ENGINE (1GR–FE)

1415Q–02

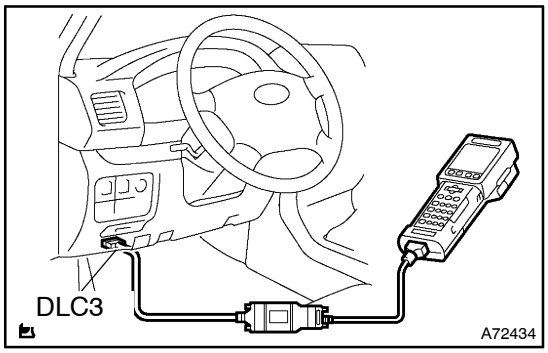
INSPECTION

1. INSPECT ENGINE COOLANT (See page 16–1)
2. INSPECT ENGINE OIL (See page 17–1)
3. INSPECT BATTERY SPECIFIC GRAVITY (See page 19–7)
4. **INSPECT AIR CLEANER FILTER ELEMENT SUB–ASSY**
5. **INSPECT FAN AND GENERATOR V BELT**

HINT:

Use of the automatic tensioner has made the tension and flexibility measurements unnecessary.

6. INSPECT V–RIBBED BELT TENSIONER ASSY (See page 14–5)
7. **WARM UP ENGINE**



8. **INSPECT IGNITION TIMING**

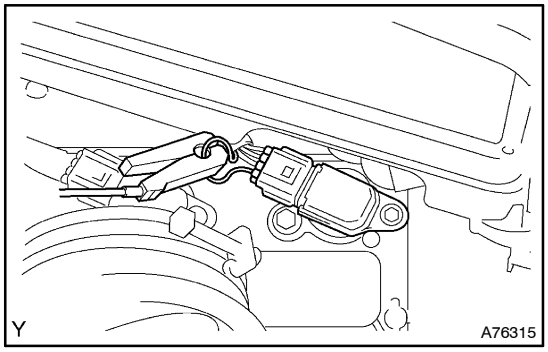
(a) When using hand–held tester.

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

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

Ignition timing: 7 to 24° BTDC at idle
(Transmission in neutral position)

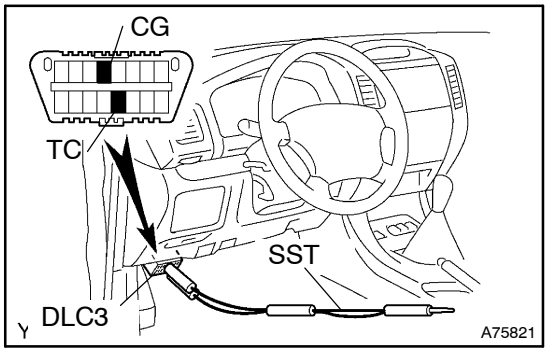
(3) Disconnect the hand–held tester from the DLC3.



(b) When not using hand–held tester.

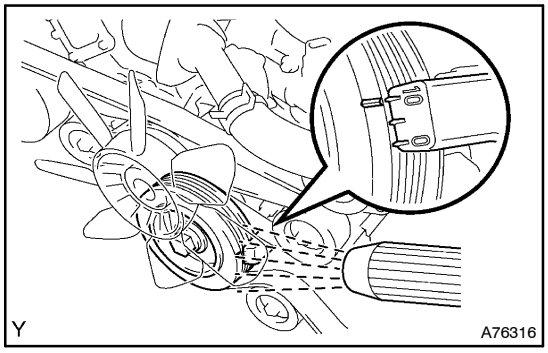
(1) Remove the air cleaner cap sub–assy.

(2) Connect the tester probe of a timing light to the wire of the ignition coil connector for No. 1 cylinder.

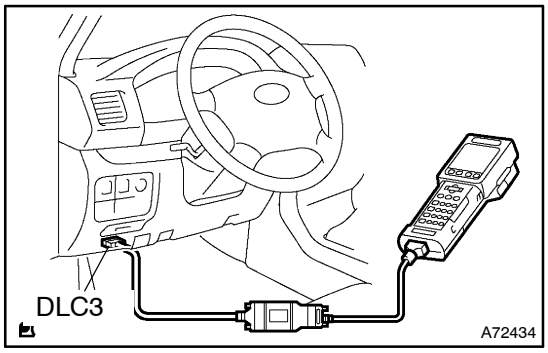


(3) Using SST, connect the terminals TC and CG of the DLC3.

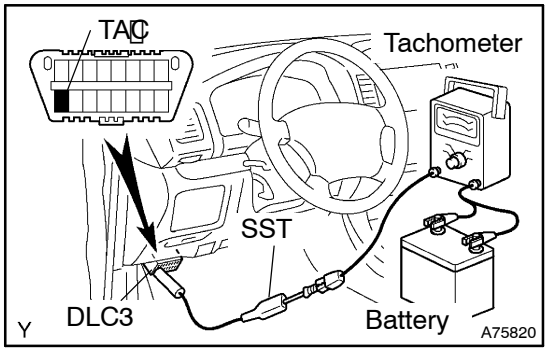
SST 09843–18040



(4) Using the timing light, check the ignition timing.
Ignition timing: 10 ± 2° BTDC at idle
(Transmission in neutral position)
(5) Remove the SST from the DLC3.
(6) Check the ignition timing.
Ignition timing: 7 to 24° BTDC at idle
(Transmission in neutral position)
(7) Disconnect the timing light from the engine.
(8) Install the air cleaner cap sub–assy.

