

Drive Cycle

ENGINE (DIAGNOSTICS)

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)-53, 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) | Diagnosis completes in drive cycle B or C as well. |
| *P0172 | System Too Rich (Bank 1) | Diagnosis completes in drive cycle B or C as well. |
| P0196 | Engine Oil Temperature Sensor Circuit Range/Performance | — |
| *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) | — |
| *P0442 | Evaporative Emission Control System Leak Detected (Small Leak) | Engine coolant temperature at engine 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) | Engine coolant temperature at engine start is less than 30°C (86°F). |
| *P0457 | Evaporative Emission Control System Leak Detected (Fuel Cap Loose/Off) | Engine coolant temperature at engine 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 | 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:

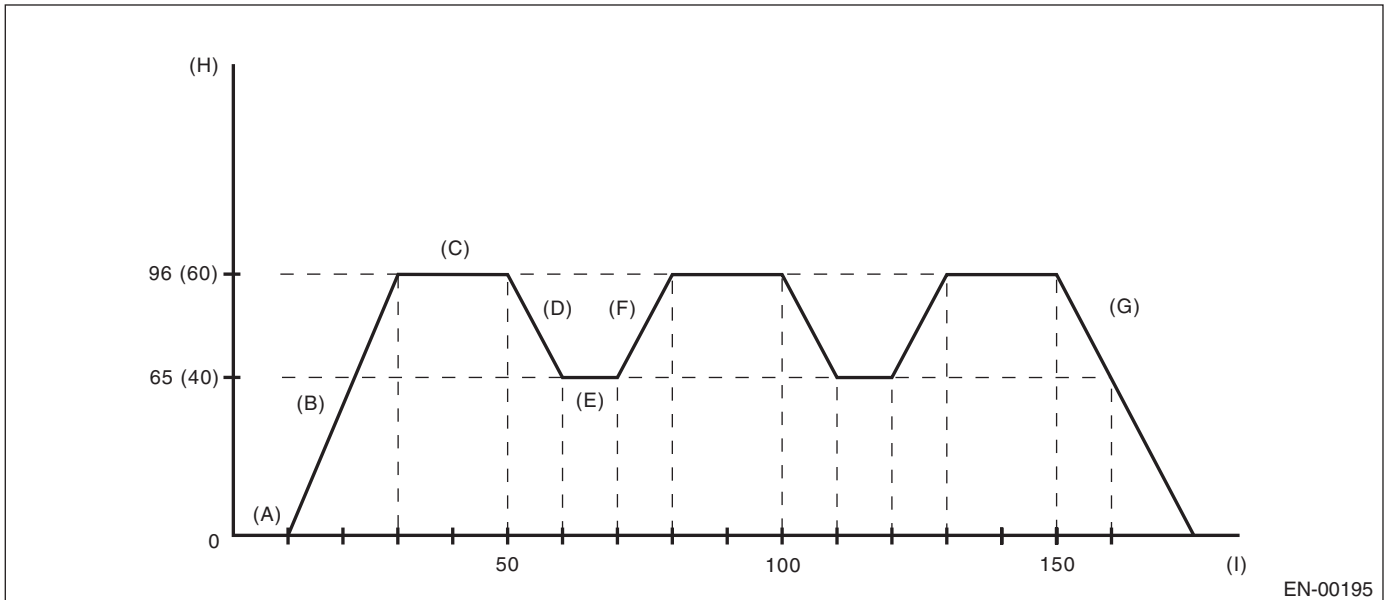
Drive the vehicle at 10 km/h (6 MPH) or more before diagnosis.

| DTC | Item | Condition |
|--------|---|--|
| *P0126 | Insufficient Coolant Temperature for Stable Operation | — |
| *P0171 | System Too Lean (Bank 1) | Diagnosis completes in drive cycle A or C as well. |
| *P0172 | System Too Rich (Bank 1) | 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. |

Drive Cycle

ENGINE (DIAGNOSTICS)

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



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

Drive Cycle

ENGINE (DIAGNOSTICS)

| 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) | Diagnosis completes in drive cycle A or B as well. |
| *P0172 | System Too Rich (Bank 1) | Diagnosis completes in drive cycle A or B as well. |
| *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. |
| *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 | 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. |

5. DRIVE CYCLE D

• DRIFT DIAGNOSIS

- 1) Check that the engine coolant temperature at engine start is less than 30°C (86°F).
- 2) Make sure that fuel remains 9.6 ℓ (2.5 US gal, 2.1 Imp gal) or more and the battery voltage is 10.9 V or more.
- 3) Start the engine, and check that the engine coolant temperature increases by 10°C (50°F) or more, and reaches 75°C (167°F) or more, when the engine is warmed up.
- 4) Idle the engine for 120 seconds or more in the condition of step 3.

Drive Cycle

ENGINE (DIAGNOSTICS)

• STUCK DIAGNOSIS

- 1) Make sure that the battery voltage is 10.9 V or more.
- 2) Perform the Clear Memory Mode. <Ref. to EN(H4SO)(diag)-53, 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 10.9 V or more.
- 2) Perform the Clear Memory Mode. <Ref. to EN(H4SO)(diag)-53, 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 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) 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 | Condition |
|-------|---|-----------|
| P0111 | Intake Air Temperature Sensor 1 Circuit Range/Performance | — |

8. DRIVE CYCLE H

- 1) Perform the Clear Memory Mode. <Ref. to EN(H4SO)(diag)-53, Clear Memory Mode.>
- 2) With the ignition switch ON, read the engine coolant temperature, intake air temperature and fuel temperature. <Ref. to EN(H4SO)(diag)-35, 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 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.
- 4) Idle the engine for 1 minute under the conditions in step 3).

| DTC | Item | Condition |
|--------|----------------------------------|-----------|
| *P1602 | Control Module Programming Error | — |