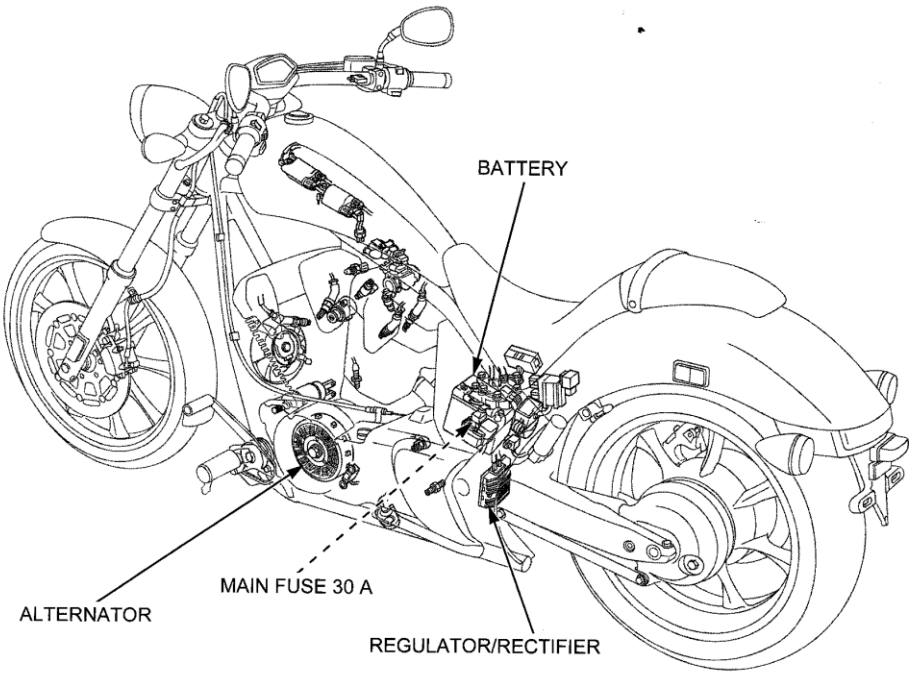
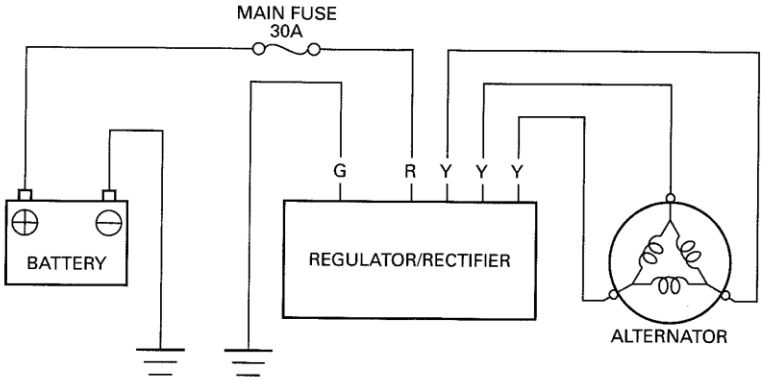
19. BATTERY/CHARGING SYSTEM

SYSTEM LOCATION



SYSTEM DIAGRAM



G : Green
R : Red
Y : Yellow

SERVICE INFORMATION

GENERAL

⚠WARNING

- 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 a call a physician immediately.

NOTICE

- *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 ON and current is present.*

- For extended storage, remove the battery, give it a full charge, and store it in a cool, dry space. For maximum service life, charge the stored battery every two weeks.
- For a battery remaining in a stored motorcycle, disconnect the negative battery cable from the battery terminal.
- The maintenance free (MF) 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, 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 tail light ON for long periods of time without riding the motorcycle.
- The battery will self-discharge when the motorcycle is not in use. For this reason, charge the battery every 2 weeks to prevent sulfation from occurring.
- When checking the charging system, always follow the steps in the troubleshooting flow chart (page 19-5).
- The alternator service may be done with the engine in the frame.

BATTERY CHARGING

- Turn power ON/OFF at the charger, not at the battery terminal.
- 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.
- Quick charging should only be done in an emergency; slow charging is preferred.

