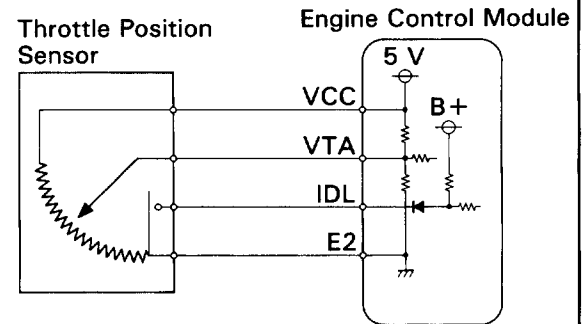


## DTC 41 47 Throttle Position Sensor(s) Circuit

### CIRCUIT DESCRIPTION

The throttle position sensor is mounted in the throttle body and detects the throttle valve opening angle. When the throttle valve is fully closed, the IDL contacts in the throttle position sensor are on, so the voltage at the terminal IDL of the ECM becomes 0 V. At this time, a voltage of approximately 0.7 V is applied to the terminal VTA of the ECM. When the throttle valve is opened, the IDL contacts go off and thus the power source voltage of approximately 12 V in the ECM is applied to the terminal IDL of the ECM. The voltage applied to the terminal VTA of the ECM increases in the proportion to the opening angle of the throttle valve and becomes approximately 3.2 - 4.9 V when the throttle valve is fully opened. The ECM judges the vehicle driving conditions from these signals input from the terminals VTA and IDL, and uses them as one of the conditions for deciding the air-fuel ratio correction, power increase corrections and fuel-cut control etc. The sub-throttle position sensor is built and operates in the same way as the main throttle position sensor. This sensor is used for traction control. The sub-throttle valve is opened and closed by the sub-throttle actuator according to signals from the TRAC ECU to control the engine output.



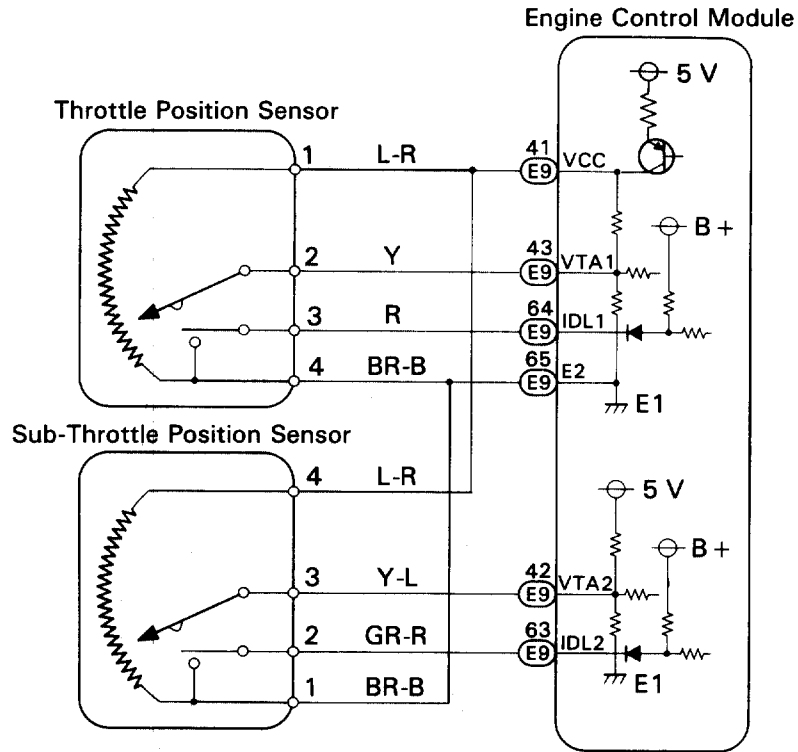
F16480

DTC No.	Diagnostic Trouble Code Detecting Condition	Trouble Area
41	Open or short in throttle position sensor circuit for 0.5 sec. or more	<ul style="list-style-type: none"> <li>• Open or short in throttle position sensor circuit</li> <li>• Throttle position sensor</li> <li>• ECM</li> </ul>
47	Open or short in sub-throttle position sensor circuit for 0.5 sec. or more	<ul style="list-style-type: none"> <li>• Open or short in sub-throttle position sensor circuit</li> <li>• Sub-throttle position sensor</li> <li>• ECM</li> </ul>

#### HINT:

- Diagnostic trouble code 41 is for the throttle position sensor circuit.
- Diagnostic trouble code 47 is for the sub-throttle position sensor circuit.
- When the connector for the throttle position sensor(s) is disconnected, diagnostic trouble code 41 or 47 is not displayed. Diagnostic trouble code 41 or 47 is displayed only when there is an open or short in the VTA signal circuit of the throttle position sensor(s).
- Signals from the throttle position sensor(s) are also input to the TRAC ECU, so when a malfunction occurs on the TRAC side, code 41 or 47 may be displayed.

