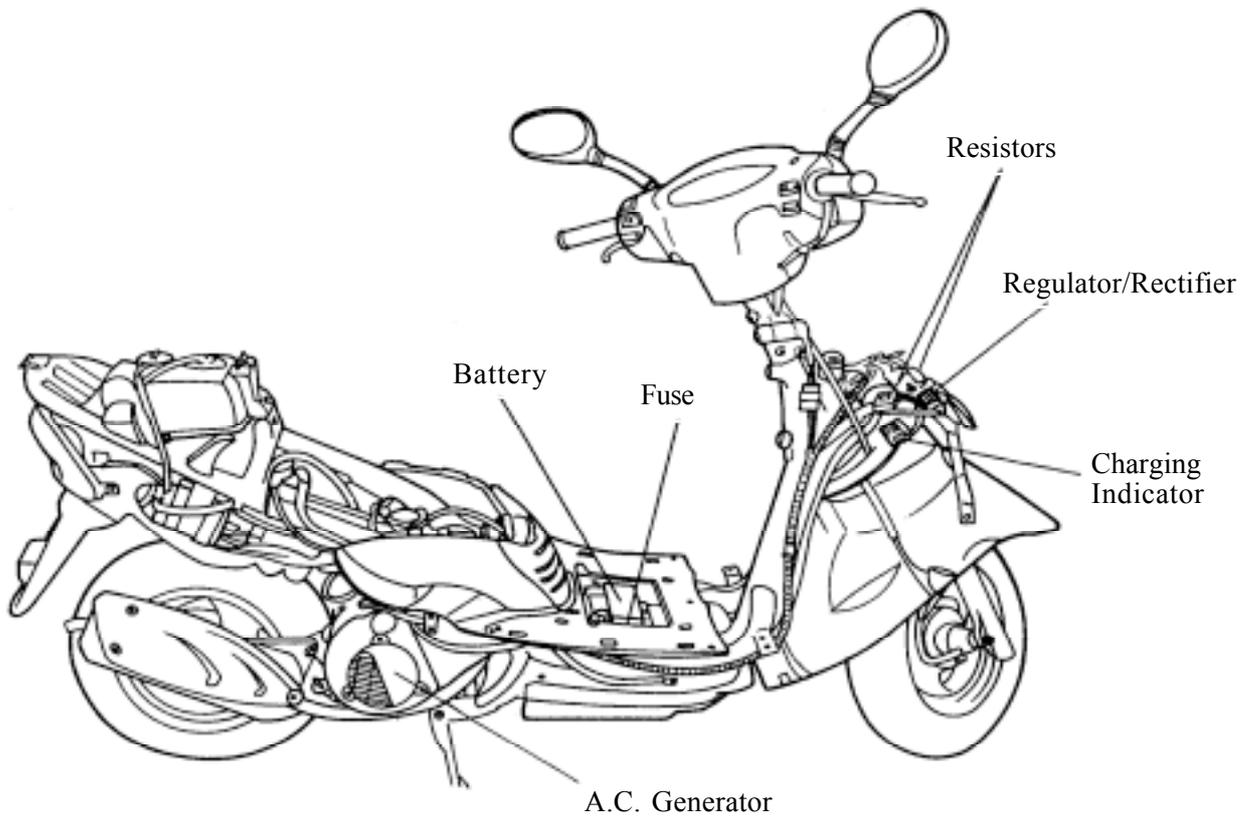
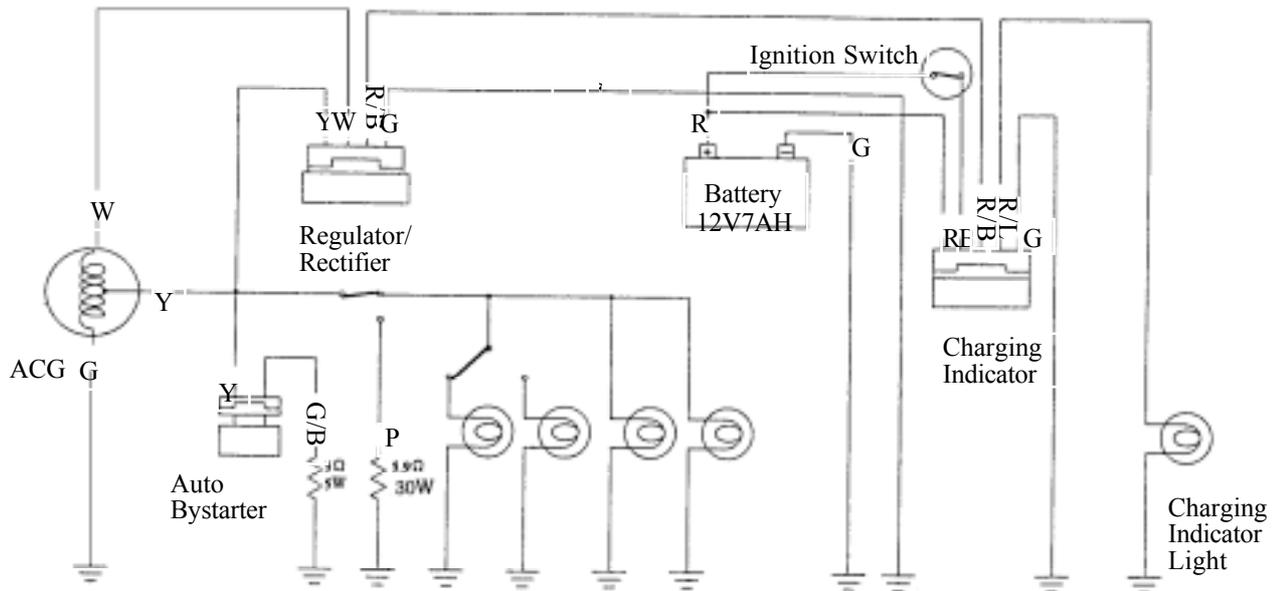


