

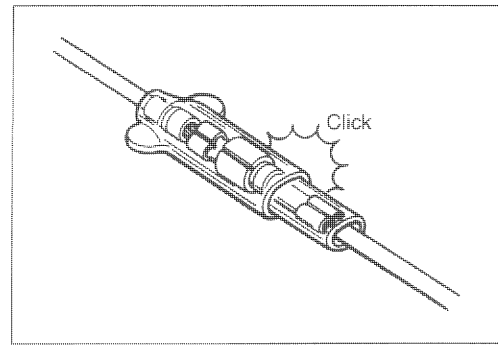
ELECTRICAL SYSTEM

CONTENTS

CAUTIONS IN SERVICING	7- 2
CONNECTORS	7- 2
COUPLERS	7- 2
CLAMPS	7- 2
FUSES	7- 2
SEMI-CONDUCTOR EQUIPPED PARTS	7- 2
BATTERY	7- 3
CONNECTING THE BATTERY	7- 3
WIRING PROCEDURE	7- 3
USING THE MULTI CIRCUIT TESTER	7- 3
LOCATION OF ELECTRICAL COMPONENTS	7- 4
CHARGING SYSTEM	7- 6
TROUBLESHOOTING	7- 6
INSPECTION	7- 8
STARTER SYSTEM	7-11
TROUBLESHOOTING	7-11
STARTER MOTOR REMOVAL AND DISASSEMBLY	7-12
STARTER MOTOR INSPECTION	7-13
STARTER MOTOR REASSEMBLY AND REMOUNTING	7-14
STARTER RELAY INSPECTION	7-15
IGNITION SYSTEM	7-17
TROUBLESHOOTING	7-17
INSPECTION	7-19
INDICATOR LIGHT POSITION	7-22
INSPECTION	7-22
LAMPS	7-23
HEADLIGHT	7-23
BRAKE LIGHT/TAILLIGHT	7-24
SWITCHES	7-25
BATTERY	7-26
SPECIFICATIONS	7-26
INITIAL CHARGING	7-26
SERVICING	7-28
RECHARGING OPERATION	7-28

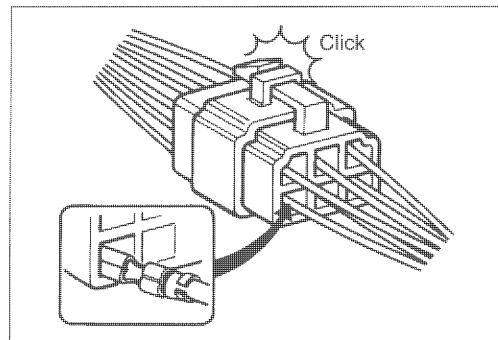
CAUTIONS IN SERVICING CONNECTORS

- When disconnecting a connector, be sure to hold the terminals; do not pull the lead wires.
- When connecting a connector, push it in so it is firmly attached.
- Inspect the connector for corrosion, contamination and any breakage in the cover.



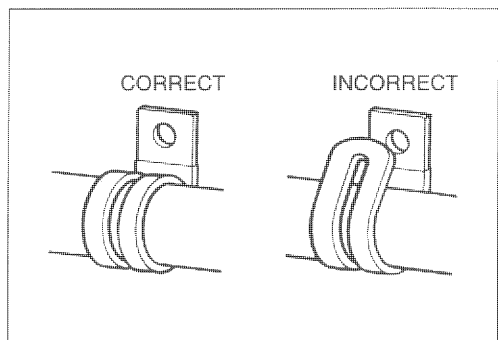
COUPLERS

- With a lock-type coupler, be sure to release the lock before disconnecting it. When connecting a coupler, push it in until the lock clicks shut.
- When disconnecting a coupler, be sure to hold the coupler; do not pull the lead wires.
- Inspect each terminal on the coupler for looseness or bends.
- Inspect each terminal for corrosion and contamination.



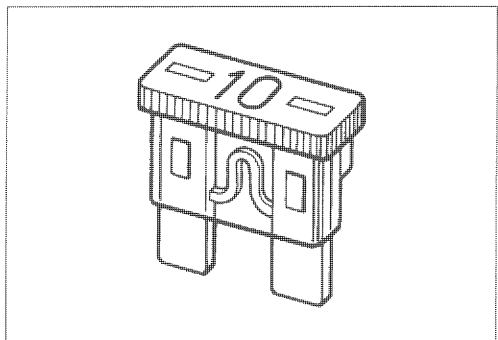
CLAMPS

- Refer to the "WIRE HARNESS ROUTING" section for proper clamping procedures. (8-11 to 8-12)
- Bend the clamp properly, as shown in the illustration.
- When clamping the wire harness, do not allow it to hang down.
- Do not use wire or any substitutes for the band-type clamp.



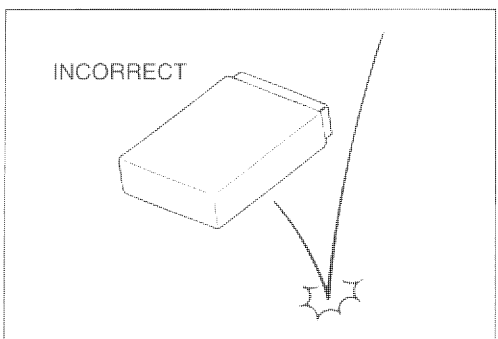
FUSES

- When a fuse blows, always investigate the cause, correct the problem, and then replace the fuse.
- Do not use a fuse of a different capacity.
- Do not use any substitutes for the fuse (e.g., wire).



SEMI-CONDUCTOR EQUIPPED PARTS

- Do not drop any part that contains a semi-conductor (e.g., CDI unit, regulator/rectifier).
- When inspecting the part, follow the inspection instructions carefully. Neglecting proper procedures may cause this part to be damaged.



BATTERY

- The MF battery used in this vehicle 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

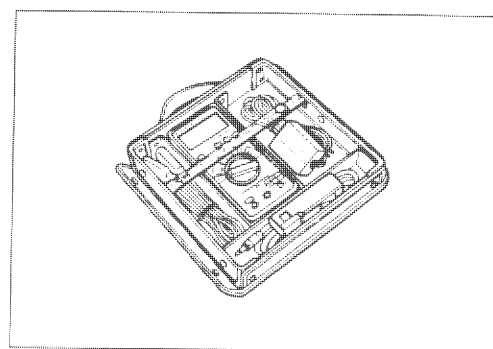
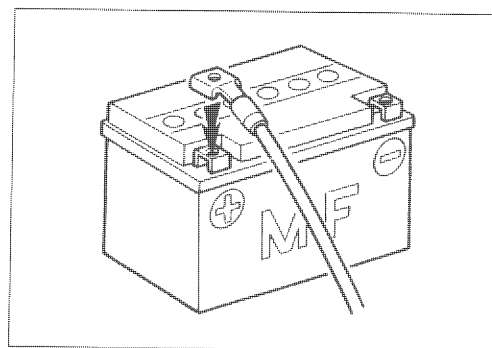
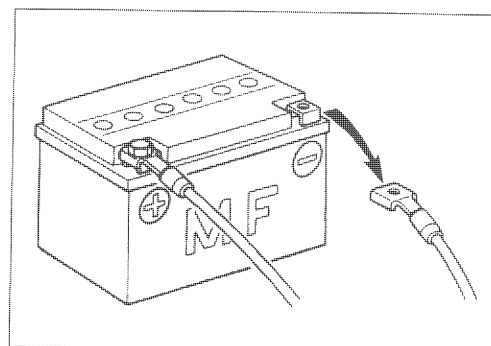
- Properly route the wire harness according to the "WIRE ROUTING" section. (8-11)

USING THE MULTI CIRCUIT TESTER

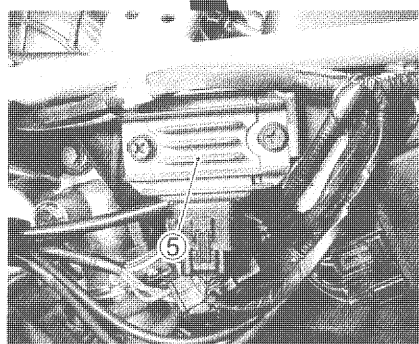
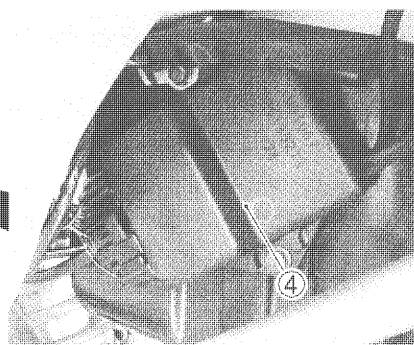
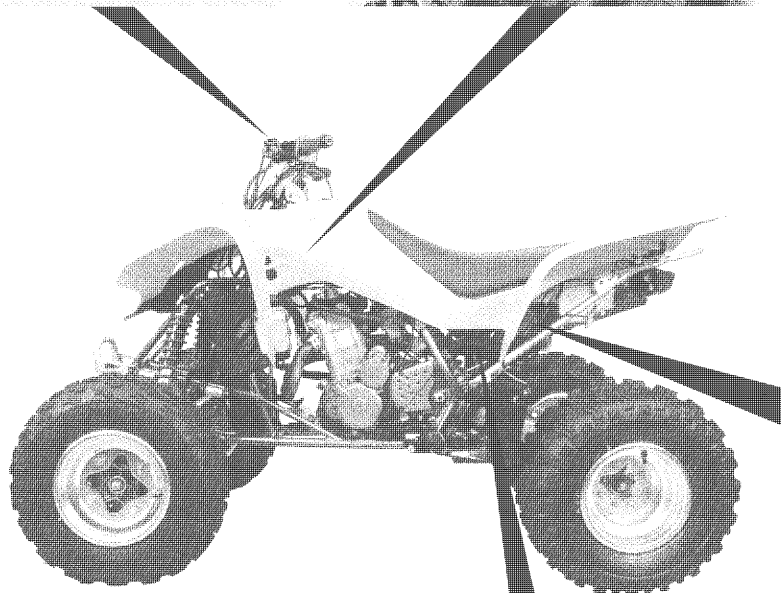
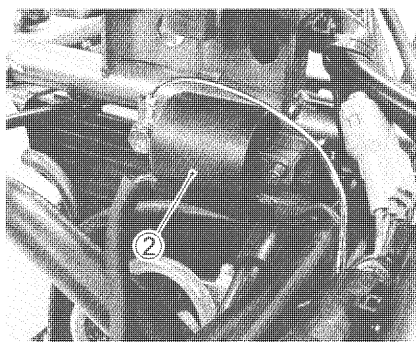
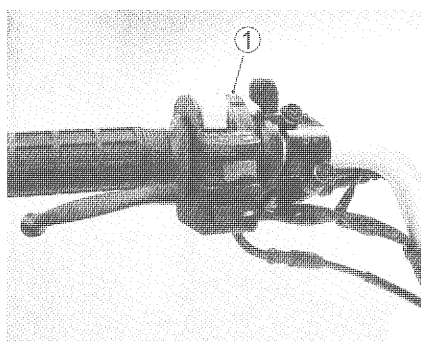
- Properly use the multi circuit tester $\oplus$ and $\ominus$ probes. Improper use can cause damage to the vehicle and tester.
- If the voltage and current values are not known, begin measuring in the highest range.
- When measuring the resistance, make sure no voltage is applied. If voltage is applied,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

