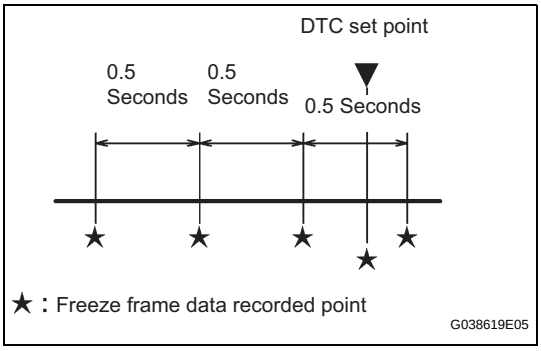
FREEZE FRAME DATA

1. DESCRIPTION

(a) The ECM records vehicle and driving condition information as freeze frame data the moment a DTC is stored. When troubleshooting, freeze frame data can be helpful in determining whether the vehicle was running or stopped, whether the engine was warmed up or not, whether the air-fuel ratio was lean or rich, as well as other data recorded at the time of a malfunction.
HINT:
If it is impossible to duplicate the problem even though a DTC is detected, confirm the freeze frame data.



(b) The ECM records engine conditions in the form of freeze frame data every 0.5 seconds. Using the intelligent tester, five separate sets of freeze frame data, including the data values at the time when the DTC was set, can be checked.
- 3 data sets before the DTC was set
- 1 data set when the DTC was set
- 1 data set after the DTC was set

These data sets can be used to simulate the condition of the vehicle around the time of the occurrence of the malfunction. The data may assist in identifying of the cause of the malfunction, and in judging whether it was temporary or not.

2. LIST OF FREEZE FRAME DATA

LABEL (Intelligent Tester Display)	Measurement Item	Diagnostic Note
Freeze DTC	Freeze DTC	-
INJECTOR (PORT)	Injector	-
IGN ADVANCE	Ignition advance	-
CALC LOAD	Calculate load	Calculated load by ECM
VEHICLE LOAD	Vehicle load	-
MAF	Mass air flow volume	If value is approximately 0.0 g/s: • Mass air flow meter power source circuit open or shorted • VG circuit open or shorted If value is 160.0 g/s or more: • E2G circuit open
ENGINE SPD	Engine speed	-
VEHICLE SPD	Vehicle speed	Speed indicated on speedometer
COOLANT TEMP	Engine coolant temperature	If value is -40°C (-40°F), sensor circuit open If value is 140°C (284°F), sensor circuit shorted
INTAKE AIR	Intake air temperature	If value is -40°C (-40°F), sensor circuit open If value is 140°C (284°F), sensor circuit shorted
AIR-FUEL RATIO	Air-fuel ratio	-
PURGE DENSITY	Learning value of purge density	-
EVAP PURGE FLOW	Purge flow	-
EVAP PURGE VSV	EVAP purge VSV duty ratio	-
KNOCK CRRT VAL	Correction learning value of knocking	-

LABEL (Intelligent Tester Display)	Measurement Item	Diagnostic Note
KNOCK FB VAL	Feedback value of knocking	-
ACCEL POS #1	Absolute Accelerator Pedal Position (APP) No. 1	-
ACCEL POS #2	Absolute APP No. 2	-
THROTTLE POS	Throttle position	Read value with ignition switch on (Do not start engine)
THROTTLE POS	Throttle sensor positioning	Read value with ignition switch on (Do not start engine)
THROTTLE POS#2	Throttle sensor positioning #2	Read value with ignition switch on (Do not start engine)
THROTTLE MOT	Throttle motor	-
O2S B1 S2	Heated oxygen sensor output	Performing INJ VOL or A/F CONTROL function of ACTIVE TEST enables technician to check voltage output of sensor
O2S B2 S2	Heated oxygen sensor output	Performing INJ VOL or A/F CONTROL function of ACTIVE TEST enables technician to check voltage output of sensor
AFS B1 S1	A/F sensor output	Performing INJ VOL or A/F CONTROL function of ACTIVE TEST enables technician to check voltage output of sensor
AFS B2 S1	A/F sensor output	Performing INJ VOL or A/F CONTROL function of ACTIVE TEST enables technician to check voltage output of sensor
TOTAL FT #1	Total fuel trim of bank 1	-
TOTAL FT #2	Total fuel trim of bank 2	-
SHORT FT #1	Short-term fuel trim of bank 1	Short-term fuel compensation used to maintain air-fuel ratio at stoichiometric air-fuel ratio
LONG FT #1	Long-term fuel trim of bank 1	Overall fuel compensation carried out in long-term to compensate for a continual deviation of short-term fuel trim from central valve
SHORT FT #2	Short-term fuel trim of bank 2	Short-term fuel compensation used to maintain air-fuel ratio at stoichiometric air-fuel ratio
LONG FT #2	Long-term fuel trim of bank 2	Overall fuel compensation carried out in long-term to compensate for a continual deviation of short-term fuel trim from central valve
FUEL SYS #1	Fuel system status (bank 1)	• OL (Open Loop): Has not yet satisfied conditions to go closed loop • CL (Closed Loop): Using heated oxygen sensor as feedback for fuel control • OL DRIVE: Open loop due to driving conditions (fuel enrichment) • OL FAULT: Open loop due to detected system fault • CL FAULT: Closed loop but heated oxygen sensor, which used for fuel control malfunctioning
FUEL SYS #2	Fuel system status (bank 2)	• OL (Open Loop): Has not yet satisfied conditions to go closed loop • CL (Closed Loop): Using heated oxygen sensor as feedback for fuel control • OL DRIVE: Open loop due to driving conditions (fuel enrichment) • OL FAULT: Open loop due to detected system fault • CL FAULT: Closed loop but heated oxygen sensor, which used for fuel control malfunctioning
O2FT B1 S2	Fuel trim at heated oxygen sensor	Same as SHORT FT #1

