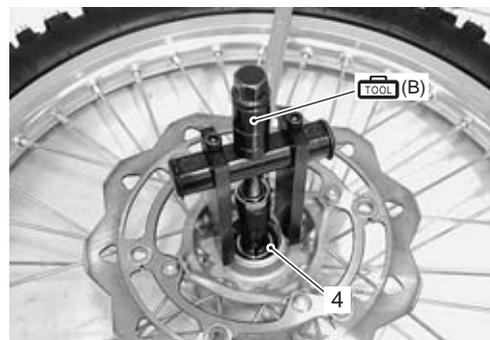


IA02J1240027-01

- 4) Remove the bearings (4) using the special tool.

**Special tool**

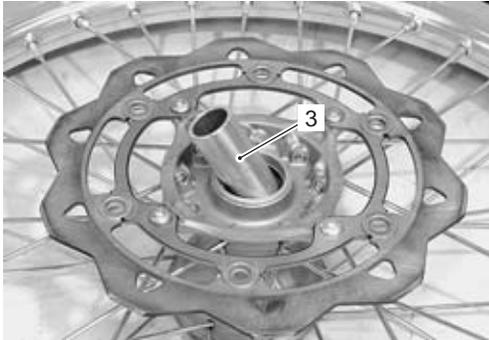
**TOOL (B): 09921-20240 (Bearing remover set)**



IA02J1240035-02

## 2D-7 Wheels and Tires:

- 5) Remove the spacer (3).



IA02J1240036-02

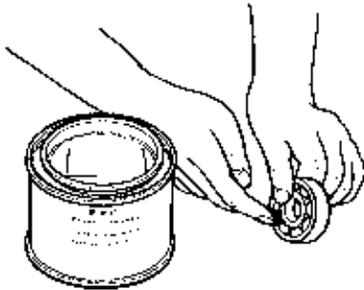
### Installation

#### ⚠ CAUTION

The removed snap ring, dust seal and bearings must be replaced with new ones.

- 1) Apply grease to the wheel bearings.

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



I649G1240019-02

- 2) First install the right wheel bearing, then install the spacer (1) and left wheel bearing with the special tool and suitable spacer (2).

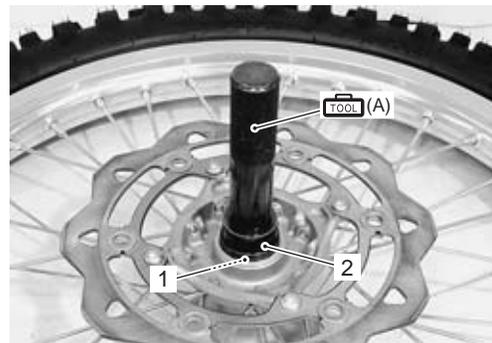
#### Special tool

 (A): 09924-84510 (Bearing installer set)

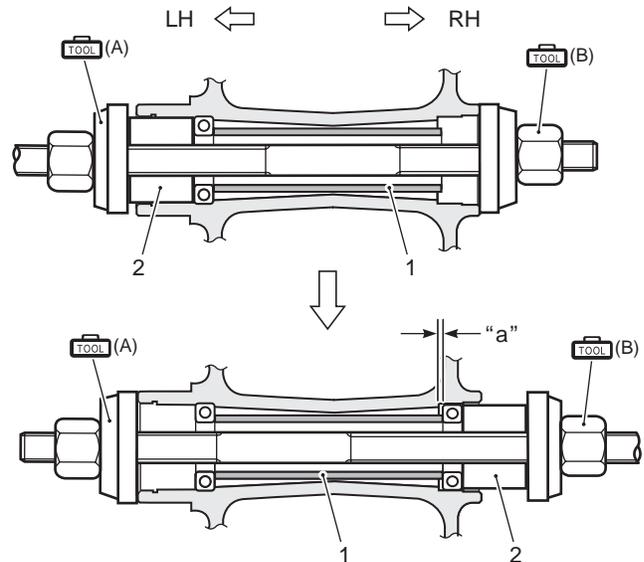
 (B): 09941-34513 (Steering race installer)

#### ⚠ CAUTION

The sealed cover of the bearing must face outside.



IA02J1240037-02



IA02J1240038-02

1. Spacer	"a": Clearance
2. Suitable spacer	

- 3) Install the dust seals with the special tool.

#### Special tool

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



IA02J1240039-01

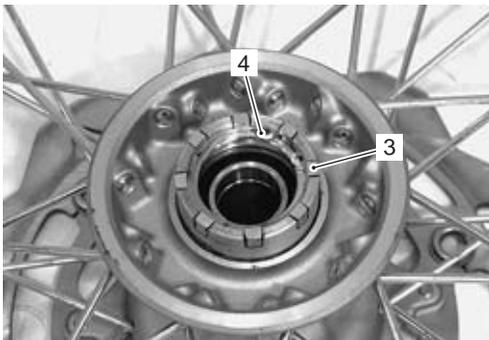
4) Install the speed rotor (3) and snap ring (4).

**⚠ CAUTION**

**Replace the snap ring (4) with a new one.**

**Special tool**

** : 09900-06108 (Snap ring remover (Close type))**



IA02J1240028-01

5) Apply grease to the lip of dust seals.

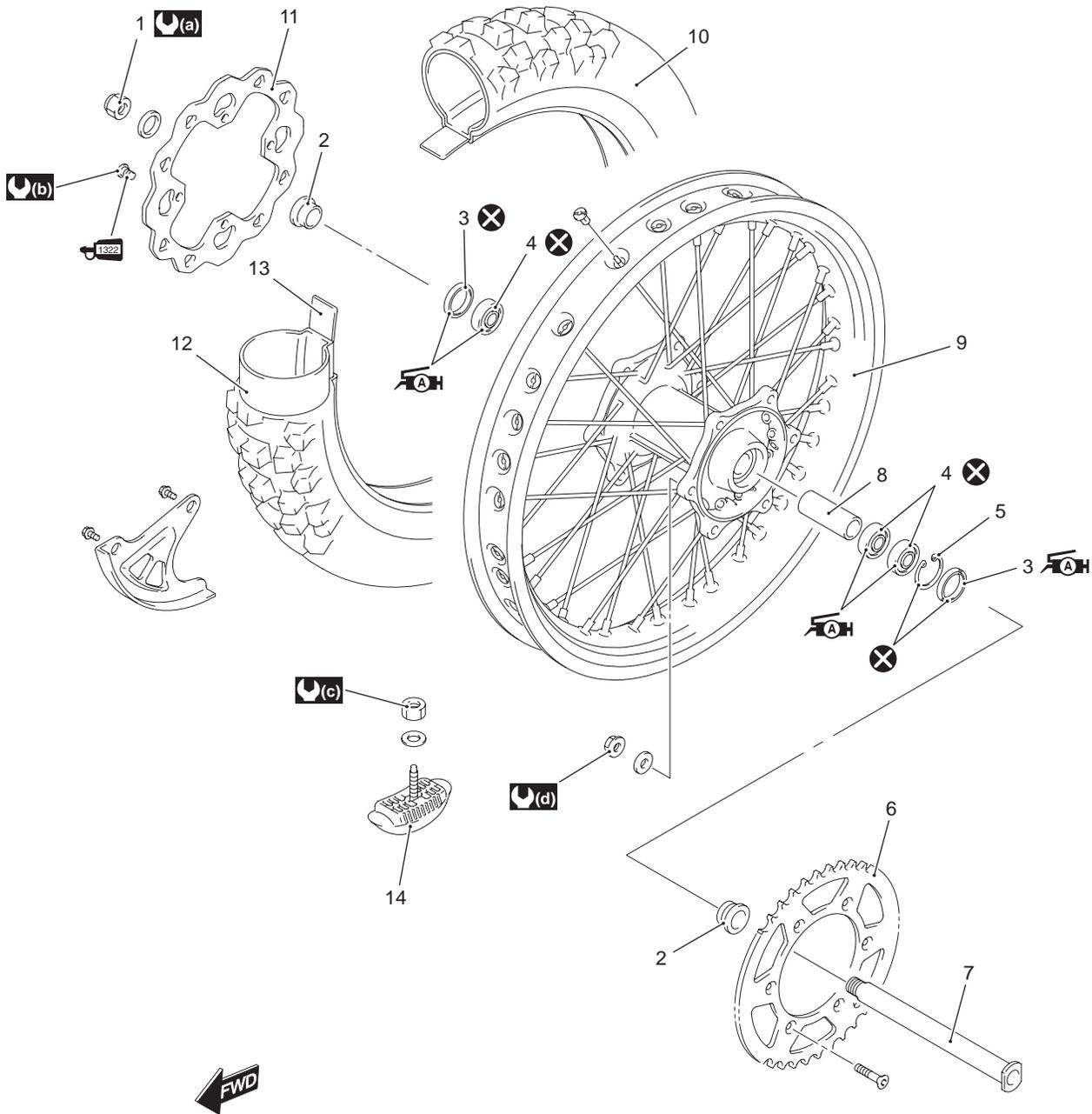
** : Grease 99000-25010 (SUZUKI SUPER GREASE "A" or equivalent)**



IA02J1240040-01

6) Install the front wheel assembly. Refer to "Front Wheel Assembly Removal and Installation" (Page 2D-3).

Rear Wheel Components

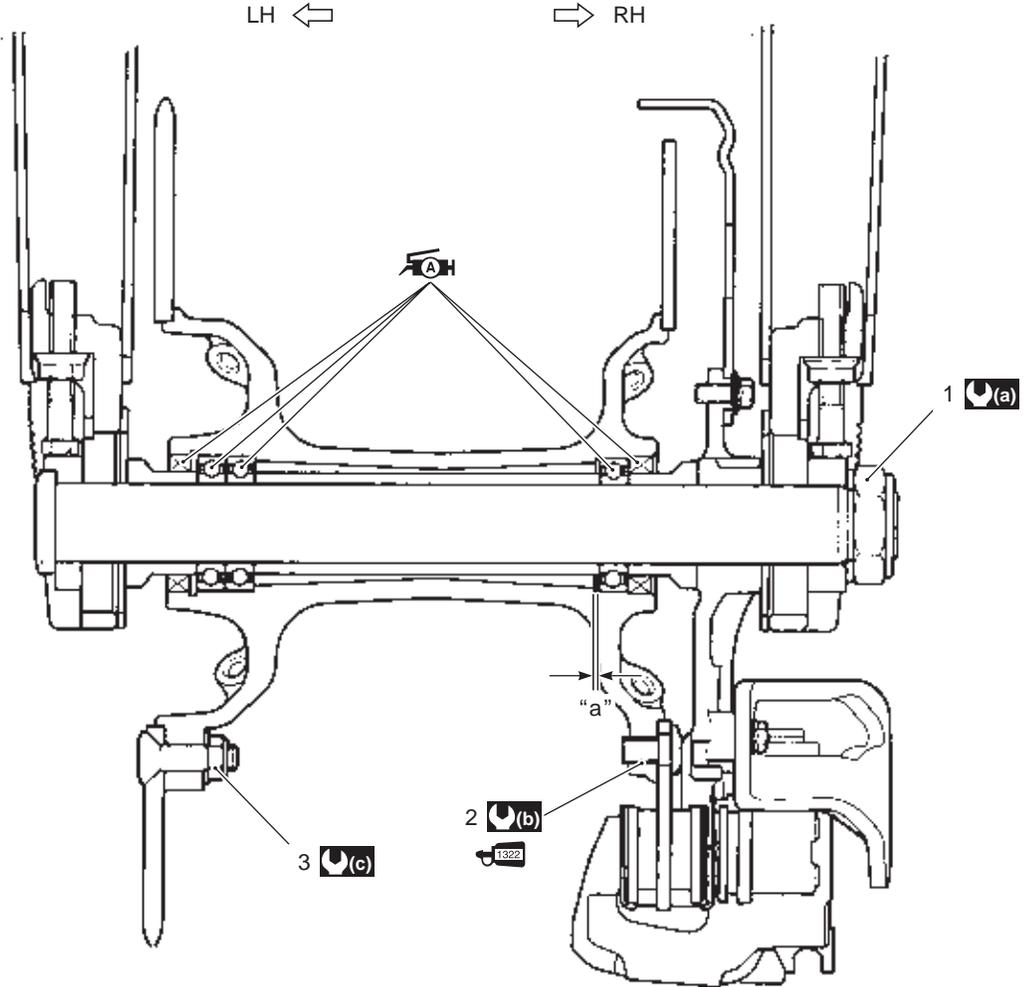


IA02J1240001-02

1. Rear axel nut	8. Spacer	: 100 N·m (10.0 kgf·m, 72.5 lbf·ft)
2. Spacer	9. Rear wheel	: 19.8 N·m (2.6 kgf·m, 19.0 lbf·ft)
3. Dust seal	10. Tire	: 17 N·m (1.7 kgf·m, 12.5 lbf·ft)
4. Bearing	11. Rear brake disc	: 30 N·m (3.0 kgf·m, 21.5 lbf·ft)
5. Snap ring	12. Tube	: Apply grease.
6. Rear sprocket	13. Inner tube protector	: Apply thread lock to the thread part.
7. Rear axle	14. Bead stopper	: Do not reuse.

Rear Wheel Assembly Construction

BA02J22406007

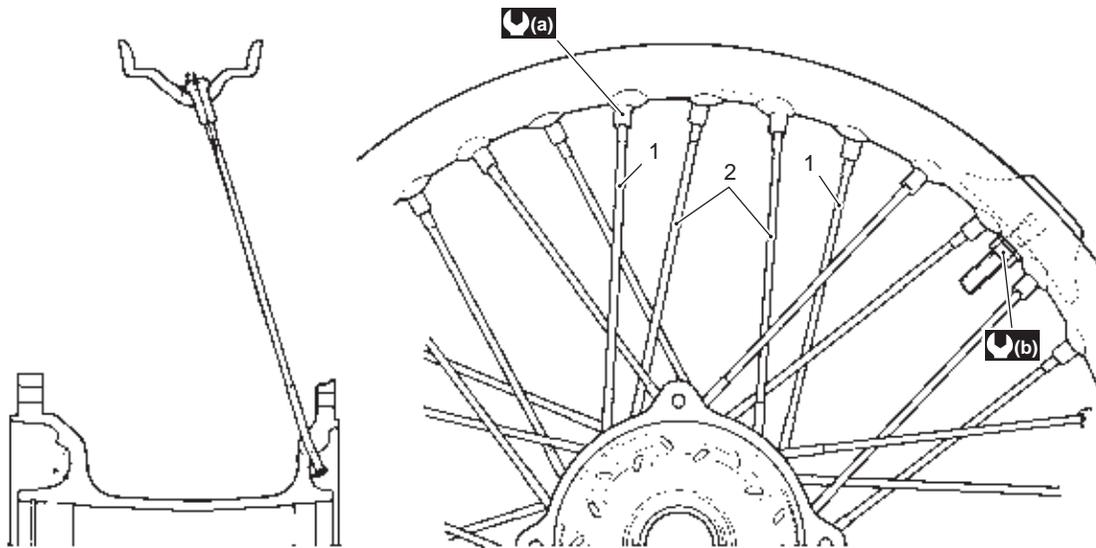


IA02J1240043-02

1. Rear axle nut	"a": Clearance	: 30 N-m (3.0 kgf-m, 21.5 lbf-ft)
2. Rear brake disc bolt	: 100 N-m (10.0 kgf-m, 72.5 lbf-ft)	: Apply grease.
3. Rear sprocket nut	: 25 N-m (2.5 kgf-m, 18.0 lbf-ft)	: Apply thread lock to the thread part.

Rear Wheel Spoke Construction

BA02J22406008



IA02J1240046-01

1. Rear wheel spoke (Inner) L=194 mm (7.64 in)	(a) : 6 N·m (0.6 kgf-m, 4.5 lbf-ft)
2. Rear wheel spoke (Outer) L=192 mm (7.56 in)	(b) : 14 N·m (1.4 kgf-m, 10.0 lbf-ft)

Rear Wheel Assembly Removal and Installation

BA02J22406009

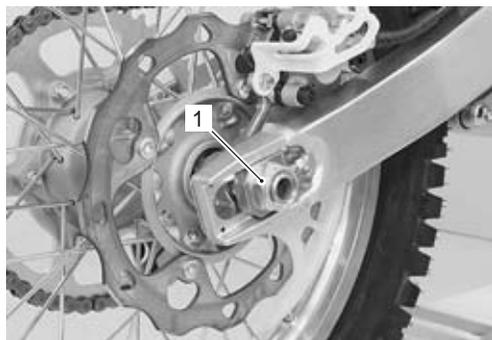
Removal

- 1) Loosen the axle nut (1).
- 2) Raise the rear wheel off the ground and support the motorcycle with a jack or wooden block.

**CAUTION**

**Make sure that the motorcycle is supported securely.**

- 3) Remove the axle nut (1) and draw out the rear axle.



IA02J1240002-01

- 4) Remove the rear wheel by disengaging the drive chain.

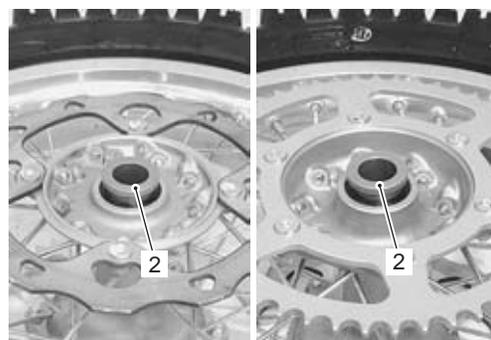
**CAUTION**

**Do not operate the rear brake pedal with the rear wheel removed.**



IA02J1240003-01

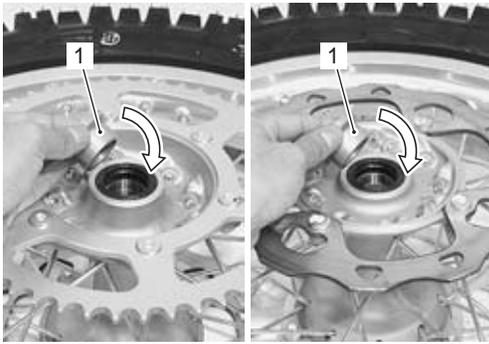
- 5) Remove the spacers (2).



IA02J1240004-01

**Installation**

- 1) Install the spacers (1).



IA02J1240005-02

- 2) Remount the rear wheel and rear axle, tighten the rear axle nut (2) temporarily.
- 3) Adjust the chain slack after installing the rear wheel. Refer to "Drive Chain Inspection and Adjustment" in Section 0B (Page 0B-20).
- 4) Tighten the rear axle nut (2) to the specified torque.

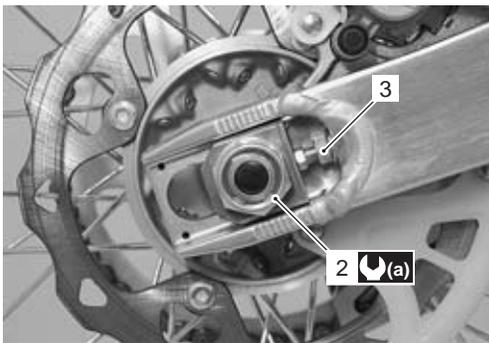
**Tightening torque**

Rear axle nut (a): 100 N·m (10.0 kgf·m, 72.5 lbf·ft)

**▲ WARNING**

After remounting the rear wheel, pump the brake pedal several times to check for proper brake operation.

- 5) Tighten both chain adjuster lock nuts (3) securely.



IA02J1240006-02

**Rear Wheel Related Parts Inspection**

BA02J22406010

Refer to "Rear Wheel Assembly Removal and Installation" (Page 2D-11).

**Tire**

Refer to "Wheel and Tire Inspection" in Section 0B (Page 0B-24).

**Rear Brake Disc**

Refer to "Rear Brake Disc Inspection" in Section 4C (Page 4C-6).

**Sprocket**

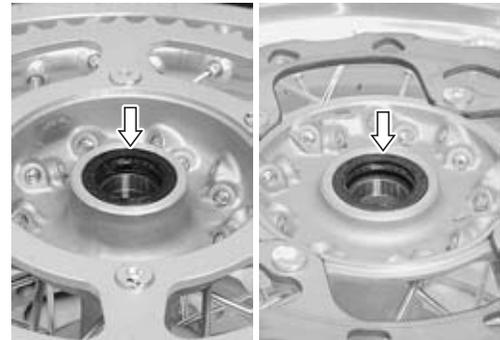
Refer to "Drive Chain Related Components" in Section 3A (Page 3A-2).

**Spoke Nipple and Rim Lock**

Refer to "Wheel and Tire Inspection" in Section 0B (Page 0B-24).

**Dust Seal**

Inspect the each dust seal lip for wear or damage. If any defects are found, replace the dust seal with a new one. Refer to "Rear Wheel Dust Seal / Bearing Removal and Installation" (Page 2D-13).



IA02J1240007-01

**Wheel Axle**

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

**Wheel axle runout**

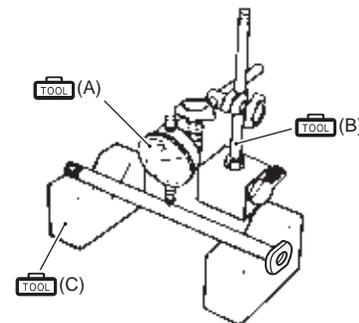
Service limit: 0.25 mm (0.010 in)

**Special tool**

TOOL (A): 09900-20607 (Dial gauge (1/100 mm, 10 mm))

TOOL (B): 09900-20701 (Magnetic stand)

TOOL (C): 09900-21304 (V-block (100 mm))



IA02J1230096-01

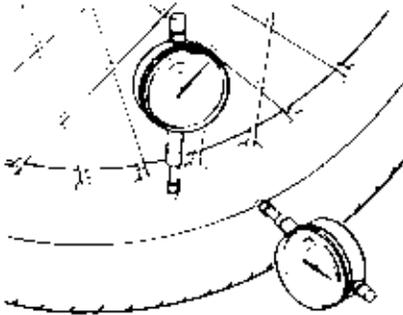
## 2D-13 Wheels and Tires:

### Wheel

- 1) Remove the rear brake pads. Refer to "Rear Brake Pad Replacement" in Section 4C (Page 4C-1).
- 2) Make sure that the wheel runout checked as shown in the figure does not exceed the service limit. An excessive runout is usually due to worn or loosened wheel bearings and can be reduced by replacing the bearings. If bearing replacement fails to reduce the runout, replace the wheel.

#### Wheel rim runout

**Service limit (Axial and Radial): 2.0 mm (0.08 in)**

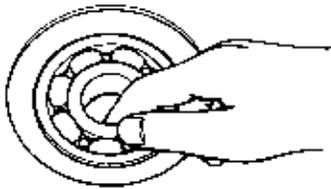


IA02J1240008-01

- 3) Install the rear brake pads. Refer to "Rear Brake Pad Replacement" in Section 4C (Page 4C-1).

### Bearing

Inspect the play of the wheel bearings by hand while they are in the wheel. Rotate the inner race by hand to inspect for abnormal noise and smooth rotation. Replace the bearing if there is anything unusual. Refer to "Rear Wheel Dust Seal / Bearing Removal and Installation" (Page 2D-13).



I649G1240015-02

### Rear Wheel Dust Seal / Bearing Removal and Installation

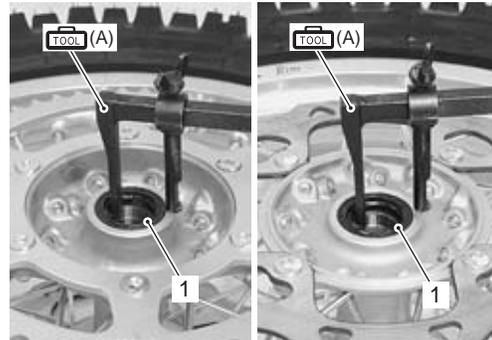
BA02J22406011

### Removal

- 1) Remove the rear wheel assembly. Refer to "Rear Wheel Assembly Removal and Installation" (Page 2D-11).
- 2) Remove the dust seals (1).

#### Special tool

**TOOL (A): 09913-50121 (Oil seal remover)**

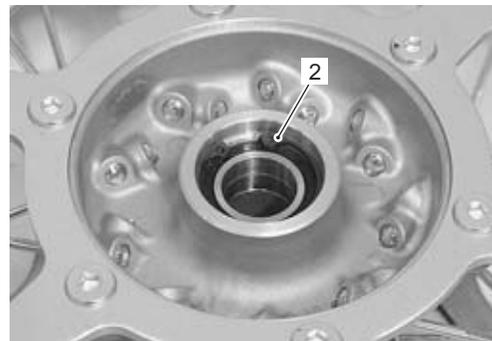


IA02J1240009-01

- 3) Remove the snap ring (2).

#### Special tool

**TOOL : 09900-06108 (Snap ring remover (Close type))**

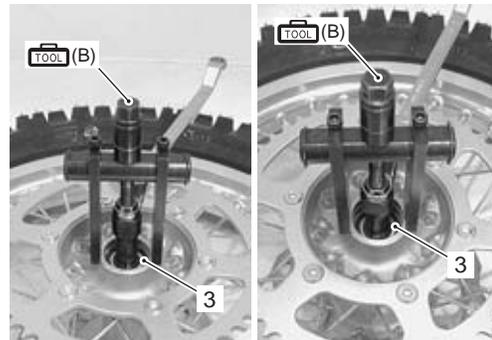


IA02J1240010-01

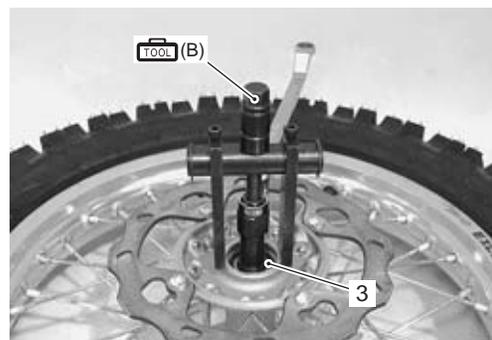
- 4) Remove the bearings (3) on both sides using the special tool.

#### Special tool

**TOOL (B): 09921-20240 (Bearing remover set)**



IA02J1240011-01



IA02J1240012-02

5) Remove the spacer (4).



IA02J1240013-01

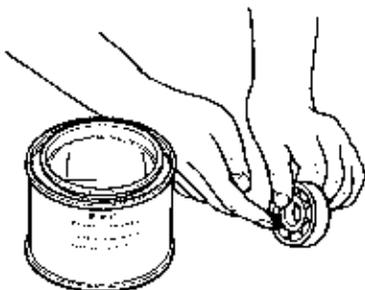
**Installation**

**⚠ CAUTION**

The removed snap ring, dust seal and bearings must be replaced with new ones.

1) Apply grease to the wheel bearings.

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



I649G1240019-02

2) First install the left wheel bearings with the special tool, using the suitable spacer "A" match for the outside dimension of bearing.

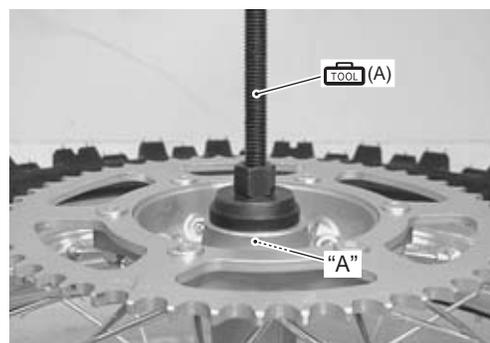
3) Next install the spacer (1) and install the right wheel bearing with the suitable spacer "A" and special tool.

**Special tool**

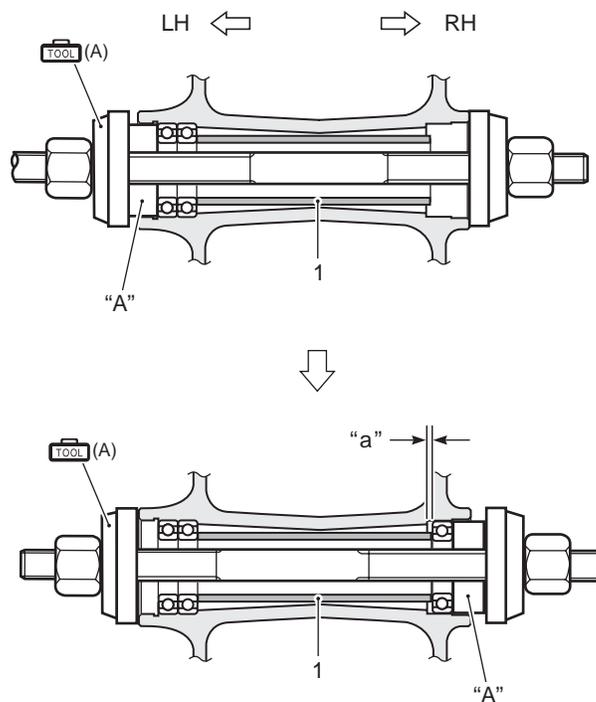
 (A): 09941-34513 (Steering race installer)

**⚠ CAUTION**

The sealed cover of the bearing must face outside.



IA02J1240014-01



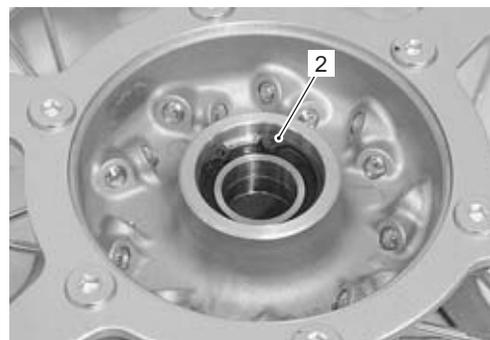
IA02J1240015-04

1. Spacer	"a": Clearance
"A": Suitable spacer	

4) Install the snap ring (2).

**Special tool**

 : 09900-06108 (Snap ring remover (Close type))



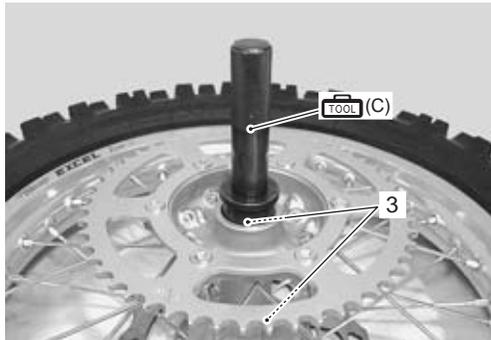
IA02J1240016-01

## 2D-15 Wheels and Tires:

5) Install a new dust seals (3) with the special tool.

### Special tool

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



IA02J1240017-01

6) Apply grease to the each dust seal lip.

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



IA02J1240018-01



IA02J1240019-01

7) Install the rear wheel assembly. Refer to "Rear Wheel Assembly Removal and Installation" (Page 2D-11).

## Specifications

### Service Data

BA02J22407001

#### Wheel

Unit: mm (in)

Item	Standard		Limit
Wheel rim runout	Axial	—	2.0 (0.08)
	Rear	—	2.0 (0.08)
Wheel rim size	Front	21 x 1.60	—
	Rear	18 x 2.15	—
Wheel axle runout	Front	—	0.25 (0.010)
	Rear	—	0.25 (0.010)

#### Tire

Unit: mm (in)

Item	Standard		Limit
Cold inflation tire pressure	Front & Rear	100 kPa (1.0 kgf/cm <sup>2</sup> , 14 psi)	—
Tire size	Front	80/100-21 51M	—
	Rear	110/100-18 64M	—
Tire type	Front	D742 F/A	—
	Rear	D756	—
Tire tread depth (Recommend depth)	Front & Rear	—	4.0 (0.16)

## Tightening Torque Specifications

BA02J22407002

Fastening part	Tightening torque			Note
	N·m	kgf·m	lbf·ft	
Front axle nut	35	3.5	25.0	☞ (Page 2D-5)
Front axle holder bolt	18	1.8	13.0	☞ (Page 2D-5)
Rear axle nut	100	10.0	72.5	☞ (Page 2D-12)

**NOTE**

The specified tightening torque is described in the following.

- “Front Wheel Components” (Page 2D-2)
- “Front Wheel Assembly Construction” (Page 2D-3)
- “Rear Wheel Components” (Page 2D-9)
- “Rear Wheel Assembly Construction” (Page 2D-10)
- “Rear Wheel Spoke Construction” (Page 2D-11)

**Reference:**

For the tightening torque of fastener not specified in this section, refer to “Tightening Torque List” in Section 0C (Page 0C-8).

## Special Tools and Equipment

## Recommended Service Material

BA02J22408001

Material	SUZUKI recommended product or Specification		Note
Grease	SUZUKI SUPER GREASE “A” or equivalent	P/No.: 99000–25010	☞ (Page 2D-4) / ☞ (Page 2D-7) / ☞ (Page 2D-8) / ☞ (Page 2D-14) / ☞ (Page 2D-15)

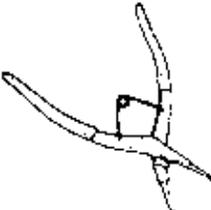
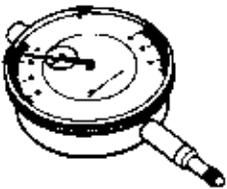
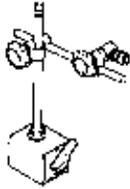
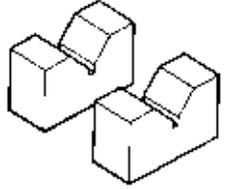
**NOTE**

Required service material is also described in the following.

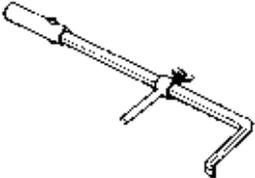
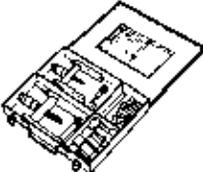
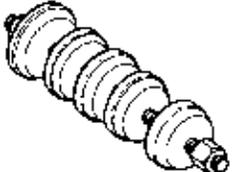
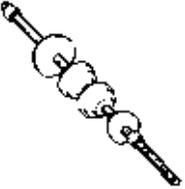
- “Front Wheel Components” (Page 2D-2)
- “Front Wheel Assembly Construction” (Page 2D-3)
- “Rear Wheel Components” (Page 2D-9)
- “Rear Wheel Assembly Construction” (Page 2D-10)

## Special Tool

BA02J22408002

09900–06108 Snap ring remover (Close type) ☞ (Page 2D-6) / ☞ (Page 2D-8) / ☞ (Page 2D-13) / ☞ (Page 2D-14)		09900–20607 Dial gauge ☞ (Page 2D-5) / ☞ (Page 2D-12)	
09900–20701 Dial gauge chuck ☞ (Page 2D-5) / ☞ (Page 2D-12)		09900–21304 V blocks ☞ (Page 2D-5) / ☞ (Page 2D-12)	

**2D-17 Wheels and Tires:**

<p>09913-50121 Oil seal remover ☞ (Page 2D-6) / ☞ (Page 2D-13)</p> 	<p>09913-70210 Bearing installing set (10 – 75 Φ) ☞ (Page 2D-7) / ☞ (Page 2D-15)</p> 
<p>09921-20240 Bearing remover set ☞ (Page 2D-6) / ☞ (Page 2D-13)</p> 	<p>09924-84510 Bearing installer set ☞ (Page 2D-7)</p> 
<p>09941-34513 Bearing installer ☞ (Page 2D-7) / ☞ (Page 2D-14)</p> 	<p>09944-28321 Hexagon socket (19 mm) ☞ (Page 2D-5)</p> 

## Section 3

## Driveline / Axle

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# Precautions

## Precautions

### Precautions for Driveline / Axle

BA02J2300001

Refer to "General Precautions" in Section 00 (Page 00-1).

---

**⚠ WARNING**

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**Never inspect or adjust the drive chain while the engine is running.**

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**⚠ CAUTION**

- 
- Do not use trichloroethylene, gasoline or such similar solvent. These fluids will damage the O-rings of the drive chain.
  - Clean the drive chain with a spray-type chain cleaner and blow dry with compressed air. If the drive chain cannot be cleaned with a spray cleaner, it may be necessary to use a kerosine. Always follow the chemical manufacturer's instructions on proper use, handling and storage.
  - Lubricate the drive chain with a heavy weight motor oil. Wipe off any excess oil or chain lubricant. Do not use any oil sold commercially as "drive chain oil". Such oil can damage the O-rings.
  - The standard drive chain is DID 520MXV. Suzuki recommends to use this standard drive chain as a replacement.
-

# Drive Chain / Drive Train / Drive Shaft

## Diagnostic Information and Procedures

### Drive Chain and Sprocket Symptom Diagnosis

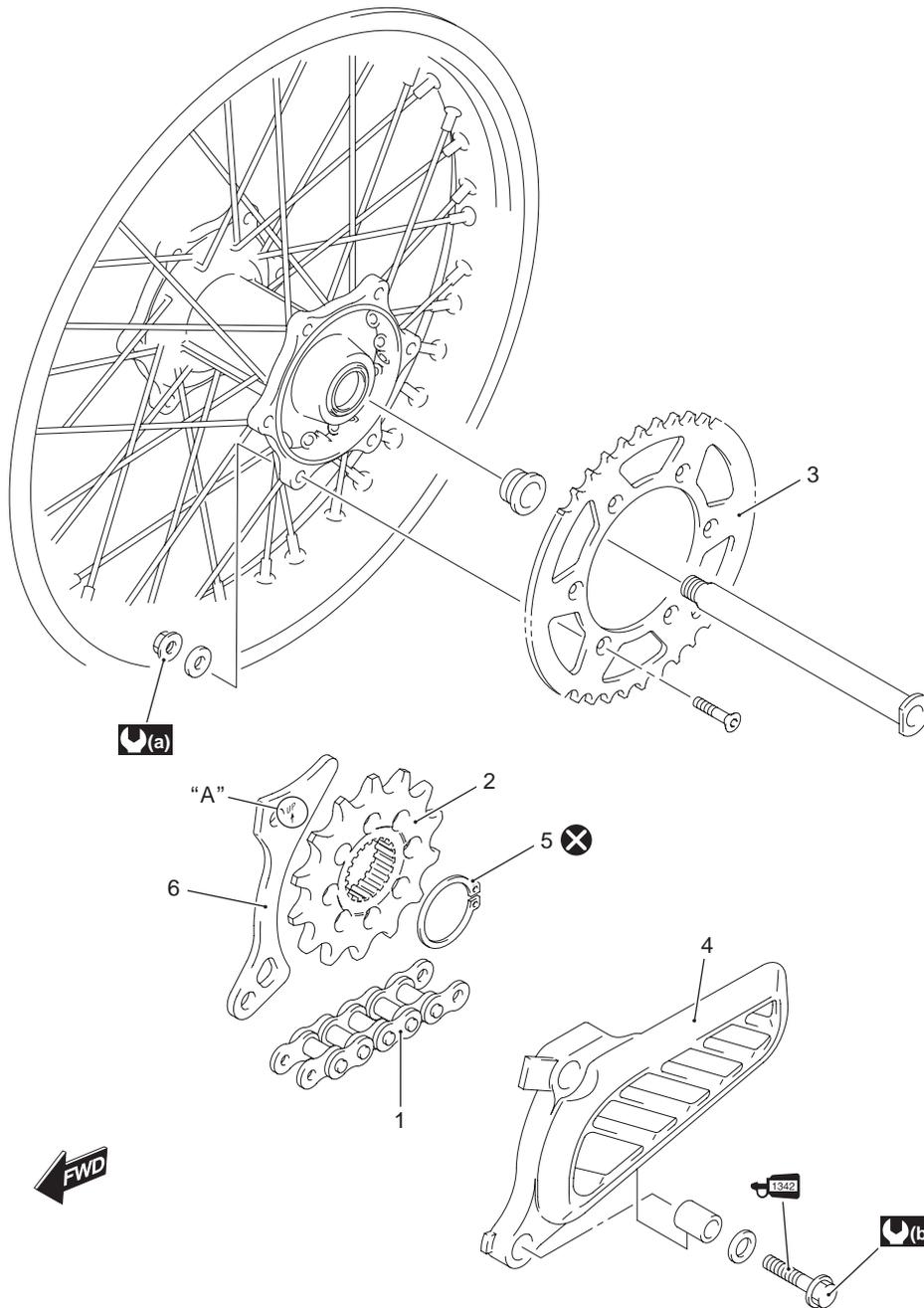
BA02J23104001

Condition	Possible cause	Correction / Reference Item
<b>Noisy Drive Chain</b>	Worn sprocket.	<i>Replace.</i>
	Worn drive chain.	<i>Replace.</i>
	Stretched drive chain.	<i>Replace.</i>
	Too large drive chain slack.	<i>Adjust.</i>
	Drive chain out of adjustment.	<i>Adjust.</i>

# Repair Instructions

## Drive Chain Related Components

BA02J23106001

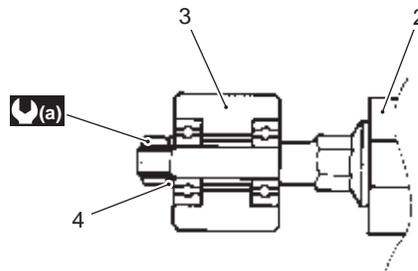
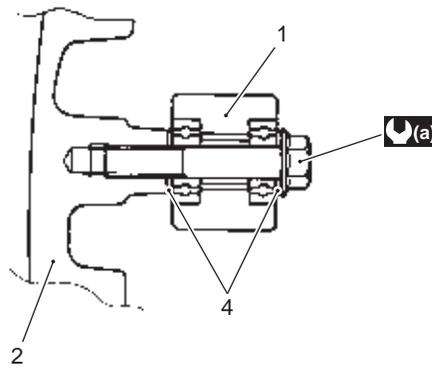


IA02J1310018-06

1. Drive chain	5. Snap ring	(b) : 11 N·m (1.1 kgf·m, 8.0 lbf·ft)
2. Engine sprocket	6. Front chain guide plate	(a) : Apply thread lock to thread part.
3. Rear sprocket	"A": "UP" mark	: Do not reuse.
4. Engine sprocket cover	(a) : 30 N·m (3.0 kgf·m, 21.5 lbf·ft)	

Drive Chain Roller Construction

BA02J23106002



IA02J1310017-01

1. Chain roller (upper)	4. Washer
2. Frame	(a) : 23 N·m (2.3 kgf-m, 16.5 lbf-ft)
3. Chain roller (lower)	

Engine Sprocket Removal and Installation

BA02J23106003

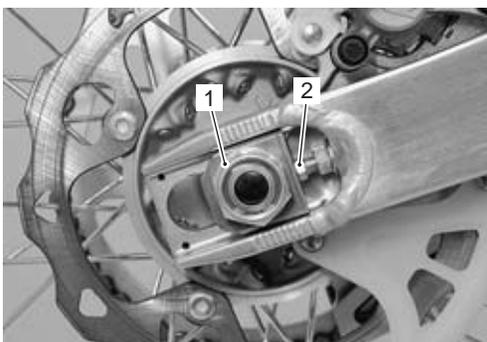
Removal

- 1) Support the motorcycle with a jack or wooden block.

**CAUTION**

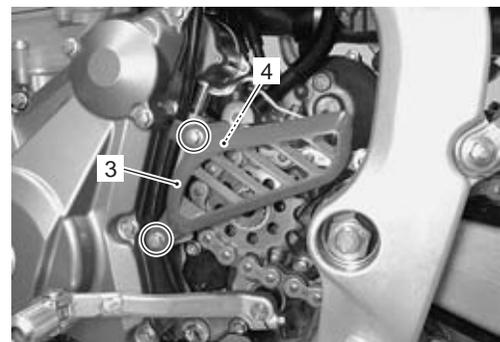
**Make sure that the motorcycle is supported securely.**

- 2) Loosen the rear axle nut (1).
- 3) Loosen the chain adjusters (2) to provide additional chain slack.



IA02J1310001-01

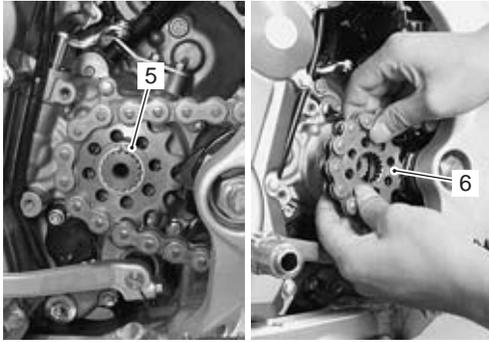
- 4) Remove the engine sprocket cover (3) and front chain guide plate (4).



IA02J1310002-01

### 3A-4 Drive Chain / Drive Train / Drive Shaft:

- Remove the snap ring (5) and remove the engine sprocket (6).



IA02J1310003-03

#### Installation

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

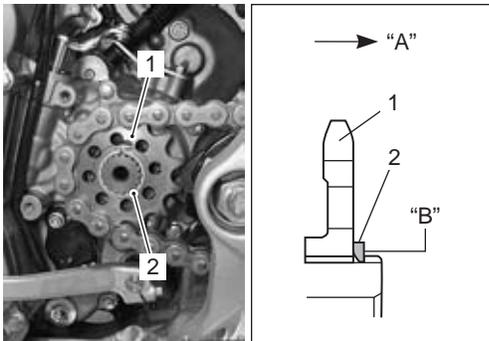
- Install the engine sprocket (1) and snap ring (2).

#### ⚠ CAUTION

**Replace the snap ring with a new one. Seat the snap ring in the groove and locate its end as shown in the illustration.**

#### Special tool

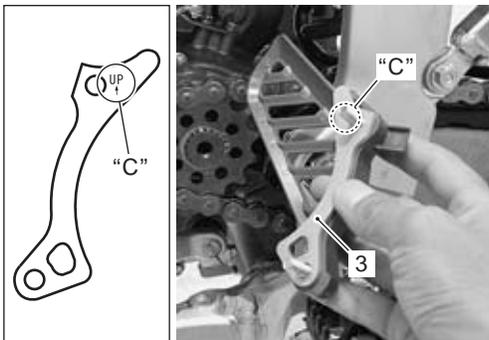
 : 09900-06107 (Snap ring remover (Open type))



IA02J1310020-01

"A": Thrust	"B": Sharp edge
-------------	-----------------

- When install the front chain guide (3), bring the "UP" letters and arrow mark "C" upward.



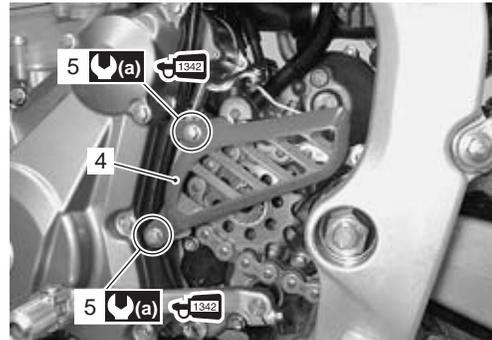
IA02J1310022-02

- Install the engine sprocket cover (4).
- Apply thread lock to the engine sprocket cover bolts (5) and tighten them to the specified torque.

 : Thread lock cement 99000-32050 (THREAD LOCK CEMENT "1342" or equivalent)

#### Tightening torque

Engine sprocket cover bolt (a): 11 N·m (1.1 kgf·m, 8.0 lbf·ft)



IA02J1310005-04

- Adjust the drive chain slack. Refer to "Drive Chain Inspection and Adjustment" in Section 0B (Page 0B-20).

### Rear Sprocket Removal and Installation

BA02J23106004

#### Removal

- Remove the rear wheel assembly by disengaging the drive chain. Refer to "Rear Wheel Assembly Removal and Installation" in Section 2D (Page 2D-11).
- Remove the rear sprocket bolts and nuts and separate the rear sprocket (1).



IA02J1310006-01

**Installation**

Install the rear sprocket and rear sprocket mounting drum in the reverse order of removal. Pay attention to the following points:

- Install the rear sprocket as the letter on the sprocket surface faces outside.

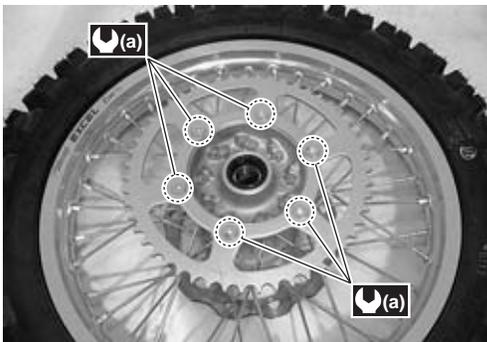


IA02J1310007-01

- Tighten the rear sprocket nuts to the specified torque.

**Tightening torque**

Rear sprocket nut (a): 30 N·m (3.0 kgf·m, 21.5 lbf·ft)



IA02J1310008-01

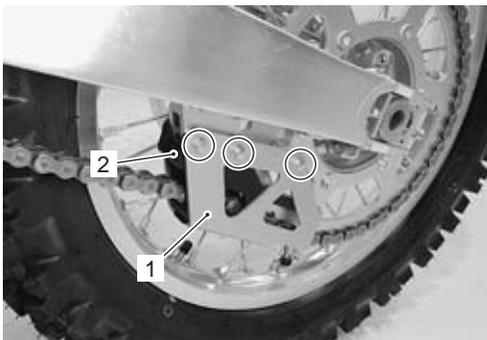
- Install the rear wheel assembly. Refer to “Rear Wheel Assembly Removal and Installation” in Section 2D (Page 2D-11).

**Drive Chain Guide Removal and Installation**

BA02J23106005

**Removal**

Remove the chain guide plate (1) and chain guide (2).



IA02J1310009-01

**Installation**

Install the chain guide in the reverse order of removal.

**Drive Chain Roller Removal and Installation**

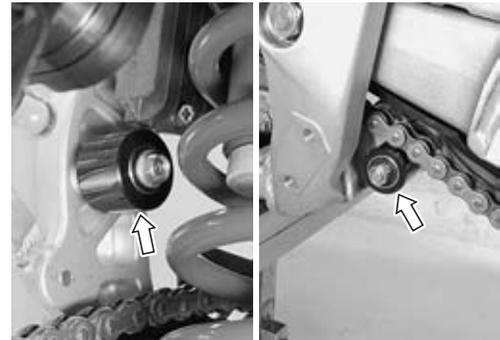
BA02J23106006

**⚠ CAUTION**

**Make sure that the motorcycle is supported securely.**

**Removal**

- 1) Remove the left footrest. Refer to “Footrest Bracket Construction” in Section 9E (Page 9E-3) and “Side-stand Construction” in Section 9E (Page 9E-3).
- 2) Remove the chain rollers.



