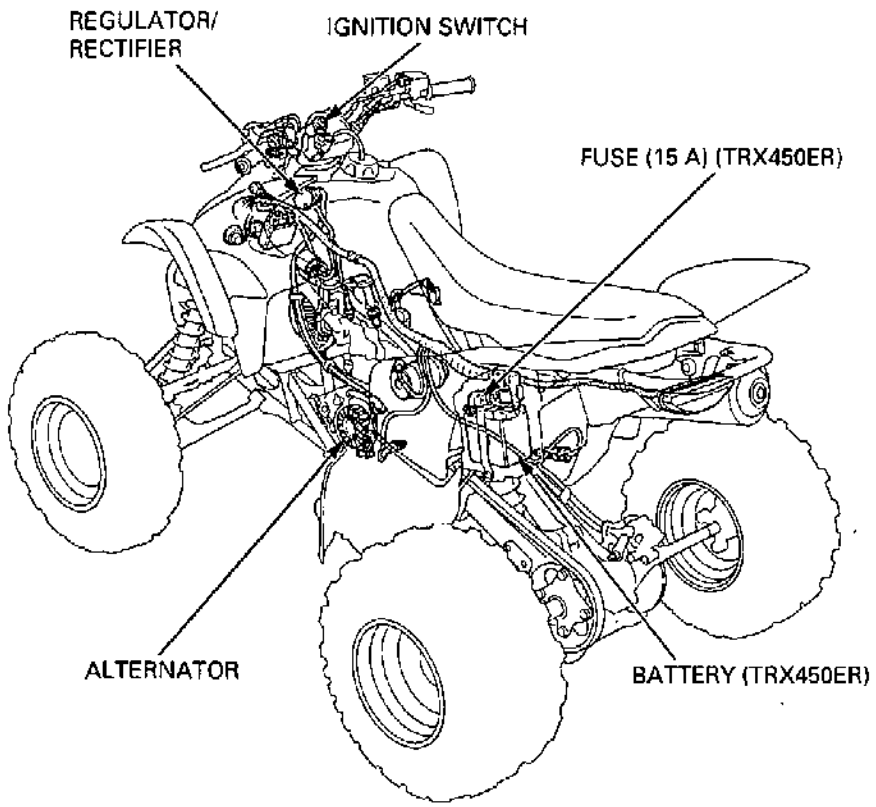
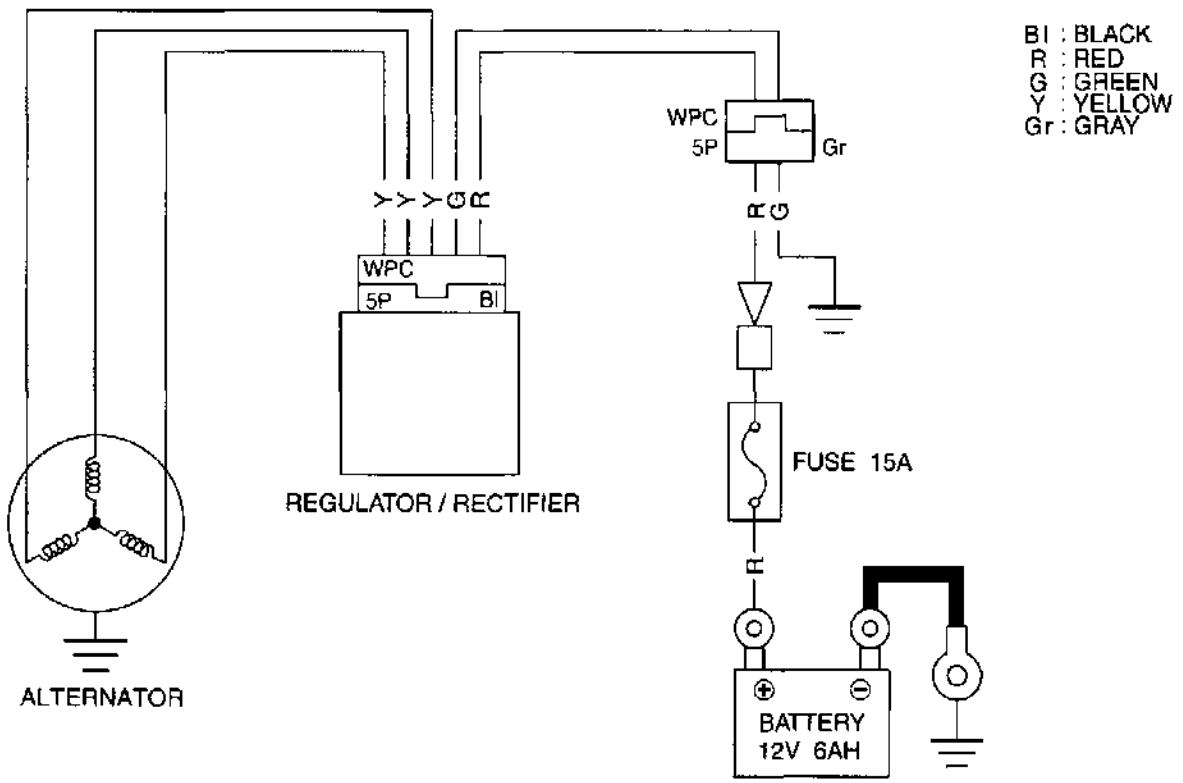
21. BATTERY/CHARGING SYSTEM (After '05)

