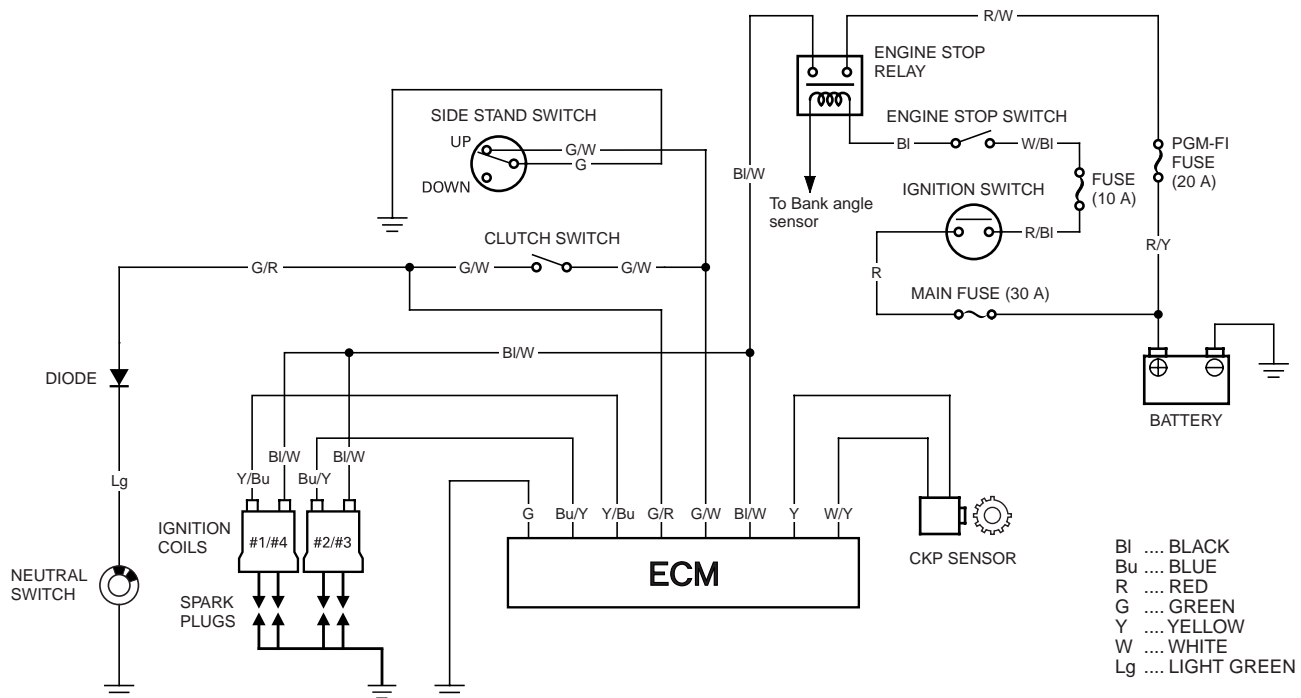
