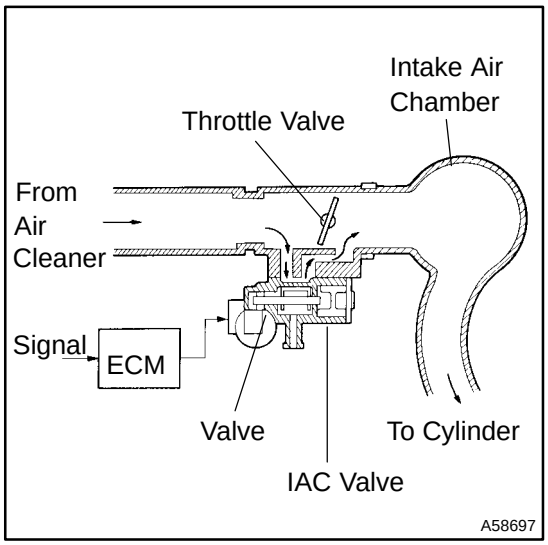
DTC	P0505	IDLE AIR CONTROL SYSTEM

DTC	P0511	IDLE AIR CONTROL CIRCUIT

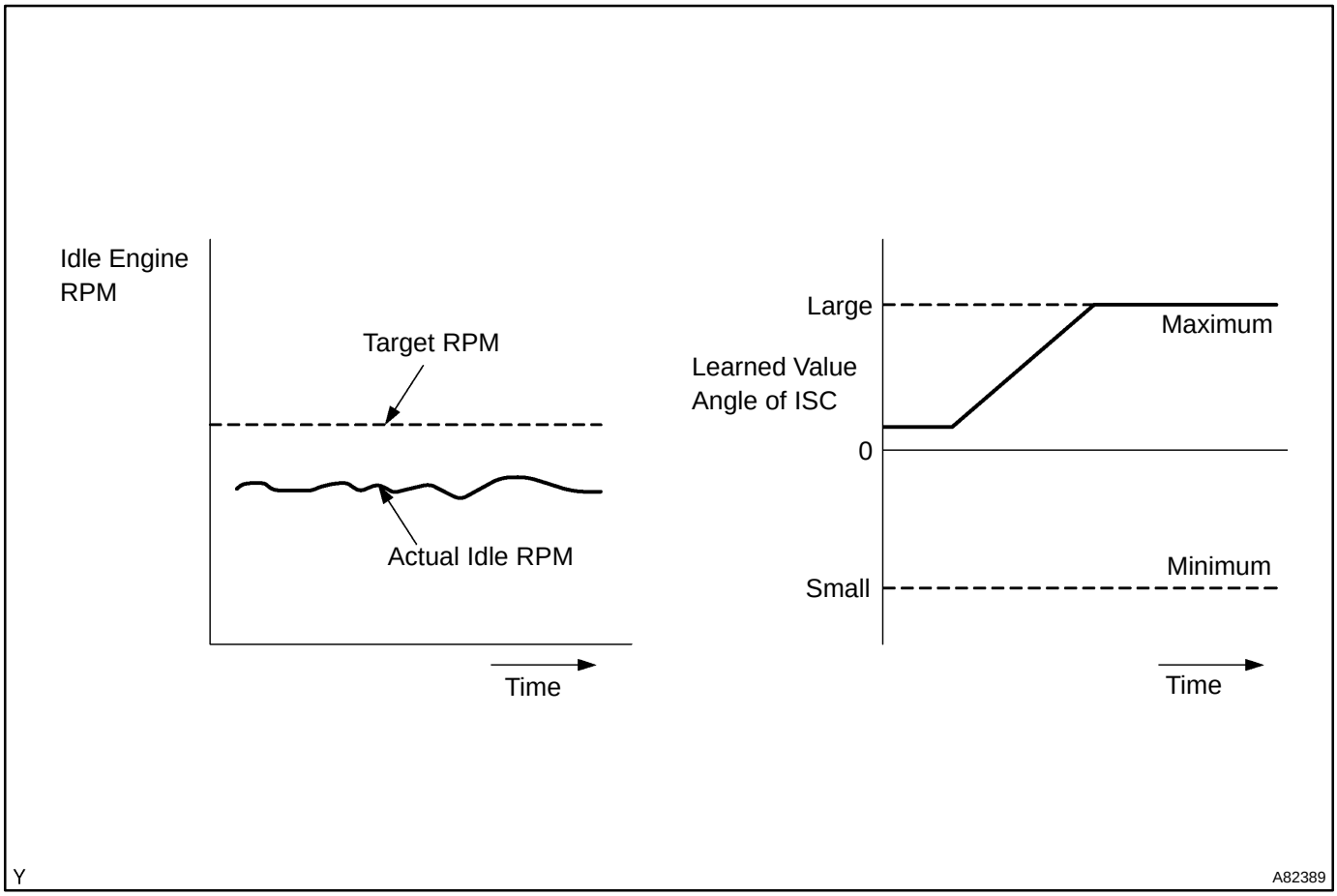
CIRCUIT DESCRIPTION



The rotary solenoid type idle air control (IAC) valve is located under the throttle body and intake air bypassing the throttle valve flows into the IAC valve through the passage.
In this way the intake air volume bypassing the throttle valve is regulated, controls the engine speed.
The ECM operates the IAC valve only to perform idle–up and provide feedback for the target idling speed.

DTC No.	DTC Detecting Condition	Trouble Area
P0505	Idle air continues to vary greatly from target speed (2 trip detection logic)	• Open or short in idle air control (IAC) valve circuit • Idle air control (IAC) valve is stuck or closed • A/C switch circuit • Air induction system • PCV valve and hose • ECM
P0511	Open or short ISC circuit	

MONITOR DESCRIPTION



The idle speeds are determined depending on the volume of air that passes through the IAC valve. When the volume is large, the idle speed becomes higher. When the volume is small, the idle speed becomes lower. The IAC valve controls the air volume that bypasses the throttle valve. The engine control module (ECM) sends duty signals to the IAC valve and drives the IAC valve stepper motor to determine the air volume that bypasses the throttle valve.

Although the ECM regulates the idle engine RPM with the feedback control in several vehicle stopped, actual idle RPM does not reach the targeted RPM and a learned valve angle of the idle air control (IAC) remains at the maximum or remains at the minimum, the ECM determines to detect malfunction in the IAC system.

