

ENGINE TUNE-UP

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Fig. 2-1



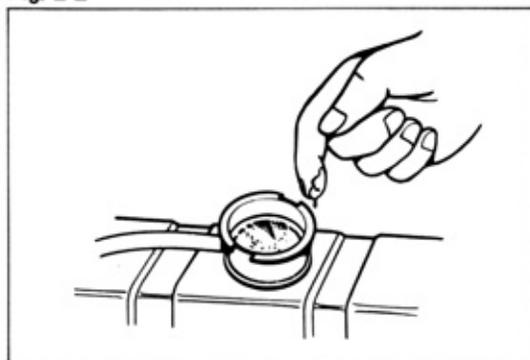
COOLING SYSTEM



CHECK COOLANT LEVEL

If coolant level is low, fill to FULL line of reservoir tank.

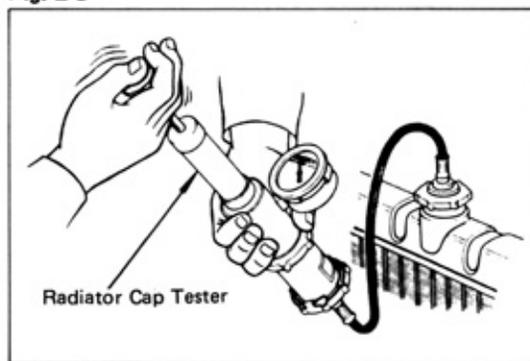
Fig. 2-2



CHECK COOLANT

Check for evidence of oil in coolant and rust or scale deposits.

Fig. 2-3

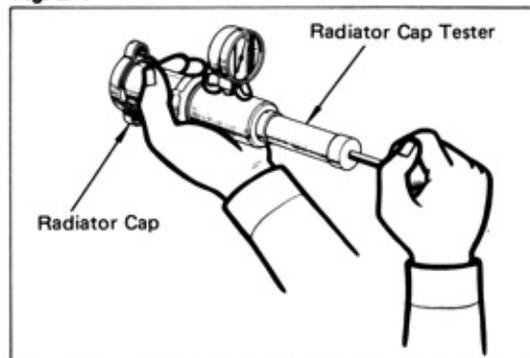


CHECK COOLING SYSTEM

Check for:

1. Damaged or deteriorated radiator and water hoses.
2. Loose hose clamps.
3. Damage or corrosion in the radiator core.
4. Leakage from the water pump, radiator core or a loose water drain cock.

Fig. 2-4



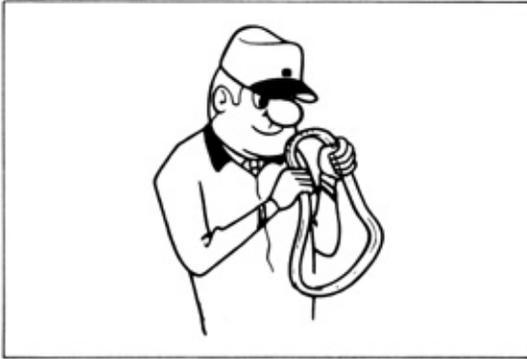
INSPECT RADIATOR CAP OPERATION

With a radiator cap tester inspect the spring tension and seating condition of the radiator cap vacuum valves. Replace the cap if the valve opens at a pressure below the specified or is otherwise defective.

Valve opening pressure:

STD	0.75 – 1.05 kg/cm ² (10.7 – 14.9 psi)
Limit	0.6 kg/cm ² (8.5 psi)

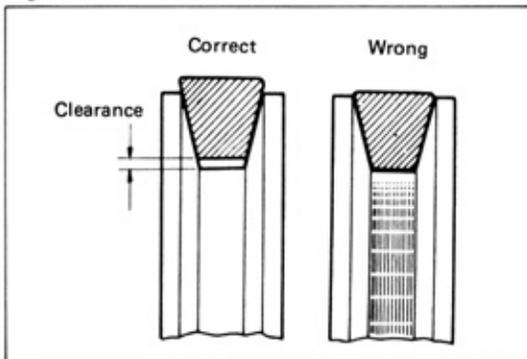
Fig. 2-5

**DRIVE BELT****VISUAL CHECK**

Check the drive belt for:

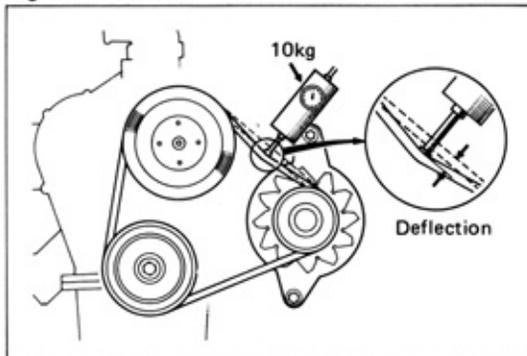
1. Cracks, deterioration, stretching or wear.
2. Adherence of oil or grease.

Fig. 2-6



3. Improper belt-to-pulley contact.

Fig. 2-7

**CHECK & ADJUST BELT TENSION**

Except USA & Canada

With 10 kg (22 lb) of force, press on the belts at the points indicated in the figure. The belts should deflect the amount specified.

Drive belt deflection at 10 kg (22 lb):

Fan – Alternator

7 – 11 mm

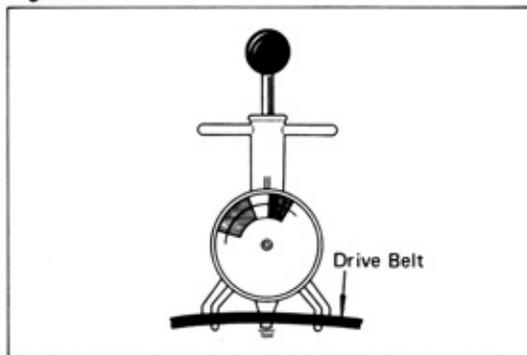
(0.28 – 0.43 in.)

Crank – A/C compressor

11 – 14 mm

(0.43 – 0.55 in.)

Fig. 2-8



USA & Canada

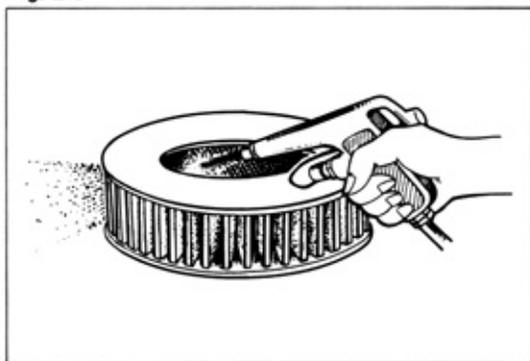
Using a time borroughs tension gauge BT-33-73F, adjust the following value.

Drive belt deflection:

New belt 125 ± 25 lbs

Used belt 80 ± 20 lbs

Fig. 2-9



AIR CLEANER

CLEAN ELEMENT

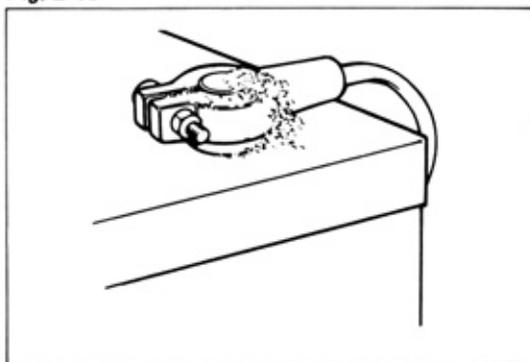
1. Remove the air cleaner element.

— Note —

Use care to prevent dirt or other foreign matter from entering into the carburetor.

2. To clean the element, blow compressed air from inside.
3. If element is torn or excessively dirty, replace it with a new one.

Fig. 2-10



BATTERY

VISUAL CHECK

Check the battery for the following:

1. Rusted battery support.
2. Loose terminal connections.
3. Rusted or deteriorated terminals.
4. Damaged or leaking battery.

Fig. 2-11



MEASURE SPECIFIC GRAVITY

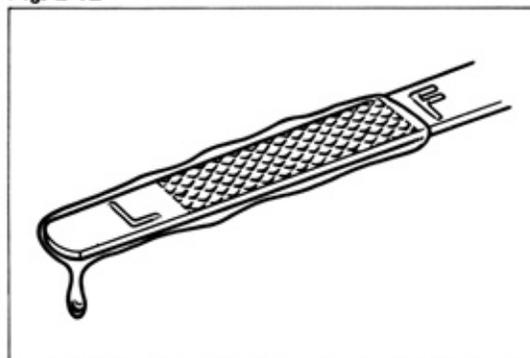
1. Check the specific gravity of electrolyte with a hydrometer.