**WIRING DIAGRAM**



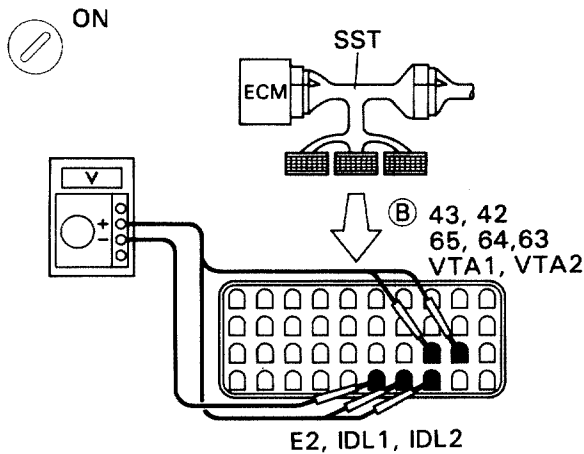
FI6879

## INSPECTION PROCEDURE

### HINT:

- If diagnostic trouble code 41 is displayed, check throttle position sensor circuit. If diagnostic trouble code 47 is displayed, check sub-throttle position sensor circuit.
- If diagnostic trouble code "22" (engine coolant temperature sensor circuit), "24" (intake air temperature sensor circuit) and "41" (throttle position sensor circuit) are output simultaneously. E2 (sensor ground) may be open.

### Check voltage between terminals VTA1, 2, IDL1, 2 and E2 of engine control module connector.



- P** (1) Connect SST (check harness "A").  
(See page [EG-510](#))  
SST 09990-01000
- (2) Turn ignition switch ON.
- (3) For throttle position sensor, disconnect the vacuum hose from the throttle body, then apply vacuum to the throttle opener.  
(See page [EG-292](#))
- (4) For sub-throttle position sensor, remove intake air duct and disconnect sub-throttle valve step motor connector.

- C** Measure voltage between terminals VTA1, 2, IDL1, 2 and E2 of engine control module connector when the (sub-) throttle valve is opened gradually from the closed condition.

**OK**

Terminal	VTA1 - E2	IDL1 - E2
Throttle Valve	VTA2 - E2	IDL2 - E2
Fully Closed	0.3 - 0.8 V	0 - 3.0 V
Fully Open	3.2 - 4.9 V	9 - 14 V

- Hint** The voltage should increase steadily in proportion to the throttle valve opening angle.

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**NG**

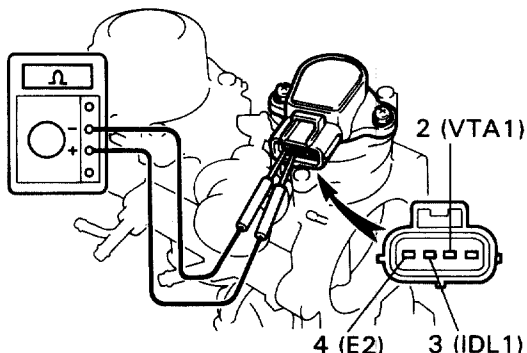
**OK**

Check for intermittent problems.  
(See page [EG-505](#))

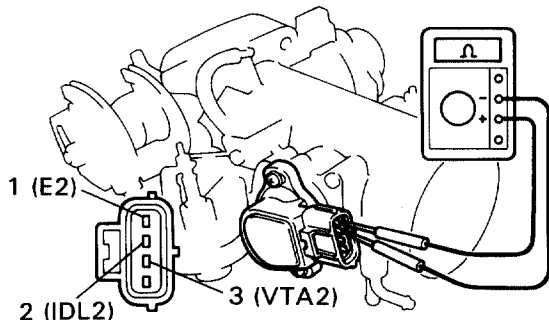
**2**

**Check throttle position sensor(s).**

For Throttle Position Sensor



For Sub-Throttle Position Sensor



P11452  
P12008

- P** (1) Remove throttle body. (See page EG-291)
- (2) For throttle position sensor, apply vacuum to throttle opener. (See page EG-292)

**C** Measure resistance of each terminal as below table when the throttle valve is opened gradually from the closed condition.

**OK**

Terminal	Throttle Valve		
	Fully Closed	Fully (Opened)	
Throttle Position Sensor	2 (VTA1) - 4 (E2)	0.3 ~ 6.3 kΩ	2.4 ~ 11.2 kΩ
	3 (IDL1) - 4 (E2)	Less than 0.5 kΩ	1 MΩ or higher
Sub throttle Position Sensor	3 (VTA2) - 1 (E2)	0.3 ~ 6.3 kΩ	2.0 ~ 10.8 kΩ
	2 (IDL2) - 1 (E2)	Less than 0.5 kΩ	1 MΩ or higher

**Hint** Resistance between terminals 2,3 (VTA1,2) and 4,1 (E2) should increase gradually in accordance with the throttle valve opening angle.

**OK**

**NG** Adjust or replace throttle position sensor(s). (See page EG-292)

**3**

**Check for open and short in harness and connector between engine control module and throttle position sensors(s) (See page IN-30).**

**OK**

**NG** Repair or replace harness or connector.

Check and replace engine control module.