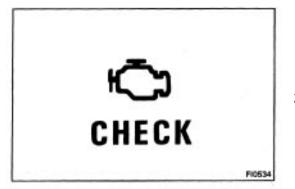
DIAGNOSIS SYSTEM DESCRIPTION

The ECU contains a built–in, self–diagnosis system which detects troubles within the engine signal network and then flashes the "CHECK" engine warning light on the instrument panel.

By analyzing various signals shown in the table (See page 30, 32 or 34) the ECU detects system malfunctions which are related to the various operating parameter sensors or actuator. The ECU stores the failure code associated with the detected failure until the diagnosis system is cleared by removing the EFI fuse with the ignition switch OFF.

The "CHECK" engine warning light on the instrument panel informs the driver that a malfunction has been detected. The light goes off automatically when the malfunction has been cleared.



"CHECK" ENGINE WARNING LIGHT CHECK

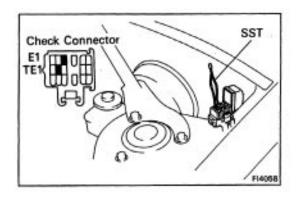
- The "CHECK" engine warning light will come on when the ignition switch is placed at ON and the engine is not running.
- 2. When the engine is started, the "CHECK" engine warning light should go off. .

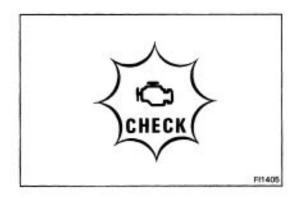
If the light remains on, the diagnosis system has detected a malfunction or abnormality in the system.

OUTPUT OF DIAGNOSTIC CODES

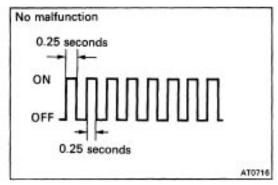
To obtain an output of diagnostic codes, proceed as follow:

- 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 check connector. SST 09843–18020



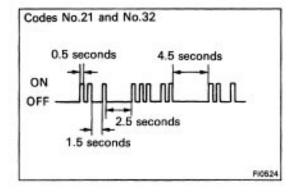


4. Read the diagnostic code as indicated by the number of flashes of the "CHECK" engine warning light.



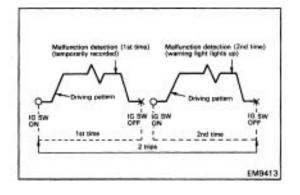
Diagnostic Codes (See page FI-30, 32 or 34) (a) Normal System Operation (no malfunction)

 The light will alternately blink ON and OFF 2 times per second.



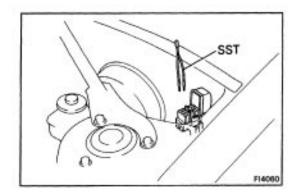
- (b) Malfunction Code Indication
 - In the event of a malfunction, the light will blink every 0.5 seconds. The first number of blinks will equal the first digit of a 2-digit diagnostic code and, after a 1.5 second pause, the 2nd number of blinks will equal the 2nd. If there are two or more codes, there will be a 2.5 second pause between each.
 - After all the codes have been signaled, there will be a 4.5 second pause and they will all be repeated as long as the terminals TE1 and E1 of the check connector are connected.

HINT: In the event of a number of trouble codes, indication will begin from the smaller value and continue to the larger in order.

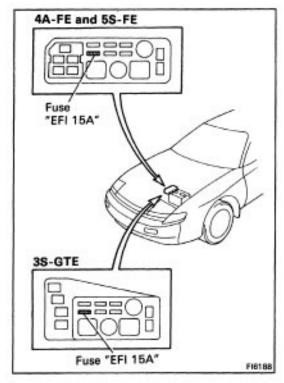


(c) (2 trip detection logic)

Diagnostic codes 21, 25, 26, 27 and 71 use "2 trip detection logic". With this logic, when a malfunction is first detected, the malfunction is temporarily stored in the ECU 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. (However, the ignition switch must be turned OFF between the 1 st time and 2nd time) .



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



CANCELLING DIAGNOSTIC CODE

- After repair of the trouble area, the diagnostic code retained in memory by the ECU must be cancelled out by removing the fuse "EFI 15A" 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 be cancelled out.
 - If the diagnostic code is not cancelled out, it will be retained by the ECU 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 code has been recorded.
- 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 code appears, it indicates that the trouble area has not been repaired thoroughly.