Specific gravity:

**1.25 – 1.27 at 20°C
(68°F)**

2. Check the electrolyte quantity of each cell. If not at the proper level, fill with distilled water.

Fig. 2-12

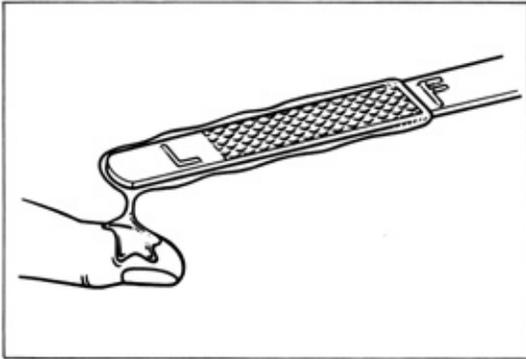


ENGINE OIL

CHECK OIL LEVEL

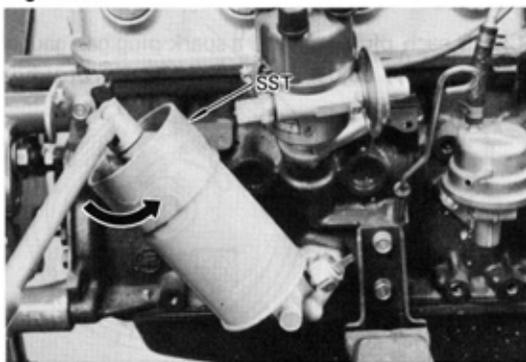
The oil level should be between the L and F marks. If low, check for leakage and add oil up to the F mark. Use API service SE classification oil.

Fig. 2-13

**CHECK OIL QUALITY**

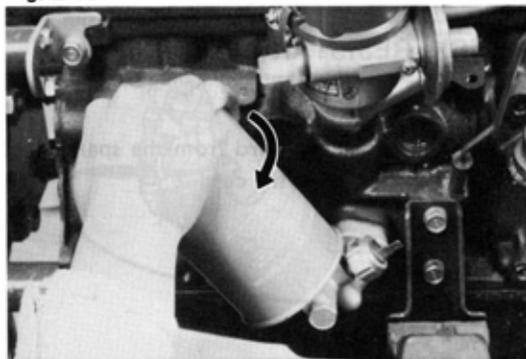
Check the oil for deterioration, entry of water, discoloring or thinning.

Fig. 2-14

**REPLACE OIL FILTER**

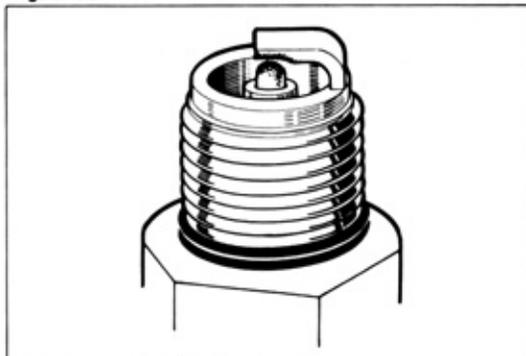
1. Remove the oil filter with SST.
SST [09228-22020]

Fig. 2-15



2. To install, hand-tighten the oil filter firmly.
3. After starting the engine, check for oil leaks and recheck the oil level.

Fig. 2-16

**SPARK PLUG****VISUAL CHECK**

Check the spark plugs for the following:

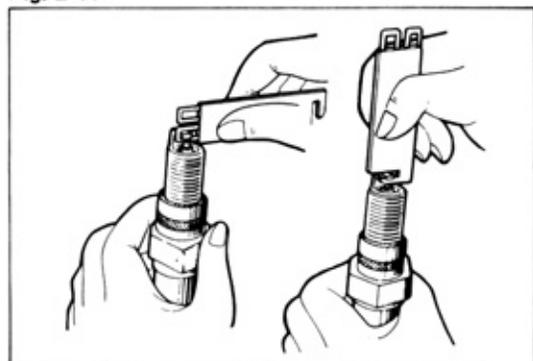
1. Cracks or other damage on the threads and insulator.
2. Electrode wear.
3. Damaged or deteriorated gaskets.
4. Burnt electrode or excess carbon deposits.

Fig. 2-17

**CLEAN SPARK PLUG**

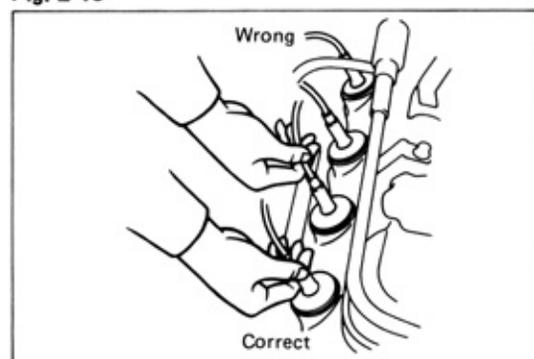
1. Do not use the spark plug cleaner longer than necessary.
2. Thoroughly blow off the cleaning compound and carbon with compressed air.
3. Clean the threads and outer insulator surface.

Fig. 2-18

**ADJUST GAP**

Check each plug gap with a spark plug gap gauge. If necessary, adjust by bending the protruding (outer) electrode.

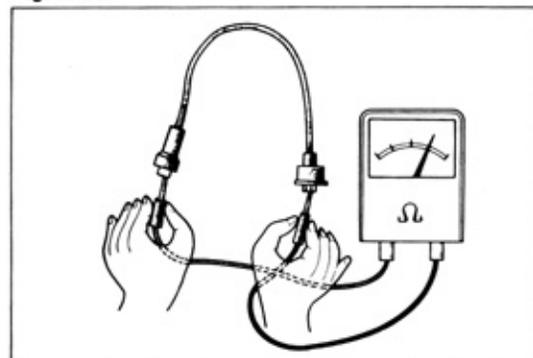
Fig. 2-19

**HIGH TENSION CORD****CHECK RESISTANCE**

— Note —

When pulling out the cord from the spark plug, always grip the end of the cord.

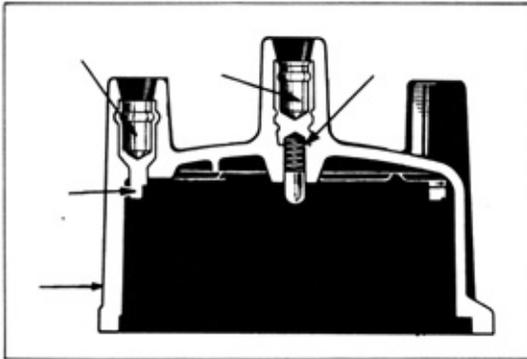
Fig. 2-20



Check the cord resistance.

Resistance: Less than 25 k Ω per cord

Fig. 2-21



DISTRIBUTOR

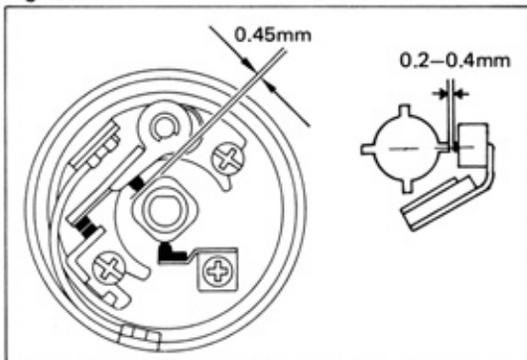


CHECK DISTRIBUTOR CAP

Check the cap and rotor.

1. Cracks, damage, corrosion, burning and dirty cord hole.
2. Burnt electrode terminal.
3. Weak center piece spring action.

Fig. 2-22



CHECK & ADJUST POINT GAP OR AIR GAP

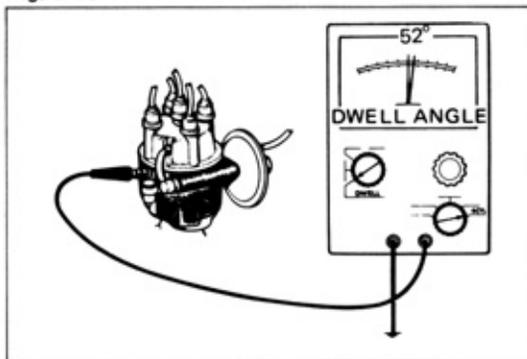
1. If the points are excessively burnt or pitted, replace the breaker points.
2. Adjust point gap and damping spring.

