

# ELECTRICAL SYSTEM

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# ELECTRICAL SYSTEM

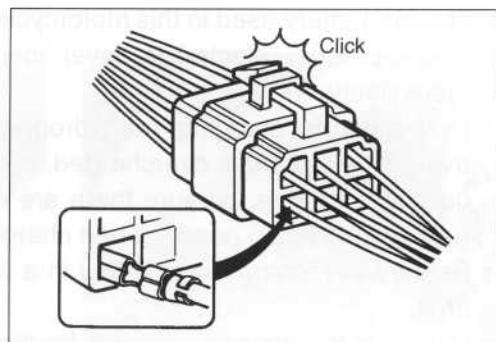
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## CAUTIONS IN SERVICING

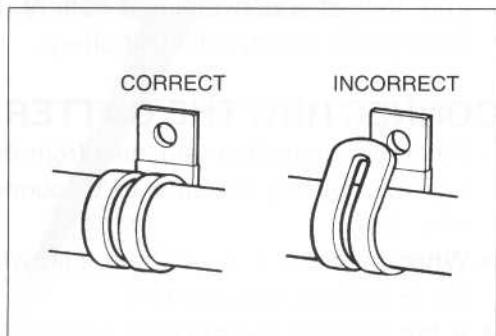
### COUPLER

- 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.



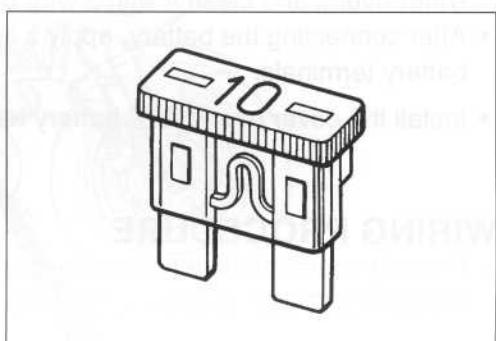
### CLAMP

- Clamp the wire harness at such positions as indicated in "WIRE HARNESS ROUTING". (8-14)
- 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.



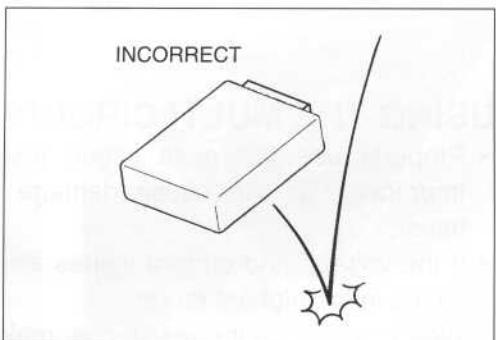
### FUSE

- 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.



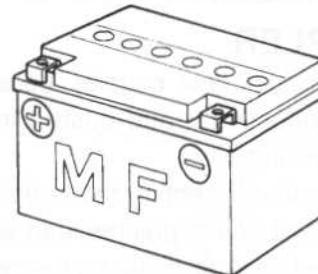
### SEMI-CONDUCTOR EQUIPPED PART

- 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.



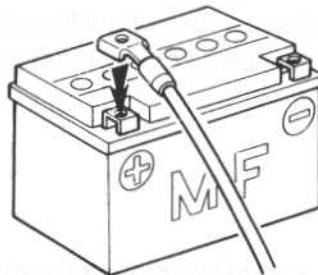
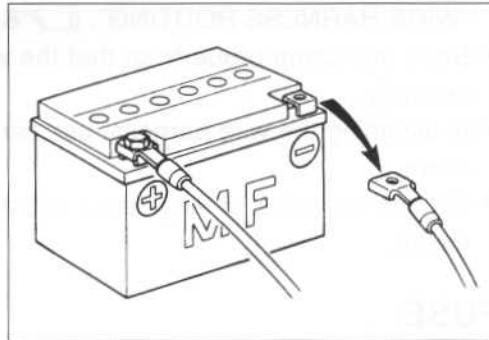
## BATTERY

- 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 HARNESS ROUTING" section. (8-14)



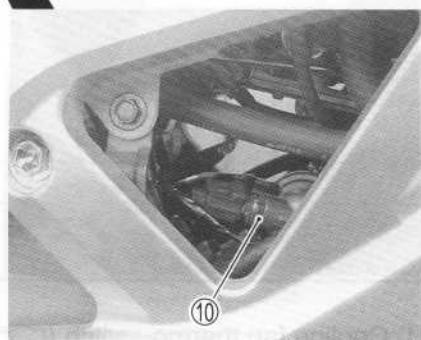
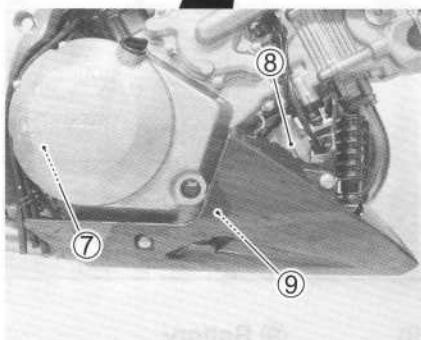
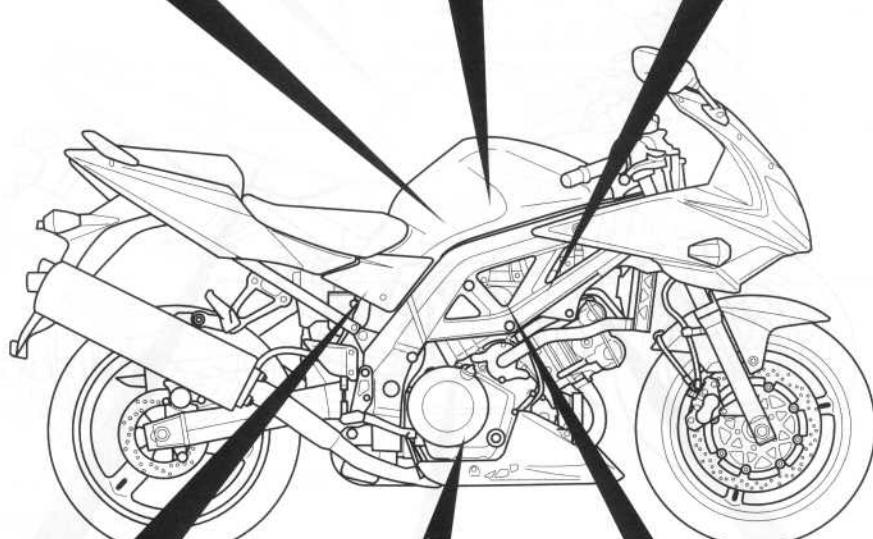
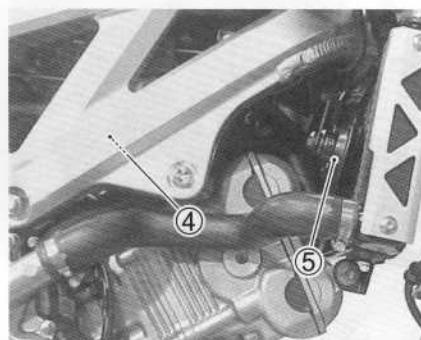
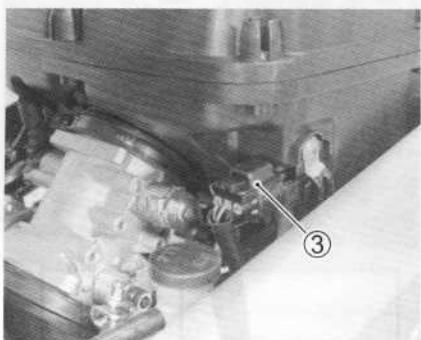
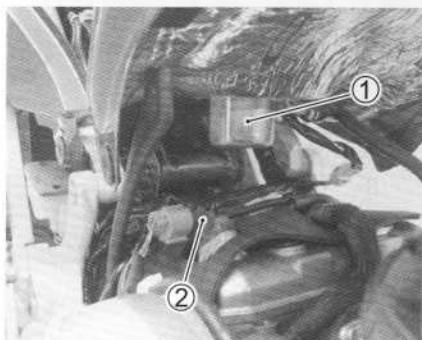
## USING THE MULTI CIRCUIT TESTER

- 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 Fuel pump (☞ 4-68)

② CMP sensor (☞ 4-92)

③ IAP sensor (☞ 4-91)

④ Ignition coil (No. 1)

⑤ Horn

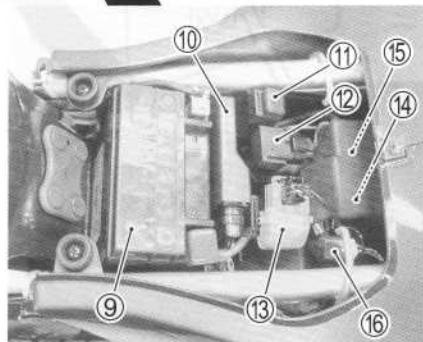
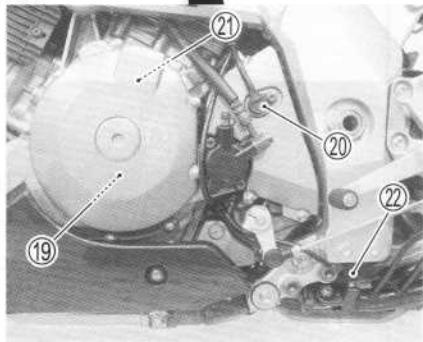
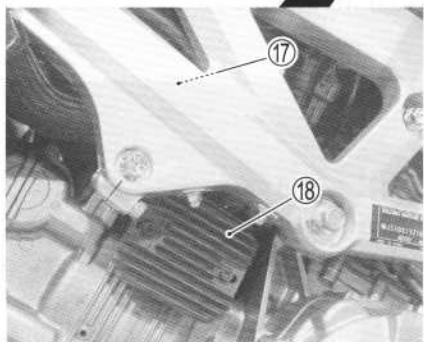
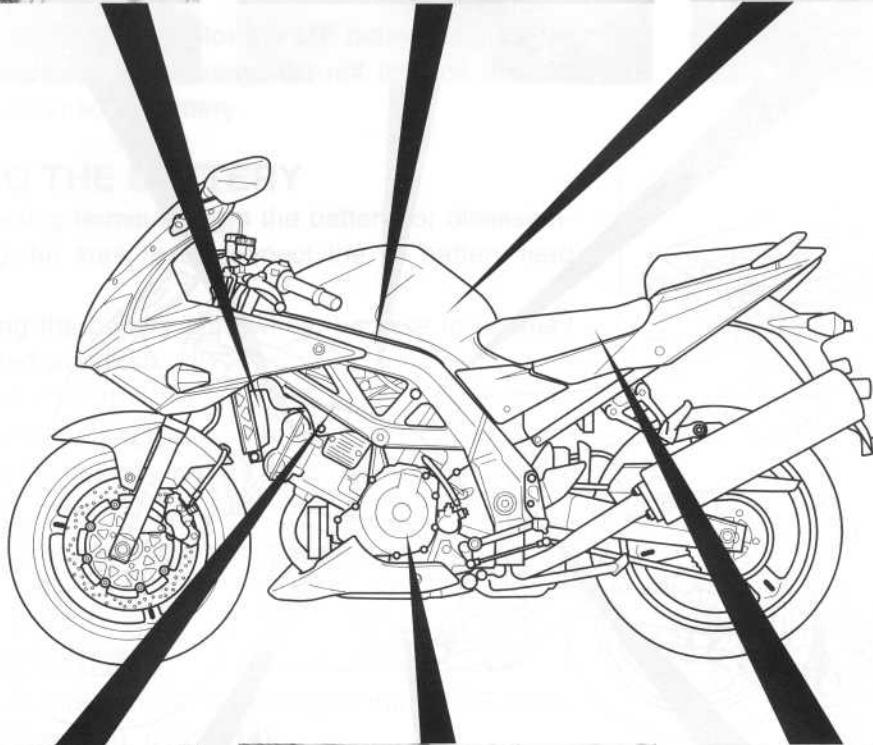
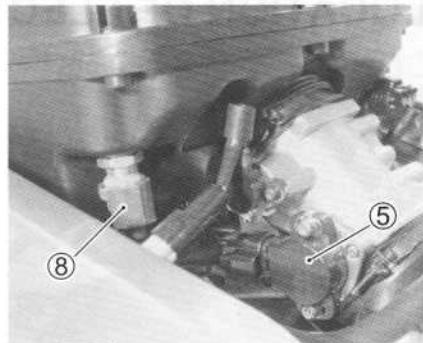
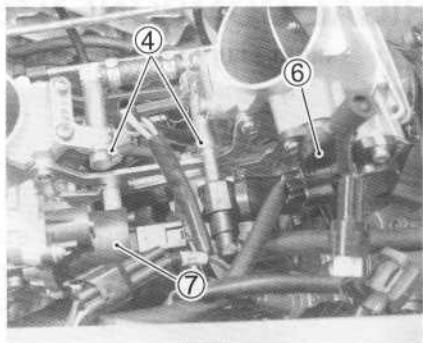
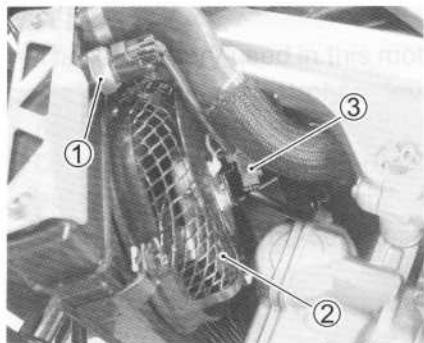
⑥ TO sensor (☞ 4-93)

