

SYMBOLS

The following symbols have been adopted for simplicity and quick recognition.



REMOVE or DISASSEMBLE



INSTALL or ASSEMBLE



INSPECT



MEASURE



TIGHTEN



CLEAN



IMPORTANT

ENGINE TUNE-UP

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ENGINE TUNE-UP ITEMS

| ITEM | | REMARKS | |
|------|---|-------------------------------------|-----------------|
| 1 | DRIVE BELT TENSION | | |
| | (General destinations) | | |
| | Deflection with 10 kg (22 lb) force | | |
| | Fan — Alternator | | |
| | N.S.W. & Victoria states | 13 — 15 mm | 0.51 — 0.59 in. |
| | Other Australian states | 7 — 10 mm | 0.28 — 0.39 in. |
| | ex. Australia | | |
| | New belt | 7 — 9 mm | 0.28 — 0.35 in. |
| | Used belt | 9 — 12 mm | 0.35 — 0.47 in. |
| | Fan — Air pump | | |
| 2 | BATTERY | | |
| | Specific gravity | 1.25 — 1.27 | |
| | | [when fully charged at 20°C (68°F)] | |
| | | Correct level | |
| | Electrolyte level | | |
| | Oil level check | | |
| | Oil replenishment | | |
| | | USA | |
| | | ECE | |
| | | Others | |
| 3 | ENGINE OIL | | |
| | Oil level check | | |
| | Oil replenishment | | |
| | | F line | |
| | | API service SE or better | |
| | | API service SD, SE or better | |
| | | API service SC, SD, SE or better | |
| | Oil capacity | 8.0 liters 8.5 US qt 7.0 Imp. qt | |
| | Dry fill | | |
| | Drain & refill | | |
| 4 | COOLING SYSTEM | | |
| | Coolant level | | |
| | Coolant quality, Leakage | | |
| | Radiator cap valve opening pressure | | |
| | | STD | |
| | | Limit | |
| | Coolant capacity w/ heater or air conditioner | | |
| | FJ40, 43, 45 series | 16.0 liters 16.9 US qt 14.1 Imp. qt | |
| | FJ60 series | 16.5 liters 17.4 US qt 14.5 Imp. qt | |
| | FA series | 25.0 liters 26.4 US qt 22.0 Imp. qt | |
| 5 | AIR CLEANER | | |
| | Clean element | | |
| | Oil capacity (Oil bath type) | | Correct level |

| ITEM | | REMARKS | |
|------|---|-------------------------|---|
| 6 | HOT AIR INTAKE | | |
| | Operational check | | |
| 7 | SPARK PLUGS | | |
| | Visual check, Cleaning | | |
| 8 | HIGH TENSION CORD | | |
| | Gap | 0.8 mm | 0.031 in. |
| 9 | DISTRIBUTOR | | |
| | Distributor cap | | |
| 10 | IGNITION TIMING | | |
| | Dwell angle (except USA) | 41° | |
| 11 | VALVE CLEARANCE | | |
| | Intake | 0.20 mm | 0.008 in. |
| 12 | CARBURETOR | | |
| | Choke, Choke breaker, Choke opener | | |
| 13 | IDLE SPEED ADJUSTMENT (USA) | | |
| | Idle speed | 650 rpm | |
| 14 | IDLE SPEED & IDLE MIXTURE ADJUSTMENT | | |
| | (except USA) | 650 rpm | |
| 15 | FAST IDLE SPEED ADJUSTMENT | | |
| | Fast idle speed | 1,800 rpm | |
| 16 | THROTTLE POSITIONER | | |
| | Throttle positioner setting speed | | |
| 17 | COMPRESSION PRESSURE | | |
| | at 250 rpm | | |
| 18 | | | |
| | STD | 10.5 kg/cm ² | 149 psi |
| 19 | | | |
| | Limit | 8.0 kg/cm ² | 114 psi |
| 20 | | | |
| | Pressure difference between each cylinder | | Less than 1.0 kg/cm ² (14 psi) |

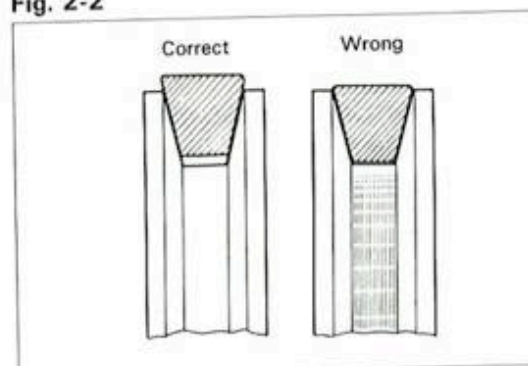
Fig. 2-1

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

Check for:

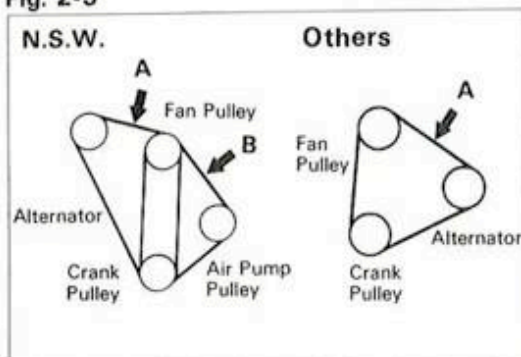
1. Cracks, deterioration, stretching or wear.
2. Adherence of oil or grease.

Fig. 2-2



3. Improper belt-to-pulley contact.

Fig. 2-3

**CHECK & ADJUST BELT TENSION****General destinations**

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

| | N.S.W. & Victoria | Other Australian states | except Australia | |
|------------------|--------------------------|-------------------------|------------------|-------------------------|
| A mm (in.) | 13 - 15 (0.51 - 0.59) | 7 - 10 (0.28 - 0.39) | New | 7 - 9 (0.28 - 0.35) |
| | | | Used | 9 - 12 (0.35 - 0.47) |
| B mm (in.) | 7 - 10 (0.28 - 0.39) | — | — | |

**USA**

Using a Borroughs belt tension gauge BT-33-73F, adjust as follows:

Drive belt tension:**Air con.**

New belt 100 - 150 lbs
Used belt 60 - 80 lbs

Others

New belt 120 - 170 lbs
Used belt 80 - 120 lbs

Fig. 2-4

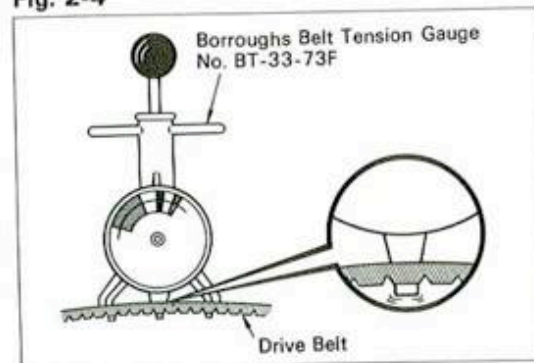
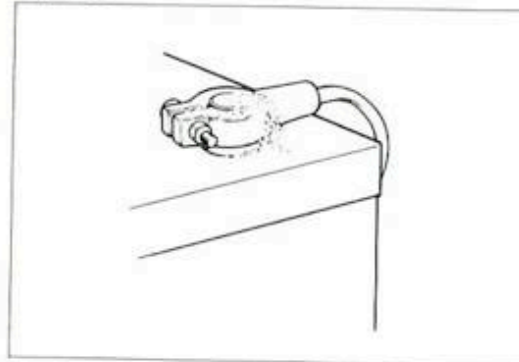


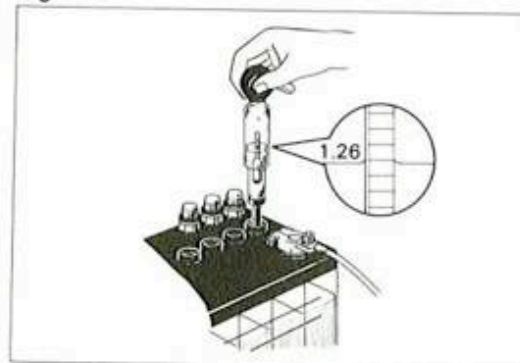
Fig. 2-5

**BATTERY****VISUAL CHECK**

Check for:

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

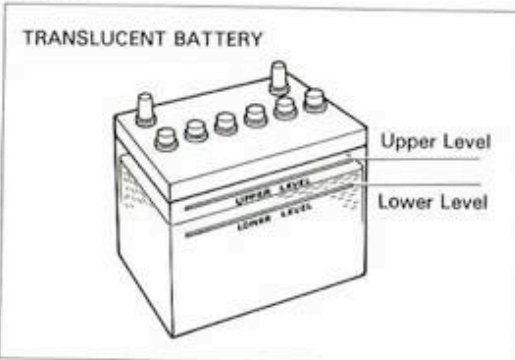
Fig. 2-6

**MEASURE SPECIFIC GRAVITY**

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

Specific gravity [when fully charged at 20°C (68°F)]:
1.25 - 1.27

Fig. 2-7



2. Check the electrolyte quantity of each cell. If insufficient, refill with distilled water.

Fig. 2-8

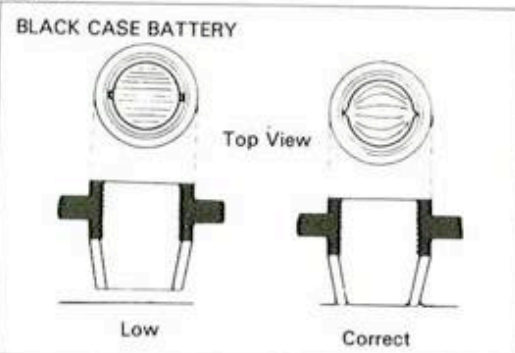
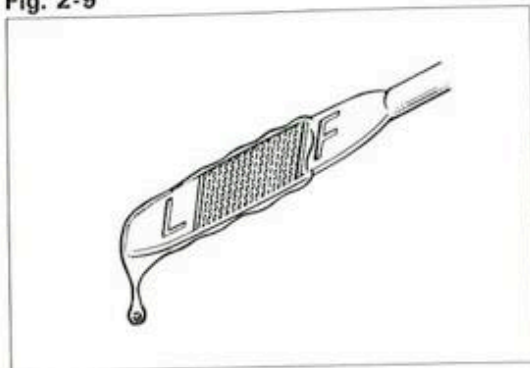


Fig. 2-9



ENGINE OIL



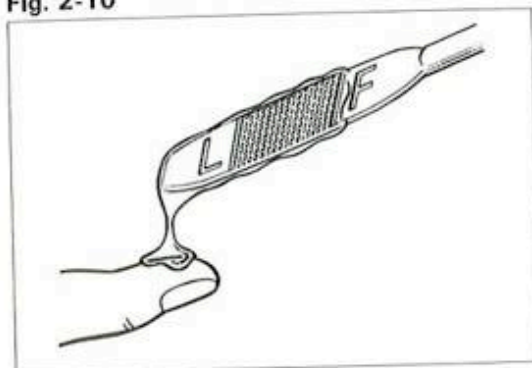
CHECK OIL LEVEL

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 the engine oil indicated below.

- USA — API service SE or better
- ECE — API service SD, SE or better
- Others — API service SC, SD, SE or better

Fig. 2-10



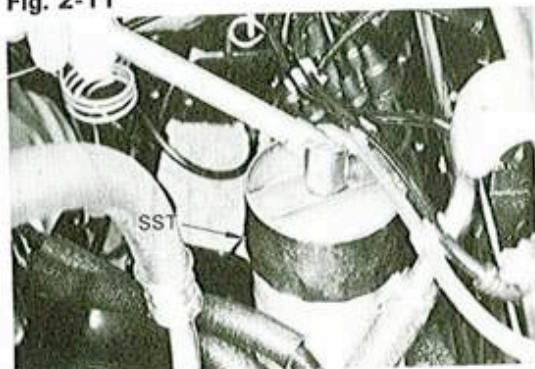
CHECK OIL QUALITY



Check for:

1. Deterioration.
2. Entry of water.
3. Discoloration or thinning.

Fig. 2-11



REPLACE OIL FILTER



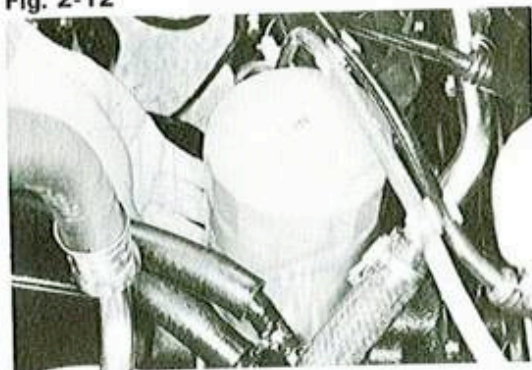
1. Remove the oil filter with SST.
2. Install a new filter and tighten it firmly by hand.



— Note —

Do not tighten with SST or a wrench.

Fig. 2-12



3. Start the engine and check for oil leakage.
4. Stop the engine and recheck the oil level.

COOLING SYSTEM



CHECK COOLANT LEVEL

If low, fill reservoir to FULL line.

— Note —

To maintain freeze protection, use a recommended anti-freeze.

Fig. 2-13

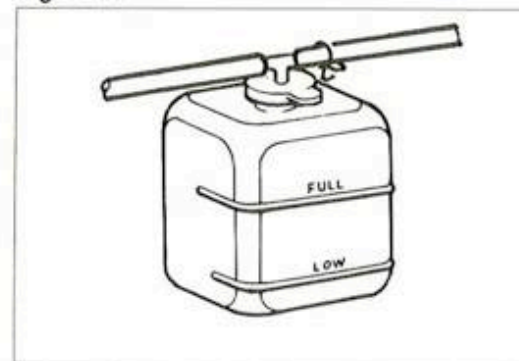
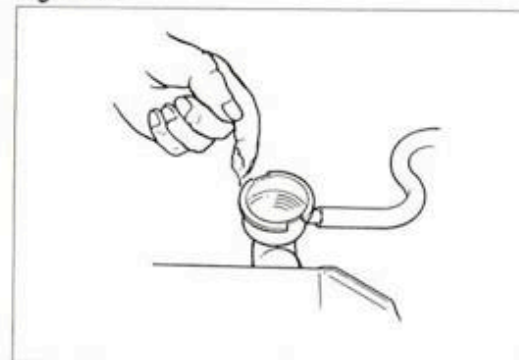


Fig. 2-14



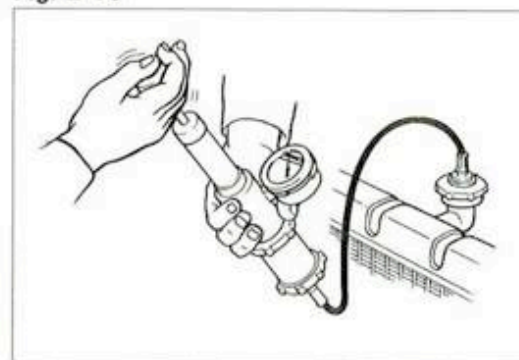
CHECK COOLANT QUALITY



Check for:

1. Coolant cleanliness.
2. Rust or scale deposits around the radiator cap and filler neck.
3. Entry of oil.

Fig. 2-15



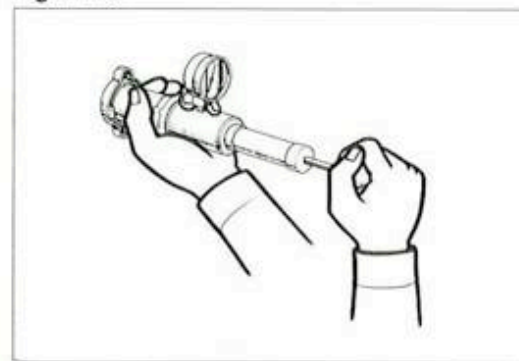
CHECK COOLING SYSTEM PARTS



Check for:

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

Fig. 2-16



5. Faulty operation of radiator cap. Inspect the spring tension and seating condition of the radiator cap vacuum valves. If the valve opens at a pressure below specification or is otherwise defective, replace the radiator cap.

