

ELECTRICAL SYSTEM

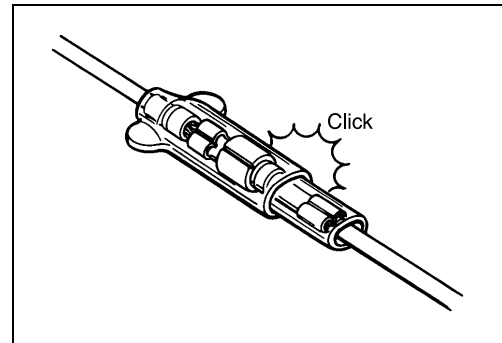
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CAUTIONS IN SERVICING

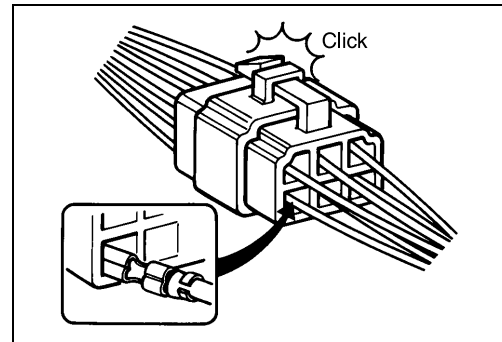
CONNECTOR

- 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.



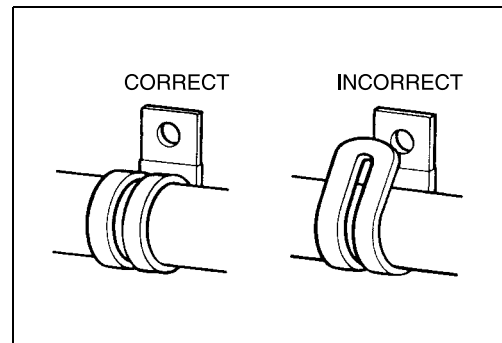
COUPLER

- 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.



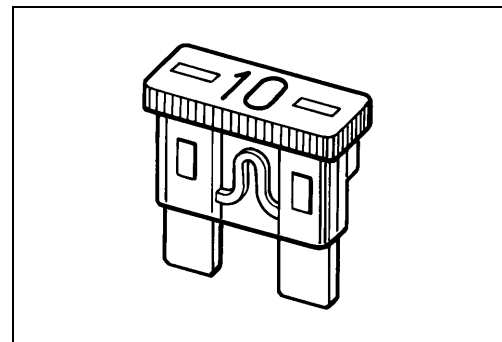
CLAMP

- Clamp the wire harness at such positions as indicated in "WIRE HARNESS ROUTING". (➡ 9-16 to 9-18)
- 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.



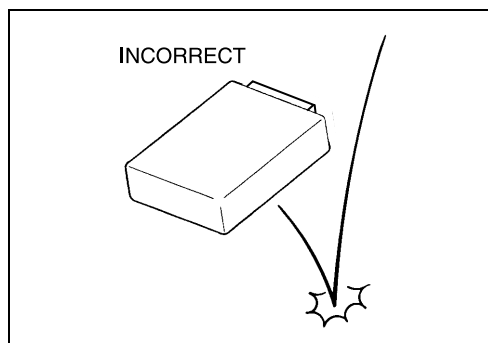
FUSE

- 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.

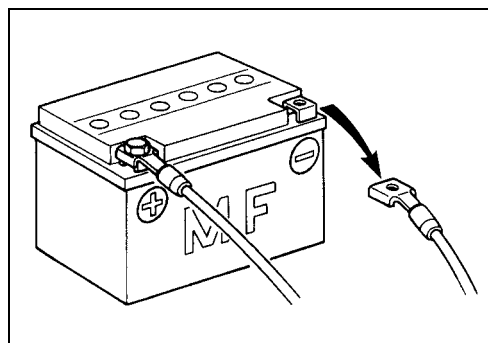


BATTERY

- 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.

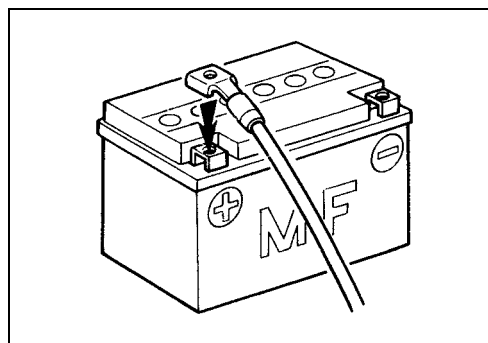
CONNECTING THE BATTERY

- 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. (9-16 to 9-18)

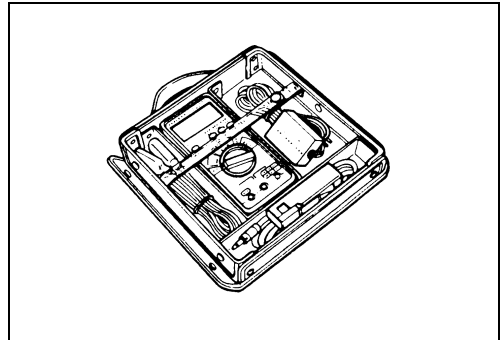


USING THE MULTI CIRCUIT TESTER

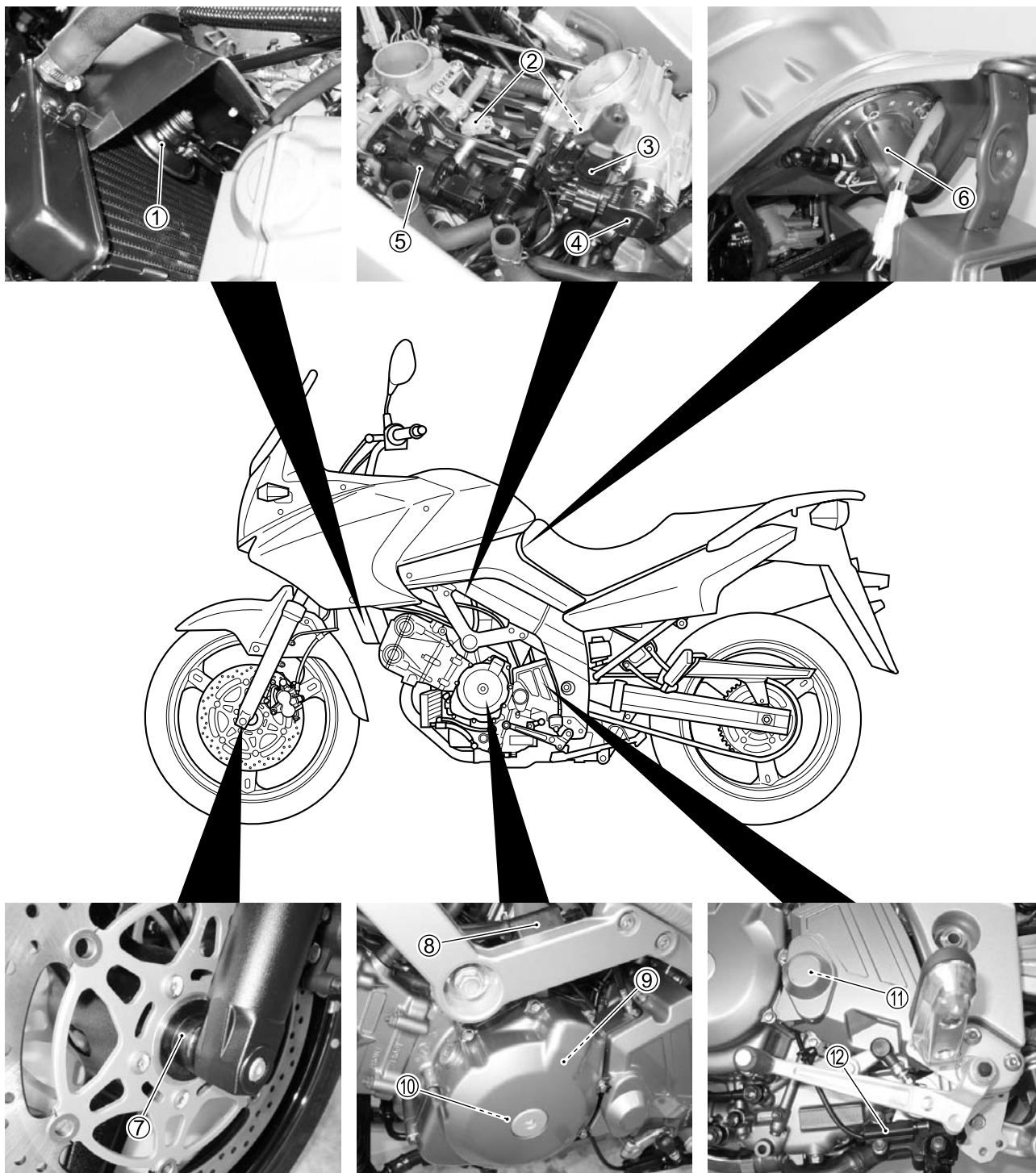
- Properly use the multi circuit tester \oplus and \ominus probes. Improper use can cause damage to the motorcycle and tester.
- If the voltage and current values are not known, begin measuring in the highest range.
- When measuring the resistance, make sure that no voltage is applied. If voltage is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

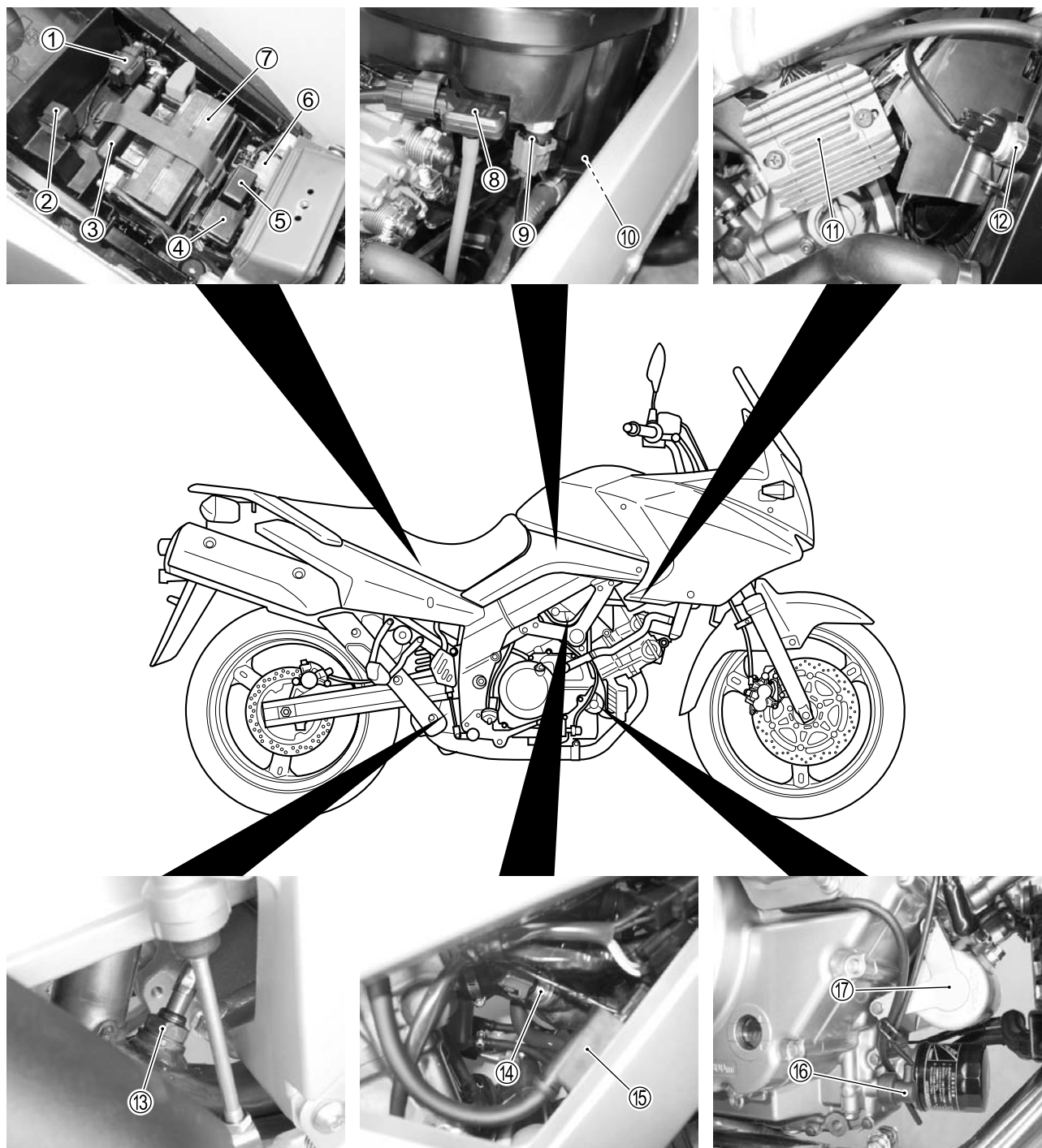


LOCATION OF ELECTRICAL COMPONENTS



- ① Horn
- ② Fuel injector (☞ 4-42)
- ③ STP sensor (☞ 4-38)
- ④ TP sensor (☞ 4-28)
- ⑤ STV actuator (☞ 4-37)
- ⑥ Fuel pump (☞ 5-9)