**Rubbing block gap: 0.45 mm
(0.0177 in.)**

3. Adjust the air gap between the rotor and pick up coil projection.

**Air gap: 0.2 – 0.4 mm
(0.008 – 0.016 in.)**

Fig. 2-23

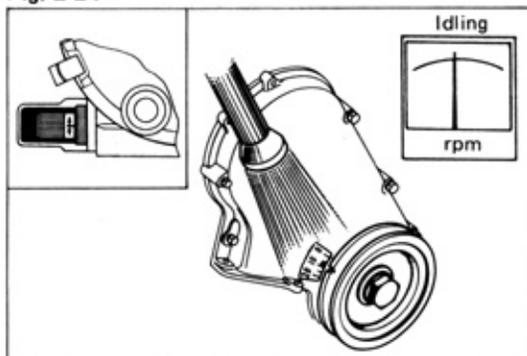


CHECK DWELL ANGLE

Check the dwell angle with a dwell angle tester.

Dwell angle: 52° ± 6°

Fig. 2-24



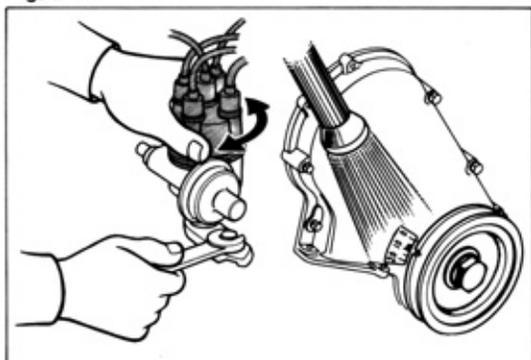
INSPECT IGNITION TIMING

Set the engine revolution at idle speed.

The octane selector must be set at standard position.

Ignition timing: 8° BTDC/idling

Fig. 2-25

**ADJUST IGNITION TIMING**

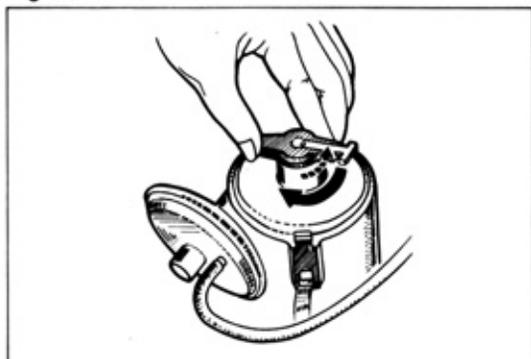
Align the timing marks by turning distributor body.

Ignition timing: 8° BTDC/idling

– Caution –

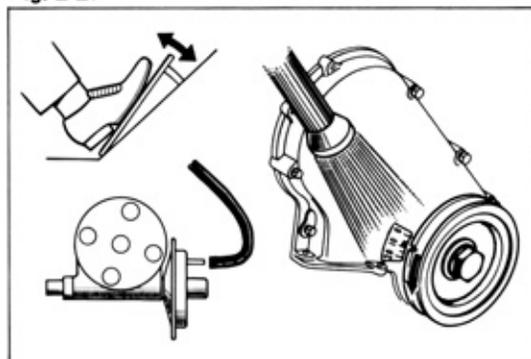
Do not adjust by the octane selector.

Fig. 2-26

**CHECK GOVERNOR OPERATION**

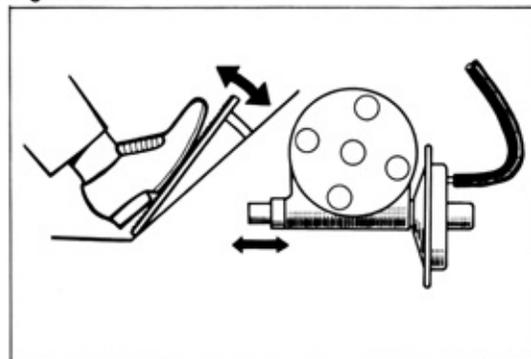
1. Rotor should return quickly when turned clockwise by hand and released.
2. Rotor should not be excessively loose.

Fig. 2-27



3. Start the engine and disconnect the vacuum hose from the distributor. The timing mark should vary in accordance with the engine speed.

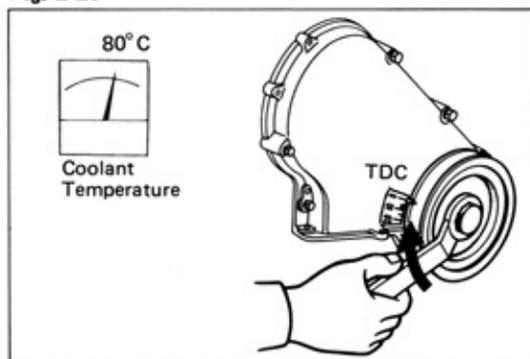
Fig. 2-28

**CHECK VACUUM ADVANCE OPERATION**

Connect the distributor vacuum hose.

The octane selector should vary in accordance with the opening and closing of the throttle valve.

Fig. 2-29



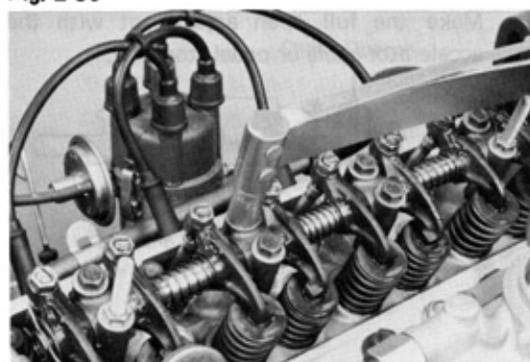
VALVE CLEARANCE



ADJUSTMENT

1. Warm up engine and turn it off.
2. Set No. 1 cylinder to TDC/compression.

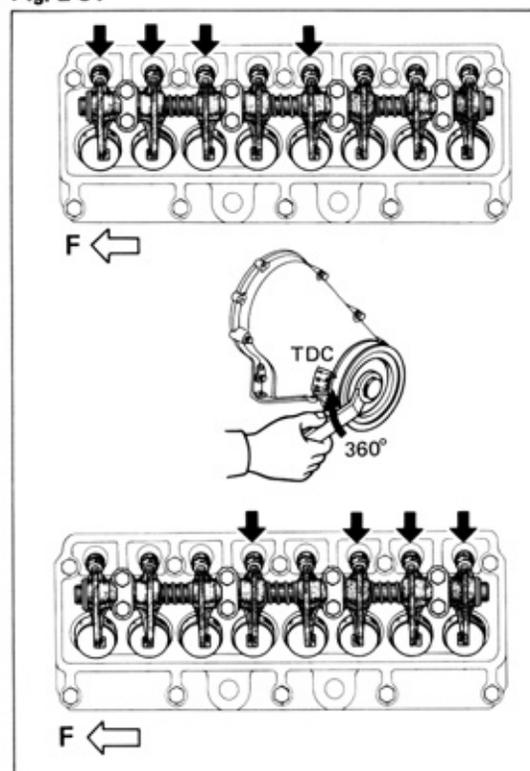
Fig. 2-30



3. Retighten the head bolts and rocker support bolts.

**Tightening torque: 1.8 – 2.4 kg-m
(14 – 17 ft-lb)**

Fig. 2-31



4. Adjust valve clearance. Valve clearance is measured between valve stem and rocker arm. Adjust the valves indicated by arrows only.

Valve clearance:

IN	0.20 mm (0.0079 in.)
EX	0.30 mm (0.0118 in.)

