18R ENGINE TUNE-UP

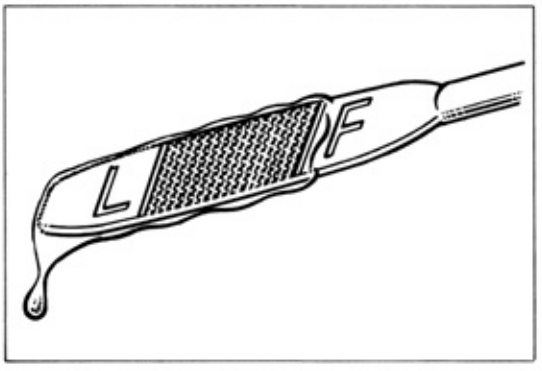
18R ENGINE TUNE-UP ITEM

	ITEM		REMARK
1	ENGINE OIL	Oil level check	"Full" line
		Oil replenishment	API service SE classification
		Oil capacity	
		RT Total	5.0 liter 5.3 US qt. 4.4 Imp.qt.
		Crankcase	3.8 liter 4.0 US qt. 3.3 Imp.qt.
		RA Total	4.7 liter 5.0 US qt. 4.1 Imp.qt.
		Crankcase	3.8 liter 4.0 US qt. 3.3 Imp.qt.
		RX Total	5.0 liter 5.3 US qt. 4.4 Imp.qt.
		Crankcase	3.9 liter 4.1 US qt. 3.4 Imp.qt.
		RN Total	5.0 liter 5.3 US qt. 4.4 Imp.qt.
		Crankcase	4.1 liter 4.3 US qt. 3.6 Imp.qt.
		Quality check	
		Oil filter replacement	SST [09228-44010]
2	COOLING SYSTEM	Coolant level check	"Full" line
		Quality check	
		Coolant capacity (w/heater)	8.0 liter 8.5 US qt. 7.0 Imp.qt.
3	DRIVE BELT	Tension Fan – Alternator	8 – 12 mm 0.35 – 0.47 in
		A/C Compressor – Crankshaft	15 – 18 mm 0.59 – 0.71 in
4	AIR CLEANER	Element cleaning	
5	BATTERY	Specific gravity	1.25 – 1.27 at 20°C (68°F)
		Electrolyte level	
6	SPARK PLUG	Visual check	
		Cleaning	
		Plug gap	0.8 mm 0.03 in
7	HIGH TENSION CORD	Resistance	Less than 25 kΩ per cord
8	DISTRIBUTOR	Distributor cap	
		Point gap	0.45 mm
		Damping spring gap	0.1 – 0.4 mm 0.004 – 0.168 in
		Dwell angle	50 – 54°
		Dwell angle variation	within 3°
		Ignition timing	7° BTDC/750 ± 50 rpm
		Governor operational	
		Vacuum operational	

	ITEM		REMARKS	
	WARM UP ENGINE			
9	VALVE CLEARANCE (HOT)	Intake	0.20 mm	0.008 in
		Exhaust	0.36 mm	0.014 in
10	CARBURETOR	Automatic check		
		Check throttle valve full open		
		Check the accelerating pump		
		Float level		
11	INITIAL IDLE SPEED	Idle speed	750 ± 50 rpm	
		Manifold vacuum	420 mm Hg	16.5 in Hg
12	CO CONCENTRATION		1–3 %	
13	ENGINE CONDITION			
14	FAST IDLE		2600 ± 200 rpm	
15	COMPRESSION PRESSURE	Standard	12.0 kg/cm^2	170.4 psi
		Limit	9.0 kg/cm^2	127.8 psi
		Difference of pressure between cylinders	Less than 1.0 kg/cm^2	14.2 psi

ENGINE OIL

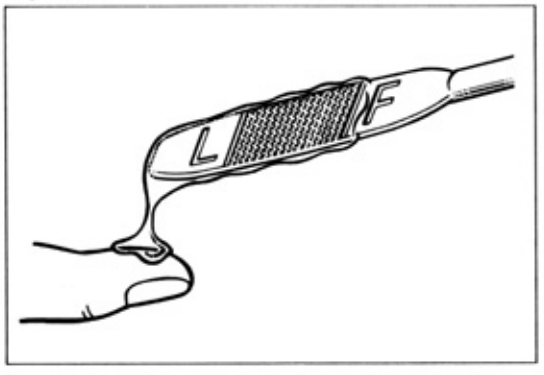
Fig. 2-1



LEVEL CHECK and REPLENISHMENT

Oil level should be up to the F line on the level gauge. If low, add oil up to the F line.
Use API service SE classification engine oil.

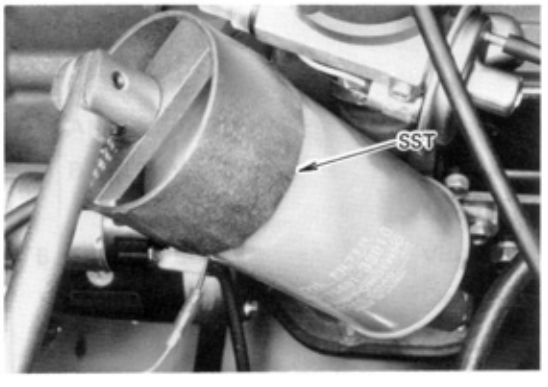
Fig. 2-2



QUALITY CHECK

Pull out the oil level gauge and examine the oil adhering on the graduated part. The oil should not be discolored or thin.

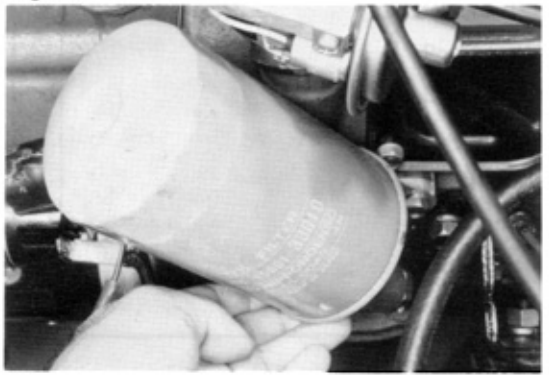
Fig. 2-3



OIL FILTER REPLACEMENT

1. Remove the oil filter by using SST [09228-44010].
2. For installation, tighten firmly the oil filter by hand.

Fig. 2-4



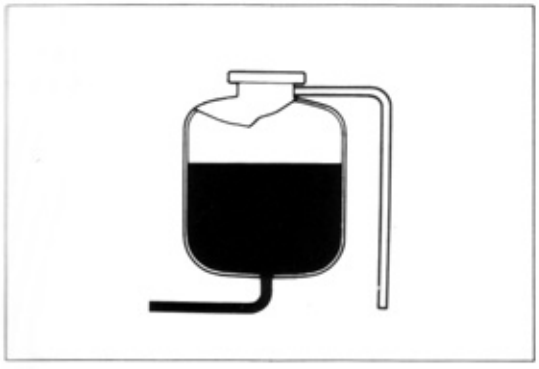
3. After starting the engine, check for oil leak and recheck the oil level.

COOLING SYSTEM

COOLANT LEVEL CHECK and REPLENISHMENT

If coolant is low, fill resorvoir tank up to "Full" line.

