

SECTION 19

PERIODIC MAINTENANCE

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A. General Description

The latest car has undergone much improvement and its periodical intervals have been considerably extended. Yet the periodical maintenance remains an indispensable necessity. If the following instructions are strictly followed, the periodic maintenance will contribute to maintain the performance and the durability of the car. On the other hand if the periodic maintenance is neglected and the car is driven continuously, serious troubles resulting in more time and money to repair can develop.

The periodic maintenance procedure are described in the following with accompanying illustrations so that servicemen can easily follow.

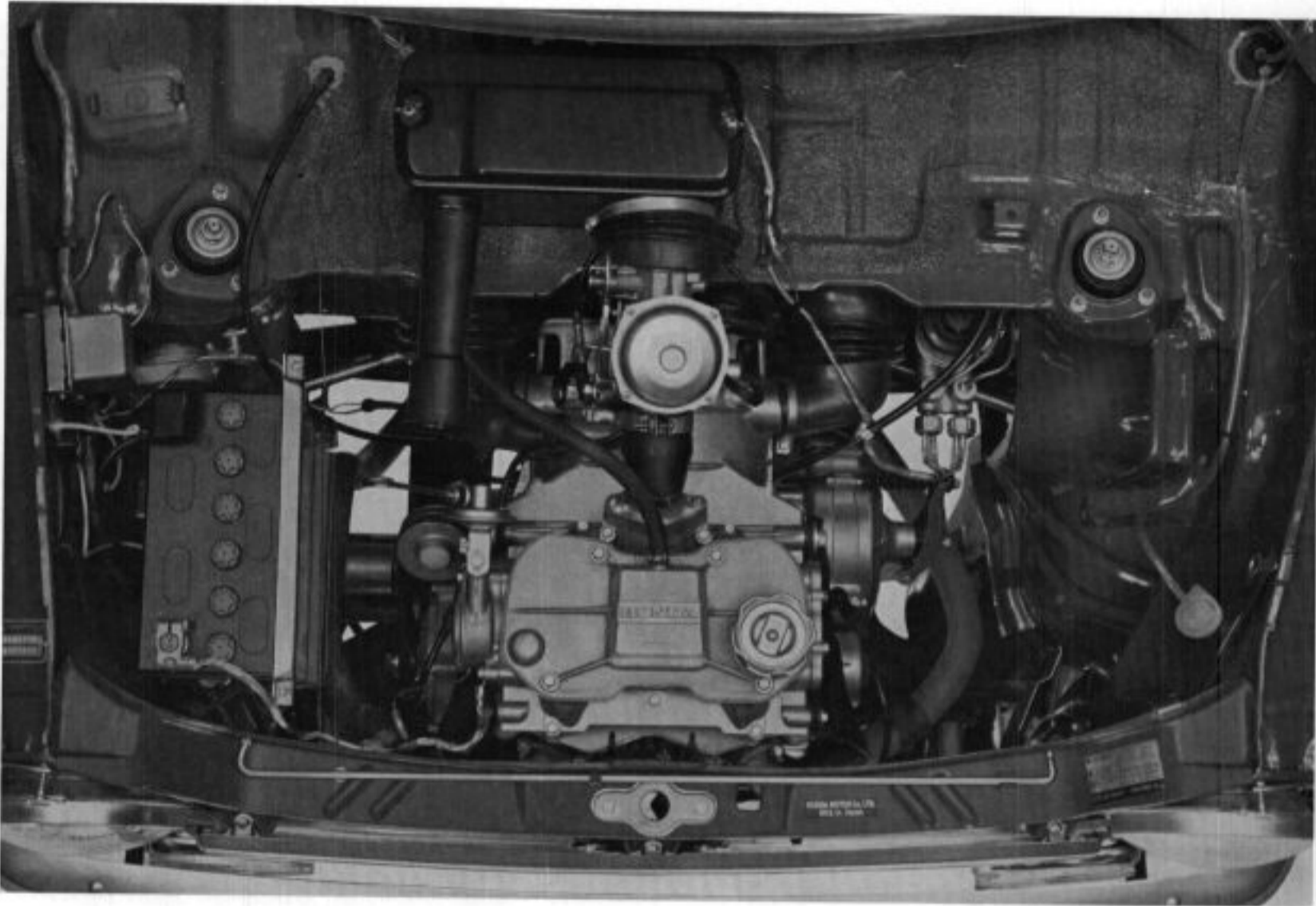


Fig. 19A-1

C. Maintenance Procedure

1. Engine

1-1. Engine Oil

(CHECK)

When checking the oil level, park the car on a flat and horizontal floor and wait until engine oil returns from the cylinder head to the crankcase.



Fig. 19C-1

(CHANGE)

Remove the filter cap and the drain plug, and let the oil drain completely. When the drain plug is tight, first tap the top of the plug and loosen it. Change the oil at every 5,000 km or 3,000 miles.

Note:

Engine oil draining should be performed while the engine is still warm so that the oil can be thoroughly

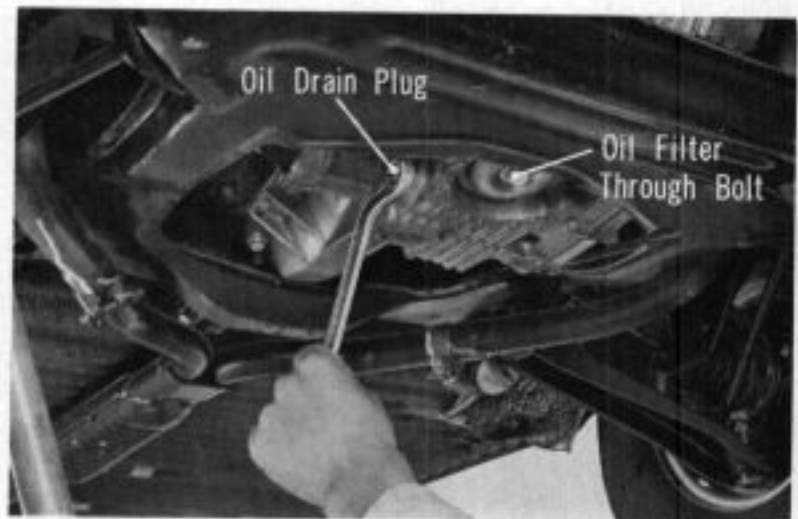


Fig. 19C-2

Oil Capacity

Standard Engine:

3.0 / (2.6 Imp.-qt., 32. Us-qt.)

Automatic Transmission Engine:

2.5 / (2.2 Imp.-qt., 2.6 Us-qt.)

Oil Grade

TEMPERATURE	GRADE	CLASS		
		API Service	ASTM	
Single Grade	-20°C(-4°F) to 0°C(32°F)	SAE 10W	MS	G-IV
	0°C(32°F) to 15°C(59°F)	SAE 20W SAE 20	MS	G-IV
	15°C(59°F) to 30°C(86°F)	SAE 30	MS	G-IV
	Above 30°C(86°F)	SAE 40	MS	G-IV
Multigrade	Above -15°C(5°F)	SAE 10W/40	MS	G-IV
	-15°C(5°F) to 30°C(86°F)	SAE 10W/30	MS	G-IV
	Above 0°C(32°F)	SAE 20W/40	MS	G-IV
GREASE	Multipurpose	NL GI No. 2	Multipurpose Type	

19-4 PERIODIC MAINTENANCE

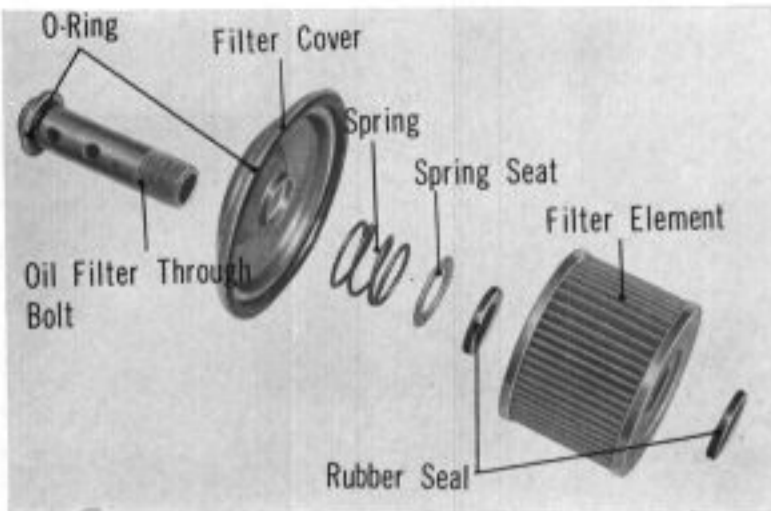


Fig. 19C-3

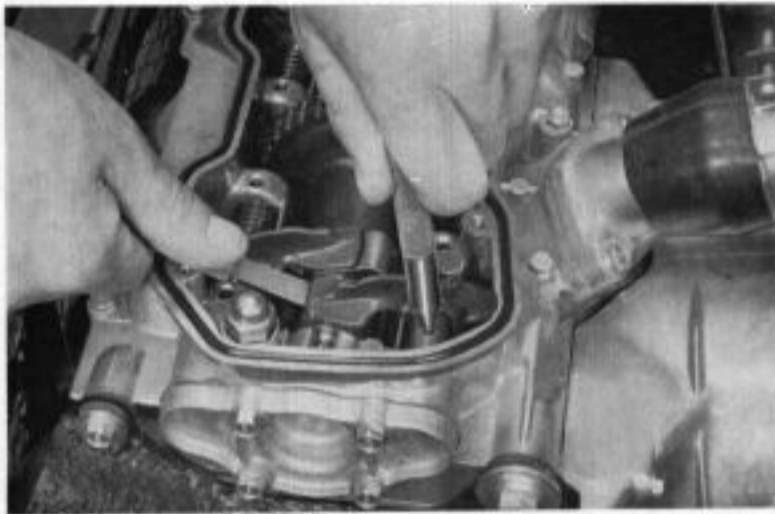


Fig. 19C-4

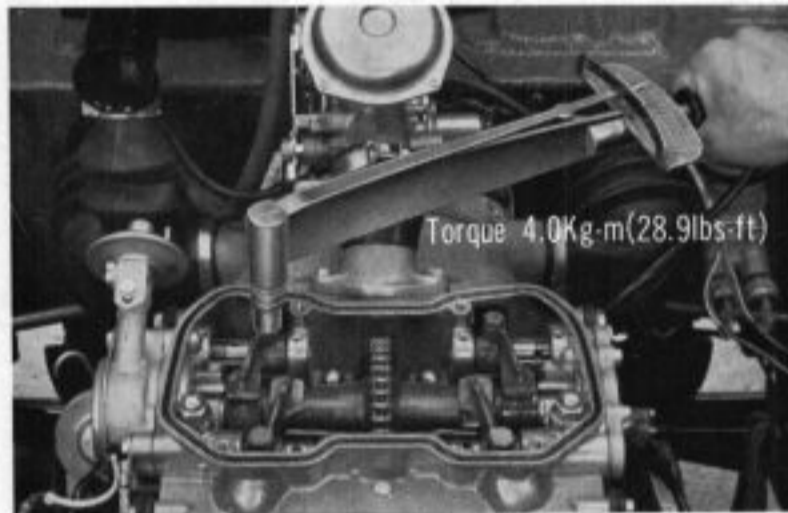


Fig. 19C-5

1-2. OIL Filter Element

Remove the through bolt. Remove the filter cover. And take out the filter element.

