FOREWORD

This service manual covers training related to the body of Subaru 1000 series vehicles. Information is presented in such a manner that those involved in maintenance can readily grasp construction principles, adjustment procedures, and trouble shooting. A side from unique construction and top performance, the Subaru 1000 offers extreme handling ease due to basic design centered on simple maintenance and a trouble-free system. Please read this manual carefully.

****

This manual covers the A12 and A41 type body. Note the following items.

1. Maintenance standards for the front axle, wheel, suspension system, steering system, brake system, tightening torque, greasing position and special tools are listed at the end of this manual.
2. Specifications for A12 and A41 type are listed at the specifications table. (For information on the engine, please refer to the "Service Manual - Engine Section".)

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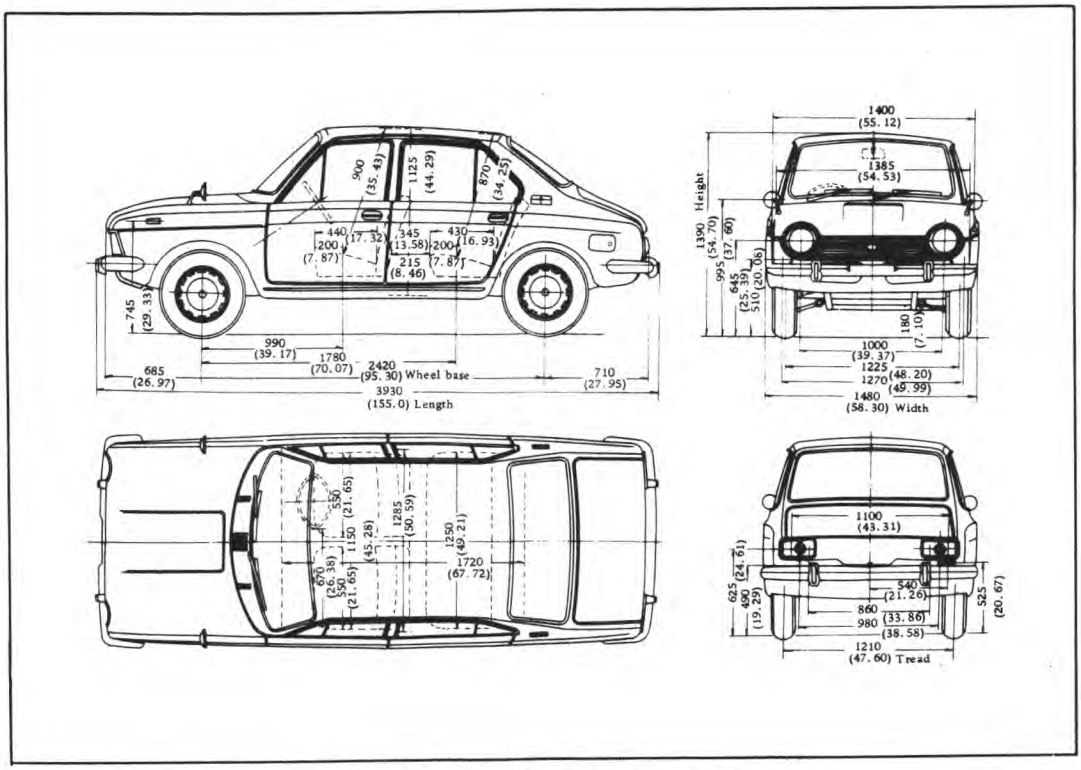
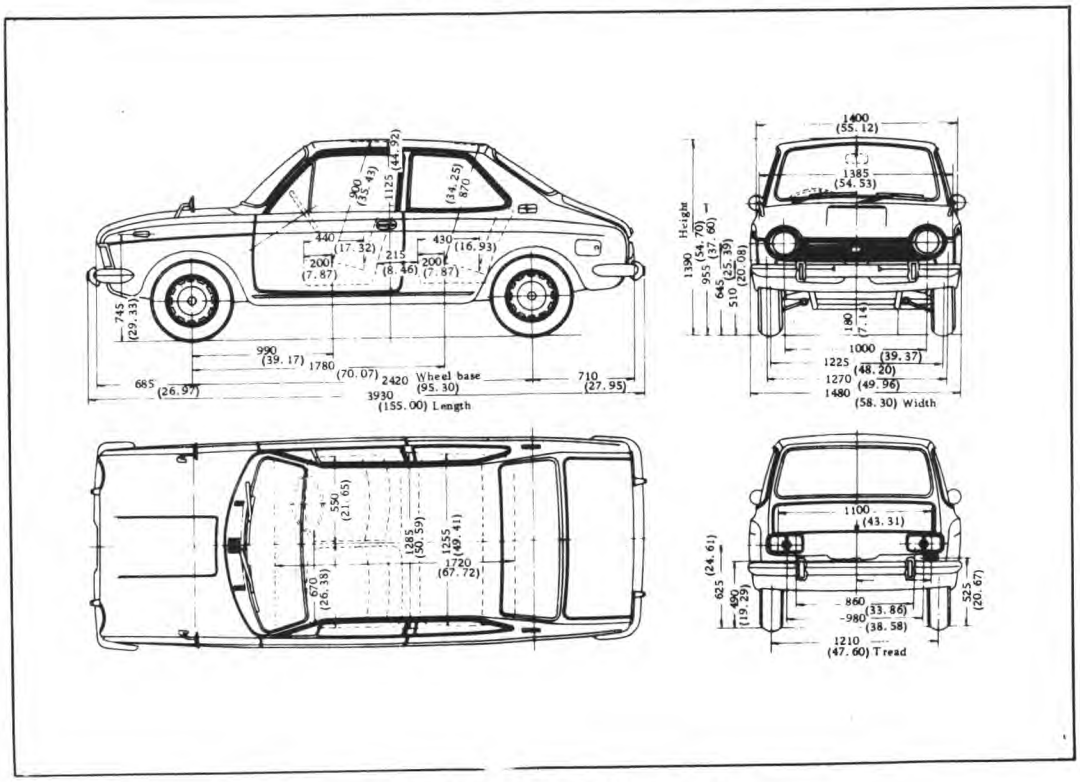
Subaru 1000 4 Door Sedan