⑦ Gear position switch

⑧ Starter motor

⑨ Oil pressure switch

⑩ ECT sensor (☞ 4-93)



① Cooling fan thermo-switch (☞ 5-9)

② Cooling fan (☞ 5-8)

③ Cooling fan motor switch coupler (☞ 5-8)

④ Fuel injector (☞ 4-86)

⑤ TP sensor (☞ 4-91)

⑥ STP sensor (☞ 4-91)

⑦ Secondary throttle valve actuator (☞ 4-51)

⑧ IAT sensor (☞ 4-92)

⑨ Battery

⑩ ECM (Engine Control Module)

⑪ Fuel pump relay

⑫ AP sensor (☞ 4-93)

⑬ Starter relay

⑭ Side-stand/turn signal relay

⑮ Fuse box

⑯ Mode selection switch coupler

⑰ Ignition coil (No. 2)

⑱ Regulator/rectifier

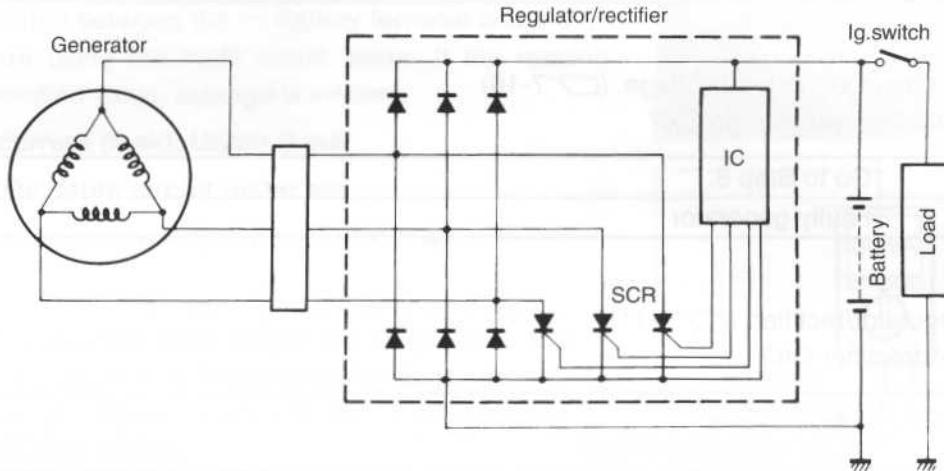
⑲ Generator

⑳ Speedometer sensor

㉑ CKP sensor

㉒ Side stand switch

## CHARGING SYSTEM



## TROUBLE SHOOTING

**Battery runs down quickly.**

### Step 1

1) Check accessories which use excessive amounts of electricity.

Are accessories being installed?

YES	Remove accessories.
NO	Go to Step 2.

### Step 2

1) Check the battery for current leaks. (☞7-9)

Is the battery for current leaks OK?

YES	Go to Step 3.
NO	<ul style="list-style-type: none"> <li>• Short circuit of wire harness</li> <li>• Faulty electrical equipment</li> </ul>

### Step 3

1) Measure the charging voltage between the battery terminals. (☞7-9)

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 Step 4.

<Continued on next page>

**Step 4**

- 1) Measure the resistance of the generator coil. (☞7-10)

Is the resistance of generator coil OK?

YES	Go to Step 5.
NO	Faulty generator coil or disconnected lead wires

**Step 5**

- 1) Measure the generator no-load voltage. (☞7-10)

Is the generator no-load voltage OK?

YES	Go to Step 6.
NO	Faulty generator

**Step 6**

- 1) Inspect the regulator/rectifier. (☞7-11)

Is the regulator/rectifier OK?

YES	Go to Step 7.
NO	Faulty regulator/rectifier

**Step 7**

- 1) Inspect the wirings.

Are the wirings OK?

YES	Faulty battery
NO	<ul style="list-style-type: none"><li>• Short circuit of wire harness</li><li>• Poor contact of couplers</li></ul>

**Battery overcharge**

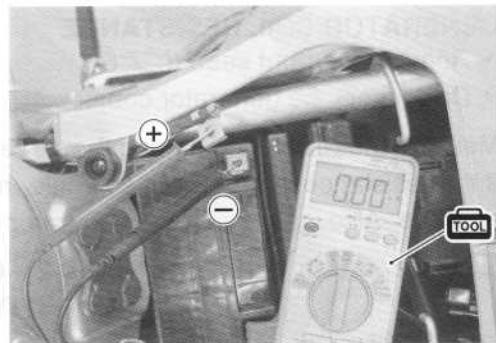
- Faulty regulator/rectifier
- Faulty battery
- Poor contact of generator lead wire coupler

## INSPECTION

### BATTERY CURRENT LEAKAGE

- Remove the front seat. (☞ 6-7)
- Turn the ignition switch to the OFF position.
- Disconnect the  $\ominus$  battery lead wire.

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



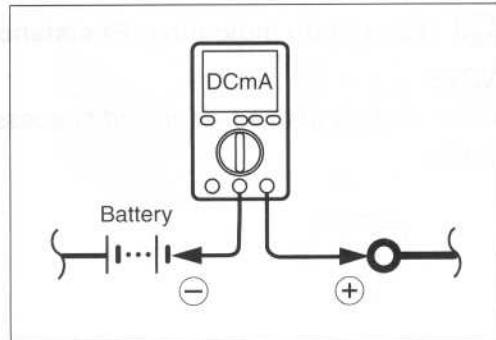
**DATA** Battery current (leak): Under 3 mA

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

**A** 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.

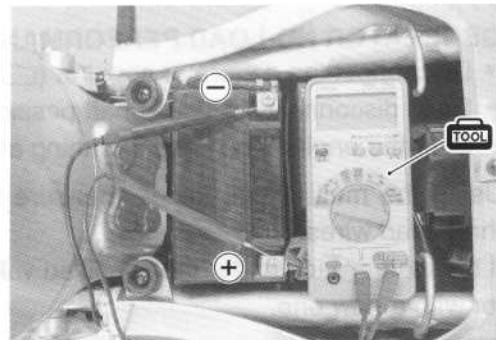


When checking to find the excessive current leakage, remove the couplers and connectors, one by one, checking each part.

### REGULATED VOLTAGE

- Remove the front seat. (☞ 6-7)
- 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. (☞ 7-11)



#### NOTE:

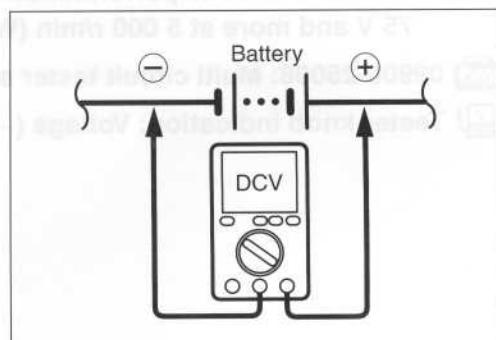
*When making this test, be sure that the battery is in fully-charged condition.*

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

14.0 – 15.5 V at 5 000 r/min

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

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



**GENERATOR COIL RESISTANCE**

- Remove the front seat. (☞ 6-7)
- Disconnect the generator coupler ①.

Measure the resistance among the three lead wires.

If the resistance is not specified value, replace the stator with a new one. Also, check that the generator core is insulated.

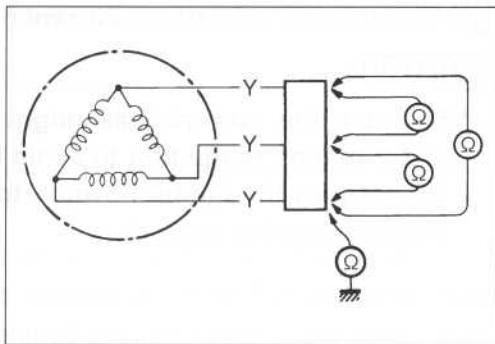
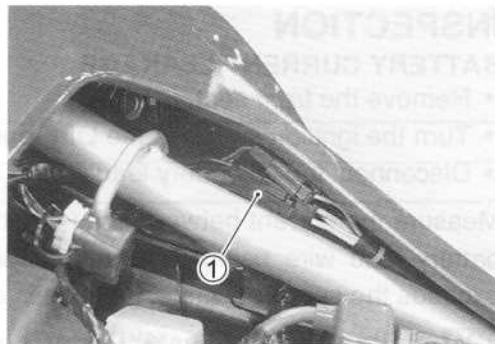
**DATA** Generator coil resistance:  $0.2 - 0.7 \Omega$  (Yellow – Yellow)  
 $\infty \Omega$  (Yellow – Ground)

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

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

**NOTE:**

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

**GENERATOR NO-LOAD PERFORMANCE**

- Disconnect the generator coupler. (☞ above)
- Don't disconnect the crankshaft position sensor coupler.
- Start the engine and keep it running at 5 000 r/min.

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

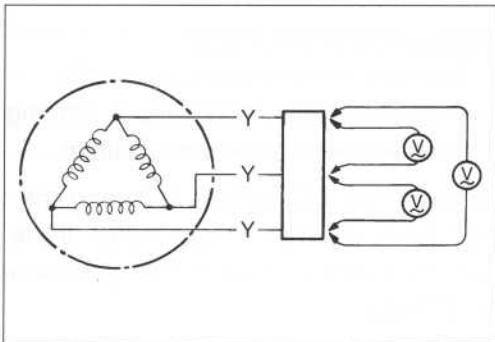
If the tester reads under the specified value, replace the generator with a new one.

**DATA** Generator no-load performance:

75 V and more at 5 000 r/min (When engine is cold)

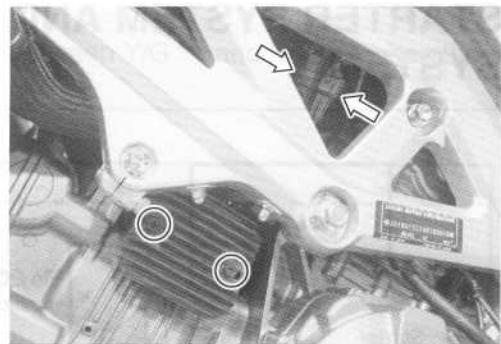
**TOOL** 09900-25008: Multi circuit tester set

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



**REGULATOR/RECTIFIER**

- Disconnect the couplers and remove the regulator/rectifier.



