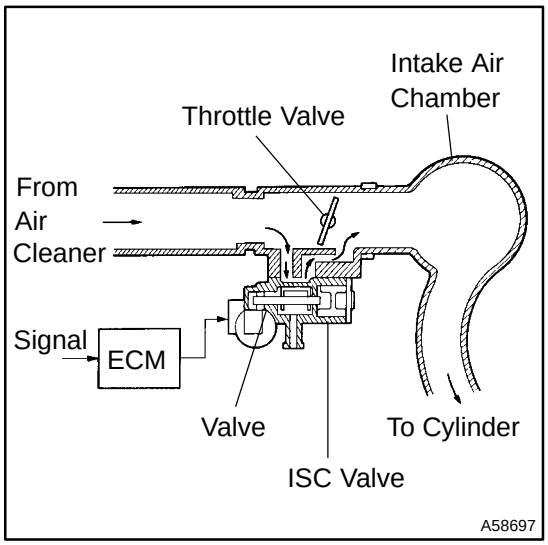
DTC	P0505	IDLE AIR CONTROL SYSTEM

DTC	P0511	IDLE AIR CONTROL CIRCUIT

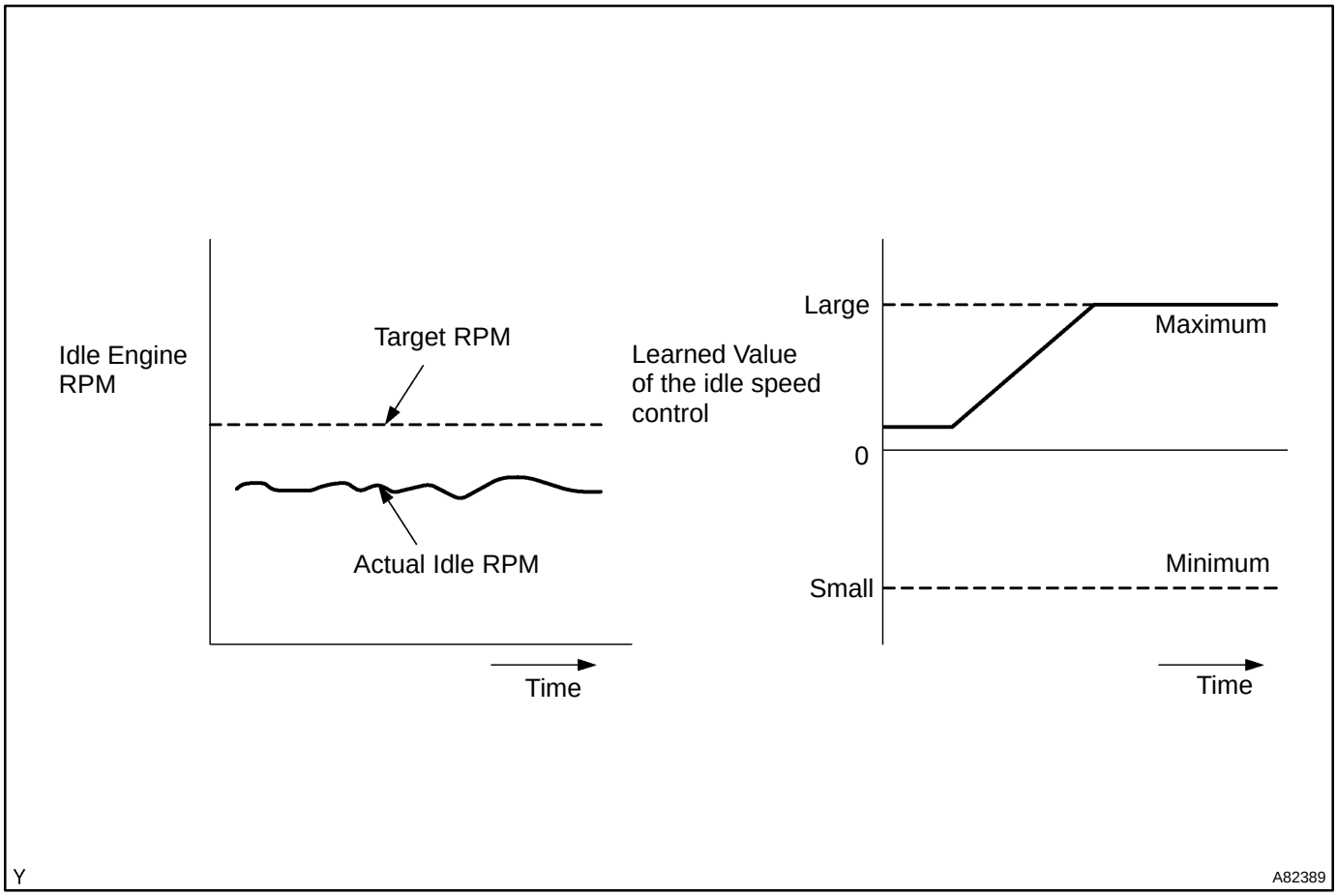
CIRCUIT DESCRIPTION



The rotary solenoid type idle speed control (ISC) valve is located under the throttle body and intake air bypassing the throttle valve flows to the idle speed control (ISC) 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 idle speed control (ISC) valve only to perform idle–up and provide feedback for the target idling speed.

DTC No.	DTC Detecting Condition	Trouble Area
P0505	Idle speed continues to vary greatly from target speed	• Open or short in idle speed control (ISC) valve circuit • Idle speed control (ISC) valve is stuck or closed • ECM • Air induction system • PCV valve and hose
P0511	Open or short ISC circuit	

MONITOR DESCRIPTION



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

Although the ECM regulates the idle engine RPM with the feedback control in several vehicle stopped, actual idle RPM dose not reach the targeted RPM and a learned valve angle of the idle speed control (ISC) remains at the maximum or remains at the minimum, the ECM determines to detect malfunction in the ISC system. If the rate of duty signal input to the ISC valve is stuck to 0 or 100 %, the ECM interprets it as an open/short circuit in the ISC valve and sets a DTC.

Example:

If then RPM difference between the target RPM and actual RPM exceeds 200 rpm (*1) with the vehicle stopped in the idle and this occurs 5 times.

*1: The threshold 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 min P0505 Range check, P0511: 10 sec	
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" table (On page 05–24)	
P0505 Functional check:		
Battery voltage	11 V	–
Engine coolant temperature	75°C (167°F)	–
Idle	ON (more than 6 sec)	
Vehicle speed	–	3 km/h (2 mph)
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	–