Subaru 1000 2 Door Sedan

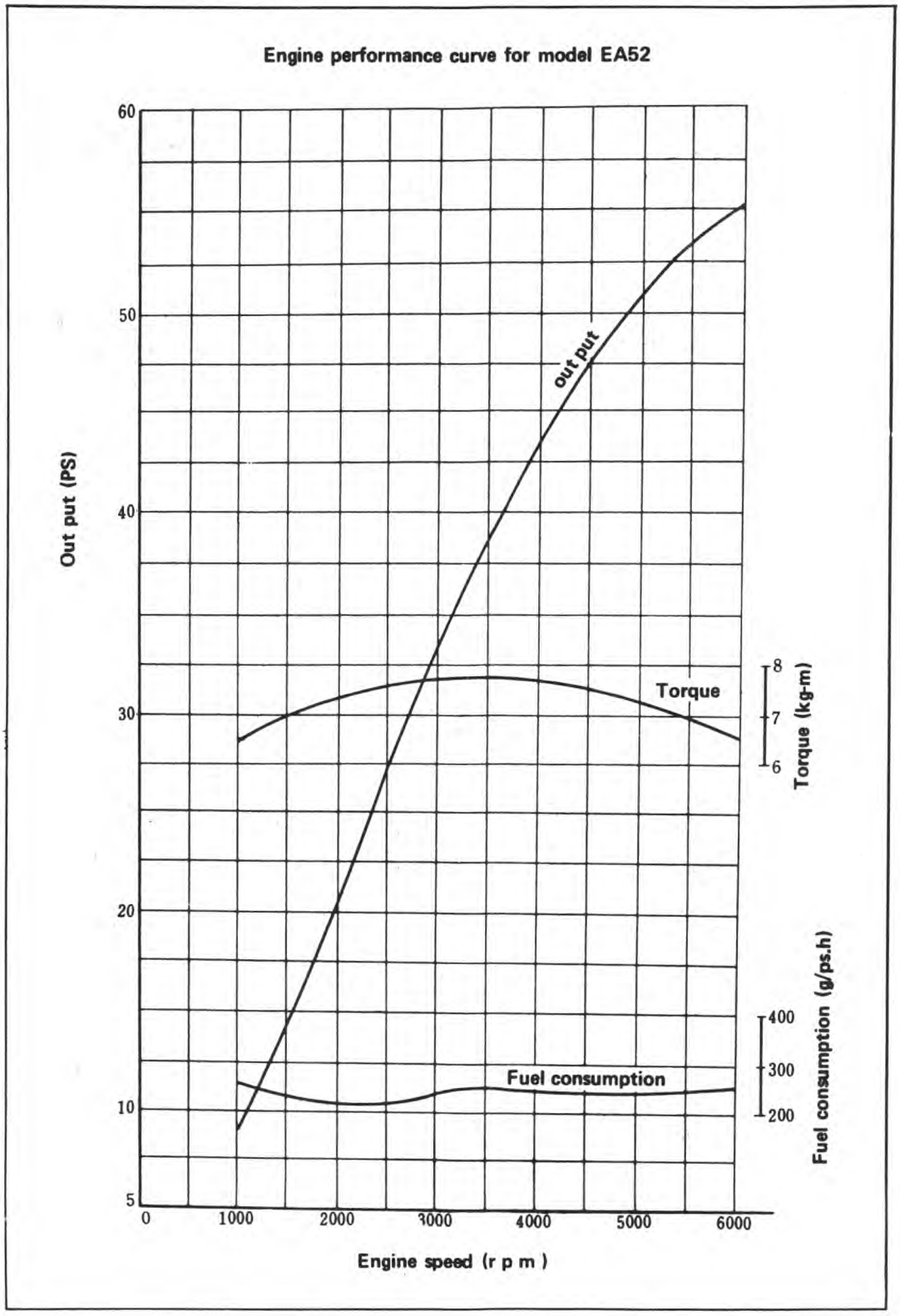


Subaru 1000 4 Door sedan



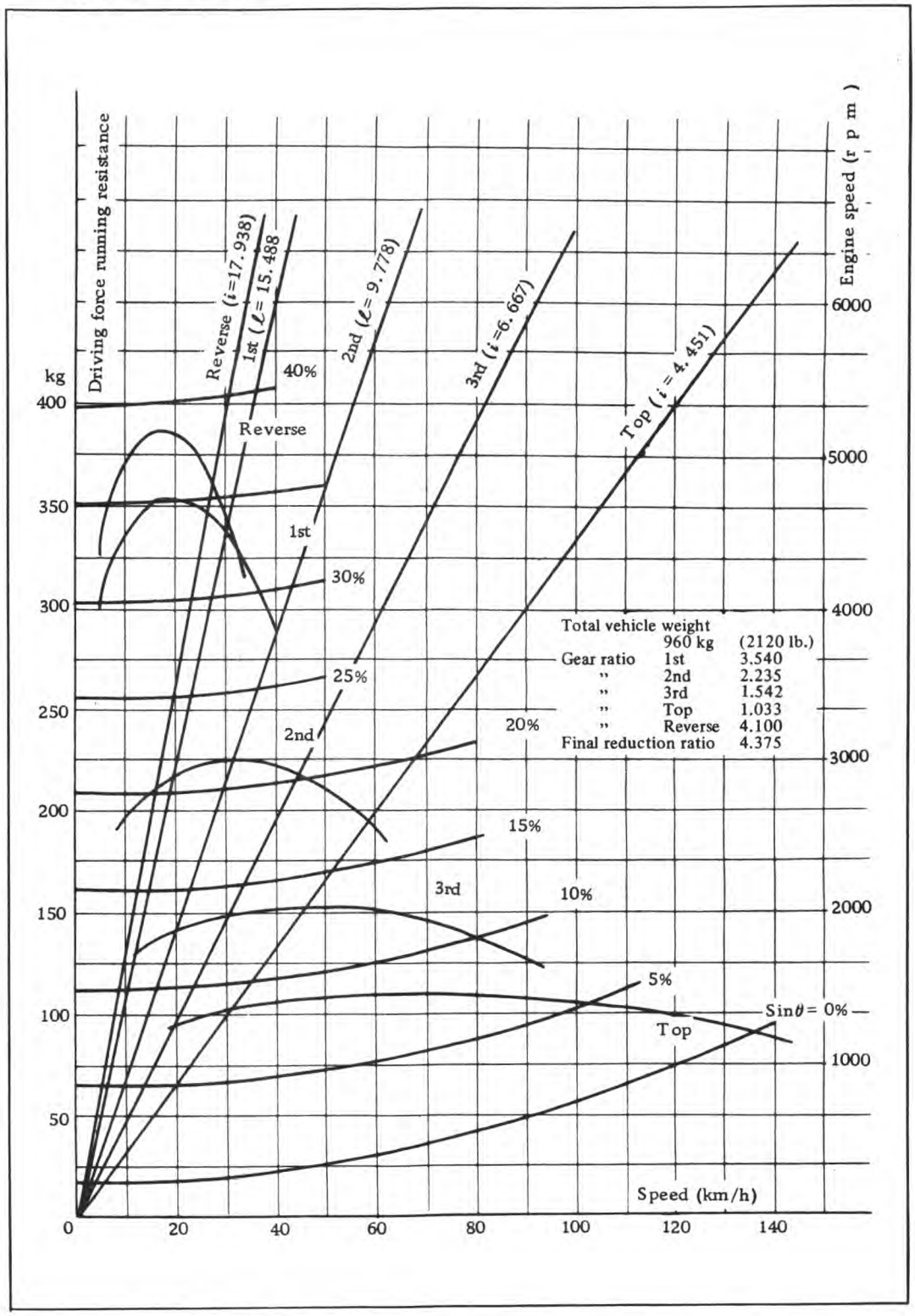
Subaru 1000 2 Door sedan

1-2 Engine Performance Curve

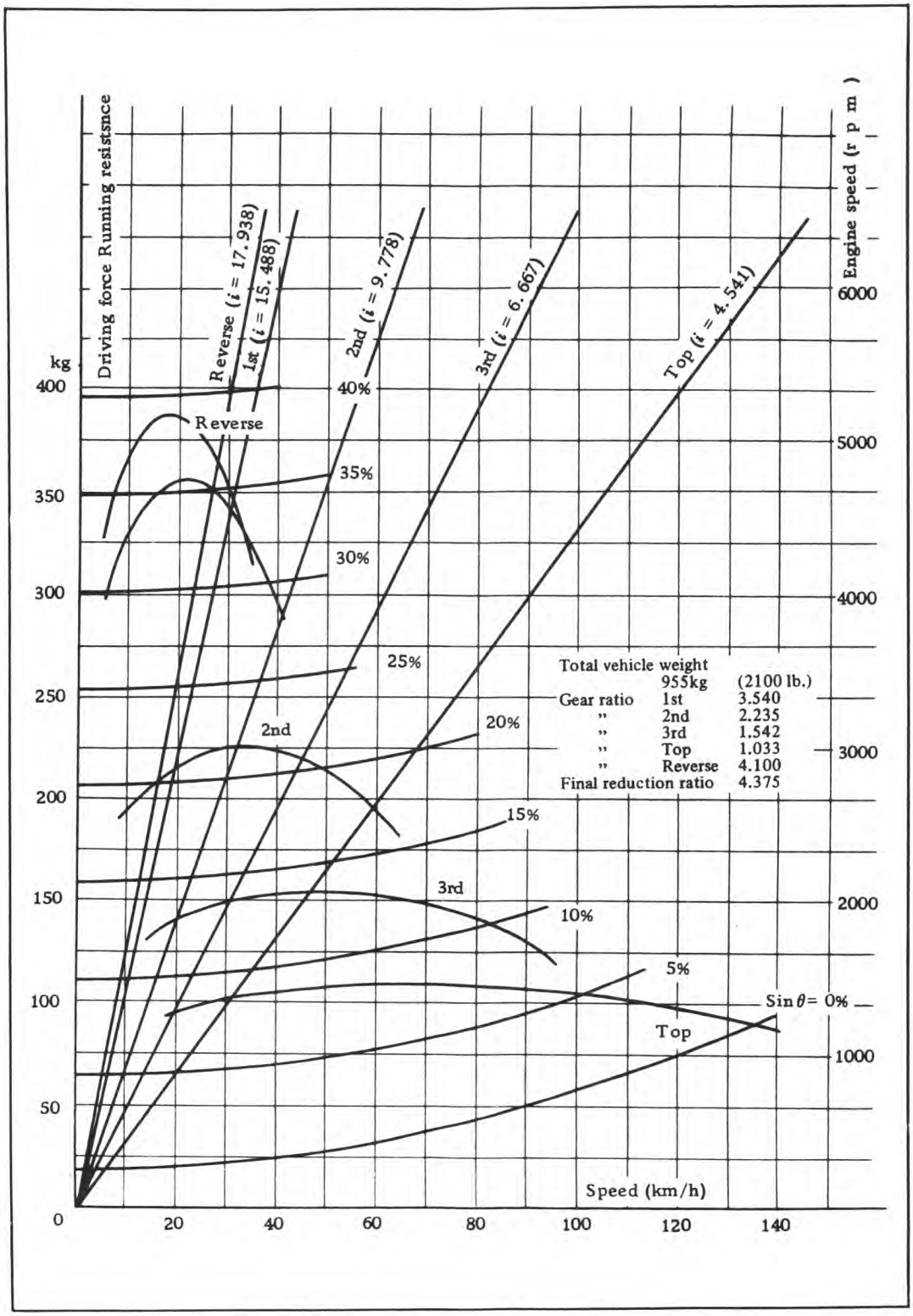


1-3 Running Performance Curves

A) 4-Door sedan



B) 2-Door sedan



SUBARU 1000				
Item \ Type			4-Door sedan	2-Door sedan
Vehicle weight			685 kg (1510 lb.)	680 kg (1500 lb.)
Total vehicle weight			945 kg (2080 lb.)	955 kg (2100 lb.)
Number of passenger seats			5	5
Length			3,930 mm (155.0 in.)	3,930 mm (155.0 in.)
Width			1,480 mm (58.3 in.)	1,480 mm (58.3 in.)
Height			1,390 mm (54.7 in.)	1,390 mm (54.7 in.)
Passenger compartment, interior dimensions		Length	1,700 mm (67.0 in.)	1,700 mm (67.0 in.)
		Width	1,270 mm (50.0 in.)	1,270 mm (50.0 in.)
		Height	1,125 mm (44.3 in.)	1,125 mm (44.3 in.)
Load distribution without passengers		Front	445 kg (980 lb.)	445 kg (980 lb.)
		Rear	240 kg (530 lb.)	235 kg (518 lb.)
Load distribution with passengers		Front	555 kg (1220 lb.)	555 kg (1220 lb.)
		Rear	405 kg (893 lb.)	400 kg (881 lb.)
Front wheel load ratio with passengers %			57.8	58.1
Tread	Front wheel		1,225 mm (48.2 in.)	1,225 mm (48.2 in.)
	Rear wheel		1,210 mm (47.6 in.)	1,210 mm (47.6 in.)
Wheel base			2,420 mm (95.3 in.)	2,420 mm (95.3 in.)
Body overhang, rear			710 mm (28.0 in.)	710 mm (28.0 in.)
Body offset rear				
Tire size		Front	6.15-13-4PR	6.15-13-4PR
		Rear	6.15-13-4PR	6.15-13-4PR
Tire load ratio with passengers %		Front	89.5	89.5
		Rear	65.3	64.5
Maximum angle of stable inclination		Right	46	46
		Left	46	46
Performance	Maximum speed		135 km/h (84 mph)	135 km/h (84 mph)
	Maximum cruising speed		120 km/h (75 mph)	

