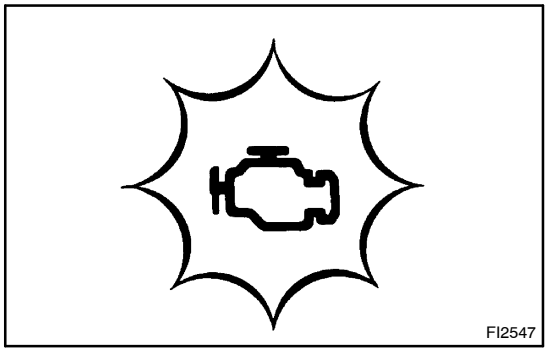
05ACZ–04

PRE–CHECK

1. DIAGNOSIS SYSTEM

(a) Description

- The ECM contains a built–in self–diagnosis system by which troubles with the engine signal network are detected and a check engine warning light in the combination meter lights up.
- By analyzing various signals as shown in the later table (See page 05–11), the ECM detects system malfunctions relating to the sensors or actuators.
- In the normal mode, the self–diagnosis system monitors 7 items, indicated by code No. as shown in 05–11. A check engine warning light informs the driver that a malfunction has been detected. The ECM 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 check connector are connected. When 2 or more codes are indicated, the lowest number (code) will appear first.
- In the test mode, 7 items, indicated by code No. as shown in 05–11 are monitored. If a malfunction is detected in any one of the systems indicated by code No. 22, 24, 31 33 41, 42 and 52 the ECM lights the check engine warning light to warn the technician that malfunction has been detected. In this case, TE2 and E1 terminals on the check connector should be connected as shown later.
- In the test mode, even if the malfunction is corrected, the malfunction code is stored in the ECM memory even when the ignition switch is off. 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 E1 terminals on the check connector, 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.



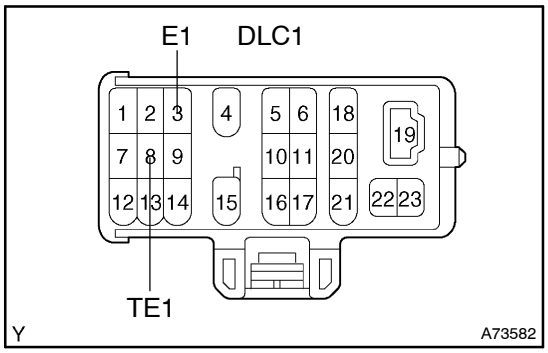
2. INSPECT DIAGNOSIS (Normal Mode)

(a) Check the check engine warning light.

(1) The check engine warning light will light up when the ignition switch is turned ON and the engine is not running.

HINT:
If the check engine warning light does not light up, proceed to troubleshooting of the combination meter. (See page 05–11)

(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.

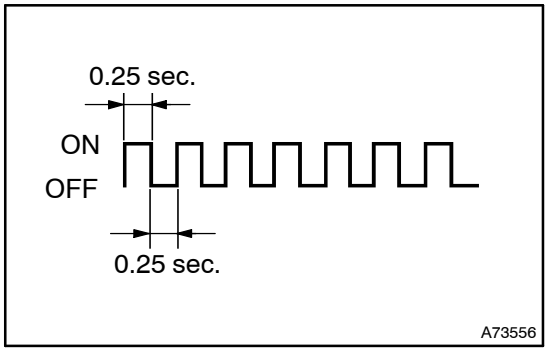


(b) Check the DTC

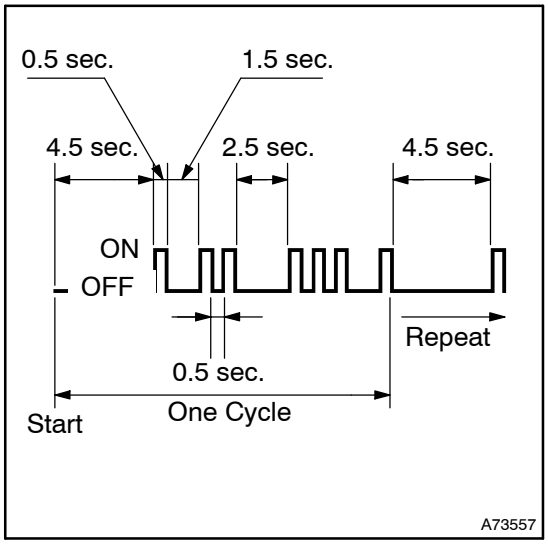
(1) Turn the ignition switch ON.

