

# ELECTRICAL SYSTEM

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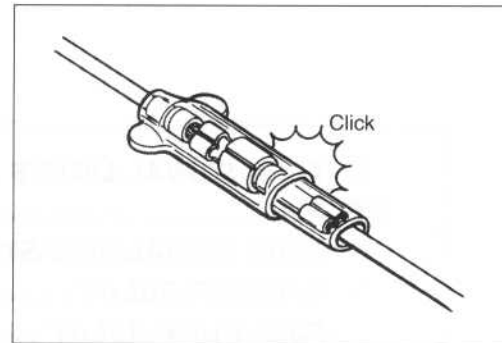
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## CAUTIONS IN SERVICING

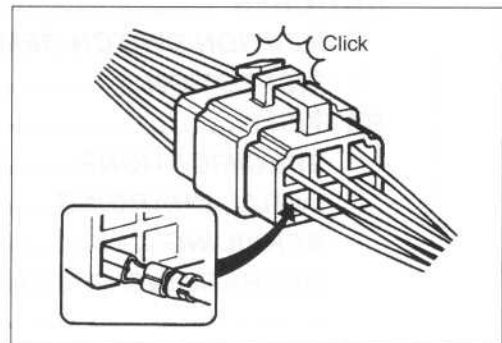
### CONNECTOR

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



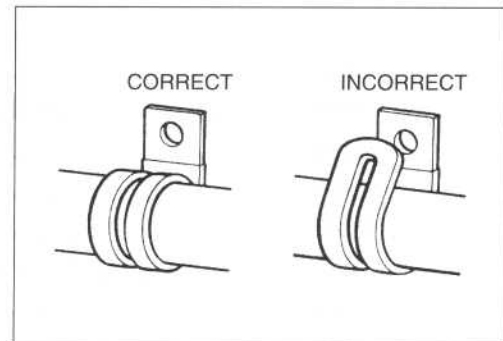
### COUPLER

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



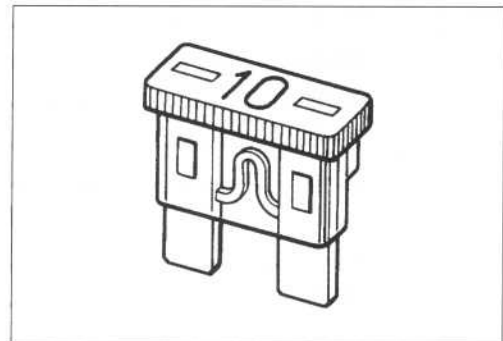
### CLAMP

- Clamp the wire harness at such positions as indicated in "WIRE HARNESS ROUTING". (☞ 9-14 to 9-16)
- Bend the clamp properly so that the wire harness is clamped securely.
- In clamping the wire harness, use care not to allow it to hang down.
- Do not use wire or any other substitute for the band type clamp.



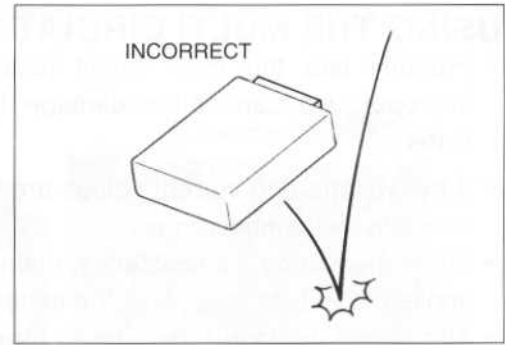
### FUSE

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



## SEMI-CONDUCTOR EQUIPPED PART

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

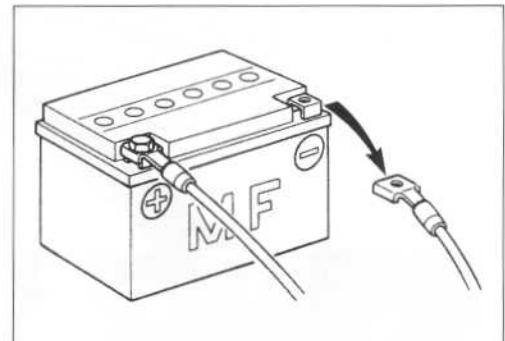


## BATTERY

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

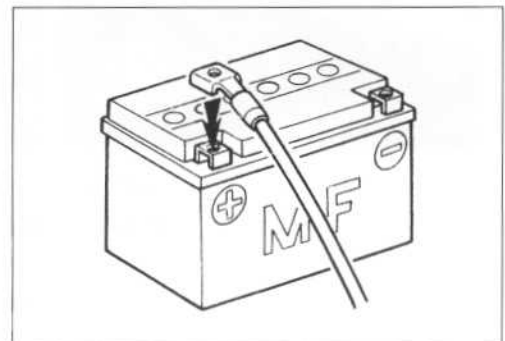
## CONNECTING THE BATTERY

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



## WIRING PROCEDURE

- Properly route the wire harness according to the "WIRE ROUTING" section. (9-14 to 9-16)

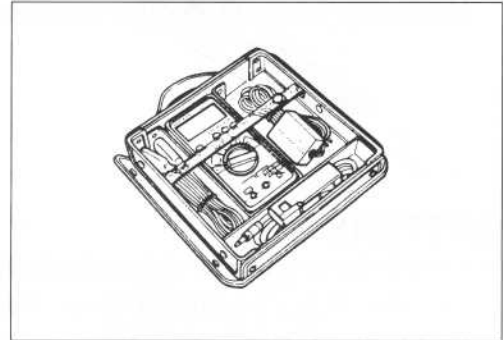


## USING THE MULTI CIRCUIT TESTER

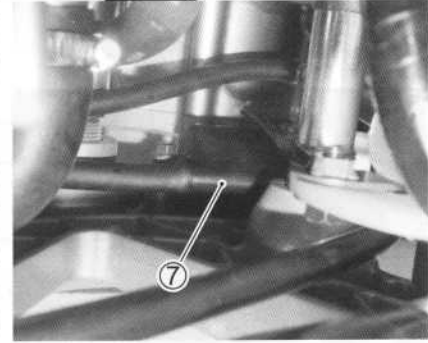
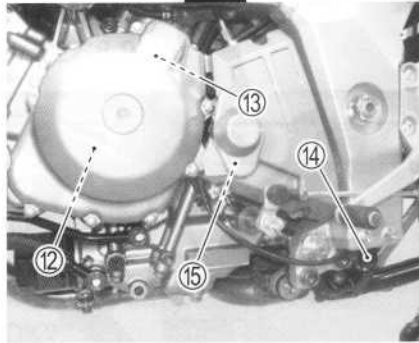
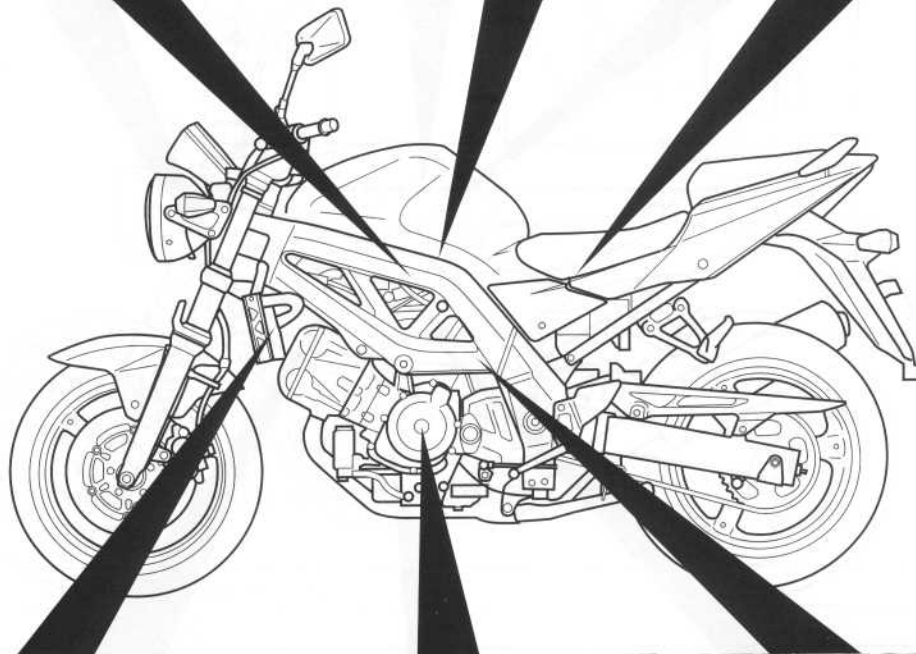
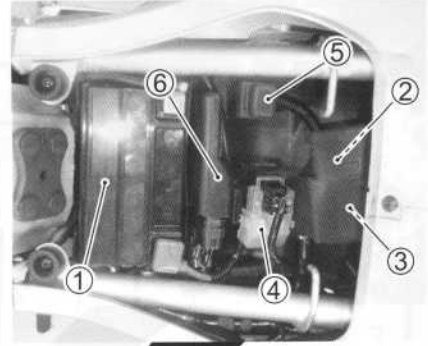
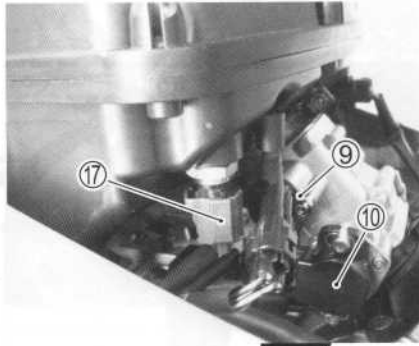
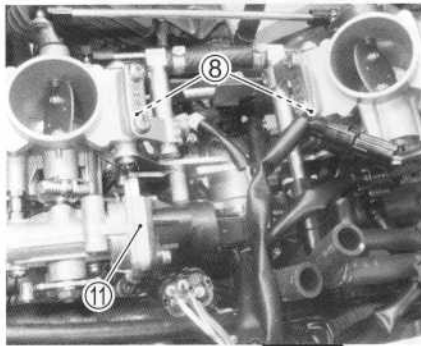
- Properly use the multi circuit tester  $\oplus$  and  $\ominus$  probes. Improper use can cause damage to the motorcycle and tester.
- If the voltage and current values are not known, begin measuring in the highest range.
- When measuring the resistance, make sure that no voltage is applied. If voltage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

### CAUTION

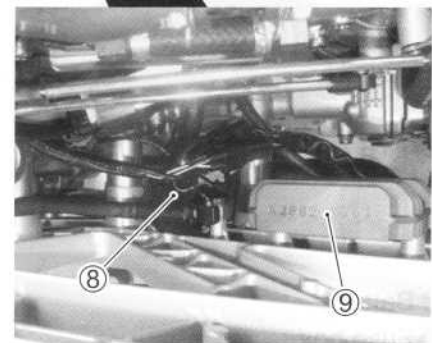
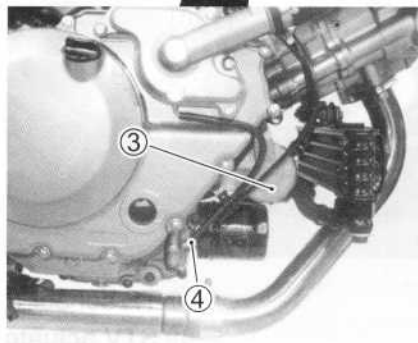
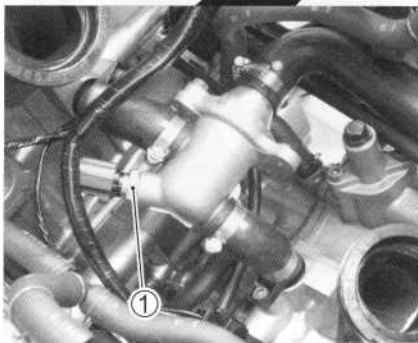
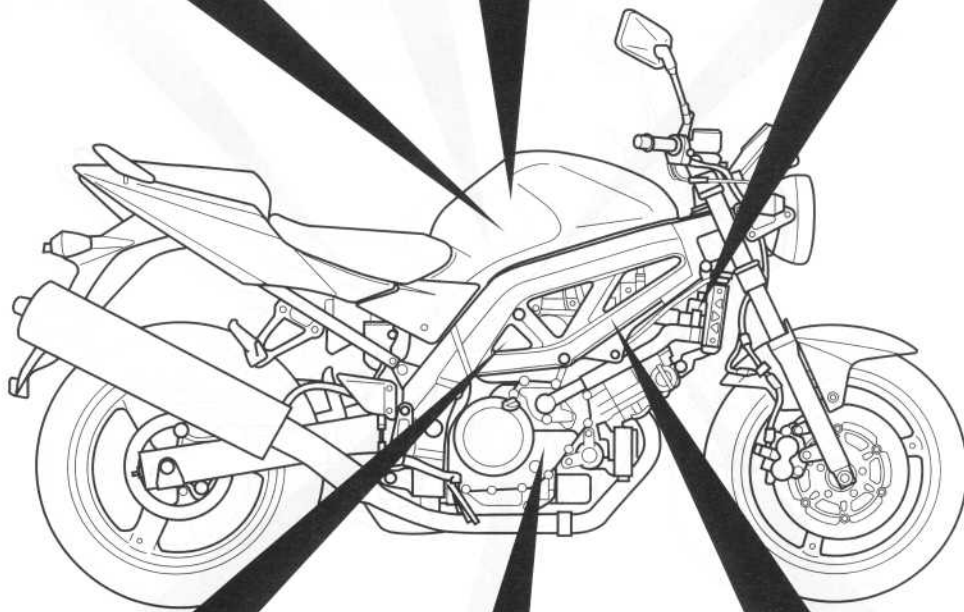
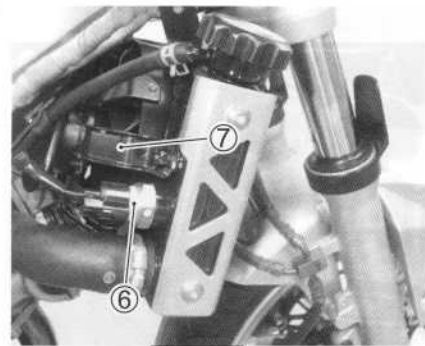
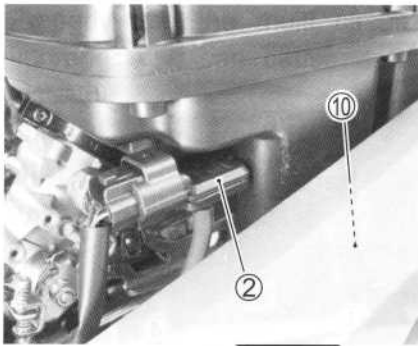
Before using the multi circuit tester, read its instruction manual.