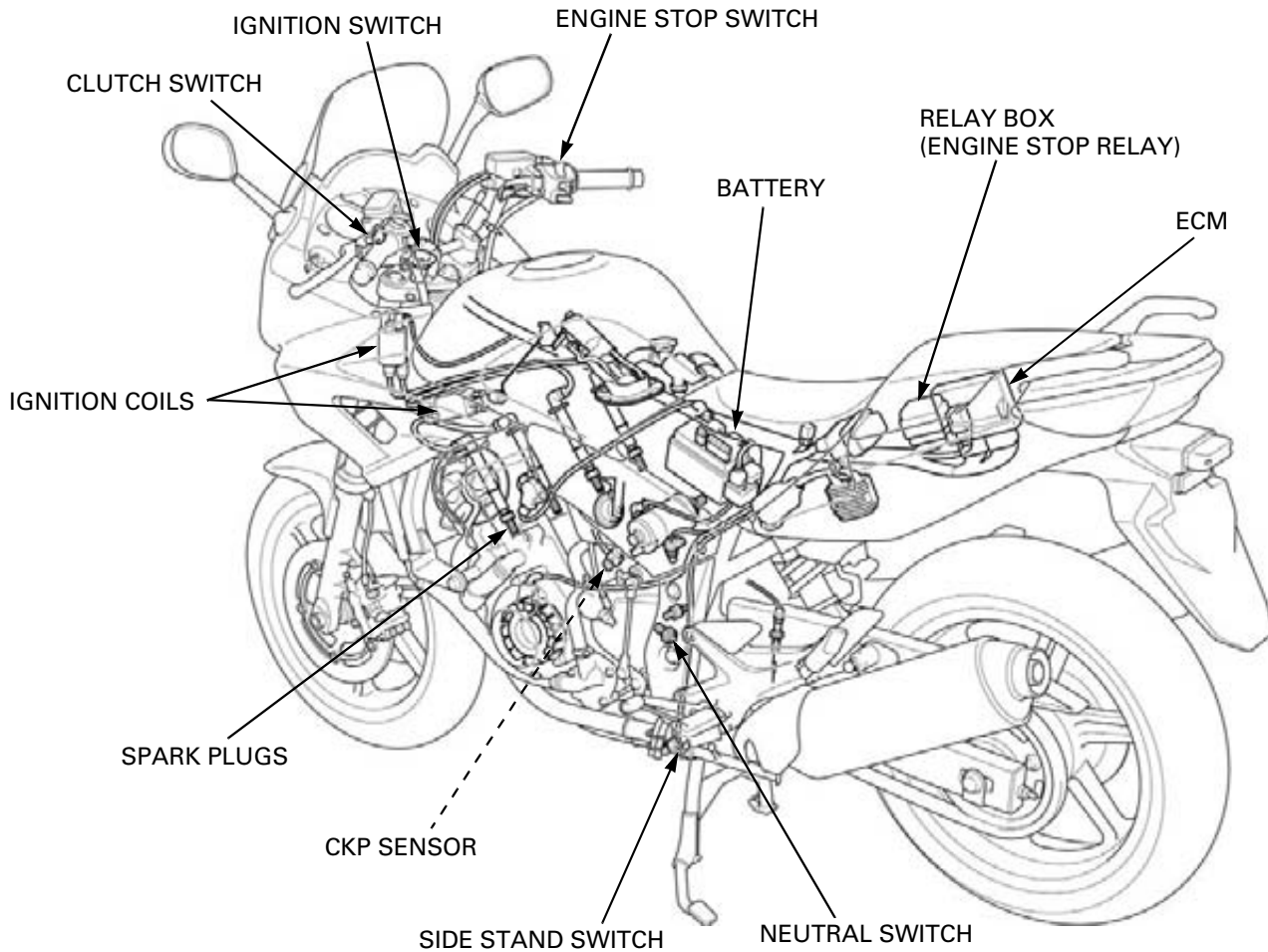


