

TROOPER

# ENGINE

## IGNITION SYSTEM

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### Service Precaution

**WARNING: THIS VEHICLE HAS A SUPPLEMENTAL RESTRAINT SYSTEM (SRS). REFER TO THE SRS COMPONENT AND WIRING LOCATION VIEW IN ORDER TO DETERMINE WHETHER YOU ARE PERFORMING SERVICE ON OR NEAR THE SRS COMPONENTS OR THE SRS WIRING. WHEN YOU ARE PERFORMING SERVICE ON OR NEAR THE SRS COMPONENTS OR THE SRS WIRING, REFER TO THE SRS SERVICE INFORMATION. FAILURE TO FOLLOW WARNINGS COULD RESULT IN POSSIBLE AIR BAG DEPLOYMENT, PERSONAL INJURY, OR OTHERWISE UNNEEDED SRS SYSTEM REPAIRS.**

**CAUTION:** Always use the correct fastener in the proper location. When you replace a fastener, use **ONLY** the exact part number for that application. ISUZU will call out those fasteners that require a replacement after removal. ISUZU will also call out the fasteners that require thread lockers or thread sealant. **UNLESS OTHERWISE SPECIFIED**, do not use supplemental coatings (Paints, greases, or other corrosion inhibitors) on threaded fasteners or fastener joint interfaces. Generally, such coatings adversely affect the fastener torque and the joint clamping force, and may damage the fastener. When you install fasteners, use the correct tightening sequence and specifications. Following these instructions can help you avoid damage to parts and systems.

## 6D2-2 IGNITION SYSTEM

### General Description

Ignition is done by the electronic ignition (EI) that directly fires the spark plugs from ignition coils through spark plug wires without using a distributor. A pair of ignition coils for the cylinders having different phases by 360° (No.1 and No.4, No.2 and No.5, No.3 and No.6) are fired simultaneously.

Since the cylinder on exhaust stroke requires less energy to fire its ignition plug, energy from the ignition coils can be utilized to fire the mating cylinder on compression stroke. After additional 360° rotation, respective cylinder strokes are reversed.

The EI consists of six ignition coils, ion sensing module, crankshaft position sensor, powertrain control module (PCM) and other components.