5. Rotate the crankshaft 360°.
6. Adjust remaining valves indicated by arrows.

– Note –

Use the SST oil tray when the adjustment is performed with engine running.
SST [09229-22010]

Fig. 2-32

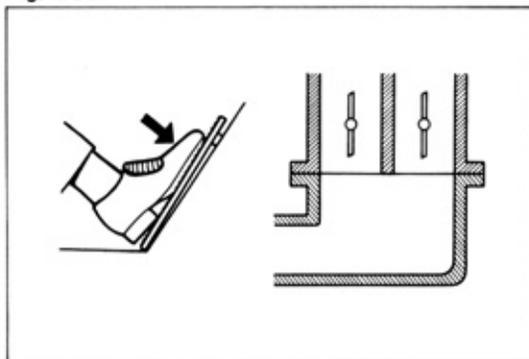


Fig. 2-33

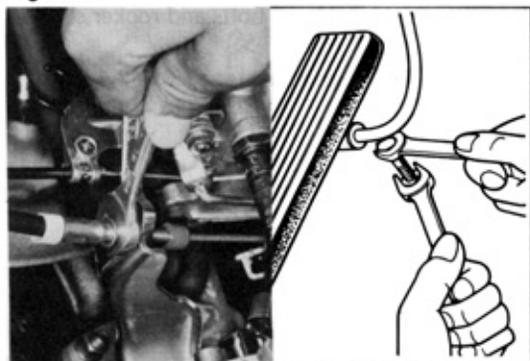


Fig. 2-34

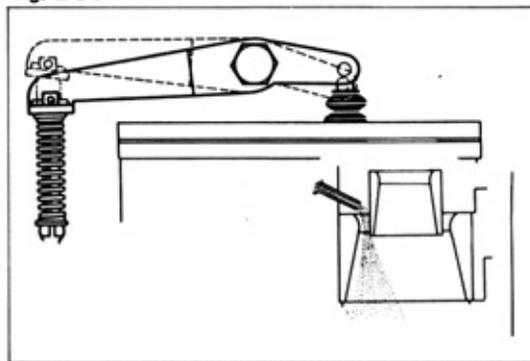
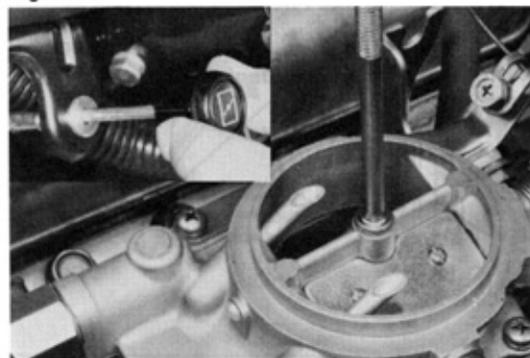


Fig. 2-35



CARBURETOR



CHECK OPERATION

– Note –

For adjustment, refer to carburetor section.

Throttle Valve

1. The throttle valve should open fully when the accelerator pedal is fully depressed.
2. Make the full open adjustment with the accelerator cable or pedal stop bolt.



Acceleration Pump

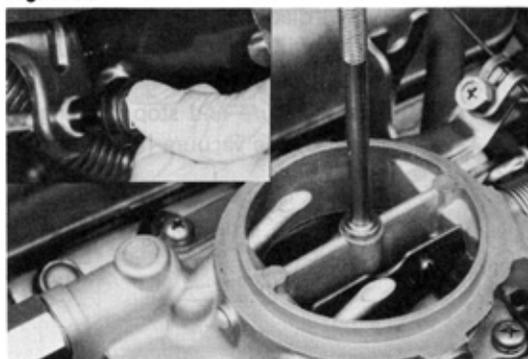
Gasoline should shoot out with force from the jet when the throttle valve is opened.



Manual Choke

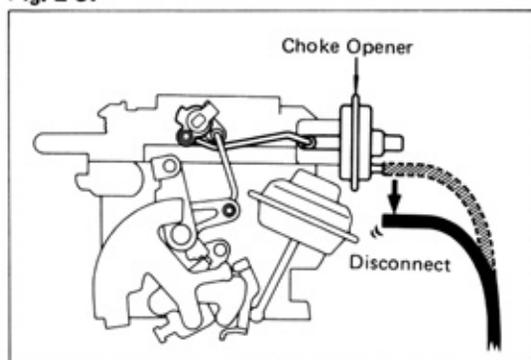
1. Choke valve should be fully closed when the choke knob is pulled all the way out.

Fig. 2-36



2. Choke valve should be fully open when the choke knob is fully returned.

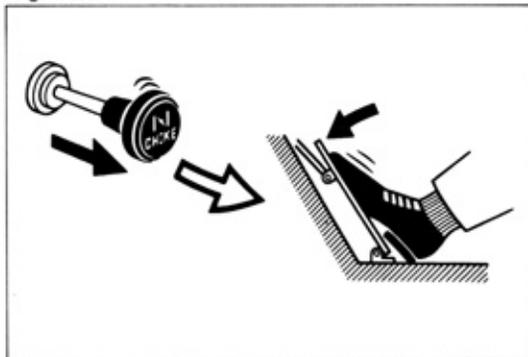
Fig. 2-37



Choke Opener (USA & Canada)

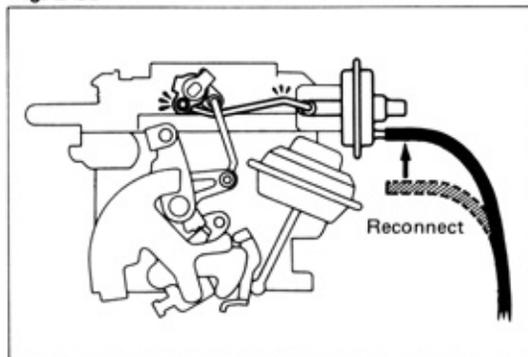
1. Check BVSV with cold engine.
 - (1) The coolant temperature should be below 30°C (86°F).
 - (2) Disconnect the vacuum hose from the choke opener.

Fig. 2-38



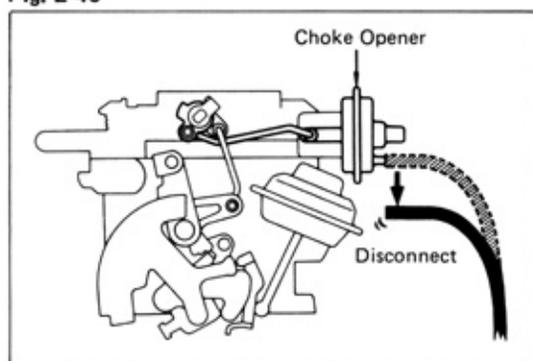
- (3) Fully pull out the choke knob, depress the accelerator pedal once, and start the engine.

Fig. 2-39



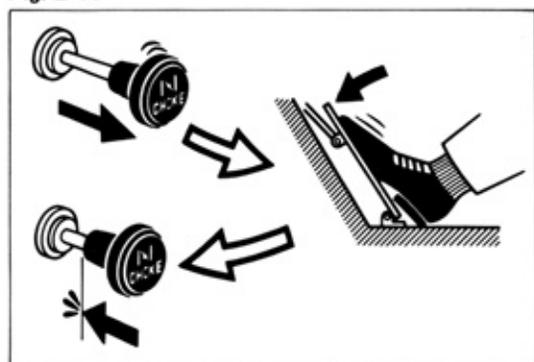
- (4) Reconnect the vacuum hose to the choke opener and check that the choke linkage does not move.

Fig. 2-40



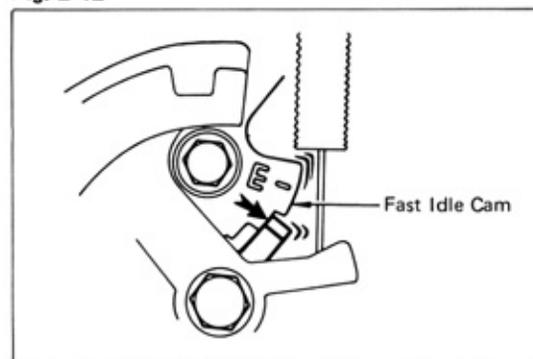
2. Check BVSV, diaphragm and linkage with hot engine.
 - (1) Warm-up the engine to normal operating temperature and stop the engine.
 - (2) Disconnect the vacuum hose from the choke opener.

Fig. 2-41



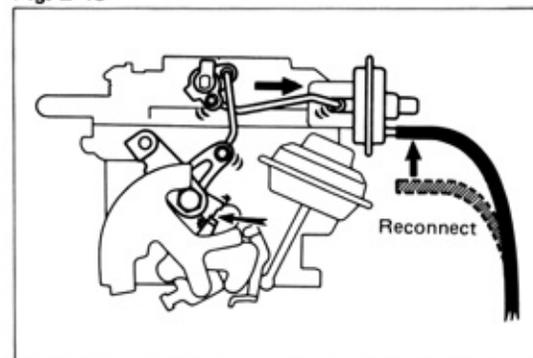
- (3) Fully pull out the choke knob, depress the accelerator pedal once, and return the choke knob about half way.

Fig. 2-42



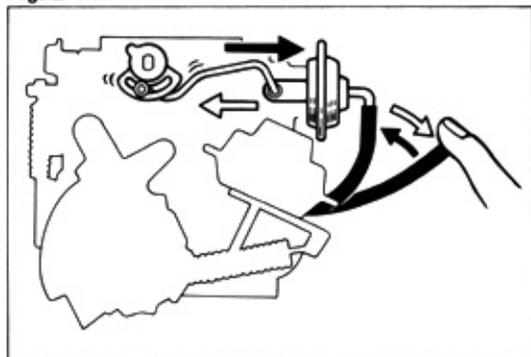
- (4) Check that the fast idle cam is at the second step.
- (5) Start the engine.

