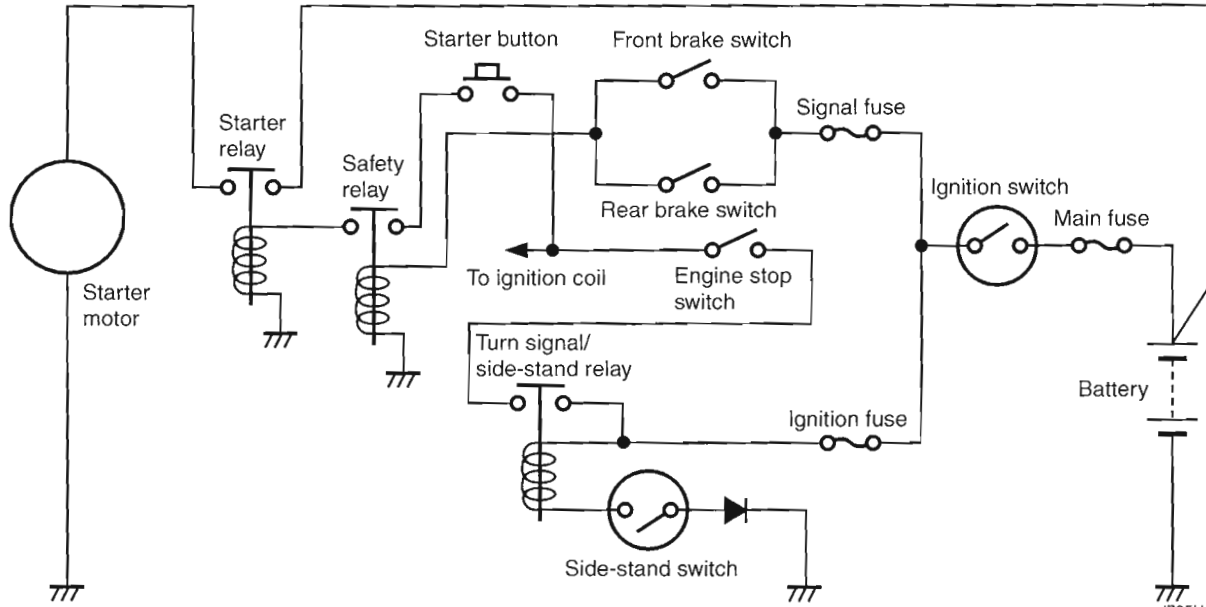


# Starting System

## Schematic and Routing Diagram

### Starting System Diagram

B705H21902001



I705H1190026-01

## Component Location

### Starting System Components Location

Refer to "Electrical Components Location in Section 0A (Page0A-7)".

