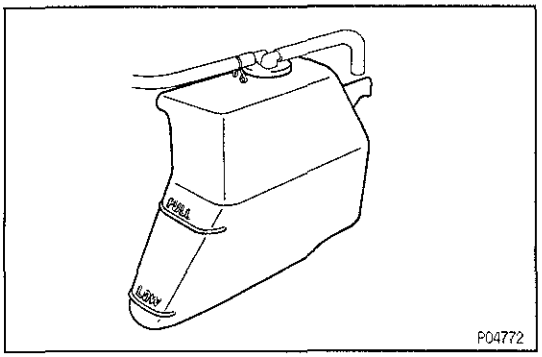


TUNE–UP

ENGINE COOLANT INSPECTION

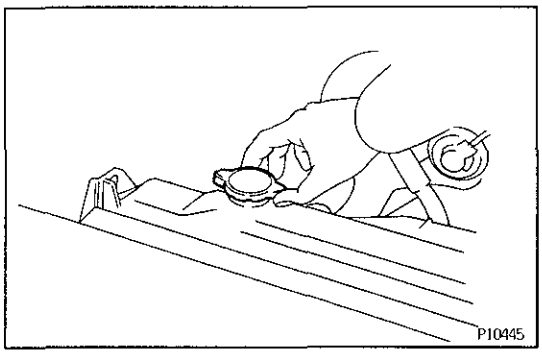
EG1JN–01

1. CHECK ENGINE COOLANT LEVEL AT RESERVOIR TANK

The coolant level should be between the "LOW" and "FULL" lines at low temperature.

If low, check for leaks and add coolant up to the "FULL" line.

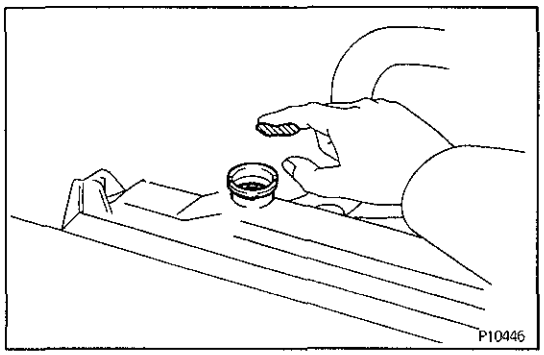
EG



2. CHECK ENGINE COOLANT QUALITY

(a) Remove the radiator cap.

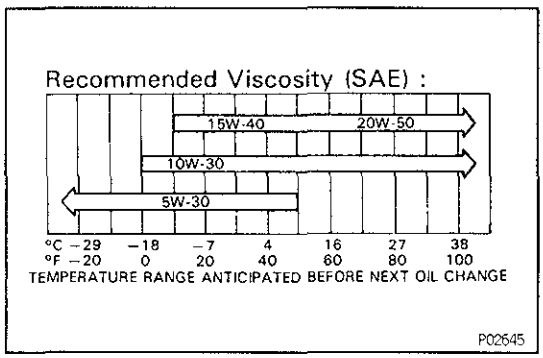
CAUTION: To avoid the danger of being burned, do not remove it while the engine and radiator are still hot, as fluid and steam can be blown out under pressure.



(b) There should not be any excessive deposits of rust or scales around the radiator cap or radiator filler hole, and the coolant should be free from oil.

If excessively dirty, replace the coolant.

(c) Reinstall the radiator cap.



ENGINE OIL INSPECTION

EG084–0A

1. CHECK OIL QUALITY

Check the oil for deterioration, entry of water, discoloring or thinning.

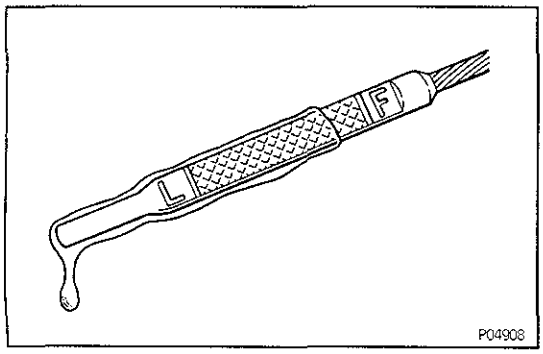
If oil quality is poor, replace it.

Oil grade:

API grade SG or better

If it is impossible to get SG or better you may use SF grade

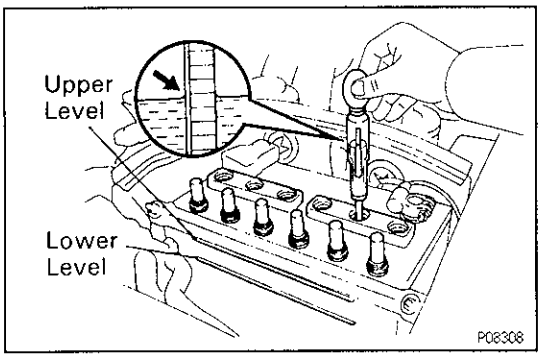
Recommended viscosity: Refer to illustration



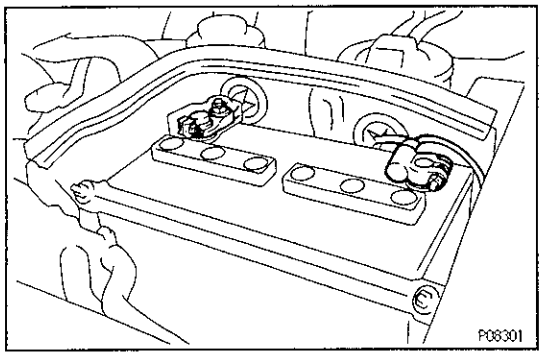
2. CHECK ENGINE OIL LEVEL

The oil level should be between the "L" and "F" marks on the dipstick.

If low, check for leakage and add oil up to the "F" mark.



EG



EG0V1-04

BATTERY INSPECTION

1. CHECK BATTERY SPECIFIC GRAVITY AND ELECTROLYTE LEVEL

(a) Check the electrolyte quantity of each cell.
If insufficient, refill with distilled (or purified) water.

(b) Check the specific gravity of each cell.
Standard specific gravity at 20°C (68°F):
1.27 – 1.28 105D31L
1.25 – 1.27 others
If not within specifications, charge the battery.

2. CHECK BATTERY TERMINALS, FUSIBLE LINKS AND FUSES

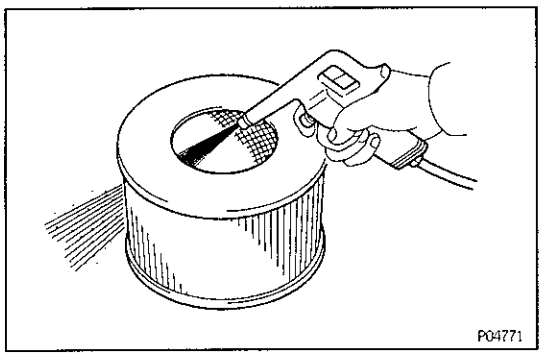
(a) Check that the battery terminals are not loose or corroded.

(b) Check the fusible links and fuses for continuity.

EG27D-01

AIR FILTER INSPECTION AND CLEANING

1. REMOVE AIR FILTER
Remove the air cleaner cap and air filter.

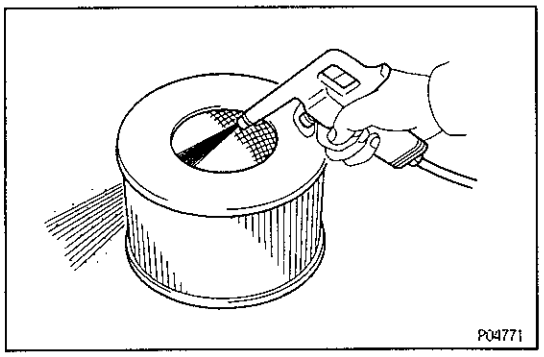


2. INSPECT AND CLEAN AIR FILTER

A. (Paper type)

(a) Visually check that the air filter is not excessively damaged or oily.
If necessary, replace the air filter.

