

2T & 3T ENGINE TUNE-UP

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2T & 3T ENGINE TUNE-UP – 2T & 3T Engine Tune-up Item**2T & 3T ENGINE TUNE-UP ITEM**

ITEM			REMARK
1	COOLING SYSTEM	Coolant level check	Full line
		Quality check	
		Coolant capacity (w/Heater)	8.0 liters 8.5 US qt 7.0 Imp. qt
2	DRIVE BELT	Tension Fan – Alternator	8 – 12 mm 0.3 – 0.5 in.
		A/C Compressor – Crankshaft	11 – 14 mm 0.4 – 0.6 in.
3	AIR CLEANER	Element cleaning	
4	BATTERY	Specific gravity	1.25 – 1.27 at 20°C (68°F)
		Electrolyte level	
5	SPARK PLUG	Visual check	
		Cleaning	
		Plug gap	0.7 – 0.8 mm 0.028 – 0.031 in.
6	HIGH TENSION CORD	Resistance	Less than 25 k Ω per cord
7	DISTRIBUTOR	Distributor cap	
		Rubbing block gap	0.4 – 0.5 mm 0.016 – 0.020 in.
		Damping spring gap	0.1 – 0.4 mm 0.004 – 0.016 in.
8	ENGINE OIL	Oil level check	Full line
		Oil replenishment	API services SE classification
		Oil capacity	
		Dry refill w/Oil filter	4.2 liters 4.4 US qt 3.7 Imp. qt
		Drain & refill w/Oil filter	3.8 liters 4.0 US qt 3.3 Imp. qt
		w/o Oil filter	3.3 liters 3.5 US qt 2.9 Imp. qt
		Quality check	
		Oil filter replacement	SST [09228-44010]
	[COLD CONDITION]		
9	CARBURETOR	Automatic choke	
		Check the accelerating pump	
		Float level	
		Throttle valve full open	
		Choke breaker	
		Choke opener	
10	DWELL ANGLE (Except USA & Canada)		52°
		Variation	within 3° (at idling to 2,000 rpm)

2T & 3T ENGINE TUNE-UP – 2T & 3T Engine Tune-up Item

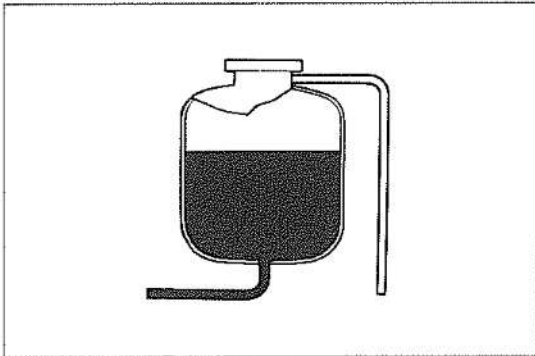
2-3

ITEM			REMARK
	WARM UP ENGINE [HOT CONDITION]		
11	CARBURETOR	Automatic choke Choke opener	
12	IGNITION TIMING		10° BTDC/idle speed
13	DISTRIBUTOR	(Iraq, Chile and Peru only) Governor advancer Vacuum advancer	(3.5° BTDC/idle speed)
14	VALVE CLEARANCE	IN EX	0.20 mm 0.008 in. 0.33 mm 0.013 in.
15	IDLE SPEED & IDLE MIXTURE ADJUSTMENT		SST [09243-00010] or [09243-00020]
	Idle mixture speed	at Neutral	
	3T	M/T	700 rpm
		A/T	800 rpm
	3T-C	M/T	760 rpm
		A/T	810 rpm
	Idle speed	2T	M/T
		A/T	650 rpm
		A/T	750 rpm
	2T-B	M/T	800 rpm
	3T	M/T	650 rpm
		A/T	750 rpm
	3T-C	M/T	700 rpm
		A/T	750 rpm
	Intake manifold vacuum (at idle speed)		
	2T & 2T-B	M/T	More than 430 mmHg (16.9 in.Hg)
	2T	A/T (N Range)	More than 400 mmHg (15.7 in.Hg)
	3T & 3T-C	M/T (N Range)	More than 450 mmHg (17.7 in.Hg)
		A/T (N Range)	More than 400 mmHg (15.7 in.Hg)

2—4 2T & 3T ENGINE TUNE-UP — 2T & 3T Engine Tune-up Item

ITEM				REMARK	
16	FAST IDLE SPEED ADJUSTMENT	2T & 3T		New vehicle	2,300 rpm
				After 1,000 km	2,700 rpm
		2T-B		New vehicle	2,200 rpm
				After 1,000 km	2,500 rpm
		3T-C	M/T A/T	3,200 rpm 3,000 rpm	
17	COMPRESSION PRESSURE	at 250 rpm			
		2T, 3T & 3T-C	STD	11.5 kg/cm ²	163 psi
			Limit	9.0 kg/cm ²	128 psi
		2T-B	STD	12.0 kg/cm ²	170 psi
			Limit	10.0 kg/cm ²	142 psi
		Difference between each cylinder		Less than 1.0 kg/cm ² (14 psi)	

Fig. 2-1



COOLING SYSTEM

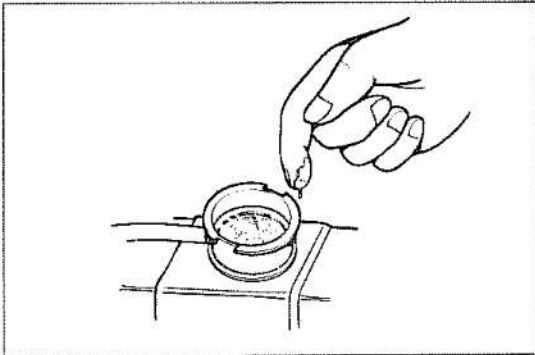
CHECK COOLANT LEVEL

If low, fill reservoir to FULL line.

— Note —

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

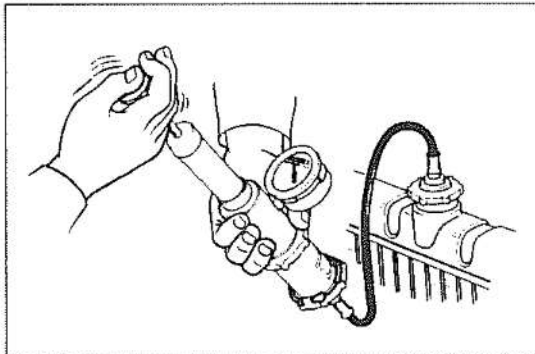
Fig. 2-2



CHECK COOLANT QUALITY

1. Check coolant cleanliness.
2. Check for rust or scale deposits around radiator cap and filler neck.
3. Check to see that there is no oil in the coolant.

Fig. 2-3

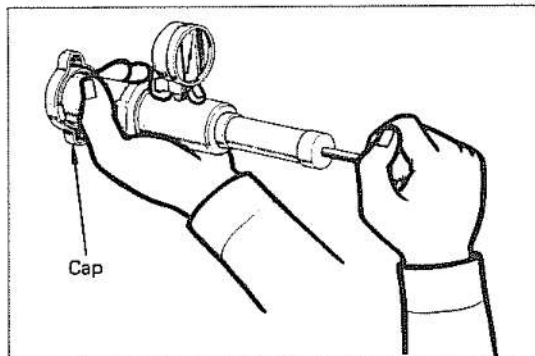


CHECK COOLING SYSTEM

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

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.