BATTERY TESTING

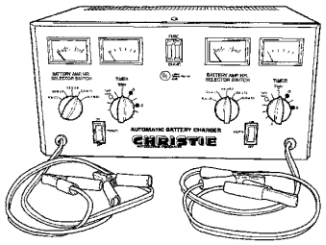
Refer to the battery tester's Operation Manual for the recommended battery testing procedure.
The recommended battery tester puts a "load" on the battery so the actual battery condition of the load can be measured.

Recommended battery tester: Micro 404XL (U.S.A. only)

SPECIFICATIONS

ITEM			SPECIFICATIONS
Battery	Capacity		12 V – 11.2 Ah
	Current leakage		• 0.5 mA maximum
	Voltage (20°C/68°F)	Fully charged	13.0 – 13.2 V
		Needs charging	Below 12.4 V
	Charging current	Normal	1.1 A/5 – 10 h
		Quick	5.5 A/1.0 h
Alternator	Capacity		0.381 kW/5,000 rpm
	Charging coil resistance (20°C/68°F)		0.2 – 0.4 Ω

TOOLS

Motorcycle battery analyzer Micro 404XL (U.S.A. only)	Christie battery charger MC1012/2T (U.S.A. only)
	

TROUBLESHOOTING

Battery is damaged or weak

1. **Battery Test**

   Remove the battery (page 19-6).

   Check the battery condition using the recommended battery tester.

   Recommended battery tester: Micro 404XL (U.S.A. only)

   Is the battery good condition?

   YES – GO TO STEP 2.

   NO – Faulty battery

2. **Current Leakage Test**

   Install the battery (page 19-6).

   Check the battery current leakage test (Leak test; page 19-7).

   Is the current leakage below 0.5 mA?

   YES – GO TO STEP 4.

   NO – GO TO STEP 3.

3. **Current Leakage Test Without Regulator/rectifier Connector**

   Disconnect the regulator/rectifier connector and recheck the battery current leakage.

   Is the current leakage below 0.5 mA?

   YES – Faulty regulator/rectifier

   NO – • Shorted wire harness
   • Faulty ignition switch

4. **Alternator Charging Coil Inspection**

   Check the alternator charging coil (page 19-10).

   Is the alternator charging coil resistance within 0.2 – 0.4 Ω (20°C/68°F)?

   YES – GO TO STEP 5.

   NO – Faulty charging coil

5. **Charging Voltage Inspection**

   Measure and record the battery voltage using a digital multimeter (page 19-6).

   Start the engine.

   Measure the charging voltage (page 19-7).

   Compare the measurements to result of the following calculation.

   STANDARD:
   Measured BV < Measured CV < 15.5 V
   · BV = Battery Voltage (page 19-6)
   · CV = Charging Voltage

   Is the measured charging voltage within the standard voltage?

   YES – Faulty battery

   NO – GO TO STEP 6.

6. **Regulator/rectifier System Inspection**

   Check the voltage and resistance at the regulator/rectifier connectors (page 19-8).

   Are the results of checked voltage and resistance correct?

   YES – Faulty regulator/rectifier

   NO – • Open circuit in related wire
   • Loose or poor contact of related connector
   • Shorted wire harness

BATTERY

REMOVAL/INSTALLATION

NOTE:
- Always turn the ignition switch OFF before removing the battery.

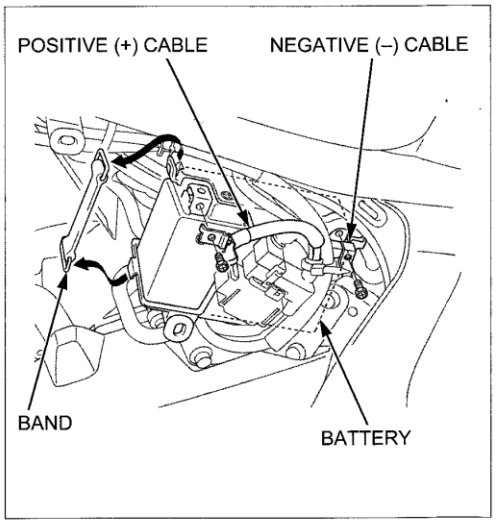
Remove the left side cover (page 3-6).

Disconnect the battery negative (–) cable first, then disconnect the battery positive (+) cable.

Remove the band and battery from the battery case.

Install the battery in the reverse order of removal.

NOTE:
- Connect the positive (+) cable first, then connect the negative (–) cable.



