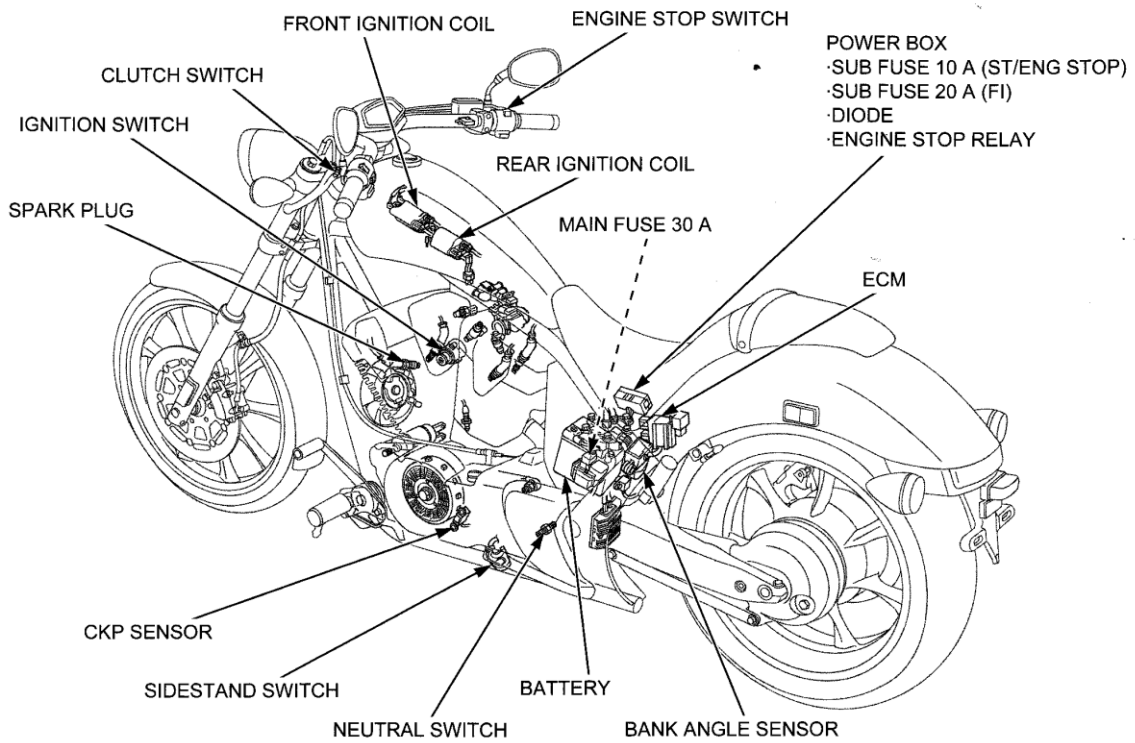


20. IGNITION SYSTEM

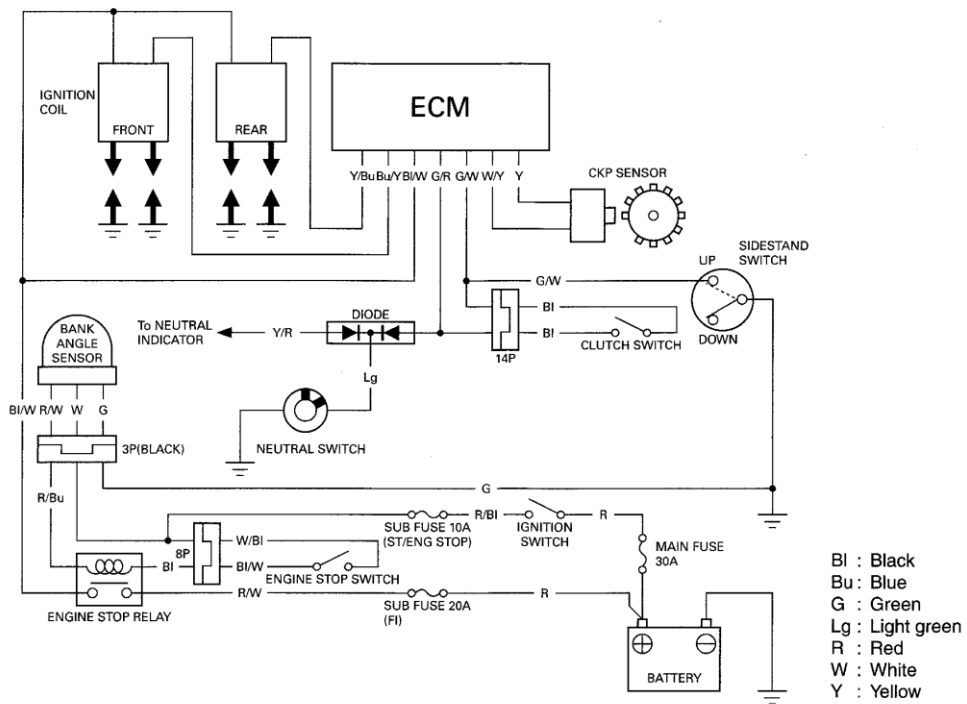
SYSTEM LOCATION.....	20-2	IGNITION SYSTEM INSPECTION	20-5
SYSTEM DIAGRAM	20-2	IGNITION COIL	20-8
SERVICE INFORMATION	20-3	IGNITION TIMING	20-10
TROUBLESHOOTING.....	20-4		