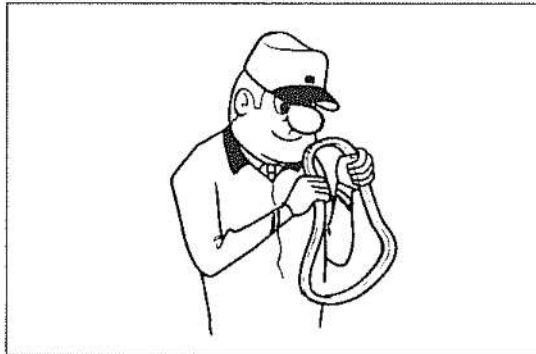
Valve opening pressure:

STD	0.9 kg/cm ² (12.8 psi)
Limit	0.6 kg/cm ² (8.5 psi)

2-6

2T & 3T ENGINE TUNE-UP – Drive Belt, Air Cleaner

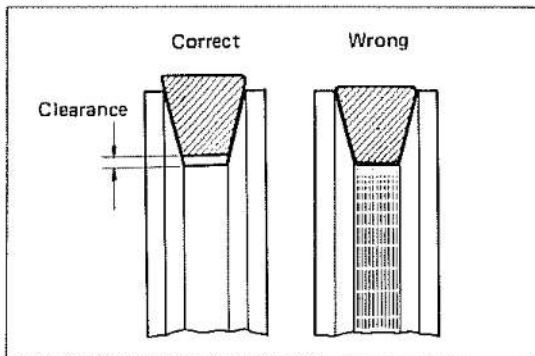
Fig. 2-5

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

Check the drive belt for:

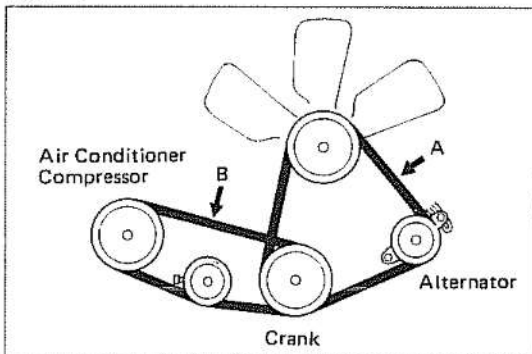
1. Cracks, deterioration, stretching or wear.
2. Adherence of oil or grease,

Fig. 2-6



3. Improper belt-to-pulley contact.

Fig. 2-7

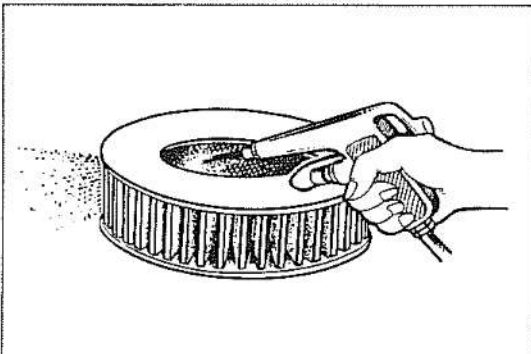
**CHECK & ADJUST BELT TENSION**

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.

Except USA**Drive belt tension:**

- | | |
|----------|--------------------------------------|
| A | 8 – 12 mm
(0.3 – 0.5 in.) |
| B | 11 – 14 mm
(0.4 – 0.6 in.) |

Fig. 2-8

**AIR CLEANER****CLEAN ELEMENT**

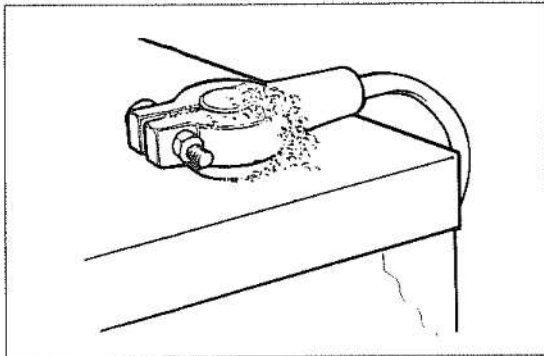
1. Remove the air cleaner element.

— 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. 2-9



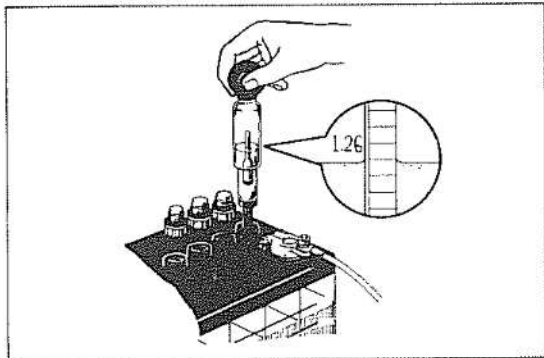
BATTERY

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. 2-10

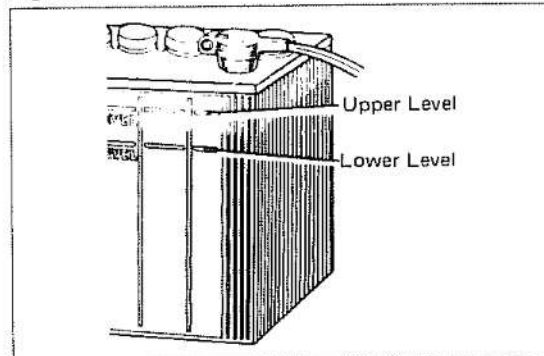


MEASURE SPECIFIC GRAVITY

1. Insert the hydrometer into the cell and hold it so that the float does not touch the cylinder wall.
2. Draw in sufficient water so that the float is suspended free from both the top and bottom of the cylinder.
3. Read the graduation.

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

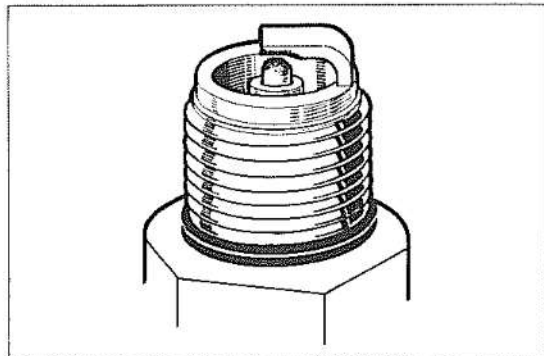
Fig. 2-11



CHECK ELECTROLYTE LEVEL

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

Fig. 2-12



SPARK PLUG

VISUAL CHECK

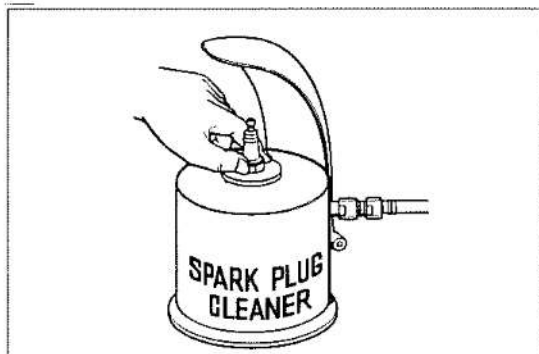
The spark plugs for the following:

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.

2-8

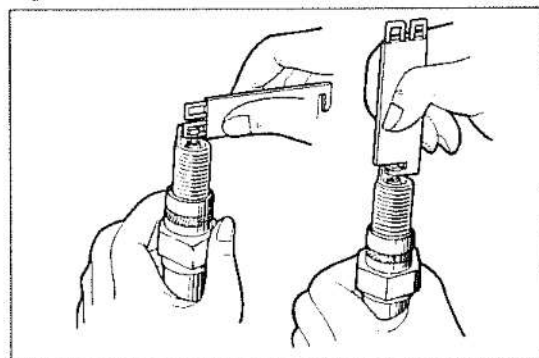
2T & 3T ENGINE TUNE-UP — Spark Plug, High Tension Cord

Fig. 2-13

**CLEAN SPARK PLUG**

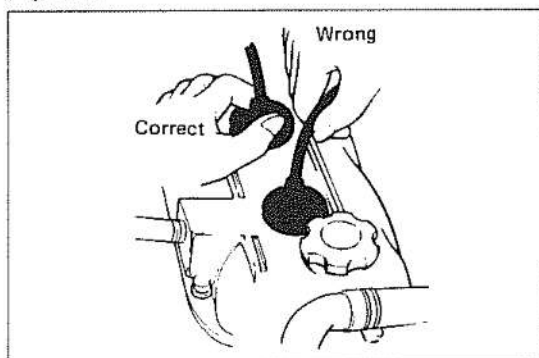
1. Do not use the spark plug cleaner longer than necessary.
2. Thoroughly blow off the cleaning compound and carbon with compressed air.
3. Clean the threads and outer insulator surface.