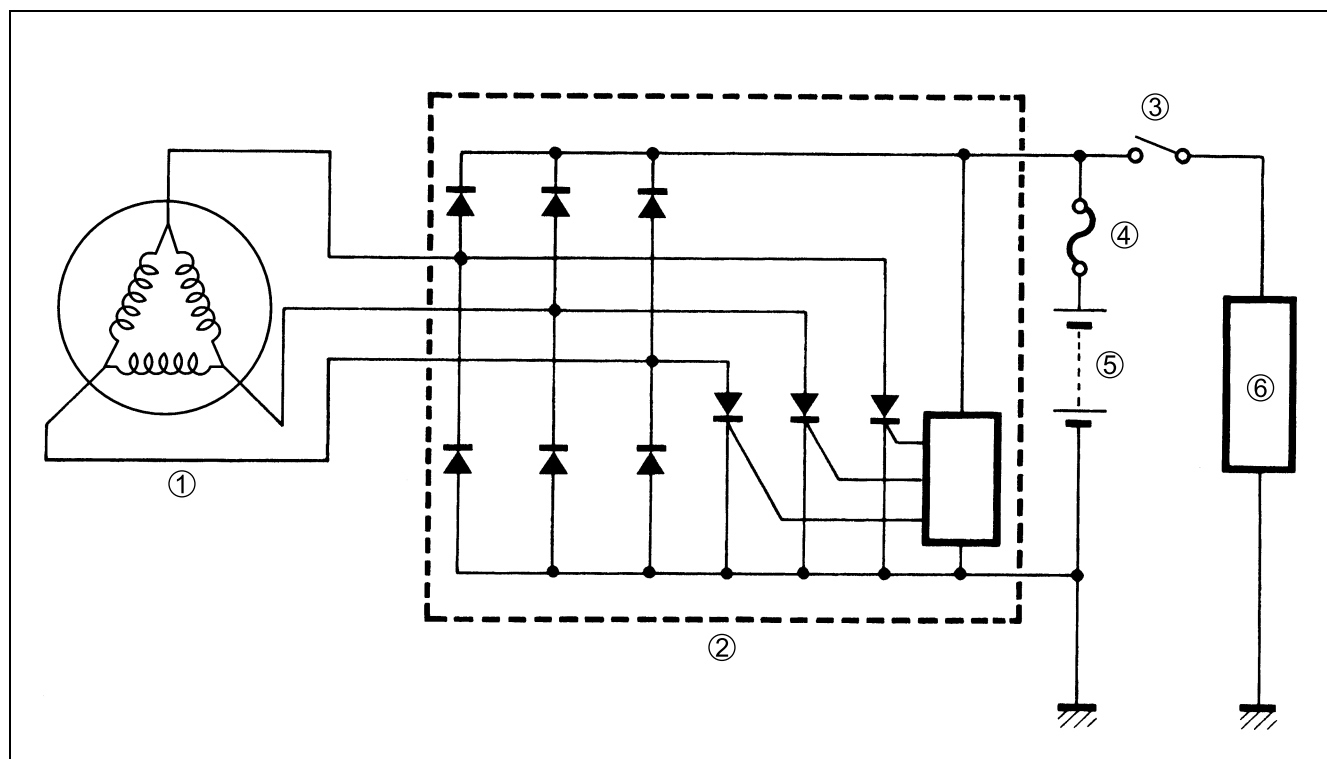
- ⑦ Speed sensor (☞ 8-35)
- ⑧ Ignition coil (No.1)
- ⑨ CKP sensor (☞ 4-23)
- ⑩ Generator (☞ 8-10)
- ⑪ Gear position switch (☞ 8-20)
- ⑫ Side-stand switch (☞ 8-20)



- ① TO sensor (📖 4-35)
- ② Fuel pump relay (📖 5-10)
- ③ ECM (Engine Control Module)
- ④ Fuse box
- ⑤ Turn signal/side-stand relay (📖 8-37)
- ⑥ Starter relay (📖 8-19)
- ⑦ Battery
- ⑧ IAP sensor (📖 4-25)
- ⑨ IAT sensor (📖 4-33)

- ⑩ PAIR control valve (📖 10-7)
- ⑪ Regulator/rectifier (📖 8-11)
- ⑫ Cooling fan thermo-switch (📖 6-9)
- ⑬ HO2 sensor (📖 4-47)
- ⑭ ECT sensor (📖 4-31)
- ⑮ Ignition coil (No.2)
- ⑯ Oil pressure switch
- ⑰ Starter motor

CHARGING SYSTEM



① Generator ② Regulator/rectifier ③ Ignition switch ④ Main fuse ⑤ Battery ⑥ Load

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"> • Short circuit of wire harness. • Faulty electrical equipment.

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"> • Faulty battery. • Abnormal driving condition.
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">• Faulty generator coil.• Disconnected lead wires.

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">• Short circuit of wire harness.• Poor contact of coupler.

Battery overcharges

Faulty regulator/rectifier.

Faulty battery.

Poor contact of generator lead wire coupler.

INSPECTION

BATTERY CURRENT LEAKAGE

- Remove the 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 ($\overline{\text{---}}$, 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 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:

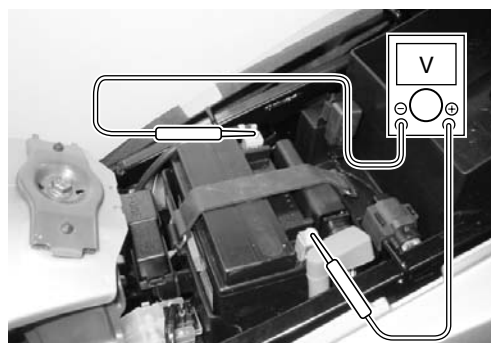
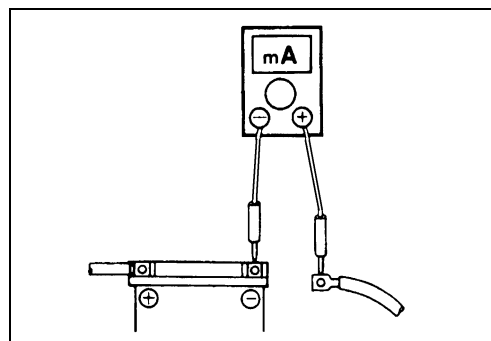
When making this test, be sure that the battery is in fully-charged condition.

TOOL 09900-25008: Multi circuit tester set

TESTER Tester knob indication: Voltage ($\overline{\text{---}}$)

DATA Charging output (Regulated voltage):

14.0 – 15.5 V at 5 000 r/min.



GENERATOR COIL RESISTANCE

- Remove the right cowling. (☞ 7-5)
- Disconnect the generator coupler ①.

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.

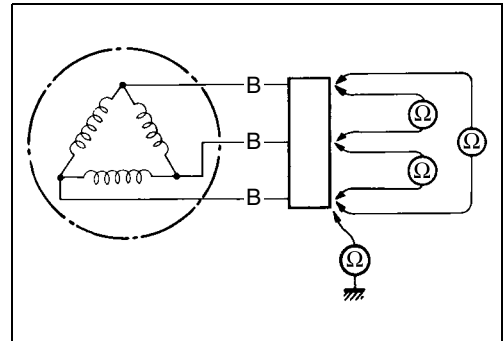
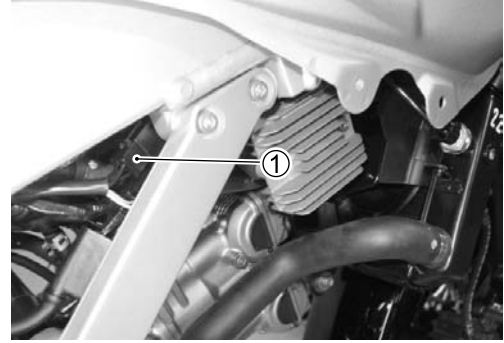
TOOL 09900-25008: Multi circuit tester set

Tester knob indication: Resistance (Ω)

DATA Generator coil resistance: 0.2 – 0.7 Ω (Black – Black)
 ∞ Ω (Black – Ground)

NOTE:

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

**GENERATOR NO-LOAD PERFORMANCE**

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

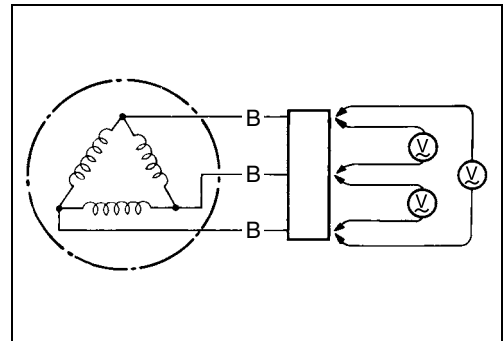
Using the multi circuit tester, measure the voltage between three lead wires.

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

TOOL 09900-25008: Multi circuit tester set

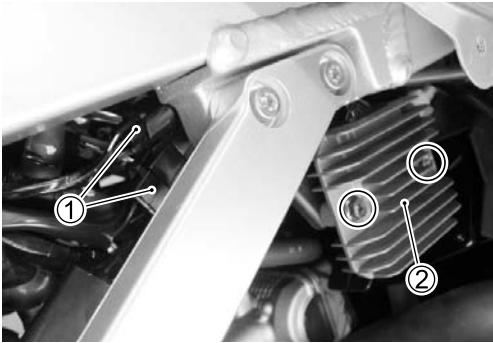
Tester knob indication: Voltage (V)

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



REGULATOR/RECTIFIER

- Remove the right cowling. (➡7-5)
- Disconnect the regulator/rectifier couplers ①.
- Remove the regulator/rectifier ②.



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.

