DIAGNOSIS SYSTEM DESCRIPTION

EGQJB–02

The PCME contains a built–in self–diagnosis system by which troubles with the engine signal network are detected and a ”CHECK” engine warning light on the combination meter lights up. By analyzing various signals as shown in the later table (See page EG1–288) the PCME detects system malfunctions relating to the sensors or actuators.

The self –diagnosis system has two modes, a normal mode and a test mode.

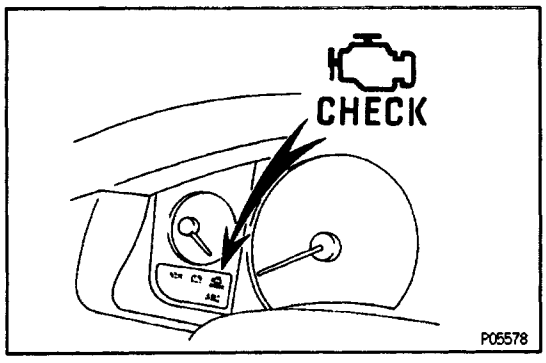
If a malfunction is detected when in the normal mode, the PCME lights up the ”CHECK” engine warning light to inform the driver of the occurrence of a malfunction. (For some codes the light does not come on.) The light goes off automatically when the malfunction has been repaired. But the diagnostic trouble code(s) remains stored in the PCME memory. The PCME stores the code(s) until it is cleared by removing the EFI fuse with the ignition switch off.

The diagnostic trouble code can be read by the number of blinks of the ”CHECK” engine warning light when TE1 and E1 terminals on the data link connector 1 are connected. When 2 or more codes are indicated, the lowest number (code) will appear first.

If a malfunction is detected when in the test mode, the PCME lights up the ”CHECK” engine warning light to inform the technician of the occurrence of a malfunction (except for code Nos. 42, 43 and 51). In this case, TE2 and E1 terminals on the data link connector 1 should be connected as shown later. (See page EG1–283)

In the test mode, even if the malfunction is corrected, the malfunction code is stored in the PCME memory even when the ignition switch is off (except code Nos. 42, 43 and 51). This also applies in the normal mode. The diagnostic mode (normal or test) and the output of the ”CHECK” engine warning light can be selected by connecting the TE1, TE2 and E 1 terminals on the data link connector 1, as shown later.

A test mode function has been added to the functions of the self–diagnosis system of the normal mode for the purpose of detecting malfunctions such as poor contact, which are difficult to detect in the normal mode. This function fills up the self–diagnosis system. The test mode can be implemented by the technician following the appropriate procedures of check terminal connection and operation described later. (See page EG1–283)



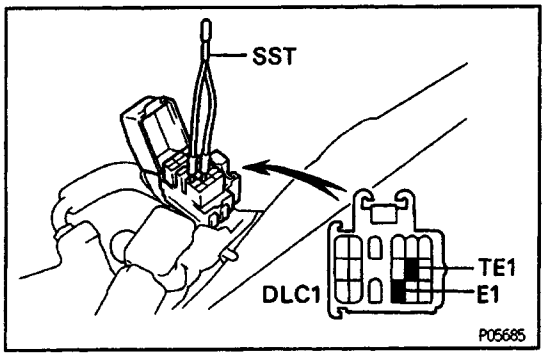
”CHECK” ENGINE WARNING LIGHT CHECK

1. The ”CHECK” engine warning light will come on when the ignition switch is placed at ON and the engine is not running.
2. When the engine is started, the ” CHECK” engine warning light should go off.
   If the light remains on, the diagnosis system has detected a malfunction or abnormality in the system.

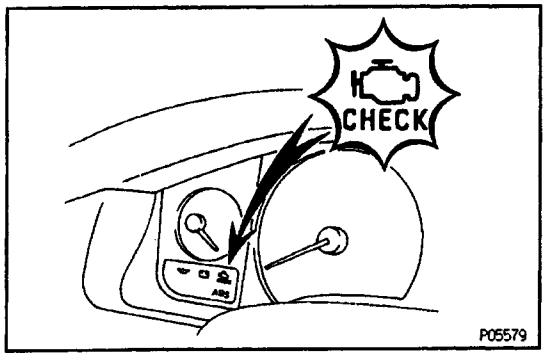
DIAGNOSTIC TROUBLE CODES OUTPUT (Normal mode)

To obtain an output of diagnostic trouble codes, proceed as follows:

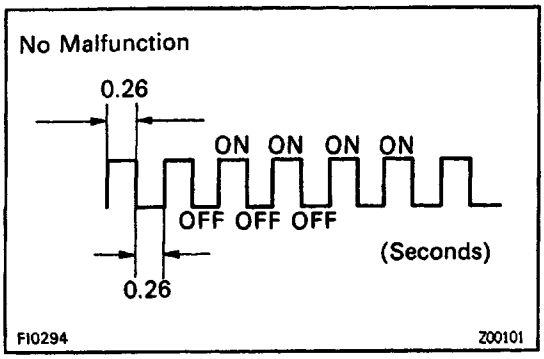
1. Initial conditions
(a) Battery voltage 11 V or more
(b) Throttle valve fully closed (throttle position sensor: IDL points closed)
(c) Transmission in neutral range
(d) Accessories switched OFF
(e) Engine at normal operating temperature
2. Turn the ignition switch ON. DO not start the engine.