Fig. 2-14

**ADJUST GAP**

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

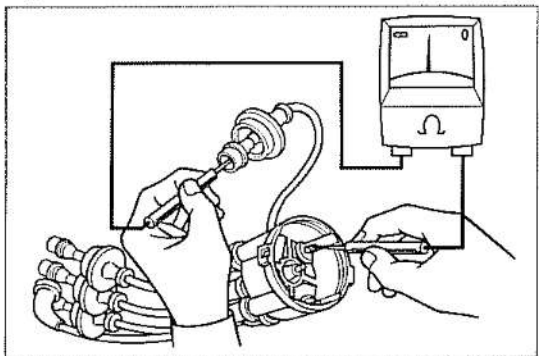
Fig. 2-15

**HIGH TENSION CORD
CHECK RESISTANCE**

— Note —

To pull the cord from the spark plug, always pull on the end of the cord.

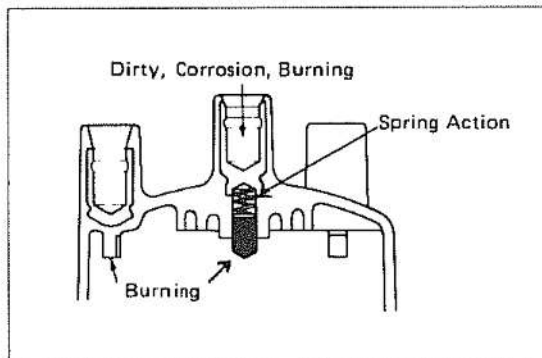
Fig. 2-16



Check the cord resistance.

Resistance: Less than 25 kΩ per cord

Fig. 2-17



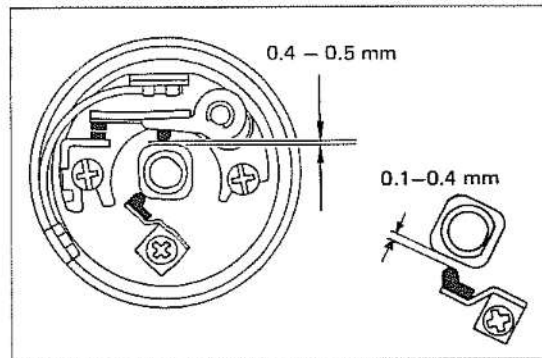
DISTRIBUTOR

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. 2-18



ADJUST POINT GAP

1. Replace the breaker points if excessively burnt or pitted.
2. Adjust the rubbing block gap and damping spring.

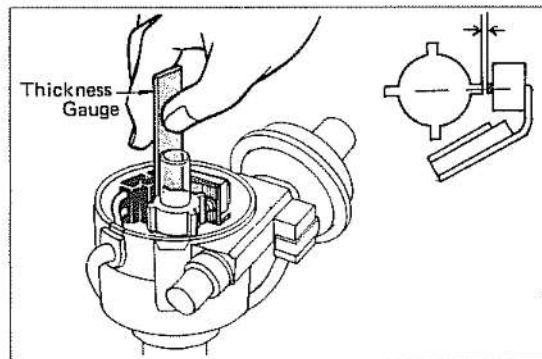
Rubbing block gap:

0.4 – 0.5 mm
(0.016 – 0.020 in.)

Damping spring gap:

0.1 – 0.4 mm
(0.004 – 0.016 in.)

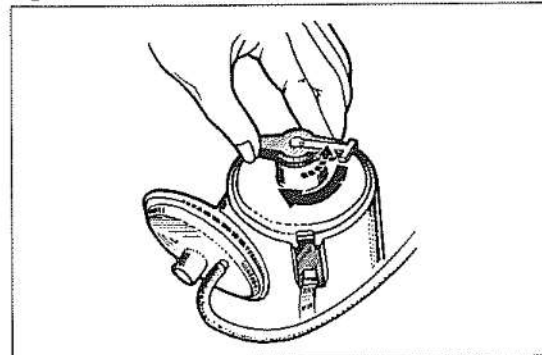
Fig. 2-19



ADJUST AIR GAP

Check the air gap between the rotor and pick up coil projection.

Fig. 2-20



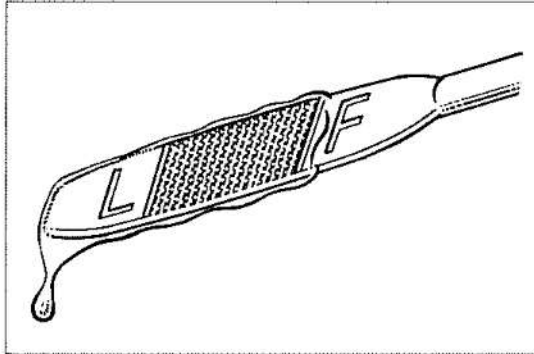
GOVERNOR CHECK OPERATION

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

2-10

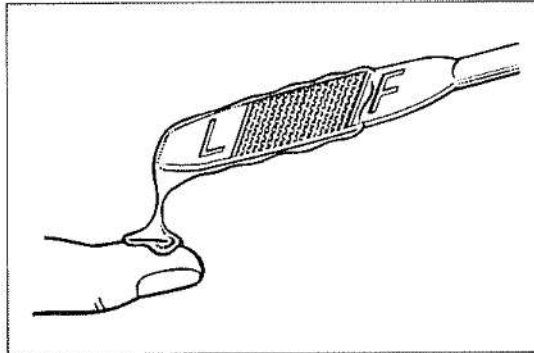
2T & 3T ENGINE TUNE-UP – Engine Oil

Fig. 2-21

**ENGINE OIL****CHECK OIL LEVEL**

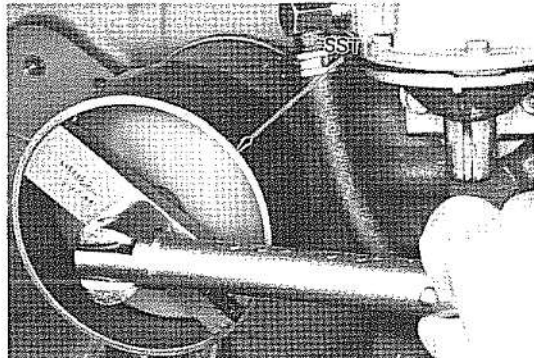
The oil level should be between the L and F marks. If low, check for leakage and add oil up to the F mark. Use API service SE classification oil.

Fig. 2-22

**CHECK OIL QUALITY**

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

Fig. 2-23

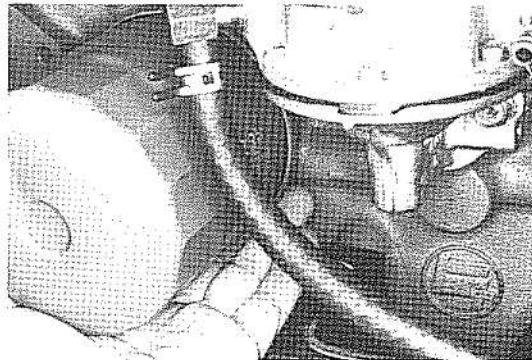
**REPLACE OIL FILTER**

1. Remove the oil filter with SST.
SST[09228-44010]
2. To install new filter, tighten firmly by hand.

— Note —

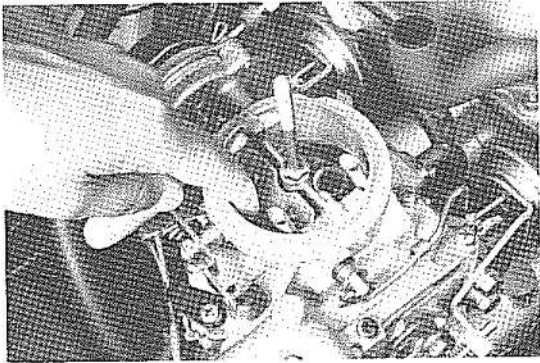
Do not tighten with SST or wrench.