Check the O-rings for damages before assembling. Replace the oil filter element with new one at first 5,000 km (or 3,000 miles) and at every 10,000 km (or 6,000 miles) intervals thereafter.

Note:

After installation, run the engine and check for the presence of oil leakage and exudation.

1-3. Valve Clearance Check and Adjustment

Check and adjust the valve clearance with cold engine.

Refer to section "ENGINE TUNE-UP" and "ENGINE MECHANICAL" for detail.

NORMAL VALVE CLEARANCE

(Both inlet and exhaust valves)

0.08~0.12mm (0.003 in~0.005 in)

Note:

A slightly larger valve clearance in extremely cold district and a slightly smaller valve clearance in hot district are recommended.

Be sure to tighten the locking bolts to a specified torque, 4.0 kg-m (29 lb-ft) upon completion of the valve clearance adjustment.

1-4. Air Cleaner Element

Hold and tap the filter element against a wooden surface, freeing the element of dirt and dust, then blow compressed air from the inside.

Note:

Do not clean the element with solvent or cleaning solution.



Fig. 19C-7a

1-5. Air Filter Oil Drainage

A mixture of blow-by gas and oil vapor is led from the crankcase into the air cleaner case where it is condensed. As a result of this, liquid accumulates in the condensing chamber and periodical drainage is required. Remove the rubber plug and drain periodically.

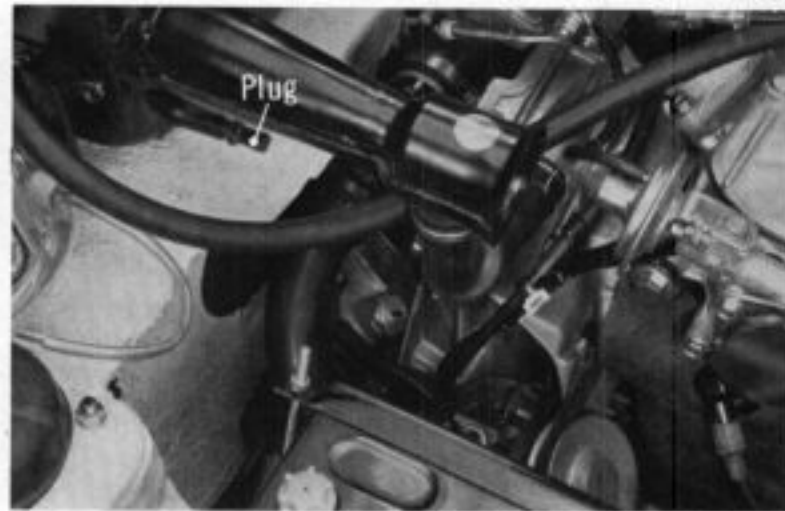


Fig. 19C-7b

1-6. Contact Breaker Point and Ignition Timing

Remove the contact breaker compartment lid; turn the crankshaft pulley clockwise so that the point gap is at its maximum. And measure the point gap with feeler gauge.

Point gap should be 0.3~0.4mm (0.012 in~0.016 in).

Point gap adjustment is made by moving the contact breaker after loosening the adjusting screws.

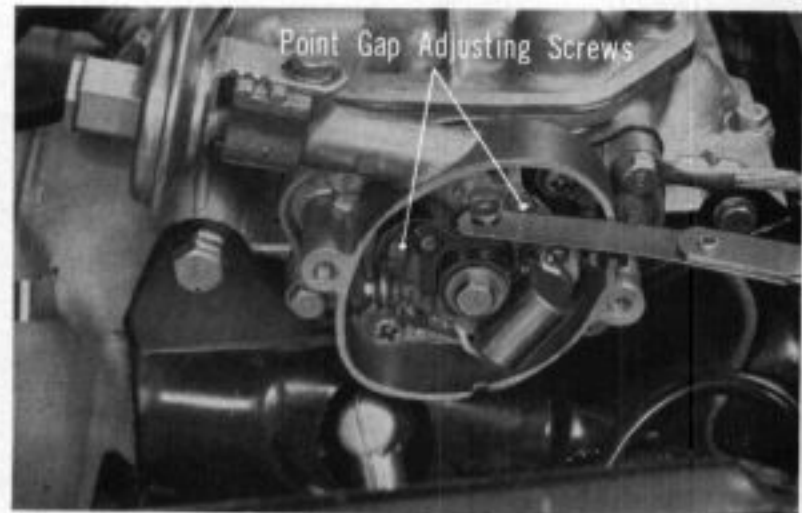


Fig. 19C-8

Turn the crankshaft pulley clockwise. Check to see if the point begins to open when "F" mark is aligned with the mark on the dynamo cover for N360 (including LN360 and N400) and on the flywheel housing cover for N600.

An accurate method is hooking up a 12V lamp to the primary lead. Turn the ignition switch on and adjust that the lamp goes off when "F" mark is aligned to the mark on the dynamo cover or on the flywheel housing cover. Another method is the use of a service tester.

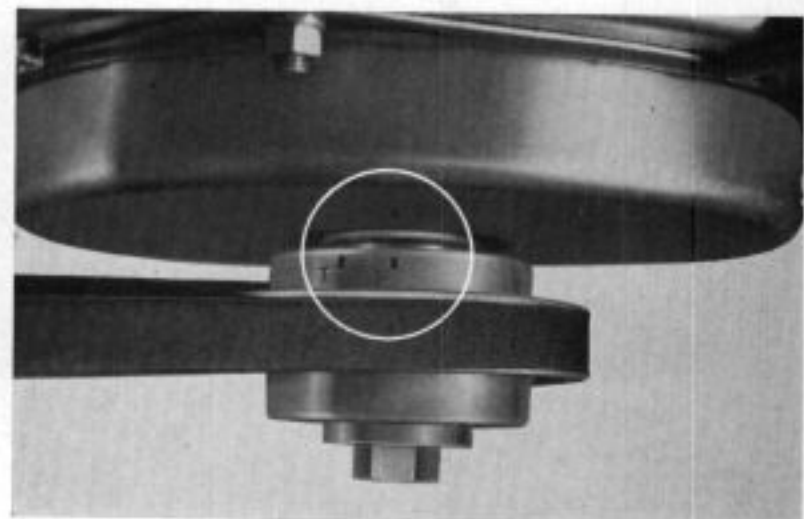


Fig. 19C-9

19-6 PERIODIC MAINTENANCE

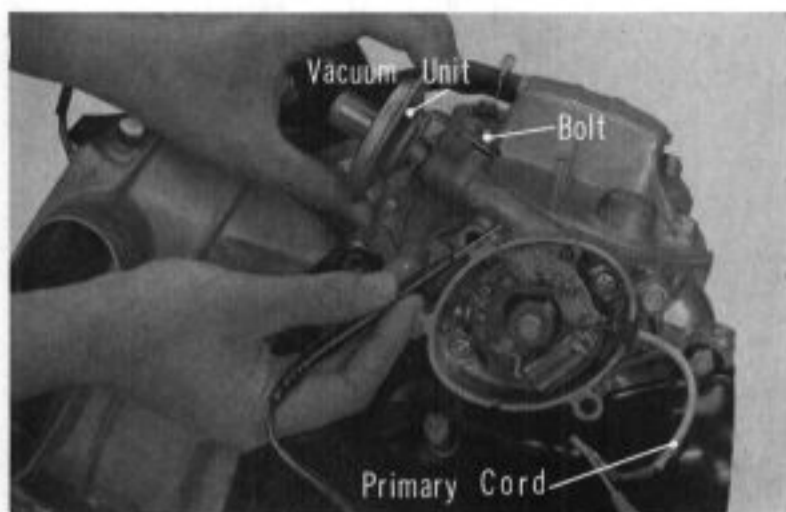


Fig. 19C-10

MAKE	HOTTER	STANDARD	COLDER
NGK	B-7ES	B-8ES	B-9E
ND	W-22ES	W-24ES	—

Ignition timing adjustment is made by moving the vacuum unit out for advancing the timing and in for retarding.

1-7. Spark Plug

Remove spark plugs. Clean them with a plug cleaner. Check for burnt electrodes and broken insulator, and select the proper heat range spark plug. Also check the spark gap..Spark gap shall be: 0.7~0.8mm (0.028"~0.032").

Note:

Never heat the electrodes with fire. To install a plug, first thread in with fingers and fingers and tighten it securely with a plug wrench.



Fig. 19C-11

1-8. Fan Belt

Check the fan belt for tension by narrowing it with fingers at a midway point between pulleys. If the inner distance is 20mm (0.787 in), the belt tension is satisfactory.

1-9. Carburetor

(Inspection of choke)

Check that the choke valve opens fully when the choke button is pushed in.

(Throttle Cable Adjustment)

Check that the throttle opens fully when the accelerator pedal is pressed down all the way. Adjust the throttle cable if necessary.

(Throttle Stop Screw Adjustment)

Insure that spark plugs are functioning satisfactorily and ignition timing is correct. Adjust engine revolution 1100~1200 rpm with the throttle stop screw.

(Pilot Screw Adjustment)

The engine should be warmed to the normal operating temperature before attempting any carburetor adjustment. Adjust the slow stop screw and set the idling speed to the specifications. Position the pilot screw to the specified turns from the fully close and then turn it both directions within $\frac{1}{4}$ turn and locate the position at which engine idles smoothly. (See page 14-8 for specifications)

After completing the pilot screw adjustment, reset the throttle stop screw to enable the engine to idle at the specified speed.

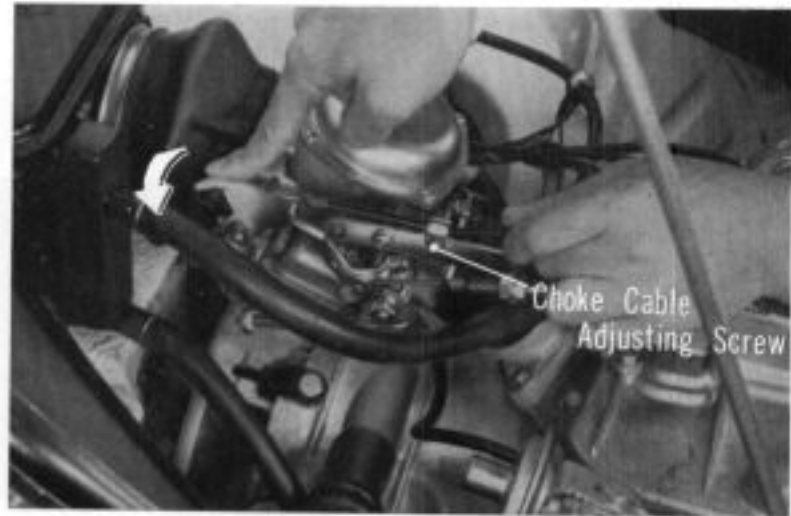


Fig. 19C-11a

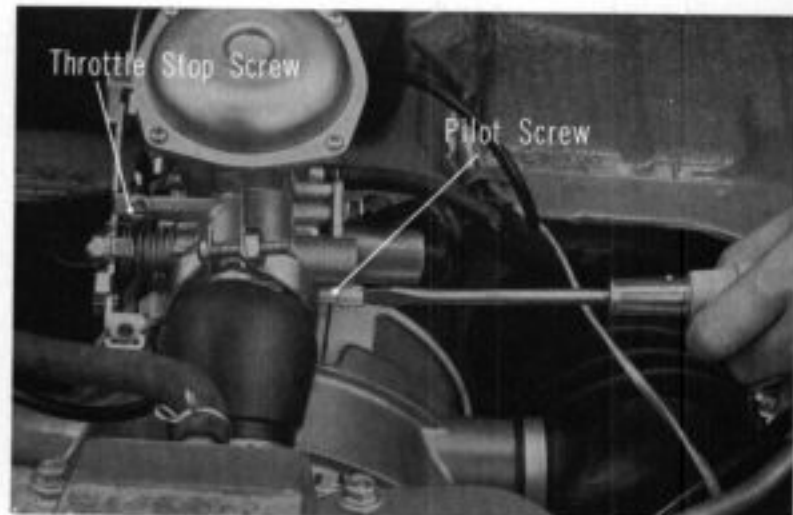


Fig. 19C-12

1-10. Fuel Strainer

Disconnect fuel tubes and remove the fuel strainer with the fuel pump in a single unit. Drain the water from the strainer. If the strainer is clogged, replace with a new strainer.

