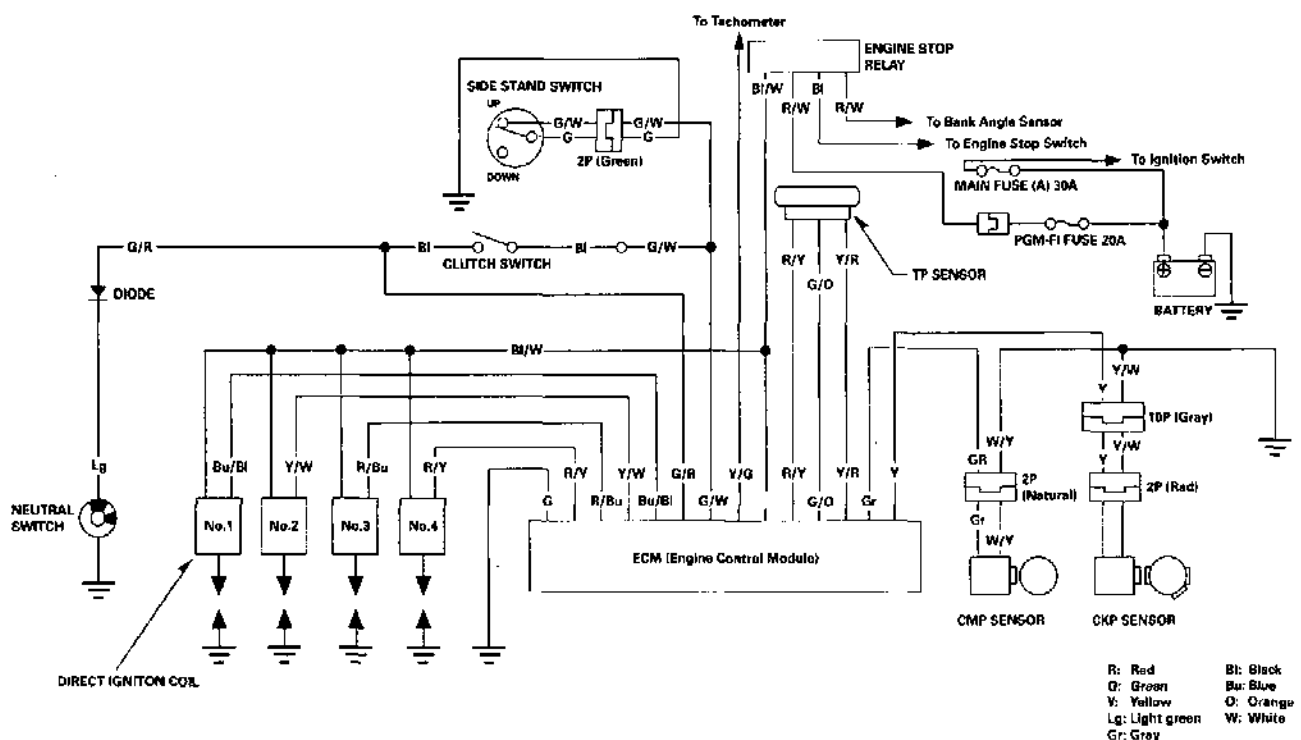


SYSTEM DIAGRAM



17. IGNITION SYSTEM

SYSTEM DIAGRAM	17-0	IGNITION SYSTEM INSPECTION	17-4
SERVICE INFORMATION	17-1	CKP SENSOR	17-6
TROUBLESHOOTING	17-3	IGNITION TIMING	17-8

SERVICE INFORMATION

GENERAL

- 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.
- When servicing the ignition system, always follow the steps in the troubleshooting sequence on page 17-3.
- This motorcycle's Ignition Control Module (ICM) is built into the Engine Control Module (ECM).
- The ignition timing does not normally need to be adjusted since the ECM is factory preset.
- 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 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 spark plug of the correct heat range. Using spark plug with an incorrect heat range can damage the engine.
- The direct ignition coil that the ignition coil and spark plug cap are integrated, is adopted in this motorcycle.
- Refer to section 5 for Throttle Position (TP) sensor, CMP sensor and ECM inspection.