Example:

If the RPM difference between the targeted and actual idle engine RPMs exceeds 200 rpm (*1) with the vehicle stopped in an idle, and this occurs 5 times, or if the learned value angle of the IAC remains at its maximum or minimum angle for 5 seconds, P505 is detected.

P0511 is detected as an open/short circuit in the IAC if the rate of duty signal input to the IAC valve has stuck at 0 or 100 %.

*1: Threshold RPM is varied by an engine load.

MONITOR STRATEGY

Related DTCs	P0505	Idle air control valve
	P0511	Idle air control valve
Required sensors/components	Main sensors	Crankshaft position sensor
	Related sensors	Vehicle speed sensor, engine coolant temperature sensor
Frequency of operation	P0505 Functional check: once per driving cycle P0505 Range check, P0511: continuous	
Duration	P0505 Functional check: 10 minutes P0505 Range check, P0511: 10 seconds	
MIL operation	P0505 Functional check: 2 driving cycles P0505 Range check, P0511: Immediately	
Sequence of operation	None	

TYPICAL ENABLING CONDITION

Item	Specification	
	Minimum	Maximum
The monitor will run whenever the following DTCs are not present	See "List of Disable a Monitor" (On page 05–25)	
P0505 Functional check:		
Battery voltage	11 V	–
Engine coolant temperature	75°C (167°F)	–
Idle	ON (more than 6 seconds)	
Vehicle speed	–	1.8 mph (3 km/h)
Engine speed	400 rpm	–
P0505 Range check:		
Output signal duty	10 %	90 %
Battery voltage	10 V	–
P0511:		
Output signal duty	10 %	90 %
Battery voltage	10 V	–
Time after first missing of voltage change	10 sec	–