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

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

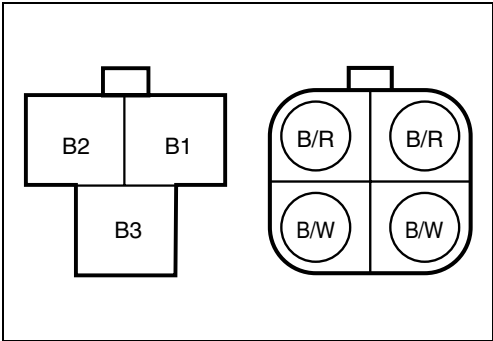
Unit: V

		⊕ 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	*	*	*	*	

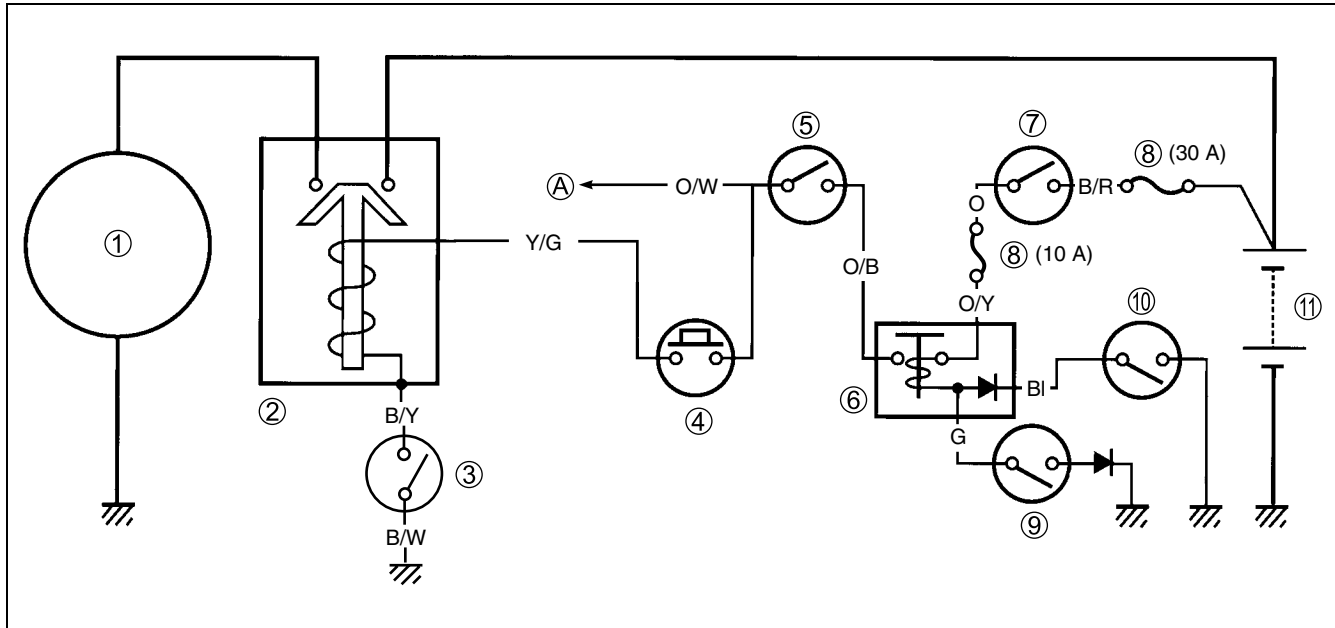
* 1.4 V and more (tester's battery voltage)

NOTE:

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



STARTER SYSTEM AND SIDE-STAND/IGNITION INTERLOCK SYSTEM



- ① Starter motor ② Starter relay ③ Clutch switch ④ Starter button ⑤ Engine stop switch
 ⑥ Turn signal/side-stand relay ⑦ Ignition switch ⑧ Fuse ⑨ Side-stand switch
 ⑩ Gear position switch ⑪ Battery A To ECM and ignition coil.

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"> Faulty starter relay. Loose or disconnected starter motor lead wire. Loose or disconnected between starter relay and ⊕ battery terminal.
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"> • Faulty gear position switch. • Faulty starter button. • Faulty engine stop switch. • Faulty turn signal/side-stand relay. • Faulty ignition switch. • Faulty clutch switch. • Faulty side-stand switch. • Improper connector contact. • Open circuit in wire harness.

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?

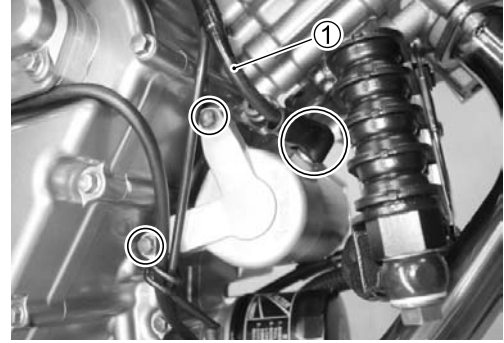
YES	<ul style="list-style-type: none"> • Open circuit in wire harness. • Poor contact of connector.
NO	<ul style="list-style-type: none"> • Faulty side-stand switch.

Engine does not turn though the starter motor runs.

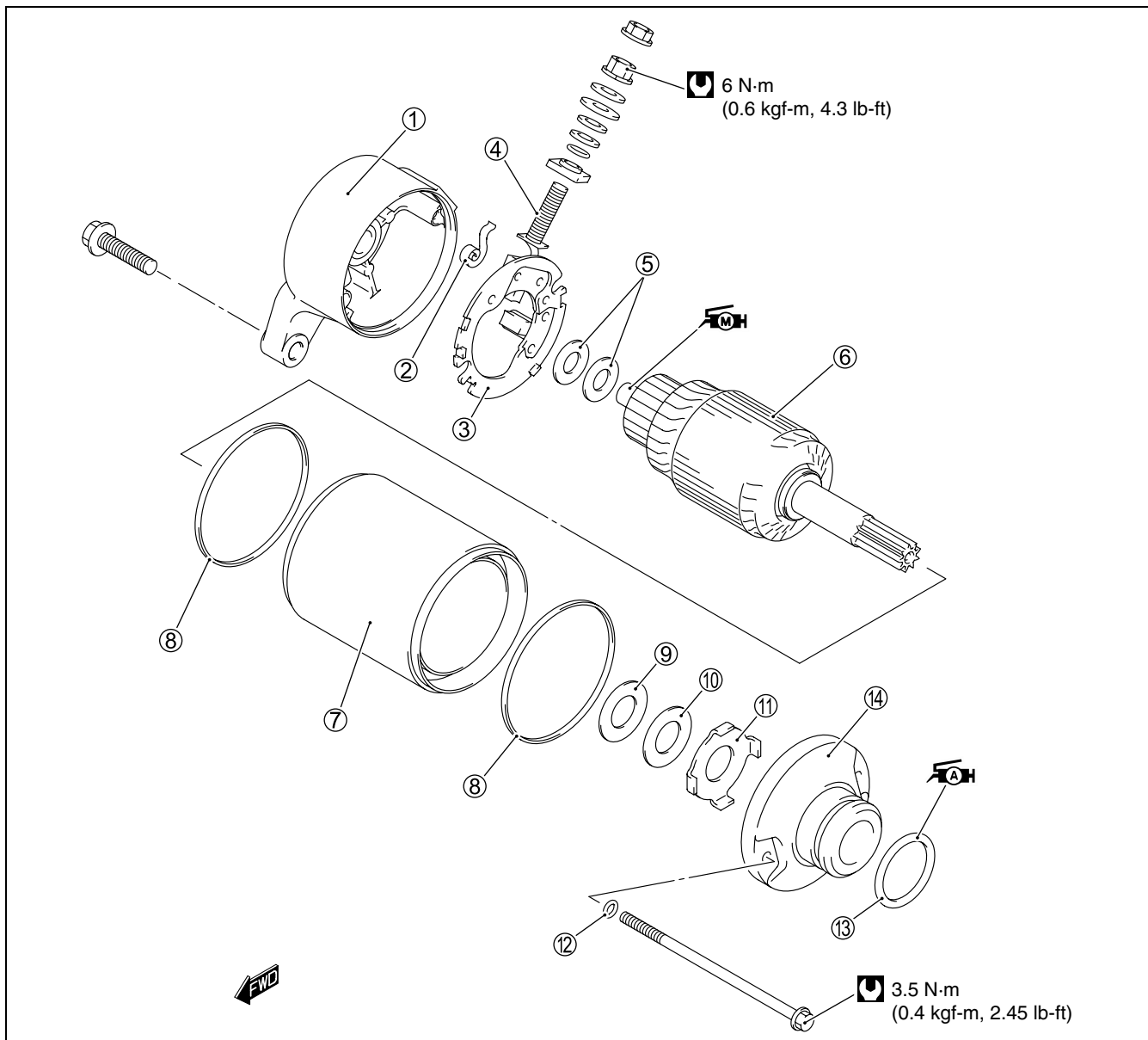
Faulty starter clutch. (🔧 3-79)

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.



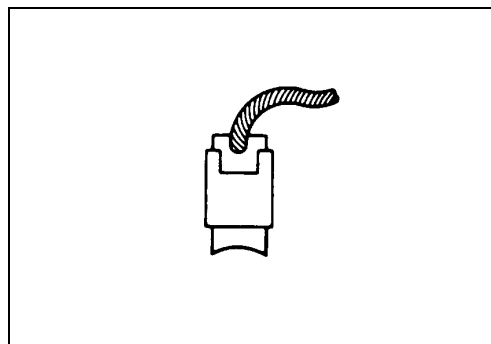
- | | | |
|------------------------------|----------------------|-------------------------------|
| ① Housing end (rear bracket) | ⑥ Armature | ⑪ Thrust stopper |
| ② Brush spring (2 pcs) | ⑦ Starter motor case | ⑫ O-ring (2 pcs) |
| ③ Brush holder | ⑧ Seal ring (2 pcs) | ⑬ O-ring |
| ④ Terminal | ⑨ Washer | ⑭ Housing end (front bracket) |
| ⑤ Washer | ⑩ Slip washer | |

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).

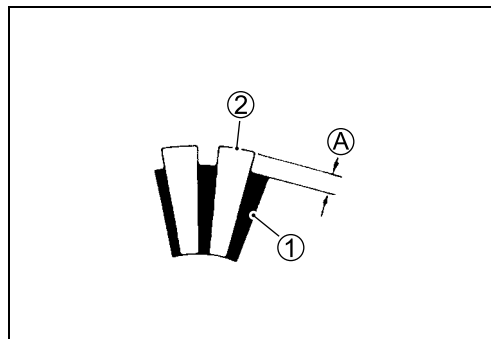
If abnormal wear is found, replace the armature with a new one.

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 with a saw blade.

① Insulator

② Segment



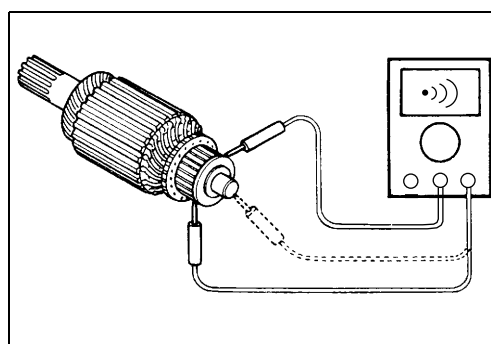
ARMATURE COIL INSPECTION

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:

CAUTION

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

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

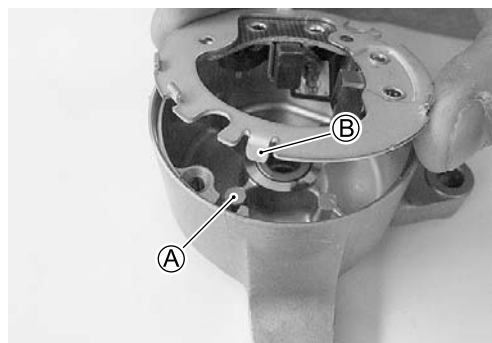
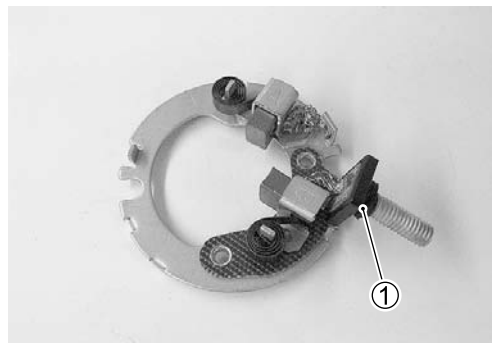
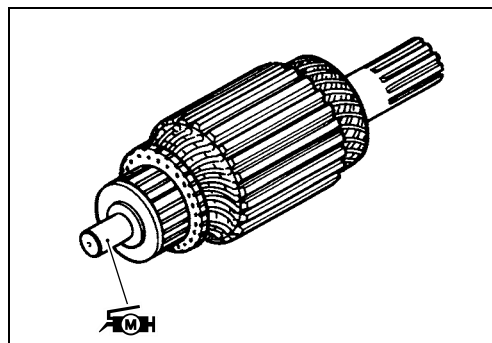
 **99000-25030: SUZUKI SUPER GREASE "A" (USA)**
99000-25010: SUZUKI SUPER GREASE "A" (Others)

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

 **99000-25140: SUZUKI MOLY PASTE**

- Install the spacer ① to brush terminal.