## LOCATION OF ELECTRICAL COMPONENTS



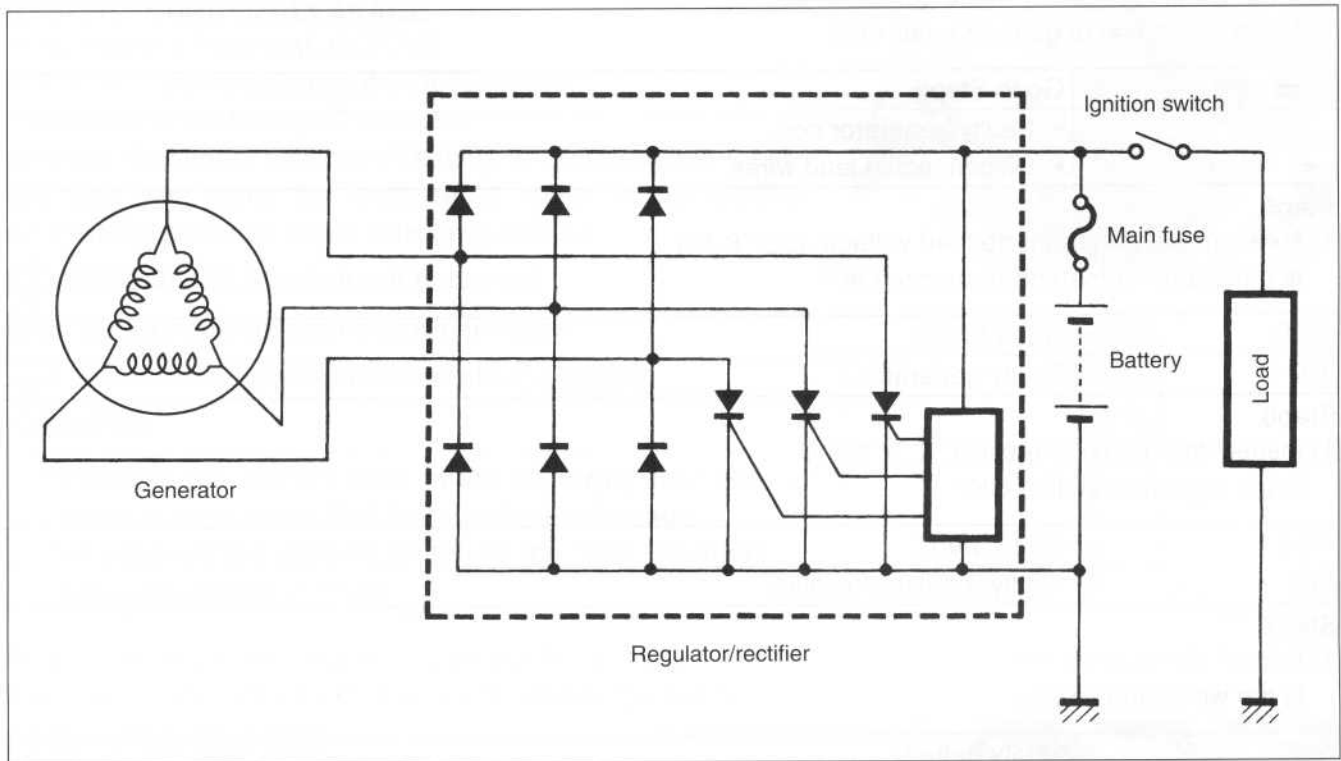
- |                                |                         |
|--------------------------------|-------------------------|
| ① Battery                      | ⑩ TP sensor (☞ 4-28)    |
| ② Fuse box                     | ⑪ STV actuator (☞ 4-37) |
| ③ Side-stand/turn signal relay | ⑫ Generator             |
| ④ Starter relay                | ⑬ CKP sensor            |
| ⑤ Fuel pump relay              | ⑭ Side stand switch     |
| ⑥ ECM (Engine Control Module)  | ⑮ Gear position switch  |
| ⑦ Ignition coil (No.1)         | ⑯ Horn                  |
| ⑧ Fuel injector (☞ 4-42)       | ⑰ IAT sensor            |
| ⑨ STP sensor (☞ 4-38)          |                         |



- ① ECT sensor (☞ 4-31)
- ② IAP sensor (☞ 4-25)
- ③ Starter motor
- ④ Oil pressure switch
- ⑤ Fuel pump (☞ 5-9)

- ⑥ Cooling fan thermo-switch (☞ 6-9)
- ⑦ Cooling fan (☞ 6-8)
- ⑧ Ignition coil (No.2)
- ⑨ Regulator/rectifier
- ⑩ PAIR control valve

## CHARGING SYSTEM



## TROUBLE SHOOTING

### Battery runs down quickly

#### Step1

1) Check accessories which use excessive amounts of electricity.

Are accessories being installed?

YES	Remove accessories.
NO	Go to Step2.

#### Step2

1) Check the battery for current leaks. (☞ 8-9)

Is the battery for current leaks OK?

YES	Go to Step3.
NO	<ul style="list-style-type: none"> <li>• Short circuit of wire harness.</li> <li>• Faulty electrical equipment.</li> </ul>

#### Step3

1) Measure the charging voltage between the battery terminals. (☞ 8-9)

Is the battery charging of voltage OK?

YES	<ul style="list-style-type: none"> <li>• Faulty battery.</li> <li>• Abnormal driving condition.</li> </ul>
NO	Go to Step4.



**Step4**

- 1) Measure the continuity of the generator coil. (☞ 8-10)  
Is the resistance of generator coil OK?

YES	Go to Step5.
NO	<ul style="list-style-type: none"> <li>• Faulty generator coil.</li> <li>• Disconnected lead wires.</li> </ul>

**Step5**

- 1) Measure the generator no-load voltage. (☞ 8-10)  
Is generator no-load performance OK?

YES	Go to Step6.
NO	Faulty generator.

**Step6**

- 1) Inspect the regulator/rectifier. (☞ 8-11)  
Is the regulator/rectifier OK?

YES	Go to Step7.
NO	Faulty regulator/rectifier.

**Step7**

- 1) Inspect the wire harness.  
Is the wire harness OK?

YES	Faulty battery
NO	<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.

## INSPECTION

### BATTERY CURRENT LEAKAGE

- Remove the front seat. (☞ 7-4)
- Turn the ignition switch to the OFF position.
- Disconnect the battery  $\ominus$  lead wire.

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

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

**DATA** Battery current (leak): 3 mA and less

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

### CAUTION

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

When checking to find the excessive current leakage, remove the couplers and connectors, one by one, checking each part.

### REGULATED VOLTAGE

- Remove the front seat. (☞ 7-4).
- Start the engine and keep it running at 5 000 r/min. with the dimmer switch turned HI position.

Measure the DC voltage between the  $\oplus$  and  $\ominus$  battery terminals using the multi circuit tester. If the voltage is not within the specified value, inspect the generator and regulator/rectifier. (☞ 8-10 and 8-11)

### NOTE:

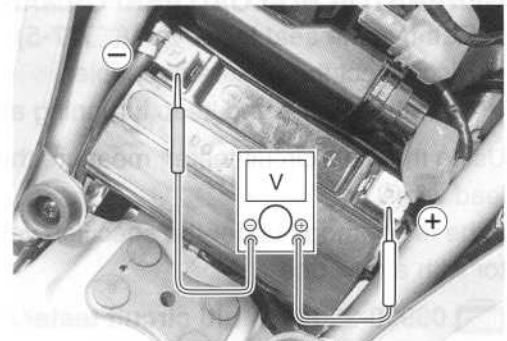
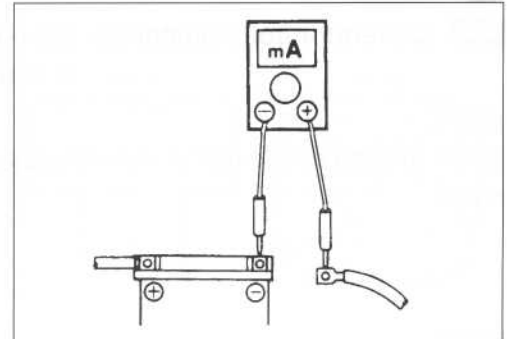
When making this test, be sure that the battery is in fully-charged condition.

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

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

**DATA** Charging output (Regulated voltage):

14.0 – 15.5 V at 5 000 r/min.



**GENERATOR COIL RESISTANCE**

- Remove the seat tail cover. (☞ 7-5)
- Disconnect the generator coupler.

Measure the resistance between the three lead wires.

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

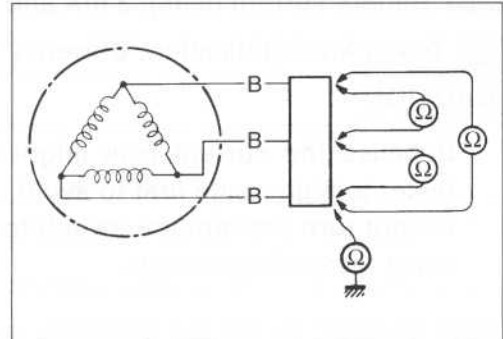
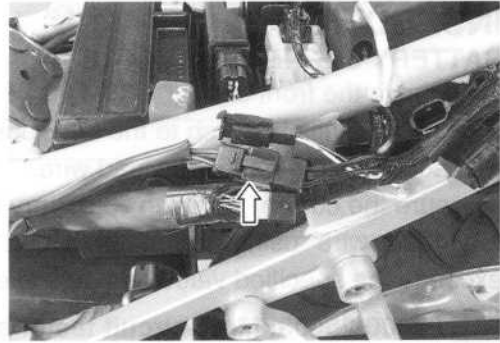
**TOOL** 09900-25008: Multi circuit tester set

**Tester knob indication: Resistance ( $\Omega$ )**

**DATA** Generator coil resistance: 0.2 – 0.7  $\Omega$  (Black – Black)  
 $\infty$   $\Omega$  (Black – Ground)

**NOTE:**

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

**GENERATOR NO-LOAD PERFORMANCE**

- Remove the seat tail cover. (☞ 7-5)
- Disconnect the generator coupler.
- Start the engine and keep it running at 5 000 r/min.

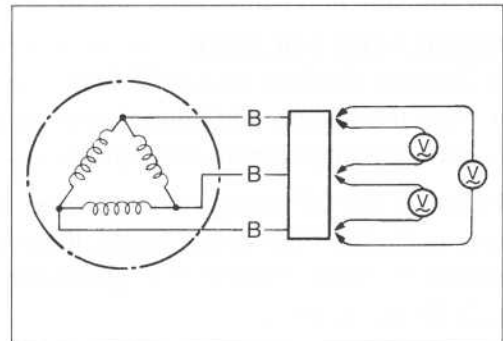
Using the multi circuit tester, measure the voltage between three lead wires.

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

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

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

**DATA** Generator no-load performance:  
 More than 60 V at 5 000 r/min (When engine is cold)



**REGULATOR/RECTIFIER**

- Lift and support the fuel tank. (☞ 5-6)
- Remove the air cleaner box. (☞ 5-16)
- Disconnect the regulator/rectifier couplers.



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

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

**Tester knob indication: Diode test (←→)**

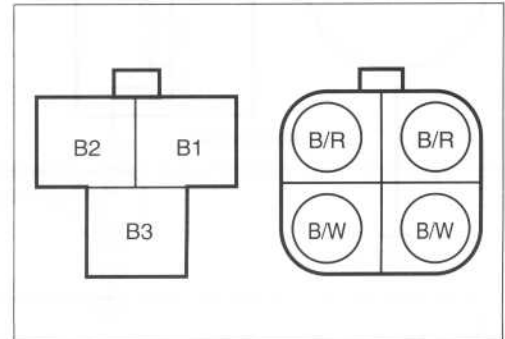
Unit: V

		⊕ Tester probe				
⊖ Tester probe		B/R	B1	B2	B3	B/W
	B/R		0.4 - 0.7	0.4 - 0.7	0.4 - 0.7	0.5 - 1.2
	B1	*		*	*	0.4 - 0.7
	B2	*	*		*	0.4 - 0.7
	B3	*	*	*		0.4 - 0.7
	B/W	*	*	*	*	

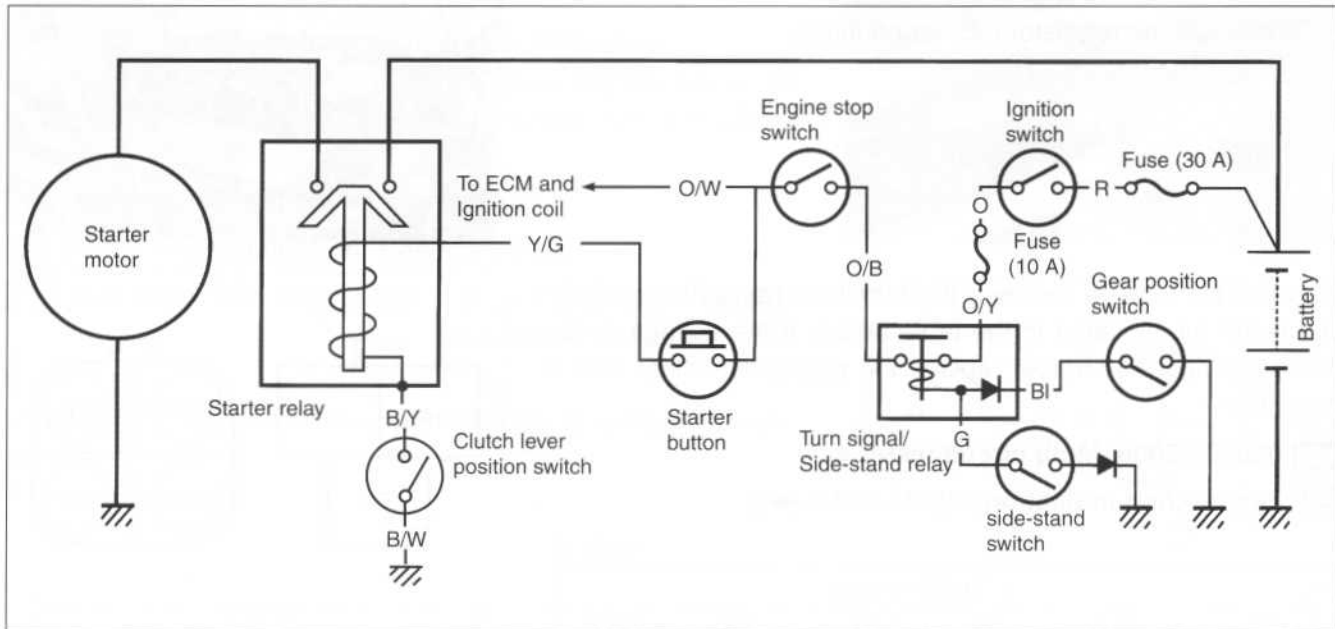
\* More than 1.4 V (tester's battery voltage)

**NOTE:**

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



## STARTER SYSTEM AND SIDE-STAND/IGNITION INTERLOCK SYSTEM



### TROUBLE SHOOTING

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

#### Starter motor will not run.

##### Step1

- 1) Grasp the clutch 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.  
Is a click sound heard?

YES	Go to Step2.
NO	Go to Step3.

##### Step2

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

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

**Step3**

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

Is a voltage OK?

YES	Go to Step4.
NO	<ul style="list-style-type: none"> <li>• Faulty gear position switch.</li> <li>• Faulty starter button.</li> <li>• Faulty engine stop switch.</li> <li>• Faulty turn signal/side-stand relay.</li> <li>• Faulty ignition switch.</li> <li>• Faulty clutch lever position switch.</li> <li>• Faulty side-stand switch.</li> <li>• Improper connector contact.</li> <li>• Open circuit in wire harness.</li> </ul>

**Step4**

1) Inspect the starter relay. (☞ 8-19)

Is the starter relay OK?

YES	Poor starter relay connection.
NO	Faulty starter relay.

**Step5**

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

1) Inspect the side-stand switch. (☞ 8-20)

Is the side-stand switch OK?