3. Using SST, connect terminals TE1 and E1 of the data link connector 1.
SST 09843–18020

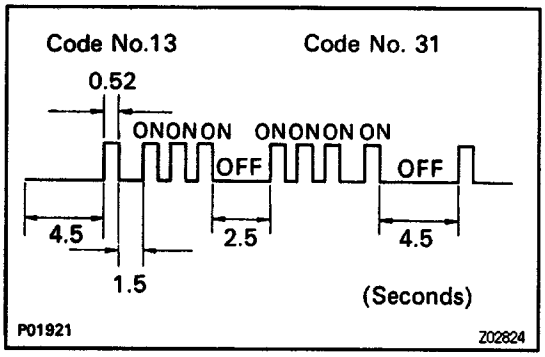


4. Read the diagnostic trouble code as indicated by the number of flashes of the ”CHECK” engine warning light.



Diagnostic Trouble Codes (See page **EG1–288**)
(a) Normal System Operation (no malfunction)

- The light will alternately blink ON and OFF at 0.26–second intervals.

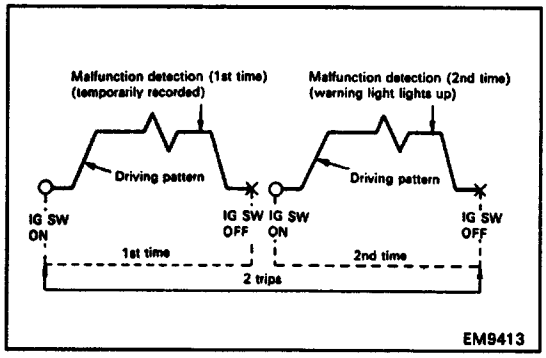


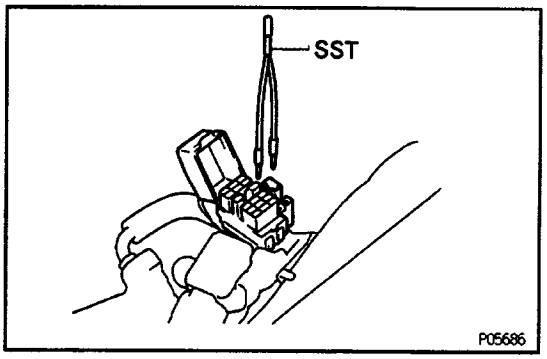
(b) Malfunction Code Indication

- In the event of a malfunction, the light will blink every 0.52–seconds. The first number of blinks will equal the first digit of a 2–digit diagnostic trouble code and, after a 1.5–second pause, the 2nd number of blinks will equal the 2nd. If there are two or more codes, there will be a 2.5–second pause between each code.

- After all the codes have been output, there will be a 4.5 second pause and they will all be repeated as long the terminals TE 1 and E 1 of the data link connector 1 are connected.

HINT: In the event of a number of trouble codes, indication will begin from the smaller value and con–tinue to the larger.





(c) (2 trip detection logic)

Diagnostic trouble codes 25, 26 and 71 use ”2 trip detection logic”. With this logic, when a malfunction is first detected, the malfunction is temporarily stored in the PCME memory. If the same case is detected again during the second drive test, this second detection causes the ”CHECK” engine warning light to light up. The 2 trip repeats the same mode a 2nd time. (How–ever, the ignition switch must be turned OFF between the 1 st time and 2nd time.) In the Test Mode, the ”CHECK” engine warning light lights up the 1 st time a malfunction is detected.

5. After the diagnosis check, remove SST.
   SST 09843–18020

(Test mode)

HINT:

- Compared to the normal mode, the test mode has high sensing ability to detect malfunctions.
- It can also detect malfunctions in the starter signal circuit and air conditioner signal.
- Furthermore, the same diagnostic items which are detected in the normal mode can also be detected in the test mode.

To obtain an output of diagnostic trouble codes, proceed as follows:

