

# Ignition System

## General Description

### Ignition System Construction

S6RW0C1801001

The ignition system is an electronic (distributor less) ignition system. Especially, a direct ignition system is adopted. They consists of the parts as described below.

- **ECM**

It detects the engine and vehicle conditions through the signals from the sensors, determines the most suitable ignition timing and time for electricity to flow to the primary coil and sends a signal to the ignitor (power unit) in the ignition coil assembly.

- **Ignition coil assembly (including an ignitor)**

The ignition coil assembly has a built-in ignitor which turns ON and OFF the current flow to the primary coil according to the signal from ECM. When the current flow to the primary coil is turned OFF, a high voltage is induced in the secondary coil.

One ignition coil is in charge of ignition of one cylinder only.

- **Spark plugs**

- **CMP sensor and CKP sensor**

Using signals from these sensors, ECM identifies the specific cylinder whose piston is in the compression stroke, detects the crank angle and adjusts initial ignition timing automatically.

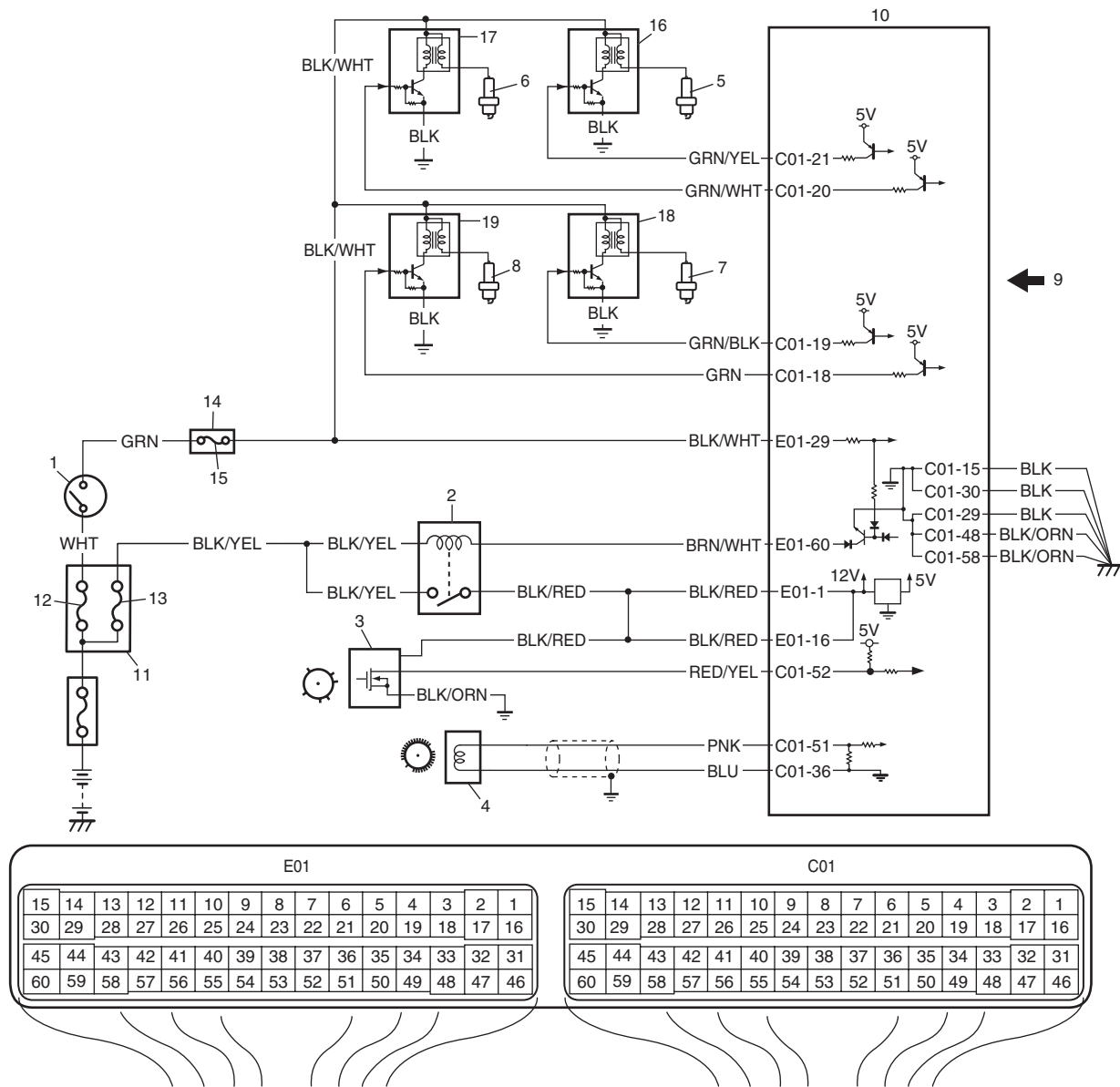
- **TP sensor, ECT sensor, MAF sensor, IAT sensor, knock sensor, wheel speed sensor (VSS) and other sensors / switches**