# 14. BATTERY/CHARGING SYSTEM/ A.C. GENERATOR



## CHARGING CIRCUIT



# 14. BATTERY/CHARGING SYSTEM/ A.C. GENERATOR

CHARGING SYSTEM LAYOUT .....	14-0	REGULATOR/RECTIFIER.....	14-5
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## SERVICE INFORMATION A.C. GENERATOR/IGNITION COIL

### GENERAL INSTRUCTIONS

The battery electrolyte (sulfuric acid) is poisonous and may seriously damage the skin and eyes. Avoid contact with skin, eyes, or clothing. In case of contact, flush with water and get prompt medical attention

- The battery can be charged and discharged repeatedly. If a discharged battery is not used for a long time, its service life will be shortened. Generally, the capacity of a battery will decrease after it is used for 2\_ 3 years. A capacity-decreased battery will resume its voltage after it is recharged but its voltage decreases suddenly and then increases when a load is added.
- When a battery is overcharged, some symptoms can be found. If there is a short circuit inside the battery, no voltage is produced on the battery terminals. If the rectifier won't operate, the voltage will become too high and shorten the battery service life.
- If a battery is not used for a long time, it will discharge by itself and should be recharged every 3 months.
- A new battery filled with electrolyte will generate voltage within a certain time and it should be recharged when the capacity is insufficient. Recharging a new battery will prolong its service life.
- Inspect the charging system according to the sequence specified in the Troubleshooting.
- Do not disconnect and soon reconnect the power of any electrical equipment because the electronic parts in the regulator/rectifier will be damaged. Turn off the ignition switch before operation.
- It is not necessary to check the MF battery electrolyte or fill with distilled water.
- Check the load of the whole charging system.
- Do not quick charge the battery. Quick charging should only be done in an emergency.
- Remove the battery from the motorcycle for charging.
- When replacing the battery, do not use a traditional battery.
- When charging, check the voltage with a voltmeter.

### SPECIFICATIONS

Item		Standard	
Battery	Capacity/Model		12V□7AH
	Voltage (20°C )	Fully charged	13.1V
		Undercharged	12.3V
	Charging current		STD: 0.7A Quick: 3.0A
	Charging time		STD: 5_ 10hr Quick: 30min
A.C. Generator	Capacity		0.114KW/5000rpm
	Lighting coil resistance		Yellow_ Green   0.1_ 1.0□
	Charging coil resistance		White Green   0.2_ 1.2□
Regulator/Rectifier	Type		Single-phase half-wave SCR
	Limit voltage	Lighting	12.0_ 14.0V/5000rpm (Electric tester,
		Charging	10_ 13.0V/5000rpm
Resistor	Resistance (20°C ) 20W5.9□		5.0_ 7.0□
	Resistance (20°C ) 20W5.9□		4.0_ 6.0□

# 14. BATTERY/CHARGING SYSTEM/ A.C. GENERATOR

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## TORQUE VALUES

Pulser coil bolt	0.5kg-m
Coil lock bolt	0.9kg-m
Flywheel nut	5.5kg-m
Cooling fan bolt	0.9kg-m

## SPECIAL TOOLS

Universal holder  
Flywheel puller

## TESTING INSTRUMENTS

Kowa electric tester  
Sanwa electric tester

## TROUBLESHOOTING

### No power

- Dead battery
- Disconnected battery cable
- Fuse burned out
- Faulty ignition switch

### Low power

- Weak battery
- Loose battery connection
- Charging system failure
- Faulty regulator/rectifier

### Charging indicator light does not come on

- Dead battery
- Faulty charging indicator
- Faulty indicator light bulb

### Charging indicator light does not go out

- Faulty battery
- Faulty charging indicator
- Faulty regulator/rectifier

### Intermittent power

- Loose battery cable connection
- Loose charging system connection
- Loose connection or short circuit in lighting system

### Charging system failure

- Loose, broken or shorted wire or connector
- Faulty regulator/rectifier
- Faulty A.C. generator

# 14. BATTERY/CHARGING SYSTEM/ A.C. GENERATOR

## BATTERY

### REMOVAL

Remove the battery cover screws on the floor board.