The fuel strainer, which is a cartridge type, cannot be disassembled or cleaned. When installing, be careful not to invert the inlet and outlet sides.



Fig. 19C-13

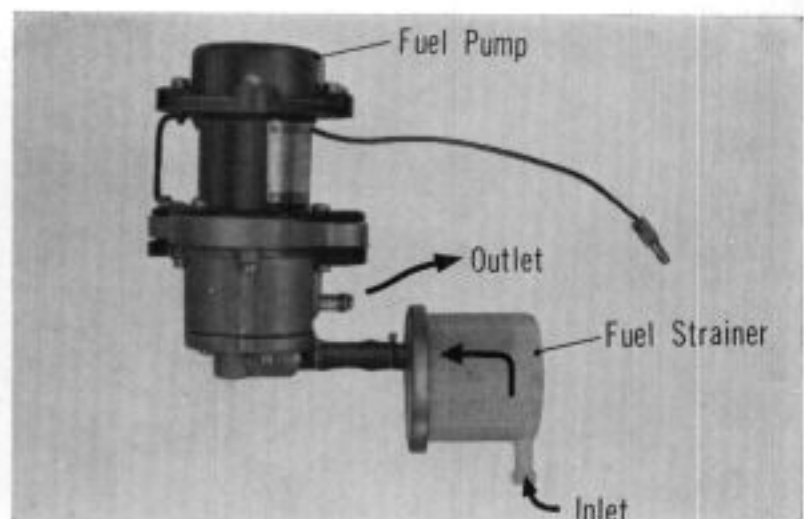


Fig. 19C-14

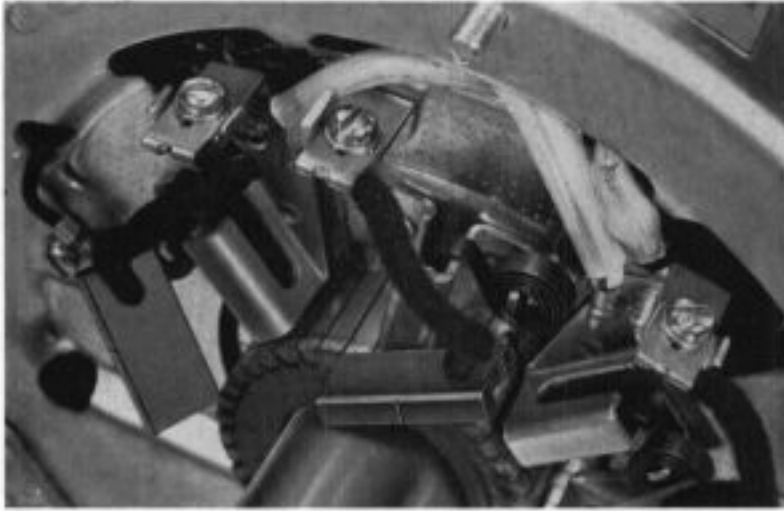


Fig. 19C-15

1-11. Motor Generator Brush (N360, LN360 and N400 only)

If the length is less than 12mm (0.47 in), replace with new brushes. (Groove indicates wear limit. Replace when worn to the groove.)

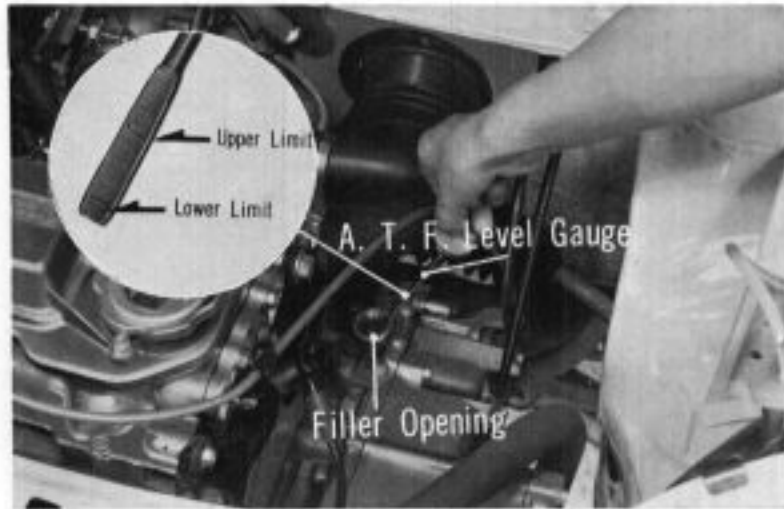


Fig. 19C-16

2. Automatic Transmission

2-1. Automatic Transmission Fluid Level

Check fluid level at 5,000 km (3,000 miles) intervals and replenish as needed up to upper limit mark. When checking the fluid level, the transmission selector lever should be in 3 position with parking brake, the car reasonably level and the engine idling. The fluid gauge dipstick is located on the opposite side of the engine oil dipstick.

2-2. Fluid Change

Change fluid at 20,000 km (12,000 miles) intervals. Remove the drain plug and drain the fluid thoroughly; tighten the plug securely before filling fluid through the filler opening. Add fresh fluid until the level reaches the upper mark on the dipstick, (capacity 3.2ℓ, 5.6 Imp. pt.).

Note:

Use a good quality A.T.F. Type A.

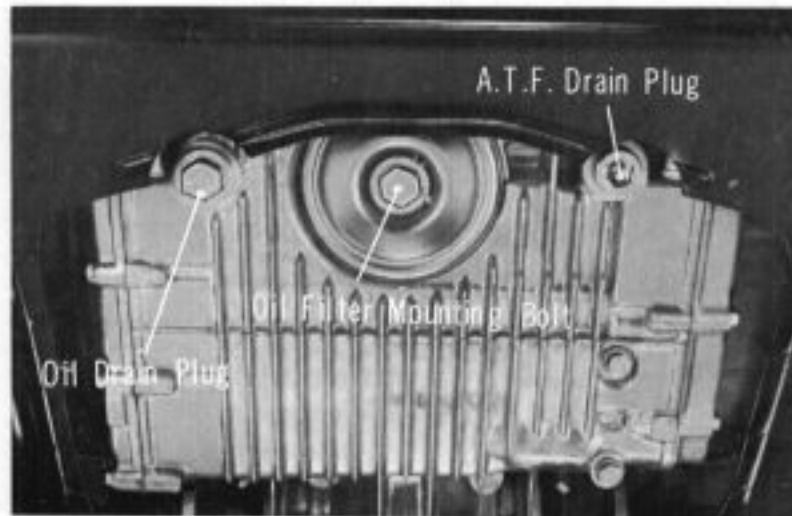


Fig. 19C-17

2-3. Selector Cables Adjustment

Position the select lever into "P" (Parking) and adjust the selector cable A (Black) with adjusting nuts so that the slack of the cable becomes zero. Then, position the selector lever into 1st to adjust the selector cable B (white).

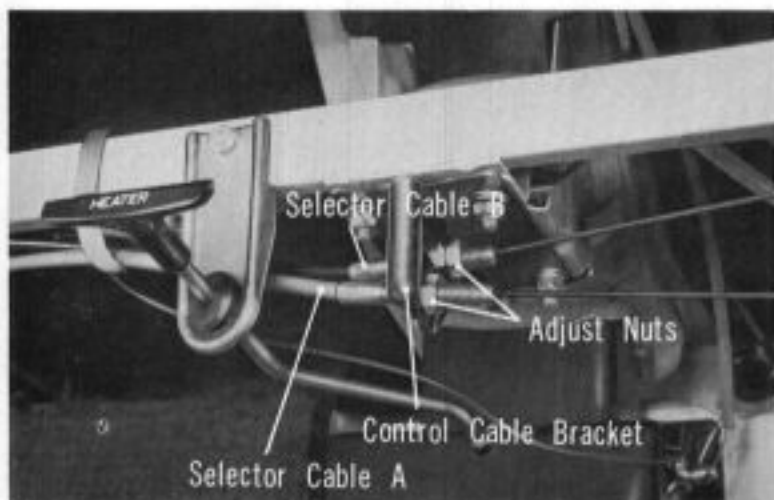


Fig. 19C-18

2-4. Throttle Secondary Cable Adjustment

Open the throttle arm lever fully until it stops by hands and check the throttle secondary cable for slack by opening the carburetor throttle valve fully. If any slack on the cable, adjust the cable with adjusting nuts.

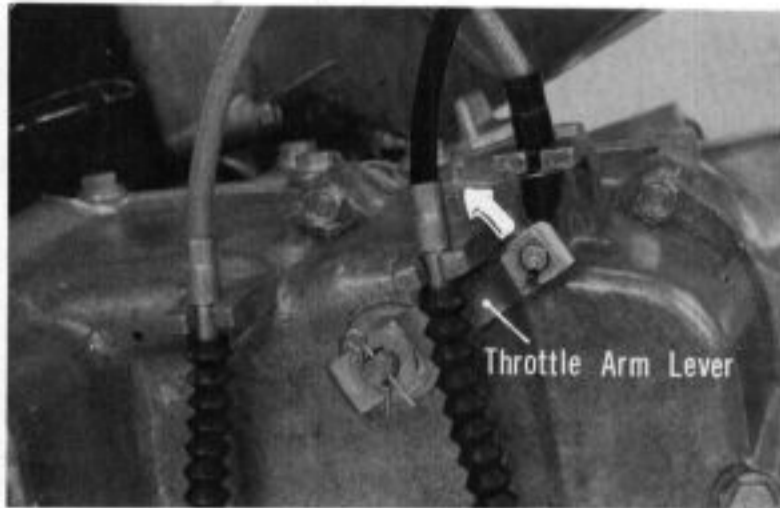


Fig. 19C-19

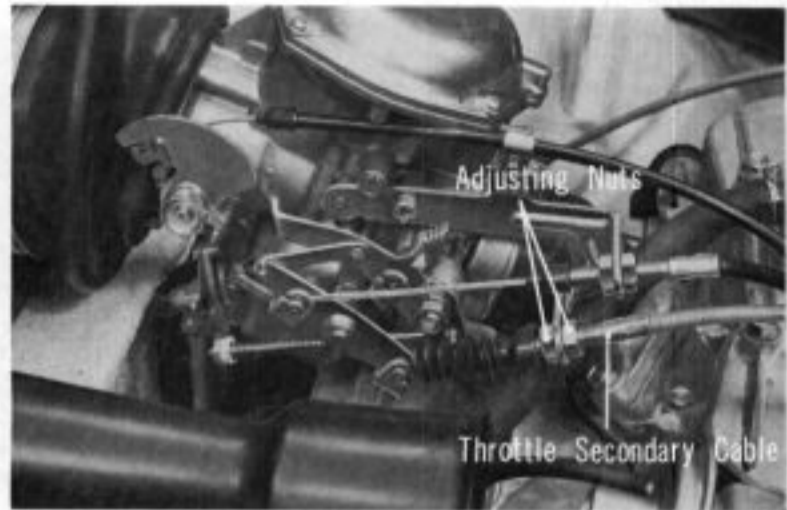


Fig. 19C-20

3. Clutch

Check the clutch release lever for free play at the tip of the lever. The specified play is 3mm (0.12 in). Adjust the free play by means of the adjusting bolt by loosening the lock nut. Check the clutch cable for movement and damage at the release lever end and the clutch pedal end.

