

DRIVE CYCLE

ENGINE (DIAGNOSTICS)

12. Drive Cycle

A: OPERATION

There are six drive patterns of drive cycles A — F for the trouble diagnosis. Performing the specified drive pattern allows diagnose malfunctioning items listed below. After the malfunctioning items listed below are repaired, always check if they correctly resume their functions by performing the required drive pattern.

1. PREPARATION FOR THE DRIVE CYCLE

- 1) Make sure that the fuel remains approx. half amount [20 — 40 ℓ (5.3 — 10.6 US gal, 4.4 — 8.8 Imp gal)], and battery voltage is 12 V or more.
- 2) Disconnect the test mode connector.

NOTE:

- Except for the engine coolant temperature specified items at starting, the diagnosis is carried out after engine warm up.
- Carry out the diagnosis which is marked * on DTC twice, then, after finishing first diagnosis, stop the engine and do second time at the same condition.

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

DTC	Item	Condition
*P0125	Insufficient Coolant Temperature for Closed Loop Fuel Control	Engine coolant temperature is less than 20°C (68°F) at engine start.
*P0126	Insufficient Coolant Temperature for Stable Operation	—
*P0128	Coolant Thermostat	Engine coolant temperature is less than 55°C (131°F) at engine start.
*P0133	O ₂ Sensor Circuit Slow Response (Bank 1 Sensor 1)	—
*P0171	System too Lean (Bank 1)	Diagnosis is also completed at drive cycles B and C.
*P0172	System too Rich (Bank 1)	Diagnosis is also completed at drive cycles B and C.
P0301	Cylinder 1 misfire detected	Diagnosis is also completed at drive cycles B and C.
P0302	Cylinder 2 misfire detected	Diagnosis is also completed at drive cycles B and C.
P0303	Cylinder 3 misfire detected	Diagnosis is also completed at drive cycles B and C.
P0304	Cylinder 4 misfire detected	Diagnosis is also completed at drive cycles B and C.
*P0420	Catalyst System Efficiency Below Threshold (Bank 1)	—
*P0442	Evaporative Emission Control System Leak Detected (small leak)	Engine coolant temperature is less than 25°C (77°F) at engine start.
*P0451	Evaporative Emission Control System Pressure Sensor Range/Performance	—
*P0456	Evaporative Emission Control System Leak Detected (very small leak)	Engine coolant temperature is less than 25°C (77°F) at engine start.
*P0457	Evaporative Emission Control System Leak Detected (fuel cap loose/off)	Engine coolant temperature is less than 25°C (77°F) at engine start.
P0459	Evaporative Emission Control System Purge Control Valve Circuit High	—
P0546	Exhaust Gas Temperature Sensor Circuit High-BANK1	—
P0692	Cooling Fan 1 Control Circuit High	—
P1301	Misfire Detected (High Temperature Exhaust Gas)	Diagnosis is also completed at drive cycles B and C.
P1312	Exhaust Gas Temperature Sensor Malfunction	Engine coolant temperature is less than 30°C (86°F) when engine start.
P1443	Vent Control Solenoid Valve Function Problem	—

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DTC	Item	Condition
*P2096	Post Catalyst Fuel Trim System Too Lean Bank 1	Diagnosis is also completed at drive cycles B and C.
*P2097	Post Catalyst Fuel Trim System Too Rich Bank 1	Diagnosis is also completed at drive cycles B and C.
P2103	Throttle Actuator Control Motor Circuit High	Diagnosis is also completed at drive cycles B and C.