IGNITION SYSTEM

SYSTEM LOCATION



SYSTEM DIAGRAM



SERVICE INFORMATION

GENERAL

NOTICE

- The ECM may be damaged if dropped. Also, if the connector is disconnected when current is flowing, the excessive voltage may damage the module. Always turn the ignition switch OFF before servicing.
- Use spark plugs with the correct heat range. Using spark plugs with an incorrect heat range can damage the engine.
- Some electrical components may be damaged if terminals or connectors are connected or disconnected while the ignition switch is turned ON and current is present.
- When servicing the ignition system, always follow the steps in the troubleshooting table on (page 20-4).
- The ignition timing cannot be adjusted since the ECM is factory preset.
- 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 plugs.
- For spark plug inspection (page 4-8).
- Refer to the following components informations:
 - Ignition switch (page 22-20)
 - Engine stop switch (page 22-21)
 - Neutral switch (page 22-24)
 - Sidestand switch (page 22-25)
 - Diode (page 21-15)
 - ECM (page 6-61)
 - Bank angle sensor (page 6-58)
 - Engine stop relay (page 6-60)
 - Clutch switch (page 22-23)

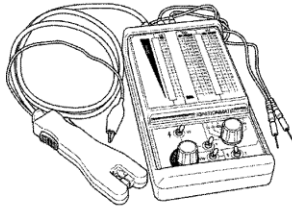
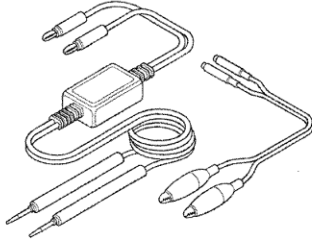
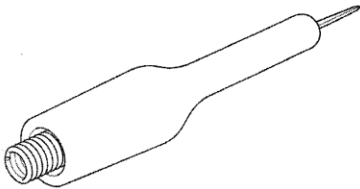
SPECIFICATIONS

ITEM		SPECIFICATIONS
Spark plug	Standard	DCPR6E (NGK), XU20EPR-U (DENSO)
	For extended high speed riding	DCPR7E (NGK), XU22EPR-U (DENSO)
Spark plug gap		0.8 – 0.9 mm (0.03 – 0.04 in)
Ignition coil primary peak voltage		100 V minimum
Ignition timing	Front ("F – F" mark)	13° BTDC at idle
	Rear ("R – F" mark)	5° BTDC at idle
CKP sensor peak voltage (20°C/68°F)		0.7 V minimum

TORQUE VALUES

- | | | |
|-----------------------------------|-------------------------------|------------------------------|
| Timing hole cap cover socket bolt | 10 N·m (1.0 kgf·m, 7 lbf·ft) | |
| Timing hole cap | 18 N·m (1.8 kgf·m, 13 lbf·ft) | Apply grease to the threads. |