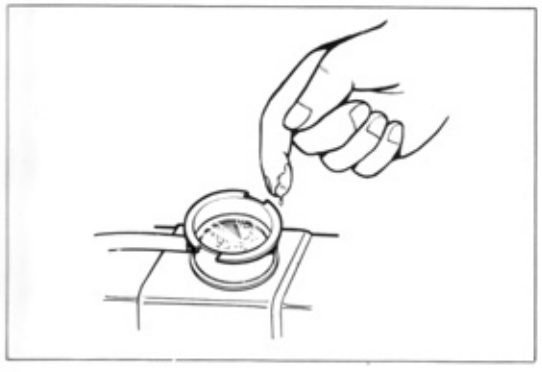
Fig. 2-5



COOLANT QUALITY CHECK

There should not be any excessive deposit of rust or scales around the radiator cap or radiator filler hole, and the coolant should also be free from oil. Replace the coolant if excessively dirty.

Fig. 2-6

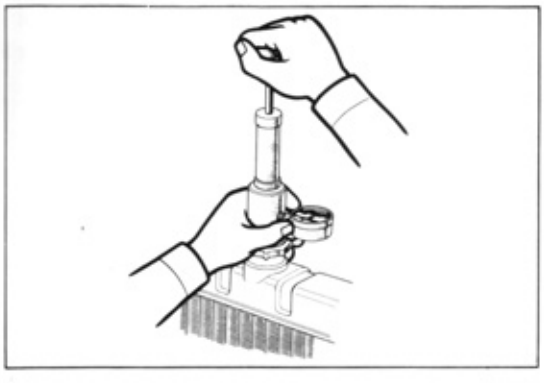


INSPECTION of COOLING SYSTEM PARTS

There should be no defects such as listed below:

1. Damage, deterioration, or loose clamps in radiator hoses, water hoses.
2. Leakage due to corrosion or damage in radiator core.
3. Leakage due to loose water drain cock.
4. Leakage from water pump.

Fig. 2-7



5. Faulty operation of radiator cap.

Inspect the radiator cap pressure regulating and vacuum valves for spring tension and seating condition. If the valve opens at a pressure level below the specified value or is otherwise defective, replace the radiator cap.

Valve opening pressure limit

	0.6 kg/cm² (8.5 psi)
Standard	**0.9 kg/cm² (12.8 psi)**

Fig. 2-8

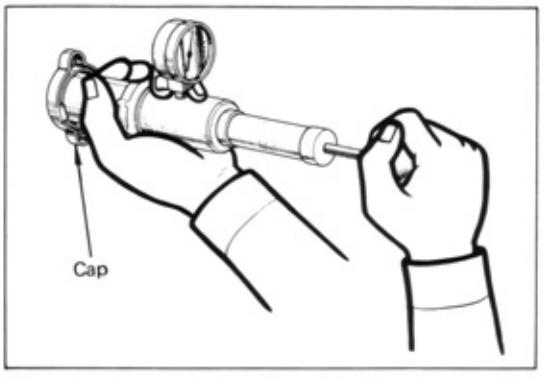
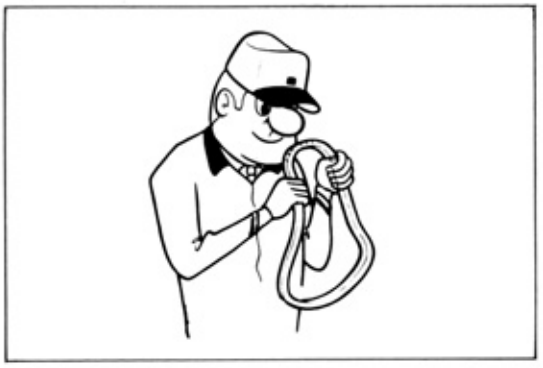


Fig. 2-9



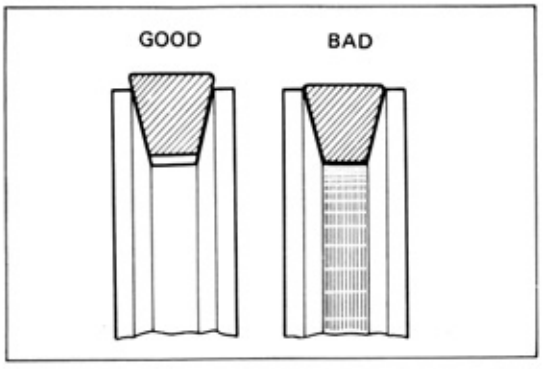
DRIVE BELT

VISUAL CHECK

There should be no defects such as listed below:

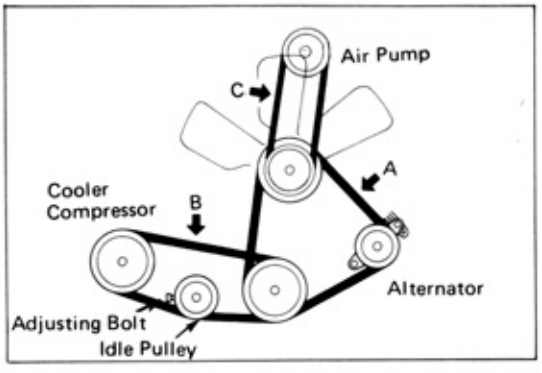
1. Cracked, deteriorated, stretched, or worn belt.
2. Adherence of oil or grease.

Fig. 2-10



3. Improper contacting of belt against the pulley.

Fig. 2-11



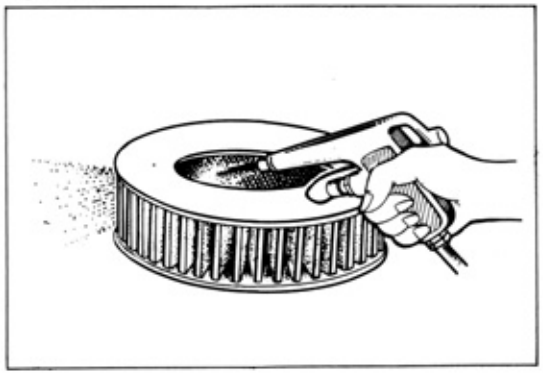
TENSION CHECK and ADJUSTMENT

When the belt is pressed down with 10 kg (22 lb) force, the belt should deflect the specified amount.

A : 9 – 13 mm (0.35 – 0.51 in)
B : 15 – 18 mm (0.59 – 0.71 in)
C : 13 – 18 mm (0.51 – 0.71 in)

– Caution –
Do not pry aluminum body of air pump.

Fig. 2-12

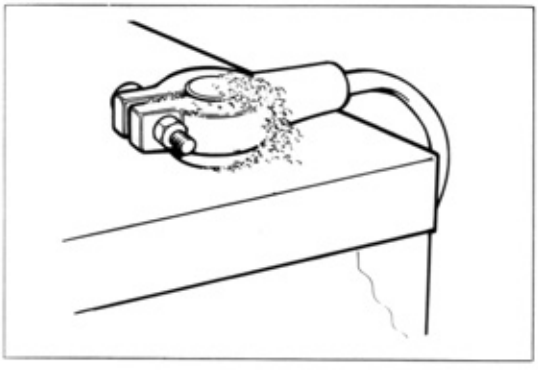


AIR CLEANER

ELEMENT CLEANING

1. In removing the air cleaner or element, and after removal, use care not to drop dirt and dust down into the carburetor.
2. In cleaning the element, blow air from the inner side.
3. In case the element is torn or excessively dirty, replace with new one.