B705H21903001

## Diagnostic Information and Procedures

### Starter Motor will not Run

B705H21904001

#### 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.

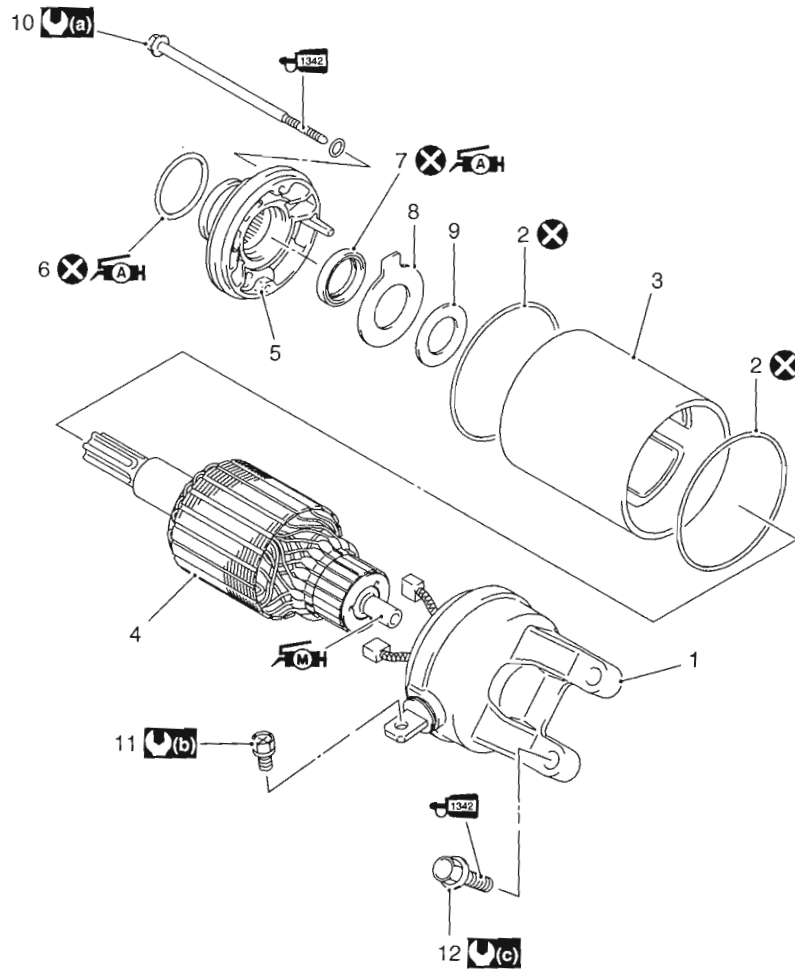
#### Engine does not turn though the starter motor runs.

- Faulty starter clutch.

## Repair Instructions

### Starter Motor Components

B705H21906001



I705H1190016-02

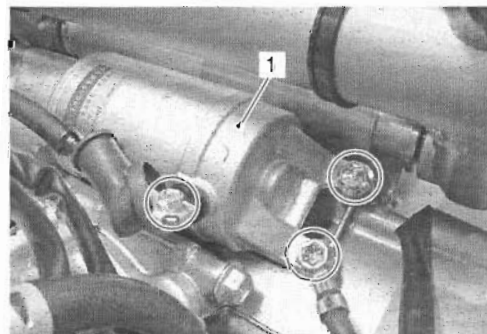
1. Housing end (Outside)	8. Washer	Ⓞ(c) : 7 N·m (0.7 kgf·m, 5.0 lb-ft)
2. O-ring	9. Shim	Ⓞ(a) : Apply grease to sliding surface.
3. Starter motor case	10. Starter motor housing bolt	Ⓞ(b) : Apply moly paste to sliding surface.
4. Armature	11. Starter motor lead wire bolt	1342 : Apply thread lock to thread part.
5. Housing end (Inside)	12. Starter motor mounting bolt	Ⓞ(c) : Do not reuse.
6. O-ring		
7. Oil seal		

### Starter Motor Removal and Installation

B705H21906002

#### Removal

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




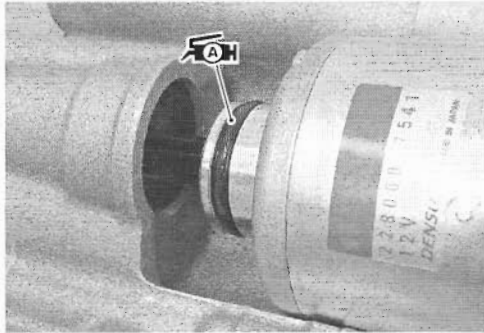
I705H1190001-01

**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)**



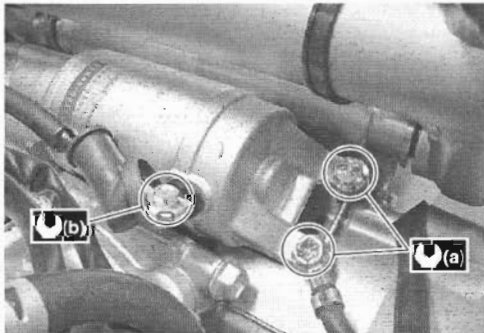
I705H1190002-02

- 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**

B705H21906003

Refer to "Starter Motor Removal and Installation (Page11-3)".

