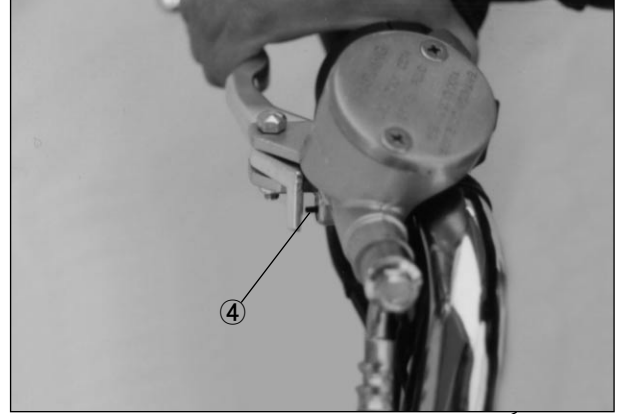


ELECTRICAL SYSTEM

CONTENTS

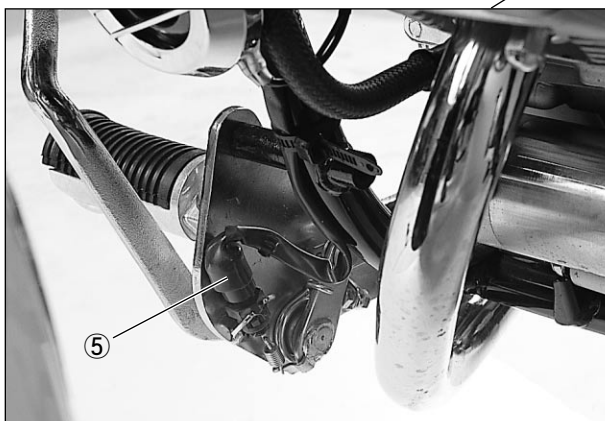
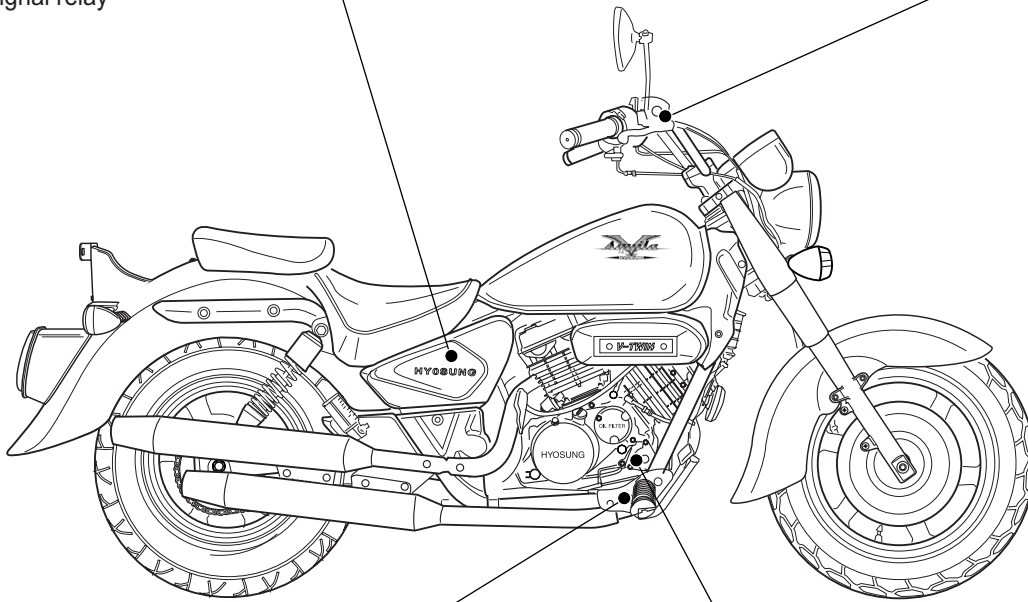
LOCATION OF ELECTRICAL COMPONENTS	5- 1
IGNITION SYSTEM	5- 3
CHARGING SYSTEM	5- 7
STARTER SYSTEM AND SIDE STAND	5- 11
IGNITION INTERLOCK SYSTEM	
SWITCHES	5- 15
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LOCATION OF ELECTRICAL COMPONENTS



- ① Battery
- ② Turn signal relay
- ③ Fuse

- ④ Front brake lamp switch

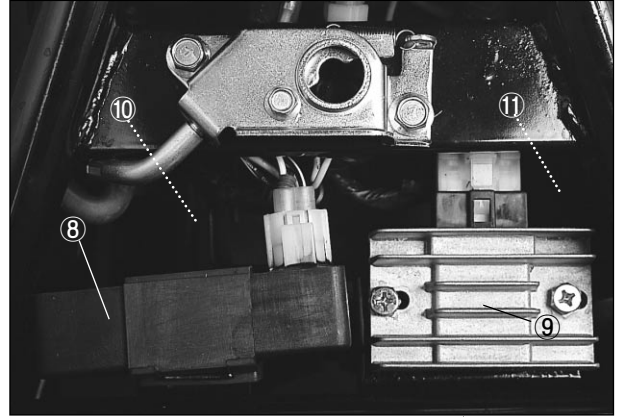


- ⑤ Rear brake lamp switch

- ⑥ Starter motor



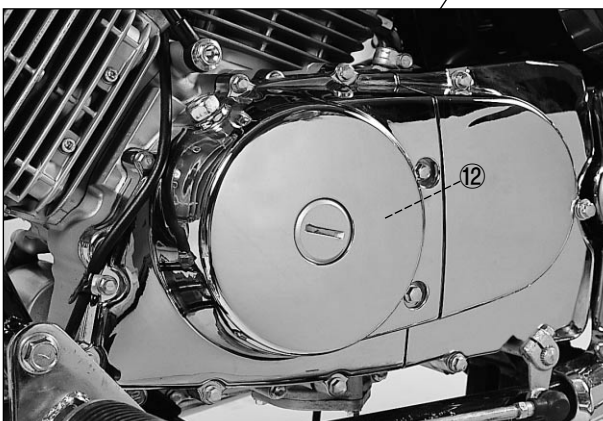
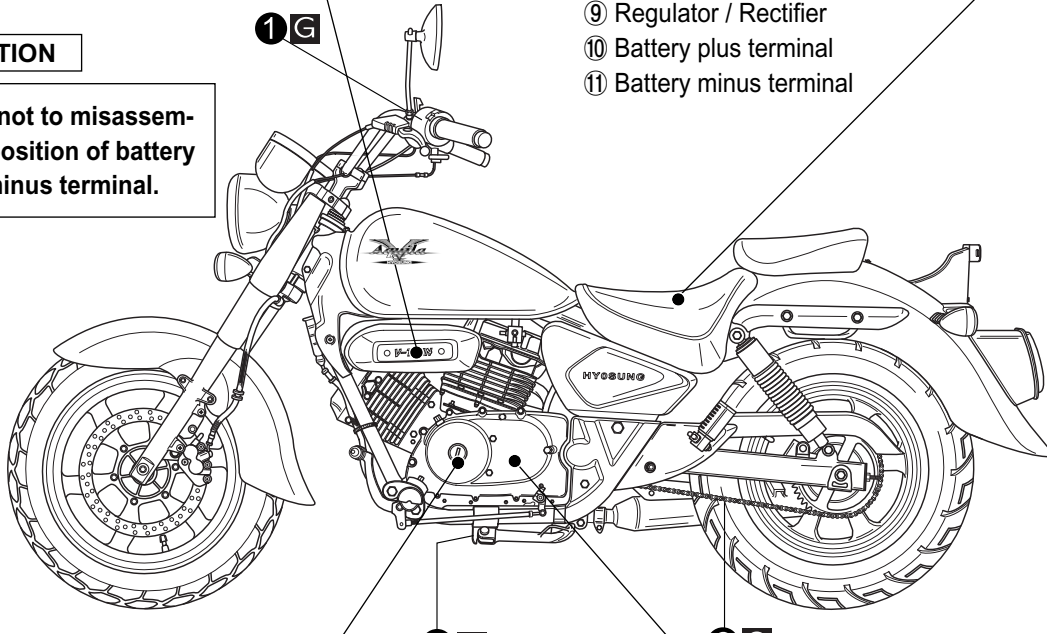
⑦ Ignition coil (NO.1 & NO.2)



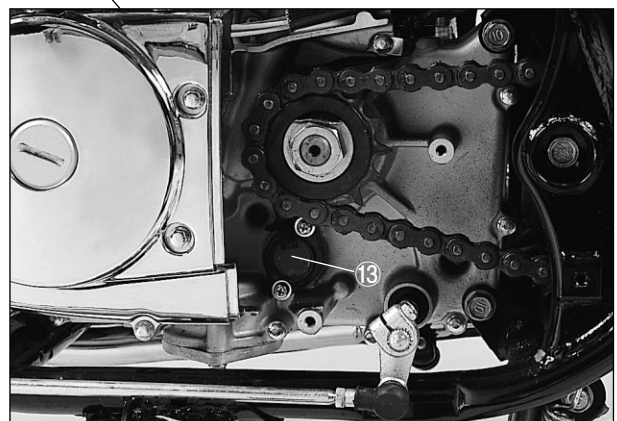
⑧ C.D.I Unit
 ⑨ Regulator / Rectifier
 ⑩ Battery plus terminal
 ⑪ Battery minus terminal

CAUTION

Be sure not to misassemble the position of battery plus & minus terminal.



