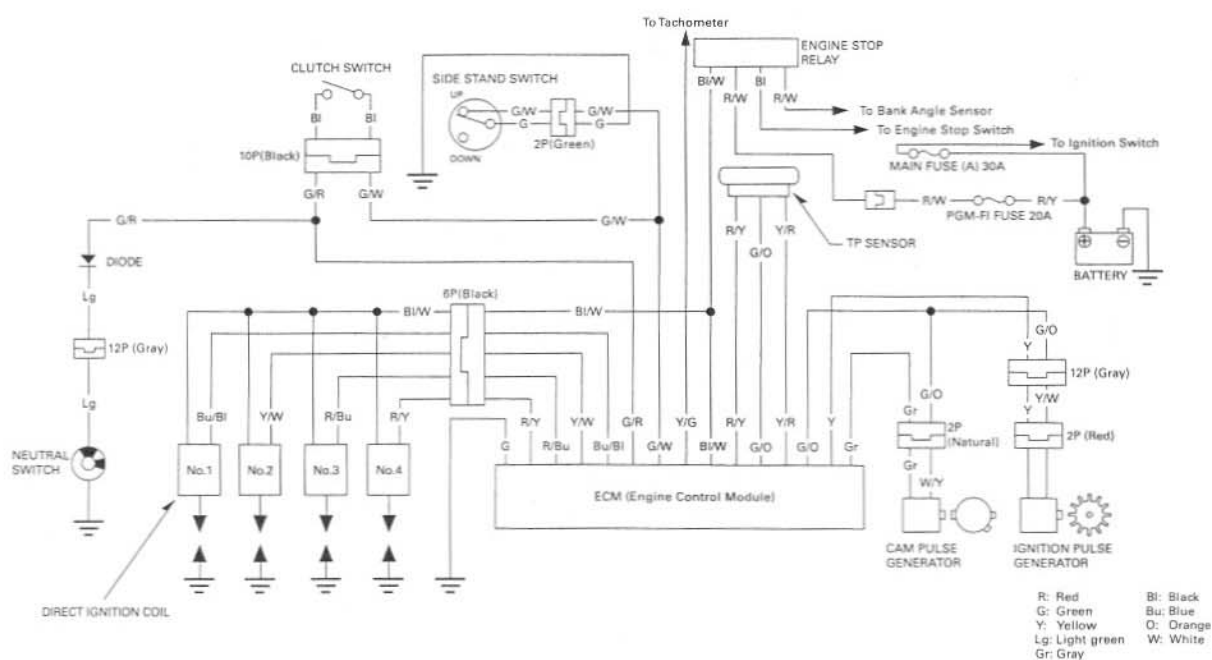
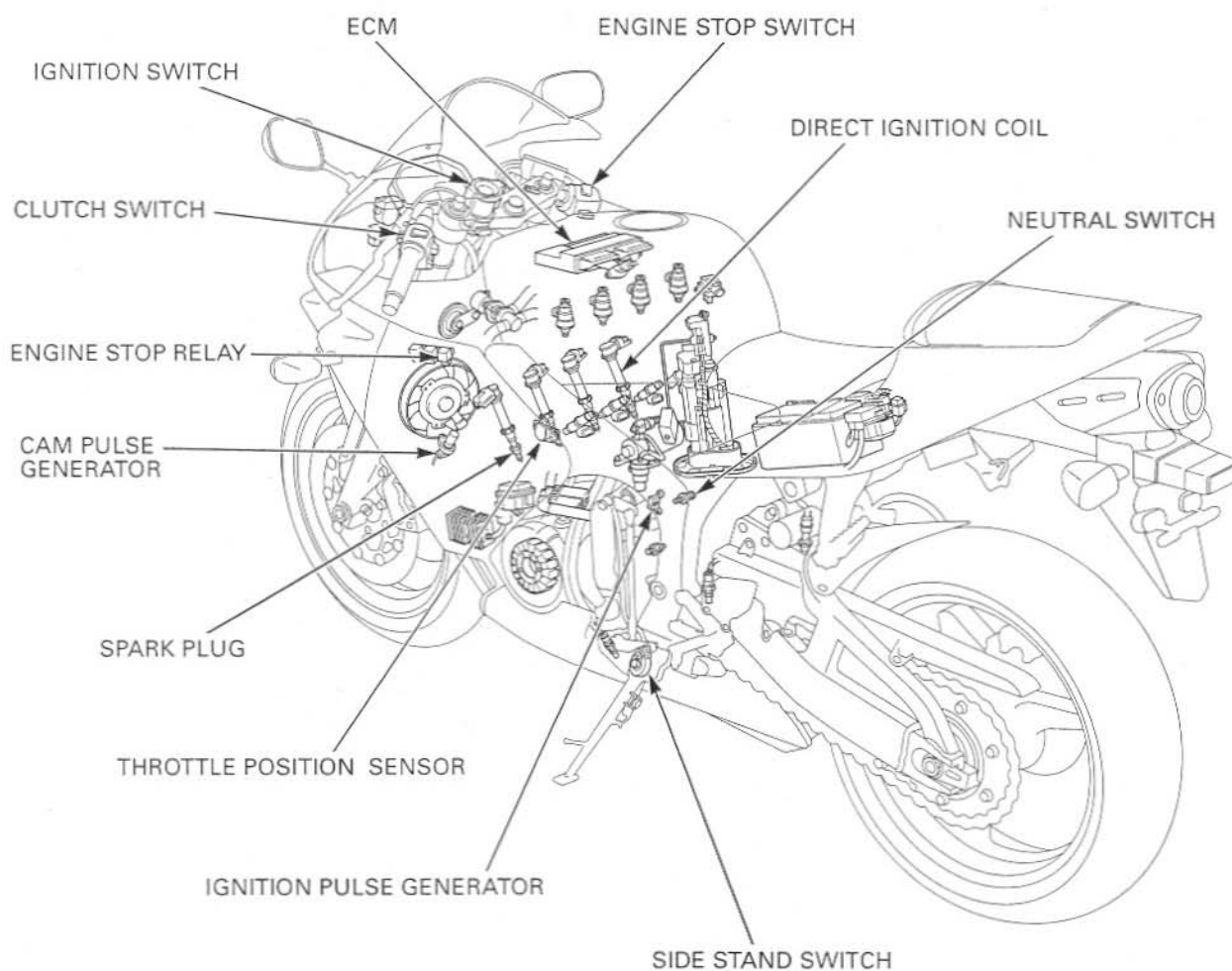