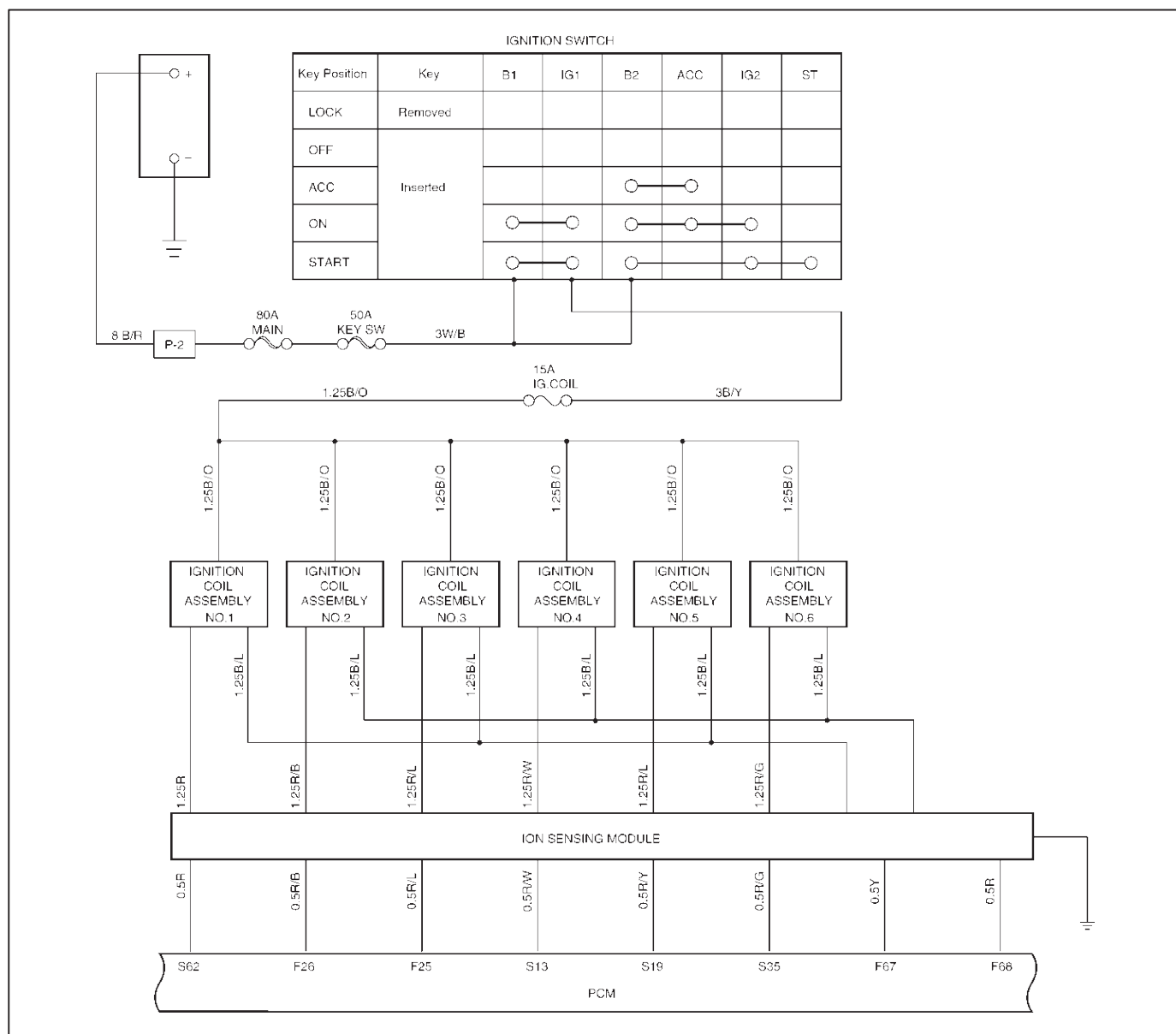
The crankshaft position coils are connected with the PCM by means of a 80 pin connector.

The PCM and ion sensing module turn on/off the primary circuit of ignition coils.

A notch in the timing disc on the crankshaft activates the crank position sensor which then sends information such as firing order and starting timing of each ignition coil to the PCM.

Further, the EI employs ignition control (IC) to control similar to a distributor system.

By receiving signals such as crank position, engine speed, water temperature and Manifold Absolute Pressure (MAP), the PCM controls the ignition timing.



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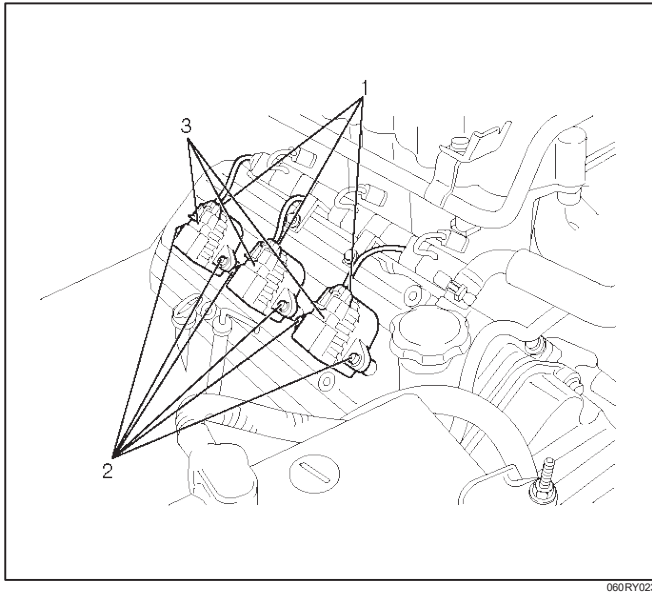
### Diagnosis

Refer to Section Drivability and Emissions for the diagnosis to electronic ignition system (EI system).

