

**SUZUKI**

***AN400***

**SERVICE MANUAL**



## FOREWORD

*This manual contains an introductory description on the SUZUKI AN400 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.**



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Section 00

# Precautions

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# Precautions

## Precautions

### Warning / Caution / Note

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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 (–) cable first and then the (+) cable.
- When reconnecting the battery, connect the (+) cable first and then the (–) cable, and replace the terminal cover on the (+) terminal.
- When performing service to electrical parts, if the service procedures do not require use of battery power, disconnect the (–) cable from 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 bolts 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.

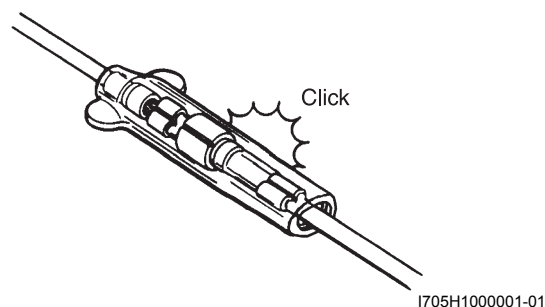
**Precautions for Electrical Circuit Service**

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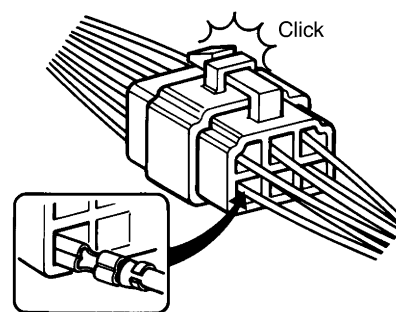
When handling the component parts or servicing the FI system, observe the following points for the safety of the system.

**Electrical Parts****Connector / Coupler**

- When connecting a connector, be sure to push it in until a click is felt.



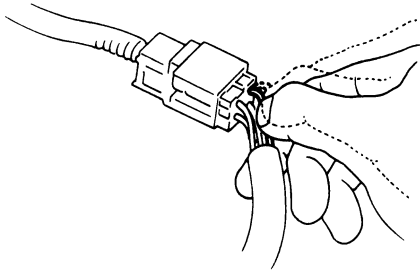
- With a lock type coupler, be sure to release the lock when disconnecting, and push in fully to engage the lock when connecting.
- When disconnecting the coupler, be sure to hold the coupler body and do not pull the lead wires.
- Inspect each terminal on the connector/coupler for looseness or bending.
- Inspect each terminal for corrosion and contamination. The terminals must be clean and free of any foreign material which could impede proper terminal contact.



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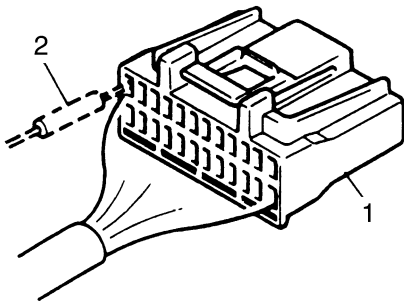
## 00-3 Precautions:

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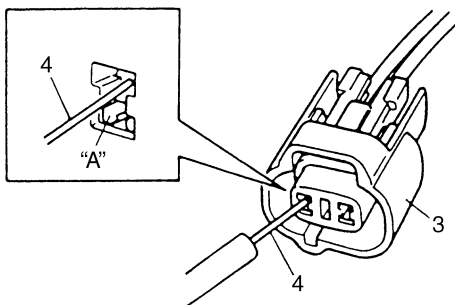
- When taking measurements at electrical connectors using a tester probe, be sure to insert the probe from the wire harness side (backside) of the connector/ coupler.



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1. Coupler	2. Probe
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- 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.

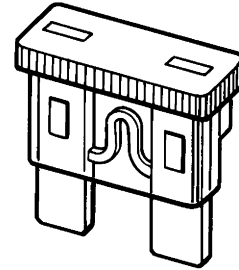


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3. Coupler	"A": Where male terminal fits
4. Probe	

## Fuse

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



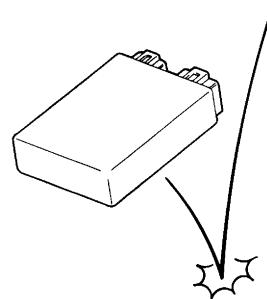
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## Switch

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

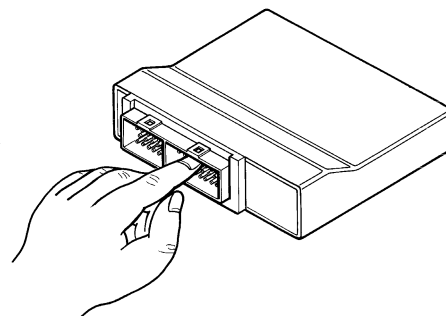
## ECM / Various Sensors

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



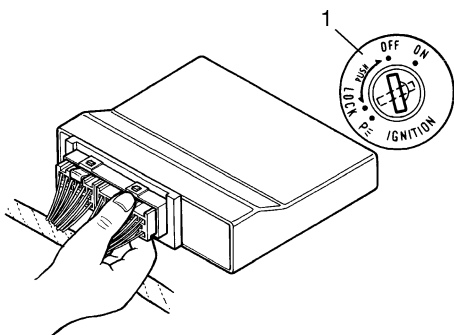
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- Be careful not to touch the electrical terminals of the ECM. The static electricity from your body may damage this part.



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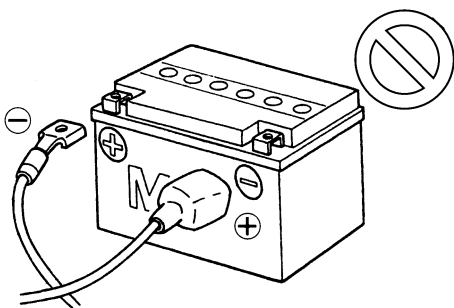
- When disconnecting and connecting the ECM couplers, make sure to turn OFF the ignition switch (1), or electronic parts may get damaged.



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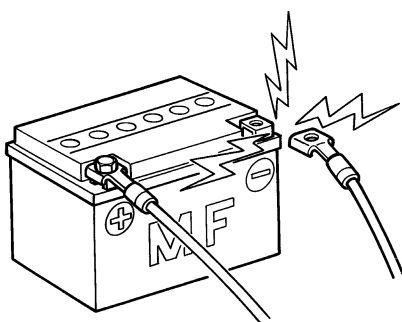
### Battery

- 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.



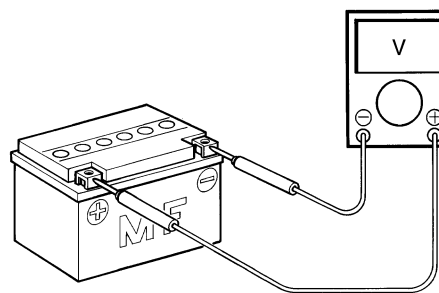
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- Removing any battery terminal of a running engine is strictly prohibited. The moment such removal is made, damaging counter electromotive force will be applied to the ECM which may result in serious damage.



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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 ECM when its coupler is disconnected. Otherwise, damage to ECM may result.
- Never connect an ohmmeter to the ECM 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 Procedures

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

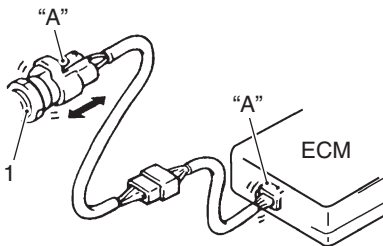
Possible causes for the open circuits are as follows. As the cause can exist in the connector/coupler or terminal, they need to be checked carefully.

- 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 (-) 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.



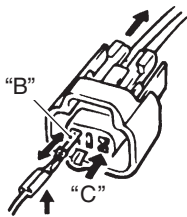
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1. Sensor	"A": Check for loose connection.
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- 3) Using a test male terminal, check the female terminals of the circuit being checked for contact tension.

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.

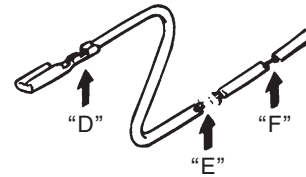
If contact tension is not enough, rectify the contact to increase tension or replace. The terminals must be clean and free of any foreign material which could impede proper terminal contact.



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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 procedures as described below, inspect the wire harness terminals for open circuit and poor connection. Locate abnormality, if any.



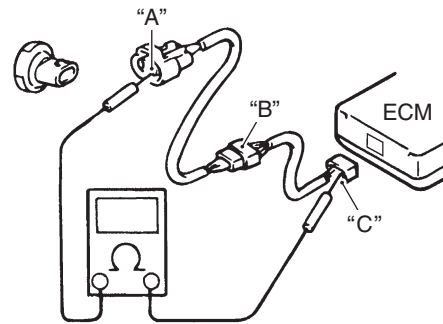
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"D": Looseness of crimping
"E": Open
"F": Thin wire (A few strands left)

### Continuity check

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

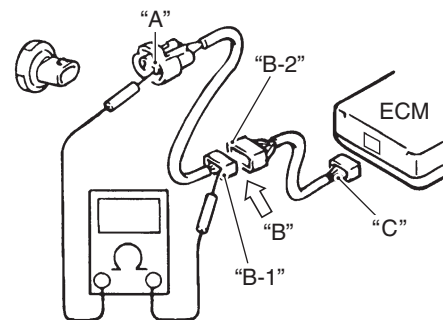
If no continuity is indicated (infinity or over limit), the circuit is open between terminals "A" and "C".



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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 below and results are as 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**

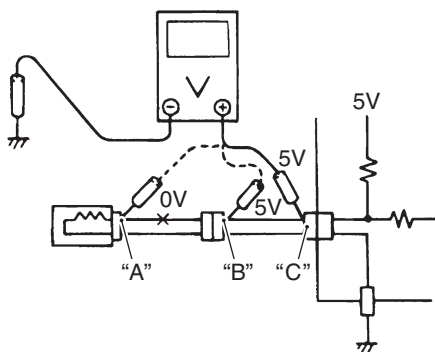
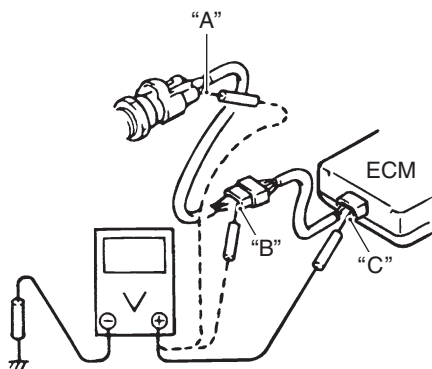
- 3) Also, if measured values are as listed in the following, a resistance (abnormality) exists which causes the voltage drop in the circuit between terminals "A" and "B".

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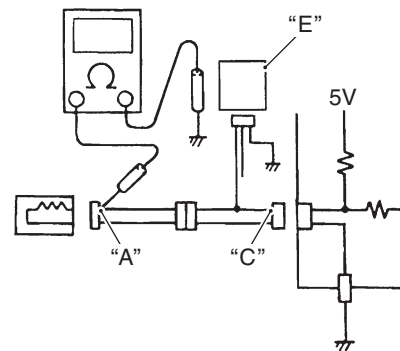
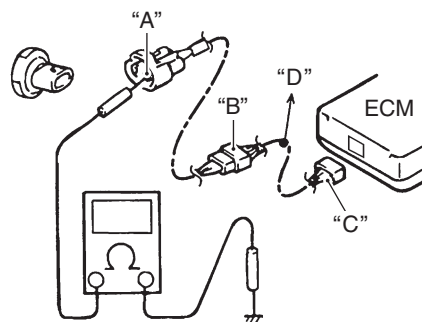
**Short circuit check (Wire harness to ground)**

- 1) Disconnect the (-) 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 figure) and body ground. If continuity is indicated, there is a short circuit to ground between terminals "A" and "C".

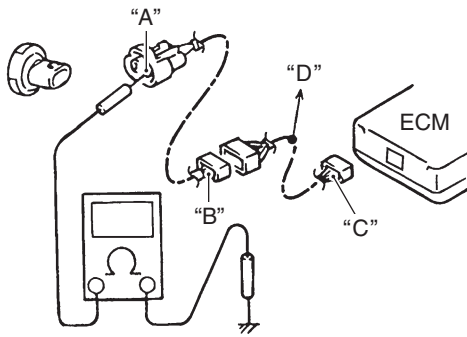


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"D": To other parts	"E": Other parts
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## 00-7 Precautions:

- 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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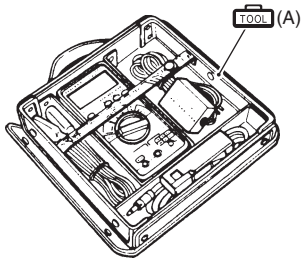
"D": To other parts

### Using the Multi-Circuit Tester

- 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

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



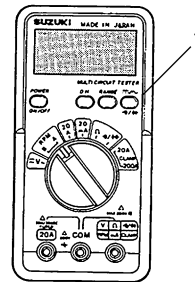
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### Using the tester

- Incorrectly connecting the (+) and (-) probes may cause the inside of the tester to burnout.
- 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

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



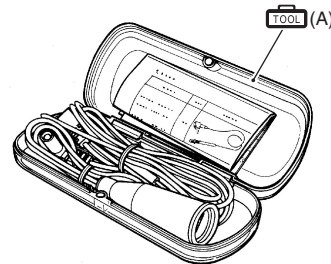
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### NOTE

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

#### Special tool

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



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## Section 0

## General Information

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














# General Information

## General Description

### Symbols

B705H10101001

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 indicates 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 "1342" or equivalent. 99000-32050
	Apply THREAD LOCK SUPER "1360" or equivalent. 99000-32130
	Use engine coolant or equivalent. 99000-99032-11X
	Use fork oil or equivalent. 99000-99044-10G
	Apply or use brake fluid.
	Use special tool.
	Do not reuse.
	Note on reassembly.

**Abbreviations**

B705H10101002

**A:**  
**ABDC:** After Bottom Dead Center  
**AC:** Alternating Current  
**ACL:** Air Cleaner, Air Cleaner Box  
**API:** American Petroleum Institute  
**ATDC:** After Top Dead Center  
**ATM Pressure:** Atmospheric Pressure  
**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  
**CO:** Carbon Monoxide  
**CPU:** Central Processing Unit  
**D:**  
**DC:** Direct Current  
**DMC:** Dealer Mode Coupler  
**DOHC:** Double Over Head Camshaft  
**DRL:** Daytime Running Light  
**E:**  
**ECM:** Engine Control Module  
 Engine Control Unit (ECU)  
 (FI Control Unit)  
**ECT Sensor:** Engine Coolant Temperature Sensor  
 (ECTS)  
 Water Temp. Sensor (WTS)  
**EVAP:** Evaporative Emission  
**EVAP Canister:** Evaporative Emission Canister  
 (Canister)  
**F:**  
**FI:** Fuel Injection, Fuel Injector  
**FP:** Fuel Pump  
**FPR:** Fuel Pressure Regulator  
**FP Relay:** Fuel Pump Relay  
**FTPC Valve:** Fuel Tank Pressure Control Valve

**G:**  
**GEN:** Generator  
**GND:** Ground  
**GP Switch:** Gear Position Switch  
**H:**  
**HC:** Hydrocarbons  
**HO2S:** Heated Oxygen Sensor  
**I:**  
**IAP Sensor:** Intake Air Pressure Sensor (IAPS)  
**IAT Sensor:** Intake Air Temperature Sensor (IATS)  
**IG:** Ignition  
**ISC Valve:** Idle Speed Control Valve (ISCV)  
**L:**  
**LCD:** Liquid Crystal Display  
**LED:** Light Emitting Diode (Malfunction Indicator Light)  
**LH:** Left Hand  
**M:**  
**MAL-Code:** Malfunction Code (Diagnostic Code)  
**Max:** Maximum  
**MIL:** Malfunction Indicator Light (LED)  
**Min:** Minimum  
**N:**  
**NOx:** Nitrogen Oxides  
**P:**  
**PARK:** Parking Brake (Brake-lock)  
**PCV:** Positive Crankcase Ventilation (Crankcase Breather)  
**R:**  
**RH:** Right Hand  
**ROM:** Read Only Memory  
**S:**  
**SAE:** Society of Automotive Engineers  
**STP Sensor:** Secondary Throttle Position Sensor  
**STVA:** Secondary Throttle Valve Actuator  
**T:**  
**TO Sensor:** Tip-Over Sensor (TOS)  
**TP Sensor:** Throttle Position Sensor (TPS)

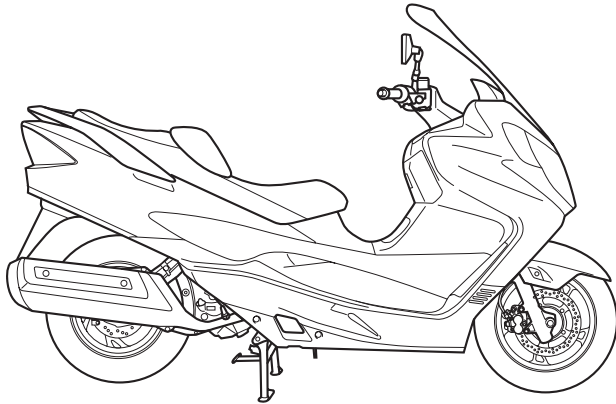
**Vehicle Side View**

B705H10101003

**NOTE**

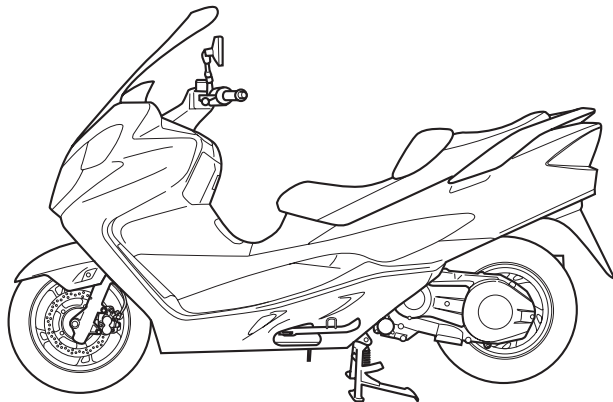
**Difference between photographs and actual motorcycles depends on the markets.**

**Right Side**



I705H1010001-02

**Left Side**

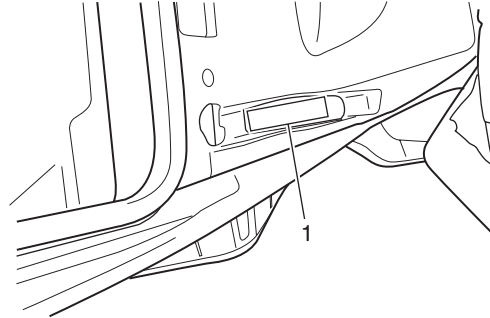


I705H1010002-02

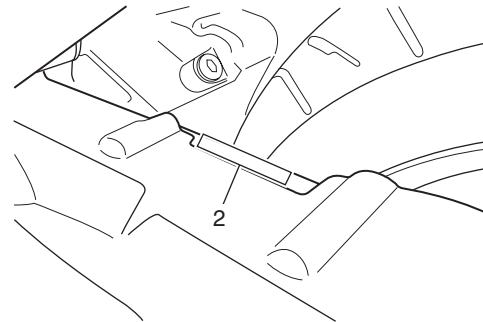
**Vehicle Identification Number**

B705H10101004

The frame serial number or V.I.N. (Vehicle Identification Number) (1) is stamped on the right side of the frame tube. The engine serial number (2) is located on the left side of the crankcase. These numbers are required especially for registering the machine and ordering spare parts.



I705H1010003-01



I705H1010004-01

**Fuel / Oil / Engine Coolant Recommendation**

B705H10101005

**Fuel (For USA and Canada)**

Use only unleaded gasoline of at least 87 pump octane (R/2 + M/2) or 91 octane or higher rated by the research method.

Gasoline containing MTBE (Methyl Tertiary Butyl Ether), less than 10% ethanol, or less than 5% methanol with appropriate cosolvents and corrosion inhibitor is permissible.

**Fuel (For Other Countries)**

Gasoline used should be graded 91 octane (Research Method) or higher. Unleaded gasoline is recommended.

**Engine Oil and Final Gear Oil (For USA)**

Oil quality is a major contributor to your engine's performance and life. Always select good quality engine oil.

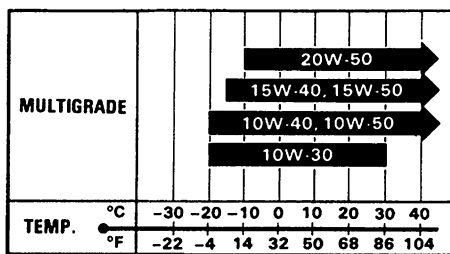
SUZUKI recommends the use of SUZUKI PERFORMANCE 4 MOTOR OIL or an equivalent engine oil. Use of SF/SG or SH/SJ in API with MA in JASO.

Suzuki recommends the use of SAE 10W-40 engine oil. If SAE 10W-40 engine oil is not available, select an alternative according to the chart.

**Engine Oil and Final Gear Oil (For Other Countries)**

Oil quality is a major contributor to your engine's performance and life. Always select good quality engine oil. Use of SF/SG or SH/SJ in API with MA in JASO.

Suzuki recommended the use of SAE 10W-40 engine oil. If SAE 10W-40 engine oil is not available, select an alternative according to the chart.



I310G1010005-01

**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 re-use brake fluid left over from a previous servicing, which has been stored for a long period.

**Front Fork Oil**

Use fork oil G-10 or an equivalent fork oil.

**Engine Coolant Recommendation**

B705H10101006

**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)**

1 700 ml (1.8/1.5 US/lmp qt)

For engine coolant mixture information, refer to "Engine Coolant Description in Section 1F (Page1F-1)".

**▲ 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**

B705H10101007

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: Below 4 000 r/min

Up to 1 600 km: Below 6 000 r/min

2) Upon reaching an odometer reading of 1 600 km (1 000 miles) you can subject the motorcycle to full throttle operation. However, do not exceed 11 000 r/min at any time.

**0A-5 General Information:****Country and Area Codes**

B705H10101009

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

<b>Code</b>	<b>Country or Area</b>	<b>Effective Frame No.</b>
AN400K7 (E-02)	U.K.	JS1CG111200100001 –
AN400K7 (E-03)	U.S.A. except for California	JS1CK44A 72100001 –
AN400K7 (E-19)	E.U.	JS1CG111300100001 –
AN400K7 (E-24)	Australia	JS1CG111300100001 –
AN400K7 (E-28)	Canada	JS1CK44A 72100001 –
AN400K7 (E-33)	California	JS1CK44A 72100001 –
AN400K7 (E-54)	Israel	JSCG111470100001 –

**Wire Color Symbols**

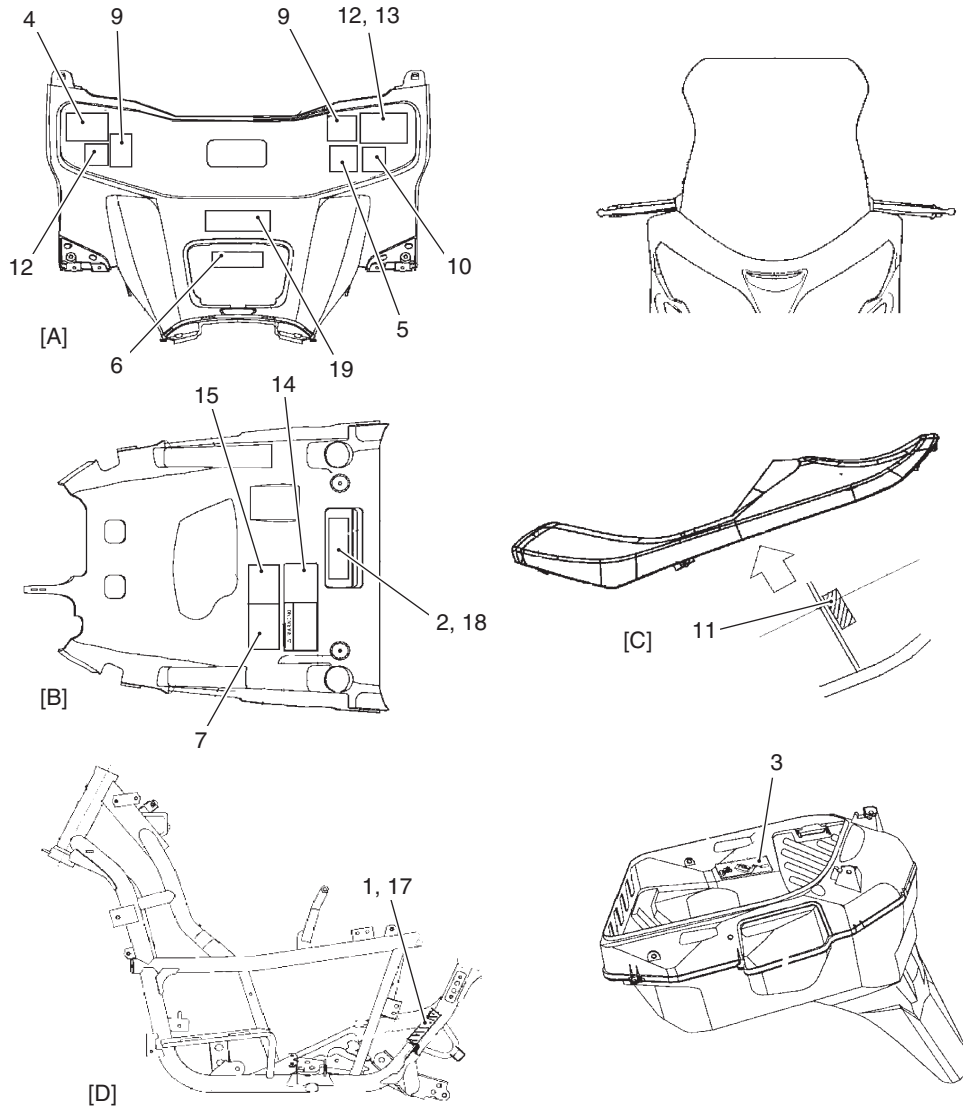
B705H10101010

<b>Symbol</b>	<b>Wire Color</b>	<b>Symbol</b>	<b>Wire Color</b>
B	Black	Bl/W	Blue/White
Bl	Blue	Bl/Y	Blue/Yellow
Br	Brown	Br/B	Brown/Black
Dbr	Dark brown	Br/W	Brown/White
Dg	Dark green	G/B	Green/Black
G	Green	G/R	Green/Red
Gr	Gray	G/W	Green/White
Lbl	Light blue	G/Y	Green/Yellow
Lg	Light green	Gr/W	Green/White
O	Orange	O/B	Orange/Black
P	Pink	O/Bl	Orange/Blue
R	Red	O/G	Orange/Green
V	Violet	O/R	Orange/Red
W	White	O/W	Orange/White
Y	Yellow	O/Y	Orange/Yellow
B/Bl	Black/Blue	P/B	Pink/Black
B/Br	Black/Brown	P/W	Pink/White
B/G	Black/Green	R/Bl	Red/Blue
B/Lg	Black/Light green	W/B	White/Blue
B/O	Black/Orange	W/G	White/Green
B/R	Black/Red	W/R	White/Red
B/W	Black/White	Y/B	Yellow/Black
B/Y	Black/Yellow	Y/Bl	Yellow/Blue
Bl/B	Blue/Black	Y/G	Yellow/Green
Bl/G	Blue/Green	Y/R	Yellow/Red
Bl/R	Blue/Red	Y/W	Yellow/White



Warning, Caution and Information Labels Location

B705H10101011



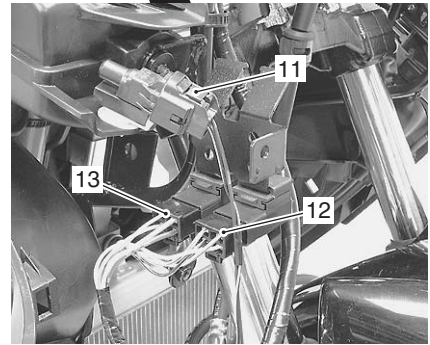
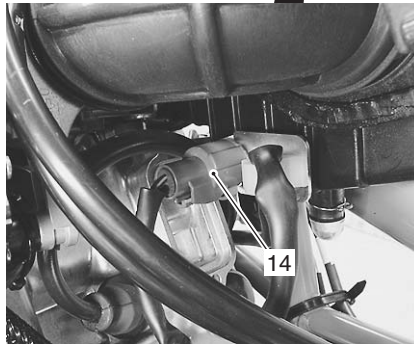
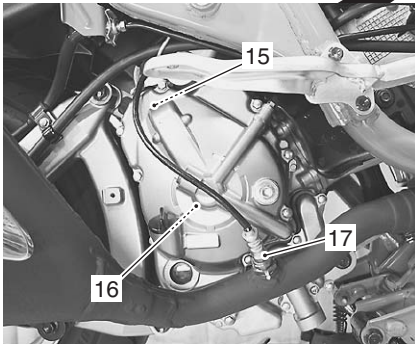
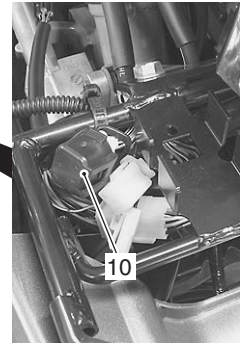
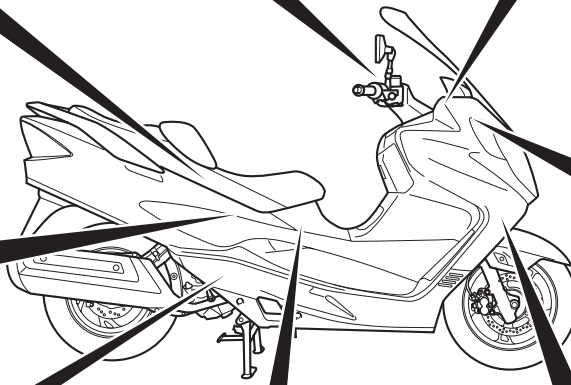
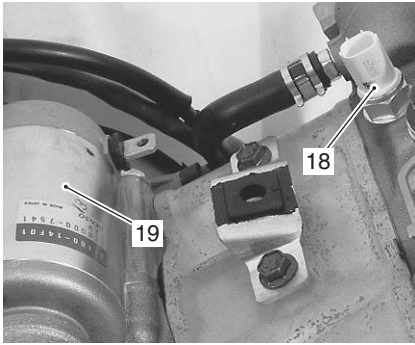
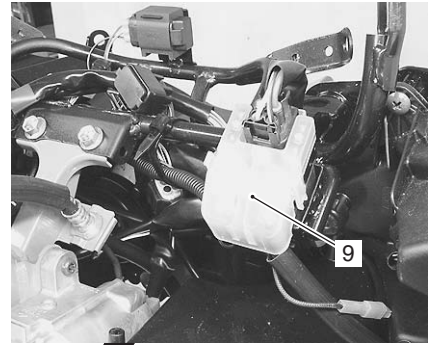
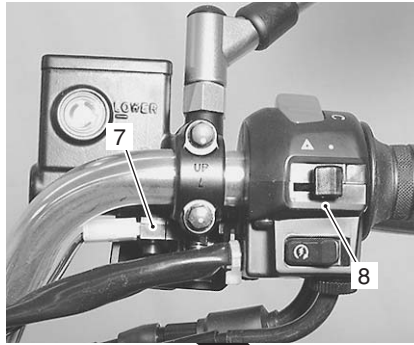
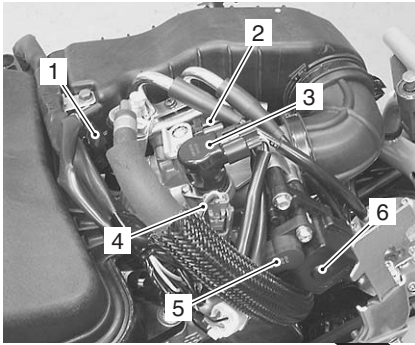
I705H1010008-02

	<b>AN400</b>
1. Noise label	For E-03, 24, 33
2. Information label	For E-03, 28, 33
3. Vacuum hose routing label	For E-33
4. Engine starting label	For E-02, 03, 19, 24, 28, 33, 54
5. Engine starting label (French)	For E-28
6. Fuel caution label	For E-02, 24
7. Manual notice label	For E-03, 33
8. Warning screen label	For E-02, 19, 24
9. Warning screen label (French)	For E-28
10. Tire information label	For E-02, 03, 19, 24, 28, 33, 54
11. General warning label	For E-02, 03, 19, 24, 28, 33, 54
12. General warning label (French)	For E-28
13. Loading capacity label	For E-02, 03, 19, 24, 28, 33, 54
14. Loading capacity label (French)	For E-28
15. ICES Canada label	For E-28
16. I.D. plate	For E-02, 19, 24, 54
17. Safety plate	For E-03, 28, 33
[A]: Front box lid	
[B]: Helmet box front cover	
[C]: Seat (Back side)	
[D]: Frame side tube (Right side)	

## Component Location

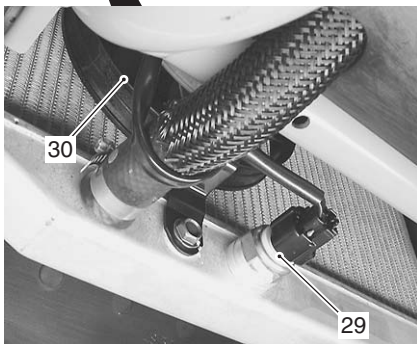
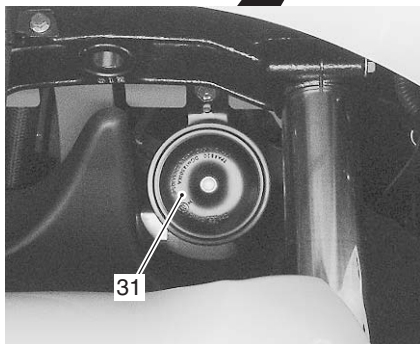
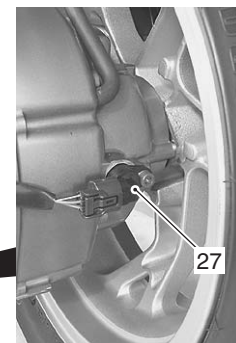
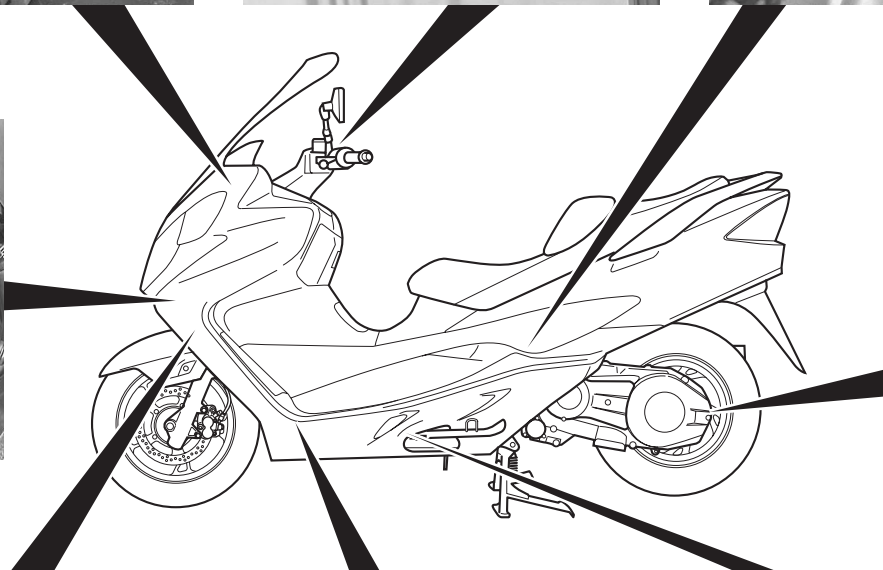
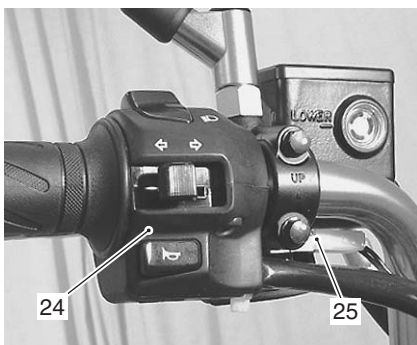
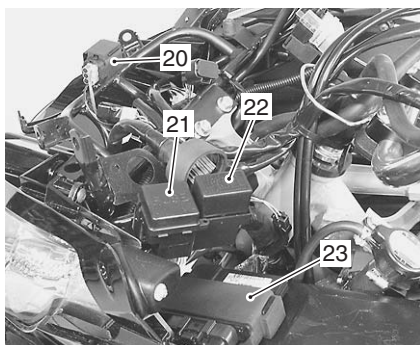
### Electrical Components Location

B705H10103001



I705H1010005-04

1. Fuel injector	6. STVA	11. Ambient air temperature sensor	16. Generator
2. IAP sensor	7. Front brake switch	12. Brake-lock relay	17. HO2 sensor
3. ISC valve	8. Right handlebar switch	13. Fuel pump relay	18. ECT sensor
4. TP sensor	9. Starter relay	14. IAT sensor	19. Starter motor
5. STP sensor	10. Mode select switch coupler	15. CKP sensor	



I705H1010007-04

20. TO sensor	24. Left handlebar switch	28. Side-stand switch	32. Regulator/rectifier
21. Fuse box	25. Rear brake switch	29. Cooling fan thermo-switch	
22. Turn signal/Side-stand relay	26. Ignition coil	30. Cooling fan	
23. ECM	27. Speed sensor	31. Horn	

## Specifications

### Specifications

B705H10107001

#### NOTE

These specifications are subject to change without notice.

#### Dimensions and Dry Mass

Item	Specification	Remark
Overall length	2 270 mm (89.4 in)	
Overall width	760 mm (29.9 in)	
Overall height	1 385 mm (54.5 in)	
Wheelbase	1 585 mm (62.4 in)	
Ground clearance	125 mm (4.9 in)	
Seat height	710 mm (28.0 in)	
Dry mass	200 kg (440 lbs)	E-33
	199 kg (438 lbs)	Others

#### Engine

Item	Specification	Remark
Type	4-stroke, liquid-cooled, DOHC	
Number of cylinders	1	
Bore	81.0 mm (3.189 in)	
Stroke	77.6 mm (3.055 in)	
Piston displacement	400 cm <sup>3</sup> (24.4 cu. in)	
Compression ratio	10.6 : 1	E-03, 28, 33
	11.2 : 1	Others
Fuel system	Fuel injection	
Air cleaner	Paper element	
Starter system	Electric	
Lubrication system	Wet sump	
Idle speed	1450 ± 100 r/min	

#### Drive Train

Item	Specification	Remark
Clutch	Dry shoe, automatic, centrifugal type	
Gearshift pattern	Automatic	
Final reduction ratio	5.904 (31/14 x 40/15)	
Gear ratio	2.200 – 0.839 (Variable change)	
Drive system	V-belt drive	

#### Chassis

Item	Specification	Remark
Front suspension	Telescopic, coil spring, oil damped	
Rear suspension	Link type, coil spring, oil damped	
Steering angle	40° (right & left)	
Caster	25° 20'	
Trail	102 mm (4.0 in)	
Turning radius	2.7 m (8.9 ft)	
Front brake	Double disk brake	
Rear brake	Disc brake	
Front tire size	120/80-14 M/C 58S, tubeless	
Rear tire size	150/70-13 M/C 64S, tubeless	
Front fork stroke	110 mm (4.3 in)	
Rear wheel travel	100 mm (3.9 in)	

**Electrical**

Item	Specification	Remark
Ignition type	Electronic ignition (Transistorized)	
Ignition timing	7° B. T. D. C at 1 450 r/min	
Spark plug	NGK: CR7E or DENSO: U22ESR-N	
Battery	12 V 32.4 kC (9 Ah)/10 HR	
Generator	Three-phase A.C. generator	
Main fuse	30 A	
Fuse	10/10/15/10/15/10 A	
Headlight	12 V 60/55 W (H4) + 55 W (H7)	
Position/Parking light	12 V 5 W x 2	E-02, 19, 24, 54
Position light	12 V 5 W x 2	E-03, 28, 33
Brake light/Taillight	12 V 21/5 W x 2	
License plate light	12 V 5 W	
Helmet box light	12 V 5 W	
Front turn signal light	12 V 27/8 W	E-03, 28, 33
	12 V 21 W	Others
Rear turn signal light	12 V 21 W	
Speedometer/Tachometer light	LED	
Coolant temperature meter light	LED	
Fuel level meter light	LED	
Turn signal indicator light	LED x 2	
High beam indicator light	LED	
Brake-lock indicator light	LED	
Oil change indicator	LCD	
Fuel injection warning light	LED	
Immobilizer indicator light	LED	Except E-03, 28, 33

**Capacities**

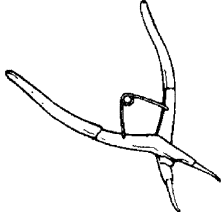
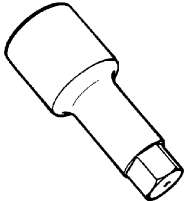
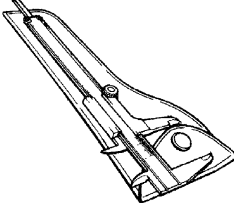
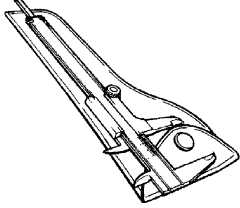
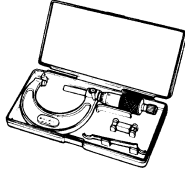
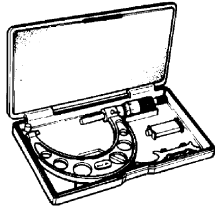
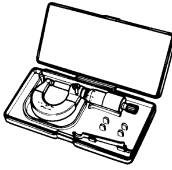
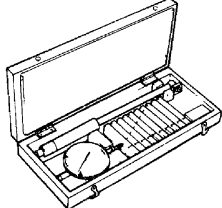
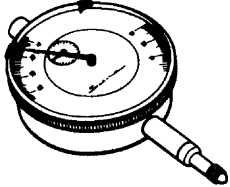
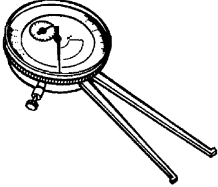
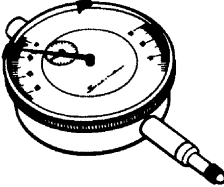
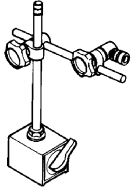
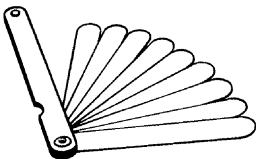
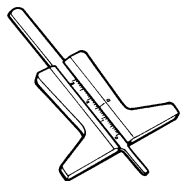
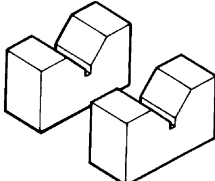
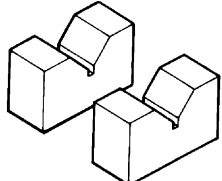

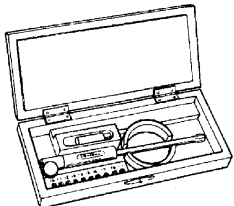
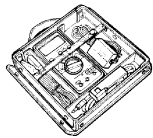
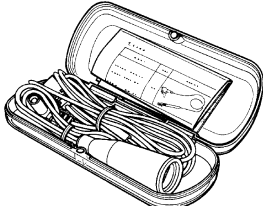
Item	Specification	Remark
Fuel tank, including reserve	13.5 L (3.6/3.0 US/Imp gal)	
Engine oil	Oil change	1 200 ml (1.3/1.1 US/Imp qt)
	With filter change	1 300 ml (1.4/1.1 US/Imp qt)
	Overhaul	1 500 ml (1.6/1.3 US/Imp qt)
Final gear oil	Oil change	180 ml (6.0/6.3 US/Imp oz)
	Overhaul	190 ml (6.4/6.7 US/Imp oz)
Coolant	1.7 L (1.8/1.5 US/Imp qt)	



## Special Tools and Equipment

**Special Tool**

B705H10108001

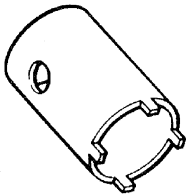
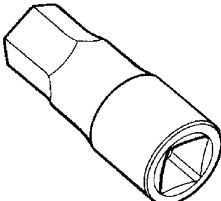
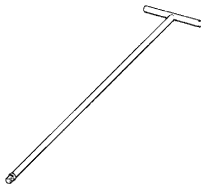
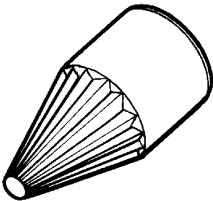
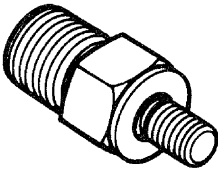
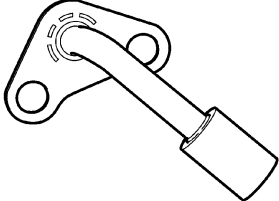
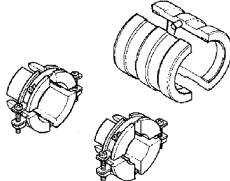

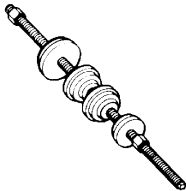
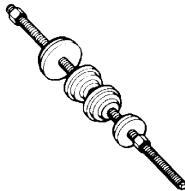
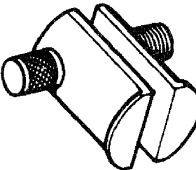
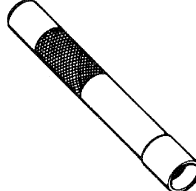
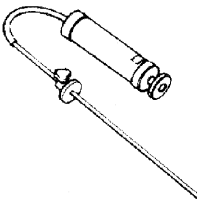
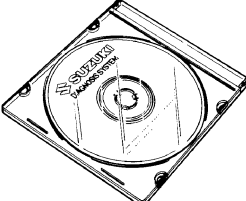
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 <p style="text-align: center;">TT09900-20202-01</p> <p><b>09900-20202</b> Micrometer (1/100 mm, 25 – 50 mm)</p>	 <p style="text-align: center;">TT09900-20203-02</p> <p><b>09900-20203</b> Micrometer (1/100 mm, 50 – 75 mm)</p>	 <p style="text-align: center;">TT09900-20205-01</p> <p><b>09900-20205</b> Micrometer (0 – 25 mm)</p>	 <p style="text-align: center;">TT09900-20508-01</p> <p><b>09900-20508</b> Cylinder gauge set</p>
 <p style="text-align: center;">TT09900-20602-01</p> <p><b>09900-20602</b> Dial gauge (1/1000 mm, 1 mm)</p>	 <p style="text-align: center;">TT09900-20605-01</p> <p><b>09900-20605</b> Dial gauge (1/1000 mm, 1 mm)</p>	 <p style="text-align: center;">TT09900-20607-01</p> <p><b>09900-20607</b> Dial gauge (1/100 mm, 10 mm)</p>	 <p style="text-align: center;">TT09900-20701-01</p> <p><b>09900-20701</b> Magnetic stand</p>
 <p style="text-align: center;">TT09900-20803-01</p> <p><b>09900-20803</b> Thickness gauge</p>	 <p style="text-align: center;">TT09900-20805-01</p> <p><b>09900-20805</b> Tire depth gauge</p>	 <p style="text-align: center;">TT09900-21303-00</p> <p><b>09900-21303</b> V-block (75 mm)</p>	 <p style="text-align: center;">TT09900-21304-01</p> <p><b>09900-21304</b> V-block (100 mm)</p>
 <p style="text-align: center;">TT09900-22301-01</p> <p><b>09900-22301</b> Plastigauge (0.025 – 0.076 mm)</p>	 <p style="text-align: center;">TT09900-22403-02</p> <p><b>09900-22403</b> Small bore gauge (18 – 35 mm)</p>	 <p style="text-align: center;">TT09900-25008-01</p> <p><b>09900-25008</b> Multi-circuit tester set</p>	 <p style="text-align: center;">TT09900-25009-02</p> <p><b>09900-25009</b> Needle probe point set</p>

 TT09900-26006-00	 TT09900-28630-00	 TT09904-41010-00	 TT09910-32812-01
<b>09900-26006</b> Engine tachometer (solar cell type)	<b>09900-28630</b> TPS test wire harness	<b>09904-41010</b> SDS set	<b>09910-32812</b> Crankshaft installer
 TT09910-32870-00	 TT09910-60611-01	 TT09913-10750-00	 TT09913-50121-01
<b>09910-32870</b> Crankshaft installer attachment	<b>09910-60611</b> Universal clamp wrench	<b>09913-10750</b> Compression gauge adapter	<b>09913-50121</b> Oil seal remover
 TT09913-70210-01	 TT09913-75821-00	 TT09913-75830-00	 TT09915-64512-01
<b>09913-70210</b> Bearing installer set	<b>09913-75821</b> Bearing installer	<b>09913-75830</b> Bearing installer	<b>09915-64512</b> Compression gauge
 TT09915-74511-01	 TT09915-74521-01	 TT09915-74570-01	 TT09915-77331-01
<b>09915-74511</b> Compression gauge	<b>09915-74521</b> Oil pressure gauge hose	<b>09915-74570</b> Oil pressure gauge attachment	<b>09915-77331</b> Meter (for high pressure)
 TT09916-10911-01	 TT09916-14510-02	 TT09916-14530-00	 TT09916-33210-01
<b>09916-10911</b> Valve lapper set	<b>09916-14510</b> Valve spring compressor	<b>09916-14530</b> Valve spring compressor attachment	<b>09916-33210</b> Valve guide reamer (4.5 mm)

**0A-13 General Information:**

 <p>TT09916-34542-01</p> <p><b>09916-34542</b> Reamer handle</p>	 <p>TT09916-34561-01</p> <p><b>09916-34561</b> Valve guide reamer (11.3 mm)</p>	 <p>TT09916-43210-01</p> <p><b>09916-43210</b> Valve guide remover/ installer</p>	 <p>TT09916-53330-01</p> <p><b>09916-53330</b> Attachment</p>
 <p>TT09916-84511-01</p> <p><b>09916-84511</b> Tweezers</p>	 <p>TT09917-47011-00</p> <p><b>09917-47011</b> Vacuum pump gauge</p>	 <p>TT09919-28610-00</p> <p><b>09919-28610</b> Sleeve protector</p>	 <p>TT09920-13120-02</p> <p><b>09920-13120</b> Crankcase separating tool</p>
 <p>TT09920-31020-01</p> <p><b>09920-31020</b> Extension handle</p>	 <p>TT09920-53740-02</p> <p><b>09920-53740</b> Clutch sleeve hub holder</p>	 <p>TT09921-20240-01</p> <p><b>09921-20240</b> Bearing remover set</p>	 <p>TT09922-21410-00</p> <p><b>09922-21410</b> Long socket (46 mm)</p>
 <p>TT09922-31440-02</p> <p><b>09922-31440</b> Clutch spring compressor</p>	 <p>TT09923-73210-01</p> <p><b>09923-73210</b> Bearing remover</p>	 <p>TT09923-74511-00</p> <p><b>09923-74511</b> Bearing puller</p>	 <p>TT09924-84521-01</p> <p><b>09924-84521</b> Bearing installer set</p>
 <p>TT09930-10121-02</p> <p><b>09930-10121</b> Spark plug wrench set</p>	 <p>TT09930-11950-00</p> <p><b>09930-11950</b> Torx wrench</p>	 <p>TT09930-30104-01</p> <p><b>09930-30104</b> Rotor remover slide shaft</p>	 <p>TT09930-31921-00</p> <p><b>09930-31921</b> Rotor remover</p>
 <p>TT09930-40113-01</p> <p><b>09930-40113</b> Rotor holder</p>	 <p>TT09930-82720-02</p> <p><b>09930-82720</b> Mode select switch</p>	 <p>TT09940-11420-00</p> <p><b>09940-11420</b> Steering stem nut socket</p>	 <p>TT09940-11430-00</p> <p><b>09940-11430</b> Steering stem nut socket</p>



 TT09940-14911-01	 TT09940-30230-01	 TT09940-34520-00	 TT09940-34531-00
09940-14911 Steering stem nut wrench	09940-30230 Socket hexagon (17 mm)	09940-34520 T handle	09940-34531 Attachment A
 TT09940-40211-01	 TT09940-40230-00	 TT09940-52861-01	 TT09940-92720-01
09940-40211 Fuel pressure gauge adapter	09940-40230 Fuel pressure gauge hose attachment	09940-52861 Front fork oil seal installer	09940-92720 Spring scale
 TT09941-34513-01	 TT09941-34513-01	 TT09941-54911-01	 TT09941-74911-01
09941-34513 Steering race installer	09941-34513 Steering race installer	09941-54911 Bearing outer race remover	09941-74911 Steering bearing installer
 TT09943-74111-01	 TT99565-01010-008		
09943-74111 Fork oil level gauge	99565-01010-008 CD-ROM Ver.8		

# Maintenance and Lubrication

## Precautions

### Precautions for Maintenance

B705H1020001

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

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

## General Description

### Recommended Fluids and Lubricants

B705H10201001

Refer to "Fuel / Oil / Engine Coolant Recommendation in Section 0A (Page0A-3)".

## Scheduled Maintenance

### Periodic Maintenance Schedule Chart

B705H10205001

Item	Interval					
	km	1 000	6 000	12 000	18 000	24 000
	miles	600	4 000	7 500	11 000	14 500
	months	2	12	24	36	48
Air cleaner element	—				R	
Exhaust pipe bolts and muffler bolts	T	—	T	—	—	T
Valve clearance	—	—	—	—	—	
Spark plug	—		R			R
Fuel line	—					
Evaporative emission control system (E-33 only)	—	—		—	—	
Engine oil	R	R	R	R	R	R
Engine oil filter	R	—	—	—	R	—
Final Reduction gear oil	—	—	R	—	—	R
Throttle cable play						
Engine coolant	Replace every 2 years.					
Radiator hoses	—					
Cooling fan filter	Clean every 3 000 km (1 800 miles).					
Drive V-belt	—	—		—	—	R
Brakes						
Brake fluid	—					
	Replace every 2 years.					
Brake hoses	—					
	Replace every 4 years.					
Tires	—					
Steering		—		—	—	
Front forks	—	—		—	—	
Rear suspension	—	—		—	—	
Chassis bolts and nuts	T	T	T	T	T	T

#### NOTE

**I = Inspect and clean, adjust, replace or lubricate as necessary.**

**R = Replace.**

**T = Tighten.**

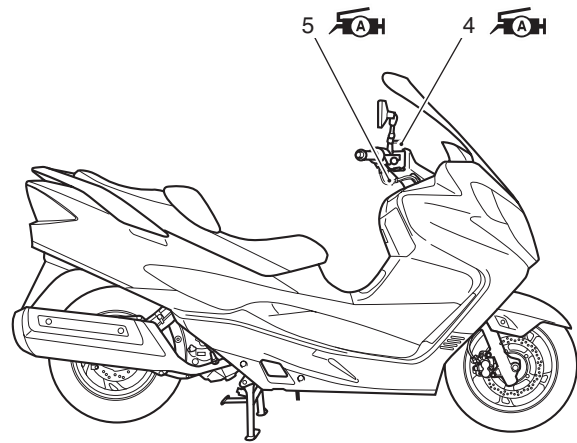
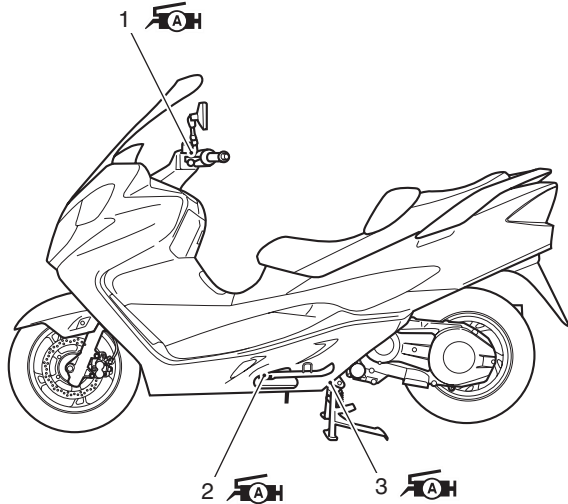
## Lubrication Points


B705H10205002

Proper lubrication is important for smooth operation and long life of each working part of the motorcycle. Major lubrication points are indicated below.

### NOTE

- Before lubricating each part, clean off any rusty spots and wipe off any grease, oil, dirt or grime.
- Lubricate exposed parts which are subject to rust, with a rust preventative spray whenever the motorcycle has been operated under wet or rainy conditions.



1. Rear brake lever holder	4. Front brake lever holder
2. Side-stand pivot and spring hooks	5. Throttle cables
3. Center stand pivot and spring hooks	 : Apply grease.

I705H1020001-01

## Repair Instructions

### Air Cleaner Element Removal and Installation

B705H10206001

Refer to "Air Cleaner Element Removal and Installation (Page0B-2)".

#### Inspect air cleaner element

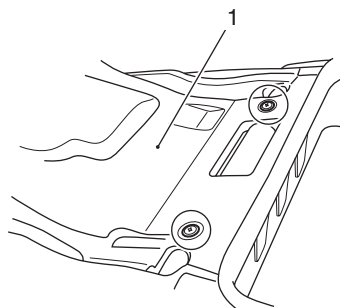
Every 6 000 km (4 000 miles, 12 months)

#### Replace air cleaner element

Every 18 000 km (11 000 miles, 36 months)

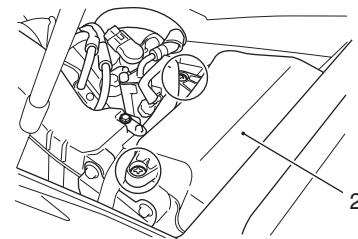
#### Removal

- 1) Remove the helmet box front cover (1). Refer to "Helmet Box Front Cover Removal and Installation in Section 9D (Page9D-16)".



I705H1020002-01

- 2) Remove the air cleaner cover (2) and air cleaner element.



I705H1020003-01

#### Installation

Install air cleaner element in the reverse order of removal. Pay attention to the following points:

- When installing the air cleaner element, fit the element to the cover first.
- When cleaning or installing the air cleaner element, drain water from the air cleaner box by removing the drain plugs. Refer to "Air Cleaner Box Removal and Installation in Section 1D (Page1D-9)".

## Air Cleaner Element Inspection

B705H10206002

### Inspect air cleaner element

Every 6 000 km (4 000 miles, 12 months)

### Replace air cleaner element

Every 18 000 km (11 000 miles, 36 months)

Remove the air duct (1) and inspect air cleaner element (2) for clogging. If it is clogged with dirt, replace it with a new one.

#### **⚠ CAUTION**

**Do not blow the air cleaner element with compressed air.**



I705H1020006-01

#### **⚠ CAUTION**

**If driving under dusty condition, replace the air cleaner element more frequently. The surest way to accelerate engine wear is to use the engine without the element or to use a ruptured element. Make sure that the air cleaner is in good condition at all times. Life of the engine depends largely on this component.**

## Spark Plug Removal and Installation

B705H10206003

### Inspect spark plug

Every 6 000 km (4 000 miles, 12 months)

### Replace spark plug

Every 12 000 km (7 500 miles, 24 months)

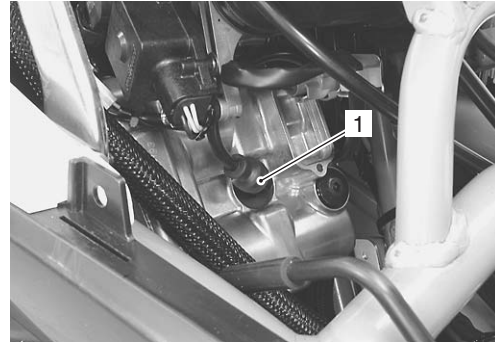
#### Removal

#### **⚠ WARNING**

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

- 1) Remove the front frame cover. Refer to "Front Frame Cover Removal and Installation in Section 9D (Page9D-17)".

- 2) Disconnect the plug cap (1).



I705H1020007-01

- 3) Remove the spark plug with the spark plug wrench.

#### Special tool

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



I705H1020008-01

#### Installation

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

#### **⚠ CAUTION**

**Before tightening the spark plug to the specified torque, carefully turn the spark plug by finger into the threads of the cylinder head to prevent damage the aluminum threads.**

- Tighten the spark plug to the specified torque.

#### Tightening torque

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

## Spark Plug Inspection and Cleaning

B705H10206004

### Inspect spark plug

Every 6 000 km (4 000 miles, 12 months)

### Replace spark plug

Every 12 000 km (7 500 miles, 24 months)

### Carbon Deposit

Check to see if there are carbon deposits on the plug. If carbon is deposited, remove it using a spark plug cleaner.


### Heat range

	Standard	Cold type
NGK	CR7E	CR8E
DENSO	U22ESR-N	U24ESR-N

### Spark Plug Gap

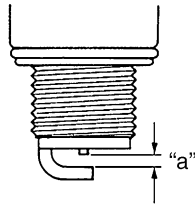
Measure the plug gap with the thickness gauge. If the gap is out of specification, adjust it to the following gap.

### Special tool

 : 09900-20803 (Thickness gauge)

### Spark plug gap "a" (Standard)

0.7 – 0.8 mm (0.028 – 0.031 in)



I705H1020070-06

### Electrodes Condition

#### CAUTION

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

Check to see the worn or burnt condition of the electrodes. If it is extremely worn or burnt, replace the plug. And also replace the plug if it has a broken insulator, damaged thread.

## Valve Clearance Inspection and Adjustment

B705H10206005

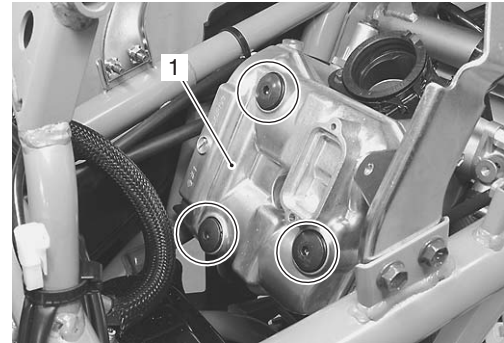
### Inspect valve clearance

Every 24 000 km (14 500 miles, 48 months)

### Inspection

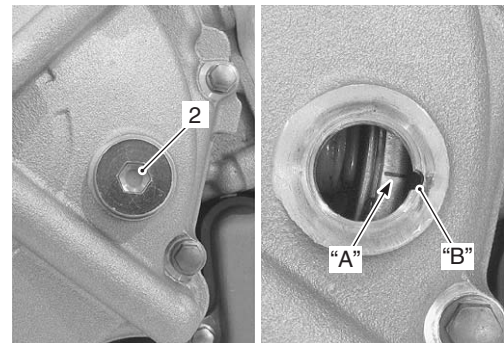
The valve clearance specification is different for intake and exhaust valves. Valve clearance must be checked and adjusted, a) at the time of periodic inspection, b) when the valve mechanism is serviced, and c) when the camshafts are removed for servicing.

- 1) Remove the air cleaner box. Refer to "Air Cleaner Box Removal and Installation in Section 1D (Page1D-9)".
- 2) Dismount the throttle body.
- 3) Remove the spark plug. Refer to "Spark Plug Removal and Installation (Page0B-3)".
- 4) Remove the cylinder head cover (1).



I705H1020009-01

- 5) Remove the cooling fan duct. Refer to "Cooling Fan Filter Inspection in Section 5A (Page5A-6)".
- 6) Remove the valve timing inspection plug (2) and bring the piston to TDC on the compression stroke by turning the crankshaft until the line "A" on the generator rotor aligns with the slit "B" in the generator cover.



I705H1020010-01

### Valve clearance (when cold)


Standard	IN	0.10 – 0.20 mm (0.004 – 0.008 in)
	EX	0.20 – 0.30 mm (0.008 – 0.012 in)

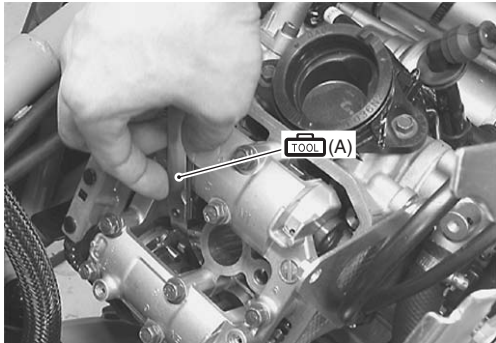
**NOTE**

- The clearance specification is for **COLD** state.
- To turn the crankshaft for clearance checking, be sure to use a wrench, and rotate in the normal running direction. Spark plug should be removed.

7) In this condition, read the valve clearance at each valve. If the clearance is out of specification, adjust the clearance.

**Special tool**

 (A): 09900-20803 (Thickness gauge)



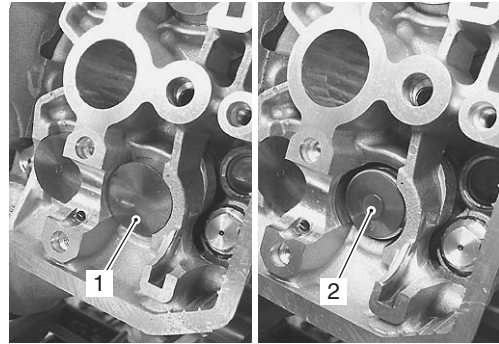
I705H1020011-02

8) Reinstall the removed parts in the reverse order of removal.

**Adjustment**

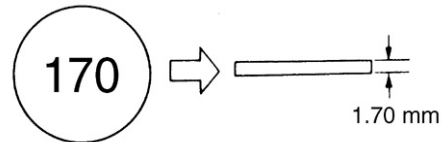
The clearance is adjusted by replacing the existing tappet shim by a thicker or thinner one.

- 1) Remove the intake or exhaust camshaft. Refer to "Engine Top Side Disassembly in Section 1D (Page1D-16)".
- 2) Remove the tappet (1) and shim (2) by fingers or magnetic hand.



I705H1020012-02

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



I310G1020023-01

- 4) Select a replacement shim that will provide a clearance within the specified range. For the purpose of this adjustment, a total of 25 sizes of tappet shim are available ranging from 1.20 to 2.20 mm in steps of 0.05 mm.
- 5) Fit the selected shim to the valve stem end, with numbers toward tappet. Be sure to check shim size with micrometer to ensure its size.
- 6) Install the camshafts. Refer to "Engine Top Side Assembly in Section 1D (Page1D-18)".

(INTAKE SIDE)

TAPPET SHIM SELECTION TABLE [INTAKE]  
TAPPET SHIM NO. (12892-05C00-XXX)

TAPPET SHIM SET (12800-05820)

MEASURED TAPPET CLEARANCE (mm)	SUFFIX NO.	SPECIFIED CLEARANCE/NO ADJUSTMENT REQUIRED																				
		120	125	130	135	140	145	150	155	160	165	170	175	180	185	190	195	200	205	210	215	220
1.20	1.20	1.25	1.30	1.35	1.40	1.45	1.50	1.55	1.60	1.65	1.70	1.75	1.80	1.85	1.90	1.95	2.00	2.05	2.10	2.15	2.20	
0.00-0.04		1.20	1.25	1.30	1.35	1.40	1.45	1.50	1.55	1.60	1.65	1.70	1.75	1.80	1.85	1.90	1.95	2.00	2.05	2.10	2.15	2.20
0.05-0.09		1.20	1.25	1.30	1.35	1.40	1.45	1.50	1.55	1.60	1.65	1.70	1.75	1.80	1.85	1.90	1.95	2.00	2.05	2.10	2.15	2.20
0.10-0.20		1.20	1.25	1.30	1.35	1.40	1.45	1.50	1.55	1.60	1.65	1.70	1.75	1.80	1.85	1.90	1.95	2.00	2.05	2.10	2.15	2.20
0.21-0.25		1.30	1.35	1.40	1.45	1.50	1.55	1.60	1.65	1.70	1.75	1.80	1.85	1.90	1.95	2.00	2.05	2.10	2.15	2.20		
0.26-0.30		1.35	1.40	1.45	1.50	1.55	1.60	1.65	1.70	1.75	1.80	1.85	1.90	1.95	2.00	2.05	2.10	2.15	2.20			
0.31-0.35		1.40	1.45	1.50	1.55	1.60	1.65	1.70	1.75	1.80	1.85	1.90	1.95	2.00	2.05	2.10	2.15	2.20				
0.36-0.40		1.45	1.50	1.55	1.60	1.65	1.70	1.75	1.80	1.85	1.90	1.95	2.00	2.05	2.10	2.15	2.20					
0.41-0.45		1.50	1.55	1.60	1.65	1.70	1.75	1.80	1.85	1.90	1.95	2.00	2.05	2.10	2.15	2.20						
0.46-0.50		1.55	1.60	1.65	1.70	1.75	1.80	1.85	1.90	1.95	2.00	2.05	2.10	2.15	2.20							
0.51-0.55		1.60	1.65	1.70	1.75	1.80	1.85	1.90	1.95	2.00	2.05	2.10	2.15	2.20								
0.56-0.60		1.65	1.70	1.75	1.80	1.85	1.90	1.95	2.00	2.05	2.10	2.15	2.20									
0.61-0.65		1.70	1.75	1.80	1.85	1.90	1.95	2.00	2.05	2.10	2.15	2.20										
0.66-0.70		1.75	1.80	1.85	1.90	1.95	2.00	2.05	2.10	2.15	2.20											
0.71-0.75		1.80	1.85	1.90	1.95	2.00	2.05	2.10	2.15	2.20												
0.76-0.80		1.85	1.90	1.95	2.00	2.05	2.10	2.15	2.20													
0.81-0.85		1.90	1.95	2.00	2.05	2.10	2.15	2.20														
0.86-0.90		1.95	2.00	2.05	2.10	2.15	2.20															
0.91-0.95		2.00	2.05	2.10	2.15	2.20																
0.96-1.00		2.05	2.10	2.15	2.20																	
1.01-1.05		2.10	2.15	2.20																		
1.06-1.10		2.15	2.20																			
1.11-1.15		2.20																				

**HOW TO USE THIS CHART:**

- I. Measure tappet clearance. "ENGINE IS COLD"
- II. Measure present shim size.
- III. Match clearance in vertical column with present shim size in horizontal column.

**EXAMPLE**

Tappet clearance is 0.23 mm  
Present shim size 1.70 mm  
Shim size to be used 1.80 mm



(EXHAUST SIDE)

TAPPET SHIM SELECTION TABLE [EXHAUST]  
TAPPET SHIM NO. (12892-05C00-XXX)

TAPPET SHIM SET (12800-05820)

MEASURED TAPPET CLEARANCE (mm)	SUFFIX NO.	SPECIFIED CLEARANCE/NO ADJUSTMENT REQUIRED																				
		120	125	130	135	140	145	150	155	160	165	170	175	180	185	190	195	200	205	210	215	220
0.05-0.09	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20
0.10-0.14	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20
0.15-0.19	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20
0.20-0.30	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20
0.31-0.35	1.30	1.35	1.40	1.45	1.50	1.55	1.60	1.65	1.70	1.75	1.80	1.85	1.90	1.95	2.00	2.05	2.10	2.15	2.20	2.20	2.20	2.20
0.36-0.40	1.35	1.40	1.45	1.50	1.55	1.60	1.65	1.70	1.75	1.80	1.85	1.90	1.95	2.00	2.05	2.10	2.15	2.20	2.20	2.20	2.20	2.20
0.41-0.45	1.40	1.45	1.50	1.55	1.60	1.65	1.70	1.75	1.80	1.85	1.90	1.95	2.00	2.05	2.10	2.15	2.20	2.20	2.20	2.20	2.20	2.20
0.46-0.50	1.45	1.50	1.55	1.60	1.65	1.70	1.75	1.80	1.85	1.90	1.95	2.00	2.05	2.10	2.15	2.20	2.20	2.20	2.20	2.20	2.20	2.20
0.51-0.55	1.50	1.55	1.60	1.65	1.70	1.75	1.80	1.85	1.90	1.95	2.00	2.05	2.10	2.15	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20
0.56-0.60	1.55	1.60	1.65	1.70	1.75	1.80	1.85	1.90	1.95	2.00	2.05	2.10	2.15	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20
0.61-0.65	1.60	1.65	1.70	1.75	1.80	1.85	1.90	1.95	2.00	2.05	2.10	2.15	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20
0.66-0.70	1.65	1.70	1.75	1.80	1.85	1.90	1.95	2.00	2.05	2.10	2.15	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20
0.71-0.75	1.70	1.75	1.80	1.85	1.90	1.95	2.00	2.05	2.10	2.15	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20
0.76-0.80	1.75	1.80	1.85	1.90	1.95	2.00	2.05	2.10	2.15	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20
0.81-0.85	1.80	1.85	1.90	1.95	2.00	2.05	2.10	2.15	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20
0.86-0.90	1.85	1.90	1.95	2.00	2.05	2.10	2.15	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20
0.91-0.95	1.90	1.95	2.00	2.05	2.10	2.15	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20
0.96-1.00	1.95	2.00	2.05	2.10	2.15	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20
1.01-1.05	2.00	2.05	2.10	2.15	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20
1.06-1.10	2.05	2.10	2.15	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20
1.11-1.15	2.10	2.15	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20
1.16-1.20	2.15	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20
1.21-1.25	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20

**HOW TO USE THIS CHART:**

- I. Measure tappet clearance. "ENGINE IS COLD"
- II. Measure present shim size.
- III. Match clearance in vertical column with present shim size in horizontal column.

**EXAMPLE**

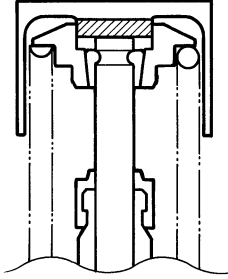
Tappet clearance is 0.33 mm  
Present shim size 1.70 mm  
Shim size to be used 1.80 mm



**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.

- 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.



I310G1020026-01

- 8) Install the cylinder head cover. Refer to "Engine Top Side Assembly in Section 1D (Page1D-18)".
- 9) Install the spark plug and plug cap. Refer to "Spark Plug Removal and Installation (Page0B-3)".
- 10) Install other removed parts.

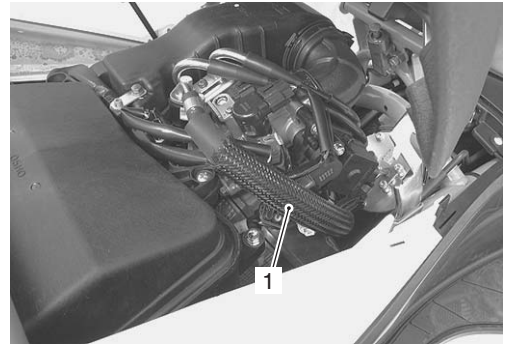
**Fuel Line Inspection**

B705H10206006

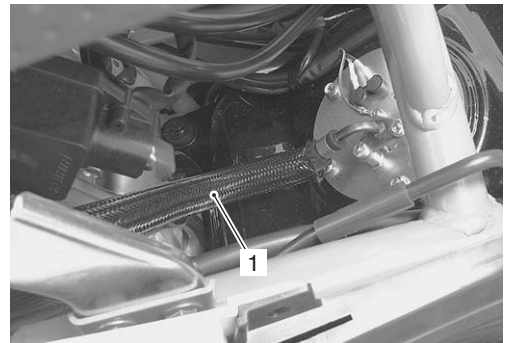
**Inspect fuel line****Every 6 000 km (4 000 miles, 12 months)**

Inspect the fuel line in the following procedures:

- 1) Remove the helmet box front cover. Refer to "Helmet Box Removal and Installation in Section 9D (Page9D-21)".
- 2) Remove the front frame cover. Refer to "Front Frame Cover Removal and Installation in Section 9D (Page9D-17)".
- 3) Inspect the fuel line (1) for damage and fuel leakage. If any defects are found, the fuel line must be replaced.



I705H1020050-01



I705H1020051-01

- 4) Reinstall the removed parts.

**Evaporative Emission Control System (E-33 Only)**

B705H10206025

**Inspect evaporative emission control system****Every 12 000 km (7 500 miles, 24 months)**

Inspect the evaporative emission control system periodically (E-33 only).

## Engine Oil and Filter Change

B705H10206007

### Replace engine oil

Initially at 1 000 km (600 miles, 2 month) and every 6 000 km (4 000 miles, 12 months) thereafter

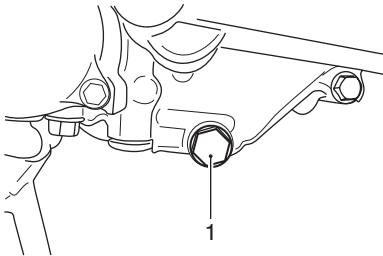
### Replace oil filter

Initially at 1 000 km (600 miles, 2 month) and every 18 000 km (11 000 miles, 36 months) thereafter

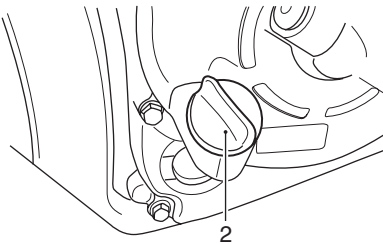
Oil should be changed while the engine is warm. Oil filter replacement at the above intervals, should be done together with the engine oil change.

### Engine Oil Change

- 1) Keep the motorcycle upright with the center stand.
- 2) Place an oil pan below the engine, and drain oil by removing the drain plug (1) and filler cap (2).



I705H1020014-03



I705H1020013-02

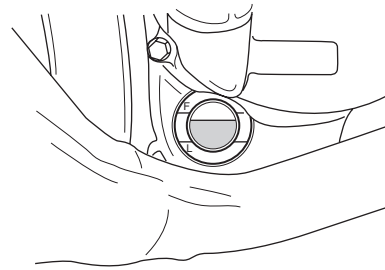
- 3) Tighten the oil drain plug to the specified torque.

#### Tightening torque

**Oil drain plug: 23 N·m (2.3 kgf·m, 16.5 lb·ft)**

- 4) Pour new oil through the oil filler. When performing an oil change (without oil filter replacement), the engine will hold about 1.2 L (1.3/1.1 US/Imp qt) of oil. Use SF/SG or SH/SJ in API with MA in JASO.
- 5) Start the engine and allow it to run for three minutes at idling speed.

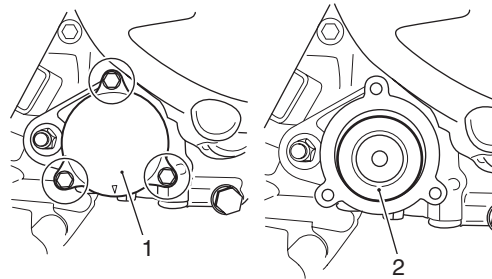
- 6) Turn off the engine and wait about three minutes, then check the oil level through the inspection window. If the level is below mark "L", add oil to "F" level. If the level is above mark "F", drain oil to "F" level.



I705H1020015-01

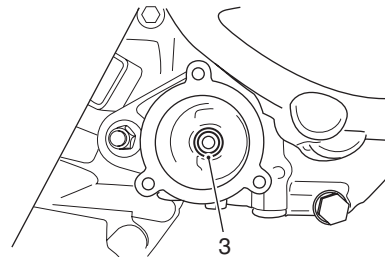
### Oil Filter Replacement

- 1) Drain engine oil in the same manner of engine oil replacement procedures.
- 2) Remove the oil filter cap (1) and oil filter (2).



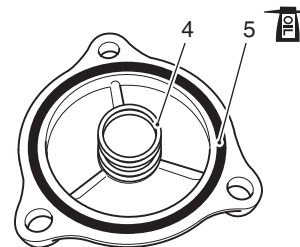
I705H1020016-01

- 3) Replace the O-ring (3) with a new one.



I705H1020017-02

- 4) Install the spring (4) to the oil filter cap.
- 5) Replace the O-ring (5) with a new one and apply engine oil to it.



I705H1020019-02

- 6) Install a new oil filter.
- 7) Install the oil filter cap.
- 8) Pour fresh engine oil and check the oil level in the same manner of engine oil replacement procedures.

**OIL: Engine Oil (SAE 10W-40, API SF/SG or SH/SJ with JASO MA)**

**Necessary amount of engine oil**

**Oil change: 1.2 L (1.2/1.0 US/Imp qt)**

**Filter change: 1.3 L (1.4/1.1 US/Imp qt)**

**Overhaul engine: 1.5 L (1.6/1.3 US/Imp qt)**

**Final Reduction Gear Oil Replacement**

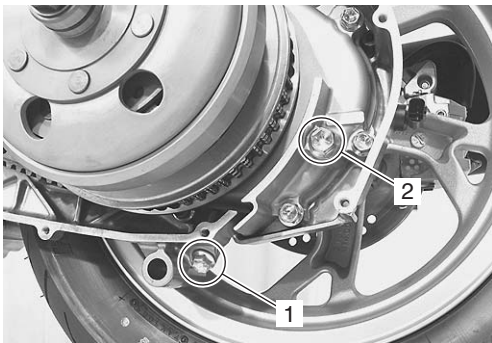
B705H10206026

**Replace final reduction gear oil**

**Every 12 000 km (7 500 miles, 12 months) thereafter.**

Replace the final reduction gear oil in the following procedures:

- 1) Keep the motorcycle upright with the center stand.
- 2) Remove the clutch covers. Refer to "V-belt Type Continuously Variable Automatic Transmission Removal and Installation in Section 5A (Page5A-3)".
- 3) Place the oil pan below the final reduction gear case.
- 4) Drain final reduction gear oil by removing the drain plug (1) and oil level check plug (2).



I705H1020018-01

- 5) Tighten the drain plug to the specified torque.

**Tightening torque**

**Final reduction gear drain plug: 12 N·m (1.2 kgf-m, 8.5 lb-ft)**

- 6) Pour new oil through the oil level check hole until the oil overflows from the hole.
- 7) Tighten the oil level check plug to the specified torque.

**Tightening torque**

**Final reduction gear oil level check plug: 16 N·m (1.6 kgf-m, 11.5 lb-ft)**

**OIL: Engine Oil (SAE 10W-40, API SF/SG or SH/SJ with JASO MA)**

**Necessary amount of final reduction gear oil**

**Oil check 180 ml (0.38/0.32 US/Imp qt)**

**Overhaul 190 ml (0.40/0.33 US/Imp qt)**

- 8) Install the clutch covers. Refer to "V-belt Type Continuously Variable Automatic Transmission Removal and Installation in Section 5A (Page5A-3)".

**Cooling Fan Filter Removal and Installation**

B705H10206028

Refer to "Cooling Fan Filter Inspection in Section 5A (Page5A-6)".

**Cooling Fan Filter Inspection and Cleaning**

B705H10206027

**Inspection**

Refer to "Cooling Fan Filter Inspection in Section 5A (Page5A-6)".

**Cleaning**

**Clean cooling fan filter**

**Every 3 000 km (1 800 miles)**

- 1) Remove the cooling fan filter. Refer to "Cooling Fan Filter Inspection in Section 5A (Page5A-6)".
- 2) Carefully use compressed air to clean the cooling fan filter.
- 3) Install the cooling fan filter. Refer to "Cooling Fan Filter Inspection in Section 5A (Page5A-6)".

### Drive V-belt Removal and Installation

B705H10206029

#### Inspect drive V-belt

Every 12 000 km (7 500 miles, 24 months)

#### Replace drive V-belt

Every 24 000 km (14 500 miles, 48 months)

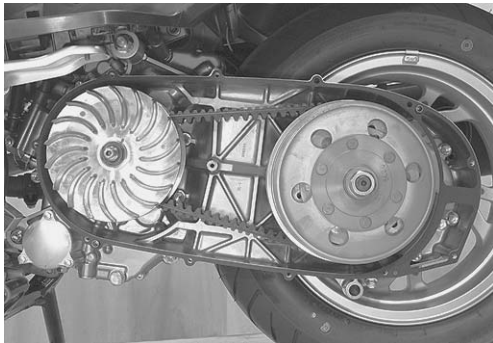
Refer to “V-belt Type Continuously Variable Automatic Transmission Removal and Installation in Section 5A (Page5A-3)”.

### Drive V-belt Inspection

B705H10206030

Inspect the drive V-belt in the following procedures:

- 1) Remove the clutch covers. Refer to “V-belt Type Continuously Variable Automatic Transmission Removal and Installation in Section 5A (Page5A-3)”.
- 2) Inspect the drive V-belt for crack or other damage and measure the width of belt if necessary. If any abnormal point are found, replace the drive V-belt with a new one. Refer to “V-belt Type Continuously Variable Automatic Transmission Removal and Installation in Section 5A (Page5A-3)”.



I705H1020052-01

- 3) Install the clutch covers. Refer to “V-belt Type Continuously Variable Automatic Transmission Removal and Installation in Section 5A (Page5A-3)”.

### Throttle Cable Play Inspection and Adjustment

B705H10206031

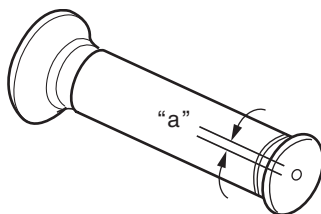
#### Inspect throttle cable play

Initially at 1 000 km (6 000 miles, 2 month) and every 6 000 km (4 000 miles, 12 months) thereafter

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

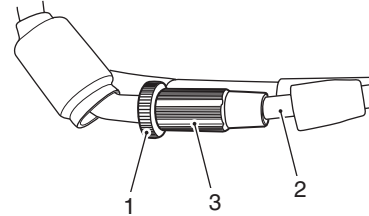
#### Throttle cable play “a”

2.0 – 4.0 mm (0.08 – 0.16 in)



I705H1020020-01

- 1) Loosen the lock-nut (1) of the throttle pulling cable (2).
- 2) Turn the adjuster (3) in or out until the throttle cable play “a” (at the throttle grip) is between 2 – 4 mm (0.08 – 0.16 in).
- 3) Tighten the lock-nut (1) while holding the adjuster (3).



I705H1020021-01

#### **▲ WARNING**

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

### Cooling System Inspection

B705H10206015

#### Engine Coolant Level Inspection

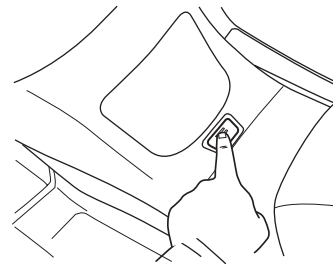
##### Inspect cooling system

Every 6 000 km (4 000 miles, 12 months)

##### Replace engine coolant

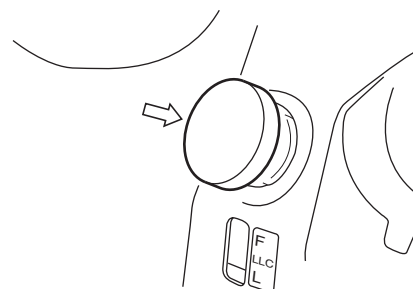
Every 2 years

- 1) Keep the motorcycle upright with the center stand.
- 2) Open the fuel lid.



I705H1020022-01

- 3) 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 from the engine coolant reservoir tank filler.



I705H1020023-02

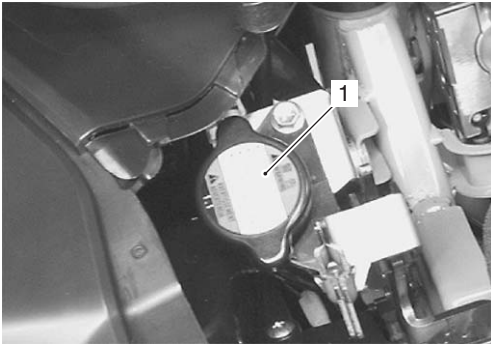
**Engine Coolant Change**

- 1) Remove the front panel. Refer to "Front Panel Removal and Installation in Section 9D (Page9D-14)".
- 2) Remove the under cover. Refer to "Under Cover Removal and Installation in Section 9D (Page9D-16)".

**▲ WARNING**

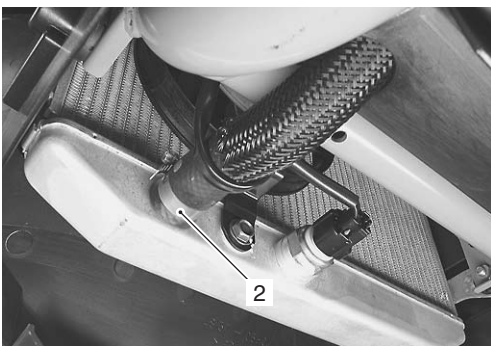
**Do not open the radiator cap when the engine is hot, as you may be injured by escaping hot liquid or vapor. Engine coolant may be harmful if swallowed or if it comes in contact with skin or eyes. If engine coolant gets into the eyes or in contact with the skin, flush thoroughly with plenty of water.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

- 3) Remove the radiator cap (1).



I705H1020024-02

- 4) Drain engine coolant by disconnecting the radiator outlet hose (2).



I705H1020026-01

- 5) Flush the radiator with fresh water if necessary.
- 6) Reconnect the radiator outlet hose.
- 7) Pour the specified engine coolant up to the radiator inlet.
- 8) Bleed air from the cooling circuit.

**Air Bleeding From the Cooling Circuit**

B705H10206032

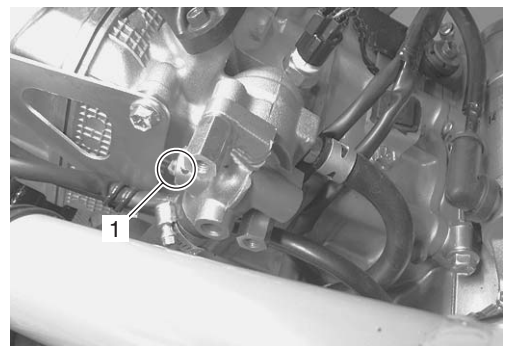
Bleed air from the cooling circuit in the following procedures:

- 1) Remove the front panel. Refer to "Front Panel Removal and Installation in Section 9D (Page9D-14)".
- 2) Remove the left footboard. Refer to "Footboard Removal and Installation in Section 9D (Page9D-21)".
- 3) Support the motorcycle upright.
- 4) Pour engine coolant up to the radiator inlet.



I705H1020027-01

- 5) Slowly swing the motorcycle, right and left, to bleed the air trapped in the cooling circuit.
- 6) Add engine coolant up to the radiator inlet.
- 7) Start up the engine and bleed air from the radiator inlet completely.
- 8) Add engine coolant up to the radiator inlet.
- 9) Repeat the above procedures until no air bleeds from the radiator inlet.
- 10) Loosen the air bleeding bolt (1) and check that the engine coolant flows out.



I705H1020028-02



## 0B-13 Maintenance and Lubrication:

- 11) Close the air bleeding bolt securely.
- 12) Close the radiator cap securely.
- 13) After warming up and cooling down the engine several times, add the engine coolant up to the full level of the reservoir.
- 14) Install the removed parts.

### **⚠ CAUTION**

**Repeat the above procedures several times and make sure that the radiator is filled with engine coolant up to the reservoir full level.**

#### **LLC: Engine coolant capacity**

**Engine side: 1 600 ml (1.7/1.4 US/lmp pt)**

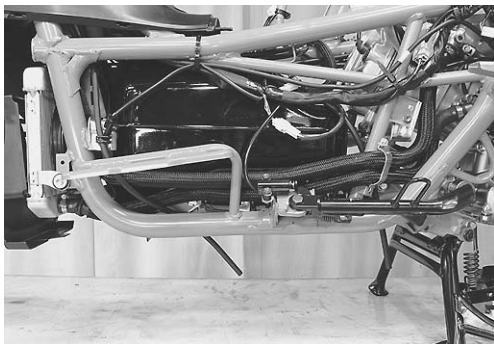
**Reservoir tank side: 250 ml (0.3/0.2 US/lmp qt)**

### **Radiator Hose Inspection**

B705H10206033

Inspect the radiator hoses in the following procedures:

- 1) Remove the left footboard. Refer to "Footboard Removal and Installation in Section 9D (Page9D-21)".
- 2) Check the radiator hoses for crack, damage or engine coolant leakage. If any defect is found, replace the radiator hose with a new one.



I705H1020031-01

- 3) Install the left footboard. Refer to "Footboard Removal and Installation in Section 9D (Page9D-21)".

### **Brake System Inspection**

B705H10206016

#### **Inspect Brake System**

**Initially at 1 000 km (600 miles, 2 month) and every 6 000 km (4 000 miles, 12 months) thereafter**

#### **Inspect Brake Hose and Brake Fluid**

**Every 6 000 km (4 000 miles, 12 months)**

#### **Replace Brake Hose**

**Every 4 years**

#### **Replace Brake Fluid**

**Every 2 years**

### **⚠ WARNING**

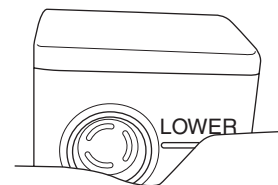
- **The brake system of this motorcycle is filled with a glycol-based brake fluid. Do not use or mix different types of fluid such as silicone-based or petroleum-based. Do not use any brake fluid taken from old, used or unsealed containers. Never re-use brake fluid left over from the last servicing or stored for a long period.**
- **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 fluid leakage before riding.**

### **Brake Fluid Level Check**

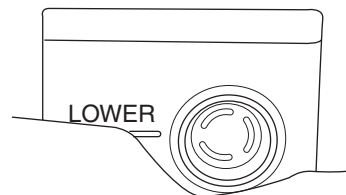
- 1) Keep the motorcycle upright and place the handlebars straight.
- 2) Check the brake fluid level by observing the lower limit lines on the front and rear brake fluid reservoirs.
- 3) When the level is below the lower limit line, replenish with brake fluid that meets the following specification.

#### **Specification and classification**

**DOT 4**



I705H1020032-01



I705H1020033-01



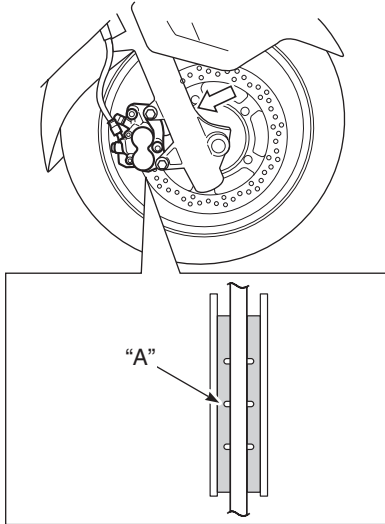
I705H1020056-01

**Brake Pad Check**

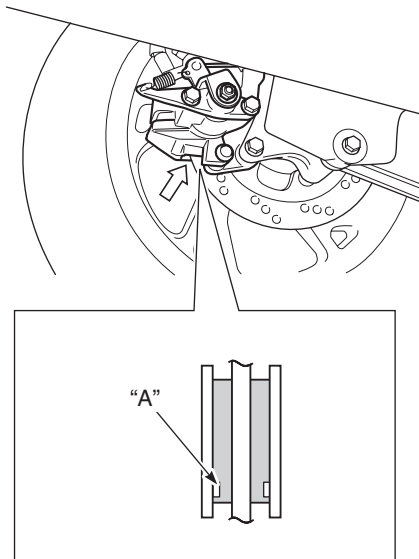
The extent of brake pad wear can be checked by observing the grooved limit line "A" on the pad. When the wear exceeds the grooved limit line, replace the pads with the new ones. Refer to "Front Brake Pad Replacement in Section 4B (Page4B-2)" and "Rear Brake Pad Replacement in Section 4C (Page4C-2)".

**⚠ CAUTION**

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



I705H1020053-02



I705H1020054-02

**Front Brake Hose Inspection**

Inspect the front brake hoses and hose joints for crack, damage or fluid leakage. If any defects are found, replace the brake hose with a new one.



I705H1020029-01

**Rear Brake Hose Inspection**

Inspect the rear brake hose for crack, damage or fluid leakage. If any defects are found, replace the brake hose with a new one.



I705H1020034-01

**Brake Hose Replacement**

B705H10206035

Refer to "Front Brake Hose Removal and Installation in Section 4A (Page4A-6)" and "Rear Brake Hose Removal and Installation in Section 4A (Page4A-6)".

**Air Bleeding from Brake Fluid Circuit**

B705H10206036

Refer to "Air Bleeding from Brake Fluid Circuit in Section 4A (Page4A-4)".

**Brake Fluid Replacement**

B705H10206037

Refer to "Brake Fluid Replacement in Section 4A (Page4A-5)".

**Tire Inspection**

B705H10206017


**Inspect tire**

Every 6 000 km (4 000 miles, 6 months)

**Tire Tread Condition**

Operating the motorcycle with excessively worn tires will decrease riding stability and consequently invite a dangerous situation. It is highly recommended to replace a tire when the remaining depth of tire tread reaches the following specification.

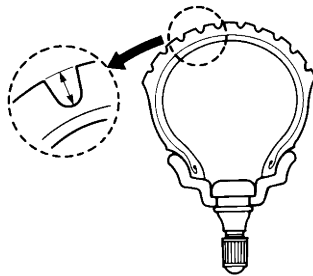
**Special tool**

 : 09900-20805 (Tire depth gauge)

**Tire tread depth (Service Limit)**

**FRONT: 1.6 mm (0.06 in)**

**REAR: 2.0 mm (0.08 in)**



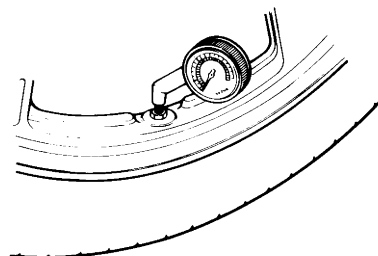
I310G1020068-01

**Tire Pressure**

If the tire pressure is too high or too low, steering will be adversely affected and tire wear increased. Therefore, maintain the correct tire pressure for good roadability or shorter tire life will result. Cold inflation tire pressure is as follows.

**Cold inflation tire pressure**

	SOLO RIDING			DUAL RIDING		
	kPa	kgf/cm <sup>2</sup>	psi	kPa	kgf/cm <sup>2</sup>	psi
<b>FRONT</b>	175	1.75	25	175	1.75	25
<b>REAR</b>	200	2.00	29	250	2.50	36



I310G1020069-01

**⚠ CAUTION**

The standard tire fitted on this motorcycle is 120/80 14M/C 58S for front and 150/70 13M/C for rear. The use of tires other than those specified may cause instability. It is highly recommended to use the specified tires.

**Tire type**

**BRIDGESTONE**

**Front: HOOP B03 G**

**Rear: HOOP B02 G**

**Steering System Inspection**

B705H10206018

**Inspect steering system**

Initially at 1 000 km (600 miles, 2 month) and every 12 000 km (7 500 miles, 24 months) thereafter

Steering should be adjusted properly for smooth turning of handlebars and safe running. Overtighten steering prevents smooth turning of the handlebars and too loose steering will cause poor stability.

- 1) Check that there is no play in the steering stem while grasping the lower fork tubes by supporting the motorcycle so that the front wheel is off the ground, with the wheel straight ahead, and pull forward.
- 2) If play is found, read just the steering. Refer to "Steering Stem Bearing Removal and Installation in Section 6B (Page6B-9)".



I705H1020035-02



## Front Fork Inspection

B705H10206019

### Inspect front forks

**Every 12 000 km (7 500 miles, 24 months)**

Inspect the front forks for oil leakage, scoring or scratches on the outer surface of the inner tubes. Replace any defective parts, if necessary. Refer to "Front Fork Disassembly and Assembly in Section 2B (Page2B-3)".



I705H1020036-02

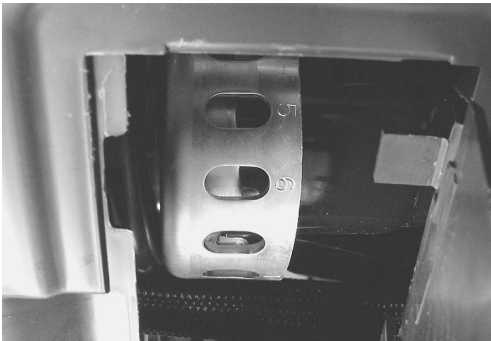
## Rear Suspension Inspection

B705H10206020

### Inspect rear suspension

**Every 12 000 km (7 500 miles, 24 months)**

Inspect the rear shock absorber for oil leakage and mounting rubbers for wear and damage. Replace any defective parts, if necessary. Refer to "Rear Shock Absorber Inspection in Section 2C (Page2C-5)".



I705H1020037-01

## Exhaust Pipe and Muffler Mounting Inspection

B705H10206021

### Tighten exhaust pipe bolts and muffler bolts

**Initially at 1 000 km (600 miles, 2 month) and every 12 000 km (7 500 miles, 24 months) thereafter**

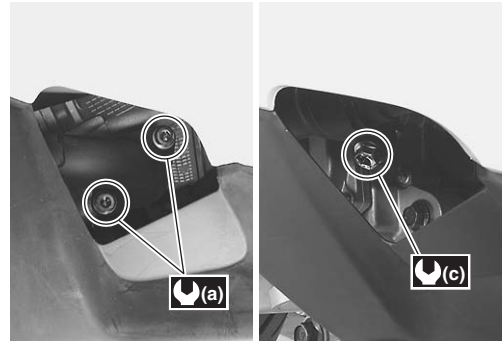
Check the exhaust pipe bolts, muffler bolts and nut to the specified torque.

### Tightening torque

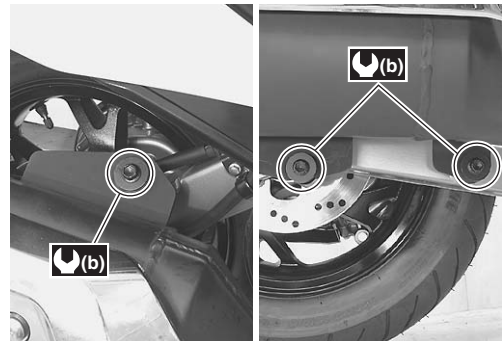
**Exhaust pipe bolt (a): 23 N·m (2.3 kgf-m, 16.5 lb-ft)**

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

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



I705H1020038-02



I705H1020040-02

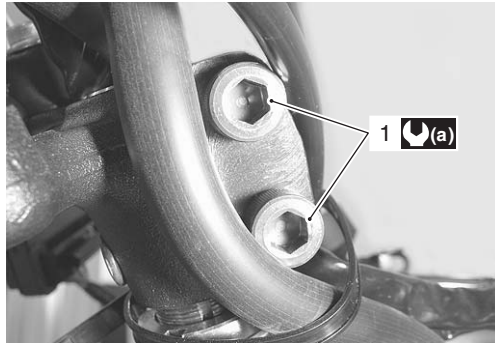
### Chassis Bolt and Nut Inspection

B705H10206022

#### Tighten chassis bolt and nut

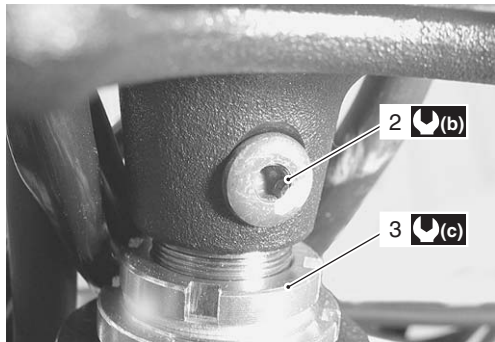
Initially at 1 000 km (600 miles, 2 month) and every 6 000 km (4 000 miles, 12 months) thereafter

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



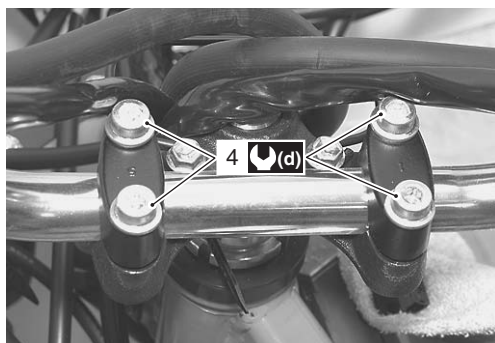
I705H1020057-03

1. Handlebar holder clamp bolt
(a) : 55 N·m (5.5 kgf·m, 40.0 lb-ft)



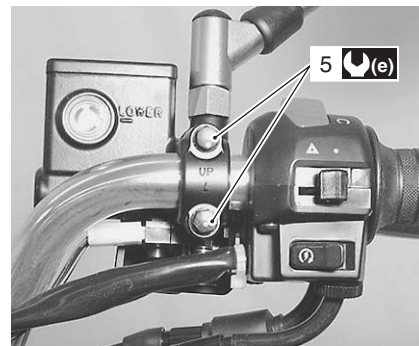
I705H1020059-01

2. Handlebar holder set bolt	(b) : 23 N·m (2.3 kgf·m, 16.5 lb-ft)
3. Steering stem lock nut	(c) : 30 N·m (3.0 kgf·m, 21.5 lb-ft)



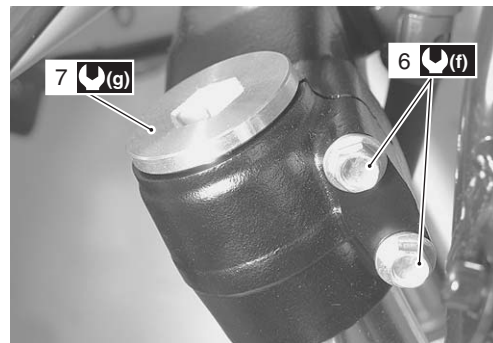
I705H1020058-06

4. Handlebar clamp bolt
(d) : 23 N·m (2.3 kgf·m, 16.5 lb-ft)



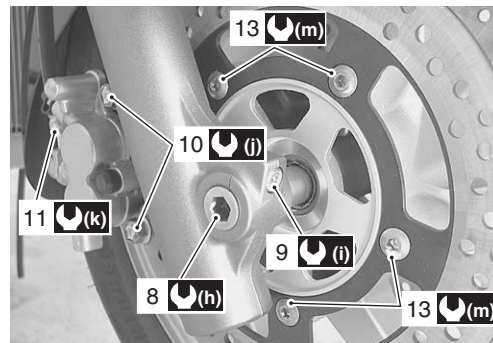
I705H1020061-01

5. Brake master cylinder mounting bolt
(e) : 10 N·m (1.0 kgf·m, 7.0 lb-ft)



I705H1020060-01

6. Front fork clamp bolt	(f) : 23 N·m (2.3 kgf·m, 16.5 lb-ft)
7. Front fork cap bolt	(g) : 45 N·m (4.5 kgf·m, 32.5 lb-ft)



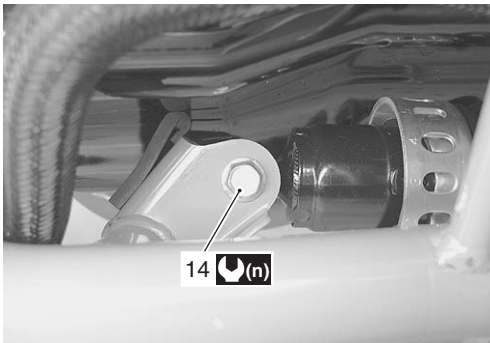
I705H1020062-03

8. Front axle	(h) : 65 N·m (6.5 kgf·m, 47.0 lb-ft)
9. Front axle pinch bolt	(i) : 23 N·m (2.3 kgf·m, 16.5 lb-ft)
10. Front brake caliper mounting bolt	(j) : 35 N·m (3.5 kgf·m, 25.5 lb-ft)
11. Brake caliper air bleeder valve (Front & Rear)	(k) : 6.0 N·m (0.6 kgf·m, 4.5 lb-ft)
13. Brake disc bolt (Front & Rear)	(m) : 23 N·m (2.3 kgf·m, 16.5 lb-ft)



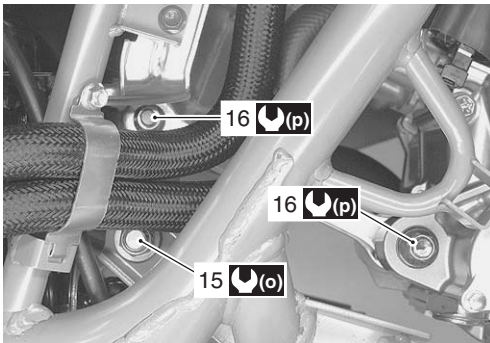
I705H1020063-03

12. Brake hose union bolt (Front & Rear)	
(l) : 23 N·m (2.3 kgf-m, 16.5 lb-ft)	



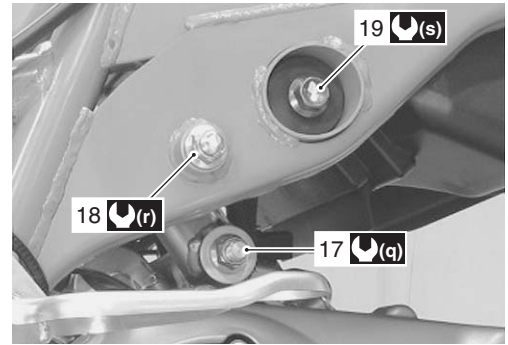
I705H1020064-01

14. Rear shock absorber mounting bolt/nut (Upper & Lower)	
(n) : 50 N·m (5.0 kgf-m, 36.0 lb-ft)	



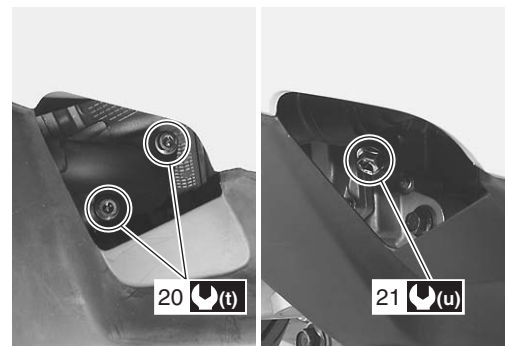
I705H1020065-01

15. Cushion lever nut	(o) : 50 N·m (5.0 kgf-m, 36.0 lb-ft)
16. Cushion rod nut	(p) : 50 N·m (5.0 kgf-m, 36.0 lb-ft)



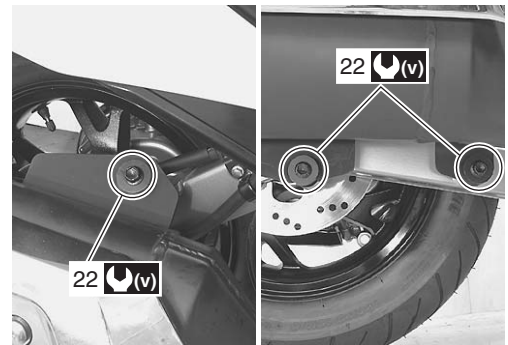
I705H1020066-04

17. Engine mounting nut	(q) : 93 N·m (9.3 kgf-m, 67.0 lb-ft)
18. Crankcase bracket nut	(r) : 85 N·m (8.5 kgf-m, 61.5 lb-ft)
19. Rubber damper bolt	(s) : 85 N·m (8.5 kgf-m, 61.5 lb-ft)



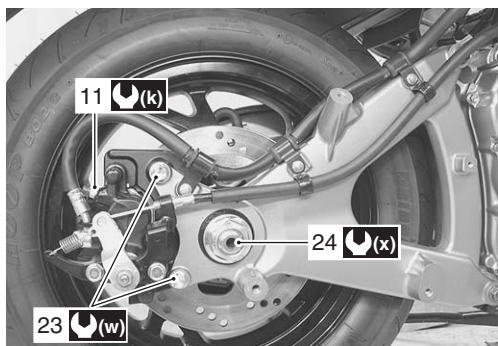
I705H1020067-01

20. Exhaust pipe bolt	(t) : 23 N·m (2.3 kgf-m, 16.5 lb-ft)
21. Muffler connecting bolt	(u) : 23 N·m (2.3 kgf-m, 16.5 lb-ft)



I705H1020068-01

22. Muffler mounting bolt	(v) : 23 N·m (2.3 kgf-m, 16.5 lb-ft)
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I705H1020069-01

11. Brake caliper air bleeder valve (Front & Rear)	(k) : 6 N·m (6.0 kgf-m, 4.5 lb-ft)
23. Rear brake caliper mounting bolt	(w) : 23 N·m (2.3 kgf-m, 16.5 lb-ft)
24. Rear axle nut	(k) : 120 N·m (12.0 kgf-m, 87.0 lb-ft)

### Compression Pressure Check

B705H10206023

Refer to “Compression Pressure Check in Section 1D (Page1D-3)”.

### Oil Pressure Check

B705H10206024

Refer to “Oil Pressure Check in Section 1E (Page1E-3)”.

### SDS Check

B705H10206038

Refer to “SDS Check in Section 1A (Page1A-17)”.

### Automatic Clutch Inspection

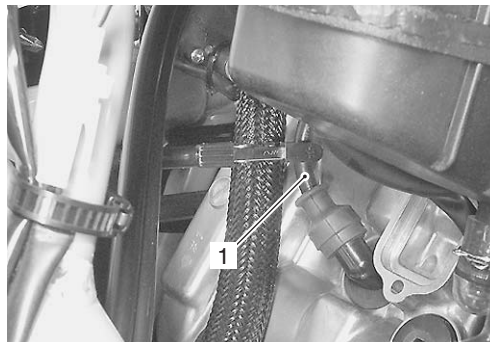
B705H10206039

This motorcycle is equipped with an automatic clutch and variable ratio belt drive transmission. The engagement of the clutch is governed by engine RPMs and centrifugal mechanism located in the clutch. To insure proper performance and longer lifetime of the clutch assembly it is essential that the clutch engages smoothly and gradually. The following inspections must be performed.

#### Initial Engagement Inspection

- 1) Warm up the engine to normal operating temperature.
- 2) Remove the frame front cover. Refer to “Front Frame Cover Removal and Installation in Section 9D (Page9D-17)”.

- 3) Connect the tachometer to the high-tension cord (1).



I705H1020055-01

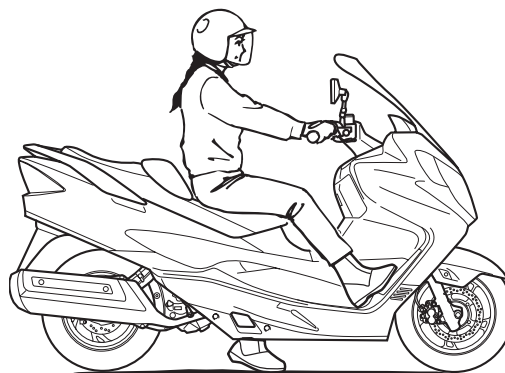
- 4) Seated on the motorcycle with the motorcycle on level ground, increase the engine RPMs slowly and note the RPM at which the motorcycle begins to move forward.

#### Special tool

: 09900-26006 (Engine tachometer (solar cell type))

#### Engagement r/min

2 100 – 2 700 r/min



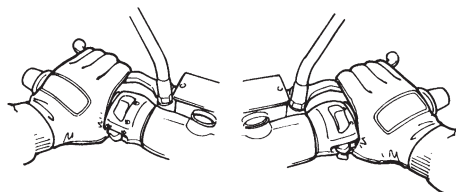
I705H1020041-01

- 5) Disconnect the tachometer and install the frame front cover.

#### Clutch “Lock-up” Inspection

Perform this inspection to determine if the clutch is engaging fully and not slipping.

- 1) Warm up the engine to normal operating temperature.
- 2) Remove the frame front cover. Refer to “Front Frame Cover Removal and Installation in Section 9D (Page9D-17)”.
- 3) Apply the front and rear brakes as firm as possible.



I705H1020043-01



- 4) Briefly open the throttle fully and note the maximum engine RPMs sustained during the test cycle.

**⚠ CAUTION**

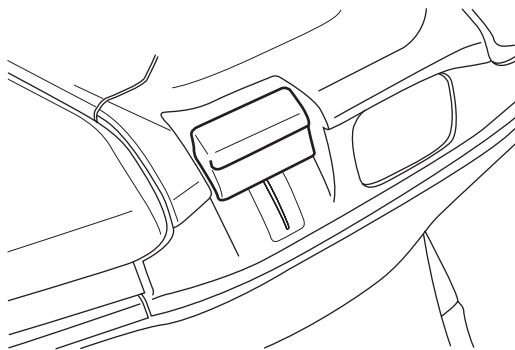
**Do not apply full power for more than 3 seconds or damage to the clutch or engine may occur.**

**Lock-up r/min**  
**4 000 – 5 000 r/min**

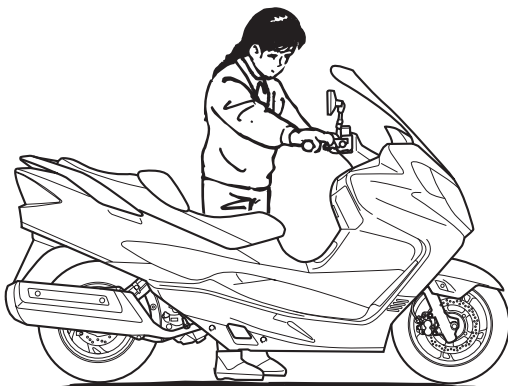
**Parking Brake (Brake-lock) Inspection**

B705H10206040

Inspect that the wheel is locked up when pulling the brake-lock lever 2 – 4 notches and moving the motorcycle forward to make sure that the brake-lock acts enough.



I705H1020044-01



I705H1020045-01

**Parking Brake (Brake-lock) Adjustment**

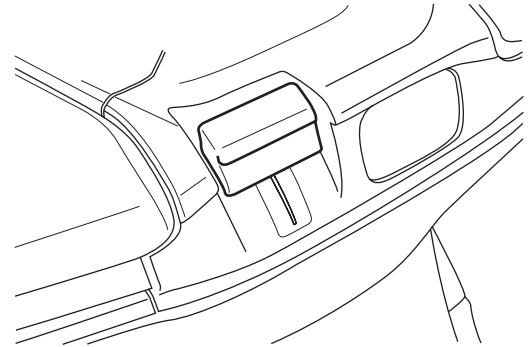
B705H10206041

Adjust the brake-lock in the following procedures:

- 1) Pull the brake-lock lever by one step (1 notch).

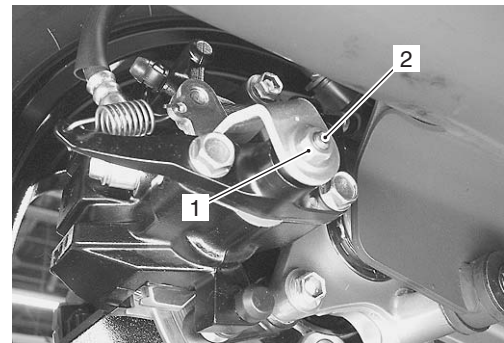
**NOTE**

**The brake-lock lever have 2 – 4 steps (2 – 4 notches) when pulling in fully.**



I705H1020044-01

- 2) With the lock-nut (1) loosening, adjust the adjuster bolt (2) in until the brake pad comes in contact with brake disc.
- 3) Tighten the lock-nut (1).

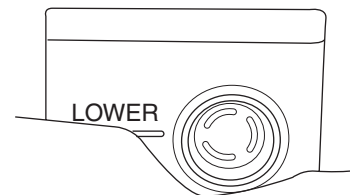


I705H1020048-01

- 4) Return the brake-lock lever to original position and inspect the brake-lock.

**⚠ CAUTION**

**After the brake-lock adjustment, inspect the brake fluid level of rear brake.**



I705H1020033-01

## Specifications

### Tightening Torque Specifications

B705H10207001

Fastening part	Tightening torque			Note
	N-m	kgf-m	lb-ft	
Spark plug	11	1.1	8.0	☞ (Page0B-3)
Oil drain plug	23	2.3	16.5	☞ (Page0B-9)
Final reduction gear drain plug	12	1.2	8.5	☞ (Page0B-10)
Final reduction gear oil level check plug	16	1.6	11.5	☞ (Page0B-10)
Exhaust pipe bolt	23	2.3	16.5	☞ (Page0B-16)
Muffler mounting bolt	23	2.3	16.5	☞ (Page0B-16)
Muffler connecting bolt	23	2.3	16.5	☞ (Page0B-16)

**NOTE**

The specified tightening torque is also described in the following.  
 “Chassis Bolt and Nut Inspection (Page0B-17)”

**Reference:**

For the tightening torque of fastener not specified in this section, refer to “Tightening Torque Specifications in Section 0C (Page0C-7)”.

## Special Tools and Equipment

### Recommended Service Material

B705H10208001

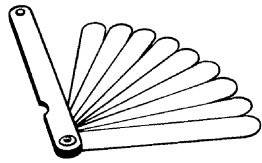
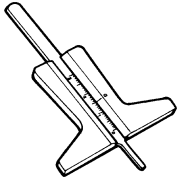
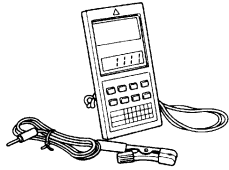
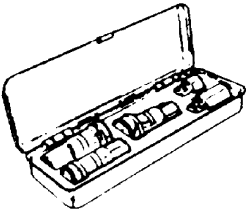
Material	SUZUKI recommended product or Specification	Note
Engine Oil	SAE 10W-40, API SF/SG or SH/SJ with JASO MA	☞ (Page0B-10) / ☞ (Page0B-10)

**NOTE**

Required service material is also described in the following.  
 “Lubrication Points (Page0B-2)”

### Special Tool

B705H10208002

09900-20803 Thickness gauge ☞ (Page0B-4) / ☞ (Page0B-5)		09900-20805 Tire depth gauge ☞ (Page0B-15)	
09900-26006 Engine tachometer (solar cell type) ☞ (Page0B-19)		09930-10121 Spark plug wrench set ☞ (Page0B-3)	

# Service Data

## Specifications

### Service Data

B705H10307001

#### Valve + Valve Guide

Unit: mm (in)

Item		Standard	Limit
Valve diam.	IN.	31.0 (1.22)	—
	EX.	27.0 (1.06)	—
Tappet clearance (when cold)	IN.	0.10 – 0.20 (0.003 – 0.008)	—
	EX.	0.20 – 0.30 (0.008 – 0.009)	—
Valve guide to valve stem clearance	IN.	0.10 – 0.37 (0.004 – 0.015)	—
	EX.	0.30 – 0.57 (0.012 – 0.022)	—
Valve guide I.D.	IN. & EX.	4.500 – 4.512 (0.1772 – 0.1776)	—
Valve stem O.D.	IN.	4.475 – 4.490 (0.1762 – 0.1768)	—
	EX.	4.455 – 4.470 (0.1754 – 0.1760)	—
Valve stem deflection	IN. & EX.	—	0.35 (0.014)
Valve stem runout	IN. & EX.	—	0.05 (0.002)
Valve head thickness	IN. & EX.	—	0.5 (0.02)
Valve seat width (30°, 45°, 60°)	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. & EX.	—	38.6 (1.52)
Valve spring tension	IN. & EX.	137.3 N (14.0 kgf, 30.1 lbs) at length 33.35 mm (1.313 in)	—

#### Camshaft + Cylinder Head

Unit: mm (in)

Item		Standard	Limit
Cam height	IN.	36.61 – 36.66 (1.441 – 1.443)	36.31 (1.430)
	EX.	35.94 – 35.99 (1.415 – 1.417)	35.64 (1.403)
Camshaft journal oil clearance	IN. & EX.	0.019 – 0.053 (0.0007 – 0.0021)	0.15 (0.006)
Camshaft journal holder I.D.	IN. & EX.	22.012 – 22.025 (0.8666 – 0.8671)	—
Camshaft journal O.D.	IN. & EX.	21.972 – 21.993 (0.8650 – 0.8659)	—
Camshaft runout	IN. & EX.	—	0.10 (0.004)
Cam chain pin (at arrow "3")		15th 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 de-comp. actuated)	E-02, 19, 24, 54	1 060 – 1 140 kPa (10.6 – 11.4 kgf/cm <sup>2</sup> , 151 – 162 psi)	660 kPa (6.0 kgf/cm <sup>2</sup> , 94 psi)
	E-03, 28, 33	1 000 – 1 080 kPa (10.0 – 10.8 kgf/cm <sup>2</sup> , 142 – 154 psi)	620 kPa (6.2 kgf/cm <sup>2</sup> , 88 psi)
Piston to cylinder clearance	0.025 – 0.035 (0.0010 – 0.0014)		0.120 (0.005)
Cylinder bore	81.000 – 81.015 (3.1890 – 3.1896)		No nicks or scratches
Piston diam.	80.970 – 80.985 (3.1878 – 3.1884) (Measure at 15 mm (0.6 in) from the skirt end.)		80.880 (3.1842)
Cylinder distortion	—		0.05 (0.002)
Piston ring free end gap	1st IT	Approx. 7.5 (0.30)	6.0 (0.24)
	2nd 2T	Approx. 11.5 (0.45)	9.2 (0.36)
Piston ring end gap	1st	0.06 – 0.21 (0.002 – 0.008)	0.5 (0.02)
	2nd	0.06 – 0.18 (0.002 – 0.007)	0.5 (0.02)
Piston ring to groove clearance	1st	—	0.18 (0.007)
	2nd	—	0.15 (0.006)
Piston ring groove width	1st	1.21 – 1.23 (0.0476 – 0.0484)	—
	2nd	1.01 – 1.03 (0.0398 – 0.0406)	—
	Oil	2.01 – 2.03 (0.0791 – 0.0799)	—
Piston ring thickness	1st	1.17 – 1.19 (0.461 – 0.469)	—
	2nd	0.97 – 0.99 (0.0382 – 0.0390)	—
Piston pin bore	20.002 – 20.008 (0.7874 – 0.7877)		20.030 (0.789)
Piston pin O.D.	19.996 – 20.000 (0.7872 – 0.7874)		19.980 (0.787)

**Conrod + Crankshaft**

Unit: mm (in)

Item	Standard	Limit
Conrod small end I.D.	20.006 – 20.014 (0.7876 – 0.7880)	20.040 (0.789)
Conrod deflection	—	3.0 (0.12)
Conrod big end side clearance	0.10 – 0.65 (0.004 – 0.026)	1.0 (0.04)
Conrod big end width	21.95 – 22.00 (0.864 – 0.866)	—
Width between crankshaft webs	59.9 – 60.1 (2.358 – 2.366)	—
Crankshaft runout	—	0.08 (0.003)

**Oil Pump**

Item	Standard	Limit
Oil pressure (at 60 °C, 140 °F)	Above 30 kPa (0.3 kgf/cm <sup>2</sup> , 4.27 psi) Below 110 kPa (1.1 kgf/cm <sup>2</sup> , 15.64 psi) at 3 000 r/min	—

**Clutch**

Unit: mm (in)

Item	Standard	Limit
Clutch wheel I.D.	160.0 – 160.2 (6.30 – 6.31)	160.5 (6.32)
Clutch shoe thickness	3.0 (0.12)	2.0 (0.08)
Engage r/min	2 100 – 2 700 r/min	—
Lock-up r/min	4 000 – 5 000 r/min	—



**Transmission**

Unit: mm (in) Except ratio

Item	Specification	Note
Primary reduction ratio	1.000	—
Reduction ratio	2.200 – 0.839	—
Secondary reduction ratio	2.214	—
Final reduction ratio	2.666	—
Drive V-belt width	25.1 (0.99)	24.1 (0.95)
Movable driven face spring free length	150.0 (5.90)	142.5 (5.61)
Movable drive face roller O.D.	26.00 – 26.16 (1.024 – 1.030)	—
Drive/driven face ware	—	0.4 (0.02)

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

Item	Specification	Note
Injector resistance	Approx. 10.3 $\Omega$ at 20 °C (68 °F)	—
Fuel pump discharge amount	35 ml and more For 10 sec., at 300 kPa (3.0 kgf/cm <sup>2</sup> , 43 psi)	—
Fuel pressure regulator operating set pressure	Approx. 300 kPa (3.0 kgf/cm <sup>2</sup> , 43 psi)	—

**FI Sensors**

Item	Specification	Note
CKP sensor resistance	190 – 290 $\Omega$	
CKP sensor peak voltage	4.5 V and more (When cranking)	(+) probe: G/W, (-) probe: Bl
IAP sensor input voltage	4.5 – 5.5 V	
IAP sensor output voltage	Approx. 1.5 – 3.5 V at idle speed	
TP sensor input voltage	4.5 – 5.5 V	
TP sensor output voltage	Closed	Approx. 0.6 V
	Opened	Approx. 3.8 V
ECT sensor input voltage	4.5 – 5.5 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 resistance	Approx. 2.58 k $\Omega$ at 20 °C (68 °F)	
TO sensor resistance	16.5 – 22.3 k $\Omega$	
TO sensor output voltage	Normal	0.4 – 1.4 V
	Leaning	3.7 – 4.4 V
Injector voltage	Battery voltage	
Ignition coil primary peak voltage	150 V and more (When cranking)	(+) probe: W, (-) probe: Ground
HO2 sensor resistance	11.5 – 14.5 $\Omega$ at 23 °C (73.4 °F)	
HO2 sensor output voltage	Idle speed	0.3 V and less
	3 000 r/min	0.7 V and more
STP sensor input voltage	4.5 – 5.5 V	
STP sensor output voltage	Closed	Approx. 0.5 V
	Opened	Approx. 3.9 V
STP actuator resistance	Approx. 6.5 $\Omega$	

**0C-4 Service Data:****Throttle Body**

Item	Specification	
	E-02, 03, 19, 24, 28, 54	E-33
ID No.	05H0	05H1
Bore size	38 mm (1.5 in)	←
Fast idle r/min	1 500 – 2 000 r/min	←
Idle r/min	1 450 ± 100 r/min	←
Throttle cable play	2.0 – 4.0 mm (0.08 – 0.16 in)	←

**Thermostat + Radiator + Fan + Coolant**

Item	Standard / Specification		Limit
Thermostat valve opening temperature	Approx. 82 °C (180 °F)		—
Thermostat valve lift	Over 3 mm (0.12 in) at 95 °C (203 °F)		—
Engine coolant temperature 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	93.3 – 122.7 kPa (0.93 – 1.23 kgf/cm <sup>2</sup> , 13.3 – 17.4 psi)		—
Cooling fan thermo-switch operating temperature	OFF → ON	Approx. 98 °C (208 °F)	—
	ON → OFF	Approx. 92 °C (198 °F)	—
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 including reserve	Reserve tank side	Approx. 250 ml (0.3/0.2 US/Imp oz)	—
	Engine side	Approx. 1 700 ml (1.8/1.5 US/Imp oz)	—

**Electrical**

Unit: mm (in)

Item	Standard / Specification		Note
Spark plug	Type	NGK: CR7E DENSO: U22ESR-N	
	Gap	0.7 – 0.8 (0.28 – 0.03)	
Spark performance	Over 8.0 (0.3) at 1 atm.		
CKP sensor resistance	190 – 290 Ω		G – BI
CKP sensor peak voltage	4.5 V and more		(+) probe: G/W, (-) probe: BI
Ignition coil resistance	Primary	1.2 – 3.5 Ω	
	Secondary	15 – 30 kΩ	
Ignition coil primary peak voltage	150 V and more (When cranking)		(+) probe: W, (-) probe: Ground
Generator coil resistance	Charging	0.1 – 1.0 Ω	Y – Y
Generator no-load voltage (When engine is cold)	55 V and more at 5 000 r/min		
Generator Max. output	Approx. 400 W at 5 000 r/min		
Starter motor brush length	Standard	7 (0.28)	
	Limit	3.5 (0.14)	
Regulated voltage	14.0 – 15.5 V at 5 000 r/min		
Starter relay resistance	3 – 6 Ω		
Battery	Type designation	FTZ9-BS	
	Capacity	12 V 32.4 kC (9 Ah)/10 HR	
Fuse size	Headlight	HI	10 A
		LO	10 A
	Meter	15 A	
	Ignition	10 A	
	Signal	15 A	
	Main	30 A	

**Wattage**

Unit: W

Item	Standard / Specification		
	E-02, 19, 24, 54	E-03, 28, 33	
Headlight	HI	60/55	←
	LO	55	←
Parking/position light	5 x 2		←
Brake light/Taillight	21/5 x 2		←
Turn signal light	21 x 2 (Front), 21 x 2 (Rear)		27/8 x 2 (Front), 21 x 2 (Rear)
License plate light	5		←
Speedometer/tachometer light	LED		←
Engine coolant temp. gauge light	LED		←
Fuel level gauge light	LED		←
Immobilizer indicator light	LED		←
Oil change indicator	LCD		←
FI indicator light	LED		←
Brake-lock indicator light	LED		←
High beam indicator light	LED		←
Turn signal indicator light	LED x 2		←
Trunk light	5		←

**Brake + Wheel**

Unit: mm (in)

Item	Standard		Limit
Brake disc thickness	Front	4.5 ± 0.2 (0.18 ± 0.008)	4.0 (0.16)
	Rear	5.0 ± 0.2 (0.20 ± 0.008)	4.5 (0.18)
Brake disc runout	—		0.30 (0.01)
Master cylinder bore	Front & Rear	12.700 – 12.743 (0.500 – 0.502)	—
Master cylinder piston diameter	Front & Rear	12.657 – 12.684 (0.498 – 0.499)	—
Brake caliper cylinder bore	Front	25.400 – 25.450 (1.000 – 1.002)	—
	Rear	27.00 – 27.05 (1.063 – 1.065)	—
Brake caliper piston diameter	Front	25.318 – 25.368 (0.997 – 0.999)	—
	Rear	26.918 – 26.968 (1.060 – 1.062)	—
Brake fluid type	DOT 4		—
Wheel rim runout	Axial	—	2.0 (0.08)
	Radial	—	2.0 (0.08)
Wheel axle runout	Front	—	0.25 (0.01)
	Rear	—	0.25 (0.01)
Wheel rim size	Front	14 M/C x MT3.00	—
	Rear	13 M/C x MT4.00	—

**Suspension**

Unit: mm (in)

Item	Standard	Item
Front fork stroke	110 (4.33)	—
Front fork spring free length	347.6 (13.69)	340
Front fork oil type	G-10	—
Front fork oil capacity (each leg)	301 ml (10.17/10.60 US/Imp oz)	—
Front fork oil level	87 (3.43) (without spring, inner/outer tube fully pressed)	—
Front fork inner tube O.D.	41 (1.61)	—
Rear wheel travel	100 (3.94)	—
Rear shock absorber spring adjuster	3rd position	—

**0C-6 Service Data:****Tire**

Item		Standard		Limit
Cold inflation tire pressure	Solo riding	Front	175 kPa (1.75 kgf/cm <sup>2</sup> , 25 psi)	—
		Rear	200 kPa (2.00 kgf/cm <sup>2</sup> , 29 psi)	—
	Dual riding	Front	175 kPa (1.75 kgf/cm <sup>2</sup> , 25 psi)	—
		Rear	250 kPa (2.50 kgf/cm <sup>2</sup> , 36 psi)	—
Tire size		Front	120/80-14M/C 58S	—
		Rear	150/70-13M/C 64S	—
Tire type		Front	BRIDGESTONE HOOP B03G	—
		Rear	BRIDGESTONE HOOP B02G	—
Tire tread depth (Recommended depth)		Front	—	1.6 mm (0.06 in)
		Rear	—	2.0 mm (0.08 in)

**Fuel + Oil**

Item	Specification		Note
Fuel type	Use only unleaded gasoline of at least 87 pump octane or 91 octane (R/2 + M/2) or higher rated by the research method. Gasoline containing MTBE (Methyl Tertiary Butyl Ether), less than 10% ethanol, or less than 5% methanol with appropriate cosolvents and corrosion inhibitor is permissible.		E-03, 28, 33
	Gasoline used should be graded 91 octane or higher. An unleaded gasoline type is recommended.		The others countries
Fuel tank capacity	Including reserve	13.5 L (3.6/3.0 US/Imp gal)	
	Reserve	4.0 L (3.17/2.64 US/Imp gal)	
Engine oil and final gear oil type	SAE 10W-40, API SF/SG or SH/SJ with JASO MA		
Engine oil capacity	Oil change	1 200 ml (1.3/1.0 US/Imp qt)	
	Filter change	1 300 ml (1.4/1.1 US/Imp qt)	
	Overhaul	1 500 ml (1.6/1.3 US/Imp qt)	
Final gear oil capacity	Oil change	180 ml (6.1/6.3 US/Imp oz)	
	Overhaul	190 ml (6.4/6.7 US/Imp oz)	

## Tightening Torque Specifications

### Engine

Item			N·m	kgf·m	lb·ft
Cam chain tensioner bolt			23	2.3	16.5
Cam chain guide No.1 bolt			23	2.3	16.5
Camshaft journal holder bolt			10	1.0	7.0
Engine oil drain plug			23	2.3	16.5
Final gear oil drain plug	M8		12	1.2	8.5
Final gear oil level bolt	M10		16	1.6	11.5
Final gear oil filler bolt	M16		23	2.3	16.5
Starter clutch bolt			26	2.6	19.0
Generator stator bolt			11	1.1	8.0
CKP sensor bolt			6	0.6	4.5
Crankcase bolt	8 mm		22	2.2	16.0
	6 mm		11	1.1	8.0
Balancer drive gear nut			150	15.0	108.5
Balancer driven gear nut			50	5.0	36.0
Oil pump mounting bolt			10	1.0	7.0
Generator rotor nut			160	16.0	115.5
Final gear cover bolt			22	2.2	16.0
Clutch housing nut			85	8.5	61.5
Clutch shoe nut			105	10.5	76.0
Fixed drive face nut			105	10.5	76.0
Inner clutch cover bolt			11	1.1	8.0
Generator cover bolt			11	1.1	8.0
Oil filter cap bolt			10	1.0	7.0
Cylinder head bolt	L130		25	2.5	18.0
	L190	Initial	25	2.5	18.0
		Final	42	4.2	30.5
Cam chain tension adjuster mounting bolt			10	1.0	7.0
Cam chain tension adjuster cap bolt			23	2.3	16.5
Cylinder head cover bolt			14	1.4	10.0
Starter motor mounting bolt			7	0.7	5.0
Starter motor lead wire bolt			3	0.3	2.0
Starter motor housing bolt			4	0.4	3.0
Spark plug			11	1.1	8.0
Oil sump filter cover bolt			10	1.0	7.0
Oil gallery plug (cylinder head)			10	1.0	7.0
Main gallery plug	M8		12	1.2	8.5
	M10		16	1.6	11.5
	M14		23	2.3	16.5
TDC inspection plug			23	2.3	16.5
Water jacket plug			40	4.0	29.0
Exhaust pipe bolt			23	2.3	16.5
Muffler connecting bolt			23	2.3	16.5
Muffler mounting bolt			23	2.3	16.5

### Cooling System

Item			N·m	kgf·m	lb·ft
Cooling fan mounting bolt			7	0.7	5.0
Radiator mounting bolt			10	1.0	7.0
Cooling fan thermo-switch			17	1.7	12.5
ECT sensor			12	1.2	8.5
Thermostat case bolt			10	1.0	7.0
Thermostat case air bleeder bolt			5.5	0.6	4.3
Water pump mounting bolt			10	1.0	7.0

**0C-8 Service Data:****FI System and Intake Air System**

Item	N-m	kgf-m	lb-ft
Fuel cut valve bolt	3.5	0.35	2.5
Fuel pump mounting bolt	4.5	0.45	3.3
Fuel tank mounting bolt	10	1.0	7.0
Fuel hose bolt	10	1.0	7.0
IAT sensor mounting screw	3.5	0.35	2.5
Speed sensor bolt	10	1.0	7.0

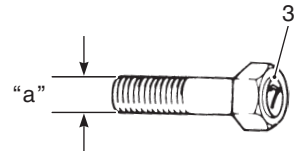
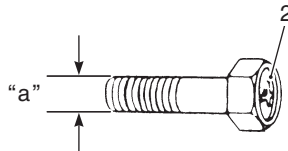
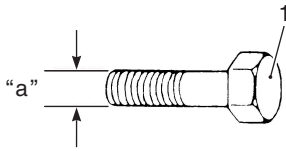
**Chassis**

Item	N-m	kgf-m	lb-ft
Pillion rider handle bolt	23	2.3	16.5
Front axle	65	6.5	47.0
Front axle pinch bolt	23	2.3	16.5
Front brake caliper pad pin	18	1.8	13.0
Front brake caliper mounting bolt	35	3.5	25.5
Front brake caliper bracket pin bolt	18	1.8	13.0
Front brake caliper air bleeder valve	6	0.6	4.5
Brake disc bolt	23	2.3	16.5
Brake hose union bolt	23	2.3	16.5
Master cylinder mounting bolt	10	1.0	7.0
Handlebar clamp bolt	23	2.3	16.5
Front fork cylinder bolt	30	3.0	21.5
Front fork clamp bolt	23	2.3	16.5
Front fork cap bolt	45	4.5	32.5
Steering stem nut	30	3.0	21.5
Steering stem lock-nut	30	3.0	21.5
Handlebar holder set bolt	23	2.3	16.5
Handlebar holder clamp bolt	55	5.5	40.0
Rear axle nut	120	12.0	87.0
Rear brake caliper mounting bolt	23	2.3	16.5
Rear brake caliper pad pin	18	1.8	13.0
Brake-lock housing bolt	23	2.3	16.5
Brake-lock cable lock-nut	16	1.6	11.5
Crankcase bracket mounting nut	85	8.5	61.5
Crankcase bracket rubber damper bolt	85	8.5	61.5
Engine mounting nut	93	9.3	67.5
Rear shock absorber mounting bolt	50	5.0	36.0
Cushion lever mounting nut	80	8.0	58.0
Rear cushion rod nut	50	5.0	36.0
Swingarm bolt	50	5.0	36.0
Center stand pivot bolt	50	5.0	36.0
Brake lever pivot bolt	1	0.1	0.5
Brake lever pivot bolt lock-nut	6	0.6	4.5

### Tightening Torque Chart

For other bolts and nuts 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	lb·ft	N·m	kgf·m	lb·ft
4	1.5	0.15	1.0	2.3	0.23	1.5
5	3	0.3	2.0	5	0.5	3.5
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



I649G1030001-03

1. Conventional bolt	2. "4" marked bolt	3. "7" marked bolt
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## Section 1

# Engine

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# Precautions

## Precautions

### Precautions for Engine

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Refer to "General Precautions in Section 00 (Page00-1)" and "Precautions for Electrical Circuit Service in Section 00 (Page00-2)".

# Engine General Information and Diagnosis

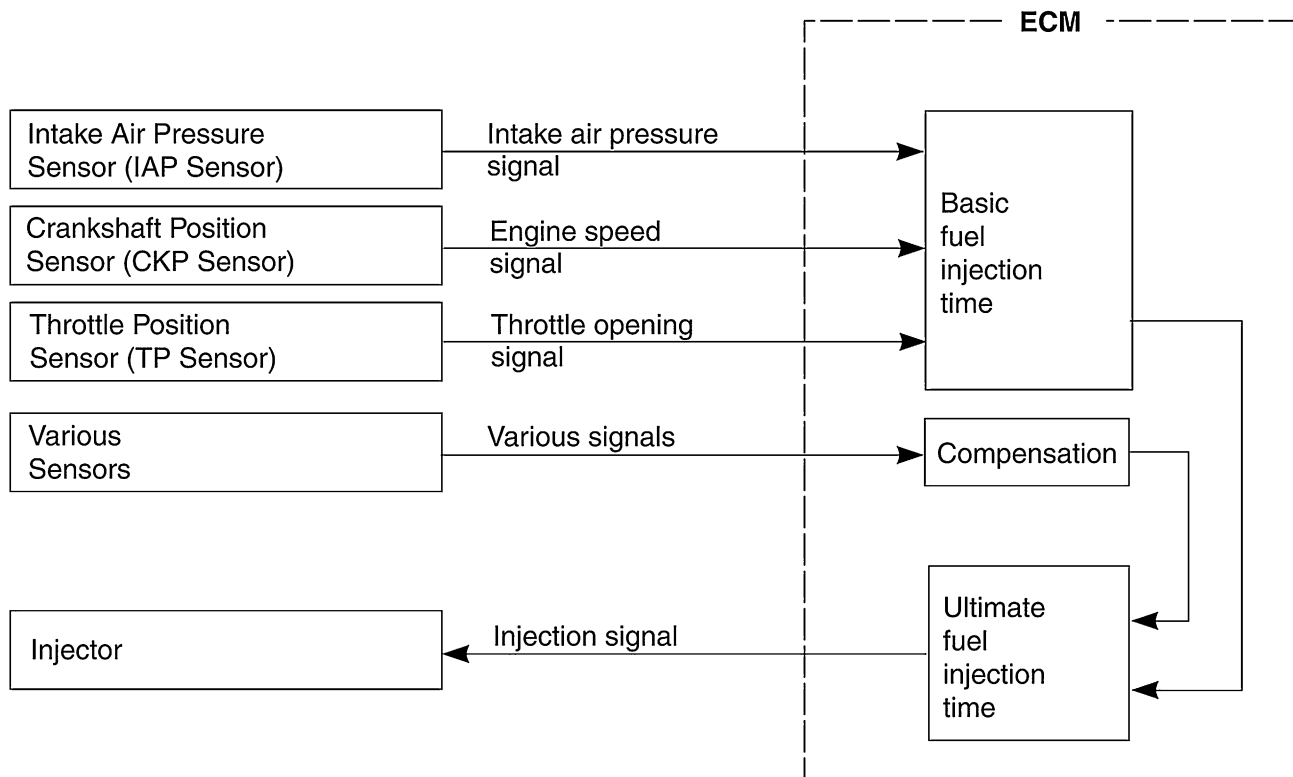
## General Description

### Injection Timing Description

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#### 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.



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**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.
HEATED OXYGEN SENSOR SIGNAL	Air/fuel ratio is compensated to the theoretical ratio from density of oxygen in exhaust gasses. The compensation occurs in such a way that more fuel is supplied if detected air/fuel ratio is lean and less fuel is supplied if it is rich.
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.
ENGINE RPM SIGNAL	At high speed, the injection time (volume) is increased.
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 motorcycle tips over, the tip-over sensor sends a signal to the ECM. Then, this signal cuts OFF current supplied to the fuel pump, fuel injectors and ignition coils.
OVER-REV. LIMITER SIGNAL	The fuel injector stops operation when engine rpm reaches rev. limit rpm.

**Self-Diagnosis Function**

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The self-diagnosis function is incorporated in the ECM. The function has two modes, "User mode" and "Dealer mode". The user can only be notified by the LCD (DISPLAY) panel and LED (FI light). To check the function of the individual FI system devices, the dealer mode is provided. In this check, the special tool is necessary to read the code of the malfunction items.

**User Mode**

Malfunction	LCD (Display) Indication	FI Light Indication	Indication Mode	
"NO"	Odometer	—	—	
"YES"	Engine can start *1	Odometer and "FI" letters	FI light turns ON.	Each 2 sec. Odometer or "FI" is indicated.
	Engine can not start *2	"FI" letters	FI light turns ON and blinks.	"FI" is indicated continuously.

**\*1**

When one of the signals is not received by ECM, the fail-safe circuit works and injection is not stopped. In this case, "FI" and odometer are indicated in the LCD panel and motorcycle can run.

**\*2**

The injection signal is stopped, when the crankshaft position sensor signal, tip-over sensor signal, ignition signal, injector signal, fuel pump relay signal or ignition switch signal is not sent to ECM. In this case, "FI" is indicated in the LCD panel. Motorcycle does not run.

**"CHEC":**

The LCD panel indicates "CHEC" when no communication signal from the ECM is received for 5 seconds and more.

**For Example:**

The ignition switch is turned ON, and the engine stop switch is turned OFF. In this case, the speedometer does not receive any signal from the ECM, and the panel indicates "CHEC".

If CHEC is indicated, the LCD does not indicate the trouble code. It is necessary to check the wiring harness between ECM and speedometer couplers.

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

The possible cause of this indication is as follows:

Engine stop switch is in OFF position. Side-Stand/ignition inter-lock system is not working. Ignition fuse is burnt.

#### Dealer Mode

##### **⚠ CAUTION**

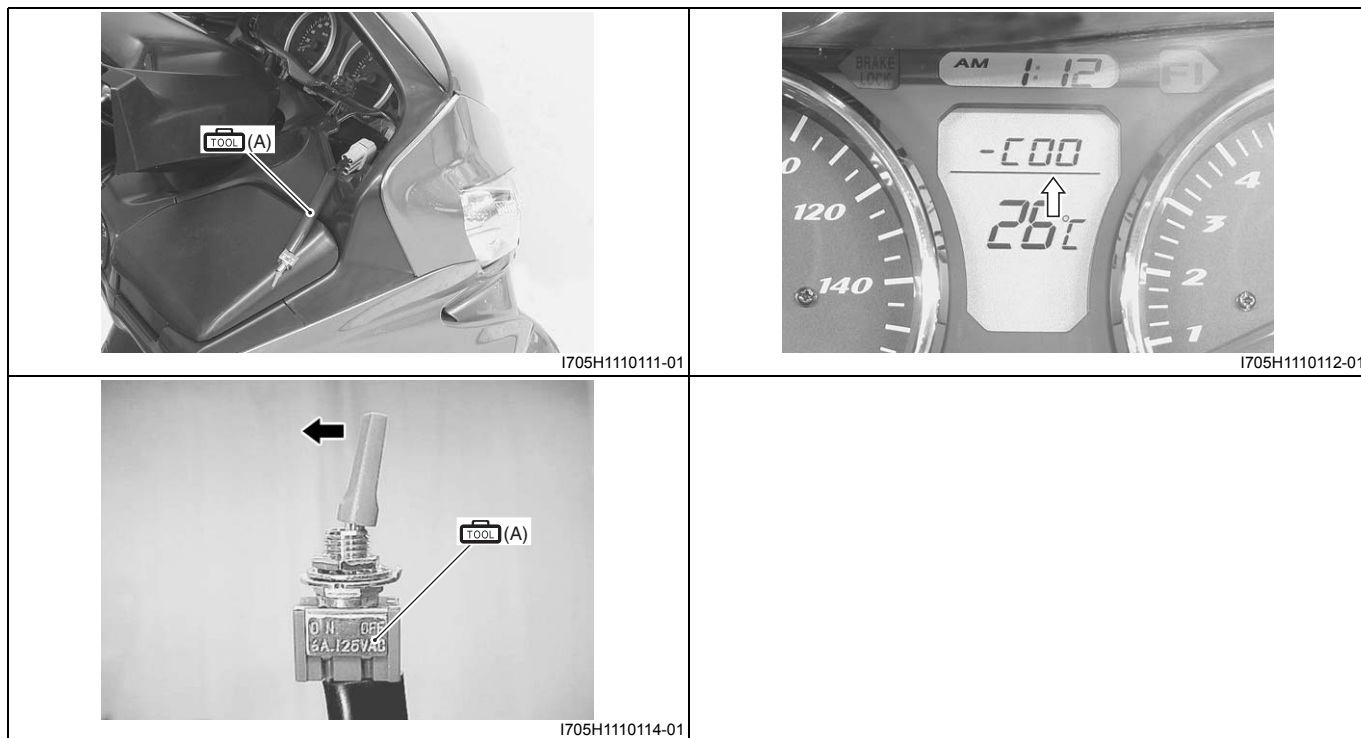
**Before checking the malfunction code, do not disconnect the ECM coupler.**

**If the coupler from the ECM is disconnected, the malfunction code memory is erased and the malfunction code can not be checked.**

The defective function is memorized in the computer. Use the special tool's coupler to connect to the dealer mode coupler (A). The memorized malfunction code is displayed on LCD (DISPLAY) panel. Malfunction means that the ECM does not receive signal from the devices. These affected devices are indicated in the code form.

#### Special tool

**TOOL (A): 09930-82720 (Mode select switch)**



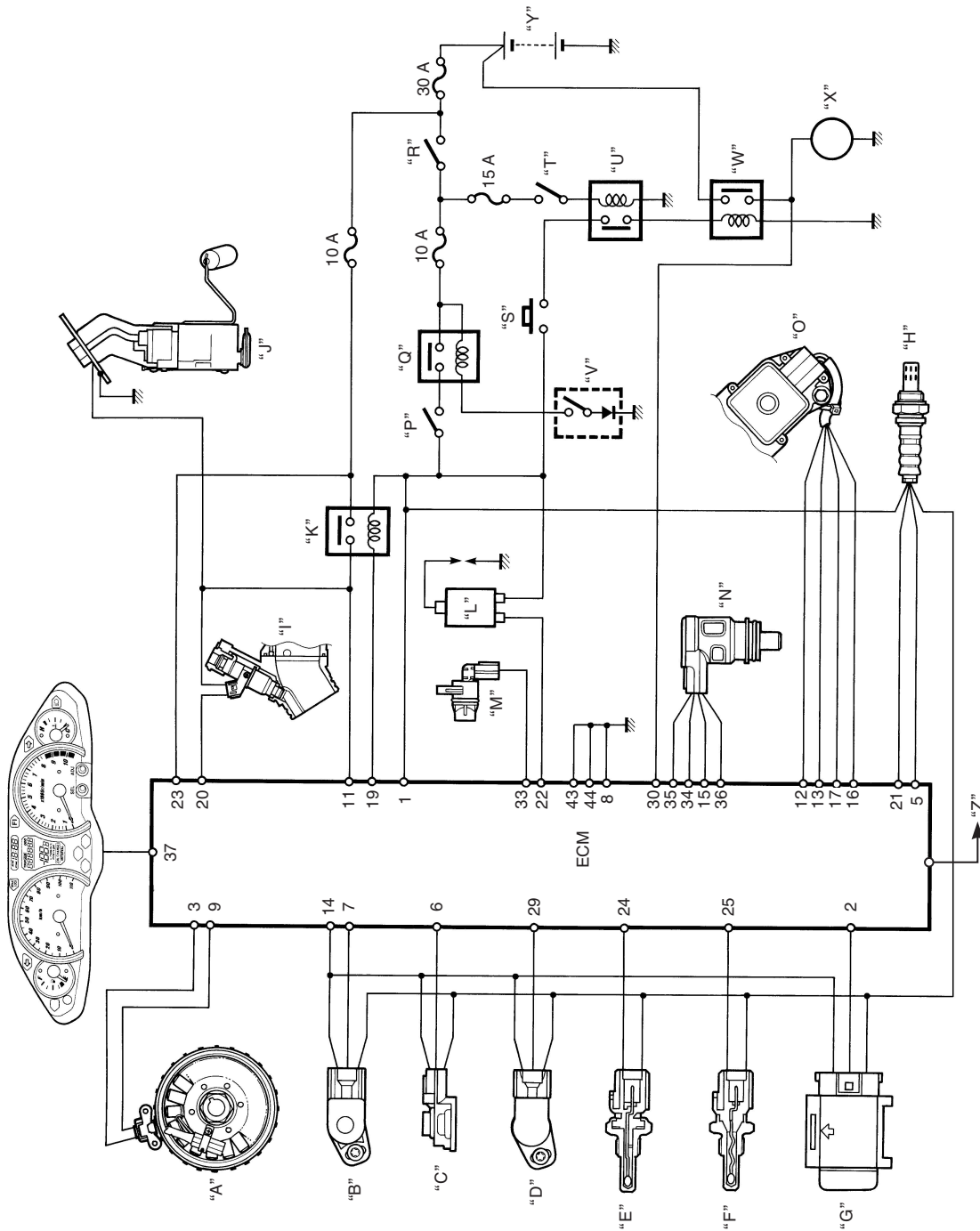
Malfunction	LCD (Display) Indication	FI Light Indication	Indication Mode
"NO"	C00	FI light turns OFF.	—
"YES"	C** code is indicated from small numeral to large one.		For each 2 sec., code is indicated.



