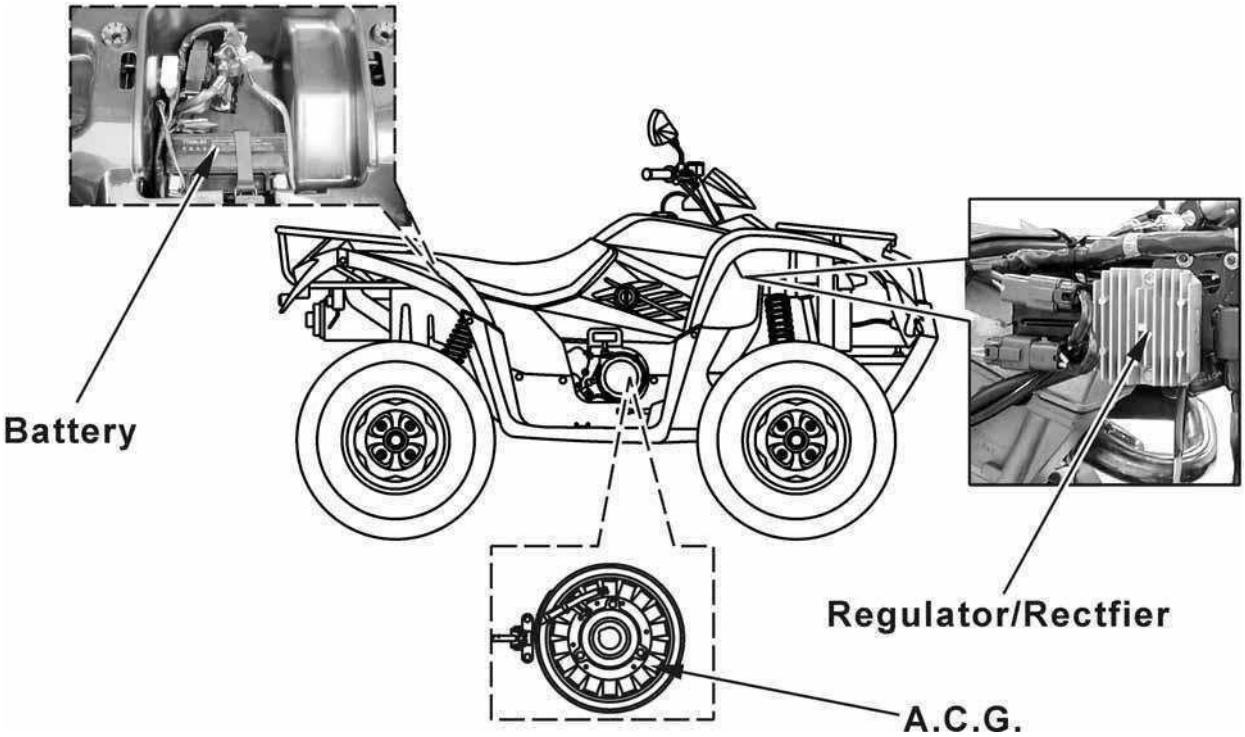
17

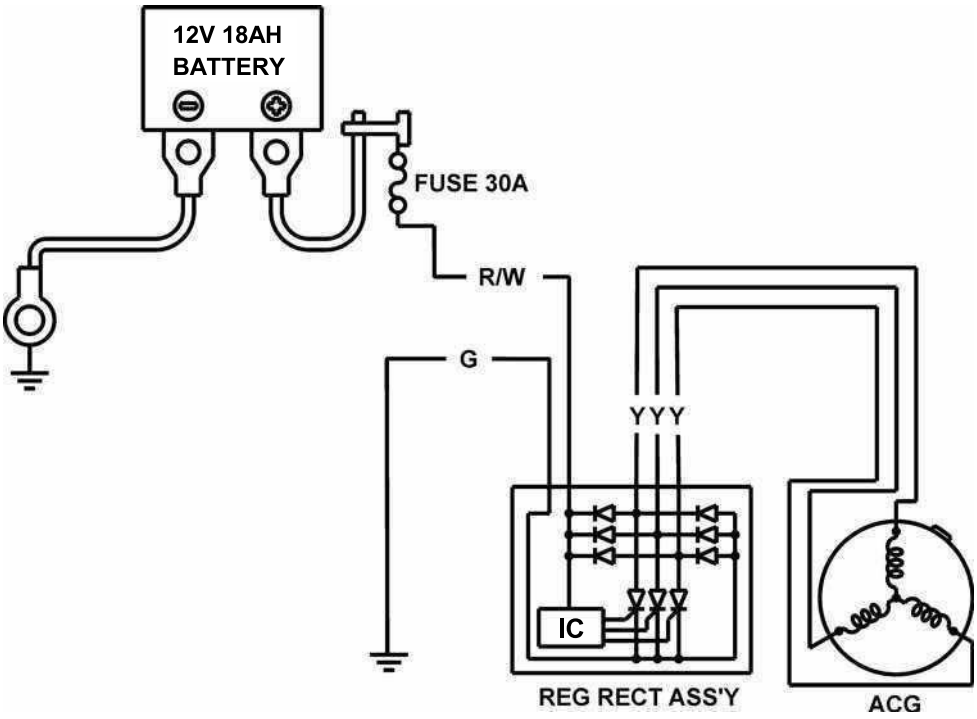
BATTERY/CHARGING SYSTEM

17. BATTERY/CHARGING SYSTEM

CHARGING SYSTEM LAYOUT



CHARGING CIRCUIT



SERVICE INFORMATION

GENERAL

CAUTION

- The battery gives off explosive gases; keep sparks, flames and cigarettes away. Provide adequate ventilation when charging.
- The battery contains sulfuric acid (electrolyte). Contact with skin or eyes may cause severe burns. Wear protective clothing and a face shield.
  - If electrolyte gets on your skin, flush with water.
  - If electrolyte gets in your eyes, flush with water for at least 15 minutes and call a physician immediately.
- Electrolyte is poisonous.
  - If swallowed, drink large quantities of water or milk and call your local Poison Control Center or physician immediately, KEEP OUT OF REACH OF CHILDREN.