DIAGNOSIS INDICATION

- 1. When 2 or more codes are indicated, the lowest number (code) will appear first.
- All detected diagnostic codes, except codes No.51 and No.53, will be retained in memory by the ECU from the time of detection until cancelled out.
- 3. Once the malfunction is cleared, the "CHECK" engine warning light on the instrument panel will go off but the diagnostic code(s) remain stored in ECU memory (except for codes No.51 and No-53).

DIAGNOSTIC CODES (4A-FE)

Code No.	Number of blinks "CHECK" Engine Warning Light	System	* 1 "CHECK" Engine Warning Light	Diagnosis	Trouble Area	*2 Memory	See page
-		Normal	-	Output when no other code is recorded.	-	-	-
12		RPM Signal	ON	No G or NE signal is input to the ECU for. 2 secs. or more after STA turns ON.	Open or short in NE, G circuit Distributor Open or short in STA circuit ECU	0	IG-4 FI-47
13		RPM Signal	ON	N E signal is not input to ECU for 50 msec. or more when engine speed is 1,000 rpm or more.	Open or short in NE circuit Distributor ECU	0	IG-4
14		Ignition Signal	ON	IGF signal from igniter is not input to ECU for 4 consecutive ignition.	Open or short in IGF or IGT circuit from igniter to ECU Igniter ECU	0	FI-48
21		Oxygen Sensor	ON	(1) Open or short in heater circuit of oxygen sensor for 500 msec. or more. (HT) (2) At normal driving speed (below 60 mph and engine speed is above 1,900 rpm), amplitude of oxygen	Open or short in heater circuit or oxygen sensor Oxygen sensor heater ECU	O F	FI-51
	Fi1609	Signal		sensor signal (OX) is reduced to be- tween 0.35 – 0.70 V continuously for 60 secs. or more. *6 (2 trip detection logic) for (2)	Open or short in oxygen sensor circuit Oxygen sensor ECU		
22		Water Temp. Sensor Signal		Open or short in water temp. sensor circuit for 500 msec. or more. (THW)	Open or short in water temp. sensor circuit Water temp. sensor ECU	0	FI-46
24		Intake Air Temp. Sensor Signal	*3 ON	Open or short in intake air temp. sensor circuit for 500 msec. or more. (THA)	Open or short in intake air temp. sensor circuit Intake air temp. sensor ECU	0	FI-48
25		Air– Fuel Ratio Lean Malfunc tion	ON	(1) Oxygen sensor output is less than 0.45 V for at least 90 secs. for CALIF.or 120 secs. for others when oxygen sensor is warmed up (racing at 2,000 rpm). (only for code 25) *4 (2) When marked variation is detected in engine revolutions for each cylinder during idle switch on and feedback condition. *6 (2 trip detection logic) (1) and (2)	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 Water temp. sensor Vacuum sensor ECU	0	FI-44
26		Air– Fuel Ratio Rich Malfunc tion	ON		Engine ground bolt loose Open in E1 circuit Short in injector circuit Fuel line pressure (Injector leakage, etc.) Open or short in oxygen sensor circuit Oxygen sensor Water temp. sensor Vacuum sensor Compression pressure ECU	0	Fi-51

DIAGNOSTIC CODES (4A-FE) (Cont'd)

Code No.	Number of blinks "CHECK" Engine Warning Light	System	*1 "CHECK' Engine Warning Light	Diagnosis	Trouble Area	*2 Memory	See page
31	_MJ	Vacuum Sensor Signal	ON	Open or short detected continuously for 500 msec. or more in vacuum sensor circuit. (PIM)	Open or short in vacuum sensor circuit Vacuum sensor ECU	0	FI-43
41		Throttle Position Sensor Signal	*3 ON	Low PSW signal is input continuously to the ECU for 500 msec. or more at idling (IDL contact is ON).	Open or short in throttle position sensor circuit Throttle position sensor ECU	0	FI-42
42		Vehicle Speed Sensor Signal	OFF	SPD signal is not input to the ECU for at least 8 seconds during high load driving with engine speed between 2,600 rpm and 4,500 rpm.	Open or short in vehicle speed sensor circuit Vehicle speed sensor ECU	0	-
43		Starter Signal	OFF	Starter signal (STA) is not input to ECU even once until engine reaches 800 rpm or more when cranking.	Open or short in starter signal circuit Open or short in IG SW or main relay circuit ECU	0	FI–47
*5 71	ЛЛЛЛЛ_Л F12622	EGR System Malfun ction	ON	EG R gas temp. sensor signal (TH G) is below total temp. of intake air temp. plus 55°C (99°F) after driving for 25 seconds in EGR operation range. *6 (2 trip detection logic)	Open in EGR gas temp. sensor circuit Open in VSV circuit for EGR EGR vacuum hose disconnected, valve stuck Clogged in EGR gas passage ECU	0	FI-52
51	_//////	Switch Condition Signal	OFF	Displayed when A/C is ON, IDL contact OFF or shift position in "R", "D", "2", or "1" ranges with the check terminals E1 and TE1 connected.	A/C switch circuit Throttle position sensor IDL circuit Neutral start switch circuit Accelerator pedal, cable ECU	x	FI-42 FI-50