# Schematic and Routing Diagram

## FI System Wiring Diagram

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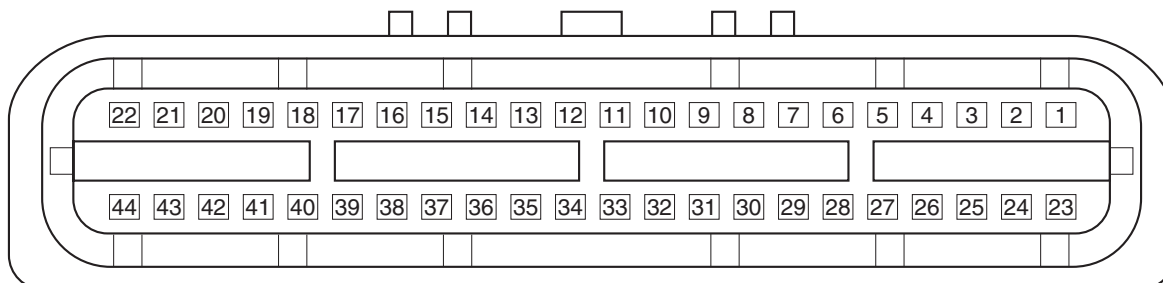
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"A": Crankshaft position sensor (CKPS)	"J": Fuel pump (FP)	"S": Starter button
"B": Throttle position sensor (TPS)	"K": Fuel pump relay (FP relay)	"T": Brake light switch
"C": Intake air pressure sensor (IAPS)	"L": Ignition coil	"U": Brake relay
"D": Secondary throttle position sensor (STPS)	"M": Speed sensor	"V": Side-stand switch
"E": Engine coolant temperature sensor (ECTS)	"N": Idle speed control valve (ISC valve)	"W": Starter relay
"F": Intake air temperature sensor (IATS)	"O": Secondary throttle valve actuator (STVA)	"X": Starter motor
"G": Tip-over sensor (TOS)	"P": Engine stop switch	"Y": Battery
"H": HO2 sensor	"Q": Side-stand relay	"Z": SDS
"I": Fuel injector	"R": Ignition switch	

## 1A-5 Engine General Information and Diagnosis:

### Terminal Alignment of ECM Coupler (Harness Side)

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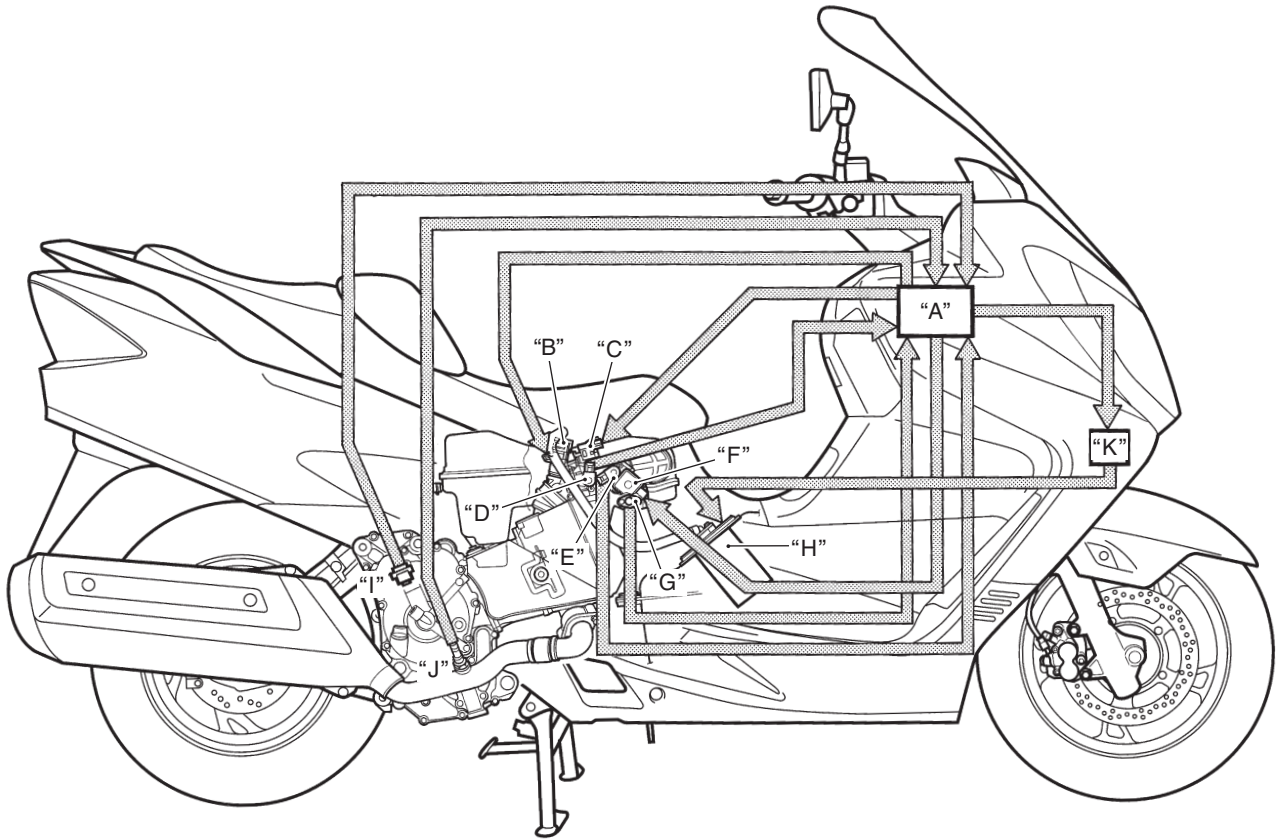
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TERMINAL NO.	CIRCUIT	TERMINAL NO.	CIRCUIT
(1)	Power source	(23)	Power source for back-up
(2)	TO sensor signal (TOS)	(24)	ECT sensor signal (ECT)
(3)	CKP sensor signal (CKP+)	(25)	IAT sensor signal (IAT)
(4)	Sensor ground (E2)	(26)	—
(5)	TP sensor signal (TP)	(27)	—
(6)	IAP sensor signal (IAP)	(28)	—
(7)	HO2 sensor signal (HO2)	(29)	STP sensor signal (STP)
(8)	ECM ground (E1)	(30)	Starter relay
(9)	CKP sensor signal (CKP-)	(31)	SDS
(10)	—	(32)	Mode select switch
(11)	Power source for fuel injector (VM)	(33)	Speed sensor
(12)	STVA signal (STVA 1A)	(34)	ISC valve motor signal (ISCA 1B)
(13)	STVA signal (STVA 1B)	(35)	ISC valve motor signal (ISCA 1A)
(14)	Power source for sensors (Vcc)	(36)	ISC valve motor signal (ISCA 2B)
(15)	ISC valve motor signal (ISCA 2A)	(37)	Meter communication
(16)	STVA signal (STVA 2B)	(38)	—
(17)	STVA signal (STVA 2A)	(39)	Immobilizer (For E-02, 19, 24, 54) communication
(18)	—	(40)	Immobilizer (For E-02, 19, 24, 54) communication, Ignition signal
(19)	Fuel pump relay (FP Relay)	(41)	—
(20)	Fuel injector	(42)	Tachometer
(21)	HO2 sensor heater	(43)	ECM ground (E1)
(22)	Ignition coil	(44)	ECM ground (E3)

## Component Location

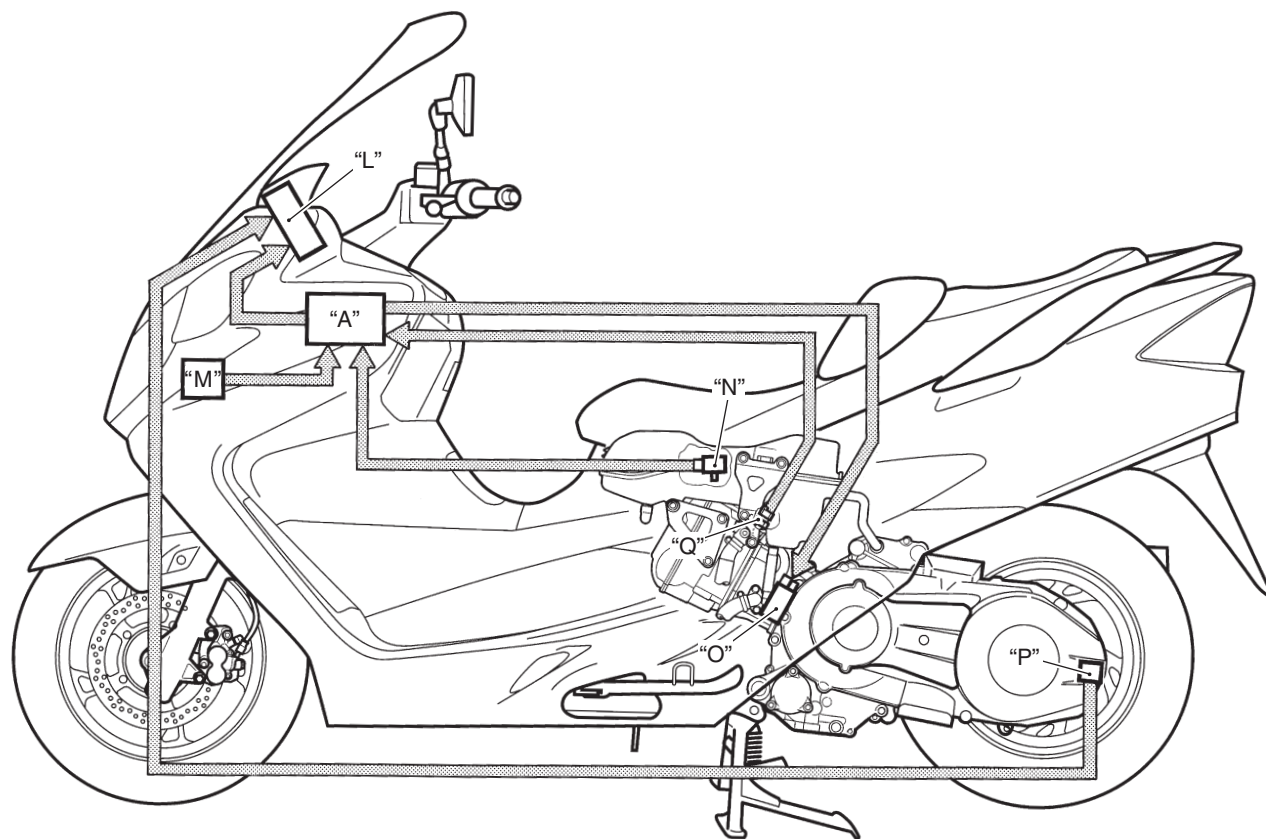
### FI System Parts Location

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"A": ECM	"G": Intake air temperature (IATS)
"B": Fuel injector (FI)	"H": Fuel pump (FP)
"C": Idle speed control valve (ISC valve)	"I": Crankshaft position sensor (CKPS)
"D": Throttle position sensor (TPS)	"J": Heated oxygen sensor (HO2S)
"E": Secondary throttle position sensor (STPS)	"K": Fuel pump relay (FP relay)
"F": Secondary throttle valve actuator (STVA)	



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"L": Speedometer	"O": Ignition coil (IG Coil)
"M": Tip-over sensor (TOS)	"P": Speed sensor
"N": Intake air pressure sensor (IAPS)	"Q": Engine coolant temperature sensor (ECTS)

## Diagnostic Information and Procedures

### Engine Symptom Diagnosis

B705H11104001

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 11 (Page 11-1)".</i>
	Poor seating of spark plug.	<i>Retighten.</i>
<b>Engine will not start or is hard to start (Plugs not sparking)</b>	Fouled spark plug.	<i>Clean.</i>
	Wet spark plug.	<i>Clean and dry.</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>

Condition	Possible cause	Correction / Reference Item
<b>Engine will not start or is hard to start (No fuel reaching the intake manifold)</b>	Clogged fuel filter or fuel hose.	<i>Clean or replace.</i>
	Defective fuel pump.	<i>Replace.</i>
	Defective fuel pressure regulator.	<i>Replace.</i>
	Defective fuel injector.	<i>Replace.</i>
	Defective fuel pump relay.	<i>Replace.</i>
	Defective ECM.	<i>Replace.</i>
	Open-circuited wiring connections.	<i>Check and repair.</i>
<b>Engine will not start or is hard to start (Incorrect fuel/air mixture)</b>	TP sensor out of adjustment.	<i>Adjust.</i>
	Defective fuel pump.	<i>Replace.</i>
	Defective fuel pressure regulator.	<i>Replace.</i>
	Defective TP sensor.	<i>Replace.</i>
	Defective CKP sensor.	<i>Replace.</i>
	Defective IAP sensor.	<i>Replace.</i>
	Defective ECM.	<i>Replace.</i>
	Defective ECT sensor.	<i>Replace.</i>
Defective IAT sensor.	<i>Replace.</i>	
<b>Engine idles poorly</b>	Valve clearance out of adjustment.	<i>Adjust.</i>
	Poor seating of valves.	<i>Replace or repair.</i>
	Defective valve guides.	<i>Replace.</i>
	Worn down camshafts.	<i>Replace.</i>
	Too wide spark plug gap.	<i>Adjust or replace.</i>
	Defective ignition coil.	<i>Replace.</i>
	Defective crankshaft position sensor.	<i>Replace.</i>
	Defective ECM.	<i>Replace.</i>
	Defective throttle position sensor.	<i>Replace.</i>
	Defective fuel pump.	<i>Replace.</i>
	Defective ISC valve.	<i>Replace.</i>
<b>Engine stalls often (Incorrect fuel/air mixture)</b>	Defective IAP sensor or circuit.	<i>Repair or replace.</i>
	Clogged fuel filter.	<i>Clean or replace.</i>
	Defective fuel pump.	<i>Replace.</i>
	Defective fuel pressure regulator.	<i>Replace.</i>
	Damaged or cracked vacuum hose.	<i>Replace.</i>
	Defective ECT sensor.	<i>Replace.</i>
	Defective thermostat.	<i>Replace.</i>
Defective IAT sensor.	<i>Replace.</i>	
<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 stalls often (Control circuit or sensor improperly operating)</b>	Defective ECM.	<i>Replace.</i>
	Defective fuel pressure regulator.	<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 fuel pump relay.	<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 hose.	<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 and burnt camshaft journal.	<i>Replace.</i>

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

<b>Condition</b>	<b>Possible cause</b>	<b>Correction / Reference Item</b>
<b>Engine noisy (Noise seems to come from piston)</b>	Worn down piston or cylinder.	<i>Replace.</i>
	Combustion chambers fouled with carbon.	<i>Clean.</i>
	Worn piston pin or piston pin bore.	<i>Replace.</i>
	Worn piston rings or ring grooves.	<i>Replace.</i>
<b>Engine noisy (Noise seems to come from timing chain)</b>	Stretched chain.	<i>Replace.</i>
	Worn sprockets.	<i>Replace.</i>
	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>
<b>Engine noisy (Noise seems to come from balancer)</b>	Worn and burnt journal bearings.	<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>
<b>Engine runs poorly in high speed range (Defective engine internal/electrical parts)</b>	Weakened valve springs.	<i>Replace.</i>
	Worn camshafts.	<i>Replace.</i>
	Valve timing out of adjustment.	<i>Adjust.</i>
	Too narrow spark plug gap.	<i>Adjust.</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 hose, resulting in inadequate fuel supply to injector.	<i>Clean and prime.</i>
	Defective fuel pump.	<i>Replace.</i>
	Defective TP sensor.	<i>Replace.</i>
Defective STP sensor/STVA.	<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 valves.	<i>Adjust or replace.</i>
	Defective ISC valve.	<i>Replace.</i>
	Sucking air from throttle body 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 sensor.	<i>Replace.</i>
	Defective IAP sensor.	<i>Replace.</i>
	Defective AP sensor.	<i>Replace.</i>
	Defective ECM.	<i>Replace.</i>
	TP sensor out of adjustment.	<i>Adjust.</i>
	Defective STP sensor/STVA.	<i>Replace.</i>
Defective fuel tank pressure control valve.	<i>Replace.</i>	

Condition	Possible cause	Correction / Reference Item
<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 injector.	<i>Clean.</i>
	TP sensor out of adjustment.	<i>Adjust.</i>
	Clogged air cleaner element.	<i>Clean.</i>
	Sucking air from throttle valve.	<i>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 AP sensor.	<i>Replace.</i>
	Defective ECM.	<i>Replace.</i>
	TP sensor out of adjustment.	<i>Adjust.</i>
	Defective STP sensor/STVA.	<i>Replace.</i>
Defective fuel tank pressure control valve.	<i>Replace.</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 intake pipe.	<i>Retighten or replace.</i>
Defective cooling system.	<i>Refer to "Engine Cooling System Warning in Section 1F (Page 1F-1)".</i>	
<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 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, CKP sensor and ECM.)	<i>Replace.</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 valves stems.	<i>Replace.</i>
	Defective stem seals.	<i>Replace.</i>
Worn oil ring side rails.	<i>Replace.</i>	

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

### DTC Table

B705H11104009

Code	Malfunction Part	Remarks
C00	None	No defective part
C12	Crankshaft position sensor (CKPS)	Pick-up coil signal, signal generator
C13	Intake air pressure sensor (IAPS)	
C14	Throttle position sensor (TPS)	*1
C15	Engine coolant temperature. sensor (ECTS)	
C16	Speed sensor	Speed sensor signal for FI system
C21	Intake air temperature sensor (IATS)	
C23	Tip-over sensor (TOS)	
C24	Ignition signal (IG coil)	
C28	Secondary throttle valve actuator (STVA)	
C29	Secondary throttle position sensor (STPS)	
C32	Fuel injector signal	
C40	Idle speed control valve (ISC valve)	
C41	Fuel pump control system (FP control system)	Fuel pump, Fuel pump relay
C42	Ignition switch signal (IG switch signal/Immobilizer for E-02, 19, 24, 54)	Anti-theft
C44	Heated oxygen sensor (HO2S)	

In the LCD (DISPLAY) panel, the malfunction code is indicated from small code to large code.

\*1

To get the proper signal from the throttle position sensor, the sensor basic position is indicated in the LCD (DISPLAY) panel. The malfunction code is indicated in three digits. In front of the three digits, a line appears in any of the three positions, upper, middle or lower line. If the indication is upper or lower line when engine rpm is 1 450 r/min, slightly turn the throttle position sensor and bring the line to the middle.

### Fail-Safe Function Table

B705H11104010

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 101 kPa (760 mmHg).	"YES"	"YES"
TP sensor	The throttle opening is fixed to full open 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 40 °C (104 °F).	"YES"	"YES"
Secondary throttle valve actuator	When motor disconnection or lock occurs, power from ECM is shut off.	"YES"	"YES"
STP sensor	Secondary throttle valve is fixed to full open position.	"YES"	"YES"
HO2 sensor	Feedback compensation is inhibited. (Air/fuel ratio is fixed to normal.)	"YES"	"YES"
ISC valve	When motor disconnection or lock occurs, power from ECM is shut off.	"YES"	"YES"

The engine can start and can run even if the signal in the table 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 such an inspection form will facilitate collecting information to the point required for proper analysis and diagnosis.

#### EXAMPLE: CUSTOMER PROBLEM INSPECTION FORM

User name:	Model:	VIN:	Date of issue:
Date Reg.	Date of problem:	Mileage:	

Malfunction indicator lamp condition (LED)	Always ON / Sometimes ON / Always OFF / Good condition
Malfunction display/code (LCD)	User mode: No display / Malfunction display (      )
	Dealer mode: No code / Malfunction code (      )

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

#### MOTORCYCLE/ENVIRONMENTAL CONDITION WHEN PROBLEM OCCURS

Environmental condition	
Weather	Fair / Cloudy / Rain / Snow / Always / Other
Temperature	Hot / Warm / Cool / Cold ( °F / °C) / Always
Frequency	Always / Sometimes (times / day, month) / Only once
	Under certain condition
Road	Urban / Suburb / Highway / Mountainous (Uphill / Downhill)
	Tarmacadam / Gravel / Other

Motorcycle condition	
Engine condition	Cold / Warming up phase / Warmed up / Always / Other at starting
	Immediately after start / Racing without load / Engine speed (      r/min)
Motorcycle condition	During driving: Constant speed / Accelerating / Decelerating
	Right hand corner / Left hand corner / When shifting (Gear position      )
	At stop / Motorcycle speed when problem occurs (      km/h,      mile/h)
	Other

#### NOTE

This form is a standard sample. The form should be modified according to conditions and characteristic of each market.

## 1A-13 Engine General Information and Diagnosis:

### Visual Inspection

Prior to diagnosis using the mode select switch 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 mode select switch or SDS.

- Engine oil level and leakage. Refer to “Engine Oil and Filter Change in Section 0B (Page0B-9)”.
- Engine coolant level and leakage. Refer to “Cooling System Inspection in Section 0B (Page0B-11)”.
- Fuel level and leakage. Refer to “Fuel Line Inspection in Section 0B (Page0B-8)”.
- Clogged air cleaner element. Refer to “Air Cleaner Element Inspection in Section 0B (Page0B-3)”.
- Battery condition. Refer to “Battery Visual Inspection in Section 1J (Page1J-9)”.
- Throttle cable play. Refer to “Throttle Cable Play Inspection and Adjustment in Section 0B (Page0B-11)”.
- Broken fuse. Refer to “Precautions for Electrical Circuit Service in Section 00 (Page00-2)”.
- FI light operation. Refer to “Self-Diagnosis Function (Page1A-2)”.
- Each warning light operation. Refer to “Combination Meter Inspection in Section 9C (Page9C-2)”.
- Speedometer operation. Refer to “Combination Meter Inspection in Section 9C (Page9C-2)”.
- Exhaust gas leakage and noise. Refer to “Exhaust System Inspection in Section 1K (Page1K-4)”.
- Each coupler disconnection. Refer to “Precautions for Electrical Circuit Service in Section 00 (Page00-2)”.

### Self-Diagnostic Procedures


B705H11104012

#### NOTE

- **Do not disconnect coupler from ECM, battery cable from battery, ECM ground wire harness from engine or main fuse before confirming DTC (Diagnostic Trouble Code) stored in memory. Such disconnection will erase memorized information in ECM memory.**
- **DTC stored in ECM memory can be checked by the special tool.**
- **Before checking DTC, read SELF-DIAGNOSIS FUNCTION “USER MODE and DEALER MODE” (Refer to “Self-Diagnosis Function (Page1A-2)”) carefully to have good understanding as to what functions are available and how to use it.**
- **Be sure to read “PRECAUTIONS for Electrical Circuit Service” (Refer to “Precautions for Electrical Circuit Service in Section 00 (Page00-2)”) before inspection and observe what is written there.**

- 1) Remove the upper meter panel. Refer to “Upper Meter Panel Removal and Installation in Section 9D (Page9D-13)”.
- 2) Connect the special tool to the dealer mode coupler (A) at the wiring harness, and start the engine or crank the engine for more than 4 seconds.

#### Special tool


 (A): 09930-82720 (Mode select switch)

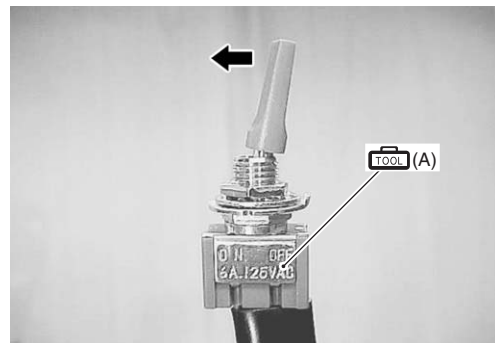


I705H1110111-01

- 3) Turn the special tool's switch ON and check the malfunction code to determine the malfunction part.

#### Special tool

 (A): 09930-82720 (Mode select switch)



I705H1110114-01

## Self-Diagnosis Reset Procedures

B705H11104013

- 1) After repairing the trouble, turn OFF the ignition switch and turn ON again. If DTC is indicated (C00), the malfunction is cleared.



I705H1110112-01

- 2) Disconnect the special tool from the dealer mode coupler.

### NOTE

- Even though DTC (C00) is indicated, the previous history DTC still remains stored in the ECM. Therefore, erase the history DTC memorized in the ECM using SDS.
- DTC 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 history DTC using SDS.

## Use of SDS Diagnostic Procedures


B705H11104030


### NOTE

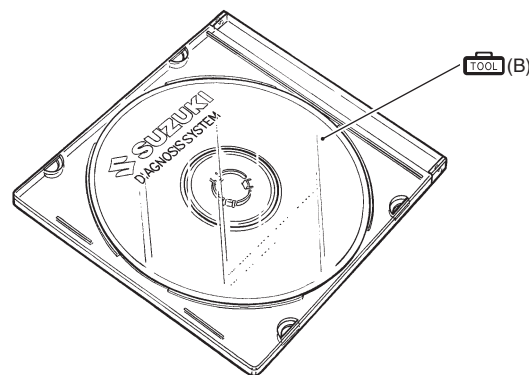
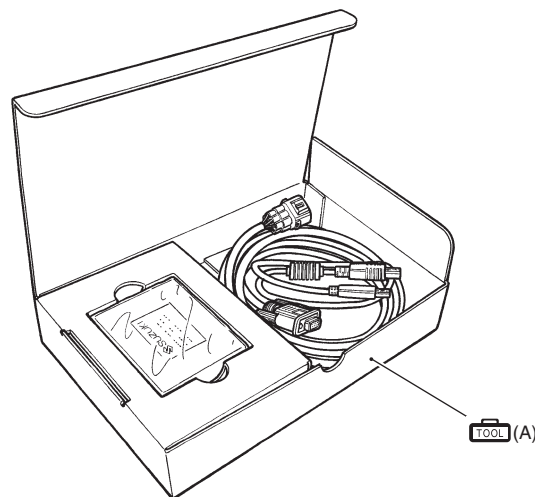
- Do not disconnect the coupler from ECM, the battery cable from the battery, ECM ground wire harness from the engine or main fuse before confirming DTC (Diagnostic Trouble Code) stored in memory. Such disconnection will erase the memorized information in ECM memory.
- DTC stored in ECM memory can be checked by the SDS.
- Be sure to read "Precautions for Electrical Circuit Service in Section 00 (Page00-2)" before inspection and observe what is written there.

- 1) Remove the upper meter panel. Refer to "Upper Meter Panel Removal and Installation in Section 9D (Page9D-13)".
- 2) Set up the SDS tools. (Refer to the SDS operation manual for further details.)

### Special tool

 (A): 09904-41010 (SDS Set)

 (B): 99565-01010-008 (CD-ROM Ver.8)



I705H1110116-03

- 3) Read the DTC (Diagnostic Trouble Code) and show data when trouble (displaying data at the time of DTC) according to instructions displayed on SDS. SDS is not only used for detecting Diagnostic.
- 4) Trouble Codes but also for reproducing and checking on screen the failure condition as described by customers using the trigger.
- 5) Refer to the SDS operation manual for How to use trigger and further details.

**Use of SDS Diagnosis Reset Procedures**

B705H11104031

Clear the Past DTC using SDS in the following procedures:

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



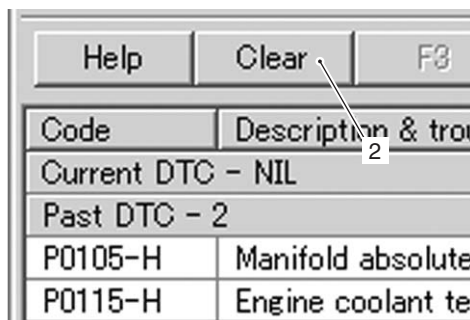
I705H1110003-01

- 4) Check the DTC.
- 5) 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.

**NOTE**

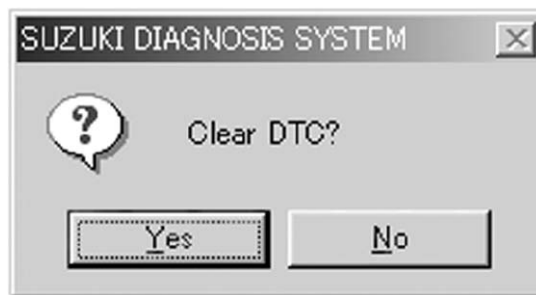
**The malfunction code is memorized in the ECM also when the wire coupler of any sensor is disconnected. Therefore, when a wire coupler has been disconnected at the time of diagnosis, erase the stored malfunction history code using SDS.**

- 6) Click "Clear" (2) to delete history code (Past DTC).



I705H1110005-01

- 7) Follow the displayed instructions.

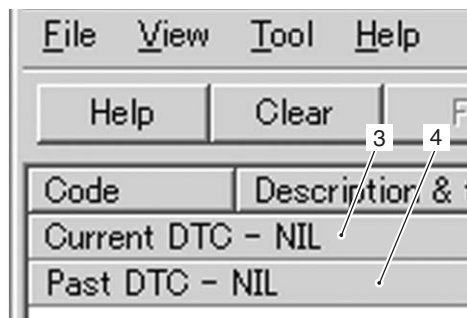


I705H1110006-01



I705H1110009-01

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



I705H1110008-01

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

B705H11104032

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 motorcycle 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 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

P0105-H Manifold absolute pressure circuit malfunction 1

Item	Pre-detect	Detect poi...	Post-dete...
Engine speed	0	0	0
Throttle position	28.9	28.9	28.9
Manifold absolute pressure 1	135.2	144.3	145.6
Engine coolant / oil temperature	24.0	24.0	24.0
Gear position	N	N	N
Secondary throttle actuator position sensor	96.1	96.1	98.4

I705H1110010-01

Click “Show data when trouble” (1) to display the data. By clicking the drop down button (2), either “Failure #1” or “Failure #2” can be selected.



Failure #2

P0110-H Intake air temperature circuit malfunction

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

I705H1110011-01

## SDS Check

B705H11104036


Using SDS, take the sample of data from the new motorcycle and at the time of periodic maintenance at your dealership.

Save the data in the computer or by printing and filing the hard copies. The saved or filed data are useful for troubleshooting as they can be compared periodically with changes over time or failure conditions of the motorcycle. For example, when a motorcycle is brought in for service but the troubleshooting is difficult, comparison with the normal data that have been saved or filed can allow the specific engine failure to be determined.

- Remove the upper meter panel. Refer to “Upper Meter Panel Removal and Installation in Section 9D (Page9D-13)”.
- Set up the SDS tool. Refer to “Use of SDS Diagnostic Procedures (Page1A-14)”.

### Special tool

 : 09904-41010 (SDS set)

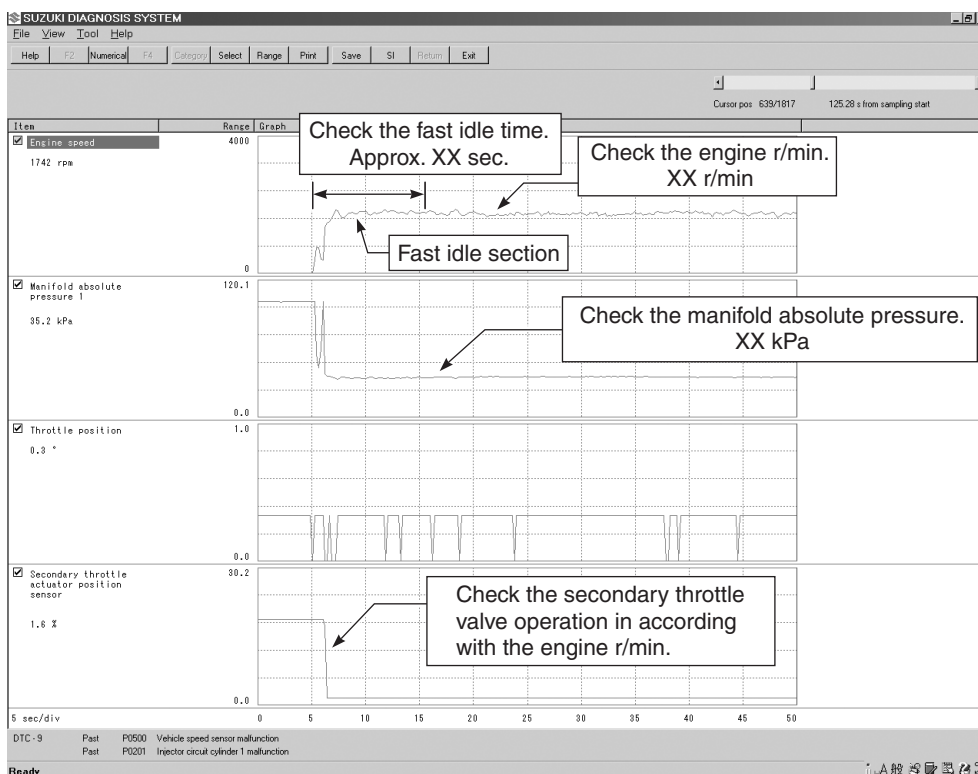
 : 99565-01010-008 (CD-ROM Ver.8)

### 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.

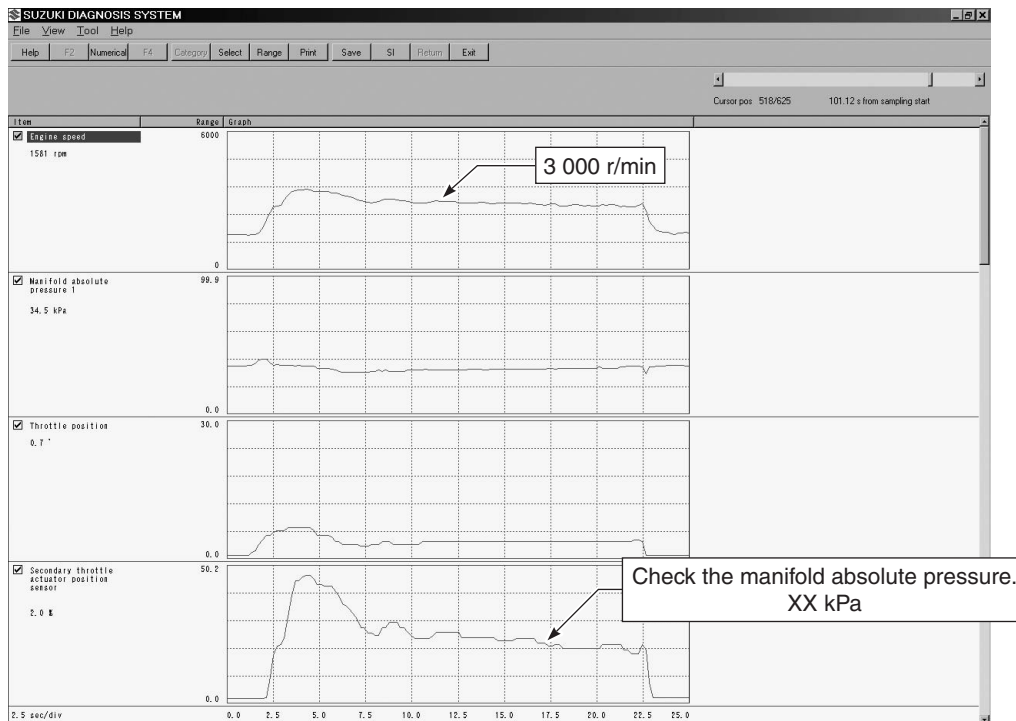
### Sample

#### Data sampled from cold starting through warm-up



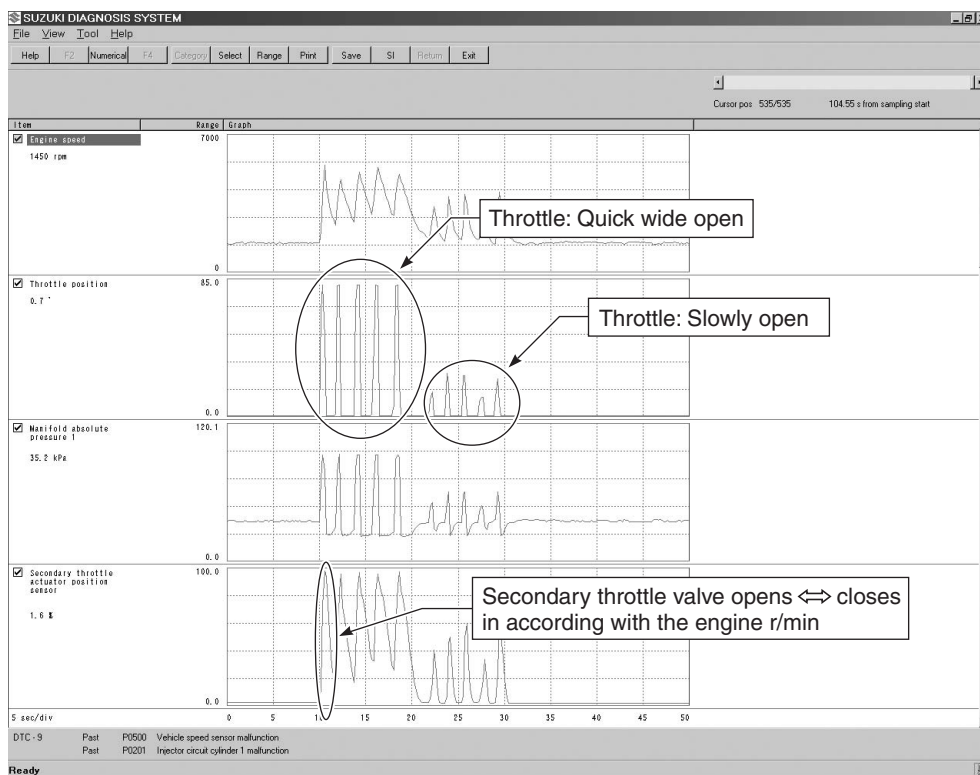
I705H1110126-03

Data at 3 000 r/min under no load



I705H1110127-02

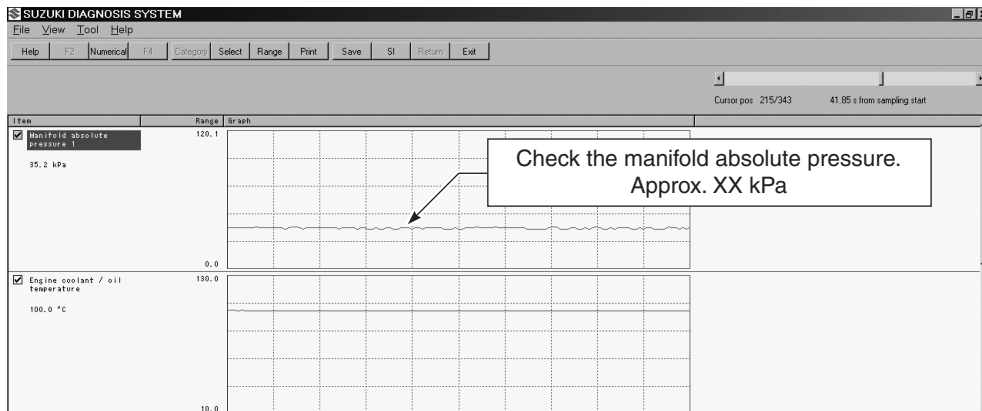
Data at the time of racing



I705H1110128-04

## 1A-19 Engine General Information and Diagnosis:

### Data of intake negative pressure during idling (100 °C)



I705H1110129-03

### Data of secondary throttle valve operation at the time of starting



I705H1110130-02



Malfunction Code and Defective Condition Table

B705H11104014

Malfunction Code	Detected Item	Detected Failure Condition	Check For	
C00	NO FAULT	—	—	
C12	CKP sensor	Although the intake pressure is fluctuated, the signal does not reach ECM for 3 sec. or more.	CKP sensor wiring and mechanical parts CKP sensor, lead wire/coupler connection	
P0335				
C13	IAP sensor	The sensor should produce following voltage. $0.24\text{ V} \leq \text{sensor voltage} < 4.10\text{ V}$ In other than the above range, C13 (P0105) is indicated.	IAP sensor, lead wire/coupler connection	
P0105		H	Sensor voltage is higher than specified value.	IAP sensor circuit open or shorted to Vcc or ground circuit open
		L	Sensor voltage is lower than specified value.	IAP sensor circuit shorted to ground or Vcc circuit open
C14	TP sensor	The sensor should produce following voltage. $0.35\text{ V} \leq \text{sensor voltage} < 4.90\text{ V}$ In other than the above range, C14 (P0120) is indicated.	TP sensor, lead wire/coupler connection	
P0120		H	Sensor voltage is higher than specified value.	TP sensor circuit shorted to Vcc or ground circuit open
		L	Sensor voltage is lower than specified value.	TP sensor circuit open or shorted to ground or Vcc circuit open
C15	ECT sensor	The sensor voltage should be the following. $0.2\text{ V} \leq \text{sensor voltage} < 4.9\text{ V}$ In other than the above range, C15 (P0115) is indicated.	ECT sensor, lead wire/coupler connection	
P0115		H	Sensor voltage is higher than specified value.	ECT sensor circuit open or ground circuit open
		L	Sensor voltage is lower than specified value.	ECT sensor circuit shorted to ground
C16	Speed sensor	The speed sensor signal is not input for more than 3 sec. during the engine is running at 5 000 r/min or more.	Speed sensor, wiring/coupler connection	
P0500				
C21	IAT sensor	The sensor voltage should be the following. $0.2\text{ V} \leq \text{sensor voltage} < 4.9\text{ V}$ In other than the above range, C21 (P0110) is indicated.	IAT sensor, lead wire/coupler connection	
P0110		H	Sensor voltage is higher than specified value.	IAT sensor circuit open or ground circuit open
		L	Sensor voltage is lower than specified value.	IAT sensor circuit shorted to ground
C23	TO sensor	The sensor voltage should be the following for 2 sec. and more, after ignition switch is turned ON. $0.17\text{ V} \leq \text{sensor voltage} < 4.70\text{ V}$ In other than the above value, C23 (P1651) is indicated.	TO sensor, lead wire/coupler connection	
P1651		H	Sensor voltage is higher than specified value.	TO sensor circuit shorted to Vcc or ground circuit open
		L	Sensor voltage is lower than specified value.	TO sensor circuit open or shorted to ground or Vcc circuit open
C24	Ignition signal	No ignition signal is detected for 0.5 sec. In this case, the code C24 (P0351) is indicated.	Ignition coil, wiring/coupler connection, power supply from the battery	
P0351				

**1A-21 Engine General Information and Diagnosis:**

Malfunction Code		Detected Item	Detected Failure Condition	Check For
C28		Secondary throttle valve actuator	When no actuator control signal is supplied from the ECM, communication signal does not reach ECM or operation voltage does not reach STVA motor, C28 (P1655) is indicated. STVA can not operate.	STVA motor, STVA lead wire/coupler
P1655				
C29		STP sensor	The sensor should produce following voltage. 0.35 V ≤ sensor voltage < 4.90 V In other than the above range, C29 (P1654) is indicated.	STP sensor, lead wire/coupler connection
P1654	H		Sensor voltage is higher than specified value.	STP sensor circuit shorted to Vcc or ground circuit open
	L		Sensor voltage is lower than specified value.	STP sensor circuit open or shorted to ground or Vcc circuit open
C32		Fuel injector	No injector signal is detected for 0.8 sec. In this case, the code C32 (P0201) is indicated.	Primary fuel injector, wiring/coupler connection, power supply to the injector
P0201				
C40 (P0505)		ISC valve	No IAC valve voltage is supplied after starting the engine.	IAC valve, wiring/coupler connection
C40 (P0506)			Idle speed is lower than the desired idle speed.	Air passage clogged ISC valve fixed ISC valve pre-set position is incorrect
C40 (P0507)			Idle speed is higher than the desired idle speed.	ISC valve is fixed ISC valve pre-set position is incorrect
C41		Fuel pump relay	No voltage is applied to the fuel pump, although fuel pump relay is turned ON, or voltage is applied to fuel pump although fuel pump relay is turned OFF.	Fuel pump relay, lead wire/coupler connection, power source to fuel pump relay and fuel injectors
P0230	H		Voltage is applied to fuel pump although fuel pump relay is turned OFF.	Fuel pump relay switch circuit shorted to power source Fuel pump relay (switch side)
	L		No voltage is applied to the fuel pump, although fuel pump relay is turned ON.	Fuel pump relay circuit open or short Fuel pump relay (coil side)
C42		Ignition switch	Ignition switch signal is not input to the ECM. * When the I.D. agreement is not verified. * ECM does not receive communication signal from the immobilizer antenna.	Ignition switch, lead wire/coupler, etc. * Immobilizer/anti-theft system
P1650				
C44		HO2 sensor (HO2S)	HO2 sensor output voltage is not input to ECM during engine operation and running condition. In other than the above value, C44 (P0130) is indicated.	HO2S lead wire/coupler connection Battery voltage supply to the HO2S
P0130				
C44			The Heater can not operate so that heater operation voltage is not supply to the oxygen heater circuit, C44 (P0135) is indicated.	HO2 sensor lead wire/coupler connection Battery voltage supply to the HO2 sensor
P0135				

\* : Immobilizer system is equipped model only.

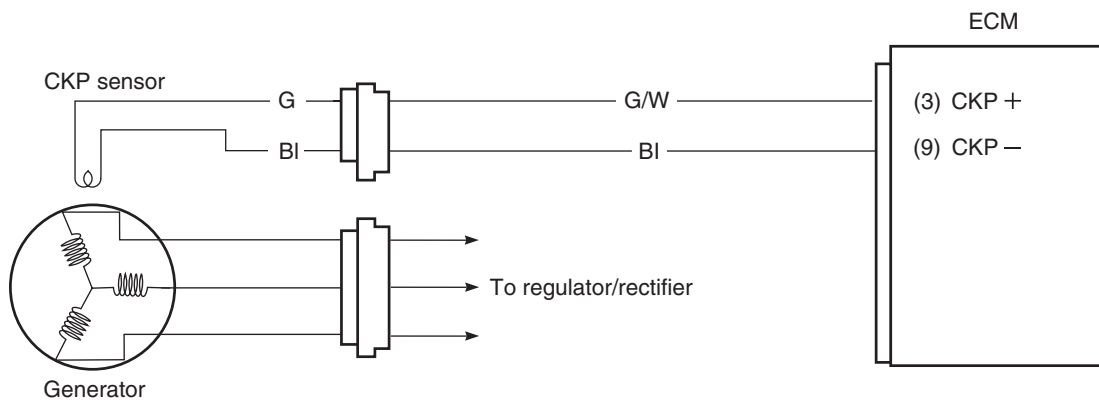
**DTC “C12” (P0335): CKP Sensor Circuit Malfunction**

B705H11104016

**Detected Condition and Possible Cause**

Detected Condition	Possible Cause
<p>Although the intake pressure is fluctuated, the signal does not reach for 3 sec. or more.</p> <p><b>NOTE</b> If SDS is used, P0355 is indicated.</p>	<ul style="list-style-type: none"> <li>• Metal particles or foreign material being attached 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**

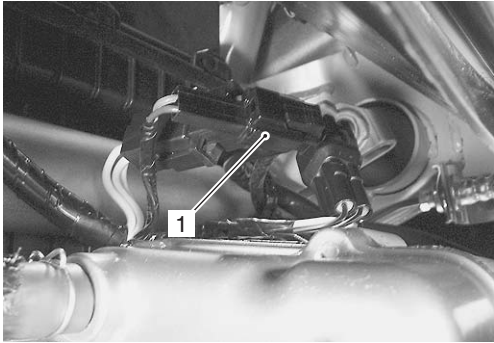

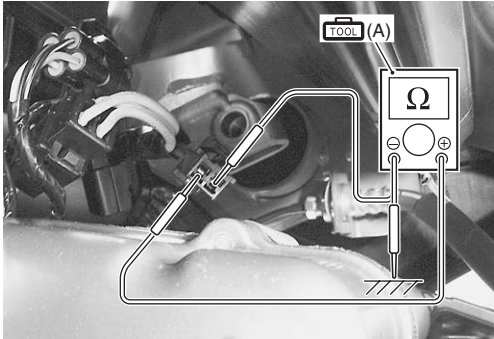



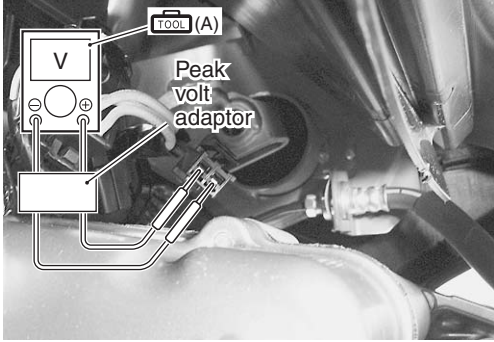
I705H1110012-02

Troubleshooting

NOTE

After repairing the trouble, clear the DTC using SDS tool. Refer to “Use of SDS Diagnosis Reset Procedures (Page1A-15)”.

Step	Action	Yes	No
1	<p>1) Turn the ignition switch OFF.</p> <p>2) Check the CKP sensor coupler (1) for loose or poor contacts. If OK, then measure the CKP sensor resistance.</p>  <p style="text-align: right; font-size: small;">I705H1110033-02</p> <p>3) Disconnect the CKP sensor coupler (1) and measure the resistance.</p> <p><b>CKP sensor resistance</b> 190 – 290 Ω (BI – G)</p> <p><b>Special tool</b>  (A): 09900–25008 (Multi-circuit tester set)</p> <p><b>Tester knob indication</b> <u>Resistance (Ω)</u></p>  <p style="text-align: right; font-size: small;">I705H1110034-03</p> <p>If OK, then check the continuity between each terminal and ground.</p> <p><b>CKP sensor continuity</b> <math>\infty</math> Ω (Infinity) (BI – Ground, G – Ground)</p> <p><b>Special tool</b>  (A): 09900–25008 (Multi-circuit tester set)</p> <p><b>Tester knob indication</b> <u>Continuity ( ∙ ) )</u></p> <p><i>Are the resistance and continuity OK?</i></p>	Go to Step 2.	Replace the CKP sensor with a new one.

Step	Action	Yes	No
2	<p>1) Crank the engine a few seconds with the starter motor, and measure the CKP sensor peak voltage at the coupler.</p> <p><b>CKP sensor peak voltage</b>  <b>4.5 V and more</b>  <b>(Positive terminal: G – Negative terminal: BI)</b></p> <p><b>Special tool</b>  <b>TOOL (A): 09900–25008 (Multi-circuit tester set)</b></p> <p><b>Tester knob indication</b>  <b>Voltage ( --- )</b></p>  <p>2) Repeat the above 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>• G/W or BI wire open or shorted to ground.</li> <li>• Loose or poor contacts on the CKP sensor coupler or ECM coupler (terminal (2) or (9)). Refer to “Terminal Alignment of ECM Coupler (Harness Side) (Page1A-5)”.</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 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.</li> </ul>

I705H1110035-04

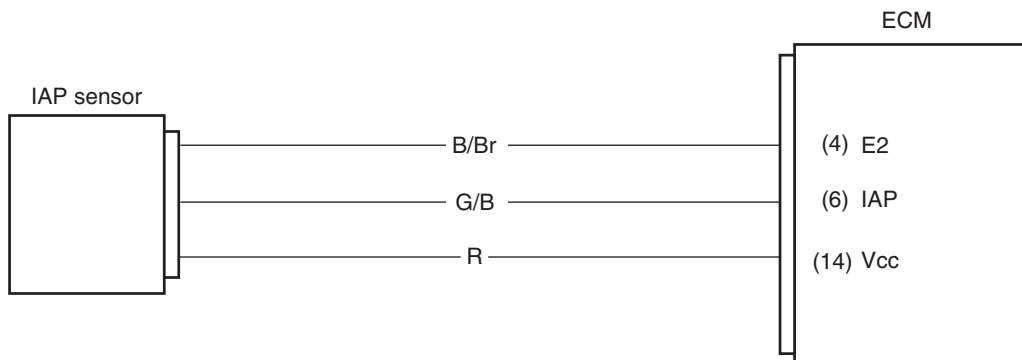
DTC “C13” (P0105-H/L): IAP Sensor Circuit Malfunction

B705H11104017

Detected Condition and Possible Cause

Detected Condition	Possible Cause
<p>IAP sensor voltage is not within the following range.  <math>0.24\text{ V} \leq \text{Sensor voltage} &lt; 4.10\text{ V}</math></p> <p><b>NOTE</b></p> <ul style="list-style-type: none"> <li>• Note that atmospheric pressure varies depending on weather conditions as well as altitude. Take that into consideration when inspecting voltage.</li> <li>• If SDS is used, P0105-H is indicated when sensor voltage is higher than specified value.</li> <li>• If SDS is used, P0105-L is indicated when sensor voltage is lower than specified value.</li> </ul>	<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 ground.</li> <li>• IAP sensor malfunction.</li> <li>• ECM malfunction.</li> </ul> <p><b>NOTE</b></p> <ul style="list-style-type: none"> <li>• When P0105-H is displayed, it is possible that IAP sensor circuit is open or shorted to Vcc or ground circuit is open.</li> <li>• When P0105-L is displayed, it is possible that IAP sensor circuit is shorted to ground or Vcc circuit is open.</li> </ul>

Wiring Diagram



I705H1110013-03

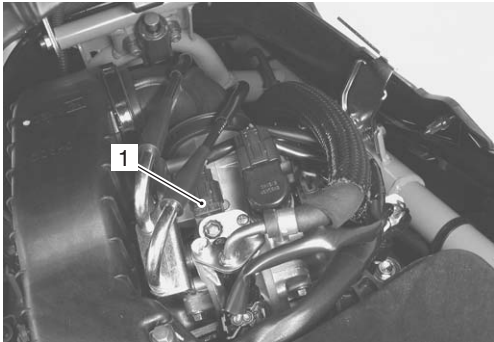
Troubleshooting

**⚠ CAUTION**

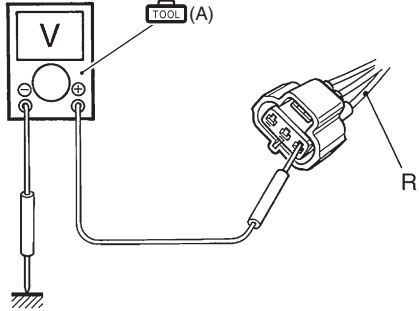
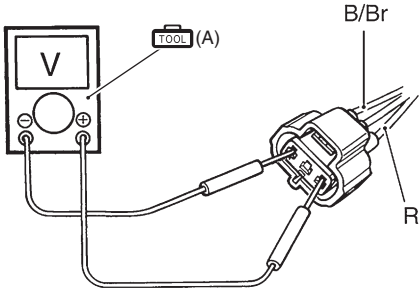
When using the multi-circuit tester, do not strongly touch the terminal of the ECM coupler with a needle pointed tester probe to prevent the terminal damage or terminal bend.

**NOTE**



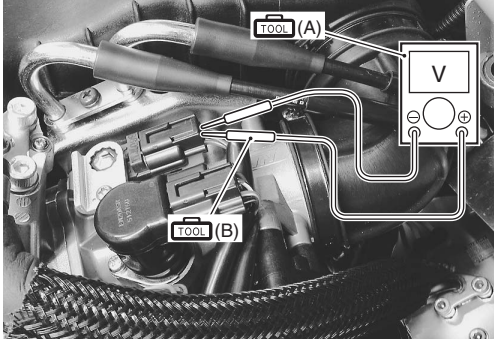
After repairing the trouble, clear the DTC using SDS tool. Refer to “Use of SDS Diagnosis Reset Procedures (Page1A-15)”.

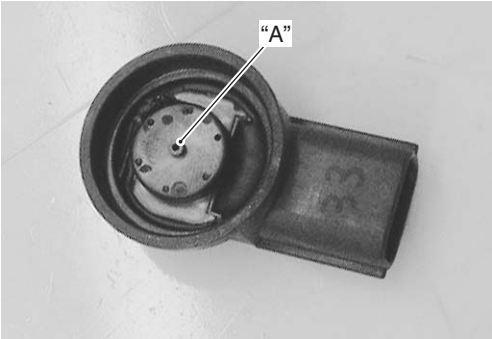


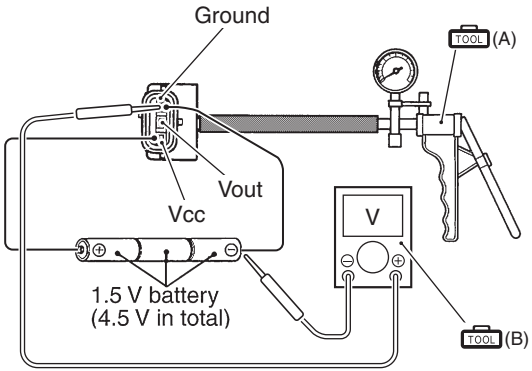
Step	Action	Yes	No
1	<p>1) Turn the ignition switch OFF.</p> <p>2) Remove the helmet box front cover. (Refer to “Helmet Box Front Cover Removal and Installation in Section 9D (Page9D-16)”.)</p> <p>3) Check the IAP sensor coupler (1) for loose or poor contacts. If OK, then measure the IAP sensor input voltage.</p>  <p style="text-align: right; font-size: small;">I705H1110016-01</p> <p>4) Disconnect the IAP sensor coupler.</p> <p>5) Turn the ignition switch ON.</p>	Go to Step 2.	<ul style="list-style-type: none"> <li>• Loose or poor contacts on the ECM coupler (terminal (14) or (4)). Refer to “Terminal Alignment of ECM Coupler (Harness Side) (Page1A-5)”.</li> <li>• Open or short circuit in the R wire or B/Br wire.</li> </ul>

**1A-27 Engine General Information and Diagnosis:**

Step	Action	Yes	No
1	<p>6) Measure the voltage at the R wire and ground. If OK, then measure the voltage at the R wire and B/Br wire.</p> <p><b>IAP sensor input voltage</b> <b>4.5 – 5.5 V</b> <b>(Positive terminal: R – Negative terminal: Ground,</b> <b>Positive terminal: R – Negative terminal: B/Br)</b></p> <p><b>Special tool</b> <b>TOOL (A): 09900–25008 (Multi-circuit tester set)</b></p> <p><b>Tester knob indication</b> <b>Voltage ( --- )</b></p>  <p style="text-align: right;">I705H1110135-01</p>  <p style="text-align: right;">I705H1110136-01</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 (terminal (14) or (4)). Refer to “Terminal Alignment of ECM Coupler (Harness Side) (Page1A-5)”.</li> <li>• Open or short circuit in the R wire or B/Br wire.</li> </ul>



Step	Action	Yes	No
2	<p>1) Connect the IAP sensor coupler.</p> <p>2) Insert the needle pointed probes to the lead wire coupler.</p> <p>3) Start the engine at idle speed.</p> <p>4) Measure the IAP sensor output voltage at the wire side coupler (between G/B and B/Br wires).</p> <p><b><u>IAP sensor output voltage</u></b>  <b>Approx. 1.5 – 3.5 V at idle speed</b>  <b>(Positive terminal: G/B – Negative terminal: B/Br)</b></p> <p><b>Special tool</b>   (A): 09900–25008 (Multi-circuit tester set)   (B): 09900–25009 (Needle pointed probe set)</p> <p><b><u>Tester knob indication</u></b>  <b>Voltage ( --- )</b></p>  <p style="text-align: right; font-size: small;">I705H1110036-05</p> <p><i>Is the voltage OK?</i></p>	<p>Go to Step 3.</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.</li> </ul>

Step	Action	Yes	No																				
3	<p>1) Remove the IAP sensor.</p> <p>2) Connect the vacuum pump gauge to the vacuum port "A" of the IAP sensor.</p>  <p style="text-align: right; font-size: small;">I705H1110117-01</p> <p>3) Arrange 3 new 1.5 V batteries in series (check that total voltage is 4.5 – 5.0 V) and connect negative terminal to ground terminal and positive terminal to Vcc terminal.</p> <p>4) Check the voltage between Vout and ground.</p> <p>5) Also, check if voltage reduces when vacuum is applied by the vacuum pump gauge.</p> <p><b>Special tool</b></p> <p> (A): 09917-47010 (Vacuum pump gauge)</p> <p> (B): 09900-25008 (Multi-circuit tester set)</p> <p><b>Tester knob indication</b></p> <p>Voltage ( --- )</p>  <p style="text-align: right; font-size: small;">I705H1110140-01</p> <table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <thead> <tr> <th colspan="3">Negative pressure</th> <th>Output voltage</th> </tr> <tr> <th>kPa</th> <th>kgf/cm<sup>2</sup></th> <th>psi</th> <th>V</th> </tr> </thead> <tbody> <tr> <td>Approx. 120.0</td> <td>Approx. 1.20</td> <td>Approx. 17.06</td> <td>Approx. 4.2</td> </tr> <tr> <td>Approx. 66.7</td> <td>Approx. 0.67</td> <td>Approx. 9.48</td> <td>Approx. 2.6</td> </tr> <tr> <td>Approx. 13.3</td> <td>Approx. 0.13</td> <td>Approx. 1.89</td> <td>Approx. 1.0</td> </tr> </tbody> </table> <p style="text-align: right; font-size: x-small;">I705H1110137-04</p> <p><i>Is the voltage OK?</i></p>	Negative pressure			Output voltage	kPa	kgf/cm <sup>2</sup>	psi	V	Approx. 120.0	Approx. 1.20	Approx. 17.06	Approx. 4.2	Approx. 66.7	Approx. 0.67	Approx. 9.48	Approx. 2.6	Approx. 13.3	Approx. 0.13	Approx. 1.89	Approx. 1.0	<ul style="list-style-type: none"> <li>• R, G/B or B/Br wire open or shorted to ground, or poor (4), (6) or (14) connection. Refer to "Terminal Alignment of ECM Coupler (Harness Side) (Page 1A-5)".</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 again.</li> </ul>	<p>If check result is not satisfactory, replace IAP sensor with a new one.</p>
Negative pressure			Output voltage																				
kPa	kgf/cm <sup>2</sup>	psi	V																				
Approx. 120.0	Approx. 1.20	Approx. 17.06	Approx. 4.2																				
Approx. 66.7	Approx. 0.67	Approx. 9.48	Approx. 2.6																				
Approx. 13.3	Approx. 0.13	Approx. 1.89	Approx. 1.0																				

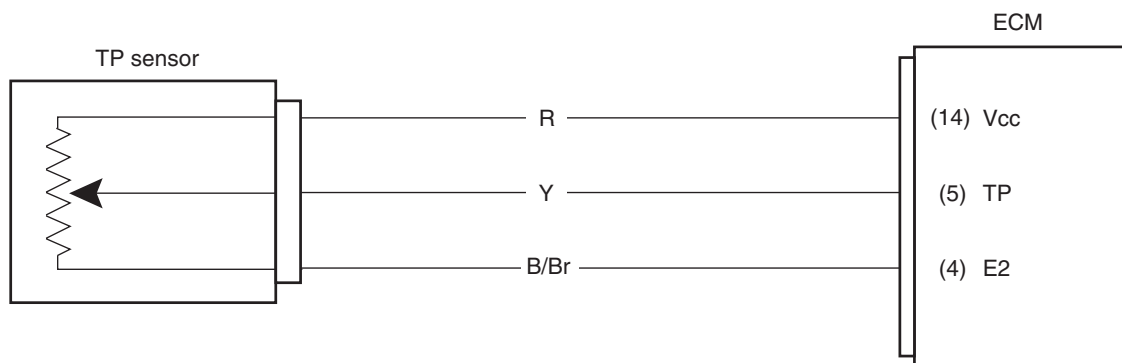
**DTC “C14” (P0120/H/L): TP Sensor Circuit Malfunction**

B705H11104018

**Detected Condition and Possible Cause**

Detected Condition	Possible Cause
<p>Output voltage is not within the following range. Difference between actual throttle opening and opening calculated by ECM is larger than specified value. 0.35 V ≤ Sensor voltage &lt; 4.90 V</p> <p><b>NOTE</b></p> <ul style="list-style-type: none"> <li>• If SDS is used, P0120-H is indicated when sensor voltage is higher than specified value.</li> <li>• If SDS is used, P0120-L is indicated when sensor voltage is lower than specified value.</li> </ul>	<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> <p><b>NOTE</b></p> <ul style="list-style-type: none"> <li>• When P0120-H is displayed, it is possible that TP sensor circuit is shorted to Vcc or ground circuit is open.</li> <li>• When P0120-L is displayed, it is possible that TP sensor circuit is open or shorted to ground or Vcc circuit is open.</li> </ul>

**Wiring Diagram**



I705H1110017-02

**Troubleshooting**



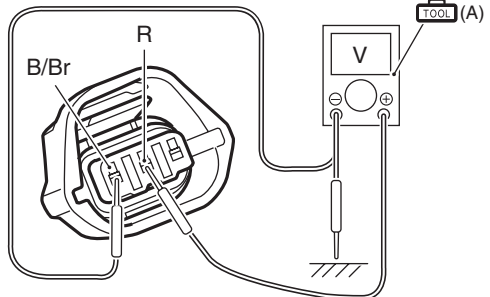
**⚠ CAUTION**

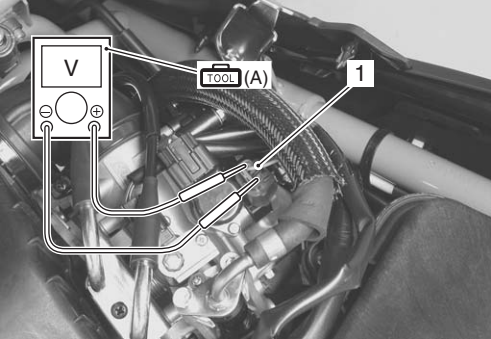
When using the multi-circuit tester, do not strongly touch the terminal of the ECM coupler with a needle pointed tester probe to prevent the terminal damage or terminal bend.

**NOTE**

After repairing the trouble, clear the DTC using SDS tool. Refer to “Use of SDS Diagnosis Reset Procedures (Page1A-15)”.

# 1A-31 Engine General Information and Diagnosis:

Step	Action	Yes	No
1	<p>1) Turn the ignition switch OFF.</p> <p>2) Remove the helmet box front cover. (Refer to "Helmet Box Front Cover Removal and Installation in Section 9D (Page9D-16)".)</p> <p>3) Check the TP sensor (1) coupler for loose or poor contacts. If OK, then measure the TP sensor input voltage.</p> <p>4) Disconnect the TP sensor coupler (1).</p>  <p style="text-align: right; font-size: small;">1705H1110041-01</p> <p>5) Turn the ignition switch ON.</p> <p>6) Measure the voltage at the R wire and ground. If OK, then measure the voltage at the R wire and B/Br wire.</p> <p><b><u>TP sensor input voltage</u></b>  <b>4.5 – 5.5 V</b>  <b>(Positive terminal: R – Negative terminal: Ground, Positive terminal: R – Negative terminal: B/Br)</b></p> <p><b>Special tool</b>   (A): 09900–25008 (Multi-circuit tester set)</p> <p><b><u>Tester knob indication</u></b>  <b>Voltage ( --- )</b></p>  <p style="text-align: right; font-size: small;">1705H1110021-04</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 (terminal (14) and (4)). Refer to "Terminal Alignment of ECM Coupler (Harness Side) (Page1A-5)".</li> <li>• Open or short circuit in the R wire or B/Br wire.</li> </ul>

Step	Action	Yes	No
2	<p>1) Connect the TP sensor coupler.</p> <p>2) Insert the needle pointed probes to the coupler.</p> <p>3) Turn the ignition switch ON.</p> <p>4) Measure the TP sensor output voltage (between positive terminal: Y and negative terminal: B/Br) by turning the throttle grip.</p> <p><b>TP sensor output voltage</b>  <b>Throttle valve is closed: Approx. 0.6 V</b>  <b>Throttle valve is opened: Approx. 3.8 V</b></p> <p><b>Special tool</b>  <b>TOOL (A): 09900-25008 (Multi-circuit tester set)</b></p> <p><b>Tester knob indication</b>  <b>Voltage ( --- )</b></p>  <p style="text-align: right; font-size: small;">I705H1110018-04</p> <p><i>Is the voltage OK?</i></p>	<ul style="list-style-type: none"> <li>• R or B/Br wire open or shorted to ground, or poor (4), (5) or (14) connection. Refer to "Terminal Alignment of ECM Coupler (Harness Side) (Page1A-5)".</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 again.</li> </ul>	<p>If check result is not satisfactory, replace TP sensor with a new one.</p>

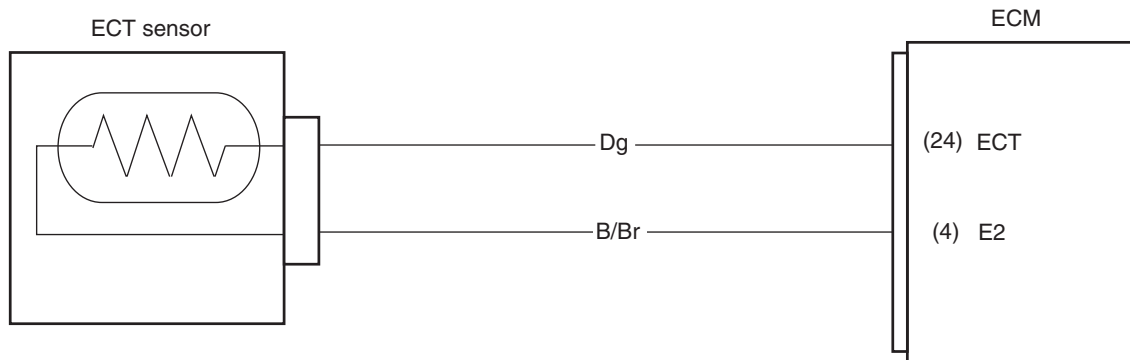
**DTC “C15” (P0115-H/L): ECT Sensor Circuit Malfunction**

B705H11104019

**Detected Condition and Possible Cause**

Detected Condition	Possible Cause
<p>Output voltage is not within the following range.  <math>0.2\text{ V} \leq \text{Sensor voltage} &lt; 4.9\text{ V}</math></p> <p><b>NOTE</b></p> <ul style="list-style-type: none"> <li>• If SDS is used, P0115-H is indicated when sensor voltage is higher than specified value.</li> <li>• If SDS is used, P0115-L is indicated when sensor voltage is lower than specified value.</li> </ul>	<ul style="list-style-type: none"> <li>• ECT sensor circuit open or short</li> <li>• ECT sensor malfunction</li> <li>• ECM malfunction</li> </ul> <p><b>NOTE</b></p> <ul style="list-style-type: none"> <li>• When P0115-H is displayed, it is possible that ECT sensor circuit is open or ground circuit is open.</li> <li>• When P0115-L is displayed, it is possible that ECT sensor circuit is shorted to ground.</li> </ul>

**Wiring Diagram**



I705H1110023-02


Troubleshooting

**⚠ CAUTION**


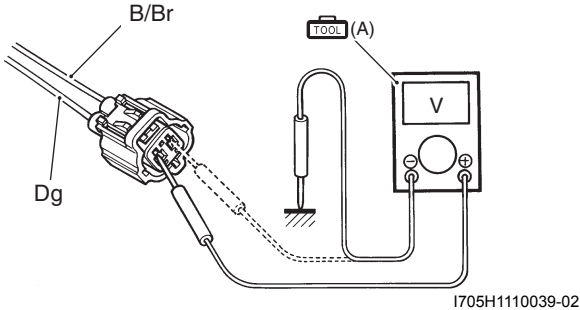

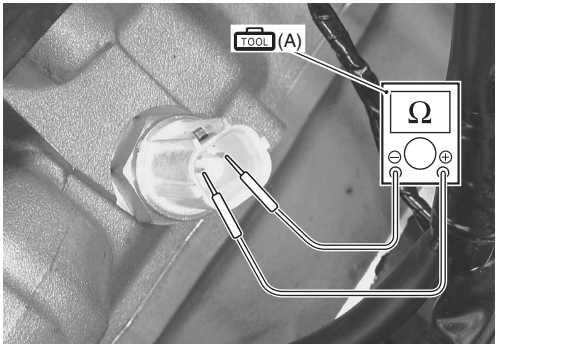
When using the multi-circuit tester, do not strongly touch the terminal of the ECM coupler with a needle pointed tester probe to prevent the terminal damage or terminal bend.

**NOTE**

- After repairing the trouble, clear the DTC using SDS tool. Refer to “Use of SDS Diagnosis Reset Procedures (Page1A-15)”.
- Refer to “ECT Sensor Inspection in Section 1C (Page1C-3)”

Step	Action	Yes	No
1	1) Turn the ignition switch OFF. 2) Remove the air cleaner box. Refer to “Air Cleaner Box Removal and Installation in Section 1D (Page1D-9)”. 3) Connect the couplers disconnected in the air cleaner box removal. 4) Check the ECT sensor coupler (1) for loose or poor contacts. If OK, then measure the ECT sensor voltage at the wire side coupler.  <p style="text-align: right; font-size: small;">I705H1110038-01</p> 5) Disconnect the ECT coupler and turn the ignition switch ON. 6) Measure the voltage between Dg wire terminal and ground.	Go to Step 2.	<ul style="list-style-type: none"> <li>• Loose or poor contacts on the ECM coupler (terminal (24) or (4)). Refer to “Terminal Alignment of ECM Coupler (Harness Side) (Page1A-5)”.</li> <li>• Open or short circuit in the Dg wire or B/Br wire.</li> </ul>

**1A-35 Engine General Information and Diagnosis:**

Step	Action	Yes	No
1	<p>7) If OK, then measure the voltage between Dg wire terminal and B/Br wire terminal.</p> <p><b><u>ECT sensor voltage</u></b>  <b>4.5 – 5.5 V</b>  <b>(Positive terminal: Dg – Negative terminal: Ground, Positive terminal: Dg – Negative terminal: B/Br)</b></p> <p><b>Special tool</b>   (A): 09900–25008 (Multi-circuit tester set)</p> <p><b><u>Tester knob indication</u></b>  <b>Voltage ( --- )</b></p>  <p><i>Is the voltage OK?</i></p>	<p>Go to Step 2.</p>	<ul style="list-style-type: none"> <li>• Loose or poor contacts on the ECM coupler (terminal (24) or (4)). Refer to “Terminal Alignment of ECM Coupler (Harness Side) (Page1A-5)”.</li> <li>• Open or short circuit in the Dg wire or B/Br wire.</li> </ul>
2	<p>1) Turn the ignition switch OFF.</p> <p>2) Measure the ECT sensor resistance.</p> <p><b><u>ECT sensor resistance</u></b>  <b>Approx. 2.58 kΩ at 20 °C (68 °F) (Terminal – Terminal)</b></p> <p><b>Special tool</b>   (A): 09900–25008 (Multi-circuit tester set)</p> <p><b><u>Tester knob indication</u></b>  <b>Resistance (Ω)</b></p>  <p><i>Is the resistance OK?</i></p>	<ul style="list-style-type: none"> <li>• Dg or B/Br wire open or shorted to ground, or poor (24) or (4) connection. Refer to “Terminal Alignment of ECM Coupler (Harness Side) (Page1A-5)”.</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 again.</li> </ul>	<p>Replace the ECT sensor with a new one.</p>

Engine coolant temp.	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



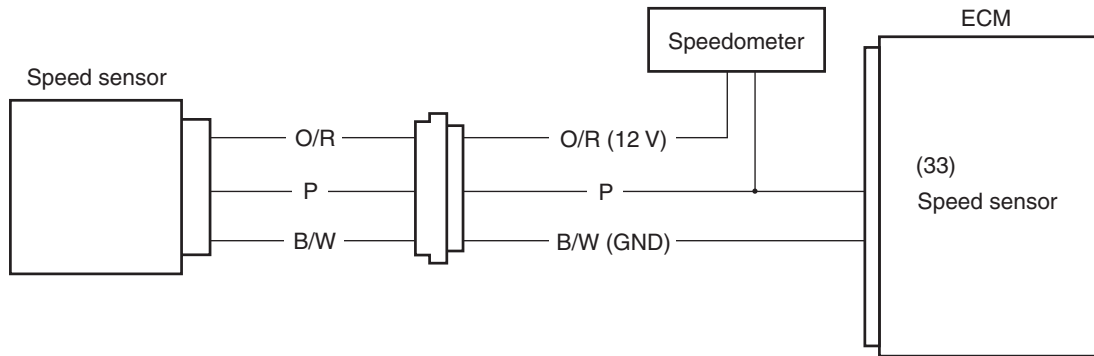
**DTC “C16” (P0500): Speed Sensor**

B705H11104020

**Detected Condition and Possible Cause**

Detected Condition	Possible Cause
The speed sensor signal is not input to ECM for more than 3 sec. during the engine is running at 5 000 r/min or more.  <b>NOTE</b> If SDS is used, P0500 is indicated.	<ul style="list-style-type: none"> <li>• Speed sensor circuit open or short.</li> <li>• Metal particles or foreign material being attached on the speed sensor.</li> <li>• Speed sensor malfunction.</li> <li>• ECM malfunction.</li> </ul>

**Wiring Diagram**



I705H1110122-02

**Troubleshooting**

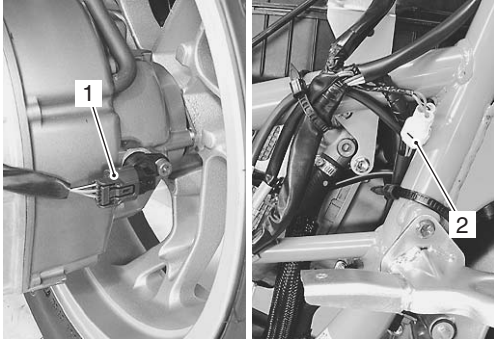


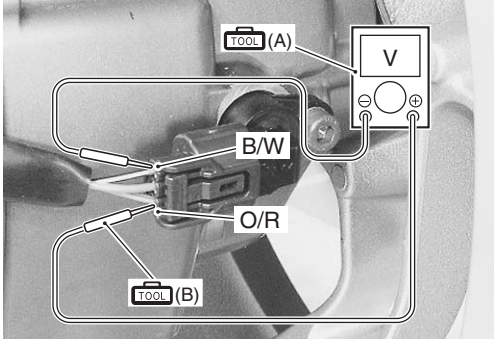
**⚠ CAUTION**



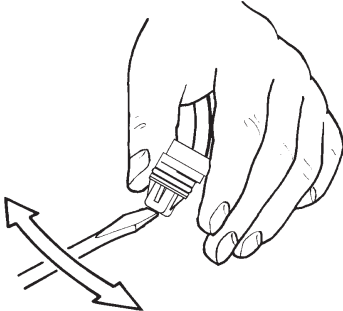
When using the multi-circuit tester, do not strongly touch the terminal of the ECM coupler with a needle pointed tester probe to prevent the terminal damage or terminal bend.

**NOTE**

- After repairing the trouble, clear the DTC using SDS tool. Refer to “Use of SDS Diagnosis Reset Procedures (Page1A-15)”.
- Refer to “Use of SDS Diagnosis Reset Procedures (Page1A-15)”

**1A-37 Engine General Information and Diagnosis:**

Step	Action	Yes	No
1	<p>1) Turn the ignition switch OFF.</p> <p>2) Remove the left foot board and clutch outer cover. (Refer to "V-belt Type Continuously Variable Automatic Transmission Removal and Installation in Section 5A (Page5A-3)".)</p> <p>3) Check the speed sensor lead wire couplers (1) and (2) for loose or poor contacts. If OK, then measure the speed sensor input voltage.</p>  <p style="text-align: right; font-size: small;">I705H1110052-01</p> <p>4) Insert the needle pointed probes to the lead wire coupler.</p> <p>5) Turn the ignition switch ON.</p> <p>6) Measure the speed sensor input voltage at the couplers (between positive terminal: O/R and negative terminal: B/W wire).</p> <p><b><u>Speed sensor input voltage</u></b>  <b>Battery voltage (Positive terminal: O/R – Negative terminal: B/W)</b></p> <p><b>Special tool</b>   (A): 09900–25008 (Multi-circuit tester set)   (B): 09900–25009 (Needle pointed probe set)</p> <p><b><u>Tester knob indication</u></b>  <b>Voltage ( --- )</b></p>  <p style="text-align: right; font-size: small;">I705H1110110-02</p> <p><i>Is the voltage OK?</i></p>	<ul style="list-style-type: none"> <li>• Remove the speed sensor and Clean away metal particles or foreign material.</li> <li>• If OK, go to Step 2.</li> </ul>	<ul style="list-style-type: none"> <li>• Loose or poor contacts on the speedometer couplers.</li> <li>• Open or short circuit in the O/R wire or B/W wire.</li> </ul>

Step	Action	Yes	No
2	<p>1) Insert the needle pointed probes to the lead wire coupler. (between positive terminal: P and negative terminal: B/W)</p> <p>2) Turn the ignition switch ON.</p> <p>3) Check that the speed sensor output voltage varies when a screwdriver is brought close to the pick-up face of the speed sensor.</p> <p><b>Special tool</b>   (A): 09900-25008 (Multi-circuit tester set)   (B): 09900-25009 (Needle pointed probe set)</p> <p><b>Tester knob indication</b>  Voltage ( --- )</p>  <p style="text-align: right;">I705H1110053-01</p> <p><i>Is the voltage OK?</i></p>	<ul style="list-style-type: none"> <li>• Recheck ECM coupler for loose or poor contacts.</li> <li>• Replace ECM with a new one and inspect again.</li> </ul>	<ul style="list-style-type: none"> <li>• Short circuit in the lead wire.</li> <li>• Replace the speed sensor with a new one.</li> </ul>

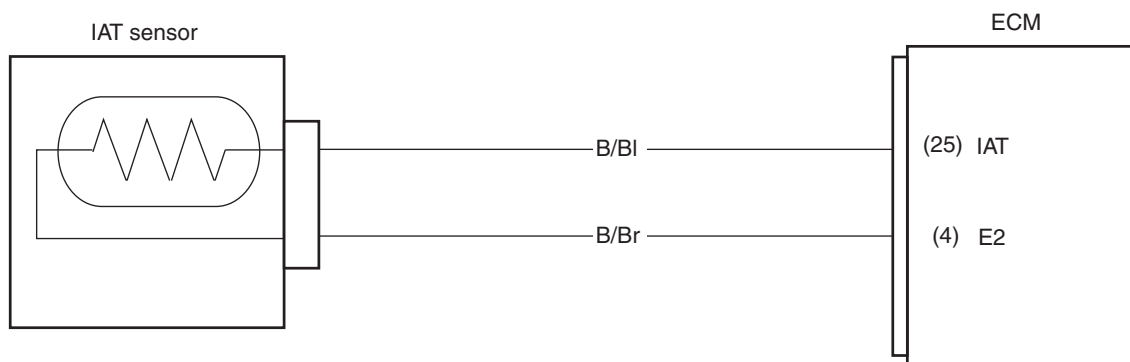
DTC “C21” (P0110-H/L): IAT Sensor Circuit Malfunction

B705H11104021

Detected Condition and Possible Cause

Detected Condition	Possible Cause
<p>Output voltage is not with in the following range.  <math>0.2\text{ V} \leq \text{Sensor voltage} &lt; 4.9\text{ V}</math></p> <p><b>NOTE</b></p> <ul style="list-style-type: none"> <li>If SDS is used, P0110-H is indicated when sensor voltage is higher than specified value.</li> <li>If SDS is used, P0110-L is indicated when sensor voltage is lower than specified value.</li> </ul>	<ul style="list-style-type: none"> <li>AT sensor circuit open or short</li> <li>IAT sensor malfunction</li> <li>ECM malfunction</li> </ul> <p><b>NOTE</b></p> <ul style="list-style-type: none"> <li>When P0110-H is displayed, it is possible that IAT sensor circuit is open or ground circuit is open.</li> <li>When P0110-L is displayed, it is possible that IAT sensor circuit is shorted to ground.</li> </ul>

Wiring Diagram



I705H1110024-01

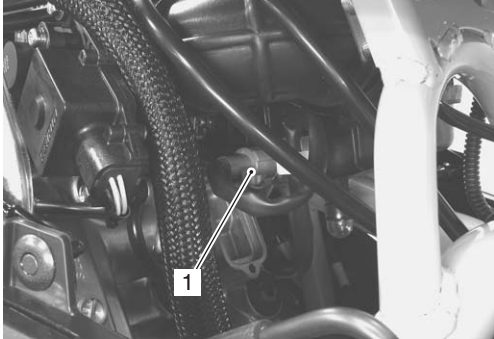

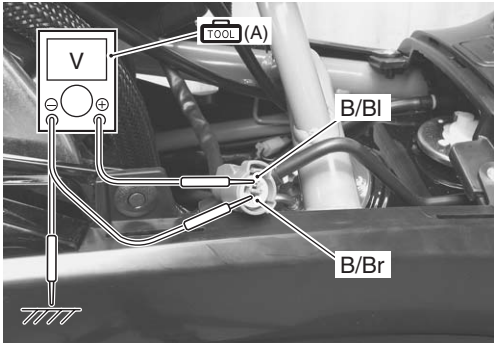
Troubleshooting

**⚠ CAUTION**


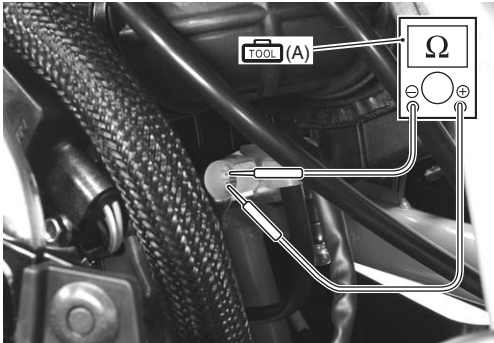
When using the multi-circuit tester, do not strongly touch the terminal of the ECM coupler with a needle pointed tester probe to prevent the terminal damage or terminal bend.

**NOTE**

- After repairing the trouble, clear the DTC using SDS tool. Refer to “Use of SDS Diagnosis Reset Procedures (Page1A-15)”.
- IAT sensor resistance measurement method is the same way as that of the ECT sensor. Refer to “IAT Sensor Inspection in Section 1C (Page1C-4)” for details.

Step	Action	Yes	No
1	<p>1) Turn the ignition switch OFF.</p> <p>2) Remove the front frame cover. (Refer to "Front Frame Cover Removal and Installation in Section 9D (Page9D-17)".)</p> <p>3) Check the IAT sensor coupler for loose or poor contacts. If OK, then measure the IAT sensor voltage at the wire side coupler.</p> <p>4) Disconnect the coupler (1) and turn the ignition switch ON.</p>  <p>I705H1110025-02</p> <p>5) Measure the voltage between B/BI wire terminal and ground.</p> <p>6) If OK, then measure the voltage between B/BI wire terminal and B/Br wire terminal.</p> <p><b><u>IAT sensor voltage</u></b>  <b>4.5 – 5.5 V</b>  <b>(Positive terminal: B/BI – Negative terminal: Ground,</b>  <b>Positive terminal: B/BI – Negative terminal: B/Br)</b></p> <p><b>Special tool</b>   (A): 09900–25008 (Multi-circuit tester set)</p> <p><b><u>Tester knob indication</u></b>  <b>Voltage ( --- )</b></p>  <p>I705H1110026-03</p> <p><i>Is the voltage OK?</i></p>	<p>Go to Step 2.</p>	<ul style="list-style-type: none"> <li>Loose or poor contacts on the ECM coupler (terminal (25) and (4)). Refer to "Terminal Alignment of ECM Coupler (Harness Side) (Page1A-5)".</li> <li>Open or short circuit in the B/BI wire or B/Br wire.</li> </ul>

## 1A-41 Engine General Information and Diagnosis:

Step	Action	Yes	No
2	<p>1) Turn the ignition switch OFF.</p> <p>2) Measure the IAT sensor resistance.</p> <p><b>IAT sensor resistance</b>  <b>Approx. 2.58 kΩ at 20 °C (68 °F) (Terminal – Terminal)</b></p> <p><b>Special tool</b>   (A): 09900–25008 (Multi-circuit tester set)</p> <p><b>Tester knob indication</b>  <b>Resistance (Ω)</b></p>  <p style="text-align: right; font-size: small;">I705H1110027-03</p> <p><i>Is the resistance OK?</i></p>	<ul style="list-style-type: none"> <li>• B/Bl or B/Br wire open or shorted to ground, or poor (25) or (4) connection. Refer to “Terminal Alignment of ECM Coupler (Harness Side) (Page1A-5)”.</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 again.</li> </ul>	<p>Replace the IAT sensor with a new one.</p>

Intake Air Temp.	Resistance
0 °C (32 °F)	Approx. 6.54 kΩ
20 °C (68 °F)	Approx. 2.58 kΩ
40 °C (104 °F)	Approx. 1.14 kΩ
80 °C (140 °F)	Approx. 0.54 kΩ

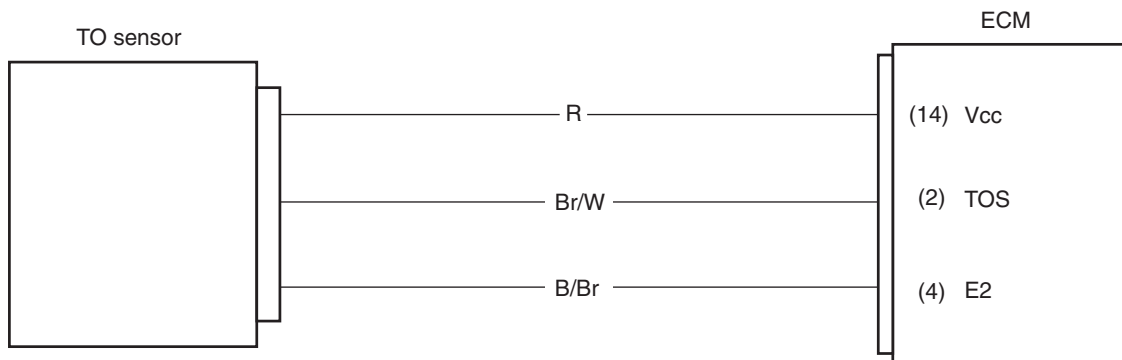
**DTC “C23” (P1651-H/L): TO Sensor Circuit Malfunction**

B705H11104023

**Detected Condition and Possible Cause**

Detected Condition	Possible Cause
<p>The sensor voltage should be the following for 2 sec. and more, after ignition switch is turned ON.  <math>0.17\text{ V} \leq \text{Sensor voltage} &lt; 4.70\text{ V}</math></p> <p><b>NOTE</b></p> <ul style="list-style-type: none"> <li>• If SDS is used, P1651-H is indicated when sensor voltage is higher than specified value.</li> <li>• If SDS is used, P1651-L is indicated when sensor voltage is lower than specified value.</li> </ul>	<ul style="list-style-type: none"> <li>• TO sensor circuit open or short</li> <li>• TO sensor malfunction</li> <li>• ECM malfunction</li> </ul> <p><b>NOTE</b></p> <ul style="list-style-type: none"> <li>• When P1651-H is displayed, it is possible that TO sensor circuit is shorted to Vcc or ground circuit is open.</li> <li>• When P1651-L is displayed, it is possible that TO sensor circuit is open or shorted to ground or Vcc circuit is open.</li> </ul>

**Wiring Diagram**



I705H1110028-03

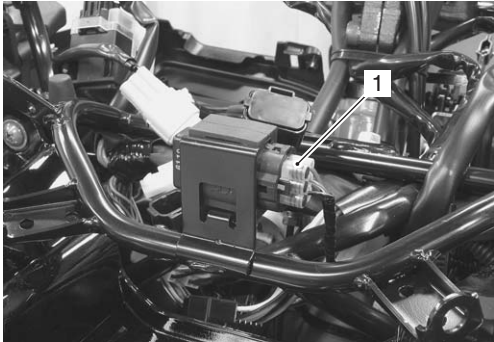

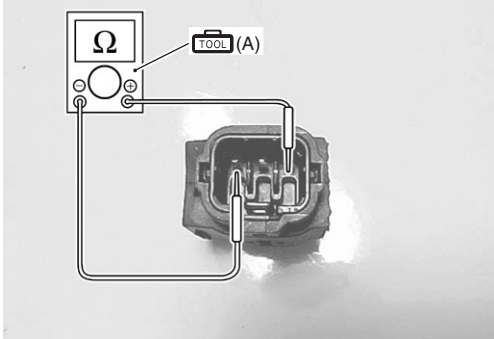
Troubleshooting

**⚠ CAUTION**

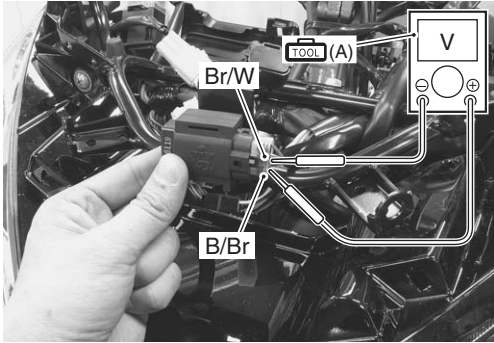
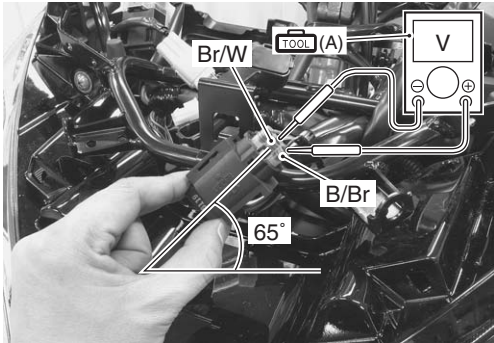
When using the multi-circuit tester, do not strongly touch the terminal of the ECM coupler with a needle pointed tester probe to prevent the terminal damage or terminal bend.

**NOTE**

After repairing the trouble, clear the DTC using SDS tool. Refer to “Use of SDS Diagnosis Reset Procedures (Page1A-15)”.

Step	Action	Yes	No
1	<p>1) Turn the ignition switch OFF.</p> <p>2) Remove the meter panel. (Refer to “Meter Panel Removal and Installation in Section 9D (Page9D-14)”.)</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;">I705H1110029-02</p> <p>4) Disconnect the TO sensor coupler.</p> <p>5) Measure the resistance between R and B/Br wire terminals.</p> <p><b><u>TO sensor resistance</u></b> 16.5 – 22.3 kΩ (R terminal– B/Br terminal)</p> <p><b><u>Special tool</u></b>  (A): 09900–25008 (Multi-circuit tester set)</p> <p><b><u>Tester knob indication</u></b> Resistance (Ω)</p>  <p style="text-align: right; font-size: small;">I705H1110138-01</p> <p><i>Is the resistance OK?</i></p>	Go to Step 2.	Replace the TO sensor with a new one.



Step	Action	Yes	No
2	<p>1) Connect the TO sensor coupler.                      2) Remove the TO sensor horizontally                      3) Insert the needle pointed probes to the lead wire coupler.                      4) Turn the ignition switch ON.                      5) Measure the voltage at the wire side coupler between Br/W and B/Br wires when holding the TO sensor horizontally.</p> <p><b><u>TO sensor voltage (Normal)</u></b>                      0.4 – 1.4 V                      (Positive terminal: Br/W – Negative terminal: B/Br)</p> <p><b>Special tool</b>                      TOOL (A): 09900–25008 (Multi-circuit tester set)</p> <p><b><u>Tester knob indication</u></b>                      Voltage ( --- )</p>  <p style="text-align: right; font-size: small;">I705H1110030-03</p> <p>6) Measure the voltage when it is leaned 65° and more, left and right, from the horizontal level.</p> <p><b><u>TO sensor voltage (Leaning)</u></b>                      3.7 – 4.4 V                      (Positive terminal: Br/W – Negative terminal: B/Br)</p> <p><b>Special tool</b>                      TOOL (A): 09900–25008 (Multi-circuit tester set)</p> <p><b><u>Tester knob indication</u></b>                      Voltage ( --- )</p>  <p style="text-align: right; font-size: small;">I705H1110031-04</p> <p><i>Is the voltage OK?</i></p>	<ul style="list-style-type: none"> <li>• R, Br/W or B/Br wire open or shorted to ground, or poor (28) or (29) connection. Refer to “Terminal Alignment of ECM Coupler (Harness Side) (Page1A-5)”.</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 again.</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.</li> </ul>

## 1A-45 Engine General Information and Diagnosis:

### DTC "C24" (P0351): Ignition System Malfunction

B705H11104024

Refer to "No Spark or Poor Spark in Section 1H (Page1H-4)" for details.

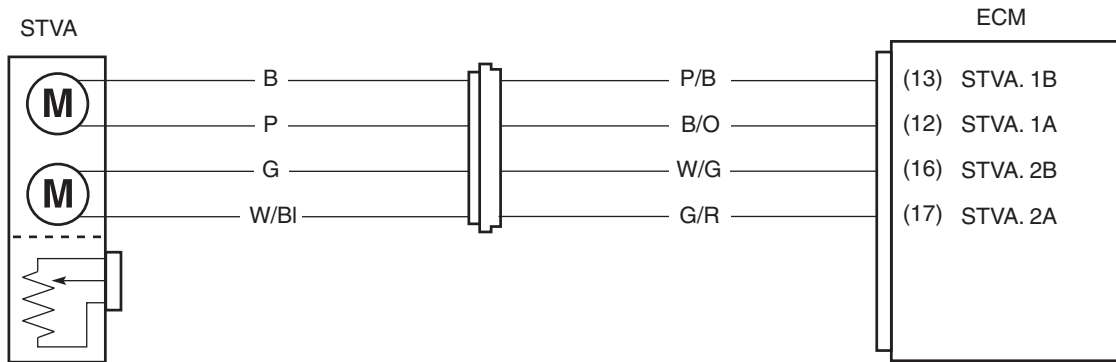
### DTC "C28" (P1655): Secondary Throttle Valve Actuator (STVA) Malfunction

B705H11104034

#### Detected Condition and Possible Cause

Detected Condition	Possible Cause
The operation voltage does not reach the STVA. ECM does not receive communication signal from the STVA.  <b>NOTE</b> If SDS is used, P1655 is indicated.	<ul style="list-style-type: none"><li>• STVA malfunction</li><li>• STVA circuit open or short</li><li>• STVA motor malfunction</li></ul>

#### Wiring Diagram



I705H1110059-07

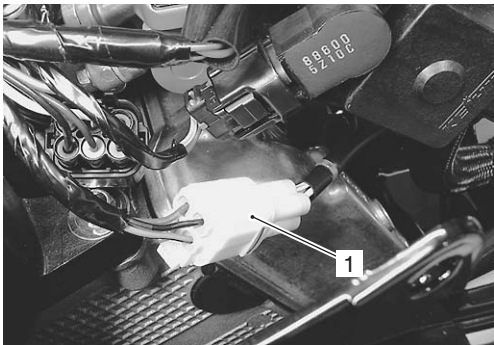
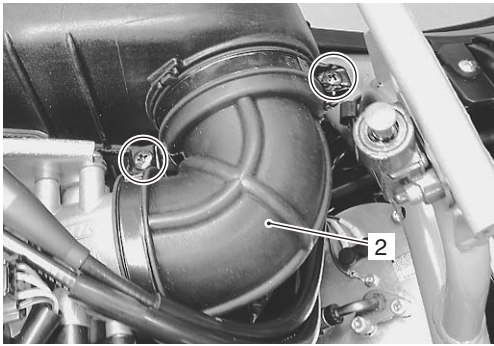
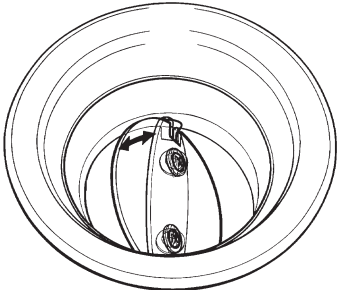
Troubleshooting

**⚠ CAUTION**

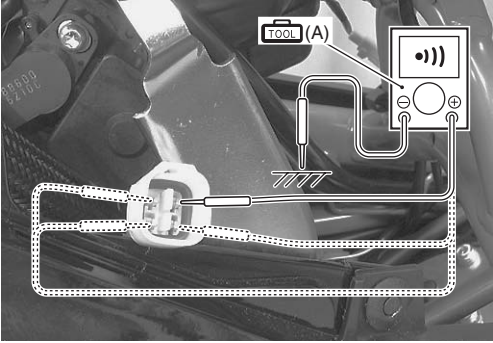
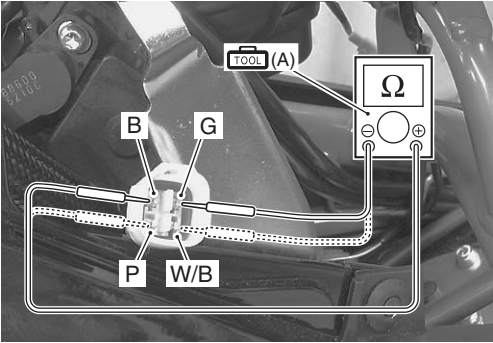
When using the multi-circuit tester, do not strongly touch the terminal of the ECM coupler with a needle pointed tester probe to prevent the terminal damage or terminal bend.

**NOTE**

After repairing the trouble, clear the DTC using SDS tool. Refer to "Use of SDS Diagnosis Reset Procedures (Page1A-15)".

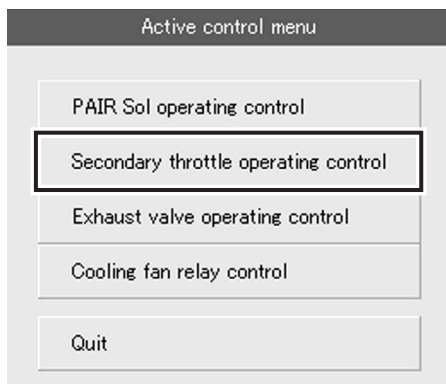
Step	Action	Yes	No
1	<p>1) Remove the helmet box front cover and frame front cover. (Refer to "Helmet Box Front Cover Removal and Installation in Section 9D (Page9D-16)" and "Front Frame Cover Removal and Installation in Section 9D (Page9D-17)".)</p> <p>2) Check the STVA lead wire coupler (1) for loose or poor contacts.</p>  <p style="text-align: right; font-size: small;">I705H1110061-01</p> <p>3) Remove the air cleaner outlet tube (2).</p>  <p style="text-align: right; font-size: small;">I705H1110062-01</p> <p>4) Turn the ignition switch ON to check the STV operation. (STV operating order: Full open → 95% open)</p>  <p style="text-align: right; font-size: small;">I705H1110063-01</p> <p><i>Is the operation OK?</i></p>	Go to Step 2.	<ul style="list-style-type: none"> <li>• Loose or poor contacts on the STVA coupler</li> <li>• Open or short circuit in the B/O, P/B, G/R or W/G wires</li> <li>• If wire and connection are OK, go to Step 2.</li> </ul>

1A-47 Engine General Information and Diagnosis:

Step	Action	Yes	No
2	<p>1) Turn the ignition switch OFF.</p> <p>2) Disconnect the STVA lead wire coupler.</p> <p>3) Check the continuity between each terminal and ground.</p> <p><b>STVA continuity</b>  <math>\infty \Omega</math> (Infinity) (Terminal – 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>Continuity (•))</b></p>  <p style="text-align: right; font-size: small;">I705H1110119-07</p> <p>4) If OK, then measure the STVA resistance B wire and P wire between and between G wire and W/B wire.</p> <p><b>STVA continuity</b>  <b>Approx. 6.5 <math>\Omega</math> (Terminal “B” – Ground “P”) (Terminal “G” – Ground “W/B”)</b></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 style="text-align: right; font-size: small;">I705H1110120-06</p> <p><i>Is the resistance OK?</i></p>	<ul style="list-style-type: none"> <li>• B/O, P/B, G/R or W/G wire open or shorted to ground, or poor (13), (12), (16) and (17) connection. (Refer to “Terminal Alignment of ECM Coupler (Harness Side) (Page1A-5)”.)</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>• Loose or poor contacts on the ECM coupler.</li> <li>• Replace the STVA with a new one.</li> </ul>

**Active Control Inspection**

- 1) Set up the SDS tool. (Refer to the SDS operation manual for further details.)
- 2) Turn the ignition switch ON.
- 3) Click “Secondary throttle operating control”.

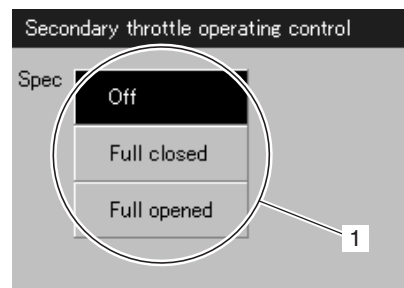


I705H1110064-02

- 4) Click each button (1).

At this time, if an operation sound is heard from the STVA, the function is normal.

<input checked="" type="checkbox"/> Secondary throttle actuator position sensor	94.5	%
<input checked="" type="checkbox"/> Secondary throttle full opened	Except full opn	
<input checked="" type="checkbox"/> Secondary throttle full closed	Except full cls	
<input checked="" type="checkbox"/> Engine coolant / oil temperature	53.5	° C
<input checked="" type="checkbox"/> Engine speed	0	rpm
<input checked="" type="checkbox"/> Throttle position	28.9	°
<input checked="" type="checkbox"/> Intake air temperature	45.9	° C
<input checked="" type="checkbox"/> Barometric pressure	102.0	kPa
<input checked="" type="checkbox"/> Manifold absolute pressure 1	101.3	kPa



I705H1110065-02

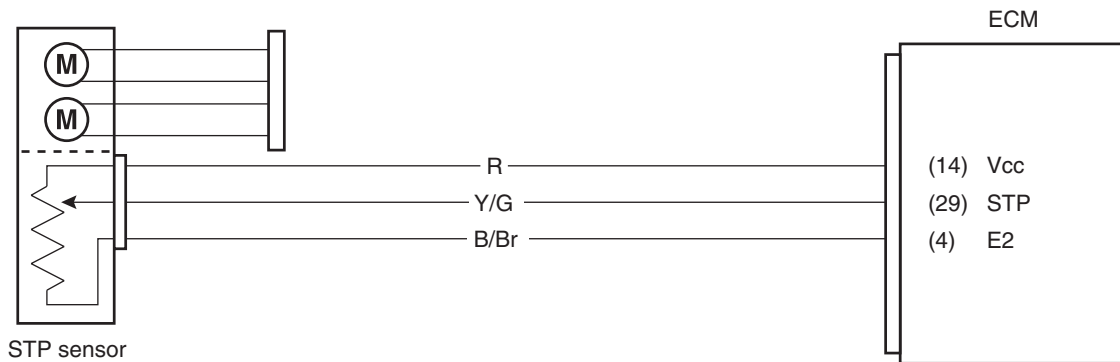
**DTC “C29” (P1654-H/L): Secondary Throttle Position Sensor (STPS)**

B705H11104035

**Detected Condition and Possible Cause**

Detected Condition	Possible Cause
<p>Signal voltage is not within the following range.                      Difference between actual throttle opening and opening calculated by ECM is larger than specified value.  <math>0.35\text{ V} \leq \text{Sensor voltage} &lt; 4.90\text{ V}</math></p> <p><b>NOTE</b></p> <ul style="list-style-type: none"> <li>• If SDS is used, P1654-H is indicated when sensor voltage is higher than specified value.</li> <li>• If SDS is used, P1654-L is indicated when sensor voltage is lower than specified value.</li> </ul>	<ul style="list-style-type: none"> <li>• STP sensor maladjusted</li> <li>• STP sensor circuit open or short</li> <li>• STP sensor malfunction</li> <li>• ECM malfunction</li> </ul> <p><b>NOTE</b></p> <ul style="list-style-type: none"> <li>• When P1654-H is displayed, it is possible that STP sensor circuit is shorted to Vcc or ground circuit is open.</li> <li>• When P1654-L is displayed, it is possible that STP sensor circuit is open or shorted to ground or Vcc circuit is open.</li> </ul>

**Wiring Diagram**



I705H1110066-02



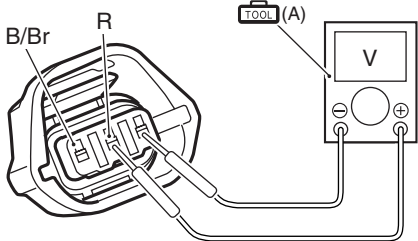
Troubleshooting

**⚠ CAUTION**

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

**NOTE**

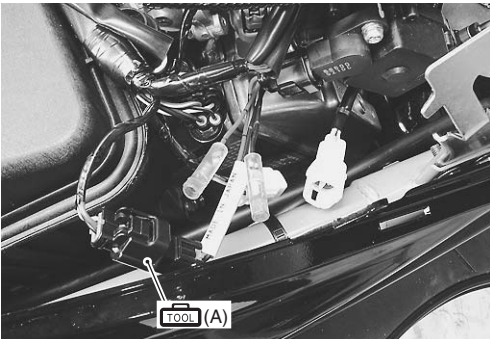
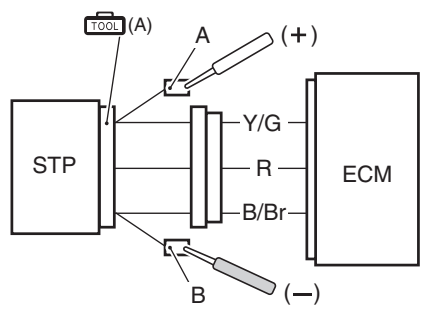
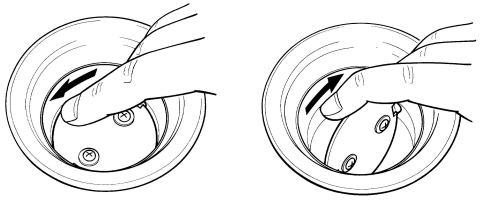
After repairing the trouble, clear the DTC using SDS tool. Refer to “Use of SDS Diagnosis Reset Procedures (Page1A-15)”.

Step	Action	Yes	No
1	<p>1) Turn the ignition switch OFF.                      2) Remove the helmet box front cover.                      3) Check the STP sensor coupler (1) for loose or poor contacts.                      If OK, then measure the STP sensor input voltage.                      4) Disconnect the STP sensor coupler. (Black)                      5) Turn the ignition switch ON.                      6) Measure the voltage at the R wire and ground.                      7) If OK, then measure the voltage at the R wire and B/Br wire.</p> <p><b>STP sensor input voltage</b>  <b>4.5 – 5.5 V</b>                      (Positive terminal: R – Negative terminal: Ground,                      Positive terminal: R – Negative terminal: B/Br)</p> <p><b>Special tool</b>   (A): 09900–25008 (Multi-circuit tester set)</p> <p><b>Tester knob indication</b>                      Voltage ( --- )</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 (terminal (14) and (4)). Refer to “Terminal Alignment of ECM Coupler (Harness Side) (Page1A-5)”.</li> <li>Open or short circuit in the R wire or B/Br wire.</li> </ul>

I705H1110067-01

I705H1110121-01

**1A-51 Engine General Information and Diagnosis:**

Step	Action	Yes	No
2	<p>1) Turn the ignition switch to OFF.</p> <p>2) Disconnect the STVA lead wire coupler.</p> <p>3) Connect the STP sensor coupler to the test harness.</p> <p>4) Turn the ignition switch to ON.</p> <p>5) Measure the STP sensor output voltage at the wire terminal (between positive terminal "A" and negative terminal "B" by turning the secondary throttle valve (close and open) with a finger.</p> <p><b>STP sensor output voltage</b>  <b>Secondary Throttle valve is closed: Approx. 0.5 V</b>  <b>Secondary Throttle valve is opened: Approx. 3.9 V</b></p> <p><b>Special tool</b>  <b>TOOL : 09900-28630 (TPS test wire harness)</b></p> <p><b>Tester knob indication</b>  <b>Voltage ( --- )</b></p>  <p style="text-align: right; font-size: small;">I705H1110073-02</p>  <p style="text-align: right; font-size: small;">I705H1110074-02</p>  <p style="text-align: right; font-size: small;">I705H1110071-01</p> <p><i>Is the voltage OK?</i></p>	<ul style="list-style-type: none"> <li>• R, Y/G or B/Br wire open or shorted to ground, or poor (14), (29) or (4) connection. Refer to "Terminal Alignment of ECM Coupler (Harness Side) (Page 1A-5)".</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>	<p>If check result is not satisfactory, replace STP sensor with a new one.</p>



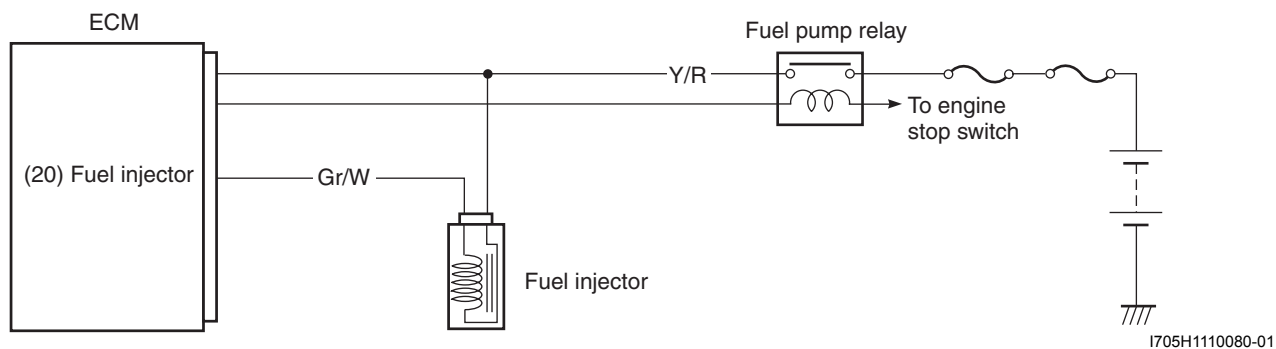
**DTC “C32” (P0201): Fuel Injector Circuit Malfunction**

B705H11104025

**Detected Condition and Possible Cause**

Detected Condition	Possible Cause
No injector signal is detected for 0.8 sec.  <b>NOTE</b> If SDS is used, P0201 is indicated.	<ul style="list-style-type: none"> <li>• Injector circuit open or short.</li> <li>• Injector malfunction.</li> <li>• ECM malfunction.</li> </ul>

**Wiring Diagram**



I705H1110080-01

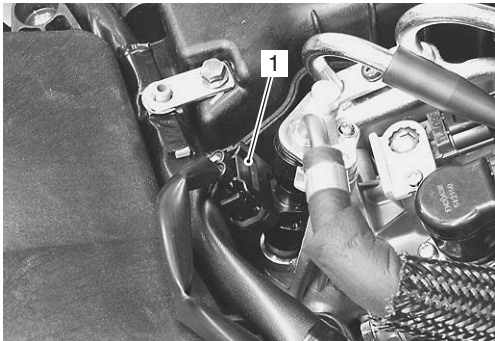

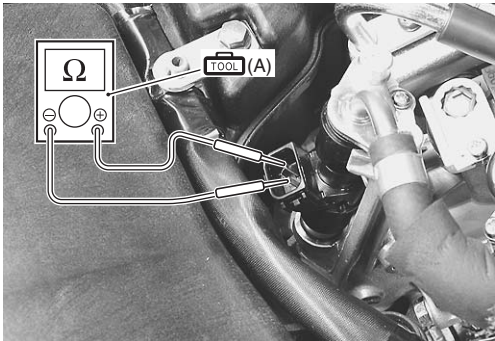
Troubleshooting

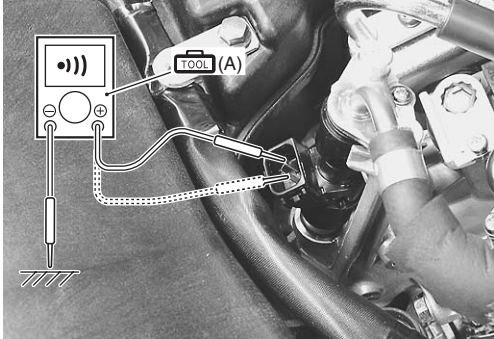
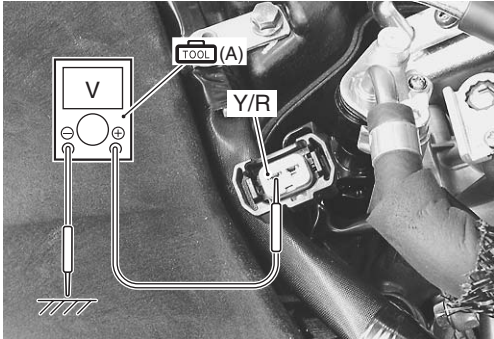
**⚠ CAUTION**

When using the multi-circuit tester, do not strongly touch the terminal of the ECM coupler with a needle pointed 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 (Page1A-15)”.
- Injector voltage can be detected only for 3 seconds after ignition switch ON.

Step	Action	Yes	No
1	<p>1) Turn the ignition switch OFF.</p> <p>2) Remove the helmet box front cover. (Refer to “Helmet Box Front Cover Removal and Installation in Section 9D (Page9D-16)”.)</p> <p>3) Check the injector coupler (1) for loose or poor contacts. If OK, then measure the injector resistance.</p>  <p style="text-align: right; font-size: small;">I705H1110081-01</p> <p>4) Disconnect the coupler and measure the resistance between terminals.</p> <p><b>Injector resistance</b>  <b>Approx. 10.3 Ω at 20 °C (68 °F) (Terminal – Terminal)</b></p> <p><b>Special tool</b>  <b> (A): 09900–25008 (Multi-circuit tester set)</b></p> <p><b>Tester knob indication</b>  <b>Resistance (Ω)</b></p>  <p style="text-align: right; font-size: small;">I705H1110082-01</p>	Go to Step 2.	Replace the injector with a new one. (Refer to “Throttle Body Disassembly and Assembly in Section 1D (Page1D-13)”.)

Step	Action	Yes	No
1	<p>5) If OK, then check the continuity between each terminal and ground.</p> <p><b>Injector continuity</b>  <math>\infty \Omega</math> (Infinity)</p> <p><b>Special tool</b>  <b>TOOL (A): 09900-25008 (Multi-circuit tester set)</b></p> <p><b>Tester knob indication</b>                      Continuity ( • )) )</p>  <p style="text-align: right; font-size: small;">I705H1110083-02</p> <p><i>Are the resistance and continuity OK?</i></p>	<p>Go to Step 2.</p>	<p>Replace the injector with a new one. (Refer to "Throttle Body Disassembly and Assembly in Section 1D (Page1D-13)".)</p>
2	<p>1) Turn the ignition switch ON.</p> <p>2) Measure the injector voltage between Y/R wire and ground.</p> <p><b>Injector voltage</b>  <b>Battery voltage</b>                      (Positive terminal: Y/R – Negative terminal: Ground)</p> <p><b>Special tool</b>  <b>TOOL (A): 09900-25008 (Multi-circuit tester set)</b></p> <p><b>Tester knob indication</b>                      Voltage ( --- )</p>  <p style="text-align: right; font-size: small;">I705H1110084-02</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 (20) connection. Refer to "Terminal Alignment of ECM Coupler (Harness Side) (Page1A-5)".</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>	<p>Open circuit in the Y/R wire.</p>

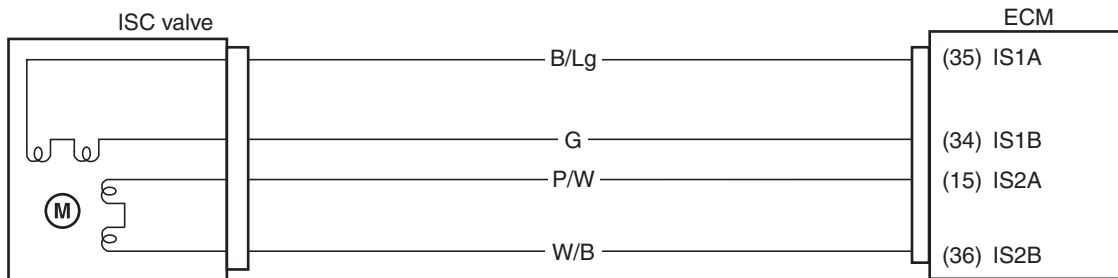
**DTC “C40” (P0505, P0506 or P0507): ISC Valve Circuit Malfunction**

B705H11104026

**Detected Condition and Possible Cause**

Detected Condition	Possible Cause
ISC valve motor current is higher than the specified value.  <b>NOTE</b> If SDS is used, P0505 is indicated.	<ul style="list-style-type: none"> <li>• ISC valve circuit open or shorted to ground</li> <li>• Power source circuit open</li> <li>• Air passage clogged</li> <li>• ISC valve is fixed</li> <li>• ISC valve pre-set position is incorrect</li> </ul>
Idle speed is lower than the desired idle speed.  <b>NOTE</b> If SDS is used, P0506 is indicated.	
Idle speed is higher than the desired idle speed.  <b>NOTE</b> If SDS is used, P0507 is indicated.	

**Wiring Diagram**



I705H1110085-01

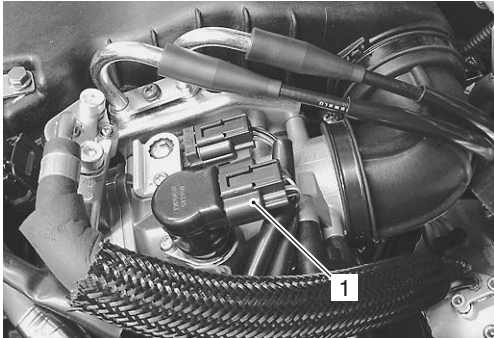
Troubleshooting

**⚠ CAUTION**

- Be careful not to disconnect the ISC valve coupler at least 3 seconds after ignition switch is turned to OFF.  
If the ECM coupler is disconnected within 3 seconds after ignition switch is turned to OFF, there is a possibility of an usual valve being written in ECM and causing an error of ISC valve operation.
- When using the multi-circuit tester, do not strongly touch the terminal of the ECM coupler with a needle pointed tester probe to prevent the terminal damage or terminal bend.



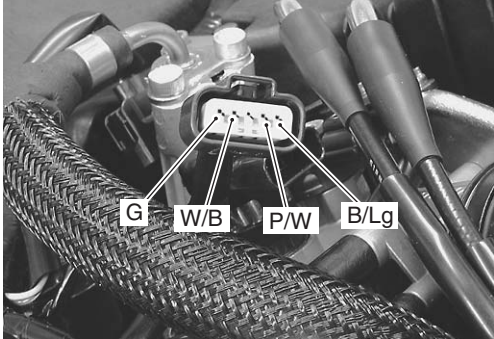
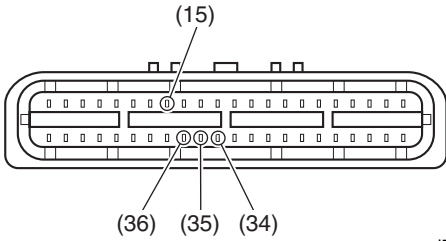
**NOTE**


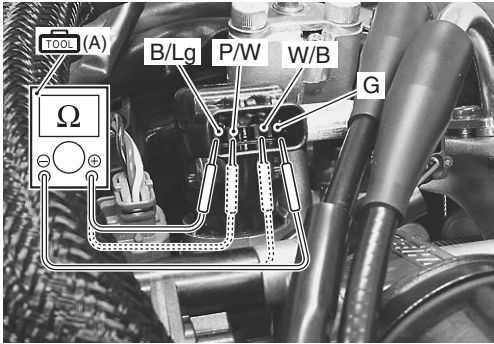
After repairing the trouble, clear the DTC using SDS tool. Refer to “Use of SDS Diagnosis Reset Procedures (Page1A-15)”.

Step	Action	Yes	No
1	1) Turn the ignition switch OFF. 2) Remove the helmet box front cover. (Refer to “Helmet Box Front Cover Removal and Installation in Section 9D (Page9D-16)”.) 3) Check the ISC valve coupler (1) for loose or poor contacts. 4) If OK, then check the ISC valve lead wire continuity. 5) Disconnect the ISC valve coupler and ECM coupler. (Refer to “ECM Removal and Installation in Section 1C (Page1C-1)”.) 	Go to Step 2.	G, W/B, P/W or B/Lg wire open.

I705H1110124-01

**1A-57 Engine General Information and Diagnosis:**

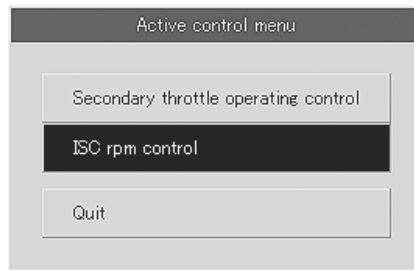
Step	Action	Yes	No
1	<p>6) Check the continuity between terminals G and (34), terminals W/B and (36), terminals P/W and (15), terminals B/Lg and (35).</p> <p><b>ISC valve wire continuity</b> Continuity ( • )) )</p> <p><b>Special tool</b>   : 09900-25008 (Multi-circuit tester set)   : 09900-25009 (Needle pointed probe set)</p> <p><b>Tester knob indication</b> Continuity test ( • )) )</p>  <p style="text-align: right; font-size: small;">I705H1110087-01</p>  <p style="text-align: right; font-size: small;">I705H1110088-01</p> <p><i>Is the continuity OK?</i></p>	Go to Step 2.	G, W/B, P/W or B/Lg wire open.

Step	Action	Yes	No
2	<p>1) Turn the ignition switch OFF.</p> <p>2) Measure the resistance (between terminal B/Lg and terminal G) and (between terminal P/W and terminal W/B).</p> <p><b>ISC valve resistance</b>  <b>Approx. 80 Ω at 68 °C (Terminal B/Lg – Terminal G)</b>  <b>(Terminal P/W – Terminal W/B)</b></p> <p><b>Special tool</b>   (A): 09900–25008 (Multi-circuit tester set)</p> <p><b>Tester knob indication</b>  <b>Resistance (Ω)</b></p>  <p style="text-align: right; font-size: small;">I705H1110090-02</p> <p><i>Is the resistance up?</i></p>	<p>If wire is OK, intermittent trouble or faulty ECM.</p>	<p>Replace the ISC valve with a new one.</p>

**ACTIVE CONTROL INSPECTION (ISC RPM CONTROL)**

**Check 1**

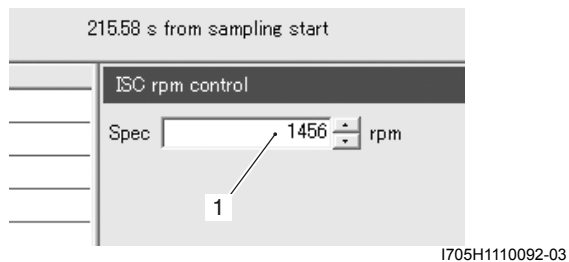
- 1) Set up the SDS tool. (Refer to the SDS operation manual for further details.)
- 2) Check that the engine is running.
- 3) Click the “Active control”.
- 4) Click the “ISC rpm control”.



I705H1110091-03

## 1A-59 Engine General Information and Diagnosis:

- 5) Check that the "Spec" (1) is idle speed  $1\,450 \pm 100$  rpm.
- 6) Check that the "Desired idle speed" (2) is within the specified idle rpm.

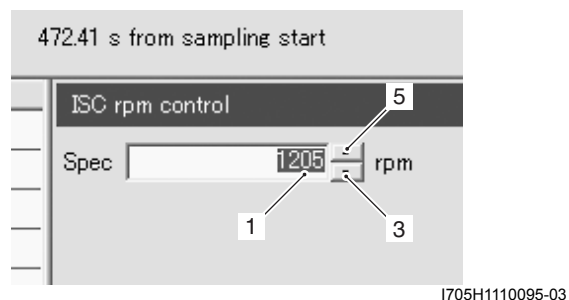


<input type="checkbox"/> Vehicle speed	0.0	km/h
<input type="checkbox"/> Engine speed	1412	rpm
<input type="checkbox"/> Desired idle speed	2 → 1456	rpm
<input type="checkbox"/> ISC valve position	180	step
<input type="checkbox"/> Engine coolant / oil temperature	63.0	°C
<input type="checkbox"/> Throttle position	0.7	°

I705H1110093-04

### Check 2

- 1) Click the button (3) and decrease the "Spec" (1) to 1 200 rpm slowly.
- 2) Check that the "Desired idle speed" (2) is nearly equal to the "Spec" (1). At the same time, check that the number of steps (4) in the ISC valve position decreases.
- 3) Click the button (5) and increase the "Spec" (1) slowly.
- 4) Check that the "Desired idle speed" (2) is nearly equal to the "Spec" (1). Also, check that the number of steps (4) in the ISC valve position increases.



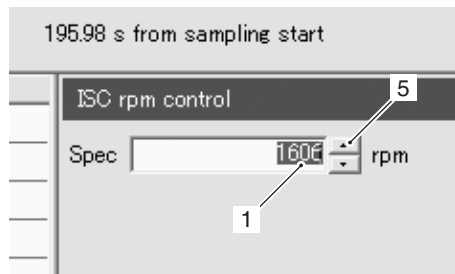
<input type="checkbox"/> Vehicle speed	0.0	km/h
<input type="checkbox"/> Engine speed	1249	rpm
<input type="checkbox"/> Desired idle speed	2 → 1205	rpm
<input type="checkbox"/> ISC valve position	4 → 170	step
<input type="checkbox"/> Engine coolant / oil temperature	86.0	°C
<input type="checkbox"/> Throttle position	0.3	°

I705H1110096-03



**Check 3**

- 1) Click the button (5) and increase the “Spec” (1) to 1 600 rpm slowly.
- 2) Check that the “Desired idle speed” (2) is nearly equal to the “Spec” (1). Also, check that the number of steps (4) in the ISC valve position increases.



I705H1110097-03

<input type="checkbox"/> Engine speed	1596	rpm
<input type="checkbox"/> Desired idle speed	2 → 1606	rpm
<input type="checkbox"/> ISC valve position	4 → 223	step
<input type="checkbox"/> Engine coolant / oil temperature	100.0	°C
<input type="checkbox"/> Throttle position	0.7	°

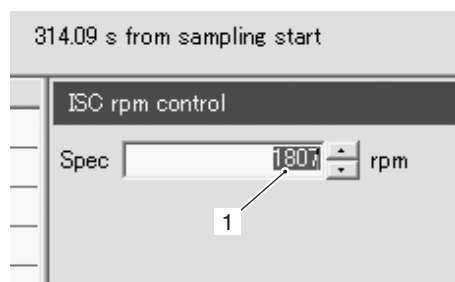
I705H1110098-03

**Check 4**

- 1) Increase the “Spec” (1) to 1 795 rpm.
- 2) Check that the “Desired idle speed” (2) is approx. 1 795 rpm.
- 3) Check that the “Engine speed” (6) is close to 1 795 rpm.

**NOTE**

**Be careful not to increase the “Spec” to 1 800 rpm, or the “Engine speed” may reach the upper limit.**



I705H1110099-02

<input type="checkbox"/> Engine speed	6 → 1837	rpm
<input type="checkbox"/> Desired idle speed	2 → 1795	rpm
<input type="checkbox"/> ISC valve position	232	step
<input type="checkbox"/> Engine coolant / oil temperature	98.0	°C
<input type="checkbox"/> Throttle position	0.7	°

I705H1110100-03

If the ISC valve does not function properly, replace the ISC valve or inspect the ISC valve. (Refer to “Throttle Body Disassembly and Assembly in Section 1D (Page1D-13)”).

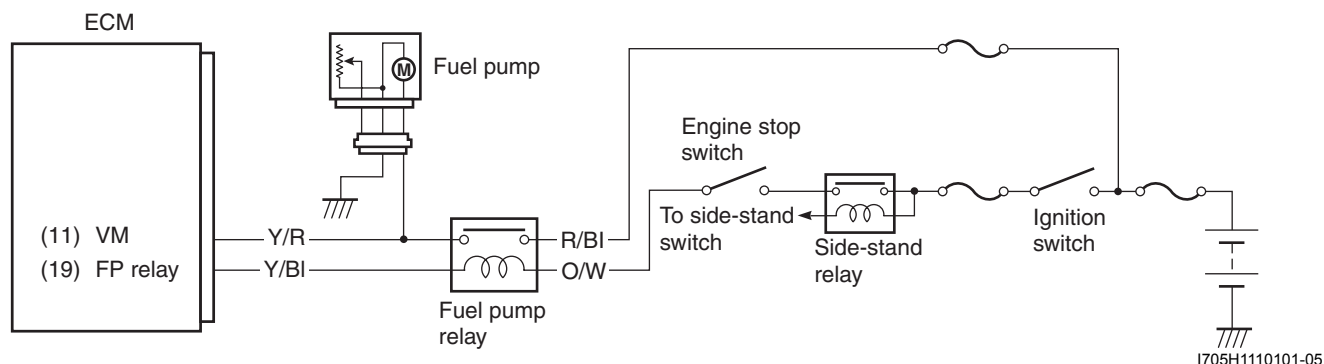
DTC “C41” (P0230-H/L): FP Relay Circuit Malfunction

B705H11104027

Detected Condition and Possible Cause

Detected Condition	Possible Cause
<p>No voltage is applied to fuel pump although fuel pump relay is turned ON, or voltage is applied to fuel pump, although fuel pump relay is turned OFF.</p> <p><b>NOTE</b></p> <ul style="list-style-type: none"> <li>• If SDS is used, P0230-H is indicated when Voltage is applied to fuel pump although fuel pump relay is turned OFF.</li> <li>• If SDS is used, P0230-L is indicated when No voltage is applied to fuel pump although fuel pump relay is turned ON.</li> </ul>	<ul style="list-style-type: none"> <li>• Fuel pump relay circuit open or short</li> <li>• Fuel pump relay malfunction</li> <li>• ECM malfunction</li> </ul> <p><b>NOTE</b></p> <ul style="list-style-type: none"> <li>• When P0230-H is displayed, it is possible that fuel pump relay switch circuit is shorted to power source or fuel pump (switch side) is faulty.</li> <li>• When P0230-L is displayed, it is possible that fuel pump relay coil circuit is open or short, or fuel pump relay (coil side) is faulty.</li> </ul>

Wiring Diagram



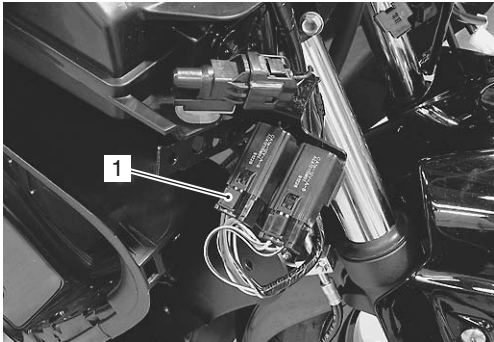
Troubleshooting

**⚠ CAUTION**

When using the multi-circuit tester, do not strongly touch the terminal of the ECM coupler with a needle pointed 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 (Page1A-15)”.

Step	Action	Yes	No
1	<p>1) Turn the ignition switch OFF.</p> <p>2) Remove the front leg shield. (Refer to “Front Leg Shield Removal and Installation in Section 9D (Page9D-14)”.)</p> <p>3) Check the FP relay coupler (1) for loose or poor contacts. If OK, then check the FP relay. (Refer to “Fuel Pump Relay Inspection in Section 1G (Page1G-13)”.)</p>  <p style="text-align: right; font-size: small;">I705H1110102-03</p> <p><i>Is the FP relay OK?</i></p>	<ul style="list-style-type: none"> <li>• B or O/W wire open or short or poor (19) connection. Refer to “Terminal Alignment of ECM Coupler (Harness Side) (Page1A-5)”.</li> <li>• Y/R or R/BI wire open, shorted or poor (11) connection Refer to “Terminal Alignment of ECM Coupler (Harness Side) (Page1A-5)”.</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>	<p>Replace the FP relay with a new one.</p>

**DTC “42” (P1650): IG Switch Circuit Malfunction**

B705H11104028

**Detected Condition and Possible Cause**

<b>Detected Condition</b>	<b>Possible Cause</b>
Ignition switch signal is not input in the ECM.  <b>NOTE</b> If SDS is used, P1650 is indicated.	<ul style="list-style-type: none"> <li>• Ignition system circuit open or short.</li> <li>• ECM malfunction.</li> </ul>
When the ID agreement is not verified. ECM does not receive communication signal from the immobilizer antenna. (For E-02, 19, 24, 54)  <b>NOTE</b> If SDS is used, P1650 is indicated.	<ul style="list-style-type: none"> <li>• Immobilizer system malfunction                      (For E-02, 19, 24, 54)</li> </ul>

**Troubleshooting**

Refer to “Ignition Switch Inspection in Section 9B (Page9B-11)” for details.

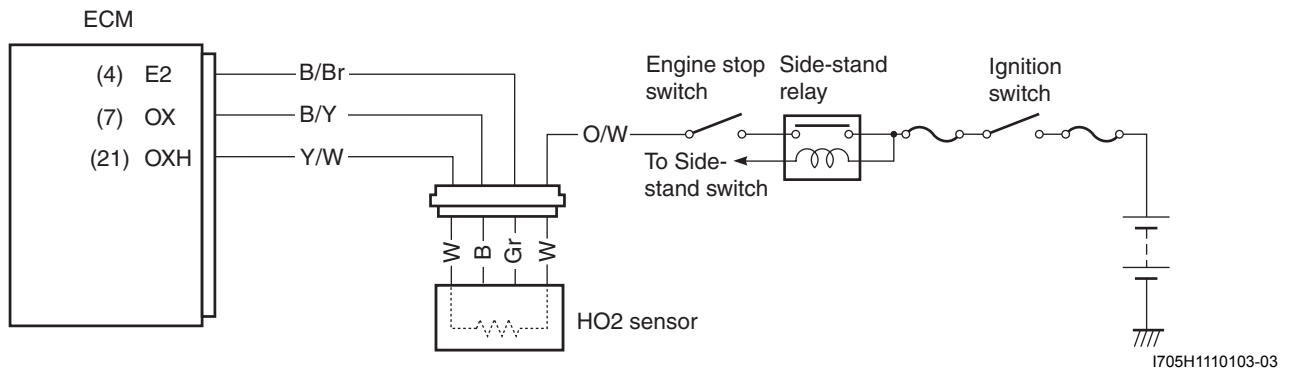
**DTC “C44” (P0130, P0135): HO2 Sensor (HO2S) Circuit Malfunction**

B705H11104029

**Detected Condition and Possible Cause**

Detected Condition	Possible Cause
HO2 sensor output voltage is not input to ECM during engine operation and running condition.  <b>NOTE</b> If SDS is used, P0130 is indicated.	<ul style="list-style-type: none"> <li>• HO2 sensor circuit open or shorted to ground.</li> <li>• Fuel system malfunction.</li> <li>• ECM malfunction.</li> </ul> <b>NOTE</b> When P0135-H is displayed, it is possible that no battery voltage is supplied to the HO2 sensor.
The heater can not operate so that heater operation voltage is not supplied to the oxygen heater circuit.  <b>NOTE</b> If SDS is used, P0135 is indicated.	

**Wiring Diagram**



I705H1110103-03

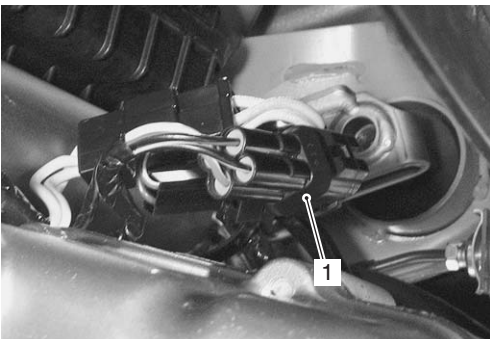


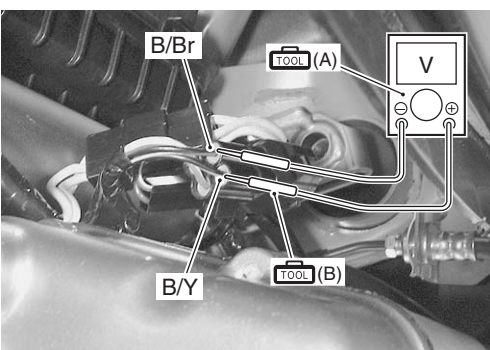
**Troubleshooting**

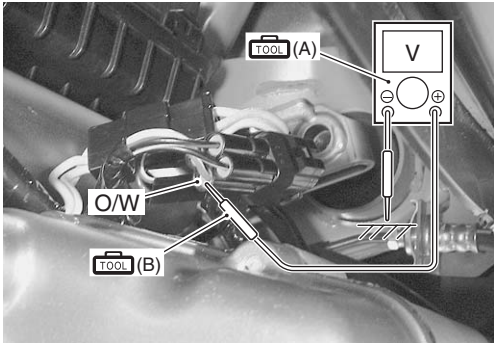
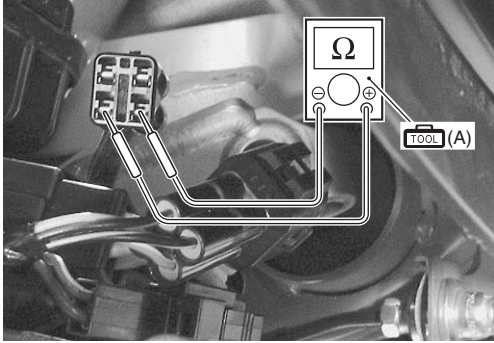
**⚠ CAUTION**

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

**NOTE**

- Battery voltage can be detected only during a few seconds after ignition switch is turned ON.
- Temperature of the sensor affects resistance value largely.
- Make sure that the sensor heater is at correct temperature.
- After repairing the trouble, clear the DTC using SDS tool. Refer to “Use of SDS Diagnosis Reset Procedures (Page1A-15)”.

Step	Action	Yes	No
1	<p>1) Turn the ignition switch OFF.</p> <p>2) Check the HO2 sensor coupler (1) for loose or poor contacts. If OK, then measure the HO2 sensor output voltage.</p>  <p style="text-align: right; font-size: small;">I705H1110104-04</p> <p>3) Insert the needle pointed probe to the HO2 sensor lead wire coupler.</p> <p>4) Warm up the engine enough.</p> <p>5) Measure the HO2 sensor output voltage between B/Y wire and B/Br wire, when idling condition.</p> <p>6) Measure the HO2 sensor output voltage while holding the engine speed at 3 000 r/min.</p> <p><b><u>HO2 sensor output voltage at idle speed</u></b>  <b>0.3 V and less</b>  <b>(Positive terminal: B/Y – Negative terminal: B/Br)</b></p> <p><b><u>HO2 sensor output voltage at 3 000 r/min</u></b>  <b>0.7 V and more</b>  <b>(Positive terminal: B/Y – Negative terminal: B/Br)</b></p> <p><b>Special tool</b>   (A): 09900–25008 (Multi-circuit tester set)   (B): 09900–25009 (Needle pointed probe set)</p> <p><b><u>Tester knob indication</u></b>  <b>Voltage ( --- )</b></p>  <p style="text-align: right; font-size: small;">I705H1110107-04</p> <p><i>Is the voltage OK?</i></p>	Go to Step 2.	Replace the HO2 sensor with a new one.

Step	Action	Yes	No
2	<p>1) Turn the ignition switch OFF.</p> <p>2) Insert the needle pointed to the HO2 sensor coupler.</p> <p>3) Turn the ignition switch ON and measure the heater voltage between O/W wire (ECM side) and ground. If the tester voltage indicates the battery voltage for few seconds, it is good condition.</p> <p><b>Heater voltage</b>  <b>Battery voltage (Positive terminal: O/W – Negative terminal: Ground)</b></p> <p><b>Special tool</b>  <b>TOOL (A): 09900–25008 (Multi-circuit tester set)</b>  <b>TOOL (B): 09900–25009 (Needle pointed probe set)</b></p> <p><b>Tester knob indication</b>  <b>Voltage ( --- )</b></p>  <p>I705H1110109-03</p> <p><i>Is the voltage OK?</i></p>	<p>Go to step 3.</p>	<p>Replace the HO2 sensor with a new one.</p>
3	<p>1) Turn the ignition switch OFF.</p> <p>2) Disconnect the HO2 sensor coupler.</p> <p>3) Measure the resistance between the terminals (W – W) of the HO2 sensor.</p> <p><b>HO2 sensor resistance</b>  <b>11.5 – 14.5 Ω at 23 °C (73 °F) (W – W)</b></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 (Ω)</b></p>  <p>I705H1110125-03</p> <p><i>Is the voltage OK?</i></p>	<ul style="list-style-type: none"> <li>• Gr or W wire open or shorted to ground, or poor (7), (4), (21) or (1).</li> <li>• If wire and connection terminal and wire harness for open circuit and poor connection.</li> <li>• Recheck each terminal and wire harness for open circuit and poor connection.</li> <li>• If the wires are OK, replace the ECM with a new one, and inspect again</li> </ul>	<p>Replace the HO2 sensor with a new one.</p>

## Specifications

### Service Data

B705H11107001

#### Injector

Item	Specification	Note
Injector resistance	Approx. 10.3 $\Omega$ at 20 °C (68 F°)	—

#### FI Sensors


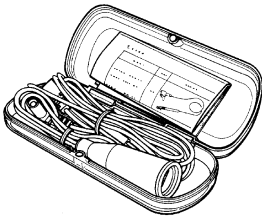
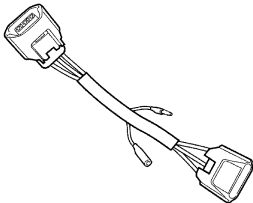
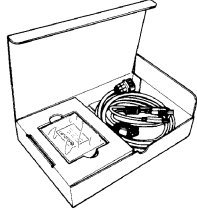
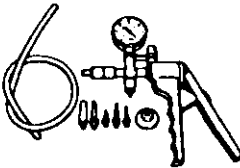

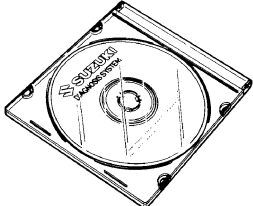
Item	Specification	Note
CKP sensor resistance	190 – 290 $\Omega$	
CKP sensor peak voltage	4.5 V and more (When cranking)	(+) probe: G/W, (-) probe: Bl
IAP sensor input voltage	4.5 – 5.5 V	
IAP sensor output voltage	Approx. 1.5 – 3.5 V at idle speed	
TP sensor input voltage	4.5 – 5.5 V	
TP sensor output voltage	Closed	Approx. 0.6 V
	Opened	Approx. 3.8 V
ECT sensor input voltage	4.5 – 5.5 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 resistance	Approx. 2.58 k $\Omega$ at 20 °C (68 °F)	
TO sensor resistance	16.5 – 22.3 k $\Omega$	
TO sensor output voltage	Normal	0.4 – 1.4 V
	Leaning	3.7 – 4.4 V
Injector voltage	Battery voltage	
Ignition coil primary peak voltage	150 V and more (When cranking)	(+) probe: W, (-) probe: Ground
HO2 sensor resistance	11.5 – 14.5 $\Omega$ at 23 °C (73.4 °F)	
HO2 sensor output voltage	Idle speed	0.3 V and less
	3 000 r/min	0.7 V and more
STP sensor input voltage	4.5 – 5.5 V	
STP sensor output voltage	Closed	Approx. 0.5 V
	Opened	Approx. 3.9 V
STP actuator resistance	Approx. 6.5 $\Omega$	



## Special Tools and Equipment

### Special Tool

B705H11108001

<p>09900-25008 Multi-circuit tester set  <a href="#">(Page1A-23)</a> / <a href="#">(Page1A-23)</a> / <a href="#">(Page1A-24)</a> / <a href="#">(Page1A-27)</a> / <a href="#">(Page1A-28)</a> / <a href="#">(Page1A-29)</a> / <a href="#">(Page1A-31)</a> / <a href="#">(Page1A-32)</a> / <a href="#">(Page1A-35)</a> / <a href="#">(Page1A-35)</a> / <a href="#">(Page1A-37)</a> / <a href="#">(Page1A-38)</a> / <a href="#">(Page1A-40)</a> / <a href="#">(Page1A-41)</a> / <a href="#">(Page1A-43)</a> / <a href="#">(Page1A-44)</a> / <a href="#">(Page1A-44)</a> / <a href="#">(Page1A-47)</a> / <a href="#">(Page1A-47)</a> / <a href="#">(Page1A-50)</a> / <a href="#">(Page1A-53)</a> / <a href="#">(Page1A-54)</a> / <a href="#">(Page1A-54)</a> / <a href="#">(Page1A-57)</a> / <a href="#">(Page1A-58)</a> / <a href="#">(Page1A-65)</a> / <a href="#">(Page1A-66)</a> / <a href="#">(Page1A-66)</a></p>		<p>09900-25009 Needle pointed probe set  <a href="#">(Page1A-28)</a> / <a href="#">(Page1A-37)</a> / <a href="#">(Page1A-38)</a> / <a href="#">(Page1A-57)</a> / <a href="#">(Page1A-65)</a> / <a href="#">(Page1A-66)</a></p>	
<p>09900-28630 TPS test wire harness  <a href="#">(Page1A-51)</a></p>		<p>09904-41010 SDS set  <a href="#">(Page1A-14)</a> / <a href="#">(Page1A-17)</a></p>	
<p>09917-47010 Vacuum pump gauge  <a href="#">(Page1A-29)</a></p>		<p>09930-82720 Mode select switch  <a href="#">(Page1A-3)</a> / <a href="#">(Page1A-13)</a> / <a href="#">(Page1A-13)</a></p>	
<p>99565-01010-008 CD-ROM Ver.8  <a href="#">(Page1A-14)</a> / <a href="#">(Page1A-17)</a></p>			

# Emission Control Devices

## Precautions

### Precautions for Emission Control Devices

B705H1120001

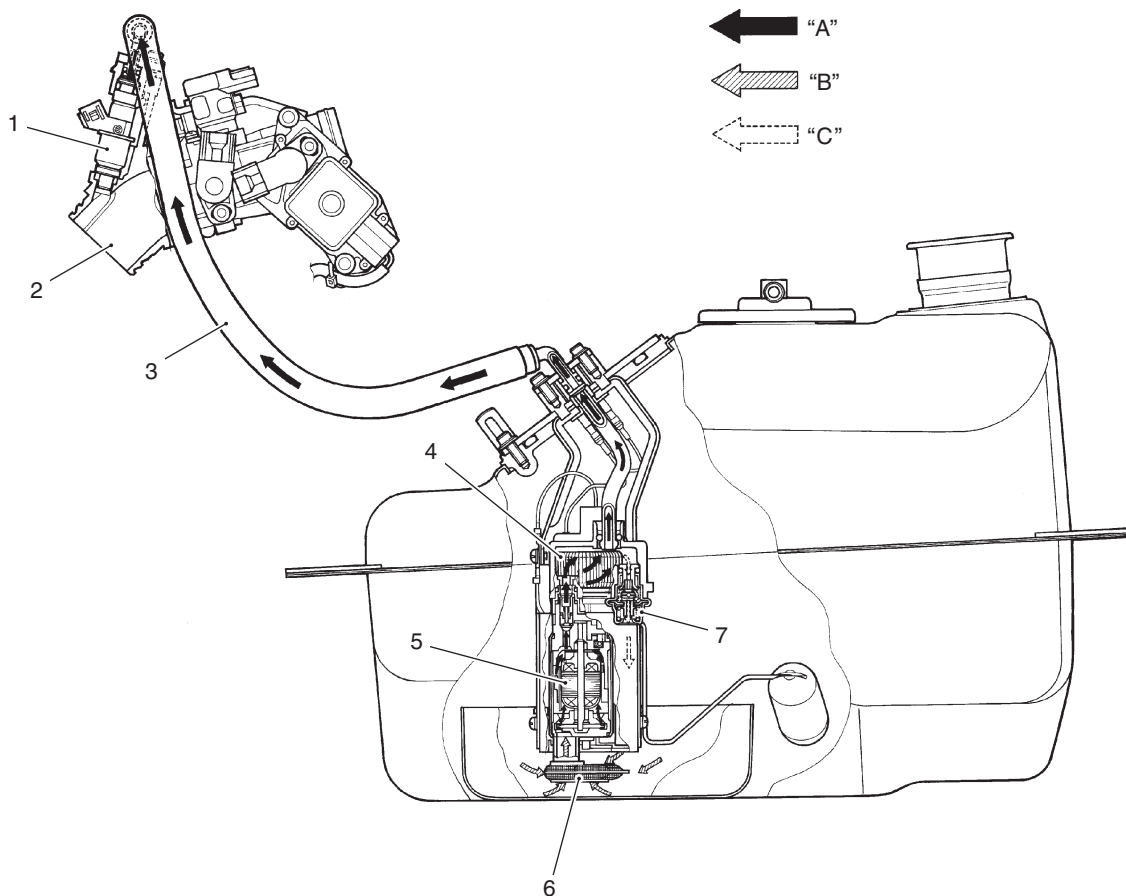
Refer to "General Precautions in Section 00 (Page00-1)".

## General Description

### Fuel Injection System Description

B705H11201005

AN400 motorcycles are equipped with a fuel injection system for emission level control. This fuel injection system is precision designed, manufactured and adjusted to comply with the applicable emission limits. With a view to reducing CO, NOx and HC, all of the fuel injection volumes are stringently controlled with the programmed injection maps in the ECM by varying engine conditions. Adjusting, interfering with, improper replacement, or resetting of any of the fuel injection components may adversely affect injection performance and cause the motorcycle to exceed the exhaust emission level limits. If unable to effect repairs, contact the distributor's representative for further technical information and assistance.



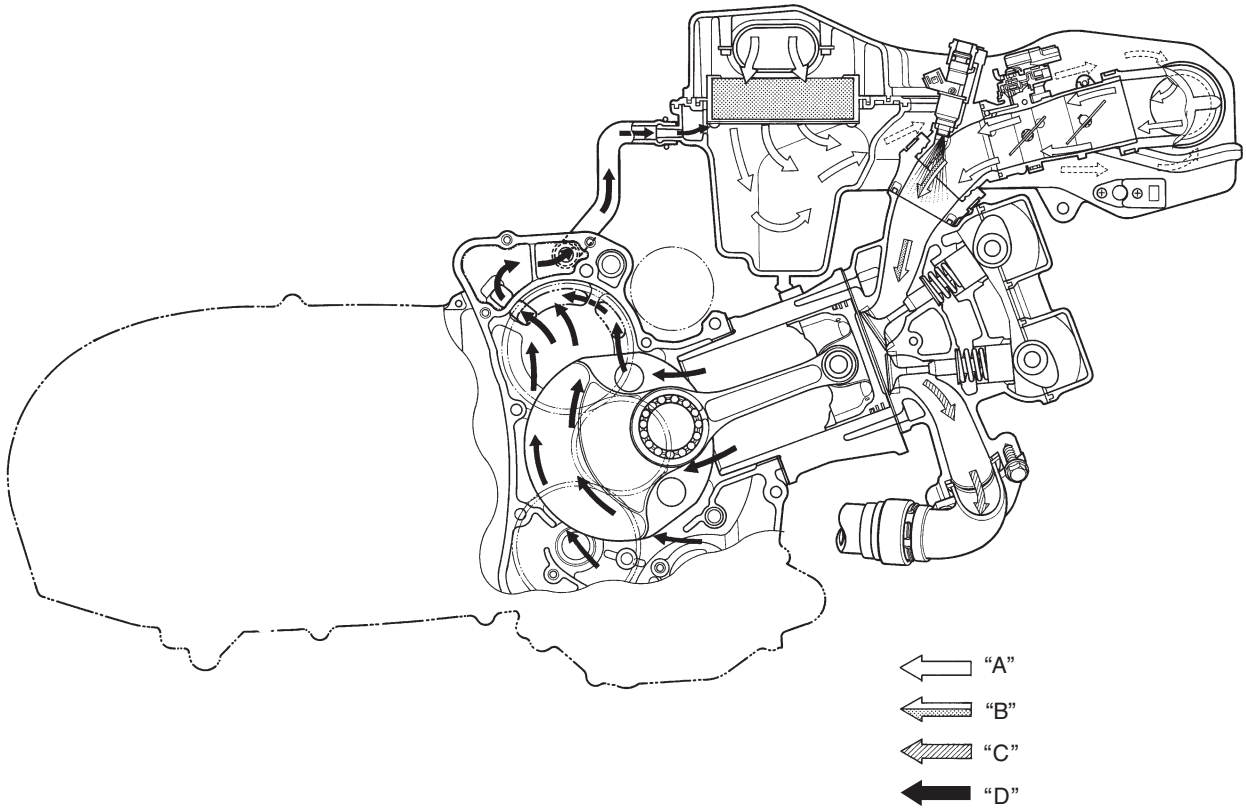
I705H1120004-01

1. Fuel injector	5. Fuel pump	"B": Before-pressurized fuel
2. Throttle body	6. Fuel mesh filter (For low pressure)	"C": Relived fuel
3. Fuel feed hose	7. Fuel pressure regulator	
4. Fuel filter (For high pressure)	"A": Pressurized fuel	

### Crankcase Emission Control System Description

B705H11201006

The engine is equipped with a PCV system. Blow-by gas in the engine is constantly drawn into the crankcase, which is returned to the combustion chamber through the PCV (breather) hose, air cleaner and throttle body.



- ← "A"
- ← "B"
- ← "C"
- ← "D"

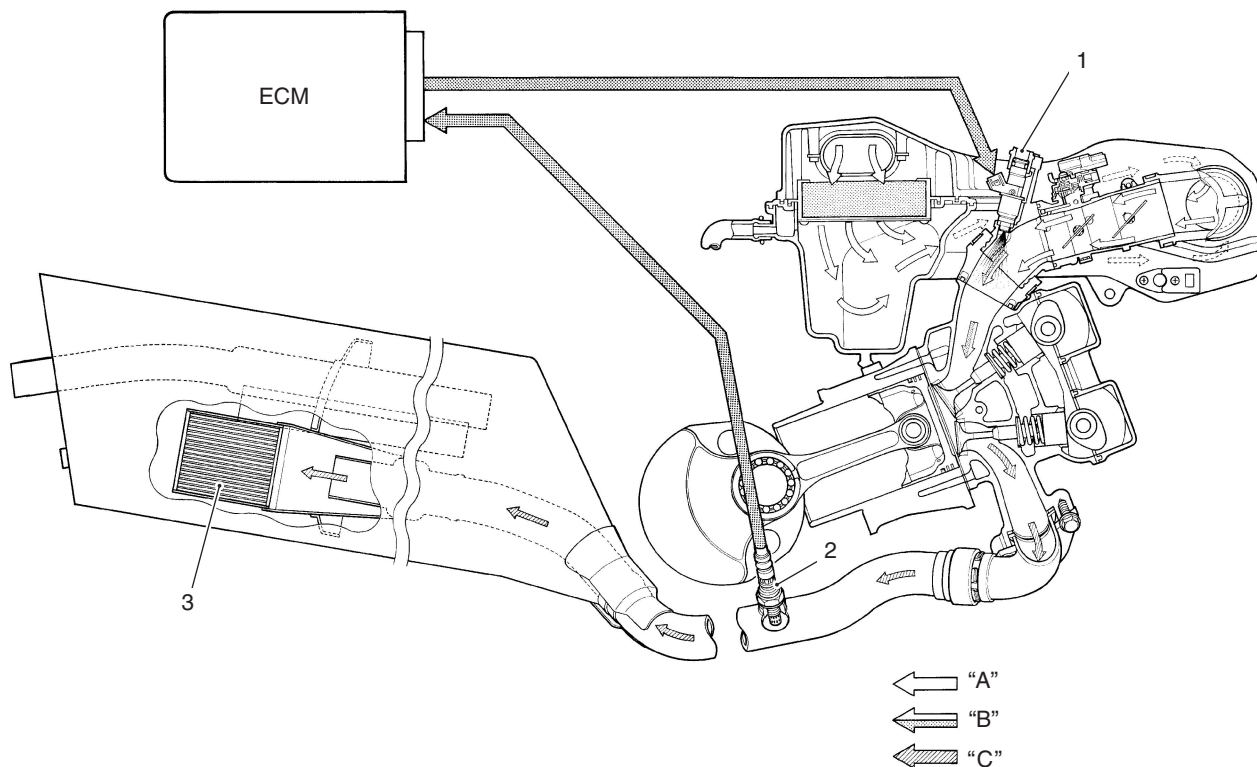
I705H1120005-01

"A": Fresh air	"B": Fuel/Air mixture	"C": Exhaust gas	"D": Blow-by gas
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**Exhaust Emission Control System Description**

B705H11201007

The exhaust emission control system is composed of the three-way catalyst system.



I705H1120006-02

1. Fuel injector	3. Three-way catalyst	"B": Fuel/Air mixture
2. HO2 sensor	"A": Fresh air	"C": Exhaust gas

**Noise Emission Control System Description**

B705H11201001

TAMPERING WITH THE NOISE CONTROL SYSTEM PROHIBITED: Local law or federal law prohibits the following acts or the causing thereof:

- The removal or rendering inoperative by any person, other than for purposes of maintenance, repair or replacement, of any device or element of design incorporated into any new vehicle for the purpose of noise control prior to its sale or delivery to the ultimate purchaser or while it is in use.
- The use of the vehicle after such device or element of design has been removed or rendered inoperative by any person.

**Among Those Acts Presumed to Constitute Tampering Are the Acts Listed Below:**

- Removing or puncturing the muffler, baffles, header pipes, screen type spark arrester (if equipped) or any other component which conducts exhaust gases.
- Removing or puncturing the air cleaner case, air cleaner cover, baffles or any other component which conducts intake air.
- Replacing the exhaust system or muffler with a system or muffler not marked with the same model specific code as the code listed on the Motorcycle Noise Emission Control Information label.

## Repair Instructions

### Heated Oxygen Sensor (HO2S) Removal and Installation

B705H11206004

#### Removal

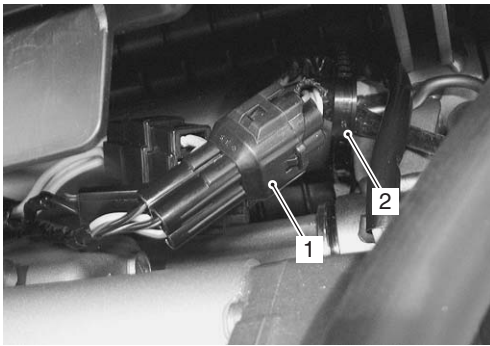
#### **⚠ WARNING**

**Do not remove the HO2 sensor while it is hot.**

#### **⚠ CAUTION**

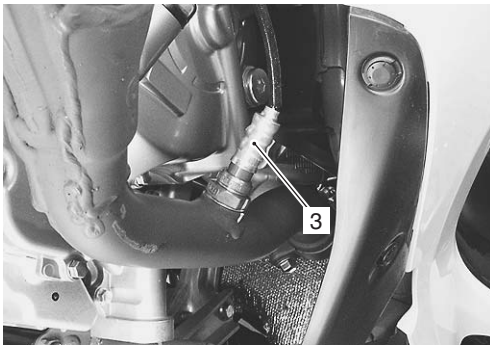
- Be careful not to expose the HO2 sensor to excessive shock.
- Do not use an impact wrench when removing or installing the HO2 sensor.
- Be careful not to twist or damage the sensor lead wires.

- 1) Disconnect the HO2 sensor coupler (1) and remove the clamp (2).



I705H1120007-01

- 2) Remove the HO2 sensor (3).



I705H1120001-02

#### Installation

#### **⚠ CAUTION**

**Do not apply oil or other materials to the sensor air holes.**

Install the HO2 sensor in the reverse order of removal. Pay attention to the following point:

- Tighten the HO2 sensor to the specified torque.

#### Tightening torque

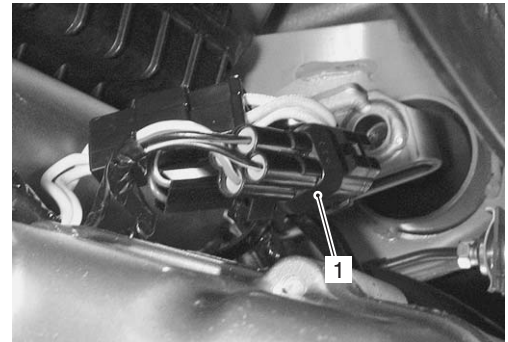
**HO2 sensor: 48 N·m (4.8 kgf-m, 34.5 lb-ft)**

#### Heated Oxygen Sensor (HO2S) Inspection

B705H11206002

Inspect the HO2 sensor in the following procedures:

- 1) Inspect the HO2 sensor and its circuit referring to flow table of the malfunction code (C44). Refer to "DTC "C44" (P0130, P0135): HO2 Sensor (HO2S) Circuit Malfunction in Section 1A (Page1A-64)".
- 2) Disconnect the HO2 sensor coupler (1).



I705H1110104-04

#### NOTE

- Temperature of the sensor affects resistance value largely.
- Make sure that the sensor heater is at correct temperature.


## 1B-5 Emission Control Devices:

- 3) Check the resistance between the terminals (W – W) of the HO2 sensor. If the resistance is not within the standard range, replace the HO2 sensor with a new one.

### Resistance

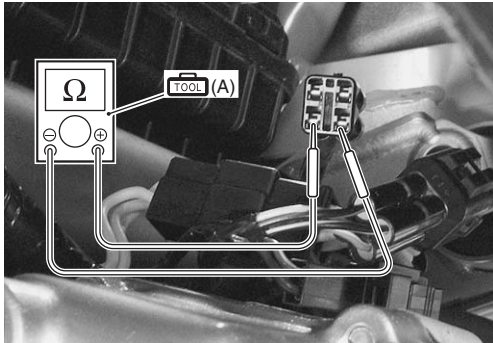
Approx. 11.5 – 14.5  $\Omega$  (at 23 °C)

### Special tool

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

### Tester knob indication

Resistance ( $\Omega$ )



I705H1120008-01

- 4) Connect the HO2 sensor coupler securely.

### ⚠ CAUTION

**Do not apply oil or other materials to the sensor air hole.**

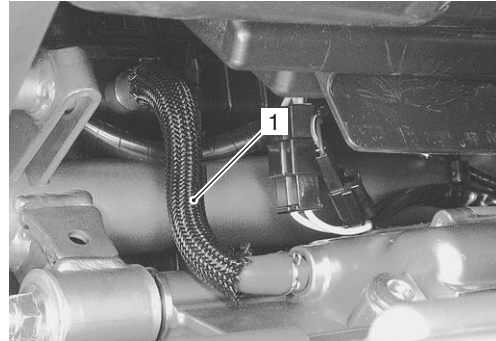
## PCV Hose Inspection

B705H11206003

Inspect the PCV hose (1) for wear and damage.

If it is worn or damaged, replace the PCV hose with a new one.

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



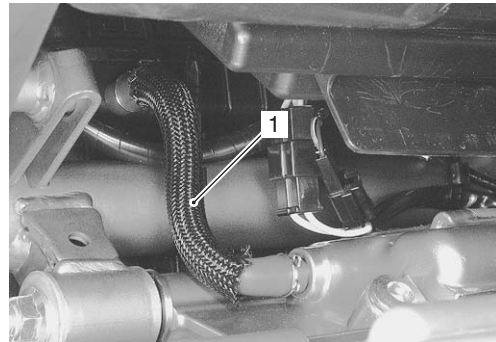
I705H1120002-01

## PCV Hose Removal and Installation

B705H11206005

### **Removal**

- 1) Remove the PCV hose (1).



I705H1120002-01

### **Installation**

Install the PCV hose in the reverse order of removal.

## Specifications

### Service Data

B705H11207002

#### FI Sensors

Item	Specification		Note
HO2 sensor resistance	11.5 – 14.5 $\Omega$ at 23 °C (73.4 °F)		
HO2 sensor output voltage	Idle speed	0.3 V and less	
	3 000 r/min	0.7 V and more	

#### Electrical

Unit: mm (in)

Item	Standard / Specification		Note
Spark plug	Type	NGK: CR7E DENSO: U22ESR-N	
	Gap	0.7 – 0.8 (0.28 – 0.03)	

### Tightening Torque Specifications

B705H11207003

Fastening part	Tightening torque			Note
	N·m	kgf·m	lb·ft	
HO2 sensor	48	4.8	34.5	☞ (Page1B-4)


#### Reference:

For the tightening torque of fastener not specified in this section, refer to “Tightening Torque Specifications in Section 0C (Page0C-7)”.

## Special Tools and Equipment

### Special Tool

B705H11208001

09900–25008 Multi-circuit tester set ☞ (Page1B-5)	
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# Engine Electrical Devices

## Precautions

### Precautions for Engine Electrical Device

B705H11300001

Refer to “General Precautions in Section 00 (Page00-1)” and “Precautions for Electrical Circuit Service in Section 00 (Page00-2)”.

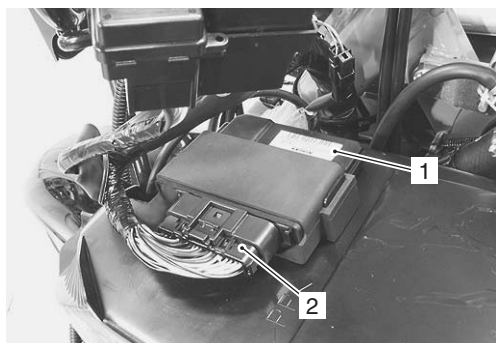
## Repair Instructions

### ECM Removal and Installation

B705H11306023

#### Removal

- 1) Remove the battery (–) lead wire. Refer to “Battery Removal and Installation in Section 1J (Page1J-10)”.
- 2) Remove the meter panel. Refer to “Meter Panel Removal and Installation in Section 9D (Page9D-14)”.
- 3) Pull out the ECM (1) from the front box and disconnect the ECM coupler (2).



I705H1130001-02

#### Installation

Install the ECM in the reverse order of removal.

### CKP Sensor Inspection

B705H11306003

Refer to “DTC “C12” (P0335): CKP Sensor Circuit Malfunction in Section 1A (Page1A-22)”.

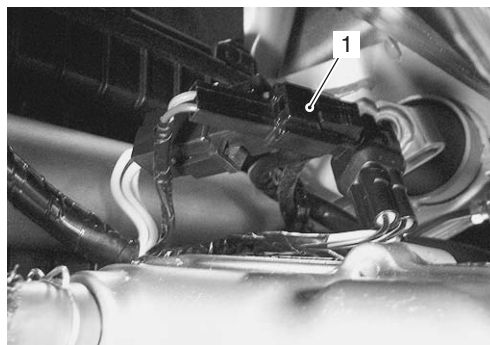
### CKP Sensor Removal and Installation

B705H11306004

#### Removal

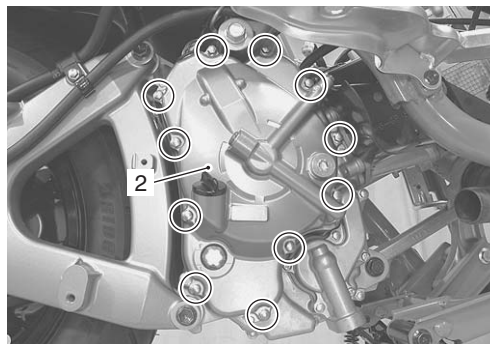
- 1) Drain engine oil. Refer to “Engine Oil and Filter Change in Section 0B (Page0B-9)”.
- 2) Remove the muffler. Refer to “Exhaust Pipe / Muffler Removal and Installation in Section 1K (Page1K-2)”.

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



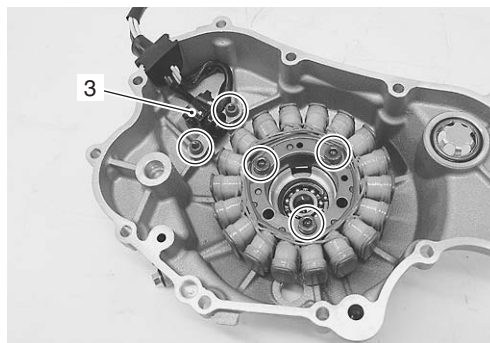
I705H1130021-02

- 4) Remove the generator cover (2).