- Always turn off the ignition switch before disconnecting any electrical component.
- Some electrical components may be damaged if terminals or connectors are connected or disconnected while the ignition switch is turned to "ON" and current is present.
- For extended storage, remove the battery, give it a full charge, and store it in a cool, dry place.
- For a battery remaining in a shorted vehicle, disconnect the negative battery cable from the battery.
- The battery caps should not be removed. Attempting to remove the sealing caps from the cells may damage the battery.
- The maintenance free battery must be replaced when it reaches the end of its service life.
- The battery can be damaged if overcharged or undercharged, or if left to discharge for long period. These same conditions contribute to shortening the "life span" of the battery. Even under normal use, the performance of the battery deteriorates after 2-3 years.
- Battery voltage may recover after battery charging, but under heavy load, the battery voltage will drop quickly and eventually die out. For this reason, the charging system is often suspected as the problem. Battery overcharge often results from problems in the battery itself, which may appear to be an overcharging symptom. If one of the battery cells is shorted and battery voltage does not increase, the regulator/rectifier supplies excess voltage to the battery. Under these conditions, the electrolyte level goes down quickly.
- Before troubleshooting the charging system, check for proper use and maintenance of the battery. Check if the battery is frequently under heavy load, such as having the headlight and taillight on for long periods of time without riding the vehicle.
- The battery self-discharge when the vehicle is not in use, for this reason, charge the battery every 2 weeks to prevent sulfate from occurring.
- Filling a new battery with electrolyte will produce some voltage, but in order to achieve its maximum performance, always charge the battery. Also, the battery life is lengthened when it is initially charged.
- When checking the charging system, always follow the steps in the troubleshooting flow chart (page 17-4)

BATTERY CHARGING
- This model comes with a maintenance free (MF) battery. Remember the following about MF batteries.
  - ─ Use only the electrolyte that comes with the battery.
  - ─ Use all of the electrolyte
  - ─ Seal the battery properly
  - ─ Never open the seals again
- For battery charging, do not exceed the charging current and time specified on the battery. Using excessive current or extending the charging time may damage the battery.

SPECIFICATIONS

ITEM			SPECIFICATIONS
Battery	Capacity		12V – 18 Ah
	Current leakage		0.5 Ma max.
	Voltage (20°C/68°F)	Full charged	13.0 – 13.2 V
		Needs charging	Below 12.3 V
	Charging current	Normal	1.8 A/5 – 10 h
		Quick	9 A/1 h
Alternator	Capacity		310 – 400 W/5000 rpm
	Charging coil resistance (20°C/68°F)		0.1 – 0.3 Ω

TROUBLESHOOTING

Battery is damaged or weak

Remove the battery.
Check the battery condition.

— Incorrect → •Faulty battery

Correct ↓

Install the battery.
Check the battery current leakage.

Specified current leakage: 0.5 Ma max

— Incorrect → Disconnect the regulator/rectifier connectors and recheck the battery current leakage.

Incorrect → •Shorted wire harness.
•Faulty ignition switch.

Correct → •Faulty regulator/rectifier.

Correct ↓

Check the alternator charging coil.

Standard: 0.1 – 0.3 Ω (20°C/68°F)

— Incorrect → •Faulty charging coil.

Correct ↓

Measure and record the battery voltage using a digital multimeter.
Start the engine.
Measure the charging voltage.
Compare the measurements to result of the following calculation.

Measured voltage < measured charging voltage < 15.5 V

— Correct → •Faulty battery.

Incorrect ↓

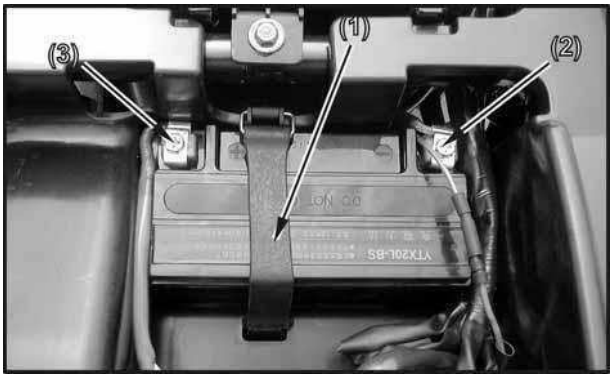
Perform the regulator/rectifier wire harness inspection.

— Incorrect → •Open circuit in related wire.
•Loose or poor contacts of related terminal.
•Shorted wire harness

Correct ↓

•Faulty regulator/rectifier

BATTERY



REMOVAL/INSTALLATION

Battery removal

1. Make sure the ignition switch is OFF.
2. Remove the seat (refer to the "**FRAME COVERS**" section in the chapter 2)
3. Release the rings and remove the rubber band (1).
4. Disconnect the negative (-) terminal lead (2) from the battery first, then disconnect the positive (+) terminal lead (3).
5. Remove the battery.

Battery installation

1. Install in the reverse order of removal.
2. After installing the battery, check to see if the battery cables are routed correctly.

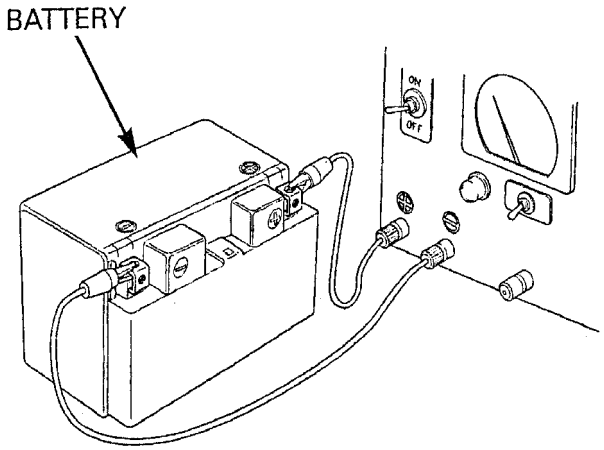
After connecting the battery cables, coat the terminals with grease.