VOLTAGE INSPECTION

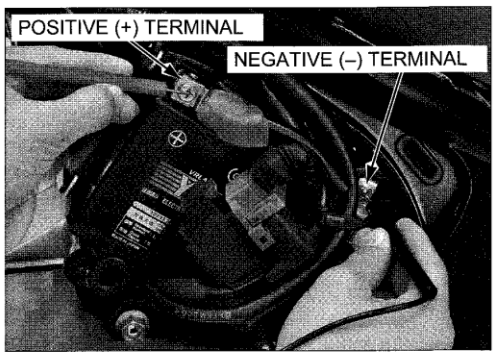
Remove the left side cover (page 3-6).

Measure the battery voltage using a commercially available digital multimeter.

VOLTAGE (20°C/68°F):
Fully charged: 13.0 – 13.2 V
Needs charging: Below 12.4 V

If the battery voltage is below 12.4 V, charge the battery.

Install the left side cover (page 3-6).



BATTERY TESTING

Remove the battery (page 19-6).

Refer to the instructions that are appropriate to the battery testing equipment available to you.

TOOL:

Motorcycle battery analyzer	**Micro 404XL (U.S.A. only)**

BATTERY CHARGING (U.S.A. only)

Remove the battery (page 19-6).

Refer to the instructions that are appropriate to the battery charging equipment available to you.

TOOL:

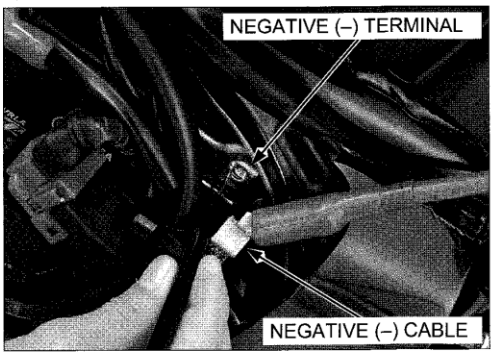
Christie battery charger	**MC1012/2T (U.S.A. only)**

CHARGING SYSTEM INSPECTION

CURRENT LEAKAGE TEST

Remove the left side cover (page 3-6).

Turn the ignition switch OFF, disconnect the negative (–) cable from the battery.
Connect the ammeter (+) probe to the negative (–) cable and the ammeter (–) probe to the battery (–) terminal.
With the ignition switch OFF, check for current leakage.



NOTE:

- When measuring current using a tester, set it to a high range, and then bring the range down to an appropriate level. Current flow higher than the range selected may blow the fuse in the tester.
- While measuring current, do not turn the ignition switch ON. A sudden surge of current may blow the fuse in the tester.

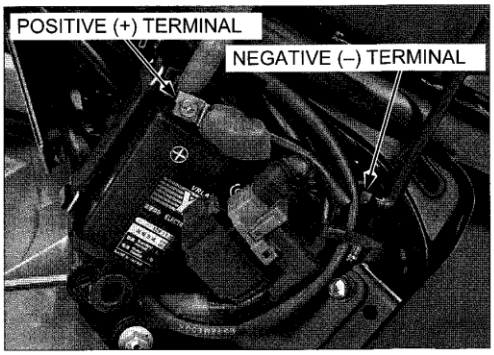
SPECIFIED CURRENT LEAKAGE: 0.5 mA maximum

If current leakage exceeds the specified value, a shorted circuit is the probable cause.
Locate the short by disconnecting connections one by one and measuring the current.

Install the left side cover (page 3-6).

CHARGING VOLTAGE INSPECTION

Remove the left side cover (page 3-6).



NOTE:

- Make sure the battery is in good condition before performing this test.

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

Connect the multimeter between the positive and negative terminals of the battery.

NOTE:

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

With the headlight on high beam, restart the engine.
Measure the voltage on the multimeter when the engine runs at 5,000 rpm.

STANDARD:

Measured BV < Measured CV < 15.5 V

- **BV = Battery Voltage (page 19-6)**
- **CV = Charging Voltage**

Install the left side cover (page 3-6).