Measure the voltage among 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.

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

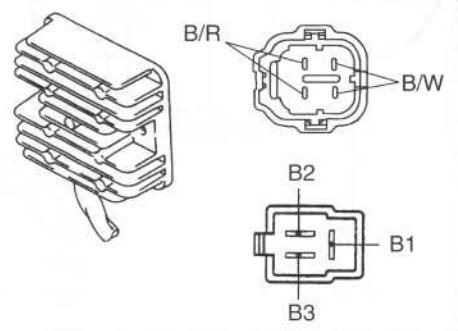
**Tester knob indication: Diode test (-↔-)**

Unit: V

		+ Probe of tester to:				
		B/R	B1	B2	B3	B/W
Probe of tester to:	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	*	*	*	*	

B: Black, B/R: Black with Red tracer

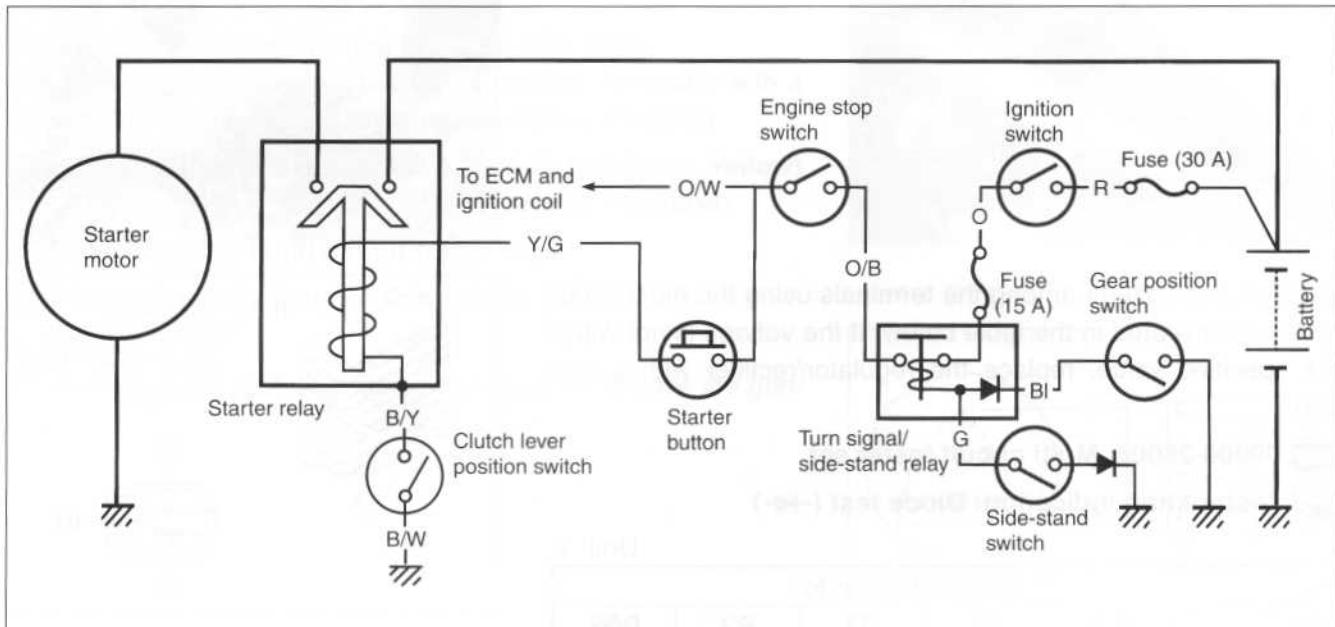
\* More than 1.4 V (tester's battery voltage)



**NOTE:**

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

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



### TROUBLE SHOOTING

**Starter motor will not run.**

#### Step 1

- 1) The transmission is in neutral. Grasp the clutch lever, turn on the ignition switch with the engine stop switch in the "RUN" position.
- 2) Listen for a click from the starter relay when the starter button is pushed.  
Is a click sound heard?

YES	Go to Step 2.
NO	Go to Step 3.

#### Step 2

- 1) Check if the starter motor runs when its terminal is connected to the  $\oplus$  battery terminal. (Do not use 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> </ul>
NO	Faulty starter motor

<Continued on next page>

**Step 3**

- 1) Measure the starter relay voltage at the starter relay connectors (between Y/G  $\oplus$  and B/Y  $\ominus$ ) when the starter button is pushed.  
Is the voltage OK?

YES	Go to Step 4.
NO	<ul style="list-style-type: none"> <li>• Faulty ignition switch</li> <li>• Faulty engine stop switch</li> <li>• Faulty clutch lever position switch</li> <li>• Faulty gear position switch</li> <li>• Faulty turn signal/side-stand relay</li> <li>• Faulty starter button</li> <li>• Poor contact of connector</li> <li>• Open circuit in wire harness</li> </ul>

**Step 4**

- 1) Check the starter relay. (☞7-16)

Is the starter relay OK?

YES	Poor contact of the starter relay
NO	Faulty starter relay

**NOTE:**

*The starter motor runs when the transmission is in 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.*

- 2) Check the side-stand switch. (☞7-17)

Is the side-stand switch OK?

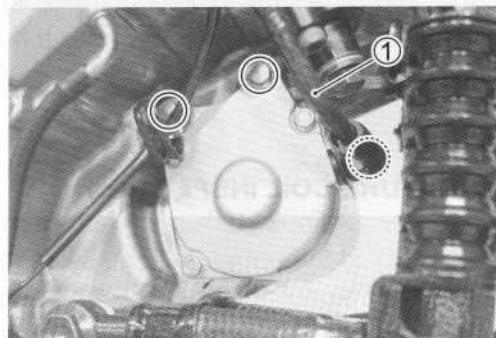
YES	<ul style="list-style-type: none"> <li>• Open circuit in wire harness</li> <li>• Poor contact of connector</li> </ul>
NO	Faulty side-stand switch

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

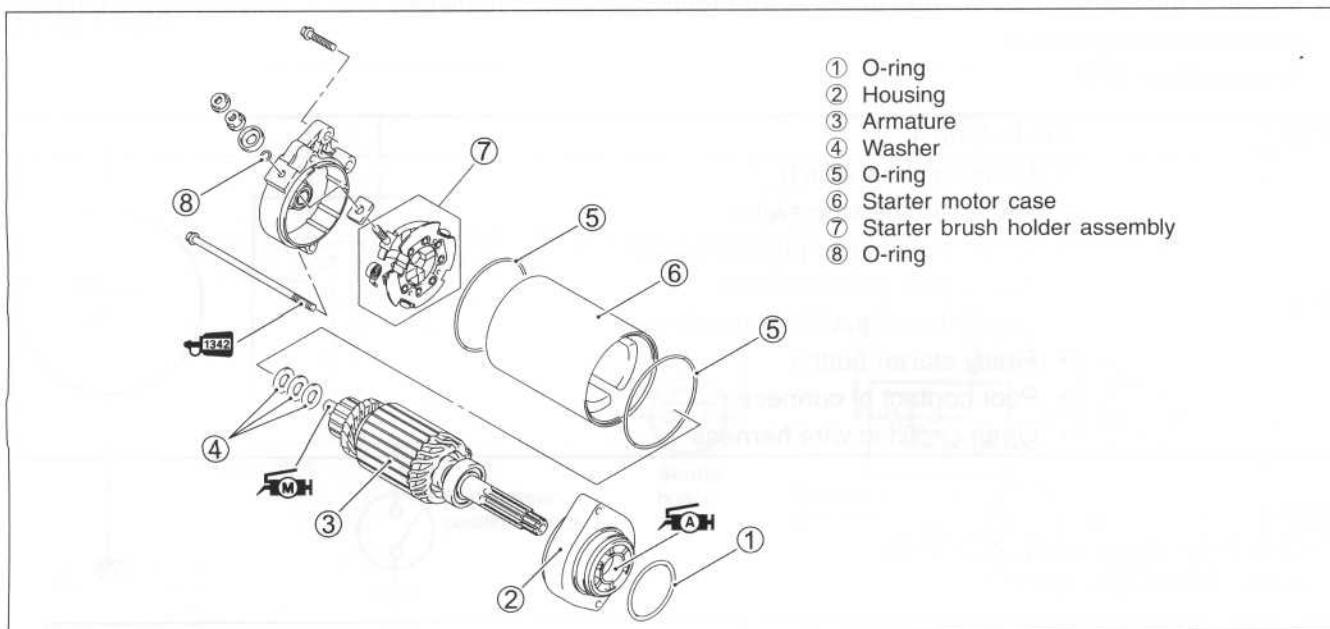
- Faulty starter torque limiter (☞3-64)

**STARTER MOTOR REMOVAL AND DISASSEMBLY**

- Remove the under cowling. (☞6-5)
- Disconnect the starter motor lead wire ① and remove the starter motor.



- Disassemble the starter motor as shown in the illustration.



## STARTER MOTOR INSPECTION

### CARBON BRUSH

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

If any damages are found, replace the brush assembly with a new one.



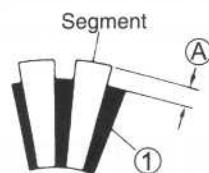
### COMMUTATOR

Inspect the commutator for discoloration, abnormal wear or undercut ①.

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.



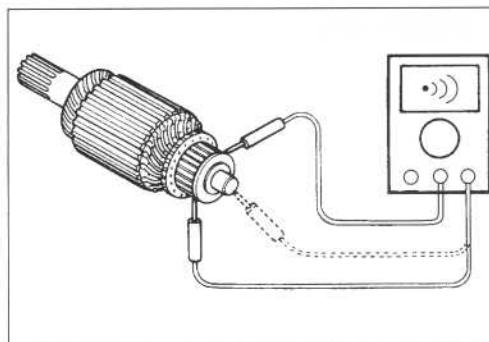
### ARMATURE COIL INSPECTION

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.

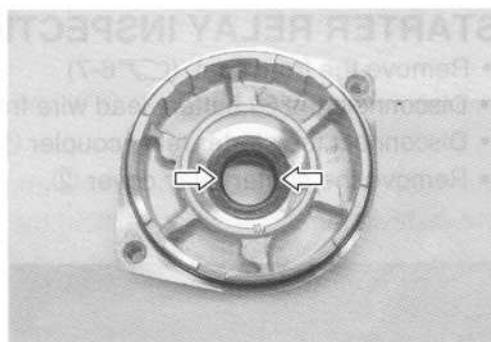
**09900-25008: Multi circuit tester set**

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



**OIL SEAL INSPECTION**

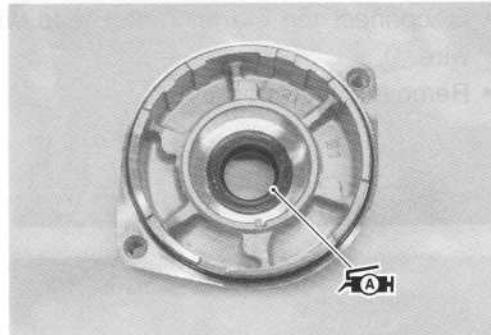
Check the oil seal lip for damage or leakage.  
If any damage is found, replace the housing end.

**STARTER MOTOR REASSEMBLY**

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

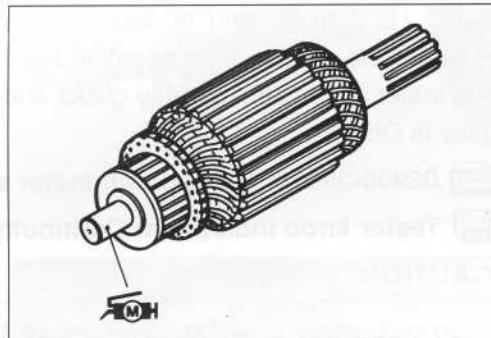
- Apply SUSUKI SUPER GREASE to the lip of the oil seal.