CAUTION

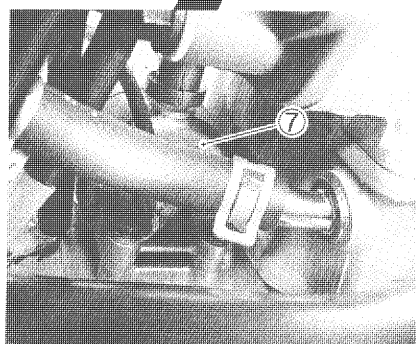
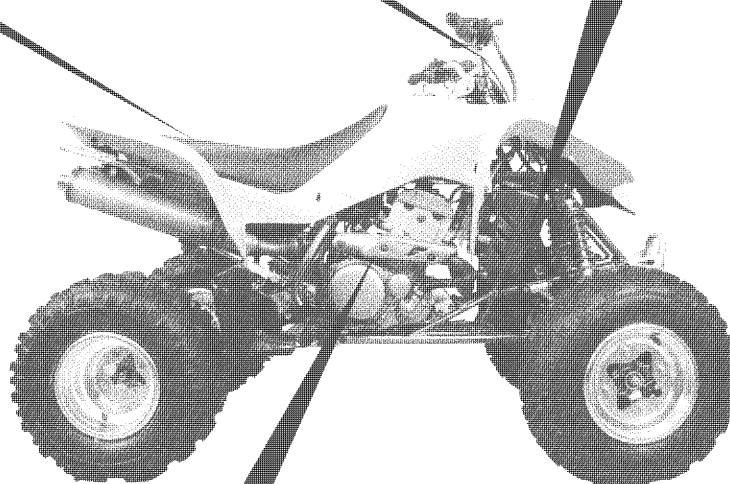
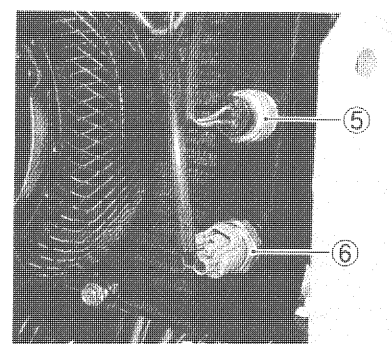
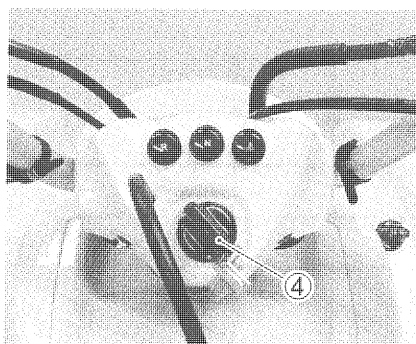
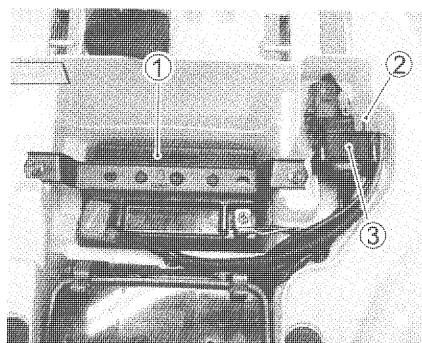
Before using the multi circuit tester, read its instruction manual.



LOCATION OF ELECTRICAL COMPONENTS



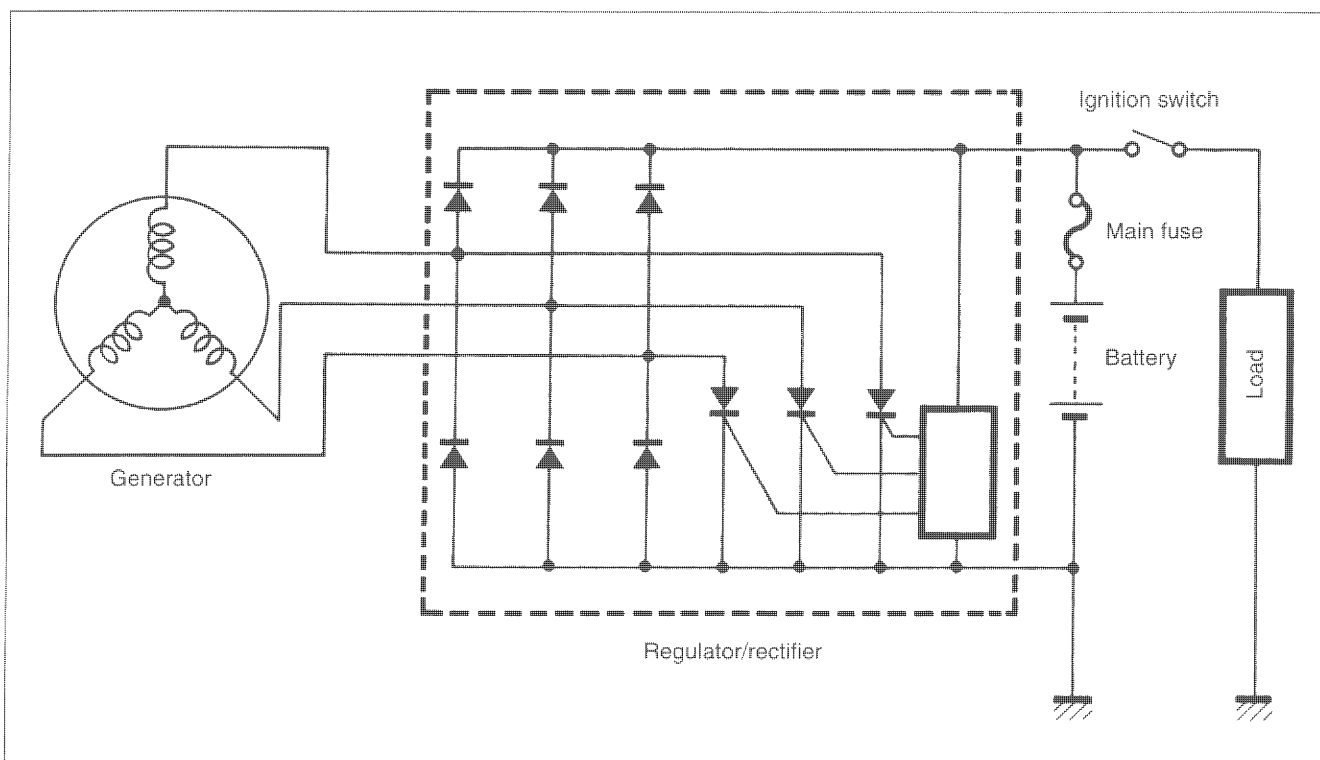
- ① Handlebar switch
- ② Ignition coil
- ④ CDI unit
- ⑤ Regulator/rectifier



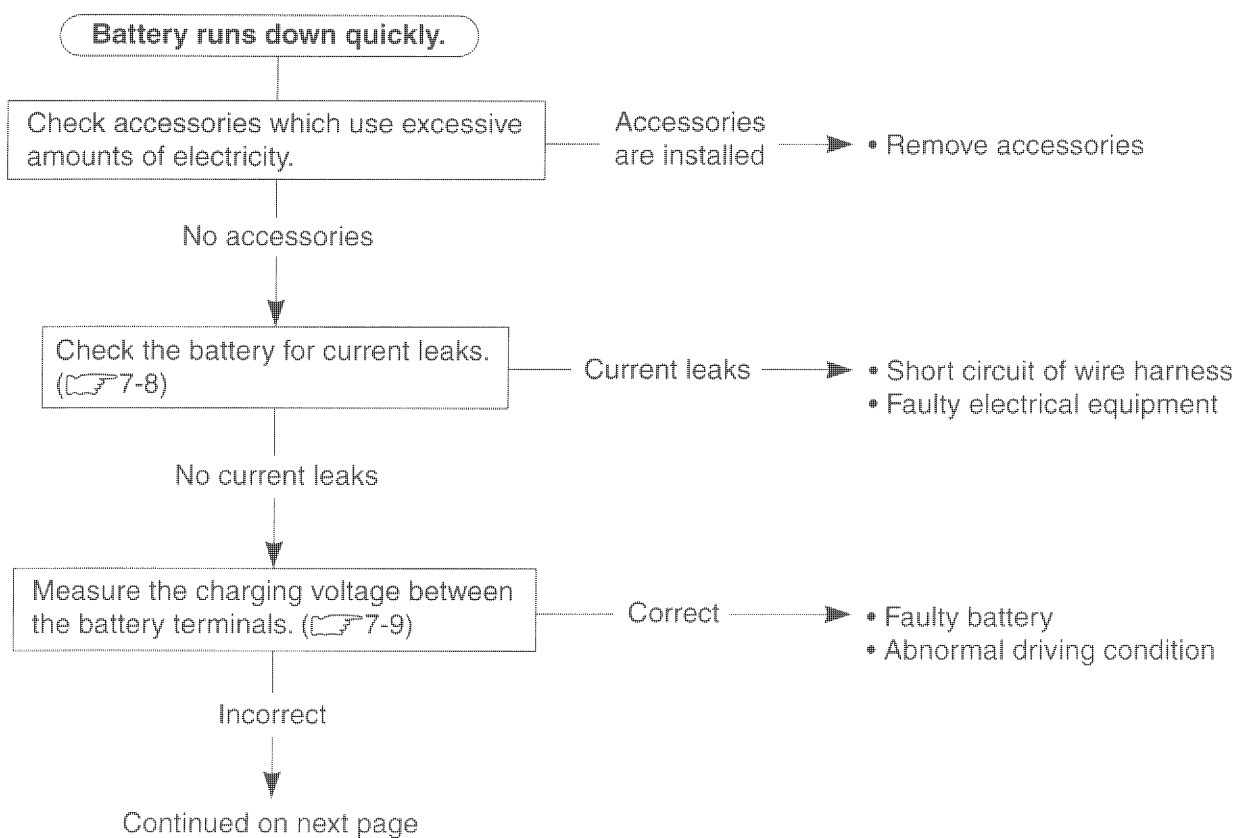
- ① Battery
- ② Main fuse
- ③ Starter relay
- ④ Ignition switch

