

# ON-VEHICLE INSPECTION

## 1. INSPECT COOLANT (for Engine)

HINT: **INFO**.

## 2. INSPECT ENGINE OIL

HINT: **INFO**.

## 3. INSPECT AUXILIARY BATTERY

HINT: **INFO**.

## 4. INSPECT AIR CLEANER FILTER ELEMENT SUB-ASSEMBLY

- (a) Remove the air cleaner cap.
- (b) Remove the air cleaner filter element.
- (c) Visually check that the air cleaner filter element is not excessively damaged or oily.

If necessary, replace the air cleaner filter element.

- (d) Install the air cleaner filter element.
- (e) Install the air cleaner cap.

## 5. INSPECT VALVE AND ADJUSTER NOISE

(a) Put the engine in inspection mode **INFO**.

(b) Rev up the engine several times. Check that the engine does not emit unusual noises. If unusual noises occur, warm up the engine and idle it for over 30 minutes. Then, perform the inspection above again. If any defects or problems are found during the inspection above, perform a lash adjuster inspection **INFO**.

## 6. INSPECT IGNITION TIMING

(a) Put the engine in inspection mode **INFO**.

- (b) Warm up and stop the engine.
- (c) When using the Techstream:

Check the ignition timing.

(1) Connect the Techstream to the DLC3.

(2) Put the engine in inspection mode **INFO**.

(3) Turn the Techstream on.

(4) Enter the following menus: Powertrain / Engine and ECT / Data List / IGN Advance.

Standard ignition timing:

0 to 16 degrees BTDC

NOTICE:

- Check the ignition timing with the cooling fans off.
- Turn off all electrical systems and the A/ C.
- When checking the ignition timing, the transaxle should be in neutral or park.

HINT:

Refer to the Techstream operator's manual for further details.

(5) Check that the ignition timing advances immediately when the engine speed is increased.

(6) Enter the following menus: Powertrain / Engine and ECT / Active Test / Connect the TC and TE1 / ON.

(7) Monitor IGN Advance of the Data List.

Standard ignition timing:

8 to 12 degrees BTDC

NOTICE:

When checking the ignition timing, the transaxle should be in neutral or park.

HINT:

Refer to the Techstream operator's manual for further details.

(8) Enter the following menus: Connect the TC and TE1 / OFF.

(9) Turn the power switch off.

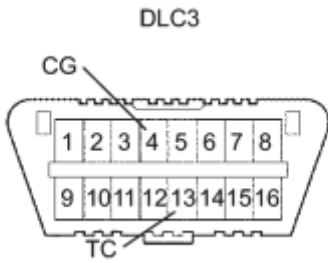
(10) Turn the Techstream off.

(11) Disconnect the Techstream from the DLC3.

(d) When not using the Techstream:

(1) Using SST, connect terminals 13 (TC) and 4 (CG) of the DLC3.

SST: 09843-18040



- Be sure to connect the terminals correctly. Failure to do this can damage the engine.
- Check the ignition timing with the cooling fans off.
- Turn off all electrical systems and the A/ C.
- When checking the ignition timing, the transaxle should be in neutral or park.

(2) Remove the No. 2 cylinder head cover INFO.



(3) Pull out the wire harness shown in the illustration.

NOTICE:

After checking, wrap the wire harness with tape.

(4) Connect the clip of the timing light to the wire harness.

NOTICE:

Use a timing light that detects the primary signal.

(5) Inspect the ignition timing at idle.

Standard ignition timing:

8 to 12 degrees BTDC

NOTICE:

When checking the ignition timing, the transaxle should be in neutral or park.

HINT:

After running the engine at 1000 to 1300 rpm for 5 seconds, check that it returns to idle speed.

(6) Disconnect terminals 13 (TC) and 4 (CG) of the DLC3.

(7) Inspect the ignition timing at idle.

Standard ignition timing:

0 to 16 degrees BTDC

(8) Confirm that the ignition timing advances when the engine rpm is increased.

(9) Remove the timing light.


(10) Install the No. 2 cylinder head cover .

## 7. INSPECT ENGINE IDLE SPEED

(a) Put the engine in inspection mode .

(b) Warm up and stop the engine.

(c) Connect the Techstream to the DLC3.

(d) Put the engine in inspection mode .

(e) Turn the Techstream on.

(f) Enter the following menus: Powertrain / Engine and ECT / Data List / Engine Speed.

### HINT:

Refer to the Techstream operator's manual for further details.

(g) Inspect the engine idle speed.

Standard idle speed:

950 to 1050 rpm

### NOTICE:


- Turn all electrical systems and the A/C off.
- Inspect the idle speed with the cooling fans off.
- When checking the idle speed, the transaxle should be in neutral or park.

(h) Turn the power switch off.