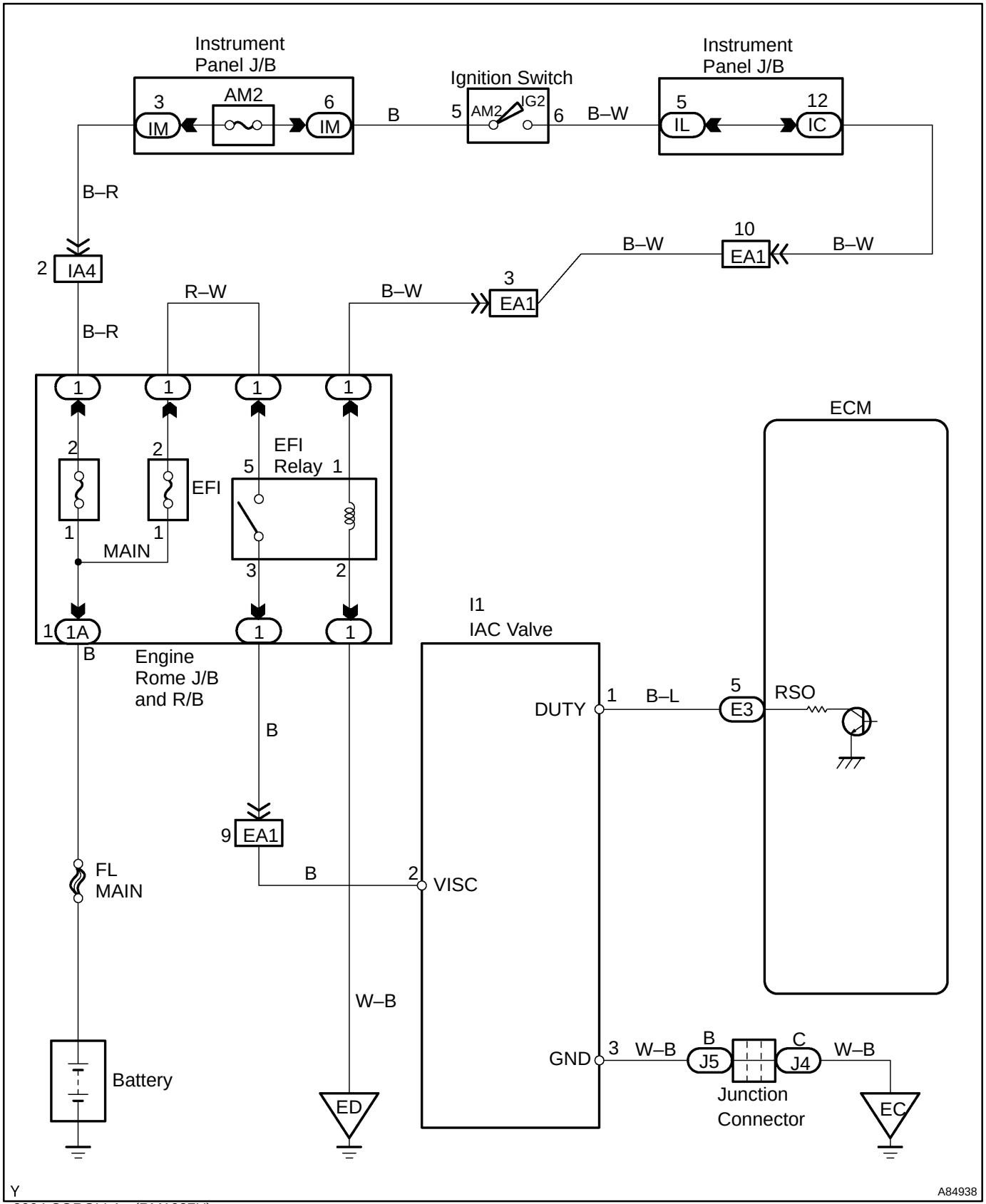
TYPICAL MALFUNCTION THRESHOLDS

Detection Criteria	Threshold
P0505 Functional check:	
Following conditions are met (At idle (after running with more than 6.2 mph (10 km/h) per trip)	Case1: A and B (5 times) Case2: B (5 seconds)
A. Either of the following conditions is met:	1 or 2
1. Deviation of engine speed (When shift position N or A/C ON)	Less than – 100 rpm or more than 200 rpm
2. Deviation of engine speed (When shift position D or A/C OFF)	Less than – 100 rpm or more than 150 rpm
B. Either of the following condition is met:	1 or 2
1. IAC flow rate learning value (A/C OFF)	0.5 L/sec or less or 2.75 L/sec or more
2. IAC flow rate learning value (A/C ON)	0.22 L/sec or less or 0.98 L/sec or more
P0505 Range check:	
Number of missing output voltage change	2,000 times or more
P0511:	
Number of missing output voltage change	1,000 times or more

COMPONENT OPERATING RANGE

Parameter	Standard value
P0505, P0511:	
Time while no missing voltage change	0.5 seconds or more

WIRING DIAGRAM



2004 COROLLA (RM1037U)

INSPECTION PROCEDURE

HINT:

- When the throttle position is slightly opened (the accelerator pedal is slightly depressed) because a floor carpet is overlapped on the accelerator pedal, or if not fully releasing the accelerator pedal, etc., DTC P505 will possibly be detected.
- Read freeze frame data using the hand−held tester or the OBD II scan tool. Freeze frame data records the engine conditions when a malfunction is detected. When troubleshooting, it is useful for determining whether the vehicle was running or stopped, the engine was warmed up or not, the air–fuel ratio was lean or rich, etc. at the time of the malfunction.