1. Initial conditions

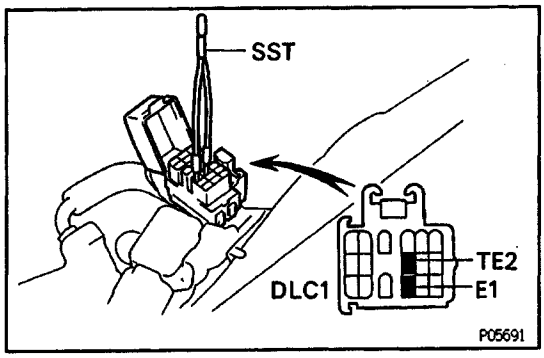
(a) Battery voltage 11 volts or more

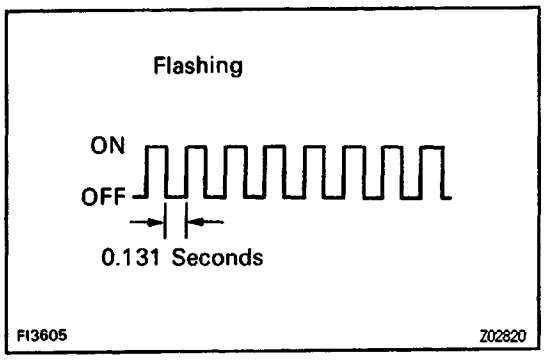
(b) Throttle valve fully closed (throttle position sensor IDL points closed)

(c) Transmission in neutral range

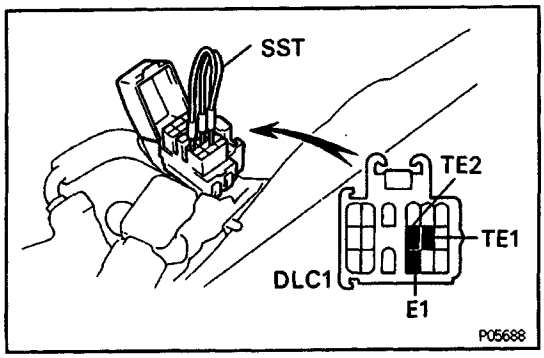
(d) Accessories switched OFF

2. First, using SST, connect terminals TE2 and E1 of the data link connector 1.
SST 09843–18020

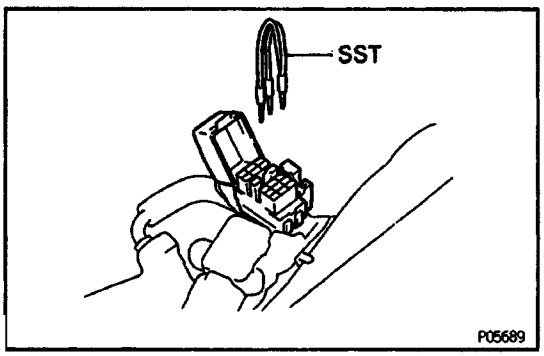




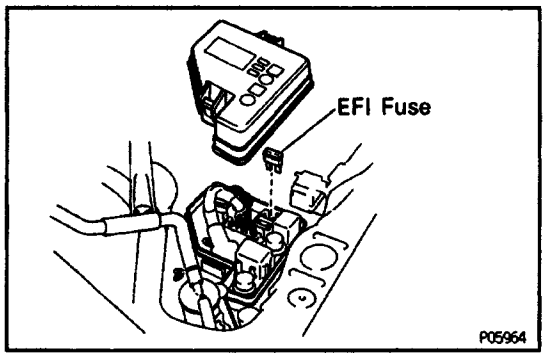
3. Turn the ignition switch ON.
HINT: To confirm that the test mode is operating, check that the ”CHECK” engine warning light flashes when the ignition switch is turned ON.
4. Start the engine and drive the vehicle at a speed of 10 km/h (6 mph) or higher.
5. Simulate the conditions of the malfunction described by the customer.



6. Using SST, connect terminals TE1 and E1 of the data link connector 1.
SST 09843–18020
7. Read the diagnostic trouble code as indicated by the number of flashes of the ”CHECK” engine warning light. (See page EG1–286)



8. After the diagnosis check, remove SST.
   SST 09843–18020
   HINT:
   - The test mode will not start if terminals TE2 and E1 are connected after the ignition switch is turned on.
   - The starter signal and vehicle speed signal will be diagnosed by the PCME as malfunctions, and code Nos. 42, and 43 will be output, if the oper–ation in step 4 is not performed.
   - When the air conditioner is on or when the ac–celerator pedal is depressed, code ’51” (Switch condition signal) is output, but this is not abnor–mal.



EGGJE–02

DIAGNOSTIC TROUBLE CODE CANCELLATION

1. After repair of the trouble area, the diagnostic troble code retained in memory by the PCME must be can–celled out by removing the EFI fuse (15 A) for 10 seconds or more, depending on ambient temperature (the lower the temperature, the longer the fuse must be left out) with the ignition switch OFF.
   HINT:
   - Cancellation can also be done by removing the battery negative (–) terminal, but in this case, other memory systems (clock, etc.) will also cancelled out.
   - If the diagnostic trouble code is not cancelled out, it will be retained by the PCME and appear along with a new code in the event of future trouble.
   - If it is necessary to work on engine components requiring removal of the battery terminal, a check must first be made to see if a diagnostic trouble code has been recorded.
2. After cancellation, perform road test of the vehicle to check that a normal code is now read on the ”CHECK” engine warning light.
   If the same diagnostic trouble code appears, it indi–cates that the trouble area has not been repaired thoroughly.