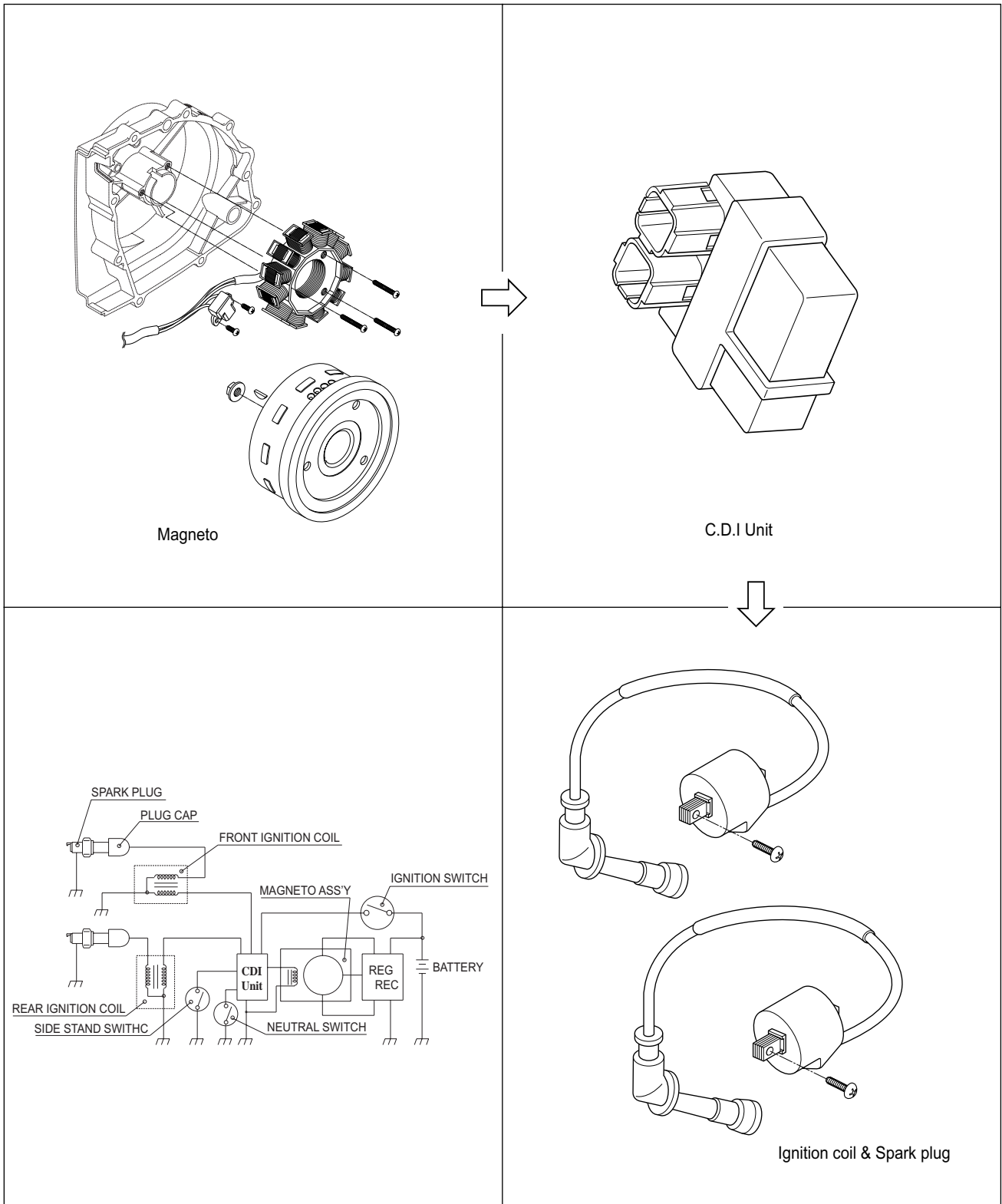
⑫ Magneto



⑬ Gear position switch

IGNITION SYSTEM

Aquila 250 is started as the battery discharged ignition system without a contact point. The battery ignition system is composed a rotor with five rotor tip, the D.C CDI, the ignition coil and battery. Ignite after permit signal at ignition timing of pick-up as electric energy of this battery, occur the 1st electric current. Therefore a high voltage current is induced in the secondary winding of the ignition coil resulting in strong spark between the spark plug gap.



⊙ INSPECTION

■ MAGNETO

Using the pocket tester, measure the resistance between the lead wires in the following table.

Pick-up coil	G - L Approx 90~110 Ω
Charging coil	Y - Y Approx 0.6~0.9 Ω

 Pocket Tester : 09900-25002



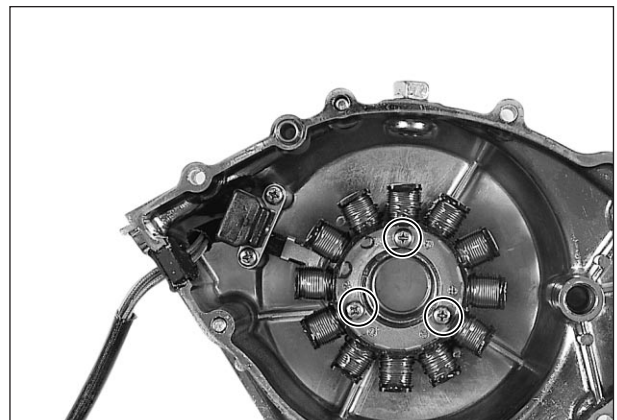
 CAUTION

When mounting the stator on the magneto cover, apply a small quantity of THREAD LOCK "1324" to the threaded parts of screws.

 THREAD LOCK "1324"

WIRE COLOR

- L : Blue
- G : Green
- Br : Brown
- B / Y : Black with Yellow tracer
- O / B : Orange with Black tracer
- G / W : Green with White tracer
- B / W : Black with White tracer
- W / L : White with Blue tracer



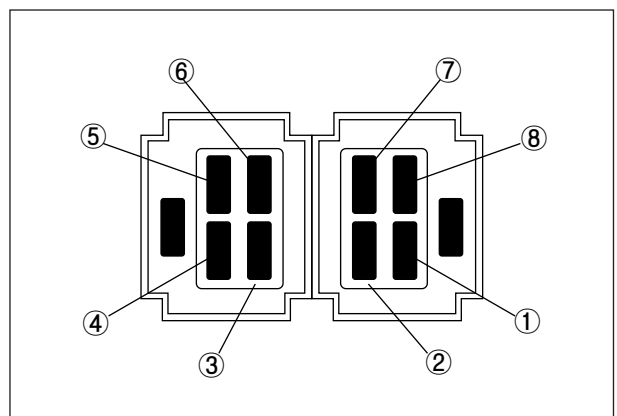
■ CDI UNIT

Using the pocket (R × 1kΩ range), measure the resistance between the lead wires in the following table.

Unit : kΩ

		⊕ Probe of tester							
		1	2	3	4	5	6	7	8
⊖ Probe of tester	1	—	∞	∞	30~200	30~200	30~200	30~200	10~100
	2	5~100	—	∞	5~50	2~50	5~50	5~50	1~20
	3	10~100	∞	—	5~50	2~50	5~50	5~50	1~20
	4	∞	∞	∞	—	∞	∞	∞	∞
	5	30~150	∞	∞	30~150	—	1~30	30~150	5~50
	6	10~100	∞	∞	10~100	5~50	—	10~100	2~20
	7	∞	∞	∞	∞	∞	∞	—	∞
	8	10~50	∞	∞	5~30	2~30	2~50	2~50	—

 Pocket Tester : 09900-25002



5-5 ELECTRICAL SYSTEM

⚠ CAUTION

- ❖ Pay caution as the numerical value differs a little according to the tester.
- ❖ Please remind that there may be defect which can not be identified even though the measurement by using the tester indicates a low voltage.
- ❖ The range of measurement adjust a [x 1k Ω] unit.

⊙ INSPECTION

■ IGNITION COIL (Checking with Electro Tester)

- Remove the ignition coil ①, ②.
- Make sure that the three-needle sparking distance of the electro tester is set at 8 mm (0.3 in).
- With the electro tester, test the ignition coil for sparking performance.
- If no sparking or orange color sparking occurs in the above conditions, it may be caused by the defective coil.

Spark performance	Over 8 mm (0.3 in)
--------------------------	--------------------

 Electro tester : 09900-28107

⚠ WARNING

Do not touch the wire clips to prevent an electric shock when testing.

⚠ CAUTION

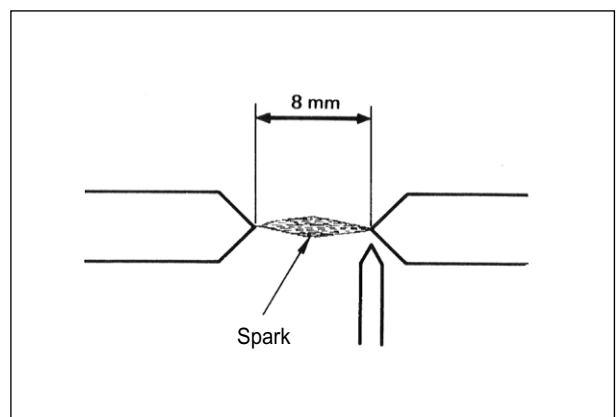
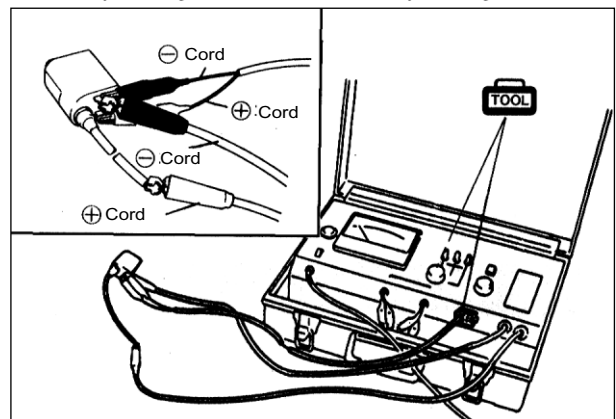
When using the electro tester, follow the instruction manual.

⚠ CAUTION

The ignition coil is marked the **F** for front, and the **R** for rear.
If otherwise, it may occur severe damage to the engine.



① Front cylinder ignition coil ② Rear cylinder ignition coil



■ IGNITION COIL (Checking with Pocket Tester)

● A pocket tester or an ohm meter may be used, instead of the electro tester. In either case, the ignition coil is to be checked for continuity in both primary and secondary windings. Exact ohmic readings are not necessary, but, if the windings are in sound condition, their continuity will be noted with approximate ohmic values.