19. IGNITION SYSTEM

| | | | |
|---------------------------|------|---------------------------------|------|
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| SERVICE INFORMATION | 19-3 | CKP SENSOR..... | 19-7 |
| TROUBLESHOOTING | 19-4 | IGNITION TIMING | 19-8 |

IGNITION SYSTEM

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 off the ignition switch before servicing.
- Use spark plug of the correct heat range. Using spark plug 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 ON and current is present.
- When servicing the ignition system, always follow the steps in the troubleshooting sequence (page 19-4).
- 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.
- 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.
- Refer to the ECM inspection (page 6-82).



SPECIFICATIONS

| ITEM | | SPECIFICATIONS |
|---|-------|-----------------------------------|
| Spark plug (Iridium) | NGK | CR8EH-9 |
| | DENSO | U24FER9 |
| Spark plug gap | | 0.80 – 0.90 mm (0.031 – 0.035 in) |
| Ignition coil peak voltage | | 100 V minimum |
| CKP (crankshaft position) sensor peak voltage | | 0.7 V minimum |
| Ignition timing ("F"mark) | | 5° BTDC at idle |

TORQUE VALUE

Timing hole cap 18 N·m (1.8 kgf·m, 13 lbf·ft) Apply grease to the threads

TOOLS

| | |
|--|--|
| <p>Imrie diagnostic tester (model 625) or Peak voltage adaptor 07HGJ-0020100</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 connection
 - Loose ignition coil connectors
 - Water got into the spark plug cap (shorting the ignition coil secondary voltage)
- If there is no spark at any cylinder, temporarily exchange the ignition coil with the other good one and perform the spark test. If there is spark, the exchanged ignition coil is faulty.
- "Initial voltage" of the ignition primary coil is the battery voltage with the ignition switch turned ON and engine stop switch turned "⏻" (When 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 the ignition ON and engine stop switch turned "⏻" (other electrical components are normal). | <ol style="list-style-type: none"> 1. Faulty engine stop relay. 2. An open circuit in Black/white wire between the ignition coil and engine stop relay. 3. Loose or poor connect of the ignition coil connectors, 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 connectors). |
| | Initial voltage is normal, but it drops down to 2 – 4 V while cranking the engine. | <ol style="list-style-type: none"> 1. Incorrect peak voltage adaptor connections. 2. Undercharged battery. 3. No voltage between the Black/white (+) and body ground (-) at the ECM connector or loosen ECM connection. 4. An open circuit or loose connection in Green wire. 5. An open circuit or loose connection in Yellow/blue or Blue/yellow wire between the ignition coils and ECM. 6. Faulty side stand switch or neutral switch. 7. An open circuit or loose connection: <ul style="list-style-type: none"> – Side stand switch line: Green/white wire – Neutral switch line: Light green or Green/red wire 8. Faulty CKP sensor (Measure the peak voltage). 9. Faulty ECM (in case when above No. 1 – 8 are normal). |
| | Initial voltage is normal, but no peak voltage while cranking the engine. | <ol style="list-style-type: none"> 1. Faulty peak voltage adaptor connections. 2. Faulty peak voltage adaptor. 3. Faulty CKP sensor (Measure the peak voltage). 4. Faulty ECM (in case when above No. 1 – 3 are normal). |
| | Initial voltage is normal, but peak voltage is lower than standard value. | <ol style="list-style-type: none"> 1. The multimeter impedance is too low; below 10 MΩ/DCV. 2. Faulty CKP sensor (Measure the peak voltage). 3. Cranking speed is too low (Battery is undercharged). 4. The sampling timing of the tester and measured pulse were not synchronized (System is normal if measured voltage is over the specification at least once). 5. Faulty ECM (in case when above No. 1 – 4 are normal). |
| | Initial and peak voltage are normal, but does not spark. | <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 standard value. | <ol style="list-style-type: none"> 1. The multimeter impedance is too low; below 10 MΩ/DCV. 2. Cranking speed is too low (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 specification at least once). 4. Faulty CKP sensor (in case when above No. 1 – 3 are normal). |
| | No peak voltage. | <ol style="list-style-type: none"> 1. Faulty peak voltage adaptor. 2. Faulty CKP sensor. |

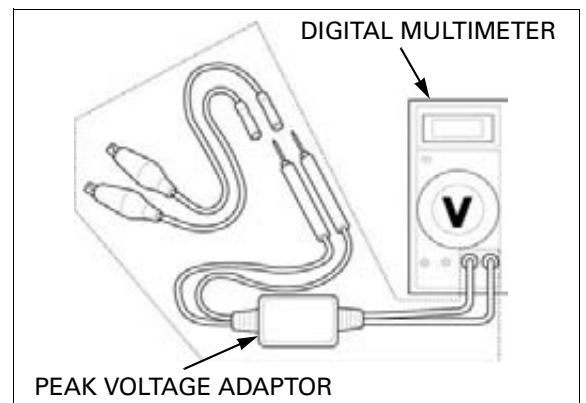
IGNITION SYSTEM INSPECTION

- If there is no spark at any plug, check all connections for loose or poor contact before measuring each peak voltage.
- Use 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 Imrie diagnostic tester (model 625) is used, follow the manufacturer's instruction.