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. 2-17



Fig. 2-18

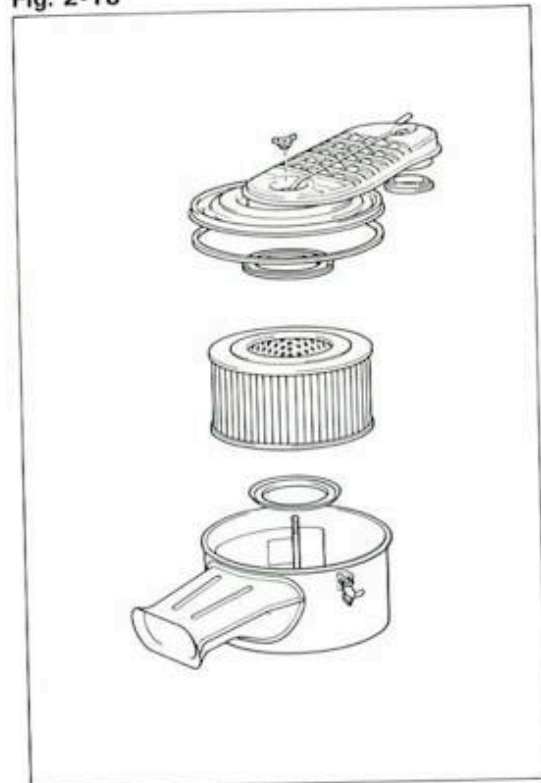
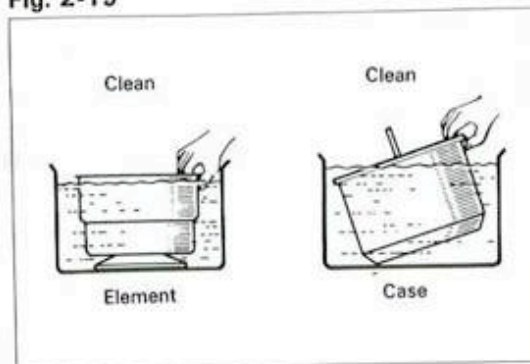


Fig. 2-19

**AIR CLEANER****[Paper Element Type]****CLEAN ELEMENT**

1. Remove the air cleaner.

— Note —

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

2. Remove the element and blow compressed air from inside.
3. Replace the element with a new one if torn or excessively dirty.

VISUAL CHECK

Check for:

1. Damaged, worn or deteriorated gaskets.
2. Damaged or worn seal washer.

INSTALL AIR CLEANER

1. Install the gaskets.
2. Finger tighten the brackets.
3. After installing the element, tighten the air cleaner cap with the clips.
4. Tighten the wing nut and brackets.

[Oil Bath Type]**CLEAN ELEMENT**

1. Remove the air cleaner and element.
2. Clean the element and case with kerosene and dry them thoroughly.

Fig. 2-20

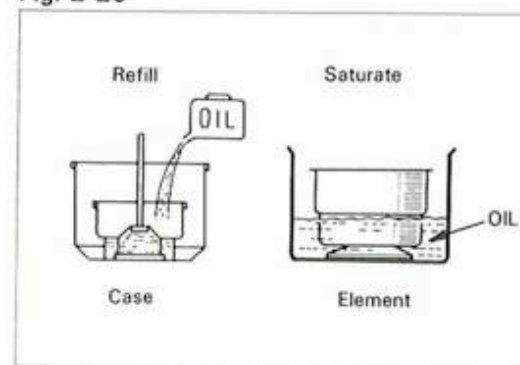


Fig. 2-21

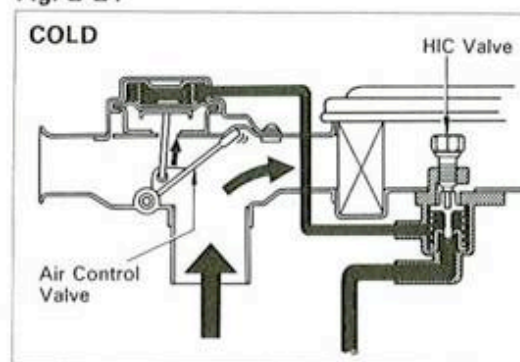


Fig. 2-22

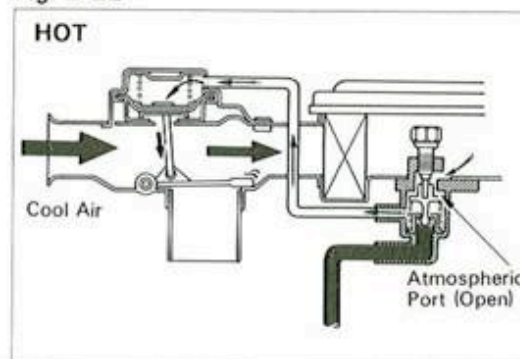


Fig. 2-23

**INSTALL AIR CLEANER**

1. Refill the case up to the indicated level with clean engine oil.
2. Saturate the element with clean engine oil.
3. Install the cap and element.
4. Tighten the air cleaner on the air cleaner support.

HOT AIR INTAKE (USA, N.S.W. & ECE FJ series)**INSPECTION**

1. Remove the air cleaner cap.
2. Cool the HIC valve by blowing compressed air on it.
3. Check that the air control valve closes the cool air passage at idle.
4. Reinstall the air cleaner cap and warm up the engine.
5. Check that the air control valve opens the cool air passage at idle.

SPARK PLUGS**VISUAL CHECK**

Check for:

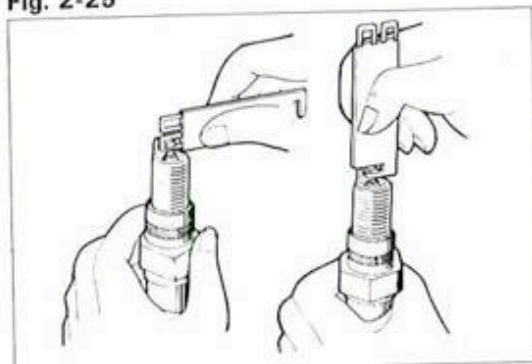
1. Cracks or other damage on the threads and insulator.
2. Electrode wear.
3. Damaged or deteriorated gaskets.
4. Burnt electrode or excess carbon deposits.

Fig. 2-24

**CLEAN SPARK PLUGS**

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

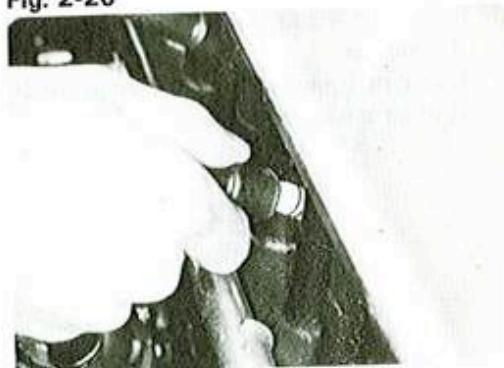
Fig. 2-25

**ADJUST SPARK PLUG GAP**

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

Spark plug gap: 0.8 mm
(0.031 in.)

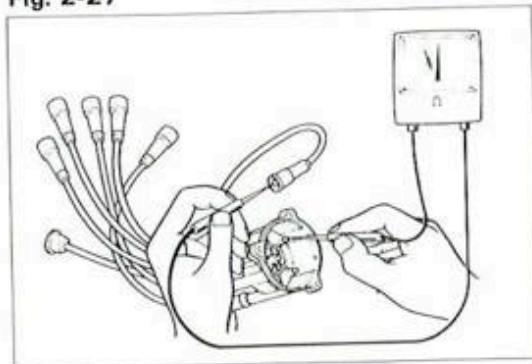
Fig. 2-26

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

— Note —

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

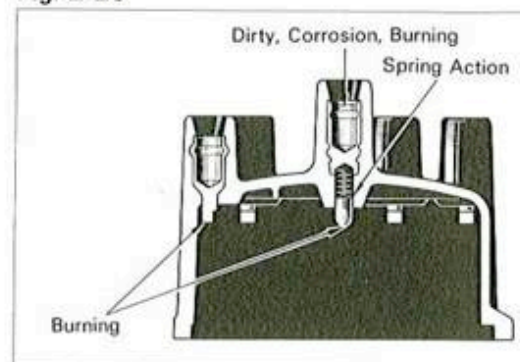
Fig. 2-27



Check the cord resistance.