IA02J1310010-01

**Installation**

Install the chain rollers as shown in the chain roller construction. Refer to “Drive Chain Roller Construction” (Page 3A-3).

**Drive Chain Buffer Removal and Installation**

BA02J23106007

Refer to “Swingarm Removal and Installation” in Section 2C (Page 2C-20).

**Drive Chain Related Parts Inspection**

BA02J23106008

Refer to “Rear Sprocket Removal and Installation” (Page 3A-4) and “Drive Chain Guide Removal and Installation” (Page 3A-5) and “Drive Chain Buffer Removal and Installation” (Page 3A-5).

**Engine Sprocket and Rear Sprocket**

Refer to “Sprocket Inspection” in Section 0B (Page 0B-21).

### 3A-6 Drive Chain / Drive Train / Drive Shaft:

#### Chain Roller

Rotate the chain roller by hand and check that it moves smoothly. If it does not move smoothly, replace the chain roller assembly.



IA02J1310011-01

#### Chain Buffer and Chain Guide

Inspect the chain buffer and chain guide for damage and excessive wear. If any defects are found, replace the chain buffer or guide with a new one.



IA02J1310015-01

#### Drive Chain

Refer to "Drive Chain Inspection and Adjustment" in Section 0B (Page 0B-20).

#### Drive Chain Replacement

BA02J23106009

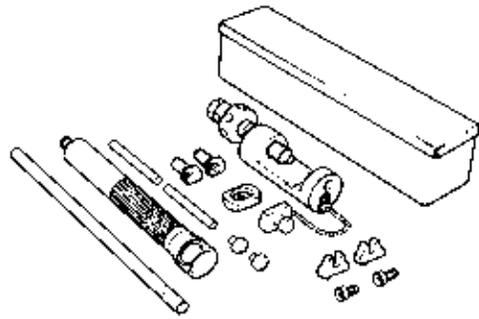
Use the special tool in the following procedures, to cut and rejoin the drive chain.

#### NOTE

**When using the special tool, apply a small quantity of grease to the threaded parts of the special tool.**

#### Special tool

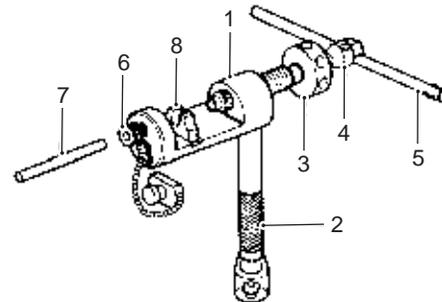
 : 09922-22711 (Drive chain cutting and joint tool set)



I649G1310023-02

#### Drive Chain Cutting

1) Set up the special tool as shown in the figure.

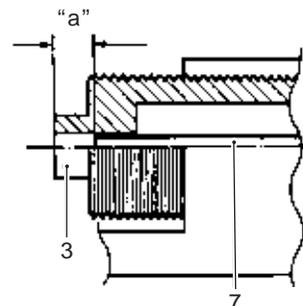


I649G1310024-02

1.	Tool body
2.	Grip handle
3.	Pressure bolt [A]
4.	Pressure bolt [B]
5.	Bar
6.	Adjuster bolt (With through hole)
7.	Pin remover
8.	Chain holder (Engraved mark 500) with reamer bolt M5 x 10

#### NOTE

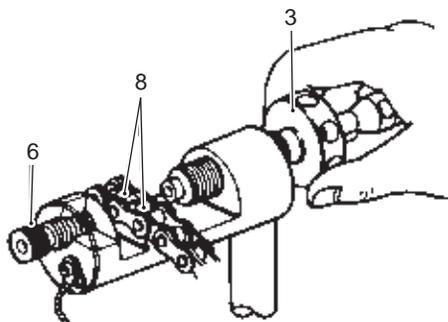
**The tip of pin remover (7) should be positioned inside "a" approximately 5 mm (0.2 in) from the end face of pressure bolt [A] (3) as shown in the figure.**



"a": 5 mm (0.2 in)

I837H1310026-02

- 2) Place the drive chain link being disjointed on the chain holder (8) of the tool.
- 3) Turn in both the adjuster bolt (6) and pressure bolt [A] (3) so that each of their end hole fits over the chain joint pin properly.
- 4) Tighten the pressure bolt [A] (3) with the bar.



I837H1310027-02

- 5) Turn in the pressure bolt [B] (4) with the bar (5) and force out the drive chain joint pin (9).

**CAUTION**

Continue turning in the pressure bolt [B] (4) until the joint pin should be completely pushed out of the chain.

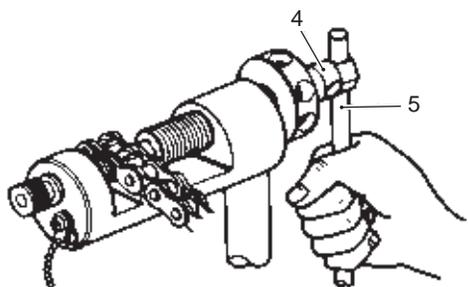
**NOTE**

After the joint pin (9) is removed, loosen the pressure bolt [B] (4) and then pressure bolt [A] (3).

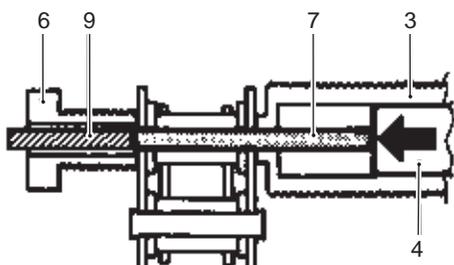
- 6) Remove the joint pin (9) of the other side of joint plate.

**CAUTION**

Never reuse joint pins, O-rings and plates.



I649G1310027-02



I837H1310028-02

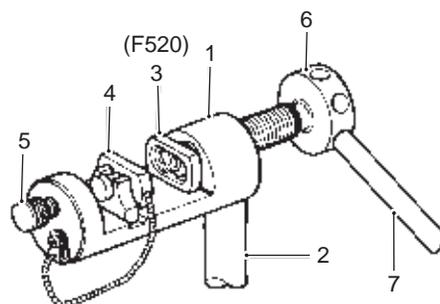
**Drive Chain Connecting**

**WARNING**

Do not use joint clip type of drive chain. The joint clip may have a chance to drop which may cause severe damage to motorcycle and severe injury.

**Joint plate installation**

- 1) Set up the special tool as shown in the figure.



IA02J1310023-01

1.	Tool body
2.	Grip handle
3.	Joint plate holder (Engraved mark "F520")
4.	Wedge holder & wedge pin
5.	Adjuster bolt (Without hole)
6.	Pressure bolt [A]
7.	Bar

- 2) Apply grease to the joint pins (8), O-rings (9) and plates (10).

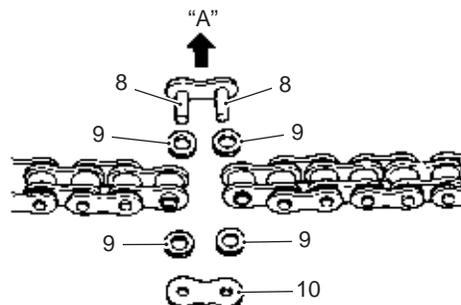
**CAUTION**

Replace the joint pins (8), O-rings (9) and plates (10) with new ones.

- 3) Connect both ends of the drive chain with the joint pins (8) inserted from the wheel side "A" as installed on the motorcycle.

**Joint set part number**

DID: 27620 - 02J00



I837H1310029-01

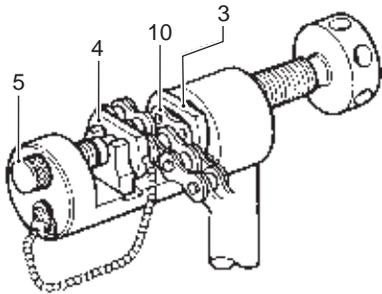
### 3A-8 Drive Chain / Drive Train / Drive Shaft:

- 4) Apply grease on the recessed portion of the joint plate holder (3) and set the joint plate (10).

#### NOTE

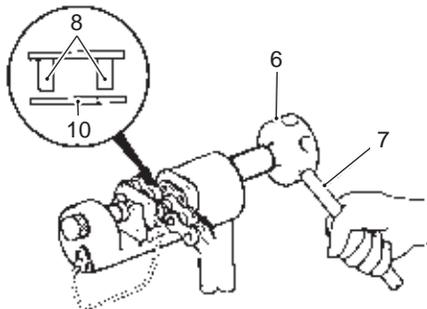
**When positioning the joint plate (10) on the tool, its stamp mark must face the joint plate holder (3) side.**

- 5) Set the drive chain on the tool as illustrated and turn in the adjuster bolt (5) to secure the wedge holder and wedge pin (4).



I649G1310031-02

- 6) Turn in the pressure bolt [A] (6) and align two joint pins (8) properly with the respective holes of the joint plate (10).
- 7) Turn in the pressure bolt [A] (6) further using the bar (7) to press the joint plate over the joint pins.



I837H1310030-01

- 8) Continue pressing the joint plate until the distance between the two joint plates comes to the specification.

**Joint plate distance specification "a"**  
14.5 – 14.7 mm (0.57 – 0.58 in)

#### ⚠ CAUTION

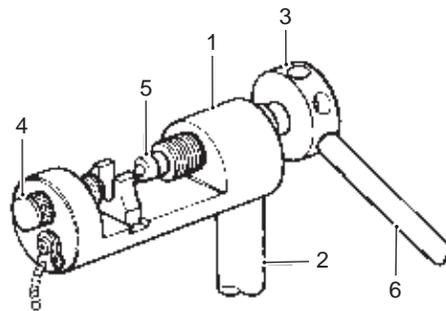
**If pressing of the joint plate makes the dimension out of specification excessively, the work must be carried out again by using new joint parts.**



I649G1310033-03

#### Joint pin staking

- 1) Set up the special tool as shown in the figure.



I649G1310034-02

1. Tool body
2. Grip handle
3. Pressure bolt [A]
4. Adjuster bolt (Without hole)
5. Staking pin (Stowed inside grip handle behind rubber cap)
6. Bar

#### NOTE

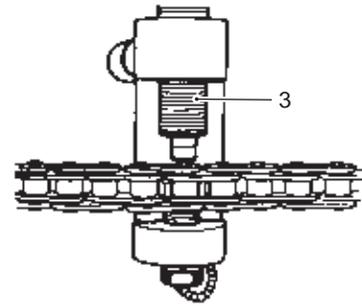
**Before staking the joint pin, apply a small quantity of grease to the staking pin (5).**

2) Stake the joint pin by turning (approximately 7/8 turn) the pressure bolt [A] (3) with the bar until the pin end diameter becomes the specified dimension.

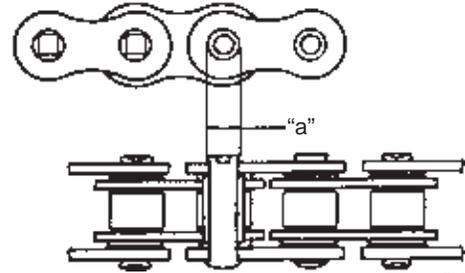
**CAUTION**

- After joining of the chain has been completed, check to make sure that the link is smooth and no abnormal condition is found.
- Should any abnormal condition be found, reassemble the chain link using the new joint parts.

**Pin end diameter specification "a"**  
 DID: 5.5 – 5.8 mm (0.22 – 0.23 in)



I649G1310035-02



I649G1310036-03

3) Adjust the drive chain slack, after connecting it. Refer to "Drive Chain Inspection and Adjustment" in Section 0B (Page 0B-20).

## Specifications

### Service Data

BA02J23107001

#### Drive Train

Unit: mm (in) Except ratio

Item	Standard		Limit
Final reduction ratio	3.923 (51/13)		—
Drive chain	Type	DID 520MXV	—
	Links	114 links	—
Drive chain plate height	Inner	15.0 (0.59)	12.75 (0.502)
	Outer	12.8 (0.50)	11.20 (0.441)
Drive chain slack	40 – 50 (1.6 – 2.0)		—

### Tightening Torque Specifications

BA02J23107002

Fastening part	Tightening torque			Note
	N·m	kgf·m	lbf·ft	
Engine sprocket cover bolt	11	1.1	8.0	☞ (Page 3A-4)
Rear sprocket nut	30	3.0	21.5	☞ (Page 3A-5)

**NOTE**

The specified tightening torque is described in the following.  
 "Drive Chain Related Components" (Page 3A-2)  
 "Drive Chain Roller Construction" (Page 3A-3)

**Reference:**

For the tightening torque of fastener not specified in this section, refer to "Tightening Torque List" in Section 0C (Page 0C-8).

## Special Tools and Equipment

### Recommended Service Material

BA02J23108001

Material	SUZUKI recommended product or Specification	Note
Thread lock cement	THREAD LOCK CEMENT "1342" or equivalent	☞ (Page 3A-4)

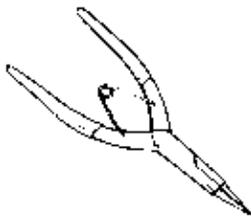
#### NOTE

Required service material is also described in the following.  
 "Drive Chain Related Components" (Page 3A-2)

### Special Tool

BA02J23108002

<p>09900-06107                      Snap ring remover (Open type)                      ☞ (Page 3A-4)</p>	<p>09922-22711                      Drive chain cutting and joint tool set                      ☞ (Page 3A-6)</p>
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## Section 4

# Brake

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# Precautions

## Precautions

### Precautions for Brake System

BA02J2400001

Refer to "General Precautions" in Section 00 (Page 00-1).

### Brake Fluid Information

BA02J2400002

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**⚠ WARNING**

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- This brake system is filled with an ethylene glycol-based DOT 4 brake fluid. Do not use or mix different types of fluid, such as silicone-based or petroleum-based.
  - Do not use any brake fluid taken from old, used or unsealed containers. Never reuse brake fluid left over from the last servicing or which has been stored for a long period of time.
  - When storing brake fluid, seal the container completely and keep it away from children.
  - When replenishing brake fluid, take care not to get dust into the fluid.
  - When washing brake components, use new brake fluid. Never use cleaning solvent.
  - A contaminated brake disc or brake pad reduces braking performance. Discard contaminated pads and clean the disc with high quality brake cleaner or neutral detergent.
- 

**⚠ CAUTION**

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

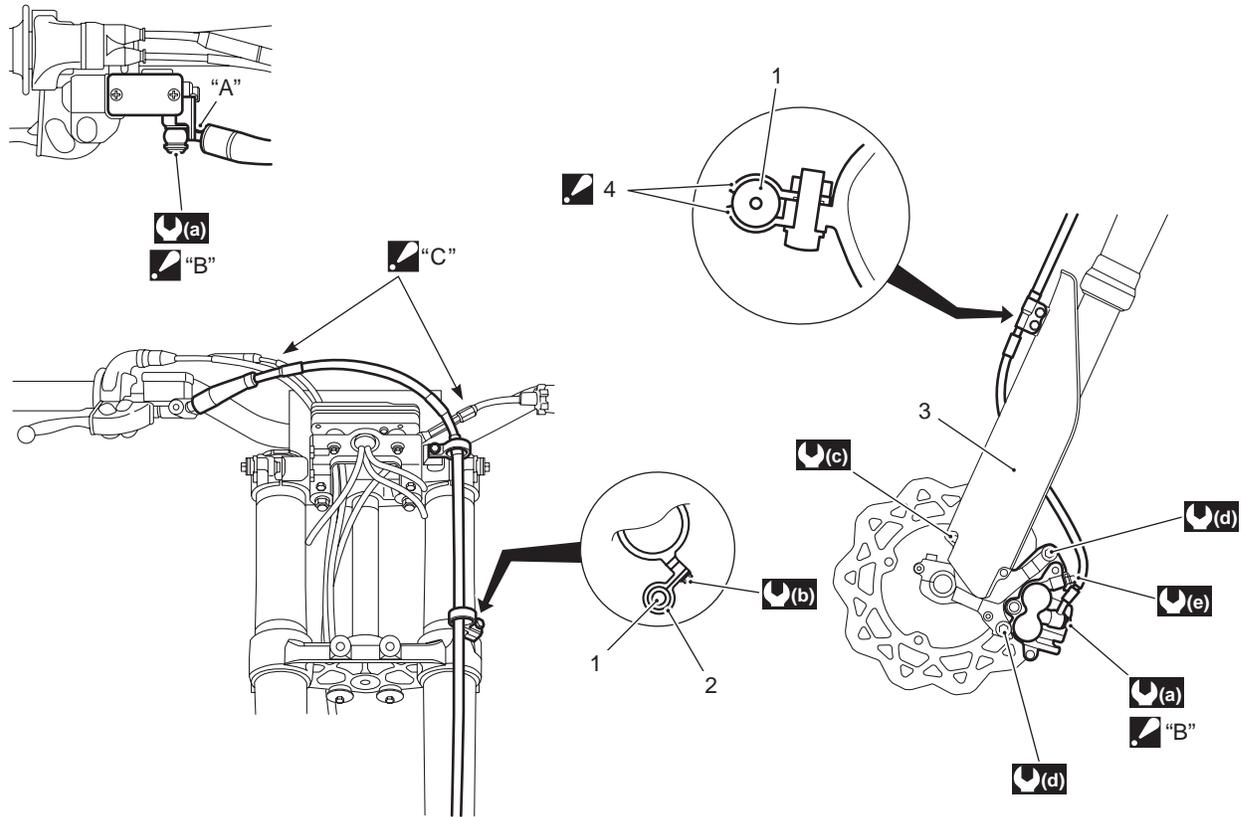
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# Brake Control System and Diagnosis

## Schematic and Routing Diagram

### Front Brake Hose Routing Diagram

BA02J24102001

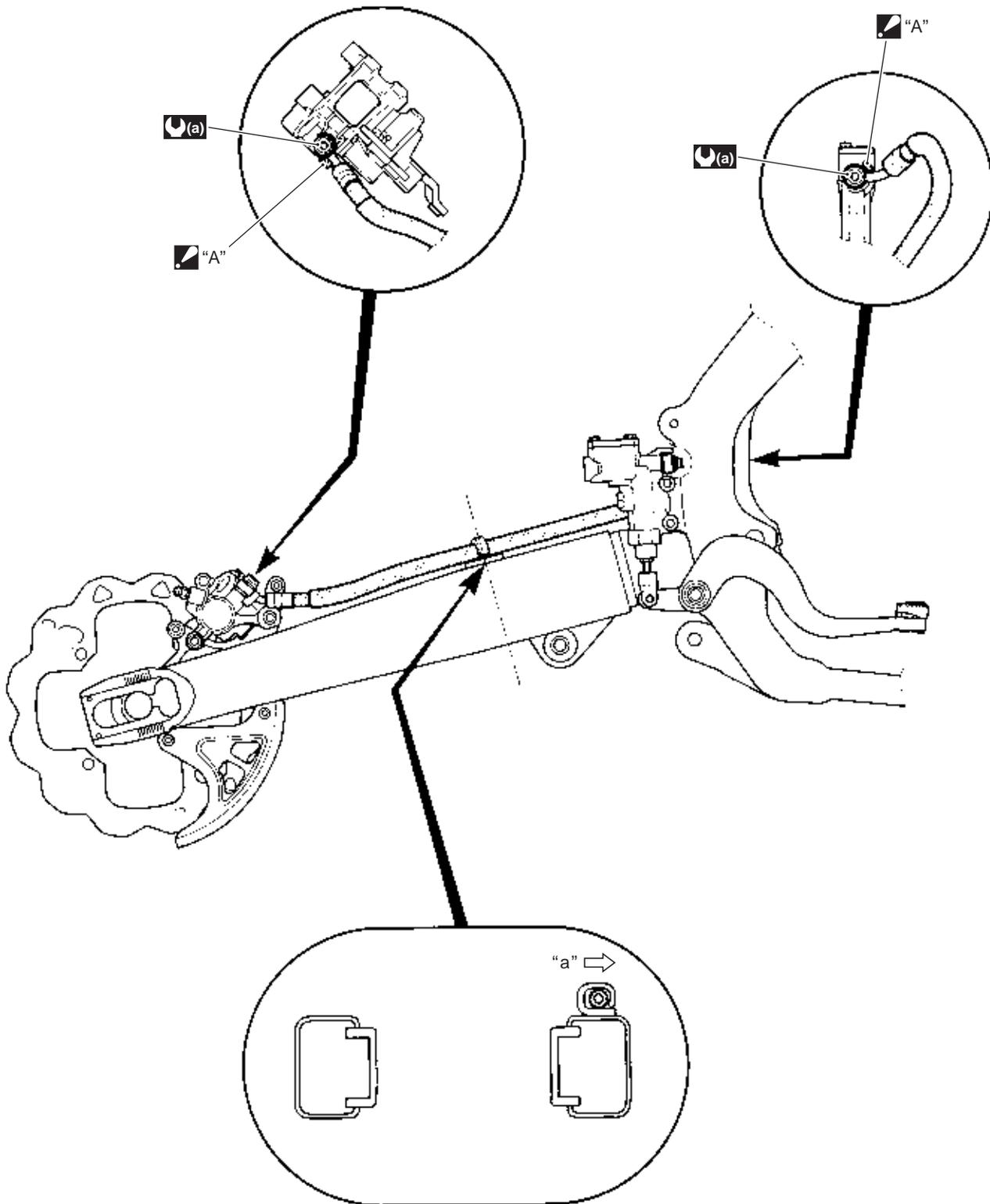


IA02J1410044-03

1. Front brake hose	☑ "C": Pass the front brake hose in front of the cables.
2. Brake hose guide	☑ (a) : 23 N-m (2.3 kgf-m, 16.5 lbf-ft)
3. Front fork protector (LH)	☑ (b) : 3 N-m (0.3 kgf-m, 2.0 lbf-ft)
☑ 4. Brake hose clamp : Clamp the upper stepped part of the brake hose.	☑ (c) : 4.5 N-m (0.45 kgf-m, 3.5 lbf-ft)
"A": Black paint	☑ (d) : 25 N-m (2.5 kgf-m, 18.0 lbf-ft)
☑ "B": After setting the brake hose union to the stopper, tighten the union bolt.	☑ (e) : 6 N-m (0.6 kgf-m, 4.5 lbf-ft)

Rear Brake Hose Routing Diagram

BA02J24102002



IA02J1410041-02

<p><b>"A"</b> After the brake hose union set between the stoppers, tighten the union bolt.</p>	<p><b>(a)</b> : 23 N·m (2.3 kgf·m, 16.5 lbf·ft)</p>
<p>"a" Outside</p>	

## Diagnostic Information and Procedures

### Brake Symptom Diagnosis

BA02J24104001

Condition	Possible cause	Correction / Reference Item
<b>Insufficient brake power</b>	Leakage of brake fluid from hydraulic system.	<i>Repair or replace.</i>
	Worn pads and disc.	<i>Replace.</i>
	Oil adhesion on friction surface of pads.	<i>Clean disc and pads.</i>
	Air in hydraulic system.	<i>Bleed air.</i>
	Not enough brake fluid in the reservoir.	<i>Replenish.</i>
<b>Brake squeaking</b>	Carbon adhesion on pad surface.	<i>Repair surface with sandpaper.</i>
	Tilted pad.	<i>Correct pad fitting or replace.</i>
	Damaged wheel bearing.	<i>Replace.</i>
	Loose front wheel axle or rear wheel axle.	<i>Tighten to specified torque.</i>
	Worn pads and disc.	<i>Replace.</i>
	Foreign material in brake fluid.	<i>Replace brake fluid.</i>
	Clogged return port of master cylinder.	<i>Disassemble and clean master cylinder.</i>
<b>Excessive brake lever stroke</b>	Air in hydraulic system.	<i>Bleed air.</i>
	Insufficient brake fluid.	<i>Replenish fluid to specified level; bleed air.</i>
	Improper quality of brake fluid.	<i>Replace with correct fluid.</i>
<b>Leakage of brake fluid</b>	Insufficient tightening of connection joints.	<i>Tighten to specified torque.</i>
	Cracked hose.	<i>Replace.</i>
	Worn piston and/or cup.	<i>Replace piston and/or cup.</i>
	Worn piston seal and dust seal.	<i>Replace piston seal and dust seal.</i>
<b>Brake drags</b>	Rusty part.	<i>Clean and lubricate.</i>
	Insufficient brake lever or brake pedal pivot lubrication.	<i>Lubricate.</i>

## Repair Instructions

### Brake Pedal Height Inspection and Adjustment

BA02J24106001

Refer to "Brake System Inspection" in Section 0B (Page 0B-22).

### Brake Fluid Level Check

BA02J24106002

Refer to "Brake System Inspection" in Section 0B (Page 0B-22).

### Brake Hose Inspection

BA02J24106003

Refer to "Brake System Inspection" in Section 0B (Page 0B-22).

### Air Bleeding from Brake Fluid Circuit

BA02J24106004

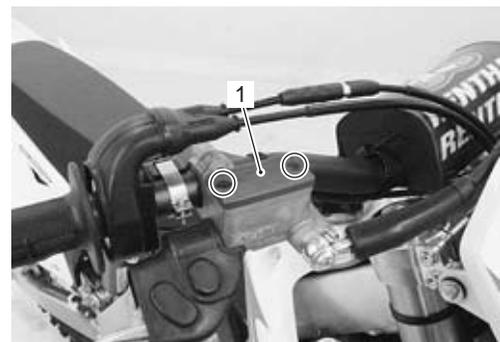
Air trapped in the brake fluid circuit acts like a cushion to absorb a large proportion of the pressure developed by the master cylinder and thus interferes with the full braking performance of the brake caliper. The presence of air is indicated by "sponginess" of the brake lever and also by lack of braking force. Considering the danger to which such trapped air exposes the machine and rider, it is essential that after remounting the brake and restoring the brake system to the normal condition, the brake fluid circuit be purged of air in the following manner:

### ⚠ CAUTION

**Handle brake fluid with care: the fluid reacts chemically with paint, plastic, rubber materials, etc.**

#### Front Brake

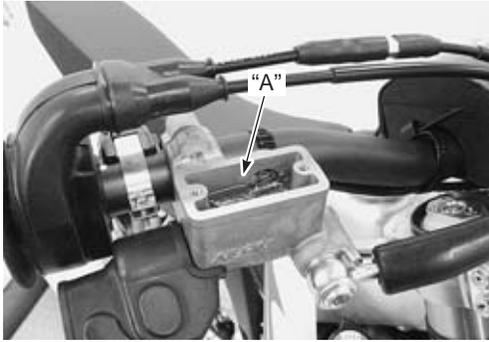
- 1) Remove the reservoir cap (1) and diaphragm.



IA02J1410002-01

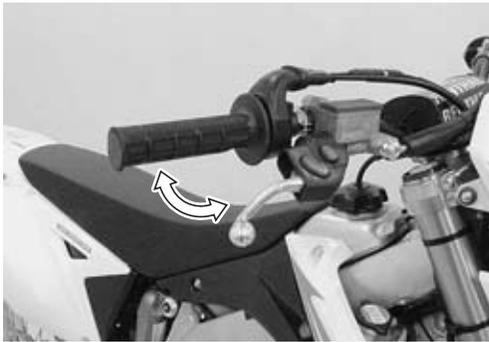
## 4A-4 Brake Control System and Diagnosis:

- 2) Fill the reservoir with brake fluid to the upper line "A". Place the reservoir cap to prevent dirt from entering.



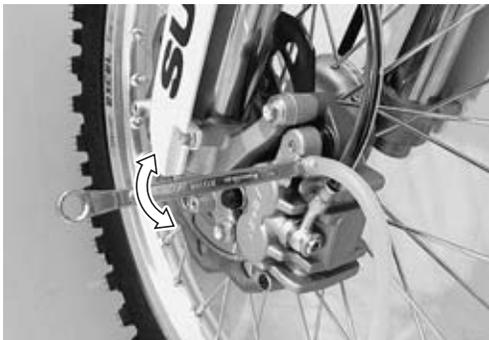
IA02J1410003-01

- 3) Attach a hose to the air bleeder valve, and insert the free end of the hose into a receptacle.
- 4) Squeeze and release the brake lever several times in rapid succession and squeeze the lever fully without releasing it.



IA02J1410004-01

- 5) Loosen the air bleeder valve by turning it a quarter of a turn so that the brake fluid runs into the receptacle, this will remove the tension of the brake lever causing it to touch the handlebar grip.
- 6) Close the air bleeder valve, pump and squeeze the lever, and open the valve.



IA02J1410005-02

- 7) Repeat this process until the fluid flowing into the receptacle no longer contains air bubbles.

### NOTE

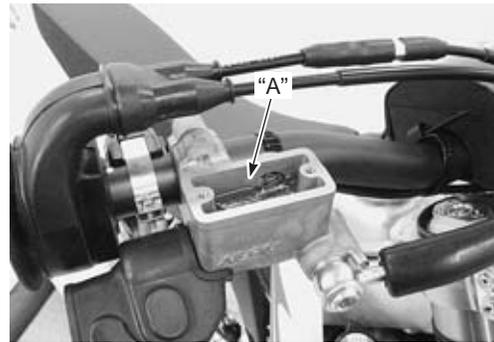
**While bleeding the brake system, replenish the brake fluid in the reservoir as necessary. Make sure that there is always some fluid visible in the reservoir.**

- 8) Close the air bleeder valve and disconnect the hose.

### Tightening torque

**Air bleeder valve (Front caliper): 6 N-m (0.6 kgf-m, 4.5 lbf-ft)**

- 9) Fill the reservoir with brake fluid to the upper line "A".

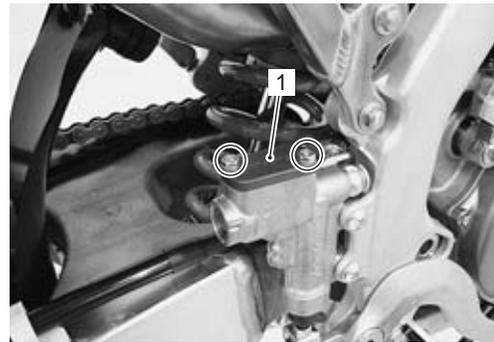


IA02J1410003-01

- 10) Install the diaphragm and reservoir cap.

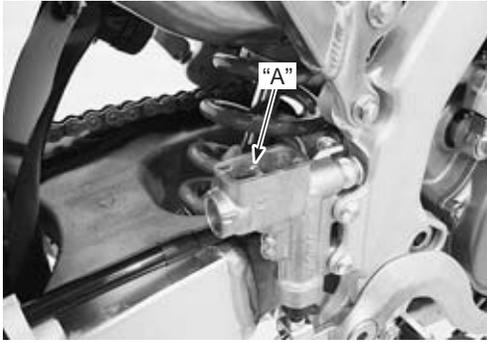
### Rear Brake

- 1) Remove the reservoir cap (1) and diaphragm.



IA02J1410006-01

- 2) Fill the reservoir with brake fluid to the upper line "A". Place the reservoir cap to prevent dirt from entering.



IA02J1410007-01

**NOTE**

The difference of bleeding operation from the front brake is that the rear master cylinder is actuated by a pedal.

**Tightening torque**

Air bleeder valve (Rear caliper): 6 N·m (0.6 kgf·m, 4.5 lbf·ft)

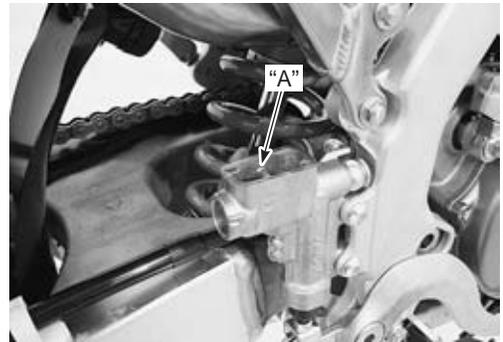


IA02J1410008-01



IA02J1410009-01

- 3) Fill the reservoir with brake fluid to the upper line "A".



IA02J1410007-01

- 4) Install the diaphragm and reservoir cap.

**Brake Fluid Replacement**

BA02J24106005

**⚠ CAUTION**

Handle brake fluid with care: the fluid reacts chemically with paint, plastic, rubber materials, etc.

**Front Brake**

- 1) Place the motorcycle on a level surface and keep the handlebars straight.
- 2) Remove the reservoir cap and diaphragm.
- 3) Suck up the old brake fluid as much as possible.



IA02J1410010-01

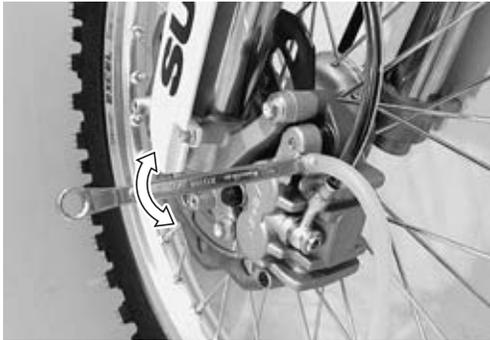
- 4) Fill the reservoir with new brake fluid.

**BF: Brake fluid (DOT 4)**

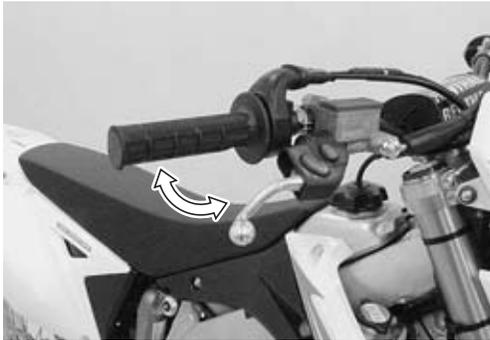
- 5) Connect a clear hose to the air bleeder valve and insert the other end of the hose into a receptacle.

## 4A-6 Brake Control System and Diagnosis:

- Loosen the air bleeder valve and pump the brake lever until the old brake fluid flows out of the brake system.



IA02J1410005-02



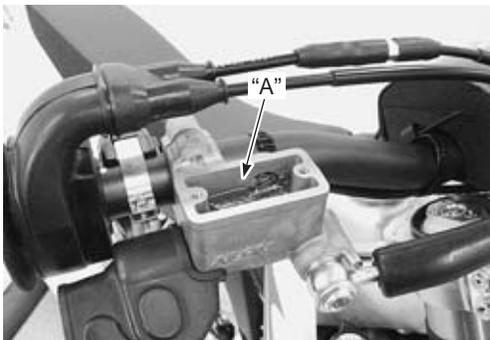
IA02J1410004-01

- Close the air bleeder valve and disconnect the clear hose.

### Tightening torque

**Air bleeder valve (Front caliper): 6 N·m (0.6 kgf·m, 4.5 lbf·ft)**

- Fill the reservoir with brake fluid to the upper line "A".



IA02J1410003-01

- Bleed air from the brake fluid circuit. Refer to "Air Bleeding from Brake Fluid Circuit" (Page 4A-3).
- Install the diaphragm and reservoir cap.

## Rear Brake

- Place the motorcycle on a level surface.
- Remove the reservoir cap and diaphragm.
- Suck up the old brake fluid as much as possible.



IA02J1410011-01

- Fill the reservoir with new brake fluid.

### BF: Brake fluid (DOT 4)

- Connect a clear hose to the air bleeder valve and insert the other end of the hose into a receptacle.
- Loosen the air bleeder valve and pump the brake pedal until the old brake fluid flows out of the brake system.



IA02J1410009-01



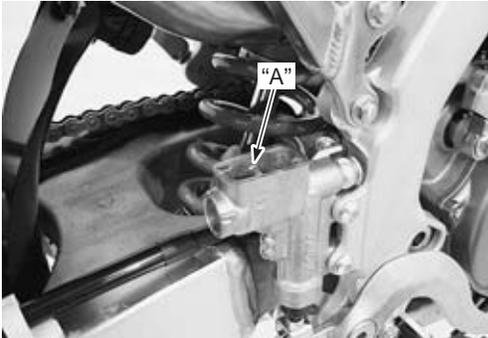
IA02J1410008-01

- 7) Close the air bleeder valve and disconnect the clear hose.

**Tightening torque**

**Air bleeder valve (Rear caliper): 6 N·m (0.6 kgf·m, 4.5 lbf·ft)**

- 8) Fill the reservoir with brake fluid to the upper line "A".



IA02J1410007-01

- 9) Bleed air from the brake fluid circuit. Refer to "Air Bleeding from Brake Fluid Circuit" (Page 4A-3).

- 10) Install the diaphragm and reservoir cap.

**Front Brake Hose Removal and Installation**

BA02J24106006

**Removal**

- 1) Drain brake fluid. Refer to "Brake Fluid Replacement" (Page 4A-5).
- 2) Remove the front brake hoses as shown in the front brake hose routing diagram. Refer to "Front Brake Hose Routing Diagram" (Page 4A-1).

**Installation**

**⚠ CAUTION**

**The seal washers should be replaced with the new ones to prevent fluid leakage.**

- 1) Install the front brake hose as shown in the front brake hose routing diagram. Refer to "Front Brake Hose Routing Diagram" (Page 4A-1).
- 2) Bleed air from the front brake system. Refer to "Air Bleeding from Brake Fluid Circuit" (Page 4A-3).

**Rear Brake Hose Removal and Installation**

BA02J24106007

**Removal**

- 1) Drain brake fluid. Refer to "Brake Fluid Replacement" (Page 4A-5).
- 2) Remove the rear brake hoses as shown in the rear brake hose routing diagram. Refer to "Rear Brake Hose Routing Diagram" (Page 4A-2).

**Installation**

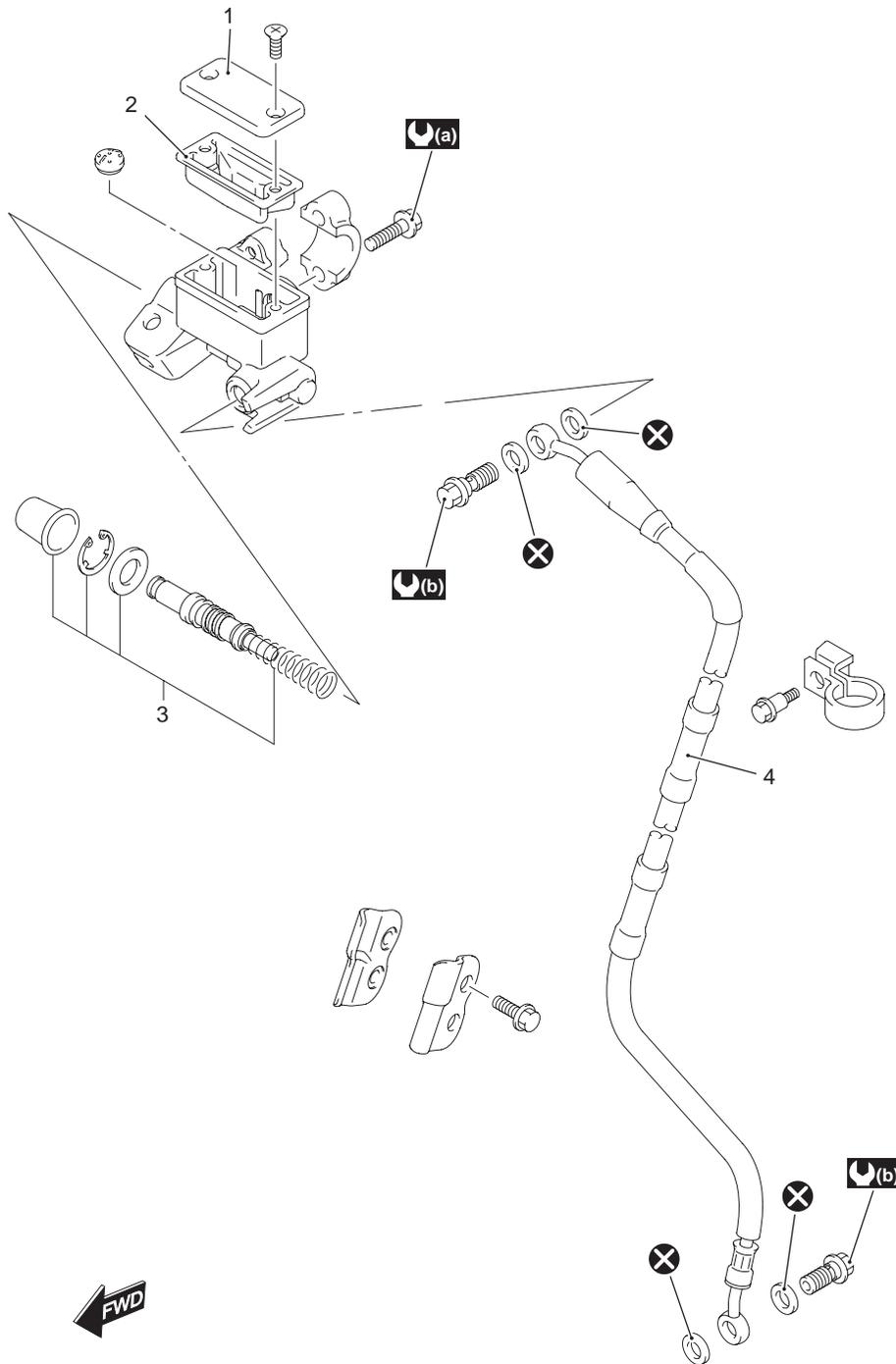
**⚠ CAUTION**

**The seal washers should be replaced with new ones to prevent fluid leakage.**

- 1) Install the rear brake hose as shown in the rear brake hose routing diagram. Refer to "Rear Brake Hose Routing Diagram" (Page 4A-2).
- 2) Bleed air from the rear brake system. Refer to "Air Bleeding from Brake Fluid Circuit" (Page 4A-3).

Front Brake Master Cylinder Components

BA02J24106008



IA02J1410043-01

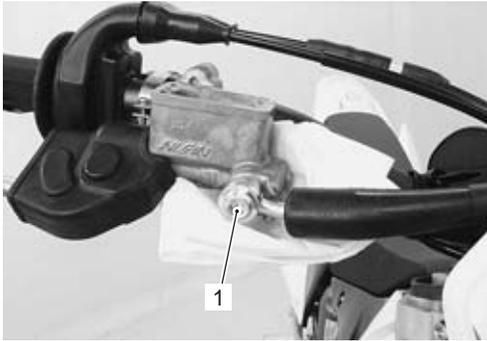
1. Reservoir cap	4. Front brake hose	⊗ : Do not reuse.
2. Diaphragm	: 10 N-m (1.0 kgf-m, 7.0 lbf-ft)	
3. Piston/cup set	: 23 N-m (2.3 kgf-m, 16.5 lbf-ft)	

## Front Brake Master Cylinder Assembly Removal and Installation

BA02J24106009

### Removal

- 1) Drain brake fluid. Refer to "Brake Fluid Replacement" (Page 4A-5).
- 2) Place a rag underneath the brake hose union bolt (1) on the master cylinder to catch any spilt brake fluid.
- 3) Remove the brake hose union bolt (1).



IA02J1410012-01

- 4) Remove the master cylinder assembly.



IA02J1410013-01

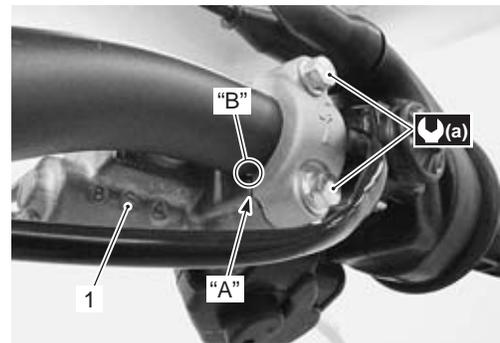
### Installation

Install the front brake master cylinder in the reverse order of removal. Pay attention to the following points:

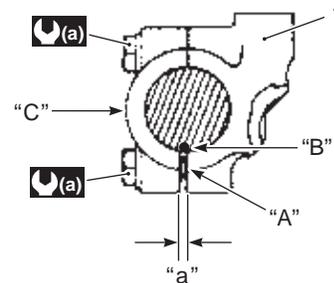
- When installing the master cylinder (1) onto the handlebars, align the master cylinder holder's mating surface "A" with the marking "B" on the handlebars and tighten the upper holder bolt first.

#### Tightening torque

**Front brake master cylinder holder bolt (Upper and Lower) (a): 10 N·m (1.0 kgf·m, 7.0 lbf·ft)**



IA02J1410014-02



IA02J1410015-01

"C": Up mark	"a": Clearance
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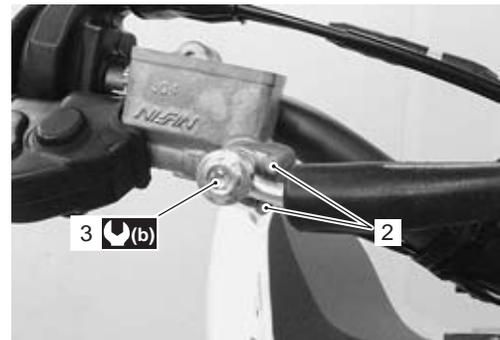
- After setting the brake hose union between the stoppers (2), tighten the union bolt (3) to the specified torque.

#### ⚠ CAUTION

**The seal washers should be replaced with new ones to prevent fluid leakage.**

#### Tightening torque

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



IA02J1410016-02

- Bleed air from brake system. Refer to "Air Bleeding from Brake Fluid Circuit" (Page 4A-3).
- Clamp the starter button lead wire properly. Refer to "Wiring Diagram" in Section 9A (Page 9A-1).

## 4A-10 Brake Control System and Diagnosis:

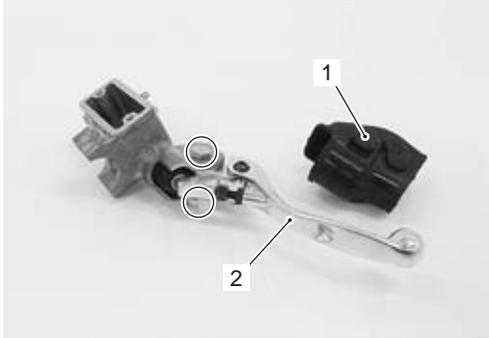
### Front Brake Master Cylinder / Brake Lever Disassembly and Assembly

BA02J24106010

Refer to "Front Brake Master Cylinder Assembly Removal and Installation" (Page 4A-9).

#### Disassembly

- 1) Remove the brake lever boot (1) and brake lever (2).

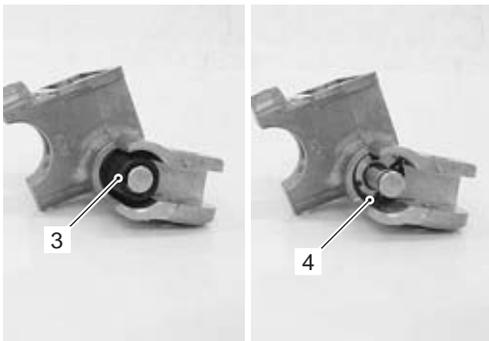


IA02J1410017-01

- 2) Remove the dust boot (3) and snap ring (4).

#### Special tool

 : 09900-06108 (Snap ring remover (Close type))



IA02J1410018-01

- 3) Remove the washer (5) and piston/cup set (6).



IA02J1410019-01

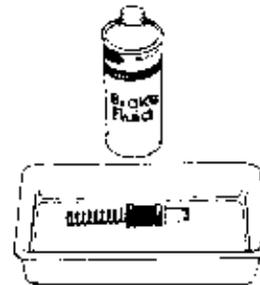
#### Assembly

Assemble the master cylinder in the reverse order of disassembly. Pay attention to the following points:

#### CAUTION

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

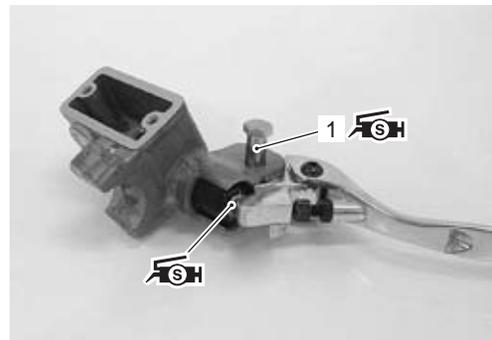
BF: Brake fluid (DOT 4)



I933H1410029-01

- Apply grease to the brake lever pivot bolt (1).
- Apply grease to the contact point between the piston and brake lever.

 : Grease 99000-25100 (SUZUKI SILICONE GREASE or equivalent)



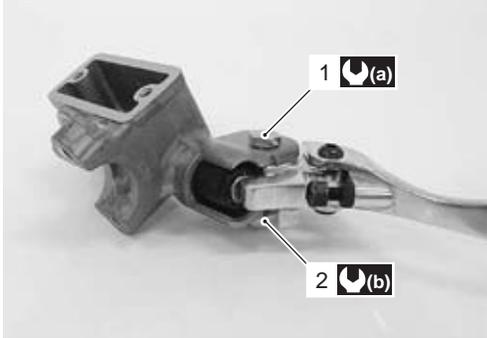
IA02J1410020-02

- Tighten the pivot bolt (1) and lock-nut (2) to the specified torque.

**Tightening torque**

**Brake lever pivot bolt (a): 6 N·m (0.6 kgf·m, 4.5 lbf·ft)**

**Brake lever pivot bolt lock-nut (b): 6 N·m (0.6 kgf·m, 4.5 lbf·ft)**



IA02J1410021-01

**Front Brake Master Cylinder Parts Inspection**

BA02J24106011

Refer to "Front Brake Master Cylinder / Brake Lever Disassembly and Assembly" (Page 4A-10).

**Master Cylinder**

Inspect the master cylinder bore for any scratches or other damage.



IA02J1410042-01

**Piston / Rubber Parts**

Inspect the piston surface for any scratches or other damage.