COMPONENT LOCATION



SYSTEM DIAGRAM (TRX450ER)



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 physician immediately.

- Always turn the ignition switch to OFF 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 space.
- For a battery remaining in a stored vehicle, disconnect the negative battery cable from the battery terminal.
- The battery sealing caps should not be removed. Attempting to remove the sealing caps from the cells may damage the battery.
- 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, 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 will self-discharge when the vehicle is not in use. For this reason, charge the battery every 2 weeks to prevent sulfation 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 (page 21-5).
- For alternator removal/installation, see (page 21-12)

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 instructions in the Operation Manual for the recommended battery tester for details about battery testing. The recommended battery tester puts a "load" on the battery so that the actual battery condition can be measured.

Recommended battery tester: BM-210-AH (U.S.A. only), BM-210, BATTERY MATE (MTP08-0192, U.S.A. only) or equivalent

SPECIFICATIONS

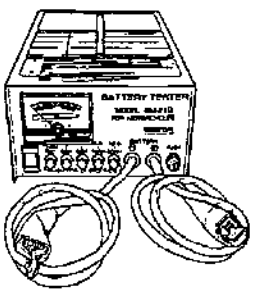
ITEM			SPECIFICATIONS
Battery	Capacity		12V – 6 Ah
	Voltage (20°C/68°F)	Fully charged	13.0 – 13.2 V
		Needs charging	Below 12.3 V
	Charging current	Normal	0.6 A/5 – 10 h
		Quick	3.0 A/1 h
Current leakage			0.01 mA max.
Alternator	Capacity		200 W/5,000 rpm (min^{-1})
	Charging coil resistance (20°C/68°F)		0.1 – 1.0 Ω

TORQUE VALUES

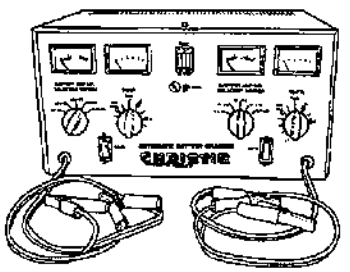
Alternator stator bolt	9.8 N·m (1.0 kgf·m, 7 lbf·ft)
Ignition pulse generator bolt	5 N·m (0.5 kgf·m, 3.6 lbf·ft)
Flywheel nut	64 N·m (6.5 kgf·m, 4.7 lbf·ft)

TOOLS

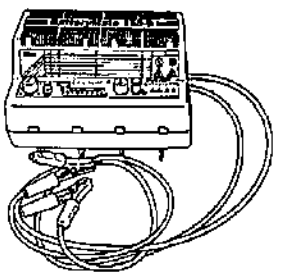
Battery tester
BM-210-AH (U.S.A. only)



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



Battery Mate tester/charger
MTP08-0192 (U.S.A only)



TROUBLESHOOTING

Battery is Damaged or Weak

1. **Battery Test**

   Remove the battery (page 21-6).

   Check the battery condition using the recommended battery tester.

   RECOMMENDED BATTERY TESTER: BM-210-AH (U.S.A. only), BM-210, BATTERY MATE (MTP08-0192, U.S.A. only) or equivalent

   Is the battery in good condition?

   NO – Faulty battery

   YES – GO TO STEP 2.

2. **Current Leakage Test**

   Install the battery (page 21-6).