Fig. 2-24



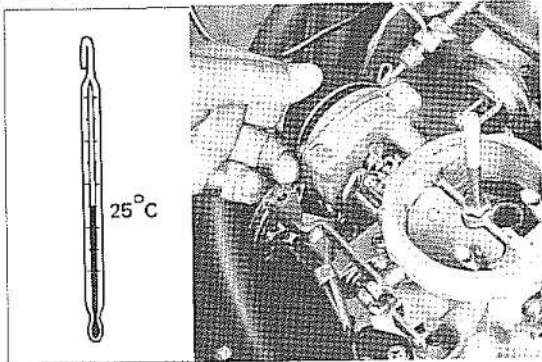
3. Start the engine and check for oil leakage.
4. Stop the engine and recheck the oil level.

Fig. 2-25

**[COLD CONDITION]****CARBURETOR****AUTOMATIC CHOKE**

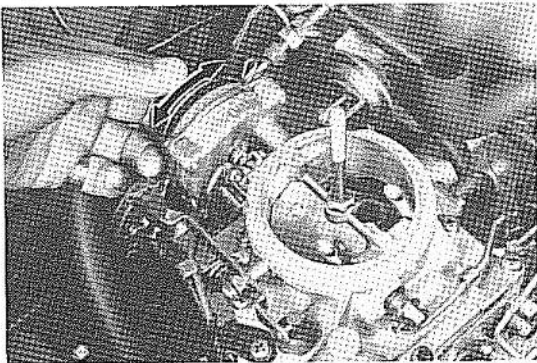
1. Check the choke valve operation by pushing down the valve with your finger and releasing it. The valve should return quickly and smoothly.

Fig. 2-26



2. Check to see that the choke valve just closes exactly when the atmospheric temperature reaches 25°C (77°F). If it doesn't, loosen the three screws and adjust by turning the coil housing.

Fig. 2-27



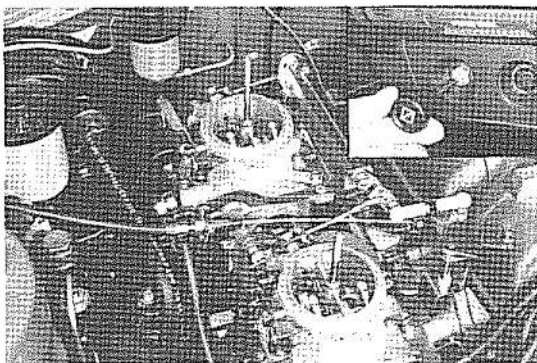
3. Check the engine starting and running condition. If necessary, readjust the automatic choke setting by turning the coil housing.

— Note —

If mixture is too rich . . . Turn clockwise.

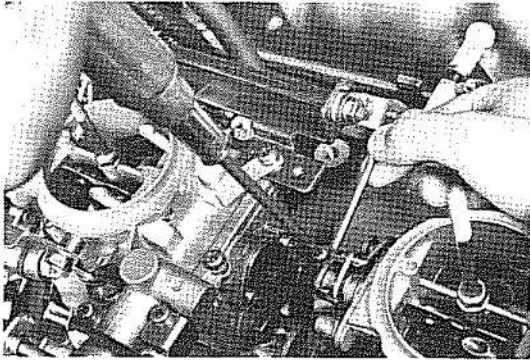
If too lean Turn counterclockwise.

Fig. 2-28

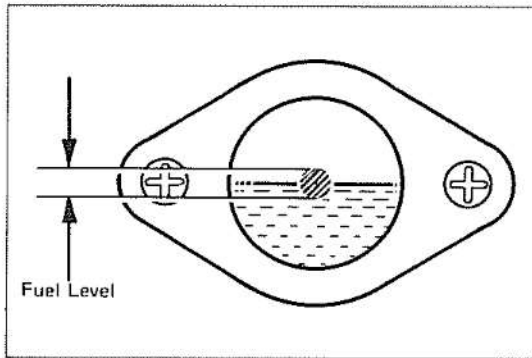
**MANUAL CHOKE**

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

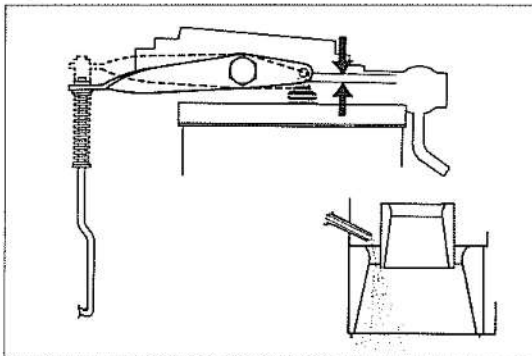
2-12

2T & 3T ENGINE TUNE-UP – Carburetor**Fig. 2-29**

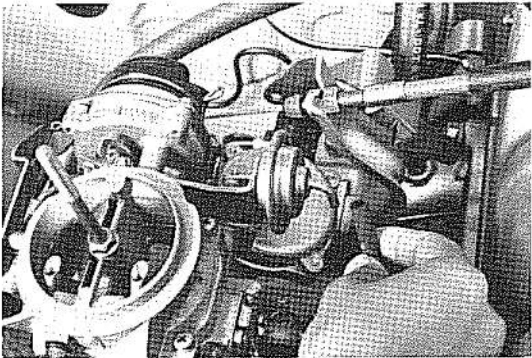
2. Adjust the link so that the front and rear carburetor choke valves open at the same time.

Fig. 2-30**CHECK THE FLOAT LEVEL**

Check the float level while the engine is idling.

Fig. 2-31**CHECK THE 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 depressed all the way.

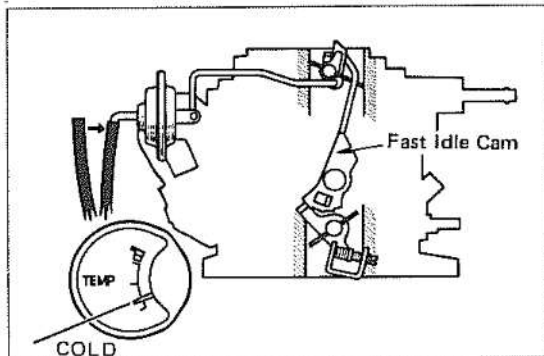
Fig. 2-32**CHOKE BREAKER**

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

2T & 3T ENGINE TUNE-UP — Carburetor, Dwell Angle

2-13

Fig. 2-33

**CHOKE OPENER**

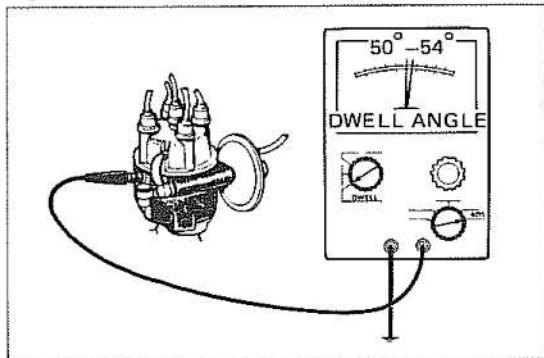
1. Inspect the linkage movement at cold engine.

— Note —

Coolant temperature below 35°C (95°F).

2. Start the engine.
3. Disconnect and connect the hose. Check to see that the linkage does not move.

Fig. 2-34

**DWELL ANGLE**

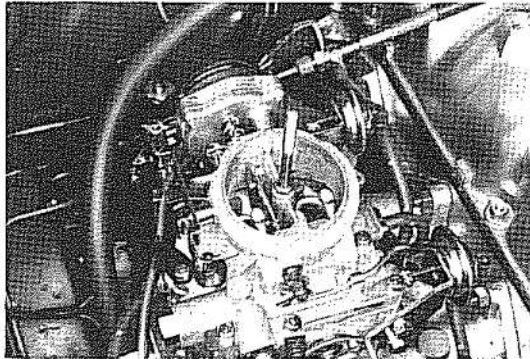
Inspect the dwell angle with a dwell angle tester.