SUBARU 1000			
Item \ Type		4-Door sedan	2-Door sedan
Performance	Hill-climbing ability (sin θ)	0.355	0.356
	Minimum turning circle	9.6 m (31.6 ft.)	9.6 m (31.6 ft.)
	Braking distance	13.5 m (44.3 ft.) at 50 km/h(31 mph)	13.5 m (44.3 ft.) at 50 km/h (31 mph)

Dimensions

Minimum road clearance	180 mm (7.1 in.)
Floor to road clearance	215 mm (8.5 in.)
Body overhang, front (excluding bumper)	685 mm (27.0 in.)
Body overhang, rear (excluding bumper)	710 mm (28.0 in.)
Height of center of gravity	600 mm (23.6 in.)

Engine

Model		EA52
Manufacturer		Fuji Heavy Industries Co., Ltd.
Type		Gasoline engine
Cooling system		Water
Number of cylinders and layout		Four horizontally opposed
Stroke		Four
Type of combustion chamber		Bath-tub
Valve arrangement		Over-head
Type of cylinder liner		Wet
Bore x Stroke		72 x 60 mm (2.83 x 2.30 in.)
Piston displacement		977 cc 59.6 cu.in.
Compression ratio		9.0 : 1
Compression		12.5 kg/cm^2 (177.8 psi) 350 r.p.m. (350 r.p.m.)
Maximum combustion pressure		60 kg/cm^2 (853.2 psi) 3200 r p m (3200 r p m)
Maximum average effective pressure		10.0 kg/cm^2 (142.2 psi.) 3200 r p m (3200 r p m)
Maximum output		55 ps/6000 r p m
Maximum torque		7.8 kg-m/3200 r p m (56.4 lb-ft/3200 r p m)
Minimum fuel consumption at full load		215 gr/ps-hr 2400 r p m
Engine dimensions (Length x Width x Height)		427 x 650 x 580 mm (16.8 x 25.6 x 22.8 in.)
Engine maintenance weight		76 kg (167.6 lb.) : Dry 80 kg (176 lb.) : (with oil and coolant)
Engine location		Front
Type of piston		T-slit type
Piston material		Lo - Ex
Number of piston rings	Pressure	2
	Oil	1
Intake valve opening		20° Before top dead center
Intake valve closing		60° After bottom dead center
Exhaust valve opening		60° Before bottom dead center
Exhaust valve closing		20° After top dead center
Valve clearance (Intake)		0.22 ± 0.02 mm (when cold) (0.0079 ± 0.0094 in.)
Valve clearance (Exhaust)		0.27 ± 0.02 mm (when cold) (0.0098 ± 0.0144 in.)
Starting system		Starter motor

Ignition system

Ignition system	Battery and coil
Firing order	1-3-2-4
Ignition timing	6° Before top dead center at 600 ± 50 rpm.
Ignition coil	
Type	29700
Manufacturer	Nippon Denso
Distributor	
Type	D414
Manufacturer	Hitachi Ltd.
Type of ignition advancer	Centrifugal and vacuum system
Spark plug	
Type	B-6E
Manufacturer	Nippon Tokushu Togyo
Dimensions	14 mm (0.6 in.)
Gap	0.8 mm (0.031 in.)

Fuel system

Carburetor (Note)	
Original type	Zenith-Stromberg
Type and quantity	DCG-286 One
Manufacture	Hitachi Ltd
Gas valve diameter	26 mm | 28 mm
Venturi diameter	19 x 8 mm | 25 x 8 mm
High-speed jet diameter	#90-#60 | #130-#40
Low-speed jet diameter	#45-#210 | #60-#60
Acceleration jet diameter	0.4 mm
Economy jet diameter	#35
Air direction	Down
Air cleaner	
Type and quantity	Paper filter, one
Manufacturer	Tsuchiya Ltd.
Fuel pump	
Type	Electromagnet Type
Manufacturer	Jidosha Kiki Ltd.
Fuel tank	
Tank capacity	36 ℓ 9.5 USgal. 7.9 Imp.gal.

Lubricating system

Lubrication system	Forced feed and splash system
Oil pump	Trochoid type
Oil filter	Paper
Oil pan capacity	2.7ℓ2.8 USqt., 2.4 Imp. qt.

Cooling system

Cooling method	Water
Type of radiator	Corrugated fin type

Note: Primary is the area to the left of the broken line, and secondary the area to the right.

Coolant capacity (total)		6.05ℓ6.4USqt., 5.3 Imp. qt.
Water pump		Centrifugal type
Type of thermostat		Wax

Battery

Type and quantity	NS-40, one
Voltage	12 V
Capacity	32 AH

Charging generator

Type	LT-123
Manufacturer	Hitachi Ltd.
Power generating system	AC
Voltage	12 V
Capacity	0.3 KW
Type of voltage/current regulators	Contact point system

Starter motor

Type	28000
Manufacturer	Nippon Denso Ltd.
Voltage output	12V - 0.82 PS

Power transmission system

Clutch

Type	Dry single plate type
Number of clutch discs	1
Clutch disc lining (Inner diameter x Outer diameter x Thickness)	180 x 125 x 3 mm (7.1 x 4.92 x 0.118 in.)
Area of lining	132 x 2 cm^2 (20.4 x 2 in^2.)

Transmission

Type		Synchromesh
Operating system		Remote control
Gear ratio	1st	3.540 : 1
Gear ratio	2nd	2.235 : 1
Gear ratio	3rd	1.542 : 1
Gear ratio	Top	1.033 : 1
Gear ratio	Reverse	4.100 : 1

Reduction gear

1st reduction gear

Type of gear	Hypoid
Reduction ratio	4.375 : 1

Differential gear

Type of housing	Transmission housing is commonly used.

Type and number of gears		Bevel, two

Steering system

Type		Rack-and-pinion
Gear ratio		18.43 : 1
Steering angle	Inner	36°20'
	Outer	34°20'
Steering wheel diameter		400 mm (15.75 in.)

