ENGINE

ON-VEHICLE INSPECTION

1. INSPECT COOLANT

(a) Inspect the coolant (See page CO-1).

2. INSPECT ENGINE OIL

3. INSPECT BATTERY

Standard specific gravity:
1.25 to 1.29 at 20°C (68°F)

4. INSPECT AIR CLEANER FILTER ELEMENT SUB-ASSEMBLY

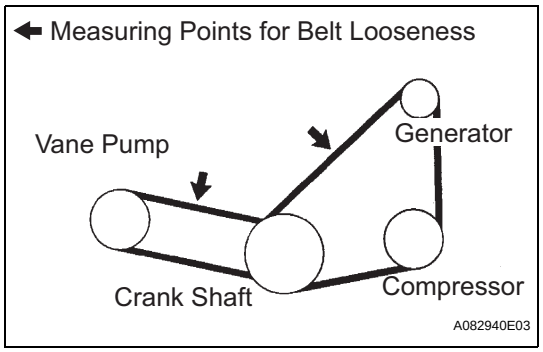
5. INSPECT SPARK PLUG

(a) Inspect the spark plug (See page IG-1).

6. INSPECT V-RIBBED BELT

(a) Belt deflection

Pressing force:
98 N (10 kgf, 22 lbf)



	New belt mm (in.)	Used belt mm (in.)
V ribbed belt (For fan and generator)	9.1 to 10.5 (0.358 to 0.413)	11.0 to 13.5 (0.433 to 0.531)
V ribbed belt (for vane pump)	8 to 10 (0.315 to 0.394)	11 to 14 (0.433 to 0.551)

(b) Tension

	New belt N (kg, lb)	Used belt N (kg, lb)
V ribbed belt (For fan and generator)	637 to 735 (63 to 75 , 143 to 165)	392 to 588 (40 to 60 , 80 to 132)
V ribbed belt (for vane pump)	588 to 686 (60 to 70 , 132 to 154)	245 to 392 (25 to 40 , 55 to 88)

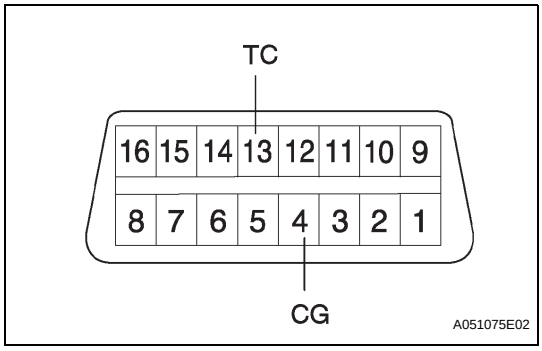
NOTICE:

- **Check the drive belt deflection at the specified point.**
- **When installing a new belt, set its tension value as specified.**
- **When inspecting a belt which is used for over 5 minutes, apply the specification of "Used belt".**
- **When reinstalling a belt which is used for over 5 minutes, adjust its belt deflection and tension to the medium value in each specification of "Used belt".**
- **V-ribbed belt tension and deflection value should be checked after 2 revolutions of engine cranking.**
- **When using a belt tension gauge, confirm the accuracy first by using a master gauge.**

7. INSPECT IGNITION TIMING

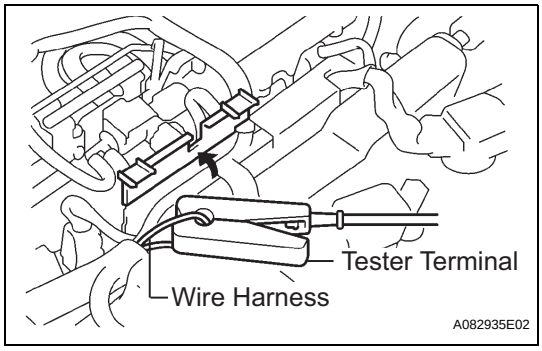
(a) Warm up engine.

(b) When using intelligent tester or OBD II scan tool :
(1) Connect the intelligent tester or OBD II scan tool to the DLC3.
(2) Enter DATA LIST MODE on the intelligent tester or OBD II scan tool.
Ignition timing:
8 to 12° BTDC
HINT:
Please refer to the intelligent tester or OBD II scan tool operator's manual if you need help to select DATA LIST.



(c) When not using the intelligent tester or OBD II scan tool :
(1) Using SST, connect terminals 13 (TC) and 4 (CG) of DLC3.
SST 09843-18040
NOTICE:
- **Make sure of the terminal numbers before connecting them. Connection with a wrong terminal can damage the engine.**
- **Turn OFF all electrical systems before connecting the terminals.**
- **Perform this inspection after the cooling fan motor is turned OFF.**

(2) Remove the V-bank cover.