Resistance:
Less than 25 kΩ per cord

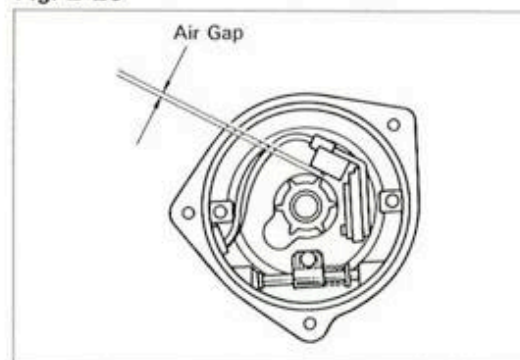
Fig. 2-28

**DISTRIBUTOR****CHECK DISTRIBUTOR CAP**

Clean the distributor cap and check the cap and rotor for:

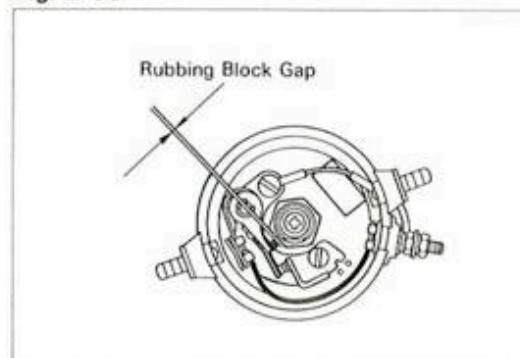
1. Cracks, damage, corrosion, burning or dirty cord hole.
2. Burnt electrode terminal.
3. Weak center piece spring action.

Fig. 2-29

**ADJUST GAP**

1. Adjust the air gap. (USA)
Air gap: 0.2 – 0.4 mm
(0.008 – 0.016 in.)

Fig. 2-30



2. Adjust the rubbing block gap. (Others)
Rubbing block gap:
0.3 mm
(0.012 in.)

Fig. 2-31

**CHECK GOVERNOR OPERATION**

1. Turn the rotor clockwise and release it. The rotor should return quickly.
2. Check the rotor for looseness.

Fig. 2-32

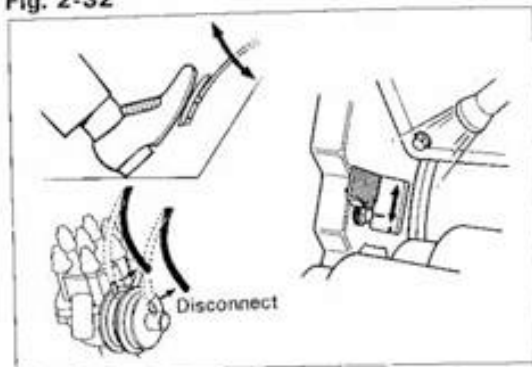
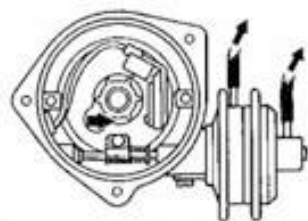
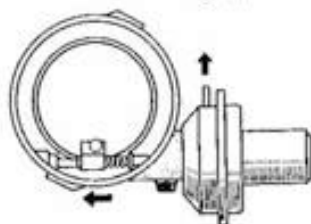


Fig. 2-33

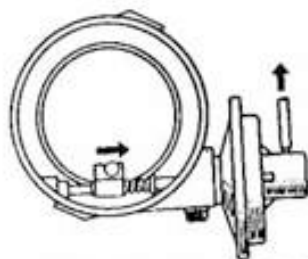
USA



N.S.W.



Others



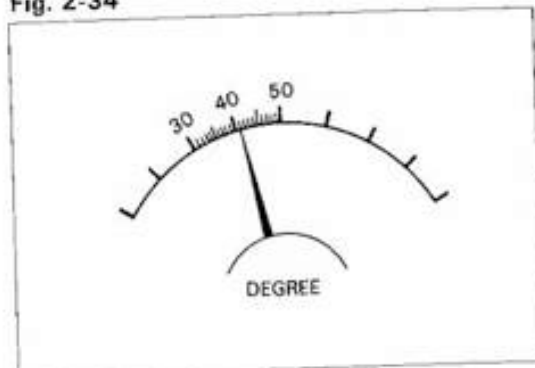
3. Start the engine and disconnect the vacuum hoses from the distributor. The timing mark should vary with the engine rpm.



CHECK VACUUM ADVANCER OPERATION

Apply vacuum to the diaphragm and check that the vacuum advancer moves in accordance with the vacuum.

Fig. 2-34



IGNITION TIMING



CHECK DWELL ANGLE (except USA)

Using a dwell angle tester, check the dwell angle at idle speed before adjusting the ignition timing.

Dwell angle: 41°

If the angle does not meet specification, adjust the rubbing block gap as follows:

- More than 42° —> Decrease the gap.
- Less than 40° —> Increase the gap.

Fig. 2-35

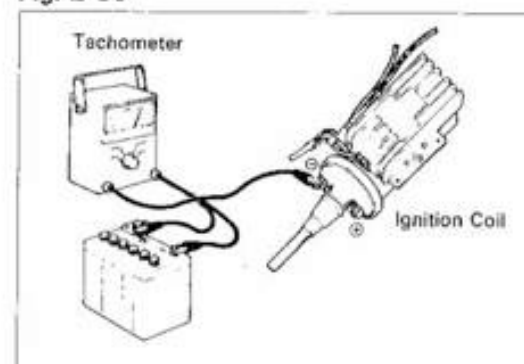


Fig. 2-36

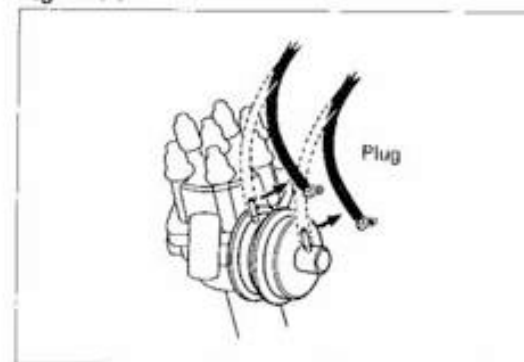


Fig. 2-37

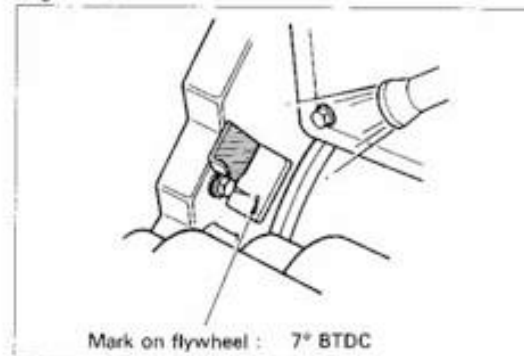
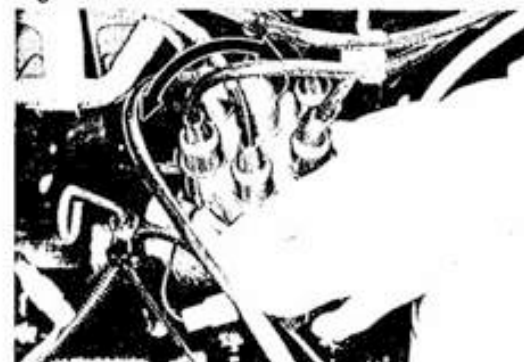


Fig. 2-38



CHECK IGNITION TIMING

1. Connect a tachometer and timing light.

— Note —

1. Do not keep the ignition switch ON for more than 10 minutes if the engine will not start.
2. As some tachometers are not compatible with this ignition system, it is recommended that you consult with the manufacturer.
3. NEVER allow the ignition coil terminals to touch ground as it could result in damage to the igniter and/or ignition coil.
4. Do not disconnect the battery when the engine is running.
5. Make sure that the igniter is properly grounded to the body.
2. Warm up the engine.
3. Disconnect the vacuum hoses from the distributor and plug the ends of them.