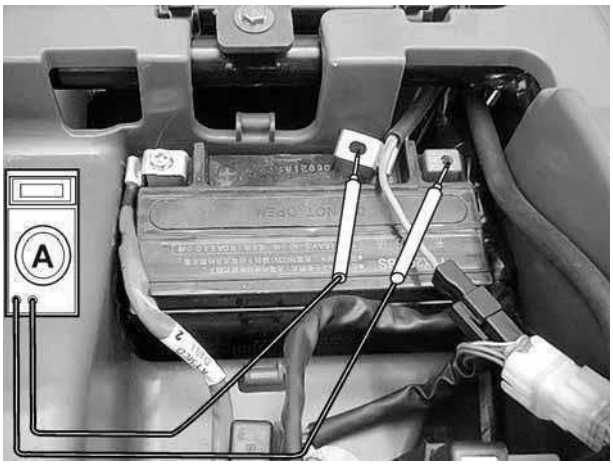
VOLTAGE INSPECTION

Remove the battery cover (see above).

Measure the battery voltage using a commercially available digital multi-meter.

Voltage (20ºC/68ºC):
Fully charged: 13.0 13.2 V
Under charged: below 12.3 V


BATTERY
ON
OFF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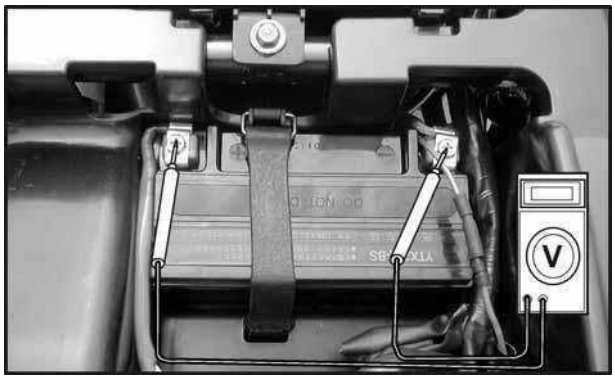
CHARGING VOLTAGE INSPECTION



Be sure that the battery is in good condition before performing this test.

> Do not disconnect the battery or any cable in the charging system without first switching off the ignition switch. Failure to follow this precaution can damage the tester or electrical components.

Start the engine and warm it up to the operating temperature; stop the engine.

Connect the multi-meter between the positive and negative terminals of the battery.

To prevent short, make absolutely certain which are the positive and negative terminals or cable.

With the headlight on and turned to the high beam position, restart the engine.

Measure the voltage on the multi-meter when the engine runs at 5000 min-1 (rpm).

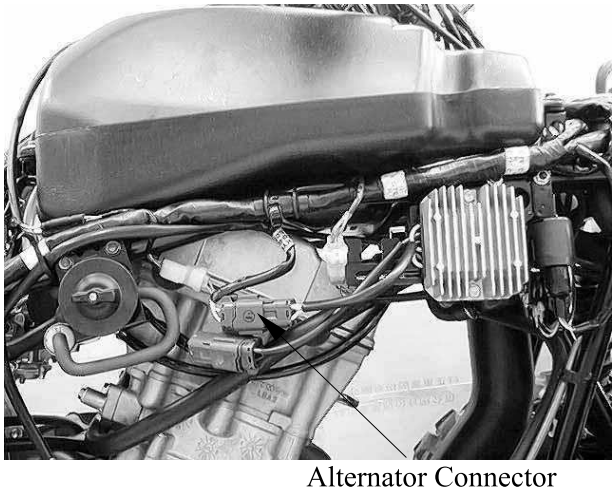
Standard:

Measured battery voltage (page 17-5) < Measure charging voltage (see above) < 15 V

ALTERNATOR CHARGING COIL

INSPECTION

Disconnect the alternator connector.

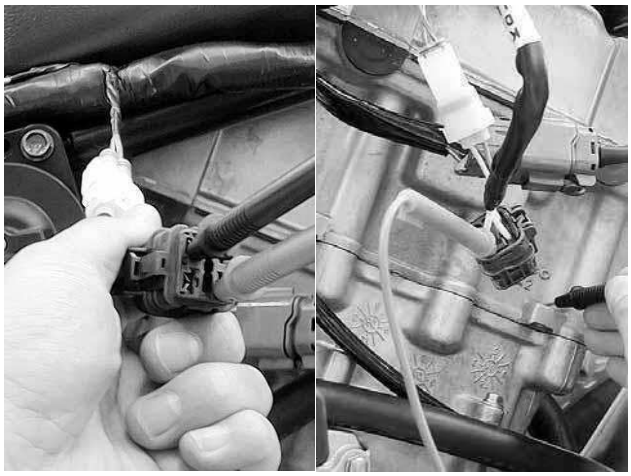


Alternator Connector

Measure the resistance between each Yellow wire terminals.
Standard: 0.1 0.3 Ω (20ºC/68ºF)

Check for continuity between each Yellow wire terminal of the alternator side connector and ground.
There should be no continuity.

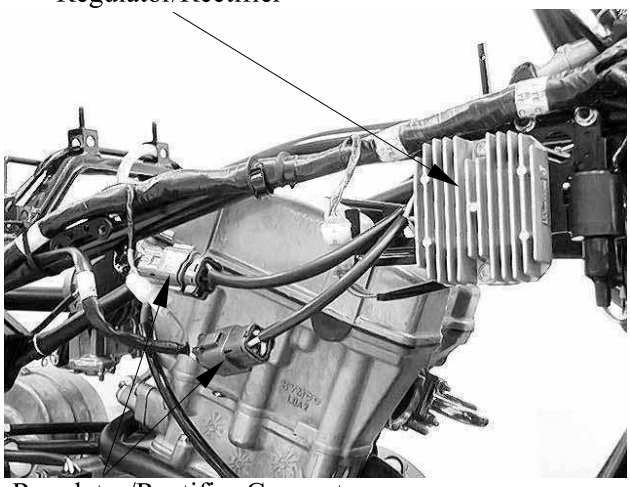
Replace the alternator stator if resistance is out of specification, or if any wire has continuity to ground.