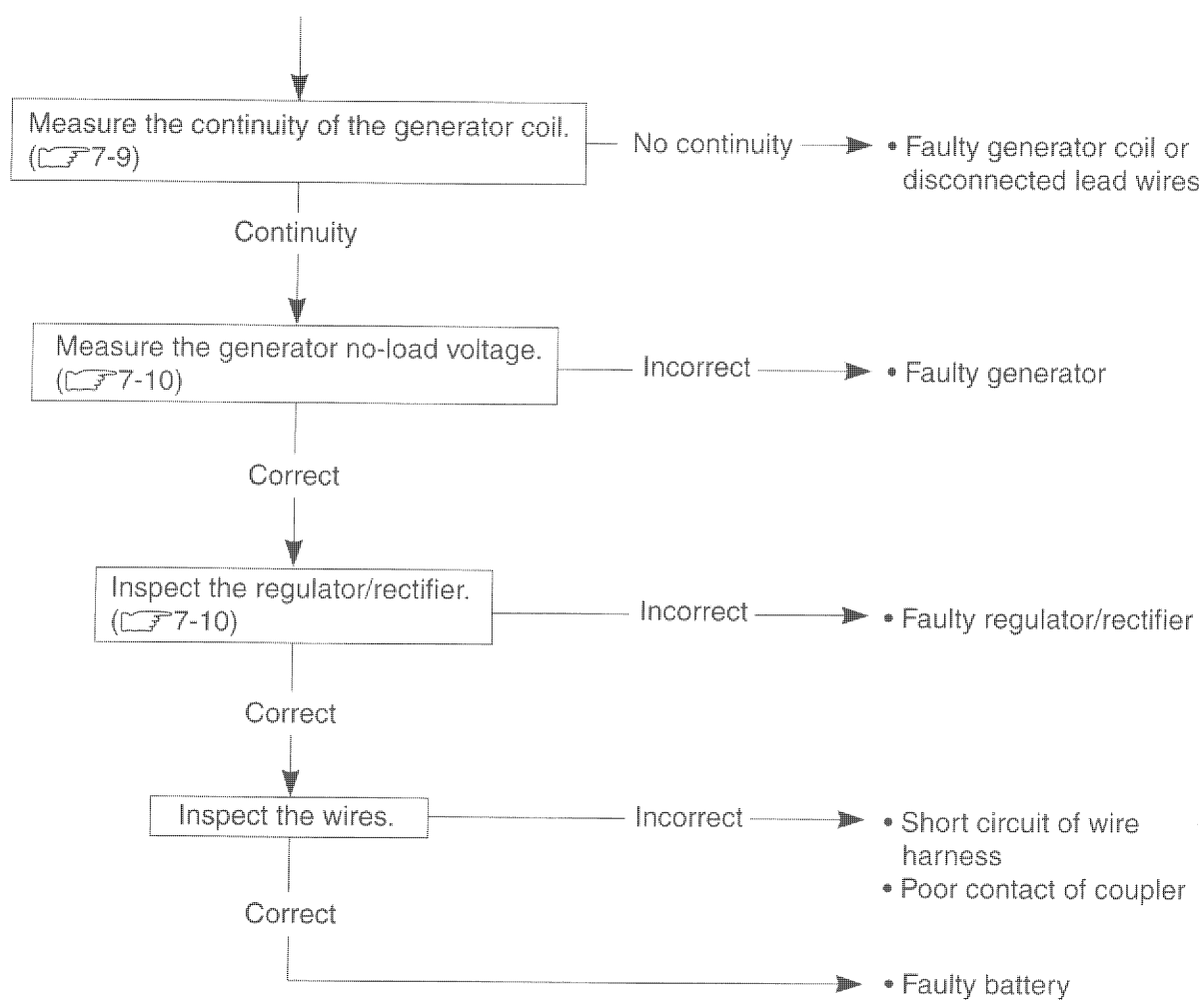
- ⑤ Engine coolant temp. switch (☞ 5-10)
- ⑥ Cooling fan thermo-switch (☞ 5-9)
- ⑦ Starter motor

CHARGING SYSTEM



TROUBLESHOOTING





Others

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

INSPECTION

BATTERY CURRENT LEAKAGE

- Remove the seat. (☞ 6-4)
- Turn the ignition switch to the "OFF" position.
- Disconnect the $\ominus$ battery 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

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

DATA Battery current (leak): Under 1.0 mA

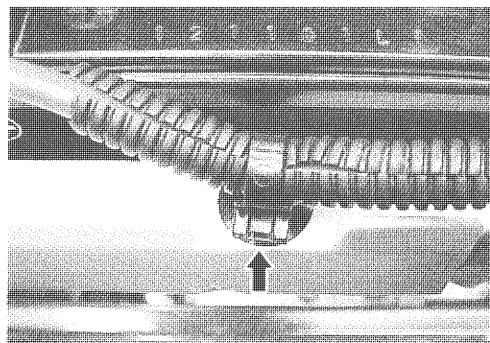
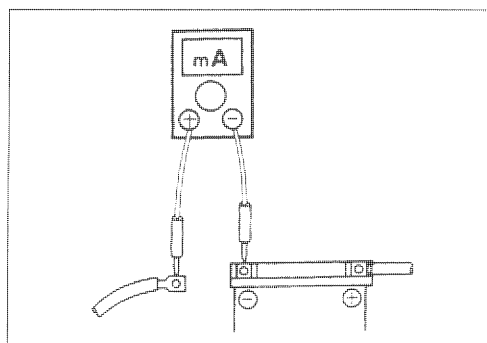
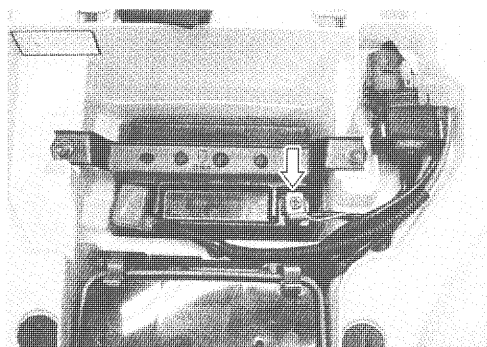
CAUTION

- * Because the current leak might be large, turn the tester to the 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.

NOTE:

When removing the $\oplus$ battery lead wire release the hook of clamp.



REGULATED VOLTAGE

- Remove the seat. (☞ 6-4)
- Start the engine, turn the ignition switch to LIGHT (☞) and the dimmer switch to HI and run the engine at 5 000 r/min.

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. (☞ 7-9 and 7-10)

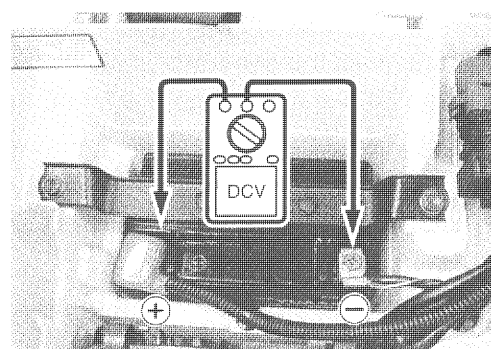
NOTE:

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

 **09900-25008: Multi circuit tester set**
09900-26006: Tachometer

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

 **Regulated voltage: 14.0 – 15.5 V at 5 000 r/min**



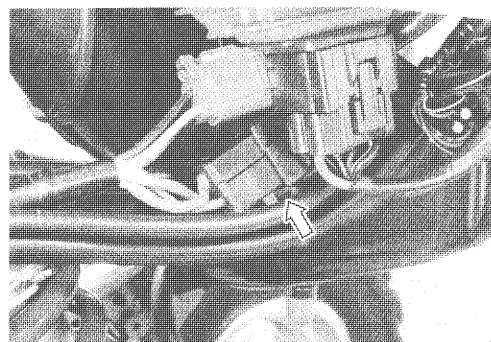
GENERATOR COIL RESISTANCE

- Disconnect the generator coupler.

Measure the resistance between the three lead wires.

If the resistance is not specified value, replace the stator coil with a new one.

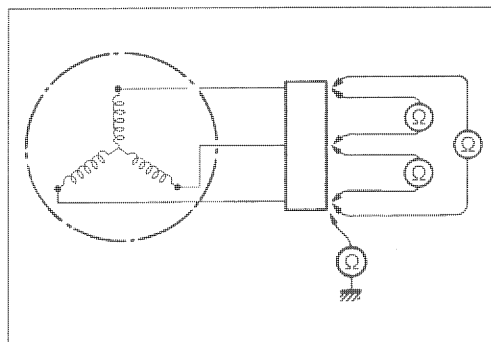
Also, check that the generator core is insulated.



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

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

 **Generator coil resistance:**
0.1 – 1.5 Ω (Brown – Brown) ∞ Ω (Brown – Ground)



GENERATOR NO-LOAD PERFORMANCE

- Disconnect the generator lead wire coupler.
- Start the engine and run it at 5 000 r/min.

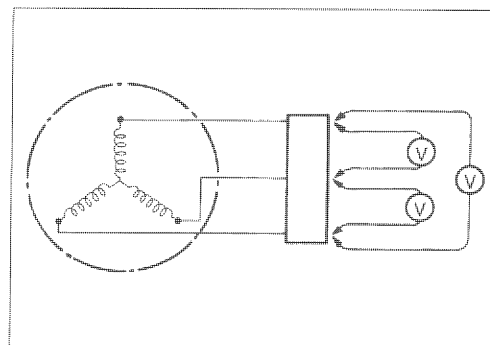
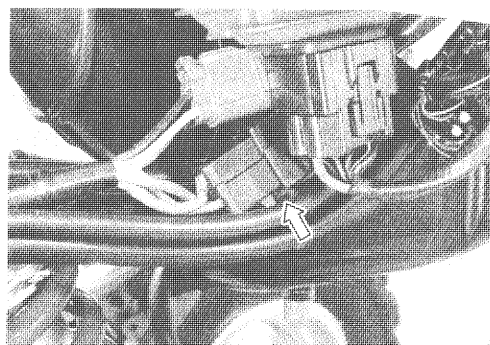
Measure the AC voltage between the lead wires of the generator using the multi circuit tester.

If the voltage is under the specified value, replace the AC generator with a new one.

TOOL 09900-25008: Multi circuit tester set
09900-26006: Tachometer

TESTER Tester knob indication: Voltage (~)

DATA Generator no-load performance (when engine is cold):
More than 65 V (AC) at 5 000 r/min

**REGULATOR/RECTIFIER**

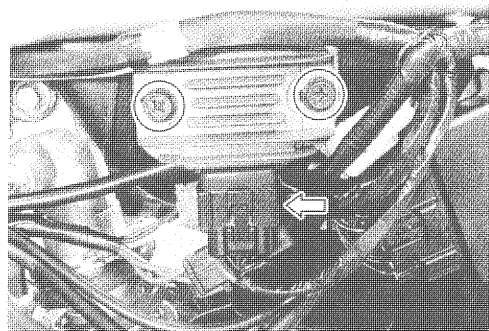
- Remove the rear fender. (6-7)
- Remove the regulator/rectifier.

Measure the voltage between the terminals using the multi circuit tester, as indicated in the table below.

If the voltage is not within the specified value, replace the regulator/rectifier with a new one.