Driving system

Wheel arrangement	Two wheels each, front and rear
Type of front axle	Wishbone
Toe-in	2 ~ 8 mm (0.079 ~ 0.314 in.)
Camber	1°20'~1°50'
Caster	1°30'~2°
Trail	7 mm (0.276 in.)
King pin angle	-1°50'~-2°50'
Rear axle type	Trailing arm

Braking system

Main brake		
Type of brake		Duoservo (Front) and Leading and trailing (Rear)
Brake lining dimensions (Width x Thickness x Length)	Front	45 x 5 x 195 mm (1.8 x 0.20 x 7.7 in.)
Brake lining dimensions (Width x Thickness x Length)	Rear	35 x 5 x 141 mm (1.4 x 0.20 x 5.6 in.)
Area of brake lining	Front	88 cm^2 (13.6 in^2.)
Area of brake lining	Rear	49.3 cm^2 (7.7 in^2.)
Brake drum diameter	Front	203.2 mm (8 in.)
Brake drum diameter	Rear	180 mm (7.1 in.)
Hydraulic brake		
Master cylinder bore		19.05 mm (3/4 in.)
Wheel cylinder bore	Front	23.81 mm (15/16 in.)
Wheel cylinder bore	Rear	15.87 mm (5/8 in.)
Maximum hydraulic pressure		150 kg/cm^2 (214 psi)
Parking brake		
Type and system		Manual for both front wheels
Parking brake lining dimensions		45 x 5 x 195 mm (1.8 x 0.2 x 7.7 in.)
Area of brake lining		88 cm^2 (13.6 in^2.)
Brake drum diameter		203.2 mm (8 in.)

Suspension system

Front wheel suspension system	Independent suspension type
Spring dimensions (Diameter x Effective length)	18.0 x 650 mm (0.71 x 25.6 in.)
Rear wheel suspension system	Independent suspension type

Spring dimensions (Diameter x Effective length)		17.6ϕ x 450 mm (0.69ϕ x 17.7 in.)
Coil (material diameter x center diameter x free length x effective number of turns)		14 x 50 x 84 mm (0.55 x 2.0 x 3.3 in.) x 3.8
Type of shock absorber	Front	Oil damper -cylindrical double-action
Type of shock absorber	Rear	Oil damper -cylindrical double-action

Frame

Type	Frameless

Table of Specifications for Lamps and Instruments

Item	Remarks
Head lamp	12V 50W/40W white, 2 each, sealed beam
Parking lamp	12V 7W white, 2 each, 106 sq. cm. (Commonly used for front direction indicator)
License plate lamp	12V 8W white, 1 each
Tail lamp	12V 8W red, 2 each, 83 sq. cm. (Commonly used for braking lamp)
Rear reflector	33 ϕ red, 2 each (Self-contained tail lamp)
Braking lamp	12V 23W red, 2 each, 83 sq. cm. (Commonly used for tail lamp)
Reversing light	12V 23W white, 1 each, 54 sq. cm.
Direction indicator Flashing system	12V 23W white, 2 each, 106 sq. cm. (Commonly used for parking lamp)
	12V 23W amber, 2 each, 83 sq. cm.
	12V 6W amber, 2 each, 19 sq. cm.
Passenger compartment lamp	12V 5W pearl bulb, 1 each 50.2 sq. cm.
Horn	12V 3A, 1 each (12V 2.5A, 2 each)
Rear view mirror	Outside (1 each for left and right sides)
	Inside 1 each (suspended type)
Windshield wiper	50 rpm (50 and 70 rpm 2 speeds)
Speedometer and distance driven counter	60 km/h 637 r.p.m. (37.3 mph. 637 r p m)
Fuel gauge	Resistance - bimetal system
Thermometer	Thermistor - bimetal system

This table may be changed without advance notice.

Inspecting period / Check items	Initial 1,000 km	Initial 3,000 km	Every 5,000 km	Every 10,000 km	Every 20,000 km	Every 40,000 km
Inspecting battery electrolyte level	O	O	O	O	O	O
Inspecting brake fluid level	O	O	O	O	O	O
Retightening steering system	O					
Inspecting steering and related components				O	O	O
Brake pedal play and brake pedal clearance to floor when depressed	O		O	O	O	O
Clutch pedal play and clearance to floor when clutch is disengaged		O		O	O	O
Inspecting hand brake	O		O	O	O	O
Changing coolant						O
Replacing air cleaner filter element						O
Checking V-belt tension	O		O	O	O	O
Inspecting distributor cap, rotor, and breaker points			O	O	O	O
Inspecting and cleaning spark plugs		O		O		
Replacing spark plugs					O	O
Inspecting high-tension cord plug cap					O	O
Checking ignition timing	O			O	O	O
Inspecting generator and starter brushes						O
Inspecting fuel strainer			O	O	O	O
Inspecting and cleaning fuel pump						O
Inspecting carburetor						O
Retightening cylinder head bolts	O	O		O	O	O
Inspecting and adjusting valve clearance	O	O		O	O	O

Inspecting period / Check items	Initial 1,000 km	Initial 3,000 km	Every 5,000 km	Every 10,000 km	Every 20,000 km	Every 40,000 km
Inspecting and retightening bolts and nuts in engine intake/exhaust systems	O					
Retightening engine mounting	O					
Replacing oil filter		O		O	O	O
Checking engine idling conditions			O	O	O	O
Adjusting engine to best idling conditions	O	O				
Inspecting brake line for leakage, damage, and installation faults	O	O		O	O	O
Inspecting suspension system and component parts				O	O	O
Retightening suspension system	O					
Inspecting joints of front axle	O			O	O	O
Adjusting and retightening body units	O					
Wheel rotation			O	O	O	O
Retightening wheel nuts	O					
Adjusting tire pressure	O		O	O	O	O
Checking body attitude	O					
Checking individual units for leakage	O	O	O	O	O	O

Lubricating period / Items	Initial 1,000 km	Initial 3,000 km	Every 5,000 km	Every 10,000 km	Every 20,000 km	Every 40,000 km
Lubricating distributor cam surface and related parts				O	O	O
Lubricating clutch and gear change ring units				O	O	O
Lubricating doors, hood, and trunk lid hinges, and locks				O	O	O
Changing engine oil	O	O	O	O	O	O
Checking transmission oil		O		O	O	
Changing transmission oil	O					O

When disassembling, conducting maintenance, and inspecting the engine, and especially when dismounting or remounting the engine, care must be taken so as not to contaminate or damage the body exterior, especially painted surfaces interior, seat etc. Always cover the fenders and seats.

When overhauling the engine and other components, it is important to arrange the parts which have been removed in a neat and orderly fashion.