Hand–held tester:

1 CHECK OTHER DTC OUTPUT

(a) Connect the hand–held tester to the DLC3.
(b) Turn the ignition switch ON and push the hand–held tester main switch ON.
(c) Read the DTCs.

Result:

Display (DTC output)	Proceed to
P0505	A
P0511 and other DTCs	B

B → **Go to step 7**

A

2 CHECK CONNECTION OF PCV HOSE

NG → **REPAIR OR REPLACE PCV HOSE**

OK

3 CHECK AIR INDUCTION SYSTEM

NG → **REPAIR OR REPLACE**

OK

4	PERFORM ACTIVE TEST USING HAND–HELD TESTER(CHECK IAC VALVE OPERATION)

(a) Warm up the engine to the normal operating temperature.
(b) Switch off all the accessories.
(c) Switch off the A/C.
(d) Shift the lever into the neutral position.
(e) Connect the hand–held tester to the DLC3.
(f) Select the item ”DIAGNOSIS / ENHANCED OBD II / ACTIVE TEST / ISC DUTY RATIO”.
(g) Check that the engine RPM varies when changing the ISC duty ratio.
Engine RPM:
Engine RPM fluctuates up and down in response to the ISC duty ratio variation.

OK → **CHECK FOR INTERMITTENT PROBLEMS (See page 05–41)**

NG

5	CHECK A/C SIGNAL CIRCUIT

NG → **REPAIR OR REPLACE**

OK

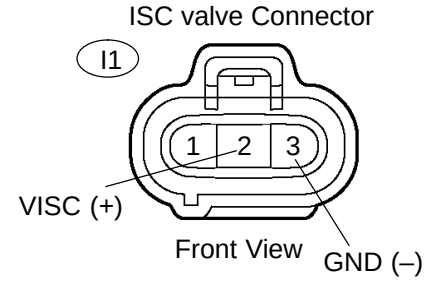
6	CHECK BLOCKAGE OF IAC VALVE AND PASSAGE TO BYPASS THROTTLE VALVE

NG → **REPLACE IDLE AIR CONTROL VALVE**

OK

7	CHECK HARNESS AND CONNECTOR

Wire Harness Side:



(a) Disconnect the I1 IAC valve connector.
(b) Turn the ignition switch ON.
(c) Measure the voltage between the terminals of the IAC valve wire harness side connector.
Standard:

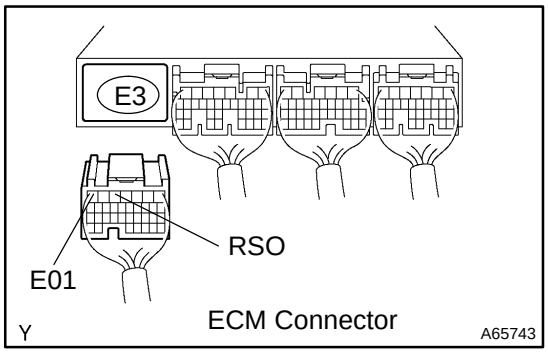
Tester Connection	Specified Condition
VISC (I1–2) – GND (I1–3)	9 to 14 V

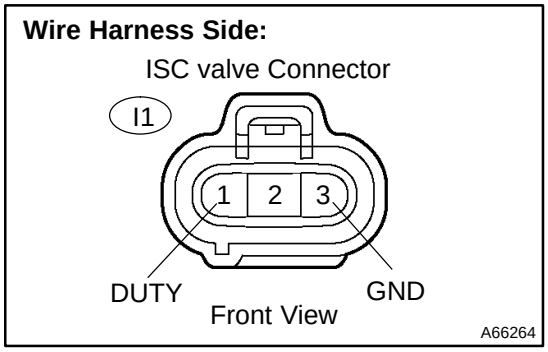
(d) Reconnect the IAC valve connector.

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

OK

8	CHECK HARNESS AND CONNECTOR(IAC VALVE – ECM)





(a) Disconnect the I1 IAC valve connector.
(b) Disconnect the E3 ECM connector.
(c) Check the resistance between the wire harness side connectors.

