

INFORMATION/FREEZE FRAME DATA

1. FREEZE FRAME DATA

HINT:

The freeze frame data records the driving condition at the time of detection of a DTC. It is used for estimating or simulating the condition of the vehicle when malfunction occurred. To check the details of the hybrid vehicle control system, check the detailed information for the DTC (Information).

- (a) Connect the hand-held tester to the DLC3.
- (b) Turn the power switch ON (IG).
- (c) Turn the hand-held tester ON.
- (d) On the hand-held tester, enter the following menus: DIAGNOSIS / ENHANCED OBD II / HV ECU / DTC INFO / TROUBLE CODES.
- (e) Select a DTC in order to display its freeze frame data.
- (f) Check the freeze frame data of the DTC that has been detected.
- (g) Check information of the DTC (see next page).

Freeze frame data:

| Hand-held Tester Display | Measurement Item/Range (Display) | Suspected Vehicle Status When Malfunction Occurs |
|--------------------------|--|---|
| FREEZE DTC | DTC corresponding to displayed freeze frame data | — |
| COOLANT TEMP | Engine coolant temperature/ Min.: -40°C, Max.: 140°C | Cold or warm engine |
| VEHICLE SPD | Vehicle speed/ Min.: 0 km/h, Max.: 255 km/h | Stopped, or driving (low, medium, and high speeds) |
| ENG RUN TIME | Elapsed time after starting engine Min.: 0 s, Max.: 65,535 s | Elapsed time from engine start |
| +B | Auxiliary battery voltage/ Min.: 0 V, Max.: 65.535 V | Condition of auxiliary battery |
| ACCEL POS #1 | Accelerator pedal position sensor No. 1/ Min.: 0 %, Max.: 100 % | Idling, accelerating, or decelerating |
| ACCEL POS #2 | Accelerator pedal position sensor No. 2/ Min.: 0 %, Max.: 100 % | Idling, accelerating or decelerating (For comparison with above to detect failure of accelerator pedal position sensor No. 1) |
| AMBIENT TEMP | Ambient air temperature/ Min.: -40°C, Max.: 215°C | Ambient air temperature |
| INTAKE AIR TEMP | Intake air temperature/ Min.: -40°C, Max.: 140°C | Ambient air temperature |
| DTC CLEAR WARM | The number of times engine is warmed up after clearing DTCs/ Min.: 0, Max.: 255 | Frequency of the malfunction recurrence after clearing DTCs |
| DTC CLEAR RUN | Drive distance after clearing DTCs/ Min.: 0 km, Max.: 65,535 km | Frequency of the malfunction recurrence after clearing DTCs |
| DTC CLEAR MIN | Elapsed time after clearing DTCs/ Min.: 0 min, Max.: 65,535 min | Frequency of the malfunction recurrence after clearing DTCs |
| ECU TYPE | Type of ECU | — |
| INFORMATION 1 to 5 | Information code | — |

2. INFORMATION

HINT:

Similar to freeze frame data, information records operating condition of the HV system and components at the time of detection of a DTC.

(a) Select one which has an INF code from among INFORMATION 1 to 5.

(b) Check the information of the DTC.

Information:

| Hand-held Tester Display | Measurement Item/Range (Display) | Suspected Vehicle Status When Malfunction Occurs |
|--------------------------|--|--|
| INFORMATION N | Information code | Indication of system with malfunction |
| MG1 REV | MG1 revolution/ Min.: -16,384 rpm, Max.: 16,256 rpm | MG1 speed • Forward rotation appears as "+" • Backward rotation appears as "-" |
| MG2 REV | MG2 revolution/ Min.: -16,384 rpm, Max.: 16,256 rpm | MG2 speed (proportionate to vehicle speed) • Forward rotation appears as "+" • Backward rotation appears as "-" Moving direction of vehicle • Forward direction appears as "+" • Backward direction appears as "-" |
| MG1 TORQ | MG1 torque/ Min.: -512 Nm, Max.: 508 Nm | When MG1 rotation in + direction: • Torque appears as "+" while MG1 discharges • Torque appears as "-" while MG1 charges When MG1 rotation in - direction: • Torque appears as "-" while MG1 discharges • Torque appears as "+" while MG1 charges |
| MG2 TORQ | MG2 torque/ Min.: -512 Nm, Max.: 508 Nm | When MG2 rotation in + direction: • Torque appears as "+" while MG2 discharges • Torque appears as "-" while MG2 charges When MG2 rotation in - direction: • Torque appears as "-" while MG2 discharges • Torque appears as "+" while MG2 charges |
| INVERT TEMP-MG1 | MG1 inverter temperature/ Min.: -50°C, Max.: 205°C | MG1 inverter temperature |
| INVERT TEMP-MG2 | MG2 inverter temperature/ Min.: -50°C, Max.: 205°C | MG2 inverter temperature |
| MG2 TEMP (No2) | Transaxle fluid temperature/ Min.: -50°C, Max.: 205°C | Transaxle fluid temperature |
| MG2 TEMP (No1) | MG2 temperature/ Min.: -50°C, Max.: 205°C | MG2 temperature |
| POWER RQST | Request engine power/ Min.: 0 W, Max.: 255 kW | Engine power output requested to ECM |
| ENGINE SPD | Engine speed/ Min.: 0 rpm, Max.: 16,320 rpm | Engine speed |
| MCYL CTRL POWER | Master cylinder control torque/ Min.: -512 Nm, Max.: 508 Nm | Brake force requested by driver |
| SOC | Battery state of charge/ Min.: 0 %, Max.: 100 % | State of charge of HV battery |
| WOUT CTRL POWER | Power value discharge control/ Min.: 0 W, Max.: 81,600 W | Discharge amount of HV battery |
| WIN CTRL POWER | Power value charge control/ Min.: -40,800 W, Max.: 0 W | Charge amount of HV battery |
| DRIVE CONDITION | Drive condition ID • Engine stopped: 0 • Engine about to be stopped: 1 • Engine about to be started: 2 • Engine operated or operating: 3 • Generating or loading movement: 4 • Revving up with P position: 6 | Engine operating condition |

