DTC	P0351	IGNITION COIL ”A” PRIMARY CIRCUIT

DTC	P0352	IGNITION COIL ”B” PRIMARY CIRCUIT

DTC	P0353	IGNITION COIL ”C” PRIMARY CIRCUIT

DTC	P0354	IGNITION COIL ”D” PRIMARY CIRCUIT

DTC	P0355	IGNITION COIL ”E” PRIMARY CIRCUIT

DTC	P0356	IGNITION COIL ”F” PRIMARY CIRCUIT

DTC	P0357	IGNITION COIL ”G” PRIMARY CIRCUIT

DTC	P0358	IGNITION COIL ”H” PRIMARY CIRCUIT

HINT:

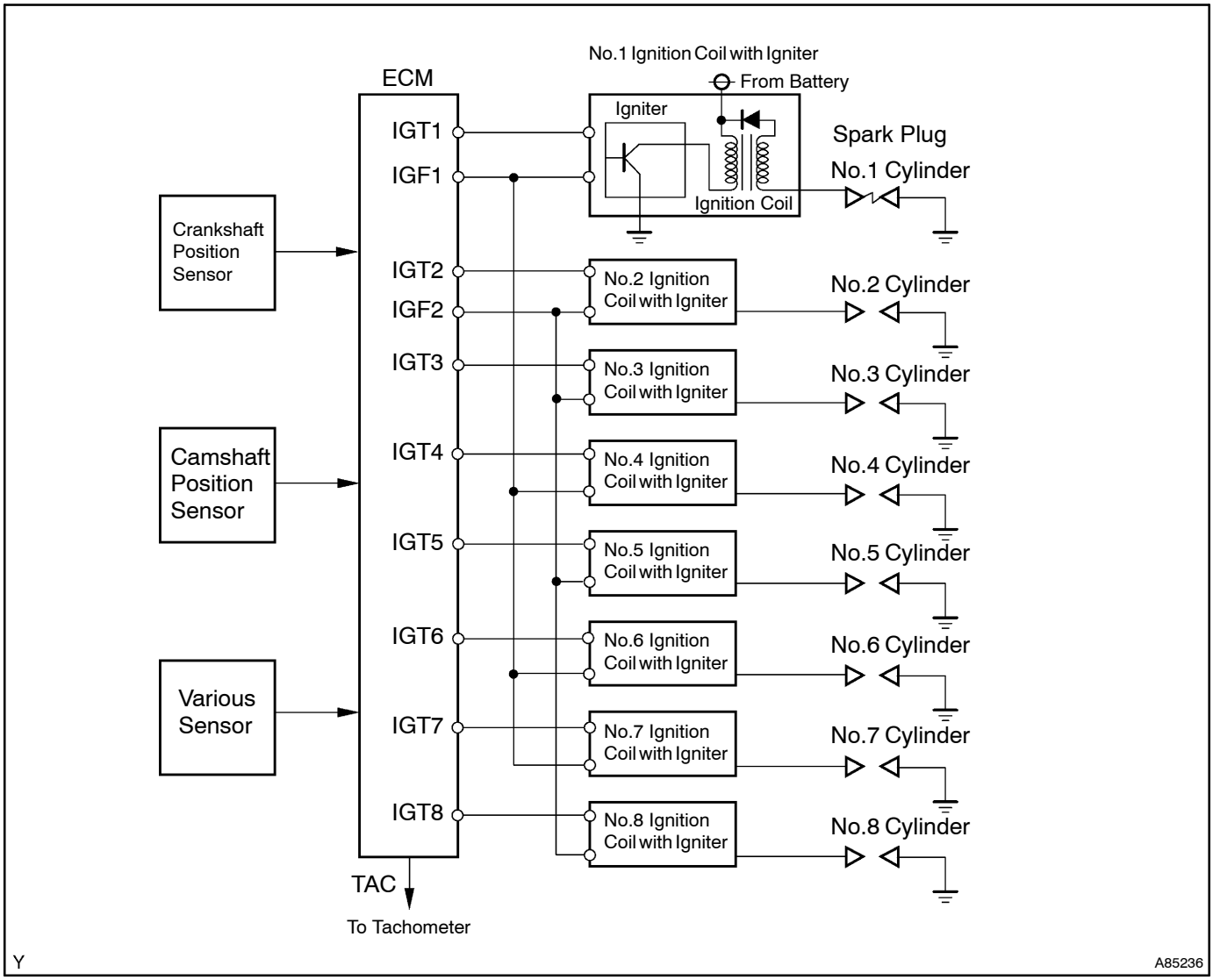
- These DTCs indicate a malfunction related to primary circuit.
- If DTC P0351 is displayed, check No. 1 ignition coil with igniter circuit.
- If DTC P0352 is displayed, check No. 2 ignition coil with igniter circuit.
- If DTC P0353 is displayed, check No. 3 ignition coil with igniter circuit.
- If DTC P0354 is displayed, check No. 4 ignition coil with igniter circuit.
- If DTC P0355 is displayed, check No. 5 ignition coil with igniter circuit.
- If DTC P0356 is displayed, check No. 6 ignition coil with igniter circuit.
- If DTC P0357 is displayed, check No. 7 ignition coil with igniter circuit.
- If DTC P0358 is displayed, check No. 8 ignition coil with igniter circuit.

