

CIRCUIT INSPECTION

DTC 12 G NE Signal Circuit (No.1) (Exc. California spec.)

CIRCUIT DESCRIPTION

The distributor in the Engine Control System contains 3 pickup coils.

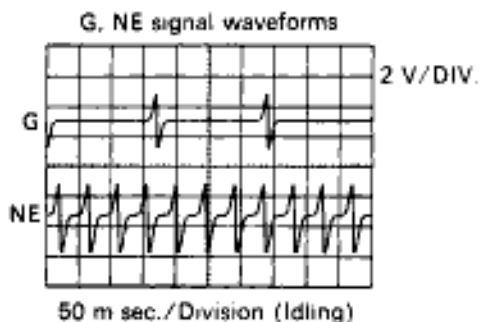
The G signals inform the ECM of the standard crankshaft position.

The NE signals inform the ECM of the crankshaft position and the engine speed.

DTC No.	Diagnostic Trouble Code Detecting Condition	Trouble Area
12	No N E signal to ECM with 2 sec. or more after cranking.	• Open or short in NE, G circuit • Distributor • Open or short in STA circuit • ECM
	No G signal to ECM for 3 sec. or more with engine speed between 600 rpm and 4,000 rpm.	

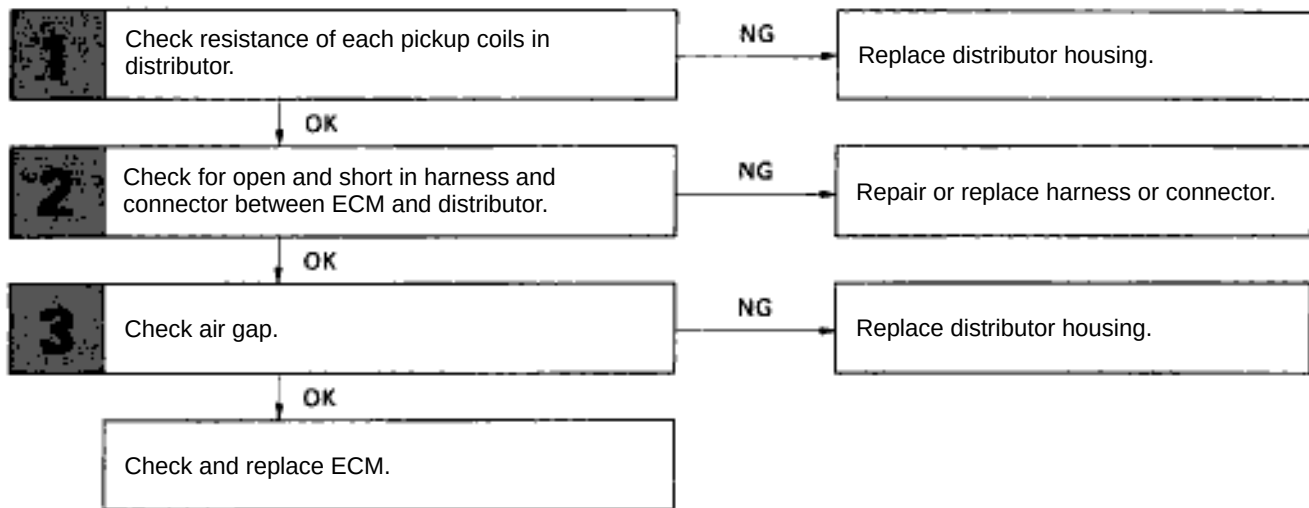
Reference

INSPECTION USING OSCILLOSCOPE

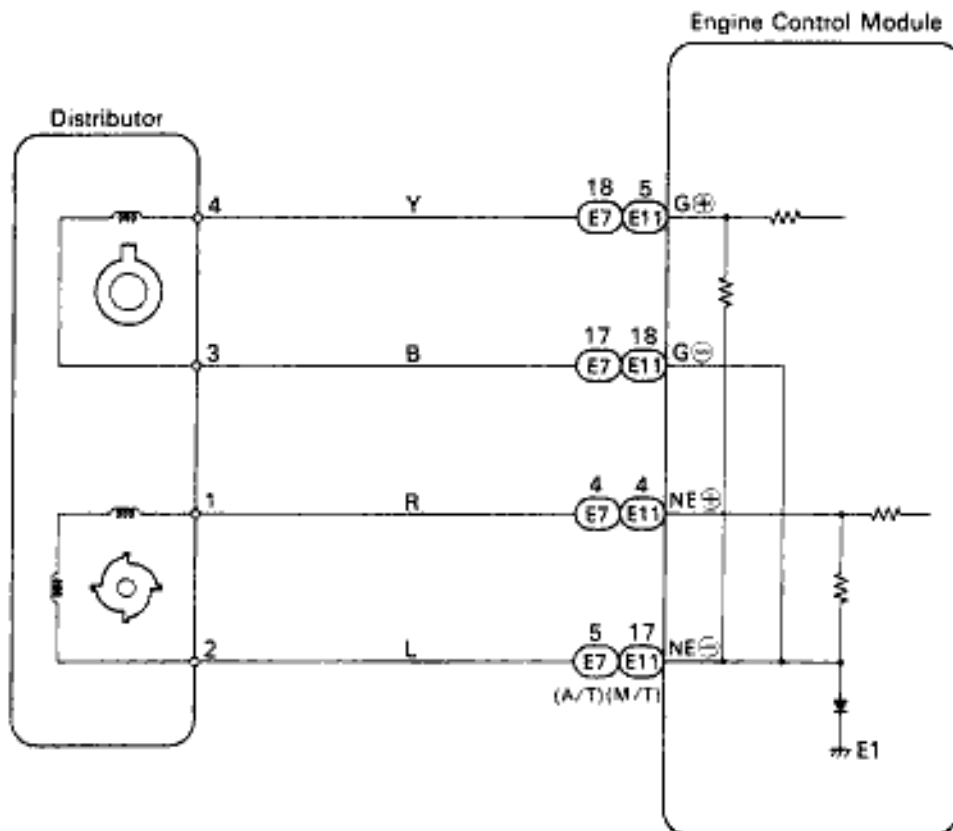


- During cranking or idling, check waveforms between terminals G (+) and G (-), NE (+) and NE (-) of engine control module.
- HINT: The correct waveforms appear as shown in the illustration on the left.

DIAGNOSTIC CHART

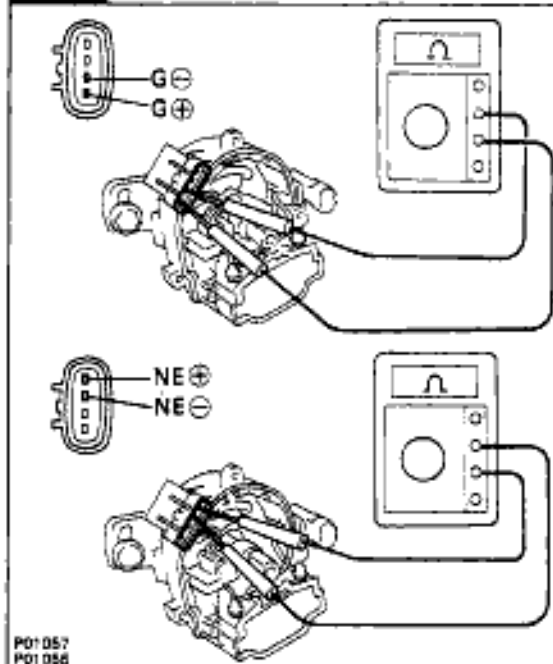


WIRING DIAGRAM



INSPECTION PROCEDURE

Check resistance of each pickup coils in distributor.



- P** Disconnect distributor connector.
- C** Measure resistance between each terminal shown in table below.

OK

		Resistance
G Pickup Coil (G1 – G (–))	Cold	185 ~ 275Ω
	Hot	240 ~ 325 Ω
NE Pickup Coil (NE (+) – NE (–))	Cold	370 ~ 550Ω
	Hot	475 ~ 650Ω

“Cold” is from –10°C (14°F) to 50°C (122°F) and
“Hot” is from 50°C (122°F) to 100°C (212°F).

OK

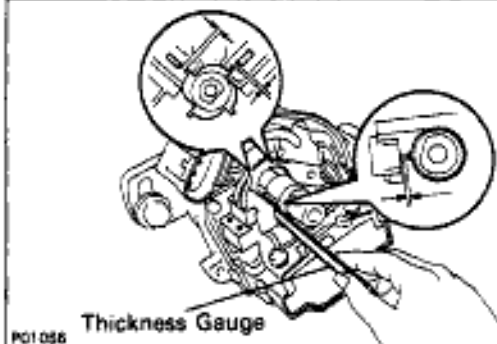
NG Replace distributor housing.

Check for open and short in harness and connector between engine control module and distributor (See page [IN-31](#)).

OK

NG Repair or replace harness or connector.

Check air gap.



- P** Remove distributor cap and rotor.
- C** Using a thickness gauge, measure the air gap between the signal rotor and pickup coil projection.
- OK** Air gap: 0.2 – 0.4 mm (0.008 – 0.006 in.)

OK

NG Replace distributor housing.

Check and replace engine control module.

DTC 12 G NE Signal Circuit (No.1) (Only for California spec.)

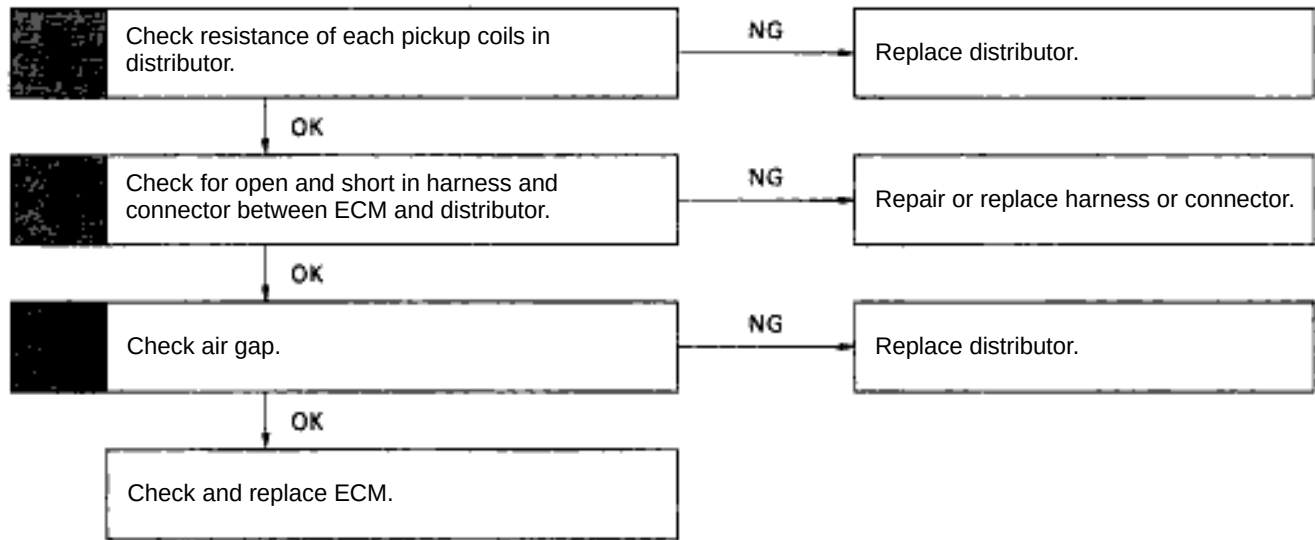
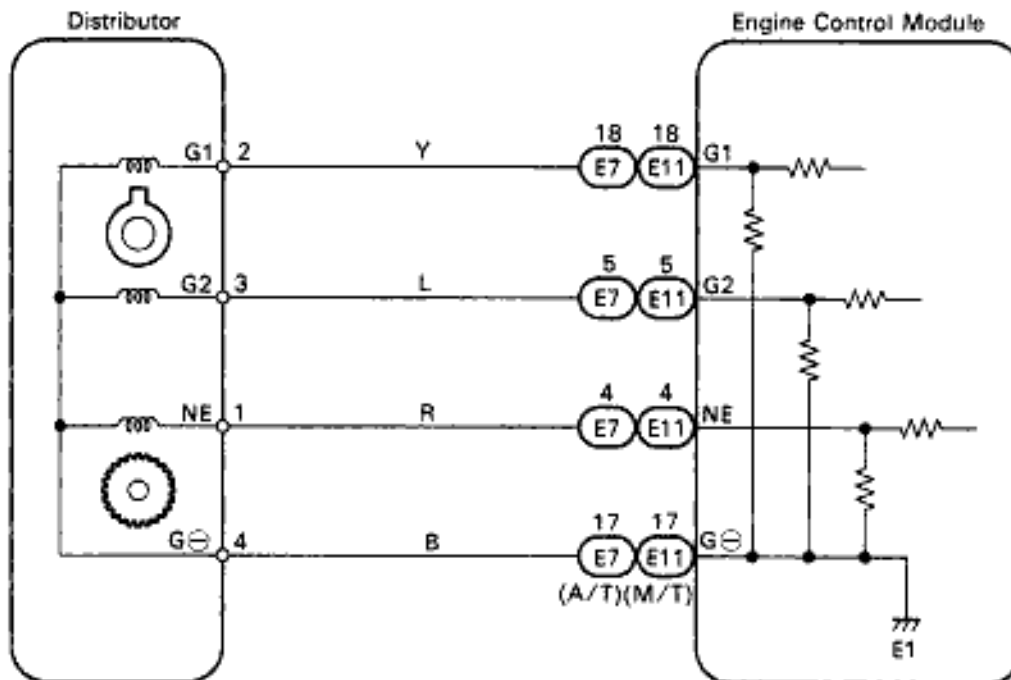
CIRCUIT DESCRIPTION

The distributor in the Engine Control System contains 3 pick-up coils (G1, G2 and NE).

The G1, G2 signals inform the ECM of the standard crankshaft angle.

The NE signals inform the ECM of the crankshaft angle and the engine speed.

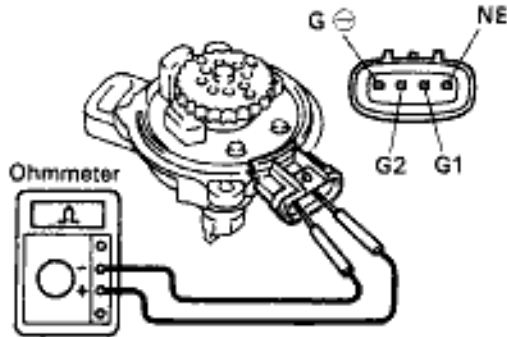
DTC No.	Diagnostic Trouble Code Detecting Condition	Trouble Area
12	No NE or G1 and G2 signal to ECM for 2 sec. or more after cranking.	• Open or short in NE, G circuit. • Distributor • Open or short in STA circuit. • ECM
	Open in G (–) circuit.	

DIAGNOSTIC CHART**WIRING DIAGRAM**

INSPECTION PROCEDURE

1

Check resistance of each pickup coils in distributor.



- P** Disconnect distributor connector.
- C** Measure resistance between each terminal shown in table below.

OK

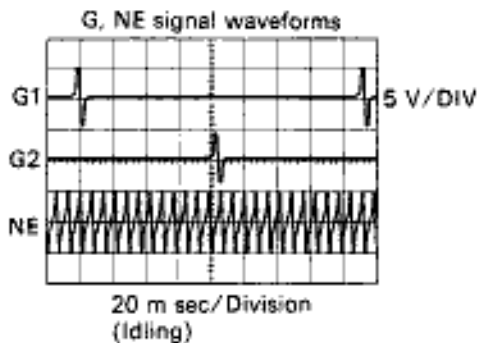
		Resistance
G1 pickup coil (G1 - G ⊖)	Cold	125 ~ 200 Ω
	Hot	180 ~ 235 Ω
G2 pickup coil (G2 - G ⊖)	Cold	125 ~ 200 Ω
	Hot	180 ~ 235 Ω
NE pickup coil (NE - G ⊖)	Cold	155 ~ 250 Ω
	Hot	190 ~ 290 Ω

"Cold" is from -10°C (14°F) to 50°C (122°F) and "Hot" is from 50°C (122°F) to 100°C (212°F).

P13791

Reference

INSPECTION USING OSCILLOSCOPE



- During cranking or idling, check waveforms between terminals G1, G2, NE and G O of engine control module.

HINT: The correct waveforms appear as shown in the illustration on the left.

F16519

OK
NG

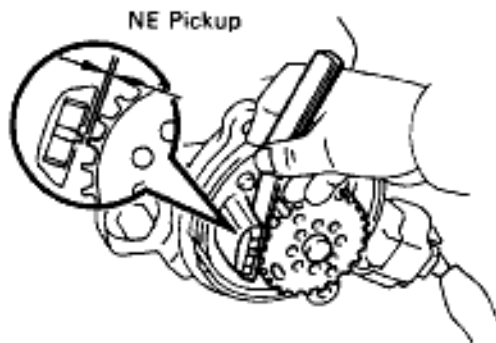
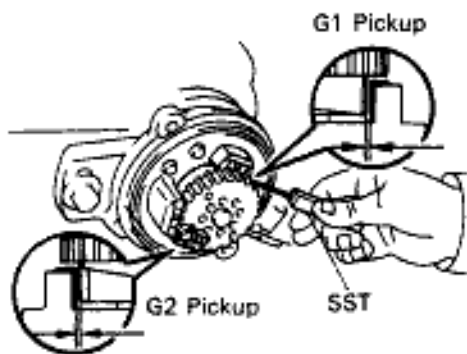
Replace distributor.

2

Check for open and short in harness and connector between engine control module and distributor (See page [IN-31](#)).

OK
NG

Repair or replace harness or connector.

Check air gap.P13787
P13786

- P** Remove distributor cap & rotor.
- C** Using SST (G1 and G2 pickups) and a thickness gauge (NE pickup), measure the air gap between the signal rotor and pickup coil projection.
SST 09240-00020 for G1 and G2 pickups
- OK** Air gap: 0.2–0.5 mm (0.008–0.020 in.)

OK**NG** Replace distributor housing assembly.

Check and replace engine control module.

DTC 13 G NE Signal Circuit (No.2)

CIRCUIT DESCRIPTION

Refer to G, NE signal circuit (No. 1) on page [EG1-336](#), 339.

DTC No.	Diagnostic Trouble Code Detecting Condition	Trouble Area
13	No NE signal to ECM for 0.3 sec. or more at 1,500 rpm or more.	• Open or short in NE circuit • Distributor • ECM
	No G signal to ECM while N E signal is input 4 times to ECM when engine speed is between 500 rpm and 4,000 rpm.	
	* No NE signal to ECM for 0.1 sec. or more at 1,000 rpm or more.	
	* NE signal does not pulse 12 times to ECM during the interval between G1 and G2 pulses.	

*: Only for California specification vehicles.

DIAGNOSIS

This code indicates that a momentary interruption of the G, N E signal from the distributor to the ECM has occurred, but that it is returned to normal. Note that although this problem may not necessarily appear at the time of inspection, it cannot be ignored because this diagnostic trouble code is output, indicating that there is or was a malfunction in the G, NE signal circuit; this "malfunction" is usually a loose connector.

The distributor connector and the N E terminal of the ECM connector must therefore be checked for the following:

1. Loose connectors
2. Dirty connector terminals
3. Loose connector terminals

DTC 14 Ignition Signal Circuit

CIRCUIT DESCRIPTION

The ECM determines the ignition timing, turns on Tr, at a predetermined angle (*CA) before the desired ignition timing and outputs an ignition signal (IGT) "1" to the igniter.

Since the width of the IGT signal is constant, the dwell angle control circuit in the igniter determines the time the control circuit starts primary current flow to the ignition coil based on the engine rpm and ignition timing one revolution ago, that is, the time the Tr₂ turns on.

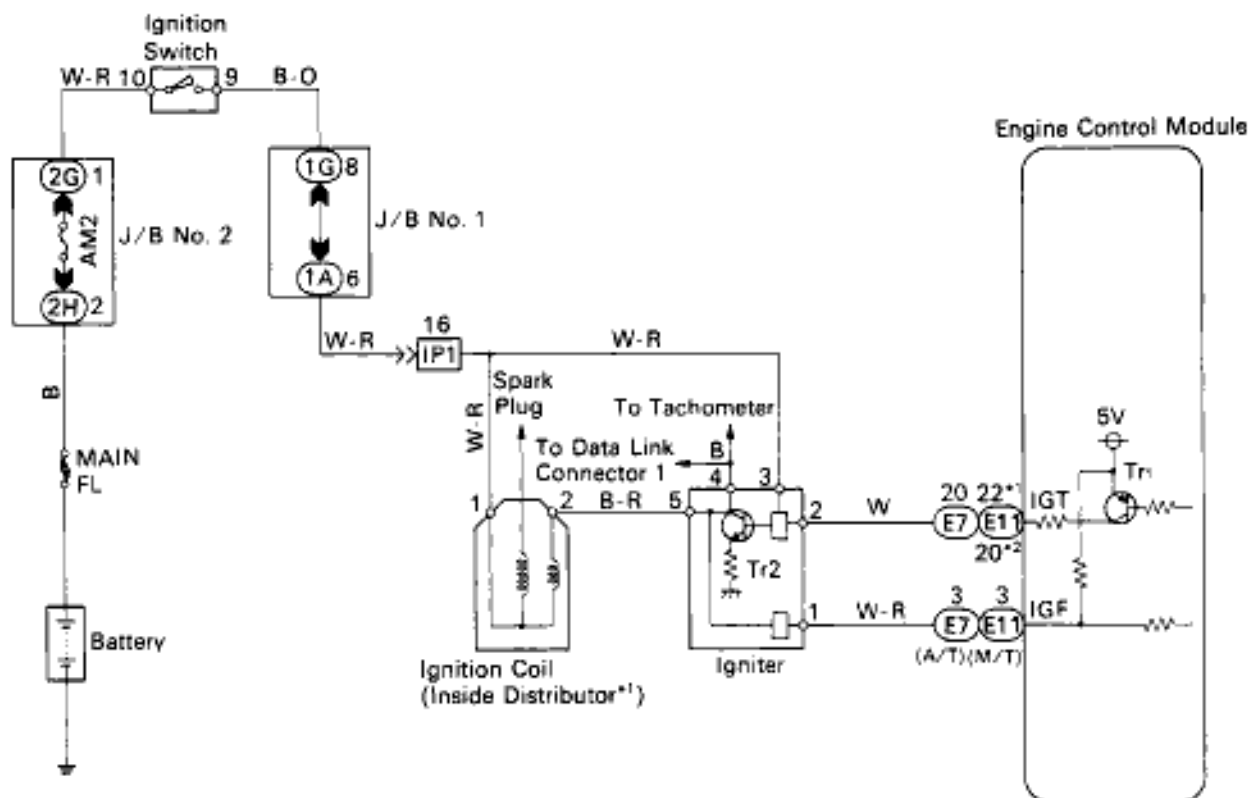
When it reaches the ignition timing, the ECM turns Tr, off and outputs the IGT signal "0".

This turns Tr₂ off, interrupting the primary current flow and generating a high voltage in the secondary coil which causes the spark plug to spark. Also, by the counter electromotive force generated when the primary current is interrupted, the igniter sends an ignition confirmation signal (IGF) to the ECM.

The ECM stops fuel injection as a fail safe function when the IG F signal is not input to the ECM.

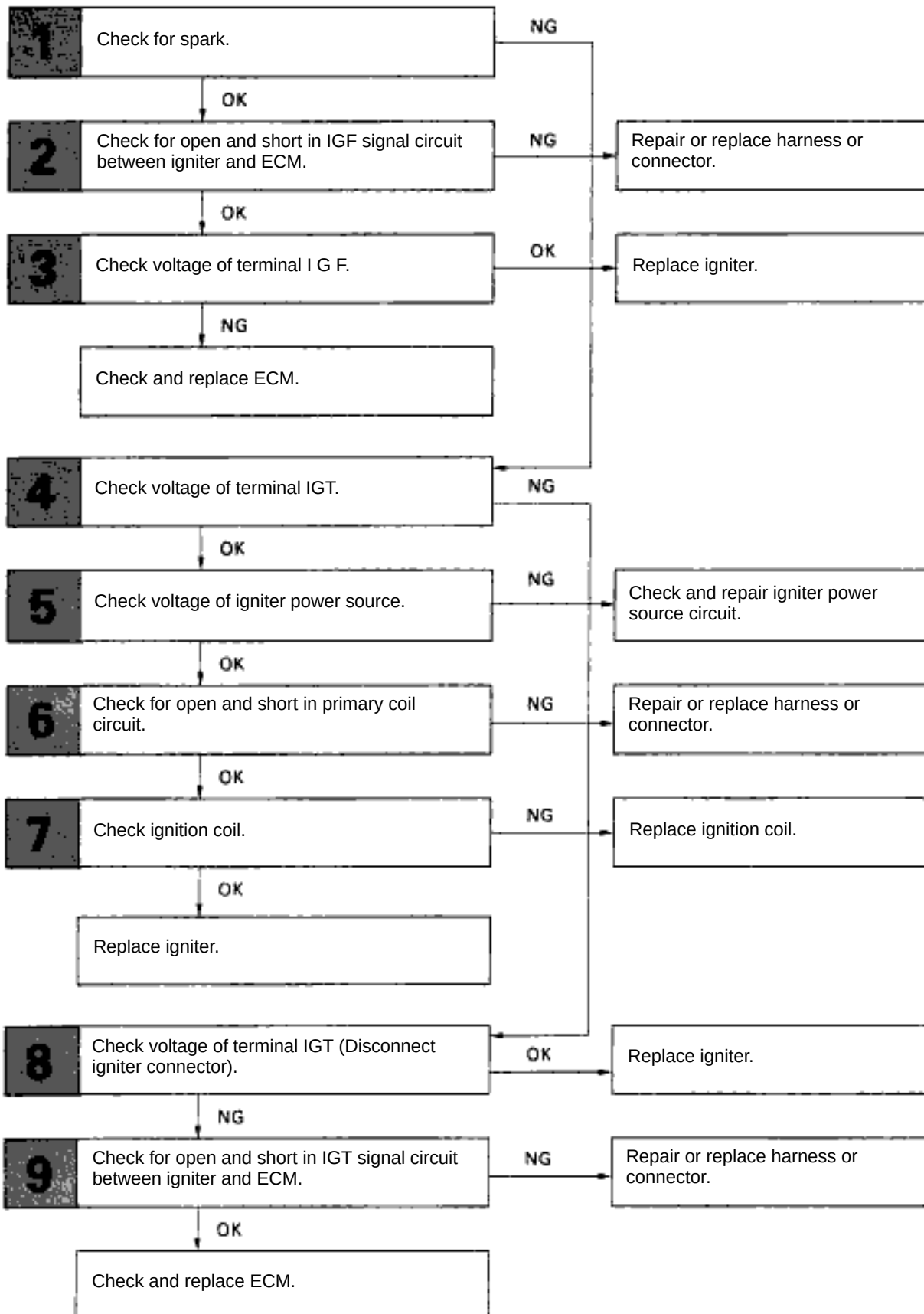
DTC No.	Diagnostic Trouble Code Detecting Condition	Trouble Area
14	No IGF signal to ECM for 4 (8*2) consecutive IGT signals.	- Open or short in IG F or IGT circuit from igniter to ECM. - Igniter - ECM

WIRING DIAGRAM



*1: Except California specification vehicles.

*2: Only for California specification vehicles.

DIAGNOSTIC CHART

INSPECTION PROCEDURE

Check for spark.

C Disconnect the high-tension cord from the distributor, hold its end about 12.5 mm (11/2") from the ground, see if spark occurs while the engine is being cranked.

OK Spark should be generated.

Hint To prevent excessive fuel injected from the injectors during this check, don't crank the engine for more than 1 – 2 seconds at a time.

OK

NG

Go to step **1**

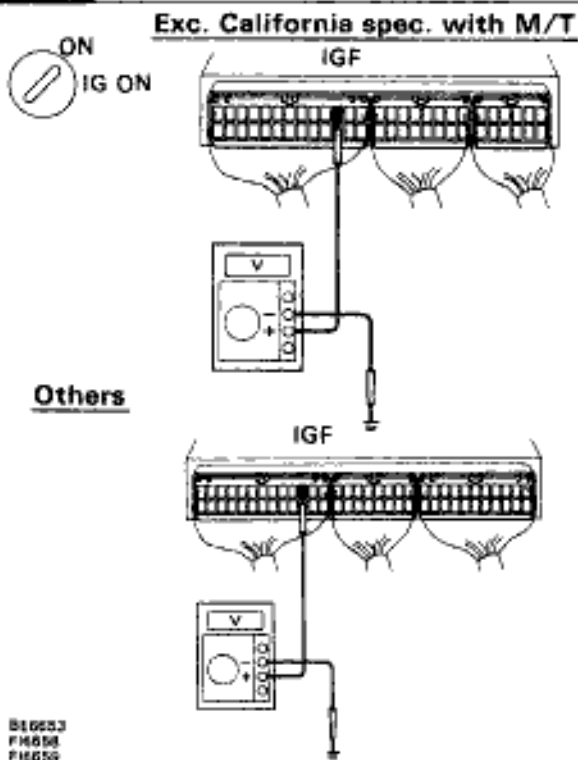
Check for open and short in harness and connector in IGF signal circuit between engine control module and igniter (See page [IN-31](#)).

OK

NG

Repair or replace harness or connector.

Disconnect igniter connector and check voltage between terminal IGF of engine control module connector and body ground.



- P** (1) Disconnect igniter connector.
(2) Remove glove compartment.
(See page [EG1-234](#)).
(3) Turn ignition switch on.

C Measure voltage between terminal IGF of engine control module connector and body ground.

OK Voltage: 4.5 ~ 5.5 V

NG

OK

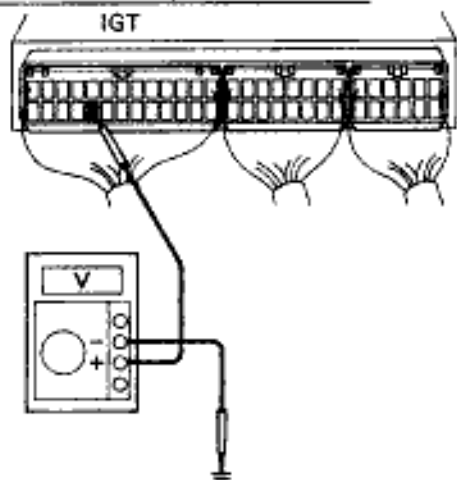
Replace igniter.

Check and replace engine control module.

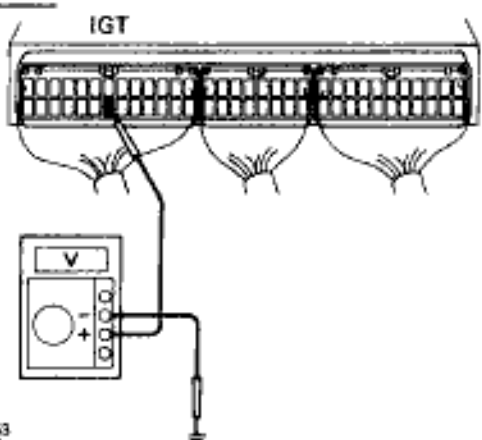
Check voltage between terminal IGT of engine control module connector and body ground.



