ENGINE CONTROL SYSTEM OPERATION INSPECTION [SKYACTIV-D 2.2]

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Intake Shutter Valve Operation Inspection

1. Connect the M-MDS to the DLC-2.
2. Start the engine and run it at idle.
3. Access and monitor the ETC_DSD, TP and MAP PIDs. (See ON-BOARD DIAGNOSTIC TEST [SKYACTIV-D 2.2].)
4. Verify that the MAP PID increases and TP PID increases linearly, while increasing the opening angle of the intake shutter valve using the active command mode function of ETC_DSD.
   - If both PIDs do not increase according to the intake shutter valve opening angle, inspect using the following steps.
     1. Remove the intake shutter valve with connector connected. (See INTAKE SHUTTER VALVE REMOVAL/INSTALLATION [SKYACTIV-D 2.2].)
     2. Verify that the intake shutter valve opens and closes while it is operated using the active command mode function of the ETC_DSD.
        — If not verified, retest after cleaning the intake shutter valve and inspecting related wiring harness and connectors.
     3. If the intake shutter valve does not operate, replace the intake shutter valve. (See INTAKE SHUTTER VALVE REMOVAL/INSTALLATION [SKYACTIV-D 2.2].)
   - If the MAP PID increases but TP PID does not increase linearly according to the intake shutter valve opening angle inspect using the following steps.
     1. Inspect the intake shutter valve position sensor related wiring harness and connector. (See INTAKE SHUTTER VALVE POSITION SENSOR INSPECTION [SKYACTIV-D 2.2].)
     2. Remove the intake shutter valve with the connector connected. (See INTAKE SHUTTER VALVE REMOVAL/INSTALLATION [SKYACTIV-D 2.2].)
     3. Verify that the TP PID increases and decreases linearly while the intake shutter valve is operated using the active command mode function of ETC_DSD.
        — If the TP PID does not increase and decrease linearly, replace the intake shutter valve. (See INTAKE SHUTTER VALVE REMOVAL/INSTALLATION [SKYACTIV-D 2.2].)
   - If the TP PID increases linearly but the MAP PID does not increase according to the intake shutter valve opening angle inspect using the following steps.
     1. Inspect air for leakage at the intake shutter valve and cylinder head.
     2. If normal, inspect and replace the MAP sensor. (See MANIFOLD ABSOLUTE PRESSURE (MAP) SENSOR INSPECTION [SKYACTIV-D 2.2].) (See MANIFOLD ABSOLUTE PRESSURE (MAP) SENSOR REMOVAL/INSTALLATION [SKYACTIV-D 2.2].)

Brake Override System Operation Inspection

Note
- If the brake override system operates normally after performing the following inspection, the PCM detects DTC P2299:00.

1. Start the engine and run it is idling.
2. Verify that the engine speed becomes **approx. 1,000 rpm** under the following conditions.
   - Neutral
   - Engine speed of **875 rpm or more** other than idle
   - Brake pedal depressed
     — If the engine speed becomes **approx. 1,000 rpm**, clear the PCM DTC using the M-MDS. (System operation is normal.) (See AFTER REPAIR PROCEDURE [SKYACTIV-D 2.2].)
     — If the engine speed does not become **approx. 1,000 rpm**, inspect for the following parts, then repair or replace the malfunctioning part:
       - APP sensor (See ACCELERATOR PEDAL POSITION (APP) SENSOR INSPECTION [SKYACTIV-D 2.2].)
       - Neutral switch (MTX) (See NEUTRAL SWITCH INSPECTION [SKYACTIV-D 2.2].)
       - CPP switch (MTX) (See CLUTCH PEDAL POSITION (CPP) SWITCH INSPECTION [SKYACTIV-D 2.2].)
       - Brake switch (No.1 signal) (See BRAKE SWITCH INSPECTION.)
       - Brake switch (No.2 signal) (See BRAKE SWITCH INSPECTION.)

EGR Valve Operation Inspection

1. Verify that the MAP sensor is normal. (See MANIFOLD ABSOLUTE PRESSURE (MAP) SENSOR INSPECTION [SKYACTIV-D 2.2].)
2. Connect the M-MDS to the DLC-2.
3. Start the engine.

4. Access the PID/DATA monitor items EGRP and MAP. (See ON-BOARD DIAGNOSTIC TEST [SKYACTIV-D 2.2].)
5. Verify the MAP PID value when the simulation item EGRP increases from 0 % to 100 %.
   - If the MAP PID value does not change:
     — Go to the next step.
   - If the MAP PID value changes:
     — EGR valve is normal.
6. Switch the ignition off.
7. Remove the EGR valve. (See EGR VALVE REMOVAL/INSTALLATION [SKYACTIV-D 2.2].)
8. Connect the EGR valve/EGR valve position sensor connector.
9. Switch the ignition ON (engine off).
10. Verify the EGR valve operation when the simulation item EGRP increases from 0 % to 100 %.
    - If the EGR valve does not operate:
      — Perform the EGR valve resistance inspection. (See EGR VALVE INSPECTION [SKYACTIV-D 2.2].)
    - If the EGR valve operates:
      — Inspect the EGR pipe for clogging, then repair or replace the malfunctioning part according to the inspection results.

