12.Drive Cycle

A: PROCEDURE

For the troubleshooting, there are five driving patterns of drive cycles A to E. Driving in the specified pattern allows to diagnose malfunctioning items listed below. After the repair of the following trouble items, be sure to drive the vehicle with the specified drive patterns to check whether the function is resumed correctly.

1. PREPARATION FOR DRIVE CYCLE

1) Check that the battery voltage is 12 V or more and fuel remains approx. half [20 — 40 ℓ (5.3 — 10.6 US gal, 4.4 — 8.8 Imp gal)].
2) After performing the diagnostics and clearing the memory, check for any remaining unresolved trouble data. <Ref. to EN(H4SO)(diag)-43, Clear Memory Mode.>
3) Disconnect the test mode connector.

NOTE:
• Perform the diagnosis after warming up the engine except when the engine coolant temperature at starting is specified.
• Perform the diagnosis twice if the DTC marked with *. After completing the first diagnosis, stop the engine and perform second diagnosis in same condition.

2. DRIVE CYCLE A (AFTER RUNNING 20 MINUTES AT 80 KM/H (50 MPH), IDLE THE ENGINE FOR 1 MINUTE.)

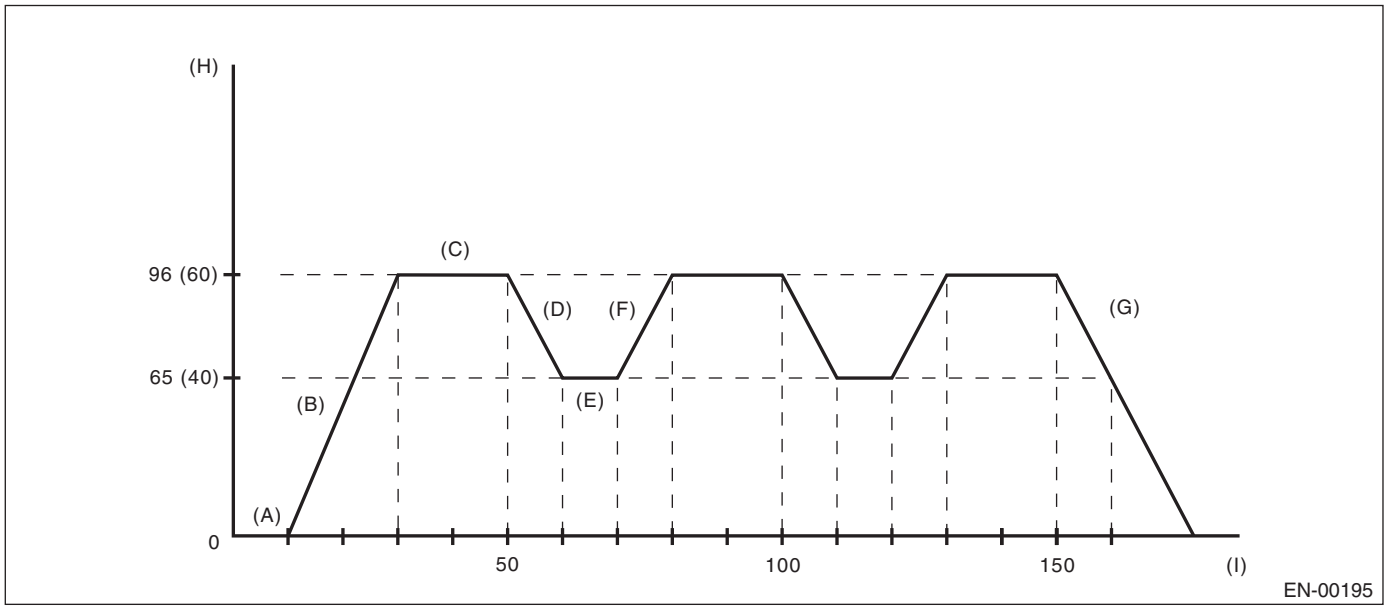
DTC	Item	Condition
*P0125	Insufficient Coolant Temperature For Closed Loop Fuel Control	Coolant temperature at start is less than 20°C (68°F).
*P0128	Coolant Thermostat (Engine Coolant Temperature Below Thermostat Regulating Temperature)	—
*P0133	O2 Sensor Circuit Slow Response (Bank 1 Sensor 1)	—
*P0171	System Too Lean (Bank 1)	Complete diagnosis for drive cycle B or C.
*P0172	System Too Rich (Bank 1)	Complete diagnosis for drive cycle B or C.
P0196	Engine Oil Temperature Sensor Circuit Range/Performance	—
*P0301	Cylinder 1 Misfire Detected	Complete diagnosis for drive cycle B or C.
*P0302	Cylinder 2 Misfire Detected	Complete diagnosis for drive cycle B or C.
*P0303	Cylinder 3 Misfire Detected	Complete diagnosis for drive cycle B or C.
*P0304	Cylinder 4 Misfire Detected	Complete diagnosis for drive cycle B or C.
*P0420	Catalyst System Efficiency Below Threshold (Bank 1)	—
*P0442	Evaporative Emission Control System Leak Detected (Small Leak)	Coolant temperature at start is less than 30°C (86°F).
*P0451	Evaporative Emission Control System Pressure Sensor	—
*P0456	Evaporative Emission Control System Leak Detected (Very Small Leak)	Coolant temperature at start is less than 30°C (86°F).
*P0457	Evaporative Emission Control System Leak Detected (Fuel Cap Loose/Off)	Coolant temperature at start is less than 30°C (86°F).
*P0459	Evaporative Emission System Purge Control Valve Circuit High	—
P1443	Vent Control Solenoid Valve Function Problem	—
*P2096	Post Catalyst Fuel Trim System Too Lean Bank 1	Complete diagnosis for drive cycle B or C.
*P2097	Post Catalyst Fuel Trim System Too Rich Bank 1	Complete diagnosis for drive cycle B or C.

