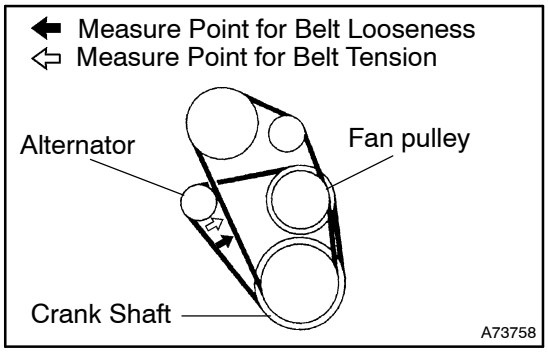
ENGINE (1KZ–TE)

1410M–01

INSPECTION

1. INSPECT ENGINE COOLANT (See page 16–34)
2. INSPECT ENGINE OIL (See page 17–27)
3. INSPECT BATTERY (See page 19–26)
4. INSPECT AIR CLEANER FILTER ELEMENT SUB–ASSY



5. INSPECT V (COOLER COMPRESSOR TO CRANKSHAFT PULLEY) BELT NO.1 (W/ AIR CONDITIONING)

(a) Check the V belt deflection.

(1) Belt deflection

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

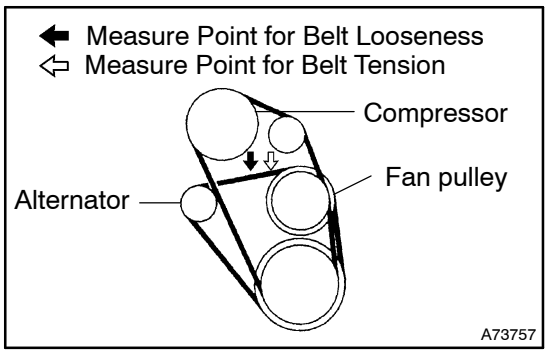
New belt mm (in.)	Used belt mm (in.)
13 – 15 (0.52 – 0.58)	15 – 21 (0.58 – 0.82)

(2) Tension

New belt N (kgf)	Used belt N (kgf)
370 – 610 (38 – 62)	190 – 395 (20 – 40)

NOTICE:

- **Check the drive belt deflection at the specified point.**
- **When installing a new belt, set its tension value as specified.**
- **When checking a belt used for over 5 minutes, confirm the deflection value is within the specified one.**
- **When reinstalling a belt used for over 5 minutes, perform the check based on the used deflection value.**
- **V belt tension and deflection value should be checked after two revolution of engine cranking.**
- **When using a belt tension gauge, confirm the accuracy first by using a master gauge.**



6. INSPECT FAN AND GENERATOR V BELT

(a) Check the V belt deflection. (Per 1 belt)

(1) Belt deflection

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

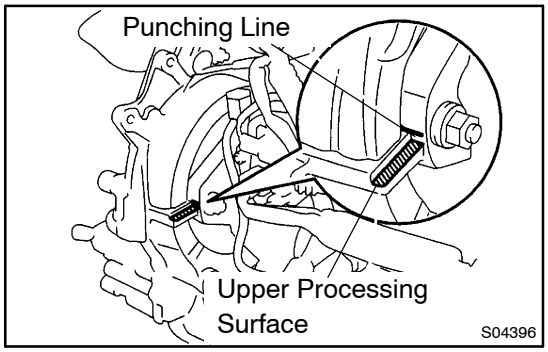
New belt mm (in.)	Used belt mm (in.)
6 – 8 (0.24 – 0.31)	8 – 12 (0.31 – 0.47)

(2) Tension. (Per 1 belt)

New belt N (kgf)	Used belt N (kgf)
400 – 600 (41 – 61)	300 – 500 (31 – 51)

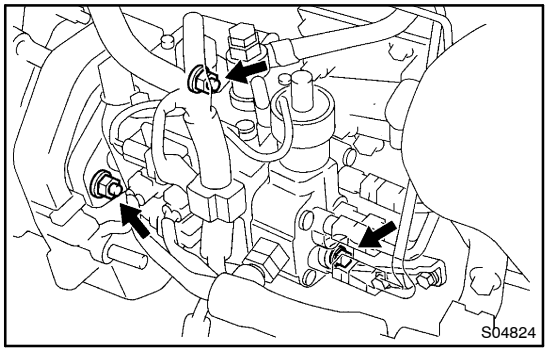
NOTICE:

- **Check the drive belt deflection at the specified point.**
- **When installing a new belt, set its tension value as specified.**
- **When checking a belt used for over 5 minutes, confirm the deflection value is within the specified one.**
- **When reinstalling a belt used for over 5 minutes, perform the check based on the used deflection value.**
- **V belt tension and deflection value should be checked after two revolution of engine cranking.**
- **When using a belt tension gauge, confirm the accuracy first by using a master gauge.**