**AH 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.

**MH 99000-25140: SUZUKI MOLY PASTE**

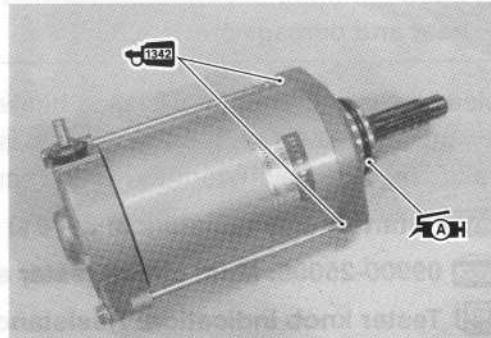


- Apply a small quantity of THREAD LOCK to the starter motor housing bolts.

**1342 99000-32050: THREAD LOCK "1342"**

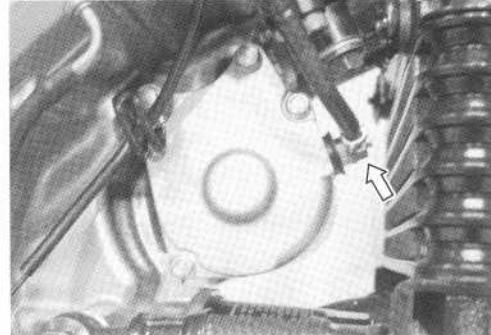
- Apply SUZUKI SUPER GREASE to the O-ring.

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



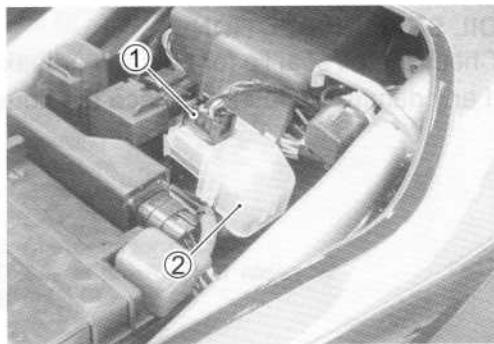
- Tighten the starter motor lead wire nut to the specified torque.

**Starter motor lead wire nut: 5 N·m (0.5 kgf·m, 3.7 lb·ft)**

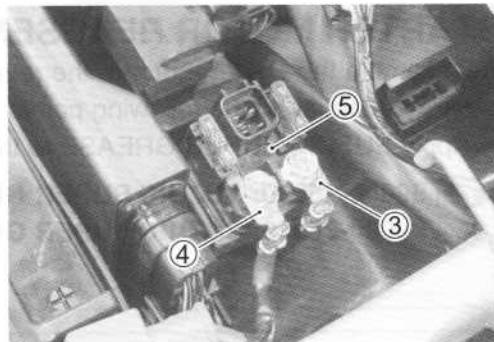


## STARTER RELAY INSPECTION

- Remove the front seat. (☞ 6-7)
- Disconnect the  $\ominus$  battery lead wire from the battery.
- Disconnect the starter relay coupler ①.
- Remove the starter relay cover ②.



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



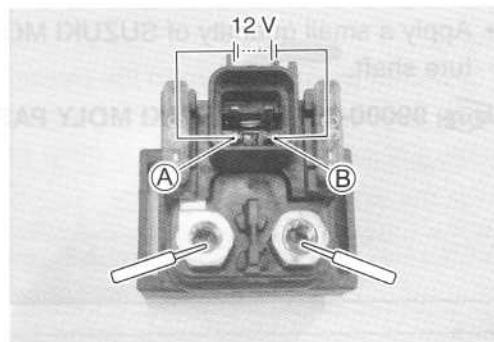
Apply 12 V to Ⓐ and Ⓑ terminals and check for continuity between the positive and negative terminals using the multi circuit tester. If the starter relay clicks and continuity is found, the relay is OK.

**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 overheat and damaged.**

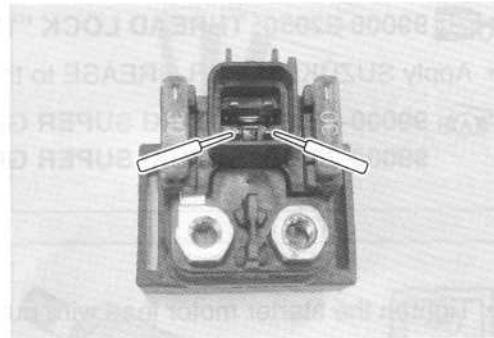


Measure the relay coil resistance between the terminals using the multi circuit tester. If the resistance is not within the specified value, replace the starter relay with a new one.

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

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

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



## 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. (☞ 4-65)
- Disconnect the side-stand switch coupler and measure the voltage between Green and Black/Yellow lead wires.

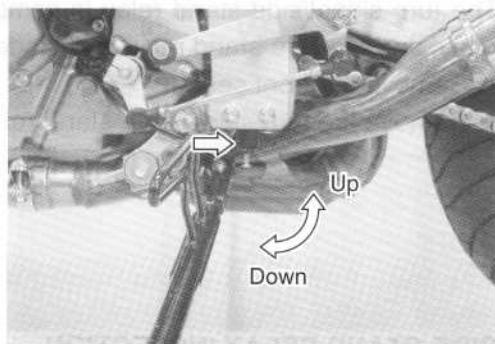
**TOOL** 09900-25008: Multi circuit tester set

 **Tester knob indication: Diode test (↔)**

	Green (+ Probe)	Black/Yellow (- 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 under 1.4 V when the tester probes are not connected, replace its battery.



### GEAR POSITION SWITCH

- Lift and support the fuel tank. (☞ 4-65)
- Disconnect the gear position switch coupler and check the continuity between Blue and Black with the transmission in "NEUTRAL".

	Blue	Black
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.

**DATA** Gear position switch voltage: 0.6 V and more

(\* Low to top gear position) (Pink – Black)  
(\* Except neutral position)



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

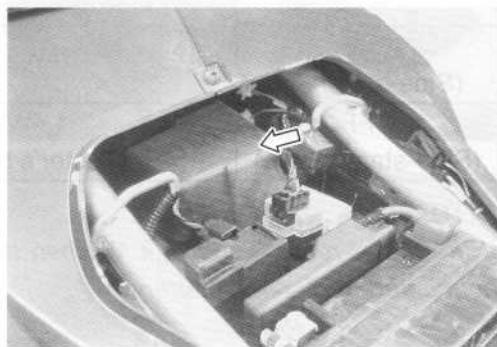
09900-25009: Needle pointed probe set

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

#### TURN SIGNAL/SIDE-STAND RELAY

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

- Remove the front seat. (☞ 6-7)
- Remove the turn signal/side-stand relay.

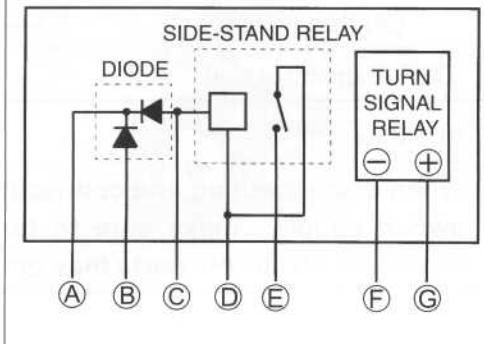
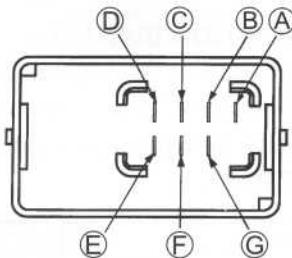


#### SIDE-STAND RELAY INSPECTION

First check the insulation between **D** and **E** terminals with the tester. Then 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.

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

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

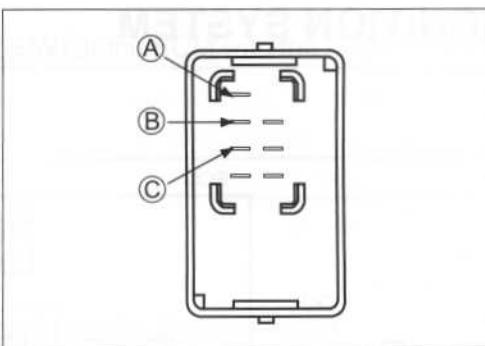


**DIODE INSPECTION**

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

Unit: V

Probe of tester to:	+ Probe of tester to:	
	(C, B)	(A)
(I)	(C, B)	More than 1.4 V (Tester's battery voltage)
(A)	0.4 – 0.6	

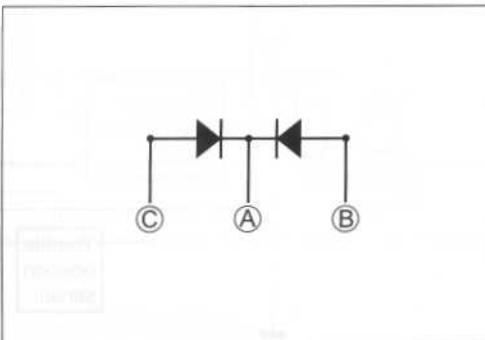


**09900-25008: Multi circuit tester set**

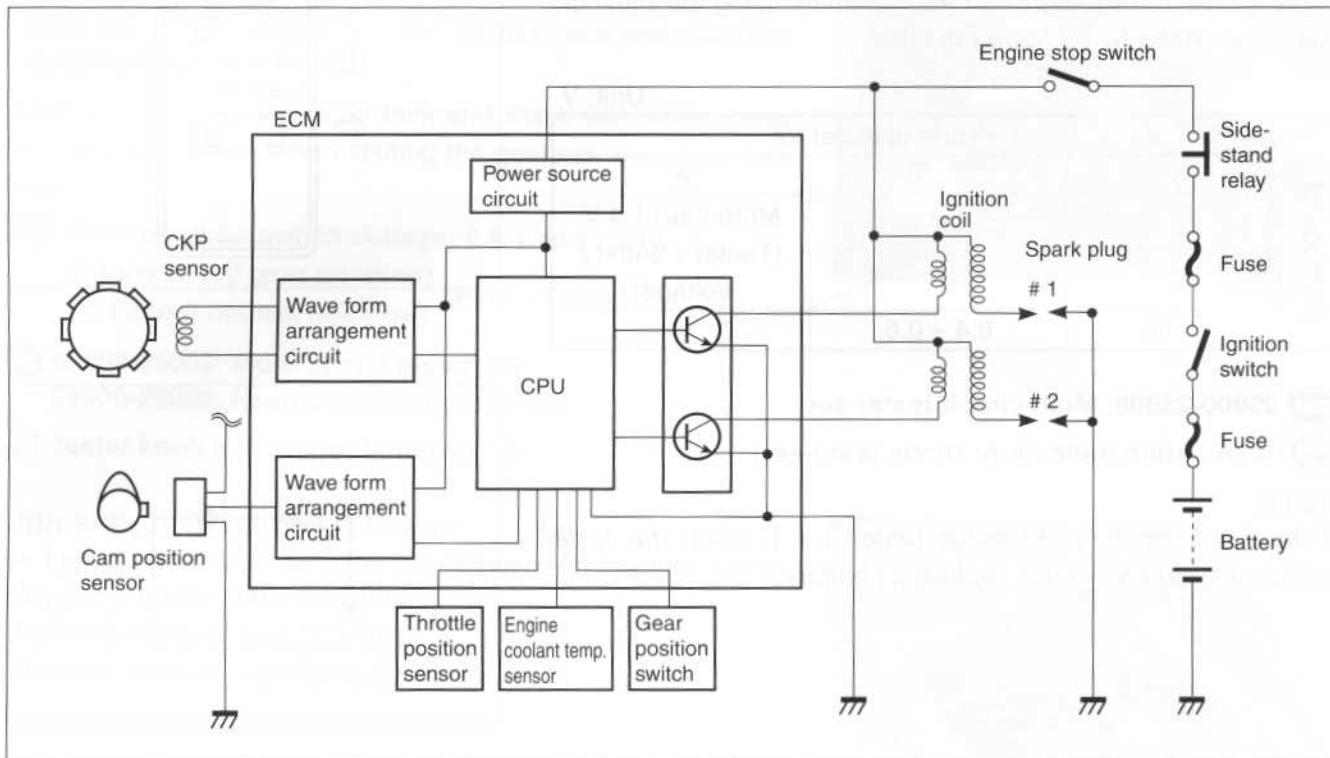
**Tester knob indication: Diode test (-<-)**

**NOTE:**

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



## IGNITION SYSTEM



**NOTE:**

The fuel cut-off circuit is incorporated in this ECM in order to prevent over-running of engine. When engine speed reaches 10 600 r/min, this circuit cuts off fuel at the fuel injector.