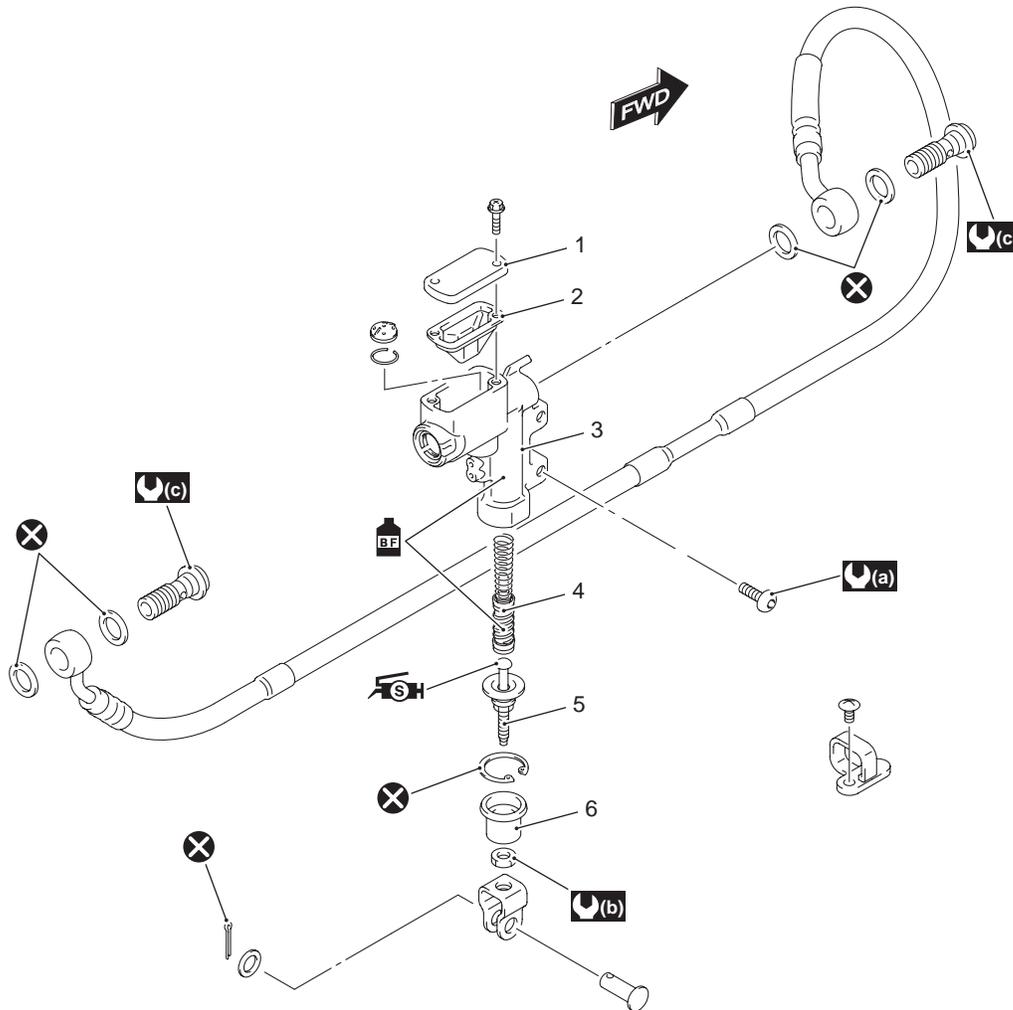
Inspect the primary cup, secondary cup and dust boot for wear or damage.



IA02J1410022-02

Rear Brake Master Cylinder Components

BA02J24106012



IA02J1410023-02

1. Reservoir cap	5. Push rod	: 23 N-m (2.3 kgf-m, 16.5 lbf-ft)
2. Diaphragm	6. Dust boot	: Apply silicone grease.
3. Master cylinder	: 10 N-m (1.0 kgf-m, 7.0 lbf-ft)	: Apply brake fluid.
4. Piston/Cup set	: 6 N-m (0.6 kgf-m, 4.5 lbf-ft)	: Do not reuse.

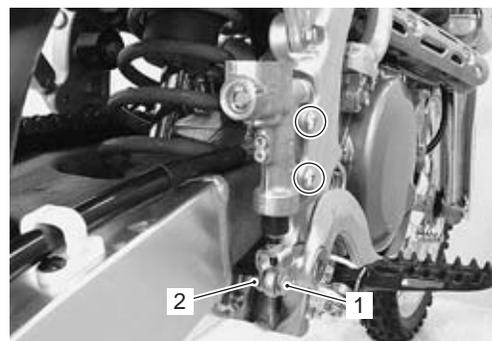
Rear Brake Master Cylinder Assembly Removal and Installation

BA02J24106013

Refer to "Rear Brake Hose Routing Diagram" (Page 4A-2).

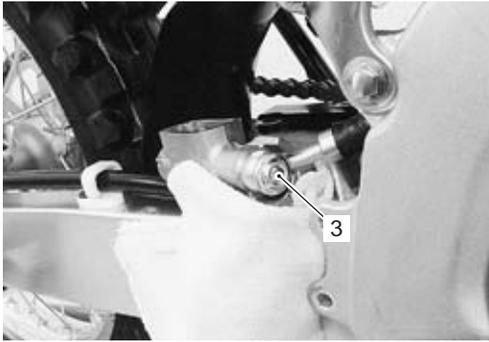
Removal

- 1) Drain brake fluid. Refer to "Brake Fluid Replacement" (Page 4A-5).
- 2) Remove the master cylinder rod pin (1) and washer by removing the cotter pin (2).
- 3) Remove the master cylinder mounting bolts.



IA02J1410024-01

- 4) Place a rag under the brake hose union bolt (3) to catch spilled brake fluid.
- 5) Remove the rear brake master cylinder by removing the union bolt (3).



IA02J1410025-01

**Installation**

Install the rear brake master cylinder in the reverse order of removal. Pay attention to the following points:

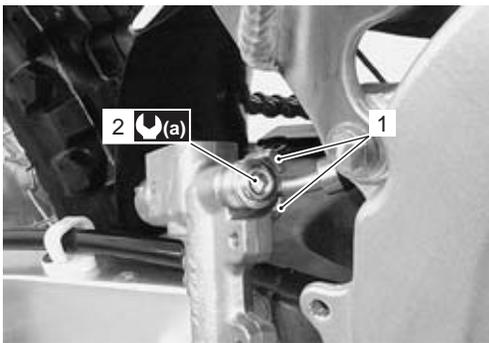
**CAUTION**

The seal washers should be replaced with new ones to prevent fluid leakage.

- After setting the brake hose union between the stoppers (1), tighten the union bolt (2) to the specified torque.

**Tightening torque**

Brake hose union bolt (a): 23 N-m (2.3 kgf-m, 16.5 lbf-ft)



IA02J1410026-01

- Tighten the master cylinder mounting bolts (3) to the specified torque.

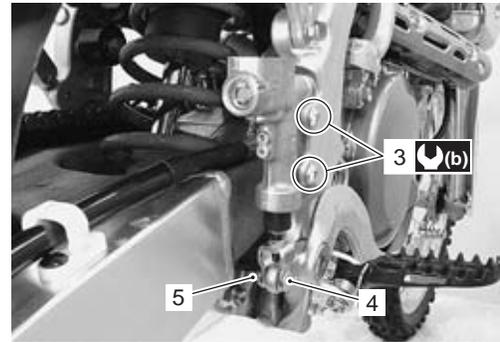
**CAUTION**

Improper brake hose routing can damage the brake hose. Ensure the brake hose has enough clearance to the rear suspension spring.

**Tightening torque**

Master cylinder mounting bolt (b): 10 N-m (1.0 kgf-m, 7.0 lbf-ft)

- Install the master cylinder rod pin (4), washer and new cotter pin (5).



IA02J1410027-01

- Refill brake fluid and bleed air from the brake system. Refer to "Air Bleeding from Brake Fluid Circuit" (Page 4A-3).

**Rear Brake Master Cylinder Disassembly and Assembly**

BA02J24106014

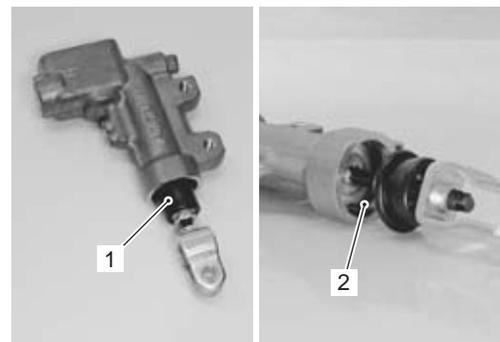
Refer to "Rear Brake Master Cylinder Assembly Removal and Installation" (Page 4A-12).

**Disassembly**

- 1) Remove the dust boot (1) and snap ring (2).

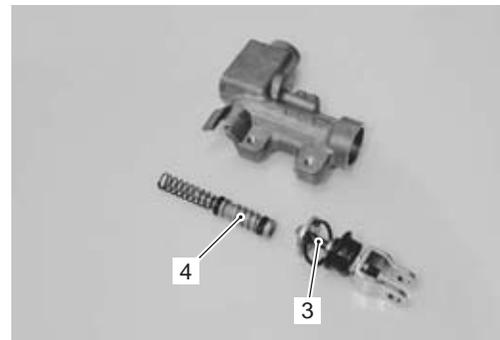
**Special tool**

**Tool** : 09900-06108 (Snap ring remover (Close type))



IA02J1410028-02

- 2) Remove the push rod (3).
- 3) Remove the piston/cup set (4).



IA02J1410029-02

## 4A-14 Brake Control System and Diagnosis:

### Assembly

Assemble the master cylinder in the reverse order of disassembly. Pay attention to the following points:

#### ⚠ CAUTION

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

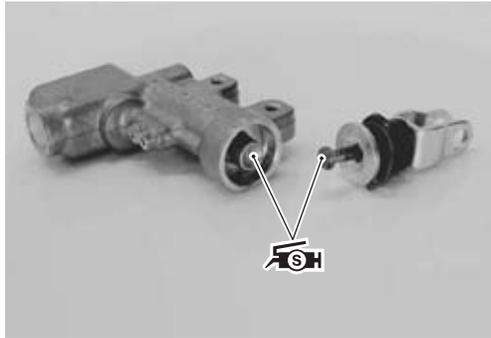
BF: Brake fluid (DOT 4)



IA947H1410038-01

- Apply grease to the push rod end.

 : Grease 99000-25100 (SUZUKI SILICONE GREASE or equivalent)



IA02J1410030-02

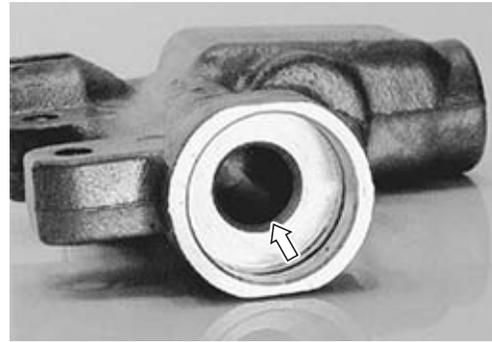
### Rear Brake Master Cylinder Parts Inspection

BA02J24106015

Refer to "Rear Brake Master Cylinder Disassembly and Assembly" (Page 4A-13).

### Master Cylinder

Inspect the master cylinder bore for any scratches or other damage.

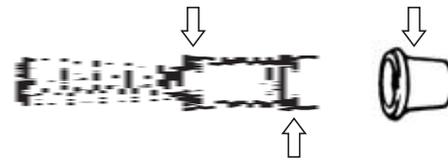


IA02J1410031-01

### Piston / Rubber Parts

Inspect the piston surface for any scratches or other damage.

Inspect the primary cup, secondary cup and dust boot for wear or damage.



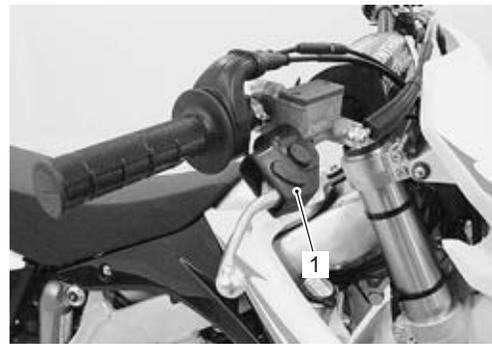
IB37H1410050-01

### Brake Lever Removal and Installation

BA02J24106016

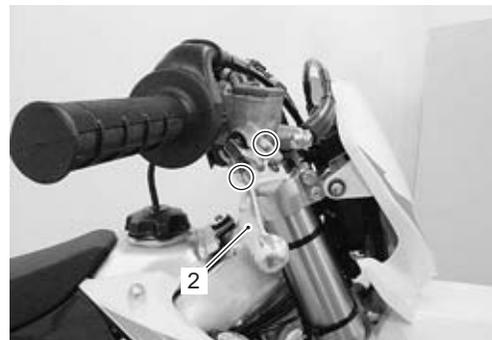
#### Removal

- 1) Removal the brake lever boot (1).



IA02J1410032-01

- 2) Remove the brake lever (2) by removing the pivot bolt and nut.



IA02J1410033-01

**Installation**

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

- Apply grease to the brake lever, pivot bolt and contact point between piston and brake lever.

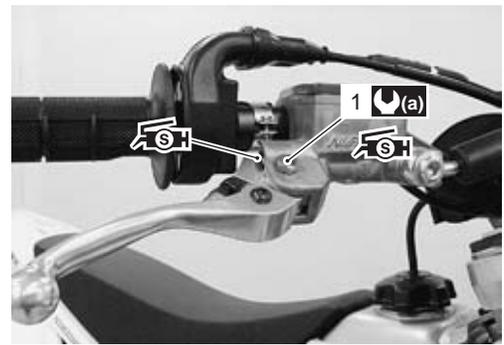
 : Grease 99000-25100 (SUZUKI SILICONE GREASE or equivalent)

- Tighten the brake lever pivot bolt (1) and lock-nut (2) to the specified torque.

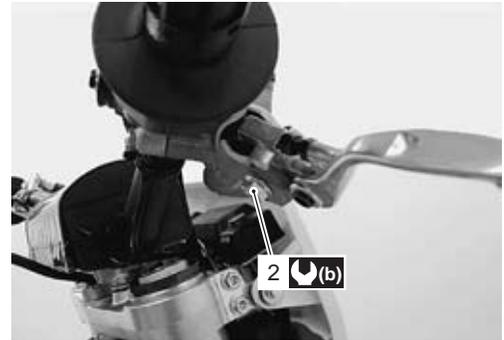
**Tightening torque**

Brake lever pivot bolt (a): 6 N-m (0.6 kgf-m, 4.5 lbf-ft)

Brake lever pivot bolt lock-nut (b): 6 N-m (0.6 kgf-m, 4.5 lbf-ft)



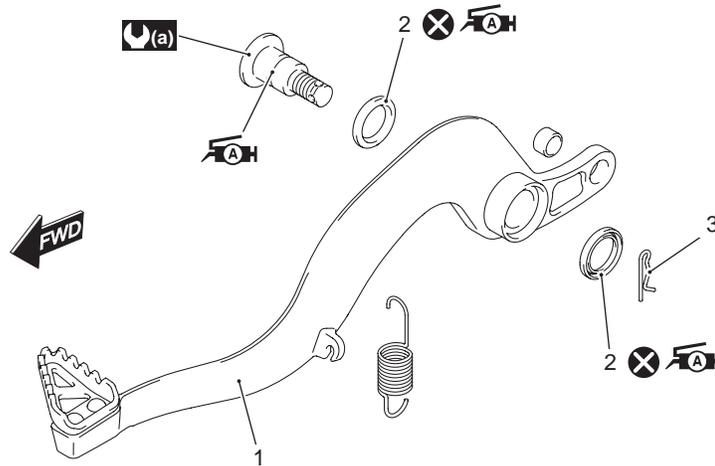
IA02J1410034-02



IA02J1410035-01

**Rear Brake Pedal Construction**

BA02J24106017



IA02J1410036-03

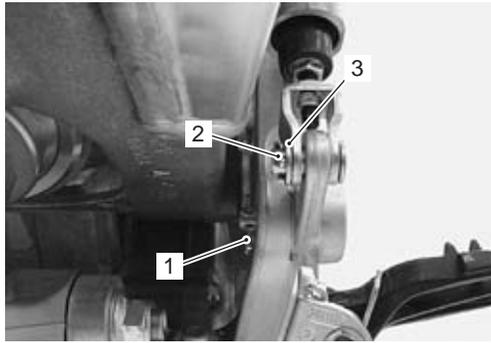
1. Rear brake pedal	 : 29 N-m (2.9 kgf-m, 21.0 lbf-ft)
2. Dust seal	 : Apply grease.
3. Clip	 : Do not reuse.

**Rear Brake Pedal Removal and Installation**

BA02J24106018

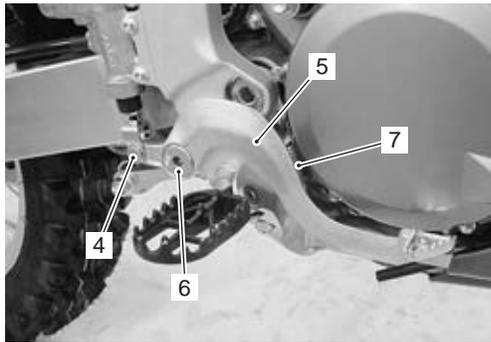
**Removal**

- 1) Remove the clip (1).
- 2) Remove the cotter pin (2) and washer (3).



IA02J1410037-01

- 3) Remove the master cylinder rod pin (4).
- 4) Remove the rear brake pedal (5) by removing the brake pedal pivot bolt (6) and return spring (7).



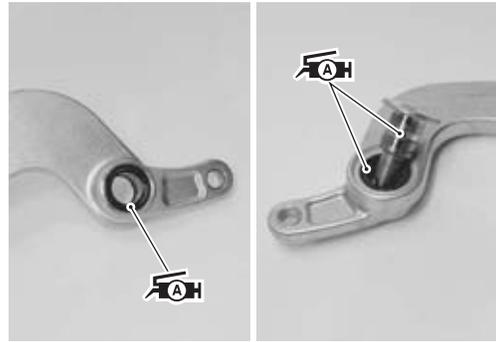
IA02J1410038-01

**Installation**

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

- Apply grease to the dust seals and brake pedal pivot bolt groove.

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



IA02J1410040-01

- Install the return spring (1) properly.
- Tighten the brake pedal pivot bolt (2) to the specified torque.

**Tightening torque**

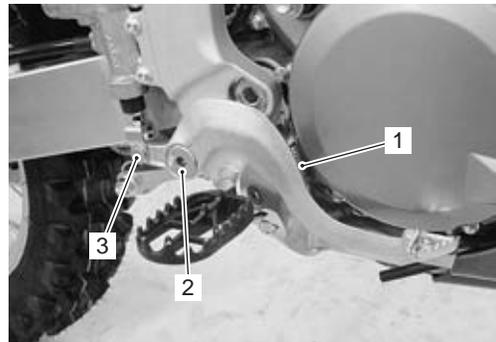
**Brake pedal pivot bolt: 29 N·m (2.9 kgf·m, 21.0 lbf·ft)**

- Install the clip.
- Install the master cylinder rod pin (3), washer and new cotter pin.

**⚠ CAUTION**

**Do not reuse the removed cotter pin.**

- Adjust the brake pedal height. Refer to "Brake System Inspection" in Section 0B (Page 0B-22).



IA02J1410039-02

**Specifications**

**Service Data**

BA02J24107001

**Brake**

Unit: mm (in)

Item	Standard		Limit
Brake lever adjuster length	11 – 15 (0.4 – 0.6)		—
Rear brake pedal height	0 – 10 (0 – 0.4)		—
Master cylinder bore	Front	11.000 – 11.043 (0.4331 – 0.4348)	—
	Rear	11.000 – 11.043 (0.4331 – 0.4348)	—
Master cylinder piston diam.	Front	10.957 – 10.984 (0.4314 – 0.4324)	—
	Rear	10.957 – 10.984 (0.4314 – 0.4324)	—
Brake fluid type	DOT 4		—

## Tightening Torque Specifications

BA02J24107002

Fastening part	Tightening torque			Note
	N·m	kgf·m	lbf·ft	
Air bleeder valve (Front caliper)	6	0.6	4.5	☞(Page 4A-4) / ☞(Page 4A-6)
Air bleeder valve (Rear caliper)	6	0.6	4.5	☞(Page 4A-5) / ☞(Page 4A-7)
Front brake master cylinder holder bolt (Upper and Lower)	10	1.0	7.0	☞(Page 4A-9)
Brake hose union bolt	23	2.3	16.5	☞(Page 4A-9) / ☞(Page 4A-13)
Brake lever pivot bolt	6	0.6	4.5	☞(Page 4A-11)
Brake lever pivot bolt lock-nut	6	0.6	4.5	☞(Page 4A-11)
Master cylinder mounting bolt	10	1.0	7.0	☞(Page 4A-13)
Brake lever pivot bolt	6	0.6	4.5	☞(Page 4A-15)
Brake lever pivot bolt lock-nut	6	0.6	4.5	☞(Page 4A-15)
Brake pedal pivot bolt	29	2.9	21.0	☞(Page 4A-16)

**NOTE**

The specified tightening torque is described in the following.

“Front Brake Hose Routing Diagram” (Page 4A-1)

“Rear Brake Hose Routing Diagram” (Page 4A-2)

“Front Brake Master Cylinder Components” (Page 4A-8)

“Rear Brake Master Cylinder Components” (Page 4A-12)

“Rear Brake Pedal Construction” (Page 4A-15)

**Reference:**

For the tightening torque of fastener not specified in this section, refer to “Tightening Torque List” in Section 0C (Page 0C-8).

## Special Tools and Equipment

### Recommended Service Material

BA02J24108001

Material	SUZUKI recommended product or Specification		Note
Brake fluid	DOT 4	—	☞(Page 4A-5) / ☞(Page 4A-6) / ☞(Page 4A-10) / ☞(Page 4A-14)
Grease	SUZUKI SUPER GREASE “A” or equivalent	P/No.: 99000–25010	☞(Page 4A-16)
	SUZUKI SILICONE GREASE or equivalent	P/No.: 99000–25100	☞(Page 4A-10) / ☞(Page 4A-14) / ☞(Page 4A-15)

**NOTE**

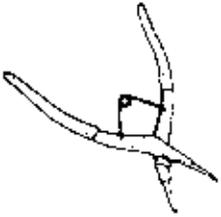
Required service material is also described in the following.

“Rear Brake Master Cylinder Components” (Page 4A-12)

“Rear Brake Pedal Construction” (Page 4A-15)

**Special Tool**

BA02J24108002

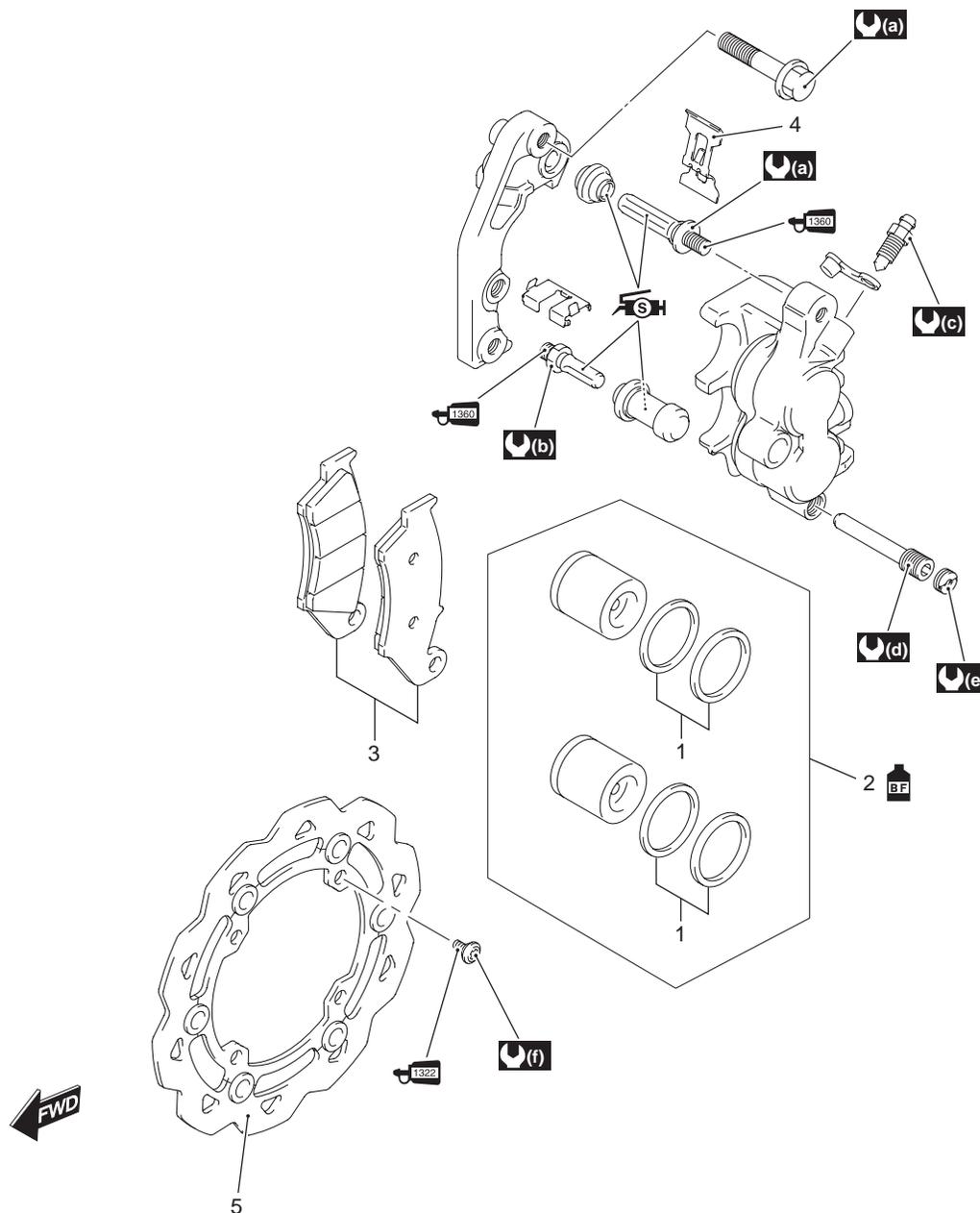
<p>09900-06108 Snap ring remover (Close type) ☞ (Page 4A-10) / ☞ (Page 4A-13)</p>	 A technical line drawing of a snap ring remover tool. It consists of two long, curved, tapered arms that meet at a central point. A small rectangular block is positioned between the inner curves of the arms, near their base. The tool is shown in a perspective view, highlighting its curved shape and the central assembly.
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# Front Brakes

## Repair Instructions

### Front Brake Components

BA02J24206001



IA02J1420021-07

1. Seal set	: 25 N-m (2.5 kgf-m, 18.0 lbf-ft)	: 11 N-m (1.1 kgf-m, 8.0 lbf-ft)
2. Piston and seal set	: 23 N-m (2.3 kgf-m, 16.5 lbf-ft)	: Apply thread lock to the thread part.
3. Brake pad set	: 6 N-m (0.6 kgf-m, 4.5 lbf-ft)	: Apply thread lock to the thread part.
4. Pad spring	: 17 N-m (1.7 kgf-m, 12.5 lbf-ft)	: Apply silicone grease.
5. Brake disc	: 2.5 N-m (0.25 kgf-m, 2.0 lbf-ft)	: Apply brake fluid.

## 4B-2 Front Brakes:

### Front Brake Pad Inspection

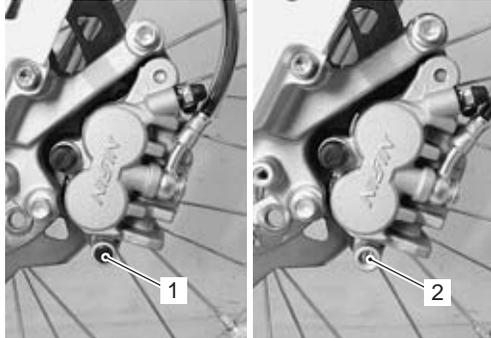
BA02J24206002

Refer to "Brake System Inspection" in Section 0B (Page 0B-22).

### Front Brake Pad Replacement

BA02J24206003

- 1) Remove the plug (1) and brake pad mounting pin (2).

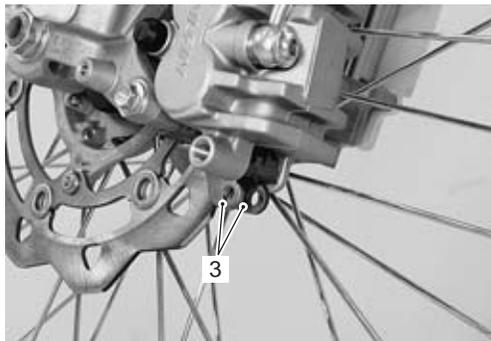


IA02J1420001-03

- 2) Remove the brake pads (3).

#### **⚠ CAUTION**

**Do not operate the brake lever while the pads are removed.**



IA02J1420002-02

- 3) Install new brake pads.

#### **⚠ CAUTION**

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

- 4) Tighten the brake pad mounting pin (2) and plug (1) to the specified torque.

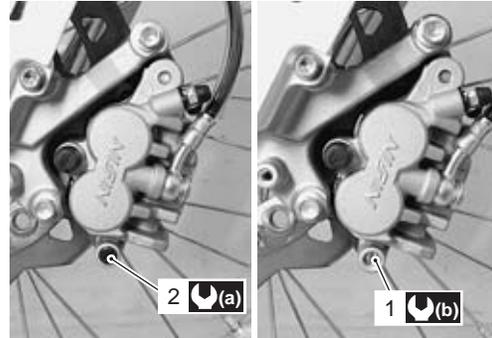
#### **Tightening torque**

**Front brake pad mounting pin (a): 17 N·m (1.7 kgf·m, 12.5 lbf·ft)**

**Front brake pad mounting pin plug (b): 2.5 N·m (0.25 kgf·m, 2.0 lbf·ft)**

#### **⚠ WARNING**

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



IA02J1420003-02

### Front Brake Caliper Removal and Installation

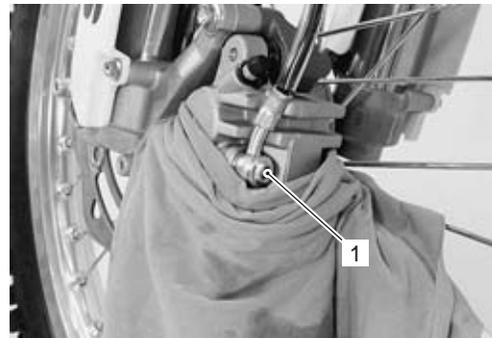
BA02J24206004

#### Removal

- 1) Drain brake fluid. Refer to "Brake Fluid Replacement" in Section 4A (Page 4A-5).
- 2) Remove the brake hose from the caliper by removing the union bolt (1) and catch the brake fluid in a suitable receptacle.

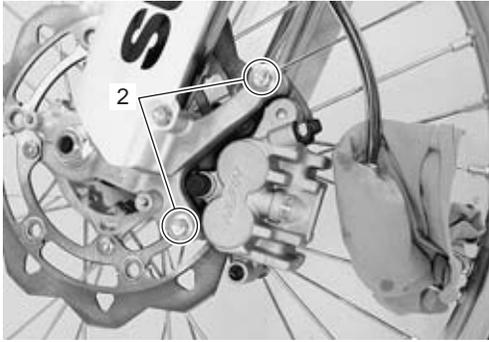
#### NOTE

**Place a rag underneath the union bolt on the brake caliper to catch any spilt brake fluid.**



IA02J1420004-02

- Remove the brake caliper by removing its mounting bolts (2).



IA02J1420005-02

**Installation**

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

- Tighten each bolt to the specified torque.

**Tightening torque**

**Front brake caliper mounting bolt (a): 25 N·m (2.5 kgf·m, 18.0 lbf·ft)**

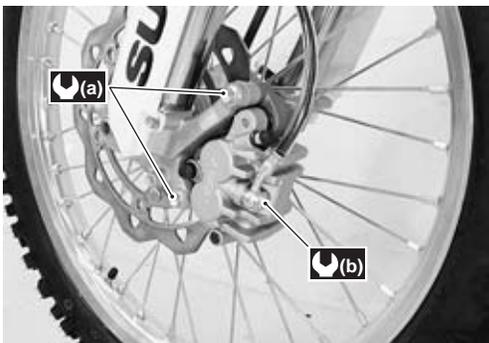
- After setting the brake hose union between the stoppers, tighten the union bolt to the specified torque.

**CAUTION**

The seal washers should be replaced with new ones to prevent fluid leakage.

**Tightening torque**

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



IA02J1420006-02

- Bleed air from the brake system after installing the caliper. Refer to “Air Bleeding from Brake Fluid Circuit” in Section 4A (Page 4A-3).
- Check the brake fluid leakage and brake operation.

**CAUTION**

Brake fluid, if it leaks, will interfere with safe running and discolor painted surfaces. Check the brake hose and hose joints for cracks and fluid leakage.

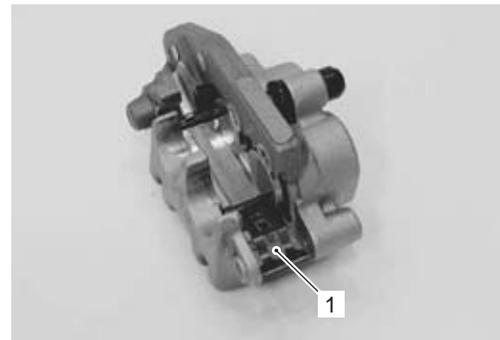
**Front Brake Caliper Disassembly and Assembly**

BA02J24206005

Refer to “Front Brake Caliper Removal and Installation” (Page 4B-2).

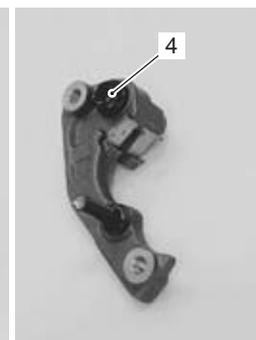
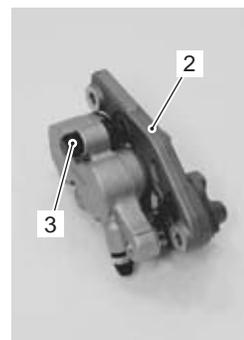
**Disassembly**

- Remove the brake pads. Refer to “Front Brake Pad Replacement” (Page 4B-2).
- Remove the spring (1).



IA02J1420007-01

- Remove the caliper bracket (2) from the caliper.
- Remove the boots (3) and (4).



IA02J1420008-02

## 4B-4 Front Brakes:

- 5) Wrap the caliper with a rag to prevent brake fluid scatter and piston pop-out.
- 6) Apply low-pressure air into the caliper through the hole to remove the pistons.

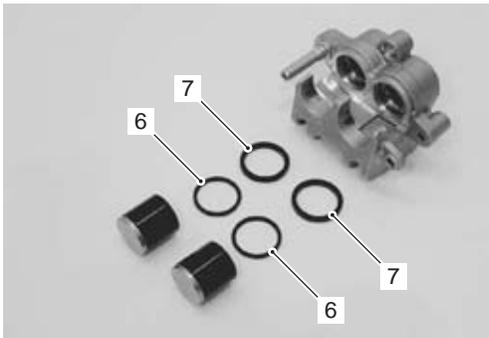
### **⚠ WARNING**

Fingers can get caught between piston and caliper body when removing the piston. Do not place your fingers on the piston when removing the piston.



IA02J1420009-01

- 7) Remove the dust seals (6) and piston seals (7).



IA02J1420010-02

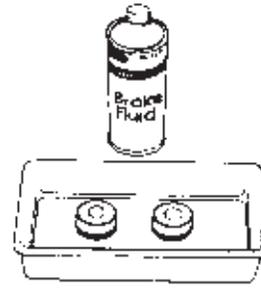
### **Assembly**

Assemble the caliper in the reverse order of disassembly. Pay attention to the following points:

### **⚠ CAUTION**

- Wash the caliper components with fresh brake fluid before reassembly.
- Do not wipe the brake fluid off after washing the components.
- When washing the components, use the specified brake fluid. Never use different types of fluid or cleaning solvent such as gasoline, kerosine or the others.

**BF:** Brake fluid (DOT 4)



I649G1420012-02

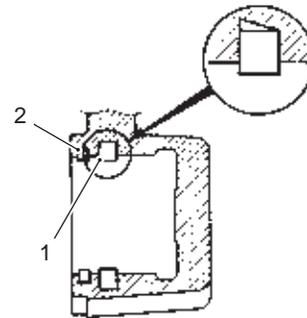
- Apply the brake fluid to new piston seals (1) and dust seals (2).

### **⚠ CAUTION**

Replace the piston seals (1) and dust seals (2) with new ones.

**BF:** Brake fluid (DOT 4)

- Install the piston seals as shown in the figure.

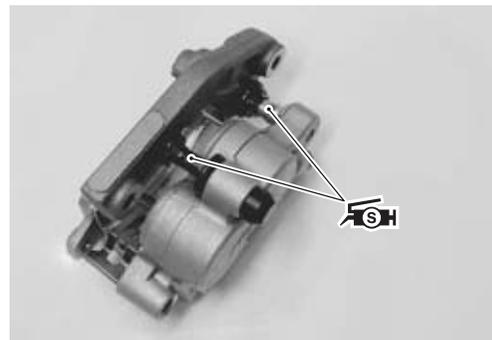


I649G1420013-02

- Install the springs and boots.
- Apply SUZUKI SILICONE GREASE to the caliper axles.

**🔧 :** Grease 99000-25100 (SUZUKI SILICONE GREASE or equivalent)

- Install the caliper bracket.



IA02J1420011-01

- Install the brake pads and temporarily tighten the pad mounting pin (3).



IA02J1420012-01

### Front Brake Caliper Parts Inspection

BA02J24206006

Refer to “Front Brake Caliper Disassembly and Assembly” (Page 4B-3).

### Brake Caliper Cylinder

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



IA02J1420013-02

### Brake Caliper Piston

Inspect the surface of brake caliper pistons for any scratches or other damage. If any damage is found, replace the pistons with a new set.



IA02J1420014-01

### Boot

Inspect the boots for damage and wear. If any defects are found, replace it with a new one.



IA02J1420015-01

### Brake Pad Spring

Inspect the brake pad spring for damage and excessive bend. If any damage is found, replace it with a new one.



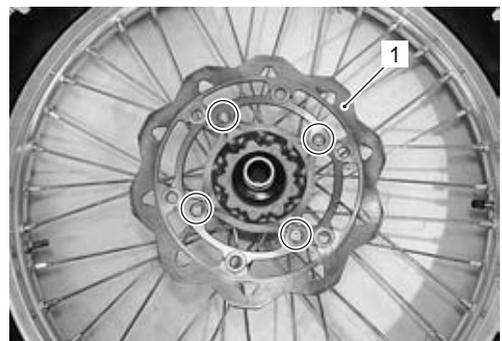
IA02J1420016-01

### Front Brake Disc Removal and Installation

BA02J24206007

#### Removal

- 1) Remove the front wheel assembly. Refer to “Front Wheel Assembly Removal and Installation” in Section 2D (Page 2D-3).
- 2) Remove the front brake disc (1).



IA02J1420017-02

## 4B-6 Front Brakes:

### Installation

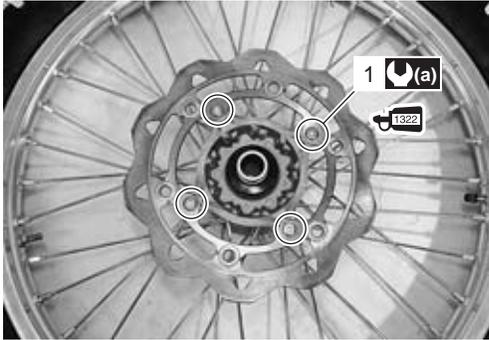
Install the front brake disc in the reverse order of removal. Pay attention to the following points:

- Make sure that the brake disc is clean and free of any grease.
- Apply thread lock to the brake disc bolts (1) and tighten them to the specified torque.

 : Thread lock cement 99000–32110 (THREAD LOCK CEMENT SUPER “1322” or equivalent)

### Tightening torque

Brake disc bolt (Front) (a): 11 N·m (1.1 kgf·m, 8.0 lbf·ft)



IA02J1420018-03

### Front Brake Disc Inspection

BA02J24206008

#### Brake Disc Thickness

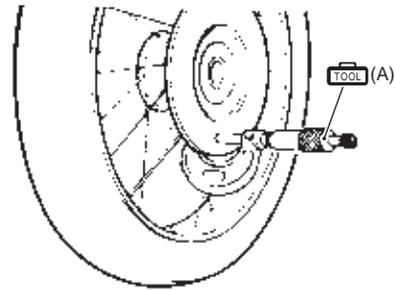
Check the brake disc for damage or cracks and measure the thickness using the micrometer. Replace the brake disc if the thickness is less than the service limit or if defect is found.

#### Special tool

 (A): 09900–20205 (Micrometer (0 – 25 mm))

### Brake disc thickness

Service limit (Front): 2.5 mm (0.10 in)



IA02J1420019-01

### Brake Disc Distortion

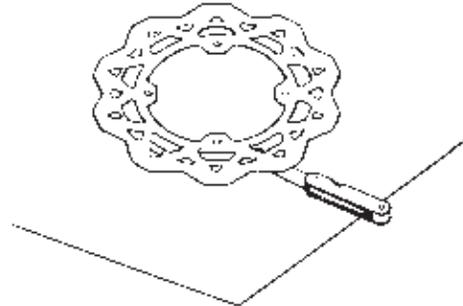
- 1) Remove the front brake disc. Refer to “Front Brake Disc Removal and Installation” (Page 4B-5).
- 2) Measure the front and rear brake disc distortion. Replace the disc if the distortion exceeds the service limit.

#### Brake disc distortion

Service limit: 0.30 mm (0.012 in)

#### Special tool

 : 09900–20803 (Thickness gauge)



IA02J1420020-01

## Specifications

### Service Data

BA02J24207001

#### Brake + Wheel

Unit: mm (in)

Item	Standard		Limit
Brake disc thickness	Front	2.8 – 3.2 (0.11 – 0.13)	2.5 (0.10)
Brake disc distortion	Front	—	0.3 (0.012)
Brake caliper cylinder bore	Front	27.000 – 27.050 (1.0630 – 1.0650)	—
Brake caliper cylinder piston diam.	Front	26.918 – 26.968 (1.0591 – 1.0610)	—
Brake fluid type	DOT 4		—

## Tightening Torque Specifications

BA02J24207002

Fastening part	Tightening torque			Note
	N·m	kgf·m	lbf·ft	
Front brake pad mounting pin	17	1.7	12.5	☞ (Page 4B-2)
Front brake pad mounting pin plug	2.5	0.25	2.0	☞ (Page 4B-2)
Front brake caliper mounting bolt	25	2.5	18.0	☞ (Page 4B-3)
Brake hose union bolt	23	2.3	16.5	☞ (Page 4B-3)
Brake disc bolt (Front)	11	1.1	8.0	☞ (Page 4B-6)

**NOTE**

The specified tightening torque is described in the following.  
**“Front Brake Components” (Page 4B-1)**

**Reference:**

For the tightening torque of fastener not specified in this section, refer to “Tightening Torque List” in Section 0C (Page 0C-8).

## Special Tools and Equipment

## Recommended Service Material

BA02J24208001

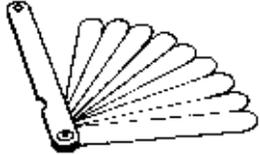
Material	SUZUKI recommended product or Specification		Note
Brake fluid	DOT 4	—	☞ (Page 4B-4) / ☞ (Page 4B-4)
Grease	SUZUKI SILICONE GREASE or equivalent	P/No.: 99000–25100	☞ (Page 4B-4)
Thread lock cement	THREAD LOCK CEMENT SUPER “1322” or equivalent	P/No.: 99000–32110	☞ (Page 4B-6)

**NOTE**

Required service material is also described in the following.  
**“Front Brake Components” (Page 4B-1)**

## Special Tool

BA02J24208002

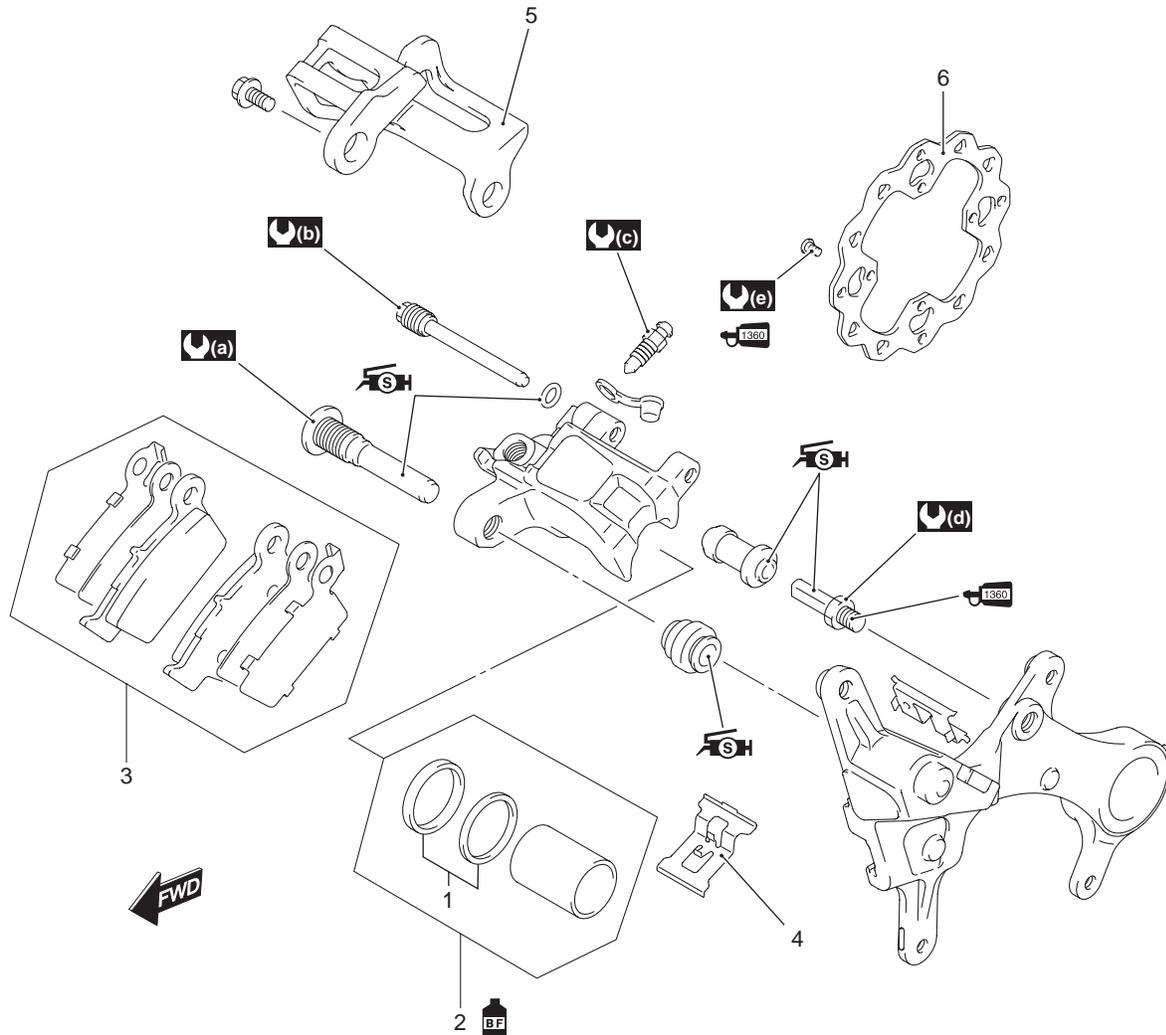
09900–20205 Micrometer (0 – 25 mm) ☞ (Page 4B-6)		09900–20803 Thickness gauge ☞ (Page 4B-6)	
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# Rear Brakes

## Repair Instructions

### Rear Brake Components

BA02J24306001



IA02J1430019-02

1. Seal set	5. Rear caliper guard	: 5 N·m (0.55 kgf-m, 4.0 lbf-ft)	: Apply thread lock to the thread part.
2. Piston and seal set	6. Brake disc	: 12 N·m (1.2 kgf-m, 8.5 lbf-ft)	: Apply brake fluid.
3. Brake pad set		: 43 N·m (4.3 kgf-m, 31.0 lbf-ft)	: 25 N·m (2.5 kgf-m, 18.0 lbf-ft)
4. Spring		: 17 N·m (1.7 kgf-m, 12.5 lbf-ft)	: Apply silicone grease.

### Rear Brake Pad Inspection

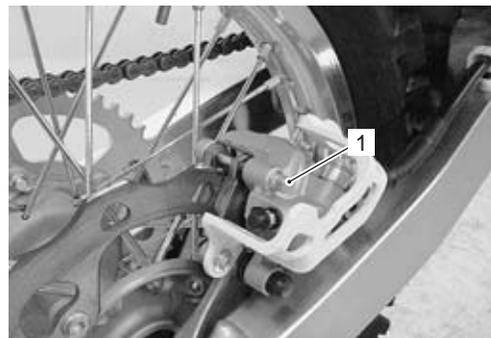
BA02J24306002

Refer to “Brake System Inspection” in Section 0B (Page 0B-22).

### Rear Brake Pad Replacement

BA02J24306003

1) Remove the brake pad mounting pin (1).

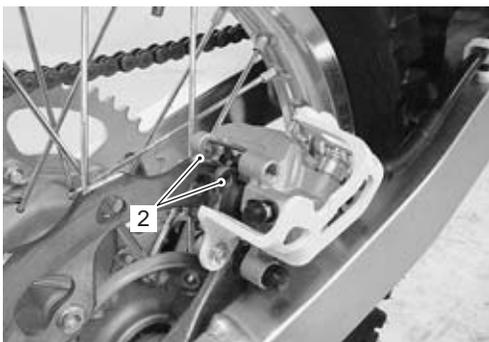


IA02J1430001-01

2) Remove the brake pads (2).