TOOL 09900-25008: Multi circuit tester set

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



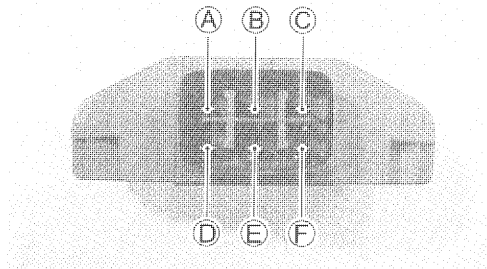
Unit: V

Tester probe	⊕ Tester probe					
	(A)	(B)	(C)	(D)	(E)	(F)
(A)		*	0.5-1.2	0.4-0.7	0.4-0.7	0.4-0.7
(B)	*		*	*	*	*
(C)	*	*		*	*	*
(D)	*	*	0.4-0.7		*	*
(E)	*	*	0.4-0.7	*		*
(F)	*	*	0.4-0.7	*	*	

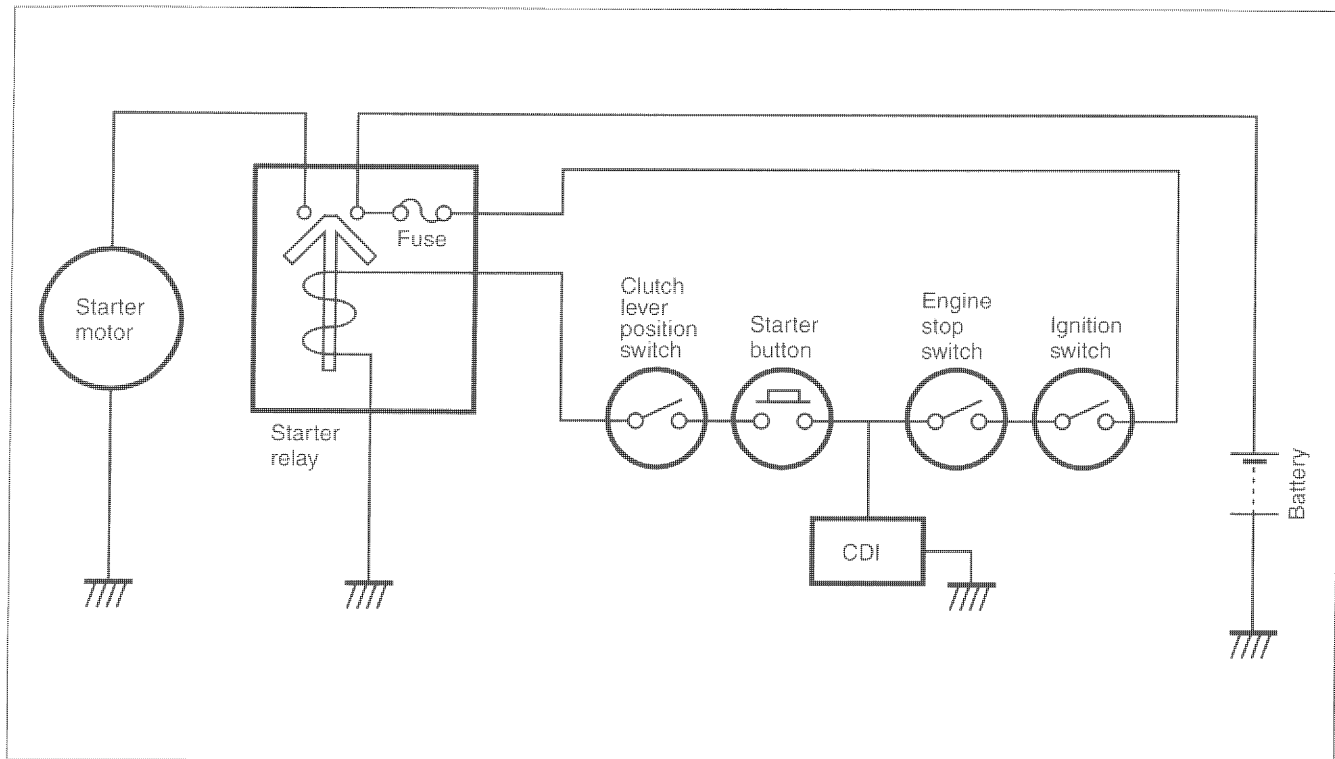
* More than 1.4 V (tester's battery voltage)

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



TROUBLESHOOTING

Starter motor will not run.

The transmission is in neutral. Turn on the ignition switch with the engine stop switch in the "RUN" position. Listen for a click from the starter relay when the starter button is pushed.

Clicks

Check if the starter motor runs when its terminal is connected to the $\oplus$ battery terminal (Do not use a thin wire because a large amount of current flows.)

Runs

Does not run

• Faulty starter motor

- Faulty starter relay
- Loose or disconnected starter motor lead wire

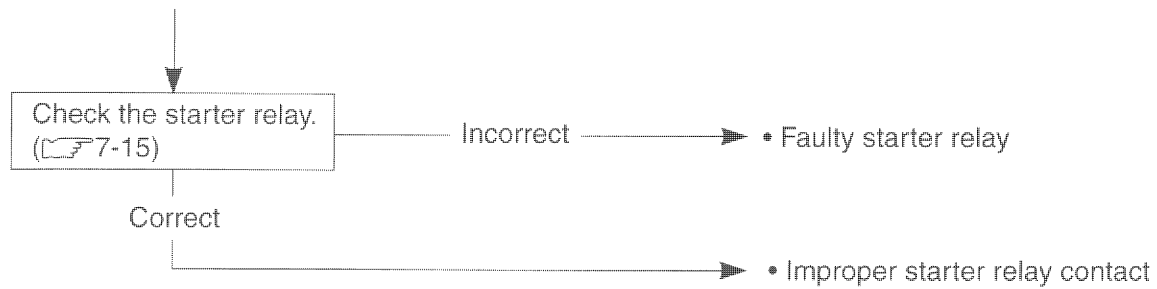
Measure the starter relay voltage at the starter relay connectors (between Y/B $\oplus$ and B/W $\ominus$) when the starter button is pushed.

No voltage

- Faulty ignition switch
- Faulty engine stop switch
- Faulty neutral switch
- Faulty starter button
- Improper connector contact
- Open circuit in wire harness

Voltage

Continued on next page



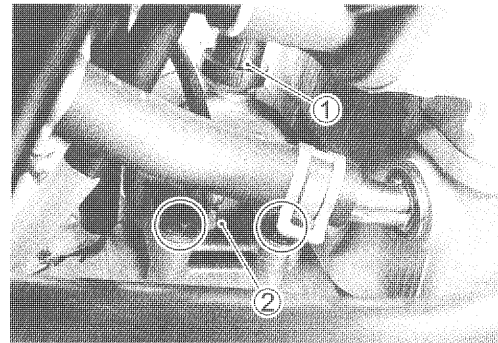
The starter motor runs when the transmission is in neutral, but does not run when the transmission is in any position other than neutral, with the parking brake lever grasp firmly.

Others

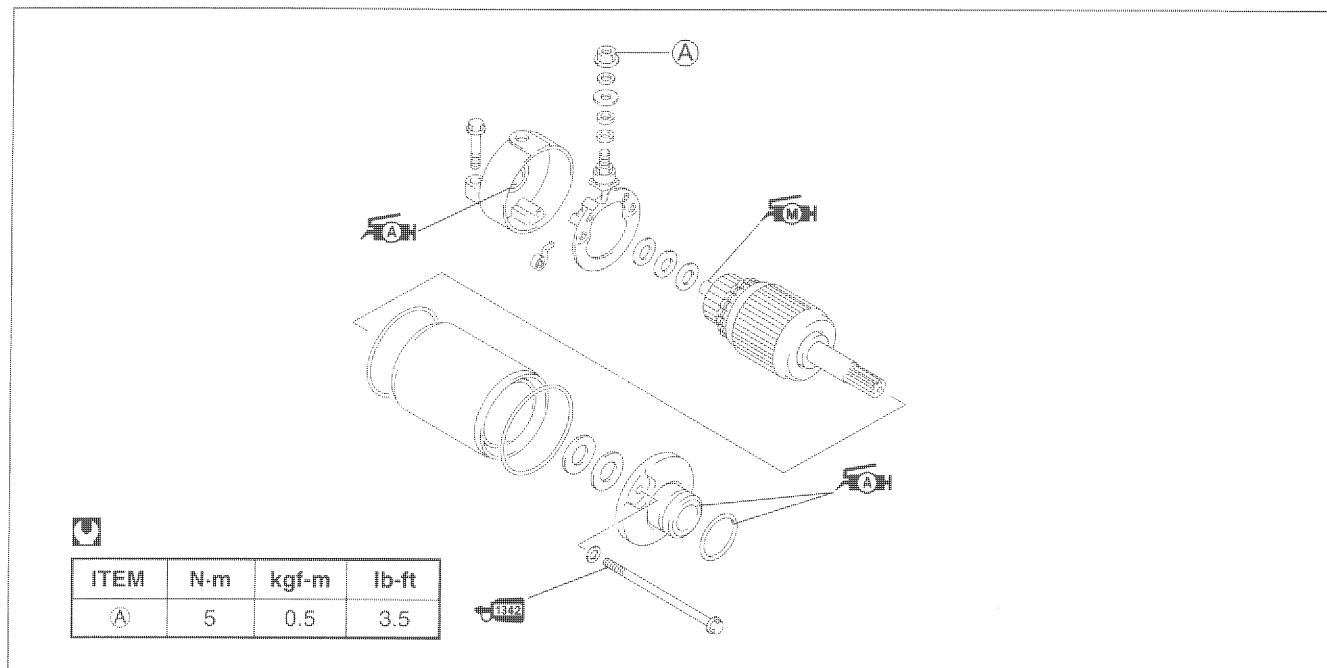
Engine does not turn though the starter motor runs.	• Faulty starter clutch
---	-------------------------

STARTER MOTOR REMOVAL AND DISASSEMBLY

- Disconnect the starter motor lead wire ① and engine ground lead wire ②.
- Remove the starter motor.



- Disassembly the starter motor, as shown.