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

TOOLS:

**Imrie diagnostic tester (model 625) or
Peak voltage adaptor 07HGJ-0020100
with commercially available digital multimeter
(impedance 10 M Ω /DCV minimum)**



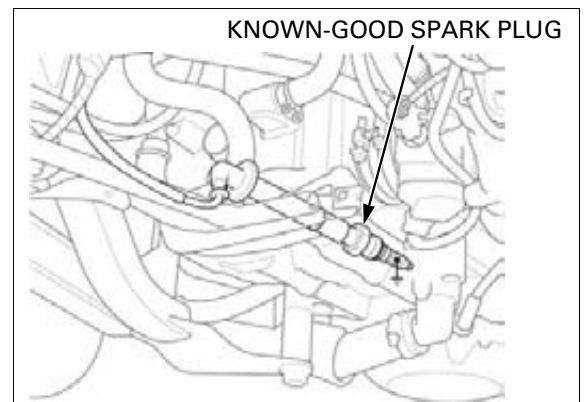
IGNITION COIL PRIMARY PEAK VOLTAGE

- 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.

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

Reinstall the ignition coils onto the frame and left front cowl stay.

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



IGNITION SYSTEM

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

For #2/#3 ignition coil inspection, remove the upper mounting bolt, nut and spacer.

Connect the peak voltage adaptor or Imrie diagnostic tester probes to the test harness terminals.

CONNECTIONS:

#1/#4 ignition coil:

Yellow/blue (+) – body ground (-)

#2/#3 ignition coil:

Blue/yellow (+) – body ground (-)

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

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

Check for initial voltage at this time. Battery voltage should be present.

If the initial voltage cannot be measured, check the power supply circuit. Refer to the troubleshooting chart (page 19-4).

Shift the transmission into neutral.

Crank the engine with the starter motor with the throttle grip fully opened and read the ignition coil primary peak voltage.

PEAK VOLTAGE: 100 V minimum

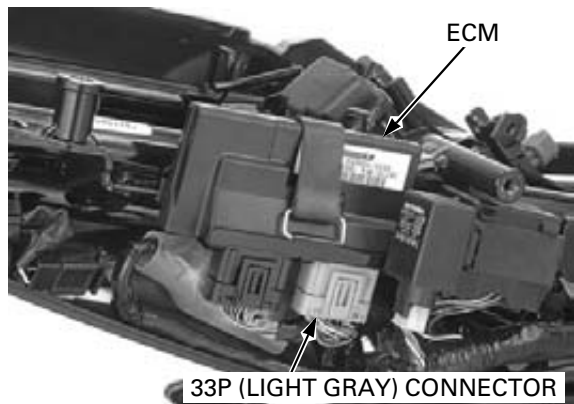
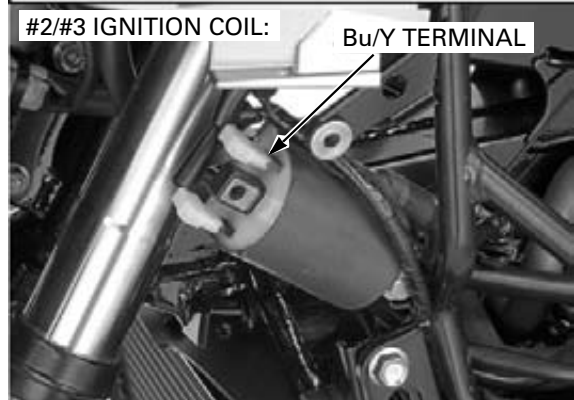
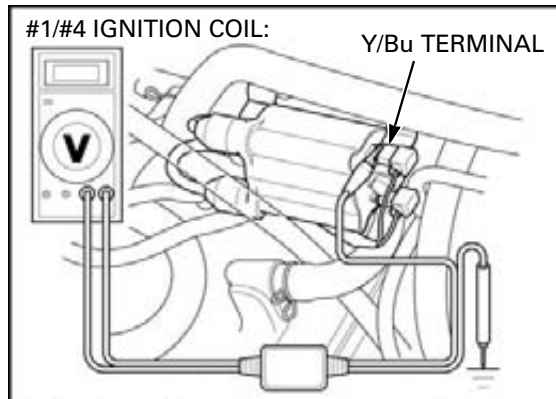
If the peak voltage is abnormal, refer to the troubleshooting chart (page 19-4).