**⚠ CAUTION**

- Do not operate the brake pedal while the pads are removed.
- Replace the brake pads as a set, otherwise braking performance will be adversely affected.



IA02J1430002-01

3) Install new brake pads.

4) Apply SUZUKI SILICONE GREASE to the O-ring.

**🔧 : Grease 99000-25100 (SUZUKI SILICONE GREASE or equivalent)**



IA02J1430003-01

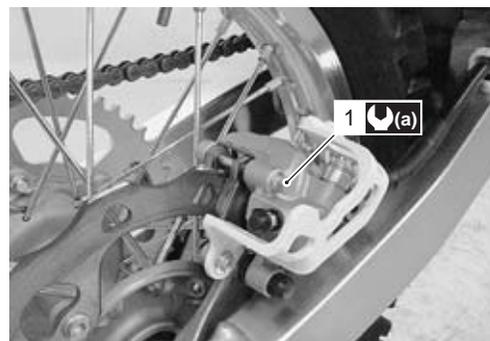
5) Tighten the brake pad mounting pin (1) to the specified torque.

**Tightening torque**

**Rear brake pad mounting pin (a): 17 N·m (1.7 kgf-m, 12.5 lbf-ft)**

**NOTE**

**After replacing the brake pads, pump the brake pedal several times to check for proper brake operation and then check the brake fluid level.**



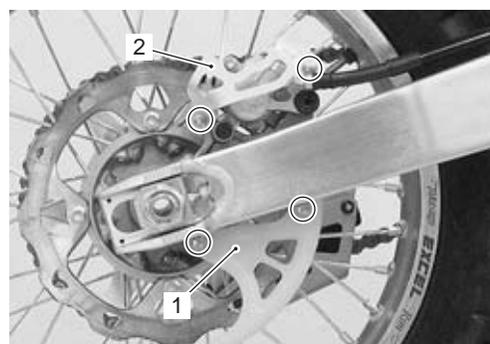
IA02J1430004-01

**Rear Brake Caliper Removal and Installation**

BA02J24306004

**Removal**

1) Remove the disc cover (1) and caliper protector (2).



IA02J1430005-01

2) Place a rag under the brake hose union bolt to catch spilled brake fluid.

3) Disconnect the brake hose by removing the union bolt (3).



IA02J1430006-01

4) Remove the rear wheel. Refer to "Rear Wheel Assembly Removal and Installation" in Section 2D (Page 2D-11).

5) Remove the caliper and bracket from the swingarm.

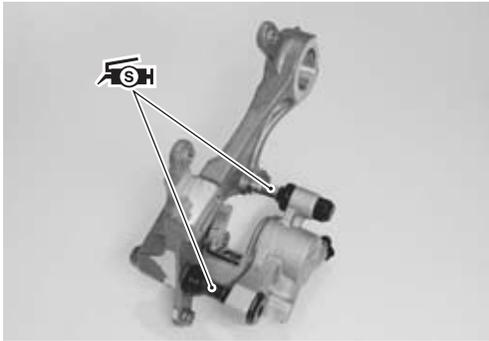
## 4C-3 Rear Brakes:

### Installation

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

- Apply SUZUKI SILICONE GREASE to the caliper axles.

 : Grease 99000-25100 (SUZUKI SILICONE GREASE or equivalent)

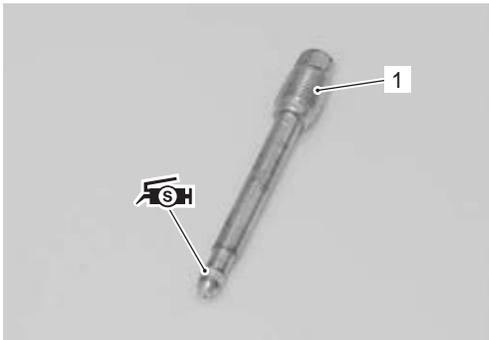


IA02J1430007-01

- Install the brake pads.
- Apply SUZUKI SILICONE GREASE to the O-ring.

 : Grease 99000-25100 (SUZUKI SILICONE GREASE or equivalent)

- Temporarily tighten the brake pad mounting pin (1).



IA02J1430008-01

- Install the rear wheel. Refer to "Rear Wheel Assembly Removal and Installation" in Section 2D (Page 2D-11).
- Tighten the brake pad mounting pin (1) to the specified torque.

### Tightening torque

**Rear brake pad mounting pin (a): 17 N·m (1.7 kgf·m, 12.5 lbf·ft)**

- Set the brake hose end between the hose stoppers, then tighten the brake hose union bolt (2) to the specified torque.

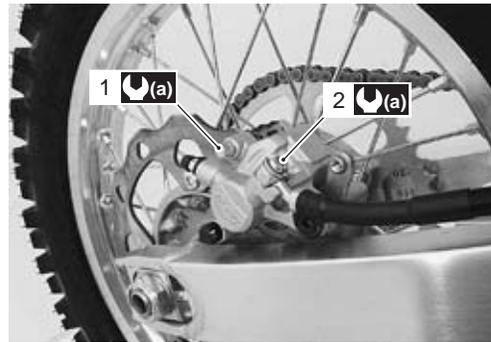
### CAUTION

**The seal washers should be replaced with new ones to prevent fluid leakage.**

### Tightening torque

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

- Refill brake fluid and bleed air from the brake system. Refer to "Brake Fluid Replacement" in Section 4A (Page 4A-5).



IA02J1430021-01

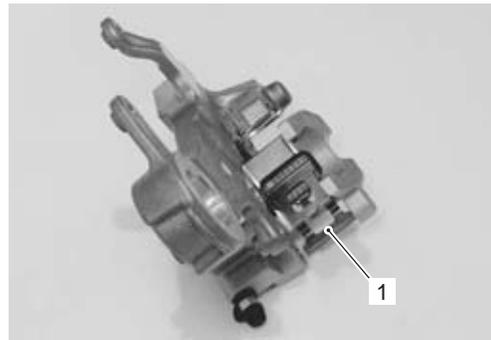
### Rear Brake Caliper Disassembly and Assembly

BA02J24306005

Refer to "Rear Brake Caliper Removal and Installation" (Page 4C-2).

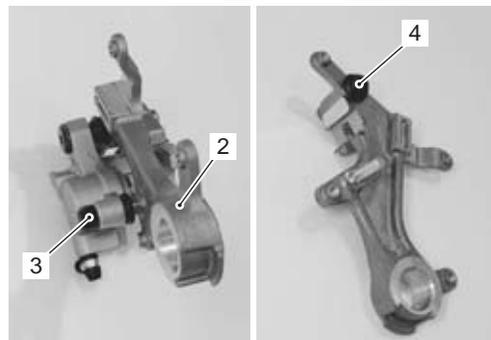
### Disassembly

- 1) Remove the brake pad. Refer to "Rear Brake Pad Replacement" (Page 4C-1).
- 2) Remove the spring (1).



IA02J1430009-01

- 3) Remove the caliper bracket (2) from the caliper.
- 4) Remove the boots (3) and (4).



IA02J1430010-02

- 5) Wrap the caliper with a rag to prevent brake fluid scatter and piston pop-out.
- 6) Apply low-pressure air into the caliper through the hole to remove the piston.

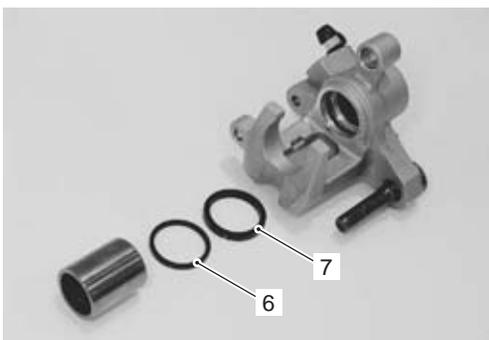
**⚠ WARNING**

Fingers can get caught between piston and caliper body when removing the piston. Do not place your fingers on the piston when removing the piston.



IA02J1430011-01

- 7) Remove the dust seal (6) and piston seal (7).



IA02J1430012-02

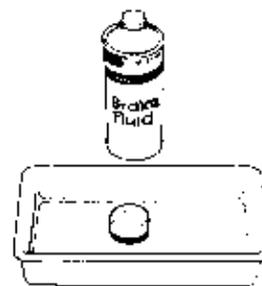
**Assembly**

Assemble the caliper in the reverse order of disassembly. Pay attention to the following points:

**⚠ CAUTION**

- Wash the caliper components with fresh brake fluid before reassembly.
- Do not wipe the brake fluid off after washing the components.
- When washing the components, use the specified brake fluid. Never use different types of fluid or cleaning solvent such as gasoline, kerosine or the others.

**BF: Brake fluid (DOT 4)**

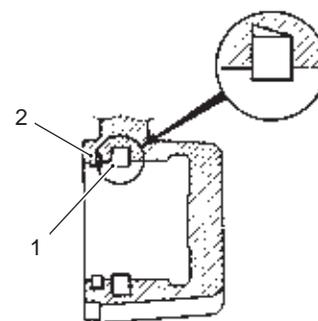


I649G1430018-02

- Apply the brake fluid to new piston seal (1) and dust seal (2).

**BF: Brake fluid (DOT 4)**

- Replace the piston seal (1) and dust seal (2) with new ones.
- Install the piston seal (2) as shown in the figure.



IA02J1430022-02

- Install the rear brake caliper. Refer to "Rear Brake Caliper Removal and Installation" (Page 4C-2).

**Rear Brake Caliper Parts Inspection**

BA02J24306006

Refer to "Rear Brake Caliper Disassembly and Assembly" (Page 4C-3).

**Brake Caliper Cylinder**

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



IA02J1430013-01

## 4C-5 Rear Brakes:

### Brake Caliper Piston

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



IA02J1430014-01

### Boot

Inspect the boots for damage and wear. If any defects are found, replace it with a new one.



IA02J1430015-01

### Brake Pad Spring

Inspect the brake pad spring for damage and excessive bend. If any defects are found, replace it with a new one.



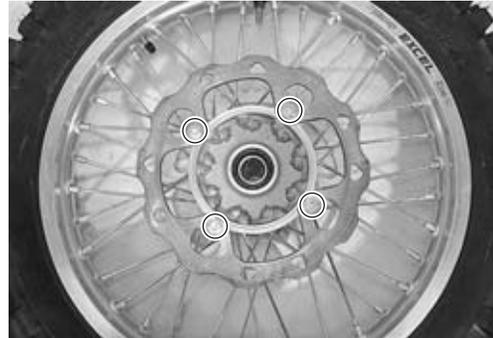
IA02J1430016-01

## Rear Brake Disc Removal and Installation

BA02J24306007

### Removal

- 1) Remove the rear wheel assembly. Refer to "Rear Wheel Assembly Removal and Installation" in Section 2D (Page 2D-11).
- 2) Remove the rear brake disc.



IA02J1430017-02

### Installation

Install the rear brake disc in the reverse order of removal. Pay attention to the following points:

- Make sure that the brake disc is clean and free of any grease.
- Apply thread lock to the brake disc bolts (1) and tighten them to the specified torque.

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

### Tightening torque

**Brake disc bolt (Rear) (a): 25 N·m (2.5 kgf·m, 18.0 lbf·ft)**



IA02J1430018-02

**Rear Brake Disc Inspection**

BA02J24306008

**Brake Disc Thickness**

Check the brake disc for damage or cracks and measure the thickness using the micrometer.

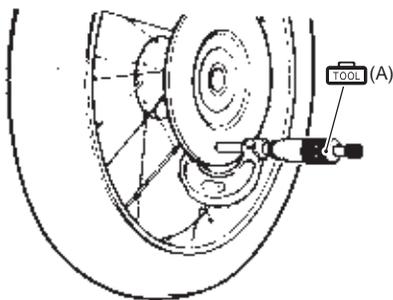
Replace the brake disc if the thickness is less than the service limit or if defect is found.

**Special tool**

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

**Brake disc thickness**

**Service limit (Rear): 3.5 mm (0.14 in)**



IA02J1430020-01

**Brake Disc Distortion**

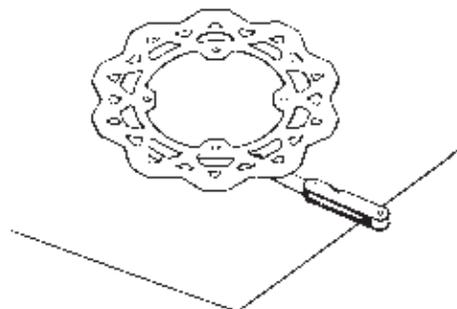
- 1) Remove the rear brake disc. Refer to "Rear Brake Disc Removal and Installation" (Page 4C-5).
- 2) Measure the rear brake disc distortion. Replace the disc if the distortion exceeds the service limit.

**Brake disc distortion**

**Service limit: 0.30 mm (0.012 in)**

**Special tool**

 : 09900-20803 (Thickness gauge)



IA02J1430023-01

**Specifications****Service Data**

BA02J24307001

**Brake**

Unit: mm (in)

Item		Standard	Limit
Brake disc thickness	Rear	3.85 ± 4.15 (0.157 – 0.163)	3.5 (0.14)
Brake disc distortion	Rear	—	0.3 (0.012)
Brake caliper cylinder bore	Rear	25.400 – 25.450 (1.0000 – 1.0020)	—
Brake caliper cylinder piston diam.	Rear	25.318 – 25.368 (0.9968 – 0.9987)	—
Brake fluid type		DOT 4	—

**Tightening Torque Specifications**

BA02J24307002

Fastening part	Tightening torque			Note
	N·m	kgf·m	lbf·ft	
Rear brake pad mounting pin	17	1.7	12.5	☞ (Page 4C-2) / ☞ (Page 4C-3)
Brake hose union bolt	23	2.3	16.5	☞ (Page 4C-3)
Brake disc bolt (Rear)	25	2.5	18.0	☞ (Page 4C-5)

**NOTE**

The specified tightening torque is described in the following.

“Rear Brake Components” (Page 4C-1)

**Reference:**

For the tightening torque of fastener not specified in this section, refer to “Tightening Torque List” in Section 0C (Page 0C-8).

## Special Tools and Equipment

### Recommended Service Material

BA02J24308001

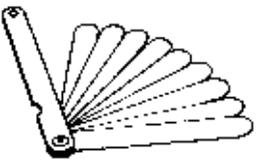
Material	SUZUKI recommended product or Specification		Note
Brake fluid	DOT 4	—	☞(Page 4C-4) / ☞(Page 4C-4)
Grease	SUZUKI SILICONE GREASE or equivalent	P/No.: 99000-25100	☞(Page 4C-2) / ☞(Page 4C-3) / ☞(Page 4C-3)
Thread lock cement	THREAD LOCK CEMENT SUPER "1322" or equivalent	P/No.: 99000-32110	☞(Page 4C-5)

### NOTE

Required service material is also described in the following.  
 "Rear Brake Components" (Page 4C-1)

### Special Tool

BA02J24308002

09900-20205 Micrometer (0 – 25 mm) ☞(Page 4C-6)		09900-20803 Thickness gauge ☞(Page 4C-6)	
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## Section 5

## Transmission / Transaxle

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# Precautions

## Precautions

### Precautions for Transmission / Transaxle

Refer to "General Precautions" in Section 00 (Page 00-1).

BA02J2500001

# Manual Transmission

## Diagnostic Information and Procedures

### Manual Transmission Symptom Diagnosis

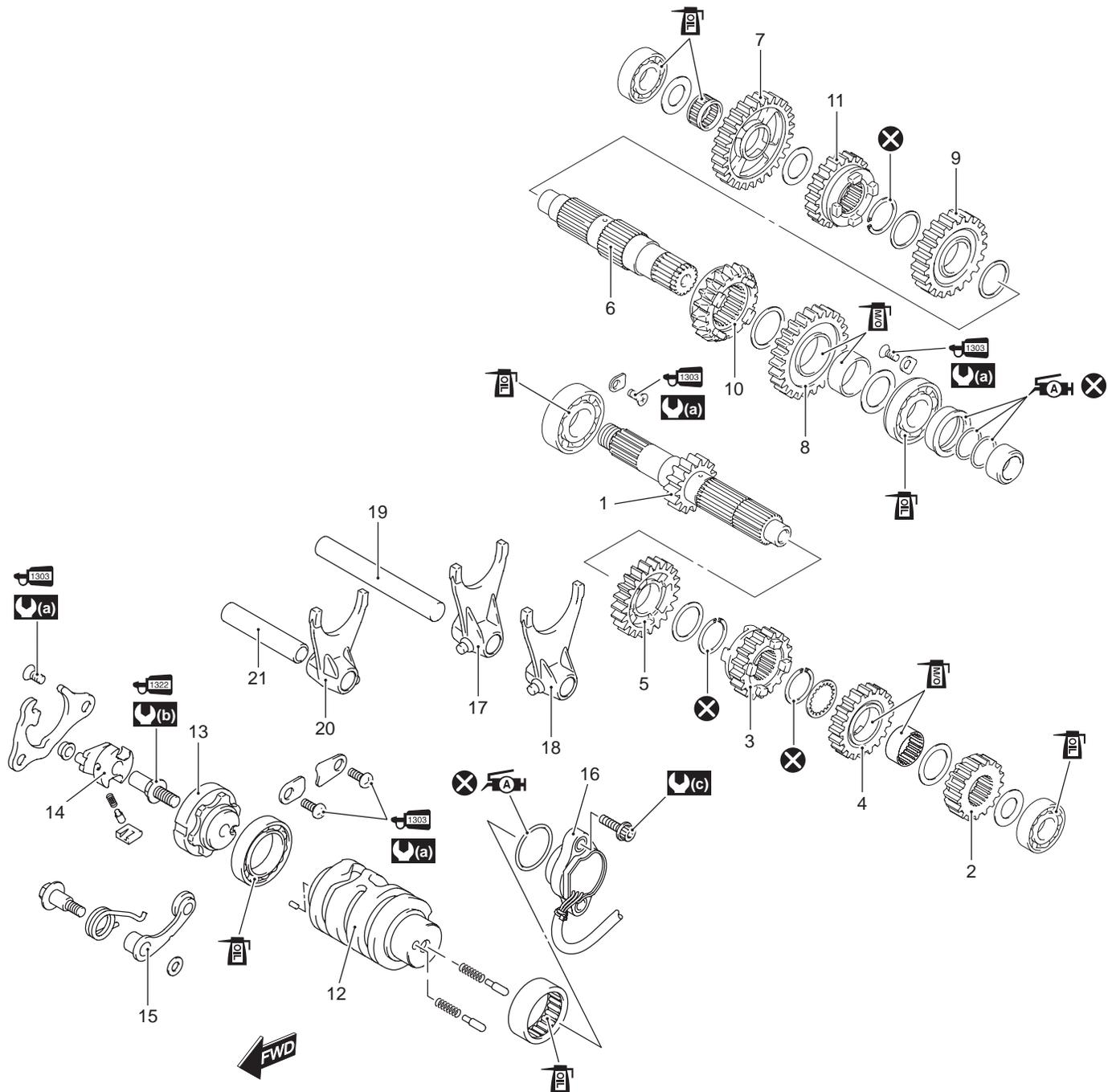
BA02J25204001

Condition	Possible cause	Correction / Reference Item
<b>Engine is noisy (Noise seems to come from the transmission)</b>	Worn or rubbing gears.	<i>Replace.</i>
	Worn countershaft splines.	<i>Replace countershaft.</i>
	Worn driveshaft splines.	<i>Replace driveshaft.</i>
	Worn or rubbing primary gears.	<i>Replace.</i>
	Worn bearings.	<i>Replace.</i>
<b>Transmission will not shift</b>	Broken gearshift cam.	<i>Replace.</i>
	Distorted gearshift forks.	<i>Replace.</i>
	Worn gearshift pawl.	<i>Replace.</i>
<b>Transmission will not shift back</b>	Clutch cable out of adjustment.	<i>Adjust.</i>
	Broken gearshift shaft return spring.	<i>Replace.</i>
	Rubbing or stuck gearshift shaft.	<i>Repair or replace.</i>
	Worn or distorted gearshift forks.	<i>Replace.</i>
<b>Transmission jumps out of gear</b>	Clutch cable out of adjustment.	<i>Adjust.</i>
	Worn shifting gears on driveshaft or countershaft.	<i>Replace.</i>
	Worn or distorted gearshift forks.	<i>Replace.</i>
	Weakened gearshift stopper spring.	<i>Replace.</i>
	Worn gearshift cam stopper plate.	<i>Replace.</i>

# Repair Instructions

## Transmission Components

BA02J25206001



IA02J1520059-04

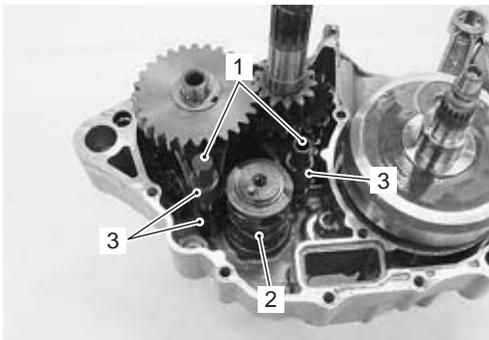
1. Countershaft/1st drive gear	11. 5th driven gear	21. Gearshift shaft
2. 2nd drive gear	12. Gearshift cam	(a): 8.5 N-m (0.85 kgf-m, 6.0 lbf-ft)
3. 3rd drive gear	13. Gearshift cam stopper plate	(b): 24 N-m (2.4 kgf-m, 17.5 lbf-ft)
4. 4th drive gear	14. Gearshift cam driven gear	(c): 6.5 N-m (0.65 kgf-m, 4.7 lbf-ft)
5. 5th drive gear	15. Gearshift cam stopper	: Apply engine oil.
6. Driveshaft	16. Gear position switch	: Apply molybdenum oil.
7. 1st driven gear	17. Gearshift fork No. 1	: Apply grease.
8. 2nd driven gear	18. Gearshift fork No. 2	(a): Apply thread lock to the thread part.
9. 3rd driven gear	19. Gearshift fork shaft	(a): Apply thread lock to the thread part.
10. 4th driven gear	20. Gearshift fork No. 3	: Do not reuse.

## Transmission Removal and Installation

BA02J25206002

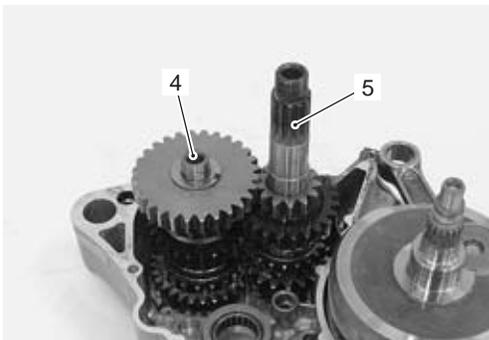
### Removal

- 1) Remove the engine assembly from the frame. Refer to "Engine Assembly Removal" in Section 1D (Page 1D-20).
- 2) Remove the engine top side. Refer to "Engine Top Side Disassembly" in Section 1D (Page 1D-27).
- 3) Separate the left and right crankcases. Refer to "Engine Bottom Side Disassembly" in Section 1D (Page 1D-51).
- 4) Remove the gearshift fork shafts (1), gearshift cam (2) and gearshift forks (3).



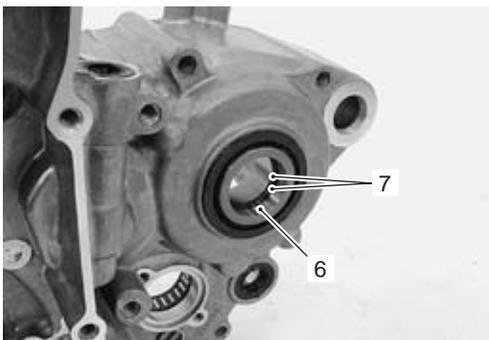
IA02J1520001-01

- 5) Remove the driveshaft assembly (4) and countershaft assembly (5).



IA02J1520002-01

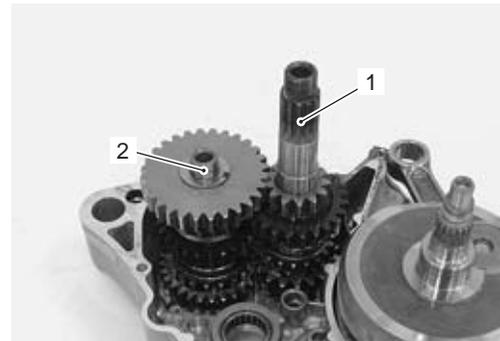
- 6) Remove the engine sprocket spacer (6) and O-rings (7).



IA02J1520003-04

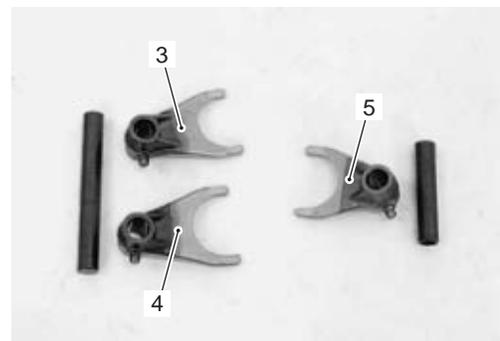
### Installation

- 1) Install the countershaft assembly (1) and driveshaft assembly (2).

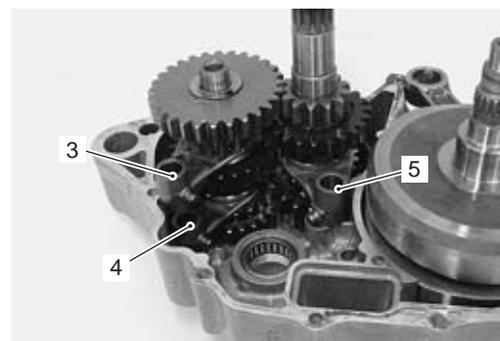


IA02J1520004-01

- 2) Install the gearshift forks into the gearshifting grooves in the correct position and direction.



IA02J1520005-01



IA02J1520006-02

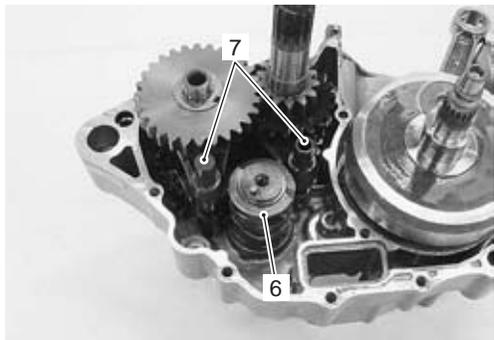
3.	Gearshift fork No. 1 (28H1□)
4.	Gearshift fork No. 2 (28H2□)
5.	Gearshift fork No. 3 (28H3□)

## 5B-4 Manual Transmission:

- 3) Install the gearshift cam (6).
- 4) Install the gearshift fork shafts (7).

### NOTE

**Turn the gearshift cam to the neutral position and confirm that the driveshaft and countershaft turn without resistance.**



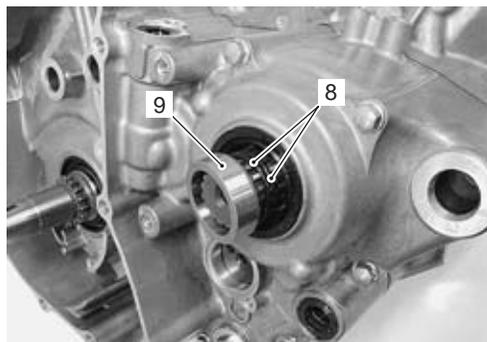
IA02J1520007-01

- 5) Install the right crankcase. Refer to “Engine Bottom Side Assembly” in Section 1D (Page 1D-55).

- 6) Install new O-rings (8) and engine sprocket spacer (9).

### ⚠ CAUTION

- The removed O-rings must be replaced with new ones.
- The grooved side of the engine sprocket spacer (9) must face the crankcase side.

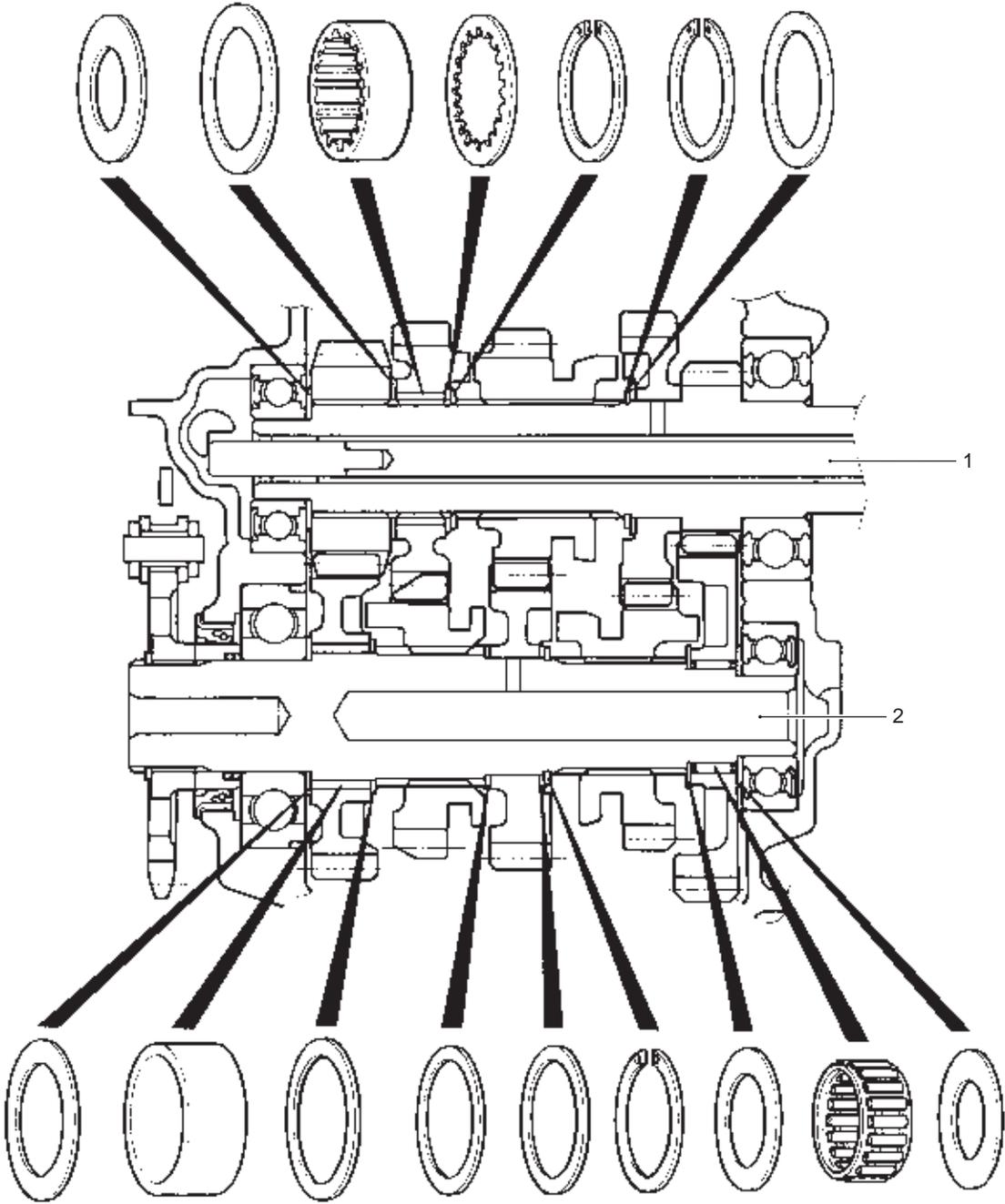


IA02J1520008-01

- 7) Assemble the engine. Refer to “Engine Bottom Side Assembly” in Section 1D (Page 1D-55) and “Engine Top Side Assembly” in Section 1D (Page 1D-30).
- 8) Remount the engine assembly. Refer to “Engine Assembly Installation” in Section 1D (Page 1D-24).

Transmission Construction

BA02J25206003



1. Countershaft	2. Driveshaft
-----------------	---------------

IA02J1520009-01

## Countershaft Gear / Driveshaft Gear Disassembly and Assembly

BA02J25206004

Refer to "Transmission Removal and Installation" (Page 5B-3).

### Disassembly

#### ⚠ CAUTION

**Identify the position of each removed part. Organize the parts in their respective groups (i.e., drive or driven) so that they can be reinstalled in their original positions.**

Disassemble the transmission as shown in the transmission components and transmission construction. Refer to "Transmission Components" (Page 5B-2) and "Transmission Construction" (Page 5B-5).

### Assembly

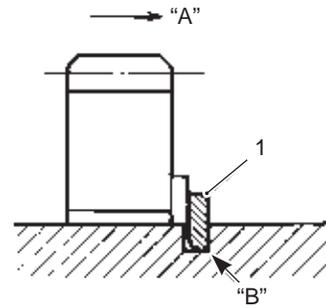
Assembly the transmission in the reverse order of disassembly. Pay attention to the following points:

#### NOTE

- When reassembling the transmission, attention must be given to the locations and positions of washers and snap rings. The cross sectional view shows the correct position of the gears, bushings, washers and snap rings. Refer to "Transmission Construction" (Page 5B-5).
- Rotate the bearing by hand to inspect for abnormal noises and smooth rotation. Replace the bearing if there is anything unusual.
- Before installing the gears, apply engine oil to the driveshaft and countershaft.

#### ⚠ CAUTION

- Never reuse a snap ring. After a snap ring has been removed from the shaft, it should be discarded and a new snap ring must be installed.
  - When installing a new snap ring, do not expand the end gap larger than required to slip the snap ring over the shaft.
  - After installing a new snap ring, make sure that it is completely seated in the groove and securely fitted.
- When installing a new snap ring (1), pay attention to its direction. Fit it to the side where the thrust is as shown in the figure.



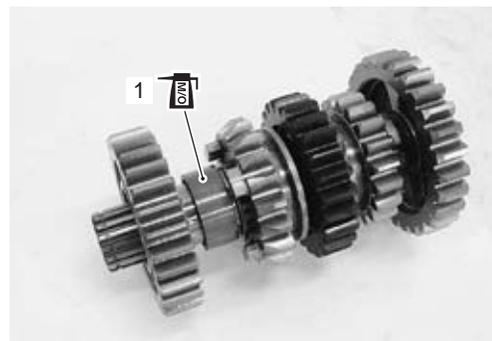
I649G1520049-02

"A": Thrust	"B": Sharp edge
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### Driveshaft

Apply molybdenum oil solution to the 2nd driven gear bushing (1).

**M/O: Molybdenum oil (MOLYBDENUM OIL SOLUTION)**



IA02J1520058-01

### Countershaft

Apply molybdenum oil solution to the surface of 4th drive gear bushing (1).

**M/O: Molybdenum oil (MOLYBDENUM OIL SOLUTION)**



IA02J1520010-02

## Transmission Related Parts Inspection

BA02J25206005

Refer to "Transmission Removal and Installation" (Page 5B-3) and "Countershaft Gear / Driveshaft Gear Disassembly and Assembly" (Page 5B-6).

### Gearshift Fork to Groove Clearance

#### NOTE

The clearance for each gearshift fork plays an important role in the smoothness and positiveness of the shifting action.

Using the thickness gauge, check the gearshift fork clearance in the groove of its gear. If the clearance checked is noted to exceed the limit specified, replace the fork or its gear, or both.

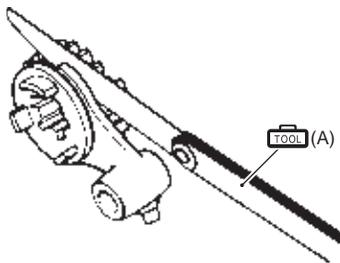
#### Special tool

 (A): 09900-20803 (Thickness gauge)

#### Gearshift fork to groove clearance

Standard: 0.1 – 0.3 mm (0.004 – 0.012 in)

Service limit: 0.5 mm (0.020 in)



I649G1520056-03

### Gearshift Fork Groove Width

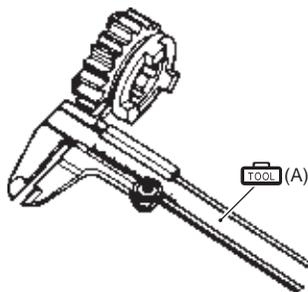
Measure the gearshift fork groove width using the vernier calipers.

#### Special tool

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

#### Gearshift fork groove width

Standard: 5.0 – 5.1 mm (0.197 – 0.201 in)



I649G1520057-03

### Gearshift Fork Thickness

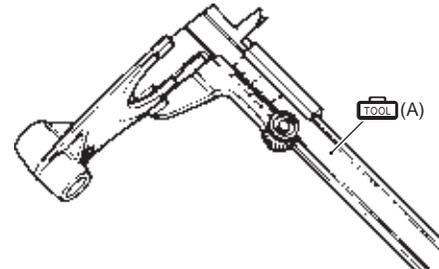
Measure the gearshift fork thickness using the vernier calipers.

#### Special tool

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

#### Gearshift fork thickness

Standard: 4.8 – 4.9 mm (0.189 – 0.193 in)

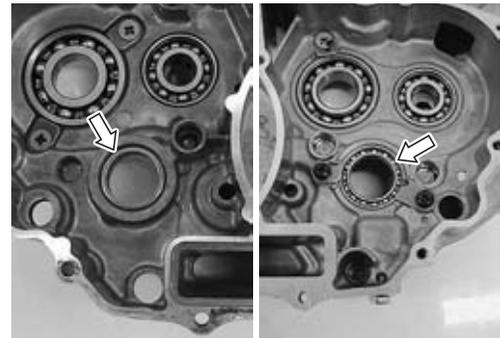


I649G1520058-03

### Gearshift Cam Bearing

Inspect the left and right gearshift cam bearings for abnormal noise and smooth rotation.

Replace the bearing if there is anything unusual. Refer to "Transmission Oil Seal / Bearing Removal and Installation" (Page 5B-8).



IA02J1520011-01

### Gearshift Cam

Inspect the gearshift cam groove for abnormal wear and damage. If any defects are found, replace the gearshift cam with a new one.



IA02J1520012-01

### Transmission Oil Seal / Bearing Inspection

BA02J25206006

Refer to "Transmission Removal and Installation" (Page 5B-3).

#### Oil Seal

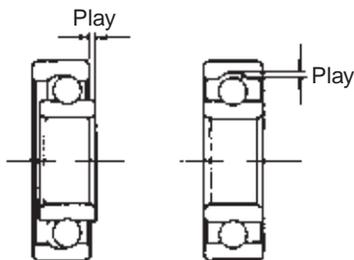
Inspect the oil seal lips for wear or damage. If any defects are found, replace the oil seal with new ones. Refer to "Transmission Oil Seal / Bearing Removal and Installation" (Page 5B-8).



IA02J1520013-01

#### Bearing

Rotate the bearing inner race by finger to inspect for abnormal play, noise and smooth rotation while the bearings are in the crankcase. Replace the bearing if there is anything unusual. Refer to "Transmission Oil Seal / Bearing Removal and Installation" (Page 5B-8).



I933H1520033-01

### Transmission Oil Seal / Bearing Removal and Installation

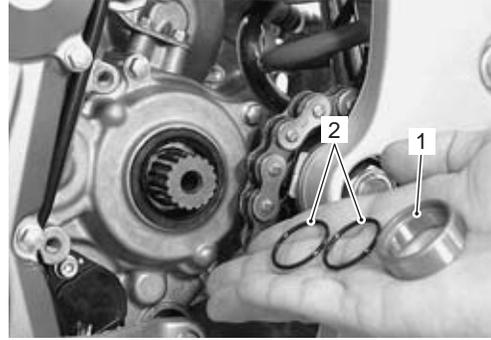
BA02J25206007

#### Oil Seal

##### Removal

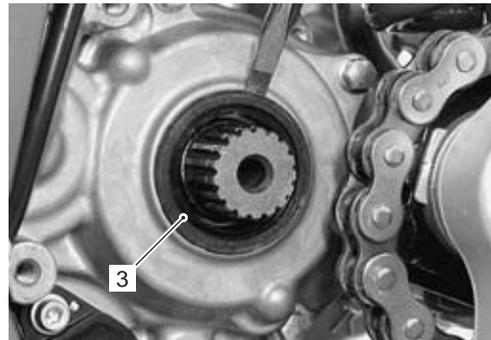
- 1) Remove the engine sprocket. Refer to "Engine Sprocket Removal and Installation" in Section 3A (Page 3A-3).

- 2) Remove the engine sprocket spacer (1) and O-rings (2).



IA02J1520061-01

- 3) Remove the driveshaft oil seal (3).



IA02J1520066-01

#### Installation

##### ⚠ CAUTION

**The removed oil seal and O-rings must be replaced with new ones.**

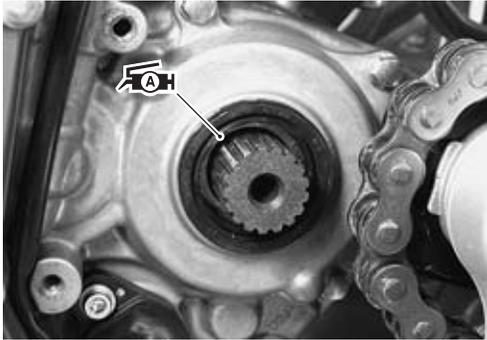
- 1) Install the drive shaft oil seal (1) with a suitable socket wrench.



IA02J1520062-02

2) Apply grease to the oil seal lip.

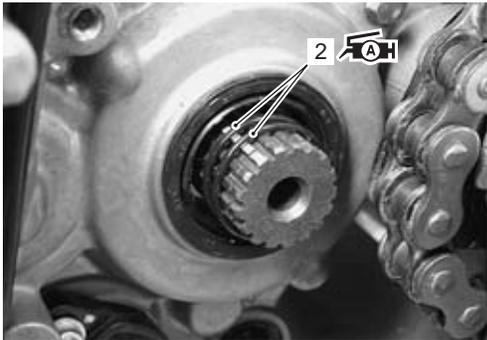
 : Grease 99000-25010 (SUZUKI SUPER GREASE "A" or equivalent)



IA02J1520063-01

3) Apply grease to the O-rings (2) and install them to the driveshaft.

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

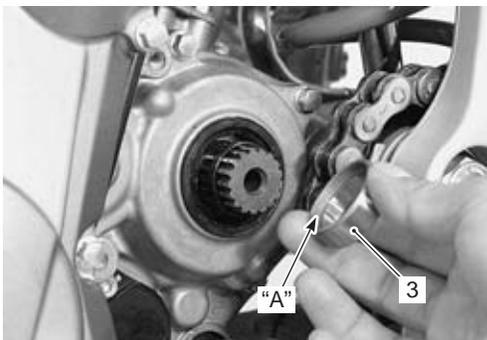


IA02J1520064-01

4) Install the engine sprocket spacer (3).

**⚠ CAUTION**

The grooved side "A" of the engine sprocket spacer (3) must face crankcase side.



IA02J1520065-01

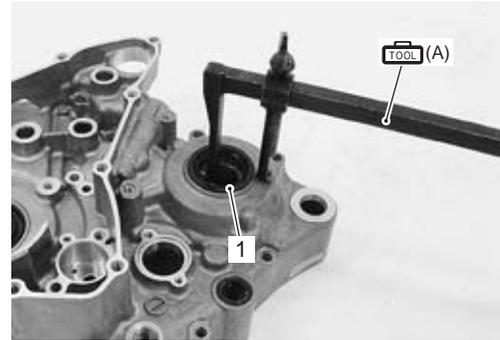
5) Install the engine sprocket. Refer to "Rear Sprocket Removal and Installation" in Section 3A (Page 3A-4).

**Bearing Removal**

- 1) Remove the transmission assembly. Refer to "Transmission Removal and Installation" (Page 5B-3).
- 2) Remove the driveshaft oil seal (1) with the special tool.

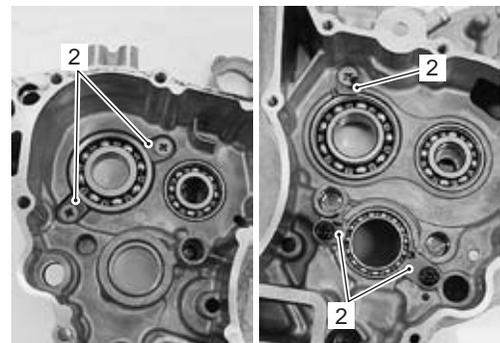
**Special tool**

 (A): 09913-50121 (Oil seal remover)



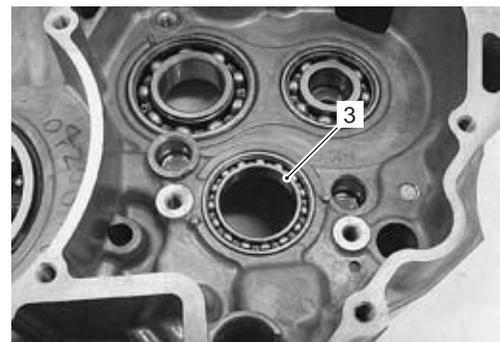
IA02J1520014-01

3) Remove the bearing retainers (2).



IA02J1520015-01

4) Remove the right gearshift cam bearing (3).



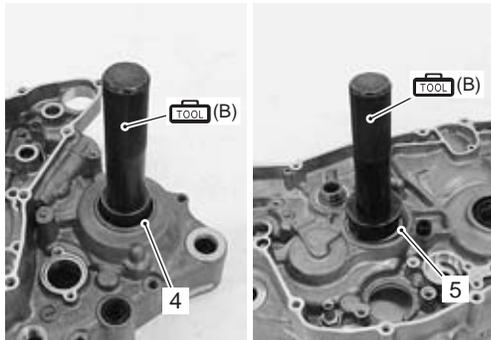
IA02J1520016-01

## 5B-10 Manual Transmission:

- 5) Remove the left driveshaft bearing (4) and right countershaft bearing (5) using the special tool.

### Special tool

 (B): 09913-70210 (Bearing installing set (10 – 75 Φ))

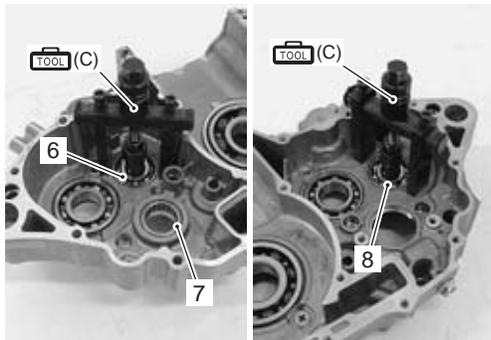


IA02J1520017-02

- 6) Remove the left countershaft bearing (6), left gearshift cam bearing (7) and right driveshaft bearing (8) using the special tool.

### Special tool

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



IA02J1520018-01

## Installation

### CAUTION

The removed bearings and oil seal must be replaced with new ones.

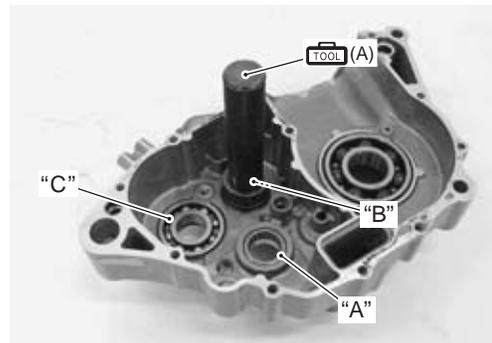
- 1) Install the bearings using the special tool.

### Special tool

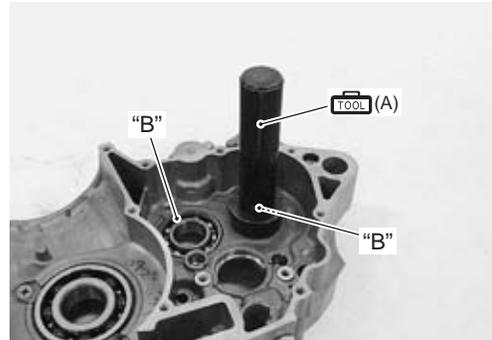
 (A): 09913-70210 (Bearing installer set)

### CAUTION

- The stamped mark side of bearing “A” faces inside.
- The sealed side of the bearing “B” faces outside.
- The stepped side of the bearing “C” faces inside.



IA02J1520019-01

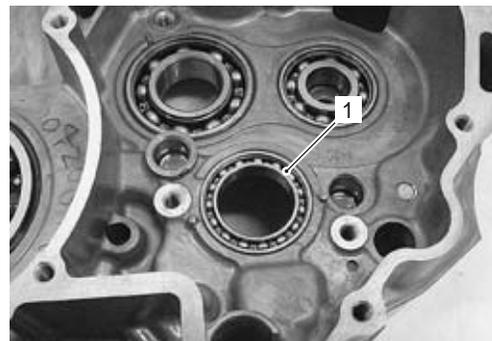


IA02J1520020-01

- 2) Install the right gearshift cam bearing (1).

### CAUTION

The sealed side of bearing faces outside.



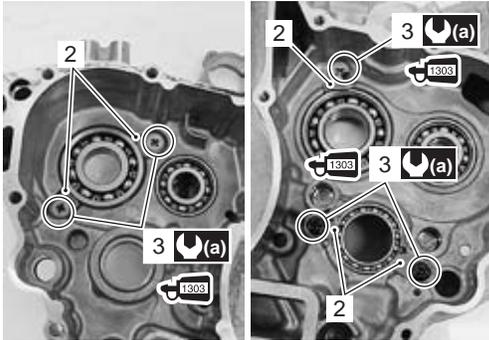
IA02J1520021-01

- 3) Install the bearing retainers (2).
- 4) Apply a small quantity of thread lock to the bearing retainer screws (3), and tighten them to the specified torque.

