DTC	P0351/14	IGNITION COIL ”A” PRIMARY/SECONDARY CIRCUIT

DTC	P0352/15	IGNITION COIL ”B” PRIMARY/SECONDARY CIRCUIT

DTC	P0353/14	IGNITION COIL ”C” PRIMARY/SECONDARY CIRCUIT

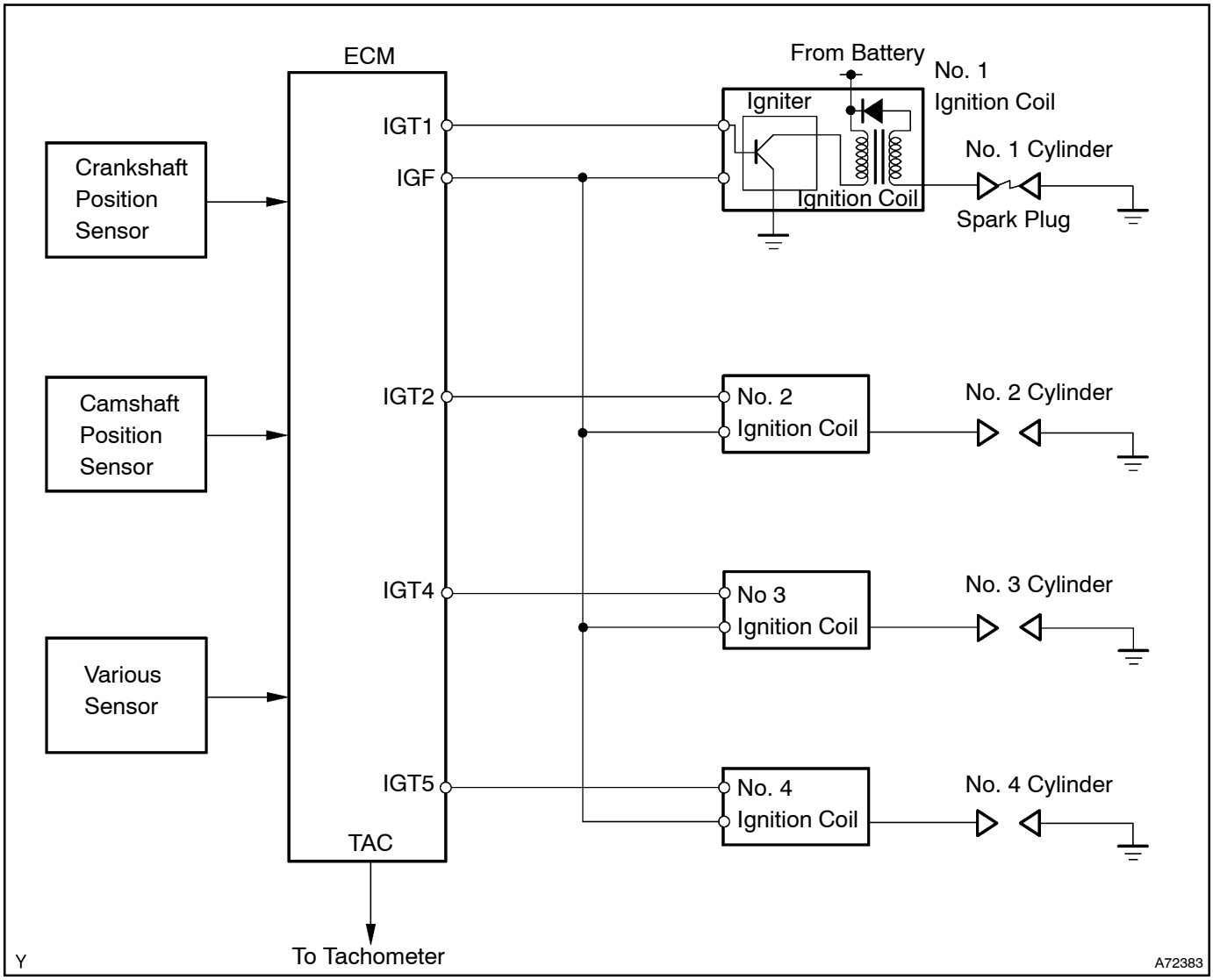
DTC	P0354/15	IGNITION COIL ”D” PRIMARY/SECONDARY CIRCUIT

CIRCUIT DESCRIPTION

HINT:

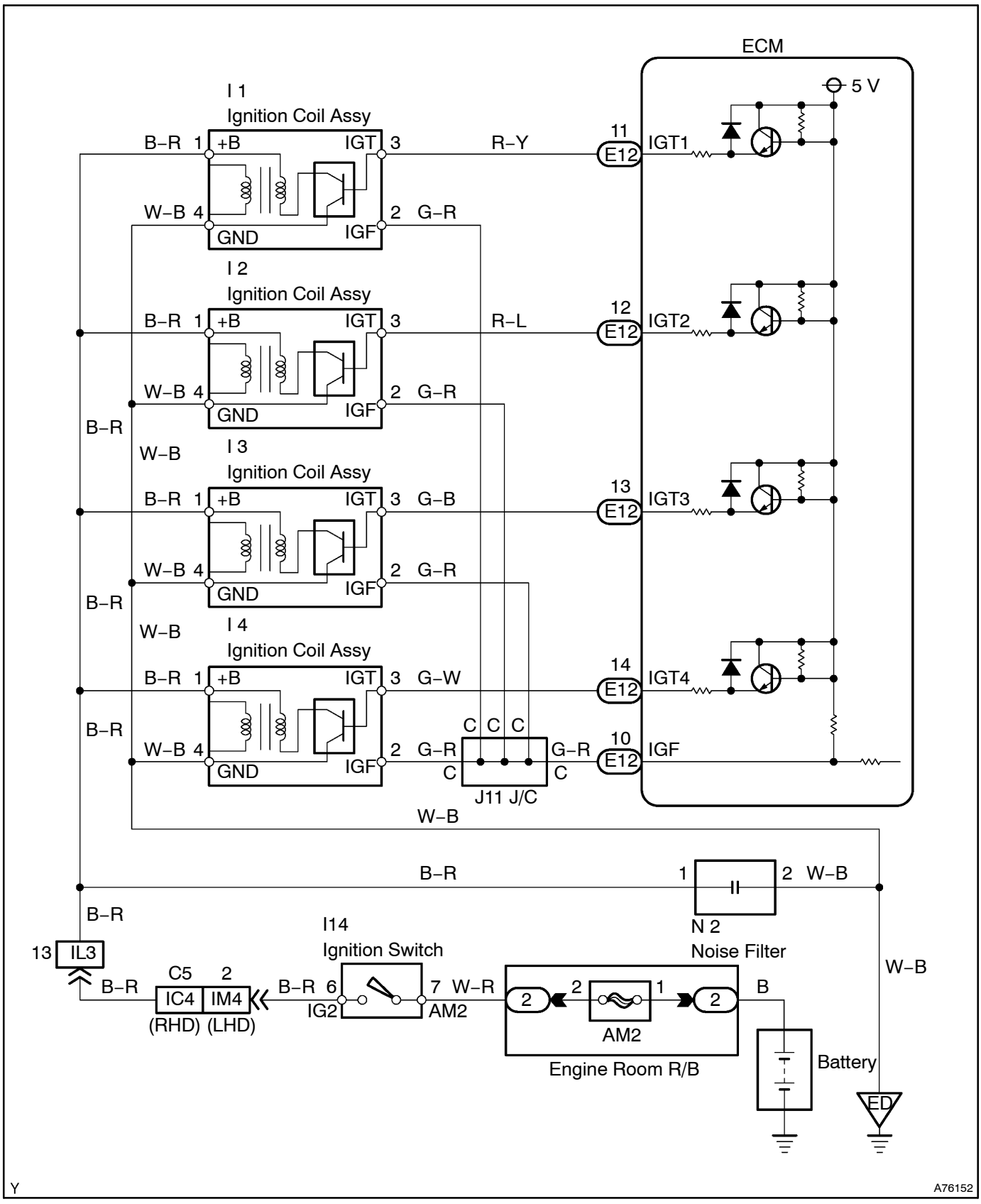
- If DTCs indicate a malfunction related to primary circuit.
- If DTC P0351/14 is displayed, check No.1 ignition coil with igniter circuit.
- If DTC P0352/15 is displayed, check No.2 ignition coil with igniter circuit.
- If DTC P0353/14 is displayed, check No.3 ignition coil with igniter circuit.
- If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

A Direct Ignition System (DIS) has been adopted. The DIS improves the ignition timing accuracy, reduces high–voltage loss, and enhances the overall reliability of the ignition system by eliminating the distributor.
The DIS is a 1–cylinder ignition system which ignites one cylinder with one ignition coil. In the 1–cylinder ignition system, the spark plug is connected to the end of the secondary winding. High voltage generated in the secondary winding 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 outputs the ignition signals (IGT) for each cylinder. Based on the IGT signals, the power transistors in the igniter cut off the current to the primary coil in the ignition coil is supplied to the spark plug that is connected to the end of the secondary coil. At the same time, the igniter also sends an ignition confirmation signal (IGF) as a fail–safe measure to the ECM.