Fig. 2-13



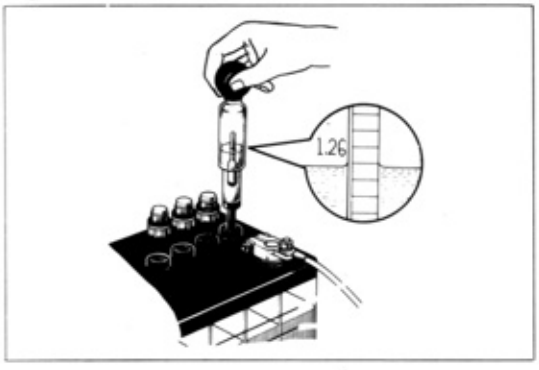
BATTERY

VISUAL CHECK

If very dirty, remove and clean before checking. There should be no defects such as listed below:

1. Rusted battery mounting hardware.
2. Damage or leakage in battery.
3. Loose connection, rusting, deterioration or corrosion of battery terminals.

Fig. 2-14

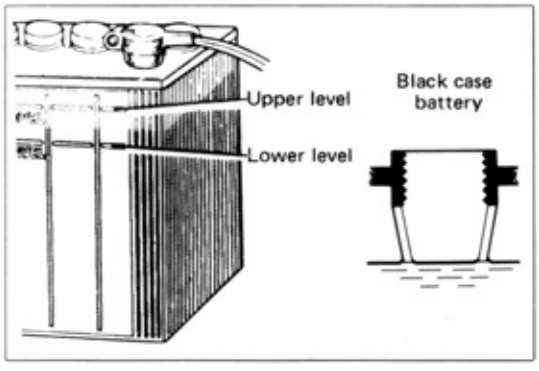


SPECIFIC GRAVITY MEASUREMENT

Hold the hydrometer so that the float will not contact against the cylinder wall and read the graduation.

Specific gravity	**1.25–1.27 at 20°C (68°F)**

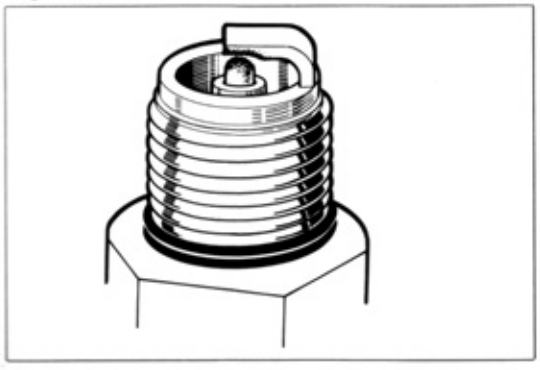
Fig. 2-15



ELECTROLYTE LEVEL CHECK and REPLENISHMENT

The electrolyte level should be up to the upper level. If low, add distilled water (or purified water).

Fig. 2-16



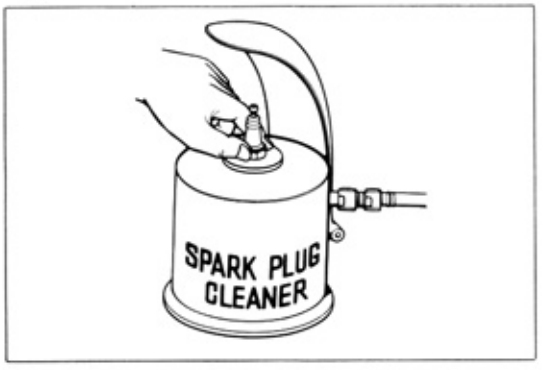
SPARK PLUG

VISUAL CHECK

Condition is good if none of the following defects are present:

1. Cracks or damages in the threads or insulator.
2. Wear on the electrodes.
3. Damaged or deteriorated gaskets.
4. Burnt condition of electrode and undesirable carbon deposit.

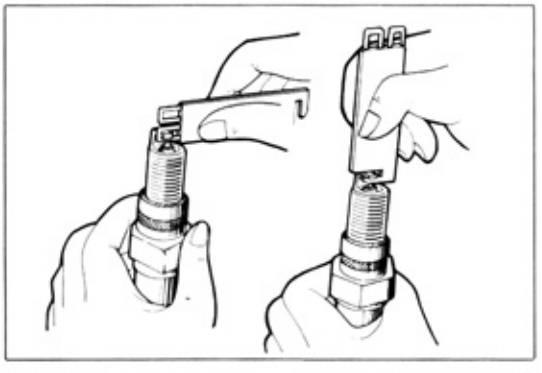
Fig. 2-17



CLEANING

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

Fig. 2-18

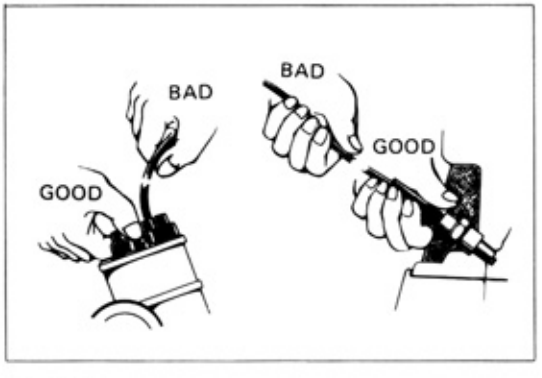


GAP ADJUSTMENT

Check the plug gap with plug gap gauge. If not to specified value, adjust by bending the ground (outer) electrode.

Plug gap **0.8 mm (0.031 in)**

Fig. 2-19

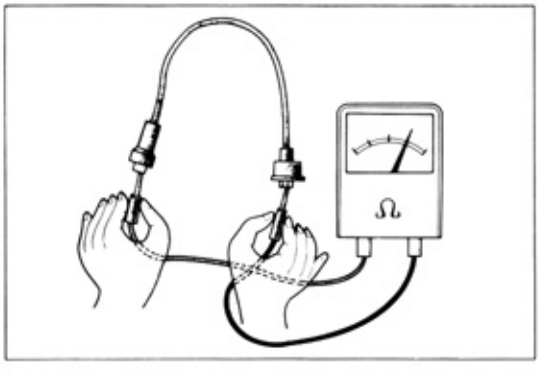


HIGH TENSION CORD

– Note –

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

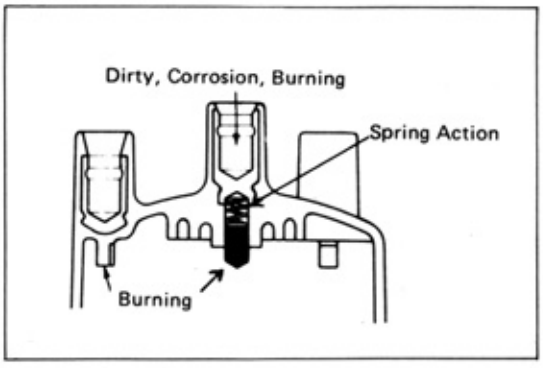
Fig. 2-20



Check the resistance of resistivity cord.