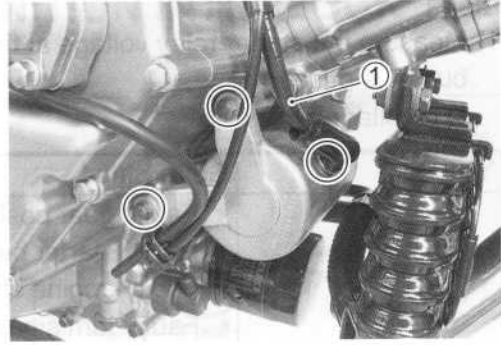
YES	<ul style="list-style-type: none"> <li>• Open circuit in wire harness.</li> <li>• Poor contact of connector.</li> </ul>
NO	<ul style="list-style-type: none"> <li>• Faulty side-stand switch.</li> </ul>

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

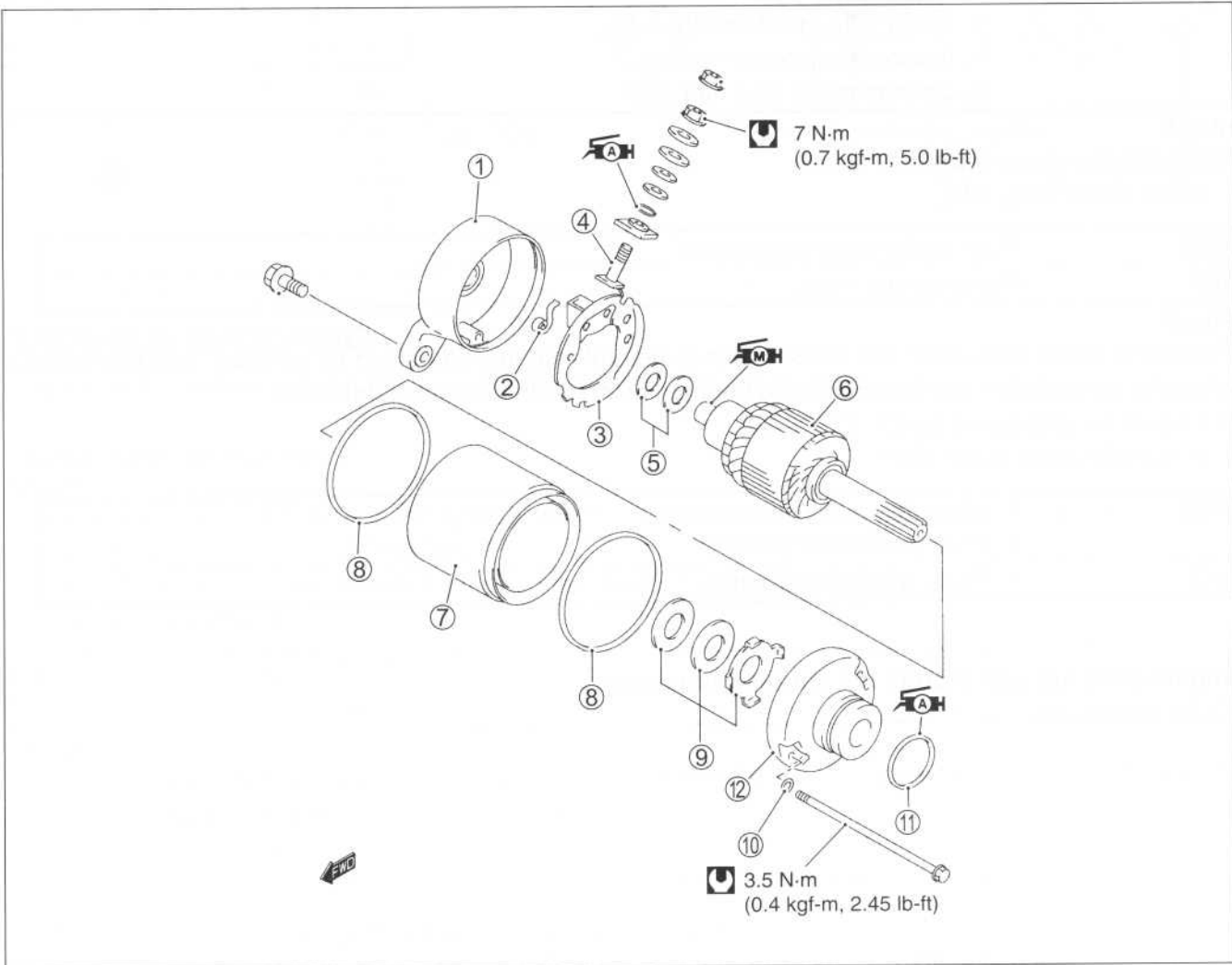
Faulty starter clutch. (☞ 3-82)

## STARTER MOTOR REMOVAL AND DISASSEMBLY

- Remove the starter motor and disconnect the starter motor lead wire ①.



- Disassemble the starter motor as shown in the illustration.



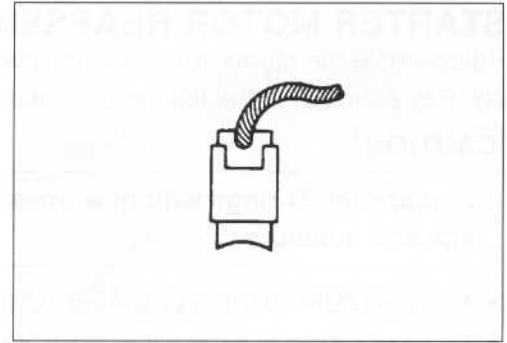
- |                              |                        |                               |
|------------------------------|------------------------|-------------------------------|
| ① Housing end (rear bracket) | ② Brush spring (2 pcs) | ③ Brush holder                |
| ④ Terminal                   | ⑤ Washer               | ⑥ Armature                    |
| ⑦ Starter motor case         | ⑧ Seal ring (2 pcs)    | ⑨ Washer                      |
| ⑩ O-ring (2 pcs)             | ⑪ O-ring               | ⑫ Housing end (front bracket) |

## STARTER MOTOR INSPECTION

### CARBON BRUSH

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

If any damage is found, replace the brush assembly with a new one.



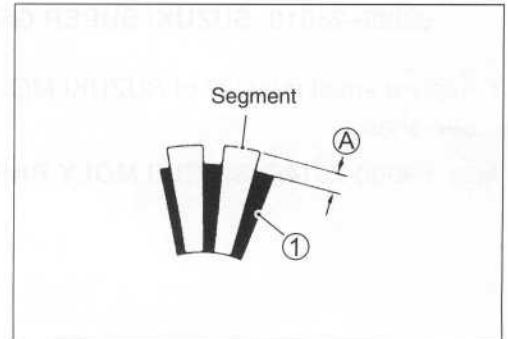
### COMMUTATOR

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

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

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

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



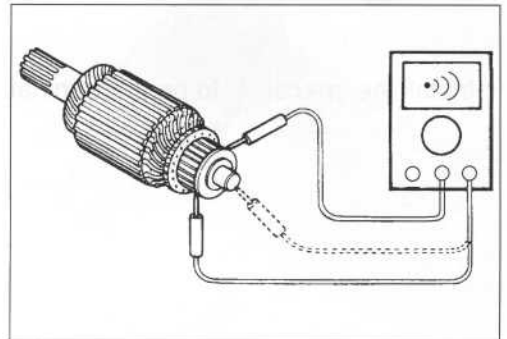
### ARMATURE COIL INSPECTION

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

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

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

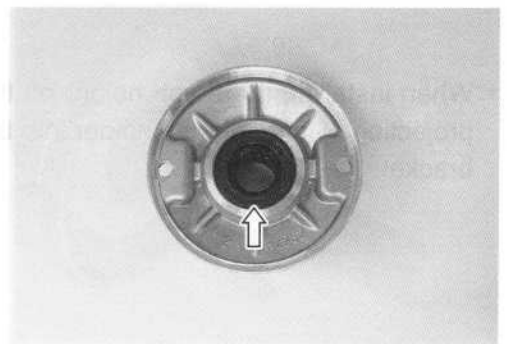
**Tester knob indication: Continuity test (••••)**



### OIL SEAL INSPECTION

Check the oil seal lip for damage or leakage.

If any damage is found, replace the housing end.






## STARTER MOTOR REASSEMBLY

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


### CAUTION

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

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

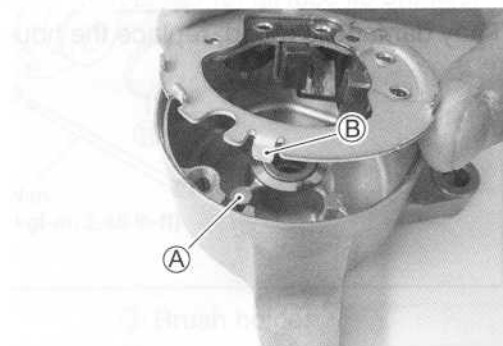
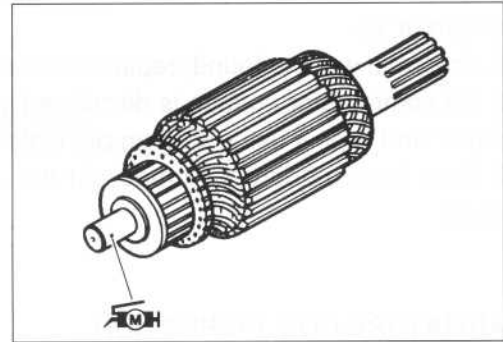
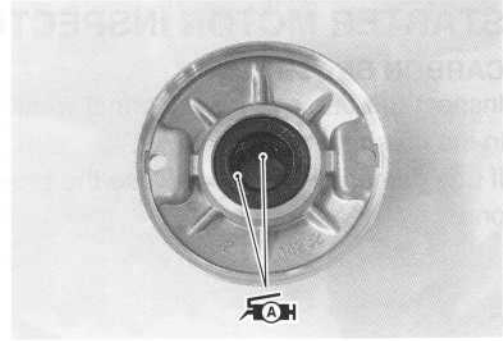
 99000-25030: SUZUKI SUPER GREASE "A" (USA)  
99000-25010: SUZUKI SUPER GREASE "A" (Others)

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

 99000-25140: SUZUKI MOLY PASTE

- Install the spacer ① to brush terminal.

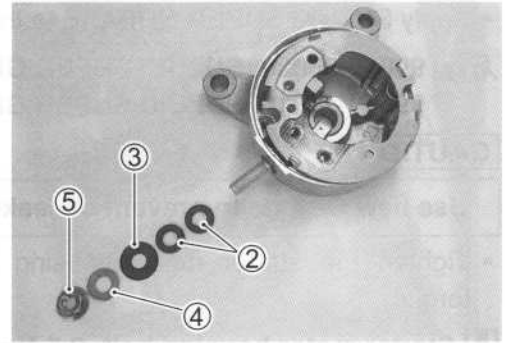
- When installing the brush holder on the rear bracket, set the projection ② of the brush holder into the groove ① of the rear bracket.



- Install the washers ② ( $12 \times 6.5 \times 2$ ), washer ③ ( $16 \times 6.5 \times 1$ ), washer ④ ( $14 \times 6.5 \times 1$ ) and nut ⑤.

**CAUTION**

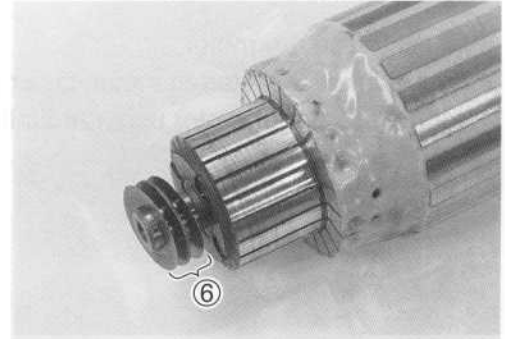
Replace the O-rings with new ones to prevent oil leakage and moisture.



- Install the washers ⑥.

**NOTE:**

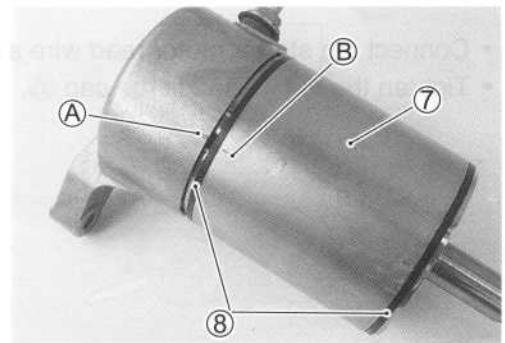
The number of washer ⑥ varies according to individual.



- Install the seal rings ⑧ to starter motor case ⑦.
- When install the rear bracket to starter motor case, align the marks ① on the rear bracket with cut point ② at the starter motor case.

**CAUTION**

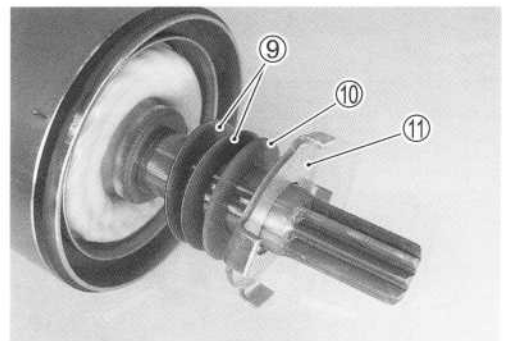
Replace the seal rings with new ones to prevent oil leakage and moisture.



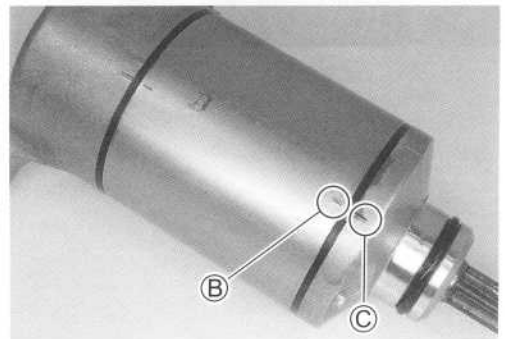
- Install the washers ⑨ slip washer ⑩ and thrust stopper ⑪.

**NOTE:**


The number of washer ⑨ varies according to individual.



- Install the front bracket.
- Align the marks ③ on the front bracket with the marks ④ on the starter motor case.




- Apply SUZUKI SUPER GREASE to the starter motor O-rings.

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

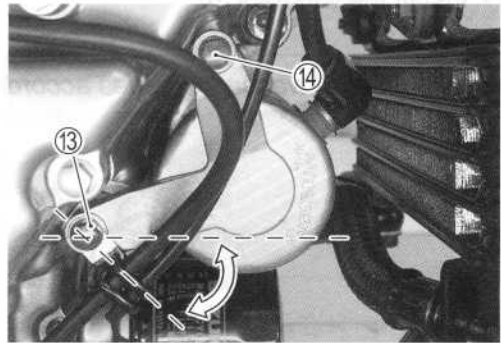
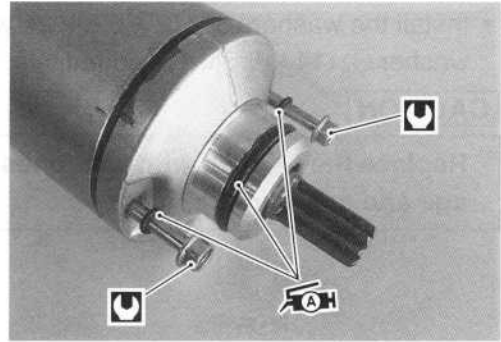
**CAUTION**

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

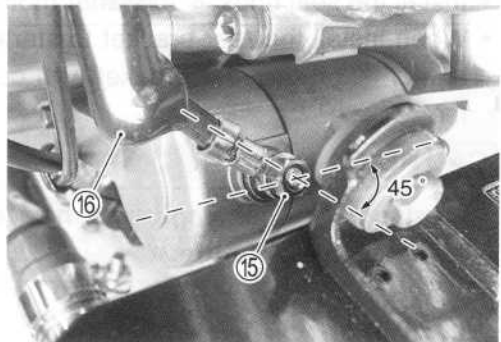
- Tighten the starter motor housing bolts to the specified torque.