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

**Tightening torque**

Bearing retainer screws (a): 8.5 N·m (0.85 kgf·m, 6.0 lbf·ft)

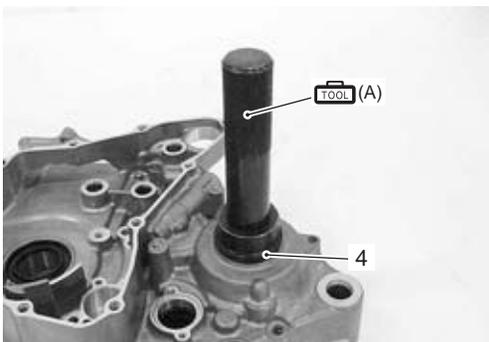


IA02J1520022-02

- 5) Install the oil seals (4) using the special tool.

**Special tool**

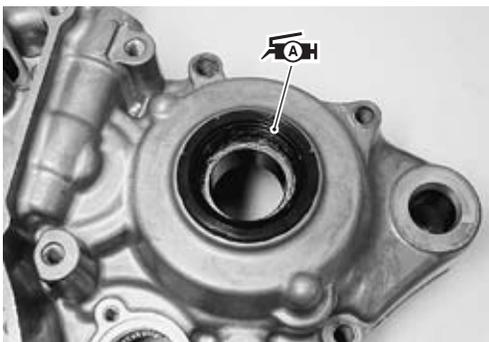
 (A): 09913-70210 (Bearing installer set)



IA02J1520023-02

- 6) Apply grease to the oil seal lip.

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



IA02J1520024-01

- 7) Install the transmission assembly. Refer to "Transmission Removal and Installation" (Page 5B-3).

**Gear Position (GP) Switch Inspection**

BA02J25206008

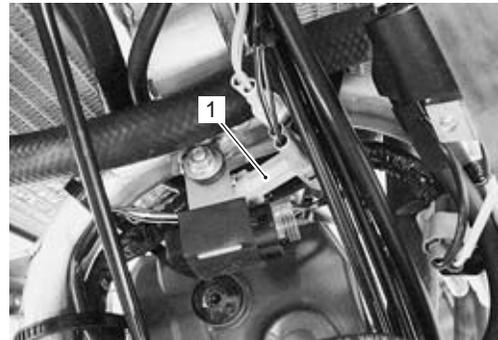
Refer to "Gear Position (GP) Switch Inspection" in Section 1I (Page 1I-7).

**Gear Position (GP) Switch Removal and Installation**

BA02J25206009

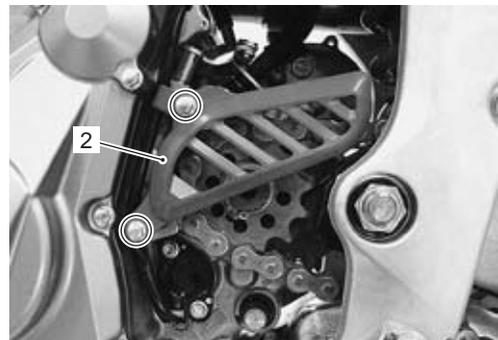
**Removal**

- 1) Turn off the ignition switch.
- 2) Remove the fuel tank. Refer to "Fuel Tank Removal and Installation" in Section 1G (Page 1G-5).
- 3) Disconnect the gear position switch lead wire coupler (1).



IA02J1520057-01

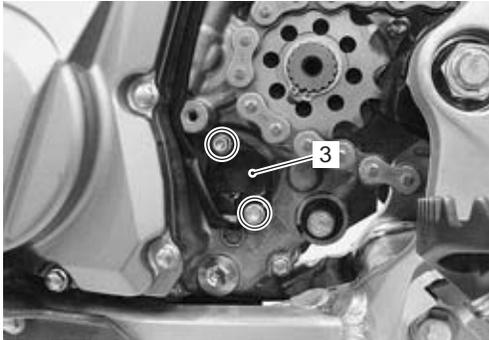
- 4) Remove the engine sprocket cover (2). Refer to "Engine Sprocket Removal and Installation" in Section 3A (Page 3A-3).



IA02J1520025-01

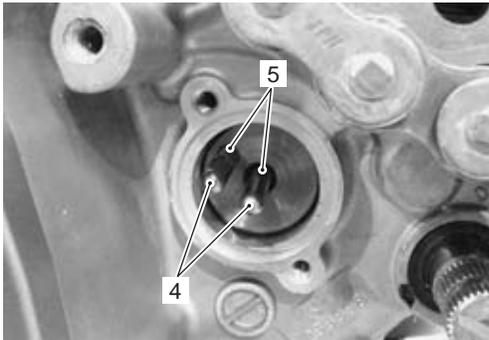
## 5B-12 Manual Transmission:

- 5) Remove the gear position switch (3).



IA02J1520026-01

- 6) Remove the switch contacts (4) and springs (5).



IA02J1520027-01

### Installation

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

- Apply grease to the O-ring.

#### ⚠ CAUTION

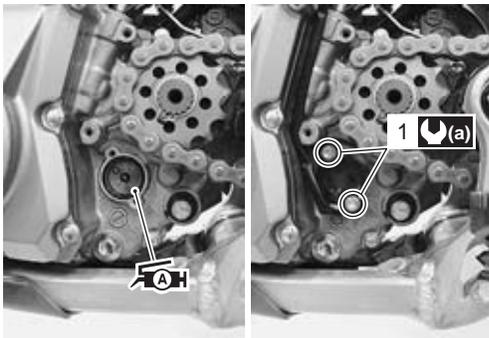
**Replace the O-ring with a new one.**

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

- Tighten the gear position switch mounting bolts (1) to the specified torque.

#### Tightening torque

**Gear position switch mounting bolt (a): 6.5 N·m (0.65 kgf·m, 4.7 lbf·ft)**

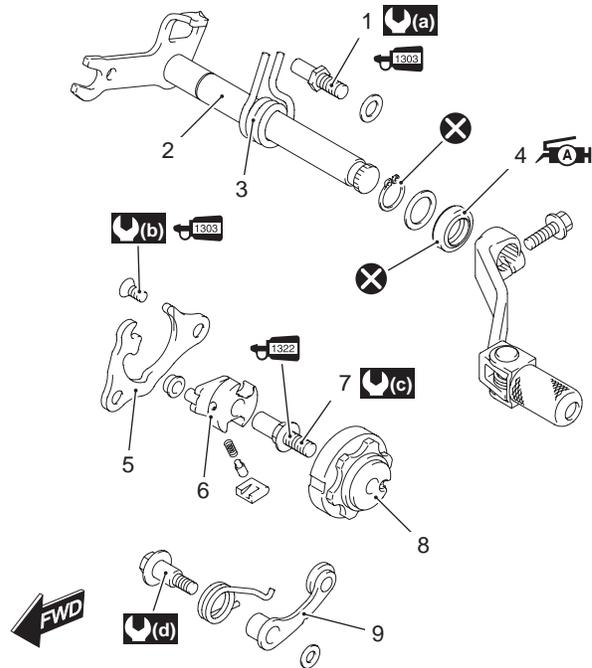


IA02J1520028-01

- Route the gear position switch lead wire properly. Refer to "Wiring Harness Routing Diagram" in Section 9A (Page 9A-2).

### Gearshift Shaft / Gearshift Cam Plate Components

BA02J25206010

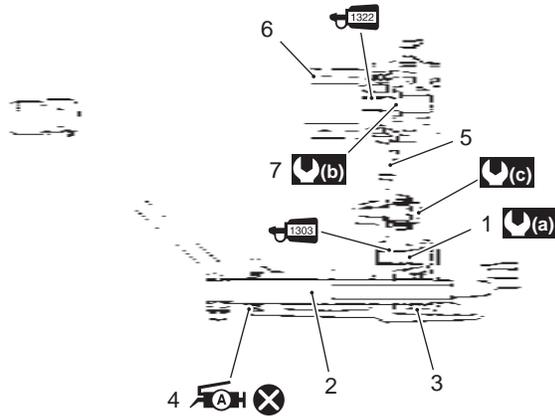


IA02J1520056-07

1. Gearshift arm stopper	: 23 N·m (2.3 kgf·m, 16.5 lbf·ft)
2. Gearshift shaft	: 8.5 N·m (0.85 kgf·m, 6.0 lbf·ft)
3. Return spring	: 24 N·m (2.4 kgf·m, 17.5 lbf·ft)
4. Oil seal	: 10 N·m (1.0 kgf·m, 7.0 lbf·ft)
5. Pawl lifter	: Apply thread lock to thread part.
6. Gearshift cam driven gear	: Apply thread lock to thread part.
7. Gearshift cam driven gear pin	: Apply grease.
8. Gearshift cam stopper plate	: Do not reuse.
9. Gearshift cam stopper	

## Gearshift Construction

BA02J25206011



IA02J1520029-04

1. Gearshift arm stopper	: 23 N-m (2.3 kgf-m, 16.5 lbf-ft)
2. Gearshift shaft	: 24 N-m (2.4 kgf-m, 17.5 lbf-ft)
3. Return spring	: 10 N-m (1.0 kgf-m, 7.0 lbf-ft)
4. Oil seal	: Apply grease.
5. Gearshift cam stopper	: Apply thread lock to the thread part.
6. Gearshift cam	: Apply thread lock to the thread part.
7. Gearshift cam driven gear pin	: Do not reuse.

## Gearshift Shaft / Gearshift Cam Plate Removal and Installation

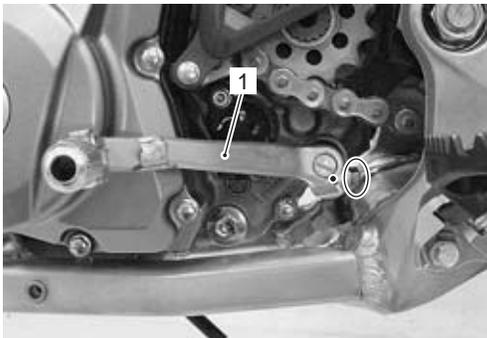
BA02J25206012

### Removal

- 1) Remove the protector. Refer to “Exterior Parts Removal and Installation” in Section 9D (Page 9D-1).
- 2) Drain engine oil. Refer to “Engine Oil Inspection and Replacement” in Section 0B (Page 0B-5).
- 3) Drain engine coolant. Refer to “Cooling System Inspection” in Section 0B (Page 0B-9).
- 4) Remove the gearshift lever (1).

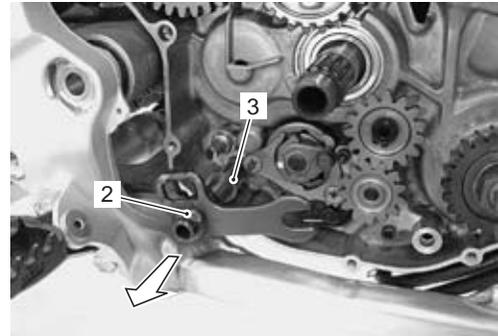
### NOTE

Mark the gearshift shaft head at which the gearshift lever slit set for correct reinstallation.



IA02J1520030-01

- 5) Remove the right crankcase cover. Refer to “Kick Starter Removal and Installation” in Section 11 (Page 11-15).
- 6) Remove the clutch component parts. Refer to “Clutch Removal” in Section 5C (Page 5C-7).
- 7) Remove the gearshift shaft (2) and washer (3).

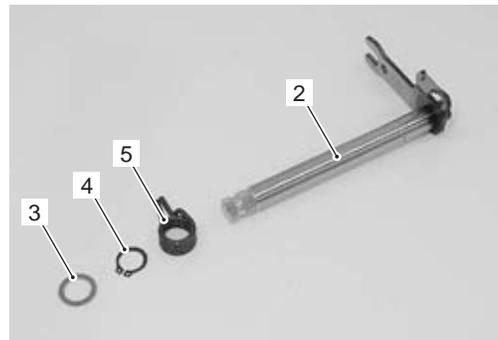


IA02J1520031-01

- 8) Remove the washer (3), snap ring (4) and return spring (5) from the gearshift shaft (2).

### Special tool

: 09900-06107 (Snap ring remover (Open type))

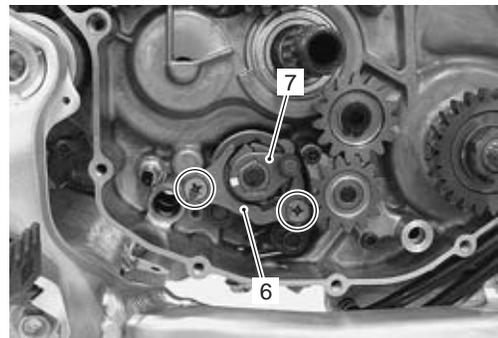


IA02J1520032-02

- 9) Remove the gearshift pawl lifter (6) and gearshift cam driven gear (7).

### NOTE

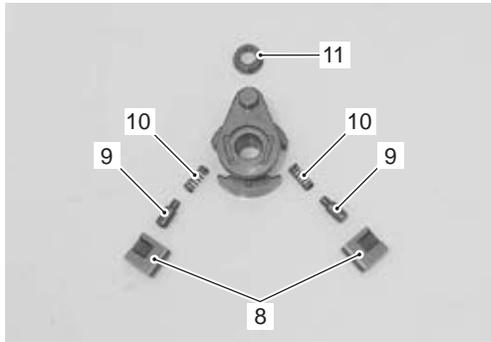
Be careful not to drop the pins and springs when removing the gearshift cam driven gear.



IA02J1520033-01

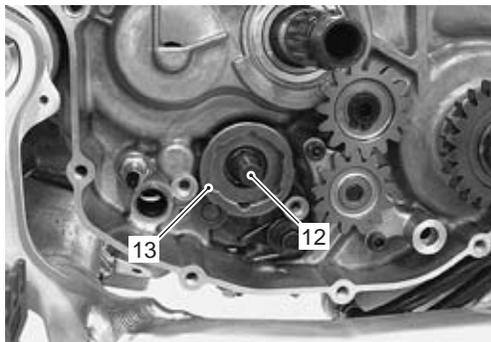
## 5B-14 Manual Transmission:

- 10) Remove the gearshift pawls (8), pins (9), springs (10) and gearshift roller (11).



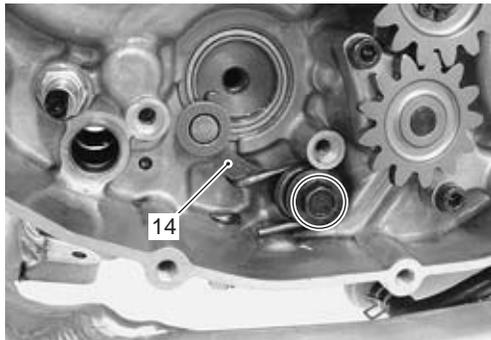
IA02J1520034-01

- 11) Remove the gearshift cam driven gear pin (12) and gearshift cam stopper plate (13).



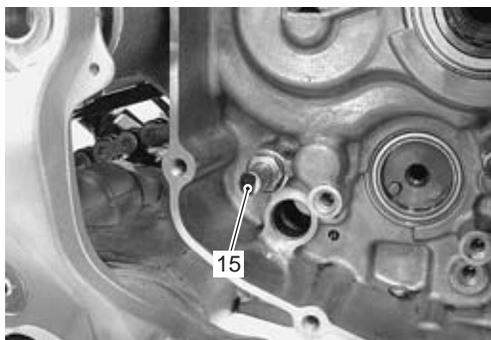
IA02J1520035-02

- 12) Remove the gearshift cam stopper (14), spring and washer.



IA02J1520036-01

- 13) Remove the gearshift arm stopper (15) and washer.



IA02J1520037-01

## Installation

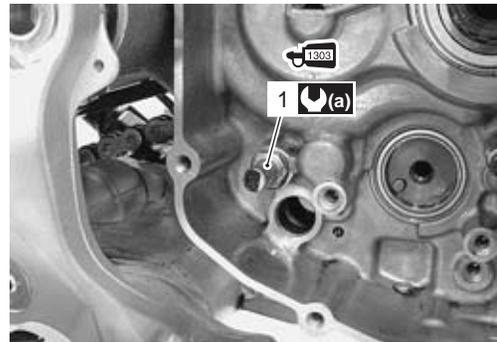
Install the gearshift shaft/gearshift cam plate in the reverse order of removal. Pay attention to the following points:

- Apply a small quantity of thread lock to the gearshift arm stopper (1) and tighten it to the specified torque.

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

### Tightening torque

Gearshift arm stopper (a): 23 N·m (2.3 kgf·m, 16.5 lbf·ft)



IA02J1520038-01

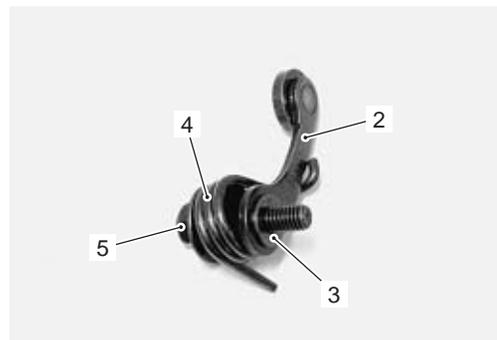
- Assemble the gearshift cam stopper (2), washer (3), spring (4) and bolt (5).
- Tighten the gearshift cam stopper bolt (5) to the specified torque.

### NOTE

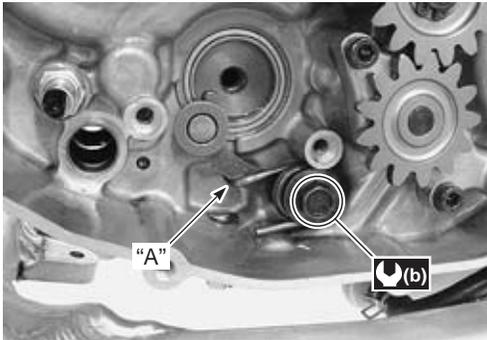
Hook the return spring end "A" to the gearshift cam stopper.

### Tightening torque

Gearshift cam stopper bolt (b): 10 N·m (1.0 kgf·m, 7.0 lbf·ft)



IA02J1520039-01

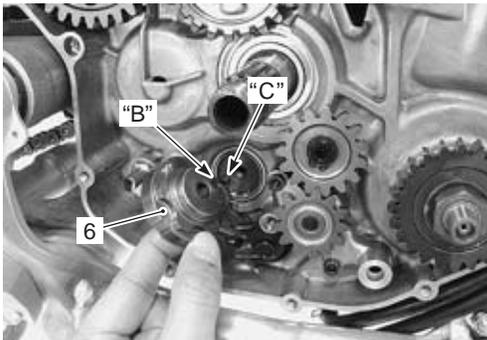


IA02J1520040-02

- Check the gearshift cam stopper moves smoothly.
- Locate the gearshift cam in the neutral position.
- Install the gearshift cam stopper plate (6).

**NOTE**

Align the gearshift cam stopper plate groove "B" with the gearshift cam pin "C".



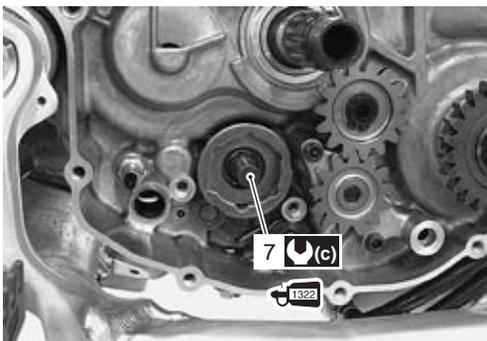
IA02J1520041-01

- Apply a small quantity of thread lock to the gearshift cam driven gear pin (7) and tighten it to the specified torque.

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

**Tightening torque**

Gearshift cam driven gear pin (c): 24 N·m (2.4 kgf·m, 17.5 lbf·ft)

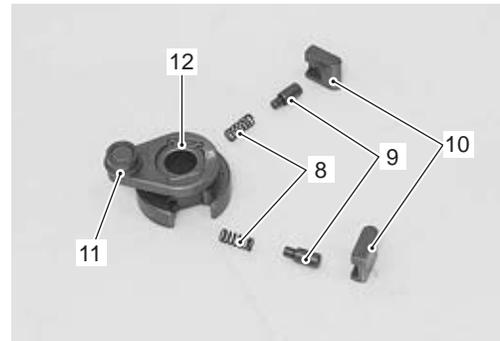


IA02J1520042-02

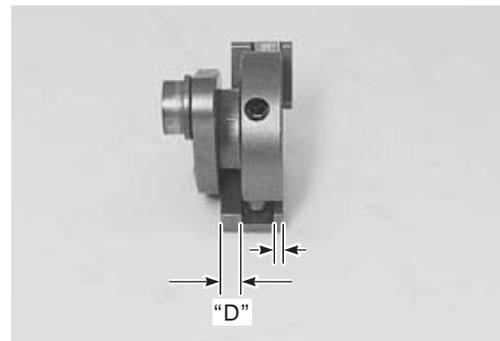
- Install the springs (8), pins (9), pawls (10) and gearshift roller (11) to the gearshift cam driven gear (12).

**NOTE**

Wider side "D" of pawl should be positioned outside.

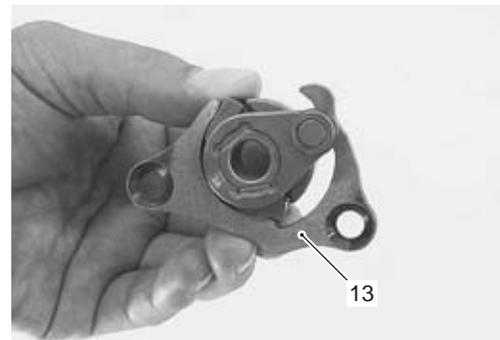


IA02J1520043-01



IA02J1520044-01

- With the pawls held in pushed position, install the pawl lifter (13).



IA02J1520045-01

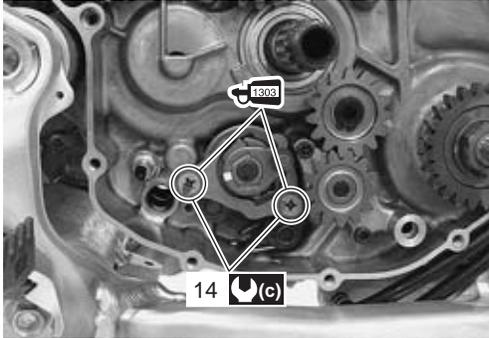
## 5B-16 Manual Transmission:

- Apply a small quantity of thread lock to the pawl lifter screws (14), and tighten them to the specified torque.

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

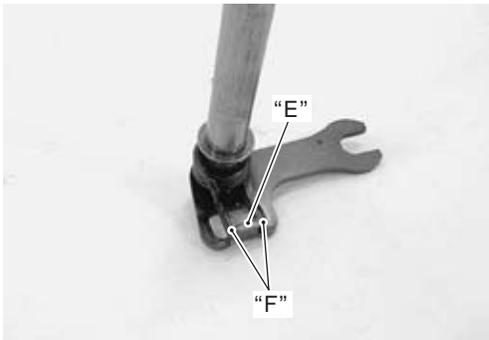
### Tightening torque

Pawl lifter screw (c): 8.5 N-m (0.85 kgf-m, 6.0 lbf-ft)



IA02J1520046-02

- When installing the gearshift shaft return spring, position the stopper "E" of gearshift arm between the shaft return spring ends "F".



IA02J1520047-01

- Install the gearshift shaft assembly.

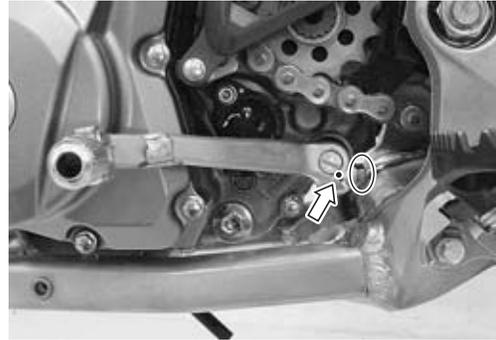
### NOTE

**Pinch the gearshift arm stopper with the return spring and gearshift cam roller with the gearshift shaft.**



IA02J1520048-01

- Align the matching mark on the gearshift shaft head with slit of the gearshift lever.
- Tighten the gearshift lever bolt securely.



IA02J1520049-02

### Gearshift Linkage Inspection

BA02J25206013

Refer to "Gearshift Shaft / Gearshift Cam Plate Removal and Installation" (Page 5B-13).

### Gearshift Shaft

Check the gearshift shaft for bend or wear. Check the return spring for damage or fatigue. If any defects are found, replace the defective part(-s).



IA02J1520050-01

### Gearshift Cam Driven Gear

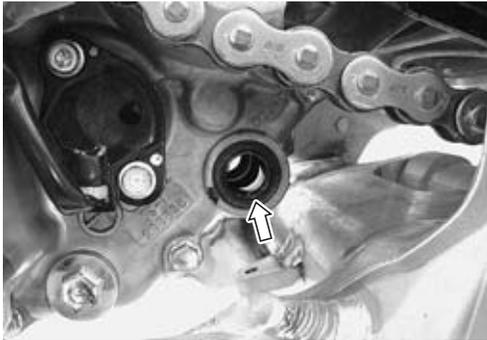
Inspect the pawls, pins, springs and gearshift roller for damage. If necessary, replace the defective parts with a new one.



IA02J1520051-01

**Gearshift Shaft Oil Seal**

Inspect the gearshift shaft oil seal lip for damage or wear. If any defect is found, replace the oil seal with a new one.



IA02J1520052-01

**Gearshift Shaft Oil Seal / Removal and Installation**

BA02J25206014

**Removal**

- 1) Remove the gearshift shaft. Refer to “Gearshift Shaft / Gearshift Cam Plate Removal and Installation” (Page 5B-13).
- 2) Remove the gearshift shaft oil seal (1).



IA02J1520053-01

**Installation**

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

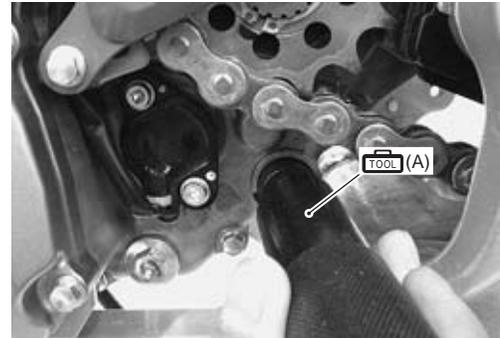
**⚠ CAUTION**

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

- Install new oil seal with the special tool.

**Special tool**

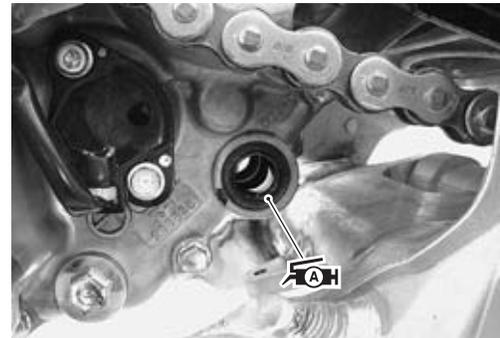
 (A): 09913-70210 (Bearing installer set)



IA02J1520054-01

- Apply grease to the oil seal lip.

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



IA02J1520055-01

**Specifications**

**Service Data**

BA02J25207001

**Transmission + Drive Chain**

Unit: mm (in) Except ratio

Item		Standard	Limit
Primary reduction ratio		2.708 (65/24)	—
Final reduction ratio		0.254 (13/51)	—
Gear ratios	Low	2.153 (28/13)	—
	2nd	1.611 (29/18)	—
	3rd	1.250 (25/20)	—
	4th	1.000 (19/19)	—
	Top	0.826 (19/23)	—
Shift fork to groove clearance		No. 1, 2, 3	0.1 – 0.3 (0.004 – 0.012)
Shift fork to groove width		No. 1, 2, 3	5.0 – 5.1 (0.197 – 0.201)
Shift fork thickness		No. 1, 2, 3	4.8 – 4.9 (0.189 – 0.193)

## Tightening Torque Specifications

Fastening part	Tightening torque			Note
	N·m	kgf·m	lbf·ft	
Bearing retainer screws	8.5	0.85	6.0	☞ (Page 5B-11)
Gear position switch mounting bolt	6.5	0.65	4.7	☞ (Page 5B-12)
Gearshift arm stopper	23	2.3	16.5	☞ (Page 5B-14)
Gearshift cam stopper bolt	10	1.0	7.0	☞ (Page 5B-14)
Gearshift cam driven gear pin	24	2.4	17.5	☞ (Page 5B-15)
Pawl lifter screw	8.5	0.85	6.0	☞ (Page 5B-16)

### NOTE

The specified tightening torque is described in the following.

“Transmission Components” (Page 5B-2)

“Gearshift Shaft / Gearshift Cam Plate Components” (Page 5B-12)

“Gearshift Construction” (Page 5B-13)

### Reference:

For the tightening torque of fastener not specified in this section, refer to “Tightening Torque List” in Section 0C (Page 0C-8).

## Special Tools and Equipment

### Recommended Service Material

Material	SUZUKI recommended product or Specification		Note
Grease	SUZUKI SUPER GREASE “A” or equivalent	P/No.: 99000–25010	☞ (Page 5B-9) / ☞ (Page 5B-9) / ☞ (Page 5B-11) / ☞ (Page 5B-12) / ☞ (Page 5B-17)
Molybdenum oil	MOLYBDENUM OIL SOLUTION	—	☞ (Page 5B-6) / ☞ (Page 5B-6)
Thread lock cement	THREAD LOCK CEMENT SUPER “1303” or equivalent	P/No.: 99000–32030	☞ (Page 5B-11) / ☞ (Page 5B-14) / ☞ (Page 5B-16)
	THREAD LOCK CEMENT SUPER “1322” or equivalent	P/No.: 99000–32110	☞ (Page 5B-15)

### NOTE

Required service material is also described in the following.

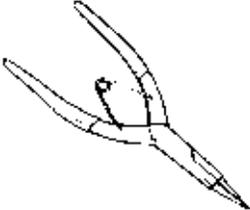
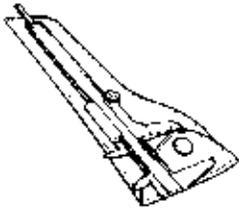
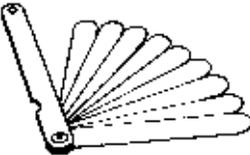
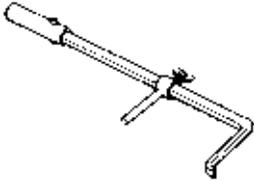
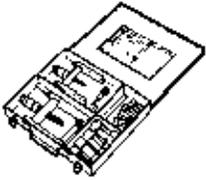
“Transmission Components” (Page 5B-2)

“Gearshift Shaft / Gearshift Cam Plate Components” (Page 5B-12)

“Gearshift Construction” (Page 5B-13)

## Special Tool

BA02J25208002

<p>09900-06107 Snap ring remover (Open type) ☞ (Page 5B-13)</p> 	<p>09900-20102 Vernier calipers (200 mm) ☞ (Page 5B-7) / ☞ (Page 5B-7)</p> 
<p>09900-20803 Thickness gauge ☞ (Page 5B-7)</p> 	<p>09913-50121 Oil seal remover ☞ (Page 5B-9)</p> 
<p>09913-70210 Bearing installing set (10 – 75 Φ) ☞ (Page 5B-10) / ☞ (Page 5B-10) / ☞ (Page 5B-11) / ☞ (Page 5B-17)</p> 	<p>09921-20240 Bearing remover set ☞ (Page 5B-10)</p> 

# Clutch

## Precautions

### Precautions for Clutch System

BA02J25300001

Refer to “General Precautions” in Section 00 (Page 00-1).

## Diagnostic Information and Procedures

### Clutch System Symptom Diagnosis

BA02J25304001

Condition	Possible cause	Correction / Reference Item
<b>Engine is noisy (Noise seems to come from the clutch)</b>	Worn countershaft spline.	Replace countershaft.
	Worn clutch hub spline.	Replace clutch hub.
	Worn clutch plate teeth.	Replace clutch plates.
	Distorted clutch plates.	Replace.
	Worn clutch release bearing.	Replace.
	Weakened clutch damper.	Replace primary driven gear.
<b>Clutch slips</b>	Weakened clutch springs.	Replace.
	Worn or distorted clutch pressure plate.	Replace.
	Distorted clutch plates.	Replace.
	Clutch cable play out of adjustment.	Adjust.
<b>Clutch drags</b>	Clutch cable play out of adjustment.	Adjust.
	Some clutch springs are weak, while others are not.	Replace.
	Worn or distorted clutch pressure plate.	Replace.
	Distorted clutch plate.	Replace.

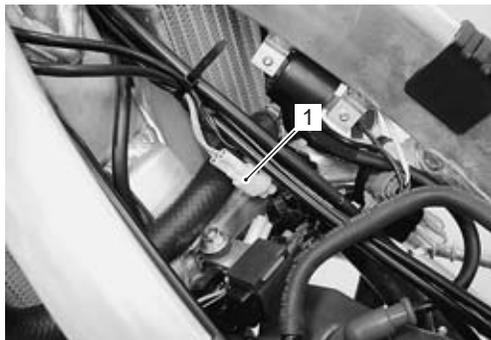
## Repair Instructions

### Clutch Lever Position Switch Inspection

BA02J25306001

Inspect the clutch lever position switch in the following procedures:

- 1) Remove the fuel tank. Refer to “Fuel Tank Removal and Installation” in Section 1G (Page 1G-5).
- 2) Disconnect the clutch lever position switch coupler (1).



IA02J1530001-01

- 3) Inspect the clutch lever position switch for continuity with the tester.  
If abnormality is found, replace the switch with a new one.

#### Special tool

 : 09900-25008 (Multi circuit tester set)

#### Tester knob inspection

Continuity (••)]])

Color	Y/G	Y/G
Position		
OFF		
ON		

IA02J1530004-02

- 4) Connect the clutch lever position switch coupler.
- 5) Install the fuel tank. Refer to “Fuel Tank Removal and Installation” in Section 1G (Page 1G-5).

## Clutch Cable Inspection and Adjustment

BA02J25306002

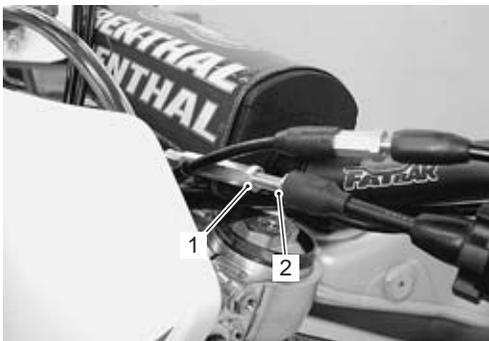
Refer to "Clutch Lever Clearance Inspection and Adjustment" in Section 0B (Page 0B-11).

## Clutch Cable Removal and Installation

BA02J25306003

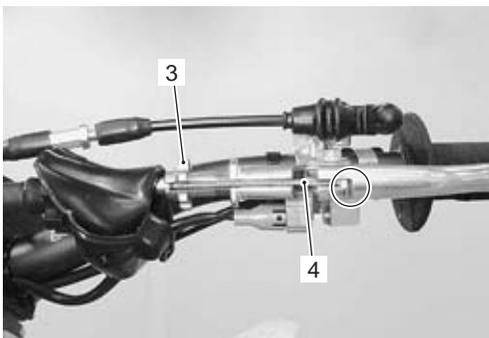
### Removal

- 1) Remove the fuel tank. Refer to "Fuel Tank Removal and Installation" in Section 1G (Page 1G-5).
- 2) Loosen the cable adjuster lock-nut (1) and adjuster (2).



IA02J1530002-01

- 3) Turn the adjuster (3) to align the slits of adjuster and of the lever holder straight.
- 4) Disconnect the clutch cable (4) from the lever.



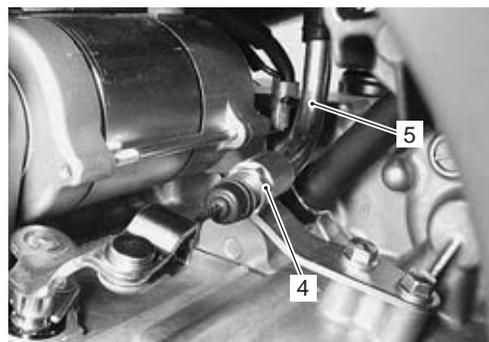
IA02J1530007-01

- 5) Remove the clamps.



IA02J1530008-01

- 6) Loosen the nut (4) and disconnect the clutch cable (5) from the clutch release camshaft.



IA02J1530034-03

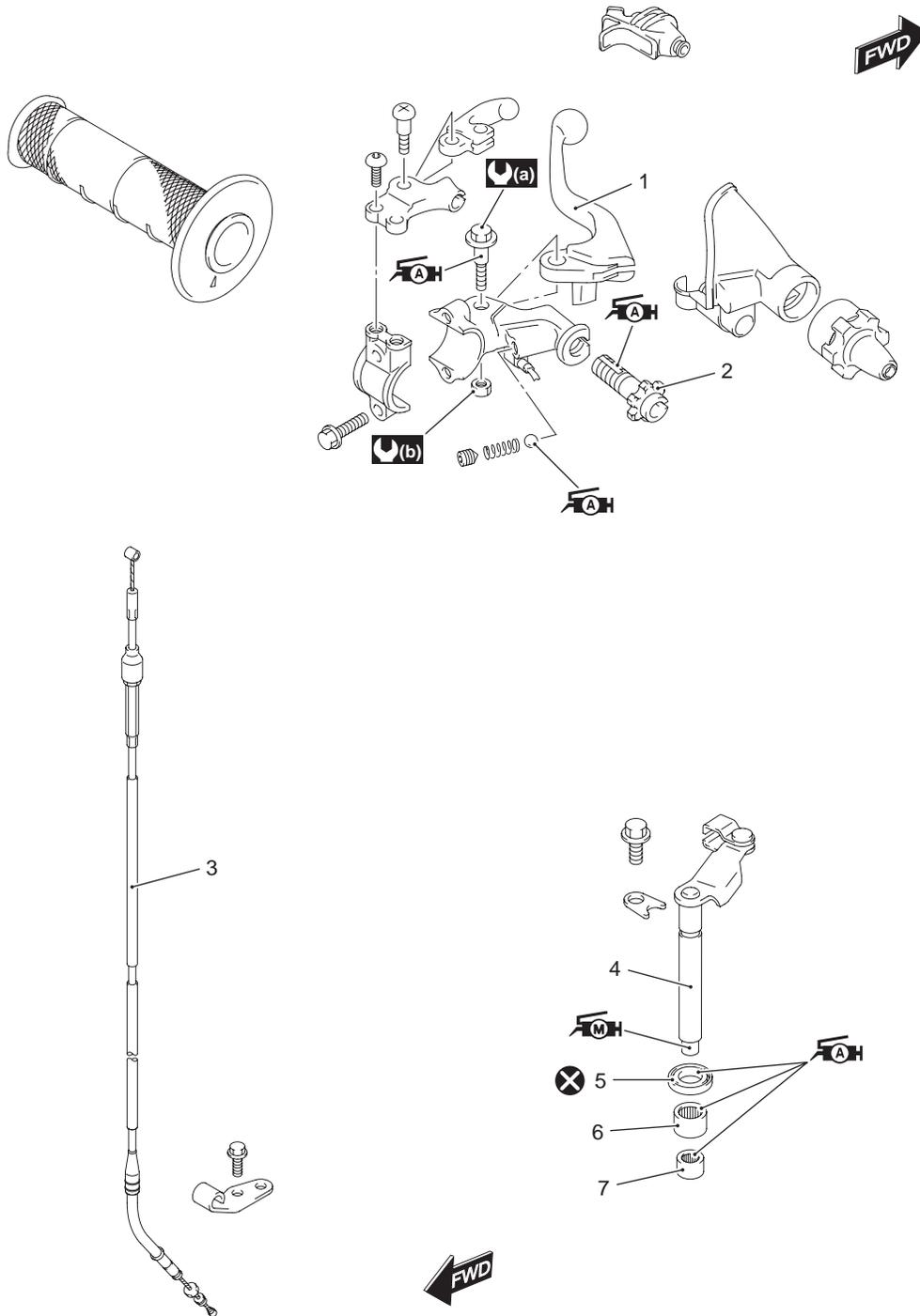
### Installation

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

- Route the clutch cable properly. Refer to "Throttle Cable Routing Diagram" in Section 1D (Page 1D-2).
- After install the removed parts, adjust the clutch cable play. Refer to "Clutch Lever Clearance Inspection and Adjustment" in Section 0B (Page 0B-11).

Clutch Control System Components

BA02J25306004

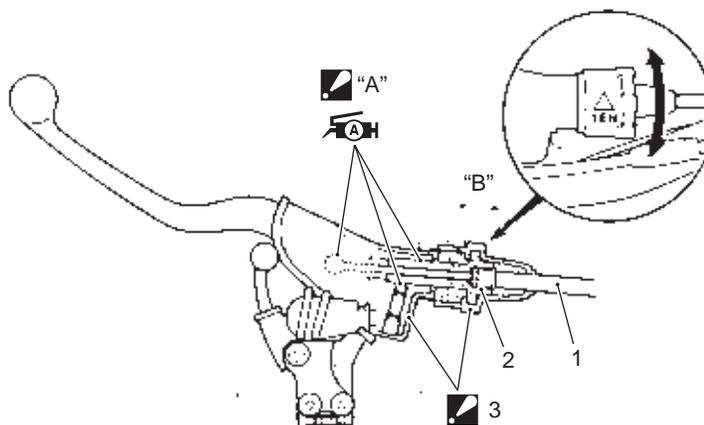


IA02J1530044-04

1. Clutch lever	5. Oil seal	(b) : 4 N·m (0.4 kfg-m, 3.0 lbf-ft)
2. Quick adjuster	6. Bearing	: Apply moly paste.
3. Clutch cable	7. Bearing	: Apply grease.
4. Clutch release camshaft	(a) : 4 N·m (0.4 kfg-m, 3.0 lbf-ft)	: Do not reuse.

## Clutch Cable Adjuster Construction

BA02J25306005



IA02J1530009-01

1. Clutch cable	3. Cover : Do not apply grease to the covers.	"B": Adjustable range.
2. Quick adjuster	"A": When the lever movement is felt heavier, clean these points and apply grease.	: Apply grease.

## Clutch Release Camshaft Removal and Installation

BA02J25306006

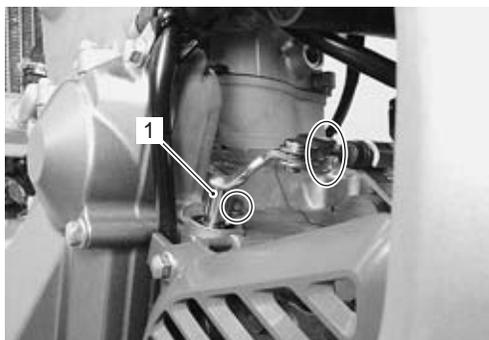
## Removal

- 1) Drain engine oil. Refer to "Engine Oil Inspection and Replacement" in Section 0B (Page 0B-5).
- 2) Remove the clutch pressure plate and push rod. Refer to "Clutch Removal" (Page 5C-7).
- 3) Remove the starter motor. Refer to "Starter Motor Removal and Installation" in Section 1I (Page 1I-4).
- 4) Disconnect the clutch cable from the clutch release camshaft (1).

## NOTE

Loosen the clutch cable adjuster on the clutch lever fully when disconnecting the cable.

- 5) Remove the clutch release camshaft (1).



IA02J1530038-02

## Installation

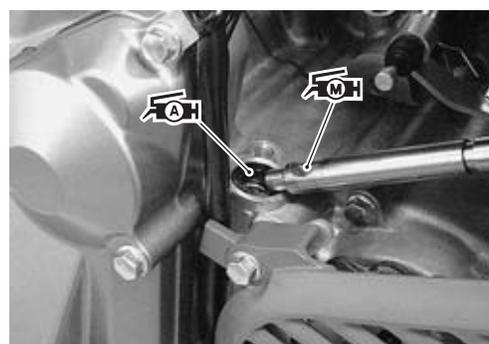
Install the clutch release camshaft in the reverse order of removal. Pay attention to the following points:

- Apply SUZUKI MOLY PASTE to the clutch release camshaft.

: Moly paste 99000-25140 (SUZUKI MOLY PASTE or equivalent)

- Apply grease to the oil seal lip.

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



IA02J1530039-03

- Install the clutch release camshaft and connect the clutch cable.
- Install the clutch push rod and pressure plate. Refer to "Clutch Installation" (Page 5C-8).
- Pour engine oil. Refer to "Engine Oil Inspection and Replacement" in Section 0B (Page 0B-5).
- Inspect the clutch lever clearance. Refer to "Clutch Lever Clearance Inspection and Adjustment" in Section 0B (Page 0B-11).

## 5C-5 Clutch:

### Clutch Release Camshaft / Oil Seal / Bearing Inspection

BA02J25306007

Refer to "Clutch Release Camshaft Removal and Installation" (Page 5C-4).

#### Clutch Release Camshaft

Inspect the clutch release camshaft for abnormal deflection and damage. If any defects are found, replace the clutch release camshaft with a new one.



IA02J1530040-01

#### Oil Seal

Inspect the oil seal for oil leakage and oil seal lip damage. If necessary, replace the oil seal with a new one. Refer to "Clutch Release Camshaft Oil Seal / Bearing Removal and Installation" in Section 1D (Page 1D-66).



IA02J1530041-01

#### Bearing

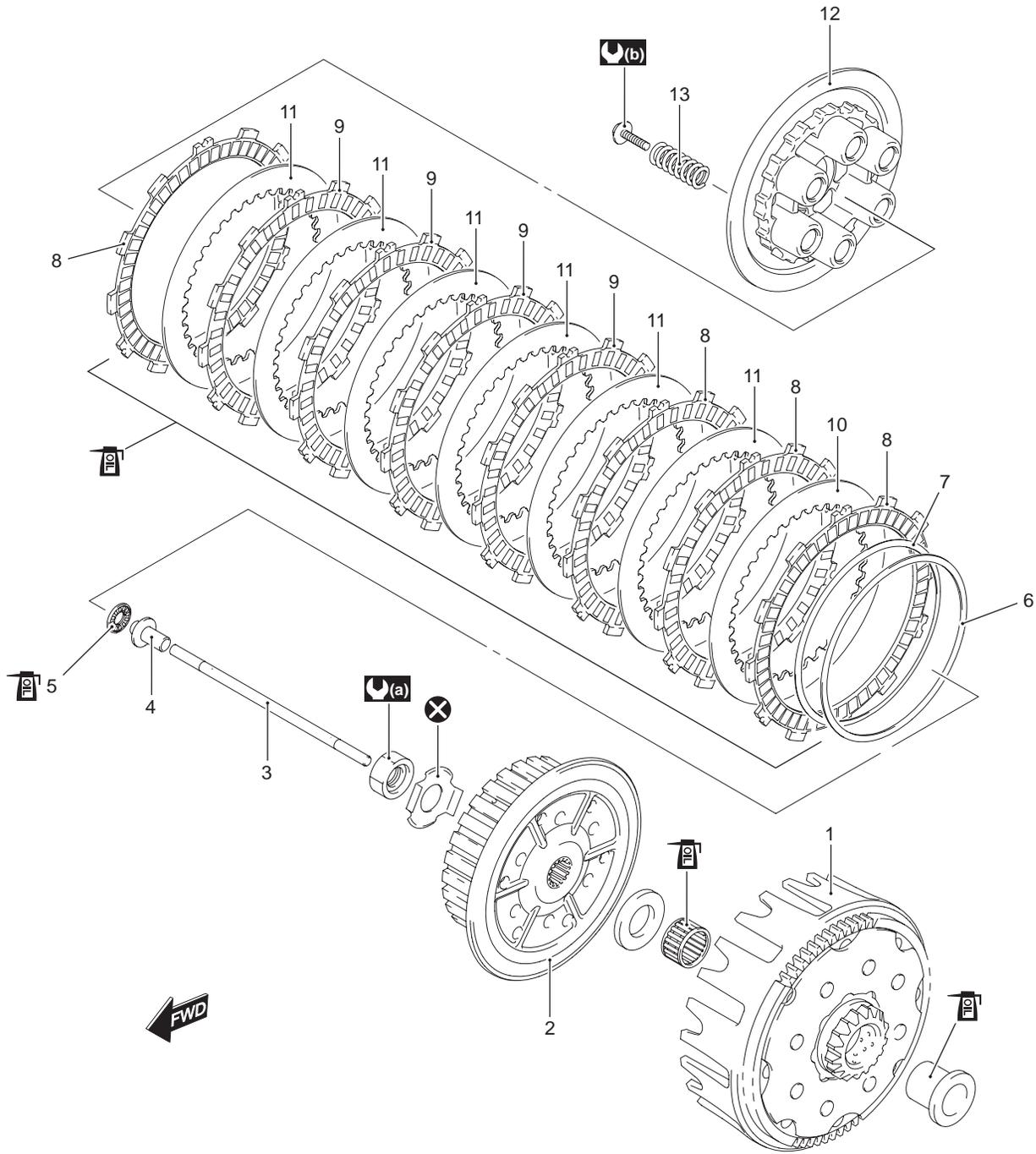
- 1) Insert the clutch release camshaft into the bearings.
- 2) Inspect the bearings for play and smooth movement by turning the camshaft. If necessary, replace the bearing with a new one. Refer to "Clutch Release Camshaft Oil Seal / Bearing Removal and Installation" in Section 1D (Page 1D-66).



IA02J1530042-01

Clutch Components

BA02J25306008



IA02J1530010-02

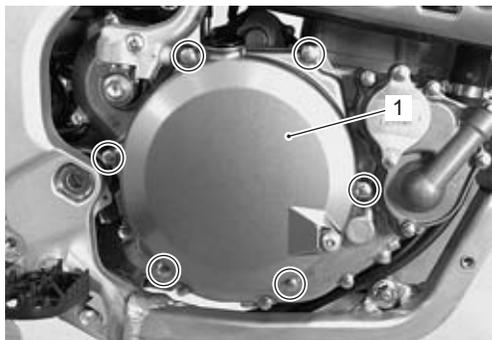
1. Primary driven gear	7. Spring washer	13. Spring
2. Clutch sleeve hub	8. Drive plate No. 2	<b>(a)</b> : 90 N·m (9.0 kgf·m, 65.0 lbf·ft)
3. Push rod	9. Drive plate No. 1	<b>(b)</b> : 10 N·m (1.0 kgf·m, 7.0 lbf·ft)
4. Push piece	10. Driven plate No. 2	<b>(FO)</b> : Apply engine oil.
5. Bearing	11. Driven plate No. 1	<b>(X)</b> : Do not reuse.
6. Spring washer seat	12. Pressure plate	

## 5C-7 Clutch:

### Clutch Removal

BA02J25306009

- 1) Drain engine oil. Refer to "Engine Oil Filter Replacement" in Section 0B (Page 0B-7).
- 2) Remove the rear brake pedal. Refer to "Rear Brake Pedal Removal and Installation" in Section 4A (Page 4A-16).
- 3) Remove the clutch cover (1).