3. DRIVE CYCLE B (TEN MINUTES IDLING)

NOTE:
Drive the vehicle at 10 km/h (6 MPH) or more before diagnosis.

DTC	Item	Condition
*P0126	Insufficient Coolant Temperature for Stable Operation	—
*P0171	System Too Lean (Bank 1)	Complete diagnosis for drive cycle A or C
*P0172	System Too Rich (Bank 1)	Complete diagnosis for drive cycle A or C
*P0301	Cylinder 1 Misfire Detected	Complete diagnosis for drive cycle A or C
*P0302	Cylinder 2 Misfire Detected	Complete diagnosis for drive cycle A or C
*P0303	Cylinder 3 Misfire Detected	Complete diagnosis for drive cycle A or C
*P0304	Cylinder 4 Misfire Detected	Complete diagnosis for drive cycle A or C
*P0464	Fuel Level Sensor Circuit Intermittent	—
*P0483	Fan Rationality Check	—
*P0506	Idle Air Control System RPM Lower Than Expected	—
*P0507	Idle Air Control System RPM Higher Than Expected	—
*P2096	Post Catalyst Fuel Trim System Too Lean Bank 1	Complete diagnosis for drive cycle A or C
*P2097	Post Catalyst Fuel Trim System Too Rich Bank 1	Complete diagnosis for drive cycle A or C

4. DRIVE CYCLE C (DRIVE ACCORDING TO THE FOLLOWING DRIVE PATTERN)



(A) Idle the engine for 1 minute.
(B) Accelerate to 96 km/h (60 MPH) within 20 seconds.
(C) Drive the vehicle at 96 km/h (60 MPH) for 20 seconds.
(D) Decelerate with fully closed throttle to 65 km/h (40 MPH).
(E) Drive the vehicle at 65 km/h (40 MPH) for 10 seconds.
(F) Accelerate to 96 km/h (60 MPH) within 10 seconds.
(G) Stop vehicle with the throttle fully closed.
(H) km/h (MPH)
(I) Sec.

