

DTC	P0351/14	IGNITION COIL "A" PRIMARY/SECONDARY CIRCUIT
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DTC	P0352/15	IGNITION COIL "B" PRIMARY/SECONDARY CIRCUIT
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DTC	P0353/14	IGNITION COIL "C" PRIMARY/SECONDARY CIRCUIT
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DTC	P0354/15	IGNITION COIL "D" PRIMARY/SECONDARY CIRCUIT
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CIRCUIT DESCRIPTION

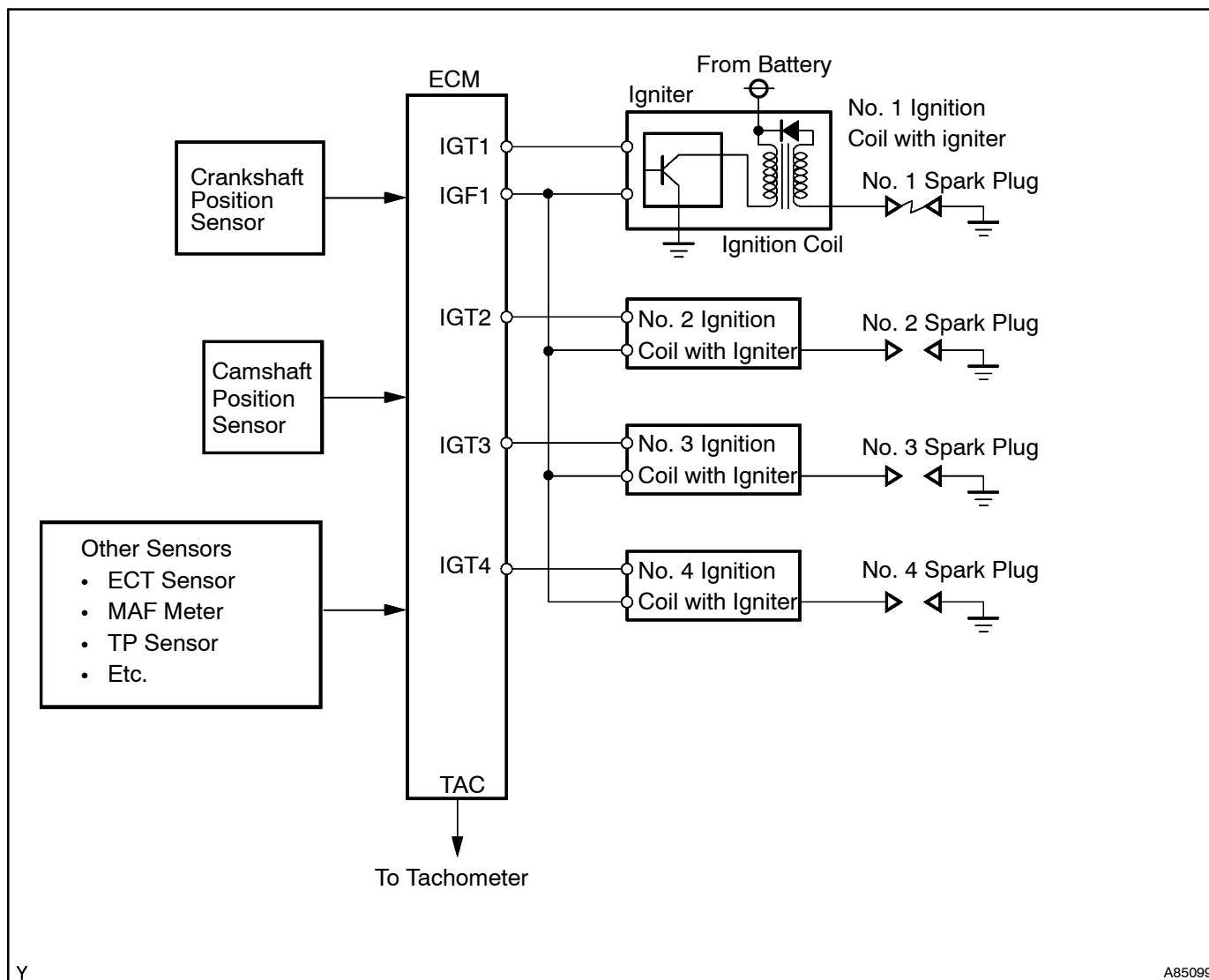
HINT:

- These DTCs indicate malfunctions related to the primary circuit.
- If DTC P0351/14 is displayed, check No.1 ignition coil with igniter circuit.
- If DTC P0352/15 is displayed, check No.2 ignition coil with igniter circuit.
- If DTC P0353/14 is displayed, check No.3 ignition coil with igniter circuit.
- If DTC P0354/15 is displayed, check No.4 ignition coil with igniter circuit.

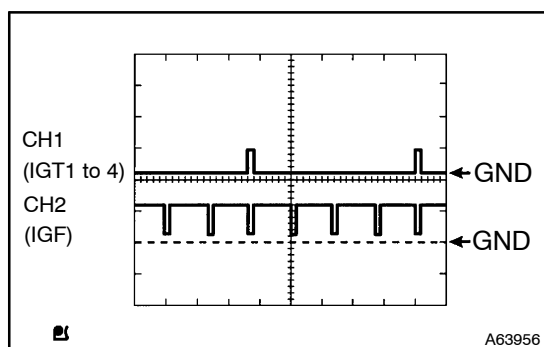
A Direct Ignition System (DIS) is used on this vehicle.

The DIS is a 1-cylinder ignition system which ignites one cylinder with one ignition coil. In the 1-cylinder ignition system, one spark plug is connected to the end of the secondary winding. High-voltage is generated in the secondary winding and is applied directly to the spark plug. The spark of the spark plug passes from the center electrode to the ground electrode.

The ECM determines the ignition timing and transmits the ignition (IGT) signals for each cylinder. Using the IGT signal, the ECM turns ON and OFF the power transistor inside the igniter, which switches ON and OFF a current to the primary coil. When the current to the primary coil is cut off, high-voltage is generated in the secondary coil and this voltage is applied to the spark plugs to create sparks inside the cylinders. As the ECM cuts the current to the primary coil, the igniter sends back the ignition confirmation (IGF) signal to the ECM.



DTC No.	DTC Detection Condition	Trouble Area
P0351/14 P0352/15 P0353/14 P0354/15	No IGF signal to ECM while engine is running	<ul style="list-style-type: none"> • Ignition system • Open or short in IGF or IGT1 to 4 circuit from ignition coil with igniter to ECM • No. 1 to No. 4 ignition coil with igniter • ECM



Reference: Inspection using the oscilloscope.

During cranking or idling, check the waveform between terminals IGT1 to IGT4 and E1, and IGF and E1 of the E11 and E13 ECM connectors.

Item	Contents
Terminal	CH1: IGT1, IGT2, IGT3, IGT4 - E1 CH2: IGF1 - E1
Equipment Setting	2 V/Division, 20 ms/Division
Condition	While the engine is cranking or idling

[illegible]

INSPECTION PROCEDURE

HINT:

Read freeze frame data using the Intelligent Tester II. Freeze frame data record the engine condition when malfunctions are detected. When troubleshooting, freeze frame data can help determine if the vehicle was moving or stationary, if the engine was warmed up or not, if the air-fuel ratio was lean or rich, and other data from the time the malfunction occurred.

1 PERFORM SIMULATION TEST

- (a) Clear the DTCs (see page 05-20).
- (b) Shuffle arrangement of the ignition coil with igniters.

NOTICE:

Do not shuffle the connectors.

- (c) Perform the simulation test.