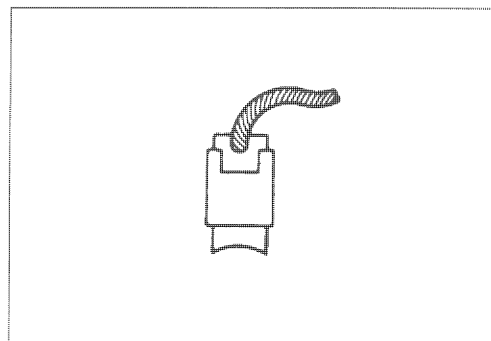


STARTER MOTOR INSPECTION

CARBON BRUSHES

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

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



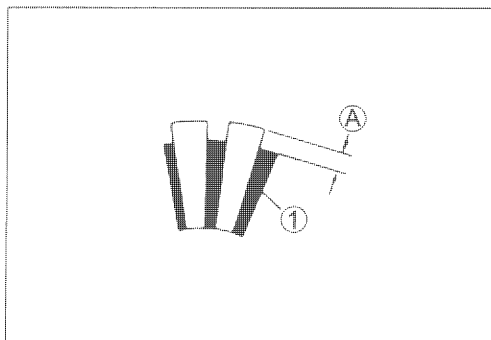
COMMUTATOR

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

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

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

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



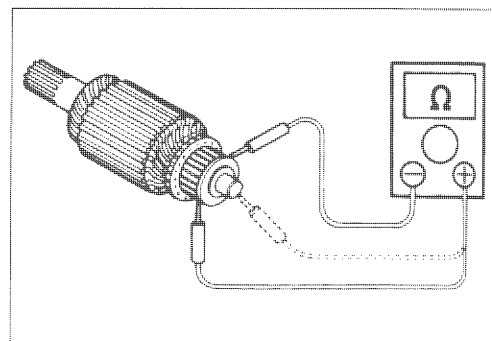
ARMATURE COIL INSPECTION

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

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

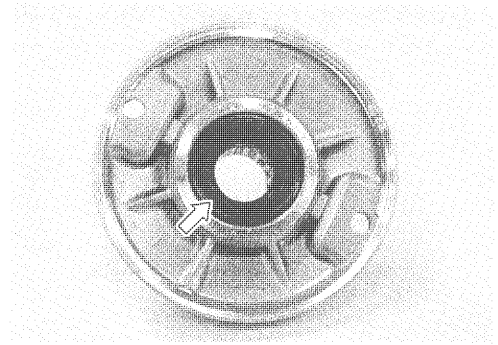
TOOL 09900-25008: Multi circuit tester set

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



OIL SEAL

Check the seal lip for damage or leakage. If any damages are found, replace the starter motor with a new one.

**STARTER MOTOR REASSEMBLY AND REMOUNTING**

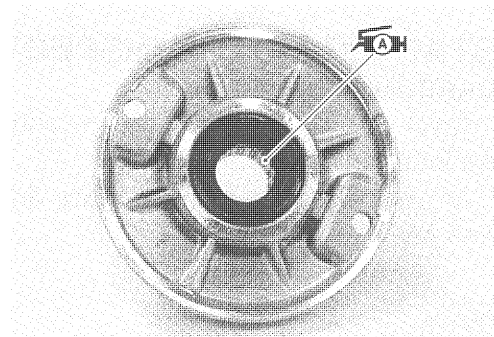
Reassemble and remount the starter motor in the reverse order of removal and disassembly. Pay attention to the following points:

CAUTION

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

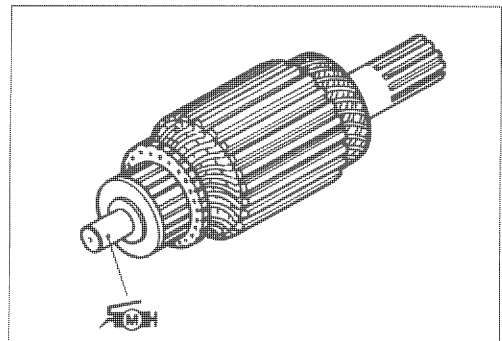
- Apply SUZUKI SUPER GREASE "A" to the lip of the oil seal.

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



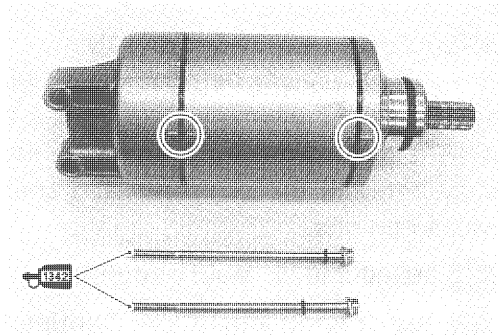
- Apply a small quantity of SUZUKI MOLY PASTE to the armature shaft.

 99000-25140: SUZUKI MOLY PASTE



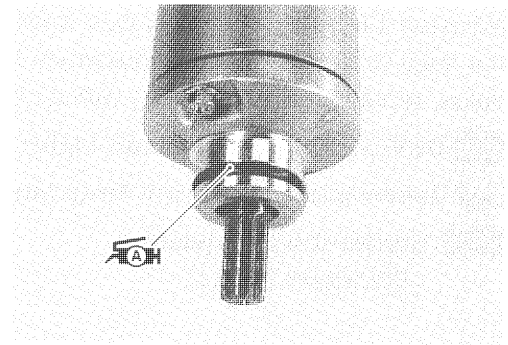
- Align the match marks on the starter motor case with the match mark on the housing end.
- Apply a small quantity of THREAD LOCK "1342" to the starter motor housing bolts and tighten it securely.

 99000-32050: THREAD LOCK "1342"



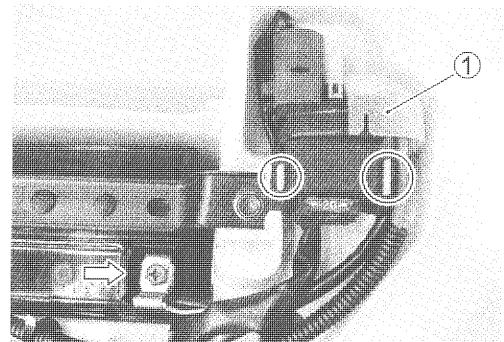
- Apply SUZUKI SUPER GREASE "A" to the O-ring .

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

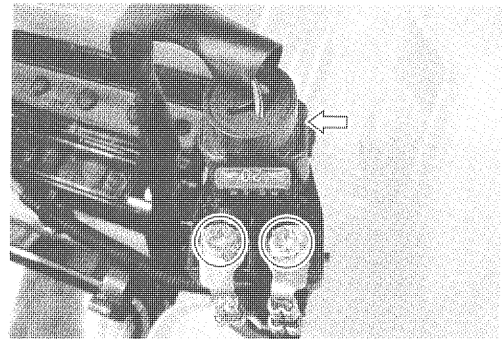


STARTER RELAY INSPECTION

- Remove the seat. (☞ 6-4)
- Disconnect the battery $\ominus$ lead wire at battery terminal.
- Remove the starter relay cover ①.



- Disconnect the starter motor lead wire, battery lead wire and starter relay coupler at the starter relay.



Apply 12 V to the 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.

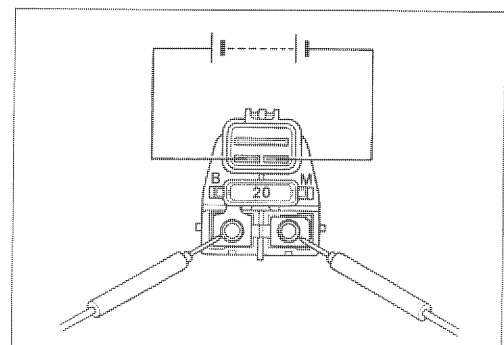
 09900-25008: Multi circuit tester set

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

CAUTION

Do not apply a battery voltage to the starter relay for more than five seconds.

This may overheat and damage the relay coil.

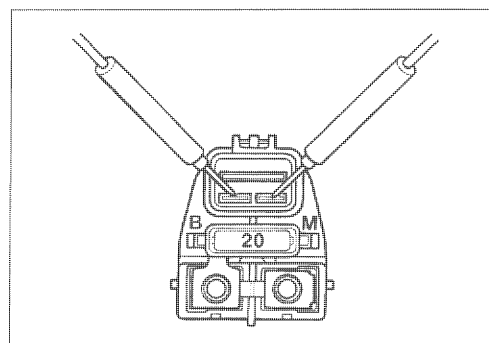


Measure the relay coil resistance between the terminals using the multi circuit tester. If the resistance is not within the specified value, replace the starter relay with a new one.

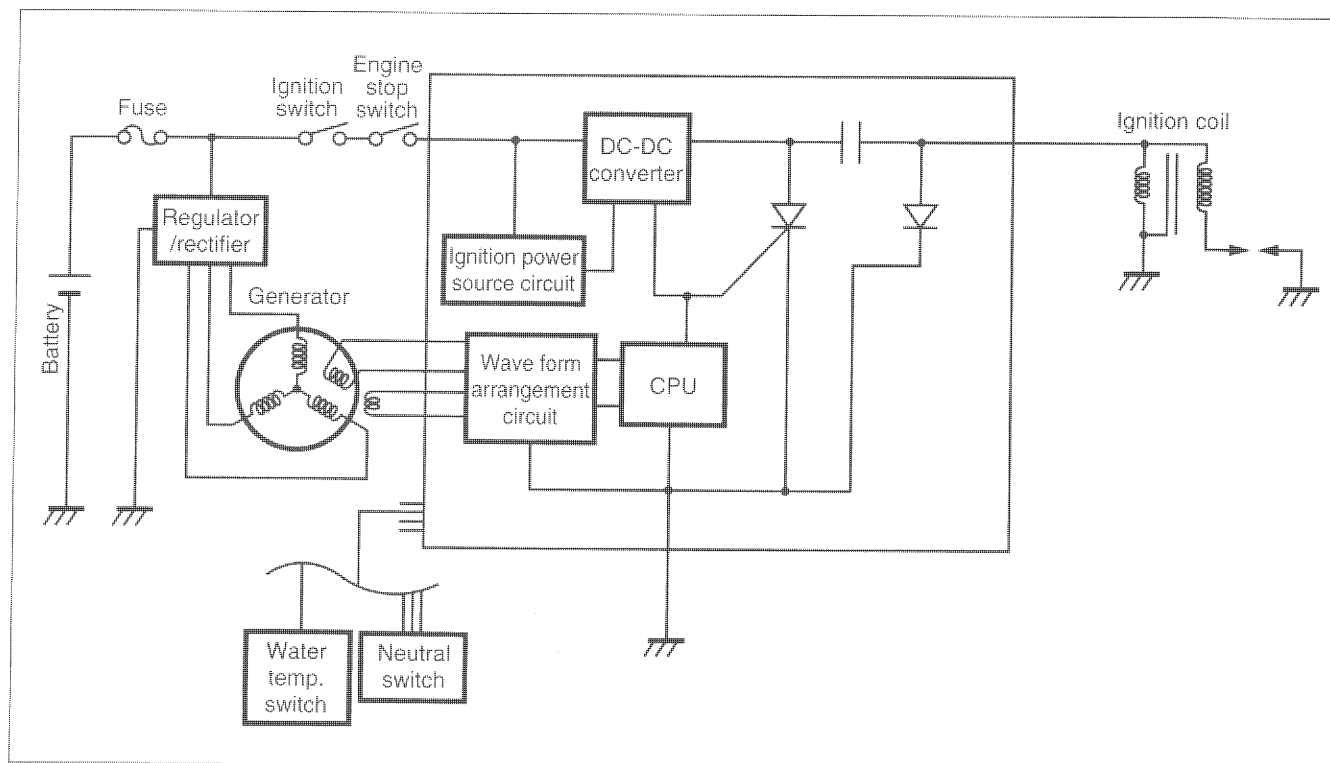
 **09900-25008: Multi circuit tester set**