I705H1130022-01

- 5) Remove the CKP sensor (3).



I705H1130002-02



**Installation**

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

- Install the CKP sensor to the generator cover. Refer to “Generator Removal and Installation in Section 1J (Page1J-6)”.
- Install the muffler. Refer to “Exhaust Pipe / Muffler Removal and Installation in Section 1K (Page1K-2)”.
- Pour engine oil. Refer to “Engine Oil and Filter Change in Section 0B (Page0B-9)”.

**IAP Sensor Inspection**

B705H11306005

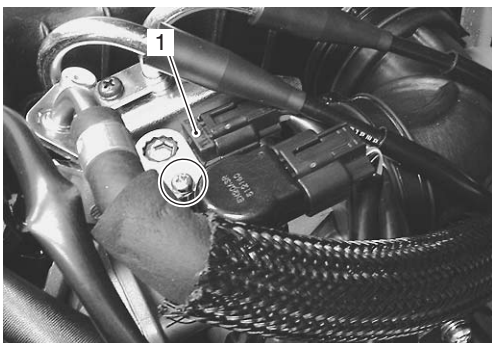
Refer to “DTC “C13” (P0105-H/L): IAP Sensor Circuit Malfunction in Section 1A (Page1A-25)”.

**IAP Sensor Removal and Installation**

B705H11306006

**Removal**

- 1) Remove the helmet box front cover. Refer to “Helmet Box Front Cover Removal and Installation in Section 9D (Page9D-16)”.
- 2) Disconnect the coupler and screw.
- 3) Remove the IAP sensor (1).



I705H1130006-03

**Installation**

Install the IAP sensor in the reverse order of removal.

**TP Sensor Inspection**

B705H11306007

Refer to “DTC “C14” (P0120/H/L): TP Sensor Circuit Malfunction in Section 1A (Page1A-30)”.

**TP Sensor Adjustment**

B705H11306008

Adjust the TP sensor in the following procedures:

- 1) Warm up the engine.
- 2) Remove the helmet box front cover. Refer to “Helmet Box Front Cover Removal and Installation in Section 9D (Page9D-16)”.

- 3) Remove the upper meter panel. Refer to “Upper Meter Panel Removal and Installation in Section 9D (Page9D-13)”.
- 4) Connect the special tool to the dealer mode coupler. Refer to “Self-Diagnostic Procedures in Section 1A (Page1A-13)”.

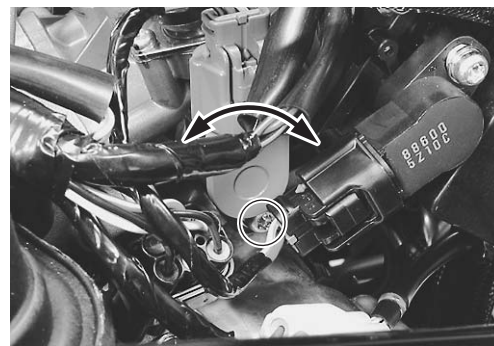
**Special tool**

 (A): 09930-82720 (Mode select switch)

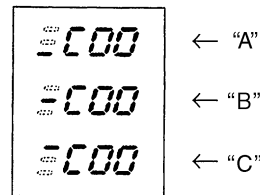


I705H1130023-03

- 5) Turn the special tool's switch ON.
- 6) If the TP sensor adjustment is necessary, loosen the TP sensor mounting screw.
- 7) Slide the TP sensor and bring the line to the middle.
- 8) Tighten the TP sensor mounting screw.



I705H1130007-01



I705H1130025-01

"A": Incorrect	"B": Correct position	"C": Incorrect
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- 9) Remove the special tool.
- 10) Install the removed parts.

**TP Sensor Removal and Installation**

B705H11306009

**Removal**

- 1) Remove the helmet box front cover. Refer to “Helmet Box Front Cover Removal and Installation in Section 9D (Page9D-16)”.
- 2) Disconnect the coupler and remove the TP sensor (1).



I705H1130003-03

**Installation**

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

- Adjust the position of the TP sensor. Refer to “TP Sensor Adjustment (Page1C-2)”.


**ECT Sensor Inspection**

B705H11306010

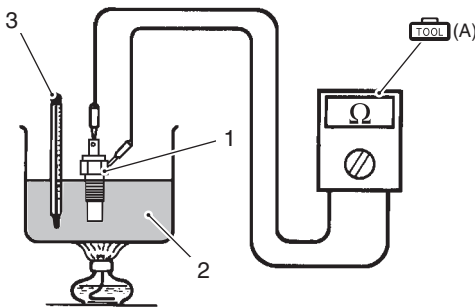
ECT sensor is installed on the cylinder head. Inspect the ECT sensor in the following procedures:

- 1) Remove the ECT sensor. Refer to “ECT Sensor Removal and Installation (Page1C-3)”.
- 2) Connect the ECT sensor (1) to a circuit tester and place it in the oil (2) contained in a pan, which is placed on a stove.

**Special tool**

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

- 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.



I705H1130004-01

**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

**CAUTION**

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

- 4) Install the ECT sensor. Refer to “ECT Sensor Removal and Installation (Page1C-3)”.

**ECT Sensor Removal and Installation**

B705H11306011

**Removal**

- 1) Remove the air cleaner box. Refer to “Air Cleaner Box Removal and Installation in Section 1D (Page1D-9)”.
- 2) Disconnect the coupler and remove the ECT sensor (1).



I705H1130005-01

**Installation**

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

- Tighten the ECT sensor to the specified torque.

**Tightening torque**

ECT sensor: 12 N·m (1.2 kgf-m, 8.5 lb-ft)

**Speed Sensor Inspection**

B705H11306012

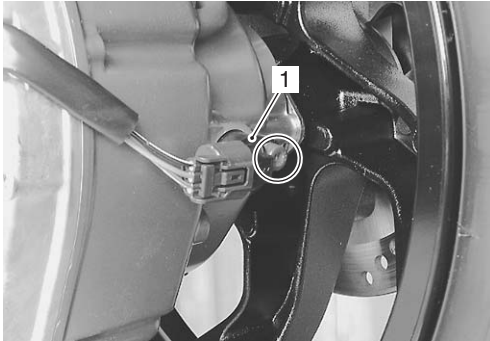
Inspect the speed sensor. Refer to “DTC “C16” (P0500): Speed Sensor in Section 1A (Page1A-36)”.

## Speed Sensor Removal and Installation

B705H11306013

### Removal

- 1) Remove the outer clutch cover. Refer to "V-belt Type Continuously Variable Automatic Transmission Removal and Installation in Section 5A (Page5A-3)".
- 2) Disconnect the coupler and remove the speed sensor (1).



I705H1130008-02

### Installation

Install the speed sensor in the reverse order of removal.

## IAT Sensor Inspection

B705H11306014

Inspect the IAT sensor in the following procedures:

- 1) Remove the IAT sensor. Refer to "IAT Sensor Removal and Installation (Page1C-4)".
- 2) Inspect the IAT sensor resistance. If the value dose not change in the proportion indicated, replace the IAT sensor with a new one.

### NOTE

**IAT sensor resistance measurement method is the same way as that of ECT sensor. Refer to "ECT Sensor Inspection (Page1C-3)".**

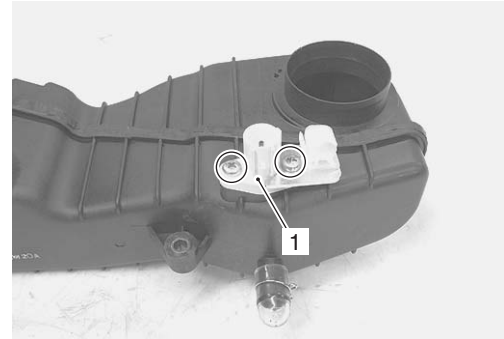
- 3) Install the IAT sensor. Refer to "IAT Sensor Removal and Installation (Page1C-4)".

## IAT Sensor Removal and Installation

B705H11306015

### Removal

- 1) Remove the air cleaner box. Refer to "Air Cleaner Box Removal and Installation in Section 1D (Page1D-9)".
- 2) Remove the IAT sensor (1).



I705H1130024-03

### Installation

Install the IAT sensor in the reverse order of removal.

Pay attention to the following point:

- Tighten the IAT sensor mounting screw to the specified torque.

### Tightening torque

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

## TO Sensor Inspection

B705H11306018

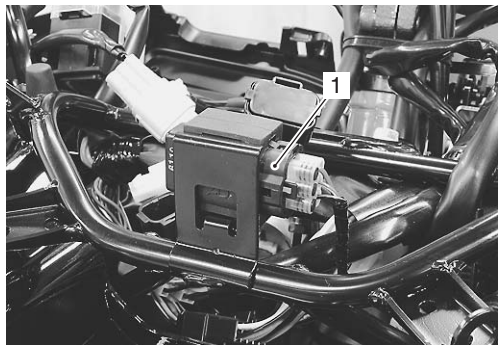
Inspect the TO sensor. Refer to "DTC "C23" (P1651-H/L): TO Sensor Circuit Malfunction in Section 1A (Page1A-42)".

## TO Sensor Removal and Installation

B705H11306019

### Removal

- 1) Remove the meter panel. Refer to "Meter Panel Removal and Installation in Section 9D (Page9D-14)".
- 2) Disconnect the coupler and remove the TO sensor (1).

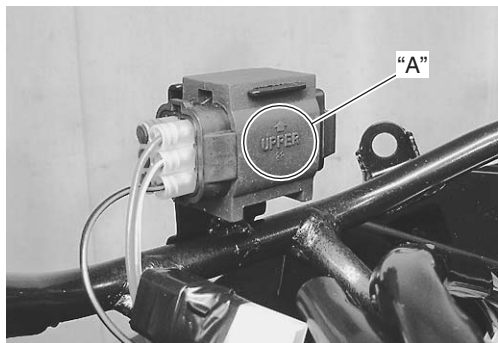


I705H113009-03

### Installation

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

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



I705H1130010-02

### STP Sensor Inspection

B705H11306024

Inspect the STP sensor. Refer to "DTC "C29" (P1654-H/L): Secondary Throttle Position Sensor (STPS) in Section 1A (Page1A-49)".

## STP Sensor Adjustment

B705H11306025

Adjust the STP sensor in the following procedures:

- 1) Remove the helmet box front cover. Refer to "Helmet Box Front Cover Removal and Installation in Section 9D (Page9D-16)".
- 2) Remove the air cleaner box outlet tube (1).



I705H1130011-01

- 3) Disconnect the STVA lead wire coupler (2).
- 4) Turn the ignition switch ON.
- 5) Insert the needle pointed probes to the STP sensor coupler.


### STP sensor output voltage


ST valve is fully closed: 0.5 V

ST valve is fully open: 3.9 V

(Positive terminal: Y/G – Negative terminal: B/Br)

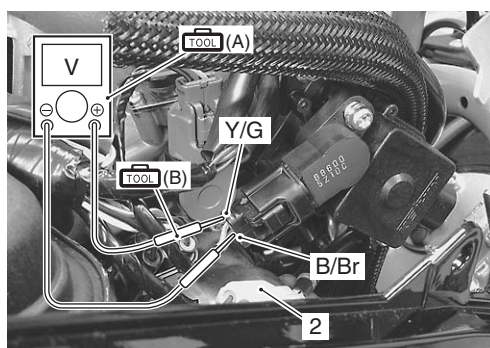
### Special tool

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

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

### Tester knob indication

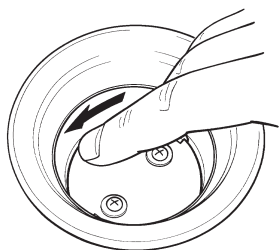
Voltage ( --- )



I705H1130012-01



- 6) Close the STV by finger, and measure the STP sensor output voltage. If the output voltage is out of the value, loosen the STP sensor mounting screw.

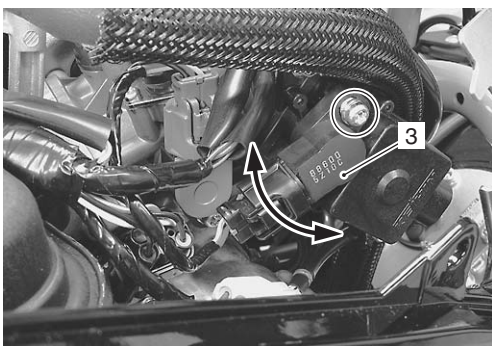


I705H1130013-01

- 7) Adjust the STP sensor (3) until the output voltage comes within the specified value and tighten the STP sensor mounting screw.

**Special tool**

 : 09930-11950 (Torx wrench)



I705H1130014-03

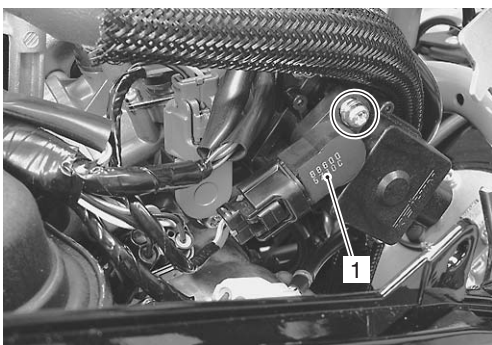
- 8) Install the removed parts.

**STP Sensor Removal and Installation**

B705H11306026

**Removal**

- 1) Remove the helmet box front cover. Refer to “Helmet Box Front Cover Removal and Installation in Section 9D (Page9D-16)”.
- 2) Disconnect the coupler and remove the STP sensor (1).



I705H1130016-01

**Installation**

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

- Adjust the position of STP sensor. Refer to “STP Sensor Adjustment (Page1C-5)”.

**ISC Valve Inspection**

B705H11306027

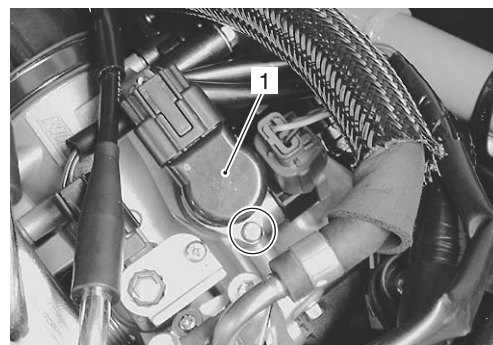
Inspect the ISC valve. Refer to “DTC “C40” (P0505, P0506 or P0507): ISC Valve Circuit Malfunction in Section 1A (Page1A-55)”.

**ISC Valve Removal and Installation**

B705H11306028

**Removal**

- 1) Remove the helmet box front cover. Refer to “Helmet Box Front Cover Removal and Installation in Section 9D (Page9D-16)”.
- 2) Disconnect the coupler and screw.
- 3) Remove the ISC valve (1).



I705H1130018-01

**Installation**

Install the ISC valve in the reverse order of removal.


**ISC valve pre-set**

When removing or replacing the ISC valve, set the ISC valve to the following procedures:

**Procedure**

- 1) Turn the ignition switch to OFF position.
- 2) Remove the upper meter panel. Refer to “Upper Meter Panel Removal and Installation in Section 9D (Page9D-13)”.
- 3) Connect the special tool to the dealer mode coupler and turn its switch to ON position. Refer to “Self-Diagnostic Procedures in Section 1A (Page1A-13)”.

**Special tool**

 : 09930-82720 (Mode select switch)

- 4) Open the throttle valve fully and turn the ignition switch to ON position.
- 5) Then, wait more than 10 seconds while holding the 4) condition.
- 6) Close the throttle valve and turn the ignition switch to OFF position.

**NOTE**

**The ISC valve is automatically set at PRE-SET position.**

- 7) Turn the special tool to OFF position and remove it from the dealer mode coupler.

## 1C-7 Engine Electrical Devices:

8) Install the upper meter panel. Refer to “Upper Meter Panel Removal and Installation in Section 9D (Page9D-13)”.

### HO2 Sensor Inspection

B705H11306020

Inspect the HO2 sensor. Refer to “DTC “C44” (P0130, P0135): HO2 Sensor (HO2S) Circuit Malfunction in Section 1A (Page1A-64)”.

### HO2 Sensor Removal and Installation

B705H11306021

Refer to “Heated Oxygen Sensor (HO2S) Removal and Installation in Section 1B (Page1B-4)”.

## Specifications

### Service Data

B705H11307002

#### FI Sensors

Item	Specification	Note
ECT sensor resistance	Approx. 2.58 kΩ at 20 °C (68 °F)	
IAT sensor resistance	Approx. 2.58 kΩ at 20 °C (68 °F)	

### Tightening Torque Specifications

B705H11307003

Fastening part	Tightening torque			Note
	N-m	kgf-m	lb-ft	
ECT sensor	12	1.2	8.5	☞ (Page1C-3)
IAT sensor mounting screw	3.5	0.35	2.5	☞ (Page1C-4)

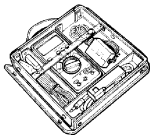
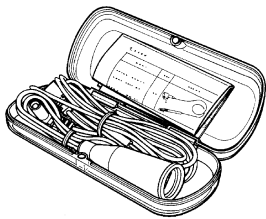
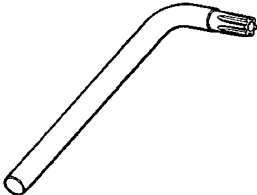

#### Reference:

For the tightening torque of fastener not specified in this section, refer to “Tightening Torque Specifications in Section 0C (Page0C-7)”.

## Special Tools and Equipment

### Special Tool

B705H11308001

09900–25008 Multi-circuit tester set ☞ (Page1C-3) / ☞ (Page1C-5) 	09900–25009 Needle pointed probe set ☞ (Page1C-5) 
09930–11950 Torx wrench ☞ (Page1C-6) 	09930–82720 Mode select switch ☞ (Page1C-2) / ☞ (Page1C-6) 

# Engine Mechanical

## Precautions

### Precautions for Engine Mechanical

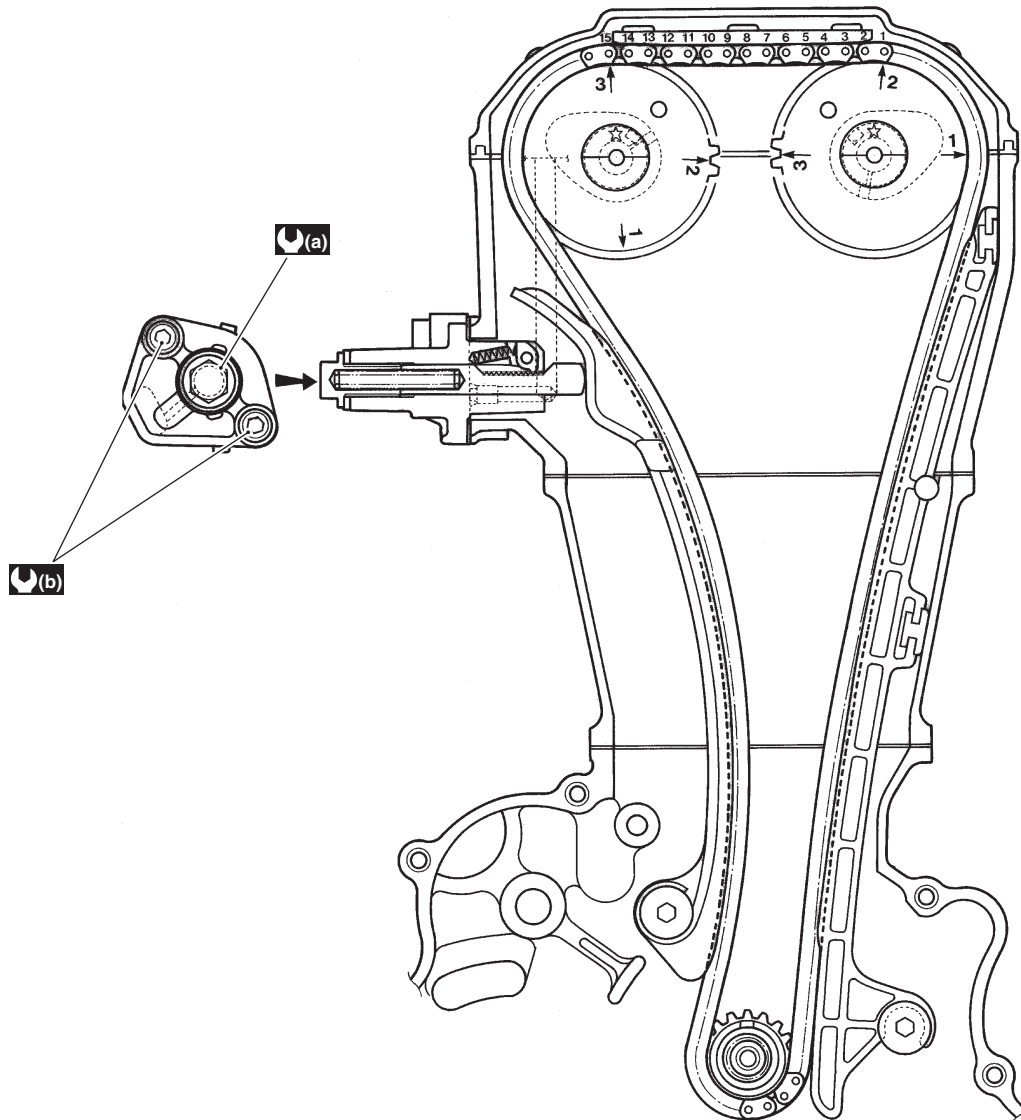
Refer to "General Precautions in Section 00 (Page00-1)".

B705H1140001

## Schematic and Routing Diagram

### Camshaft and Sprocket Assembly Diagram

B705H1140201

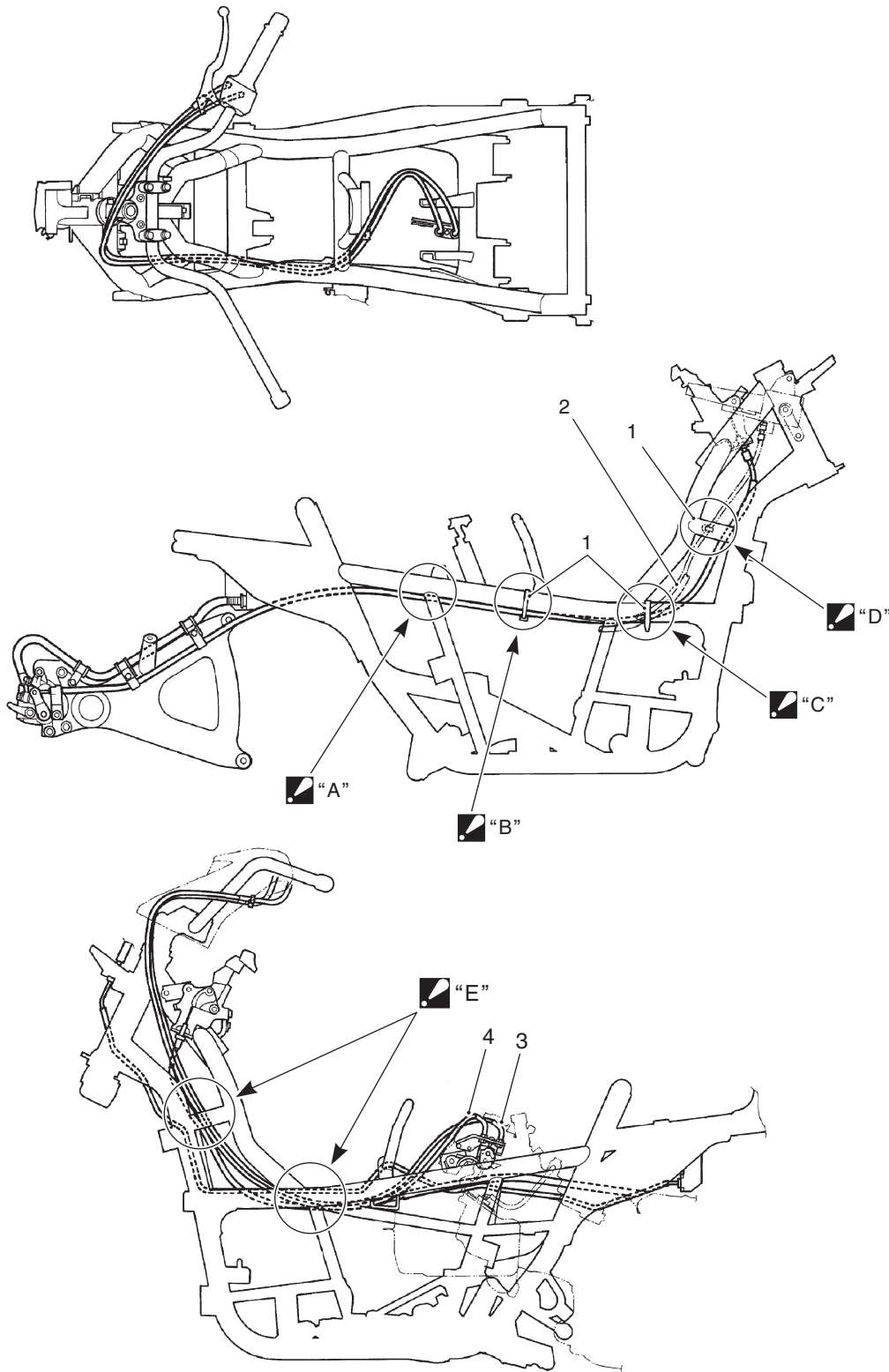


(a) : 23 N·m (2.3 kgf·m, 16.5 lb·ft)	(b) : 10 N·m (1.0 kgf·m, 7.0 lb·ft)
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I705H1140174-02

Throttle Cable Routing Diagram

B705H11402003



I705H1140175-02

1. Clamp	<ul style="list-style-type: none"> <li>▣ "B": Pass the throttle cables through under and inside of the frame. Bind the brake-lock cable, starter motor lead wire and seat-lock cable together.</li> </ul>
2. Wire harness	<ul style="list-style-type: none"> <li>▣ "C": Pass the throttle cables through inside of the frame. Bind the parking brake cable starter motor lead wire and seat-lock cable together.</li> </ul>
3. Throttle cable No. 1	<ul style="list-style-type: none"> <li>▣ "D": Pass the throttle cables through inside of the frame.</li> </ul>
4. Throttle cable No. 2	<ul style="list-style-type: none"> <li>▣ "E": Pass the throttle cables through inside of the frames.</li> </ul>
<ul style="list-style-type: none"> <li>▣ "A": Pass the throttle cables through inside of the frame.</li> </ul>	



## Diagnostic Information and Procedures

### Compression Pressure Check

B705H11404002

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 a compression test. Periodic maintenance records kept at your dealership should include compression readings for each maintenance service.


#### NOTE

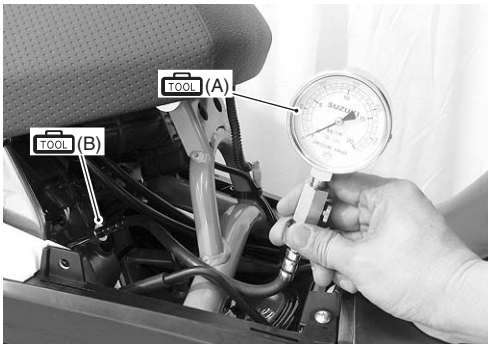
- Before checking the engine for compression pressure, make sure that the cylinder head bolts are tightened to the specified torque and the valves are properly adjusted.
- Make sure that the battery is in fully-charged condition.

- 1) Warm up the engine.
- 2) Remove the spark plug. Refer to "Spark Plug Removal and Installation in Section 0B (Page0B-3)".
- 3) 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 adapter)



I705H1140176-01

- 4) Keep the throttle grip in the fully-opened position.



I705H1140177-01

- 5) 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		Limit
E-02, 19, 24, 54	1 060 – 1 140 kPa (10.6 – 11.4 kgf/cm <sup>2</sup> , 150 – 162 psi)	660 kPa (6.6 kgf/cm <sup>2</sup> , 94 psi)
E-03, 28, 33	1 000 – 1 080 kPa (10.0 – 10.8 kgf/cm <sup>2</sup> , 142 – 154 psi)	620 kPa (6.2 kgf/cm <sup>2</sup> , 88 psi)

#### 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

- 6) After checking the compression pressure, reinstall the removed parts.

## Repair Instructions

### Engine Components Removable with the Engine in Place

B705H11406001

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
Starter motor	Refer to "Starter Motor Removal and Installation in Section 11 (Page11-3)".	Refer to "Starter Motor Inspection in Section 11 (Page11-5)".	Refer to "Starter Motor Removal and Installation in Section 11 (Page11-3)".
Air cleaner	Refer to "Air Cleaner Element Removal and Installation in Section 0B (Page0B-2)".	Refer to "Air Cleaner Element Inspection in Section 0B (Page0B-3)".	Refer to "Air Cleaner Element Removal and Installation in Section 0B (Page0B-2)".
Throttle body	Refer to "Throttle Body Removal and Installation (Page1D-13)".	Refer to "Throttle Body Inspection and Cleaning (Page1D-15)".	Refer to "Throttle Body Removal and Installation (Page1D-13)".
Cylinder head	Refer to "Engine Top Side Disassembly (Page1D-16)".	Refer to "Cylinder Head Related Parts Inspection (Page1D-29)".	Refer to "Engine Top Side Assembly (Page1D-18)".
Cam chain tension adjuster	Refer to "Engine Top Side Disassembly (Page1D-16)".	Refer to "Cam Chain Tension Adjuster Inspection (Page1D-24)".	Refer to "Engine Top Side Assembly (Page1D-18)".
Spark plug	Refer to "Spark Plug Removal and Installation in Section 0B (Page0B-3)".	Refer to "Spark Plug Inspection and Cleaning in Section 0B (Page0B-4)".	Refer to "Spark Plug Removal and Installation in Section 0B (Page0B-3)".
Cylinder head cover	Refer to "Valve Clearance Inspection and Adjustment in Section 0B (Page0B-4)".	—	Refer to "Engine Top Side Assembly (Page1D-18)".
Camshaft	Refer to "Engine Top Side Disassembly (Page1D-16)".	Refer to "Camshaft Inspection (Page1D-22)".	Refer to "Engine Top Side Assembly (Page1D-18)".
Valve	Refer to "Cylinder Head Disassembly and Reassembly (Page1D-25)".	Refer to "Cylinder Head Related Parts Inspection (Page1D-29)".	Refer to "Cylinder Head Disassembly and Reassembly (Page1D-25)".
Cylinder	Refer to "Engine Top Side Disassembly (Page1D-16)".	Refer to "Cylinder Inspection (Page1D-34)".	Refer to "Engine Top Side Assembly (Page1D-18)".
Piston	Refer to "Engine Top Side Disassembly (Page1D-16)".	Refer to "Piston and Related Parts Inspection (Page1D-35)".	Refer to "Engine Top Side Assembly (Page1D-18)".

#### Engine Left Side

Item	Removal	Inspection	Installation
Fixed drive face	Refer to "V-belt Type Continuously Variable Automatic Transmission Removal and Installation in Section 5A (Page5A-3)".	—	Refer to "V-belt Type Continuously Variable Automatic Transmission Removal and Installation in Section 5A (Page5A-3)".
Movable drive face	Refer to "V-belt Type Continuously Variable Automatic Transmission Removal and Installation in Section 5A (Page5A-3)".	Refer to "Movable Drive Face Parts Inspection in Section 5A (Page5A-9)".	Refer to "V-belt Type Continuously Variable Automatic Transmission Removal and Installation in Section 5A (Page5A-3)".

Item	Removal	Inspection	Installation
Clutch housing	Refer to "V-belt Type Continuously Variable Automatic Transmission Removal and Installation in Section 5A (Page5A-3)".	Refer to "Movable Drive Face Parts Inspection in Section 5A (Page5A-9)".	Refer to "V-belt Type Continuously Variable Automatic Transmission Removal and Installation in Section 5A (Page5A-3)".
Clutch shoe/movable driven face assembly	Refer to "V-belt Type Continuously Variable Automatic Transmission Removal and Installation in Section 5A (Page5A-3)".	Refer to "Movable Drive Face Parts Inspection in Section 5A (Page5A-9)".	Refer to "V-belt Type Continuously Variable Automatic Transmission Removal and Installation in Section 5A (Page5A-3)".
Drive V-belt	Refer to "V-belt Type Continuously Variable Automatic Transmission Removal and Installation in Section 5A (Page5A-3)".	Refer to "Drive V-belt Inspection in Section 5A (Page5A-6)".	Refer to "V-belt Type Continuously Variable Automatic Transmission Removal and Installation in Section 5A (Page5A-3)".
Final reduction gear cover	Refer to "Final Gear Assembly Removal and Installation in Section 3A (Page3A-3)".	Refer to "Final Drive Gear Bearing Inspection in Section 3A (Page3A-8)".	Refer to "Final Gear Assembly Removal and Installation in Section 3A (Page3A-3)".
Oil filter	Refer to "Engine Oil and Filter Change in Section 0B (Page0B-9)".	—	Refer to "Engine Oil and Filter Change in Section 0B (Page0B-9)".
Rear axle shaft	Refer to "Final Gear Disassembly and Assembly in Section 3A (Page3A-4)".	—	Refer to "Final Gear Disassembly and Assembly in Section 3A (Page3A-4)".
Idle shaft	Refer to "Final Gear Disassembly and Assembly in Section 3A (Page3A-4)".	—	Refer to "Final Gear Disassembly and Assembly in Section 3A (Page3A-4)".
Driveshaft	Refer to "Final Gear Disassembly and Assembly in Section 3A (Page3A-4)".	—	Refer to "Final Gear Disassembly and Assembly in Section 3A (Page3A-4)".

**Engine Right Side**

Item	Removal	Inspection	Installation
Exhaust pipe/muffler	Refer to "Exhaust Pipe / Muffler Removal and Installation in Section 1K (Page1K-2)".	Refer to "Exhaust System Inspection in Section 1K (Page1K-4)".	Refer to "Exhaust Pipe / Muffler Removal and Installation in Section 1K (Page1K-2)".
Generator	Refer to "Generator Removal and Installation in Section 1J (Page1J-6)".	Refer to "Generator Coil Resistance Inspection in Section 1J (Page1J-5)", "Generator No-load Performance Inspection in Section 1J (Page1J-5)".	Refer to "Generator Removal and Installation in Section 1J (Page1J-6)".
Starter idle gear	Refer to "Engine Bottom Side Disassembly (Page1D-37)".	—	Refer to "Engine Bottom Side Assembly (Page1D-44)".
Balancer driven gear	Refer to "Engine Bottom Side Disassembly (Page1D-37)".	—	Refer to "Engine Bottom Side Assembly (Page1D-44)".
Water pump	Refer to "Water Pump Removal and Installation in Section 1F (Page1F-14)".	Refer to "Water Pump Related Parts Inspection in Section 1F (Page1F-17)".	Refer to "Water Pump Removal and Installation in Section 1F (Page1F-14)".

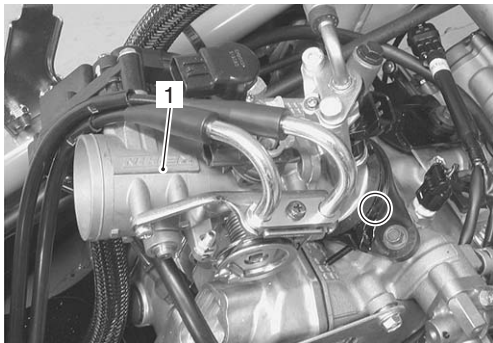
## Engine Assembly Removal and Installation

B705H11406002

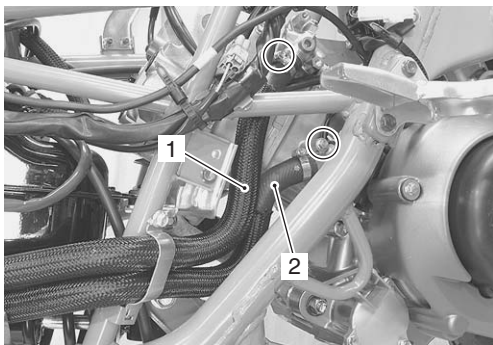
### Removal

Remove the engine from the frame in the following procedures:

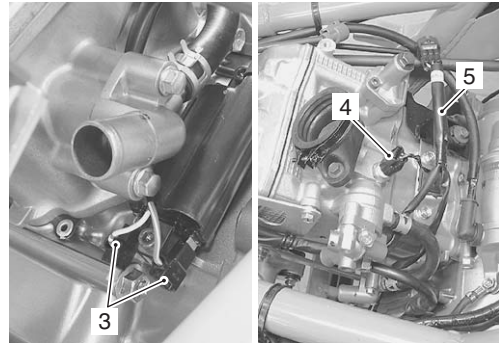
- 1) Drain engine oil. Refer to "Engine Oil and Filter Change in Section 0B (Page0B-9)".
- 2) Drain engine coolant. Refer to "Cooling System Inspection in Section 0B (Page0B-11)".
- 3) Drain final reduction gear oil. Refer to "Final Reduction Gear Oil Replacement in Section 0B (Page0B-10)".
- 4) Remove the under cover. Refer to "Under Cover Removal and Installation in Section 9D (Page9D-16)".
- 5) Remove the left and right footboards. Refer to "Footboard Removal and Installation in Section 9D (Page9D-21)".
- 6) Remove the air cleaner box. Refer to "Air Cleaner Box Removal and Installation (Page1D-9)".
- 7) Remove the throttle body (1) from the intake pipe.



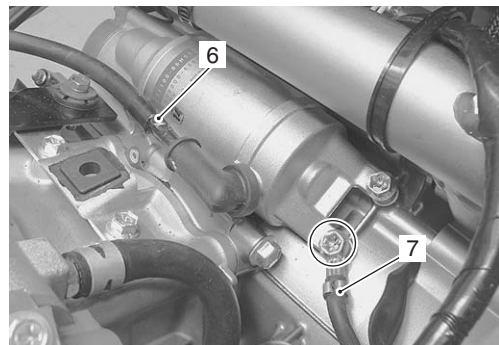
- 8) Disconnect the radiator hoses (1) and (2).



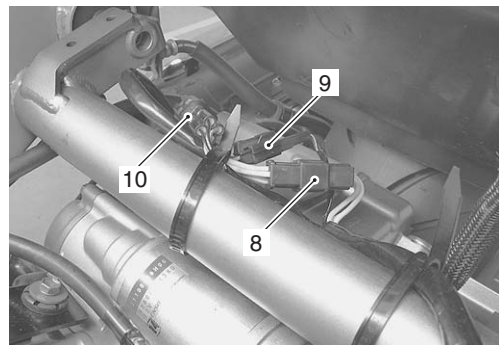
- 9) Disconnect the ignition coil lead wires (3).
- 10) Disconnect the ECT sensor coupler (4) and remove the wire harness (5) (for the ignition coil, ECT sensor and IAT sensor).



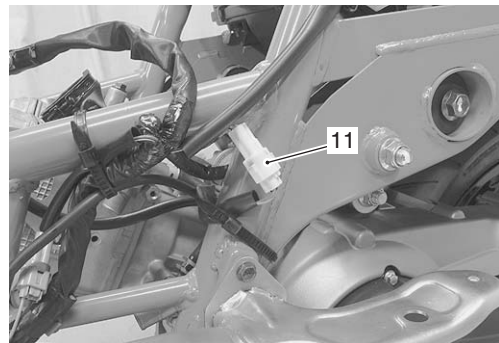
- 11) Disconnect the starter motor lead wire (6) and engine ground lead wire (7).



- 12) Disconnect the generator coupler (8), CKP sensor coupler (9) and HO2 sensor coupler (10).

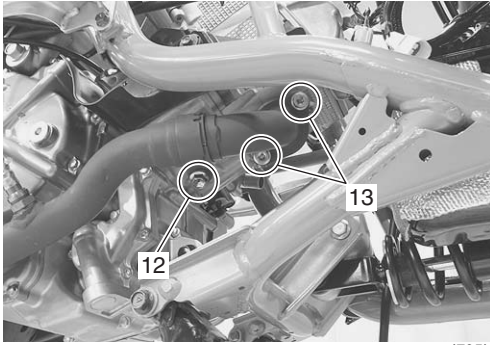


- 13) Remove the speed sensor coupler (11).





- 14) Loosen the muffler connecting bolt (12) and remove the exhaust pipe bolts (13).



I705H1140184-01

- 15) Remove the exhaust pipe/muffler by removing the muffler mounting bolts.

- 16) Remove the exhaust pipe gasket.



I705H1140185-02

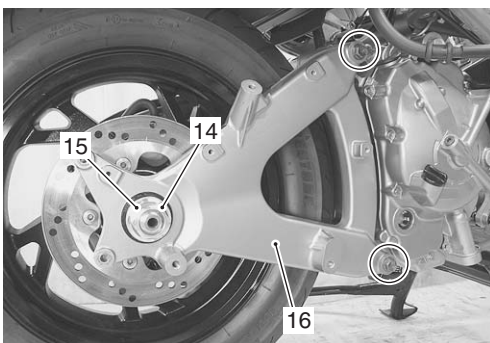
- 17) Remove the brake hose clamps and rear brake caliper from the swingarm.



I705H1140186-01

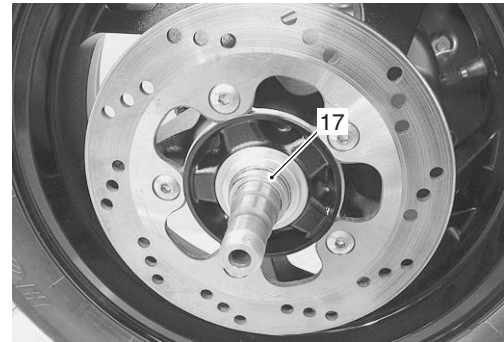
- 18) Remove the rear axle nut (14) and collar (15).

- 19) Remove the swingarm (16).



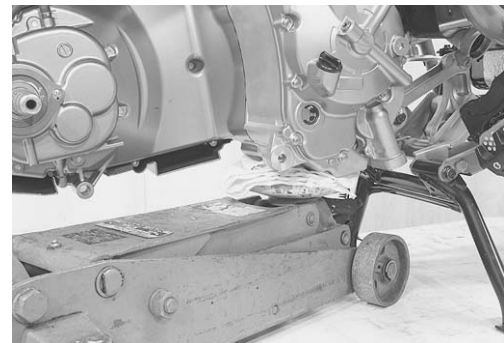
I705H1140187-02

- 20) Remove the collar (17) and rear wheel.



I705H1140188-02

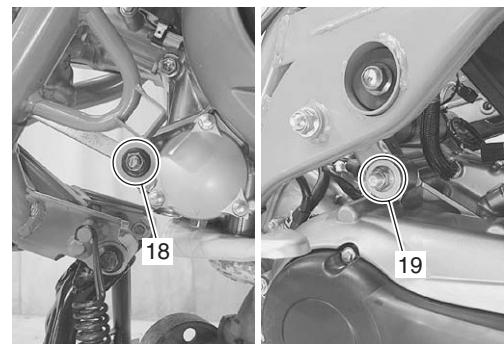
- 21) Support the engine using an engine jack.



I705H1140189-01

- 22) Remove the cushion rod bolt/nut (18) and engine mounting bolt/nut (19).

- 23) Remove the engine from the frame.

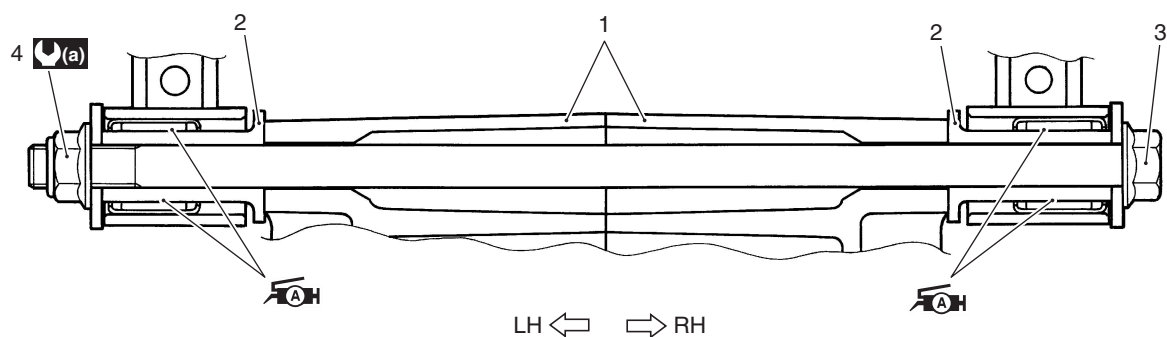


I705H1140190-02

## 1D-8 Engine Mechanical:

### Installation

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



1705H1140191-05

1. Crankcase	3. Engine mounting bolt	: 93 N·m (9.3 kgf-m, 67.0 lb-ft)
2. Collar	4. Engine mounting nut	: Apply grease.

- Tighten the engine mounting nut (2) to the specified torque.

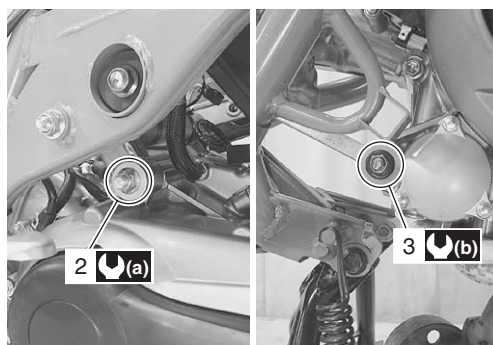
#### Tightening torque

**Engine mounting nut (a): 93 N·m (9.3 kgf-m, 67.0 lb-ft)**

- Tighten the cushion rod nut (3) to the specified torque.

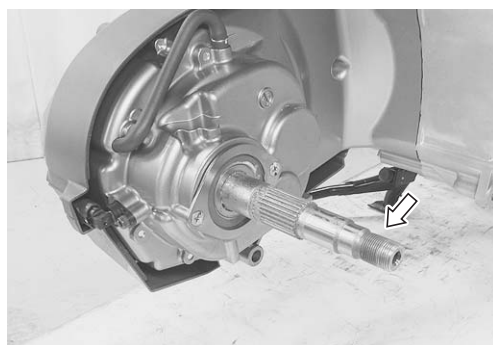
#### Tightening torque

**Cushion rod nut (b): 85 N·m (8.5 kgf-m, 61.5 lb-ft)**



1705H1140193-02

- Make sure that the thread of axle shaft is clean from any greasy matter.



1705H1140194-02

- Install the rear wheel. Refer to "Rear Wheel Assembly Removal and Installation in Section 2D (Page2D-9)".
- Tighten the rear axle nut to the specified torque.

#### Tightening torque

**Rear axle nut: 120 N·m (12.0 kgf-m, 87.0 lb-ft)**

- Install the exhaust pipe/muffler. Refer to "Exhaust Pipe / Muffler Removal and Installation in Section 1K (Page1K-2)".

### Crankcase bracket Removal and Installation

B705H11406064

Refer to "Crankcase Bracket Removal and Installation in Section 2C (Page2C-12)".

### Crankcase bracket Inspection

B705H11406065

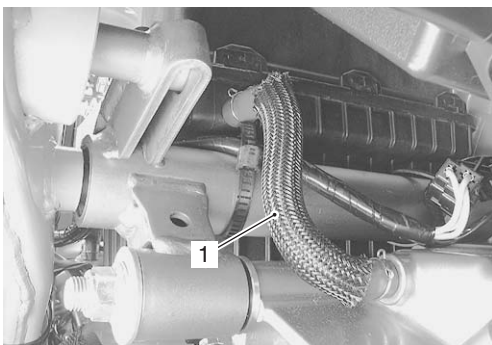
Refer to "Crankcase Bracket Related Parts Inspection in Section 2C (Page2C-12)".

### Air Cleaner Box Removal and Installation

B705H11406066

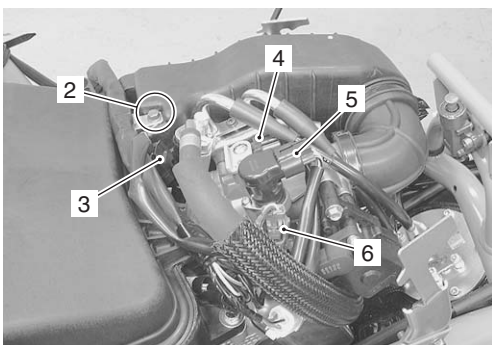
#### Removal

- 1) Remove the helmet box front cover. Refer to "Helmet Box Front Cover Removal and Installation in Section 9D (Page9D-16)".
- 2) Remove the frame front cover. Refer to "Front Frame Cover Removal and Installation in Section 9D (Page9D-17)".
- 3) Remove the left footboard. Refer to "Footboard Removal and Installation in Section 9D (Page9D-21)".
- 4) Disconnect the PCV hose (1).

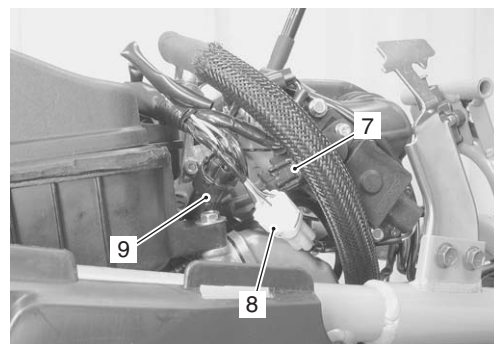


I705H1140195-01

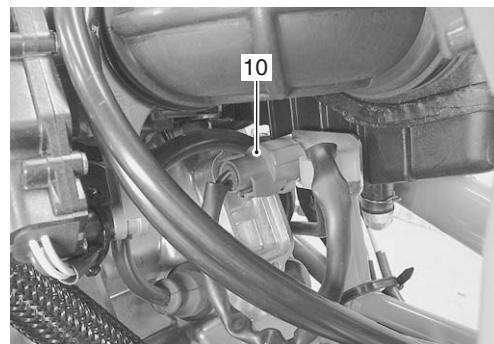
- 5) Remove the wire harness clamp bolt (2).
- 6) Disconnect the following couplers.
  - Injector coupler (3)
  - IAP sensor coupler (4)
  - ISC valve coupler (5)
  - TP sensor coupler (6)
  - STP sensor coupler (7)
  - STVA coupler (8)
  - ECTS-IATS-Ignition coil lead wire coupler (9)
  - IAT sensor coupler (10)



I705H1140196-01

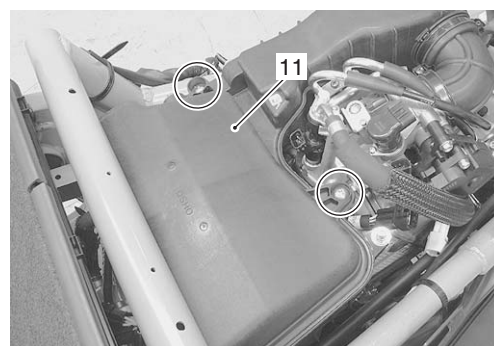


I705H1140197-02



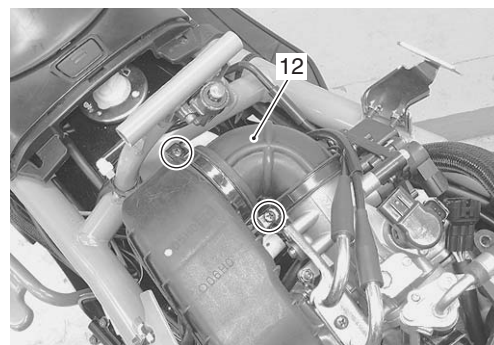
I705H1140198-01

- 7) Remove the air cleaner box cover (11) and air cleaner element.



I705H1140199-01

- 8) Remove the air cleaner box outlet tube (12).

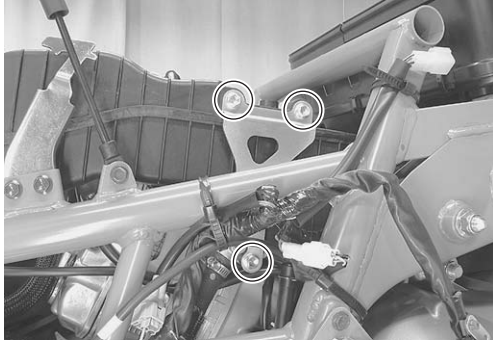


I705H1140200-01

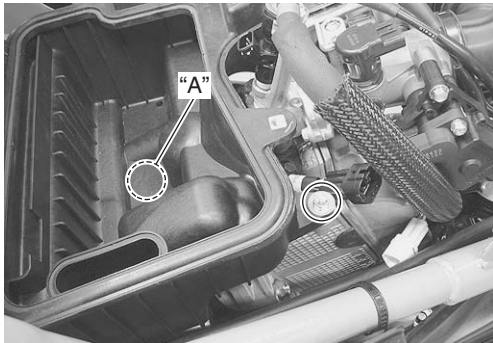


## 1D-10 Engine Mechanical:

- 9) Remove the air cleaner box.



I705H1140201-01



I705H1140202-02

"A": Hooked point

### Installation

Install the air cleaner box in the reverse order of removal. Refer to "Air Cleaner Element Removal and Installation in Section 0B (Page0B-2)", "Footboard Removal and Installation in Section 9D (Page9D-21)", "Front Frame Cover Removal and Installation in Section 9D (Page9D-17)" and "Helmet Box Front Cover Removal and Installation in Section 9D (Page9D-16)".

### Air Cleaner Element Inspection

B705H11406067

Refer to "Air Cleaner Element Inspection in Section 0B (Page0B-3)".

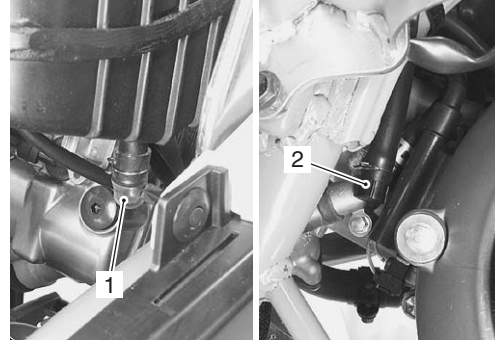
### Air Cleaner Drain Plug Inspection

B705H11406068

Inspect the air cleaner drain plugs in the following procedures:

- 1) Remove the air cleaner element and inspect the drain hole on the air cleaner box for clogging.
- 2) Remove the front frame cover. Refer to "Front Frame Cover Removal and Installation in Section 9D (Page9D-17)".
- 3) Remove the left side leg shield. Refer to "Side Leg Shield Removal and Installation in Section 9D (Page9D-15)".

- 4) Visually inspect the drain plugs (1) and (2).



I705H1140238-01

- 5) Drain water if necessary by removing the plug.
- 6) Install the removed parts.

## Throttle Cable Removal and Installation

B705H11406069

### Removal

- 1) Remove the handlebar covers. Refer to "Handlebar Cover Removal and Installation in Section 9D (Page9D-13)".
- 2) Remove the front box. Refer to "Front Box Removal and Installation in Section 9D (Page9D-18)".
- 3) Remove the front frame cover. Refer to "Front Frame Cover Removal and Installation in Section 9D (Page9D-17)".
- 4) Disengage the throttle cable ends from the throttle case on handlebars. Refer to "Handlebars Removal and Installation in Section 6B (Page6B-2)".
- 5) Remove the throttle cables by disengaging the other ends from the throttle body.



I705H1140204-01

### Installation

Install the throttle cables in the reverse order of removal. Pay attention to the following point.

- Rout the throttle cables properly. Refer to "Throttle Cable Routing Diagram (Page1D-2)".

### Throttle Cable Adjustment

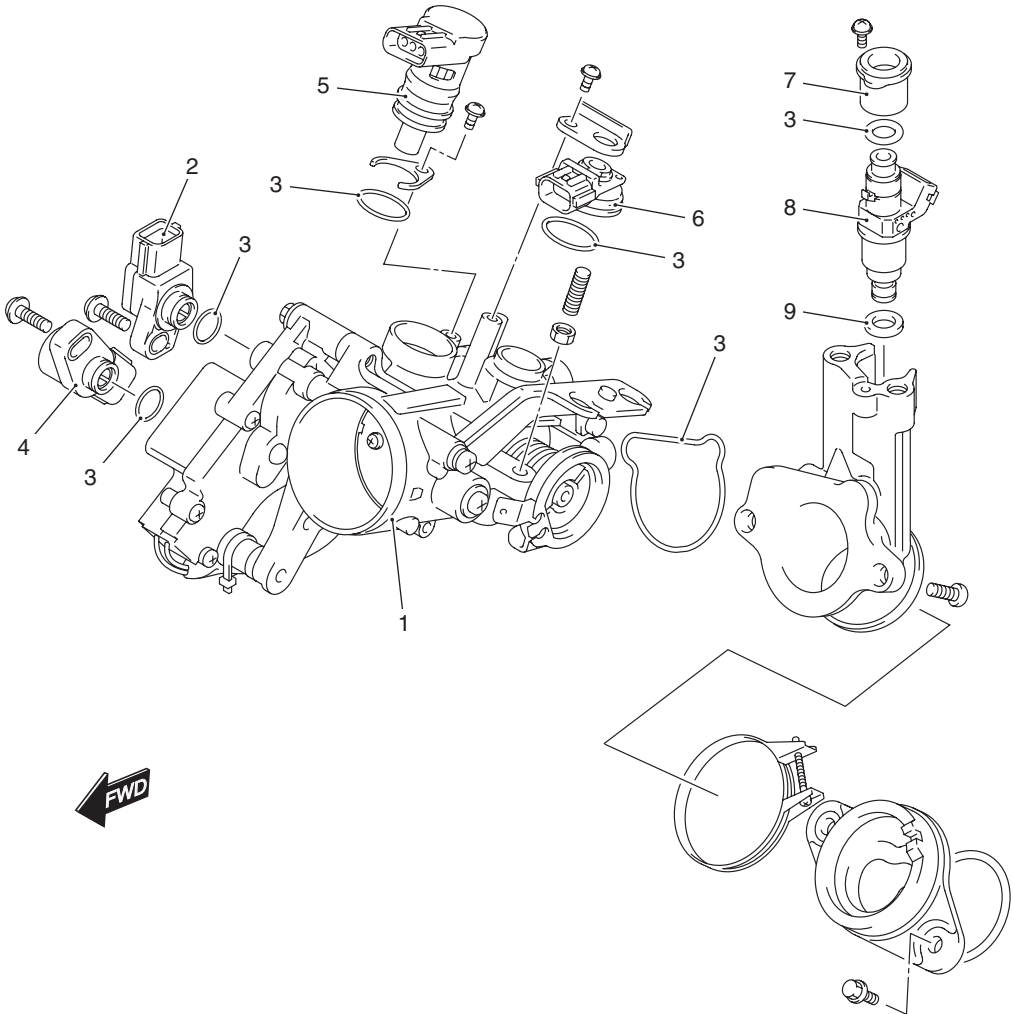
B705H11406071

Adjust the throttle cable play. Refer to "Throttle Cable Play Inspection and Adjustment in Section 0B (Page0B-11)".



Throttle Body Components

B705H11406072

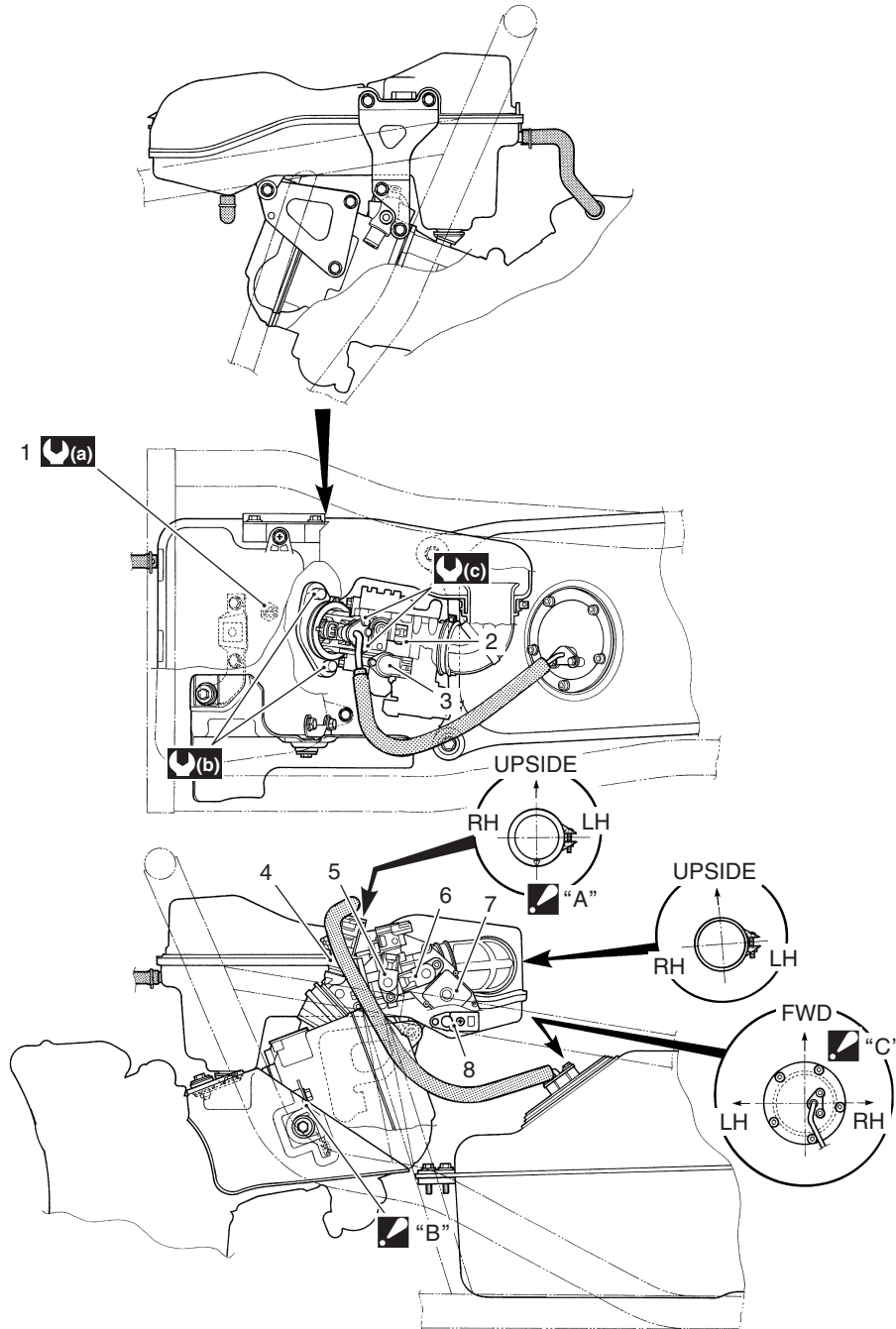


1. Throttle body	4. STP sensor	7. Insulator
2. TP sensor	5. ISC valve	8. Fuel injector
3. O-ring	6. IAP sensor	9. Cushion seal

I705H1140207-05

Throttle Body Construction

B705H11406074



I705H1140237-03

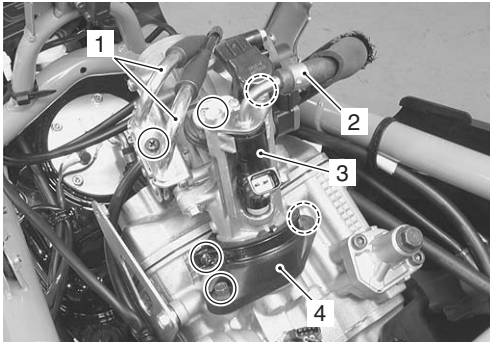
1. ECT sensor	8. IAT sensor
2. IAP sensor	▲ "A": Triangle mark must point downward.
3. ISC valve	▲ "B": Tighten the bracket with the cylinder head bolt (L130).
4. Fuel injector	▲ "C": Tighten each bolt in temporary and final stages in numerical order on bolt. Refer to "Fuel Pump Disassembly and Assembly in Section 1G (Page1G-10)".
5. TP sensor	🔩 (a) : 12 N·m (1.2 kgf·m, 8.5 lb-ft)
6. STP sensor	🔩 (b) : 10 N·m (1.0 kgf·m, 7.0 lb-ft)
7. STVA	🔩 (c) : 10 N·m (1.0 kgf·m, 7.0 lb-ft)

## Throttle Body Removal and Installation

B705H11406070

### Removal

- 1) Remove the air cleaner box. Refer to "Air Cleaner Box Removal and Installation (Page1D-9)".
- 2) Remove the throttle cables (1).
- 3) Remove the fuel hose (2).
- 4) Remove the throttle body assembly (3).
- 5) Remove the intake pipe (4).



I705H1140205-01

### Installation

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

- Install the intake pipe. Refer to "Cylinder Disassembly and Assembly (Page1D-33)".
- When installing the throttle body to the intake pipe, fit the projection on the throttle body to the depression of the intake pipe.



I705H1140206-01

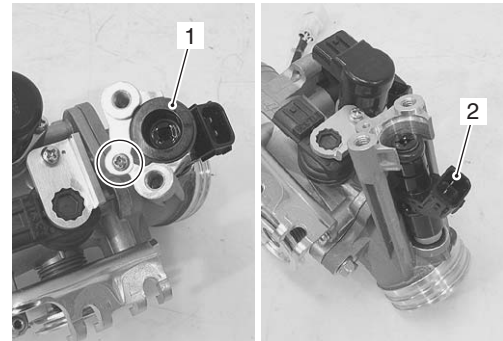
- Connect the throttle cables properly. Refer to "Throttle Cable Removal and Installation (Page1D-10)".
- Adjust the throttle cable play. Refer to "Throttle Cable Play Inspection and Adjustment in Section 0B (Page0B-11)".

## Throttle Body Disassembly and Assembly

B705H11406073

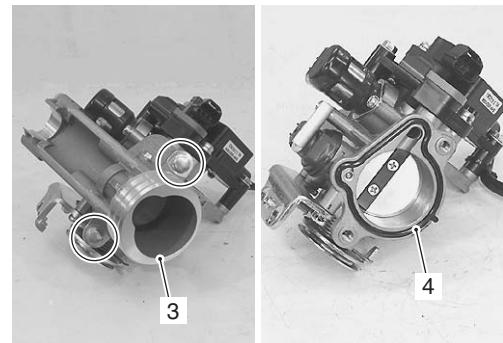
### Disassembly

- 1) Remove the throttle body. Refer to "Throttle Body Removal and Installation (Page1D-13)".
- 2) Remove the insulator (1) and fuel injector (2).



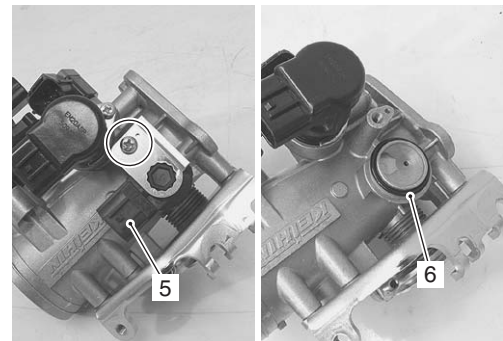
I705H1140208-01

- 3) Remove the intake pipe (3) and O-ring (4).



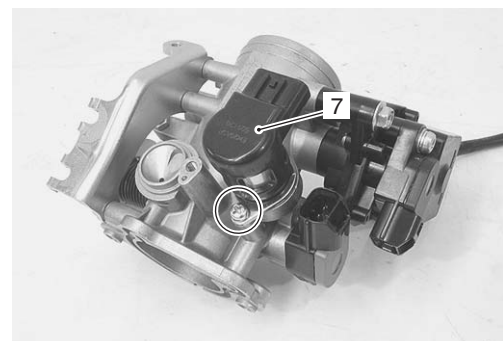
I705H1140209-02

- 4) Remove the IAP sensor (5) and O-ring (6).



I705H1140210-01

- 5) Remove the ISC valve (7).



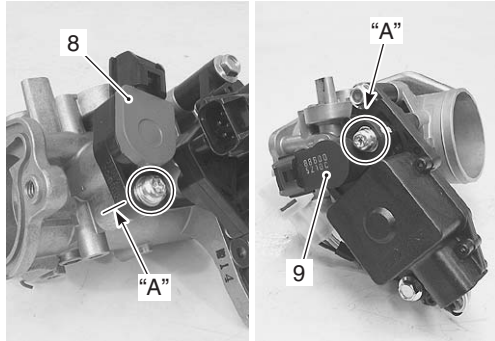
I705H1140211-01

## 1D-14 Engine Mechanical:

6) Remove the TP sensor (8) and STV sensor (9).

### NOTE

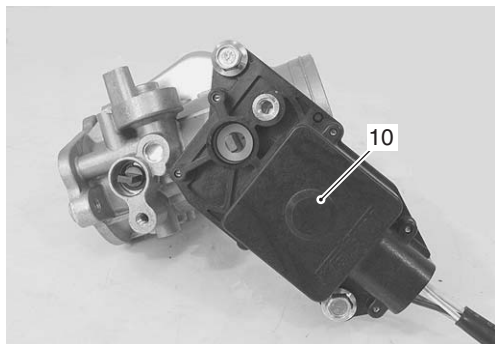
Prior to disassembly, mark each sensors original position with a paint or scribe "A" for accurate reinstallation.



I705H1140212-02

### CAUTION

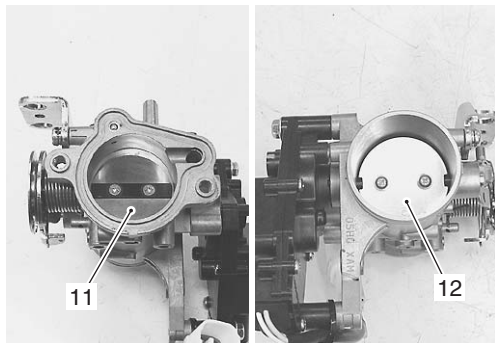
Never remove the STVA (10) from the throttle body.



I705H1140213-01

### CAUTION

Never remove the throttle valve (11) and secondary throttle valve (12).



I705H1140216-01

## Assembly

Assembly is the throttle body in the reverse order of removal. Pay attention to the following points:

- With the STV fully opened, install the STP sensor (1).

### CAUTION

Apply thin coat of the engine oil to the O-ring.

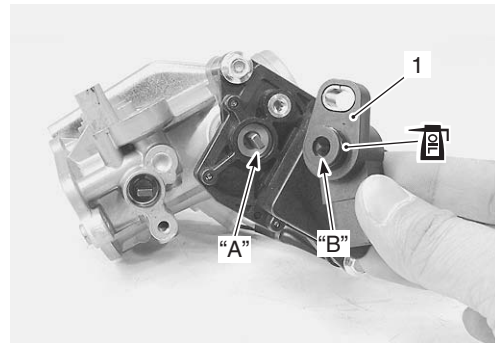
### NOTE

- Align the secondary throttle shaft end "A" with the groove "B" of STP sensor.
- Apply grease to the secondary throttle shaft end "A".

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

### NOTE

Make sure the STP valve open or close smoothly. If the STP sensor adjustment is necessary, refer to "STP Sensor Adjustment in Section 1C (Page1C-5)".



I705H1140214-02

- With the throttle valve fully closed, install the TP sensor (2).

### CAUTION

Apply thin coat of the engine oil to the O-ring.

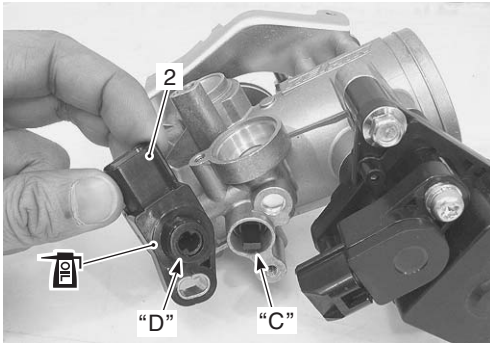
### NOTE

- Align the throttle shaft end "C" with the groove "D" of TP sensor.
- Apply grease to the secondary throttle shaft end "C".

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

**NOTE**

Make sure the TP valve open or close smoothly. If the TP sensor adjustment is necessary, refer to "TP Sensor Adjustment in Section 1C (Page1C-2)".



I705H1140215-01

- Install the ISC valve. Refer to "ISC Valve Removal and Installation in Section 1C (Page1C-6)".
- Apply thin coat of the engine oil to the new O-ring (3) and cushion seal (4).

**CAUTION**

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

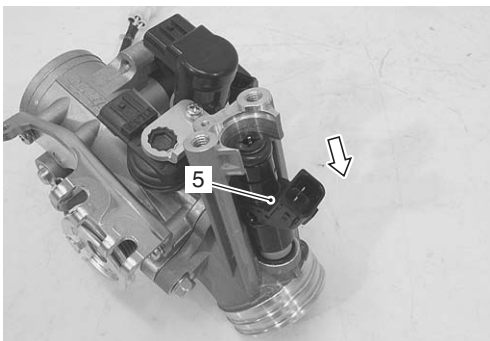


I705H1140217-01

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

**CAUTION**

Never turn the fuel injector while pushing it.



I705H1140218-01

**Throttle Body Inspection and Cleaning**

B705H11406075

Refer to "Throttle Body Disassembly and Assembly (Page1D-13)".

**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.

- Throttle shafts
- Throttle valve
- Secondary throttle valve

Replace the throttle body if necessary.

**ISC Valve Inspection**

Inspect the ISC valve for any carbon deposition defects. Clean or replace the ISC valve if necessary.



I705H1140239-01



## Engine Top Side Disassembly

B705H11406004

It is unnecessary to remove the engine assembly from the frame when servicing the engine top side.

### NOTE

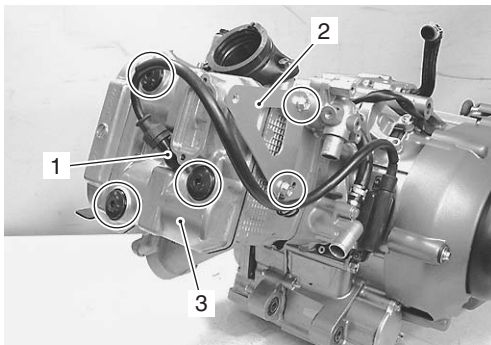
Before servicing the engine top side with engine in place, remove the air cleaner box, throttle body, fuel tank, exhaust pipe, muffler and etc. Refer to "Engine Assembly Removal and Installation (Page1D-6)".

### 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

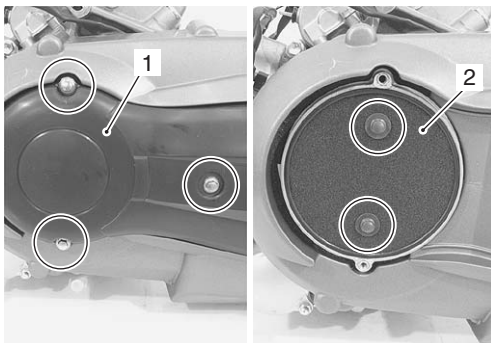
- 1) Disconnect the spark plug cap (1).
- 2) Remove the bracket (2).
- 3) Remove the cylinder head cover (3).



I705H1140134-02

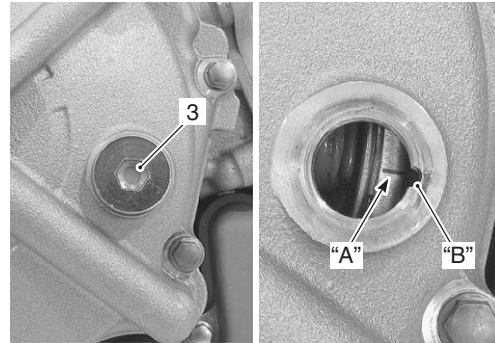
### Camshaft

- 1) Remove the spark plug. Refer to "Spark Plug Removal and Installation in Section 0B (Page0B-3)".
- 2) Remove the cooling fan cover (1) and cooling fan filter (2).



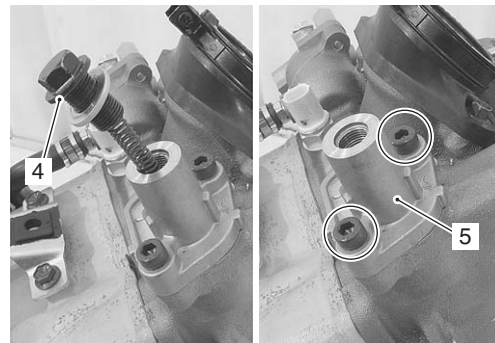
I705H1140004-01

- 3) Remove the generator cover plug (3) and bring the piston to TDC on the compression stroke by turning the crankshaft until the line "A" on the generator rotor aligns with the slit "B" in the generator cover.



I705H1140005-06

- 4) After removing the cam chain tension adjuster cap bolt (4), gasket washer and spring, remove the cam chain tension adjuster (5) and gasket.

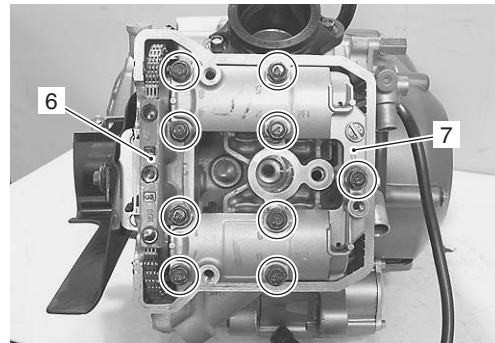


I705H1140006-01

- 5) Remove the cam chain guide No. 2 (6) and camshaft journal holder (7).

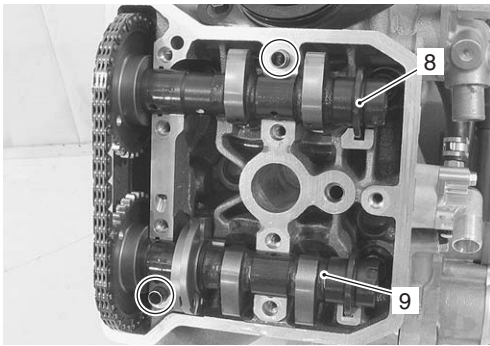
### CAUTION

Be sure to loosen the camshaft journal holder bolts evenly by shifting the wrench diagonally.



I705H1140007-03

- 6) Remove the intake camshaft (8) and exhaust camshaft (9).
- 7) Remove the dowel pins.



I705H1140008-01

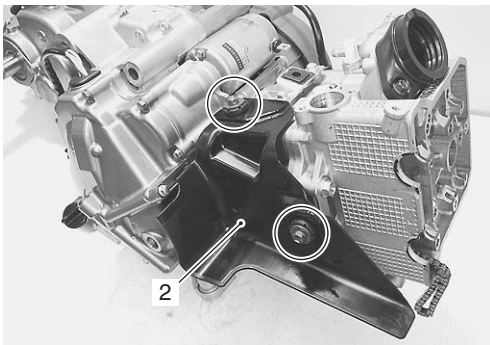
### Cylinder Head and Cylinder

- 1) Remove the water bypass hose (1).



I705H1140009-01

- 2) Remove the heat shield (2).

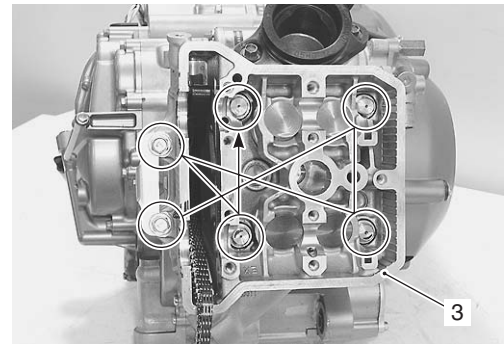


I705H1140010-02

- 3) Remove the cylinder head (3).

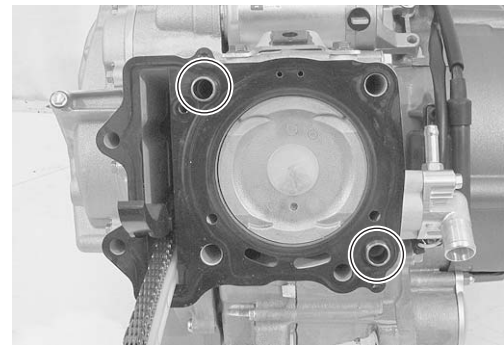
### NOTE

**Be sure to loosen the cylinder head bolts evenly and in a crisscross pattern.**



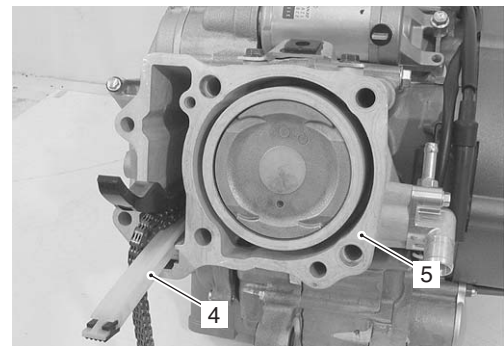
I705H1140011-02

- 4) Remove the dowel pins and gasket.



I705H1140012-01

- 5) Remove the cam chain guide No. 1 (4).
- 6) Remove the cylinder (5).



I705H1140013-02

- 7) Remove the dowel pins and gasket.



I705H1140014-01

## 1D-18 Engine Mechanical:

### Piston

- 1) Place a clean rag over the cylinder base so as not to drop the piston pin circlip into the crankcase.
- 2) Remove the piston pin circlip (1).



I705H1140015-01

- 3) Remove the piston pin and piston.

### Engine Top Side Assembly

B705H11406037

Assemble the engine top side in the reverse order of disassembly. Pay attention to the following points:

#### Piston

- Before installing the piston pin, apply molybdenum oil to its surface.

#### M/O: Molybdenum oil (Molybdenum oil solution)

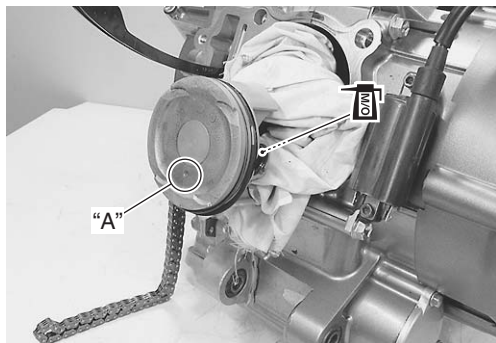
- When installing the piston, face the dent mark "A" on its head to the exhaust side of the cylinder.

#### NOTE

Place a clean rag over the cylinder base so as not to drop the piston pin circlip into the crankcase.

#### ⚠ CAUTION

Use new piston pin circlips.



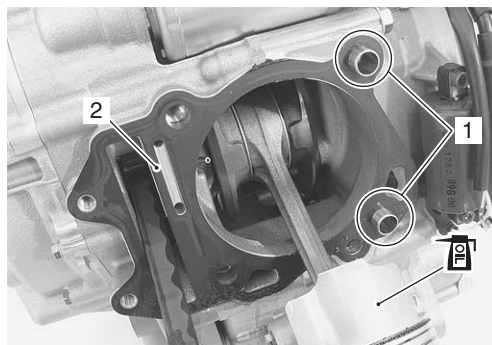
I705H1140135-03

### Cylinder

- Install the dowel pins (1) and a new gasket (2) to the crankcase.
- Coat the cylinder wall and piston surface with engine oil.

#### ⚠ CAUTION

Replace the gasket with a new one.



I705H1140016-02

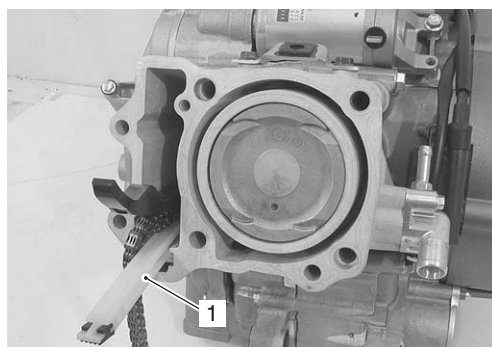
- Install the cylinder.

### Cam Chain Guide

- Install the cam chain guide No. 1 (1).

#### ⚠ CAUTION

When installing the cam chain guide No. 1, check that the chain is properly engaged with the crankshaft sprocket.



I705H1140017-01

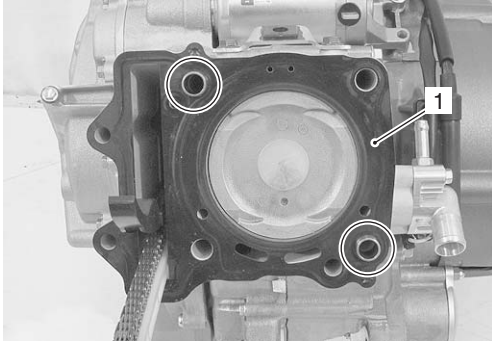


### Cylinder Head

- Place the dowel pins and a new gasket (1) on the cylinder.

**⚠ CAUTION**

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



I705H1140018-02

- Install the cylinder head.

**NOTE**

**When installing the cylinder head, keep the cam chain taut.**

### Cylinder head bolt

Tighten the cylinder head bolts "A" (L190) and "B" (L130) in the following procedures:

- Apply engine oil to the bolt threads and both sides of washers.
- Tighten the bolts 1 and 2 diagonally and evenly to the specified torque.

**Tightening torque**

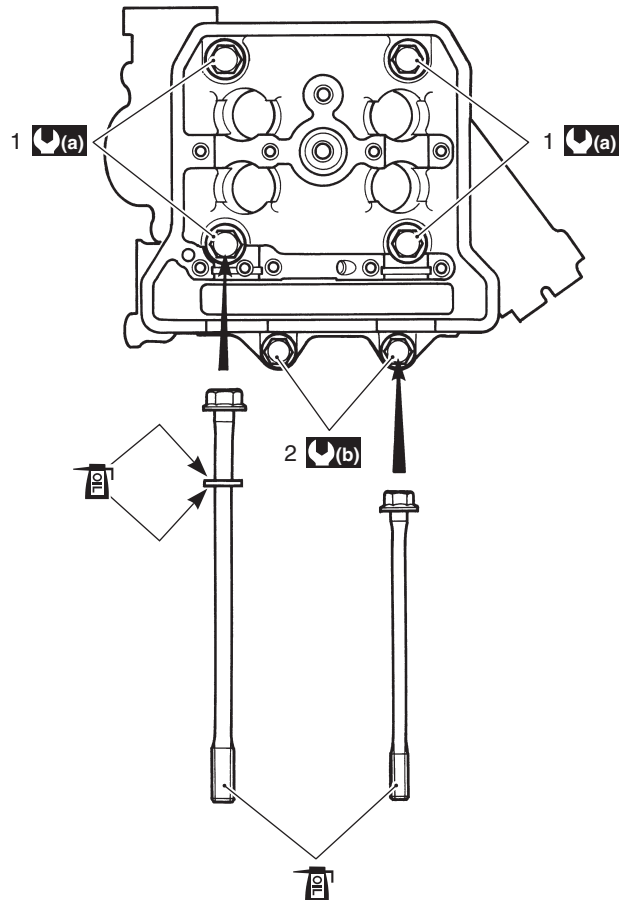
**Cylinder head bolt (L190) (Initial) (a): 25 N·m (2.5 kgf-m, 18.0 lb-ft)**

**Cylinder head bolt (L130) (b): 25 N·m (2.5 kgf-m, 18.0 lb-ft)**

- Additionally tighten the bolts "A" to the specified torque.

**Tightening torque**

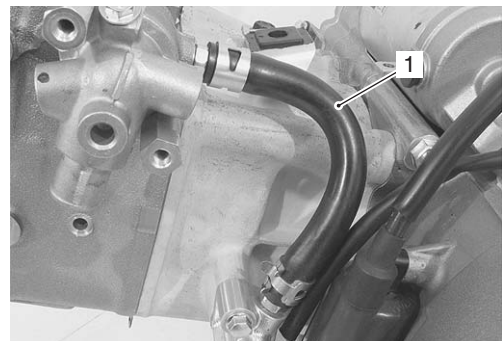
**Cylinder head bolt (L190) (Final) (a): 42 N·m (4.2 kgf-m, 30.5 lb-ft)**



I705H1140138-03

### Water hose

- Install the water by-pass hose (1).



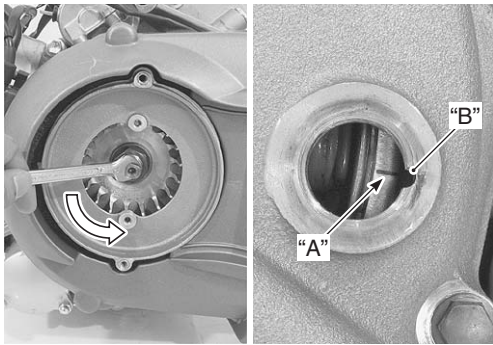
I705H1140019-01

**Camshaft**

- Turn the crankshaft to bring the piston to the TDC. (Refer to "Valve Clearance Inspection and Adjustment in Section 0B (Page0B-4)".)

**⚠ CAUTION**

- **Keep the cam chain taut when turning the crankshaft, or the chain will be caught between crankcase and cam drive sprocket.**
- **To adjust the camshaft timing correctly, be sure to align the line "A" with slit "B" and hold this position during installing the camshafts.**



I705H1140020-07

- Coat the journals, cam surfaces and camshaft journal holder with molybdenum oil.

**M/O: Molybdenum oil (Molybdenum oil solution)**

- The exhaust camshaft and intake camshaft are distinguished by the embossed letters "EX" or "IN".

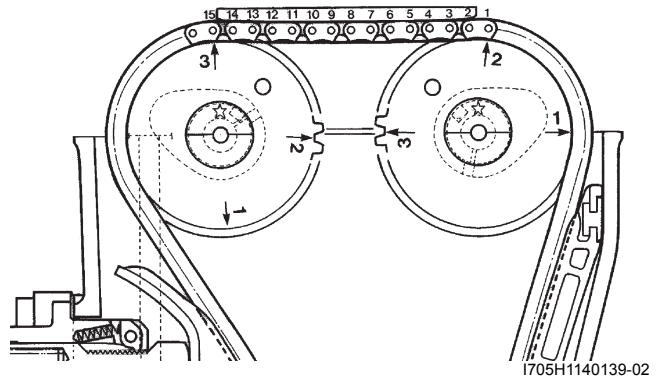


I705H1140021-02

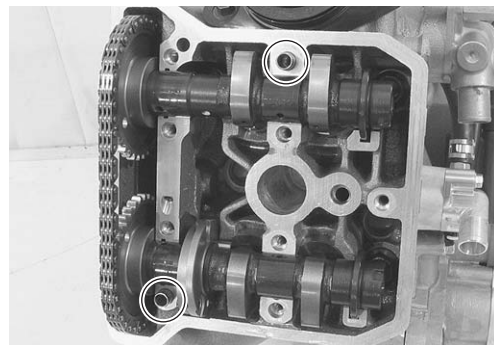
- The exhaust camshaft sprocket has an arrow marked "1". Turn the exhaust camshaft so that the arrow is aligned with the gasket surface of the cylinder head.
- Engage the cam chain with the exhaust camshaft sprocket.
- The other arrow marked "2" should now be pointing upward. Starting from the roller pin that is directly above the arrow marked "2", count out 15 roller pins (from the exhaust camshaft side going towards the intake camshaft side).
- Engage the 15th roller pin on the cam chain with the arrow marked "3" on the intake sprocket.

**NOTE**

**The cam chain should now be on all three sprockets. Be careful not to move the crankshaft until the camshaft journal holder and cam chain tension adjuster are secured.**



- Install the dowel pins.

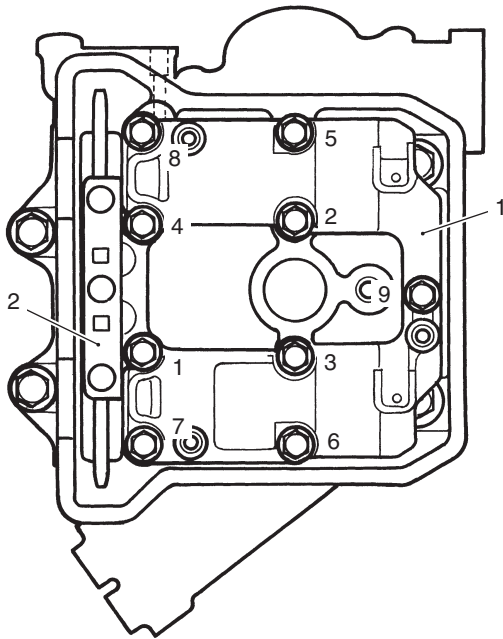


I705H1140022-02

- Install the camshaft journal holder (1) and cam chain guide No. 2 (2).
- Tighten the camshaft journal holder bolts in the ascending order of numbers to the specified torque.

**Tightening torque**

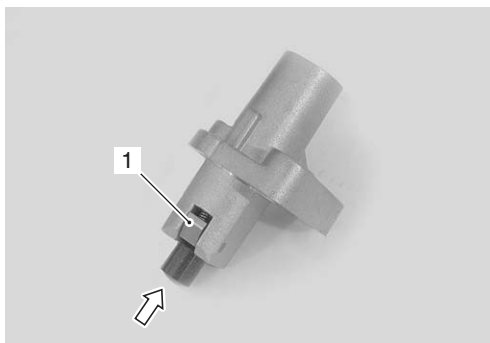
**Camshaft journal holder bolt: 10 N·m (1.0 kgf-m, 0.7 lb-ft)**



I705H1140219-03

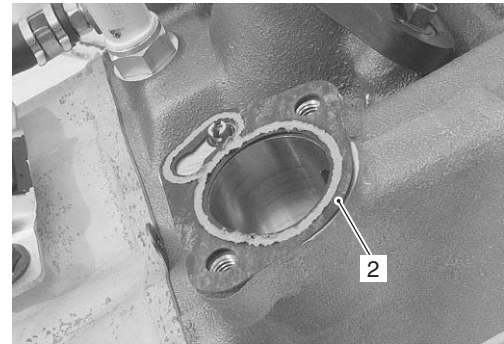
**Cam Chain Tension Adjuster**

- With the spring holder bolt and spring removed from the cam chain tension adjuster, release locking of the ratchet mechanism (1) and push the push rod all the way in.



I705H1140026-01

- Fit a new gasket (2) on the cylinder head.



I705H1140027-01

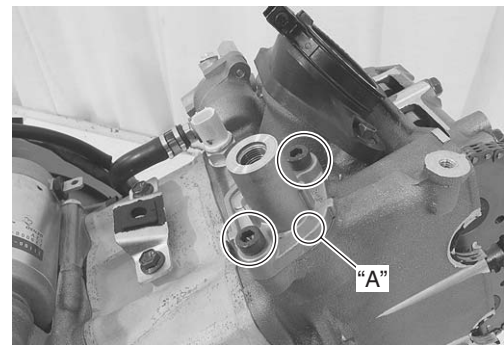
- Position the cam chain tension adjuster so the UP mark "A" points upward.
- Tighten the cam chain tension adjuster bolts to the specified torque.

**⚠ CAUTION**

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

**Tightening torque**

**Cam chain tension adjuster bolt: 10 N·m (1.0 kgf-m, 7.0 lb-ft)**

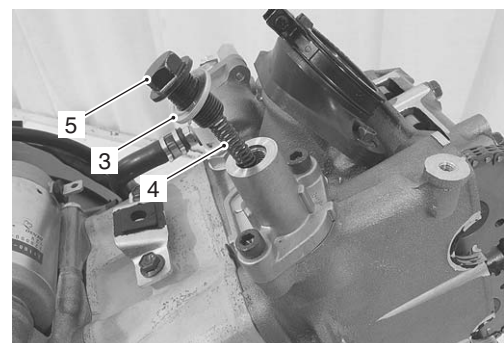


I705H1140028-04

- Install the gasket washer (3), spring (4) and spring holder bolt (5).

**⚠ CAUTION**

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



I705H1140029-01

## 1D-22 Engine Mechanical:

- Tighten the spring holder bolt to the specified torque.

### Tightening torque

Spring holder bolt: 23 N·m (2.3 kgf-m, 16.5 lb-ft)

### ⚠ CAUTION

- **When the cam chain tension adjuster has been installed, check for cam chain tension to determine if the tension adjuster is functioning properly.**
- **Turn the crankshaft and check that all the moving parts work properly.**

- Inspect the valve clearance. Refer to “Valve Clearance Inspection and Adjustment in Section 0B (Page0B-4)”.


### Cylinder Head Cover

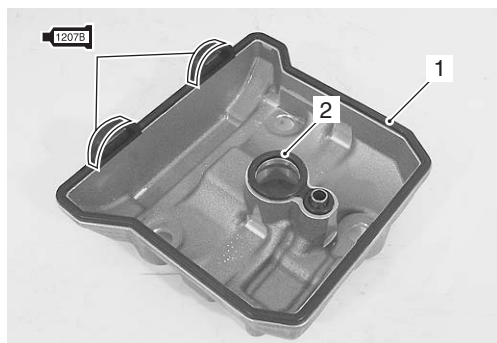
- Install the gaskets (1) and (2) to the cylinder head cover.

### ⚠ CAUTION

Replace the gaskets with the new ones.

- Apply bond to the cam end cap.

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

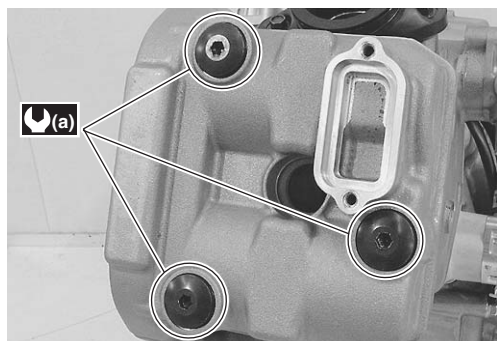


I705H1140030-02

- Replace the gaskets with new ones and apply engine oil to both sides of them.
- Tighten the bolts to the specified torque.

### Tightening torque

Cylinder head cover bolt (a): 14 N·m (1.4 kgf-m, 10.0 lb-ft)



I705H1140031-02

- Install the spark plug.

### Tightening torque

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

### Camshaft Inspection

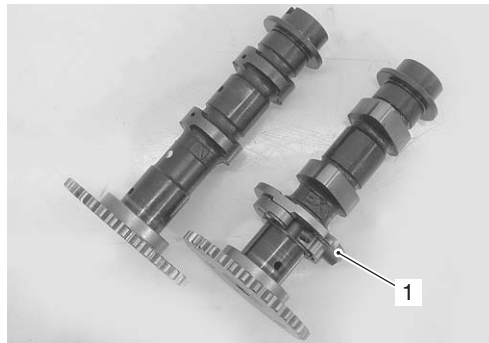
B705H11406046

Refer to “Engine Top Side Disassembly (Page1D-16)”.  
Refer to “Engine Top Side Assembly (Page1D-18)”.

### Camshaft Identification

The exhaust camshaft has embossed letters “EX” and automatic decomp. (1).

The intake camshaft has embossed letters “IN”.



I705H1140037-01

### Cam Wear

Check the camshaft for wear or damage.

Measure the cam height “a” with a micrometer.

Replace a camshaft if the cams are worn to the service limit.

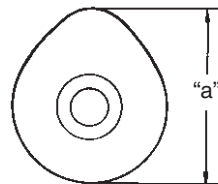
### Special tool

 : 09900-20202 (Micrometer (1/100 mm, 25 – 50 mm))

### Cam height “a”

Service limit: (IN) 36.31 mm (1.430 in)

Service limit: (EX) 35.64 mm (1.403 in)




I649G1140199-01




### Camshaft Runout

Measure the runout using the dial gauge. Replace the camshaft if the runout exceeds the limit.

#### Special tool

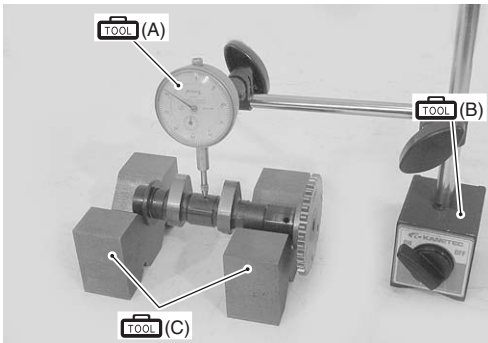
 (A): 09900-20606 (Dial gauge (1/100 mm))

 (B): 09900-20701 (Magnetic stand)

 (C): 09900-21303 (V-block (75 mm))

#### Camshaft runout (IN & EX)

Service limit: 0.10 mm (0.004 in)




I705H1140038-03

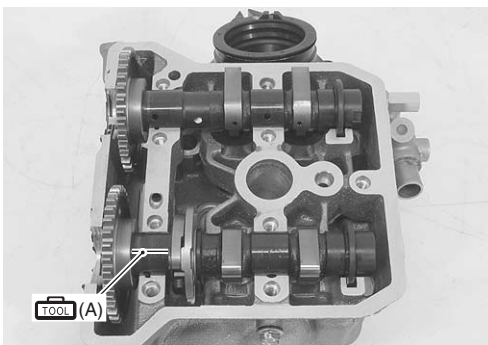
### Camshaft Journal Wear

Inspect the camshaft journal wear in the following procedures:

- 1) Determine whether or not each journal is worn down to the limit by measuring the oil clearance with the camshaft installed in place.
- 2) Use the plastigauge to read the clearance at the widest portion, which is specified as follows.

#### Special tool

 (A): 09900-22301 (Plastigauge (0.025 – 0.076 mm))



I705H1140039-02

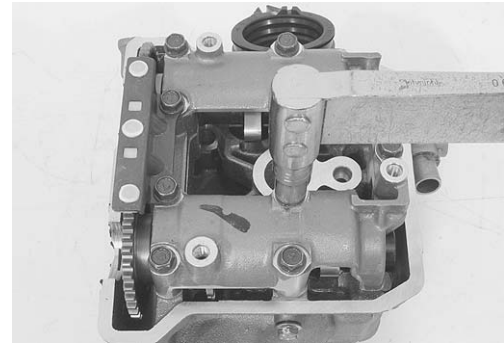
- 3) Install the camshaft journal holder. Refer to “Engine Top Side Assembly (Page1D-18)”.

#### NOTE

Do not rotate the camshafts with the plastigauge in place.

#### Tightening torque

Camshaft journal holder bolt: 10 N·m (1.0 kgf·m, 7.0 lb-ft)

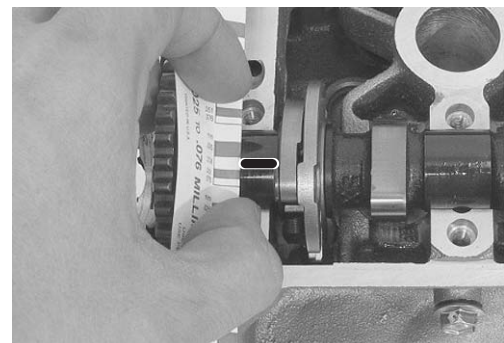


I705H1140040-01

- 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: 0.15 mm (0.0059 in)



I705H1140041-02

## 1D-24 Engine Mechanical:

- 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 the cylinder head depending upon which one exceeds the specification.

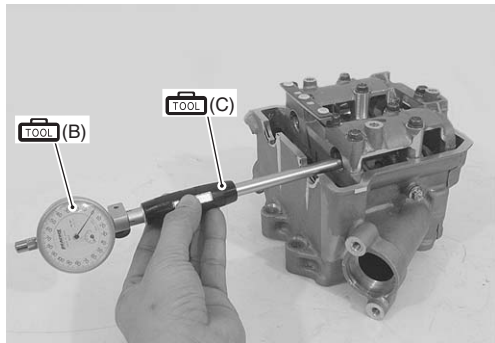
### Special tool

**TOOL (B): 09900-20602 (Dial gauge (1/1000 mm, 1 mm))**

**TOOL (C): 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)**



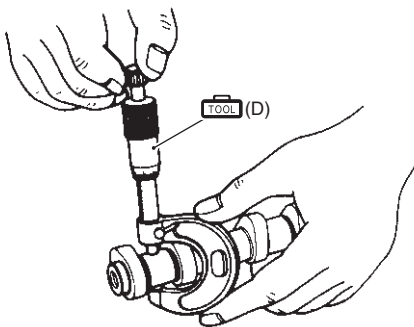
I705H1140042-04

### Special tool

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

### Camshaft journal O.D. (IN & EX)

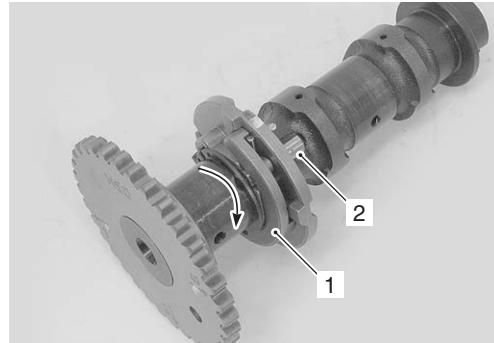
**Standard: 21.972 – 21.993 mm (0.8650 – 0.8659 in)**



I705H1140243-01

### Automatic Decomp.

Check that automatic decomp. cam (1) moves smoothly and pin (2) rotates together. If any abnormal condition are found, replace the camshaft.



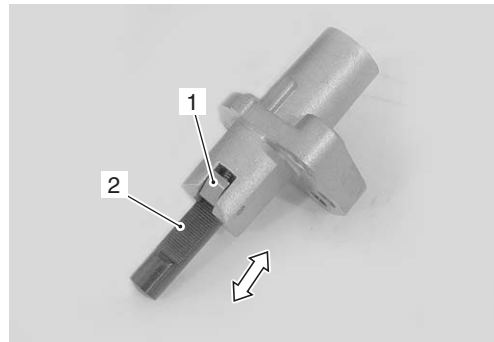
I705H1140043-01

### Cam Chain Tension Adjuster Inspection

B705H11406047

The cam chain tension adjuster is maintained at the proper tension by an automatically adjusted.

- 1) Remove the cam chain tension adjuster. Refer to "Engine Top Side Disassembly (Page1D-16)".
- 2) Unlock the ratchet mechanism (1) and move the push rod (2) in place to see if it slides smoothly. If it does not slide smoothly or the ratchet mechanism is worn or damaged, replace the cam chain tension adjuster with a new one.



I705H1140044-01

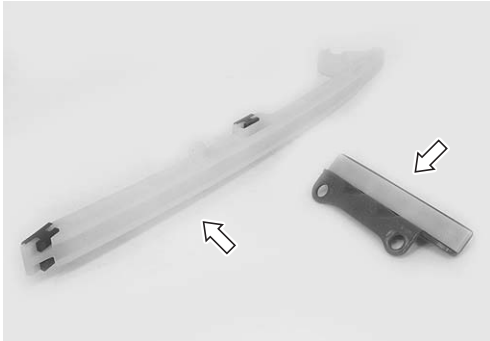
- 3) Install the cam chain tension adjuster. Refer to "Engine Top Side Assembly (Page1D-18)".

### Cam Chain Guide Inspection

B705H11406049

Inspect the cam chain guide in the following procedures:

- 1) Remove the cam chain guides. Refer to "Engine Top Side Assembly (Page1D-18)".
- 2) Check the contacting surface of the cam chain guide. If it is worn or damaged, replace it with a new one.



I705H1140046-01

- 3) Install the cam chain guides. Refer to "Engine Top Side Assembly (Page1D-18)".

### Cylinder Head Disassembly and Reassembly

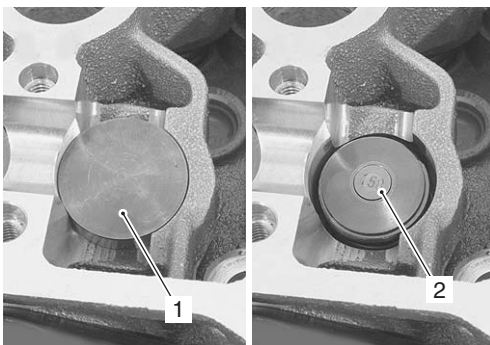
B705H11406013

#### Disassembly

**⚠ CAUTION**

**Identify the position of each removed part.**

- 1) Remove the tappet (1) and shim (2) by fingers or magnetic hand.



I705H1140236-01

**⚠ CAUTION**

**Identify the position of each removed part.**

- 2) Install the protector (3) between the valve spring and cylinder head.
- 3) Using the special tools, compress the valve spring and remove the two cotter halves from the valve stem.

**Special tool**

**TOOL (A): 09916-14510 (Valve spring compressor)**

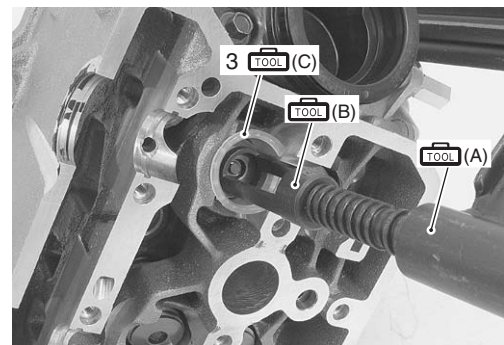
**TOOL (B): 09916-14530 (Valve spring compressor attachment)**

**TOOL (C): 09919-28610 (Sleeve protector)**

**TOOL : 09916-84511 (Tweezers)**

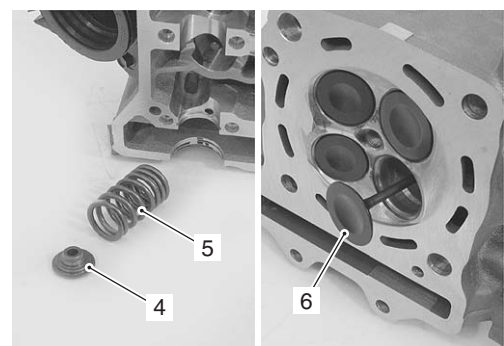
**⚠ CAUTION**

**To prevent damage of the tappet sliding surface with the special tool, use the protector.**



I705H1140048-04

- 4) Remove the valve spring retainer (4) and valve spring (5).
- 5) Pull out the valve (6) from the combustion chamber side.

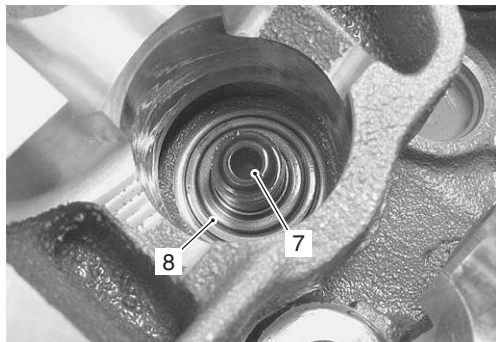


I705H1140049-01



## 1D-26 Engine Mechanical:

- 6) Remove the oil seal (7) and spring seat (8).

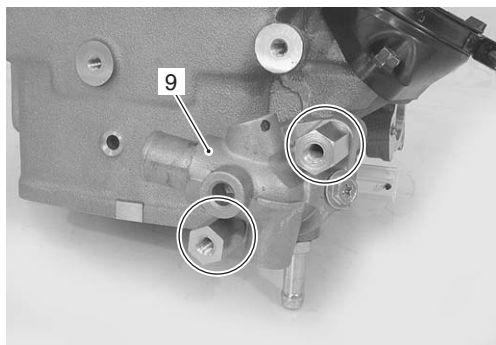


I705H1140050-02

### **⚠ CAUTION**

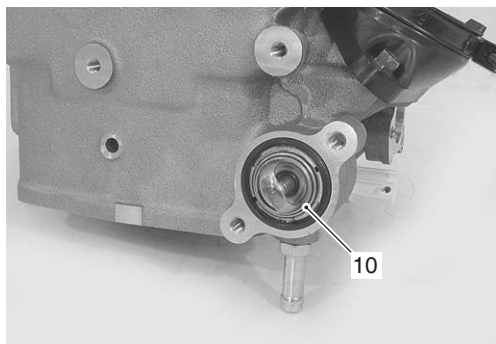
**Do not reuse the removed oil seal.**

- 7) Remove the other valves in the same manner as described previously.  
8) Remove the thermostat case (9).



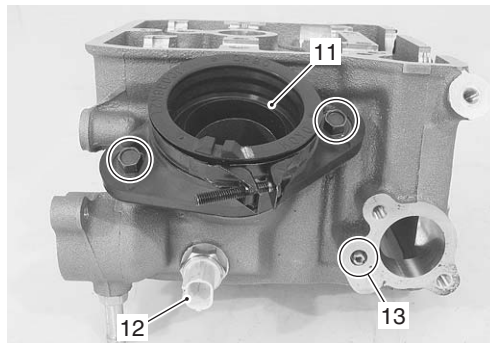
I705H1140051-02

- 9) Remove the thermostat (10).



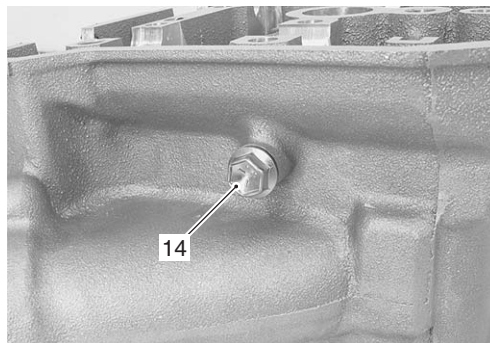
I705H1140053-01

- 10) Remove the intake pipe (11).  
11) Remove the ECT sensor (12).  
12) Remove the oil jet (for cam chain tension adjuster) (13).



I705H1140054-01

- 13) Remove the oil gallery plug (cylinder head) (14).

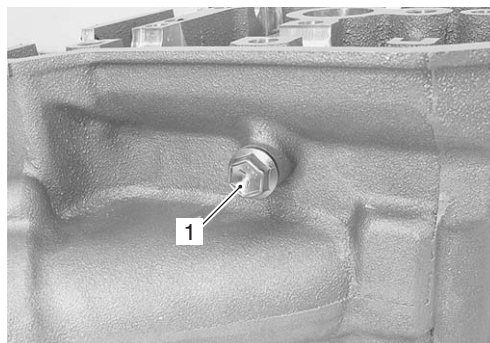


I705H1140055-01

### **Assembly**

Assembly is in the reverse order of disassembly. Pay attention to the following points:

- Tighten the oil gallery plug (cylinder head) (1) to the specified torque.



I705H1140141-01

### **Tightening torque**

**Oil gallery plug (cylinder head): 10 N·m (1.0 kgf·m, 7.0 lb-ft)**

### **⚠ CAUTION**

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

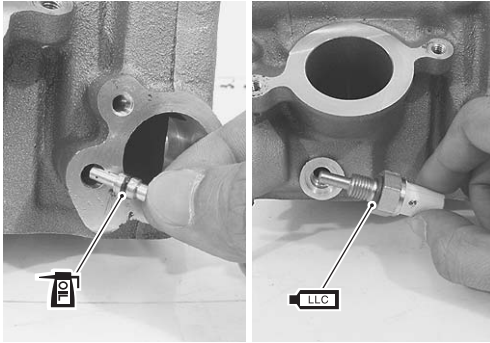
- Apply engine oil to O-ring and install the oil jet.
- Apply engine coolant to O-ring and install the ECT sensor.

**⚠ CAUTION**

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

**Tightening torque**

**ECT sensor: 12 N·m (1.2 kgf-m, 8.5 lb-ft)**



I705H1140220-01

- Make sure that the scooped part “A” faces downward.
- Apply grease to O-ring and thread lock to the intake pipe bolts.

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

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

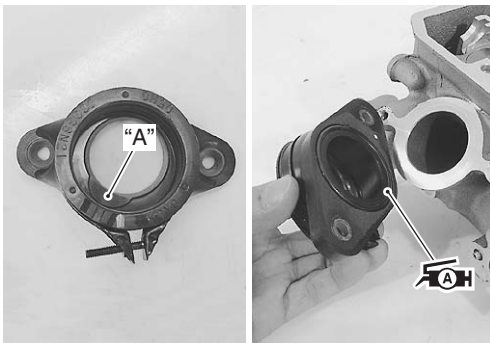
- Tighten the intake pipe bolts to the specified torque.

**⚠ CAUTION**

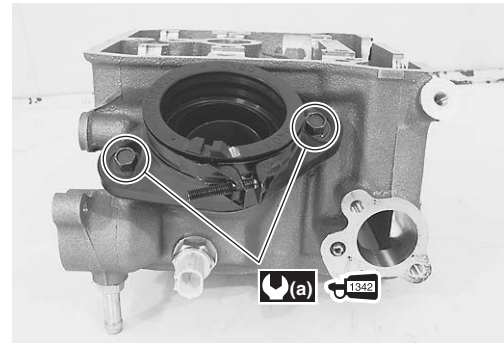
**Replace the O-ring with a new one.**

**Tightening torque**

**Intake pipe bolt (a): 10 N·m (1.0 kgf-m, 7.0 lb-ft)**



I705H1140221-02



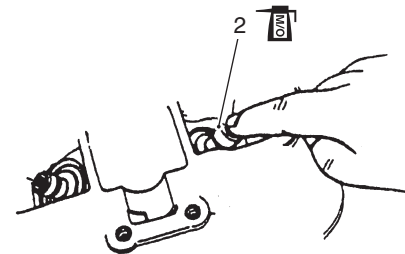
I705H1140222-01

- Install the thermostat. Refer to “Thermostat Removal and Installation in Section 1F (Page1F-11)”.
- Install the valve spring seat.
- Apply MOLYBDENUM OIL SOLUTION to the oil seal (2), and press-fit it into position.

**M/O: Molybdenum oil (MOLYBDENUM OIL SOLUTION)**

**⚠ CAUTION**

**Do not reuse the removed oil seal.**



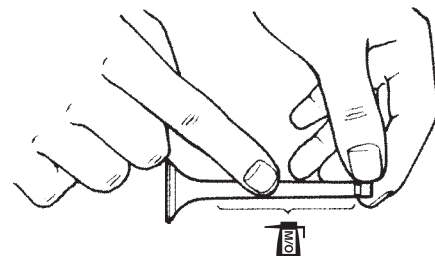
I705H1140223-01

- Insert the valve, with its stem coated with MOLYBDENUM OIL SOLUTION 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 oil seal.**

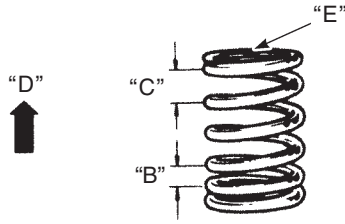
**M/O: Molybdenum oil (MOLYBDENUM OIL SOLUTION)**



I705H1140165-01

## 1D-28 Engine Mechanical:

- Install the valve spring with the small-pitch portion "B" facing cylinder head.



I705H1140166-02

"C": Large-pitch portion	"D": UPWARD	"E": Paint
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- Put on the valve spring retainer (3), and using the special tools, press down the spring, fit the cotter halves to the stem end, and release the lifter to allow the cotter halves to wedge in between retainer and stem.

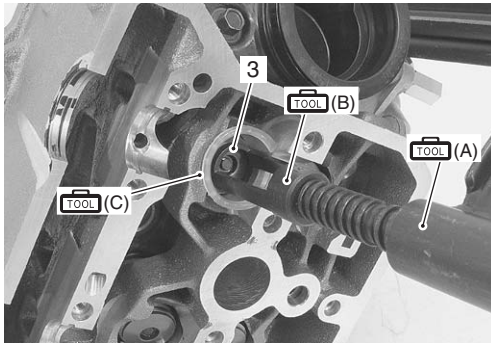
### Special tool

(A): 09916-14510 (Valve spring compressor)

(B): 09916-14530 (Valve spring compressor attachment)

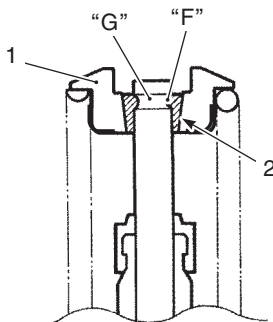
(C): 09919-28610 (Sleeve protector)

: 09916-84511 (Tweezers)



I705H1140167-03

- Be sure that the rounded lip "F" of the cotter fits snugly into the groove "G" in the stem end.



I705H1140168-02

1. Valve spring retainer	2. Cotter
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- Install the other valves and springs in the same manner as described previously.

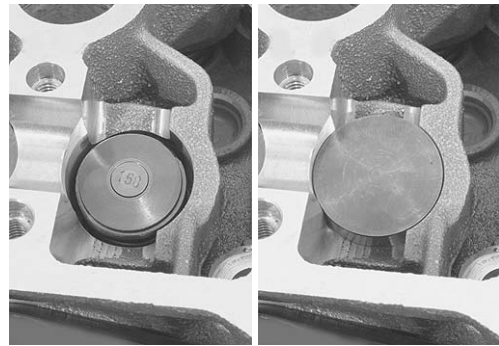
### ⚠ CAUTION

- Be sure to restore each spring and valve to their original positions.
- Be careful not to damage the valve and valve stem when handling it.

- Install the tappet shims and the tappets to their original positions.

### NOTE

- Apply engine 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.



I705H1140047-02


## Cylinder Head and Related Parts Inspection

B705H11406014

### Cylinder Head Distortion

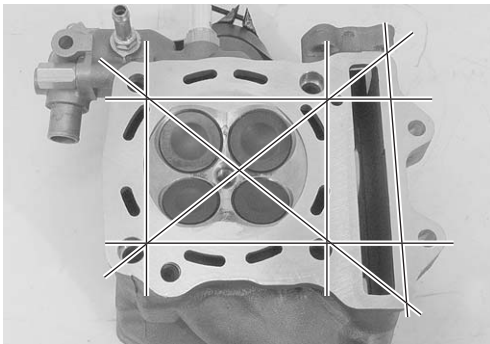
- 1) Decarbonize the combustion chambers.
- 2) Check the gasket surface of the cylinder head for distortion. Use a straightedge and thickness gauge. Take clearance readings at several places. If readings exceed the service limit, replace the cylinder head.

#### Special tool

 : 09900-20803 (Thickness gauge)

#### Cylinder head distortion

Service limit: 0.05 mm (0.002 in)





I705H1140056-02


### Valve Stem Runout

Support the valve using V-blocks, as shown, and check its runout using the dial gauge. If the runout exceeds the service limit, replace the valve.

#### Special tool

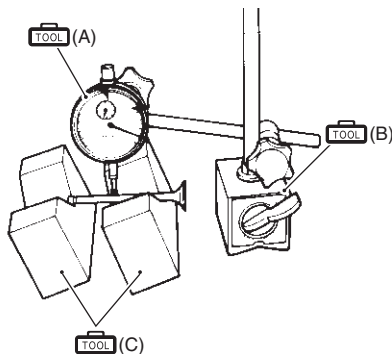
 (A): 09900-20606 (Dial gauge (1/100 mm))

 (B): 09900-20701 (Magnetic stand)

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

#### Valve stem runout

Service limit: 0.05 mm (0.002 in)





I649G1140231-02


### 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

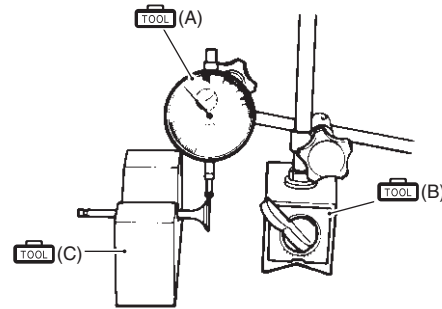
 (A): 09900-20606 (Dial gauge (1/100 mm))

 (B): 09900-20701 (Magnetic stand)

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

#### Valve head radial runout

Service limit: 0.03 mm (0.001 in)



I649G1140232-02

### Valve Face Wear

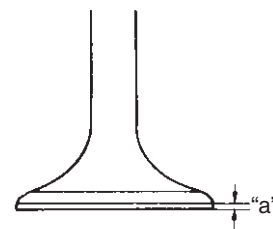
Visually inspect each valve face for wear. Replace any valve with an abnormally worn face. The thickness of the valve face decreases as the face wears. Measure the valve face "a". If it is out of specification replace the valve with a new one.

#### Special tool

 : 09900-20102 (Vernier calipers)

#### Valve face thickness "a"

Service limit: 0.5 mm (0.02 in)





I649G1140233-01



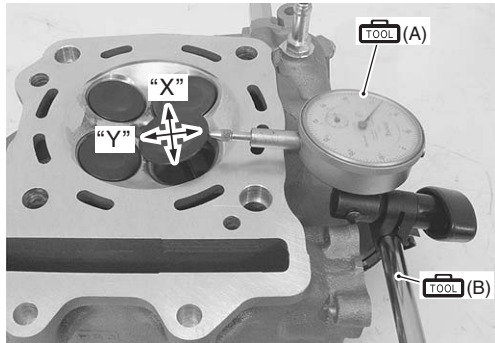
**Valve Stem Deflection**

Lift the valve about 10 mm (0.39 in) “a” 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**

-  (A): 09900-20606 (Dial gauge (1/100 mm))
-  (B): 09900-20701 (Magnetic stand)

**Valve stem deflection (IN & EX)**  
**Service limit: 0.35 mm (0.014 in)**



I705H1140057-02

**Valve Stem Diameter**

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**

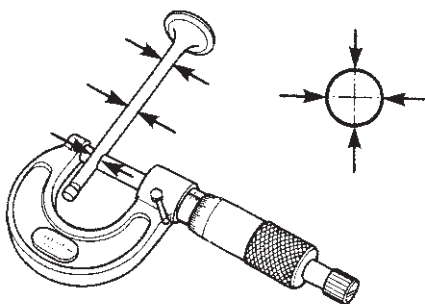
-  (A): 09900-20205 (Micrometer (0 – 25 mm))

**Valve stem O.D.**

**Standard (IN): 4.475 – 4.490 mm (0.1762 – 0.1768 in)**  
**Standard (EX): 4.455 – 4.470 mm (0.1754 – 0.1760 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 (Page1D-32)”.



I310G1140110-01


**Valve Springs**

The force of the coil spring keeps the valve seat tight. Weak-ened spring result in reduced engine power output, and often account for the chattering noise coming from the valve mechanism.

Check the valve spring for proper strength by measuring its free length and also by the force required to compress it.

If the spring length is less than the service limit, or if the force required to compress the spring does not fall within the range specified, replace the spring.

**Special tool**

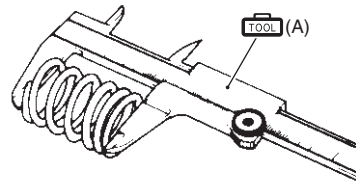
-  (A): 09900-20102 (Vernier calipers)

**Valve spring free length (IN & EX)**

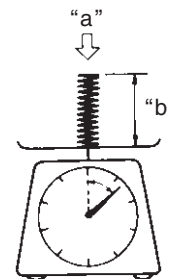
**Service limit: 38.6 mm (1.52 in)**

**Valve spring tension (IN & EX)**

**Standard: 137.3 N (14.0 kgf, 30.1 lbs) 33.35 mm (1.313 in)**



I649G1140237-02




I649G1140238-02

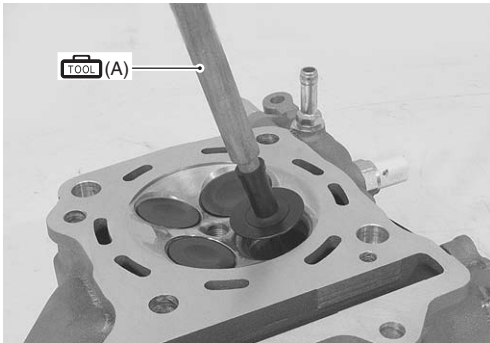
Tension “a”	Length “b”
137.3 N (14.0 kgf, 30.1 lbs)	33.35 mm (1.313 in)

**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.
- 3) Rotate the valve with light pressure.

**Special tool**

 (A): 09916-10911 (Valve lapper set)

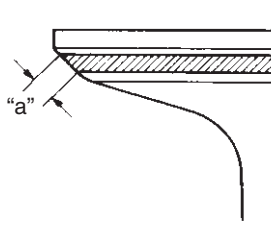


I705H1140058-01

- 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 (Page1D-33)”.

**Valve seat width “a”**

**Standard: 0.9 – 1.1 mm (0.035 – 0.043 in)**



I649G1140246-01

**Valve Seat Sealing Condition**

- 1) Clean and assemble the cylinder head and valve components.
- 2) Fill the intake and exhaust port 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 (Page1D-33)”.

**⚠ WARNING**

**Always use extreme caution when handling gasoline.**



I705H1140059-01

**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 (Page0B-4)”.**

**Valve Guide Replacement**

B705H11406051

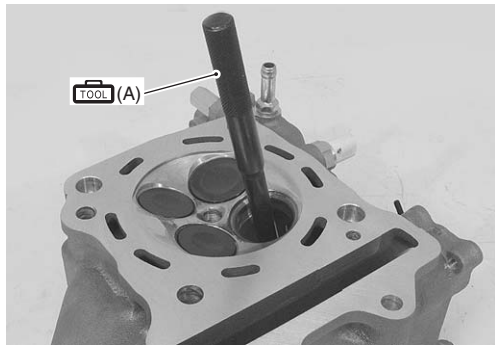
- 1) Remove the cylinder head. Refer to “Engine Top Side Disassembly (Page1D-16)”.
- 2) Remove the valves. Refer to “Cylinder Head Disassembly and Reassembly (Page1D-25)”.
- 3) Using the valve guide remover, drive the valve guide out toward the intake or exhaust camshaft side.

**Special tool**

**TOOL (A): 09916-43210 (Valve guide remover/installer)**

**NOTE**

- Discard the removed valve guide sub assemblies.
- Only oversized valve guides are available as replacement parts. (Part No. 11115-32C71)



I705H1140060-02

- 4) Refinish the valve guide holes in the cylinder head using the reamer and handle.

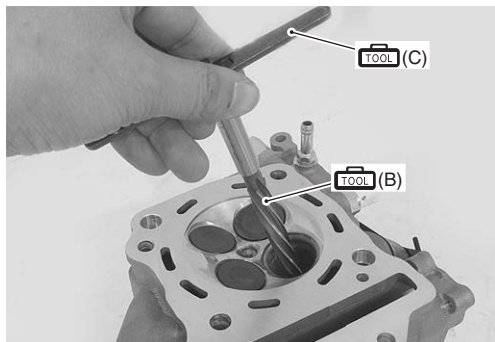
**CAUTION**

**When refinishing or removing the reamer from the valve guide hole, always turn it clockwise.**

**Special tool**

**TOOL (B): 09916-34561 (Valve guide reamer (11.3 mm))**

**TOOL (C): 09916-34542 (Reamer handle)**



I705H1140061-03

- 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 (1) and valve guide hole.
- 7) Drive the guide into the guide hole using the valve guide installer.

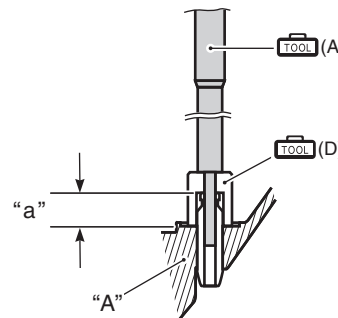
**CAUTION**

**Failure to oil the valve guide hole before driving the new guide into place may result in a damaged guide or head.**

**Special tool**

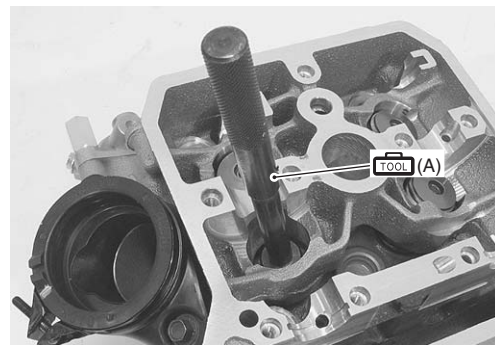
**TOOL (A): 09916-43210 (Valve guide remover/installer)**

**TOOL (D): 09916-53330 (Attachment)**



I705H1140023-04

“A”: Cylinder head	“a”: 13.3 mm (0.52 in)
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I705H1140062-02

- 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**

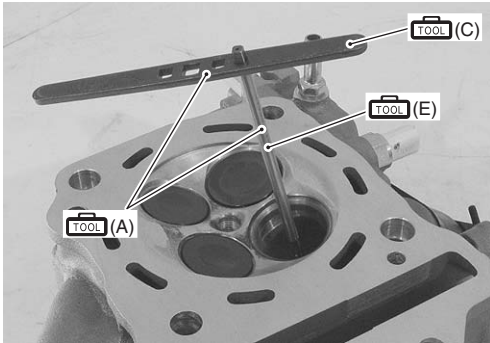
**TOOL (C): 09916-34542 (Reamer handle)**

**TOOL (E): 09916-33210 (Valve guide reamer (4.5 mm))**



**NOTE**

- Be sure to cool down the cylinder head to ambient air temperature.
- Insert the reamer from the combustion chamber side and always turn the reamer handle clockwise.



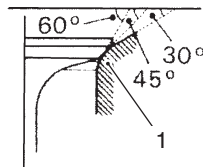
I705H1140063-04

- 9) Reassemble the cylinder head. Refer to "Cylinder Head Disassembly and Reassembly (Page1D-25)".
- 10) Install the cylinder head assembly. Refer to "Engine Top Side Assembly (Page1D-18)".

**Valve Seat Repair**

B705H11406052

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°.



I705H1140224-01

	Intake	Exhaust
Seat angle	30°/45°/60°	
Seat width	0.9 – 1.1 mm (0.035 – 0.043 in)	
Valve diameter	31 mm (1.22 in)	27 mm (1.06 in)
Valve guide I.D.	4.500 – 4.512 mm (0.1969 – 0.1973 in)	

**CAUTION**

- The valve seat contact area must be inspected after each nut.
- Do not use lapping compound after the final cut is made. 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.

**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 (Page0B-4)".

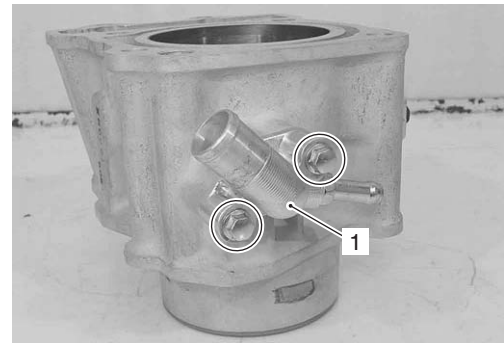
**Cylinder Disassembly and Assembly**

B705H11406059

Refer to "Engine Top Side Disassembly (Page1D-16)" and "Engine Top Side Assembly (Page1D-18)".

**Disassembly**

- Remove the water inlet connector (1).



I705H1140142-01

**Assembly**

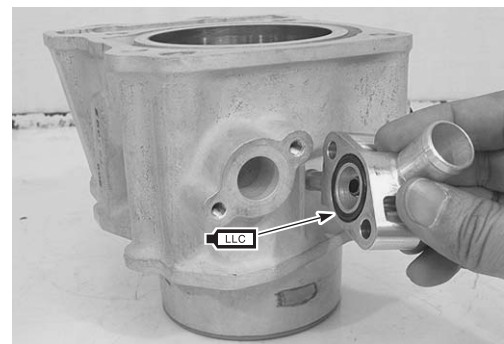
- Apply engine coolant to the O-ring.

**CAUTION**

Replace the O-ring with a new one.

**Tightening torque**

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



I705H1140143-01

### Cylinder Inspection


B705H11406053

Refer to "Engine Top Side Disassembly (Page1D-16)".  
Refer to "Engine Top Side Assembly (Page1D-18)".

#### Cylinder Distortion

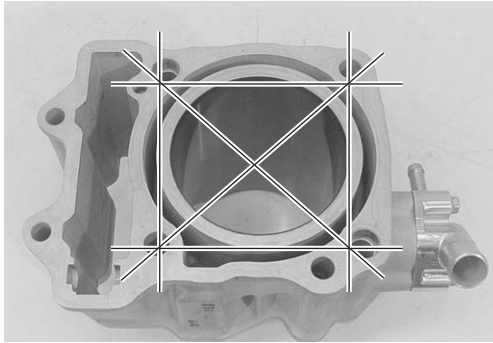
Check the gasket surface of the cylinder for distortion. Use a straightedge and thickness gauge. Take clearance readings at several places. If any reading exceeds the service limit, replace the cylinder.

#### Special tool

 : 09900-20803 (Thickness gauge)

#### Cylinder distortion

Service limit: 0.05 mm (0.002 in)




I705H1140064-01

#### Cylinder Bore

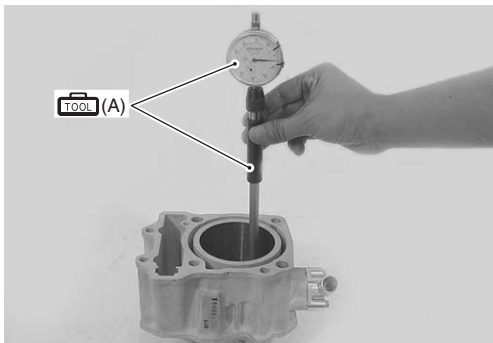
- Inspect the cylinder wall for any scratches, nicks or other damage.
- Measure the cylinder bore diameter at six place.

#### Special tool

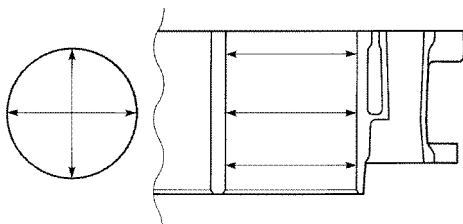
 (A): 09900-20508 (Cylinder gauge set)

#### Cylinder bore

Standard: 81.000 – 81.015 mm (3.1890 – 3.1896 in)



I705H1140065-01



I705H1140025-01

### Piston-to-cylinder Clearance

Refer to "Piston and Related Parts Inspection (Page1D-35)".

### Piston Ring Removal and Installation

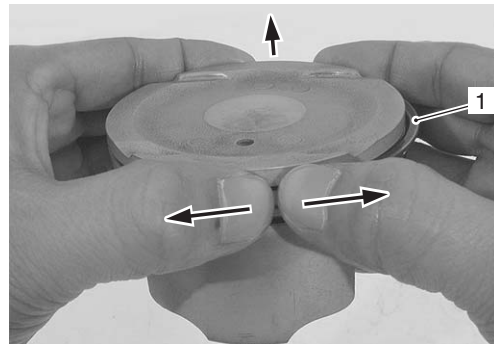
B705H11406055

#### Removal

- 1) Draw out the piston pin and remove the piston. Refer to "Engine Top Side Disassembly (Page1D-16)".
- 2) Carefully spread the ring opening with your thumbs and then push up the opposite side of the 1st ring (1) to remove it.

#### NOTE

**Do not expand the piston ring excessively since it is apt to be broken down.**



I705H1140066-02

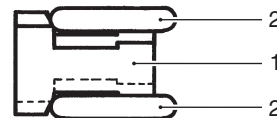
- 3) Remove the 2nd ring and oil ring in the same procedures.

#### 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.

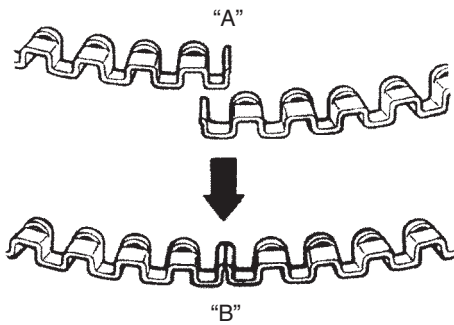
- 1) Install the piston rings in the order of the oil ring, second ring and top ring.
  - a) The first member to go into the of the oil ring groove is a spacer (1). After placing the spacer, fit the two side rails (2).



I705H1140169-02

**⚠ CAUTION**

When installing the spacer, be careful so that the both edges are not overlapped.



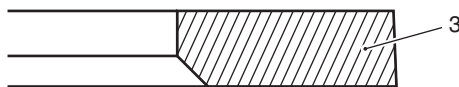
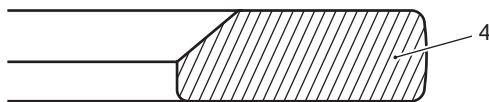
I705H1140170-02

"A": INCORRECT	"B": CORRECT
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b) Install the 2nd ring (3) and 1st ring (4) to piston.

**NOTE**

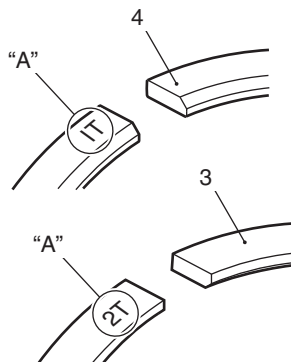
1st ring (4) and 2nd ring (3) differ in shape.



I705H1140164-01

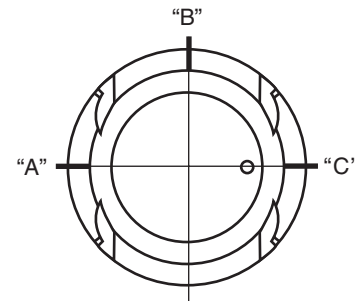
**NOTE**

Face the side with the stamped mark "A" upward when assembling.



I705H1140133-04

2) Position the gaps of the three rings and side rails as shown. Before inserting piston into the cylinder, check that the gaps are so located.



I705H1140172-03

"A": 1st ring and upper side rail	"C": 2nd ring and lower side rail
"B": Spacer	

3) Install the piston and piston pin. Refer to "Engine Top Side Assembly (Page1D-18)".

**Piston and Related Parts Inspection**

B705H11406056

Refer to "Engine Top Side Disassembly (Page1D-16)".

**Piston Diameter**

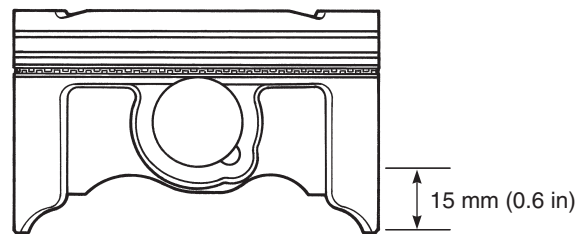
Measure the piston diameter using the micrometer at 15 mm (0.6 in) from the skirt end. If the piston diameter is less than the service limit, replace the piston.

**Special tool**

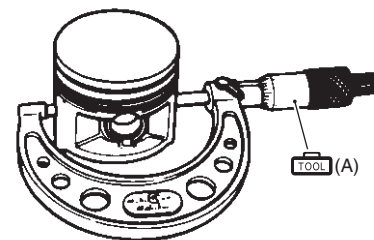
(A): 09900-20204 (Micrometer (75 – 100 mm))

**Piston diameter**

Service limit: 80.880 mm (3.1842 in)



I705H1140173-02



I649G1140262-02

**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: 0.12 mm (0.0047 in)**

**Piston Ring-to-Groove Clearance**

Measure the side clearances of the 1st and 2nd piston rings using the thickness gauge. If any of the clearances exceed the limit, replace both the piston and piston rings.

**Special tool**

 (A): 09900-20803 (Thickness gauge)

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

**Piston ring-to-groove clearance**

**Service limit: (1st): 0.18 mm (0.007 in)**

**Service limit: (2nd): 0.15 mm (0.006 in)**

**Piston ring groove width**

**Standard: (1st): 1.21 – 1.23 mm (0.0476 – 0.0484 in)**

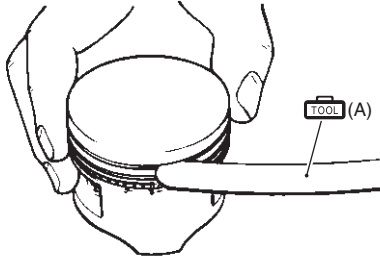
**Standard: (2nd): 1.01 – 1.03 mm (0.0398 – 0.0406 in)**

**Standard: (Oil): 2.01 – 2.03 mm (0.0791 – 0.0799 in)**

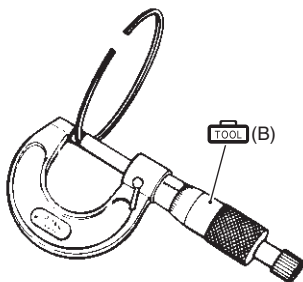
**Piston ring thickness**

**Standard: (1st): 1.17 – 1.19 mm (0.0461 – 0.0469 in)**

**Standard: (2nd): 0.97 – 0.99 mm (0.0382 – 0.0396 in)**



I649G1140263-02




I649G1140264-02

**Piston Ring Free End Gap and Piston Ring End Gap**

Measure the piston ring free end gap using 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): 09900-20102 (Vernier calipers)

**Piston ring free end gap**

**Service limit: (1st): 6.0 mm (0.24 in)**

**Service limit: (2nd): 9.2 mm (0.36 in)**

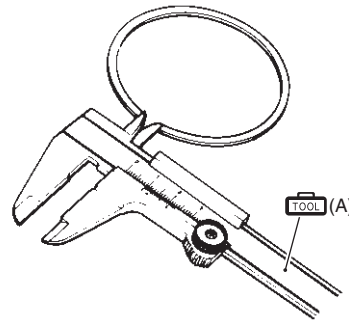
**Special tool**

 (B): 09900-20803 (Thickness gauge)

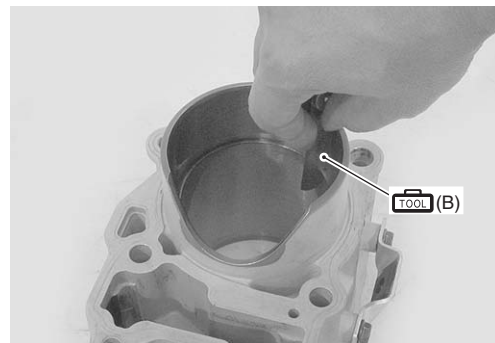
**Piston ring end gap**

**Service limit: (1st): 0.5 mm (0.020 in)**

**Service limit: (2nd): 0.5 mm (0.020 in)**



I649G1140265-02



I705H1140067-01

**Piston Pin and Pin Bore**

Measure the piston pin bore inside diameter using the small bore gauge. If either is out of specification or the difference between these measurement is more than the limits, replace the piston.

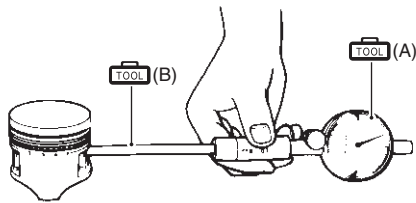
**Special tool**

**TOOL (A):** 09900-20602 (Dial gauge (1/1000 mm, 1 mm))

**TOOL (B):** 09900-22403 (Small bore gauge (18 – 35 mm))

**Piston pin bore I.D.**

**Service limit: 20.030 mm (0.7886 in)**



I649G1140267-02

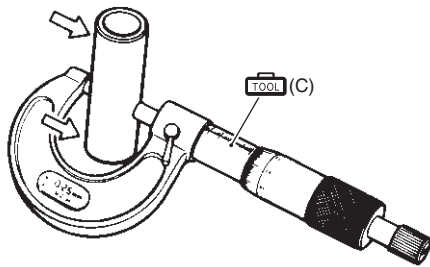
Measure the piston pin outside diameter at three positions using the micrometer. If any of the measurements are out of specification, replace the piston pin.

**Special tool**

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

**Piston pin O.D.**

**Service limit: 19.980 mm (0.7866 in)**



I649G1140268-02

**Engine Bottom Side Disassembly**

B705H11406057

**⚠ 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.**

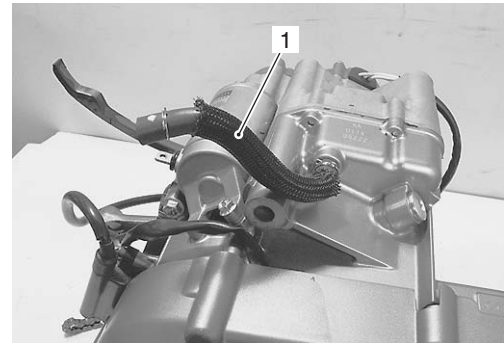
**NOTE**

**The crankcase must be separated to service the crankshaft, oil pump.**

- 1) Remove the engine assembly. Refer to “Engine Assembly Removal and Installation (Page1D-6)”.
- 2) Remove the cylinder head, cylinder and piston. Refer to “Engine Top Side Disassembly (Page1D-16)”.

**PCV hose**

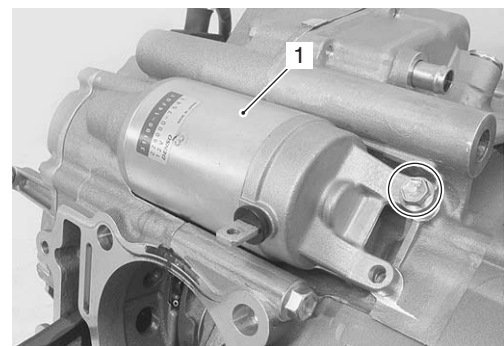
Remove the PCV hose (1).



I705H1140225-01

**Starter Motor**

Remove the starter motor (1).

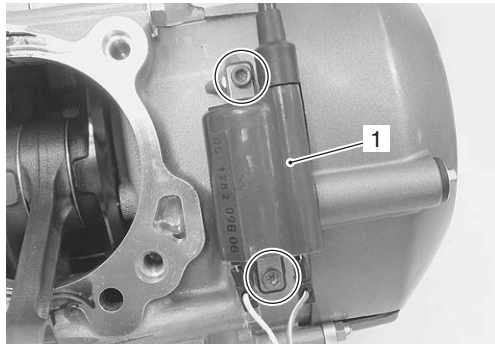


I705H1140068-01



**Ignition Coil**

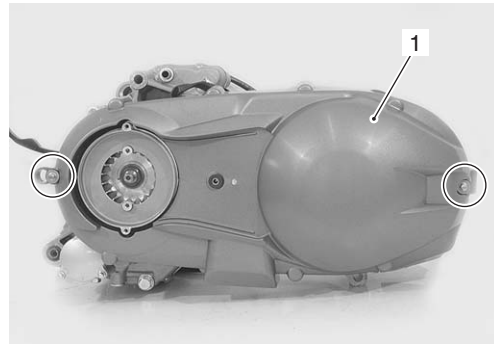
Remove the ignition coil (1).



I705H1140069-01

**Outer Clutch Cover**

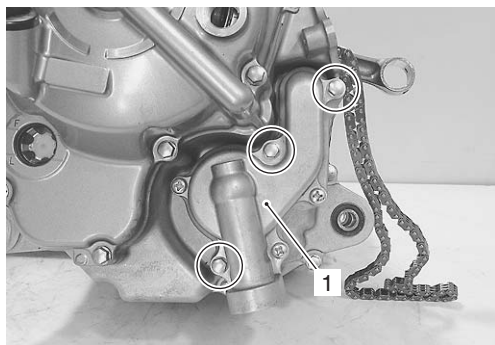
Remove the outer clutch cover (1).



I705H1140072-01

**Water Pump**

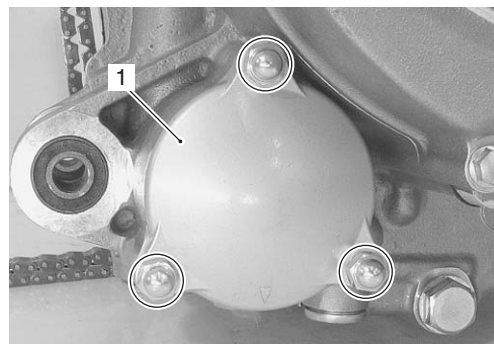
Remove the water pump assembly (1).



I705H1140073-03

**Oil Filter**

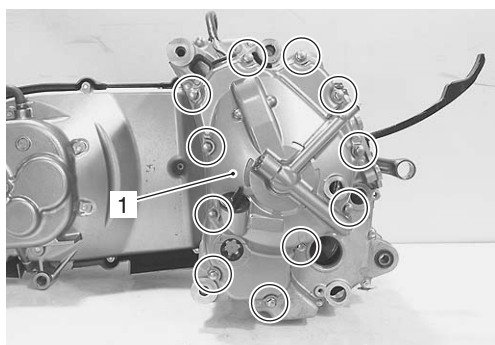
1) Remove the oil filter cap (1).



I705H1140074-01

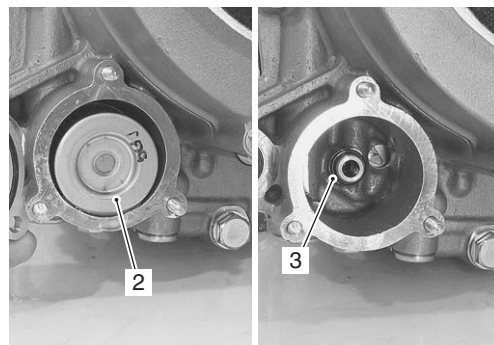
**Generator Cover**

1) Remove the generator cover (1).



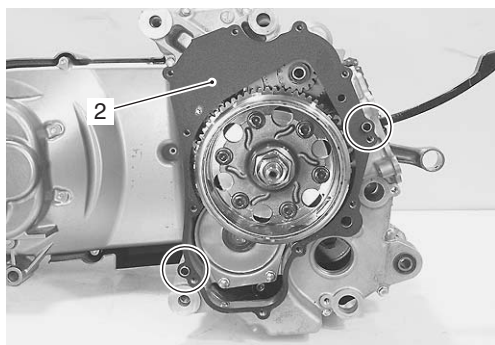
I705H1140070-04

2) Remove the oil filter (2) and O-ring (3).



I705H1140075-02

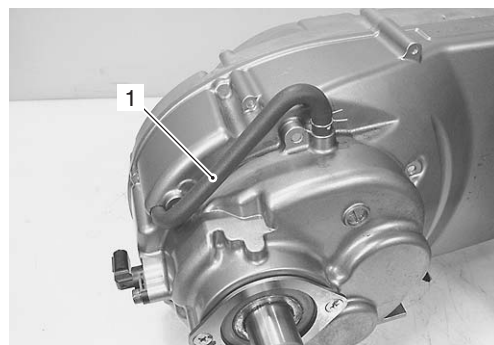
2) Remove the dowel pins and gasket (2).



I705H1140071-02

**Transmission Breather Hose**

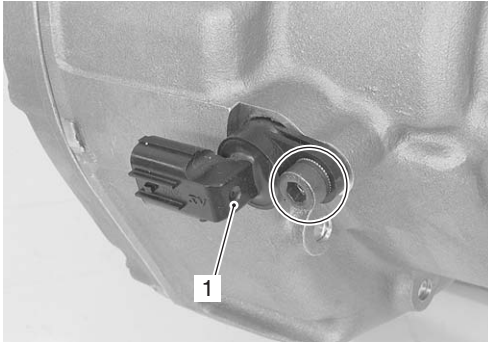
Remove the transmission breather hose (1).



I705H1140076-04

**Speed Sensor**

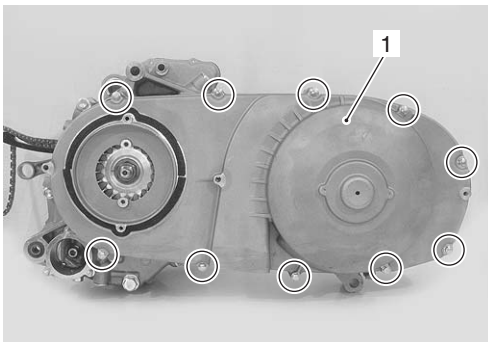
Remove the speed sensor (1).



I705H1140077-01

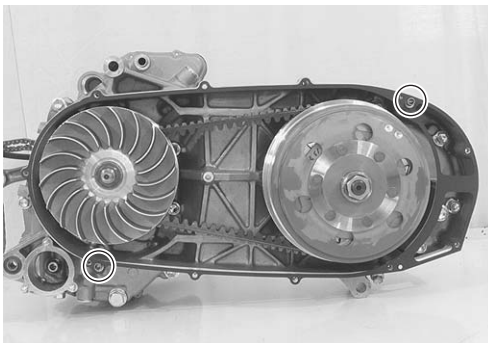
**Drivetrain**

1) Remove the inner clutch cover (1).



I705H1140078-01

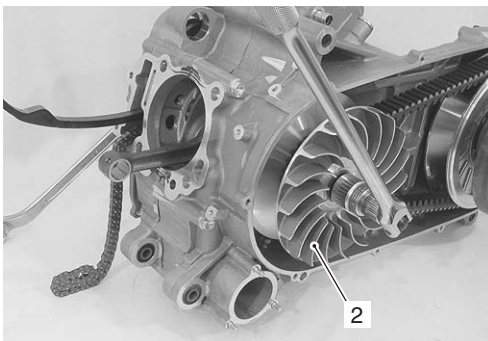
2) Remove the dowel pins and gasket.



I705H1140079-01

3) With the crankshaft held immovable, remove the fixed drive face nut and concaved washer.

4) Remove the fixed drive face (2).



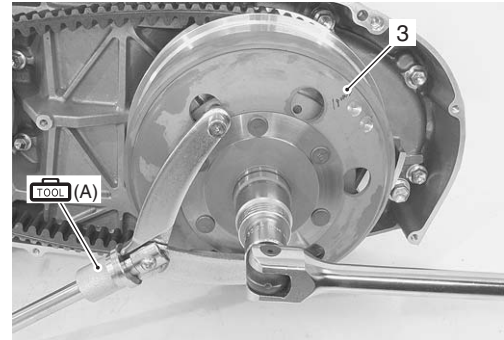
I705H1140080-01

5) With the clutch housing held immovable using the special tool, remove the clutch housing nut and concaved washer.

6) Remove the clutch housing (3).

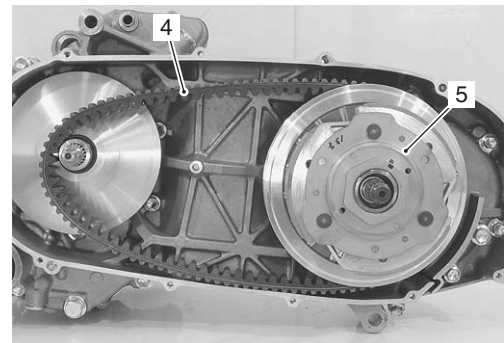
**Special tool**

 (A): 09930-40113 (Rotor holder)



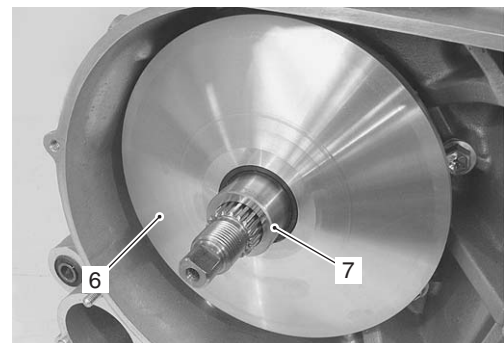
I705H1140081-01

7) Remove the drive V-belt (4) and clutch shoe/movable driven face assembly (5).



I705H1140082-01

8) Remove the movable drive face assembly (6) with the spacer (7).



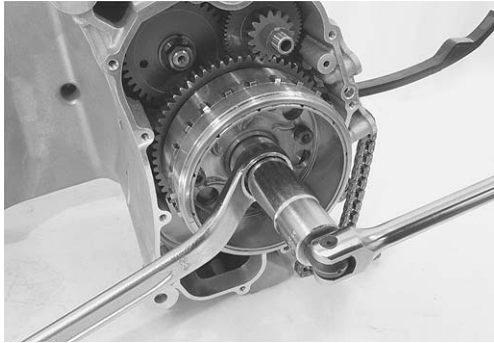
I705H1140083-02

9) Remove the final gear assembly. Refer to "Final Gear Assembly Removal and Installation in Section 3A (Page3A-3)".



### Generator Rotor


- 1) With the generator rotor held immovable, loosen the generator rotor nut.

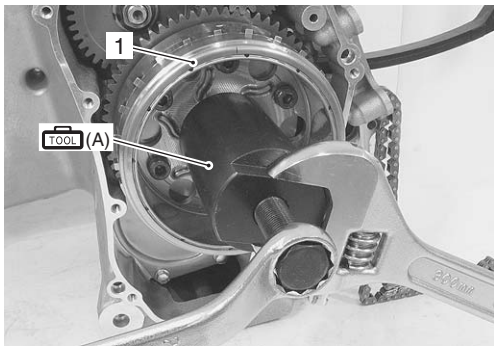


I705H1140087-01

- 2) Remove the generator rotor (1) using the special tool.

#### Special tool

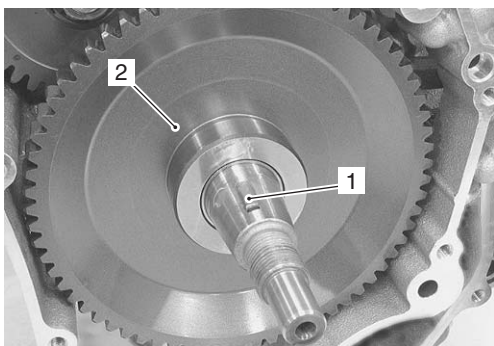
 (A): 09930-31921 (Rotor remover)



I705H1140088-02

### Starter Drive Gear

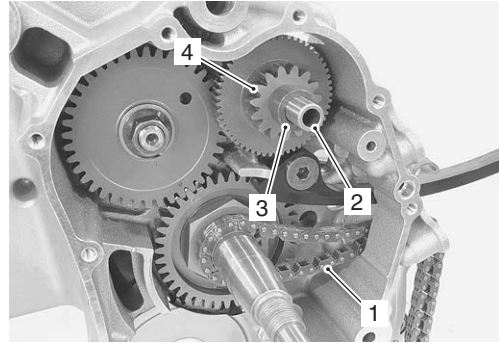
Remove the key (1) and starter driven gear (2).



I705H1140089-02

### Cam Chain and Starter Idle Gear

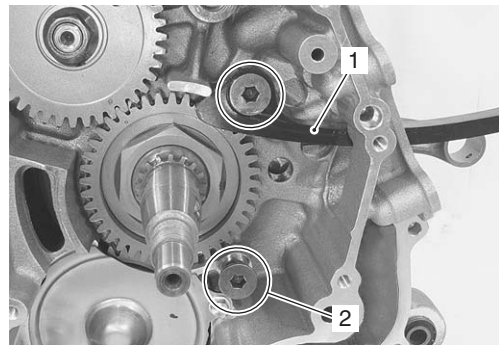
- 1) Remove the cam chain (1), starter idle gear shaft (2), spacer (3) and starter idle gear (4).



I705H1140090-02

### Cam Chain Tensioner

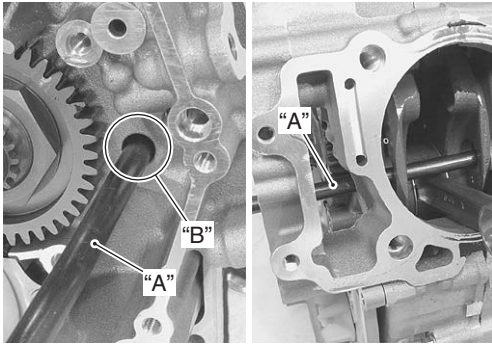
- 1) Remove the cam chain tensioner (1).
- 2) Remove the cam chain guide bolt (2).



I705H1140091-01

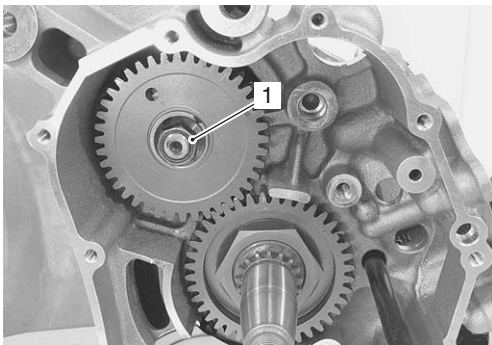
### Balancer Driven Gear

- 1) Insert a proper steel rod "A" into the crankcase hole "B" and pass it through the crankshaft web holes in order to prevent the crankshaft from turning.