 **Starter motor housing bolt: 3.5 N·m (0.4 kgf·m 2.45 lb-ft)**

- Install the starter motor.
- First tighten the starter motor lower mounting bolt ⑬, then tighten the starter motor upper mounting bolt ⑭.

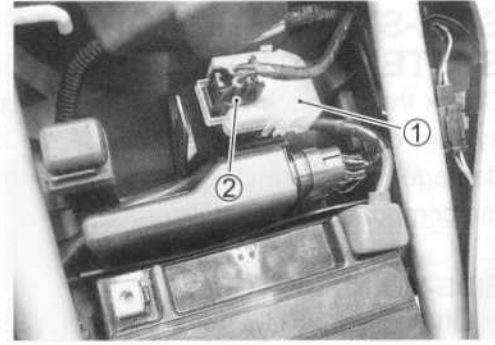


- Connect the starter motor read wire as shown.
- Tighten the nut ⑮ and fit the cap ⑯.

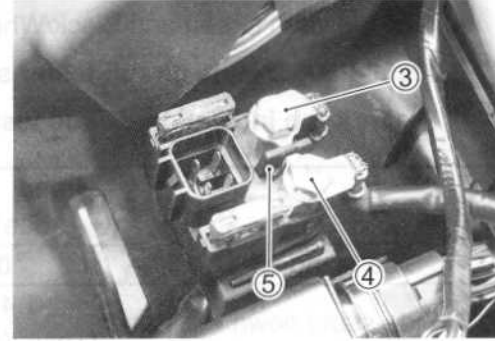


## STARTER RELAY INSPECTION

- Remove the front seat. (☞ 7-4)
- Disconnect the battery  $\ominus$  lead wire from the battery.
- Remove the starter relay cover ①.
- Disconnect the starter relay coupler ②.



- Disconnect the starter motor lead wire ③ and battery lead wire ④.
- Remove the starter relay ⑤.



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

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

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

### CAUTION

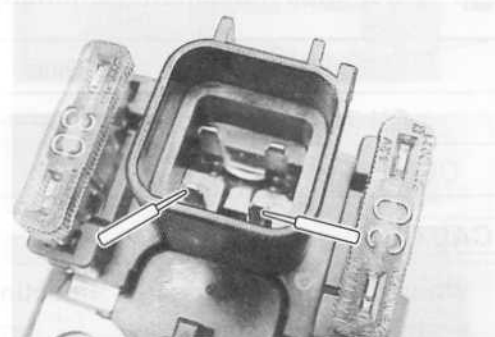
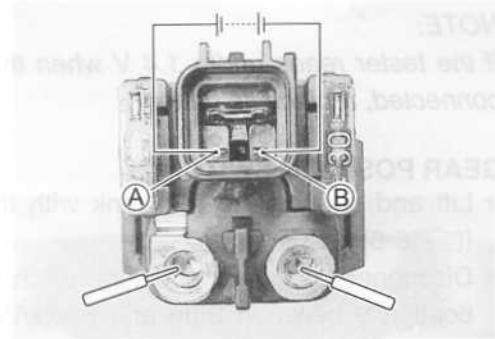
**Do not apply a battery voltage to the starter relay for more than five seconds, since the relay coil may over-heat and get damaged.**

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

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

**Tester knob indication: Resistance ( $\Omega$ )**

**DATA** Starter relay resistance: 3 – 6  $\Omega$



## SIDE-STAND/IGNITION INTERLOCK SYSTEM PARTS INSPECTION

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

### SIDE-STAND SWITCH

- Lift and support the fuel tank with its prop stay. (☞ 5-6)
- Disconnect the side-stand switch coupler and measure the voltage between Green and Black/White lead wires.

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

**Tester knob indication: Diode test (←→)**

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

**NOTE:**

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

### GEAR POSITION SWITCH

- Lift and support the fuel tank with the fuel tank prop stay. (☞ 5-6)
- Disconnect the gear position switch coupler and check the continuity between Blue and Black/White with the transmission in "NEUTRAL".

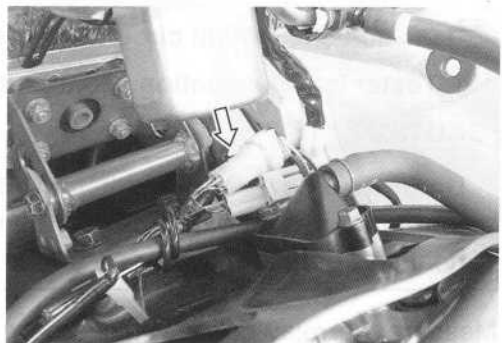
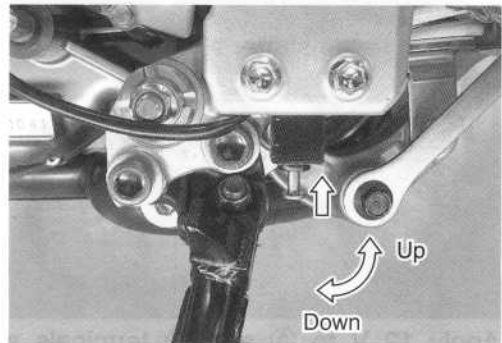
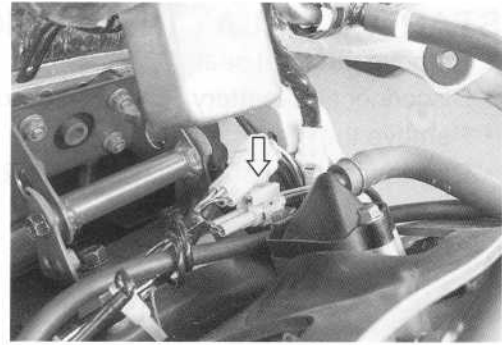
**TOOL** 09900-25008: Multi circuit tester set

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

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

**CAUTION**

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



- Connect the gear position switch coupler to the wiring harness.
- Turn the ignition switch to "ON" position and side-stand to upright position.

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

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

**TESTER** Tester knob indication: voltage (V)

**DATA** Gear position switch voltage

Gear position	1st	2nd	3rd	4th	5th	6th
Voltage	Approx. 1.36 V	Approx. 1.77 V	Approx. 2.49 V	Approx. 3.23 V	Approx. 4.10 V	Approx. 4.55 V

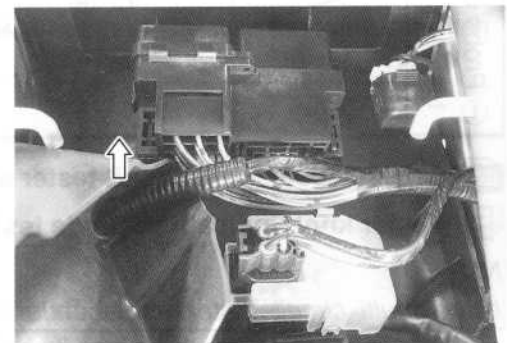
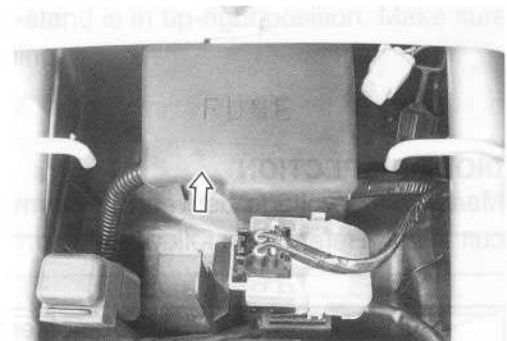
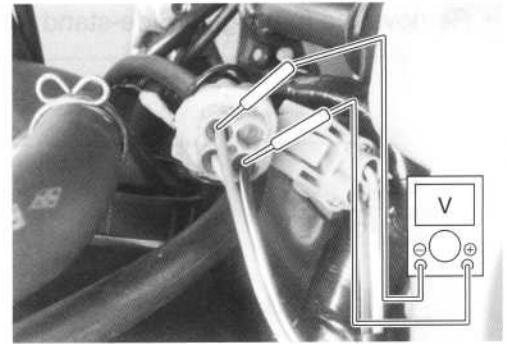
**NOTE:**

- \* 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 a needle pointed probe outer diameter being below 0.5 mm to prevent the rubber of the water proof coupler from damage.

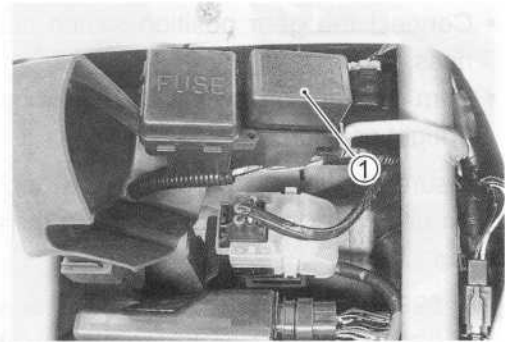
**TURN SIGNAL/SIDE-STAND RELAY**

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

- Remove the front seat. (7-4)
- Remove the fuse box cover.
- Remove the fuse box from the rear fender.



- Remove the turn signal/Side-stand relay ①.

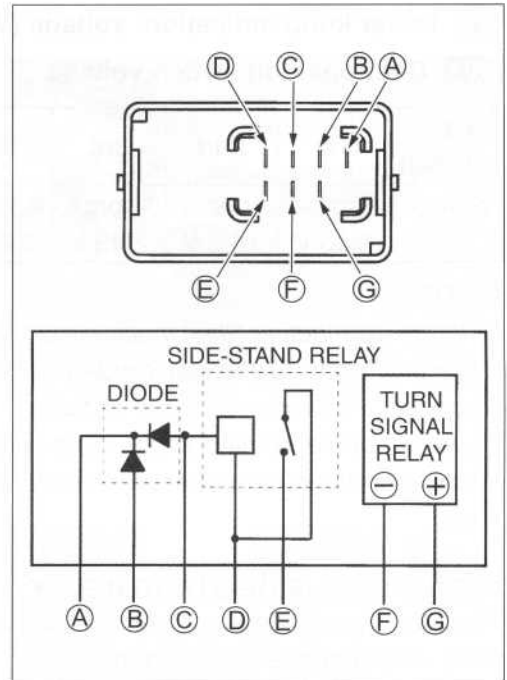


**SIDE-STAND RELAY INSPECTION**

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

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

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



**DIODE INSPECTION**

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

Unit: V

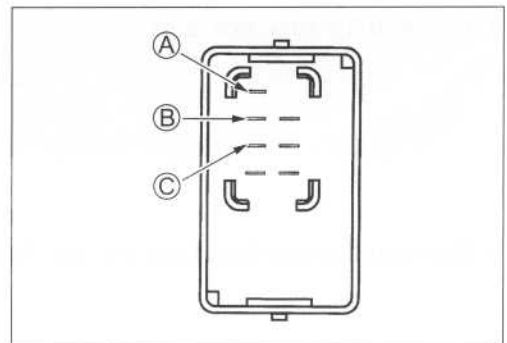
		⊕ Probe of tester to:	
		③, ②	④
⊖ Probe of tester to:	③, ②		More than 1.4 V
	④	0.4 - 0.6	

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

**Tester knob indication: Diode test (→|←)**

**NOTE:**

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







**Step3**

1) Measure the ignition coil primary peak voltage. (☞ 8-25)

**NOTE:**

*The ignition coil peak voltage inspection method is applicable only with the multi circuit tester and peak volt adaptor.*

Is the peak voltage OK?

YES	Go to Step4.
NO	Go to Step5.

**Step4**

1) Inspect the spark plug. (☞ 2-6)

Is the spark plug OK?

YES	<ul style="list-style-type: none"> <li>• Improper spark plug connection.</li> <li>• Go to Step5.</li> </ul>
NO	Faulty spark plug.

**Step5**

1) Inspect the ignition coil. (☞ 8-26)

Is the ignition coil OK?

YES	Go to Step6.
NO	Faulty ignition coil.

**Step6**

1) Measure the CKP sensor peak voltage and its resistance.

**NOTE:**

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

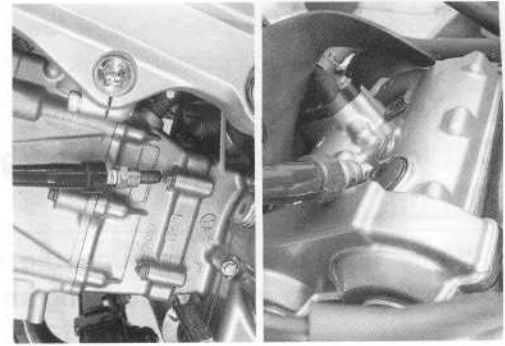
Is the peak voltage and resistance OK?

YES	<ul style="list-style-type: none"> <li>• Faulty ECM.</li> <li>• Faulty wire harness.</li> <li>• Improper ignition coupler connection.</li> </ul>
NO	Faulty CKP sensor.

## INSPECTION

### IGNITION COIL PRIMARY PEAK VOLTAGE

- Lift and support the fuel tank. (☞ 5-6)
- Loosen the radiator lower mounting bolt and then swing the radiator up.
- Disconnect the two spark plug caps.
- Connect new two spark plugs to each spark plug cap and ground them.
- Remove the air cleaner box.



#### NOTE:

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

Measure the No.1 and No.2 ignition coils primary peak voltage in the following procedure.

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

- |                     |                              |
|---------------------|------------------------------|
| No.1 ignition coil: | ⊕ Probe: White/Blue terminal |
|                     | ⊖ Probe: Ground              |
| No.2 ignition coil: | ⊕ Probe: Black terminal      |
|                     | ⊖ Probe: Ground              |

#### NOTE:

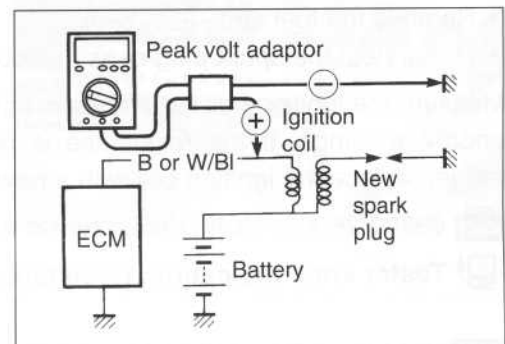
Do not disconnect the ignition coil primary wire coupler.

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

#### CAUTION

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

- Shift the transmission into the neutral and then turn the ignition switch to the "ON" position.
- Pull the clutch lever.
- Press the starter button and allow the engine to crank for a few seconds, and then measure the ignition coil primary peak voltage.



- Repeat the above procedure a few times and measure the highest ignition coil primary peak voltage.

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

**DATA** Ignition coil primary peak voltage: 150 V and more

**⚠ WARNING**

While testing, do not touch the tester probes and spark plugs to prevent receiving an electric shock.

- If the peak voltage is lower than the specified values, inspect the ignition coil. (☞ 8-26)

### IGNITION COIL RESISTANCE

- Remove the fuel tank. (☞ 5-6)
- Disconnect the spark plug caps and coupler.

Measure the ignition coil resistance in both the primary and secondary windings. If the resistance is not within the standard range, replace the ignition coil with a new one.