   Check the battery current leakage test (Leak test: page 21-7).

   Is the current leakage below 0.01 mA?

   YES – GO TO STEP 4.

   NO – GO TO STEP 3.

3. **Current Leakage Test without Regulator/Rectifier**

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

   Is the current leakage below 0.01 mA?

   YES – Faulty regulator/rectifier

   NO – • Shorted wire harness
   • Faulty ignition switch

4. **Alternator Charging Coil Inspection**

   Check the alternator charging coil (page 21-8).

   Is the alternator charging coil resistance within 0.1 – 1.0Ω (20°C/68°F)?

   YES – Faulty charging coil

   NO – GO TO STEP 5.

5. **Charging Voltage Inspection**

   Measure and record the battery voltage using a digital multimeter (page 21-6).

   Start the engine.

   Measure the charging voltage (page 21-7).

   Compare the measurements to the results of the following calculation.

   STANDARD: Measured BV < Measured CV < 15.5 V

   - **BV = Battery voltage**
   - **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 connector (page 21-8).

   Are the measurements correct?

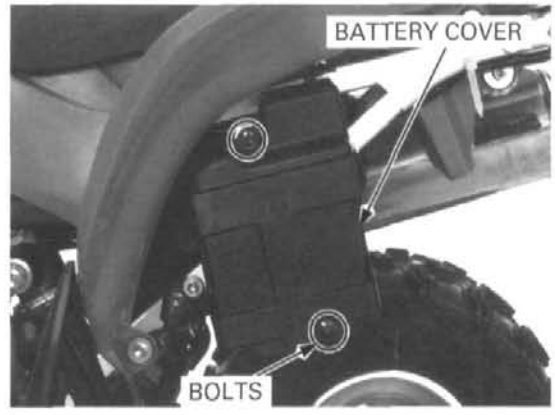
   YES – Faulty regulator/rectifier

   NO – • Open circuit in related wire
   • Loose or poor contacts of related terminal
   • Shorted wire harness

BATTERY (TRX450ER)

REMOVAL/INSTALLATION

With the ignition switch OFF, remove the two bolts and battery cover.



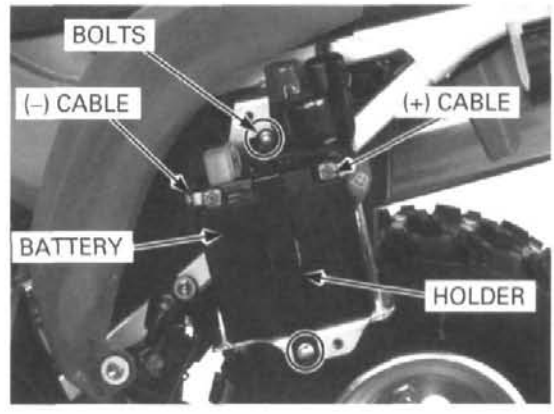
Disconnect the negative (-) cable first, then disconnect the positive (+) cable by removing each terminal bolt.

Remove the two bolts and battery holder.
Remove the battery from the battery box.

Connect the positive (+) cable first and then the negative (–) cable.

Install the battery in the reverse order of removal.

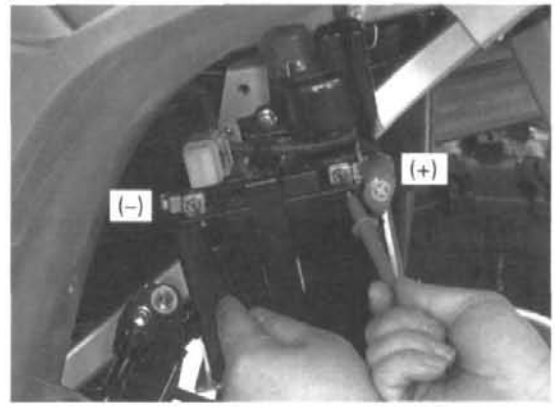
After installing the battery, coat the terminals with clean dielectric grease.



VOLTAGE INSPECTION

Measure the battery voltage using a commercially available digital multimeter.

VOLTAGE (20°C/68°F):
Fully charged: 13.0 – 13.2 V
Under charged: Below 12.3 V



BATTERY TESTING

Remove the battery (page 21-6).

