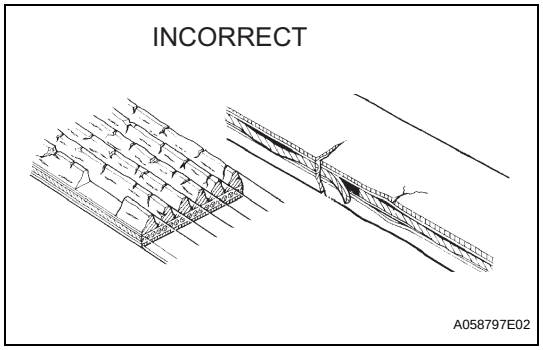
ENGINE

ON-VEHICLE INSPECTION

1. **INSPECT ENGINE COOLANT (See page CO-2)**
2. **INSPECT ENGINE OIL (See page LU-2)**
3. **INSPECT BATTERY (See page CH-4)**
4. **INSPECT AIR CLEANER FILTER ELEMENT SUB-ASSEMBLY**
5. **INSPECT SPARK PLUG (See page IG-5)**
6. **INSPECT DRIVE BELT**

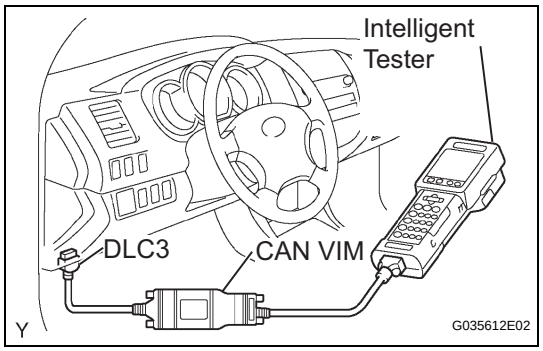


(a) Visually check the driver belt for excessive wear, frayed cords, etc. If any defect is found, replace the drive belt.
HINT:
Cracks on the rib side of a drive belt are considered acceptable. If the drive belt has chunks missing from the ribs, it should be replaced.

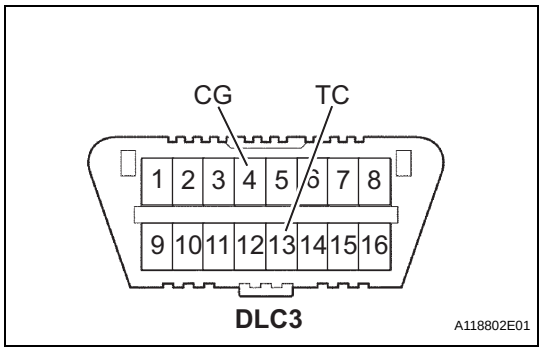
7. **INSPECT IGNITION TIMING**

NOTICE:
- **Turn all electrical systems OFF.**
- **Operate the inspection when the cooling fan motor is turned OFF.**

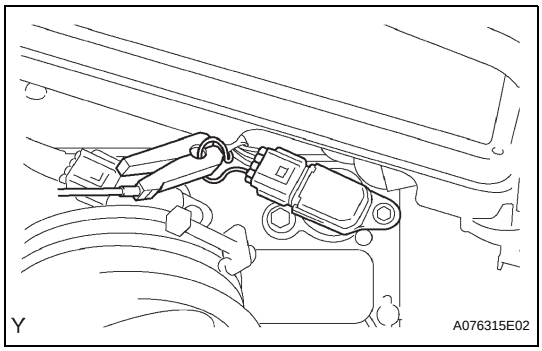
(a) Warm up the engine.



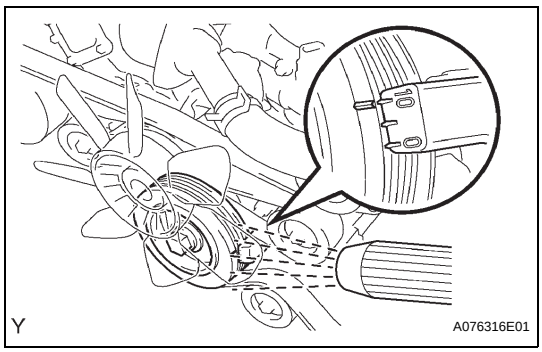
(b) When using the intelligent tester.
(1) Connect the intelligent tester to the DLC3.
(2) Select the following menu items: DIAGNOSIS / ENHANCED OBD ll / DATA LIST / IGN ADVANCE.
(3) Inspect the ignition timing during idling.
Ignition timing:
7 to 24°CA BTDC during idling
(Transmission in neutral position)
(4) Check that the ignition timing advances immediately when the engine speed is increased.



(c) When not using intelligent tester.
(1) Using SST, connect the terminals 13 (TC) and 4 (CG) of the DLC3.
SST 09843-18040
NOTICE:
Be sure not to connect the terminals wrongly. It causes breakage of the engine.
(2) Remove the air cleaner.