CIRCUIT DESCRIPTION

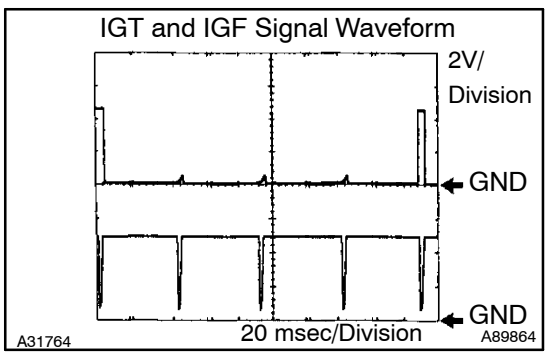
A Direct Ignition System (DIS) is used on this vehicle.

The DIS is a 1–cylinder ignition system which ignites one cylinder with one ignition coil. In the 1–cylinder ignition system, the one 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 (IGTs) for each cylinder. Using the IGTs, the ECM turns the power transistor inside the igniter on/off, which switches current to the primary coil. When 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 current to the primary coil, the igniter sends back ignition confirmation signals (IGFs) for each cylinder ignition to the ECM.

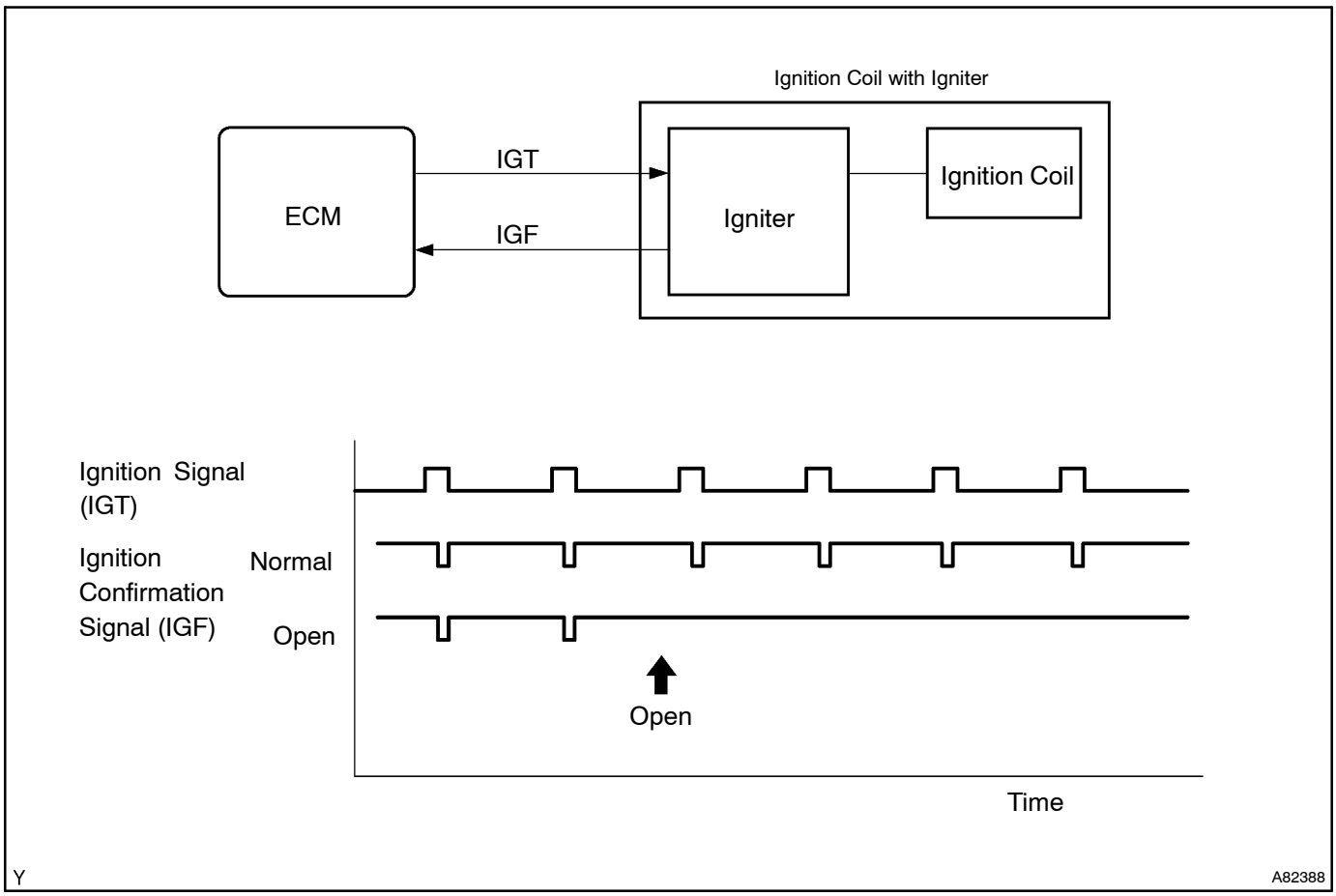


DTC No.	DTC Detection Condition	Trouble Area
P0351 P0352 P0353 P0354 P0355 P0356 P0357 P0358	No IGF signal to ECM while engine is running (1 trip detection logic)	• Ignition system • Open or short in IGF or IGT circuit (ignition coil – ECM) • Ignition coil with igniter (primary coil) • ECM