Open the battery cover and remove the battery by removing the bolt and band.

First disconnect the battery negative (-) cable and then the positive (+) cable.

- \* When disconnecting the battery positive (+) cable, do not touch the frame with tool; otherwise it will cause short circuit and sparks to fire the fuel.

The installation sequence is the reverse of removal.

- \* First connect the positive (+) cable and then negative (-) cable to avoid short circuit.

### BATTERY VOLTAGE (OPEN CIRCUIT VOLTAGE) INSPECTION

Remove the floor board.

Open the battery cover and disconnect the battery cables.

Measure the voltage between the battery terminals.

Fully charged : 13.1V

Undercharged : 12.3V max.

- \* Battery charging inspection must be performed with a voltmeter.

### CHARGING

Connect the charger positive (+) cable to the battery positive (+) terminal.

Connect the charger negative (-) cable to the battery negative (-) terminal.

- \* • Keep flames and sparks away from a charging battery.
- Turn power ON/OFF at the charger, not at the battery terminals to prevent sparks near the battery to avoid explosion.
- Charge the battery according to

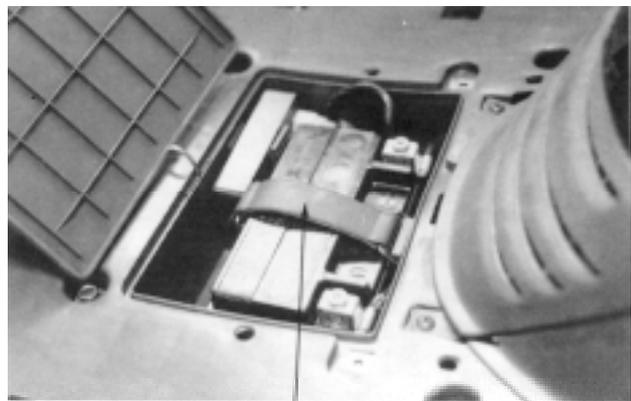
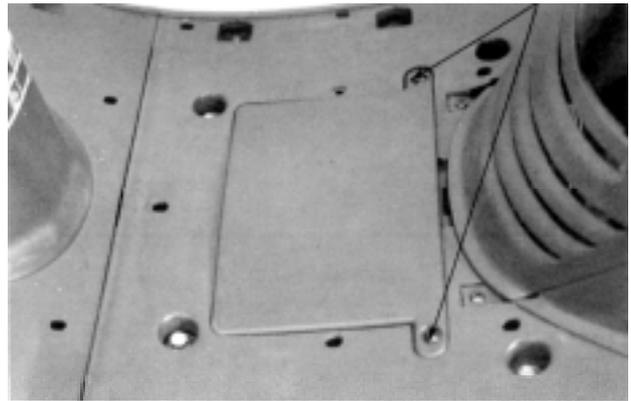
- \* • Quick charging should only be done in an emergency.
- Measure the voltage 30 minutes after the battery is charged.

Charging current : Standard : 0.7A  
Quick : 3.0A

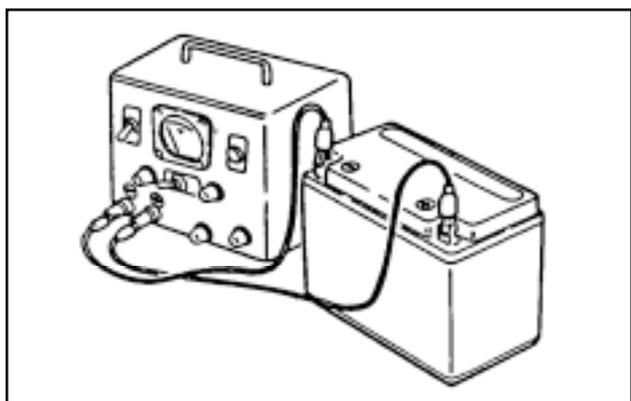
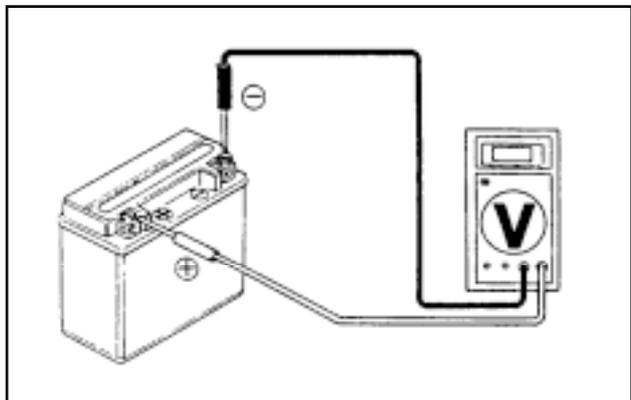
Charging time : Standard : 5\_ 10 hours  
Quick : 30 minutes

After charging Open circuit voltage: 12.8V min.