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

TOOL:

Battery tester	**BM-210-AH (U.S.A. only), BM-210, BATTERY MATE (MTP08-0192, U.S.A. only) or equivalent**

BATTERY CHARGING (U.S.A. only)

Remove the battery (page 21-6).

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

TOOL:

Battery charger	**Christie battery charger (MC1012/2, U.S.A. only), BATTERY MATE (MTP08-0192, U.S.A. only) or equivalent**

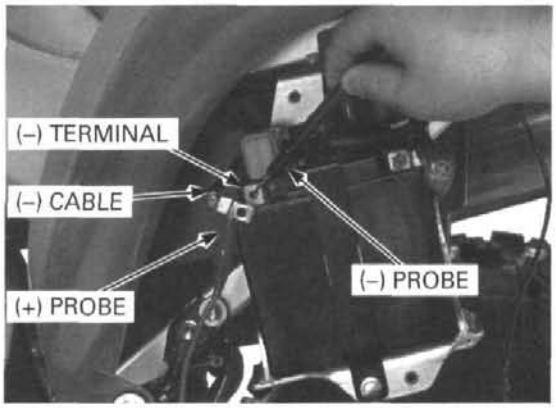
CHARGING SYSTEM INSPECTION (TRX450ER)

CURRENT LEAKAGE INSPECTION

Turn the ignition switch to OFF and 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 turned to OFF, check for current leakage.

- 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 out the fuse in the tester.
- *While measuring current, do not turn the ignition* switch ON. A sudden surge of current may blow out the fuse in the tester.



SPECIFIED CURRENT LEAKAGE: 0.01 mA maximum

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

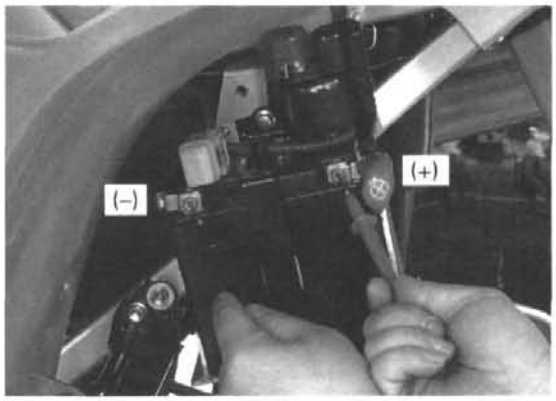
CHARGING VOLTAGE INSPECTION

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

Warm up the engine to normal operating temperature.
Connect the multimeter between the battery positive (+) and negative (–) terminals.

NOTICE

- *To prevent a short, make absolutely certain which are the positive* (+) and negative (–) *terminals or cables.*
- *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.*



Connect the tachometer.

With the headlight on, measure the voltage on the multimeter when the engine runs at 5,000 rpm (min^{-1}).

STANDARD: Measured BV < Measured CV < 15.5 V
BV = Battery voltage (page 21-6)
CV = Charging voltage

REGULATOR/RECTIFIER

WIRE HARNESS INSPECTION

Disconnect the regulator/rectifier 5P black connector.

Check the connector for loose contacts or corroded terminals.

BATTERY LINE (TRX450ER)

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

IGNITION SWITCH LINE (TRX450R)

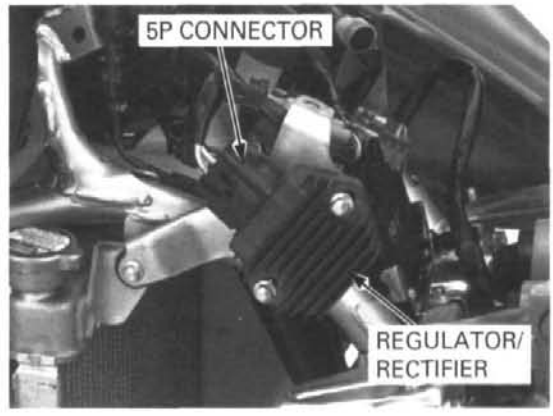
Check the Red wire for continuity between the regulator/rectifier and ignition switch connectors.
There should be continuity.

CHARGING COIL LINE (TRX450ER/R)

Measure the resistance between the Yellow wire terminal.