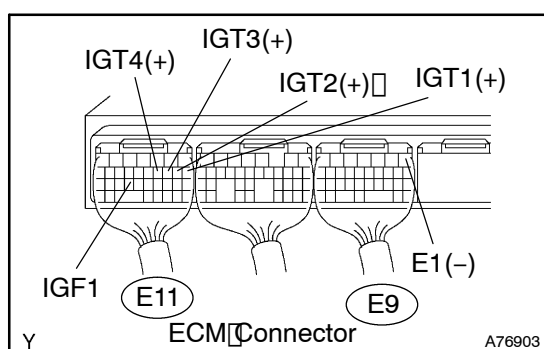
Result:

Display DTC Output	Proceed To
Same DTCs (that have been erased)	A
Other DTCs	B

B REPLACE IGNITION COIL ASSY

A

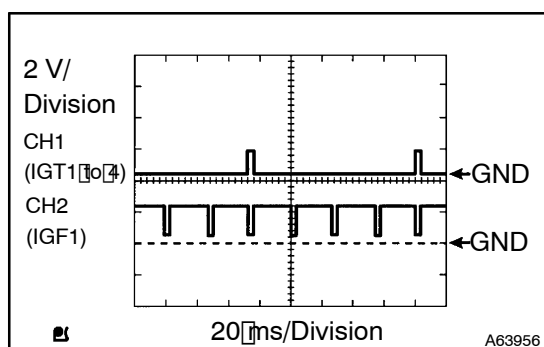
2 INSPECT ECM (IGT1, IGT2, IGT3, IGT4 AND IGF1 SIGNAL)



- (a) Inspect using the oscilloscope.
- (b) During cranking or idling, check the waveform between the specified terminals of the E9 and E11 ECM connectors.

Standard:

Tester Connection	Specified Condition
IGT1 (E11-8) - E1 (E9-1)	Correct waveform is as shown
IGT2 (E11-9) - E1 (E9-1)	Correct waveform is as shown
IGT3 (E11-10) - E1 (E9-1)	Correct waveform is as shown
IGT4 (E11-11) - E1 (E9-1)	Correct waveform is as shown



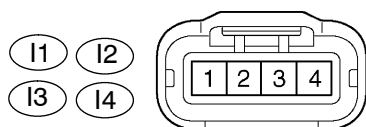
NG REPLACE ECM (See page 10-30)

OK

3 CHECK HARNESS AND CONNECTOR(IGNITION COIL ASSY - ECM)

Wire Harness Side:

Ignition Coil with Igniter Connector



Front View

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A54393

- Disconnect the I1, I2, I3 or I4 ignition coil with igniter connector.
- Disconnect the E11 ECM connector.
- Check the resistance.

Standard (Check for open):

Tester Connection	Specified Condition
Ignition Coil (I1-2) - IGF1 (E11-24)	Below 1 Ω
Ignition Coil (I2-2) - IGF1 (E11-24)	Below 1 Ω
Ignition Coil (I3-2) - IGF1 (E11-24)	Below 1 Ω
Ignition Coil (I4-2) - IGF1 (E11-24)	Below 1 Ω

Standard (Check for open):

Tester Connection	Specified Condition
Ignition Coil (I1-3) - IGT1 (E11-8)	Below 1 Ω
Ignition Coil (I2-3) - IGT2 (E11-9)	Below 1 Ω
Ignition Coil (I3-3) - IGT3 (E11-10)	Below 1 Ω
Ignition Coil (I4-3) - IGT4 (E11-11)	Below 1 Ω

Standard (Check for short):

Tester Connection	Specified Condition
Ignition Coil (I1-2) or IGF1 (E11-24) - Body ground	10 k Ω or higher
Ignition Coil (I2-2) or IGF1 (E11-24) - Body ground	10 k Ω or higher
Ignition Coil (I3-2) or IGF1 (E11-24) - Body ground	10 k Ω or higher
Ignition Coil (I4-2) or IGF1 (E11-24) - Body ground	10 k Ω or higher

Standard (Check for short):

Tester Connection	Specified Condition
Ignition Coil (I1-3) or IGT1 (E11-8) - Body ground	10 k Ω or higher
Ignition Coil (I2-3) or IGT2 (E11-9) - Body ground	10 k Ω or higher
Ignition Coil (I3-3) or IGT3 (E11-10) - Body ground	10 k Ω or higher
Ignition Coil (I4-3) or IGT4 (E11-11) - Body ground	10 k Ω or higher

- Reconnect the ECM connector.
- Reconnect the ignition coil with igniter connector.

