ENGINE TUNE-UP (2RZ-E)

INSPECTION OF ENGINE COOLANT
(See steps 1, 2 on page CO-5)

INSPECTION OF ENGINE OIL
(See steps 1, 2 on page LU-5)

INSPECTION OF BATTERY
(See steps 1, 2 on page CH-4)

CLEANING OF AIR FILTER
(See page EM-11)

INSPECTION OF HIGH-TENSION CORDS
(See page IG-8)

INSPECTION OF SPARK PLUGS
(See page IG-9)

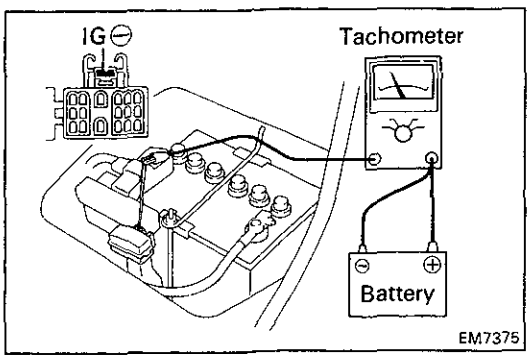
INSPECTION OF ALTERNATOR DRIVE BELT
(See step 3 on pages CH-4, 5)

INSPECTION AND ADJUSTMENT OF VALVE CLEARANCE
(See pages EM-12 to 23)

INSPECTION AND ADJUSTMENT OF IGNITION TIMING

1. **WARM UP ENGINE**

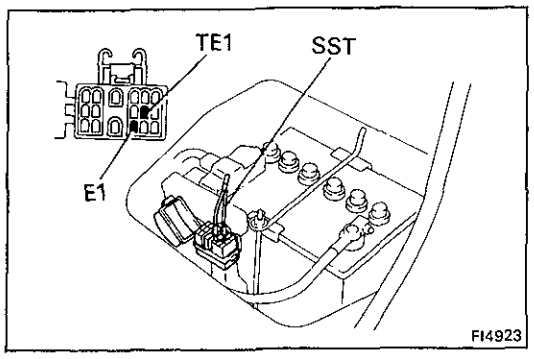
   Allow the engine to reach normal operating temperature.



2. **CONNECT TACHOMETER AND TIMING LIGHT TO ENGINE**

   (See step 2 on page EM-24)

   HINT: The rpm signal can also be taken from the IG⊖ terminal of the check connector.



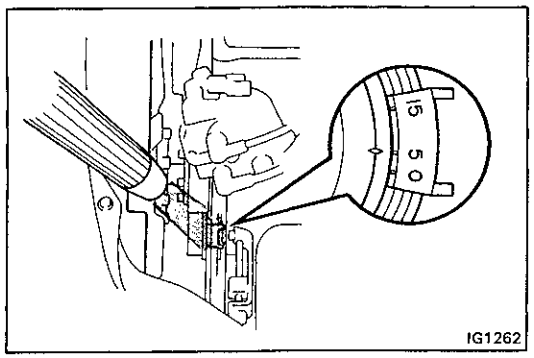
3. **CHECK AND ADJUST IGNITION TIMING**

   (a) Using SST, connect terminals TE1 and E1 of the check connector.

   SST 09843-18020

   (b) Check that the idle speed.

   Idle speed: 800 rpm

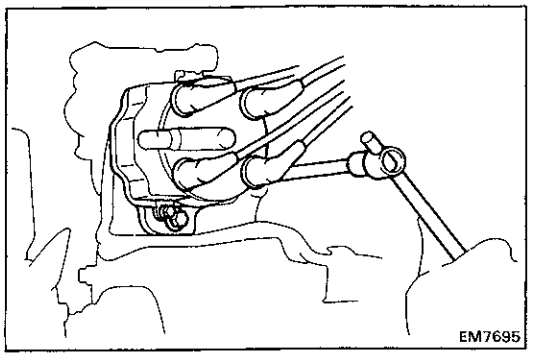


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(c) Remove the service hole cover from the radiator fan shrou