STANDARD: 0.1 – 1.0 Ω (at 20°C/68°F)

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

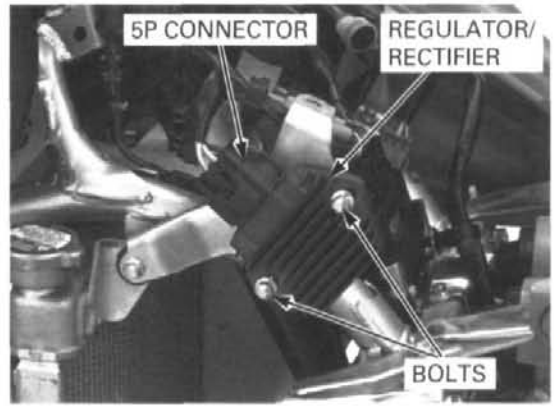


REMOVAL/INSTALLATION

Disconnect the 5P black connector.

Remove the two bolts and regulator/rectifier from the frame.

Installation is in the reverse order of removal.



GENERATING SYSTEM

GENERATING VOLTAGE INSPECTION

Start the engine and warm it up to the operating temperature.
Stop the engine.

Remove the top cover (page 3-5).

TRX450ER: Disconnect the handlebar switch 6P natural connector.

TRX450R: Disconnect the handlebar switch 4P natural connector.

Connect the voltmeter positive (+) probe to the Black wire terminal and negative (–) probe to the Green wire terminal of the wire harness side handlebar switch connector.

Restart the engine.
Measure the generating voltage when the engine runs at 5,000 rpm.

The voltage will drops about 1 V when the coolingfan motor is running.