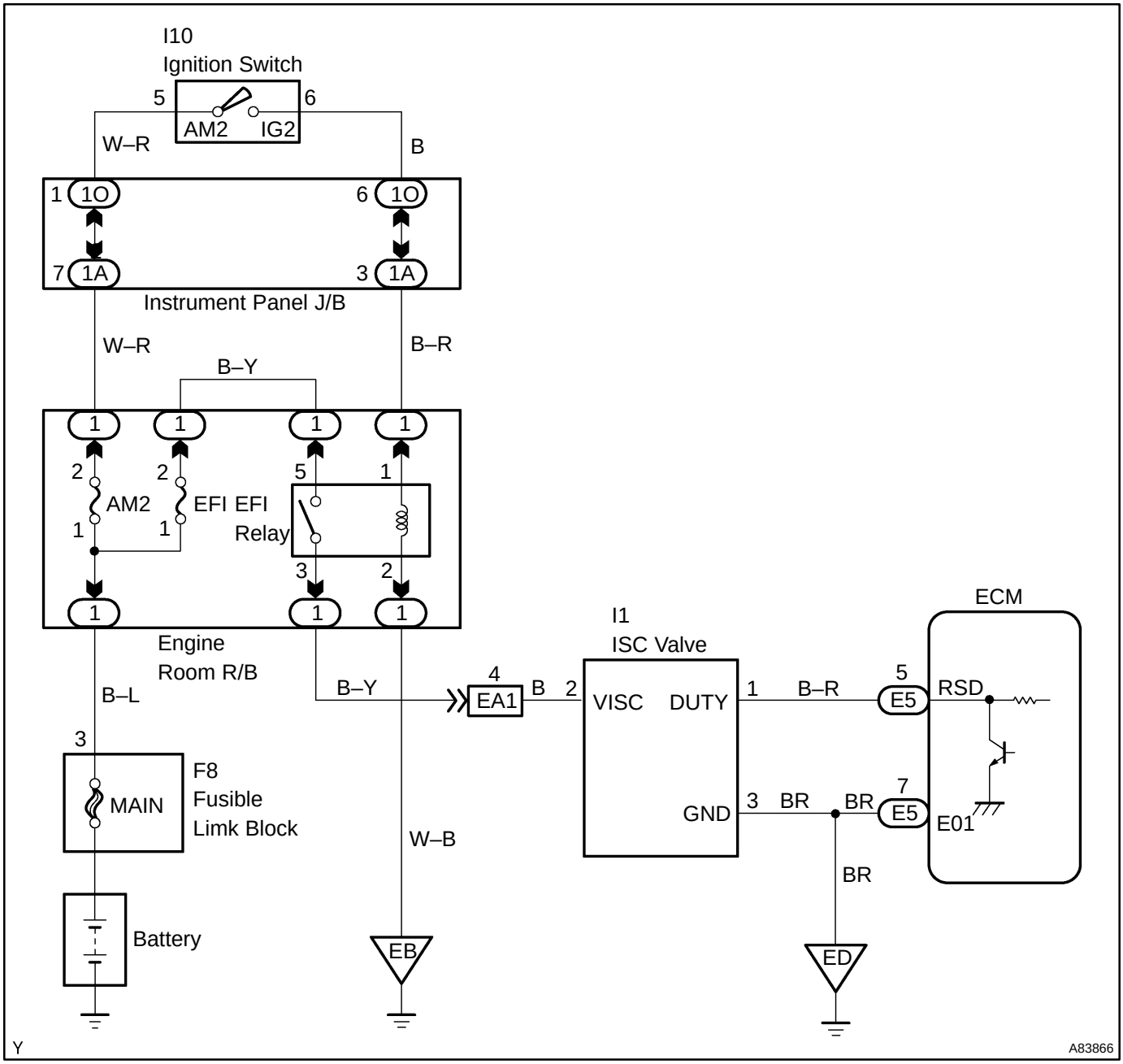
TYPICAL MALFUNCTION THRESHOLDS

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:	A, B and C
A. Either following condition 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. IAC flow rate learning value	–0.07 L/sec or less or 0.75 L/sec or more (A/C OFF) 0.38 L/sec or less or 1.88 L/sec or more (A/C ON)
C. Number of detections	5 times/trip
P0505 Range check:	
Missing output duty voltage	
P0511:	
Number of missing output voltage change	1000 times or more

COMPONENT OPERATING RANGE

Parameter	Standard Value
P0511:	
Time while no missing voltage change	0.5 sec or more

WIRING DIAGRAM



INSPECTION PROCEDURE

HINT:

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 CONNECTION OF PCV HOSE

NG → REPAIR OR REPLACE PCV HOSE

OK

2	CHECK AIR INDUCTION SYSTEM

NG → REPAIR OR REPLACE

OK

3	CHECK OTHER DTCS 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) Select the item ”DIAGNOSIS / OBD/MOBD / DTC INFO / CURRENT CODES”.
(d) Read the DTCs using the hand–held tester.
Result:

Display (DTC output)	Proceed to
Only ”P0505” is output	A
”P0505” and other DTCs are output	B

HINT:
If any other codes besides ”P0505” is output, perform the troubleshooting for those DTCs first.