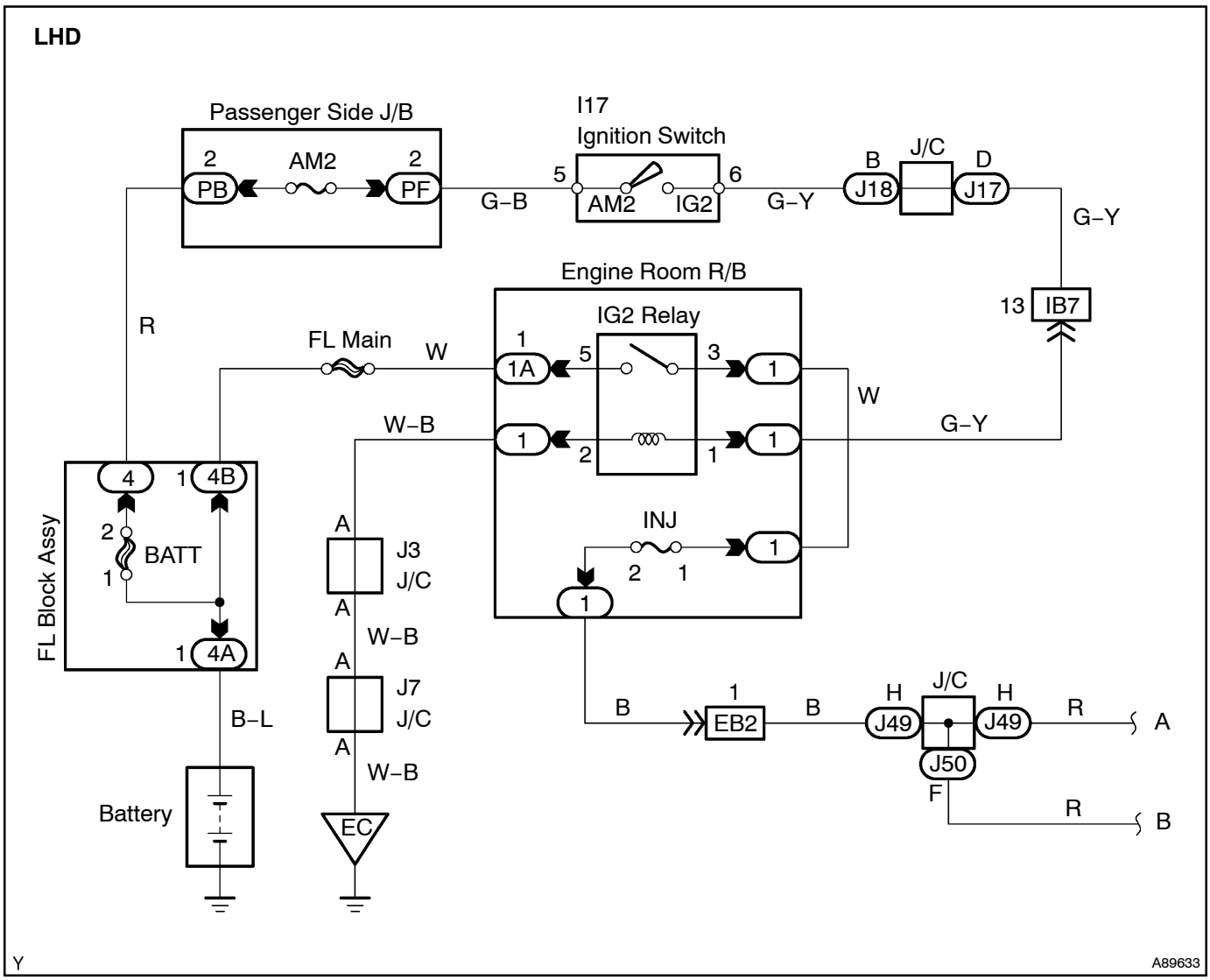
Reference: Inspection using an oscilloscope.
During cranking or idling, check the waveform between terminals IGT1 to IGT8 and E1, and IGF1 to IGF2 and E1 of the E5, E6 and E7 ECM connectors.