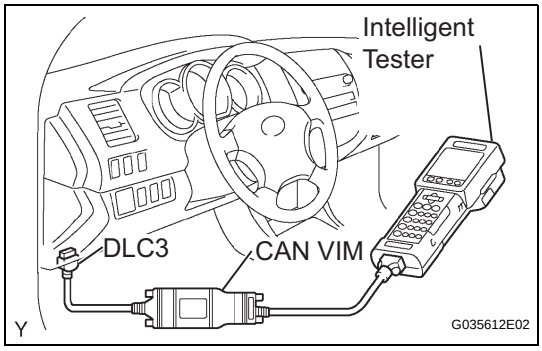
(3) Pull out the wire harness as shown in the illustration.
(4) Connect the tester probe of a timing light to the wire of the ignition coil connector for No. 1 cylinder.
NOTICE:
- **Use a timing light that detects the first signal.**
- **After checking, be sure to wrap the wire harness with tape.**



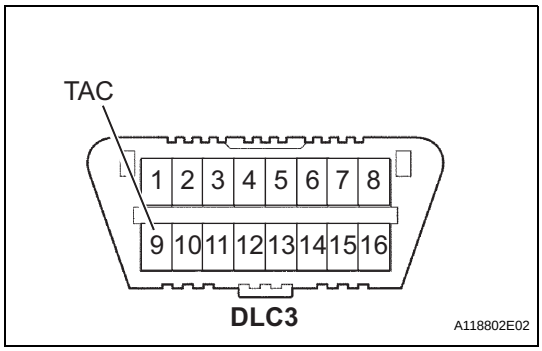
(5) Inspect the ignition timing during idling.
Ignition timing:
8 to 12°CA BTDC during idling (Transmission in neutral position)
(6) Remove the SST from the DLC3.
(7) Inspect the ignition timing during idling.
Ignition timing:
7 to 24°CA BTDC during idling (Transmission in neutral position)
(8) Install the air cleaner.

8. INSPECT ENGINE IDLING SPEED
NOTICE:
- **Turn all the electrical systems OFF.**
- **Operate the inspection when the cooling fan motor is turned OFF.**

(a) Warm up the engine.

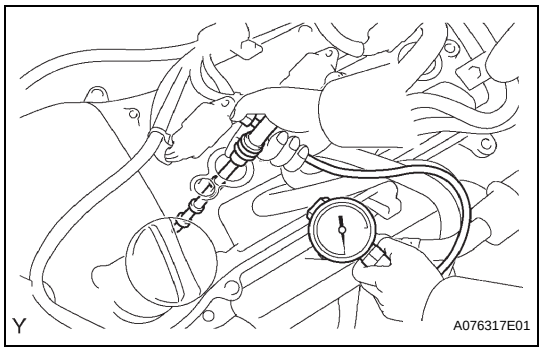


(b) When using the intelligent tester:
(1) Connect the intelligent tester to the DLC3.
(2) Select the following menu items: DIAGNOSIS / ENHANCED OBD ll / DATA LIST / ENGINE SPD.
(3) Inspect the engine idling speed.
Idling speed:
650 to 750 rpm (Transmission in neutral position)



(c) When not using the intelligent tester:
(1) Using SST, connect the terminal 8 (TAC) of the DLC3.
SST 09843-18030
(2) Race the engine speed at 2,500 rpm for approximately 90 seconds.
(3) Inspect the engine idling speed.
Idling speed:
650 to 750 rpm (Transmission in neutral position)

9. INSPECT COMPRESSION
(a) Warm up and stop the engine.
(b) Remove the circuit opening relay.
(c) Remove the V-bank cover.
(d) Remove the air cleaner assembly.



(e) Remove the ignition coils.
(f) Remove the spark plugs.
(g) Inspect the cylinder compression pressure.
(1) Insert a compression gage into the spark plug hole.
SST 09992-00500
(2) Fully open the throttle.
(3) While cranking the engine, measure the compression pressure.
Compression pressure:
1,300 kPa (13.3 kgf/cm^2, 189 psi)
Minimum pressure:
1,000 kPa (10.2 kgf/cm^2, 145 psi)
Difference between each cylinder:
100 kPa (1.0 kgf/cm^2, 15 psi)
NOTICE:
- **Use a fully-charged battery so the engine speed can be increased to 250 rpm or more.**
- **Inspect the other cylinders in the same way.**
- **Measure the compression 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 repeat steps (1) through (3) for cylinders with low compression.
- 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 stuck or seated improperly, or there may be leakage from 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) Immediately check the CO/HC concentration during idling and/or at 2,500 rpm.
HINT:
- Complete the measurement within 3 minutes.
- When carrying out the 2 modes (idling and 2,500 rpm) test, the measurement orders are prescribed by the applicable local regulations.

(e) If the CO/HC concentration does not comply with regulations, troubleshoot in the order given below.
(1) Check the heated oxygen sensor operation.

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