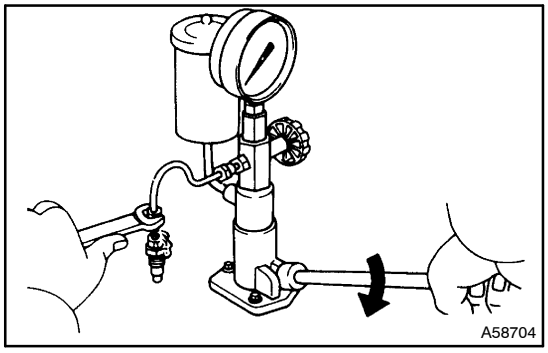
7. INSPECT INJECTION TIMING

(a) Using mirror, check that the punching line of the injection pump flange and the upper processing surface of the timing gear case aligned.



8. ADJUST INJECTION TIMING

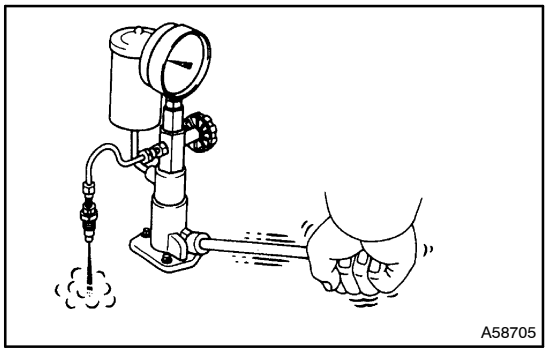
(a) Remove the cylinder block insulator.
(b) Loosen the bolt holding the injection pump to the injection pump stay.
(c) Loosen the 2 nuts holding the injection pump to the timing gear case.
(d) Align the punching line and upper processing surface by slightly tilting the injection pump.
(e) Tighten the 2 nuts holding the injection pump to the timing gear case.
Torque: 21 N·m (210 kgf·cm, 15 ft·lbf)
(f) Tighten the bolt holding the injection pump to the injection pump stay.
Torque: 32 N·m (330 kgf·cm, 24 ft·lbf)
(g) Reinstall the cylinder block insulator.



9. INSPECT INJECTION PRESSURE

(a) Install the injection nozzle to the injection nozzle hand tester and bleed air from the union nut.

CAUTION:
Do not place your finger over the nozzle injection hole.



(b) Pump the tester handle a few times as fast as possible to discharge the carbon from the injection hole.

(c) Pump the tester handle slowly and observe the pressure gauge.

(d) Read the pressure gauge just as the injection pressure begins to drop.

Opening pressure (New nozzle):
15,310 – 16,090 kPa
(156 – 164 kgf/cm^2, 2,219 – 2,233 psi)
Opening pressure (Reused nozzle):
14,710 – 15,690 kPa
(150 – 160 kgf/cm^2, 2,134 – 2,276 psi)

HINT:
Proper nozzle operation can be determined by a swishing sound.
If the opening pressure in not as specified, disassemble the nozzle holder and change the adjusting shim on the top of the pressure spring.

Adjusted opening pressure :
15,200 – 16,181 kPa
(154 – 166 kgf/cm^2, 2,205 – 2,347 psi)

Adjusting shim thickness: mm (in.)

0.900 (0.0354)	1.300 (0.0512)	1.700 (0.0669)
0.950 (0.0374)	1.350 (0.0531)	1.750 (0.0689)
1.000 (0.0394)	1.400 (0.0551)	1.800 (0.0709)
1.050 (0.0413)	1.450 (0.0571)	1.850 (0.0728)
1.100 (0.0433)	1.500 (0.0591)	1.900 (0.0748)
1.150 (0.0453)	1.550 (0.0610)	1.950 (0.0768)
1.200 (0.0472)	1.600 (0.0630)	–
1.250 (0.0492)	1.650 (0.0650)	–

HINT:
- Varying the adjusting shim thickness by 0.05 mm (0.0020 in.) changes the injection pressure by about 628 kPa (6.4 kgf/cm^2, 91 psi).
- Only one adjusting shim should be used.
  (1) After adjustment, adjust the accelerator linkage.