Exc. California spec. with M/T



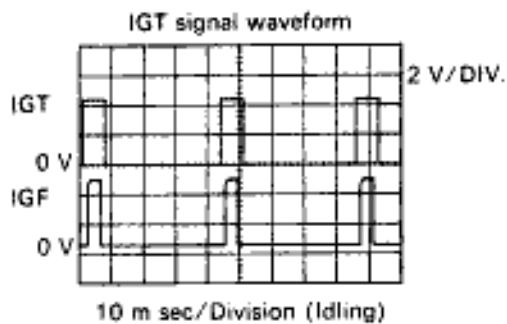
Others



BE6653
FI6660
FI6661

- P** Remove glove compartment.
(See page [EG1-234](#)).
- C** Measure voltage between terminal IGT of engine control module connector and body ground when engine is cranked.
- OK** **Voltage: 0.5 – 1.0 V**
(Neither 0 V nor 5 V)

Reference INSPECTION USING OSCILLOSCOPE



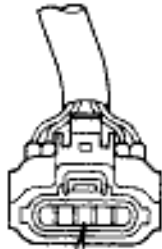
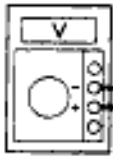
- During cranking or idling, check waveform between terminal IGT and E1 of engine control module.
- HINT: The correct waveform appears as shown in the illustration on the left, with rectangle waves.

FI6660



NG

Go to step **8**

Check voltage between terminal 3 of igniter connector and body ground.IG ON $\Rightarrow$ STA ON819653
F16438**P**

Disconnect igniter connector.

C

Measure voltage between terminal 3 of igniter connector and body ground, when ignition switch is turned to "ON" and "STA" position.

OK

Voltage: 9 ~ 14 V

OK**NG**

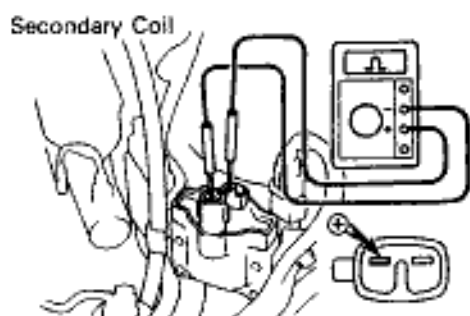
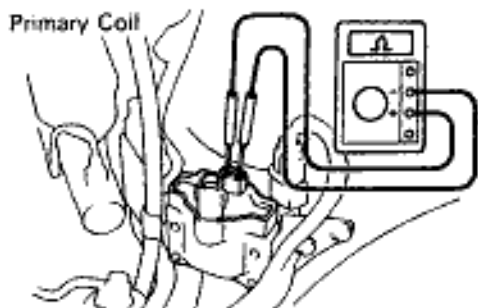
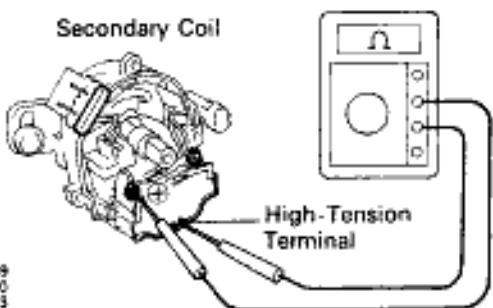
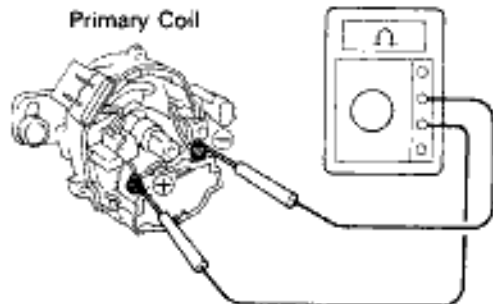
Check and repair igniter power source circuit.

Check for open and short in harness and connector between ignition switch and ignition coil, ignition coil and igniter (See page [IN-31](#)).**OK****NG**

Repair or replace harness or connector.

7

Check ignition coil.

For California spec.**Exc. California spec.**

P14139
P14140
P01053
P01054

P**For California spec.**

- (1) Disconnect ignition coil connector.
- (2) Disconnect high-tension cord from ignition coil.

Exc. California spec.

- (1) Disconnect distributor connectors.
- (2) Remove distributor cap and rotor.
- (3) Remove ignition coil dust cover.

C

- (1) Check primary coil.
Measure resistance between the positive (+) and negative (-) terminals.
- (2) Check secondary coil.
Measure resistance between the positive (+) and high-tension terminals.

OK

		Resistance
Primary Coil	Cold	0.36 ~ 0.55 Ω
	Hot	0.45 ~ 0.65 Ω
Secondary Coil	Cold	9.0 ~ 15.4 k Ω
	Hot	11.4 ~ 18.1 k Ω

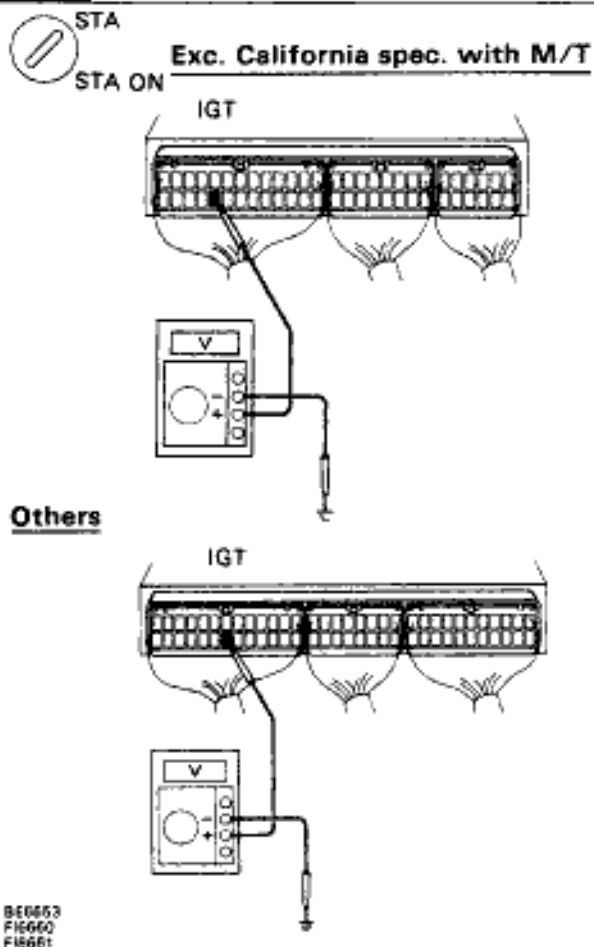
"Cold" is from -10°C (14°F) to 50°C (122°F) and
 "Hot" is from 50°C (122°F) to 100°C (212°F).

OK**NG**

Replace ignition coil.

Replace igniter.

Disconnect igniter connector and check voltage between terminal IGT of engine control module connector and body ground.



- P** Disconnect igniter connector.
- C** Measure voltage between terminal IGT of engine control module connector and body ground when engine is cranked.
- OK** Voltage: 0.5–1.0 V
(Neither 0 V nor 5 V)

NG**OK**

Replace igniter.

9

Check for open and short in harness and connector in IGT signal circuit between engine control module and igniter (See page [IN-31](#)).

OK**NG**

Repair or replace harness or connector.

Check and replace engine control module.

DTC 16 A-T Control Signal Malfunction

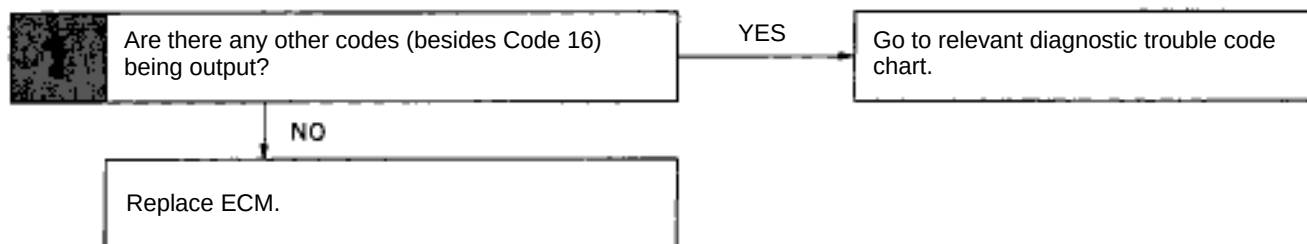
CIRCUIT DESCRIPTION

The signal from the A/T CPU retards the ignition timing of the engine during A/T shifting, thus momentarily reducing torque output of the engine for smooth clutch operation inside the transmission and reduced shift shock.

DTC No.	Diagnostic Trouble Code Detecting Condition	Trouble Area
16	Fault in communications between the engine CPU and A/T CPU in the ECM	ECM

If the ECM detects the diagnostic trouble code “16” in memory, it prohibits the torque control of the A/T which performs smooth gear shifting.

DIAGNOSTIC CHART

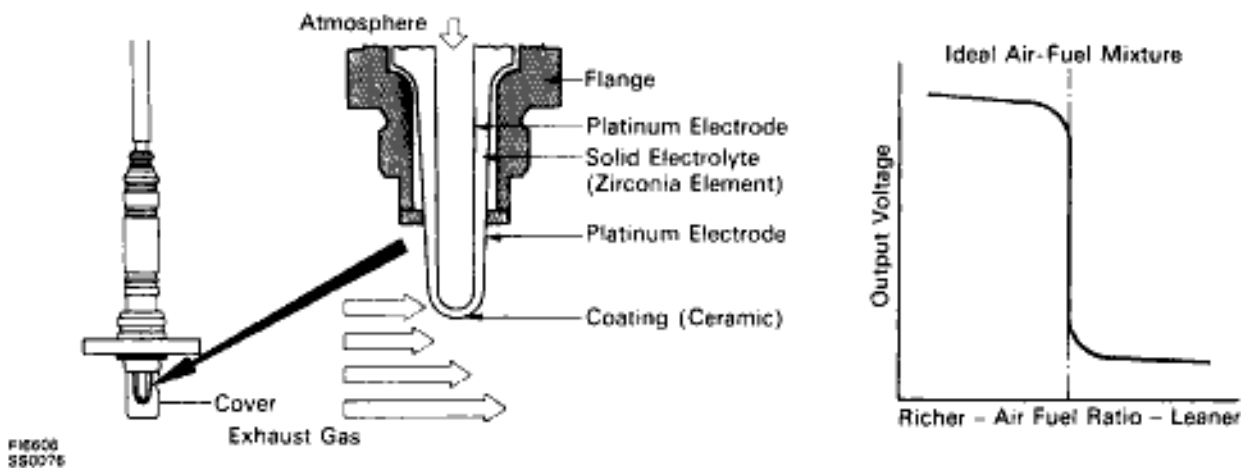


DTC 21 Main Oxygen Sensor Circuit

CIRCUIT DESCRIPTION

To obtain a high purification rate for the CO, HC and NO_x components of the exhaust gas, a three-way catalytic converter is used, but for most efficient use of the three-way catalytic converter, the air-fuel ratio must be precisely controlled so that it is always close to the stoichiometric air-fuel ratio. The oxygen sensor has the characteristic whereby its output voltage changes suddenly in the vicinity of the stoichiometric air-fuel ratio. This characteristic is used to detect the oxygen concentration in the exhaust gas and provide feedback to the computer for control of the air-fuel ratio. When the air-fuel ratio becomes LEAN, the oxygen concentration in the exhaust increases and the oxygen sensor informs the ECM of the LEAN condition (small electromotive force; 0 V).

When the air-fuel ratio is RICHER than the stoichiometric air-fuel ratio the oxygen concentration in the exhaust gas is reduced and the oxygen sensor informs the ECM of the RICH condition (large electromotive force: 1 V). The ECM judges by the electromotive force from the oxygen sensor whether the air-fuel ratio is RICH or LEAN and controls the injection time accordingly. However, if malfunction of the oxygen sensor causes output of abnormal electromotive force, the ECM is unable to perform accurate air-fuel ratio control.



DTC No.	Diagnostic Trouble Code Detecting Condition	Trouble Area
21	Main oxygen sensor signal voltage is reduced to between 0.35 V and 0.70 V for 60 sec. under conditions (a) – (d). (2 trip detection logic) * (a) Engine coolant temp. : 80°C (176°F) or more. (b) Engine speed : 1,500 rpm or more. (c) Load driving (EX. A/T in overdrive (5th for M/T), A/C ON, Flat road, 50 mph (80km/h)). (d) Main oxygen sensor signal voltage : Alternating above and below 0.45 V.	• Main oxygen sensor circuit. • Main oxygen sensor.

*See page [EG1-307](#)

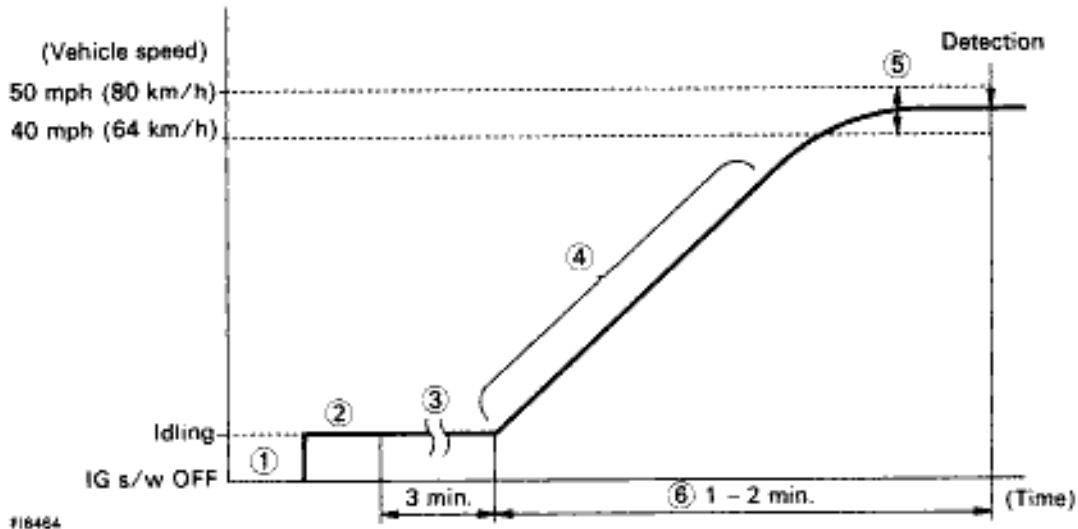
CIRCUIT DESCRIPTION (Cont'd)

DIAGNOSIS TROUBLE CODE DETECTION DRIVING PATTERN

Purpose of the driving pattern.

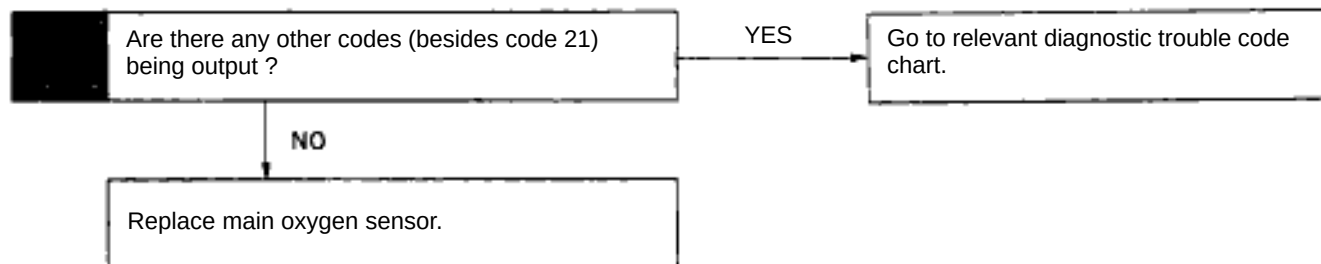
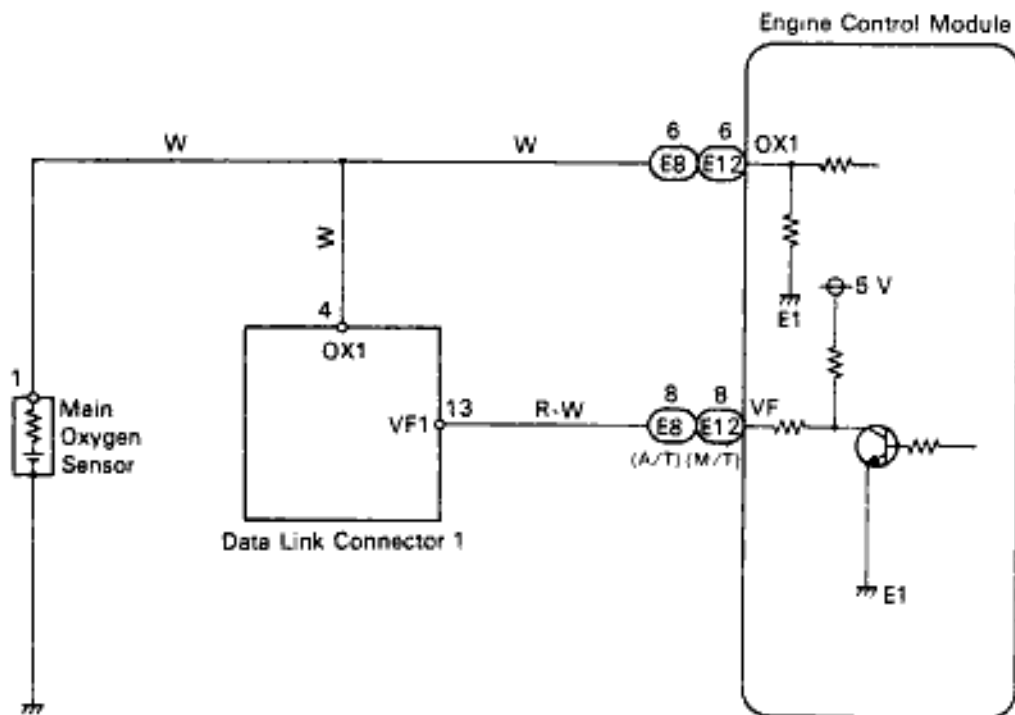
- (a) To simulate diagnostic trouble code detecting condition after diagnostic trouble code is recorded.
- (b) To check that the malfunction is corrected when the repair is completed confirming that diagnostic trouble code is no longer detected.

Malfunction: Main Oxygen Sensor Deterioration



- ① Disconnect the EFI fuse (15A) for 10 sec. or more, with IG switch OFF. Initiate test mode (Connect terminal TE2 and E1 of data link connector 1 or 2 with IG switch OFF).
- ② Start the engine and warm up with all ACC switch OFF.
- ③ After the engine is warmed up, let it idle for 3 min.
- ④ After performing the idling in (3), perform gradual acceleration with in the range 1,300~1,700 rpm (centered around 1,500 rpm) with the A/C switch ON and D position for A/T (5th for M/T).
(Take care that the engine speed does not fall below 1,200 rpm when shifting. Gradually depress the accelerator pedal and keep it. Steady so that engine braking does not occur).
- ⑤ Maintain the vehicle speed at 40 – 50 mph (64 – 80 km/h).
- ⑥ Keep the vehicle running for 1 – 2 min. after starting acceleration.
HINT: If a malfunction exists, the malfunction indicator lamp will light up after approx. 60 sec. from the start of acceleration.

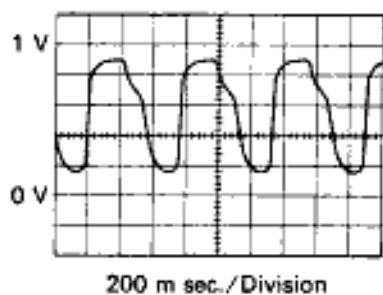
NOTICE: If the conditions in this test are not strictly followed, detection of the malfunction will not be possible.

DIAGNOSTIC CHART**WIRING DIAGRAM**

F66g1

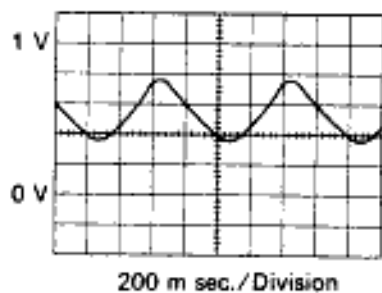
Reference INSPECTION USING OSCILLOSCOPE

Ox signal waveform



- With the engine racing (4,000 rpm) measure waveform between terminals OX1 and E1 of engine control module.

HINT: The correct waveform appears as shown in the illustration on the left, oscillating between approx. 0.1 V and 0.9 V.



If the oxygen sensor is deteriorated, the amplitude of the voltage is reduced as shown on the left.

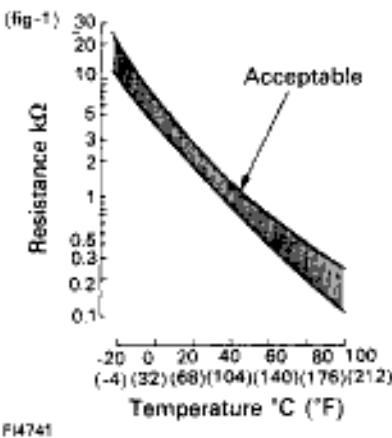
FIGS14
FIGS15

DTC 22 Engine coolant Temp. Sensor Circuit

CIRCUIT DESCRIPTION

The engine coolant temperature sensor senses the engine coolant temperature. A thermistor built in the sensor changes its resistance value according to the engine coolant temperature. The lower the engine coolant temperature, the greater the thermistor resistance value, and the higher the engine coolant temperature, the lower the thermistor resistance value (See Fig. 1.).

The engine coolant temperature sensor is connected to the ECM (See next page). The 5 V power source voltage in the ECM is applied to the engine coolant temperature sensor from the terminal THW via a resistor R. That is, resistor R and the engine coolant temperature sensor are connected in series. When the resistance value of the engine coolant temperature sensor changes in accordance with changes in the engine coolant temperature, the potential at the terminal THW also changes. Based on this signal, the ECM increases the fuel injection volume to improve driveability during cold engine operation. If the ECM detects the diagnostic trouble code 22, it operates the fail safe function in which the engine coolant temperature is assumed to be 80°C (176°F).



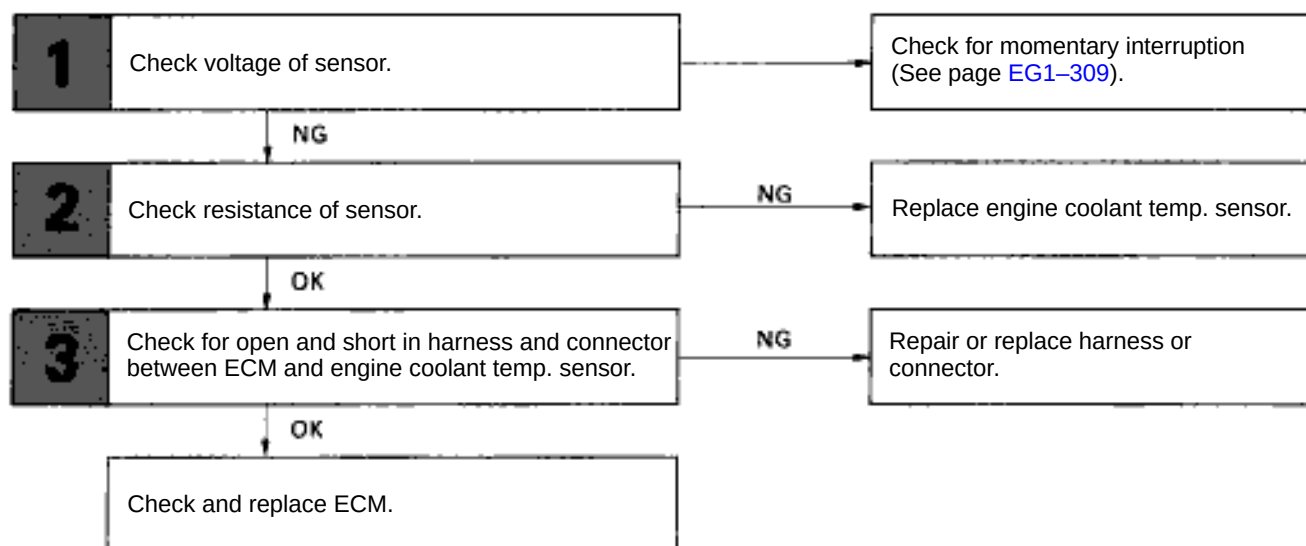
(Reference)

Engine coolant Temp. 1°C (1°F)	Resistance (kΩ)	Voltage (V)
-20 (-4)	16.0	4.3
0 (32)	5.9	3.4
20 (68)	2.5	2.4
40 (104)	1.2	1.5
60 (140)	0.6	0.9
80 (176)	0.3	0.5
100 (212)	0.2	0.3

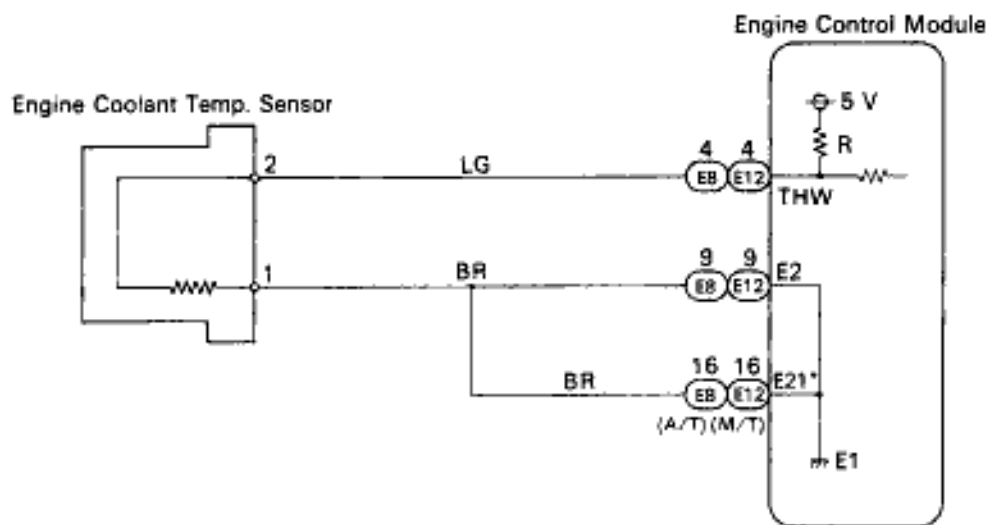
DTC No.	Diagnostic Trouble Code Detecting Condition	Trouble Area
22	Open or short in engine coolant temp. sensor circuit for 0.5 sec. or more.	- Open or short in engine coolant temp, sensor circuit - Engine coolant temp. sensor - ECM

DIAGNOSTIC CHART

HINT If diagnostic trouble codes "22" (engine coolant temperature sensor circuit), "24" (intake air temperature sensor circuit), "31" (manifold absolute pressure sensor circuit) and "41" (throttle position sensor circuit) are output simultaneously, E2 (sensor ground) may be open, OK Check for momentary interruption



WIRING DIAGRAM

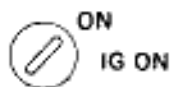


*: Except California specification vehicles.

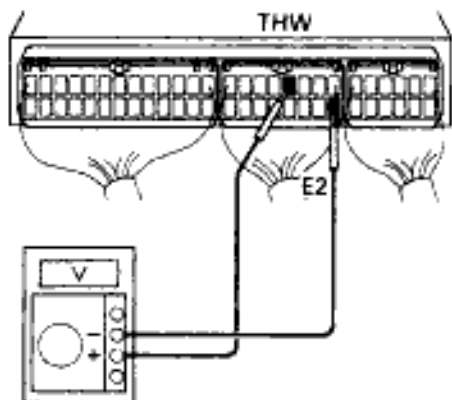
INSPECTION PROCEDURE

HINT: If diagnostic trouble codes "22" (engine coolant temperature sensor circuit), "24" (intake air temperature sensor circuit), "31" (manifold absolute pressure sensor circuit) and "41" (throttle position sensor circuit) are output simultaneously, E2 (sensor ground) may be open,

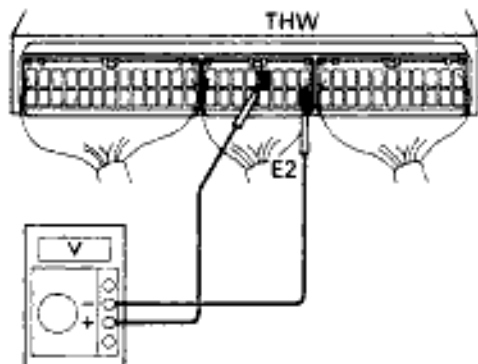
Check voltage between terminals THW and E2 of engine control module connector.



Exc. California spec. with M/T



Others



8E6653
F16662
F16663

P

(1) Remove glove compartment
(See page [EG1-234](#))

(2) Turn ignition switch on.

Measure voltage between terminals THW and E2 of engine control module connector.

C

OK

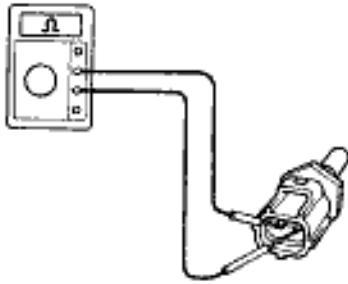
Engine Coolant Temp. 1C (1F)	Voltage
20 (68) (Engine is cool)	0.5 ~ 3.4 V
80 (176) (Engine is hot)	0.2 ~1.0 v

NG

OK

Check for momentary interruption
(See page [EG1-309](#))

Check engine coolant temp. sensor.

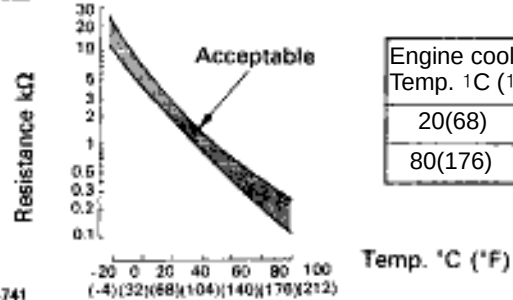


F14178

P Disconnect the engine coolant temp. sensor connector.

C Measure resistance between terminals.

OK Resistance is within Acceptable Zone on chart.



F14741

OK

NG

Replace engine coolant temp. sensor.

Check for open and short in harness and connector between engine control module and engine coolant temp. sensor (See page [IN-31](#)).

OK

NG

Repair or replace harness or connector.

Check and replace engine control module.

DTC 24 Intake Air Temp. Sensor Circuit

CIRCUIT DESCRIPTION

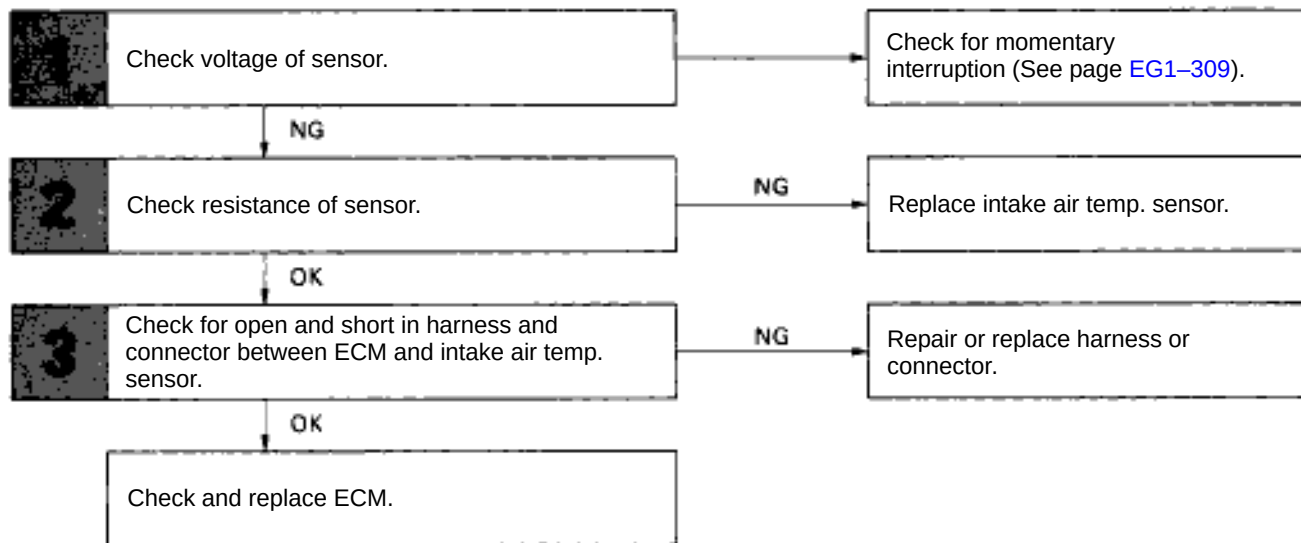
The intake air temp. sensor is built into the air cleaner cap and senses the intake air temperature. The structure of the sensor and connection to the ECM is the same as in the engine coolant temp. sensor shown on page [EG1-356](#).