B → **Go to step 7**

A

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

(a) Connect the hand–held tester to the DLC3 on the vehicle.
(b) Warm up the engine to the normal operating temperature.
(c) Switch off all the accessories.
(d) Switch off the A/C.
(e) Shift the lever into the neutral position.
(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 respose 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

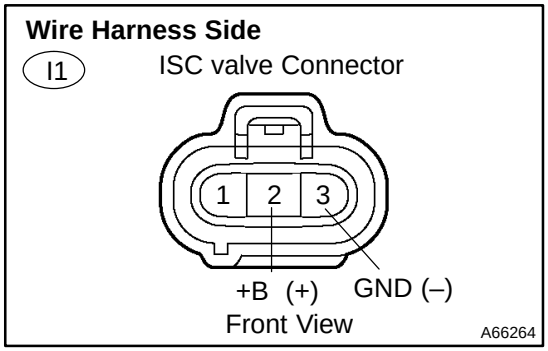
OK

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

NG → REPAIR OR REPLACE THLOTTLE BODY IDLE SPEED CONTROL VALVE ASSY

OK

7	CHECK HARNESS AND CONNECTOR



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

Standard:

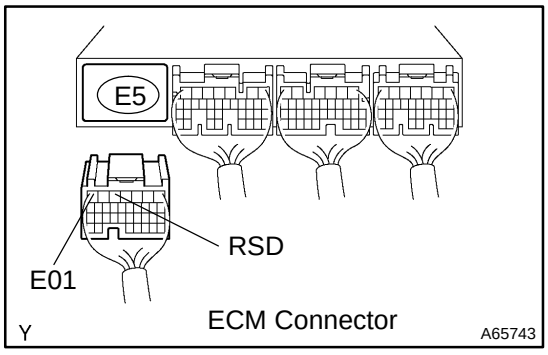
Tester Connection	Specified Condition
+B (I1–2) – GND (I1–3)	9 to 14 V

(d) Reconnect the ISC valve connector.

NG → REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

8	CHECK HARNESS AND CONNECTOR(ISC VALVE – ECM)



(a) Disconnect the I1 ISC valve connector.
(b) Disconnect the E5 ECM connector.
(c) Measure the resistance between the wire harness side connectors.

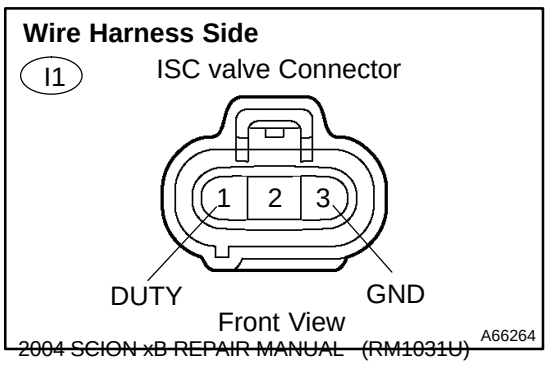
Standard (Check for open):

Tester Connection	Specified Condition
DUTY (I1–1) – RSD (E5–5)	Below 1 Ω
GND (I1–3) – E01 (E5–7)	

Standard (Check for short):

Tester Connection	Specified Condition
DUTY (I1–1) or RSD (E5–5) – Body groundr	10 kΩ or higher

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



NG	REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

9	INSPECT THLOTTLE BODY IDLE SPEED CONTROL VALVE ASSY (See page 10–1)

NG	REPLACE THLOTTLE BODY IDLE SPEED CONTROL VALVE ASSY

OK

REPLACE ECM (See page 10–17)

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

1	CHECK CONNECTION OF PCV HOSE

NG	REPAIR OR REPLACE PCV HOSE

OK

2	CHECK AIR INDUCTION SYSTEM

NG	REPAIR OR REPLACE

OK

3	CHECK OTHER DTCS OUTPUT

(a) Connect the OBD II scan tool to the DLC3.
(b) Turn the ignition switch ON and push the OBD II scan tool main switch ON.
(c) Select the item ”DIAGNOSIS / OBD/MOBD / DTC INFO / CURRENT CODES”.
(d) Read the DTCs using the OBD II scan tool.

