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 battery voltage is more than 12 V and fuel remains half [20 to 40 ℓ (5.3 to 10.6 US gal, 4.4 to 8.8 Imp gal)].
2) After performing the diagnostics and clearing the memory, check for any remaining unresolved trouble data. <Ref. to EN(H6DO)(diag)-49, 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 — DRIVE THE VEHICLE WITH 80 KM/H (50 MPH) FOR 20 MINUTES, AND IDLE THE ENGINE FOR A MINUTE.

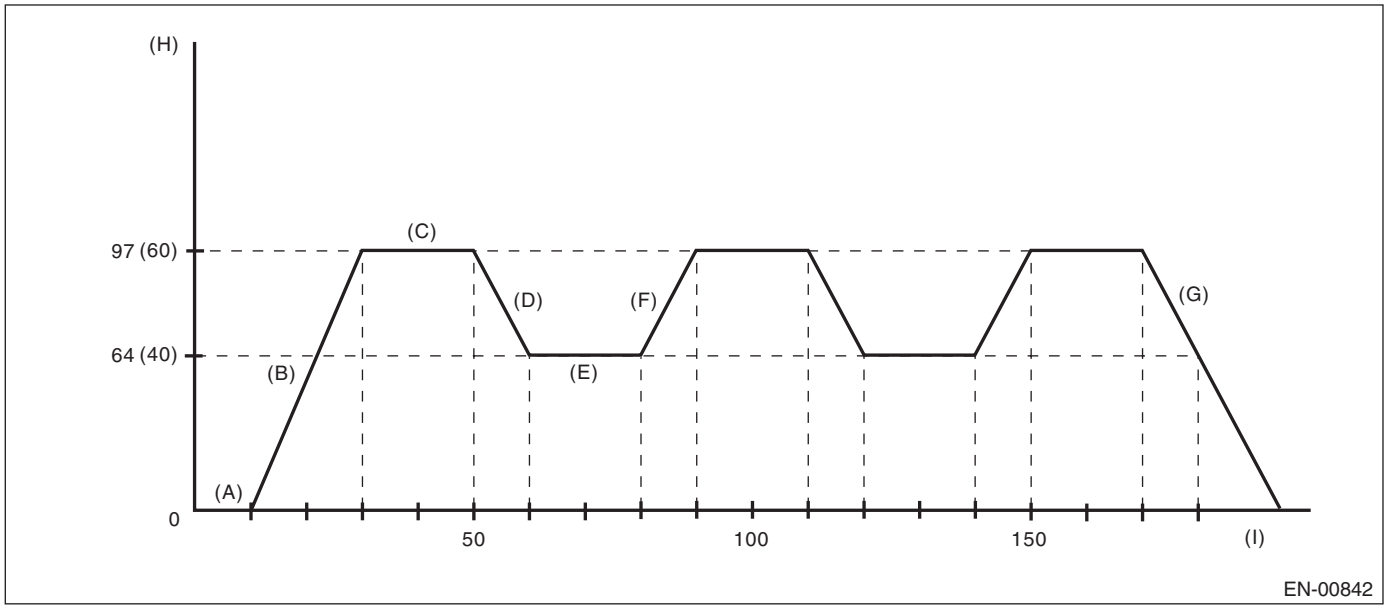
DTC	Item	On condition
*P0125	Insufficient Coolant Temperature For Closed Loop Fuel Control	Engine coolant temperature at engine start is 20°C (68°F) or less.
*P0128	Coolant Thermostat (Coolant Temperature Below Thermostat Regulating Temperature)	—
*P0133	O2 Sensor Circuit Slow Response (Bank 1 Sensor 1)	—
*P0153	O2 Sensor Circuit Slow Response (Bank 2 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
*P0174	System Too Lean (Bank 2)	Complete diagnosis for drive cycle B or C
*P0175	System Too Rich (Bank 2)	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
*P0305	Cylinder 5 Misfire Detected	Complete diagnosis for drive cycle B or C
*P0306	Cylinder 6 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)	Engine coolant temperature at engine start is 25°C (77°F) or less.
*P0451	Evaporative Emission Control System Pressure Sensor	—
*P0456	Evaporative Emission Control System Leak Detected (Very Small Leak)	Engine coolant temperature at engine start is 25°C (77°F) or less.
*P0457	Evaporative Emission Control System Leak Detected (Fuel Cap Loose/Off)	Engine coolant temperature at engine start is 25°C (77°F) or less.
*P0464	Fuel Level Sensor Circuit Intermittent	—
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
*P2098	Post Catalyst Fuel Trim System Too Lean (Bank 2)	Complete diagnosis for drive cycle B or C
*P2099	Post Catalyst Fuel Trim System Too Rich (Bank 2)	Complete diagnosis for drive cycle B or C