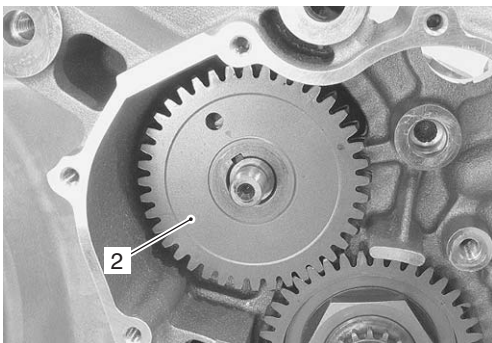
I705H1140092-02

- 2) Remove the balancer driven gear nut (1) and washer.



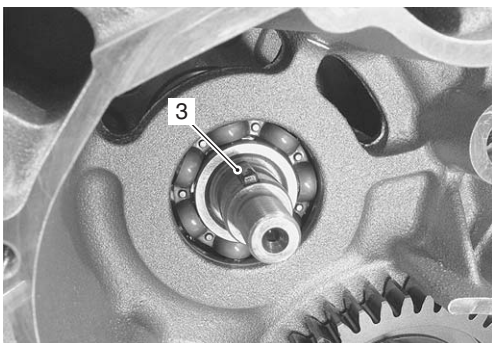
I705H1140093-01

- 3) Remove the balancer driven gear (2) along with the scissors gear behind.



I705H1140094-01

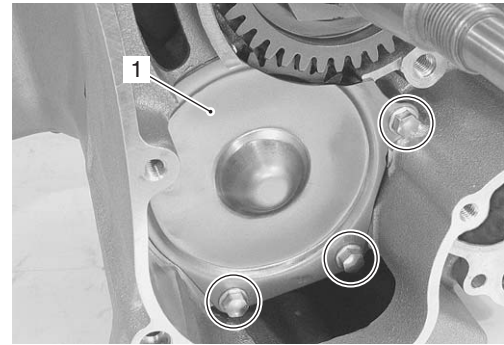
- 4) Remove the key (3).



I705H1140095-01

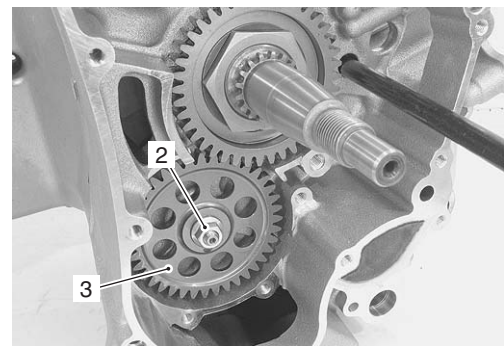
### Oil Pump Drive Gear

- 1) Remove the oil pump drive gear cover (1).



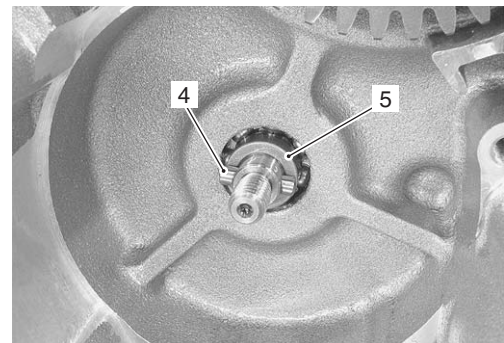
I705H1140096-01

- 2) Remove the oil pump drive gear nut (2).
- 3) Remove the oil pump drive gear (3).



I705H1140097-01

- 4) Remove the pin (4) and spacer (5).



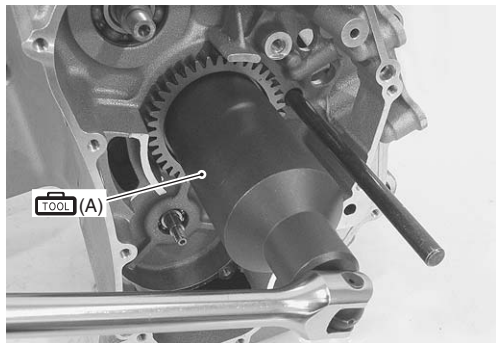
I705H1140098-02

**Crankcase**

1) Remove the balancer drive gear nut.

**Special tool**

**TOOL (A): 09922-21410 (Long socket (46 mm))**

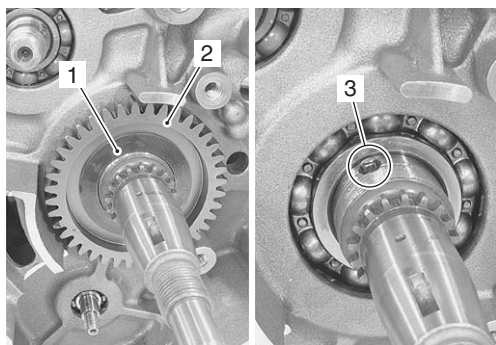


I705H1140099-01

2) Remove the steel rod.

3) Remove the washer (1) and balancer drive gear (2).

4) Remove the pin (3).

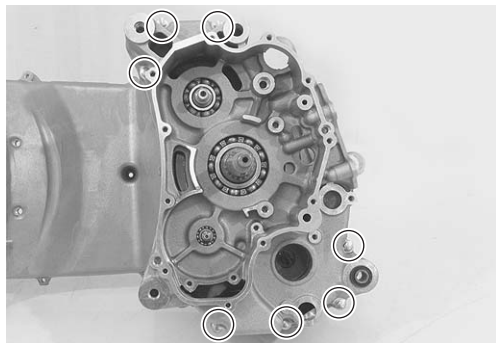


I705H1140100-01

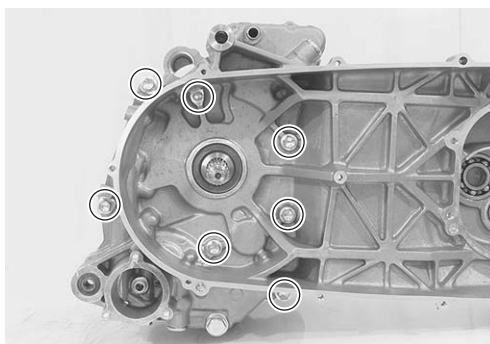
5) Remove the crankcase bolts (M6 and M8).

**⚠ CAUTION**

**Loosen the smaller diameter crankcase bolts first and then larger ones diagonally and evenly.**



I705H1140101-01



I705H1140102-01

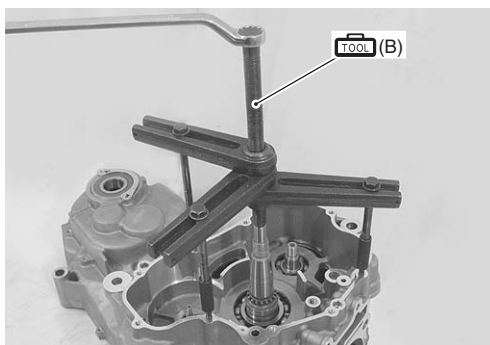
6) Separate the crankcase using the special tool.

**Special tool**

**TOOL (B): 09920-13120 (Crankcase separating tool)**

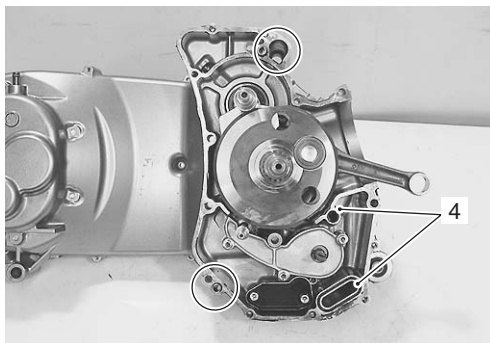
**NOTE**

- Set the special tool so that the tool arms are in parallel with the end face of crankcase.
- The crankshaft should remain in the left crankcase half.



I705H1140103-03

7) Remove the O-rings (4) and dowel pins.

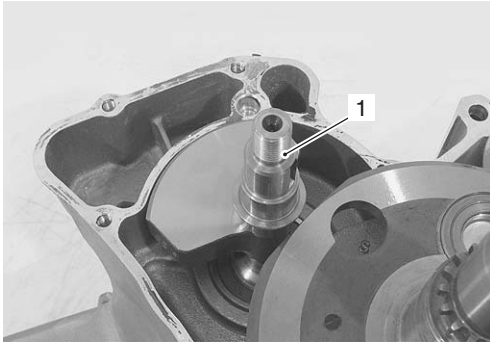


I705H1140104-04



### Balancer Shaft

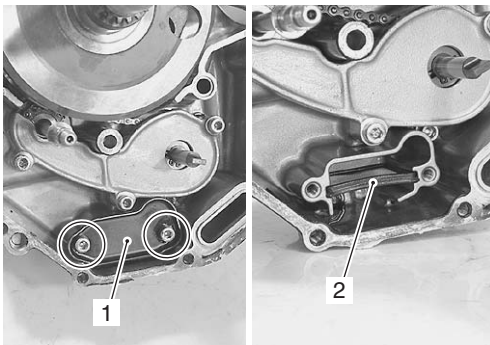
Remove the balancer shaft (1).



I705H1140105-01

### Oil Sump Filter

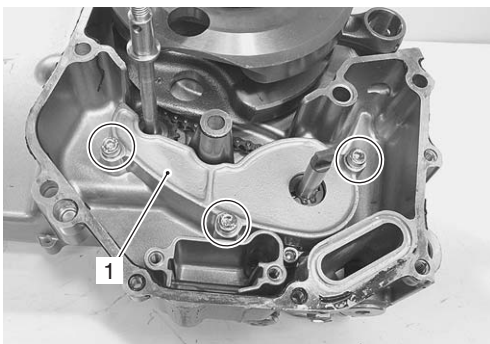
- 1) Remove the oil sump filter cover (1).
- 2) Remove the oil sump filter (2).



I705H1140106-03

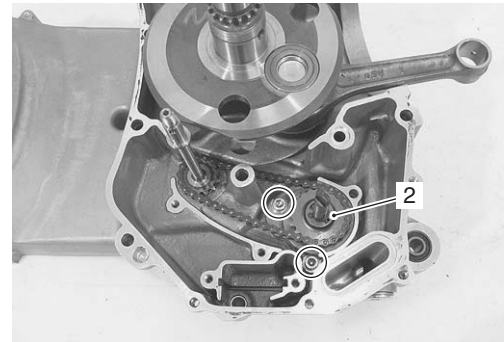
### Oil Pump

- 1) Remove the oil pump drive chain case (1).



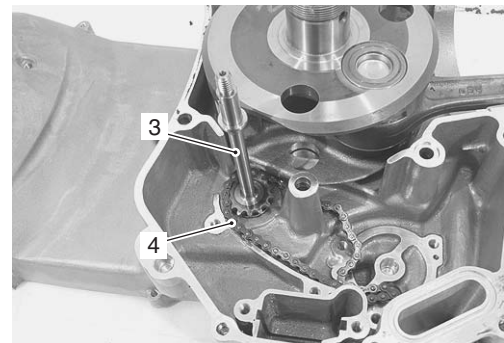
I705H1140107-04

- 2) Remove the oil pump assembly (2).



I705H1140108-01

- 3) Remove the oil pump drive shaft (3) and chain (4).



I705H1140109-01

### Crankshaft

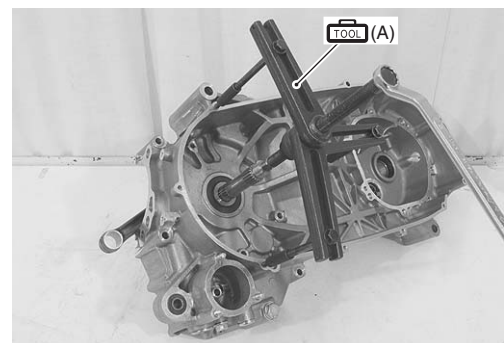
Remove the crankshaft using the special tool.

#### Special tool

 (A): 09920-13120 (Crankcase separating tool)

#### NOTE

Set the special tool so that the tool arms are in parallel with the end face of crankcase.



I705H1140110-02

## Engine Bottom Side Assembly

B705H11406058

Assemble the engine bottom side in the reverse of disassembly. Pay attention to the following points:


### Crankshaft


- Using the special tools, press in the crankshaft into the left crankcase.


#### NOTE

When pressing in the crankshaft into the crankcase, insert the inner driver attachments "A" ( $\phi 25$  mm) and "B" ( $\phi 30$  mm) of the bearing installer set between the crankcase bearing inner lace and crankshaft installer.

### Special tool

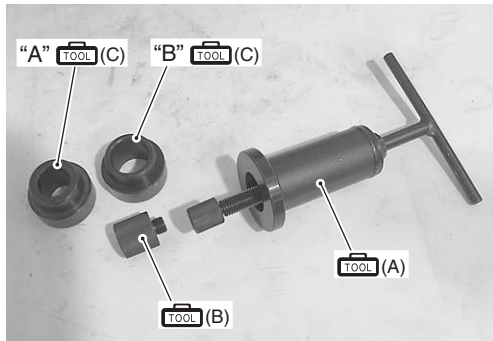
 (A): 09910-32812 (Crankshaft installer)

 (B): 09910-32870 (Crankshaft installer attachment)

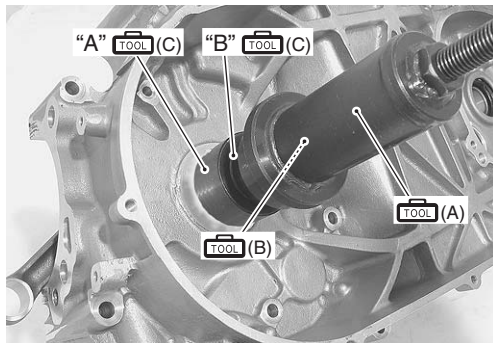
 (C): 09913-70210 (Bearing installer set)

#### CAUTION

- Do not hit the crankshaft with a plastic hammer or the like to install the crankshaft into the crankcase.
- Make sure that the direction of conrod is turned toward the cylinder hole.



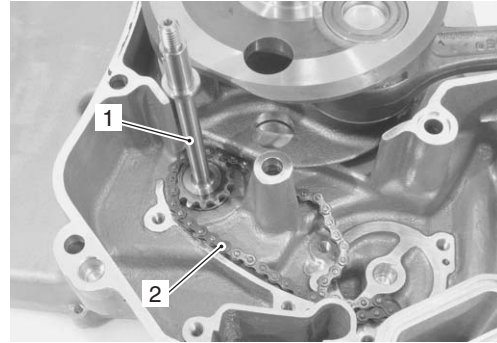
I705H1140226-01



I705H1140111-03

## Oil Pump

- Install the oil pump drive shaft (1) and oil pump drive chain (2) to the bearing.

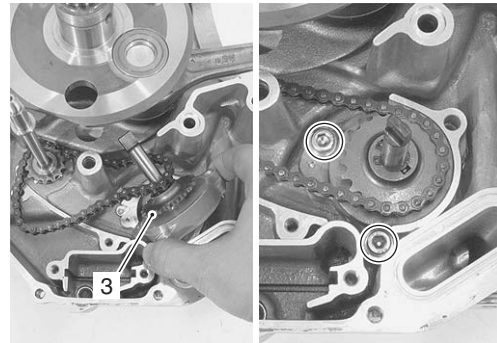


I705H1140113-02

- Install the oil pump assembly (3) and tighten the oil pump mounting bolt to the specified torque.

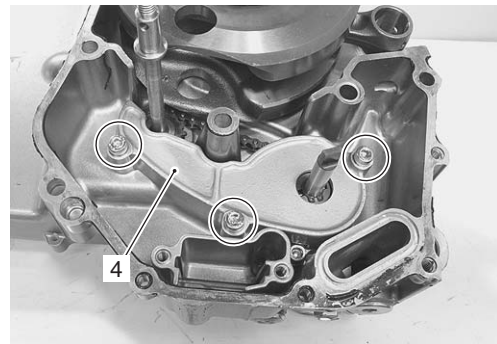
### Tightening torque

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



I705H1140114-01

- Install the oil pump drive chain cover (4).



I705H1140115-04

**Oil Sump Filter**

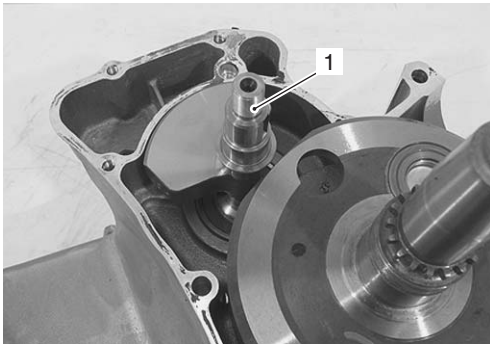
Refer to "Oil Sump Filter Removal and Installation in Section 1E (Page1E-4)".

**Balancer Shaft**

- Install the balancer shaft (1).

**NOTE**

**Bring the straightened part of the crank web toward the balancer shaft.**



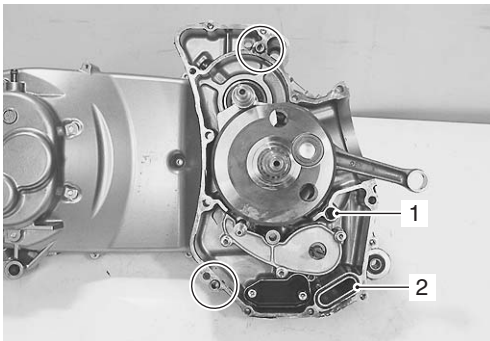
I705H1140171-01

**Crankcase**

- Install the O-rings (1) and (2).
- Install the dowel pins.

**CAUTION**

**Replace the O-rings with the new ones.**



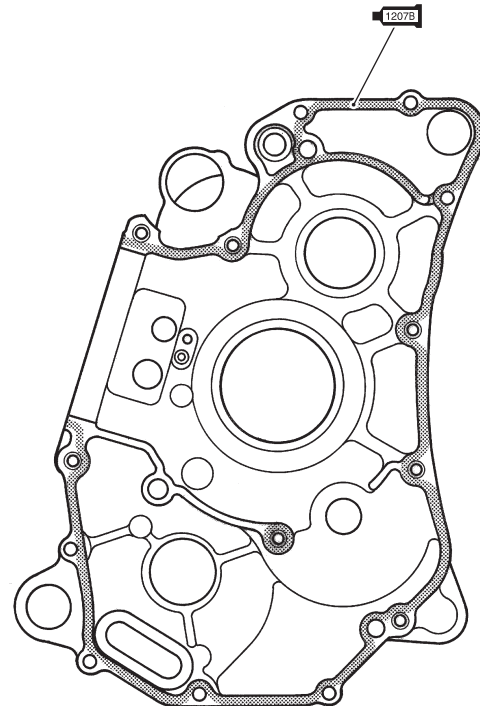
I705H1140118-04

- Clean and degrease the crankcase mating surfaces (both surfaces) with a cleaning solvent.
- Apply bond to the right crankcase.

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

**CAUTION**

- Coat the sealant evenly without break.
- Application of sealant must be performed within a short period of time.
- Take extreme care not to let sealant enter into the oil passages or bearings.



I705H1140227-01



## 1D-46 Engine Mechanical:

- Tighten the crankcase bolts to the specified torque.

### Tightening torque

Crankcase bolt (M6): 11 N·m (1.1 kgf-m, 8.0 lb-ft)

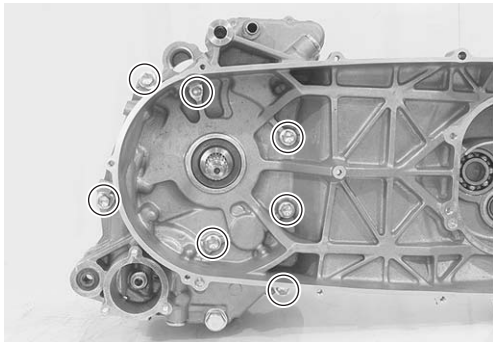
Crankcase bolt (M8): 22 N·m (2.2 kgf-m, 16.0 lb-ft)

### ⚠ CAUTION

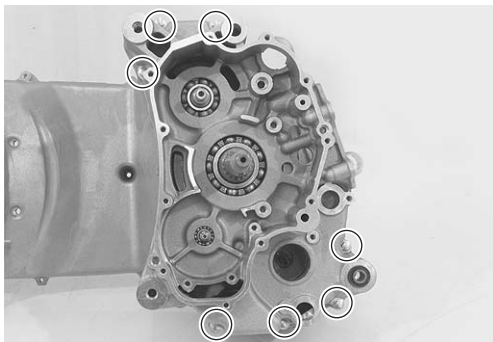
Tighten the larger diameter crankcase bolts first and then smaller ones diagonally and evenly.

### NOTE

After crankcase bolts have been tightened, check it crankshaft rotate smoothly.



I705H1140102-01



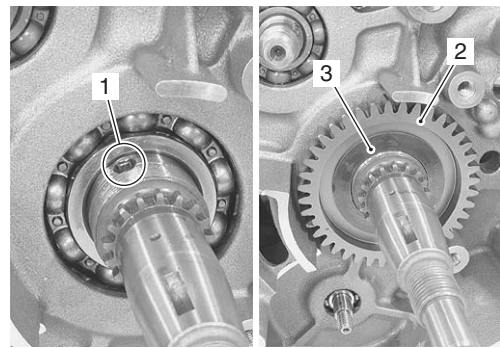
I705H1140101-01

### Balancer Drive Gear

- Insert the pin (1).
- Install the balancer drive gear (2) and washer (3).

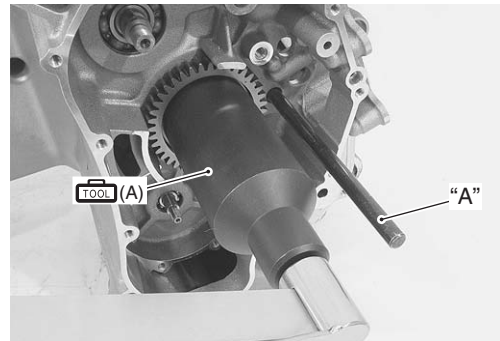
### ⚠ CAUTION

- Make sure to align the slot of the balancer drive gear with the pin.
- Set the washer with its convex side facing outside.



I705H1140120-03


- Insert a proper steel rod "A" into the crankcase hole and pass it through the crankshaft wed holes in order to prevent the crankshaft from turning.



I705H1140119-03

- Using the special tool, tighten the balancer drive gear nut to the specified torque.

### Special tool

 : 09922-21410 (Long socket (46 mm))

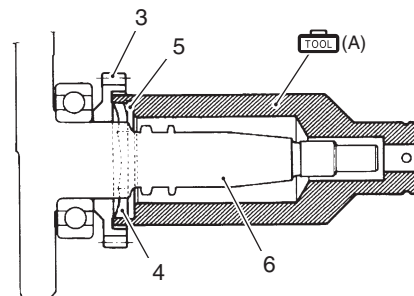
### Tightening torque

Balancer drive gear nut: 150 N·m (15 kgf-m, 11 lb-ft)

### ⚠ CAUTION

Pay attention to the direction of balancer drive gear nut.

- (3) Balancer drive gear
- (4) Wave washer
- (5) Balancer drive gear nut
- (6) Crankshaft

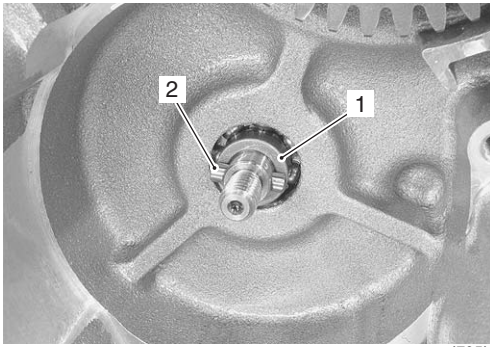


I705H1140121-01



### Oil Pump Drive Gear

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



I705H1140125-02

- Install the oil pump drive gear (3).

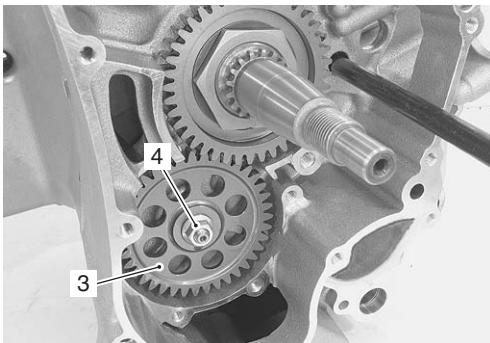
**⚠ CAUTION**

**Make sure to align the slot of the oil pump drive gear with the pin.**

- With the crankshaft held immovable, tighten the oil pump drive gear nut (4) to the specified torque.

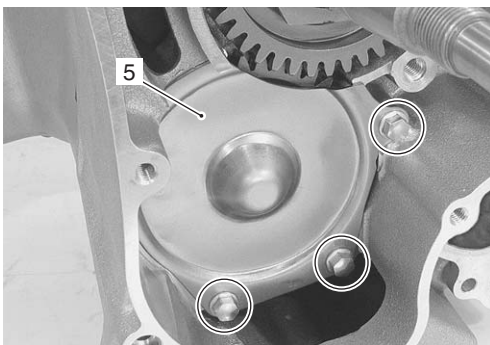
**Tightening torque**

**Oil pump drive gear nut: 23 N·m (2.3 kgf-m, 16.5 lb-ft)**



I705H1140126-02

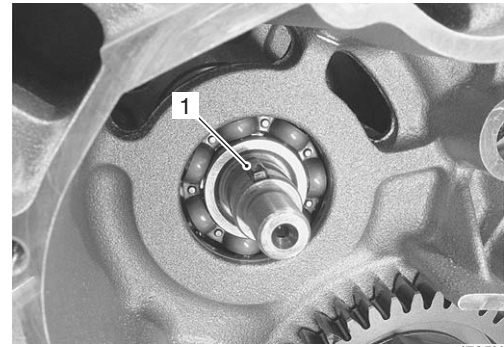
- Install the oil pump drive gear cover (5).



I705H1140127-02

### Balancer Driven Gear

- Install the key (1).

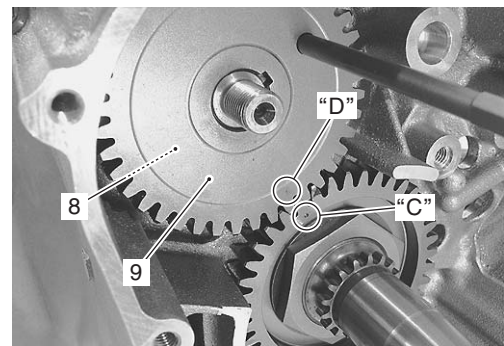


I705H1140122-01

- When installing the balancer driven gear No. 2 (8), align the punch mark "C" on the balancer drive gear with the punch mark "D" on the balancer driven gear No. 1.
- Insert a steel rod through the driven gear holes and let the balancer driven gear No. 1 teeth mesh with the balancer drive gear teeth.

**⚠ CAUTION**

**Make sure that the punch mark "C" on the balancer drive gear is aligned with the punch mark "D" on the balancer driven gear No. 1.**

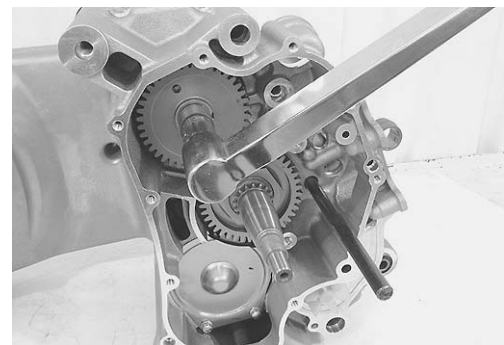


I705H1140228-01

- Install the washer and tighten the balancer driven gear nut to the specified torque.

**Tightening torque**

**Balancer driven gear nut: 50 N·m (5.0 kgf-m, 36.0 lb-ft)**



I705H1140229-01

- Remove the steel rod.

### Cam Chain Tensioner

- Install the cam chain tensioner (1) and tighten the cam chain tensioner bolt (2) to the specified torque.

#### Tightening torque

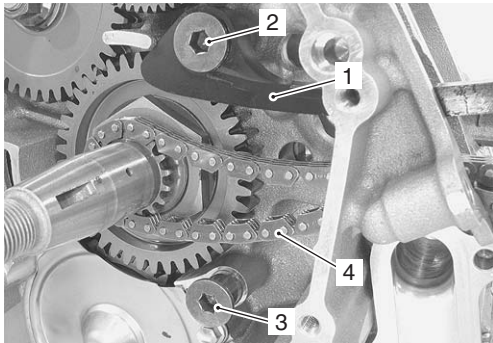
**Cam chain tensioner bolt: 23 N·m (2.3 kgf-m, 16.5 lb-ft)**

- Tighten the cam chain guide bolt (3) to the specified torque.

#### Tightening torque

**Cam chain guide bolt: 23 N·m (2.3 kgf-m, 16.5 lb-ft)**

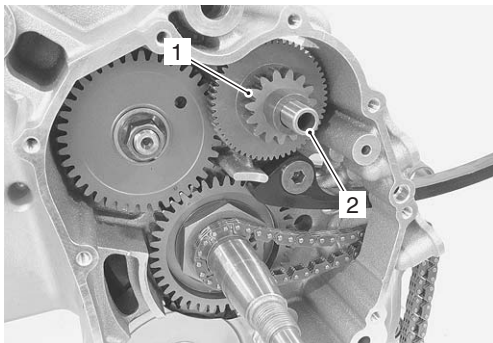
- Set the cam chain (4) onto the crankshaft.



I705H1140123-02

### Starter Idle Gear

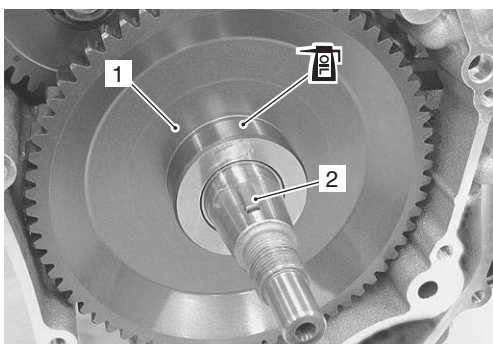
- Install the starter idle gear (1) onto the starter idle gear shaft (2).



I705H1140124-01

### Starter Driven Gear

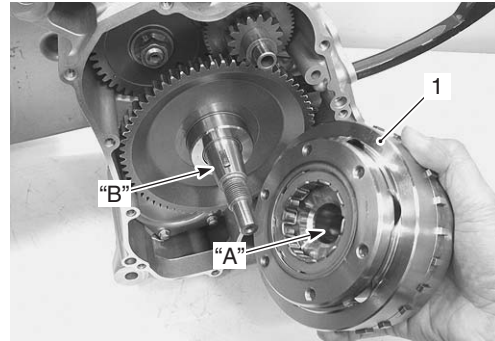
- Install the starter driven gear (1) and key (2).
- Apply engine oil to the starter clutch mating surface.



I705H1140128-02

### Generator Rotor

- Degrease the tapered portion "A" of generator rotor and also the crankshaft "B". Use nonflammable cleaning solvent to wipe off oily or greasy matter and make these surfaces completely off oily or greasy matter and make these surfaces completely dry.



I705H1140240-01

- Install the generator rotor (1).

#### NOTE

**Make sure to engage the starter clutch with the starter driven gear.**

- With the generator rotor locked, tighten the generator rotor nut to the specified torque.

#### Tightening torque

**Generator rotor nut: 160 N·m (16.0 kgf-m, 115.5 lb-ft)**



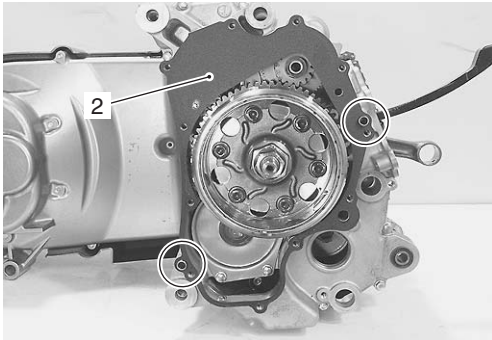
I705H1140129-01

### Generator Cover

- Install the dowel pins (1) and gasket (2).

**⚠ CAUTION**

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

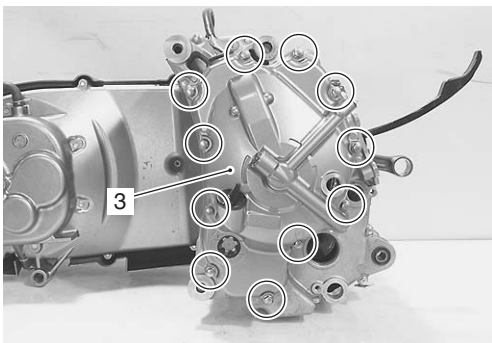


I705H1140230-01

- Install the generator cover (3).
- Tighten the generator cover bolts to the specified torque.

**Tightening torque**

**Generator cover bolt: 11 N·m (1.1 kgf-m, 8.0 lb-ft)**



I705H1140231-03

- Install the final gear assembly. Refer to “Final Gear Assembly Removal and Installation in Section 3A (Page3A-3)”.
- Install the clutch and movable driven face. Refer to “V-belt Type Continuously Variable Automatic Transmission Removal and Installation in Section 5A (Page5A-3)”.

### Water Pump

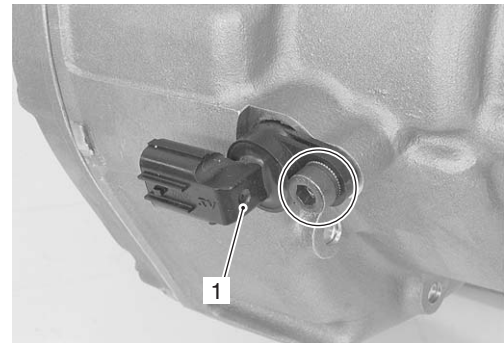
Refer to “Water Pump Removal and Installation in Section 1F (Page1F-14)”.

### Speed Sensor

- Install the speed sensor (1).

**Tightening torque**

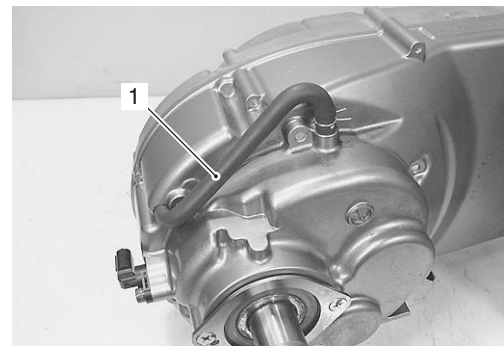
**Speed Sensor: 10 N·m (1.0 kgf-m, 7.0 lb-ft)**



I705H1140077-01

### Final Reduction Gear Breather Hose

- Install the final reduction gear breather hose (1).



I705H1140076-04



### Oil Filter

- Install the O-ring (1).

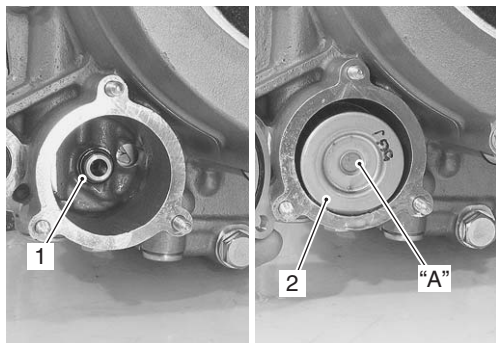
**⚠ CAUTION**

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

- Install the oil filter (2).

**⚠ CAUTION**

**Position the oil filter so that the valve "A" comes outside.**



I705H1140232-03

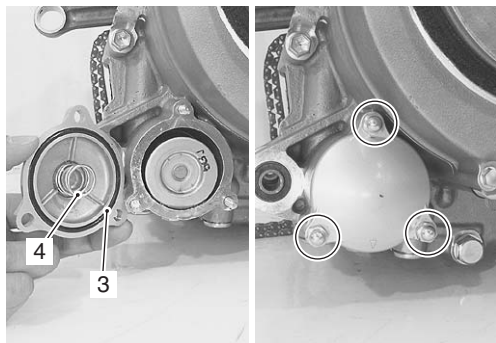
- Install the O-ring (3).
- Install the spring (4).
- Tighten the oil filter cap bolts to the specified torque.

**⚠ CAUTION**

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

### Tightening torque

Oil filter cap bolt: 10 N·m (1.0 kgf·m, 7.0 lb·ft)



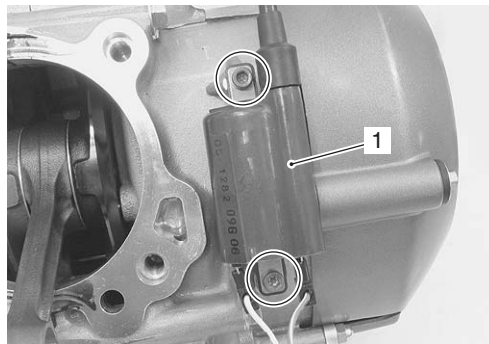
I705H1140233-01

### Outer Clutch Cover

Refer to "V-belt Type Continuously Variable Automatic Transmission Removal and Installation in Section 5A (Page5A-3)".

### Ignition Coil

- Install the ignition coil (1).



I705H1140069-01

### Starter Motor

- Install the O-ring (1) to the starter motor.

**⚠ CAUTION**

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

- Apply grease to the O-ring (1).

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



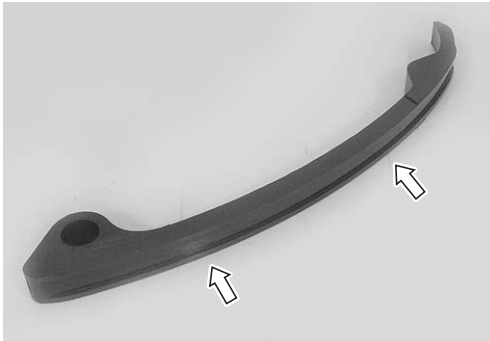
I705H1140235-02

### Cam Chain Tensioner Inspection

B705H11406060

Inspect the cam chain tensioner in the following procedures:

- 1) Remove the cam chain tensioner. Refer to "Engine Bottom Side Disassembly (Page1D-37)".
- 2) Inspect the contacting surface of the cam chain tensioner. If it is worn or damaged, replace the cam chain tensioner with a new one.



I705H1140144-01

- 3) Install the cam chain tensioner. Refer to "Engine Bottom Side Assembly (Page1D-44)".

### Conrod and Crankshaft Inspection

B705H11406025

Refer to "Engine Bottom Side Disassembly (Page1D-37)".

Refer to "Engine Bottom Side Assembly (Page1D-44)".

#### Conrod Small End I.D.

Measure the conrod small end inside diameter using the small bore gauge.

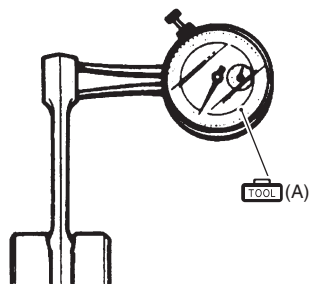
If the conrod small end inside diameter exceeds the service limit, replace the conrod.

#### Conrod small end I.D.

Service limit: 20.040 mm (0.789 in)

#### Special tool

**TOOL (A):** 09900-20605 (Dial calipers (1/100 mm, 10 – 34 mm))



I705H1140145-02

### Conrod Big End Side Clearance

Inspect the conrod side clearance using the thickness gauge.

If the clearance exceeds the limit, inspect the conrod big end width and crank pin width.

If the width exceed the limit, replace conrod or crankshaft.

#### Conrod big end side clearance

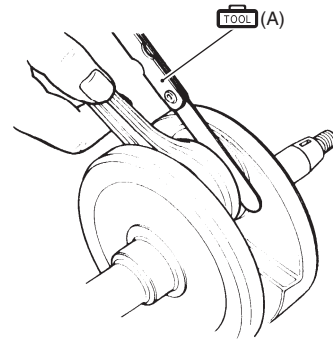
Limit: 1.00 mm (0.04 in)

#### Special tool

**TOOL (A):** 09900-20803 (Thickness gauge)

#### Conrod big end width

Standard: 21.95 – 22.00 mm (0.864 – 0.866 in)



I705H1140146-02

### 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

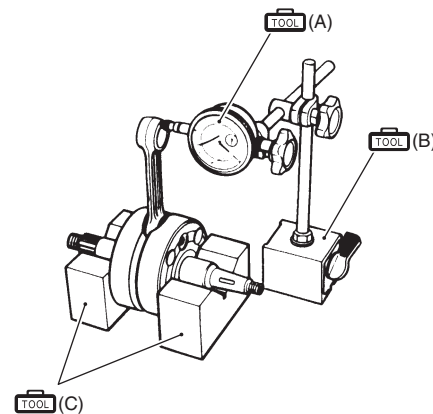
Service limit: 3.0 mm (0.12 in)

#### Special tool

**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))



I705H1140147-02


**Crankshaft Runout**


- With the right and left crank journals supported with V-block, turn the crankshaft slowly. At this time, measure the crankshaft end runout using a dial gauge. If the runout exceeds the service limit, replace the crankshaft.


**Crankshaft runout**

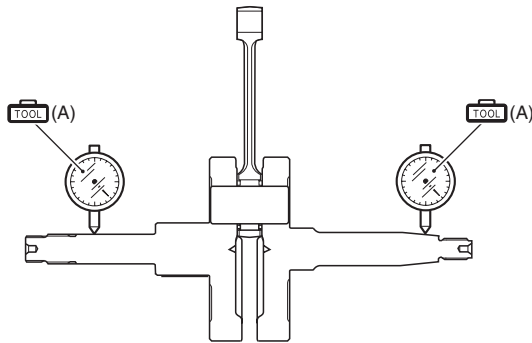
**Service limit: 0.08 mm (0.003 in)**

**Special tool**

 (A): 09900-20607 (Dial gauge (1/100 mm, 10 mm))

 : 09900-20701 (Magnetic stand)

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



I705H1140241-01

**NOTE**

**Set the V-block so that the crankshaft becomes horizontal.**

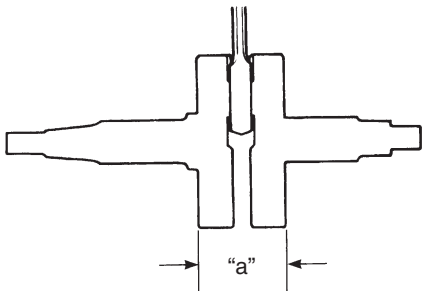
**Width Between Crankshaft Webs**

B705H11406030

Measure the width between crankshaft webs "a".

**Width between crankshaft webs "a"**

**Standard: 59.9 – 60.1 mm (2.358 – 2.366 in)**



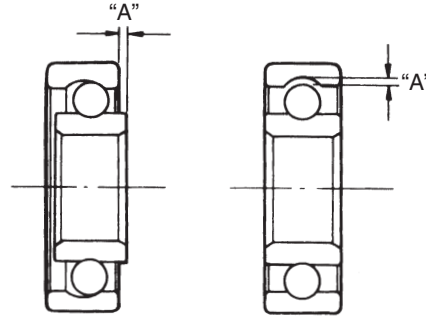
I705H1140149-04

**Bearing Inspection**

B705H11406061

Inspect the bearing in the following procedures:

- 1) Separate the crankcase. Refer to "Engine Bottom Side Assembly (Page1D-44)"
- 2) Rotate the bearing inner race by finger to inspect for abnormal play, noise and smooth rotation while the bearings are in the crankcase, if there is anything unusual, replace the bearing. Refer to "Bearing Removal and Installation (Page1D-52)".



I705H1140150-03

"A": Play

**NOTE**

**If abnormal noise does not occur, it is not necessary to remove the bearing.**

**Bearing Removal and Installation**


B705H11406062

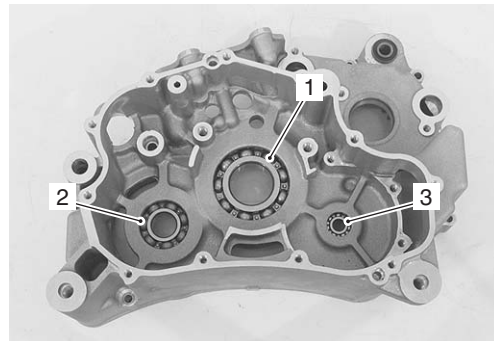
**Removal**

Separate the crankcase. Refer to "Engine Bottom Side Assembly (Page1D-44)"

- Remove the bearing (1), (2) and (3) using the special tool.

**Special tool**


 : 09913-70210 (Bearing installer set)

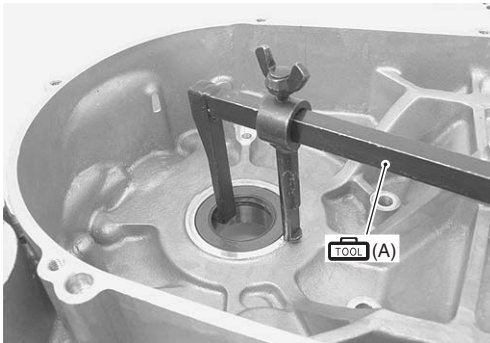


I705H1140151-01

- Remove the oil seal using the special tool.

**Special tool**


 (A): 09913-50121 (Oil seal remover)

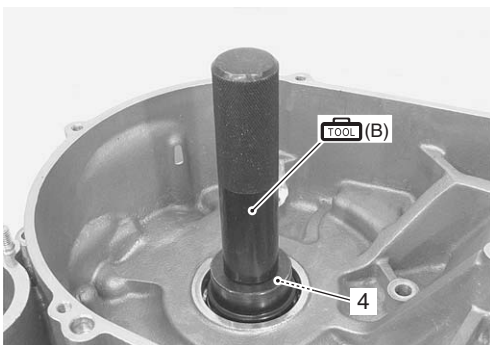


I705H1140152-01

- Remove the bearing (4) using the special tool.

**Special tool**


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

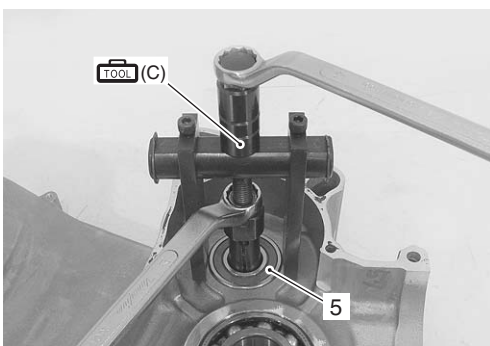


I705H1140153-02

- Remove the bearing (5) using the special tool.

**Special tool**


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

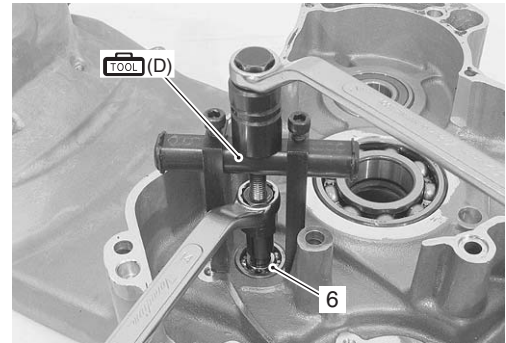


I705H1140154-02

- Remove the bearing (6) using the special tool.

**Special tool**

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




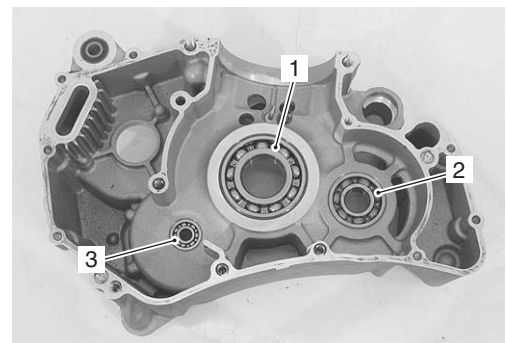
I705H1140155-02

**Installation**

- Install the bearing (1), (2) and (3) using the special tool.

**Special tool**


 : 09913-70210 (Bearing installer set)

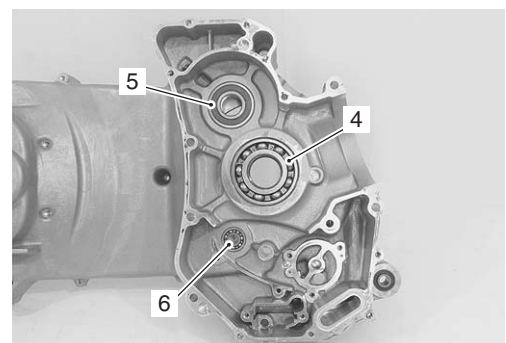


I705H1140156-01

- Install the bearing (4), (5) and (6) using the special tool.

**Special tool**

 : 09913-70210 (Bearing installer set)




I705H1140157-01



## 1D-54 Engine Mechanical:

- Install the oil seal using the special tool.

### Special tool

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

### CAUTION

Replace the removed oil seal with a new one.



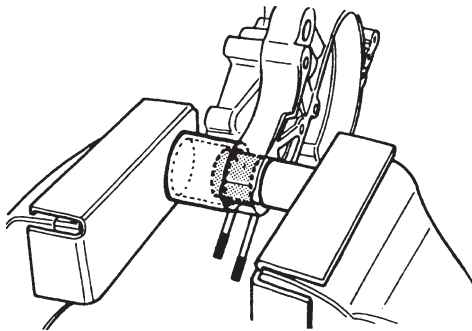
I705H1140158-02

## Rear Suspension Mounting Bushing Removal and Installation

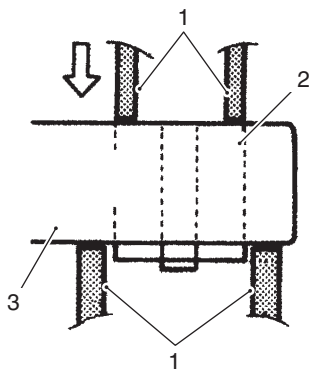
B705H11406063

### Removal

- 1) Separate the crankcase. Refer to "Engine Bottom Side Disassembly (Page1D-37)" and "Engine Bottom Side Assembly (Page1D-44)".
- 2) Using appropriate size steel tubes (1) and vise, remove the rear suspension mounting bushing (2) (LH and RH).



I705H1140159-01

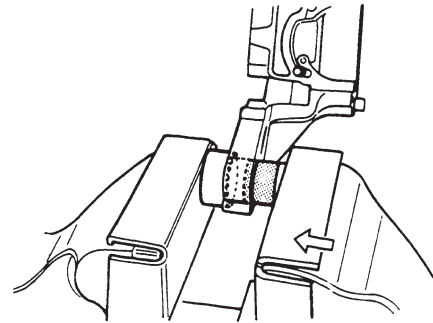


I705H1140160-01

1. Steel tube	2. Bushing	3. Crank case
---------------	------------	---------------

### Installation

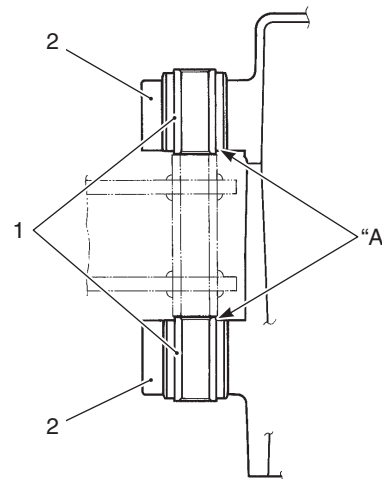
- 1) Using an appropriate side steel tube and vise, press in the bushing into the crankcase (LH and RH).



I705H1140161-01

### CAUTION

Bushing end "A" must be flush with the crankcase surface.



I705H1140162-05

1. Bushing	2. Crank case
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- 2) Assemble the crankcase. Refer to "Engine Bottom Side Disassembly (Page1D-37)" and "Engine Bottom Side Assembly (Page1D-44)".

## Specifications

### Service Data

B705H11407002

#### Valve + Valve Guide

Unit: mm (in)

Item	Standard		Limit
Valve diam.	IN.	31.0 (1.22)	—
	EX.	27.0 (1.06)	—
Tappet clearance (when cold)	IN.	0.10 – 0.20 (0.003 – 0.008)	—
	EX.	0.20 – 0.30 (0.008 – 0.009)	—
Valve guide to valve stem clearance	IN.	0.10 – 0.37 (0.004 – 0.015)	—
	EX.	0.30 – 0.57 (0.012 – 0.022)	—
Valve guide I.D.	IN. & EX.	4.500 – 4.512 (0.1772 – 0.1776)	—
Valve stem O.D.	IN.	4.475 – 4.490 (0.1762 – 0.1768)	—
	EX.	4.455 – 4.470 (0.1754 – 0.1760)	—
Valve stem deflection	IN. & EX.	—	0.35 (0.014)
Valve stem runout	IN. & EX.	—	0.05 (0.002)
Valve head thickness	IN. & EX.	—	0.5 (0.02)
Valve seat width (30°, 45°, 60°)	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. & EX.	—	38.6 (1.52)
Valve spring tension	IN. & EX.	137.3 N (14.0 kgf, 30.1 lbs) at length 33.35 mm (1.313 in)	—

#### Camshaft + Cylinder Head

Unit: mm (in)

Item	Standard		Limit
Cam height	IN.	36.61 – 36.66 (1.441 – 1.443)	36.31 (1.430)
	EX.	35.94 – 35.99 (1.415 – 1.417)	35.64 (1.403)
Camshaft journal oil clearance	IN. & EX.	0.019 – 0.053 (0.0007 – 0.0021)	0.15 (0.006)
Camshaft journal holder I.D.	IN. & EX.	22.012 – 22.025 (0.8666 – 0.8671)	—
Camshaft journal O.D.	IN. & EX.	21.972 – 21.993 (0.8650 – 0.8659)	—
Camshaft runout	IN. & EX.	—	0.10 (0.004)
Cam chain pin (at arrow "3")	15th pin		—
Cylinder head distortion	—		0.05 (0.002)

**1D-56 Engine Mechanical:****Cylinder + Piston + Piston Ring**

Unit: mm (in)

Item	Standard		Limit
Compression pressure (Automatic de-comp. actuated)	E-02, 19, 24, 54	1 060 – 1 140 kPa (10.6 – 11.4 kgf/cm <sup>2</sup> , 151 – 162 psi)	660 kPa (6.0 kgf/cm <sup>2</sup> , 94 psi)
	E-03, 28, 33	1 000 – 1 080 kPa (10.0 – 10.8 kgf/cm <sup>2</sup> , 142 – 154 psi)	620 kPa (6.2 kgf/cm <sup>2</sup> , 88 psi)
Piston to cylinder clearance	0.025 – 0.035 (0.0010 – 0.0014)		0.120 (0.005)
Cylinder bore	81.000 – 81.015 (3.1890 – 3.1896)		No nicks or scratches
Piston diam.	80.970 – 80.985 (3.1878 – 3.1884) (Measure at 15 mm (0.6 in) from the skirt end.)		80.880 (3.1842)
Cylinder distortion	—		0.05 (0.002)
Piston ring free end gap	1st IT	Approx. 7.5 (0.30)	6.0 (0.24)
	2nd 2T	Approx. 11.5 (0.45)	9.2 (0.36)
Piston ring end gap	1st	0.06 – 0.21 (0.002 – 0.008)	0.5 (0.02)
	2nd	0.06 – 0.18 (0.002 – 0.007)	0.5 (0.02)
Piston ring to groove clearance	1st	—	0.18 (0.007)
	2nd	—	0.15 (0.006)
Piston ring groove width	1st	1.21 – 1.23 (0.0476 – 0.0484)	—
	2nd	1.01 – 1.03 (0.0398 – 0.0406)	—
	Oil	2.01 – 2.03 (0.0791 – 0.0799)	—
Piston ring thickness	1st	1.17 – 1.19 (0.461 – 0.469)	—
	2nd	0.97 – 0.99 (0.0382 – 0.0390)	—
Piston pin bore	20.002 – 20.008 (0.7874 – 0.7877)		20.030 (0.789)
Piston pin O.D.	19.996 – 20.000 (0.7872 – 0.7874)		19.980 (0.787)

**Conrod + Crankshaft**

Unit: mm (in)

Item	Standard	Limit
Conrod small end I.D.	20.006 – 20.014 (0.7876 – 0.7880)	20.040 (0.789)
Conrod deflection	—	3.0 (0.12)
Conrod big end side clearance	0.10 – 0.65 (0.004 – 0.026)	1.0 (0.04)
Conrod big end width	21.95 – 22.00 (0.864 – 0.866)	—
Width between crankshaft webs	59.9 – 60.1 (2.358 – 2.366)	—
Crankshaft runout	—	0.08 (0.003)

**Throttle Body**

Item	Specification	
	E-02, 03, 19, 24, 28, 54	E-33
ID No.	05H0	05H1
Bore size	38 mm (1.5 in)	←
Fast idle r/min	1 500 – 2 000 r/min	←
Idle r/min	1 450 ± 100 r/min	←
Throttle cable play	2.0 – 4.0 mm (0.08 – 0.16 in)	←

## Tightening Torque Specifications

Fastening part	Tightening torque			Note
	N·m	kgf·m	lb·ft	
Engine mounting nut	93	9.3	67.0	☞ (Page1D-8)
Cushion rod nut	85	8.5	61.5	☞ (Page1D-8)
Rear axle nut	120	12.0	87.0	☞ (Page1D-8)
Cylinder head bolt (L190) (Initial)	25	2.5	18.0	☞ (Page1D-19)
Cylinder head bolt (L130)	25	2.5	18.0	☞ (Page1D-19)
Cylinder head bolt (L190) (Final)	42	4.2	30.5	☞ (Page1D-19)
Camshaft journal holder bolt	10	1.0	0.7	☞ (Page1D-21)
Cam chain tension adjuster bolt	10	1.0	7.0	☞ (Page1D-21)
Spring holder bolt	23	2.3	16.5	☞ (Page1D-22)
Cylinder head cover bolt	14	1.4	10.0	☞ (Page1D-22)
Spark plug	11	1.1	8.0	☞ (Page1D-22)
Camshaft journal holder bolt	10	1.0	7.0	☞ (Page1D-23)
Oil gallery plug (cylinder head)	10	1.0	7.0	☞ (Page1D-26)
ECT sensor	12	1.2	8.5	☞ (Page1D-27)
Intake pipe bolt	10	1.0	7.0	☞ (Page1D-27)
Water inlet connector bolt	10	1.0	7.0	☞ (Page1D-33)
Oil pump mounting bolt	10	1.0	7.0	☞ (Page1D-44)
Crankcase bolt (M6)	11	1.1	8.0	☞ (Page1D-46)
Crankcase bolt (M8)	22	2.2	16.0	☞ (Page1D-46)
Balancer drive gear nut	150	15	11	☞ (Page1D-46)
Oil pump drive gear nut	23	2.3	16.5	☞ (Page1D-47)
Balancer driven gear nut	50	5.0	36.0	☞ (Page1D-47)
Cam chain tensioner bolt	23	2.3	16.5	☞ (Page1D-48)
Cam chain guide bolt	23	2.3	16.5	☞ (Page1D-48)
Generator rotor nut	160	16.0	115.5	☞ (Page1D-48)
Generator cover bolt	11	1.1	8.0	☞ (Page1D-49)
Speed Sensor	10	1.0	7.0	☞ (Page1D-49)
Oil filter cap bolt	10	1.0	7.0	☞ (Page1D-50)

### NOTE

The specified tightening torque is also described in the following.

“Camshaft and Sprocket Assembly Diagram (Page1D-1)”

“Engine Assembly Removal and Installation (Page1D-6)”

“Throttle Body Construction (Page1D-12)”

### Reference:

For the tightening torque of fastener not specified in this section, refer to “Tightening Torque Specifications in Section 0C (Page0C-7)”.

## Special Tools and Equipment

### Recommended Service Material

B705H11408001

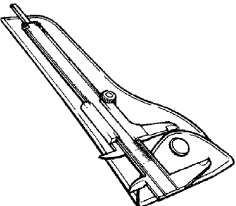
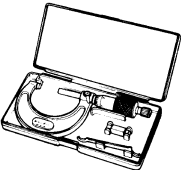
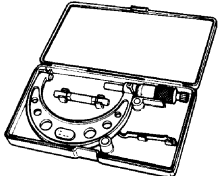

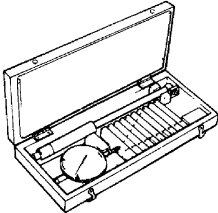
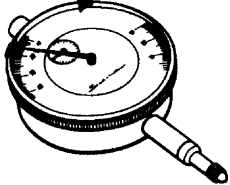
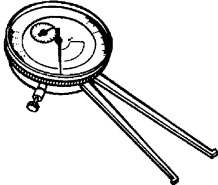
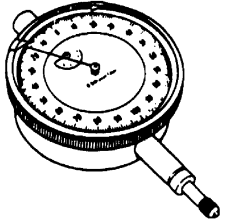
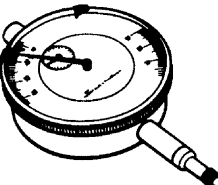
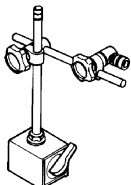
Material	SUZUKI recommended product or Specification		Note
Grease	SUZUKI SUPER GREASE A or equivalent	P/No.: 99000-25010	☞(Page1D-14) / ☞(Page1D-14) / ☞(Page1D-27) / ☞(Page1D-50)
Molybdenum oil	Molybdenum oil solution	—	☞(Page1D-18) / ☞(Page1D-20) / ☞(Page1D-27) / ☞(Page1D-27)
Sealant	SUZUKI BOND No.1207B or equivalent	P/No.: 99000-31140	☞(Page1D-45)
	SUZUKI Bond 1207B or equivalent	P/No.: 99000-31140	☞(Page1D-22)
Thread lock cement	THREAD LOCK CEMENT 1342 or equivalent	P/No.: 99000-32050	☞(Page1D-27)

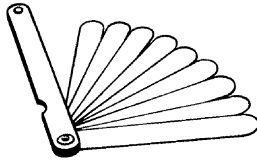
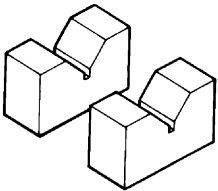
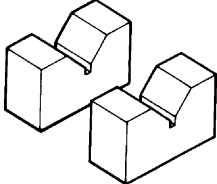
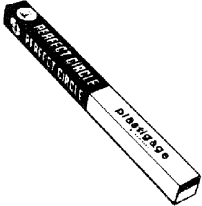
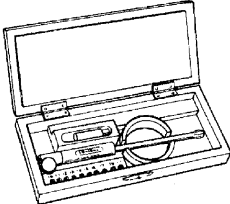
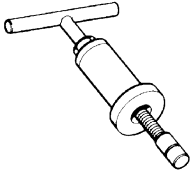

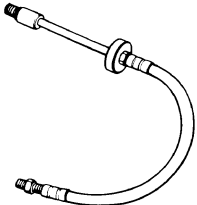
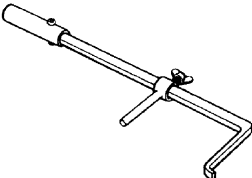
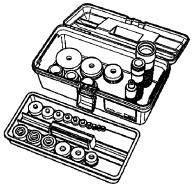
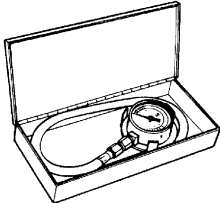
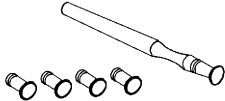
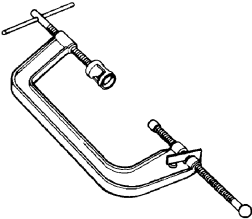
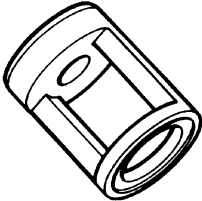


### NOTE

Required service material is also described in the following.  
 “Engine Assembly Removal and Installation (Page1D-6)”

### Special Tool




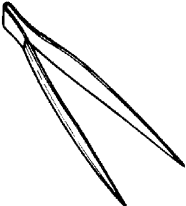
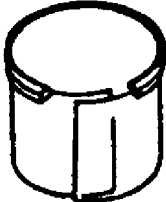
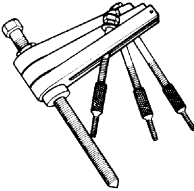
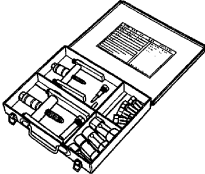
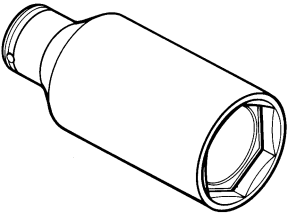
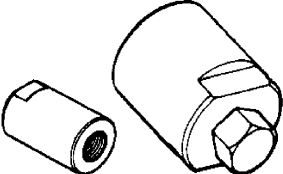
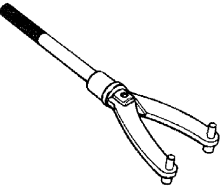
B705H11408002

09900-20102 Vernier calipers (1/20 mm, 200 mm) ☞(Page1D-29) / ☞(Page1D-30) / ☞(Page1D-36)		09900-20202 Micrometer (1/100 mm, 25 – 50 mm) ☞(Page1D-22)	
09900-20204 Micrometer (75 – 100 mm) ☞(Page1D-35)		09900-20205 Micrometer (0 – 25 mm) ☞(Page1D-24) / ☞(Page1D-30) / ☞(Page1D-36) / ☞(Page1D-37)	
09900-20508 Cylinder gauge set ☞(Page1D-34)		09900-20602 Dial gauge (1/1000 mm, 1 mm) ☞(Page1D-24) / ☞(Page1D-37)	
09900-20605 Dial calipers (1/100 mm, 10 – 34 mm) ☞(Page1D-51)		09900-20606 Dial gauge (1/100 mm) ☞(Page1D-23) / ☞(Page1D-29) / ☞(Page1D-29) / ☞(Page1D-30)	
09900-20607 Dial gauge (1/100 mm, 10 mm) ☞(Page1D-51) / ☞(Page1D-52)		09900-20701 Magnetic stand ☞(Page1D-23) / ☞(Page1D-29) / ☞(Page1D-29) / ☞(Page1D-30) / ☞(Page1D-51) / ☞(Page1D-52)	

<p>09900-20803 Thickness gauge ☞(Page1D-29) / ☞(Page1D-34) / ☞(Page1D-36) / ☞(Page1D-36) / ☞(Page1D-51)</p>		<p>09900-21303 V-block (75 mm) ☞(Page1D-23)</p>	
<p>09900-21304 V-block (100 mm) ☞(Page1D-29) / ☞(Page1D-29) / ☞(Page1D-51) / ☞(Page1D-52)</p>		<p>09900-22301 Plastigauge (0.025 – 0.076 mm) ☞(Page1D-23)</p>	
<p>09900-22403 Small bore gauge (18 – 35 mm) ☞(Page1D-24) / ☞(Page1D-37)</p>		<p>09910-32812 Crankshaft installer ☞(Page1D-44)</p>	
<p>09910-32870 Crankshaft installer attachment ☞(Page1D-44)</p>		<p>09913-10750 Compression gauge adapter ☞(Page1D-3)</p>	
<p>09913-50121 Oil seal remover ☞(Page1D-53)</p>		<p>09913-70210 Bearing installer set ☞(Page1D-44) / ☞(Page1D-52) / ☞(Page1D-53) / ☞(Page1D-53) / ☞(Page1D-53) / ☞(Page1D-54)</p>	
<p>09915-64512 Compression gauge ☞(Page1D-3)</p>		<p>09916-10911 Valve lapper set ☞(Page1D-31)</p>	
<p>09916-14510 Valve spring compressor ☞(Page1D-25) / ☞(Page1D-28)</p>		<p>09916-14530 Valve spring compressor attachment ☞(Page1D-25) / ☞(Page1D-28)</p>	
<p>09916-33210 Valve guide reamer (4.5 mm) ☞(Page1D-32)</p>		<p>09916-34542 Reamer handle ☞(Page1D-32) / ☞(Page1D-32)</p>	



**1D-60 Engine Mechanical:**

<p>09916-34561 Valve guide reamer (11.3 mm) ☞ (Page1D-32)</p>	 <p>09916-43210 Valve guide remover/ installer ☞ (Page1D-32) / ☞ (Page1D-32)</p> 
<p>09916-53330 Attachment ☞ (Page1D-32)</p>	 <p>09916-84511 Tweezers ☞ (Page1D-25) / ☞ (Page1D-28)</p> 
<p>09919-28610 Sleeve protector ☞ (Page1D-25) / ☞ (Page1D-28)</p>	 <p>09920-13120 Crankcase separating tool ☞ (Page1D-42) / ☞ (Page1D-43)</p> 
<p>09921-20240 Bearing remover set ☞ (Page1D-53) / ☞ (Page1D-53)</p>	 <p>09922-21410 Long socket (46 mm) ☞ (Page1D-42) / ☞ (Page1D-46)</p> 
<p>09930-31921 Rotor remover ☞ (Page1D-40)</p>	 <p>09930-40113 Rotor holder ☞ (Page1D-39)</p> 

# Engine Lubrication System

## Precautions

### Precautions for Engine Oil

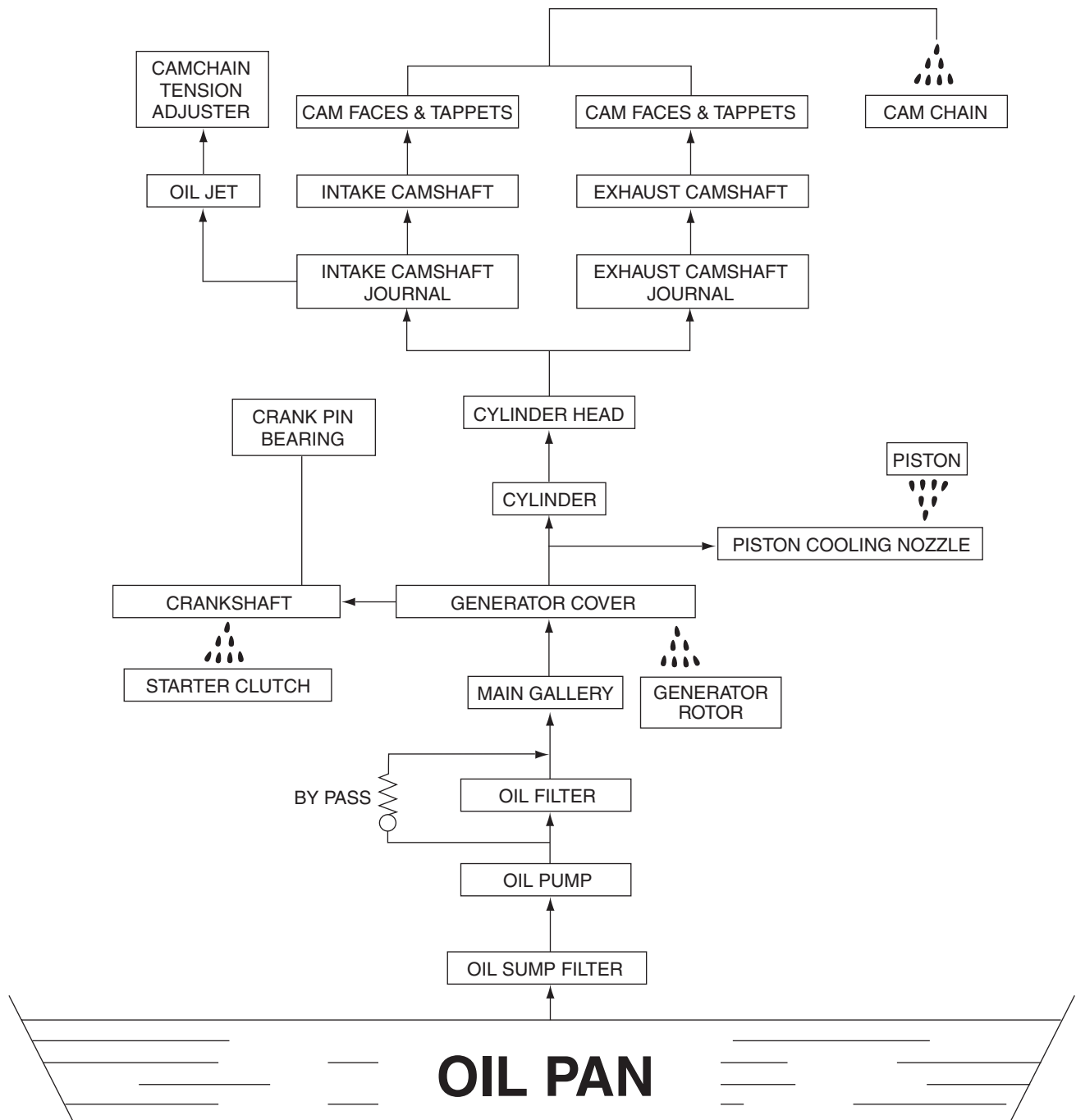
Refer to "Fuel / Oil / Engine Coolant Recommendation in Section 0A (Page0A-3)".

B705H1150001

## Schematic and Routing Diagram

### Engine Lubrication System Chart Diagram

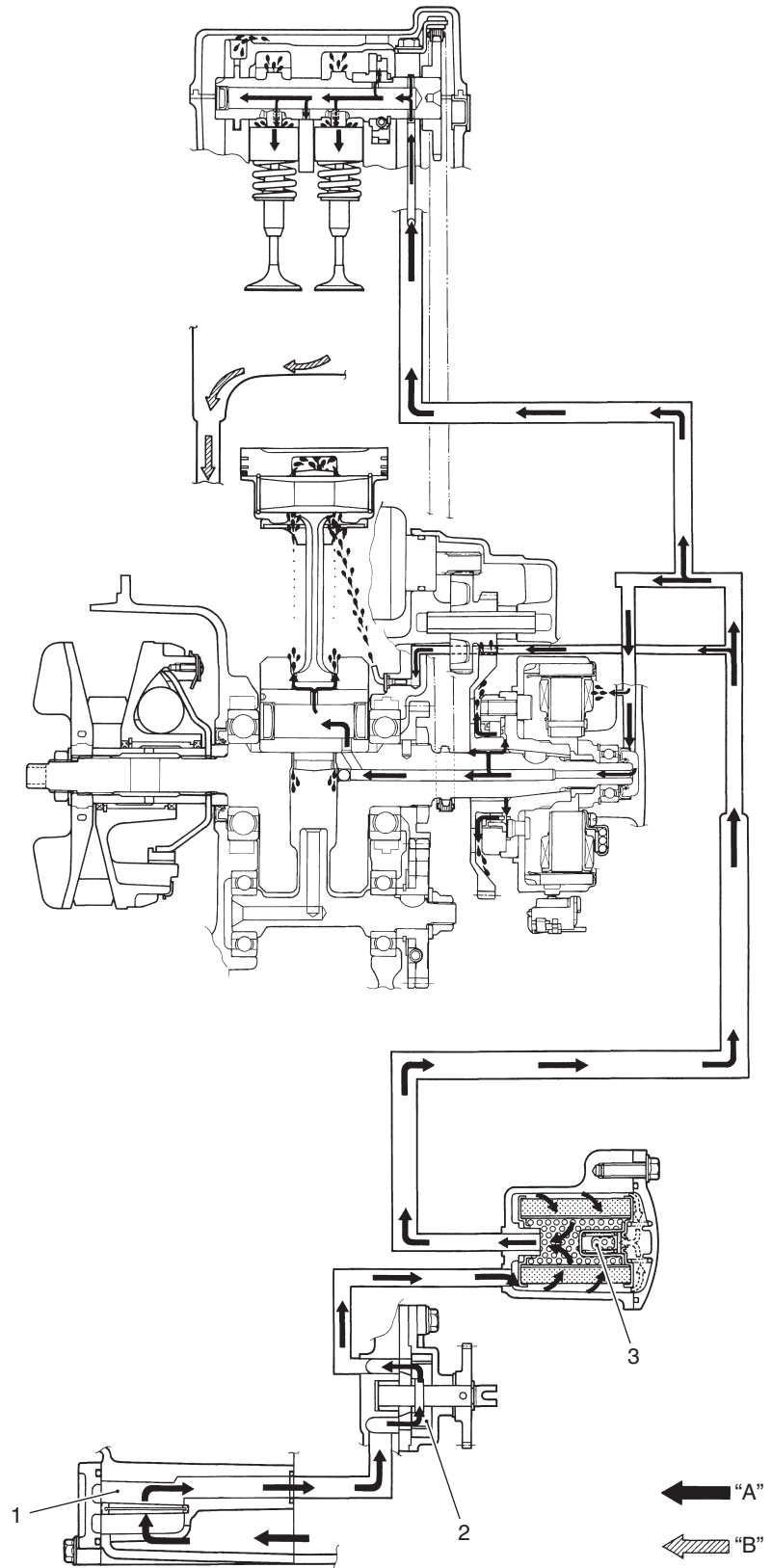
B705H11502001



I705H1150001-05

Engine Lubrication Circuit Diagram

B705H11502002



1. Oil sump filter	3. Oil filter	"B": Returned oil
2. Oil pump	"A": Lubrication oil	

## Diagnostic Information and Procedures

### Engine Lubrication Symptom Diagnosis

B705H11504001

Condition	Possible cause	Correction / Reference Item
<b>Engine overheats.</b> <i>(Defective engine internal parts)</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>
<b>Exhaust smoke is dirty or thick</b>	Too much engine oil in the engine.	<i>Check level and drain.</i>

### Oil Pressure Check

B705H11504003

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

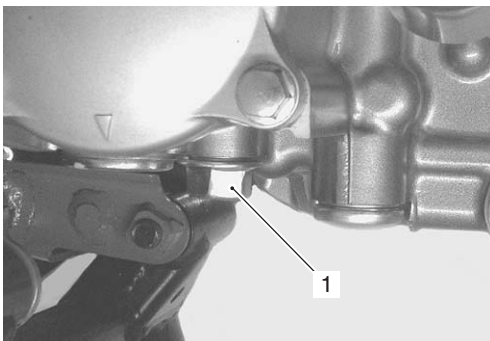
#### NOTE

Before checking the oil pressure, check the following.

- Oil level (Refer to “Engine Oil and Filter Change in Section 0B (Page0B-9)”)
- Oil leaks (If leak is found, repair it.)
- Oil quality (If oil is discolored or deteriorated, replace it.)

Check the oil pressure in the following procedures:

- 1) Remove the main oil gallery plug (1).



I705H1150002-01

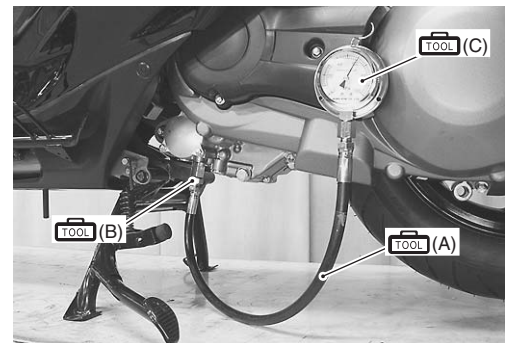
- 2) Install the oil pressure gauge and attachment to the main oil gallery.

#### Special tool

(A): 09915-74521 (Oil pressure gauge hose)

(B): 09915-74570 (Oil pressure gauge attachment)

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



I705H1150013-01

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

#### Oil pressure specification

**Above 30 kPa (0.3 kgf/cm<sup>2</sup>, 4.27 psi) at 3 000 r/min, oil temp. at 60 °C (86 °F)**

**Below 110 kPa (11.0 kgf/cm<sup>2</sup>, 15.64 psi) at 3 000 r/min, oil temp. at 60 °C (86 °F)**

## 1E-4 Engine Lubrication System:

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>

5) Stop the engine and remove the oil pressure gauge and attachment.

6) Reinstall the main oil gallery plug and tighten it to the specified torque.

### ⚠ CAUTION

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

### Tightening torque

**Main oil gallery plug: 16 N·m (1.6 kgf-m, 11.5 lb-ft)**

7) Check the engine oil level. Refer to "Engine Oil and Filter Change in Section 0B (Page0B-9)".

## Repair Instructions

### Engine Oil and Filter Replacement

B705H11506022

Refer to "Engine Oil and Filter Change in Section 0B (Page0B-9)".

### Oil Sump Filter Removal and Installation

B705H11506008

#### Removal

- 1) Dismount the engine. Refer to "Engine Assembly Removal and Installation in Section 1D (Page1D-6)".
- 2) Separate the crankcase. Refer to "Engine Bottom Side Disassembly in Section 1D (Page1D-37)".
- 3) Remove the oil sump filter from the left crankcase. Refer to "Engine Bottom Side Disassembly in Section 1D (Page1D-37)".

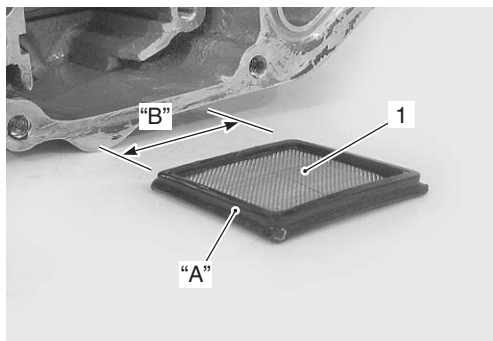
#### Installation

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

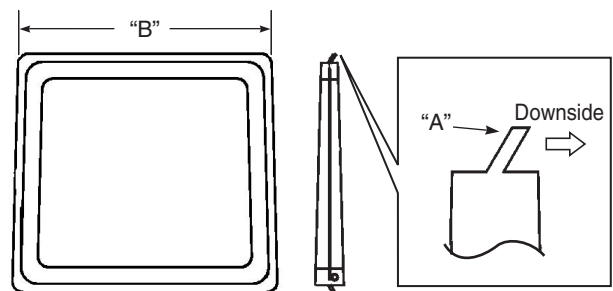
- Install the oil sump filter (1).

### ⚠ CAUTION

- The lip "A" of the oil sump filter should be positioned downward.
- The shorter side "B" of the oil sump filter should be positioned inside.



I705H1150003-01



I705H1150004-01

"A": Lip

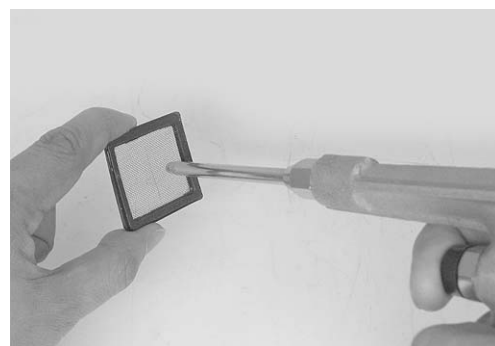
"B": Shorter side

### Oil Sump Filter Cleaning

B705H11506009

Clean the oil sump filter in the following procedures:

- 1) Remove the oil sump filter. Refer to "Oil Sump Filter Removal and Installation (Page1E-4)".
- 2) Clean the oil sump filter using compressed air.



I705H1150005-01

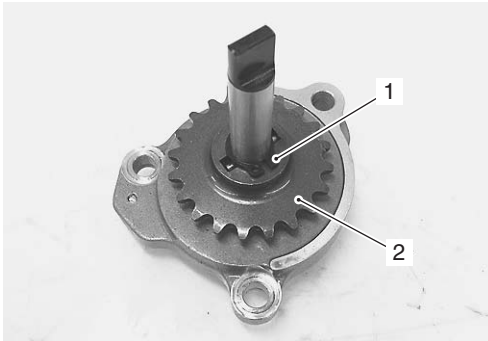
- 3) Install the oil sump filter. Refer to "Oil Sump Filter Removal and Installation (Page1E-4)".

## Oil Pump Removal and Installation

B705H11506015

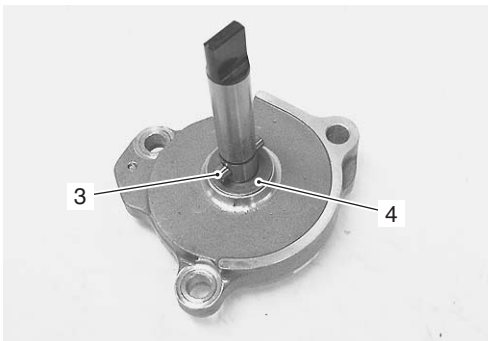
### Removal

- 1) Dismount the engine. Refer to "Engine Assembly Removal and Installation in Section 1D (Page1D-6)".
- 2) Separate the crankcase. Refer to "Engine Bottom Side Disassembly in Section 1D (Page1D-37)".
- 3) Remove the oil pump assembly from the left crankcase. Refer to "Engine Bottom Side Disassembly in Section 1D (Page1D-37)".
- 4) Remove the snap ring (1) and oil pump drain driven gear (2).



I705H1150006-01

- 5) Remove the pin (3) and washer (4).



I705H1150007-01

### ⚠ CAUTION

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

### Installation

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

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

#### Tightening torque

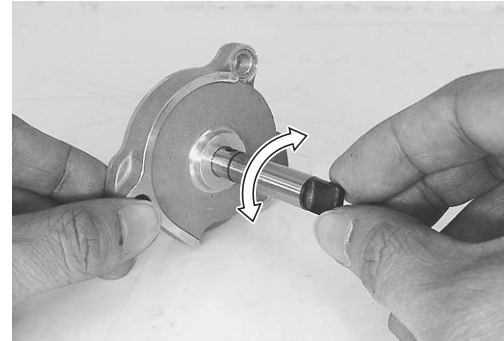
**Oil pump mounting bolt: 10 N·m (1.0 kgf·m, 7.0 lb·ft)**

## Oil Pump Inspection

B705H11506016

Inspect the oil pump in the following procedures:

- 1) Remove the oil pump. Refer to "Oil Pump Removal and Installation (Page1E-5)".
- 2) Rotate the oil pump shaft by hand and check that it moves smoothly. If it does not move smoothly, replace the oil pump with a new one.



I705H1150008-01

- 3) Install the oil pump in the reverse order of removal. Refer to "Oil Pump Removal and Installation (Page1E-5)".

## Piston Cooling Nozzle Removal and Installation

B705H11506017

### Removal

- 1) Dismount the engine. Refer to "Engine Assembly Removal and Installation in Section 1D (Page1D-6)".
- 2) Separate the crankcase. Refer to "Engine Bottom Side Disassembly in Section 1D (Page1D-37)".
- 3) Remove the piston cooling nozzle (1) from the right crankcase.



I705H1150009-01

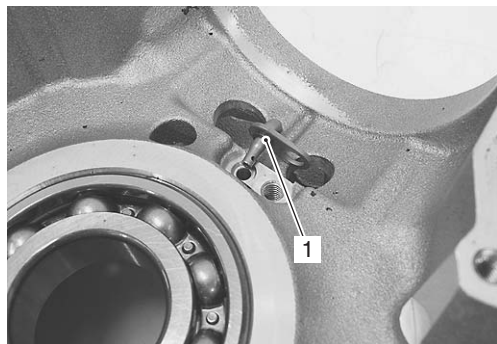
## 1E-6 Engine Lubrication System:

### Installation

Install the piston cooling nozzle in the reverse order of removal. Pay attention to the following point:

#### NOTE

**Before installing, replace the O-ring (1) with a new one and coat the O-ring with engine oil.**



I705H1150010-01

### Piston Cooling Nozzle Inspection

B705H11506021

Inspect the piston cooling nozzle in the following procedures:

- 1) Remove the piston cooling nozzle. Refer to "Piston Cooling Nozzle Removal and Installation (Page1E-5)".
- 2) Inspect the piston cooling nozzle for clogging. If it is clogged, clean its oil passage with a proper wire or compressed air.



I705H1150011-01

- 3) Install the piston cooling nozzle. Refer to "Piston Cooling Nozzle Removal and Installation (Page1E-5)".

## Specifications

### Service Data

B705H11507002

#### Oil Pump

Item	Standard	Limit
Oil pressure (at 60 °C, 140 °F)	Above 30 kPa (0.3 kgf/cm <sup>2</sup> , 4.27 psi) Below 110 kPa (1.1 kgf/cm <sup>2</sup> , 15.64 psi) at 3 000 r/min	—

### Tightening Torque Specifications

B705H11507003

Fastening part	Tightening torque			Note
	N·m	kgf·m	lb·ft	
Main oil gallery plug	16	1.6	11.5	☞ (Page1E-4)
Oil pump mounting bolt	10	1.0	7.0	☞ (Page1E-5)

### Reference:


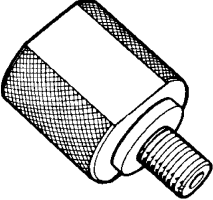

For the tightening torque of fastener not specified in this section, refer to "Tightening Torque Specifications in Section 0C (Page0C-7)".



## Special Tools and Equipment

### Special Tool

B705H11508001

<p>09915-74521 Oil pressure gauge hose ☞ (Page1E-3)</p> 	<p>09915-74570 Oil pressure gauge attachment ☞ (Page1E-3)</p> 
<p>09915-77331 Meter (for high pressure) ☞ (Page1E-3)</p> 	

# Engine Cooling System

## Precautions

### Engine Cooling System Warning

B705H1160001

#### **▲ WARNING**

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

## General Description

### Cooling System Description

B705H11601001

The engine is cooled by the forced circulation of engine coolant, using a high-capacity, centrifugal water pump, through water jackets formed in the cylinder and cylinder head, and through the radiator. The tube-and-fin type radiator is made of aluminum, which is characterized by lightness in weight and good heat dissipation.

A wax-pellet type thermostat is used to regulate the flow of engine coolant through the radiator. As the coolant temperature rises to about 88 °C (190 °F) the thermostat valve unseats and a normal coolant flow is established.

At about 100 °C (212 °F) the thermostat becomes completely open and, as a result, heat is released to the atmosphere through the radiator core.

### Engine Coolant Description

B705H11601002

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 °C (–24 °F). If the vehicle is to be exposed to temperatures below –31 °C (–24 °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 °C (–24 °F)
55%	–40 °C (–40 °F)
60%	–55 °C (–67 °F)

#### **▲ CAUTION**

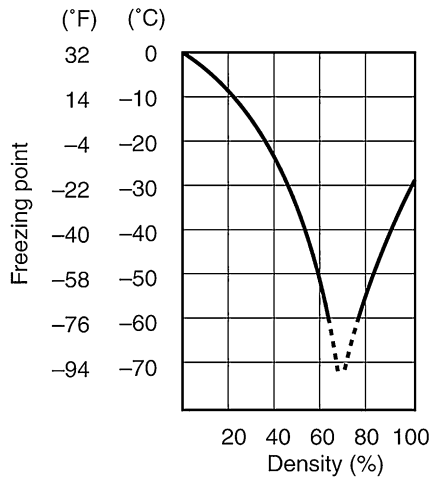
- Use a high quality ethylene glycol base anti-freeze, mixed with distilled water. Do not mix an alcohol base anti-freeze and different brands of anti-freeze.
- Do not put in more than 60% anti-freeze or less than 50%. (Refer to Fig. 1 and 2.)

50% Engine coolant including reserve tank capacity

#### Engine Coolant Capacity

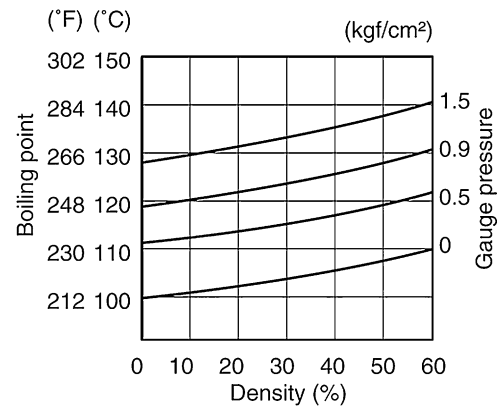
Anti-freeze	975 ml (2.1/1.7 US/Imp. pt)
Water	975 ml (2.1/1.7 US/Imp. pt)

Fig. 1: Engine coolant density-freezing point curve



I310G1160001-01

Fig. 2: Engine coolant density-boiling point curve

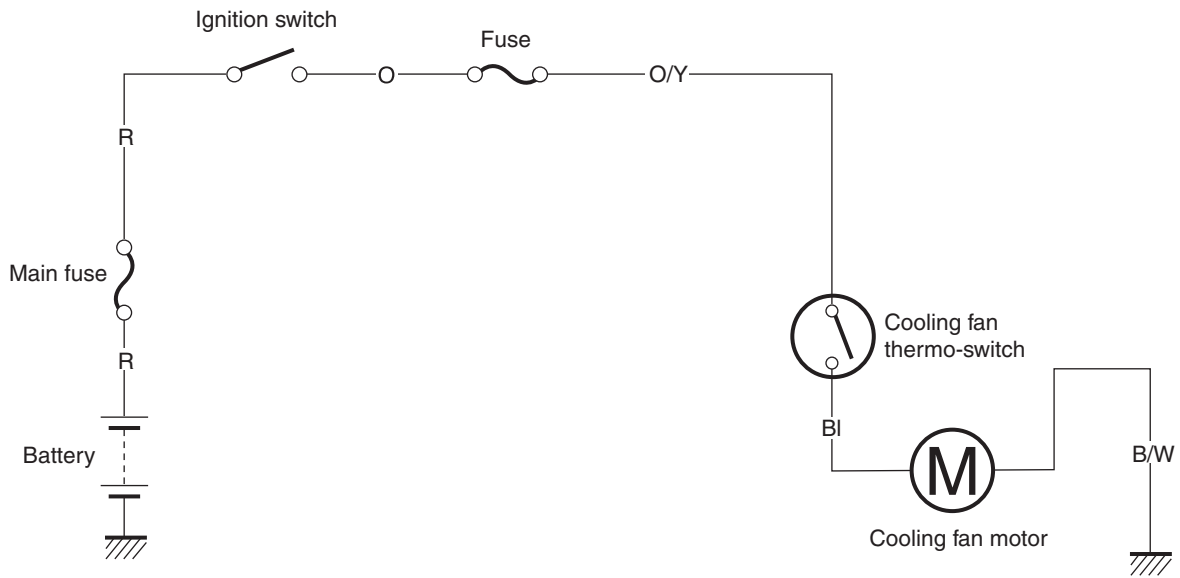


I310G1160002-01

### Cooling Fan Thermo-Switch Description

B705H11601003

The cooling fan is secured behind the radiator by three bolts and is automatically controlled by the thermo-switch. The thermo-switch remains open when the temperature of the engine coolant is low, but closes when the temperature reaches approximately 98 °C (208 °F) setting the cooling fan in motion.



I705H1160001-02

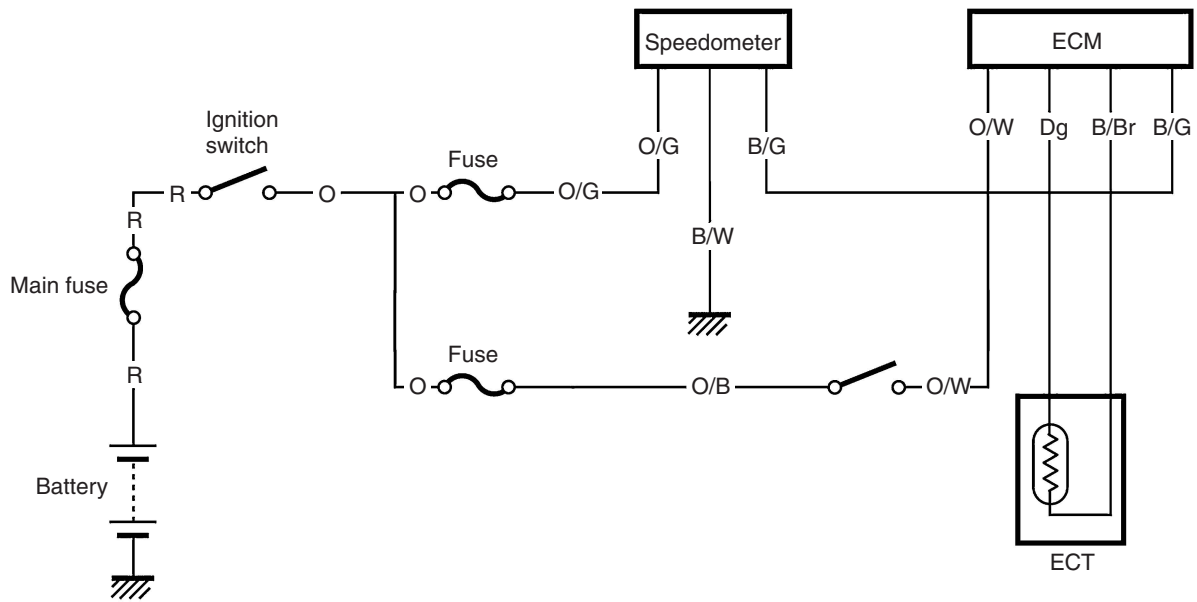
Bl: Blue	R: Red	O/Y: Orange with Yellow tracer
O: Orange	B/W: Black with White tracer	

### 1F-3 Engine Cooling System:

#### Engine Coolant Temperature Sensor Description

B705H11601004

The following circuit diagram shows the electrical wiring for the thermometer. The major components are ECT sensor in contact with coolant, and engine coolant temperature meter.



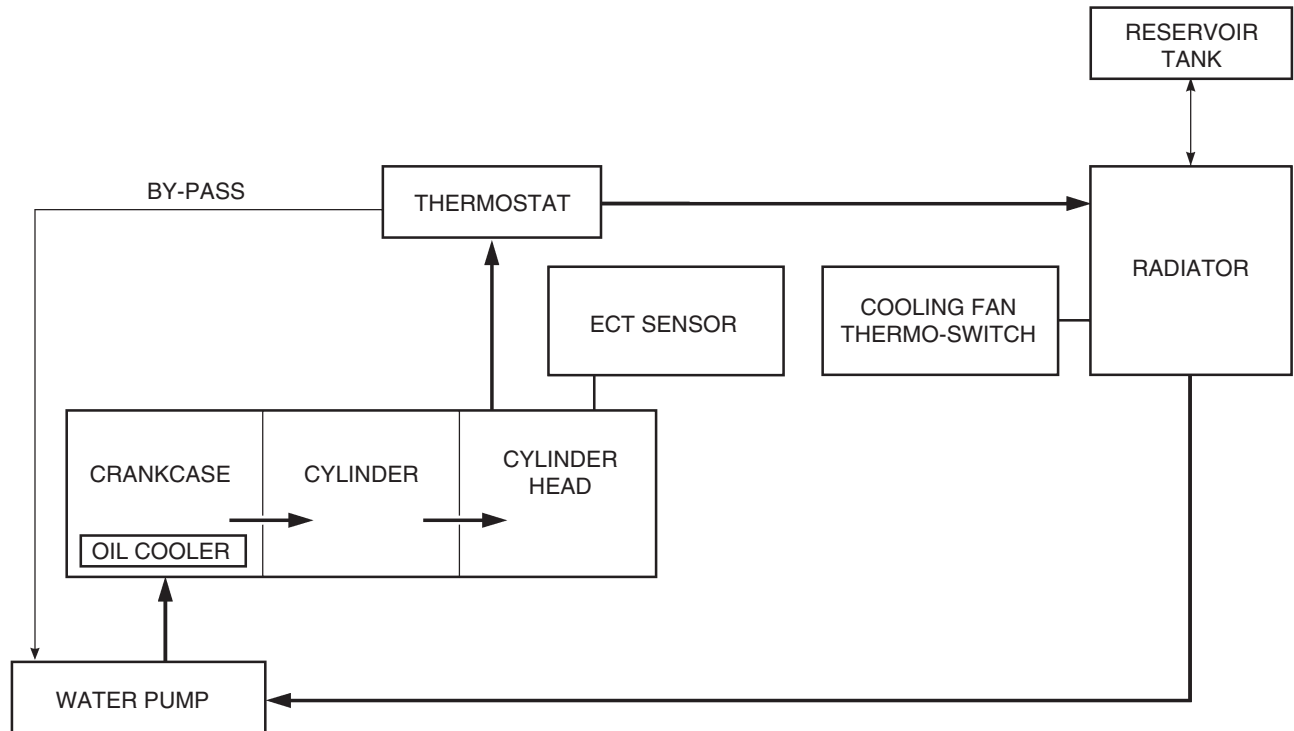
I705H1160060-03

Dg: Dark green	B/Br: Black with Brown tracer	O/G: Orange with Green tracer
O: Orange	B/G: Black with Green tracer	O/W: Orange with White tracer
R: Red	O/B: Orange with Black tracer	P/W: Pink with White tracer

## Schematic and Routing Diagram

### Cooling Circuit Diagram

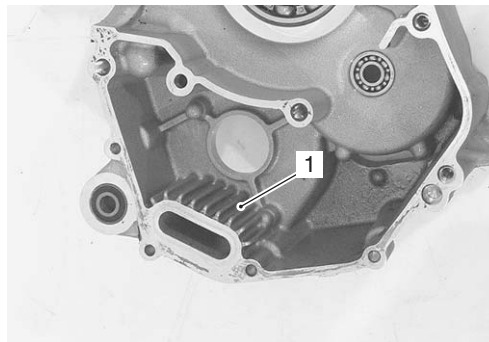
B705H11602001



I705H1160059-04

Oil cooler (1) is located inside the crankcase.

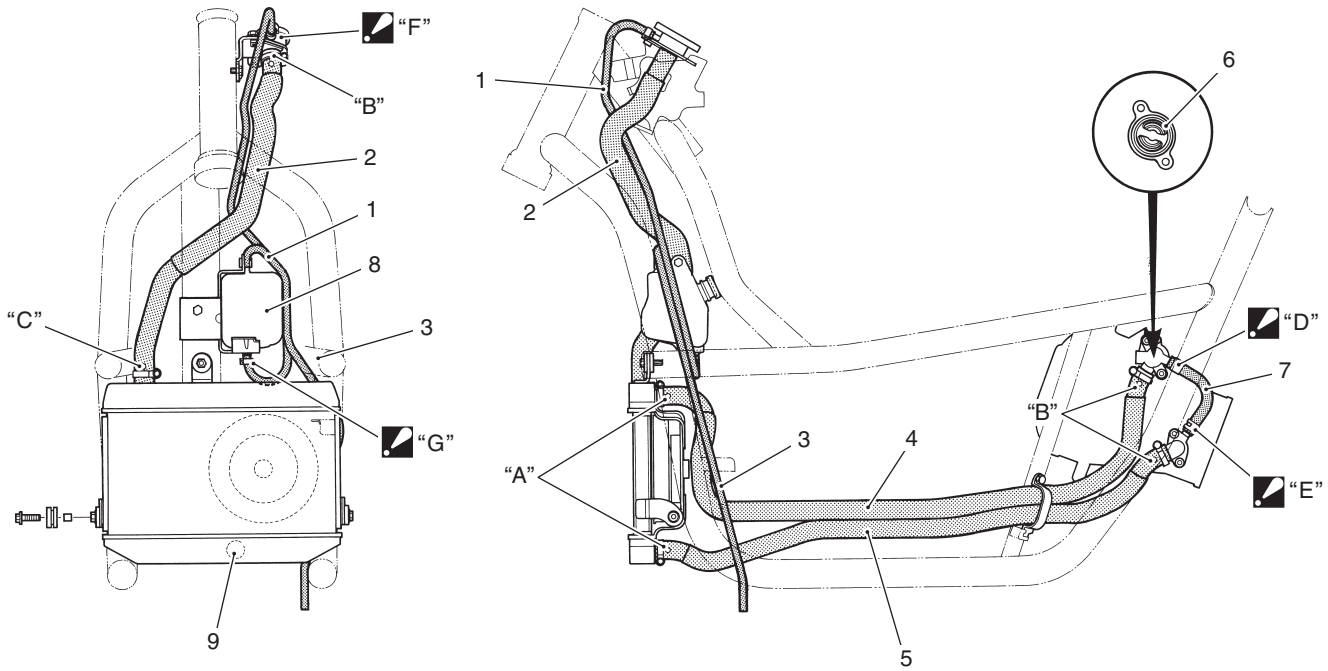
The engine oil is cooled by engine coolant, which is circulated through inside core of oil cooler.



I705H1160002-03

Radiator Hose Routing Diagram

B705H11602002



I705H1160056-02

1. Reservoir tank inlet hose	9. Cooling fan thermo-switch
2. Conduction hose	"A": Yellow marking
3. Reservoir tank overflow hose	"B": White marking
4. Radiator inlet hose	"C": Pink marking
5. Radiator outlet hose	☑ "D": The clamp end should face to engine side.
6. Thermostat	☑ "E": The clamp end should face forward.
7. Water by-pass hose	☑ "F": The clamp end should face downward.
8. Reservoir tank	☑ "G": The clamp end should face to left side.

## Component Location

### Engine Cooling System Components Location

Refer to "Electrical Components Location in Section 0A (Page0A-7)".

B705H11603001

## Diagnostic Information and Procedures

### Engine Cooling Symptom Diagnosis

B705H11604001

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

## Repair Instructions

### Cooling Circuit Inspection

B705H11606001

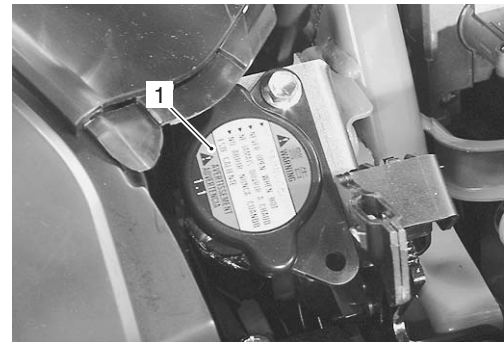
#### **⚠ WARNING**

- 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.

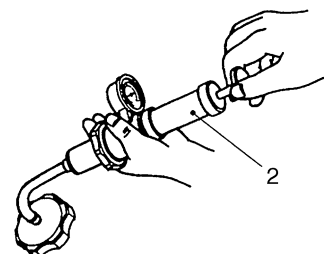
Inspect the cooling circuit in the following procedures:

- 1) Remove the handlebar covers. Refer to "Handlebar Cover Removal and Installation in Section 9D (Page9D-13)".
- 2) Remove the front panel. Refer to "Front Panel Removal and Installation in Section 9D (Page9D-14)".
- 3) Remove the radiator cap (1) and connect the radiator tester (2) to the filler.
- 4) 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.
- 5) If the cooling system does not hold the pressure for at least 10 seconds, check the entire cooling system for leaks and replace the damaged part.
- 6) Install the front panel. Refer to "Front Panel Removal and Installation in Section 9D (Page9D-14)".

- 7) Install the handlebar covers. Refer to "Handlebar Cover Removal and Installation in Section 9D (Page9D-13)".



I705H1160003-02



I705H1160004-01

#### **⚠ CAUTION**

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



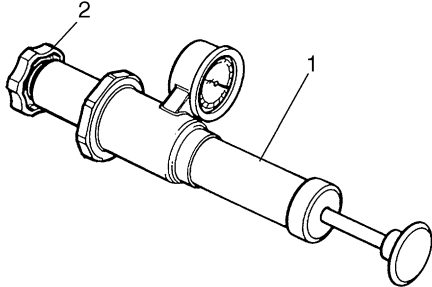
## 1F-7 Engine Cooling System:

### Radiator Cap Inspection

B705H11606002

Inspect the radiator cap in the following procedures:

- 1) Remove the radiator cap. Refer to “Cooling Circuit Inspection (Page1F-6)”.
- 2) Attach the radiator cap (1) to the radiator tester (2) as shown.



I705H1160032-01

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

### Radiator cap release pressure

93.3 – 122.7 kPa (0.93 – 1.23 kgf/cm<sup>2</sup>, 13.3 – 17.4 psi)

### Radiator Removal and Installation

B705H11606027

#### Removal

- 1) Remove the lower leg shield. Refer to “Lower Leg Shield Removal and Installation in Section 9D (Page9D-16)”.
- 2) Remove the left and right footboards. Refer to “Footboard Removal and Installation in Section 9D (Page9D-21)”.
- 3) Drain engine coolant. Refer to “Cooling System Inspection in Section 0B (Page0B-11)”.
- 4) Remove the radiator outlet hose (1).



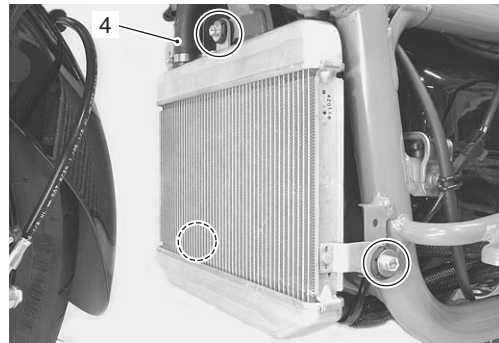
I705H1160005-02

- 5) Disconnect the cooling fan motor coupler (2) and radiator heat shields (3).



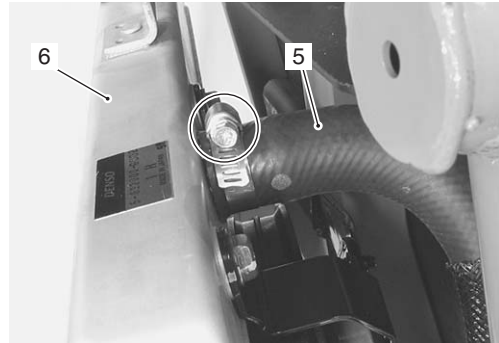
I705H1160006-03

- 6) Disconnect the conduction hose (4) and remove the radiator mounting bolts.



I705H1160007-01

- 7) Disconnect the radiator inlet hose (5) and remove the radiator (6).



I705H1160008-02

#### Installation

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

- Pour engine coolant. Refer to “Cooling System Inspection in Section 0B (Page0B-11)”.
- Bleed air from the cooling circuit. Refer to “Cooling System Inspection in Section 0B (Page0B-11)”.

## Radiator Cleaning

B705H11606028

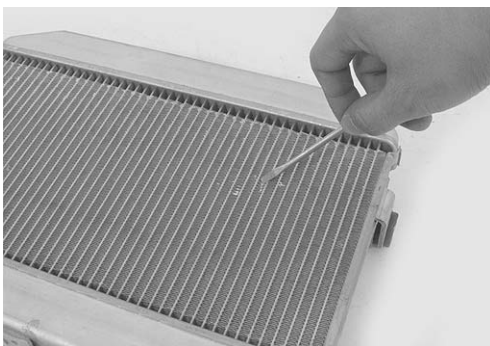
Clean the radiator in the following procedures:

- 1) Remove the radiator. Refer to "Radiator Removal and Installation (Page1F-7)".
- 2) Remove the cooling fan. Refer to "Cooling Fan Removal and Installation (Page1F-10)".
- 3) Inspect the radiator for dirt and other foreign materials.
- 4) Clean the radiator using compressed air.



I705H1160009-01

- 5) Repair any bent or dented fins using a small screw driver.



I705H1160010-01

- 6) Reinstall the radiator. Refer to "Radiator Removal and Installation (Page1F-7)".

## Radiator Hose Inspection

B705H11606029

Inspect the radiator hoses in the following procedures:

- 1) Remove the left footboard. Refer to "Footboard Removal and Installation in Section 9D (Page9D-21)".
- 2) Remove the air cleaner box. Refer to "Air Cleaner Box Removal and Installation in Section 1D (Page1D-9)".
- 3) Remove the radiator mounting bolts. Refer to "Radiator Removal and Installation (Page1F-7)".

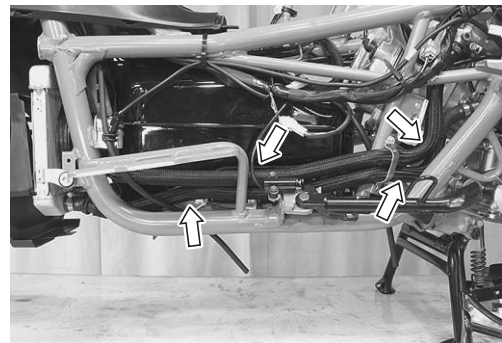
- 4) Inspect the radiator hoses for crack or flat and leakage of hose connection. If any radiator hose found in a cranked condition or flattened must be replaced. Refer to "Radiator Hose Removal and Installation (Page1F-9)". If any leakage from the connecting section should be corrected by proper tightening.



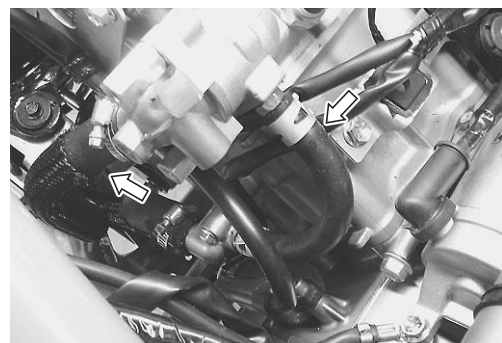
I705H1160011-03



I705H1160012-03



I705H1160013-01



I705H1160014-04

## 1F-9 Engine Cooling System:

### Radiator Hose Removal and Installation

B705H11606030

#### Removal

- 1) Drain engine coolant. Refer to "Cooling System Inspection in Section 0B (Page0B-11)".
- 2) Remove the left footboard. Refer to "Footboard Removal and Installation in Section 9D (Page9D-21)".
- 3) Remove the air cleaner box. Refer to "Air Cleaner Box Removal and Installation in Section 1D (Page1D-9)".
- 4) Remove the radiator mounting bolts. Refer to "Radiator Removal and Installation (Page1F-7)".
- 5) Remove the required radiator hose.

#### Installation

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

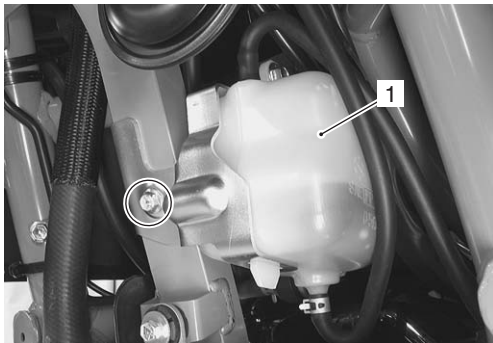
- Rout the radiator hose properly. Refer to "Radiator Hose Routing Diagram (Page1F-5)".

### Radiator Reservoir Tank Removal and Installation

B705H11606007

#### Removal

- 1) Remove the front leg shield. Refer to "Front Leg Shield Removal and Installation in Section 9D (Page9D-14)".
- 2) Remove the reservoir tank bracket bolt.
- 3) Disconnect the hoses and remove the reservoir tank (1).



I705H1160015-01

- 4) Remove the bracket (2).

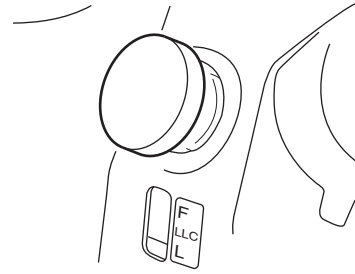


I705H1160016-01

### Installation

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

- Fill the reservoir tank to the upper level.



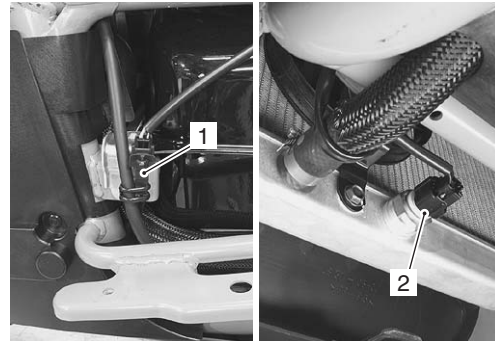
I705H1160018-05

### Cooling Fan Inspection

B705H11606008

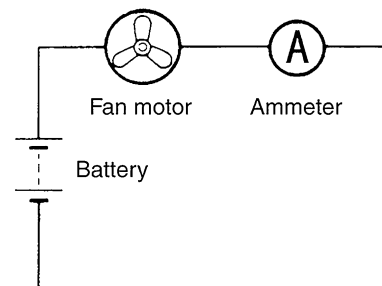
Inspect the cooling fan in the following procedures:

- 1) Remove the left footboard. Refer to "Footboard Removal and Installation in Section 9D (Page9D-21)".
- 2) Remove the under cover. Refer to "Under Cover Removal and Installation in Section 9D (Page9D-16)".
- 3) Disconnect the cooling fan motor lead wire coupler (1) and fan switch coupler (2).



I705H1160019-01

- 4) Test the cooling fan motor for load current with an ammeter connected as shown in the figure.



I310G1160028-01



**NOTE**

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

- 5) If the fan motor does not turn, replace the cooling fan assembly with a new one. Refer to "Cooling Fan Removal and Installation (Page1F-10)".

**NOTE**

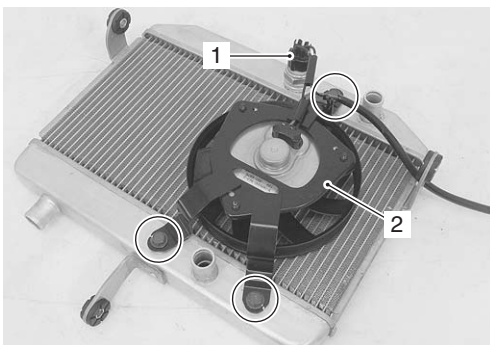
When making this test, it is not necessary to remove the cooling fan.

**Cooling Fan Removal and Installation**

B705H11606009

**Removal**

- 1) Remove the radiator. Refer to "Radiator Removal and Installation (Page1F-7)".
- 2) Disconnect the cooling fan switch coupler (1) and remove the cooling fan (2).



I705H1160020-01

**Installation**

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

- Tighten the cooling fan mounting bolts to the specified torque.

**Tightening torque**

**Cooling fan mounting bolt: 7 N·m (0.7 kgf-m, 5.0 lb-ft)**

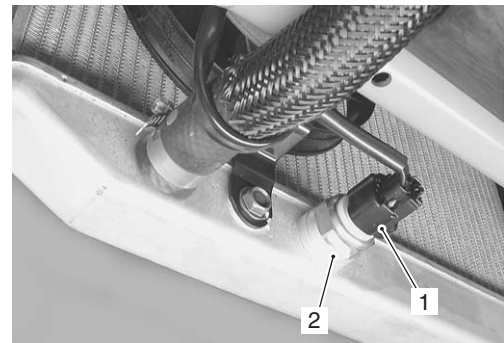
**Cooling Fan Thermo-Switch Removal and Installation**

B705H11606011

**Removal**

- 1) Remove the left footboard. Refer to "Footboard Removal and Installation in Section 9D (Page9D-21)".
- 2) Remove the under cover. Refer to "Under Cover Removal and Installation in Section 9D (Page9D-16)".

- 3) Drain engine coolant. Refer to "Cooling System Inspection in Section 0B (Page0B-11)".
- 4) Disconnect the cooling fan thermo-switch lead wire coupler (1).
- 5) Remove the cooling fan thermo-switch (2).



I705H1160021-01

**Installation**

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

**⚠ CAUTION**

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

- Apply engine coolant to the O-ring.



I705H1160023-01

- Tighten the cooling fan thermo-switch to the specified torque.

**Tightening torque**

**Cooling fan thermo-switch: 17 N·m (1.7 kgf-m, 12.5 lb-ft)**

- Pour engine coolant. Refer to "Cooling System Inspection in Section 0B (Page0B-11)".
- Bleed air from the cooling circuit. Refer to "Cooling System Inspection in Section 0B (Page0B-11)".

## 1F-11 Engine Cooling System:

### Cooling Fan Thermo-Switch Inspection

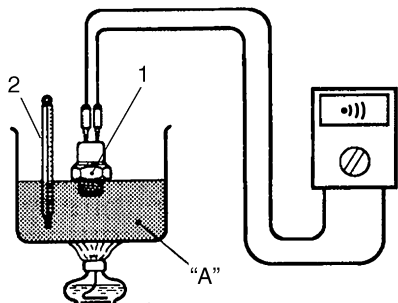
B705H11606012

Inspect the cooling fan thermo-switch in the following procedures:

#### **⚠ CAUTION**

- Take special care when handling the cooling fan thermo-switch. Do not subject it to strong blows or allow it to be dropped.
- Do not contact the cooling fan thermo-switch (1) and the column thermometer (2) with a pan.

- 1) Remove the cooling fan thermo-switch. Refer to "Cooling Fan Thermo-Switch Removal and Installation (Page1F-10)".
- 2) Check the thermo-switch closing or opening temperatures by testing it at the bench as shown in the figure.
- 3) Connect the thermo-switch (1) to a circuit tester and place it in the oil "A" contained in a pan, which is placed on a stove.
- 4) Heat the oil to raise its temperature slowly and read the column thermometer (2) when the switch closes or opens.



I705H1160033-03

#### **Special tool**

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

#### **Tester knob indication**

Continuity test ( • )) )

#### **Cooling fan thermo-switch operating temperature**

Standard (OFF – ON): Approx. 98 °C (208 °F)

Standard (ON – OFF): Approx. 92 °C (198 °F)

### ECT Sensor Removal and Installation

B705H11606014

Refer to "ECT Sensor Removal and Installation in Section 1C (Page1C-3)".

### ECT Sensor Inspection

B705H11606015

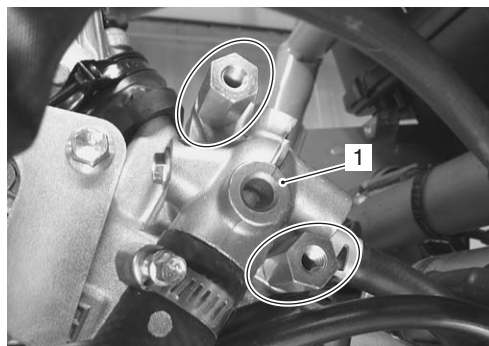
Refer to "ECT Sensor Inspection in Section 1C (Page1C-3)".

### Thermostat Removal and Installation

B705H11606017

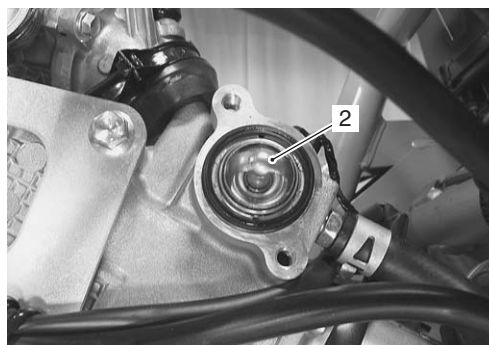
#### **Removal**

- 1) Drain a small amount of engine coolant. Refer to "Cooling System Inspection in Section 0B (Page0B-11)".
- 2) Remove the air cleaner box. Refer to "Air Cleaner Box Removal and Installation in Section 1D (Page1D-9)".
- 3) Place a rag under the thermostat case (1).
- 4) Remove the thermostat case (1).



I705H1160026-02

- 5) Remove the thermostat (2).

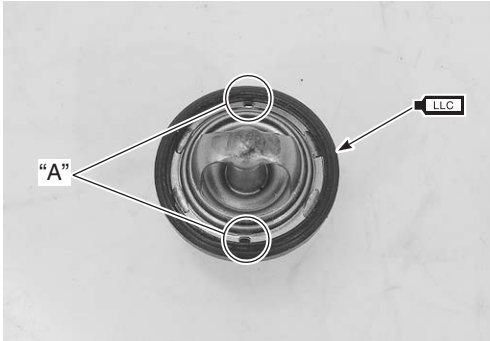


I705H1160027-01

**Installation**

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

- Apply engine coolant to the rubber seal around the thermostat.
- Position the thermostat with one of the air bleeder hole "A" upside.



I705H1160028-01

- Pour engine coolant. Refer to "Cooling System Inspection in Section 0B (Page0B-11)".
- Bleed air from the cooling circuit. Refer to "Cooling System Inspection in Section 0B (Page0B-11)".

**Thermostat Inspection**

B705H11606018

Inspect the thermostat in the following procedures:

- 1) Remove the thermostat. Refer to "Thermostat Removal and Installation (Page1F-11)".
- 2) Inspect the thermostat pellet for signs of cracking.



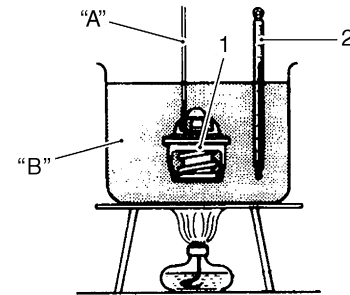
I705H1160029-01

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

**⚠ CAUTION**

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

- 4) Immerse the thermostat (1) in the water contained in a beaker and note that the immersed thermostat is in suspension.
- 5) Heat the water by placing the beaker on a stove and observe the rising temperature on a thermometer (2).



I705H1160030-03

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

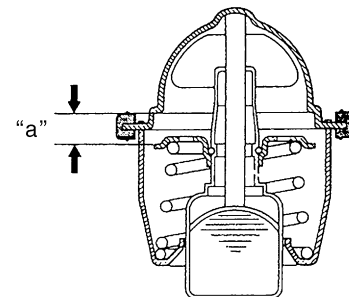
**Thermostat valve opening temperature**

**Standard: Approx. 82 °C (180 °F)**

- 7) Keep on heating the water to raise its temperature. Just when the water temperature reaches specified value, the thermostat valve should have lifted by at least 3 mm (0.12 in). A thermostat failing to satisfy either of the two requirements (start-to-open temperature and valve lift) must be replaced.

**Thermostat valve lift "a"**

**Standard: 3 mm and over at 95 °C (0.12 in and over at 203 °F)**

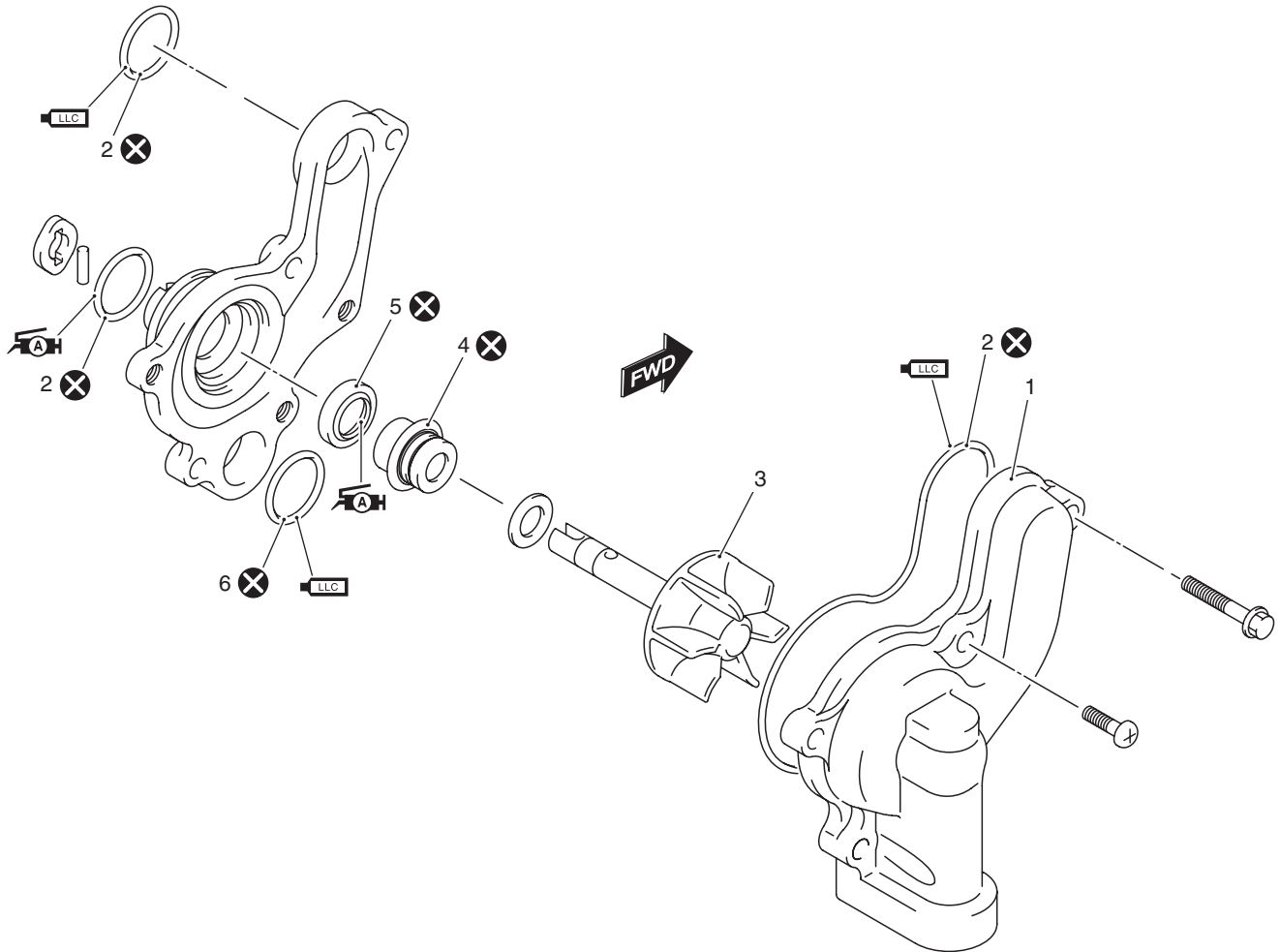


I705H1160031-04

- 8) Install the thermostat. Refer to "Thermostat Removal and Installation (Page1F-11)".

Water Pump Components

B705H11606020



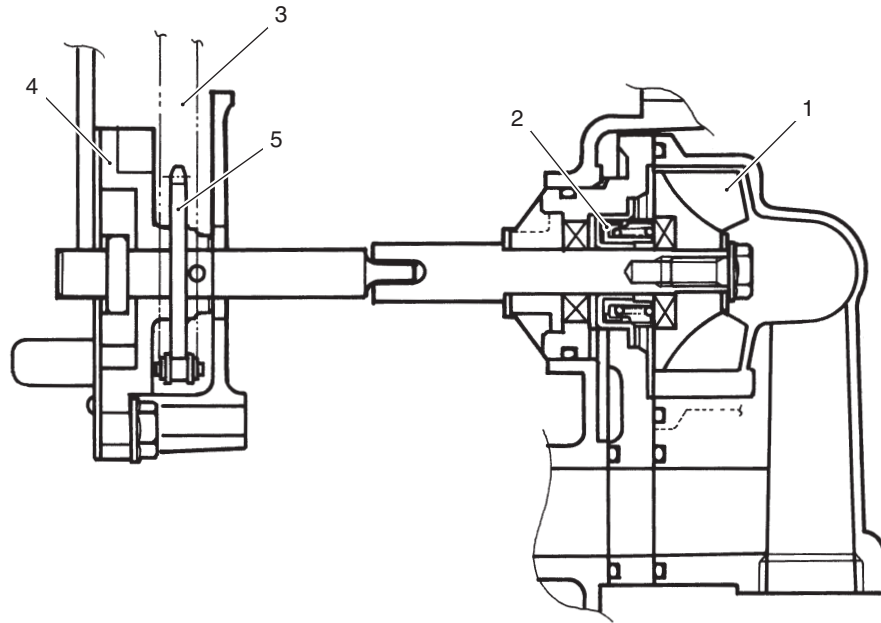
I705H1160057-02

1. Water pump cover	4. Mechanical seal	: Apply grease.
2. O-ring	5. Oil seal	: Apply engine coolant.
3. Impeller	6. Mechanical seal ring	: Do not reuse.



**Water Pump Construction**

B705H11606031



1. Impeller	3. Oil pump drive chain	5. Oil pump driven sprocket
2. Mechanical seal	4. Oil pump	

I705H1160058-01

**Water Pump Removal and Installation**

B705H11606021

**Removal**

- 1) Remove the under cover. Refer to "Under Cover Removal and Installation in Section 9D (Page9D-16)".
- 2) Drain engine coolant. Refer to "Cooling System Inspection in Section 0B (Page0B-11)".
- 3) Drain engine oil. Refer to "Engine Oil and Filter Change in Section 0B (Page0B-9)".
- 4) Remove the water pump assembly (1).



I705H1160035-02

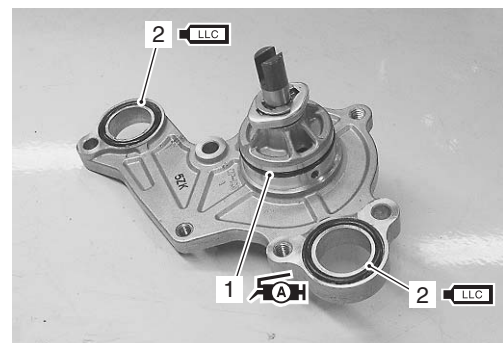
**Installation**

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

**⚠ CAUTION**

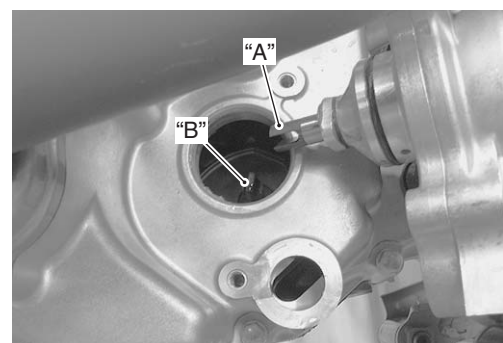
**Replace the O-rings with the new ones.**

- Apply grease to the O-ring (1).
- **⚠ CAUTION**: Grease 99000-25010 (SUZUKI SUPER GREASE A or equivalent)
- Apply engine coolant to the O-rings (2).



I705H1160036-04

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



I705H1160037-05

## 1F-15 Engine Cooling System:

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

### Tightening torque

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



I705H1160052-02

- Pour engine coolant. Refer to “Cooling System Inspection in Section 0B (Page0B-11)”.
- Pour engine oil. Refer to “Engine Oil and Filter Change in Section 0B (Page0B-9)”.
- Bleed air from the cooling circuit. Refer to “Cooling System Inspection in Section 0B (Page0B-11)”.

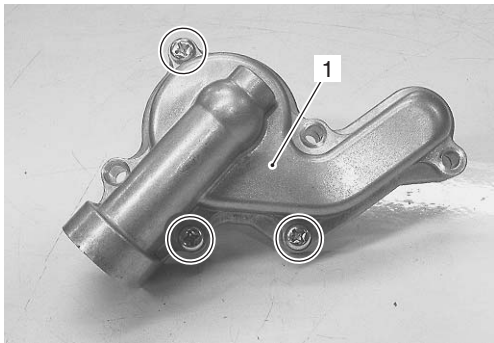
### Water Pump Disassembly and Assembly

B705H11606022

Refer to “Water Pump Removal and Installation (Page1F-14)”.

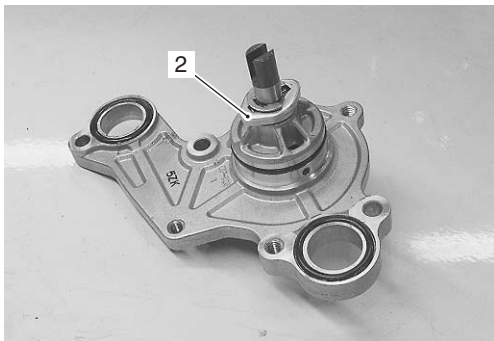
#### Disassembly

- 1) Remove the water pump cover (1).



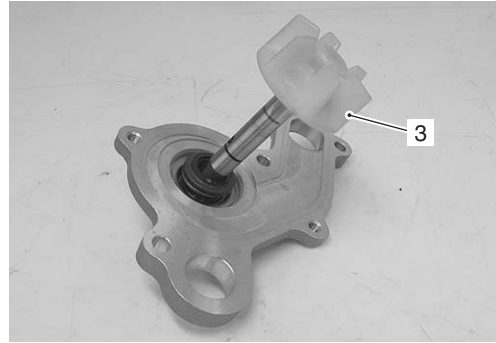
I705H1160053-01

- 2) Remove the O-rings and E-ring (2).



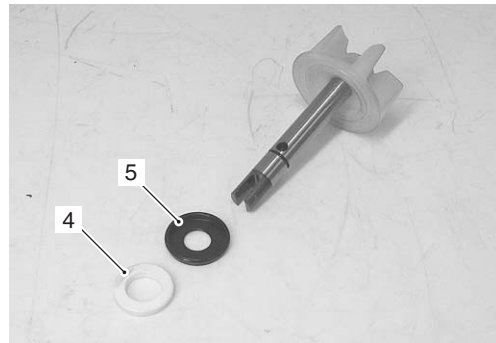
I705H1160054-01

- 3) Remove the impeller (3) together with the water pump shaft.



I705H1160038-03

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



I705H1160039-03

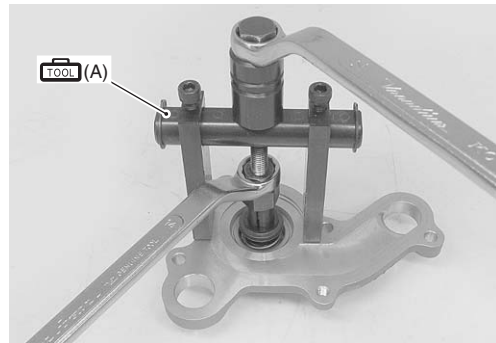
- 5) Remove the mechanical seal using the special tool.

#### NOTE

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

#### Special tool

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



I705H1160040-02

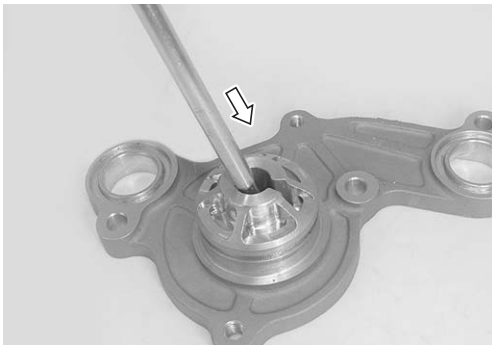
6) Remove the oil seal using a suitable bar.

**⚠ CAUTION**

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

**NOTE**

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



I705H1160041-02

**Assembly**

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

- Install the oil seal using the special tool.

**Special tool**

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

**NOTE**

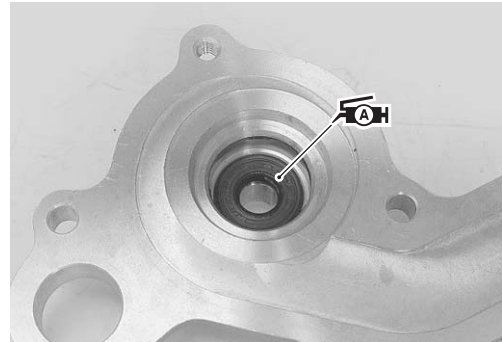
The stamped mark on the oil seal faces mechanical seal side.



I705H1160042-02

- Apply a small quantity of the super grease to the oil seal lip.

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

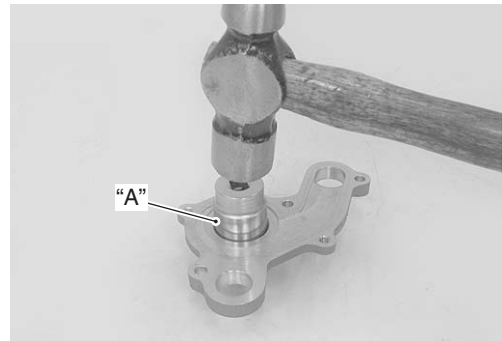


I705H1160043-02

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

**⚠ CAUTION**

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



I705H1160044-03

**NOTE**

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



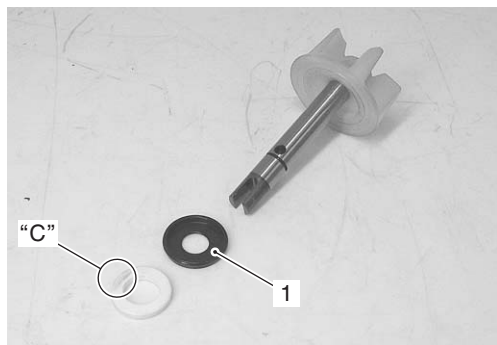
I705H1160045-03

## 1F-17 Engine Cooling System:

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

### NOTE

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



I705H1160046-03

- Install the new O-rings (2), (3).

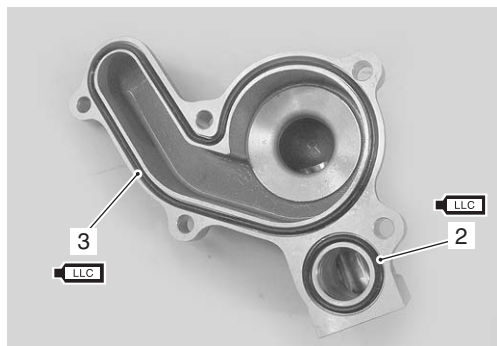
### ⚠ CAUTION

Use the new O-rings to prevent engine coolant leakage.

### NOTE

Apply engine coolant to the O-ring (2) and (3).

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



I705H1160047-03

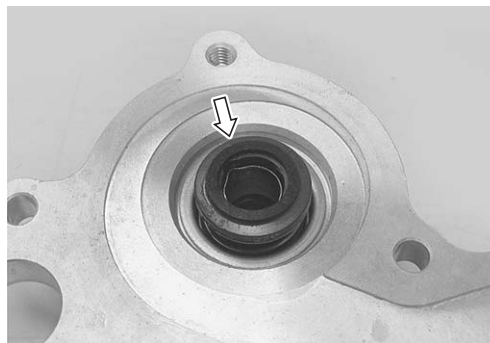
## Water Pump Related Parts Inspection

B705H11606023

Refer to "Water Pump Disassembly and Assembly (Page 1F-15)".

### Mechanical Seal

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



I705H1160048-02

### Oil Seal

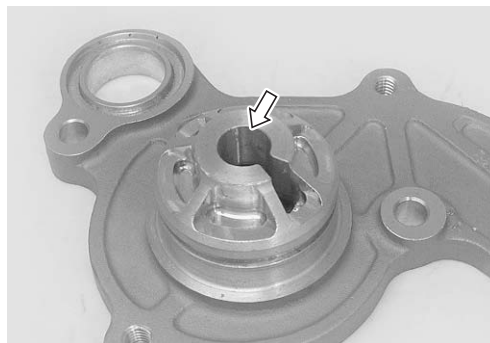
Visually inspect the oil seal for damage, with particular attention given to the lip. Replace the oil seal that shows indications of leakage.



I705H1160049-04

### Impeller Shaft Journal

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



I705H1160050-02

**Impeller**

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



I705H1160051-02

**Specifications**

**Service Data**

B705H11607002

**Thermostat + Radiator + Fan + Coolant**

Item	Standard / Specification		Limit
Thermostat valve opening temperature	Approx. 82 °C (180 °F)		—
Thermostat valve lift	Over 3 mm (0.12 in) at 95 °C (203 °F)		—
Engine coolant temperature 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	93.3 – 122.7 kPa (0.93 – 1.23 kgf/cm <sup>2</sup> , 13.3 – 17.4 psi)		—
Cooling fan thermo-switch operating temperature	OFF → ON	Approx. 98 °C (208 °F)	—
	ON → OFF	Approx. 92 °C (198 °F)	—
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 including reserve	Reserve tank side	Approx. 250 ml (0.3/0.2 US/Imp oz)	—
	Engine side	Approx. 1 700 ml (1.8/1.5 US/Imp oz)	—

**Tightening Torque Specifications**

B705H11607003

Fastening part	Tightening torque			Note
	N·m	kgf·m	lb·ft	
Cooling fan mounting bolt	7	0.7	5.0	☞ (Page1F-10)
Cooling fan thermo-switch	17	1.7	12.5	☞ (Page1F-10)
Water pump mounting bolt	10	1.0	7.0	☞ (Page1F-15)

**Reference:**

For the tightening torque of fastener not specified in this section, refer to “Tightening Torque Specifications in Section 0C (Page0C-7)”.

## Special Tools and Equipment

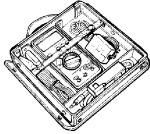
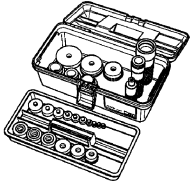
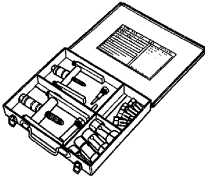
### Recommended Service Material

B705H11608001

Material	SUZUKI recommended product or Specification	Note
Grease	SUZUKI SUPER GREASE A or equivalent	P/No.: 99000-25010 ☞ (Page1F-14) / ☞ (Page1F-16) / ☞ (Page1F-17)

### Special Tool

B705H11608002

<p>09900-25008 Multi-circuit tester set ☞ (Page1F-11)</p> <div style="text-align: center;">  </div>	<p>09913-70210 Bearing installer set ☞ (Page1F-16)</p> <div style="text-align: center;">  </div>
<p>09921-20240 Bearing remover set ☞ (Page1F-15)</p> <div style="text-align: center;">  </div>	

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# Fuel System

## Precautions

### Precautions for Fuel System

B705H1170001

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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**

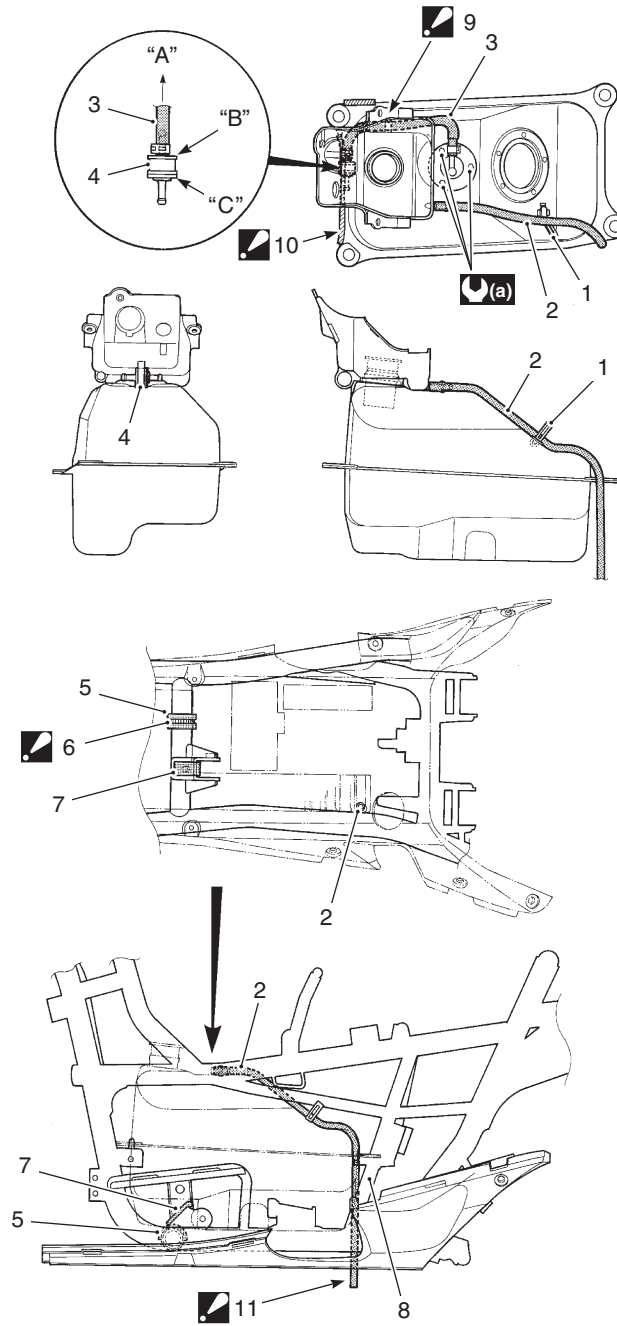
- To prevent the fuel system (fuel tank, fuel hose, etc.) from contamination with foreign particles, blind all openings.
  - After removing the throttle body, tape the cylinder intake section to prevent foreign particles from entering.
-



## Schematic and Routing Diagram

### Fuel Tank Hose Construction

B705H11702001



I705H1170039-02

1. Clamp	7. Cushion	"A": To fuel tank
2. Water drain hose	8. Clamp	"B": Black
3. Breather hose	9. Breather hose : Pass the breather hose through into the ring part of the tray.	"C": Orange
4. Check valve	10. Molding : Adhere both ends and center area for approx. 10 mm (1.4 in) using adhesive.	
5. Cushion	11. Water drain hose : Pass the water drain hose through into the slit located on rear left side end of under cover.	
6. Clamp : Cut off the clamp after tightening.	(a) : 3.5 N·m (0.35 kgf·m, 2.5 lb·ft)	

## Diagnostic Information and Procedures

### Fuel System Diagnosis

B705H11704001

Condition	Possible cause	Correction / Reference Item
<b>Engine will not start or hard to start (Gasoline does not reach the intake pipe)</b>	Clogging, bending or improper routing of fuel filter or fuel hose.	<i>Clean, replace or adjust.</i>
	Fuel pump failure.	<i>Replace.</i>
	Fuel pressure regulator failure.	<i>Replace.</i>
	Fuel pump injector failure.	<i>Replace.</i>
	Fuel pump relay failure.	<i>Replace.</i>
	ECM failure.	<i>Replace.</i>
	Wiring connection failure.	<i>Inspect or repair.</i>
<b>Engine will not start or hard to start</b>	Throttle position sensor improperly adjusted.	<i>Adjust.</i>
	Throttle position sensor failure.	<i>Replace.</i>
	Intake air pressure sensor failure.	<i>Replace.</i>
	ECM failure.	<i>Replace.</i>
	Engine temperature sensor failure.	<i>Replace.</i>
	Intake air pressure sensor failure.	<i>Replace.</i>
	Fuel pump failure.	<i>Replace.</i>
	Fuel hose improperly routed.	<i>Adjust.</i>
<b>Engine is likely to stop (Improper air/Fuel ratio)</b>	Fuel pump filter clogging.	<i>Clean or replace.</i>
	Fuel pump failure.	<i>Replace.</i>
	Fuel pressure regulator failure.	<i>Replace.</i>
<b>Engine is likely to stop (Fuel injector function failure)</b>	ECM failure.	<i>Replace.</i>
	Injection signal not received from ECM.	<i>Repair or replace.</i>
	Lead wire disconnection or shorted.	<i>Repair or replace.</i>
	Battery failure or voltage too low.	<i>Replace or recharge.</i>
<b>Engine is likely to stop (Control circuit or sensor function failure)</b>	ECM failure.	<i>Replace.</i>
	Fuel pressure regulator failure.	<i>Replace.</i>
	Throttle position sensor failure.	<i>Replace.</i>
	Fuel pump relay failure.	<i>Replace.</i>
<b>Engine is likely to stop (Engine parts function failure)</b>	Fuel hose clogging.	<i>Clean.</i>
<b>Engine operation failure in high speed range (Engine internal parts or electrical equipment failure)</b>	ECM failure.	<i>Replace.</i>
	Insufficient fuel supply to injector due to fuel hose blockage.	<i>Clean and priming.</i>
	Fuel pump failure.	<i>Replace.</i>
	Throttle sensor failure.	<i>Replace.</i>
<b>Insufficient engine power in high speed range (Airflow system failure)</b>	Air leakage from throttle body joint.	<i>Repair or replace.</i>
<b>Insufficient engine power in high speed range (Control circuit or sensor failure)</b>	Fuel pressure too low.	<i>Repair or replace.</i>
	Throttle position sensor failure.	<i>Replace.</i>
	ECM failure.	<i>Replace.</i>
	Throttle position sensor synchronization failure.	<i>Adjust.</i>
	Fuel tank pressure control valve failure.	<i>Replace.</i>
<b>Insufficient engine power (Engine internal parts or electrical equipment failure)</b>	Injector clogged.	<i>Clean.</i>
	Throttle position sensor adjustment failure.	<i>Replace.</i>
	Air leakage from throttle or vacuum hose.	<i>Retighten or replace.</i>
	Fuel pump or ECM failure.	<i>Replace.</i>

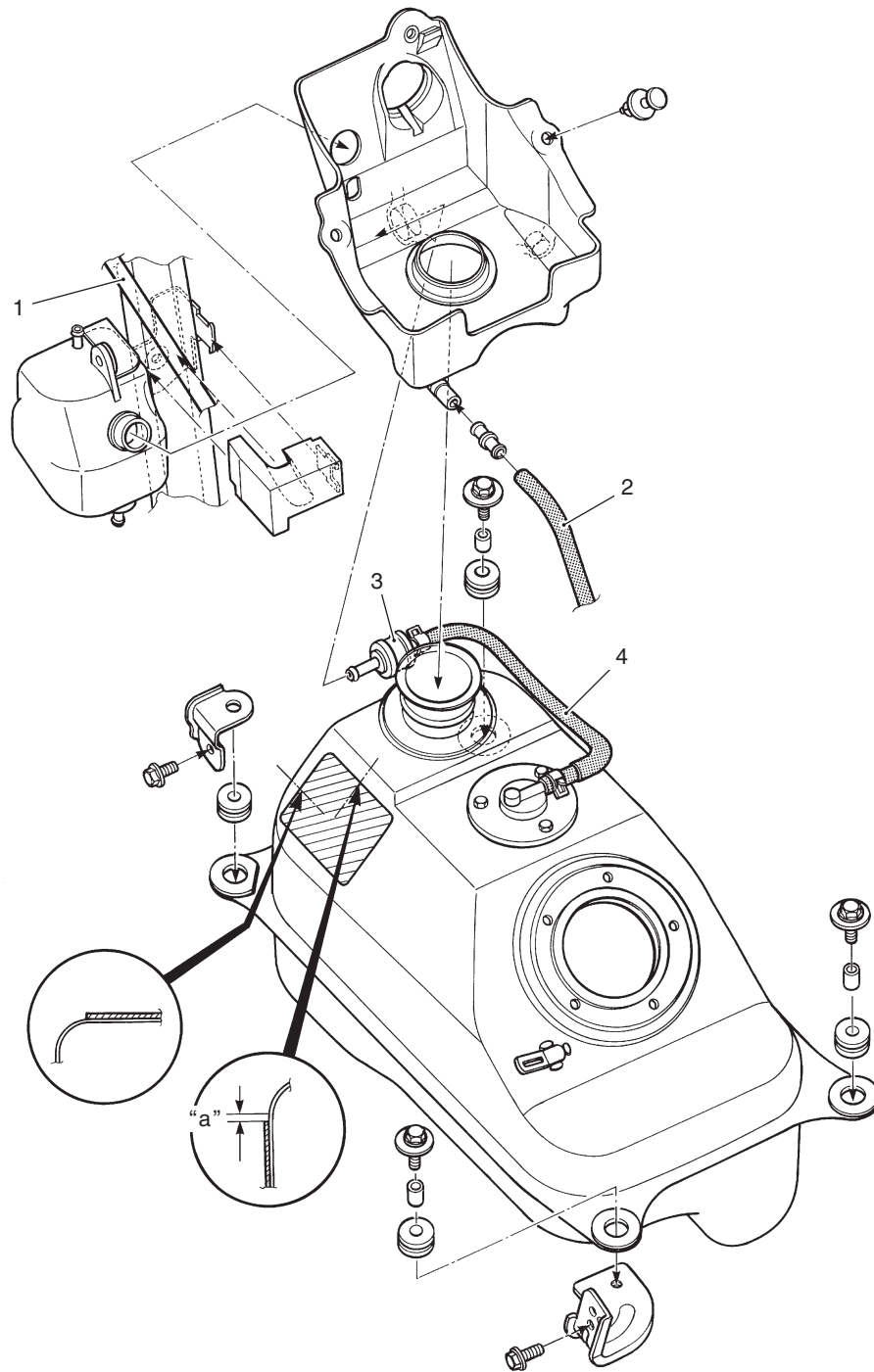
**1G-4 Fuel System:**

<b>Condition</b>	<b>Possible cause</b>	<b>Correction / Reference Item</b>
<b><i>Insufficient engine power (Control circuit or sensor failure)</i></b>	Fuel pressure too low.	<i>Repair or replace.</i>
	Throttle position failure.	<i>Replace.</i>
	ECM failure.	<i>Replace.</i>
	Throttle position sensor synchronization failure.	<i>Adjust.</i>
<b><i>Engine overheats (Fuel mixture too lean)</i></b>	Fuel injector failure.	<i>Replace.</i>

# Repair Instructions

## Fuel System Components

B705H11706001

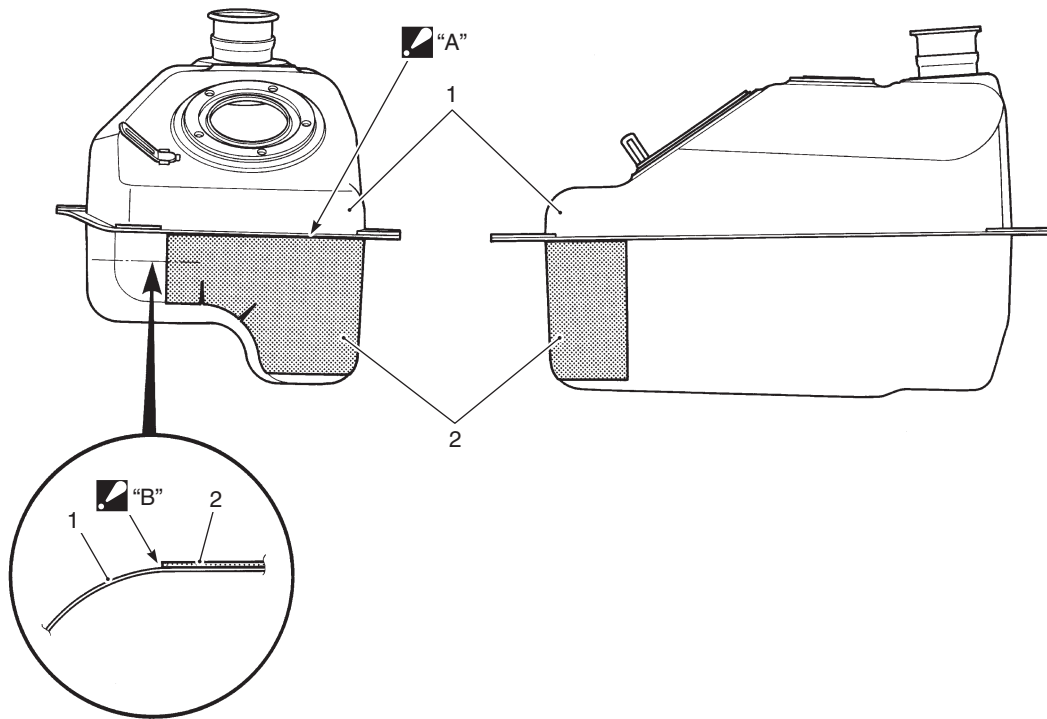


1. Brake-lock cable	3. Check valve	"a": 5 mm (0.2 in)
2. Water drain hose	4. Breather hose	

I705H1170040-01

Fuel Tank Heat Shield Construction

B705H11706026



I705H1170041-01

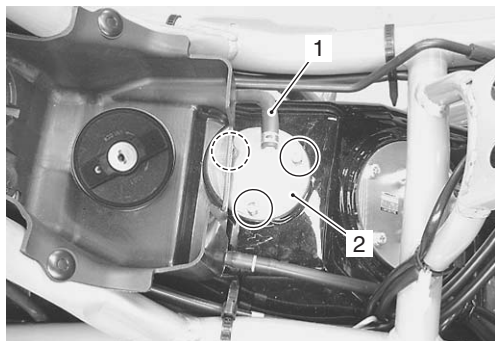
1. Fuel tank	☑ "A": Match the upper end of the fuel tank heat shield with the flange base.
2. Fuel tank heat shield	☑ "B": Match the fuel tank heat shield with the R-edge.

Fuel Cut Valve Removal and Installation

B705H11706002

Removal

- 1) Remove the front box. Refer to "Front Box Removal and Installation in Section 9D (Page9D-18)".
- 2) Disconnect the hose (1) and remove the fuel cut valve (2).



I705H1170026-04

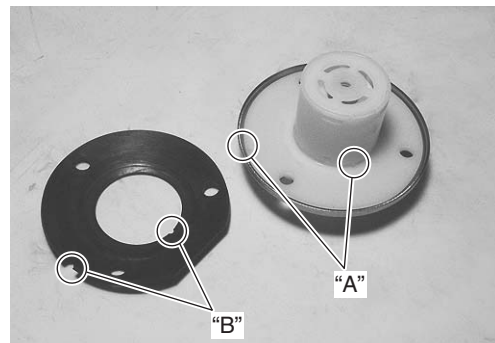
Installation

Install the fuel cut valve in the reverse order of removal. Pay attention the following points:

- Install the fuel cut valve with its protrusions "A" engaged with cutaway "B" on the gasket.

**⚠ CAUTION**

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

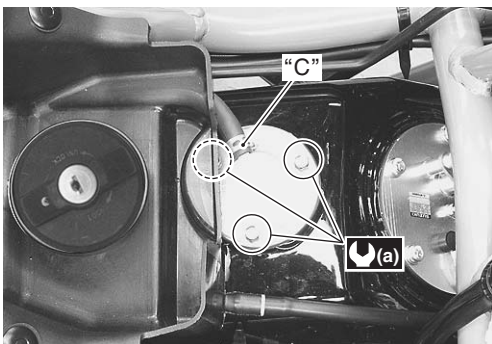


I705H1170001-02

- Install the fuel cut valve with its hose attaching section “C” facing the vehicle body right side.
- Tighten the fuel cut valve bolt to the specified torque.

**Tightening torque**

Fuel cut valve bolt (a): 3.5 N·m (0.35 kgf·m, 2.5 lb-ft)



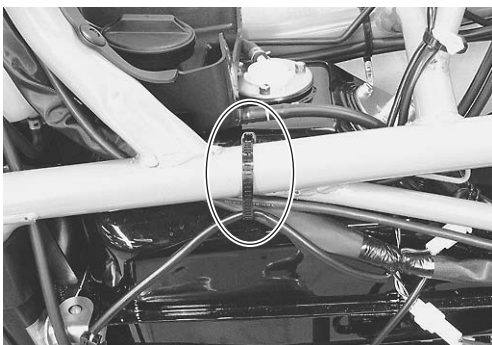
I705H1170027-06

**Fuel Tank Removal and Installation**

I705H11706018

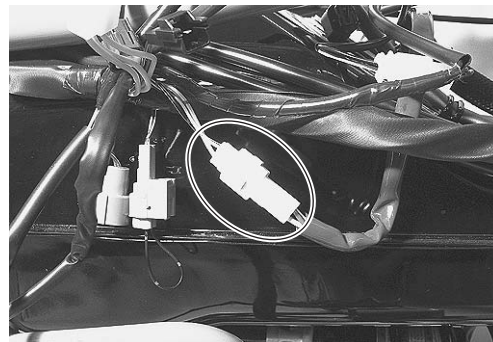
**Removal**

- 1) Remove the footboards. Refer to “Footboard Removal and Installation in Section 9D (Page9D-21)”.
- 2) Remove the engine. Refer to “Engine Assembly Removal and Installation in Section 1D (Page1D-6)”.
- 3) Remove the cushion lever mounting nut. Refer to “Rear Shock Absorber and Rear Shock Absorber Assembly Removal and Installation in Section 2C (Page2C-4)”.
- 4) Remove the clamp.



I705H1170002-03

- 5) Disconnect the fuel pump coupler.

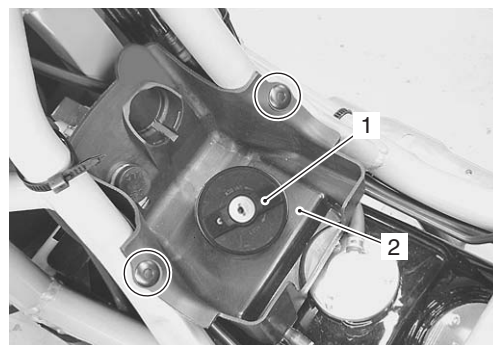


I705H1170003-01

- 6) Remove the fuel tank filler cap (1) and fuel drain tray (2) from the fuel inlet.