REGULATOR/RECTIFIER

WIRE HARNESS INSPECTION

Disconnect the regulator/rectifier connectors.
Check the connectors for loose contacts of corroded terminals.



Regulator/Rectifier Connectors

Battery line

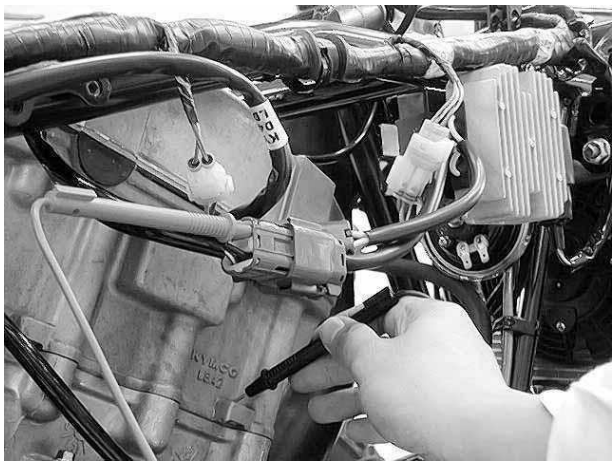
Measure the voltage between the Red/White wire terminal and ground.
There should be battery voltage at all times.

Voltage feedback line

Measure the voltage between the black wire terminal and ground.
There should be battery voltage with the ignition switch “ON”, and no voltage with the ignition switch “OFF”.

Ground line

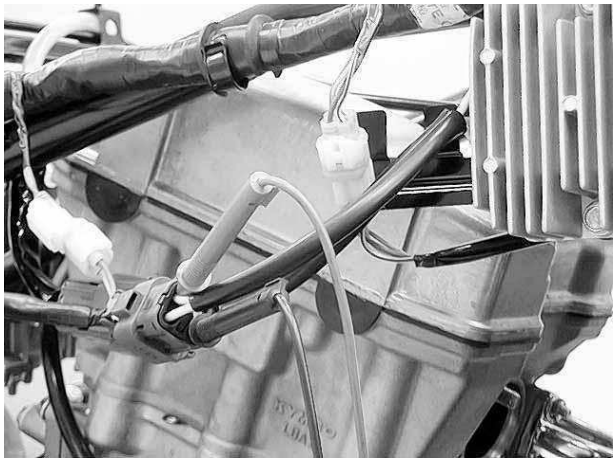
Check the continuity between the Green wire terminal and ground.
There should be continuity at all times.



Charging coil line

Measure the resistance between each Yellow wire terminals.
Standard: 0.1 0.3 Ω (20ºC/68ºF)

Check for continuity between each Yellow wire terminal and ground.
There should be no continuity.

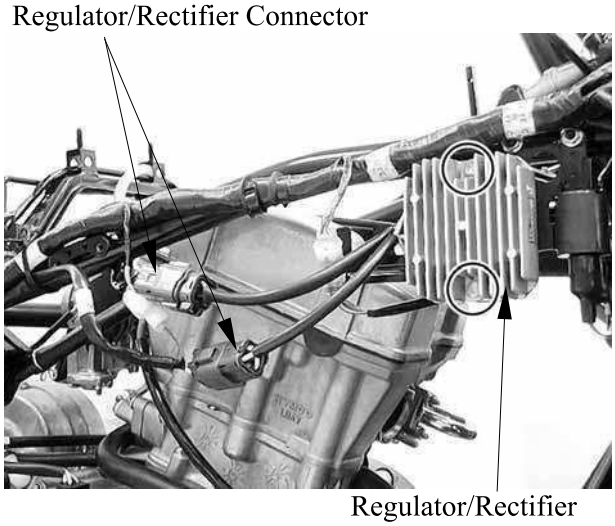


REMOVAL/INSTALLATION

Disconnect the regulator/rectifier connectors.

Remove the two bolts and then remove the regulator/rectifier.

Installation is in the reverse order of removal.

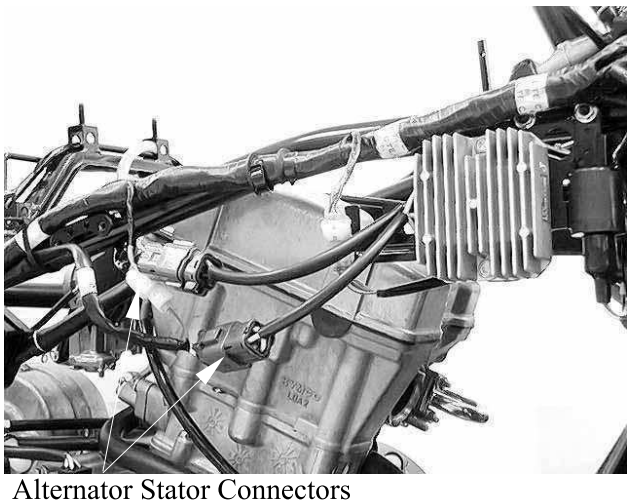


ALTERNATOR STATOR REMOVAL/INSPECTION/ INSTALLATION

REMOVAL

Drain the engine oil (refer to the "**ENGINE OIL**" section in the chapter 3).

Disconnect the alternator stator connectors.