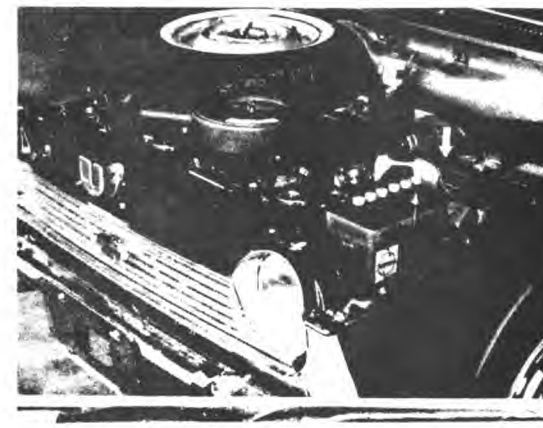
When replacing parts during disassembly and repair work, use genuine SUBARU parts. SUBARU parts are manufactured under production processing and quality control equal to that of original parts and Fuji Heavy Industries Ltd. guarantees quality.

Before jacking up the vehicle, be sure to check the wheels.

Some parts require special tools for repair and adjustment. Special tools are covered in individual descriptions of this manual, in addition to a table of special tools on page.

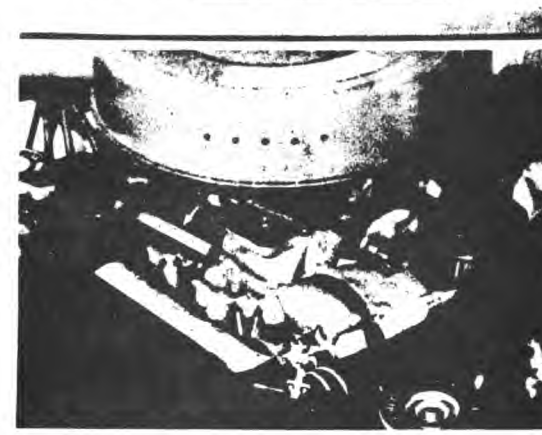
o Chassis Number

The chassis number (stamped) are located on the left side of the separator within the engine compartment.



o Engine Number

The engine number is stamped at the front of the crankcase.



CHAPTER 2: ENGINE TUNE-UP

2- 1 ENGINE TUNE-UP

Periodic and correct engine adjustment is necessary to maintain the engine in the optimum state and obtain top performance.

If the engine shows any defects, the cause should be determined immediately and proper corrective action taken.

Engine tune-up work is mainly classified into visual inspection and tune-up adjustments using the appropriate tools. In both cases, tune-up must be both correct and complete.

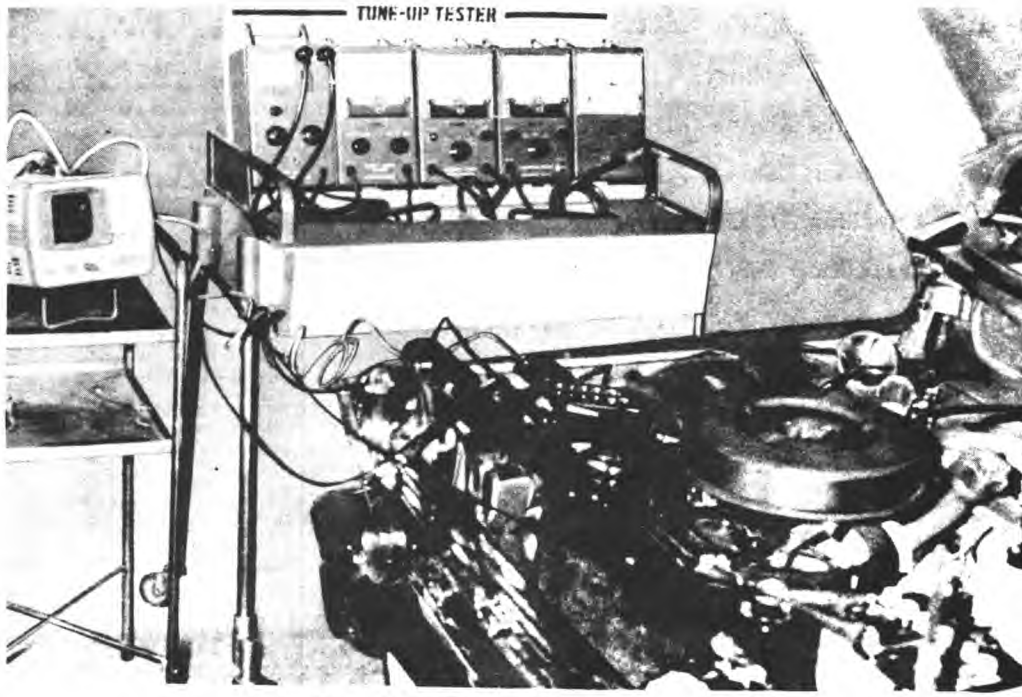


Fig. 2-1 Engine tune-up

2-2 CHECKING BATTERY

(a) With the battery full changed, check the electrolyte level. Add distilled water if the level is below the minimum level "B" marked on the case. (Checking must be made when the battery is level.)

(NOTE)
"A" indicates the maximum level.

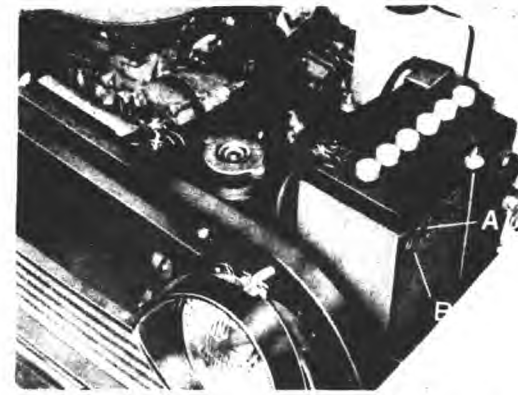


Fig. 2-2 Battery electrolyte level

(b) Measure specific gravity of the electrolyte of individual cells and make sure that the specific gravity is 1.280 at a temperature of 20°C (68°F). If the specific gravity at 20°C (68°F) falls to 1.196 (= 50% charged) or below, or the difference of specific gravity between individual cells exceeds 0.025, charge for the rated time or add distilled water, adjusting specific gravity to the correct value.

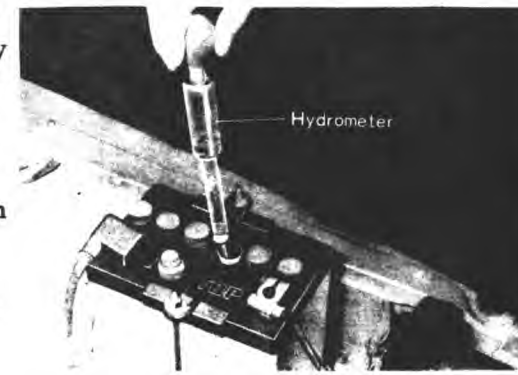


Fig. 2-3 Measuring specific gravity of battery electrolyte

(c) Inspect terminals and the case for damage, and repair if necessary.