Standard (Check for open):

Tester Connection	Specified Condition
DUTY (I1–1) – RSO (E3–5)	Below 1 Ω
GND (I1–3) – E01 (E3–7)	

Standard (Check for short):

Tester Connection	Specified Condition
DUTY (I1–1) or RSO (E3–5) – Body ground	10 kΩ or higher

(d) Reconnect the ECM connector.
(e) Reconnect the IAC valve connector.

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

OK

9	INSPECT IDLE AIR CONTROL VALVE (See page 10–1)

NG → **REPLACE IDLE AIR CONTROL VALVE**

OK

REPLACE ECM (See page 10–11)

OBD II scan tool (excluding hand–held tester):

1	CHECK OTHER DTC OUTPUT

(a) Connect the hand–held tester to the DLC3.

Result:

Display (DTC output)	Proceed to
P0505	A
”P0511” and other DTCs	B

B → **Go to step 6**

A

2	CHECK CONNECTION OF PCV HOSE

NG → REPAIR OR REPLACE PCV HOSE

OK

3	CHECK AIR INDUCTION SYSTEM

NG → REPAIR OR REPLACE

OK

4	CHECK A/C SIGNAL CIRCUIT

NG → REPAIR OR REPLACE

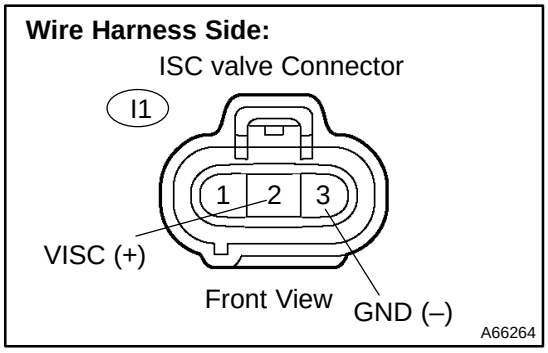
OK

5	CHECK BLOCKAGE OF IAC VALVE AND PASSAGE TO BYPASS THROTTLE VALVE

NG → REPAIR OR REPLACE IDLE AIR CONTROL VALVE

OK

6	CHECK HARNESS AND CONNECTOR



(a) Disconnect the I1 IAC valve connector.
(b) Turn the ignition switch ON.
(c) Measure the voltage between the terminals of the IAC valve wire harness side connector.

Standard:

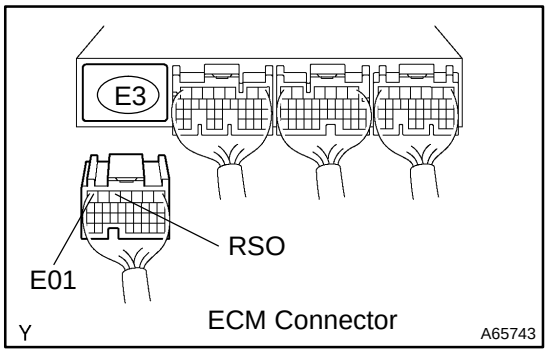
Tester Connection	Specified Condition
VISC (I1–2) – GND (I1–3)	9 to 14 V

(d) Reconnect the IAC valve connector.

NG → REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

7	CHECK HARNESS AND CONNECTOR(IAC VALVE – ECM)



(a) Disconnect the I1 IAC valve connector.
(b) Disconnect the E3 ECM connector.
(c) Check the resistance between the wire harness side connectors.

Standard (Check for open):

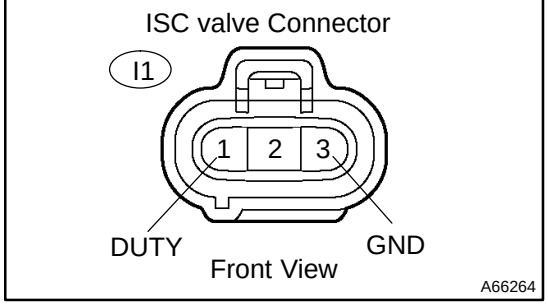
Tester Connection	Specified Condition
DUTY (I1–1) – RSO (E3–5)	Below 1 Ω
GND (I1–3) – E01 (E3–7)	

Standard (Check for short):

Tester Connection	Specified Condition
DUTY (I1–1) or RSO (E3–5) – Body ground	10 kΩ or higher

(d) Reconnect the ECM connector.
(e) Reconnect the IAC valve connector.

Wire Harness Side:



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

OK

8	INSPECT IDLE AIR CONTROL VALVE (See page 10–1)

NG → **REPAIR OR REPLACE IDLE AIR CONTROL VALVE**

OK

REPLACE ECM(See page 10–11)