**Disassembly**

Disassemble the starter. Refer to "Starter Motor Components (Page11-3)".


**Assembly**

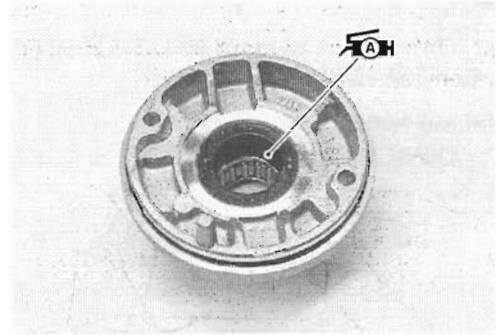
Reassemble the starter motor in the reverse order of removal. Pay attention to the following points:

**⚠ CAUTION**

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

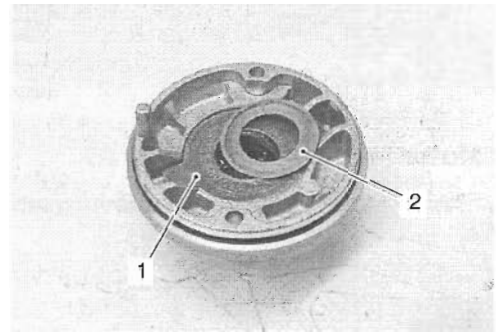
- Apply grease to the lip of the oil seal.

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




I705H1190019-01

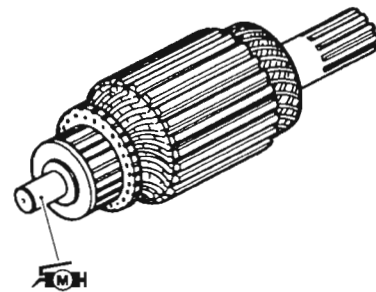
- Fit the washer (1) to the housing end with the tab aligned with the housing end cutaway, position the shim (2) and assemble the starter motor.



I705H1190020-01

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

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



I649G1190013-02

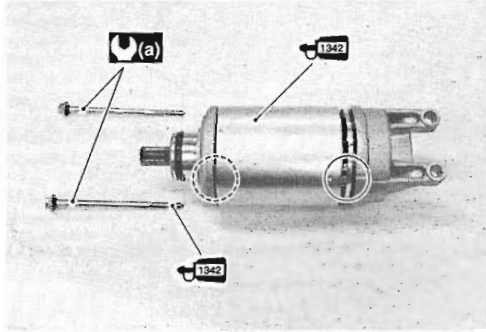
## 11-5 Starting System:

- 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

B705H21906004

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.

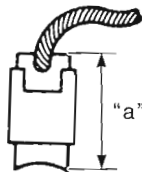
Measure the length "a" of the carbon brushes using a vernier calipers. If the measurement is less than the service limit, replace the brush holder set with a new one.

### Brush length "a"

Service limit: 3.5 mm (0.14 in)

### Special tool

**TOOL** : 09900-20102 (Vernire 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.

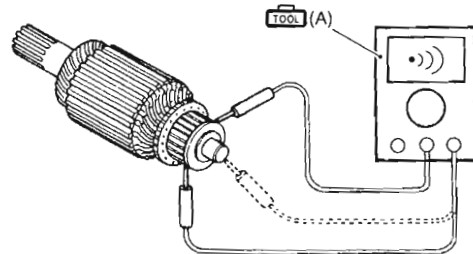
If there is no continuity between the segments or there is continuity between the segments and shaft, replace the armature with a new one.