## Ignition Coil

### Removal

1. Disconnect battery ground cable.
2. Ignition coil connector and ignition coil.
  - Disconnect three connector from ignition coil.
  - Remove harness bracket bolt on cylinder head cover.
  - Remove fixing bolts on ignition coil.



#### Legend

- (1) Ignition Coil Connector
- (2) Bolt
- (3) Ignition Coil Assembly

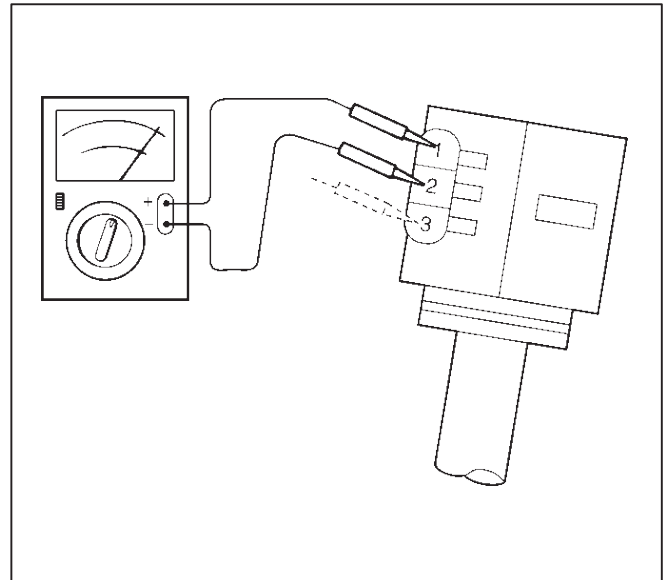
### Inspection and Repair

Check the ignition coil assembly for insulation. Check terminals for corrosion or damage, and replace as necessary.

Measuring resistance of ignition coil assembly.

| Terminal No. | Limit                                                          |
|--------------|----------------------------------------------------------------|
| 1 to 2       | Resistance cannot be 0 ohm (short) or infinity (open circuit). |
| 1 to 3       | Same as above                                                  |
| 2 to 3       | Same as above                                                  |

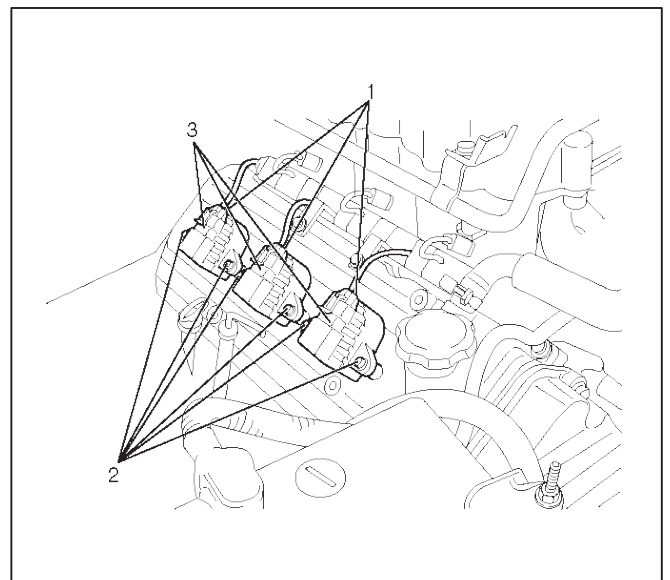
Measure resistance of ignition coil assembly, and replace the ignition coil assembly if its value exceeds the standard.



### Installation

1. Install the ignition coil assembly (3).  
Connect ignition coil connector (1) and ignition coil (3), then tighten bolt (2) to the specified torque.