TOOLS

<p>IgnitionMate peak voltage tester MTP07-0286 (U.S.A. only)</p> 	<p>Peak voltage adaptor 07HGJ-0020100 (not available in U.S.A.)</p>  <p>with commercially available digital multimeter (impedance 10 MΩ/DCV minimum)</p>	<p>Test probe 07ZAJ-RDJA110</p> 
--	---	---

IGNITION SYSTEM

TROUBLESHOOTING

- Inspect the following before diagnosing the system.
 - Faulty spark plug
 - Loose spark plug cap or spark plug wire connection
 - Water in the spark plug cap (Leaking the ignition coil secondary voltage)
- If there is no spark at either cylinder, temporarily exchange the ignition coil with a known-good one and perform the spark test. If there is spark, the original ignition coil is faulty.
- "Initial voltage" of the ignition primary coil is the battery voltage with the ignition switch turned ON and the engine stop switch "O" (The engine is not cranked by the starter motor).

No spark at spark plugs

UNUSUAL CONDITION		PROBABLE CAUSE (Check in numerical order)
Ignition coil primary voltage	No initial voltage with the ignition switch turned ON and engine stop switch "O". (Other electrical components are normal)	<ol style="list-style-type: none"> 1. Faulty engine stop relay 2. Faulty bank angle sensor 3. An open circuit in Black/white wire between the ignition coil and engine stop relay 4. Loose or poor connection of the primary terminal, or an open circuit in the primary coil 5. Faulty ECM (in case when the initial voltage is normal with the ECM connector disconnected)
	Initial voltage is normal, but it drops by 2 – 4 V while cranking the engine	<ol style="list-style-type: none"> 1. Incorrect peak voltage adaptor connections (System is normal if measured voltage is over the specifications with reverse connections) 2. Battery is undercharged (Voltage drops largely when the engine is started) 3. No voltage between the Black/white (+) wire and body ground (-) at the ECM connector or loosen the ECM connection 4. Loose or poor connection or an open circuit in Green wire at the ECM 5. Loose or poor connection or an open circuit in Blue/yellow or Yellow/blue wire between the ignition coils and ECM 6. A short circuit in the ignition primary coil 7. Faulty sidestand switch, clutch switch or neutral switch 8. Loose or poor connection or an open circuit in No. 7 related wires <ul style="list-style-type: none"> – Sidestand switch line: Green/white wire – Neutral switch line: Light green wire – Clutch switch line: Green/white wire 9. Faulty CKP sensor (Measure peak voltage) 10. Faulty ECM (in case when above No. 1 through 9 are normal)
	Initial voltage is normal but there is no peak voltage while cranking the engine	<ol style="list-style-type: none"> 1. Incorrect peak voltage adaptor connections (System is normal if measured voltage is over the specifications with reverse connections) 2. Faulty peak voltage adaptor 3. Faulty CKP sensor (Measure peak voltage) 4. Faulty ECM (in case when above No. 1 and 3 are normal)
	Initial voltage is normal but peak voltage is lower than the standard value	<ol style="list-style-type: none"> 1. The multimeter impedance is too low; below 10 MΩ/DCV 2. Cranking speed is too slow (Battery is undercharged) 3. The sampling timing of the tester and measured pulse were not synchronized (System is normal if measured voltage is over the standard voltage at least once) 4. Faulty ECM (in case when above No. 1 through 3 are normal)
	Initial and peak voltages are normal but no spark jumps	<ol style="list-style-type: none"> 1. Faulty spark plug or leaking ignition coil secondary current ampere 2. Faulty ignition coil(s)
	CKP sensor	Peak voltage is lower than the standard value
No peak voltage		<ol style="list-style-type: none"> 1. Faulty peak voltage adaptor 2. Faulty CKP sensor

IGNITION SYSTEM INSPECTION

NOTE:

- If no spark jumps at the plug, check all connections for loose or poor contact before measuring the peak voltage.
- Use a commercially available digital multimeter with an impedance of 10 M Ω /DCV minimum.
- The display value differs depending upon the internal impedance of the multimeter.
- If the peak voltage tester (U.S.A. only) is used, follow the manufacture's instruction.