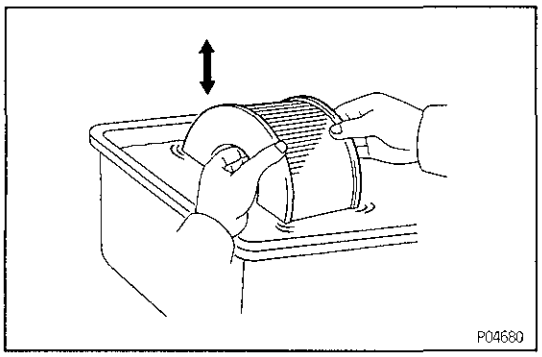
(b) Clean the air filter with compressed air.
First blow from the inside thoroughly, then blow off the outside of the air filter.



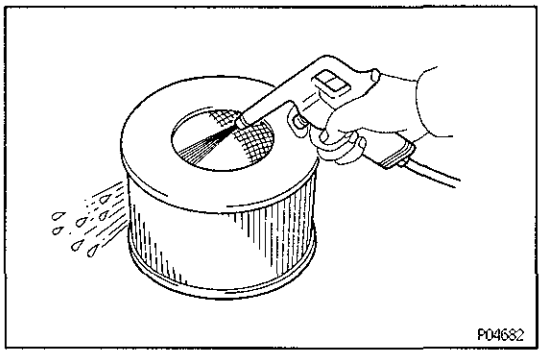
B. (Fabric type)

(a) Visually check that the element is not excessively dirty damaged or oily.

(b) Blow dirt off in the element with compressed air from the inside.

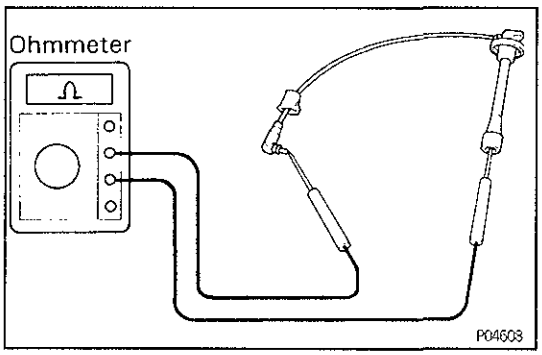


(c) Submerge the element in the water and agitate it up and down ten or more times.
(d) Repeat rinsing in clean water until rise water is clear.



(e) Remove excess water by shaking the element or blowing with compressed air.
NOTICE: Do not beat or drop filter element.
(f) Wipe off dust on the air cleaner case interior.

3. REINSTALL AIR FILTER



HIGH–TENSION CORDS INSPECTION

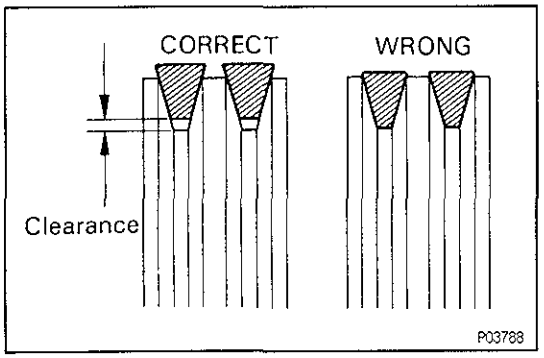
EG0B7-02

(See IG section)
Maximum resistance:
25 kΩ per cord

SPARK PLUGS INSPECTION

EG0NE-04

(See IG section)
Recommended spark plug:
ND K16R–U
NGK BKR5EYA
Correct electrode gap:
0.8 mm (0.031 in.)



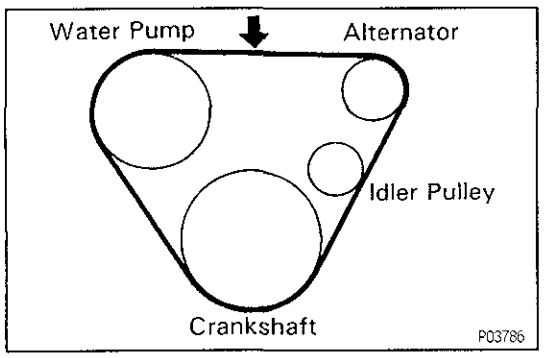
EG

ALTERNATOR DRIVE BELT INSPECTION EG27E–01

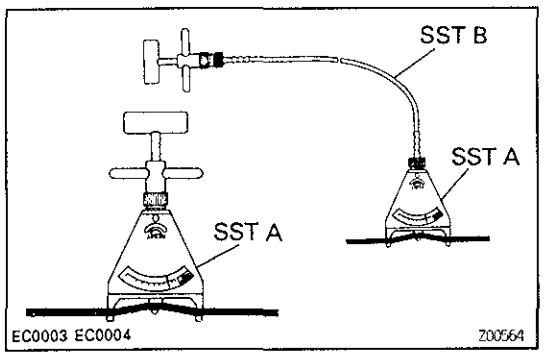
(See CH section)

INSPECT DRIVE BELTS

(a) Visually check the drive belt for cracks, oiliness or wear. Check that the belt does not touch the bottom of the pulley groove.
If necessary, replace the drive belts as a set.

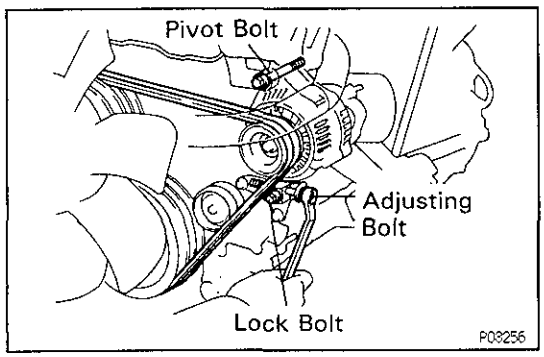


Drive belt deflection (w/ 98N (10kgf, 22lbf))
New belt
11 – 15 mm (0.43 – 0.59 in.)
Used belt
15 – 20 mm (0.59 – 0.79 in.)



(b) (Reference)
Using SST, measure the belt tension.
SST 95506 – 00020
Drive belt tension(w/ SST):
New belt
33 – 57 kgf
Used belt
15 – 35 kgf
If the belt tension is not as specified, adjust it.
HINT:

- "New belt" refers to a belt which has been used less than 5 minutes on a running engine.
- "Used belt" refers to a belt which has been used on a running engine for 5 minutes or more.
- After installing a new belt, run the engine for about 5 miutes and recheck the belt tension.

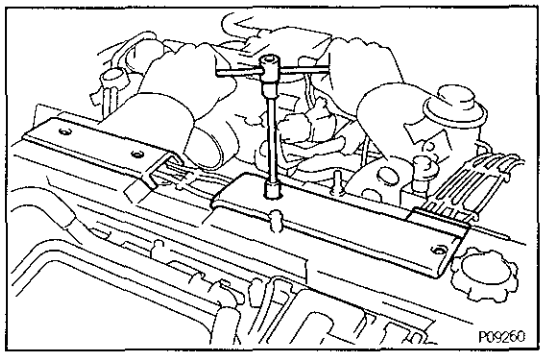


VALVE CLEARANCE INSPECTION AND ADJUSTMENT

EG27F–01

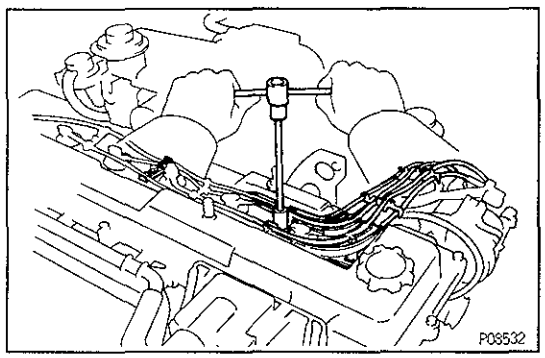
HINT: Inspect and adjust the valve clearance when the engine is cold.

EG



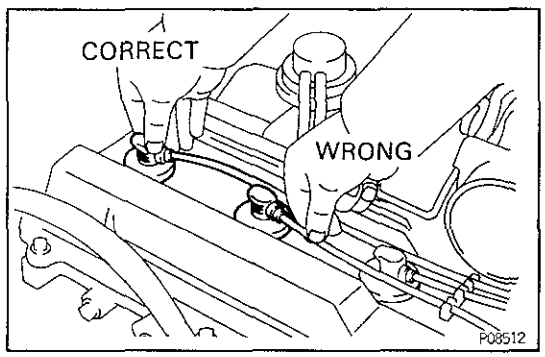
1. REMOVE NO.2 AND NO.3 CYLINDER HEAD COVERS

Remove the four bolts and head covers.