EGR Cooler Bypass Valve Operation Inspection
1. Verify that the MAP sensor is normal. (See MANIFOLD ABSOLUTE PRESSURE (MAP) SENSOR INSPECTION [SKYACTIV-D 2.2].)
2. Connect the M-MDS to the DLC-2.
3. Start the engine.
4. Access the PID/DATA monitor items EGR_C_BP and MAP. (See ON-BOARD DIAGNOSTIC TEST [SKYACTIV-D 2.2].)
5. Verify the MAP PID value when the simulation item EGR_C_BP increases from 0 % to 100 %.
   - If the MAP PID value does not change:
     — Go to the next step.
   - If the MAP PID value changes:
     — EGR cooler bypass valve is normal.
6. Switch the ignition off.
7. Remove the EGR cooler bypass valve. (See EGR COOLER BYPASS VALVE REMOVAL/INSTALLATION [SKYACTIV-D 2.2].)
8. Connect the EGR cooler bypass valve/EGR cooler bypass valve position sensor connector.
9. Switch the ignition ON (engine off).
10. Verify the EGR cooler bypass valve operation when the simulation item EGR_C_BP increases from 0 % to 100 %.
    - If the EGR cooler bypass valve does not operate:
      — Perform the EGR cooler bypass valve resistance inspection. (See EGR COOLER BYPASS VALVE INSPECTION [SKYACTIV-D 2.2].)
    - If the EGR cooler bypass valve operates:
      — Inspect the EGR pipe for clogging, then repair or replace the malfunctioning part according to the inspection results.

Fuel Injector Operation Inspection
1. Connect the M-MDS to the DLC-2.
2. Start the engine and warm it up to normal operating temperature.
3. Perform the KOER self test. (See KOEO/KOER SELF TEST [SKYACTIV-D 2.2].)
4. Verify that DTCs P0201:00, P0202:00, P0203:00 and/or P0204:00 are not shown using the KOER self test.
   - If DTC P0201:00, P0202:00, P0203:00 and/or P0204:00 are shown, perform the DTC troubleshooting procedure. (See DTC TABLE [SKYACTIV-D 2.2].)
5. Verify that the engine speed drops or stalls when each cylinder fuel injector turns to off from on using the M-MDS active command mode function. (See ON-BOARD DIAGNOSTIC TEST [SKYACTIV-D 2.2].)
   - If it cannot be verified, inspect the following for the suspected cylinder;
     — Fuel injector (See FUEL INJECTOR INSPECTION [SKYACTIV-D 2.2].)
     — Wiring harness for PCM—Fuel injector

A/C Cut-off Control System Inspection
1. Start the engine.
2. Turn the A/C switch and the fan switch on.
3. Verify that the A/C compressor magnetic clutch actuates.
   - If it does not actuate, go to symptom troubleshooting “NO.28 A/C DOES NOT WORK SUFFICIENTLY”. (See NO.28 A/C DOES NOT WORK SUFFICIENTLY [SKYACTIV-D 2.2].)
4. Fully open the throttle valve and verify that the A/C compressor magnetic clutch does not actuate for **2—5 s**.
   - If it actuates, inspect as follows:

- — A/C relay (See RELAY INSPECTION.)
- — Open or short to ground circuit in wiring harness and connectors (Front body control module (FBCM) terminal 1C—A/C relay—PCM terminal 2BE)
- — A/C related parts
- — APP1, APP2 PIDs (See ON-BOARD DIAGNOSTIC TEST [SKYACTIV-D 2.2].) (See PCM INSPECTION [SKYACTIV-D 2.2].)

Engine Oil Solenoid Valve Operation Inspection

1. Verify that the oil pressure is normal. (See OIL PRESSURE INSPECTION [SKYACTIV-D 2.2].)
2. Connect the M-MDS to the DLC-2.
3. Start the engine.
4. Access the PID/DATA monitor items OIL_P_DUTY, RPM and ECT. (See ON-BOARD DIAGNOSTIC TEST [SKYACTIV-D 2.2].)
5. When the following conditions are met, verify the oil pressure gauge value changes:
   - Engine coolant temperature (PID: ECT): **98 °C {208 °F} or more**
   - Engine speed: **3,000 rpm or more**
   - OIL_P_DUTY PID value is changing.
     - — If the oil pressure gauge value does not change:
       - Inspect the engine oil solenoid valve. (See ENGINE OIL SOLENOID VALVE INSPECTION [SKYACTIV-D 2.2].)
     - — If the oil pressure gauge value changes:
       - Engine oil solenoid valve is normal.