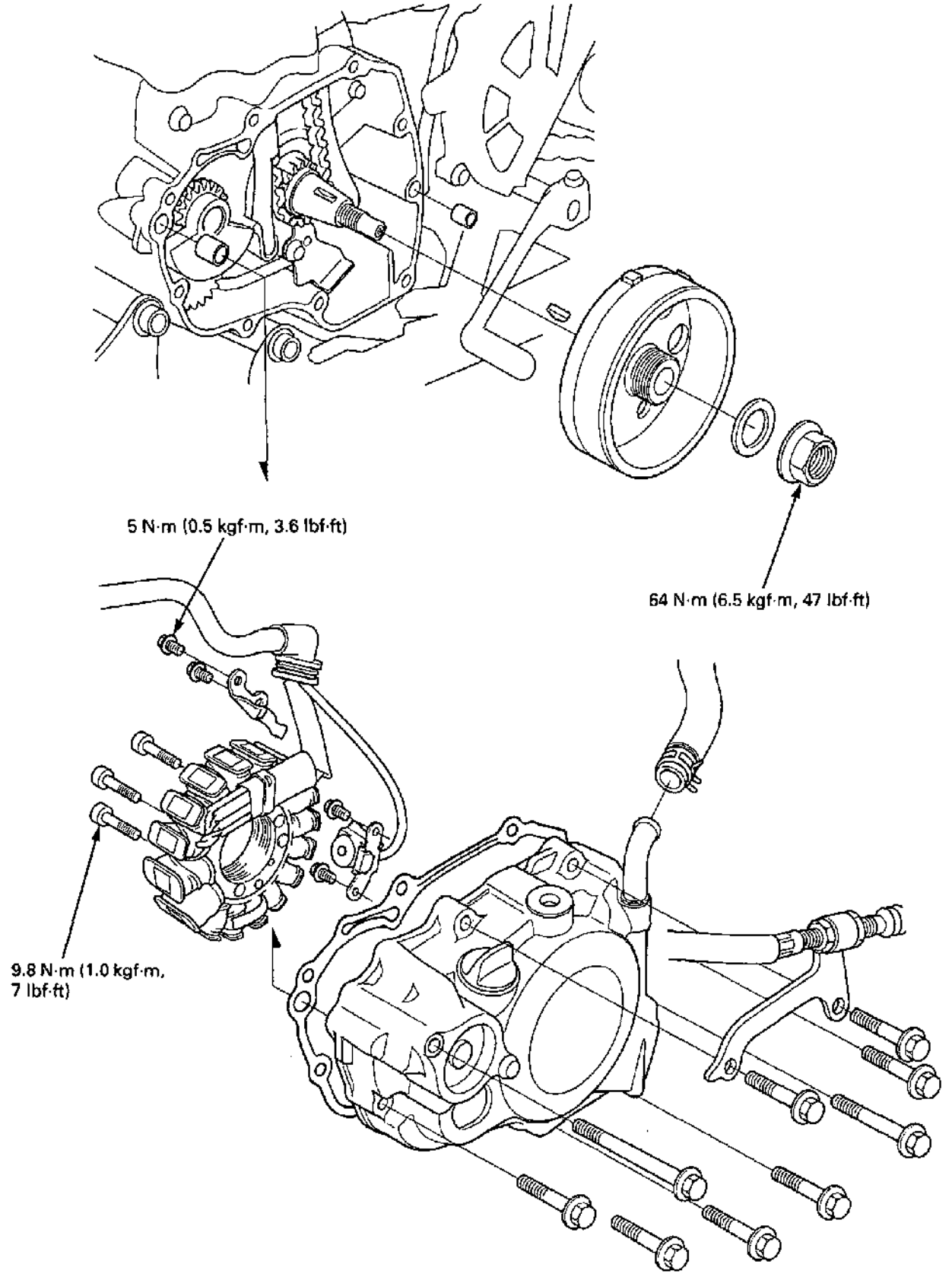
STANDARD: 13 – 16 V

Connect the handlebar switch 6P (TRX450ER) or 4P (TRX450R) natural connector.

Install the top cover (page 3-5).

HANDLEBAR SWITCH 6P (TRX450ER) or 4P (TRX450R) CONNECTOR

ALTERNATOR

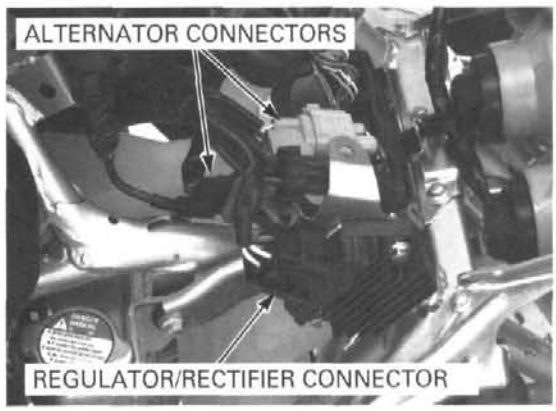


LEFT CRANKCASE COVER REMOVAL

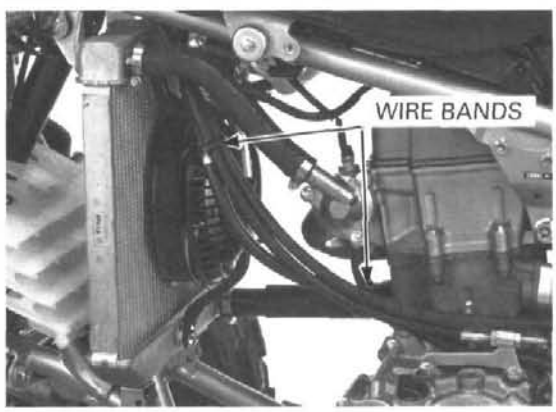
Drain the engine oil (page 4-15).
Remove both front fenders (page 3-6).

Disconnect the alternator connectors and regulator/rectifier connector.

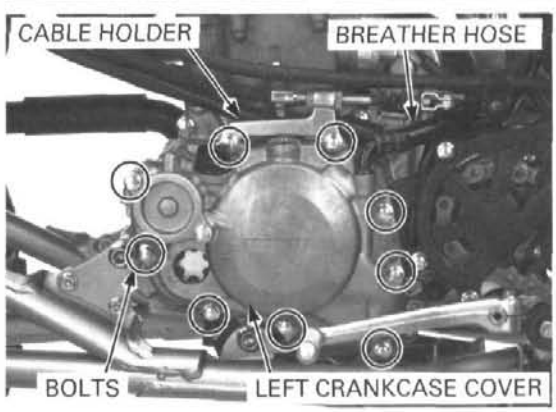
Remove the wire bands and free the alternator wire from the frame.



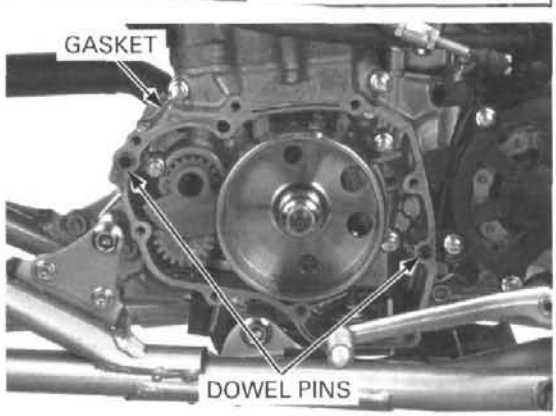
Remove the wire bands.