DIAGNOSIS INDICATION

E0QJF–02

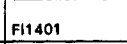
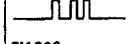
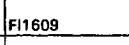
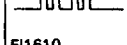
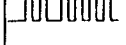
1. When 2 or more codes are indicated, the lowest number (code) will appear first.
2. All detected diagnostic trouble codes, except code Nos. 43, 51 and 53 will be retained in memory by the PCM E from the time of detection until cancelled out.
3. Once malfunction is cleared, the ”CHECK” engine warning light on the combination meter will go off but the diagnostic trouble code(s) remains stored in PCME memory (except for code Nos. 43, 51 and 53).

5Q0J6–02

DIAGNOSTIC TROUBLE CODES

HINT:

- If a malfunction is detected during the diagnostic trouble code check, refer to the circuit indicated in the table, and turn to the corresponding page,
- Your readings may vary from the parameters listed in the table, depending on the instruments used.

Code No.	Number of blinks "CHECK" Engine Warning Light	System	*1 "CHECK" Engine Warning Light		Diagnosis	Trouble Area	*2 Memory	See Page
			Normal Mode	Test Mode				
—	 FI1401	Normal	—	—	No trouble code is recorded.	—	—	—
12	 FI1606	RPM Signal	ON	N.A.	• No G1, G2 or NE signal is input to the PCM E for 2 secs. or more after STA turns ON. • Open in G – circuit	• Open or short in NE, G circuit • Distributor • Open or short in STA circuit • PCME	O	IG–4 EG1–304
13	 FI1607	RPM Signal	ON	ON	NE signal is not input to PCME for 0.05 sec. or more when engine speed is 1,000 rpm or more.	• Open or short in NE circuit • Distributor • PCME	O	IG–4
14	 FI1608	Ignition Signal	ON	N.A.	IG signal from igniter is not input to PCME for 8 consecutive ignition.	• Open or short in IG F or IGT circuit from igniter to ECU • Igniter • PCME	O	EG1–305
21	FI1609	Oxygen Sensor Signal	ON	N.A.	Open or short in heater circuit of oxygen sensor for 0.5 sec. or more. (HT)	• Open or short in heater circuit of oxygen sensor • Oxygen sensor heater • PCME	O	EG1–403
				ON	At normal driving speed (below 60 mph and engine speed is above 1,900 rpm), amplitude of oxygen sensor signal (0X1) is reduced to between 0.35 – 0.70 V continuously for 60 secs. or more. *6 (2 trip detection logic) (Exc. Calif.)	• Open or short in oxygen sensor circuit • Oxygen sensor • Open or short in air flow sensor circuit • Air flow sensor • PCME		
22	 FI1610	Engine Coolant Temp. Sensor Signal	ON	ON	Open or short in engine coolant temp. sensor circuit for 0.5 sec. or more. (THW)	• Open or short in engine coolant temp. sensor circuit • Engine coolant temp. sensor • PCME	O	EG1–303
24	 FI1611	Intake Air Temp. Sensor Signal	*3 ON	ON	Open or short in intake air temp. sensor circuit for 0.5 sec. or more. (THA)	• Open or short in intake air temp. sensor circuit • Intake air temp. sensor • PCME	O	EG1–302
25	 FI2562	Air–Fuel Radio Lean Mal–function	ON	ON	(1) Oxygen sensor output in less than 0.45 V for at least 90 secs. when oxygen sensor is warmed up (racing at 1,500 rpm). (only for code 25) (2) When the oxygen sensor signal oscillates beyond 0.45 V more than 10 times within a 4 sec. period at idle and at coolant temperature of 60°C (140°F) or above. (3) When the air–fuel compensation value fluctuates more than 20% from the PCM E set range within an 80 sec. period at coolant temperature of 60°C (140°F) or above. *6 (2 trip detection logic) (1) – (3)	• Engine ground bolt loose • Open in E1 circuit • Open in injector circuit • Fuel line pressure (Injector blockage, etc.) • Open or short in oxygen sensor circuit. • Oxygen sensor • Ignition system • Engine coolant temp. sensor • Air flow sensor (air intake) • PCM E	O	EG1–301 EG1–310
26	 FI2563	Air–Fuel Ratio Rich Mal–function	*3 ON	*3 ON		• Engine ground bolt loose • Open in E1 circuit • Short in injector circuit • Fuel line pressure (Injector leakage, etc.) • Open or short in cold start injector circuit • Cold start injector • Open or short in oxygen sensor circuit • Oxygen sensor • Air flow sensor • Compression pressure • PCIME	O	

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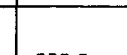
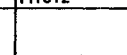
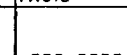
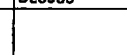
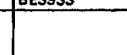
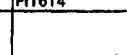
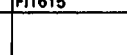
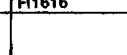
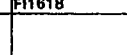
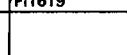
DIAGNOSTIC TROUBLE CODES (Cont'd)