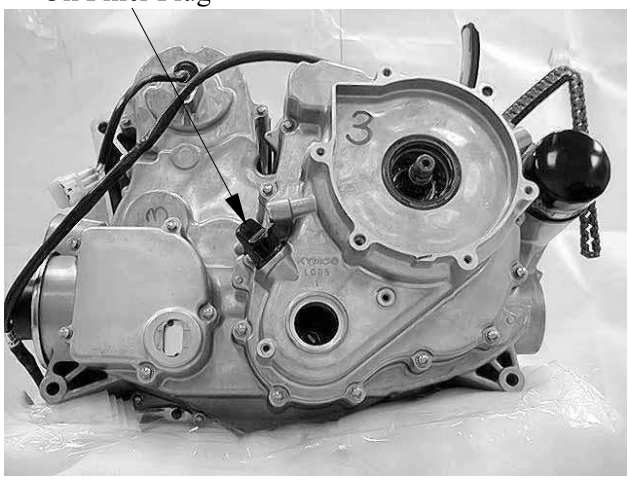


Alternator Stator Connectors

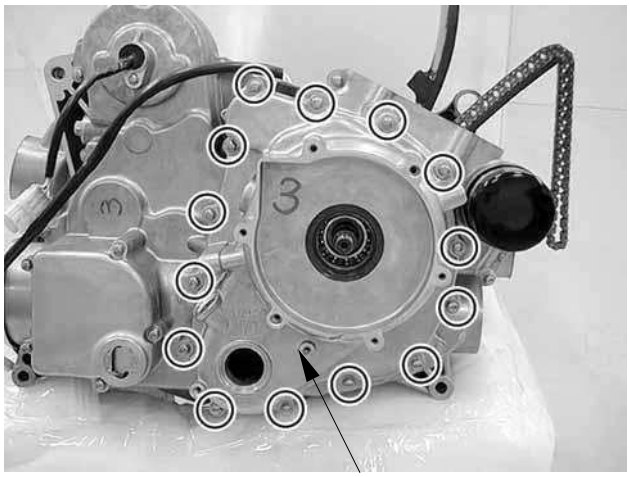
Remove the starter pulley (refer to the "**STARTER PULLEY REMOVAL/INSPECTION/INSTALLATION**" section in the chapter 19).

Remove the oil filler plug.

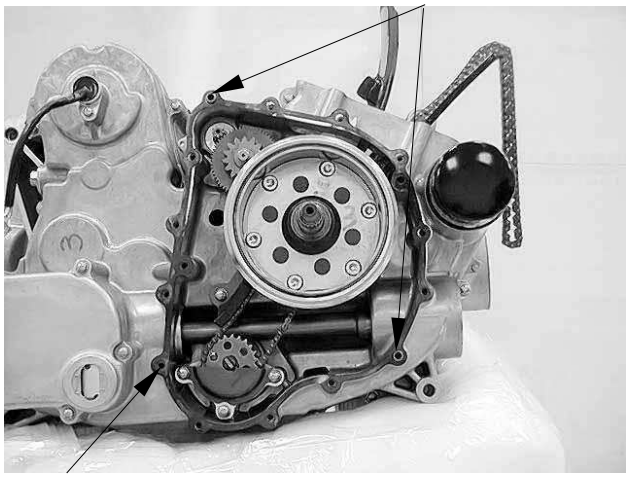
Oil Filler Plug



Remove the fourteen bolts and then remove the right crankcase cover.



Right Crankcase Cover



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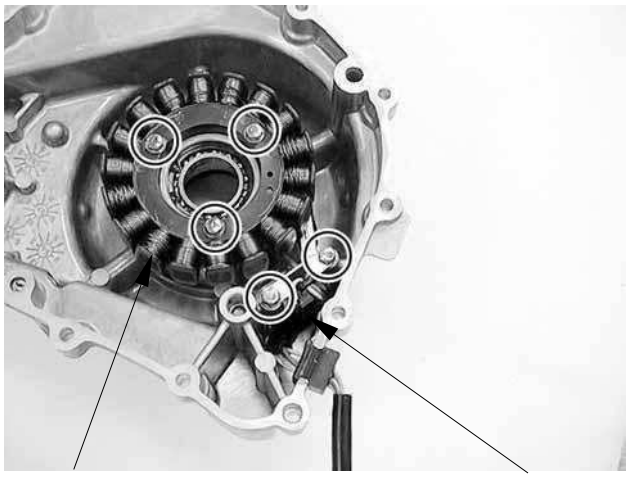
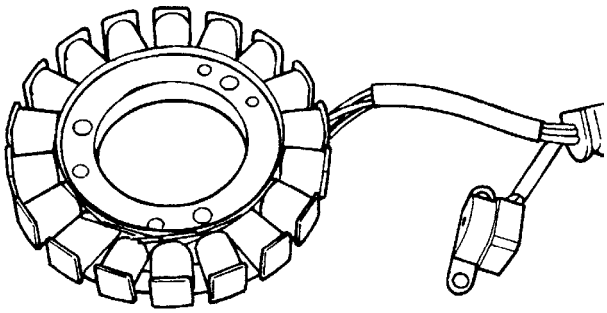


Stator Pulse Coil



INSTALLATION

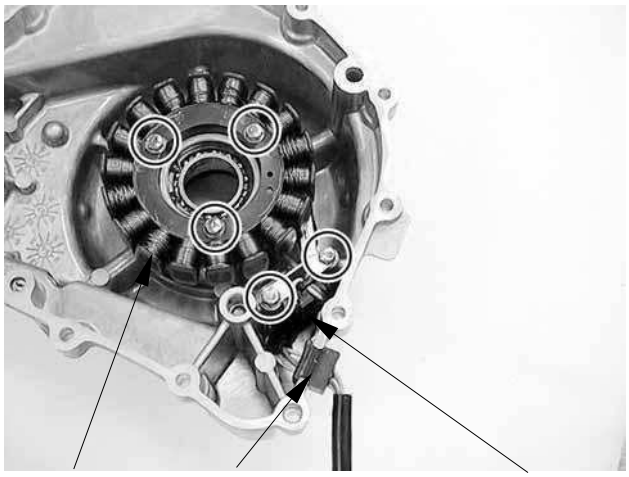
Install the stator and tighten the stator mount bolts to the specified torque.

Torque: 1.2 kgf-m (12 N-m)

Apply sealant to the grommet seating surface and install it to the cover groove properly.

