

## 12. Drive Cycle

### A: PROCEDURE

For the troubleshooting, there are driving patterns described below. 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 — 40 ℥ (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(H4DOTC)(diag)-54, Clear Memory Mode.>
- 3) Disconnect the delivery (test) mode connector.

#### NOTE:

- Except for the water temperature specified items at starting, be sure to carry out the diagnosis after the engine is warmed up.
- Perform the diagnosis twice if the DTC marked with \*. After completing the first diagnosis, stop the engine and perform second diagnosis in same condition.

# Drive Cycle

## ENGINE (DIAGNOSTICS)

### 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)	Diagnosis completes in drive cycle B or C as well.
*P0172	System Too Rich (Bank 2)	Diagnosis completes in drive cycle B or C as well.
P0301	Cylinder 1 Misfire Detected	Diagnosis completes in drive cycle B or C as well.
P0302	Cylinder 2 Misfire Detected	Diagnosis completes in drive cycle B or C as well.
P0303	Cylinder 3 Misfire Detected	Diagnosis completes in drive cycle B or C as well.
P0304	Cylinder 4 Misfire Detected	Diagnosis completes in drive cycle B or C as well.
*P0420	Catalyst System Efficiency Below Threshold (Bank 1)	—
P0441	Evaporative Emission System Incorrect Purge Flow	Coolant temperature at start is less than 25°C (77°F).
*P0442	Evaporative Emission Control System Leak Detected (Small Leak)	Coolant temperature at start is less than 25°C (77°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 25°C (77°F).
*P0457	Evaporative Emission Control System Leak Detected (Fuel Cap Loose/Off)	Coolant temperature at start is less than 25°C (77°F).
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	Diagnosis completes in drive cycle B or C as well.
*P2097	Post Catalyst Fuel Trim System Too Rich Bank 1	Diagnosis completes in drive cycle B or C as well.

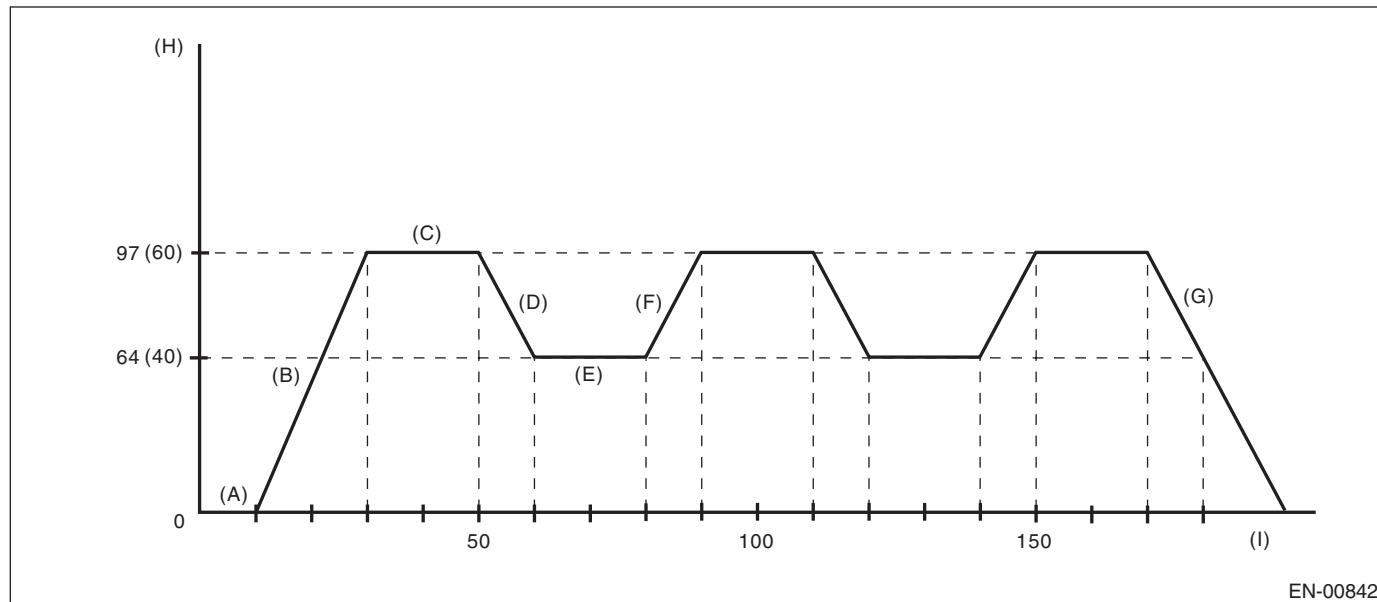
### 3. DRIVE CYCLE B (10 MINUTES IDLING)