Code No.	Number of blinks "CHECK" Engine Warning Light	System	*1 "CHECK" Engine Warning Light		Diagnosis	Trouble Area	*2 Memory	See Page
			Normal Mode	Test Mode				
31	 FI1612	Air Flow Sensor Signal	ON	ON	At idling. open or short detected continuously for 0.5 sec. or more in air flow sensor circuit. • Open – VC • Short – VC–E2	• Open or short in air flow sensor circuit • Air flow sensor • PCME	○	EG1–300
32	 FI1613	Air Flow Sensor Signal	ON	ON	Open or short detected continuously for 0.5 sec. or more in air flow sensor circuit. • Open – E2 • Short – VS–VC		○	EG1–300
34	 BE3933	Turbo–charging Pressure Signal	'3 ON	N.A.	Abnormal over charge during high load driving.	• Open or short in manifold absolute pressure sensor circuit • Manifold absolute pressure sensor • Turbocharger • PCME	○	—
35	 BE3933	Manifold Absolute Pressure sensor Signal	ON	ON	Open or short detected continuously for 0.5 sec. or more in manifold absolute pressure sensor signal circuit. (PIM)		○	EG1–308
41	 FI1614	Throttle Position Sensor Signal	'3 ON	ON	Open or short detected in throttle position sensor signal (VTA) for 0.5 sec. or more.	• Open or short in throttle position sensor circuit • Throttle position sensor • PCME	○	EG1–298
42	 FI1615	Vehicle Speed Pulse Generator Signal	OFF	OFF	SPO signal is not input to the PCM E for at least 8 seconds during high load driving with engine speed between 2,500 rpm and 5,000 rpm.	• Open or short in vehicle speed pulse generator circuit • Vehicle speed pulse generator • PCM E	○	—
43	 FI1616	Starter Signal	N.A.	OFF	Starter signal (STA) is not input to PCME until TE1 and E1 are connected.	• Open or short in starter signal circuit • Open or short in IG SW or MPI main relay circuit • PCME	X	EG1–304
52	 FI1618	Knock Sensor Signal	ON	N.A.	With engine speed between 2,520 rpm and 7,200 rpm, signal from knock sensor is not input to PCME for 2 revolutions. (KNK)	• Open or short in knock sensor circuit • Knock sensor (looseness, etc.) • PCME	○	—
53	 FI1619	Knock Control Signal	ON	N.A.	Engine speed is between 700 rpm and 7,200 rpm and PCME (for knock control) malfunction is detected.	• PCME	X	—
71	 FI2622	EG R System Ma1–function	*3 ON	*3 ON	120 secs. from start of EGR operation, EGR gas temp. is less than 80'C (176'F) with coolant temp. 72'C (162'F) more. *6 (2 trip detection logic)	• Open in EGR function sensor circuit • Open in VSV circuit for EG R • EGR vacuum hose disconnected, valve stuck • Clogged in EGR gas passage • PCME	○	EG1–313
51	 FI1617	Switch Condition Signal	N.A.	OFF	Displayed when A/C is ON or IDL contact OFF with the check terminals E1 and TE1 connected.	• A/C switch circuit • Throttle position sensor IDL circuit. • Accelerator pedal, cable • PCME	X	EG1–309

REMARKS:
*1: 'ON" displayed in the diagnosis mode column indicates that the "CHECK" Engine Warning Light is lighted up when a malfunction is detected.
"OFF" indicates that the "CHECK" does not light up during malfunction diagnosis, even if a malfunction is detected.
"N.A." indicates that the item is not included in malfunction diagnosis.
*2: "○" in the memory column indicates that a diagnostic trouble code is recorded in the PCME memory when a malfunction occurs. "X" indicates that a diagnostic
code is not recorded in the PCME memory even it a malfunction occurs.
Accordingly, output of diagnostic results is performed with the ignition switch ON.
*3: The "CHECK" Engine Warning Light comes on if malfunction occurs only for California specifications.
*4: No. (2) and (3) in the diagnostic contents of codes No. 25 and 26 apply to California specification vehicles only, while (1) applies to all models.
*5: Code 71 is used only for California specifications.
*6: "2 trip detection logic" (See page EG1–282)