**CAUTION**

Under no load, the engine can run over 10 600 r/min, even if the fuel cut-off circuit is effective, and it may cause engine damage. Do not run the engine without load over 10 600 r/min at any-time.

## TROUBLESHOOTING

**NOTE:**

\* Check that the transmission is in neutral and the engine stop switch is in the "RUN" position. Pull the clutch lever. Check that the fuse is not blown and the battery is fully-charged before diagnosing.

### No spark or poor spark

**Step 1**

- 1) Check the ignition system couplers for poor connections.

Is there connection in the ignition switch couplers?

YES	Go to Step 2.
NO	Poor connection of couplers

<Continued on next page>

**Step 2**

- 1) Measure the battery voltage between input lead wires (O/W and B/W) at the ECM with the ignition switch in the "ON" position.  
Is the voltage OK?

YES	Go to Step 3.
NO	<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>

**Step 3**

- 1) Measure the ignition coil primary peak voltage. (☞ 7-22)

*NOTE:*

*This inspection method is applicable only with the multi circuit tester and the peak volt adaptor.*

Is the peak voltage OK?

YES	Go to Step 4.
NO	Go to Step 5.

**Step 4**

- 1) Inspect the spark plugs. (☞ 2-6)

Are the spark plugs OK?

YES	<ul style="list-style-type: none"> <li>• Poor connection of the spark plug cap (-s)</li> <li>• Go to Step 5.</li> </ul>
NO	Faulty spark plug (-s)

**Step 5**

- 1) Inspect the ignition coils. (☞ 7-23)

Are the ignition coils OK?

YES	Go to Step 6.
NO	Faulty ignition coil (-s)

**Step 6**

- 1) Measure the crankshaft position sensor peak voltage and its resistance.

*NOTE:*

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

Are the peak voltage and its resistance OK?

YES	<ul style="list-style-type: none"> <li>• Faulty ECM</li> <li>• Poor connection of ignition couplers</li> </ul>
NO	Faulty crankshaft position sensor

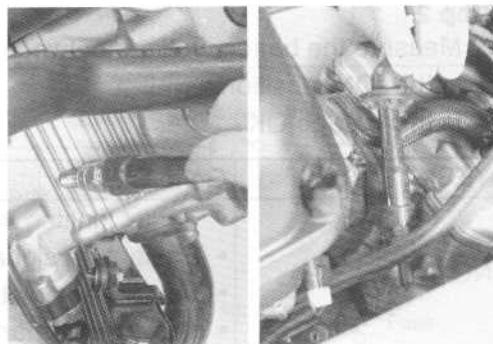
## INSPECTION

### IGNITION COIL PRIMARY PEAK VOLTAGE

- Lift and support the fuel tank. (☞ 4-65)
- Disconnect both of the spark plug caps. (☞ 2-6)
- Connect new spark plugs to each spark plug cap and ground them.

**NOTE:**

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



**CAUTION**

Avoid grounding the spark plugs and supplying the electrical shock to the cylinder head cover (magnesium parts) in order to prevent the magnesium material from damage.

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: Black terminal

- Probe: Ground

No. 2 ignition coil: + Probe: White/Blue 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 neutral.
- 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.

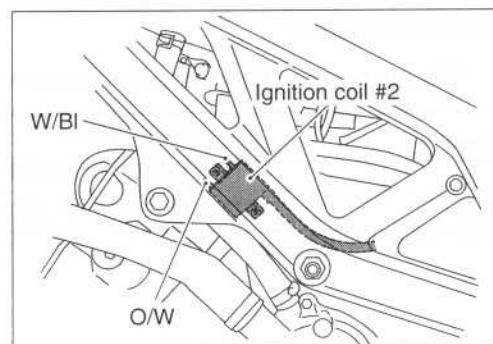
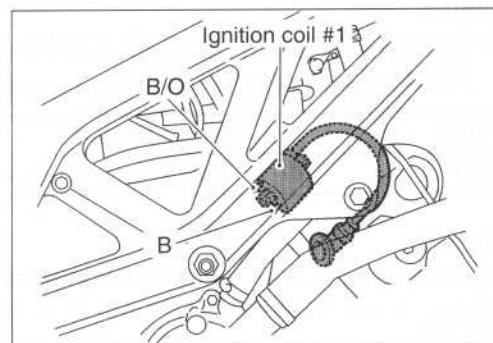
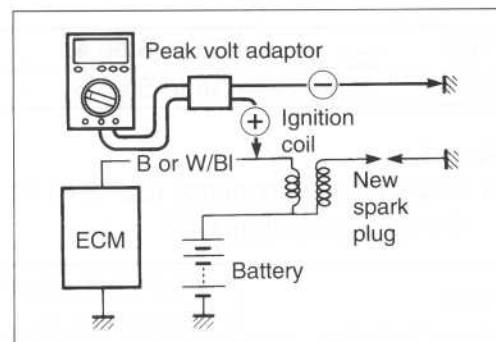
**DATA** Ignition coil primary peak voltage: 200 V and more

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

**⚠ 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. (☞ 7-23)



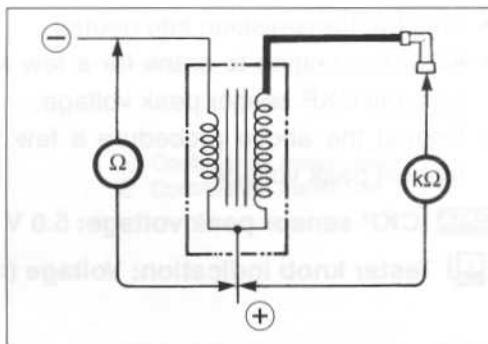
**IGNITION COIL RESISTANCE**

- Disconnect the spark plug caps.

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.

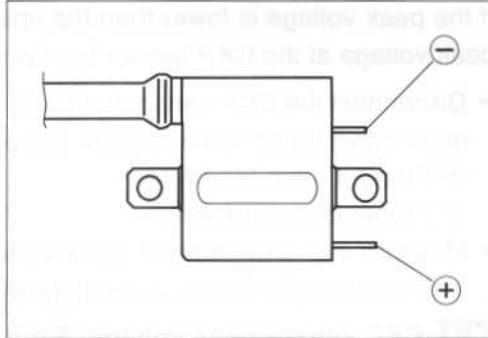
**DATA Ignition coil resistance**

- Primary:  $2.8 - 4.2 \Omega$  (+ terminal – – terminal)  
 Secondary:  $24 - 36 k\Omega$  (Plug cap – + terminal)



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

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

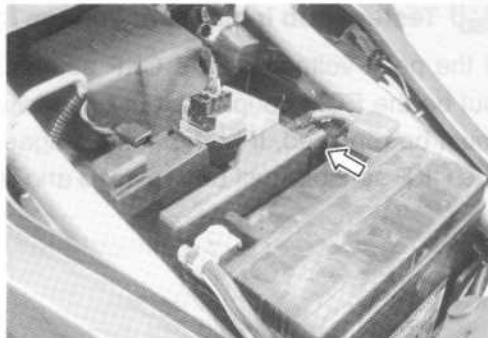
**CKP SENSOR PEAK VOLTAGE**

- Remove the front seat. (☞ 6-7)
- 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.



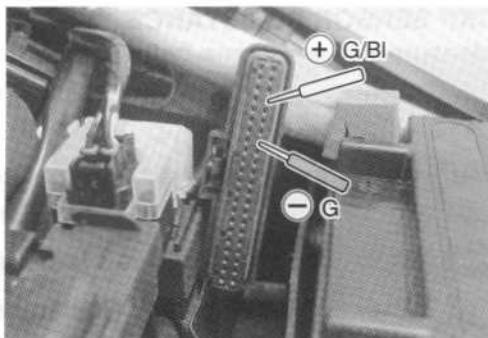
- Connect the multi circuit tester with peak volt adaptor as follows.

- + Probe: Green/Blue lead wire
- - Probe: Green lead wire

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

**CAUTION**

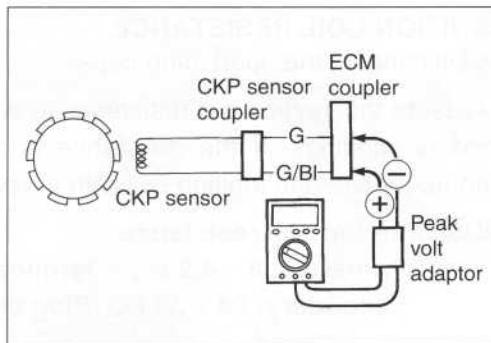
**Before using the multi circuit tester and peak volt adaptor, be sure to refer to the appropriate instruction manual.**



- Shift the transmission into neutral.
- 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.

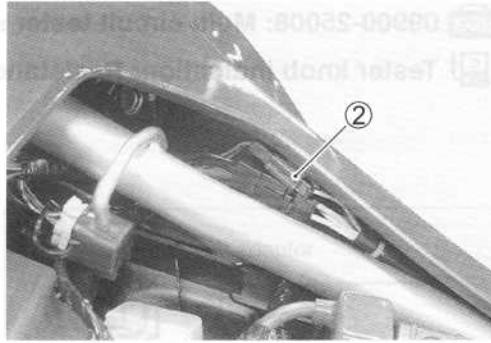
**DATA CKP sensor peak voltage: 5.0 V and more**

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



If the peak voltage is lower than the specified values, check the peak voltage at the CKP sensor lead wire coupler ②.

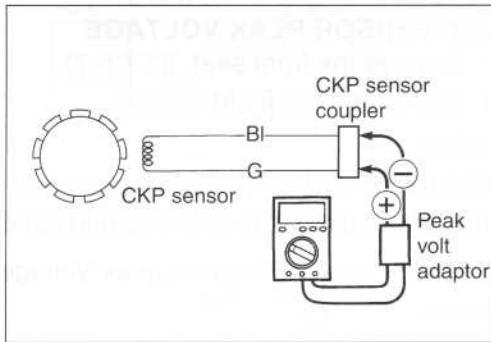
- Disconnect the CKP sensor lead wire coupler and connect the multi circuit tester with the peak volt adaptor.
- + Probe: Green lead wire
- Probe: Blue lead wire
- Measure the CKP sensor peak voltage at the CKP sensor lead wire coupler in the same manner as on the ECM coupler.



**DATA CKP sensor peak voltage: 5.0 V and more**

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

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.