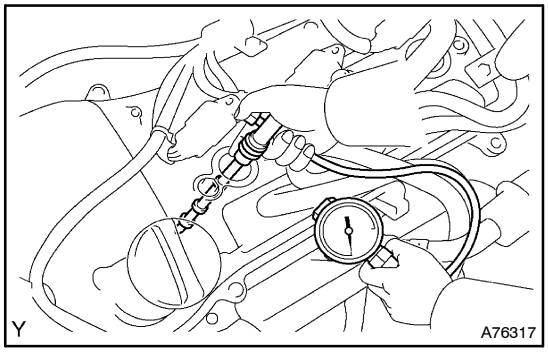


9. INSPECT ENGINE IDLE SPEED
(a) When using hand–held tester.
(1) Connect the hand–held tester to the DLC3.
(2) Please refer to the hand–held tester operator's manual for further details.
(3) Switch the air conditioning OFF.
(4) Race the engine speed at 2,500 rpm for approx. 90 seconds.
(5) Check the idle speed.
Idle speed: 700 ± 50 rpm
(Transmission in neutral position)
If the idle speed is not as specified, check the air intake system.
(6) Disconnect the hand–held tester from the DLC3.



(b) When not using hand–held tester.
(1) Using SST, connect tachometer probe to terminal TAC of the DLC3.
SST 09843–18030
(2) Switch the air conditioning OFF.
(3) Race the engine speed at 2,500 rpm for approx. 90 seconds.
(4) Check the idle speed.
Idle speed: 700 ± 50 rpm
(Transmission in neutral position)
If the idle speed is not as specified, check the air intake system.
(5) Disconnect the tachometer from the DLC3.

10. INSPECT COMPRESSION
(a) Remove the V–bank cover.
(b) Remove the air cleaner assy.
(c) Remove the intake air surge tank (See page 14–58).
(d) Remove the 6 ignition coils.
(e) Remove the 6 spark plugs.
(f) Disconnect the 6 injector connectors.



(g) Inspect the cylinder compression pressure.
(1) Insert a compression gauge into the spark plug hole.
(2) Fully open the throttle by hand.
(3) While cranking the engine, measure the compression pressure.

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

(4) Repeat steps through (1) to (3) for each cylinder.

NOTICE:
This measurement must be done as quickly as possible.
Compression pressure:
1.3 MPa (13.3 kgf/cm^2, 189 psi) or more
Minimum pressure: 1.0 MPa (10.2 kgf/cm^2, 145 psi)
Difference between each cylinder:
0.1 MPa (1.0 kgf/cm^2, 15 psi) or less

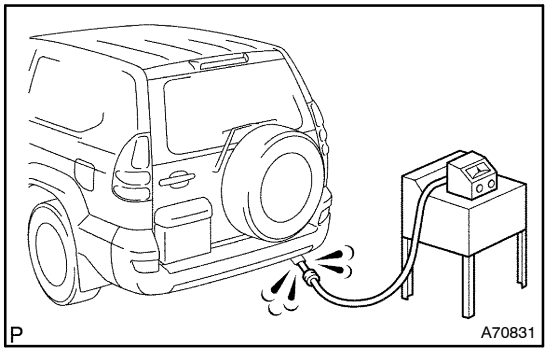
(5) If the cylinder compression in one or more cylinders is low, pour a small amount of engine oil into the cylinder through the spark plug hole and repeat steps through (1) to (3) for cylinders with low compression.
- If adding oil helps the compression, it is likely that the piston rings and/or cylinder 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.

(h) Connect the 6 injector connectors.
(i) Install the 6 spark plugs.
(j) Install the 6 ignition coils.
(k) Install the intake air surge tank (See page 14–58).
(l) Install the air cleaner assy.
(m) Install the V–bank cover.

11. INSPECT CO/HC

HINT:
This check for determining whether or not the idle CO/HC complies with regulations.

(a) Start the engine.
(b) Keep the engine speed 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:

When performing the 2 mode (2,500 rpm and idle) test, follow the measurement order prescribed by the applicable local regulations.

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

(1) Check the A/F sensor and heated oxygen sensor operation (See page 05–182 and 05–81).

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

CO	HC	Symptom	Causes
Normal	High	Rough idle	1. Faulty ignitions: • Incorrect timing • Fouled, shorted or improperly gapped plugs 2. Incorrect valve clearance 3. Leaky intake and exhaust valves 4. Leaky cylinder
Low	High	Rough idle (Fluctuating HC reading)	1. Vacuum leaks: • PCV hose • Intake manifold • Throttle body 2. Lean mixture causing misfire
High	High	Rough idle (Black smoke from exhaust)	1. Restricted air filter 2. Faulty SFI system: • Faulty pressure regulator • Defective ECT sensor • Faulty ECM • Faulty injector • Faulty throttle position sensor • Faulty MAF sensor