Ignition coil resistance		
Primary	0.19 ~ 0.24 Ω	Tester knob indication $\times 1\Omega$ range
Secondary	5.4 ~ 6.6 k Ω	Tester knob indication $\times 1k\Omega$ range
Check to attached plug cap		

 **TOOL** Pocket tester : 09900-25002

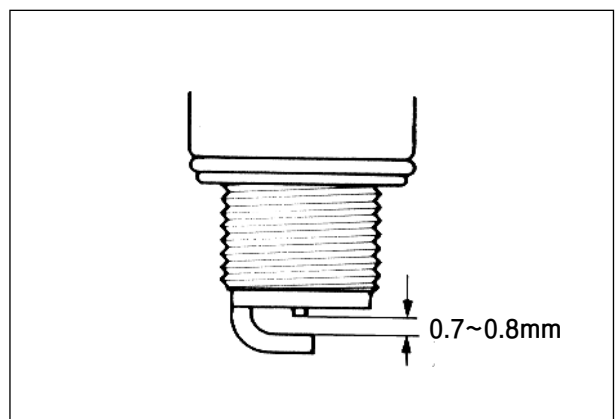
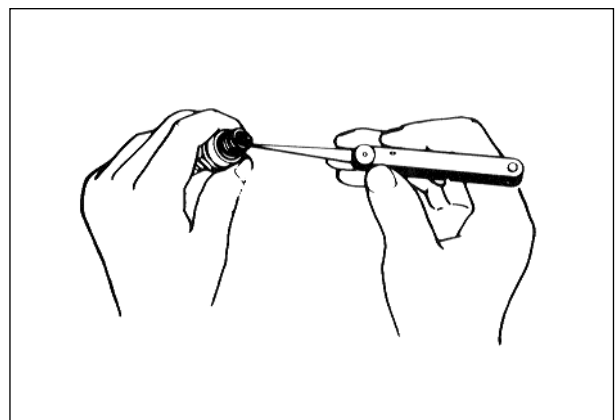
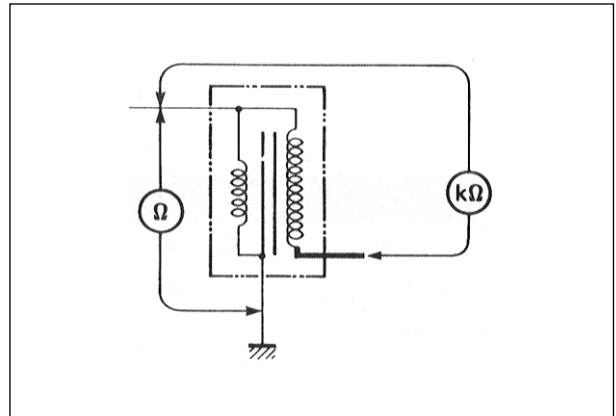
■ SPARK PLUG

Clean the plug with a wire brush and pin. Use the pin to remove carbon, taking care not to damage the porcelain.

● Check the gap with a thickness gauge.

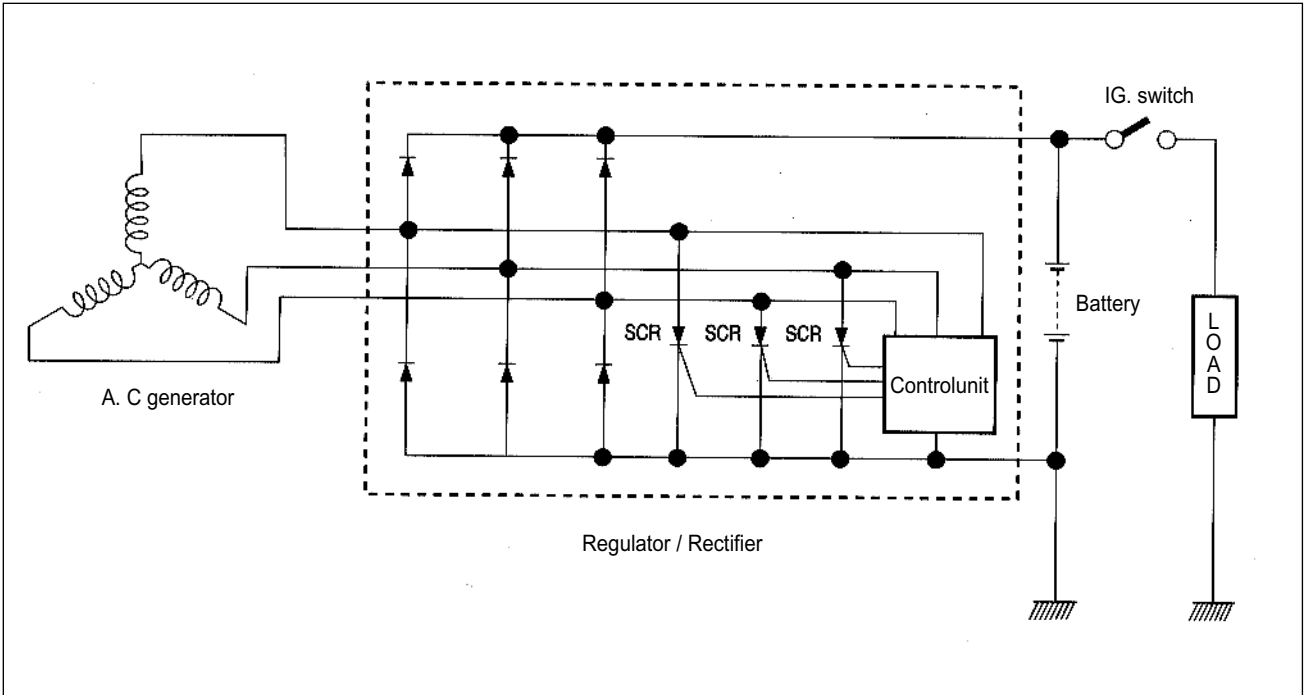
Spark plug gap	0.7 ~ 0.8 mm
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 **TOOL** Thickness gauge : 09900-20806



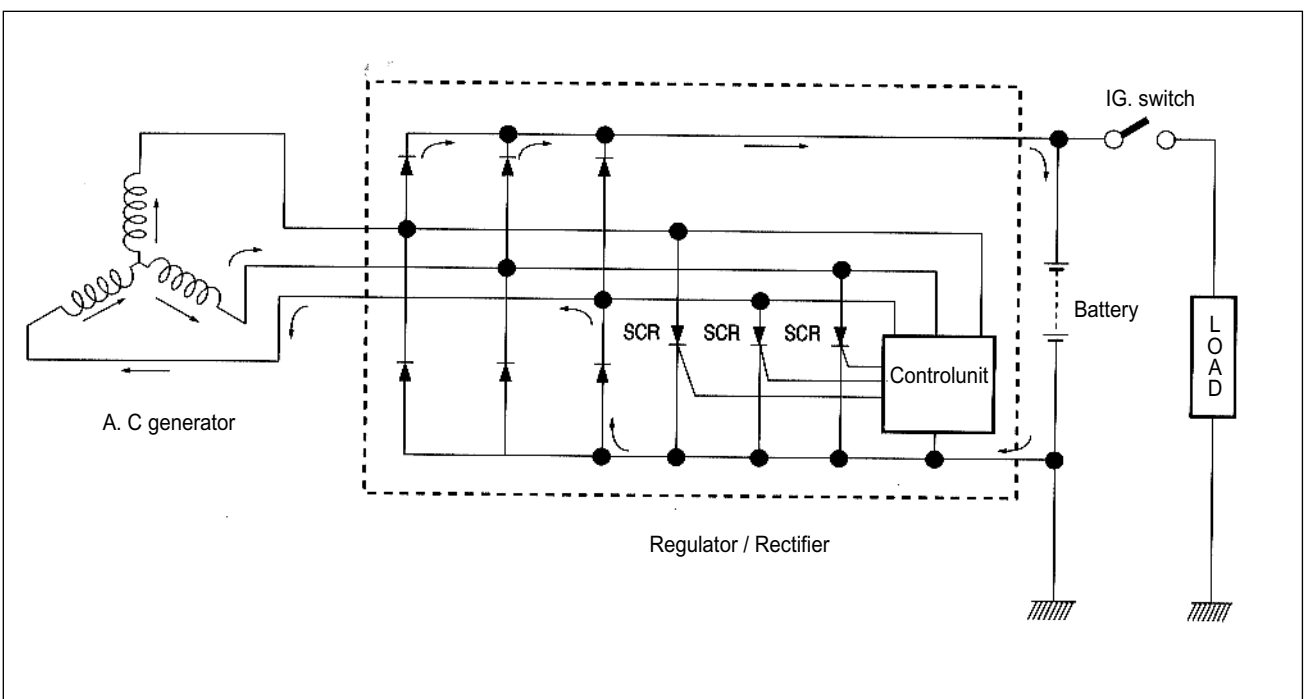
CHARGING SYSTEM

The circuit of the charging system is indicated in figure, which is composed of the AC generator, regulator / rectifier unit and battery. The AC current generated from the AC generator is converted by the rectifier and is turned into the DC current, then it charges the battery.

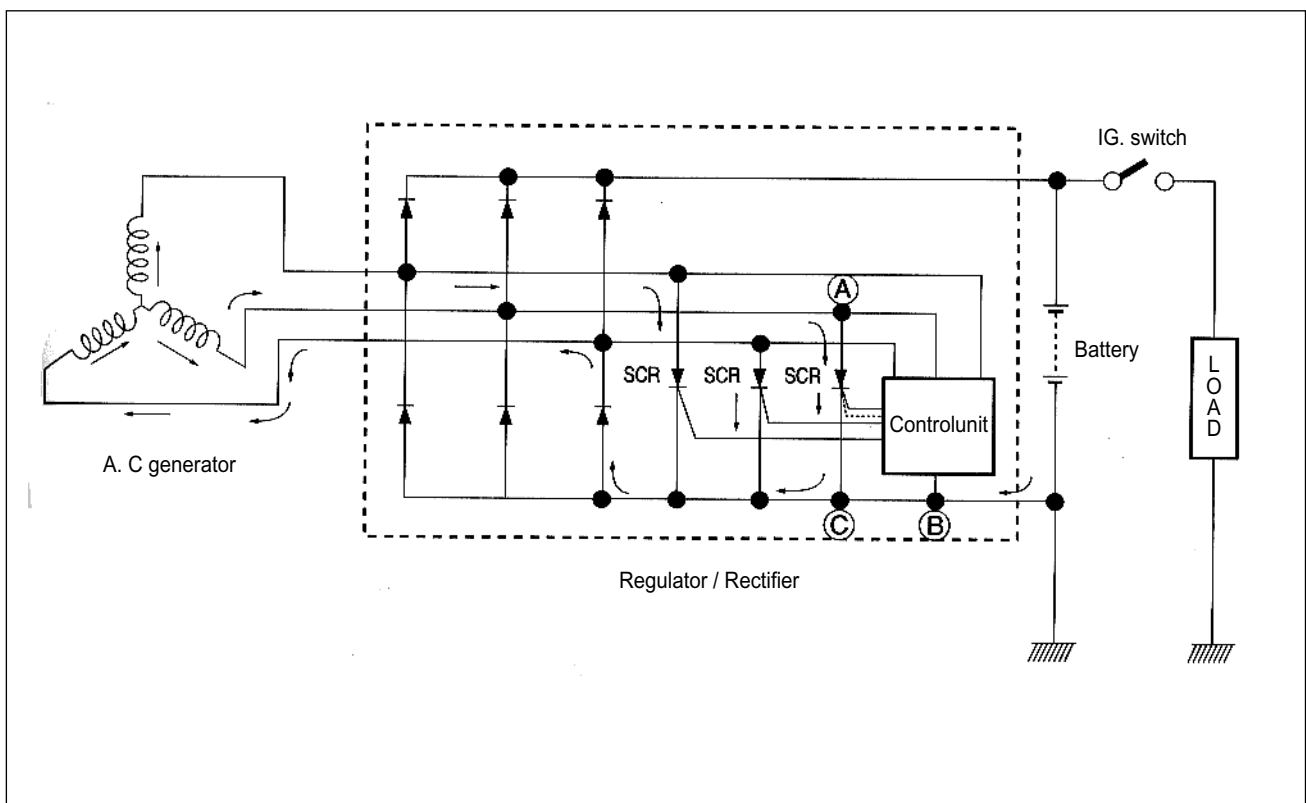


⊙ FUNCTION OF REGULATOR

While the engine rpm is low and the generated current of the AC generator is lower than the adjusted voltage of the regulator, the regulator does not function, incidentally the generated current charges the battery directly.