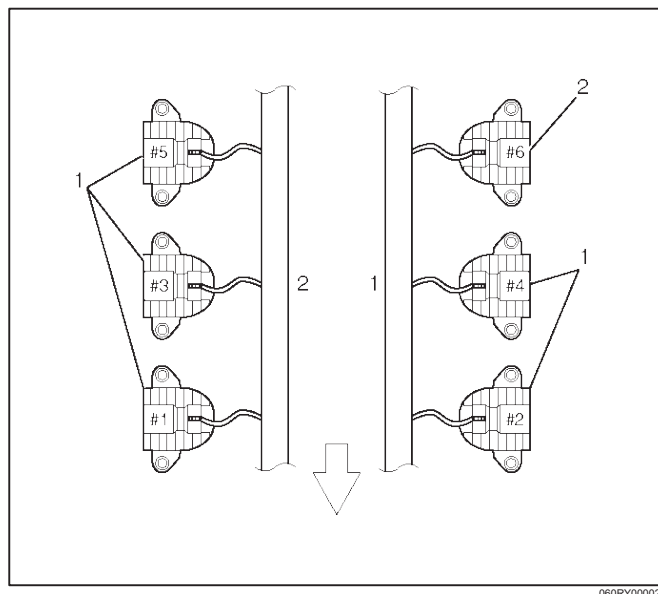
**Torque: 4 N·m (35 lb in)**



## 6D2-4 IGNITION SYSTEM

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**CAUTION:** Ignition coil assembly # 6 is different from ignition coil assembly from # 1 to # 5. Ignition coil assembly # 6 is short type. So, note it when installing ignition coil assembly of # 6.



### Legend

- (1) Long Type Ignition Coil Assemblies (# 1 ~ # 5)
- (2) Short Type Ignition Coil Assembly (# 6)

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2. Connect battery ground cable.

## Spark Plug

### Removal

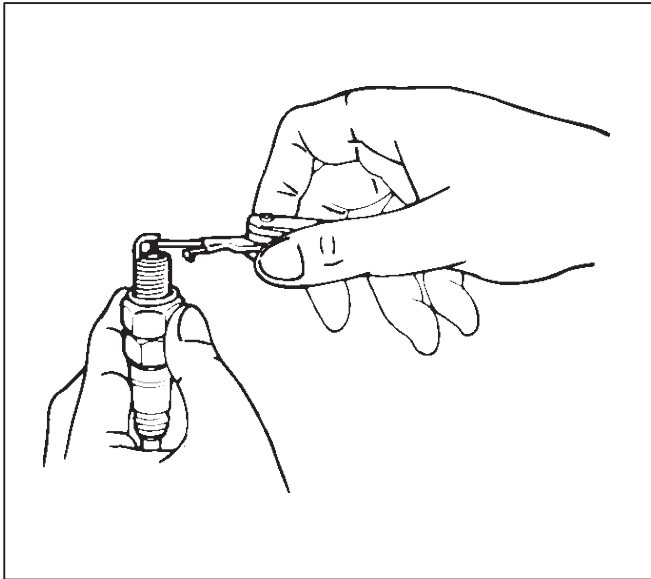
1. Remove spark plugs.

### Inspection and Repair

The spark plug affects entire engine performance and therefore its inspection is very important.

- Check electrode and insulator for presence of cracks, and replace if any.
- Check spark plug gap. Replace spark plugs if measured value is out of standard.

**Spark plug gap : 1.0 – 1.1 mm (0.4 – 0.043 in)**



- Check gasket for damage, and replace if necessary.
- Measure insulation resistance with an ohmmeter, and replace if faulty.
- Check fuel and electrical systems if spark plug is extremely dirty.
- Use spark plugs having low heat value (hot type plug) if fuel and electrical systems are normal.
- Use spark plugs having high heat value (cold type plug) if insulator and electrode are extremely burned.

### Sooty Spark Plugs

Much deposit of carbon or oil on the electrode and insulator of spark plug reduces the engine performance.

#### Possible causes:

- Too rich mixture
- Presence of oil in combustion chamber
- Incorrect spark plug gap

### Burning Electrodes

This fault is characterized by scorched or heavily oxidized electrode or blistered insulator nose.