IA02J1530011-02

- 4) Remove the gasket (2).

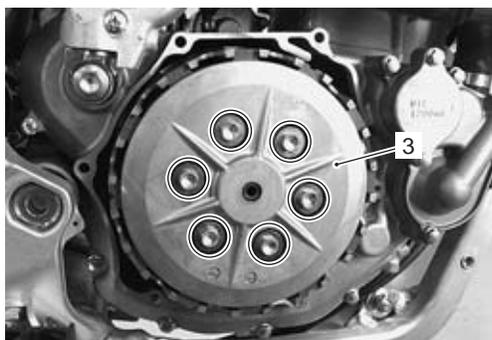


IA02J1530012-02

- 5) Remove the clutch springs and clutch pressure plate (3).

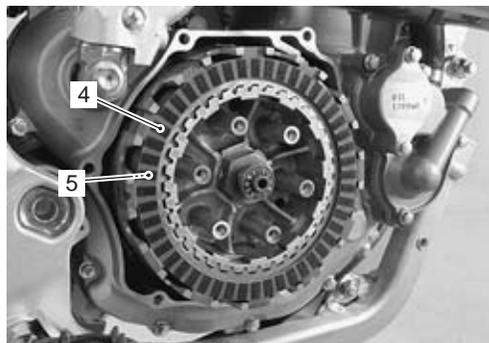
#### NOTE

**Loosen the clutch spring set bolts little by little and diagonally.**



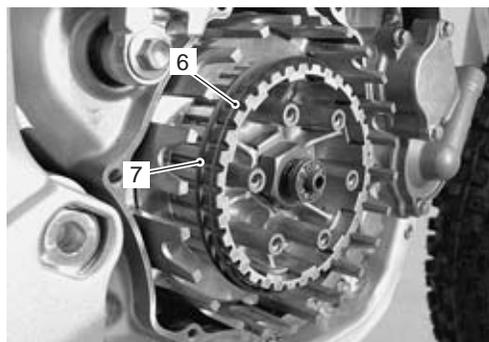
IA02J1530013-02

- 6) Remove the clutch drive plates (4) and driven plates (5).



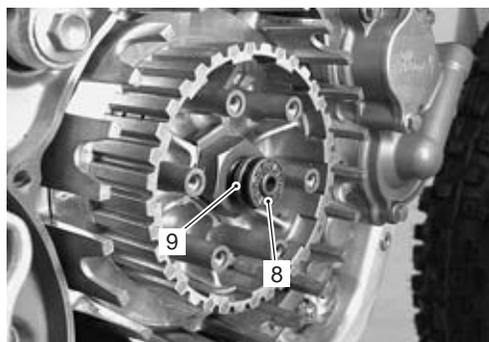
IA02J1530014-02

- 7) Remove the spring washer (6) and washer seat (7).



IA02J1530015-02

- 8) Remove the clutch release thrust bearing (8) and clutch push piece (9).

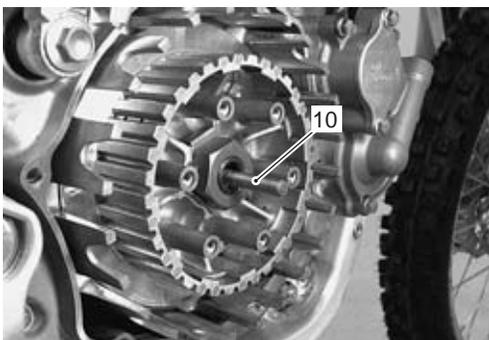


IA02J1530016-02

9) Remove the push rod (10).

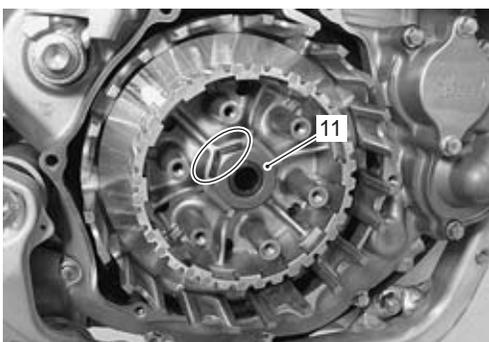
#### NOTE

If it is difficult to pull out the push rod (10), use a magnetic hand or a wire.



IA02J1530017-02

10) Flatten the clutch sleeve hub washer (11).



IA02J1530018-02

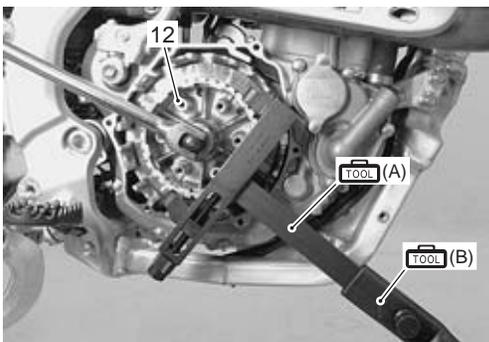
11) Hold the clutch sleeve hub (12) with the special tools.

#### Special tool

 (A): 09920-53740 (Clutch sleeve hub holder)

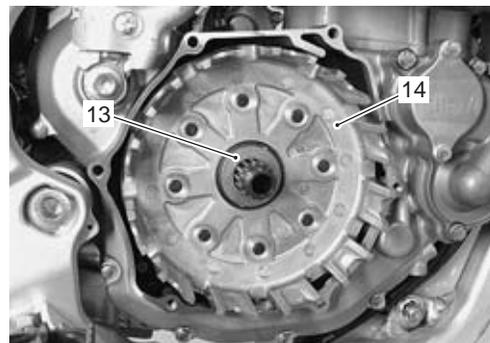
 (B): 09920-31020 (Extension handle)

12) Remove the nut, clutch sleeve hub washer (11) and clutch sleeve hub (12).



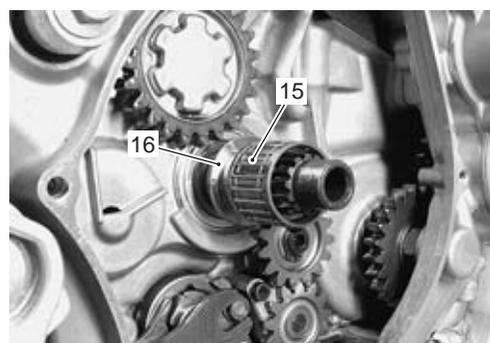
IA02J1530019-02

13) Remove the thrust washer (13) and primary driven gear assembly (14).



IA02J1530020-02

14) Remove the primary driven gear bearing (15) and spacer (16).

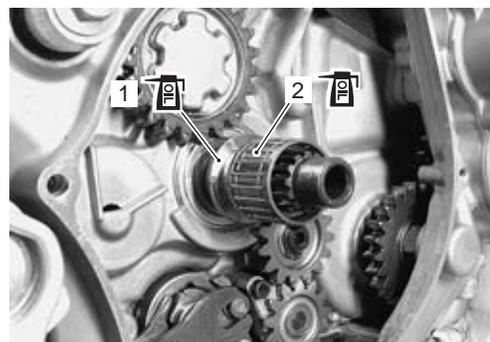


IA02J1530021-02

#### Clutch Installation

BA02J25306010

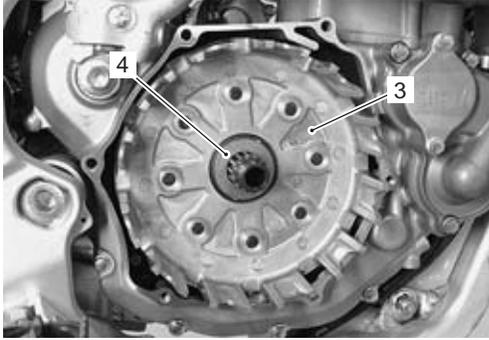
- 1) Apply engine oil to the spacer (1) and primary driven gear bearing (2).
- 2) Install the spacer (1) and bearing (2).



IA02J1530022-02

## 5C-9 Clutch:

- 3) Install the primary driven gear assembly (3) and thrust washer (4).



IA02J1530035-02

- 4) Install the clutch sleeve hub (5) and new washer (6).

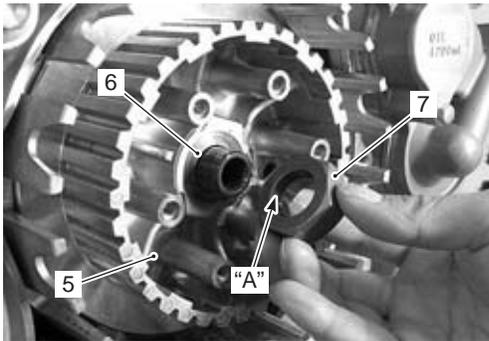
### NOTE

The removed washer must be replaced with a new one.

- 5) Install the clutch sleeve hub nut (7).

### NOTE

The concave side "A" of clutch sleeve hub nut (7) faces inside.



IA02J1530023-02

- 6) Hold the clutch sleeve hub with the special tools.

### Special tool

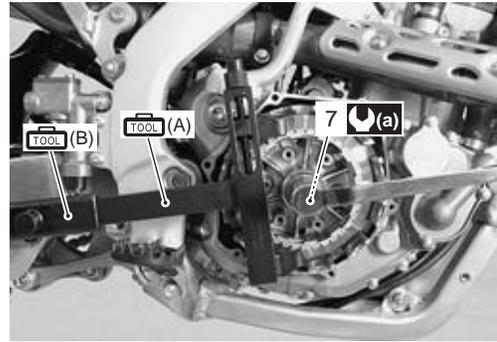
 (A): 09920-53740 (Clutch sleeve hub holder)

 (B): 09920-31020 (Extension handle)

- 7) Tighten the clutch sleeve hub nut (7) to the specified torque.

### Tightening torque

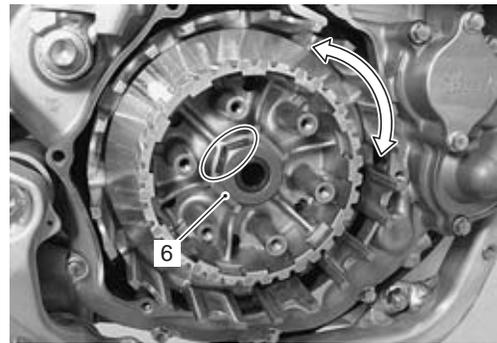
Clutch sleeve hub nut (a): 90 N·m (9.0 kgf·m, 65.0 lbf·ft)



IA02J1530024-02

- 8) Make sure the clutch sleeve hub for smooth movement.

- 9) Bend the tongue of the washer (6) securely.



IA02J1530025-02

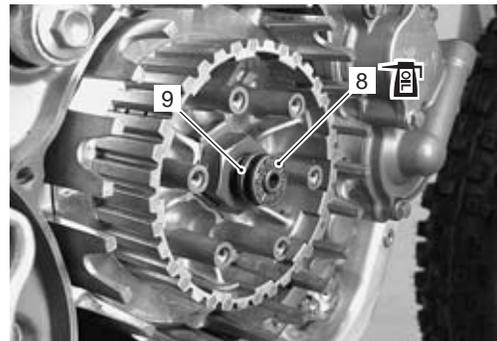
- 10) Insert the push rod into the countershaft.

- 11) Apply engine oil to the clutch release thrust bearing (8).

### NOTE

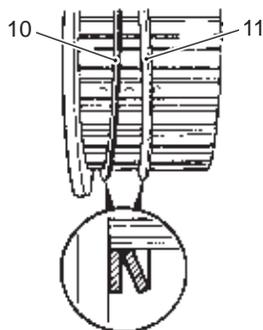
The covered side of the bearing (8) should face outside.

- 12) Install the push piece (9) and bearing (8).



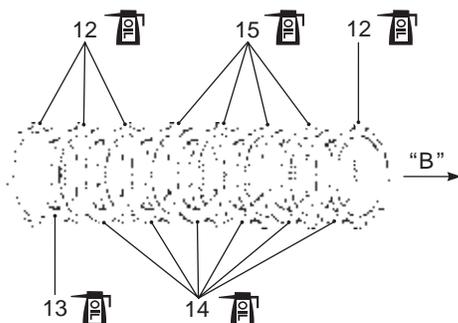
IA02J1530036-04

- 13) Install the spring washer seat (10) and spring washer (11) onto the clutch sleeve hub correctly.



IA02J1530037-03

- 14) Apply engine oil to the clutch drive plates and driven plates.  
 15) Install the clutch drive plates and driven plates one by one to the clutch sleeve hub in the prescribed order.

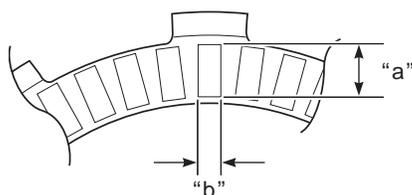


IA02J1530026-06

12.	No. 2 drive plate (3 pcs. + 1 pc.)
13.	No. 2 driven plate (1 pc.)
14.	No. 1 driven plate (6 pcs.)
15.	No. 1 drive plate (4 pcs.)
"B":	Direction of outside

**NOTE**

Two kinds of the drive plate (No. 1, No. 2) are equipped in the clutch system, they can be distinguished by form of clutch facings.



IA02J1530043-01

Drive plate	"a"	"b"
No. 1	10.5 mm (0.41 in)	5.2 mm (0.20 in)
No. 2	9.0 mm (0.35 in)	6.7 mm (0.26 in)

**NOTE**

Two kinds of the driven plate (No. 1 and No. 2) are equipped in the clutch system, they can be distinguished by color. The No. 2 driven plate should be installed innermost.

Driven plate	Color
No. 1	Sliver
No. 2	Gray (Heat treated)

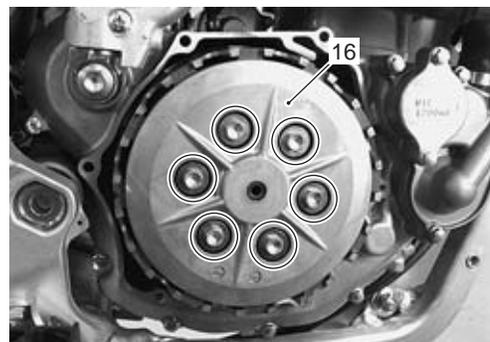
- 16) Install the clutch pressure plate (16) and clutch springs.  
 17) Tighten the clutch spring set bolts to the specified torque.

**Tightening torque**

Clutch spring set bolt: 10 N·m (1.0 kgf·m, 7.0 lbf·ft)

**NOTE**

Tighten the clutch spring set bolt little by little and diagonally.

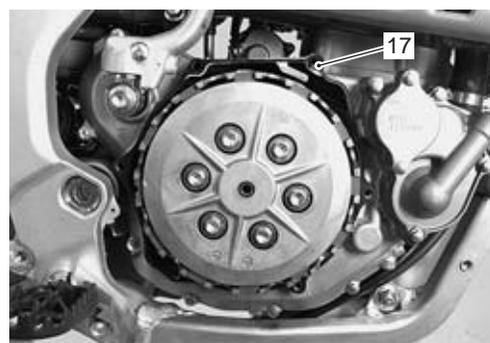


IA02J1530027-03

- 18) Install new gasket (17).

**⚠ CAUTION**

Use new gasket to prevent oil leakage.



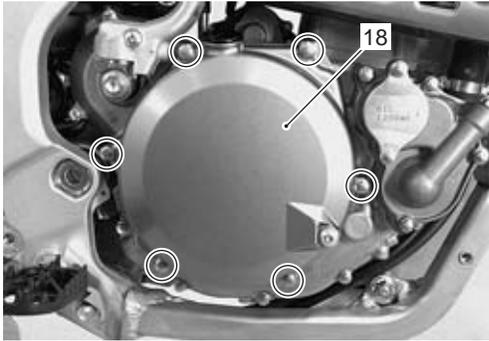
IA02J1530028-03

## 5C-11 Clutch:

- 19) Install the clutch cover (18) and tighten its bolts to the specified torque.

### Tightening torque

**Clutch cover bolt: 11 N·m (1.1 kgf·m, 8.0 lbf·ft)**



IA02J1530029-03

- 20) Install the rear brake pedal. Refer to "Rear Brake Pedal Removal and Installation" in Section 4A (Page 4A-16).
- 21) Pour engine oil and coolant. Refer to "Engine Oil Filter Replacement" in Section 0B (Page 0B-7) and "Cooling System Inspection" in Section 0B (Page 0B-9).

### Clutch Parts Inspection

BA02J25306011

Refer to "Clutch Removal" (Page 5C-7) and "Clutch Installation" (Page 5C-8).

### Clutch Drive and Driven Plate

#### NOTE

**Wipe off the engine oil from the drive and driven plates with a clean rag.**

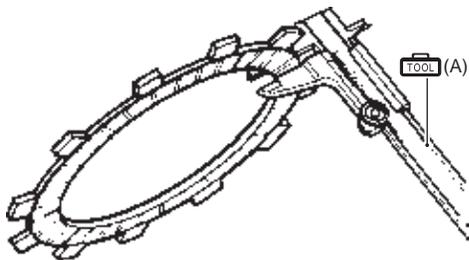
Measure the thickness of drive plates with a vernier calipers. If the drive plate thickness is found to have reached the limit, replace it with a new one.

#### Special tool

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

#### Clutch drive plate thickness

**Service limit (No. 1 and No. 2 drive plate): 2.77 mm (0.109 in)**



I649G1530056-03

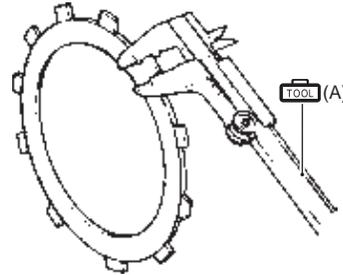
Measure the claw width of drive plates with a vernier calipers. Replace the drive plates found to have worn down to the limit.

#### Special tool

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

#### Clutch drive plate claw width

**Service limit (No. 1 and No. 2 drive plate): 13.05 mm (0.514 in)**



I649G1530057-03

Measure each driven plate for distortion with a thickness gauge and surface plate.

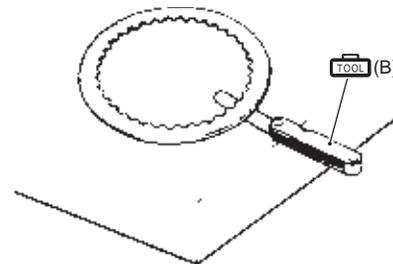
Replace driven plates which exceed the limit.

#### Special tool

**TOOL (B): 09900-20803 (Thickness gauge)**

#### Clutch driven plate distortion

**Service limit: 0.10 mm (0.004 in)**



I649G1530058-03

**Clutch Spring**

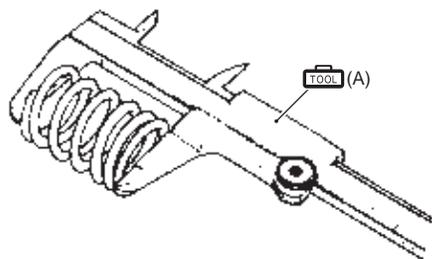
Measure the free length of each coil spring with a vernier calipers, and compare the length with the specified limit. Replace all the springs if any spring is not within the limit.

**Special tool**

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

**Clutch spring free length**

Service limit: 49.4 mm (1.945 in)



I718H1530062-01

**Clutch Release Thrust Bearing**

Inspect the clutch release thrust bearing for any abnormality, especially cracks. When removing the bearing from the clutch, decide whether it can be reused or if it should be replaced.

Smooth engagement and disengagement of the clutch depends on the condition of this bearing.



IA02J1530030-01

**Push Rod**

Inspect the push rod for wear and damage.

If any defects are found, replace the push rod with a new one.



IA02J1530031-01

**Clutch Sleeve Hub and Primary Driven Gear Assembly**

Inspect the slot of the clutch sleeve hub and primary driven gear assembly for damage or wear caused by the clutch plates. If necessary, replace it with a new one.



IA02J1530032-01

**Primary Driven Gear Bearing**

Inspect the primary driven gear and bearing and spacer for damage and wear.

If any defects are found, replace the bearing or spacer with a new one.



IA02J1530033-01

## Specifications

### Service Data

BA02J25307001

#### Clutch

Unit: mm (in)

Item	Standard	Limit
Clutch lever clearance	2.0 – 3.0 (0.08 – 0.12)	—
Drive plate thickness (No. 1 & No. 2)	3.07 – 3.23 (0.121 – 0.127)	2.77 (0.109)
Drive plate claw width (No. 1 & No. 2)	13.85 – 13.95 (0.545 – 0.549)	13.05 (0.514)
Driven plate distortion	—	0.10 (0.004)
Clutch spring free length	51.94 (2.045)	49.4 (1.945)

### Tightening Torque Specifications

BA02J25307002

Fastening part	Tightening torque			Note
	N-m	kgf-m	lbf-ft	
Clutch sleeve hub nut	90	9.0	65.0	☞ (Page 5C-9)
Clutch spring set bolt	10	1.0	7.0	☞ (Page 5C-10)
Clutch cover bolt	11	1.1	8.0	☞ (Page 5C-11)

#### NOTE

The specified tightening torque is described in the following.

“Clutch Control System Components” (Page 5C-3)

“Clutch Components” (Page 5C-6)

#### Reference:

For the tightening torque of fastener not specified in this section, refer to “Tightening Torque List” in Section 0C (Page 0C-8).

## Special Tools and Equipment

### Recommended Service Material

BA02J25308001

Material	SUZUKI recommended product or Specification		Note
Grease	SUZUKI SUPER GREASE “A” or equivalent	P/No.: 99000–25010	☞ (Page 5C-4)
Moly paste	SUZUKI MOLY PASTE or equivalent	P/No.: 99000–25140	☞ (Page 5C-4)

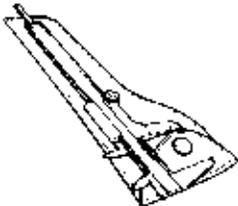
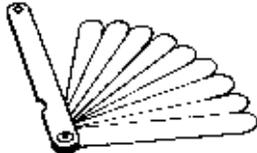
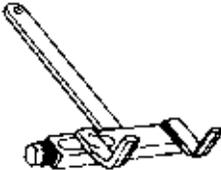
#### NOTE

Required service material is also described in the following.

“Clutch Control System Components” (Page 5C-3)

“Clutch Components” (Page 5C-6)

**Special Tool**

<p>09900-20102 Vernier calipers (200 mm) ☞ (Page 5C-11) / ☞ (Page 5C-11) / ☞ (Page 5C-12)</p>		<p>09900-20803 Thickness gauge ☞ (Page 5C-11)</p>	
<p>09900-25008 Multi circuit tester set ☞ (Page 5C-1)</p>		<p>09920-31020 Extension handle ☞ (Page 5C-8) / ☞ (Page 5C-9)</p>	
<p>09920-53740 Clutch sleeve hub holder ☞ (Page 5C-8) / ☞ (Page 5C-9)</p>			



## Section 6

## Steering

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# Precautions

## Precautions

### Precautions for Steering

Refer to "General Precautions" in Section 00 (Page 00-1).

BA02J2600001

# Steering General Diagnosis

## Diagnostic Information and Procedures

### Steering Symptom Diagnosis

BA02J26104001

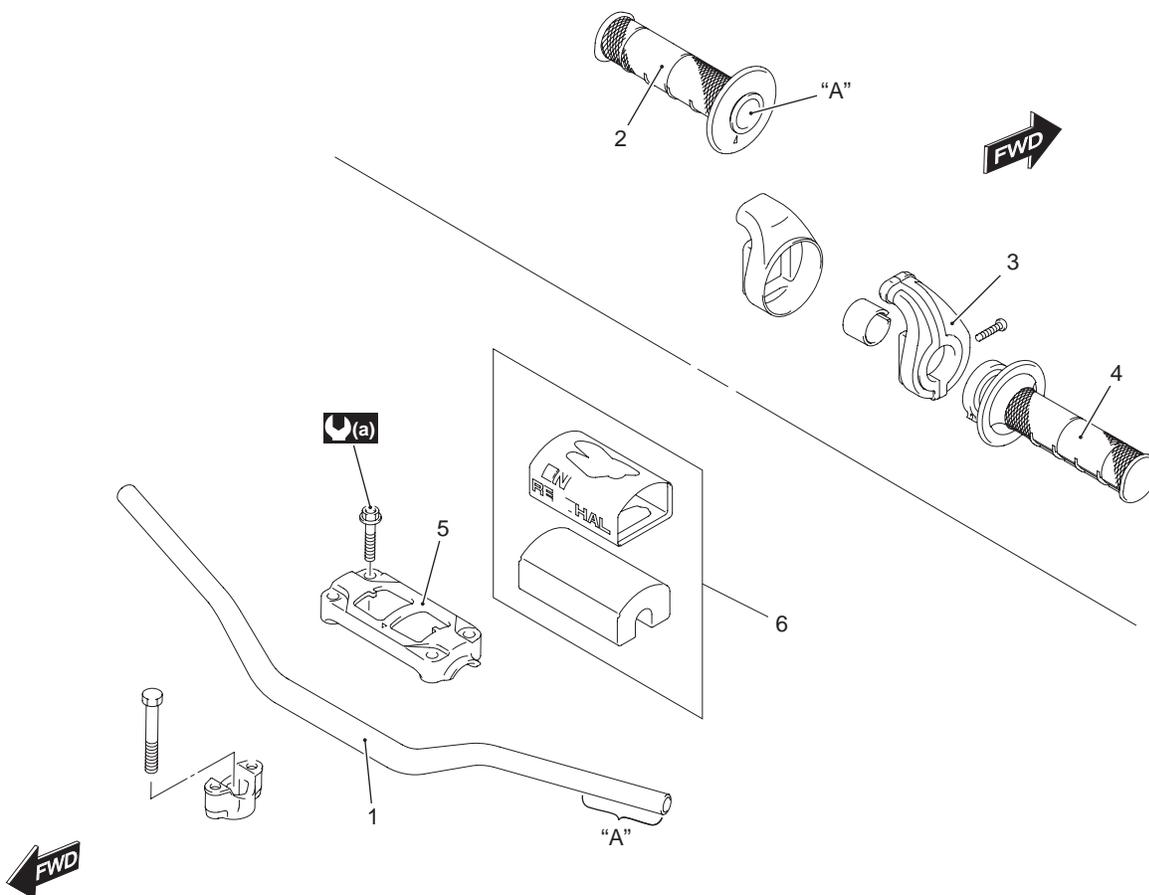
Condition	Possible cause	Correction / Reference Item
<b>Heavy steering</b>	Over tightened steering stem nut.	<i>Adjust.</i>
	Broken bearing in steering stem.	<i>Replace.</i>
	Distorted steering stem.	<i>Replace.</i>
	Not enough pressure in tires.	<i>Adjust.</i>
	Defective steering damper unit.	<i>Replace.</i>
<b>Wobbly handlebars</b>	Loss of balance between right and left front forks.	<i>Replace fork, adjust fork oil level or replace spring.</i>
	Distorted front fork.	<i>Repair or replace.</i>
	Distorted front axle or crooked tire.	<i>Replace.</i>
	Loose steering stem nut.	<i>Adjust.</i>
	Worn or incorrect tire or wrong tire pressure.	<i>Adjust or replace.</i>
	Worn bearing/race in steering stem.	<i>Replace.</i>

# Steering / Handlebar

## Repair Instructions

### Handlebars Components

BA02J26206001

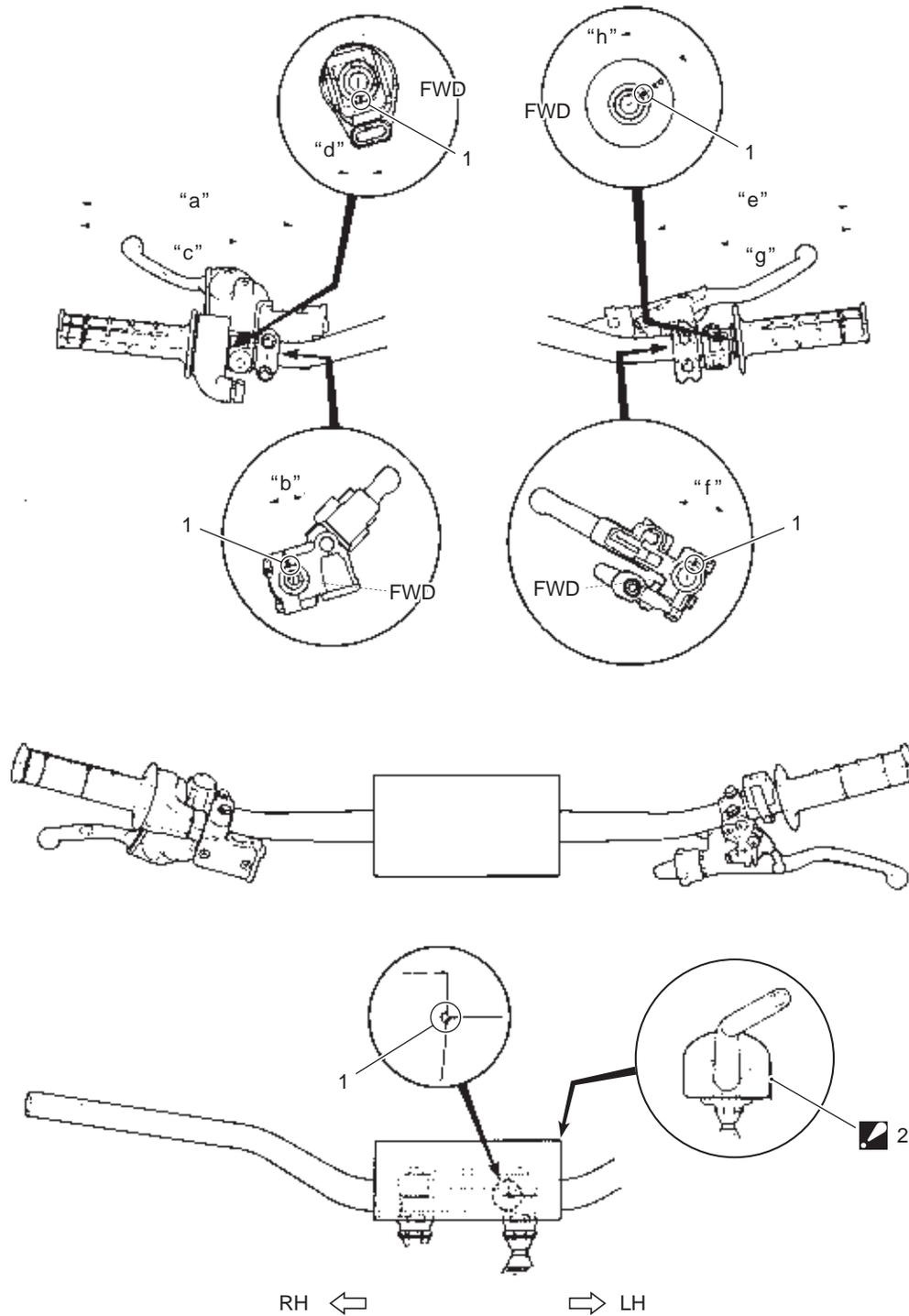


IA02J1620001-01

1. Handlebars	4. Throttle grip	"A": Apply handle grip bond.
2. Handle grip	5. Handlebar holder	 : 25 N·m (2.5 kgf·m, 18.0 lbf·ft)
3. Throttle case	6. Handlebar pad	

Handlebar Construction

BA02J26206002



1. Marking	"d": 15°
2. Velcro fastening: Position the velcro fastening side of the handlebar pad cover backward.	"e": 175 mm (6.9 in)
"a": 193 mm (7.6 in)	"f": 35°
"b": 24°	"g": 121 mm (4.8 in)
"c": 145 mm (5.7 in)	"h": 60°

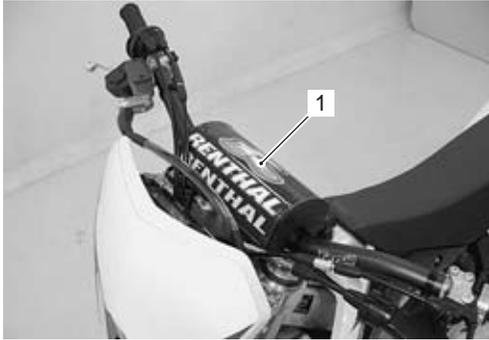
IA02J1620035-02

## Handlebars Removal and Installation

BA02J26206003

### Removal

- 1) Remove the handlebar pad (1).

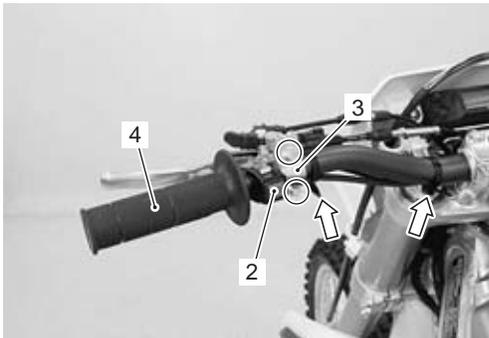


IA02J1620002-01

- 2) Disconnect the clamp.
- 3) Remove the engine stop switch (2), clutch lever holder (3) and left grip (4).

### NOTE

Mark the paint marks to the matching surfaces of clutch lever holder and handlebars, left handlebar grip and handlebars.



IA02J1620003-02



IA02J1620004-01

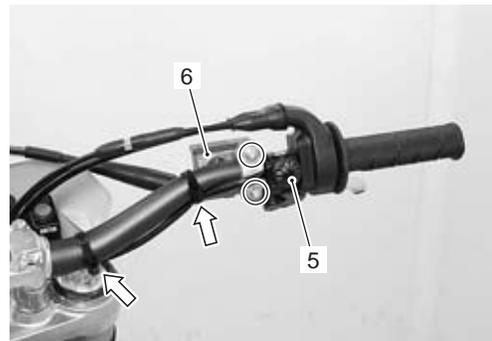
- 4) Disconnect the clamps.
- 5) Remove the starter button (5) and front brake master cylinder (6).

### ⚠ CAUTION

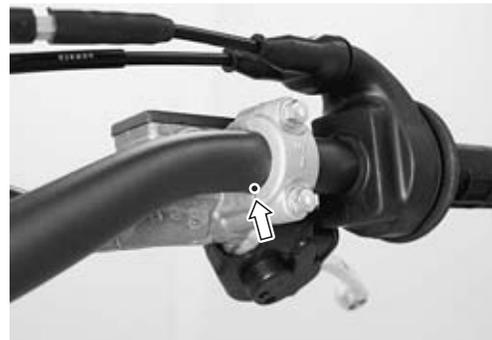
Do not turn the front brake master cylinder upside down.

### NOTE

Mark the paint mark to the matching surface of master cylinder holder and handlebars before removing.



IA02J16200037-01

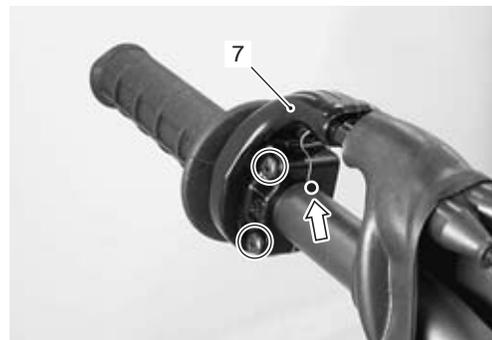


IA02J1620005-01

- 6) Remove the throttle case (7).

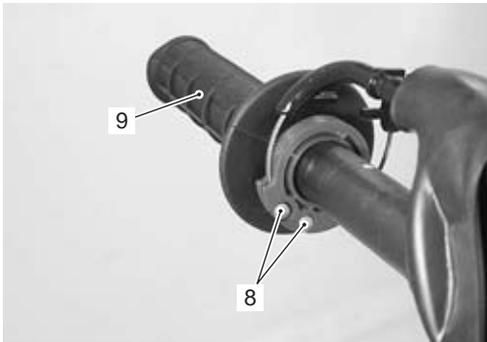
### NOTE

Mark the paint mark to the matching surface of throttle holder and handlebars before removing.



IA02J1620007-01

7) Remove the throttle cables (8) and throttle grip (9).



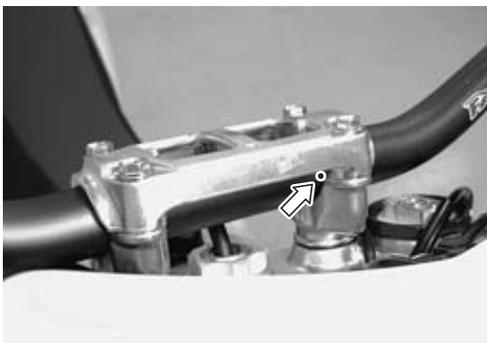
IA02J1620008-01

8) Remove the handlebar clamp bolts (10).

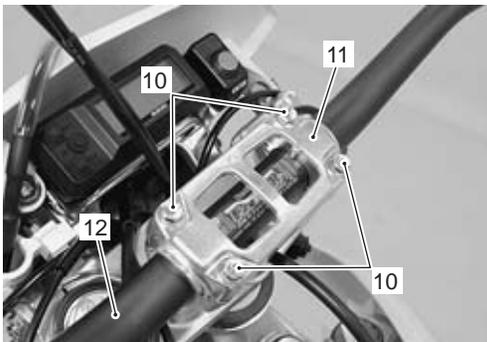
**NOTE**

**Mark the paint mark to the matching surface of handlebar holder and handlebars before removing.**

9) Remove the handlebar holder (11) and handlebars (12).



IA02J1620040-02

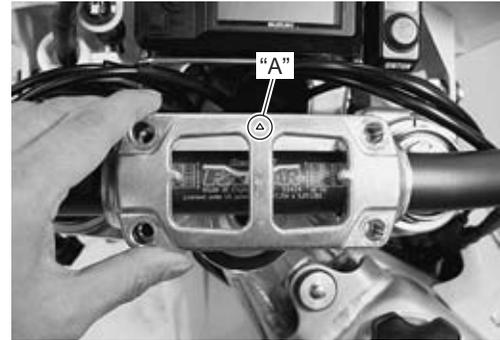


IA02J1620009-01

**Installation**

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

- Set the mark "A" on the handlebar holder forward.



IA02J1620010-01

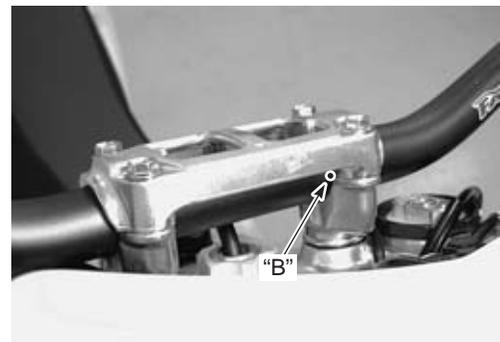
- Align the paint mark "B" on the handlebars with the mating surface of handlebar holder.
- First tighten the bolts (1) to the specified torque and then tighten the bolts (2) to the specified torque.

**NOTE**

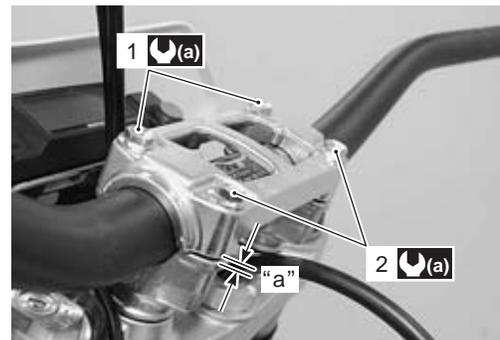
**The higher portion of handlebar holder must face forward, so that the clearance "a" of holder is in back of the handlebars.**

**Tightening torque**

**Handlebar clamp bolt (a): 25 N·m (2.5 kgf·m, 18.0 lbf·ft)**



IA02J1620011-01



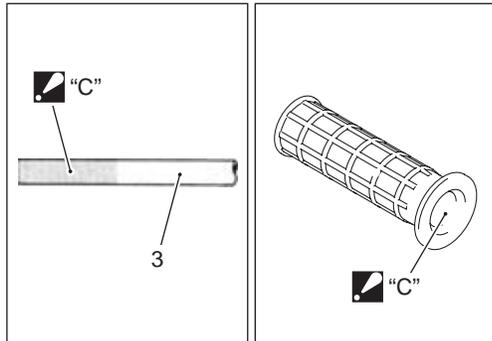
IA02J1620012-02

"a": Clearance

## 6B-5 Steering / Handlebar:

- Apply adhesive agent to the handlebar left end and left grip inner wall.

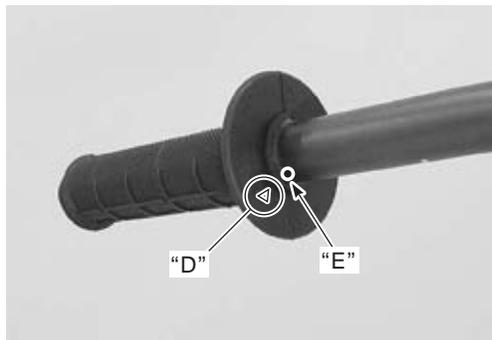
 **Handle grip bond (Handle Grip Bond (commercially available))**



IA02J1620039-01

3. Handlebar
 "C": Apply handle grip bond.

- Align the matching mark "D" on the left grip with the paint mark "E" on the left handlebar end.

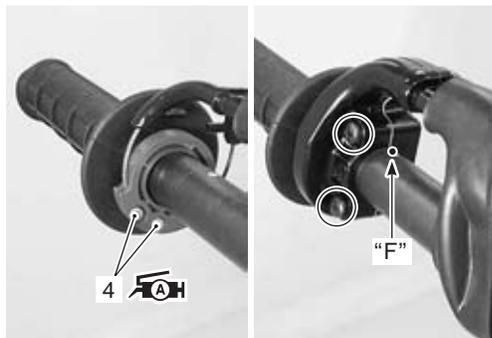


IA02J1620013-02

- Connect the starter cables (4) to the throttle grip.
- Apply grease to the end of starter cables (4).

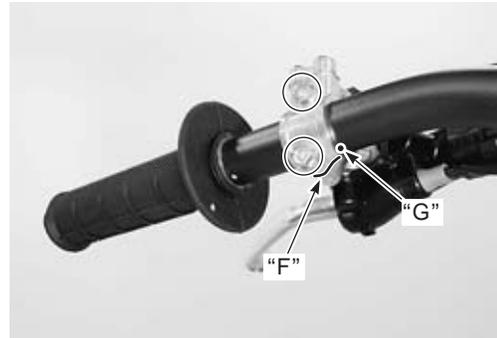
 **Grease 99000-25010 (SUZUKI SUPER GREASE "A" or equivalent)**

- Align the paint mark "F" on the handlebars with the matching surface of throttle cover.



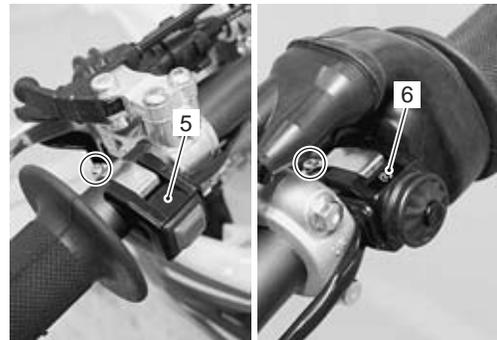
IA02J1620014-02

- Install the clutch lever assembly, align the holder's mating surface "F" with paint mark "G" on the handlebars.
- Tighten the upper bolt first temporarily to provide clearance on the lower side and then tighten both the bolts.



IA02J1620038-01

- Install the front brake master cylinder. Refer to "Front Brake Master Cylinder Assembly Removal and Installation" in Section 4A (Page 4A-9).
- Install the engine stop switch (5) and starter button (6).



IA02J1620015-02

- Check the wiring harness routing and cable routing. Refer to "Wiring Harness Routing Diagram" in Section 9A (Page 9A-2) and "Throttle Cable Routing Diagram" in Section 1D (Page 1D-2).

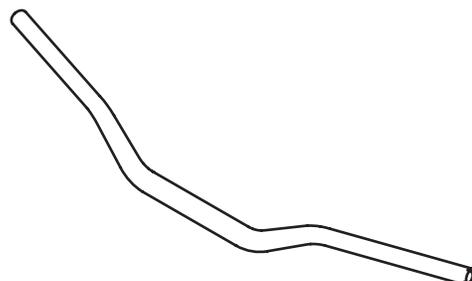
### Handlebars Inspection

BA02J26206004

Refer to "Handlebars Removal and Installation" (Page 6B-3).

Inspect the handlebars for distortion and damage.

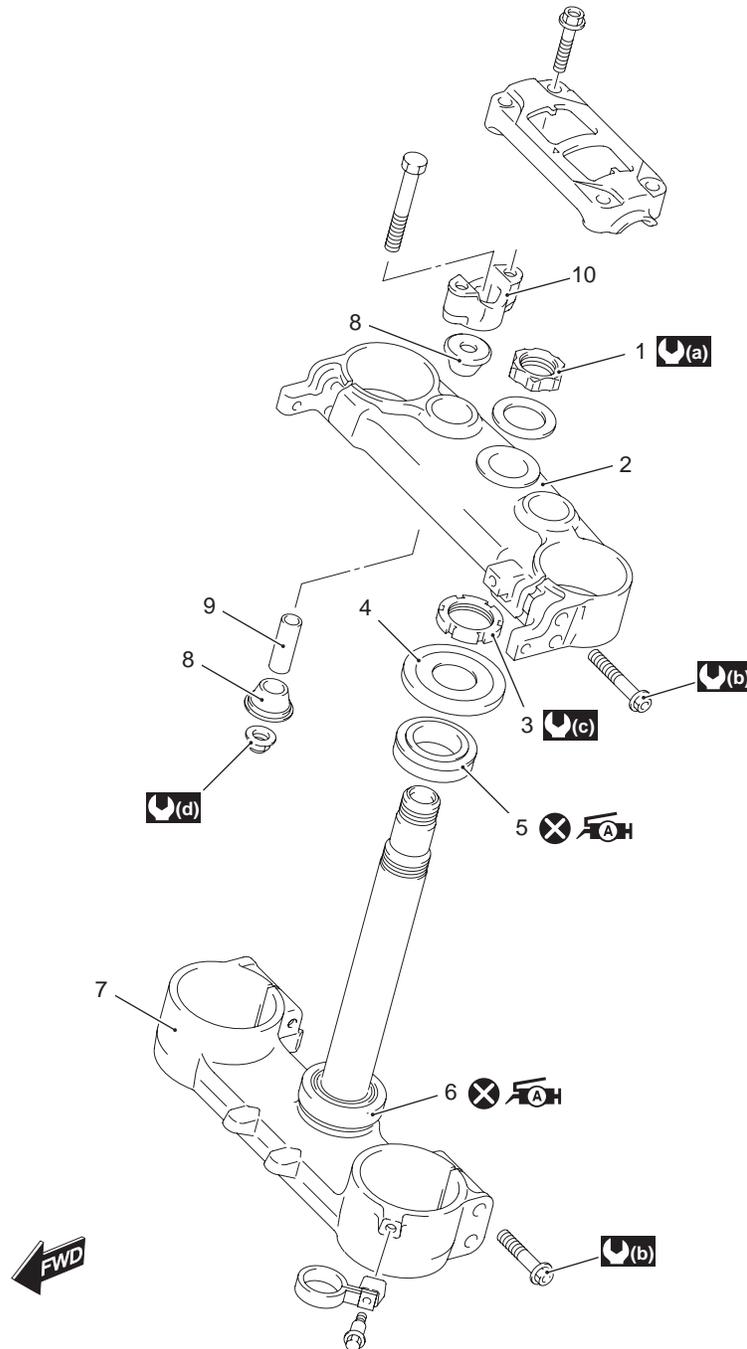
If any defects are found, replace the handlebars with a new one.



IA02J1620016-01

## Steering Components

BA02J26206005



IA02J1620017-03

1. Steering stem head nut	10. Spacer
2. Steering stem upper bracket	11. Handlebar holder
3. Steering stem nut	: 100 N·m (10.0 kgf·m, 72.5 lbf·ft)
4. Washer	: 23 N·m (2.3 kgf·m, 16.5 lbf·ft)
5. Steering stem upper dust seal	: 45 N·m (4.5 kgf·m, 32.5 lbf·ft) then turn back 1/4 – 1/2.
6. Steering stem upper bearing	: 45 N·m (4.5 kgf·m, 32.5 lbf·ft)
7. Steering stem lower bearing	: Apply grease.
8. Steering stem lower bracket	: Do not reuse.
9. Damper bushing	

## Steering Removal and Installation

BA02J26206006

### ⚠ CAUTION

**Make sure that the motorcycle is supported securely.**

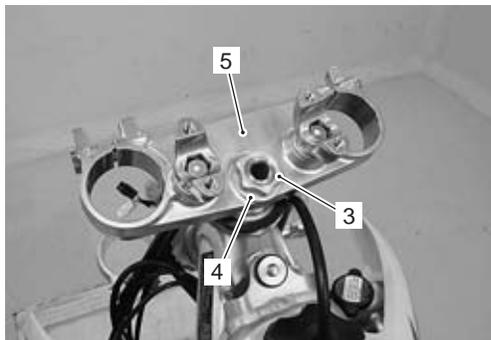
### Removal

- 1) Remove the head light. Refer to "Headlight Removal and Installation" in Section 9B (Page 9B-2).
- 2) Remove the speedometer and its bracket. Refer to "Speedometer Removal and Installation" in Section 9C (Page 9C-4).
- 3) Loosen the handlebar holder set nuts (1) and front brake hose guide (2).