Remove the breather hose.
Remove the nine bolts, cable holder and left crankcase cover.



Remove the dowel pins and gasket.



STATOR REPLACEMENT

Remove the left crankcase cover (page 21-11).

Remove the four bolts, wire clamp and ignition pulse generator.
Remove the three socket bolts, wire grommet and alternator stator from the left crankcase cover.

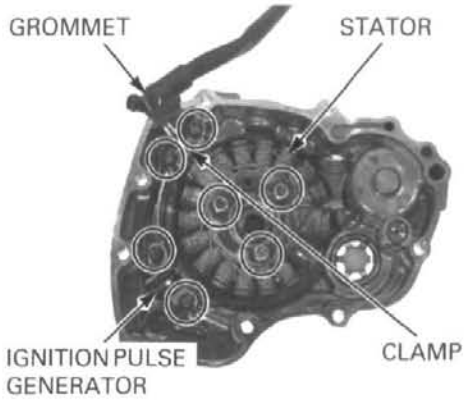
Install the alternator stator into the left crankcase cover and tighten the three socket bolts to the specified torque.

TORQUE: 9.8 N·m (1.0 kgf·m, 7 lbf·ft)

Install the wire grommet into the left crankcase cover groove properly.
Install the ignition pulse generator and wire clamp and tighten the four bolts to the specified torque.

TORQUE: 5 N·m (0.5 kgf·m, 3.6 lbf·ft)

Install the left crankcase cover (page 21-13).



FLYWHEEL REMOVAL

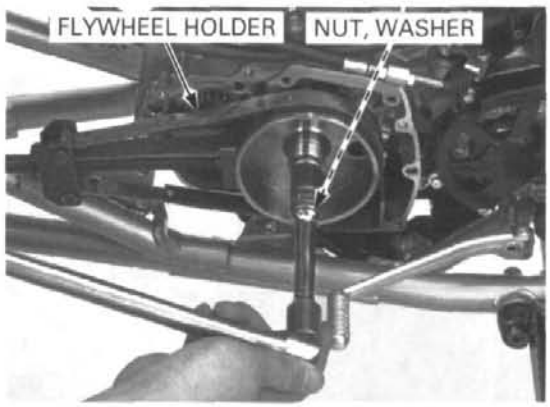
Remove the left crankcase cover (page 21-11).

Hold the flywheel using the special tool and loosen the flywheel nut.

TOOL:

Flywheel holder	**07725-0040000 or equivalent commercially available**

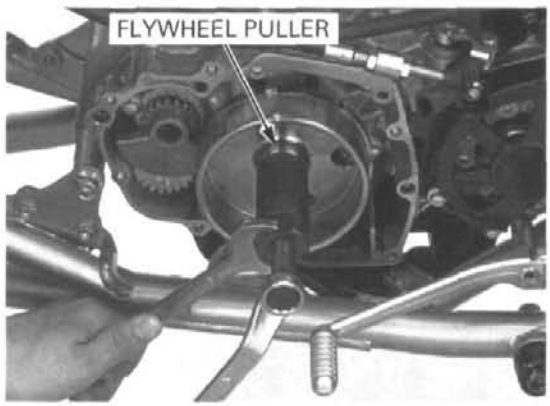
Remove the flywheel nut and washer.



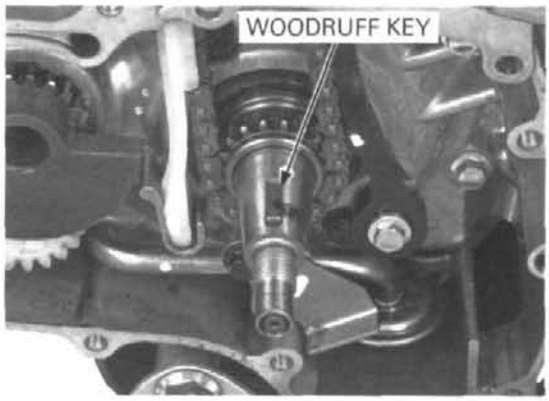
Remove the flywheel using the special tool.

TOOL:

Flywheel puller	**070MC-HP10100 or 070MC-HP1A100 (U.S.A. only)**



Remove the woodruff key from the crankshaft.