When the engine rpm become higher, the generated voltage of the AC generator also becomes higher and the voltage between points **A** and **B** of the regulator according becomes high, and when it reaches the adjusted voltage of the control unit, consequently the control unit becomes "ON" condition. On the "ON" condition of the control unit, signal will be sent to the SCR (Thyristor) gate probe and SCR will become "ON" condition. Then the SCR becomes conductive to the direction from point **A** to point **B**. Namely at the state of this, the current generated from the AC generator gets through SCR without charging the battery and returns to the AC generator again. At the end of this state, since the AC current generated from the AC generator flows into the point **B**, reverse current tends to flow to SCR, then the circuit of SCR turns to "OFF" mode and begins to charge the battery again. Thus these repetitions maintain charging constant voltage to the battery and protect it from overcharging.



5-9 ELECTRICAL SYSTEM

⊙ INSPECTION

■ CHARGING OUTPUT CHECK

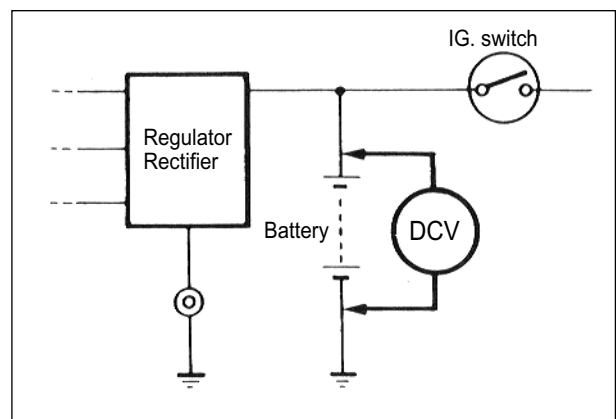
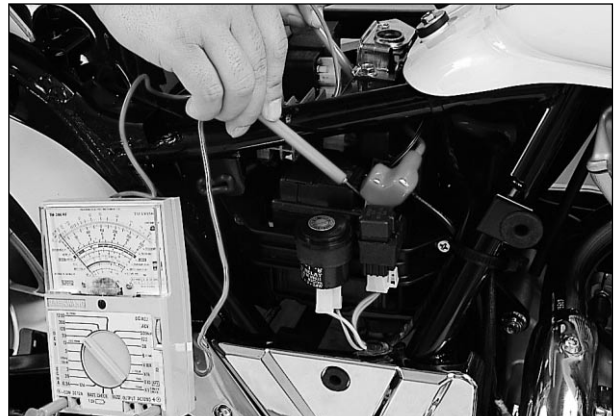
Start the engine and keep it running at 5,000 rpm.
Using the pocket tester, measure the DC voltage between the battery terminal ⊕ and ⊖.
If the tester reads under 13.5 V or over 16.0 V, check the AC generator no-load performance and regulator / rectifier.

⚠ CAUTION

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

Standard charge	13.5 ~ 16.0 V at 5,000 rpm
------------------------	----------------------------

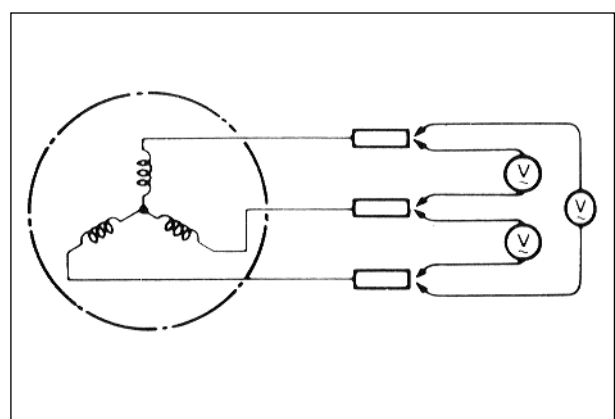
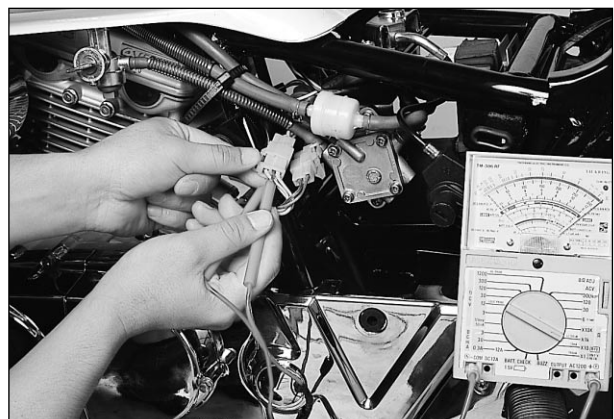
 **TOOL** Pocket tester : 09900-25002



■ AC GENERATOR NO-LOAD PERFORMANCE

Disconnect the three lead wires from the AC generator terminal.
Start the engine and keep it running at 5,000 rpm.
Using the pocket tester, measure the AC voltage between the three lead wires.
If the tester reads under 72V the AC generator is faulty.

Standard NO-load performance of AC generator	72 ~ 99 V at 5,000 rpm
---	------------------------



★ REGULATOR / RECTIFIER

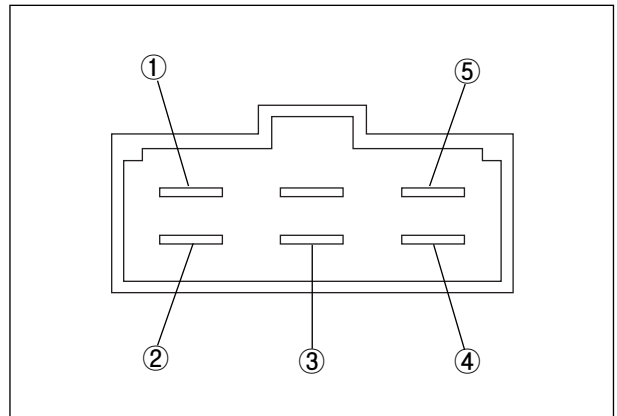
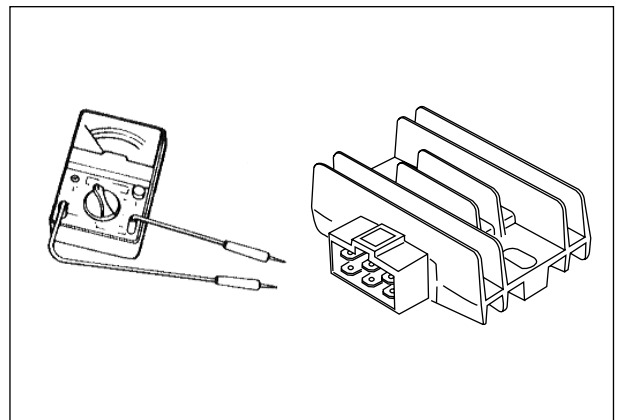
Using the pocket tester (X 1 Ω range), measure the resistance between the lead wires in the following table.

If the resistance checked is incorrect, replace the regulator / rectifier.

Unit : k Ω

		⊕ Probe of tester				
		1	2	3	4	5
⊖ Probe of tester	1	—	OFF	OFF	OFF	OFF
	2	7~8	—	OFF	OFF	OFF
	3	7~8	OFF	—	OFF	OFF
	4	7~8	OFF	OFF	—	OFF
	5	35~55	7~8	7~8	7~8	—