IA02J1620018-02

- 4) Remove the handlebars. Refer to "Handlebars Removal and Installation" (Page 6B-3).
- 5) Remove the front forks. Refer to "Front Fork Removal and Installation" in Section 2B (Page 2B-2).
- 6) Remove the front fender. Refer to "Exterior Parts Removal and Installation" in Section 9D (Page 9D-1).
- 7) Remove the steering head nut (3) and washer (4).
- 8) Remove the steering stem upper bracket assembly (5).



IA02J1620020-02

- 9) Remove the steering stem nut (6) and washer (7) with the special tool.

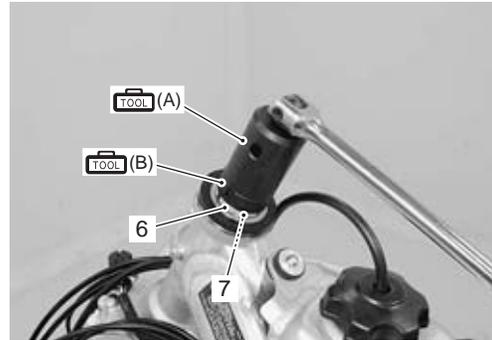
### NOTE

**When loosening the stem nuts, hold the steering stem lower bracket to prevent it from falling.**

### Special tool

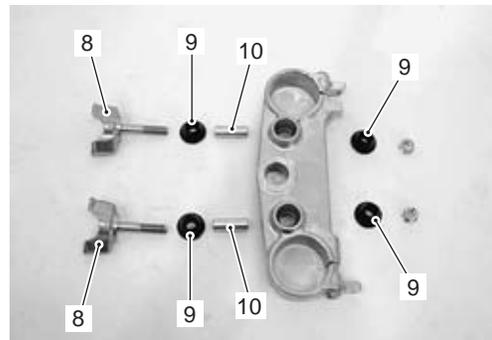
 (A): 09940-14911 (Steering stem nut socket wrench)

 (B): 09940-14960 (Steering stem nut socket wrench)



IA02J1620019-03

- 10) Remove the steering stem lower bracket.
- 11) Remove the handlebar holders (8), damper bushings (9) and spacers (10).



IA02J1620022-04

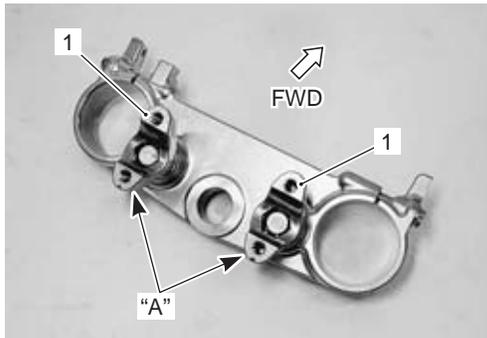
**Installation**

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

- Temporarily install the handlebar holders (1).

**NOTE**

**Make sure that the notch make “A” on the handlebar holder faces backward.**

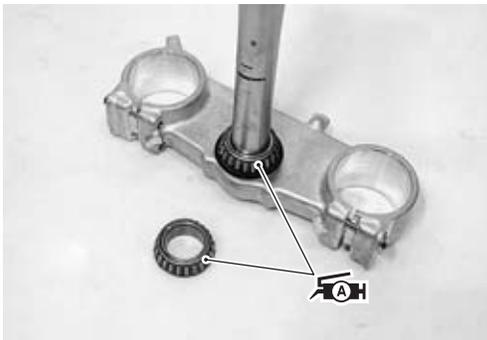


IA02J1620023-01

**Bearing**

Apply grease to the steering stem bearings before remounting the steering stem.

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



IA02J1620024-01

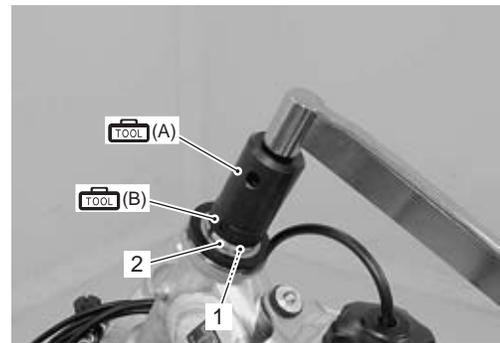
**Steering stem nut**

- Install the washer (1).
- Tighten the steering stem nut (2) to the 45 N·m (4.5 kgf·m, 32.5 lbf·ft) using the special tools.

**Special tool**

 (A): 09940-14911 (Steering stem nut socket wrench)

 (B): 09940-14960 (Steering stem nut socket wrench)

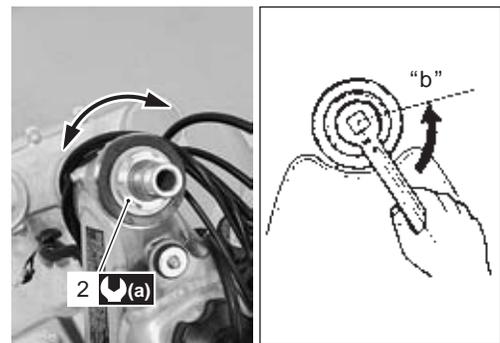


IA02J1620025-02

- Turn the steering stem lower bracket several times to the left and right so that the taper roller bearings seat properly.
- Loosen the steering stem nut (2) 1/4 – 1/2 turn “b”.

**Tightening torque**

**Steering stem nut (a): 45 N·m (4.5 kgf·m, 32.5 lbf·ft) then turn back 1/4 – 1/2**



IA02J1620026-03

**Steering stem upper bracket**

Install the front forks and steering stem upper bracket in the following steps:

- 1) Install the steering stem upper bracket, washer (1) and steering stem head nut (2).

**NOTE**

**The conical curve side of washer (1) faces upward.**

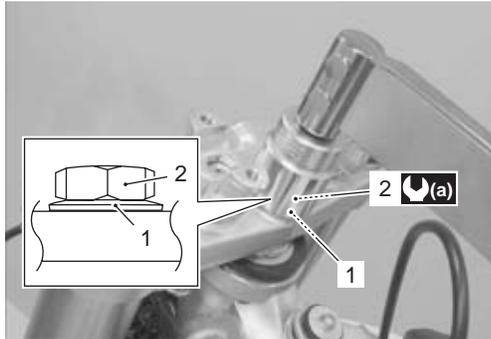
- 2) Install the front forks. Refer to “Front Fork Removal and Installation” in Section 2B (Page 2B-2).

## 6B-9 Steering / Handlebar:

3) Tighten the steering stem head nut (2).

### Tightening torque

**Steering stem head nut (a): 100 N·m (10.0 kgf·m, 72.5 lbf·ft)**

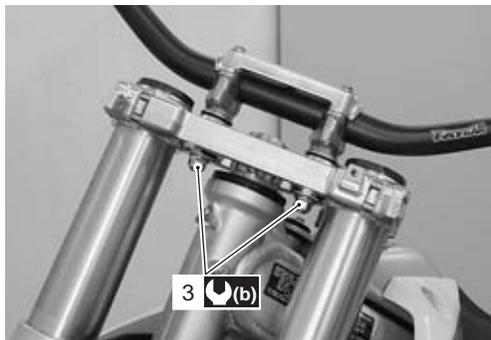


IA02J1620027-02

4) Temporary install the handlebars and tighten the handlebar bolts (3) to the specified torque.

### Tightening torque

**Handlebar holder bolt (b): 45 N·m (4.5 kgf·m, 32.5 lbf·ft)**



IA02J1620029-01

### Handlebars

Install the handlebars. Refer to "Handlebars Removal and Installation" (Page 6B-3).

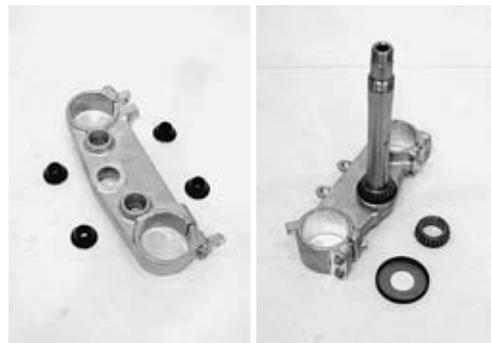
### Steering Related Parts Inspection

BA02J26206007

Refer to "Steering Removal and Installation" (Page 6B-7).

Inspect the removed parts for the following abnormalities:

- Distortion of the steering stem
- Bearing wear or damage
- Abnormal bearing noise
- Race wear or damage
- Dust seal damage
- Damper bushing wear or damage if any abnormal are found, replace defective parts with new ones.



IA02J1620030-01



IA02J1620031-01

### Steering System Inspection

BA02J26206008

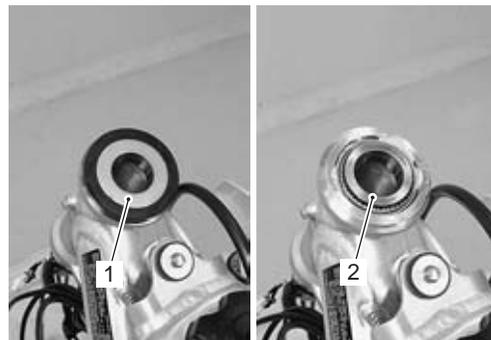
Refer to "Steering System Inspection" in Section 0B (Page 0B-25).

### Steering Stem Bearing Removal and Installation

BA02J26206009

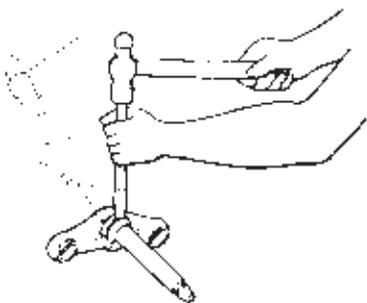
#### Removal

- 1) Remove the steering stem lower bracket. Refer to "Steering Removal and Installation" (Page 6B-7).
- 2) Remove the dust seal (1) upper bearing (2).



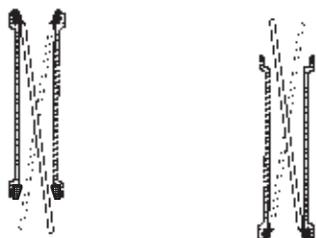
IA02J1620032-01

- 3) Remove the steering stem lower bearing and inner race using a chisel.



I649G1620033-02

- 4) Remove the steering stem upper and lower bearing races using the steel rod.



IA02J1620036-01

### Installation

Install the steering stem bearings in the reverse order of removal. Pay attention to the following points:

#### ⚠ CAUTION

**The removed bearings and races should be replaced with new ones.**

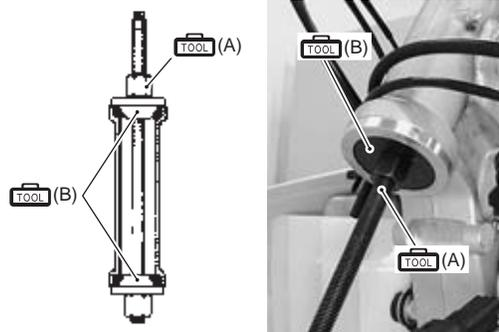
### Outer race

Press in the upper and lower outer races using the special tool.

#### Special tool

 (A): 09941-34513 (Bearing installer)

 (B): 09913-70210 (Bearing installing set (10 – 75 Φ))



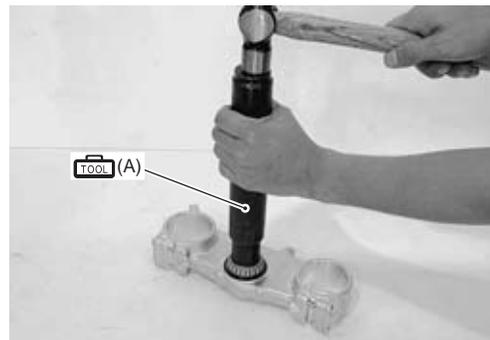
IA02J1620033-01

### Inner race

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

#### Special tool

 (A): 09925-18011 (Bearing installer)



IA02J1620034-01

- Install the steering. Refer to “Steering Removal and Installation” (Page 6B-7).

## Specifications

### Tightening Torque Specifications

BA02J26207001

Fastening part	Tightening torque			Note
	N-m	kgf-m	lbf-ft	
Handlebar clamp bolt	25	2.5	18.0	☞ (Page 6B-4)
Steering stem nut	45 N-m (4.5 kgf-m, 32.5 lbf-ft) then turn back 1/4 – 1/2			☞ (Page 6B-8)
Steering stem head nut	100	10.0	72.5	☞ (Page 6B-9)
Handlebar holder bolt	45	4.5	32.5	☞ (Page 6B-9)

#### NOTE

The specified tightening torque is described in the following.

“Handlebars Components” (Page 6B-1)

“Steering Components” (Page 6B-6)

#### Reference:

For the tightening torque of fastener not specified in this section, refer to “Tightening Torque List” in Section 0C (Page 0C-8).

## Special Tools and Equipment

### Recommended Service Material

BA02J26208001

Material	SUZUKI recommended product or Specification		Note
Grease	SUZUKI SUPER GREASE “A” or equivalent	P/No.: 99000–25010	☞ (Page 6B-5) / ☞ (Page 6B-8)
Handle grip bond	Handle Grip Bond (commercially available)	—	☞ (Page 6B-5)

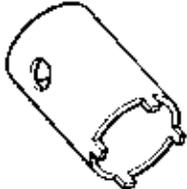
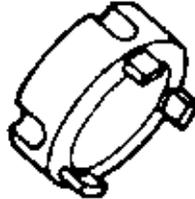
#### NOTE

Required service material is also described in the following.

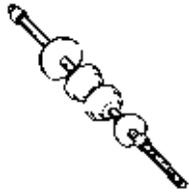
“Steering Components” (Page 6B-6)

### Special Tool

BA02J26208002

09913–70210 Bearing installing set (10 – 75 Φ) ☞ (Page 6B-10) 	09925–18011 Bearing installer ☞ (Page 6B-10) 
09940–14911 Steering stem nut socket wrench ☞ (Page 6B-7) / ☞ (Page 6B-8) 	09940–14960 Steering stem nut socket wrench ☞ (Page 6B-7) / ☞ (Page 6B-8) 

09941-34513  
Bearing installer  
☞ (Page 6B-10)





## Section 9

## Body and Accessories

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# Precautions

## Precautions

### Precautions for Electrical System

BA02J2900001

Refer to "General Precautions" in Section 00 (Page 00-1) and "Precautions for Electrical Circuit Service" in Section 00 (Page 00-2).

## Component Location

### Electrical Components Location

BA02J29003001

Refer to "Electrical Components Location" in Section 0A (Page 0A-6).

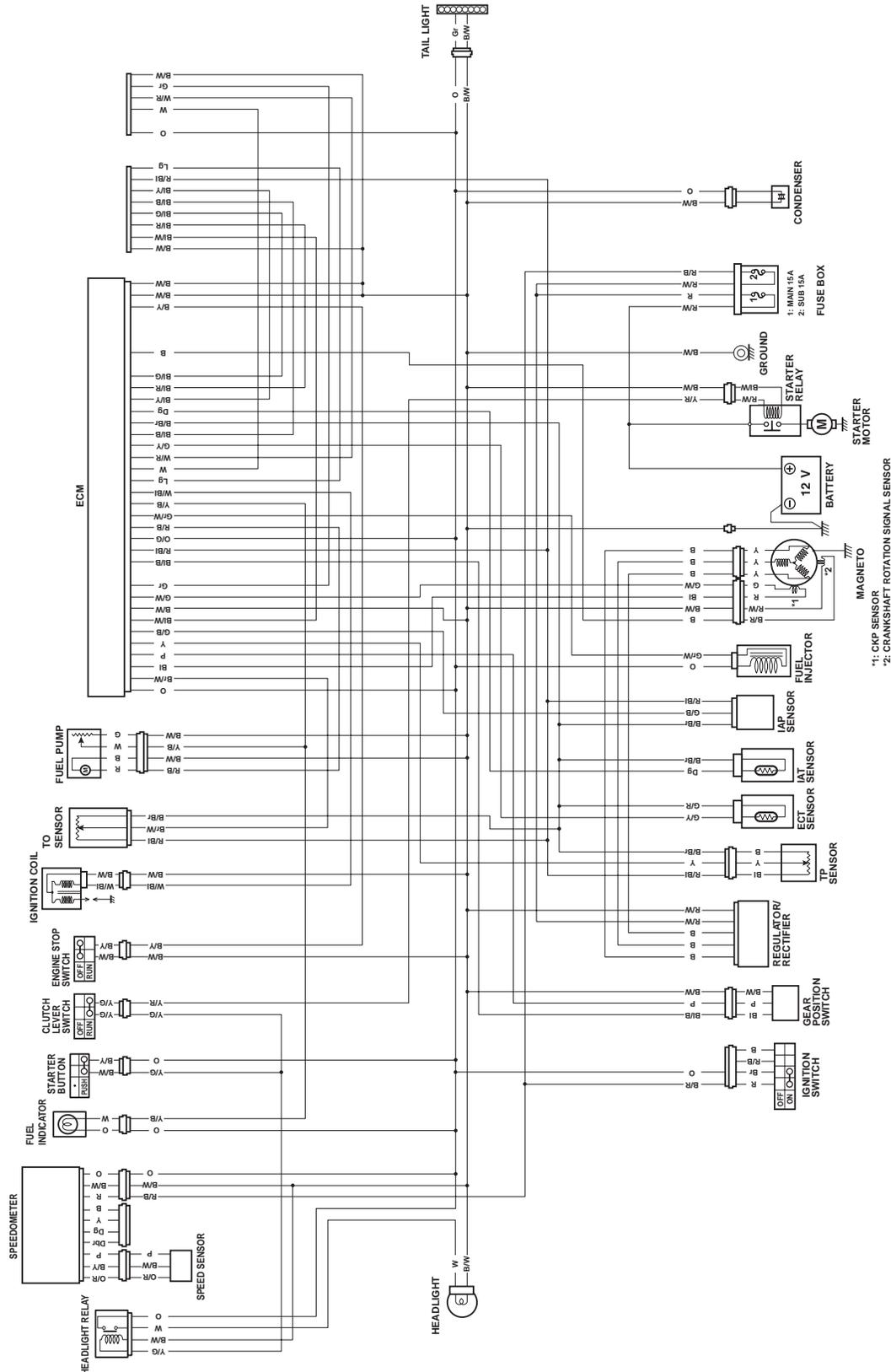
# Wiring Systems

## Schematic and Routing Diagram

### Wiring Diagram

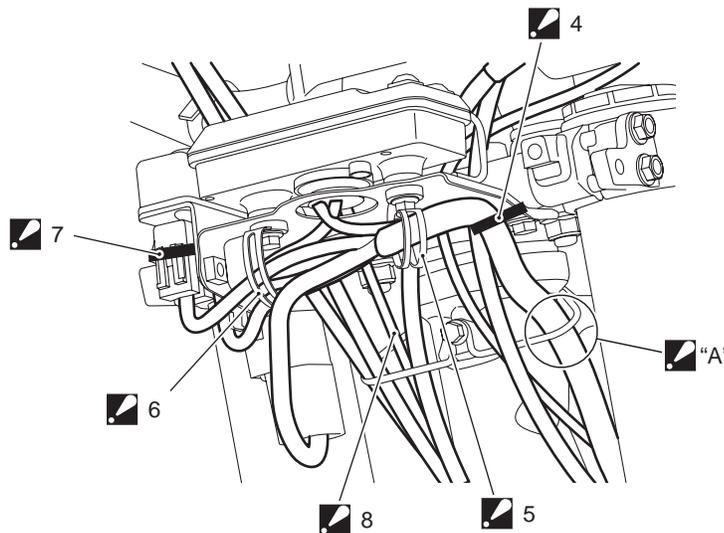
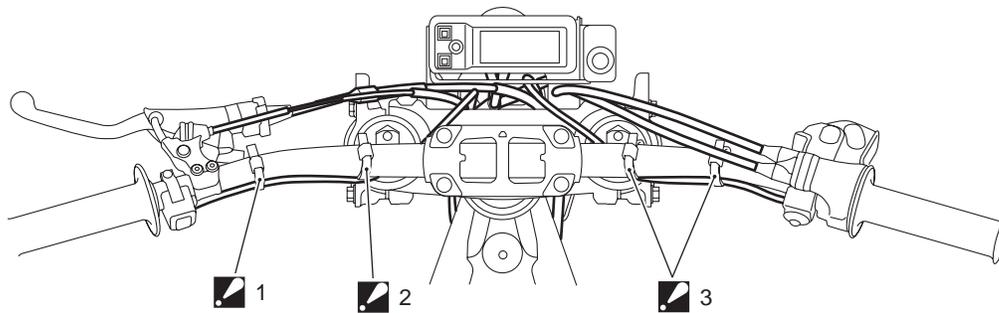
BA02J29102001

Refer to "Wire Color Symbols" in Section 0A (Page 0A-5).



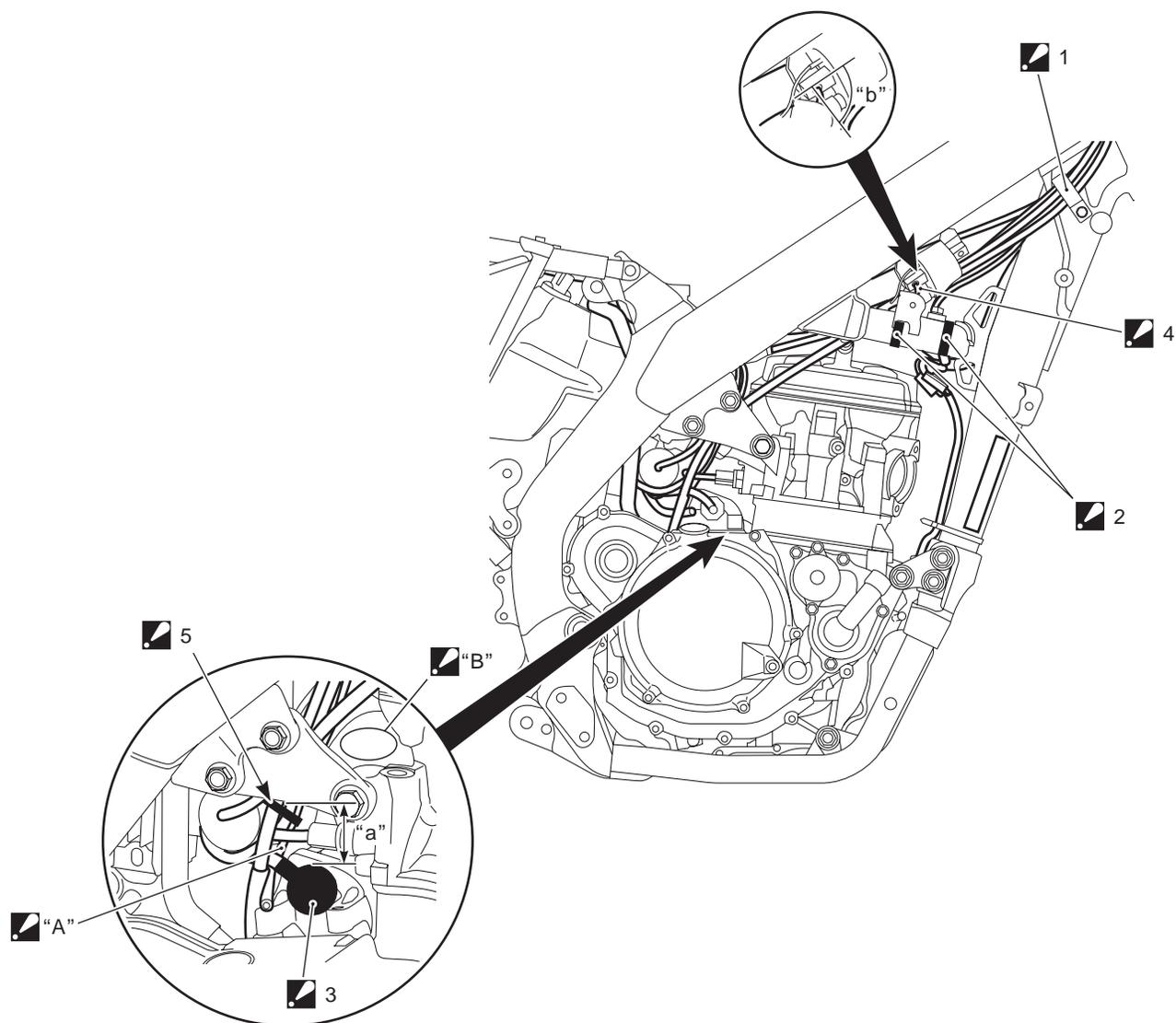
Wiring Harness Routing Diagram

BA02J29102002



IA02J1910909-02

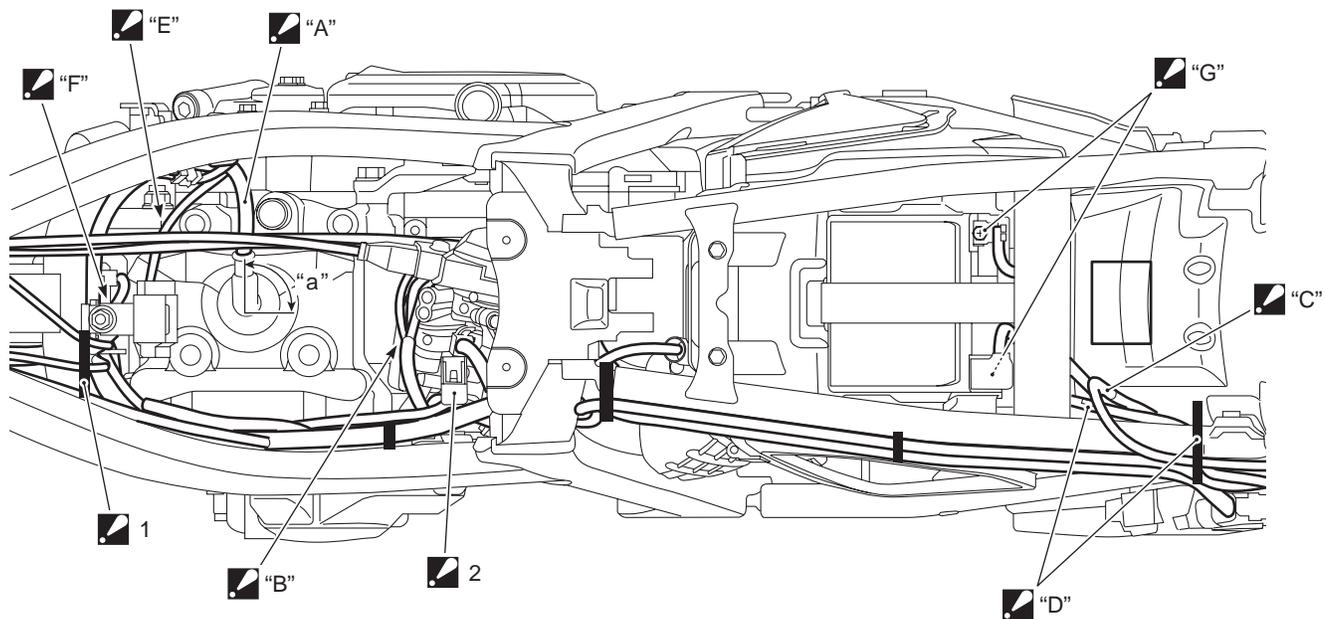
<p> 1. Clamp : Bind the engine stop switch lead wire. Set the tip of clamp foreword.</p>	<p> 6. Steel clamp : Fix the steel clamp toward the front side. Clamp the fuse box lead wire, ignition switch lead wire, speedometer lead wire and speed sensor lead wire.</p>
<p> 2. Clamp : Bind the engine stop switch lead wire and clutch position switch lead wire. Set the tip of clamp foreword.</p>	<p> 7. Clamp : Bind the fuse box lead wire and ignition switch lead wire. Set the lock part of clamp to the right side and tip of clamp backward.</p>
<p> 3. Clamp : Bind the starter button lead wire. Set the tip of clamp foreword.</p>	<p> 8. Starter button lead wire : Pass the starter button lead wire behind the cables.</p>
<p> 4. Clamp : Bind the wiring harness to the combination bracket. Set the lock part of clamp downward and tip of clamp to the right side.</p>	<p> "A": Pass the wiring harness inside the left harness guide.</p>
<p> 5. Steel clamp : Fix the steel clamp to 45° in the right-back side. Clamp the clutch position switch lead wire, speedometer lead wire and gray taping point of the wiring harness.</p>	



IA02J1910910-03

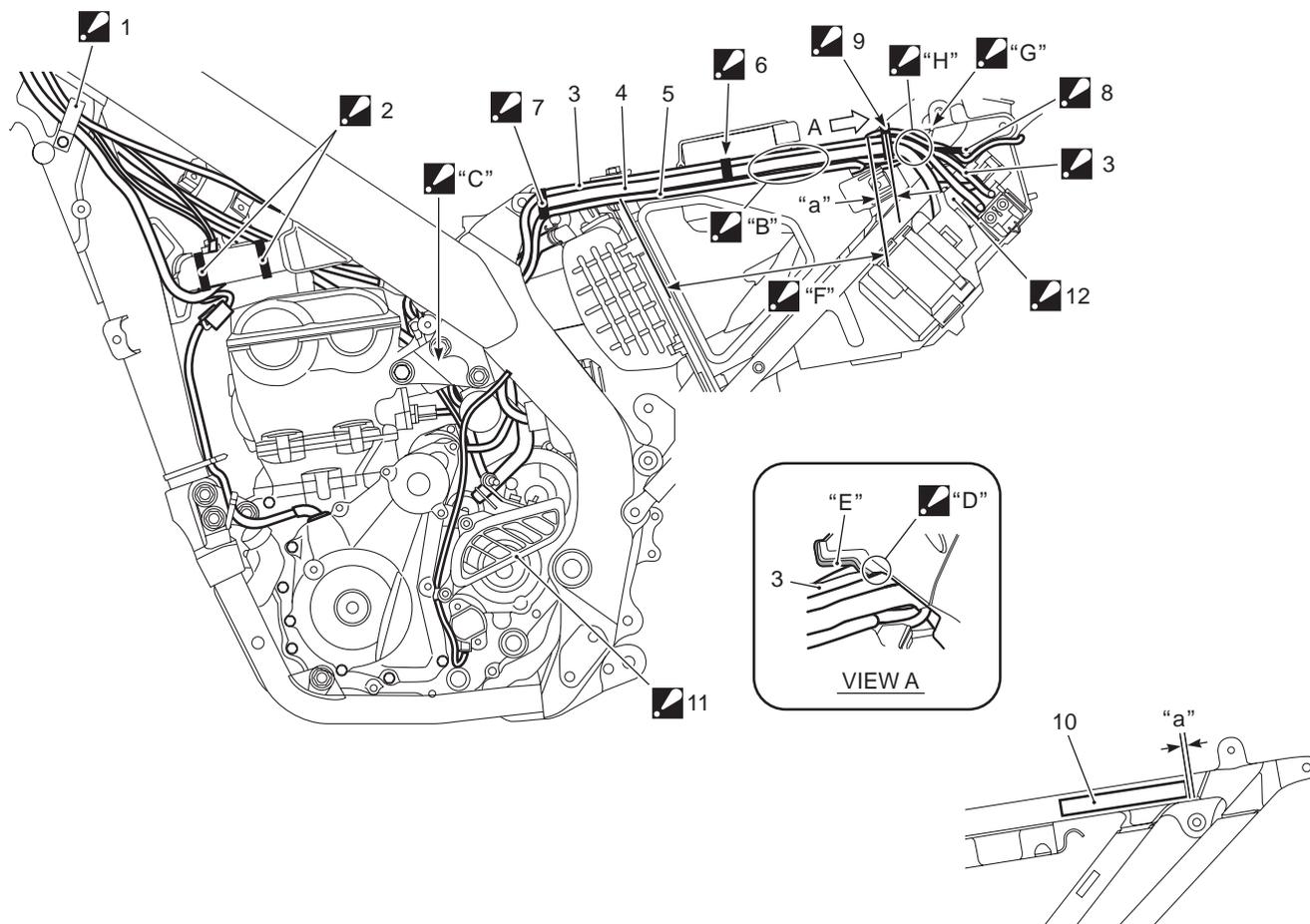
<p> 1. Cable clamp : Pass the throttle cables, clutch cable and starter button lead wire inside the cable clamp. Set the starter button lead wire in front of the cables.</p>	<p> "A": Pass the battery (-) lead wire left side of the starter motor lead wire and ECT sensor lead wire. Pass the TP sensor lead wire behind each lead wire.</p>
<p> 2. Clamp : Bind the wiring harness. Set the tip of clamps inside.</p>	<p> "B": : Pass the lead wires and couplers right side of the intake pipe. Do not contact the lead wires and couplers to the cylinder head.</p>
<p> 3. Starter motor lead wire cap.</p>	<p>"a": 39 – 41 mm (1.54 – 1.61 in)</p>
<p> 4. Ground lead wire : Tighten the ground lead wire terminal with the ignition coil mounting bolt.</p>	<p>"b": 90 °</p>
<p> 5. Clamp : Do not clamp the TP sensor lead wire. Pass the lead wires behind the clutch cable. Set the tip of clamp downward.</p>	

## 9A-4 Wiring Systems:



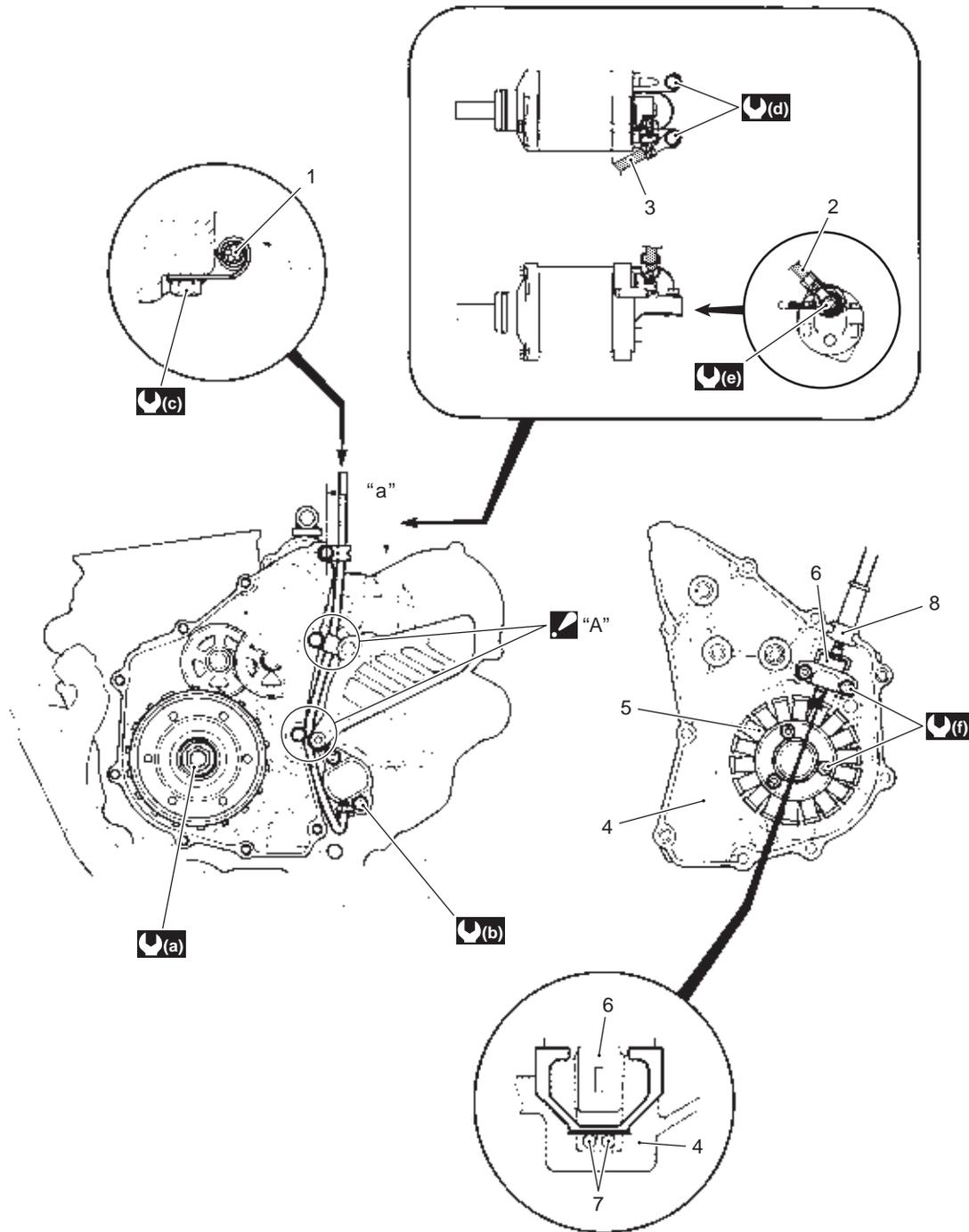
IA02J1910911-05

<p> 1. Clamp : Clamp the lead wire at tube part of the lead wire and set the tip of clamp right side.</p>	<p> "D": Face the fuse box over the lead wire and clamp the lead wire with the clamp.</p>
<p> 2. Fuel pump coupler : Set the fuel pump coupler over the throttle body.</p>	<p> "E": Do not route the TO sensor lead wire too tight.</p>
<p> "A": Pass the high tension code between the throttle cable and clutch cable.</p>	<p> "F": Pass the gear position switch lead wire under the TO sensor lead wire.</p>
<p> "B": Pass the lead wires and couplers over the intake pipe. Do not contact the lead wires and couplers to the cylinder head.</p>	<p> "G": Tighten the battery (+) and (-) lead wires from the top side.</p>
<p> "C": Pass the tail light lead wire coupler over the rear fender. Do not pinch the coupler between the air cleaner box and seat rail.</p>	<p>"a": 90°</p>



IA02J1910912-05

<p> 1. Cable clamp : Pass the engine stop switch lead wire, hot starter cable and wiring harness inside the clamp from top side.</p>	<p> 11. Engine sprocket cover : Do not pinch the lead wire when installing the engine sprocket cover.</p>
<p> 2. Clamp : Set the tip of clamp inside.</p>	<p> 12. Mode select coupler : Set the mode select coupler inside of the ECM coupler.</p>
<p> 3. Starter motor lead wire : Pass the starter motor lead wire between the seat rail and rear fender.</p>	<p> "B": Be careful not to pinch the lead wires between the seat rail and air cleaner box cover. Do not slacken. Pass the lead wires upper the rib of the air cleaner cover rid.</p>
<p>4. Wiring harness</p>	<p> "C": Pass the regulator/rectifier lead wire and gear position switch lead wire behind the TP sensor lead wire.</p>
<p>5. Battery (-) lead wire</p>	<p> "D": Pass the starter motor lead wire to the cutting part of left frame cover. Do not pinch the starter motor lead wire between the rib of left frame cover and seat rail.</p>
<p> 6. Clamp : Bind the lead wires at taping point with the clamp. Pass the starter motor lead wire and wiring harness up and down from top side.</p>	<p>"E": Rib part</p>
<p> 7. Clamp : Bind the lead wires at taping point with the clamp and set the tip of clamp inside of the seat rail. Pass the lead wires in order of starter motor lead wire, wiring harness and battery (-) lead wire from top side. Route the lead wires horizontally from this clamp backward. Position the clamp in front of square part of seat rail.</p>	<p> "F": Pass the battery (-) lead wire between the air cleaner box and seat rail in this section. Be careful that the lead wires does not pinch the lead wires when closing the air cleaner box rid. Clamp the lead wires with the clamp tightly.</p>
<p> 8. Clamp : Cut the clamp after clamping.</p>	<p> "G": Do not route the lead wires at this convex position.</p>
<p> 9. Clamp : Bind the lead wires at taping point with the clamp. Set the lock part of clamp inside of the seat rail. Face the tip of clamp downward. Bind the battery (+) lead wire inside of the seat rail. Pass the lead wires in order of tail light lead wire, battery (+) lead wire, starter motor lead wire and wiring harness from top side.</p>	<p> "H": Route the wiring harness and starter motor lead wire up and down from top side.</p>
<p>10. Protector</p>	<p>"a": 0 – 5 mm (0 – 0.2 in)</p>



IA02J1910906-04

1. Gear position switch lead wire	"A": Pass the gear position switch lead wire between the engine sprocket cover and crankcase.
2. Starter motor lead wire	: 100 N·m (10.0 kgf·m, 72.5 lbf·ft)
3. Battery (-) lead wire	: 6.5 N·m (0.65 kgf·m, 4.7 lbf·ft)
4. Magneto cover	: 11 N·m (1.1 kgf·m, 8.0 lbf·ft)
5. Crankshaft rotation signal sensor	: 10 N·m (1.0 kgf·m, 7.0 lbf·ft)
6. CKP sensor	: 6 N·m (0.6 kgf·m, 4.5 lbf·ft)
7. Magneto and crankshaft rotation signal sensor lead wires	: 5.5 N·m (0.55 kgf·m, 4.0 lbf·ft)
8. Grommet	

## Specifications

### Service Data

BA02J2910S001

### Electrical

Unit: mm

	Item	Specification	Note
Fuse size	Main	15 A	
	Sub	15 A	

### Tightening Torque Specifications

BA02J2910S002

#### NOTE

The specified tightening torque is described in the following.  
“Wiring Harness Routing Diagram” (Page 9A-2)

#### Reference:

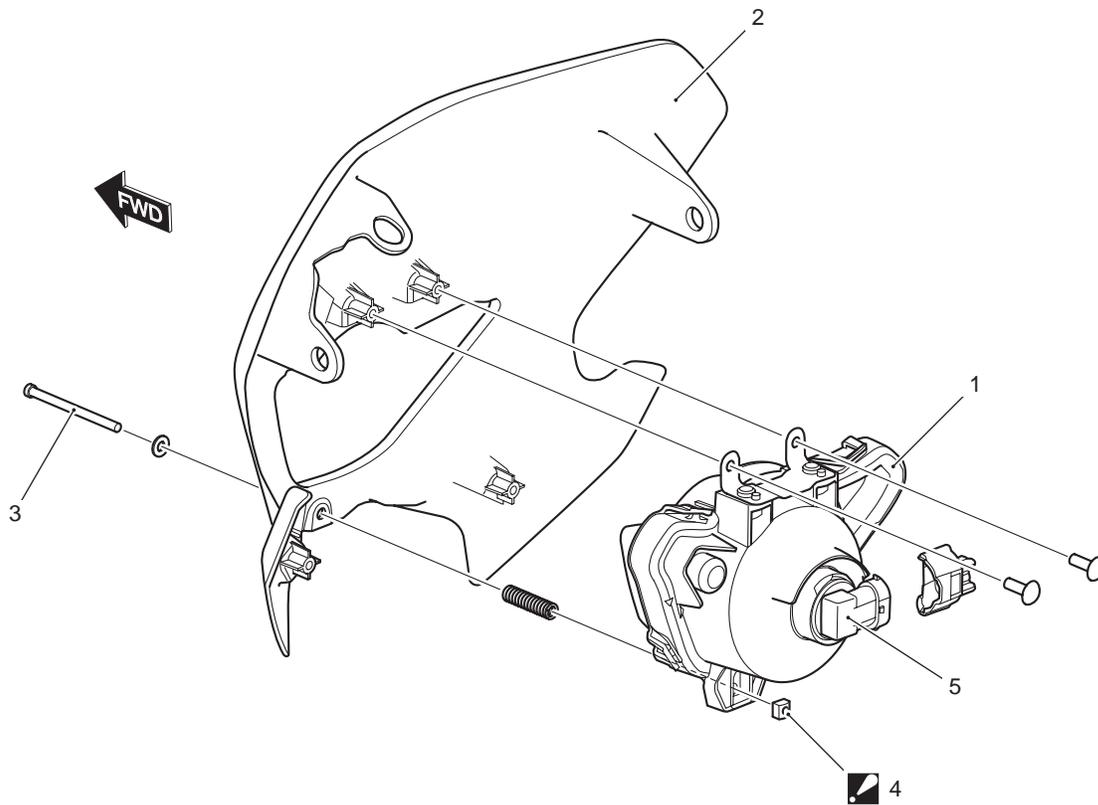
For the tightening torque of fastener not specified in this section, refer to “Tightening Torque List” in Section 0C (Page 0C-8).

# Lighting Systems

## Repair Instructions

### Headlight Construction

BA02J29206001

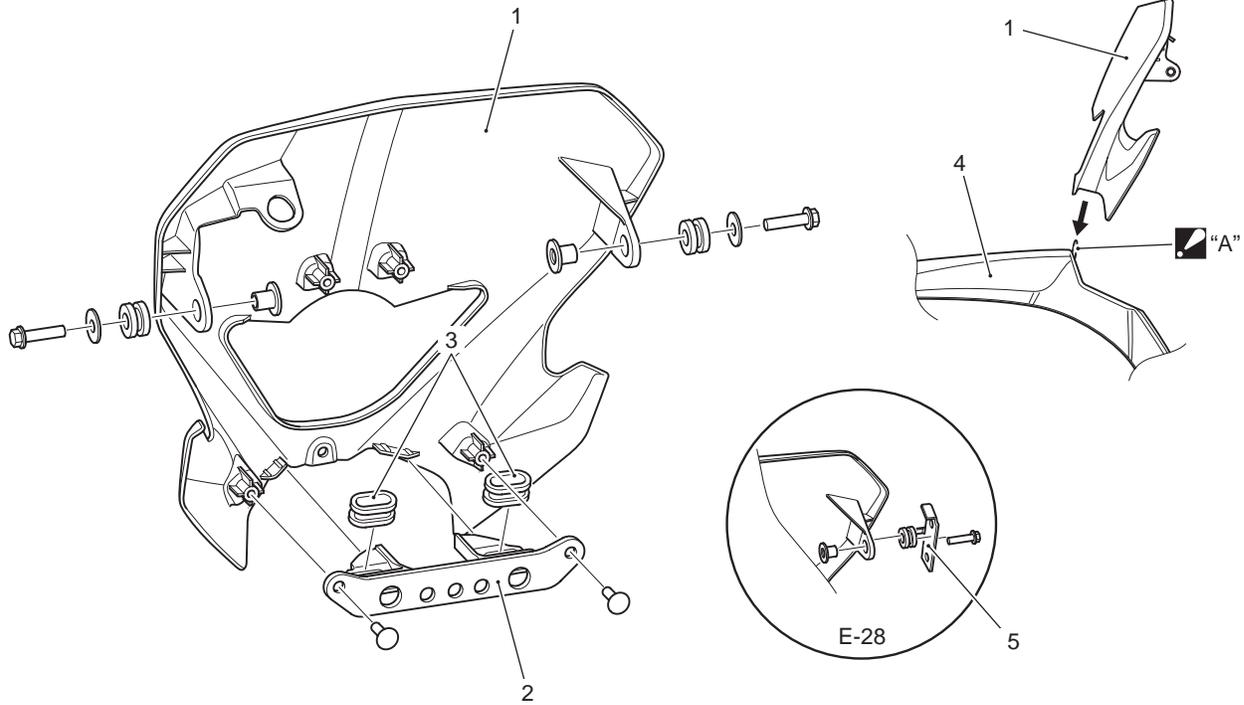


IA02J1920001-02

1. Headlight assembly	3. Headlight beam adjusting screw	5. Headlight bulb (12 V 35W)
2. Headlight cover	 4. Nut : Set the flat side forward.	

## Headlight Cover Construction

BA02J29206002



1. Headlight cover	4. Front fender
2. Lower headlight cover	5. Front side reflex reflector bracket (E-28 only)
3. Cushion	▲ "A": Set the headlight cover cushions to the ribs on the front fender.

IA02J1920002-02

## Headlight Removal and Installation

BA02J29206003

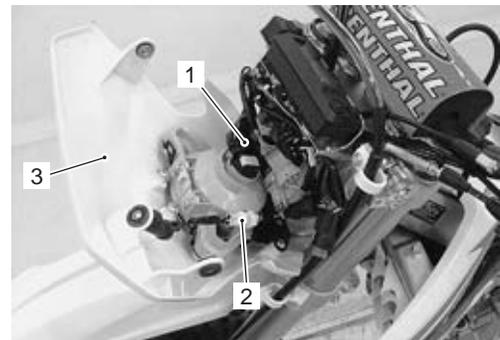
### Removal

- 1) Remove the headlight cover side bolts.



IA02J1920003-02

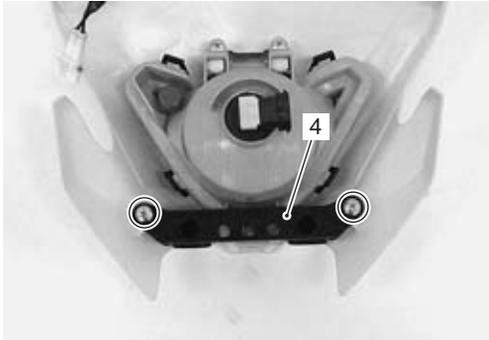
- 2) Disconnect the headlight coupler (1) and fuel indicator light coupler (2).
- 3) Remove the headlight cover (3).



IA02J1920004-03

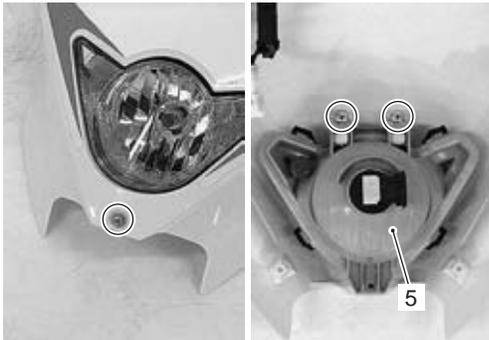
## 9B-3 Lighting Systems:

- 4) Remove the headlight lower cover (4).



IA02J1920006-03

- 5) Remove the headlight (5) by removing the screws.