MONITOR DESCRIPTION

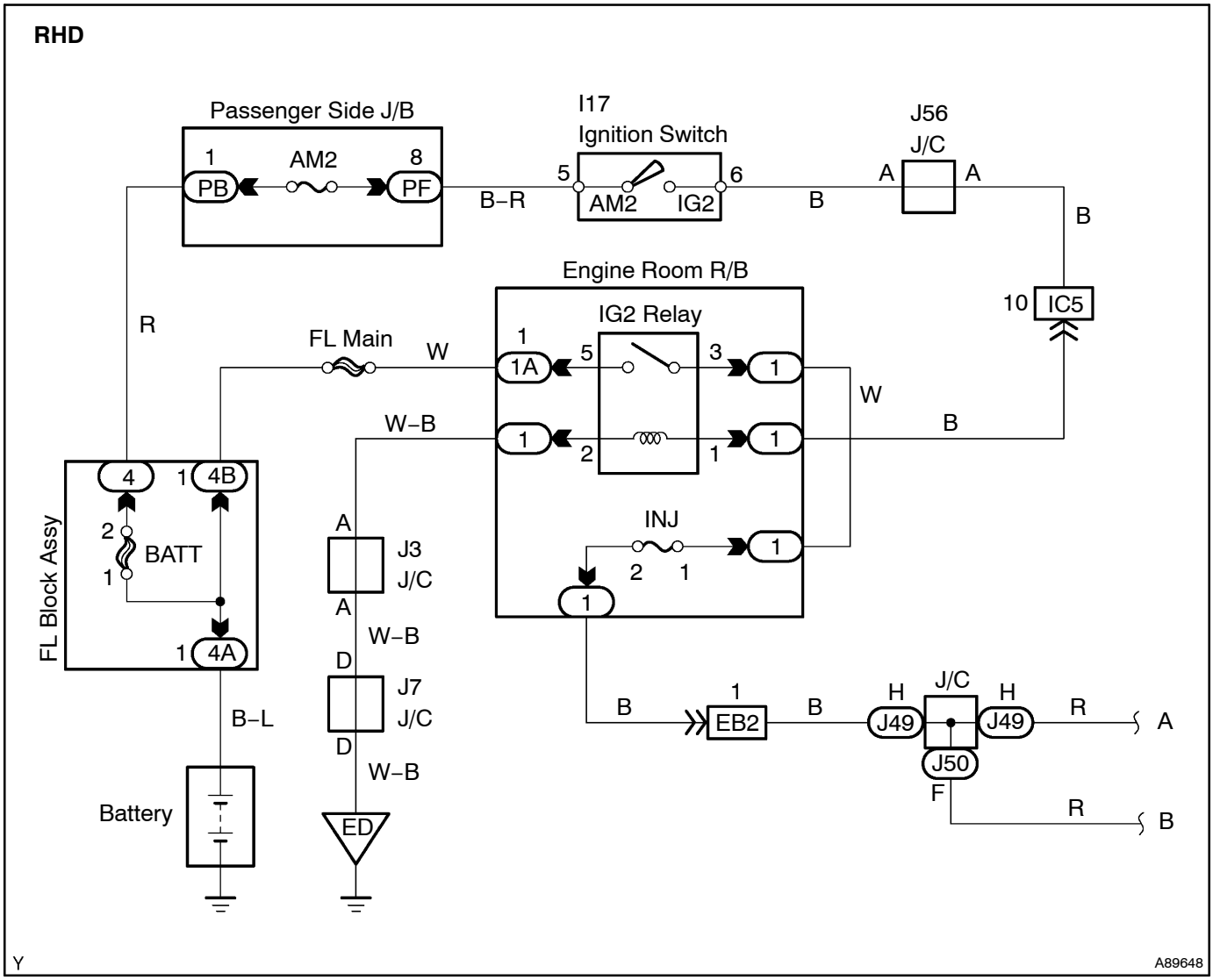


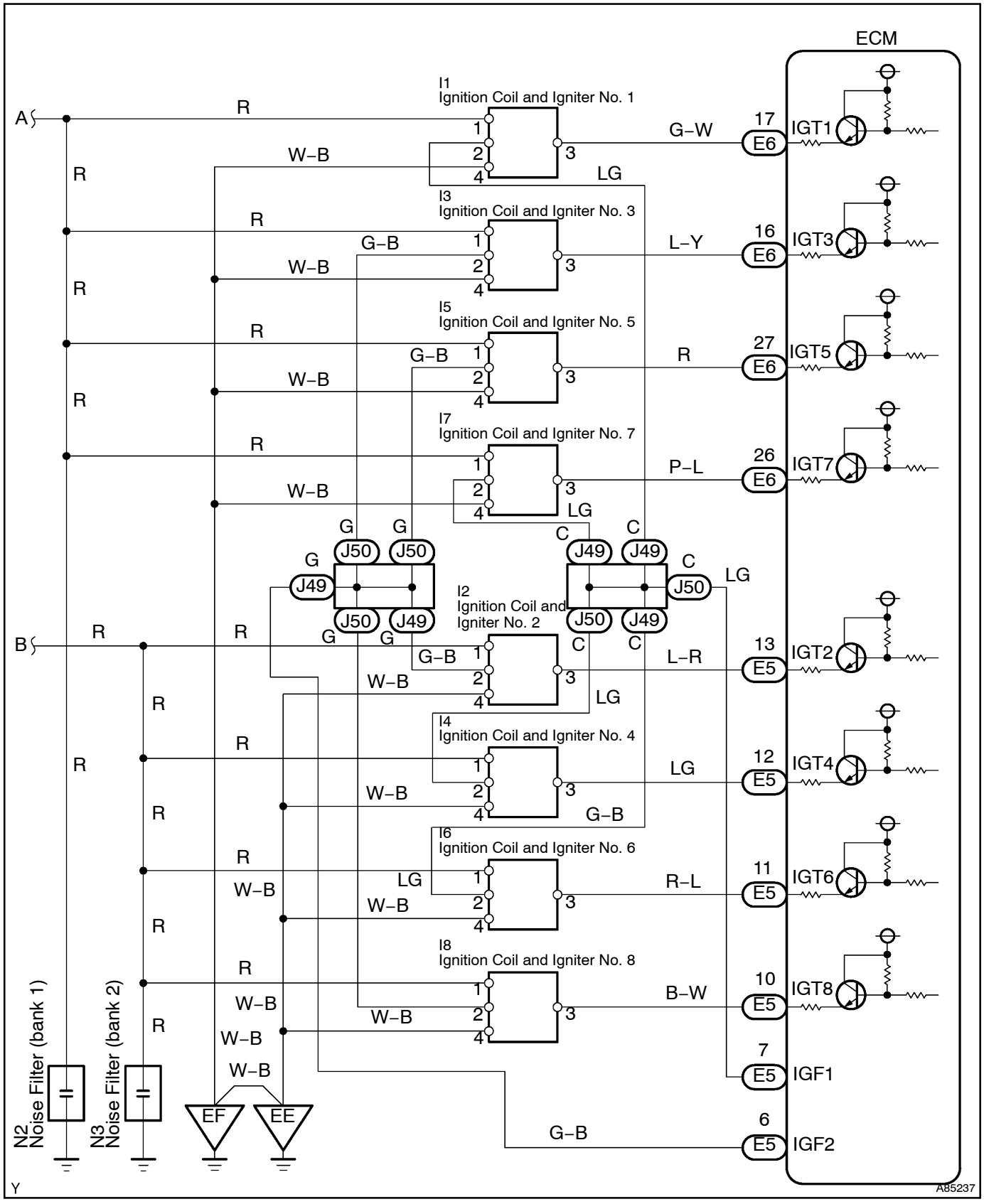
If the ECM does not receive an IGF after sending an IGT, it interprets this as a fault in the igniter and sets a DTC.
The monitor runs for 1 second (the first second of engine idle) after the engine is started.

WIRING DIAGRAM



RHD


Passenger Side J/B
1
AM2
8
PB
PF
B–R
I17
Ignition Switch
5
6
AM2
IG2
B
J56
J/C
A
A
B
10
IC5
Engine Room R/B
IG2 Relay
R
FL Main
W
1
1A
5
3
1
W
W–B
1
2
1
1
B
4
1
4B
2
BATT
1
4A
FL Block Assy
A
J3
J/C
A
INJ
1
2
1
1
W–B
D
J7
J/C
D
W–B
B–L
B
1
EB2
B
H
J/C
H
J49
J49
R
A
J50
F
R
B
Battery
ED
Y
A89648

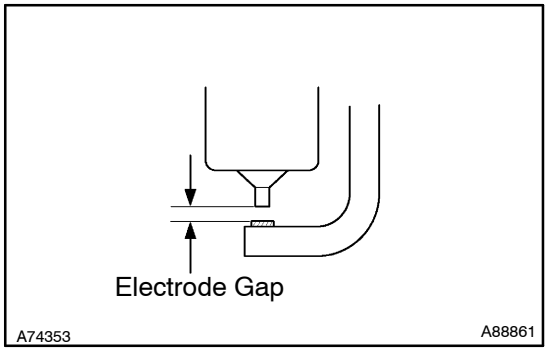

ECM
I1
Ignition Coil and Igniter No. 1
I3
Ignition Coil and Igniter No. 3
I5
Ignition Coil and Igniter No. 5
I7
Ignition Coil and Igniter No. 7
I2
Ignition Coil and Igniter No. 2
I4
Ignition Coil and Igniter No. 4
I6
Ignition Coil and Igniter No. 6
I8
Ignition Coil and Igniter No. 8
A
B
R
W–B
G–B
LG
G
C
G–W
L–Y
R
P–L
L–R
R–L
B–W
J50
J49
17
16
27
26
13
12
11
10
7
6
E6
E5
IGT1
IGT3
IGT5
IGT7
IGT2
IGT4
IGT6
IGT8
IGF1
IGF2
N2
Noise Filter (bank 1)
N3
Noise Filter (bank 2)
EF
EE
Y
A85237

INSPECTION PROCEDURE

HINT:

Read freeze frame data using the Intelligent Tester II. Freeze frame data records the engine conditions when a malfunction is detected. When troubleshooting, freeze frame data can help determine if the vehicle was running or stopped, 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	CHECK SPARK PLUG



(a) Remove the engine cover.
(b) Remove the ignition coil and the spark plug of the misfire cylinder.
(c) Measure the spark plug's electrode gap.
Standard:
Electrode gap: 1.0 to 1.3 mm (0.039 to 0.051 in.)
(d) Check the electrode for carbon deposits.
Recommended spark plug:

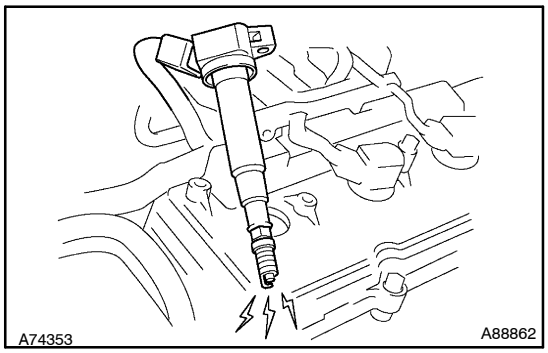
DENSO	SK20R11
NGK	IFR6A11

NOTICE:
If the electrode gap is larger than the standard, replace the spark plug. Do not adjust the electrode gap.

NG → **REPLACE SPARK PLUG**

OK

2	CHECK SPARK AND IGNITION

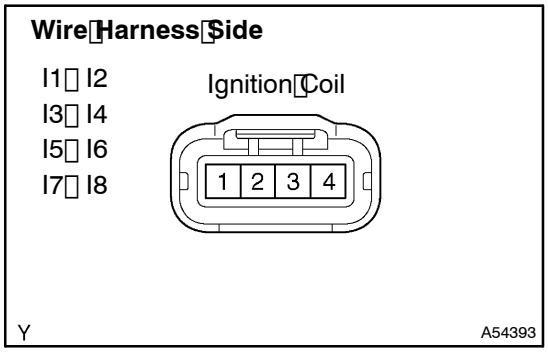


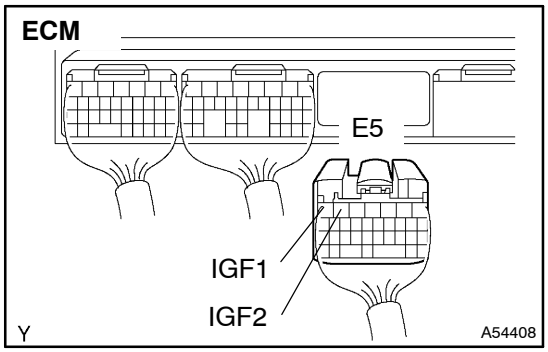
(a) Disconnect the injector connectors to prevent the engine starting.
(b) Install the spark plug to the ignition coil.
(c) Attach the spark plug to the cylinder head cover.
(d) Crank the engine within 2 seconds and check the spark.
OK: Spark occurs

NG → **Go to step 5**

OK

3 CHECK WIRE HARNESS (IGNITION COIL – ECM)





(a) Disconnect the I1, I2, I3, I4, I5, I6, I7 or I8 ignition coil connector.
(b) Disconnect the E5 ECM connector.
(c) Measure the resistance of the wire harness side connectors.

Standard:

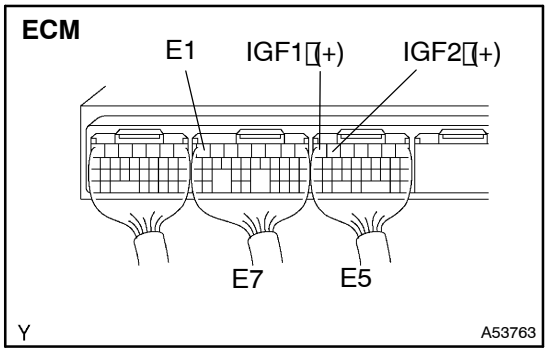
Tester Connection	Specified Condition
I1–2 – E5–7 (IGF1)	Below 1 Ω
I2–2 – E5–6 (IGF2)	Below 1 Ω
I3–2 – E5–6 (IGF2)	Below 1 Ω
I4–2 – E5–7 (IGF1)	Below 1 Ω
I5–2 – E5–6 (IGF2)	Below 1 Ω
I6–2 – E5–7 (IGF1)	Below 1 Ω
I7–2 – E5–7 (IGF1)	Below 1 Ω
I8–2 – E5–6 (IGF2)	Below 1 Ω
I1–2 or E5–7 (IGF1) – Body ground	10 kΩ or higher
I2–2 or E5–6 (IGF2) – Body ground	10 kΩ or higher
I3–2 or E5–6 (IGF2) – Body ground	10 kΩ or higher
I4–2 or E5–7 (IGF1) – Body ground	10 kΩ or higher
I5–2 or E5–6 (IGF2) – Body ground	10 kΩ or higher
I6–2 or E5–7 (IGF1) – Body ground	10 kΩ or higher
I7–2 or E5–7 (IGF1) – Body ground	10 kΩ or higher
I8–2 or E5–6 (IGF2) – Body ground	10 kΩ or higher

(d) Reconnect the ECM connector.
(e) Reconnect the ignition coil connector.

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

OK

4 INSPECT ECM (IGF1 AND IGF2 VOLTAGE)



(a) Disconnect the I1, I2, I3, I4, I5, I6, I7 or I8 ignition coil connector.
(b) Turn the ignition switch ON.
(c) Measure the voltage of the ECM connectors.