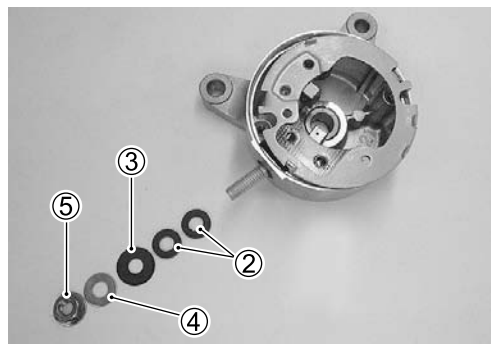
- When installing the brush holder on the rear bracket, set the projection ② of the brush holder into the groove ① of the rear bracket.



- 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

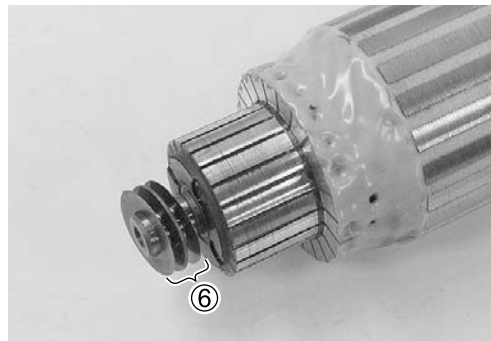
Replace the O-rings with the new ones to prevent oil leakage and moisture.



- Install the washers ⑥.

NOTE:

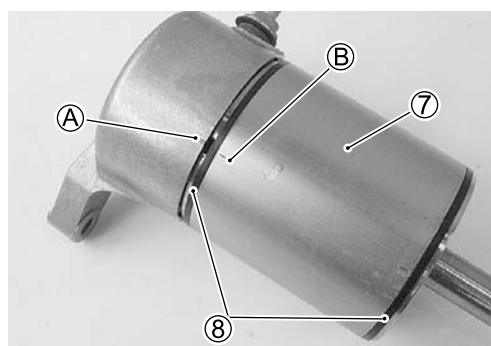
The number of washer ⑥ varies according to individual.



- 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

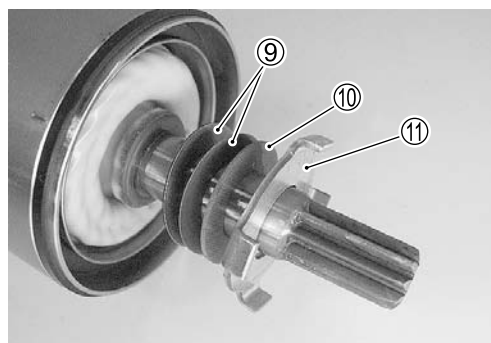
Replace the seal rings with the new ones to prevent oil leakage and moisture.



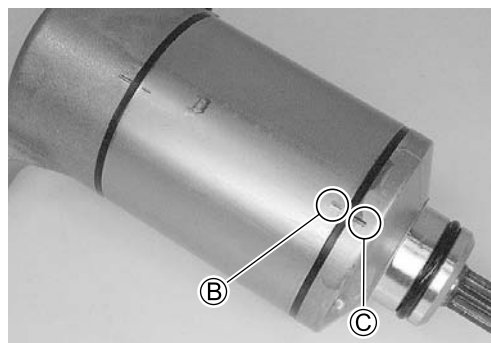
- Install the washers ⑨ slip washer ⑩ and thrust stopper ⑪.

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 ② 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)

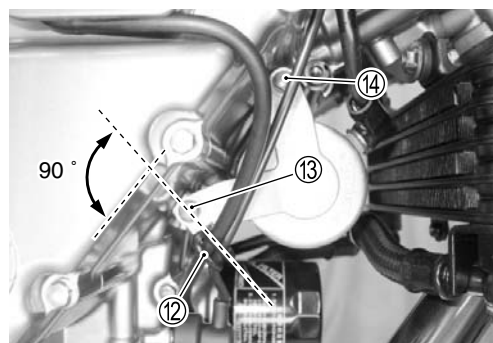
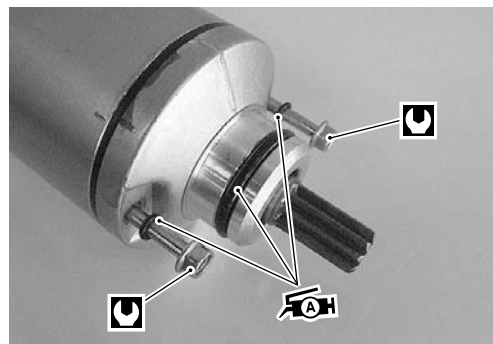
CAUTION

Use new O-rings to prevent oil leakage.

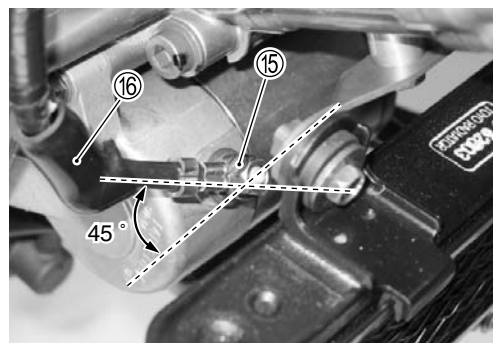
- Tighten the starter motor housing bolts to the specified torque.

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

- Install the starter motor.
- Install the clamp ⑫ as shown.
- First tighten the starter motor lower mounting bolt ⑬, then tighten the starter motor upper mounting bolt ⑭.

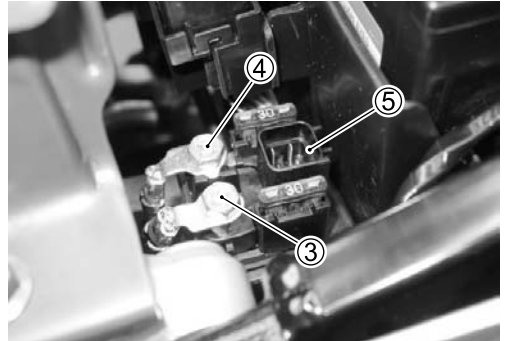
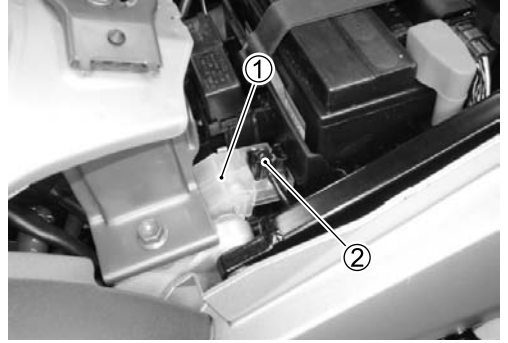


- Connect the starter motor read wire as shown.
- Tighten the nut ⑮ and fit the cap ⑯.



STARTER RELAY INSPECTION

- Remove the 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

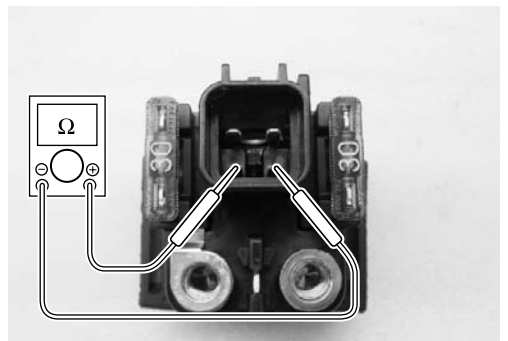
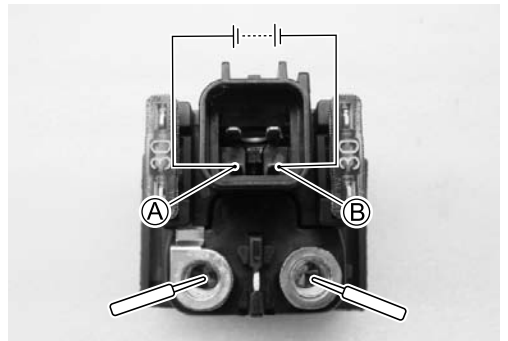
Do not apply a battery voltage to the starter relay for five seconds and more, since the relay coil may over-heat and get damaged.

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 (Ω)

DATA Starter relay resistance: 3 – 6 Ω



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

- Remove the left frame cover. (👉7-5)
- Disconnect the side-stand switch coupler ① and measure the voltage between Black/White and Green lead wires.



 **09900-25008: Multi circuit tester set**
 **Tester knob indication: Diode test (⚡↔)**

	Black/White (⊕ probe)	Green (⊖ probe)
Side-stand up ①	0.4 – 0.6 V	
Side-stand down ②	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

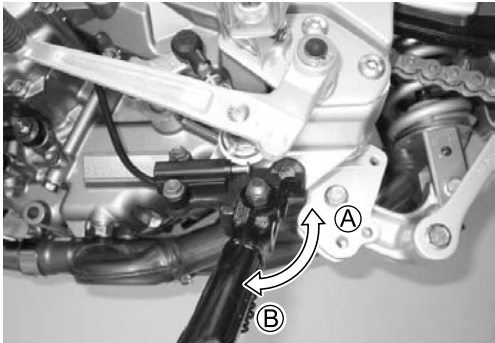
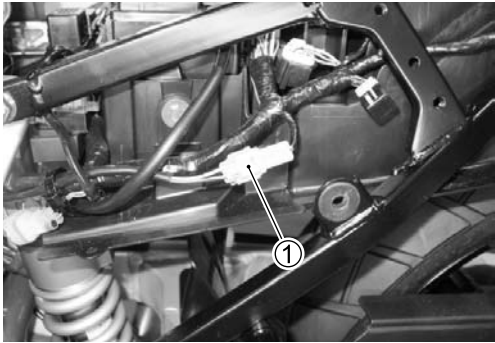
- Remove the left frame cover. (👉7-5)
- Disconnect the gear position switch coupler and check the continuity between Blue and Black/White with the transmission in “NEUTRAL”.

 **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.
- Insert the needle pointed probes to the gear position switch coupler.

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



09900-25008: Multi circuit tester set

09900-25009: Needle pointed probe set



Tester knob indication: voltage (V)



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

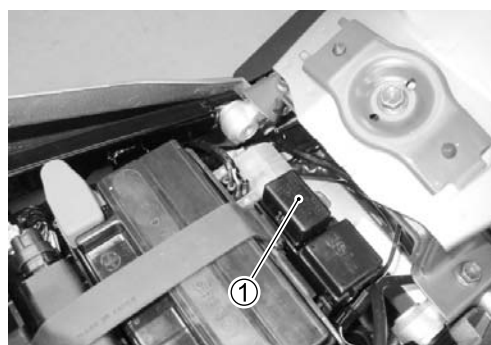
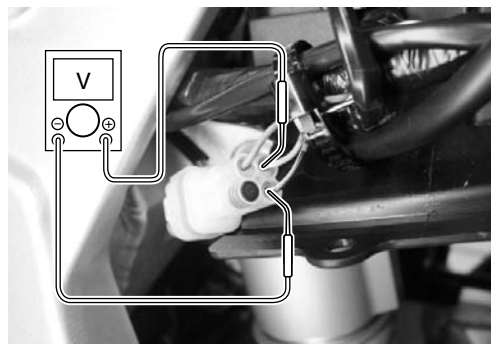
NOTE:

- * 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 REMOVAL AND INSTALLATION

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

- Remove the seat. (7-4)
- Remove the turn signal/side-stand relay ①.
- Install the turn signal/side-stand relay in the reverse order of removal.