Resistance **Less than 25 kΩ per cord.**

Fig. 2-21



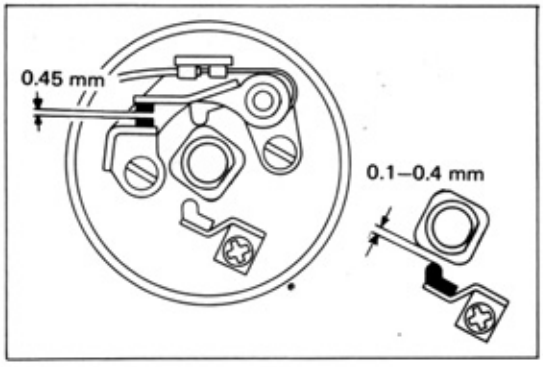
DISTRIBUTOR

CAP INSPECTION

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

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

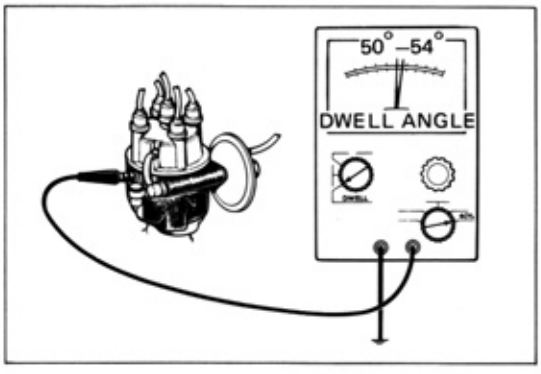
Fig. 2-22



POINT GAP ADJUSTMENT

1. If the points are excessively burnt or pitted, replace the breaker points.
2. Adjust point gap and damping spring.
   Point gap 0.45 mm (0.018 in)
   Damping spring gap
   0.1 – 0.4 mm
   (0.004 – 0.168 in)

Fig. 2-23



DWELL ANGLE

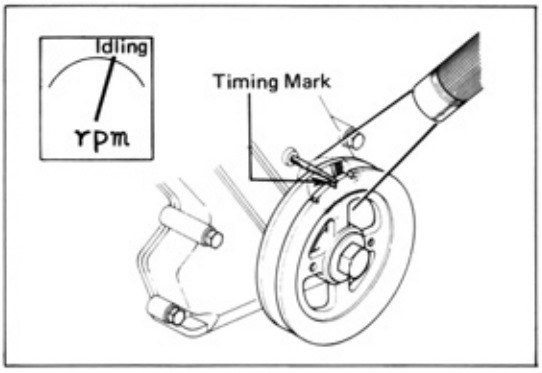
Check if dwell angle is within the specified value.

Dwell angle 50 – 54°

Variation

within 3° (at idling to 2000 rpm)

Fig. 2-24



IGNITION TIMING INSPECTION

Set the engine revolution at idle speed.

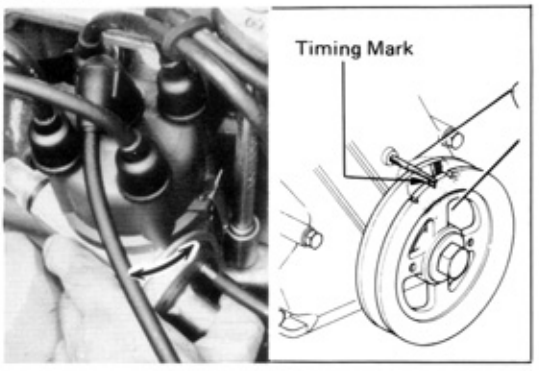
The octane selector must be set at standard position.

Ignition timing

7° BTDC/750 ± 50 rpm

(Red mark)

Fig. 2-25

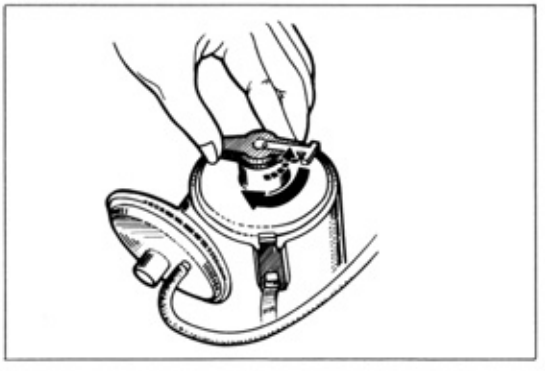


ADJUSTMENT

Align the timing marks by turning distributor body.

Ignition timing **7° BTDC/750 ± 50 rpm (Red mark)**

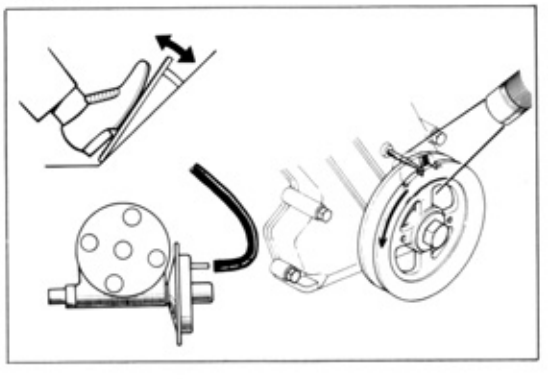
Fig. 2-26



GOVERNOR OPERATIONAL INSPECTION

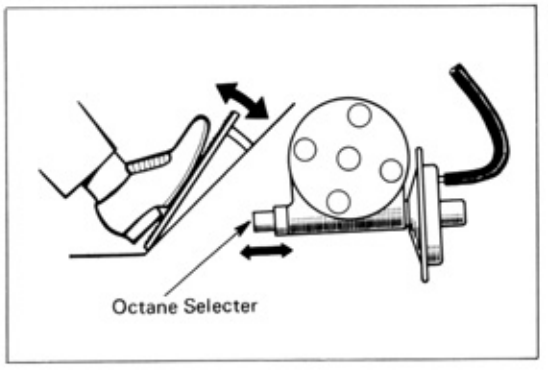
1. Rotor should return quickly when turned clockwise by hand and released.
2. Rotor should not be excessively loose.

Fig. 2-27



3. Start the engine and disconnect the vacuum hose from the distributor. The timing mark should vary in accordance with the opening and closing of throttle valve.

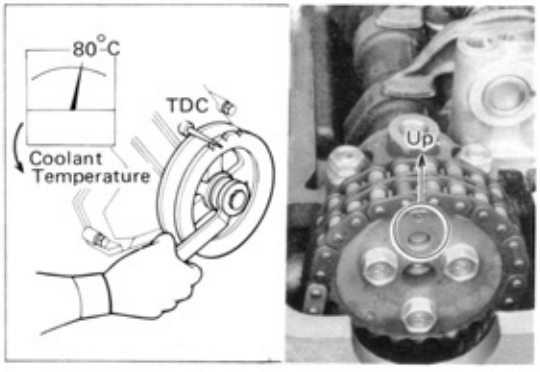
Fig. 2-28



VACUUM ADVANCE OPERATIONAL INSPECTION

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

Fig. 2-29

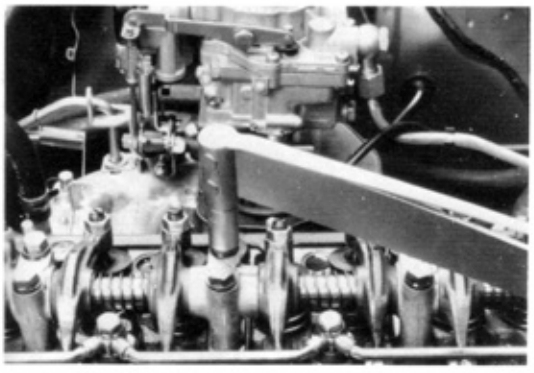


VALEVE CLEARANCE

ADJUSTMENT

1. Warm up engine, then stop.
2. Set No.1 cylinder to TDC/compression.
   At TDC compression position, camshaft knock pin should point up.