### Special tool

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

### Tester knob indication

Continuity set (•))

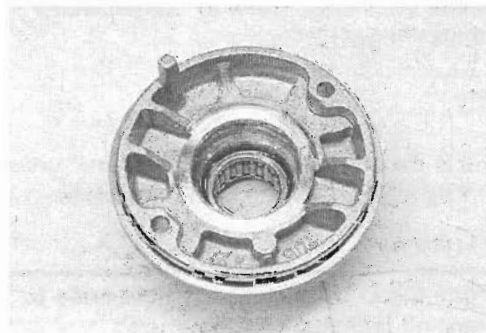


I649G1190017-02

### Bearing

Check the bearing of housing end for damage.

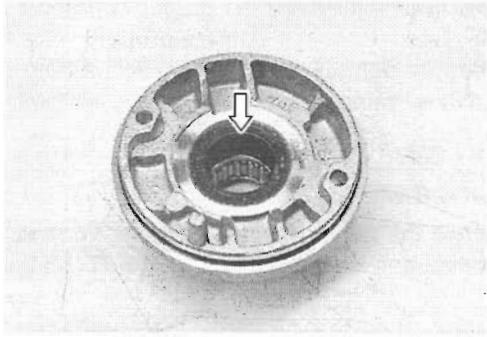
If any damage is found, replace the housing end.



I705H1190022-01

**Oil Seal**

Check the seal lip for damage.  
If any damage is found, replace the housing end (Inside).



I705H1190023-01

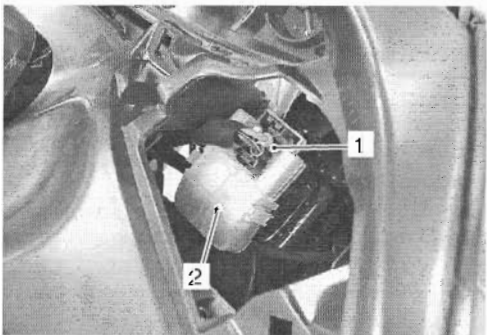
**Starter Relay Removal and Installation**

B705H21906005

Refer to "Electrical Components Location in Section 0A (Page0A-7)".

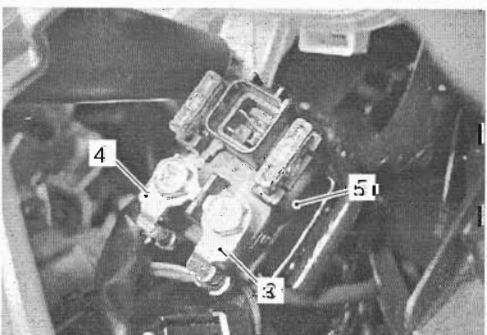
**Removal**

- 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**

B705H21906006

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**

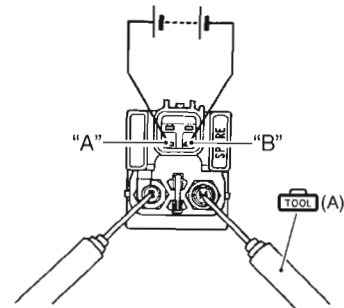
**Do not apply battery voltage to the starter relay for five seconds and more, since the relay coil may overheat and get damaged.**

**Special tool**

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

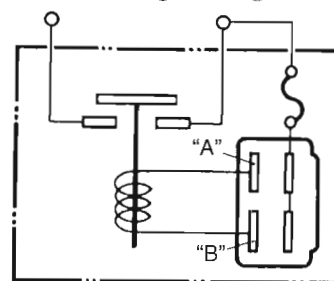
**Tester knob indication**

**Continuity test (•••)**



I705H1190005-03

To starter motor ⊖      ⊕ To battery




I649G1190022-01

## 11-7 Starting System:

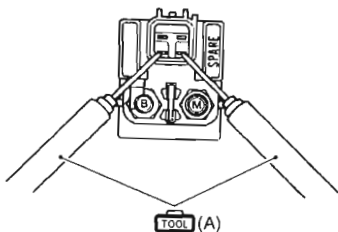
- 3) Measure the relay coil resistance between the terminals using the multi-circuit tester. If the resistance is not within the specified value, replace the starter relay with a new one.