Fig. 2-43



- (6) Reconnect the vacuum hose and check that the choke linkage moves, and that the fast idle cam is released to the third step.
- (7) When the choke knob is pushed in all the way, check that the engine speed returns to idle.

Fig. 2-44

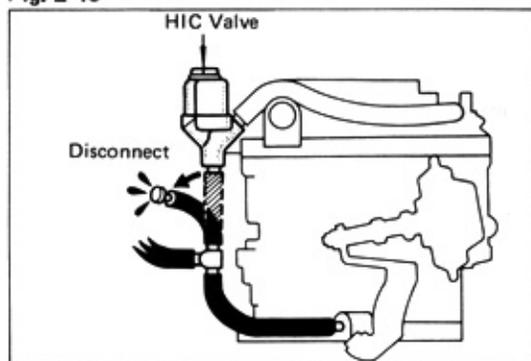
**Choke Breaker (4K A/T & Australia 4K-C)**

1. With the engine idling, disconnect the vacuum hose from the choke breaker. Check to see that the choke linkage has returned.
2. Reconnect the vacuum hose and check to see that the choke linkage is pulled in by the diaphragm.
If defective, replace the diaphragm.

IDLE SPEED & IDLE MIXTURE ADJUSTMENT**2K, 3K-C, 3K-H, 4K & 4K-C**

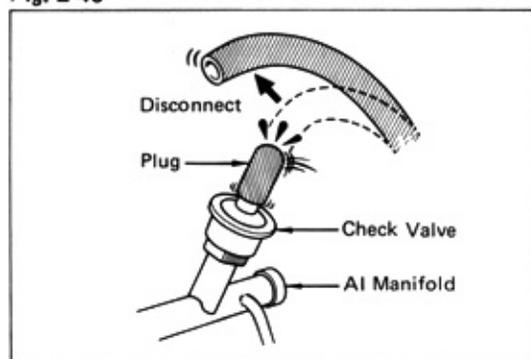
1. The adjusting and measuring conditions should be as follows:
 - (1) Air cleaner installed
 - (2) Normal operating coolant temperature
 - (3) Choke fully open
 - (4) All accessories switched off
 - (5) All vacuum lines connected
 - (6) Transmission in N range
 - (7) Ignition timing set
 - (8) Tachometer & vacuum gauge attached
 - (9) Zero setting of CO meter warmed up

Fig. 2-45



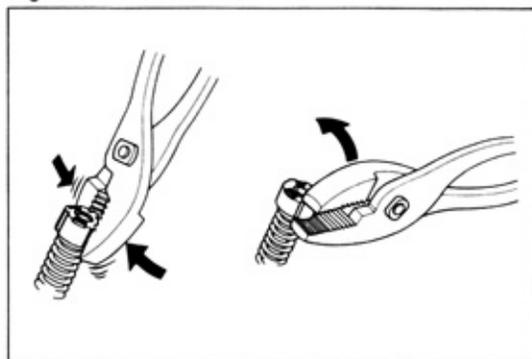
2. Disconnect the HIC hose and plug the hose end.

Fig. 2-46



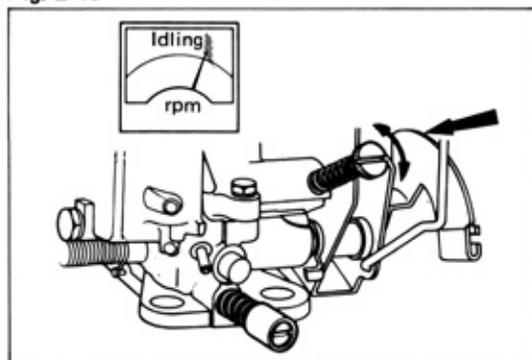
3. Australia N.S.W & Victoria only:
Disconnect the air injection hose from the AI check valve and plug the check valve.

Fig. 2-47



4. Break the idle limiter cap on the idle mixture adjusting screw if installed.

Fig. 2-48



5. Set the idle speed to specified rpm by turning the idle speed adjusting screw.

Idle speed:

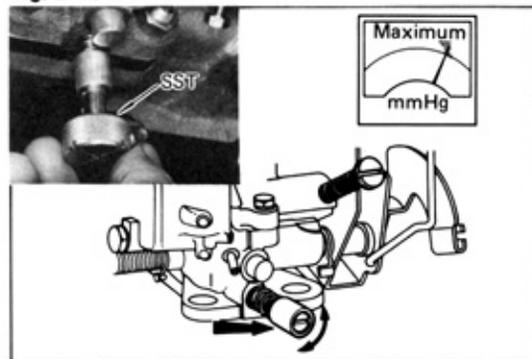
2K, 3K-C, 3K-H, 4K M/T &

Sweden 4K-C 750 rpm

Australia 4K & 4K-C 800 rpm

4K A/T 850 rpm

Fig. 2-49



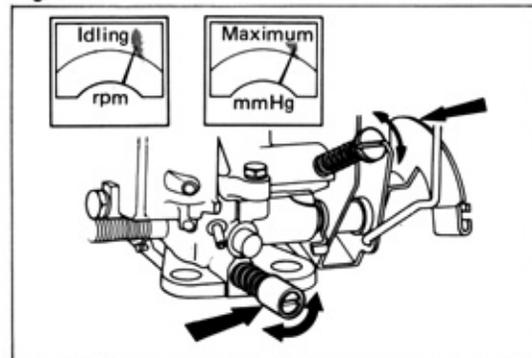
6. Set to the maximum vacuum by turning the idle mixture adjusting screw.

– Note –

It is necessary to use SST for Europe specification engine adjustment.

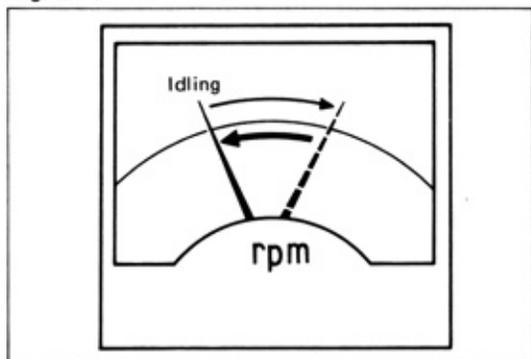
SST [09243-00010] or [09243-00020]

Fig. 2-50



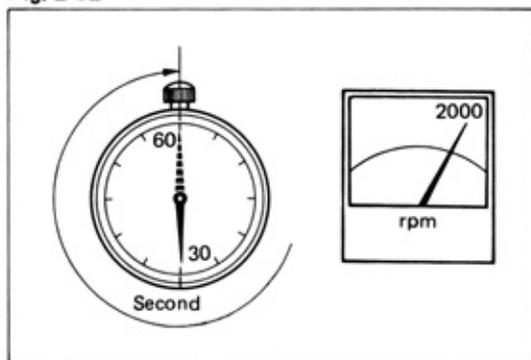
7. Repeat adjustments 5 and 6 above until the maximum vacuum reading at the specified idle speed is obtained.

Fig. 2-51



8. Race the engine momentarily with the accelerator link to verify that the engine returns to specified rpm when released.

Fig. 2-52

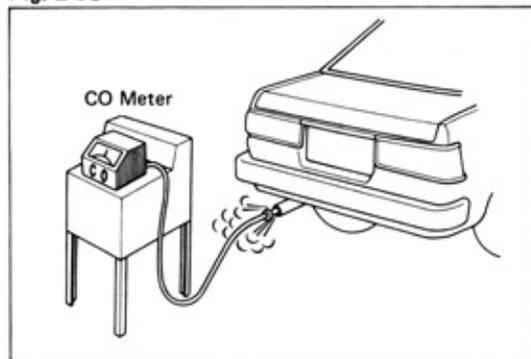


9. Measure the CO concentration in the exhaust gases with a CO meter.

- (1) Be sure to race the engine at about 2,000 rpm for 30 – 60 seconds.

- (2) To allow the concentration to stabilize, wait at least one minute before measuring but complete the measuring within three minutes.