Result:

Display (DTC output)	Proceed to
Only ”P0505” is output	A
”P0505” and other DTCs are output	B

HINT:
If any other codes besides ”P0505” is output, perform the troubleshooting for those DTCs first.

B	Go to step 7

A

4	CHECK A/C SIGNAL CIRCUIT

NG → REPAIR OR REPLACE

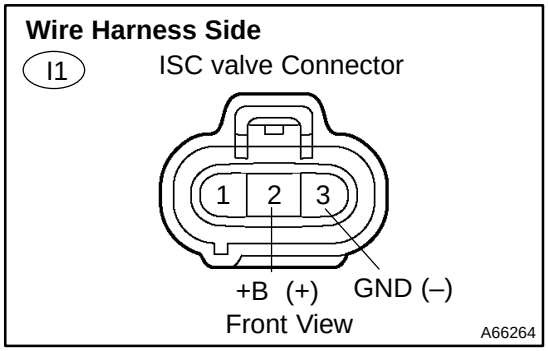
OK

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

NG → REPAIR OR REPLACE THLOTTLE BODY IDLE SPEED CONTROL VALVE ASSY

OK

6	CHECK HARNESS AND CONNECTOR



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

Standard:

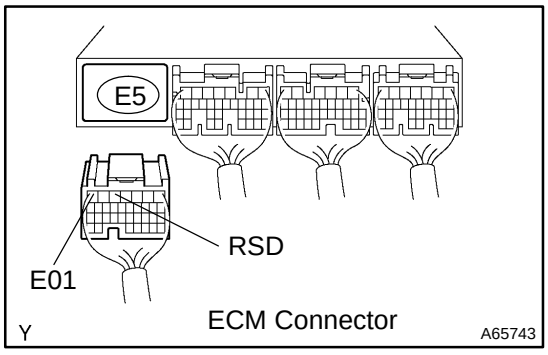
Tester Connection	Specified Condition
+B (I1–2) – GND (I1–3)	9 to 14 V

(d) Reconnect the ISC valve connector.

NG → REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

7	CHECK HARNESS AND CONNECTOR(ISC VALVE – ECM)



(a) Disconnect the I1 ISC valve connector.
(b) Disconnect the E5 ECM connector.
(c) Measure the resistance between the wire harness side connectors.

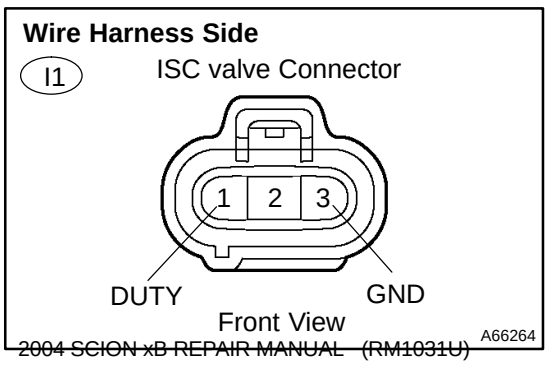
Standard (Check for open):

Tester Connection	Specified Condition
DUTY (I1–1) – RSD (E5–5)	Below 1 Ω
GND (I1–3) – E01 (E5–7)	

Standard (Check for short):

Tester Connection	Specified Condition
DUTY (I1–1) or RSD (E5–5) – Body groundr	10 kΩ or higher

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



NG	REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

8	INSPECT THLOTTLE BODY IDLE SPEED CONTROL VALVE ASSY (See page 10–1)

NG	REPLACE THLOTTLE BODY IDLE SPEED CONTROL VALVE ASSY

OK

REPLACE ECM (See page 10–17)