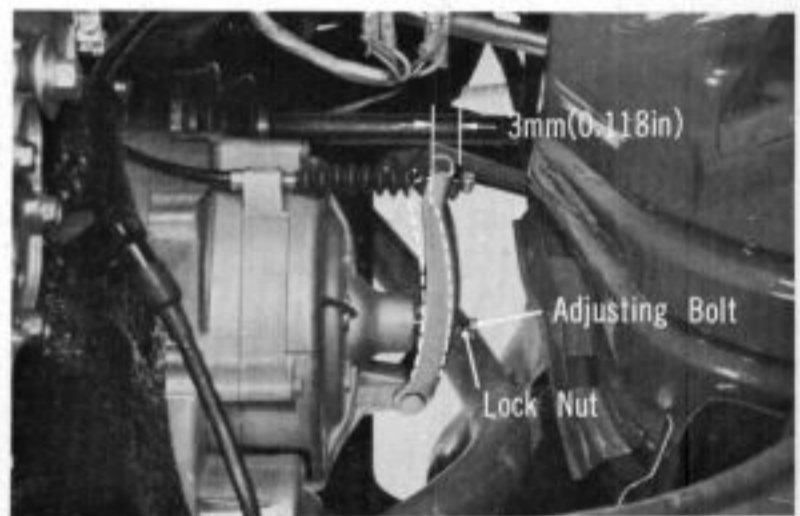


Fig. 19C-21

4. Brakes

Foot Brakes

(Air Bleeding)

Air bleeding shall be started with the wheel cylinder located farthest from the master cylinder while taking a care to the fluid level in the reservoir.

Connect a vinyl tube to the bleed screw. Depress the brake pedal several times. Then, with the pedal kept depressed; repeat turning the bleed screw back and in quickly until no air bubbles appear in the fluid. By the same manner, bleed other wheels. And finally refill the reservoir with the brake fluid up to the prescribed level.

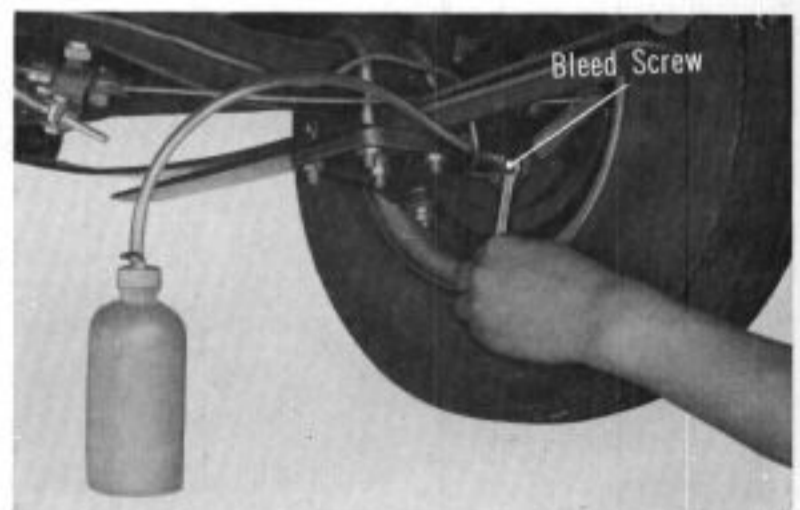


Fig. 19C-22

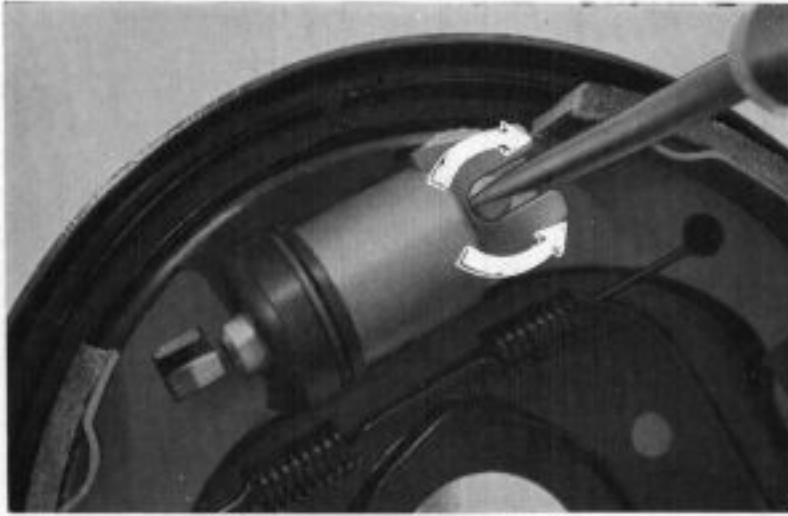


Fig. 19C-23



Fig. 19C-24

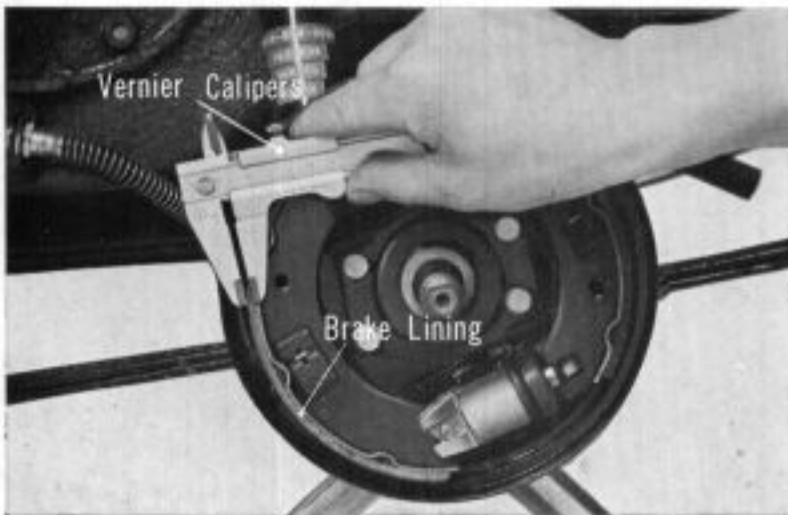


Fig. 19C-25

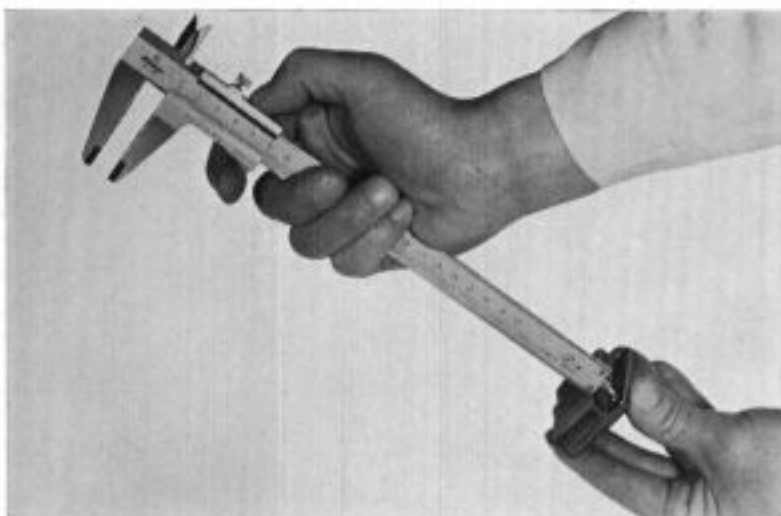


Fig. 19C-26

(Leading/Trailing Drum Brake Adjustment)

Turn the adjusting screw clockwise and back off the minimum amount necessary to allow the drum to rotate freely.

Note:

Press the brake pedal several times to centralize the brake shoes before checking the brake shoe release.

(Two Leading Drum Brake Adjustment)

(Two Leading Drum Brake Adjustment)

Turn the star adjusting screw outward till the brake drum is locked, and back off as explained in leading/trailing brake adjustment.

Perform these procedures with two wheel cylinders in each wheel uniformly.

(Wheel Cylinder and Brake Shoe)

The wheel cylinder assembly of the leading/trailing type must slide smoothly, so apply a light coating of the grease.

If the shoe lining is less than 1.4mm (0.055 in) thick when measured with vernier calipers, it should be replaced.

Note:

Replace shoe on all four wheels at the same time. In the case of uneven wear between front and rear wheels, however, only the front or rear wheel shoes may be replaced.

(Disk Brake Pad)

New brake pads have a thickness of 10.3mm (0.405 in). They must be replaced when worn to 2mm (0.079 in).

Parking Brake

When the lever stroke is appropriate, the rear wheels are locked at 30 to 50% (2~3 notches) of the full lever stroke. Parking brake lever stroke adjustment shall be made by means of the adjusting nut located at the rear axle beam after the footbrake is adjusted. Thread in the adjusting nut to reduce the lever stroke when excessive.