Fig. 2-53

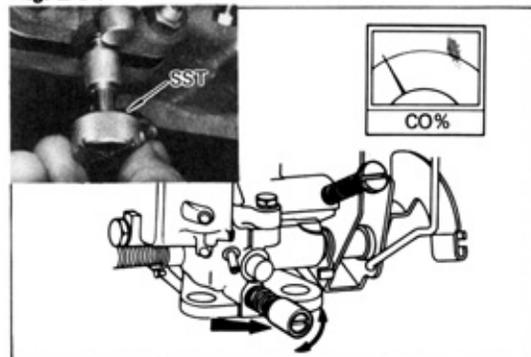


CO concentration

Engine model	%
2K (KP60 series), 3K-C, 3K-H & 4K	0.5 – 1.5
2K (KP36 series)	0.5 – 3.5
Australia 4K-C	1.0
Sweden 4K-C	0.3 – 2.0

- (3) If the concentration exceeds the specified value, tighten the idle mixture adjusting screw little by little until the concentration is within the specified value.

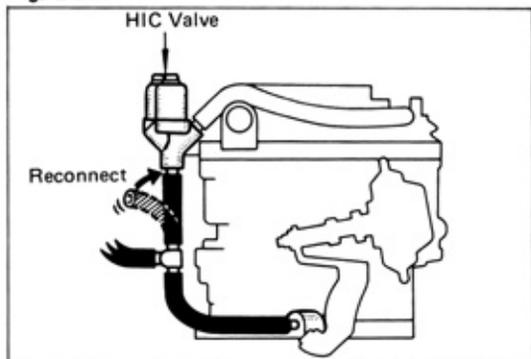
Fig. 2-54



– Note –

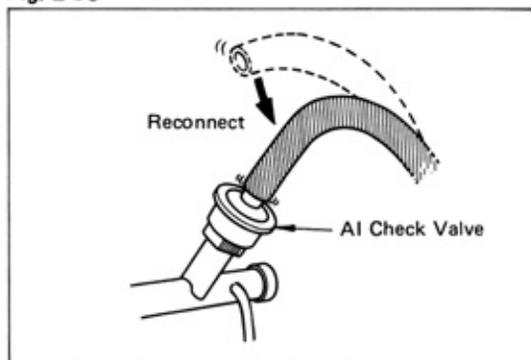
1. When the idle mixture adjusting screw is tightened, there will be a point where the engine speed drops rapidly. Further adjustment must not be attempted by screwing in beyond this point.
2. Allowable engine idle speed is ± 50 rpm of the specified speed.

Fig. 2-55



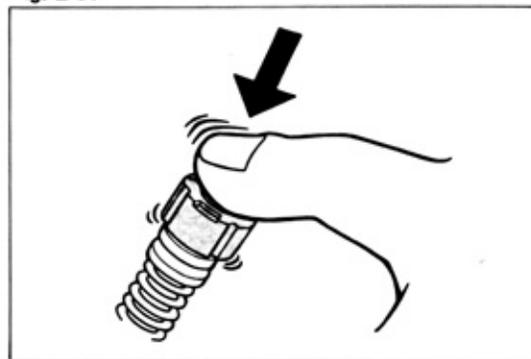
10. Reconnect the hose to the HIC valve.

Fig. 2-56



11. Australia N.S.W. & Victoria only:
Reconnect the air injection hose to the AI check valve.

Fig. 2-57

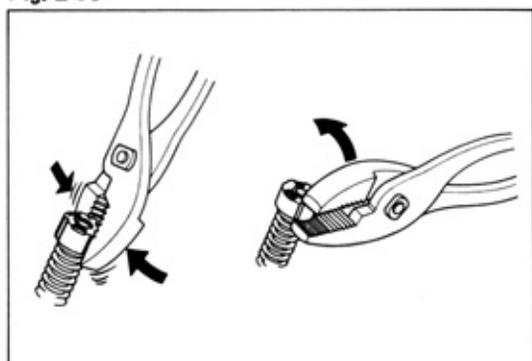


12. Install the new idle limiter cap on the idle mixture adjusting screw.

CANADA 4K-C (LEAN DROP METHOD)

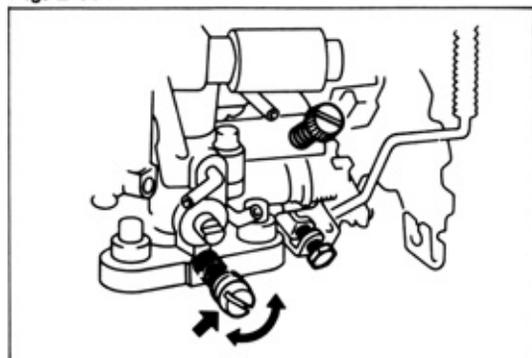
1. The adjusting and measuring conditions should be as follows:
 - (1) Air cleaner installed
 - (2) Normal operating coolant temperature
 - (3) Choke fully open
 - (4) All accessories switched off
 - (5) All vacuum lines connected
 - (6) Transmission in N range
 - (7) Ignition timing set

Fig. 2-58



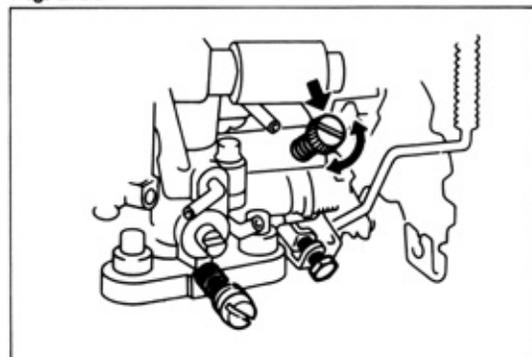
2. Break the idle limiter cap on the idle mixture adjusting screw if installed.

Fig. 2-59



3. Adjust idle speed and idle mixture.
 - (1) Start the engine.
 - (2) Set to the maximum speed by turning the idle mixture adjusting screw.

Fig. 2-60



- (3) Set the idle mixture speed by turning the idle speed adjusting screw.

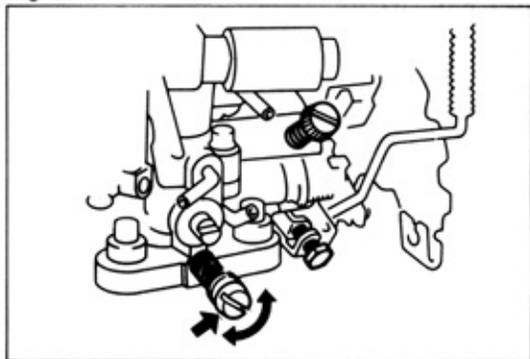
Idle mixture speed: 680 rpm

– Note –

Make adjustment with the cooling fan OFF.

- (4) Before moving to the next step, continue adjustments 2 and 3 until the maximum speed will not rise any further no matter how much the idle mixture adjusting screw is adjusted.

Fig. 2-61



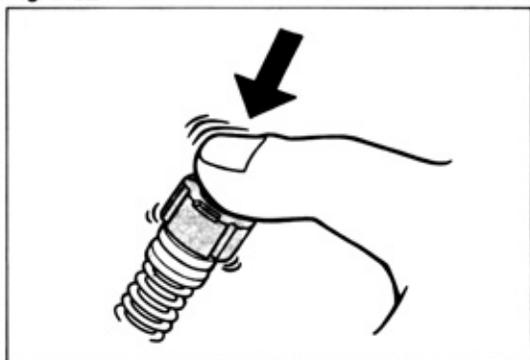
- (5) Set to the idle speed by screwing in the idle mixture adjusting screw.

Idle speed: 650 rpm

– Note –

1. Make adjustment with the cooling fan OFF.
2. This is the Lean Drop Method for setting idle speed and mixture.

Fig. 2-62

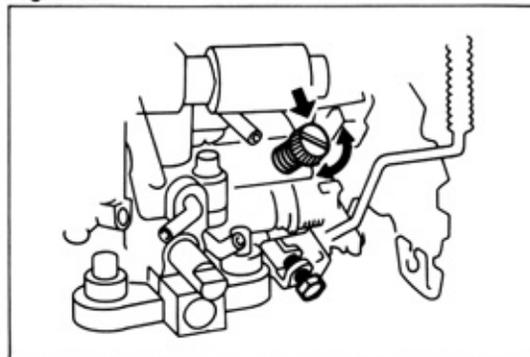


4. Install a new limiter cap on the idle mixture adjusting screw, if one was installed.

USA 4K-C (IDLE SPEED)

1. The adjusting and measuring conditions should be as follows:
 - (1) Air cleaner installed
 - (2) Normal operating coolant temperature
 - (3) Choke fully open
 - (4) All accessories switched off
 - (5) All vacuum lines connected
 - (6) Transmission in N range
 - (7) Ignition timing set

Fig. 2-63



2. Adjust the idle speed by turning the idle speed adjusting screw.

Idle speed:

Federal	650 rpm
California	700 rpm

– Note –

Make adjustment with the cooling fan OFF.