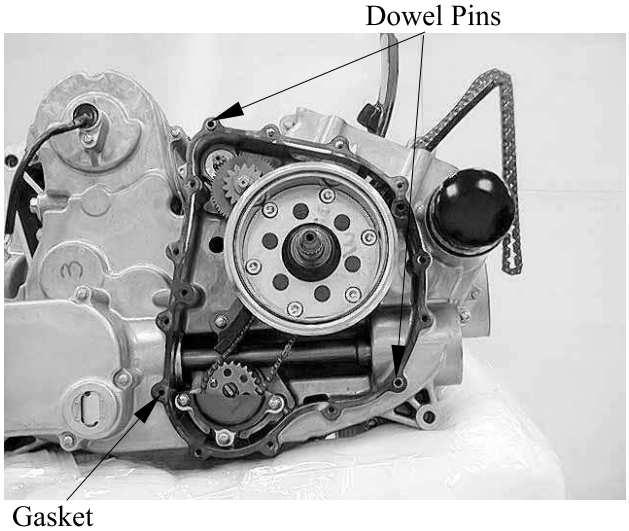
Install the pulse coil and tighten mount bolts to the specified torque.

Torque: 1.2 kgf-m (12 N-m)



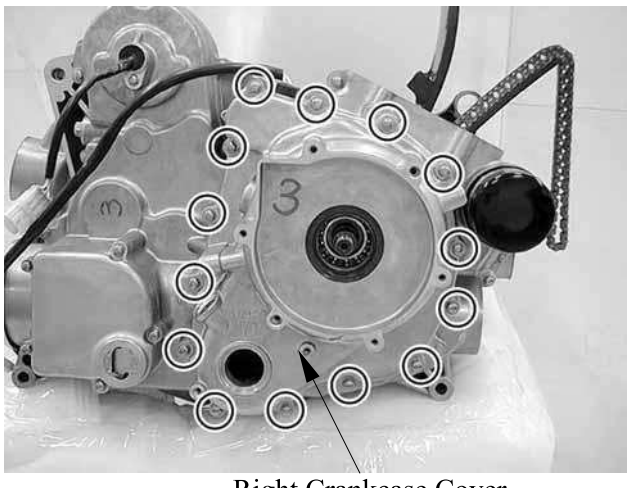
Clean the mating surfaces of the right crankcase and cover.

Install the dowel pins and gasket.



Install the right crankcase cover and tighten the bolts in a crisscross pattern in 2 or 3 steps.

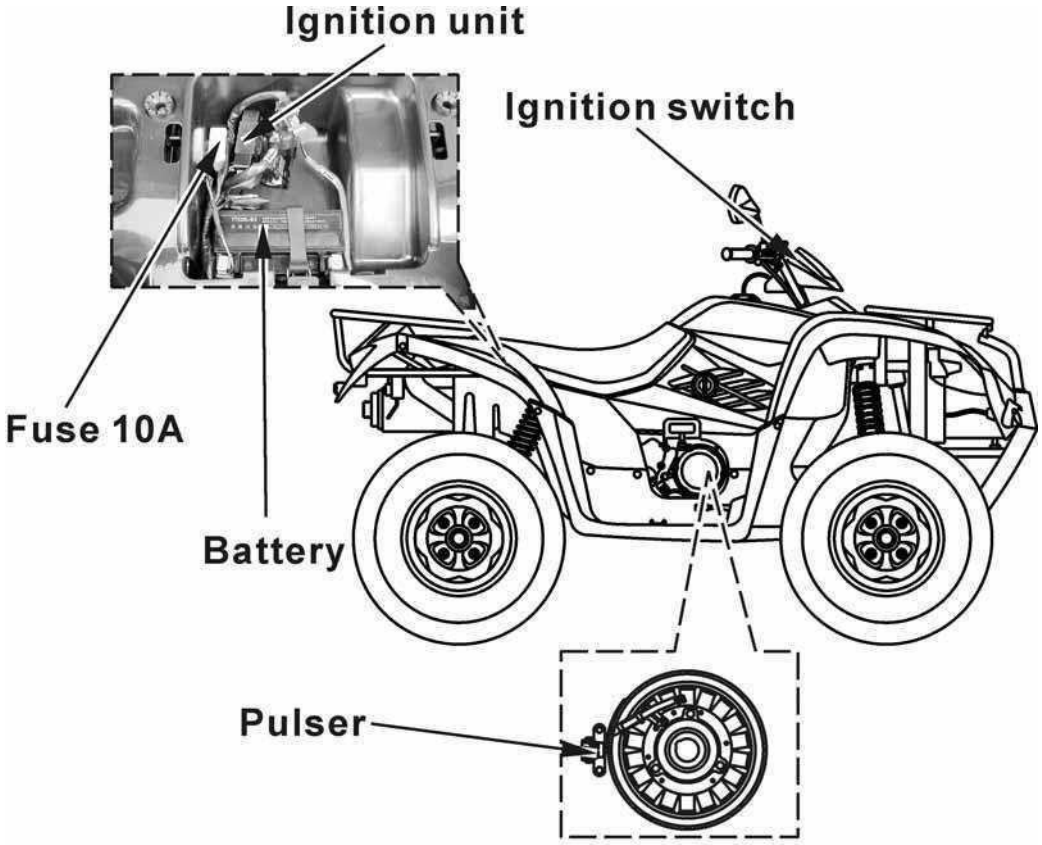
FLYWHEEL:
Refer to the "**STARTER CLUTCH REMOVAL/INSPECTION/INSTALLATION**" section in the chapter 19