2. DISCONNECT HIGH–TENSION CORDS FROM SPARK PLUGS

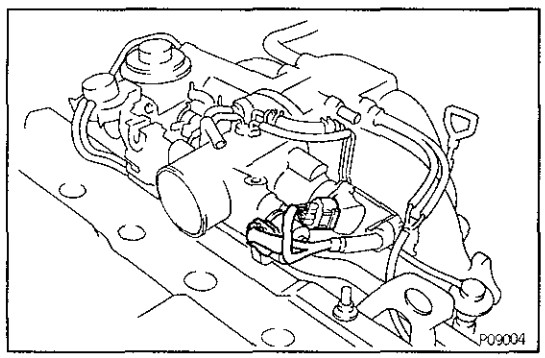
(a) Remove the two mounting bolts of the No.1 and No.2 cord clamps.



(b) Disconnect the high – tension cords at the rubber boot.

Do Not pull on the cords.

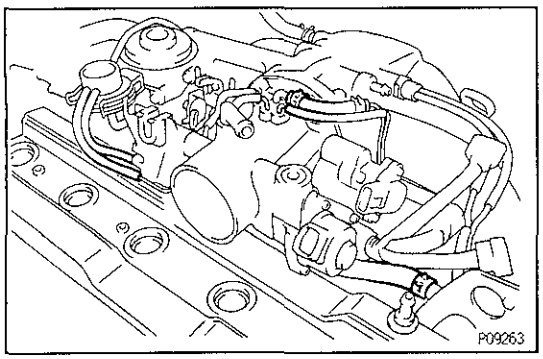
NOTICE: Pulling on or bending the cords may damage the conductor inside.



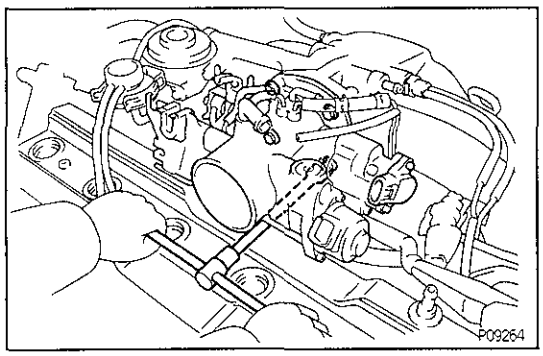
3. (1FZ–FE) REMOVE THROTTLE BODY

(a) Disconnect the throttle position sensor connector.

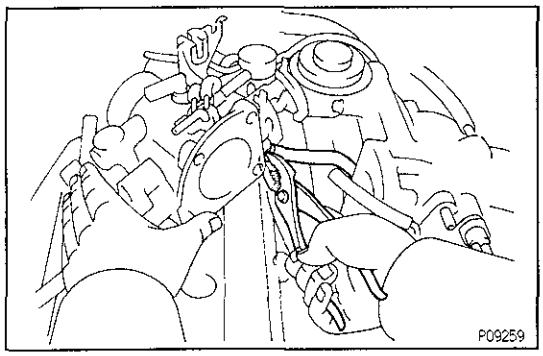
(b) Disconnect the ISC valve connector.



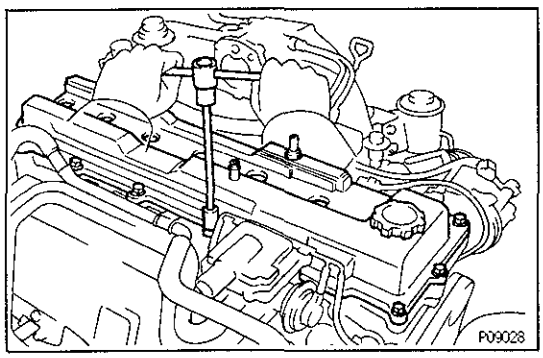
(c) Disconnect the three vacuum hoses.
(d) Disconnect the EVAP hose.
(e) Disconnect the water hose from the No.2 water by–pass pipe.



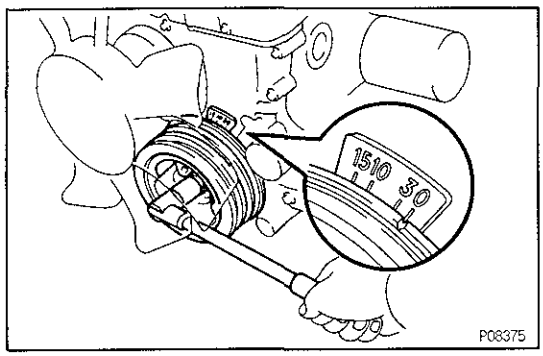
(f) Remove the four bolts, and disconnect the throttle body from the air intake chamber.
(g) Remove the throttle body gasket.



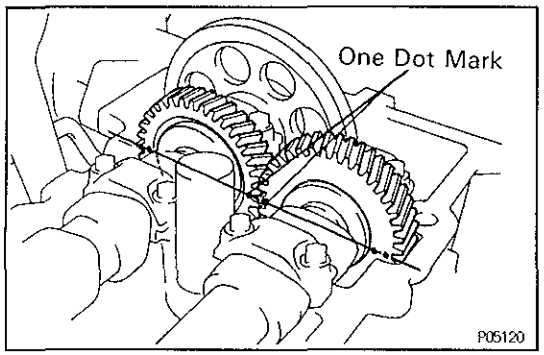
(h) *Disconnect the No.1 water by–pass hose from the* throttle body, and remove the throttle body.



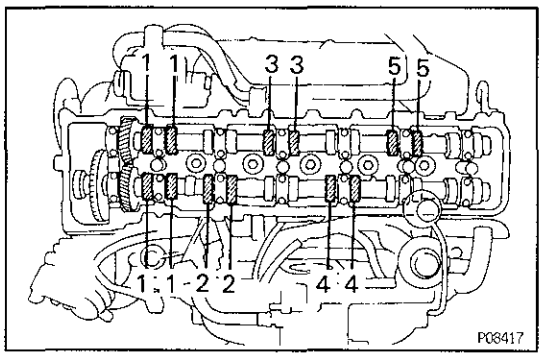
4. REMOVE CYLINDER HEAD COVER
Remove the 13 bolts, cylinder head cover and gasket.



5. SET NO.1 CYLINDER TO TDC/COMPRESSION
(a) Turn the crankshaft pulley, and align its groove with the timing mark "0" of the timing chain cover.



(b) Check that the timing marks (one and two dots) of the camshaft drive and driven gears are in straight line on the cylinder head surface as shown in the illustration. If not, turn the crankshaft one revolution (360°) and align the marks as above.



6. INSPECT VALVE CLEARANCE

(a) Check only the valves indicated.

- Using a thickness gauge, measure the clearance between the valve lifter and camshaft.
- Record the out — of — specification valve clearance measurements. They will be used later to determine the required replacement adjusting shim.

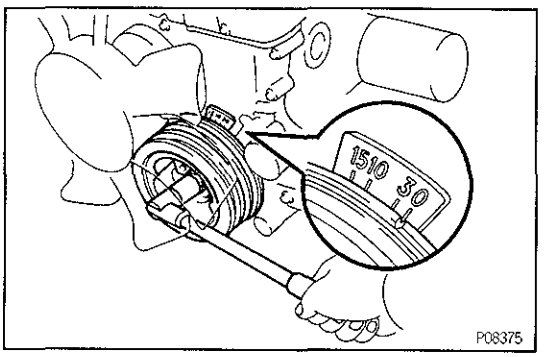
Valve clearance (Cold):

Intake

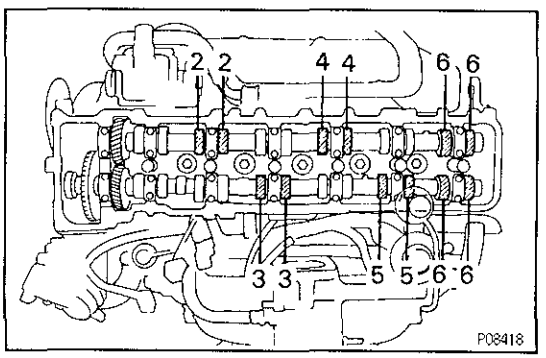
0.15 — 0.25 mm (0.006 — 0.010 in.)