Dwell angle: 52°**Variation: within 3°
(at idling to 2,000 rpm)**

2-14

2T & 3T ENGINE TUNE-UP — Carburetor, Ignition Timing

Fig. 2-35

**[HOT CONDITION]****CARBURETOR****AUTOMATIC CHOKE**

When the engine is warmed up the choke valve should be fully opened.

Fig. 2-36

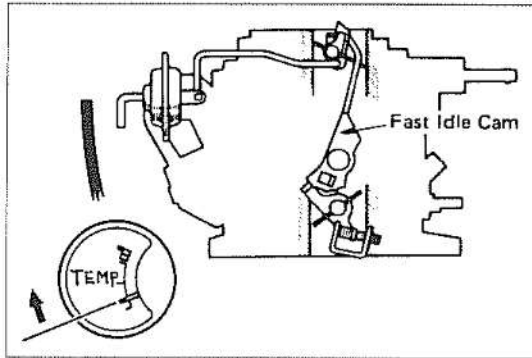


Fig. 2-37

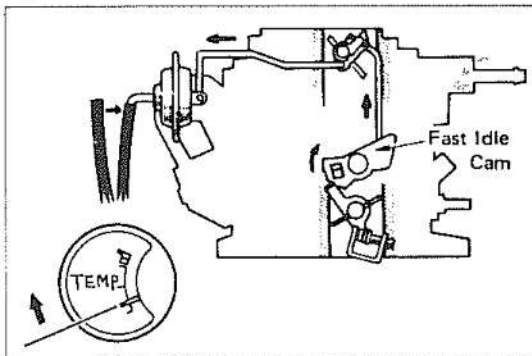
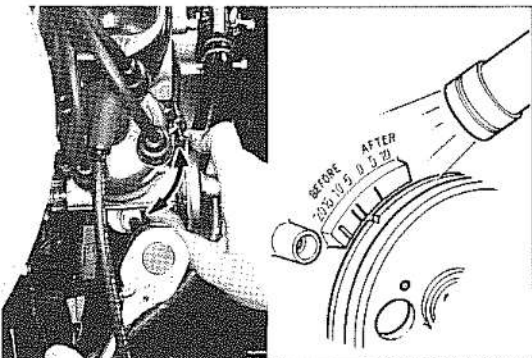


Fig. 2-38

**CHOKE OPENER**

1. Inspect the system operation at hot engine.
2. Disconnect the hose from the diaphragm and step down the accelerator pedal once. Start the engine.

3. Reconnect the hose.
4. Choke valve should open with force. Fast idle cam should be released to third step.
5. If a problem is found, check the diaphragm, linkage and the TVSV.

IGNITION TIMING

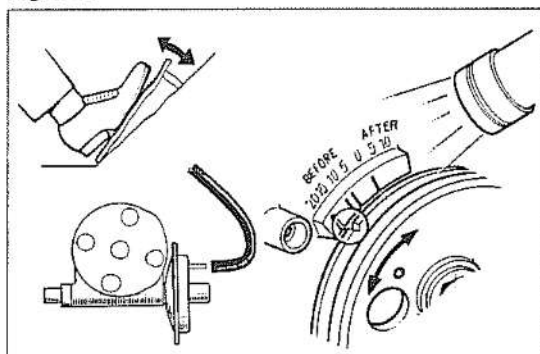
Turn the distributor body to align the timing marks.

Ignition timing: 10° BTDC/idle speed
[For Iraq, Chile and Peru]
3.5° BTDC/idle speed

— Note —

Do not make this adjustment with the octane selector.

Fig. 2-39



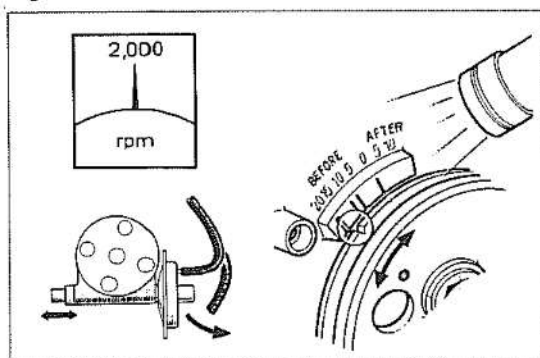
DISTRIBUTOR



GOVERNOR ADVANCER OPERATIONAL INSPECTION

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

Fig. 2-40

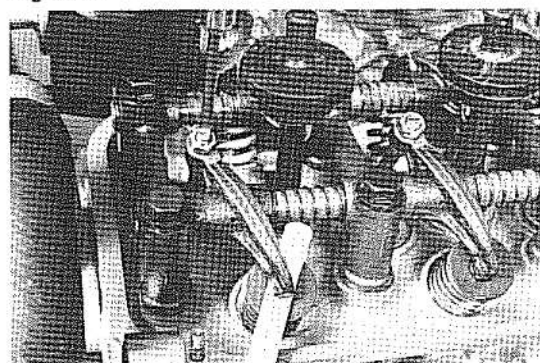


VACUUM ADVANCE OPERATIONAL INSPECTION



With the engine running at about 2,000 rpm, disconnect and connect the vacuum hose and insure that the timing mark moves.

Fig. 2-41



VALVE CLEARANCE



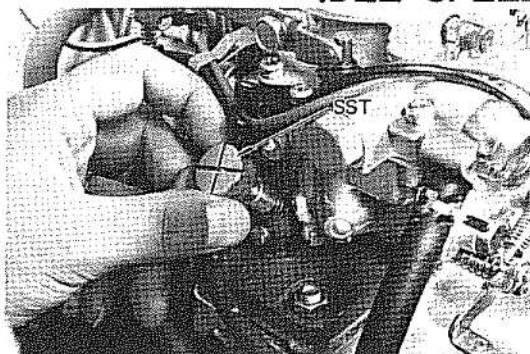
With the engine hot, run at idle rpm. Valve clearance is measured between valve stem and rocker arm.

Valve clearance:	IN	0.20 mm (0.008 in.)
	EX	0.33 mm (0.013 in.)

2-16

2T & 3T ENGINE TUNE-UP – Idle Speed & Idle Mixture Adjustment

Fig. 2-42

**IDLE SPEED & IDLE MIXTURE ADJUSTMENT****2T & 3T ENGINE****Except USA, Canada & Sweden**

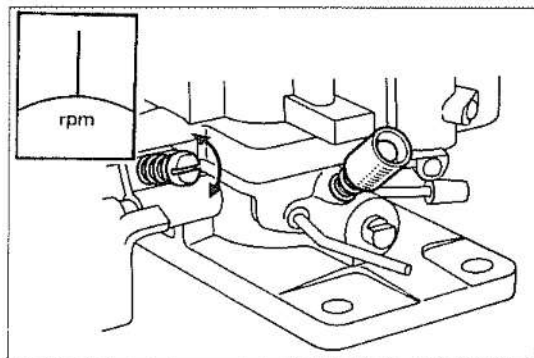
If necessary, adjust the idle mixture adjusting screw with SST.