**⚠ CAUTION**

After removing the fuel drain tray (2), refit the fuel tank filler cap (1) to the fuel tank.



I705H1170004-05

- 7) Remove the fuel tank by removing the bolts and bracket.

**⚠ CAUTION**

Keep away from fire or sparks since gasoline may leak.



I705H1170028-01

## 1G-8 Fuel System:

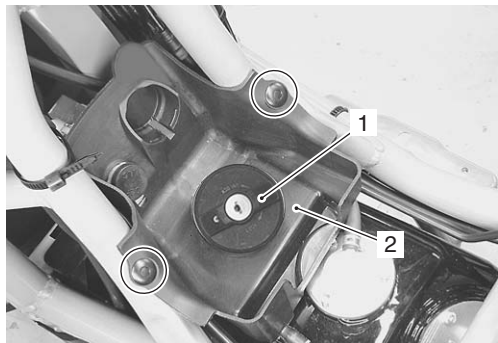
### Installation

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

- Tighten the fuel tank bolts.
- Remove the fuel filler cap (1) and install the fuel drain tray (2) on the fuel inlet.

#### **⚠ CAUTION**

**After the fuel drain tray (2) has been fitted on the fuel tank, the fuel tank filler cap (1) should be fitted to the fuel tank.**



I705H1170004-05

- Clamp the wiring harness surely.

### Fuel Pump Assembly Removal and Installation

B705H11706010

#### Removal

- 1) Remove the front box. Refer to "Front Box Removal and Installation in Section 9D (Page9D-18)".
- 2) Loosen the fuel tank bolt and move the fuel tank rearward.
- 3) Disconnect the fuel hose (1).

#### **⚠ CAUTION**

**After the fuel hose (1) has been disconnected, fit a blind plug to the opening.**

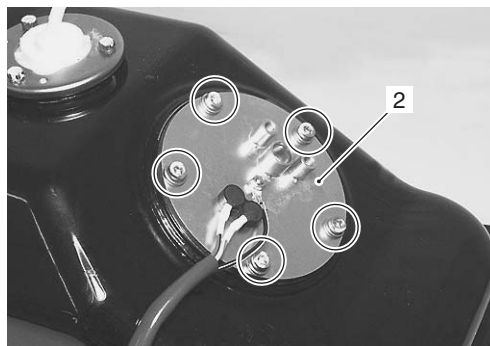


I705H1170005-03

- 4) Remove the fuel pump assembly (2).

#### **⚠ CAUTION**

**When removing the fuel pump assembly, take care not to cause damage to it. If such a possibility is thought to exist, remove the fuel tank from the body. Refer to "Fuel Tank Removal and Installation (Page1G-7)".**



I705H1170006-01

#### **⚠ WARNING**

- Use caution to minimize spillage of gasoline.
- Spilled gasoline should be wiped off immediately.
- Keep away from fire or spark.
- Work in a well-ventilated area.

#### Installation

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

- Apply engine oil to the O-ring (1) and install the fuel tank.

#### **⚠ CAUTION**

**Replace the fuel pump O-ring and fuel hose O-ring with the new ones.**



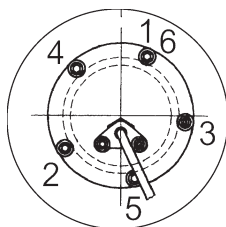
I705H1170007-01



- 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 lb·ft)**



I705H1170008-01

- Tighten the fuel hose to the specified torque.

**Tightening torque**

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



I705H1170038-04

**Fuel Drain Tray and FTPC Valve Removal and Installation**

B705H11706019

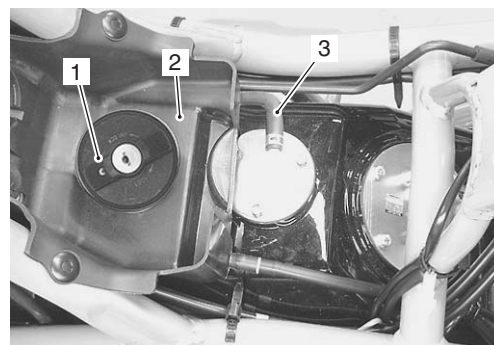
**Removal**

- Remove the front box. Refer to "Front Box Removal and Installation in Section 9D (Page9D-18)".
- Remove the fuel tank filler cap (1) fuel drain tray (2) from the fuel tank.

**⚠ CAUTION**

**After the fuel drain tray has been removed, the fuel cap should be fitted to the fuel tank.**

- Disconnect the hose (3) from the fuel cut valve.



I705H1170029-02

- Remove the FTPC valve (4) from the fuel drain tray.



I705H1170009-01

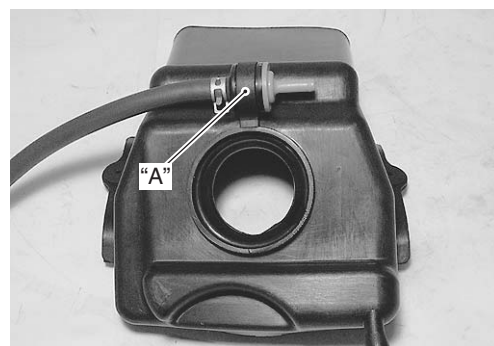
**Installation**

Install the fuel drain tray and FTPC valve in the reverse order of removal. Pay attention the following points:

- The hose should be fitted on the black side "A" of the FTPC valve.

**⚠ CAUTION**

**When installing fuel drain, care should be used not to cause tear or other damage.**



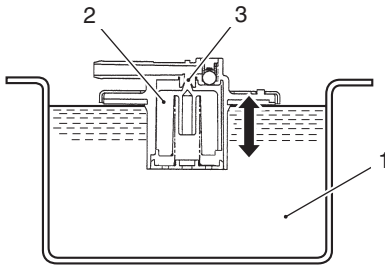
I705H1170010-02

**Fuel Cut Valve Inspection**

B705H11706004

Inspect the fuel cut valve in the following procedures:

- 1) Remove the fuel cut valve. Refer to “Fuel Drain Tray and FTPC Valve Removal and Installation (Page1G-9)”.
- 2) Check for the following points and replace if any abnormal condition is found.
  - With the fuel cut valve being immersed in kerosene (1), check that valve (2) operates smoothly and valve seat (3) contacts correctly.

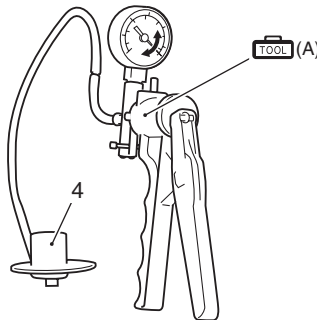


I705H1170011-01

- Using the special tool, apply vacuum to the fuel cut valve (4) and check that the gauge pointer moves correctly.

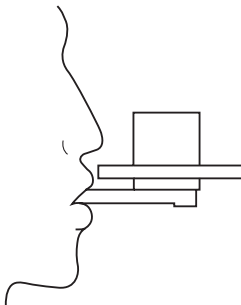
**Special tool**

**TOOL (A): 09917-47011 (Vacuum pump gauge)**



I705H1170012-01

- Check for resistance when the fuel cut valve is blown.



I705H1170013-01

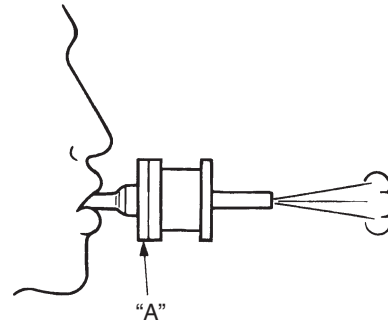
- 3) After finishing the fuel cut valve inspection, reinstall the fuel cut valve. Refer to “Fuel Drain Tray and FTPC Valve Removal and Installation (Page1G-9)”.

**FTPC Valve Inspection**

B705H11706023

Inspect the FTPC valve in the following procedures:

- 1) Remove the FTPC valve. Refer to “Fuel Drain Tray and FTPC Valve Removal and Installation (Page1G-9)”.
- 2) Check that air passes easily when blown from the orange paint side of the FTPC valve and that resistance exists when blown from the other side. If any abnormal condition exists, replace the valve with a new one.



I705H1170014-02

“A”: Orange

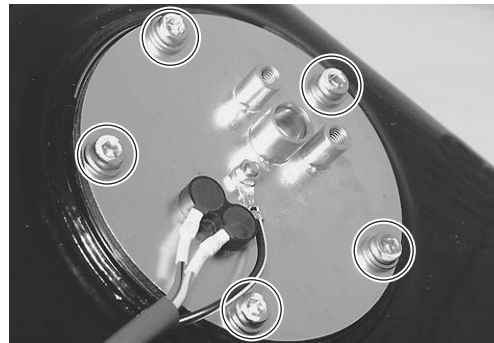
- 3) After finishing the FTPC valve inspection, reinstall the FTPC valve. Refer to “Fuel Drain Tray and FTPC Valve Removal and Installation (Page1G-9)”.

**Fuel Pump Disassembly and Assembly**

B705H11706011

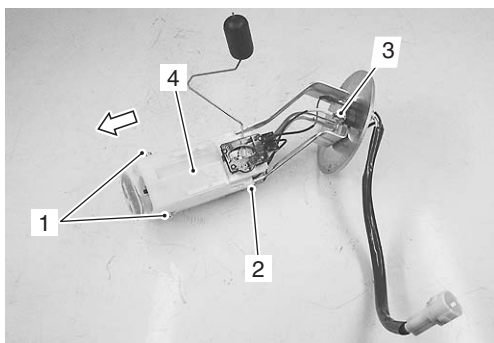
**Disassembly**

- 1) Remove the fuel pump assembly. Refer to “Fuel Pump Assembly Removal and Installation (Page1G-8)”.



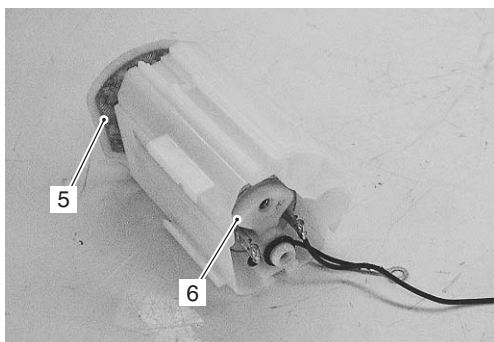
I705H1170015-01

- 2) After removing the clamp screw (1), ground wire (2) and lead wire (BI) (3), remove the fuel pump assembly (4).



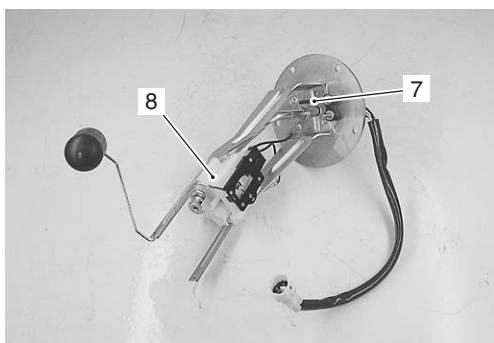
I705H1170016-02

- 3) Detach the fuel mesh filter (5) and remove the fuel pump (6).



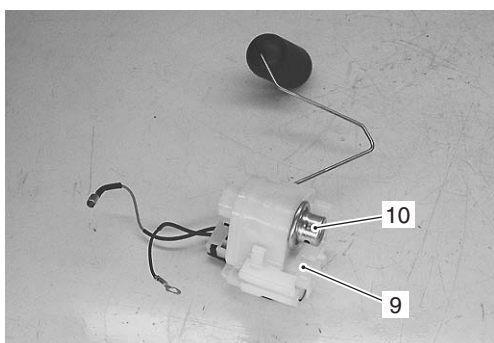
I705H1170017-02

- 4) Disconnect the lead wire (gray) (7) and remove the fuel level gauge assembly (8).



I705H1170018-02

- 5) Remove the fuel guide (9) and fuel pressure regulator (10).



I705H1170019-02

### Assembly

Refer to "Fuel Mesh Filter Inspection (Page1G-13)". Assemble the fuel pump assembly in the reverse order of the disassembly. Pay attention to the following points:

#### ⚠ CAUTION

- To prevent fuel leakage, each O-ring must be replaced with a new one.
  - Apply engine oil lightly to each of the O-rings.
- 
- Connect all wiring couplers securely so as not to cause contact failure.
  - With the engine oil lightly applied to the O-ring, install the fuel pump to the fuel tank.

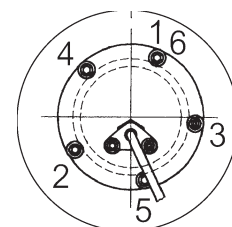
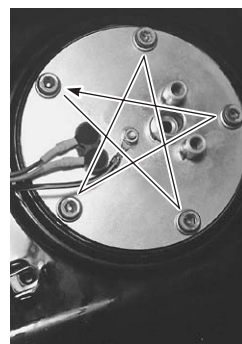


I705H1170021-02

- After the fuel pump mounting bolts have been tightened temporarily, tighten them to specification in the specified torque.

#### Tightening torque

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



I705H1170022-01

## Fuel Pressure Inspection

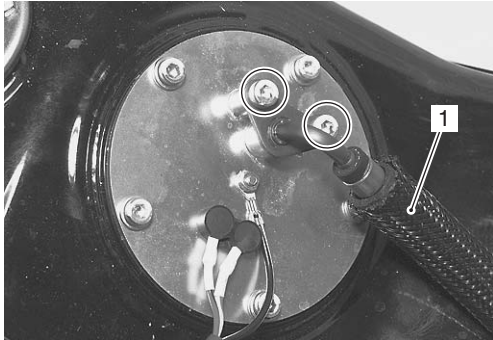
B705H11706005

Inspect the fuel pressure in the following procedures:

- 1) Remove the fuel tank bolt and move the fuel tank for vehicle backward.
- 2) Place a rag under the fuel feed hose and disconnect fuel feed hose (1) from the fuel tank.

### **▲ WARNING**

- Use caution to minimize spillage of gasoline.
- Keep away from fire or spark.
- Spilled gasoline should be wiped off immediately.
- Work in a well-ventilated area.



I705H1170030-01

- 3) Install the special tools to the fuel tank.

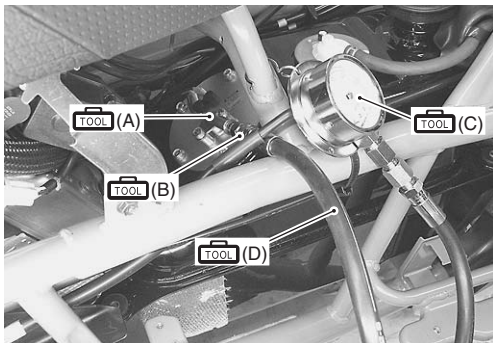
### Special tool

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

**TOOL (B): 09940-40230 (Fuel pressure gauge hose attachment)**

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

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



I705H1170031-01

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

### **Fuel pressure**

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

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

- Hose leakage
- Filter clogging
- Pressure regulator
- Fuel pump

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

- Pump check valve
- Pressure regulator

### **▲ CAUTION**

- Prior to removing the special tool, turn the ignition switch to OFF position and gradually release fuel pressure.

### **▲ WARNING**

- Use caution to minimize spillage of gasoline.
- Keep away from fire or spark.
- Spilled gasoline should be wiped off immediately.
- Work in a well-ventilated area.

- 5) After finishing the fuel pressure inspection, reinstall the fuel tank. Refer to "Fuel Tank Removal and Installation (Page1G-7)".



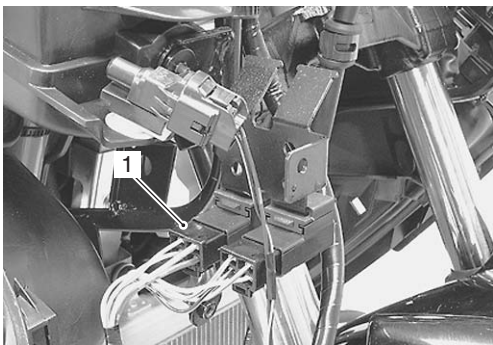
### Fuel Pump Relay Inspection

B705H11706006

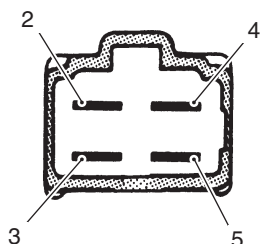
Refer to “Electrical Components Location in Section 0A (Page0A-7)”.

Inspect the fuel pump relay in the following procedures:

- 1) Remove the front leg shield. Refer to “Front Leg Shield Removal and Installation in Section 9D (Page9D-14)”.
- 2) Remove the fuel pump relay (1).
- 3) First, check for insulation with the tester between terminals (2) and (3). Next, check for continuity between (2) and (3) with 12 V voltage applied, positive (+) to terminal (4) and negative (–) to terminal (5). If continuity does not exist, replace the relay with a new one.



I705H1170023-03



I705H1170024-02

### Fuel Mesh Filter Inspection

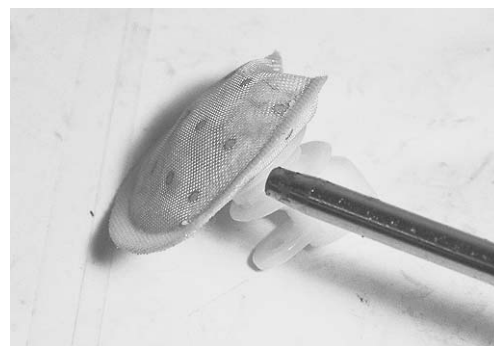
B705H11706020

Inspect the fuel mesh filter in the following procedures:

- 1) Remove the fuel mesh filter. Refer to “Fuel Pump Disassembly and Assembly (Page1G-10)”.
- 2) If the fuel mesh filter is clogged with foreign particles, it hinders smooth gasoline flow resulting in loss of engine power. Such a filter should be cleaned by blowing with compressed air.

### NOTE

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



I705H1170025-01

- 3) After finishing the fuel mesh filter inspection, reinstall the fuel mesh filter. Refer to “Fuel Mesh Filter Inspection (Page1G-13)”.

### Fuel Level Gauge Inspection

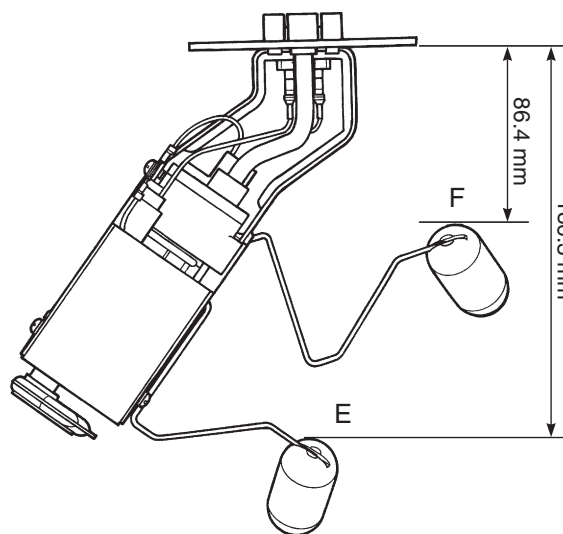
B705H11706021

Inspect the fuel level gauge in the following procedures:

- 1) Remove the fuel pump assembly. Refer to “Fuel Pump Disassembly and Assembly (Page1G-10)”.
- 2) Check for resistance between the terminals for each of the following float position.  
If the resistance measured is out of specification, replace the fuel gauge with a new one.

#### Special tool

 : 09900–25008 (Multi-circuit tester set)



I705H1170033-06

Float position	Resistance between terminals
F: 86.4 mm from tank mating face	Approx. 9 – 11 Ω
E: 186.3 mm from tank mating face	Approx. 129 – 131 Ω

## 1G-14 Fuel System:

- 3) Inspect the fuel meter. Refer to "Fuel Level Meter Inspection in Section 9C (Page9C-2)".

### Fuel Pump Inspection

B705H11706022

Turn the ignition switch ON and check for operation of the fuel pump for a few seconds. If the fuel pump is not operating properly, replace the fuel pump or check the fuel pump relay and fuel cut sensor.

### Fuel Discharge Inspection

#### **▲ WARNING**

- Use caution to minimize spillage of gasoline.
- Keep away from fire or spark.
- Spilled gasoline should be wiped off immediately.
- Work in a well-ventilated area.

- 1) Remove the front frame cover. Refer to "Front Frame Cover Removal and Installation in Section 9D (Page9D-17)".
- 2) Disconnect the fuel feed hose from the injector.
- 3) Insert the end of fuel feed hose into a measuring cylinder.



I705H1170034-01

- 4) Remove the meter panel. Refer to "Meter Panel Removal and Installation in Section 9D (Page9D-14)".

- 5) Disconnect the ECM lead wire coupler.



I705H1170042-02

- 6) With 12 V voltage applied to the power source lead wire (Y/R), measure the volume of gasoline discharged within 10 seconds.
- 7) If the discharge amount is out of the specification, the probable cause may be failure of the fuel pump or clogged fuel filter.

#### **Fuel discharge amount**

**At least approx. 35 ml/10 seconds**

#### **NOTE**

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

- 8) After finishing the fuel discharge inspection, reinstall the fuel feed hose, meter panel and front frame cover. Refer to "Front Frame Cover Removal and Installation in Section 9D (Page9D-17)".

### Fuel Injector Inspection

B705H11706024

Refer to "DTC "C32" (P0201): Fuel Injector Circuit Malfunction in Section 1A (Page1A-52)".

### Fuel Injector Removal and Installation

B705H11706025

Refer to "Throttle Body Disassembly and Assembly in Section 1D (Page1D-13)".

## Specifications

### Service Data

B705H11707002

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

Item	Specification	Note
Injector resistance	Approx. 10.3 $\Omega$ at 20 °C (68 F°)	—
Fuel pump discharge amount	35 ml and more For 10 sec., at 300 kPa (3.0 kgf/cm <sup>2</sup> , 43 psi)	—
Fuel pressure regulator operating set pressure	Approx. 300 kPa (3.0 kgf/cm <sup>2</sup> , 43 psi)	—

### Fuel

Item	Specification	Note
Fuel type	Use only unleaded gasoline of at least 87 pump octane or 91 octane (R/2 + M/2) or higher rated by the research method. Gasoline containing MTBE (Methyl Tertiary Butyl Ether), less than 10% ethanol, or less than 5% methanol with appropriate cosolvents and corrosion inhibitor is permissible.	E-03, 28, 33
	Gasoline used should be graded 91 octane or higher. An unleaded gasoline type is recommended.	The others countries
Fuel tank capacity	Including reserve	13.5 L (3.6/3.0 US/Imp gal)
	Reserve	4.0 L (3.17/2.64 US/Imp gal)

### Tightening Torque Specifications

B705H11707003

Fastening part	Tightening torque			Note
	N·m	kgf·m	lb·ft	
Fuel cut valve bolt	3.5	0.35	2.5	☞ (Page1G-7)
Fuel pump mounting bolt	10	1.0	7.0	☞ (Page1G-9) / ☞ (Page1G-11)
Fuel hose mounting bolt	10	1.0	7.0	☞ (Page1G-9)

#### NOTE

The specified tightening torque is also described in the following.  
 “Fuel Tank Hose Construction (Page1G-2)”

#### Reference:

For the tightening torque of fastener not specified in this section, refer to “Tightening Torque Specifications in Section 0C (Page0C-7)”.

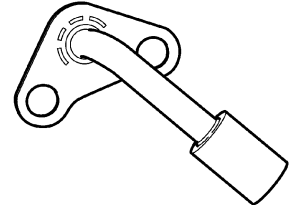
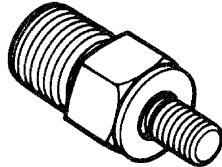
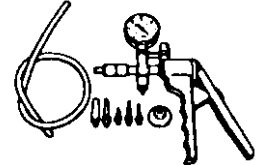
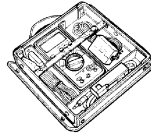


## Special Tools and Equipment

**Special Tool**

B705H11708001

<p>09900-25008 Multi-circuit tester set ☞ (Page1G-13)</p>	<p>09915-74521 Oil pressure gauge hose ☞ (Page1G-12)</p>
<p>09915-77331 Meter (for high pressure) ☞ (Page1G-12)</p>	<p>09917-47011 Vacuum pump gauge ☞ (Page1G-10)</p>
<p>09940-40211 Fuel pressure gauge adapter ☞ (Page1G-12)</p>	<p>09940-40230 Fuel pressure gauge hose attachment ☞ (Page1G-12)</p>



# Ignition System

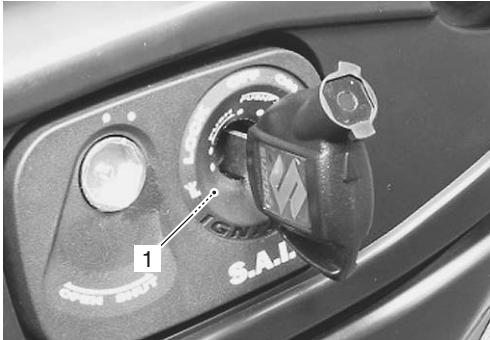
## General Description

### Immobilizer Description (For E-02, 19, 24, 54)

B705H11801001

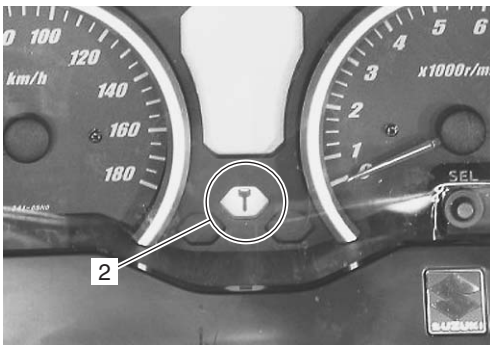
The immobilizer, an anti-theft system, is installed as a standard equipment.

The immobilizer verifies that the key ID agrees with ECM ID by means of radio communication through the immobilizer antenna. When the ID agreement is verified, the system makes the engine ready to start.



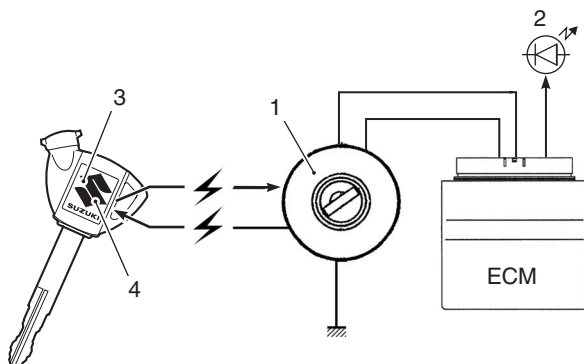
I705H1180001-02

1. Immobilizer antenna



I705H1180002-01

2. Indicator light



I705H1180003-01

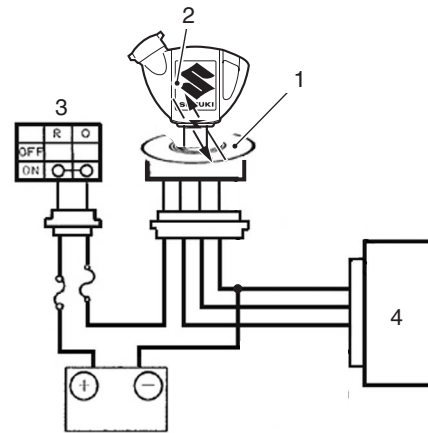
1. Immobilizer antenna	3. Transponder
2. Indicator light	4. ID

### Operation

When the ignition switch is turned ON with the engine stop switch in ON, the immobi-antenna and ECM are powered ON.

The ECM transmits a signal to the transponder through the immobi-antenna in order to make comparison between the key ID and ECM ID.

With the signal received, the transponder transmits the key ID signal to ECM so that ECM can make comparison with its own ID, and if it matches, the engine is made ready to start.

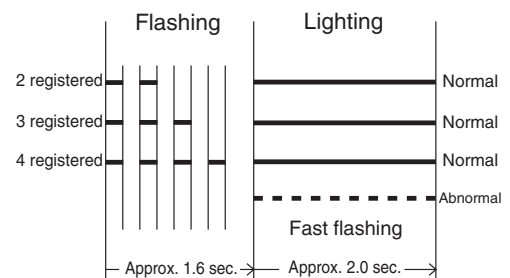


I705H1180004-01

1. Immobilizer antenna	3. Ignition switch
2. Transponder	4. ECM

Also, when the ignition switch is turned ON, the indicator light flashes as many as the number of IDs registered in ECM. Thereafter, if the IDs are in agreement, the indicator light turns on for two seconds to notify of completion in successful communication.

If the indicator light (LED) flashes fast, it notifies of communication error or disagreement of ID.



I705H1180006-01

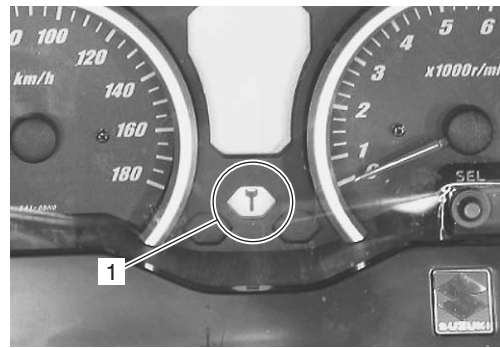
## 1H-2 Ignition System:

### NOTE

If the indicator light flashes fast, turn the ignition switch OFF then ON to make judgment again as there is possible misjudgment due to environmental radio interference.

### ⚠ CAUTION

When the battery performance is lowered in winter (low temperature), the system may at times make a re-judgment at the time of beginning the starter motor operation. In this case, the indicator light operation starts immediately after the starter operation.



1705H1180007-01

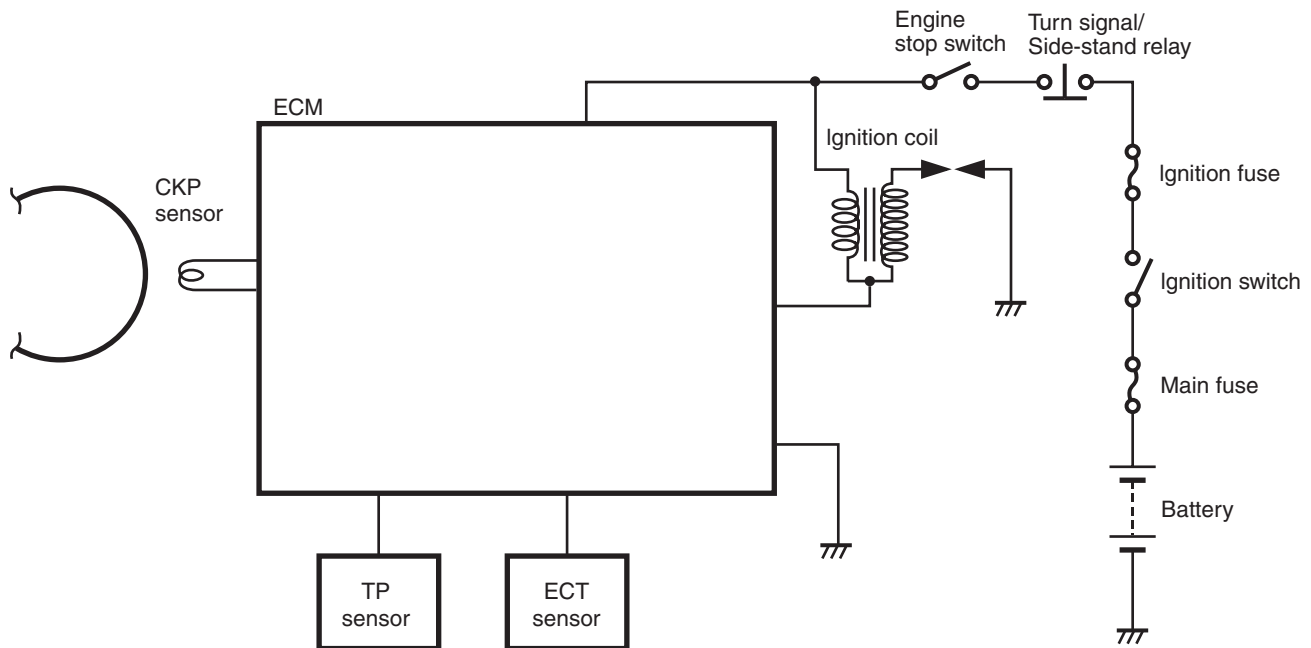
### NOTE

In the case that the LED flashes fast, remains lit or unlit, the probable cause of such a failure may be due to abnormal condition in the key, key cylinder, wiring harness or ECM. (If such a failure exists, contact your distributor or dealer.)

## Schematic and Routing Diagram

### Ignition System Diagram

B705H11802001



1705H1180008-04

## Diagnostic Information and Procedures

### Ignition System Symptom Diagnosis

B705H11804005

Condition	Possible cause	Correction / Reference Item
<b>Spark plug not sparking</b>	Damaged spark plug.	<i>Replace.</i>
	Damaged spark plug cap.	<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>
	Open or short in high-tension cord.	<i>Replace.</i>
	Defective CKP sensor.	<i>Replace.</i>
	Defective ECM.	<i>Replace.</i>
<b>Engine stalls easily (No spark)</b>	Fouled spark plug.	<i>Clean or replace.</i>
	Defective CKP sensor.	<i>Replace.</i>
	Defective ECM.	<i>Replace.</i>
<b>Spark plug is wet or quickly becomes fouled with carbon</b>	Excessively rich air/fuel mixture.	<i>Consult FI system.</i>
	Incorrect gasoline.	<i>Change.</i>
	Dirty air cleaner element.	<i>Replace.</i>
	Incorrect spark plug (Cold type).	<i>Change to hot type spark plug.</i>
<b>Spark plug quickly becomes fouled with oil or carbon</b>	Worn piston ring.	<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 seal.	<i>Replace.</i>
<b>Spark plug electrodes overheat or burn</b>	Incorrect spark plug (Hot type).	<i>Change to cold type spark plug.</i>
	Overheated engine.	<i>Tune-up.</i>
	Loose spark plug.	<i>Tighten.</i>
	Excessively lean air/fuel mixture.	<i>Consult FI system.</i>

## 1H-4 Ignition System:

### No Spark or Poor Spark

B705H11804001

#### Troubleshooting

##### NOTE

**Make sure the engine stop switch is in the "RUN" position and side-stand is in up-right position. Grasp the front or rear brake lever. Make sure 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/W and 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 turn signal/ side-stand relay.</li> <li>Faulty engine stop switch.</li> <li>Broken wire harness or poor connection of related circuit couplers.</li> </ul>
3	Measure the ignition coil primary peak voltage. Refer to "Ignition Coil Inspection (Page1H-5)".  <b>NOTE</b> <b>This ignition coil primary peak voltage inspection method is applicable only with the multi-circuit tester and the peak volt adaptor.</b>  <i>Is the peak voltage OK?</i>	Go to step 4.	Go to step 5.
4	Inspect the spark plug. Refer to "Spark Plug Inspection and Cleaning in Section 0B (Page0B-4)". <i>Is the spark plug OK?</i>	Go to Step 5.	Faulty spark plug.
5	Inspect the ignition coil. Refer to "Ignition Coil Inspection (Page1H-5)". <i>Is the ignition coil(-s) OK?</i>	Go to step 6.	Faulty ignition coil(-s).
6	Measure the CKP sensor peak voltage and its resistance. Refer to "CKP Sensor Inspection (Page1H-6)".  <b>NOTE</b> <b>The CKP sensor peak voltage inspection is applicable only with the multi-circuit tester and peak volt adaptor.</b>  <i>Is the peak voltage and resistance OK?</i>	<ul style="list-style-type: none"> <li>Faulty ECM.</li> <li>Poor connection of ignition couplers.</li> </ul>	<ul style="list-style-type: none"> <li>Faulty CKP sensor.</li> <li>Metal particles or foreign material being stuck on the CKP sensor and rotor tip.</li> </ul>

## Repair Instructions

### Spark Plug Removal and Installation

B705H11806007

Refer to "Spark Plug Removal and Installation in Section 0B (Page0B-3)".

### Spark Plug Inspection and Cleaning

B705H11806008

Refer to "Spark Plug Inspection and Cleaning in Section 0B (Page0B-4)".

### Ignition Coil Inspection

B705H11806009

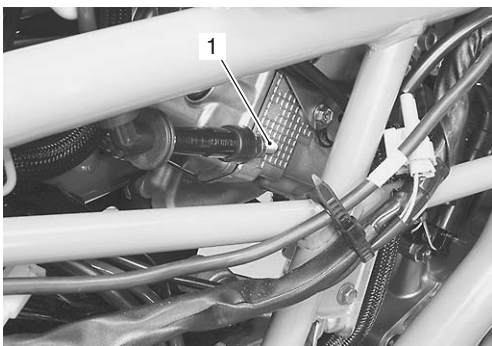
Refer to "Electrical Components Location in Section 0A (Page0A-7)".

### Ignition Coil Primary Peak Voltage

- 1) Remove the left footboard. Refer to "Footboard Removal and Installation in Section 9D (Page9D-21)".
- 2) Disconnect the spark plug cap.
- 3) Connect new spark plug (1) to the spark plug cap and ground it on the cylinder.

#### NOTE

Be sure that the spark plug is connected properly and the battery used is in fully-charged condition.



I705H1180014-02

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


#### ⚠ WARNING

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

#### NOTE

Do not disconnect the ignition coil lead wires.

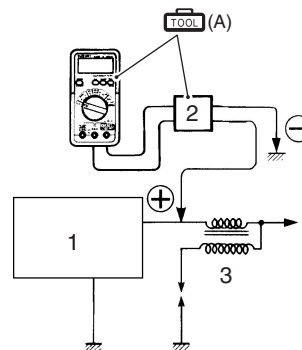
#### Special tool

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

#### Tester knob indication

Voltage ( --- )

	(+) probe	(-) probe
Ignition coil:	W lead wire connector	Ground



I705H1180009-03

1. ECM	3. Ignition coil
2. Peak voltage adapter	

- 5) Press the starter button and allow the engine to crank for a few seconds, and then measure the ignition coil primary peak voltage.



I705H1180015-01



## 1H-6 Ignition System:

- Repeat above procedures a few times and measure the highest ignition coil primary peak voltage. If the voltages are lower than standard values, inspect the ignition coil and the CKP sensor.

### Ignition coil primary peak voltage 150 V and more

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

### **Ignition Coil Resistance**

- Remove the left footboard. Refer to "Footboard Removal and Installation in Section 9D (Page9D-21)".
- Disconnect the spark plug cap.
- Disconnect the ignition coil lead wires.
- Measure the ignition coil resistance in both the primary and secondary windings.

#### **Special tool**

 : 09900-25008 (Multi-circuit tester set)

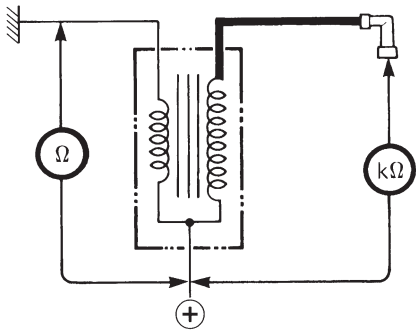
#### **Ignition coil resistance**

**Primary: Approx. 1.2 – 3.5  $\Omega$  ((+) terminal – (-) terminal)**

**Secondary: Approx. 15 – 30 k $\Omega$  ((+) terminal – Spark plug cap)**

#### **Tester knob indication**

**Resistance ( $\Omega$ )**



1705H1180020-01

- After measure the ignition coil resistance, reinstall the removed parts.

## **Ignition Coil Assembly Removal and Installation**

B705H11806010

Refer to "Electrical Components Location in Section 0A (Page0A-7)".

### **Removal**

- Remove the front frame cover and left footboard. Refer to "Footboard Removal and Installation in Section 9D (Page9D-21)".
- Disconnect the spark plug cap.
- Disconnect the lead wires and remove the ignition coil assembly.



1705H1180021-01

### **Installation**

Install the ignition coil assembly in the reverse order of removal.

## **Spark Plug Removal and Installation**

B705H11806011

Refer to "Spark Plug Inspection and Cleaning in Section 0B (Page0B-4)".

### **Spark Plug Inspection**

B705H11806012

Refer to "Spark Plug Inspection and Cleaning in Section 0B (Page0B-4)".

### **CKP Sensor Inspection**

B705H11806013

Refer to "Electrical Components Location in Section 0A (Page0A-7)".

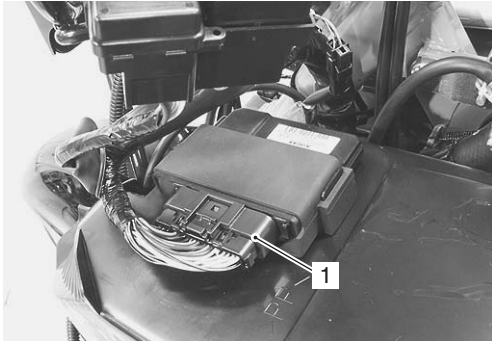
### **CKP Sensor Peak Voltage**

- Remove the meter panel. Refer to "Meter Panel Removal and Installation in Section 9D (Page9D-14)".

2) Disconnect the ECM coupler (1).

**NOTE**

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



I705H1180017-01

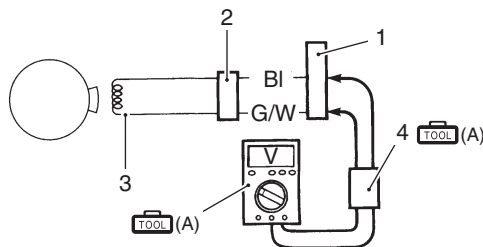
3) Connect the multi-circuit tester with the peak volt adaptor as follows.

**Special tool**

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

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

ECM coupler	(+) probe	(-) probe
	G/W	BI



I705H1180022-03

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

4) Measure the CKP sensor peak voltage in the following procedures:

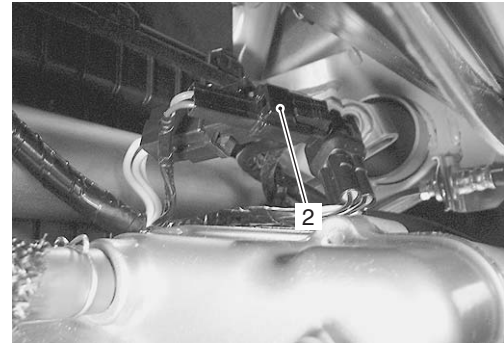
- Press the starter button and allow the engine to crank for a few seconds, and then measure the CKP sensor peak voltage.

5) Repeat the above procedures a few times and measure the highest CKP sensor peak voltage.

**CKP sensor peak voltage**  
**4.5 V and more (G/W – BI)**

6) If the peak voltage measured on the ECM coupler is lower than the standard value, measure the peak voltage on the CKP sensor coupler as follows.

a) Disconnect the CKP sensor coupler (2).



I705H1180011-03

b) Connect the multi-circuit tester with the peak voltage adaptor.

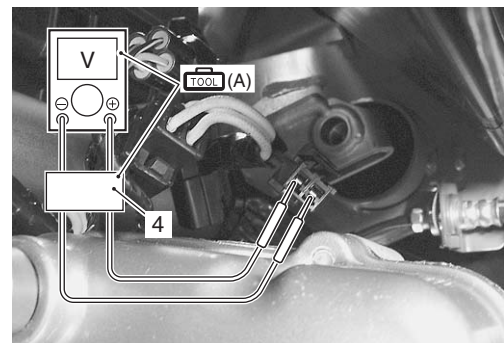
**Special tool**

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

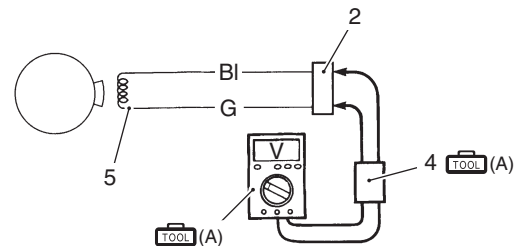
**Tester knob indication**

**Voltage (---)**

CKP sensor coupler	(+) probe	(-) probe
	G	BI



I705H1180012-04



I705H1180023-04

2. CKP sensor coupler
4. Peak volt adaptor
5. CKP sensor

## 1H-8 Ignition System:

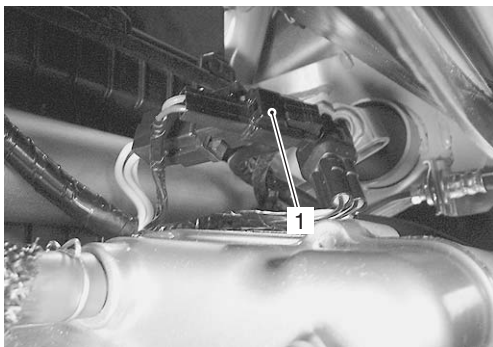
- c) Measure the CKP sensor peak voltage in the same manner as on the ECM coupler. If the peak voltage on the CKP sensor lead wire couplers is within specification, but on the ECM coupler is out of specification, the wire harness must be replaced. If both peak voltages are out of specification, the CKP sensor must be replaced and rechecked.

### CKP sensor peak voltage 4.5 V and more (G – BI)

- 7) After measuring the CKP sensor peak voltage, reinstall the removed parts.

### CKP Sensor Resistance

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

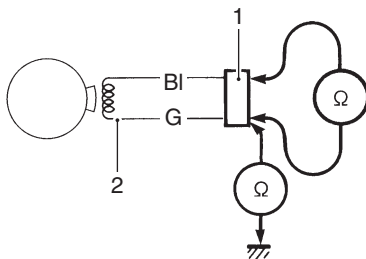


1705H1180025-01

- 2) Measure the resistance between the lead wires and ground. If the resistance is not within the specified value, the CKP sensor must be replaced. Refer to “CKP Sensor Removal and Installation (Page1H-8)”.

### Tester knob indication Resistance ( $\Omega$ )

### CKP sensor resistance Approx. 190 – 290 $\Omega$ (G – BI) $\infty \Omega$ (G – Ground)



1705H1180024-02

1. CKP sensor coupler	2. CKP sensor
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- 3) After measuring the CKP sensor resistance, reinstall the removed parts.

### CKP Sensor Removal and Installation

B705H11806014

Refer to “CKP Sensor Removal and Installation in Section 1C (Page1C-1)”.

### Engine Stop Switch Inspection

B705H11806015

Refer to “Engine Stop Switch Inspection in Section 9B (Page9B-10)”.

### Ignition Switch Inspection

B705H11806016

Refer to “Ignition Switch Inspection in Section 9B (Page9B-11)”.

### Ignition Switch Removal and Installation

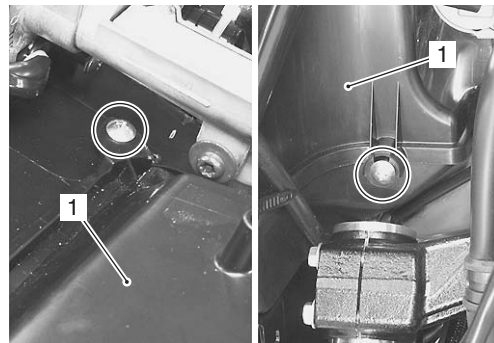
B705H11806017

#### Removal

- 1) Disconnect the battery (–) cable.
- 2) Remove the front leg shield. Refer to “Front Leg Shield Cover Removal and Installation in Section 9D (Page9D-13)”.
- 3) Remove the right front box inner cover (1).



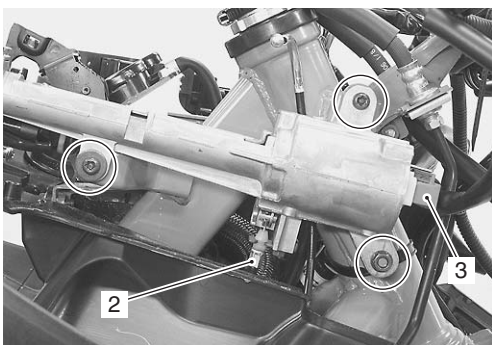
1705H1180026-01



1705H1180027-01

- 4) Disconnect the immobilizer coupler. (Only for E-02, 19, 24, 54)
- 5) Disconnect the ignition switch coupler (2).
- 6) Remove the ignition switch.

7) Disconnect the seat-lock cable (3).



I705H1180028-01

**Installation**

Installation is in the reverse order of removal.

**Specifications**

**Service Data**

B705H11807001

**Electrical**

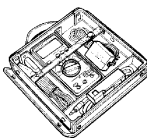
Unit: mm (in)

Item	Standard / Specification		Note
Spark performance	Over 8.0 (0.3) at 1 atm.		
CKP sensor resistance	190 – 290 Ω		G – BI
CKP sensor peak voltage	4.5 V and more		(+) probe: G/W, (-) probe: BI
Ignition coil resistance	Primary	1.2 – 3.5 Ω	
	Secondary	15 – 30 kΩ	
Ignition coil primary peak voltage	150 V and more (When cranking)		(+) probe: W, (-) probe: Ground

**Special Tools and Equipment**

**Special Tool**

B705H11808001

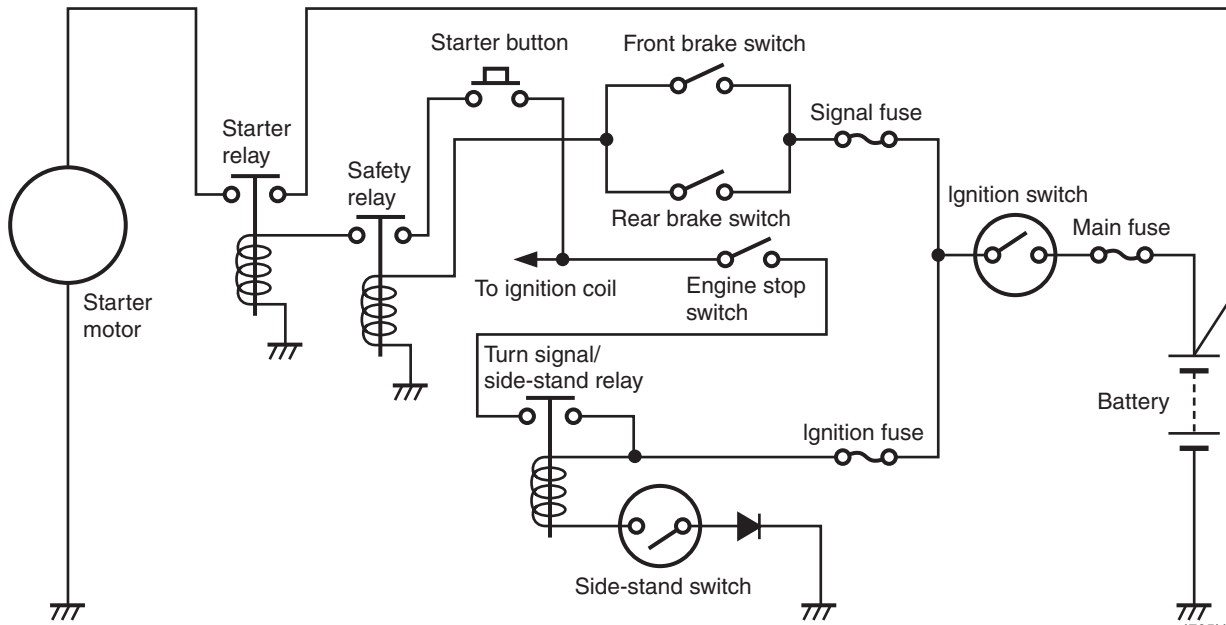
<p>09900–25008 Multi-circuit tester set ☞(Page1H-5) / ☞(Page1H-6) / ☞(Page1H-7) / ☞(Page1H-7)</p>	
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# Starting System

## Schematic and Routing Diagram

### Starting System Diagram

B705H11902001



I705H1190026-01

## Component Location

### Starting System Components Location

B705H11903001

Refer to "Electrical Components Location in Section 0A (Page0A-7)".

## Diagnostic Information and Procedures

### Starter Motor will not Run

B705H11904001

#### NOTE

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

#### Troubleshooting

Step	Action	Yes	No
1	1) Grasp the front or rear brake lever, turn on the ignition switch with the engine stop switch in the "RUN" position and side-stand switch in the "ON" position. 2) 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	1) Check if the starter motor runs when its terminal is connected to positive: battery terminal (Do not use a 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> </ul>	Faulty starter motor.
3	1) Measure the starter relay voltage at the starter relay connectors (between positive terminal: Y/G and negative terminal: 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 side-stand relay.</li> <li>• Faulty front brake switch.</li> <li>• Faulty rear brake switch.</li> <li>• Faulty starter button.</li> <li>• Improper coupler contact.</li> <li>• Open circuit in wire harness.</li> </ul>
4	1) Check the starter relay. (Refer to "Starter Relay Removal and Installation (Page11-6)".)  <i>Is the starter relay OK?</i>	Improper starter relay contact.	Faulty starter relay.

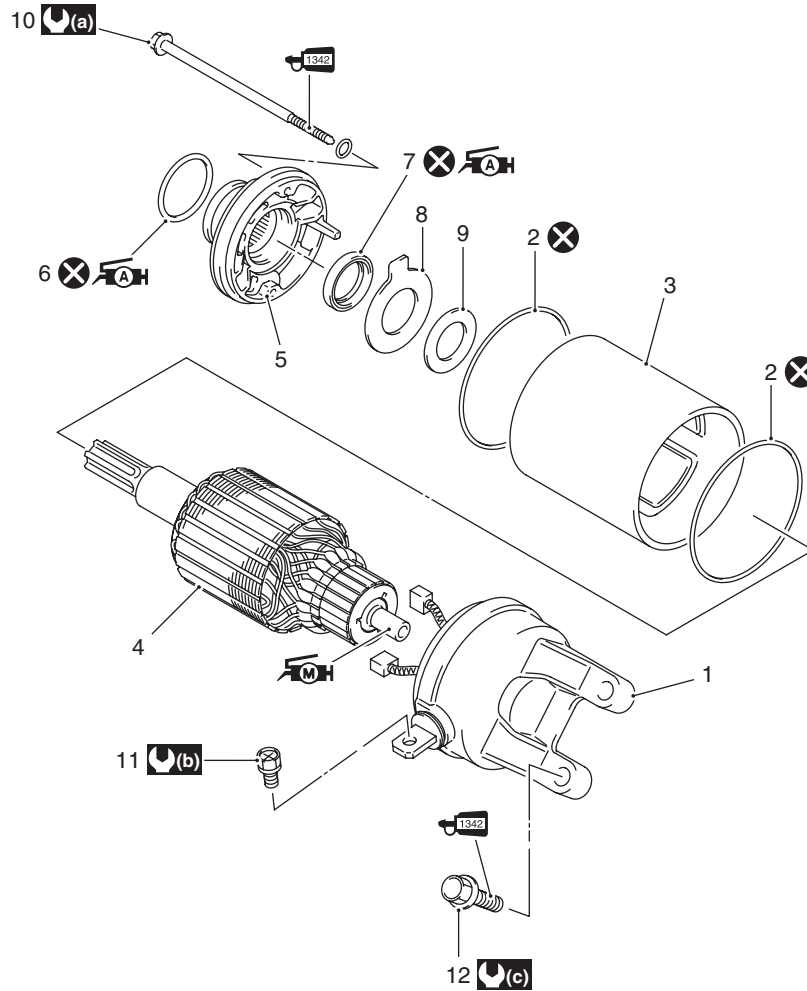
#### Engine does not turn though the starter motor runs.

- Faulty starter clutch.

# Repair Instructions

## Starter Motor Components

B705H11906002



I705H1190016-02

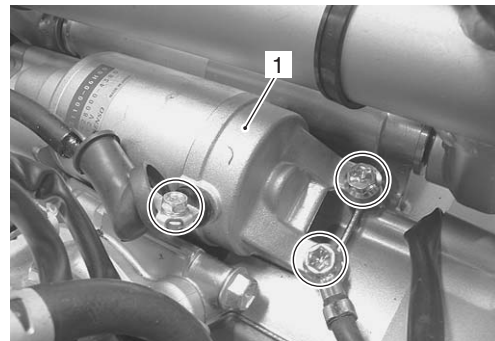
1. Housing end (Outside)	8. Washer	: 7 N·m (0.7 kgf-m, 5.0 lb-ft)
2. O-ring	9. Shim	: Apply grease to sliding surface.
3. Starter motor case	10. Starter motor housing bolt	: Apply moly paste to sliding surface.
4. Armature	11. Starter motor lead wire bolt	: Apply thread lock to thread part.
5. Housing end (Inside)	12. Starter motor mounting bolt	: Do not reuse.
6. O-ring	: 4 N·m (0.4 kgf-m, 3.0 lb-ft)	
7. Oil seal	: 3 N·m (0.3 kgf-m, 2.0 lb-ft)	

## Starter Motor Removal and Installation

B705H11906001

### Removal

- 1) Remove the air cleaner box. Refer to "Air Cleaner Box Removal and Installation in Section 1D (Page 1D-9)".
- 2) Remove the starter motor (1).



I705H1190001-01

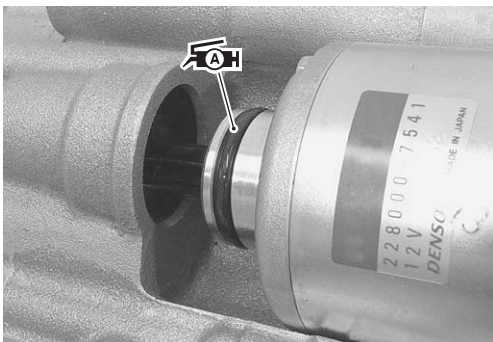


**Installation**

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)**



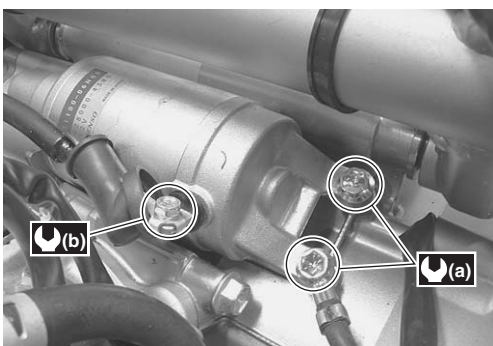
I705H1190002-02

- Tighten the bolts to the specified torque.

**Tightening torque**

**Starter motor mounting bolt (a): 7 N·m (0.7 kgf-m, 5.0 lb-ft)**

**Starter motor lead wire bolt (b): 3 N·m (0.3 kgf-m, 2.0 lb-ft)**



I705H1190025-01

**Starter Motor Disassembly and Assembly**

B705H11906013

Refer to "Starter Motor Removal and Installation (Page11-3)".

**Disassembly**

Disassemble the starter. Refer to "Starter Motor Components (Page11-3)".

**Assembly**

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

**⚠ CAUTION**

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

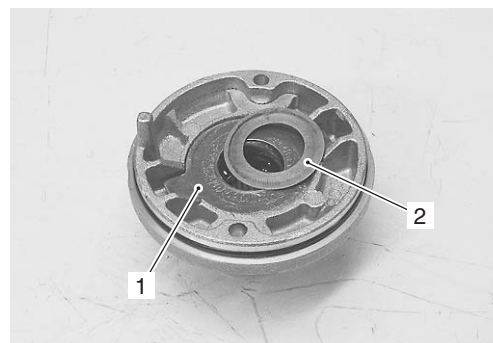
- Apply grease to the lip of the oil seal.

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




I705H1190019-01

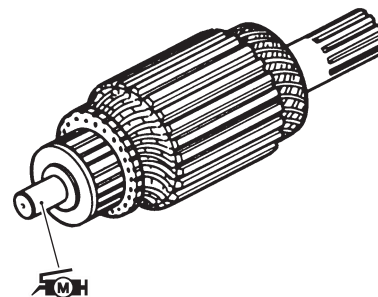
- Fit the washer (1) to the housing end with the tab aligned with the housing end cutaway, position the shim (2) and assemble the starter motor.



I705H1190020-01

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

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



I649G1190013-02

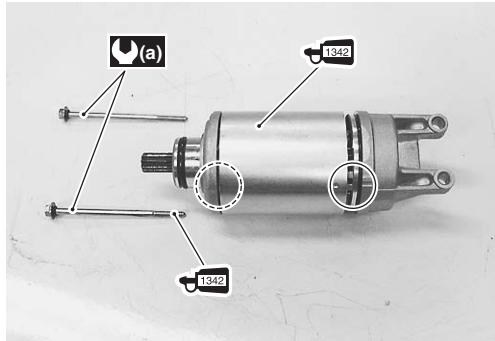
## 11-5 Starting System:

- Align the match mark on the starter motor case with the match mark on the housing end.
- Apply a small quantity of thread lock to the starter motor housing bolts and tighten them to the specified torque.

 **1342** : Thread lock cement 99000-32050 (Thread Lock Cement 1342 or equivalent)

### Tightening torque

**Starter motor housing bolt (a): 4 N·m (0.4 kgf-m, 3.0 lb-ft)**



I705H1190021-01

### Starter Motor Inspection

B705H11906003

Refer to "Starter Motor Disassembly and Assembly (Page11-4)".

### Carbon Brush

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


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

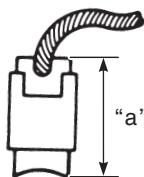
Measure the length "a" of the carbon brushes using a vernier calipers. If the measurement is less than the service limit, replace the brush holder set with a new one.

### Brush length "a"

**Service limit: 3.5 mm (0.14 in)**

### Special tool

 **09900-20102 (Vernier calipers)**



I649G1190050-01

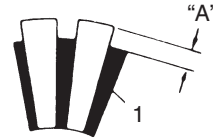
### Commutator

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.




I649G1190016-01

### Armature Coil

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

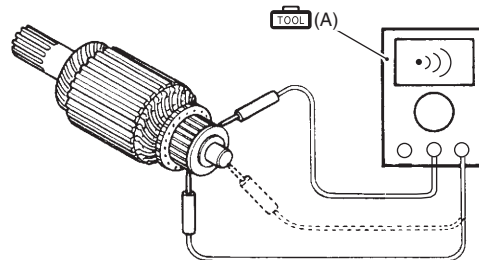
If there is no continuity between the segments or there is continuity between the segments and shaft, replace the armature with a new one.

### Special tool

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

### Tester knob indication

**Continuity set (••))**



I649G1190017-02

### Bearing

Check the bearing of housing end for damage.

If any damage is found, replace the housing end.



I705H1190022-01

**Oil Seal**

Check the seal lip for damage.  
If any damage is found, replace the housing end (Inside).



I705H1190023-01

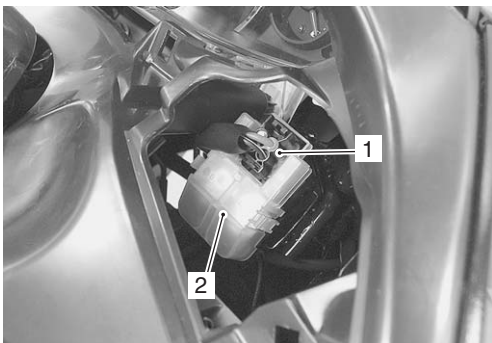
**Starter Relay Removal and Installation**

B705H11906004

Refer to "Electrical Components Location in Section 0A (Page0A-7)".

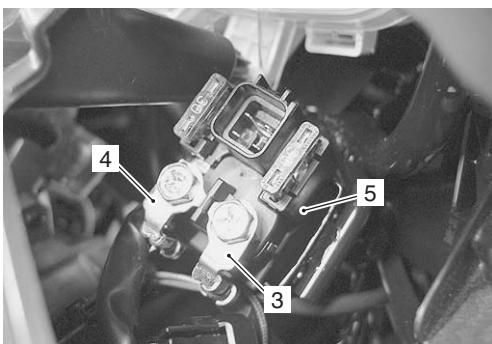
**Removal**

- 1) Remove the upper meter panel. Refer to "Meter Panel Removal and Installation in Section 9D (Page9D-14)".
- 2) Disconnect the battery (-) lead wire from the battery. Refer to "Battery Removal and Installation in Section 1J (Page1J-10)".
- 3) Disconnect the starter relay coupler (1) and remove the starter relay cover (2).



I705H1190003-03

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



I705H1190004-02

**Installation**

Install the starter relay in the reverse order of removal.

**Starter Relay Inspection**

B705H11906005


Inspect the starter relay in the following procedures:

- 1) Remove the starter relay. Refer to "Starter Relay Removal and Installation (Page11-6)".
- 2) Apply 12 V to "A" and "B" terminals and check for continuity between the (+) and (-) terminals using the multi-circuit tester. If the starter relay clicks and continuity is found, the relay is ok.

**⚠ CAUTION**

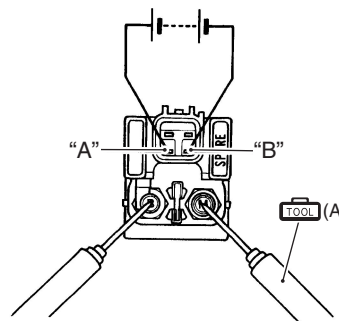
**Do not apply battery voltage to the starter relay for five seconds and more, since the relay coil may overheat and get damaged.**

**Special tool**

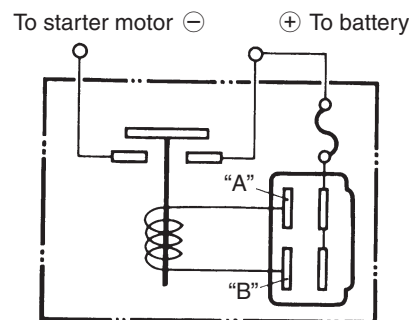
 (A): 09900-25008 (Multi-circuit tester set)

**Tester knob indication**

Continuity test (•))



I705H1190005-03




I649G1190022-01

## 11-7 Starting System:

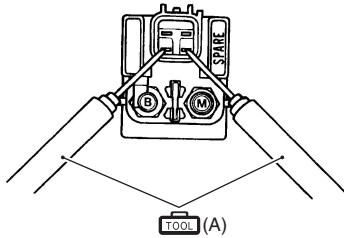
- 3) Measure the relay coil resistance between the terminals using the multi-circuit tester. If the resistance is not within the specified value, replace the starter relay with a new one.

### Special tool

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

### Starter relay resistance

3 – 6 Ω



I705H1190006-01

- 4) Install the starter relay. Refer to “Starter Relay Removal and Installation (Page11-6)”.

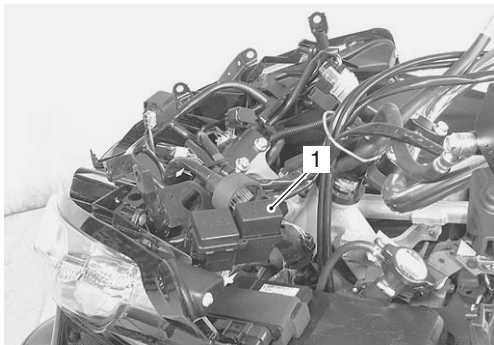
## Turn Signal / Side-stand Relay Removal and Installation

B705H11906006

Refer to “Electrical Components Location in Section 0A (Page0A-7)”.

### Removal

- 1) Remove the meter panel. Refer to “Meter Panel Removal and Installation in Section 9D (Page9D-14)”.
- 2) Remove the turn signal/side-stand relay (1).



I705H1190007-01

### Installation

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

## Side-stand / Ignition Interlock System Parts Inspection

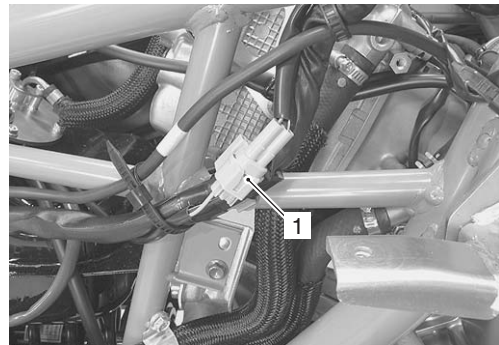
B705H11906007

Refer to “Electrical Components Location in Section 0A (Page0A-7)”.

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

### Side-stand Switch

- 1) Remove the left footboard. Refer to “Footboard Removal and Installation in Section 9D (Page9D-21)”.
- 2) Disconnect the side-stand switch coupler (1).



I705H1190008-01

- 3) Measure the voltage between G and B/W lead wires.

### Special tool

 : 09900-25008 (Multi-circuit tester set)

### Tester knob indication

Diode test ( ←→ )

	G (+ probe)	B/W (- probe)
ON (Side-stand up)	0.4 – 0.6 V	
OFF (Side-stand down)	1.4 V and more (Tester's battery voltage)	

### NOTE

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



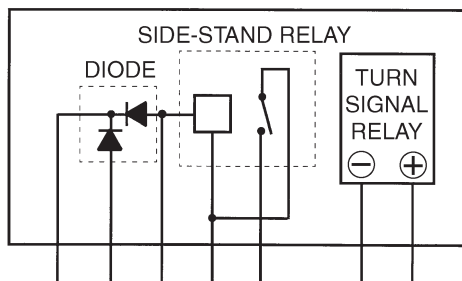
I705H1190009-01



- 4) Connect the side-stand switch coupler.
- 5) Install the left footboard. Refer to "Footboard Removal and Installation in Section 9D (Page9D-21)".

### Turn Signal / Side-stand Relay

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



I649G1190027-01

### Side-stand relay

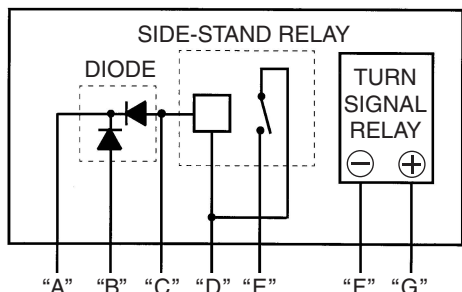
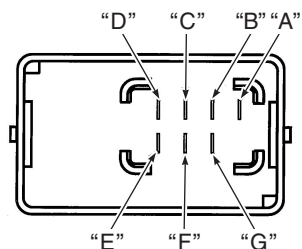
- 1) Remove the turn signal/side-stand relay. Refer to "Turn Signal / Side-stand Relay Removal and Installation (Page11-7)".
- 2) Check the insulation between "D" and "E" terminals using the multi-circuit tester.
- 3) Apply 12 V to terminals "D" and "C" ((+ to "D" and (-) to "C") and check the continuity between "D" and "E". If there is no continuity, replace the turn signal/side-stand relay with a new one. Refer to "Turn Signal / Side-stand Relay Removal and Installation (Page11-7)".

### Special tool

: 09900-25008 (Multi-circuit tester set)

### Tester knob indication

Continuity test (•))



I649G1190028-01

- 4) Install the turn signal/side-stand relay. Refer to "Turn Signal / Side-stand Relay Removal and Installation (Page11-7)".

### Diode inspection

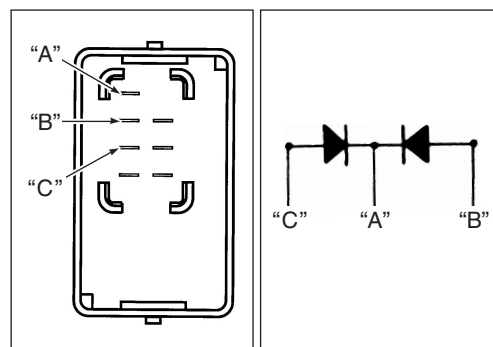
- 1) Remove the turn signal/side-stand relay. Refer to "Turn Signal / Side-stand Relay Removal and Installation (Page11-7)".
- 2) Measure the voltage between the terminals using the multi-circuit tester.

### Special tool

: 09900-25008 (Multi-circuit tester set)

### Tester knob indication

Diode test (←→)



I649G1190029-01

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

I649G1190046-03

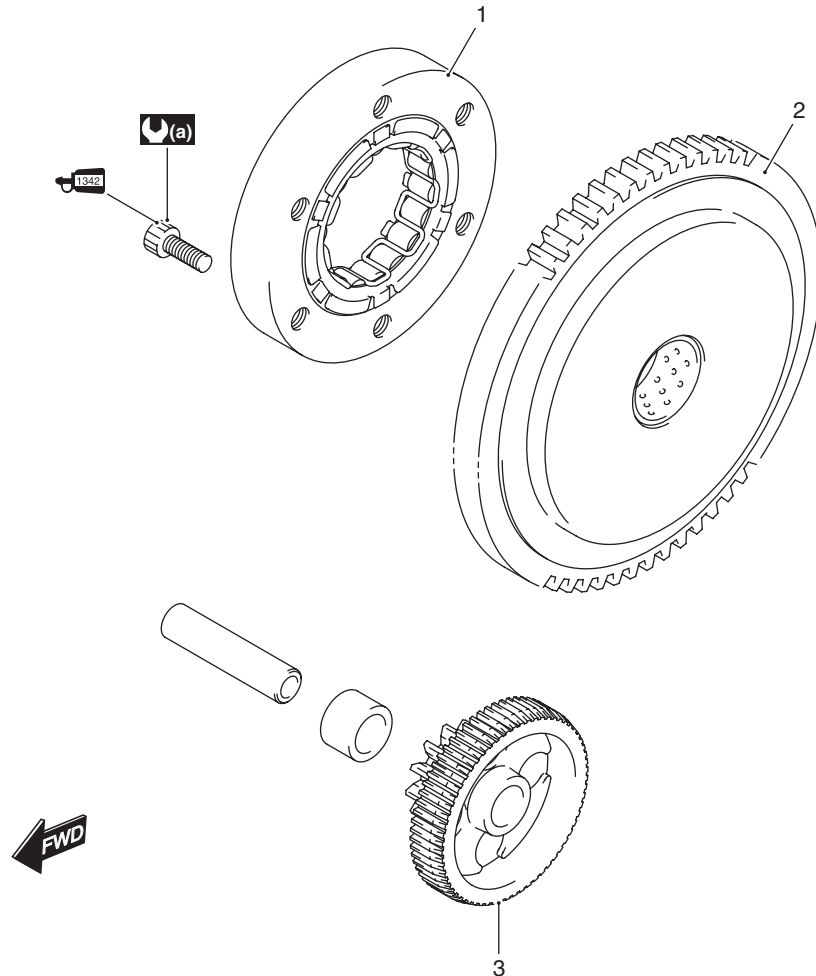
### NOTE

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

- 3) Install the turn signal/side-stand relay. Refer to "Turn Signal / Side-stand Relay Removal and Installation (Page11-7)".

Starter Clutch Component

B705H11906008



I705H1190017-01

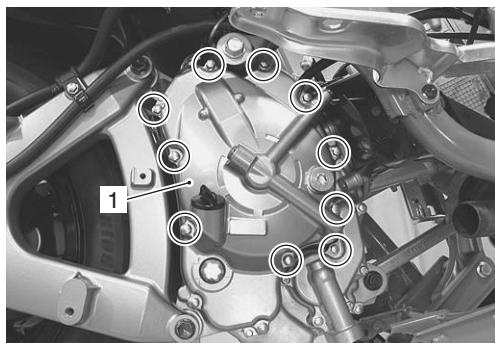
1. One-way clutch	3. Starter idle gear	: 26 N·m (2.6 kgf·m, 19.0 lb·ft)
2. Starter driven gear	: Apply thread lock to thread part.	

Starter Clutch Removal and Installation

B705H11906009

Removal

- 1) Drain engine oil. Refer to “Engine Oil and Filter Change in Section 0B (Page0B-9)”.
- 2) Remove the muffler. Refer to “Exhaust Pipe / Muffler Removal and Installation in Section 1K (Page1K-2)”.
- 3) Remove the generator cover (1).



I705H1190018-02

- 4) Remove the generator rotor and starter driven gear. Refer to “Engine Bottom Side Disassembly in Section 1D (Page1D-37)”.

Installation

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

- Install the generator rotor. Refer to “Engine Bottom Side Assembly in Section 1D (Page1D-44)”.
- Replace the generator cover gasket with a new one.
- Install the muffler. Refer to “Exhaust Pipe / Muffler Removal and Installation in Section 1K (Page1K-2)”.
- Pour engine oil. Refer to “Engine Oil and Filter Change in Section 0B (Page0B-9)”.

**Starter Clutch Inspection**

B705H11906010

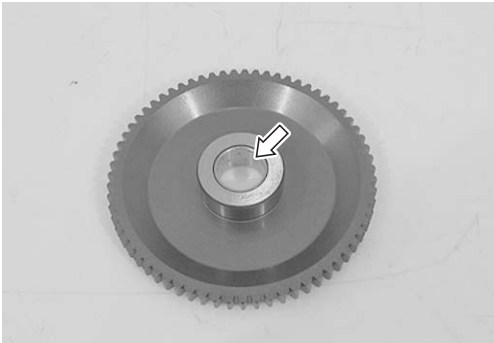
Inspect the starter clutch in the following procedures.

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



I705H1190010-01

- 2) Inspect the starter driven gear bearing for any damages.



I705H1190011-01

**Starter Clutch Disassembly and Assembly**

B705H11906011

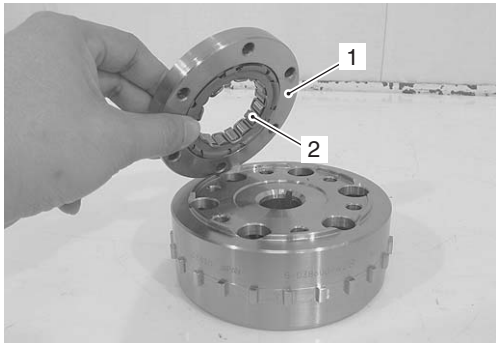
**Disassembly**

- 1) With the rotor held with a wrench, loosen the starter clutch bolts.



I705H1190012-02

- 2) Remove the one-way clutch guide (1) and one-way clutch (2) from the rotor.

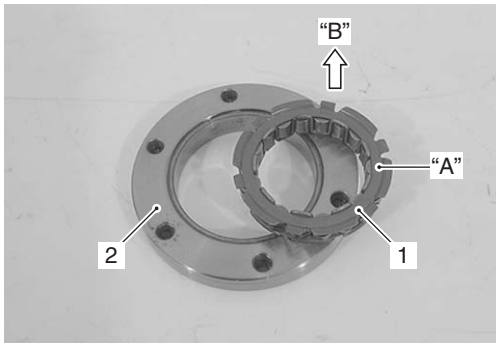


I705H1190013-01

**Reassembly**

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

- When inserting the one-way clutch (1) into the one-way clutch guide (2), the flange side "A" must be positioned on the rotor side "B".



I705H1190014-02

1. One-way clutch	"A": Flange
2. One-way guide	"B": Rotor side



## 11-11 Starting System:

- Apply thread lock on the starter clutch bolts and tighten them to the specified torque.

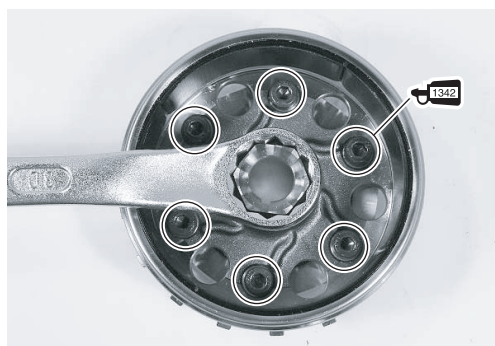
### Tightening torque

**Starter clutch bolt: 26 N·m (2.6 kgf·m, 19.0 lb·ft)**

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

### CAUTION

After installing the starter driven gear, check that the clutch functions properly.



I705H1190027-01

### Starter Button Inspection

B705H11906012

Refer to “Starter Button Inspection in Section 9B (Page9B-10)”.

## Specifications

### Service Data

B705H11907002





#### Electrical

Unit: mm (in)

Item	Standard / Specification		Note
Starter relay resistance	3 – 6 Ω		
Starter motor brush length	Standard	7 (0.28)	
	Limit	3.5 (0.14)	

### Tightening Torque Specifications

B705H11907003

Fastening part	Tightening torque			Note
	N·m	kgf·m	lb·ft	
Starter motor mounting bolt	7	0.7	5.0	 (Page11-4)
Starter motor lead wire bolt	3	0.3	2.0	 (Page11-4)
Starter motor housing bolt	4	0.4	3.0	 (Page11-5)
Starter clutch bolt	26	2.6	19.0	 (Page11-11)

### NOTE

The specified tightening torque is also described in the following.

“Starter Motor Components (Page11-3)”

“Starter Clutch Component (Page11-9)”

### Reference:

For the tightening torque of fastener not specified in this section, refer to “Tightening Torque Specifications in Section 0C (Page0C-7)”.

## Special Tools and Equipment

### Recommended Service Material

B705H11908001

Material	SUZUKI recommended product or Specification		Note
Grease	SUZUKI SUPER GREASE A or equivalent	P/No.: 99000-25010	☞ (Page11-4) / ☞ (Page11-4)
Moly paste	SUZUKI Moly paste or equivalent	P/No.: 99000-25140	☞ (Page11-4)
Thread lock cement	Thread Lock Cement 1342 or equivalent	P/No.: 99000-32050	☞ (Page11-5) / ☞ (Page11-11)

### NOTE

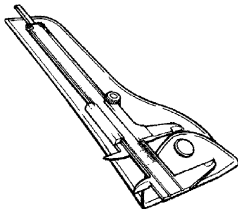

Required service material is also described in the following.

“Starter Motor Components (Page11-3)”

“Starter Clutch Component (Page11-9)”

### Special Tool

B705H11908002

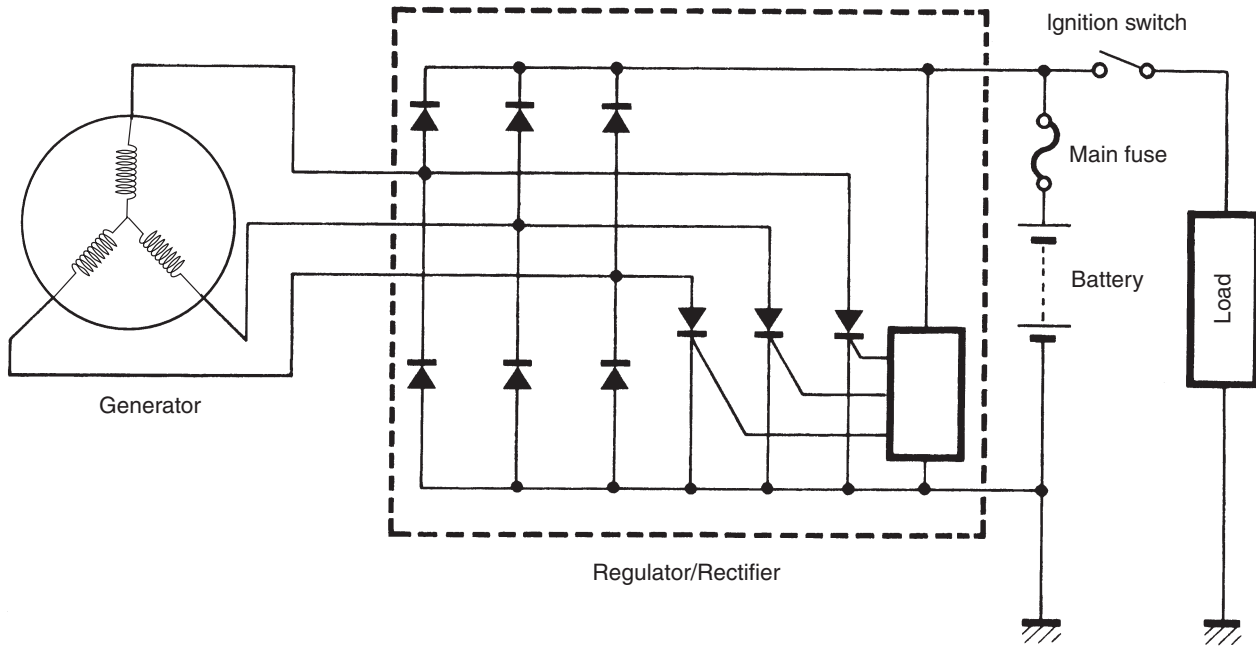
09900-20102 Vernier calipers (1/20 mm, 200 mm) ☞ (Page11-5)		09900-25008 Multi-circuit tester set ☞ (Page11-5) / ☞ (Page11-6) / ☞ (Page11-7) / ☞ (Page11-7) / ☞ (Page11-8) / ☞ (Page11-8)	
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# Charging System

## Schematic and Routing Diagram

### Charging System Diagram

B705H11A02001



I705H11A0001-02

## Component Location

### Charging System Components Location

Refer to "Electrical Components Location in Section 0A (Page0A-7)".

B705H11A03001

## Diagnostic Information and Procedures

### Charging System Symptom Diagnosis

B705H11A04009

Condition	Possible cause	Correction / Reference Item
<b>Generator does not charge</b>	Open- or short-circuited lead wires, or loose lead connections.	<i>Repair or replace or retighten.</i>
	Short-circuited, grounded or open generator coils.	<i>Replace.</i>
	Short-circuited or punctured regulator/rectifiers.	<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 stator coils or generator.	<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 resistor element in the 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>"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 material as a result of overcharging.	<i>Replace the battery, and correct the charging system.</i>
	Internal short-circuit in the battery.	<i>Replace the battery.</i>
	Too low battery voltage.	<i>Recharge the battery fully.</i>
	Too old battery.	<i>Replace the battery.</i>
<b>Battery "sulfation"</b>	Incorrect charging rate. (When not in use battery should be checked at least once a month to avoid sulfation.)	<i>Replace the battery.</i>
	The battery was left unused in a cold climate for too long.	<i>Replace the battery if badly sulfated.</i>

## 1J-3 Charging System:

### Battery Runs Down Quickly

B705H11A04001

#### Troubleshooting

Step	Action	Yes	No
1	1) Check accessories which use excessive amounts of electricity. <i>Are accessories being installed?</i>	Remove accessories.	Go to step 2.
2	1) Check the battery for current leaks. (Refer to "Battery Current Leakage Inspection (Page1J-4)".) <i>Is the battery for current leaks 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	1) Measure the charging voltage between the battery terminals. (Refer to "Regulated Voltage Inspection (Page1J-4)".) <i>Is the battery charging of voltage OK?</i>	<ul style="list-style-type: none"><li>• Faulty battery.</li><li>• Abnormal driving condition.</li></ul>	Go to step 4.
4	1) Measure the resistance of the generator coil. (Refer to "Generator Coil Resistance Inspection (Page1J-5)".) <i>Is the resistance of generator coil OK?</i>	Go to step 5.	Faulty generator coil or disconnected lead wires.
5	1) Measure the generator no-load voltage. (Refer to "Generator No-load Performance Inspection (Page1J-5)".) <i>Is the generator no-load performance OK?</i>	Go to step 6.	Faulty generator.
6	1) Inspect the regulator/rectifier. Refer to "Regulator/Rectifier Inspection (Page1J-5)". <i>Is the regulator/rectifier OK?</i>	Go to step 7.	Faulty regulator/rectifier.
7	1) Inspect the wires. <i>Is the wire harness OK?</i>	Faulty battery.	<ul style="list-style-type: none"><li>• Short circuit of wire harness.</li><li>• Poor contact of coupler.</li></ul>

#### Battery overcharges

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

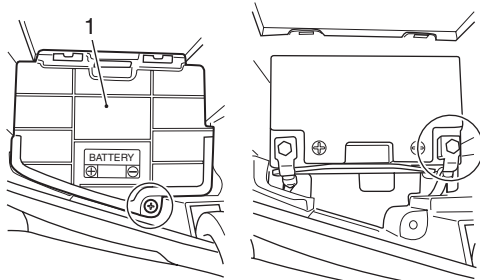
## Repair Instructions

### Battery Current Leakage Inspection

B705H11A06001

Inspect the battery current leakage in the following procedures:

- 1) Turn the ignition switch to the OFF position.
- 2) Remove the battery cover (1).
- 3) Disconnect the (-) battery lead wire.



I705H11A0002-01

- 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.

#### Special tool

 : 09900-25008 (Multi-circuit tester set)

#### Battery current (leak)

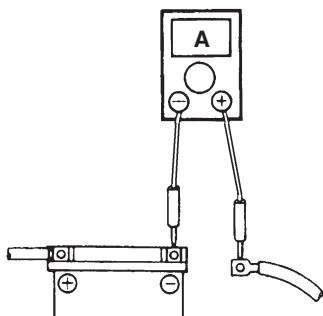
Under 3 mA

#### Tester knob indication

Current ( --- , 20 mA)

#### ⚠ CAUTION

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



I705H11A0003-01

- 5) Reinstall the removed parts.

### Regulated Voltage Inspection

B705H11A06002

Inspect the regulated voltage in the following procedures:

- 1) Remove the battery cover (1).
- 2) Start the engine and keep it running at 5 000 r/min with the dimmer switch turned HI position.
- 3) Measure the DC voltage between the (+) and (-) battery terminals using the multi-circuit tester. If the voltage is not within the specified value, inspect the generator and regulator/rectifier.

#### NOTE

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

#### Special tool

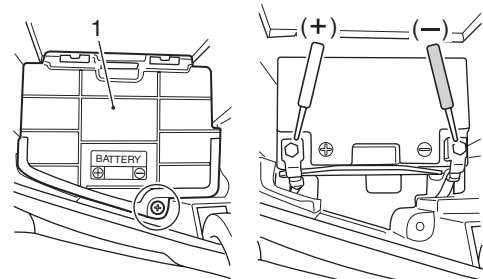
 : 09900-25008 (Multi-circuit tester set)

#### Tester knob indication

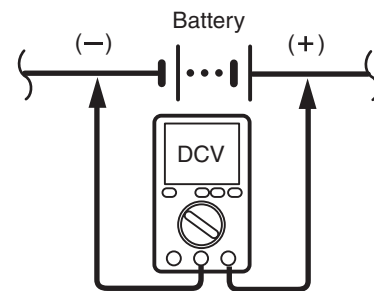
Voltage ( --- )

#### Regulated voltage

14.0 – 15.5 V at 5 000 r/min



I705H11A0004-01



I705H11A0005-01

- 4) Reinstall the removed parts.



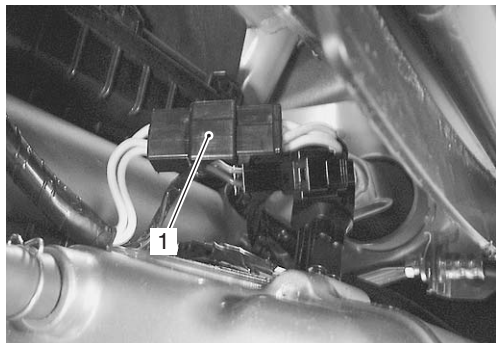
## 1J-5 Charging System:

### Generator Coil Resistance Inspection

B705H11A06004

Inspect the generator coil resistance in the following procedures:

- 1) Disconnect the generator coupler (1).



I705H11A0006-02

- 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.

#### Special tool

 : 09900-25008 (Multi-circuit tester set)

#### Tester knob indication

Resistance ( $\Omega$ )

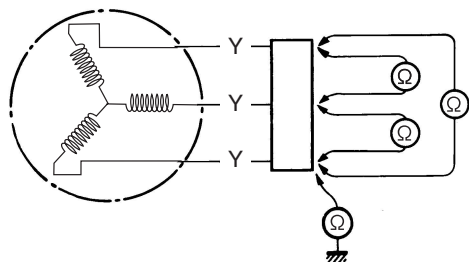
#### Generator coil resistance

0.1 – 1.0  $\Omega$  (Y – Y)

$\infty\Omega$  (Y – Ground)

#### NOTE

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



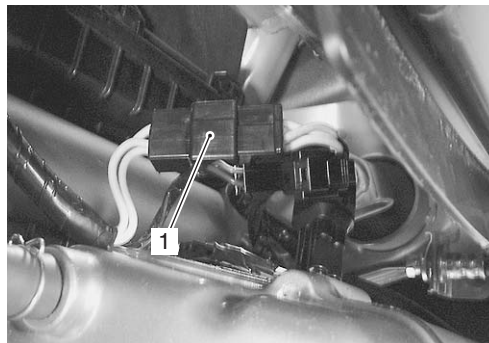
I705H11A0008-02

### Generator No-load Performance Inspection

B705H11A06005

Inspect the generator no-load performance in the following procedures:

- 1) Disconnect the generator coupler (1).



I705H11A0006-02

- 2) Start the engine and run it at 5 000 r/min.
- 3) Using the multi-circuit tester, measure the voltage between three lead wires.  
If the tester reads under the specified value, replace the generator with a new one.

#### Special tool

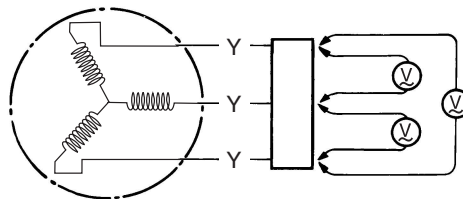
 : 09900-25008 (Multi-circuit tester set)

#### Tester knob indication

Voltage (~)

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

More than 55 V (AC) at 5 000 r/min



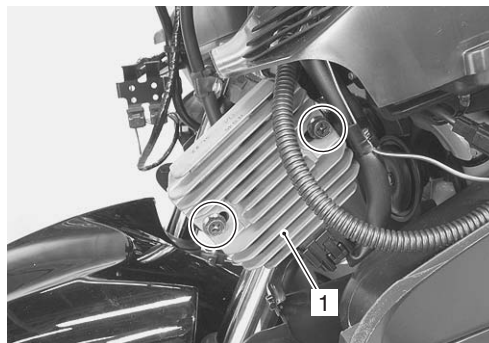
I705H11A0007-02

### Regulator/Rectifier Inspection

B705H11A06010

Inspect the regulator/rectifier in the following procedures:

- 1) Remove the front leg shield. Refer to "Front Leg Shield Removal and Installation in Section 9D (Page9D-14)".
- 2) Remove the regulator/rectifier (1).



I705H11A0028-01

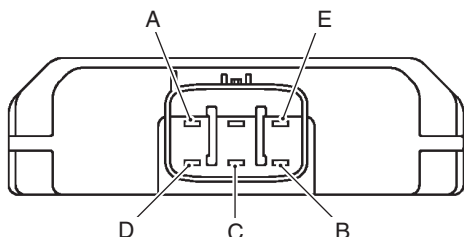
- 3) Measure the voltage between the terminals using the multi circuit tester as indicated in the following table. If the voltage is not within the specified value, replace the regulator/rectifier with a new one.

**Special tool**

 : 09900-25008 (Multi-circuit tester set)

**Tester knob indication**

Diode test (  )



I705H11A0009-02

Unit: V

		(+ tester probe				
		A	B	C	D	E
(-) tester probe	A	—	0.4 - 0.7	0.4 - 0.7	0.4 - 0.7	0.5 - 1.2
	B	*	—	*	*	0.4 - 0.7
	C	*	*	—	*	0.4 - 0.7
	D	*	*	*	—	0.4 - 0.7
	E	*	*	*	*	—

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

**NOTE**

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

- 4) Install the regulator/rectifier.
- 5) Install the front leg shield. Refer to "Front Leg Shield Removal and Installation in Section 9D (Page9D-14)".

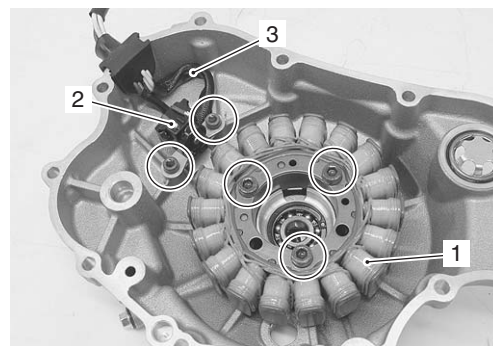
**Generator Removal and Installation**

B705H11A06003

**Removal**

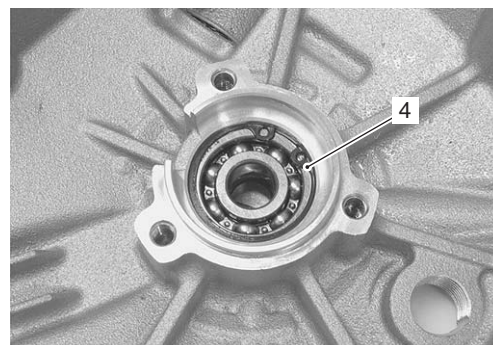
- 1) Drain engine oil.
- 2) Remove the side leg shield. Refer to "Side Leg Shield Removal and Installation in Section 9D (Page9D-15)".
- 3) Remove the generator cover. Refer to "CKP Sensor Removal and Installation in Section 1C (Page1C-1)".

- 4) Remove the generator stator (1), CKP sensor (2) and lead wire guide (3).



I705H11A0010-03


- 5) Remove the snap ring (4).

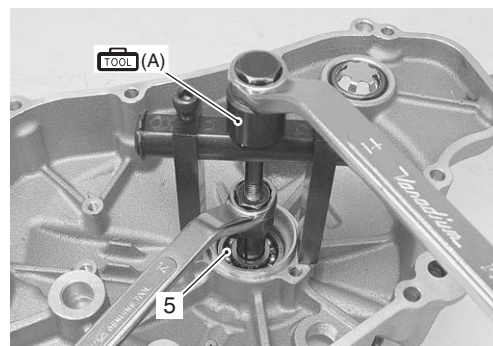


I705H11A0011-03

- 6) Remove the bearing (5) using the special tool.

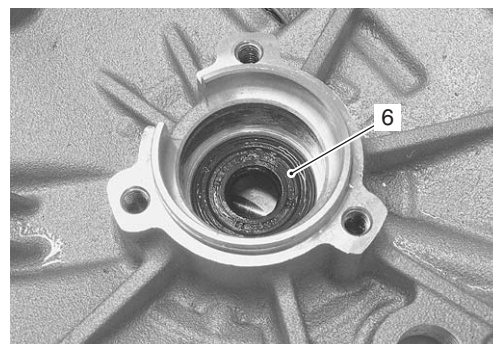
**Special tool**

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



I705H11A0013-03

- 7) Remove the oil seal (6).



I705H11A0014-03


## 1J-7 Charging System:

### Installation

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

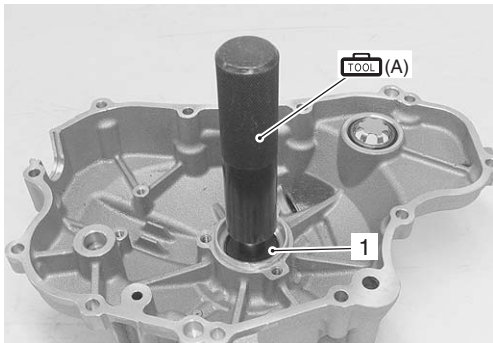
- Install the oil seal (1) using the special tool.

#### Special tool

 (A): 09913-75821 (Bearing installer)

#### CAUTION


- Install the oil seal with the marked code toward outside.
- Replace the oil seal with a new one.



I705H11A0015-01

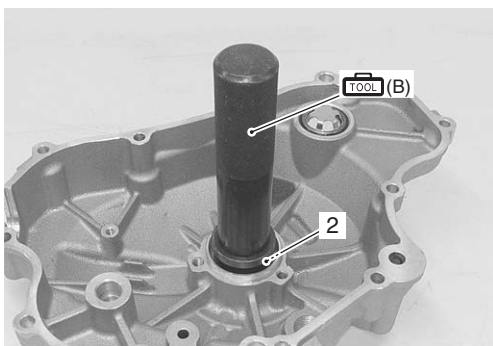
- Install the bearing (2) using the special tool.

#### Special tool

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

#### CAUTION

Replace the bearing with a new one.

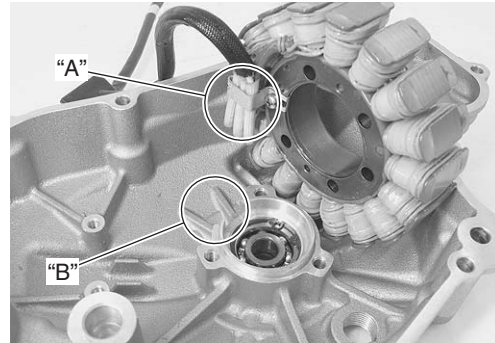


I705H11A0016-01

- Install the snap ring.
- Install the generator stator into the generator cover.

#### CAUTION

Engage the convex part "A" on the starter into the notch "B" on the generator cover.



I705H11A0018-02

- Tighten the generator stator bolts (3) to the specified torque.

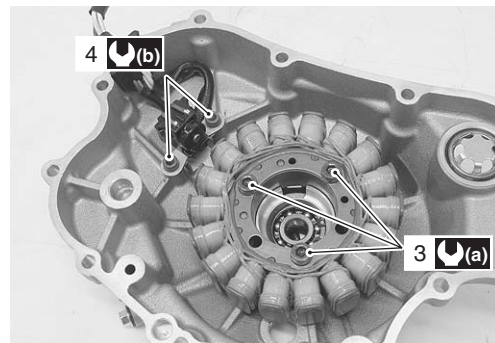
#### Tightening torque

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

- Tighten the CKP sensor bolts (4) to the specified torque.

#### Tightening torque

CKP sensor bolt (b): 6 N·m (0.6 kgf-m, 4.5 lb-ft)



I705H11A0019-05

- Install the generator cover.

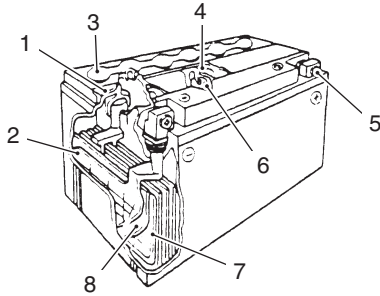
#### CAUTION

Replace the gasket with a new one.

- Install the muffler. Refer to "Exhaust Pipe / Muffler Removal and Installation in Section 1K (Page1K-2)".
- Install the side leg shield. Refer to "Side Leg Shield Removal and Installation in Section 9D (Page9D-15)".

### Battery Components

B705H11A06011



I705H11A0020-01

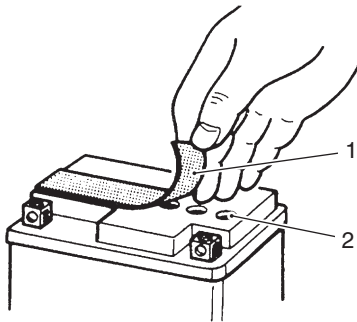
1. Upper cover breather	5. Terminal
2. Cathode plates	6. Safety valve
3. Stopper	7. Anode plates
4. Filter	8. Separator (Fiberglass)

### Battery Initial Charging

B705H11A06007

#### Filling Electrolyte

- 1) Remove the aluminum tape (1) which seals the battery filler holes (2).

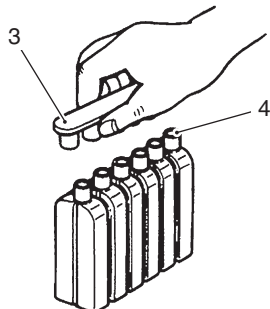


I705H11A0021-01

- 2) Remove the caps (3) from the electrolyte container.

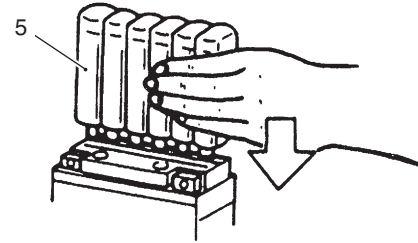
#### NOTE

- Do not remove or pierce the sealed areas (4) of the electrolyte container.
- After completely filling the battery with electrolyte, use the caps (3) from the electrolyte container to seal the battery filler holes.



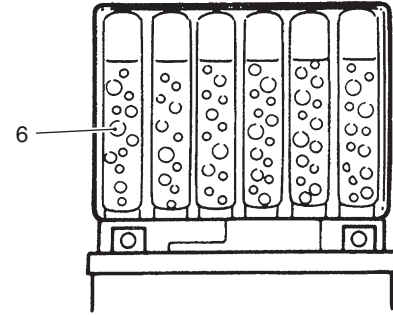
I705H11A0022-01

- 3) Insert the nozzles of the electrolyte container (5) into the electrolyte filler holes of the battery.
- 4) Hold the electrolyte container firmly so that it does not fall.
- 5) Do not allow any of the electrolyte to spill.



I705H11A0023-01

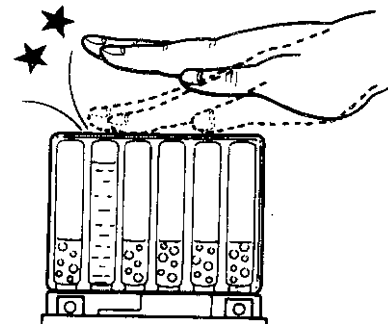
- 6) Make sure the air bubbles (6) rise to the top of each electrolyte container and leave the electrolyte container in this position for more than 20 minutes.



I705H11A0024-04

#### NOTE

If air bubbles do not rise from any one of the filler ports, tap the bottom of the electrolyte container two or three times. Never remove the electrolyte container from the battery while there is still electrolyte in the container.



I310G11A0024-01

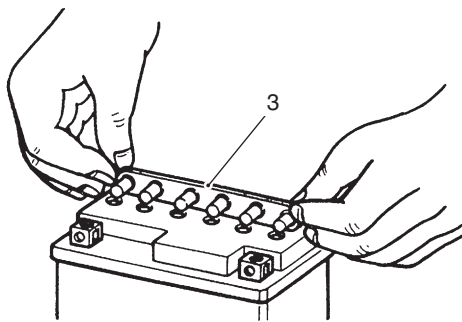


## 1J-9 Charging System:

- After the electrolyte container is completely empty, remove it from the battery and wait about 20 minutes.
- Insert the caps (3) firmly into the filler holes, so that the top of the caps do not protrude above the upper surface of the top cover of the battery.

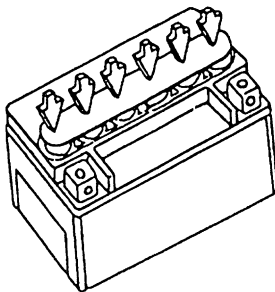
### ⚠ CAUTION

- Never use anything except the specified battery.
- Once install the caps to the battery, do not remove the caps.
- Do not tap the caps with a hammer when installing them.



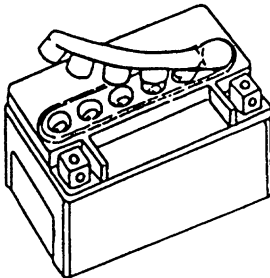
I705H11A0025-03

**CORRECT**



I310G11A0026-01

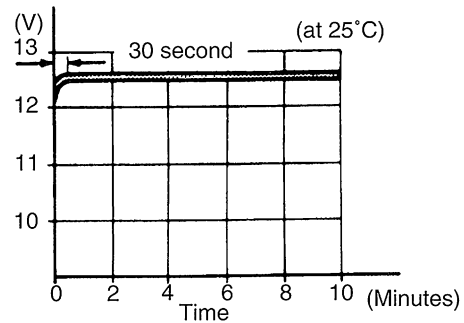
**INCORRECT**



I310G11A0027-01

## Initial Charging

- Measure the battery voltage using multi circuit tester.
- The tester should indicate more than 12.5 – 12.6 V (DC) as shown in the figure.
- If the battery voltage is lower than the specification, charge the battery with a battery charger. Refer to “Battery Recharging (Page 1J-10)”.



I310G11A0028-01

### ⚠ CAUTION

**Do not remove the caps on the battery top while charging.**

### NOTE

**Initial charging for a new battery is recommended if two years have elapsed since the date of manufacture.**

## Battery Visual Inspection

B705H11A06008

Inspect the battery visual in the following procedures:

- 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.

## Battery Recharging

B705H11A06009

### ⚠ CAUTION

**When recharging the battery, remove the battery from the motorcycle.**

### NOTE

**While recharging, do not remove the caps on the top of the battery.**

- 1) Measure the battery voltage using the multi circuit tester.
- 2) If the voltage reading is less than the 12 V (DC), recharge the battery with a battery charger.

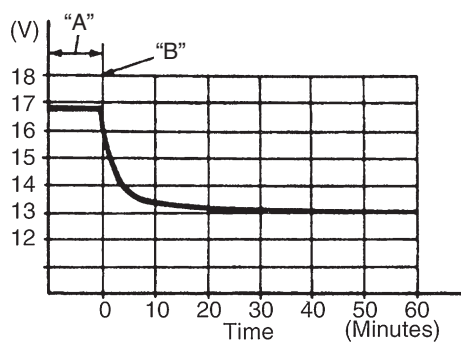
### Recharging time

**0.9 A for 5 to 10 hours or 4 A for 1 hour**

### ⚠ CAUTION

**Be careful not to permit the charging current to exceed 6 A at any time.**

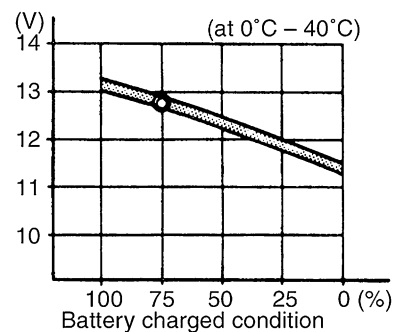
- 3) After recharging, wait at least 30 minutes and then measure the battery voltage using the multi circuit tester.
- 4) If the battery voltage is less than 12.5 V, recharge the battery again.
- 5) If the battery voltage is still less than 12.5 V after recharging, replace the battery with a new one.
- 6) When a battery is left unused for a long time, its voltage needs to be regularly measured.
- 7) When the motorcycle is not used for more than one month (especially during the winter season), measure the battery voltage at least once a month.



I649G11A0045-01

"A": Charging period

"B": Stop charging



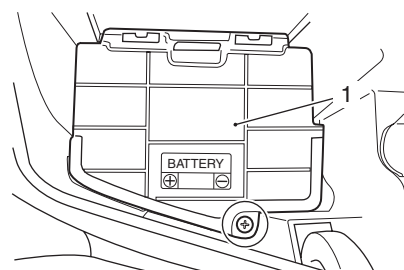
I705H11A0029-02

## Battery Removal and Installation

B705H11A06012

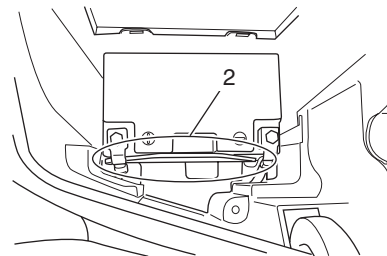
### Removal

- 1) Open the front box and remove the battery cover (1).



I705H11A0026-01

- 2) Disconnect the (-) cable first, then (+) cable.
- 3) Take out the battery by pulling the slider (2).



I705H11A0027-01

### Installation

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

- Connect the (+) cable first, then (-) cable.

### ⚠ CAUTION

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

## Specifications

### Service Data

B705H11A07003

#### Electrical

Unit: mm (in)

Item	Standard / Specification		Note
Generator coil resistance	Charging	0.1 – 1.0 $\Omega$	Y – Y
Generator no-load voltage (When engine is cold)	55 V and more at 5 000 r/min		
Generator Max. output	Approx. 400 W at 5 000 r/min		
Starter motor brush length	7 (0.28)		3.5 (0.14)
Regulated voltage	14.0 – 15.5 V at 5 000 r/min		
Battery	Type designation	FTZ9-BS	
	Capacity	12 V 32.4 kC (9 Ah)/10 HR	

### Tightening Torque Specifications

B705H11A07004

Fastening part	Tightening torque			Note
	N·m	kgf·m	lb·ft	
Generator stator bolt	11	1.1	8.0	☞ (Page1J-7)
CKP sensor bolt	6	0.6	4.5	☞ (Page1J-7)

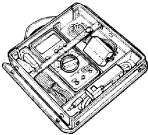
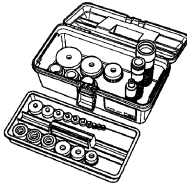
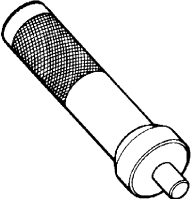
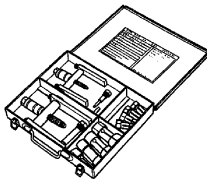
#### Reference:

For the tightening torque of fastener not specified in this section, refer to “Tightening Torque Specifications in Section 0C (Page0C-7)”.

## Special Tools and Equipment

### Special Tool

B705H11A08001

09900–25008 Multi-circuit tester set ☞ (Page1J-4) / ☞ (Page1J-4) / ☞ (Page1J-5) / ☞ (Page1J-5) / ☞ (Page1J-6)		09913–70210 Bearing installer set ☞ (Page1J-7)	
09913–75821 Bearing installer ☞ (Page1J-7)		09921–20240 Bearing remover set ☞ (Page1J-6)	



# Exhaust System

## Precautions

### Precautions for Exhaust System

B705H11B00001

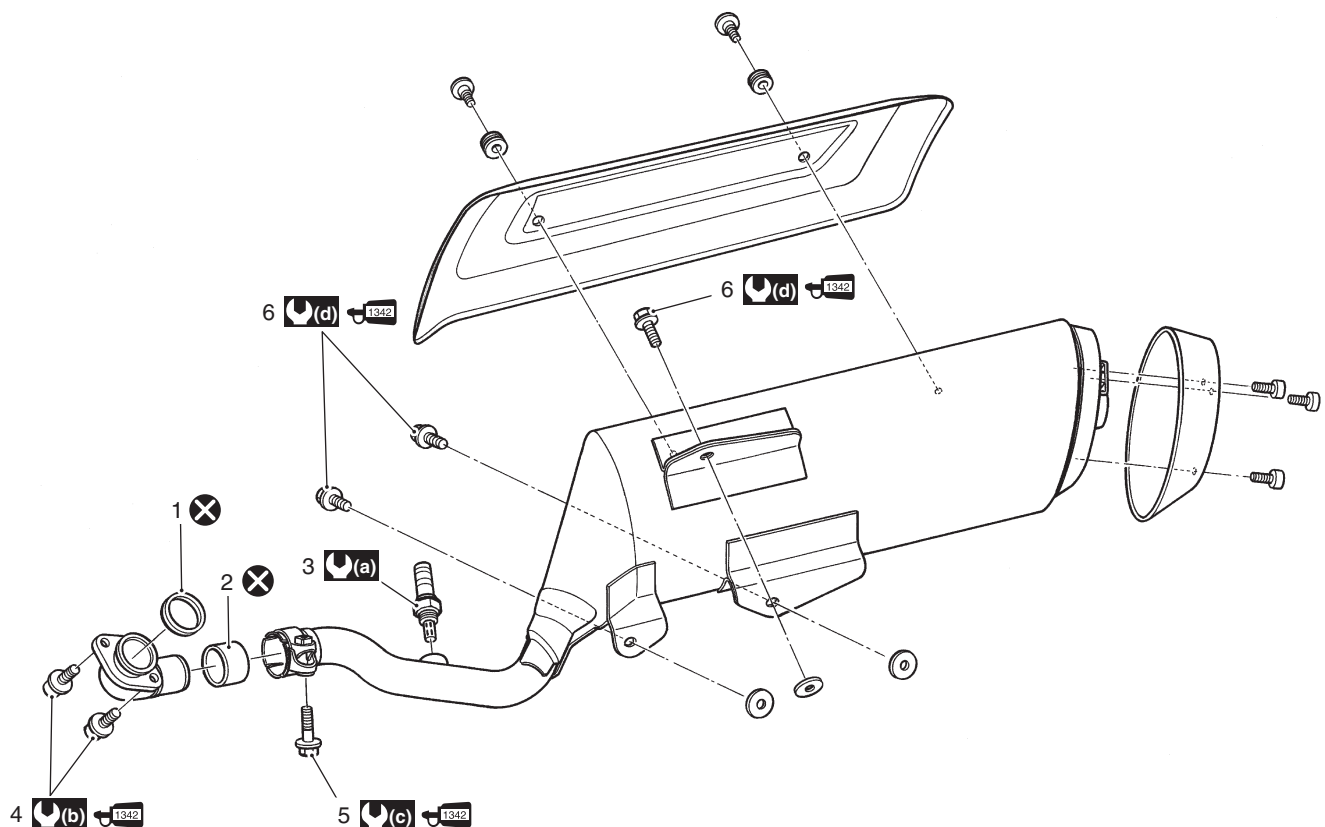
#### **▲ WARNING**

- To avoid the danger 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.
- Make sure that the exhaust pipe and muffler have enough clearance from the rubber parts and plastic parts to avoid melting.
- After installing the exhaust pipe and muffler, check the exhaust pipe connection and muffler connection for exhaust gas leakage.

## Repair Instructions

### Exhaust System Components

B705H11B06001



I705H11B0012-04

1. Exhaust pipe gasket	5. Exhaust pipe connecting bolt	<b>(c)</b> : 23 N·m (2.3 kgf·m, 16.5 lb-ft)
2. Muffler connector	6. Muffler mounting bolt	<b>(d)</b> : 23 N·m (2.3 kgf·m, 16.5 lb-ft)
3. HO2 sensor	<b>(a)</b> : 48 N·m (4.8 kgf·m, 34.5 lb-ft)	<b>1342</b> : Apply thread lock.
4. Exhaust pipe bolt	<b>(b)</b> : 23 N·m (2.3 kgf·m, 16.5 lb-ft)	<b>(X)</b> : Do not reuse.

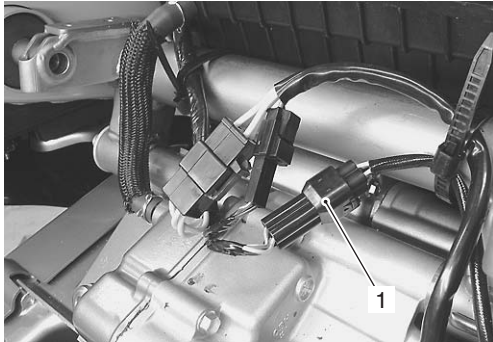
## 1K-2 Exhaust System:

### Exhaust Pipe / Muffler Removal and Installation

B705H11B06002

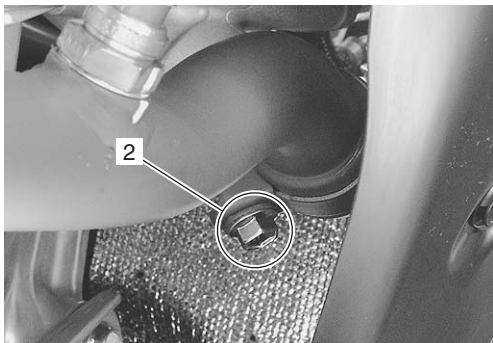
#### Removal

- 1) Remove the HO2 sensor lead wire coupler (1).



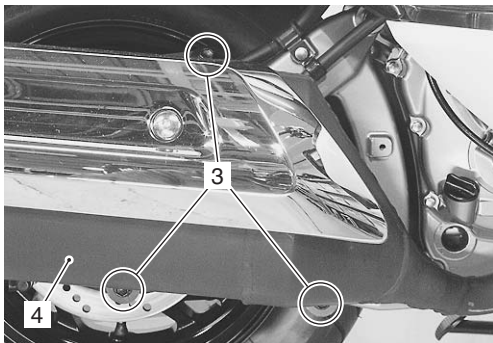
I705H11B0001-01

- 2) Loosen the exhaust pipe connecting bolt (2).



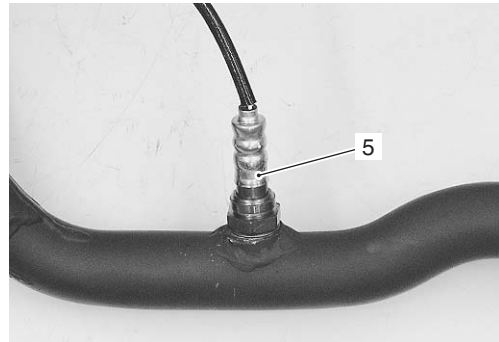
I705H11B0002-01

- 3) Remove the muffler mounting bolts (3) and remove the muffler (4).



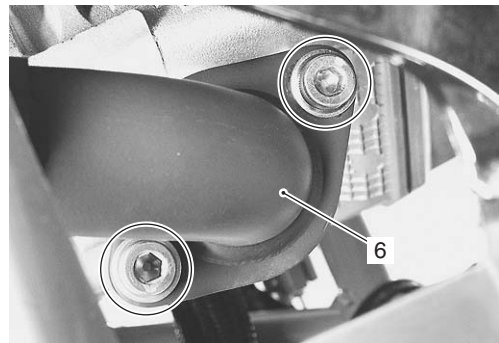
I705H11B0003-01

- 4) Remove the HO2 sensor (5).



I705H11B0004-01

- 5) Remove the exhaust pipe (6).



I705H11B0005-01

- 6) Remove the exhaust pipe gasket (7).



I705H11B0006-01

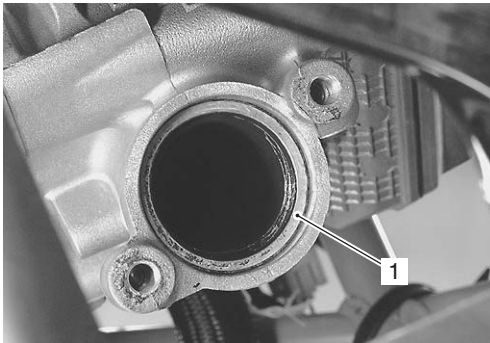
**Installation**

Install the exhaust pipe/muffler in the reverse order of removal. Pay attention to the following points:

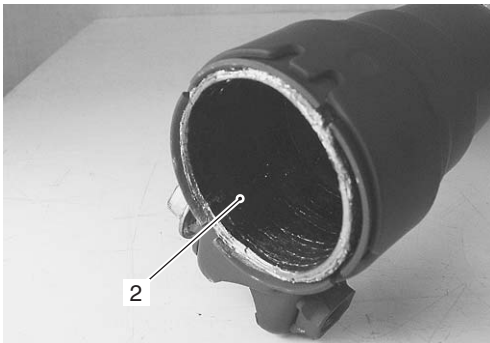
**⚠ CAUTION**

Replace the exhaust pipe gasket (1) and exhaust pipe connector (2) with the new ones.

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



I705H11B0007-03

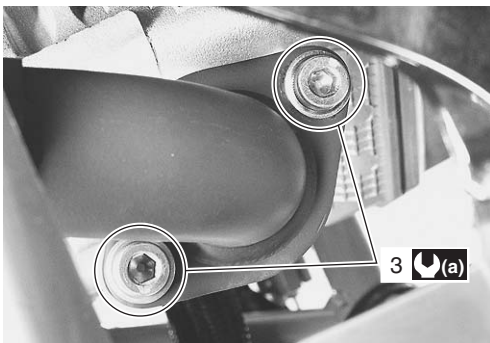


I705H11B0008-02

- Tighten the exhaust pipe bolts (3) to the specified torque.

**Tightening torque**

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



I705H11B0009-02

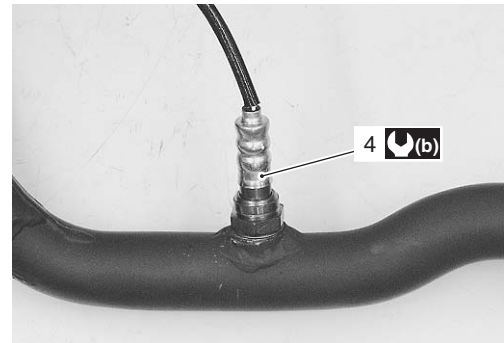
- Tighten the HO2 sensor (4) to the specified torque.

**Tightening torque**

HO2 sensor (b): 48 N·m (4.8 kgf-m, 34.5 lb-ft)

**⚠ CAUTION**

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



I705H11B0010-02

- Apply thread lock to the exhaust pipe joint bolt and muffler mounting bolts.

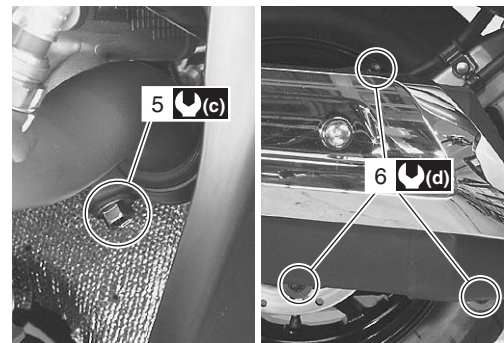
**1342** : Thread lock cement 99000-32050 (THREAD LOCK CEMENT 1342 or equivalent)

- Tighten the exhaust pipe connecting bolt (5) and muffler mounting bolts (6) to the specified torque.

**Tightening torque**

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

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



I705H11B0011-02

## 1K-4 Exhaust System:

### Exhaust System Inspection

B705H11B06005

Inspect the exhaust pipe connection and muffler connection for exhaust gas leakage and mounting condition. If any defect is found, replace the exhaust pipe or muffler with a new one.

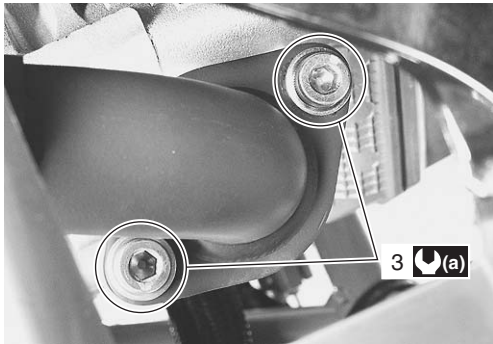
Check the exhaust pipe bolts, exhaust pipe connecting bolt and muffler mounting bolts are tightened to their specified torque.

#### Tightening torque

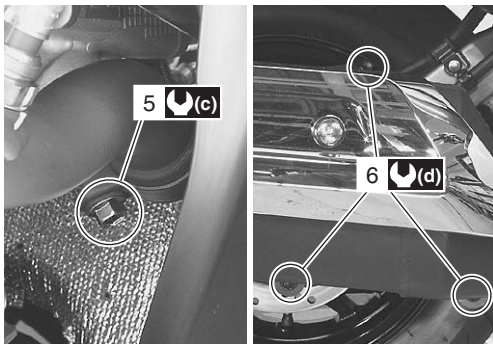
**Exhaust pipe bolt (a): 23 N·m (2.3 kgf-m, 16.5 lb-ft)**

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

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



I705H11B0009-02



I705H11B0011-02

### HO2 Sensor Inspection

B705H11B06006

Refer to "HO2 Sensor Inspection in Section 1C (Page1C-6)".

## Specifications

### Tightening Torque Specifications

B705H11B07001

Fastening part	Tightening torque			Note
	N·m	kgf·m	lb·ft	
Exhaust pipe bolt	23	2.3	16.5	☞(Page1K-3) / ☞(Page1K-4)
HO2 sensor	48	4.8	34.5	☞(Page1K-3)
Exhaust pipe connecting bolt	23	2.3	16.5	☞(Page1K-3) / ☞(Page1K-4)
Muffler mounting bolt	23	2.3	16.5	☞(Page1K-3) / ☞(Page1K-4)

#### NOTE

The specified tightening torque is also described in the following.  
 “Exhaust System Components (Page1K-1)”

#### Reference:

For the tightening torque of fastener not specified in this section, refer to “Tightening Torque Specifications in Section 0C (Page0C-7)”.

## Special Tools and Equipment

### Recommended Service Material

B705H11B08001

Material	SUZUKI recommended product or Specification		Note
Thread lock cement	THREAD LOCK CEMENT 1342 or equivalent	P/No.: 99000-32050	☞(Page1K-3)

#### NOTE

Required service material is also described in the following.  
 “Exhaust System Components (Page1K-1)”



## Section 2

## Suspension

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# Precautions

## Precautions

### Precautions for Suspension

B705H1200001

Refer to "General Precautions in Section 00 (Page00-1)".

---

#### **⚠ 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

B705H12104001

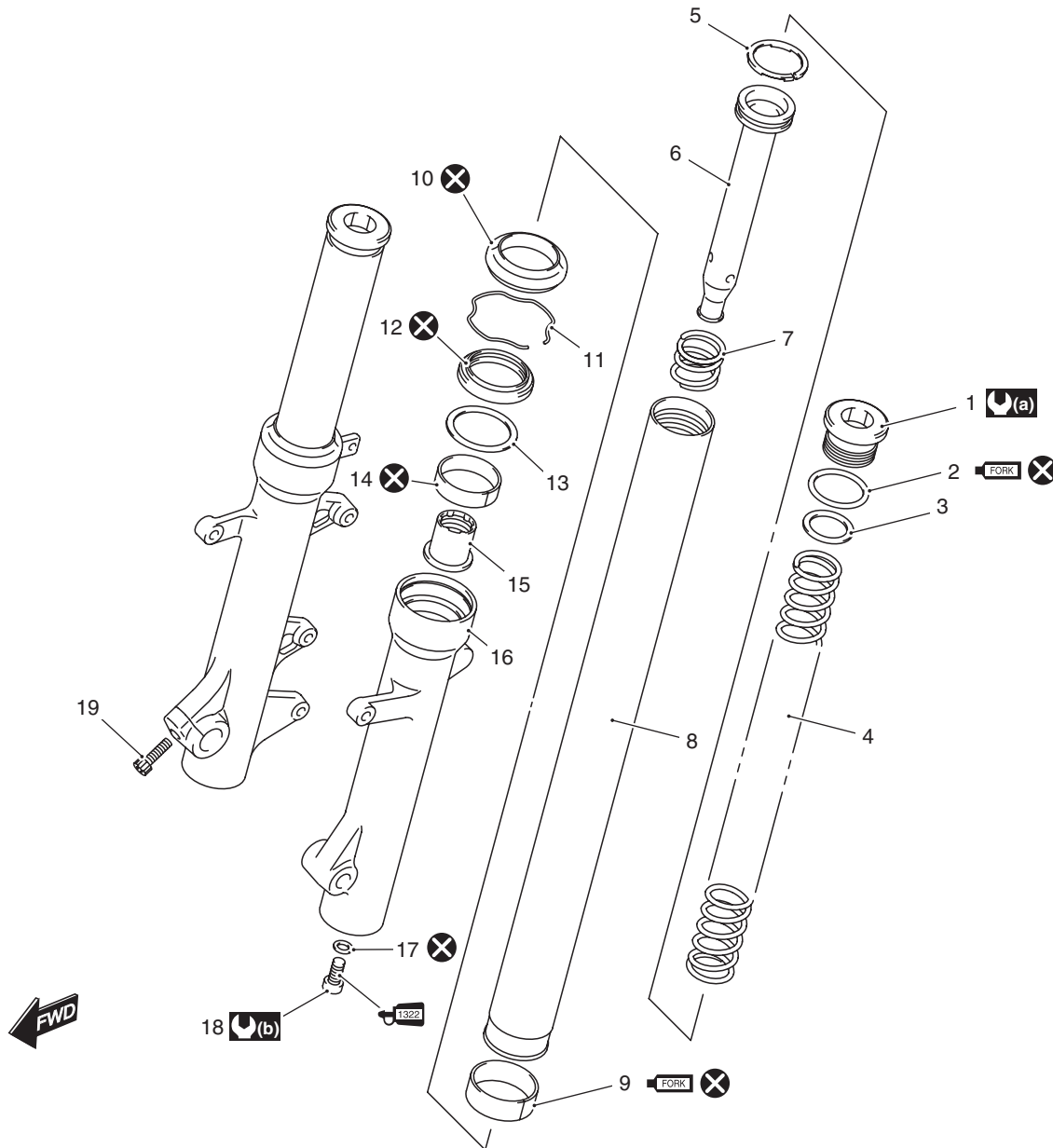
Condition	Possible cause	Correction / Reference Item
<b>Wobbly front wheel</b>	Distorted wheel rim.	<i>Replace.</i>
	Worn front wheel bearings.	<i>Replace.</i>
	Defective or incorrect tire.	<i>Replace.</i>
	Loose axle or axle pinch bolt.	<i>Retighten.</i>
	Incorrect front fork oil level.	<i>Adjust.</i>
<b>Front suspension too soft</b>	Weakened springs.	<i>Replace.</i>
	Not enough fork oil.	<i>Replenish.</i>
	Wrong viscous fork oil.	<i>Replace.</i>
<b>Front suspension too stiff</b>	Too viscous fork oil.	<i>Replace.</i>
	Too much fork oil.	<i>Drain excess oil.</i>
	Bent front axle.	<i>Replace.</i>
<b>Noisy front suspension</b>	Not enough fork oil.	<i>Replenish.</i>
	Loose bolts on suspension.	<i>Retighten.</i>
<b>Wobbly rear wheel</b>	Distorted wheel rim.	<i>Replace.</i>
	Worn rear swingarm bearing.	<i>Replace.</i>
	Defective or incorrect tire.	<i>Replace.</i>
	Worn rear suspension bushing.	<i>Replace.</i>
	Loose bolts on rear suspension and rear swingarm.	<i>Retighten.</i>
	Loose rear axle nut.	<i>Retighten.</i>
<b>Rear suspension too soft</b>	Weakened spring of shock absorber.	<i>Replace.</i>
	Leakage of oil from shock absorber.	<i>Replace.</i>
	Improperly set rear spring unit adjuster.	<i>Adjust.</i>
<b>Rear suspension too stiff</b>	Bent shock absorber shaft.	<i>Replace.</i>
	Over tightened cushion lever mounting nut, rear cushion rod nut.	<i>Adjust.</i>
	Worn swingarm and suspension bearings.	<i>Replace.</i>
	Improperly set rear suspension adjuster.	<i>Adjust.</i>
<b>Rear suspension too noisy</b>	Loose nuts or bolts on rear suspension.	<i>Retighten.</i>
	Worn swingarm bearings.	<i>Replace.</i>

# Front Suspension

## Repair Instructions

### Front Fork Components

B705H12206001



I705H1220035-06

1. Front fork top cap	7. Rebound spring	13. Oil seal retainer	19. Front axle pinch bolt
2. O-ring	8. Inner tube	14. Guide metal	: 45 N-m (4.5 kgf-m, 32.5 lb-ft)
3. Washer	9. Inner tube slide metal	15. Oil lock piece	: 30 N-m (3.0 kgf-m, 21.5 lb-ft)
4. Front fork spring	10. Dust seal	16. Outer tube	: Apply thread lock to thread part.
5. Cylinder ring	11. Oil seal stopper ring	17. Gasket	: Apply fork oil.
6. Cylinder	12. Oil seal	18. Cylinder bolt	: Do not reuse.

## Front Fork Removal and Installation

B705H12206007

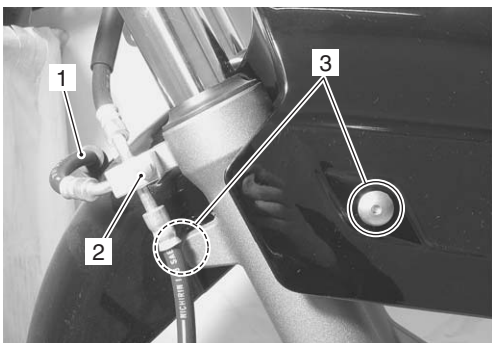
### Removal

- 1) Remove the front leg shield. Refer to "Front Leg Shield Removal and Installation in Section 9D (Page9D-14)".
- 2) Remove the front wheel assembly. Refer to "Front Wheel Assembly Removal and Installation in Section 2D (Page2D-4)".

#### ⚠ CAUTION

- **Make sure that the motorcycle is supported securely.**
- **Do not operate the front brake lever with the front wheel removed.**

- 3) Disconnect the brake hose clamp (1) from the front fender.
- 4) Remove the brake hose clamp bolt (2).
- 5) Remove the front fender by removing the bolts (3) (L & R).



I705H1220001-01

- 6) Remove the front fork cap bolt (4) and washer using the special tool.

#### ⚠ CAUTION

**Use caution when removing the front fork cap bolt since the spring force is applied to the cap bolt.**

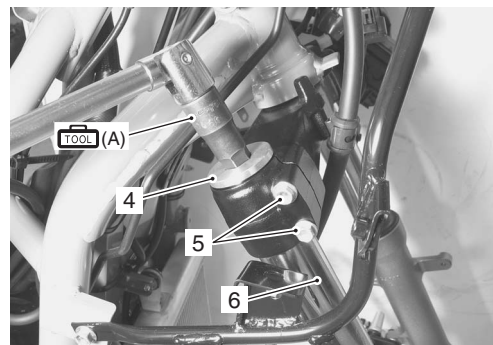
#### Special tool

**TOOL (A): 09940-30230 (Socket hexagon (17 mm))**

- 7) Loosen the front fork clamp bolts (5) and remove the front fork (6).

#### NOTE

**Hold the front fork by the hand to prevent sliding out of the steering stem.**



I705H1220002-02

### Installation

- 1) Insert the front fork inner tube top end into the steering stem all the way until the step of mounting hole has been contacted and tighten the clamp bolts temporarily.



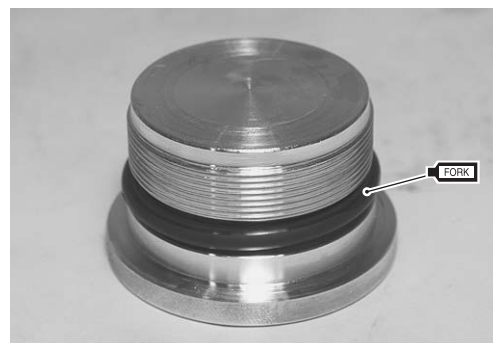
I705H1220003-01

- 2) Replace the O-ring of the front fork cap bolt and apply fork oil.

#### ⚠ CAUTION

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

**FORK : Fork Oil 99000-99044-10G (FORK OIL or equivalent)**



I705H1220004-01

## 2B-3 Front Suspension:


- 3) Install the washer and temporarily tighten the front fork cap bolt and tighten the front fork clamp bolts (1) to the specified torque.

### Tightening torque

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

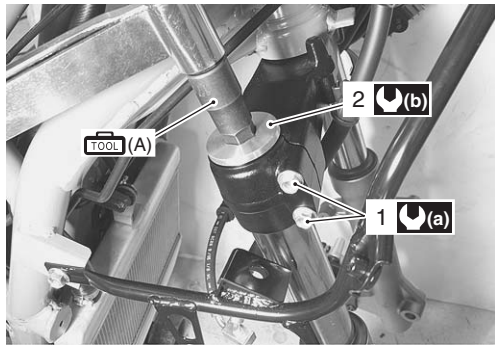
- 4) Tighten the front fork cap bolt (2) to the specified torque using the special tool.

### Special tool

 (A): 09940-30230 (Socket hexagon (17 mm))

### Tightening torque

Front fork cap bolt (b): 45 N·m (4.5 kgf-m, 32.5 lb-ft)



I705H1220005-01

- 5) Install the front fender.
- 6) Tighten the brake hose clamp bolt.
- 7) Connect the brake hose clamp to the front fender.



I705H1220006-03

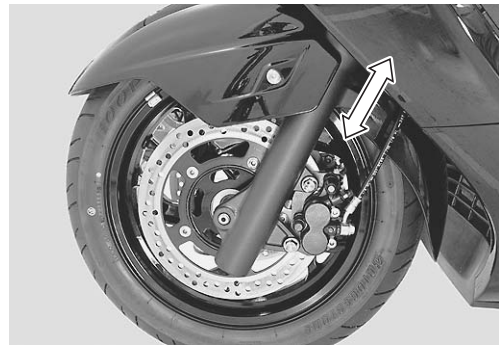
- 8) Install the front wheel assembly. Refer to "Front Wheel Assembly Removal and Installation in Section 2D (Page2D-4)".

### WARNING

After remounting the brake caliper, pump the brake lever until the pistons push the pads correctly.

### NOTE

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



I705H1240027-01

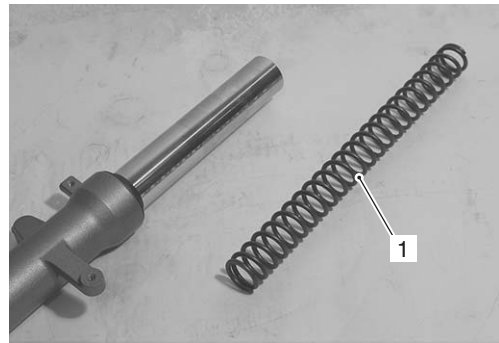
## Front Fork Disassembly and Assembly

B705H12206008

Refer to "Front Fork Removal and Installation (Page2B-2)".

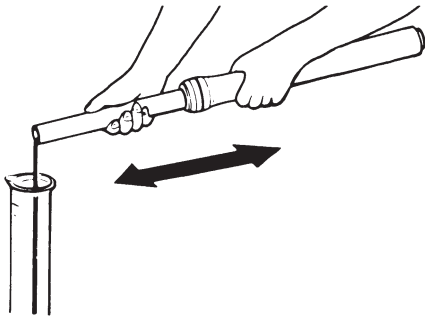
### Disassembly

- 1) Remove the front fork spring (1).



I705H1220007-01

- 2) Invert the fork and stroke it several times to drain out fork oil.
- 3) Hold the fork inverted for a few minutes to drain oil.

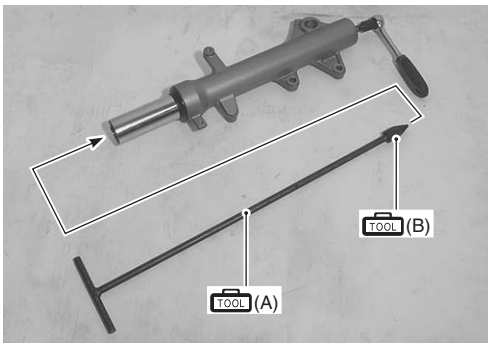


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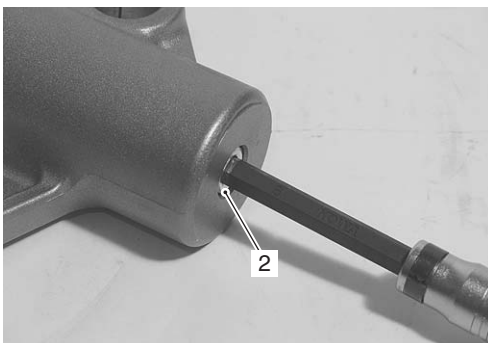
- 4) Remove the cylinder bolt (2) using the special tools.

**Special tool**

- (A): 09940-34520 (T handle)
- (B): 09940-34531 (Attachment A)

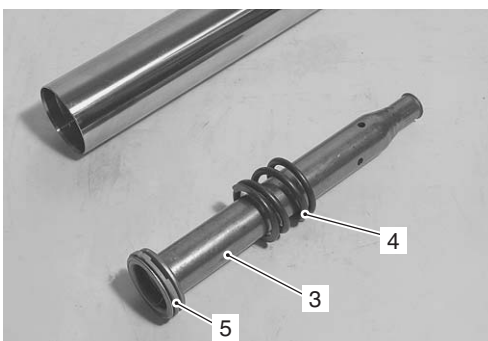


I705H1220008-01



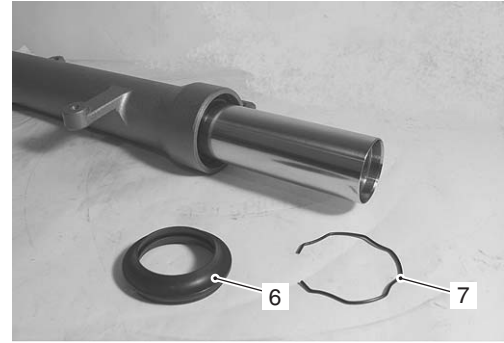
I705H1220009-01

- 5) Remove the cylinder (3), rebound spring (4) and cylinder ring (5).



I705H1220010-02

- 6) Remove the dust seal (6) and oil seal stopper ring (7).

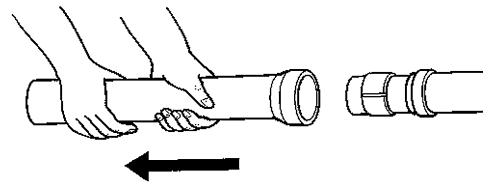


I705H1220011-02

- 7) Pull the outer tube out of the inner tube.

**NOTE**

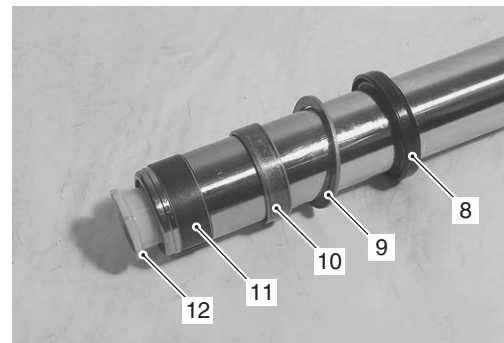
**Be careful not to damage the inner tube.**



I310G1220012-01

- 8) Remove the following parts.

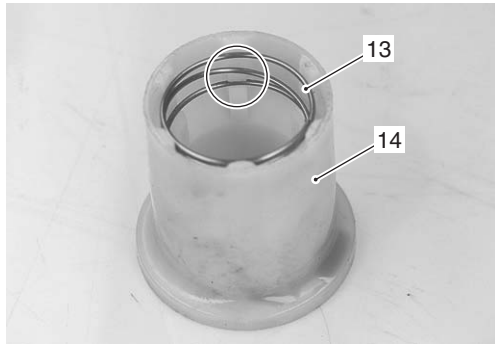
- Oil seal (8)
- Oil seal retainer (9)
- Guide metal (10)
- Slide metal (11)
- Oil lock piece (12)



I705H1220012-02

## 2B-5 Front Suspension:

- Remove the spring (13) from the oil lock piece (14).



1705H1220032-02

### Assembly

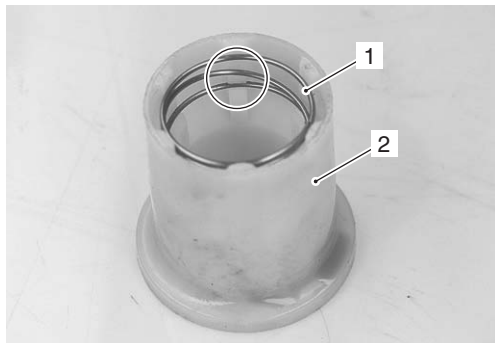
Assemble the front fork in the reverse order of disassembly. Pay attention to the following points:

#### **⚠ CAUTION**

- Thoroughly wash all the component parts being assembled. Insufficient washing can result in oil leakage or premature wear of the parts.
- When reassembling the front fork, use new fork oil.
- Use the specified fork oil for the front fork.
- When reassembling, replace the slide metal, guide metal, oil seal, dust seal and cylinder bolt gasket with the new ones.
- Use care not to cause damage to the slide metal surfaces since the surfaces are teflon coated.

### Oil lock piece

- Install the spring (1) into the oil lock piece (2) securely.



1705H1220013-01

### Inner tube

- Apply fork oil to the guide metal and oil seal lip.  
**FORK**: Fork Oil 99000-99044-10G (FORK OIL or equivalent)
- Install the following parts onto the inner tube.
  - Oil seal (1)
  - Oil seal retainer (2)
  - Guide metal (3)

#### **⚠ CAUTION**

**When installing the oil seal to inner tube, be careful not to damage the oil seal lip.**



1705H1220014-02

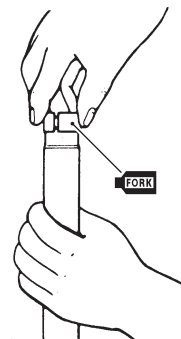
- Hold the inner tube vertically, clean the metal groove and install the slide metal by hand.

#### **⚠ CAUTION**

**Do not damage the Teflon coated surface of the inner tube's slide metal when mounting it.**

- Apply fork oil to the slide metal.

**FORK**: Fork Oil 99000-99044-10G (FORK OIL or equivalent)



1649G1220021-01



- Install the oil lock piece into the inner tube.



I705H1220036-01

- Install the inner tube into the outer tube with care not to drop the oil lock piece out.

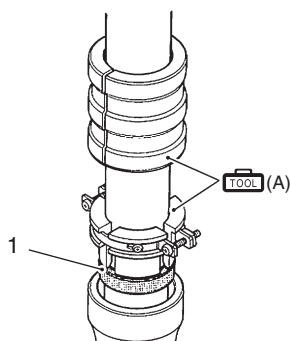
**NOTE**

After installing the inner tube into the outer tube, keep the oil lock piece into the inner tube by compressing the front fork fully.

- Install the oil seal (1) into the outer tube using the special tool.

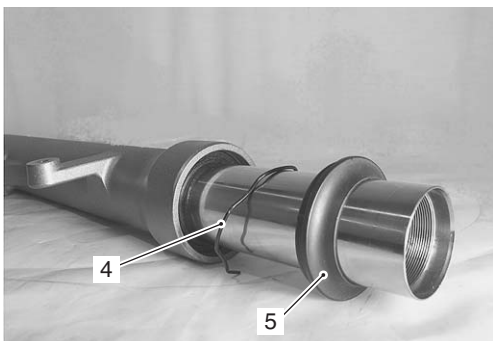
**Special tool**

 (A): 09940-52861 (Front fork oil seal installer)

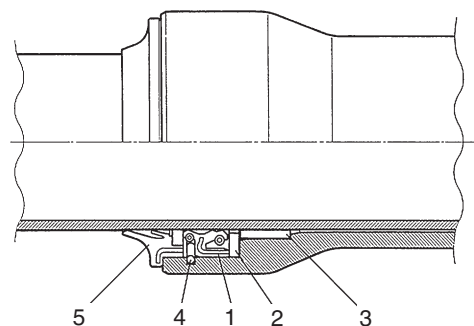


I705H1220016-03

- Install the oil seal stopper ring (4) and the dust seal (5).



I705H1220017-03

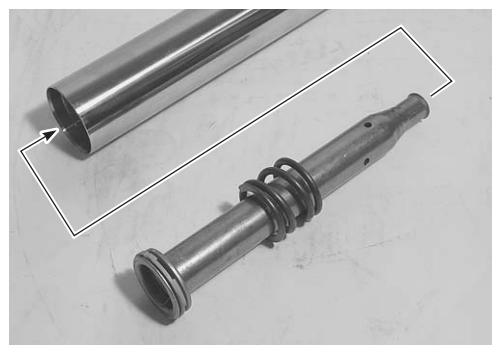


I705H1220034-02

- Dust seal (5)
- Oil seal stopper ring (4)
- Oil seal (1)
- Oil seal retainer (2)
- Guide metal (3)

**Cylinder / Rebound spring / Cylinder ring**

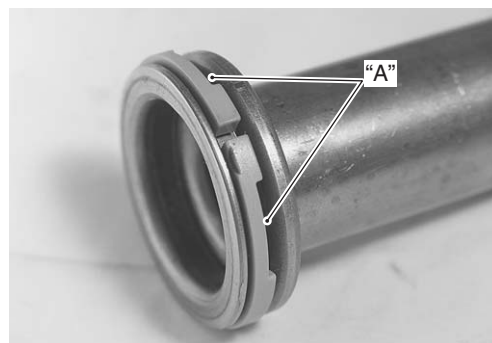
- Install the rebound spring and the cylinder ring to the cylinder and install them together to the inner tube.



I705H1220019-01

**NOTE**

The cylinder ring should be installed onto the cylinder with its oil passage notches "A" facing downward.



I705H1220025-02

## 2B-7 Front Suspension:

- Apply thread lock to the cylinder bolt and tighten it to the specified torque using the special tools.

### ⚠ CAUTION


Use a new cylinder bolt gasket to prevent oil leakage.


### NOTE

Check the front fork for smoothness by stroking it after installing the cylinder.

 : Thread lock cement 99000-32050 (Thread Lock Cement 1342 or equivalent)

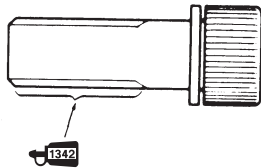
### Special tool

 (A): 09940-34520 (T handle)

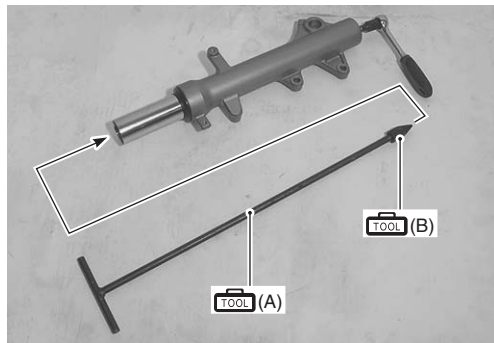
 (B): 09940-34531 (Attachment A)

### Tightening torque

Cylinder bolt: 30 N·m (3.0 kgf·m, 21.5 lb-ft)




I649G1220025-01



I705H1220008-01

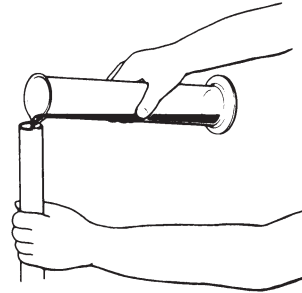
### Front fork oil

- Place the front fork vertically without spring.
- Compress the front fork fully.
- Pour the specified front fork oil into the front fork.

 : Fork Oil 99000-99044-10G (FORK OIL or equivalent)

### Front fork oil capacity (each leg)

301 ml (10.17/10.60 US/Imp oz)

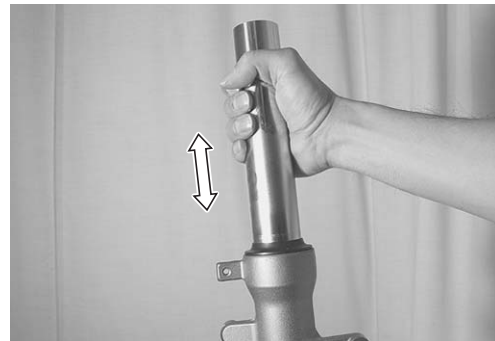


I649G1220026-01

- Move the inner tube up and down slowly several strokes until no more bubbles come out from the oil.
- Keep the front fork vertically and leave it during 5 – 6 minutes.

### NOTE

Take extreme attention to pump out air completely.



I705H1220020-01

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

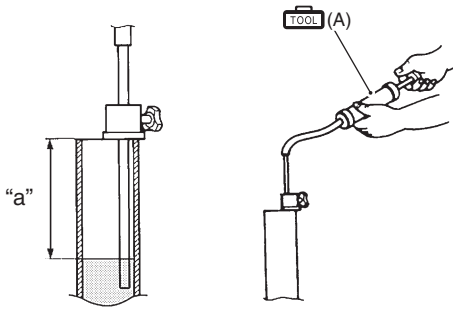
**NOTE**

**When adjusting the fork oil level, remove the fork spring and compress the inner tube fully.**

**Special tool**

**TOOL (A): 09943-74111 (Fork oil level gauge)**

**Fork oil level "a"**  
**87 mm (3.43 in)**



I705H1220021-01

**Front fork spring**

- Install the fork spring into the front fork.



I705H1220022-01

**Front Fork Inspection**

B705H12206004

Refer to "Front Fork Inspection in Section 0B (Page0B-16)".

**Front Fork Parts Inspection**

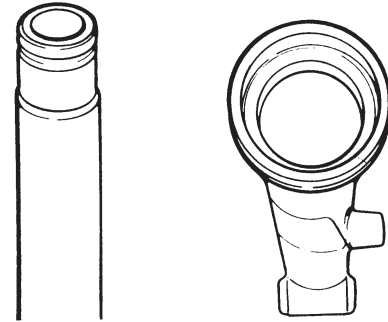
B705H12206009

Refer to "Front Fork Disassembly and Assembly (Page2B-3)".

Inspect the following parts.

**Inner / Outer Tubes**

Inspect the inner tube sliding surface and outer tube sliding surface for scuffing. If any defects are found, replace them with the new ones.



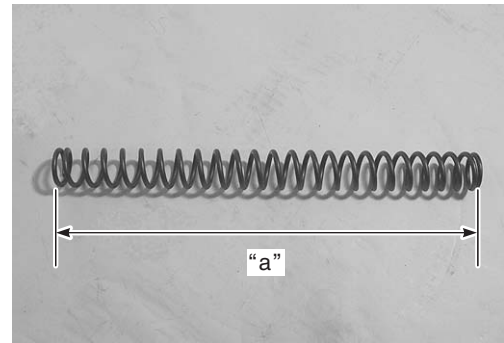
I649G1220035-02

**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"**

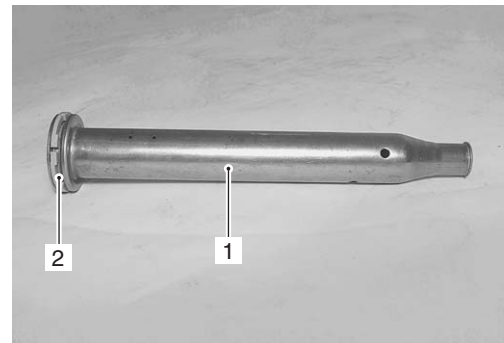
**347.6 mm (13.39 in)**



I705H1220023-01

**Cylinder / Cylinder Ring**

Inspect the cylinder (1) and cylinder ring (2) for wear or damage. If any defects are found, replace the cylinder or cylinder ring with a new one.



I705H1220024-01

## Specifications

### Service Data

B705H12207002

#### Suspension

Unit: mm (in)

Item	Standard	Item
Front fork stroke	110 (4.33)	—
Front fork spring free length	347.6 (13.69)	340
Front fork oil type	G-10	—
Front fork oil capacity (each leg)	301 ml (10.17/10.60 US/lmp oz)	—
Front fork oil level	87 (3.43) (without spring, inner/outer tube fully pressed)	—
Front fork inner tube O.D.	41 (1.61)	

### Tightening Torque Specifications

B705H12207003

Fastening part	Tightening torque			Note
	N·m	kgf·m	lb-ft	
Front fork clamp bolt	23	2.3	16.5	☞ (Page2B-3)
Front fork cap bolt	45	4.5	32.5	☞ (Page2B-3)
Cylinder bolt	30	3.0	21.5	☞ (Page2B-7)

#### NOTE

The specified tightening torque is also described in the following.  
 “Front Fork Components (Page2B-1)”

#### Reference:

For the tightening torque of fastener not specified in this section, refer to “Tightening Torque Specifications in Section 0C (Page0C-7)”.