SPECIFICATIONS

ITEM			SPECIFICATIONS
Spark plug (Iridium)	NGK	'01:	IMR9A-9H
		After '01:	IMR9C-9H
	DENSO	'01:	IUH27D
		After '01:	VUH27D
Spark plug gap			0.80 – 0.90 mm (0.031 – 0.035 in)
Ignition coil peak voltage			100 V minimum
CKP sensor peak voltage			0.7 V minimum
Ignition timing ("F" mark)			13° BTDC at idle

IGNITION SYSTEM

TORQUE VALUES

Timing hole cap	18 N•m (1.8 kgf•m, 13 lbf•ft)	Apply grease to the threads.
Spark plug	12 N•m (1.2 kgf•m, 9 lbf•ft)	
CKP sensor rotor special bolt	59 N•m (6.0 kgf•m, 43 lbf•ft)	

TOOLS

Peak voltage tester (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)
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TROUBLESHOOTING

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

No spark at all plugs

Unusual condition		Probable cause (Check in numerical order)
Ignition coil primary voltage	No initial voltage with ignition and engine stop switches turned on (other electrical components are normal).	1. Faulty engine stop switch. 2. An open circuit in Black/White wire between the direct ignition coil and engine stop switch. 3. Loose or poor connect of the direct ignition coil primary wire terminal, or an open circuit in primary coil (check at the ECM connector). 4. Faulty ECM (in case when the initial voltage is normal while disconnecting ECM connector)
	Initial voltage is normal, but it drops down to 2 – 4 V while cranking the engine.	1. Incorrect peak voltage adaptor connections. 2. Undercharged battery. 3. No voltage between the Black/White (+) and body ground (–) at the ECM multi-connector or loosen ECM connection. 4. An open circuit or loose connection in Green wire. 5. An open circuit or loose connection in Blue/Black, Yellow/White, Red/Blue and Red/Yellow wires between the direct ignition coils and ECM. 6. Short circuit in ignition primary coil. 7. Faulty side stand switch or neutral switch. 8. An open circuit or loose connection in No.7 related circuit wires. • Side stand switch line: Green/White wire • Neutral switch line: Light Green wire 9. Faulty CKP sensor (measure the peak voltage). 10. Faulty ECM (in case when above No. 1 – 9 are normal).
	Initial voltage is normal, but no peak voltage while cranking the engine.	1. Faulty peak voltage adaptor connections. 2. Faulty peak voltage adaptor. 3. Faulty ECM (in case when above No.1, 2 are normal).
	Initial voltage is normal, but peak voltage is lower than standard value.	1. The multimeter impedance is too low; below 10 MΩ/DCV. 2. Cranking speed is too low (battery undercharged). 3. The sampling timing of the tester and measured pulse were not synchronised (system is normal if measured voltage is over the standard voltage at least once). 4. Faulty ECM (in case when above No. 1 – 3 are normal).
	Initial and peak voltage are normal, but does not spark.	1. Faulty spark plug or leaking ignition coil secondary current ampere. 2. Faulty ignition coil (s).
CKP sensor	Peak voltage is lower than standard value.	1. The multimeter impedance is too low; below 10 MΩ/DCV. 2. Cranking speed is too low (battery undercharged). 3. The sampling timing of the tester and measured pulse were not synchronised (system is normal if measured voltage is over the standard voltage at least once). 4. Faulty ECM (in case when above No. 1 – 3 are normal).
	No peak voltage.	1. Faulty peak voltage adaptor. 2. Faulty CKP sensor.

IGNITION SYSTEM INSPECTION

- If there is no spark at any plug, check all connections for loose or poor contact before measuring each peak voltage.
- Use the recommended digital multimeter or 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 manufacturer's instruction.

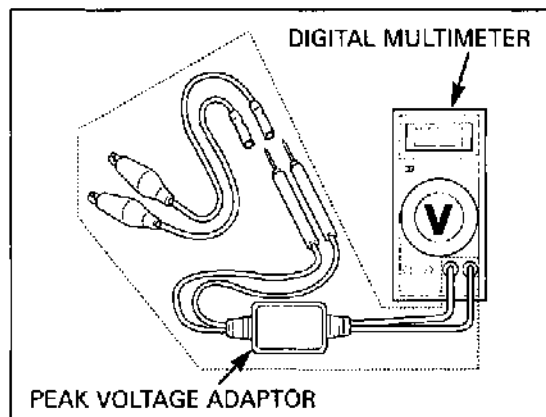
Connect the peak voltage tester or peak voltage adaptor to the digital multimeter.