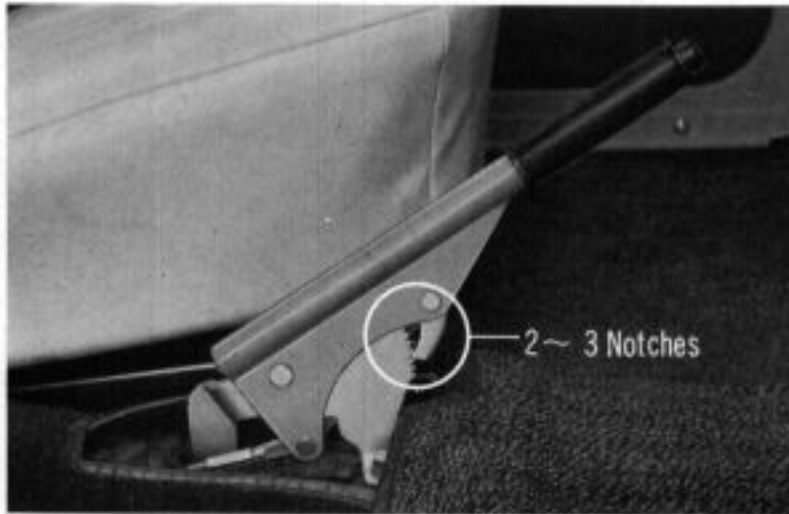


Fig. 19C-27

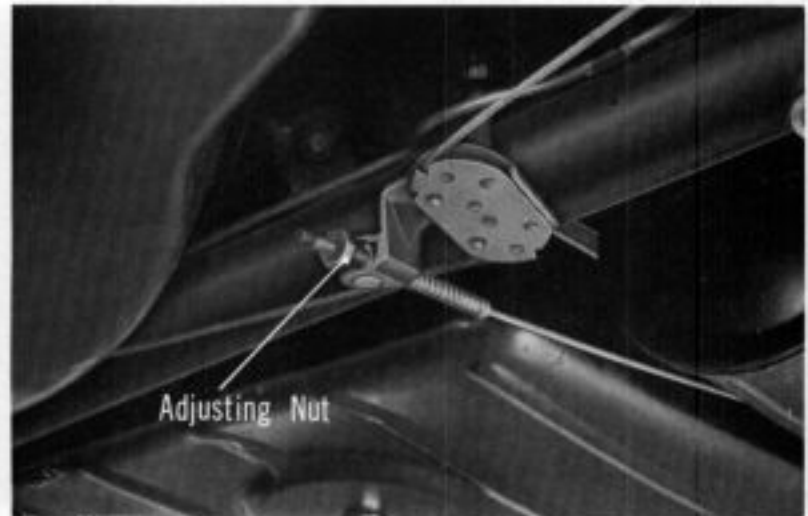


Fig. 19C-28

Brake Hydraulic System

In addition to periodical check every 3000 miles, brake line, hoses and cable should be inspected for brake fluid leak, chafing, corrosion, deterioration, or other damages whenever the car is raised on a lift.



Fig. 19C-29a

Vacuum Booster Filter

Remove the valve body cap with a screw driver and detach the air filter. Air filter should be washed in clean alcohol and air-dried.



Fig. 19C-29b

Overhaul of Vacuum Booster

Whenever overhauling the vacuum booster for any reason, replace all rubber material parts. A repair kit shown in page 11-29-7 is available for overhauling.

19-12 PERIODIC MAINTENANCE

Brake Fluid Level

With the brake fluid reservoir cap removed, check to see if the fluid level reaches the mark on the wall and also the condition of the fluid. If the fluid level is too low, add the recommended fluid. The fluid, if dirty, should be changed.

Note:

Be careful not to spill the fluid on painted surfaces as it will corrode the paint.

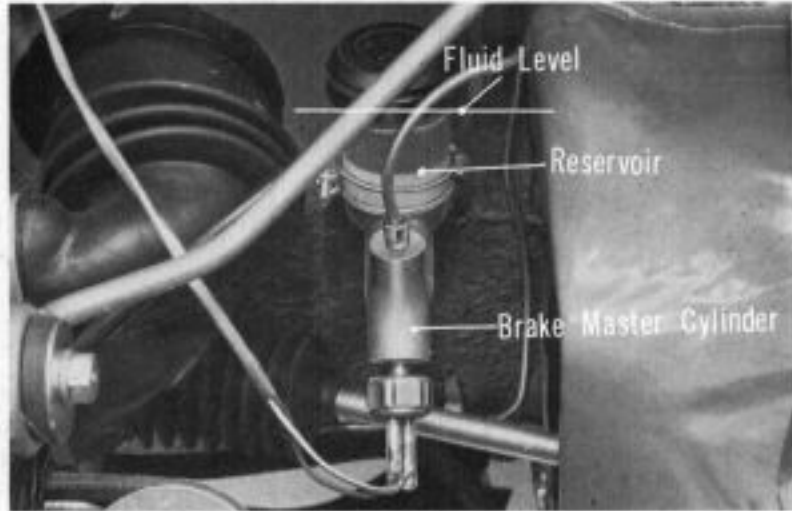


Fig. 19C-29c

5. Steering and Wheels

5-1. Steering Operation and Tie-rod End. (Loose Steering Wheel)

To check for looseness of the steering wheel; move it back and forth, and right and left. If the steering wheel is loose, check the following items;

- 1 worn or improperly adjusted steering gear box.
- 2 Worn or loose wheel bearings.
- 3 Worn or loose steering linkages.
- 4 Steering column housing mounting bolts are loose.



Fig. 19C-30

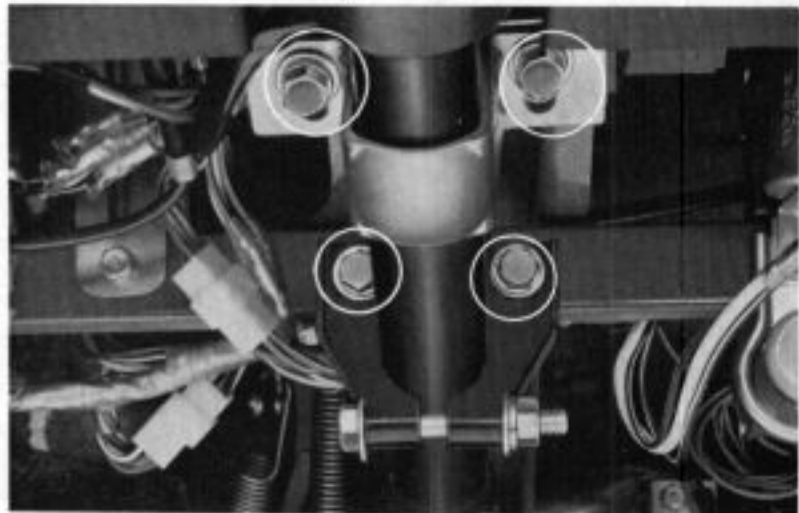


Fig. 19C-31

5. Steering shaft connections are loose. Tighten the clamp bolts.

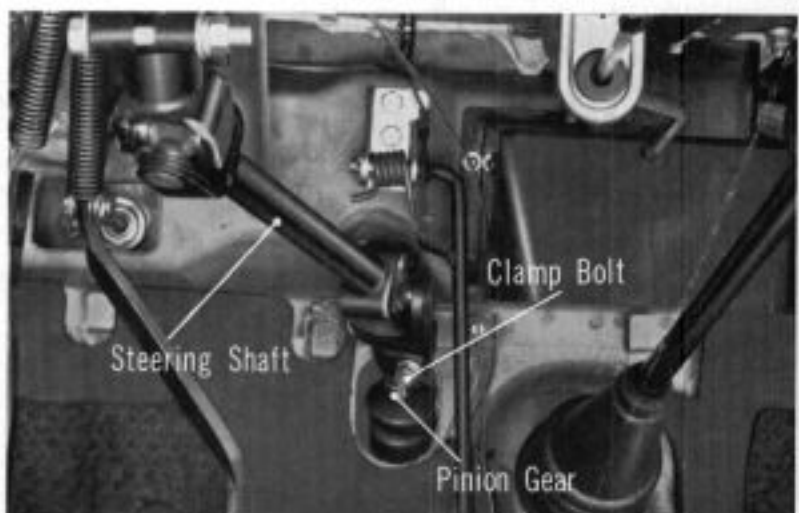


Fig. 19C-32

6. Steering shafts universal joints are loose.
 - * Factory-sealed-lubrication universal joints. Correct the joints in accordance with the methods described in section "STEERING."

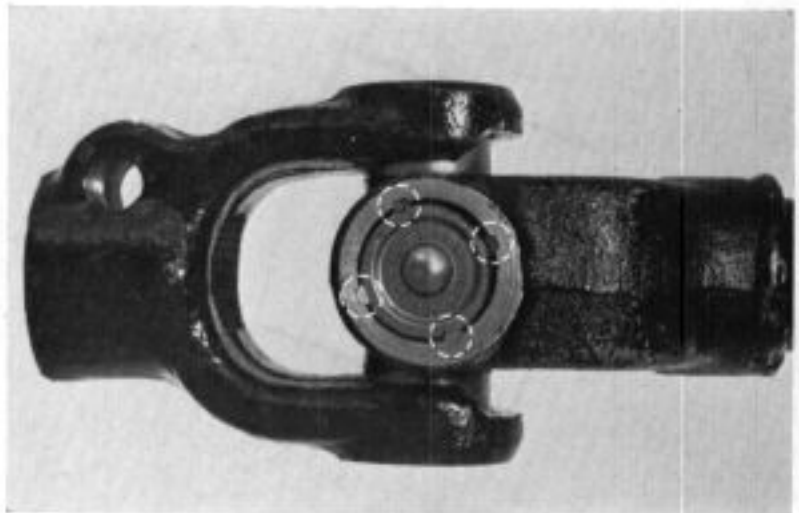


Fig. 19C-33a

19-14 PERIODIC MAINTENANCE

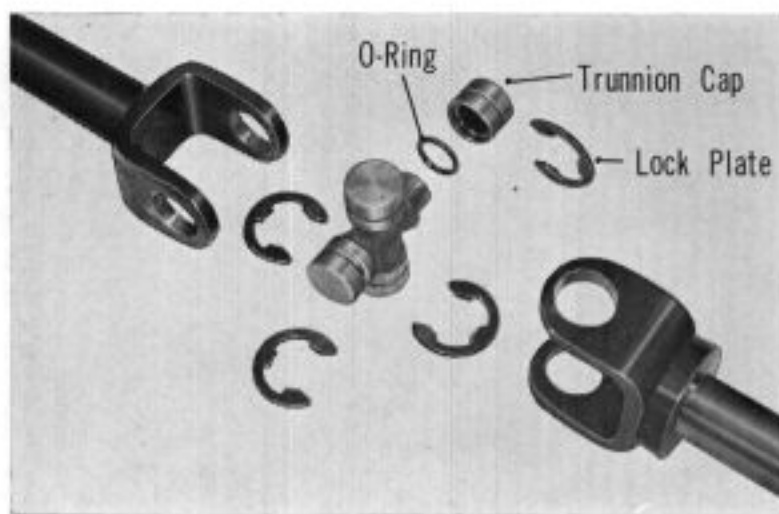


Fig. 19C-33b



Fig. 19C-34

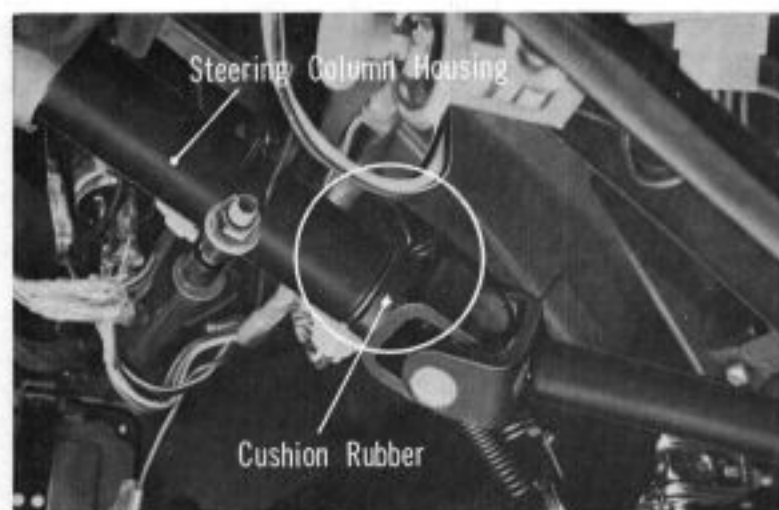


Fig. 19C-35

* Standard joints

Select assemble the lock plate to minimize the play or install wave springs inside trunion cap. There are four different lock plates available.