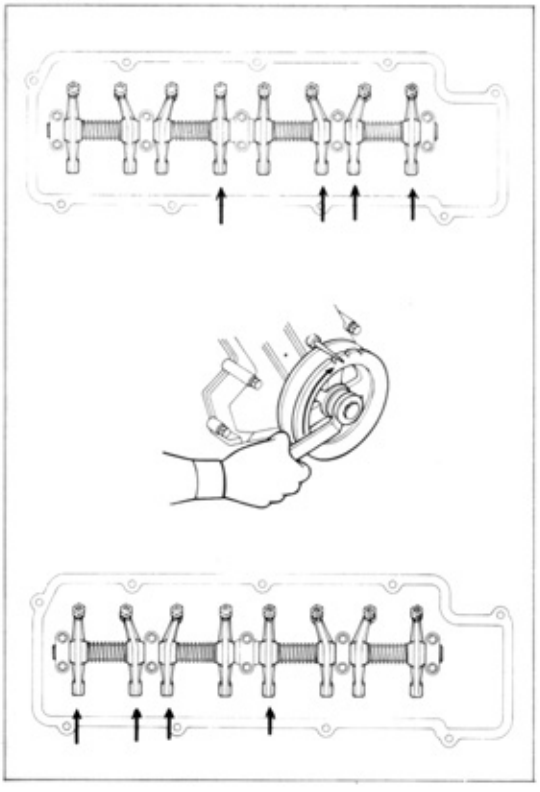
Fig. 2-30



3. Stop the engine.
4. Tighten the rocker support.

   Torque **1.7 – 2.3 kg-m (12.3 – 16.6 ft-lb)**

Fig. 2-31



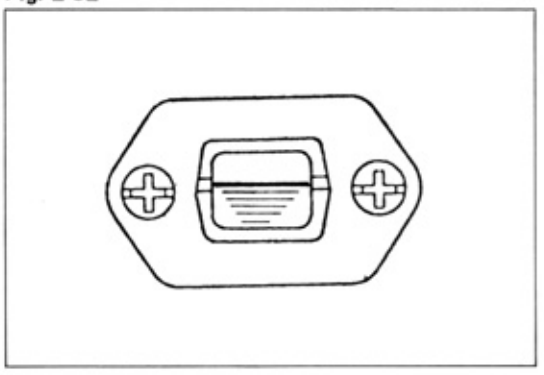
5. Make adjustment.
   Valve clearance is measured between valve stem and rocker arm.
   Adjust valves indicated by arrows only.

   Intake **0.20 mm (0.008 in)**
   0.36 mm (0.012 in)

6. Rotate crankshaft 360°.

7. Adjust remaining valve as arrows.

Fig. 2-32

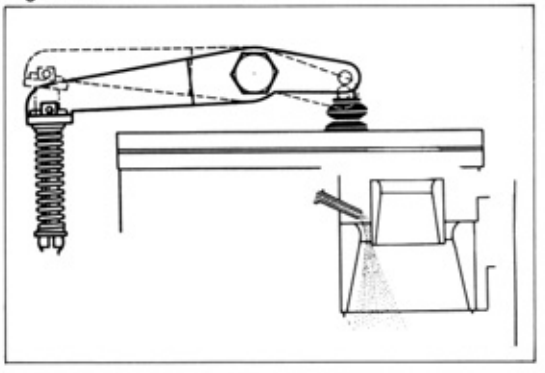


CARBURETOR

OPERATIONAL CHECK

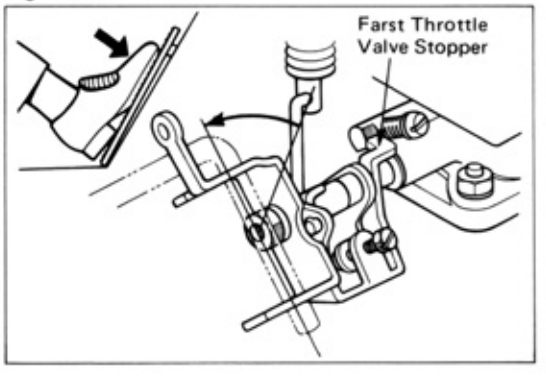
1. Check float level.
   Float level is satisfactory if the fuel level is up to the standard line when the engine is idling. For adjustment, refer to carburetor section.

Fig. 2-33



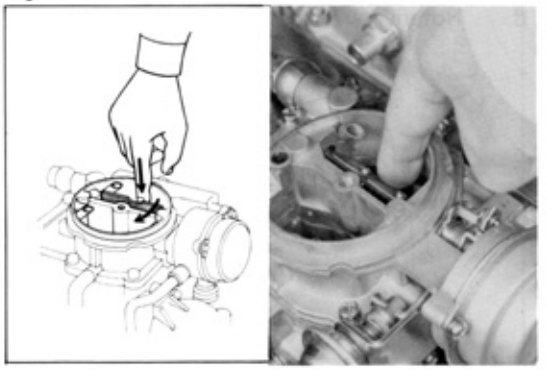
2. Check the accelerating pump operation.
   Gasoline should shoot out with good force from the jet when the throttle valve is opened.

Fig. 2-34



3. Check throttle valve full open.
   The throttle valve should open fully when the accelerator pedal is stepped all the way down.

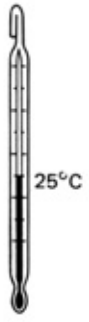
Fig. 2-35

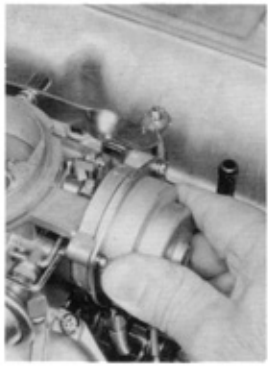


[COLD CONDITION] AUTOMATIC CHOKE

1. Check choke valve action.

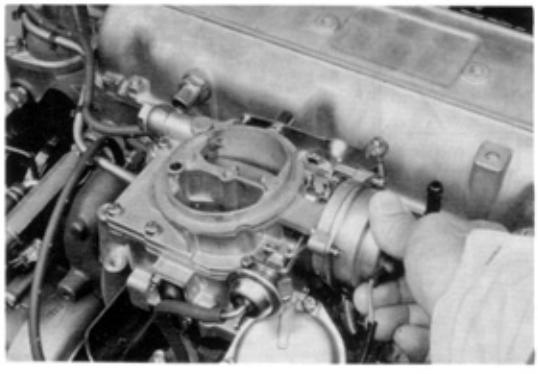
Fig. 2-36





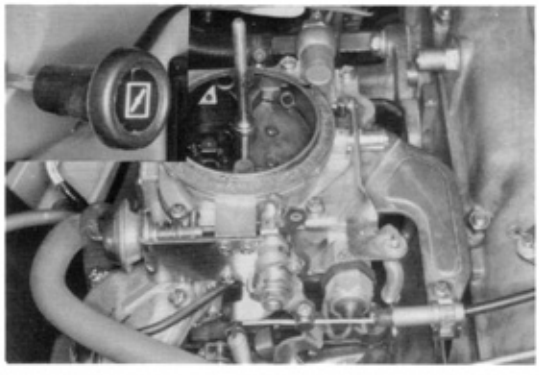
2. Choke valve becomes fully closed when atmospheric temperature reaches 25°C (77°F).

Fig. 2-37



3. Depending on the vehicle operating conditions, turn the coil housing and adjust the engine starting mixture.
   If too rich ..... Turn clock-wise.
   If too lean ... Turn counterclock-wise.