TOOLS:

Peak voltage tester (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)



IGNITION COIL PRIMARY PEAK VOLTAGE

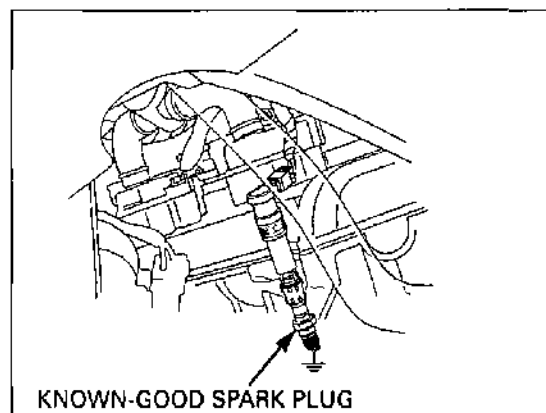
- Check all system connections before inspection. If the system is disconnected, incorrect peak voltage might be measured.
- Check cylinder compression and check that the spark plugs are installed correctly.

Disconnect the direct ignition coils from the spark plugs (page 3-6).

Connect the direct ignition coil 2P connectors to the direct ignition coil.

Shift the transmission into neutral.

Connect known-good spark plugs to the direct ignition coils and ground the spark plugs to the cylinder head as done in the spark test.



With the ignition coil sub-harness 9P (Black) connector connected, connect the peak voltage adaptor or peak voltage tester to the 9P (Black) connector primary wire terminal and ground.

CONNECTION:

No.1 coil:

Blue/Black terminal (+) – Body ground (–)

No.2 coil:

Yellow/White terminal (+) – Body ground (–)

No.3 coil:

Red/Blue terminal (+) – Body ground (–)

No.4 coil:

Red/Yellow terminal (+) – Body ground (–)

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

Turn the ignition switch to "ON" and the engine stop switch on.

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 (refer to the troubleshooting, page 17-3).

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

PEAK VOLTAGE: 100 V minimum

If the peak voltage is abnormal, check for an open circuit or poor connection in the Blue/Black, Yellow/White, Red/Blue and Red/Yellow wires.

If no defects are found in the harness, refer to the troubleshooting chart on page 17-3.

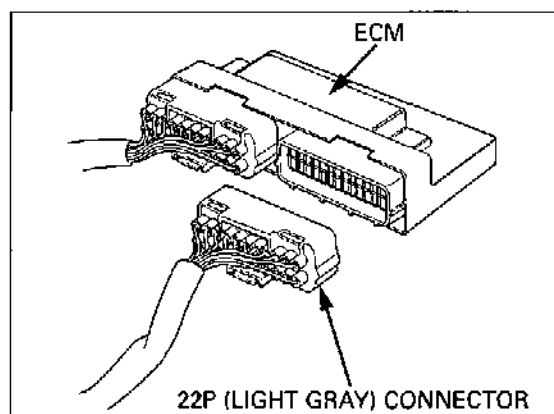
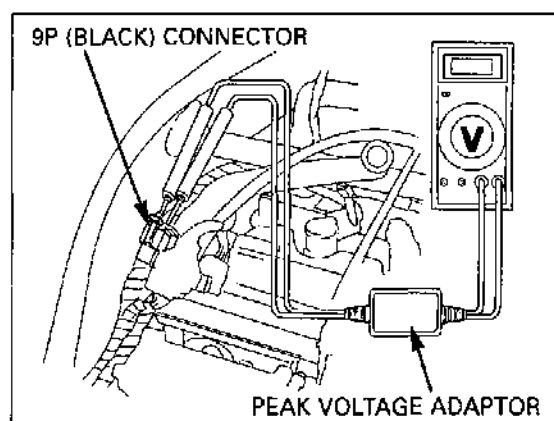
CKP SENSOR PEAK VOLTAGE

- Check all system connections before inspection. If the system is disconnected, incorrect peak voltage might be measured.
- Check cylinder compression and check that the spark plugs are installed correctly.