### Special tool

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

### Starter relay resistance

3 – 6  $\Omega$



I705H1190006-01

- 4) Install the starter relay. Refer to "Starter Relay Removal and Installation (Page11-6)".

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

B705H21906007

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

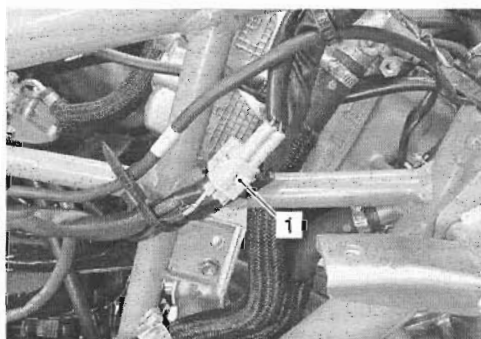
B705H21906008

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 (  $\rightarrow \leftarrow$  )

	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.

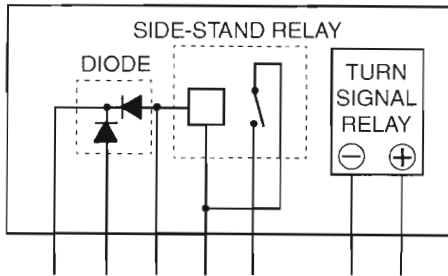


I705H1190009-01

- 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.



1649G1190027-01

**Side-stand relay**

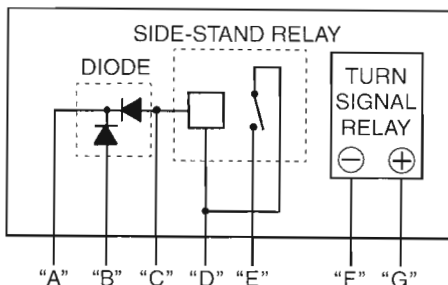
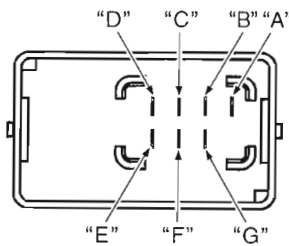
- 1) Remove the turn signal/side-stand relay. Refer to "Turn Signal / Side-stand Relay Removal and Installation (Page11-7)".
- 2) Check the insulation between "D" and "E" terminals using the multi-circuit tester.
- 3) Apply 12 V to terminals "D" and "C" ((+) to "D" and (-) to "C") and check the continuity 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 ( • )) )



1649G1190028-01

- 4) Install the turn signal/side-stand relay. Refer to "Turn Signal / Side-stand Relay Removal and Installation (Page11-7)".

**Diode inspection**

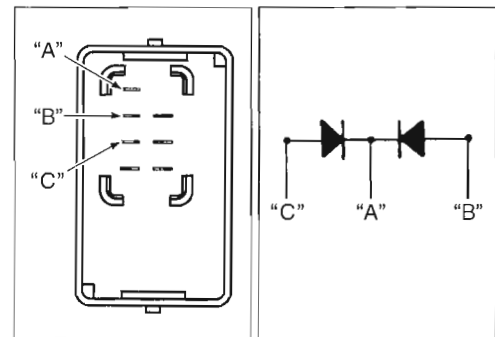
- 1) Remove the turn signal/side-stand relay. Refer to "Turn Signal / Side-stand Relay Removal and Installation (Page11-7)".
- 2) Measure the voltage between the terminals using the multi-circuit tester.