Battery Cover Screw



Battery Band



# 14. BATTERY/CHARGING SYSTEM/ A.C. GENERATOR

Perform this test with a fully charged. battery

(-) Terminal

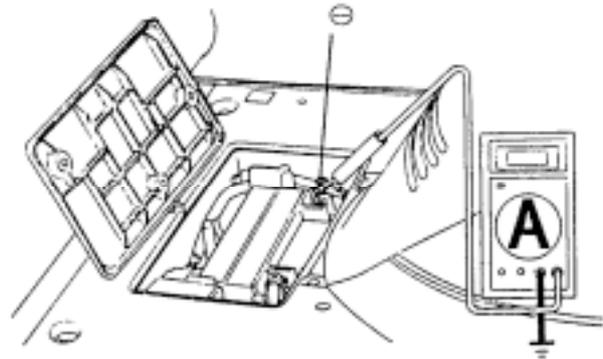
## CHARGING SYSTEM

### SHORT CIRCUIT TEST

Disconnect the ground wire from the battery and connect an ammeter across the battery negative (-) terminal and the ground wire. Turn the ignition switch OFF and check for short circuit.

- \* Connect the electric tester positive (+) terminal to ground wire and the tester negative (-) terminal to the battery negative (-) terminal.

If any abnormality is found, check the ignition switch and wire harness for short circuit .



### CURRENT TEST

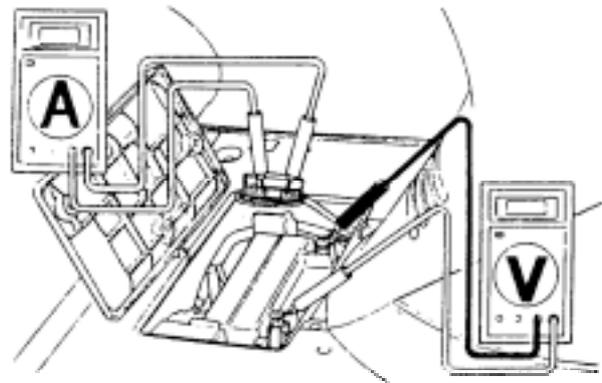
This inspection must be performed with an electric tester when the battery is fully charged.

Warm up the engine for inspection.

Connect the electric tester across the battery terminals. Disconnect the red wire from the fuse terminal and connect an ammeter between the red wire lead and the fuse terminal as shown.

Attach a tachometer to the engine.

Start the engine and gradually increase the engine speed to measure the limit voltage and current.



### Limit Voltage/Current:

13.5\_ 15.5V/0.5  
A max (5000rpm  
max)

If the limit voltage is not within the specified range, check the regulator/rectifier. (⇒14-5)

### LIGHTING SYSTEM LIMIT VOLTAGE INSPECTION

Remove the front cover. (⇒2-4)

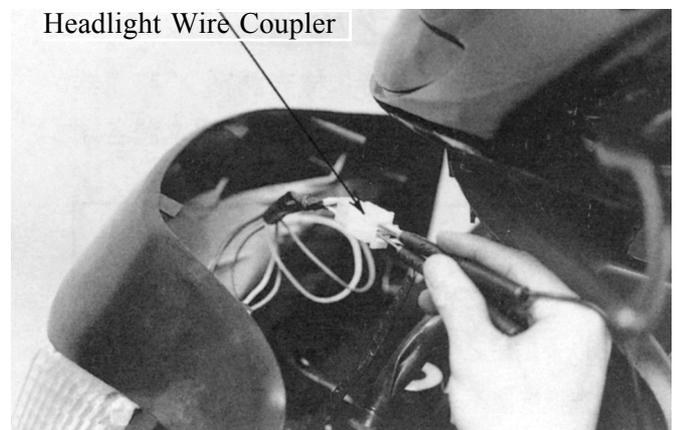
- \* Measure the voltage with the electric tester in the AC range.

**Limit Voltage:** 12\_ 14V/5000rpm

If the limit voltage is not within the specified range, check the regulator/rectifier. (⇒14-5)

### PERFORMANCE TEST

RPM	2500	6000
Day	1.0A min.	2.0A min.
Night	1.0A min.	2.0A min.