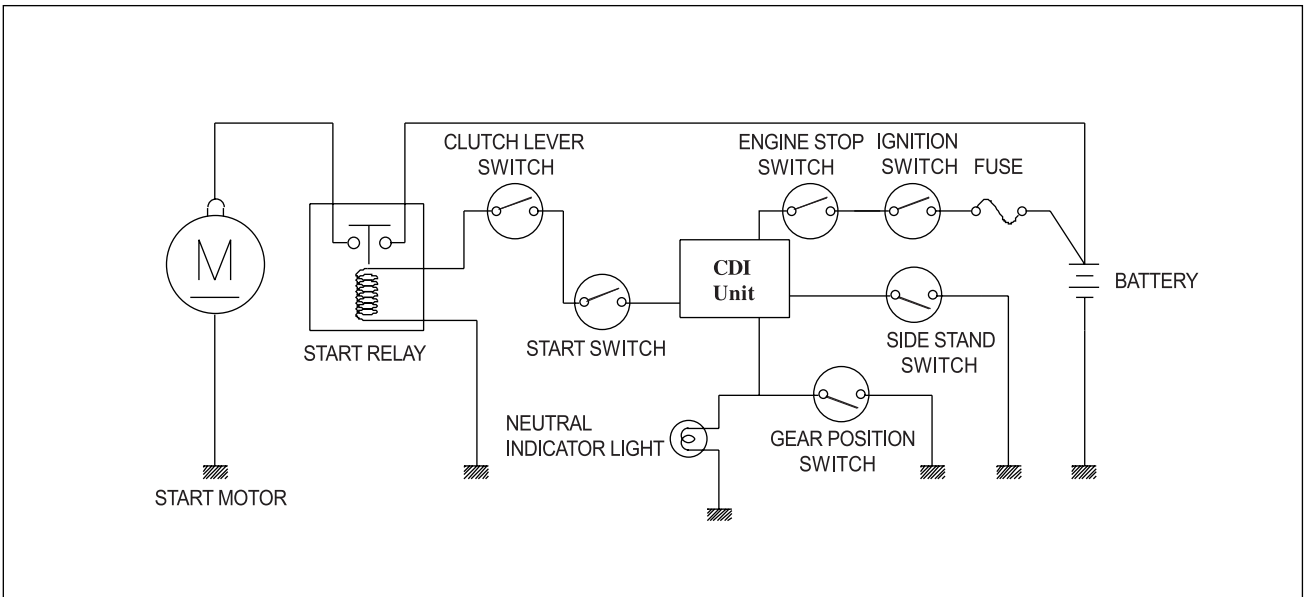
 Pocket tester : 09900-25002



STARTER SYSTEM AND SIDE STAND IGNITION INTERLOCK SYSTEM

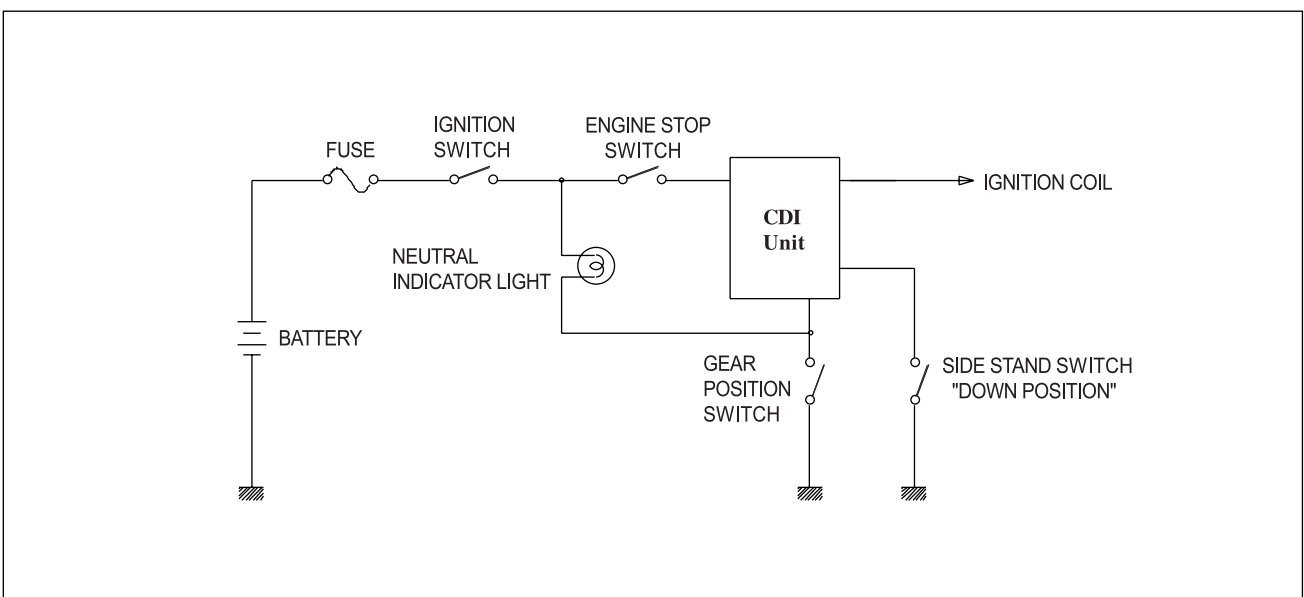
STARTER SYSTEM DESCRIPTION

The starter system consists of the following components : the starter motor, starter relay, clutch lever position switch, C.D.I unit, side stand switch, gear position switch, starter switch, engine stop switch, ignition switch and battery. Pressing the starter switch (on the right handlebar switch) energizes the starter relay, causing the contact points to close, thus completing the circuit from the starter motor to the battery.

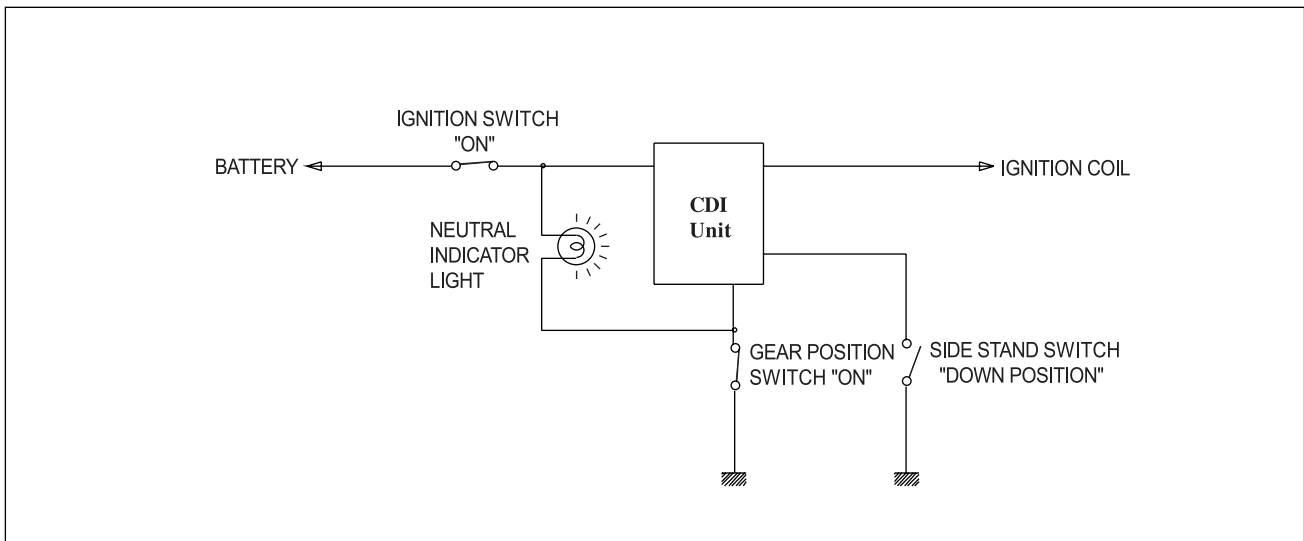


SIDE STAND / IGNITION INTERLOCK SYSTEM DESCRIPTION

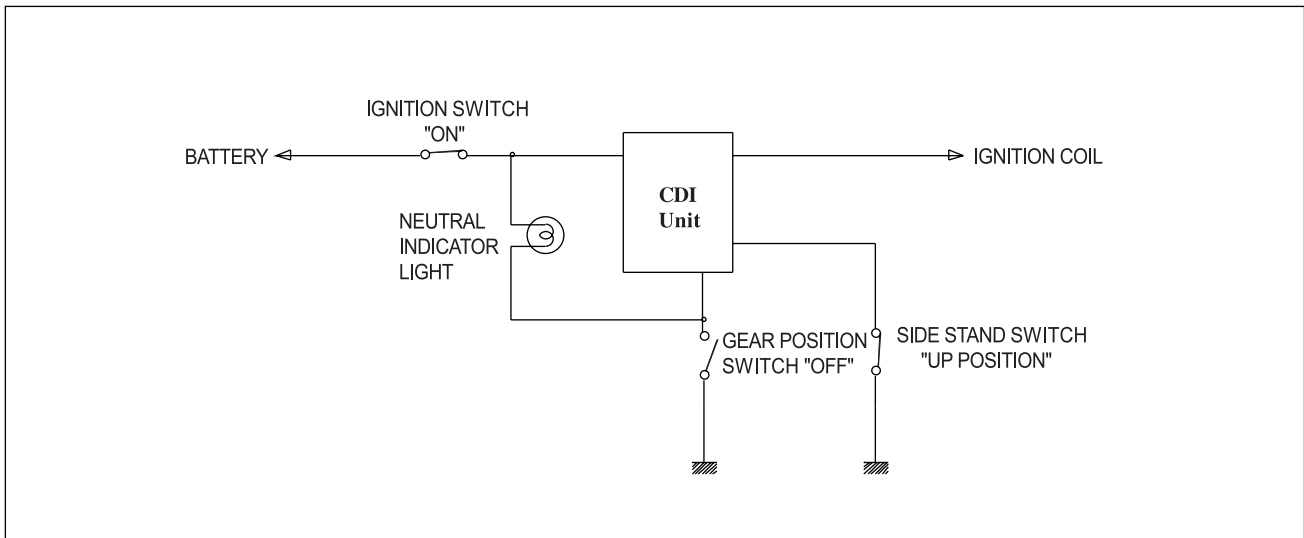
This side stand / ignition interlock system prevents the motorcycle from being started with side stand down. The system is operated by an electric circuit provided between the battery and ignition coil. The circuit consists of the C.D.I unit, neutral indicator light and switches. The ignition coils will send voltage to the spark plugs dependant on what gear the transmission is in and whether the side stand is either up or down. The gear position and side stand switches work together in this system. The ignition coil work only in two situations as follows.



■ **TRANSMISSION** : Neutral - ON
Side stand - Down (OFF)



■ **TRANSMISSION** : Neutral - OFF
Side stand - Up (ON)



Aquila 250 is equipped with the side stand ignition interlock system.

1. If the transmission is in neutral, you can start the engine regardless of clutch lever and side stand.
2. If the transmission is not in neutral, you can only start the engine with pulling in clutch lever and side stand up.

No	Neutral switch	Clutch lever	Side stand	Engine Start
1	●	△	△	Possible
2	△	●	●	Possible
3	△	●	△	Impossible
4	△	△	●	Impossible

NOTE : ● - On or Up. △ - Off or Down

⊙ STARTER MOTOR REMOVAL AND DISASSEMBLY

- Disconnect the starter motor lead wire ①. (Refer to page 3-3)
- With loosen the bolt ②, remove the starter motor. (Refer to page 3-8)
- Disassemble the starter motor.

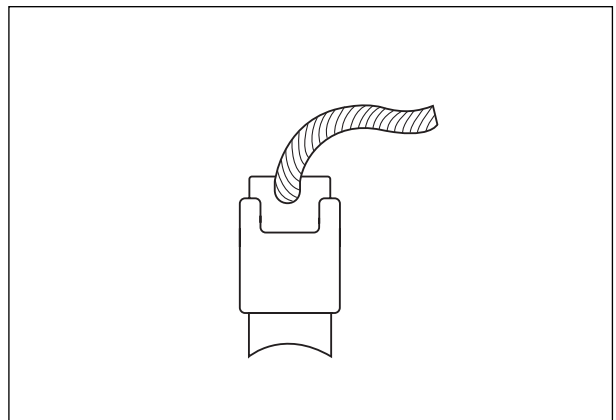


⊙ STARTER MOTOR INSPECTION

■ CARBON BRUSH

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

If the brush has failed, replace the brush sub assy.

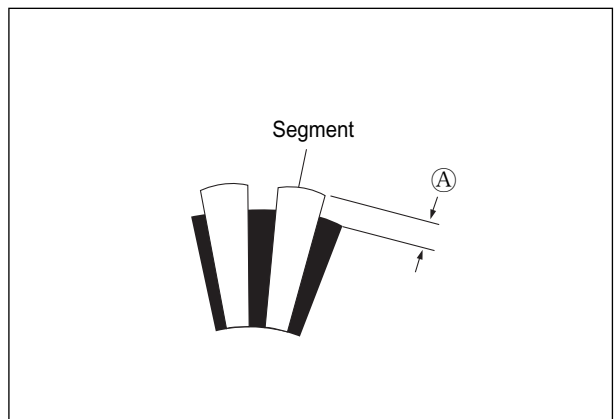


■ COMMUTATOR

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

If the commutator is abnormally worn, replace the armature.