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

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
- (7) Transmission in N range

Fig. 2-43

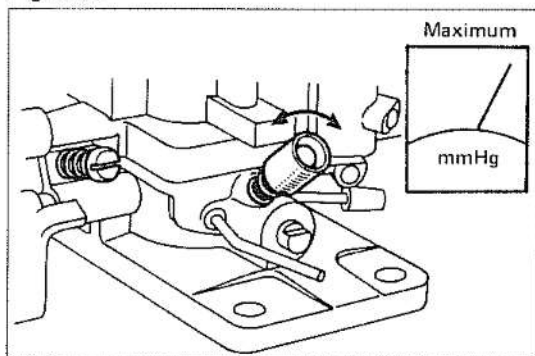


2. Set the idle with the idle speed adjusting screw.

Idle speed:

2T	M/T	650 rpm
	A/T	750 rpm
3T	M/T	650 rpm
	A/T	750 rpm
3T-C	M/T	700 rpm
	A/T	750 rpm

Fig. 2-44

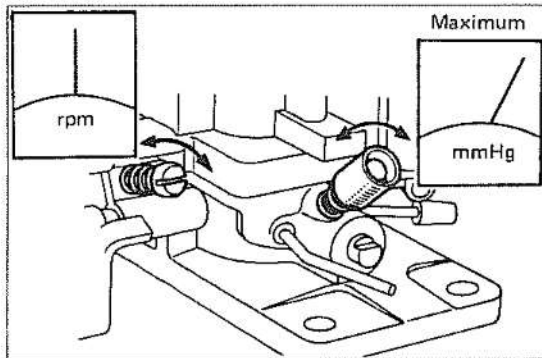


3. Set to maximum vacuum with the idle mixture adjusting screw.

2T & 3T ENGINE TUNE-UP – Idle Speed & Idle Mixture Adjustment

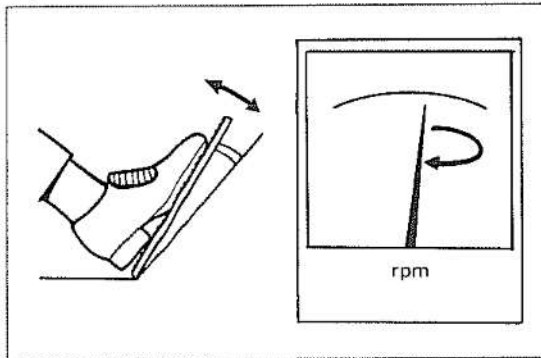
2-17

Fig. 2-45



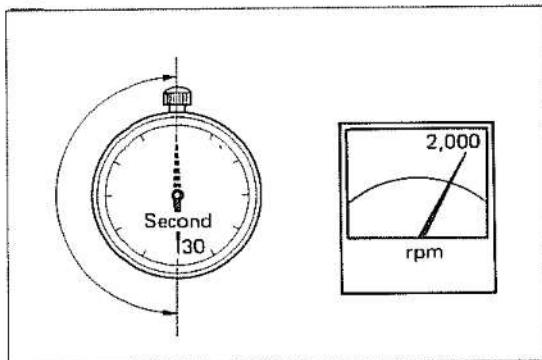
4. Repeat the above adjustments until the maximum vacuum and specified rpm is obtained.

Fig. 2-46



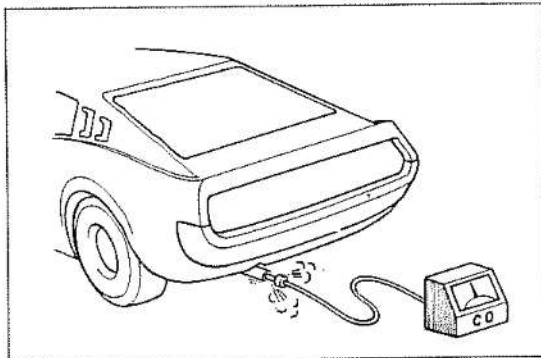
5. Race the engine momentarily by manipulating the accelerator link to verify that the engine will return to specified rpm when released.

Fig. 2-47



6. Measure the CO concentration.
 - (1) Race the engine about 2,000 rpm for 30 – 60 seconds.

Fig. 2-48



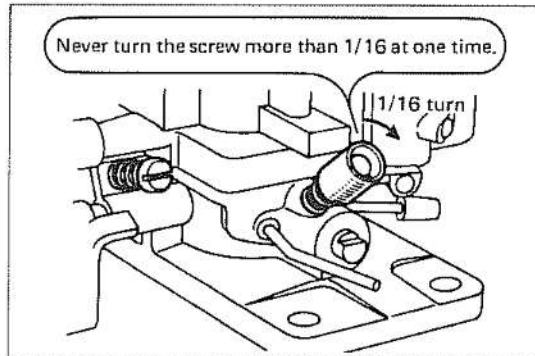
- (2) Before measuring, wait 1 – 3 minutes after racing the engine to allow the concentration to stabilize.

CO concentration: 1.0 – 2.0 %

— Note —
Calibrate the CO meter beforehand.

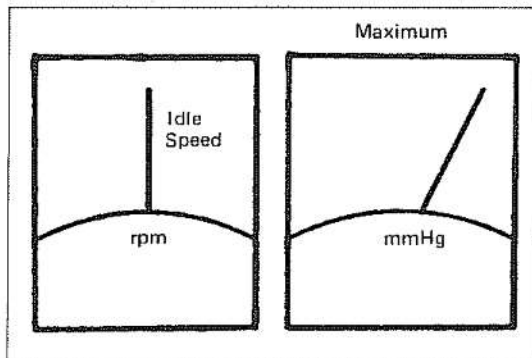
2-18 2T & 3T ENGINE TUNE-UP – Idle Speed & Idle Mixture Adjustment

Fig. 2-49



- (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. 2-50

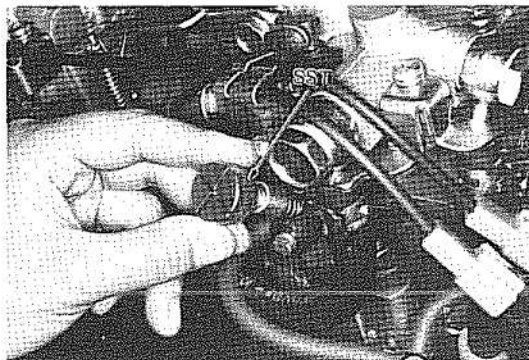


7. Recheck the intake manifold vacuum and idle speed.

– 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. 2-51



2T-B ENGINE

Use SST when adjusting the idle mixture adjusting screw.

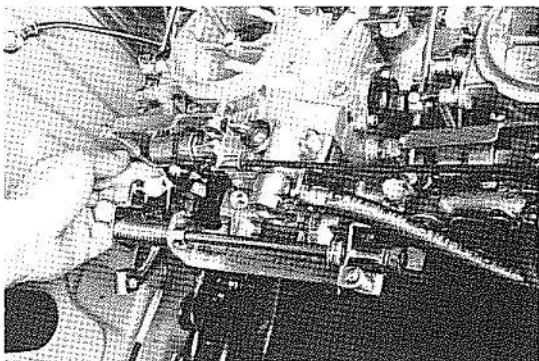
SST [09243-00010] or
[09243-00020]

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 and vacuum gauge attached
 - (9) Zero setting of CO meter warmed up

2T & 3T ENGINE TUNE-UP — Idle Speed & Idle Mixture Adjustment

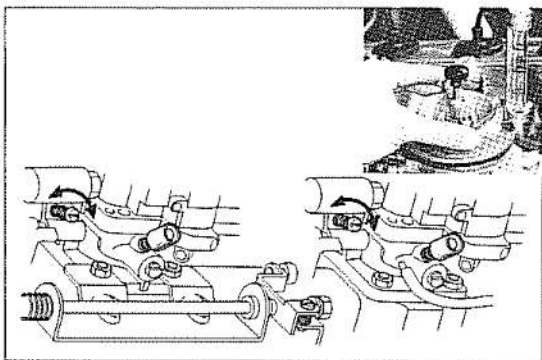
2-19

Fig. 2-52



2. Disconnect front and rear carburetor the connecting rods.

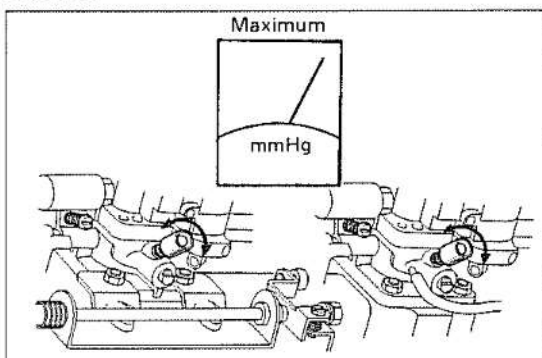
Fig. 2-53



3. Using a carburetor balancer, adjust by turning each idle speed adjusting screw so that the intake air volume at the front and rear carburetors will be the same at specified idling speed.