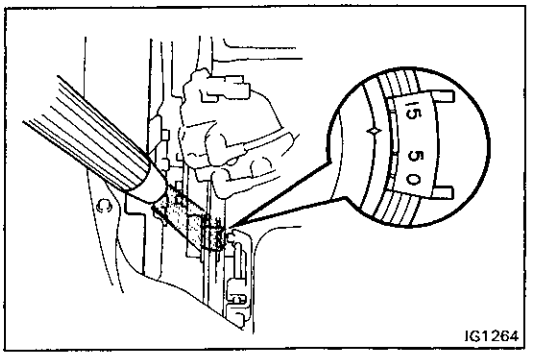
(d) Check the ignition timing.

Ignition timing : 5° BTDC @ Idle


EM7695

If necessary, loosen the distributor bolts and turn the distributor to align the marks. Recheck the timing after tightening the distributor.

Torque: 195 kg-cm (14 ft-lb, 19 N·m)



IG1264

4. FURTHER CHECK IGNITION TIMING

(a) Remove SST.

(b) Check that the ignition timing.

Ignition timing: Approx. 12°BTDC@ Idle

(c) Install the service hole cover.

5. DISCONNECT TACHOMETER AND TIMING LIGHT

INSPECTION AND ADJUSTMENT OF IDLE SPEED

1. INITIAL CONDITIONS

(a) Air cleaner installed.

(b) Normal operating coolant temperature.

(c) All pipes and hoses of air induction system connected.

(d) All accessories switched off.

(e) All vacuum lines connected.

(f) EFI system wiring connectors fully plugged

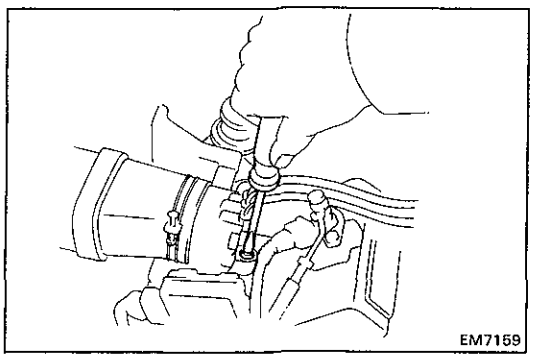
(g) Ignition timing set correctly.

(h) Transmission in neutral.

2. CONNECT TACHOMETER TO ENGINE

3. WARM UP ENGINE

Allow the engine to reach normal operating temperature.



4. CHECK AIR VALVE OPERATION

Check the engine rpm by closing the air valve port on the throttle body.

At low temp.(Coolant temp.: below 80°C(176°F))

When the port is closed, the engine rpm should drop.

After warm-up

When the port is closed, check that the engine rpm does not drop more than 100 rpm.

5. INSPECT AND ADJUST IDLE SPEED

(a) Check the idle speed.

Idle speed: 800 ± 50 rpm

If the idle speed is not as specified, adjust the idle speed by turning the idle speed adjusting screw.

Idle speed: 800 rpm

6. DISCONNECT TACHOMETER TO ENGINE

IDLE HC/CO CONCENTRATION CHECK METHOD

HINT: This check method is used only to determine whether or not the idle HC/CO complies with regulations.

1. INITIAL CONDITIONS

(a) Air cleaner installed.

(b) Normal operating coolant temperature.

(c) All pipes and hoses of air induction system connected

(d) All accessories switched off.

(e) All vacuum lines connected.

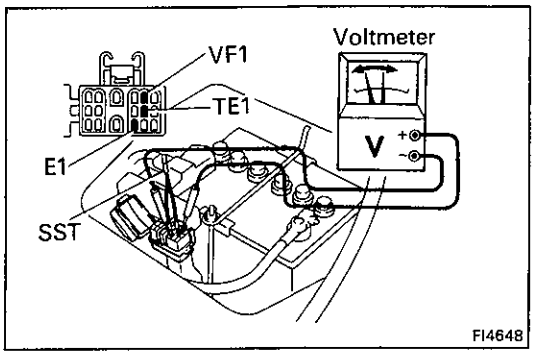
HINT: All vacuum hoses for EGR system, etc. should be properly connected.