If the ECM detects the diagnostic trouble code "24", it operates the fail safe function in which the intake air temperature is assumed to be 20°C (68°F).

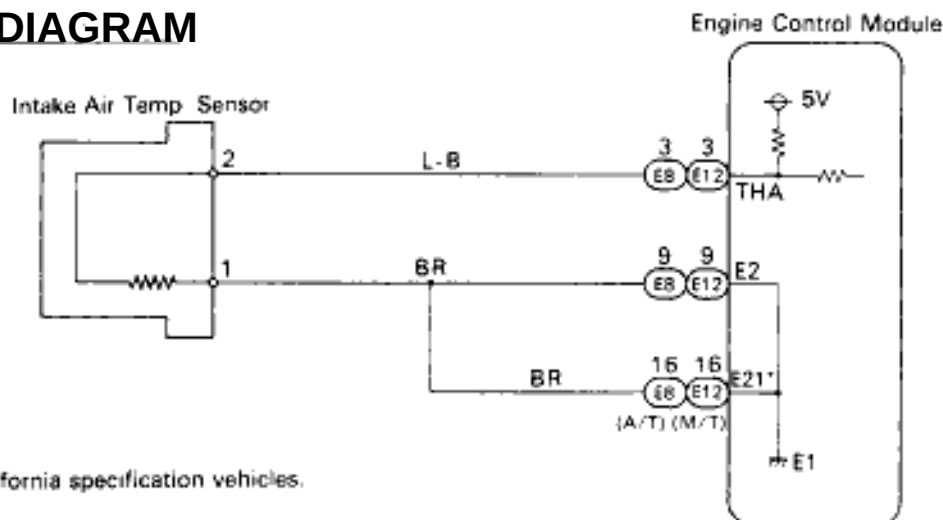
DTC No.	Diagnostic Trouble Code Detecting Condition	Trouble Area
24	Open or short in intake air temp. sensor circuit for 0.5 sec. or more.	- Open or short in intake air temp. sensor circuit - Intake air temp. sensor - ECM

DIAGNOSTIC CHART

HINT: If diagnostic trouble codes "22" (engine coolant temperature sensor circuit), "24" (intake air temperature sensor circuit), "31" (manifold absolute pressure sensor circuit) and "41" (throttle position sensor circuit) are output simultaneously, E2 (sensor ground) may be open.



WIRING DIAGRAM



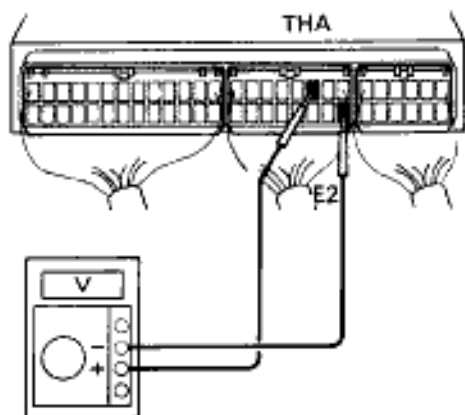
*: Except California specification vehicles.

INSPECTION PROCEDURE

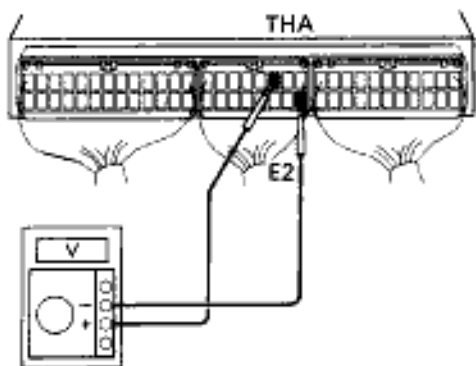
1 Check voltage between terminals THA and E2 of engine control module connector.



Exc. California spec. with M/T



Others



BEG653
F10664
F10665

- P** (1) Remove glove compartment.
(See page [EG1-234](#))
(2) Turn ignition switch on.
- C** Measure voltage between terminals THA and E2 of engine control module connector.

OK

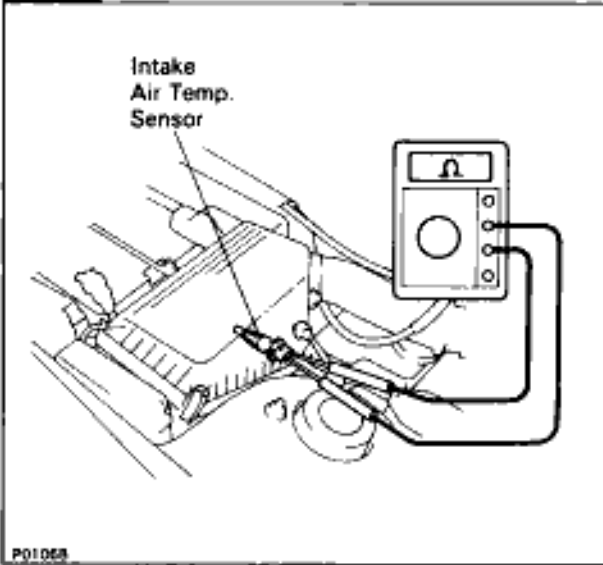
Intake air temp. °C (°F)	Voltage
20 (68)	0.5 ~ 3.4 V
60 (140)	0.2 ~ 1.0 V

NG

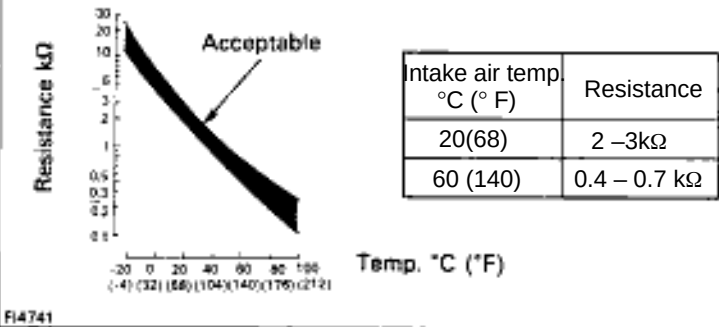
OK

Check for momentary interruption
(See page [EG1-309](#)).

Check intake air temp. sensor.



- P** Disconnect the air temp. sensor connector.
- C** Measure resistance between terminals.
- OK** Resistance is within Acceptable Zone on chart.



OK

NG Replace intake air temp. sensor.

Check for open and short in harness and connector between engine control module and intake air temp. sensor (See page [IN-31](#)).

OK

NG Repair or replace harness or connector.

Check and replace engine control module.

DTC 25 26 Air-Fuel Ratio Lean Rich Malfunction

CIRCUIT DESCRIPTION

The main oxygen sensor is located in the exhaust manifold.

It indirectly determines whether the fuel mixture is rich or lean by detecting the concentration of oxygen present in the exhaust gas.

DTC No.	Diagnostic Trouble Code Detecting Condition	Trouble Area
25	(1) Main oxygen sensor voltage is 0.45 V or less (lean) for 90 sec. under conditions (a) and (b). (2 trip detection logic) * (a) Engine coolant temp.: 60°C (140°F) or more. (b) Engine speed: 1,500 rpm or more.	• Open or short in main oxygen sensor circuit • Main oxygen sensor • Ignition system • ECM
	(2) Engine speed varies by more than 15 rpm over the preceding crank position period during a period of 50 sec. or more under conditions (a) and (b). (2 trip detection logic) * (a) Engine speed: Idling (b) Engine coolant temp.: 60°C (140°F) or more.	• Open or short in injector circuit • Fuel line pressure (injector leak, blockage) • Mechanical system malfunction (skipping teeth of timing belt) • Ignition system • Compression pressure (foreign object caught in valve) • Air leakage • ECM
26	Engine speed varies by more than 15 rpm over the preceding crank position period during a period of 50 sec. or more under conditions (a) and (b). (2 trip detection logic) * (a) Engine speed: Idling (b) Engine coolant temp.: 60°C (140°F) or more	• Open or short in injector circuit • Fuel line pressure (injector leak, blockage) • Mechanical system malfunction (skipping teeth of timing belt) • Ignition system • Compression pressure (foreign object caught in valve) • Air leakage • ECM

*: See page [EG1-307](#)

CIRCUIT DESCRIPTION (Cont'd)**DIAGNOSIS TROUBLE CODE DETECTION DRIVING PATTERN**

Purpose of the driving pattern.

- (a) To simulate diagnostic trouble code detecting condition after diagnostic trouble code is recorded.
- (b) To check that the malfunction is corrected when the repair is completed confirming that diagnostic trouble code is no longer detected.

Malfunction: Open or Short in Main Oxygen Sensor.

Open or Short in Injector Circuit, Injector Leak or Blockage.

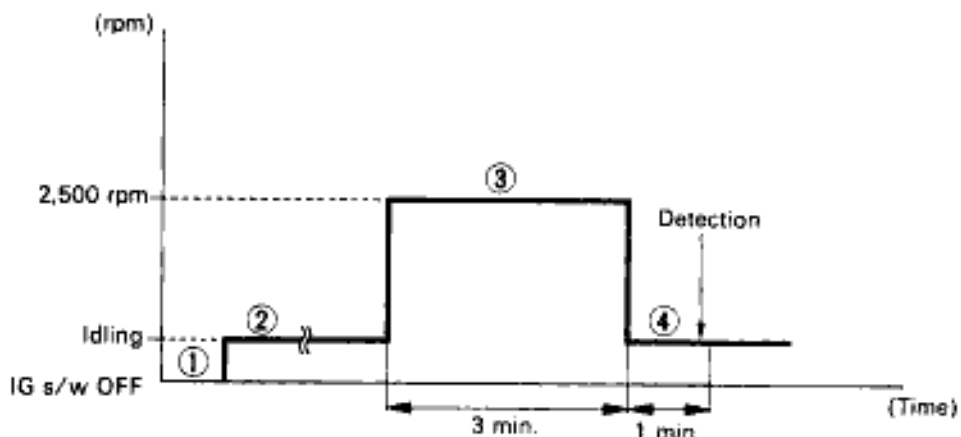


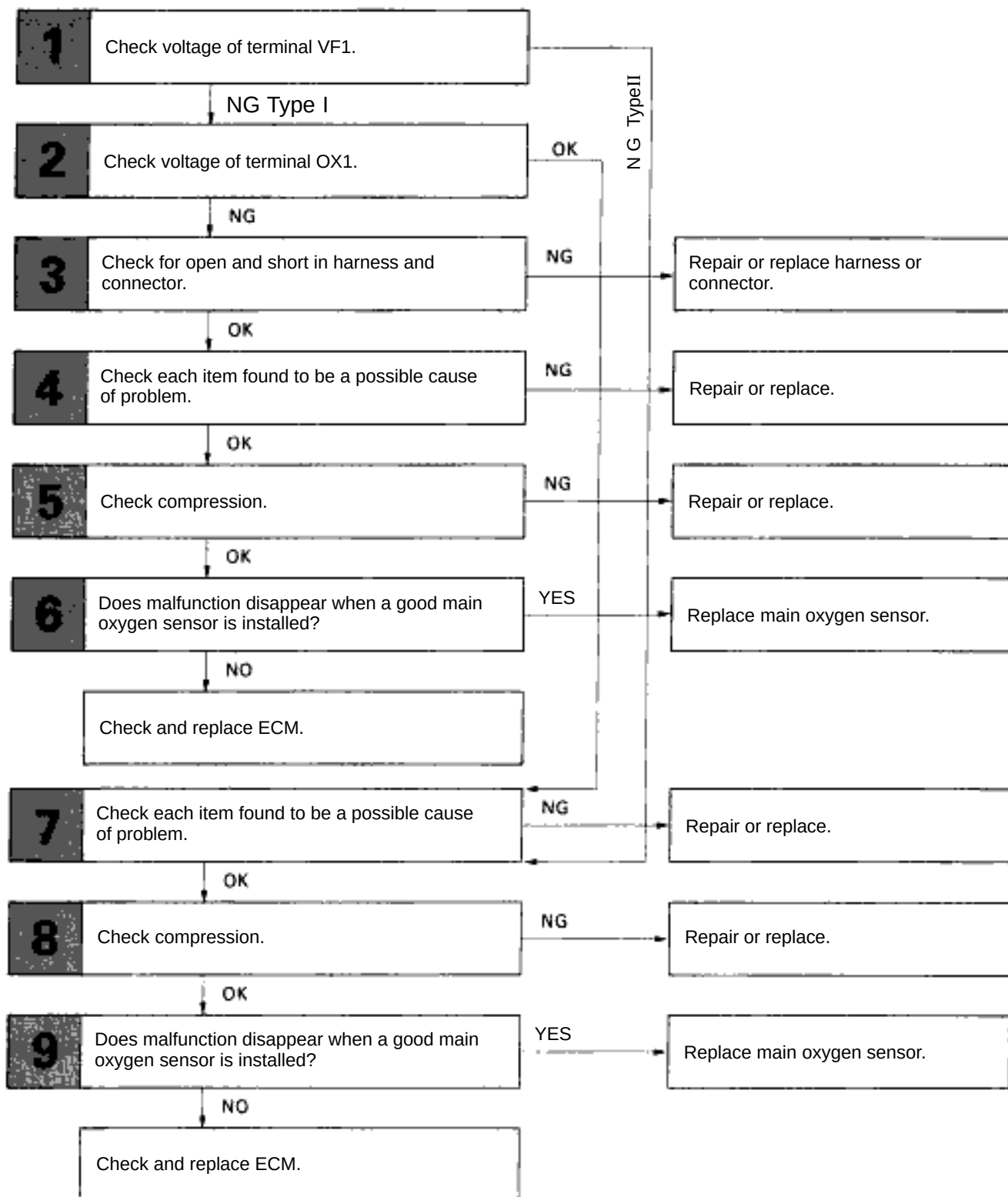
Fig. 79

H I N T: Before this test, check the feedback voltage for oxygen sensor.

- ① Disconnect the EFI fuse (15 A) for 10 sec. or more, with IG switch OFF.
Initiate test mode (Connect terminal TE2 and E1 of data link connector 1 or 2 with IG switch OFF).
- ② Start engine and warm up.
- ③ After the engine is warmed up, let it race at 2,500 rpm for 3 min.
- ④ After performing the racing in (3), perform idling 1 min.

H I N T: If a malfunction exists, the malfunction indicator lamp will light up during step (4).

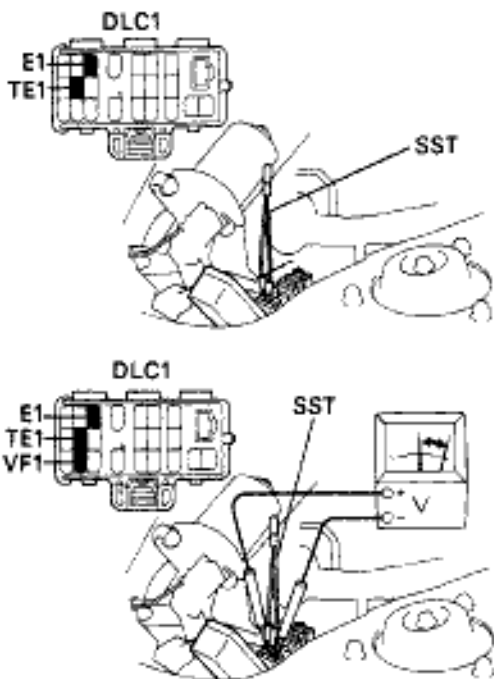
NOTICE: If the conditions in this test are not strictly followed, detection of the malfunction will not be possible.

DIAGNOSTIC CHART**WIRING DIAGRAM**

Refer to page [EG1-354](#) for the WIRING DIAGRAM.

INSPECTION PROCEDURE

Check voltage between terminals VF1 and E1 of data link connector 1.



P00487
P00494

- P** (1) Warm up engine at normal operating temperature.
(2) Connect terminals TE1 and E1 of data link connector 1.
(3) Connect positive probe to terminal VF1 and negative probe to terminal E1 of data link connector 1.

- C** (1) Warm up the oxygen sensor by running engine at 2,500 rpm for about 2 minutes.
(2) Then, maintaining engine at 2,500 rpm, count how many times needle of voltmeter fluctuates between 0 and 5 V.

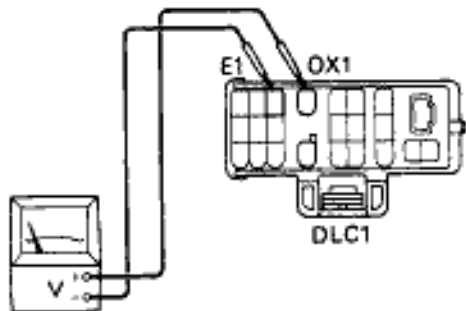
Result	
Needle fluctuates of 8 times or more for every ten seconds	OK
Continue at 0 V	NG Type II
Continue at 5 V	NG Type II

NG
Type I

NG
Type II

Go to step **7**

Check voltage between terminals OX1 and E1 of data link connector 1.



F06652

- P** Warm up engine at normal operating temperature.
- C** Measure voltage between terminals OX1 and E1 of data link connector 1 when engine is suddenly raced to full throttle.
- OK** The voltage should be 0.5 V or higher at least once.
- Hint** Perform inspection within 1 second.

NG

OK

Go to step **7**

3 Check for open and short in harness and connector between engine control module and main oxygen sensor, engine control module and data link connector 1 (See page [IN-31](#)).

OK

NG

Repair or replace harness or connector.

4 Check each item found to be a possible cause of problem.

Check each circuit found to be a possible cause of trouble according to the results of the check in **4** or **5**. The numbers in the table below show the order in which the checks should be performed.

Main oxygen sensor signal continue at OV.	Possible Cause	See page
1	Faulty sensor installation.	-
5	Injector circuit	EG1-410
3	Misfire	IG-6 , 26*
9	Valve timing	EG1-36
2	Air leakage	EG1-173
4	Fuel system	EG1-419
8	Characteristics deviation in manifold absolute pressure sensor.	EG1-372
6	Characteristics deviation in engine coolant temp. sensor.	EG1-356
7	Characteristics deviation in intake air temp. sensor.	EG1-360

*: Except California specification vehicles.

OK

NG

Repair or replace.

5

Check compression (See page [EG1-23](#)).

OK

NG

Repair or replace.

6

Does malfunction disappear when a good main oxygen sensor is installed?

NO

YES

Replace main oxygen sensor.

Check and replace engine control module.

Check each item found to be a possible cause of problem.

Check each circuit found to be a possible cause of trouble according to the results of the check in . The numbers in the table below show the order in which the checks should be performed.

Main oxygen sensor signal continue at 5.0 V.	Main oxygen sensor signal is normal.	Possible Cause	See page
2	7	Injector circuit	EG1-410
	3	Misfire	IG-6, 26*
8	4	Valve timing	EG1-36
	1	Air leakage	EG1-173
1	2	Fuel system	EG1-419
5	8	Characteristics deviation in manifold absolute pressure sensor.	EG1-372
3	5	Characteristics deviation in engine coolant temp. sensor.	EG1-356
4	6	Characteristics deviation in intake air temp. sensor.	EG1-360

x: Except California specification vehicles.

OK

NG

Repair or replace.

Check compression (See page [EG1-23](#)).

OK

NG

Repair or replace.

Does malfunction disappear when a good main oxygen sensor is installed?

NO

YES

Replace main oxygen sensor.

Check and replace engine control module.

DTC 27 Sub Oxygen Sensor Circuit

CIRCUIT DESCRIPTION

The sub oxygen sensor is installed on the exhaust pipe. Its construction and operation is the same as the main oxygen sensor on page [EG1-352](#).

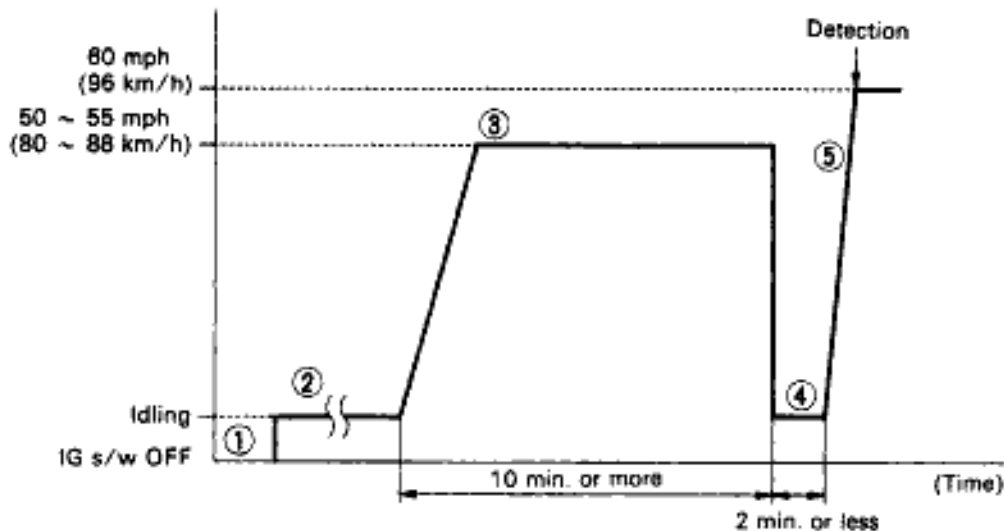
DTC No.	Diagnostic Trouble Code Detecting Condition	Trouble Area
27	Main oxygen sensor signal is 0.45 V or more and sub oxygen sensor signal is 0.45 V or less under conditions (a) and (b). (2 trip detection logic) * (a) Engine coolant temp. : 80°C (176°F) or more. (b) Accel. pedal : Fully depressed for 2 sec. or more.	• Open or short in sub oxygen sensor circuit. • Sub oxygen sensor • ECM

* : See page [EG1-307](#).

CIRCUIT DESCRIPTION (Cont'd)**DIAGNOSIS TROUBLE CODE DETECTION DRIVING PATTERN**

Purpose of the driving pattern.

- (a) To simulate diagnostic trouble code detecting condition after diagnostic trouble code is recorded.
- (b) To check that the malfunction is corrected when the repair is completed confirming that diagnostic trouble code is no longer detected.

Malfunction: Open or Short in Sub Oxygen Sensor

#16527

- ① Disconnect the E F I fuse (15 A) for 10 sec. or more, with IG switch OFF. Initiate test mode (Connect terminals TE2 and E1 of data link connector 1 or 2 with I G switch OFF).
- ② Start the engine and warm up, with all ACC switch OFF.
- ③ After the engine is warmed up, let it drive at 50 ~ 55 mph (80 ~ 88 km/h) for 10 min. or more.
- ④ After driving, stop at a safe place and perform idling for 2 min. or less.
- ⑤ After performing the idling in (4) , perform acceleration to 60 mph (96 km/h) with the throttle valve fully open.

HINT: If a malfunction exists, the malfunction indicator lamp will light up during step.

NOTICE: If the conditions in this test are not strictly followed, detection of the malfunction will not be possible.

```

graph TD
    A[Are there any other codes (beside Code 27) being output?] -- YES --> B[Go to relevant diagnostic trouble code chart.]
    A -- NO --> C[Replace sub oxygen sensor.]
  
```

FIG594

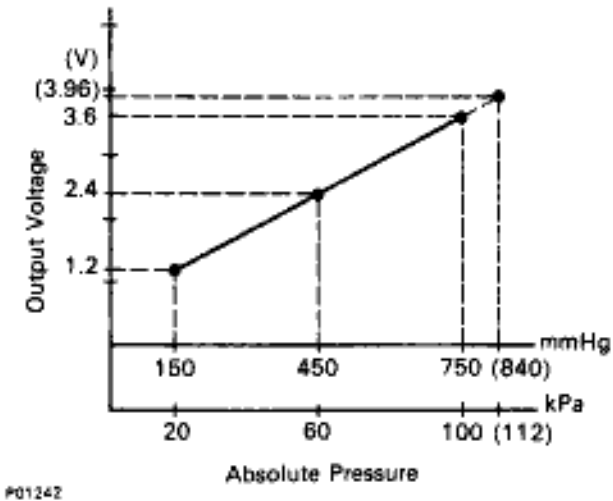
DTC 31 Manifold Absolute Pressure Sensor Circuit

CIRCUIT DESCRIPTION

By a built-in sensor unit, the manifold absolute pressure sensor detects the intake manifold absolute pressure as a voltage.

The ECM then determines the basic injection duration and basic ignition advance angle based on this voltage.

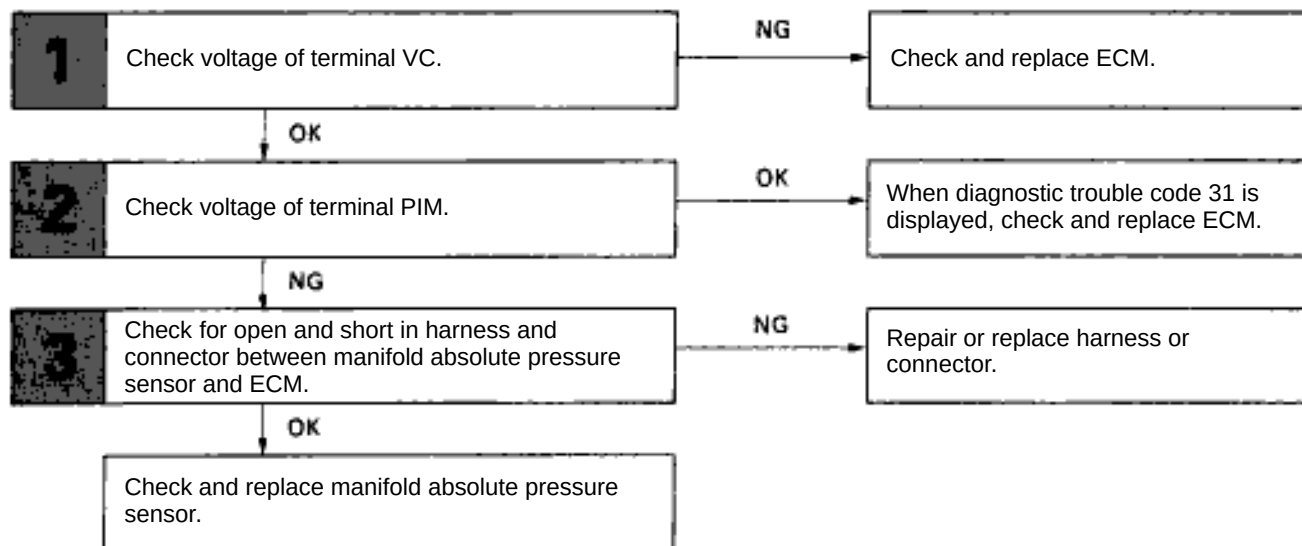
Since the manifold absolute pressure sensor does not use the atmospheric pressure as a criterion, but senses the absolute pressure inside the intake manifold (the pressure in proportion to the preset absolute vacuum O), it is not influenced by fluctuations in the atmospheric pressure due to high altitude and other factors. This permits it to control the air-fuel ratio at the proper level under all conditions.



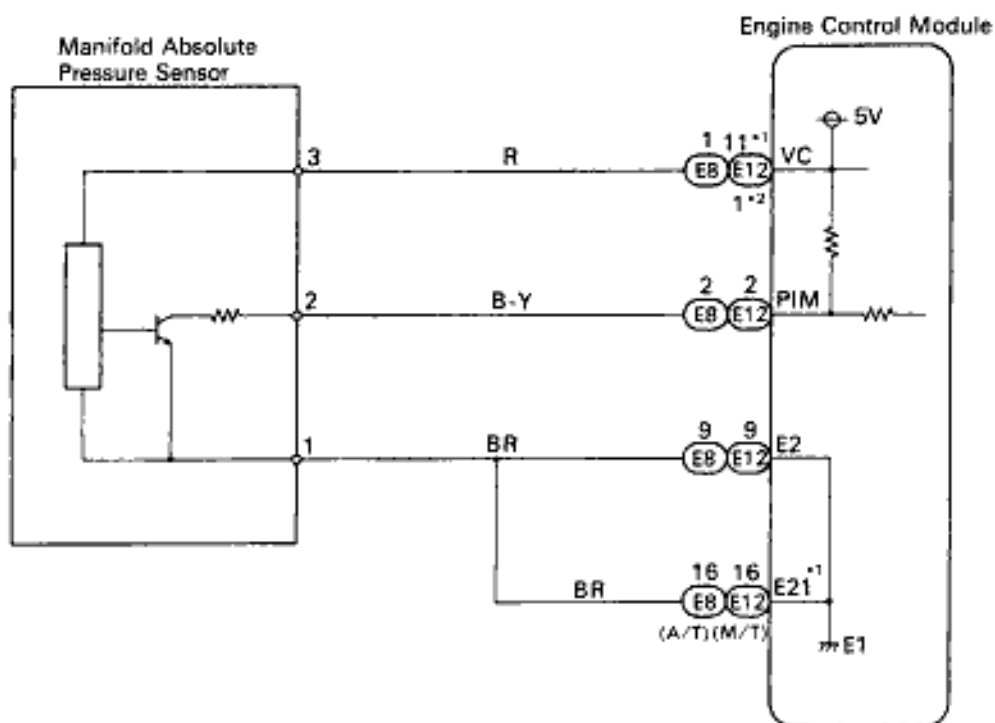
DTC No.	Diagnostic Trouble Code Detecting Condition	Trouble Area
31	Open or short in manifold absolute pressure sensor circuit for 0.5 sec. or more.	• Open or short in manifold absolute pressure sensor circuit. • Manifold absolute pressure sensor. • ECM

If the ECM detect diagnostic trouble code “31 “, it operates the fail safe function, keeping the ignition timing and fuel injection volume constant and making it possible to drive the vehicle.

DIAGNOSTIC CHART



WIRING DIAGRAM



*1: Except California specification vehicles.

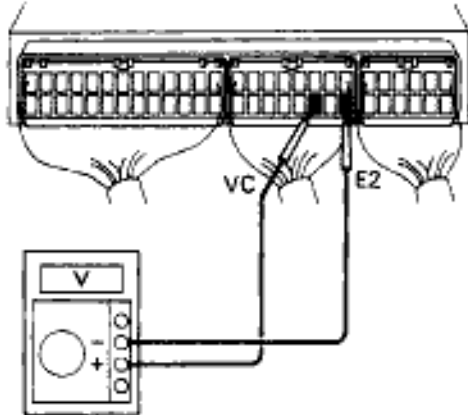
*2: Only for California specification vehicles.

INSPECTION PROCEDURE

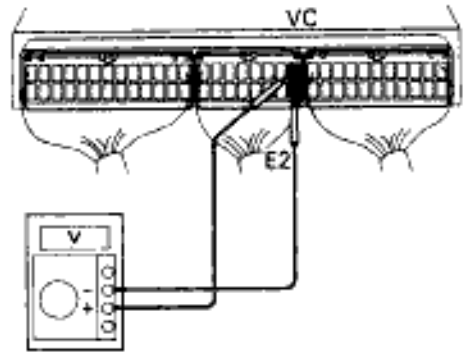
Check voltage between terminals VC and E2 of engine control module connector.