REMARKS

"OFF" indicates that the "CHECK" does not light up during malfunction diagnosis, even if a malfunction is detected.

- *3: The "CHECK" Engine Warning Light comes on if malfunction occurs only for California specifications.
- *4 : No.(2) 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 FI-28)

^{*1: &}quot;ON" displayed in the diagnosis mode column indicates that the "CHECK" Engine Warning Light is lighted up when a malfunction is detected.

^{*2 : &}quot;0" in the memory column indicates that a diagnostic code is recorded in the ECU memory when a malfunction occurs. "X" indicates that a diagnostic code is not recorded in the ECU memory even if a malfunction occurs.

Accordingly, output of diagnostic results is performed with the IG SW ON.

DIAGNOSTIC CODES (3S-GTE)

Code No.	Number of blinks "CHECK" Engine Warning Light	System	*1 "CHECK' Engine Warning Light	Diagnosis	Trouble Area	*2 Memory	See page
-		Normal	_	Output when no other code is recorded.	32	-	
12		RPM Signal	ON	No G1, G2 or N E signal is input to the ECU for 2 secs. or more after STA turns ON.	 Open or short in NE, G circuit Distributor Open or short in STA circuit ECU 	0	IG-4 FI-63
13		RPM Signal	ON	NE signal is not input to ECU for 50 msec. or more when engine speed is 1,000 rpm or more.	Open or short in NE circuitDistributorECU	0	IG–4
14		Ignition Signal	ON	IGF signal from igniter is not input to ECU for 8 – 11 consecutive ignition.	 Open or short in IG F or IGT circuit from igniter to ECU Igniter ECU 	0	FI-64
		Oxygen		 (1) Open or short in heater circuit of Oxygen sensor for 500 msec. or more. (HT) (2) At normal driving speed (below 60 mph and engine speed is above 	ocuit of msec. or Open or short in heater circuit of oxygen sensor Oxygen sensor heater	0	FI-69
21		Sensor Signal	ON	1,900 rpm), amplitude of oxygen sensor signal (OX1) is reduced to between 0.35 – 0.70 V contin- uously for 60 secs. or more. *6 (2 trip detection logic) (only for (2))			
22	N_M	Water Temp. Sensor Signal	ON	Open or short in water temp. sensor circuit for 500 msec. or more. (THW)	 Open or short in water temp sensor circuit Water temp. sensor ECU 	0	FI-62
24	 F1611	Intake Air Temp Sensor Signal	. *3 ON	Open or short in intake air temp. senso circuit for 500 msec. or more. (THA)	 Open or short in intake air temp. sensor circuit. Intake air temp. sensor ECU 	0	FI–6′
25		Air– Fuel Ratio Lean Malfunc tion	ON	when oxygen sensor is warmed up (racing at 1,500 rpm). (only for code 25) *4 (2) When air–fuel ratio feedback correction value or adaptive control value continues at the upper (lean) or lower (rich) limit for a certain period of time or adaptive control value is not renewed for a certain period of time. *4 (3) When the oxygen sensor feedback frequency is abnormally high during feedback condition. *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 Water temp. sensor Air flow meter (air intake) ECU 	0	FI-60
26		Air– Fuel Ratio Rich Malfunc tion	ON		Engine ground bolt loose Open in E1 circuit	0	FI-69

DIAGNOSTIC CODES (3S-GTE) (Cont'd)