(f) EFI system wiring connectors fully plugged.

(g) Ignition timing set correctly.

(h) Transmission in neutral.

(i) Tachometer and HC/CO meter calibrated and at hand.



2. CHECK VF1 VOLTAGE

(a) Using SST, connect terminals TE1 and E1 of the check connector.

SST 09843-18020

(b) Connect the voltmeter to the check connector.

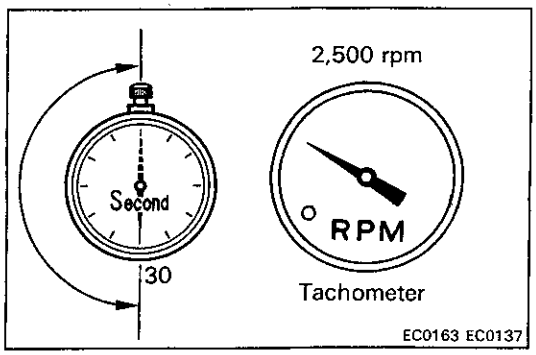
Connect the positive (+) testing probe to the VF1 terminal and negative (–) testing probe to the E1 terminal.

(c) Race the engine at 2,500 rpm for approx. 120 seconds.

(d) Maintain engine speed at 2,500 rpm.

(e) Check that the needle of the voltmeter fluctuates 8 times or more in 10 seconds within 0 – 7 volts.

If the VF1 voltage is not as specified, check the air induction system. If necessary, see EFI SYSTEM.

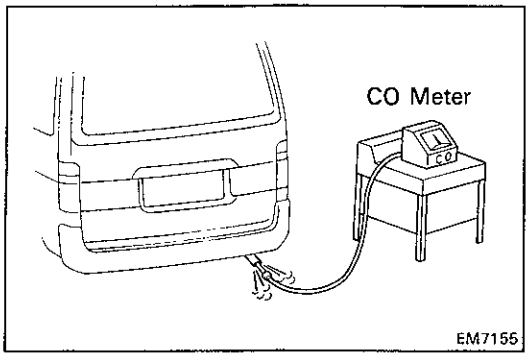


3. MEASURE CO CONCENTRATION

(a) Make sure the CO meter is properly calibrated.

(b) Race the engine for three minutes at approx. 2,500 rpm before measuring concentration.

(c) Wait 1 – 3 minutes after racing the engine to allow the concentration to stabilize.



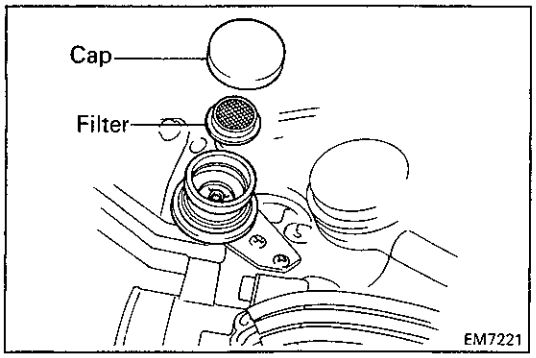
(d) Insert a testing probe at least 40 cm (1.3 ft) into the tailpipe, and measure the concentration with a short time.

Idle CO concentration: 0 – 0.5 %

If the CO concentration does not conform to regulations, see the table below for possible causes.