	Thickness
Lock plate A	1.7 mm (0.067 in)
Lock plate B	1.9 mm (0.075 in)
Lock plate C	1.3 mm (0.051 in)
Lock plate D	1.5 mm (0.059 in)

7 Steering wheel nut is loose.

Tightening torque:

3.0~3.5 kg-m (21.7~25.3 lb-ft)

8 Steering column housing is improperly positioned or the cushion rubber between the column housing and the steering shaft universal joint is worn.

(Steering Wheel Turning Force)

Check the turning force by hooking a scale to the steering wheel, with the front wheels set in straight, forward position and freed (off the ground).

In this state, the steering wheel must turn with the operating torque of 1.5 kg (3.3 lbs) or less.

If the steering is found heavy, the possible causes are:

- (1) Improperly positioned steering column housing.
- (2) Rack adjust-bolts adjusted too tight.
- (3) Rack end ball joints are tight during the first 3,000 km (2,000 miles) mileage.



Fig. 19C-36

(Steering Gear Box)

Check steering gear box mounting bolts for looseness, and the tie-rod dust seals for damage. Check the pinion gear for play in axial, radial, and rotational directions by hands. Grease the gear box through the greasing nipple or special tool-greasing adaptor.



Fig. 19C-37

(1) Excessive play in radial direction

Check the pinion gear and the bushing wear. The pinion gear bushing is press fitted in the gear box with damper rubber incorporated. Check the damper rubber for wear, and make a replacement if it is worn excessively.

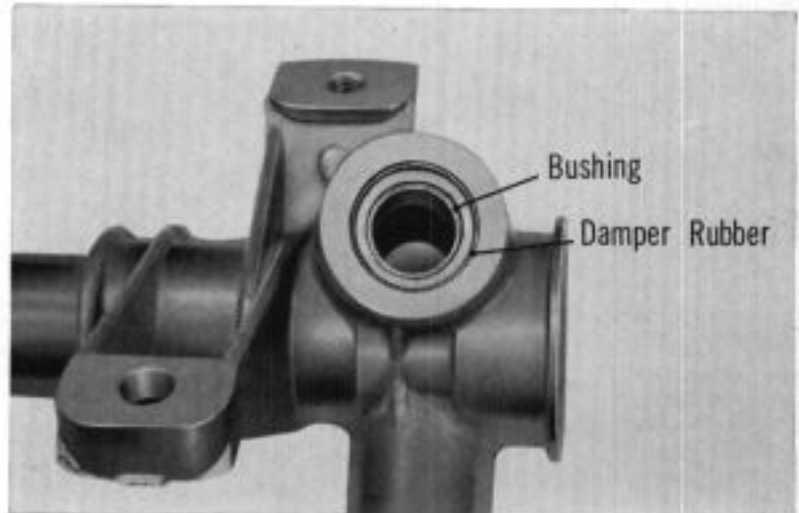


Fig. 19C-38

(2) Excessive play in axial direction

Tighten the pinion gear mounting bolt and eliminate the pinion gear end play. Secure with the lock nut.

(3) Excessive play in rotational direction

Adjust the rack adjusting bolts at both ends of the steering gear box.

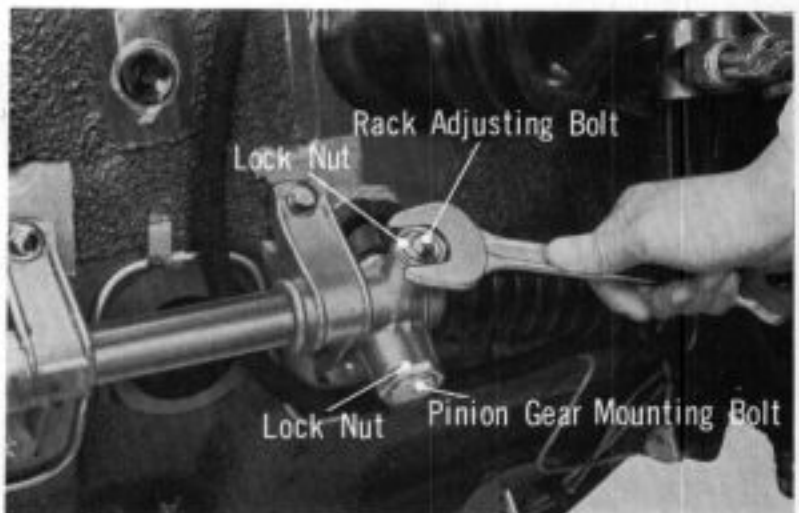


Fig. 19C-39

19-16 PERIODIC MAINTENANCE

(Steering Linkages)

Check the ball joints for wear and the loose connection to the rack gear.
Tighten to a torque 4.5~5.0 kg-m (32.5~36.2 lb-ft) and secure with the lock washer.

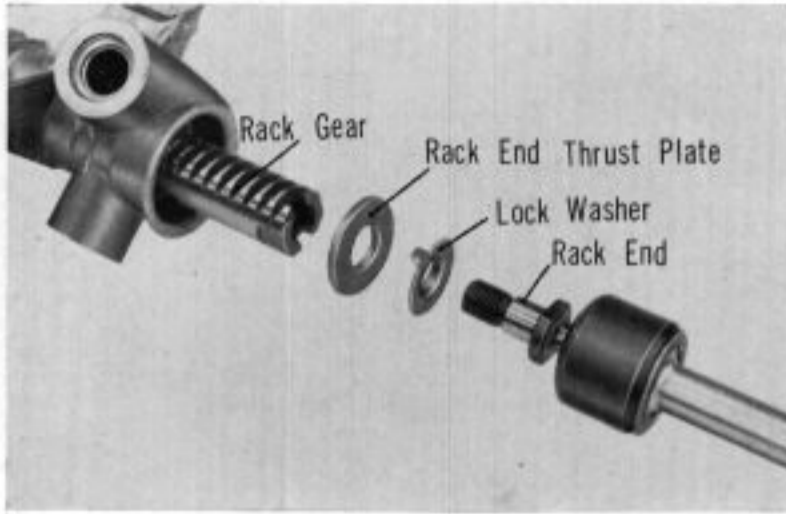


Fig. 19C-40

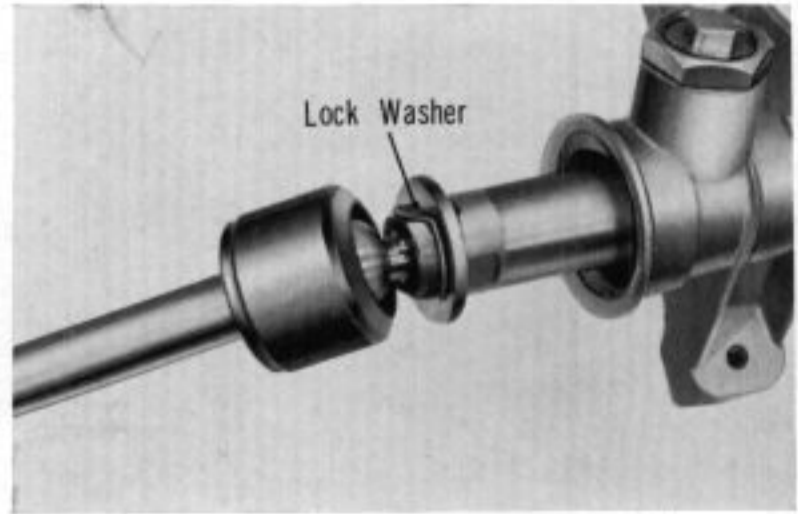


Fig. 19C-41

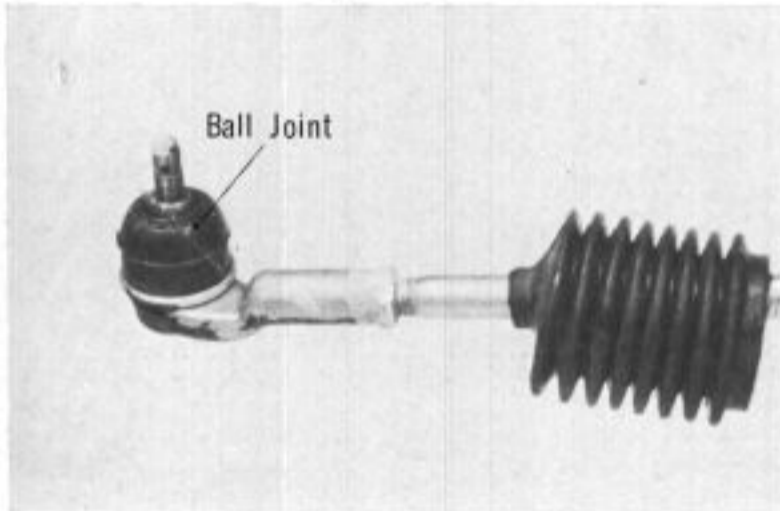


Fig. 19C-41a



Fig. 19C-41b

(Greasing the Steering Gear Box)

Turn the steering wheel to the extremely right for LH car on extremely left for RH car and grease the steering gear box through the nipple.

5-2. Wheel Alignment

When checking wheel alignment, place the unloaded car on a level surface. It is imperative that all checks of steering linkage for bends, wear, and other damage (spring damage, bent frame, wheel distortion, deformed tires, tire pressure, worn wheel bearings, steering gear backlash) be made and faults corrected before performing this test. If these checks are not made in advance, no accurate test of the wheel alignment can be made.

- | | |
|------------|----------------|
| (1) Camber | 0.5° |
| (2) Caster | 1° |
| (3) Trail | 5mm (0.197 in) |

For checking and adjusting the above items, see section 12 "SUSPENSION"

- | | |
|------------|----------|
| (4) Toe-in | out 2 mm |
|------------|----------|

Checking Toe-In:

Set the front wheels in the straight ahead position. Chalk a mark line at the center of each front tire and measure distance between the chalked lines. Turn wheels 180 degrees and measure the distance at the rear.

Toe-in equals (rear measured value) - (Front measured value)

The standard value of the toe-in is -2 mm (-0.08 in) OUT.

Adjustment:

Toe-in can be adjusted by loosening the lock nuts at each of the ties rods. To increase toe-in, turn the right tie-rod in the direction of wheel rotation when the car moves forward; turn the left tie-rod in the opposite direction. Turn both tie-rods an equal amount until toe-in becomes -2 mm.