Exc. California spec. with M/T



Others



BC6653
F18666
F18667

- P** (1) Remove glove compartment.
(See page [EG1-234](#)).
(2) Turn ignition switch on.
- C** Measure voltage between terminals VC and E2 of engine control module connector.
- OK** Voltage: 4.5 ~ 5.5 V

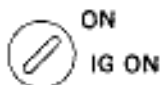
OK

NG

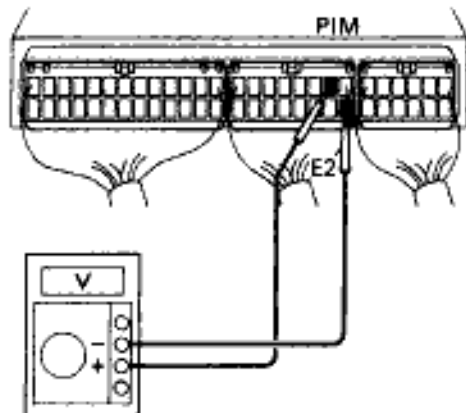
Check and replace engine control module.

2

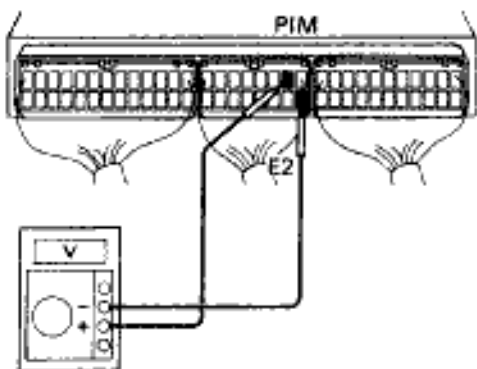
Check voltage between terminals PIM and E2 of engine control module connector.



Exc. California spec. with M/T



Others



BT6653
F16608
F16669

- P** Turn ignition switch on
- C** Measure voltage between terminals PIM and E2 of engine control module connector.
- OK** Voltage: 13 – 3.9 V

NG

OK

When diagnostic trouble code 31 is displayed, check and replace engine control module.

3

Check for open and short in harness and connector between engine control module and manifold absolute pressure sensor
(See page [IN-31](#)).

OK

NG

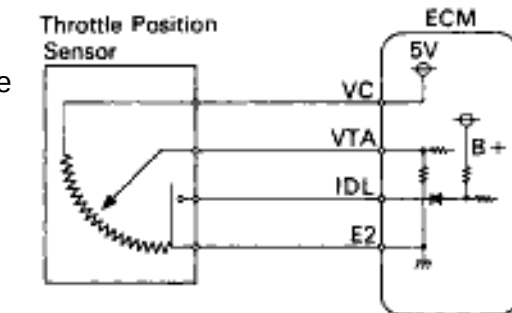
Repair or replace harness or connector.

Check and replace manifold absolute pressure sensor.

DTC 41 Throttle Position Sensor 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 I D L contacts in the throttle position sensor are on, so the voltage at the terminal I D L of the ECM become 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 I D L 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 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 correction and fuel–cut control etc.



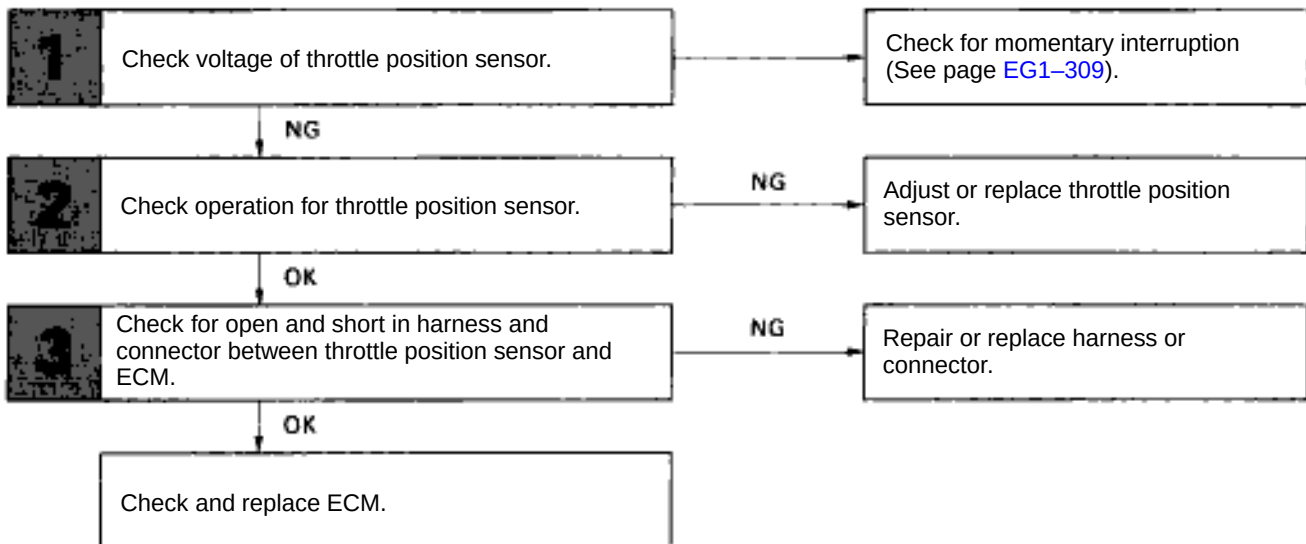
DTC No.	Diagnostic Trouble Code Detecting Condition	Trouble Area
41	Open or short in throttle position sensor circuit for 0.5 sec. or more.	• Open or short in throttle position sensor circuit. • Throttle position sensor. • ECM

HINT;

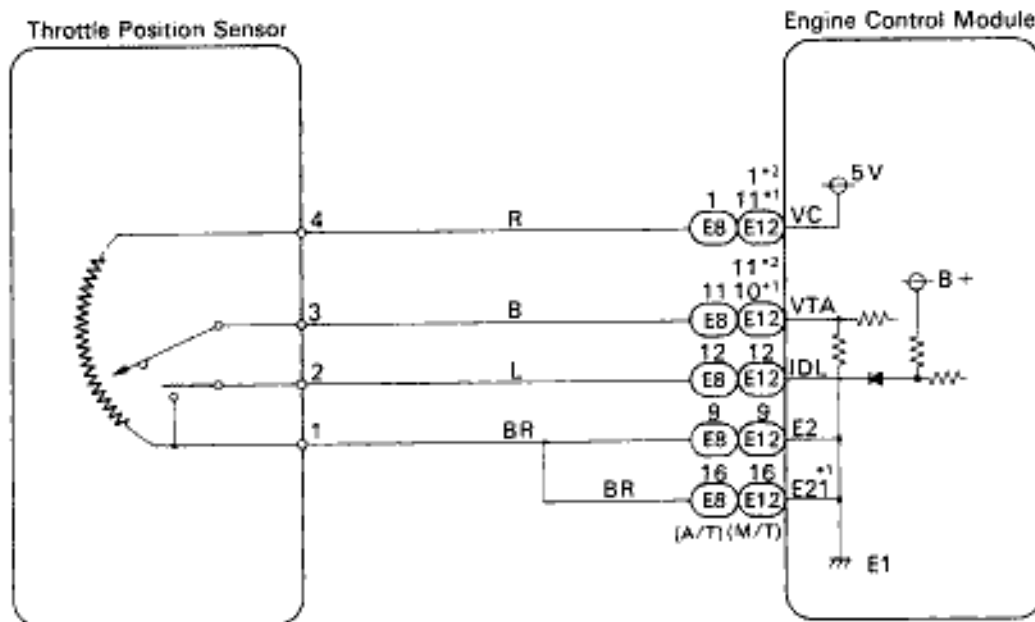
- When the connector for the throttle position sensor is disconnected, diagnostic trouble code 41 is not displayed. Diagnostic trouble code 41 is displayed only when there is an open or short in the VTA signal circuit of the throttle position sensor.

DIAGNOSTIC CHART

HINT: If diagnostic trouble codes "22" (engine coolant temperature sensor circuit), "24" (intake air temperature sensor circuit), "31" (manifold absolute pressure sensor circuit) and "41" (throttle position sensor circuit) are output simultaneously, E2 (sensor ground) may be open.



WIRING DIAGRAM



*1: Except California specification vehicles.

*2: Only for California specification vehicles.

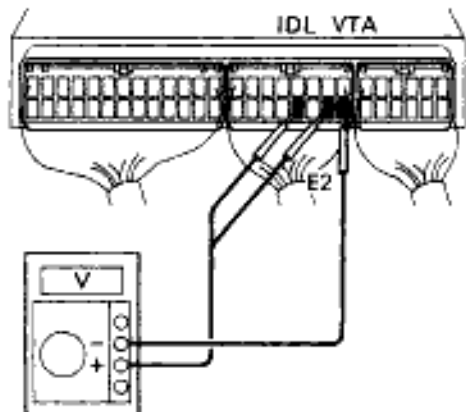
INSPECTION PROCEDURE

HINT: If diagnostic trouble code "22" (engine coolant temperature sensor circuit), "24" (intake air temperature sensor circuit), "31" (manifold absolute pressure sensor circuit) and "41" (throttle position sensor circuit) are output simultaneously, E2 (sensor ground) may be open.

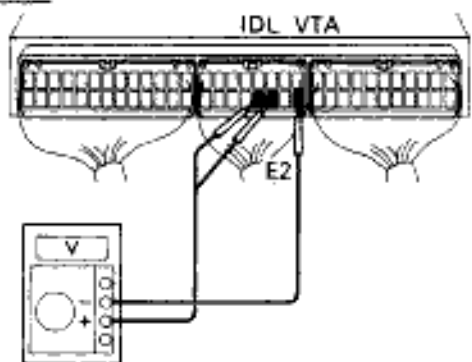
Check voltage between terminals VTA, IDL and E2 of engine control module connector.



Exc. California spec. with M/T



Others



826867
F46670
F46671

- P** (1) Remove glove compartment.
(See page [EG1-234](#)).
- (2) Disconnect the vacuum hose from the throttle body, then apply vacuum to the throttle opener (See page [EG1-204](#)).
- (3) Turn ignition switch ON.
- C** Measure voltage between terminals VTA, IDL and E2 of engine control module connector when the throttle valve is opened gradually from the closed condition.

OK

Terminal	VTA - E2	IDL - E2
Throttle Valve		
Fully Closed	0.3 - 0.8 V	0 - 3.0 V
Fully Open	3.2 - 4.9 V	9 - 14 V

Hint

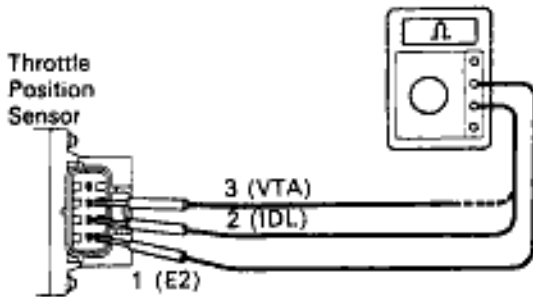
The voltage should increase steadily in proportion to the throttle valve opening angle.

NG

OK

Check for momentary interruption
(See page [EG1-309](#)).

2 Check throttle position sensor.



F16651

- P** (1) Disconnect throttle position sensor connector.
 (2) Disconnect the vacuum hose from the throttle body, then apply vacuum to the throttle opener (See page [EG1-204](#)).

- C** Measure resistance between terminals 3 (VTA), 2 (IDL) and 1 (E2) of throttle position sensor connector when the throttle valve is opened gradually from the closed condition.

OK

Terminal	3 (VTA) – 1 (E2)	2 (IDL) – 1 (E2)
Throttle Valve		
Fully Closed	0.2 – 5.7 k Ω	Less than 2.3 k Ω
Fully Open	2.0 – 10.2 k Ω	1 M Ω or higher

- Hint** Resistance between terminals 3 (VTA) and 1 (E2) should increase gradually in accordance with the throttle valve opening angle.

OK**NG**

Adjust or replace throttle position sensor (See page [EG1-209](#)).

3 Check for open and short in harness and connector between engine control module and throttle position sensor (See page [IN-31](#)).

OK**NG**

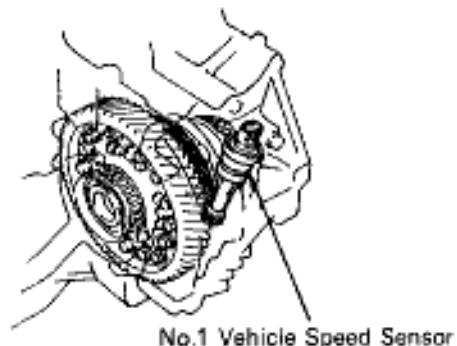
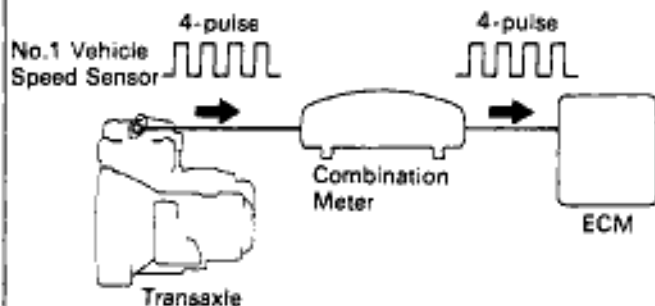
Repair or replace harness or connector.

Check and replace engine control module.

DTC 42 No.1 Vehicle Speed Sensor Signal Circuit

CIRCUIT DESCRIPTION

The No.1 vehicle speed sensor outputs a 4-pulse signal for every revolution of the rotor shaft, which is rotated by the transmission output shaft via the driven gear. After this signal is converted into a more precise rectangular waveform by the waveform shaping circuit inside the combination meter, it is then transmitted to the ECM. The ECM determines the vehicle speed based on the frequency of these pulse signals.

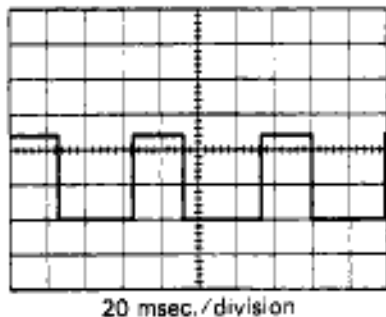


G00515
G00514

DTC No.	Diagnostic Trouble Code Detecting Condition	Trouble Area
42	For A/T All conditions below are detected continuously for 8 sec. or more. (a) No.1 Vehicle speed signal: 0 mph (km/h) (b) Engine speed: 3,100 rpm or more (c) Park/Neutral position switch: OFF	- Open or short in No.1 vehicle speed sensor circuit. - No.1 vehicle speed sensor. - Combination meter. - ECM
	For M/T All conditions below are detected continuously for 8 sec. or more. (a) No.1 vehicle speed signal: 0 mph (km/h) (b) Engine speed: Between 3,100 rpm and 5,000 rpm (c) Engine coolant temp.: 80°C (176°F) or more (d) Load driving	

HINT: In test mode, diagnostic trouble code 42 is output when vehicle speed is 3 mph (5 km/h) or below.

< Reference >

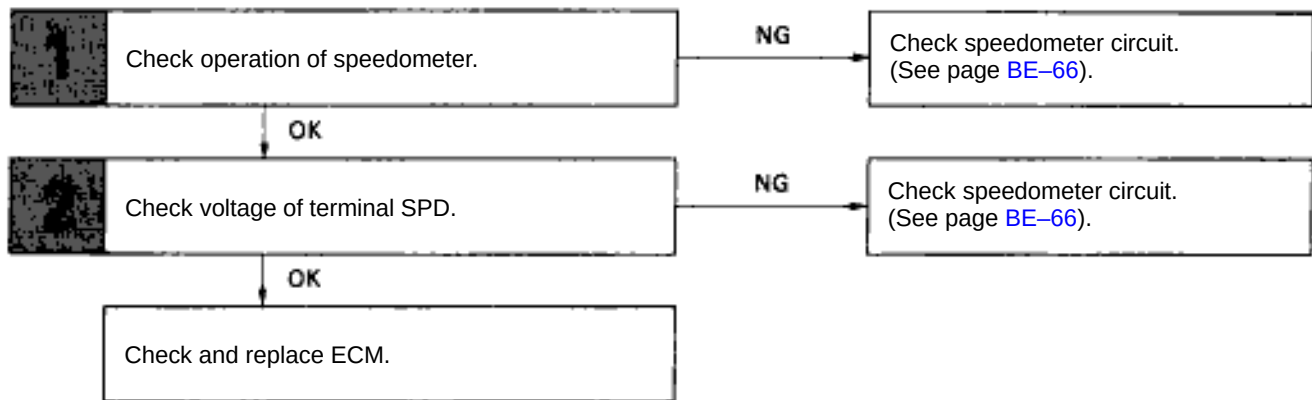


- Waveform between terminals SPD and E1 when vehicle speed is approx. 12 mph (20 km/h).

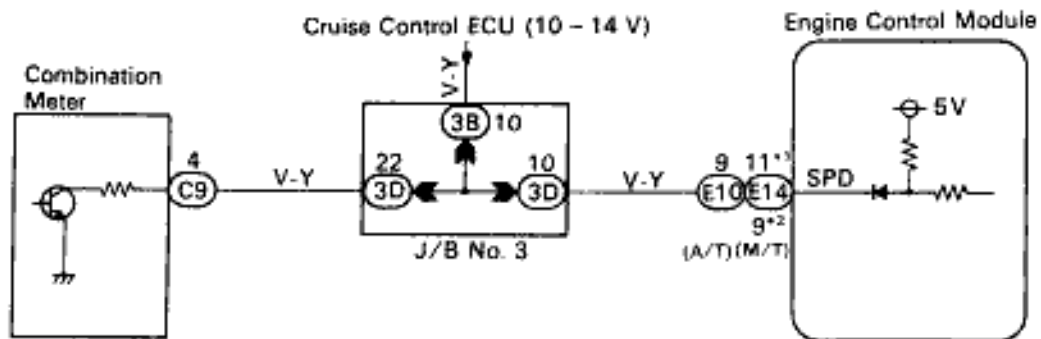
HINT: The greater the vehicle speed, the greater the number of No.1 vehicle speed sensor signals produced.

V01480

DIAGNOSTIC CHART



WIRING DIAGRAM



*1: Except California specification vehicles.
 *2: Only for California specification vehicles.

INSPECTION PROCEDURE

1

Check operation of speedometer.

C Drive the vehicle and check if the operation of the speedometer in the combination meter is normal.

Info The No. 1 vehicle speed sensor is operating normally if the speedometer display is normal.

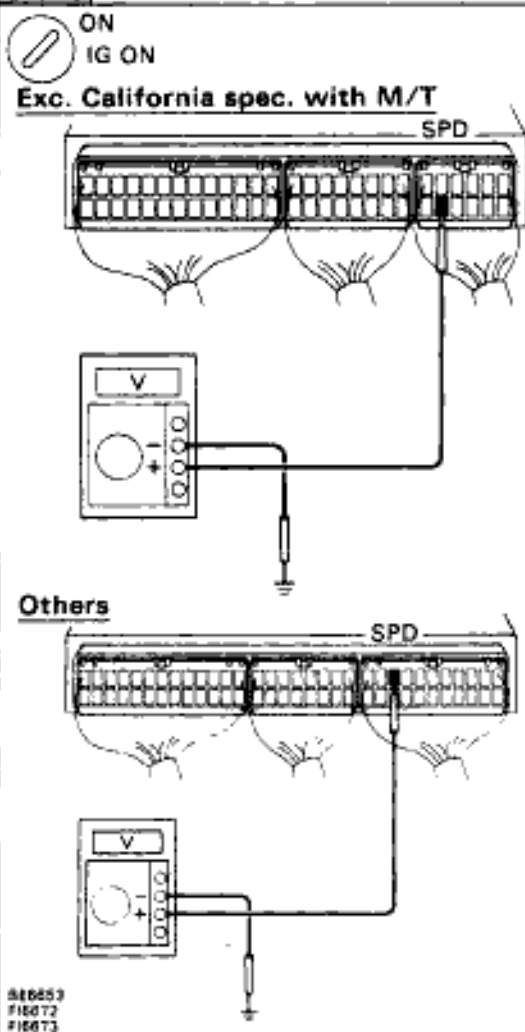
OK

NG

Check speedometer circuit. See combination meter troubleshooting on page [BE-66](#).

2

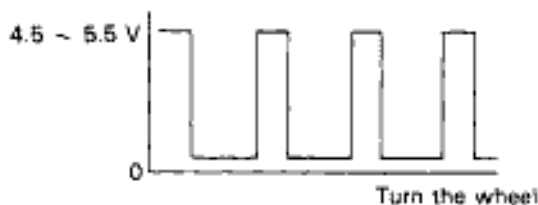
Check voltage between terminal SPD of engine control module connector and body ground.



- P** (1) Remove glove compartment.
(See page [EG1-234](#)).
(2) Disconnect cruise control ECU connector.
(3) Shift the shift lever to N position or neutral.
(4) Jack up a front wheel on one side.
(5) Turn ignition switch on.

C Measure voltage between terminal SPD of engine control module connector and body ground when the wheel is turned slowly.

OK Voltage is generated intermittently.



A77809

OK

NG

Check speedometer circuit. See combination meter troubleshooting on page [BE-66](#).

Check and replace engine control module.

DTC 43 Starter Signal Circuit

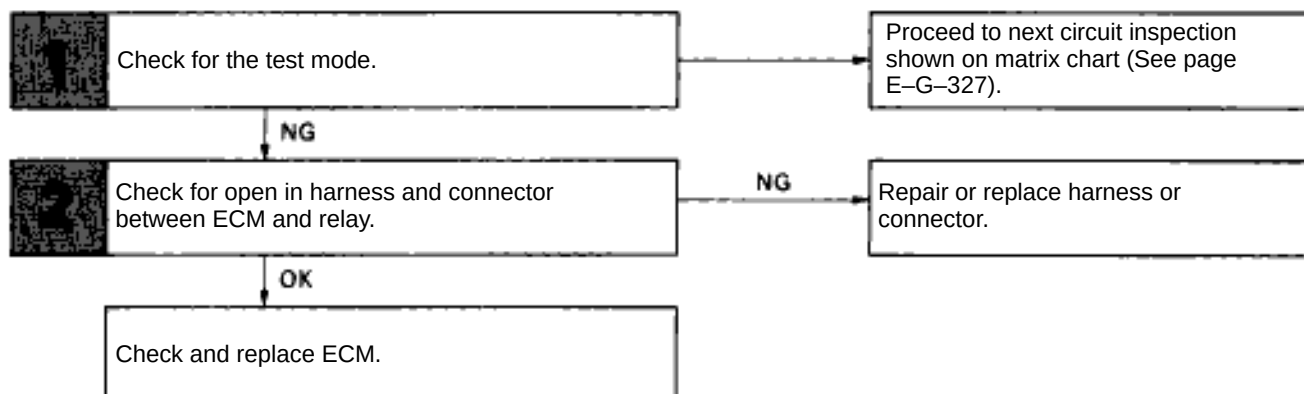
CIRCUIT DESCRIPTION

When the engine is cranked, the intake air flow is slow, so fuel vaporization is poor. A rich mixture is therefore necessary in order to achieve good startability. While the engine is being cranked, the battery positive voltage is applied to terminal STA of the ECM. The starter signal is mainly used to increase the fuel injection volume for the starting injection control and after-start injection control.

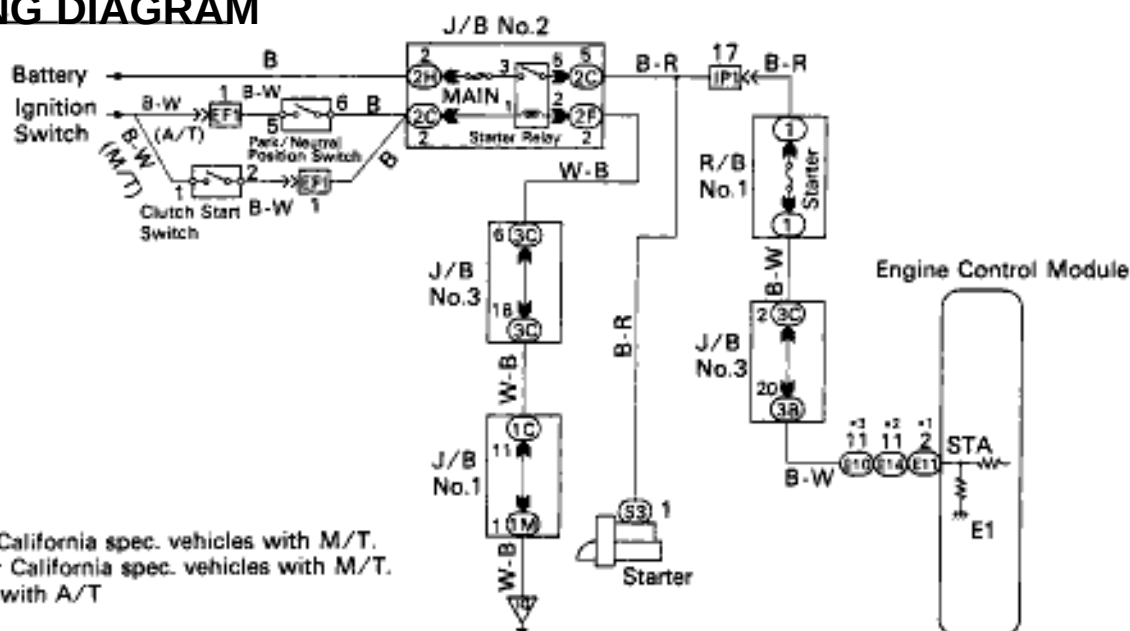
DTC No.	Diagnostic Trouble Code Detecting Condition	Trouble Area
43	No starter signal to ECM.	- Open or short in starter signal circuit. - Open or short in ignition switch or starter relay circuit. - ECM

DIAGNOSTIC CHART

HINT: This diagnostic chart is based on the premise that the engine is cranked normally. If the engine is not cranked, proceed to the matrix chart of problem symptoms on page [EG1-327](#),

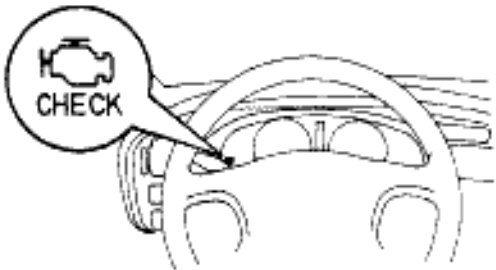


WIRING DIAGRAM



- *1: Except California spec. vehicles with M/T.
 *2: Only for California spec. vehicles with M/T.
 *3: Vehicle with A/T

INSPECTION PROCEDURE

1	Check output condition of diagnostic trouble code 43.
 P00956	P Setting the test mode. (1) Turn ignition switch OFF. (2) Connect terminals TE2 and E1 of DLC2. (3) Turn ignition switch ON. (Don't start the engine) (4) Connect terminals TE1 and E1 of DLC2. C Check if code "43" is output by the malfunction indicator lamp. OK Code "43" is output. C Start the engine. Check if the code "43" disappear. OK Code "43" is not output.
NG	OK Proceed to next circuit inspection shown on matrix chart (See page EG1-327).
2	Check for open in harness and connector between engine control module and starter relay (See page IN-31).
OK	NG Repair or replace harness or connector.
Check and replace engine control module.	

DTC 52 Knock Sensor Circuit

CIRCUIT DESCRIPTION

Knock sensor is fitted the cylinder block to detect engine knocking. This sensor contains a piezoelectric element which generates a voltage when it becomes deformed, which occurs when the cylinder block vibrates due to knocking. If engine knocking occurs, ignition timing is retarded to suppress it.

DTC No.	Diagnostic Trouble Code Detecting Condition	Trouble Area
52	Open or short in knock sensor circuit with engine speed between 1,200 rpm and 6,000 rpm.	• Open or short in knock sensor circuit. • Knock sensor (looseness) • ECM

If the ECM detects the above diagnosis conditions, it operates the fail safe function in which the corrective retard angle value is set to the maximum value.

DIAGNOSIS TROUBLE CODE DETECTION DRIVING PATTERN

Purpose of the driving pattern.

- To simulate diagnostic trouble code detecting condition after diagnostic trouble code is recorded.
- To check that the malfunction is corrected when the repair is completed confirming that diagnostic trouble code is no longer detected.

Malfunction: Open or Short in Knock Sensor

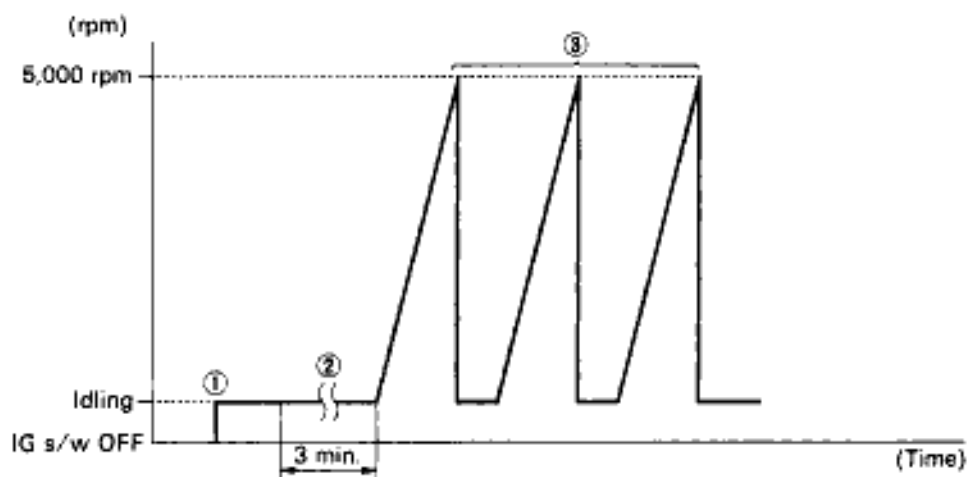
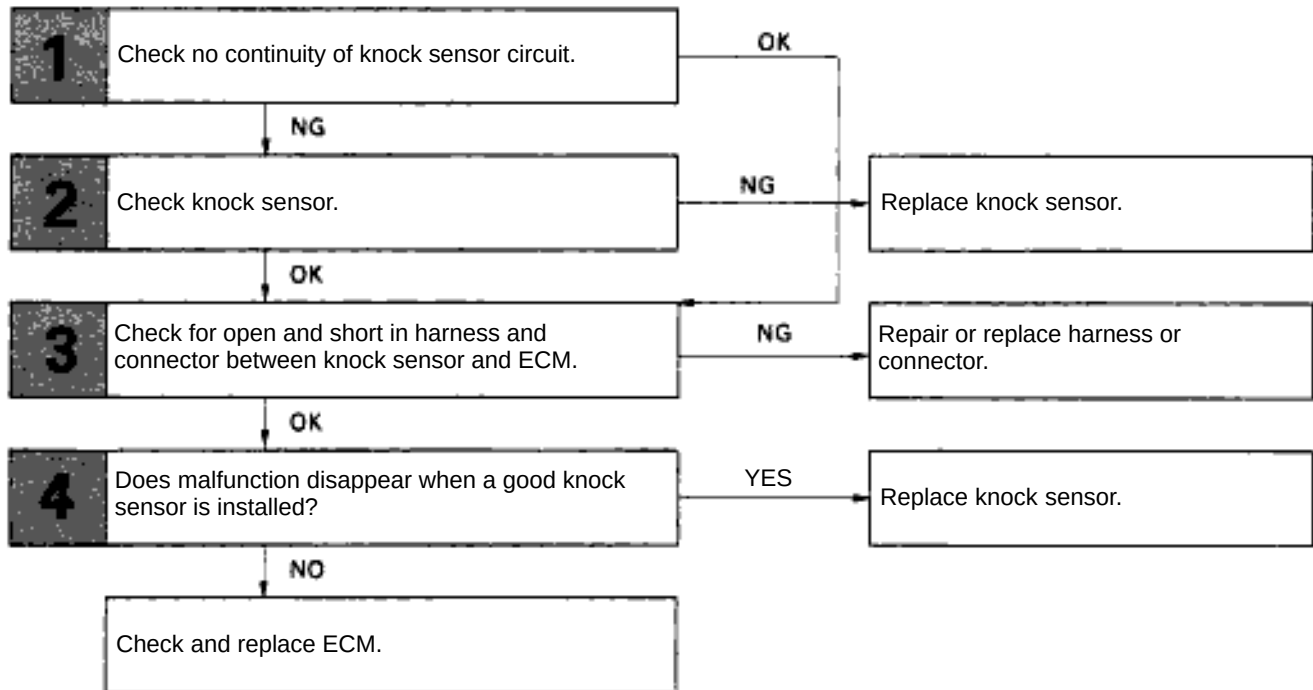
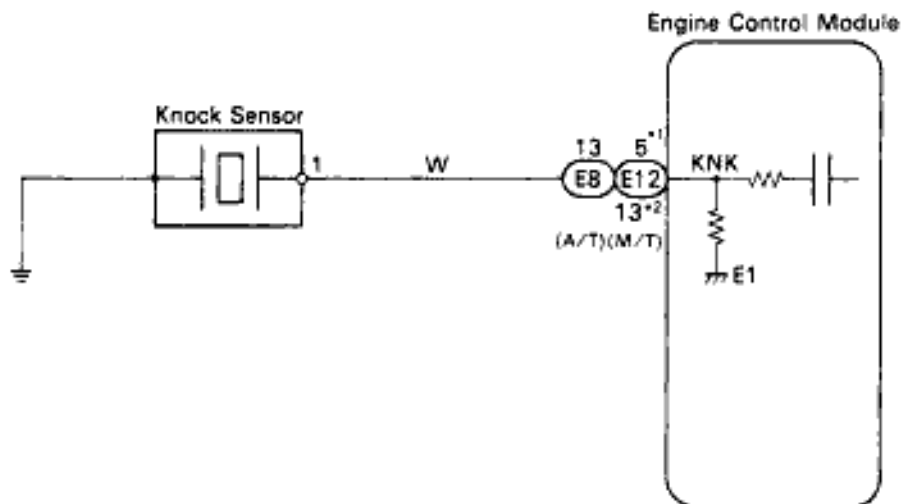


FIG461

- ① Start engine and warm up.
- ② After engine is warmed up, let it idle for 3 min.
- ③ With the A/C ON, perform quick racing (5,000 rpm) 3 times.
(Rapidly depress the accelerator pedal and suddenly release it.)