# 14. BATTERY/CHARGING SYSTEM/ A.C. GENERATOR

## REGULATOR/RECTIFIER

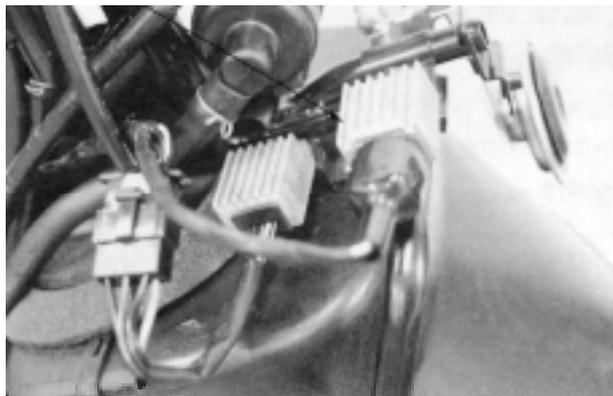
### MAIN HARNESS CIRCUIT INSPECTION

Remove the front cover. (⇒2-4)

Remove the regulator/rectifier 4P coupler and check for continuity between the wire harness terminals according to the following :

Item (Wire Color)	Judgement
Between battery (red) and engine ground	Battery has voltage
Between ground (green) and engine ground	Continuity exists
Between lighting wire (yellow) and engine ground (Remove the resistor coupler and auto bystarter coupler and turn the lighting switch OFF for inspection)	A.C. generator coil has resistance
Between charging coil (white) and engine ground	A.C. generator coil has resistance

Regulator/Rectifier

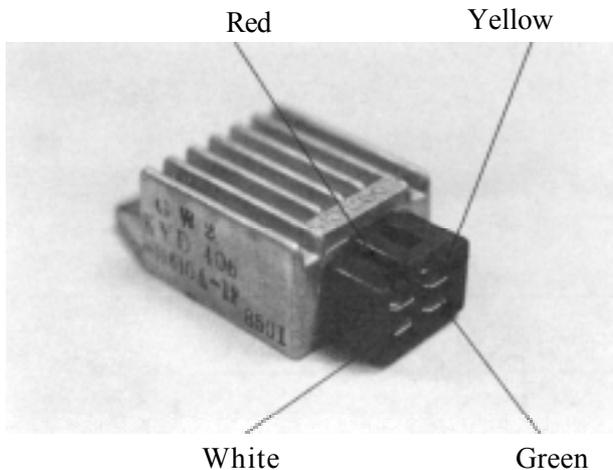


### REGULATOR/RECTIFIER INSPECTION

If the main harness terminals are normal, check the regulator/rectifier coupler for loose connection and measure the resistances between the regulator/rectifier terminals.

\*

- Do not touch the tester probes with your finger because human body has resistance.
- Use the following specified testers for accurate testing. Use of an improper tester in an improper range may give false readings.
  - Kowa Electric Tester
  - Sanwa Electric Tester
  - Kowa Electric Tester TH-5H
- Proper range for testing:
  - Use XK□ range for Sanwa Tester
  - Use X100□ range for Kowa Tester
- If the dry battery in the tester is weak, the readings will be incorrect. In this case, check the dry battery.
- The Kowa tester readings are 100 times the actual values. Be careful during testing.



Probe⊕ Probe(-)	White	Yellow	Red	Green
White		∞	3K-100K	∞
Yellow	∞		∞	5K-100K
Red	∞	∞		∞
Green	∞	5K-100K	∞	

Replace the regulator/rectifier if the readings are not within the specifications in the table.

# 14. BATTERY/CHARGING SYSTEM/ A.C. GENERATOR

## A.C. GENERATOR CHARGING COIL

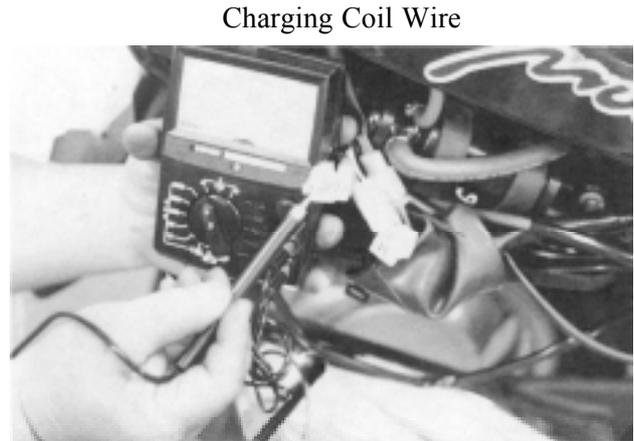
- \* The inspection of A.C. generator charging coil can be made with the engine installed.

### INSPECTION

Disconnect the A.C. generator 3P connector. Measure the resistance between the A.C. generator white wire and engine ground with an electric tester.

**Standard:** 0.2\_ 1.2 $\square$  (at 20°C )

Replace the A.C. generator charging coil if the reading is not within the specifications.