LABEL (Intelligent Tester Display)	Measurement Item	Diagnostic Note
O2FT B2 S2	Fuel trim at heated oxygen sensor	Same as SHORT FT #2
AF FT B1 S1	Fuel trim at A/F sensor	-
AF FT B2 S1	Fuel trim at A/F sensor	-
CAT TEMP B1 S1	Catalyst temperature	-
CAT TEMP B2 S1	Catalyst temperature	-
CAT TEMP B1 S2	Catalyst temperature	-
CAT TEMP B2 S2	Catalyst temperature	-
S O2S B1 S2	Heated oxygen sensor impedance (Sensor 2)	-
S O2S B2 S2	Heated oxygen sensor impedance (Sensor 2)	-
INI COOL TEMP	Initial engine coolant temperature	-
INI INTAKE TEMP	Initial intake air temperature	-
INJ VOL	Injection volume	-
STARTER SIG	Starter signal	-
PS SW	Power steering signal	-
PS SIGNAL	Power steering signal (history)	This signal status usually ON until ignition switch turned off
CTP SW	Closed throttle position switch	-
A/C SIGNAL	A/C signal	-
ELECT LOAD SIG	Electrical load signal	-
STOP LIGHT SW	Stop light switch	-
BATTERY VOLTAGE	Battery voltage	-
ATM PRESSURE	Atmospheric pressure	-
FUEL PMP SP CTL	Fuel pump speed control status	-
ACIS VSV	VSV for Air Intake Control Induction System (AICS)	-
VVT CTRL B2	VVT control (bank 2 Intake side) status	-
EVAP (Purge) VSV	EVAP purge VSV	-
FUEL PUMP/SPD	Fuel pump speed status	VSV for EVAP controlled by ECM (ground side duty control)
VACUUM PUMP	Key-off EVAP system pump status	-
EVAP VENT VAL	Key-off EVAP system vent valve status	-
FAN MOTOR	Electric fan motor	-
TC/TE1	TC and TE1 terminals of DLC3	-
ACM	ACM control status	-
VVTL AIM ANGL #1	VVT aim angle	-
VVT CHNG ANGL #1	VVT change angle	-
VVT OCV DUTY B1	VVT OCV operation duty	-
VVT EX HOLD B1	VVT exhaust hold duty ratio learning value (bank 1 Exhaust side)	-
VVT EX CHG ANG1	VVT change angle (bank 1 Exhaust side)	-
VVT EX OCV D B1	VVT OCV (bank 1 Exhaust side) operation duty	-
VVTL AIM ANGL#2	VVT aim angle (bank 2 Intake side)	-
VVT CHNG ANGL#2	VVT change angle (bank 2 Intake side)	-
VVT OCV DUTY B2	VVT OCV (bank 2 Intake side) operation duty	-
VVT EX HOLD B2	VVT exhaust hold duty ratio learning value (bank 2 Exhaust side)	-
VVT EX CHG ANG2	VVT change angle (bank 2 Exhaust side)	-
VVT EX OCV D B2	VVT OCV (bank 2 Exhaust side) operation duty	-

LABEL (Intelligent Tester Display)	Measurement Item	Diagnostic Note
FC IDL	Idle fuel cut	ON: when throttle valve fully closed and engine speed over 1500 rpm
FC TAU	FC TAU	Fuel cut initiated under light load to prevent incomplete combustion
IGNITION	Ignition	-
CYL #1	Cylinder #1 misfire rate	Displayed only during idling
CYL #2	Cylinder #2 misfire rate	Displayed only during idling
CYL #3	Cylinder #3 misfire rate	Displayed only during idling
CYL #4	Cylinder #4 misfire rate	Displayed only during idling
CYL #5	Cylinder #5 misfire rate	Displayed only during idling
CYL #6	Cylinder #6 misfire rate	Displayed only during idling
CYL ALL	All cylinder misfire rate	Displayed only during idling
MISFIRE RPM	Misfire RPM	-
MISFIRE LOAD	Misfire load	-
MISFIRE MARGIN	Misfire monitoring	-
ENG RUN TIME	Accumulated engine running time	-
TIME DTC CLEAR	Cumulative time after DTC cleared	-
DIST DTC CLEAR	Accumulated distance after DTC cleared	-
WU CYC DTC CLEAR	Warm-up cycle after DTC cleared	-