## Special Tools and Equipment

### Recommended Service Material

B705H12208001

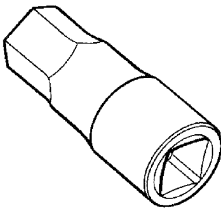
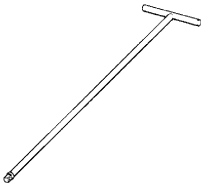
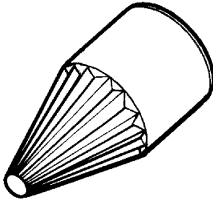
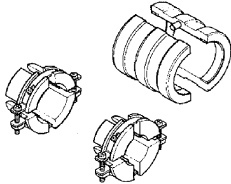
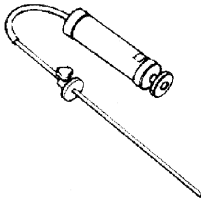
Material	SUZUKI recommended product or Specification	Note
Fork Oil	FORK OIL or equivalent	P/No.: 99000-99044-10G ☞ (Page2B-2) / ☞ (Page2B-5) / ☞ (Page2B-7)
Thread lock cement	Thread Lock Cement 1342 or equivalent	P/No.: 99000-32050 ☞ (Page2B-7)

#### NOTE

Required service material is also described in the following.  
 “Front Fork Components (Page2B-1)”

### Special Tool

B705H12208002

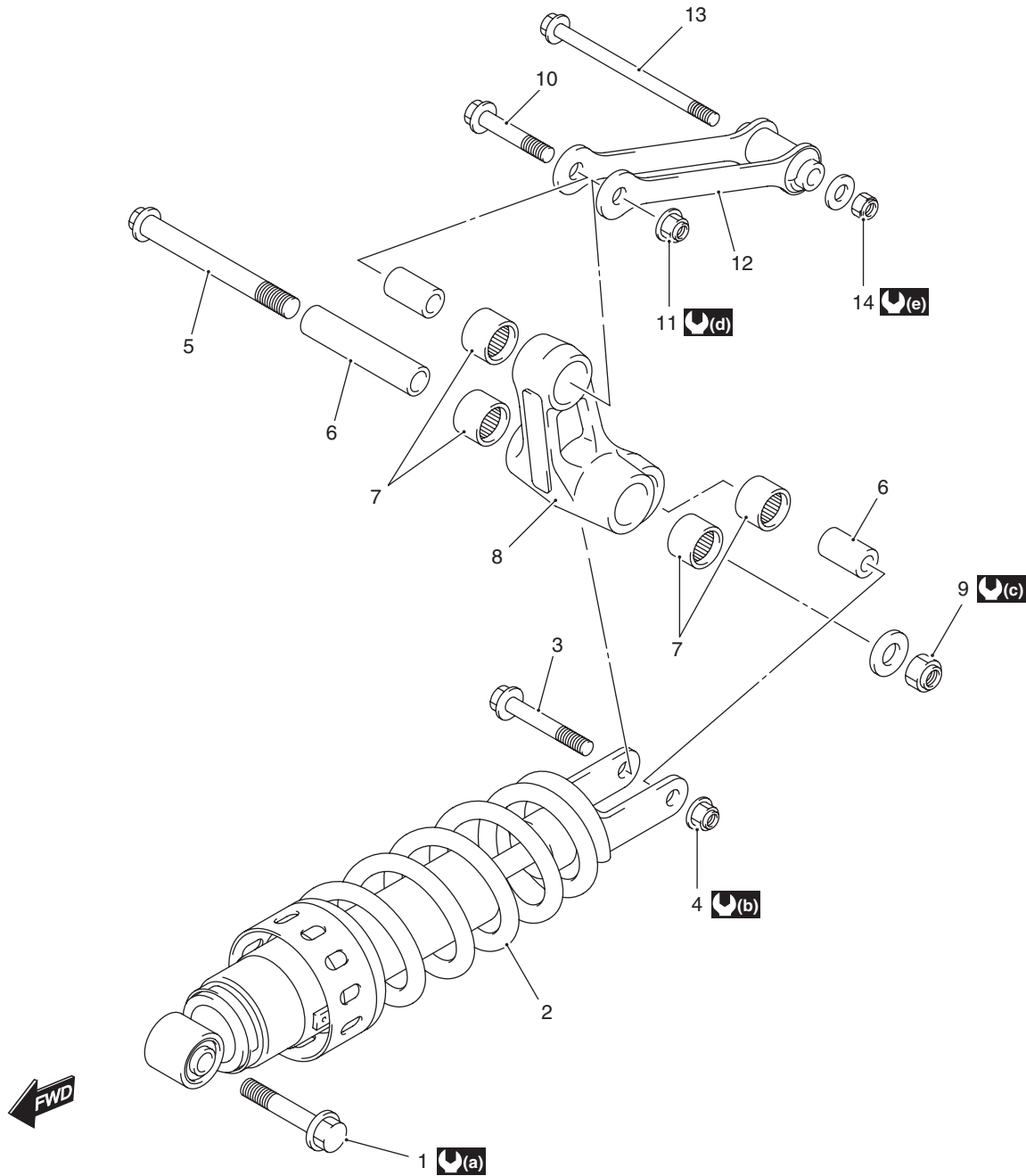
09940-30230 Socket hexagon (17 mm) ☞ (Page2B-2) / ☞ (Page2B-3)		09940-34520 T handle ☞ (Page2B-4) / ☞ (Page2B-7)	
09940-34531 Attachment A ☞ (Page2B-4) / ☞ (Page2B-7)		09940-52861 Front fork oil seal installer ☞ (Page2B-6)	
09943-74111 Fork oil level gauge ☞ (Page2B-8)			

# Rear Suspension

## Repair Instructions

### Rear Suspension Components

B705H12306012

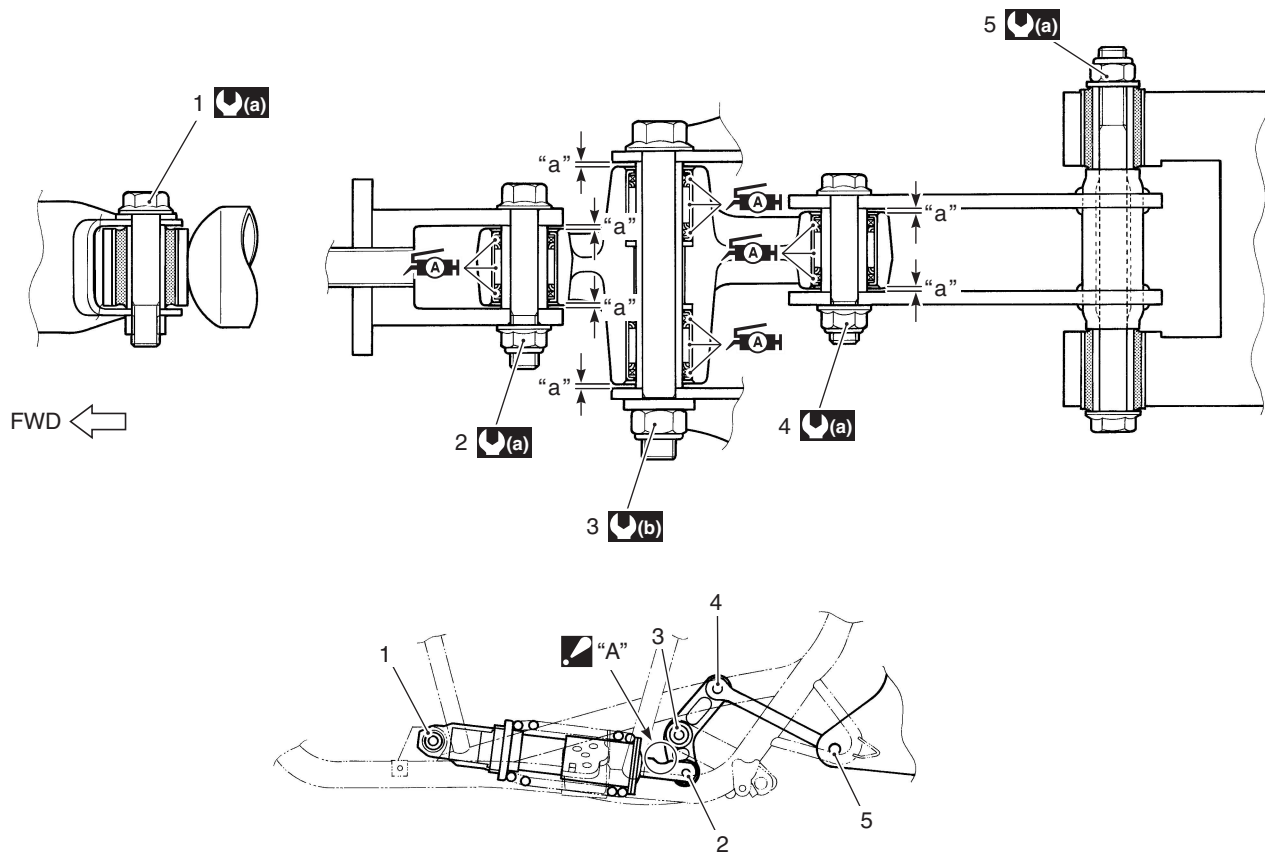


I705H1230034-01

1. Rear shock absorber bolt	8. Cushion lever	ⓐ : 50 N·m (5.0 kgf-m, 36.0 lb-ft)
2. Rear shock absorber	9. Cushion lever nut	ⓑ : 50 N·m (5.0 kgf-m, 36.0 lb-ft)
3. Cushion lever bolt	10. Cushion lever rod bolt	ⓒ : 80 N·m (8.0 kgf-m, 58.0 lb-ft)
4. Cushion lever nut	11. Cushion lever rod nut	ⓓ : 50 N·m (5.0 kgf-m, 36.0 lb-ft)
5. Cushion lever bolt	12. Cushion lever rod	ⓔ : 50 N·m (5.0 kgf-m, 36.0 lb-ft)
6. Spacer	13. Cushion lever rod bolt	
7. Bearing	14. Cushion lever rod nut	

Rear Suspension Assembly Construction

B705H12306013



I705H1230041-04

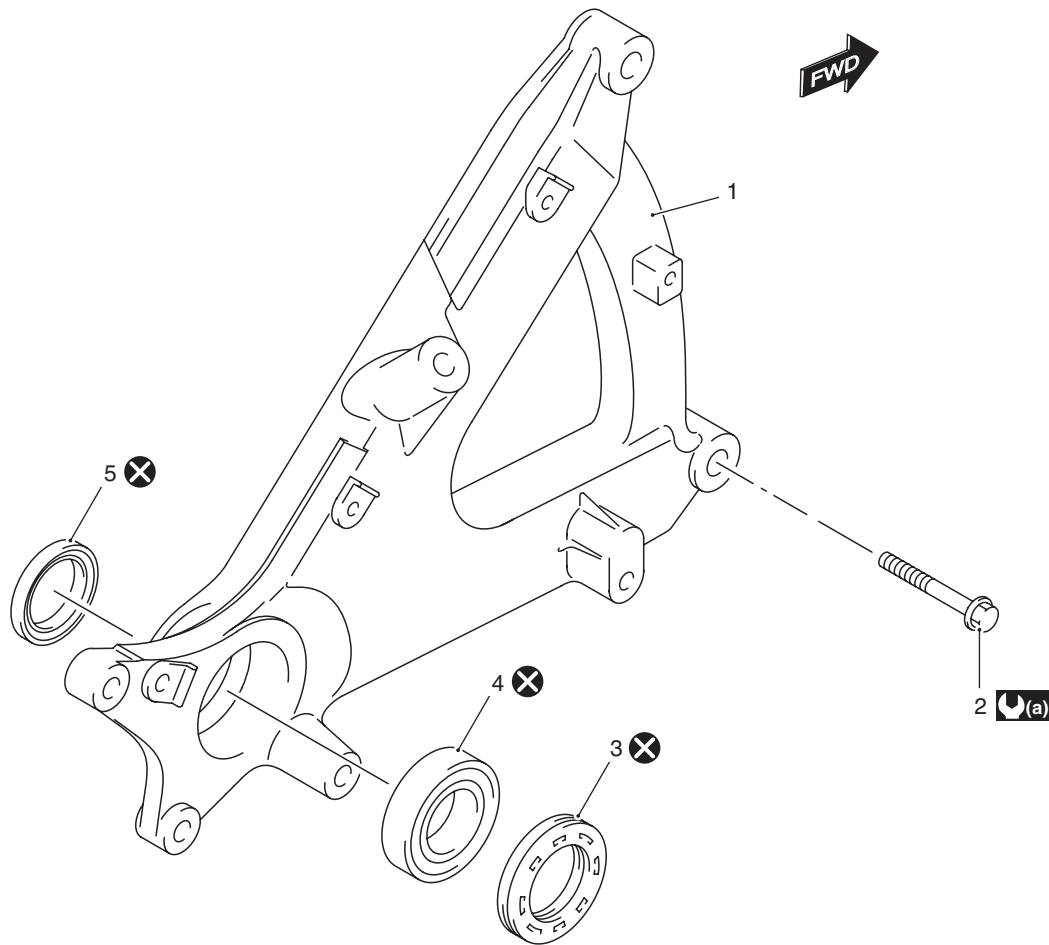
1. Rear shock absorber mounting bolt	5. Cushion rod mounting nut	<b>(b)</b> : 80 N·m (8.0 kgf·m, 58.0 lb·ft)
2. Cushion lever nut	<b>A</b> : Assemble the rear shock absorber with dent side up.	<b>AH</b> : Apply grease.
3. Cushion lever mounting nut	"a": 1 mm (0.04 in)	
4. Cushion rod nut	<b>(a)</b> : 50 N·m (5.0 kgf·m, 36.0 lb·ft)	



## 2C-3 Rear Suspension:

### Rear Swingarm Components

B705H12306027



I705H1230035-01

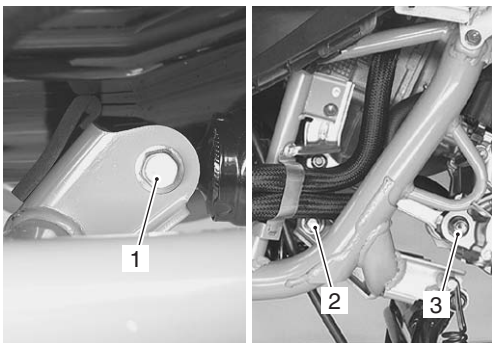
1. Rear swingarm	3. Dust seal	5. Dust seal	⊗ : Do not reuse.
2. Rear swingarm mounting bolt	4. Bearing	⌚(a) : 50 N·m (5.0 kgf-m, 36.0 lb-ft)	

## Rear Shock Absorber and Rear Shock Absorber Assembly Removal and Installation

B705H12306014

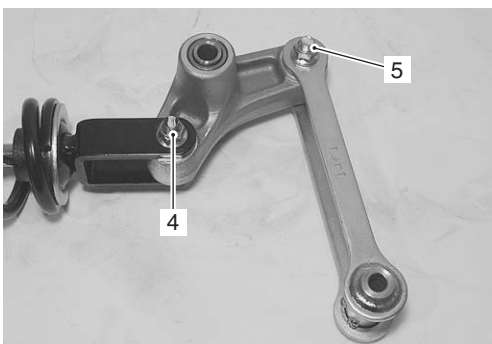
### Removal

- 1) Place the motorcycle on the center stand and support the motorcycle with a jack to be no load for the rear shock absorber.
- 2) Remove the right and left footboards. Refer to "Footboard Removal and Installation in Section 9D (Page9D-21)".
- 3) Disconnect the clamps.
- 4) Remove the rear shock absorber bolt (1), cushion lever mounting nut (2) and rear cushion rod nut (3).



I705H1230001-03

- 5) Remove the rear shock absorber assembly.
- 6) Remove the cushion lever nuts (4) and cushion rod nut (5) to remove the rear suspension linkage.



I705H1230003-03

### Installation

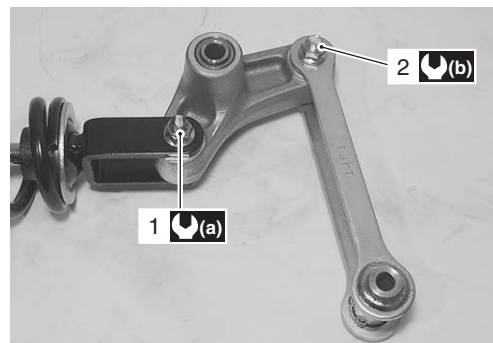
Install the rear shock absorber assembly in the reverse order of removal. Pay attention to the following points:

- Tighten the cushion lever nuts (1) and cushion rod nut (2) to the specified torque.

#### Tightening torque

**Cushion lever nut (a): 50 N·m (5.0 kgf-m, 36.0 lb-ft)**

**Cushion rod nut (b): 50 N·m (5.0 kgf-m, 36.0 lb-ft)**



I705H1230002-02

- Install the rear shock absorber assembly and tighten the rear shock absorber bolt (3), rear cushion rod nut (4) and cushion lever mounting nut (5) to the specified torque.

#### Tightening torque

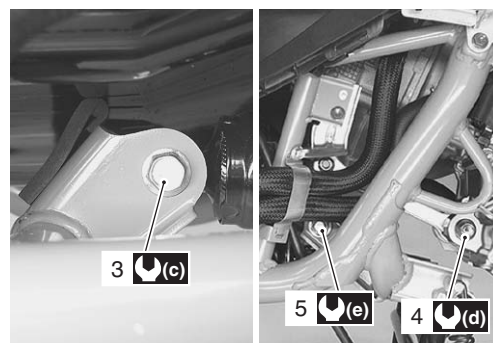
**Rear shock absorber bolt (c): 50 N·m (5.0 kgf-m, 36.0 lb-ft)**

**Rear cushion rod nut (d): 50 N·m (5.0 kgf-m, 36.0 lb-ft)**

**Cushion lever mounting nut (e): 80 N·m (8.0 kgf-m, 58.0 lb-ft)**

#### NOTE

**Pass the cushion lever mounting bolt after all other bolts have been inserted.**



I705H1230004-02

## 2C-5 Rear Suspension:

### Rear Suspension Inspection

B705H12306015

Refer to “Rear Suspension Inspection in Section 0B (Page0B-16)”.

### Rear Shock Absorber Inspection

B705H12306016

Inspect the rear shock absorber in the following procedures:

- 1) Remove the rear shock absorber. Refer to “Rear Shock Absorber and Rear Shock Absorber Assembly Removal and Installation (Page2C-4)”.
- 2) Inspect the rear shock absorber for oil leakage.
- 3) Inspect the bushing for play and damage.
- 4) Inspect the rear shock absorber spring for crack or other damage. If any defects are found, replace the shock absorber with a new one.

#### **⚠ CAUTION**

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



I705H1230005-01



I705H1230006-01

- 5) Install the rear shock absorber. Refer to “Rear Shock Absorber and Rear Shock Absorber Assembly Removal and Installation (Page2C-4)”.

### Rear Shock Absorber Gas Pressure Release

B705H12306017

Refer to “Rear Shock Absorber and Rear Shock Absorber Assembly Removal and Installation (Page2C-4)”.

#### **⚠ WARNING**

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

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

#### **Gas Pressure Release**

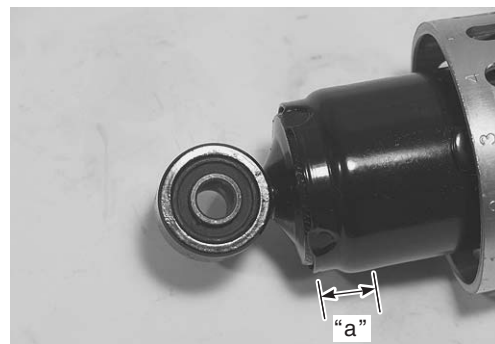
Make sure to observe the following precautions.

#### **⚠ WARNING**

- **Never apply heat or disassemble the damper unit since it can explode or oil can splash hazardously.**
- **When discarding the rear shock absorber, be sure to release gas pressure from the rear shock absorber following the procedures.**

- 1) Mark the drill hole at position “a” shown in the illustration, with a center punch.

**Length “a”  
15 mm**



I705H1230007-02

- 2) Wrap rear shock absorber (1) with a vinyl bag (2) and fix it on a vise as shown.
- 3) Drill a 2 – 3 mm (0.08 – 0.12 in) hole at the marked drill center using a drilling machine and let out gas while taking care not to get the vinyl bag entangled with the drill bit.

**⚠ WARNING**

- Be sure to wear protective glasses since drilling chips and oil may fly off with blowing gas when the drill bit has penetrated through the body.
- Make sure to drill at the specified position. Otherwise, pressurized oil may spout out forcefully.



I649G1230009-02

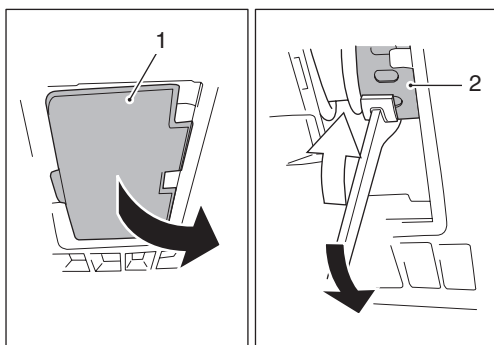
**Rear Suspension Adjustment**

B705H12306005

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

**Spring Pre-load Adjustment**

- 1) Keep the motorcycle upright with the center stand.
- 2) Remove the adjuster cover.
- 3) Turn the spring tension ring to the desired position.



I705H1230036-01

1. Cover

2. Adjuster

**⚠ CAUTION**

Position "1" provides the softest spring tension and position "7" provides the stiffest.

**STD position**

Position "3"

**Rear Swingarm Removal and Installation**

B705H12306024

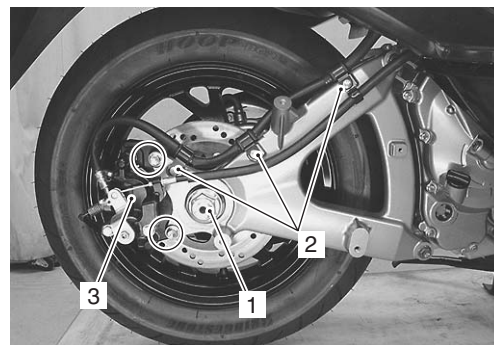
**Removal**

- 1) Raise the rear wheel resting center-stand and using jack.

**⚠ CAUTION**

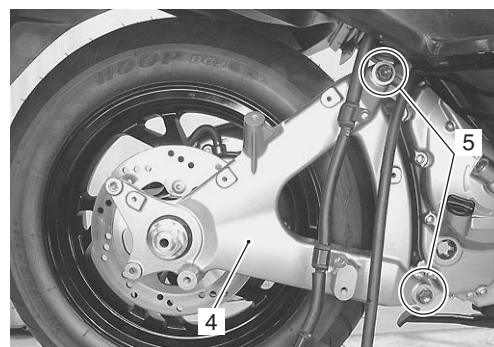
**Fix the frame to be stabilized.**

- 2) Remove the muffler. Refer to "Exhaust Pipe / Muffler Removal and Installation in Section 1K (Page1K-2)".
- 3) Loosen the rear axle nut (1) while depressing the rear brake pedal.
- 4) Remove the rear brake hose clamps (2) and rear brake caliper (3).



I705H1230023-04

- 5) Remove the rear swingarm (4) by removing the rear swingarm mounting bolts (5) and rear axle nut.



I705H1230024-03

**⚠ CAUTION**

**Do not operating the rear brake lever and brake-lock lever with the rear brake caliper removed.**

- 6) Remove the collar from the swingarm.

## 2C-7 Rear Suspension:

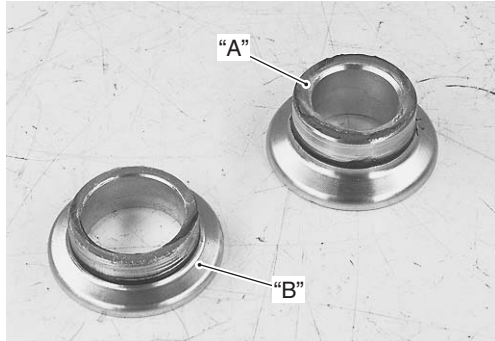
### Installation

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

- Install the collar to swingarm.

#### **⚠ CAUTION**

**When installing the swingarm to the frame, pay attention to the difference of the collar.**



I705H1230033-02

"A": Rear axle nut side

"B": Wheel side

- After install the rear swingarm temporarily, tighten the rear brake caliper bolts (1) to the specified torque.

#### Tightening torque

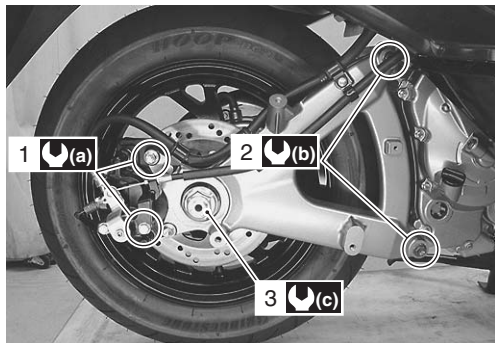
**Rear brake caliper bolt (a): 23 N·m (2.3 kgf-m, 16.5 lb-ft)**

- Tighten the rear swingarm bolts (2), rear axle nut (3) to the specified torque.

#### Tightening torque

**Rear swingarm bolt (b): 50 N·m (5.0 kgf-m, 36.0 lb-ft)**

**Rear axle nut (c): 120 N·m (12.0 kgf-m, 87.0 lb-ft)**



I705H1230025-01

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

#### **⚠ CAUTION**

**Replace the exhaust pipe connector with a new one.**

#### Tightening torque

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

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

#### **⚠ WARNING**

**After remounting the rear wheel, pump the rear brake lever several times to check for proper brake operation.**

### Rear Swingarm Related Parts Inspection

B705H12306025

Refer to "Rear Swingarm Removal and Installation (Page2C-6)".

Inspect the following parts.

#### Rear Swingarm

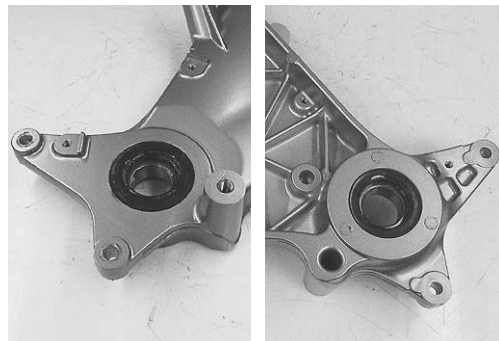
Inspect the rear swingarm for crack or other damage. If any defects are found, replace the swingarm with a new one.



I705H1230026-01

#### Dust Seal

Inspect dust seal lip for wear or damage. If any defects are found, replace the dust seal with a new one.

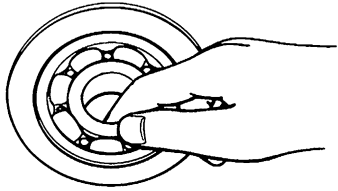


I705H1230027-01



**Bearing**

Inspect the play of the bearings by finger while they are in the rear swingarm. Rotate the inner race by finger to inspect for abnormal noise and smooth rotation. Replace the bearing in the following procedures if there is anything unusual. Refer to "Rear Swingarm Dust Seal / Bearing Removal and Installation (Page2C-8)".



I649G1240015-01

**Collar**

Inspect the collar for wear or damage. If any defects are found, replace it with a new one.



I705H1230028-01

**Rear Swingarm Dust Seal / Bearing Removal and Installation**

B705H12306026

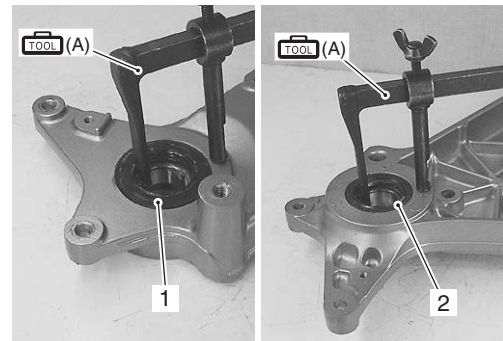
Refer to "Rear Suspension Assembly Construction (Page2C-2)".

**Removal**

- 1) Remove the rear swingarm. Refer to "Rear Swingarm Removal and Installation (Page2C-6)".
- 2) Remove the dust seals (1) and (2) using the special tool.

**Special tool**

**TOOL (A): 09913-50121 (Oil seal remover)**

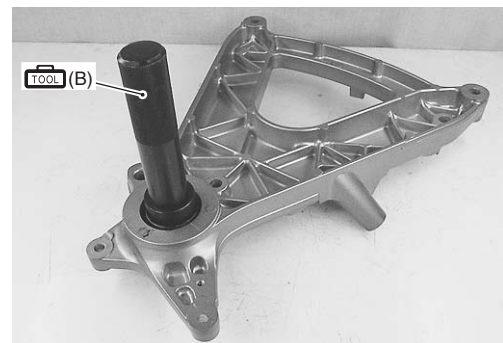


I705H1230029-02

- 3) Remove the bearing using the special tool.

**Special tool**

**TOOL (B): 09913-70210 (Bearing installer set)**



I705H1230030-02

## 2C-9 Rear Suspension:

### Installation

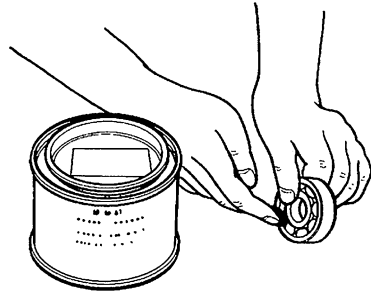
Install the dust seal and bearing in the reverse order of removal. Pay attention to the following points:

#### **CAUTION**

**The removed dust seal and bearings must be replaced with the new ones.**

- Apply grease to the bearing.

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

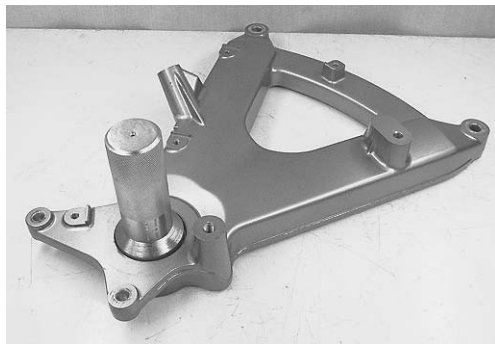


I649G1240019-01

- Install the bearing to the rear swingarm using an appropriate tool.

#### **CAUTION**

**When installing the bearing, stamped mark on the bearing must face outside.**



I705H1230031-01

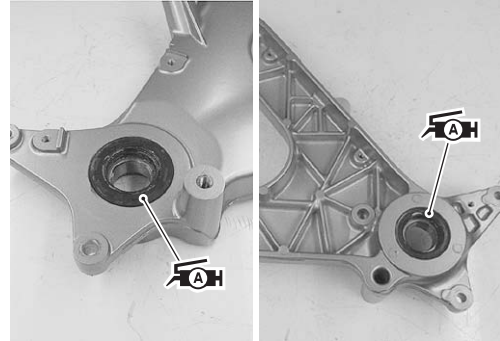
- Install the oil seal using the special tool.

#### **Special tool**

**⚠️: 09913-70210 (Bearing installer set)**

- Apply grease to the oil seal lip.

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



I705H1230037-01

### Cushion Lever and Cushion Rod Inspection

B705H12306018

Refer to "Rear Shock Absorber and Rear Shock Absorber Assembly Removal and Installation (Page2C-4)".

Inspect the following parts.

#### **Cushion Lever**

Inspect the cushion lever for crack or other damage. If any defects are found, replace the cushion lever with a new one.



I705H1230008-01



**Spacer**

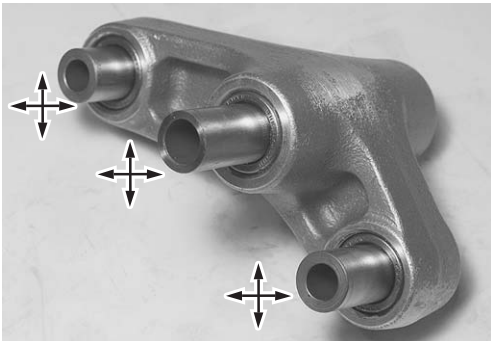
- 1) Remove the spacers from the cushion lever.
- 2) Inspect the spacers for any flaws or other damage. If any defects are found, replace the spacers with the new ones.



I705H1230009-01

**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 (Page2C-10)".



I705H1230010-01

**Cushion Rod**

Inspect the cushion rod for damage and bend. If any defects are found, replace the cushion rod with a new one.



I705H1230011-01


**Cushion Lever Bearing Removal and Installation**

B705H12306019

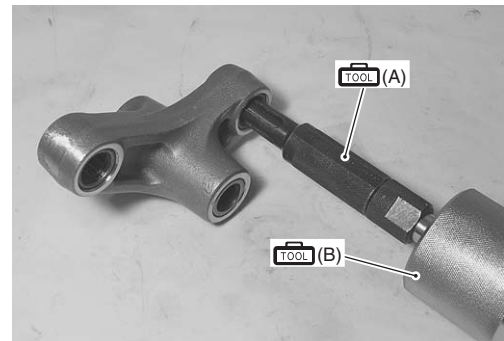
**Removal**

- 1) Remove the cushion lever. Refer to "Rear Shock Absorber and Rear Shock Absorber Assembly Removal and Installation (Page2C-4)".
- 2) Remove the cushion lever bearings using the special tools.

**Special tool**

 (A): 09923-73210 (Bearing remover)

 (B): 09930-30104 (Sliding shaft)



I705H1230012-01

## 2C-11 Rear Suspension:

### Installation

Install the cushion lever bearing in the reverse order of removal. Pay attention to the following points:

#### ⚠ CAUTION


The removed bearings must be replaced with the new ones.

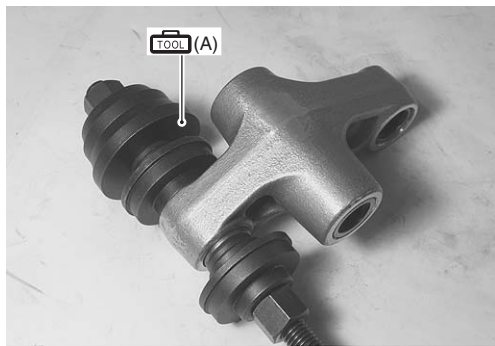
- Press the bearings into the cushion lever using the special tool.

#### NOTE

When installing the bearing, stamped mark on the bearing must face outside.

#### Special tool

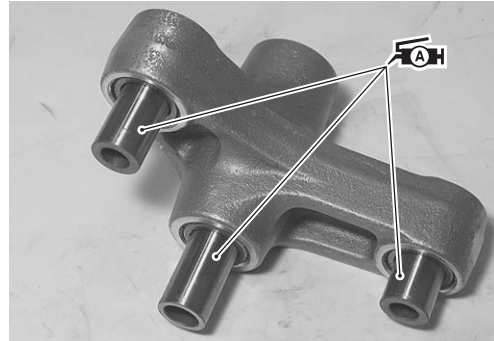
 (A): 09941-34513 (Steering race installer)



I705H1230013-01

- Apply grease to the bearings.

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

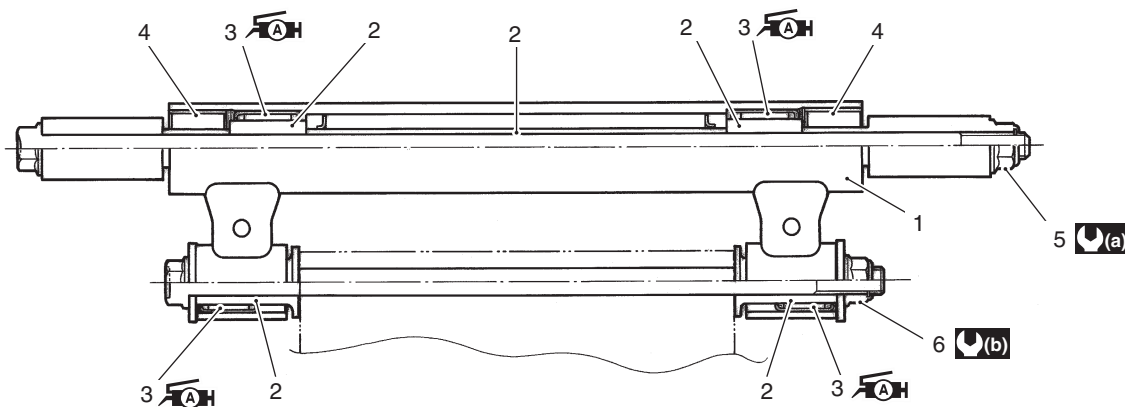


I705H1230014-01




- Install the cushion lever. Refer to "Rear Shock Absorber and Rear Shock Absorber Assembly Removal and Installation (Page2C-4)".

## Crankcase Bracket Construction

B705H12306020



I705H1230042-01

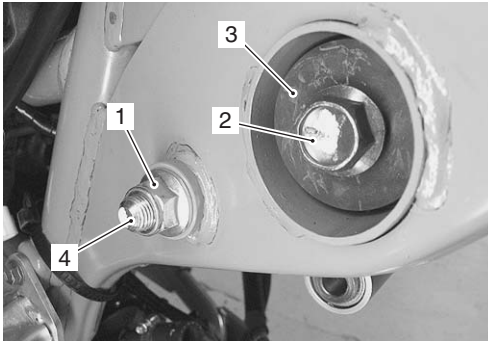
1. Crankcase bracket	4. Bushing	 (a) : 85 N·m (8.5 kgf·m, 61.5 lb·ft)
2. Spacer	5. Crankcase bracket nut	 (b) : 93 N·m (9.3 kgf·m, 67.0 lb·ft)
3. Bearing	6. Engine mounting nut	 (AH) : Apply grease.

**Crankcase Bracket Removal and Installation**

B705H12306021

**Removal**

- 1) Remove the engine.  
Refer to "Engine Assembly Removal and Installation in Section 1D (Page1D-6)".
- 2) Remove the crankcase bracket nut (1) and rubber damper bolts (2) (L & R).
- 3) Remove the rubber dampers (3) (L & R).
- 4) Pull out the crankcase bracket bolt (4) and remove the crankcase bracket.



I705H1230015-04

**Installation**

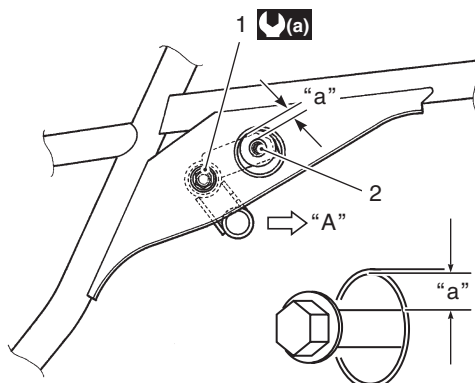
- 1) Install the crankcase bracket with the bolt and tighten the crankcase bracket nut (1) temporarily.
- 2) Install the rubber damper bolts (2) temporarily without installing the rubber dampers.
- 3) Move the crankcase bracket backwards "A" to provide the clearance "a" as shown in the figure.

**Clearance "a"**  
**14 mm (0.55 in)**

- 4) With the crankcase bracket held immovable, tighten the crankcase bracket nut (1) to the specified torque.

**Tightening torque**

**Crankcase bracket nut (a): 85 N·m (8.5 kgf-m, 61.5 lb-ft)**

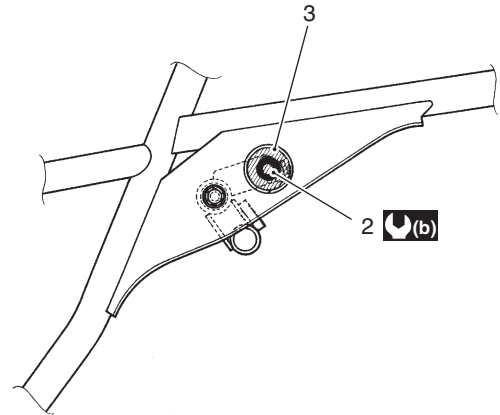


I705H1230039-04

- 5) Remove the rubber damper bolts (2) (L & R) after tightening the crankcase bracket nut (1).
- 6) Install the rubber dampers (3) (L & R) and tighten the rubber damper bolts (2) (L & R) to the specified torque.

**Tightening torque**

**Rubber damper bolt (b): 85 N·m (8.5 kgf-m, 61.5 lb-ft)**



I705H1230040-03

- 7) Install the engine.  
Refer to "Engine Assembly Removal and Installation in Section 1D (Page1D-6)".

**Crankcase Bracket Related Parts Inspection**

B705H12306022

Refer to "Crankcase Bracket Removal and Installation (Page2C-12)".

**Spacer**

- 1) Remove the spacers from the crankcase bracket.
- 2) Inspect the spacers for any flaws or other damage. If any defects are found, replace the spacers with the new ones.

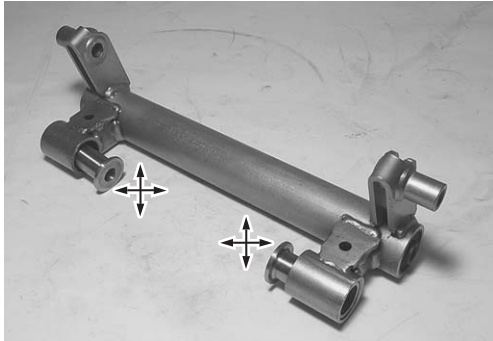


I705H1230018-01

## 2C-13 Rear Suspension:

### Bearing

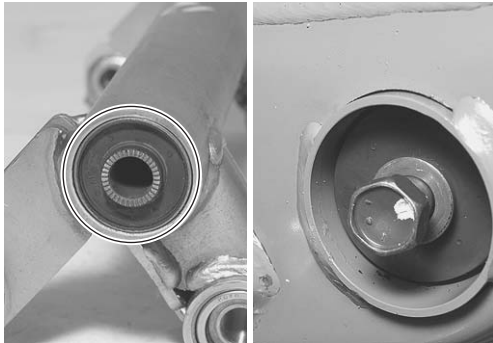
- 1) Insert the spacers into the bearings.
- 2) Check the play by moving the spacers up and down. If excessive play is noted, replace the bearing with a new one. Refer to "Crankcase Bracket Bearing Removal and Installation (Page2C-13)".



I705H1230019-01

### Rubber Parts

Inspect the rubber damper and bushing for crack or other damage. If any defects are found, replace them with the new ones.



I705H1230020-01

### Crankcase Bracket Bearing Removal and Installation

B705H12306023

#### Removal

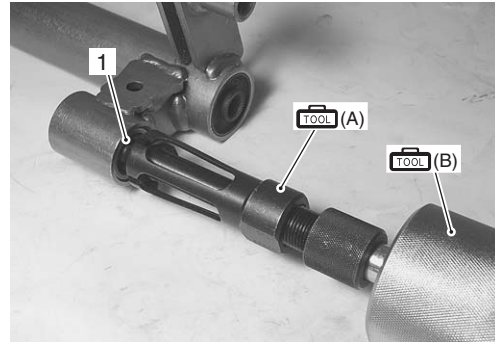
- 1) Remove the crankcase bracket. Refer to "Crankcase Bracket Removal and Installation (Page2C-12)".

- 2) Remove the bearing (1) using the special tools.

#### Special tool

 (A): 09923-74511 (Bearing puller)

 (B): 09930-30104 (Sliding shaft)



I705H1230021-01


#### Installation

#### CAUTION

**The removed bearings must be replaced with the new ones.**

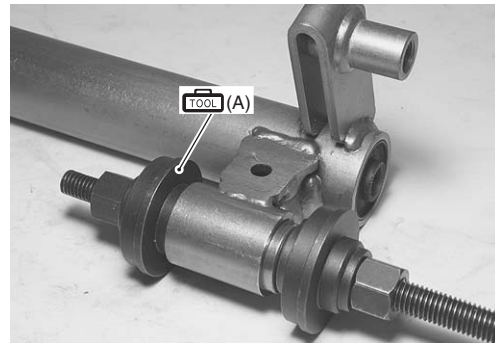
- 1) Install the bearing using the special tool.

#### Special tool

 (A): 09924-84521 (Bearing installer set)

#### NOTE

**When installing the bearing, stamped mark on the bearing must face outside.**



I705H1230022-03

- 2) Install the crankcase bracket. Refer to "Crankcase Bracket Removal and Installation (Page2C-12)".

## Specifications

### Service Data

B705H12307002

### Suspension

Unit: mm (in)

Item	Standard	Item
Rear wheel travel	100 (3.94)	—
Rear shock absorber spring adjuster	3rd position	—

### Tightening Torque Specifications

B705H12307003

Fastening part	Tightening torque			Note
	N·m	kgf·m	lb·ft	
Cushion lever nut	50	5.0	36.0	☞ (Page2C-4)
Cushion rod nut	50	5.0	36.0	☞ (Page2C-4)
Rear shock absorber bolt	50	5.0	36.0	☞ (Page2C-4)
Rear cushion rod nut	50	5.0	36.0	☞ (Page2C-4)
Cushion lever mounting nut	80	8.0	58.0	☞ (Page2C-4)
Rear brake caliper bolt	23	2.3	16.5	☞ (Page2C-7)
Rear swingarm bolt	50	5.0	36.0	☞ (Page2C-7)
Rear axle nut	120	12.0	87.0	☞ (Page2C-7)
Exhaust pipe connecting bolt	23	2.3	16.5	☞ (Page2C-7)
Muffler mounting bolt	23	2.3	16.5	☞ (Page2C-7)
Crankcase bracket nut	85	8.5	61.5	☞ (Page2C-12)
Rubber damper bolt	85	8.5	61.5	☞ (Page2C-12)

#### NOTE

The specified tightening torque is also described in the following.

“Rear Suspension Components (Page2C-1)”

“Rear Suspension Assembly Construction (Page2C-2)”

“Rear Swingarm Components (Page2C-3)”

“Crankcase Bracket Construction (Page2C-11)”

#### Reference:

For the tightening torque of fastener not specified in this section, refer to “Tightening Torque Specifications in Section 0C (Page0C-7)”.

## Special Tools and Equipment

### Recommended Service Material

B705H12308001

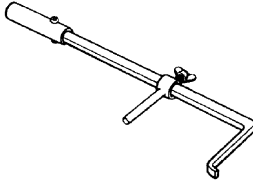
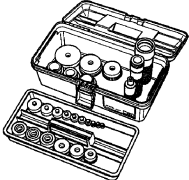

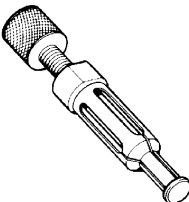
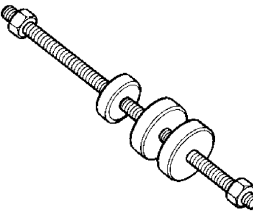
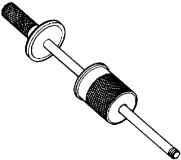
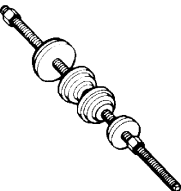
Material	SUZUKI recommended product or Specification	Note
Grease	SUZUKI SUPER GREASE A or equivalent	P/No.: 99000-25010 ☞ (Page2C-9) / ☞ (Page2C-9) / ☞ (Page2C-11)

#### NOTE

Required service material is also described in the following.  
 “Rear Suspension Assembly Construction (Page2C-2)”  
 “Crankcase Bracket Construction (Page2C-11)”

### Special Tool

B705H12308002

09913-50121 Oil seal remover ☞ (Page2C-8)		09913-70210 Bearing installer set ☞ (Page2C-8) / ☞ (Page2C-9)	
09923-73210 Bearing remover ☞ (Page2C-10)		09923-74511 Bearing puller ☞ (Page2C-13)	
09924-84521 Bearing installer set ☞ (Page2C-13)		09930-30104 Rotor remover slide shaft ☞ (Page2C-10) / ☞ (Page2C-13)	
09941-34513 Steering race installer ☞ (Page2C-11)			

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# Wheels and Tires

## Precautions

### Precautions for Wheel and Tire

B705H1240001

**▲ WARNING**

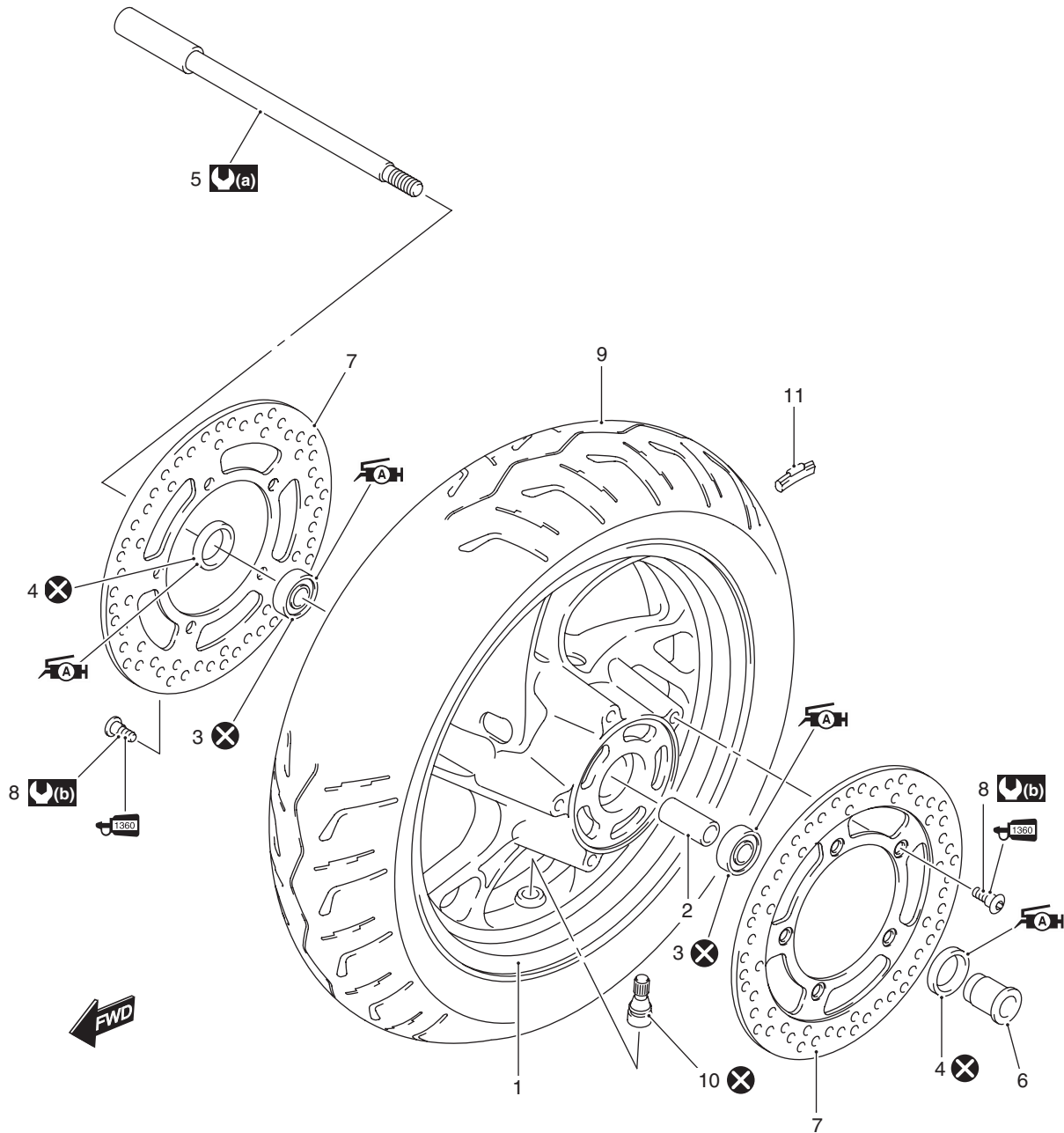
- 
- Proper tire pressure and proper tire loading are important factors. Over loading tire can lead to tire failure and loss of motorcycle control.
  - Under-inflated tires make smooth cornering difficult, and can result in rapid tire wear.
  - Over-inflated tires have a smaller amount of tire in contact with the road, 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

B705H12406003

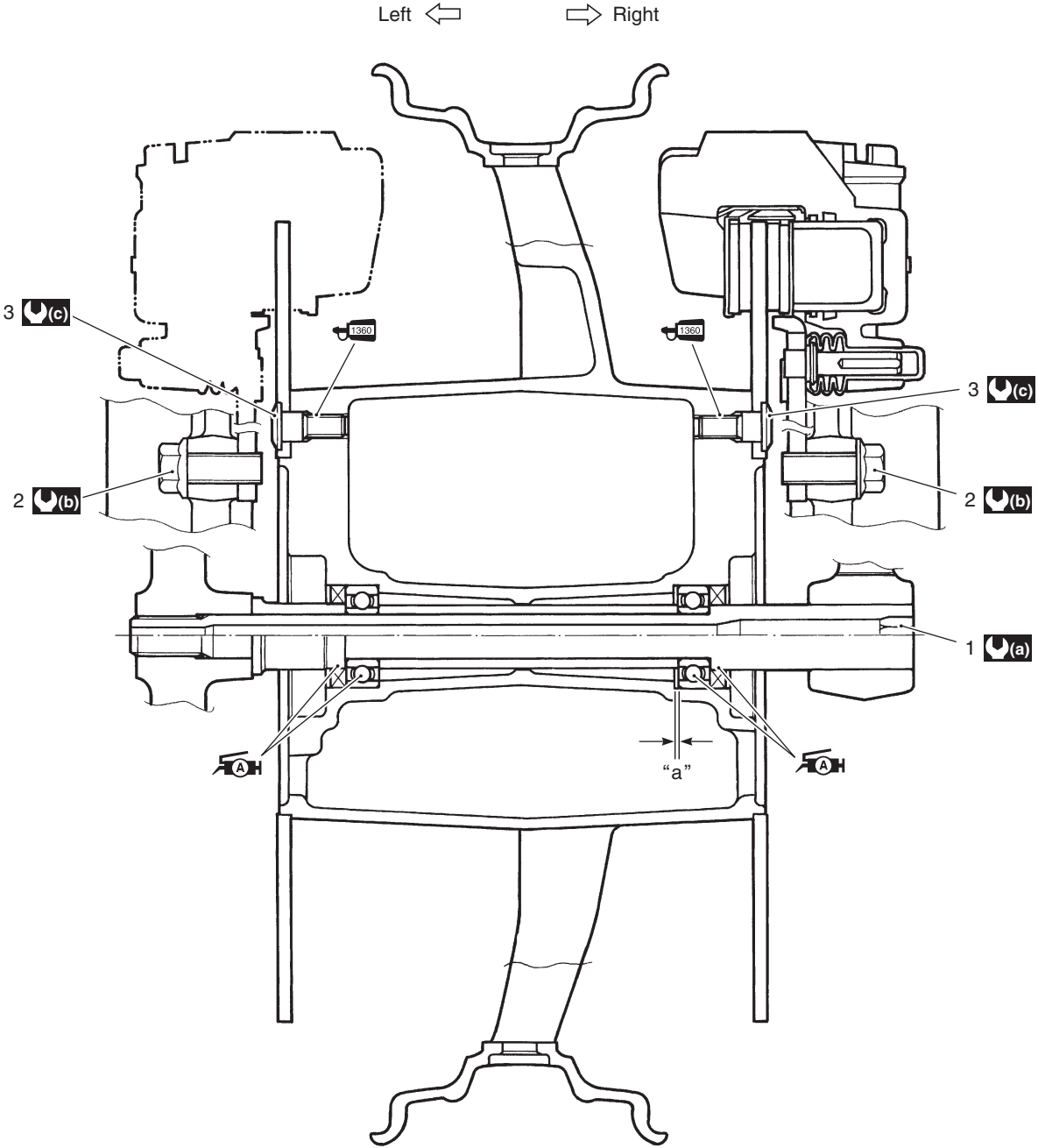


I705H1240028-05

1. Front wheel	7. Brake disc	(a) : 23 N·m (2.3 kgf·m, 16.5 lb·ft)
2. Spacer	8. Brake disc bolt	AH : Apply grease.
3. Bearing	9. Tire	1360 : Apply thread lock to thread part.
4. Dust seal	10. Air valve	: Do not reuse.
5. Front axle	11. Wheel balancer	
6. Collar	(a) : 65 N·m (6.5 kgf·m, 47.0 lb·ft)	

Front Wheel Assembly Construction

B705H12406019



I705H1240030-02

1. Front axle	"a": Clearance	<b>(c)</b> : 23 N-m (2.3 kgf-m, 16.5 lb-ft)
2. Front brake caliper mounting bolt	<b>(a)</b> : 65 N-m (6.5 kgf-m, 47.0 lb-ft)	<b>(A)</b> : Apply grease.
3. Front brake disc bolt	<b>(b)</b> : 35 N-m (3.5 kgf-m, 25.5 lb-ft)	<b>(1360)</b> : Apply thread lock to thread part.

## Front Wheel Assembly Removal and Installation

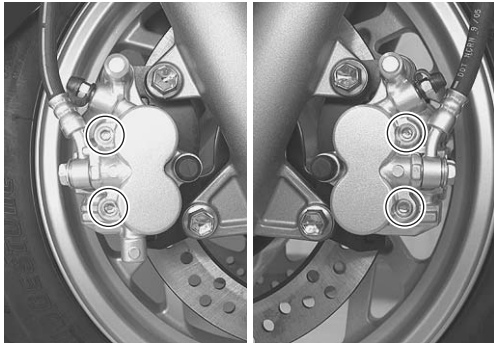
B705H12406020

### Removal

- 1) Support the motorcycle with a jack or a wooden block.
- 2) Remove the brake calipers. Refer to "Front Brake Caliper Removal and Installation in Section 4B (Page4B-3)".

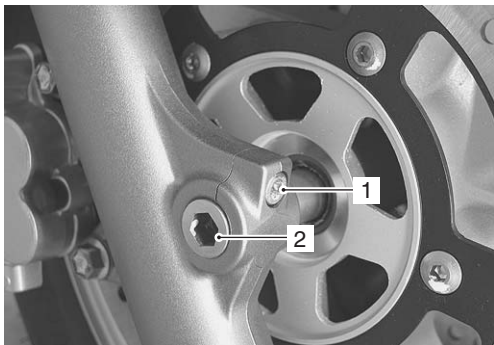
#### **⚠ CAUTION**

**Do not operate the brake lever while removing the caliper.**



I705H1240001-03

- 3) Loosen the axle pinch bolt (1) on the right front fork leg.
- 4) Loosen the front axle (2).



I705H1240002-02

- 5) Raise the front wheel off the ground and support the motorcycle with a jack or a wooden block.

#### **⚠ CAUTION**

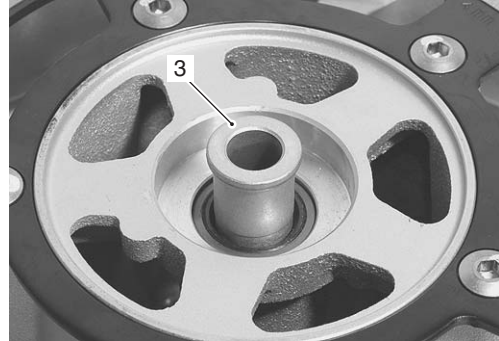
**Do not carry out the work with the motorcycle resting on the side-stand. Do not support the motorcycle with the fuel tank and the radiator. Make sure that the motorcycle is supported securely.**

- 6) Draw out the front axle and remove the front wheel.

#### **NOTE**

**After removing the front wheel, install the calipers temporarily to the original positions.**

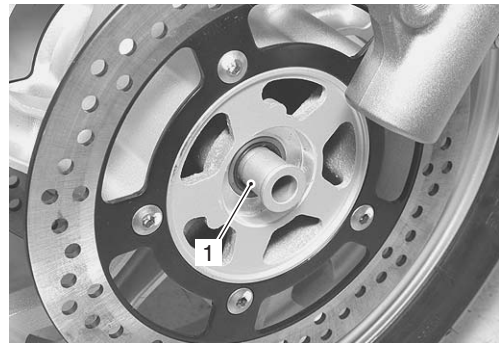
- 7) Remove the collar (3).



I705H1240003-01

### Installation

- 1) Install the collar (1) into the left side of the wheel.



I705H1240014-01

- 2) Install the front wheel with the front axle.

#### **⚠ WARNING**


**The directional arrow on the tire should point to the wheel rotation, when remounting the wheel.**



I705H1240004-01

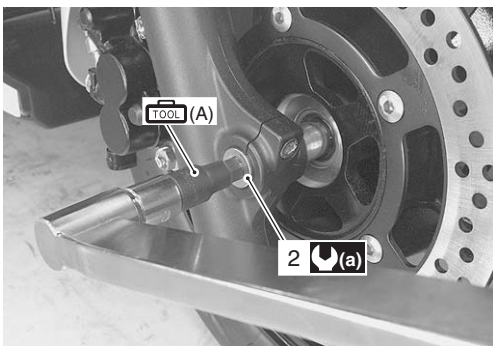
- Tighten the front axle (2) to the specified torque using the special tool.

**Special tool**

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

**Tightening torque**

Front axle (a): 65 N·m (6.5 kgf-m, 47.0 lb-ft)



I705H1240005-04

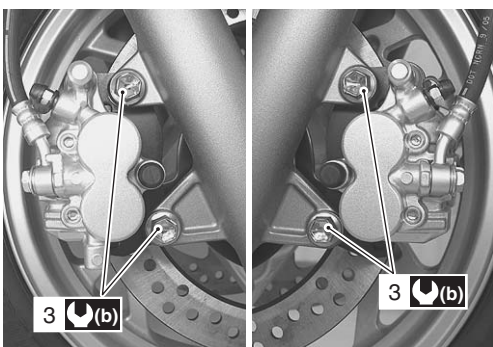
- Tighten the brake caliper mounting bolts (3) to the specified torque.

**Tightening torque**

Front brake caliper mounting bolt (b): 35 N·m (3.5 kgf-m, 25.5 lb-ft)

**⚠ WARNING**

After remounting the brake calipers, pump the brake lever until the pistons push the pad correctly.



I705H1240006-04

- Move the front fork up and down 4 or 5 times.



I705H1240027-01

- Tighten the axle pinch bolt (4) on the right front fork leg to the specified torque.

**Tightening torque**

Front axle pinch bolt (c): 23 N·m (2.3 kgf-m, 16.5 lb-ft)



I705H1240007-04

**Front Wheel Related Parts Inspection**

B705H12406021

Refer to “Front Wheel Assembly Removal and Installation (Page2D-4)”

Inspect the following parts.

**Tire**

Refer to “Tire Inspection in Section 0B (Page0B-15)”.

**Front Brake Disc**

Refer to “Front Brake Disc Inspection in Section 4B (Page4B-6)”.

**Dust Seal**

Inspect the dust seal lips for wear or damage. If any defects are found, replace the dust seal with the new ones. Refer to “Front Wheel Dust Seal / Bearing Removal and Installation (Page2D-6)”.




I705H1240008-01


## 2D-6 Wheels and Tires:

### Axle Shaft

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

### Special tool

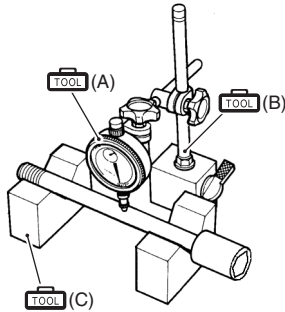
 (A): 09900-20607 (Dial gauge (1/100 mm, 10 mm))

 (B): 09900-20701 (Magnetic stand)

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

### Axle shaft runout

Service limit: 0.25 mm (0.010 in)



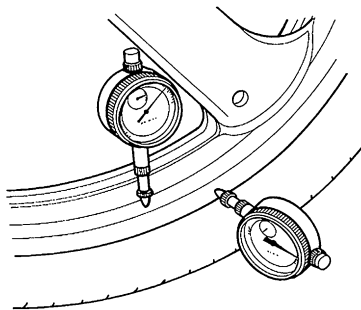
I649G1240054-01

### Wheel

Make sure that the wheel runout checked as shown 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 runout

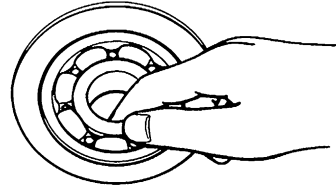
Service limit (Axial and Radial): 2.0 mm (0.08 in)



I649G1240014-01

### 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 in the following procedures if there is anything unusual. Refer to "Front Wheel Dust Seal / Bearing Removal and Installation (Page2D-6)".



I649G1240015-01


### Front Wheel Dust Seal / Bearing Removal and Installation

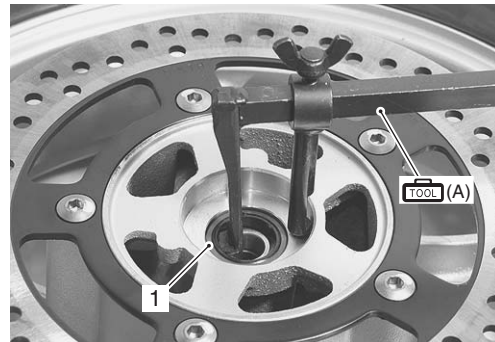
B705H12406023

### Removal

- 1) Remove the front wheel assembly. Refer to "Front Wheel Assembly Removal and Installation (Page2D-4)".
- 2) Remove the dust seals (1) using the special tool (LH & RH).

### Special tool

 (A): 09913-50121 (Oil seal remover)




I705H1240009-01



3) Remove the bearings (2) using the special tool.

**Special tool**

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



I705H1240010-01

4) Remove the spacer (3).



I705H1240011-01

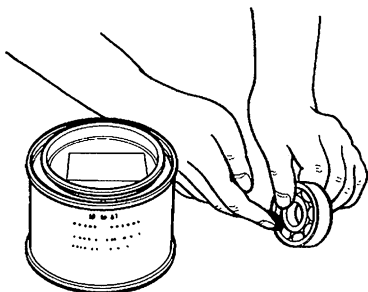
**Installation**

**⚠ CAUTION**

The removed dust seals and bearings must be replaced with the new ones.

1) Apply grease to the wheel bearings.


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



I649G1240019-01

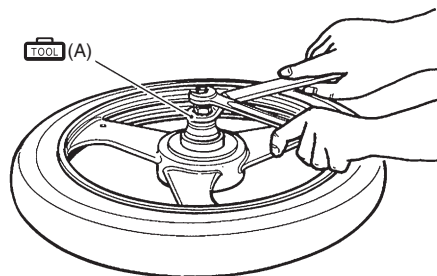
2) First install the right wheel bearing, then install the spacer (1) and left wheel bearing.

**Special tool**

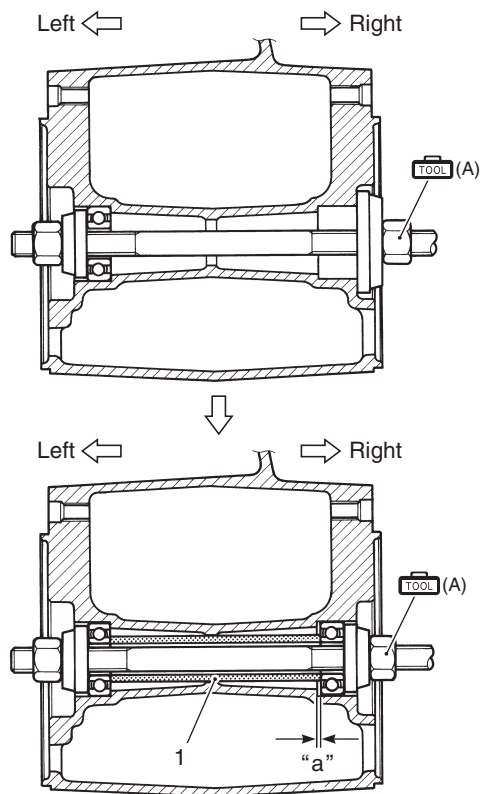
 (A): 09941-34513 (Steering race installer)

**⚠ CAUTION**

The sealed cover of the bearing must face outside.



I649G1240020-02



I705H1240031-01

1. Spacer	"a": Clearance
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## 2D-8 Wheels and Tires:

3) Install the dust seals using the special tool.

**Special tool**

**TOOL (B): 09913-70210 (Bearing installer set)**



I705H1240012-01

4) Apply grease to the lip of dust seals.

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

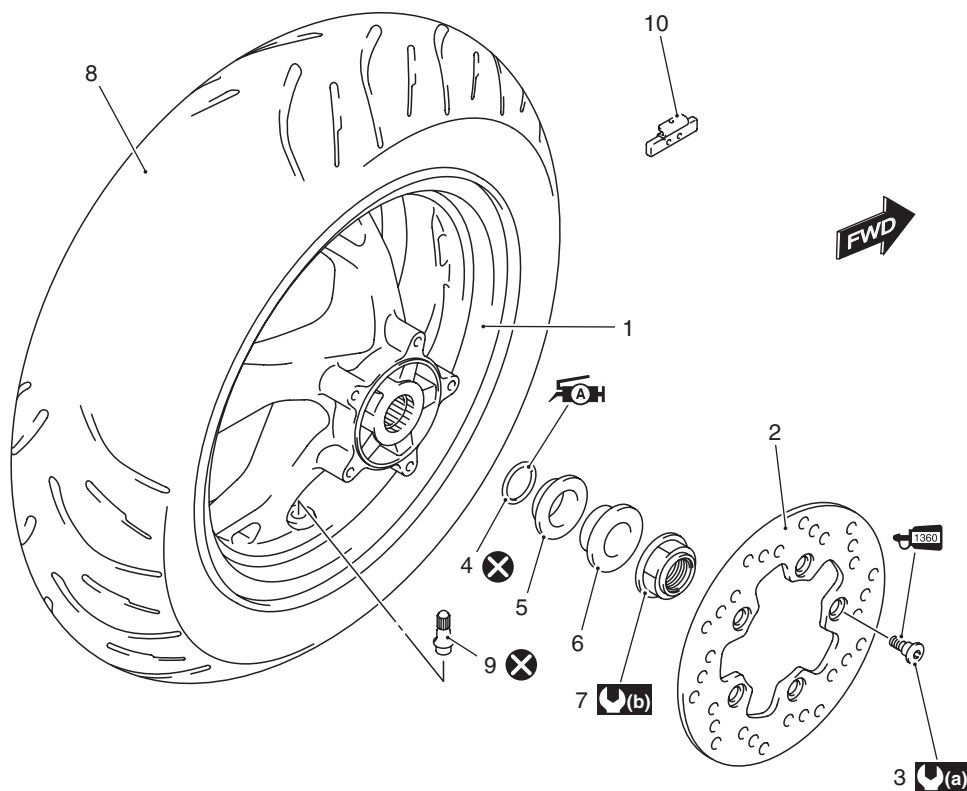


I705H1240013-01

5) Install the front wheel assembly. Refer to "Front Wheel Assembly Removal and Installation (Page 2D-4)".

## Rear Wheel Components

B705H12406024



I705H1240029-02

1. Rear wheel	6. Collar	<b>U(a)</b> : 23 N-m (2.3 kgf-m, 16.5 lb-ft)
2. Brake disc	7. Rear axle nut	<b>U(b)</b> : 120 N-m (12.0 kgf-m, 87.0 lb-ft)
3. Brake disc bolt	8. Tire	<b>FAH</b> : Apply grease.
4. O-ring	9. Air valve	<b>1360</b> : Apply thread lock to thread part.
5. Collar	10. Wheel balancer	<b>X</b> : Do not reuse.



**Rear Wheel Assembly Removal and Installation**

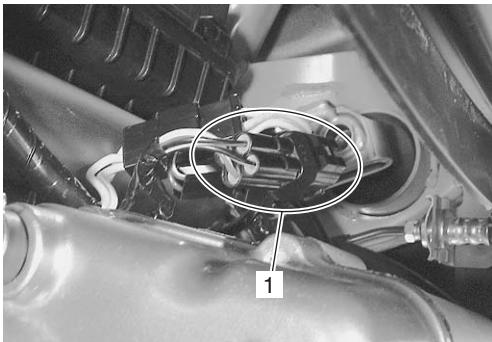
B705H12406025

Refer to "Exhaust Pipe / Muffler Removal and Installation in Section 1K (Page1K-2)".

Refer to "Rear Brake Caliper Removal and Installation in Section 4C (Page4C-3)".

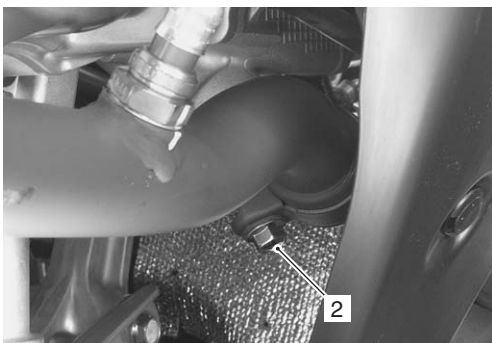
**Removal**

- 1) Remove the helmet box front cover. Refer to "Helmet Box Front Cover Removal and Installation in Section 9D (Page9D-16)".
- 2) Disconnect the HO2 sensor lead wire coupler (1).



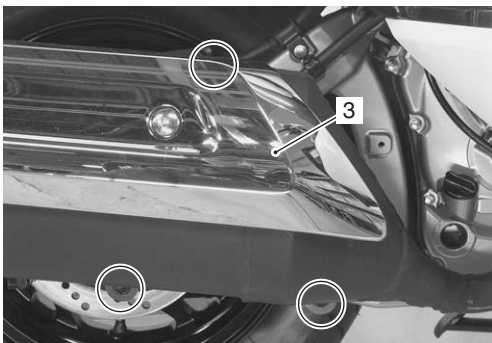
I705H1240016-02

- 3) Remove the exhaust pipe connecting bolt (2).



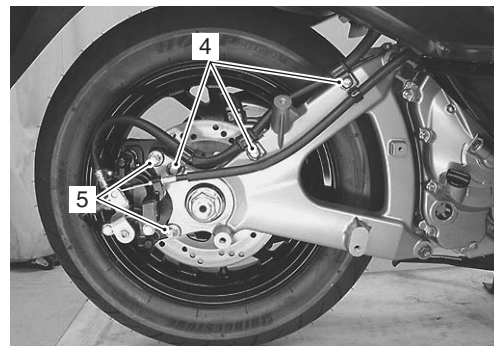
I705H1240017-01

- 4) Remove the muffler (3).



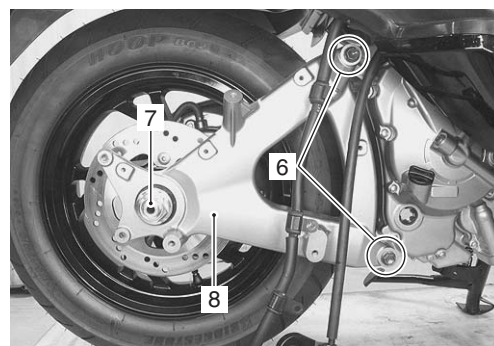
I705H1240018-01

- 5) Remove the rear brake hose clamps (4) and rear brake caliper (5).



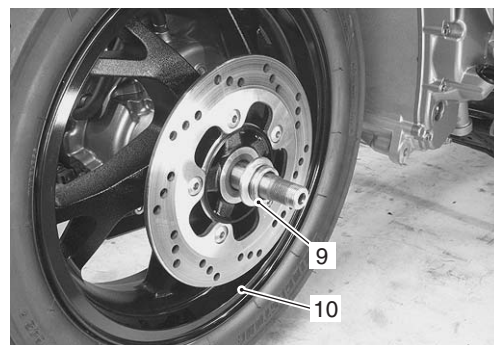
I705H1240019-02

- 6) Remove the rear swingarm mounting bolts (6), rear axle nut (7) and remove the rear swing arm (8).



I705H1240021-01

- 7) Remove the inner color (9) and the rear wheel (10).



I705H1240020-01

**⚠ CAUTION**

**Do not operate the brake lever while removing the rear wheel.**

## 2D-10 Wheels and Tires:

### Installation

Refer to “Rear Wheel Related Parts Inspection (Page2D-11)” and “Wheel/Tire/Air Valve Inspection and Cleaning (Page2D-13)”

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

- Install the rear swingarm mounting bolts and rear wheel nut temporarily.
- Tighten the rear swingarm mounting bolts (1) to the specified torque.

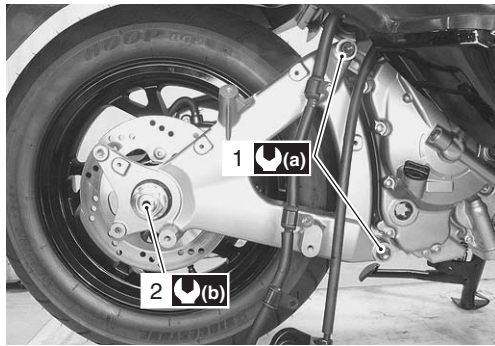
#### Tightening torque

**Rear swingarm mounting bolt (a): 50 N·m (5.0 kgf-m, 36.0 lb-ft)**

- Tighten the rear wheel nut (2) to the specified torque.

#### Tightening torque

**Rear wheel nut (b): 120 N·m (12.0 kgf-m, 87.0 lb-ft)**



1705H1240022-01

- Tighten the rear brake caliper mounting bolts (3) to the specified torque.

#### Tightening torque

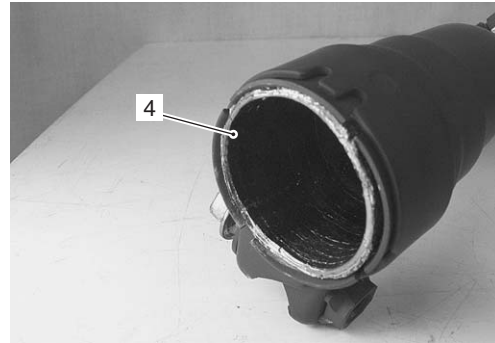
**Rear brake caliper mounting bolt (c): 23 N·m (2.3 kgf-m, 16.5 lb-ft)**



1705H1240023-03

### ⚠ CAUTION

**Replace the exhaust pipe connector (4) with a new one.**



1705H1240025-01

4. Exhaust pipe connector

- Insert the exhaust pipe connecting bolt and the muffler mounting bolt temporarily.
- Tighten the exhaust pipe connecting bolts (5) to the specified torque.

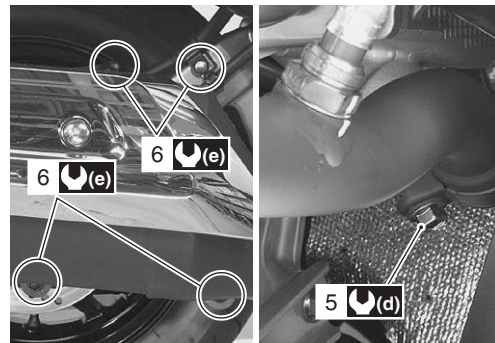
#### Tightening torque

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

- Tighten the muffler mounting bolts (6) to the specified torque.

#### Tightening torque

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



1705H1240024-03

## Rear Wheel Related Parts Inspection

B705H12406026

Refer to "Rear Wheel Assembly Removal and Installation (Page2D-9)".

Refer to "Rear Wheel Components (Page2D-8)".  
Inspect the rear wheel related parts.

### Tire

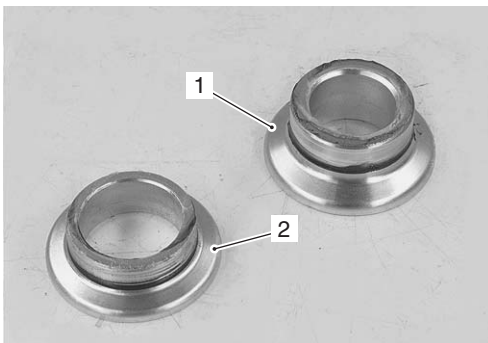
Refer to "Tire Inspection in Section 0B (Page0B-15)".

### Rear Brake Disc

Refer to "Rear Brake Disc Removal and Installation in Section 4C (Page4C-9)".

### Collar

Inspect the collars for wear or damage. If any defects are found, replace it with a new one.



I705H1240026-01

- |                                     |
|-------------------------------------|
| 1. Collar for lock-nut (Outer side) |
| 2. Collar for wheel (Inner side)    |

### Rear Swingarm

Refer to "Rear Suspension Components in Section 2C (Page2C-1)".

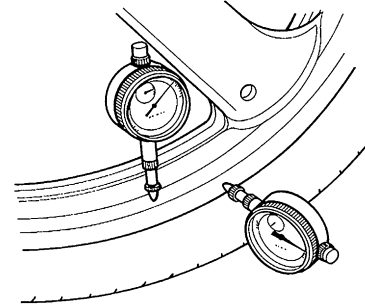
## Wheel

Make sure that the wheel runout checked as shown 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 runout

**Service limit (Axial and Radial): 2.0 mm (0.08 in)**

Wheel clean and check. Refer to "Wheel/Tire/Air Valve Inspection and Cleaning (Page2D-13)".



I649G1240014-01

## Tire Removal and Installation

B705H12406027

### Removal

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

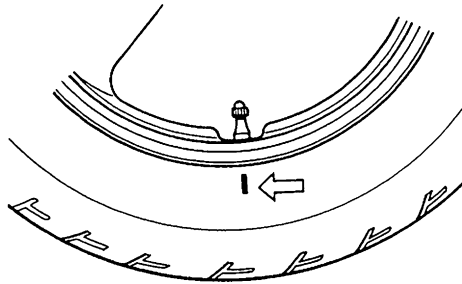
- 1) Remove the wheel assembly. Refer to "Front Wheel Assembly Removal and Installation (Page2D-4)" and "Rear Wheel Assembly Removal and Installation (Page2D-9)".
- 2) Remove the valve core.
- 3) Remove the tire using the tire changer.

### ⚠ CAUTION

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

**NOTE**

When removing the tire in case of repair or inspection, mark the tire with a chalk to indicate the tire position relative to the valve position. Even though the tire is refitted to the original position after repairing puncture, the tire may have to be balanced again since such a repair can cause imbalance.



I649G1240037-01

**Installation**

**CAUTION**

Do not reuse the air valve which has been once removed.

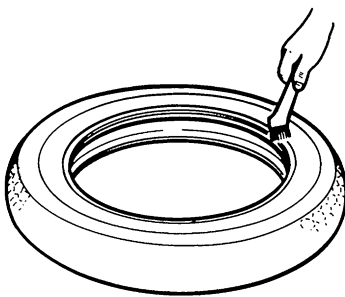
**NOTE**

It is recommended to replace the air valve with a new one together with a tire replacement.

- 1) Apply tire lubricant to the tire bead.

**CAUTION**

Never use oil, grease or gasoline on the tire bead in place of tire lubricant.



I649G1240038-01

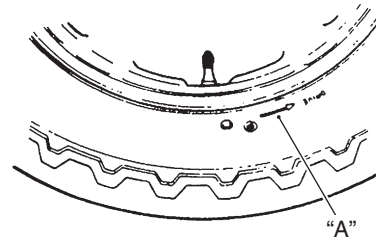
- 2) Install the tire onto the wheel.

**CAUTION**

For installation procedures of tire onto the wheel, follow the instructions given by the tire changer manufacturer.

**NOTE**

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



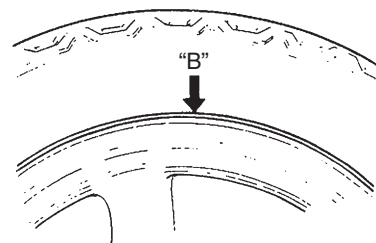
I649G1240039-01

- 3) Bounce the tire several times while rotating. This makes the tire bead expand outward to contact the wheel, thereby facilitating air inflation.
- 4) Install the valve core and inflate the tire.

**WARNING**

- Do not inflate the tire to more than 400 kPa (4.0 kgf/cm<sup>2</sup>). If inflated beyond this limit, the tire can burst and possibly cause injury. Do not stand directly over the tire while inflating.
- In the case of preset pressure air inflator, pay special care for the set pressure adjustment.

- 5) In this condition, check the "grim line" "B" cast on the tire side walls. The line must be equidistant from the wheel rim all around.
- 6) If the distance between the rim line and wheel rim varies, this indicates that the bead is not properly seated. If this is the case, deflate the tire completely and unseat the bead for both sides. Coat the bead with lubricant and fit the tire again.



I649G1240040-01

- 7) When the bead has been fitted properly, adjust the pressure to specification.
- 8) As necessary, adjust the tire balance. Refer to "Wheel Balance Check and Adjustment (Page2D-14)".

**Cold inflation tire pressure**

	Front	Rear
Solo riding	175 kPa (1.75 kgf/cm <sup>2</sup> )	200 kPa (2.00 kgf/cm <sup>2</sup> )
Dual riding	175 kPa (1.75 kgf/cm <sup>2</sup> )	250 kPa (2.50 kgf/cm <sup>2</sup> )

- 9) Install the wheel assembly. Refer to "Front Wheel Assembly Removal and Installation (Page2D-4)" and "Rear Wheel Assembly Removal and Installation (Page2D-9)".

**Wheel/Tire/Air Valve Inspection and Cleaning**

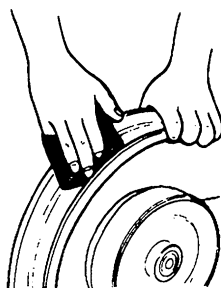
B705H12406028

Refer to "Tire Removal and Installation (Page2D-11)".

**Wheel**

Wipe the wheel clean and check for the following points:

- Distortion and crack
- Any flaws and scratches at the bead seating area.
- Wheel rim runout. Refer to "Front Wheel Assembly Removal and Installation (Page2D-4)" and "Rear Wheel Assembly Removal and Installation (Page2D-9)".

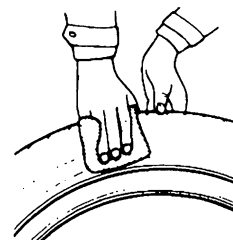


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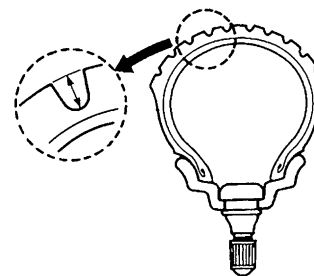
**Tire**

Tire must be checked for the following points:

- Nick and rupture on side wall
- Tire tread depth (Refer to "Tire Inspection in Section 0B (Page0B-15)".)
- Tread separation
- Abnormal, uneven wear on tread
- Surface damage on bead
- Localized tread wear due to skidding (Flat spot)
- Abnormal condition of inner liner



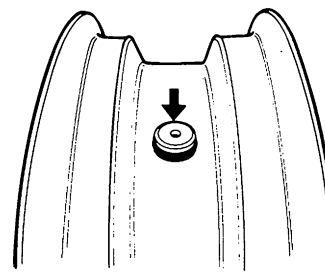
I649G1240042-01



I649G1240043-01

**Air Valve**

Inspect the air valve for peeling and damage. If any defect is found, replace the air valve with a new one. Refer to "Air Valve Removal and Installation (Page2D-14)".

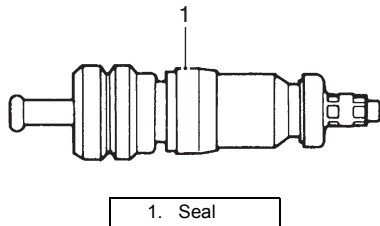


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## 2D-14 Wheels and Tires:

Inspect the valve core seal (1) for wear and damage. If any defect is found, replace the valve core with a new one. Refer to "Air Valve Removal and Installation (Page2D-14)".



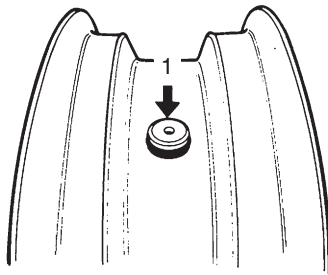
I649G1240045-01

### Air Valve Removal and Installation

B705H12406029

#### Removal

- 1) Remove the wheel assembly. Refer to "Front Wheel Assembly Removal and Installation (Page2D-4)" and "Rear Wheel Assembly Removal and Installation (Page2D-9)".
- 2) Remove the tire. Refer to "Tire Removal and Installation (Page2D-11)".
- 3) Remove the air valve (1) from the wheel.

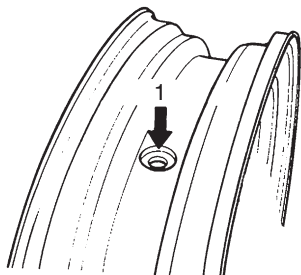


I649G1240046-01

#### Installation

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

- Any dust or rust around the valve hole (1) must be cleaned off.



I705H1240032-01

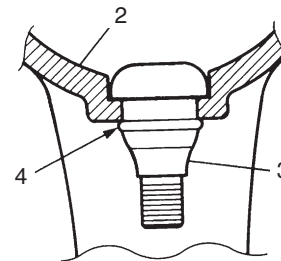
- Install the air valve in the wheel.

#### **CAUTION**

- Be careful not to damage the lip of valve.
- Replace the air valve with a new one.

## NOTE

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



I705H1240033-01

2. Wheel

3. Valve

4. Valve lip

### Wheel Balance Check and Adjustment

B705H12406030

Check and adjust the wheel balance in the following procedures:

- 1) Remove the wheel assembly. Refer to "Front Wheel Assembly Removal and Installation (Page2D-4)" and "Rear Wheel Assembly Removal and Installation (Page2D-9)".
- 2) Check the wheel balance using the balancer and adjust the wheel balance if necessary.

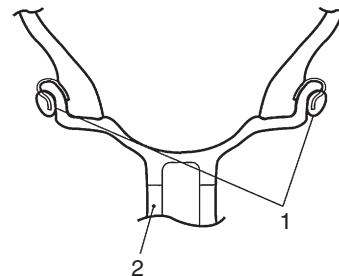
#### **CAUTION**

For operating procedures, refer to the instructions supplied by the wheel balancer manufacturer.

- 3) When installing the balancer weights (1) to the wheel (2), set the two balancer weights on both sides of wheel rim.

#### **CAUTION**

Weight difference between the two balancer weights must be less than 10 g.



I649G1240049-01

- 4) Recheck the wheel balance.
- 5) Install the wheel assembly. Refer to "Front Wheel Assembly Removal and Installation (Page2D-4)" and "Rear Wheel Assembly Removal and Installation (Page2D-9)".

## Specifications

### Service Data

B705H12407002

#### Wheel

Unit: mm (in)

Item	Standard		Limit
Wheel rim runout	Axial	—	2.0 (0.08)
	Radial	—	2.0 (0.08)
Wheel axle runout	Front	—	0.25 (0.01)
	Rear	—	0.25 (0.01)
Wheel rim size	Front	14 M/C x MT3.00	—
	Rear	13 M/C x MT4.00	—

#### Tire

Item	Standard		Limit	
Cold inflation tire pressure	Solo riding	Front	175 kPa (1.75 kgf/cm <sup>2</sup> , 25 psi)	—
		Rear	200 kPa (2.00 kgf/cm <sup>2</sup> , 29 psi)	—
	Dual riding	Front	175 kPa (1.75 kgf/cm <sup>2</sup> , 25 psi)	—
		Rear	250 kPa (2.50 kgf/cm <sup>2</sup> , 36 psi)	—
Tire size	Front	120/80-14M/C 58S	—	
	Rear	150/70-13M/C 64S	—	
Tire type	Front	BRIDGESTONE HOOP B03G	—	
	Rear	BRIDGESTONE HOOP B02G	—	
Tire tread depth (Recommended depth)	Front	—	1.6 mm (0.06 in)	
	Rear	—	2.0 mm (0.08 in)	

### Tightening Torque Specifications

B705H12407003

Fastening part	Tightening torque			Note
	N-m	kgf-m	lb-ft	
Front axle	65	6.5	47.0	☞ (Page2D-5)
Front brake caliper mounting bolt	35	3.5	25.5	☞ (Page2D-5)
Front axle pinch bolt	23	2.3	16.5	☞ (Page2D-5)
Rear swingarm mounting bolt	50	5.0	36.0	☞ (Page2D-10)
Rear wheel nut	120	12.0	87.0	☞ (Page2D-10)
Rear brake caliper mounting bolt	23	2.3	16.5	☞ (Page2D-10)
Exhaust pipe connecting bolt	23	2.3	16.5	☞ (Page2D-10)
Muffler mounting bolt	23	2.3	16.5	☞ (Page2D-10)

#### NOTE

The specified tightening torque is also described in the following.

“Front Wheel Components (Page2D-2)”

“Front Wheel Assembly Construction (Page2D-3)”

“Rear Wheel Components (Page2D-8)”

#### Reference:

For the tightening torque of fastener not specified in this section, refer to “Tightening Torque Specifications in Section 0C (Page0C-7)”.



## Special Tools and Equipment

### Recommended Service Material

B705H12408001

Material	SUZUKI recommended product or Specification	P/No.: 99000-25010	Note
Grease	SUZUKI SUPER GREASE A or equivalent		☞ (Page2D-7) / ☞ (Page2D-8)

### NOTE

Required service material is also described in the following.

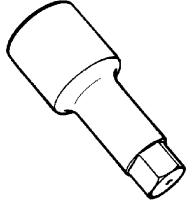
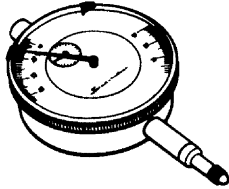
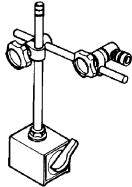
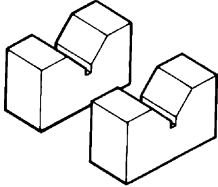
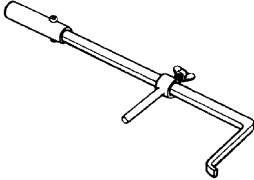
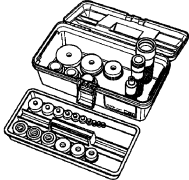
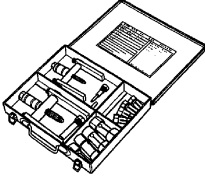
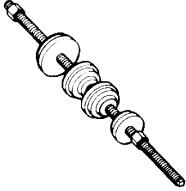
“Front Wheel Components (Page2D-2)”

“Front Wheel Assembly Construction (Page2D-3)”

“Rear Wheel Components (Page2D-8)”

### Special Tool

B705H12408002

<p>09900-18710 Hexagon socket (12 mm) ☞ (Page2D-5)</p>		<p>09900-20607 Dial gauge (1/100 mm, 10 mm) ☞ (Page2D-6)</p>	
<p>09900-20701 Magnetic stand ☞ (Page2D-6)</p>		<p>09900-21304 V-block (100 mm) ☞ (Page2D-6)</p>	
<p>09913-50121 Oil seal remover ☞ (Page2D-6)</p>		<p>09913-70210 Bearing installer set ☞ (Page2D-8)</p>	
<p>09921-20240 Bearing remover set ☞ (Page2D-7)</p>		<p>09941-34513 Steering race installer ☞ (Page2D-7)</p>	

## Section 3

## Driveline / Axle

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# Precautions

## Precautions

### Precautions for Driveline/Axle

Refer to "General Precautions in Section 00 (Page00-1)".

B705H13000001

# Drive Chain / Drive Train / Drive Shaft

## Diagnostic Information and Procedures

### Drive Chain and Sprocket Symptom Diagnosis

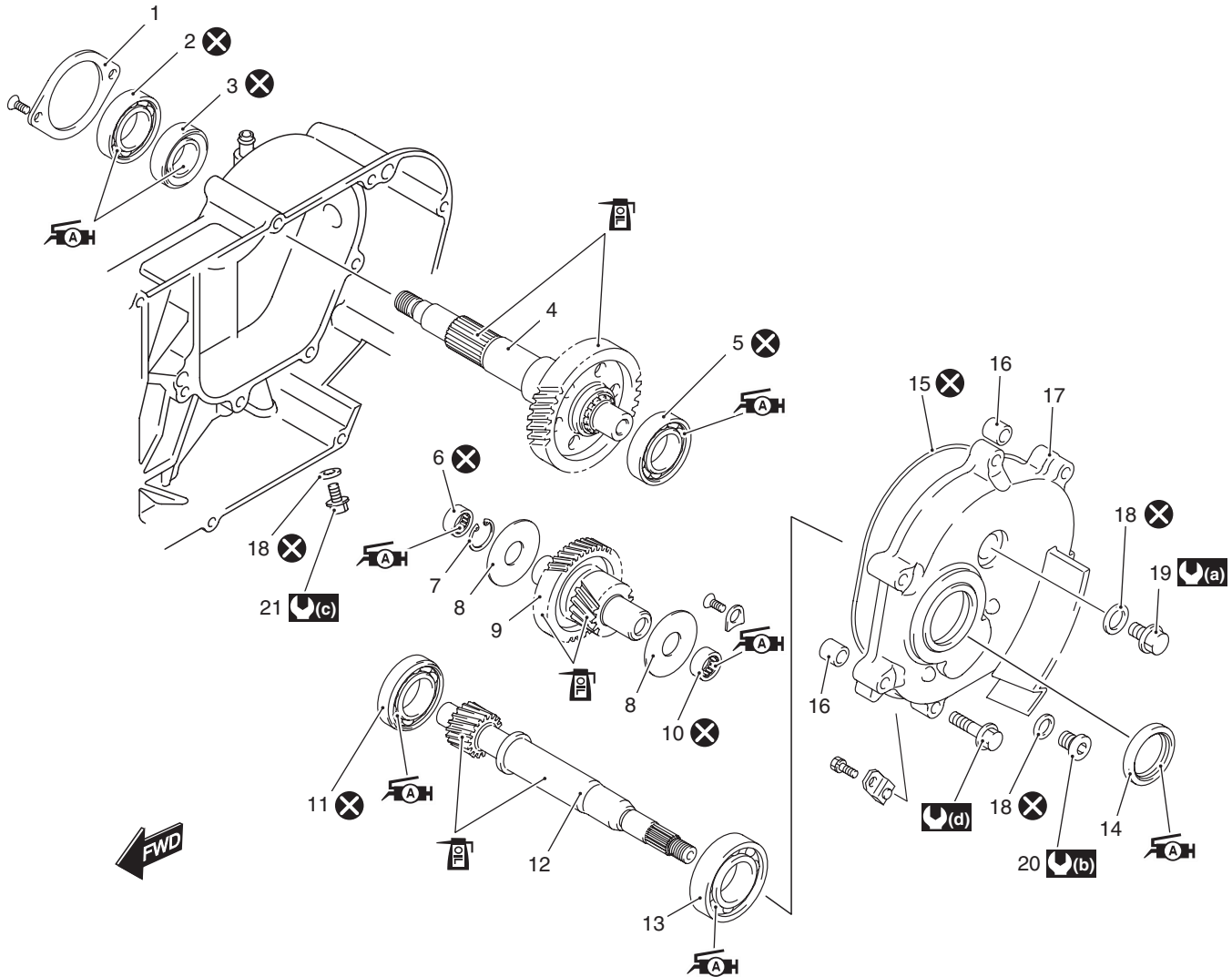
B705H13104001

Condition	Possible cause	Correction / Reference Item
<b>Noisy drive chain (Noise seems to come from final gear case)</b>	Worn or rubbing gears.	<i>Replace.</i>
	Worn splines.	<i>Replace.</i>
	Worn bearing.	<i>Replace.</i>

# Repair Instructions

## Final Gear Components

B705H13106001



I705H1310001-05

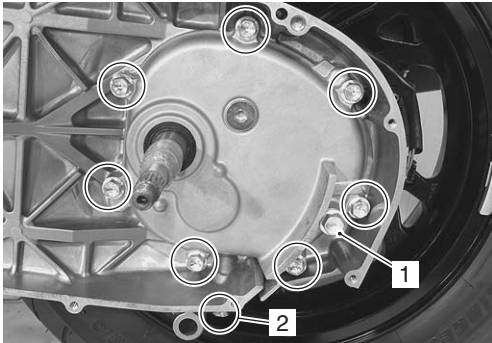
1. Bearing retainer	11. Bearing	21. Oil drain bolt.
2. Bearing	12. Drive shaft	: 23 N·m (2.3 kgf-m, 16.5 lb-ft)
3. Oil seal	13. Bearing	: 16 N·m (1.6 kgf-m, 11.5 lb-ft)
4. Rear axle shaft	14. Oil seal	: 12 N·m (1.2 kgf-m, 8.5 lb-ft)
5. Bearing	15. O-ring	: 22 N·m (2.2 kgf-m, 16.0 lb-ft)
6. Bearing	16. Dowel pin	: Apply oil.
7. Snap ring	17. Final gear cover	: Apply grease.
8. Washer	18. Gasket	: Do not reuse.
9. Idle shaft	19. Oil filler bolt	
10. Bearing	20. Oil level bolt	

## Final Gear Assembly Removal and Installation

B705H13106002

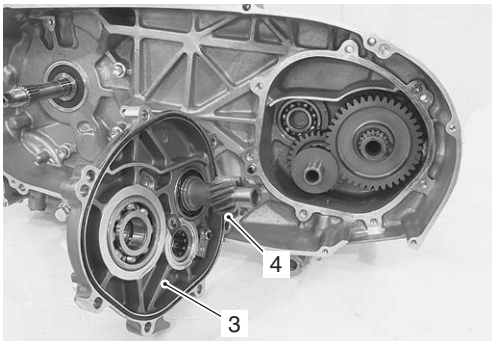
### Removal

- 1) Remove the drive V-belt. Refer to "Drive V-belt Removal and Installation in Section 0B (Page0B-11)".
- 2) Remove the oil level bolt (1).
- 3) Remove the oil drain bolt (2) and drain oil.
- 4) Remove the final gear cover bolts.



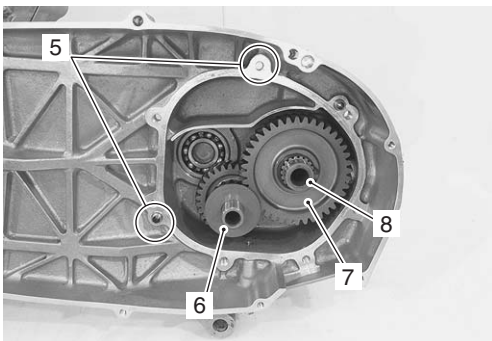
I705H1310003-04

- 5) Remove the rear wheel. Refer to "Rear Wheel Assembly Removal and Installation in Section 2D (Page2D-9)".
- 6) Remove the final gear cover (3) along with the drive shaft (4).



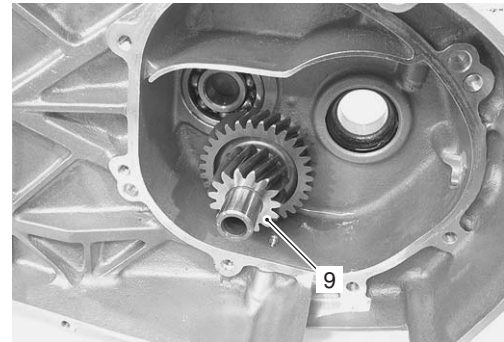
I705H1310004-02

- 7) Remove the dowel pins (5) and washer (6).
- 8) Remove the final driven gear (7) and rear axle shaft (8).



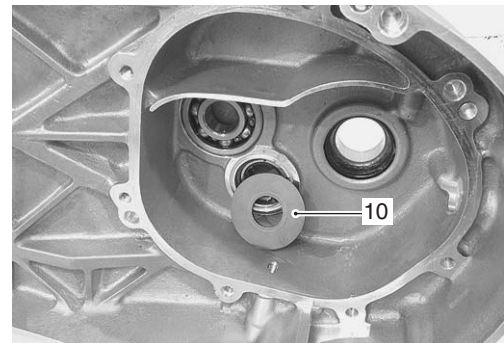
I705H1310005-01

- 9) Remove the idle shaft (9).



I705H1310007-01

- 10) Remove the washer (10).



I705H1310008-01

### Installation

Install the final gear assembly in the reverse order of removal. Pay attention to the following points:

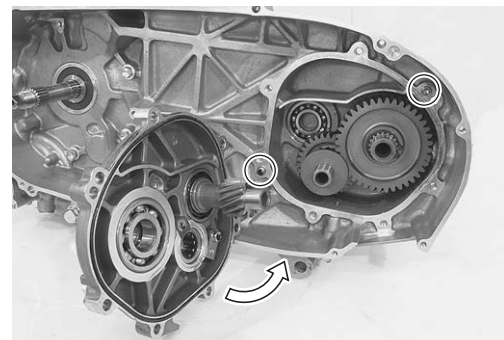
#### **⚠ CAUTION**

**Apply engine oil to each gears and shaft part.**

- Install the dowel pin to the case side.
- Install the final gear cover and drive shaft.

#### **⚠ CAUTION**

- **Replace the O-ring with a new one.**
- **Care should be used not to allow the O-ring to be come off when installing the transmission cover.**



I705H1310009-01

### 3A-4 Drive Chain / Drive Train / Drive Shaft:

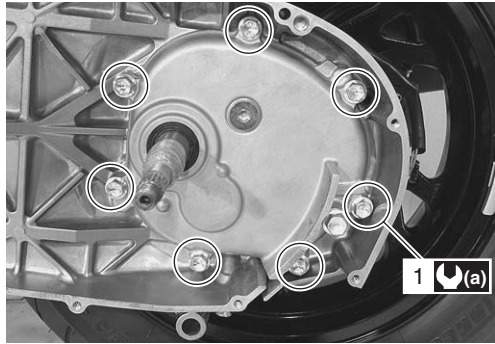
- Tighten the final gear cover bolt (1) to the specified torque.

#### **⚠ CAUTION**

**Tighten the final gear cover bolts diagonally and evenly.**

#### **Tightening torque**

**Final gear cover bolt (a): 22 N·m (2.2 kgf-m, 16.0 lb-ft)**



1705H1310033-01

- Tighten the oil drain plug (2) to the specified torque and after filling oil through the level hole, also tighten the level bolt (3) to the specified torque.

#### **⚠ CAUTION**

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

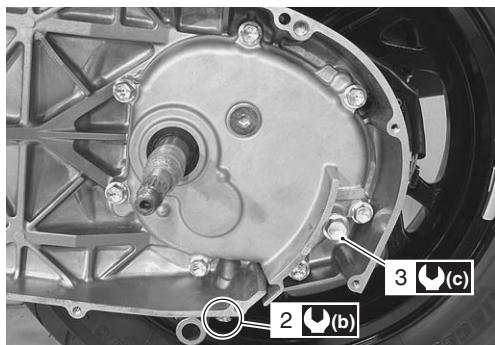
#### **Tightening torque**

**Oil drain plug (b): 12 N·m (1.2 kgf-m, 8.5 lb-ft)**

**Oil level bolt (c): 16 N·m (1.6 kgf-m, 11.5 lb-ft)**

#### **Final gear capacity (when replacing)**

**190 ml**



1705H1310010-01

### Final Gear Disassembly and Assembly

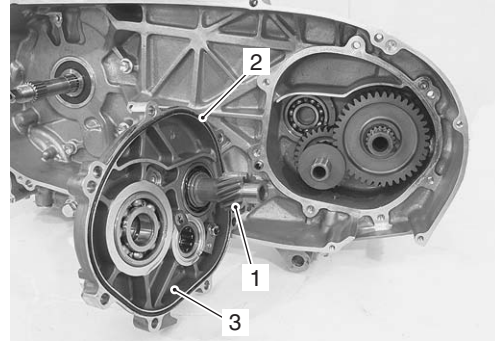
B705H13106003

Refer to "Final Gear Assembly Removal and Installation (Page3A-3)".

#### Disassembly

##### Final gear cover

- 1) Remove the drive shaft (1) and O-ring (2) from the final gear cover (3).

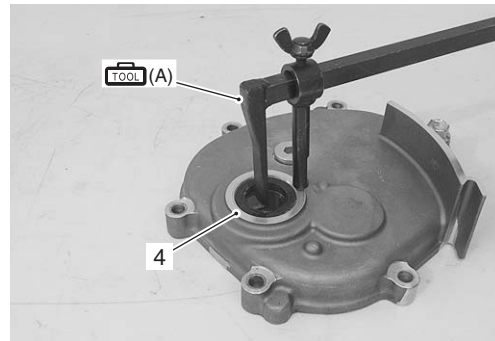


1705H1310011-02

- 2) Remove the oil seal (4) using the special tool.

#### Special tool

**TOOL (A): 09913-50121 (Oil seal remover)**

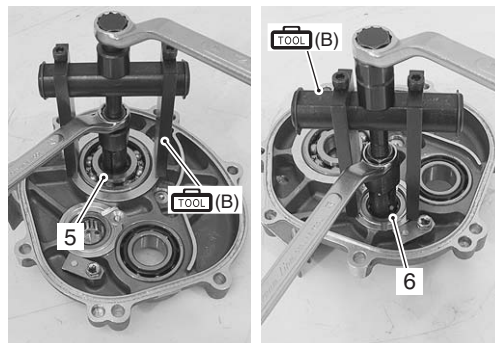


1705H1310012-01

- 3) Remove the bearing (5) and (6) using the special tool.

#### Special tool

**TOOL (B): 09921-20240 (Bearing remover set)**




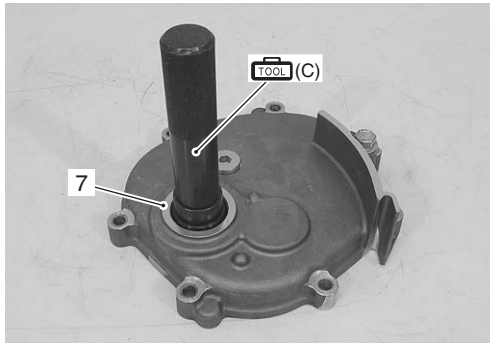
1705H1310013-01



4) Remove the bearing (7) using the special tool.

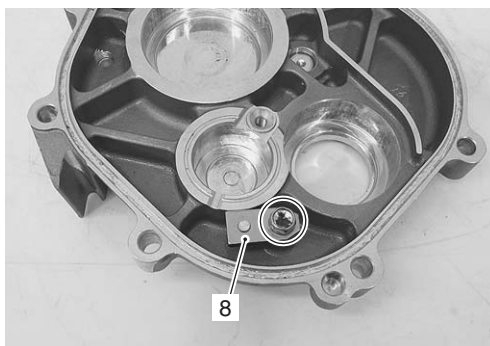
**Special tool**

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



I705H1310014-05

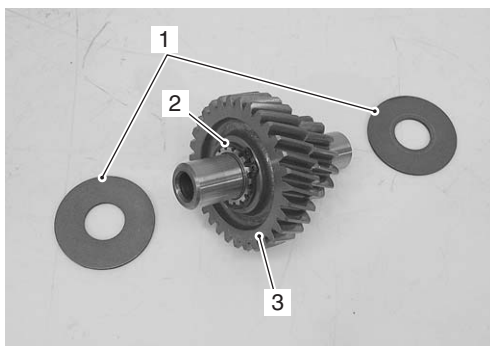
5) Remove the magnet (8).



I705H1310015-01

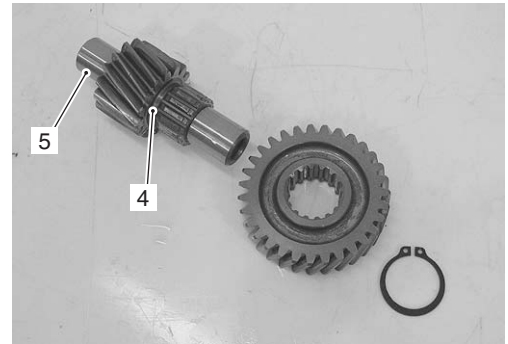
**Idle gear / Idle shaft**

1) Remove the washers (1), snap ring (2) and idle gear (3).



I705H1310018-01

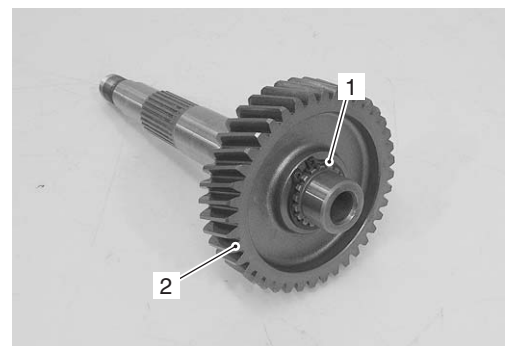
2) Remove the snap ring (4) and idle shaft (5).



I705H1310019-02

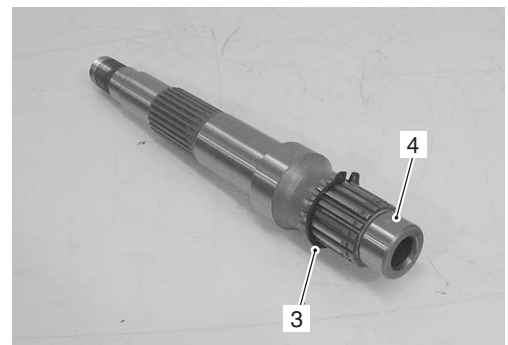
**Final driven gear / Rear axle shaft**

1) Remove the snap ring (1) and final driven gear (2).



I705H1310016-01

2) Remove the snap ring (3) from the rear axle shaft (4).

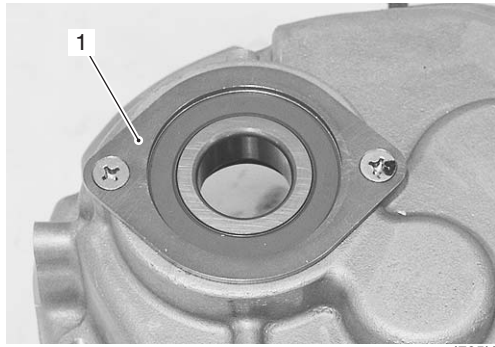


I705H1310034-04

## 3A-6 Drive Chain / Drive Train / Drive Shaft:

### Final gear case

- 1) Remove the bearing retainer (1).

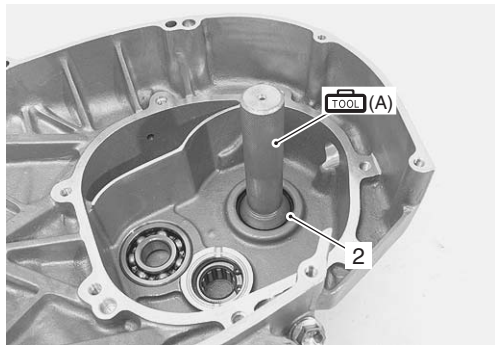


I705H1310035-02

- 2) Remove the bearing (2) using the special tool.

#### Special tool

**TOOL (A): 09913-75830 (Bearing installer)**

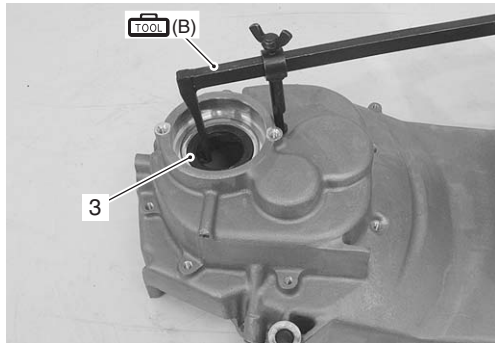


I705H1310020-01

- 3) Remove the oil seal (3) using the special tool.

#### Special tool

**TOOL (B): 09913-50121 (Oil seal remover)**

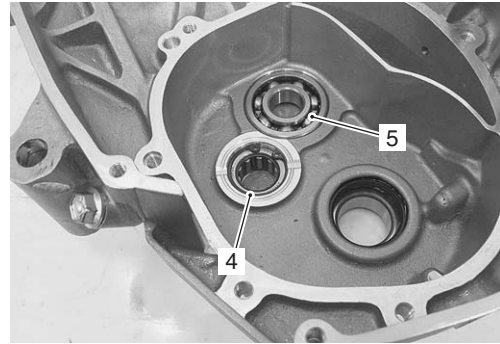


I705H1310021-01

- 4) Remove the bearings (4) and (5) using the special tool.

#### Special tool

**TOOL : 09921-20240 (Bearing remover set)**



I705H1310022-01

### Assembly

Assemble the final gear assembly in the reverse order of disassembly. Pay attention to the following points:

#### Final gear case

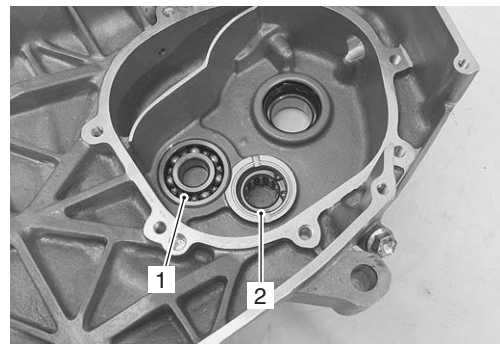
- Install the bearings (1) and (2) using the special tool.

#### ⚠ CAUTION

- Replace the bearings with the new ones.
- Install the bearing so that its stamped mark faces outside.

#### Special tool

**TOOL : 09913-70210 (Bearing installer set)**




I705H1310023-01

- Install the oil seal (3) and bearings (4) using the special tool.

**⚠ CAUTION**

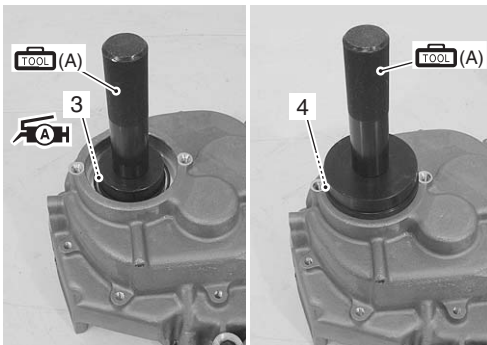
- Replace the O-ring with a new one.
- Replace the bearings with the new ones.
- Install the bearing so that its stamped mark faces outside.

**Special tool**

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

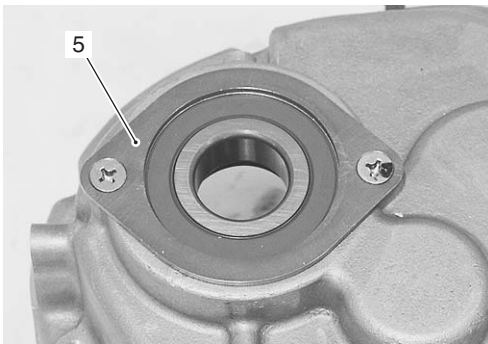
- Apply the grease to the oil seal lip.

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



I705H1310024-01

- Install the bearing retainer (5).



I705H1310025-02


**Final gear cover**

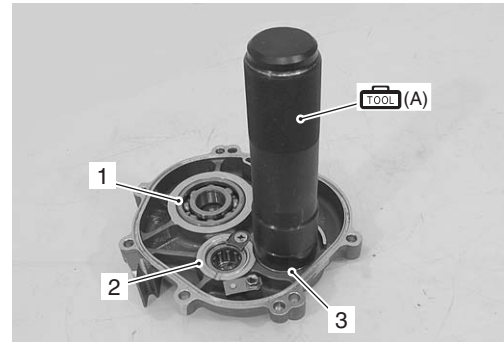
- Install the bearings (1), (2) and (3) using the special tool.

**⚠ CAUTION**

- Replace the bearing with a new one.
- Install the bearing so that its stamped mark faces outside.

**Special tool**

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




I705H1310027-01

- Install the oil seal (4) using the special tool.

**⚠ CAUTION**

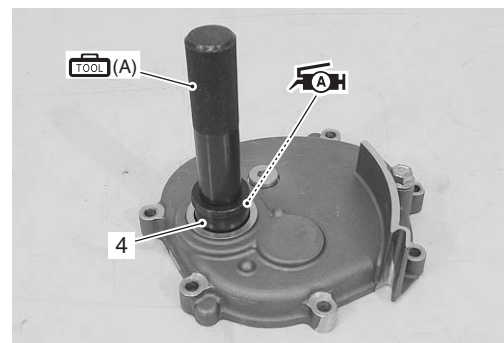
**Replace the oil seal with a new one.**

**Special tool**

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

- Apply the super grease to the oil seal lip.

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



I705H1310028-02

### 3A-8 Drive Chain / Drive Train / Drive Shaft:

- Tighten the oil level bolt (5), oil filler bolt (6) and final gear cover bolts (7) to the specified torque.

#### ⚠ CAUTION

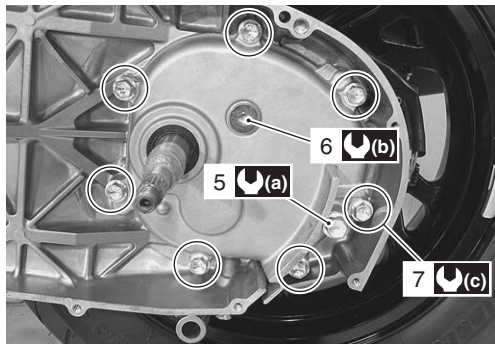
- Replace the gasket washer with a new one.
- Apply engine oil to each gear and bearing.
- Tighten the final gear cover bolts diagonally.

#### Tightening torque

Oil level bolt (a): 16 N·m (1.6 kgf-m, 11.5 lb-ft)

Oil filler bolt (b): 23 N·m (2.3 kgf-m, 16.5 lb-ft)

Final gear cover bolt (c): 22 N·m (2.2 kgf-m, 16.0 lb-ft)



I705H1310029-02

#### Final Drive Gear Bearing Inspection

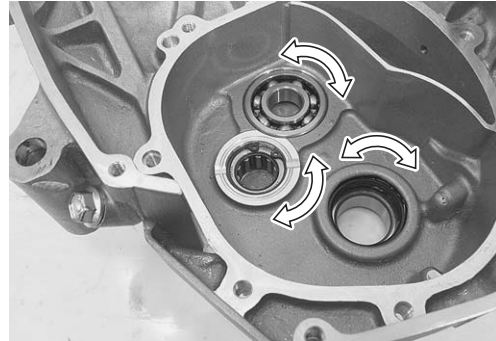
B705H13106004

Refer to "Final Gear Disassembly and Assembly (Page3A-4)".

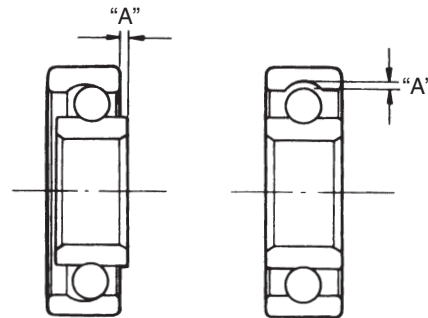
Inspect the following items.

#### Final gear case side

Inspect the play of the bearings by hand while they are in the case. Rotate the inner race by hand to inspect for abnormal noise and smooth rotation. Replace the bearing if there is anything unusual. Refer to "Final Gear Assembly Removal and Installation (Page3A-3)".



I705H1310030-01

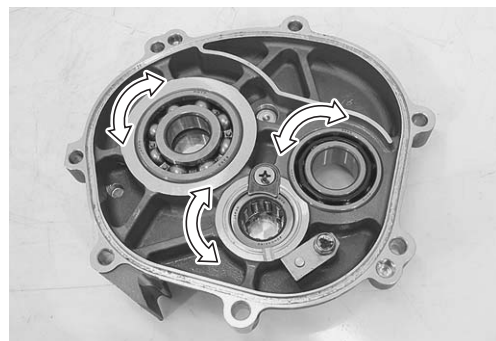


I705H1310036-01

"A": Play

#### Final gear cover side

Inspect the play of the bearings by hand while they are in the cover. Rotate the inner race by hand to inspect for abnormal noise and smooth rotation. Replace the bearing if there is anything unusual. Refer to "Final Gear Assembly Removal and Installation (Page3A-3)".



I705H1310032-01

## Specifications

### Tightening Torque Specifications

B705H13107001

Fastening part	Tightening torque			Note
	N·m	kgf·m	lb·ft	
Final gear cover bolt	22	2.2	16.0	☞(Page3A-4) / ☞(Page3A-8)
Oil drain plug	12	1.2	8.5	☞(Page3A-4)
Oil level bolt	16	1.6	11.5	☞(Page3A-4) / ☞(Page3A-8)
Oil filler bolt	23	2.3	16.5	☞(Page3A-8)

#### NOTE

The specified tightening torque is also described in the following.  
“Final Gear Components (Page3A-2)”

#### Reference:

For the tightening torque of fastener not specified in this section, refer to “Tightening Torque Specifications in Section 0C (Page0C-7)”.

## Special Tools and Equipment

### Recommended Service Material

B705H13108001

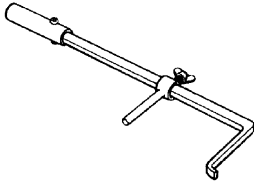
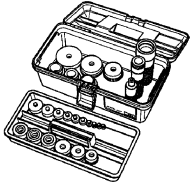
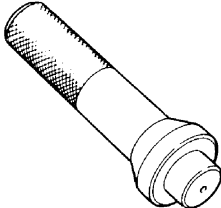
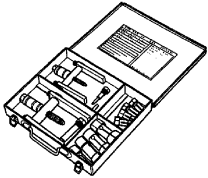
Material	SUZUKI recommended product or Specification		Note
Grease	SUZUKI SUPER GREASE A or equivalent	P/No.: 99000-25010	☞(Page3A-7) / ☞(Page3A-7)

#### NOTE

Required service material is also described in the following.  
“Final Gear Components (Page3A-2)”

### Special Tool

B705H13108002

09913-50121 Oil seal remover ☞(Page3A-4) / ☞(Page3A-6)		09913-70210 Bearing installer set ☞(Page3A-5) / ☞(Page3A-6) / ☞(Page3A-7) / ☞(Page3A-7) / ☞(Page3A-7)	
09913-75830 Bearing installer ☞(Page3A-6)		09921-20240 Bearing remover set ☞(Page3A-4) / ☞(Page3A-6)	



## Section 4

## Brake

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# Precautions

## Precautions

### Precautions for Brake System

B705H1400001

Refer to “General Precautions in Section 00 (Page00-1)”.

### Brake Fluid Information

B705H1400002

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**▲ WARNING**

- 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 long periods 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.

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**▲ CAUTION**

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.

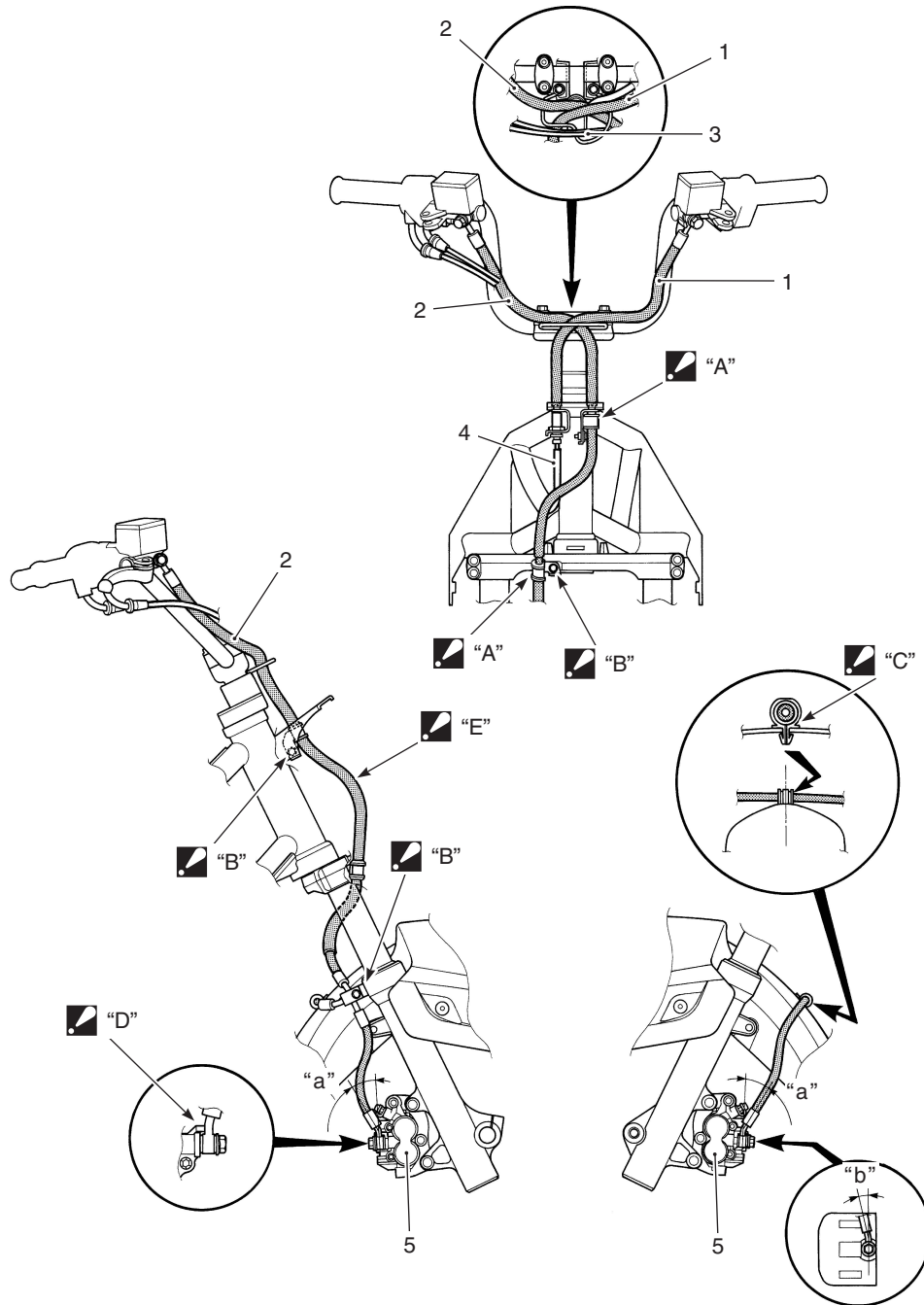
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# Brake Control System and Diagnosis

## Schematic and Routing Diagram

### Front Brake Hose Routing Diagram

B705H14102003

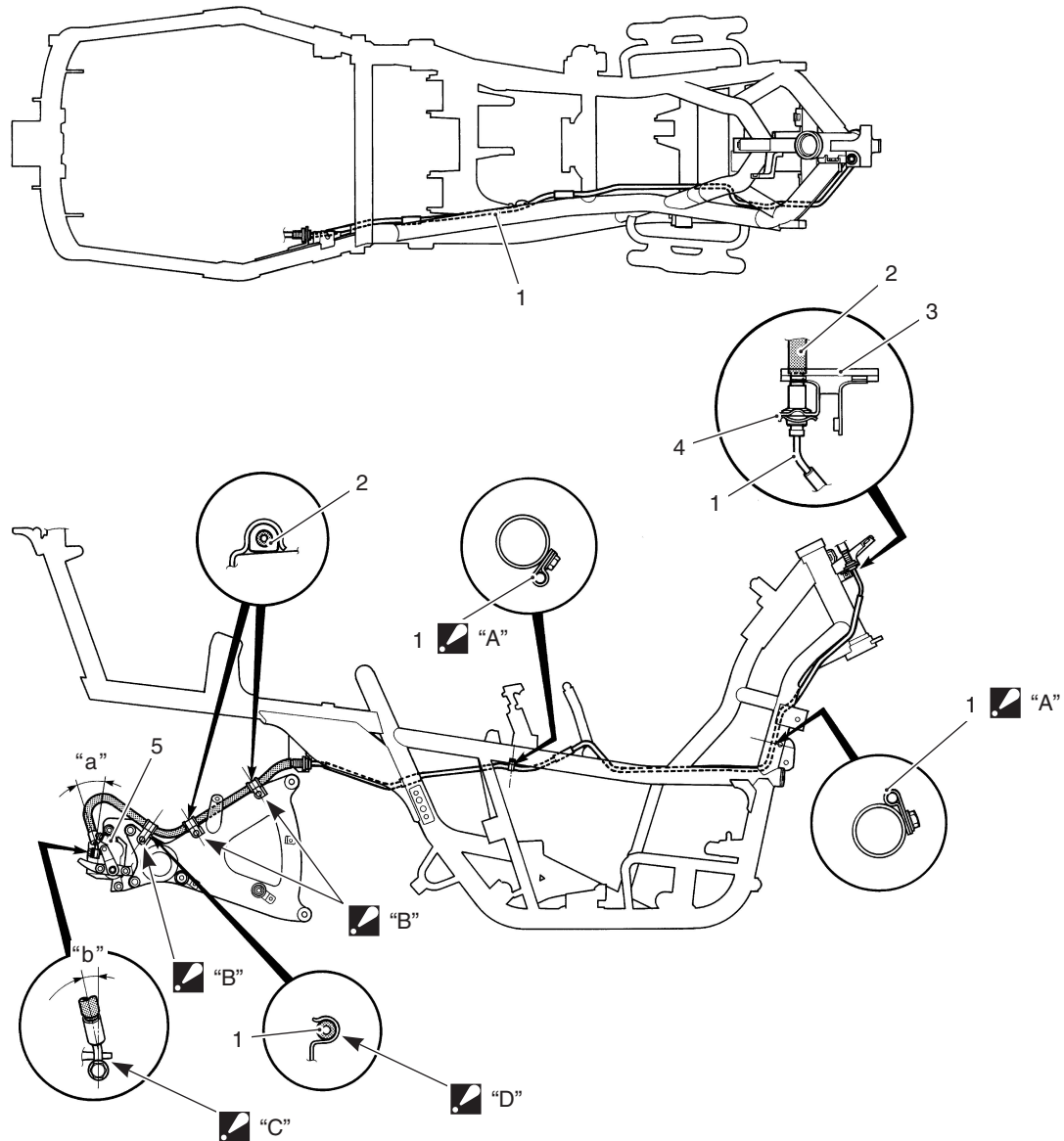


I705H1410028-02

1. Rear brake hose	☑ "B": After touching the clamp to the stopper, tighten the clamp bolt.
2. Front brake hose	☑ "C": Insert the clamp to the hole of the front fender fully.
3. Brake hose guide	☑ "D": After touching the brake hose union to the stopper, tighten the union bolt to the specified torque.
4. Rear brake pipe	☑ "E": Do not bend the brake hose to frame head pipe side.
5. Front brake caliper	"a": 28° "b": 14°
☑ "A": Fix the brake hose grommet to its hose clamp.	

Rear Brake Hose Routing Diagram

B705H14102004



I705H1410029-03

1. Rear brake pipe	▣ "B": After positioning the clamp with the stopper on the swingarm, tighten the clamp bolt.
2. Rear brake hose	▣ "C": After touching the brake hose union to the stopper, tighten the union bolt to the specified torque.
3. Front cowling plate	▣ "D": Clamp the brake hose firmly.
4. E-ring	"a": 28°
5. Rear brake caliper	"b": 14°
▣ "A": Clamp the rear brake pipe at white mark position.	

## Diagnostic Information and Procedures

### Brake Symptom Diagnosis

B705H14104001

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.	<i>Replace.</i>
	Oil adhesion on friction surface of pads.	<i>Clean disc and pads.</i>
	Worn disc.	<i>Replace.</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 or 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>
<b>Brake drags</b>	Rusty part.	<i>Clean and lubricate.</i>
	Insufficient brake lever or brake pedal pivot lubrication.	<i>Lubricate.</i>
	Malfunction of brake-lock.	<i>Adjust or replace.</i>

## Repair Instructions

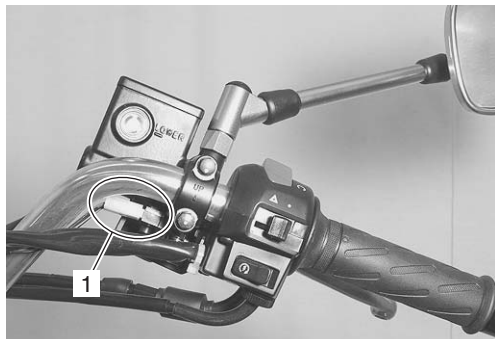
### Brake Light Switch Inspection

B705H14106008

#### Front Brake Light Switch

Inspect the front brake light switch in the following procedures:

- 1) Remove the handlebar cover. Refer to "Handlebar Cover Removal and Installation in Section 9D (Page9D-13)".
- 2) Disconnect the front brake light switch lead wire couplers (1).



I705H1410001-01

- 3) Inspect the switch for continuity with a tester. If any defects are found, replace the front brake light switch with a new one. Refer to "Front Master Cylinder / Brake Lever Disassembly and Assembly (Page4A-9)".

#### Special tool

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

#### Tester knob indication

**Continuity ( • )) )**

#### Front brake light switch

Color Position	Terminal (B/BI)	Terminal (B/R)
OFF		
ON	○	○

I705H1410020-03

- 4) Connect the front brake light switch lead wire couplers.

### Rear Brake Light Switch

Inspect the rear brake light switch in the same manner as the front brake light switch. Refer to “Brake Light Switch Inspection (Page4A-3)”.

#### Rear brake light switch

Color Position	Terminal (B/Y)	Terminal (B/Y)
ON		
OFF		

I705H1410021-01

### Brake Fluid Level Check

B705H14106017

Refer to “Brake System Inspection in Section 0B (Page0B-13)”.

### Brake Hose Inspection

B705H14106018

Refer to “Brake System Inspection in Section 0B (Page0B-13)”.

### Air Bleeding from Brake Fluid Circuit

B705H14106019

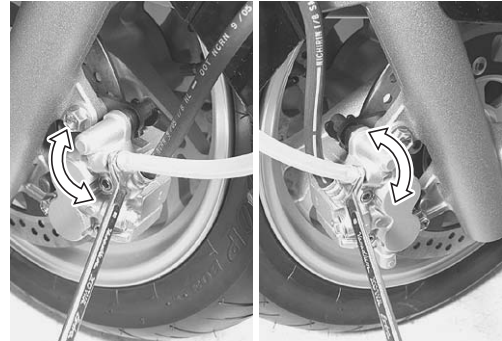
Air trapped in the brake fluid circuit acts like a cushion to absorb a large proportion of the pressure developed by the master cylinder and thus interferes with the full braking performance of the brake caliper. The presence of air is indicated by “sponginess” of the brake lever and also by lack of 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.**

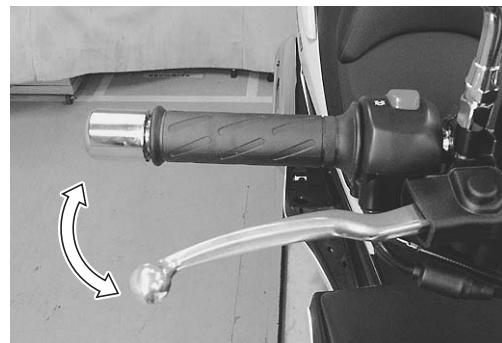
### Front Brake

- 1) Fill the master cylinder reservoir to the top of the inspection window. Place the reservoir cap to prevent dirt from entering.
- 2) Attach a hose to the air bleeder valve, and insert the free end of the hose into a receptacle.



I705H1410002-03

- 3) Squeeze and release the brake lever several times in rapid succession and squeeze the lever fully without releasing it.



I705H1410002-01

- 4) 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.
- 5) Close the air bleeder valve, pump and squeeze the lever, and open the valve.
- 6) 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.**

## 4A-5 Brake Control System and Diagnosis:

- 7) Close the air bleeder valve and disconnect the hose.
- 8) Fill the reservoir with brake fluid to the top of the inspection window.

### Tightening torque

**Air bleeder valve (Front brake): 6.0 N·m (0.6 kgf-m, 4.5 lb-ft)**

- 9) Install the reservoir cap.

### Rear Brake

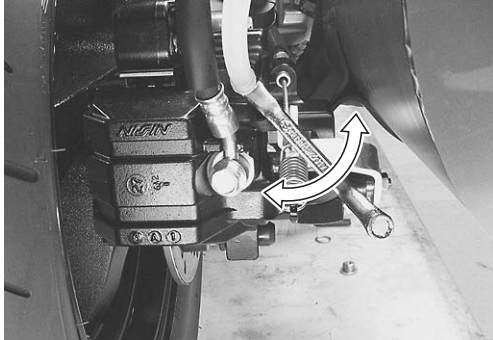
Bleed air from the rear brake in the same manner as the front brake.

### Tightening torque

**Air bleeder valve (Rear brake): 6.0 N·m (0.6 kgf-m, 4.5 lb-ft)**



I705H1410023-01



I705H1410024-01

## Brake Fluid Replacement

B705H14106020

### ⚠ 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 brake fluid reservoir cap and diaphragm.
- 3) Suck up the old brake fluid as much as possible.

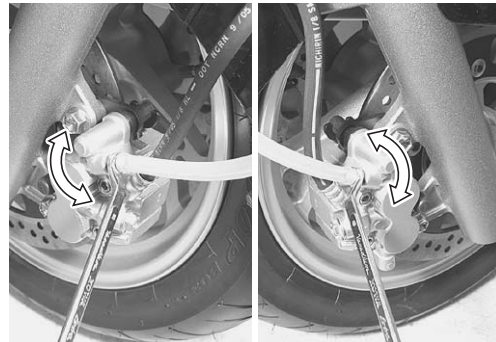


I705H1410003-01

- 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.



I705H1410002-03

- 6) Loosen the air bleeder valve and pump the brake lever until the old brake fluid flows out of the brake system.



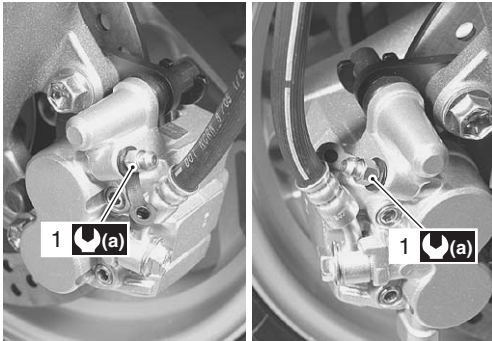
I705H1410022-01



- 7) Close the air bleeder valve (1) and disconnect the clear hose.

**Tightening torque**

**Air bleeder valve (Front brake) (a): 6.0 N·m (0.6 kgf-m, 4.5 lb-ft)**



I705H1410004-02

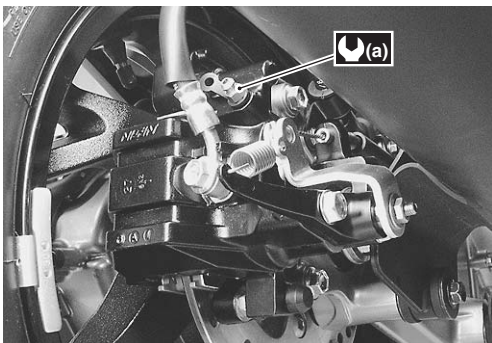
- 8) Fill the reservoir with new brake fluid to the upper line of the reservoir.

**Rear brake**

Brake fluid replacement in the same manner as the front brake.

**Tightening torque**

**Air bleeder valve (Rear brake) (a): 6.0 N·m (0.6 kgf-m, 4.5 lb-ft)**



I705H1410025-01

**Front Brake Hose Removal and Installation**

B705H14106021

**Removal**

- 1) Remove the front leg shield. Refer to “Front Leg Shield Removal and Installation in Section 9D (Page9D-14)”.
- 2) Drain brake fluid. Refer to “Brake Fluid Replacement (Page4A-5)”.
- 3) Remove the front brake hoses. Refer to “Front Brake Hose Routing Diagram (Page4A-1)”.

**Installation**

**⚠ CAUTION**

**The seal washers should be replaced with the new ones to prevent fluid leakage.**

- 1) Install the front brake hose. Refer to “Front Brake Hose Routing Diagram (Page4A-1)”.
- 2) Bleed air from the front brake system. Refer to “Air Bleeding from Brake Fluid Circuit (Page4A-4)”.
- 3) Reinstalled remove the parts.

**Rear Brake Hose Removal and Installation**

B705H14106022

**Removal**

- 1) Remove the right foot board. Refer to “Footboard Removal and Installation in Section 9D (Page9D-21)”.
- 2) Drain brake fluid. Refer to “Brake Fluid Replacement (Page4A-5)”.
- 3) Remove the rear brake hose. Refer to “Rear Brake Hose Routing Diagram (Page4A-2)”.

**Installation**

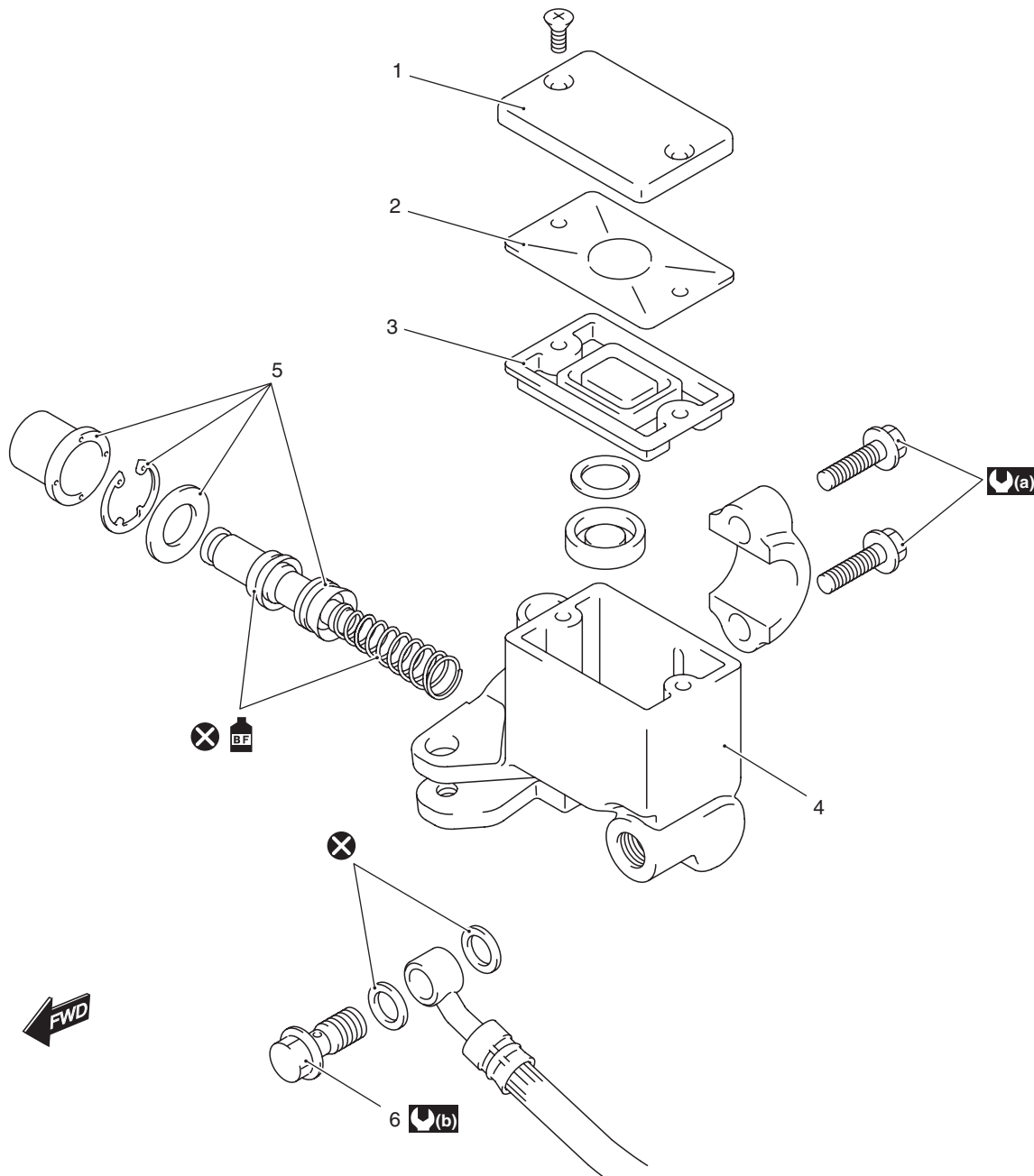
**⚠ CAUTION**

**The seal washers should be replaced with the new ones to prevent fluid leakage.**

- 1) Install the rear brake hose. Refer to “Rear Brake Hose Routing Diagram (Page4A-2)”.
- 2) Bleed air from the rear brake system. Refer to “Air Bleeding from Brake Fluid Circuit (Page4A-4)”.
- 3) Reinstalled remove the parts.

Front Brake Master Cylinder Components

B705H14106023



I705H1410026-06

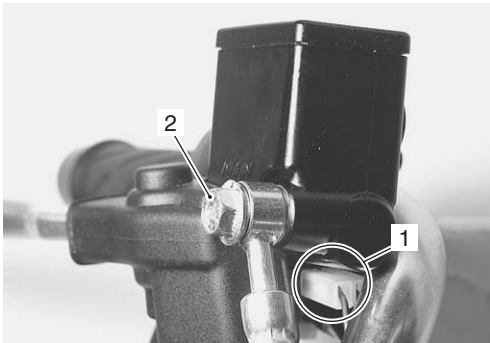
1. Reservoir cap	4. Master cylinder	(a) : 10 N·m (1.0 kgf-m, 7.0 lb-ft)	(X) : Do not reuse.
2. Plate	5. Piston/Cup set	(b) : 23 N·m (2.3 kgf-m, 16.5 lb-ft)	
3. Diaphragm	6. Brake hose union bolt	BF : Apply brake fluid.	

## Front Brake Master Cylinder Assembly Removal and Installation

B705H14106002

### Removal

- 1) Remove the handlebar cover. Refer to "Handlebar Cover Removal and Installation in Section 9D (Page9D-13)".
- 2) Remove the rear view mirror.
- 3) Drain the brake fluid. Refer to "Brake Fluid Replacement (Page4A-5)".
- 4) Disconnect the front brake light switch lead wire couplers (1).
- 5) Place a rag underneath the union bolt (2) on the master cylinder to catch any split brake fluid. Remove the brake hose union bolt and disconnect the brake hose.
- 6) Remove the master cylinder assembly.



I705H1410005-01



I705H1410006-01

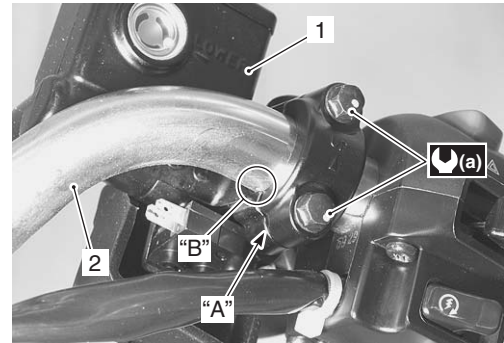
### Installation

Install the front brake master cylinder in the reverse order of removal. Pay attention to the following points:

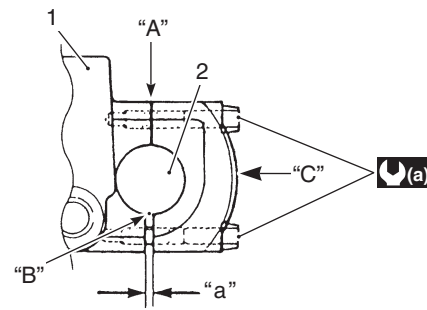
- When installing the master cylinder (1) onto the handlebars (2), align the master cylinder holder's mating surface "A" with the punch mark "B" on the handlebars (2) and tighten the upper holder bolt first temporarily to provide clearance on the lower side and then tighten both of the bolts to the specified torque.

### Tightening torque

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



I705H1410007-02



I705H1410018-02

"C": "Up" mark	"a": Clearance
----------------	----------------

## 4A-9 Brake Control System and Diagnosis:

- After setting the brake hose union to the stopper, tighten the union bolt to the specified torque.

### ⚠ CAUTION

The seal washers should be replaced with the new ones to prevent fluid leakage.

### Tightening torque

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



I705H1410008-01

- Bleed air from the brake system. Refer to “Air Bleeding from Brake Fluid Circuit (Page4A-4)”.

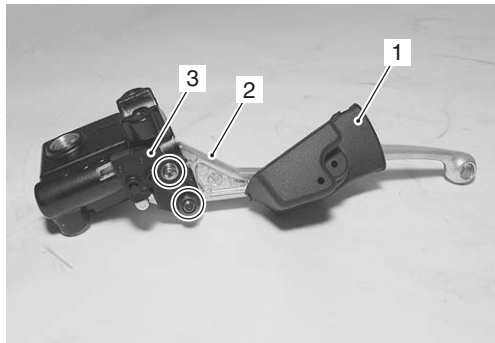
## Front Master Cylinder / Brake Lever Disassembly and Assembly

B705H14106024

Refer to “Front Brake Master Cylinder Assembly Removal and Installation (Page4A-8)”.

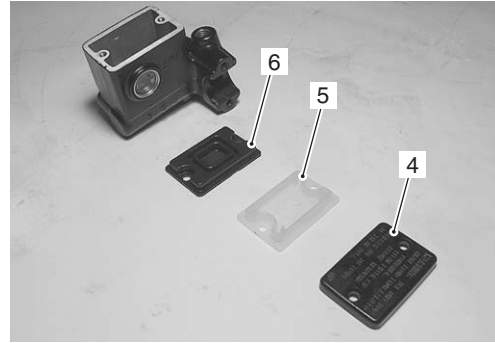
### Disassembly

- 1) Remove the dust cover (1), brake lever (2) and brake light switch (3).



I705H1410009-01


- 2) Remove the reservoir cap (4), plate (5) and diaphragm (6).

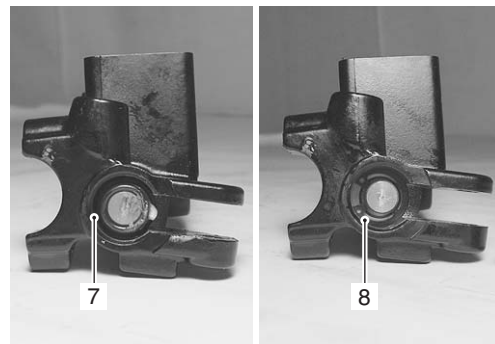


I705H1410010-02

- 3) Pull out the dust boot (7) and remove the snap ring (8) using the special tool.

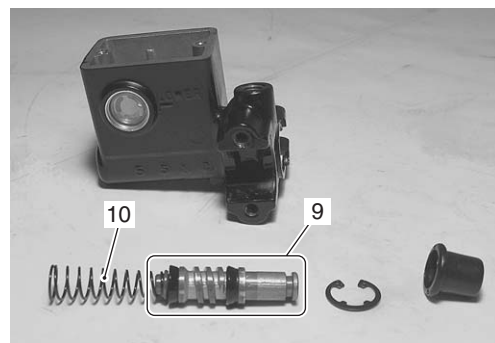
### Special tool

 : 09900-06108 (Snap ring pliers)



I705H1410011-01

- 4) Remove the following parts from the master cylinder.
  - Piston/Cup set (9)
  - Spring (10)



I705H1410012-01

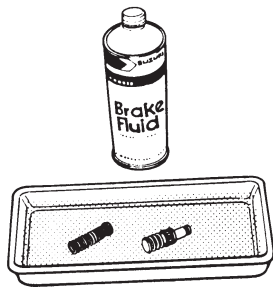
**Assembly**

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.
- Apply brake fluid to the master cylinder bore and all of the master cylinder component to be inserted into the bore.

BF: Brake fluid (DOT 4)



I649G1410024-01

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



I705H1410013-01

- Apply grease to the brake lever pivot bolt.

- Apply grease to the contact point between piston and brake lever.

**SH**: Grease 99000-25100 (SUZUKI Silicone Grease or equivalent)



I705H1410014-01

**Tightening torque**

Brake lever pivot bolt: 1.0 N·m (0.1 kgf·m, 0.72 lb·ft)  
 Brake lever pivot bolt lock-nut: 6.0 N·m (0.6 kgf·m, 4.5 lb·ft)

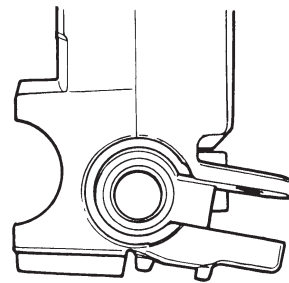
**Front Master Cylinder Parts Inspection**

B705H14106025

Refer to “Front Master Cylinder / Brake Lever Disassembly and Assembly (Page4A-9)”.

**Master Cylinder**

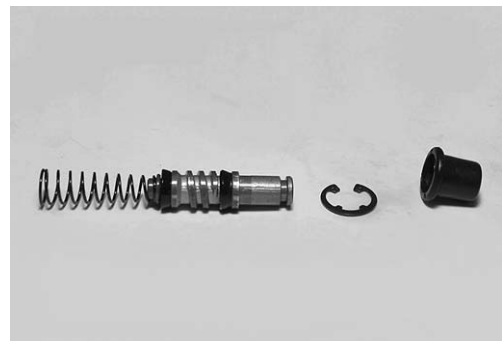
Inspect the master cylinder bore for any scratches, corrosion or other damage. If any defects are found, replace it with the new ones.



I649G1410027-01

**Inner Parts**

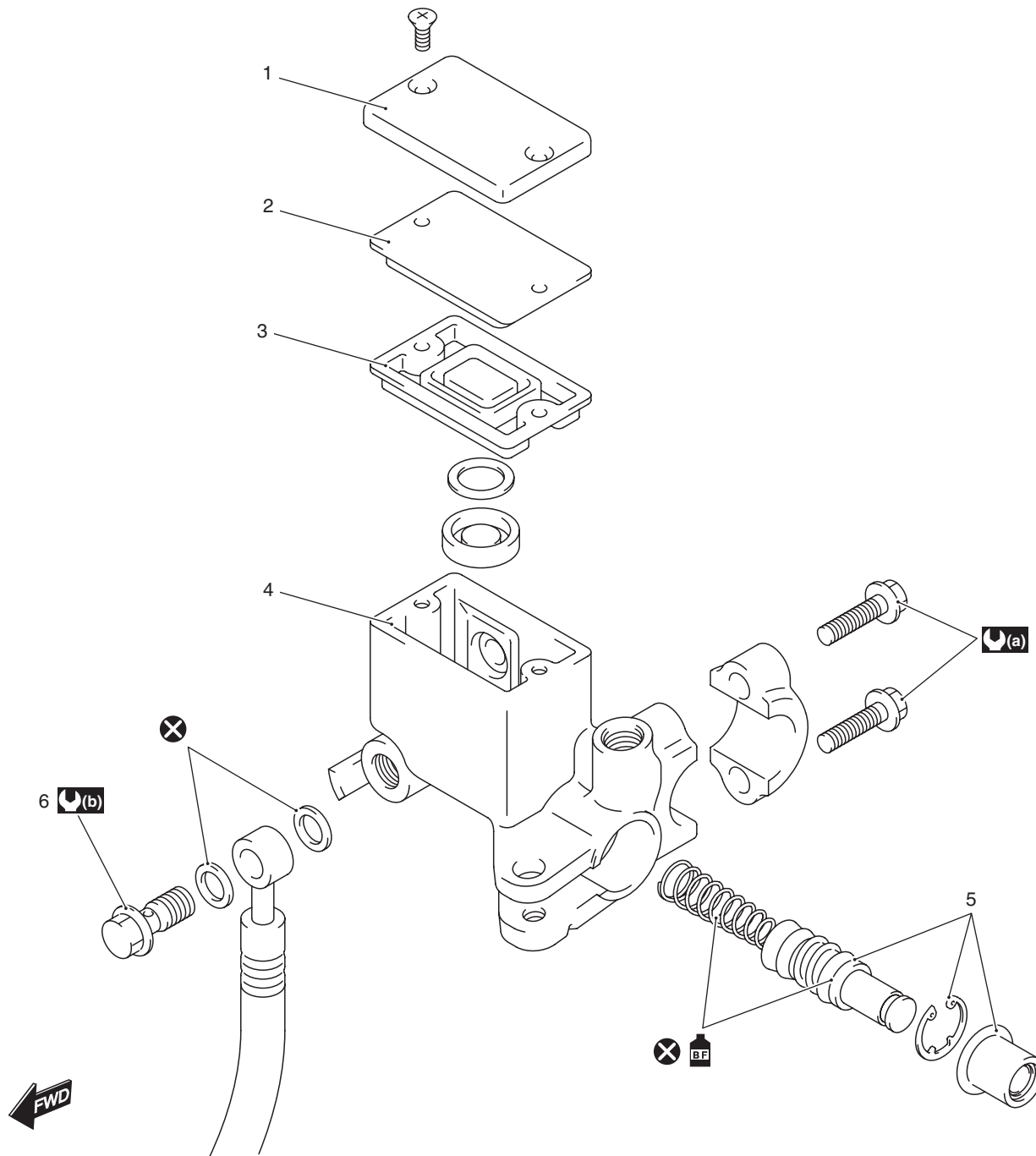
Inspect the piston/cup set, spring, snap ring and dust boot surface for any scratches or other damage. If any defects are found, replace it with the new ones.



I705H1410015-01

Rear Brake Master Cylinder Components

B705H14106026



I705H1410027-04

1. Reservoir cap	4. Master cylinder	(a) : 10 N-m (1.0 kgf-m, 7.0 lb-ft)	X : Do not reuse.
2. Plate	5. Piston/Cup set	(b) : 23 N-m (2.3 kgf-m, 16.5 lb-ft)	
3. Diaphragm	6. Brake hose union bolt	BF : Apply brake fluid.	



## Rear Brake Master Cylinder Assembly Removal and Installation

B705H14106027

Refer to "Front Brake Master Cylinder Assembly Removal and Installation (Page4A-8)".

### Removal

Remove the rear brake master cylinder in the same manner as the front brake master cylinder. Refer to "Front Brake Master Cylinder Assembly Removal and Installation (Page4A-8)".

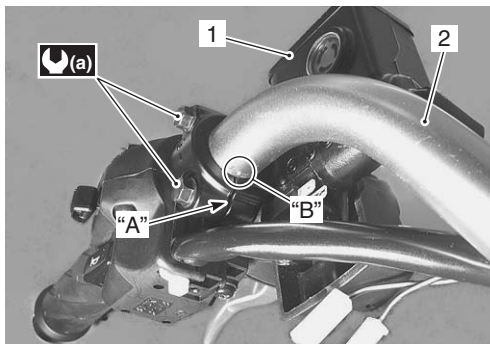
### Installation

Install the rear brake master cylinder in the same manner as the front brake master cylinder. Refer to "Front Brake Master Cylinder Assembly Removal and Installation (Page4A-8)".

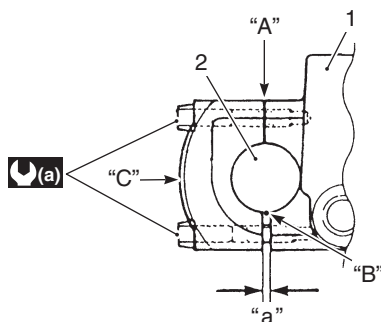
- When installing the master cylinder (1) onto the handlebars (2), align the master cylinder holder's mating surface "A" with the punch mark "B" on the handlebars (2) and tighten the upper holder bolt first temporarily to provide clearance on the lower side and then tighten both to the bolts to the specified torque.

### Tightening torque

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



I705H1410016-02



I705H1410019-02

"C": "UP" mark	"a": Clearance
----------------	----------------

- After setting the brake hose union to the stopper, tighten the union bolt to the specified torque.

### ⚠ CAUTION

**The seal washers should be replaced with the new ones to prevent fluid leakage.**

### Tightening torque

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



I705H1410017-01

- Bleed air from the brake system. Refer to "Air Bleeding from Brake Fluid Circuit (Page4A-4)".

## Rear Master Cylinder / Brake Lever Disassembly and Assembly

B705H14106028

Refer to "Rear Brake Master Cylinder Assembly Removal and Installation (Page4A-12)".

Refer to "Rear Brake Master Cylinder Components (Page4A-11)".

### Disassembly

Disassemble the rear brake master cylinder/brake lever in the same manner as the front brake master cylinder/brake lever. Refer to "Front Master Cylinder / Brake Lever Disassembly and Assembly (Page4A-9)".

### Assembly

Assemble the rear brake master cylinder/brake lever in the same manner as the front brake master cylinder/brake lever. Refer to "Front Master Cylinder / Brake Lever Disassembly and Assembly (Page4A-9)".

## Rear Master Cylinder Parts Inspection

B705H14106012

Inspect the rear master cylinder parts in the same manner as the front brake master cylinder. (Refer to "Front Master Cylinder Parts Inspection (Page4A-10)".)



## Specifications

### Service Data

B705H14107002

#### Brake + Wheel

Unit: mm (in)

Item		Standard	Limit
Master cylinder bore	Front & Rear	12.700 – 12.743 (0.500 – 0.502)	—
Master cylinder piston diameter	Front & Rear	12.657 – 12.684 (0.498 – 0.499)	—
Brake fluid type		DOT 4	—

### Tightening Torque Specifications

B705H14107003

Fastening part	Tightening torque			Note
	N·m	kgf-m	lb-ft	
Air bleeder valve (Front brake)	6.0	0.6	4.5	☞ (Page4A-5) / ☞ (Page4A-6)
Air bleeder valve (Rear brake)	6.0	0.6	4.5	☞ (Page4A-5) / ☞ (Page4A-6)
Master cylinder holder bolt	10	1.0	7.0	☞ (Page4A-8) / ☞ (Page4A-12)
Brake hose union bolt	23	2.3	16.5	☞ (Page4A-9) / ☞ (Page4A-12)
Brake lever pivot bolt	1.0	0.1	0.72	☞ (Page4A-10)
Brake lever pivot bolt lock-nut	6.0	0.6	4.5	☞ (Page4A-10)

#### NOTE

The specified tightening torque is also described in the following.

“Front Brake Master Cylinder Components (Page4A-7)”

“Rear Brake Master Cylinder Components (Page4A-11)”

#### Reference:

For the tightening torque of fastener not specified in this section, refer to “Tightening Torque Specifications in Section 0C (Page0C-7)”.

## Special Tools and Equipment

### Recommended Service Material

B705H14108001

Material	SUZUKI recommended product or Specification		Note
Brake fluid	DOT 4	—	☞ (Page4A-5) / ☞ (Page4A-10)
Grease	SUZUKI Silicone Grease or equivalent	P/No.: 99000-25100	☞ (Page4A-10)

#### NOTE

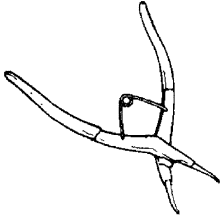

Required service material is also described in the following.

“Front Brake Master Cylinder Components (Page4A-7)”

“Rear Brake Master Cylinder Components (Page4A-11)”

### Special Tool

B705H14108002

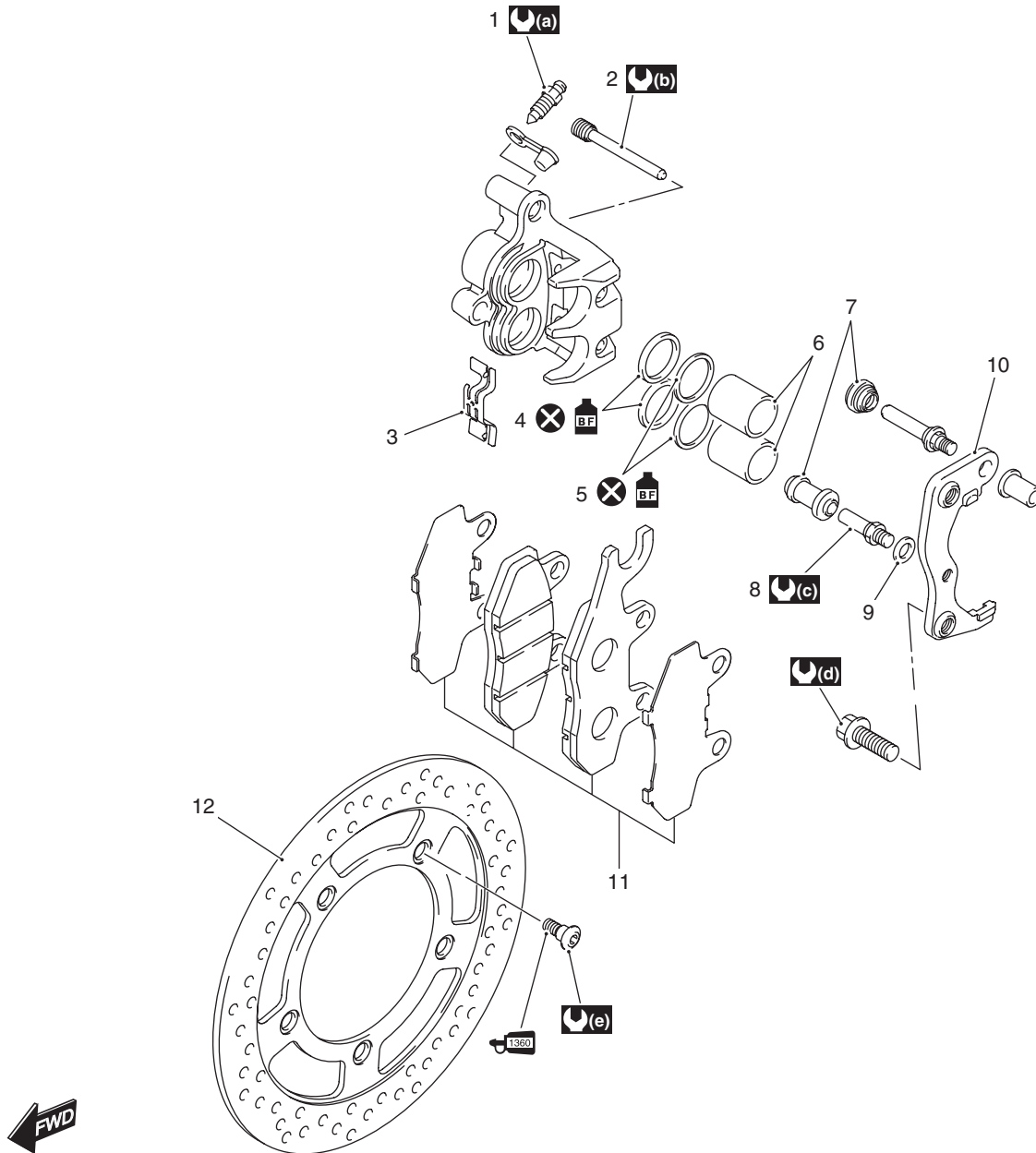
<p>09900-06108 Snap ring pliers ☞ (Page4A-9)</p>		<p>09900-25008 Multi-circuit tester set ☞ (Page4A-3)</p>	
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# Front Brakes

## Repair Instructions

### Front Brake Components

B705H14206011



I705H1420026-02

1. Air bleeder valve	8. Pin bolt	: 18 N·m (1.8 kgf-m, 13.0 lb-ft)
2. Pad mounting pin	9. Washer	: 35 N·m (3.5 kgf-m, 25.5 lb-ft)
3. Brake pad spring	10. Bracket	: 23 N·m (2.3 kgf-m, 16.5 lb-ft)
4. Piston seal	11. Front brake pad set	: Apply thread lock to thread part.
5. Dust seal	12. Front brake disc	: Apply brake fluid.
6. Piston	: 6 N·m (0.6 kgf-m, 4.5 lb-ft)	: Do not reuse.
7. Boot	: 18 N·m (1.8 kgf-m, 13.0 lb-ft)	

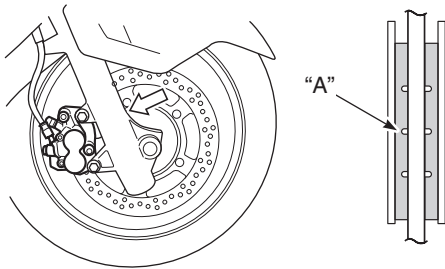
### Front Brake Pad Inspection

B705H14206004

The extent of brake pad wear can be checked by observing the grooved limit line “A” on the pad. When the wear exceeds the grooved limit line, replace the pads with the new ones. Refer to “Front Brake Pad Replacement (Page4B-2)”.