Charging Coil Wire

## A.C. GENERATOR LIGHTING COIL

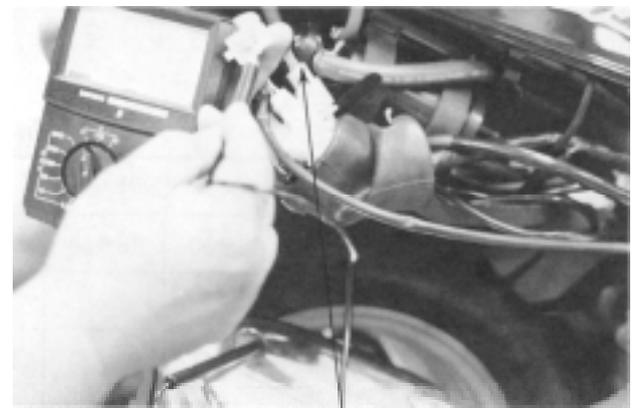
- \* The inspection of A.C. generator lighting coil can be made with the engine installed.

### INSPECTION

Disconnect the A.C. generator 3P connector. Measure the resistance between the A.C. generator yellow wire and engine ground with an electric tester.

**Standard:** 0.1\_ 1.0 $\square$  (at 20°C )

Replace the A.C. generator lighting coil if the reading is not within the specifications.



Lighting Coil Wire

## RESISTOR INSPECTION

Remove the front cover. (⇒2-4)  
Measure the resistance between the resistor lead and engine ground.

**Resistances:** 30W5.9 $\square$  : 5.0\_ 7.0 $\square$   
5W5.0 $\square$  : 4.0\_ 6.0 $\square$



Resistor

## A.C. GENERATOR REMOVAL

Remove the rear right side cover. (⇒2-2)  
Remove the four bolts attaching the cooling fan cover to remove the fan cover.



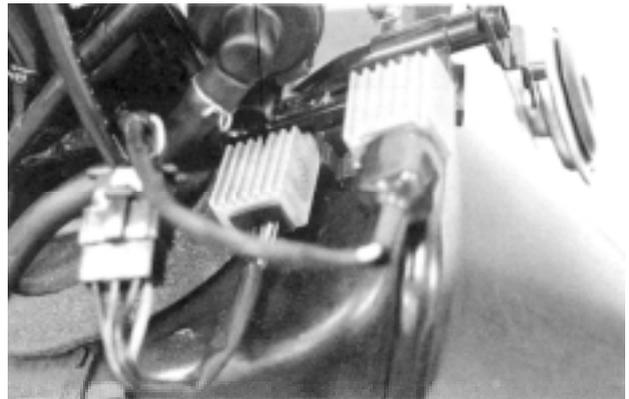
Fan Cover

# 14. BATTERY/CHARGING SYSTEM/ A.C. GENERATOR

## CHARGING INDICATOR INSPECTION

Remove the front cover. (⇒2-4)  
Remove the charging indicator 6P coupler.  
Measure the resistance between each terminal.

Charging Indicator

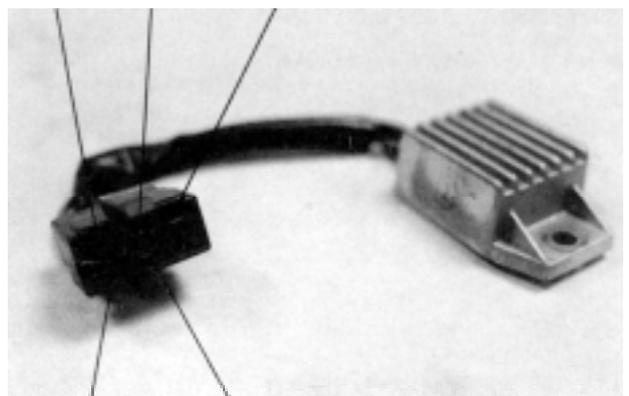


Use an electric tester for testing.  
Take readings in K $\Omega$  range.

Unit: K $\Omega$

Probe(+) Probe(-)	Red/ Black	Red	Brown/ Blue	Red/ Blue	Green
Red/ Black		3_ 5	12→50	16→50	7→30
Red	$\infty$		$\infty$	$\infty$	$\infty$
Brown/B lue	24→50	40→70		25_ 3 5 0	15_ 2 0
Red/ Blue	$\infty$	$\infty$	$\infty$		$\infty$
Green	8→35	15→45	15→20	5_ 7	

Red/ Black Brown/Blue Red

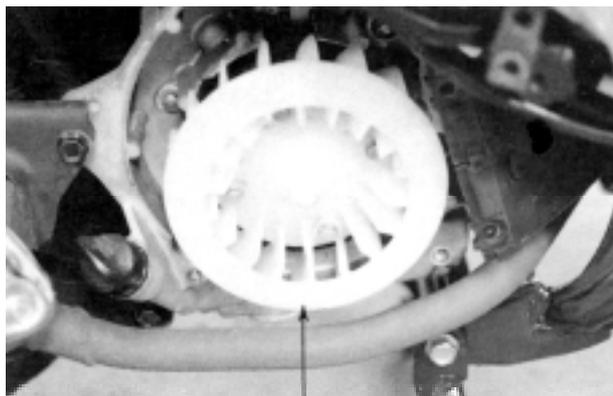


Green Red/ Blue

## 14. BATTERY/CHARGING SYSTEM/ A.C. GENERATOR

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Remove the cooling fan by removing the four cooling fan attaching bolts.