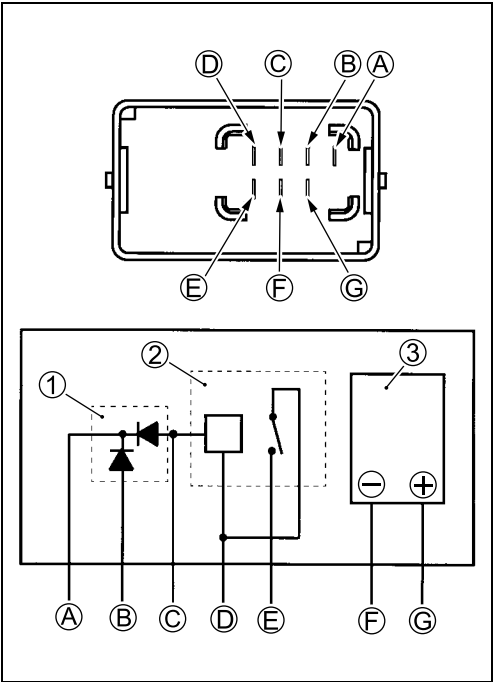
SIDE-STAND RELAY INSPECTION

First check the insulation between ① and ② terminals with the tester. Then apply 12 V to terminals ① and ③ (+ to ① and - to ③) and check the continuity between ① and ②. If there is no continuity, replace the turn signal/side-stand relay with a new one.

 09900-25008: Multi circuit tester set

 Tester knob indication: Continuity test (•••)

- ① Diode
- ② Side-stand relay
- ③ Turn signal relay



DIODE INSPECTION

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

Unit: V

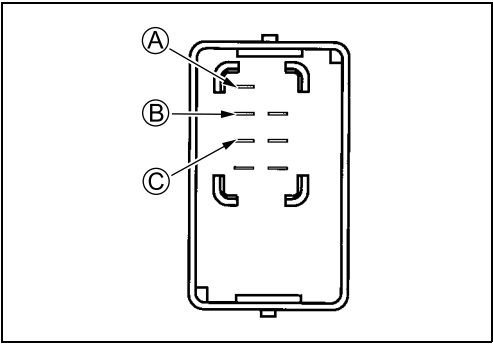
① Probe of tester to:	⊕ Probe of tester to:		
	ⓐ, ⓑ	ⓐ	
	ⓐ, ⓑ	ⓐ	1.4 V and more
①	ⓐ		0.4 – 0.6

 09900-25008: Multi circuit tester set

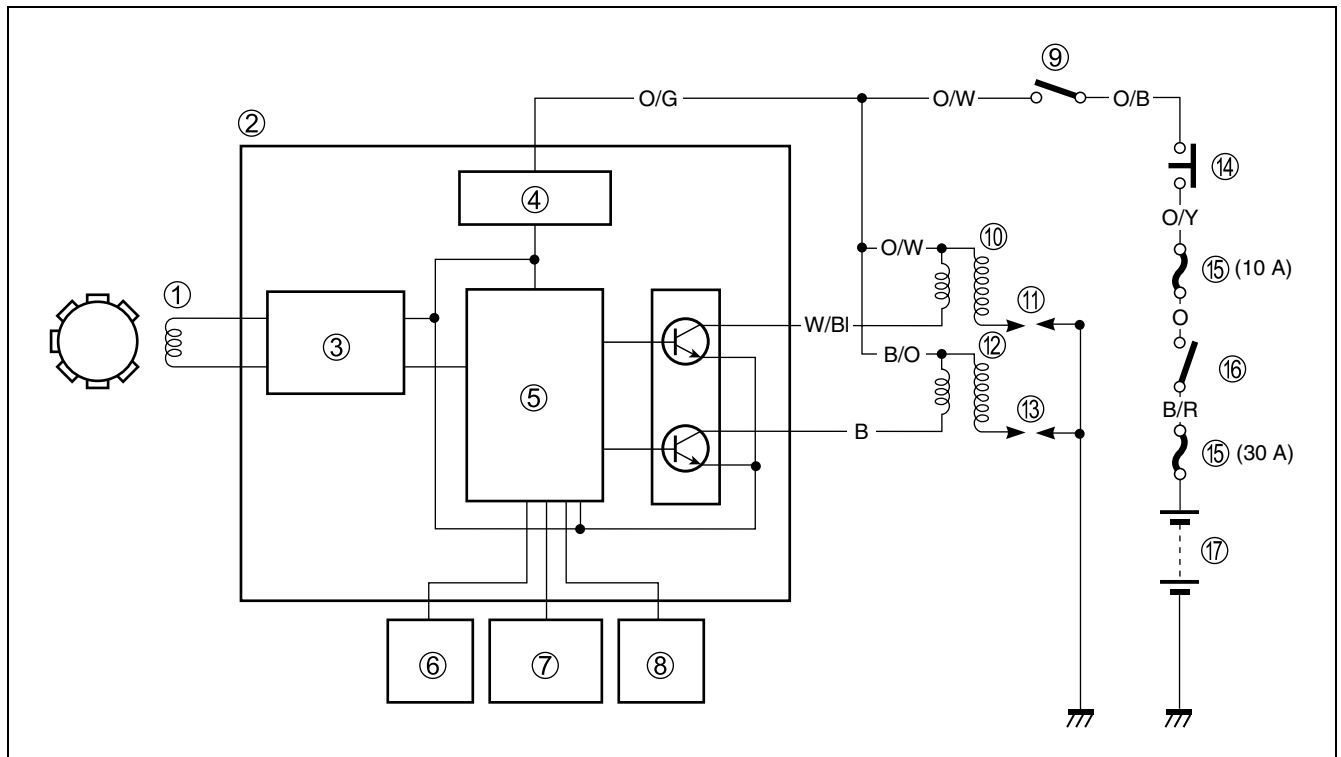
 Tester knob indication: Diode test (→←)

NOTE:

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



IGNITION SYSTEM



- ① CKP sensor ② ECM ③ Wave form arrangement circuit ④ Power source circuit ⑤ CPU
 ⑥ TP sensor ⑦ ECT sensor ⑧ Gear position switch ⑨ Engine stop switch ⑩ Ignition coil #1
 ⑪ Spark plug #1 ⑫ Ignition coil #2 ⑬ Spark plug #2 ⑭ Side-stand relay ⑮ Fuse
 ⑯ Ignition switch ⑰ Battery

TROUBLESHOOTING

No spark or poor spark

Make sure the engine stop switch is in the “RUN” position and side-stand is in up-right position. Make sure the fuse is not blown and the battery is fully-charged before diagnosing.

Step1

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

Is there connection in the ignition switch couplers?

YES	Go to Step2.
NO	Improper coupler connection.

Step 2

- 1) Measure the battery voltage between input lead wire (O/G and B/W) at the ECM with the ignition switch in the “ON” position.

Is the voltage OK?

YES	Go to Step3.
NO	<ul style="list-style-type: none"> Faulty ignition switch. Faulty turn signal/side-stand relay. Faulty engine stop switch. Broken wire harness or poor connection of related circuit couplers.

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">• Improper spark plug connection.• Go to Step5.
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">• Faulty ECM.• Faulty wire harness.• Improper ignition coupler connection.
NO	Faulty CKP sensor.

INSPECTION

IGNITION COIL PRIMARY PEAK VOLTAGE

- Lift and support the fuel tank. (☞ 5-7)
- Remove the radiator lower mounting bolt and move the radiator lower side to forward.
- Disconnect the two spark plug caps.
- Connect the new two 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.

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

- ① Peak volt adaptor
 ② Ignition coil (No.1 or No.2)
 ③ New spark plug
 ④ ECM
 ⑤ Battery

NOTE:

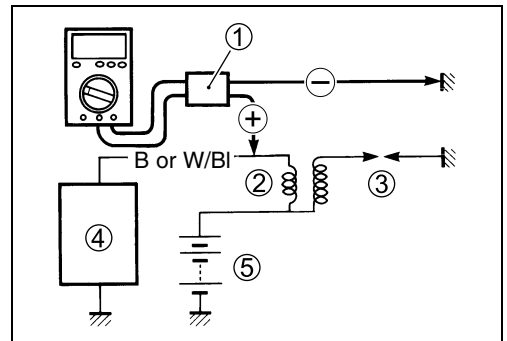
Do not disconnect the ignition coil primary wire coupler.

 **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.
- Push 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

- Lift and support the fuel tank. (🔧 5-7)
- Disconnect the spark plug caps and ignition coil lead wires.

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.



09900-25008: Multi circuit tester set



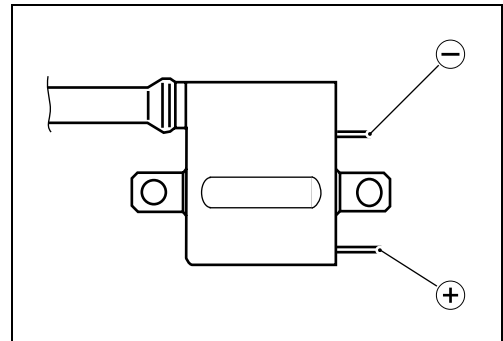
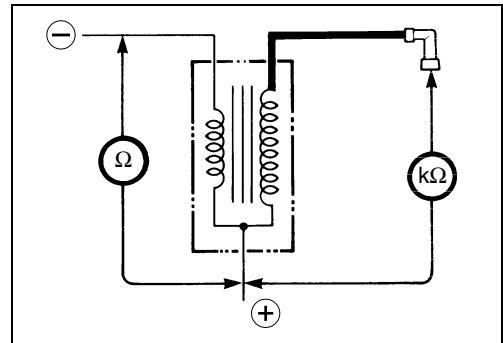
Tester knob indication: Resistance (Ω)



DATA Ignition coil resistance

Primary : 2 – 5 Ω (⊕ terminal – ⊖ terminal)

Secondary : 24 – 37 kΩ (Plug cap – ⊕ terminal)



CKP SENSOR PEAK VOLTAGE

- Remove the 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.
- Push 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.