Exhaust

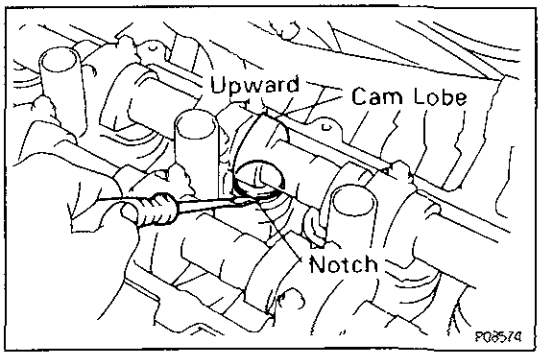
0.25 — 0.35 mm (0.010 — 0.014 in.)



(b) Turn the crankshaft pulley one revolution (360°) and align the its groove with timing mark "0" of the timing chain cover.



(c) Check only the valves indicated as shown. Measure the valve clearance. (See procedure in step (a))



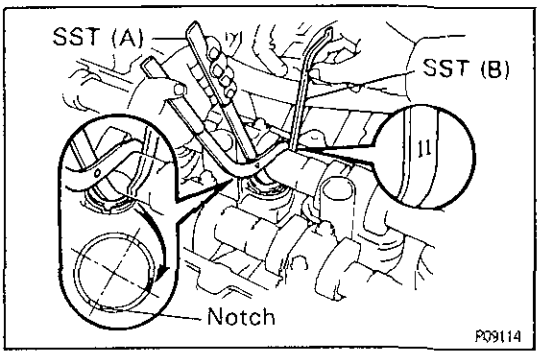
EG

7. ADJUST VALVE CLEARANCE

A. except for Rear valves of No.6 cylinder

(a) Remove the adjusting shim.

- Turn the crankshaft to position the cam lobe of the camshaft on the the adjusting valve upward.
- Position the notch of the valve lifter toward the spark plug side.

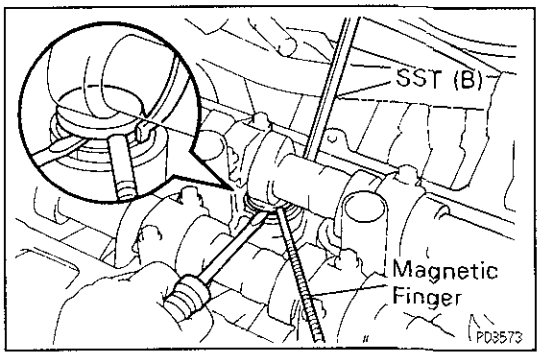


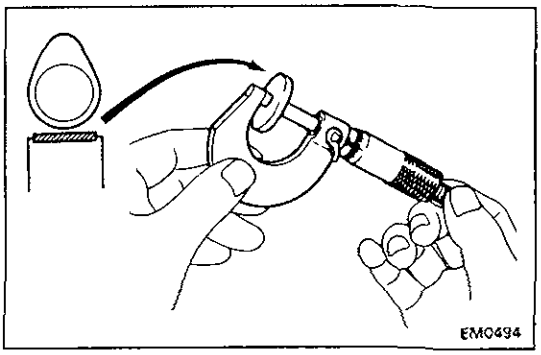
- Using SST (A), press down the valve lifter and place SST (B) between the camshaft and valve lifter flange. Remove SST (A).

SST 09248−66011 (09248−05310, 09248−06020)

HINT:

- Apply SST (B) at slight angle on the side marked with "11", at the position shown in the illustration.
- When SST (B) is inserted too deeply, it will get pinched by the shim. To prevent it from being stuck, insert it shallowly from the outside of the cylinder head, at a slight angle.
- Remove the adjusting shim with a small screwdriver and magnetic finger.





(b) Determine the replacement adjusting shim size by following the Formula or Charts:

- Using a micrometer, measure the thickness of the removed shim.
- Calculate the thickness of a new shim so that the valve cllearance comes within specified value.

T ..... Thickness of removed shim
A ..... Measured valve clearance
N ..... Thickness of new shim

Intake:

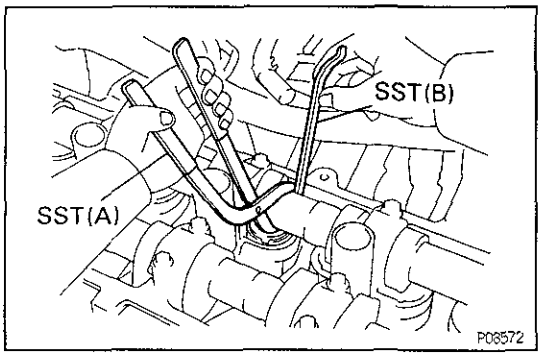
N=T + (A − 0.20 mm (0.008 in.))

Exhaust:

N=T + (A − 0.30 mm (0.012 in.))

- Select a new shim with a thickness as close as possible to the calculated value.

HINT: *Shims are available in 17 sized in increments* of 0.05 mm (0.0020 in.), from 2.50 mm (0.0984 in.) to 3.30 mm (0.1299 in.).

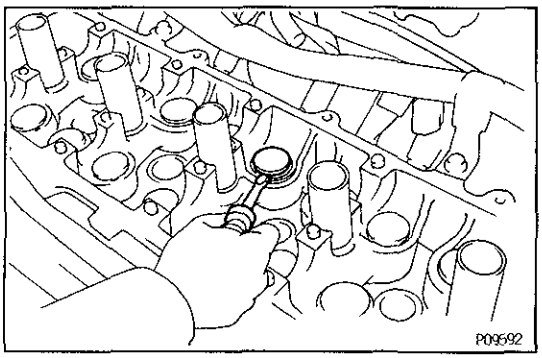


(c) Install a new adjusting shim.
- Place a new adjusting shim on the valve lifter.
- Using SST (A), press down the valve lifter and remove SST (B).

SST 09248–66011 (09248–05310, 09248–06020)

(d) Recheck the valve clearance.

EG

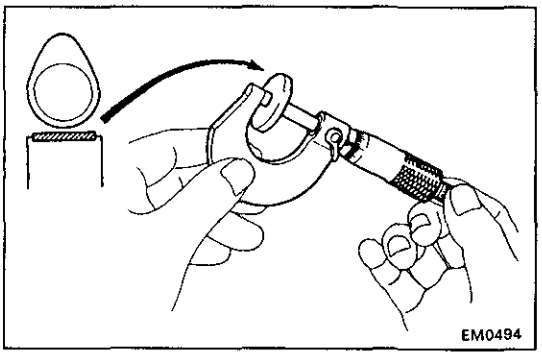


B. Rear valves of No.6 cylinder

(a) Remove the distributor.
(See IG section)

(b) Remove the camshafts.
(See step 39 on pages EG–49 to 51)

(c) Remove the adjusting shim with a small screwdriver.



(d) Determine the replacement adjusting shim size by following the Formula or Charts:
- Using a micrometer, measure the thickness of the removed shim.
- Calculate the thickness of a new shim so that the valve cllearance comes within specified value.

T ..... Thickness of removed shim
A ..... Measured valve clearance
N ..... Thickness of new shim

Intake:

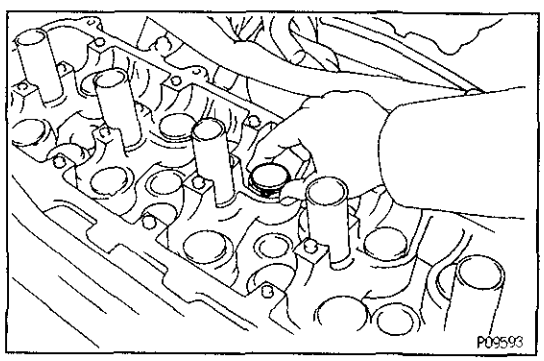
N=T + (A – 0.20 mm (0.008 in.))

Exhaust:

N=T + (A – 0.30 mm (0.012 in.))

- Select a new shim with a thickness as close as possible to the calculated value.

HINT: Shims are available in 17 sized in increments of 0.05 mm (0.0020 in.), from 2.50 mm (0.0984 in.) to 3.30 mm (0.1299 in.).



(e) Place a new adjusting shim on the valve lifters.