When surface is discolored, polish it with #400 sand paper and clean it with dry cloth.



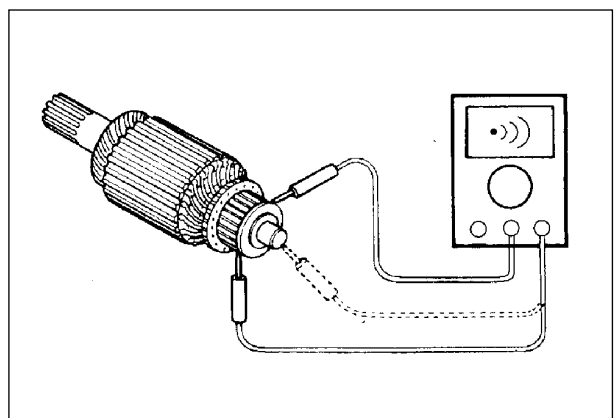
■ ARMATURE COIL INSPECTION

Check for continuity between each segment.

Check for continuity between each segment and the armature shaft.

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

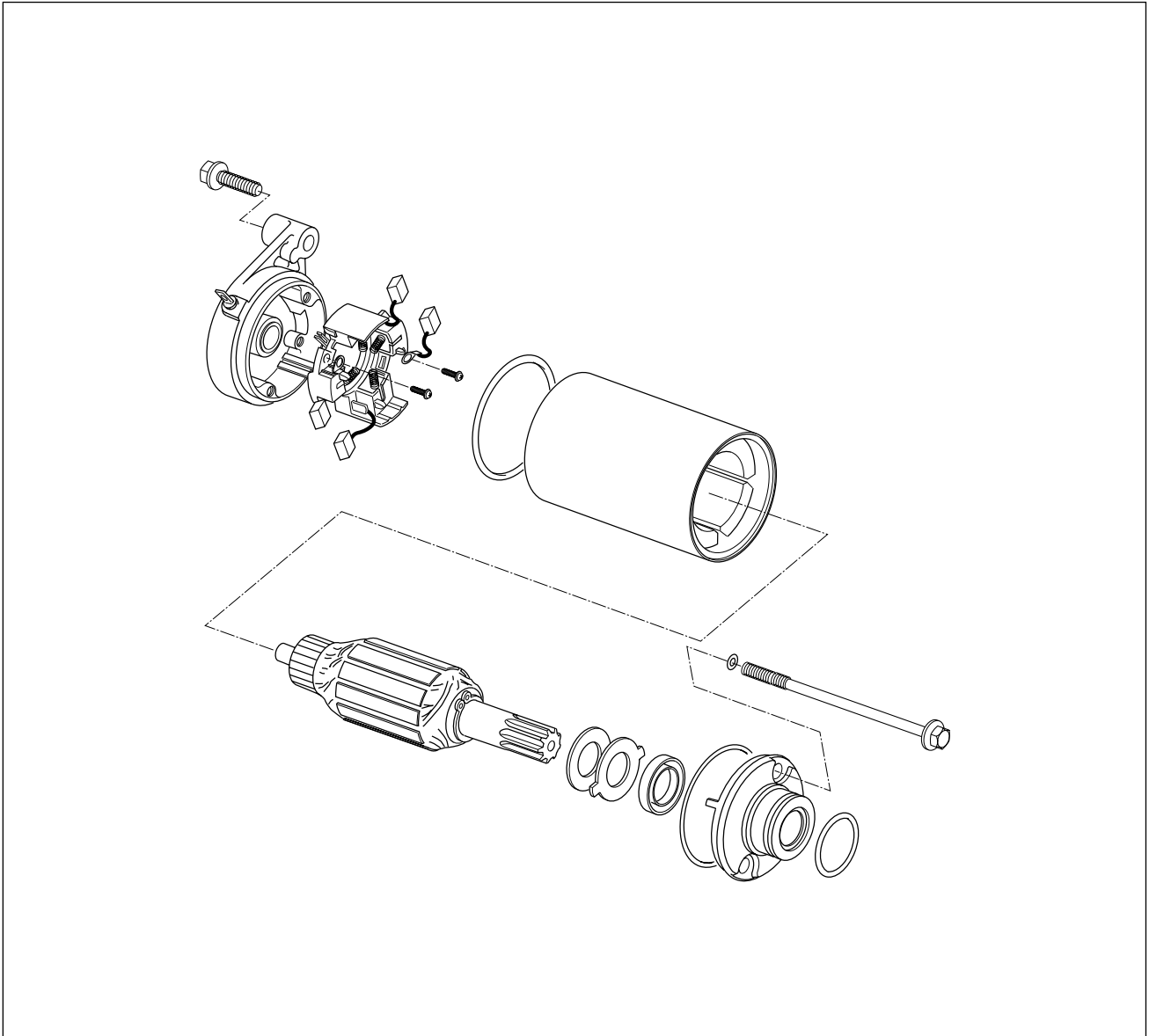
 **Tool** Pocket tester : 09900-25002



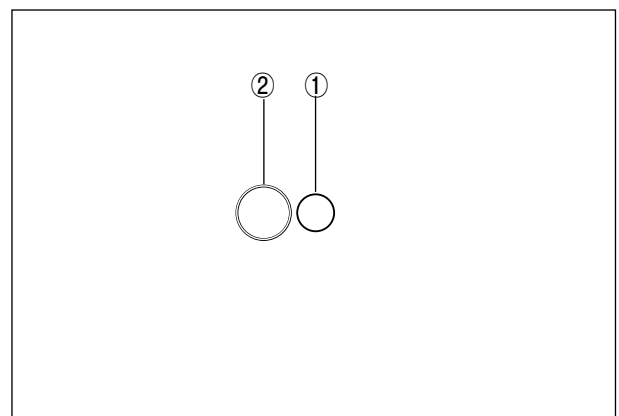
STARTER MOTOR REASSEMBLY

Reassembly the starter motor. Pay attention to the following points :

- Reassembly the starter motor as shown in the illustration.



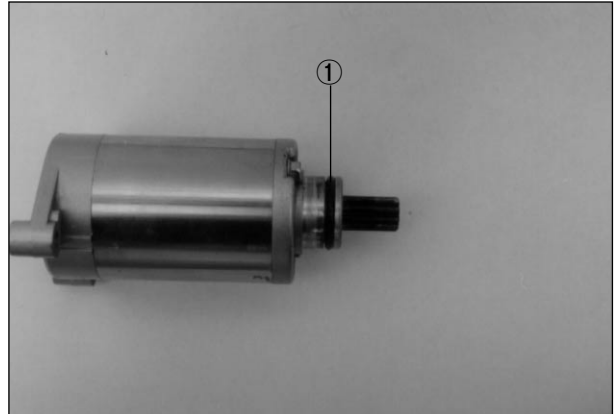
- Align the mark ① on the housing with the line ② on the housing end.



5-15 ELECTRICAL SYSTEM

- Apply SUPER GREASE “A” to the O-ring ① and remount the starter motor.

 **SUPER GREASE “A”**





SWITCHES

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

 **TOOL** Pocket tester : 09900-25002

IGNITION SWITCH				
	R	O	BW	BR
ON	○-----○			
OFF			○-----○	○-----○
LOCK			○-----○	○-----○

ENGINE STOP SWITCH		
	O	OB
	○-----○	○-----○
	⊗	
	○	

HEADLAMP SWITCH			
	O	YW	Gr
	○-----○	○-----○	○-----○
	○-----○	○-----○	○-----○
○			

STARTER SWITCH		
	OB	YG
ON	○-----○	○-----○
OFF		

DIMMER SWITCH			
	YW	Y	W
HI	○-----○	○-----○	
LO	○-----○	○-----○	○-----○

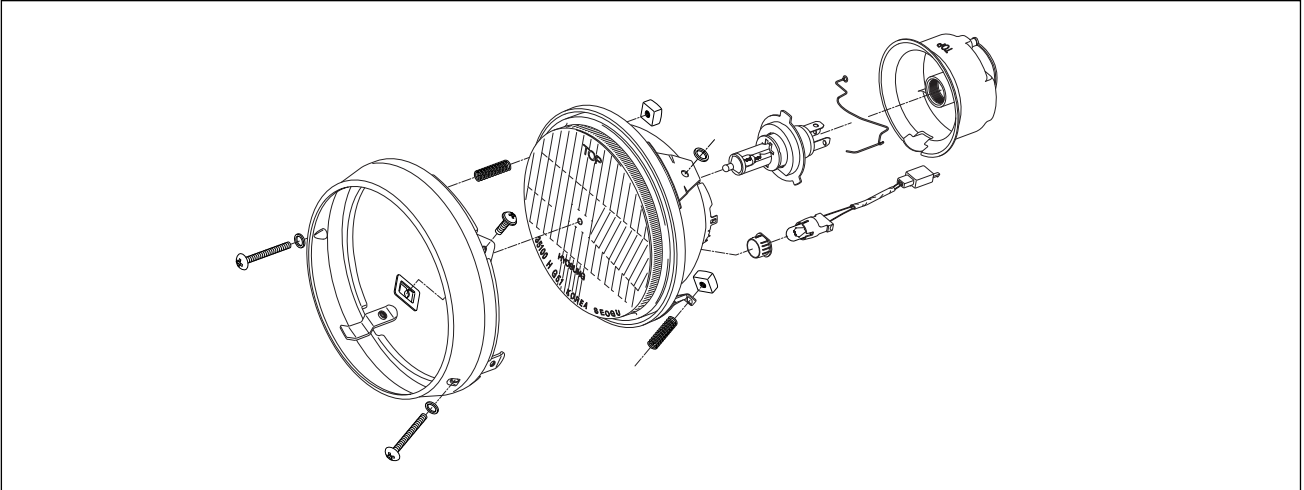
HORN SWITCH		
	G	BW
ON	○-----○	○-----○
OFF		