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 right rear cowl (page 3-8).

Disconnect the ECM 33P (Light gray) connector from the ECM.



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

TOOLS:

- Imrie diagnostic tester (model 625) or**
- Peak voltage adaptor 07HGJ-0020100**
- with commercially available digital multimeter**
- (impedance 10 MΩ/DCV minimum)**
- Test probe 07ZAJ-RDJA110**

CONNECTION:

Yellow terminal (+) – Body ground (–)

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

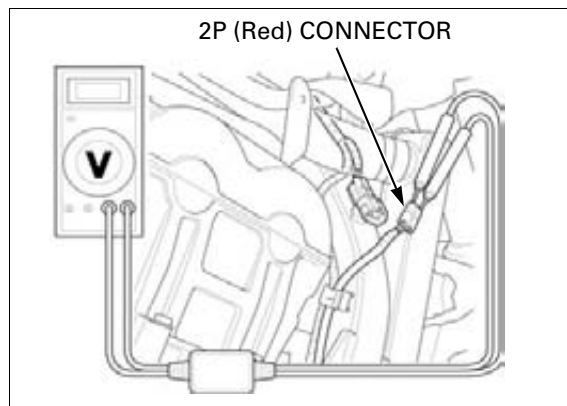
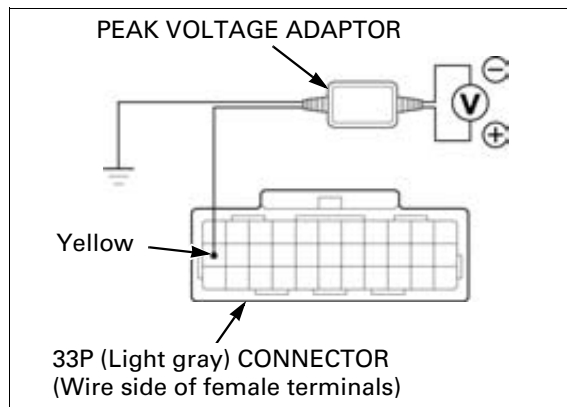
PEAK VOLTAGE: 0.7 V minimum

If the peak voltage measured at ECM 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, check the 2P (Red) connector for loose connection and the wire harness for an open circuit or loose connection.
- If both peak voltage measured are abnormal, check each item in the troubleshooting chart (page 19-4). If all items are normal, the CKP sensor is faulty. See following steps for CKP sensor replacement.



CKP SENSOR

REPLACEMENT

Remove the right crankcase cover (page 10-15).

Remove the wire grommet from the cover and remove the sensor wire setting bolt/washer. Remove the bolts and CKP sensor.

