

ENGINE ASSEMBLY (1ZZ-FE)

1400C-02

INSPECTION

1. INSPECT COOLANT (See page 16-1)
2. INSPECT ENGINE OIL (See page 17-1)
3. INSPECT BATTERY (See page 19-12)
4. INSPECT AIR CLEANER FILTER ELEMENT SUB-ASSY
5. INSPECT SPARK PLUG (See page 18-2)
6. INSPECT FAN AND GENERATOR V BELT

HINT:

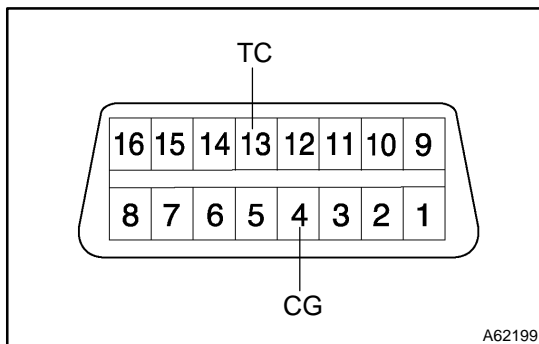
You don't need to check the belt deflection because auto tensioner is adopted.

7. INSPECT IGNITION TIMING

- (a) Warm up engine.
- (b) When using hand-held tester or OBDII scan tool.
 - (1) Connect the hand-held tester or OBDII scan tool to the DLC3.

HINT:

Please refer to the hand-held tester or OBDII scan tool operator's manual for further details.



- (c) When not using hand-held tester or OBDII scan tool.
 - (1) Using SST, connect terminal 13 (TC) and 4 (CG) of the DLC3.

SST 09843-18040

NOTICE:

- **Be sure not to connect incorrectly. It causes breakage of the engine.**
- **Turn OFF all electrical systems.**
- **Operate the inspection when the cooling fan motor is turned OFF**
 - (2) Remove the 2 nuts, 2 clips and cylinder head cover.
 - (3) Pull out the wire harness as shown in the illustration.
 - (4) Connect the clip of the timing light to the engine.

NOTICE:

- **Use a timing light which can detect the first signal.**
- **After checking, be sure to tape the wire harness.**
 - (5) Inspect ignition timing at idle.

Ignition timing: 8 – 12° BTDC

NOTICE:

When checking the ignition timing, the transmission is at neutral position.

HINT:

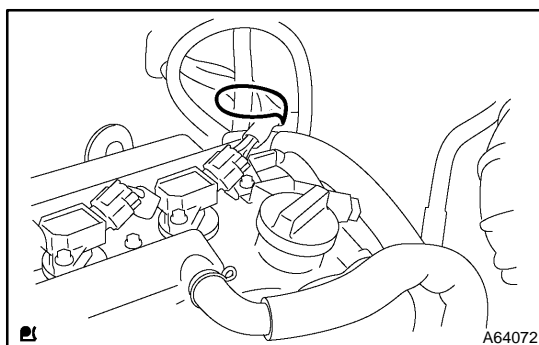
After engine rpm is kept at 1,000 – 1,300 rpm for 5 seconds, check that it returns idle speed.

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

- (7) Inspect ignition timing at idle.

Ignition timing: 10 – 18 ° BTDC

- (8) Confirm that ignition timing moves to advanced angle side when the engine rpm is increased.



- (9) Remove the timing light.
- (10) Install cylinder head cover No. 2 with the 2 nuts and 2 clips.

Torque: 7.0 N·m (71 kgf·cm, 62 in.-lbf)

8. INSPECT ENGINE IDLE SPEED

- (a) Warm up engine.
- (b) When using hand-held tester or OBDII scan tool.
 - (1) Connect the hand-held tester or OBDII scan tool to the DLC3.

HINT:

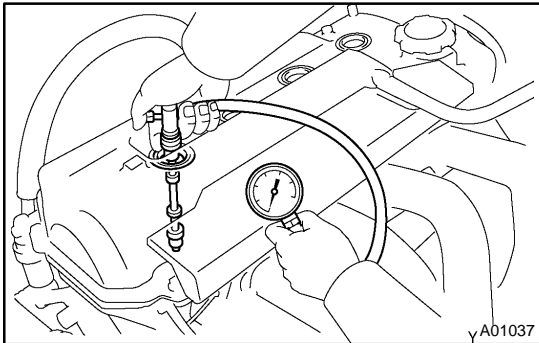
Please refer to the hand – held tester or OBDII scan tool operator's manual for further details.

- (c) Check the idle speed.

Idle speed: 650 – 750 rpm

NOTICE:

- **Check idle speed with cooling fan OFF.**
- **Switch off all accessories and air conditioning.**



9. INSPECT COMPRESSION

- (a) Warm up and stop engine.
- (b) Remove ignition coil.
- (c) Remove spark plugs.
- (d) 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

1,300 kPa (13.3 kgf·cm², 189 psi)

Minimum pressure: 1,000 kPa (10.2 kgf·cm², 145 psi)

Difference between each cylinder:

100 kPa (1.0 kgf·cm², 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 in one more cylinders 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.

HINT:

- If adding oil helps the compression, it is likely that the piston rings and/or cylinder bore are worn or damaged.
- If pressure stays low, a valve may be sticking or seating is improper, or there may be leakage past the gasket.

10. INSPECT CO/HC

- (a) Start the engine.
- (b) Race engine at 2,500 rpm for approx. 180 seconds.
- (c) Insert CO/HC meter testing probe at least 40 cm (1.3 ft) into tailpipe during idling.
- (d) Immediately check CO/HC concentration at idle and/or 2,500 rpm.

HINT:

- Complete the measuring within 3 minutes.
 - When doing the 2 mode (idle and 2,500 rpm) test, these measuring 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 heated oxygen sensor operation. (See page 05-51 or 05-63)
 - (2) See the table below for possible causes, and then inspect and correct the applicable causes if necessary.

CO	HC	Problems	Causes
Normal	High	Rough idle	3. Faulty ignitions: <ul style="list-style-type: none"> • Incorrect timing • Fouled, shorted or improperly gapped plugs 4. Incorrect valve clearance 5. Leaky intake and exhaust valves 6. Leaky cylinders
Low	High	Rough idle (Fluctuating HC reading)	1. Vacuum leaks: <ul style="list-style-type: none"> • PCV hoses • Intake manifold • Throttle body • ISC valve • Brake booster line 2. Lean mixture causing misfire
High	High	Rough idle (Black smoke form exhaust)	1. Restricted air filter 2. Plugged PCV valve 3. Faulty EFI systems: <ul style="list-style-type: none"> • Faulty pressure regulator • Defective water temperature sensor • DEFECTIVE Air-flow meter • Faulty ECM • Faulty injectors • Faulty throttle position sensor