10. INSPECT AND ADJUST CHECK ENGINE IDLE SPEED AND MAXIMUM SPEED

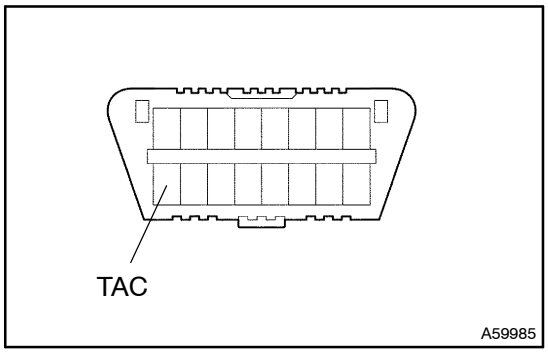
HINT:

Check should be done under the following condition.

- Engine at normal operating temperature.
- Air cleaner installed.
- All pipes and hoses of air induction system connected.
- All accessories switched OFF.
- All vacuum lines properly connected.
- ECD system wiring connectors fully plugged.
- Valve clearance set correctly.

(a) Connect a hand–held tester to the DLC3.

(b) Please refer to the hand–held tester operator's manual for further details.



(c) If you have no hand–held tester, connect a tester probe of a tachometer to terminal 9 (TAC) of the DLC3 with SST.
SST 09843–18040

(d) Inspect the idle speed.
(1) Start the engine and check the idle speed.
Idle speed: 650 – 750 rpm

If the idle speed is not as specified, check the troubleshooting in DI section.

(e) Inspect the maximum speed.
(1) Start the engine.
(2) Depress the accelerator pedal all the way.
(3) Check the maximum speed.
Maximum speed: 4,450 – 4,750 rpm

If the maximum speed is not as specified, check the troubleshooting in DI section.

(f) Disconnect the tester probe of a tachometer from terminal 9 (TAC) of the DLC3 with SST.

(g) Disconnect a hand–held tester from the DLC3.

11. INSPECT COMPRESSION

HINT:

If there is lack of power, excessive oil consumption or poor fuel economy, measure the compression pressure.

(a) Warm up and stop engine.

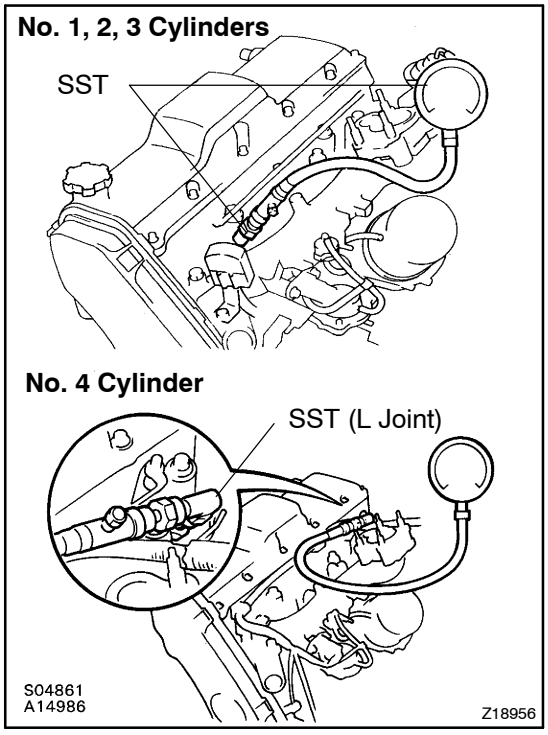
(b) Remove the glow plugs.

(c) Disconnect spill valve connector.

(d) Check cylinder compression pressure.

HINT:

Turn the starter before measuring the compression and discharge the foreign objects.



(e) Install SST (attachment) to the glow plug hole.
SST 09992–00500
Torque: 13 N·m (130 kgf·cm, 9 ft·lbf)

(f) Connect SST (compression gauge) to the SST (attachment).
SST 09992–00025 (09992–00211)

(g) Fully open the throttle valve, and start the engine.

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

HINT:
Always use a fully charged battery to obtain engine revolution of 250 rpm or more.

(i) Repeat steps (a) through (d) for each cylinder.

NOTICE:
This measurement must be done in as short a time as possible.

Compression pressure:
3,040 kPa (31.0 kgf/cm^2, 441 psi) or more
Minimum pressure:
1,961 kPa (20.0 kgf/cm^2, 284 psi)
Difference between each cylinder:
490 kPa (5.0 kgf/cm^2, 71 psi) or less

(j) If the cylinder compression in one or more cylinders is low, pour a small amount of engine oil into the cylinder through the glow plug hole and repeat steps (a) through (d) for the cylinder with low compression.
(1) If adding oil helps the compression, chances are that the piston rings and/or cylinder bore are worn or damaged.
(2) If pressure stays low, a valve may be sticking or seating improperly, or there may be leakage past the gasket.

(k) Remove the SST.

(l) Reinstall the glow plugs.

(m) Reconnect injection pump (fuel cut solenoid) connector.

12. INSPECT DIESEL SMOKE