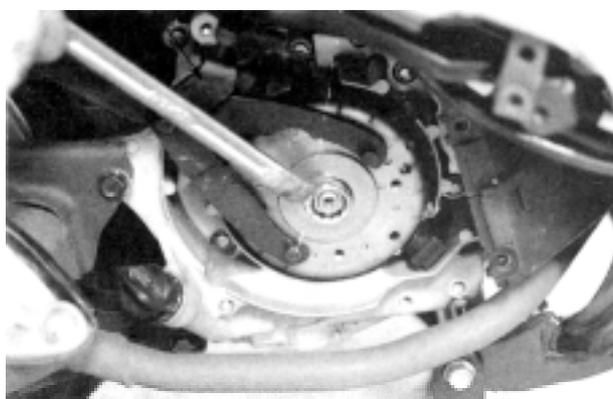
Cooling Fan

Universal Holder

Hold the flywheel with an universal holder.  
Remove the flywheel nut.

**Special**

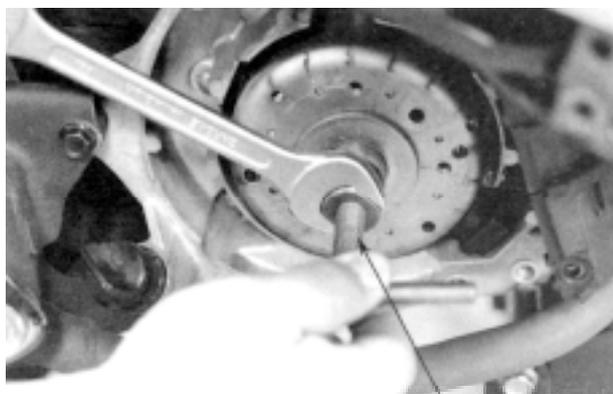
Universal Holder



Remove the A.C. generator flywheel using the flywheel puller.  
Remove the woodruff key.

**Special**

Flywheel Puller



Flywheel Puller

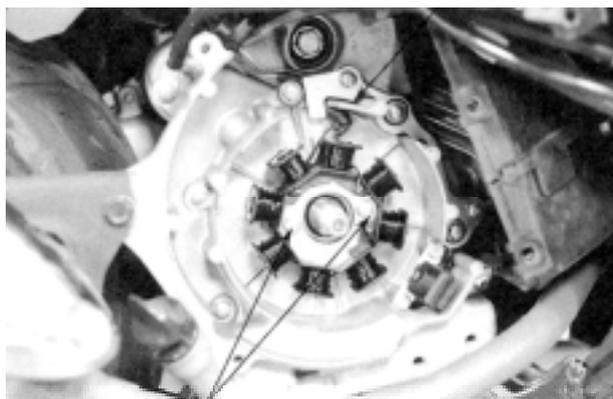
A.C. Generator Wire

Remove the A.C. generator wire connector.



# 14. BATTERY/CHARGING SYSTEM/ A.C. GENERATOR

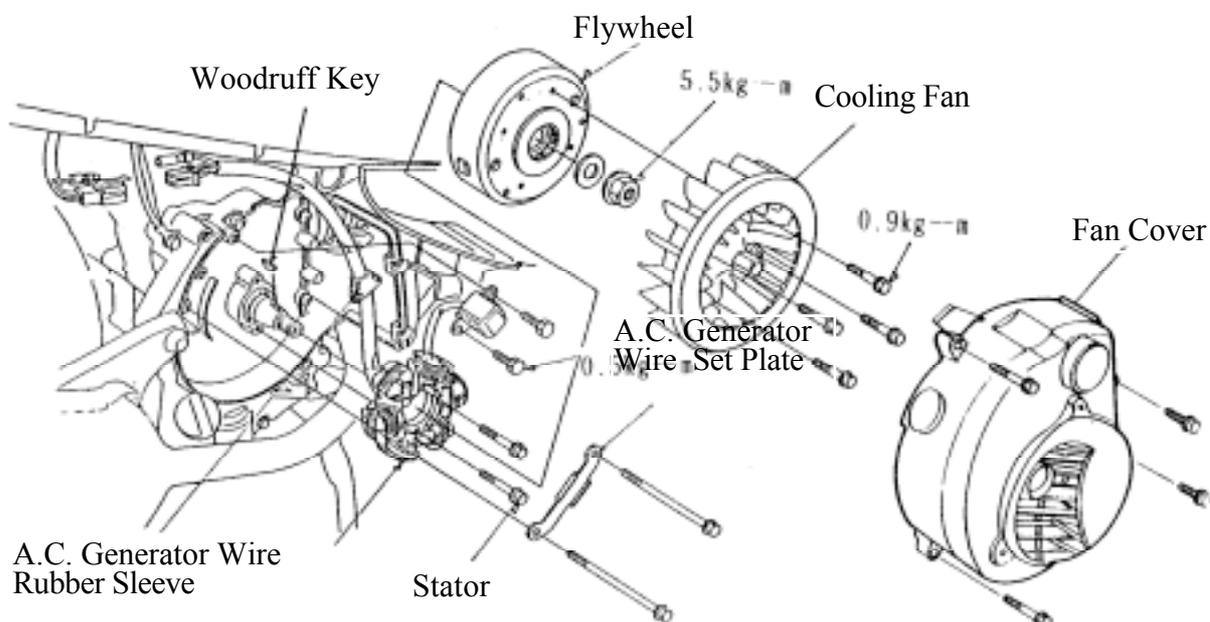
Remove the A.C. generator wire set plate.  
Remove the pulser coil bolts.  
Remove the A.C. generator wire rubber sleeve and pulser coil from the right crankcase.  
Remove the two bolts and A.C. generator stator.