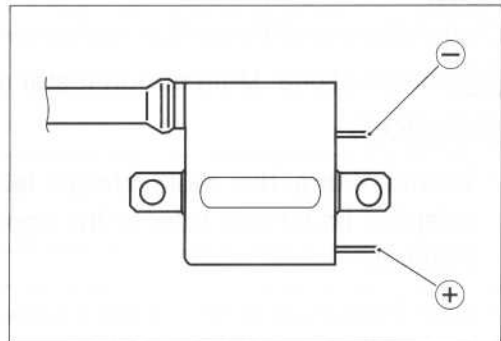
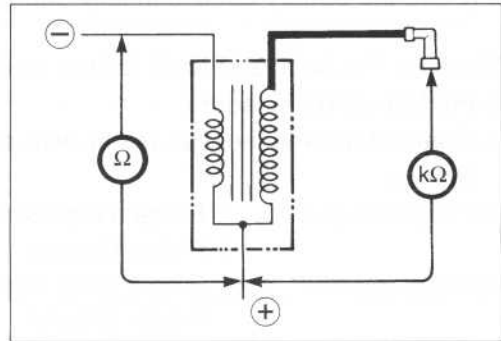
**TOOL** 09900-25008: Multi circuit tester set

 **Tester knob indication: Resistance ( $\Omega$ )**

**DATA** Ignition coil resistance

Primary : 2 – 5  $\Omega$  ( $\oplus$  terminal –  $\ominus$  terminal)

Secondary : 24 – 37 k $\Omega$  (Plug cap –  $\oplus$  terminal)



**CKP SENSOR PEAK VOLTAGE**

- Remove the front seat. (☞ 7-4)
- Disconnect the ECM coupler.

**NOTE:**

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

Measure the CKP sensor peak voltage in the following procedures.

- Connect the multi circuit tester with peak volt adaptor as follows.
  - ⊕ Probe: White lead wire
  - ⊖ Probe: Black/White lead wire

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

**CAUTION**

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

- Shift the transmission into the neutral, and then turn the ignition switch to the "ON" position.
- Pull the clutch lever.
- Press the starter button and allow the engine to crank for a few seconds, and then measure the CKP sensor peak voltage.
- Repeat the above procedure a few times and measure the highest peak voltage.

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

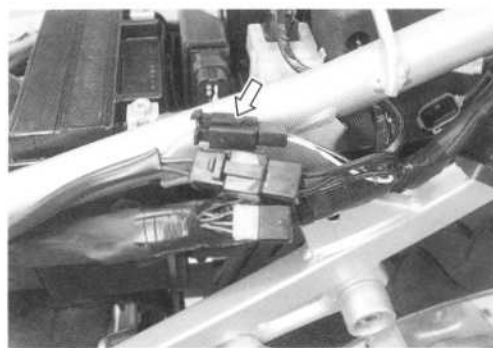
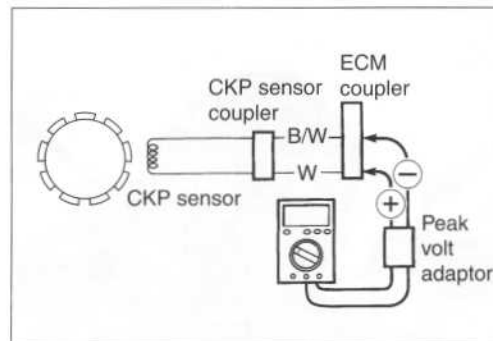
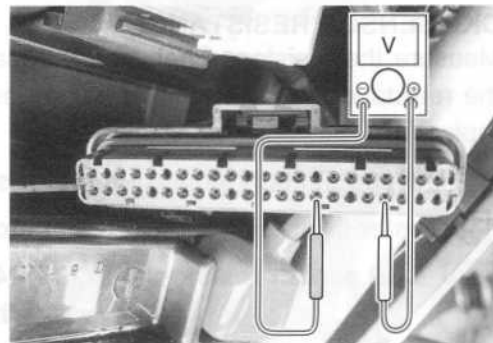
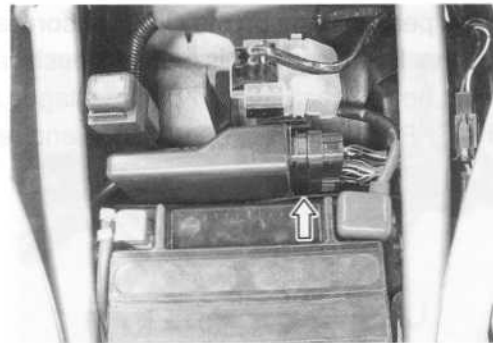
**DATA** CKP sensor peak voltage: 3.7 V and more

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

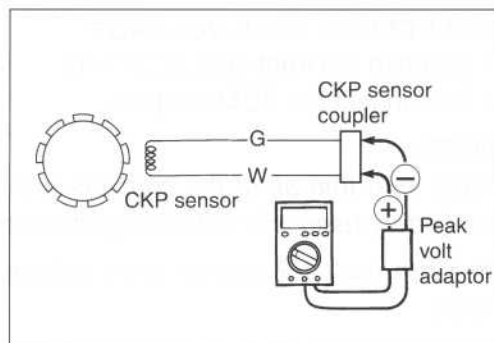
- Remove the seat tail cover. (☞ 7-5)
- Disconnect the CKP sensor lead wire coupler and connect the multi circuit tester with the peak volt adaptor.
  - ⊕ Probe: Green lead wire
  - ⊖ Probe: Blue lead wire
- Measure the CKP sensor peak voltage at the CKP sensor lead wire coupler in the same manner as on the ECM coupler.

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

**DATA** CKP sensor peak voltage: 3.7 V and more



If the peak voltage on the CKP sensor lead wire coupler is ok 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 re-checked.



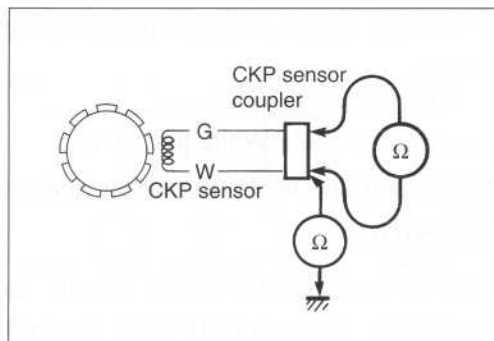
### CKP SENSOR RESISTANCE

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

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

**Tester knob indication: Resistance ( $\Omega$ )**

**DATA** CKP sensor resistance: 130 – 240  $\Omega$  (White – Green)  
 $\infty$   $\Omega$  (White – Ground)



## COMBINATION METER

### REMOVAL

#### (SV650S)

- Remove the cowling. (☞7-6)
- Remove the combination meter.

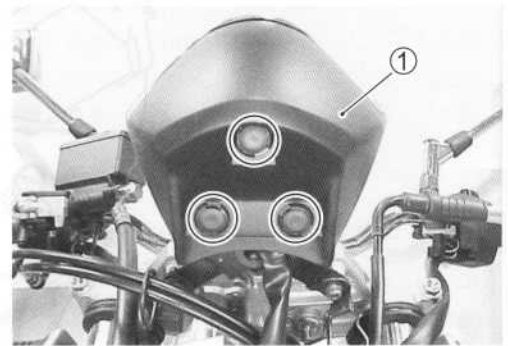
#### NOTE:

“☆” indicates hook location.



#### (SV650)

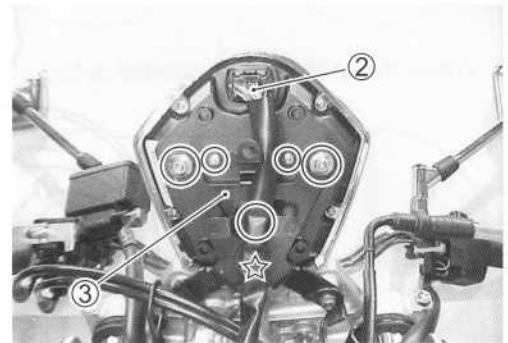
- Remove the headlight. (☞7-29)
- Remove the cover ①.



- Disconnect the combination meter coupler ②.
- Remove the bracket ③.
- Remove the combination meter.

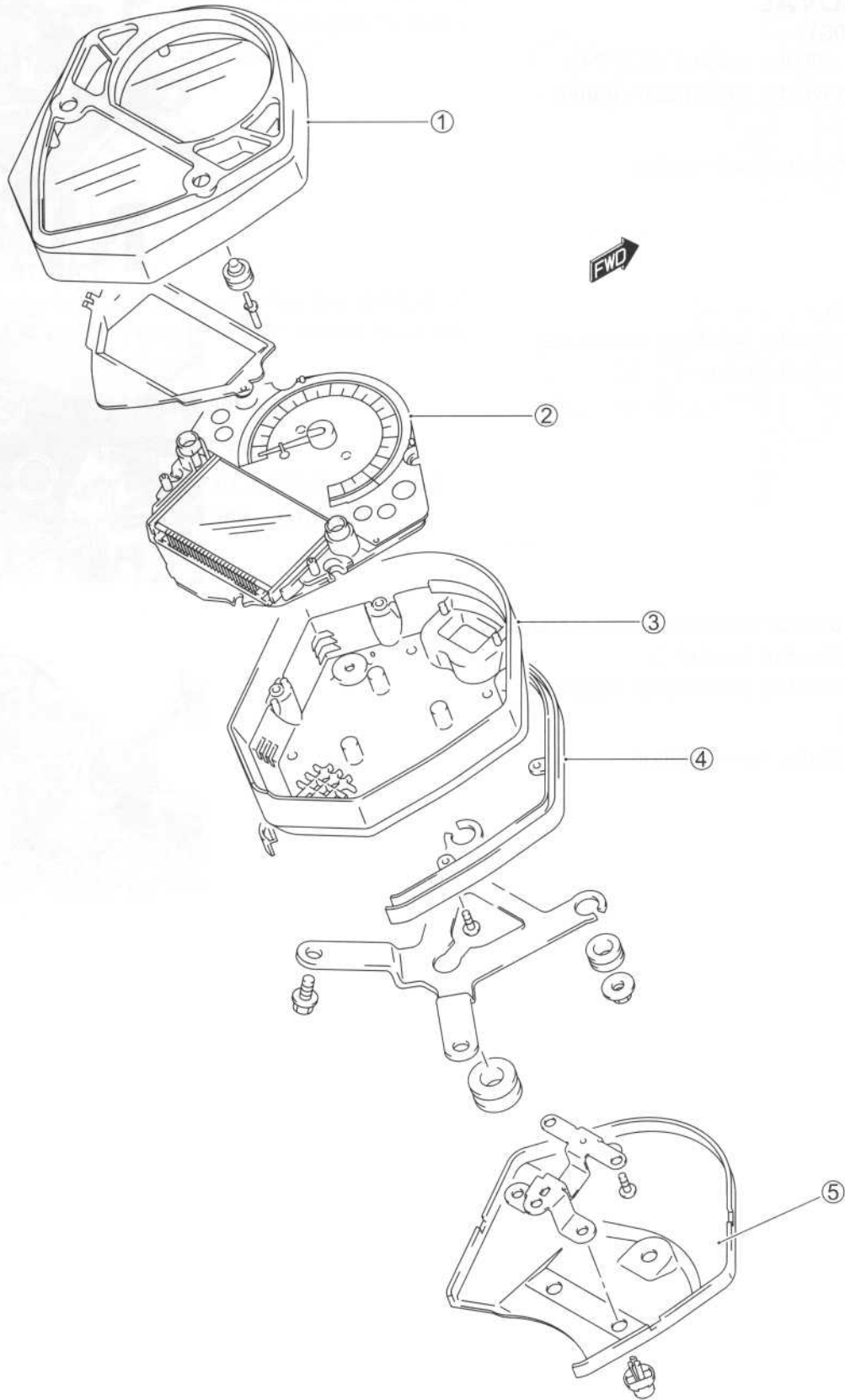
#### NOTE:

“☆” indicates hook location.



- Disassemble the combination meter as shown in the illustration.

SV650

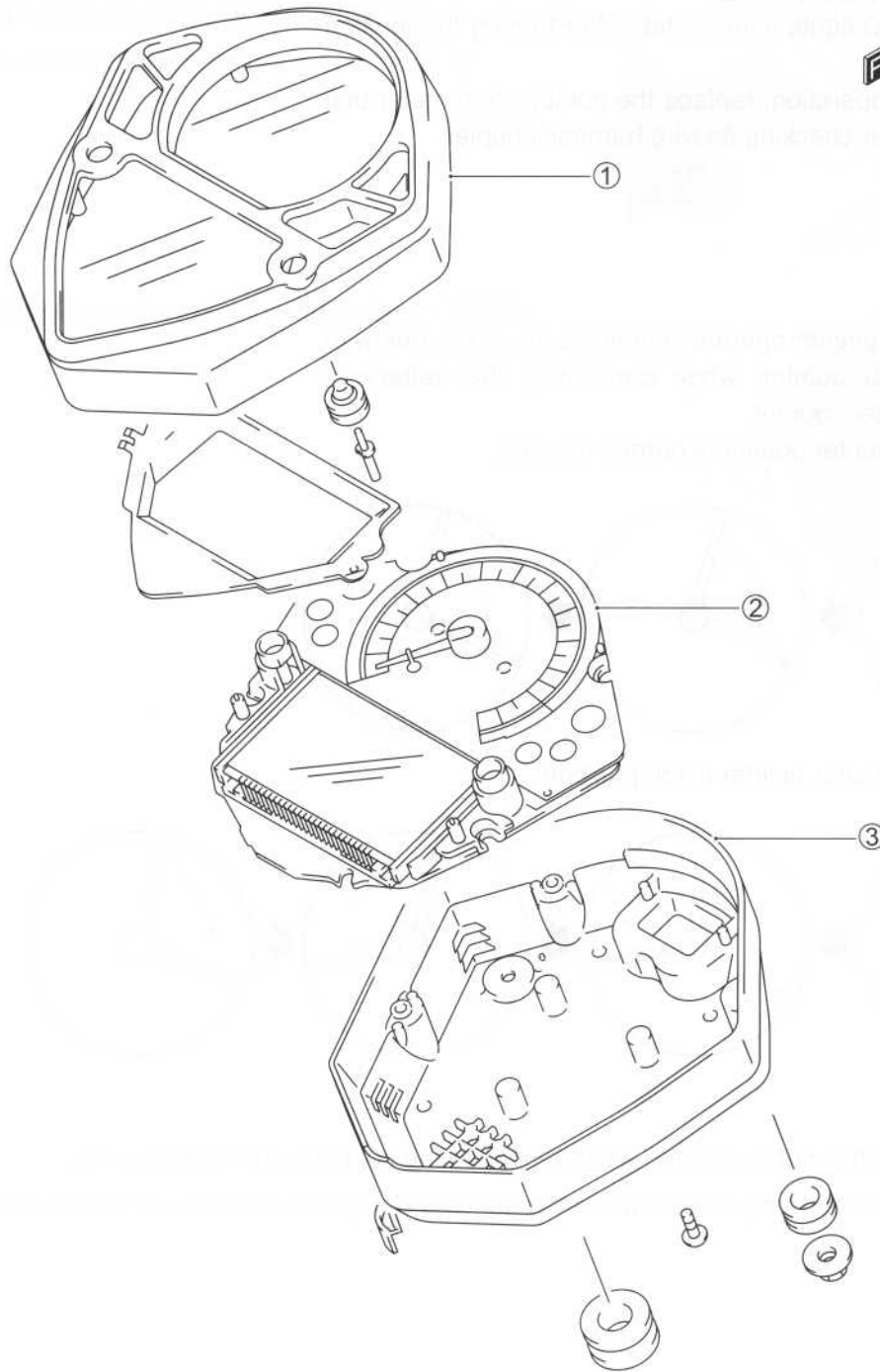


① Meter cover  
④ Molding

② Combination meter  
⑤ Cover

③ Housing

SV650S



① Meter cover

② Combination meter

③ Housing



## INSPECTION

### LED (LIGHT EMITTING DIODE)

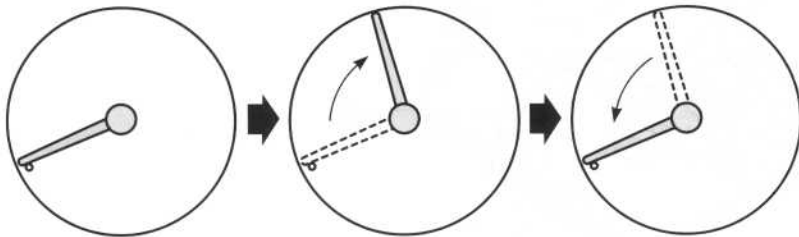
Check that the LED lights immediately after turning the ignition switch on.