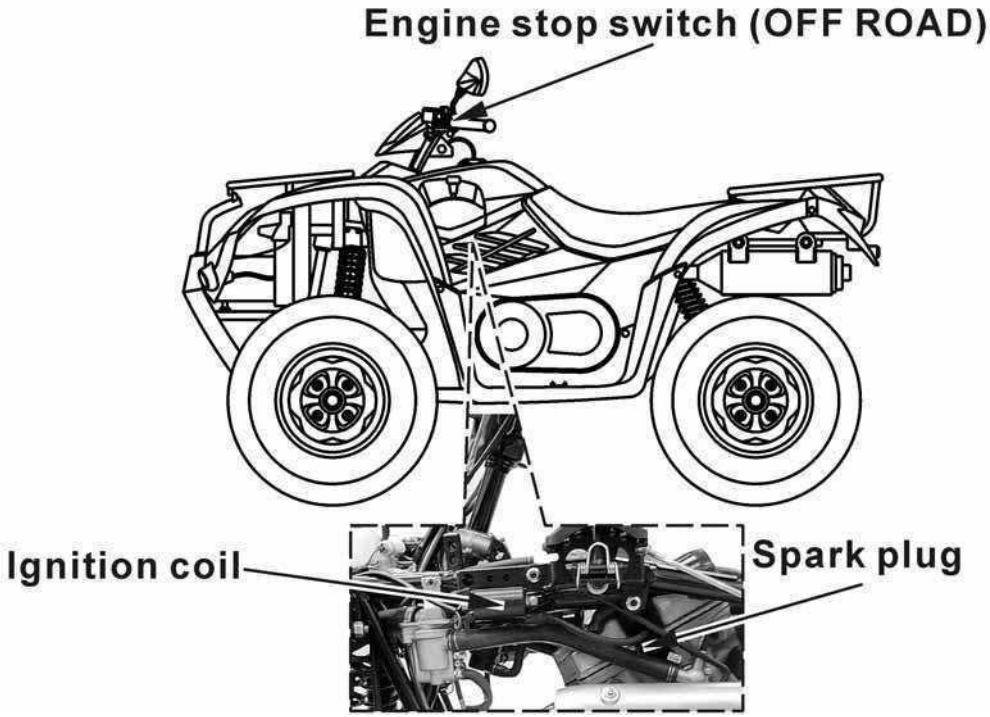


18

IGNITION SYSTEM

IGNITION SYSTEM LAYOUT





18. IGNITION SYSTEM

SERVICE INFORMATION

GENERAL INSTRUCTIONS

- Some electrical components may be damaged if terminals or connectors are connected or disconnected while the ignition switch is "ON" and current is present.
- When servicing the ignition system, always follow the steps in the troubleshooting on page **18-3**.
- The ignition timing cannot be adjusted since the ignition control module is factory preset.
- The ignition control module may be damaged if dropped. Also, if the connector is disconnected when current is flowing, the excessive voltage may damage the ignition control module. Always turn off the ignition switch before servicing.
- A faulty ignition system is often related to poor connections. Check those connections before proceeding.
- Make sure the battery is adequately charged. Using the starter motor with a weak battery results in a slower engine cranking speed as well as no spark at the spark plug.
- Use a spark plug of the correct heat range. Using spark plug with an incorrect heat range can damage the engine.
- See section 17 for ignition pulse generator removal/installation.
- See section 20 for following components:

™ Ignition switch
™ Engine stop switch

SPECIFICATIONS

Item	Standard
Spark plug	NGK-CR7E
Spark plug gap	0.7 mm (0.028 in)
Ignition system	Full transistor digital ignition
Ignition timing	5°/1500 rpm

TROUBLESHOOTING

LOW PEAK VOLTAGE

- Cranking speed is too low (battery is undercharged).
- Poorly connected connectors or an open circuit in the ignition system.
- Faulty ignition-coil.
- Faulty ignition control module.

NO PEAK VOLTAGE

- Short circuit in engine stop switch or ignition switch wire.
- Faulty engine stop switch or ignition switch.
- Loose or poorly connected ignition control module connectors.
- Open circuit or poor connection in ground wire of the ignition control module.
- Faulty ignition pulse generator.
- Faulty ignition control module.

PEAK VOLTAGE IS NORMAL, BUT NO SPARK JUMPS AT THE PLUG

- Faulty spark plug or leaking ignition coil secondary current.
- Faulty ignition coil.

IGNITION COIL INSPECTION

IGNITION COIL PRIMARY PEAK VOLTAGE

Check cylinder compression and check that the spark plugs is installed correctly in the cylinder.
Disconnect the spark plug cap from the spark plug.


Spark Plug Cap

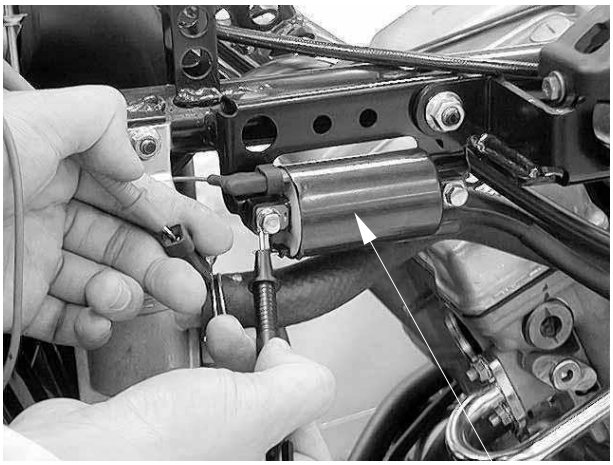
Connect known good spark plug to the spark plug cap and ground the spark plugs to the cylinder as done in the spark test.

Spark Plug Cap

Turn the ignition switch to “ON” and engine stop switch ON.
Turn the engine stop switch in RUN (OFF ROAD).

Connect the multi-meter (+) probe to the Brown/Blue wire and the multi-meter (-) to the body ground.
Check for initial voltage at this time.
The battery voltage should be measured.