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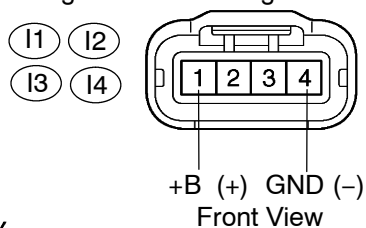
REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

4 INSPECT IGNITION COIL ASSY(POWER SOURCE)

Wire Harness Side:

Ignition Coil with Igniter Connector



(a) Disconnect the I1, I2, I3 or I4 ignition coil with igniter connector.

(b) Check the resistance.

Standard (Check for open):

Tester Connection	Specified Condition
GND (I1-4) - Body ground	Below 1 Ω
GND (I2-4) - Body ground	Below 1 Ω
GND (I3-4) - Body ground	Below 1 Ω
GND (I4-4) - Body ground	Below 1 Ω

(c) Turn the ignition switch to ON.

(d) Measure the voltage between the terminal of the wire harness side connectors.

Standard:

Tester Connection	Specified Condition
+B (I1-1) - GND (I1-4)	9 to 14 V
+B (I2-1) - GND (I2-4)	9 to 14 V
+B (I3-1) - GND (I3-4)	9 to 14 V
+B (I4-1) - GND (I4-4)	9 to 14 V

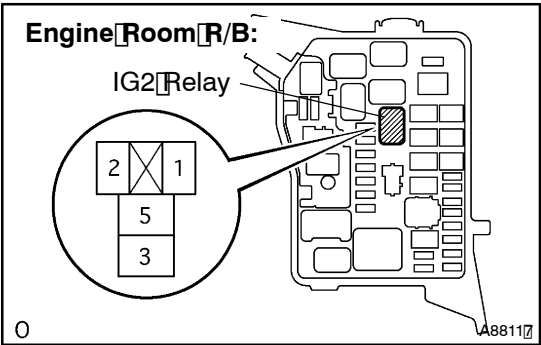
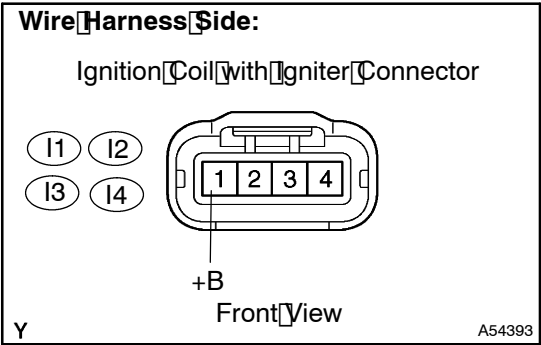
(e) Reconnect the ignition coil with igniter connector.

OK

REPLACE IGNITION COIL ASSY
(See [page 18-7](#))

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5 CHECK HARNESS AND CONNECTOR (IGNITION COIL ASSY - IG2 RELAY)



- (a) Disconnect the 1, 2, 3 or 4 Ignition coil with Igniter connector.
- (b) Remove the IG2 relay from the Engine room R/B.
- (c) Check the resistance.

Standard (Check for open):

Tester Connection	Specified Condition
Ignition coil (1-1) - Engine room R/B (IG2 relay terminal 3)	Below 1 Ω
Ignition coil (2-1) - Engine room R/B (IG2 relay terminal 3)	Below 1 Ω
Ignition coil (3-1) - Engine room R/B (IG2 relay terminal 3)	Below 1 Ω
Ignition coil (4-1) - Engine room R/B (IG2 relay terminal 3)	Below 1 Ω

Standard (Check for short):

Tester Connection	Specified Condition
Ignition coil (1-1) or Engine room R/B (IG2 relay terminal 3) - Body ground	10 k Ω or higher
Ignition coil (2-1) or Engine room R/B (IG2 relay terminal 3) - Body ground	10 k Ω or higher
Ignition coil (3-1) or Engine room R/B (IG2 relay terminal 3) - Body ground	10 k Ω or higher
Ignition coil (4-1) or Engine room R/B (IG2 relay terminal 3) - Body ground	10 k Ω or higher

- (d) Reconnect the Ignition coil with Igniter connector.
- (e) Reinstall the IG2 relay.

NG

REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

REPLACE IGNITION COIL ASSY (See page 18-7)