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

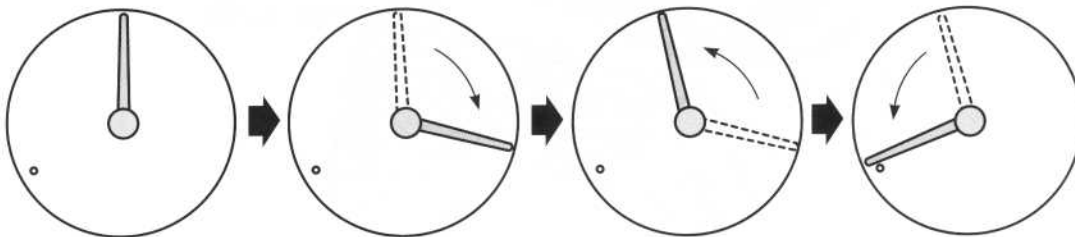
### TACHOMETER

- The tachometer pointer operates onetimes as shown below to reset tachometer pointer, when connecting the battery or combination meter coupler.

1. When the tachometer pointer is normal position.



2. When the tachometer pointer is top position.



#### NOTE:

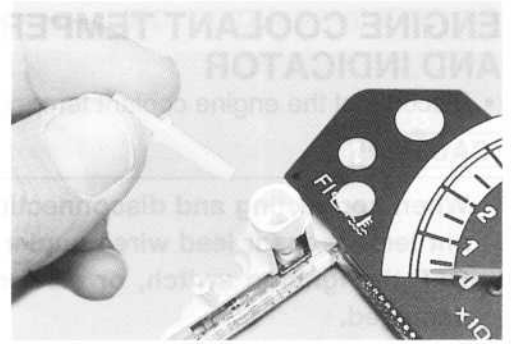
\* This sweep motion is not performed when reconnecting coupler within 40 seconds.

- If it do not operate correctly, check the wiring harness or replace combination meter with a new one.

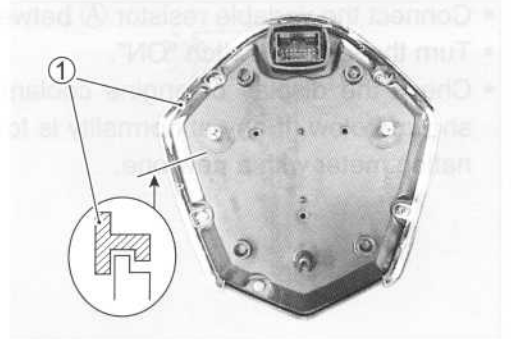
**REASSEMBLY AND INSTLLATION**

Reassemble and installation the combination meter in the reverse order of disassembly. Pay attention the following points.

- Install the push-rods with the shorter portion faced up.



- Install the molding ① as shown in the illustration. (SV650)



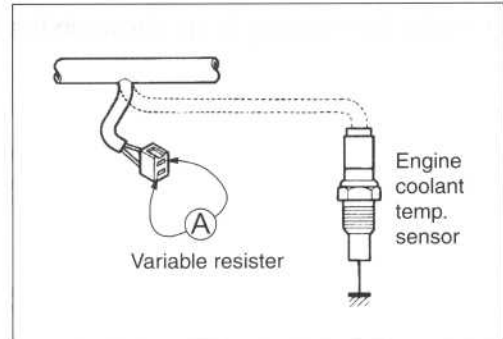
## ENGINE COOLANT TEMPERATURE METER AND INDICATOR

- Disconnect the engine coolant temperature sensor coupler.

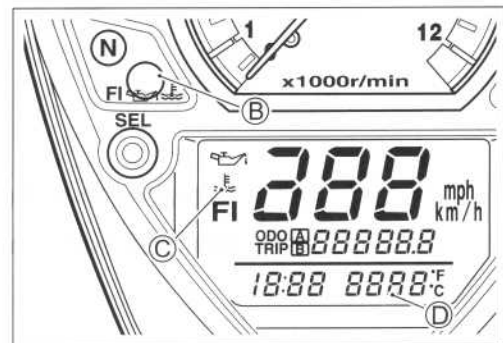
### CAUTION

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

- Connect the variable resistor (A) between the terminals.
- Turn the ignition switch "ON".
- Check the display of engine coolant temperature meter as shown below. If any abnormality is found, replace the combination meter with a new one.



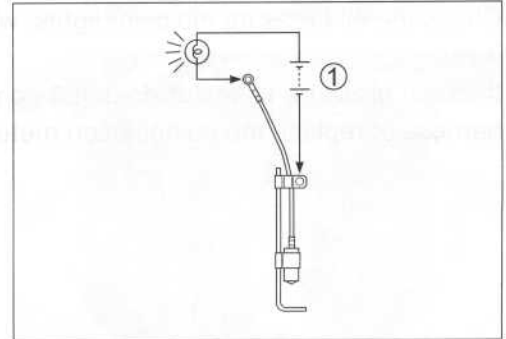
Water temperature	Under 19 °C (67 °F)	Approx. 60 °C (140 °F)	120 – 129 °C (248 – 265 °F)	Over 130 °C (266 °F)
Resistance	2.45 kΩ and more	Approx. 0.587 kΩ	0.1 kΩ and less	0 Ω
LCD (B)	OFF	OFF	ON	ON
LCD (C)	OFF	OFF	ON	ON
LCD (D)	---	60 (140)	120 – 129/Flicker (248 – 265/Flicker)	HI/Flicker



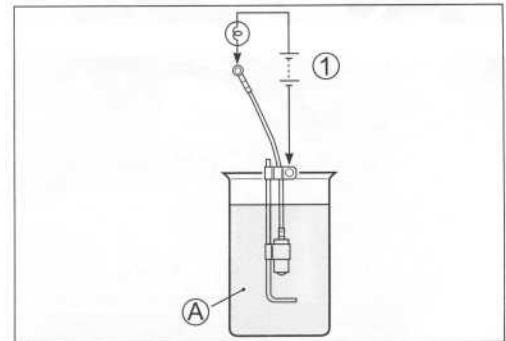
**FUEL LEVEL SWITCH INSPECTION**

- Remove the fuel pump assembly. (☞ 5-10)

- Connect 12 V battery ① and test bulb (12 V, 3.4 W) to the fuel level switch as shown in the right illustrations. The bulb should come on after several seconds if the switch is in good condition.



- When the switch is immersed in water ① under the above condition, the bulb should go out. If the bulb remains lit, replace the unit with a new one.

**FUEL LEVEL INDICATOR**

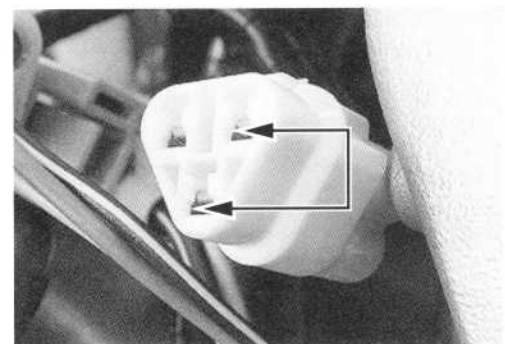
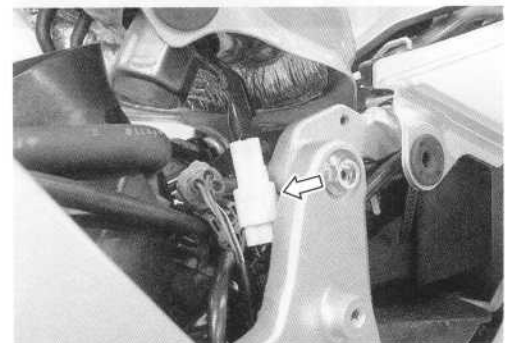
- Lift and support the fuel tank with the fuel tank prop stay. (☞ 5-6)
- Connect jumper wire between the Yellow/Black and Black/White lead wires at the wire harness.
- Turn the ignition switch "ON" position and wait for approx. 5 seconds.

Check the fuel level indicator lights.

If not, replace the combination meter with a new one.

**NOTE:**

After disconnecting the jump wire, it takes 30 seconds that the fuel level indicator comes off.



### OIL PRESSURE INDICATOR

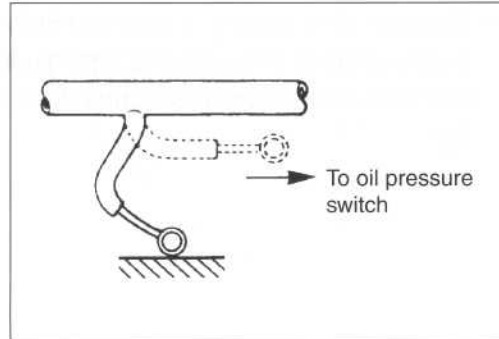
Before inspecting the oil pressure switch, check the engine oil level. (☞ 2-14)

- Disconnect the oil pressure switch lead wire from the oil pressure switch.
- Turn the ignition switch "ON" position.



Check the oil pressure indicator lights, when grounding the lead wire.

If the oil pressure indicator does not come on, check the wiring harness or replace the combination meter with a new one.

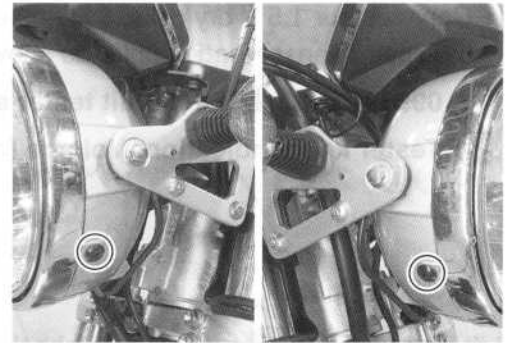


## SPEED SENSOR

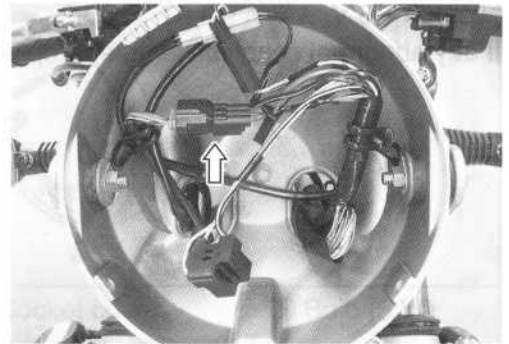
### REMOVAL

#### SV650

- Remove the headlight with two screws.

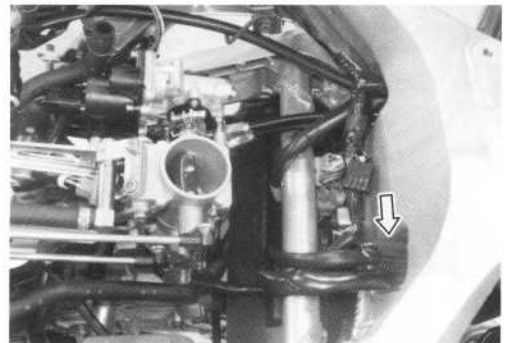


- Disconnect the speed sensor coupler.



#### SV650S

- Lift up and support the fuel tank. (☞ 5-6)
- Remove the air cleaner box. (☞ 5-16)
- Disconnect the speed sensor coupler.



### INSTALLATION

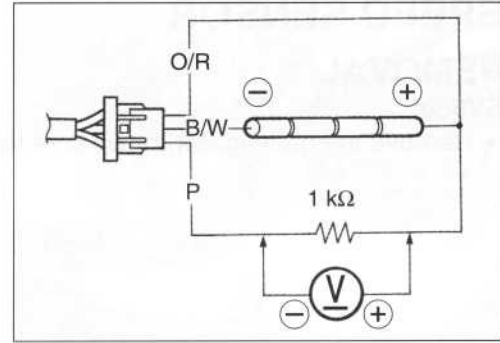
- Installation is in the reverse of removal.
- Connect the speed sensor coupler and check the wire harness routing. (☞ 9-17)

## INSPECTION

- Connect four 1.5 V dry cells, 1 k $\Omega$  resistance and the tester to the speed sensor lead coupler as shown.

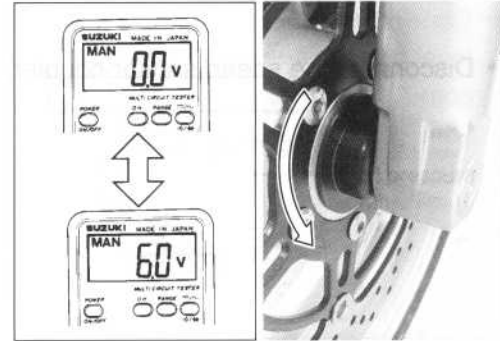
 **09900-25008: Multi-circuit tester set**

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



Lift and turn the front wheel and check that voltage varies between 0 – 6 V.

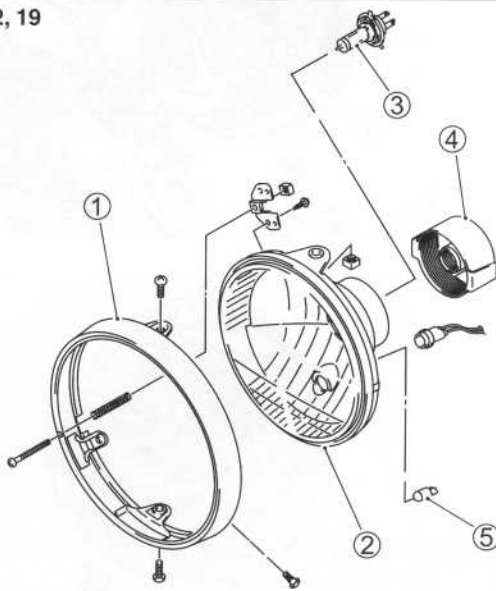
If any abnormal condition is noted, replace the sensor.