V00887

DIAGNOSTIC TROUBLE CODE DETECTION DRIVING PATTERN

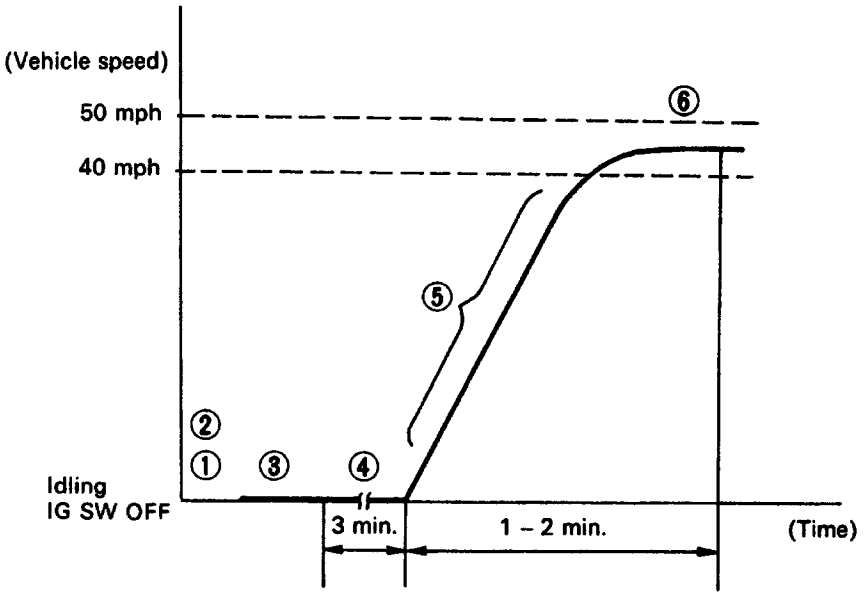
Purpose of the driving pattern.

(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.

Code No.	21	Oxygen Sensor Circuit

Malfunction: Deterioration of Oxygen Sensor



P01713

1 Disconnect the EFI fuse (115 A) for 10 seconds or more, with ignition switch OFF.
2 Initiate test mode: Connect terminals TE2 and E1 of DLC1 with ignition switch OFF.
3 Start the engine and warm the engine up with all accessory switches OFF.
4 After the engine is warmed up, let it idle for 3 minutes.
5 Accelerate gradually and maintain at approximately 1,500 rpm, or within the 1,300 to 1,700 rpm range. Turn the A/C on, and upshift appropriately. Shift carefully so that the engine speed would not fall below 1,200 rpm. Depress the accelerator pedal gradually and maintain a steady speed to avoid engine braking:
6 Maintain the vehicle speed at 40 – 50 mph.
Keep the vehicle running for 1 – 2 minutes after staring acceleration.

HINT: If any malfunction is detected, the ”CHECK” engine warning light will light up during step **6**.

NOTICE: If this procedure is not strictly followed, you cannot detect the malfunction.

V00888

DIAGNOSTIC TROUBLE CODE DETECTION DRIVING PATTERN (Cont'd)

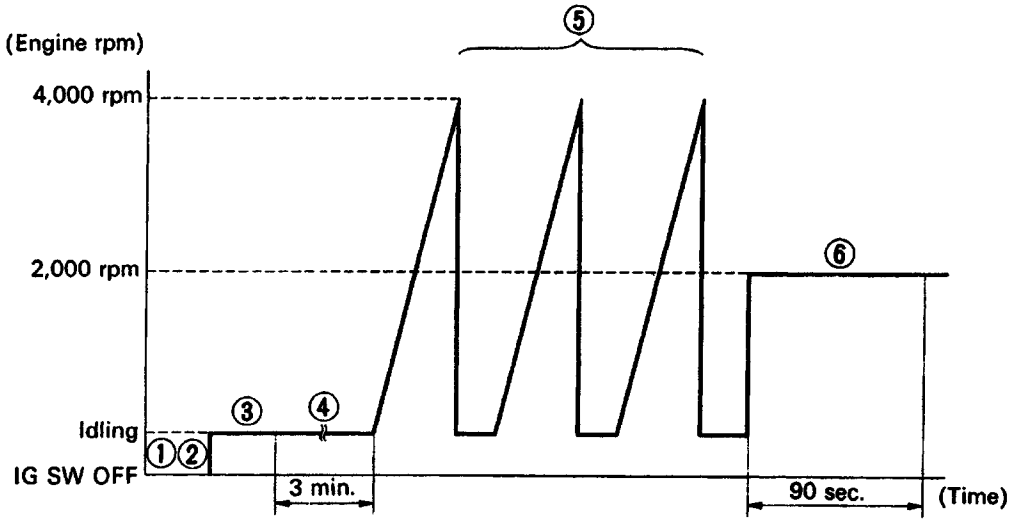
Purpose of the driving pattern.

(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.

Code No.	25	Air–Fuel Ratio Lean Malfunction
	26	Air–Fuel Ratio Rich Malfunction

Malfunction: Open or Short in Oxygen Sensor



P02491

1 Disconnect the EFI fuse (15 A) for 10 seconds or more, with ignition switch OFF.
2 Initial test mode: Connect terminal TE2 and E1 of DLC1 with ignition switch OFF.
3 Start the engine and warm the engine up with all accessory switches OFF.
4 After the engine is warmed up, let it idle for 3 minutes.
5 Accelerate rapidly to 4,000 rpm three times.
6 Maintain at 2,000 rpm for 90 seconds.

HINT: If any malfunction is detected, the "CHECK" engine warning light will light up during step **6**.

NOTICE: If this procedure is not strictly followed, you cannot detect the malfunction.