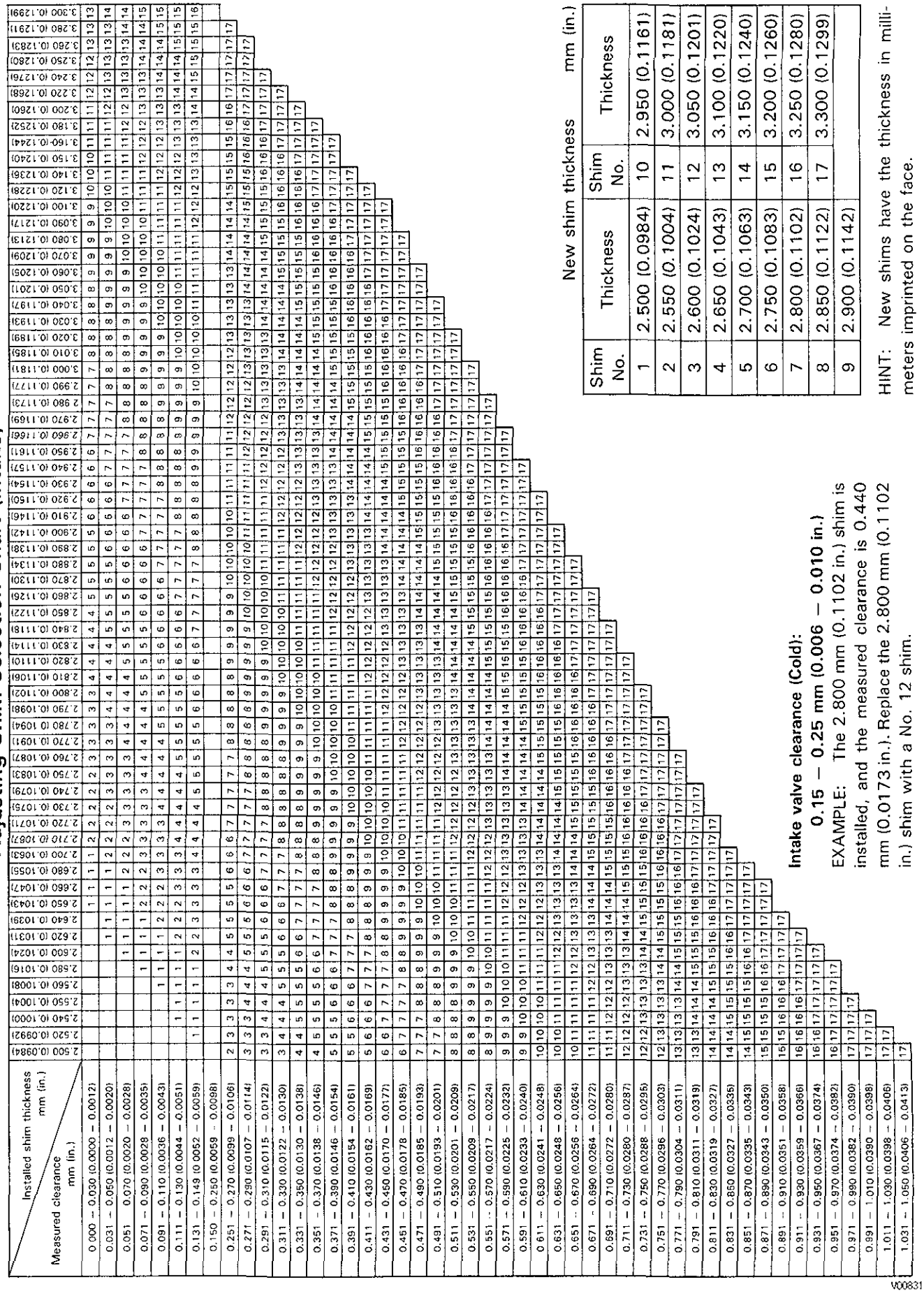
(f) Install the camshafts.
(See step 7 on pages EG–73 to 76)

(g) Recheck the valve clearance.

(h) Install the distributor.
(See IG section)

EG

Adjusting Shim Selection Chart (Intake)



Intake valve clearance (Cold):
0.15 — 0.25 mm (0.006 — 0.010 in.)

EXAMPLE: The 2.800 mm (0.1102 in.) shim is installed, and the measured clearance is 0.440 mm (0.0173 in.). Replace the 2.800 mm (0.1102 in.) shim with a No. 12 shim.

New shim thickness mm (in.)

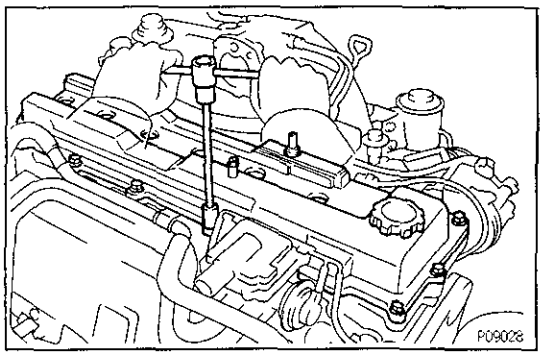
Shim No.	Thickness	Shim No.	Thickness
1	2.500 (0.0984)	10	2.950 (0.1161)
2	2.550 (0.1004)	11	3.000 (0.1181)
3	2.600 (0.1024)	12	3.050 (0.1201)
4	2.650 (0.1043)	13	3.100 (0.1220)
5	2.700 (0.1063)	14	3.150 (0.1240)
6	2.750 (0.1083)	15	3.200 (0.1260)
7	2.800 (0.1102)	16	3.250 (0.1280)
8	2.850 (0.1122)	17	3.300 (0.1299)
9	2.900 (0.1142)		

HINT: New shims have the thickness in millimeters imprinted on the face.

V00831

Adjusting Shim Selection Chart (Exhaust)

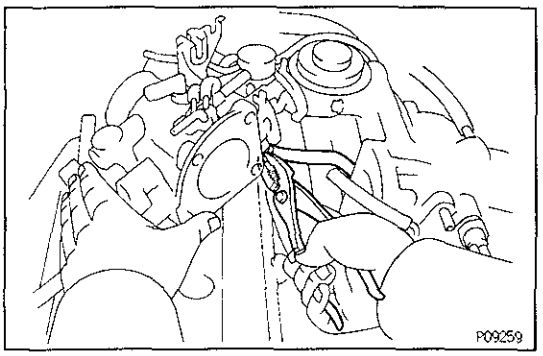
| Measured clearance mm (in.) \ Installed shim thickness mm (in.) | 2.500 (0.0984) | 2.520 (0.0992) | 2.540 (0.1000) | 2.550 (0.1004) | 2.580 (0.1016) | 2.600 (0.1024) | 2.620 (0.1031) | 2.640 (0.1039) | 2.650 (0.1043) | 2.660 (0.1047) | 2.680 (0.1055) | 2.700 (0.1063) | 2.710 (0.1067) | 2.720 (0.1071) | 2.730 (0.1075) | 2.740 (0.1079) | 2.750 (0.1083) | 2.760 (0.1087) | 2.770 (0.1091) | 2.780 (0.1094) | 2.790 (0.1098) | 2.800 (0.1102) | 2.810 (0.1106) | 2.820 (0.1110) | 2.830 (0.1114) | 2.840 (0.1118) | 2.850 (0.1122) | 2.860 (0.1126) | 2.870 (0.1130) | 2.880 (0.1134) | 2.890 (0.1138) | 2.900 (0.1142) | 2.910 (0.1146) | 2.920 (0.1150) | 2.930 (0.1154) | 2.940 (0.1157) | 2.950 (0.1161) | 2.960 (0.1166) | 2.970 (0.1169) | 2.980 (0.1173) | 2.990 (0.1177) | 3.000 (0.1181) | 3.010 (0.1185) | 3.020 (0.1189) | 3.030 (0.1193) | 3.040 (0.1197) | 3.050 (0.1201) | 3.060 (0.1205) | 3.070 (0.1209) | 3.080 (0.1213) | 3.090 (0.1217) | 3.100 (0.1220) | 3.120 (0.1228) | 3.140 (0.1236) | 3.150 (0.1240) | 3.160 (0.1244) | 3.180 (0.1252) | 3.200 (0.1260) | 3.220 (0.1268) | 3.240 (0.1276) | 3.250 (0.1280) | 3.260 (0.1283) | 3.280 (0.1291) | 3.300 (0.1299) |
|---|---|---



8. REINSTALL CYLINDER HEAD COVER

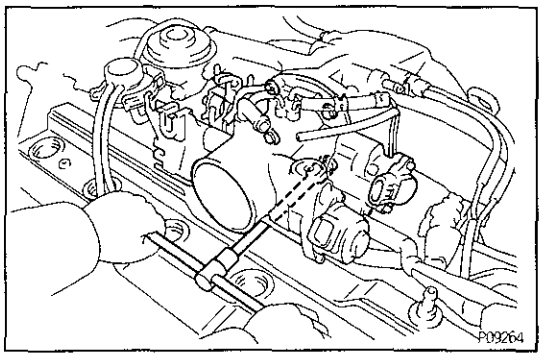
(a) Install the gasket to the cylinder head cover.