Standard:

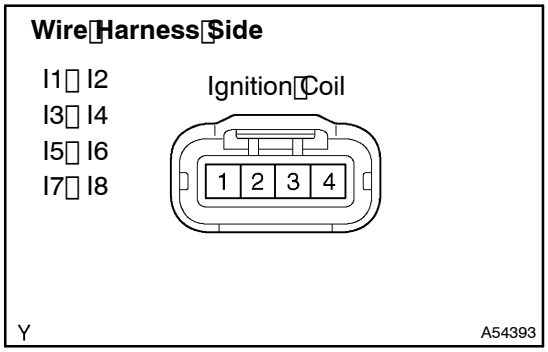
Tester Connection	Specified Condition
E5–7 (IGF1) – E7–7 (E1)	4.5 to 5.5 V
E5–6 (IGF2) – E7–7 (E1)	4.5 to 5.5 V

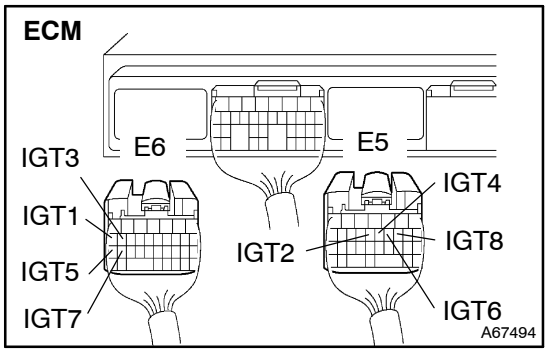
NG → **REPLACE ECM (See page 10–21)**

OK

REPLACE IGNITION COIL ASSY (See page 18–10)

5 CHECK WIRE HARNESS (IGNITION COIL – ECM (IGT SIGNAL TERMINAL))





(a) Disconnect the I1, I2, I3, I4, I5, I6, I7 or I8 ignition coil connector.
(b) Disconnect the E5 or E6 ECM connector.
(c) Measure the resistance of the wire harness side connectors.

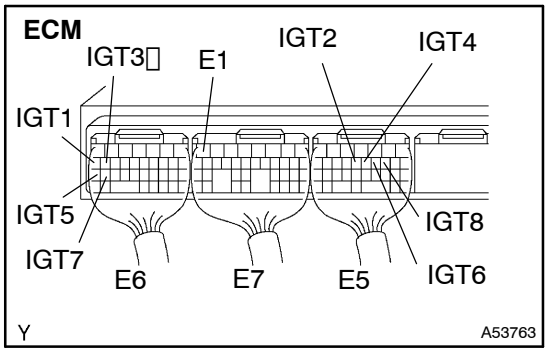
Standard:

Tester Connection	Specified Condition
I1–3 – E6–17 (IGT1)	Below 1 Ω
I2–3 – E5–13 (IGT2)	Below 1 Ω
I3–3 – E6–16 (IGT3)	Below 1 Ω
I4–3 – E5–12 (IGT4)	Below 1 Ω
I5–3 – E6–27 (IGT5)	Below 1 Ω
I6–3 – E5–11 (IGT6)	Below 1 Ω
I7–3 – E6–26 (IGT7)	Below 1 Ω
I8–3 – E5–10 (IGT8)	Below 1 Ω
I1–3 or E6–17 (IGT1) – Body ground	10 kΩ or higher
I2–3 or E5–13 (IGT2) – Body ground	10 kΩ or higher
I3–3 or E6–16 (IGT3) – Body ground	10 kΩ or higher
I4–3 or E5–12 (IGT4) – Body ground	10 kΩ or higher
I5–3 or E6–27 (IGT5) – Body ground	10 kΩ or higher
I6–3 or E5–11 (IGT6) – Body ground	10 kΩ or higher
I7–3 or E6–26 (IGT7) – Body ground	10 kΩ or higher
I8–3 or E5–10 (IGT8) – Body ground	10 kΩ or higher

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

OK

6 INSPECT ECM (IGT1, IGT2, IGT3, IGT4, IGT5, IGT6, IGT7 AND IGT8 VOLTAGE)



(a) Measure the voltage of the ECM connectors when the engine is cranked.

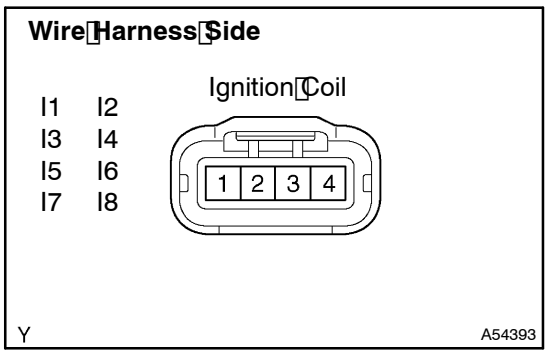
Standard:

Tester Connection	Specified Condition
E6–17 (IGT1) – E7–7 (E1)	0.1 to 4.5 V
E5–13 (IGT2) – E7–7 (E1)	0.1 to 4.5 V
E6–16 (IGT3) – E7–7 (E1)	0.1 to 4.5 V
E5–12 (IGT4) – E7–7 (E1)	0.1 to 4.5 V
E6–27 (IGT5) – E7–7 (E1)	0.1 to 4.5 V
E5–11 (IGT6) – E7–7 (E1)	0.1 to 4.5 V
E6–26 (IGT7) – E7–7 (E1)	0.1 to 4.5 V
E5–10 (IGT8) – E7–7 (E1)	0.1 to 4.5 V

NG → **REPLACE ECM (See page 10–21)**

OK

7	INSPECT IGNITION COIL ASSY (POWER SOURCE)



(a) Disconnect the I1, I2, I3, I4, I5, I6, I7 or I8 ignition coil connector.