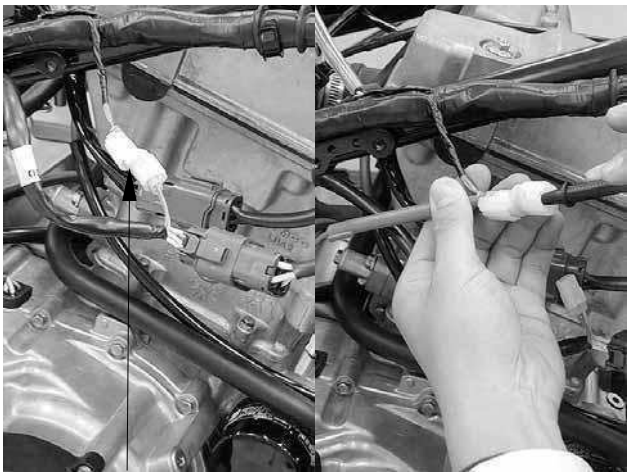
If the initial voltage cannot be measured, check the power supply circuit.


Ignition Coil

IGNITION PULSE GENERATOR INSPECTION

Disconnect the ignition pulse generator connector.
Measure the ignition pulse generator resistance between the Green/White wire and Blue/Yellow wire.

Standard: 489±20% Ω (20ºC/68ºF)



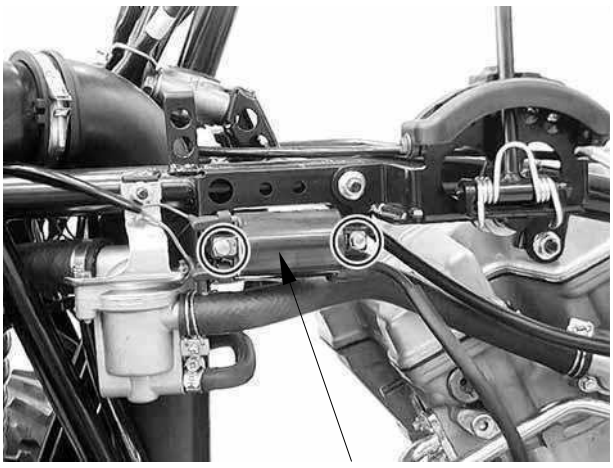
Ignition Pulse Generator Connector

IGNITION COIL REMOVAL/INSTALLATION

Disconnect the spark plug cap from the spark plug (page 18-4).

Disconnect the ignition coil primary connectors.
Remove the two bolts and the ignition coil.

Installation is in the reverse order of removal.



Ignition Coil

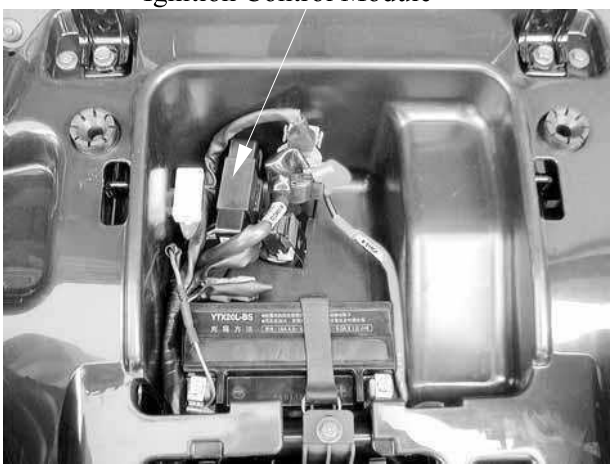
IGNITION CONTROL MODULE

REMOVAL/INSTALLATION

Remove the seat (refer to the "**FRAME COVERS**" section in the chapter 2).

Disconnect the ignition control module connectors and remove the ignition control module.

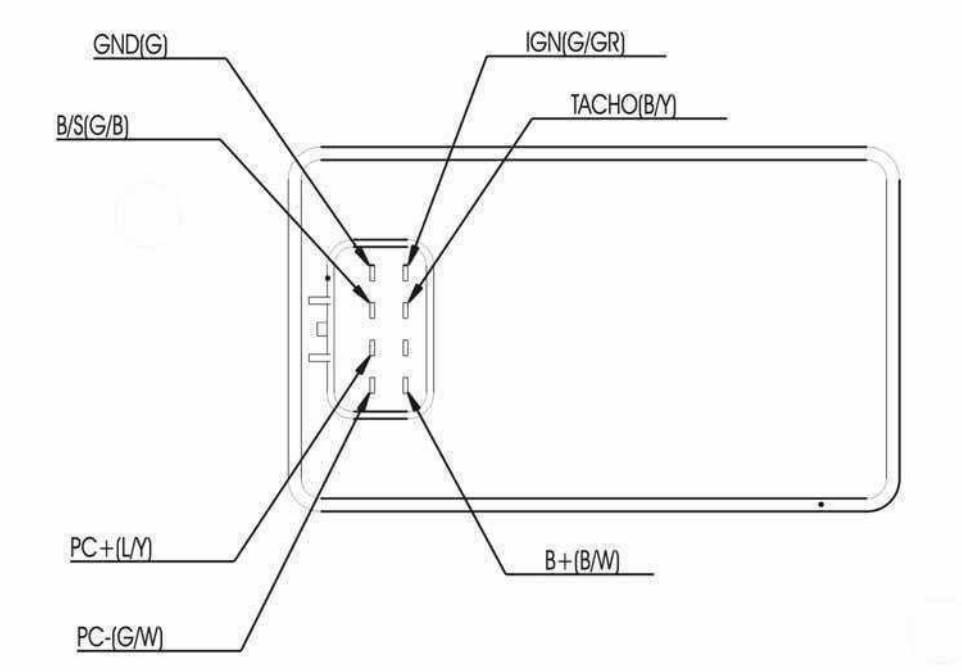
Ignition Control Module



RESISTANCE INSPECTION

Measure the resistance between the terminals.

Due to the semiconductor in circuit, it is necessary to use a specified tester for accurate testing. Use of an improper tester in an improper range may give false readings.



Unit: Ω

(-) \ (+)	B/W	G/GR	L/Y	G/W	B/Y	G
B/W						
G/GR			6.7 M	6.7 M		6.7 M
L/Y				0.785 K		Continue
G/W			0.778 K			0.785 k
B/Y						
G			Continue	0.785 K		

STARTER SYSTEM

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