## LAMPS

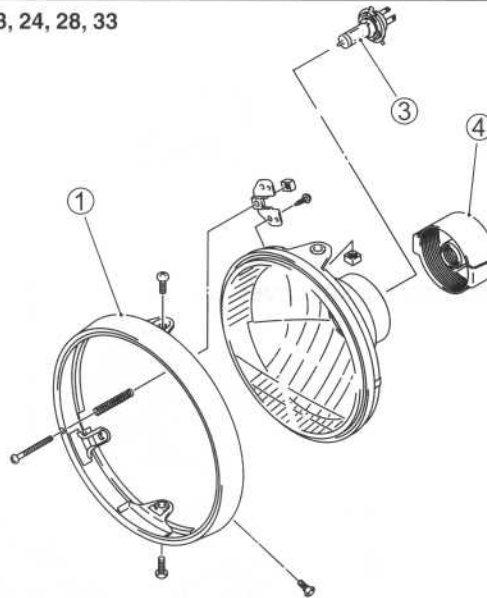
### HEADLIGHT (SV650)

E-02, 19



① Rim      ② Reflector      ③ Bulb (60/50 W)

E-03, 24, 28, 33



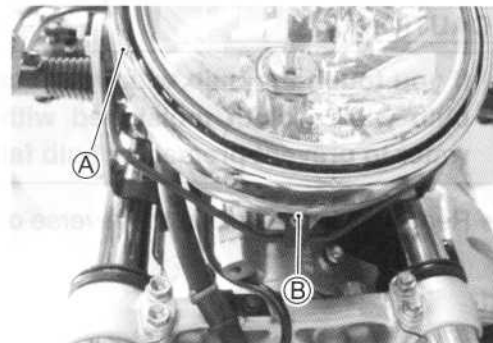
④ Socket cover      ⑤ Bulb (5 W)

### HEADLIGHT BEAM ADJUSTMENT

- Adjust the headlight beam, both vertical and horizontal.
- Ⓐ: Vertical adjuster
- Ⓑ: Horizontal adjuster

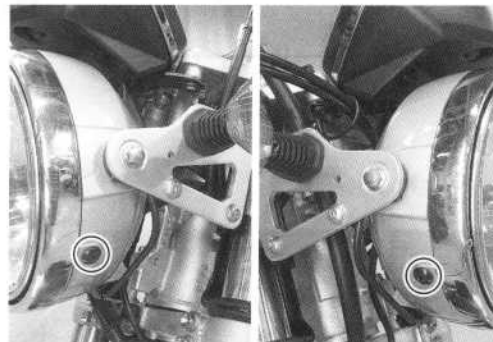
#### NOTE:

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



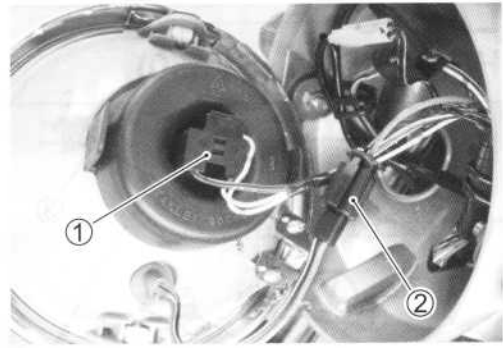
### BULB REPLACEMENT

- Remove the headlight with two screws.

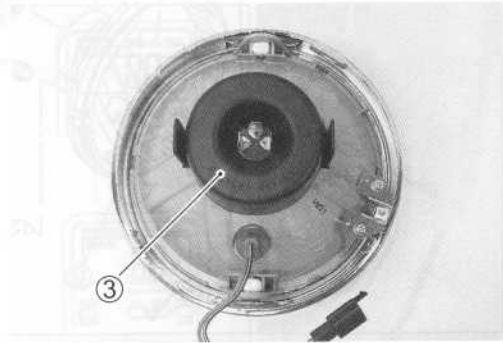




- Disconnect the coupler ①.
- Disconnect the position light coupler ②.



- Remove the socket cover ③.

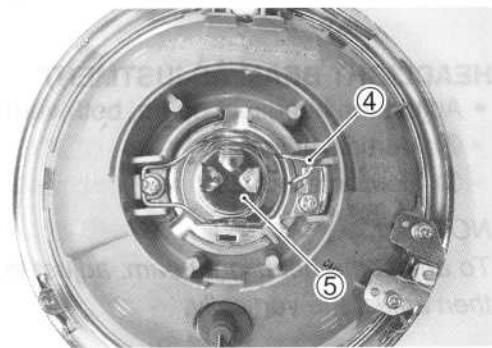


- Unhook the bulb holder spring ④ and pull out the bulb ⑤.

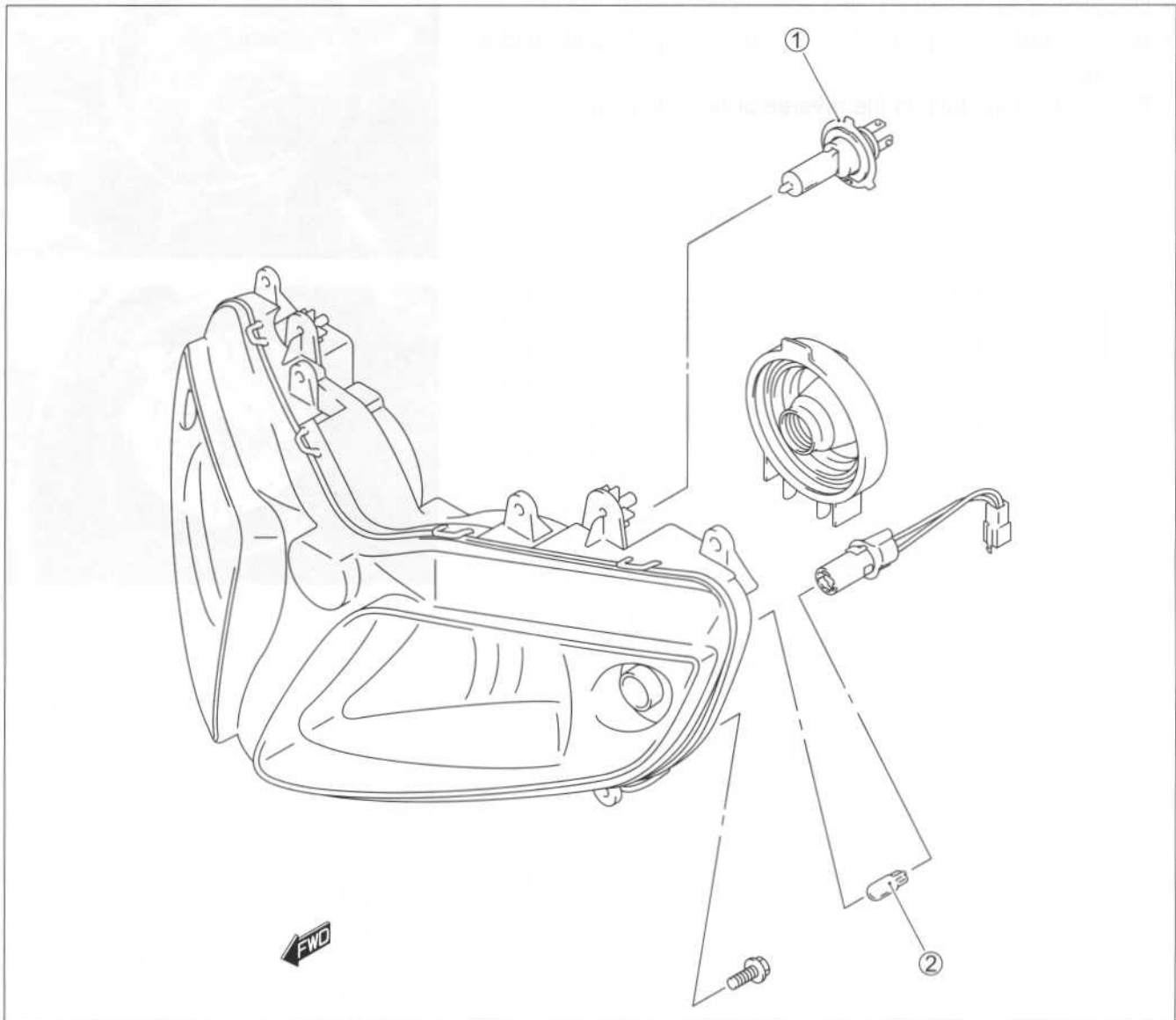
**CAUTION**

**If you touch the bulb with your bare hands, clean the bulb with a cloth moistened with alcohol or soapy water to prevent premature bulb failure.**

- Reassemble the bulb in the reverse order of removal.



## HEADLIGHT (SV650S)



① Headlight                      ② Position light

Headlight bulb    ①: 12 V 60/55 W

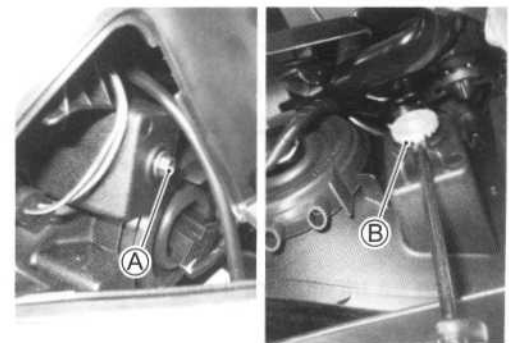
Position light bulb ②: 12 V 5 W

### HEADLIGHT BEAM ADJUSTMENT

- Adjust the headlight beam, both vertical and horizontal.
  - Ⓐ: Vertical adjuster
  - Ⓑ: Horizontal adjuster

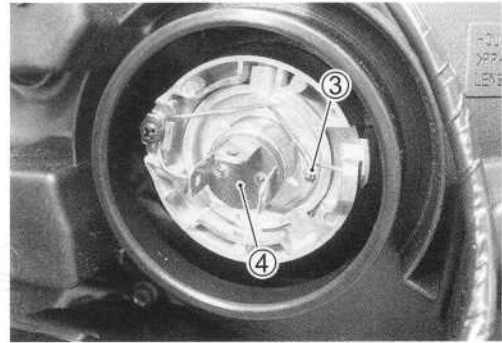
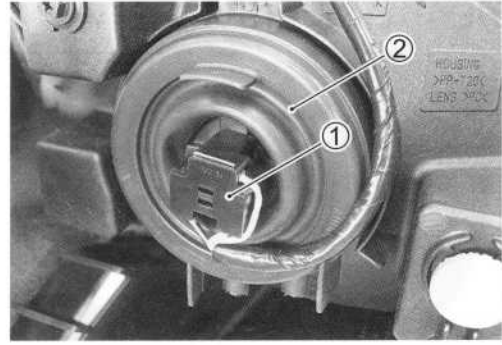
#### NOTE:

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

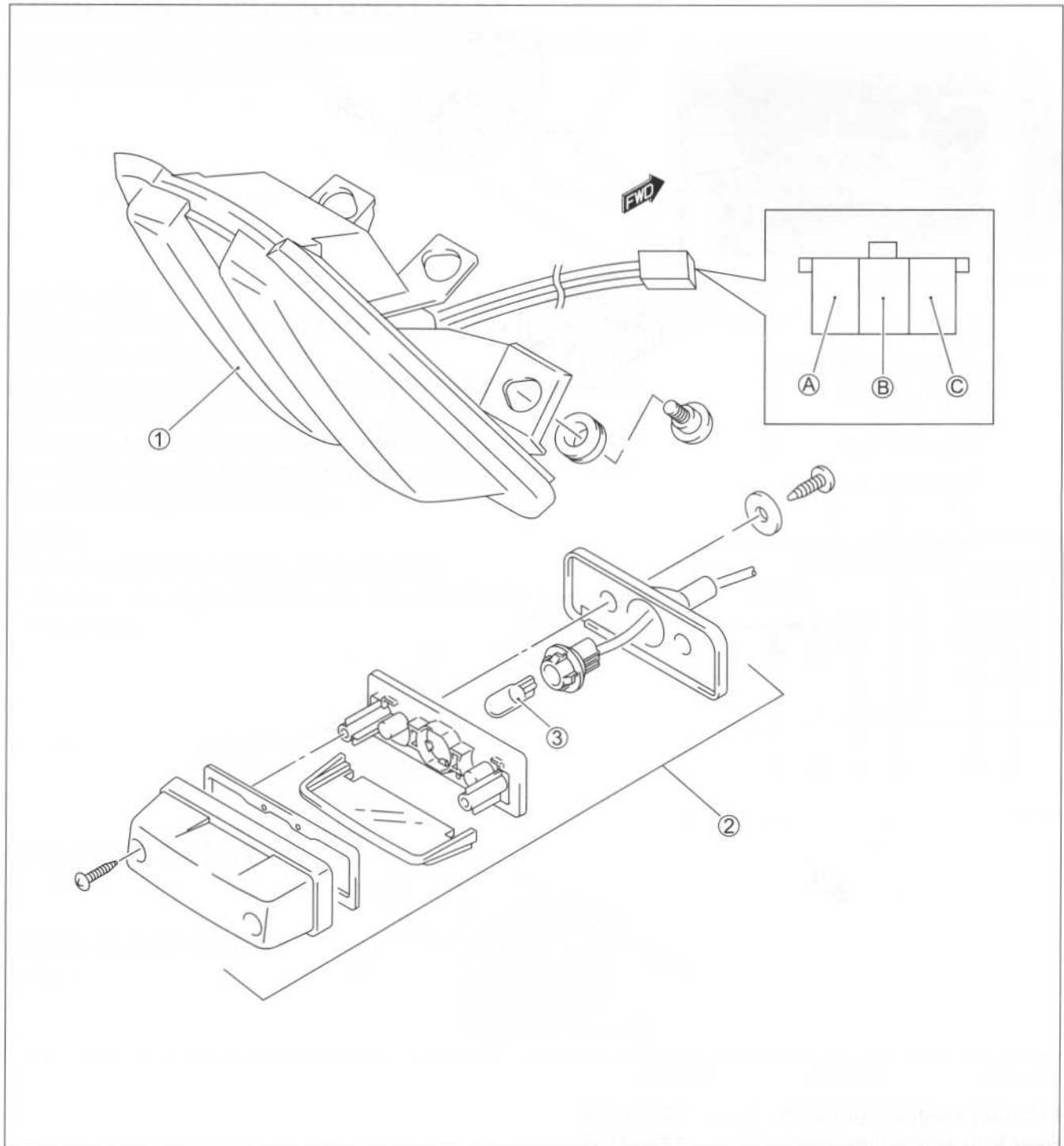


### BULB REPLACEMENT

- Disconnect the coupler ① and remove the rubber cap ②.
- Remove the headlight bulb ④ by unhooking the bulb holder spring ③.
- Reassemble the bulb in the reverse order of removal.