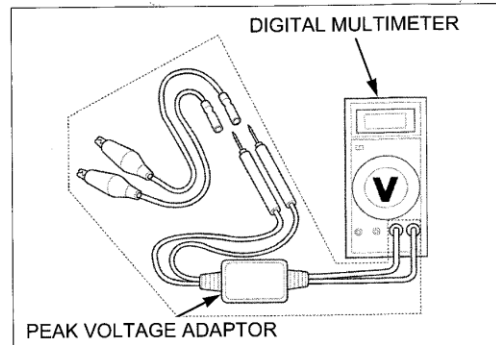
Connect the peak voltage adaptor to the digital multimeter or use the peak voltage tester.

TOOLS:

IgnitionMate peak voltage tester MTP07-0286
(U.S.A. only) or
07HGJ-0020100
(not available in
U.S.A.)

Peak voltage adaptor

with commercially available digital multimeter
(impedance 10 M Ω /DCV minimum)



IGNITION COIL PRIMARY PEAK VOLTAGE

NOTE:

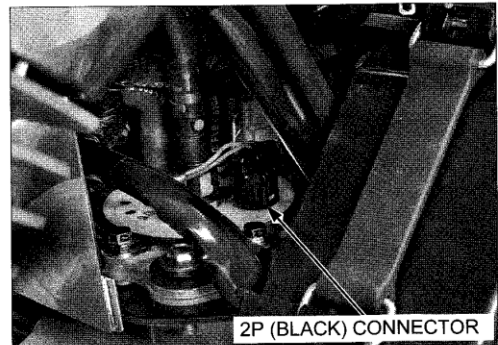
- Check all system connections before performing this inspection. Loose connectors can cause incorrect readings.
- Check that the cylinder compression is normal for each cylinder and the spark plug is installed correctly in the cylinder head.

Remove the following:

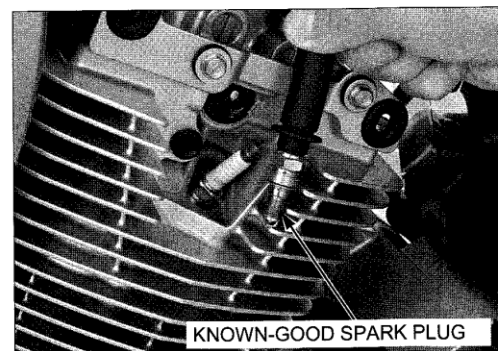
- Left side cover (page 3-6)
- Over head cover (page 3-5)

Disconnect all spark plug caps from the spark plugs (page 4-8).

Disconnect the fuel pump 2P (Black) connector.



Connect known-good spark plugs to all spark plug caps and ground them to the cylinder heads as done in a spark test.



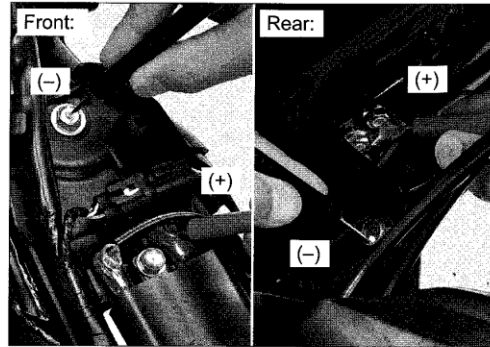
IGNITION SYSTEM

Front: Remove the fuel tank (page 6-43).

Measure the initial voltage between the Black/white (+) wire and body ground.

If the battery voltage appears only when the ignition switch is ON position, the initial voltage is normal.

If the initial voltage is abnormal, refer to the troubleshooting (page 20-4).



With the ignition coil primary wires connected, connect the peak voltage tester or adaptor probes to the ignition coil primary terminal and ground.

TOOLS:

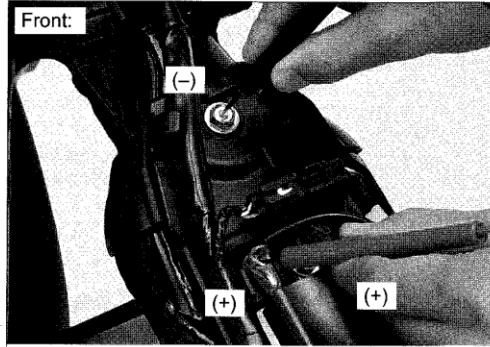
IgnitionMate peak voltage tester MTP07-0286
(U.S.A. only) or
Peak voltage adaptor 07HGJ-0020100
(not available in
U.S.A.)

with commercially available digital multimeter
(impedance 10 M Ω /DCV minimum)

CONNECTIONS:

FRONT: Blue/yellow (+) – Ground (-)

REAR: Yellow/blue (+) – Ground (-)



Turn the ignition switch ON and engine stop switch "O".