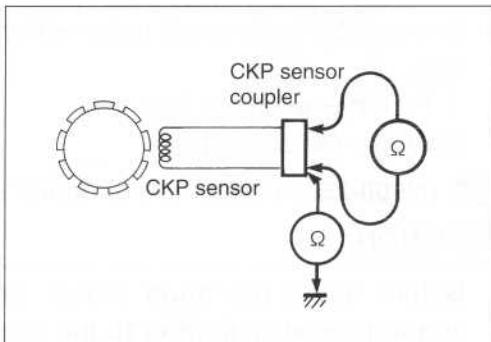
### CKP SENSOR RESISTANCE

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

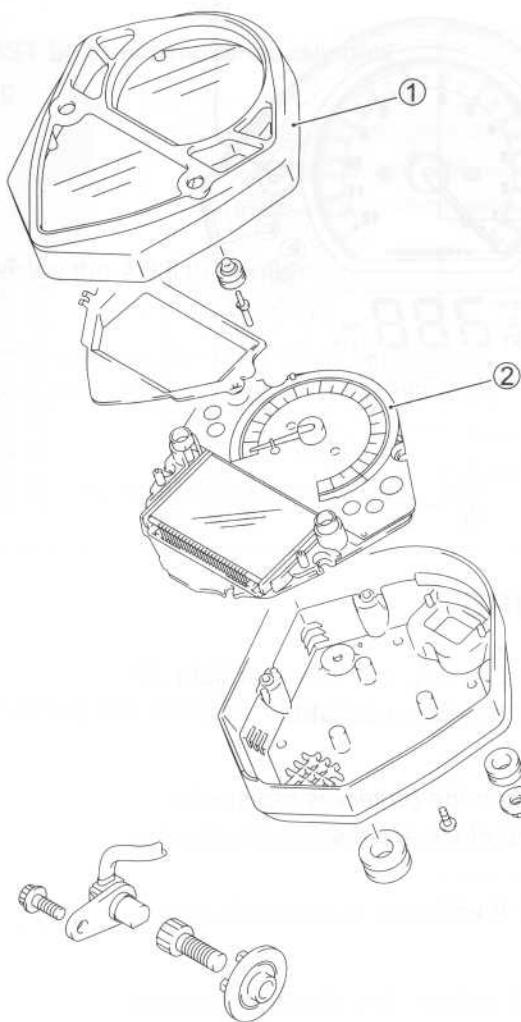
**DATA CKP sensor resistance: 130 – 240 Ω (Green – Blue)  
∞ Ω (Green – Ground)**

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

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



## COMBINATION METER



① Combination meter cover  
② Combination meter unit

### REMOVAL

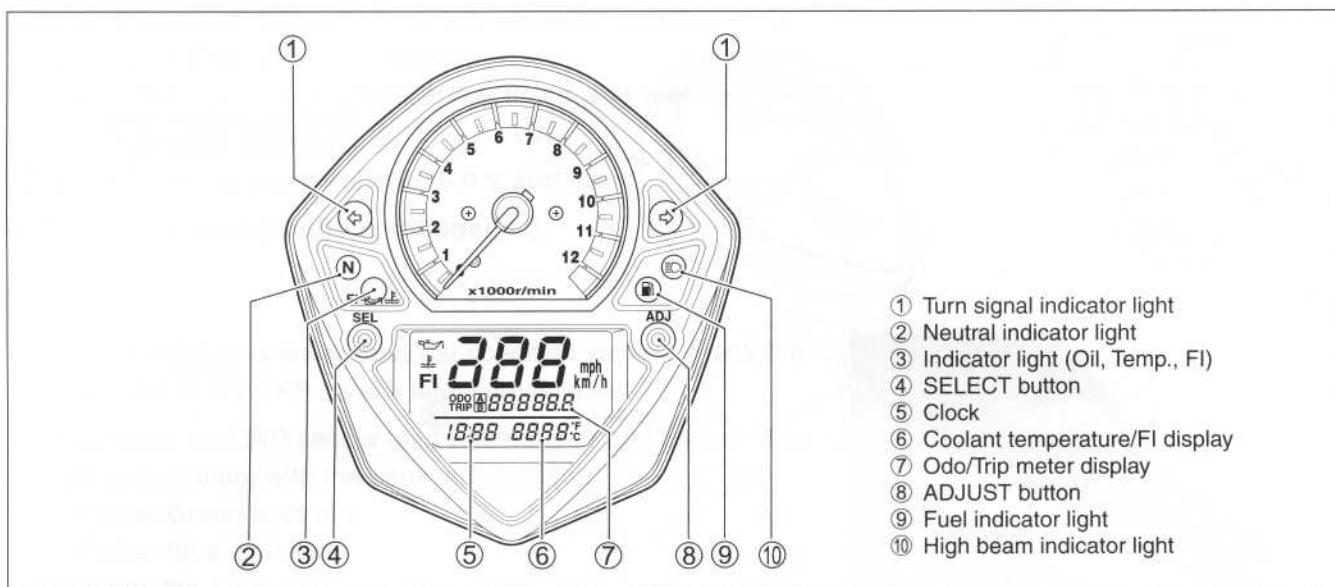
- Remove the body cowling. (☞ 6-6)
- Remove the meter panel mounting bolts and disconnect the meter coupler ①.

#### CAUTION

- \* When disconnecting and connecting the combination meter coupler, make sure to turn OFF the ignition switch, or electronic parts may get damaged.
- \* Do not attempt to disassemble the combination meter unit.



## PARTS NAME



- ① Turn signal indicator light
- ② Neutral indicator light
- ③ Indicator light (Oil, Temp., FI)
- ④ SELECT button
- ⑤ Clock
- ⑥ Coolant temperature/FI display
- ⑦ Odo/Trip meter display
- ⑧ ADJUST button
- ⑨ Fuel indicator light
- ⑩ High beam indicator light

## OPERATING PROCEDURE

### INITIAL DISPLAY

When the ignition switch is turned to ON, the indicator light ③ and ⑨ come on, then ⑨ goes out two seconds later.

#### NOTE:

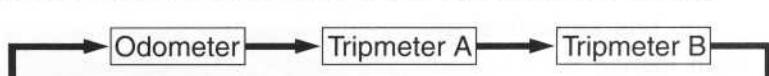
*If the power supply is cut (e.g., when the battery is replaced):*

\* The speedometer, tripmeter and clock are displayed after the initial display appears.

\* Since the clock resets to "1:00", it will need to be readjusted.

### CHANGE THE DISPLAY MODE

With each press of the SELECT button, the display changes between odometer, tripmeter A and tripmeter B as shown.



### WARNING

To avoid riding with only one hand, do not operate the buttons while riding.

### ODOMETER

- Displays the total distance travelled

### TRIPMETER

- Displays the distance travelled since the tripmeter was last reset

#### NOTE:

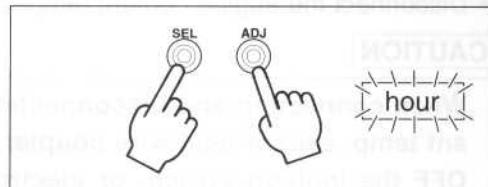
*The tripmeters A and B can be used independently.*

- Hold down the ADJUST button for two seconds to reset the tripmeter.

**CLOCK**

- Displays the time (hours and minutes) on a 12-hour clock
- Setting the time

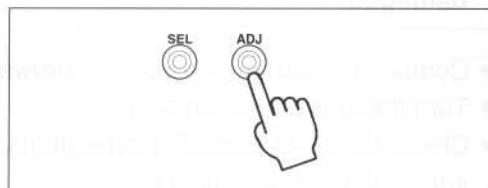
① Push the SELECT and ADJUST buttons simultaneously until the hour display starts blinking.



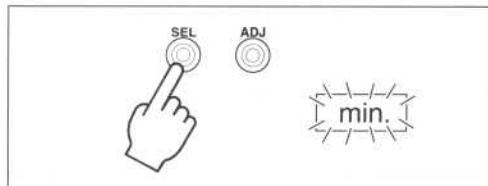
② Adjust the hour display by pushing the ADJUST button.

**NOTE:**

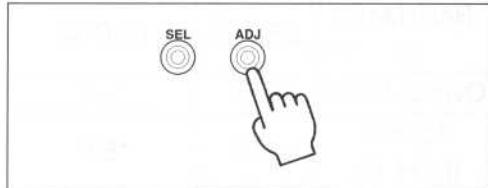
*When the ADJUST button is kept depressed for more than two seconds, the display progresses continuously.*



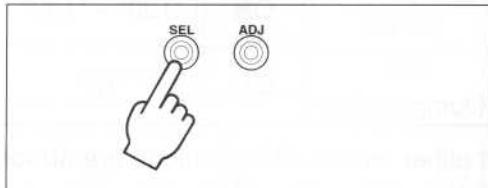
③ Push the SELECT button. The setting that is blinking can be changed.



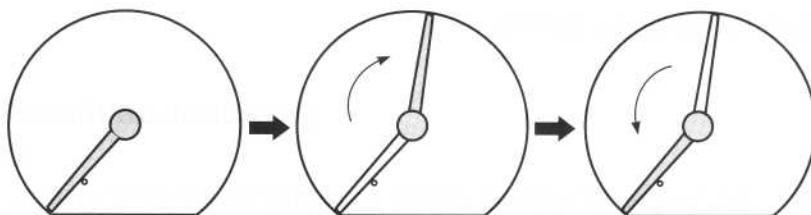
④ Adjust the minute display by pushing the ADJUST button.



⑤ Push the SELECT button to finish setting time.

**TACHOMETER**

- The tachometer pointer operates one time as shown below to reset tachometer pointer, when connecting the battery or tachometer coupler.



## ENGINE COOLANT TEMPERATURE METER AND INDICATOR

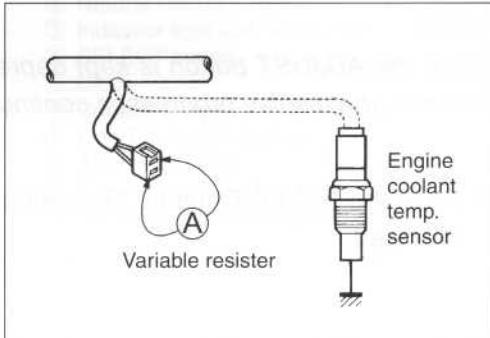
- Disconnect the engine coolant temperature sensor coupler.

### 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 LCD and LED operations when the resistance is adjusted to the specified values.



Resistance <b>A</b>	LED <b>B</b>	LCD <b>C</b>	LCD <b>D</b>	Water temperature
Over 2.45 kΩ	OFF	"--"	—	Under 19 °C
Approx. 0.811 kΩ	OFF	"50"	—	Approx. 50 °C
Approx. 0.1 kΩ	ON	"120" – "139"	Flicker	120 – 139 °C
0 Ω (Jumper wire)	ON	"HI"	Flicker	Over 140 °C

If either one or all indications are abnormal, replace the combination meter with a new one.

### NOTE:

*If the engine stop switch is turned OFF while the ignition switch is ON, the LCD displays "CHEC". But it is not malfunction.*

*This condition implies that combination meter receives no signal from the ECM.*

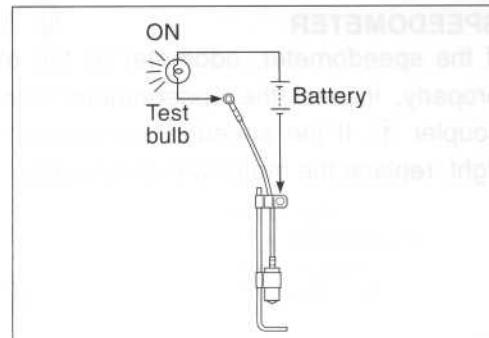
*In that case, they are restored to ordinary indication by turning the engine stop switch RUN.*



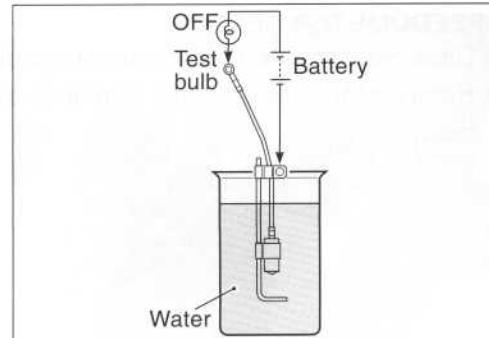
### FUEL LEVEL INDICATOR SWITCH INSPECTION

- Remove the fuel pump assembly. (☞ 4-69)

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



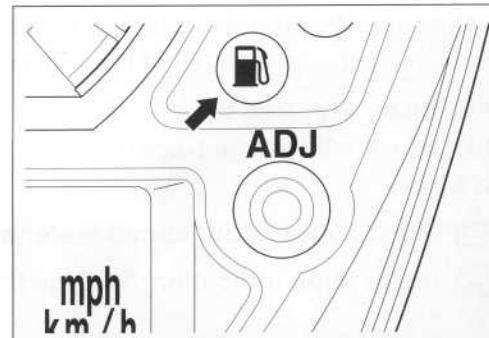
- When the switch is immersed in water under the above condition, the bulb should go out. If the bulb remains lit, replace the unit with a new one.