4. Check the ignition timing with the engine idling.

Ignition timing:

**7° BTDC/Max. 950 rpm
(w/ Vacuum advance cut)**



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

Fig. 2-39

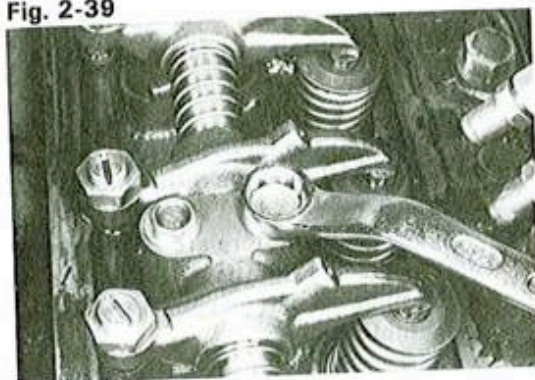


Fig. 2-40

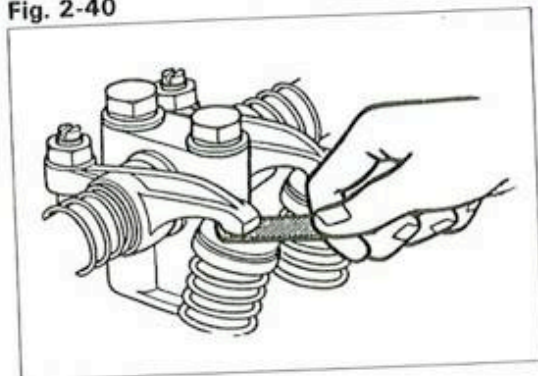


Fig. 2-41

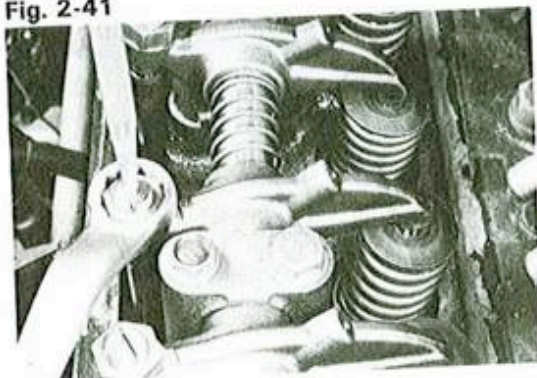
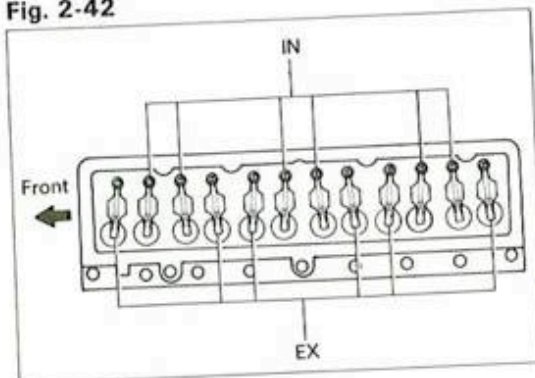


Fig. 2-42



VALVE CLEARANCE

ADJUSTMENT

1. Warm up the engine to normal operating temperature.
2. Stop the engine and retighten the cylinder head bolts, the rocker support bolts and nuts.

Tightening torque:

Cylinder head bolts
11.5 – 13.5 kg-m
(84 – 97 ft-lb)

Rocker support bolts and nuts
10 mm bolt 3.0 – 4.5 kg-m
(22 – 32 ft-lb)
8 mm bolt 2.0 – 3.0 kg-m
(15 – 21 ft-lb)

3. Adjust the valve clearance.
(1) Set the engine at idle speed, and check the valve clearance. Adjust if necessary.

Valve clearance:

Intake 0.20 mm
(0.008 in.)
Exhaust 0.35 mm
(0.014 in.)

- (2) Retighten the lock nuts securely after adjustment.

- (3) Recheck the valve clearance.



CARBURETOR

CHOKE

1. Pull out the choke knob all the way and check to see that the choke valve is fully closed.

Fig. 2-43

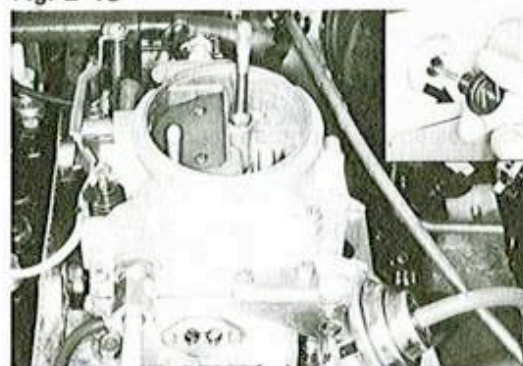
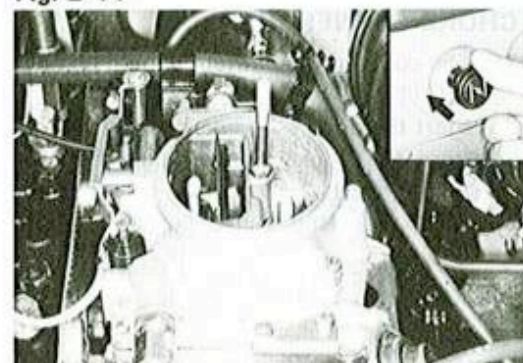
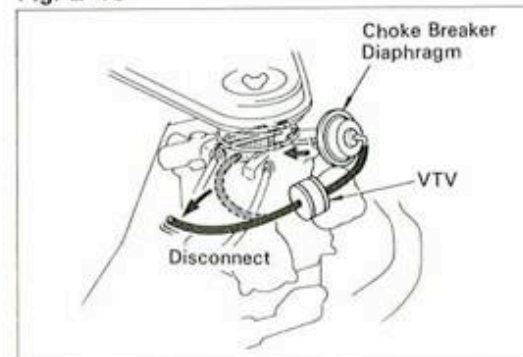


Fig. 2-44



2. Check to see that the choke valve is fully open when the choke knob has been returned.

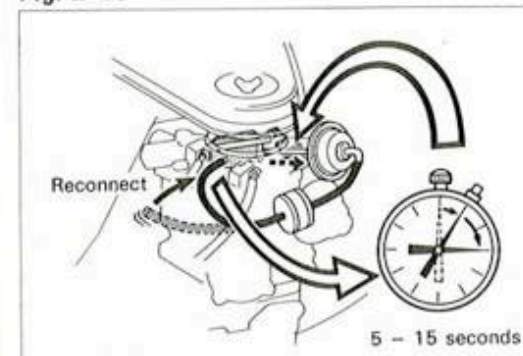
Fig. 2-45



CHOKE BREAKER (USA)

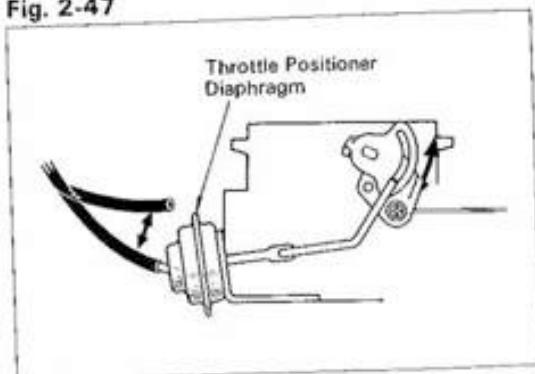
1. Start the engine.
2. Disconnect the vacuum hose between the carburetor and the VTV at the carburetor side.
3. Check that the choke breaker linkage returns quickly by spring tension.

Fig. 2-46



4. Reconnect the hose.
5. Check that the choke breaker linkage is pulled into the diaphragm within 5 – 15 seconds after reconnecting the hose.

Fig. 2-47



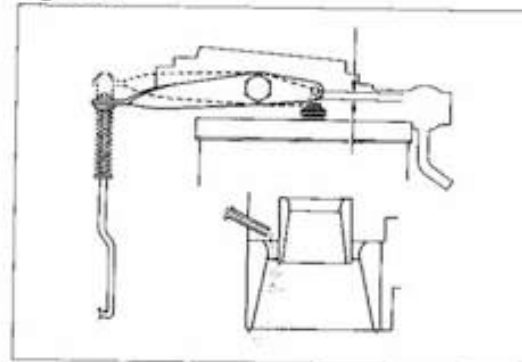
CHOKE BREAKER (FJ except General and USA)

1. Start the engine.
2. Disconnect the hose from the throttle positioner diaphragm and check that the choke linkage returns.
3. Reconnect the hose to the throttle positioner diaphragm and check that the choke linkage is pulled by the diaphragm.