**⚠ CAUTION**

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



I705H1420001-02

### Front Brake Pad Replacement

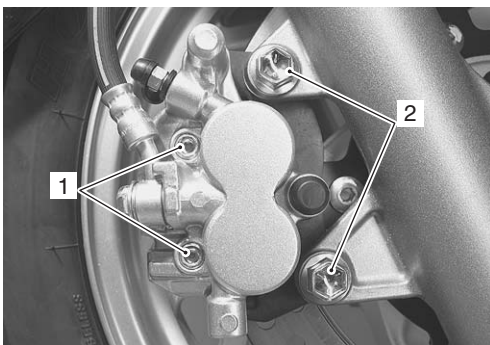
B705H14206005

Replace the front brake pads in the following procedures:

**⚠ CAUTION**

**Do not operate the brake lever while removing the caliper.**

- 1) Loosen the front brake pad mounting pins (1).
- 2) Remove the front brake caliper mounting bolts (2).
- 3) Remove the front brake caliper.



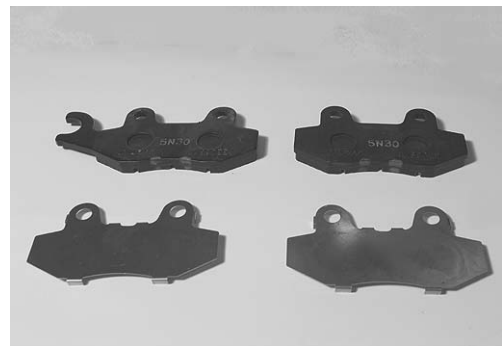
I705H1420002-01

- 4) Remove the front brake pad mounting pins.
- 5) Remove the front brake pads.



I705H1420003-02

- 6) Disassemble the shims from the front brake pads.



I705H1420004-01

- 7) Clean up the caliper especially around the caliper piston and the shim.
- 8) Assemble the new front brake pads and shims.

**⚠ CAUTION**

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



I705H1420005-01

## 4B-3 Front Brakes:

- 9) Install the front brake pads.
- 10) Install the front brake pad mounting pins temporarily.
- 11) Install the front brake caliper.
- 12) Tighten the front brake caliper mounting bolts (1) to the specified torque.

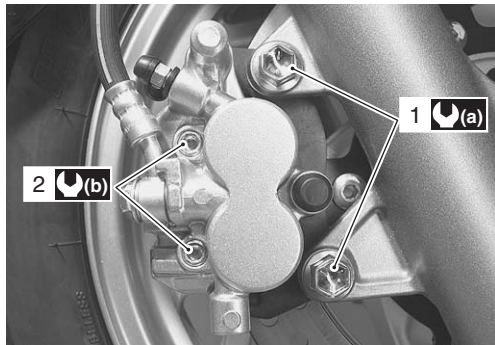
### Tightening torque

**Front brake caliper mounting bolt (a): 35 N·m (3.5 kgf-m, 25.5 lb-ft)**

- 13) Tighten the front brake pad mounting pin (2) to the specified torque.

### Tightening torque

**Front brake pad mounting pin (b): 18 N·m (1.8 kgf-m, 13.0 lb-ft)**



I705H1420006-02

### NOTE

**After replacing the brake pads, pump the brake lever several times in order to operate the brake correctly and then check the brake fluid level.**

## Front Brake Caliper Removal and Installation

B705H14206012

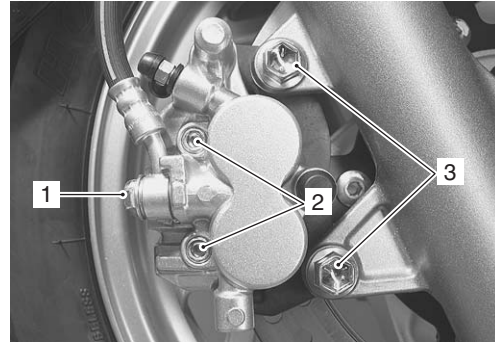
### Removal

- 1) Drain brake fluid. Refer to “Brake Fluid Replacement in Section 4A (Page4A-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.
- Slightly loosen the brake pad mounting pins (2) to facilitate later disassembly, if necessary.

- 3) Remove the brake caliper by removing the caliper mounting bolts (3).



I705H1420007-01

- 4) Remove the front brake pads. Refer to “Front Brake Pad Replacement (Page4B-2)”.
- 5) Remove the front brake caliper bracket.



I705H1420008-01

### Installation

Install the front brake caliper in the reverse order of removal. Pay attention to the following points:

### **⚠ CAUTION**

**The seal washers should be replaced with the new ones to prevent fluid leakage.**

- Tighten each bolt to the specified torque.

### Tightening torque

**Front brake caliper mounting bolt (a): 35 N·m (3.5 kgf-m, 25.5 lb-ft)**

**Front brake pad mounting pin (b): 18 N·m (1.8 kgf-m, 13.0 lb-ft)**

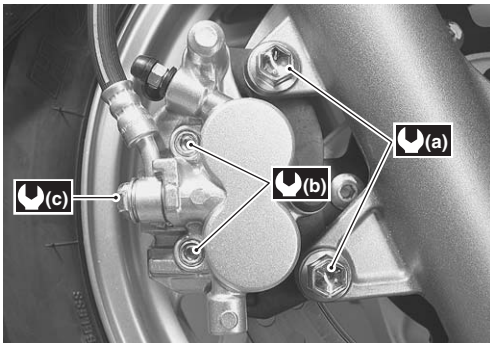
- After setting the brake hose union to the stopper, tighten the union bolt to the specified torque.

**⚠ CAUTION**

The seal washers should be replaced with the new ones to prevent fluid leakage.

**Tightening torque**

Front brake hose union bolt (c): 23 N·m (2.3 kgf·m, 16.5 lb-ft)



I705H1420009-03

- Bleed air from the brake system after installing the caliper. Refer to “Air Bleeding from Brake Fluid Circuit in Section 4A (Page4A-4)”.
- Check the brake fluid leakage and brake operation.

**⚠ WARNING**

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**

B705H14206013

Refer to “Front Brake Caliper Removal and Installation (Page4B-3)”

**Disassembly**

- 1) Remove the front brake pads. Refer to “Front Brake Caliper Removal and Installation (Page4B-3)”.
- 2) Remove the front brake pad spring.



I705H1420010-01

- 3) Place a rag over the pistons to prevent it from popping out and then force out the pistons using compressed air.

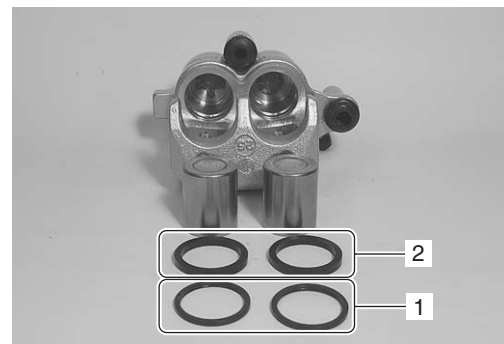
**⚠ CAUTION**

Do not use high pressure air to prevent piston damage.



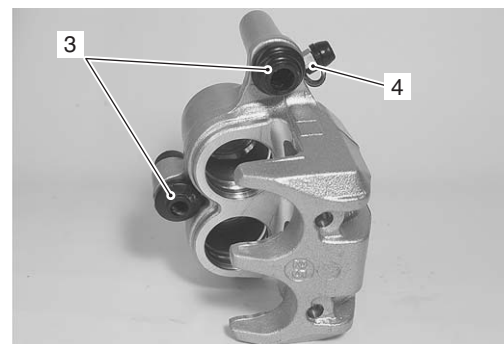
I705H1420011-01

- 4) Remove the dust seals (1) and piston seals (2).



I705H1420012-03

- 5) Remove the rubber boots (3) and the front brake caliper air bleeder valve (4).



I705H1420013-02

## 4B-5 Front Brakes:

- Remove the pin bolt from the front brake caliper bracket.



1705H1420014-01

### Assembly

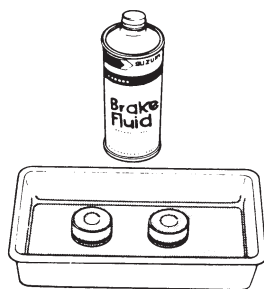
Assemble the front brake caliper in the reverse order of disassembly. Pay attention to the following points:

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

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

### ⚠ CAUTION

- Wash the caliper components with fresh brake fluid before reassembly. Never use cleaning solvent or gasoline to wash them.
- 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.



1649G1420012-01

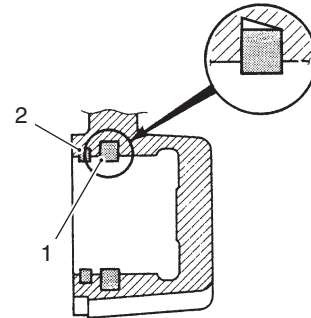
- Apply the brake fluid to piston seals (1) and dust seals (2).

### ⚠ CAUTION

**Replace the piston seals (1) and dust seals (2) with the new ones.**

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

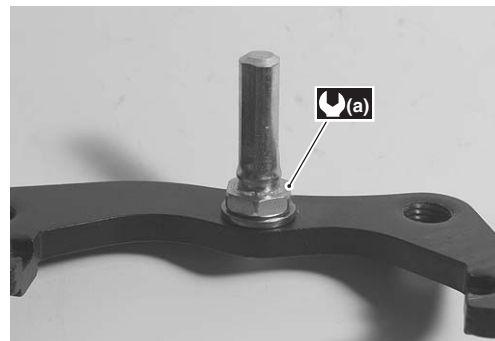
- Install the piston seals as shown in the figure.



1649G1420013-01

### Tightening torque

**Pin bolt (a): 18 N·m (1.8 kgf-m, 13.0 lb-ft)**



1705H1420015-01

### Front Brake Caliper Parts Inspection

B705H14206014

Refer to "Front Brake Caliper Disassembly and Assembly (Page4B-4)"

Inspect the following parts.

### 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.



1705H1420016-01



### 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.



I705H1420017-01

### Front Brake Disc Removal and Installation

B705H14206015

#### Removal

- 1) Remove the front wheel assembly. Refer to “Front Wheel Assembly Removal and Installation in Section 2D (Page2D-4)”.
- 2) Remove the front brake disc.



I705H1420025-01

#### Installation

Install the front brake disc in the reverse order of removal. Pay attention to the following points:

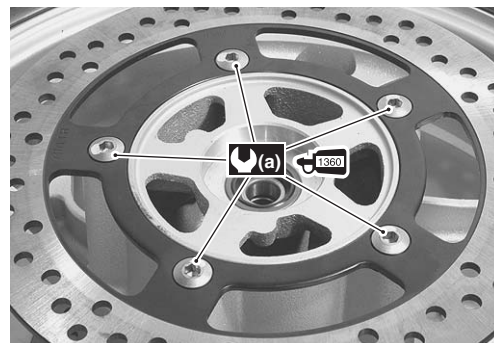
- Make sure that the brake discs are clean and free of any grease.

- Apply thread lock to the brake disc bolts and tighten them to the specified torque.

 : Thread lock cement 99000–32130 (Thread Lock Cement Super 1360 or equivalent)

#### Tightening torque

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



I705H1420024-01

### Front Brake Disc Inspection


B705H14206002

#### Brake Disc Thickness

Check the brake disc for damage or cracks and measure the thickness using the micrometer.

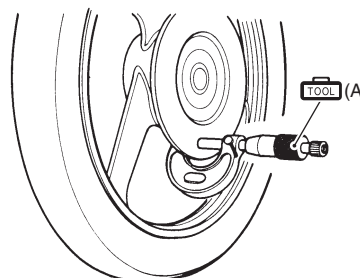
Replace the brake disc if the thickness is less than the service limit or if defect is found.

#### Special tool

 (A): 09900–20205 (Micrometer (0 – 25 mm))

#### Brake disc thickness

Service limit (Front): 4.0 mm (0.16 in)




I649G1420019-02

## 4B-7 Front Brakes:

### Brake Disc Runout

- 1) Remove the front brake caliper. Refer to "Front Brake Caliper Removal and Installation (Page4B-3)".
- 2) Measure the runout using the dial gauge.  
Replace the disc if the runout exceeds the service limit.

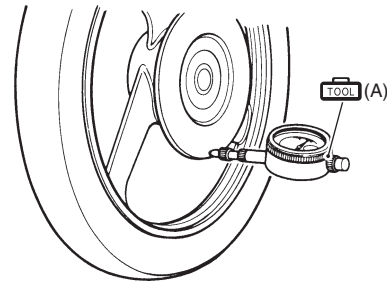
#### Special tool

 (A): 09900-20607 (Dial gauge (1/100 mm, 10 mm))

 : 09900-20701 (Magnetic stand)

### Brake disc runout

**Service limit: 0.30 mm (0.012 in)**



I649G1420020-02

- 3) Install the front brake caliper. Refer to "Front Brake Caliper Removal and Installation (Page4B-3)".

## Specifications

### Service Data

B705H14207017








#### Brake + Wheel

Unit: mm (in)

Item	Standard		Limit
	Front	Rear	
Brake disc thickness	Front	4.5 ± 0.2 (0.18 ± 0.008)	4.0 (0.16)
	Rear	5.0 ± 0.2 (0.20 ± 0.008)	4.5 (0.18)
Brake disc runout	—		0.30 (0.01)
Brake caliper cylinder bore	Front	25.400 – 25.450 (1.000 – 1.002)	—
	Rear	27.00 – 27.05 (1.063 – 1.065)	—
Brake caliper piston diameter	Front	25.318 – 25.368 (0.997 – 0.999)	—
	Rear	26.918 – 26.968 (1.060 – 1.062)	—

### Tightening Torque Specifications

B705H14207018

Fastening part	Tightening torque			Note
	N·m	kgf·m	lb·ft	
Front brake caliper mounting bolt	35	3.5	25.5	 (Page4B-3) /  (Page4B-3)
Front brake pad mounting pin	18	1.8	13.0	 (Page4B-3) /  (Page4B-3)
Front brake hose union bolt	23	2.3	16.5	 (Page4B-4)
Pin bolt	18	1.8	13.0	 (Page4B-5)
Brake disc bolt	23	2.3	16.5	 (Page4B-6)

#### NOTE

The specified tightening torque is also described in the following.  
"Front Brake Components (Page4B-1)"

#### Reference:

For the tightening torque of fastener not specified in this section, refer to "Tightening Torque Specifications in Section 0C (Page0C-7)".

## Special Tools and Equipment

### Recommended Service Material

B705H14208001


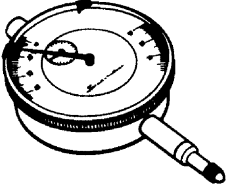
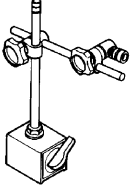
Material	SUZUKI recommended product or Specification		Note
Brake fluid	DOT 4	—	☞ (Page4B-5) / ☞ (Page4B-5)
Thread lock cement	Thread Lock Cement Super 1360 or equivalent	P/No.: 99000-32130	☞ (Page4B-6)

### NOTE

Required service material is also described in the following.  
 “Front Brake Components (Page4B-1)”

### Special Tool

B705H14208002

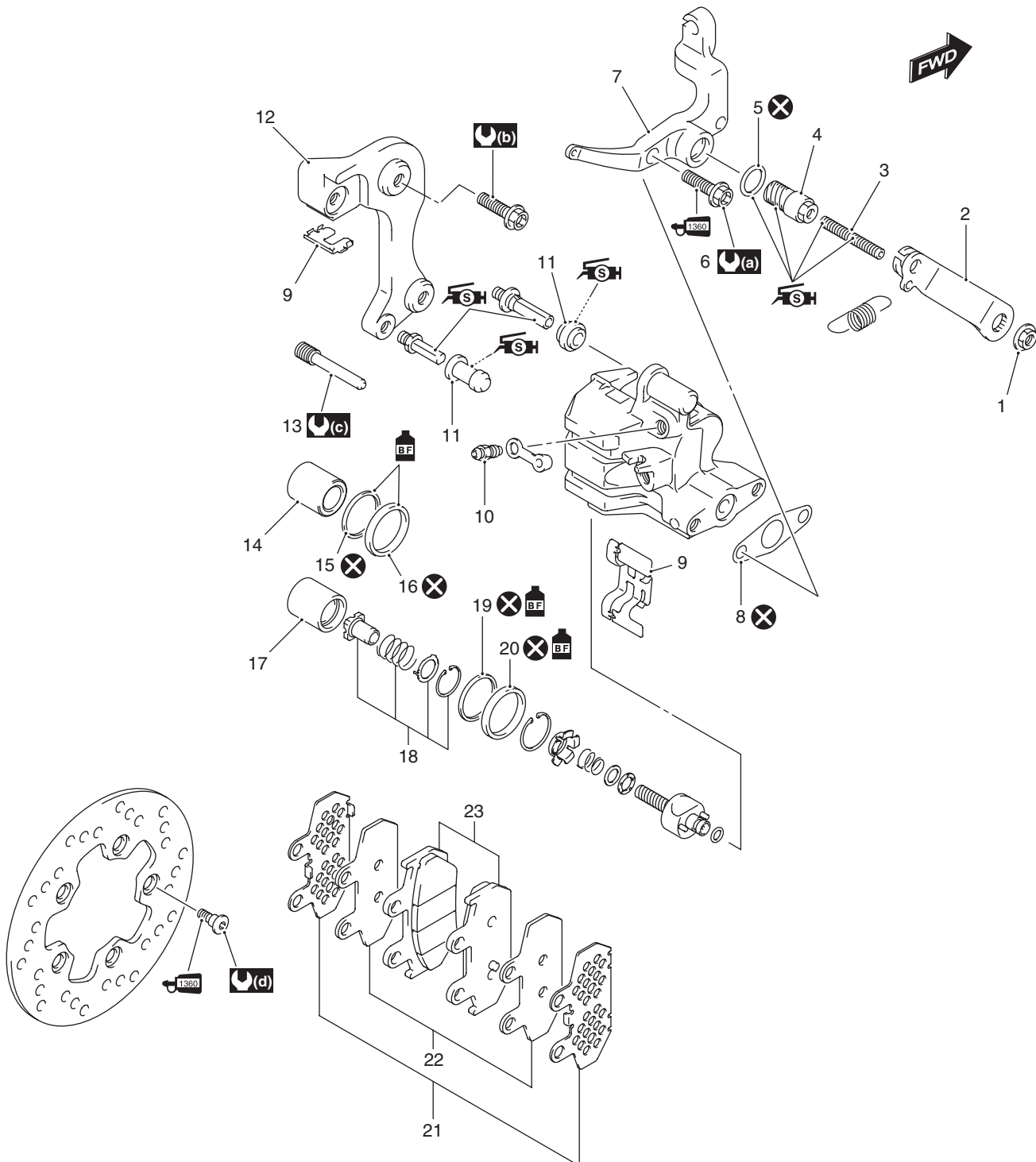
09900-20205 Micrometer (0 – 25 mm) ☞ (Page4B-6) 	09900-20607 Dial gauge (1/100 mm, 10 mm) ☞ (Page4B-7) 
09900-20701 Magnetic stand ☞ (Page4B-7) 	

# Rear Brakes

## Repair Instructions




### Rear Brake Components

B705H14306011



I705H1430001-02

1. Lock-nut	12. Bracket	23. Brake pad
2. Arm	13. Pad mounting pin	(a) : 22 N-m (2.2 kgf-m, 16.0 lb-ft)
3. Adjuster	14. Piston (Upper side)	(b) : 23 N-m (2.3 kgf-m, 16.5 lb-ft)
4. Brake-lock shaft	15. Dust seal	(c) : 18 N-m (1.8 kgf-m, 13.0 lb-ft)
5. O-ring	16. Piston seal	(d) : 23 N-m (2.3 kgf-m, 16.5 lb-ft)
6. Brake-lock housing bolt	17. Piston (Lower side)	SH : Apply silicone grease to sliding surface.

7. Brake-lock housing	18. Piston set	 : Apply thread lock to thread part.
8. Gasket	19. Dust seal	 : Apply brake fluid.
9. Pad spring	20. Piston seal	 : Do not reuse.
10. Air bleeder valve	21. Back plate	
11. Boot	22. Shim	

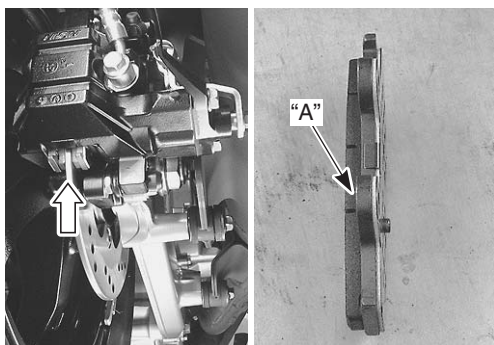
### Rear Brake Pad Inspection

B705H14306004

The extent of brake pad wear can be checked by observing the grooved limit line "A" on the pad. When the wear exceeds the grooved limit line, replace the pads with the new ones. Refer to "Rear Brake Pad Replacement (Page4C-2)".

**⚠ CAUTION**

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



I705H1430003-03

### Rear Brake Pad Replacement

B705H14306005

Replace the rear brake pad in the following procedures:

**⚠ CAUTION**

**Do not operate the brake lever and brake-lock lever while dismantling the caliper.**

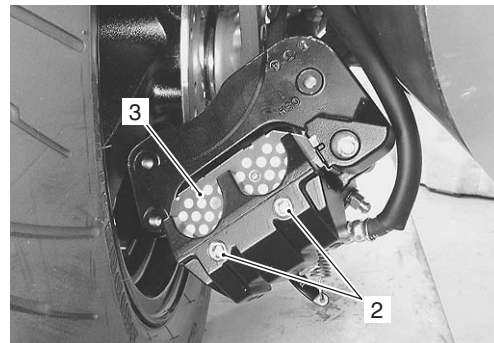
Refer to "Rear Brake Components (Page4C-1)".

- 1) Remove the caliper mounting bolts (1).



I705H1430004-01

- 2) Remove the pad pins (2) and brake pads (3).

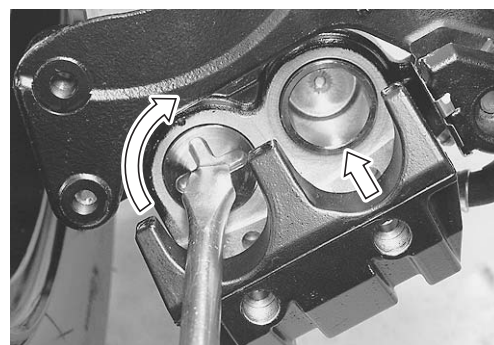


I705H1430005-01

- 3) Clean up the caliper especially around the pistons.
- 4) With the caliper piston (front side) pushed back into the caliper, force the other caliper piston (rear side) also into the caliper by turning it clockwise.

**⚠ CAUTION**

**When pushing on the caliper piston (rear side), keep holding the caliper piston (front side) securely to prevent it from coming out.**



I705H1430006-01

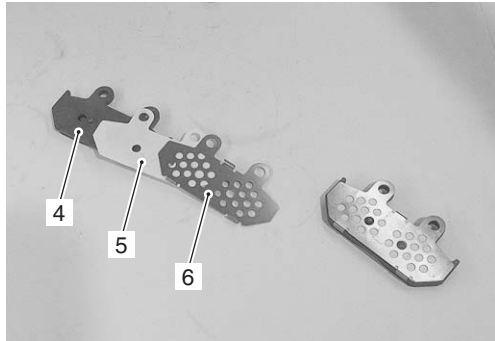


## 4C-3 Rear Brakes:

- Assemble the new pads (4), shims (5) and back plates (6).

### ⚠ CAUTION

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

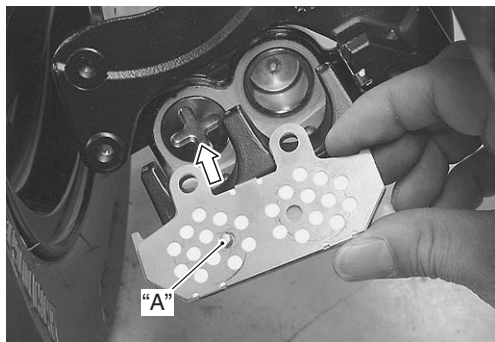


I705H1430038-01

- Locate the projection "A" of the brake pad to the center of caliper piston groove.

### NOTE

Make sure that the projection of the pad is seated onto the retainer on the caliper bracket.

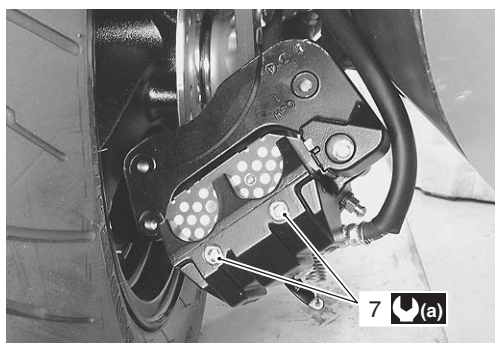


I705H1430034-03

- Tighten the pad mounting pins (7) to the specified torque.

### Tightening torque

Pad mounting pin (a): 18 N·m (1.8 kgf-m, 13.0 lb-ft)

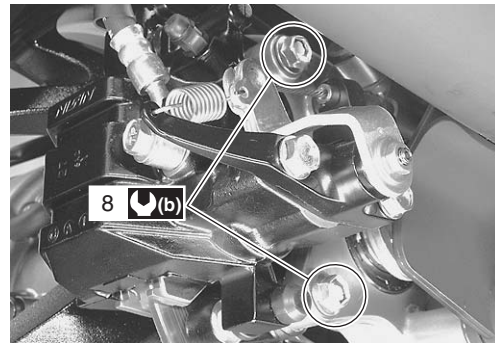


I705H1430007-02

- Tighten the caliper mounting bolts (8) to the specified torque.

### Tightening torque

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



I705H1430008-02

### NOTE

After replacing the brake pads, pump the brake lever several times in order to operate the brake correctly and then check the brake fluid level.

## Rear Brake Caliper Removal and Installation

B705H14306006

### Removal

- Drain the brake fluid. Refer to "Brake Fluid Replacement in Section 4A (Page4A-5)".
- Remove the brake hose from the caliper by removing the union bolt (1) and catch the brake fluid in a suitable receptacle.

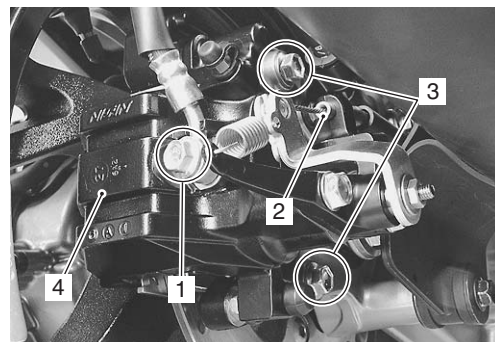
### ⚠ CAUTION

Place a rag underneath the union bolt on the brake caliper to catch any split brake fluid.

### NOTE

Slightly loosen the brake pad mounting pins to facilitate later disassembly, if necessary.

- Remove the brake-lock cable (2), caliper mounting bolts (3) and brake caliper (4).



I705H1430009-02

**Installation**

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

**⚠ CAUTION**

The seal washers should be replaced with the new ones to prevent fluid leakage.

- Tighten the caliper mounting bolts (1) to the specified torque.

**Tightening torque**

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

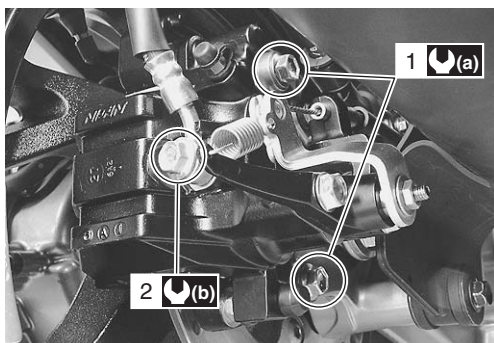
- After setting the brake hose union to the stopper, tighten the union bolt (2) to the specified torque.

**Tightening torque**

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

**⚠ CAUTION**

The seal washers should be replaced with the new ones to prevent fluid leakage.



I705H1430010-02

- Bleed air from the brake system after installing the caliper. Refer to “Brake System Inspection in Section 0B (Page0B-13)”.
- Check the brake fluid leakage and brake operation.

**⚠ WARNING**

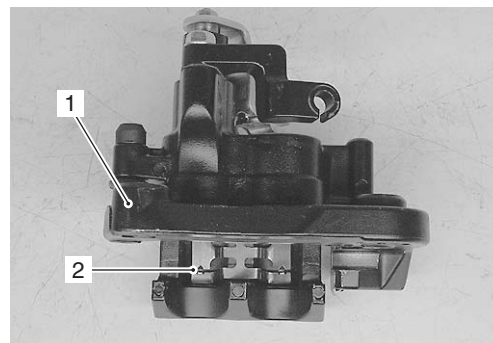
Brake fluid, if it leaks, will interfere with safe running and discolor painted surfaces. Check the brake hose and hose joints for cracks and fluid leakage.

**Rear Brake Caliper Disassembly and Assembly**

B705H14306007

Refer to “Rear Brake Caliper Removal and Installation (Page4C-3)”.

- 1) Remove the caliper bracket (1) and pad spring (2).



I705H1430035-01

- 2) Place a rag over the piston to prevent it from popping out and then force out the piston (upper side) using compressed air.

**⚠ WARNING**

- Use caution that brake fluid can splash out.
- Do not put your hand under the piston as it may pop out dangerously.
- When blowing compressed air in, hold the caliper securely.

**⚠ CAUTION**

Do not use high pressure air to prevent piston damage.

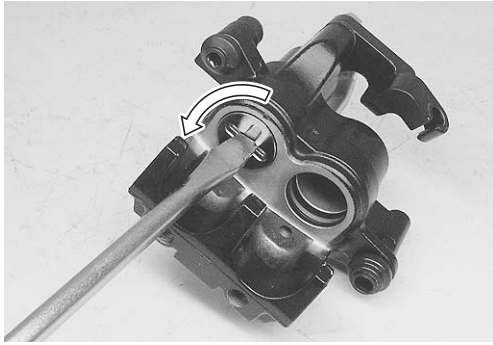


I705H1430036-01



## 4C-5 Rear Brakes:

- 3) Remove the piston (back side) with turning counterclockwise.

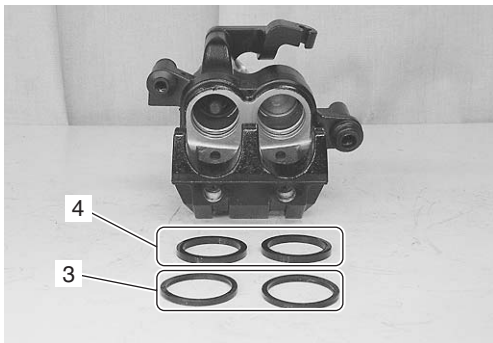


I705H1430011-01

- 4) Remove the dust seals (3) and piston seals (4) from the cylinder.

### ⚠ CAUTION

- Use care not to cause scratch on the cylinder bore.
- Do not reuse the piston seal and dust seal that have been removed.



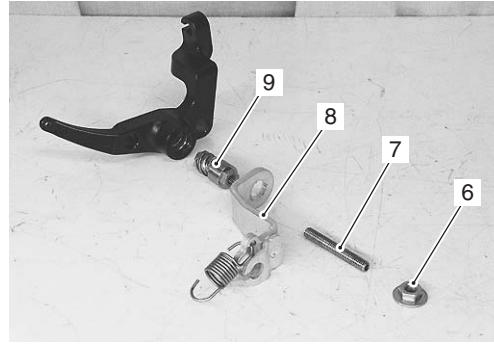
I705H1430012-02

- 5) Remove the brake-lock housing bolt and brake-lock housing (5).



I705H1430013-02

- 6) Remove the lock-nut (6), adjuster (7), arm (8) and brake-lock shaft (9).



I705H1430014-01

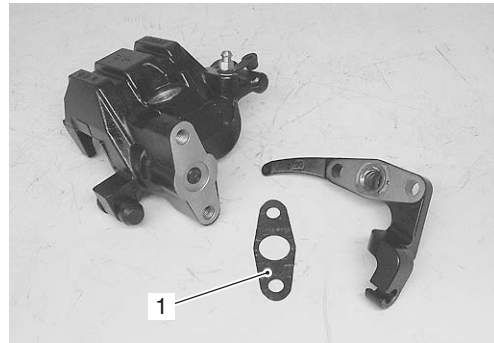
### Assembly

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

- Assemble the gasket (1).

### ⚠ CAUTION

Replace the gasket with a new one.



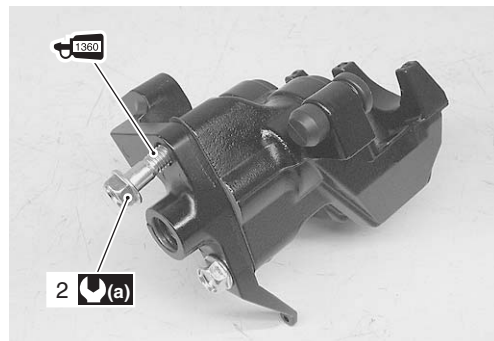
I705H1430015-01

- Apply thread lock to the brake-lock housing bolts (2) and tighten them to the specified torque.

1360 : Thread lock cement 99000-32130  
(THREAD LOCK CEMENT SUPER 1360 or equivalent)


### Tightening torque

Brake-lock housing bolt (a): 22 N·m (2.2 kgf·m, 16.0 lb·ft)



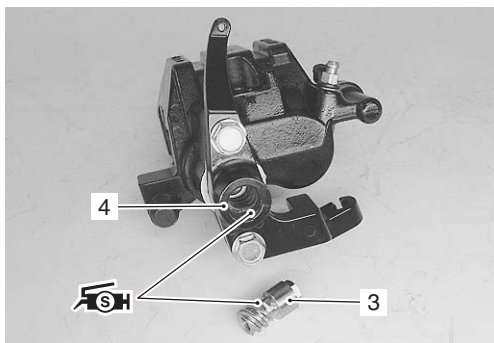
I705H1430017-04

- Apply silicone grease to the brake-lock shaft (3) and O-ring (4).

 **Grease 99000-25100 (SUZUKI Silicone Grease or equivalent)**

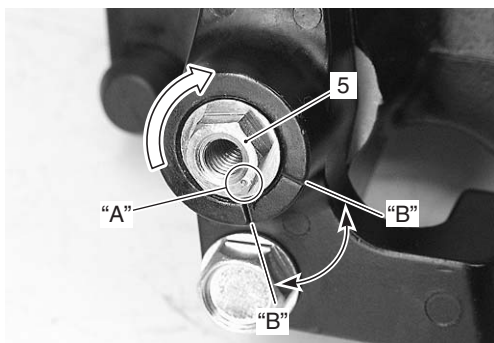
**CAUTION**

Replace the O-ring with a new one.



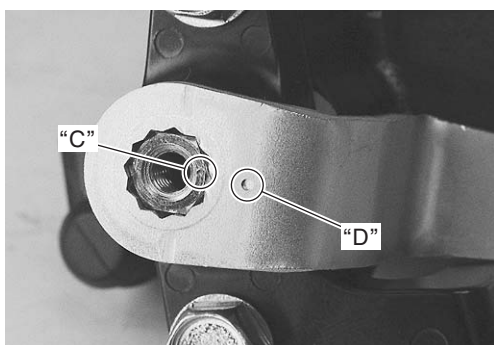
I705H1430016-01

- Install the brake-lock shaft (5) so as the punch mark "A" may position between "B" of housing when tightening (turning clockwise) the brake-lock shaft.




I705H1430018-01

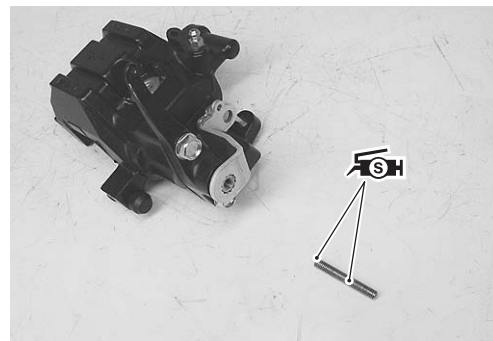
- Align the punch mark "C" on the brake-lock shaft with the punch mark "D" on the brake-lock arm.



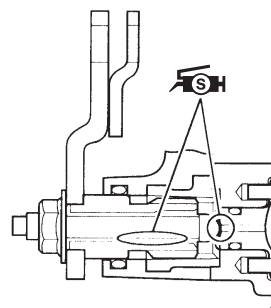
I705H1430019-01

- Apply silicone grease to the tip and thread of brake-lock adjuster, assemble the lock-nut and spring temporarily.

 **Grease 99000-25100 (SUZUKI Silicone Grease or equivalent)**



I705H1430020-01



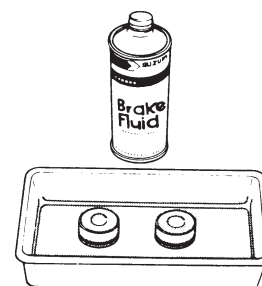
I705H1430021-02

- Wash the bore and piston of the caliper with specified brake fluid. Particularly wash the dust seal groove and piston seal groove.

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

**CAUTION**

- Wash the caliper components with fresh brake fluid before reassembly. Never use cleaning solvent or gasoline to wash them.
- 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.



I649G1420012-01

## 4C-7 Rear Brakes:

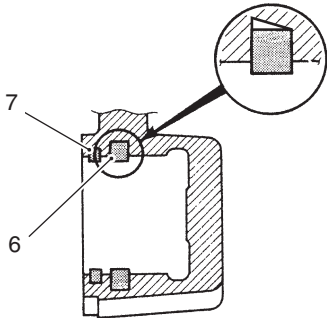
- Apply the brake fluid to piston seal (6) and dust seal (7).

### **CAUTION**

**Replace the piston seal (6) and dust seal (7) with the new ones.**

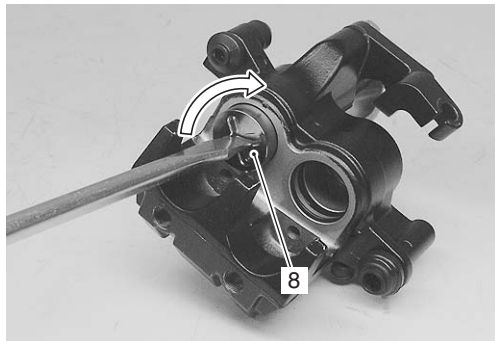
**BF: Brake fluid (DOT 4)**

- Install the piston seals as shown in the figure.



I705H1430039-01

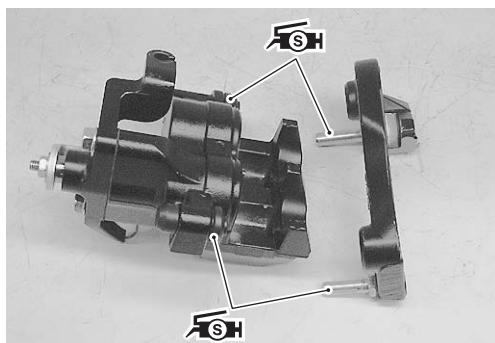
- Set back the rear caliper piston (8) (back side) into the caliper with turning clockwise.



I705H1430022-01

- Apply silicone grease to inside of the boot and caliper bracket pins and install them.

**SH: Grease 99000-25100 (SUZUKI Silicone Grease or equivalent)**



I705H1430023-01

## Brake Caliper Piston Disassembly and Assembly

B705H14306012

Refer to "Rear Brake Caliper Disassembly and Assembly (Page4C-4)".

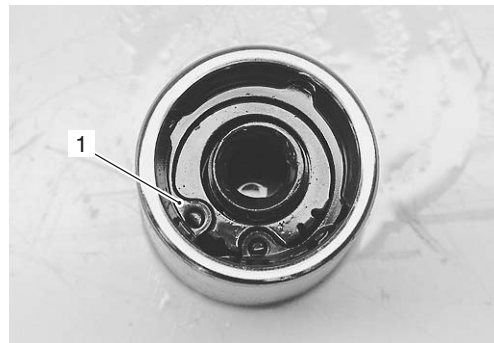
### Disassembly

- 1) Remove the snap ring (1).

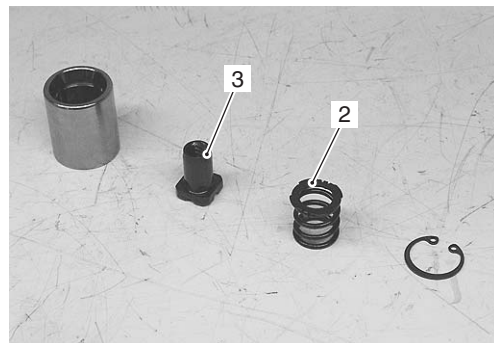
### **CAUTION**

**Use caution when removing the snap ring as the parts inside may fly out of position.**

- 2) Remove the spring (2) and adjust nut (3).



I705H1430024-01



I705H1430025-02

**Assembly**

Assemble the brake caliper piston (bottom side) in the reverse order of disassembly. Pay attention to the following point:

- When assembling, position the adjust nut so as to fit to the seat inside the piston.



I705H1430026-01

**⚠ CAUTION**

**When installing the snap ring, use the utmost care not to allow the internal parts to pop out.**

**Rear Brake Caliper Parts Inspection**

B705H14306008

Refer to "Rear Brake Caliper Removal and Installation (Page4C-3)".

Inspect the following parts.

**Brake Caliper Cylinder**

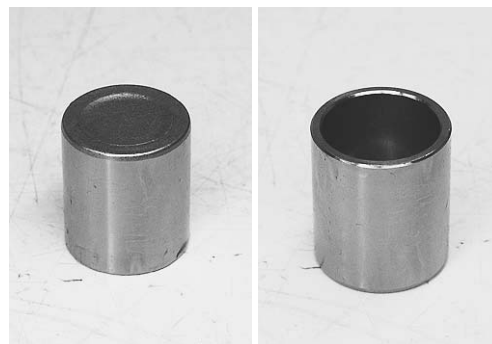
Inspect the brake caliper cylinder sliding face and oil seal groove for wear or other damage. If any damage is found, replace the caliper with a new one.



I705H1430027-01

**Brake Caliper Piston**

Inspect the brake caliper piston sliding face for any scratches or other damage. If any damage is found, replace the piston with a new one.



I705H1430028-01

**Brake Caliper Piston**

Inspect the brake caliper piston sliding face and oil seal groove of the seal for wear or damage. If any damage is found, replace the piston with a new one.

Inspect the adjust nut, spring or snap ring for any scratches or other damage. If any damage is found, replace the piston with a new one.



I705H1430029-01

## Rear Brake Disc Removal and Installation

B705H14306001

### Removal

- 1) Remove the rear wheel. Refer to “Rear Wheel Assembly Removal and Installation in Section 2D (Page2D-9)”.
- 2) Remove the rear brake disc.



I705H1430037-01

### Installation

Refer to “Rear Brake Disc Inspection (Page4C-9)”. Install the rear brake disc in the reverse order of removal. Pay attention to the following points:

- Make sure that the brake discs are clean and free of any grease.
- Apply thread lock to the brake disc bolts and tighten them to the specified torque.

 **1360** : Thread lock cement 99000–32130 (Thread Lock Cement Super 1360 or equivalent)

### Tightening torque

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



I705H1430033-01

## Rear Brake Disc Inspection

B705H14306002

### Brake Disc Thickness

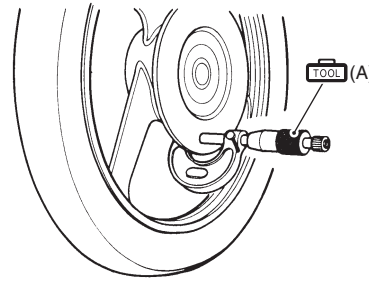
Check the brake disc for damage or cracks and measure the thickness using the micrometer. Replace the brake disc if the thickness is less than the service limit or if defect is found.

### Special tool

 (A): 09900–20205 (Micrometer (0 – 25 mm))

### Brake disc thickness

Service limit (Rear): 4.5 mm (0.18 in)





I649G1430027-02

### Brake Disc Runout

- 1) Remove the rear brake caliper. Refer to “Rear Brake Caliper Removal and Installation (Page4C-3)”.
- 2) Measure the runout using the dial gauge. Replace the disc if the runout exceeds the service limit.

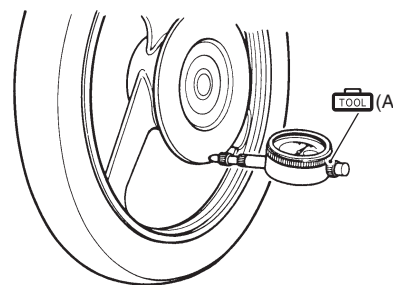
### Special tool

 (A): 09900–20607 (Dial gauge (1/100 mm, 10 mm))

 : 09900–20701 (Magnetic stand)

### Brake disc runout

Service limit: 0.30 mm (0.012 in)



I649G1430028-02

- 3) Install the rear brake caliper. Refer to “Rear Brake Caliper Removal and Installation (Page4C-3)”.



## Specifications

### Tightening Torque Specifications

B705H14307001

Fastening part	Tightening torque			Note
	N·m	kgf·m	lb·ft	
Pad mounting pin	18	1.8	13.0	☞ (Page4C-3)
Caliper mounting bolt	23	2.3	16.5	☞ (Page4C-3) / ☞ (Page4C-4)
Brake hose union bolt	23	2.3	16.5	☞ (Page4C-4)
Brake-lock housing bolt	22	2.2	16.0	☞ (Page4C-5)
Brake disc bolt	23	2.3	16.5	☞ (Page4C-9)

#### NOTE

The specified tightening torque is also described in the following.  
 “Rear Brake Components (Page4C-1)”

#### Reference:

For the tightening torque of fastener not specified in this section, refer to “Tightening Torque Specifications in Section 0C (Page0C-7)”.

## Special Tools and Equipment

### Recommended Service Material

B705H14308001


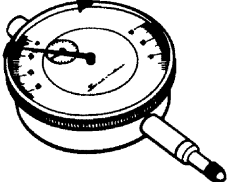
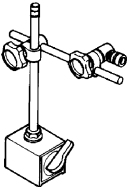
Material	SUZUKI recommended product or Specification		Note
Brake fluid	DOT 4	—	☞ (Page4C-6) / ☞ (Page4C-7)
Grease	SUZUKI Silicone Grease or equivalent	P/No.: 99000-25100	☞ (Page4C-6) / ☞ (Page4C-6) / ☞ (Page4C-7)
Thread lock cement	THREAD LOCK CEMENT SUPER 1360 or equivalent	P/No.: 99000-32130	☞ (Page4C-5) / ☞ (Page4C-9)

#### NOTE

Required service material is also described in the following.  
 “Rear Brake Components (Page4C-1)”

### Special Tool

B705H14308002

09900-20205 Micrometer (0 – 25 mm) ☞ (Page4C-9) 	09900-20607 Dial gauge (1/100 mm, 10 mm) ☞ (Page4C-9) 
09900-20701 Magnetic stand ☞ (Page4C-9) 	



# Parking Brake

## General Description

### Parking Brake System (Brake-lock System) Description

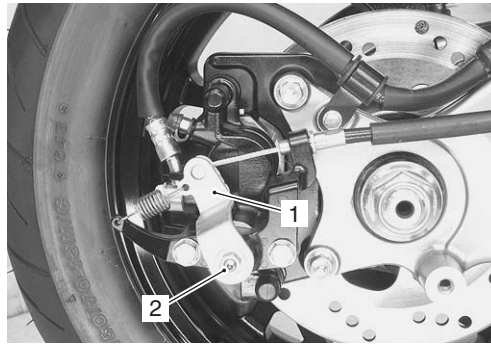
B705H14401001

#### Parking Brake (Brake-lock) Operation

The brake-lock arm turns through the brake-lock cable as soon as pulling the brake-lock lever. The turning movement is converted to axial movement by the brake-lock adjuster connected to the body with the thread "A".

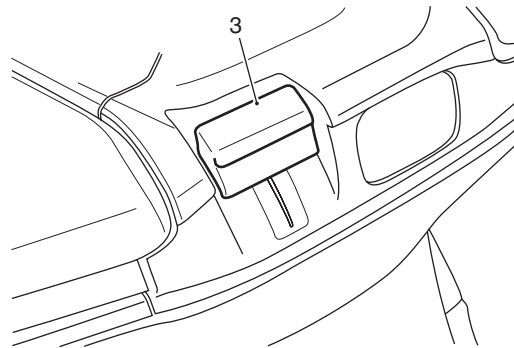
The axial movement transmits automatically from sleeve piston to adjust-bolt. The adjust-bolt presses brake pad to brake disk through the adjust-nut/caliper piston. In this bout, the adjust-bolt and adjust-nut move together with the relation as shown in the figure.

When releasing the brake-lock lever, each part return to home position, the caliper piston will be returned by an elasticity transform of piston seal, the adjust-bolt will be returned by the adjust-bolt spring, the brake-lock adjuster will be returned by the return-spring.



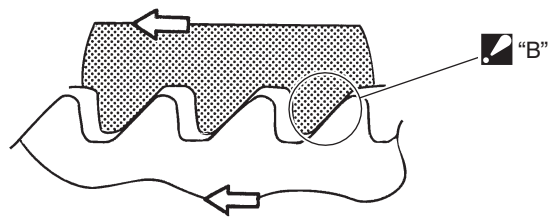
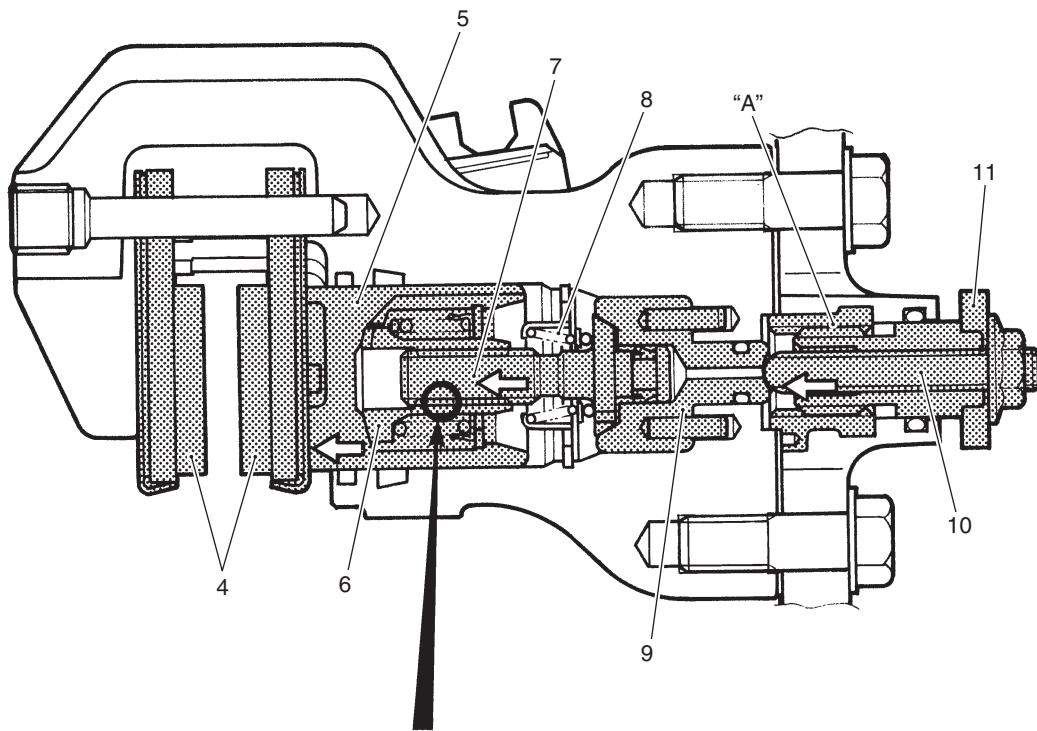
I705H1440010-02

1. Brake-lock arm	2. Brake-lock adjuster
-------------------	------------------------



I705H1440009-02

3. Brake-lock lever
---------------------



4. Brake pad	9. Sleeve piston
5. Caliper piston	10. Brake-lock adjuster
6. Adjust nut	11. Brake-lock arm
7. Adjust bolt	"A": Thread
8. Adjust bolt spring	▣ "B": The adjust bolt presses the adjust nut.

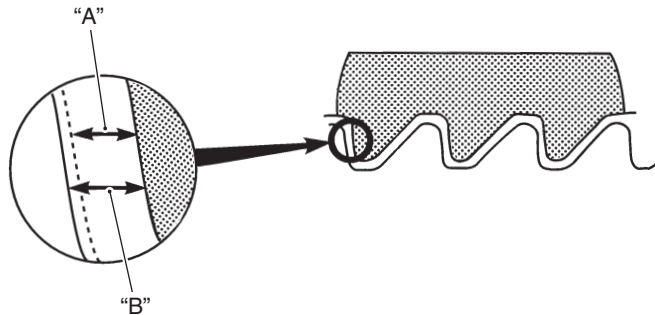
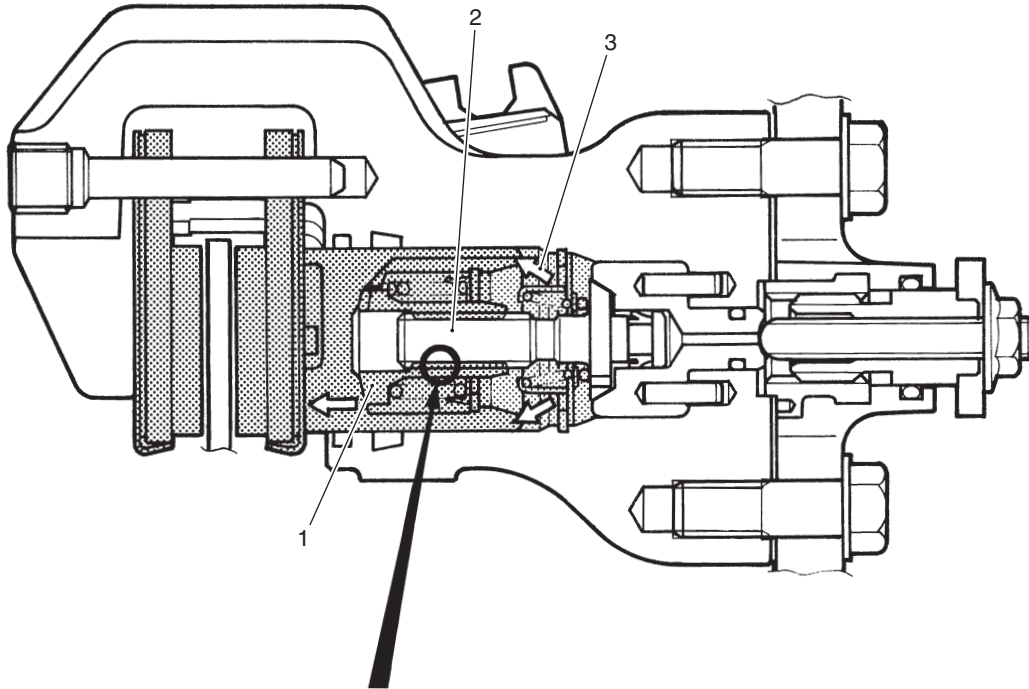
## 4D-3 Parking Brake:

### Automatic Parking Brake Adjuster System (Automatic Brake-lock Adjuster System)

The automatic brake-lock adjuster system is equipped on the brake-lock. If the brake pad worn, the adjust-bolt/nut adjust the position of caliper piston so as to keep the certain clearance between brake pad and brake disk.

#### Operation (Normal Condition → Braking)

The hydraulic pressure by brake lever operation acts on the adjust-nut/caliper piston. The adjust-bolt threads and adjust-nut threads have a clearance. The piston stroke when braking is shorter than clearance, thus, the braking operation will finish without automatic brake-lock adjuster system operation.



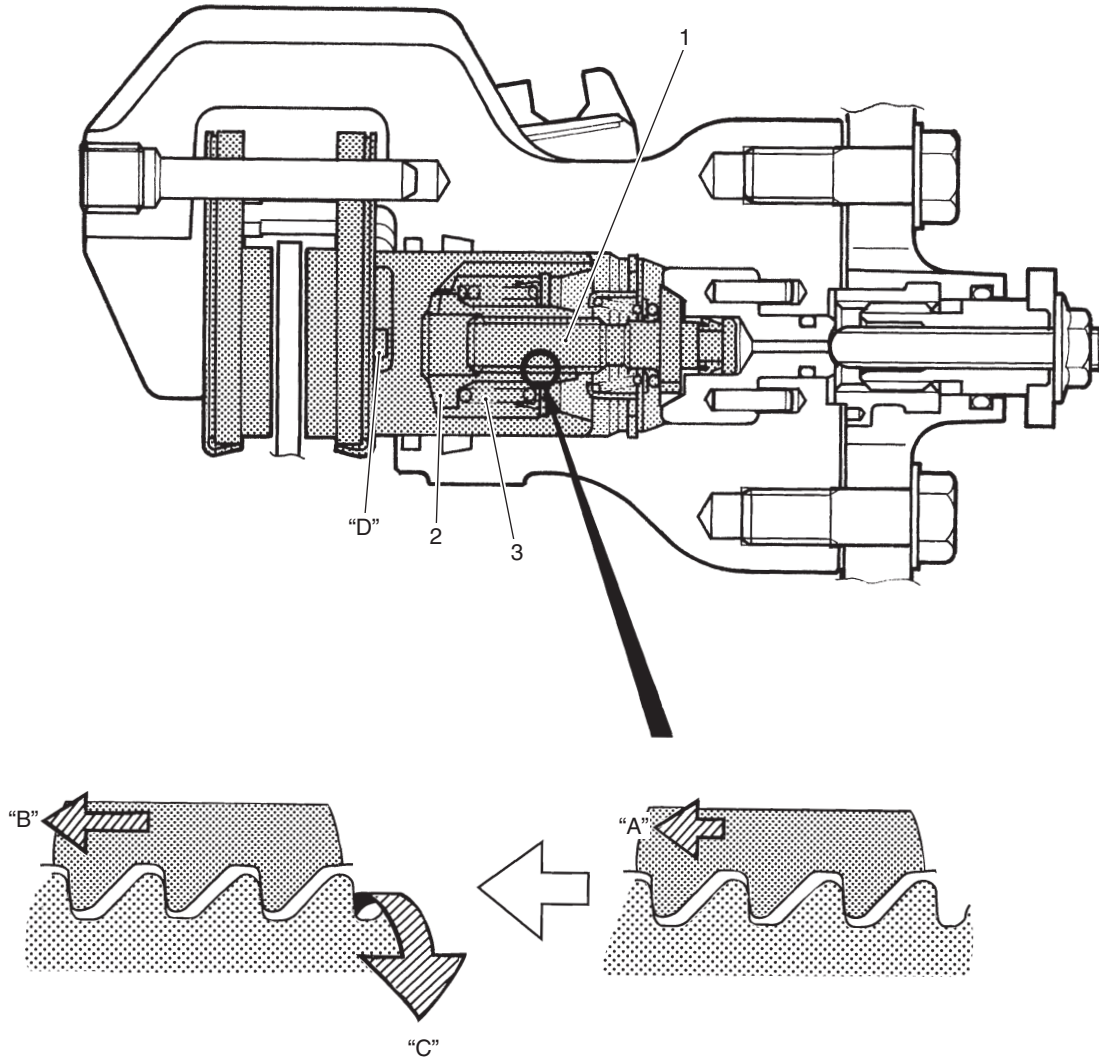
1. Adjust nut	3. Hydraulic pressure	"B": Clearance
2. Adjust bolt	"A": Caliper piston stroke	

I705H1440012-03

**Operation (Brake Pads are Worn → Braking → Automatic Adjuster Operate)**

If braking when the brake pad being worn, the caliper piston/adjust nut move "A" until the clearance depended on abrasion is done away.

The axial movement "B" is converted to rotary movement and acts on the adjust bolt and adjust-nut. Only the adjust-bolt turns "C" because the caliper piston/adjust-nut is fixed to the brake pad with caliper piston groove and pad boss at "D". Thus, the adjust-bolt keeps original position with rotating as well as the caliper piston/adjust-nut moves outside. The adjust-bolt stops rotating once the brake pad-to-disc clearance become zero, so the automatic adjuster operation is completed.



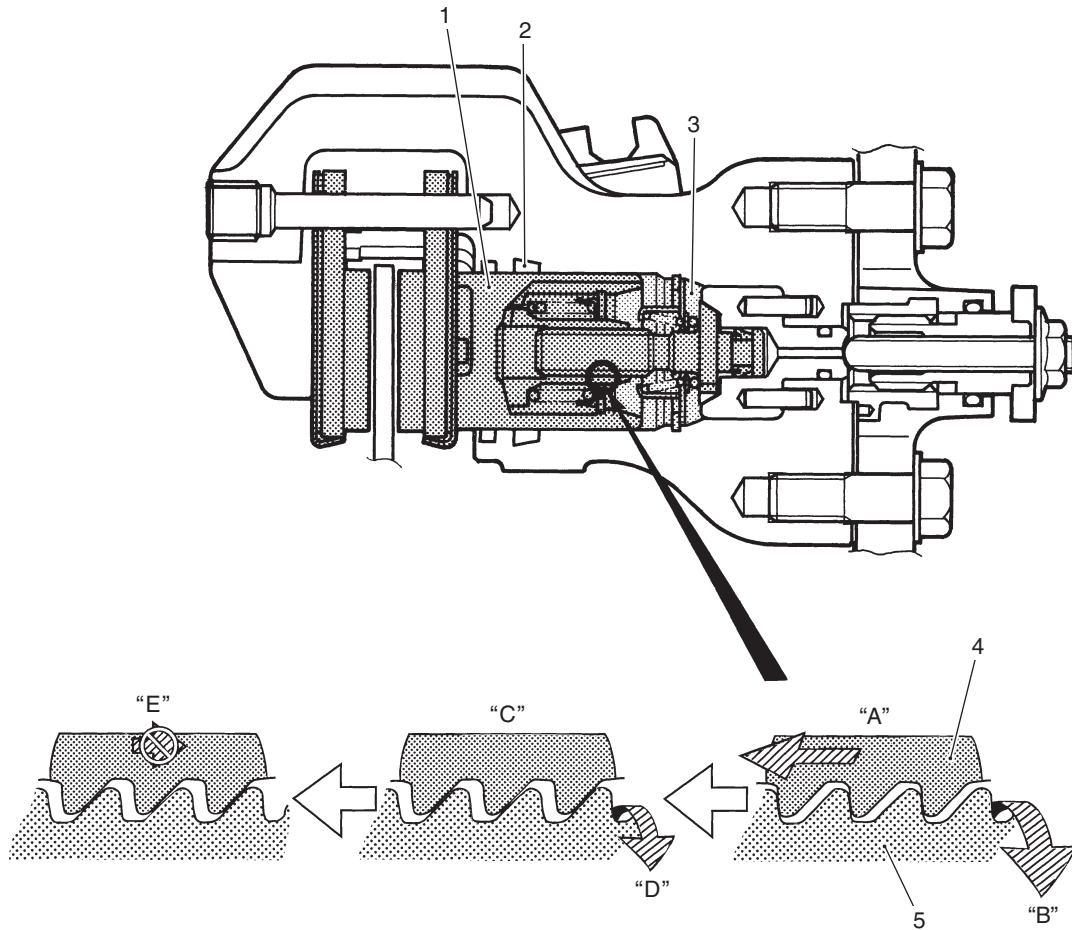
1. Adjust bolt	2. Adjust nut	3. Adjust nut spring
----------------	---------------	----------------------

## 4D-5 Parking Brake:

### Over-adjust Prevention Mechanism

When rapid braking "A", the automatic brake-lock adjuster operation works too fast "B".

The caliper piston/adjust nut is forced to stop "C" as soon as the brake pad contacts with brake disk, but the adjust bolt turns by inertia force "D" after that. The adjust bolt stops after the adjust-bolt/nut clearance becomes zero. On this account, the caliper piston/adjust nut can not return back "E" using the elasticity transform of piston seal when releasing the brake lever. It is the over-adjust condition.

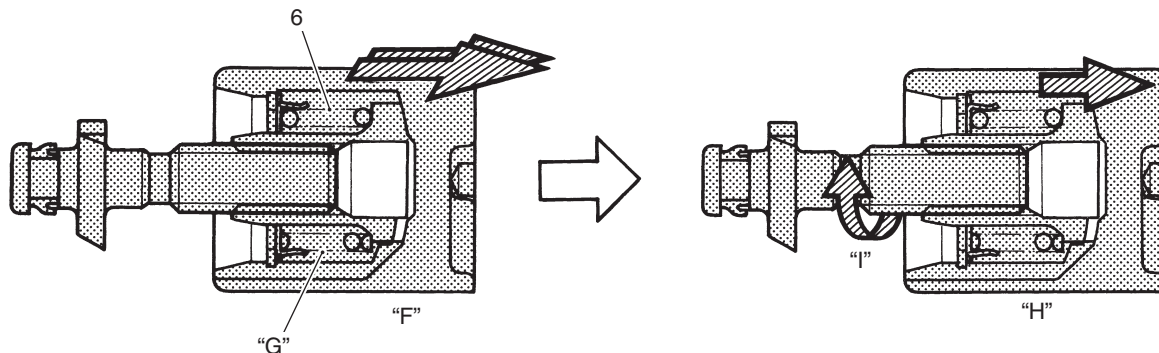


1. Caliper piston	"A": Rapid braking
2. Piston seal	"B": Rapid rotation
3. Hydraulic pressure	"C": Sudden stop
4. Adjust nut	"D": Turn by inertia
5. Adjust bolt	"E": Impossible to return

I705H1440014-02

The spring is equipped between the caliper piston and the adjust-nut for preventing the over-adjust, serves damper in term of rapid caliper piston movement.

The spring compress "A" as soon as the caliper piston moves exponentially "B", the adjust-nut moves "C", "D" behind time. Here with, it is possible to make correct clearance of the adjust bolt/nut because the inertia force with rapid movement does not work the adjust-bolt.



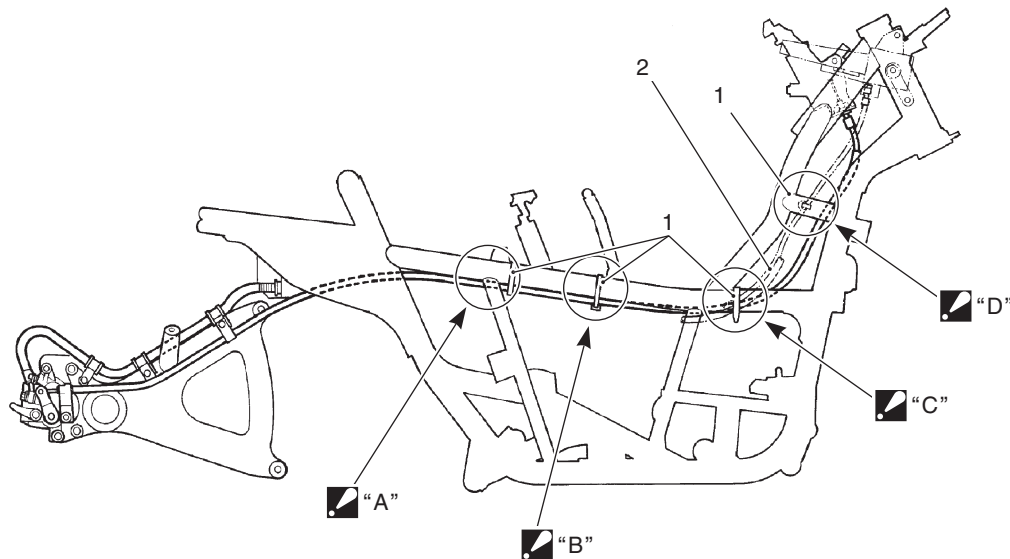
I705H1440015-02

6. Spring	"G": Spring compresses	"I": Rotate
"F": Rapid braking	"H": Spring tensions/adjuster nut moves	

## Schematic and Routing Diagram

### Parking Brake Cable (Brake-lock Cable) Routing Diagram

B705H14402001



I705H1440007-03

1. Clamp	☑ "B": Pass the throttle cables through under and inside of the frame. Bind the brake-lock cable, starter motor lead wire and seat-lock cable together.
2. Wire harness	☑ "C": Pass the throttle cables through inside of the frame. Bind the brake-lock cable starter motor lead wire and seat-lock cable together.
☑ "A": Pass the throttle cables through inside of the frame.	☑ "D": Pass the throttle cables through inside of the frame.



## Repair Instructions

### Parking Brake System (Brake-lock System) Inspection

B705H14406001

Refer to "Parking Brake (Brake-lock) Inspection in Section 0B (Page0B-20)".

### Parking Brake System (Brake-lock System) Removal and Installation

B705H14406002

Refer to "Rear Brake Caliper Removal and Installation in Section 4C (Page4C-3)".

### Parking Brake System (Brake-lock System) Disassembly and Assembly

B705H14406003

Refer to "Rear Brake Caliper Disassembly and Assembly in Section 4C (Page4C-4)".

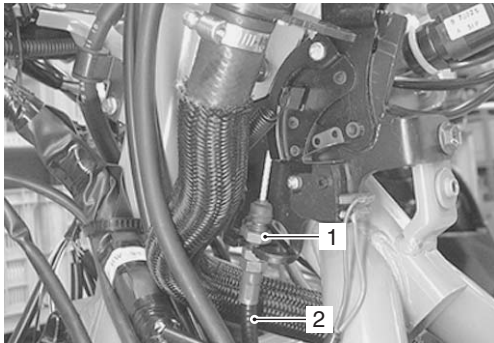
### Parking Brake Cable (Brake-lock Cable) Removal and Installation

B705H14406004

Refer to "Parking Brake Cable (Brake-lock Cable) Routing Diagram (Page4D-6)".

#### Removal

- 1) Remove the front box. Refer to "Front Box Removal and Installation in Section 9D (Page9D-18)".
- 2) Loosen the brake-lock nut (1), remove the brake-lock cable (2).



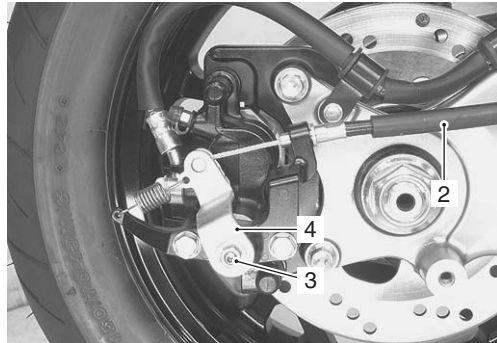
I705H1440001-02

- 3) Remove the brake hose clamp.



I705H1440002-05

- 4) Remove the lock-nut (3) and remove the brake-lock arm (4).

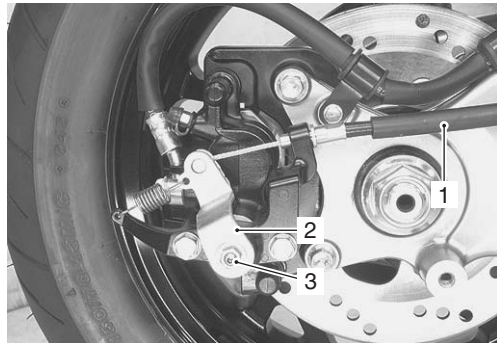


I705H1440003-01

- 5) Remove the brake-lock cable. Refer to "Parking Brake Cable (Brake-lock Cable) Routing Diagram (Page4D-6)".

#### Installation

- 1) Install the brake-lock cable. Refer to "Parking Brake Cable (Brake-lock Cable) Routing Diagram (Page4D-6)".
- 2) Assemble the brake-lock cable (1) to brake-lock arm (2), install the lock-nut (3). Refer to "Rear Brake Caliper Removal and Installation in Section 4C (Page4C-3)".

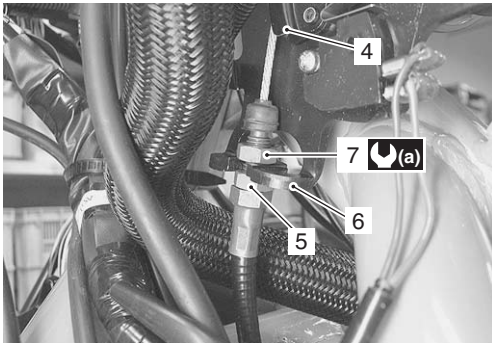


I705H1440004-01

- 3) Pull the brake-lock lever (4) one notch.
- 4) Tighten the brake-lock cable adjust bolt (5) by hand until it contacts the holder (6).
- 5) Tighten the brake-lock cable lock-nut (7) to the specified torque.

**Tightening torque**

**Brake-lock cable lock-nut (a): 10 N·m (1.0 kgf-m, 7.0 lb-ft)**



I705H1440005-03

- 6) Install the brake hose clamp.



I705H1440002-05

- 7) Install the front box. Refer to “Front Box Removal and Installation in Section 9D (Page9D-18)”.
- 8) After installing, adjust the brake-lock. Refer to “Brake System Inspection in Section 0B (Page0B-13)”.

## Specifications

### Tightening Torque Specifications

B705H14407001

Fastening part	Tightening torque			Note
	N·m	kgf-m	lb-ft	
Brake-lock cable lock-nut	10	1.0	7.0	☞ (Page4D-8)

**Reference:**

For the tightening torque of fastener not specified in this section, refer to “Tightening Torque Specifications in Section 0C (Page0C-7)”.



## Section 5

## Transmission / Transaxle

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Inner Clutch Cover Bearing Inspection .....	5A-7	Recommended Service Material .....	5A-18
Inner Clutch Cover Bering Removal and		Special Tool .....	5A-18
Installation .....	5A-7		

# Precautions

## Precautions

### Precautions for Transmission/Transaxle

Refer to "General Precautions in Section 00 (Page00-1)".

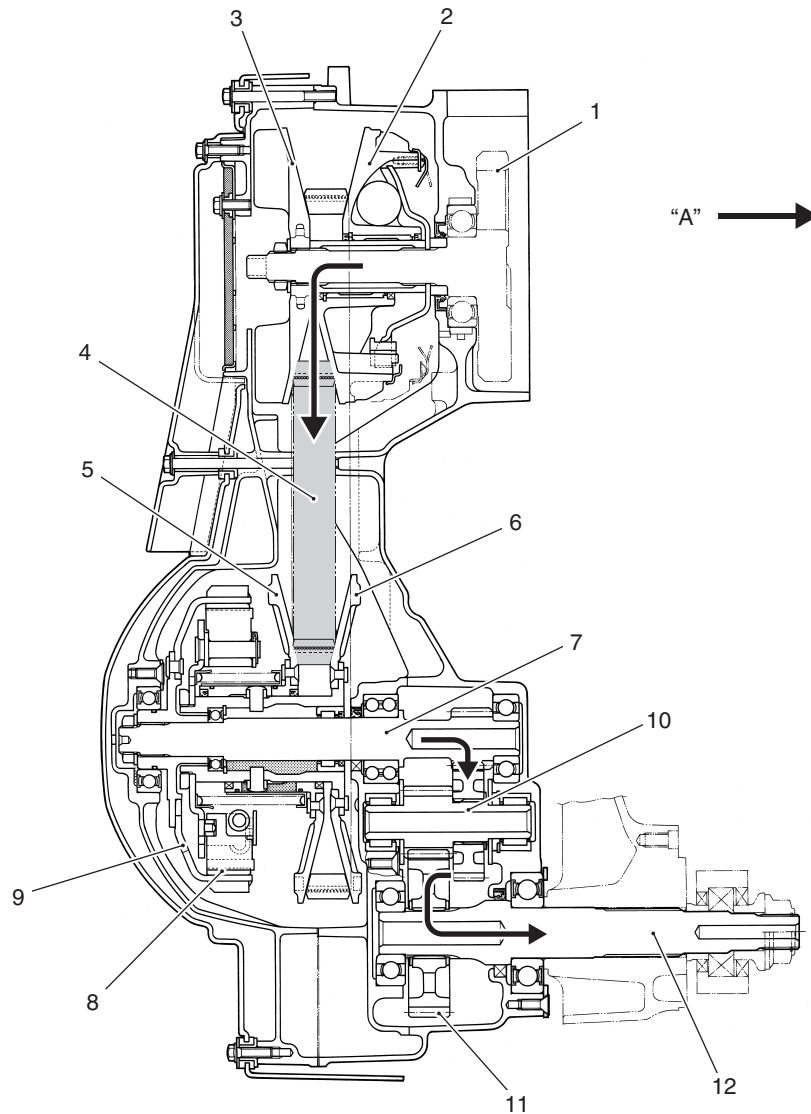
B705H15000001

# Automatic Transmission

## Schematic and Routing Diagram

### Drive Train System

B705H15102001



I705H1510001-07

1. Crankshaft	6. Fixed driven face	11. Final gear
2. Movable drive face	7. Driveshaft	12. Rear axle shaft
3. Fixed drive face	8. Clutch shoe	"A": Drive Train route
4. V-belt	9. Clutch housing	
5. Movable driven face	10. Idle gear	



## Diagnostic Information and Procedures

### Automatic Transmission Symptom Diagnosis

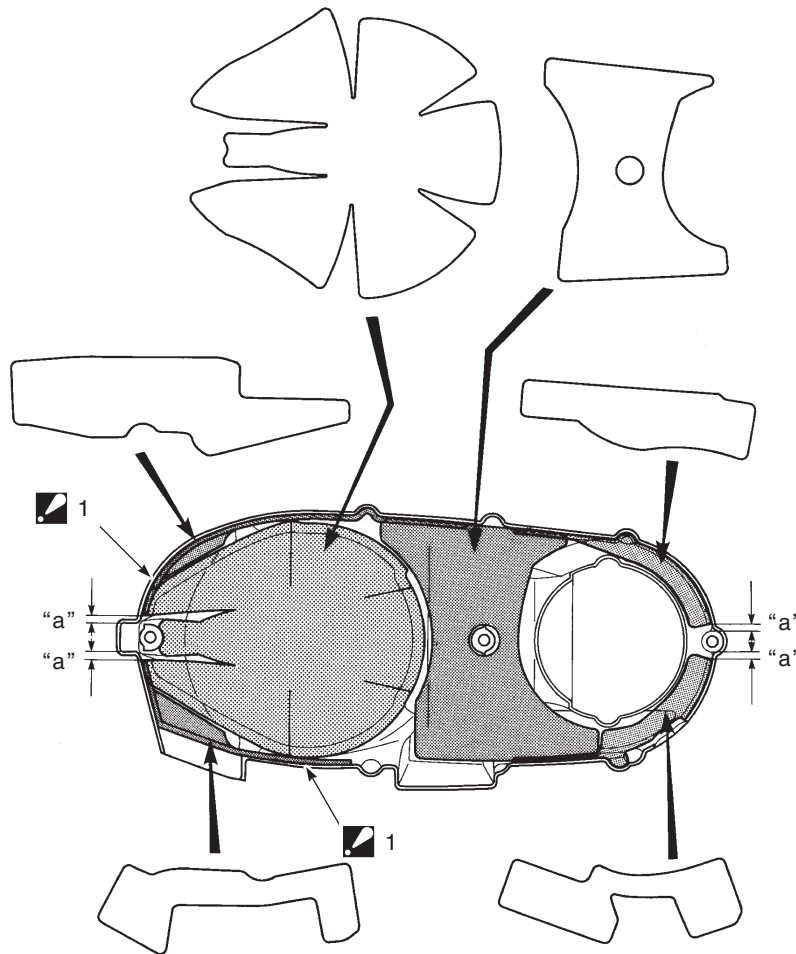
B705H15104001

Condition	Possible cause	Correction / Reference Item
<b>Excessive engine noise</b>	Gear worn or abnormal contact.	<i>Replace.</i>
	Spline worn.	<i>Replace.</i>
	Bearing worn or burned.	<i>Replace.</i>
<b>V-belt slipping</b>	V-belt slipping.	<i>Replace.</i>
	Pulley face worn.	<i>Replace.</i>
<b>Clutch slipping</b>	Clutch shoe worn.	<i>Replace.</i>
	Centrifugal weight operation failure.	<i>Repair or replace.</i>
	V-belt worn.	<i>Replace.</i>
<b>Clutch dragging</b>	Clutch shoe spring fatigued.	<i>Replace.</i>
	Movable driven face distorted.	<i>Replace.</i>

## Repair Instructions

### Outer Clutch Cover Cushion Construction

B705H15106012



I705H1510068-02

1. Cushion  
: Stick top of cushion 0 – 5 mm (0 – 0.2 in) inside of the clutch outer cover.

"a": 5 – 10 mm (0.2 – 0.4 in)

**Clutch In / Stall Speed Inspection**

B705H15106001

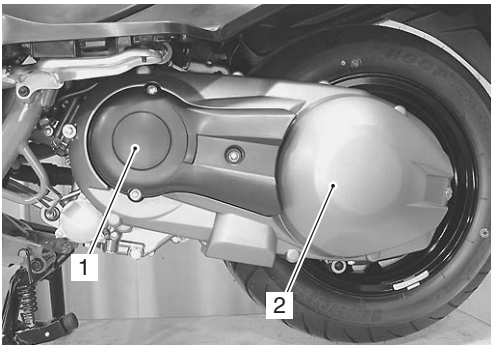
Refer to "Automatic Clutch Inspection in Section 0B (Page0B-19)".

**V-belt Type Continuously Variable Automatic Transmission Removal and Installation**

B705H15106002

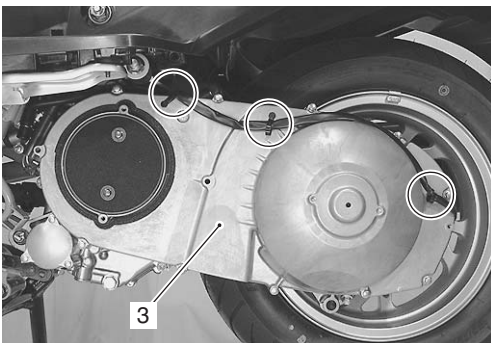
**Removal****Clutch cover**

- 1) Remove the side leg shield. Refer to "Side Leg Shield Removal and Installation in Section 9D (Page9D-15)".
- 2) Remove the belt cooling duct (1) and outer clutch cover (2).



I705H1510002-01

- 3) Unfasten the clamp and remove the inner clutch cover (3).



I705H1510003-01


**Movable drive face**


- 1) Hold the fixed drive face using the special tools and remove the fixed drive face nut and washer.

**⚠ WARNING**

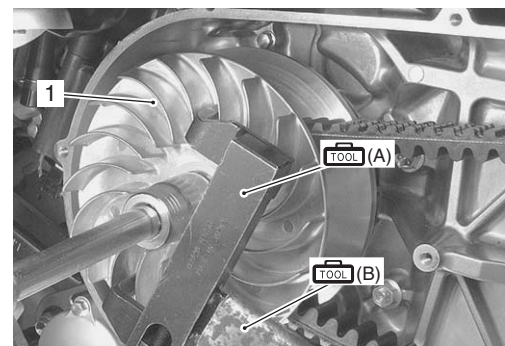
- To prevent the fin from breakage or injury from occurring due to inadvertent slipping, engage the tool end with the side of pulley securely and make sure the contact is on a center area of the fin.
- Remove the drive face nut with pressing the special tool to the drive face.

**Special tool**

 (A): 09920-53740 (Clutch sleeve hub holder)

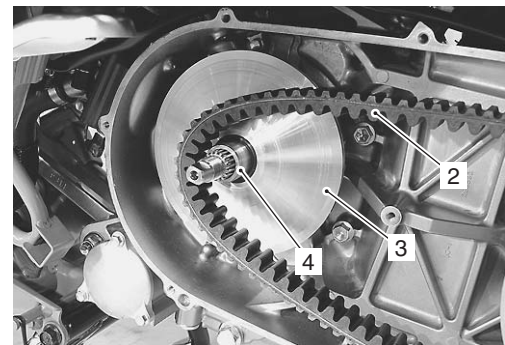
 (B): 09920-31020 (Extension handle)

- 2) Remove the fixed drive face (1).



I705H1510004-02

- 3) Remove the V-belt (2) and remove the movable drive face assembly (3) together with the spacer (4).



I705H1510005-01

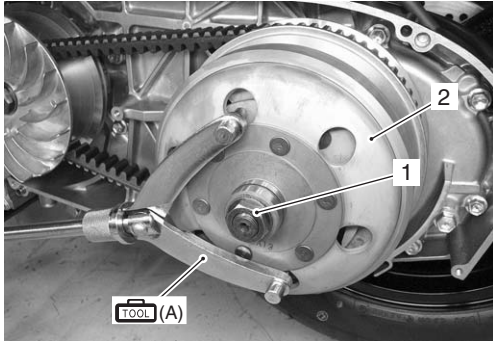
## 5A-4 Automatic Transmission:

### Clutch and movable driven face

- 1) Hold the clutch housing using the special tool and remove the clutch housing nut (1) and remove the clutch housing (2).

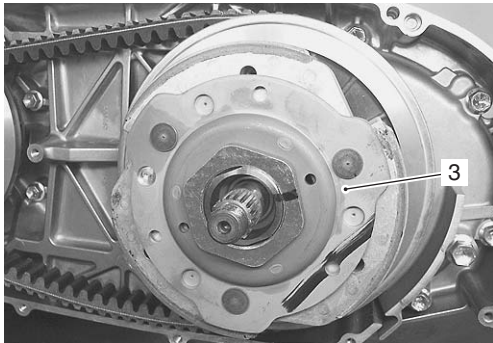
#### Special tool

 (A): 09930-40113 (Rotor holder)



I705H1510006-02

- 2) Remove the clutch shoe and movable driven face assembly (3).



I705H1510007-02

### Installation

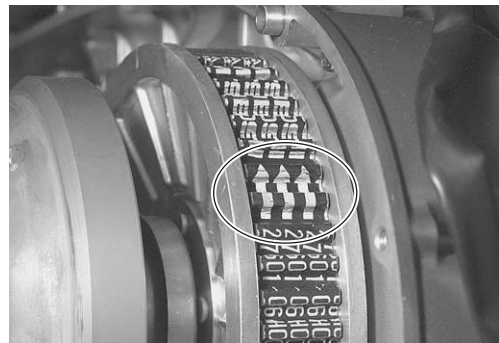
Refer to "Drive V-belt Inspection (Page5A-6)". Install the V-belt type continuously variable automatic transmission in the reverse order of the removal. Pay attention to the following points:

### Clutch and movable driven face

- 1) Assemble the clutch shoe, movable driven face assembly and V-belt.

#### CAUTION

- Position the V-belt so that its arrow points to the engine rotational direction.
- Degrees the V-belt contact surface (pulley face).

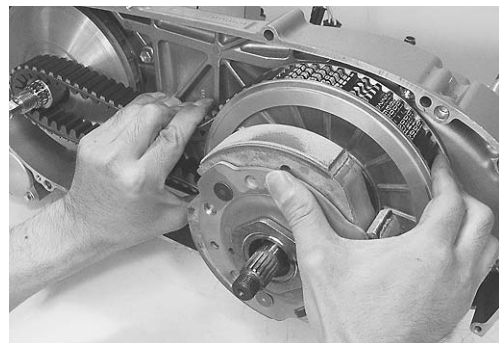


I705H1510066-01

- 2) Fit the V-belt by compressing it and pushing open the driven face assembly.

#### CAUTION

Keep compressing the center of V-belt so as not to open apart.



I705H1510008-03

3) Apply grease to the O-ring.

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

4) Hold the clutch housing using the special tool and tighten the clutch housing nut (1) to the specified torque.

#### CAUTION

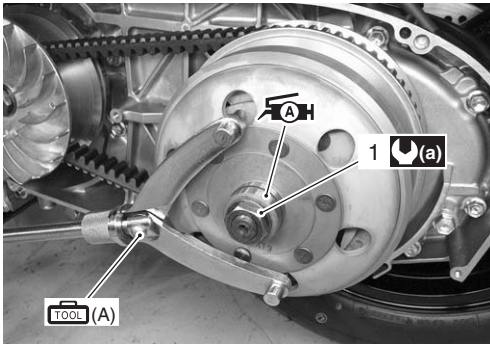
- Degrease the clutch housing surface.
- Replace the O-ring with a new one.

#### Special tool

 (A): 09930-40113 (Rotor holder)

#### Tightening torque

Clutch housing nut (a): 85 N·m (8.5 kgf-m, 61.5 lb-ft)



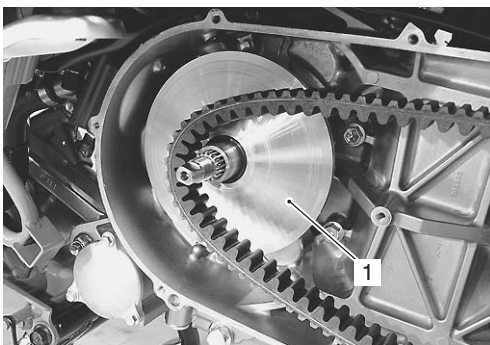
I705H1510009-05

#### Movable drive face assembly

1) Install the movable drive face assembly (1).

#### CAUTION

Degrease the V-belt contact face (pulley surface).



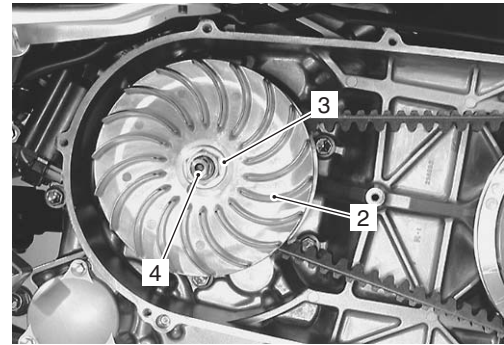
I705H1510010-01

2) Install the fixed drive face (2).

3) Install the washer (3) and fixed drive face nut (4).

#### CAUTION

- Check for dirt or grease on the fixed drive face and if any, clean and degrease thoroughly. Also check that the parts are properly fitted with the spline.
- When installing the fixed drive face, check that the V-belt has a play and the fixed drive face contacts the end of the spacer.
- When installing the fixed drive face nut, check that the V-belt is not caught in the movable drive face assembly.




I705H1510011-01


4) Hold the fixed drive face using the special tools and tighten the fixed drive face nut (4) to the specified torque.

#### WARNING

- To prevent the fin from breakage or injury from occurring due to inadvertent slipping, engage the tool end with the side of pulley securely and make sure the contact is on a center area of the fin.
- Tighten the drive face nut with pressing the special tool to the drive face.

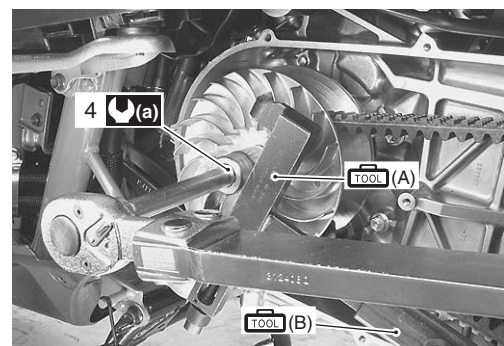
#### Special tool

 (A): 09920-53740 (Clutch sleeve hub holder)

 (B): 09920-31020 (Extension handle)

#### Tightening torque

Fixed drive face nut (a): 105 N·m (10.5 kgf-m, 76.0 lb-ft)

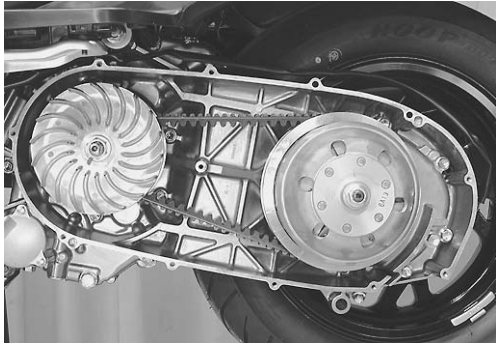


I705H1510012-02



## 5A-6 Automatic Transmission:

- 5) Continue to turn the fixed drive face until it moves simultaneously with the movable driven face in order to have the V-belt broken in.



I705H1510013-01


### Drive V-belt Inspection

B705H15106003

Perform the inspection in the following procedures:

- 1) Remove the drive V-belt. Refer to “V-belt Type Continuously Variable Automatic Transmission Removal and Installation (Page5A-3)”.
- 2) Inspect the following items and if any defects are found, replace the drive V-belt with a new one.
  - Check for grease or oil sticking on the drive V-belt.
  - Check for crack or other damage on the surface contacted by the face.
  - Measure drive V-belt width using the vernier calipers.

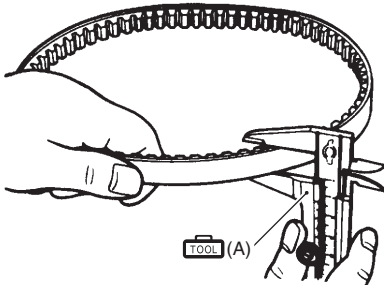
#### Special tool

 (A): 09900-20101 (Vernier calipers (1/15 mm, 150 mm))

#### Drive V-belt width

Standard: 25.1 mm (0.99 in)

Service limit: 24.1 mm (0.95 in)



I705H1510062-01

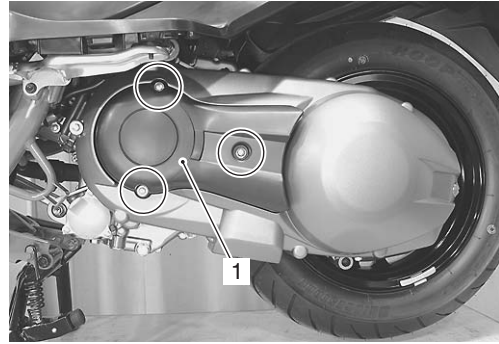
- 3) After inspection, install the drive V-belt. Refer to “V-belt Type Continuously Variable Automatic Transmission Removal and Installation (Page5A-3)”.

## Cooling Fan Filter Inspection

B705H15106004

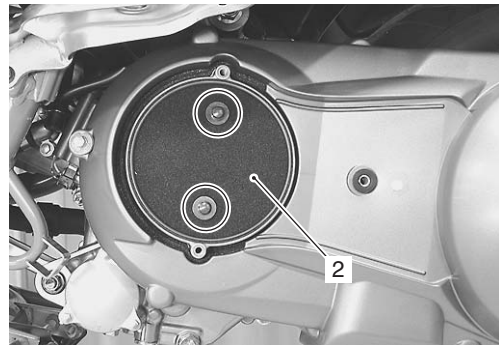
Perform the inspection in the following procedures:

- 1) Remove the cooling fan duct (1).



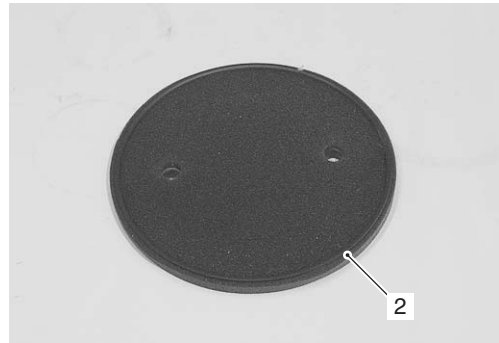
I705H1510014-01

- 2) Remove the cooling fan filter (2).



I705H1510015-01

- 3) Check for dirt, clogging and damage on belt cooling filter (2) and if any, replace the filter with a new one.



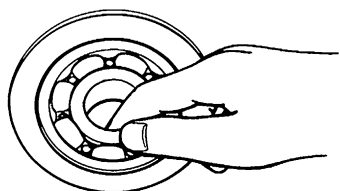
I705H1510067-01

- 4) After inspection, install the belt cooling filter and belt cooling duct.

## Inner Clutch Cover Bearing Inspection

B705H15106013

Inspect the play of the inner clutch cover bearings by finger while they are in the inner clutch cover. Rotate the inner race by finger to inspect for abnormal noise and smooth rotation. Replace the bearing in the following procedures if there is anything unusual. Refer to “Inner Clutch Cover Bering Removal and Installation (Page5A-7)”.



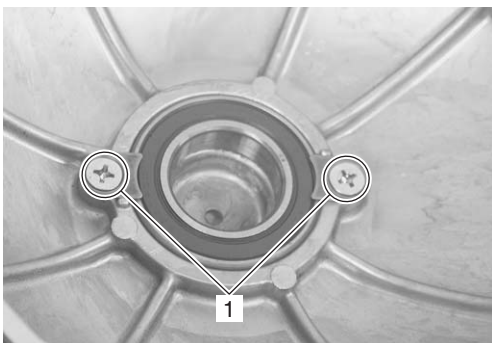
I649G1240015-01

## Inner Clutch Cover Bering Removal and Installation

B705H15106014

### Removal


- 1) Remove the inner clutch cover. Refer to “V-belt Type Continuously Variable Automatic Transmission Removal and Installation (Page5A-3)”.
- 2) Remove the bearing retainers (1).

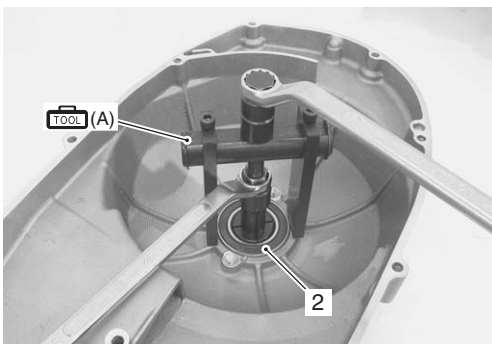


I705H1510069-01

- 3) Remove the bearing (2) using the special tool.

### Special tool

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



I705H1510070-02

## Installation

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

### ⚠ CAUTION

**The removed bearing must be replaced with the new ones.**

- Apply grease to the bearing and inner clutch cover side.

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




I649G1240019-01

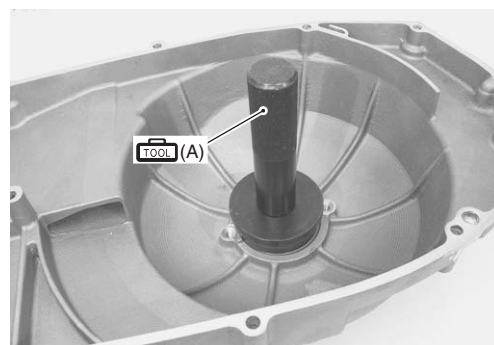
- Install the bearing to the inner clutch cover using the special tool.

### ⚠ CAUTION

**When installing the bearing, stamped mark on the bearing must face outside.**

### Special tool

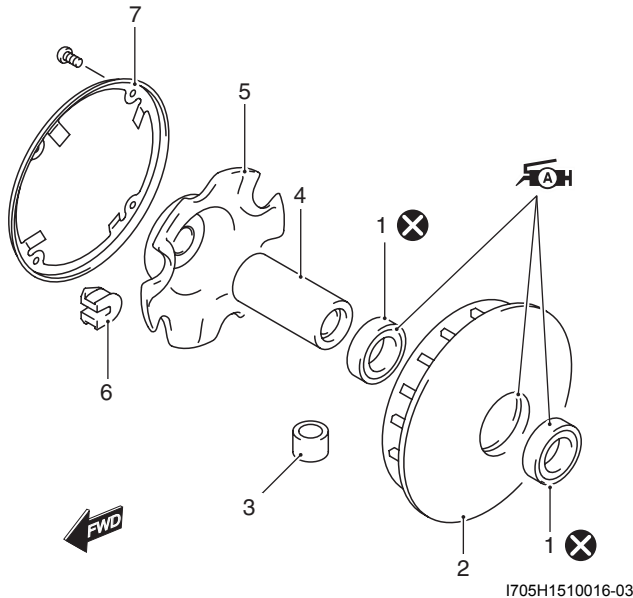
 (A): 09913-70210 (Bearing installer set)



I705H1510071-01

**Movable Drive Face Component**

B705H15106005



I705H1510016-03

1. Oil seal	6. Damper
2. Movable drive face	7. Movable drive face cover
3. Roller	<b>AH</b> : Apply grease.
4. Spacer	<b>X</b> : Do not reuse.
5. Movable drive plate	

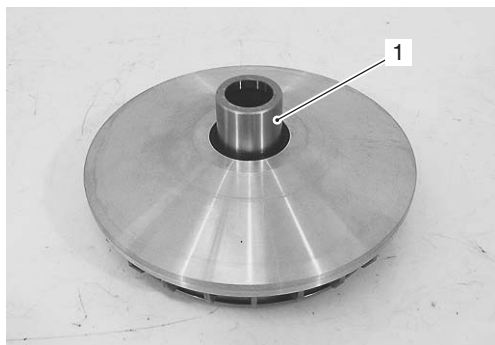
**Movable Drive Face Disassembly and Assembly**

B705H15106006

Refer to “V-belt Type Continuously Variable Automatic Transmission Removal and Installation (Page5A-3)” and “Movable Drive Face Component (Page5A-8)”.

**Disassembly**

1) Remove the spacer (1).



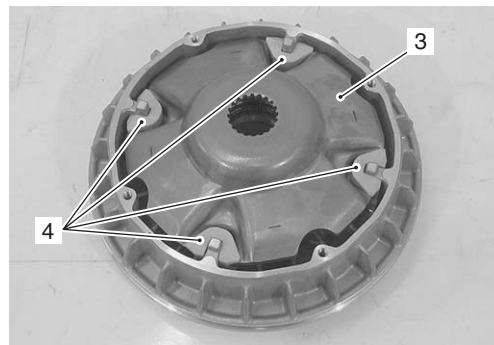
I705H1510017-01

2) Remove the movable drive face cover (2).



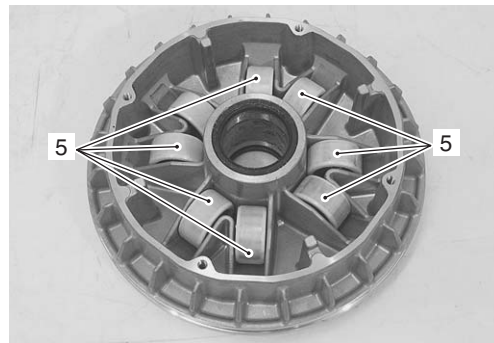
I705H1510018-04

3) Remove the movable drive plate (3) and dampers (4).



I705H1510019-03

4) Remove the rollers (5).



I705H1510020-02



**Assembly**

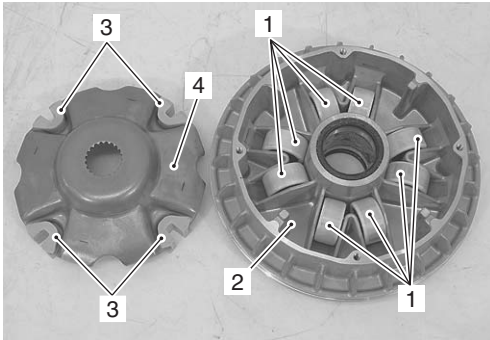
Refer to “Movable Drive Face Parts Inspection (Page5A-9)”.

- 1) Assemble the rollers (1) to the movable drive face (2).

**NOTE**

**Check that the roller inside the movable drive face is not running off the groove.**

- 2) Assemble the damper (3) to the movable drive plate (4).



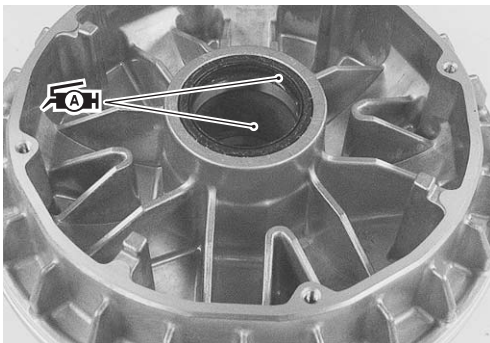
I705H1510021-06

- 3) Fill the grease into the sliding face of movable drive face.
- 4) Apply the grease lightly on the oil seal lip.

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

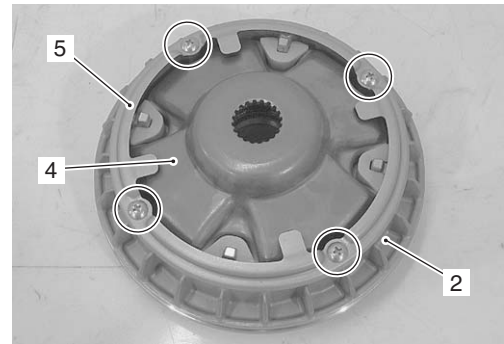
**⚠️ CAUTION**

**Excess grease should be wiped off.**



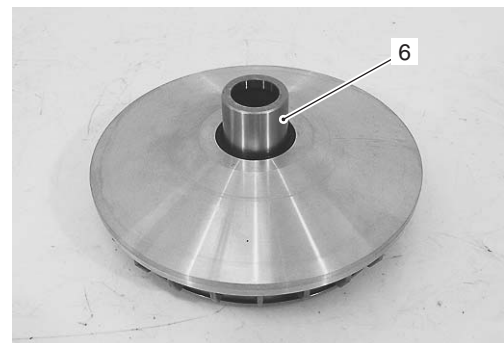
I705H1510022-06

- 5) Assemble the movable drive plate (4) to movable drive face (2).
- 6) Assemble the movable drive face cover (5).



I705H1510023-04

- 7) Assemble the spacer (6).



I705H1510024-01

**Movable Drive Face Parts Inspection**

B705H15106007

Refer to “Movable Drive Face Disassembly and Assembly (Page5A-8)”.

Inspect the following parts.

**Movable Face**

Inspect the movable face for any stepped wear on the drive face. If any defects are found, replace the drive face with a new one.

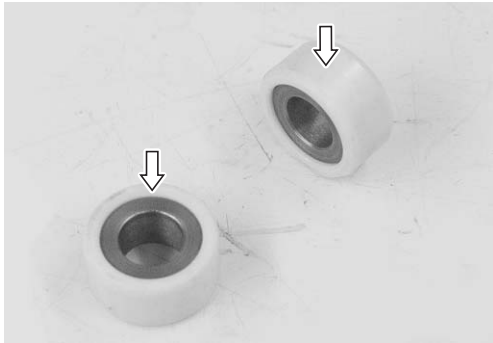


I705H1510026-01

## 5A-10 Automatic Transmission:

### Roller Inspection

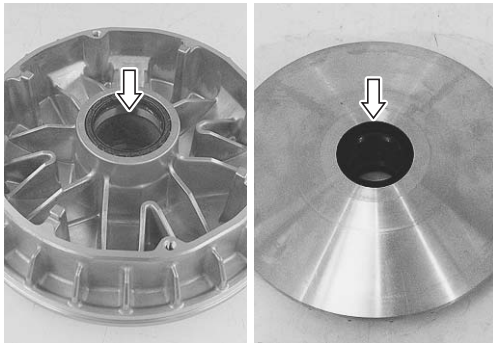
Inspect the roller for abnormal wear or other damage. If any defects are found, replace the roller with a new one.



I705H1510027-02

### Oil Seal

Inspect the oil seal for wear or other damage. If any defects are found, replace the oil seal with a new one.



I705H1510031-02

### Oil Seal Removal and Installation


B705H15106008

Refer to “V-belt Type Continuously Variable Automatic Transmission Removal and Installation (Page5A-3)” and “Movable Drive Face Disassembly and Assembly (Page5A-8)”.

#### Removal

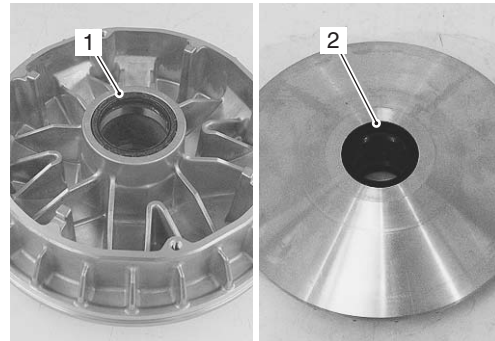
- 1) Remove the movable drive face.
- 2) Remove the roller.
- 3) Remove the oil seals (1) and (2) using the special tool.

#### Special tool

 : 09913-50121 (Oil seal remover)

### CAUTION

Care should be used when removing the drive face so as not to cause scratch or other damage on its surface.




I705H1510032-02

### Installation

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

#### Special tool

 : 09913-70210 (Bearing installer set)

### CAUTION

Care should be used when installing the drive face so as not to cause scratch or other damage on its surface.

- 2) Apply the grease lightly on the oil seal lip.

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

### CAUTION

Excess grease should be wiped off.

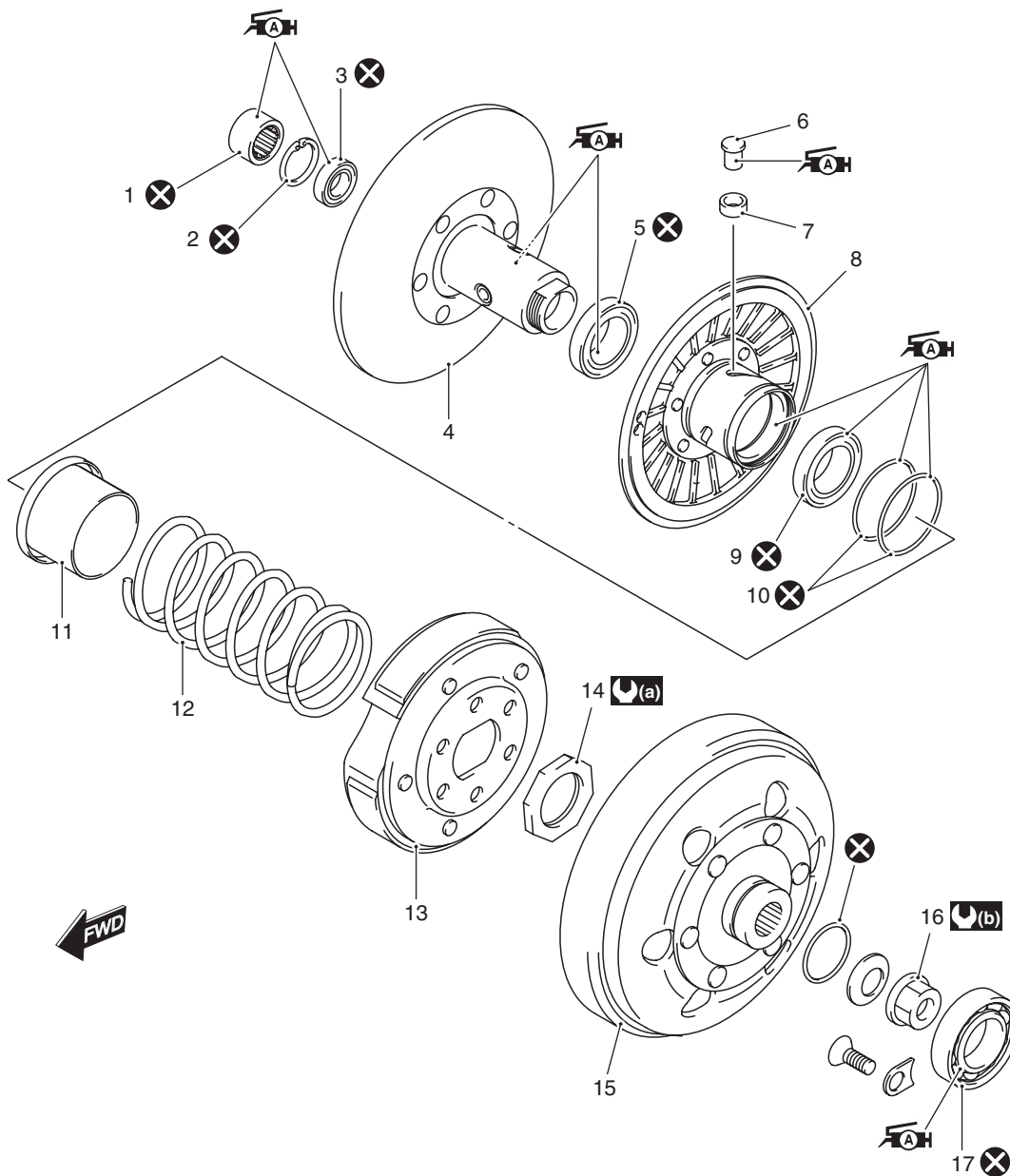


I705H1510033-02

- 3) Install the roller.
- 4) Install the movable drive face.

Clutch Shoe / Movable Driven Face Components

B705H15106011



I705H1510063-05

1. Needle bearing	8. Movable driven face	15. Clutch housing
2. Snap ring	9. Oil seal	16. Clutch housing nut
3. Bearing	10. O-ring	17. Inner clutch cover bearing
4. Fixed driven face	11. Movable driven face seat	(a) : 105 N·m (10.5 kgf·m, 76.0 lb-ft)
5. Oil seal	12. Movable driven face spring	(b) : 85 N·m (8.5 kgf·m, 61.5 lb-ft)
6. Movable driven pin	13. Clutch shoe assembly	AH : Apply grease.
7. Movable driven pin spacer	14. Clutch shoe nut	X : Do not reuse.

### Clutch Shoe / Movable Driven Face Disassembly and Assembly


B705H15106009


Refer to "V-belt Type Continuously Variable Automatic Transmission Removal and Installation (Page5A-3)" and "Movable Drive Face Component (Page5A-8)".

#### Disassembly

- 1) Engage the "A" of the special tool with five holes on the clutch shoe and fix the clutch shoe/movable driven face assembly by turning in the special tool handle.
- 2) Remove the clutch shoe nut (1).

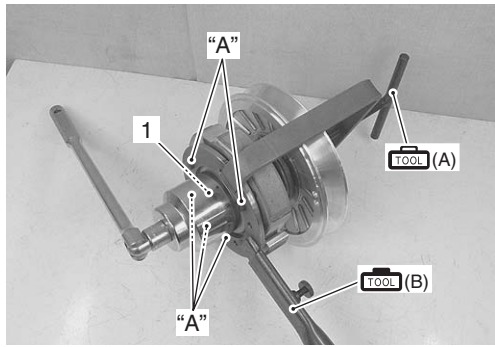
#### Special tool

 (A): 09922-31440 (Clutch spring compressor)

 (B): 09920-31020 (Extension handle)

#### CAUTION

Since a high spring force applies to the clutch shoe assembly, care must be used so as not to cause the clutch shoe assembly and movable driven face to come off abruptly.

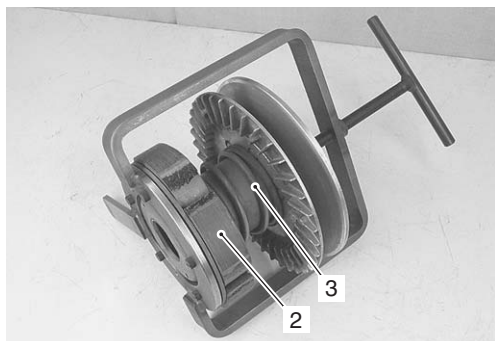


I705H1510034-08

- 3) Remove the clutch shoe plate (2) and spring (3) by loosening the special tool handle slowly.

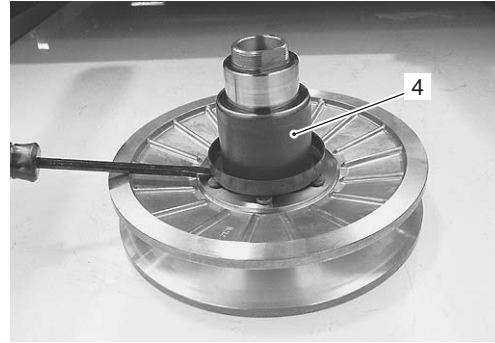
#### CAUTION

The clutch shoe cannot be disassembled.



I705H1510035-03

- 4) Remove the movable driven face seat (4) using a sharp point such as flat screwdriver.



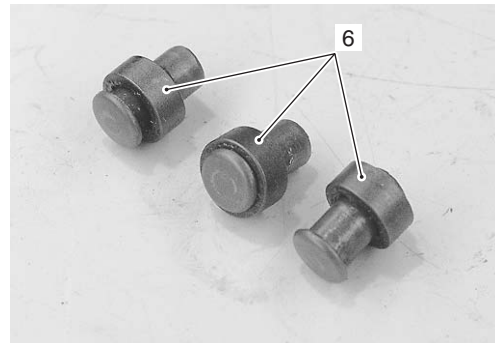
I705H1510036-01

- 5) Remove the movable driven pins (5) (3 pcs).



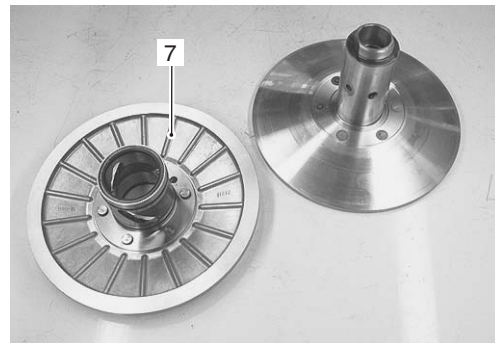
I705H1510038-01

- 6) Remove the movable driven pin spacers (6).



I705H1510039-01

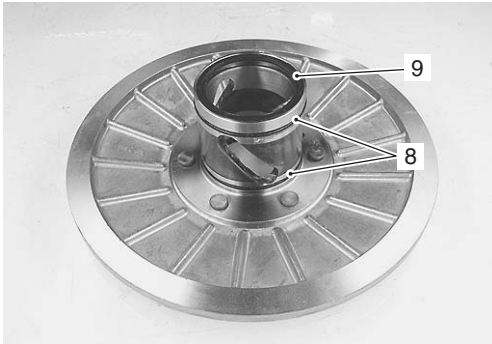
- 7) Remove the movable driven face (7).



I705H1510040-01

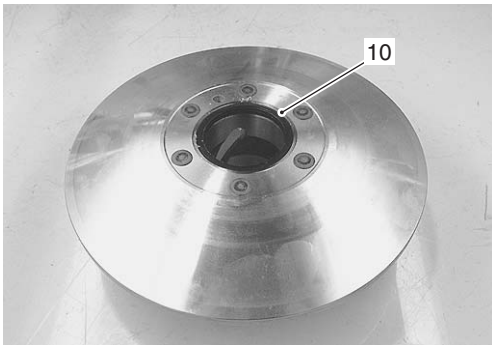


8) Remove the O-ring (8) and oil seal (9).



I705H1510041-01

9) Remove the oil seal (10).

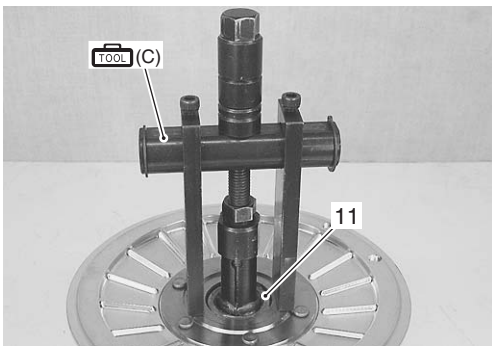


I705H1510042-01

10) Remove the needle bearing (11) using the special tool.

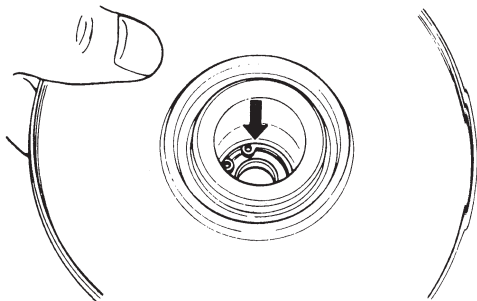
**Special tool**

**TOOL (C): 09921-20240 (Bearing remover set)**



I705H1510043-03

11) Remove the snap ring.



I705H1510044-01

12) Remove the bearing using the special tool.

**Special tool**

**TOOL (D): 09913-70210 (Bearing installer set)**



I705H1510064-02

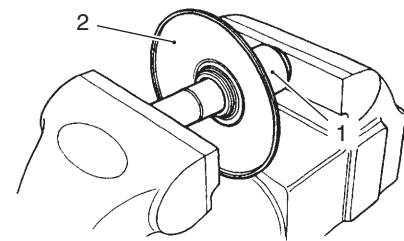
**Assembly**

Refer to "Clutch Shoe and Movable Driven Face Parts Inspection (Page5A-16)".

1) Install the bearing (1) to the fixed driven face (2) using a spacer, the size being appropriate for outside diameter of the bearing.

**⚠ CAUTION**

**Use a new bearing.**

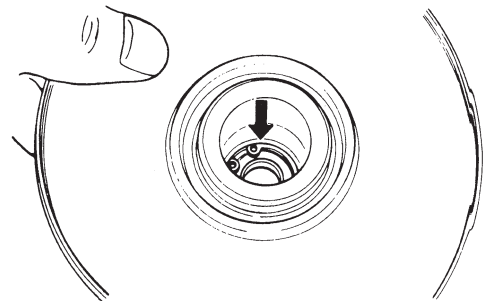


I705H1510045-02

2) Install the snap ring.

**⚠ CAUTION**

**Use a new snap ring.**



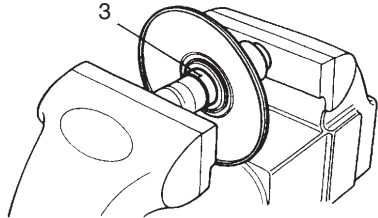
I705H1510046-01

## 5A-14 Automatic Transmission:

- 3) Install needle bearing (3) using a spacer, the size being appropriate for the outside diameter of the bearing.

### ⚠ CAUTION

- Use a new bearing.
- The stamp mark on the needle bearing should face outside when installed.



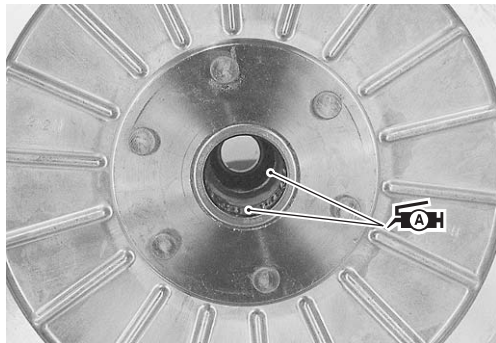
I705H1510047-01

- 4) Apply the grease both to the bearing and needle bearing.

### ⚠ CAUTION

Fill sufficient grease in the grease groove inside the fixed driven face and also on the needle bearing.

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



I705H1510048-01

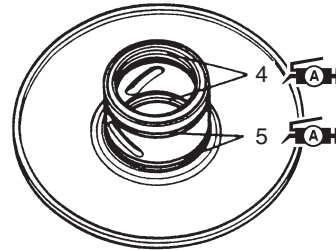
- 5) Install the oil seal (4) and O-ring (5) to the movable driven face.

### ⚠ CAUTION

Use a new oil seal and O-ring.

- 6) Apply the grease both to the lip of oil seal and O-ring.

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



I705H1510049-01

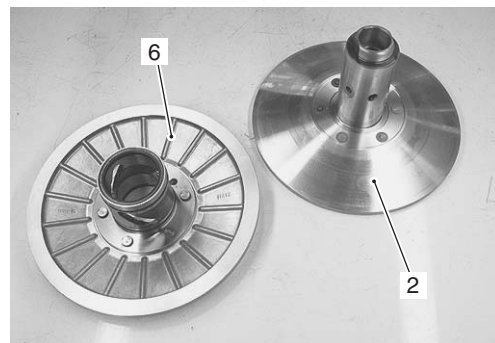
- 7) Apply the grease in the grease groove of movable driven face (6) and sliding face.

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



I705H1510050-01

- 8) Assemble the movable driven face (6) to the fixed driven face (2).



I705H1510051-05



- 9) Install the movable driven pin (7) to the pin hole with the grease lightly coated.

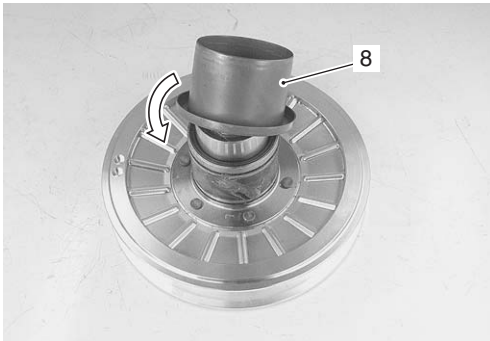
 **Grease 99000-25010 (SUZUKI SUPER GREASE A or equivalent)**

- 10) Check that the movable driven face can move smoothly.



I705H1510052-01


- 11) Install the movable driven face seat (8).

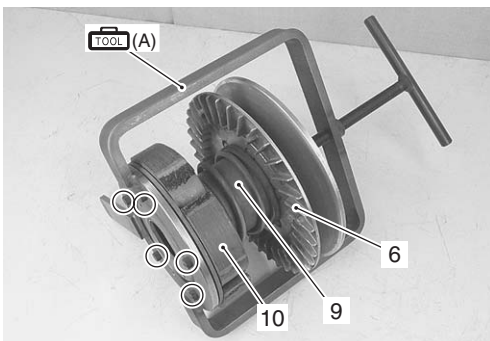


I705H1510053-04

- 12) Install the spring (9) and clutch shoe assembly (10) to the movable driven face (6) and attach the special tool.
- 13) Engage the pawl of special tool to the hole of the clutch shoe plate.

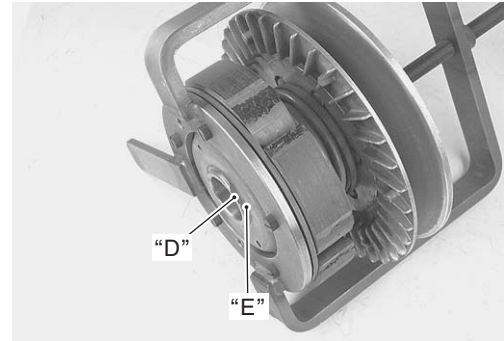
#### Special tool

 **(A): 09922-31440 (Clutch spring compressor)**



I705H1510054-04


- 14) While the special tool handle is being turned in slowly, engage two flats "D" on the end of movable driven face with the same shaped hole "E" on the clutch shoe plate.



I705H1510055-04

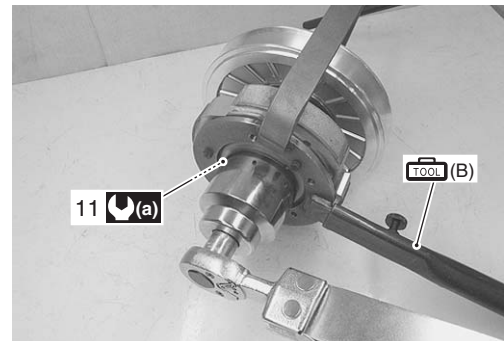
- 15) Check that the pawl on the special tool is securely fitted into the hole on the clutch shoe plate and tighten the clutch shoe nut (11) to the specified torque.

#### Special tool

 **(B): 09920-31020 (Extension handle)**

#### Tightening torque

Clutch shoe nut (a): 105 N·m (10.5 kgf-m, 76.0 lb-ft)



I705H1510056-04

**Clutch Shoe and Movable Driven Face Parts Inspection**

B705H15106010

Refer to “Clutch Shoe / Movable Driven Face Disassembly and Assembly (Page5A-12)”.  
Inspect the following parts.

**Clutch Housing Inspection**

Check for the following items and if any defects are found, replace it with a new one.

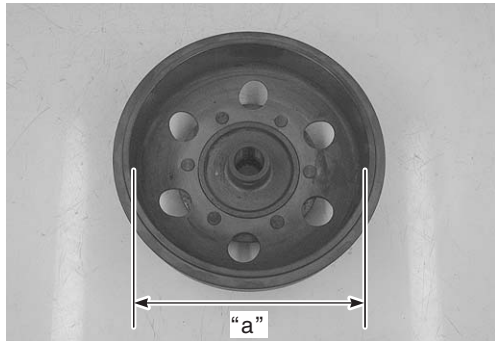
- Existence of abnormal scratch.
- Measurement of clutch housing inside diameter.

**Special tool**

 : 09900-20101 (Vernier calipers (1/15 mm, 150 mm))

**Clutch housing inside “a”**

**Service limit: 160.5 mm (6.32 in)**

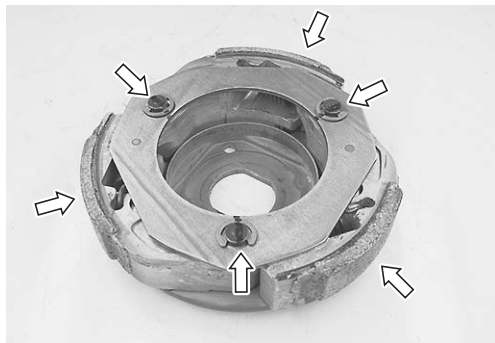


I705H1510065-03

**Clutch Shoe Inspection**

Check for the following items and if any abnormal condition is found, replace the part with a new one.

- Play, damage, operation, etc. for the center area and the centrifugal weight fulcrum.
- Existence of damage or oil sticking on the clutch shoe.



I705H1510057-02

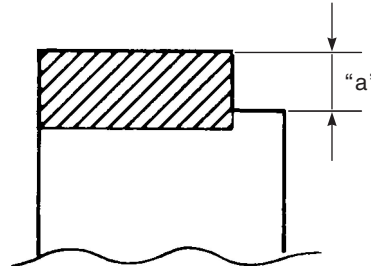
- Measure the thickness of clutch shoe center area by using vernier calipers.

**Special tool**

 : 09900-20101 (Vernier calipers (1/15 mm, 150 mm))

**Thickness of clutch shoe “a”**

**Service limit: 2.0 mm (0.08 in)**



I705H1510058-03

**Movable Driven Face Spring Inspection**

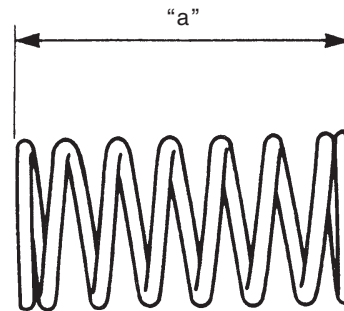
Measure the free length of movable driven face spring by using vernier calipers. If the measurement is below the service limit, replace the spring with a new one.

**Special tool**

 : 09900-20101 (Vernier calipers (1/15 mm, 150 mm))

**Free length of movable driven face spring “a”**

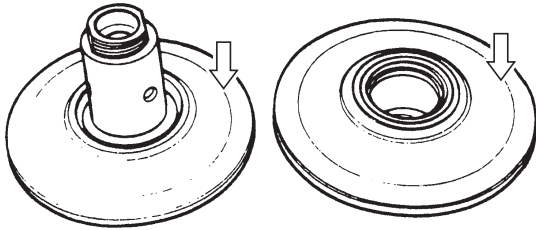
**Service limit: 142.5 mm (5.61 in)**



I705H1510059-02

**Driven Face Inspection**

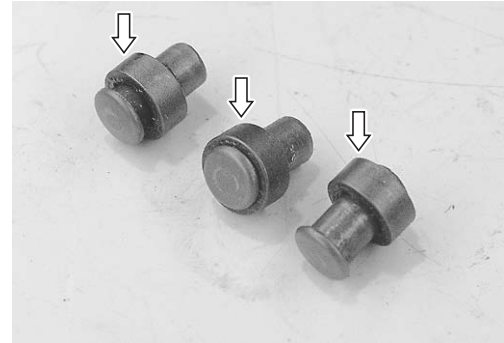
Inspect the driven face surface for stepped wear. If any defects are found, replace if with a new one.



I705H1510060-01

**Movable Driven Pin Inspection**

Inspect the movable driven pin for abnormal wear or damage. If any defects are noted, replace the pin with a new one.



I705H1510061-01

**Specifications****Service Data**

B705H15107002

**Clutch**

Unit: mm (in)

Item	Standard	Limit
Clutch wheel I.D.	160.0 – 160.2 (6.30 – 6.31)	160.5 (6.32)
Clutch shoe thickness	3.0 (0.12)	2.0 (0.08)

**Transmission**

Unit: mm (in) Except ratio

Item	Specification	Note
Primary reduction ratio	1.000	—
Reduction ratio	2.200 – 0.839	—
Secondary reduction ratio	2.214	—
Final reduction ratio	2.666	—
Drive V-belt width	25.1 (0.99)	24.1 (0.95)
Movable driven face spring free length	150.0 (5.90)	142.5 (5.61)
Movable drive face roller O.D.	26.00 – 26.16 (1.024 – 1.030)	—
Drive/driven face ware	—	0.4 (0.02)

**Tightening Torque Specifications**

B705H15107003

Fastening part	Tightening torque			Note
	N·m	kgf·m	lb·ft	
Clutch housing nut	85	8.5	61.5	☞ (Page5A-5)
Fixed drive face nut	105	10.5	76.0	☞ (Page5A-5)
Clutch shoe nut	105	10.5	76.0	☞ (Page5A-15)

**NOTE**

The specified tightening torque is also described in the following.  
 “Clutch Shoe / Movable Driven Face Components (Page5A-11)”

**Reference:**

For the tightening torque of fastener not specified in this section, refer to “Tightening Torque Specifications in Section 0C (Page0C-7)”.

## Special Tools and Equipment

### Recommended Service Material

B705H15108001

Material	SUZUKI recommended product or Specification		Note
Grease	SUZUKI SUPER GREASE A or equivalent	P/No.: 99000-25010	☞ (Page5A-5) / ☞ (Page5A-7) / ☞ (Page5A-9) / ☞ (Page5A-10) / ☞ (Page5A-14) / ☞ (Page5A-14) / ☞ (Page5A-14) / ☞ (Page5A-15)

### NOTE

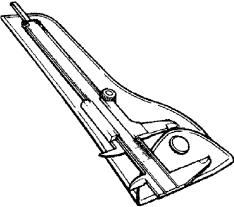
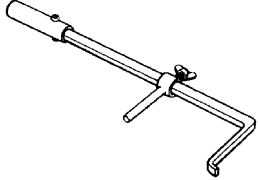
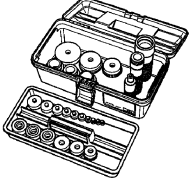
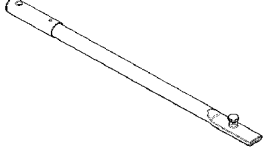
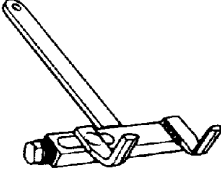
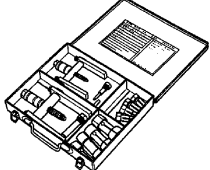
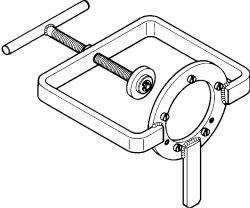
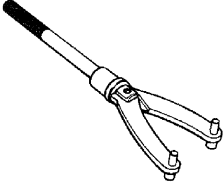
Required service material is also described in the following.

“Movable Drive Face Component (Page5A-8)”

“Clutch Shoe / Movable Driven Face Components (Page5A-11)”

### Special Tool

B705H15108002

09900-20101 Vernier calipers (1/15 mm, 150 mm) ☞ (Page5A-6) / ☞ (Page5A-16) / ☞ (Page5A-16) / ☞ (Page5A-16)		09913-50121 Oil seal remover ☞ (Page5A-10)	
09913-70210 Bearing installer set ☞ (Page5A-7) / ☞ (Page5A-10) / ☞ (Page5A-13)		09920-31020 Extension handle ☞ (Page5A-3) / ☞ (Page5A-5) / ☞ (Page5A-12) / ☞ (Page5A-15)	
09920-53740 Clutch sleeve hub holder ☞ (Page5A-3) / ☞ (Page5A-5)		09921-20240 Bearing remover set ☞ (Page5A-7) / ☞ (Page5A-13)	
09922-31440 Clutch spring compressor ☞ (Page5A-12) / ☞ (Page5A-15)		09930-40113 Rotor holder ☞ (Page5A-4) / ☞ (Page5A-5)	

## Section 6

## Steering

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# Precautions

## Precautions

### Precautions for Steering

Refer to "General Precautions in Section 00 (Page00-1)".

B705H16000001



# Steering General Diagnosis

## Diagnostic Information and Procedures

### Steering Symptom Diagnosis

B705H16104001

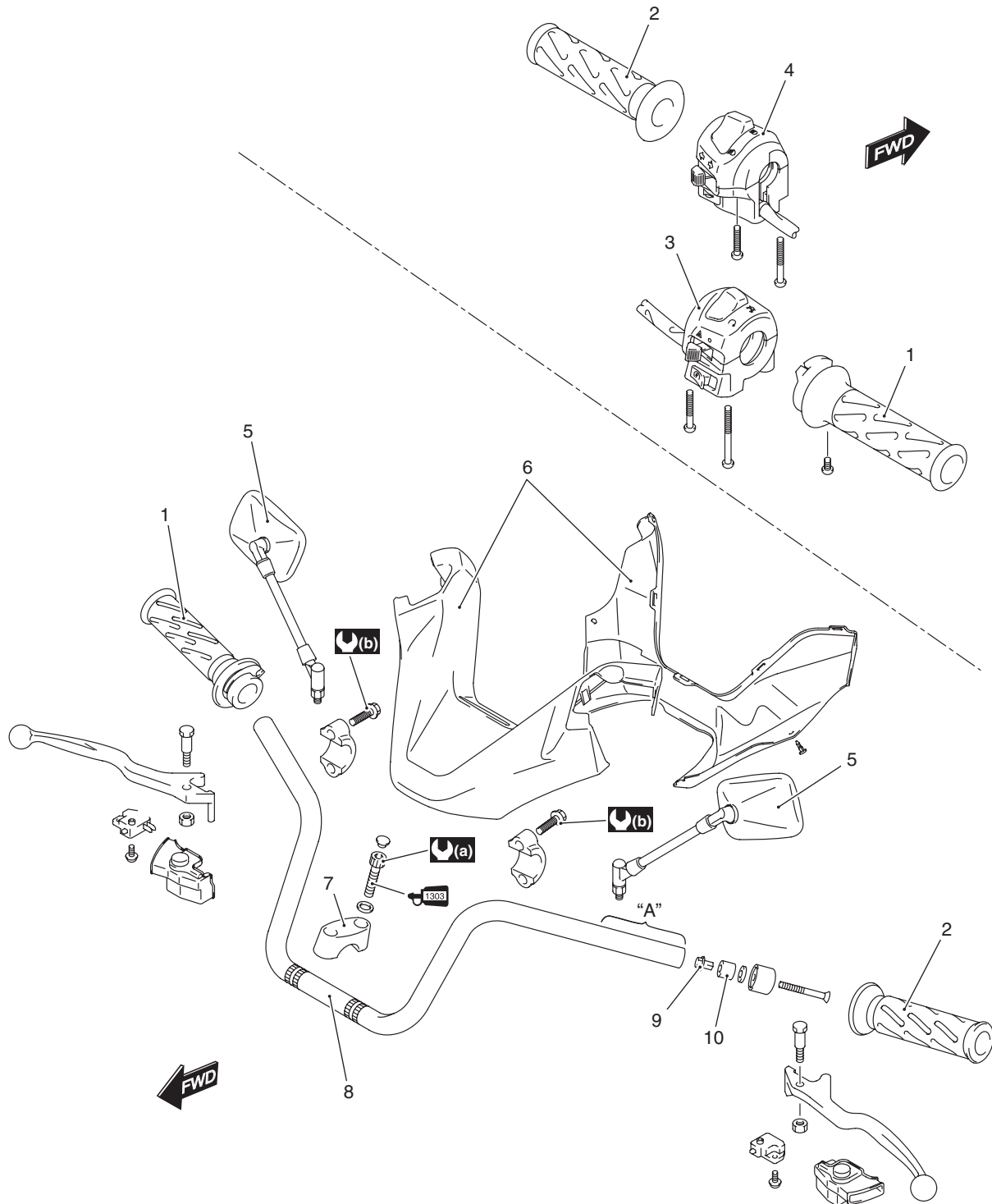
Condition	Possible cause	Correction / Reference Item
<b>Heavy Steering</b>	Over tightened steering stem nut.	<i>Adjust.</i>
	Broken bearing in steering stem.	<i>Replace.</i>
	Distorted steering stem.	<i>Replace.</i>
	Not enough pressure in tires.	<i>Adjust.</i>
<b>Wobbly Handlebars</b>	Loss of balance between right and left front forks.	<i>Replace fork or 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>
<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 front axle or pinch bolt.	<i>Retighten.</i>
	Incorrect front fork oil level.	<i>Adjust.</i>

# Steering / Handlebar

## Repair Instructions

### Handlebars Components

B705H16206008



I705H1620033-05

1. Throttle grip	6. Handle cover	"A": Apply handle grip bond.
2. Rubber grip	7. Handlebar holder	<b>1303</b> : Apply thread lock to thread part.
3. Handlebar switch box (RH)	8. Handlebar	<b>(a)</b> : 23 N·m (2.3 kgf·m, 16.5 lb·ft)
4. Handlebar switch box (LH)	9. Handle expander	<b>(b)</b> : 10 N·m (1.0 kgf·m, 7.0 lb·ft)
5. Rear view mirror	10. Handle balancer expander	

## Handlebars Removal and Installation

B705H16206016

### Removal

Remove the handlebar cover. Refer to "Handlebar Cover Removal and Installation in Section 9D (Page9D-13)".

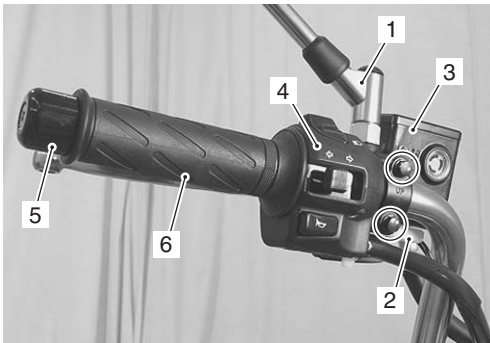
### Left side

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

#### **⚠ CAUTION**

**Do not turn the rear brake master cylinder upside down.**

- 4) Remove the left handlebar switch box (4).
- 5) Remove the handlebar balancer (5).
- 6) Remove the grip rubber (6).



I705H1620001-01

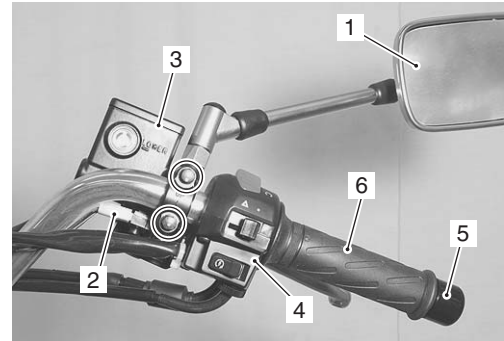
### Right side

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

#### **⚠ CAUTION**

**Do not turn the front brake master cylinder upside down.**

- 4) Remove the right handlebar switch box (4).
- 5) Remove the handlebar balancer (5).
- 6) Remove the throttle grip (6).



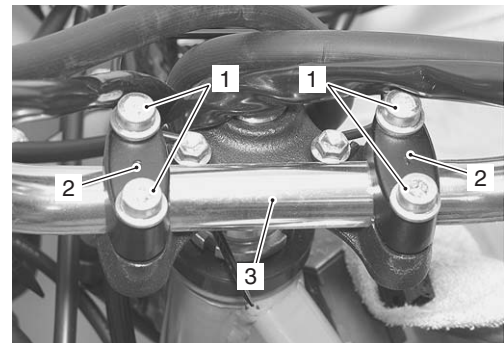
I705H1620002-01

### Handlebar holder

- 1) Remove the handlebar clamp bolts (1).
- 2) Remove the handlebar holder (2).
- 3) Remove the handlebars (3).

#### **⚠ CAUTION**

**Hold the handlebar by the hand to prevent throw or drop out of the steering stem.**



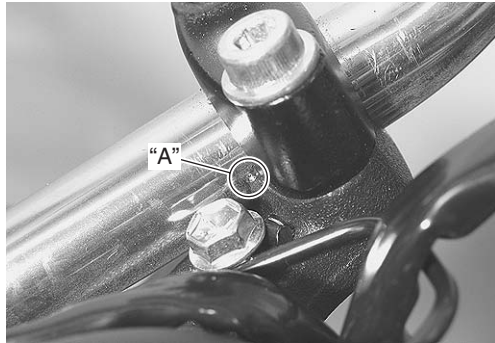
I705H1620003-03

## 6B-3 Steering / Handlebar:

### Installation


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

- Set the handlebars so that its punch mark "A" aligns with the mating surface of the left handlebar holder.



1705H1620004-02

- Apply thread lock to the handlebar clamp bolts.
- Tighten the forward handlebar clamp bolts first temporarily to provide clearance on the rear side and then tighten both the bolts to the specified torque.

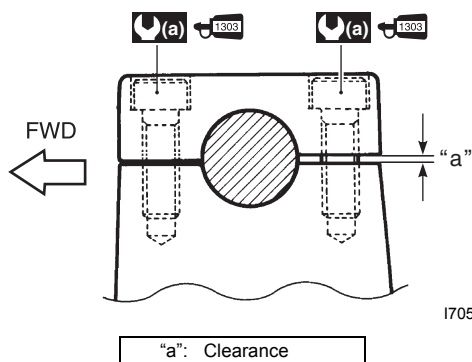
 : Thread lock cement 99000-32030 (Thread Lock Cement Super 1303 or equivalent)

#### Tightening torque

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

#### NOTE

First tighten the handlebar clamp bolts (front ones) to the specified torque.

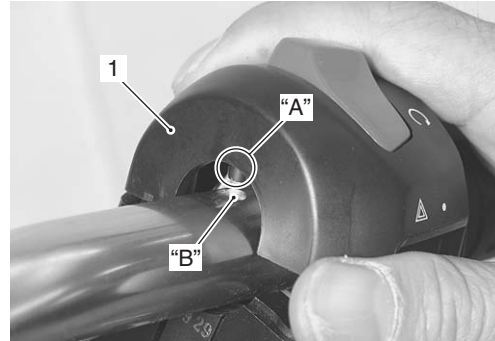


1705H1620005-04

- After installing the steering, the following adjustments are required before driving.
  - Cable routing (Refer to "Throttle Cable Routing Diagram in Section 1D (Page1D-2)".)
  - Throttle cable play (Refer to "Throttle Cable Play Inspection and Adjustment in Section 0B (Page0B-11)".)

### Right side

- Install the right handlebar switch box (1) to the handlebars by engaging the stopper "A" with the hole "B" on the handlebars.
- Adjust the throttle cable play. Refer to "Throttle Cable Play Inspection and Adjustment in Section 0B (Page0B-11)".

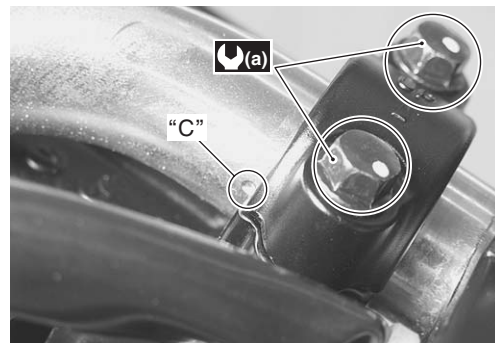


1705H1620006-02

- Install the brake master cylinder onto the handlebars, align the master cylinder holder's mating surface with punch mark "C" on the handlebars.
- Tighten the upper bolt first temporarily to provide clearance on the lower side and then tighten both the bolts to the specified torque.

#### Tightening torque

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

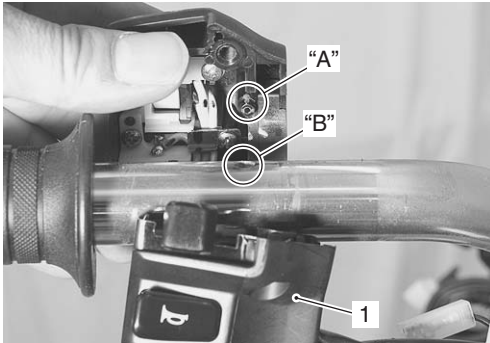


1705H1620007-02

- Connect the front brake light switch lead wire couplers.

**Left side**

- Install the left handlebar switch box (1) to the handlebars by engaging the stopper "A" with the hole "B" on the handlebars.

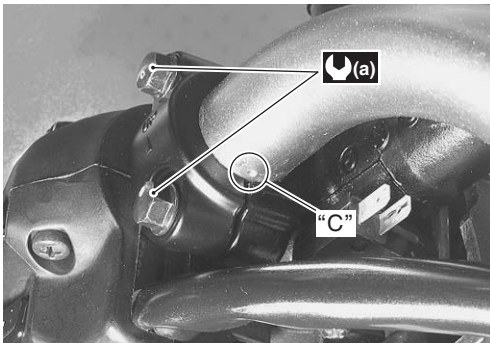


I705H1620008-03

- Install the brake master cylinder onto the handlebars, align the master cylinder holder's mating surface with punch mark "C" on the handlebars.
- Tighten the upper bolt first temporarily to provide clearance on the lower side and then tighten both the bolts to the specified torque.

**Tightening torque**

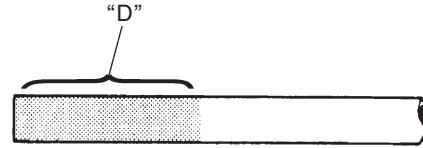
**Master cylinder bolt (a): 10 N·m (1.0 kgf-m, 7.0 lb-ft)**



I705H1620009-02

- Connect the rear brake light switch lead wire couplers.
- Apply a handle grip bond "D" onto the left handlebar before installing the handlebar grip.

**: Handle grip bond (Handle grip bond (commercial available))**



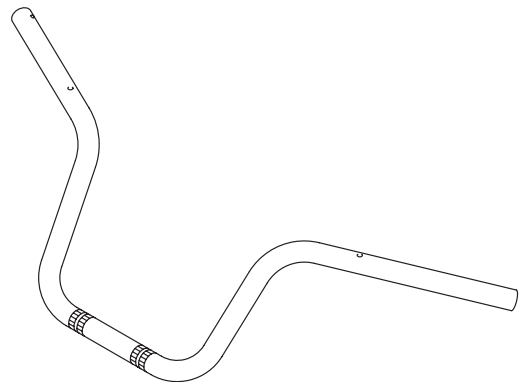
I705H1620031-01

**Handlebars Inspection**

B705H16206009

Refer to "Handlebars Removal and Installation (Page6B-2)".

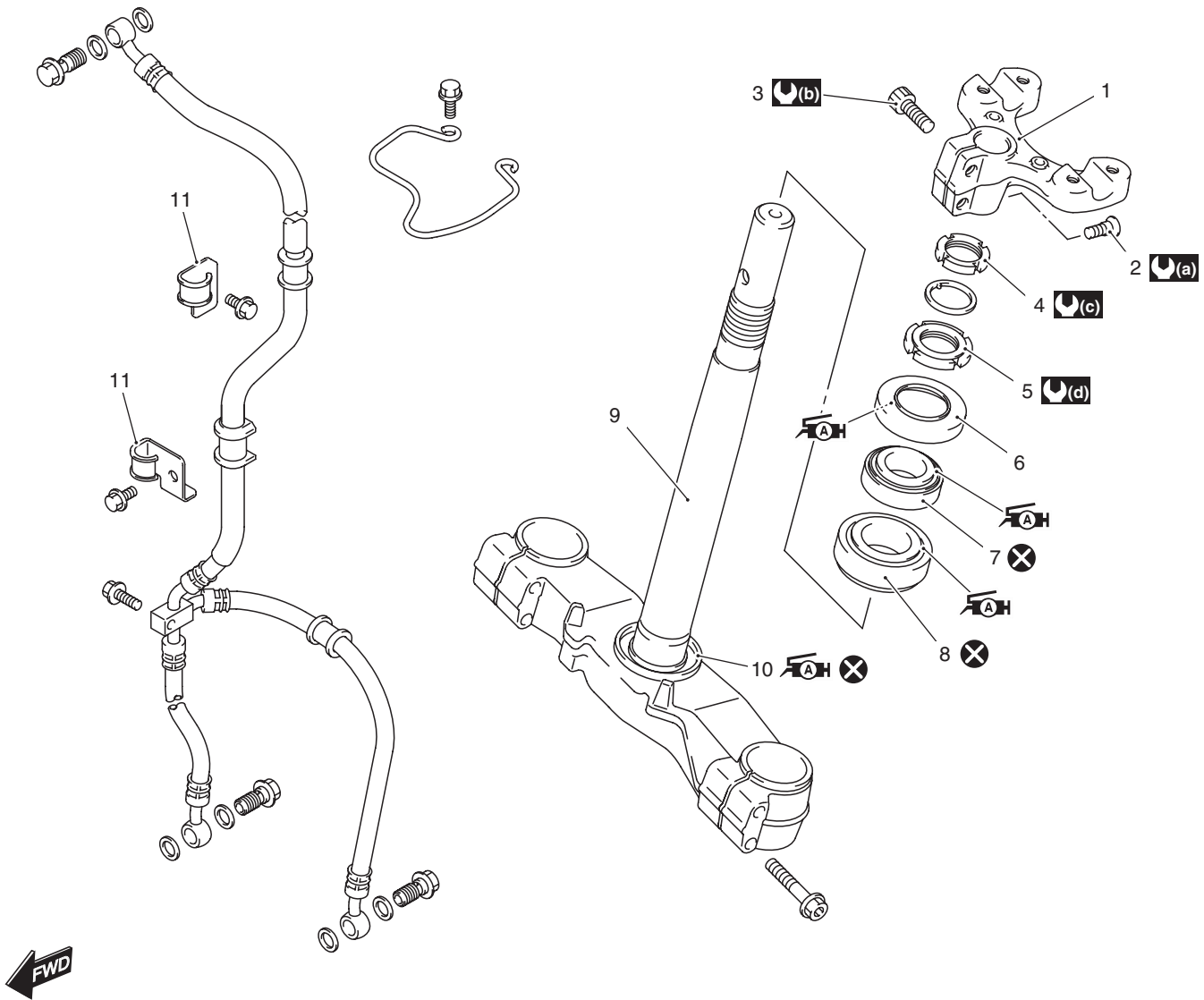
Inspect the handlebars for distortion and damage. If any defect are found, replace the handlebars with a new one.



I705H1620034-01

Steering Components

B705H16206010



I705H1620035-06

1. Handlebar holder	7. Upper bearing	: 55 N·m (5.5 kgf·m, 40.0 lb·ft)
2. Handlebar holder set bolt	8. Lower bearing	: 30 N·m (3.0 kgf·m, 21.5 lb·ft)
3. Handlebar holder clamp bolt	9. Steering stem	: 30 N·m (3.0 kgf·m, 21.5 lb·ft)
4. Steering stem lock nut	10. Lower inner race	: Apply grease.
5. Steering stem nut	11. Front brake hose clamp	: Do not reuse.
6. Dust seal		: 23 N·m (2.3 kgf·m, 16.5 lb·ft)



## Steering Removal and Installation

B705H16206011

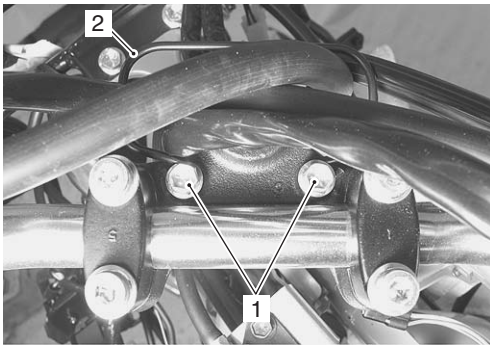
### Removal

- 1) Support the motorcycle with a jack or wooden block.
- 2) Remove the front box. Refer to "Front Box Removal and Installation in Section 9D (Page9D-18)".
- 3) Remove the front forks. Refer to "Front Fork Removal and Installation in Section 2B (Page2B-2)".

### NOTE

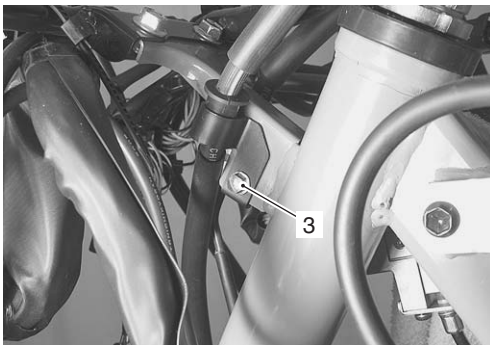
The front fork removal is not necessary unless the steering stem replacement or front fork disassembly work is required. Refer to "Front Fork Removal and Installation in Section 2B (Page2B-2)".

- 4) Remove the front brake hose clamp bolts (1) and remove the cable guide (2).



I705H1620011-01

- 5) Remove the front brake hose clamp (3).



I705H1620012-01

- 6) Remove the front brake hose clamp (4) from the steering stem.

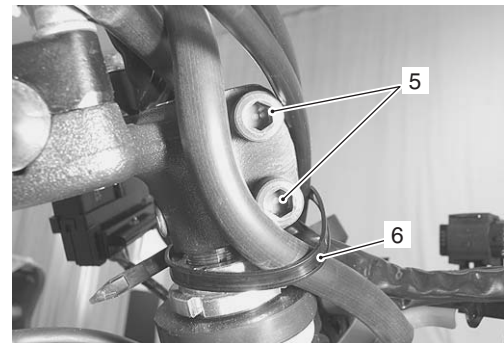
### ⚠ CAUTION

- Take care not to make air come in to the front brake system.
- Be careful not to drop the front brake caliper components.



I705H1620013-01

- 7) Loosen the handlebar holder clamp bolts (5) and remove the clamp (6).



I705H1620014-01

- 8) Remove the handlebar holder set bolt (7).
- 9) Remove the handlebar holder with handlebars.

### ⚠ CAUTION

This operation must be performed without causing undue stress to the brake hoses, lead wires and throttle cables.




I705H1620015-01

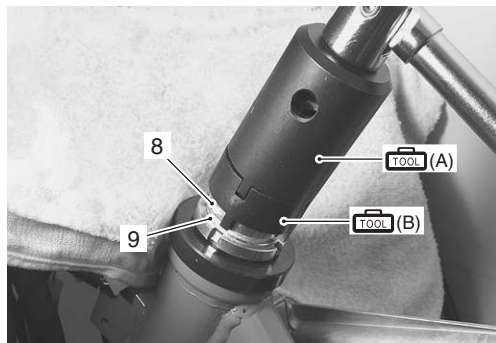
## 6B-7 Steering / Handlebar:

- 10) Remove the lock-nut (8) and washer (9) using the special tools.

### Special tool

 (A): 09940-14911 (Steering stem nut wrench)

 (B): 09940-11420 (Steering stem nut socket)




I705H1620016-01


- 11) Remove the steering stem nut (10) using the special tools and remove the steering stem.

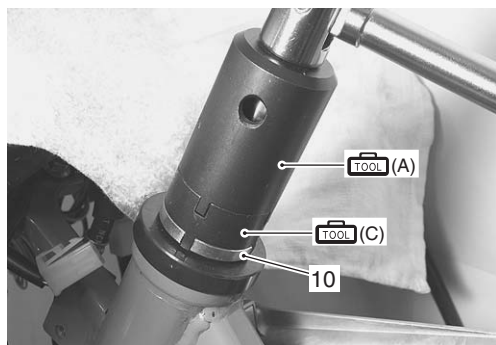
### NOTE

Hold the steering stem by hand to prevent it from falling.

### Special tool

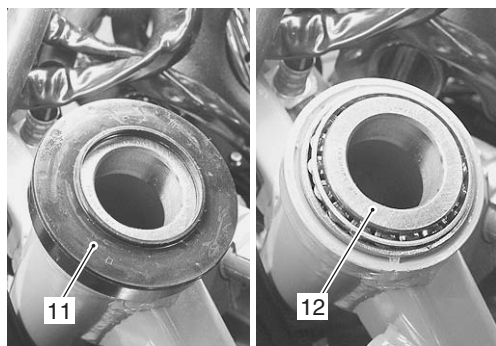
 (A): 09940-14911 (Steering stem nut wrench)

 (C): 09940-11430 (Steering stem nut socket)



I705H1620017-03

- 12) Remove the dust seal (11) and upper bearing (12).



I705H1620018-02

### Installation

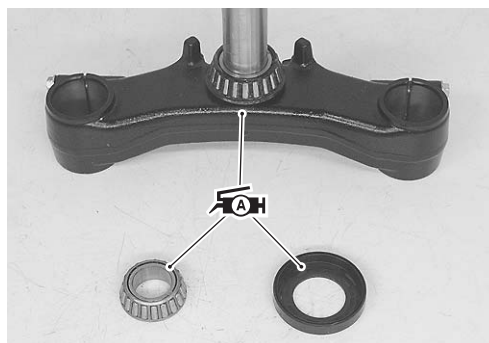
Install the steering in the reverse order of removal. Pay attention to the following points:

- Clean the steering related parts before installing.

### Bearing

- Apply grease to the bearings, races and dust seals before remounting the steering stem.

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




I705H1620019-04

### Steering stem nut / Washer / Lock-nut

- Tighten the steering stem nut (1) to the specified torque using the special tools.