| Hand-held Tester Display | Measurement Item/Range (Display) | Suspected Vehicle Status When Malfunction Occurs |
|--------------------------|---|---|
| PWR RESOURCE VB | HV battery voltage/ Min.: 0 V, Max.: 510 V | HV battery voltage |
| PWR RESOURCE IB | HV battery current/ Min.: -256 A, Max.: 254 A | Charging/discharging state of HV battery • Discharging amperage indicated by a positive value • Charging amperage indicated by a negative value |
| SHIFT POSITION | Shift position (P, R, N, D or B position) | Shift position |
| ACCEL SENSOR MAIN | Accelerator pedal position sensor main/ Min.: 0 %, Max.: 100 % | Idling, accelerating, or decelerating |
| AUX. BATT V | Auxiliary battery voltage/ Min.: 0 V, Max.: 20 V | State of auxiliary battery |
| CONVERTER TEMP | Boost converter temperature/ Min.: -50°C, Max.: 205°C | Boost converter temperature |
| VL | High voltage before it is boosted/ Min.: 0 V, Max.: 510 V | High voltage level before it is boosted |
| VH | High voltage after it is boosted/ Min.: 0 V, Max.: 765 V | High voltage level after it is boosted |
| IG ON TIME | The time after power switch ON (IG)/ Min.: 0 min, Max.: 255 min | Time elapsed with power switch ON (IG) |
| VEHICLE SPD-MAX | Maximum vehicle speed/ Min.: -256 km/h, Max.: 254 km/h | Maximum vehicle speed |
| A/C CONSMPT PWR | A/C consumption power/ Min.: 0 kW, Max.: 5 kW | A/C load |
| ENG STOP RQST | Engine stop request/ NO or YES | Presence of engine stop request |
| IDLING REQUEST | Engine idling request/ NO or YES | Presence of idle stop request |
| ENGINE FUEL CUT | Engine fuel cut request/ NO or YES | Presence of fuel cut request |
| HV BATT CH RQST | HV battery charging request/ NO or YES | Presence of HV battery charging request |
| ENG WARM UP RQT | Engine warming up request/ NO or YES | Presence of engine warm-up request |
| STOP SW COND | Stop lamp switch ON condition/ NO or YES | Brake pedal depressed or released |
| CRUISE CONTROL | Cruise control active condition/ NO or YES | Operation under cruise control ON or OFF |
| EXCLUSIVE INFO 1 to 7 | Exclusive information (in form of numerical data) | Exclusive Information linked to Information |
| OCCURENCE ORDER | Occurrence sequence of information | Occurrence sequence of information |
| INVT TMP-MG1 IG | MG1 inverter temperature after power switch ON (IG)/ Min.: -50°C, Max.: 205°C | MG1 inverter temperature soon after power switch ON (IG) |
| INVT TMP-MG2 IG | MG2 inverter temperature after power switch ON (IG)/ Min.: -50°C, Max.: 205°C | MG2 inverter temperature soon after power switch ON (IG) |
| MG2 TEMP IG | MG2 temperature after power switch ON (IG)/ Min.: -50°C, Max.: 205°C | MG2 temperature soon after power switch ON (IG) |
| CONVRTR TEMP IG | Boost converter temperature after power switch ON (IG)/ Min.: -50°C, Max.: 205°C | Boost converter temperature soon after power switch ON (IG) |
| SOC IG | Battery state of charge after power switch ON (IG)/ Min.: 0 %, Max.: 100 % | Battery state of charge soon after power switch ON (IG) |
| INVT TMP-MG1MAX | MG1 inverter maximum temperature/ Min.: -50°C, Max.: 205°C | Overheating state of MG1 inverter |
| INVT TMP-MG2MAX | MG2 inverter maximum temperature/ Min.: -50°C, Max.: 205°C | Overheating state of MG2 inverter |
| MG2 TEMP MAX | MG2 maximum temperature/ Min.: -50°C, Max.: 205°C | Overheating state of MG2 |
| CONVRTR TMP MAX | Boost converter maximum temperature/ Min.: -50°C, Max.: 205°C | Overheating state of boost converter |

DIAGNOSTICS – HYBRID CONTROL SYSTEM

| Hand-held Tester Display | Measurement Item/Range (Display) | Suspected Vehicle Status When Malfunction Occurs |
|--------------------------|---|---|
| SOC MAX | Maximum status of charge/ Min.: 0 %, Max.: 100 % | Over-charging of HV battery |
| SOC MIN | Minimum status of charge/ Min.: 0 %, Max.: 100 % | Over-discharging of HV battery |