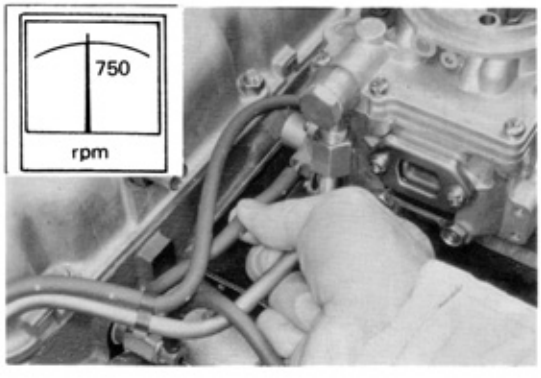
Fig. 2-38



MANUAL CHOKE

1. Choke valve becomes fully closed when fully pulled out choke knob.

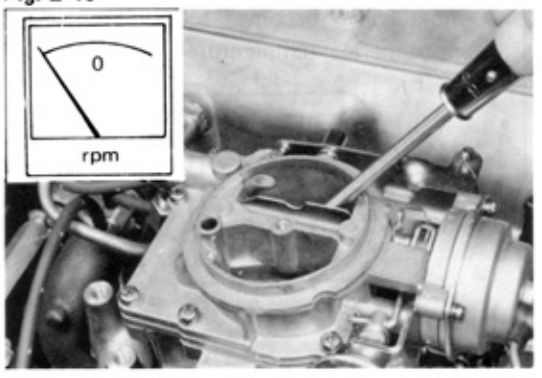
Fig. 2-39



AAP

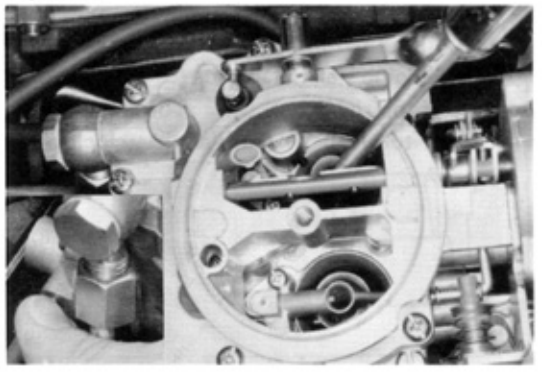
1. Start engine.
2. Pinching AAP hose.

Fig. 2-40



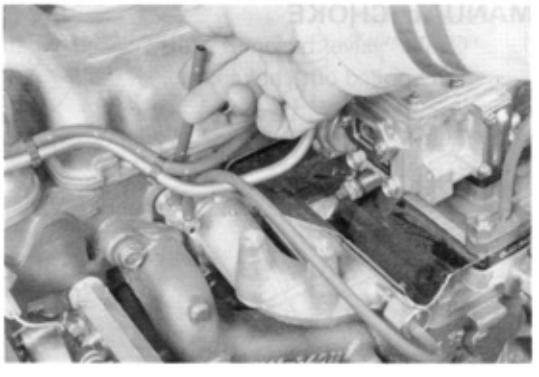
3. Stop engine and open choke valve.

Fig. 2-41



4. Gasoline should shurt out from accelerating jet when AAP hose released.

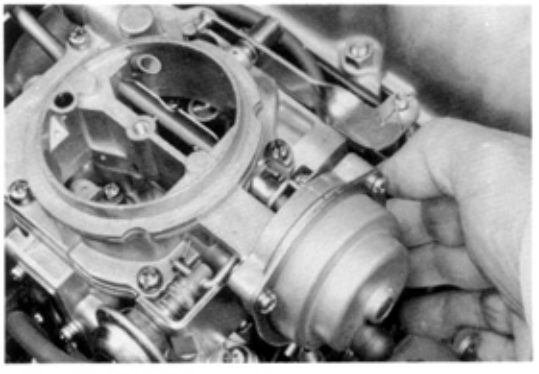
Fig. 2-42



TVSV (for AAP)

1. Have engine idling. (below 60°C, 140°F)
2. When hose is disconnected from AAP diaphragm, engine should run rough idling.

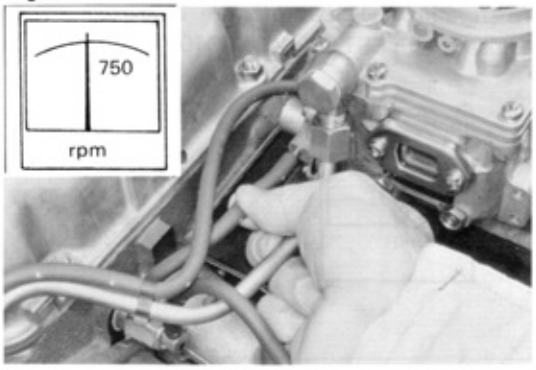
Fig. 2-43



[HOT CONDITION] AUTOMATIC CHOKE

1. With engine warm up, choke valve should be open.

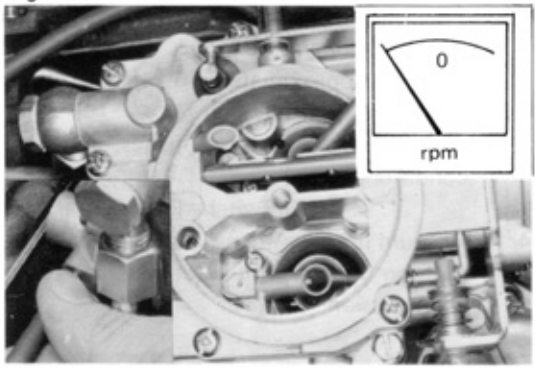
Fig. 2-44



AAP

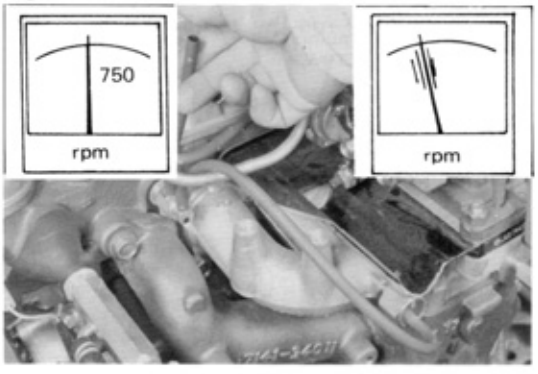
1. Start engine.
2. Pinching AAP hose.

Fig. 2-45



3. Stop engine.
4. Gasoline did not shurt out from accelerating jet when AAP hose released.

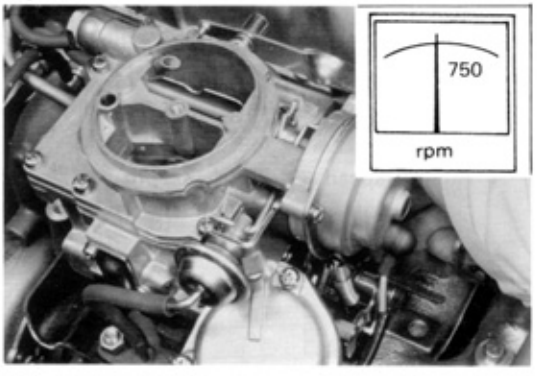
Fig. 2-46



TVSV (for AAP)

1. Have engine idling. (above 60°C, 140°F)
2. When hose is disconnected from AAP diaphragm, engine should run idling smoothly.