(3) Pull out the black-colored wire harness as shown in the illustration.
(4) Connect the tester terminal of the timing light to the engine.
NOTICE:
Use a timing light which detects the first signal.
(5) Inspect ignition timing at idle.
Ignition timing:
8 to 12° BTDC
NOTICE:
When checking the ignition timing, the transmission is in the neutral position.
HINT:
Run the engine at 1,000 to 1,300 rpm for 5 seconds, check that the engine rpm returns idle speed.
(6) Disconnect terminals 13 (TC) and 4 (CG) of the DLC3.
(7) Inspect ignition timing at idle.
Ignition timing:
7 to 24° BTDC
(8) Confirm that the ignition timing advances when the engine rpm is increased.
(9) Remove the timing light.

8. INSPECT ENGINE IDLE SPEED
(a) Warm up the engine.

(b) Connect the intelligent tester or OBD II scan tool to the DLC3.

(c) Enter DATA LIST MODE on the intelligent tester or OBD II scan tool.

Idle speed:

650 to 750 rpm.

NOTICE:

- **When checking the idle speed, the transmission is in the neutral position.**
- **Check the idle speed with the cooling fan OFF.**
- **Switch off all accessories and air conditioning before connecting the intelligent tester or OBD II scan tool.**

HINT:

Please refer to the intelligent tester or OBD II scan tool operator's manual for further details.

EM

9. INSPECT COMPRESSION

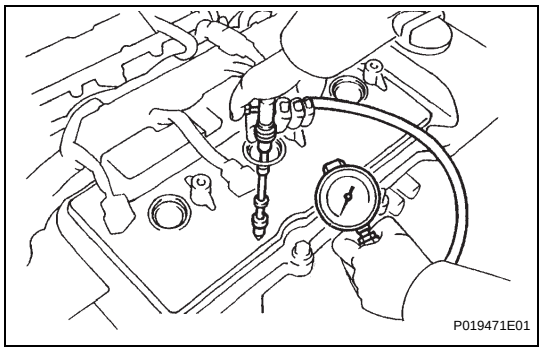
(a) Warm up and stop the engine.

(b) Disconnect the injector connectors.

(c) Remove the intake air surge tank. (See page EM-8)

(d) Remove the ignition coil.

(e) Remove the spark plugs.



(f) Inspect cylinder compression pressure.

SST 09992-00500

(1) Insert a compression gauge into the spark plug hole.

(2) Fully open the throttle.

(3) While cranking the engine, measure the compression pressure.

Compression pressure:

1.5 MPa (15.3 kgf/cm^2, 218psi)

Minimum pressure:

1.0 MPa (10.2 kgf/cm^2, 145 psi)

Difference between each cylinder:

100 kPa (1.0 kgf/cm^2, 15 psi)

NOTICE:

- **Always use a fully charged battery to obtain engine speed of 250 rpm or more.**
- **Check other cylinder's compression pressure in the same way.**
- **This measurement must be done in as short a time as possible.**

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

HINT:

- If adding oil increases the compression, the piston rings and/or cylinder bore may be worn or damaged.
- If pressure stays low, a valve may be sticking or seating improperly, or there may be leakage past the gasket.

10. INSPECT CO/HC

(a) Start the engine.

(b) Run the engine at 2,500 rpm for approximately 180 seconds.

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

(d) Check CO/HC concentration at idle and/or 2,500 rpm.

HINT:

When doing the 2 mode (with the engine is in the idle and 2,500 rpm) test, these measuring order are prescribed by the applicable local regulations.

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

(1) Check heated oxygen sensor operation (See page EC-3).

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

CO	HC	Problems	Causes
Normal	High	Rough idle	1. Faulty ignitions: – Incorrect timing – Fouled, shorted or improperly gapped plugs 2. Incorrect valve clearance 3. Leaks in intake and exhaust valves 4. Leaks in cylinders
Low	High	Rough idle (Fluctuating HC reading)	1. Vacuum leaks: – PCV hoses – Intake manifold – Throttle body – Brake booster line 2. Lean mixture causing misfire
High	High	Rough idle (Black smoke from exhaust)	1. Restricted air filter 2. Plugged PCV valve 3. Faulty EFI systems: – Faulty pressure regulator – Defective water temperature sensor – Defective mass air-flow meter – Faulty ECM – Faulty injectors – Faulty throttle position sensor