## BRAKE LIGHT/TAILLIGHT



① Brake light/taillight

② License lamp

③ Bulb

A Brake light

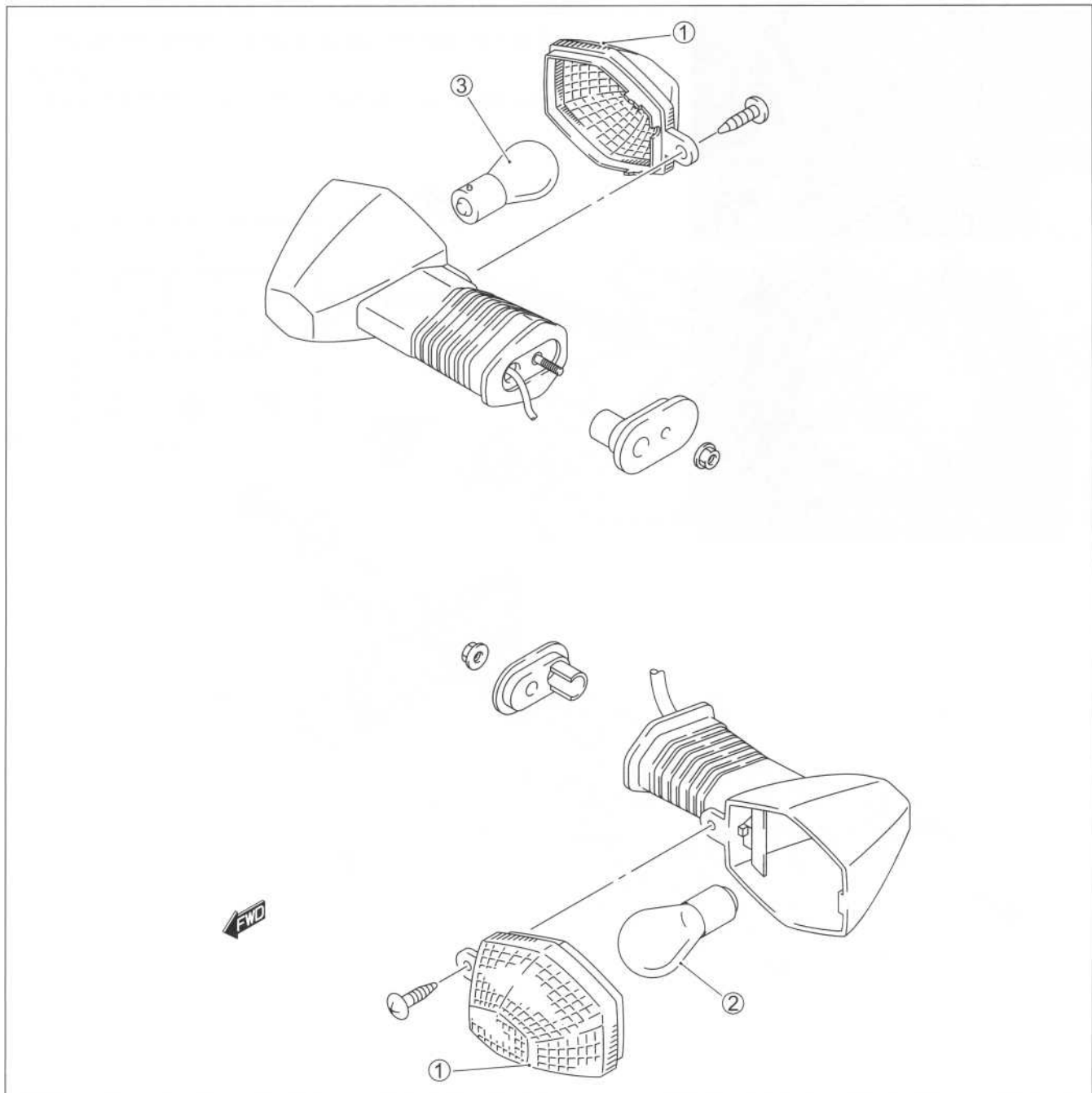
B Tail light

C GND

**License lamp bulb ③: 12 V 5 W**

The brake light/taillight is equipped LED. If LED fails in operation, replace the brake light/taillight as assembly.

## TURN SIGNAL LIGHTS



- ① Lens                      ② Bulb                      ③ Bulb

Front turn signal light bulb ②: ... 12 V 21 W

Rear turn signal light bulb ③: ..... 12 V 21 W

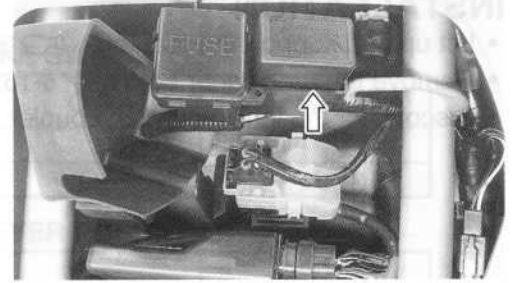
### CAUTION

Do not overtighten the lens fitting screws.  
 If you touch the bulb with your bare hands, clean the bulb with a cloth moistened with alcohol or soapy water to prevent premature bulb failure.

## RELAYS

### TURN SIGNAL/SIDE-STAND RELAY

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



#### INSPECTION

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

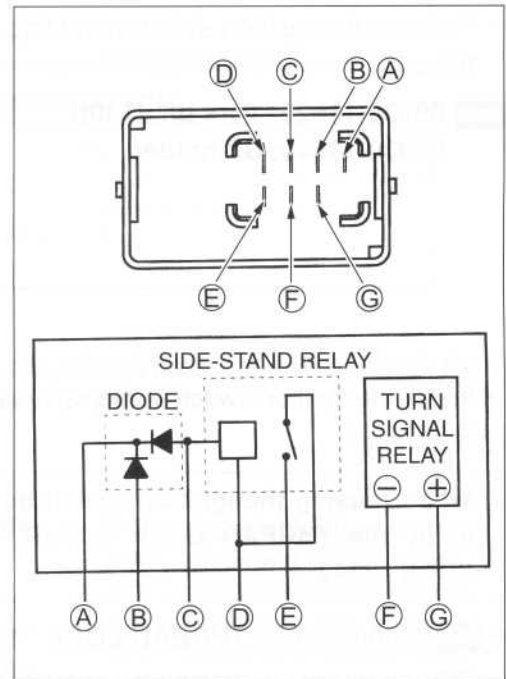
If the turn signal light does not illuminate, inspect the bulb, turn signal switch and circuit connection.

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

#### NOTE:

\* Make sure that the battery is fully charged.

\* Refer to the page 8-22 for the side-stand relay and diode inspection.



### STARTER RELAY

☞ 8-19

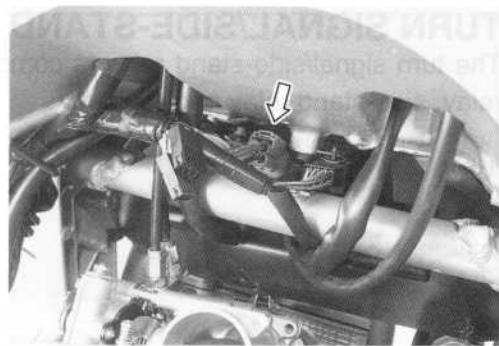
### FUEL PUMP RELAY

☞ 5-10

## SWITCHES

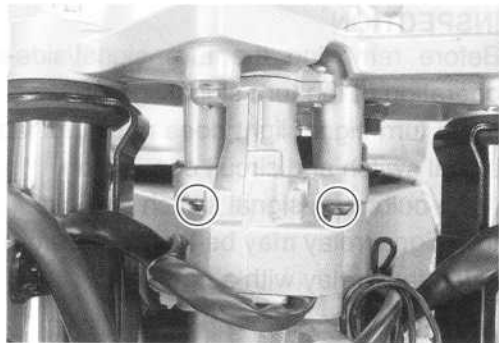
### IGNITION SWITCH REMOVAL/ INSTALLATION

- Lift up and support the fuel tank. (☞ 5-6)
- Remove the air cleaner box. (☞ 5-16)
- Disconnect the ignition switch coupler.



- Remove the ignition switch mounting bolts using the special tools.

**TOOL** 09930-11920: Torx bit JT40H  
09930-11940: Bit holder



- Install the ignition switch in the reverse order of removal.

#### CAUTION

When reusing the ignition switch bolt, clean thread and apply the **THREAD LOCK SUPER "1322"** or **THREAD LOCK "1342"**.

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

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

## INSPECTION

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

### IGNITION SWITCH

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

### DIMMER SWITCH

Color Position	W	Y	O
HI (≡▷)			
LO (≡▷)			

### TURN SIGNAL SWITCH

Color Position	Lg	Lbl	B
L			
PUSH			
R			

### PASSING LIGHT SWITCH

Color Position	O	Y
•		
PUSH		

### ENGINE STOP SWITCH

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

### STARTER BUTTON

Color Position	O/W	Y/G
•		
PUSH		

### HORN BUTTON

Color Position	O/G	B/W
•		
PUSH		

### HAZARD

Color Position	B	Lbl	Lg
ON			
OFF			

### FRONT BRAKE SWITCH

Color Position	B/R	B/BI
OFF		
ON		

### REAR BRAKE SWITCH

Color Position	O/G	W/B
OFF		
ON		

### CLUTCH LEVER POSITION SWITCH

Color Position	B/Y	B/Y
OFF		
ON		

### OIL PRESSURE SWITCH

Color Position	G/Y	Ground
ON (engine is stopped)		
OFF (engine is running)		

#### NOTE:

Before inspecting the oil pressure switch, check the engine oil level. (☞ 2-14)

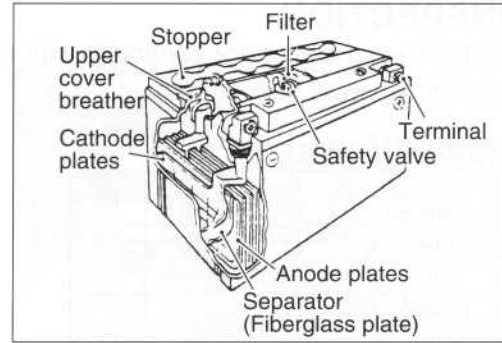
### WIRE COLOR

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



## BATTERY SPECIFICATIONS

Type designation	YTX12 – BS
Capacity	12 V, 36.0 kC (10 Ah)/10 HR



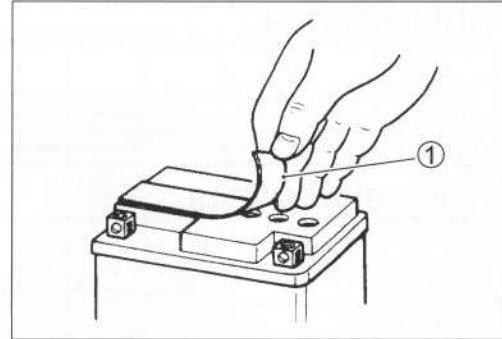
## INITIAL CHARGING

### Filling electrolyte

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

#### NOTE:

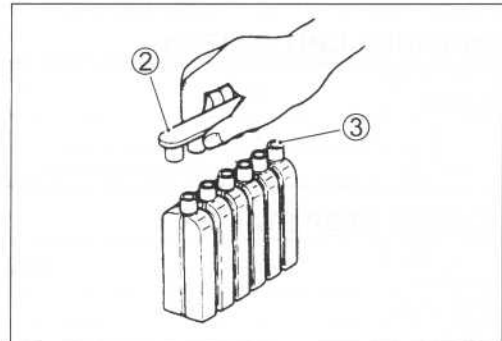
When filling electrolyte, the battery must be removed from the vehicle and must be put on the level ground.



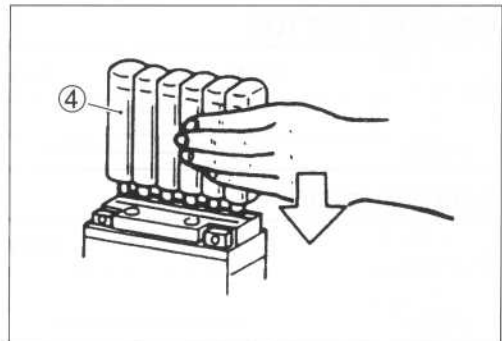
- Remove the caps ②.

#### NOTE:

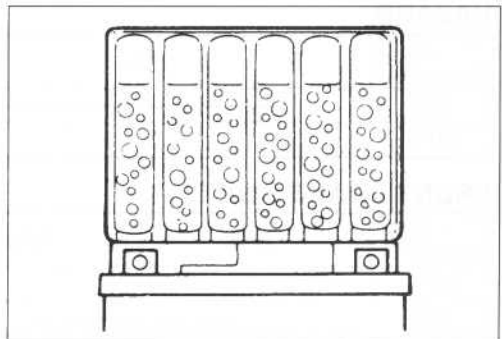
- After filling the electrolyte completely, use the removed cap ② as the sealed caps of battery-filler holes.
- Do not remove or pierce the sealed areas ③ of the electrolyte container.



- Insert the nozzles of the electrolyte container ④ into the battery's electrolyte filler holes, holding the container firmly so that it does not fall. Take precaution not to allow any of the fluid to spill.



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

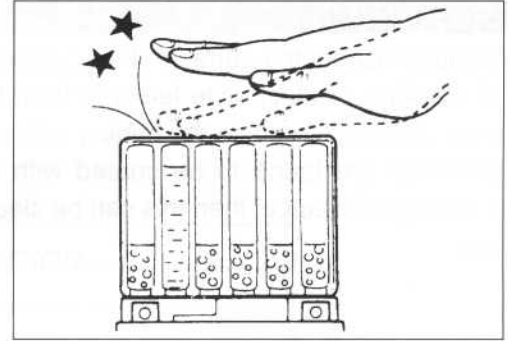


**NOTE:**

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

Never remove the container from the battery.

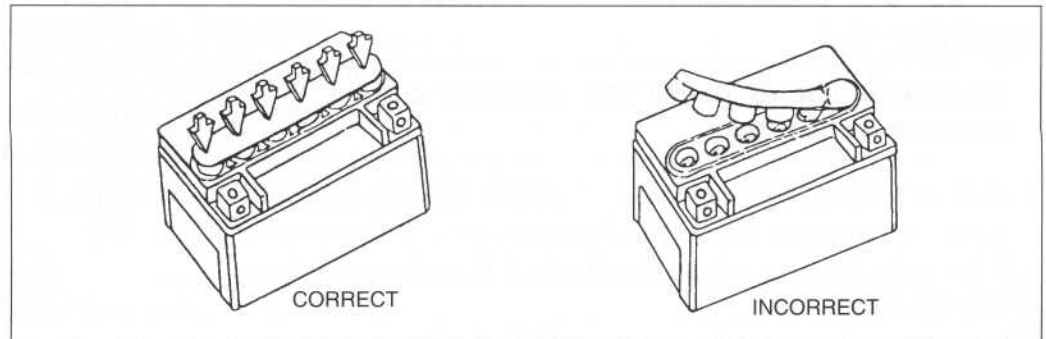
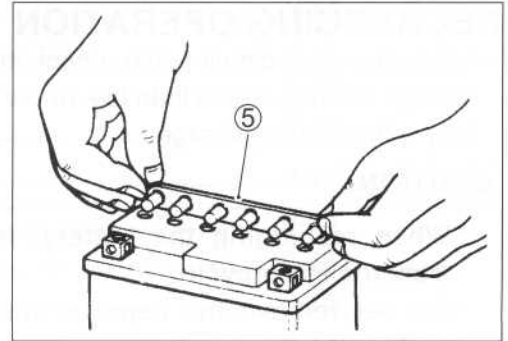
- After confirming that the electrolyte has entered the battery completely, remove the electrolyte containers from the battery. Wait for about 20 minutes.



- Insert the caps ⑤ into the filler holes, pressing in firmly so that the top of the caps do not protrude above the upper surface of the battery's top cover.

**CAUTION**

- \* Never use anything except the specified battery.
- \* Once install the caps to the battery; do not remove the caps.
- \* Do not tap the caps with a hammer when installing them.



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

**CAUTION**

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

## SERVICING

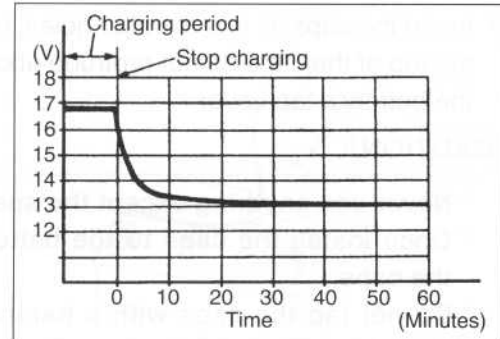
Visually inspect the surface of the battery container. If any signs of cracking or electrolyte leakage from the sides of the battery have occurred, replace the battery with a new one. If the battery terminals are found to be coated with rust or an acidic white powdery substance, then this can be cleaned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

## RECHARGING OPERATION

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

### CAUTION

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



Recharging time: 1.4 A for 5 to 10 hours or 6 A for one hour

### CAUTION

Be careful not to permit the charging current to exceed 6 A at any time.

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