3. DRIVE CYCLE B — 10 MINUTES IDLING

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

DTC	Item	On 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
*P0174	System Too Lean (Bank 2)	Complete diagnosis for drive cycle A or C
*P0175	System Too Rich (Bank 2)	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
*P0305	Cylinder 5 Misfire Detected	Complete diagnosis for drive cycle A or C
*P0306	Cylinder 6 Misfire Detected	Complete diagnosis for drive cycle A or C
*P0459	Evaporative Emission Control System Purge Control Valve Circuit High	—
*P0483	Cooling Fan Rationality Check	—
*P0506	Idle Control System RPM Lower Than Expected	—
*P0507	Idle 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
*P2098	Post Catalyst Fuel Trim System Too Lean (Bank 2)	Complete diagnosis for drive cycle A or C
*P2099	Post Catalyst Fuel Trim System Too Rich (Bank 2)	Complete diagnosis for drive cycle A or C

4. DRIVE CYCLE C — DRIVE THE VEHICLE WITH FOLLOWING DRIVE PATTERNS



(A) Idle the engine for more than 10 seconds.

(B) Accelerate the vehicle to 97 km/h (60 MPH) within 20 seconds.

(C) Drive the vehicle at 97 km/h (60 MPH) for 20 seconds.

(D) Decelerate the vehicle to 64 km/h (40 MPH) with throttle fully closed.

(E) Drive the vehicle at 64 km/h (40 MPH) for 20 seconds.

(F) Accelerate the vehicle to 97 km/h (60 MPH) within 10 seconds.

(G) Stop the vehicle with throttle fully closed.

(H) Vehicle speed km/h (MPH)

(I) Sec.

DTC	Item	On 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)	—
*P0050	HO2S Heater Control Circuit (Bank 2 Sensor 1)	—
*P0068	MAP/MAF - Throttle Position Correlation	—
P0076	Intake Valve Control Circuit Low (Bank 1)	—
P0082	Intake Valve Control 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)	—
P0154	O2 Sensor Circuit No Activity Detected (Bank 2 Sensor 1)	—
*P0159	O2 Sensor Circuit Slow Response (Bank 2 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
*P0174	System Too Lean (Bank 2)	Complete diagnosis for drive cycle A or B
*P0175	System Too Rich (Bank 2)	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
*P0305	Cylinder 5 Misfire Detected	Complete diagnosis for drive cycle A or B
*P0306	Cylinder 6 Misfire Detected	Complete diagnosis for drive cycle A or B

5. DRIVE CYCLE D

Drift Diagnosis

1) Check that the engine coolant temperature at engine start is 30°C (86°F) or less.
2) Check that the battery voltage is more than 10.9 V and that more than 9.6 ℓ (2.5 US gal, 2.1 Imp gal) of fuel remains.
3) Start the engine, and check that the engine coolant temperature increases over 10°C (18°F), and reaches 75°C (167°F) or more, when the engine is warmed up.
4) After the engine has reached the state of procedure 3), idle the engine for 120 seconds or more.

Stuck Diagnosis

1) Check that the battery voltage is over 10.9 V.
2) Perform the Clear Memory Mode. <Ref. to EN(H6DO)(diag)-49, Clear Memory Mode.>
3) Drive for approximately 50 ℓ (13.2 US gal, 11 Imp gal) of fuel.

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	On condition
P0181	Fuel Temperature Sensor “A” Circuit Range/Performance	—

6. DRIVE CYCLE E

1) Check that the battery voltage is over 10.9 V.
2) Perform the Clear Memory Mode. <Ref. to EN(H6DO)(diag)-49, Clear Memory Mode.>
3) Drive for approximately 30 ℓ (7.9 US gal, 6.6 Imp gal) of fuel.

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	On condition
P0461	Fuel Level Sensor 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) Start the engine, and warm it up until engine coolant temperature increases over 95°C (203°F).
3) After the engine has reached the state of procedure 2), idle the engine for 10 minutes or more.

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

DTC	Item	On condition
P0111	Intake Air Temperature Circuit Range/Performance	—

8. DRIVE CYCLE H

1) Perform the Clear Memory Mode. <Ref. to EN(H6DO)(diag)-49, Clear Memory Mode.>
2) With the ignition switch ON, read the engine coolant temperature, intake air temperature and fuel temperature. <Ref. to EN(H6DO)(diag)-29, READ CURRENT DATA FOR ENGINE (NORMAL MODE), OPERATION, Subaru Select Monitor.>
3) If the values from step 2) satisfy the following two conditions, start the engine.

Condition:

Engine coolant temperature – intake air temperature ≤ 5°C (41°F)

Engine coolant temperature – fuel temperature ≤ 2°C (36°F)

NOTE:
- If the conditions are not satisfied, turn the ignition switch to OFF and wait until the parameters are satisfied.
- Start AT vehicles in the P range, and MT vehicles in the N position.
- Idle the engine for 1 minute under the conditions in step 2).

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

DTC	Item	On condition
*P1602	ECM Error (Cold Start)	—