Although ignition system does not have a distributor and high-tension cords, each cylinder has an ignition coil assembly (ignitor and ignition coil) and the secondary voltage which occurred in the ignition coil is sent to the spark plug directly. Also, the signal (s) are sent from the CMP sensor to ECM so as to control each ignition coil independently through the ignitor (in ignition coil assembly).

# Schematic and Routing Diagram

## Ignition System Wiring Circuit Diagram

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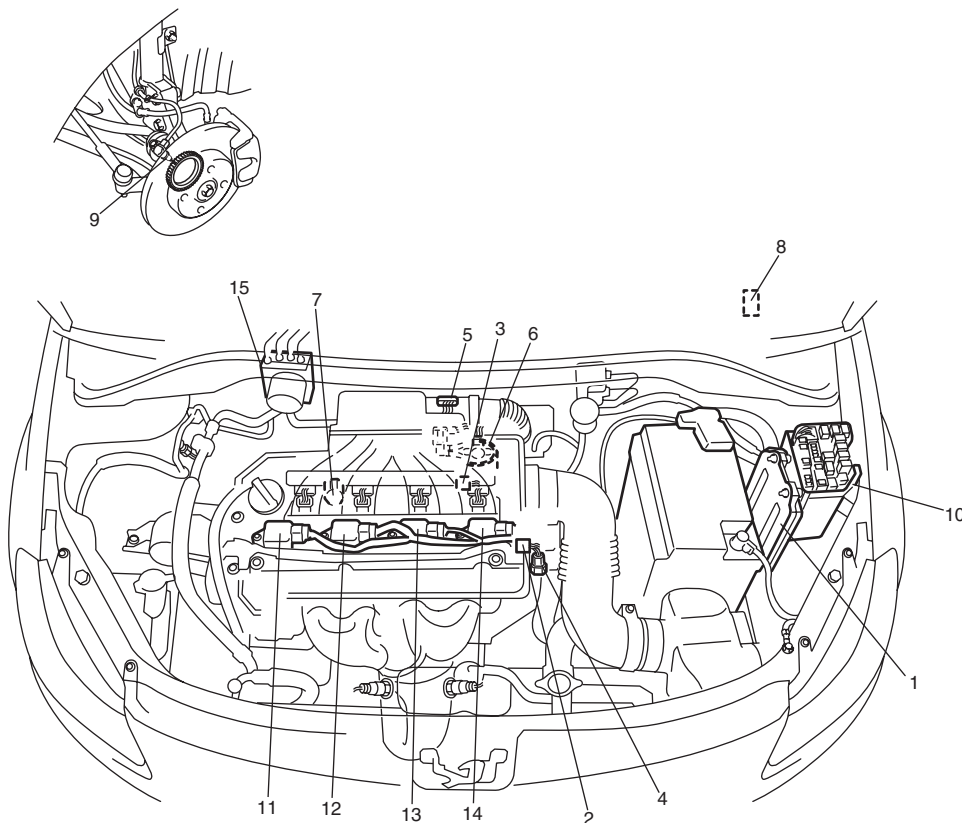
1. Ignition switch	8. No.4 spark plug	15. "IG COIL" fuse
2. Main relay	9. Sensed information (ECT sensor, MAF and IAT sensor, TP sensor, Knock sensor, wheel speed signal (ABS), Electric load signal, Engine start signal, Torque reduction signal (TCM))	16. Ignition coil assembly for No.1
3. CMP sensor	10. ECM	17. Ignition coil assembly for No.2
4. CKP sensor	11. Fuse box No.2	18. Ignition coil assembly for No.3
5. No.1 spark plug	12. "IGN" fuse	19. Ignition coil assembly for No.4
6. No.2 spark plug	13. "FI" fuse	
7. No.3 spark plug	14. Junction block	