REGULATOR/RECTIFIER

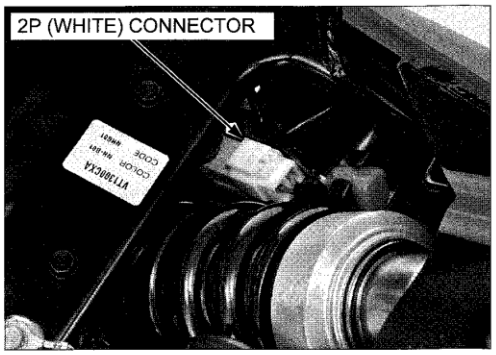
WIRE HARNESS INSPECTION

BATTERY CHARGING LINE

Remove the seat (page 3-6).

Turn the ignition switch OFF.

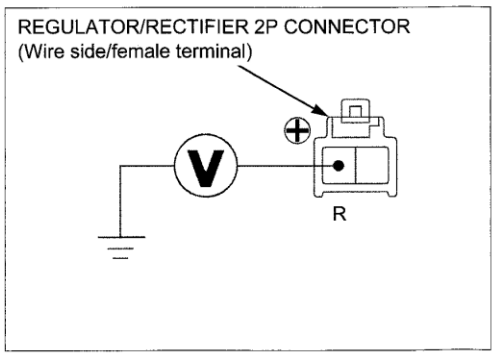
Disconnect the regulator/rectifier 2P (White) connector.



Measure the voltage between the regulator/rectifier 2P (White) connector of the wire side and ground.

CONNECTION: Red (+) – Ground (–)

There should be battery voltage at all times.



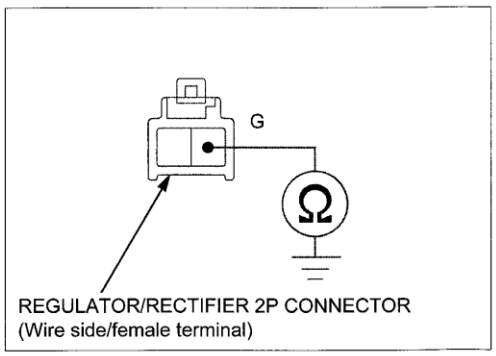
GROUND LINE

Check for continuity between the regulator/rectifier 2P (White) connector of the wire side and ground.

CONNECTION: Green – Ground

There should be continuity at all times.

If all components of the charging system are normal and there are no loose connection at the regulator/ rectifier connector, replace the regulator/rectifier.

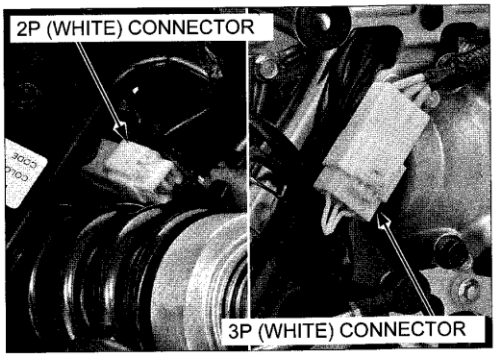


REMOVAL/INSTALLATION

Remove the following:

- Seat (page 3-6)
- Swingarm (page 16-17)
- Battery (page 19-6)