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

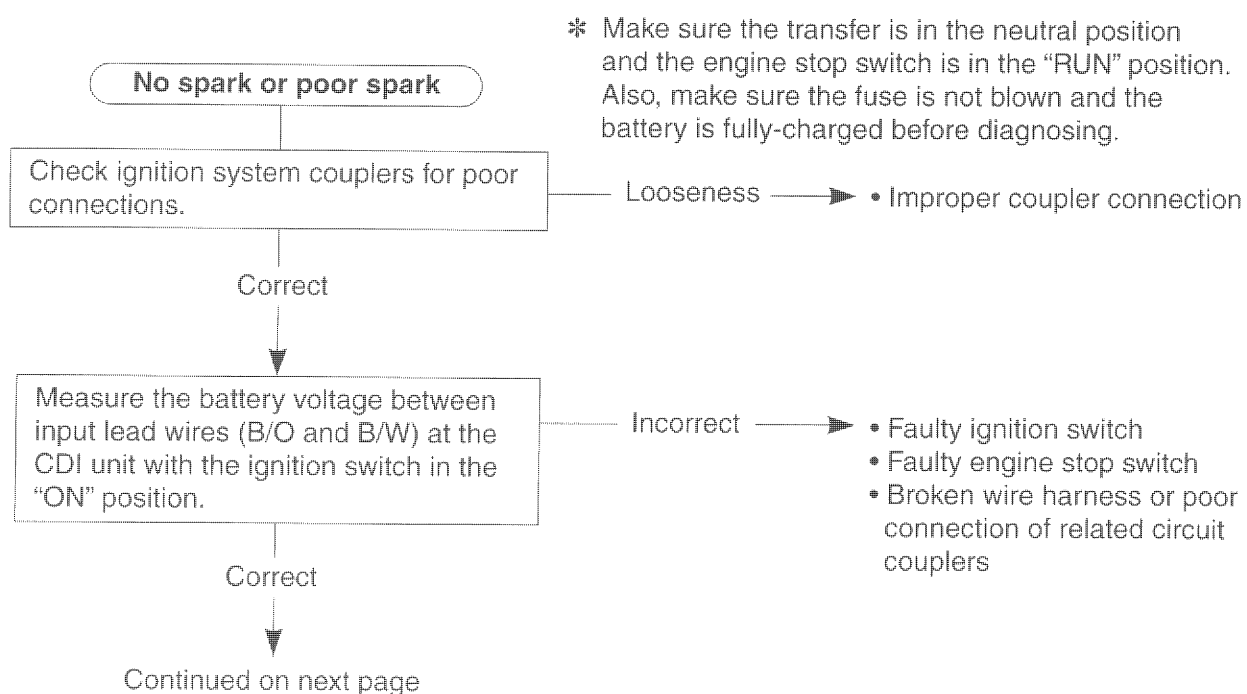
 **Starter relay resistance**
Standard: 3 – 6 Ω



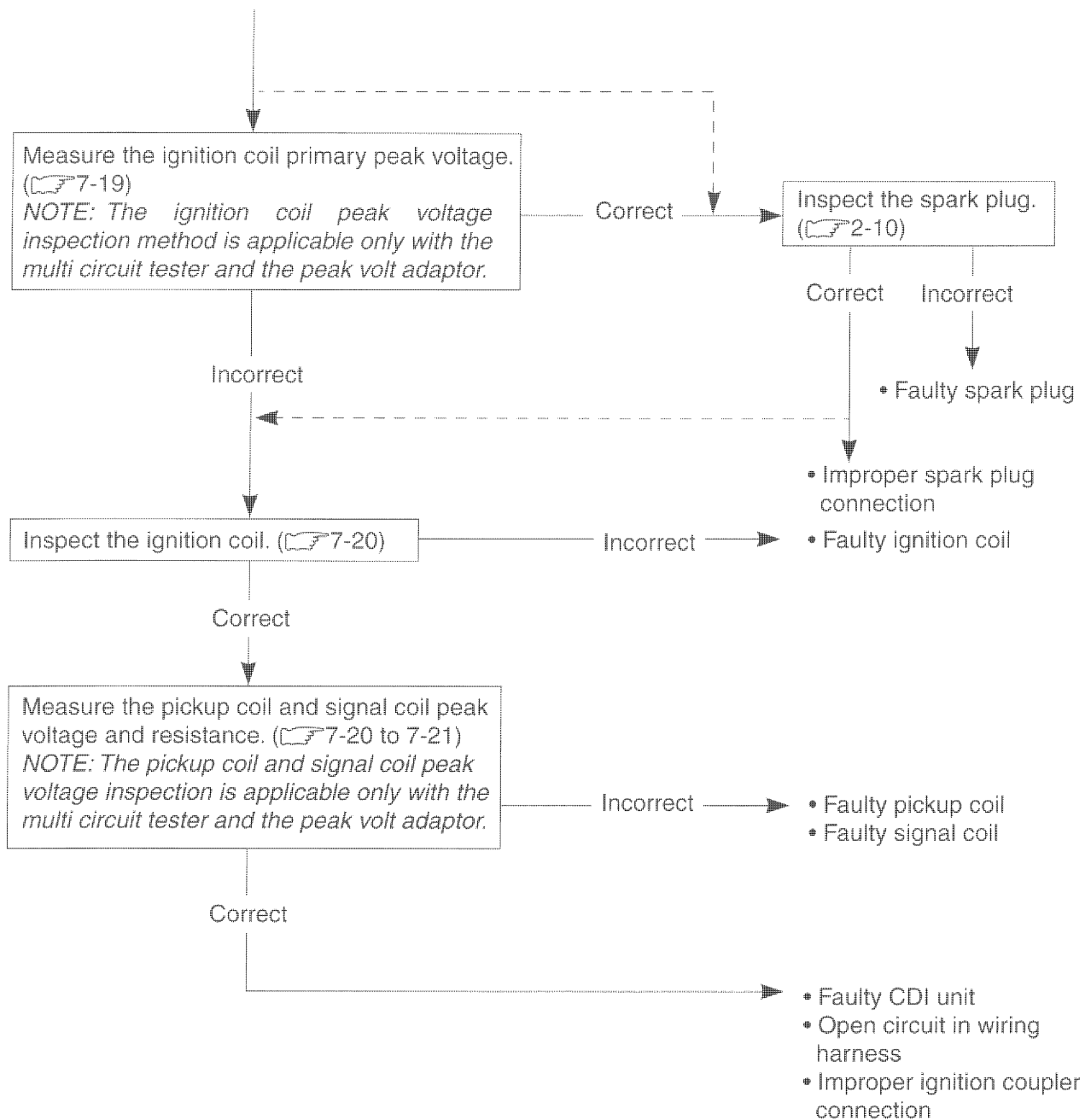
IGNITION SYSTEM



TROUBLESHOOTING



* Make sure the transfer is in the neutral position and the engine stop switch is in the "RUN" position. Also, make sure the fuse is not blown and the battery is fully-charged before diagnosing.



INSPECTION

IGNITION COIL PRIMARY PEAK VOLTAGE

- Remove the front fender, side cover, fuel tank. (☞ 6-4)
- Remove the spark plug cap.
- Connect a new spark plug to spark plug cap and ground it to the cylinder head.

NOTE:

Make sure that the spark plug cap and spark plug are connected properly and the battery is fully-charged.

Measure ignition coil primary peak voltage using the multi circuit tester in the following procedure.

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

⊕ Probe: Black/White lead wire or Ground

⊖ Probe: Black

NOTE:

Do not disconnect the ignition coil primary wire.

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

CAUTION

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

- Shift the transfer to the neutral position and turn the ignition switch to the "ON" position.
- Press the starter button and allow the engine to crank for a few seconds, and then measure the ignition coil primary peak voltage.
- Repeat the above procedure a few times and measure the highest ignition coil primary peak voltage.

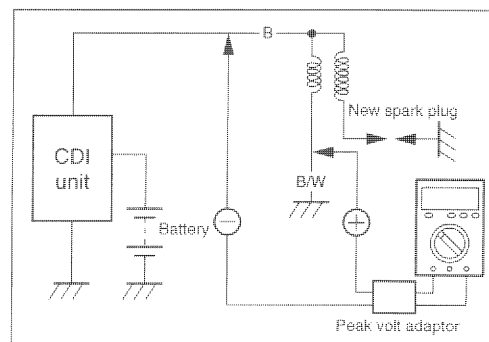
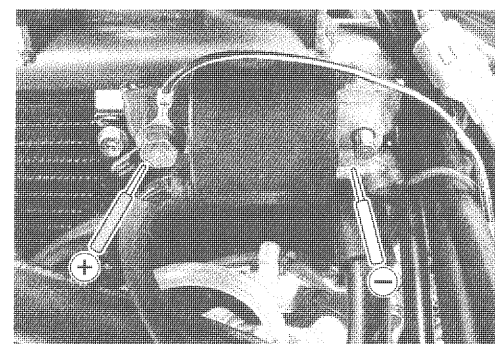
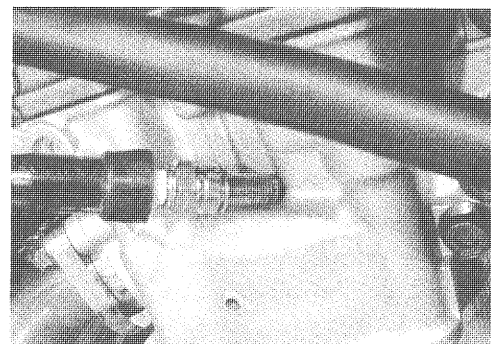
 **Tester knob indication: Voltage (V)**

 **Ignition coil primary peak voltage: More than 130 V**

WARNING

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

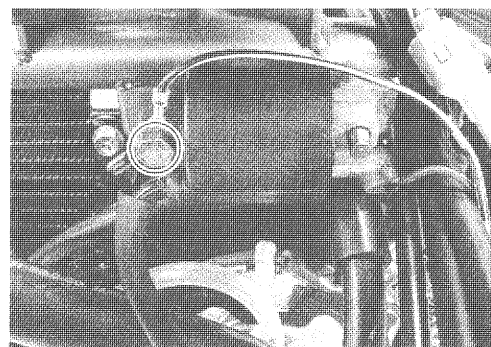
If the voltage is lower than the standard values, inspect the ignition coil. (☞ 7-20)



IGNITION COIL RESISTANCE

- Remove the front fender, side cover, fuel tank. (6-4)
- Disconnect the ignition coil lead wires and spark plug cap, and remove the ignition oil.

Measure the ignition coil resistance in both the primary and secondary windings using the multi circuit tester. If the resistance in both the primary and secondary windings is close to the specified values, the windings are in sound condition.