Fig. 2-64

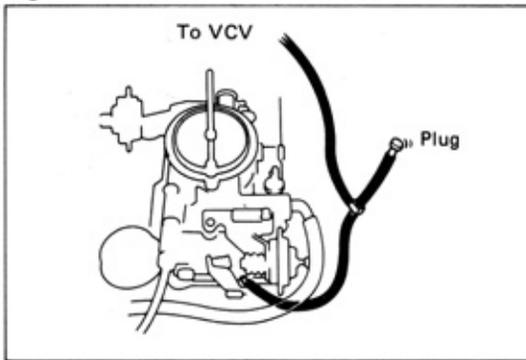


Fig. 2-65

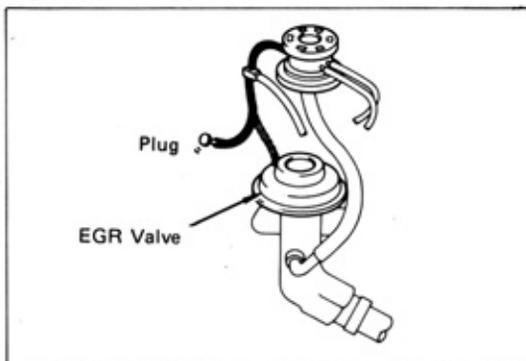


Fig. 2-66

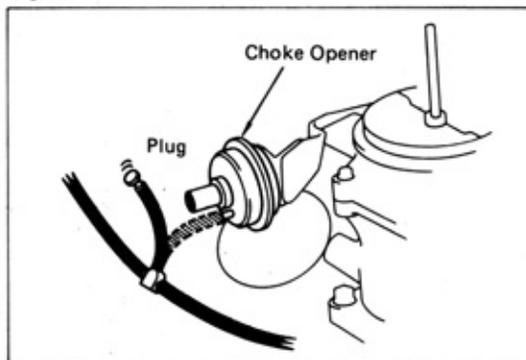
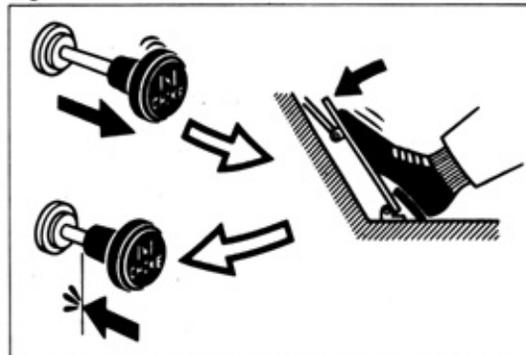


Fig. 2-67



FAST IDLE SPEED



ADJUSTMENT

1. Remove the air cleaner and plug the hose end for the HIC system to prevent rough idling.
2. Warm up the engine and then turn it off.



3. Disconnect the vacuum hose from the EGR valve and plug the hose end.

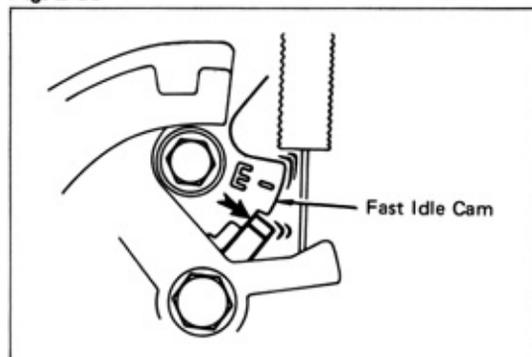


4. Disconnect the vacuum hose from the choke opener and plug the hose end.



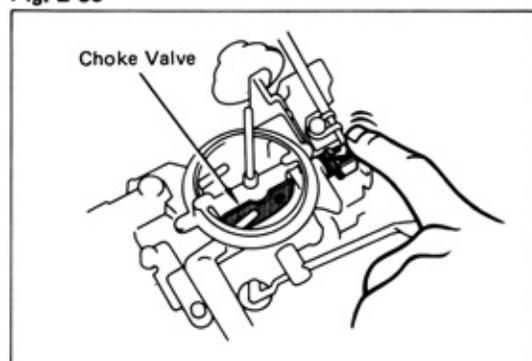
5. Fully pull out the choke knob, depress the accelerator pedal once, and return the choke knob about half way.

Fig. 2-68



6. Check that the fast idle cam is at the second stop.

Fig. 2-69



7. Start the engine and fully open the choke valve.

Fig. 2-70



8. Adjust the fast idle speed by turning the fast idle adjusting screw.

Fast idle speed:

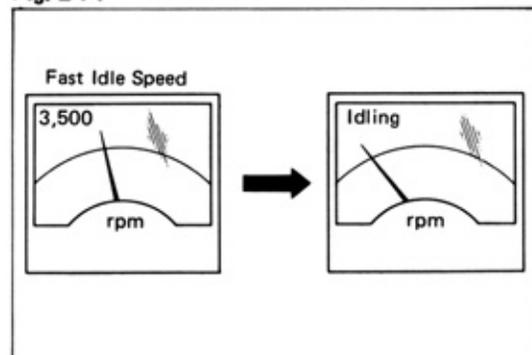
KM20 series (4K & 4K-C) 1,500 rpm

Australia 4K 3,100 rpm

USA & Canada 3,500 rpm

9. Reconnect the vacuum hoses to the proper locations.

Fig. 2-71



10. Make sure that the engine returns to the specified idle speed after racing the engine.

Idle speed:

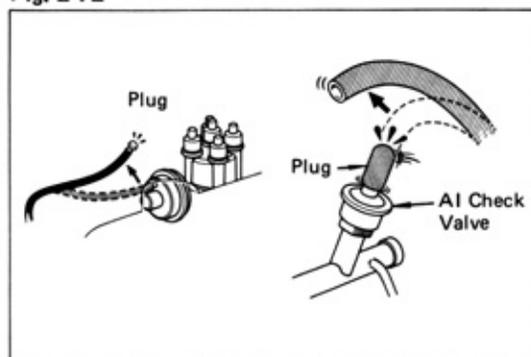
USA (ex. California) & Canada

650 rpm

California 700 rpm

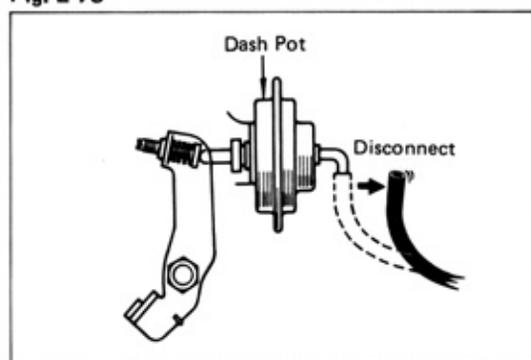
KM20 series (4K & 4K-C) 800 rpm

Fig. 2-72

**DASH POT (Australia & Sweden)****ADJUSTMENT**

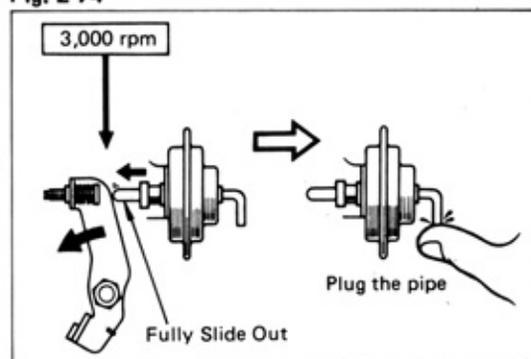
1. Warm up the engine and then turn it off.
2. Disconnect the vacuum hose from the distributor and plug the hose end.
3. Disconnect the air injection hose from the air injection check valve and plug the check valve (Australia only).

Fig. 2-73



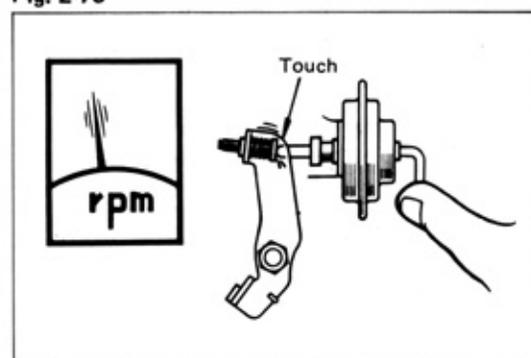
4. Disconnect the vacuum hose from the dash pot.