Check the initial voltage at this time.

The battery voltage should be measured.

If the initial voltage cannot be measured, follow the checks in the troubleshooting table (page 20-4).

Shift the transmission into neutral.

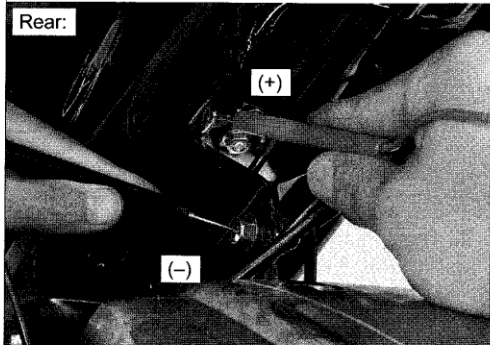
Crank the engine with the starter motor and measure the ignition coil primary peak voltage.

PEAK VOLTAGE: 100 V minimum

NOTE:

- Although measured values are different for each ignition coil, they are normal as long as voltage is higher than the specified value.
- If the peak voltage is lower than the standard value, follow the checks in the troubleshooting table (page 20-4).

Install the removed parts in the reverse order of removal.



Avoid touching the spark plugs and tester probes to prevent electric shock.

CKP SENSOR PEAK VOLTAGE

NOTE:

- Check that the cylinder compression is normal for each cylinder and the spark plug is installed correctly in the cylinder head.

Disconnect the ECM 33P (Gray) connector (page 6-62).

Connect the peak voltage tester or peak voltage adaptor probes to the connector terminal of the wire side.

CONNECTION: B22 (+) – ground (-)

TOOLS:

IgnitionMate peak voltage tester MTP07-0286 (U.S.A. only) or 07HGJ-0020100 (not available in U.S.A.)

Peak voltage adaptor

with commercially available digital multimeter (impedance 10 MΩ/DCV minimum)

Test probe 07ZAJ-RDJA110

Turn the ignition switch ON and engine stop switch "O".

Shift the transmission into neutral.

Crank the engine with the starter motor and measure the ignition pulse generator peak voltage.

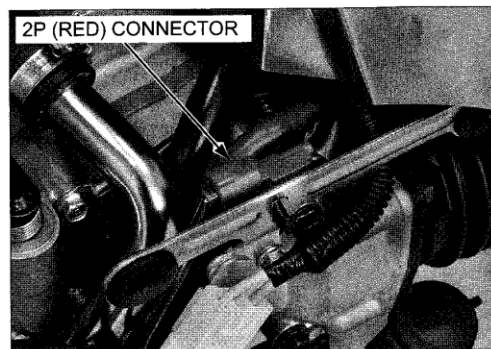
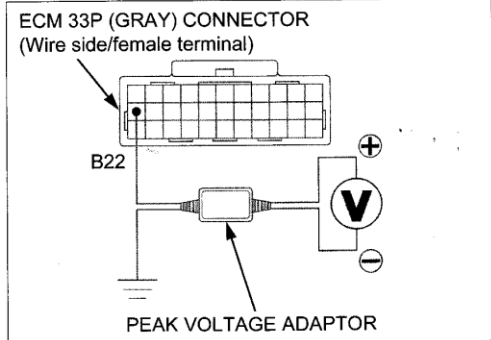
PEAK VOLTAGE: 0.7 V minimum

If the peak voltage measured at the ECM 33P (Gray) connector is abnormal, measure the peak voltage at the CKP sensor 2P (Red) connector.

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

Turn the ignition switch OFF.

Disconnect the CKP sensor 2P (Red) connector.