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3. DRIVE CYCLE B (IDLE FOR 10 MINUTES)

NOTE:

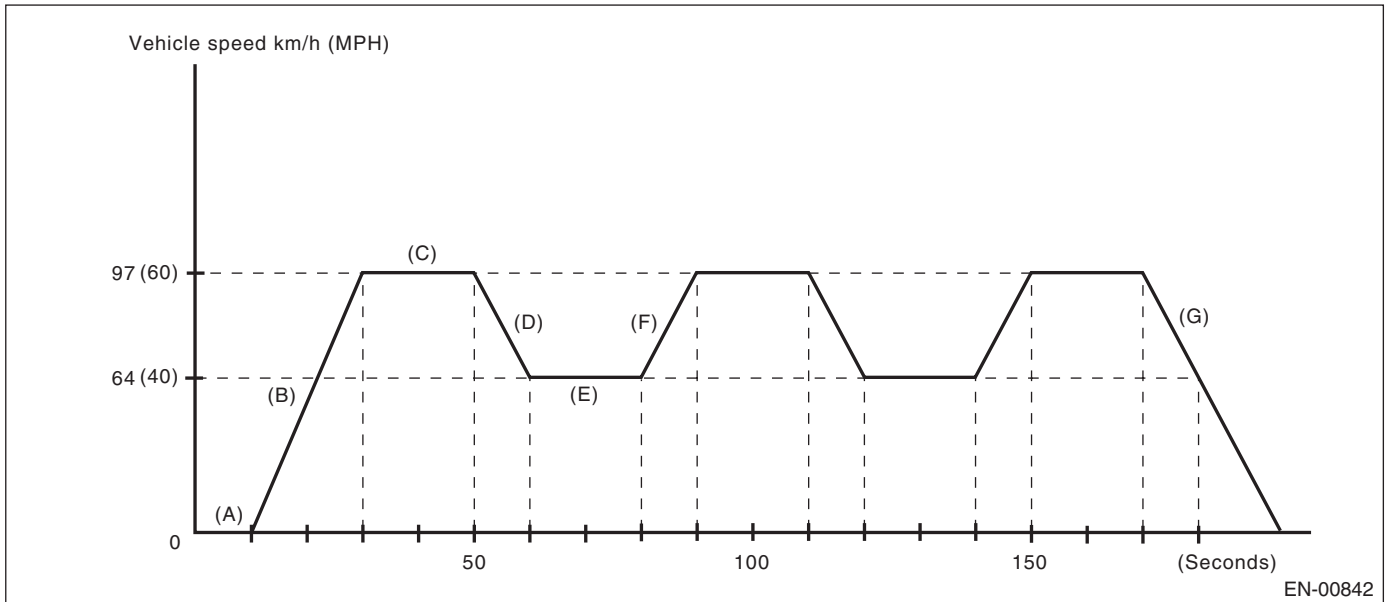
Before the diagnosis, drive the vehicle at 10 km/h (6 MPH) or more.

DTC	Item	Condition
*P0111	Intake Air Temperature Sensor Range/Performance Problem	Engine coolant temperature is less than 30°C (86°F) at engine start.
*P0171	System too Lean (Bank 1)	Diagnosis is also completed at drive cycles A and C.
*P0172	System too Rich (Bank 1)	Diagnosis is also completed at drive cycles A and C.
P0301	Cylinder 1 misfire detected	Diagnosis is also completed at drive cycles A and C.
P0302	Cylinder 2 misfire detected	Diagnosis is also completed at drive cycles A and C.
P0303	Cylinder 3 misfire detected	Diagnosis is also completed at drive cycles A and C.
P0304	Cylinder 4 misfire detected	Diagnosis is also completed at drive cycles A and C.
*P0464	Fuel Level Sensor Circuit Intermittent	—
*P0483	Cooling Fan Rationality Check	—
*P0506	Idle Control System RPM Lower Than Expected	—
*P0507	Idle Control System RPM Higher Than Expected	—
P1301	Misfire Detected (High Temperature Exhaust Gas)	Diagnosis is also completed at drive cycles A and C.
*P2096	Post Catalyst Fuel Trim System Too Lean Bank 1	Diagnosis is also completed at drive cycles A and C.
*P2097	Post Catalyst Fuel Trim System Too Rich Bank 1	Diagnosis is also completed at drive cycles A and C.
P2103	Throttle Actuator Control Motor Circuit High	Diagnosis is also completed at drive cycles A and C.