HINT: If a malfunction exists, the malfunction indicator lamp will light up when sudden racing is performed.

NOTICE: If the conditions in this test are not strictly followed, detection of the malfunction will not be possible.

DIAGNOSTIC CHART**WIRING DIAGRAM**

*1: Except California specification vehicles with M/T.

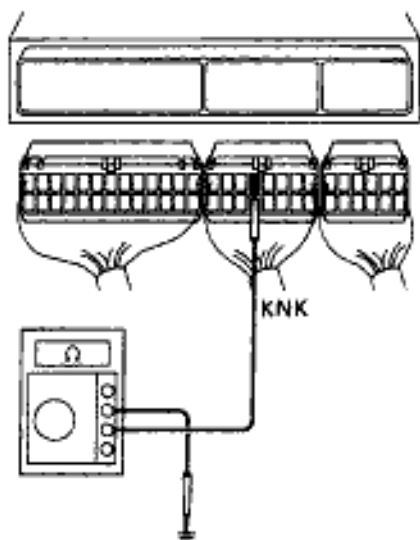
*2: Only for California specification vehicles with M/T.

INSPECTION PROCEDURE

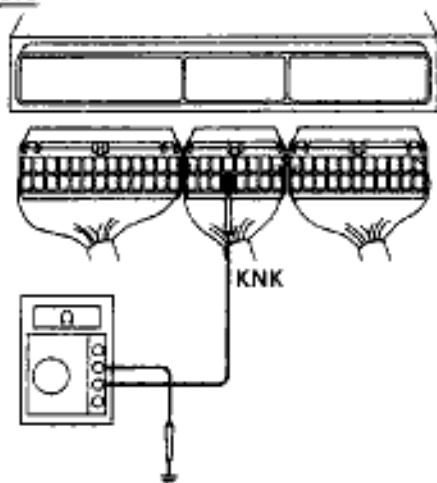
Check continuity between terminal KNK of engine control module connector and body ground.



Exc. California spec. with M/T



Others



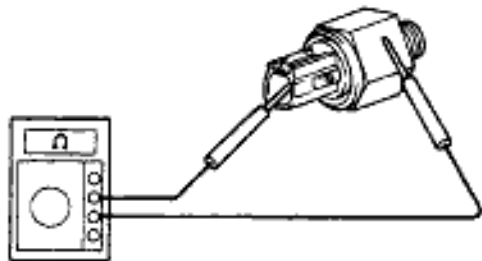
886653
F16723
F16724

- P** (1) Remove glove compartment.
(See page [EG1-234](#))
(2) Disconnect the engine control module connector.
- C** Measure resistance between terminal KNK of engine control module connector and body ground.
- OK** Resistance: 1 MΩ or higher

NG

OK

Go to step

2**Check knock sensor.**

F16E30

- P** Disconnect knock sensor connector.
- C** Measure resistance between the knock sensor terminal and body.
- OK** Resistance: 1 M Ω or higher

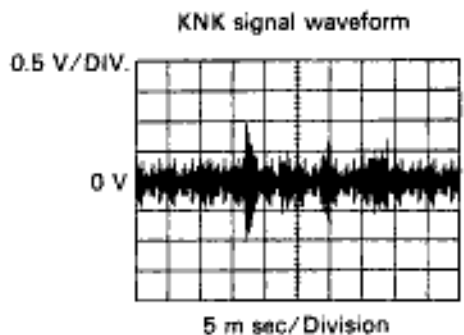
OK**NG**Replace knock sensor (See page [EG1-93](#)).**3****Check for open and short in harness and connector between engine control module and knock sensor (See page [IN-31](#)).****OK****NG**

Repair or replace harness or connector.

4**Does malfunction disappear when a good knock sensor is installed?****NO****YES**Replace knock sensor (See page [EG1-93](#)).

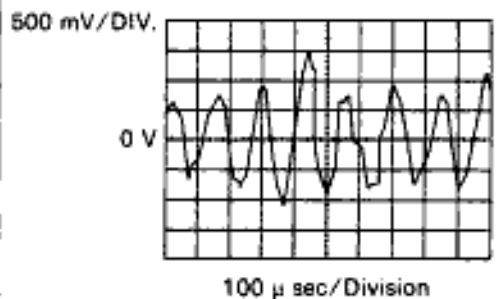
Check and replace engine control module.

Reference INSPECTION USING OSCILLOSCOPE



- With the engine racing (4,000 rpm) measure waveform between terminal KN K of engine control module and body ground.

HINT: The correct waveform appears as shown in the illustration on the left.



- Spread the time on the horizontal axis, and confirm that period of the wave is 132 μ sec. (Normal mode vibration frequency of knock sensor: 7.6 KHz).

HINT: If normal mode vibration frequency is not 7.6 KHz, the sensor is malfunctioning.

DTC 71 EGR System Malfunction

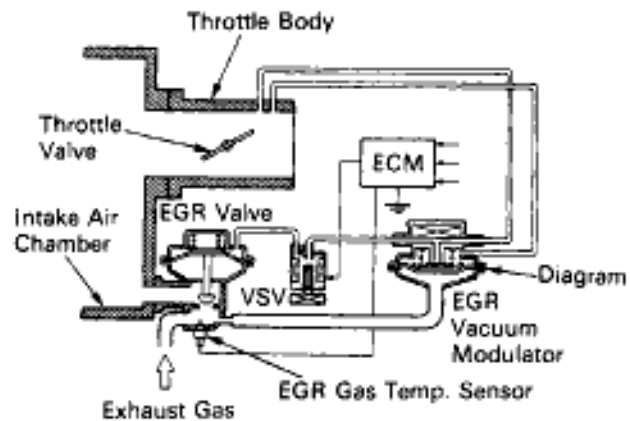
CIRCUIT DESCRIPTION

The EGR system recirculates exhaust gas, which is controlled to the proper quantity to suit the driving conditions, into the intake air mixture to slow down combustion, reduce the combustion temperature and reduces NOx emissions. The amount of EGR is regulated by the EGR vacuum modulator according to the engine load.

If even one of the following conditions is fulfilled, the VSV is turned ON by a signal from the ECM. This results in atmospheric air acting on the EGR valve, closing the EGR valve and shutting off the exhaust gas (EGR cut-OFF).

Under the following conditions, EGR is cut to maintain driveability.

- Engine coolant temp. below 60°C (140°F).
- During deceleration (throttle valve closed).
- Light engine load (amount of intake air very small).
- Engine speed over 4,400 rpm.
- Engine racing.



DTC No.	Diagnostic Trouble Code Detecting Condition	Trouble Area
71	EGR gas temp. is 70°C (158°F) or below for 50 sec. under conditions (a) and (b). (2 trip detection logic) * (a) Engine coolant temp.: 80°C (176°F) or more. (b) EGR operation possible (EX. A/T in 3rd speed (5th for M/T), 55 – 60 mph (88 – 96 km/h), Flat road).	• Open in EGR gas temp. sensor circuit. • Short in VSV circuit for EGR. • EGR hose disconnected, valve stuck. • Clogged EGR gas passage. • ECM

*: See page [EG1-307](#).

CIRCUIT DESCRIPTION (Cont'd)**DIAGNOSIS TROUBLE CODE DETECTION DRIVING PATTERN**

Purpose of the driving pattern.

- (a) To simulate diagnostic trouble code detecting condition after diagnostic trouble code is recorded.
- (b) To check that the malfunction is corrected when the repair is completed confirming that diagnostic trouble code is no longer detected.

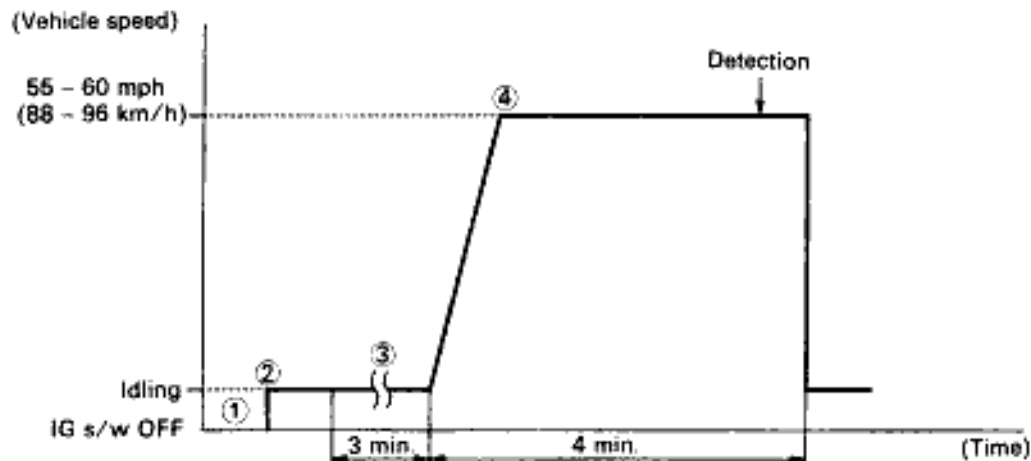
Malfunction: Open in EGR gas temp. sensor circuit

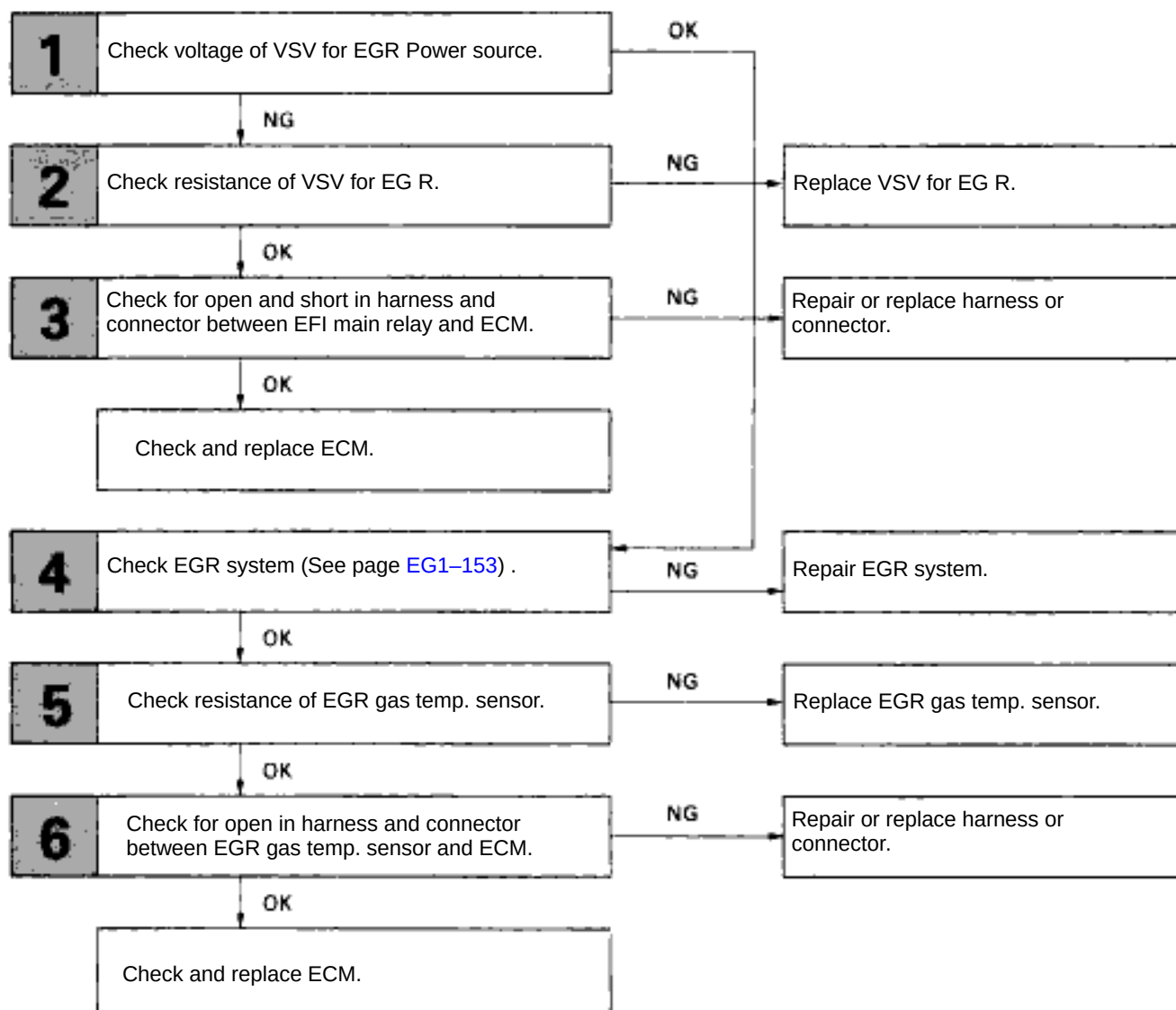
Fig528

- ① Disconnect the EFI fuse (15 A) for 10 sec. or more, with IG switch OFF. Initiate test mode (Connect terminals TE2 and E1 of data link connector, 1 or 2 with IG switch OFF).
- ② Start the engine and warm up.
- ③ After the engine is warmed up, let it idle for 3 min.
- ④ With the A/C ON and transmission in 5th gear A/T in "D" position), drive at 55 – 60 mph (88 – 96 km/h) for 4 min. or less.

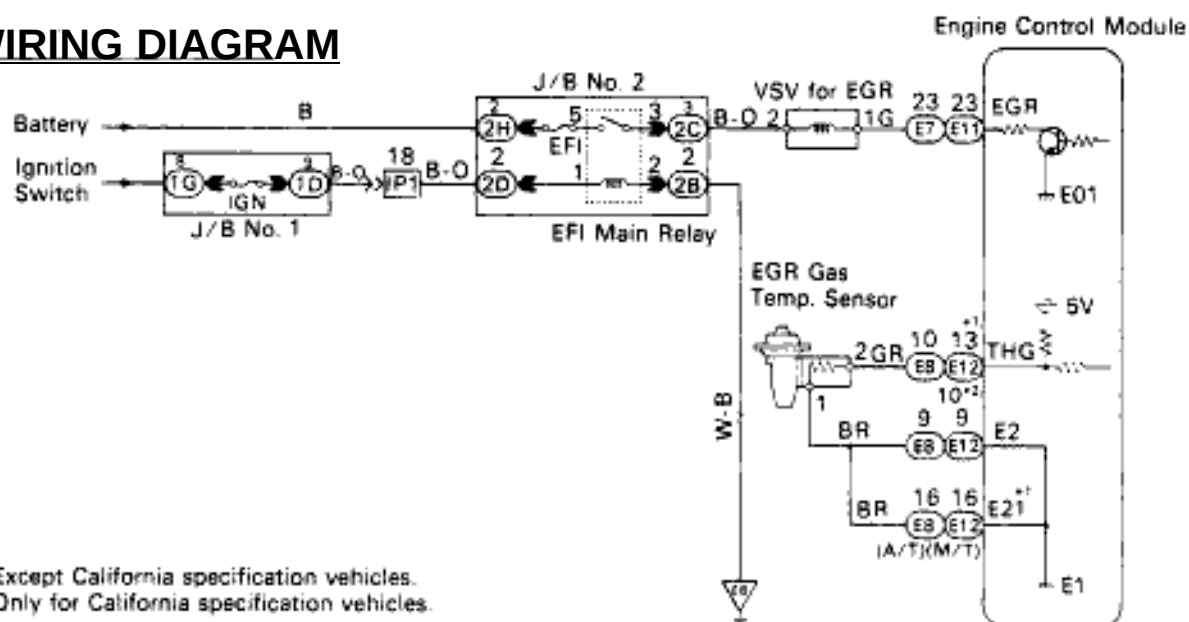
HINT: If a malfunction exists, the malfunction indicator lamp will light up during step (4) .

NOTICE: If the conditions in this test are not strictly observed, detection of the malfunction will not be possible.

DIAGNOSTIC CHART



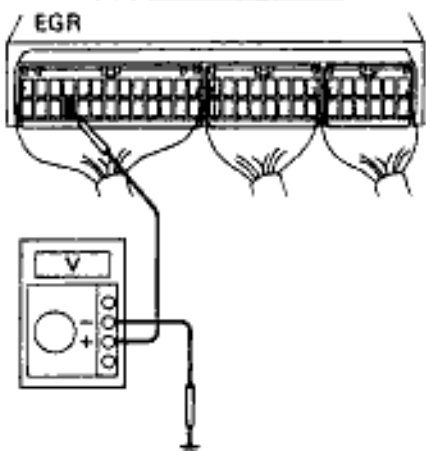
WIRING DIAGRAM



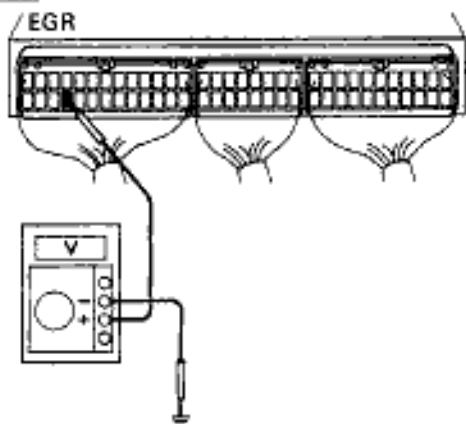
INSPECTION PROCEDURE

Check voltage between terminal EGR of engine control module connector and body ground.

Exc. California spec. with M/T



Others



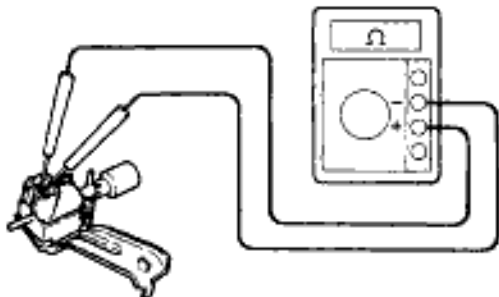
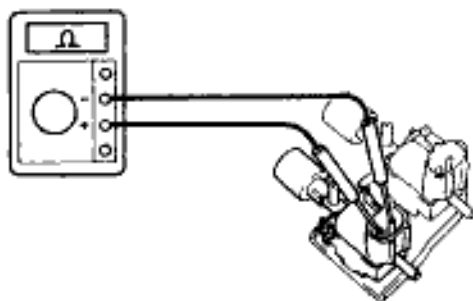
F16726
F16725

- P** (1) Remove glove compartment.
(See page [EG1-234](#)).
(2) Warm up engine to normal operating temperature.
- C** Measure voltage between terminal EGR of engine control module connector and body ground.
- OK** Voltage: 9 -14 V

NG

OK

Go to step 

2**Check resistance between terminals of VSV for EGR.**Exc. California spec.Only for California spec.PD0820
PT4145

- P** Remove VSV for EGR. (See page [EG1-154](#), 155*).
- C** Measure resistance between terminals of VSV for EGR.

OK Resistance: 33 – 39Ω (Cold)

*: Except California specification vehicle.

OK**NG**

Replace VSV for EGR.

3**Check for open and short in harness and connector between EFI main relay and VSV for EGR, VSV and engine control module. (See page [IN-31](#)).****OK****NG**

Repair or replace harness or connector.

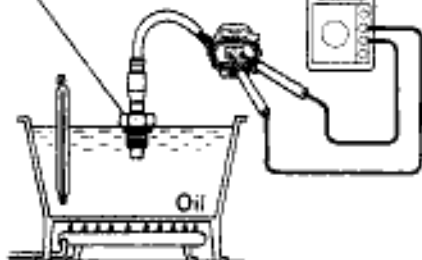
Check and replace engine control module.

4**Check EGR system (See page [EG1-153](#)).****OK****NG**

Repair EGR system.

Check resistance of EGR gas temp. sensor.

EGR Gas Temp. Sensor



#16320

- P** Remove EGR gas temp. sensor.
- C** Measure resistance between terminals of EGR gas temp. sensor connector.
- OK** Resistance: 64 – 97 k Ω at 50°C (122°F)
11 – 16 k Ω at 100°C (212°F)
2 – 4 k Ω at 150°C (302°F)

OK**NG**

Replace EGR gas temp. sensor.

Check for open in harness and connector between EGR gas temp. sensor and engine control module (See page [IN-31](#)).

OK**NG**

Repair or replace harness or connector.

Check and replace engine control module.

DTC 51 Switch Condition Signal Circuit

CIRCUIT DESCRIPTION

Park/Neutral Position Switch Signal*

The ECM uses the signals from the park/neutral position switch to determine whether the transmission is in park or neutral, or in some other gear.

Air Conditioning Switch Signal

The ECM uses the output from the air conditioning switch to determine whether or not the air conditioning is operating so that it can increase the idling speed of the engine if necessary.

Throttle Position Sensor IDL Signal

The IDL contacts are mounted in the throttle position sensor, and detects the idle condition.

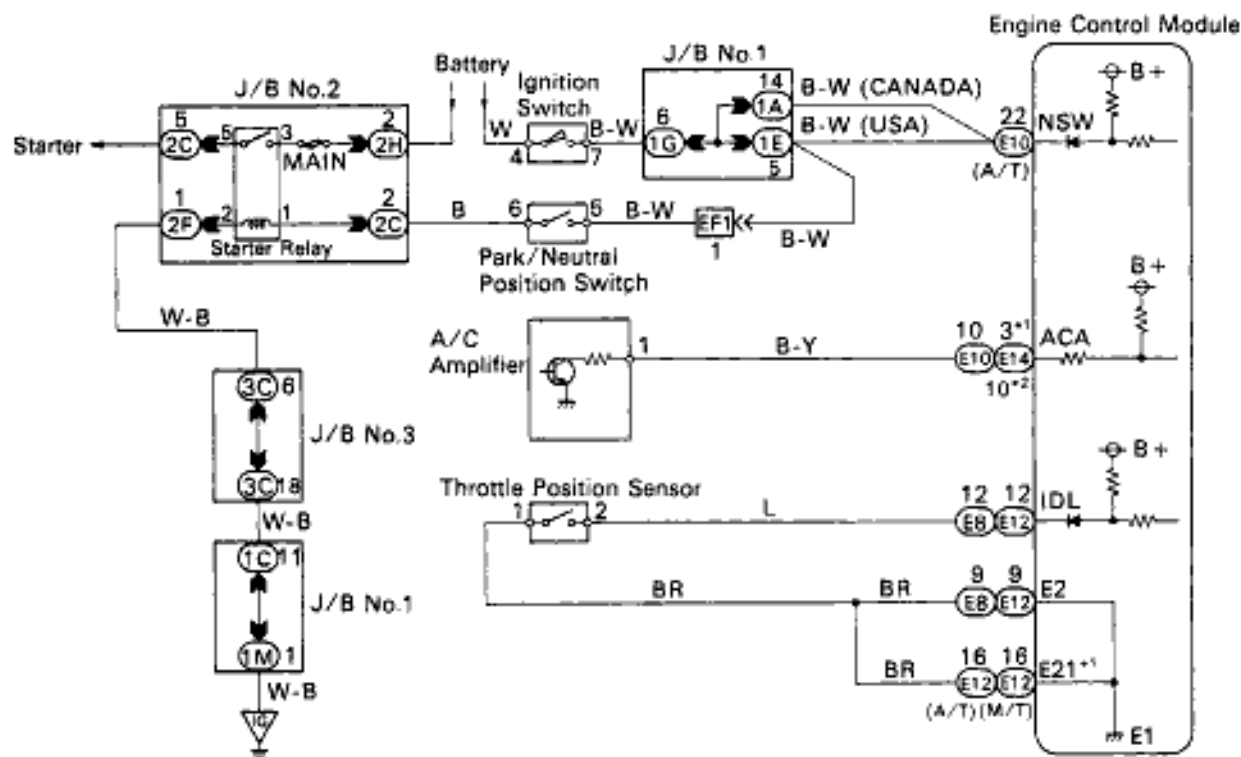
DTC No.	Diagnostic Trouble Code Detecting Condition	Trouble Area
51	(1) 3 sec. or more after engine starts with closed throttle position switch OFF (IDL). (2) * Park/ Neutral position switch OFF. (Shift position in "R", "D", "2" or "L" positions). (3) A/C switch ON.	- Throttle position sensor IDL circuit - Accelerator pedal and cable - Park/Neutral position switch circuit - A/C switch circuit - ECM

*: Only vehicles with A/T.

HINT: In this circuit, diagnosis can only be made in the test mode.

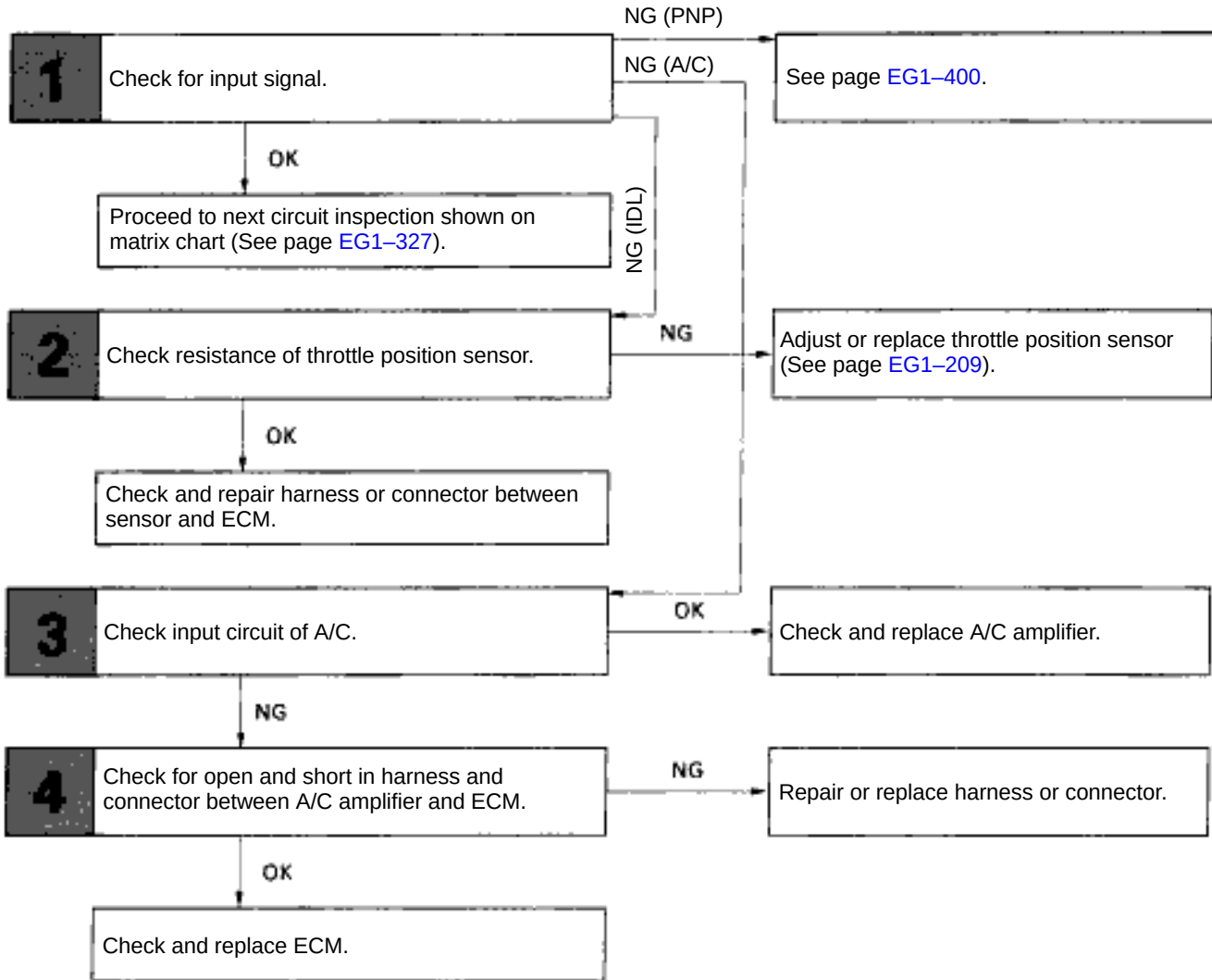
DIAGNOSTIC CHART

WIRING DIAGRAM



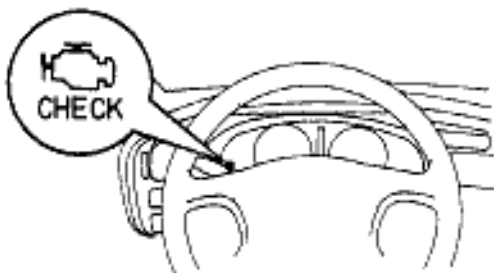
*1: Except California specification vehicles.

*2: Only for California specification vehicles.

DIAGNOSTIC CHART

INSPECTION PROCEDURE

Check output condition of diagnostic trouble code 51.



- P** Setting the test mode.
- (1) Turn ignition switch OFF.
 - (2) Connect terminals TE2 and E1 of DLC2.
 - (3) Turn ignition switch ON.
- (For checking terminal IDL, disconnect the vacuum hose from the throttle body, then apply vacuum to the throttle opener (See page [EG1-204](#)).)
- (For checking terminal A/C, start the engine.)
- (4) Connect terminals TE1 and E1 of DLC2.
- C** Check if code "51" is output by the malfunction indicator lamp.

OK

	Condition	Code
Park/Neutral Position Switch (PNP)	P or N position	Normal*
	R, D, 2 or L position	51*
Throttle Position Sensor (IDL)	Accelerator pedal released	Normal*
	Accelerator pedal depressed	51*
A/C Switch (A/C)	A/C SW ON	51
	A/C SW OFF	Normal

*: Before the STA signal is input (ST is not ON), diagnostic trouble code 43 is also output.

Hint

Diagnostic trouble code 42 is output with vehicle speed 3 mph (5 km/h) or below.