Remove the following:

- Seat (page 2-2)
- Lower cowl (page 2-6)

Disconnect the 22P (Light gray) connector from the ECM.



IGNITION SYSTEM

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

TOOLS:

Peak voltage tester (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)

CONNECTION:

Yellow terminal (+) – Ground (–)

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

Crank the engine with the starter motor and read the peak voltage.

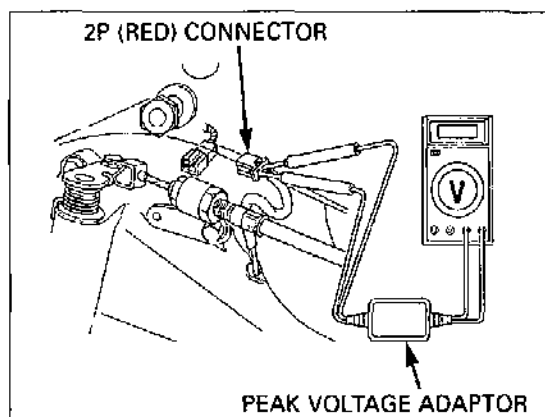
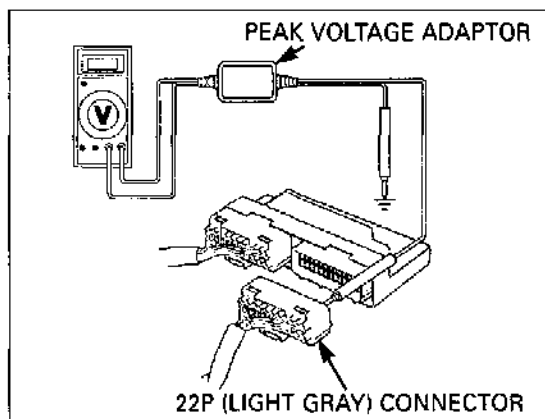
PEAK VOLTAGE: 0.7 V minimum

If the peak voltage measured at ECM multi-connector is abnormal, measure the peak voltage at the CKP sensor connector.

Disconnect the CKP sensor 2P (Red) connector and connect the tester probes to the terminal (Yellow and White/Yellow).

In the same manner as at the ECM connector, measure the peak voltage and compare it to the voltage measured at the ECM connector.

- If the peak voltage measured at the ECM is abnormal and the one measured at the CKP sensor is normal, the wire harness has an open circuit or loose connection.
- If both peak voltages are abnormal, check each item in the troubleshooting chart. If all items are normal, the CKP sensor is faulty. See following steps for CKP sensor replacement.

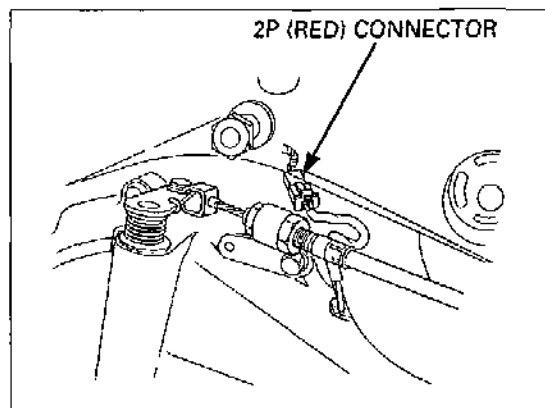


CKP SENSOR

REMOVAL

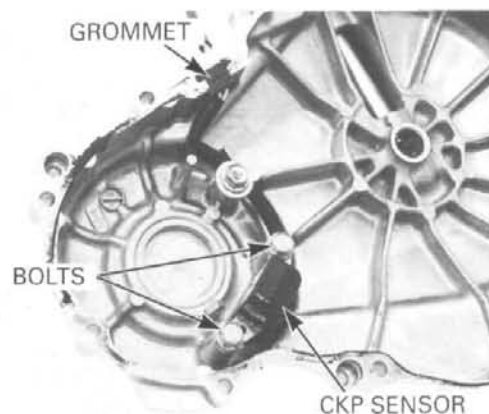
Remove the lower cowl (page 2-6).