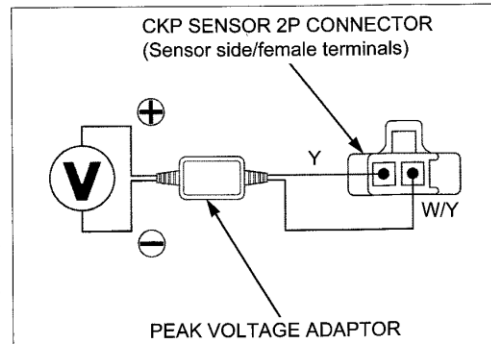
Connect the peak voltage tester or peak voltage adaptor probes to the connector terminals of the CKP sensor side.

In the same manner as at the ECM 33P (Gray) connector, measure the peak voltage and compare it to the voltage measured at the ECM 33P (Gray) connector.

NOTE:

- If the peak voltage measured at the ECM is abnormal and the one measured at the CKP sensor is normal, check the CKP sensor 2P (Red) connector for loose connection and wire harness for an open or short circuit, or loose connection.
- If the peak voltage is lower than standard value, follow the checks in the troubleshooting table (page 20-4).

Install the removed parts in the reverse order of removal.



IGNITION SYSTEM

IGNITION COIL

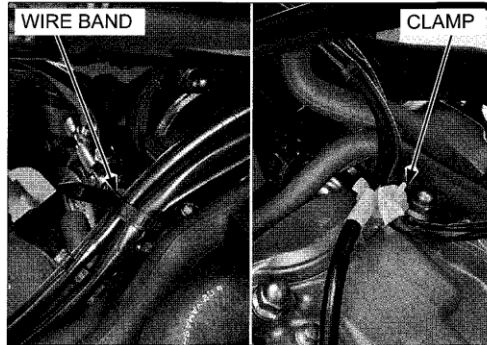
FRONT IGNITION COIL REMOVAL/ INSTALLATION

Remove the following:

- Fuel tank (page 6-43)
- Front over head cover (page 3-5)

Disconnect the spark plug caps from the spark plugs (page 4-8).

Remove the wire band and release the spark plug wires from the clamp

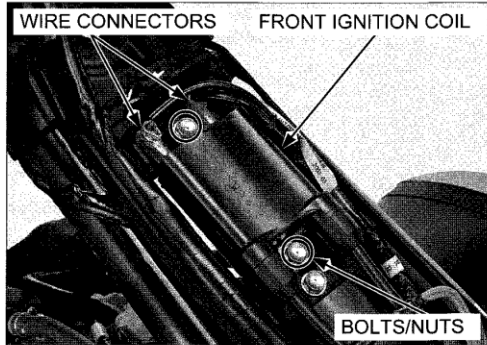


Disconnect the wire connectors.

Remove the bolts, nuts and front ignition coil.

Installation is in the reverse order of removal.

Route the spark plug wires properly (page 1-22).

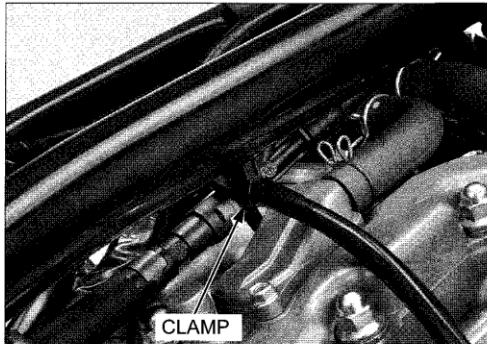


REAR IGNITION COIL REMOVAL/ INSTALLATION

Remove the following:

- Front ignition coil (page 20-8)
- Rear over head cover (page 3-5)

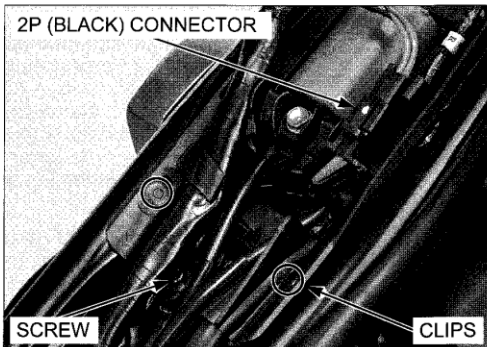
Remove the rear right spark plug wire clamp from the frame.