(b) Install the cylinder head cover with the 13 bolts.

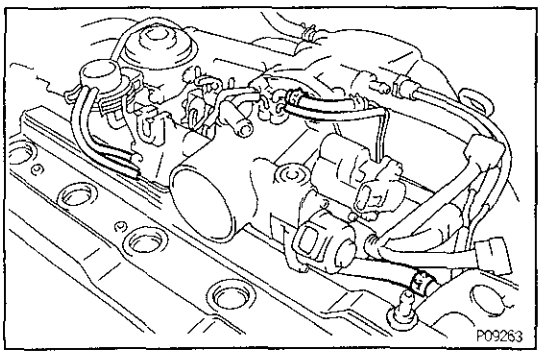


9. (1FZ–FE)
INSTALL THROTTLE BODY

(a) Connect the No.1 water by–pass hose to the throttle body.



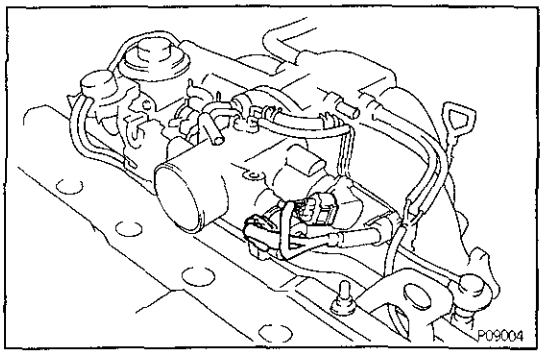
(b) Install a new gasket and throttle body with the four bolts.
***Torque*: 21 N·m (210 kgf·cm, 15 ft·lbf)**



(c) Connect the water hose to the No.2 water by–pass pipe.

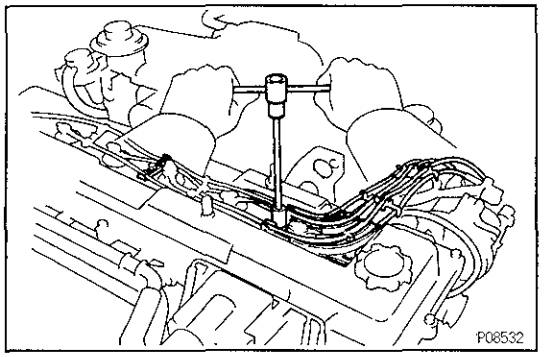
(d) Connect the EVAP hose.

(e) Connect the three vacuum hoses.



(f) Connect the ISC valve connector.

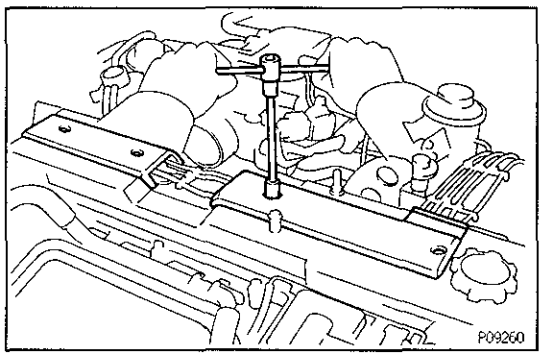
(g) Connect the throttle position sensor connector.



10. RECONNECT HIGH–TENSION CORDS TO SPARK PLUGS

(a) Connect the high–tension cords.

(b) Install the No.1 and No.2 cord clamps with the two bolts.



11. REINSTALL NO.2 AND NO.3 CYLINDER HEAD COVERS

Install the head covers with the four bolts.

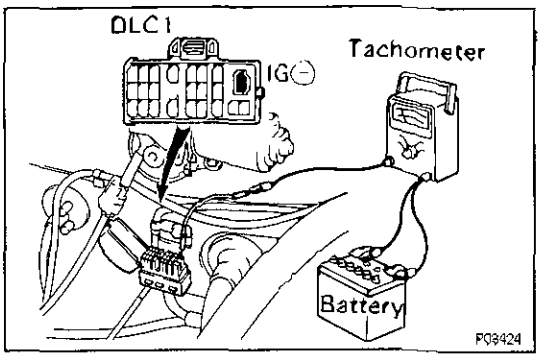
EG27G-01

IGNITION TIMING INSPECTION AND ADJUSTMENT

1. WARM UP ENGINE

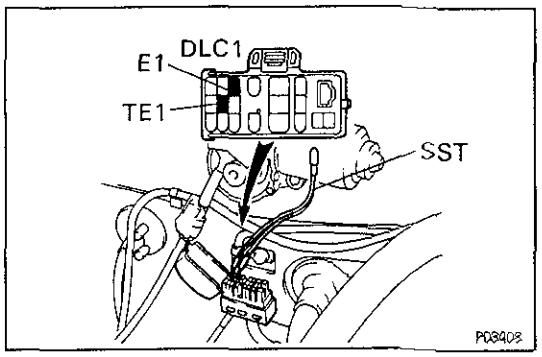
Allow the engine to warm up to normal operating temperature.

2. CONNECT TACHOMETER AND TIMING LIGHT



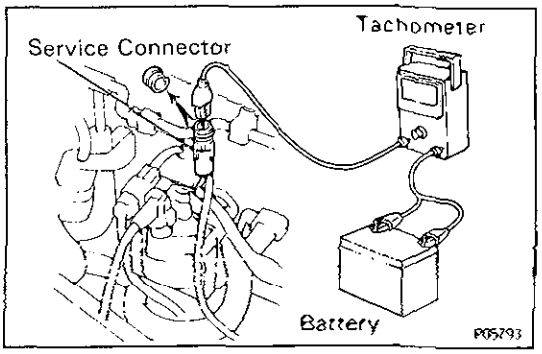
A. (1FZ–FE)

Connect the test probe of a tachometer to terminal IG ⊖ of the check connector.



Using SST,connect terminals TE1 and E1 of the check *connector*

SST 09843–18020

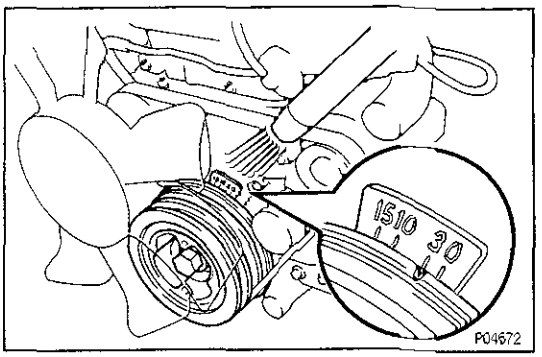


B. (1FZ–F)

Remove the cap and connect the test probe of a tester to the service connector from the igniter.

NOTICE:

- **NEVER allow the tachometer terminal to touch ground as it could result in damage to the igniter and/or ignition coil.**
- **As some tachometers are not compatible with this ignition system, we recommend that you confirm the compatibility of your unit before use.**



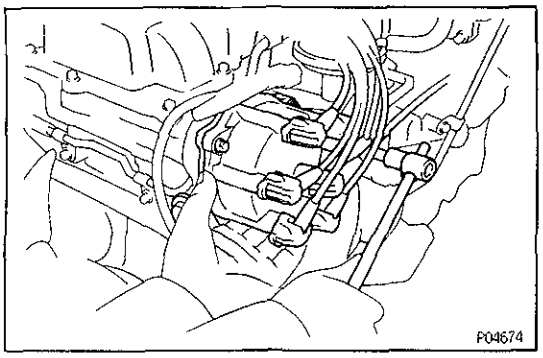
3. INSPECT AND ADJUST IGNITION TIMING

With the engine idling as specified, use a *timing light* to check the timing.