— Note —

The choke breaker system utilizes the throttle positioner diaphragm.

Fig. 2-51

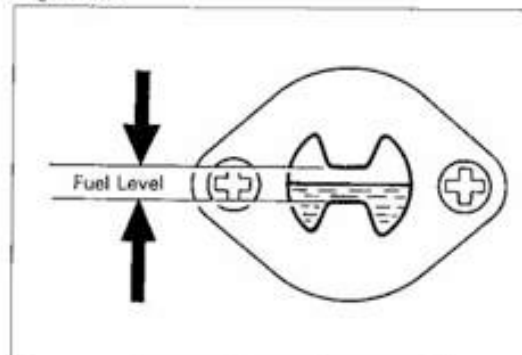


CHECK ACCELERATION PUMP

1. Check the acceleration pump operation. Gasoline should shoot out with force from the jet when the throttle valve is opened.
2. Check the throttle valve opening. The throttle valve should be fully open when the accelerator pedal is fully depressed.

Acceleration pump stroke:
9.5 mm
(0.374 in.)

Fig. 2-52



IDLE SPEED ADJUSTMENT (USA)

1. Check the following items beforehand.
 - (1) Air cleaner installed
 - (2) Normal operating coolant temperature
 - (3) Choke fully open
 - (4) All accessories switched off
 - (5) All vacuum lines connected
 - (6) Ignition timing set correctly
 - (7) Transmission in neutral
 - (8) Fuel level should be about even with the correct level in the sight glass.

Fig. 2-53

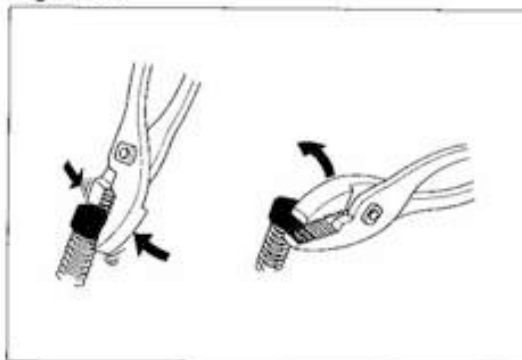
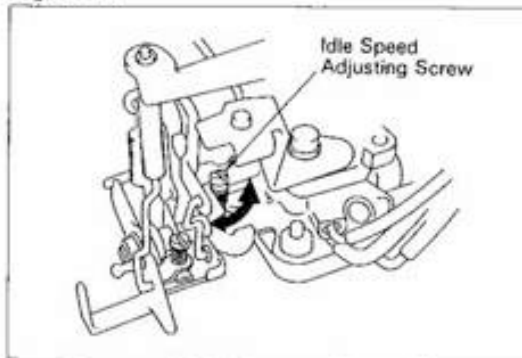


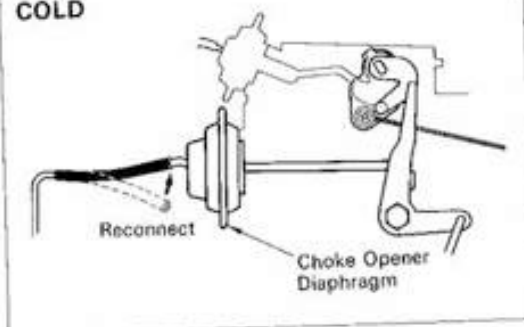
Fig. 2-54



3. Adjust the idle speed by turning the idle speed adjusting screw.
Idle speed: 650 rpm

Fig. 2-48

COLD

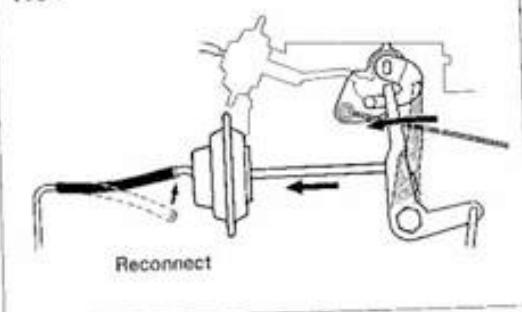


CHOKE OPENER (USA)

1. The coolant temperature should be below 5°C (41°F).
2. Start the engine and disconnect the hose from the choke opener diaphragm and reconnect it.
3. Check that the choke linkage does not move.

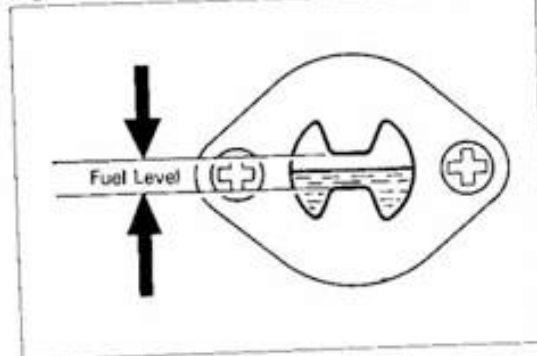
Fig. 2-49

HOT



4. With the engine warm and idling, disconnect the hose from the choke opener diaphragm and check that the choke linkage returns.
5. Reconnect the hose and check that the choke linkage is pulled by the choke opener diaphragm.

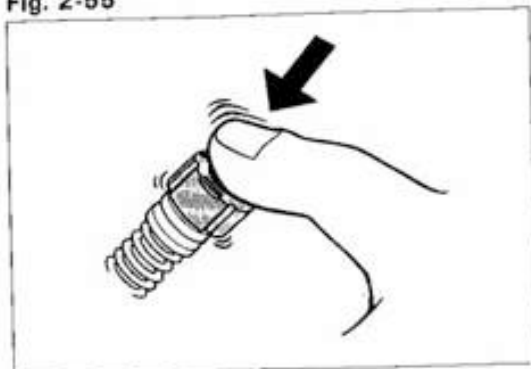
Fig. 2-50



CHECK FUEL LEVEL

Check the fuel level while the engine is idling.

Fig. 2-55



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

Fig. 2-56

SEE
FUEL SYSTEM SECTION
Fig. 6-163 to 6-175

— Note —

For the idle mixture adjustment, the idle mixture adjusting screw is adjusted and plugged with a steel plug by the manufacturer. If necessary, remove the plug and follow the procedure described in FUEL SYSTEM section.

Fig. 2-57

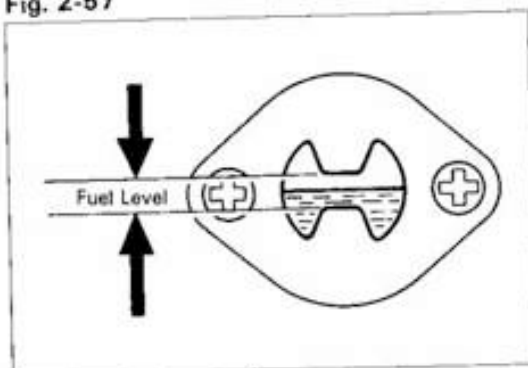
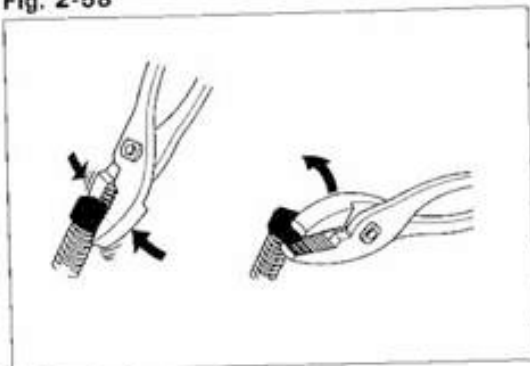


Fig. 2-58



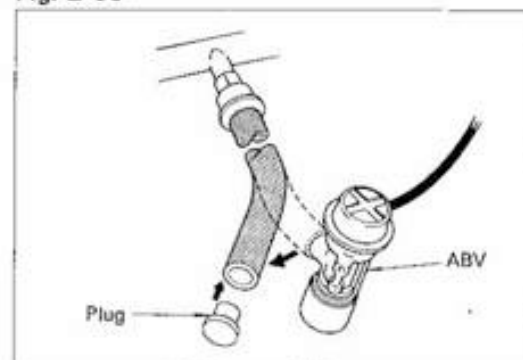
2. Break the idle limiter cap on the idle speed adjusting screw, if one is installed.