Disconnect the ignition switch 2P (Black) connector.

Remove the trim clips and screw.

For trim clip information (page 3-3).

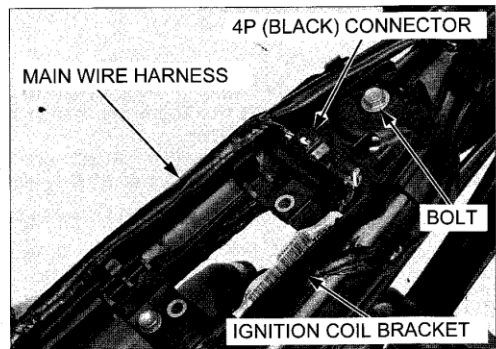


IGNITION SYSTEM

VT1300CX: Disconnect the ignition coil sub harness 4P (Black) connector.

Release the main wire harness from the ignition coil bracket guide.

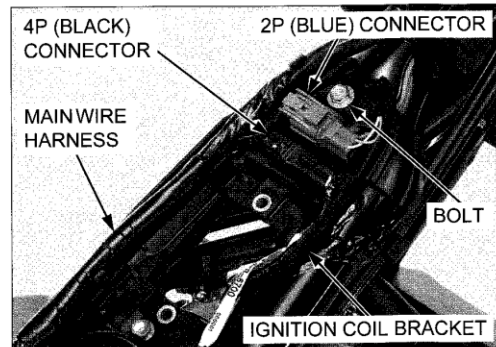
Remove the bolt and ignition coil bracket.



VT1300CXA: Disconnect the ignition coil sub harness 4P (Black) connector.

Remove the bolt, then release the front wheel speed sensor 2P (Blue) connector and main wire harness from the ignition coil bracket guide.

Remove the ignition coil bracket.

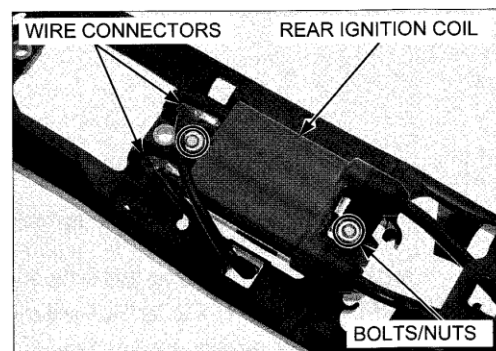


Disconnect the wire connectors.

Remove the bolts, nuts and rear ignition coil.

Installation is in the reverse order of removal.

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



IGNITION SYSTEM

IGNITION TIMING

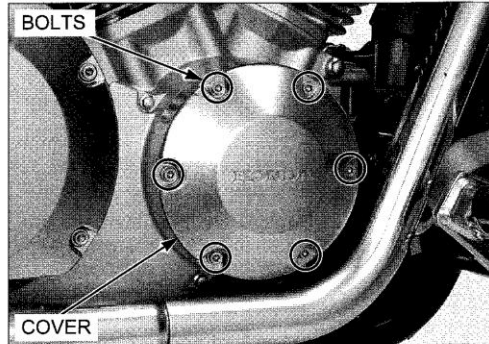
NOTE:

- The ignition timing is factory preset and only needs to be checked when an electrical system component is replaced.
- Use a tachometer with graduations of 50 rpm or smaller that will accurately indicate 50 rpm change.

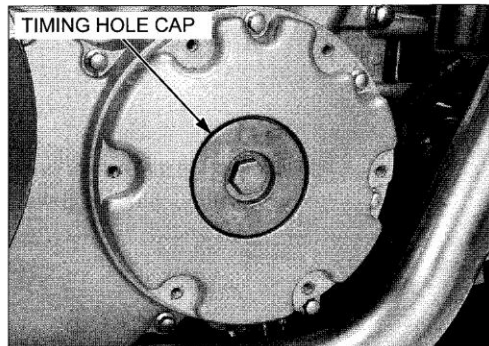
Remove the over head covers (page 3-5).

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

Remove the socket bolts and the timing hole cap cover.



Remove the timing hole cap.



Connect a tachometer according to manufacturer's operating instruction.