(2) Using SST connect the terminals TE1 and E1 of the DLC1.

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(3) Read the DTC from the check engine warning light (CHK ENG).



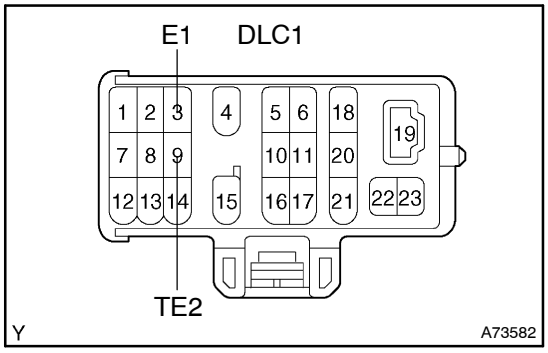
(4) As an example, the blinking patterns for codes, normal, 12 and 31 are as shown on the illustration.

HINT:
If a DTC is not output, check the TE1 terminal circuit. (See page 05–73).

(5) Check the details of the malfunction using the DTC chart on page 05–11.

(6) After completing the check, disconnect the SST from the terminals TE1 and E1, and turn off the display.

HINT:
In the event of 2 or more malfunction cords, indication will begin from the smaller numbered code and continue in order to the larger.



3. INSPECT DIAGNOSIS (Test Mode)

HINT:

Compared to the normal mode, the test mode has an increased sensing ability to detect malfunctions.

Furthermore the same diagnostic items which are detected in the normal mode can also be detected in the test mode.

(a) Check the DTC.

(1) Initial conditions

- Battery voltage 11 V or more.
- Throttle valve fully closed.
- Transmission in ”P” or ”N” position.
- Air conditioning switched.

(2) Turn ignition switch OFF.

(3) Using SST, connect the terminals TE2 and E1 of the DLC1.

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(4) 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.
- If the check engine warning light does not flash, refer to diagnostic chart for the TE2 terminal circuit on page 05–73

(5) Start the engine.

(6) Simulate the conditions of the malfunction described by the customer.

(7) After the road test, using SST, connect the terminals TE1 and E1 of DLC1.

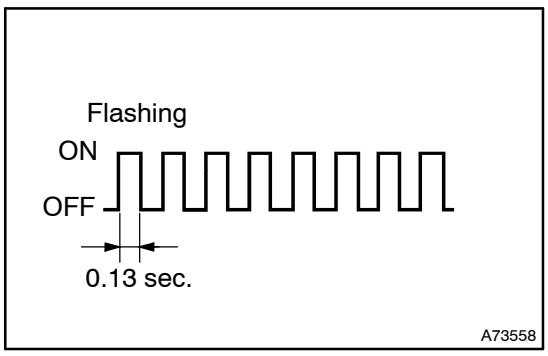
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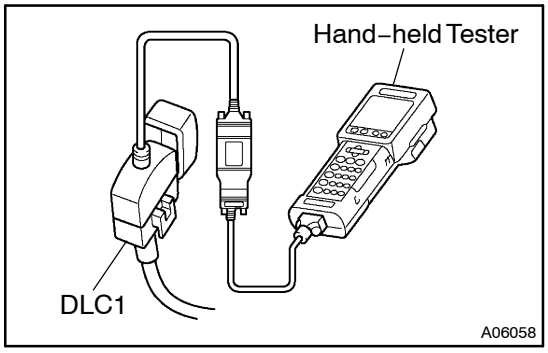
(8) Read the DTC on check engine warning light in the combination meter.