18. IGNITION SYSTEM

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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 18-4).
- 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.
- This motorcycle features direct ignition coils, where the ignition coil and spark plug cap are integrated. There are four direct ignition coils.
- Refer to the Throttle Position (TP) sensor inspection (page 6-91), cam pulse generator inspection (page 6-90) and ECM inspection (page 6-94).

SPECIFICATIONS

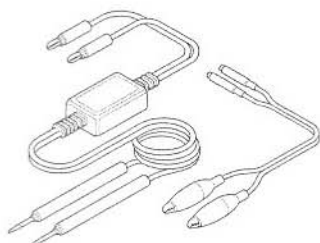
ITEM	SPECIFICATIONS
Spark plug (Iridium)	IMR9C-9HE (NGK)
Spark plug gap	0.80 – 0.90 mm (0.031 – 0.035 in)
Ignition coil peak voltage	100 V minimum
Ignition pulse generator peak voltage	0.7 V minimum
Ignition timing ("F"mark)	15° BTDC at idle

TORQUE VALUES

Timing hole cap	18 N·m (1.8 kgf·m, 13 lbf·ft)	Apply grease to the threads
Spark plug	16 N·m (1.6 kgf·m, 12 lbf·ft)	
Stator wire clamp bolt	14 N·m (1.4 kgf·m, 10 lbf·ft)	CT bolt

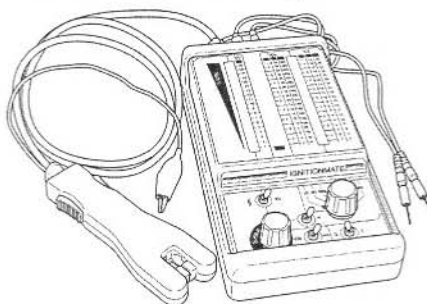
TOOLS

Peak voltage adaptor
07HGJ-0020100
(not available in U.S.A.)