Code No.	Number of blinks "CHECK" Engine Warning Light	System	*1 •"CHECK' Engine Warning Light	Diagnosis	Trouble Area	*2 Memory	See page
31		Air Flow Meter Signal	ON	At idling, open or short detected continuously for 500 msec. or more in air flow meter circuit. Open – VC Short – VC–E2	Open or short in air flow meter circuit	0	FI-59
32		Air Flow Meter Signal	ON	Open or short detected continuously for 500 msec. or more in air flow meter circuit. Open – E2 Short – VS–VC	Air flow meter ECU	0	FI–59
34		Turbo charging Pressure Signal	ON	Abnormal over charge during high load driving.	Open or short in turbocharging pressure sensor circuit Turbocharging	0	15.0
35		Turbo charging Pressure Sensor Signal	OFF	Open or short detected continuously for 500 msec. or more in .turbocharging pressure sensor signal circuit. (PIM)	Turbocharging pressure sensorTurbochargerECU	0	FI–67
41		Throttle Position Sensor Signal	*3 ON	Open or short detected in throttle position sensor signal (VTA) for 500 msec. or more. I D L contact is ON and VTA output exceeds 1.5 V.	Open or short in throttle position sensor circuit Throttle position sensor ECU	0	FI–57
42		Vehicle Speed Sensor Signal	OFF	SPD signal is not input to the ECU 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 sensor circuit Vehicle speed sensor ECU	0	-
43		Starter Signal	OFF	Starter signal (STA) is not input to ECU even once until engine reaches 800 rpm or more when cranking.	Open or short in starter signal circuit. Open or short in 1G SW or main relay circuit ECU	0	FI-63
52		Knock Sensor Signal	ON	With engine speed between 1,600 rpm and 7,200 rpm, signal from knock sensor is not input to ECU for 17 revolutions. (KNK)	Open or short in knock sensor circuit Knock sensor (looseness, etc.) ECU	0	-
53		Knock Control Signal	ON	Engine speed is between 700 rpm and 7,200 rpm and ECU (for knock control) malfunction is detected.	• ECU	х	-
71	/////////\/\\\\\\\\\\\\\\\\\\\\\\\\\\	EGR System Malfunc tion	ON	EGR gas temp. sensor signal (THG) is below 80°C (176°F) after driving for 60 seconds in EGR operation range. *6 (2 trip detection logic)	Open in EGR gas temp. sensor circuit Open in VSV circuit for EGR EGR Vacuum hose disconnected, valve stuck Clogged in EGR gas passage ECU	0	FI–70
51		Switch Condition Signal	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 ECU		FI–57 FI–68

REMARKS

"OFF" indicates that the "CHECK" does not light up during malfunction diagnosis, even if a malfunction is detected.

*3 : The "CHECK" Engine Warning Light comes on if malfunction occurs only for California specifications.

^{*1: &}quot;ON" displayed in the diagnosis mode column indicates that the "CHECK" Engine Warning Light is lighted up when a malfunction is detected.

^{*2: &}quot;0" in the memory column indicates that a diagnostic code is recorded in the ECU memory when a malfunction occurs. "X" indicates that a diagnostic code is not recorded in the ECU memory even if a malfunction occurs.

Accordingly, output of diagnostic results is performed with the IG SW ON.

^{*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: &}quot;2 trip detection logic" (See page FI-28)

DIAGNOSTIC CODES (5S-FE)

Code No.	Number of blinks "CHECK" Engine Warning Light	System	*1 "CHECK" Engine Warning Light	Diagnosis	Trouble Area	*2 Memory	See page
-		Normal	-	Output when no other code is recorded.	-	-	-
12		RPM Signal	ON	No G or NE signal is input to the ECU for 2 secs. or more after STA turns ON.	 Open or short in NE, G circuit Distributor Open or short in STA circuit ECU 	0	IG-5 FI-80 FI-97
13		RPM Signal	ON	N E signal is not input to ECU for 50 msec. or more when engine speed is 1,000 rpm or more.	Open or short in NE circuit Distributor ECU	0	IG–5
14		Ignition Signal	ON	IG F signal from igniter is not input to ECU for 4 – 5 consecutive ignition.	Open or short in IGT or IGT circuit from igniter to ECU Igniter ECU	0	FI-81 FI-98
21		Main Oxygen Sensor Signal	ON	At normal driving speed (below 60 mph and engine speed is above 1,800 rpm), amplitude of oxygen sensor signal (OX1) is reduced to between 0.35 – 0.70 V continuously for 60 secs. or more.	Open or short in oxygen sensor circuit Oxygen sensor ECU	0	FI-85 FI-102
22		Water Temp. Sensor Signal	ON	Open or short in water temp. sensor circuit for 500 msec. or more. (THW)	Open or short in intake air temp. sensor circuit Intake air temp. sensor ECU	0	FI-79 FI-96
24		Intake Air Temp. Sensor Signal	*3 ON	Open or short in intake air temp. sensor circuit for 500 msec. or more. (THA)	Open or short in intake air temp. sensor circuit Intake air temp. sensor ECU	0	FI–78 FI–95
25		Air– Fuel Ratio Lean Malfunc tion	ON	(1) Oxygen sensor output is less than 0.45 V for at least 90 secs. when oxygen sensor is warmed up (racing at 2,000 rpm) . (only for code 25)	Engine ground bolt loose Open in a circuit Open in injector circuit Fuel line pressure (Injector blockage, etc.) Open or short in oxygen sensor circuit Oxygen sensor Ignition system Water temp. sensor Vacuum sensor ECU		FI-77 FI-85
26		Air– Fuel Ratio Rich Malfunc tion	ON	(2) When marked variation is detected in engine revolutions for each cylinder during idle switch on and feedback condition *6 (2 trip detection logic) (1) and (2)	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 Water temp. sensor Vacuum sensor Compression pressure ECU	0	FI-94 FI-102