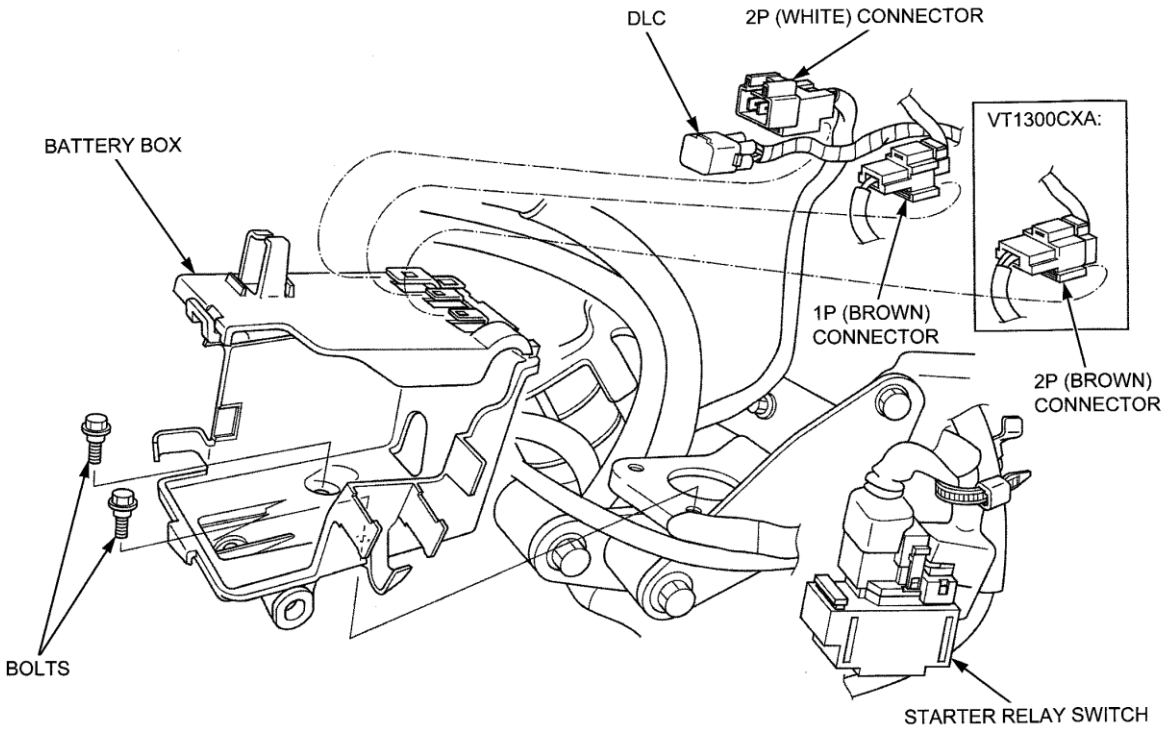
Disconnect the regulator/rectifier 2P (White) connector and alternator 3P (White) connector.



VT1300CXA: Remove the battery 2P (Brown) connector.

Remove the following:

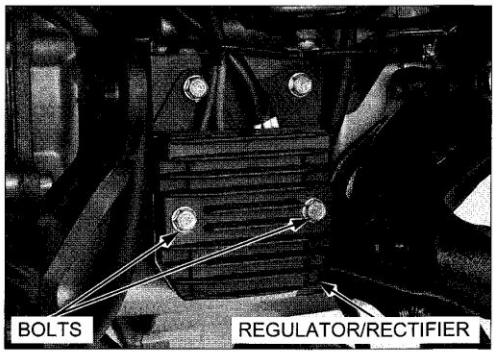
- Regulator/rectifier 2P (White) connector
- Battery 1P (Brown) connector
- DLC
- Starter relay switch
- Bolts
- Battery box



Remove the bolts and regulator/rectifier.

Route the wires and hoses properly (page 1-22).

Installation is in the reverse order of removal.



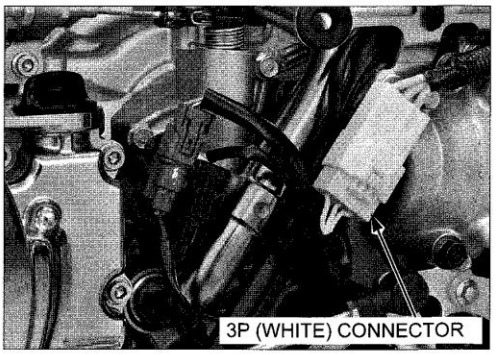
ALTERNATOR CHARGING COIL

INSPECTION

Remove the left crankcase rear cover (page 3-7).

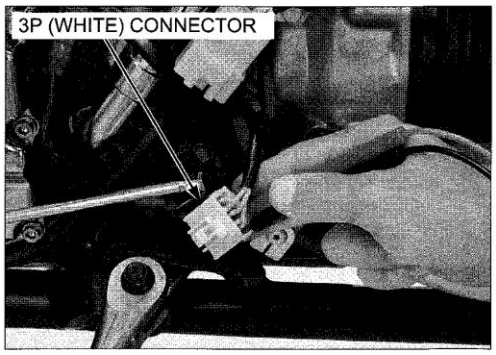
Turn the ignition switch OFF.

Disconnect the alternator 3P (White) connector.



Measure the resistance at the alternator/stator side connector of all terminals.

CONNECTION: Yellow – Yellow
STANDARD: 0.2 – 0.4 Ω at 20°C (68°F)



Check for continuity between each wire terminal of the alternator/stator side connector and ground.

There should be no continuity.

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

For alternator/starter replacement (page 12-6).