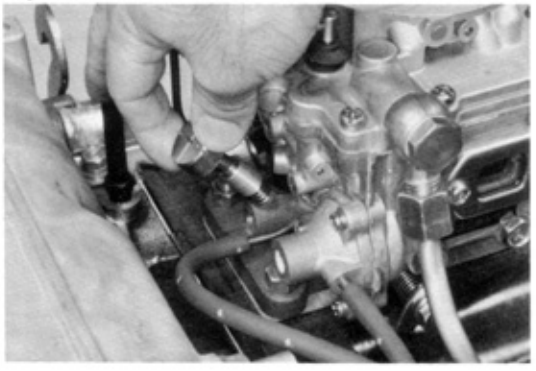
Fig. 2-47



CHOKE BREAKER

1. Have engine idling.
2. When hose is disconnected from intake manifold, check to see that choke breaker link is returned.
3. When hose is reconnected to intake manifold, check to see that the choke breaker link is pulled in by diaphragm.
   If defective, replace diaphragm.

Fig. 2-48



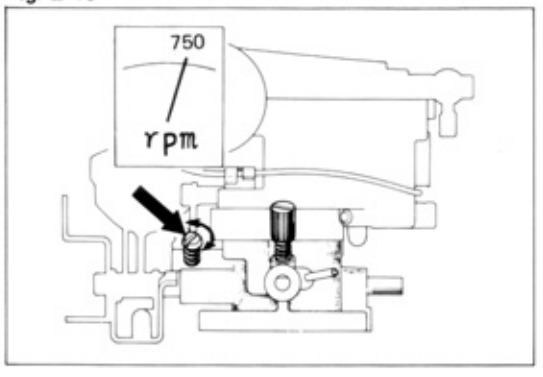
INITIAL IDLE SPEED

⚠ When adjusting idle mixture adjusting screw, adjust it with SST [09243-00010].

Check the following items beforehand.

1. Coolant temperature –
   Approximately 80°C (180°F)
2. Choke valve – Full open
3. Accessory parts (wipers, heater, lights, air conditioner, etc.)
   – All switched off.
4. Vacuum lines – All lines connected.
5. Ignition timing – Initial set position.
6. Transmission – In "N"

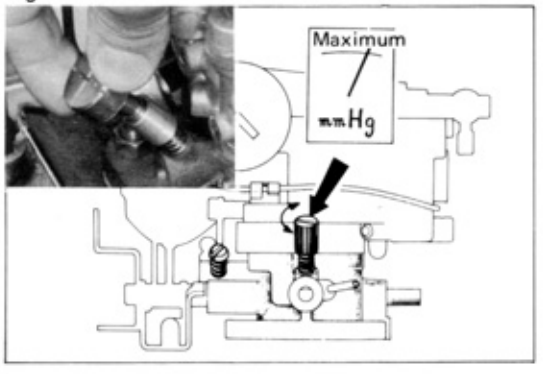
Fig. 2-49



BEST IDLE

1. Set to 750 rpm by turning the idle speed adjusting screw.

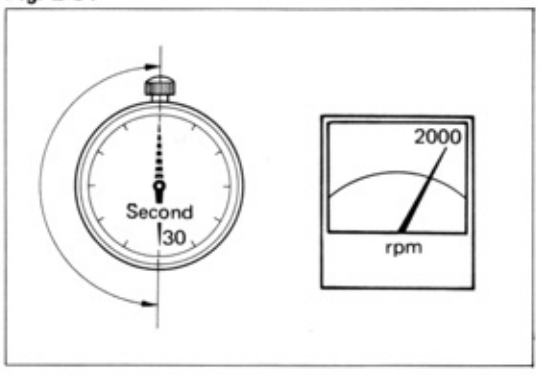
Fig. 2-50



2. Set to the maximum vacuum by turning the idle mixture adjusting screw.
3. Repeat the above adjustments until the specified rpm and maximum vacuum will be obtained.

Idle speed	**750 ± 50 rpm**
Vacuum	**420 mmHg (16.5 inHg)**

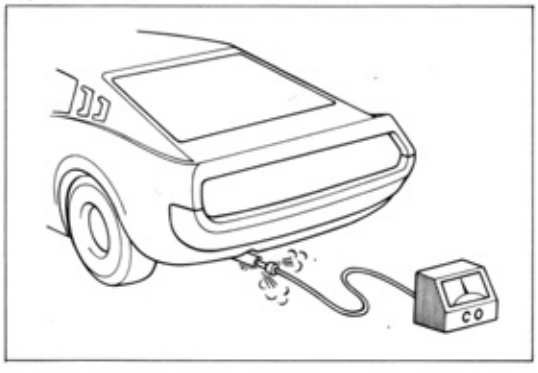
Fig. 2-51



CO CONCENTRATION

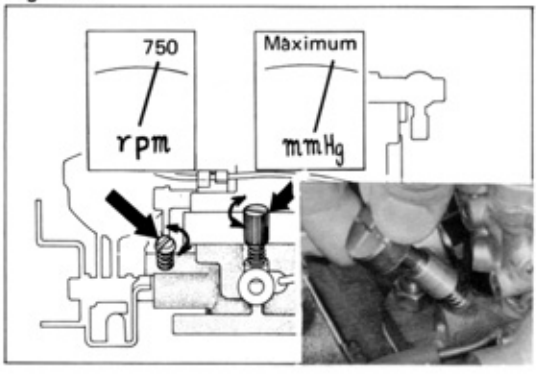
1. Measure the CO concentration.
   (1) Be sure to race the engine before taking measurement. About 2,000 rpm for 30 ~ 60 seconds.

Fig. 2-52



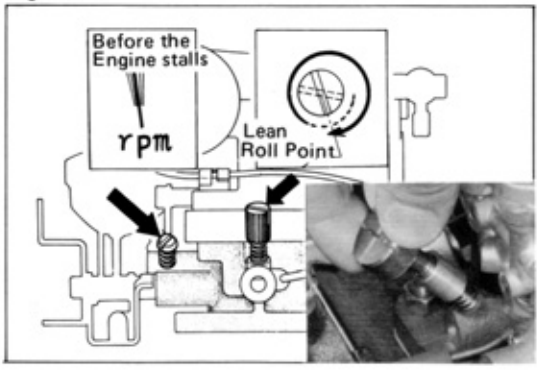
   (2) Measure within 1 to 3 minutes after racing the engine to allow the concentration to stabilize.
   CO concentration Less than 1–3 %

Fig. 2-53



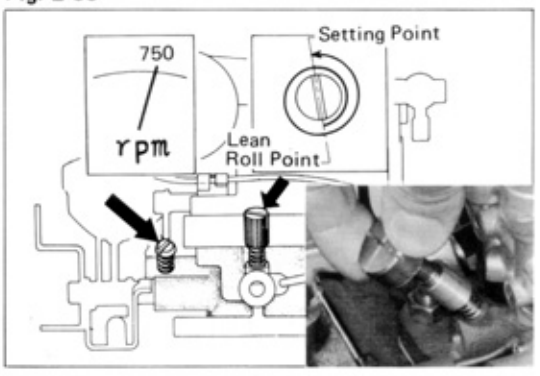
2. Adjust the CO concentration
   (1) Set to 750 rpm by turning the idle speed adjusting screw.
   (2) Set to maximum vacuum by turning the idle mixture adjusting screw.
   (3) Repeat the above steps.