Disconnect the CKP sensor 2P (Red) connector.



Remove the right crankcase cover (page 9-3).

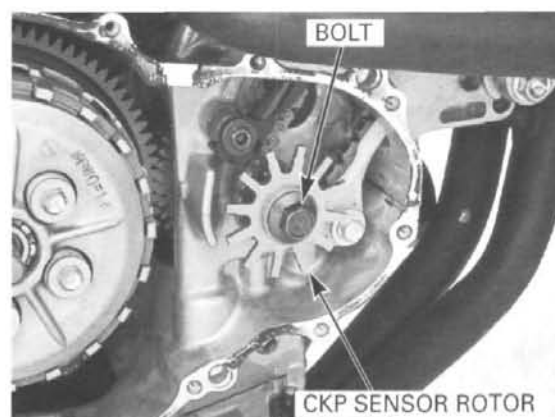
Remove the wire grommet from the cover.
Remove the bolts and CKP sensor.



If the engine is out of the frame, remove the alternator cover (page 10-2) and hold the flywheel with the flywheel holder (P/N: 07725-0040000), then remove the bolt.

Shift the transmission into 6th gear and apply the rear brake.

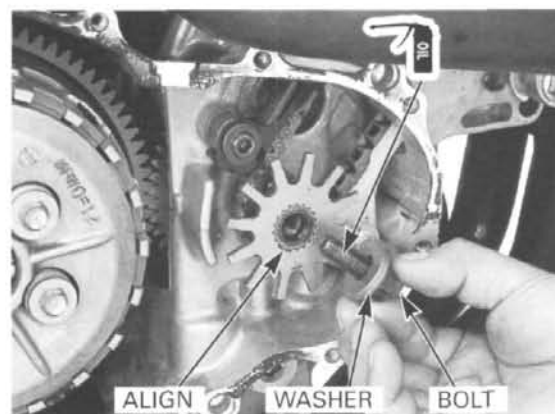
Remove the CKP sensor rotor bolt.



INSTALLATION

Install the CKP sensor rotor by aligning the wide groove with the wide teeth of the crankshaft.

Apply oil to the CKP sensor rotor bolt threads, then install the washer and rotor bolt.

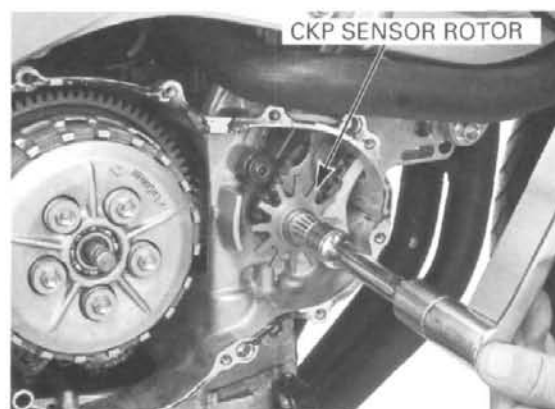


If the engine is out of frame, remove the alternator cover (page 10-2) and hold the flywheel with the flywheel holder (P/N: 07725-0040000), then tighten the bolt.

Shift the transmission into 6th gear and apply the rear brake.

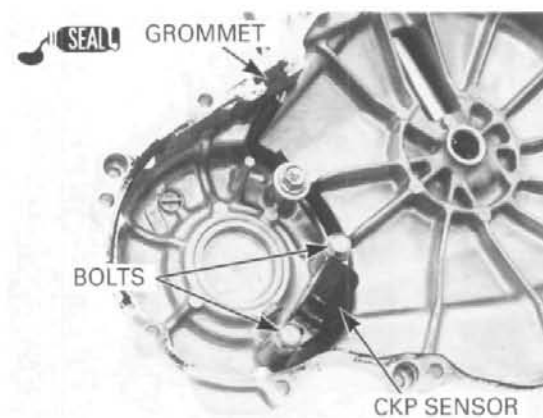
Tighten the CKP sensor rotor bolt to the specified torque.