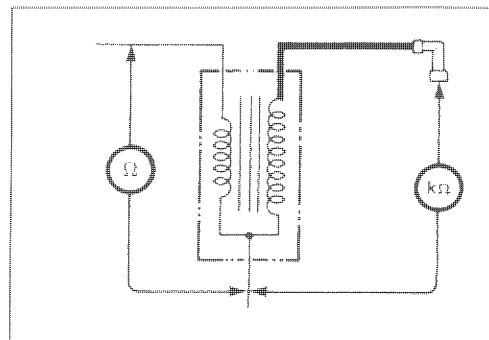
TOOL 09900-25008: Multi circuit tester set

TESTER Tester knob indication: Resistance (Ω)

DATA Ignition coil resistance

Primary: 0.1 – 1.0 Ω (+Terminal – $\ominus$ Ground)

Secondary: 12 – 20 k Ω (Spark plug cap – +Terminal)

**PICKUP COIL AND SIGNAL COIL PEAK VOLTAGE****NOTE:**

Make sure that all of the couplers are connected properly.

- Disconnect the wire harness coupler ①.

Measure the pickup coil and signal coil peak voltage in the following procedure.

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

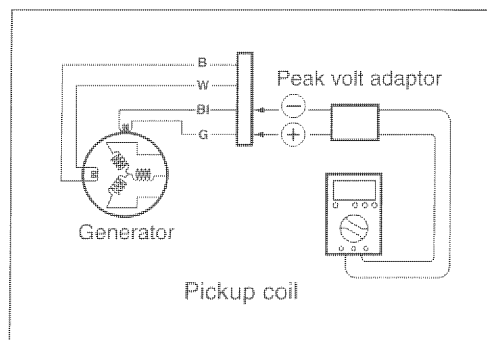
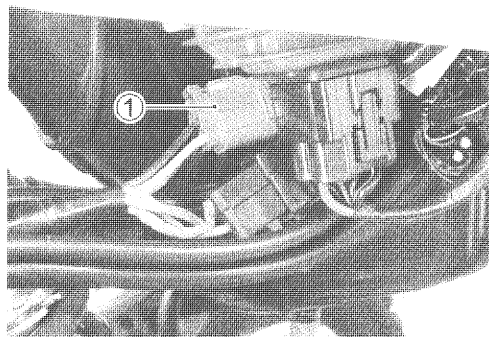
Pickup coil: Blue ($\ominus$ probe) – Green ($\oplus$ probe)

Signal coil: Black ($\ominus$ probe) – White ($\oplus$ probe)

TOOL 09900-25008: Multi circuit tester set

CAUTION

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



- Shift the transmission to the neutral position, turn the ignition switch to the "ON" position.
- Press the starter button and allow the engine to turn for a few seconds, and then measure the pickup coil and signal coil peak voltage.
- Repeat the above procedure a few times and measure the highest pickup coil and signal coil peak voltage.

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

DATA Pickup coil peak voltage: More than 2.0 V

Signal coil peak voltage: More than 0.1 V

PICKUP COIL AND SIGNAL COIL RESISTANCE

- Disconnect the generator coupler ①.

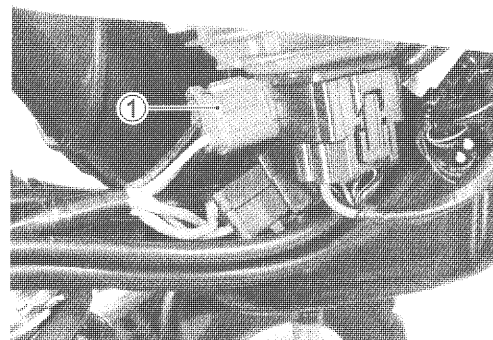
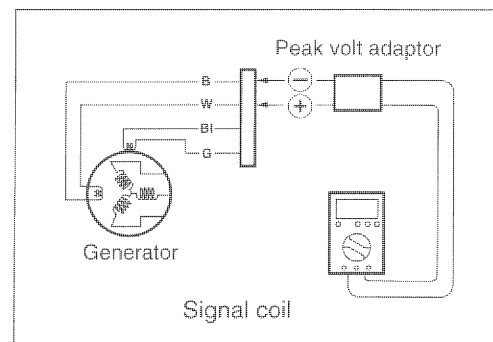
Measure the resistance between the lead wires using the multi circuit tester. If the resistance is not within the specified value, the pickup coil and signal coil must be replaced.

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

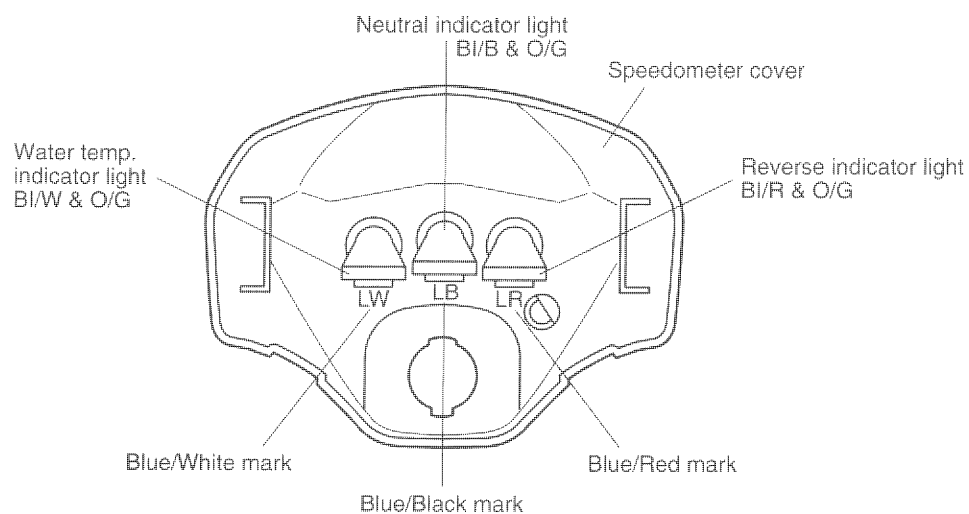
 **Tester knob indication: Resistance (Ω)**

DATA Pickup coil resistance: 350 – 670 Ω (Blue – Green)

Signal coil resistance: 0.09 – 0.5 Ω (Black – White)



INDICATOR LIGHT POSITION



WIRE COLOR

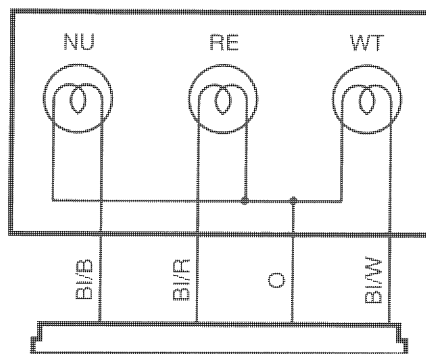
BI/B: Blue with Black tracer

BI/W: Blue with White tracer

BI/R: Blue with Red tracer

O/G: Orange with Green tracer

INSPECTION



ITEM	+	-
WT: Water temp. warning	O	BI/W
RE: Reverse indicator light	O	BI/R
NU: Neutral indicator light	O	BI/B

WIRE COLOR

BI/B : Blue with Black tracer

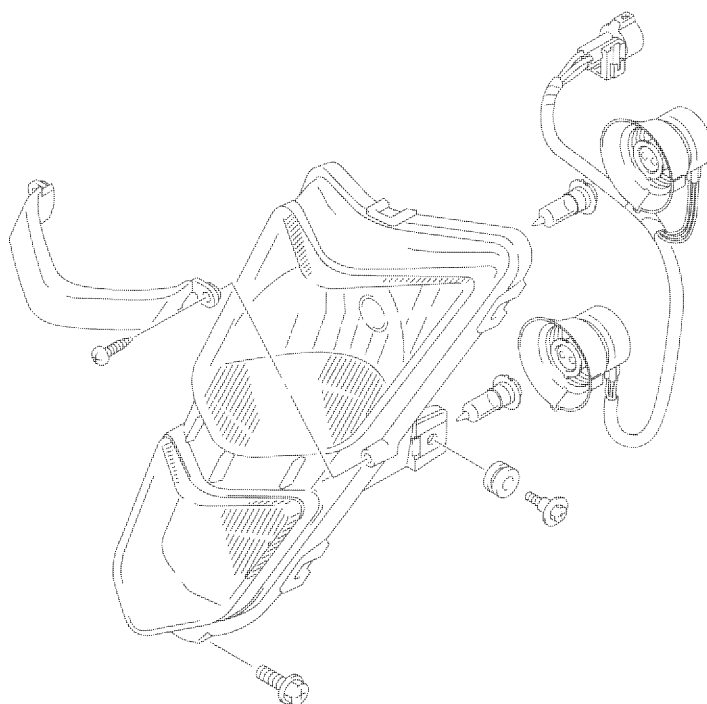
BI/R : Blue with Red tracer

BI/W: Blue with White tracer

O : Orange

LAMPS

HEADLIGHT

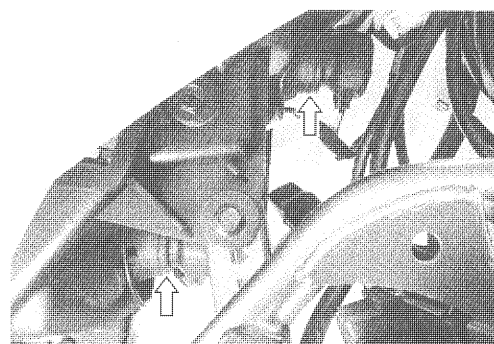


CAUTION

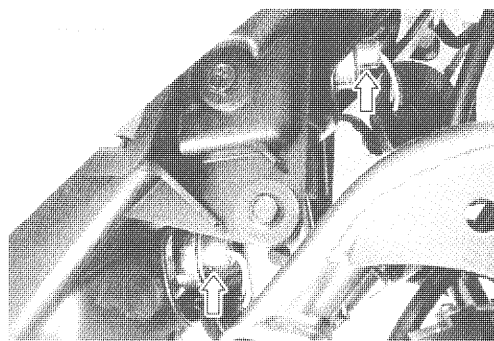
If you touch the bulb with your bare hands, clean the bulb with a cloth moistened with alcohol or soapy water to prevent premature bulb failure.

HEADLIGHT BULB REPLACEMENT

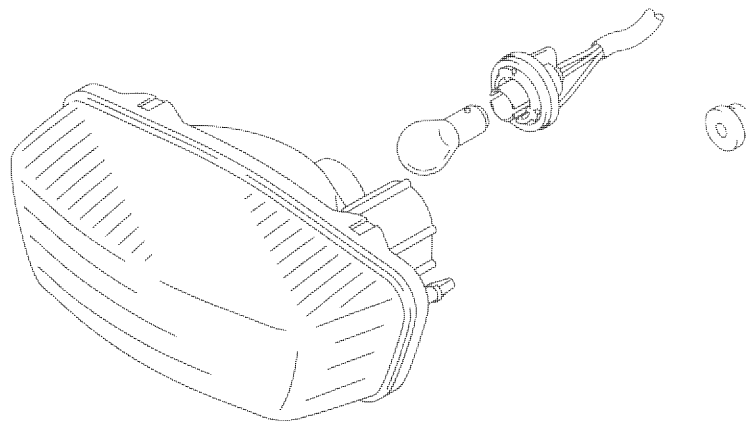
- Remove the cover.



- Remove the socket.
- Remove the bulb.
- Install the new bulb in the reverse order of removal.