OK

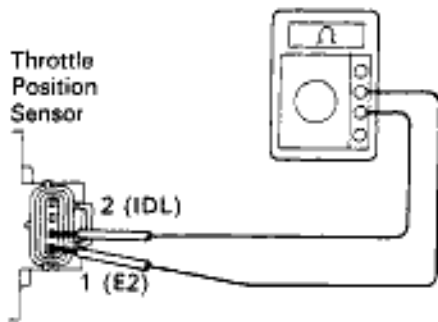
NG

IDL Go to step
A/C ... Go to step

PN P ... Go to page
[EG1-400](#).

Proceed to next circuit inspection shown on matrix chart (See page [EG1-327](#)).

2 Check resistance of throttle position sensor.



F16564

- P** (1) Disconnect throttle position sensor connector.
 (2) Disconnect the vacuum hose from the throttle body, then apply vacuum to the throttle opener (See page [EG1-204](#)).
C Measure resistance between terminals 2 (IDL) and 1 (E2) of throttle position sensor connector.

OK

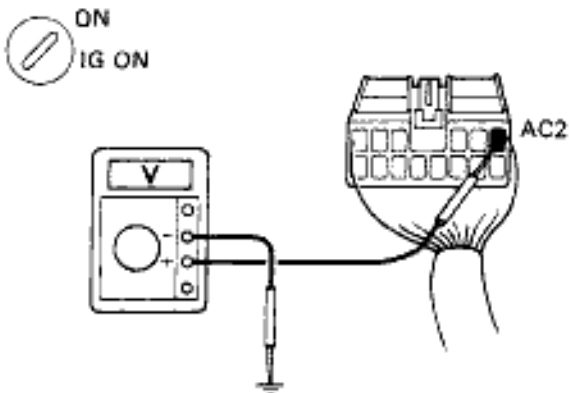
Throttle Valve	Resistance
Fully closed	Less than 2.3 kΩ
Opened	1 MΩ or higher

OK**NG**

Adjust or replace throttle position sensor
 (See page [EG1-209](#)).

Check and repair harness or connector between
 engine control module and throttle position sensor.

3 Disconnect A/C amplifier connector, check voltage between terminal AC2 of A/C amplifier connector and body ground.

B16553
F16689

- P** (1) Remove glove compartment
 (See page [BO-114](#)).
 (2) Disconnect A/C amplifier connector.
C (3) Turn ignition switch on.
 Measure voltage between terminal AC2 of A/C
 amplifier connector and body ground.
OK **Voltage: 9 -14 V**

OK**OK**

Check and replace A/C amplifier.

4

Check for open and short in harness and connector between
 engine control module and A/C amplifier (See page [IN-31](#)).

OK**NG**

Repair or replace harness or connector.

Check and replace engine control module.

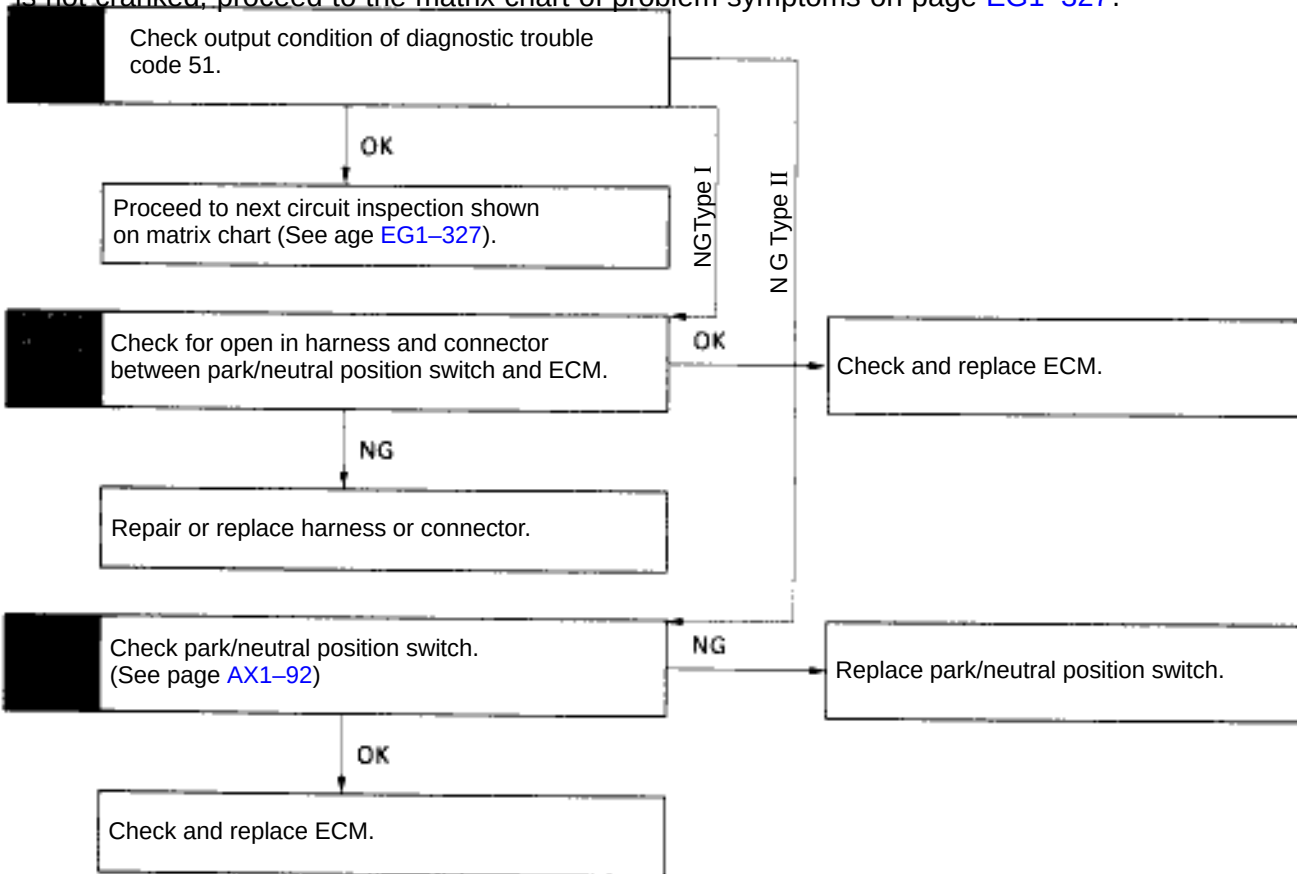
Park Neutral Position Switch Circuit (Only vehicles with A-T)

CIRCUIT DESCRIPTION

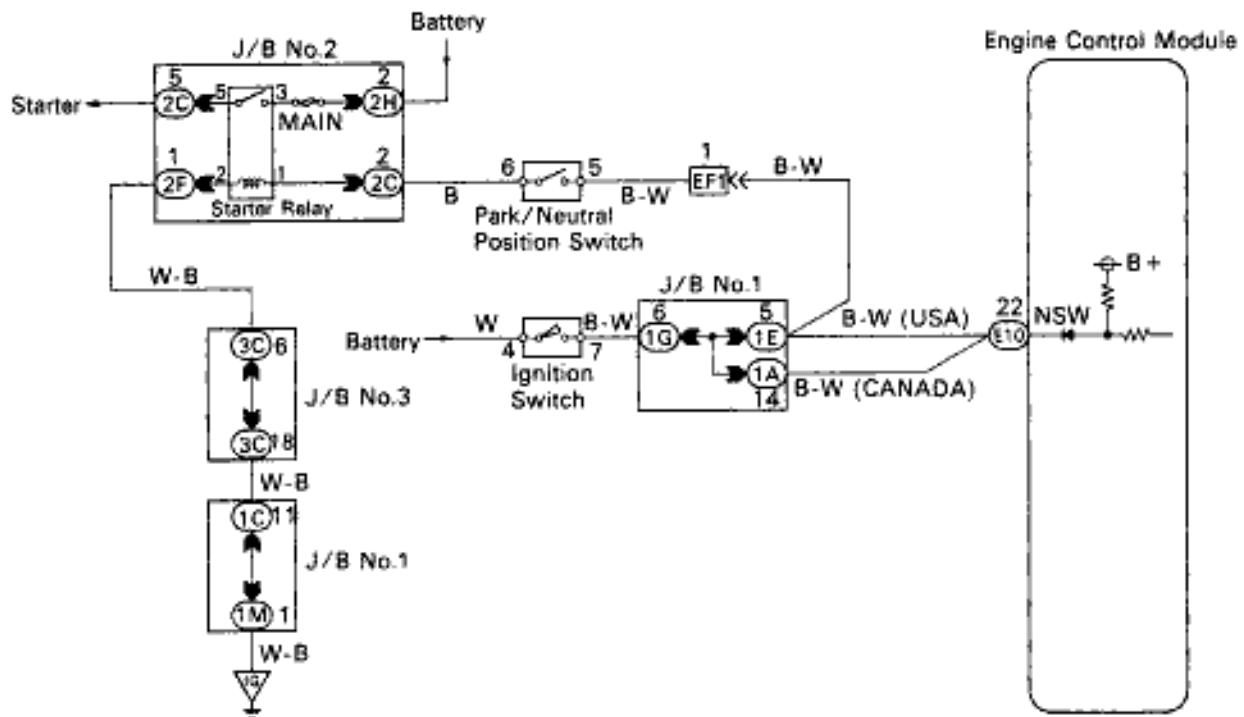
The Park/Neutral position switch goes on when the shift lever is in the N or P shift position. When it goes on the terminal NSW of the ECM is grounded to body ground via the starter relay and theft deterrent ECU, thus the terminal NSW voltage becomes 0V. When the shift lever is in the D, 2, L or R position, the Park/Neutral position switch goes off, so the voltage of ECM terminal NSW becomes battery voltage, the voltage of the ECM internal power source. If the shift lever is moved from the N position to the D position, this signal is used for air-fuel ratio correction and for idle speed control (estimated control), etc. When the Park/Neutral position switch is off, code "51" is output in the test mode diagnosis. (This is not abnormal.)

DIAGNOSTIC CHART

HINT: This diagnosis chart is based on premise that the engine is cranked normally. If the engine is not cranked, proceed to the matrix chart of problem symptoms on page [EG1-327](#).

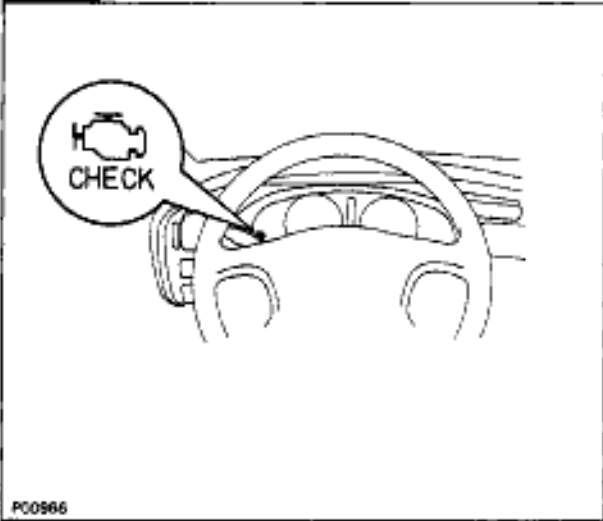


WIRING DIAGRAM



INSPECTION PROCEDURE

Check output condition of diagnostic trouble code 51.



- P** (1) Connect terminals TE2 and E1 of DLC2.
- (2) Turn ignition switch on.
- (3) Crank the engine.
- C** (4) Connect terminals TE1 and E1 of DLC2.
- Check if diagnostic trouble code "51" is output when the shift lever is in the P and D shift positions.

Shift Position	Result		
	OK	N G Type I	NG Type II
"P"	Normal Code	Code 51	Normal Code
"D"	Code 51	Code 51	Normal Code



NG Type I Go to step **2**

NG Type II Go to step **2**

Proceed to next circuit inspection shown on matrix chart (See age [EG1-327](#)).

Check for open in harness and connector between engine control module and park/neutral position switch (See page [IN-31](#)).



OK Check and replace engine control module.

Repair or replace harness or connector.

Check park/neutral position switch (See page [AX1-92](#)).



NG Replace park/neutral position switch.

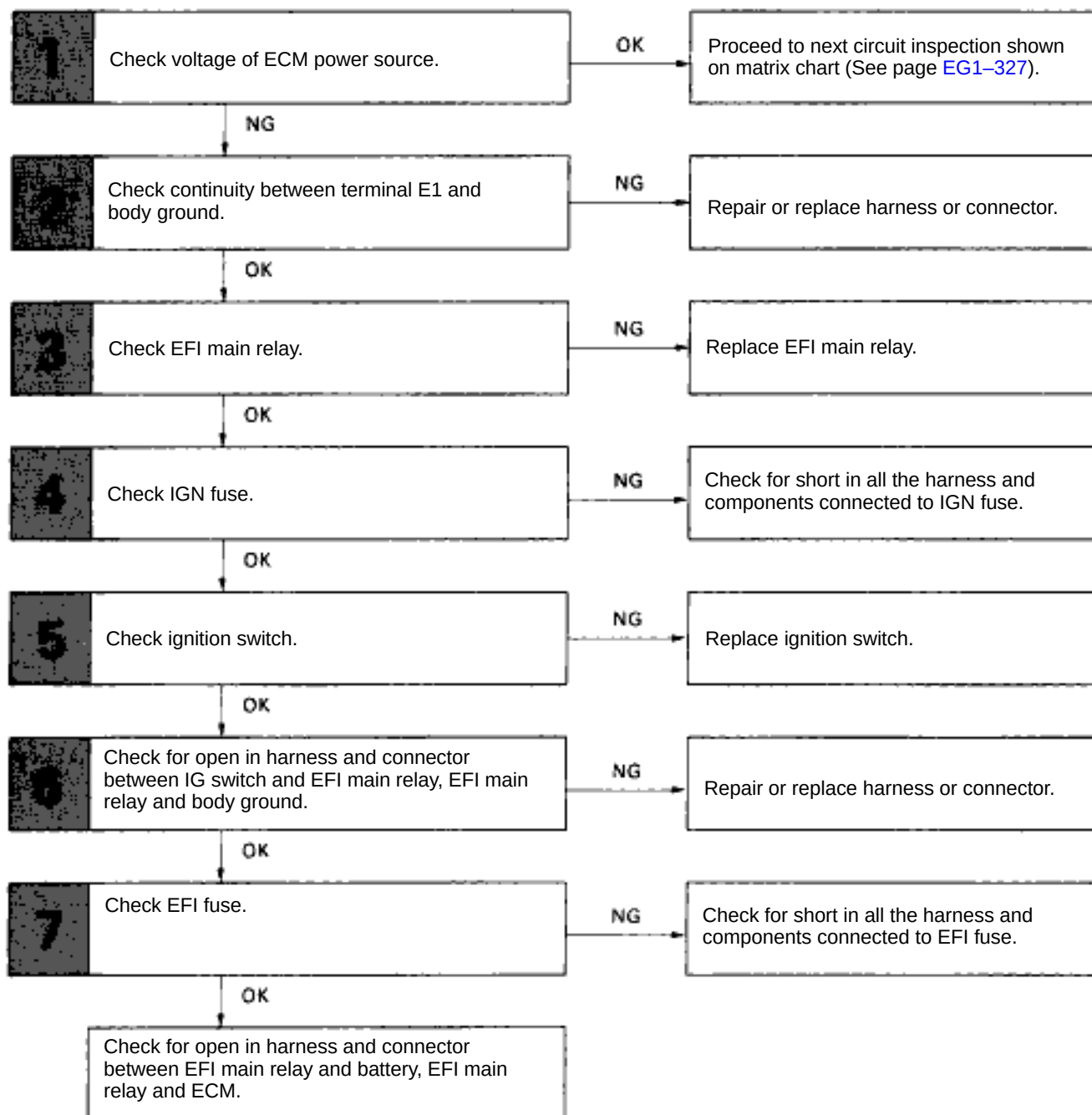
Check and replace engine control module.

ECM Power Source Circuit

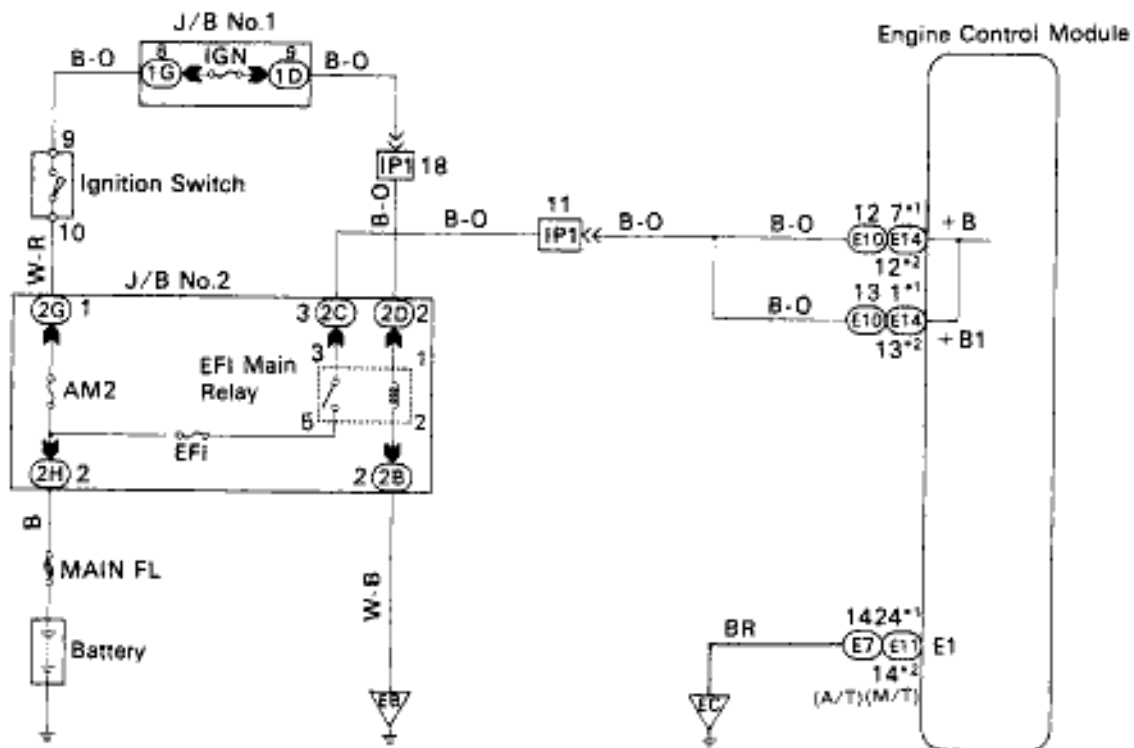
CIRCUIT DESCRIPTION

When the ignition switch is turned on, battery positive voltage is applied to the coil, closing the contacts of the EFI main relay and supplying power to the terminals + B and + 131 of the ECM.

DIAGNOSTIC CHART



WIRING DIAGRAM

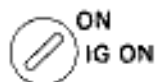


- *1: Except California specification vehicles with M/T.
 *2: Only for California specification vehicles with M/T.

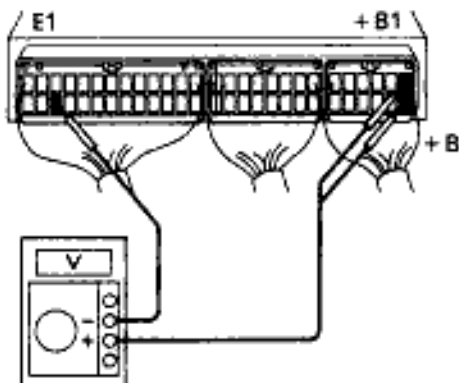
INSPECTION PROCEDURE

1

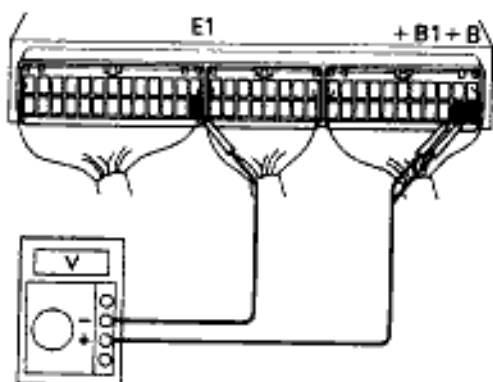
Check voltage between terminals + B, + 131 and E1 of engine control module connector.



Exc. California spec. with M/T



Others



086863
F16727
F16728

P

(1) Remove glove compartment.
(See page [EG1-234](#))

C

Measure voltage between terminals + B, + 131 and E1 of engine control module connector.

OK

Voltage: 9 -14 V

NG**OK**

Proceed to next circuit inspection shown on matrix chart (See page [EG1-327](#)).

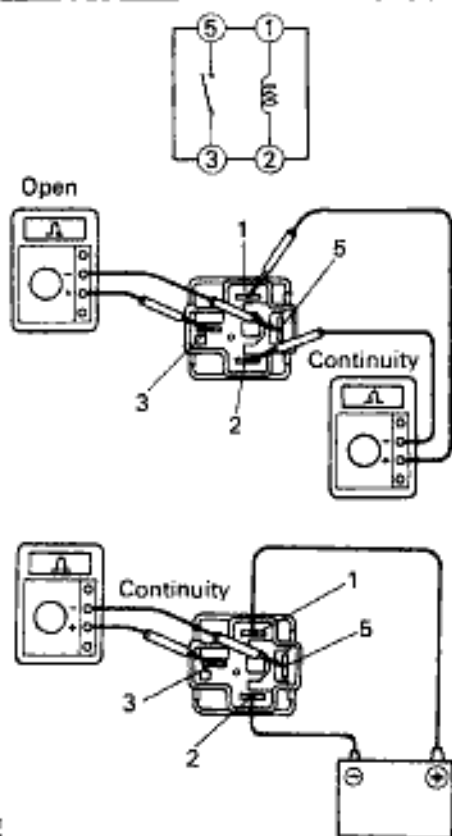
2

Check for open in harness and connector between terminal E1 of engine control module and body ground (See page [IN-31](#)).

OK**NG**

Repair or replace harness or connector.

Check EFI main relay.



8E1841
P07170
P07171

OK

- P** Remove EFI main relay from J/B No-2.
C Check continuity between terminals of EFI main relay shown below.

OK

Terminals 3 and 5	Open
Terminals 1 and 2	Continuity (Reference value 72Ω)

C

- (1) Apply battery voltage between terminals 1 and 2.
 (2) Check continuity between terminals 3 and 5.

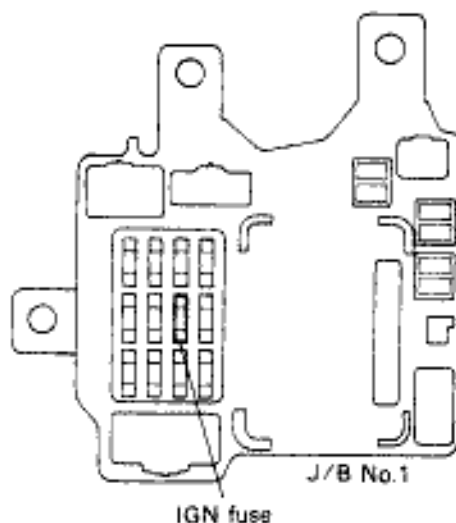
OK

Terminals 3 and 5	Continuity
-------------------	------------

NG

Replace EFI main relay.

Check IGN fuse.



ND18C3

OK

- P** Remove IGN fuse from J/B No.1.

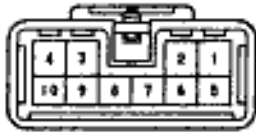
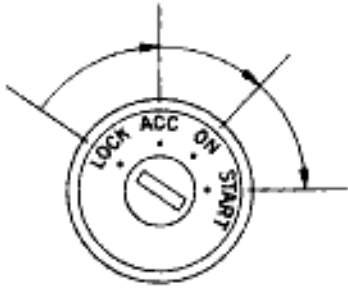
- C** Check continuity of IGN fuse.

OK Continuity

NG

Check for short in all the harness and components connected to IGN fuse (See attached wiring diagram).

5 Check ignition switch.



DI2582
p.10.2-B

P

Remove under cover and finish panel.

C

Check continuity between terminals.

OK

○—○ continuity

Terminal Switch position	2 IG1	3 ACC	4 AM1	6 ST2	7 ST1	9 IG2	10 AM2
LOCK							
ACC		○—○					
ON	○—○	○—○	○—○			○—○	○—○
START	○—○		○—○	○—○	○—○	○—○	○—○

OK

NG

Replace ignition switch.

6

Check for open in harness and connector between IG switch and EFI main relay, EFI main relay and body ground (See page [IN-31](#)).

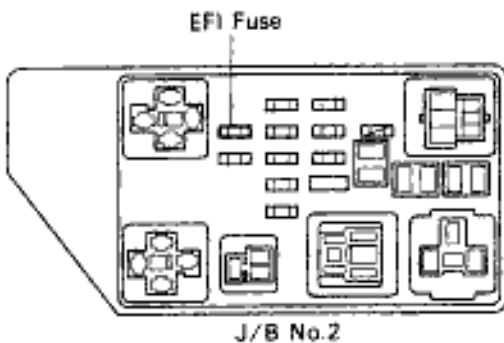
OK

NG

Repair or replace harness or connector.

7

Check EFI fuse.



F17078

P

Remove EFI fuse from J/B No.2.

C

Check continuity of EFI fuse.

Continuity

OK

OK

NG

Check for short in all the harness and components connected to EFI fuse (See attached wiring diagram).

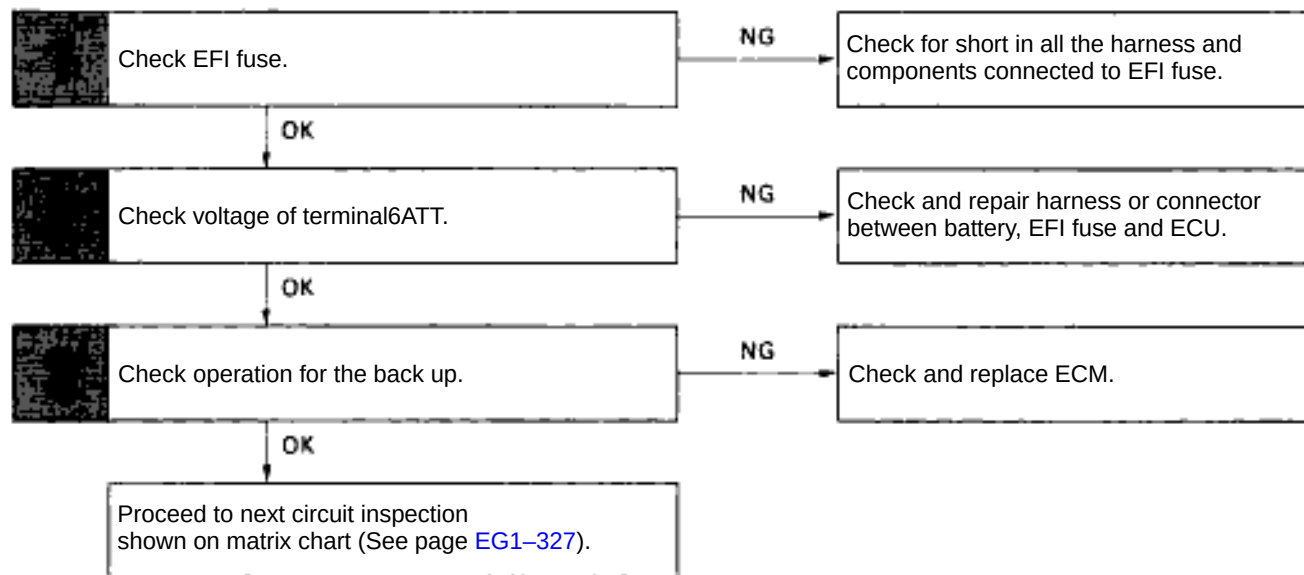
Check for open in harness and connector between EFI main relay and battery, EFI main relay and engine control module.

Back Up Power Source Circuit

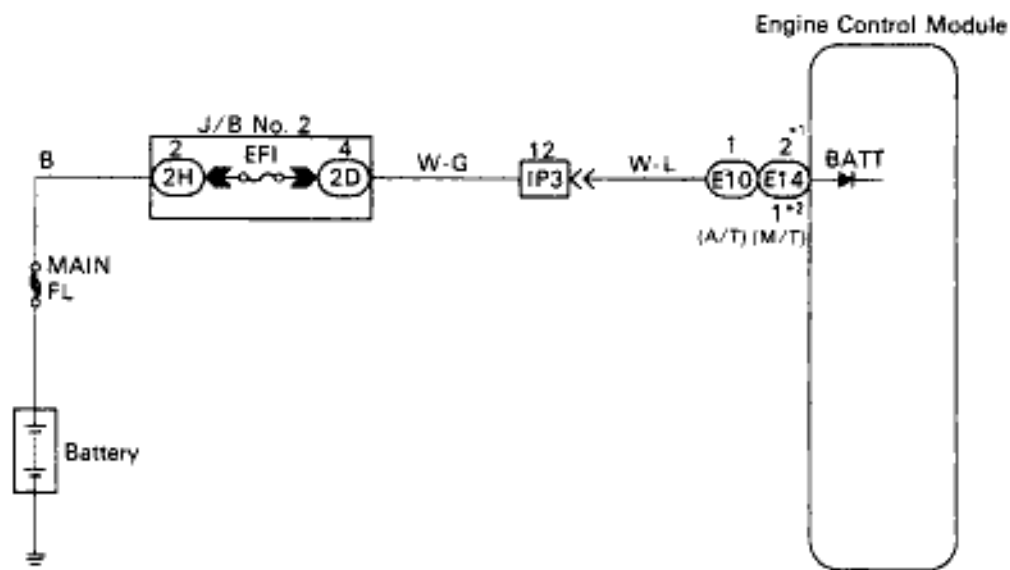
CIRCUIT DESCRIPTION

Battery positive voltage is supplied to terminal BATT of the ECM even when the ignition switch is off for use by the diagnostic trouble code memory and air-fuel ratio adaptive control value memory, etc.

DIAGNOSTIC CHART



WIRING DIAGRAM

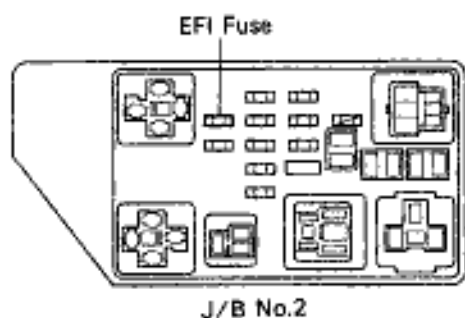


*1: Except California specification vehicles with M/T.

*2: Only for California specification vehicles with M/T.

INSPECTION PROCEDURE

1 Check EFI fuse.



FI7078

- P** Remove EFI fuse from J/B No.2.
- C** Check continuity of EFI fuse.
- OK** Continuity

OK

NG

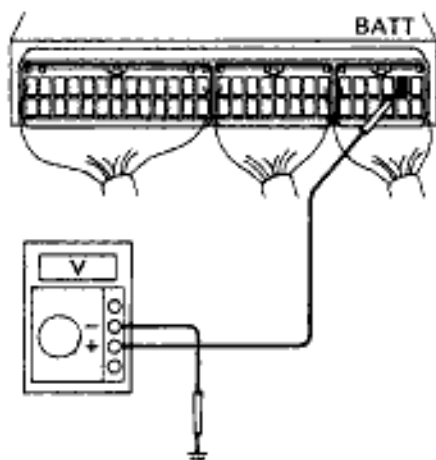
Check for short in all the harness and components connected to EFI fuse (See attached wiring diagram).