Ignition timing:

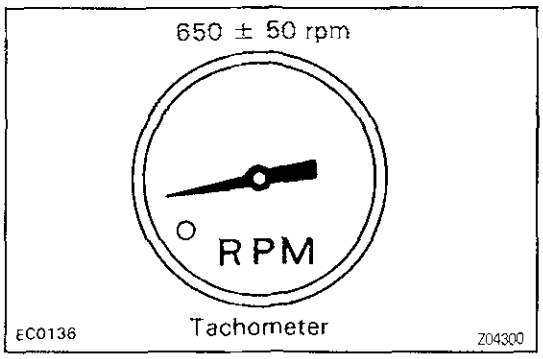
3° BTDC @ idle

(w/ Terminals TE1 and E1 connected for 1FZ–FE)



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

Torque: 21 N·m (210 kgf·cm, 15 ft·lbf)



EG1JY–03

(1FZ–FE)
IDLE SPEED INSPECTION

HINT: Initial conditions (See step 1 on page EG–33)

Idle speed:

650 ± 50 rpm

EG0V5–02

(1FZ–F)
IDLE SPEED INSPECTION AND ADJUSTMENT

1. **WARM UP ENGINE**

   Allow the engine to warm up to normal operating temperature.

2. **CONNECT TACHOMETER**

3. **INSPECT IDLE SPEED**

   Idle speed:

   600 ± 50 rpm

   If not as specified, adjust according to the following procedure:

   CAUTION:

   - **Always use a CO meter when adjusting the idle mixture. It is not necessary to adjust with the idle mixture adjusting screw in most vehicles if they are in good condition.**
   - **If a CO meter is not available and it is absolutely necessary to adjust with the idle mixture adjusting screw, use the alternative method (See page EG–29).**

EG0V6–02

A. METHOD WITH CO METER

1. VISUALLY INSPECT CARBURETOR

(a) Check for loose screws or a loose mounting to the manifold.

(b) Check for wear in the linkage, missing snap rings or excessive looseness in the throttle shaft. Correct any problems found.

EG

2. INITIAL CONDITIONS

(a) Air cleaner installed

(b) Normal operating coolant temperature

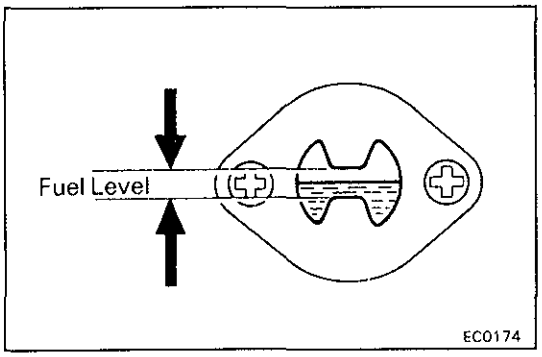
(c) Choke fully open

(d) All accessories switched off

(e) All vacuum lines connected

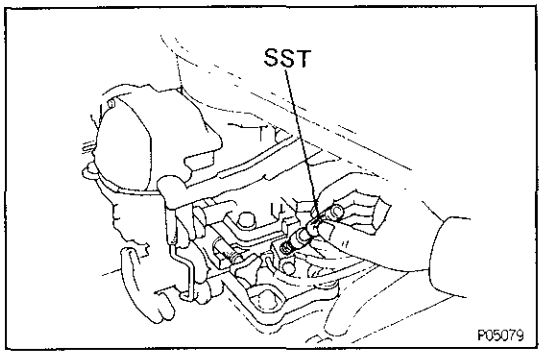
(f) Ignition timing set correctly

(g) Transmission in the "N" range



(h) *Fuel level should be about even with the correct level* in the sight glass

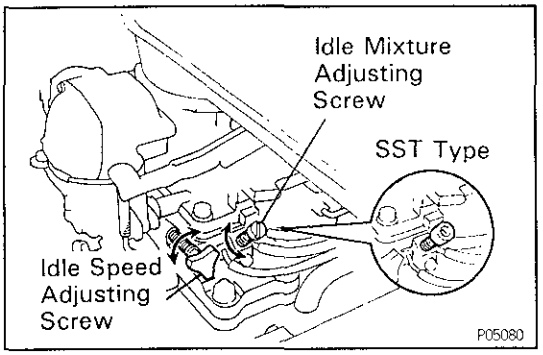
(i) CO meter operates normally



3. ADJUST IDLE SPEED AND IDLE MIXTURE

HINT: Use SST if necessary.

SST 09243–00020

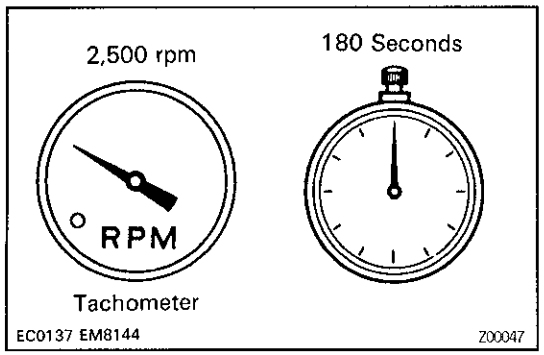


(a) Start the engine.

(b) Using a CO meter to measure the CO concentration in the exhaust, turn the idle speed and idle mixture adjusting screws to obtain the specified concentration value at idle speed.

Idle speed:

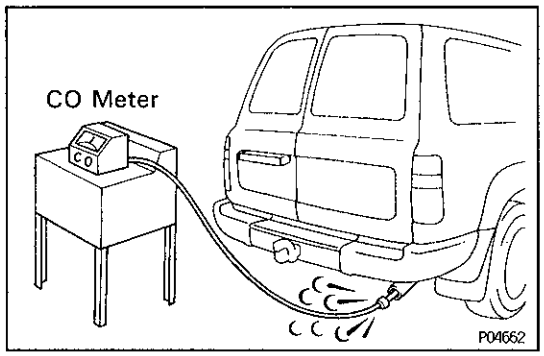
600 rpm



4. INSPECT CO CONCENTRATION

(a) Check that the CO meter is properly calibrated.

(b) Race the engine at 2,500 rpm for approx. 180 seconds before measuring concentration.



(c) Insert co Meter testing probe at least 40 cm (1.3 ft) into the tailpipe, during idling. Immediately check the co concentration at Idle.

Idle CO concentration:

1.5 ± 0.5 %

- If the CO concentration is within specification this adjustment is complete.
- If the CO concentration is not within specification, turn the idle mixture adjusting screw to obtain the specified concentration value.
- If the CO concentration cannot be corrected by adjusting the idle mixture, see table below for other possible causes.

TROUBLESHOOTING

CO	HC	Problems	Causes
Normal	High	Rough idle	1. Faulty ignition: • Incorrect timing • Fouled, shorted or improperly gapped plugs • Open or crossed ignition wires • Cracked distributor cap 2. Leaky exhaust valves 3. Leaky cylinder
Low	High	Rough idle (Fluctuating HC reading)	1. Vacuum leak: • Vacuum hose • Intake manifold • PCV line • Carburetor base
High	High	Rough idle (Black smoke from exhaust)	1. Restricted air filter 2. Plugged PCV valve 3. Faulty carburetion: • Faulty choke action • Incorrect float setting • Leaking needle or seat • Leaking power valve

V00833

EG0V7-01

B. ALTERNATIVE METHOD

To be used only if CO meter is not available.

1. VISUALLY INSPECT CARBURETOR

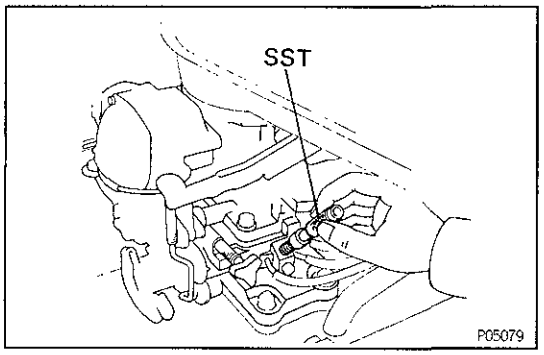
(a) Check for loose screws or loose a mounting to the manifold.

(b) Check for wear in the linkage, missing snap rings or excessive looseness in the throttle shaft. Correct any problems found.