DTC	Item	Condition
P0026	Intake Valve Control Solenoid Circuit Range/Performance (Bank 1)	—
P0028	Intake Valve Control Solenoid Circuit Range/Performance (Bank 2)	—
*P0030	HO2S Heater Control Circuit (Bank 1 Sensor 1)	—
*P0068	MAP/MAF - Throttle Position Correlation	—
P0076	Intake Valve Control Solenoid Circuit Low (Bank 1)	—
P0082	Intake Valve Control Solenoid Circuit Low (Bank 2)	—
*P0101	Mass or Volume Air Flow Circuit Range/Performance	—
*P0134	O2 Sensor Circuit No Activity Detected (Bank 1 Sensor 1)	—
*P0139	O2 Sensor Circuit Slow Response (Bank 1 Sensor 2)	—
*P0171	System Too Lean (Bank 1)	Complete diagnosis for drive cycle A or B
*P0172	System Too Rich (Bank 1)	Complete diagnosis for drive cycle A or B
*P0301	Cylinder 1 Misfire Detected	Complete diagnosis for drive cycle A or B
*P0302	Cylinder 2 Misfire Detected	Complete diagnosis for drive cycle A or B
*P0303	Cylinder 3 Misfire Detected	Complete diagnosis for drive cycle A or B
*P0304	Cylinder 4 Misfire Detected	Complete diagnosis for drive cycle A or B
*P0400	Exhaust Gas Recirculation Flow	—
P1492	EGR Solenoid Valve Signal #1 Circuit Malfunction (Low Input)	—
P1493	EGR Solenoid Valve Signal #1 Circuit Malfunction (High Input)	—
P1494	EGR Solenoid Valve Signal #2 Circuit Malfunction (Low Input)	—
P1495	EGR Solenoid Valve Signal #2 Circuit Malfunction (High Input)	—
P1496	EGR Solenoid Valve Signal #3 Circuit Malfunction (Low Input)	—
P1497	EGR Solenoid Valve Signal #3 Circuit Malfunction (High Input)	—
P1498	EGR Solenoid Valve Signal #4 Circuit Malfunction (Low Input)	—
P1499	EGR Solenoid Valve Signal #4 Circuit Malfunction (High Input)	—
*P2096	Post Catalyst Fuel Trim System Too Lean Bank 1	Complete diagnosis for drive cycle A or B
*P2097	Post Catalyst Fuel Trim System Too Rich Bank 1	Complete diagnosis for drive cycle A or B

5. DRIVE CYCLE D

• DRIFT DIAGNOSIS

1) Make sure that the engine coolant temperature at engine starting is less than 30°C (86°F).
2) Make sure that fuel remains 9.6 ℓ or more (2.5 US gal, 2.1 Imp gal) and the battery voltage is 10.9 V or more.
3) Make sure that the engine coolant temperature rises for more than 10°C (50°F) from the level of engine starting and is also above 75°C (167°F).
4) Idle the engine for more than 120 seconds in the condition of step 3.

• STUCK DIAGNOSIS

1) Make sure that the battery voltage is more than 10.9 V.
2) Perform the Clear Memory Mode. <Ref. to EN(H4SO)(diag)-43, Clear Memory Mode.>
3) Drive the vehicle for the distance equal to the fuel of 50 ℓ (13.2 US gal, 11 Imp gal).

NOTE:
• It is acceptable to drive the vehicle intermittently.
• Do not disconnect the battery terminals while diagnosing. (Data will be cleared by disconnecting the battery terminals.)

DTC	Item	Condition
P0181	Fuel Temperature Sensor “A” Circuit Range/Performance	—

6. DRIVE CYCLE E

1) Make sure that the battery voltage is more than 10.9 V.
2) Perform the Clear Memory Mode. <Ref. to EN(H4SO)(diag)-43, Clear Memory Mode.>
3) Drive the vehicle for the distance equal to the fuel of 30 ℓ (7.9 US gal, 6.6 Imp gal).

NOTE:
- It is acceptable to drive the vehicle intermittently.
- Do not disconnect the battery terminals while diagnosing. (Data will be cleared by disconnecting the battery terminals.)

DTC	Item	Condition
P0461	Fuel Level Sensor “A” Circuit Range/Performance	—

7. DRIVE CYCLE F

1) Check that the engine coolant temperature at engine start is 30°C (86°F) or less.
2) Warm up the engine until the engine coolant temperature exceeds 95°C (203°F) from engine start.
3) After the engine has reached the state of procedure 2), idle the engine for more than 10 minutes.

NOTE:
Do not disconnect the battery terminals while diagnosing. (Data will be cleared when disconnecting the battery terminals.)

DTC	Item	Condition
P0111	Intake Air Temperature Sensor 1 Circuit Range/Performance	—