(b) Turn the ignition switch ON and to the START position.

(c) Measure the voltage of the wire harness side connector.

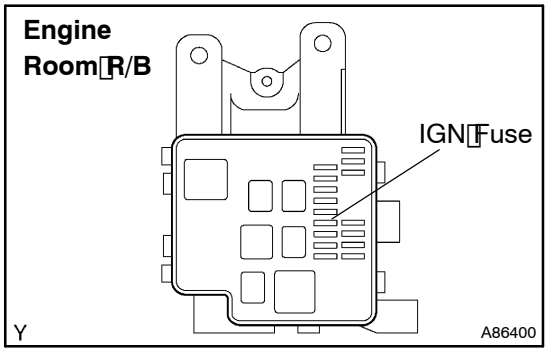
Standard:

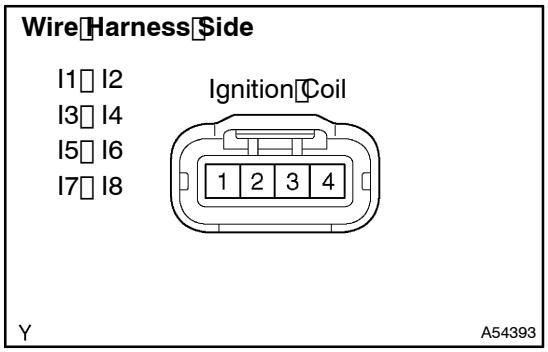
Tester Connection	Specified Condition
I1–1 – Body ground	9 to 14 V
I2–1 – Body ground	9 to 14 V
I3–1 – Body ground	9 to 14 V
I4–1 – Body ground	9 to 14 V
I5–1 – Body ground	9 to 14 V
I6–1 – Body ground	9 to 14 V
I7–1 – Body ground	9 to 14 V
I8–1 – Body ground	9 to 14 V

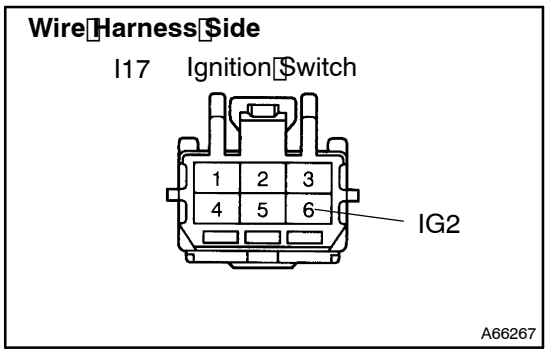
OK → **REPLACE IGNITION COIL ASSY (See page 18–10)**

NG

8 CHECK WIRE HARNESS (IGNITION COIL – IGNITION SWITCH)







(a) Inspect the IGN fuse.
  (1) Remove the IGN fuse from the engine room Relay Block (R/B).
  (2) Measure the resistance of the IGN fuse.
  Standard: Below 1 Ω
  (3) Reinstall the IGN fuse.
(b) Disconnect ignition coil connectors I1, I2, I3, I4, I5 or I6.
(c) Disconnect the I15 ignition switch connector.
(d) Measure the resistance of the wire harness side connectors.
  Standard:

Tester Connection	Specified Condition
I1–1 (Ignition coil) – I15–6 (IG2)	Below 1 Ω
I2–1 (Ignition coil) – I15–6 (IG2)	Below 1 Ω
I3–1 (Ignition coil) – I15–6 (IG2)	Below 1 Ω
I4–1 (Ignition coil) – I15–6 (IG2)	Below 1 Ω
I5–1 (Ignition coil) – I15–6 (IG2)	Below 1 Ω
I6–1 (Ignition coil) – I15–6 (IG2)	Below 1 Ω
I1–1 (Ignition coil) or I17–6 (IG2) – Body ground	10 kΩ or higher
I2–1 (Ignition coil) or I17–6 (IG2) – Body ground	10 kΩ or higher
I3–1 (Ignition coil) or I17–6 (IG2) – Body ground	10 kΩ or higher
I4–1 (Ignition coil) or I17–6 (IG2) – Body ground	10 kΩ or higher
I5–1 (Ignition coil) or I17–6 (IG2) – Body ground	10 kΩ or higher
I6–1 (Ignition coil) or I17–6 (IG2) – Body ground	10 kΩ or higher

NG → REPAIR OR REPLACE HARNESS AND CONNECTOR

OK

REPLACE IGNITION COIL ASSY (See page 18–10)