BRAKE LIGHT/TAILLIGHT



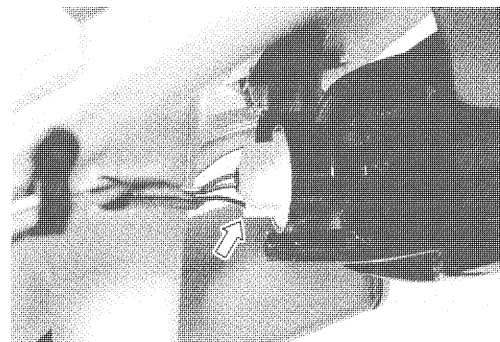
Brake light/taillight: 12 V 21/5 W

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.

BULB REPLACEMENT

- Remove the socket.
- Remove the bulb.
- Install the new bulb in the reverse order of removal.



SWITCHES

Measure each switch for continuity using a multi circuit tester. If any abnormality is found, replace the respective switch assemblies with a new one.

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

IGNITION SWITCH

Position \ Color	R	O	Gr
LIGHT (⚡)			
ON			
OFF			

DIMMER SWITCH

Position \ Color	Y	W	Gr
HI			
LO			

ENGINE STOP SWITCH

Position \ Color	O	O/W
OFF		
RUN		

STARTER BUTTON

Position \ Color	O/W	B
•		
PUSH		

NEUTRAL SWITCH

Position \ Color	R	Bl	W	B
R				
N				
F				

REAR BRAKE SWITCH

Position \ Color	O	W/B
ON		
OFF		

FRONT BRAKE SWITCH

Position \ Color	O	W/B
ON		
OFF		

COOLING FAN THERMO SWITCH

 5-10

ENGINE COOLANT TEMPERATURE SWITCH

 5-11

WIRE COLOR

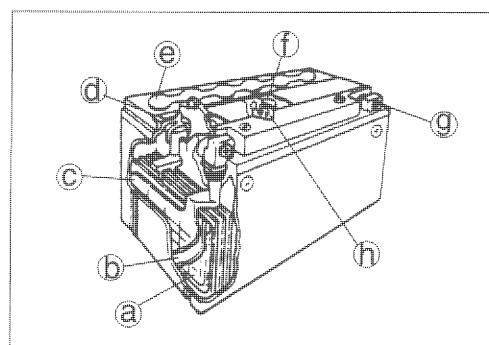
B : Black
 Bl : Blue
 Gr : Gray
 O : Orange
 R : Red
 W : White
 Y : Yellow
 O/W : Orange with White tracer
 W/B : White with Black tracer

BATTERY

SPECIFICATIONS

Type designation	YTX9-BS
Capacity	12V, 28.8 kC (8 Ah)/10HR

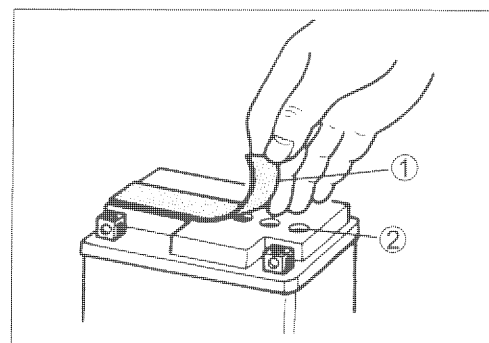
- | | |
|--------------------------------|---------------|
| Ⓐ Anode plates | Ⓔ Stopper |
| Ⓑ Separator (fiberglass plate) | Ⓣ Filter |
| Ⓒ Cathode plates | Ⓤ Terminal |
| Ⓓ Upper cover breather | Ⓥ Safty valve |



INITIAL CHARGING

FILLING ELECTROLYTE

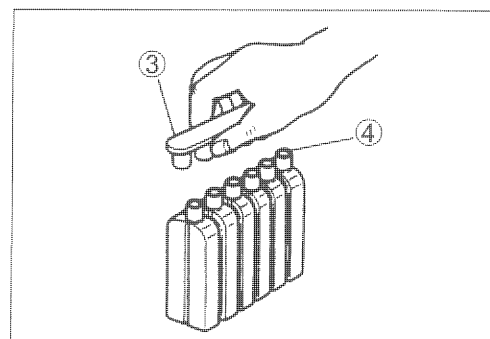
- Remove the aluminum tape ① which seals the battery filler holes ②.



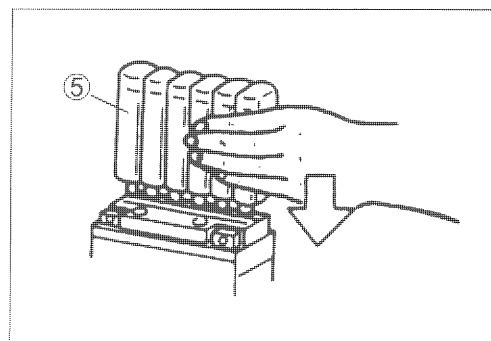
- Remove the caps ③ from the electrolyte container.

NOTE:

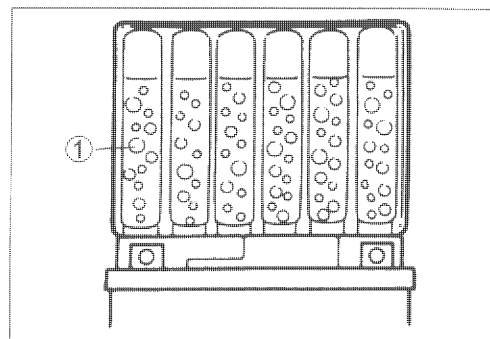
- * Do not remove or pierce the sealed areas ④ of the electrolyte container.*
- * After completely filling the battery with electrolyte, use the caps ③ from the electrolyte container to seal the battery filler holes.*



- Insert the nozzles of the electrolyte container ⑤ into the electrolyte filler holes of the battery. Hold the electrolyte container firmly so that it does not fall. Do not allow any of the electrolyte to spill.



- Make sure the air bubbles ① rise to the top of each electrolyte container and leave the electrolyte container in this position for more than 20 minutes.



NOTE:

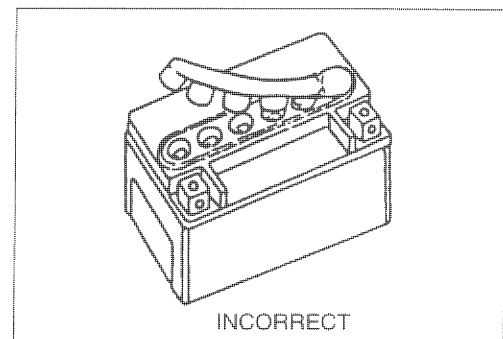
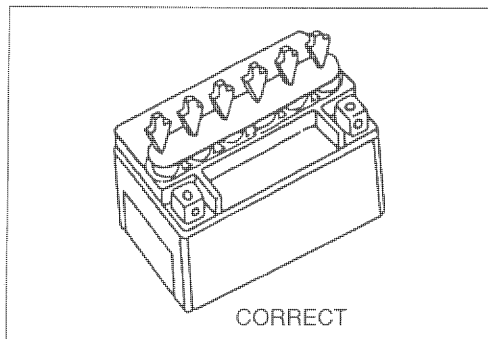
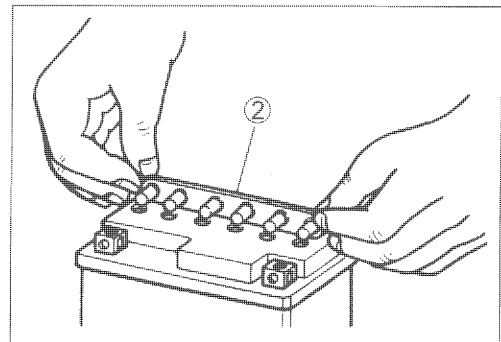
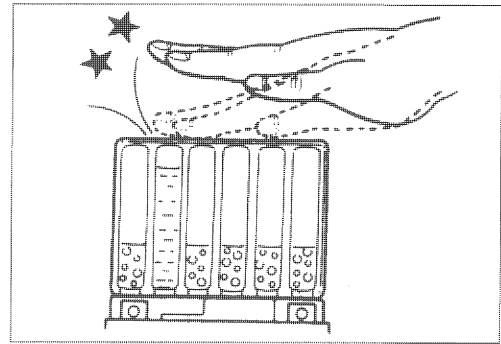
If air bubbles do not rise from any one of the filler ports, tap the bottom of the electrolyte container two or three times.

Never remove the electrolyte container from the battery while there is still electrolyte in the container.

- After the electrolyte container is completely empty, remove it from the battery and wait about 20 minutes.
- Insert the caps ② firmly into the filler holes, so that the top of the caps do not protrude above the upper surface of the top cover of the battery.

CAUTION

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



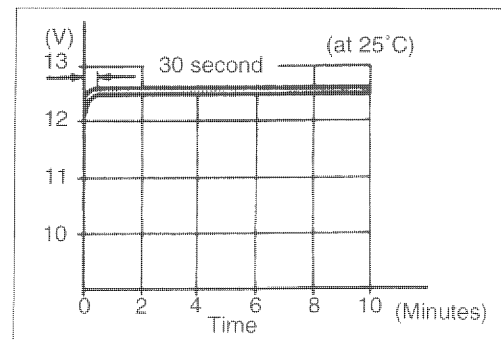
Measure the battery voltage using multi circuit tester. The tester should indicate more than 12.5 – 12.6 V (DC) as shown in the Fig. If the battery voltage is lower than the specification, charge the battery with a battery charger. (Refer to the recharging operation)

CAUTION

Do not remove the caps on the battery top while charging.

NOTE:

Initial charging for a new battery is recommended if two years have elapsed since the date of manufacture.



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 vehicle.

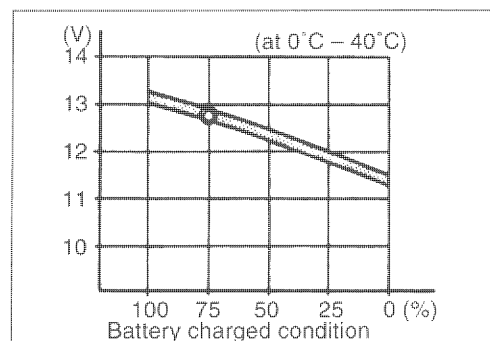
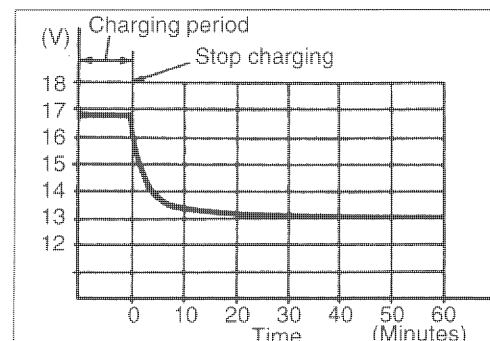
NOTE:

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 vehicle is not used for more than one month (especially during the winter season), measure the battery voltage at least once a month.