V00889

DIAGNOSTIC TROUBLE CODE DETECTION DRIVING PATTERN (Cont'd)

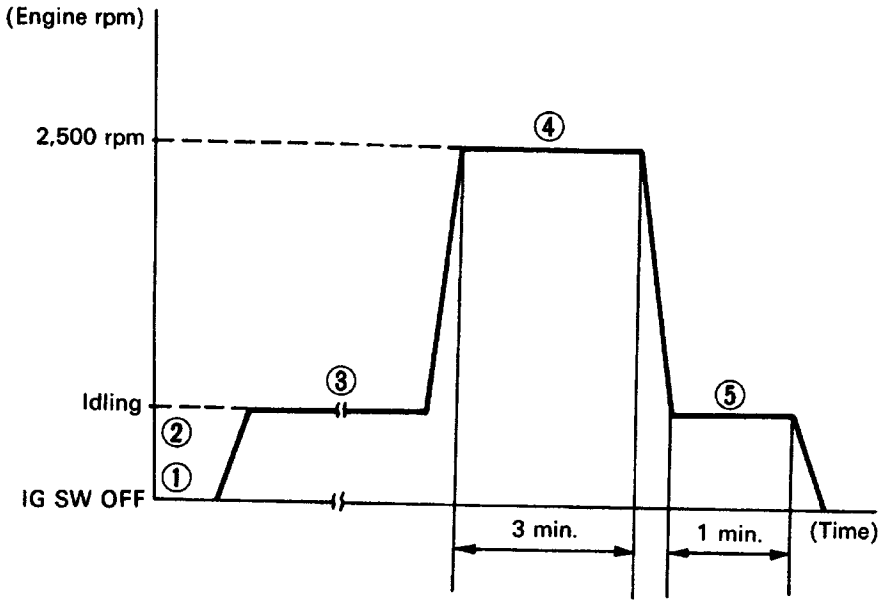
Purpose of the driving pattern.

(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.

Code No.		
	25	Air–Fuel Ratio Lean Malfunction (California)
	26	Air–Fuel Ratio Rich Malfunction (California)

Malfunction: Open or Short in Injector Leak, Blockage, Loose Engine Ground Bolt



HINT: When start this test, coolant temp. is 35˚C (95˚F) or less and A/C switch OFF.
Before this test, check the feedback voltage for oxygen sensor.

1 Disconnect the EFI fuse (15 A) for 10 seconds or more, with ignition switch OFF.

2 Initiate test mode: Connect terminals TE2 and E1 of DLC1 with ignition switch OFF.

3 Start the engine and warm the engine up.

4 After the engine is warmed up, maintain at 2,500 rpm for 3 minutes.

5 Let it idle for 1 minute.

HINT: If any malfunction is detected, the "CHECK" engine warning light will light up during step **5**.

NOTICE: If this procedure is not strictly followed, you cannot detect the malfunction.

V00890

DIAGNOSTIC TROUBLE CODE DETECTION DRIVING PATTERN (Cont'd)

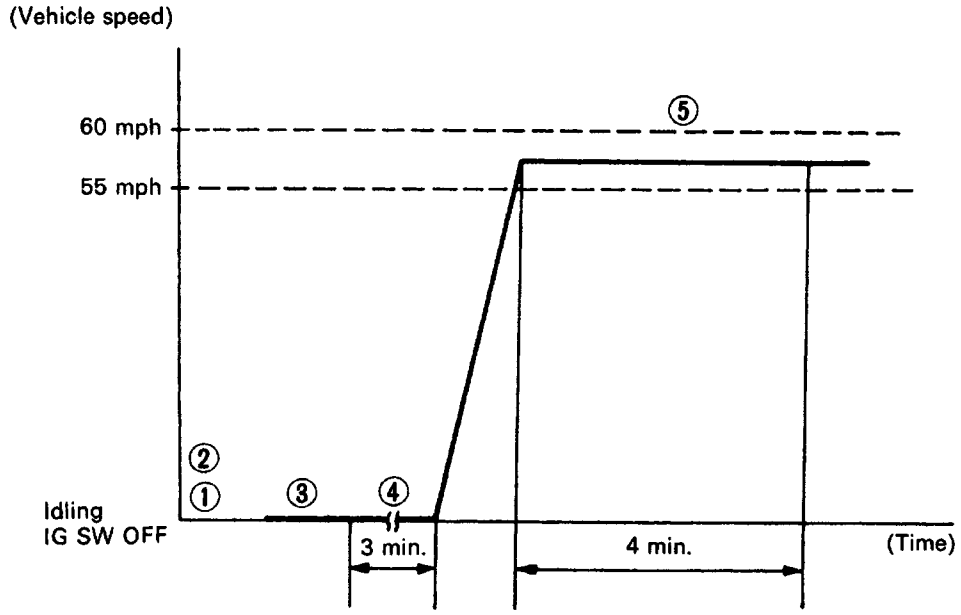
Purpose of the driving pattern,

(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.

Code No.	71	EGR System Malfunction (California)

Malfunction: Short in VSV Circuit for EGR, Loose EGR Hose, Valve Stuck



P01712

HINT: When start this test, coolant temp. is 35˚C (95˚F) or less and A/C switch OFF.