EG

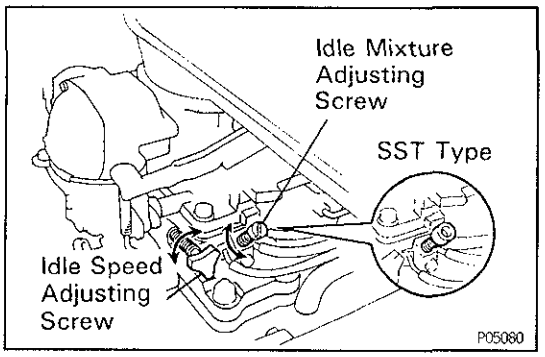
2. INITIAL CONDITIONS

(a) Air cleaner installed
(b) Normal operating coolant temperature
(c) Choke fully open
(d) All accessories switched off
(e) All vacuum lines connected
(f) Ignition timing set correctly
(g) Transmission in the "N" range



3. ADJUST IDLE SPEED AND IDLE MIXTURE

HINT: Use SST if necessary.
SST 09243—00020



(a) Start the engine.
(b) Set to the maximum speed by turning the idle mixture adjusting screw.
(c) Set to the idle mixture speed by turning the idle speed adjusting screw.
Idle mixture speed:
650 rpm
(d) Before moving to the next step continue adjustments (b) and (c) until the maximum speed will not rise any further no matter how much the idle mixture adjusting screw is adjusted.
(e) Set to the idle speed by screwing in the idle mixture adjusting screw.
Idle speed:
600 rpm

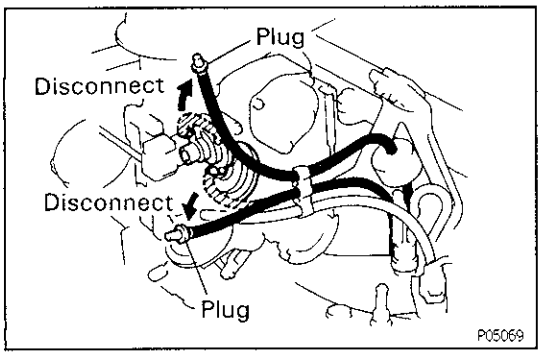
This is Lean Drop Method for setting idle speed and mixture.

EGOV8-02

(1FZ–F)
FAST IDLE SPEED INSPECTION AND ADJUSTMENT

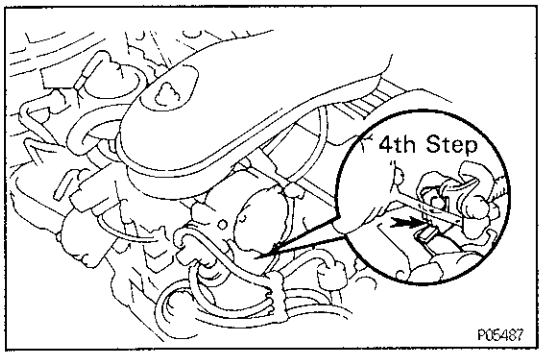
1. **WARM UP AND STOP ENGINE**
2. **CONNECT TACHOMETER TO ENGINE**

EG



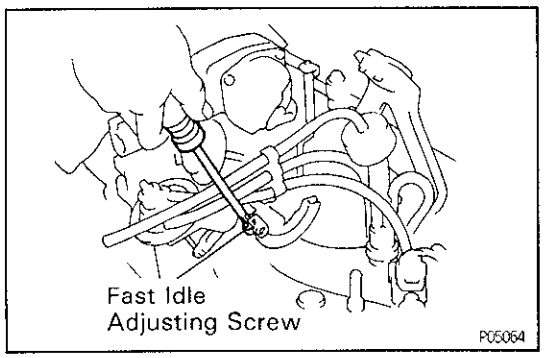
3. **CUT OPERATION OF FAST IDLE CAM BREAKER (FICB) SYSTEM**

Disconnect the vacuum hoses from the FICB and CB, and plug the hose ends. This shuts off the FICB and CB systems.



4. **SET FAST IDLE CAM**

Lightly race the engine and release the throttle, and check that the fast idle cam is set at the 4th step.



5. **INSPECT AND ADJUST FAST IDLE SPEED**

(a) Check the fast idle speed.

Fast idle speed:

G.C.C.

800 – 1,000 rpm

Others

1,100 – 1,300 rpm

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

Fast idle speed:

G.C.C.

900 rpm

Others

1,200 rpm

(b) Lightly race the engine and release the throttle, and repeat steps 4 and 5.

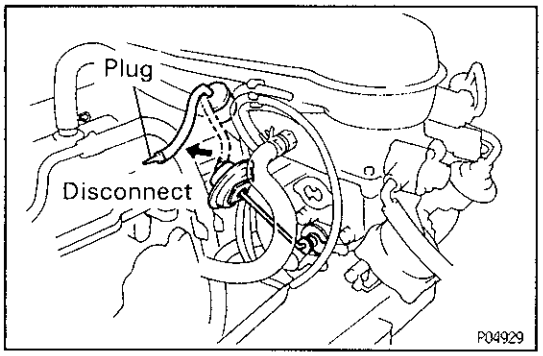
6. **RECONNECT VACUUM HOSES TO FICB AND CB**

EG0V9-02

(1FZ–F)
DASH POT (DP) INSPECTION AND ADJUSTMENT

1. **WARM UP AND STOP ENGINE**
2. **CONNECT TACHOMETER TO ENGINE**
3. **START ENGINE**

EG



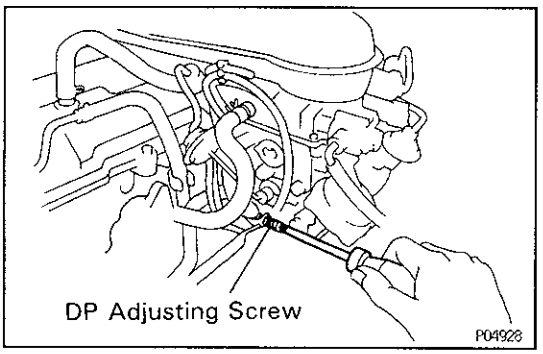
4. **INSPECT AND ADJUST DASH POT (DP) SETTING SPEED**

(a) Disconnect the vacuum hose from the DP and plug the hose end.

(b) Race the engine to 2,500 rpm for a few seconds, release the throttle and check the DP setting speed.

Dash pot setting speed:

1,400 – 1,600 rpm



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

Dash pot setting speed:

1,500 rpm

(c) Race the engine to 2,500 rpm for a few seconds, release the throttle and recheck the DP setting speed.

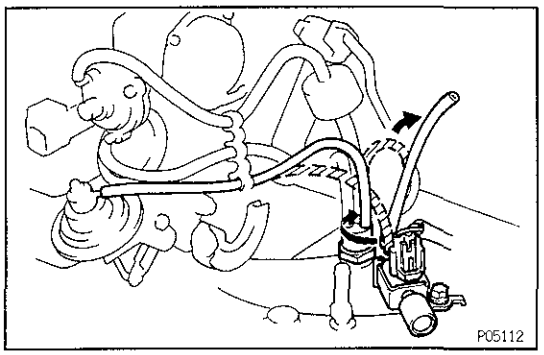
(d) Reconnect the vacuum hose to the DP.

EG0VA-02

(1FZ–F)
THROTTLE POSTIONER (TP) SETTING SPEED INSPECTION AND ADJUSTMENT

1. **WARM UP AND STOP ENGINE**
2. **CONNECT TACHOMETER TO ENGINE**
3. **START ENGINE**

EG



4. **INSPECT AND ADJUST THROTTLE POSITIONER (TP) SETTING SPEED**

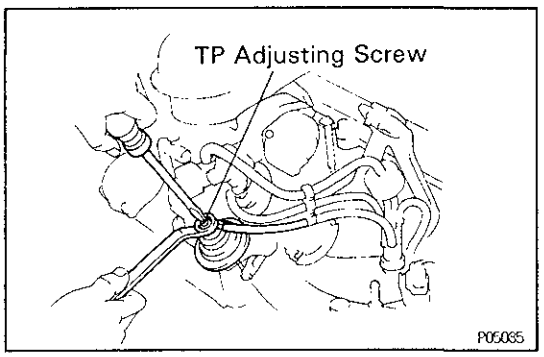
(a) Disconnect the vacuum hoses from the gas filter and VSV.

(b) Connect the vacuum hose which you have disconnected from the VSV onto the gas filter.

(c) Check the TP setting speed.

TP setting speed:

1,150 – 1,250 rpm



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

TP setting speed:

1,200 rpm

(d) Lightly race the engine and release the throttle, and recheck the TP setting speed.

(e) Reconnect the vacuum hoses to the proper locations.