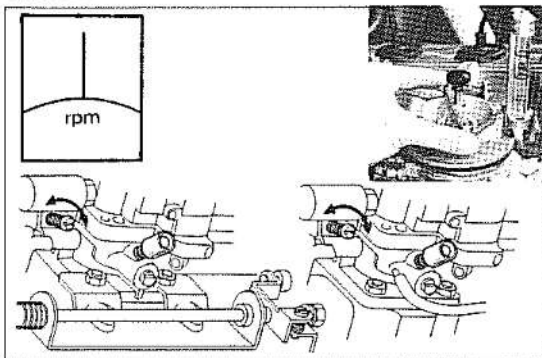
Idle speed: M/T 800 rpm

Fig. 2-54



4. Adjust by turning each idle mixture adjusting screw so that intake manifold vacuum at the front and rear carburetors will be the maximum vacuum.

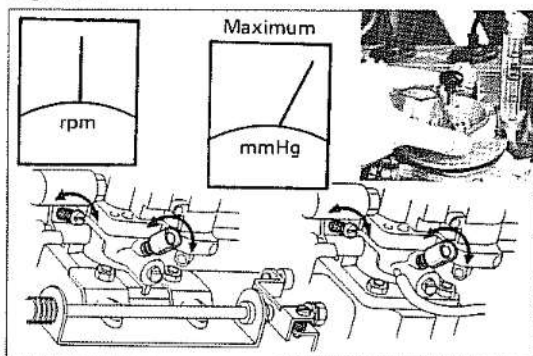
Fig. 2-55



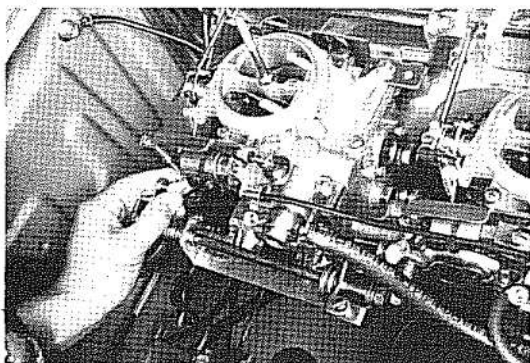
5. Using a carburetor balancer, adjust by turning each idle speed adjusting screw so that the intake air volume at the front and rear carburetors will be the same at specified idling speed.

Idle speed: M/T 800 rpm

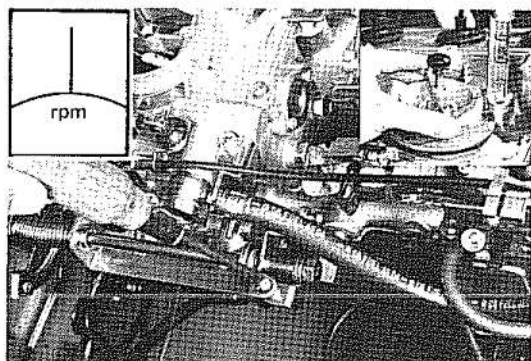
2-20

2T & 3T ENGINE TUNE-UP – Idle Speed & Idle Mixture Adjustment**Fig. 2-56**

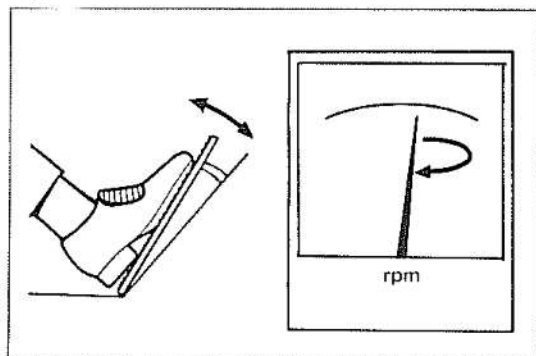
6. Repeat the above adjustments until the maximum vacuum, and intake air volume at the front and rear carburetors will be the same at specified idling speed.

Fig. 2-57

7. Connect the connecting rod so the idling rpm does not change. If it changes, adjust the rod length.

Fig. 2-58

8. Using a carburetor balancer, adjust by turning the synchronizing screw so that the intake air volume at the front and rear carburetors will be the same when the engine revolution has risen to about 1,200 rpm.

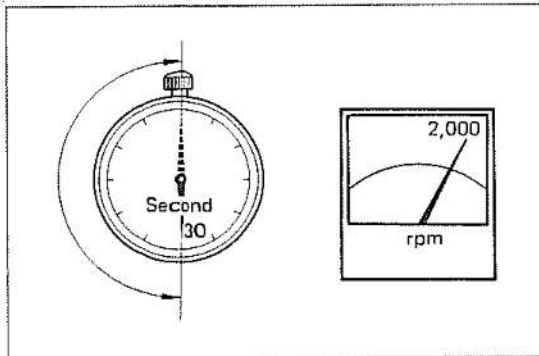
Fig. 2-59

9. Race the engine momentarily by manipulating the accelerator link to verify that the engine will return to specified rpm when released.

2T & 3T ENGINE TUNE-UP — Idle Speed & Mixture Adjustment

2-21

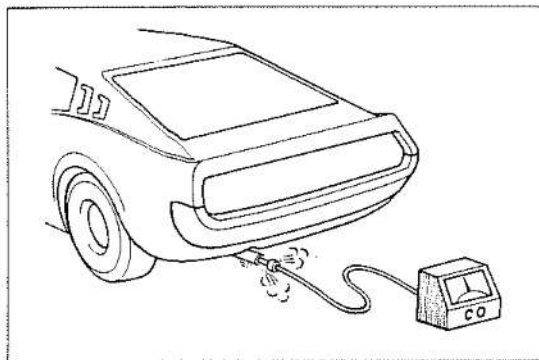
Fig. 2-60



10. Measure the CO concentration.

- (1) Race the engine about 2,000 rpm for 30 — 60 seconds.

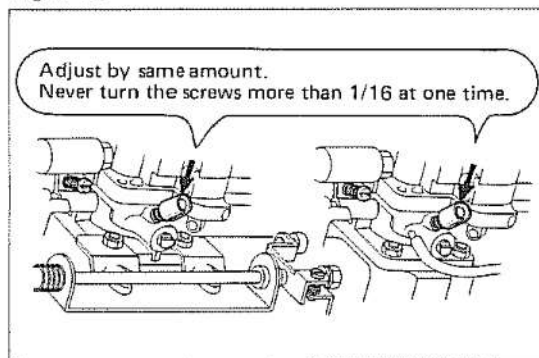
Fig. 2-61



- (2) Before measuring, wait 1 — 3 minutes after racing the engine to allow the concentration to stabilize.

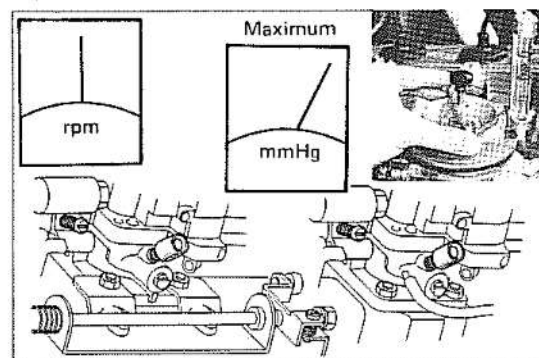
CO concentration: 1.0 — 2.0 %

Fig. 2-62



11. If the concentration exceeds the specified value, tighten the idle mixture adjusting screws by equal amount little by little until the concentration is within the specified value.
12. Remeasure the CO concentration in the exhaust gases with a CO meter.