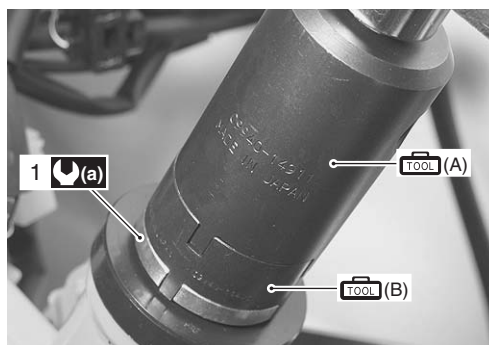
### Special tool

 (A): 09940-14911 (Steering stem nut wrench)

 (B): 09940-11430 (Steering stem nut socket)

### Tightening torque

Steering stem nut (a): 30 N·m (3.0 kgf-m, 21.5 lb-ft)

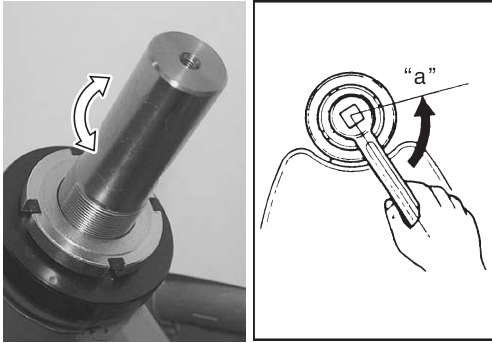


I705H1620020-02

- Turn the steering stem right and left 5 – 6 times to break-in the bearing.
- Loosen the steering stem nut 1/4 – 1/2 turn “a”.
- In this condition, check that the steering stem can turn smoothly with no rattle and stiffness. If there is a rattle or heavy movement, adjust the tightness by the stem nut.

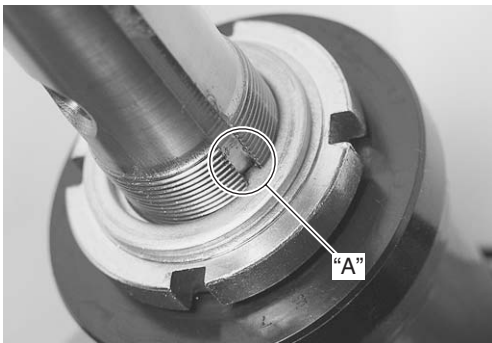
**NOTE**

This adjustment will vary from motorcycle to motorcycle.



I705H1620021-02

- Install the washer with its tab "A" engaged with the steering stem groove.



I705H1620022-02

- Tighten the lock-nut (2) to the specified torque using the special tools.

**NOTE**

Tightening the lock-nut can affect the steering stem nut adjustment. Therefore after tightening the lock-nut, check the steering movement again and adjust if necessary.

**Special tool**

 (A): 09940-14911 (Steering stem nut wrench)

 (C): 09940-11420 (Steering stem nut socket)

**Tightening torque**

Lock-nut (b): 30 N·m (3.0 kgf-m, 21.5 lb-ft)



I705H1620023-03

**Handlebar holder**

- Install the handlebar holder with the handlebars and tighten the handlebar holder set bolt (1) to the specified torque.

**⚠ CAUTION**

This operation must be performed without causing undue stress to the brake hoses, lead wires and throttle cables.

**Tightening torque**

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

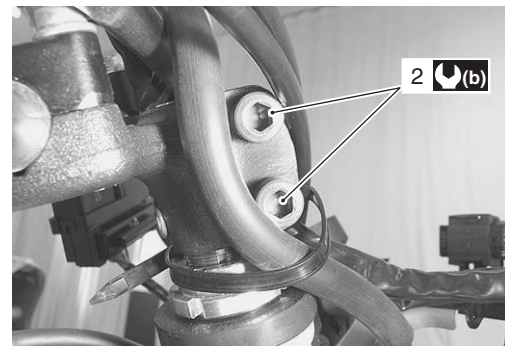


I705H1620024-01

- Install the clamp and tighten the handlebar holder clamp bolts (2) to the specified torque.

**Tightening torque**

Handlebar holder clamp bolt (b): 55 N·m (5.5 kgf-m, 40.0 lb-ft)



I705H1620025-01

- Install the front brake hose clamp (3) to the steering stem.

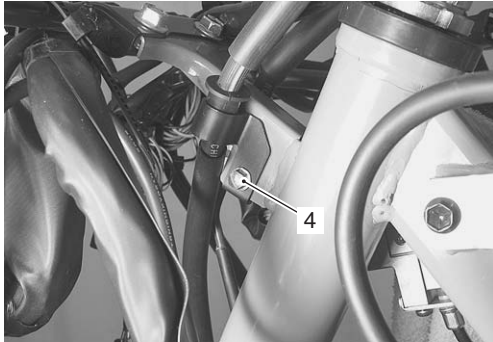


I705H1620026-01



## 6B-9 Steering / Handlebar:

- Install the front brake hose clamp (4).



I705H1620027-01

### **⚠ CAUTION**

**Take care not to make air come in to the front brake system.**

- Perform the steering inspection after assembly has been completed.

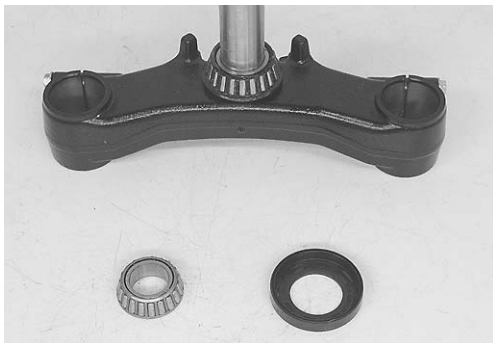
### Steering Related Parts Inspection

B705H16206012

Refer to "Steering Removal and Installation (Page6B-6)". Inspect the removed parts for the following abnormalities.

- Distortion of the steering stem
- Bearing wear or damage
- Abnormal bearing noise
- Race wear or damage

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



I705H1620028-02



I705H1620029-01

### Steering System Inspection

B705H16206013

Refer to "Steering System Inspection in Section 0B (Page0B-15)".

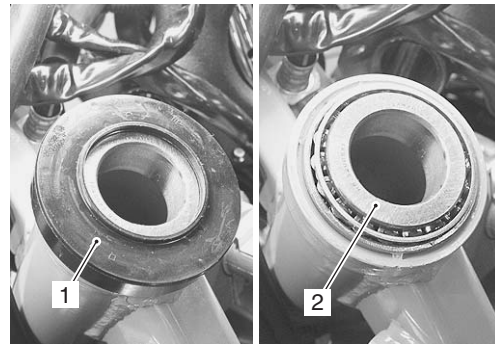
### Steering Stem Bearing Removal and Installation

B705H16206014

Refer to "Steering Components (Page6B-5)".

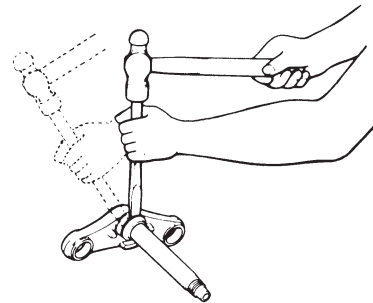
#### Removal

- 1) Remove the steering stem. Refer to "Steering Removal and Installation (Page6B-6)".
- 2) Remove the dust seal (1) and steering stem upper bearing (2).



I705H1620030-02

- 3) Remove the steering stem lower bearing and inner race using a chisel.



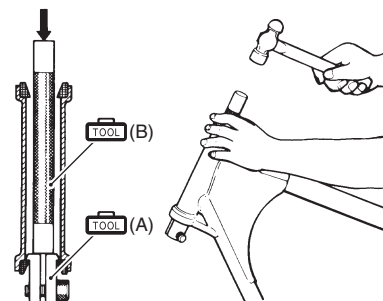
I649G1620033-01

- 4) Remove the steering stem upper and lower bearing races using the special tools.

#### Special tool

**TOOL (A): 09941-54911 (Bearing outer race remover)**

**TOOL (B): 09941-74911 (Steering bearing installer)**



I649G1620034-02

**Installation**

Install the steering stem bearings in the reverse order of removal. Pay attention to the following points:


**⚠ CAUTION**

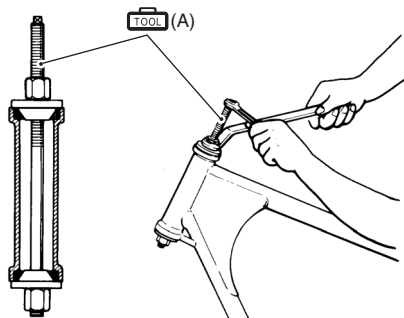
The removed bearings and races should be replaced with the new ones.

**Outer race**

- Press in the upper and lower outer races using the special tool.

**Special tool**

 (A): 09941-34513 (Steering race installer)



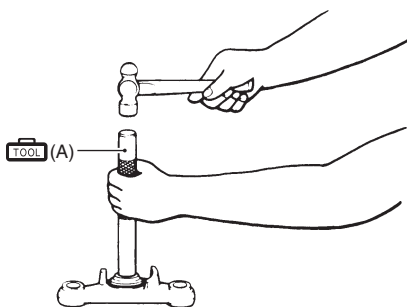
I649G1620035-02

**Inner race**

- Press in the lower inner race and bearing using the special tool.

**Special tool**

 (A): 09941-74911 (Steering bearing installer)

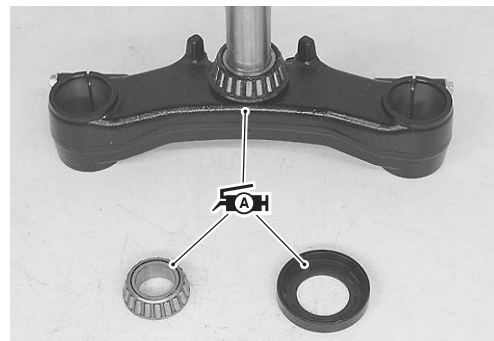


I649G1620036-02

**Bearing**

- Apply grease to the bearings, races and dust seals before remounting the steering stem.

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



I705H1620019-04

- Install the steering. Refer to "Steering Removal and Installation (Page6B-6)".

**Steering Tension Adjustment**

B705H16206015


Check the steering movement in the following procedures:

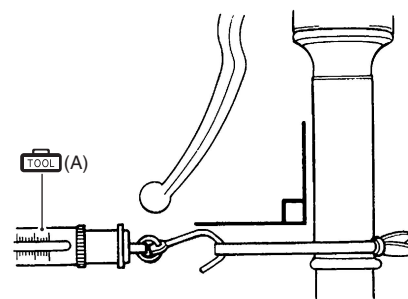
- By supporting the motorcycle with a jack, lift the front wheel unit is off the floor 20 – 30 mm (0.8 – 1.2 in).
- Check to make sure that the cables and wire harnesses are properly routed.
- With the front wheel in the straight ahead state, hitch the spring scale (special tool) on one handlebar grip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

**Initial force**

200 – 500 g

**Special tool**

 (A): 09940-92720 (Spring scale)



I649G1620040-01

## 6B-11 Steering / Handlebar:

- 4) Do the same on the other grip end.
- 5) If the initial force read on the scale when the handlebar starts turning is either too heavy or too light, adjust it till it satisfies the specification.
  - a) First, loosen the front fork clamp bolts, lock-nut and steering stem nut, and then adjust the steering stem nut by loosening or tightening it.
  - b) Tighten the steering stem nut, lock-nut and front fork clamp bolts to the specified torque and recheck the initial force with the spring scale according to the previously described procedures.
  - c) If the initial force is found within the specified range, adjustment has been completed.

### NOTE

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



B705H1620032-01

## Specifications

### Tightening Torque Specifications

B705H16207001

Fastening part	Tightening torque			Note
	N-m	kgf-m	lb-ft	
Handlebar clamp bolt	23	2.3	16.5	☞ (Page6B-3)
Master cylinder bolt	10	1.0	7.0	☞ (Page6B-3) / ☞ (Page6B-4)
Steering stem nut	30	3.0	21.5	☞ (Page6B-7)
Lock-nut	30	3.0	21.5	☞ (Page6B-8)
Handlebar holder set bolt	23	2.3	16.5	☞ (Page6B-8)
Handlebar holder clamp bolt	55	5.5	40.0	☞ (Page6B-8)

### NOTE

The specified tightening torque is also described in the following.  
“Handlebars Components (Page6B-1)”  
“Steering Components (Page6B-5)”

### Reference:

For the tightening torque of fastener not specified in this section, refer to “Tightening Torque Specifications in Section 0C (Page0C-7)”.



## Special Tools and Equipment

### Recommended Service Material

B705H16208001

Material	SUZUKI recommended product or Specification		Note
Grease	SUZUKI SUPER GREASE A or equivalent	P/No.: 99000-25010	☞ (Page6B-7) / ☞ (Page6B-10)
Handle grip bond	Handle grip bond (commercial available)	—	☞ (Page6B-4)
Thread lock cement	Thread Lock Cement Super 1303 or equivalent	P/No.: 99000-32030	☞ (Page6B-3)

### NOTE

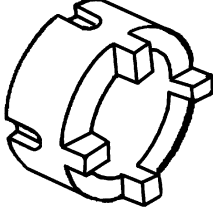
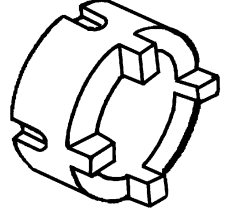
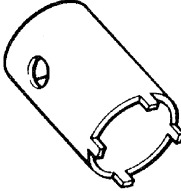
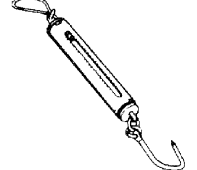
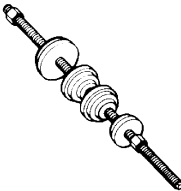
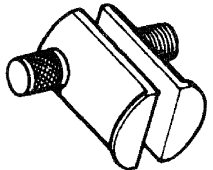
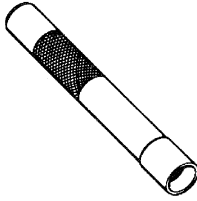
Required service material is also described in the following.

“Handlebars Components (Page6B-1)”

“Steering Components (Page6B-5)”

### Special Tool

B705H16208002

09940-11420 Steering stem nut socket ☞ (Page6B-7) / ☞ (Page6B-8)		09940-11430 Steering stem nut socket ☞ (Page6B-7) / ☞ (Page6B-7)	
09940-14911 Steering stem nut wrench ☞ (Page6B-7) / ☞ (Page6B-7) / ☞ (Page6B-7) / ☞ (Page6B-8)		09940-92720 Spring scale ☞ (Page6B-10)	
09941-34513 Steering race installer ☞ (Page6B-10)		09941-54911 Bearing outer race remover ☞ (Page6B-9)	
09941-74911 Steering bearing installer ☞ (Page6B-9) / ☞ (Page6B-10)			



## Section 9

## Body and Accessories

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# Precautions

## Precautions

### Precautions for Electrical System

B705H19000001

Refer to "General Precautions in Section 00 (Page00-1)" and "Precautions for Electrical Circuit Service in Section 00 (Page00-2)".

## Component Location

### Electrical Components Location

B705H19003001

Refer to "Electrical Components Location in Section 0A (Page0A-7)".

# Wiring Systems

## Schematic and Routing Diagram

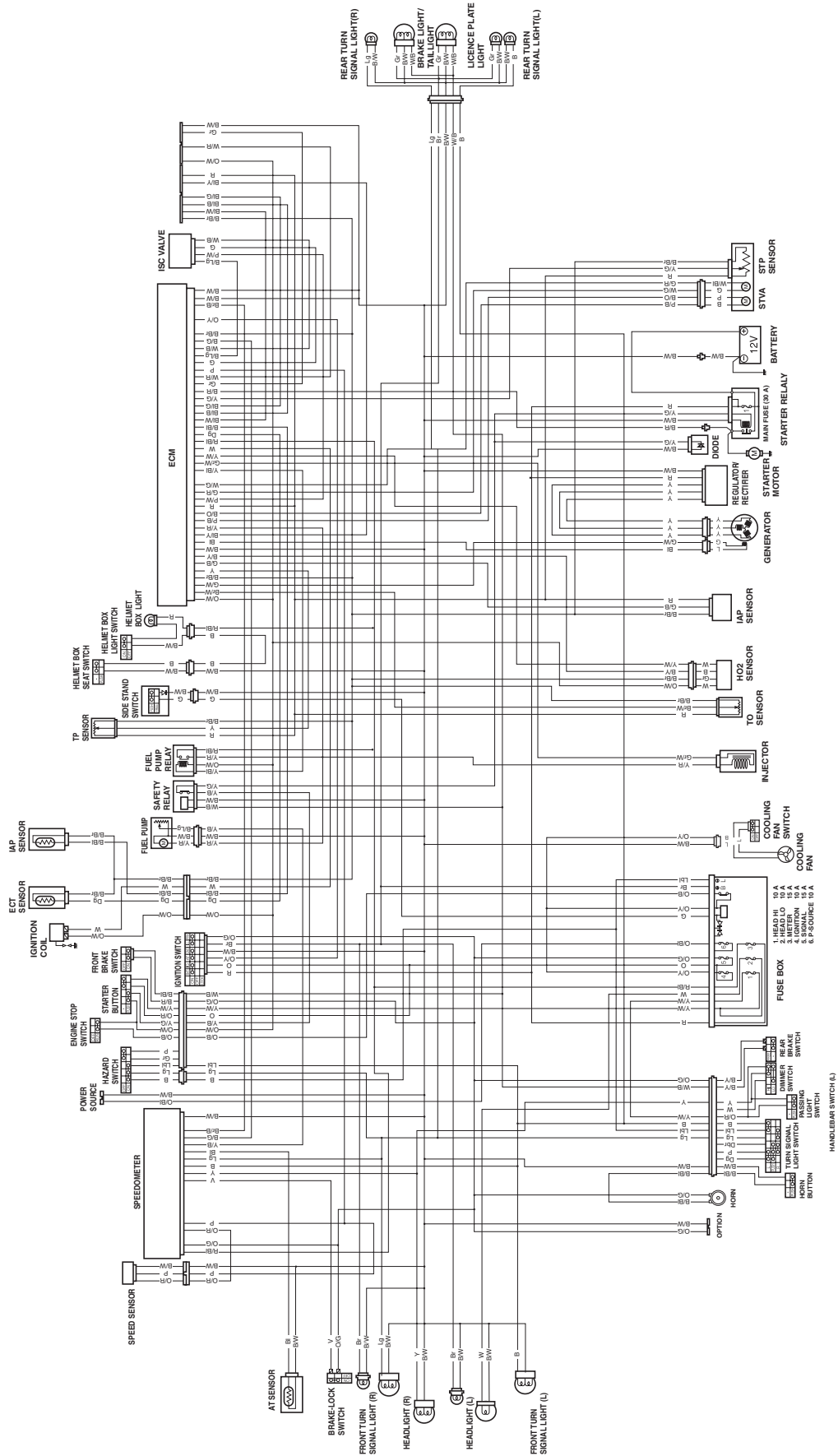
### Wiring Diagram

Refer to "Wire Color Symbols in Section 0A (Page0A-5)".

B705H19102002

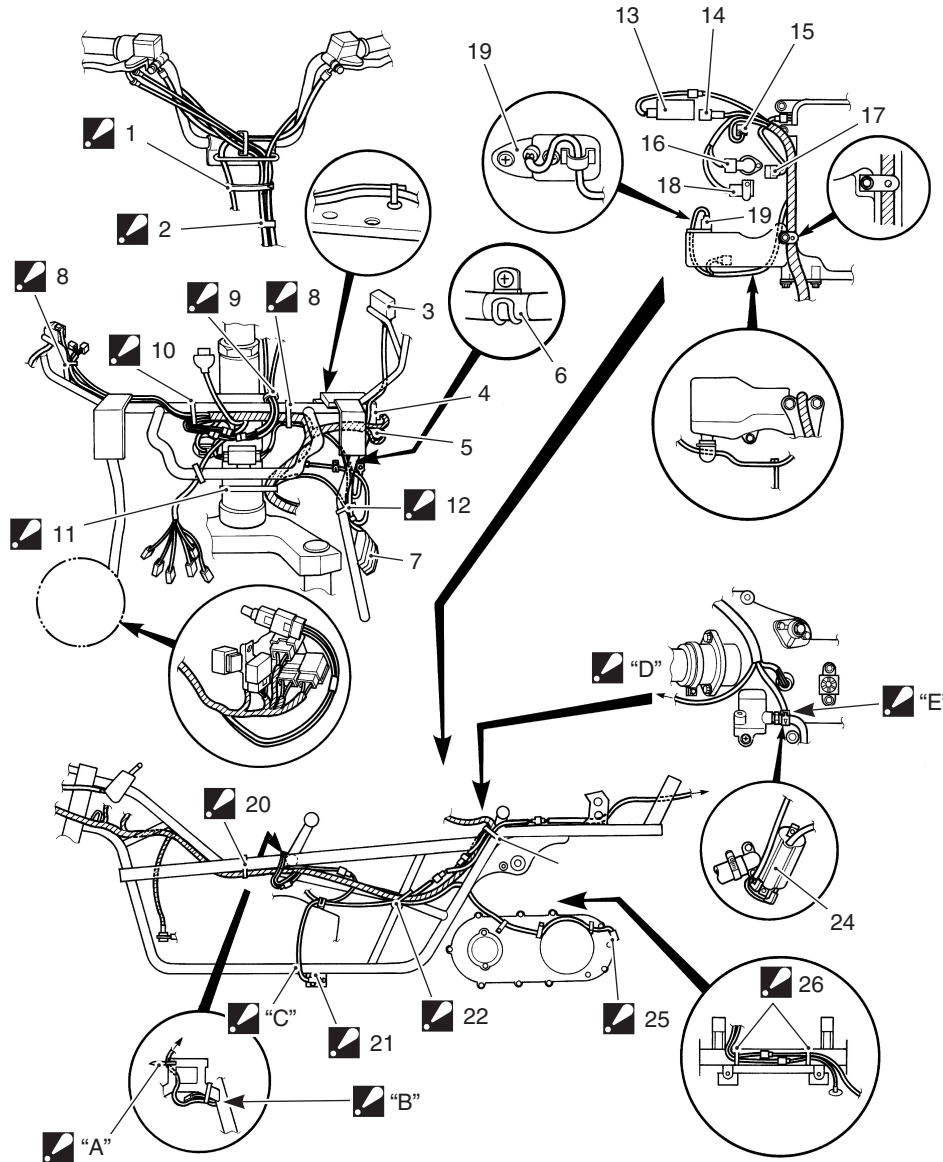






Wiring Harness Routing Diagram

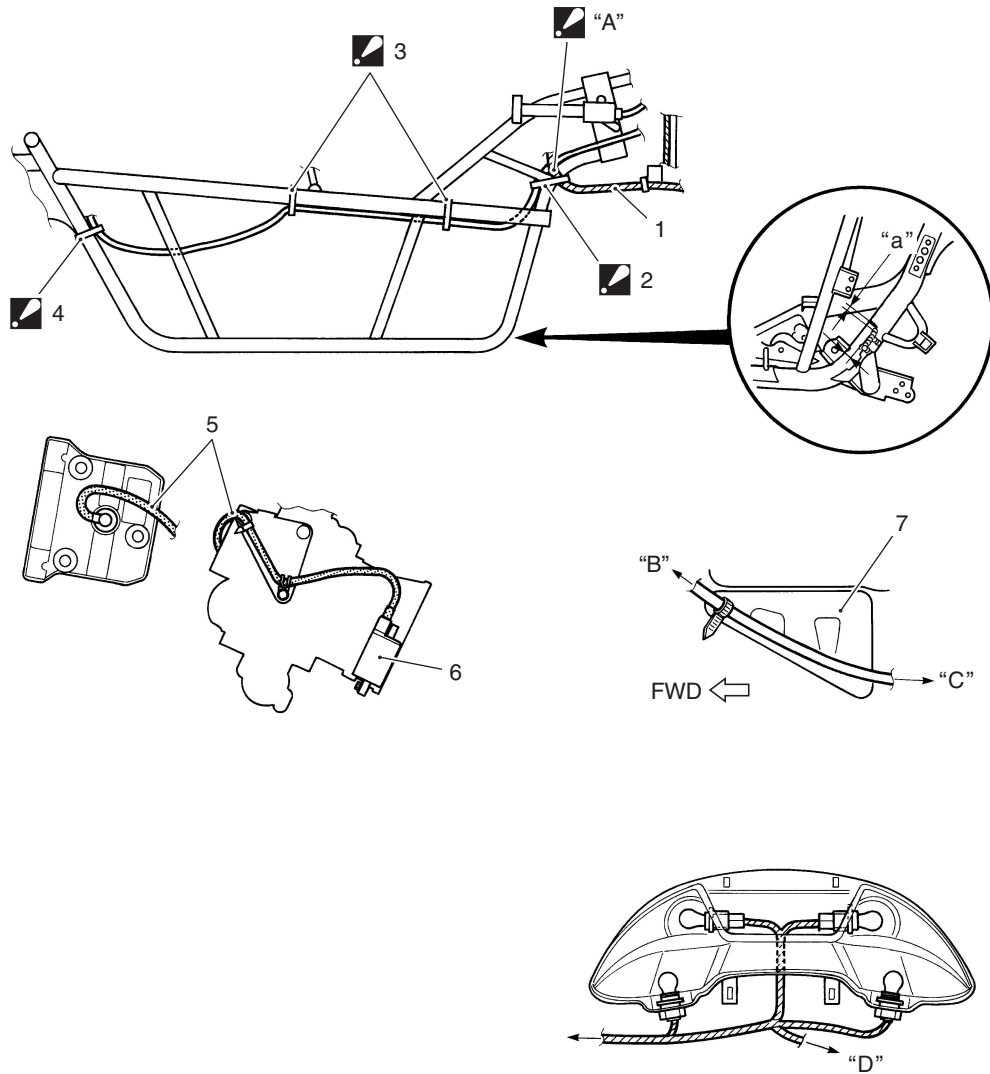
B705H19102001







I705H1910905-04

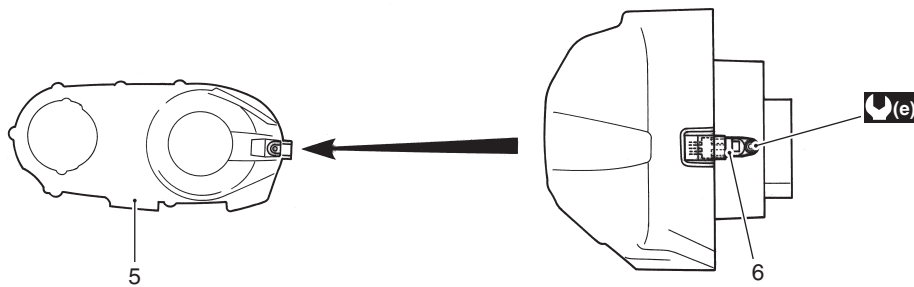
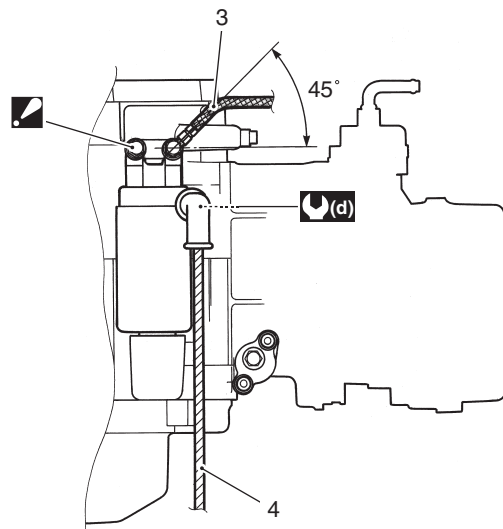
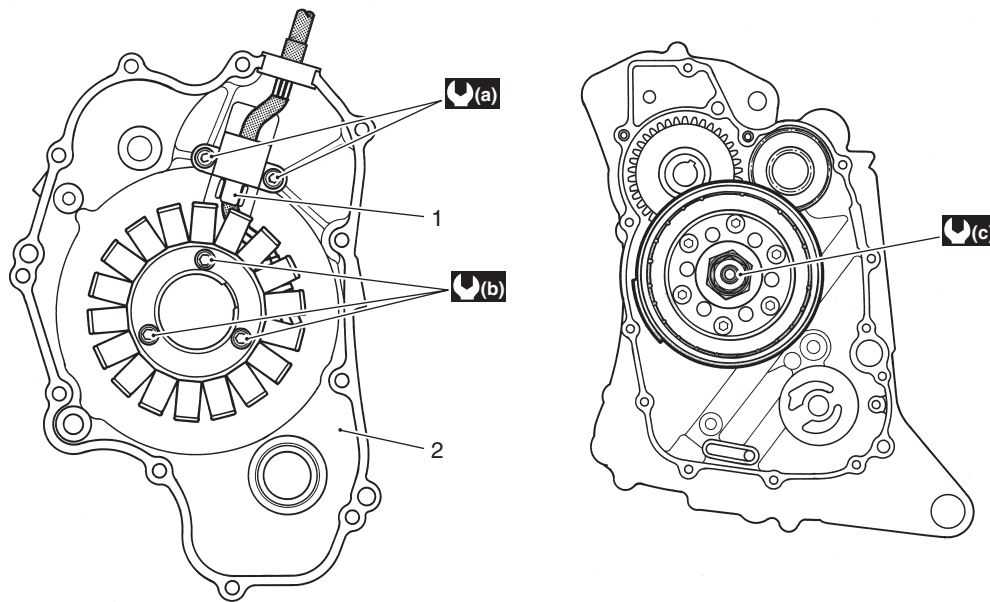
<p>1. Clamp : Clamp the handlebar switch lead wires (LH and RH), Brake hoses (Front and Rear) and throttle cables.</p>	<p>12. Clamp : Clamp the regulator/rectifier lead wire, battery (+) and (-) lead wires.</p>	<p>23. Clamp : Clamp the wiring harness, battery (-) lead wire and generator lead wires.</p>
<p>2. Clamp : Clamp with marking.</p>	<p>13. STVA</p>	<p>24. Ignition coil</p>
<p>3. Fuse box</p>	<p>14. STP sensor</p>	<p>25. Speed sensor</p>
<p>4. Key-less control unit (For 000 only)</p>	<p>15. TP sensor</p>	<p>26. Clamp : Clamp the generator lead wires and HO2 sensor lead wire with no slack.</p>
<p>5. ECM</p>	<p>16. ISC valve</p>	<p>"A": Cut the surplus of clamp.</p>
<p>6. White tape</p>	<p>17. Fuel injector</p>	<p>"B": Pass the lead wires through inside the cable guide.</p>
<p>7. Regulator/rectifier read wire</p>	<p>18. IAP sensor</p>	<p>"C": Pass the lead wires through outside the hoses.</p>
<p>8. Clamp : Clamp the wiring harness and battery (+) lead wire.</p>	<p>19. IAT sensor</p>	<p>"D": To IAT sensor.</p>
<p>9. Clamp : Clamp the left and right handlebar switch lead wires.</p>	<p>20. Clamp : Clamp the wiring harness and battery (-) lead wire.</p>	<p>"E": Pass the ignition coil lead wire through inside the water by-pass hose</p>
<p>10. Clamp : Clamp the wiring harness, battery (+) lead wire and starter relay lead wire.</p>	<p>21. Side-stand switch</p>	
<p>11. Clamp : Clamp the wiring harness and battery (-) lead wire.</p>	<p>22. Clamp : Clamp the wiring harness, battery (-) and side-stand switch lead wire.</p>	

## 9A-5 Wiring Systems:



I705H1910906-06

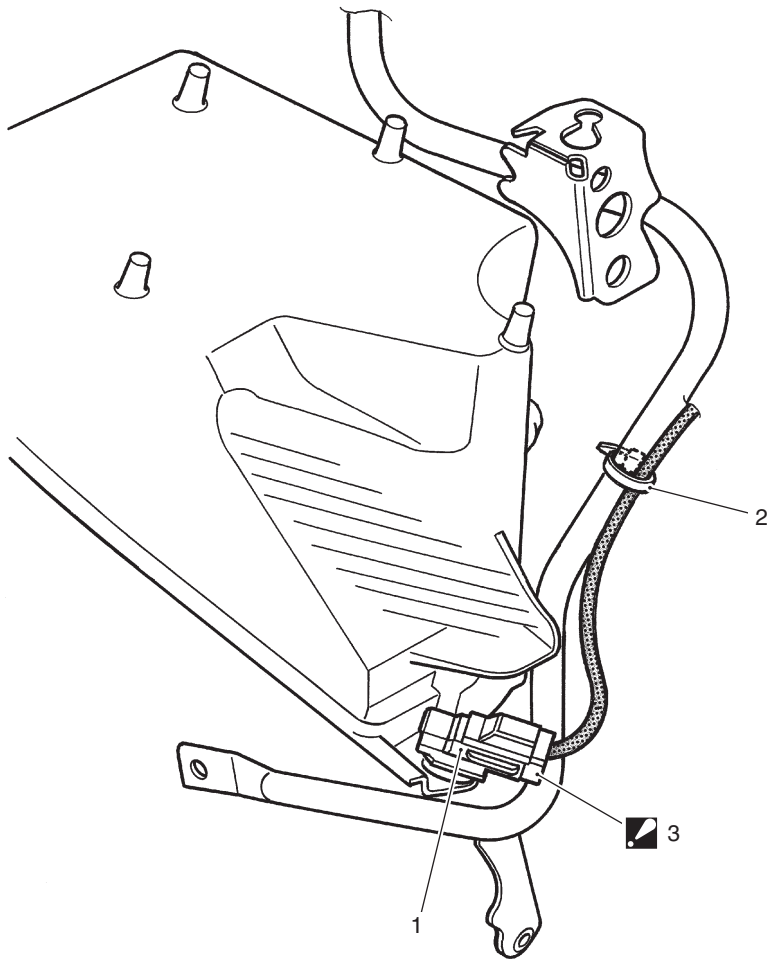
1. Wiring harness	5. High tension code	"B": To IAT sensor
 2. Clamp : Clamp the starter motor lead wire and wiring harness.	6. Ignition coil	"C": To main harness
 3. Clamp : Clamp the starter motor lead wire and brake-lock cable.	7. Air cleaner	"D": To license light
 4. Clamp : Clamp the rear brake hose, brake-lock cable and starter motor lead wire.	 "A": Pass the wiring harness through front of seat lock cable.	"a": 2.3 mm (0.08 – 0.12 in)



I705H1910901-04

1. CKP sensor	5. Outer clutch cover	(b) : 11 N·m (1.1 kgf-m, 8.0 lb-ft)
2. Generator cover	6. Speed sensor	(c) : 160 N·m (16.0 kgf-m, 111.5 lb-ft)
3. Battery (-) lead wire	: Tighten the rear side bolt first.	(d) : 3 N·m (0.3 kgf-m, 2.0 lb-ft)
4. Starter motor lead wire	(a) : 6 N·m (0.6 kgf-m, 4.5 lb-ft)	(e) : 10 N·m (1.0 kgf-m, 7.0 lb-ft)

## 9A-7 Wiring Systems:



I705H1910904-01

1. Ambient air temperature sensor	3. Coupler : Do not attempt to disconnect the coupler from the sensor.
2. Clamp	



## Specifications

### Service Data

B705H19107002

### Electrical

Unit: mm (in)

Item	Standard / Specification		Note
Fuse size	Headlight	HI	10 A
		LO	10 A
	Meter		15 A
	Ignition		10 A
	Signal		15 A
	Fan motor		10 A
	Main		30 A

### Tightening Torque Specifications

B705H19107003

#### NOTE

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The specified tightening torque is also described in the following.  
 “Wiring Harness Routing Diagram (Page9A-4)”

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#### Reference:

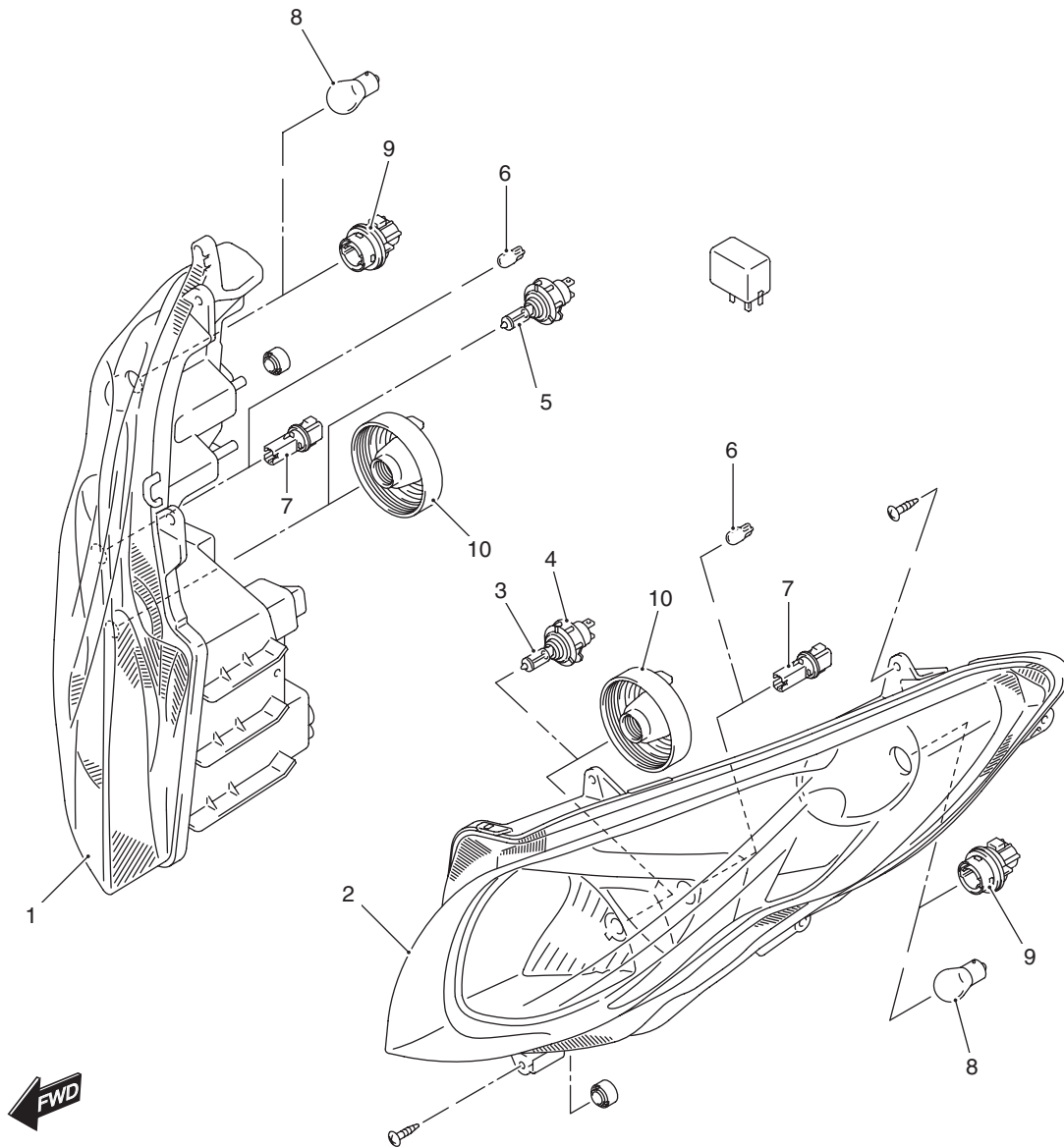
For the tightening torque of fastener not specified in this section, refer to “Tightening Torque Specifications in Section 0C (Page0C-7)”.

# Lighting Systems

## Repair Instructions

### Front Combination Light Components

B705H19206001



I705H1920011-03

1. Front combination light (RH)	5. Headlight high beam bulb	9. Socket
2. Front combination light (LH)	6. Position light bulb	10. Cover
3. Headlight low beam bulb	7. Socket	
4. Adapter	8. Front turn signal light bulb	

## Front Combination Light Removal and Installation

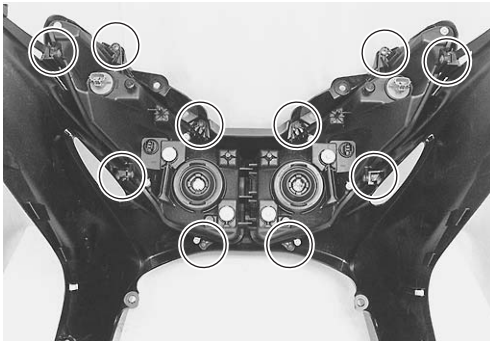
B705H19206014

### Removal

- 1) Remove the front leg shield. Refer to "Front Leg Shield Removal and Installation in Section 9D (Page9D-14)".
- 2) Remove the front combination light.

### NOTE

To facilitate the work, remove the left front combination light first and then the right combination light.

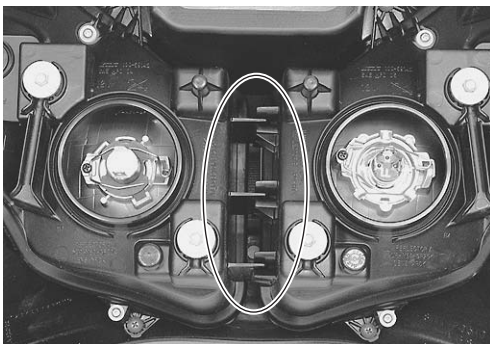


I705H1920012-01

### Installation

Install the front combination light in the reverse order of removal. Pay attention to the following points:

- When installing, match three hooks position of the left front combination light to each slit position of the right front combination light.



I705H1920013-01

- After installing, be sure to inspect the headlight beam. Refer to "Headlight Beam Adjustment (Page9B-4)".

## Headlight Bulb / Turn Signal Light Bulb / Position Light Bulb Replacement

B705H19206015

Refer to "Front Combination Light Components (Page9B-1)".

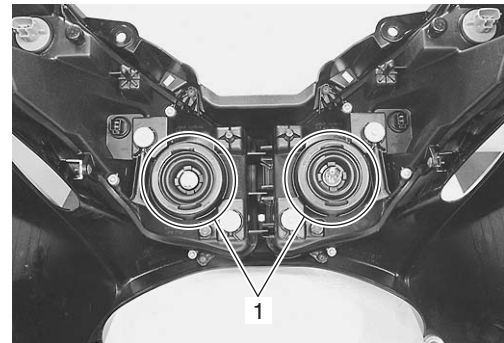
### ⚠ CAUTION

- A fouled glass can cause damage to the bulb when lit. If the bulb is contacted with bare a hand, wipe clean with a cloth dampened with alcohol or detergent.
- Do not use the bulb of a wattage other than specification.
- As the headlight bulb operates at a high temperature, handle the bulb after sufficiently cooled.

### Headlight Bulb

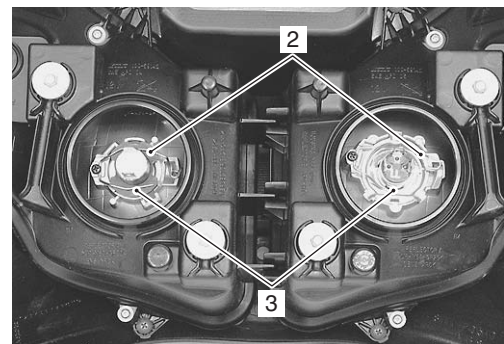
Replace the headlight bulb in the following procedures:

- 1) Remove the front leg shield. Refer to "Front Leg Shield Removal and Installation in Section 9D (Page9D-14)".
- 2) Remove the covers (1).



I705H1920001-01

- 3) Remove the springs (2) and headlight bulbs (3).



I705H1920014-01

## 9B-3 Lighting Systems:

- 4) Remove the left headlight bulb from the socket.



I705H1920015-01

- 5) Install the new left headlight bulb paying attention to the direction of the socket.



I705H1920016-01

- 6) After finishing the headlight bulb replacement, reinstall the removed parts.

### Front Turn Signal Light Bulb

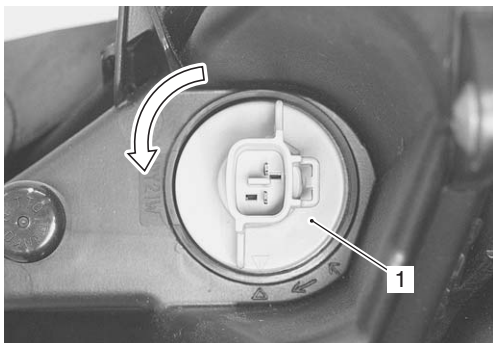
Refer to "Front Combination Light Components (Page9B-1)".

Replace the front turn signal light bulb in the following procedures:

#### **⚠ CAUTION**

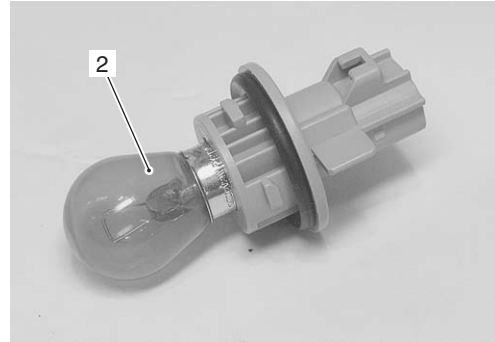
**To replace the front turn signal light bulb, the same procedures is applicable to both the right and left lights.**

- 1) Remove the front leg shield. Refer to "Front Leg Shield Removal and Installation in Section 9D (Page9D-14)".
- 2) Remove the socket (1) by turning it counter clockwise.



I705H1920002-03

- 3) Replace the front turn signal light bulb (2).



I705H1920003-02

- 4) After finishing the front turn signal light bulb replacement, reinstall the removed parts.

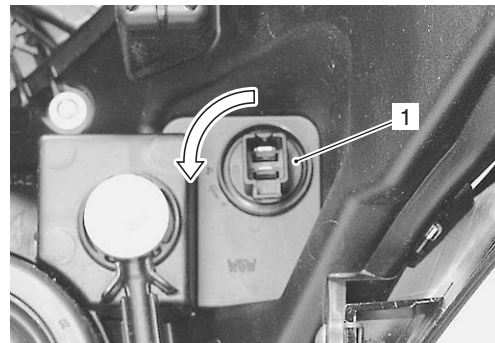
### Position Light Bulb

Replace the position light bulb in the following procedures:

#### **NOTE**

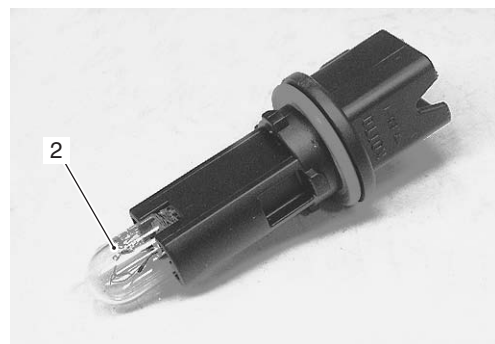
**To replace the positioning light bulb, the same procedures is applicable to both the right and left lights.**

- 1) Remove the front leg shield. Refer to "Front Leg Shield Removal and Installation in Section 9D (Page9D-14)".
- 2) Remove the socket (1) by turning it counter clockwise.



I705H1920004-02

- 3) Replace the position light bulb (2).



I705H1920006-01

- 4) After finishing the position light bulb inspection, reinstall the removed parts.

### Headlight Beam Adjustment

B705H19206034

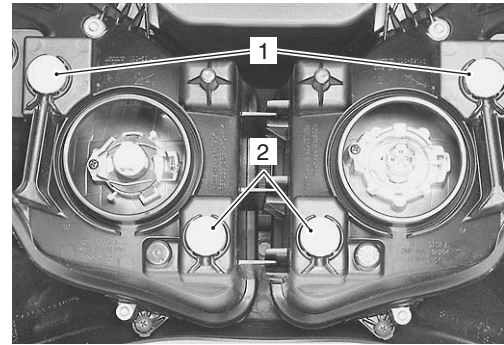
Adjust the head light beam.

**⚠ CAUTION**

**Do not bend the brake hose to frame head pipe side.**

**NOTE**

- Use a (+) screw driver for adjuster (1) and (2).
- To adjust the headlight beam, adjust the beam horizontally first, then adjust vertically.

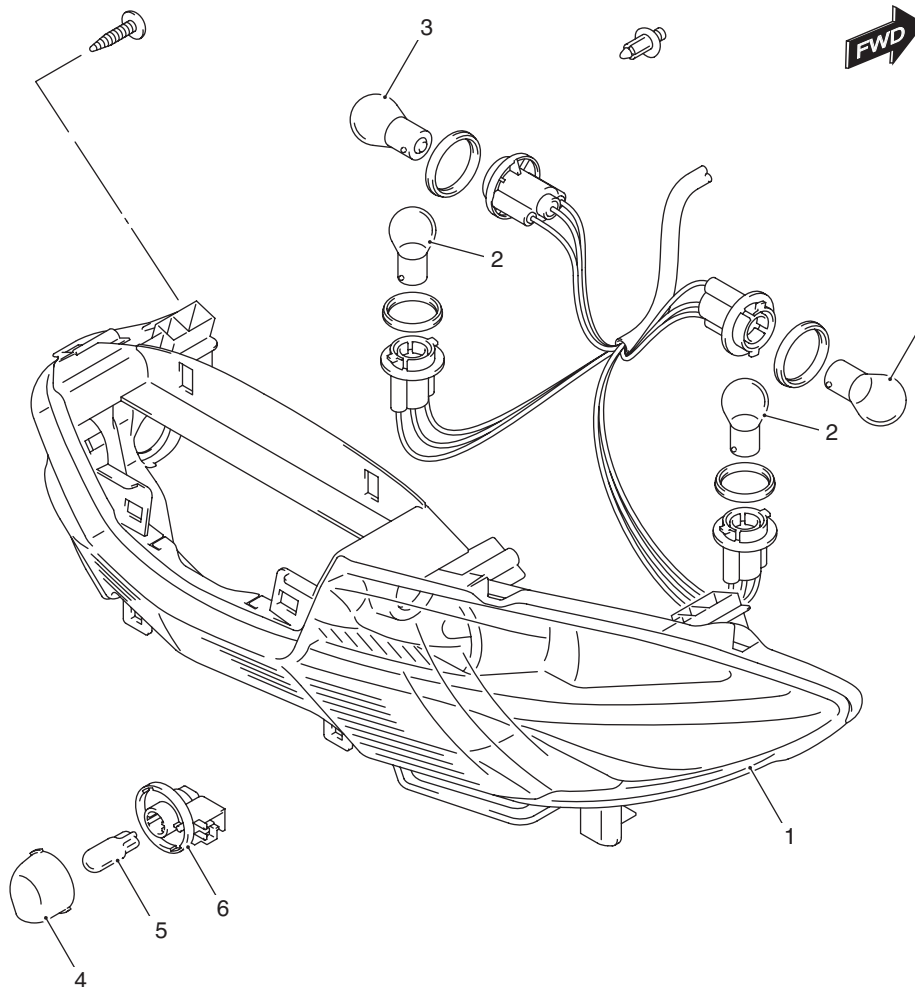


I705H1920043-01

1. Horizontal adjuster	2. Vertical adjuster
------------------------	----------------------

### Rear Reflector / Rear Combination Light / License Light Components

B705H19206016



I705H1920017-01

1. Rear combination light	3. Rear turn signal light bulb	5. License light bulb
2. Brake light/taillight bulb	4. License light lens	6. Socket



## 9B-5 Lighting Systems:

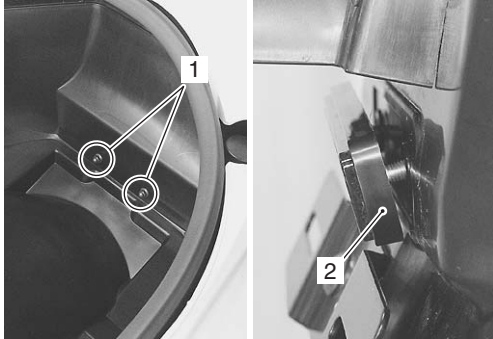
### Rear Reflector / Rear Combination Light / License Light Removal and Installation

B705H19206017

#### Rear Reflector

##### Removal

- 1) Remove the mat of the helmet box.
- 2) Remove the reflector nuts (1) and reflector (2).



I705H1920018-02

##### Installation

Install the rear reflector in the reverse order of removal.

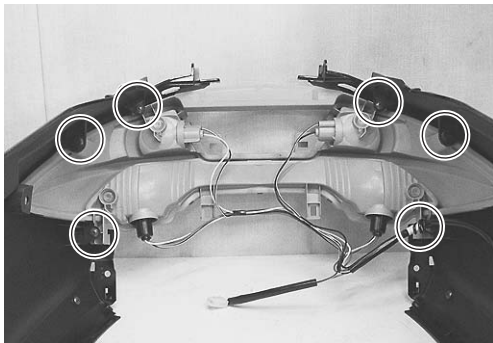
#### Rear Combination Light

##### Removal

- 1) Remove the left and right frame covers. Refer to "Frame Cover Removal and Installation in Section 9D (Page9D-20)".
- 2) Remove the rear combination light.

##### NOTE

Care should be used not to cause scratch or damage to the frame cover and rear combination light.



I705H1920019-01

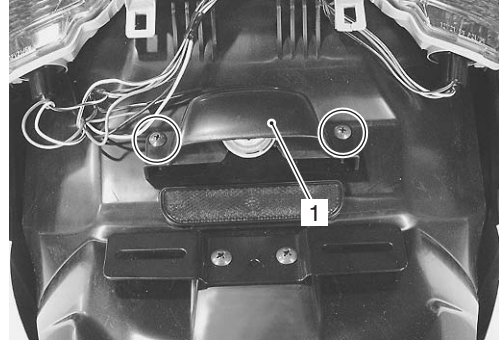
##### Installation

Install the rear combination light in the reverse order of removal.

#### License Light

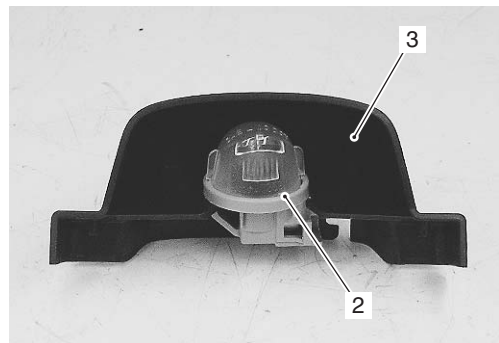
##### Removal

- 1) Remove the lower frame cover. Refer to "Lower Frame Cover Removal and Installation in Section 9D (Page9D-19)".
- 2) Remove the license plate light cover (1).



I705H1920020-01

- 3) Remove the license plate light (2) from the license plate light cover (3).



I705H1920021-02

##### Installation

Install the license plate light in the reverse order of removal.



## Rear Combination Light Bulb / License Light Bulb Replacement

B705H19206018

Refer to "Rear Reflector / Rear Combination Light / License Light Components (Page9B-4)".

### ⚠ CAUTION

- A fouled glass can cause damage to the bulb when lit. If the bulb is contacted with bare a hand, wipe clean with a cloth dampened with alcohol or detergent.
- Do not use the bulb of a wattage other than specification.

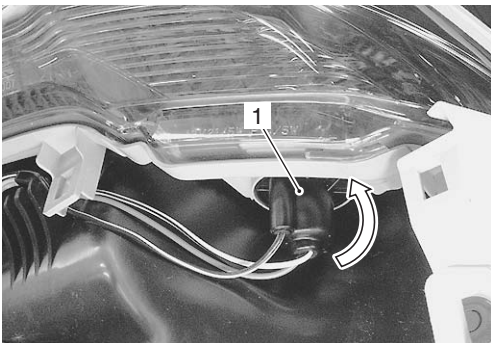
### NOTE

To replace the brake light/taillight bulb or rear turn signal light bulb, the same procedures is applicable to both the right and left lights.

### Brake Light / Taillight Bulb

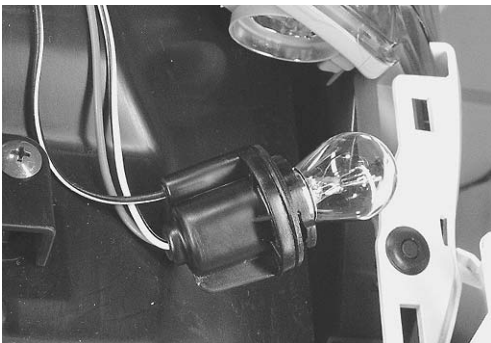
Replace the brake light/taillight bulb in the following procedures:

- 1) Remove the lower frame cover. Refer to "Lower Frame Cover Removal and Installation in Section 9D (Page9D-19)".
- 2) Remove the socket (1) by turning it counter clockwise.



I705H1920007-02

- 3) Replace the brake light/taillight bulb.



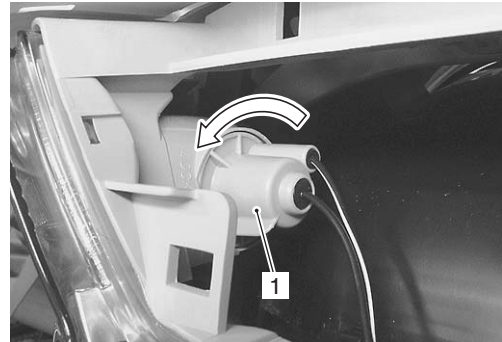
I705H1920022-01

- 4) After finishing the brake light and taillight bulb replacement, reinstall the removed parts.

### Rear Turn Signal Light Bulb

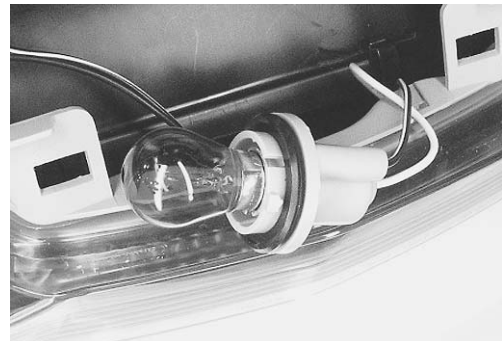
Replace the rear turn signal light bulb in the following procedures:

- 1) Remove the center frame cover. Refer to "Center Frame Cover Removal and Installation in Section 9D (Page9D-19)".
- 2) Remove the socket (1) by turning it counter clockwise.



I705H1920009-02

- 3) Replace the rear turn signal light bulb.



I705H1920023-01

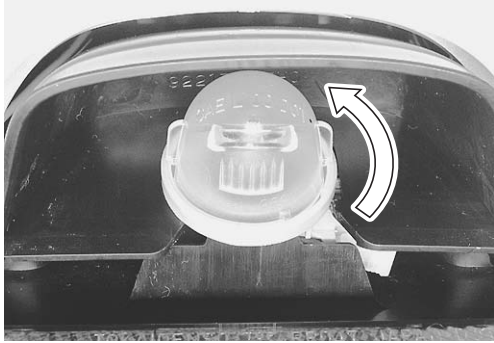
- 4) After finishing the rear turn signal light bulb replacement, reinstall the removed parts.

## 9B-7 Lighting Systems:

### License Light Bulb

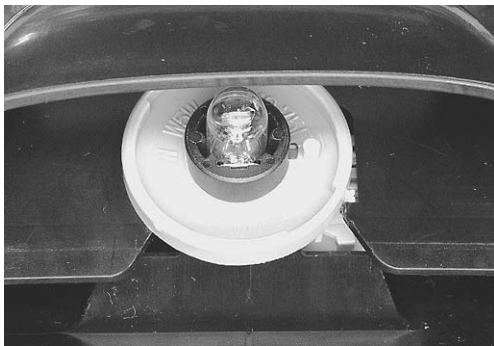
Replace the license light bulb in the following procedures:

- 1) Remove the lens by turning it counter clockwise.



I705H1920010-01

- 2) Replace the license light bulb.



I705H1920024-01

- 3) After finishing the license light bulb replacement, reinstall the removed parts.

### Turn Signal / Side-stand Relay Inspection

B705H19206019

Refer to "Electrical Components Location in Section 0A (Page0A-7)".

#### NOTE

**Make sure that the battery is fully charged.**

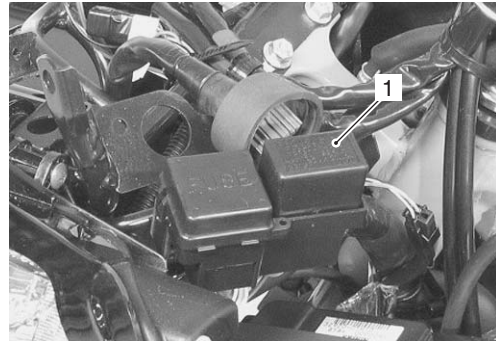
Before removing the turn signal/side-stand relay, check the operation of the turn signal light. If the turn signal light does not illuminate, inspect the bulb, turn signal switch and circuit connection. If the bulb, turn signal switch and circuit connection are OK, the turn signal relay may be faulty; therefore, replace the turn signal/side-stand relay with a new one. Refer to "Turn Signal / Side-stand Relay Removal and Installation (Page9B-7)".

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

B705H19206020

#### Removal

- 1) Remove the meter panel. Refer to "Meter Panel Removal and Installation in Section 9D (Page9D-14)".
- 2) Remove the turn signal/side-stand relay (1).



I705H1920042-01

#### Installation

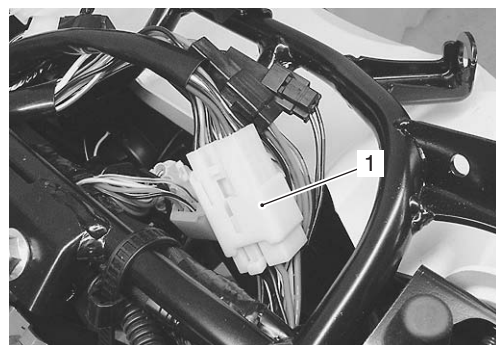
Install the turn signal/side-stand relay in the reverse order of removal.

### Dimmer Switch Inspection

B705H19206022

Inspect the dimmer switch in the following procedures:

- 1) Remove the meter panel. Refer to "Meter Panel Removal and Installation in Section 9D (Page9D-14)".
- 2) Disconnect the left handlebar switch coupler (1).



I705H1920025-01

- 3) Inspect the dimmer switch for continuity with the tester. If any abnormality is found, replace the left handlebar switch assembly with a new one. Refer to "Handlebars Removal and Installation in Section 6B (Page6B-2)".

**Special tool**

 : 09900-25008 (Multi-circuit tester set)

**Tester knob indication**

**Continuity ( ● ))**

Color Position	O/R	Y	W
HI	○ — ○	○	
LO	○		○

I705H1920026-01

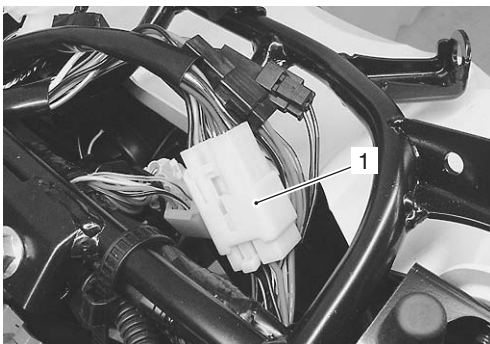
- 4) After finishing the dimmer switch inspection, reinstall the removed parts.

**Turn Signal Switch Inspection**

B705H19206023

Inspect the turn signal switch in the following procedures:

- 1) Remove the meter panel. Refer to "Meter Panel Removal and Installation in Section 9D (Page9D-14)".
- 2) Disconnect the left handlebar switch coupler (1).



I705H1920025-01

- 3) Inspect the turn signal switch for continuity with the tester. If any abnormality is found, replace the left handlebar switch assembly with a new one. Refer to "Handlebars Removal and Installation in Section 6B (Page6B-2)".

**Special tool**

 : 09900-25008 (Multi-circuit tester set)

**Tester knob indication**

**Continuity ( ● ))**

Color Position	Dg	P	Ch	Lg	Sb	B
L	○ — ○				○ — ○	
PUSH	○ — ○ — ○					
R		○ — ○		○ — ○		

I705H1920027-02

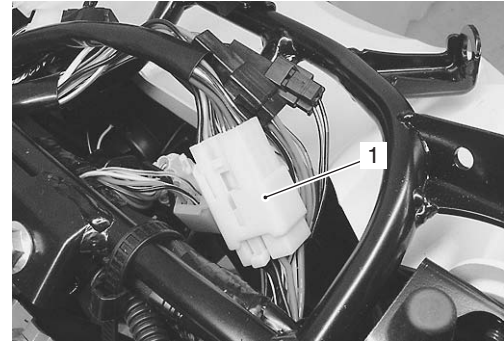
- 4) After finishing the turn signal switch inspection, reinstall the removed parts.

**Passing Light Switch Inspection**

B705H19206024

Inspect the passing light switch in the following procedures:

- 1) Remove the meter panel. Refer to "Meter Panel Removal and Installation in Section 9D (Page9D-14)".
- 2) Disconnect the left handlebar switch coupler (1).



I705H1920025-01

- 3) Inspect the passing light switch for continuity with the tester. If any abnormality is found, replace the left handlebar switch assembly with a new one. Refer to "Handlebars Removal and Installation in Section 6B (Page6B-2)".

**Special tool**

 : 09900-25008 (Multi-circuit tester set)

**Tester knob indication**

**Continuity ( ● ))**

Color Position	O/R	Y
PUSH	○ — ○	○ — ○

I705H1920028-01

- 4) After finishing the passing light switch inspection, reinstall the removed parts.

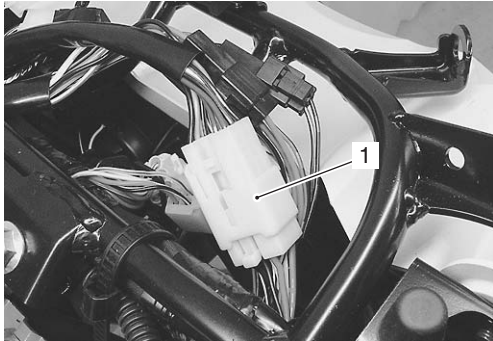
## 9B-9 Lighting Systems:

### Horn Button Inspection

B705H19206028

Inspect the horn button switch in the following procedures:

- 1) Remove the meter panel. Refer to "Meter Panel Removal and Installation in Section 9D (Page9D-14)".
- 2) Disconnect the left handlebar switch coupler (1).



I705H1920025-01

- 3) Inspect the horn button for continuity with the tester. If any abnormality is found, replace the left handlebar switch assembly with a new one. Refer to "Handlebars Removal and Installation in Section 6B (Page6B-2)".

#### Special tool

 : 09900-25008 (Multi-circuit tester set)

#### Tester knob indication

Continuity ( • )) )

Color	B/BI	B/W
Position		
•		
PUSH	○ ————— ○	○ ————— ○

I705H1920040-01

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

### Rear Brake Light Switch Inspection

B705H19206030

Refer to "Brake Light Switch Inspection in Section 4A (Page4A-3)".

Color	B/Y	B/Y
Position		
OFF		
ON	○ ————— ○	○ ————— ○

I705H1920029-02

### Front Brake Light Switch Inspection

B705H19206029

Refer to "Brake Light Switch Inspection in Section 4A (Page4A-3)".

Color	B/BI	B/R
Position		
OFF		
ON	○ ————— ○	○ ————— ○

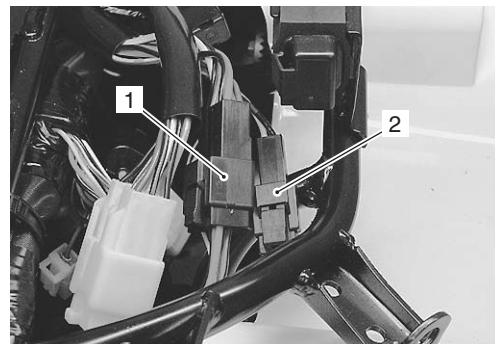
I705H1920030-01

### Hazard Switch Inspection

B705H19206031

Inspect the hazard switch in the following procedures:

- 1) Remove the meter panel. Refer to "Meter Panel Removal and Installation in Section 9D (Page9D-14)".
- 2) Disconnect the right handlebar switch coupler (1) and (2).



I705H1920032-01

- 3) Inspect the hazard switch for continuity with the tester. If any abnormality is found, replace the right handlebar switch assembly with a new one. Refer to "Handlebars Removal and Installation in Section 6B (Page6B-2)".

#### Special tool

 : 09900-25008 (Multi-circuit tester set)

#### Tester knob indication

Continuity ( • )) )

Color	B	Lg	Sb	Gr	P
Position					
OFF				○ ————— ○	
ON	○ ————— ○	○ ————— ○	○ ————— ○		

I705H1920041-02

- 4) After finishing the hazard switch inspection, reinstall the removed parts.

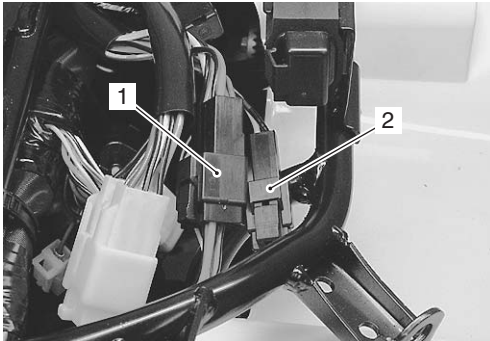


### Engine Stop Switch Inspection

B705H19206025

Inspect the engine stop switch in the following procedures:

- 1) Remove the meter panel. Refer to "Meter Panel Removal and Installation in Section 9D (Page9D-14)".
- 2) Disconnect the right handlebar switch coupler (1) and (2).



I705H1920032-01

- 3) Inspect the engine stop switch for continuity with the tester. If any abnormality is found, replace the right handlebar switch assembly with a new one. Refer to "Handlebars Removal and Installation in Section 6B (Page6B-2)".

**Special tool**

 : 09900-25008 (Multi-circuit tester set)

**Tester knob indication**

Continuity ( • ))

Color	O/B	O/W
Position		
OFF		
RUN	○ ————— ○	○ ————— ○

I705H1920031-01

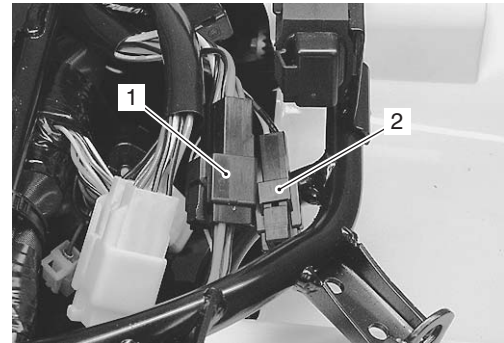
- 4) After finishing the engine stop switch inspection, reinstall the removed parts.

### Starter Button Inspection

B705H19206026

Inspect the starter button in the following procedures:

- 1) Remove the meter panel. Refer to "Meter Panel Removal and Installation in Section 9D (Page9D-14)".
- 2) Disconnect the right handlebar switch coupler (1) and (2).



I705H1920032-01

- 3) Inspect the starter button for continuity with the tester. If any abnormality is found, replace the right handlebar switch assembly with a new one. Refer to "Handlebars Removal and Installation in Section 6B (Page6B-2)".

**Special tool**

 : 09900-25008 (Multi-circuit tester set)

**Tester knob indication**

Continuity ( • ))

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

I705H1920033-01

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

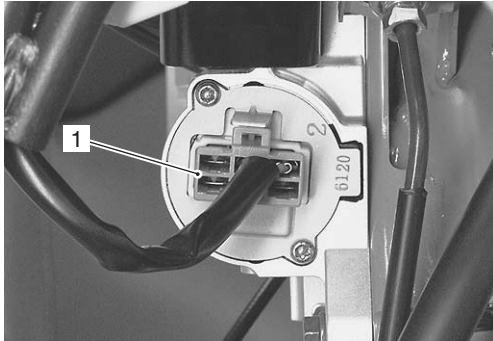
## 9B-11 Lighting Systems:

### Ignition Switch Inspection

B705H19206033

Inspect the ignition switch in the following procedures:

- 1) Remove the front leg shield. Refer to "Front Leg Shield Removal and Installation in Section 9D (Page9D-14)".
- 2) Disconnect the ignition switch coupler (1).



I705H1920034-01

- 3) Inspect the ignition switch for continuity with the tester. If any abnormality is found, replace the ignition switch assembly with a new one.

#### Special tool

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

#### Tester knob indication

**Continuity ( • ))**

Color	R	O
Position		
OFF		
ON	○	○

I705H1920035-01

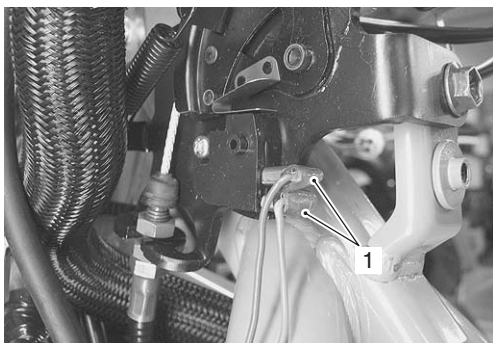
- 4) After finishing the ignition switch inspection, reinstall the removed parts.

### Parking Brake Switch (Brake-lock Switch) Inspection

B705H19206032

Inspect the brake-lock switch in the following procedures:

- 1) Remove the front box. Refer to "Front Box Removal and Installation in Section 9D (Page9D-18)".
- 2) Disconnect the brake-lock switch lead wire couplers (1).



I705H1920036-01

- 3) Inspect the brake-lock switch for continuity with the tester. If any abnormality is found, replace the brake-lock switch assembly with a new one.

#### Special tool

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

#### Tester knob indication

**Continuity ( • ))**

Color	G	B/W
Position		
OFF		
ON	○	○

I705H1920037-02

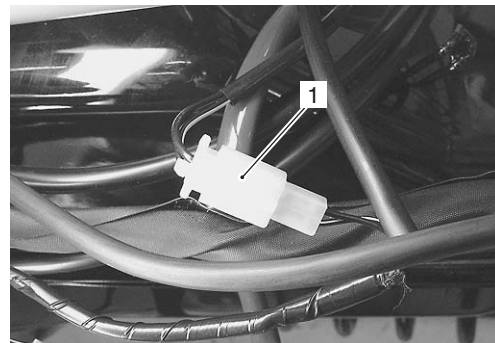
- 4) After finishing the brake-lock switch inspection, reinstall the removed parts.

### Trunk Box Switch Inspection

B705H19206027

Inspect the trunk box switch in the following procedures:

- 1) Remove the left footboard. Refer to "Footboard Removal and Installation in Section 9D (Page9D-21)".
- 2) Disconnect the trunk box switch coupler (1).



I705H1920038-01

- 3) Inspect the trunk box switch for continuity with the tester. If any abnormality is found, replace the trunk box switch assembly with a new one.

#### Special tool

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

#### Tester knob indication

**Continuity ( • ))**

Color	B	B/W
Position		
•		
PUSH	○	○

I705H1920039-01

- 4) After finishing the trunk box switch inspection, reinstall the removed parts.



## Specifications

### Service Data

B705H19207001

#### Wattage


Unit: W

Item		Standard / Specification	
		E-02, 19, 24, 54	E-03, 28, 33
Headlight	HI	60/55	←
	LO	55	←
Parking/position light		5 x 2	←
Brake light/Taillight		21/5 x 2	←
Turn signal light		21 x 2 (Front), 21 x 2 (Rear)	27/8 x 2 (Front), 21 x 2 (Rear)
License plate light		5	←
Trunk light		5	←

## Special Tools and Equipment

### Special Tool

B705H19208001

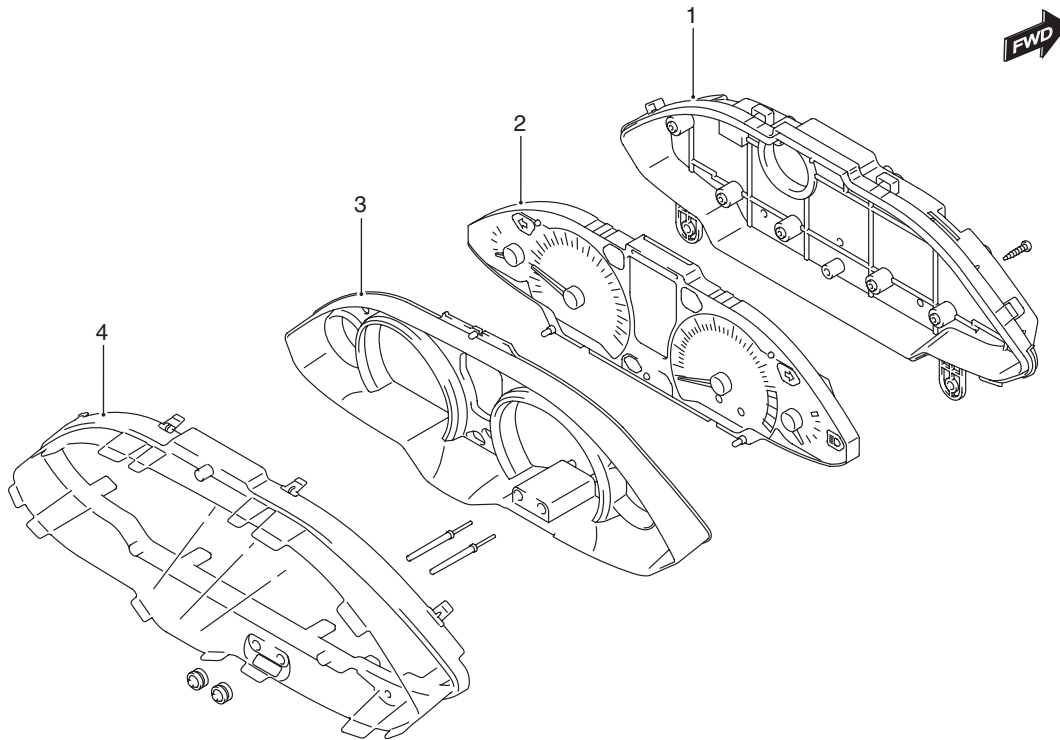
09900-25008 Multi-circuit tester set ☞(Page9B-8) / ☞(Page9B-8) / ☞(Page9B-8) / ☞(Page9B-9) / ☞(Page9B-9) / ☞(Page9B-10) / ☞(Page9B-10) / ☞(Page9B-11) / ☞(Page9B-11) / ☞(Page9B-11)	
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# Combination Meter / Fuel Meter / Horn

## Repair Instructions

### Combination Meter Components

B705H19306001



I705H1930009-01

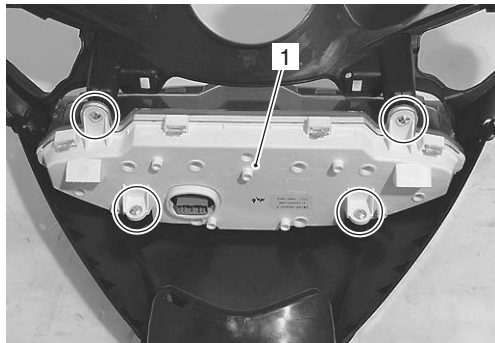
1. Lower case	2. Combination meter	3. Wind plate	4. Upper case
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### Combination Meter Removal and Installation

B705H19306014

#### Removal

- 1) Remove the meter panel.  
Refer to "Meter Panel Removal and Installation in Section 9D (Page9D-14)".
- 2) Remove the combination meter assembly (1).



I705H1930001-01

#### Installation

Install the combination meter in the reverse order of the removal.

### Combination Meter Disassembly and Assembly

B705H19306002

Refer to "Combination Meter Removal and Installation (Page9C-1)".

#### Disassembly

Disassemble the combination meter. Refer to "Combination Meter Components (Page9C-1)".

#### Assembly

Assemble the combination meter. Refer to "Combination Meter Components (Page9C-1)".

### Combination Meter Inspection

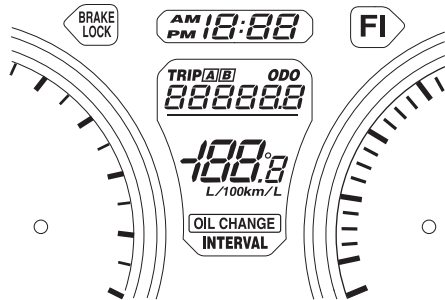
B705H19306015

Check that the illumination LED on the meter panel lights up and the indicating needle each on fuel meter, speedometer, tachometer and coolant temperature sensor once moves to the maximum and then returns to the home position immediately after the ignition switch has been turned on.



I705H1930002-01

At the same time, check that the FI lamp and each of the clock and multi-information meter segments turn on and thereafter go off to resume the normal display.



I705H1930008-01

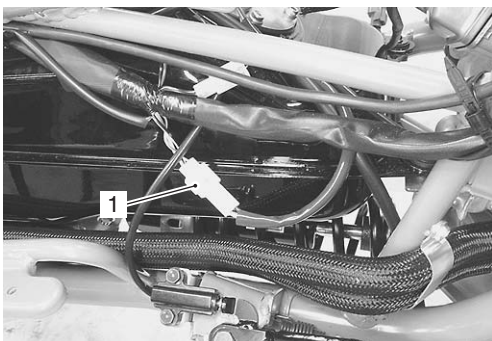
Check that the other LEDs (turn signal indicator, high beam indicator and brake-lock indicator) turn on with the respective switches operated. If the LED does not light up, inspect the wiring harness and connectors. If no abnormal condition is found, replace the combination meter.

### Fuel Level Meter Inspection

B705H19306016

Inspect the fuel level meter in the following procedures:

- 1) Remove the foot board and fuel pump coupler (1). Refer to "Footboard Removal and Installation in Section 9D (Page9D-21)".

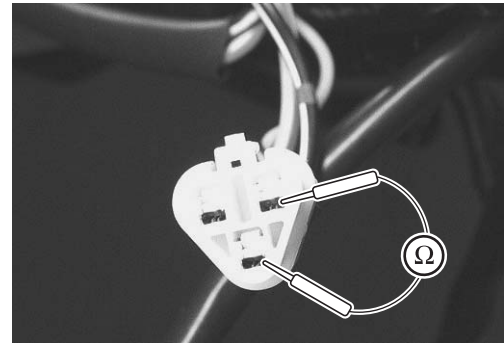


I705H1930003-01

- 2) Check that the fuel level meter operates properly when a resistor is connected between the terminals of fuel pump wiring coupler (Y/B and B/W) on the wiring harness side. If any abnormal condition is noted, replace the combination meter.

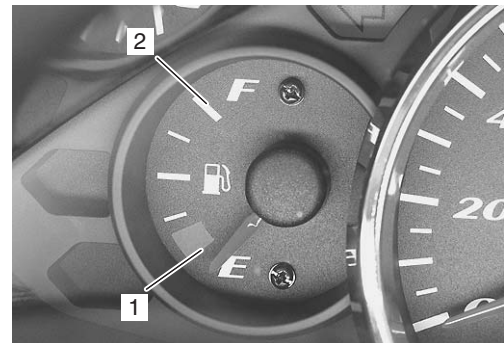
### NOTE

- Prior to the inspection, check that the fuel gauge is functioning properly.
- When reading the meter indication, wait at least 20 seconds after the resistor has been connected.



I705H1930004-01

Resister	Meter indication
130 Ω	(1)
10 Ω	(2)



I705H1930005-05

### Fuel Level Gauge Inspection

B705H19306017

Refer to "Fuel Level Gauge Inspection in Section 1G (Page1G-13)".

### Speedometer Inspection

B705H19306018

If the speedometer, odometer or trip meter does not function properly, inspect the speedometer sensor and connection of coupler. If the speedometer sensor and connection are all right, replace the meter with a new one.

Refer to "Combination Meter Disassembly and Assembly (Page9C-1)".

### Speed Sensor Removal and Installation

B705H19306019

Refer to "Speed Sensor Removal and Installation in Section 1C (Page1C-4)".

### Speed Sensor Inspection

B705H19306020

Refer to "Speed Sensor Inspection in Section 1C (Page1C-3)".

### Ignition Switch Inspection

B705H19306021

Refer to "Ignition Switch Inspection in Section 9B (Page9B-11)".

### Ignition Switch Removal and Installation

B705H19306022

Refer to "Ignition Switch Removal and Installation in Section 1H (Page1H-8)".

### Horn Inspection

B705H19306023

#### Horn Button Inspection

##### NOTE

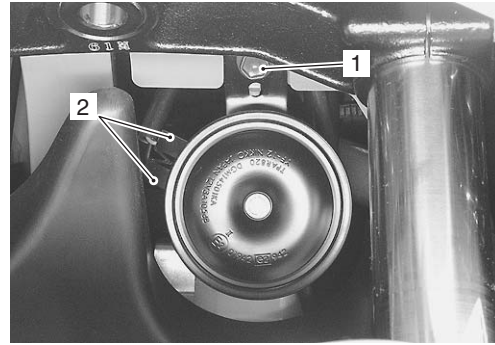
**If the horn sound condition is normal, it is not necessary to inspect the horn button continuity.**

Refer to "Horn Button Inspection in Section 9B (Page9B-9)".

### Horn Inspection

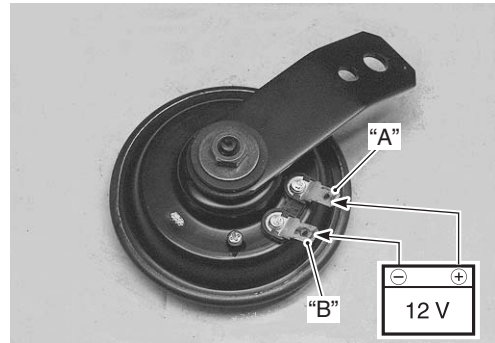
Inspect the horn in the following procedures:

- 1) Remove the horn mounting bolt (1) and disconnect the horn couplers (2).



I705H1930006-01

- 2) Connect a 12 V battery to terminal "A" and terminal "B". If the sound heard from the horn, replace the horn with a new one.



I705H1930007-01

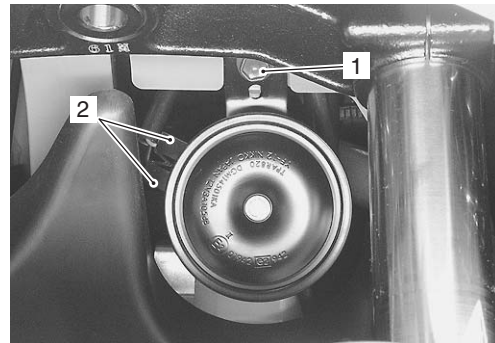
- 3) After finishing the horn inspection, reinstall the horn coupler and horn mounting bolt.

### Horn Removal and Installation

B705H19306024

#### Removal

- 1) Remove the horn mounting bolt (1).
- 2) Disconnect the horn couplers (2).



I705H1930006-01

#### Installation

Install the horn in the reverse order of removal.

## Specifications

### Service Data

B705H19307001

### Wattage

Unit: W

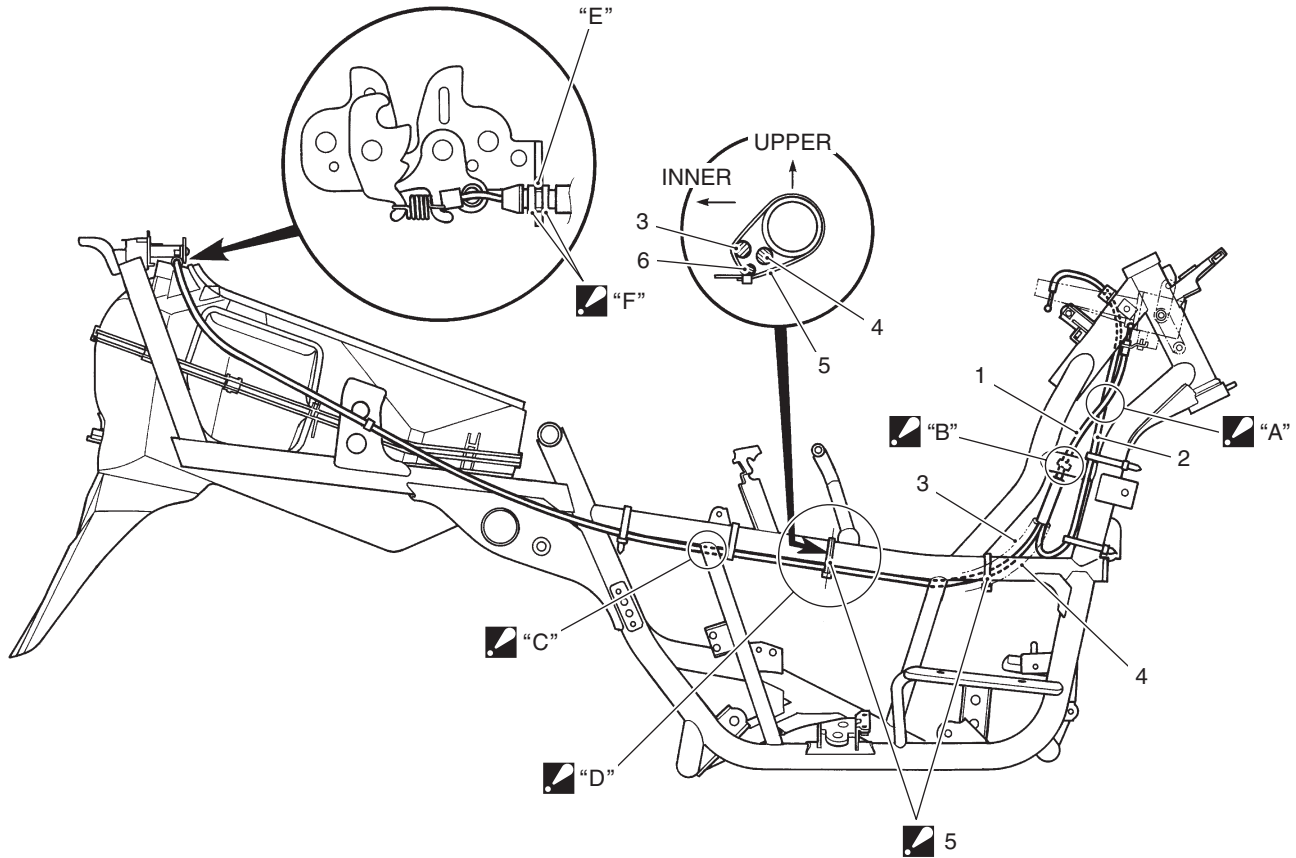
Item	Standard / Specification	
	E-02, 19, 24, 54	E-03, 28, 33
Speedometer/tachometer light	LED	←
Engine coolant temp. gauge light	LED	←
Fuel level gauge light	LED	←
Immobilizer indicator light	LED	←
Oil change indicator	LCD	←
FI indicator light	LED	←
Brake-lock indicator light	LED	←
High beam indicator light	LED	←
Turn signal indicator light	LED x 2	←

# Exterior Parts

## Schematic and Routing Diagram

### Seat Lock Cable Routing Diagram

B705H19402001



I705H1940050-04

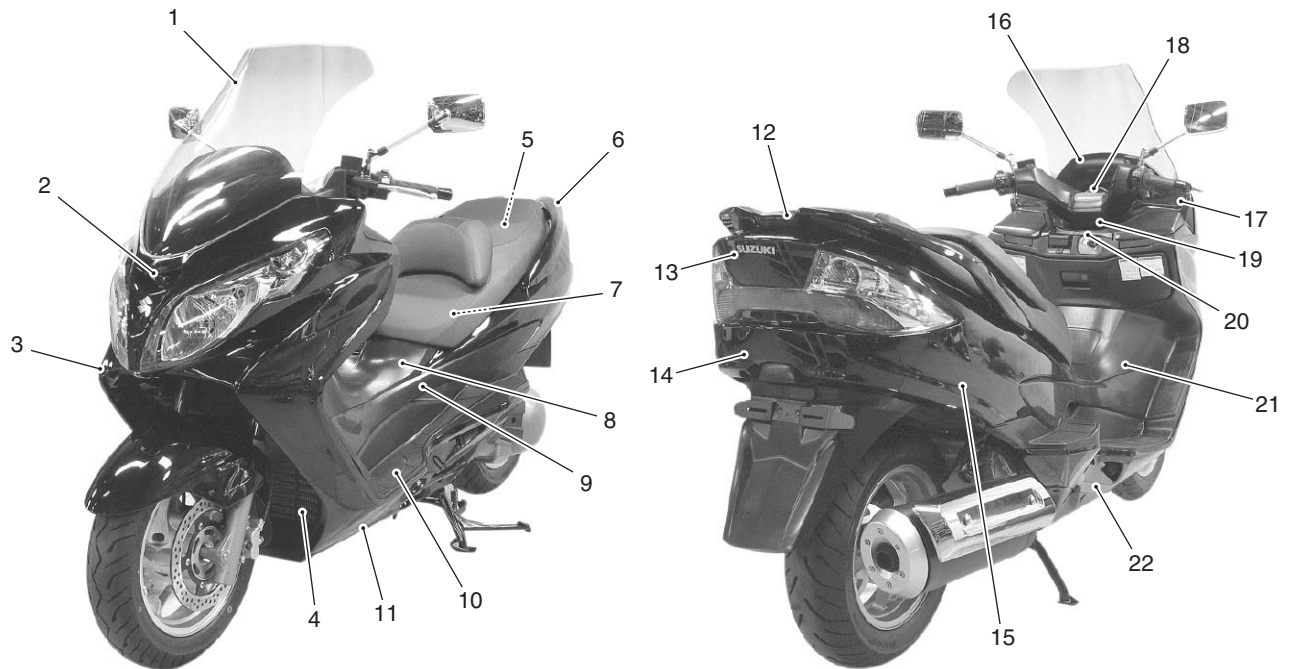
1. Seat lock cable No. 1	▲ "A": Pass the seat lock cable No. 2 through front of the seat lock cable No. 1.
2. Seat lock cable No. 2	▲ "B": Pass the seat lock cable No. 1 through inside of the frame.
3. Brake-lock cable	▲ "C": Pass the cables through inner side of the frame.
4. Starter motor lead wire	▲ "D": Pass the cables through bottom and inner side of the frame.
▲ 5. Clamp : Clamp the brake-lock cable, starter motor lead wire and seat lock cable.	"E": Seat lock cable set position
6. Seat lock cable	▲ "F": Change set position only when seat locking or releasing is impossible.



## Component Location

### Exterior Components Location

B705H19403001

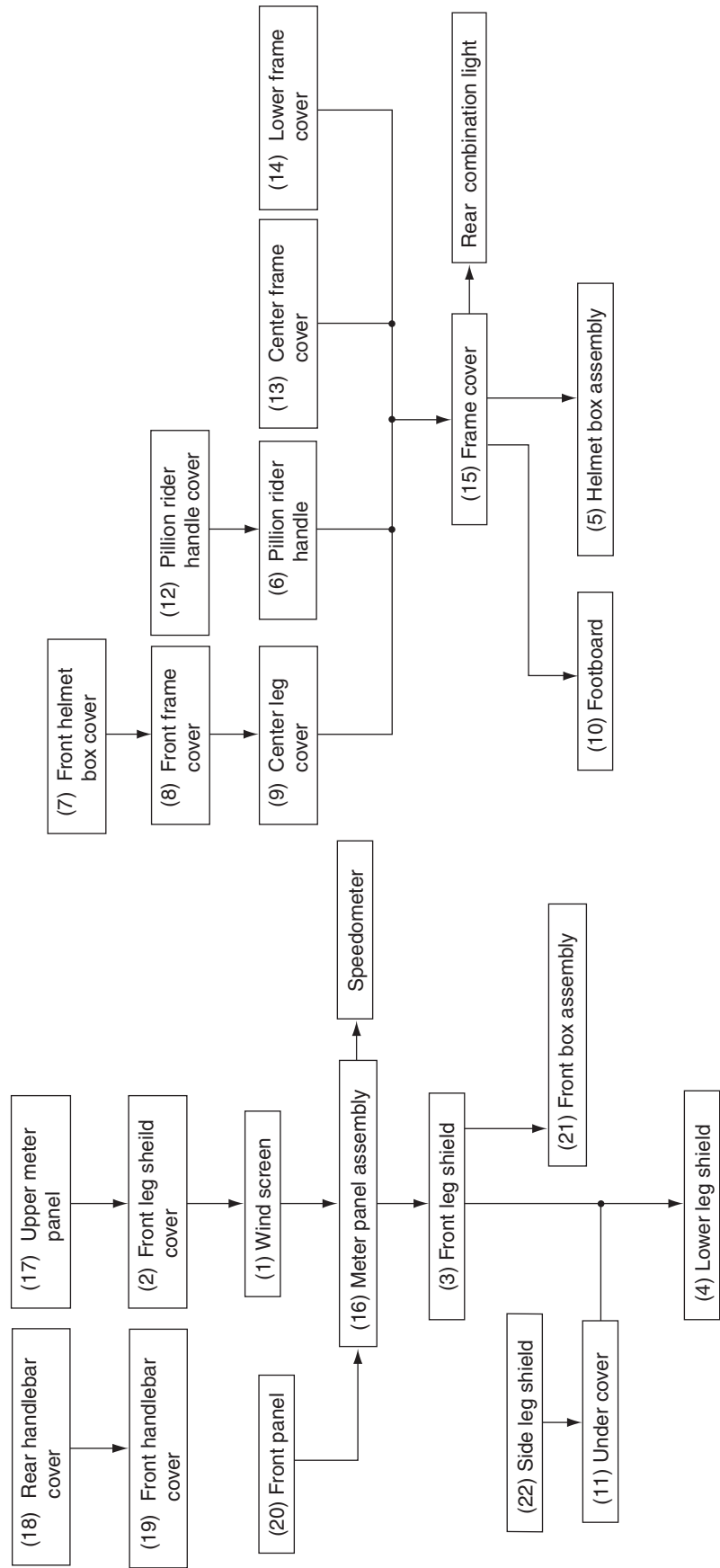


I705H1940051-02

1. Wind screen	7. Helmet box front cover	13. Center frame cover	19. Rear handlebar cover
2. Front leg shield cover	8. Front frame cover	14. Lower frame cover	20. Front panel
3. Front leg shield	9. Center leg cover	15. Frame cover	21. Front box
4. Lower leg shield	10. Footboard	16. Meter panel	22. Side leg shield
5. Helmet box	11. Under cover	17. Upper meter panel	
6. Pillion rider handle	12. Pillion rider handle cover	18. Front handlebar cover	

Removal Procedures Flow Chart

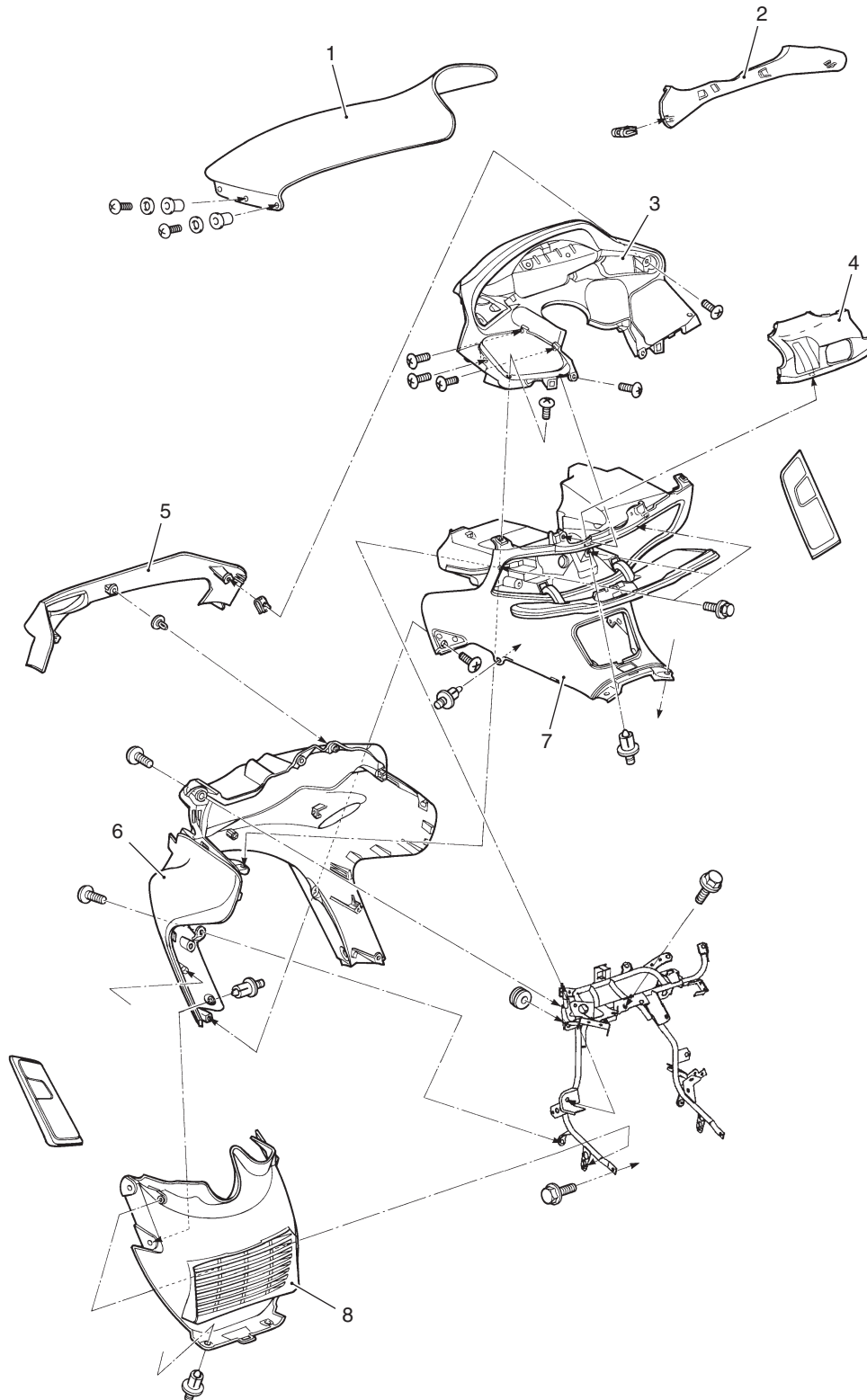
B705H19403002



# Repair Instructions

## Exterior Parts Components

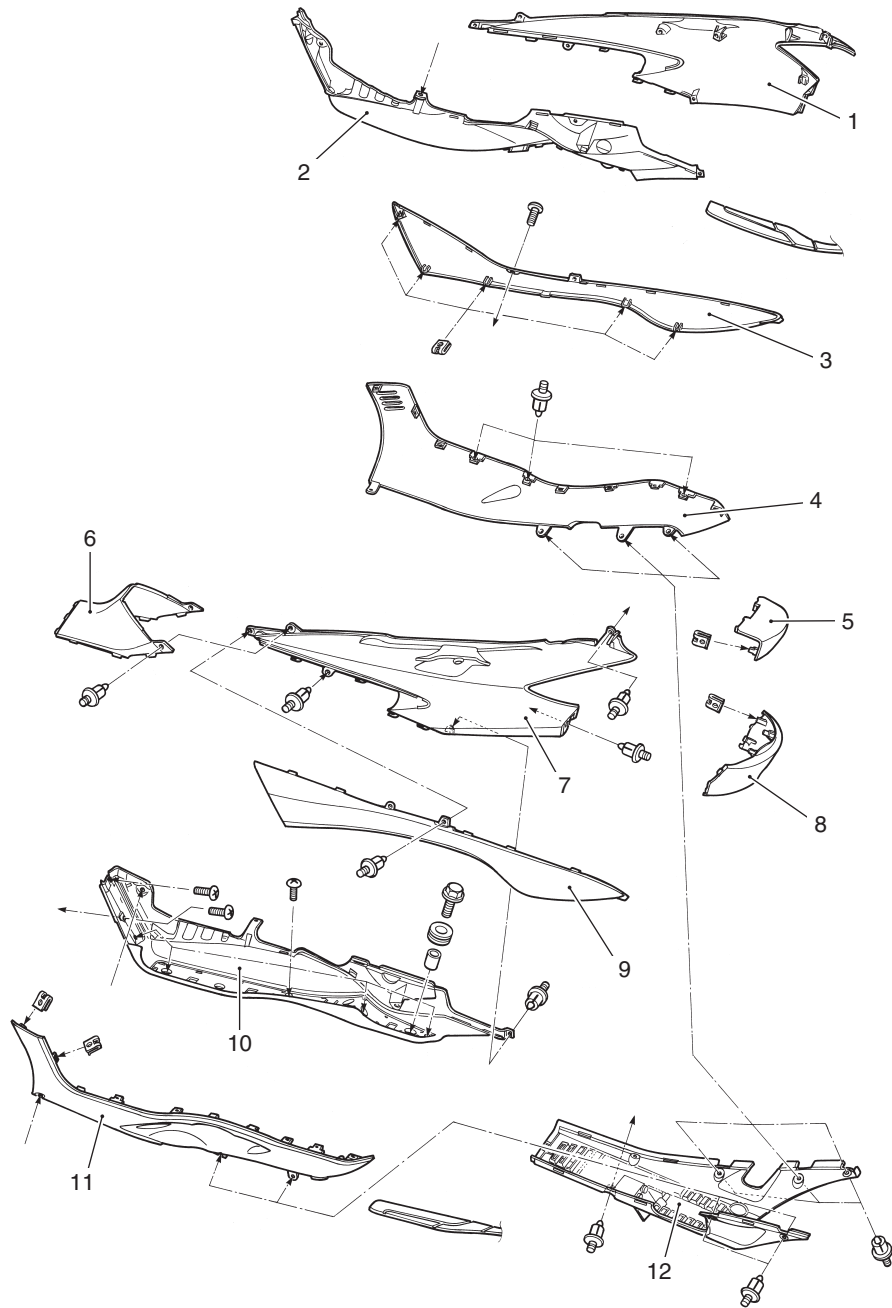
B705H19406002



I705H1940053-02

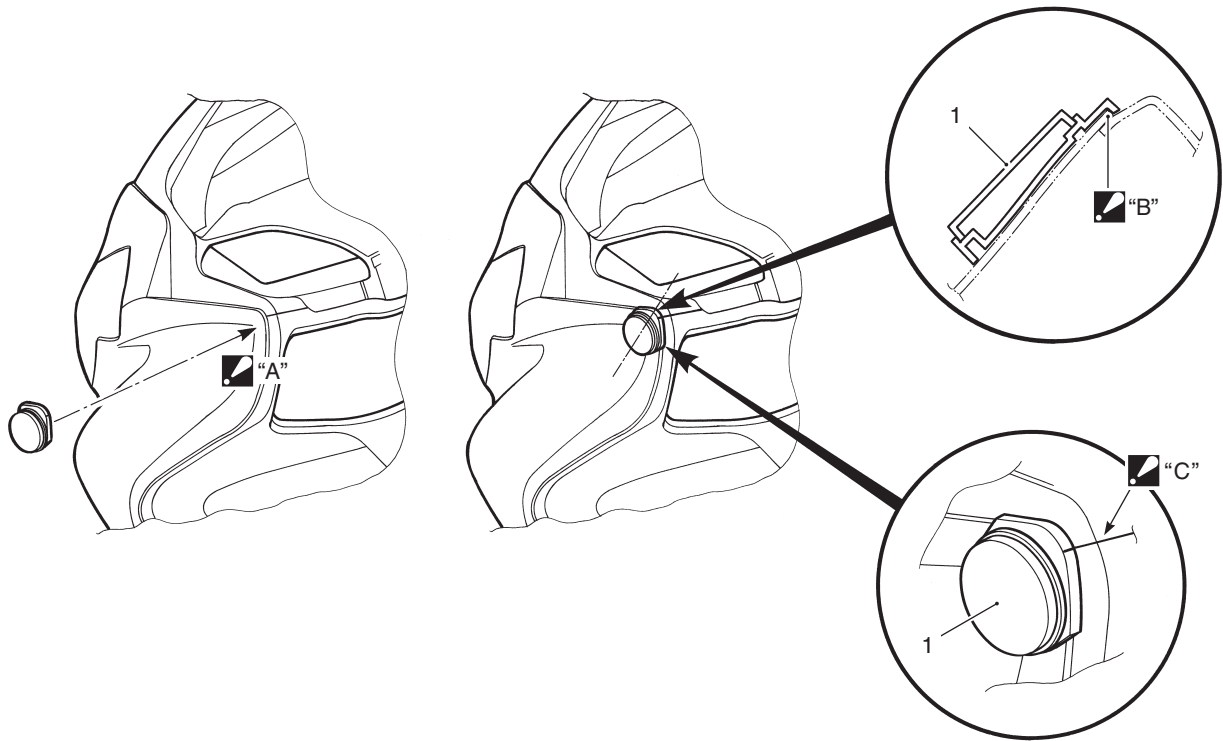
1. Wind screen	3. Meter panel assembly	5. Front leg shield cover	7. Front box assembly
2. Upper meter panel	4. Front panel	6. Front leg shield	8. Lower leg shield

## 9D-5 Exterior Parts:



I705H1940052-01

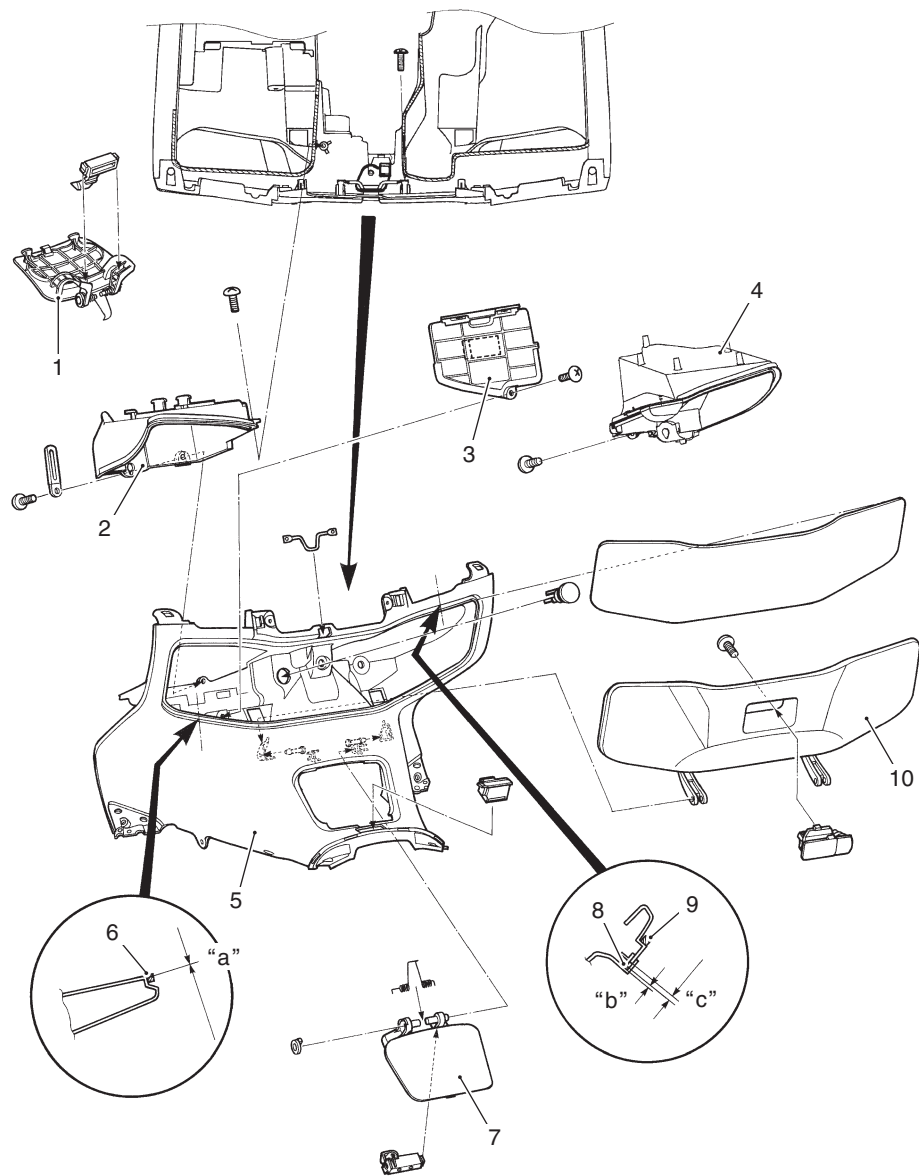
1. Frame cover (RH)	4. Side leg shield (RH)	7. Frame cover (LH)	10. Footboard (LH)
2. Footboard (RH)	5. Center frame cover	8. Lower frame cover	11. Side leg shield (LH)
3. Center leg cover (RH)	6. Front frame cover	9. Center leg cover	12. Under cover



I705H1940054-02

<p>1. Front reflex reflector (For E-03, 28, 33)</p>	<p>☑ "B": Set the reflector to the edge of front leg shield.</p>
<p>☑ "A": Adhere the front reflex reflector on to the front leg shield.</p>	<p>☑ "C": Align the projection of reflector with the joint part of meter panel and front box.</p>

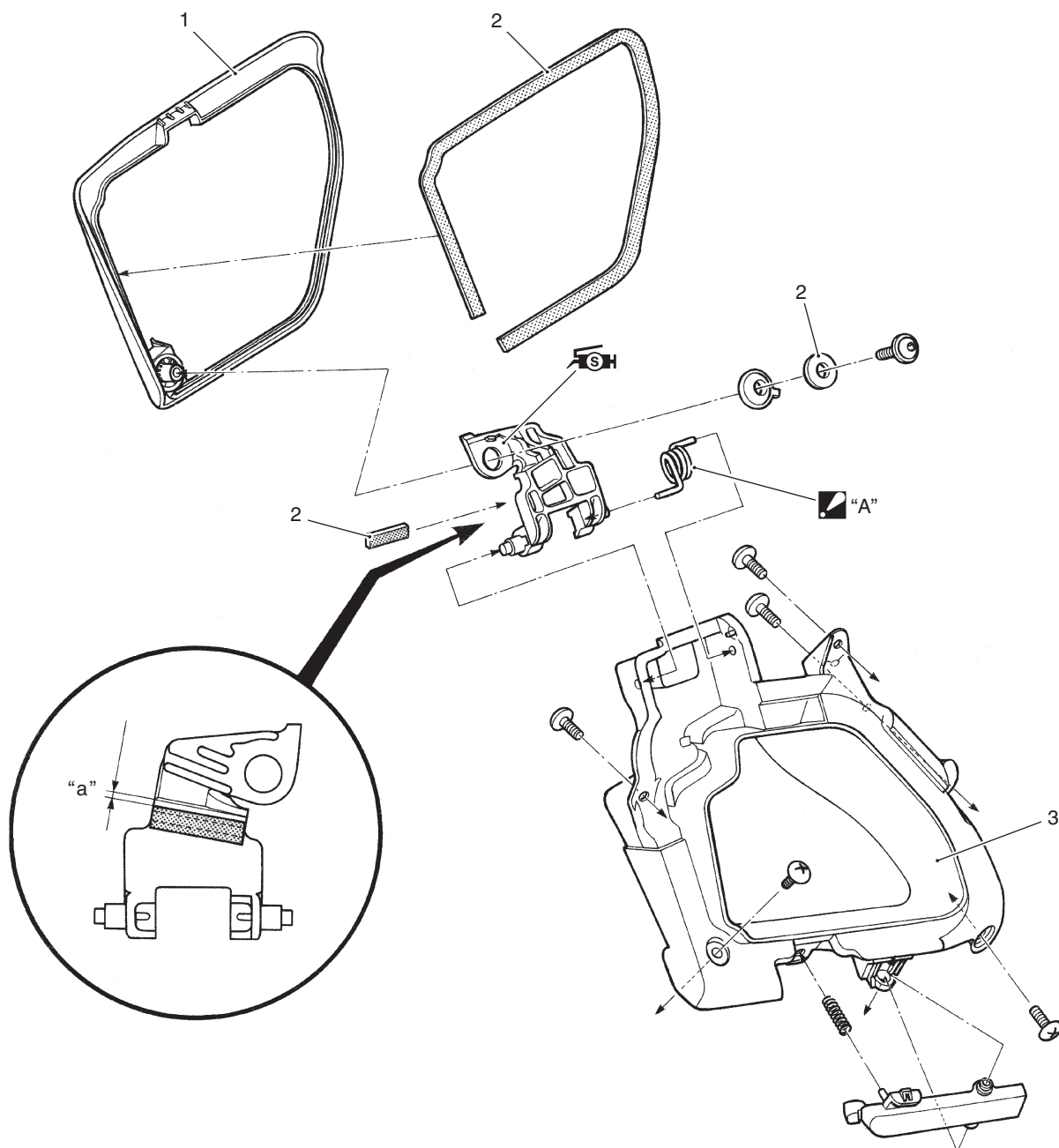
## 9D-7 Exterior Parts:



I705H1940055-04

1. Fuel lid	6. Cushion	"a": 0 mm
2. Front box inner cover (LH)	7. Fuel lid	"b": 0 – 3 mm (0 – 0.12 in)
3. Battery cover	8. Inner cushion	"c": 4 mm (0.16 in)
4. Front box inner cover (RH)	9. Cushion	
5. Front box	10. Front box lid	

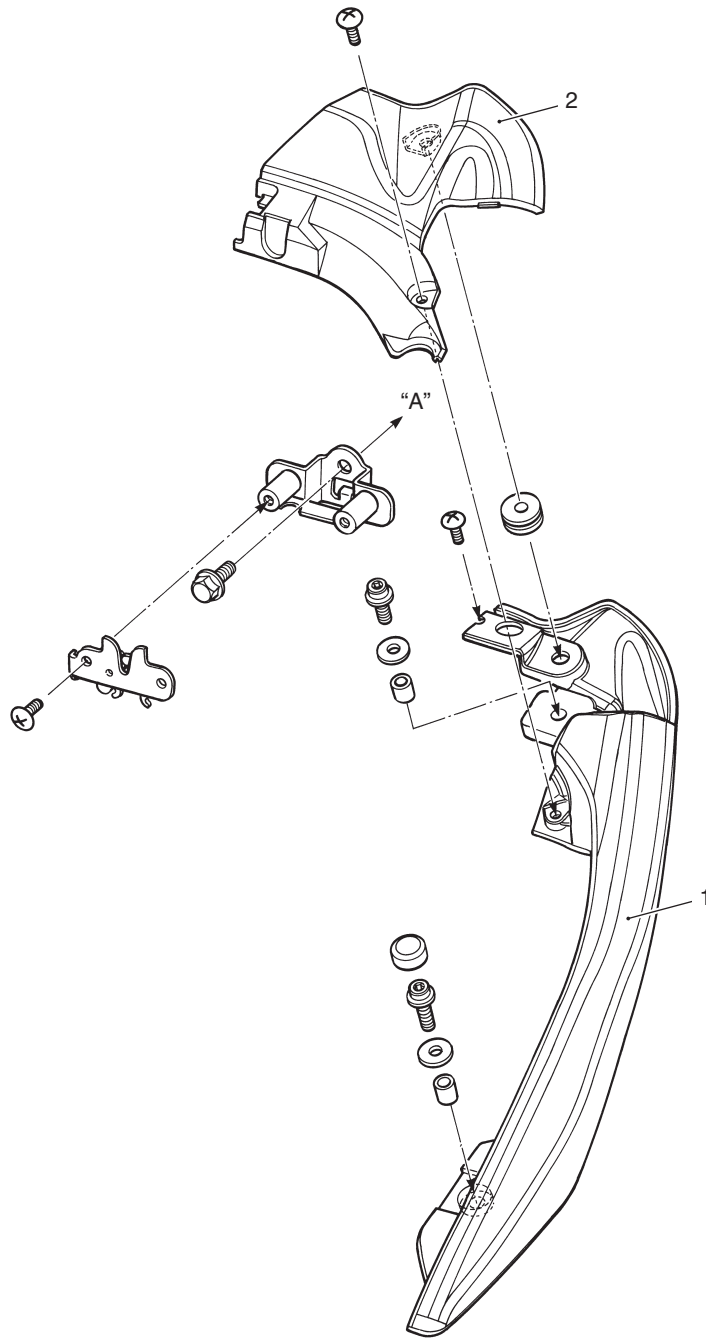




1. Front panel box lid	"a": 2 mm (0.08 in)
2. Cushion	▣ "A": Do not exchange the right one and left one.
3. Front panel box	SH: Apply silicone grease.

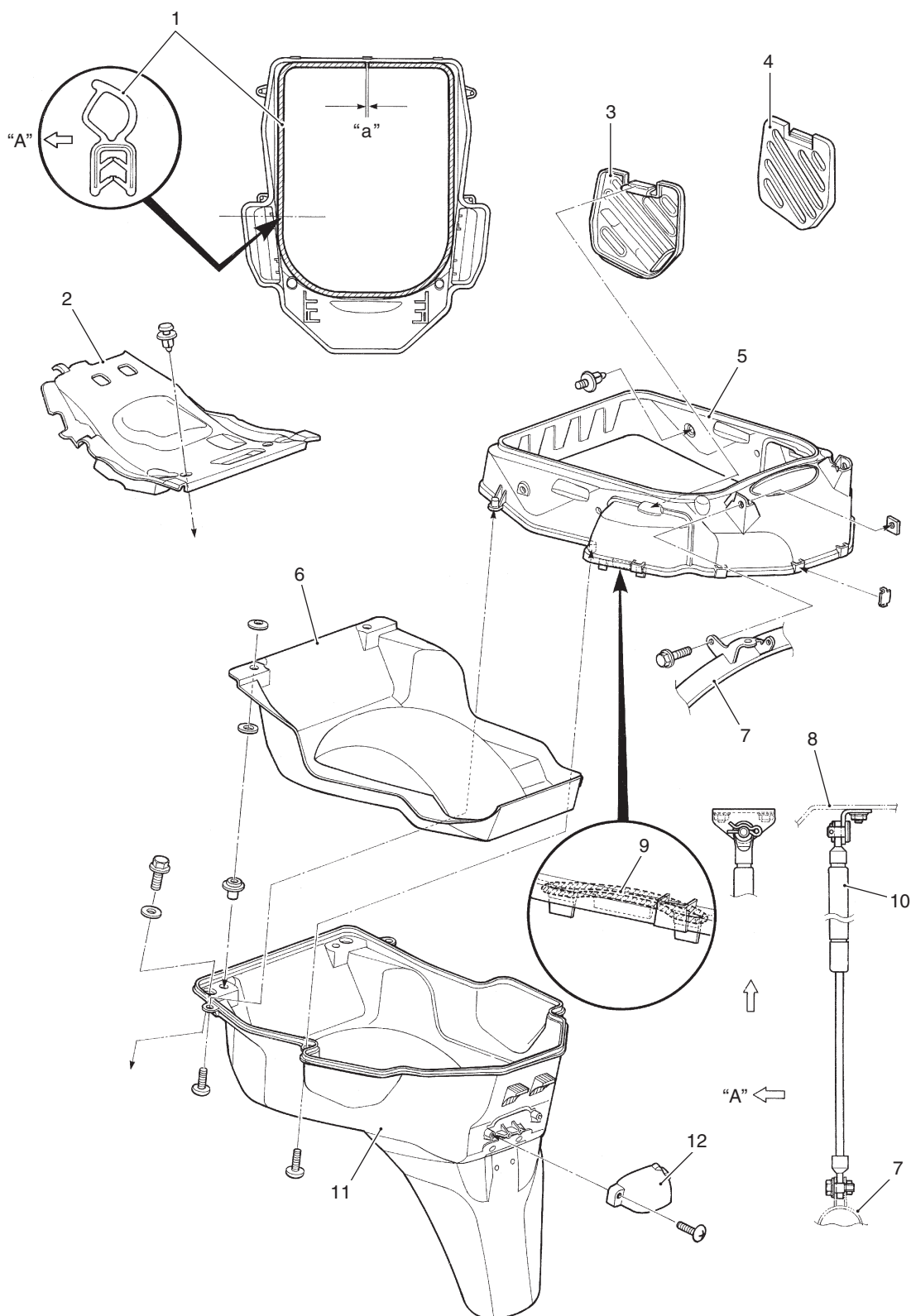
I705H1940060-01

9D-9 Exterior Parts:



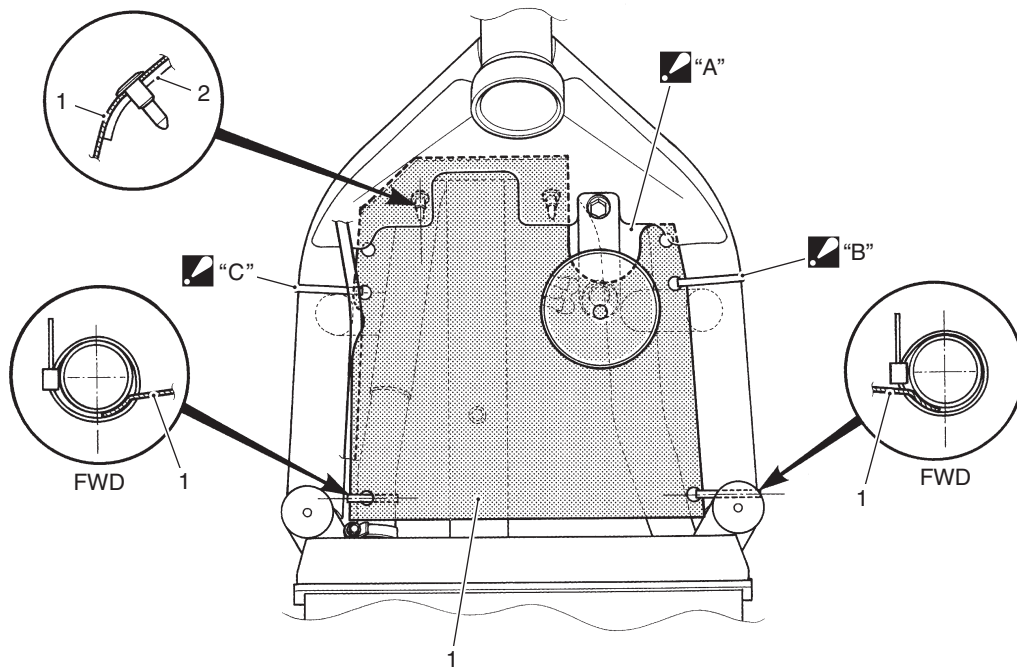
1. Pillion rider handle	2. Pillion rider handle cover	"A": To frame
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I705H1940056-03



1. Seat molding	6. Mat	11. Lower helmet box
2. Helmet box front cover	7. Frame	12. License plate light cover
3. Helmet box lid (LH)	8. Seat	"a": 0 – 1 mm (0 – 0.04 in)
4. Helmet box lid (RH)	9. Tool band	"A": Outside
5. Upper helmet box	10. Seat damper	

9D-11 Exterior Parts:

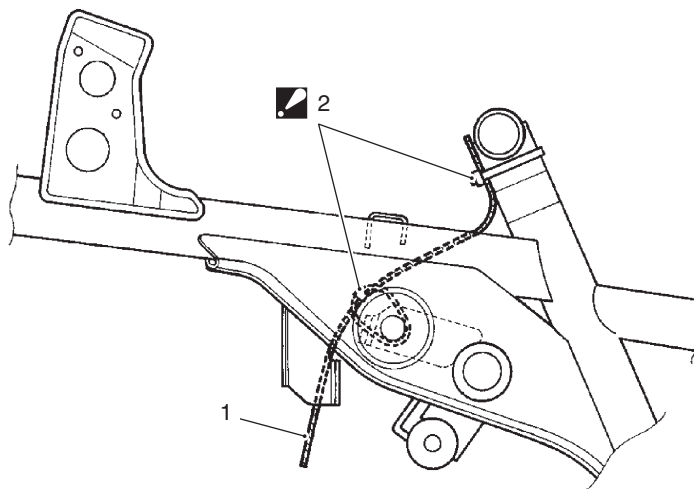
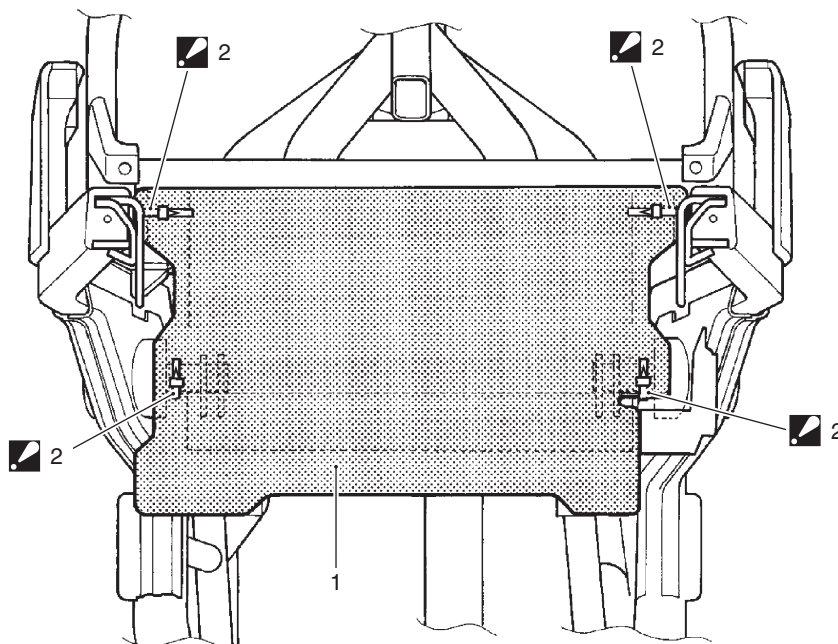


I705H1940063-02

1. Fuel tray mudguard sheet	☑ "B": Face the clamp locking part inside and clamp end backward.
2. Frame	☑ "C": Clamp the seat with the wiring harness.
☑ "A": The seat must be assembled behind the horn.	

Inner Cover Construction

B705H19406025



<p>1. Inner cover</p>	<p>2. Clamp : Clamp ends should face inside. The clamps are not fastened too much.</p>
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I705H1940062-01

### Seat Lock Cable Removal and Installation

B705H19406001

Refer to "Seat Lock Cable Routing Diagram (Page9D-1)".

### Handlebar Cover Removal and Installation

B705H19406003

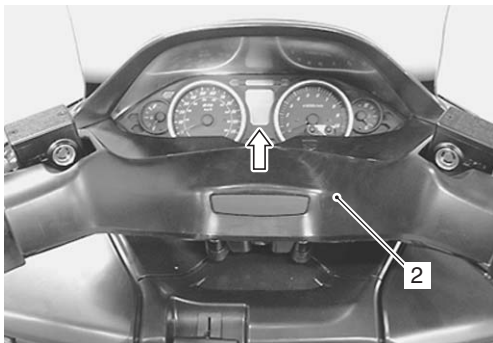
#### Removal

- 1) Remove the rear handlebar cover (1).



I705H1940001-04

- 2) Remove the front handlebar cover (2).



I705H1940002-03

#### Installation

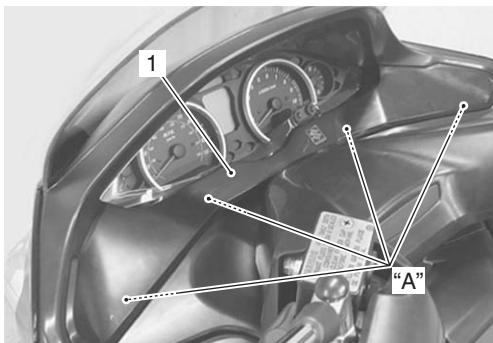
Install the handlebar covers in the reverse order of removal.

### Upper Meter Panel Removal and Installation

B705H19406004

#### Removal

Pull out the upper meter panel (1).

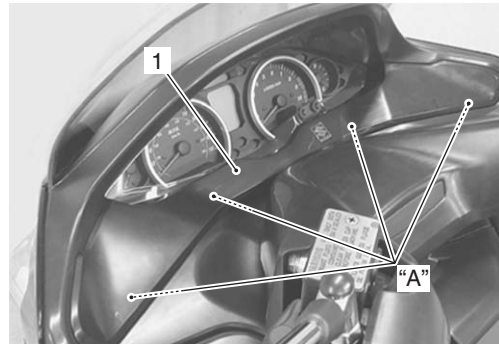


I705H1940003-03

"A": Hooked point

### Installation

Push in the upper meter panel (1).



I705H1940003-03

"A": Hooked point

### Front Leg Shield Cover Removal and Installation

B705H19406005

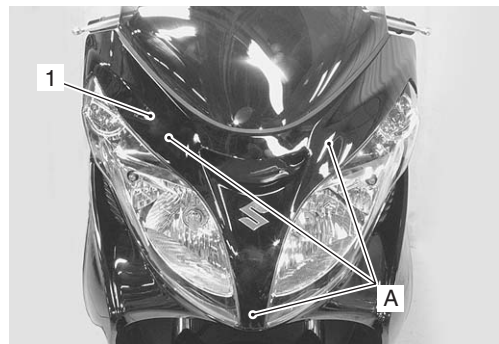
#### Removal

- 1) Remove the upper meter panel. Refer to "Upper Meter Panel Removal and Installation (Page9D-13)".
- 2) Remove the screws.



I705H1940004-02

- 3) Remove the front leg shield cover (1).



I705H1940005-01

"A": Hooked point

#### Installation

Install the front leg shield cover in the reverse order of removal.

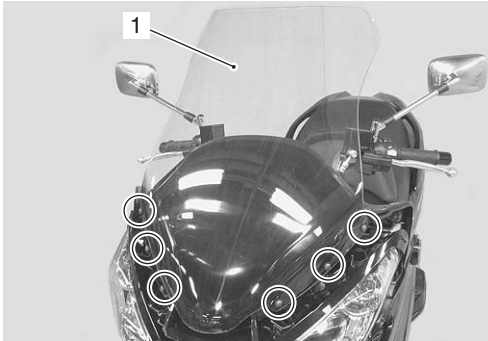


**Wind Screen Removal and Installation**

B705H19406006

**Removal**

- 1) Remove the front leg shield cover. Refer to "Front Leg Shield Cover Removal and Installation (Page9D-13)".
- 2) Remove the wind screen (1).



I705H1940006-01

**Installation**

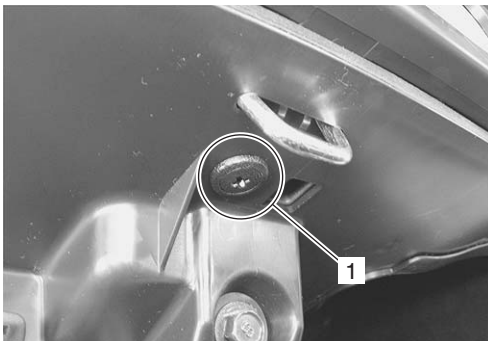
Install the wind screen in the reverse order of removal.

**Front Panel Removal and Installation**

B705H19406007

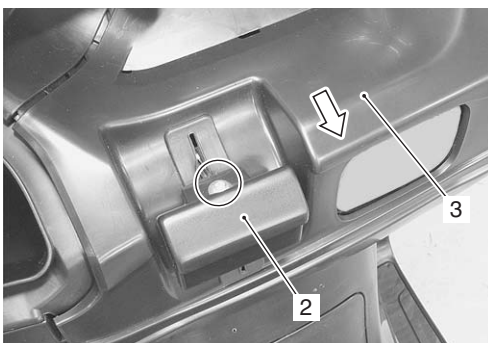
**Removal**

- 1) Open the front box and remove the fastener (1).



I705H1940007-01

- 2) Remove the brake-lock lever (2).
- 3) Remove the front panel (3).



I705H1940009-03

**Installation**

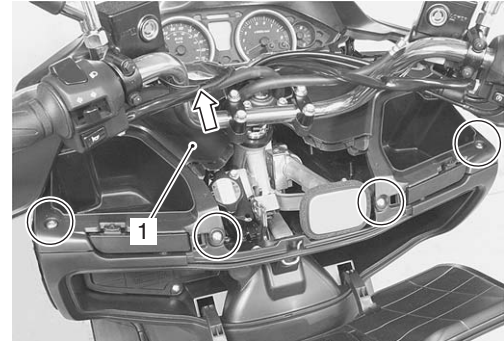
Install the front panel in the reverse order of removal.

**Meter Panel Removal and Installation**

B705H19406008

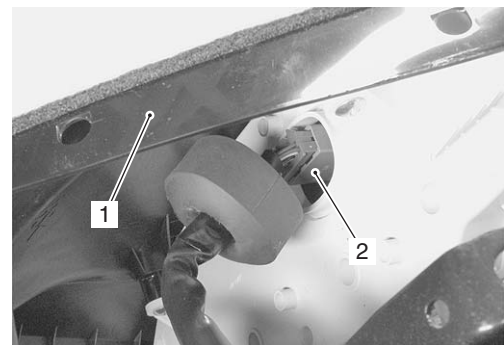
**Removal**

- 1) Remove the wind screen. Refer to "Wind Screen Removal and Installation (Page9D-14)".
- 2) Remove the screws and detach the meter panel assembly (1) forward.



I705H1940011-02

- 3) Disconnect the meter coupler (2) and remove the meter panel.



I705H1940012-01

**Installation**

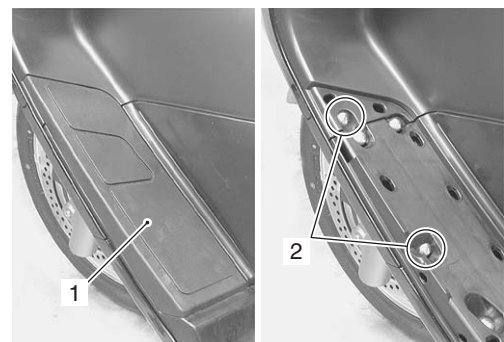
Install the meter panel in the reverse order of removal.

**Front Leg Shield Removal and Installation**

B705H19406009

**Removal**

- 1) Remove the meter panel assembly. Refer to "Meter Panel Removal and Installation (Page9D-14)".
- 2) Remove the left and right front floor mats (1) and screws (2).



I705H1940013-01

## 9D-15 Exterior Parts:

3) Remove the screws and fasteners.

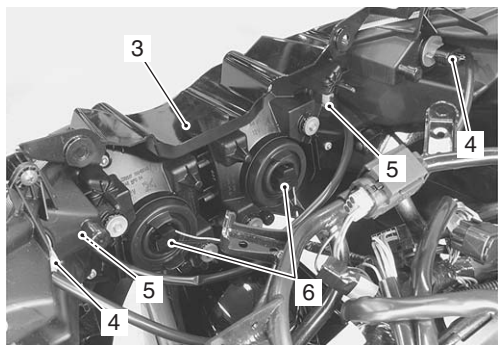


I705H1940014-01



I705H1940015-01

4) Remove the front leg shield (3) by disconnecting the turn signal light coupler (4), position light couplers (5) and headlight couplers (6).



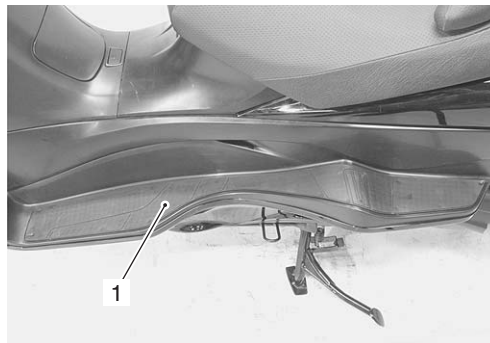
I705H1940016-02

## Side Leg Shield Removal and Installation

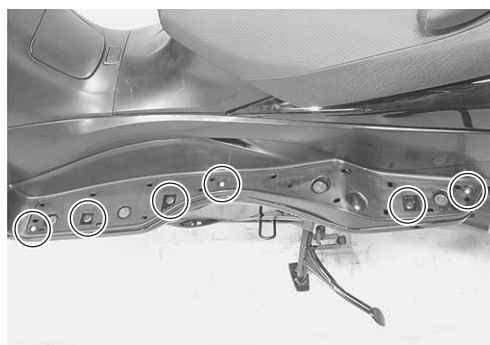
B705H19406010

### Removal

1) Remove the left and right rear floor mats (1), fasteners and screws.

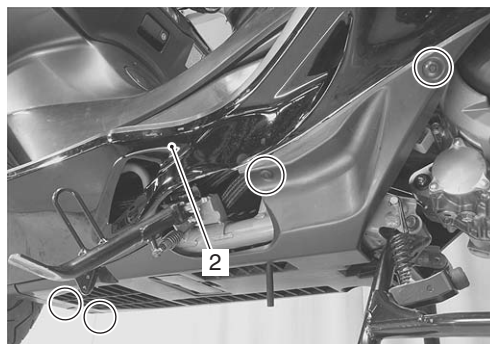


I705H1940017-01

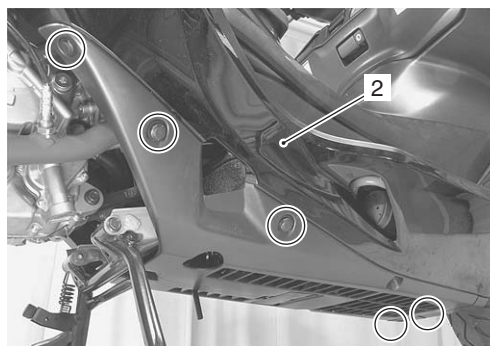


I705H1940018-01

2) Remove the left and right side leg shields (2).



I705H1940019-04



I705H1940020-04

### Installation

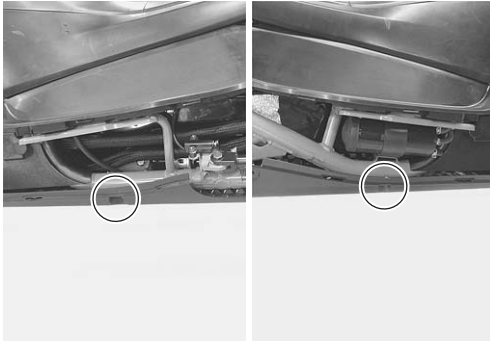
Install each of the side leg shield in the reverse order of removal.

**Under Cover Removal and Installation**

B705H19406011

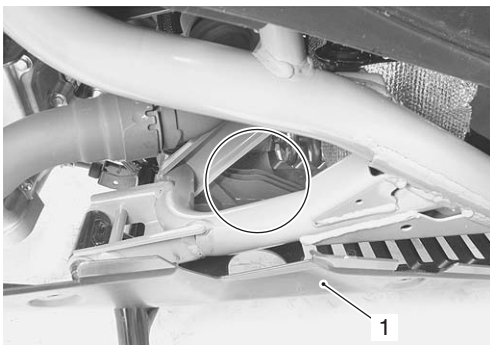
**Removal**

- 1) Remove the side leg shields. Refer to "Side Leg Shield Removal and Installation (Page9D-15)".
- 2) Remove the fasteners.



I705H1940021-01

- 3) Remove the under cover (1).



I705H1940022-03

**Installation**

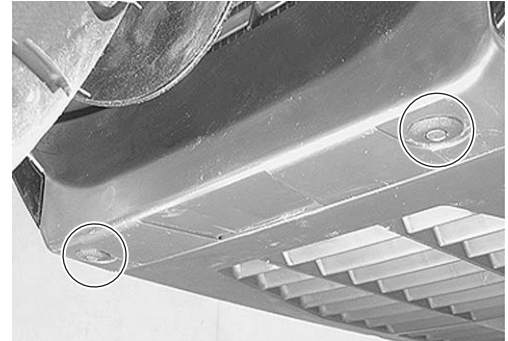
Install the under cover in the reverse order of removal.

**Lower Leg Shield Removal and Installation**

B705H19406012

**Removal**

- 1) Remove the front leg shield. Refer to "Front Leg Shield Removal and Installation (Page9D-14)".
- 2) Remove the fasteners.



I705H1940023-01

- 3) Remove the lower leg shield (1).



I705H1940024-01

**Helmet Box Front Cover Removal and Installation**

B705H19406013

**Removal**

- 1) Open the seat.
- 2) Remove the helmet box front cover (1).



I705H1940025-01

**Installation**

Install the helmet box front cover in the reverse order of removal.



### Front Frame Cover Removal and Installation

B705H19406014

#### Removal

- 1) Remove the helmet box front cover. Refer to “Helmet Box Front Cover Removal and Installation (Page9D-16)”.
- 2) Remove the front frame cover (1).



I705H1940026-01

#### Installation

Install the front frame cover in the reverse order of removal.

### Seat Removal and Installation

B705H19406015

#### Removal

- 1) Remove the front frame cover. Refer to “Front Frame Cover Removal and Installation (Page9D-17)”.
- 2) Disconnect the helmet box light coupler (1).



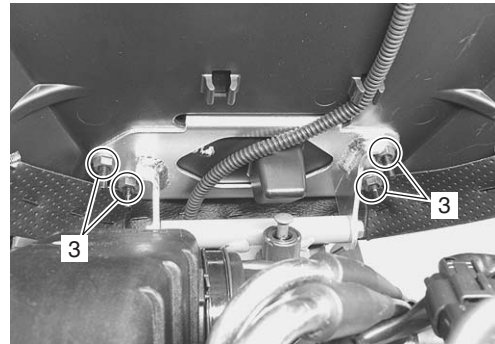
I705H1940027-01

- 3) Disengage the seat damper (2).



I705H1940028-01

- 4) Remove the seat by removing the nuts (3).



I705H1940029-02

#### Installation

Install the seat in the reverse order of removal.

### Center Leg Cover Removal and Installation

B705H19406016

#### Removal

- 1) Remove the front frame cover. Refer to “Front Frame Cover Removal and Installation (Page9D-17)”.
- 2) Remove the left and right center leg cover (1).



I705H1940057-01

#### ⚠ CAUTION

**Do not attempt to disconnect the ambient temperature sensor coupler.**

#### Installation

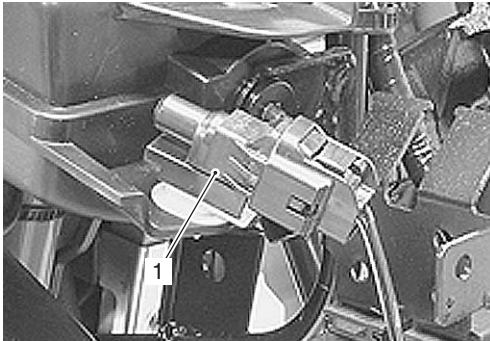
Install the center leg cover in the reverse order of removal.

## Front Box Removal and Installation

B705H19406017

### Removal

- 1) Remove the lower leg shield and front frame cover. Refer to "Lower Leg Shield Removal and Installation (Page9D-16)" and "Front Frame Cover Removal and Installation (Page9D-17)".
- 2) Remove the ambient temperature sensor (1) from the front box.



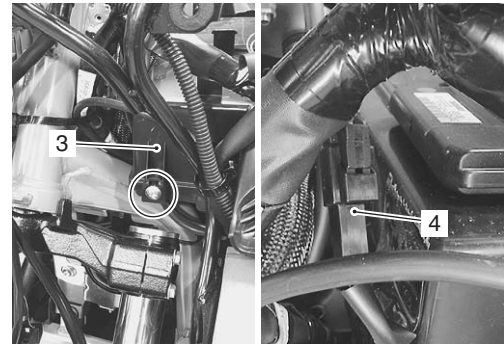
I705H1940030-02

- 3) Remove the ECM (2) from the front box.



I705H1940032-02

- 4) Remove the front box inner cover (3) and disconnect the power terminal coupler (4).

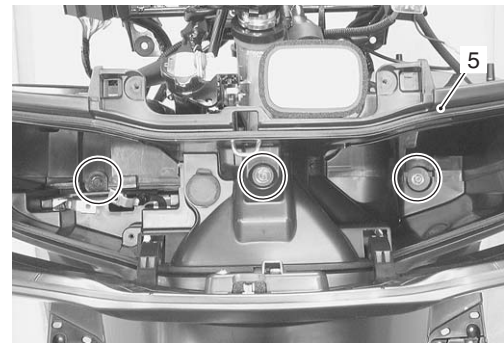


I705H1940033-02

- 5) Remove the front box (5) by removing the screws and bolts.



I705H1940034-01



I705H1940035-02

### Installation

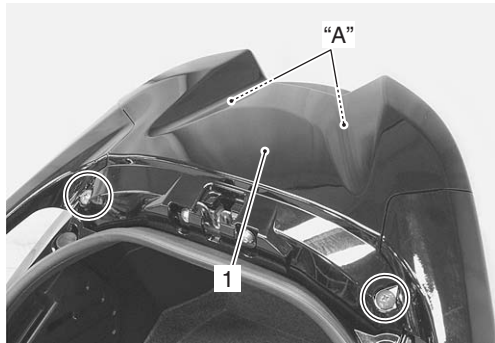
Install the front box in the reverse order of removal.

### Pillion Rider Handle Cover Removal and Installation

B705H19406018

#### Removal

Open the seat and remove the pillion rider handle cover (1).



I705H1940036-02

"A": Hooked point

#### Installation

Install the pillion rider handle cover in the reverse order of removal.

### Pillion Rider Handle Removal and Installation

B705H19406019

#### Removal

- 1) Remove the pillion rider handle cover. Refer to "Pillion Rider Handle Cover Removal and Installation (Page9D-19)".
- 2) Remove the pillion rider handle (1).



I705H1940037-01

#### Installation

Install the pillion rider handle in the reverse order of removal.

### Center Frame Cover Removal and Installation

B705H19406020

#### Removal

Pull out the center frame cover (1).



I705H1940058-01

"A": Hooked point

#### Installation

Install the center frame cover in the reverse order of removal.

### Lower Frame Cover Removal and Installation

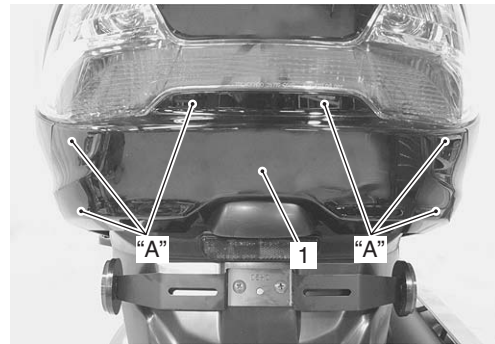
B705H19406021

#### Removal

Pull out the lower frame cover (1).

#### Installation

Push in the lower frame cover (1).



I705H1940038-02

"A": Hooked point



## Frame Cover Removal and Installation

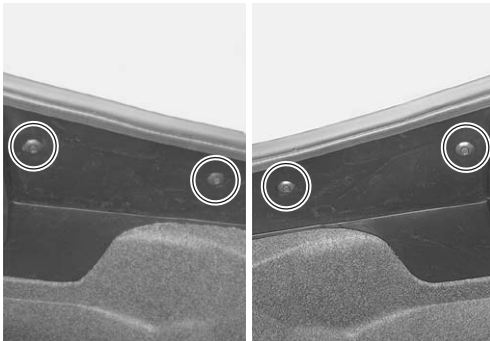
B705H19406022

### Removal

- 1) Remove the front frame cover, center leg covers, pillion rider handle, center frame cover and lower frame cover. Refer to "Front Frame Cover Removal and Installation (Page9D-17)", "Center Leg Cover Removal and Installation (Page9D-17)", "Pillion Rider Handle Removal and Installation (Page9D-19)", "Center Frame Cover Removal and Installation (Page9D-19)" and "Lower Frame Cover Removal and Installation (Page9D-19)".
- 2) Remove the fasteners and remove the footboard cover (1). (LH only)

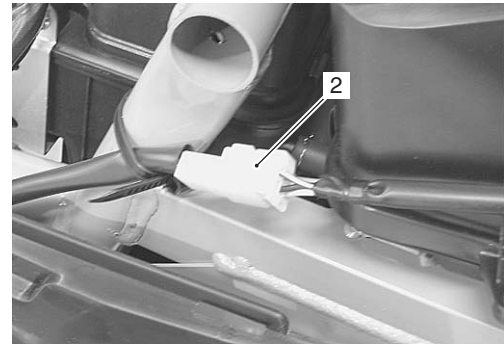


I705H1940039-01



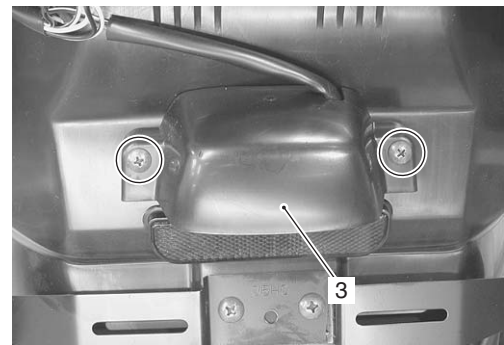
I705H1940040-01

- 3) Disconnect the rear combination light coupler (2).



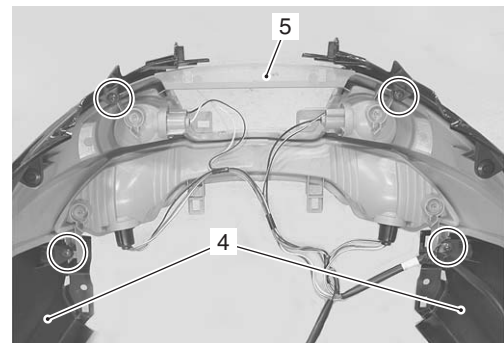
I705H1940041-01

- 4) Remove the license plate light cover (3) and remove the left and right frame covers along with the rear combination light assembly.



I705H1940042-01

- 5) Remove the frame covers (4) from the rear combination light assembly (5).



I705H1940043-02

### Installation

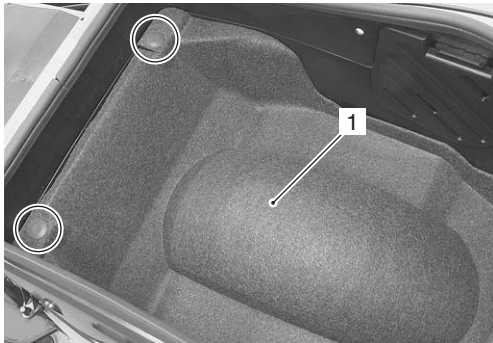
Install the frame covers in the reverse order of removal.

## Helmet Box Removal and Installation

B705H19406023

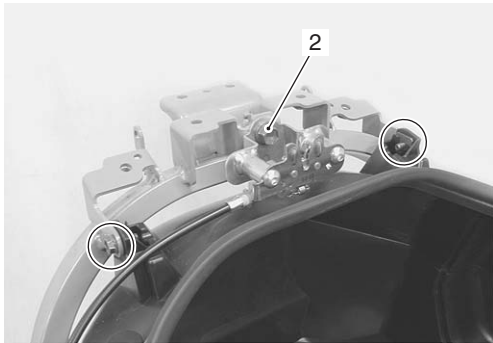
### Removal

- 1) Remove the frame covers. Refer to “Frame Cover Removal and Installation (Page9D-20)”
- 2) Remove the mat (1).



I705H1940044-01

- 3) Remove the helmet box by removing the seat lock bolt (2) and helmet box bolts.



I705H1940045-01



I705H1940046-01

### Installation

Install the helmet box in the reverse order of removal.

## Footboard Removal and Installation

B705H19406024

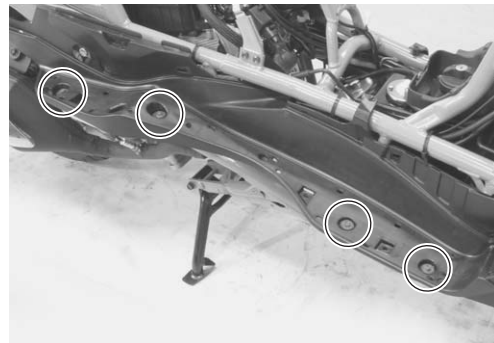
### Removal

- 1) Remove the side leg shields, front box and frame covers. Refer to “Side Leg Shield Removal and Installation (Page9D-15)”, “Front Box Removal and Installation (Page9D-18)” and “Frame Cover Removal and Installation (Page9D-20)”.



I705H1940047-01

- 2) Remove the left and right footboards.



I705H1940048-01

### Installation

Install the footboard in the reverse order of removal.

## Special Tools and Equipment

### Recommended Service Material

B705H19408001

#### NOTE

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Required service material is also described in the following.  
“Exterior Parts Components (Page9D-4)”

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### Engine Mounting Bracket Bushing Replacement

B705H19506011

Replace the engine mounting bracket bushing if necessary. Refer to "Body Frame Construction (Page9E-1)".

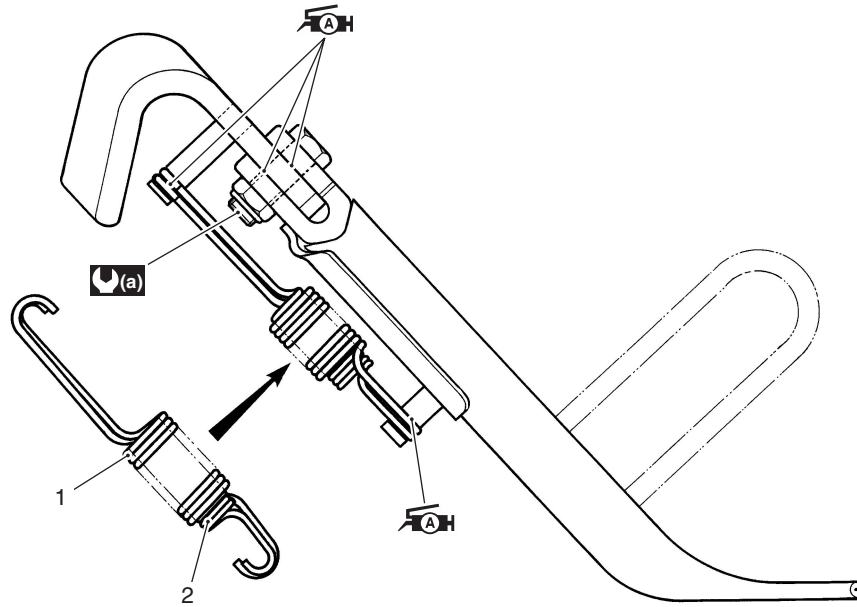
### Engine Mounting Bushing Replacement

B705H19506012

Replace the engine mounting bushing if necessary. Refer to "Body Frame Construction (Page9E-1)".

### Side-stand Construction

B705H19506015



I705H1950001-03

1. Outer spring	2. Inner spring	(a) : 50N·m (5.0 kgf·m, 36.0 lb-ft)	AH : Apply grease.
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**Side-stand Removal and Installation**

B705H19506016

**Removal**

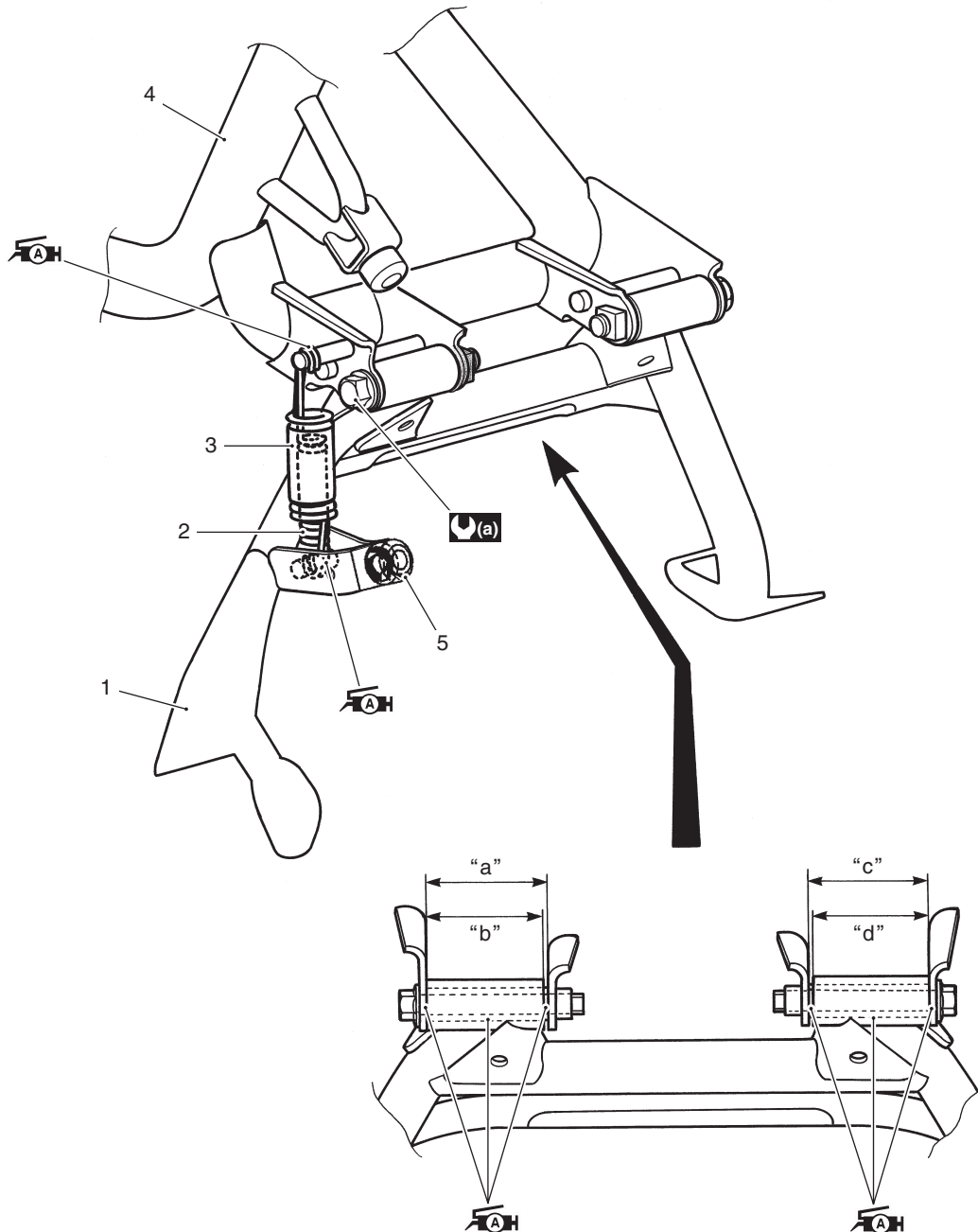
- 1) Support the motorcycle with the center stand.
- 2) Remove the side-stand. Refer to "Side-stand Construction (Page9E-2)".

**Installation**

Install the side-stand. Refer to "Side-stand Construction (Page9E-2)".

**Center Stand Construction**

B705H19506017



I705H1950002-03

1. Center stand	5. Cushion	"d": 57 mm (2.24 in)
2. Center stand inner spring	"a": 60 mm (2.36 in)	(a) : 50 N-m (5.0 kgf-m, 36.0 lb-ft)
3. Center stand outer spring	"b": 57 mm (2.24 in)	AH : Apply grease to sliding surface.
4. Frame	"c": 60 mm (2.36 in)	



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## Center Stand Removal and Installation

B705H19506018

### Removal

- 1) Support the motorcycle using a jack.

**△ CAUTION**

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**Make sure that the motorcycle is supported securely.**

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- 2) Remove the center stand. Refer to “Center Stand Construction (Page9E-3)”.

### Installation

Install the center stand. Refer to “Center Stand Construction (Page9E-3)”.

## Specifications

### Tightening Torque Specifications

B705H19507001

**NOTE**

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The specified tightening torque is also described in the following.

“Body Frame Construction (Page9E-1)”

“Side-stand Construction (Page9E-2)”

“Center Stand Construction (Page9E-3)”

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### Reference:

For the tightening torque of fastener not specified in this section, refer to “Tightening Torque Specifications in Section 0C (Page0C-7)”.

## Special Tools and Equipment

### Recommended Service Material

B705H19508001

**NOTE**

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Required service material is also described in the following.

“Side-stand Construction (Page9E-2)”

“Center Stand Construction (Page9E-3)”

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