

12. Drive Cycle

A: PROCEDURE

For the troubleshooting, there are seven driving patterns of drive cycles A to G. 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) 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 THEN IDLE THE ENGINE FOR A MINUTE.

DTC	Item	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 (Engine Coolant Temperature Below Thermostat Regulating Temperature)	Engine coolant temperature at engine start is 55°C (131°F) or less.
*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
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)	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.
P0459	Evaporative Emission System Purge Control Valve Circuit High	—
P0692	Fan 1 Control 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

Drive Cycle

ENGINE (DIAGNOSTICS)

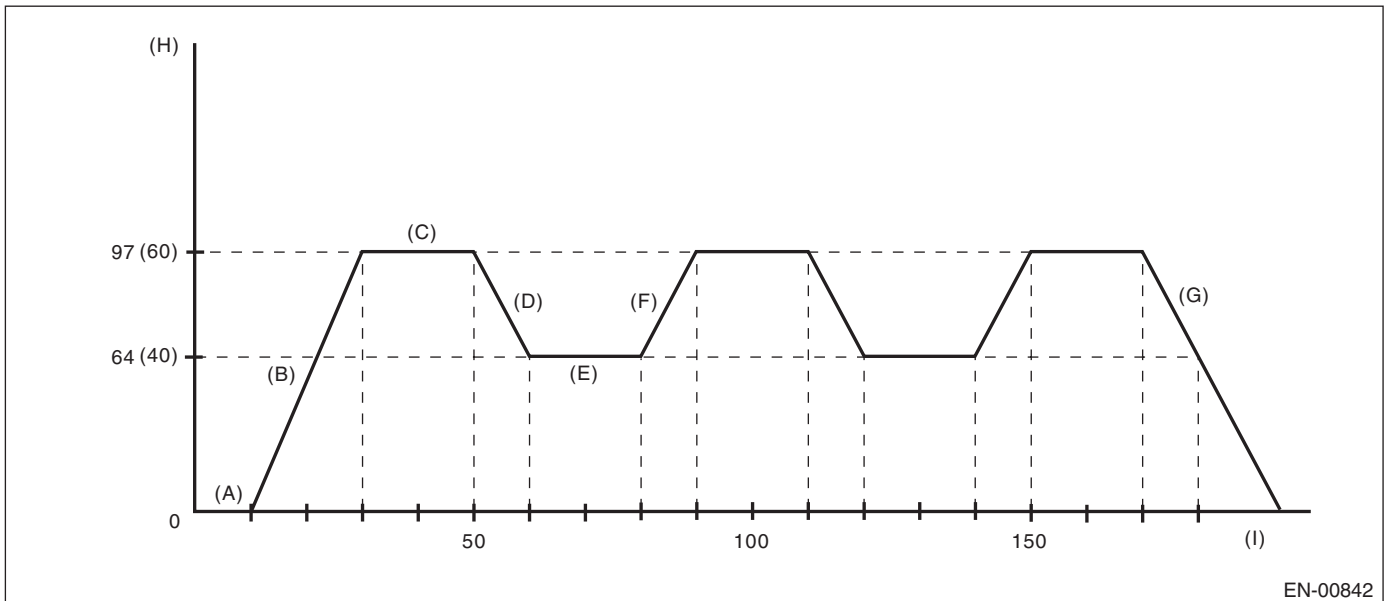
3. DRIVE CYCLE B — 10 MINUTES IDLING

NOTE:

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

DTC	Item	Condition
*P0126	Insufficient Engine 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 THE VEHICLE WITH FOLLOWING DRIVE PATTERNS



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|---|--|--|
| (A) Idle the engine for more than 10 seconds. | (D) Decelerate the vehicle to 64 km/h (40 MPH) with throttle fully closed. | (G) Stop the vehicle with throttle fully closed. |
| (B) Accelerate the vehicle to 97 km/h (60 MPH) within 20 seconds. | (E) Drive the vehicle at 64 km/h (40 MPH) for 20 seconds. | (H) Vehicle speed km/h (MPH) |
| (C) Drive the vehicle at 97 km/h (60 MPH) for 20 seconds. | (F) Accelerate the vehicle to 97 km/h (60 MPH) within 10 seconds. | (I) (sec.) |

DTC	Item	Condition
*P0030	HO2S Heater Control Circuit (Bank 1 Sensor 1)	—
P0068	MAP/MAF - Throttle Position Correlation	—
*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
*P0244	Turbo/Super Charger Wastegate Solenoid "A" Range/Performance	—
P0246	Turbo/Super Charger Wastegate Solenoid "A" High	—
*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
P2004	Intake Manifold Runner Control Stuck Open (Bank 1)	—
P2005	Intake Manifold Runner Control Stuck Open (Bank 2)	—
*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

Drive Cycle

ENGINE (DIAGNOSTICS)

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 10 ℓ (2.6 US gal, 2.2 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 more than 120 seconds.

Stuck Diagnosis

- 1) Check that the battery voltage is over 10.9 V.
- 2) Perform the Clear Memory Mode. <Ref. to EN(H4DOTC)(diag)-46, 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 when disconnecting the battery terminals.)

DTC	Item	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(H4DOTC)(diag)-46, 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 when 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	—

8. DRIVE CYCLE G

- 1) Remove the battery negative terminal, and reconnect after 10 seconds have passed.
- 2) Start the engine and warm-up engine until coolant temperature is 80°C (176°F).
- 3) Start the engine and warm-up engine until coolant temperature is 40°C (104°F).

NOTE:

Do not let engine coolant temperature drop below 5°C (41°F).

- 4) Start the engine and warm-up engine until coolant temperature is 80°C (176°F).
- 5) Start the engine and warm-up engine until coolant temperature is 40°C (104°F).

NOTE:

Do not let engine coolant temperature drop below 5°C (41°F).

- 6) Start and idle the engine.

DTC	Item	Condition
*P0410	Secondary Air Injection System	—
*P0411	Secondary Air Injection System Incorrect Flow Detected	—
P0414	Secondary Air Injection System Switching Valve "A" Circuit Shorted	—
P0417	Secondary Air Injection System Switching Valve "B" Circuit Shorted	—
P1418	Secondary Air Injection System Control "A" Circuit Shorted	—
*P2440	Secondary Air Injection System Switching Valve Stuck Open (Bank1)	—
*P2441	Secondary Air Injection System Switching Valve Stuck Closed (Bank1)	—
*P2442	Secondary Air Injection System Switching Valve Stuck Open (Bank2)	—
*P2443	Secondary Air Injection System Switching Valve Stuck Closed (Bank2)	—