DTC No.	DTC Detecting Condition	Trouble Area
P0351/14 P0352/15 P0353/14 P0354/14	No IGF signal to ECM while engine is running	• Ignition system • Open or short in IGF and IGT1 – 4 circuit from ignition coil • Ignition coil No. 1 • ECM

WIRING DIAGRAM



INSPECTION PROCEDURE

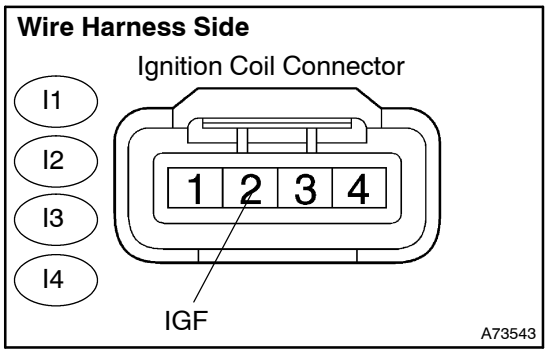
HINT:

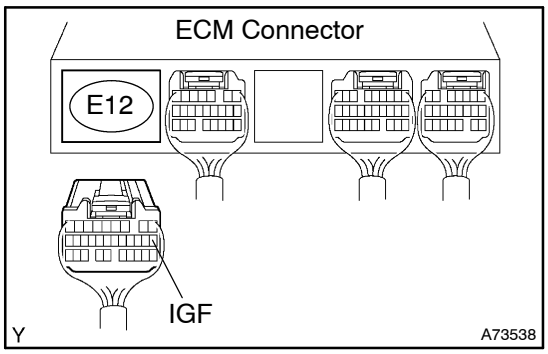
1	CHECK SPARK PLUG AND SPARK OF MISFIRING CYLINDER (See page 18–1)

NG → Go to step 4

OK

2	CHECK HARNESS AND CONNECTOR (IGNITION COIL NO. 1 ⇔ ECM (IGF SIGNAL TERMINAL))





(a) Disconnect the I1, I2, I3 or I4 ignition coil connector.
(b) Disconnect the E12 ECM connector.
(c) Check the continuity between the wire harness side connectors.

Standard (Check for open):

Symbols (Terminal No.)	Specified condition
IGF (I1, I2, I3 and I4–2) ⇔ IGF (E12–10)	Continuity

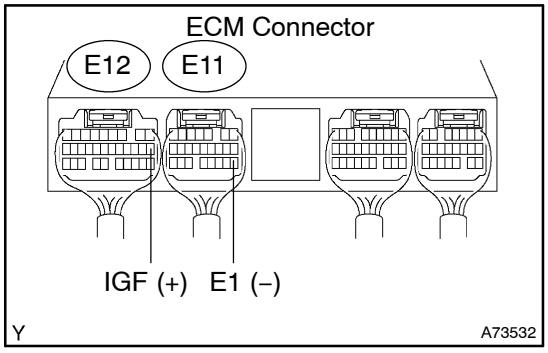
Standard (Check for short):

Symbols (Terminal No.)	Specified condition
IGF (I1, I2, I3 and I4–2) or IGF (E12–10) ⇔ Other terminals and body ground	No continuity

NG → REPAIR OR REPLACE HARNESS AND CONNECTOR

OK

3	CHECK ECM (IGF VOLTAGE)



(a) Disconnect the I1, I2 I3 or I4 ignition coil connector.
(b) Turn the ignition switch ON.
(c) Measure the voltage between the terminals of the E11 and E12 ECM connectors.

Voltage:

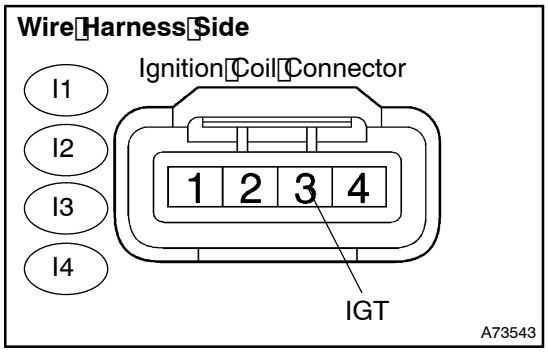
Symbols (Terminal No.)	Specified condition
IGF (E12–10) ⇔ E1 (E11–17)	4.5 – 5.5 V