1 Disconnect the fuse EFI (15 A) for 10 seconds or more, with ignition switch OFF.

2 Initiate teat mode: Connect terminals TE2 and E1 of DLC1 with ignition switch OFF.

3 Start engine and warm engine up.

4 After engine is warmed up, let it idle for 2 minutes.

5 With the A/C switch OFF and transmission in 5th gear, drive at 55 – 00 mph for 4 minutes.

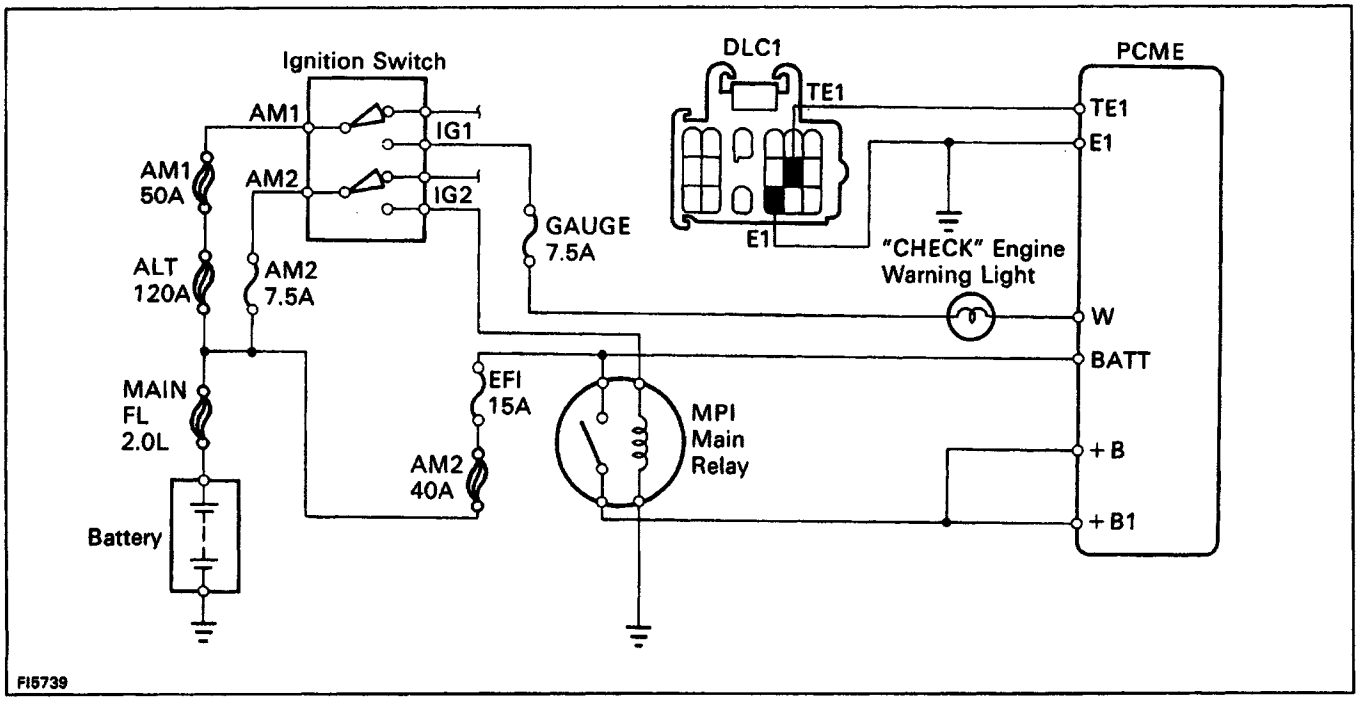
HINT: If any malfunction is detected, the "CHECK" engine warning light will light up during step **5**.

NOTICE: If this procedure is not strictly followed, you cannot detect the malfunction.

V00891

E00JH–02

DIAGNOSIS CIRCUIT INSPECTION



1.

Does "CHECK" engine warning light come on when ignition switch is at ON?
- YES → System normal
- NO → Does "CHECK" engine warning light come on when PCME terminal w is grounded to the body?
  - YES → Check wiring between PCM E terminal E1 and body ground.
    - OK → Try another PCME.
    - BAD → Repair or replace.
  - NO → Check bulb, fuse and wiring between PCM E and ignition switch.
    - BAD → Repair or replace.

2.

Does "CHECK" engine warning light go off when the engine is started?
- YES → System normal
- NO → Check wiring between PCM E and "CHECK" engine warning light.
  - BAD → Repair.
  - NO → Is there diagnostic code output when DLC1 terminals TO and E1 connected?
    - NO → Check wiring between PCME terminal TE1 and DLC1 terminal TE1, and PCME terminal E1 and DLC1 terminal E1.
      - OK → Try another PCM E.
    - YES .. → Does "CHECK" engine warning light go off after repair according to malfunction code?
      - NO → Further repair required.
      - YES → System 0 K → Cancel out diagnostic trouble code.

V00892