2 Check voltage between terminal BATT of engine control module connector and body ground.

OFF

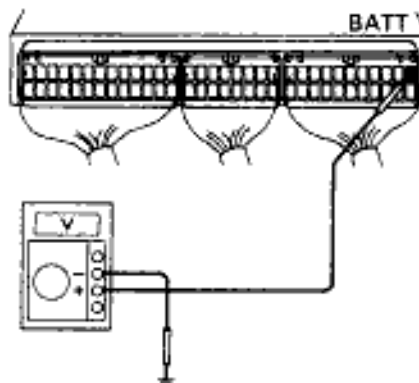


Exc. California spec. with M/T

8E6653
F16729
#16730

- P** Remove glove compartment. (See page [EG1-234](#))
- C** Measure voltage between terminal BATT of engine control module connector and body ground.
- OK** Voltage: 9 -14 V

Others



OK

NG

Check and repair harness or connector between engine control module and EN fuse, EFI fuse and battery.

3 Are the diagnostic trouble codes still in the memory when the ignition switch is turned OFF?

YES

NO

Check and replace engine control module.

Proceed to next circuit inspection shown on matrix chart (See page [EG1-327](#)).

Injector Circuit

CIRCUIT DESCRIPTION

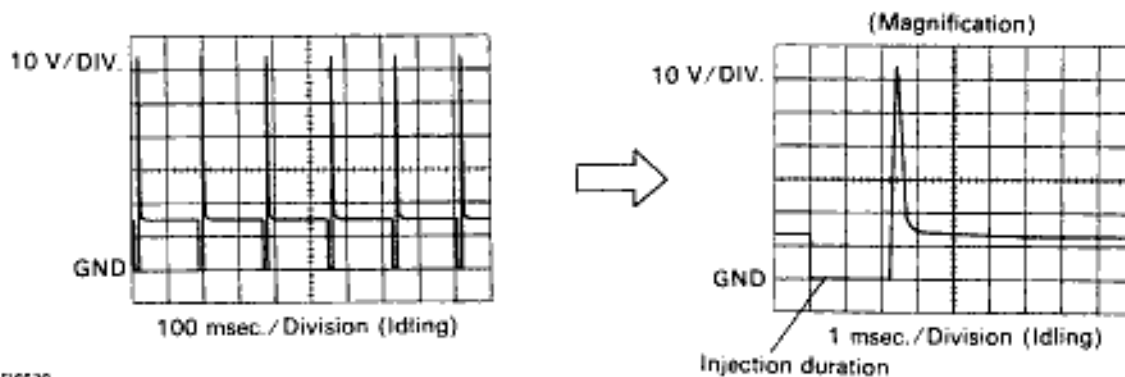
The injectors are provided to the intake manifold. They inject fuel into the cylinders based on the signals from the engine control module.

Reference INSPECTION USING OSCILLOSCOPE

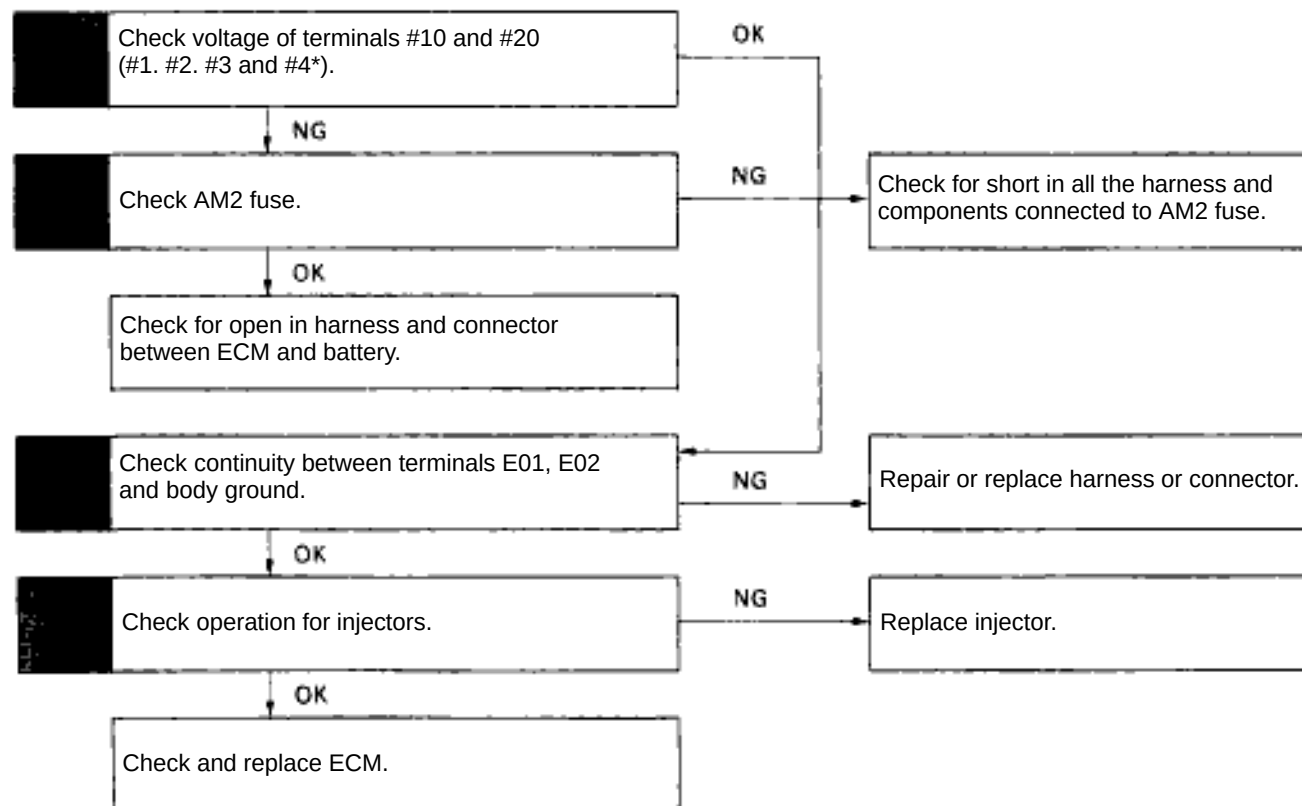
INJECTOR SIGNAL WAVEFORM

- With the engine idling measure waveform between terminals #10, #20 (#1, #2, #3 and #4*) and E01 of engine control module.

HINT: The correct waveform appears as shown in the illustration on the below.



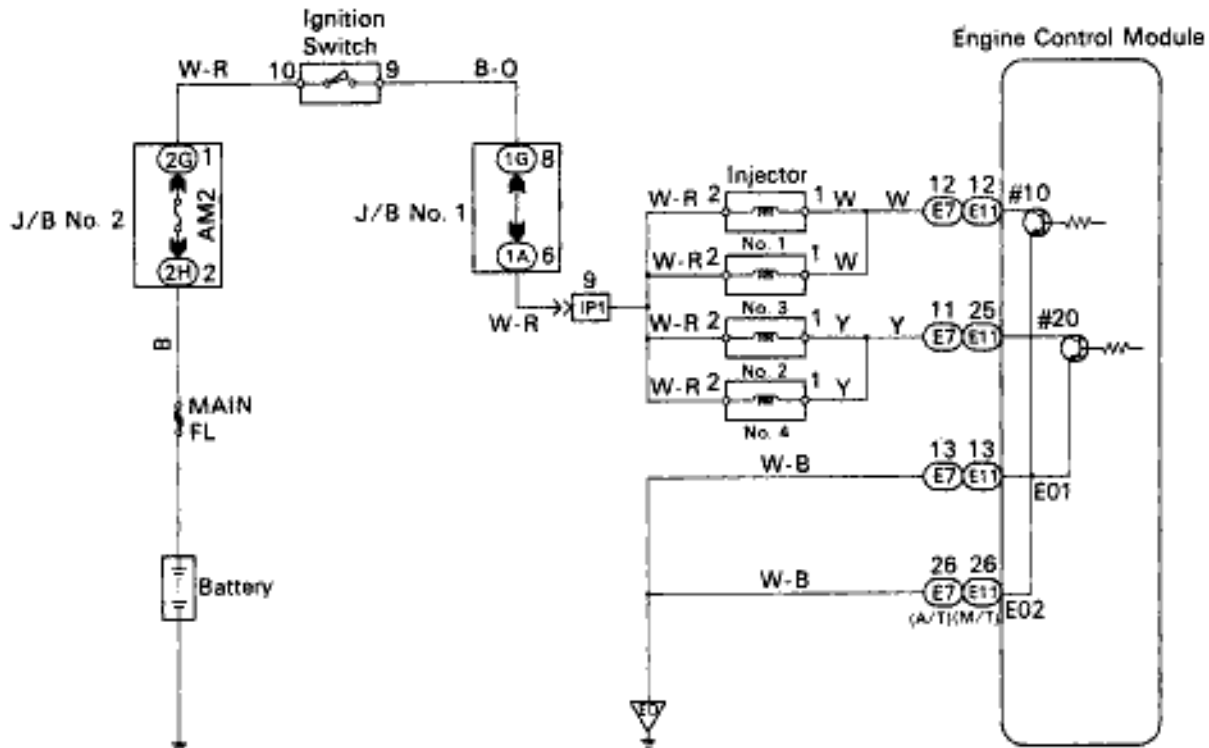
DIAGNOSTIC CHART



*: Only for California specification vehicles.

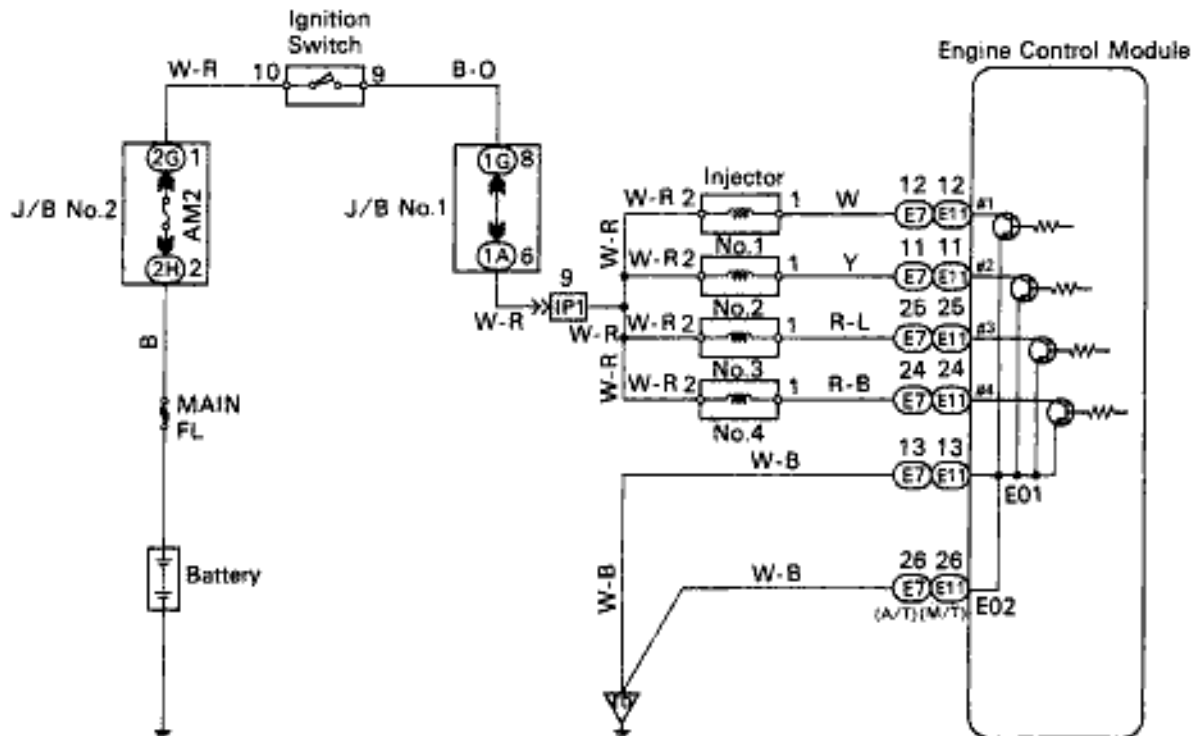
WIRING DIAGRAM

Except California specification vehicles.



T16284

Only for California specification vehicles.



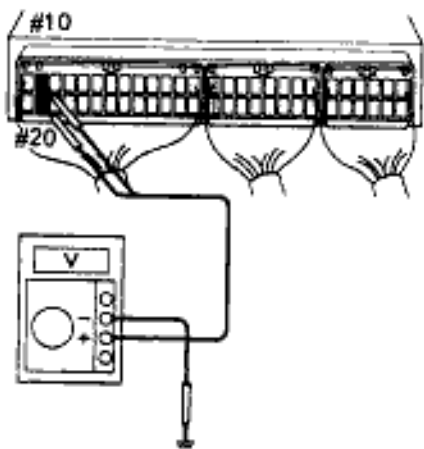
F17180

INSPECTION PROCEDURE

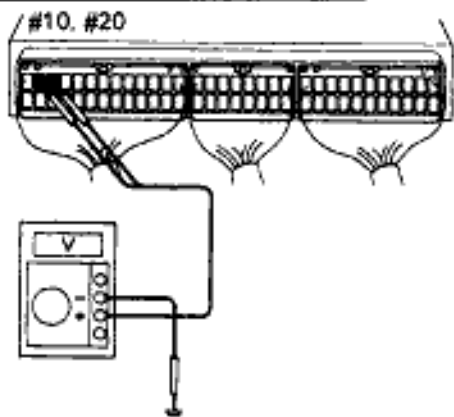
Check voltage between terminals #10, #20 (#1, #2, #3 and #4) of engine control module connector and body ground.



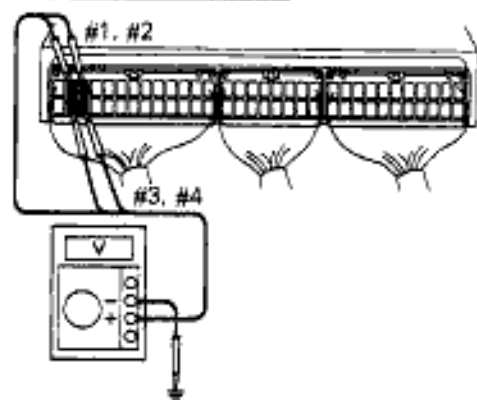
Exc. California spec. with M/T



Exc. California spec. with A/T



Only for California spec.



880653
F16731
F16732
F17165

P (1) Remove glove compartment.
(See page [EG1-234](#))

(2) Turn ignition switch ON.

G Exc. California spec.

Measure voltage between terminals #10, #20 of engine control module connector and body ground.

~~Only for California spec.~~

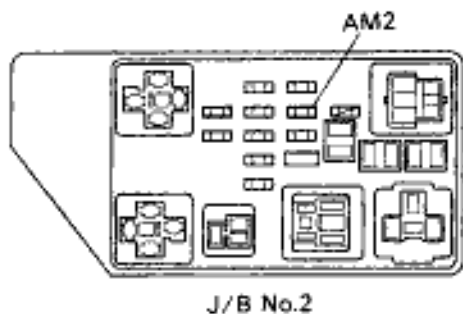
Measure voltage between terminals #1, #2, #3 and #4 of engine control module connector and body ground.

OK **Voltage: 9 -14 V**

NG

OK

Go to step **3**

2 Check AM2 fuse.

FI7078

- P** Remove AM2 fuse from J/B No. 2.
- C** Check continuity of AM2 fuse.
- OK**

OK**NG**

Check for short in all the harness and components connected to AM2 fuse.

Check for open in harness and connector between engine control module and battery.

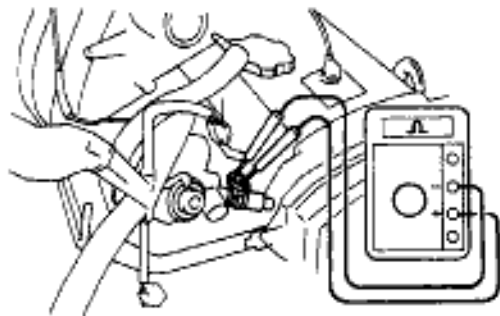
3

Check for open in harness and connector between terminals E01, E02 of engine control module connector- and body ground (See page [IN-31](#)).

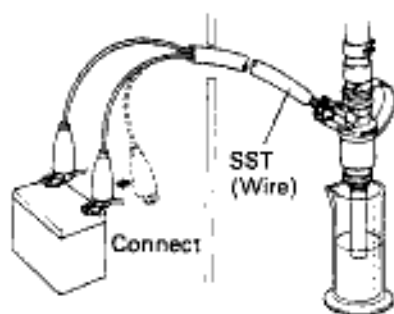
OK**NG**

Repair or replace harness or connector.

Check injectors.



- P** Disconnect injector connector
(See page [EG1-189](#)).
- C** Measure resistance of injector.
- OK** Resistance: Approx. 13.8Ω at 20 C (68 F)



- C** Check injection volume of injector
(See page [EG1-195](#)).
- OK**
 - Injection volume
49 – 59 cm³ (3.0 – 3.6 cu in.)/15 sec.
Difference between each injector:
Less than 5 cm³ (0.3 cu in.)
 - Leakage
Fuel drop: One drop or less per minute.

Exc. California



California



P01064
P14848
P14849
P10811

OK
NG

Replace injector.

Check and replace engine control module.

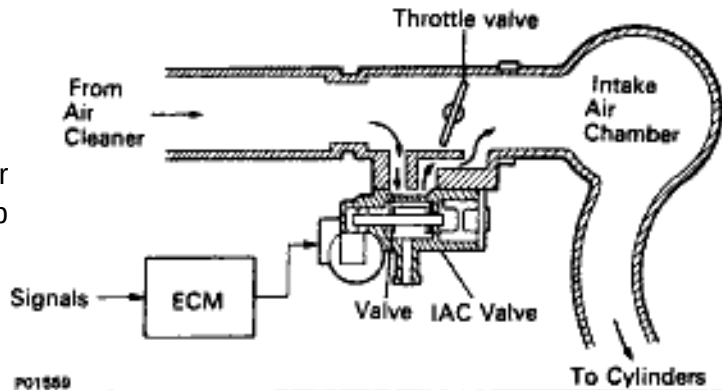
IAC Valve Circuit

CIRCUIT DESCRIPTION

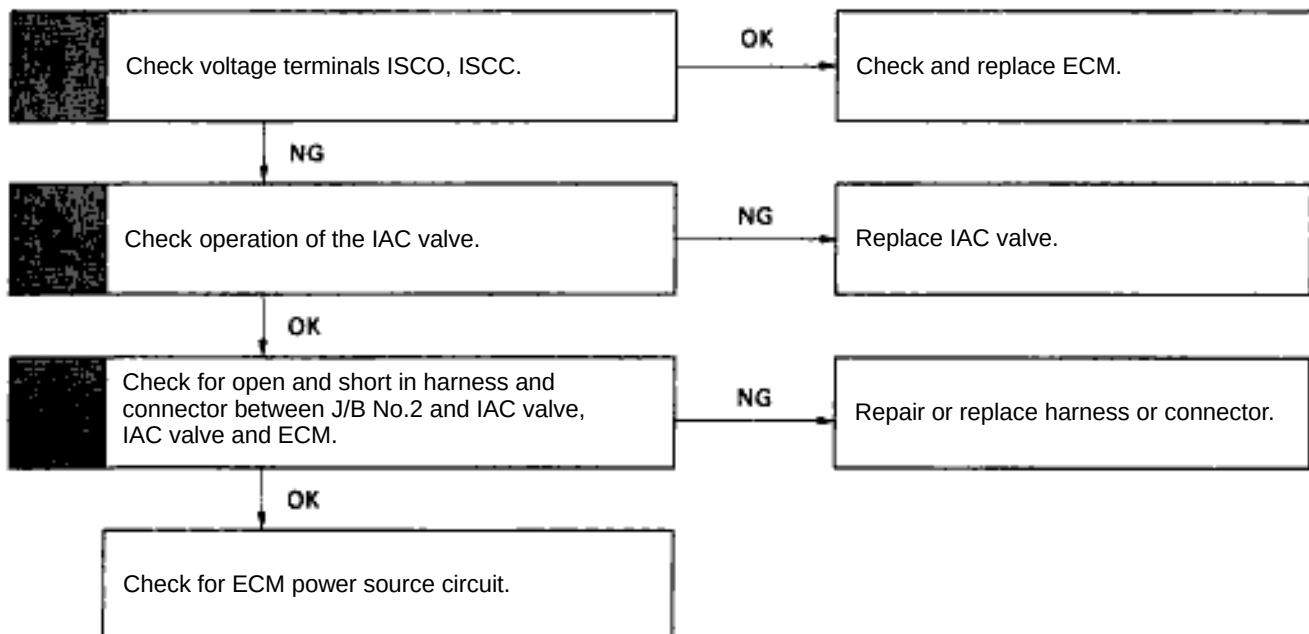
The rotary solenoid type IAC valve is provided on the intake air chamber and intake air bypassing the throttle valve is directed to the IAC valve through a passage.

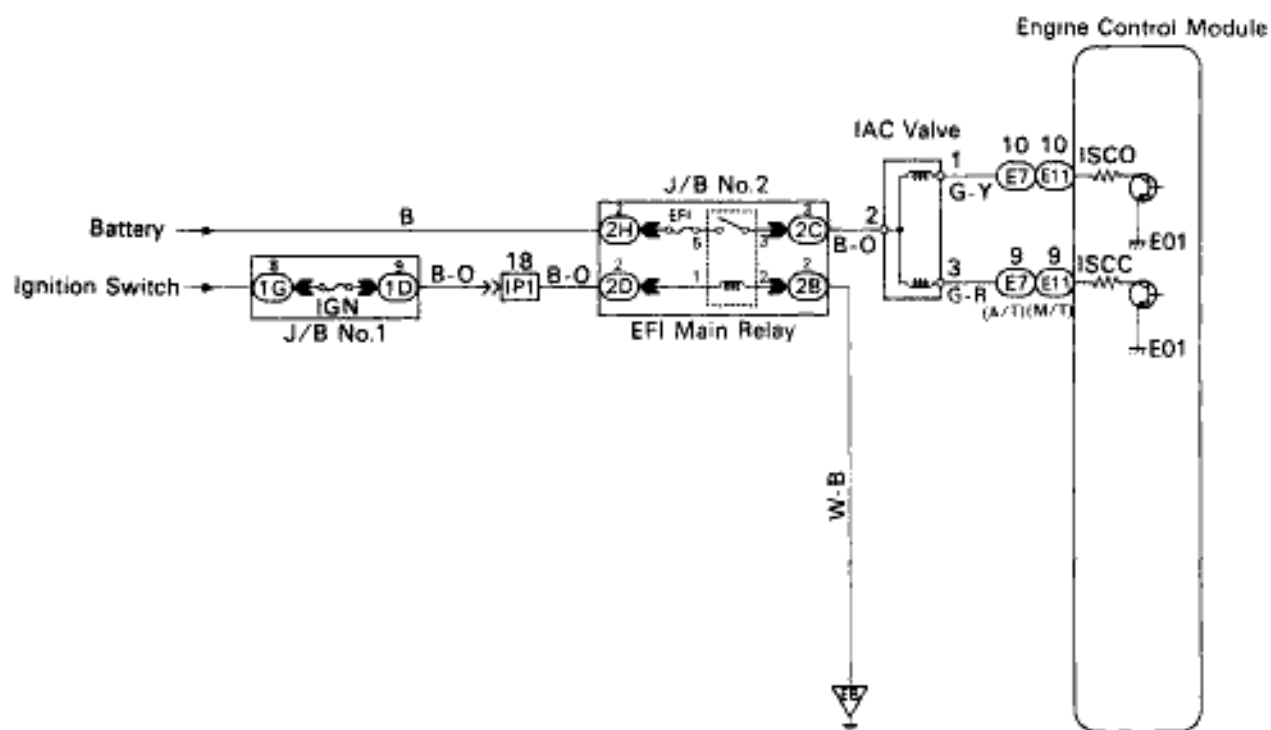
In this way the intake air volume bypassing the throttle valve is regulated, controlling the engine speed.

The ECM operated only the IAC valve to perform idle-up and provide feedback for the target idling speed, a VSV for idle-up control is also added (for air conditioning).



DIAGNOSTIC CHART

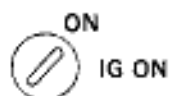


WIRING DIAGRAM

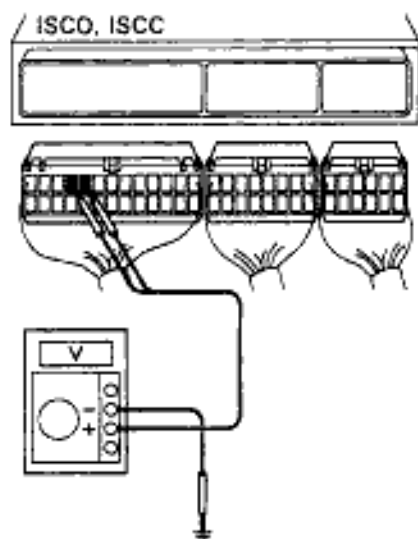
INSPECTION PROCEDURE

1

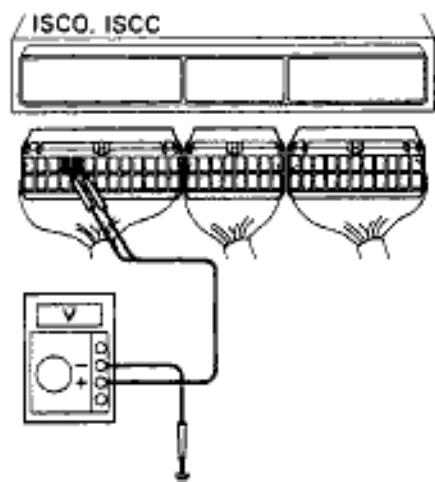
Check voltage between terminals ISCO, ISCC of engine control module connector and body ground.



Exc. California spec. with M/T



Others



BE0053
FI2100
FI2171

- P** (1) Remove glove compartment (See page [EG1-234](#)),
(2) Disconnect the engine control module connectors.
(3) Turn ignition switch ON.
- C** Measure voltage between terminals ISCO, ISCC of engine control module connector and body ground.

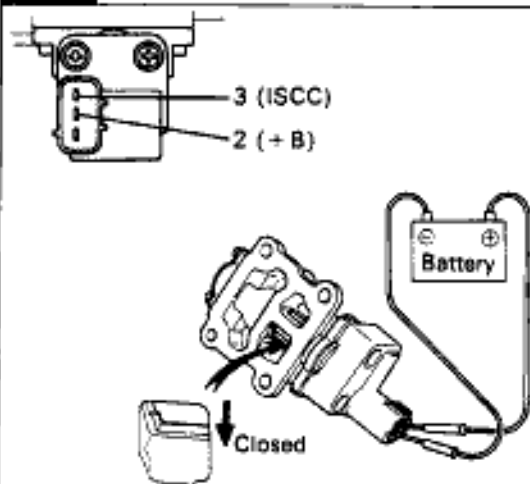
OK Voltage: 9 -14 V

NG

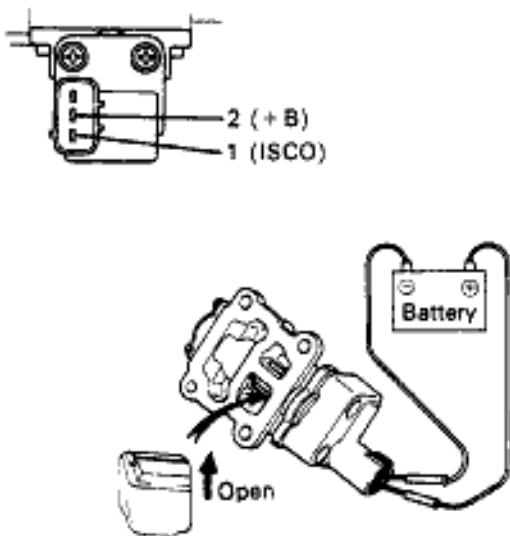
OK

Check and replace engine control module.

Check operation of the IAC valve.



F15039
F15771



F15039
F15772

- P** (1) Disconnect IAC valve connector.
(2) Remove IAC valve (See page [EG1-213](#)).
- C** (1) Connect the positive (+) lead from the battery to terminal 2 (+ B) and negative (-) lead to terminal 3 (ISCC), and check that the valve is closed.
(2) Connect the positive (+) lead from the battery to terminal 2 (+ B) and negative (-) lead to terminal 1 (ISCO), and check that the valve is open.
- OK** (1) The valve is closed.
(2) The valve is open.

OK

NG

Replace IAC valve.

Check for open and short in harness and connector between J/B No.2 and IAC valve, IAC valve and engine control module (See page [IN-31](#)).

OK

NG

Repair or replace harness or connector.

Check for ECM power source circuit (See page [EG1-403](#)).

Fuel System Circuit

CIRCUIT DESCRIPTION

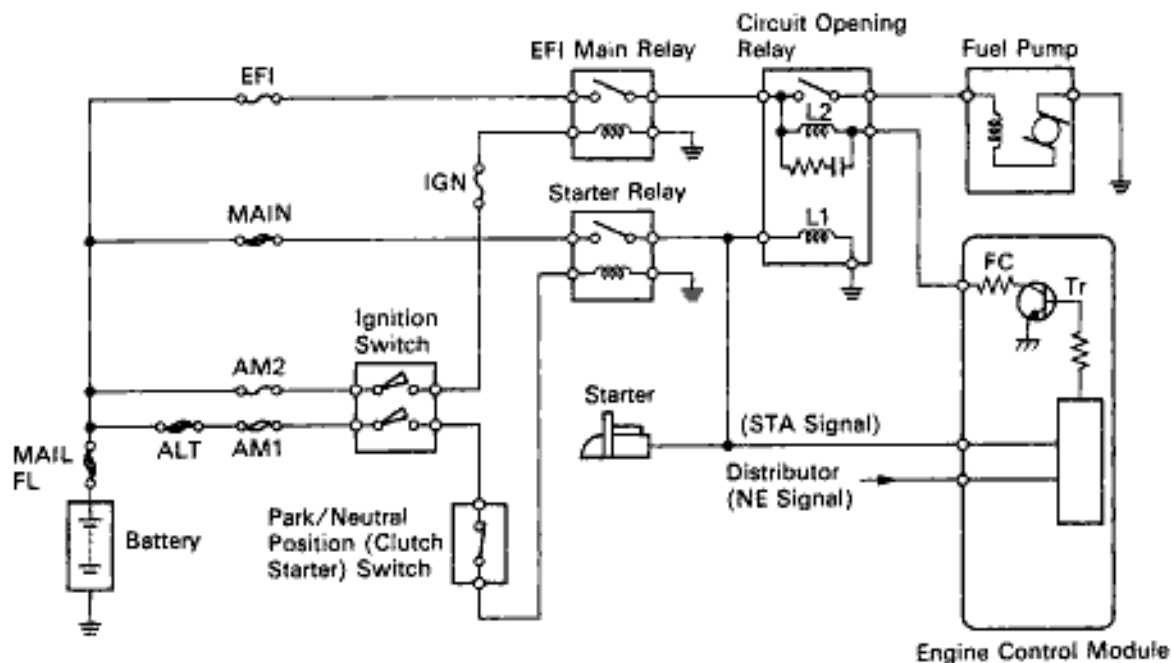
Fuel pump control

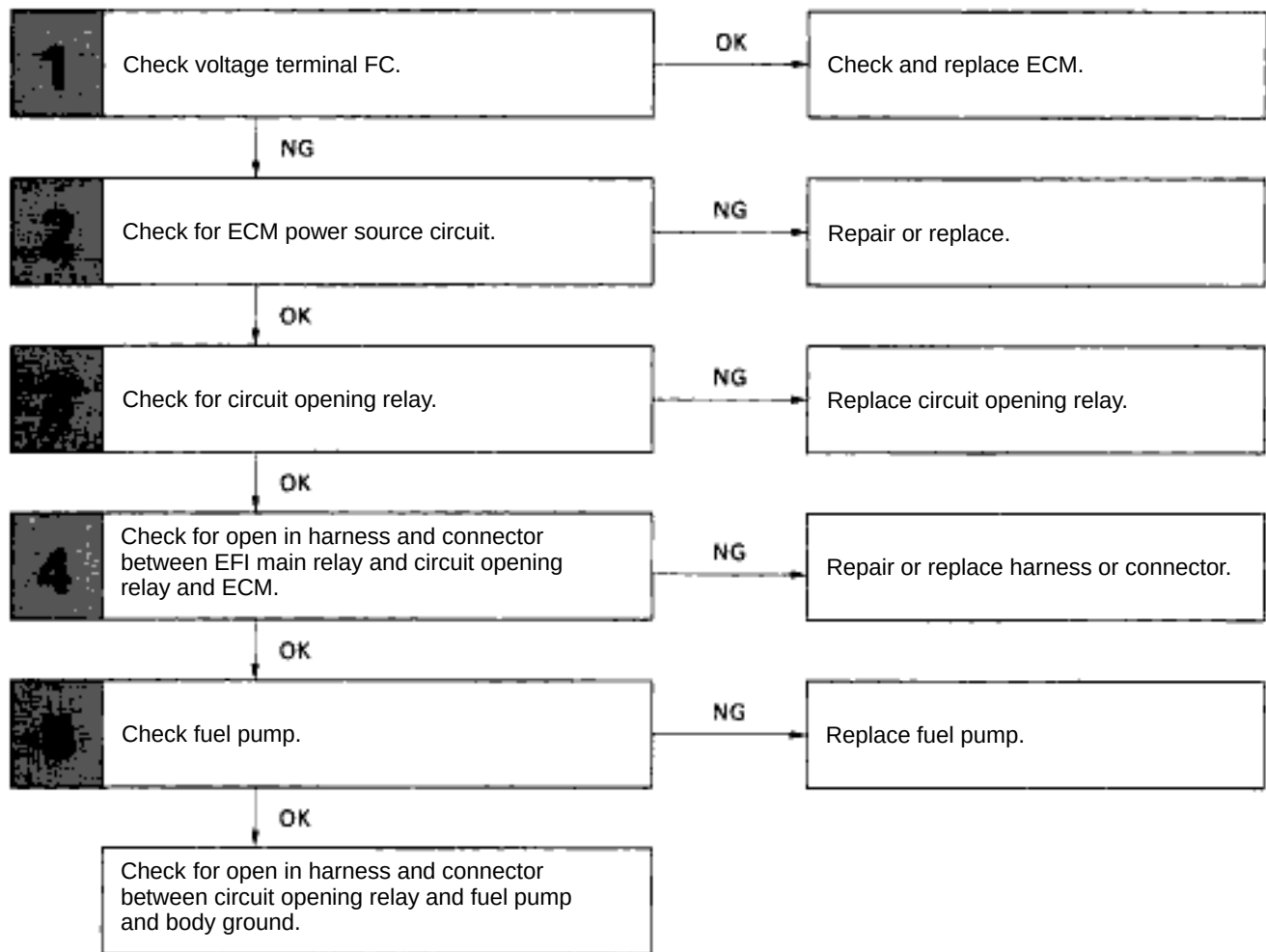
The fuel pump is switched on (low voltage at terminal FC) when STA is on or while the NE signal is input to the ECM.