#### 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)	Diagnosis completes in drive cycle A or C as well.
*P0172	System Too Rich (Bank 2)	Diagnosis completes in drive cycle A or C as well.
P0301	Cylinder 1 Misfire Detected	Diagnosis completes in drive cycle A or C as well.
P0302	Cylinder 2 Misfire Detected	Diagnosis completes in drive cycle A or C as well.
P0303	Cylinder 3 Misfire Detected	Diagnosis completes in drive cycle A or C as well.
P0304	Cylinder 4 Misfire Detected	Diagnosis completes in drive cycle A or C as well.
*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	Diagnosis completes in drive cycle A or C as well.
*P2097	Post Catalyst Fuel Trim System Too Rich Bank 1	Diagnosis completes in drive cycle A or C as well.

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



(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)	Diagnosis completes in drive cycle A or B as well.
*P0172	System Too Rich (Bank 2)	Diagnosis completes in drive cycle A or B as well.
*P0244	Turbo/Super Charger Wastegate Solenoid "A" Range/Performance	—
P0246	Turbo/Super Charger Wastegate Solenoid "A" High	—
*P0301	Cylinder 1 Misfire Detected	Diagnosis completes in drive cycle A or B as well.
*P0302	Cylinder 2 Misfire Detected	Diagnosis completes in drive cycle A or B as well.
*P0303	Cylinder 3 Misfire Detected	Diagnosis completes in drive cycle A or B as well.
*P0304	Cylinder 4 Misfire Detected	Diagnosis completes in drive cycle A or B as well.
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	Diagnosis completes in drive cycle A or B as well.
*P2097	Post Catalyst Fuel Trim System Too Rich Bank 1	Diagnosis completes in drive cycle A or B as well.

# Drive Cycle

## ENGINE (DIAGNOSTICS)

### 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 more than 10 ℥ (2.6 US gal, 2.2 Imp gal) and the battery voltage is more than 10.9 V.
- 3) Make sure that the engine coolant temperature rises for more than 10°C (18°F) from the level of engine starting and is also above 75°C (167°F).
- 4) Idle the engine for 120 seconds or more 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(H4DOTC)(diag)-54, Clear Memory Mode.>
- 3) Drive the vehicle for the distance equal to the fuel of 50 ℥ (13.2 US gal, 11 Imp gal).

#### NOTE:

- It is acceptable to drive the vehicle intermittently.
- Do not disconnect the terminal of battery during diagnosis. (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) Make sure that the battery voltage is 10.9 V or more.
- 2) Perform the Clear Memory Mode. <Ref. to EN(H4DOTC)(diag)-54, Clear Memory Mode.>
- 3) Drive the vehicle for the distance equal to the fuel of 30 ℥ (7.9 US gal, 6.6 Imp gal).

#### NOTE:

- It is acceptable to drive the vehicle intermittently.
- Do not disconnect the terminal of battery during diagnosis. (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 less than 30°C (86°F).
- 2) Start the engine, and warm it up until engine coolant temperature increases over 95°C (203°F).
- 3) Idle the engine for more than 10 minutes in the condition of step 2.

#### NOTE:

Do not disconnect the terminal of battery during diagnosis. (Data will be cleared by 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	—
*P2440	Secondary Air Injection System Switching Valve Stuck Open (Bank 1)	—
*P2441	Secondary Air Injection System Switching Valve Stuck Closed (Bank 1)	—
*P2442	Secondary Air Injection System Switching Valve Stuck Open (Bank 2)	—
*P2443	Secondary Air Injection System Switching Valve Stuck Closed (Bank 2)	—

### 9. DRIVE CYCLE H

- 1) Perform the Clear Memory Mode. <Ref. to EN(H4DOTC)(diag)-54, Clear Memory Mode.>
- 2) Read the engine coolant temperature, intake air temperature and fuel temperature with ignition switch ON. <Ref. to EN(H4DOTC)(diag)-36, 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:**

**$| \text{Engine coolant temperature} - \text{Intake air temperature} | \leq 5^\circ\text{C} (41^\circ\text{F})$**

**$| \text{Engine coolant temperature} - \text{Fuel temperature} | \leq 2^\circ\text{C} (36^\circ\text{F})$**

NOTE:

- If the value does not meet the conditions, turn the ignition switch to OFF and wait until it meets.
- Start the engine in P range (AT model) or in N position (MT model).

- 4) Idle the engine for one minute in the condition of step 3.

DTC	Item	Condition
*P1602	Control Module Programming Error	—