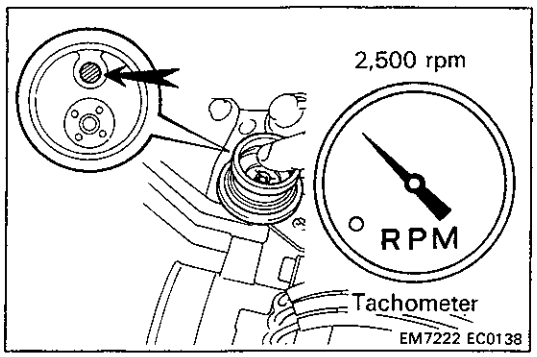
TROUBLESHOOTING

HC	CO	Problems	Causes
High	Normal	Rough idle	1. Faulty ignition: ● Incorrect timing ● Fouled, shorted or improperly gapped plugs ● Open or crossed high-tension cords ● Cracked distributor cap 2. Incorrect valve clearance 3. Leaky EGR valve 4. Leaky exhaust valves 5. Leaky cylinder
High	Low	Rough idle (Fluctuating HC reading)	1. Vacuum leak: ● Vacuum hose ● EGR valve ● Intake manifold ● PCV line ● Throttle body 2. Lean mixture causing misfire
High	High	Rough idle (Black smoke from exhaust)	1. Restricted air filter 2. Plugged PCV valve 3. Faulty EFI system: ● Faulty pressure regulator ● Clogged fuel return line ● Faulty vacuum sensor ● Defective water temp. sensor ● Defective air temp. sensor ● Faulty ECU ● Faulty injector ● Faulty cold start injector ● Faulty throttle position sensor

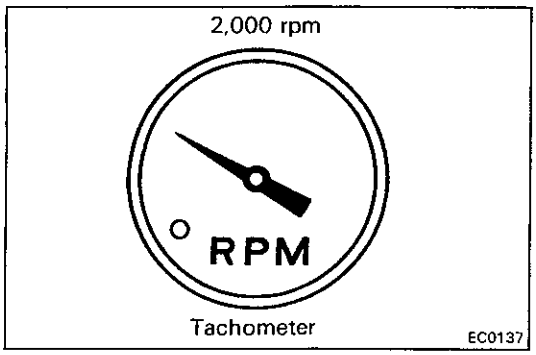


ADJUSTMENT OF DASH POT(DP)

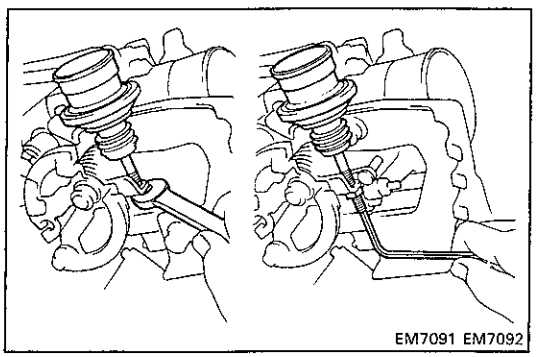
1. **WARM UP AND STOP ENGINE**
2. **CONNECT TACHOMETER TO ENGINE**
   (See step 2 on page EM-31)
3. **START ENGINE**
4. **INSPECT AND ADJUST IDLE SPEED**
   (See page EM-33)



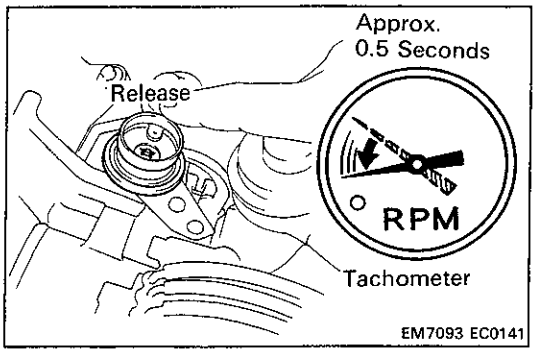
5. **ADJUST DASH POT (DP) SETTING SPEED**
   (a) Remove the cap and filter from the DP.
   (b) Race the engine at 2,500 rpm for a few seconds.
   (c) Plug the VTV hole.



   (d) Release the throttle valve.
   (e) Check the DP setting speed.
   DP setting speed: 2,000 rpm



   If not at specified speed, adjust with the DP adjusting screw.
   (f) Reinstall the DP filter and cap.



6. **CHECK VTV OPERATION**
   Race the engine at 2,500 rpm for a few seconds, release the throttle valve and check that the engine returns to idle in approx. 0.5 seconds.