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

IgnitionMate Peak voltage tester
MTP07-0286 (U.S.A. only)



IGNITION SYSTEM

TROUBLESHOOTING

- Inspect the following before diagnosing the system.
 - Faulty spark plug
 - Loose direct ignition coil and spark plug connection
 - Loose direct ignition coil connectors
 - Water got into the direct ignition coil (shorting the ignition coil secondary voltage)
- If there is no spark at any cylinder, temporarily exchange the direct ignition coil with the other 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 ON and engine stop switch turned "Q" (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 switches turned "Q" (other electrical components are normal)	<ol style="list-style-type: none"> Faulty engine stop switch. An open circuit in Black/white wire between the direct ignition coil and ECM. Loose or poor connect of the direct ignition coil primary wire terminal, or an open circuit in primary coil (Check at the ECM connector). 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.	<ol style="list-style-type: none"> Incorrect peak voltage adaptor connections. Undercharged battery. No voltage between the Black/white (+) and body ground (–) at the ECM multi-connector or loosen ECM connection. An open circuit or loose connection in Green wire. An open circuit or loose connection in Blue/black, Yellow/white, Red/blue and Red/yellow wires between the direct ignition coils and ECM. Faulty side stand switch or neutral switch. An open circuit or loose connection in No.7 related circuit wires. <ul style="list-style-type: none"> Side stand switch line: Green/white wire Neutral switch line: Light Green wire Faulty ignition pulse generator (measure the peak voltage). 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"> Faulty peak voltage adaptor connections. Faulty peak voltage adaptor. Faulty ECM (in case when above No.1, 2 are normal).
	Initial voltage is normal, but peak voltage is lower than standard valve.	<ol style="list-style-type: none"> The multimeter impedance is too low; below 10 MΩ/DCV. Cranking speed is too low (battery under charged). 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). Faulty ECM (in case when above No. 1 – 3 are normal).
	Initial and peak voltage are normal, but does not spark.	<ol style="list-style-type: none"> Faulty spark plug or leaking ignition coil secondary current ampere. Faulty direct ignition coil (s).
Ignition pulse generator	Peak voltage is lower than standard value.	<ol style="list-style-type: none"> The multimeter impedance is too low; below 10 MΩ/DCV. Cranking speed is too low (battery under charged). 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). Faulty ECM (in case when above No. 1 – 3 are normal).
	No peak voltage.	<ol style="list-style-type: none"> Faulty peak voltage adaptor. Faulty ignition pulse generator.

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.

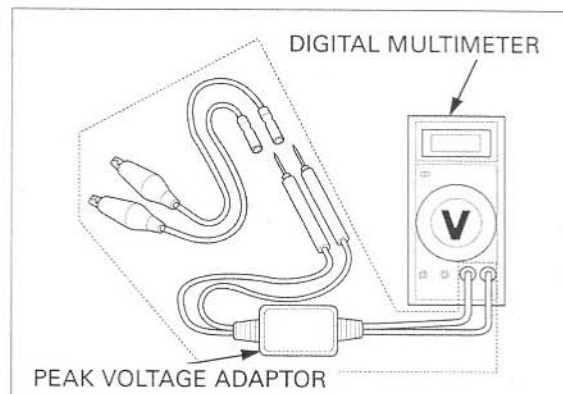
Connect the peak voltage tester or peak voltage adaptor to the digital multimeter.