**Special tool**

: 09900-25008 (Multi-circuit tester set)

**Tester knob indication**

Diode test ( -|← )



1649G1190029-01

		⊕ 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	—

1649G1190046-03

**NOTE**

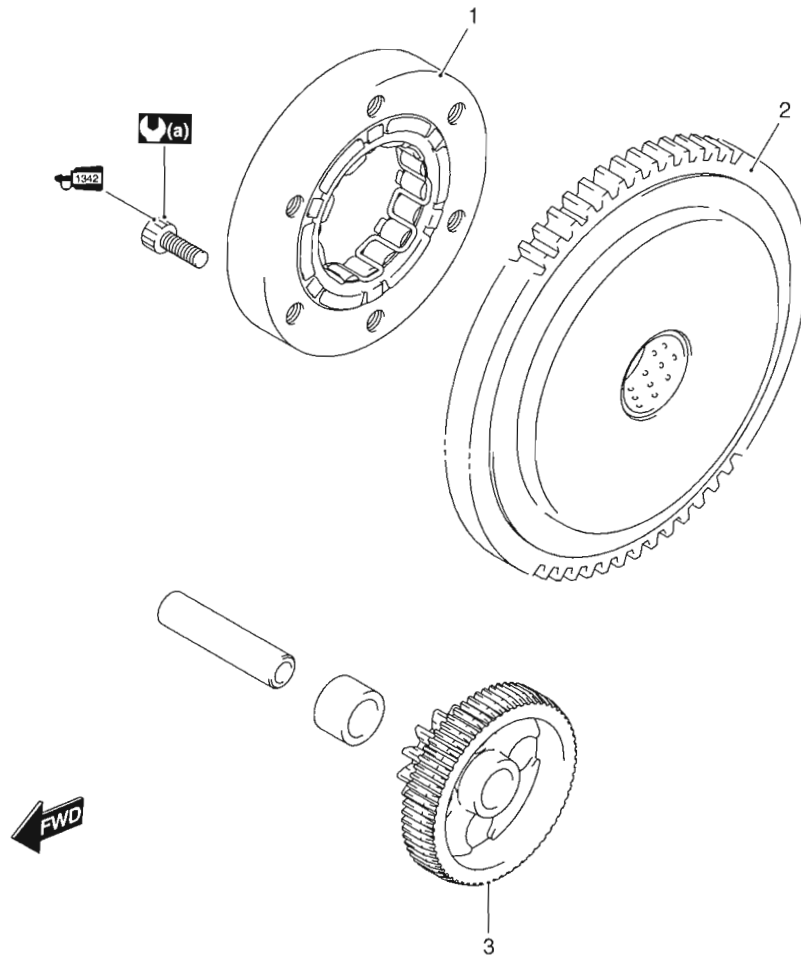
If the multi circuit tester reads 1.4 V and below when the tester probes are not connected, replace its battery.

- 3) Install the turn signal/side-stand relay. Refer to "Turn Signal / Side-stand Relay Removal and Installation (Page11-7)".



Starter Clutch Component

B705H21906009



1705H1190017-01

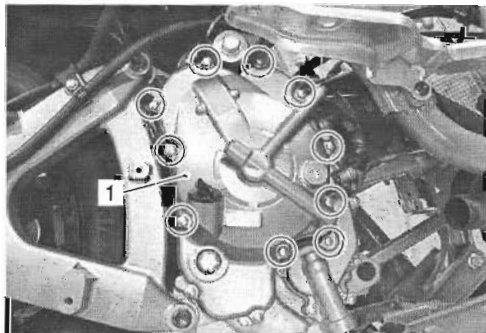
1. One-way clutch	3. Starter idle gear	(a) : 26 N·m (2.6 kgf-m, 19.0 lb-ft)
2. Starter driven gear	1342 : Apply thread lock to thread part.	

Starter Clutch Removal and Installation

B705H21906010

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).



1705H1190018-02

- 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

B705H21906011

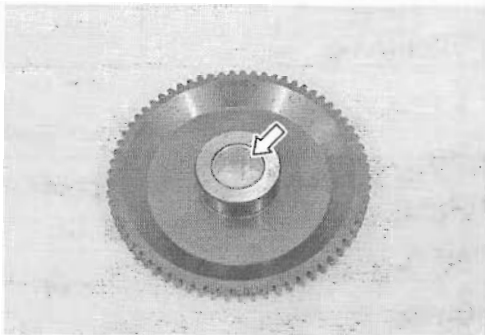
Inspect the starter clutch in the following procedures.