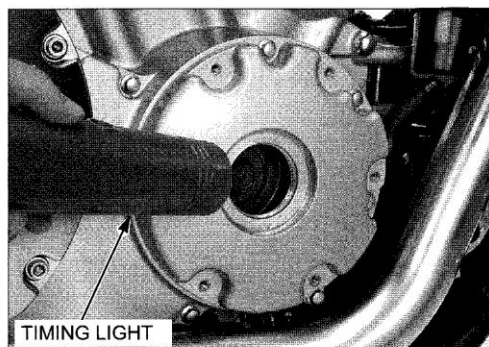
Read the manufacturer's instructions for timing light operation.

Connect the timing light to the front spark plug wire.

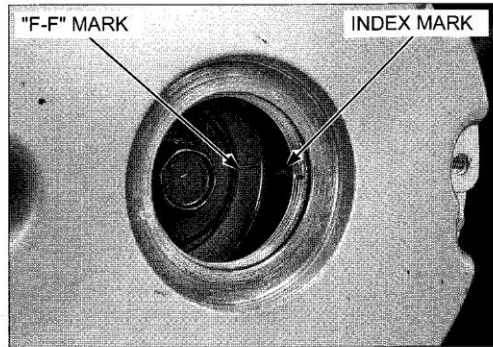
Start the engine, let it idle and check the ignition timing.

IDLE SPEED: 930 ± 100 rpm

Pointing the timing light towards the index mark.



The ignition timing is correct if the "F-F" mark on the primary drive gear aligns with the index mark on the right crankcase cover.



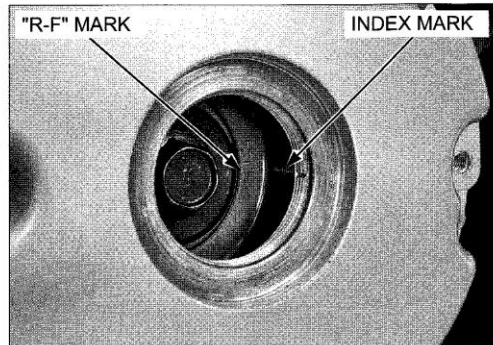
Stop the engine and connect the timing light to the rear spark plug wire.

Start the engine, let it idle and check the ignition timing.

IDLE SPEED: 930 ± 100 rpm

The ignition timing is correct if the "R-F" mark on the primary drive gear aligns with the index mark on the right crankcase cover.

Remove the timing light.

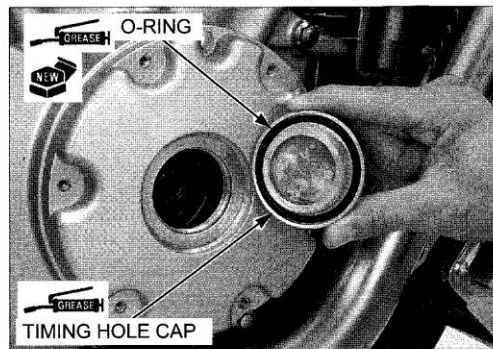


Apply grease to a new O-ring and install it into the timing hole cap groove.

Apply grease to the threads of the timing hole cap.

Install and tighten the timing hole cap to the specified torque.

TORQUE: 18 N·m (1.8 kgf·m, 13 lbf·ft)

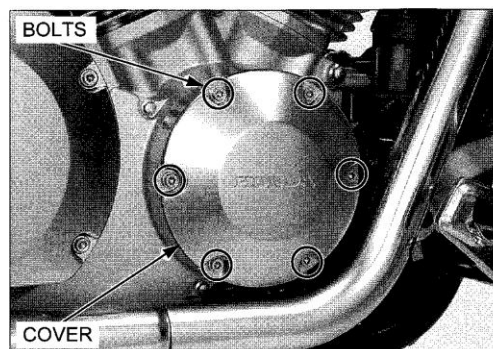


Install the timing hole cap cover and socket bolts.

Tighten the socket bolts to the specified torque.

TORQUE: 10 N·m (1.0 kgf·m, 7 lbf·ft)

Install the over head covers (page 3-5).



MEMO

(

(

(

(

(

(

(