IDLE SPEED & IDLE MIX- TURE ADJUSTMENT (except USA)

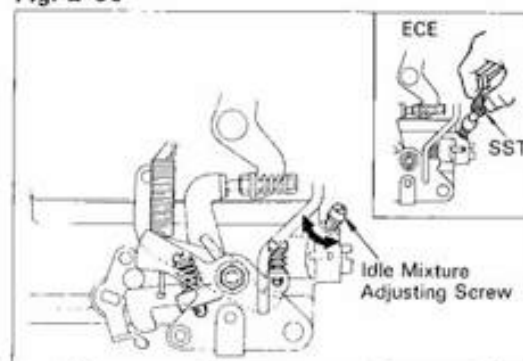
- Check the following items beforehand.
 - (1) Air cleaner installed
 - (2) Normal operating coolant temperature
 - (3) Choke fully open
 - (4) All accessories switched off
 - (5) All vacuum lines connected
 - (6) Ignition timing set correctly
 - (7) Transmission in neutral
 - (8) Fuel level should be about even with the correct level in the sight glass.

Fig. 2-59



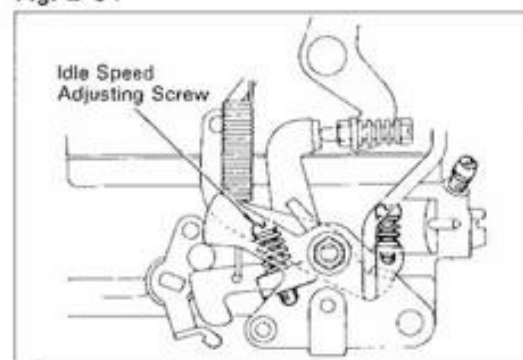
3. (N.S.W. & Victoria states)
Disconnect the air hose from the ABV and plug the hose end. (AI system OFF)

Fig. 2-60



- Start the engine.
- Set to the maximum speed by turning the idle mixture adjusting screw with SST (ECE) or a screwdriver (others).
SST [09243-00020]

Fig. 2-61

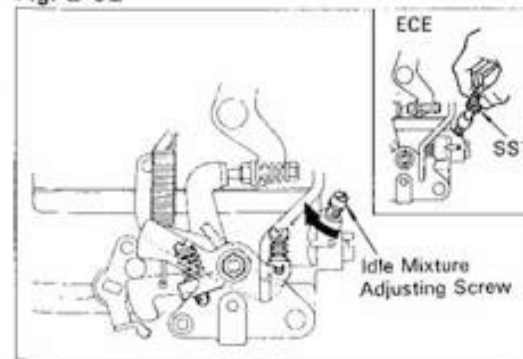


- Set to the idle mixture speed by turning the idle speed adjusting screw.
Idle mixture speed: 690 rpm

— Note —

Before moving to the next step, continue adjustments 5 and 6 above, until the maximum speed will not rise any further no matter how much the IDLE MIXTURE ADJUSTING SCREW is adjusted.

Fig. 2-62

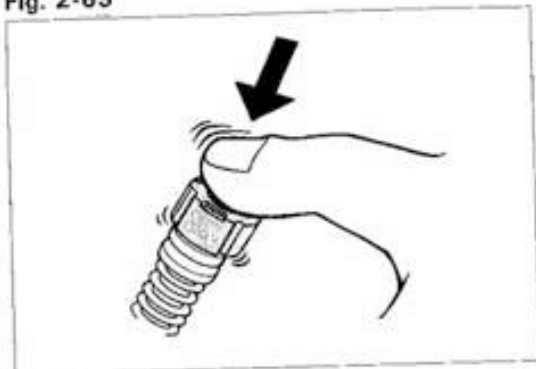


- Set to the idle speed by screwing in the idle mixture adjusting screw with SST (ECE) or a screw driver (others).
SST [09243-00020]
Idle speed: 650 rpm

— Note —

This is the LEAN DROP METHOD for setting idle speed and mixture.

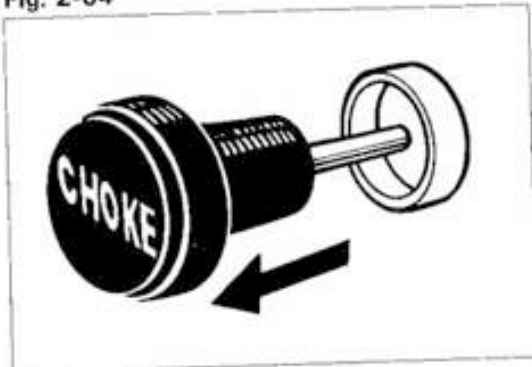
Fig. 2-63



8. (N.S.W. & Victoria states)
Reconnect the air hose to the ABV.
9. Install a new limiter cap on the idle speed adjusting screw, if one was installed.

— Note —
After completing adjustment, perform a road test to make certain engine performance has not changed.

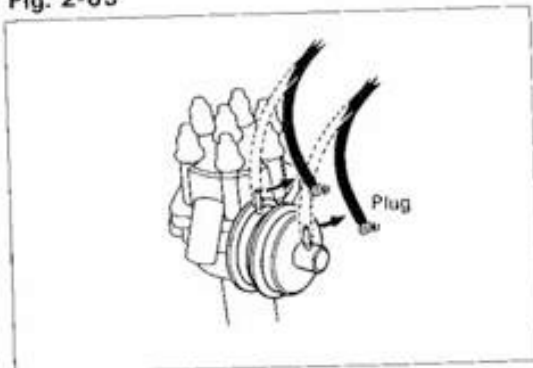
Fig. 2-64



FAST IDLE SPEED ADJUSTMENT (USA)

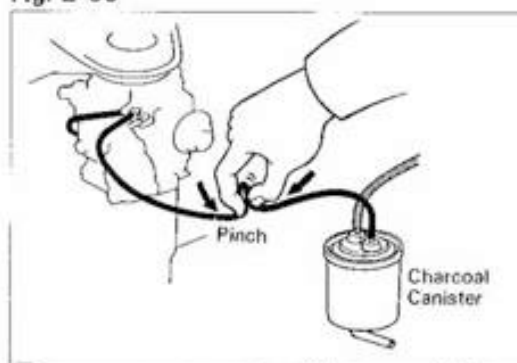
1. Warm up the engine and then stop it.
2. Remove the air cleaner cover.
3. Fully pull out the choke knob.

Fig. 2-65



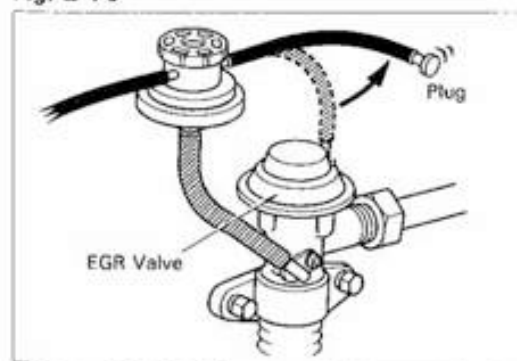
4. Disconnect the vacuum hoses from the distributor and plug the hose ends. (Vacuum advancer OFF)

Fig. 2-69



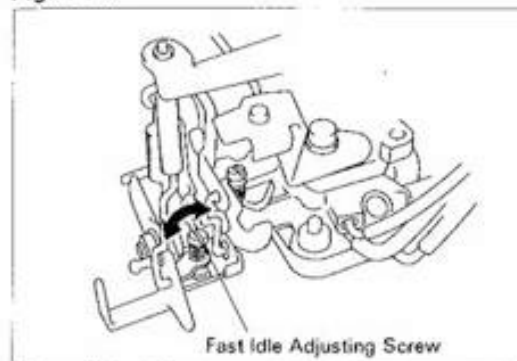
4. (N.S.W. & Victoria states)
(1) Pinch shut the vacuum hose to the charcoal canister. (EVAP system OFF)

Fig. 2-70



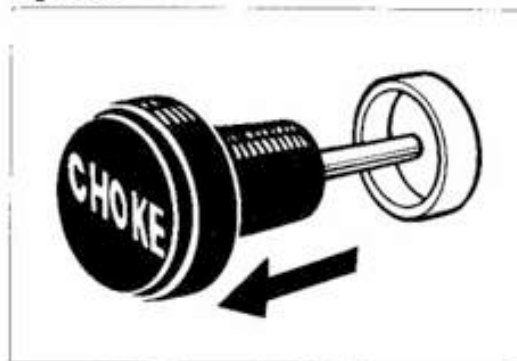
- (2) Disconnect the vacuum hose from the EGR valve and plug the hose end. (EGR system OFF)

Fig. 2-67



6. Adjust the fast idle speed by turning the fast idle adjusting screw.
Fast idle speed: 1,800 rpm
7. When the choke knob is pushed in all the way, the engine speed should return to idle speed.
8. Reinstall the air cleaner cover.