DIAGNOSTIC CODES (5S-FE) (Cont'd)

Code No.	Number of blinks "CHECK" Engine Warning Light	System	* 1 "CHECK" Engine Warning Light	Diagnosis	Trouble Area	*2 Memory	See page
*5 27		Sub- Oxygen Sensor Signal	ON	When sub—oxygen sensor is warmed up and full acceleration continued for 2 seconds, output of main oxygen sensor is 0.45 V or more (rich) and output of sub—oxygen sensor is 0.45 V or less (lean). (OX2) *6 (2 trip detection logic)	 Short or open in suboxygen sensor circuit Sub-oxygen sensor ECU 	0	FI–85 FI–102
31		Vacuum Sensor Signal	ок	Open or short detected continuously for 500 msec. or more in vacuum sensor circuit. (PI M)	Open or short in vacuum sensor circuit Vacuum sensor ECU	0	FI–52 FI–69
41		Throttle *3 Position ON Sensor Signal		Open or short detected continuously for 500 msec. or more in throttle sensor (VTA) circuit(w/ ECT)	Open or short in throttle position sensor circuit	0	FI–91
			Low PSW signal is input continuously to the ECU for 500 msec. or more at idling (IDL contact is ON). (w/o ECT)	Throttle position sensor ECU		FI-75	
42		Vehicle Speed Sensor Signal	OFF	SPD signal is not input to the ECU for at least 8 seconds during high load driving with engine speed between 2,400 rpm and 5,000 rpm.	Open or short in vehicle speed sensor circuit Vehicle speed sensor ECU	0	228
43		Starter Signal	OFF	Starter signal (STA) is not input to ECU even once until engine reaches 800 rpm or more when cranking.	Open or short in starter signal circuit Open or short in IG SW or main relay circuit ECU	0	FI–80 FI–97
*5 71		EGR System Malfunc tion	ON	EGR gas temp. sensor signal (THG) is below 70°C (122°F) (in case of intake air temp. is below 30°C (86°F) or below 80°C (176°F)) (in case of intake air temp. is above 30°C (86°F)) after driving for 50 seconds in EGR operation range.	Open in EGR gas temp. sensor circuit Open in VSV circuit for EGR EGR vacuum hose disconnected, valve stuck Clogged in EGR passage ECU	0	FI–86 FI–103
51		Switch Condition Signal	OFF	Displayed when A/C is ON, IDL contact OFF or shift position in "R", "D", "2", or ranges with the check terminals E1 and TE1 connected.	A/C switch circuit Throttle position sensor IDL circuit Neutral start switch circuit Accelerator pedal, cable ECU	x	FI–75 FI–84 FI–91 FI–101

REMARKS

"OFF" indicates that the "CHECK" does not light up during malfunction diagnosis, even if a malfunction is detected.

Accordingly, output of diagnostic results is performed with the IG SW ON.

- *3 : The "CHECK" Engine Warning Light comes on if malfunction occurs only for California specifications.
- *4 : No.(2) in the diagnostic contents of codes No.25 and 26 apply to California specification vehicles only, while (1) applies to all models
- *5 : Code 27 and 71 are used only for California specifications.
- *6 : "2 trip detection logic" (See page FI-28)

^{*1: &}quot;ON" displayed in the diagnosis mode column indicates that the "CHECK" Engine Warning Light is lighted up when a malfunction is detected.

^{*2 : &}quot;0" in the memory column indicates that a diagnostic code is recorded in the ECU memory when a malfunction occurs. "X" indicates that a diagnostic code is not recorded in the ECU memory even if a malfunction occurs.

INSPECTION OF DIAGNOSIS CIRCUIT