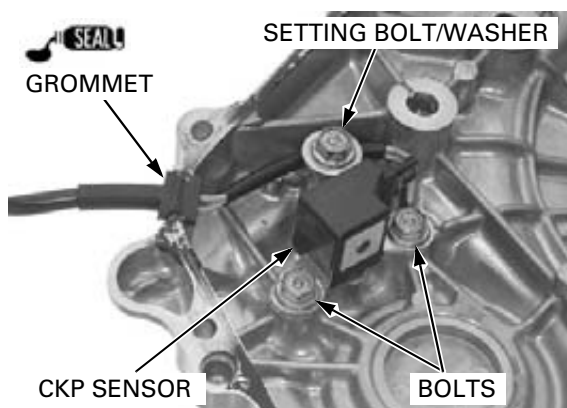
Install the new CKP sensor and tighten the mounting bolts securely.

Route the CKP sensor wire into the groove of the right crankcase cover.

Install the setting bolt/washer, then tighten it securely.

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

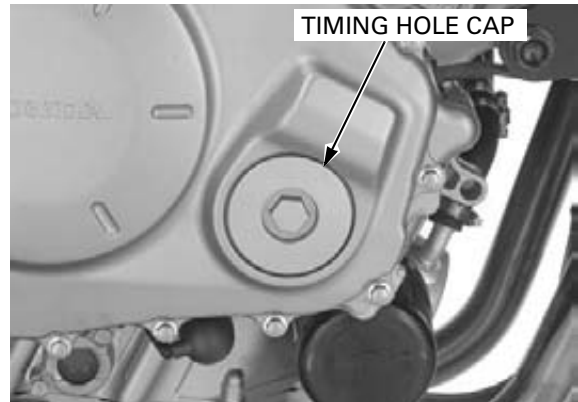
Install the right crankcase cover (page 10-33).



IGNITION SYSTEM

IGNITION TIMING

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

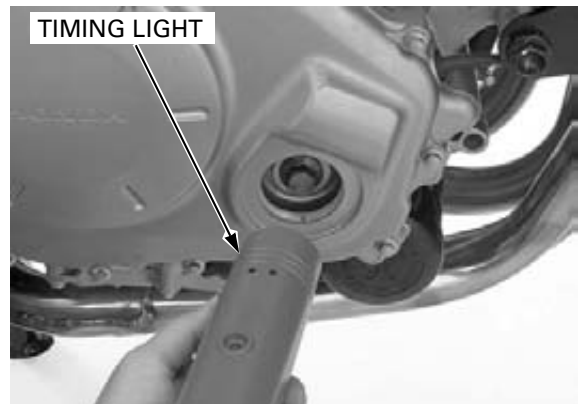


Lift and support the fuel tank (page 4-5).

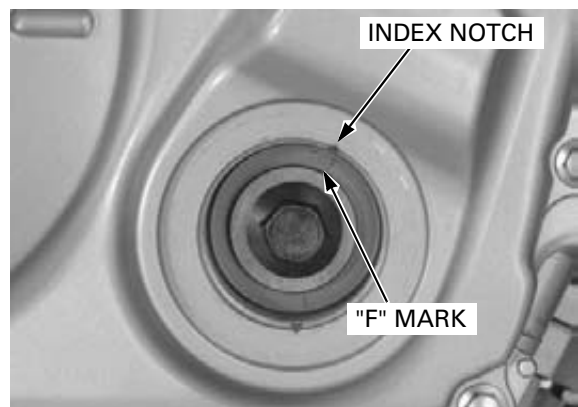
Rear the instructions for timing light operation.

Connect the timing light to the No.1 spark plug wire. Start the engine, let it idle and check the ignition timing.

IDLE SPEED: 1,200 ± 100 min⁻¹ (rpm)



The ignition timing is correct if the "F" mark on the CKP sensor rotor (starter clutch outer) aligns with the index notch on the right crankcase cover at idle.



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

Apply oil to the O-ring.

Apply grease to the timing hole cap threads and install the timing hole cap.

Tighten the timing hole cap to the specified torque.

TORQUE: 18 N·m (1.8 kgf·m, 13 lbf·ft)