(d) Clean terminals, top surface of case, and the electrolyte level indicating portion make sure that terminal contact is satisfactory.

Coat the terminals (especially the positive terminal) with a small amount of grease or vaseline.

(e) Make sure that the battery mounting nuts are properly tightened.

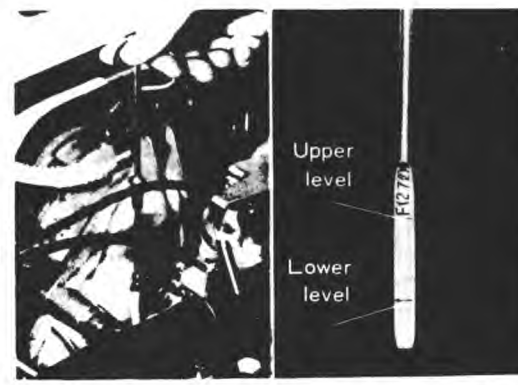


Fig. 2-4 Checking engine oil level

2-3 CHECKING ENGINE OIL

(a) Check the oil level, and add oil if below the lower level indicated on the level gauge. (Make sure that the vehicle is level when checking.)

(b) Change the engine oil when it is contaminated, by coolant or gasoline.

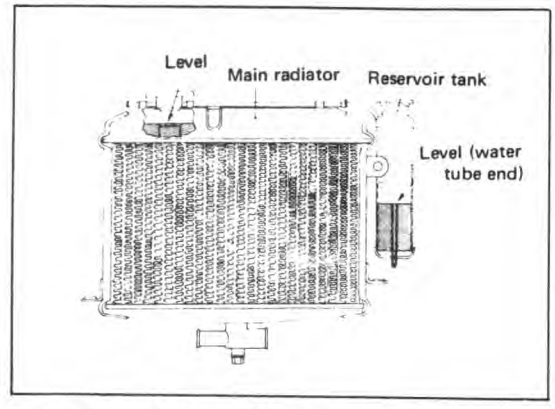


Fig. 2-5 Main radiator and reservoir tank level gauges

2-4 CHECKING COOLANT

(a) Remove main radiator and reservoir tank caps, check the coolant level, and add SUBARU COOLANT if necessary.

Volume of Coolant: 6.05 liters (6.4 US qt., 5.3 Imp.qt.)

2-5 CHECKING AIR CLEANER

Pay special attention to the following points, as a viscous-type element is used.

(a) Replace element every 4000 km (2500 miles).

(b) Do not atempt to clean the air cleaner element.

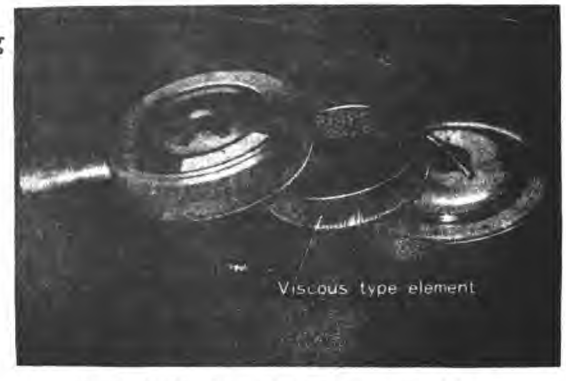


Fig. 2-6 Air cleaner assembly

(Reference)
The filter paper in the viscous-type air cleaner is soaked with a special non-inflammable slow-evaporating viscous liquid. It is resistant to cold weather and has a long service life. Dirt adhering to this filter paper, forms porous laminations with the viscous liquid, building up a filteration layer in itself and reducing penetration into the laminations. If cleaning of this filter paper is attempted, the filtration layer thus formed is lost along with viscous liquid. Therefore, cleaning of this special kind of paper element must be avoided.

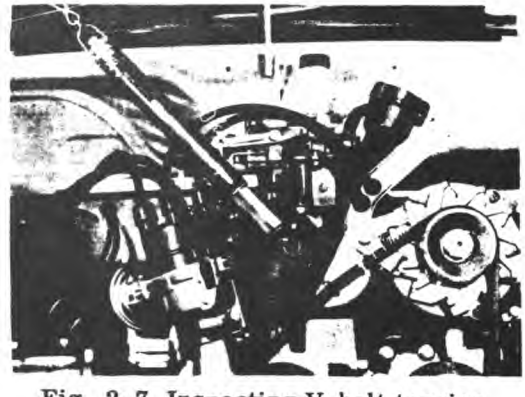


Fig. 2-7 Inspecting V-belt tension

2-6 INSPECTING FUEL FILTER

Remove the fuel filter element and glass bowl, then inspect and clean.

2-7 INSPECTING V-BELT

(a) Inspect V-belt tension, and adjust if necessary.

Standard test: 11 mm/10 kg (0.4 in/22 lb.)

(b) Replace the V-belt if cracking or other damage is found.

(c) Wipe off any oil and water.

2-8 INSPECTING AND ADJUSTING DISTRIBUTOR

Check the following areas, and adjust, repair, or replace defective parts. In addition, lubricate all moving components.

(a) Insure that the cap is dry and not cracked or corroded.

(b) Make sure that the interior is clean.

(c) Cam closing angle.

Adjusting angle: 49° ~ 55° when breaker point gap is 0.5 mm (0.02 in.)

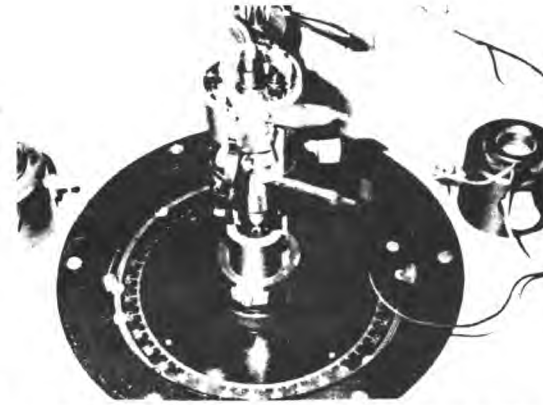


Fig. 2-8 Measuring cam closing angle

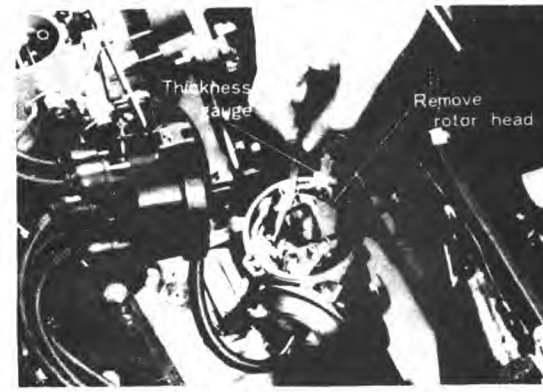


Fig. 2-9 Checking braker point gap

(d) Breaker point gap.