(9) After completing the check, disconnect the SST from the terminals TE1, TE2 and E1, and turn off the display.

HINT:

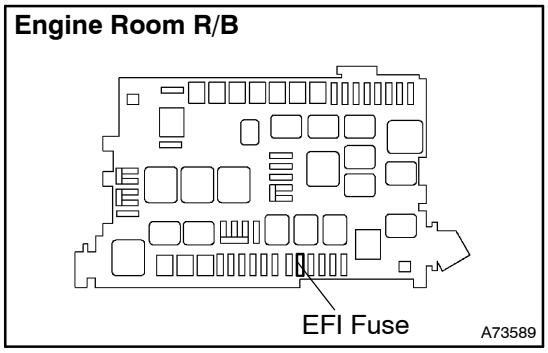
- The test mode will not start if terminals TE2 and E1 are connected after the ignition switch is turned ON.
- When vehicle speed is 5 km/h (3 mph) or below, DTC 42 (Vehicle Speed Sensor Signal Circuit) is output, but this is not abnormal.





(b) Check the DTC using hand–held tester.
(1) Hook up the hand–held tester to the DLC1.
(2) Read the DTCs by following the prompts on the tester screen.

HINT:
Please refer to the hand–held tester operator's manual for further details.



(c) Clear the DTC.
(1) After repairing the trouble areas, the DTC retained in the ECM memory must be cleared by removing the EFI fuse from engine room R/B for 60 seconds or more with the ignition switch turned OFF

HINT:
- Cancellation can also be done by removing the negative (–) terminal cable from the battery, but in this case, other memory systems (clock, etc.) will also be cancelled out.
- If it is necessary to work on engine components requiring removal of the negative (–) terminal cable from the battery, a check must first be made to see if a diagnostic trouble code has been recorded.

(2) After cancellation, road test the vehicle to check that a normal code is now read on the check engine warning light.
If the same DTCs appears, it indicates that the trouble area has not been repaired thoroughly.

4. FAIL–SAFE CHART

If any of the following codes is recorded, the ECM enters fail–safe mode.

DTC No.	Fail–Safe Operation	Fail–Safe Deactivation Conditions
22	Water temp. is fixed at 80°C (176°F)	Returned to normal condition
24	Intake air temp. is fixed at 20°C (68°F)	Returned to normal condition
31	Ignition timing fixed at 5° BTDC Manifold absolute pressure is fixed at 46.7 kPa (350 mmHg, 13.8 in.Hg)	Returned to normal condition
41	Throttle position is fixed at 0°	The following must each be repeated at least 2 times consecutively 0.1 V ≦ VTA and 0.95 V
42	High RPM for cut is prohibited ISC control prohibited	Returned to normal condition

5. CHECK FOR INTERMITTENT PROBLEMS

(a) As previously described, abnormality detection ability in the test mode is increased compared to that normal mode, so that when intermittent problems occur in the ECM signal circuit (NE, THW, THA, PIM and VTA) shown in the table opposite, the appropriate DTC is output.
Accordingly, when the DTCs shown in the table opposite (13, 22, 24, 31 and 41) are output during the DTC check, and inspection of the appropriate circuits reveals no abnormality, check for intermittent problems as described below.
By check for intermittent problems, the place where intermittent problems are occurring due to poor contacts can be isolated.
(1) Clear the DTCs (See step 3)

(2) Set the test mode (See step 3)
(3) Perform a simulation test (See page 01–26)
(4) Check the connector and terminal (See page 01–36).
(5) Handle the connector (See page 01–36).

6. ENGINE OPERATING CONDITION

HINT:
ECU data can be monitored by hand–held tester.