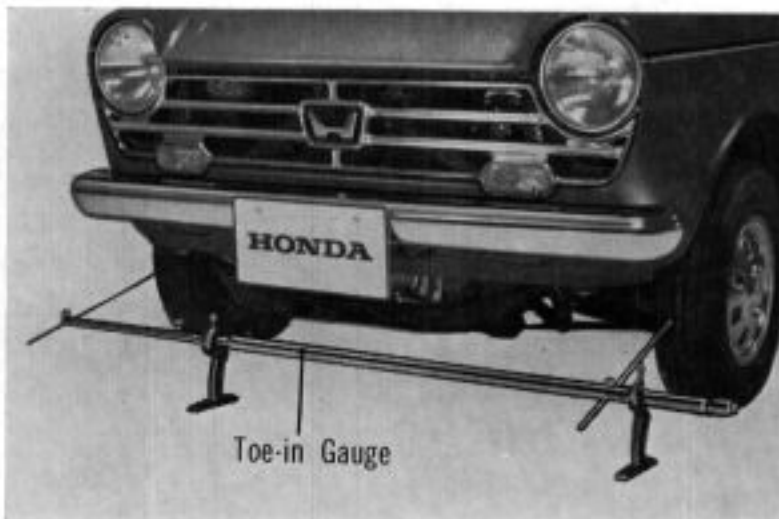


Fig. 19C-42



Fig. 19C-43

19-18 PERIODIC MAINTENANCE

5-3. Wheels and Tires

(Tire Inflation Pressure)

Check the inflation pressure of tires. If it is too low, check its cause and correct to the specified air pressure. Check inflation pressure of the spare tire at the same.

	(Tire Inflation Pressure)	
	Front	Rear
2PR Tire	1.4 kg/cm ² (20 psi)	1.0 kg/cm ² (14 psi)
4PR Tire (Standard)	1.7 kg/cm ² (24 psi)	1.5 kg/cm ² (22 psi)
4PR Tire (Radial)	1.8 kg/cm ² (26 psi)	1.5 kg/cm ² (22 psi)
6PR Tire	2.1 kg/cm ² (30 psi)	1.7 kg/cm ² (24 psi)

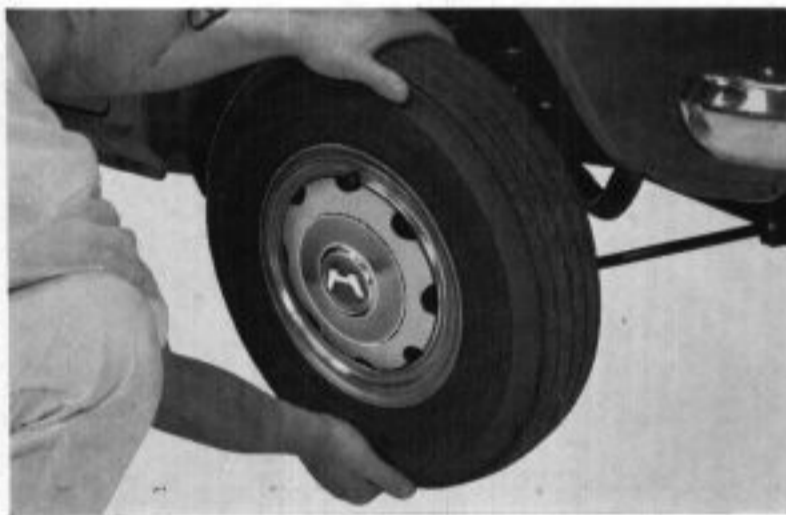


Fig. 19C44

(Wheel Bearing Play)

Jack up to make each wheel free respectively. Grasp the wheel and shake up and down to check the wheel bearing play.

If any exists, tighten hub nuts to a specified torque again and, if any play still exists, replace the bearing.

Note:

Over-tightening of hub nuts will cause hard bearing rotation, resulting in unsmooth wheel rotation.

Specified tightening torque is 16~18 kg-m (116~123 lb-ft) for front hub nuts.

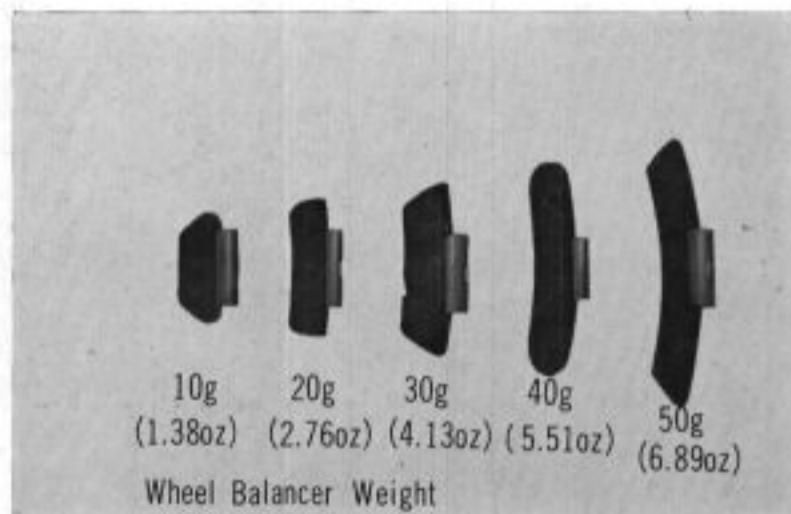


Fig. 19C-45

(Wheel Balance)

When tire is replaced or tire wear is non-uniform, balance the wheel with wheel balance weight shown in the figure.

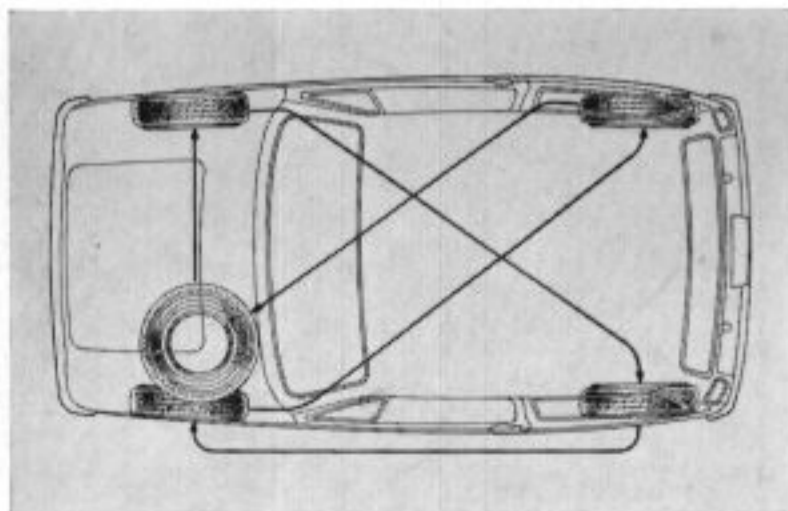


Fig. 19C-46

(Tire Rotation)

Tire, if used for a long period of time at the same position, will become worn unevenly, resulting in short tire life and poor driving performance. To prevent this, rotate tires as illustrated.

Standard period of tire rotation is 5,000 km (3,000 miles) of drive.

6. Battery and all Mounting Bolts

6-1. Mounting Bolts and Nuts

The following are examples

See "Torque Specifications" in section GENERAL for details

1. Tighten the shock absorber mounting nuts.

Tightening torque:

(12 mm)

Nut A 4.5~5.0 kg-m (32~36 lb-ft)

Nut B 2.5~3.0 kg-m (18~22 lb-ft)

(8 mm)

Nut 1.5~2.0 kg-m (11~15 lb-ft)

2. Tighten the front damper clamp bolts.

Tightening torque:

8 mm Bolt 3.0~3.5 kg-m (22~25 lb-ft)

10mm Bolt 4.5~5.0 kg-m (29~93 lb-ft)

3. Tighten the radius rod mounting bolts and lower arm mounting bolts.

Tightening torque:

4.0~4.8 kg-m (29~35 lb-ft)

4. Tighten the tie-rod end ball joint nut.

Tightening torque:

3.5~4.0 kg-m (25~29 lb-ft)

5. Tighten the U bolt nuts.

Tightening torque:

4.4~4.8 kg-m (32~35 lb-ft)