Fig. 2-74



5. Set the engine speed at 3,000 rpm.
6. Plug the dash pot diaphragm pipe with your finger.
7. Release the accelerator.

Fig. 2-75



8. Check the dash pot setting speed.

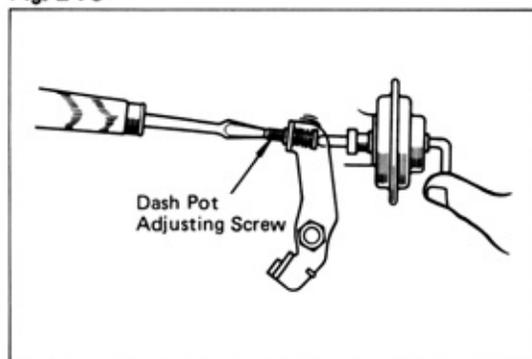
Dash pot setting speed:

Australia 4K	1,700 rpm
Sweden 3K-C	2,000 rpm
Sweden 4K-C	2,300 rpm
Australia 4KC & 4K (KM20 series)	2,100 rpm

– Note –

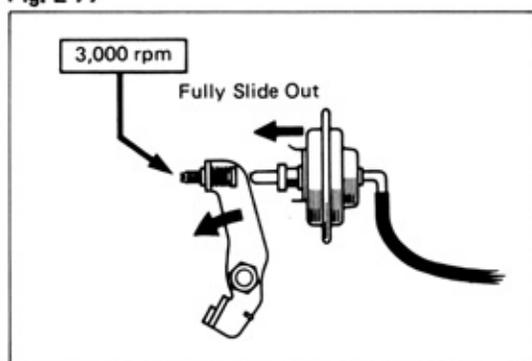
The diaphragm shaft should not move.

Fig. 2-76



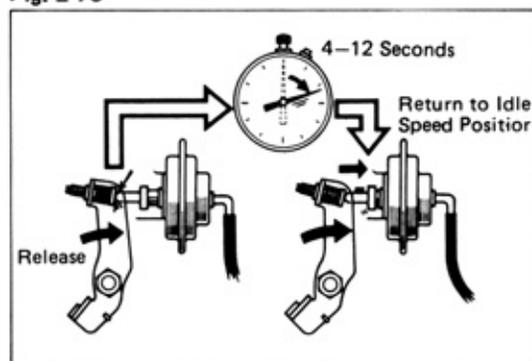
9. If not at dash pot setting speed, adjust the engine speed with the dash pot adjusting screw.

Fig. 2-77



10. Reconnect the vacuum hose to the dash pot.
11. Again set the engine speed at 3,000 rpm for about 10 seconds. Confirm that the diaphragm shaft fully slides out.

Fig. 2-78

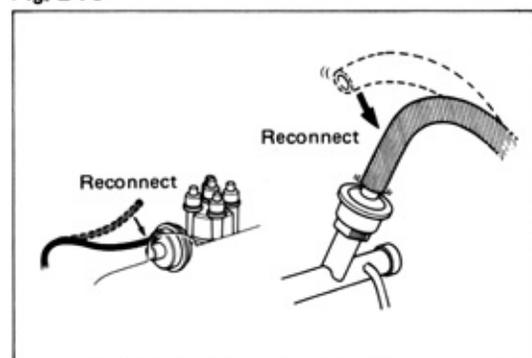


12. Release the accelerator.
13. Check the operation time when the throttle arm returns to the idle speed position after it touches the dash pot diaphragm shaft.

DP operation time: 4 – 12 seconds

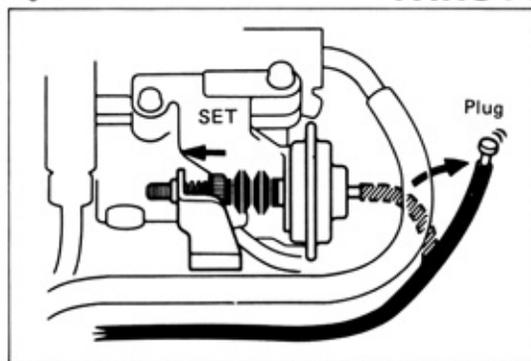
If the operation time is not within specification, inspect the dash pot diaphragm, jet and vacuum hose.

Fig. 2-79



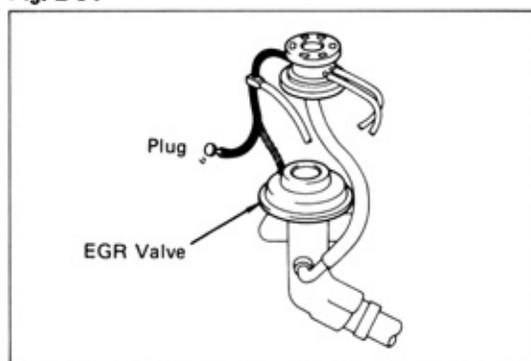
14. Reconnect the hoses to the proper locations.

Fig. 2-80

THROTTLE POSITIONER (USA & Canada)**ADJUSTMENT**

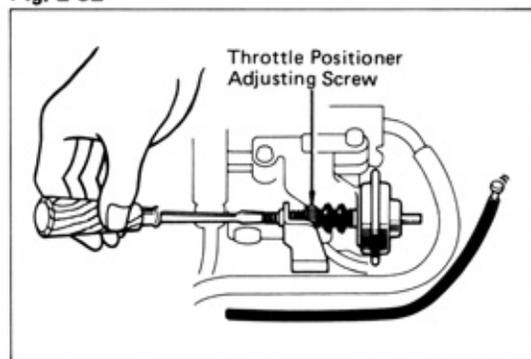
1. Warm up the engine.
2. Disconnect the vacuum hose from the throttle positioner and plug the hose end.

Fig. 2-81



3. Disconnect the vacuum hose from the EGR valve and plug the hose end.

Fig. 2-82



4. After the throttle positioner is set, check that the engine speed is correct.

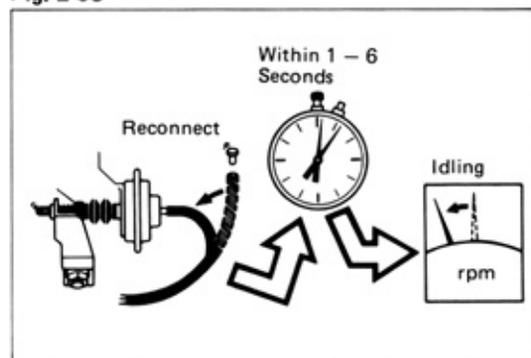
Throttle positioner setting speed:
2,000 rpm

If not at specified speed, adjust with the throttle positioner adjusting screw.

– Note –

Make adjustment with the cooling fan OFF.

Fig. 2-83



5. Reconnect the vacuum hose to the throttle positioner, check that the engine returns to idle speed within 1–6 seconds.
6. Reconnect the vacuum hose to the EGR valve.

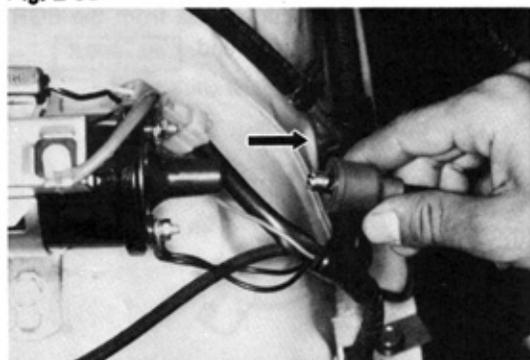
Fig. 2-84



COMPRESSION PRESSURE

1. Warm up the engine.
2. Remove all spark plugs.

Fig. 2-85



3. Disconnect the high tension cord from the ignition coil to cut off the secondary circuit.

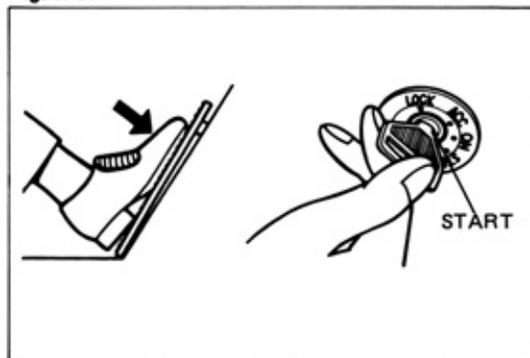
Fig. 2-86



4. Tightly insert a compression gauge into the spark plug hole.

5. Open the throttle valve fully and read the compression pressure while cranking the engine with the starter motor.

Fig. 2-87



— Note —

Keep pressure measuring time to a minimum.

Cranking speed: 250 rpm

Compression pressure:

STD 11.0 kg/cm²
(156 psi)

Limit 9.0 kg/cm²
(128 psi)

Difference between each cylinder:

1.0 kg/cm²
(14 psi)

MEMO