FLYWHEEL INSTALLATION

Clean any oil from the tapered portion of the crankshaft and flywheel.

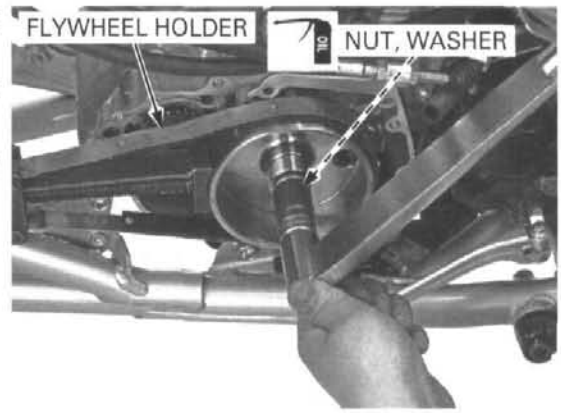
Install the woodruff key into the crankshaft key groove.

Install the flywheel onto the crankshaft by aligning the key way with the woodruff key.

Apply oil to the flywheel nut threads and seating surface.
Install the washer and flywheel nut.
Hold the flywheel using the special tool and tighten the flywheel nut to the specified.

TOOL:

Flywheel holder	**07725-0040000 or equivalent commercially available**



TORQUE: 64 N·m (6.5 kgf·m, 47 lbf·ft)

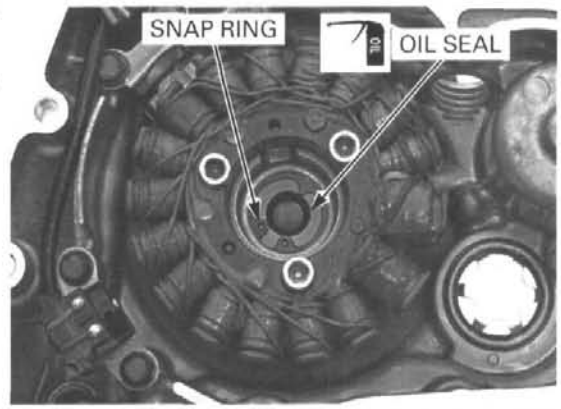
Install the left crankcase cover (page 21-13).

LEFT CRANKCASE COVER INSTALLATION

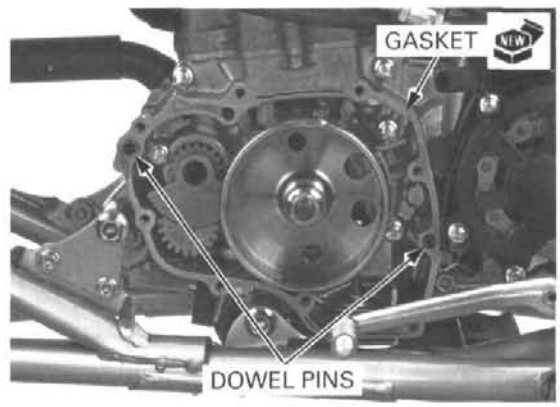
Check the oil seal in the left crankcase cover for wear or damage.

Remove the snap ring and replace the oil seal with a new one if necessary.

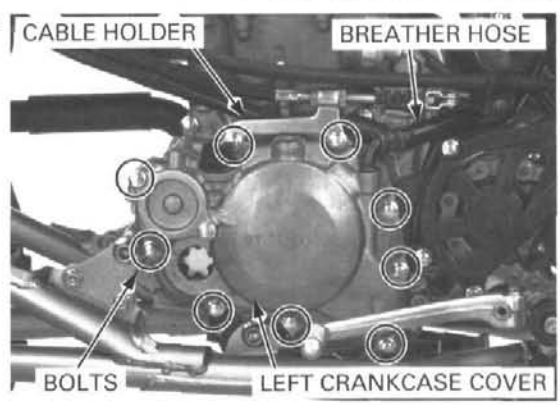
Apply oil to the oil seal lip.



Install the dowel pins and new gasket.



Install the left crankcase cover, cable holder and bolts.
Connect the breather hose.



Install the wire bands.

Route the alternator wire properly and install the wire bands (page 1-24).
Connect the alternator and regulator/rectifier connectors.

Fill the crankcase with the recommended engine oil.

Install both front fender (page 3-6).