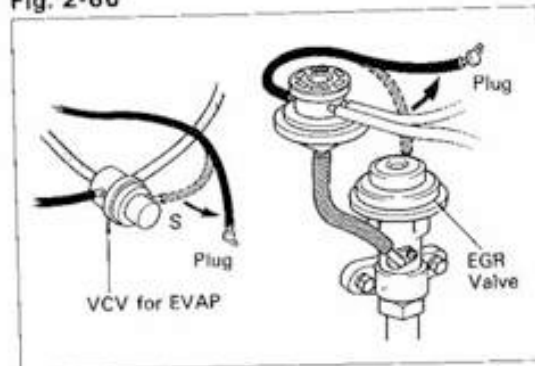
Fig. 2-68



FAST IDLE SPEED ADJUSTMENT (Others)

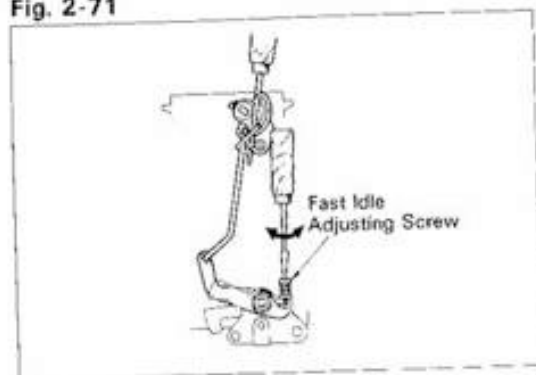
1. Warm up the engine and then stop it.
2. Remove the air cleaner cover.
3. Fully pull out the choke knob.

Fig. 2-66



5. Disconnect the vacuum hoses from port S of the VCV for EVAP, and EGR valve, and plug the hose ends. (EVAP system and EGR system OFF)

Fig. 2-71



5. Open the choke valve with a screwdriver and start the engine.
6. Adjust the fast idle speed by turning the fast idle adjusting screw.
- Fast idle speed: 1,800 rpm**
7. When the choke knob is pushed in all the way, the engine speed should return to idle speed.

Fig. 2-72

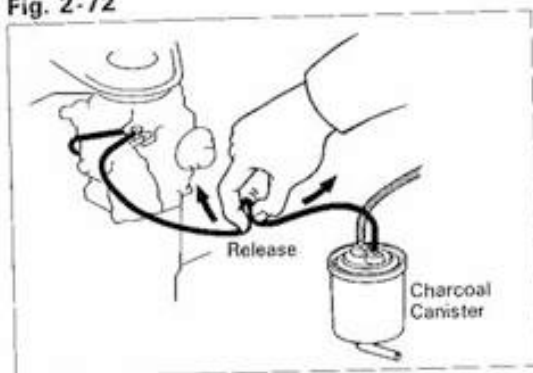


Fig. 2-73

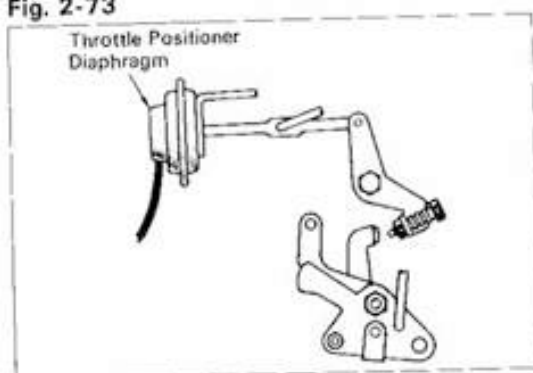
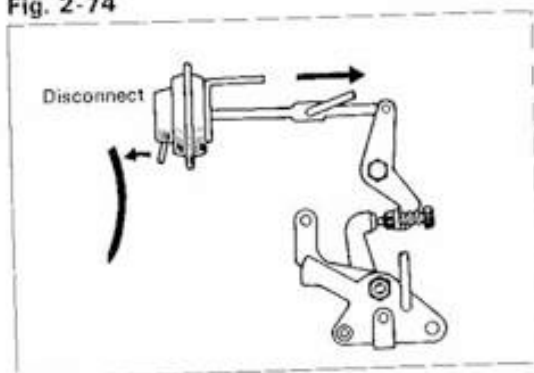


Fig. 2-74



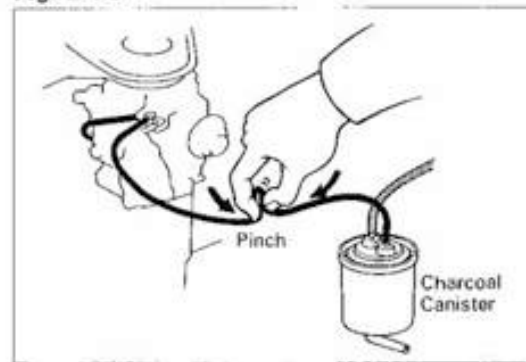
4. Disconnect the vacuum hose from the throttle positioner diaphragm and plug the hose end.
5. Race the engine and then release the accelerator pedal.
6. At this time, the throttle positioner adjusting screw should strike the throttle lever so that the engine runs faster than idle RPM. (Throttle positioner is set.)

THROTTLE POSITIONER (Australia & ECE FJ series)

CHECK THROTTLE POSITIONER OPERATION

1. Warm up the engine.
2. Check the idle speed and adjust if necessary.
3. Check that the throttle positioner is released at idle.

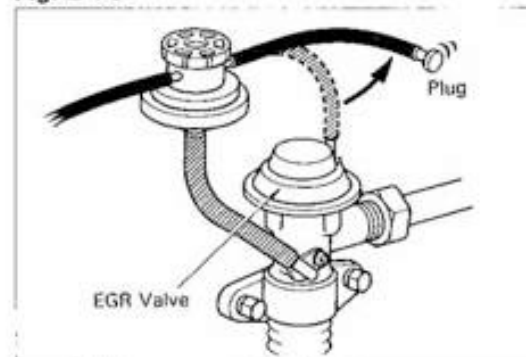
Fig. 2-75



CHECK THROTTLE POSITIONER SETTING SPEED

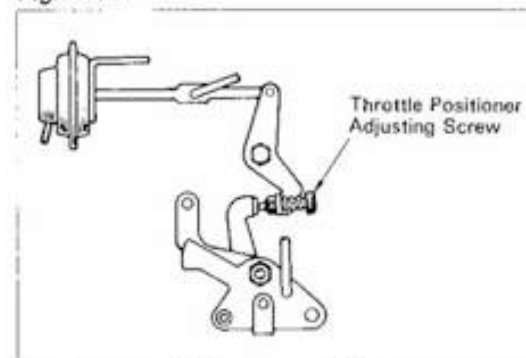
1. (N.S.W. & Victoria states)
 - (1) Pinch shut the vacuum hose to the charcoal canister. (EVAP system OFF)

Fig. 2-76



- (2) Disconnect the vacuum hose from the EGR valve and plug the hose end. (EGR system OFF)

Fig. 2-77



2. With the throttle positioner set, check the engine speed.

Throttle positioner setting speed:

N.S.W. & Victoria states

1,200 rpm

Others 1,000 rpm

3. If not at specified speed, adjust with the throttle positioner adjusting screw.
4. Release the pinched hose and reconnect the vacuum hoses to the proper locations.

Fig. 2-78



COMPRESSION PRESSURE

1. Warm up the engine.
2. Remove all spark plugs.
3. Disconnect the high tension cord from the ignition coil to cut off the secondary circuit.