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



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

DTC	Item	Condition
*P0030	HO2S Heater Control Circuit (Bank 1 Sensor 1)	—
P0068	Manifold Absolute Pressure/Barometric Pressure Circuit Range/Performance	—
*P0101	Mass or Volume Air Flow Circuit Range/performance	—
P0134	O ₂ Sensor Circuit No Activity Detected (Bank 1 Sensor 1)	—
*P0139	O ₂ Sensor Circuit Slow Response (Bank 1 Sensor 2)	—
*P0171	System too Lean (Bank 1)	Diagnosis is also completed at drive cycles A and B.
*P0172	System too Rich (Bank 1)	Diagnosis is also completed at drive cycles A and B.
*P0244	Turbo/Supercharger Wastegate Solenoid "A" Range/Performance	—
P0246	Turbo/Supercharger Wastegate Solenoid "A" High	—
*P0301	Cylinder 1 Misfire Detected	Diagnosis is also completed at drive cycles A and B.
*P0302	Cylinder 2 Misfire Detected	Diagnosis is also completed at drive cycles A and B.
*P0303	Cylinder 3 Misfire Detected	Diagnosis is also completed at drive cycles A and B.
*P0304	Cylinder 4 Misfire Detected	Diagnosis is also completed at drive cycles A and B.
P1301	Misfire Detected (High Temperature Exhaust Gas)	Diagnosis is also completed at drive cycles A and B.
P2004	Tumble Generated Valve System 1 (Valve Open)	—
P2005	Tumble Generated Valve System 2 (Valve Open)	—
*P2096	Post Catalyst Fuel Trim System Too Lean Bank 1	Diagnosis is also completed at drive cycles A and B.

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DTC	Item	Condition
*P2097	Post Catalyst Fuel Trim System Too Rich Bank 1	Diagnosis is also completed at drive cycles A and B.
P2103	Throttle Actuator Control Motor Circuit High	Diagnosis is also completed at drive cycles A and 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 of more than 10 ℓ (2.6 US gal, 2.2 Imp gal), remains and the battery voltage is more than 10.9V.
- 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 more than 70°C (158°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 10.9V.
- 2) Perform the clear memory mode. <Ref. to EN(H4DOTC)-52, Clear Memory Mode.>
- 3) Drive the vehicle for the distance equal to fuel of 50 ℓ (13.2 US gal, 11.0 Imp gal).

NOTE:

- It is possible to drive intermittently.
- Do not disconnect the terminal of battery during diagnosis. (If disconnecting the terminal of battery, the data will be cleared.)

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

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6. DRIVE CYCLE E

- 1) Make sure that the battery voltage is more than 10.9V.
- 2) Perform the clear memory mode. <Ref. to EN(H4DOTC)-52, Clear Memory Mode.>
- 3) Drive the vehicle for the distance equal to fuel of 30 ℓ (7.9 US gal, 6.6 Imp gal).

NOTE:

- It is possible to drive intermittently.
- Do not disconnect the terminal of battery during diagnosis. (If disconnecting the terminal of battery, the data will be cleared.)

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

7. DRIVE CYCLE F

- 1) Make sure that the battery voltage is more than 10.9V.
- 2) Drive the vehicle at 80 km/h (50 MPH) for 20 minutes, and then idle the engine for a minute.
- 3) Read the current data of engine using Subaru Select Monitor. Make sure that the item of evaporative emission purge control system is displayed as "Completed". <Ref. to EN(H4DOTC)-35, READ CURRENT DATA FOR ENGINE. (OBD MODE), OPERATION, Subaru Select Monitor.>
- 4) Drive down for difference of elevation of 50 m (164 ft) within 80 seconds. (Ex: Drive down a incline with grade of 6% at 40 km/h (25 MPH).]
- 5) Repeat the steps 4 for five times.

NOTE:

- Do not drive at more than 68 km/h (42 MPH) in steps 4 and 5.
- Do not disconnect the terminal of battery during diagnosis. (If disconnecting the terminal of battery, the data will be cleared.)
- Do not perform the Clear Memory in diagnosis. (If the Clear Memory is performed, the data will be cleared.)

DTC	Item	Condition
P1448	Fuel Tank Sensor Control Valve Range/Performance	—