TURN SIGNAL SWITCH			
	Lg	Sb	B
L		○-----○	
PUSH			
R	○-----○	○-----○	

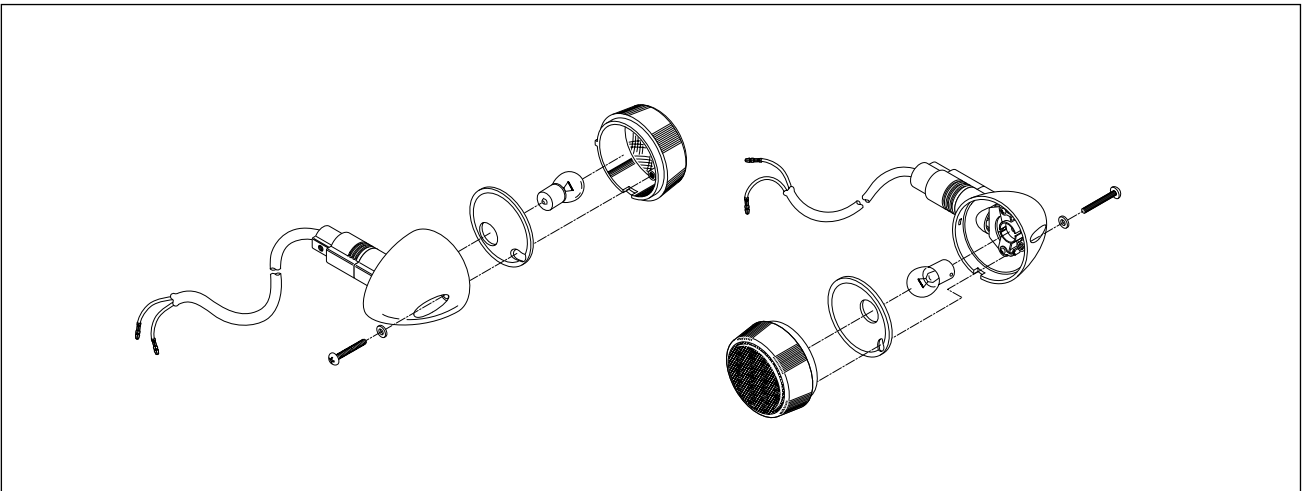
FRONT/REAR BRAKE LAMP SWITCH		
	O	WB
ON	○-----○	○-----○
OFF		

LAMP

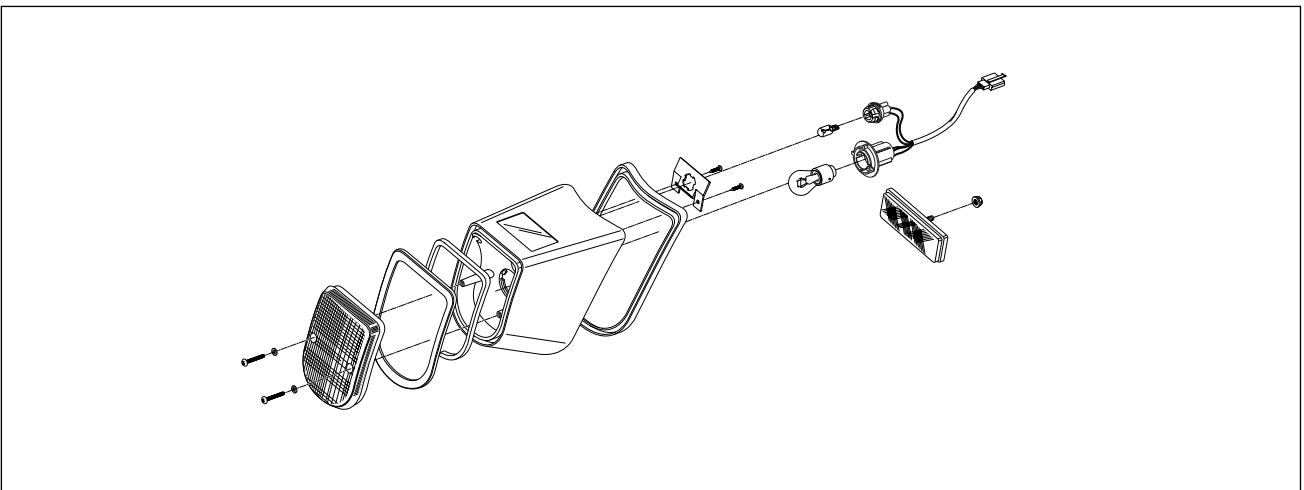
⦿ HEADLAMP



⦿ TURN SIGNAL LAMP



⦿ TAIL / BRAKE LAMP

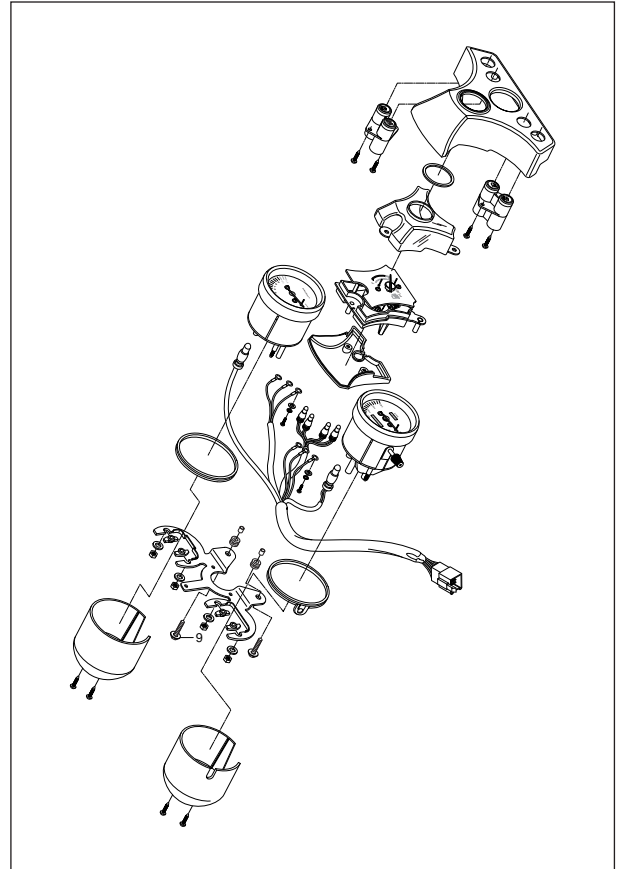


5-17 ELECTRICAL SYSTEM

⦿ COMBINATION METER

Remove the combination meter.

Disassemble the combination meter as shown in the illustration.



■ INSPECTION

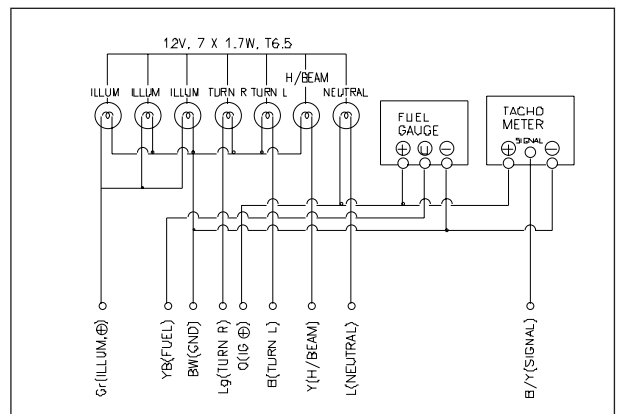
Using the pocket tester, check the continuity between lead wires in the following illustration.

If the continuity measured incorrect, replace the respective part.

 Pocket tester : 09900-25002

 **CAUTION**

When making this test, it is not necessary to remove the combination meter.



BATTERY

⊙ CAUTION OF BATTERY TREATMENT

The battery should be well taken care of because it emits flammable gas.

If you don't follow the instruction in the below, there may be an explosion and severe accident.

Therefore, please pay attention to the following points.

- Prohibit positively battery from contacting to short, spark or firearms.
- The recharge of battery should be done in the wide place where the wind is well ventilated.
Please don't recharge it at the sight of wind-proof.

⊙ CAUTION OF BATTERY ELECTROLYTE TREATMENT

- Pay attention for the battery electrolyte not to stain the chassis or the humanbody.
- If be stain the chassis or the humanbody, at once wash a vast quantity of water.
When it be stained, clothes should come into being a hole or painting should take off.
Be cured from a doctor.
- When the battery electrolyte was dropped to the surface of land, wash a vast quantity of water.
Neutralize by hudroxide, bicarbonate of soda and so on.

⊙ CAUTION OF MAINTENANCE FREE BATTERY TREATMENT

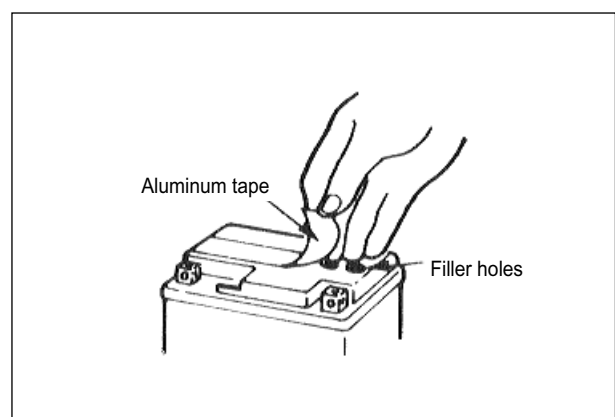
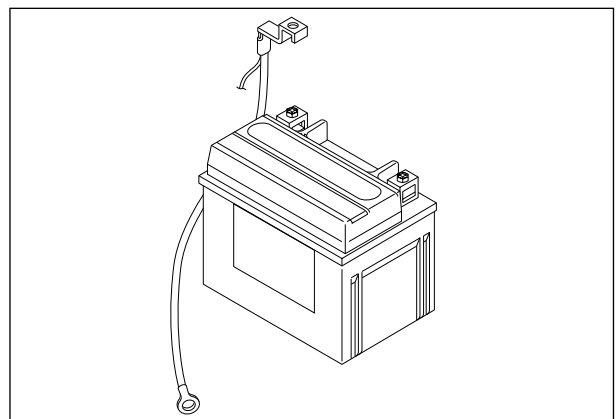
- Do not remove the aluminum tape to seal the battery electrolyte filler hole until use as battery of completely seal type.
- Do not use it except the battery electrolyte.
- When pour into the battery electrolyte, necessarily use the electrolyte of the specified capacity.
- Do not open the sealing cap after recharge the battery eletrolyte.

- Filling electrolyte.

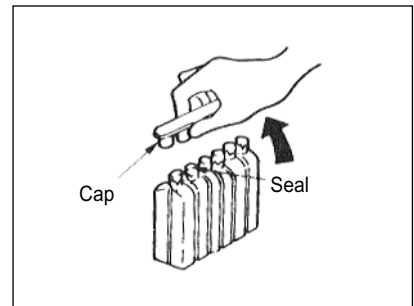
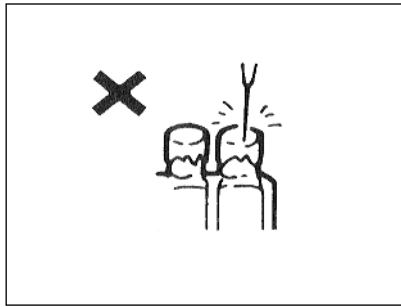
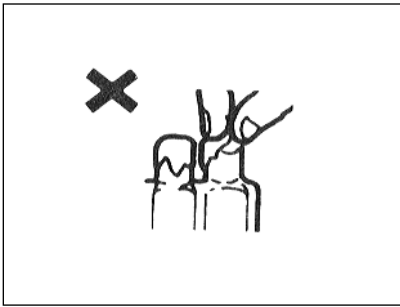
- ① The battery is puted on even land, remove the aluminum tape sealing.
- ② Remove the cap at the electrolyte container.