### FUEL LEVEL INDICATOR LIGHT INSPECTION

If the fuel level indicator light does not function properly, check the fuel level indicator switch and its lead wire/coupler.

If the fuel level indicator switch and its lead wire/coupler are all right, replace the combination meter with a new one.

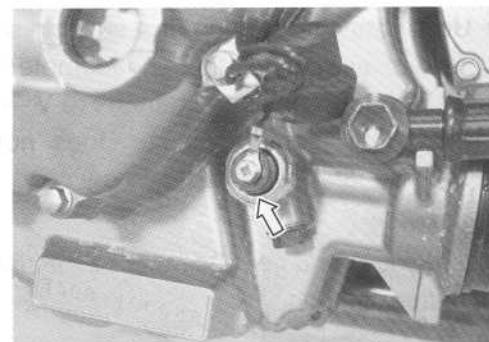


### OIL PRESSURE INDICATOR

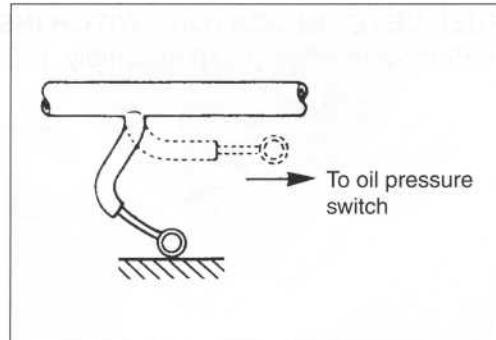
#### NOTE:

*Before inspecting the oil pressure switch, check the engine oil level. (☞ 2-15)*

- Remove the under cowling. (☞ 6-5)
- Disconnect the oil pressure switch lead wire from the oil pressure switch.
- Turn the ignition switch "ON" position.

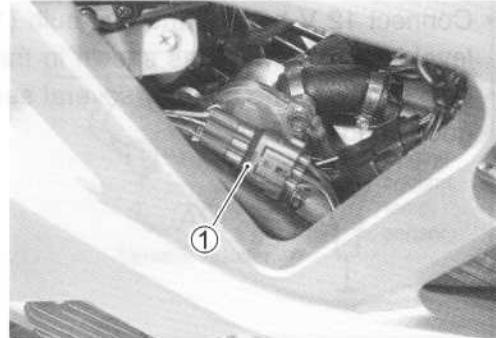


Check if the oil pressure indicator will light, when grounding the lead wire. If the oil pressure indicator does not function properly, replace the meter with a new one after checking the connection of couplers.



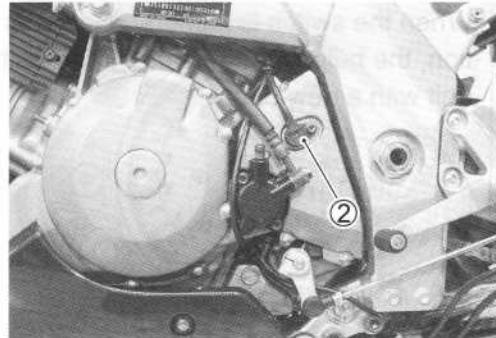
### SPEEDOMETER

If the speedometer, odometer or trip meter does not function properly, inspect the speedometer sensor and connection of coupler ①. If the speedometer sensor and connection are all right, replace the meter with a new one.



### SPEEDOMETER SENSOR

- Disconnect speedometer sensor coupler.
- Remove the speedometer sensor ② by removing its mounting bolt.



- Connect 12 V battery, 10 kΩ resistor and the multi circuit tester as shown in the right illustration.

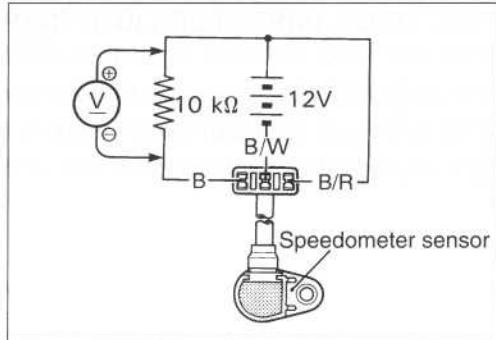
**B/R:** Black with Red tracer

**B/W:** Black with White tracer

**B:** Black

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

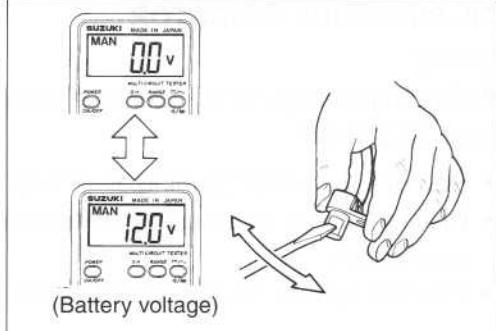
**Tester knob indication: Voltage (—)**



- Under above condition, if a suitable screwdriver touching the pick-up surface of the speedometer sensor is moved, the tester reading voltage changes (0 V → 12 V or 12 V → 0 V). If the tester reading voltage does not change, replace the speedometer sensor with a new one.

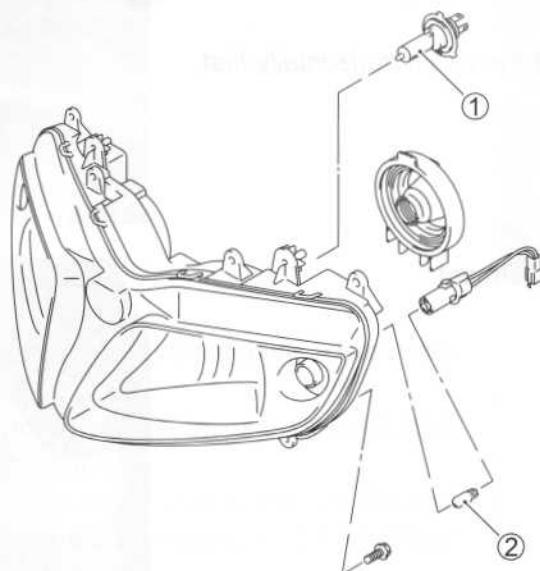
**NOTE:**

*The highest voltage reading in this test will be the same as that of battery voltage.*



## LAMPS

### HEADLIGHT AND POSITION LIGHT



① Head light  
12 V 60/55 W × 2  
② Position light  
12 V 5 W × 2

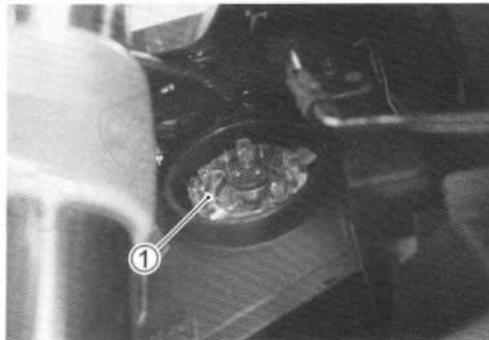
#### BULB REPLACEMENT

##### Headlight

- Remove the headlight coupler and boot.



- Unhook the holder spring ① and replace the headlight bulb.

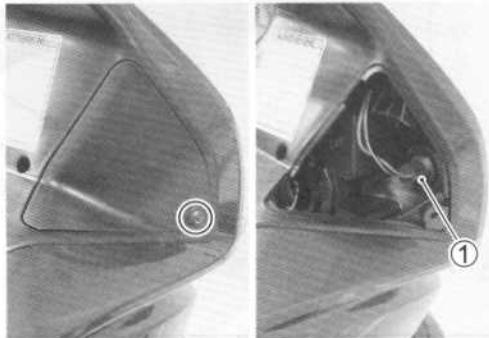


##### Position light

- Open the lids. (L & R)
- Remove the position light couplers ①. (L & R)

#### 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.



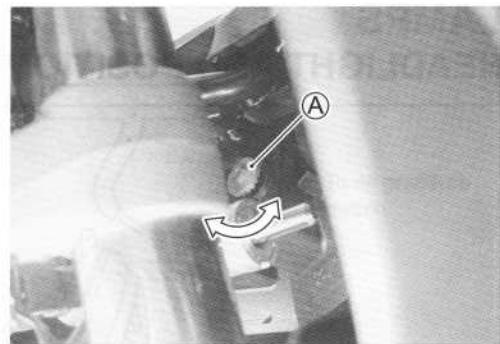
**HEADLIGHT BEAM ADJUSTMENT**

Adjust the headlight beam, both vertical and horizontal.

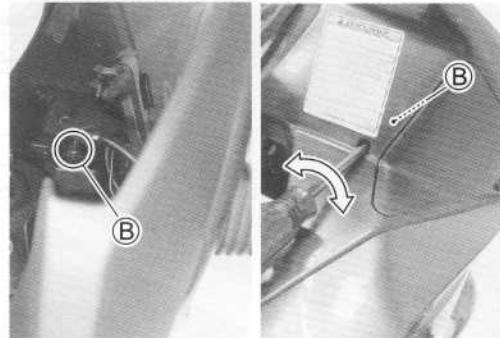
- Turn the adjuster A for the horizontal adjustment.

**NOTE:**

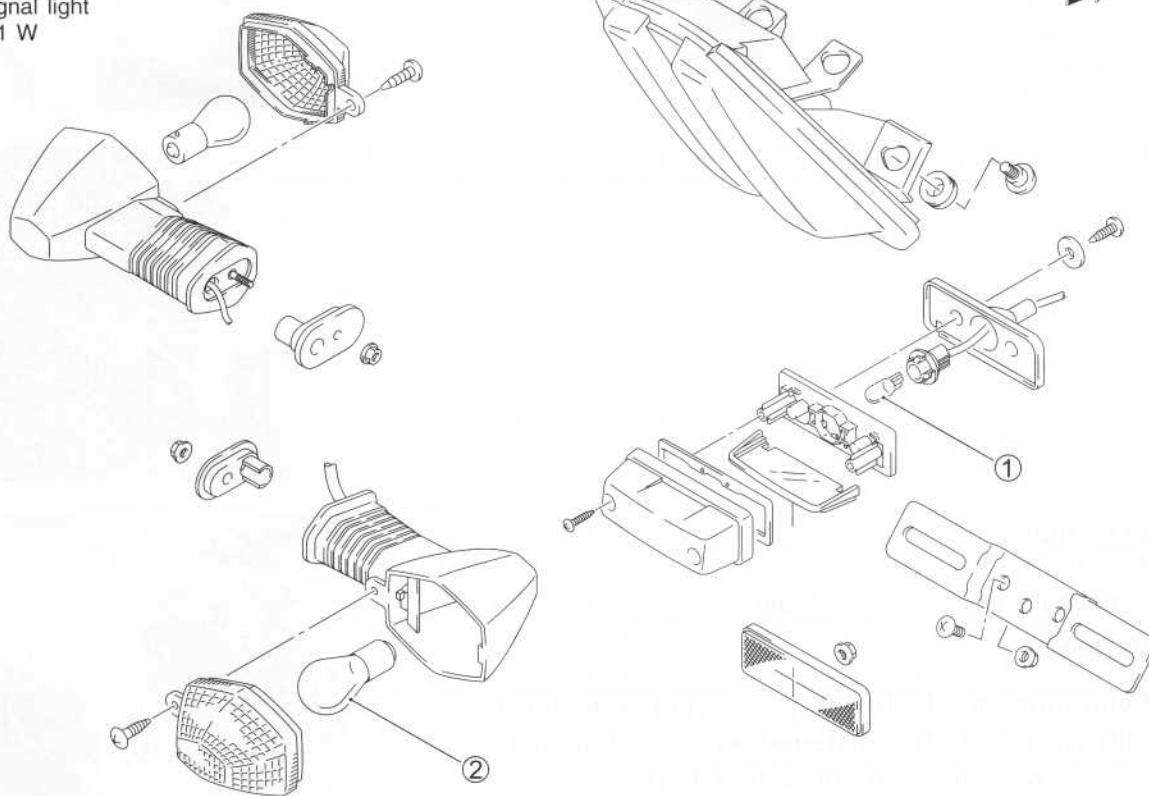
*To adjust the headlight beam, adjust the beam horizontally first, then adjust the vertically.*



- Turn the bolt B for the vertical adjustment.