TORQUE: 59 N·m (6.0 kgf·m, 43 lbf·ft)



IGNITION SYSTEM

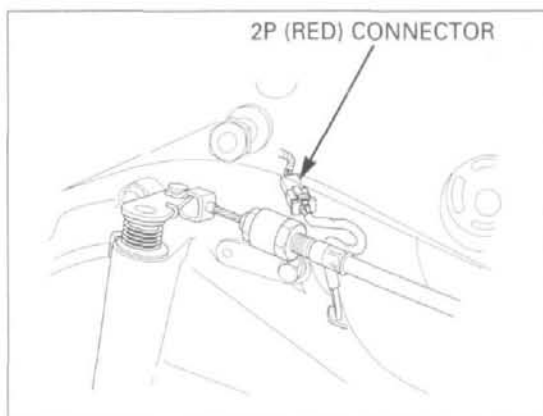
Install the CKP sensor into the cover.
Apply sealant to the wire grommet, then install it into the groove of the cover.
Install and tighten the CKP sensor bolts.



Install the right crankcase cover (page 9-17).

Route the CKP sensor wire properly, connect the 2P (Red) connector.

Install the removed parts in the reverse order of removal.



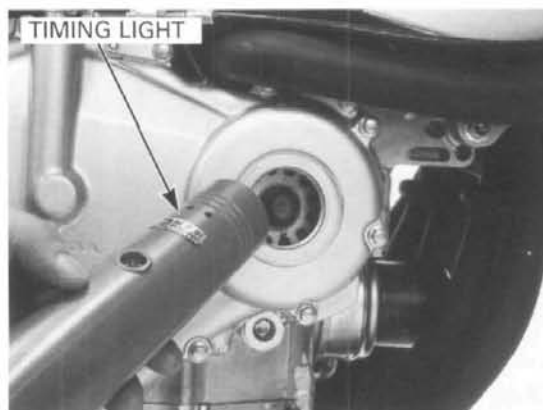
IGNITION TIMING

Warm up the engine.
Stop the engine and remove the timing hole cap.



Read the instructions for timing light operation.

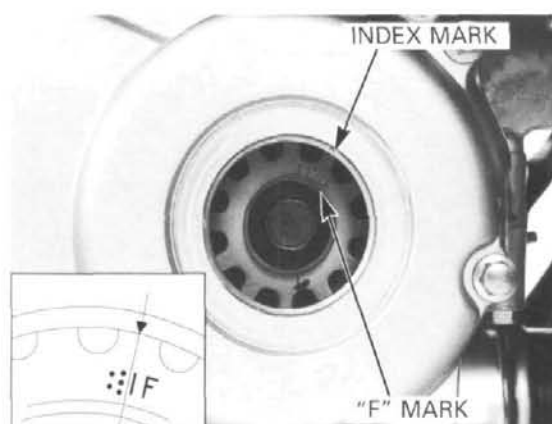
Connect the timing light to the No.1 spark plug wire.



Start the engine and let it idle.

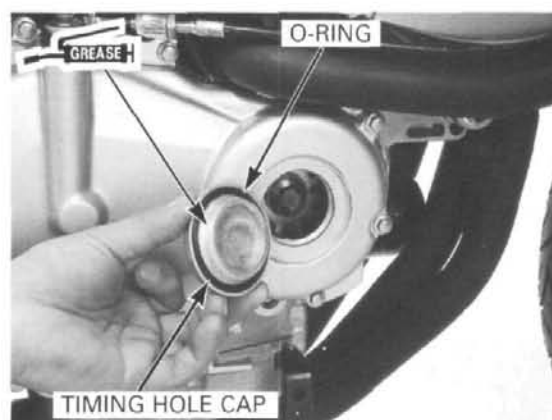
IDLE SPEED: $1,300 \pm 100$ rpm

The ignition timing is correct if the index mark on the right crankcase cover aligns between the "F" mark and the three punch marks on the CKP sensor rotor as shown.



Check that the O-ring is in good condition, replace if necessary.

Apply grease to the timing hole cap threads and install the O-ring and timing hole cap.



Tighten the timing hole cap to the specified torque.

TORQUE: 18 N·m (1.8 kgf·m, 13 lbf·ft)