⚠ CAUTION

Do not remove the seal, not prick with sharp thing.



5-19 ELECTRICAL SYSTEM



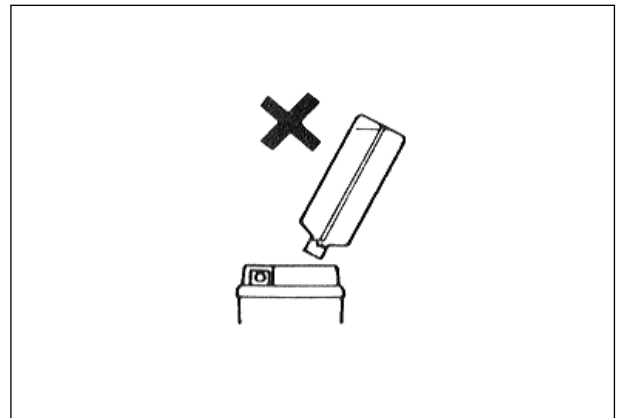
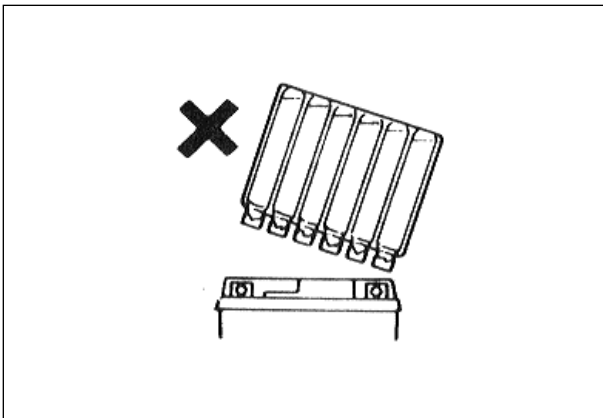
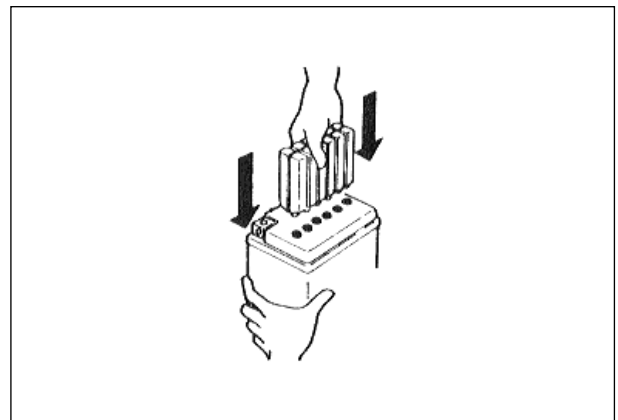
③ Pouring of battery electrolyte

When insert the nozzles of the electrolyte container 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.

⚠ CAUTION

There may be a case which can't pour the electrolyte if you put it into electrolyte container slopely.

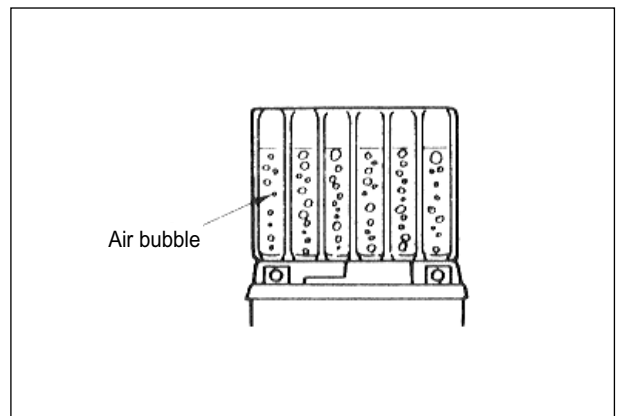


④ Confirmation of pour

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

⚠ CAUTION

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

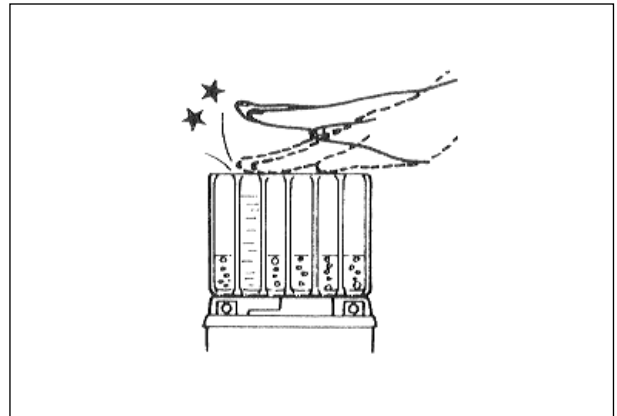


⑤ Separation of electrolyte container

After confirming that you entered the electrolyte into battery completely, remove the electrolyte containers from the battery.

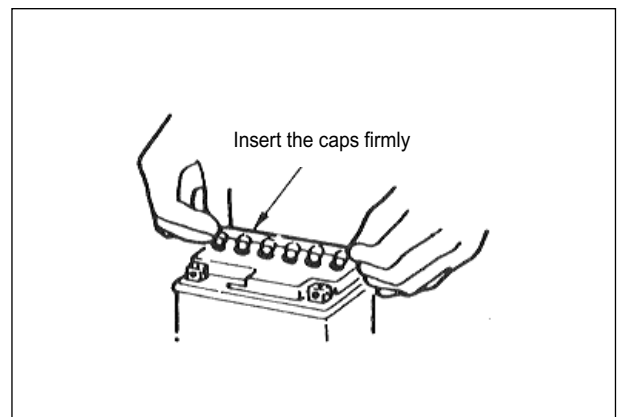
⚠ CAUTION

Draw the empty receptacle out slowly because there may be a chance which remaining electrolyte vaporize.



⑥ Insert of the caps

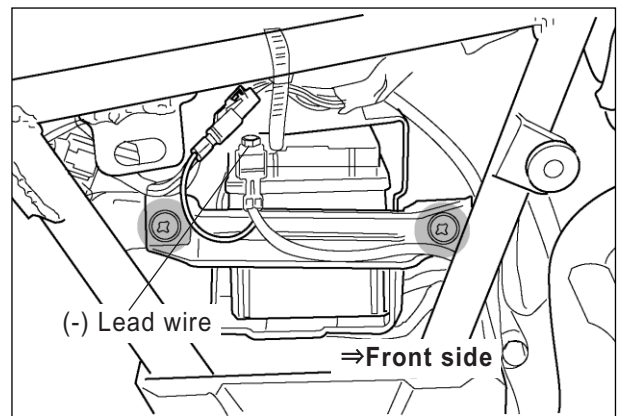
Insert the cap into the filler holes, pressing it firmly so that the top of the caps do not protrude above the upper surface of the battery's stop cover.



⊙ **BATTERY INSTALLATION**

Aquila 250 s battery installation order pay attention to following points :

- ① Remove the seat, right frame cover and battery support.
- ② Lay down (+) positive terminal of the battery at leftside of the battery case (on the motorcycle).
- ③ Install (+) positive lead wire at the battery terminal.
- ④ Put on the rubber cap at the (+) positive terminal of the battery.
- ⑤ Install (-) negative lead wire at the battery terminal.
- ⑥ Install the battery support and right frame cover.



⚠ CAUTION

If install first the lead wire at the battery then lay down at the battery case, will be installed the opposite direction [(+) positive terminal face on the rightside of the motorcycle] as that length of the (+) lead wire has no something extra. This time, the battery could not lay down perfectly and to occur the short circuit etc. if the battery install the opposite direction.

5-21 ELECTRICAL SYSTEM

⊙ ASSISTANCE RECHARGING

Use the battery that is maded after 2 years as the main-tenance free battery.

Use the battery at condition of the high temperature.

Assistance recharging to the following points.

- The main principle of assistance recharging.
Assistence recharging from rule of electric current or voltage, when the battery discharged.
- Do not assistance recharge except the right side table.
- In times of recharging the battery, please do it at the condition of removal of the lead wire.

⚠ WARNING

The firearm is strictly prohibited.

Assistance Recharging	
Standard	0.7 A × 5~10 hours
Fast	3A × 30 minutes.

FUEL SYSTEM

⊙ FUEL PUMP

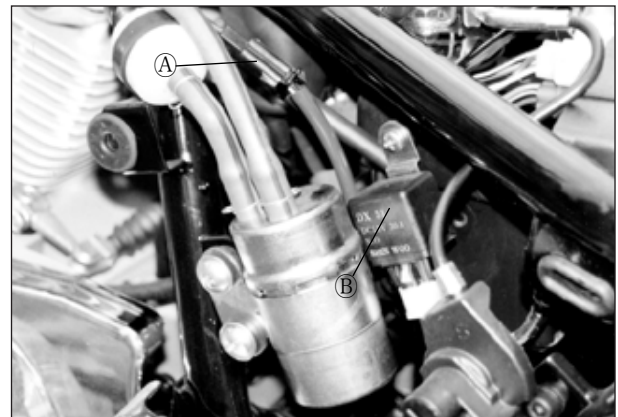
- Remove the left frame cover. (Refer to page 6-3)
- Remove the fuel pump lead wire coupler ①.
(Refer to page 4-2)

Using the pocket tester (X 1 Ω range), measure the resistance between the lead wires in the following table.

If the resistance checked is incorrect, replace the fuel pump.

Fuel pump resistance 1.0~10.0 Ω (BW-BG)

 **Pocket tester : 09900-25002**



⊙ FUEL PUMP RELAY

- Remove the fuel pump relay coupler ②.
(Refer to page 4-2)

Using the pocket tester (X 1 Ω range), measure the resistance between the lead wires in the following table.

If the resistance checked is incorrect, replace the fuel pump relay.

Unit : Ω

		⊕ Probe of tester			
		1	2	3	4
⊖ Probe of tester	1	—	∞	∞	∞
	2	∞	—	65~85	∞
	3	∞	65~85	—	∞
	4	∞	∞	∞	—

 **Pocket tester : 09900-25002**