(i) Turn the Techstream off.

(j) Disconnect the Techstream from the DLC3.

## 8. INSPECT COMPRESSION

(a) Put the engine in inspection mode .

(b) Warm up and stop the engine.

(c) Remove the 4 spark plugs .

- (d) Inspect the cylinder compression pressure.
- (1) Insert a compression gauge into the spark plug hole.
  - (2) Connect the Techstream to the DLC3.
  - (3) Turn the power switch on (IG).
  - (4) Turn the Techstream on.
  - (5) Enter the following menus: Powertrain / Hybrid Control / Active Test / Compression Test / ON.
  - (6) Fully depress the acceleration pedal.
  - (7) Depress and hold the brake pedal, and turn the power switch on (READY).

**NOTICE:**

The measurement must be done as quickly as possible.

- Noise may emit from the transmission. However, this is not a malfunction.
- Always use a fully charged battery to obtain an engine speed of 200 rpm or more.

Standard compression pressure:

1373 kPa (14.0 kgf/cm<sup>2</sup>, 199 psi) or more

Minimum pressure:

1079 kPa (11.0 kgf/cm<sup>2</sup>, 157 psi)

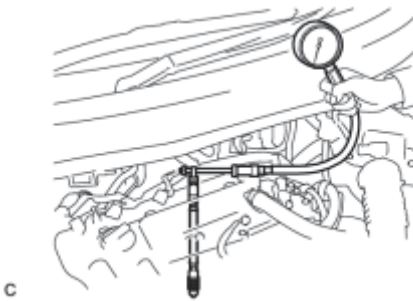
Pressure difference between each cylinder:

98 kPa (1.0 kgf/cm<sup>2</sup>, 14.2 psi) or less

- Inspect the other cylinders in the same way.
- Measure the compression as quickly as possible.

(8) If the cylinder compression is low, pour a small amount of engine oil into the cylinder through the spark plug hole, then inspect it again.

- If adding oil increases the compression, the piston rings and/or cylinder bore may be worn or damaged.
- If the pressure stays low, the valve may be stuck or seated improperly, or there may be leaks from the gasket.



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(e) Install the 4 spark plugs .

**NOTICE:**

After performing all the procedures, be sure to clear DTCs stored in memory. Then, check that the normal system code is output.

**9. INSPECT CO/HC**

**HINT:**

This check determines whether or not the idle CO / HC complies with regulations.

(a) Put the engine in inspection mode .

(b) Warm up the engine.

(c) Run the engine at 2500 rpm for approximately 180 seconds.

(d) Insert a CO/HC meter testing probe at least 40 cm (1.3 ft.) into the tailpipe while idling.

(e) Check the CO/HC concentration while idling and when the engine is running at 2500 rpm.

**HINT:**

When doing a 2 mode (with the engine idling/ running at 2500 rpm) test, the measurement procedures are determined by applicable local regulations.

If the CO/HC concentration does not comply with the regulations, troubleshoot in the order given below.

(1) Check the DTCs .

(2) See the table below for possible causes, then inspect the applicable parts and repair them if necessary.

| CO     | HC   | Problem                             | Possible Cause                                                                                                                                                                                                                                                                                                     |
|--------|------|-------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Normal | High | Rough idle                          | <ol style="list-style-type: none"><li>Faulty ignition:<ul style="list-style-type: none"><li>Incorrect timing</li><li>Fouled, shorted or improperly gapped plugs</li></ul></li><li>Incorrect valve clearance</li><li>Leaks from intake and exhaust valves</li><li>Leaks from cylinders</li><li>Faulty EGR</li></ol> |
| Low    | High | Rough idle (Fluctuating HC reading) | <ol style="list-style-type: none"><li>Vacuum leaks:<ul style="list-style-type: none"><li>PCV hoses</li><li>Intake manifold</li><li>Throttle body</li><li>Brake booster line</li></ul></li><li>Lean mixture causing misfire</li></ol>                                                                               |

| CO   | HC   | Problem                               | Possible Cause                                                                                                                                                                                                                                                                                                                                                                                                                      |
|------|------|---------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|      |      |                                       | 3. Faulty EGR                                                                                                                                                                                                                                                                                                                                                                                                                       |
| High | High | Rough idle (Black smoke from exhaust) | <ol style="list-style-type: none"> <li>1. Restricted air cleaner filter element</li> <li>2. Plugged PCV valve</li> <li>3. Faulty EFI systems: <ul style="list-style-type: none"> <li>○ Faulty pressure regulator</li> <li>○ Faulty engine coolant temperature sensor</li> <li>○ Faulty mass air flow meter</li> <li>○ Faulty ECM</li> <li>○ Faulty injectors</li> <li>○ Throttle body</li> </ul> </li> <li>4. Faulty EGR</li> </ol> |