IA02J1920018-01

### Installation

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

- Set the headlight cover cushions to the ribs on the front fender. Refer to “Headlight Cover Construction” (Page 9B-2).
- Adjust the headlight beam. Refer to “Headlight Beam Adjustment” (Page 9B-3).

### Headlight Bulb Replacement

BA02J29206004

Replace the headlight bulb in the following procedures:

#### ⚠ CAUTION

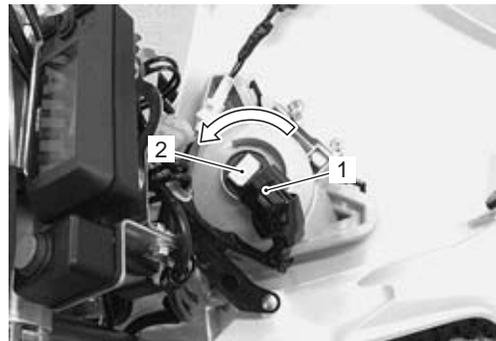
- **When you touch the bulb with your bare hands, clean the bulb with a cloth moistened with alcohol or soapy water to prevent premature bulb failure.**
- **Do not use bulb other than those with predetermined wattage.**
- **Remove the bulb when it gets cool, since it may be heated to an extremely high temperature when the headlight is turned ON.**

- 1) Remove the headlight cover side bolts.



IA02J1920003-02

- 2) Disconnect the headlight coupler (1).
- 3) Turn the bulb (2) counterclockwise and remove it.



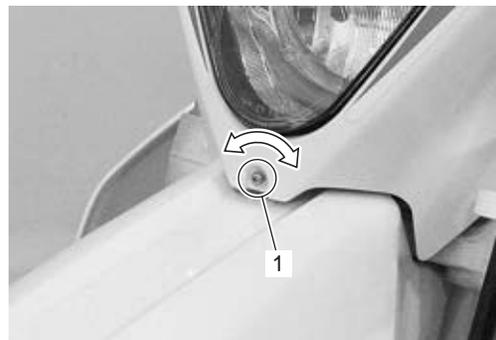
IA02J1920020-01

- 4) Replace the bulb with a new one.
- 5) Reinstall the removed parts.

### Headlight Beam Adjustment

BA02J29206005

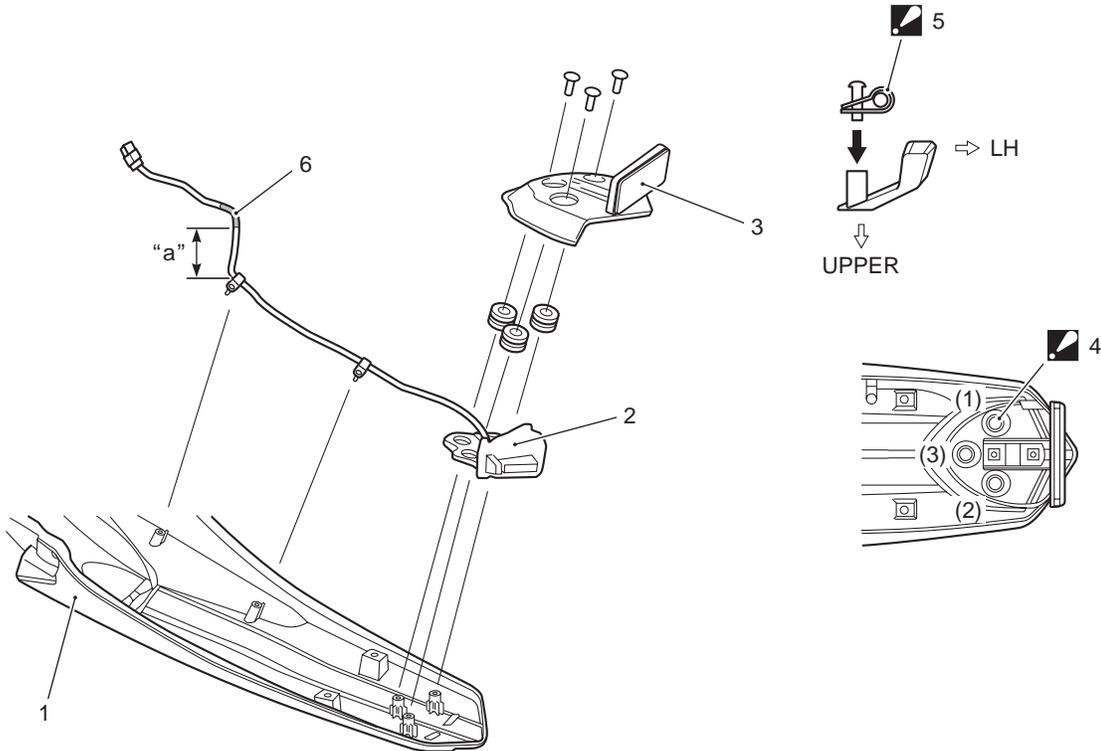
Adjust the headlight beam by turning the adjusting screw (1) in or out.



IA02J1920011-03

Tail Light Construction

BA02J29206006



IA02J1920012-05

1. Rear fender	5. Clamp : Install the clamps as shown in the illustration.
2. Tail light	6. Cushion
3. Rear reflex reflector (E-28 only)	"a": 50 mm (2.0 in)
4. Screw : Tighten the screws in the ascending order of numbers.	

## Tail Light Removal and Installation

BA02J29206007

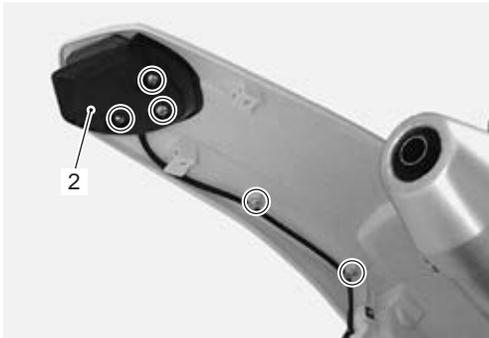
### Removal

- 1) Remove the left frame cover. Refer to "Exterior Parts Removal and Installation" in Section 9D (Page 9D-1).
- 2) Disconnect the rear tail light coupler (1).



IA02J1920013-01

- 3) Remove the tail light assembly (2).

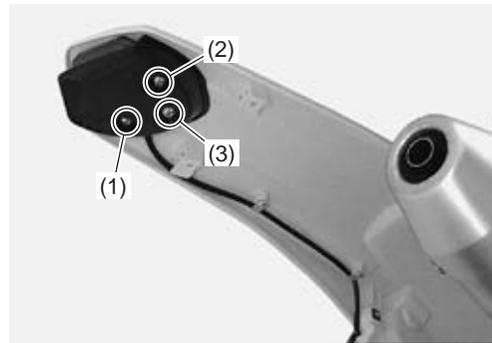


IA02J1920014-01

### Installation

Install the tail light in the reverse order of removal. Pay attention to the following point:

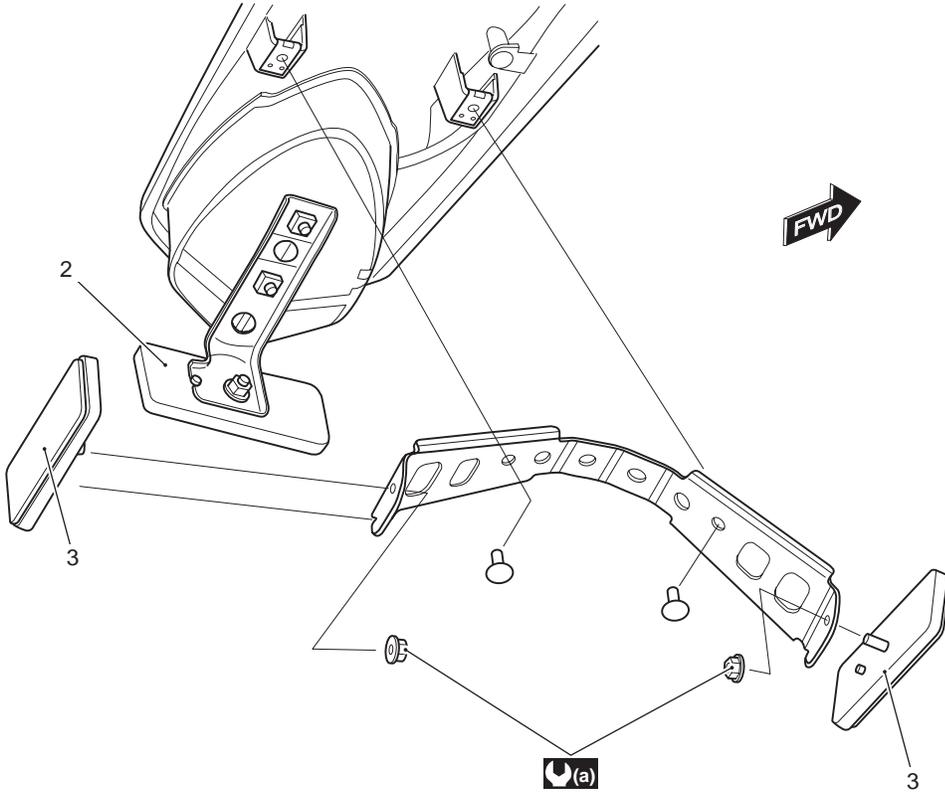
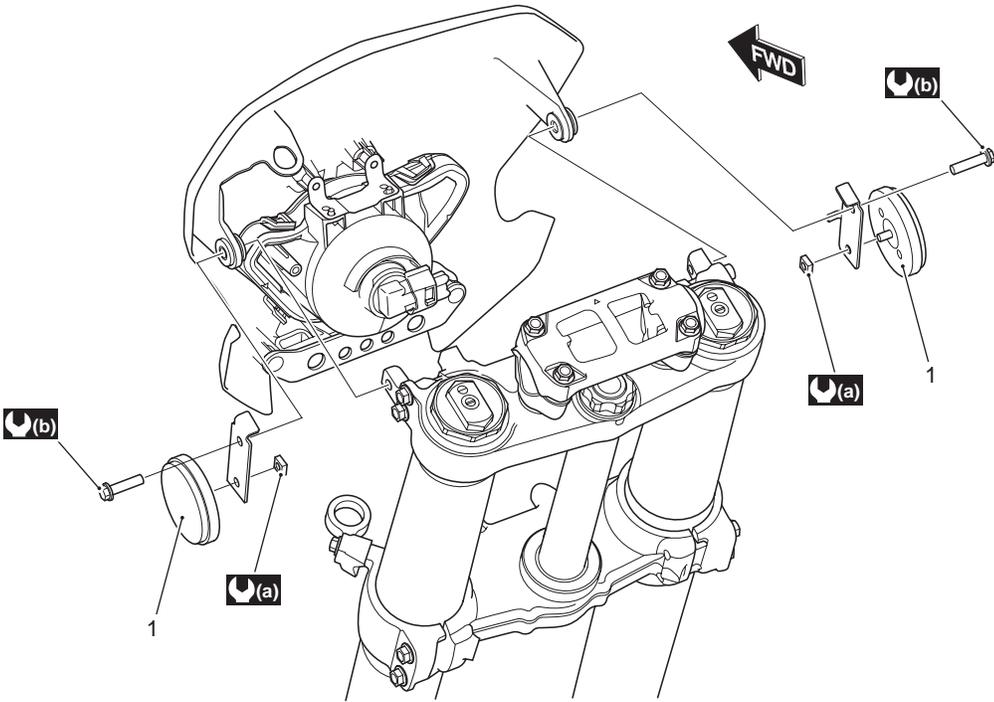
- Tighten the tail light screws in the ascending order of numbers.



IA02J1920015-01

Reflex Reflector Construction (E-28 only)

BA02J29206008



1. Front side reflex reflector	(a) : 1.8 N-m (0.18 kgf-m, 1.3 lbf-ft)
2. Rear reflex reflector	(b) : 12 N-m (1.2 kgf-m, 8.5 lbf-ft)
3. Rear side reflex reflector	

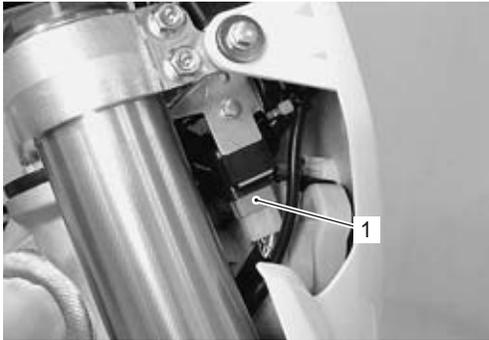
IA02J1920016-05

## 9B-7 Lighting Systems:

### Headlight Relay Inspection

BA02J29206009

- 1) Remove the headlight relay (1).



IA02J1920017-01

- 2) 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".

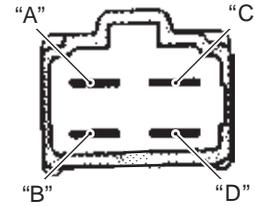
If there is no insulation, replace it with a new one.

#### Special tool

 : 09900-25008 (Multi circuit tester set)

#### Tester knob indication set

Continuity test (  )



I718H1160006-03

- 3) Reinstall the headlight relay.

## Specifications

### Service Data

BA02J29207001

#### Wattage

Unit: W

Item	Specification
Headlight	35
Tail light	LED

### Tightening Torque Specifications

BA02J29207002

#### NOTE

The specified tightening torque is described in the following.  
 "Reflex Reflector Construction (E-28 only)" (Page 9B-6)

#### Reference:

For the tightening torque of fastener not specified in this section, refer to "Tightening Torque List" in Section 0C (Page 0C-8).

## Special Tools and Equipment

### Special Tool

BA02J29208001

<p>09900-25008                      Multi circuit tester set                      (Page 9B-7)</p> 	
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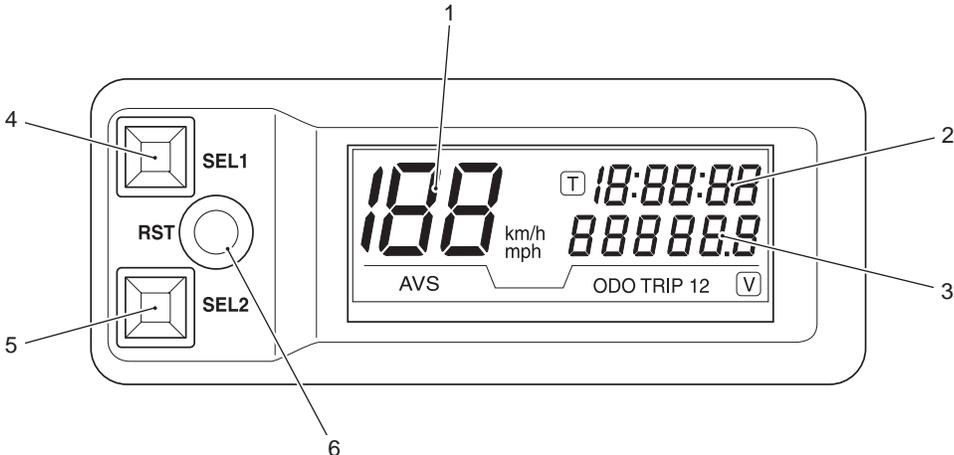
# Combination Meter / Fuel Meter / Horn

## General Description

### Speedometer System Description

BA02J29301001

The LCDs indicate followings:  
Speed / Average speed, Clock / Timer, Odo / Trip 1 / Trip 2 / Voltage and Tire diameter calculator.



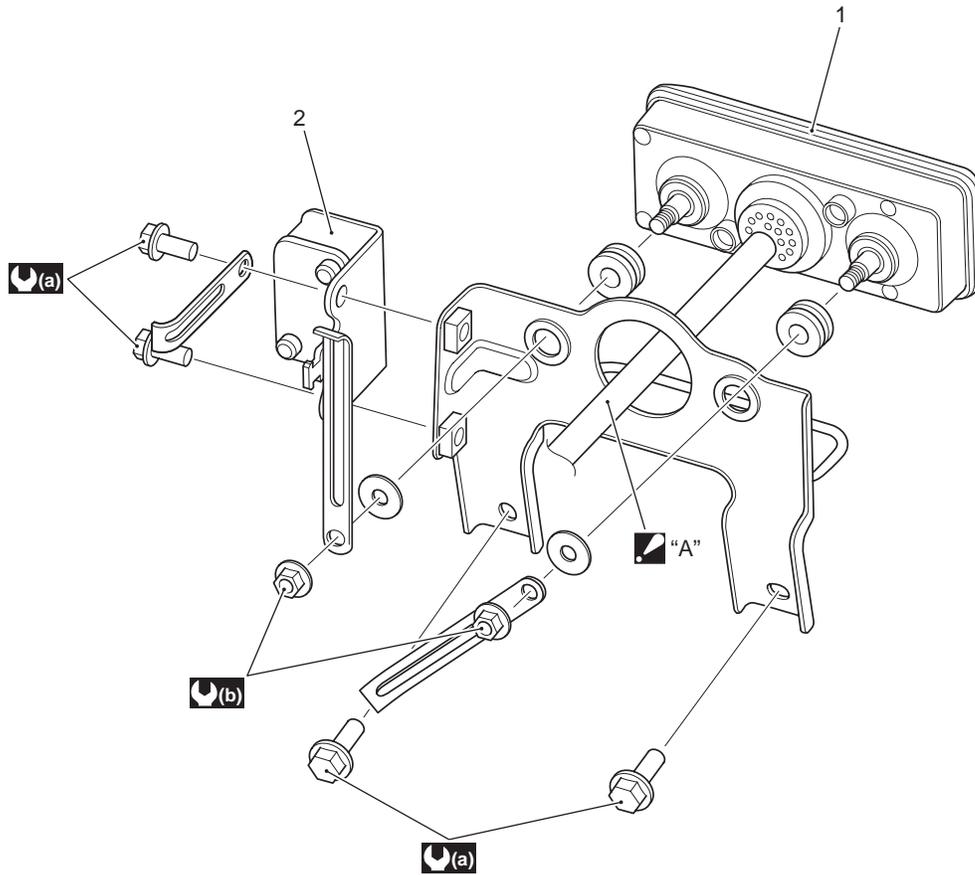
IA02J1930001-02

1. LCD (Speed / Average speed)	4. Select button 1
2. LCD (Clock / Timer, Tire diameter calculator)	5. Select button 2
3. LCD (Odo / Trip 1 / Trip 2 / Voltmeter, Tire diameter calculator)	6. Reset button

## Repair Instructions

### Speedometer Construction

BA02J29306001

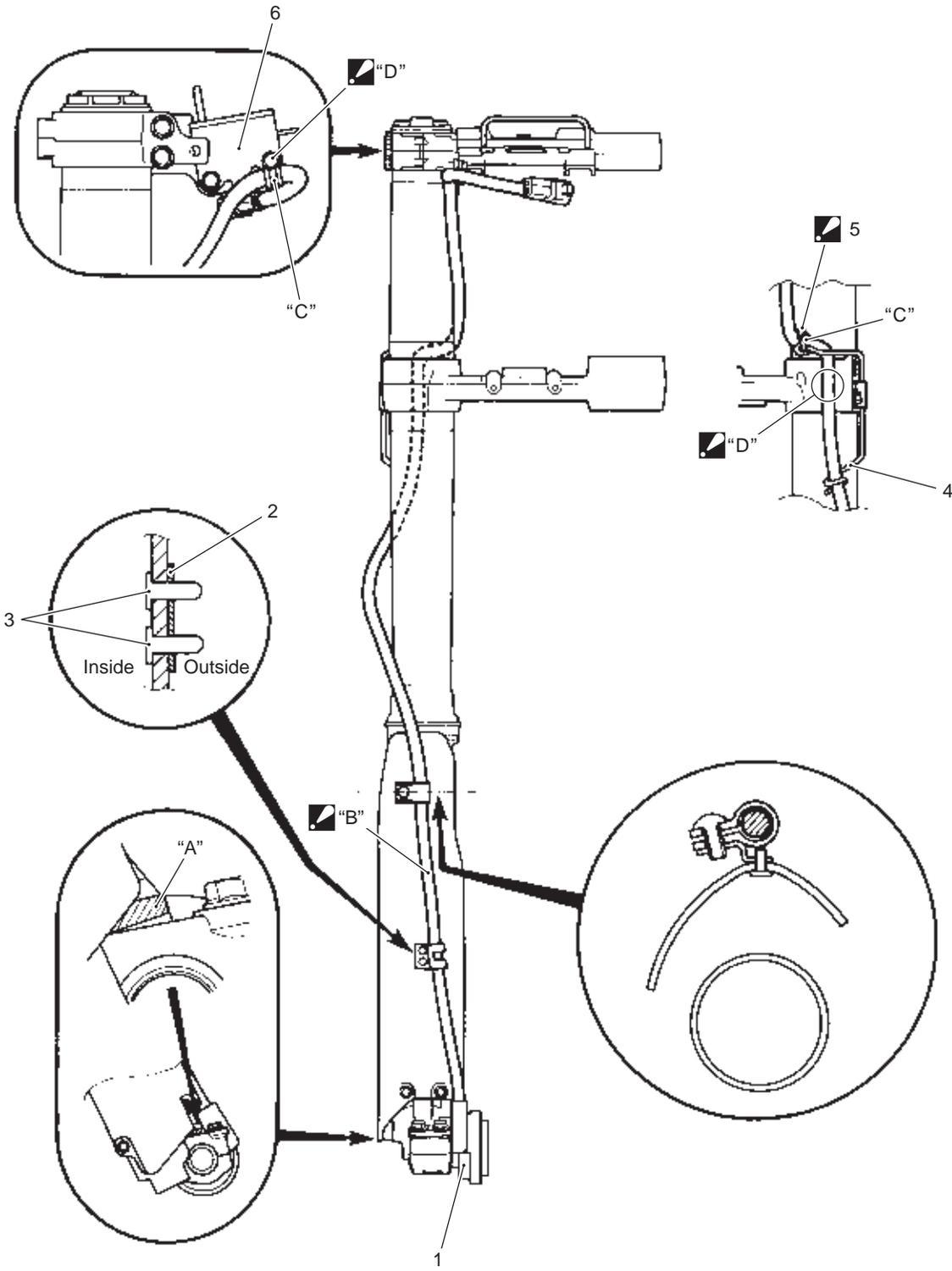


IA02J1930012-03

1. Speedometer meter	: 10 N-m (1.0 kgf-m, 7.0 lbf-ft)
2. Ignition switch	: 4.5 N-m (0.45 kgf-m, 3.5 lbf-ft)
"A": Pass the combination meter harness through the hole of the bracket.	

Speed Sensor Harness Routing Diagram

BA02J29306002



IA02J1930013-03

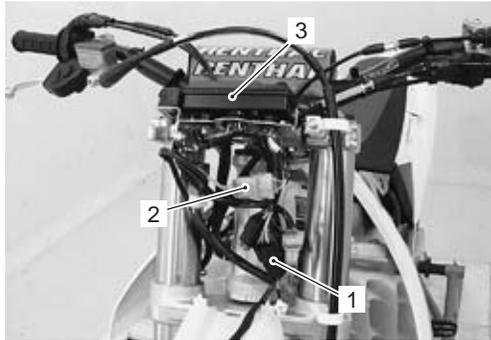
1. Speed sensor	6. Ignition switch
2. Guide	"A": Stopper part of the speed sensor
3. Rivet	☑ "B": Route the speed sensor harness tight along the fork protector.
4. Guide	"C": Marking
☑ 5. Clamp : Cut off the excess end of clamp after binding. Face the lock part of clamp over the lead wire.	☑ "D": Keep clearance between the speed sensor harness and bolt.

### Speedometer Removal and Installation

BA02J29306003

#### Removal

- 1) Remove the battery (-) lead wire.
- 2) Remove the headlight cover. Refer to "Headlight Removal and Installation" in Section 9B (Page 9B-2).
- 3) Disconnect the combination meter lead wire coupler (1) and speed sensor lead wire coupler (2).
- 4) Remove the Speedometer (3).



IA02J1930002-01

#### Installation

Installation is in the reverse order of removal.

### Speedometer Inspection

BA02J29306004

If the speedometer, odometer or tripmeter does not function properly, inspect the speed sensor and its coupler connections. If the speed sensor and coupler connections are OK, replace the combination meter unit with a new one. Refer to "Speedometer Removal and Installation" (Page 9C-4).

### Speed Sensor Removal and Installation

BA02J29306005

Refer to "Front Wheel Assembly Removal and Installation" in Section 2D (Page 2D-3) and "Speed Sensor Harness Routing Diagram" (Page 9C-3).

### Speed Sensor Inspection

BA02J29306006

Inspect the speed sensor in the following procedures:

- 1) Remove the headlight cover. Refer to "Headlight Removal and Installation" in Section 9B (Page 9B-2).
- 2) Disconnect the speed sensor lead wire coupler (1).



IA02J1930003-01

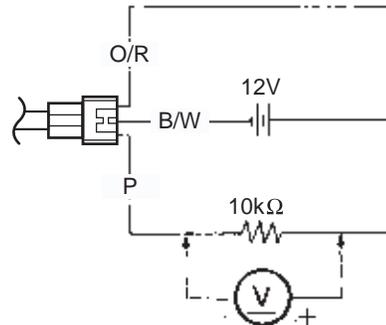
- 3) Raise the front wheel off the ground and support the motorcycle with a jack or a wooden block.
- 4) Connect a 12 V battery (between O/R and B/W), 10 kΩ resistor (between O/R and P) and multi circuit tester (tester (+) probe to O/R and tester (-) probe to P) as shown in the figure.

#### Special tool

 : 09900-25008 (Multi circuit tester set)

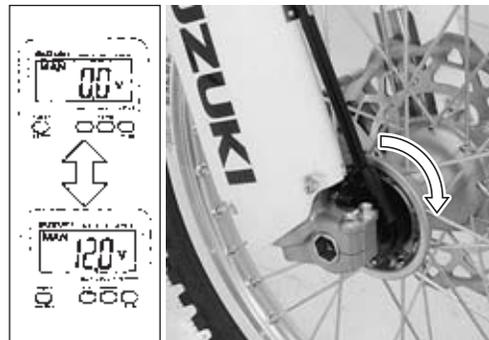
#### Tester knob indication

Voltage ( --- )



IA02J1930004-01

- 5) Turn the front wheel and check that voltage varies between 0 – 12 V.  
If any abnormal condition is noted, replace the speed sensor with a new one. Refer to "Speed Sensor Removal and Installation" (Page 9C-4).



IA02J1930005-02

- 6) Install the removed parts.

### Fuel Level Indicator Light Inspection

BA02J29306007

Check that the fuel level indicator light (1) lights on for about 2 seconds when the ignition switch is turned on. If the indicator light does not light on, replace the indicator light after inspecting its bulb and lead wires. Refer to "Fuel Level Indicator Light Removal and Installation" (Page 9C-5).



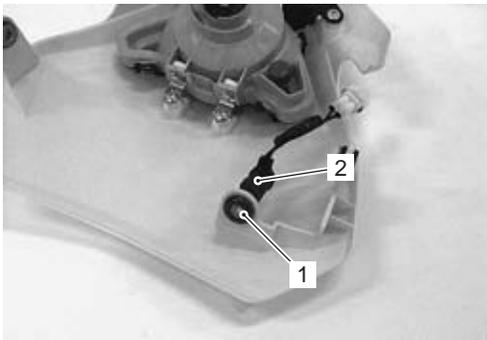
IA02J1930006-01

### Fuel Level Indicator Light Removal and Installation

BA02J29306008

#### Removal

- 1) Remove the headlight cover. Refer to "Headlight Removal and Installation" in Section 9B (Page 9B-2).
- 2) Remove the lens (1).
- 3) Remove the fuel level indicator light (2).



IA02J1930007-03

#### Installation

Installation is in the reverse order of removal.

### Fuel Level Indicator Switch (Thermistor) Inspection

BA02J29306009

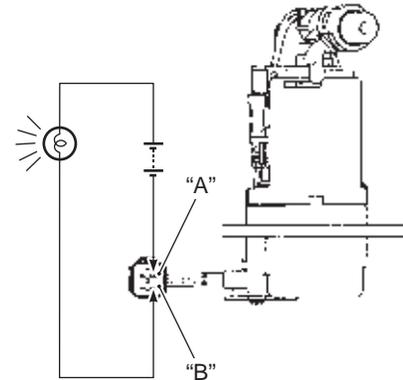
Inspect the fuel level indicator switch (thermistor) in the following procedures:

- 1) Remove the fuel pump assembly. Refer to "Fuel Pump Removal and Installation" in Section 1G (Page 1G-6).
- 2) Connect 12 V battery and test bulb (12 V, 3.4 W) to the lead wires as shown in the figure. The bulb should come on after one minutes if the switch is in good condition.

- 3) When the switch is immersed in kerosene, the bulb should go out. If the bulb remains lit, replace the fuel pump with a new one.

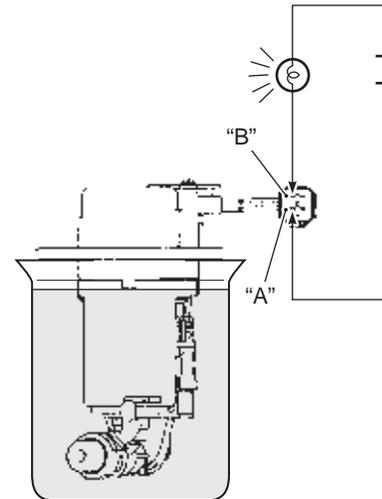
#### NOTE

- When the bulb turns off, immediately pick up the fuel pump assembly from kerosene.
- After the check has been completed, wash the fuel pump assembly with gasoline.



IA02J1930010-03

"A": Green	"B": White
------------	------------



IA02J1930008-04

"A": Green	"B": White
------------	------------

- 4) Reinstall the fuel pump assembly. Refer to "Fuel Pump Removal and Installation" in Section 1G (Page 1G-6).

**Ignition Switch Inspection**

BA02J29306010

Inspect the ignition switch in the following procedures:

- 1) Remove the headlight cover. Refer to "Headlight Removal and Installation" in Section 9B (Page 9B-2).
- 2) Disconnect the ignition switch coupler (1).



IA02J1930009-01

- 3) Inspect the ignition switch for continuity with the tester. If any abnormality is found, replace the ignition switch with a new one.

**Special tool**

 : 09900-25008 (Multi circuit tester set)

**Tester knob indication**

Continuity (  )

Color Position	R	Br	R/B	B
ON				
OFF				

IA02J1930011-01

- 4) After finishing the ignition switch inspection, reinstall the removed parts.

**Ignition Switch Removal and Installation**

BA02J29306011

Refer to "Ignition Switch Removal and Installation" in Section 1H (Page 1H-9).

**Specifications**

**Service Data**

BA02J29307001

**Wattage**

Unit: W

Item	Specification
Fuel indicator light	12 V 3.4 W

**Tightening Torque Specifications**

BA02J29307002

**NOTE**

The specified tightening torque is described in the following.  
 "Speedometer Construction" (Page 9C-2)

**Reference:**

For the tightening torque of fastener not specified in this section, refer to "Tightening Torque List" in Section 0C (Page 0C-8).

**Special Tools and Equipment**

**Special Tool**

BA02J29308001

09900-25008 Multi circuit tester set ☞ (Page 9C-4) / ☞ (Page 9C-6)	
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# Exterior Parts

## Repair Instructions

### Exterior Parts Removal and Installation

BA02J29406001

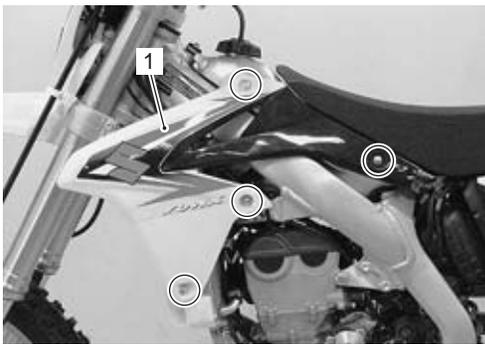
#### Radiator Cover

##### Removal

##### NOTE

The right radiator covers are installed symmetrically and therefore the removal/installation procedure for one side is the same as that for the other side.

Remove the radiator cover (1) by removing the bolts.



IA02J1940001-02

##### Installation

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

- Use the longer bolt "A" (L16) to the radiator side.



IA02J1940002-01

### Seat

#### Removal

Remove the seat by removing the bolts.



IA02J1940003-01

#### Installation

Install the seat in the reverse order of removal. Pay attention to the following point:

- Be sure to insert the seat hooks into the retainers.



IA02J1940004-02

**Frame Cover**

**Removal**

Remove the frame cover (1) (LH/RH) by removing the bolts.



IA02J1940005-01



IA02J1940006-01

**Installation**

Install the frame cover (LH/RH) in the reverse order of removal.

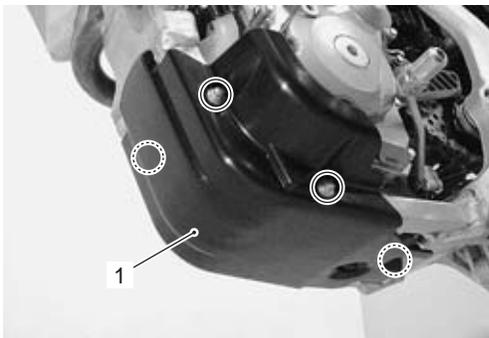
**CAUTION**

When installing the left frame cover, be careful that the wiring harness does not pinch between left frame cover and seat rail. Refer to "Wiring Harness Routing Diagram" in Section 9A (Page 9A-2).

**Protector**

**Removal**

Remove the protector (1) by removing the bolts.



IA02J1940007-01

**Installation**

Install the protector in the reverse order of removal. Pay attention to the following point:

- Make sure that the radiator reservoir tank hoses are routed properly. Refer to "Water Hose Routing Diagram" in Section 1F (Page 1F-3).

**Front Fender**

**Removal**

Refer to "Front Fork Removal and Installation" in Section 2B (Page 2B-2).

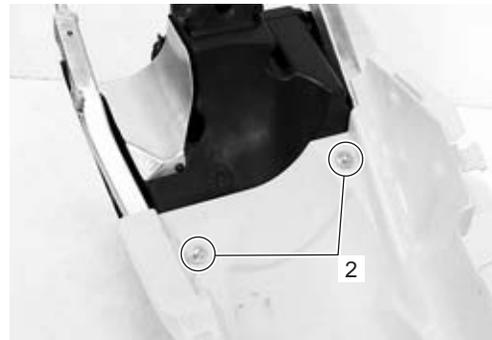
**Installation**

Refer to "Front Fork Removal and Installation" in Section 2B (Page 2B-2).

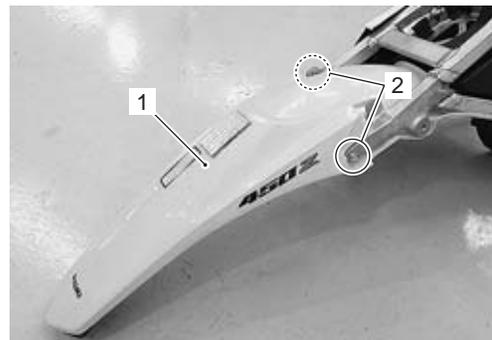
**Rear Fender**

**Removal**

- 1) Remove the seat rail along with the rear fender. Refer to "Seat Rail Removal and Installation" in Section 9E (Page 9E-2).
- 2) Remove the rear fender (1) from the seat rail by removing the mounting bolts (2).



IA02J1940008-01



IA02J1940009-01

**Installation**

Install the rear fender in the reverse order of removal. Pay attention to the following point:

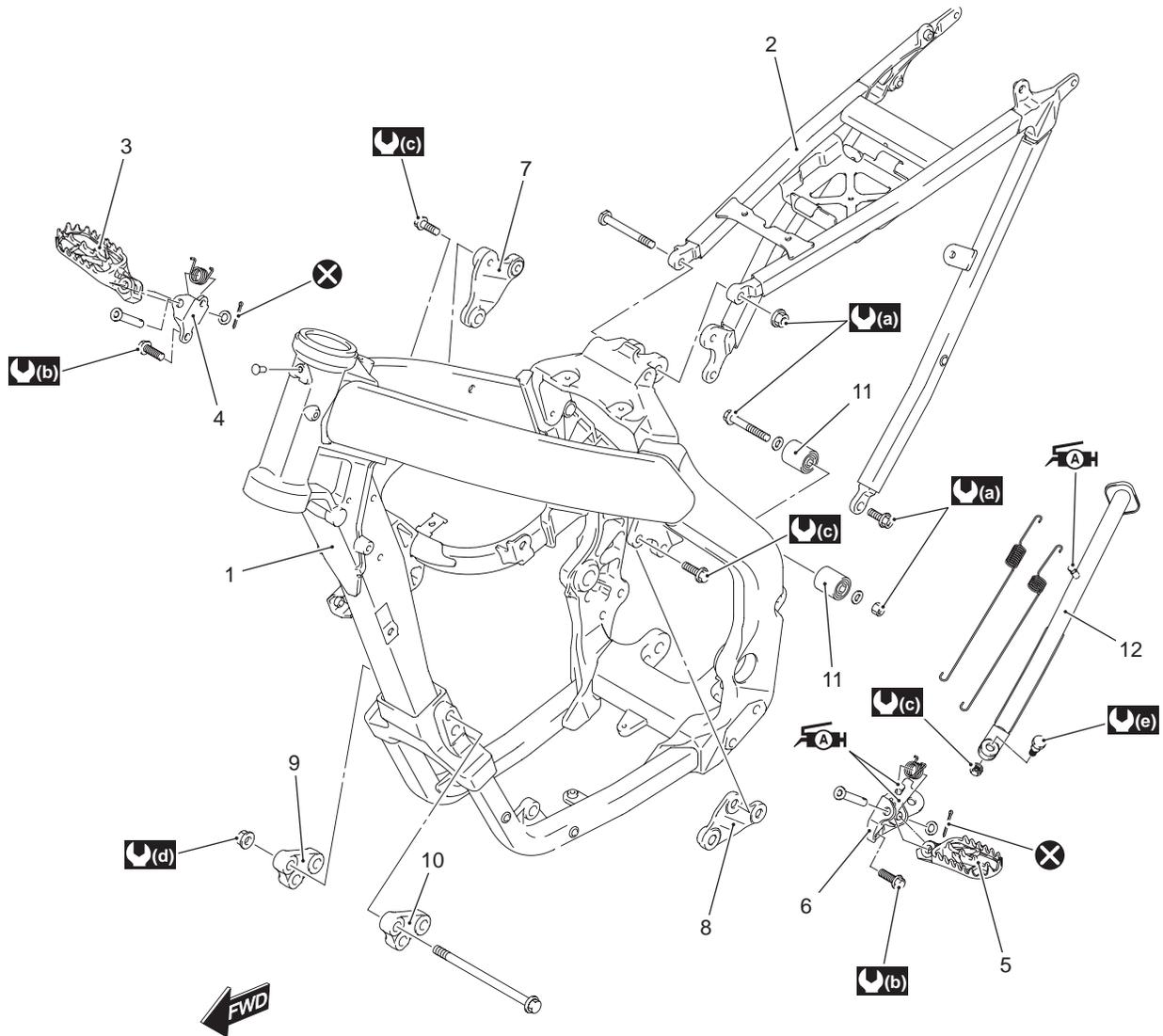
- Make sure that the wiring harness are routed properly. Refer to "Wiring Harness Routing Diagram" in Section 9A (Page 9A-2).

# Body Structure

## Repair Instructions

### Body Frame Construction

BA02J29506001



IA02J1950003-01

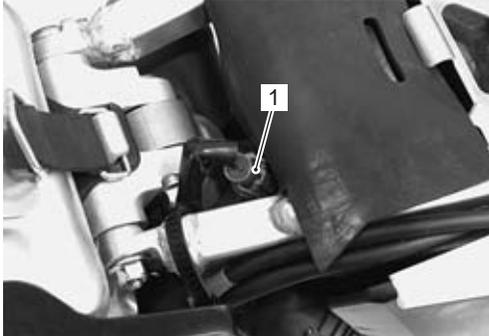
1. Frame	8. Upper engine mounting bracket (LH)	: 40 N-m (4.0 kgf-m, 29.0 lbf-ft)
2. Seat rail	9. Front engine mounting bracket (RH)	: 60 N-m (6.0 kgf-m, 43.5 lbf-ft)
3. Footrest (RH)	10. Front engine mounting bracket (LH)	: 10 N-m (1.0 kgf-m, 7.0 lbf-ft)
4. Footrest bracket (RH)	11. Chain roller	: Apply grease.
5. Footrest (LH)	12. Side-stand	: Do not reuse.
6. Footrest bracket (LH)		: 23 N-m (2.3 kgf-m, 16.5 lbf-ft)
7. Upper engine mounting bracket (RH)		: 35 N-m (3.5 kgf-m, 25.5 lbf-ft)

## Seat Rail Removal and Installation

BA02J29506002

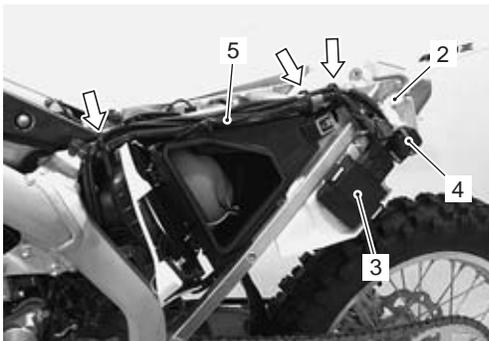
### Removal

- 1) Remove the battery. Refer to "Battery / Battery Protector Removal and Installation" in Section 1J (Page 1J-9).
- 2) Disconnect the IAT sensor coupler (1).



IA02J1950004-01

- 3) Remove the left frame cover. Refer to "Exterior Parts Removal and Installation" in Section 9D (Page 9D-1).
- 4) Disconnect the tail light coupler (2) and remove the following parts from the seat rail:
  - ECM (3) Refer to "ECM Removal and Installation" in Section 1C (Page 1C-1).
  - Starter relay (4) Refer to "Starter Relay Removal and Installation" in Section 1I (Page 1I-6).
  - Wiring harness (5).



IA02J1950005-01

- 5) Remove the muffler. Refer to "Muffler / Exhaust Pipe Removal and Installation" in Section 1K (Page 1K-2).
- 6) Loosen the throttle body clamp screw (air cleaner box side). Refer to "Throttle Body Removal and Installation" in Section 1D (Page 1D-15).
- 7) Remove the seat rail as shown in the body frame construction. Refer to "Body Frame Construction" (Page 9E-1).
- 8) Remove the air cleaner box and rear fender if necessary. Refer to "Air Cleaner Box Removal and Installation" in Section 1D (Page 1D-8) and "Exterior Parts Removal and Installation" in Section 9D (Page 9D-1).

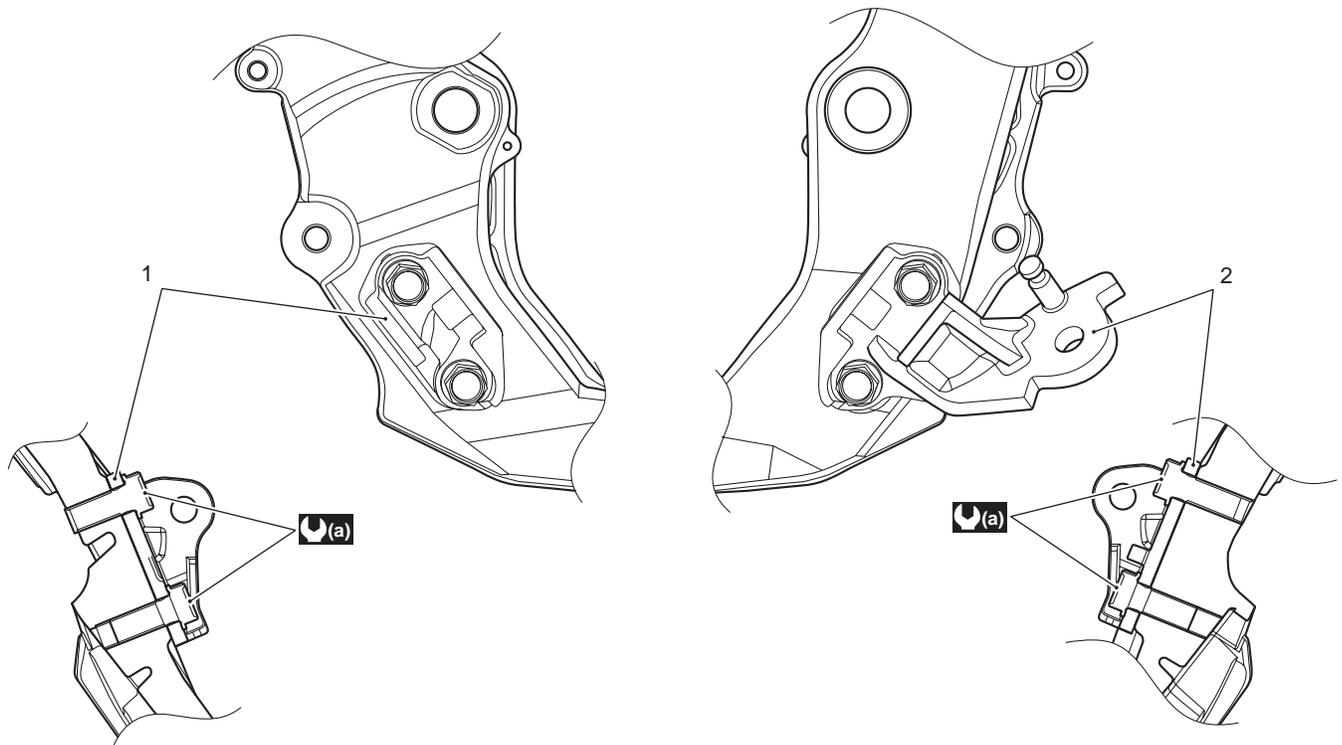
### Installation

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

- Tighten the seat rail and muffler mounting bolts and nut as shown in the body frame construction and exhaust system components. Refer to "Body Frame Construction" (Page 9E-1) and "Exhaust System Components" in Section 1K (Page 1K-1).
- Tighten the throttle body clamp screw as shown in the throttle body construction. Refer to "Throttle Body Construction" in Section 1D (Page 1D-12).
- Route the wiring harness as shown in the wiring harness routing diagram. Refer to "Wiring Harness Routing Diagram" in Section 9A (Page 9A-2).
- Install the starter relay. Refer to "Starter Relay Removal and Installation" in Section 1I (Page 1I-6).
- Install the ECM. Refer to "ECM Removal and Installation" in Section 1C (Page 1C-1).
- Connect the IAT sensor coupler.
- Install the battery. Refer to "Battery / Battery Protector Removal and Installation" in Section 1J (Page 1J-9).

### Footrest Bracket Construction

BA02J29506003

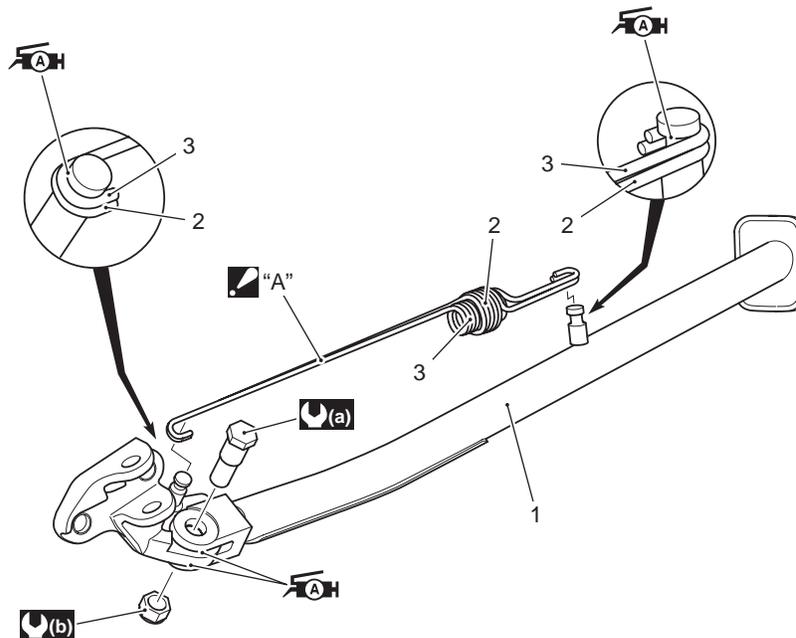


IA02J1950001-02

1. Right footrest bracket	: 35 N·m (3.5 kgf-m, 25.5 lbf-ft)
2. Left footrest bracket	

### Side-stand Construction

BA02J29506004



IA02J1950002-01

1. Side-stand	3. Inner spring	: 10 N·m (1.0 kgf-m, 7.0 lbf-ft)	: Apply grease.
2. Outer spring	"A": Do not intersect the springs.	: 40 N·m (4.0 kgf-m, 29.0 lbf-ft)	

## Side-stand Removal and Installation

BA02J29506005

### Removal

- 1) Support the motorcycle with a jack or wooden block.

#### **⚠ CAUTION**

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**Do not support the motorcycle with the exhaust pipes.**

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- 2) Remove the side-stand as shown in the side-stand construction. Refer to “Side-stand Construction” (Page 9E-3).

### Installation

Install the side-stand as shown in the side-stand construction. Refer to “Side-stand Construction” (Page 9E-3).

## Specifications

### Tightening Torque Specifications

BA02J29507001

#### **NOTE**

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The specified tightening torque is described in the following.

“Body Frame Construction” (Page 9E-1)

“Footrest Bracket Construction” (Page 9E-3)

“Side-stand Construction” (Page 9E-3)

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#### **Reference:**

For the tightening torque of fastener not specified in this section, refer to “Tightening Torque List” in Section 0C (Page 0C-8).

## Special Tools and Equipment

### Recommended Service Material

BA02J29508001

#### **NOTE**

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Required service material is also described in the following.

“Body Frame Construction” (Page 9E-1)

“Side-stand Construction” (Page 9E-3)

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Prepared by  
**SUZUKI MOTOR CORPORATION**

October, 2009  
Part No. 99500-44090-01E  
Printed in Japan



**SUZUKI MOTOR CORPORATION**

Printed in Japan (TK)

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