- ① CKP sensor
- ② CKP sensor coupler
- ③ ECM coupler
- ④ Peak volt adaptor

Tester knob indication: Voltage (V)

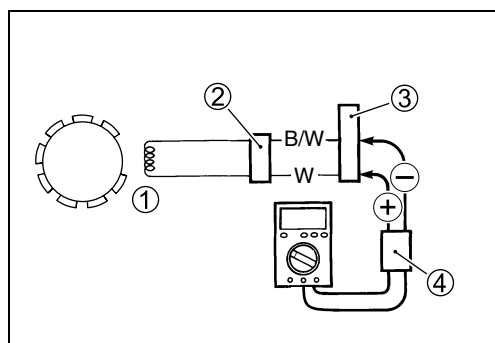
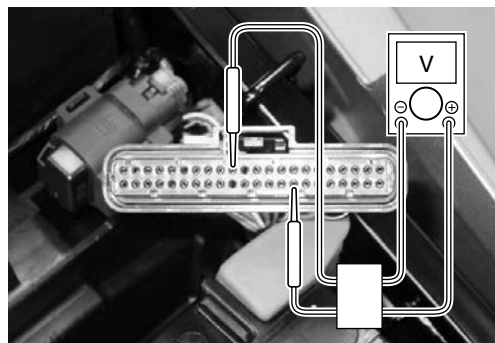
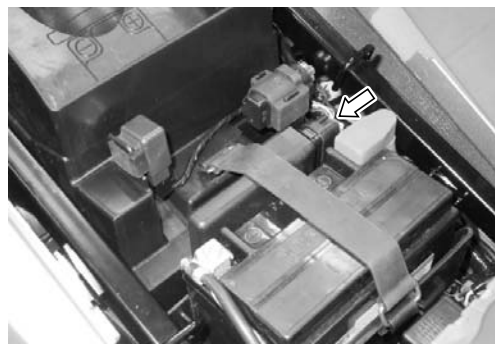
DATA CKP sensor peak voltage: 3.7 V and more

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

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

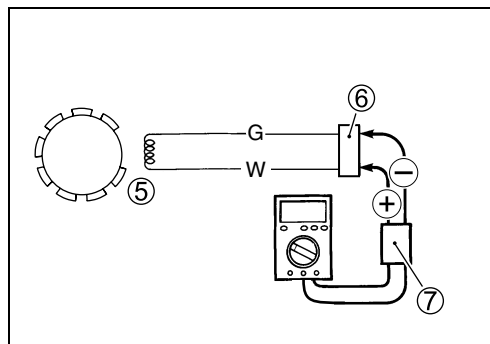
Tester knob indication: Voltage (V)

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.

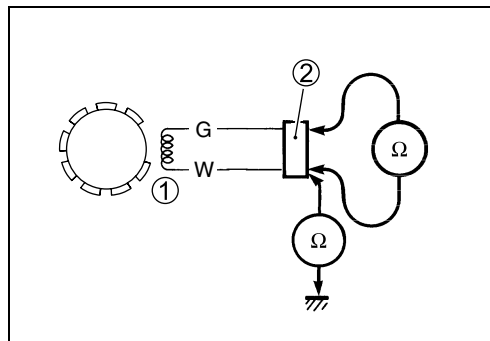
- ⑤ CKP sensor
- ⑥ CKP sensor coupler
- ⑦ Peak volt adaptor



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.

- ① CKP sensor
- ② CKP sensor coupler



09900-25008: Multi circuit tester set



Tester knob indication: Resistance (Ω)



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

COMBINATION METER

REMOVAL AND DISASSEMBLY

- Disconnect the battery \ominus lead wire.
- Remove the combination meter panel. (➡ 7-6).
- Remove the combination meter ①.

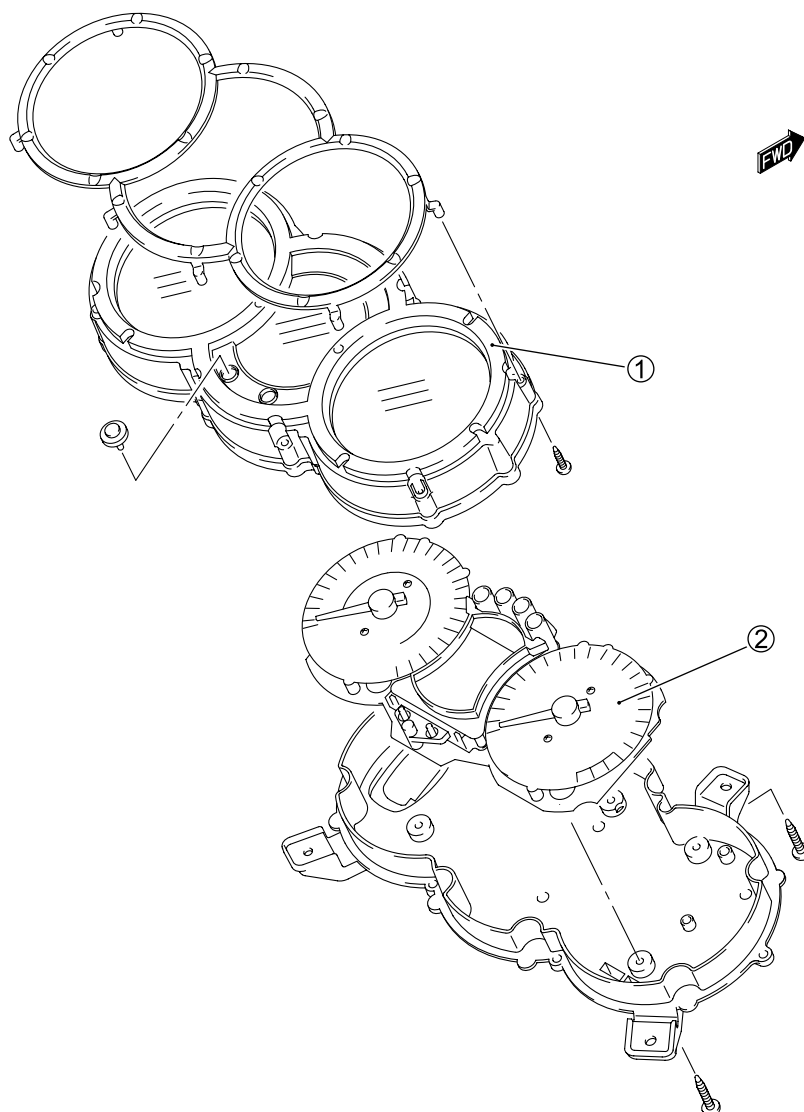
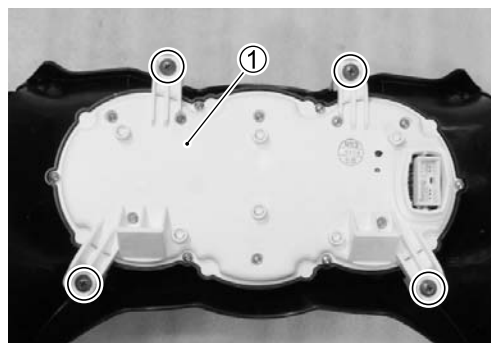
CAUTION

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

- Disassemble the combination meter as follows.

CAUTION

Do not attempt to disassemble the combination meter unit.



① Combination meter cover

② Combination meter unit

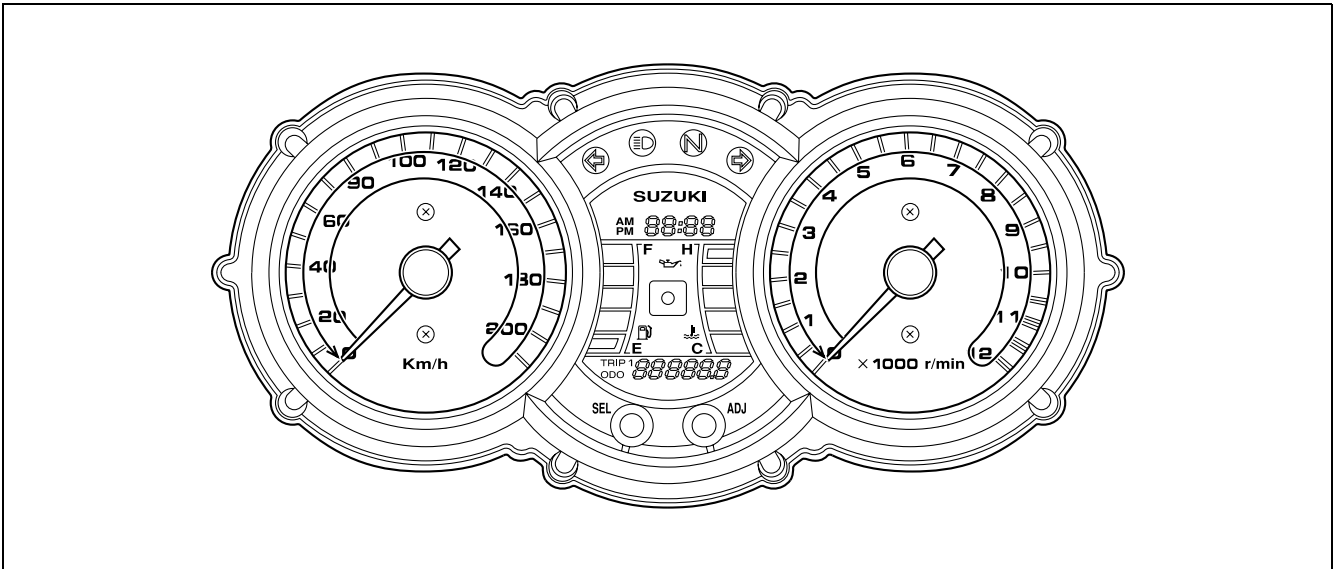
INSPECTION

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.

STEPPING MOTOR

Check that the pointer calibrates itself immediately after turning the ignition switch on and stops at starting point.
If abnormal condition is found, replace the combination meter unit with a new one after checking its wire harness/coupler.



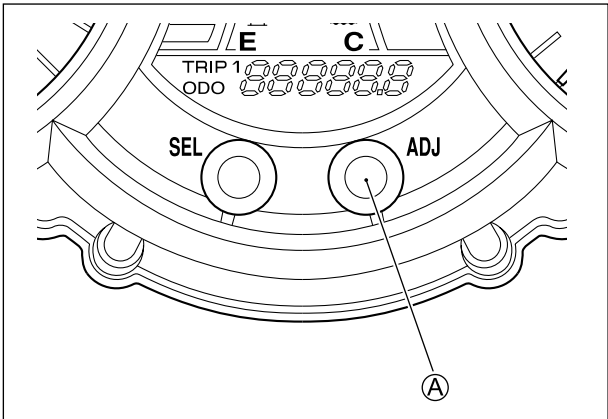
NOTE:

The pointer may not return to the proper position even turning the ignition switch on under low temperature condition. In that case, you can reset the pointer to the proper position by following the instruction below:

- 1) With the ADJ switch ① pressed, turn the ignition switch on.
- 2) Keep pushing the ADJ switch ① for 3 to 5 seconds.
- 3) Push the ADJ switch ① twice (within 1 second). → Reset

* Complete the operation within 10 seconds after the ignition switch has been turned on.

Time	Ignition switch	ADJ switch ①
0	OFF	PUSH
•	ON	
•		
3 sec		
•		
5 sec		Release
•		
•		Push
•		Push → Reset
10 sec		

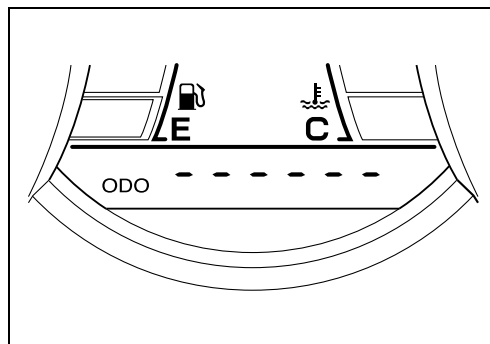


① ADJ SWITCH

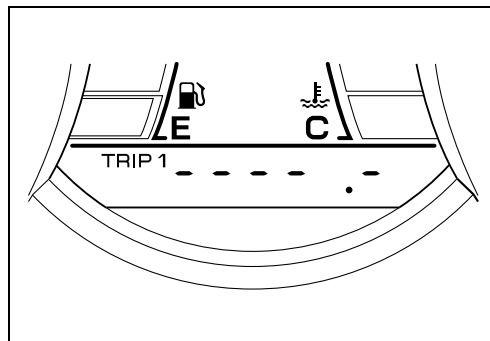
Pointer will return to the starting point right after the completion of the operation. In the case of the pointer not returning to the proper position after doing above, replace the combination meter unit.