Fig. 2-63



13. Recheck the intake manifold vacuum and intake air volume at the front and rear carburetors.

— Note —

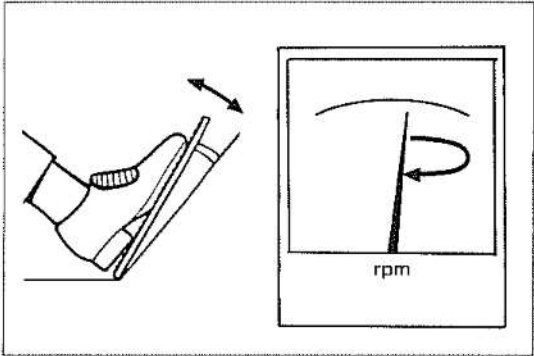
1. When the idle mixture adjusting screws are tightened, there will be a point where the engine speed drops rapidly. Further adjustment must not be attempted by screwing in beyond this point.
2. Allowable engine idle speed is ± 50 rpm of the specified speed.

2-22

2T & 3T ENGINE TUNE-UP –

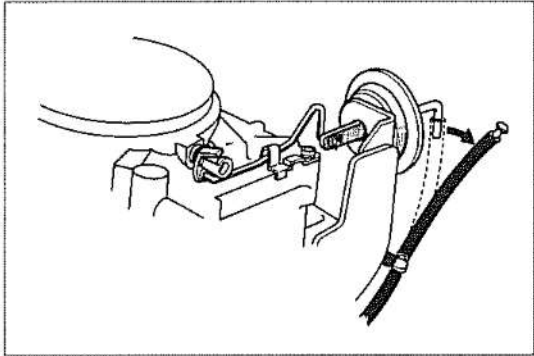
Idle Speed & Idle Mixture Adjustment,
Fast Idle Speed Adjustment

Fig. 2-64



14. Check to see that the engine returns to idle when the accelerator pedal is released both suddenly and slowly.
Check to see that the engine rpm rises smoothly in relation with the throttle valve opening.

Fig. 2-65

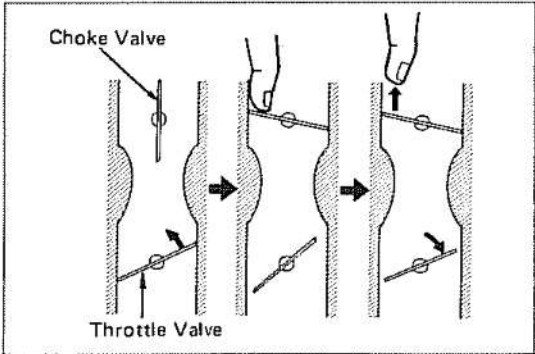


FAST IDLE SPEED ADJUSTMENT

AUTOMATIC CHOKE

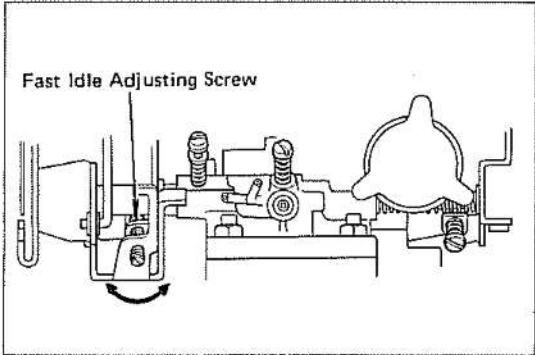
1. Stop the engine.
2. With the throttle valve slightly open, close the choke valve with your finger and then close the throttle valve.
3. Start the engine without depressing the accelerator pedal.

Fig. 2-66



4. Close choke valve.
While holding the throttle slightly open, (1) push the choke valve closed (2), and hold it closed as you release the throttle valve (3).

Fig. 2-67



5. Insure that the engine is running at the specified rpm. If not, adjust with the fast idle adjsuting screw.

Fast idle speed:

2T & 3T

New vehicle	2,300 rpm
After 1,000 km	2,700 rpm

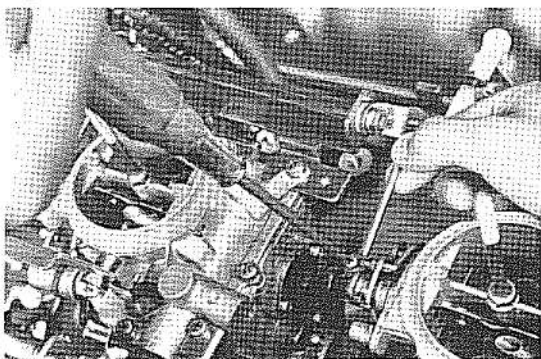
3T-C

M/T	3,200 rpm
A/T	3,000 rpm

2T & 3T ENGINE TUNE-UP – Fast Idle Speed Adjustment, Compression Pressure

2-23

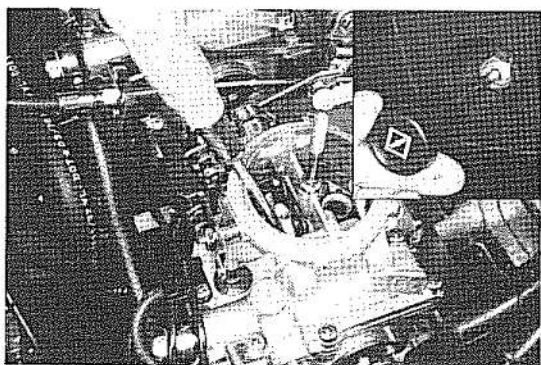
Fig. 2-68



2T-B

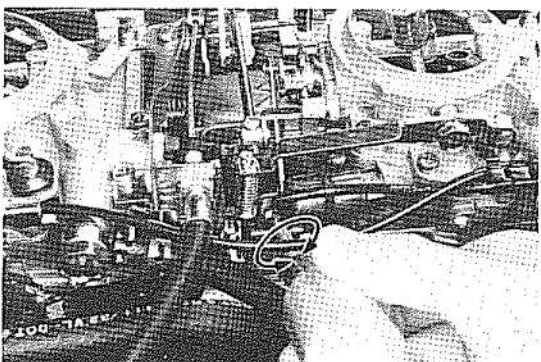
1. Adjust so that both the front and rear carburetor choke valves open at the same time.

Fig. 2-69



2. Stop the engine and open the choke valve.

Fig. 2-70

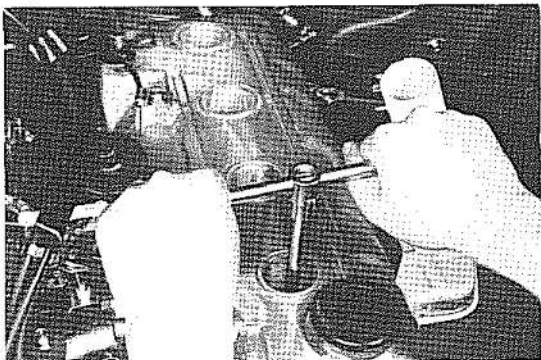


3. Start the engine.
4. To adjust, turn the fast idle adjusting screw.

Fast idle speed:

New vehicle	2,200 rpm
After 1,000 km	2,500 rpm

Fig. 2-71



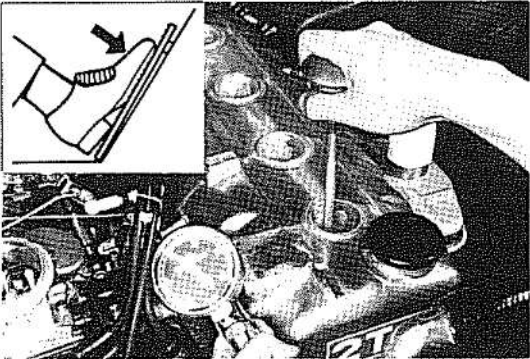
COMPRESSION PRESSURE



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

2-24 2T & 3T ENGINE TUNE-UP – Compression Pressure

Fig. 2-72



4. Place a compression gauge into the spark plug hole and fully open the throttle valve. While cranking the engine, measure the compression pressure.

Compression pressure (at 250 rpm):

2T, 3T & 3T-C

STD	11.5 kg/cm ² (163 psi)
Limit	9.0 kg/cm ² (128 psi)

2T-B

STD	12.0 kg/cm ² (170 psi)
Limit	10.0 kg/cm ² (142 psi)