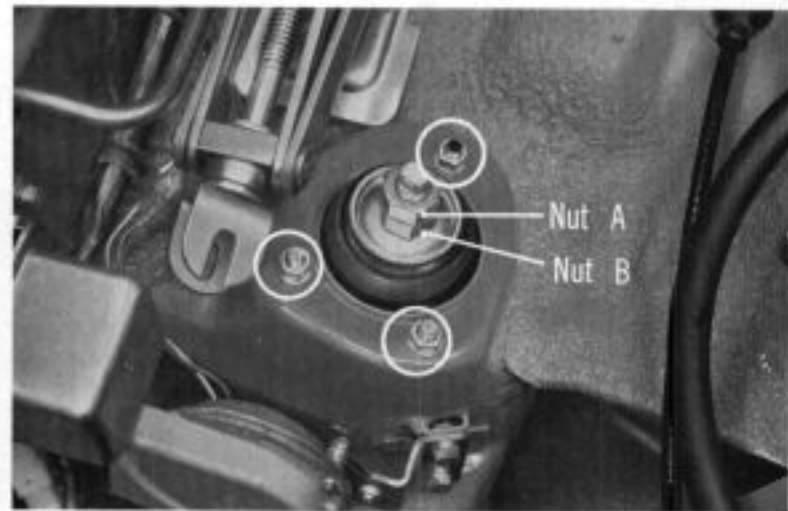


Fig. 19C-47

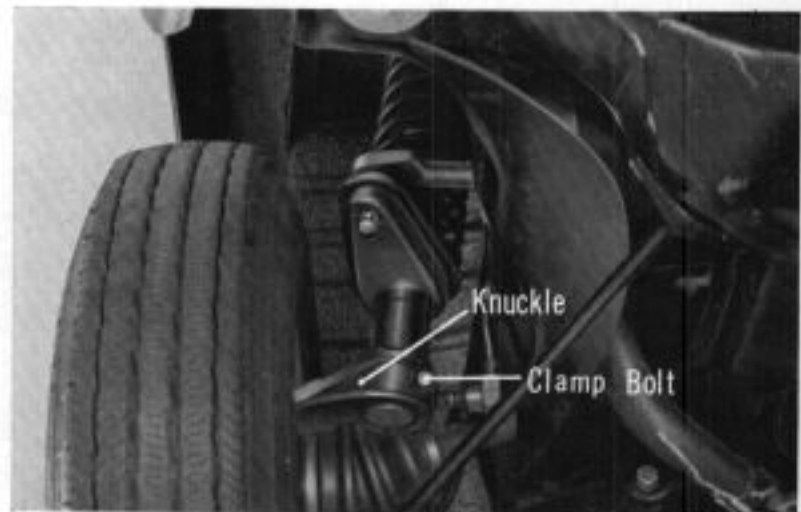


Fig. 19C-48

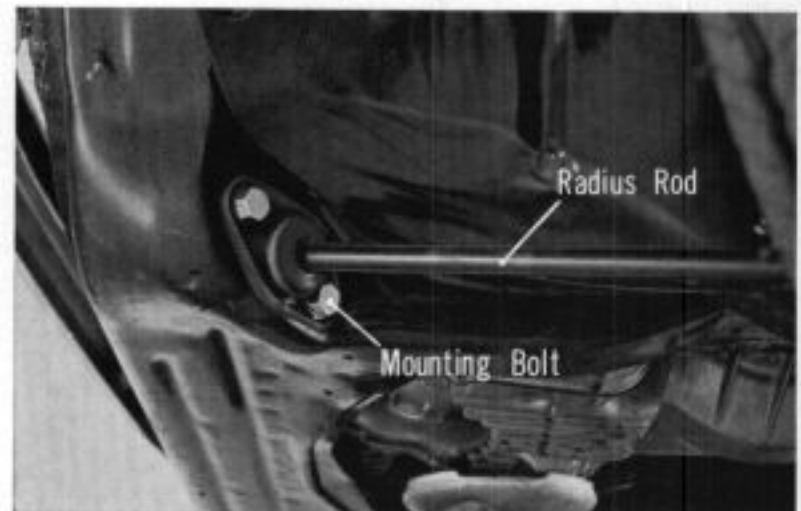


Fig. 19C-49



Fig. 19C-50

19-20 PERIODIC MAINTENANCE

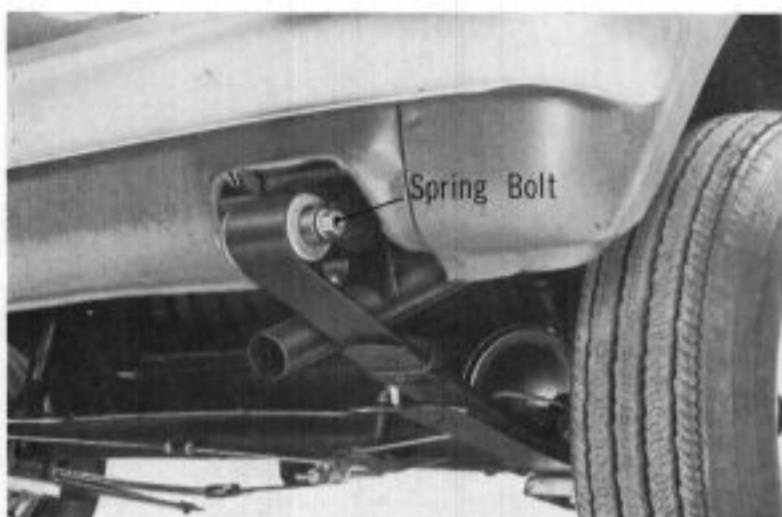


Fig. 19C-51



Fig. 19C-52



Fig. 19C-53

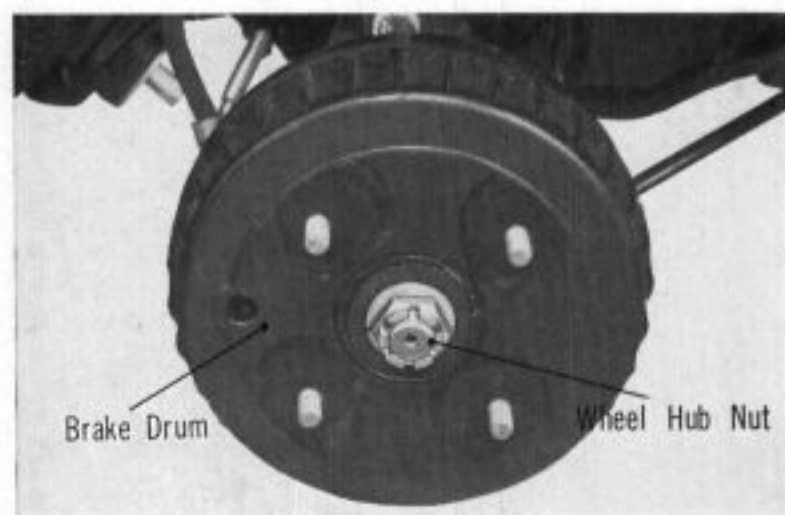


Fig. 19C-54

6. Tighten the spring bolts and shackle bolts.

Tightening torque:

4.4~4.8 kg-m (32~35 lb-ft)

7. Tighten the drive shaft mounting bolts.

Tightening torque:

2.8~3.2 kg-m (20~22 lb-ft)

8. Tighten the rack end and tie-rod end lock nut.

Tightening torque:

4.5~5.0 kg-m (33~36 lb-ft)

9. Tighten the wheel hub nuts.

Tightening torque:

14~20 kg-m (101~145 lb-ft)

10. Tighten the exhaust pipe mounting nuts and the clamp bolts of the primary silencer and exhaust pipe (manifold).

Tightening torque:

2.5~2.9 kg-m (18.1~20.3 lb-ft)

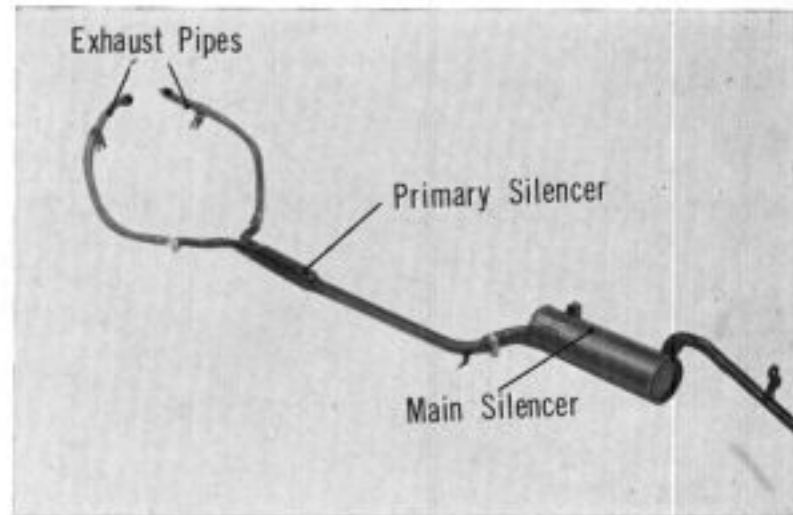


Fig. 19C-55

11. Tighten the sub-frame mounting bolts (four).

Tightening torque:

4.0~4.5 kg-m (28.9~32.5 lb-ft)

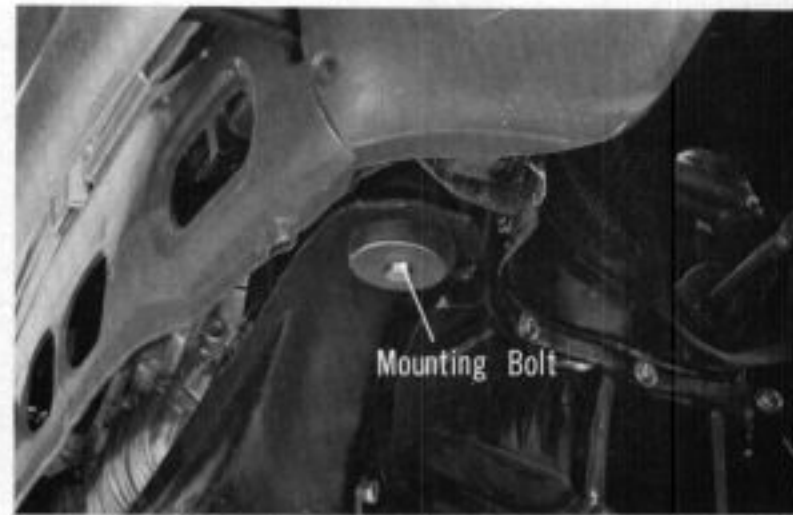


Fig. 19C-56

6.2. Battery

Battery Electrolyte Level

The battery electrolyte shall always be kept above the lower level. If the electrolyte is short, remove the six filler plugs and supply distilled water up to the upper level.

Note:

Acid should not be used for electrolyte.
Distilled water shall be filled to each cell up to the same level as viewed from outside.

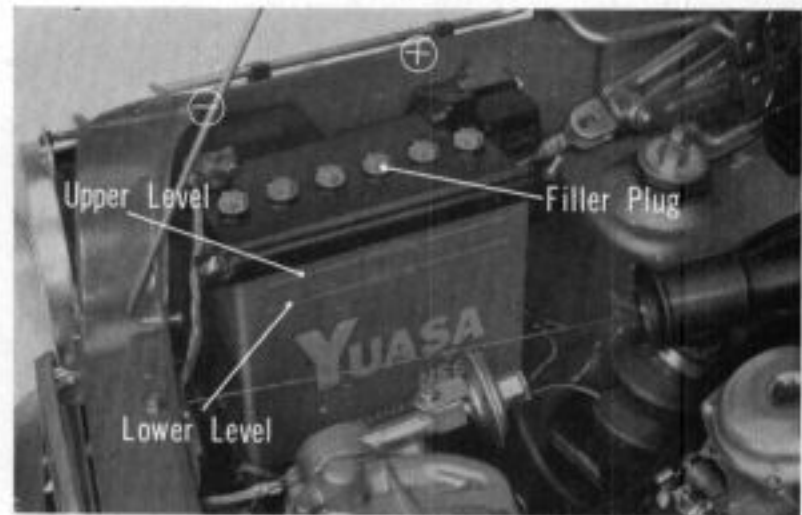


Fig. 19C-57

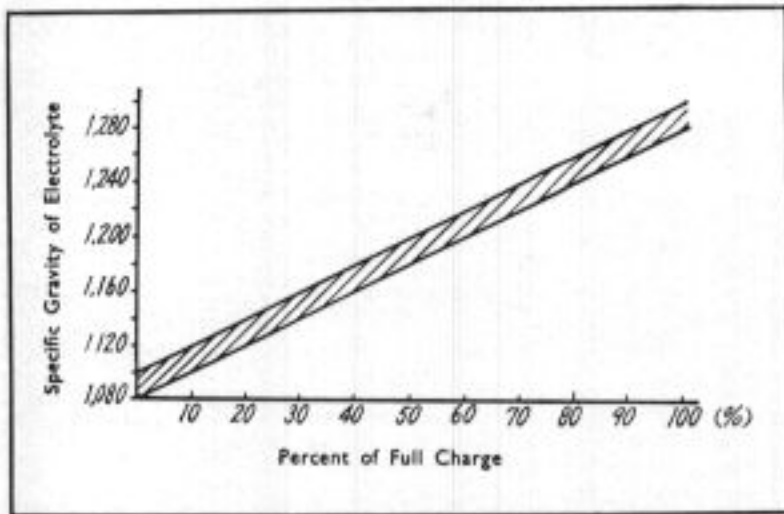


Fig. 19C-58

Temperature		Specific Gravity
°E	°F	
50°	(122°)	1.259
40°	(104°)	1.266
30°	(86°)	1.273
20°	(68°)	1.280
10°	(50°)	1.287
0°	(32°)	1.294
-10°	(24°)	1.301
-20°	(26°)	1.308

Fig. 19C-59

Contamination and Damage of Terminals

Check battery terminals for contamination and damage. The terminals, if dirty, should be cleaned with hot water and coated with grease or petrolatum.

Specific Gravity

Measure specific gravity of electrolyte in each cell. If it is less than 1.220, charge the battery.

Note:

Specific gravity of a fully-charged battery is 1.280 (electrolyte temperature: 20°C, (68°F)). The specific gravity varies 0.0007 per 1°C (1.8°F) of electrolyte temperature. (Specific gravity decreases with the rise of electrolyte temperature and increases with the drop of temperature.)

It is important that this condition be understood to prevent starting difficulties in cold weather and damage to the battery in hot weather.

A fully charged battery at standard temperature should be 1.280; for the tropic 1.260 and for extremely cold weather, it should be 1.200.