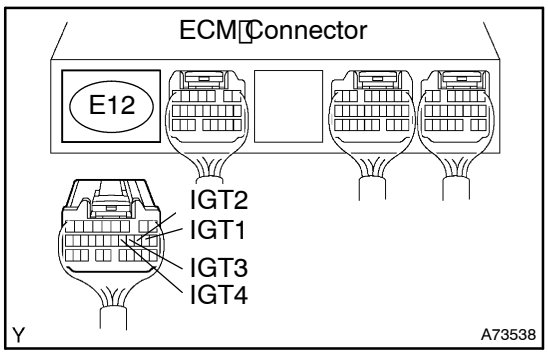
OK → REPLACE IGNITION COIL NO.1

NG

CHECK AND REPLACE ECM (See page 01–36)

4	CHECK HARNESS AND CONNECTOR (IGNITION COIL NO. 1 ⇔ ECM (IGT SIGNAL TERMINAL))





(a) Disconnect the I1, I2, I3 or I4 ignition coil connector.
(b) Disconnect the E12 ECM connector.
(c) Check the continuity between the wire harness side connectors.

Standard (Check for open):

Symbols (Terminal No.)	Specified condition
IGT (I1–3) ⇔ IGT1 (E12–11)	Continuity
IGT (I2–3) ⇔ IGT2 (E12–12)	
IGT (I3–3) ⇔ IGT3 (E12–13)	
IGT (I4–3) ⇔ IGT4 (E12–14)	

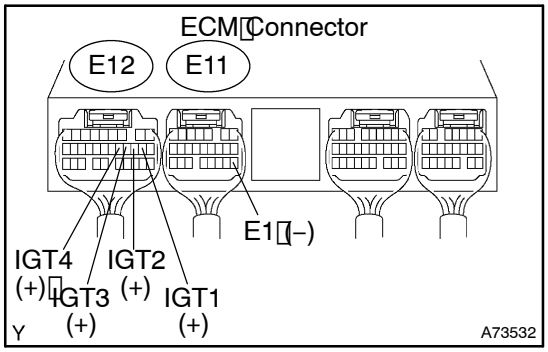
Standard (Check for short):

Symbols (Terminal No.)	Specified condition
IGT (I1–3) or IGT1 (E12–11) ⇔ Other terminals and body ground	No continuity
IGT (I2–3) or IGT2 (E12–12) ⇔ Other terminals and body ground	
IGT (I3–3) or IGT3 (E12–13) ⇔ Other terminals and body ground	
IGT (I4–3) or IGT4 (E12–14) ⇔ Other terminals and body ground	

NG → REPAIR OR REPLACE HARNESS AND CONNECTOR

OK

5 CHECK ECM (IGT1, IGT2, IGT3 AND IGT4 VOLTAGE)



(a) Turn the ignition switch ON.

(b) Measure the voltage between the terminals of the E11 and E12 ECM connectors when the engine is cranked.

Voltage:

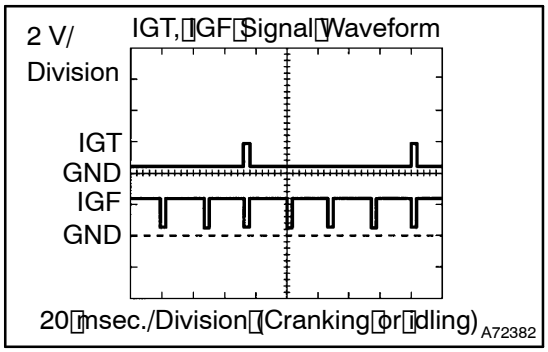
Symbols (Terminal No.)	Specified condition
IGT1 (E12–11) ⇔ E1 (E11–17)	More than 0.1 V and less than 4.5 V
IGT2 (E12–12) ⇔ E1 (E11–17)	
IGT3 (E12–13) ⇔ E1 (E11–17)	
IGT4 (E12–14) ⇔ E1 (E11–17)	

(c) Reference (using an oscilloscope).

(1) During cranking or idling, check the waveform between the terminals of the E11 and E12 ECM connectors.