- 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.



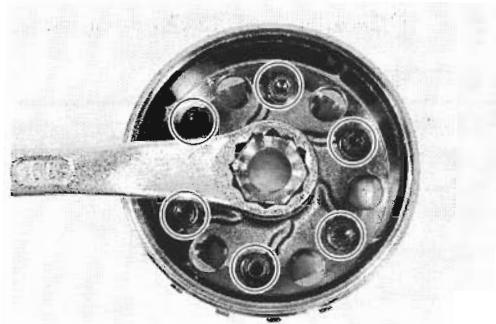
I705H1190011-01

### Starter Clutch Disassembly and Assembly

B705H21906012

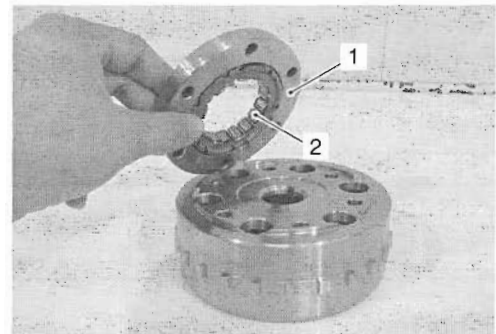
#### Disassembly

- 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.

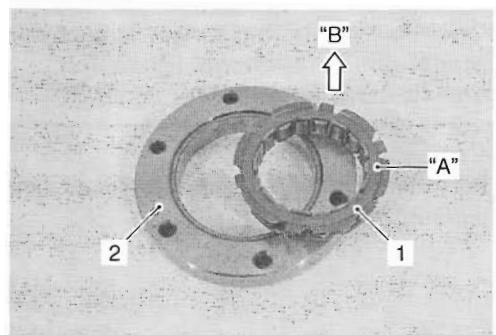


I705H1190013-01

#### 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

## 1I-11 Starting System:

- Apply thread lock on the starter clutch bolts and tighten them to the specified torque.

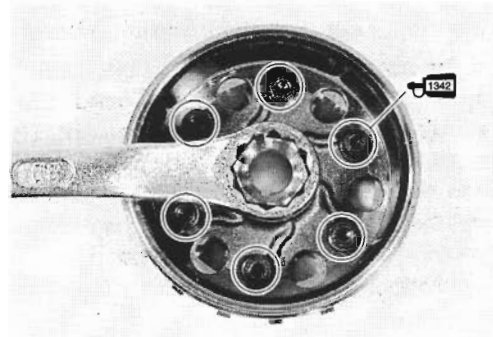
### Tightening torque

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

B705H21906013

Refer to "Starter Button Inspection in Section 9B (Page9B-10)".

## Specifications

### Service Data

B705H21907001

### Electrical

Unit: mm (in)

Item	Standard / specification		Note
Starter relay resistance	3 - 6 Ω		
Starter motor bursh length	Standard	7 (0.28)	
	Limit	3.5 (0.14)	

### Tightening Torque Specifications

B705H21907002

Fastening part	Tightening torque			Note
	N·m	kgf-m	lb-ft	
Starter motor mounting bolt	7	0.7	5.0	☞ (Page1I-4)
Starter motor lead wire bolt	3	0.3	2.0	☞ (Page1I-4)
Starter motor housing bolt	4	0.4	3.0	☞ (Page1I-5)
Starter clutch bolt	26	2.6	19.0	☞ (Page1I-11)

### NOTE

The specified tightening torque is also described in the following.

“Starter Motor Components (Page1I-3)”

“Starter Clutch Component (Page1I-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

B705H21908001

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

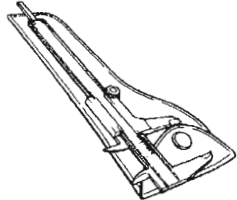

Required service material is also described in the following.

“Starter Motor Components (Page11-3)”

“Starter Clutch Component (Page11-9)”

### Special Tool

B705H21908002

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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