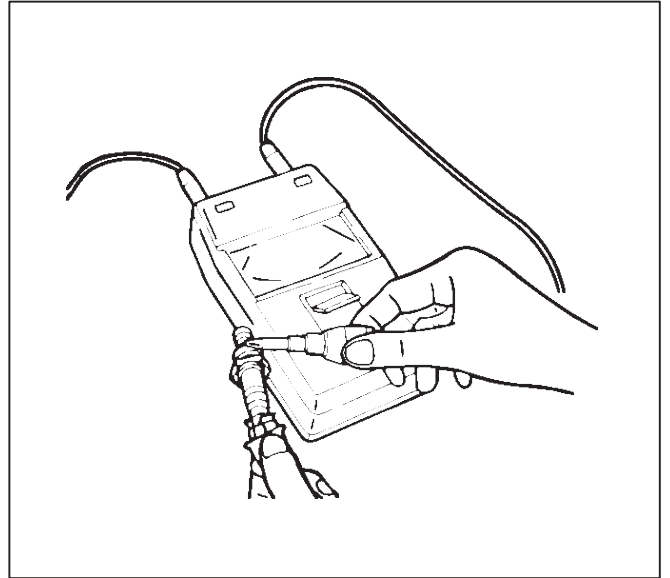
#### Possible causes:

- Too lean mixture
- Improper heat value

### Measuring Insulation Resistance

- Measure insulation resistance using a 500 volt megaohm meter.
- Replace spark plugs if measured value is out of standard.

**Insulation resistance: 50 MΩ or more**



### Cleaning Spark Plugs

- Clean spark plugs with a spark plug cleaner.
- After spark plug is thoroughly cleaned, check insulator for presence of cracks.
- Clean threads and metal body with a wire brush.

### Installation

1. Spark plugs

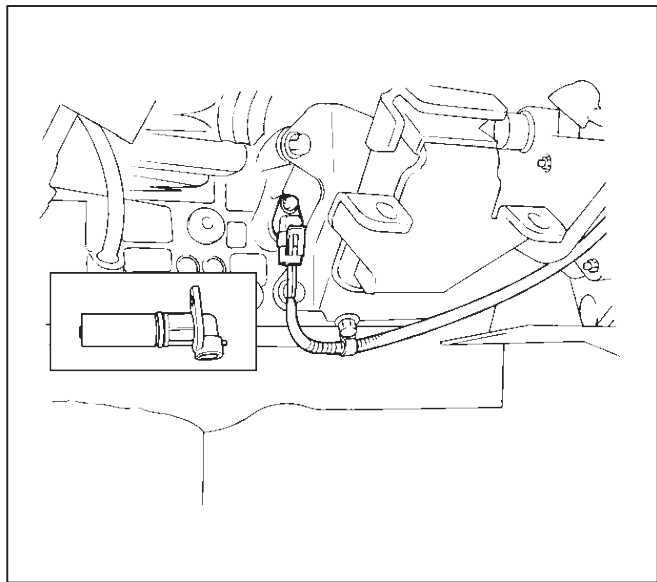
- Tighten spark plugs to the specified torque.

**Torque: 18 N·m (13 lb ft)**

## Crankshaft Position Sensor

### Removal

1. Disconnect battery ground cable
2. Wiring connector from crankshaft position sensor.
3. Remove crankshaft position sensor from cylinder block.



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### Installation

1. Install crankshaft position sensor into the cylinder block.  
Before installation, apply small amount of engine oil to the O-ring.

**Torque: 10 N·m (87 lb in)**

2. Reconnect wiring connector to crankshaft position sensor.

## Main Data and Specifications

### General Specifications

| Ignition System |                                                                        |
|-----------------|------------------------------------------------------------------------|
| Ignition Form   | Electronic Ignition System (EI system) with Crankshaft position Sensor |
| Spark Plug      |                                                                        |
| Type            | K16PR-P11 (DENSO)<br>RC10PYP4 (CHAMPION)<br>PK16PR11 (DENSO)           |
| Plug gap        | 1.0 mm (0.04 in) – 1.1 mm (0.043 in)                                   |
| Torque          | 18 N·m (13 lb ft)                                                      |

### Torque Specifications