(a) Hook up the hand–held tester to the DLC1.
(b) Monitor ECU data by by following the prompts on the tester screen. Please refer to the hand–held tester operator's manual for further detail.
(c) Reference Value

Item	Inspection Condition	Reference Value
INJECTOR	Engine cold to hot Engine idling at normal operating temp. *1	Gradually decreases Approx. 2 – 4 msecs
IGNITION	Increase engine speed	Gradually increases
ISC DUTY	Engine idling at normal operating temp. *1 A/C Switch ON	Approx. 30 – 50 % Duty raito increases
ENGINE SPEED	RPM kept stable (Comparison with tachometer)	No great changes
INTAKE MAN.	Engine idling at normal operating temp. *1 Increase engine load	Approx. 160 – 350 mmHg Gradually increases
COOLANT	Engine at normal operating temp.	75 – 95°C (185 – 203°F) *2
THROTTLE	Closed throttle position Wide open throttle From closed throttle position to wide open throttle	Below 5° Above 70° Gradually increases
VEHICLE SPD	During driving (Comparison with speedometer)	No large differences
KNOCK FB	Depress throttle pedal suddenly during idling	ON
STA SIGNAL	During cranking	ON
IDL SIGNAL	Closed throttle position	ON
A/C SIGNAL	A/C switch ON	ON
NSW SIGNAL	When shifting from "P" or "N" position into a position other than "P" or "N"	GEAR

HINT:
*1: If no conditions are specifically stated for "Idling", it means the shift lever is at N or P position, the A/C switch is OFF and all accessory switches are OFF.

7. BASIC INSPECTION

When the normal code is displayed in the DTC check, troubleshooting should be performed in the order for all possible circuits to be considered as the causes of the problems.
In many cases, by carrying out the basic engine check shown in the following flow chart, the location causing the problem can be found quickly and efficiently. Therefore, using of this check is essential in engine troubleshooting.

1	CHECK BATTERY VOLTAGE

NOTICE:
Carry out this check under the engine stoppage condition.

	OK	NG
Voltage	11 V or more	Less than 11 V

NO → **CHARGE OR REPLACE BATTERY**

OK

2	CHECK IF ENGINE IS CRANKED

NG → PROCEED TO PROBLEM SYMPTOMS TABLE (See page 05–15)

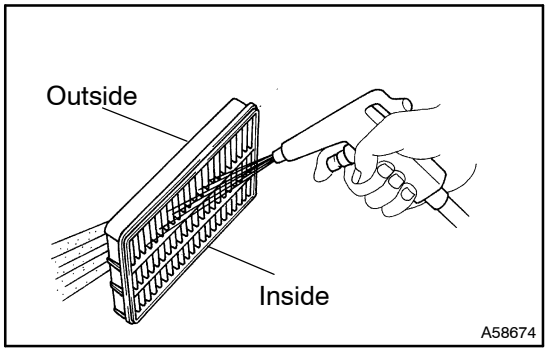
OK

3	CHECK IF ENGINE STARTS

NG → GO TO STEP 7

OK

4	CHECK AIR FILER



(a) Visually check that the air filter is not excessively dirty or oily.

NOTICE:
If necessary, clean the filter with compressed air. First blow from inside thoroughly, then blow from outside of filter.

NG → REPAIR OR REPLACE

OK

5	CHECK IDLE SPEED (See page 14–1)

NG → PROCEED TO PROBLEM SYMPTOMS TABLE (See page 05–15)

OK

6	CHECK IGNITION TIMING (See page 14–1)

NG → PROCEED TO PAGE 18–1 AND CONTINUE TO TROUBLESHOOT

OK

PROCEED TO PROBLEM SYMPTOMS TABLE (See page 05–15)

7	CHECK FUEL PRESSURE (See page 11–4)

NG → PROCEED TO PAGE 11–4 AND CONTINUE TO TROUBLESHOOT

OK

8	CHECK FOR SPARK (See page 18–1)

NG → PROCEED TO PAGE 18–1 AND CONTINUE TO TROUBLESHOOT

OK

PROCEED TO PROBLEM SYMPTOMS TABLE (See page 05–15)