Standard:

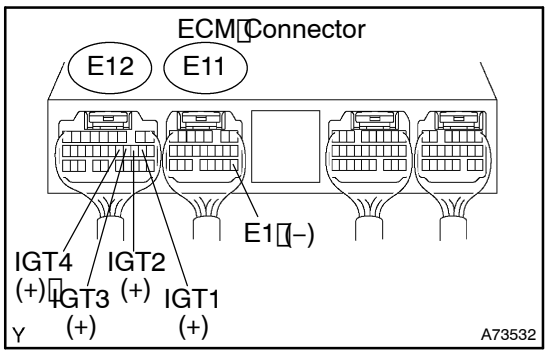
Symbols (Terminal No.)	Specified condition
IGT1 (E12–11) ⇔ E1 (E11–17)	Correct waveform is as shown
IGT2 (E12–12) ⇔ E1 (E11–17)	
IGT3 (E12–13) ⇔ E1 (E11–17)	
IGT4 (E12–14) ⇔ E1 (E11–17)	



NG → **CHECK AND REPLACE ECM (See page 01–36)**

OK

6 CHECK ECM (IGT1, IGT2, IGT3 and IGT4 VOLTAGE)



(a) Disconnect the #1, #2, #3 or #4 ignition coil connector.

(b) Turn the ignition switch ON.

(c) Measure the voltage between terminals of the E11 and E12 ECM connectors when the engine is cranked.

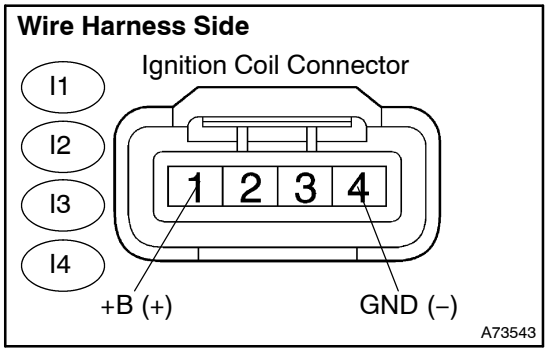
Voltage:

Symbols (Terminal No.)	Specified condition
IGT1 (E12–11) ⇔ E1 (E11–17)	More than 0.1 V and less than 4.5 V
IGT2 (E12–12) ⇔ E1 (E11–17)	
IGT3 (E12–13) ⇔ E1 (E11–17)	
IGT4 (E12–14) ⇔ E1 (E11–17)	

NG → **CHECK AND REPLACE ECM (See page 01–36)**

OK

7 CHECK IGNITION COIL NO.1 (POWER SOURCE)



(a) Disconnect the I1, I2, I3 or I4 ignition coil connector.
(b) Measure the voltage between the terminal of the wire harness side connector.

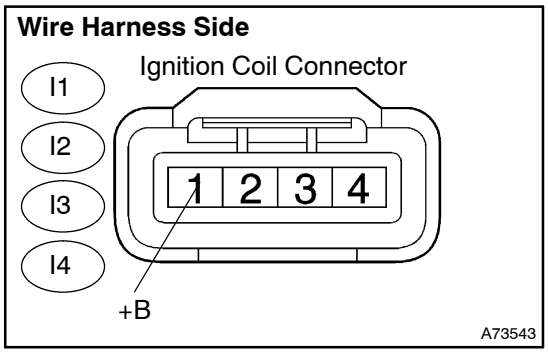
Standard:

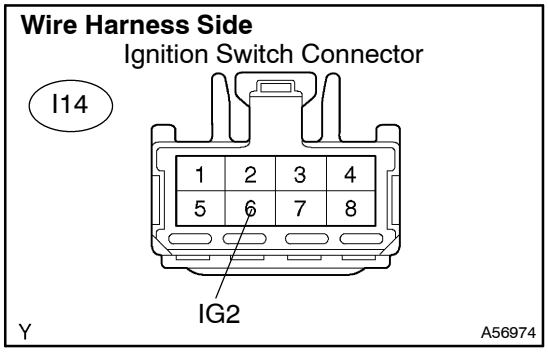
Symbols (Terminal No.)	Specified condition
+B (I1, I2, I3 and I4–1) ⇔ GND (I1, I2, I3 and I4–4)	9 – 14 V

OK ⇒ **REPLACE IGNITION COIL NO.1**

NG

8 CHECK HARNESS AND CONNECTOR (IGNITION COIL NO. 1 ⇔ IGNITION SWITCH ASSY)





(a) Disconnect the I1, I2 I3 or I4 ignition coil connector.
(b) Disconnect the I14 ignition switch connector.
(c) Check the continuity between the wire harness side connectors.

Standard (Check for open):

Symbols (Terminal No.)	Specified condition
IGT (I1, I2, I3 and I4–1) ⇔ IG2 (I14–6)	Continuity

Standard (Check for short):

Symbols (Terminal No.)	Specified condition
IGT (I1, I2, I3 and I4–1) or IG2 (I14–6) ⇔ Other terminals and body ground	No continuity

NG ⇒ **REPAIR OR REPLACE HARNESS AND CONNECTOR**

OK

REPLACE IGNITION COIL NO.1