Bolts

Wire Set Plate

## INSTALLATION

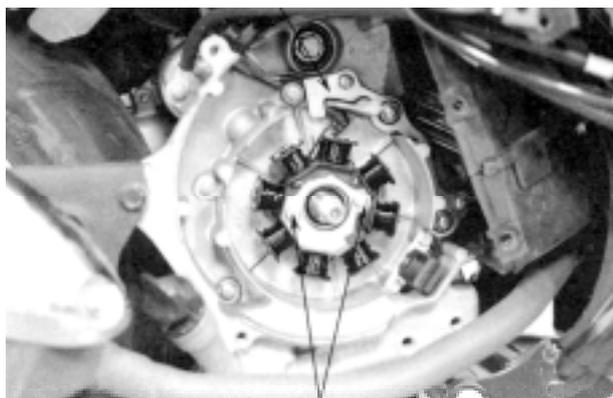


Install the A.C. generator stator and pulser coil onto the right crankcase.  
Tighten the stator and pulser coil bolts.

**Torques:** Pulser Coil: 0.5kg-m  
Stator : 0.9kg-m

Install the A.C. generator wire rubber sleeve and A.C. generator wire set plate.

Wire Set Plate



Bolts

# 14. BATTERY/CHARGING SYSTEM/ A.C. GENERATOR

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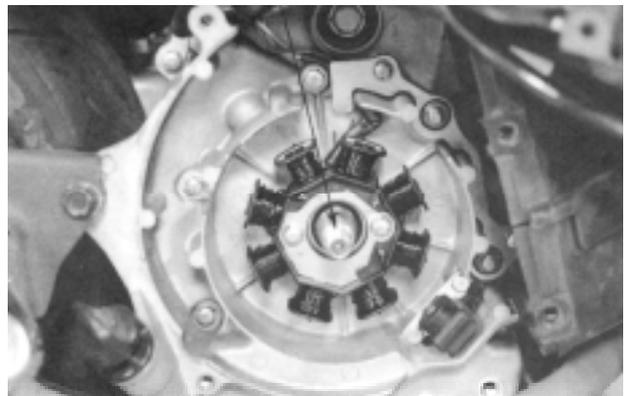
Connect the A.C. generator wire connector.

A.C. Generator Wire



Clean the taper hole in the flywheel off any burrs and dirt.  
Install the woodruff key in the crankshaft keyway.

Woodruff Key



Install the flywheel onto the crankshaft with the flywheel hole aligned with the crankshaft woodruff key.

Universal Holder



\* 

The inside of the flywheel is magnetic. Make sure that there is no bolt or nut before installation.
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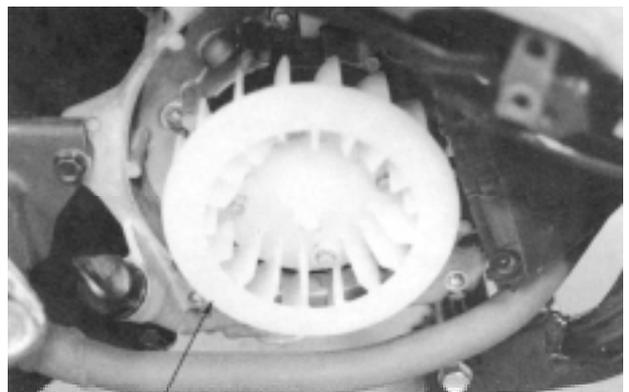
Hold the flywheel with the universal holder and tighten the flywheel nut.

**Torque:** 5.5kg-m

**Special**

Universal Holder  
Install the cooling fan.

**Torque:** 0.9kg-m



Cooling Fan

## 14. BATTERY/CHARGING SYSTEM/ A.C. GENERATOR

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Install the fan cover.

Install the rear right side cover. (⇒2-2)



Fan Cover