**BRAKE LIGHT/TAILLIGHT, TURN SIGNAL LIGHT AND LICENCE PLATE LIGHT**

- ① Licence plate light  
12 V 5 W
- ② Turn signal light  
12 V 21 W



## 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

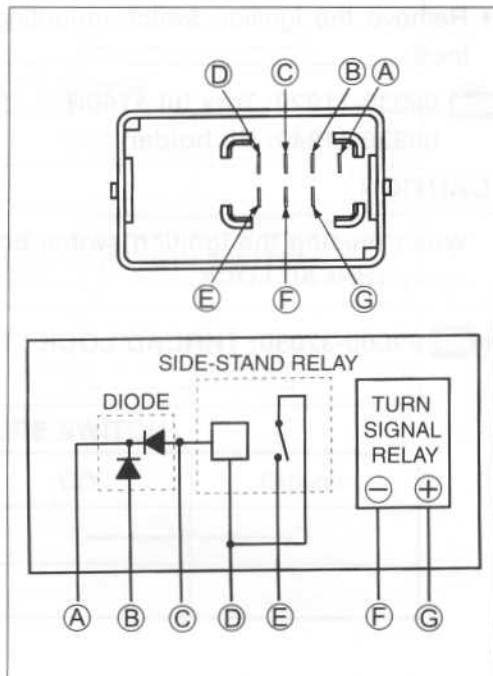
Before removing the turn signal/side-stand relay, check the operation of the turn signal light.

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 page 7-17 for the side-stand relay and diode inspection.



### STARTER RELAY

7-16

### FUEL PUMP RELAY

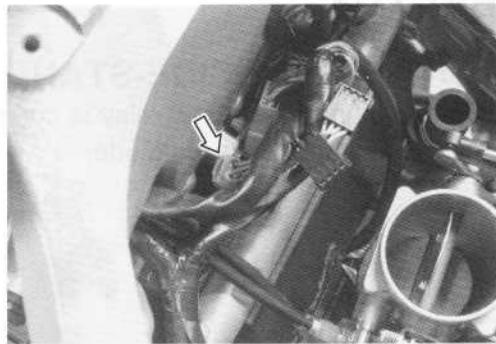
4-69

B/L	Black with Blue tracer
B/W	Black with White tracer
B/Y	Black with Yellow tracer
B/R	Black with Red tracer
G/Y	Green with Yellow tracer
O/B	Orange with Black tracer
O/G	Orange with Green tracer
O/W	Orange with White tracer
G/Y	Green with Yellow tracer
W/B	White with Black tracer
Y/W	Yellow with White tracer

## SWITCHES

### IGNITION SWITCH REMOVAL

- Lift and support the fuel tank. (☞ 4-65)
- Remove the air cleaner box. (☞ 4-75)
- Disconnect the ignition switch coupler.

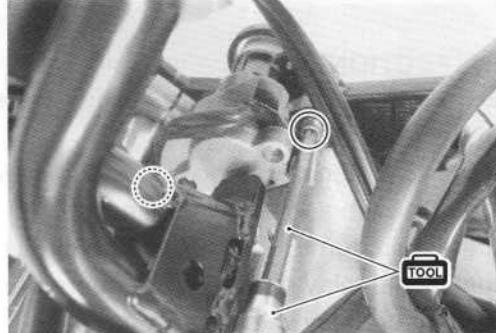


- Remove the body cowling. (☞ 6-6)
- Remove the ignition switch mounting bolts with the special tools.

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

#### CAUTION

When reusing the ignition switch bolt, clean thread and apply THREAD LOCK.



**1342 99000-32050: THREAD LOCK "1342"**

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

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

**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 SWICH**

Color Position	O/B	O/W
OFF (✗)		
RUN (Q)	○	○

**STARTER BUTTON**

Color Position	O/W	Y/G
*		
PUSH	○	○

**HORN BUTTON**

Color Position	B/Bl	B/W
*		
PUSH	○	○

**HAZARD**

Color Position	Lg	Lbl	B
ON	○	○	○
OFF			

**FRONT BRAKE SWITCH**

Color Position	B/R	B/Bl
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. (2-15)

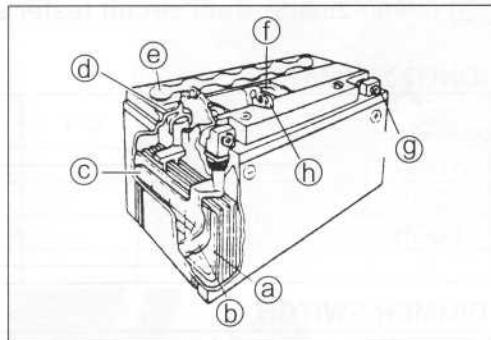
**WIRE COLOR**

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

## BATTERY SPECIFICATIONS

Type designation	FTX14-BS
Capacity	12 V, 43.2 kC (12 Ah)/10 HR

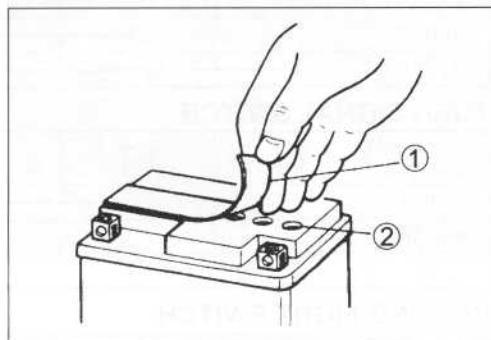
- ⓐ Anode plates
- ⓑ Separator (fiberglass plate)
- ⓒ Cathode plates
- ⓓ Upper cover breather
- ⓔ Stopper
- ⓕ Filter
- ⓖ Terminal
- ⓗ Safety valve



## INITIAL CHARGING

### FILLING ELECTROLYTE

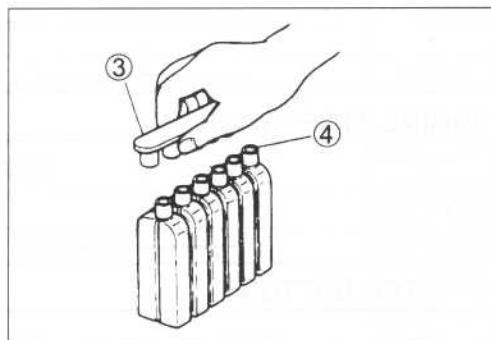
- Remove the aluminum tape ① sealing the battery electrolyte filler holes ②.



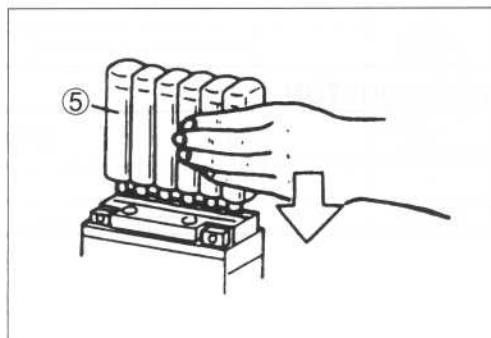
- Remove the caps ③.

**NOTE:**

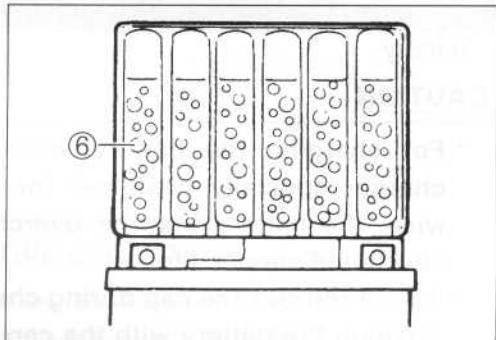
- \* After filling the electrolyte completely, use the removed caps ③ as the sealed caps of battery filler holes.
- \* Do not remove or pierce the sealed areas ④ of the electrolyte container.



- Insert the nozzles of the electrolyte container ⑤ 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 ⑥ are coming up each electrolyte container, and leave in this position for about more than 20 minutes.

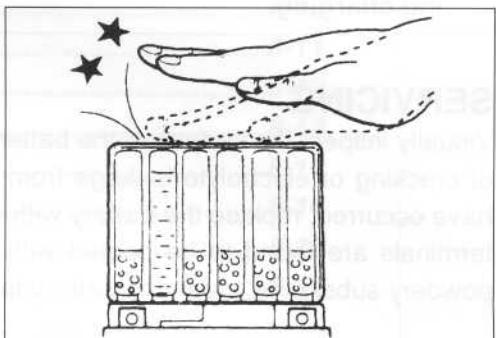


**NOTE:**

*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.*

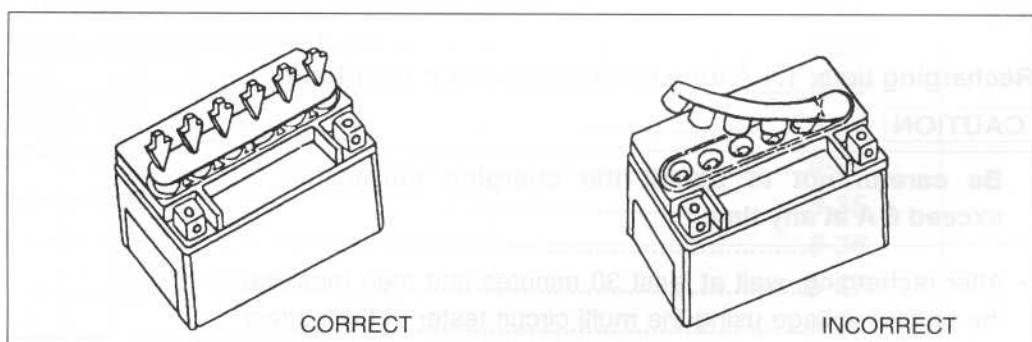
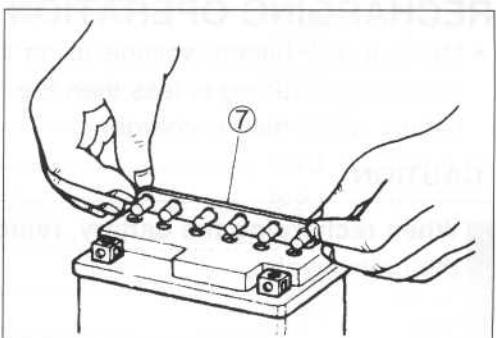
- After confirming that the electrolyte has entered the battery completely, remove the electrolyte containers from the battery. Wait for about more than 20 minutes.



- Insert the caps ⑦ 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, clean the battery terminals with sandpaper.

**RECHARGING OPERATION**

- Measure the battery voltage using the multi circuit tester. If the voltage reading is less than the 12 V (DC), recharge the battery with a battery charger.

**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.*

**Recharging time: 1.4 A for 5 to 10 hours or 6 A for 1 hour**

**CAUTION**

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

- After recharging, wait at least 30 minutes and then measure the battery voltage using the multi circuit tester. If the battery voltage is less than 12.5 V, recharge the battery again. If the battery voltage is still less than 12.5 V after recharging, replace the battery with a new one.
- When a battery is left unused for a long time, its voltage needs to be regularly measured. 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.