Fig. 2-54



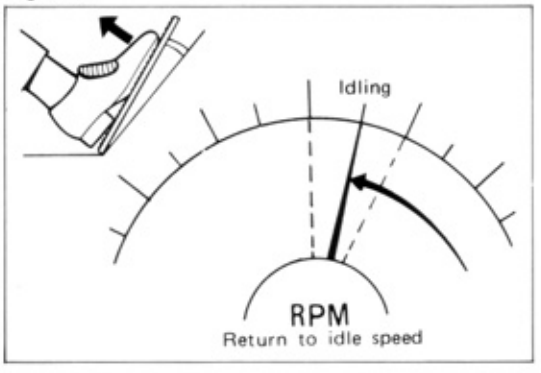
   (4) Turn the idle mixture adjusting screw clockwise to obtain the lean roll point where the engine revolution becomes very rough; just before the engine stalls.

Fig. 2-55



(5) Turn the idle mixture adjusting screw counter-clockwise about 1½ turns to richer side.
(6) Then adjust the idle speed adjusting screw to obtain the specified idle speed of 750 rpm.
(7) Repeat the above steps.

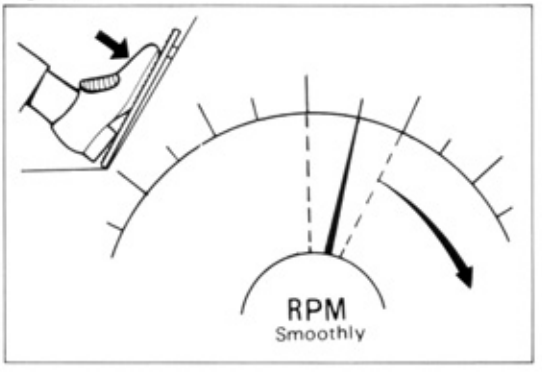
Fig. 2-56



ENGINE CONDITION

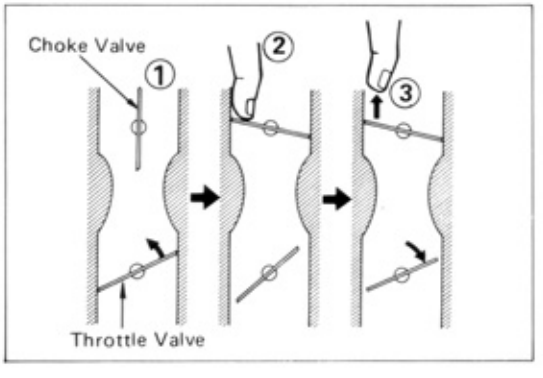
1. Check if the engine returns to idle speed when suddenly and slowly accelerated.

Fig. 2-57



2. Opening throttle valve gradually should cause engine to speed up smoothly in relation to amount of valve opening.

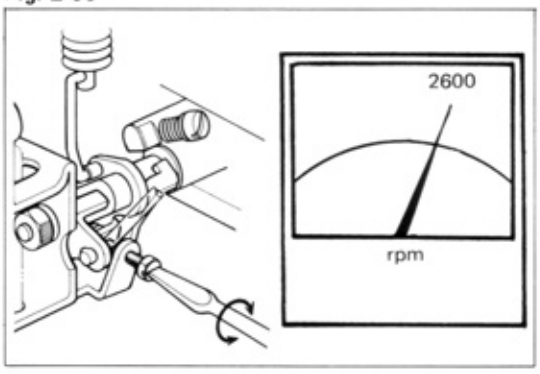
Fig. 2-58



FAST IDLE (Automatic Choke) ADJUSTMENT

1. Stop engine.
2. With the throttle valve slightly open, close the choke valve with finger, then close the throttle valve.
3. Start engine without stepping on the accelerator pedal.

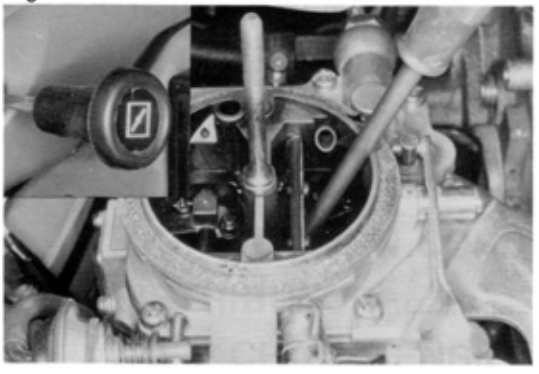
Fig. 2-59



4. Check the engine speed to see if it is a the specified rpm.
5. If not, correct by turning the fast idle adjusting screw.

Fast idle speed **2600 ± 200 rpm**

Fig. 2-60

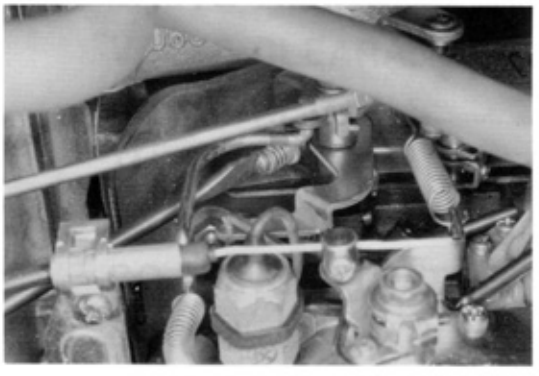


FAST IDLE [Manual Choke]

ADJUSTMENT

1. Pull choke knob fully.
2. Fully open choke valve with a screwdriver.

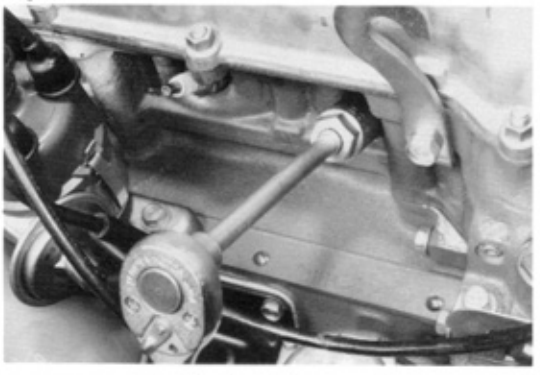
Fig. 2-61



3. Start engine.
4. Adjust by turning fast idle adjusting screw.

Fast idle speed **2600 ± 200 rpm**

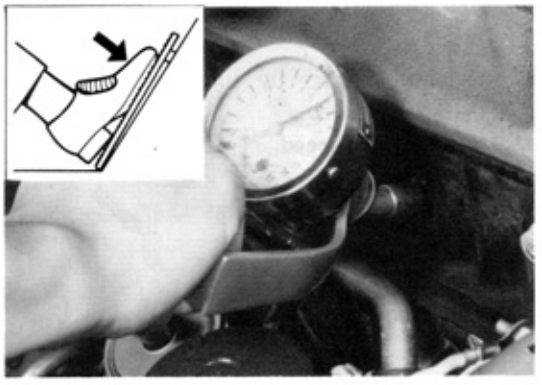
Fig. 2-62



COMPRESSION PRESSURE

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

Fig. 2-63



4. Insert a compression gauge into the spark plug hole, open the throttle valve fully, and measure the compression pressure while cranking the engine with starter motor.

Compression Pressure
12.0 kg/cm^2 (170.4 psi)
Limit
9.0 kg/cm^2 (127.8 psi)
Difference of pressure between cylinder
1.0 kg/cm^2 (14.2 psi)