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## Component Location

### Ignition System Components Location

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1. ECM	6. Electric throttle body assembly	11. Ignition coil assembly for No.1
2. CMP sensor	7. Knock sensor	12. Ignition coil assembly for No.2
3. CKP sensor	8. DLC	13. Ignition coil assembly for No.3
4. ECT sensor	9. Front wheel speed sensor (VSS)	14. Ignition coil assembly for No.4
5. MAF and IAT sensor	10. Fuse box No.2	15. ABS control module

## Diagnostic Information and Procedures

### Ignition System Check

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Step	Action	Yes	No
1	Was "Engine and Emission Control System Check" performed?	Go to Step 2.	Go to "Engine and Emission Control System Check in Section 1A".
2	<b>Ignition spark test</b> 1) Check all spark plugs for condition and type referring to "Spark Plug Inspection". 2) If OK, perform ignition spark test referring to "Ignition Spark Test". Is spark emitted from all spark plugs?	Go to Step 11.	Go to Step 3.
3	<b>DTC check</b> 1) Perform DTC check referring to "DTC Check in Section 1A". Is DTC stored in ECM?	Go to applicable DTC diag. flow.	Go to Step 4.

## 1H-4 Ignition System:

Step	Action	Yes	No
4	<p><b>Electrical connection check</b></p> <p>1) Check ignition coil assemblies for electrical connection.</p> <p><i>Are they connected securely?</i></p>	Go to Step 5.	Connect securely.
5	<p><b>Ignition coil assembly power supply and ground circuit check</b></p> <p>1) Check ignition coil assembly power supply and ground circuits for open and short.</p> <p><i>Are circuits in good condition?</i></p>	Go to Step 6.	Repair or replace.
6	<p><b>Ignition coil assembly check</b></p> <p>1) Check ignition coil for resistance referring to "Ignition Coil Assembly (Including ignitor) Inspection".</p> <p><i>Is check result satisfactory?</i></p>	Go to Step 7.	Replace ignition coil assembly.
7	<p><b>CKP sensor check</b></p> <p>1) Check CKP sensor referring to "Crankshaft Position (CKP) Sensor Inspection in Section 1C".</p> <p><i>Is check result satisfactory?</i></p>	Go to Step 8.	Tighten CKP sensor bolt, replace CKP sensor or CKP sensor plate.
8	<p><b>CMP sensor check</b></p> <p>1) Check CMP sensor referring to "Camshaft Position (CMP) Sensor Inspection in Section 1C".</p> <p><i>Is check result satisfactory?</i></p>	Go to Step 9.	Tighten CMP sensor bolt, replace CMP sensor or intake camshaft.
9	<p><b>Ignition trigger signal circuit check</b></p> <p>1) Check ignition trigger signal wire for open, short and poor connection.</p> <p><i>Is circuit in good condition?</i></p>	Go to Step 10.	Repair or replace.
10	<p><b>A known-good ignition coil assembly substitution</b></p> <p>1) Substitute a known-good ignition coil assembly and then repeat Step 2.</p> <p><i>Is check result of Step 2 satisfactory?</i></p>	Go to Step 11.	Substitute a known-good ECM and then repeat Step 2.
11	<p><b>Ignition timing check</b></p> <p>1) Check initial ignition timing and ignition timing advance referring to "Ignition Timing Inspection".</p> <p><i>Is check result satisfactory?</i></p>	System is in good condition.	Go to Step 12.
12	<p><b>Knock sensor check</b></p> <p>1) Confirm that knock sensor circuit is in good condition referring to "DTC P0327 / P0328: Knock Sensor Circuit Low / High in Section 1A".</p> <p>2) Check oscilloscope waveform of knock sensor signal referring to "Reference waveform No.23" and "Reference waveform No.24" under "Inspection of ECM and Its Circuits in Section 1A".</p> <p><i>Is check result satisfactory?</i></p>	Check CMP sensor, CMP sensor rotor tooth of camshaft, CKP sensor, CKP sensor plate and/or input signals related to this system.	Substitute a known-good knock sensor and recheck.

### A-3 Ignition System Circuit Diagram (J20A engine)

S6RW0C910E039