TOOLS:

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

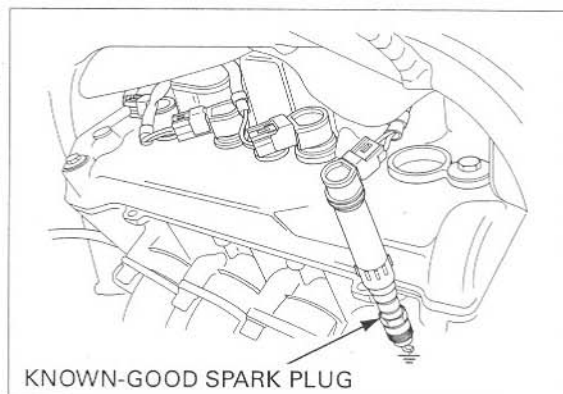
- Check all system connections before inspection. If the system is disconnected, incorrect peak voltage might be measured.
- Check cylinder compression and check that the spark plugs are installed correctly.

Disconnect the direct ignition coils from the spark plugs (page 4-7).

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

Shift the transmission into neutral.

Connect a known-good spark plug to the direct ignition coil and ground the spark plug to the cylinder head as done in a spark test.



With the ignition coil 6P (Black) connector connected, connect the peak voltage adaptor or peak voltage tester to the 6P (Black) connector primary wire terminal and ground.

CONNECTION:

No.1 coil:

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

No.2 coil:

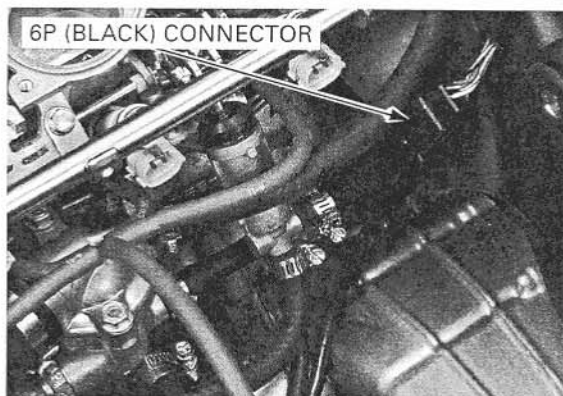
Yellow/white terminal (+) – Body ground (–)

No.3 coil:

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

No.4 coil:

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



IGNITION SYSTEM

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

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

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, page 18-4).

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

PEAK VOLTAGE: 100V minimum

If the peak voltage is abnormal, check for an open circuit or poor connection in Blue/black, Yellow/white, Red/blue and Red/yellow wires.

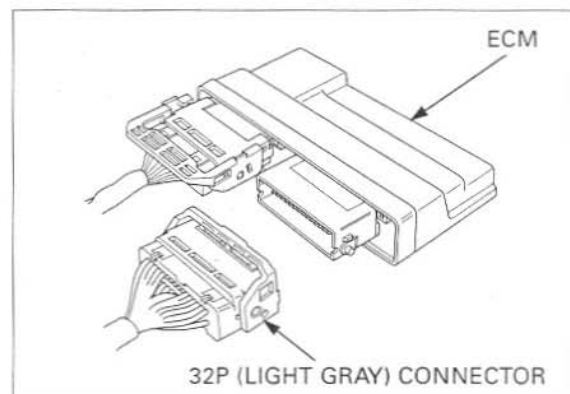
If not defects are found in the harness, refer to the troubleshooting chart on (page 18-4).

IGNITION PULSE GENERATOR 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 fuel tank cover (page 3-15).

Disconnect the ECM 32P (Light gray) connector from the ECM.



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

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)

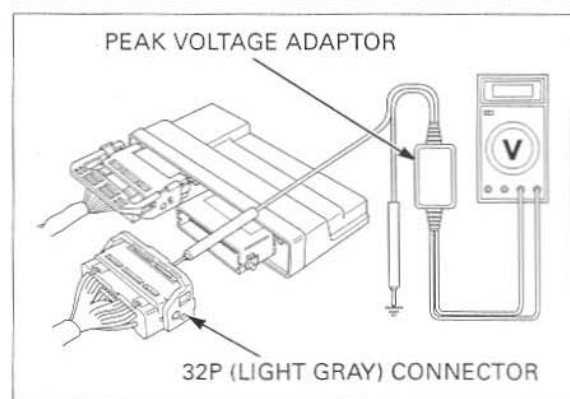
CONNECTION:

Yellow terminal (+) – 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 ignition pulse generator connector.