ODOMETER

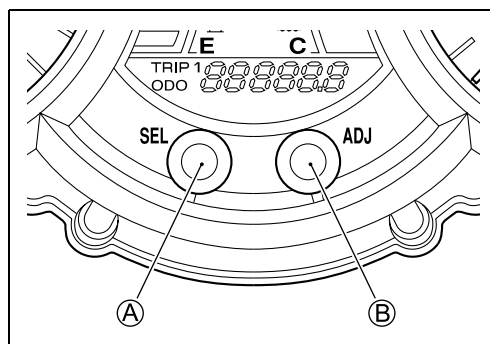
The odometer indicates “-----” when the odometer is faulty.
Replace the combination meter unit with a new one.

**TRIP METER**

The trip meter indicates “----.-” when the trip meter is faulty.
In case the odometer works normaly, perform the trip meter reset. If the trip meter isn't restored after above reset, replace the combination meter unit with a new one.

**TRIP METER RESET PROCEDURE**

1. Turn the ignition “ON”.
2. Select the trip meter by pushing the SEL switch ①.
3. Push the ADJ switch ② for 2 seconds.



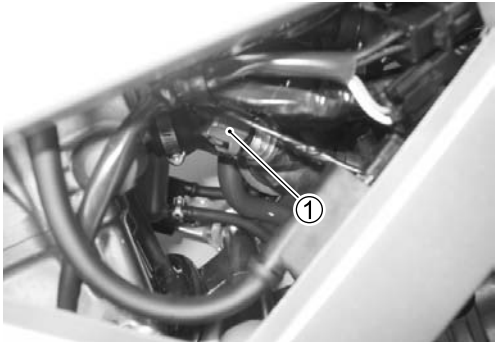
INDICATORS

ENGINE COOLANT TEMPERATURE METER INSPECTION

- Disconnect the ECT sensor coupler ①.

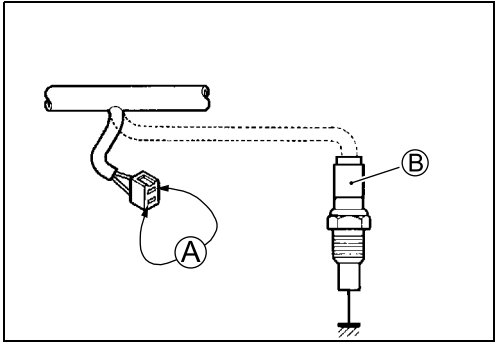
CAUTION

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



- Connect the variable resistor ① 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.

- ① Variable resistor
- ② ECT sensor



Water temperature	39 °C and below	40 – 59 °C	60 – 79 °C	80 – 111 °C
Resistance	1.148 kΩ and more	1.148 – 0.587 kΩ	0.587 – 0.188 kΩ	0.188 – 0.140 kΩ
Engine coolant temperature meter				

Water temperature	112 – 119 °C	120 °C and over	122 °C and over
Resistance	0.140 – 0.116 kΩ	0.116 kΩ and less	0.111 kΩ and less
Engine coolant temperature meter			

FUEL LEVEL GAUGE INSPECTION

- Remove the fuel tank. (🔧 5-7)
- Remove the fuel pump. (🔧 5-10)

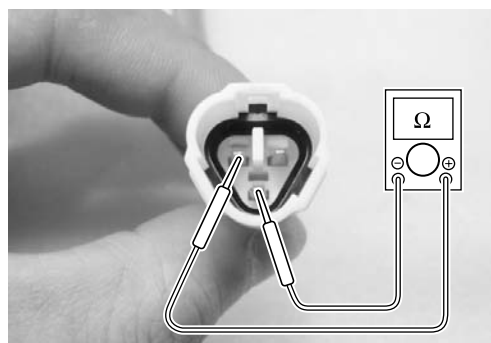
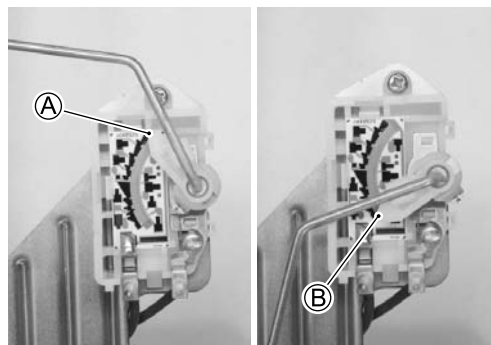
Measure the resistance at each fuel level gauge float position. If the resistance is incorrect, replace the fuel level gauge with a new one.

Float position	Resistance
Ⓐ "F" (Full)	Approx. 4 Ω
Ⓑ "E" (Empty)	Approx. 182 Ω

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

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

- Install the fuel pump. (🔧 5-12)



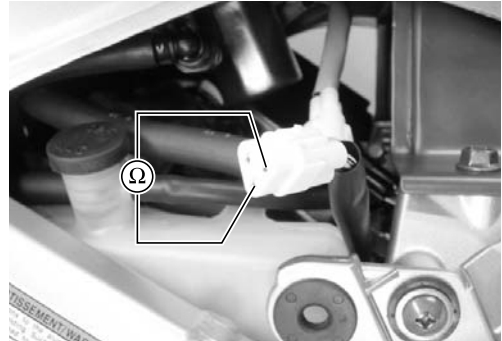
FUEL LEVEL METER INSPECTION

- Remove the fuel tank left side cover. (☞ 7-4)
- Disconnect the fuel pump lead wire coupler.



- Connect the each resistor between the Yellow/Black and Black/White lead wires at the wire harness.
- Turn the ignition switch “ON” position and wait for approx. 40 seconds.

Check the display of fuel meter as shown below, If any abnormality is found, replace the combination meter with a new one.



Resistance	More than 167.0 Ω	87.5 – 167.0 Ω	50.0 – 87.5 Ω	26.0 – 50.0 Ω	6.5 – 26.0 Ω	6.5 Ω and less
Fuel level meter						

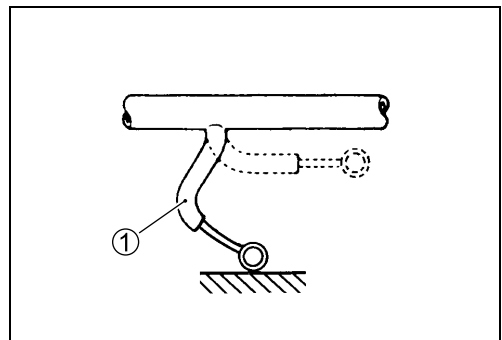
OIL PRESSURE INDICATOR INSPECTION**NOTE:**

Before inspecting the oil pressure switch, check the engine oil level. (☞ 2-13)

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

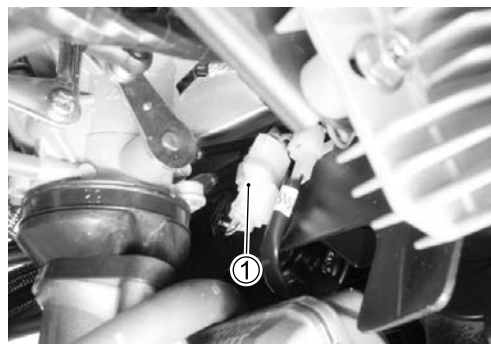


Check if the oil pressure indicator will light, when grounding the oil pressure switch lead wire ①.



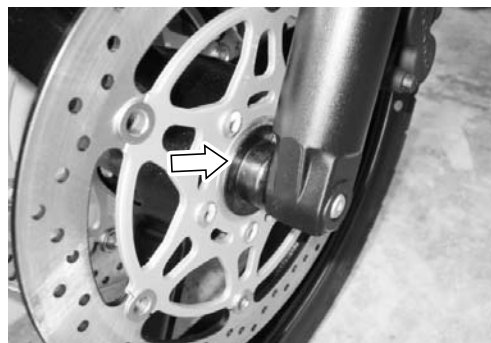
SPEEDOMETER AND SPEED SENSOR

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



SPEED SENSOR REMOVAL AND INSTALLATION

- Remove the front wheel. (➡ 7-10)
- Disconnect the speed sensor coupler. (➡ 8-35)
- Remove the speed sensor.
- Install the speed sensor in the reverse order of removal.

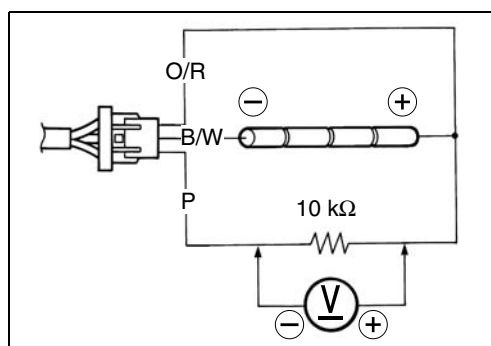


SPEED SENSOR INSPECTION

- Connect the four 1.5 V dry cells, 10 kΩ resistance and the tester to the speed sensor lead wire coupler as shown.

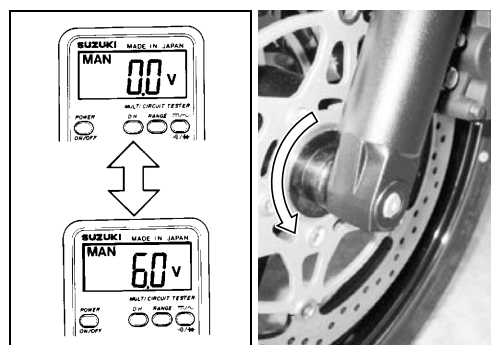
 **09900-25008: Multi-circuit tester set**

 **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

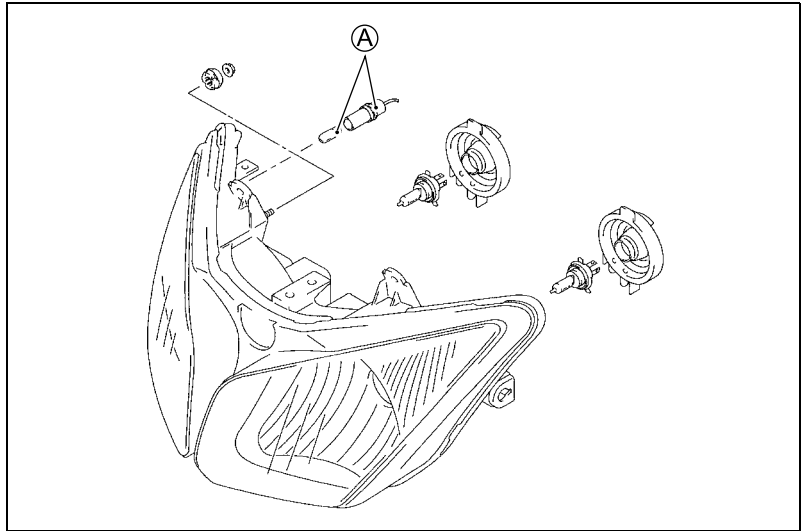
HEADLIGHT, BRAKE LIGHT/TAILLIGHT AND TURN SIGNAL LIGHT

HEADLIGHT

12 V 60/55 W

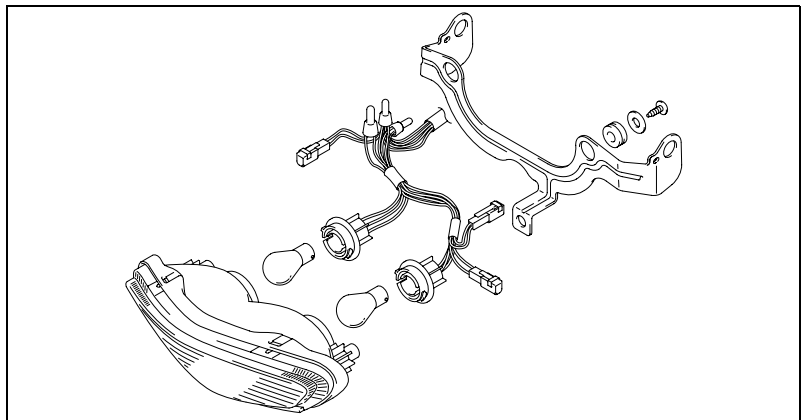
12 V 60/55 W + 5 W

Ⓐ ONLY E-02, 19



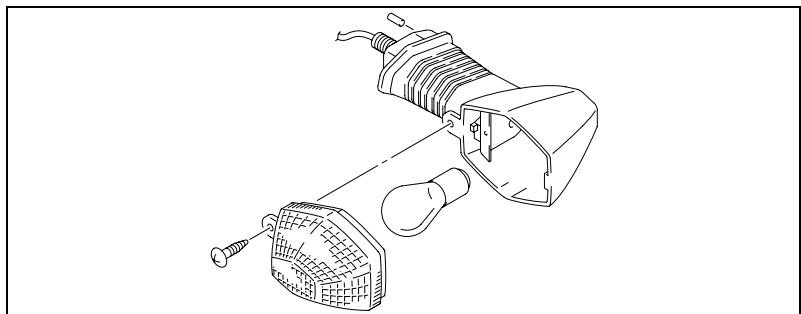
BRAKE LIGHT/TAIL LIGHT

12 V 21/5 W



TURN SIGNAL LIGHT

12 V 21 W



HEADLIGHT BEAM ADJUSTMENT

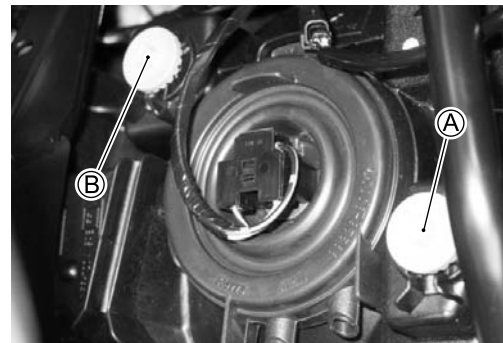
- Adjust the headlight beam, both vertical and horizontal.