In the diagram below, when the engine is cranked, current flows from terminal ST of the ignition switch to the starter relay coil, the starter relay switches on and current flows to coil L1 of the circuit opening relay. Thus the circuit opening relay switches on, power is supplied to the fuel pump and the fuel pump operates.

When the STA signal and NE signal are input to the ECM, Tr is turned ON, current flows to coil L2 of the circuit opening relay, the relay switches on and the fuel pump operates.

While the NE signal is generated (engine running), the ECM keeps Tr ON (circuit opening relay ON) and the fuel pump also keeps operating.



DIAGNOSTIC CHART

*. Except California specification vehicles with M/T.

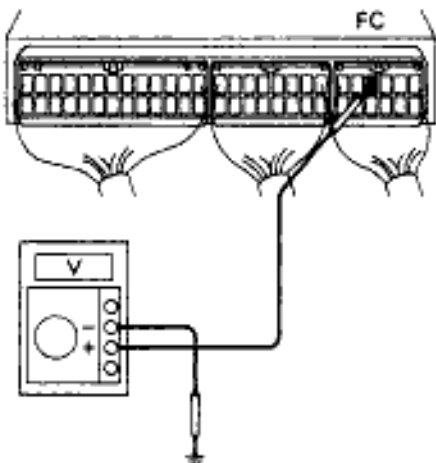
*2: Only for California specification vehicles with M/T.

INSPECTION PROCEDURE

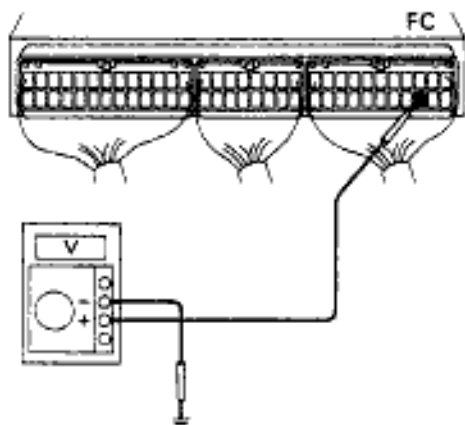
Check voltage between terminals FC of engine control module connector and body ground.



Exc. California spec. with M/T



Others



8E6603
F16735
F16736

- P** (1) Remove glove compartment.
(See page [EG1-234](#)).
(2) Turn ignition switch ON.
- C** Measure voltage between terminal FC of engine control module connector and body ground.

OK Voltage: 9 -14 V

NG

OK

Check and replace engine control module.

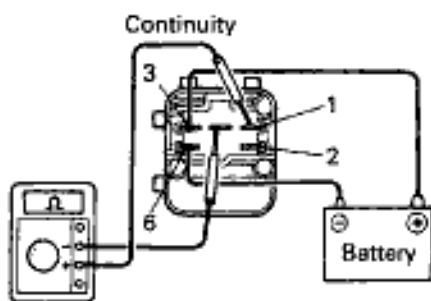
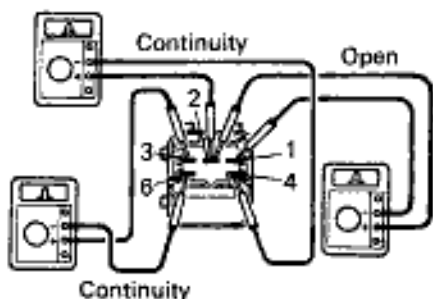
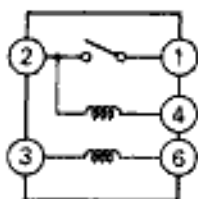
Check for ECM power source circuit (See page [EG1-403](#)).

OK

NG

Repair or replace.

Check circuit opening relay.



F16782
P14361
P14362

- P** (1) Remove glove compartment
(See page [EG1-217](#)).
(2) Remove circuit opening relay from R/B No.6.
- C** Check continuity between terminals of circuit opening relay shown below.

OK

Terminals 1 and 2	Open
Terminals 2 and 4	Continuity
Terminals 3 and 6	Continuity

- C** (1) Apply battery voltage between terminals 3 and 6.
(2) Check continuity between terminals 1 and 2.

OK

Terminals 1 and 2	Continuity
-------------------	------------

OK

NG

Replace circuit opening relay.

4 Check for open in harness and connector between EFI main relay and circuit opening relay, circuit opening relay and engine control module
(See page [IN-31](#)).

OK

NG

Repair or replace harness or connector.

Check fuel pump (See page [EG1-177](#)).

OK

NG

Replace fuel pump.

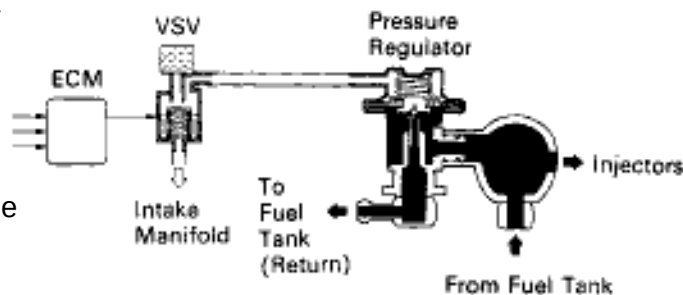
Check for open in harness and connector between circuit opening relay and fuel pump, fuel pump and body ground.

VSV Circuit for Fuel Pressure Control (Only for California spec.)

CIRCUIT DESCRIPTION

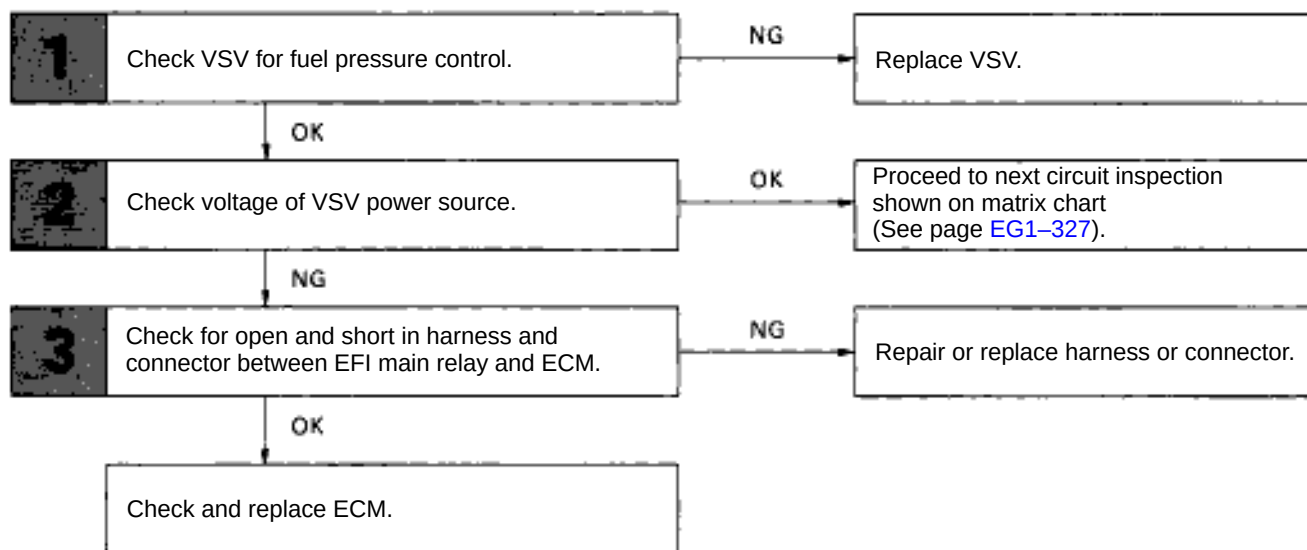
The ECM turns on a VSV (Vacuum Switching Valve) to draw the air into the diaphragm chamber of the pressure regulator if it detects that the temperature of the engine coolant is too high during engine starting. The air drawn into the chamber increases the fuel pressure to prevent fuel vapor lock at high engine temperature in order to help the engine start when it is warm.

Fuel pressure control ends approx. 90 secs. after the engine is started.

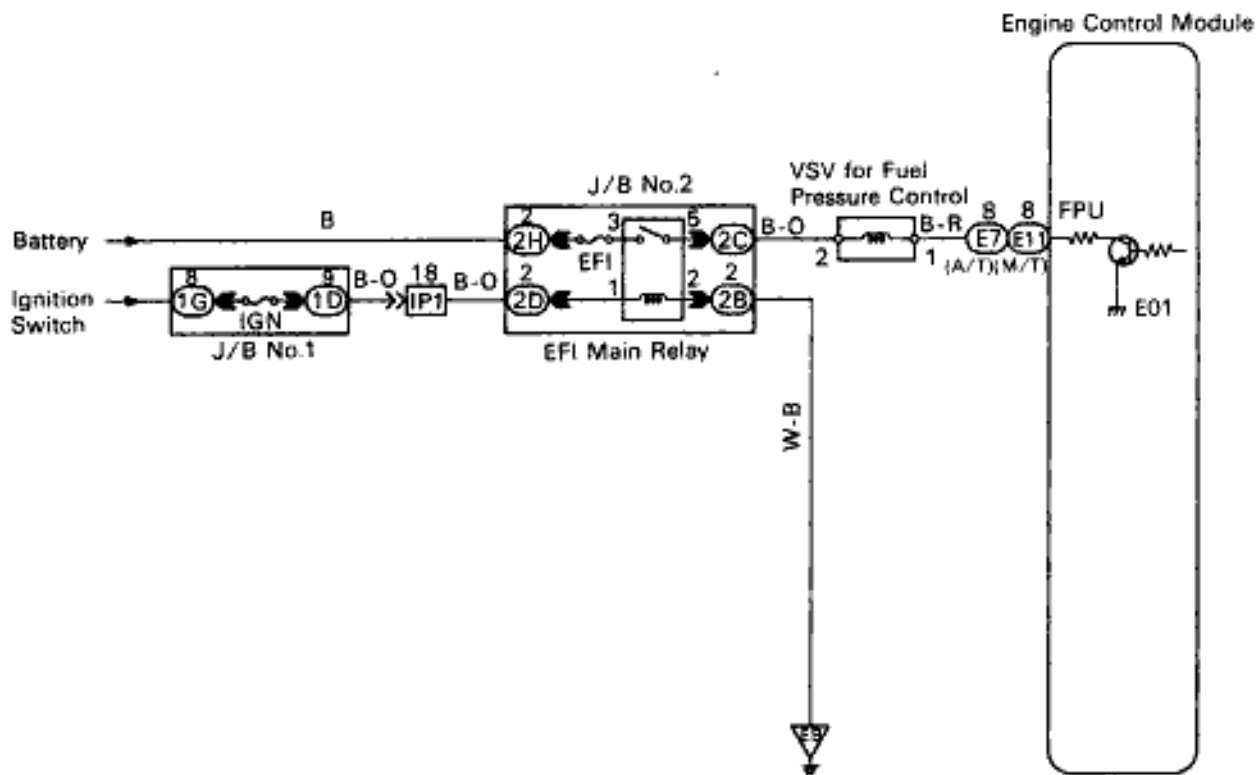


F10597

DIAGNOSTIC CHART

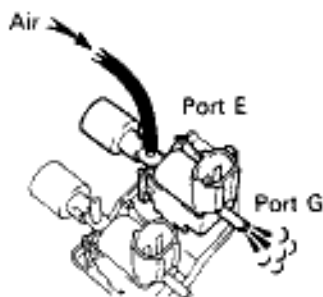
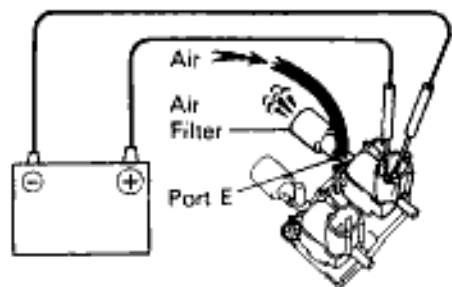
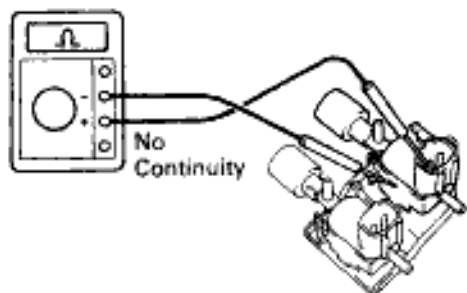
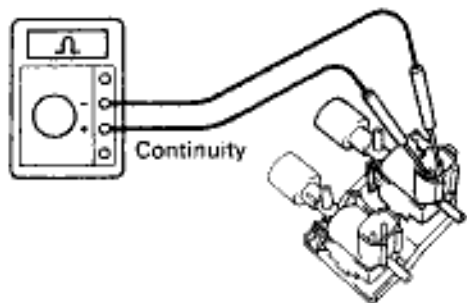


WIRING DIAGRAM



INSPECTION PROCEDURE

Check VSV for fuel pressure control.



- P** (1) Disconnect VSV connector.
(2) Remove VSV.
- C** (1) Measure resistance between terminals.
(2) Measure resistance between each terminal and the body.
- OK** (1) **Resistance: 33 – 39Ω at 20°C (68°F)**
(2) **Resistance: 1 MΩ or higher.**

- C** Check operation of VSV when battery positive voltage is applied and released to the VSV terminals.

- OK** **Battery positive voltage is applied:**
The air from port E is flowing out through the air filter.
- Battery positive voltage is not applied:**
The air from port E is flowing out through port G.

P14141
P14142
P14144
P14143

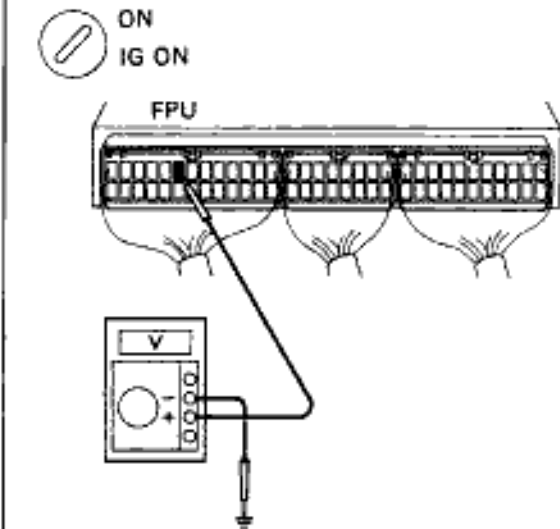
OK

NG

Replace VSV for fuel pressure control VSV.

Go to step

Check voltage between terminal FPU of engine control module connector and body ground.



8E6653
F/7174

- P** (1) Remove glove compartment
(See page [EG1-234](#)).
(2) Turn ignition switch ON.
- C** Measure voltage between terminal FPU of engine control module connector and body ground.
- OK** Voltage: 9 –14 V

NG

OK

Proceed to next circuit inspection shown on matrix chart (See page [EG1-327](#)).

Check for open and short in harness and connector between engine control module and VSV, VSV and EFI main relay (See page [IN-31](#)).

OK

NG

Repair or replace harness or connector.

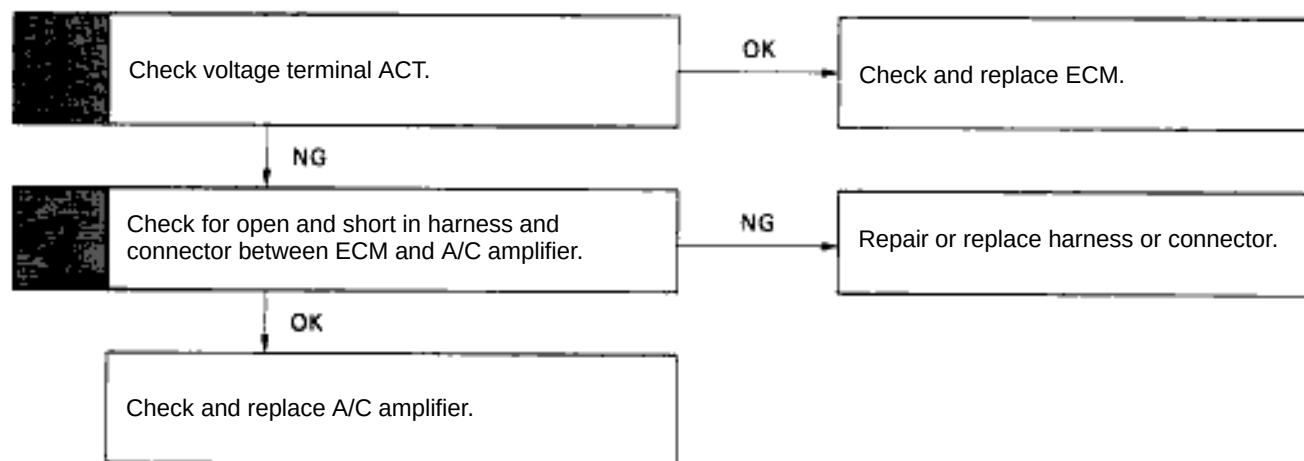
Check and replace engine control module.

Air Conditioning Cut Control Circuit

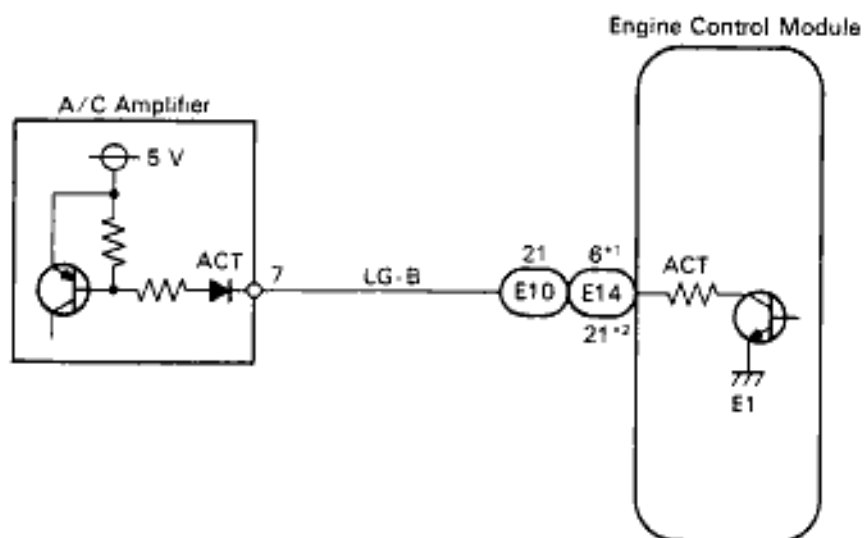
CIRCUIT DESCRIPTION

This circuit cuts air conditioning operation during vehicle acceleration in order to increase acceleration performance. During acceleration with the vehicle speed at 16 mph (25 km/h) or less, engine speed at 1,200 rpm or less and throttle valve opening angle at 60° or more, the A/C magnet switch is turned OFF for several seconds.

DIAGNOSTIC CHART



WIRING DIAGRAM

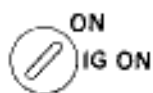


*1: Except California specification vehicles with M/T.

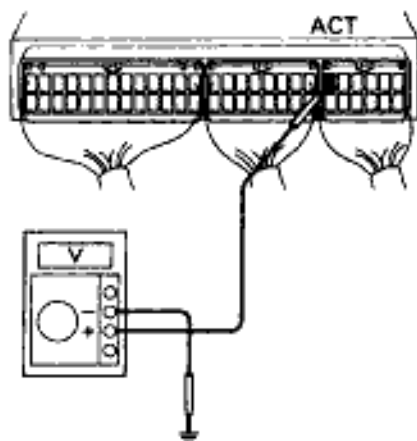
*2: Only for California specification vehicles with M/T.

INSPECTION PROCEDURE

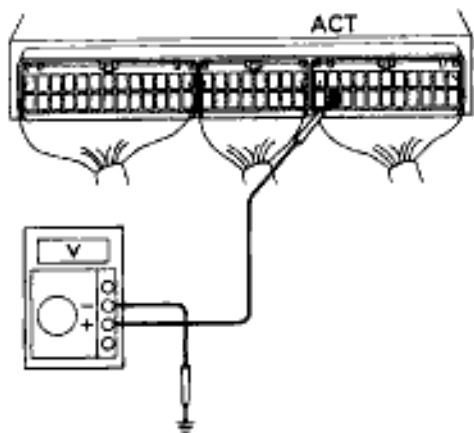
Check voltage between terminal ACT of engine control module connector and body ground.



Exc. California spec. with M/T



Others



8E8653
F16737
F16738

- P** (1) Remove glove compartment.
(See page [EG1-234](#)).
- (2) Turn ignition switch ON.
- C** Measure voltage between terminal ACT of engine control module connector and body ground when A/C switch is turned to ON.
- OK** Voltage: 9 -14 V

NG

OK

Check and replace engine control module.

Check for open and short in harness and connector between engine control module and A/C amplifier (See page [IN-31](#)).

OK

NG

Repair or replace harness or connector.

Check and replace A/C amplifier.

TE1 TE2 Terminal Circuit

CIRCUIT DESCRIPTION

Terminals TE1 and TE2 are located in the data link connector 1 and 2.

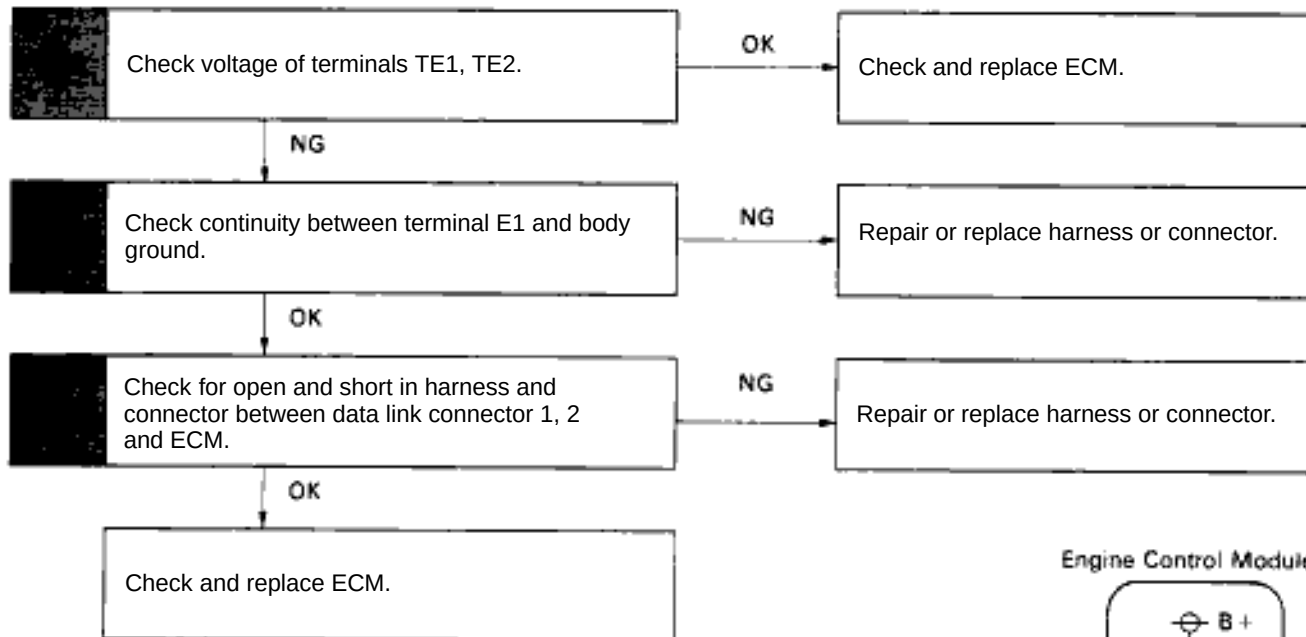
The data link connector 1 located in the engine compartment and the data link connector 2 located in the cabin. When these terminals are connected with the E1 terminal, diagnostic trouble codes in normal mode or test mode can be read from the malfunction indicator lamp on the combination meter.

DIAGNOSTIC CHART

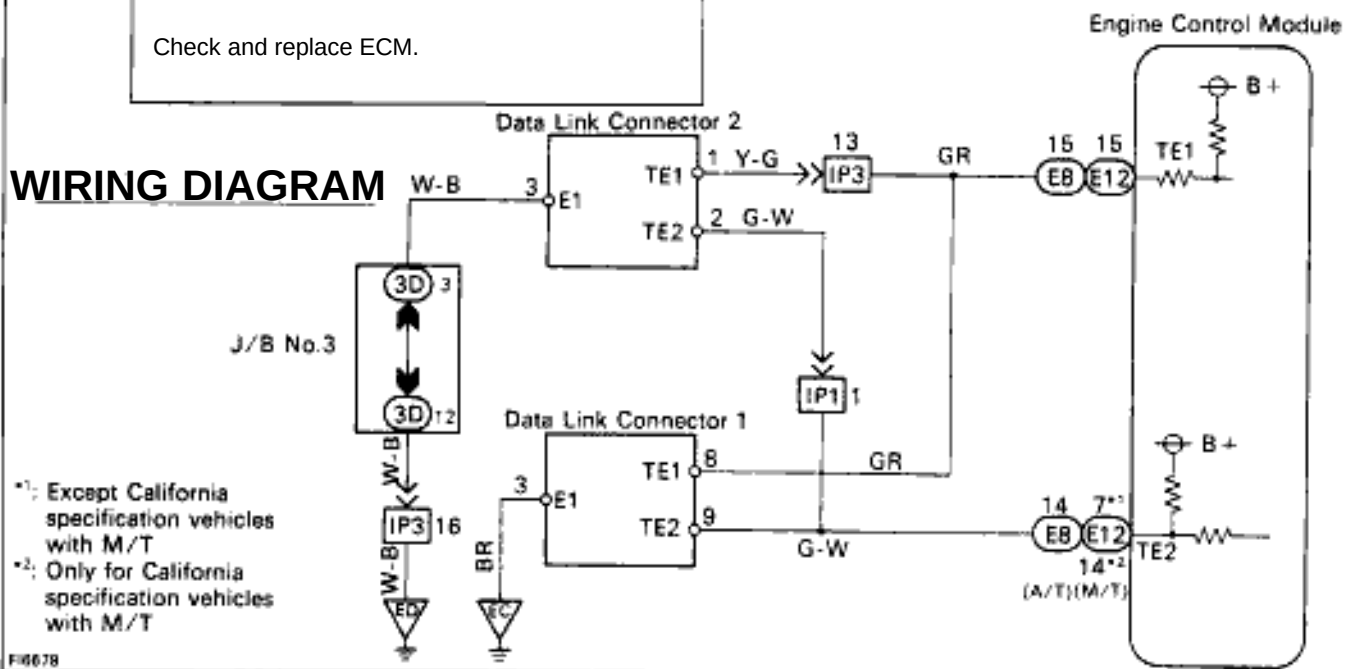
HINT: If terminals TE1 and TE2 are connected with terminal E1, diagnostic trouble code is not output or test mode is not activated.

Even though terminal TE1 is not connected with terminal E1, the malfunction indicator lamp blinks.

For the above phenomenon, the likely cause is an open or short in the wire harness, or malfunction inside the ECM.

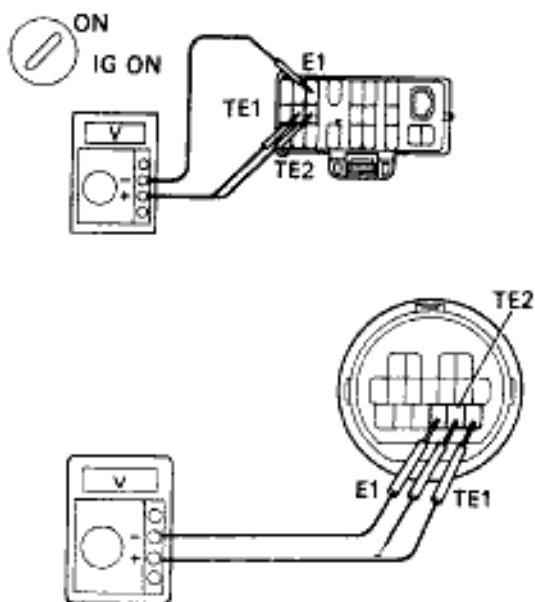


WIRING DIAGRAM



INSPECTION PROCEDURE

Check voltage between terminals TE1, TE2, and E1 of data link connector 1 and 2.



8E6053
F16592 F14412

P Turn ignition switch ON.

C Measure voltage between terminals TE1, TE2 and E1 of data link connector 1 and 2.

OK Voltage: 9 -14 v

NG

OK

Check and replace engine control module.

Check continuity between terminal E1 of data link connector 1, 2 and body ground.

OK

NG

Repair or replace harness or connector.

Check for open and short in harness and connector between engine control module and data link connector 1, 2 (See page [IN-31](#)).

OK

NG

Repair or replace harness or connector.

Check and replace engine control module.