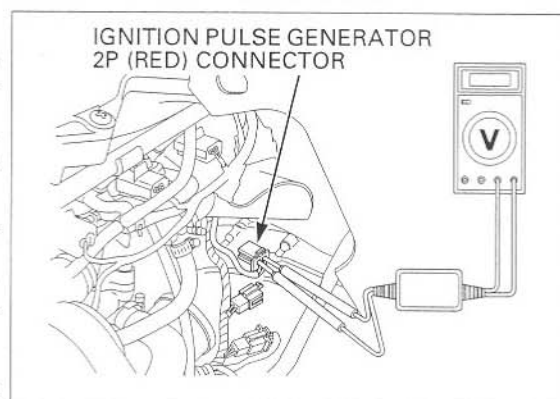


Lift and support the fuel tank (page 6-61)

Disconnect the ignition pulse generator 2P (Red) connector and connect the tester probes to the terminal (Yellow and Yellow/white).

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 ignition pulse generator 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 18-4). If all items are normal, the ignition pulse generator is faulty. See following steps for ignition pulse generator replacement.



IGNITION PULSE GENERATOR

REPLACEMENT

Remove the right crankcase cover (page 10-5).

Remove the wire grommet from the cover.

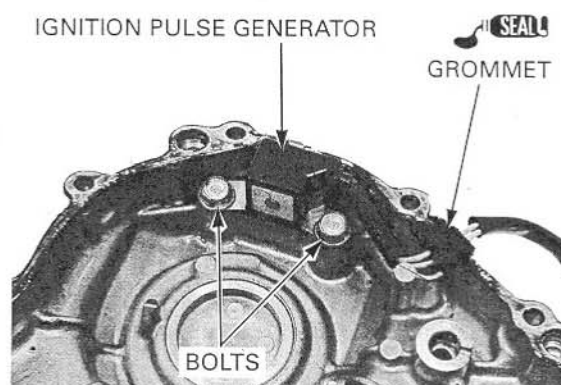
Remove the bolts and ignition pulse generator.

Apply sealant to the grommet seating surface.

Install a new ignition pulse generator and the grommet into the cover groove properly.

Apply locking agent to the threads of the bolts. Tighten the bolts securely.

Install the right crankcase cover (page 10-24).



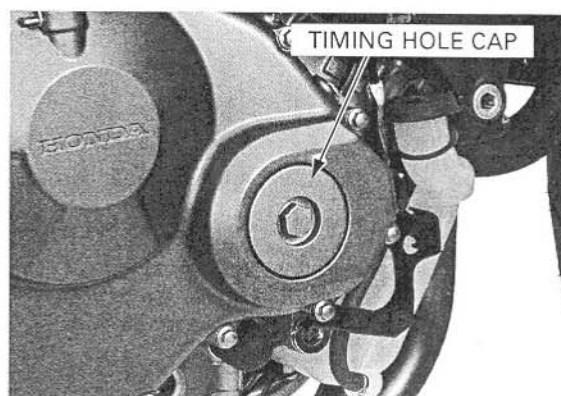
IGNITION TIMING

Remove the following:

- Lower cowls (page 3-6)
- Middle cowls (page 3-7)

Warm up the engine.

Stop the engine and remove the timing hole cap.



IGNITION SYSTEM

Read the instructions for timing light operation.

Connect the timing light to the No.1 direct ignition coil connector wire.

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

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 three punch marks on the ignition pulse generator rotor as shown.

Increase the engine speed by turning the throttle stop screw and mark sure the "F" mark begins to move counterclockwise when the engine speed is approximately 2,500 rpm.

Apply oil to the O-ring.

Check the O-ring is in good condition, replace it 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)

Install the following:

- Middle cowls (page 3-8)
- Lower cowls (page 3-6)