Ⓐ: Vertical adjuster

Ⓑ: Horizontal adjuster

NOTE:

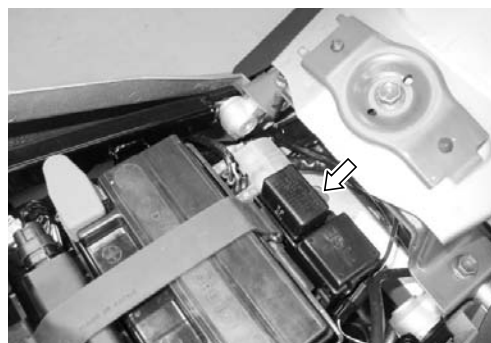
To adjust the headlight beam, adjust the beam horizontally first, then adjust the vertically.



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.

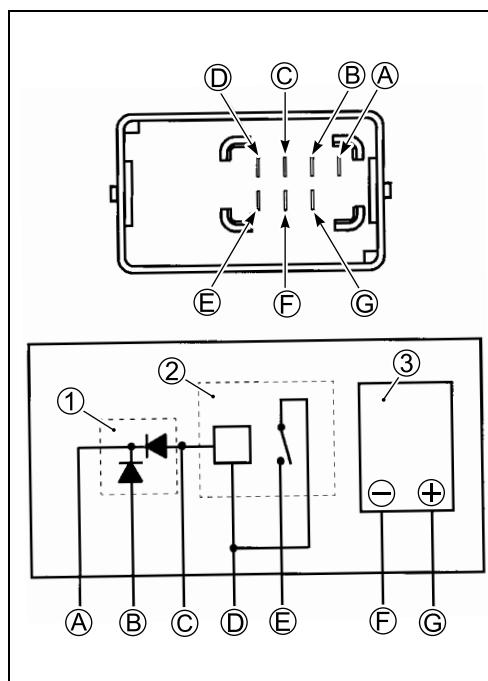
If the bulb, turn signal switch and circuit connection are OK, the turn signal relay may be faulty; therefore, replace the turn signal/side-stand relay with a new one.

NOTE:


* Make sure that the battery is fully charged.

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


- ① Diode
- ② Side-stand relay
- ③ Turn signal relay



STARTER RELAY

( 8-19)

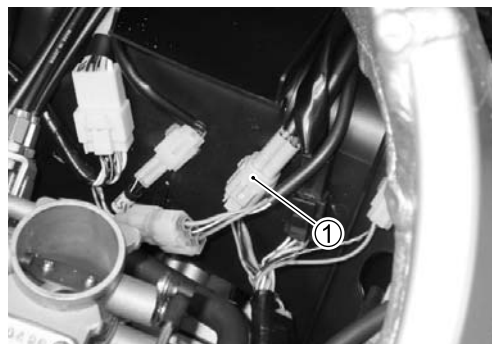
FUEL PUMP RELAY

( 5-10)

SWITCHES

IGNITION SWITCH REMOVAL

- Remove the fuel tank. (🔧 5-7)
- Remove the air cleaner box. (🔧 5-15)
- Disconnect the ignition switch coupler ①.



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

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

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	Y/W
HI (≡▷)			
LO (≡▷)			

TURN SIGNAL LIGHT SWITCH

Color Position	Lg	Lbl	B
L			
PUSH			
R			

PASSING LIGHT SWITCH

Color Position	O/R	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	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	W/B
OFF		
ON		

CLUTCH 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. (2-13)

WIRE COLOR

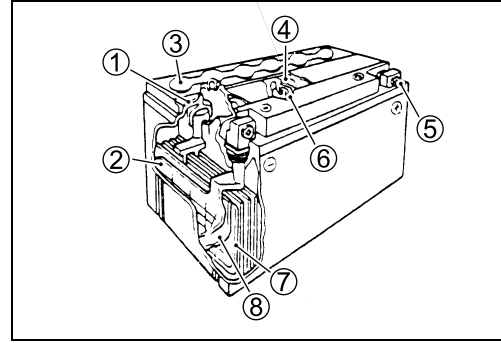
B : Black
Br : Brown
Lbl : Light blue
Lg : Light green
O : Orange
R : Red
Y : Yellow
W : White

B/Bl : 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/R : Orange with Red tracer
O/W : Orange with White tracer
O/Y : Orange with Yellow tracer
W/B : White with Black tracer
Y/G : Yellow with Green tracer
Y/W : Yellow with White tracer

BATTERY SPECIFICATIONS

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

- | | |
|------------------------|--------------------------------|
| ① Upper cover breather | ⑤ Terminal |
| ② Cathode plates | ⑥ Safety valve |
| ③ Stopper | ⑦ Anode plates |
| ④ Filter | ⑧ Separator (Fiberglass plate) |



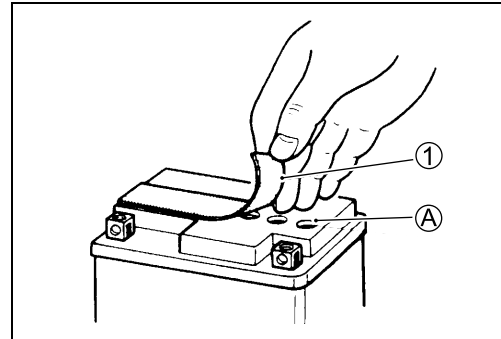
INITIAL CHARGING

Filling electrolyte

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

NOTE:

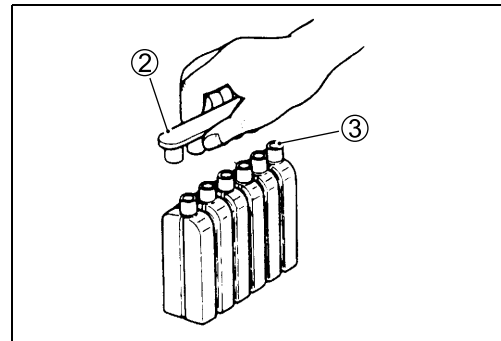
When filling electrolyte, the battery must be removed from the vehicle and must be put on the level ground.



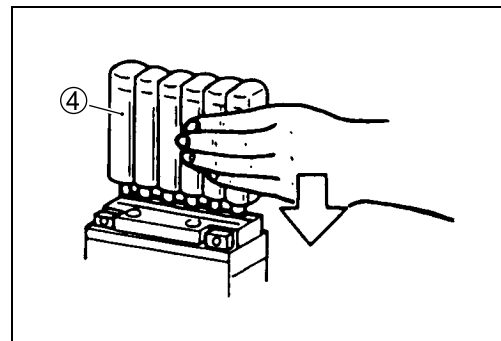
- Remove the caps ②.

NOTE:

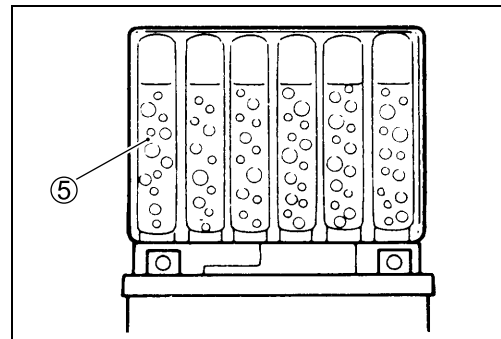
- * After filling the electrolyte completely, use the removed cap ② as the sealed caps of battery-filler holes.
- * Do not remove or pierce the sealed areas ③ of the electrolyte container.



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

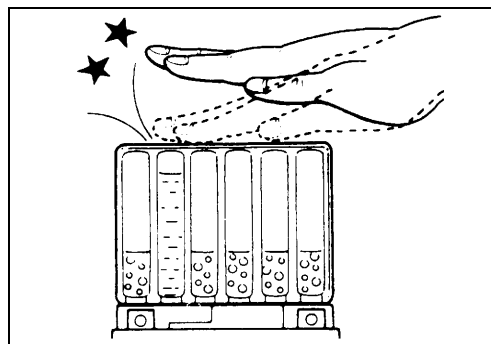


NOTE:

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.

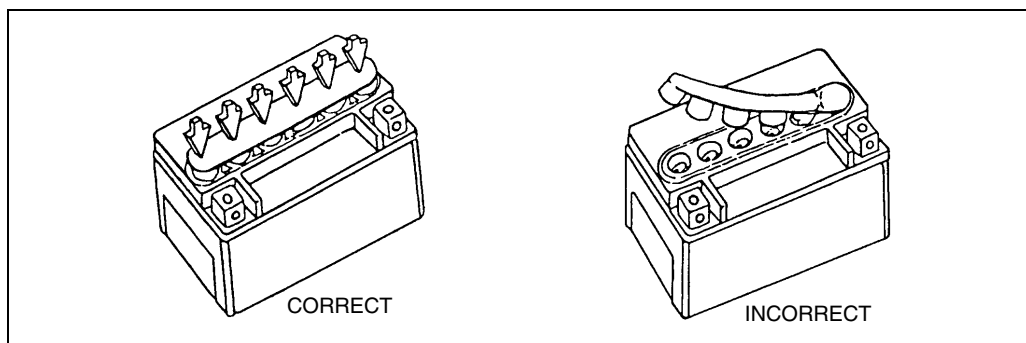
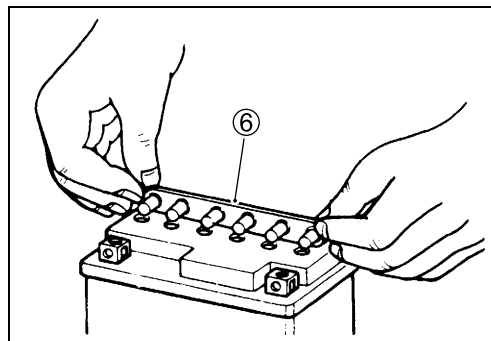
- After confirming that the electrolyte has entered the battery completely, remove the electrolyte containers from the battery. Wait for about 20 minutes.



- Insert the caps ⑥ 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 the caps have been installed to the battery, do not remove the caps.**
- * **Do not tap the caps with a tool such as 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

- 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.

Ⓐ Charging period

Ⓑ Stop charging

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.