Adjusting gap 0.45 ~ 0.55 mm (0.018 ~ 0.02 in.)

Polish breaker point surface if the contacts are burned, rough, or dirty.

(e) Breaker point contact pressure

Nominal value: 500 ~ 600 grams (180 ~ 212 oz)

(f) Condenser capacity

Nominal value 0.22 μ F ± 10 %

(g) Operating conditions of governor and vacuum advancer. (For advancer characteristics, refer to "CHAPTER 8. ENGINE ELECTRICAL SYSTEM" page 2-3.)

(h) Lubricate cam surface, cam head, breaker point arm heel, and bearings. (For the lubricant to be used, refer to "CHAPTER 8. ENGINE ELECTRICAL SYSTEM", page

(i) Check individual cord caps for proper contact and make sure that there are no leaks.

2-9 CHECKING AND ADJUSTING VALVE CLEARANCE

(NOTE)

(i) Adjust valve clearance when th the engine is cold (coolant temperature: 20°to 40°C (68° to 104° F))

(ii) Prior to adjusting, retighten the cylinder head mounting bolts (18 ea.)

Tightening Torque: 4.5 ± 0.3 kg-m (30.4 ~ 34.7 lb-ft.)

Fig. 2-10 Tightening cylinder head bolts

The following special tools are available for this operation.

899984102	Wrench
899984104	Socket
899984105	Socket

(a) Bring the piston of the cylinder to be checked and adjusted to top dead center. (Sequence of adjustment: #1, #3, #2, and #4 cylinders)

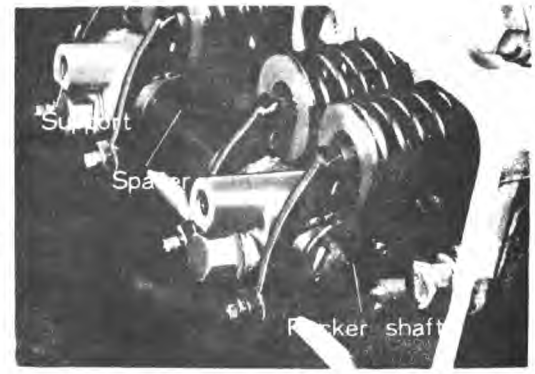


Fig. 2-11 Checking valve clearance

(b) Insert a thickness gauge between the valve and rocker arm to measure clearance.

(c) For adjustment, use socket wrench (89998140) and wrench (899994101), loosen nuts (8 x 4), and turn adjusting screws.

Nominal valve clearance (when cold)

Intake: 0.22 ± 0.02 mm (0.0079 ~ 0.0094 in.)

Exhaust: 0.27 ± 0.02 mm (0.0099~0.0114 in.)

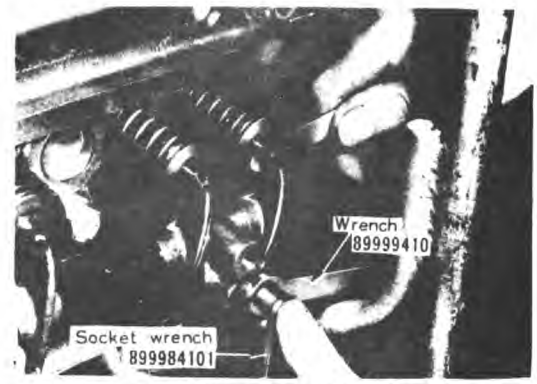


Fig. 2-12 Adjusting valve clearance

Nut (8 x 4) tightening torque: 1.6 ± 0.2 kg-m (10.2 ~ 13.0 lb-ft.)

(d) Recheck valve clearance after adjustment.

2- 10 SPARK PLUGS AND ADJUSTING GAPS

(a) INSPECTING

Using the plug wrench, remove all spark plugs, check the following items, and clean or replace the plug if defective.

(1) Insulator for cracks or other damage

(2) Electrode for wear

(3) Carbon accumulation

(4) State of center electrode insulator

(5) Gasket for damage and deterioration

Normal Black Excessively burned

Fig. 2-13 Condition of spark plug

(NOTE)

(i) Ordinarily, when black with carbon, replace the plug with one of a higher heat range.

(ii) When burned white or the electrode is worn short, replace with a lower heat range plug.

(b) Cleaning

(1) Clean all contamination from electrodes with a spark plug cleaner or wire brush, and blow away accumulated particles with compressed air.

(2) Clean contamination, rust, etc., from the insulator and terminal.

Fig. 2-14 Cleaning spark plug

(NOTE)

A sand-blast cleaner may damage the insulation and screw threads. Thus, complete cleaning within the shortest possible time.

(c) Adjusting spark plug gap

Use a spark plug gap gauge to adjust the gap.
Nominal gap: $0.8\ ^{+0}_{-0.1}$ mm

(0.028 ~ 0.031 in.)

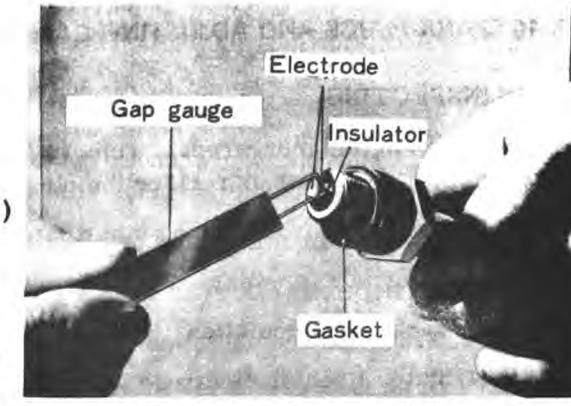


Fig. 2-15 Adjusting spark plug gap

(d) Installing spark plugs

Install spark plug after checking the sparking efficiency of each spark plug with a spark plug tester.

Tightening Torque: 2.1± 0.3 kg-m
(13.1 ~ 17.3 lb-ft.)

2-11 CHECKING AND ADJUSTING IGNITION TIMING

Nominal angle: 6°/650 ± 50 rpm

(a) Timing mark positions

(1) Smaller notch on pulley periphery, and crankcase matching point.

(2) Triangular arrow of flywheel housing and scale from 0° to 16° in 2° intervals on the flywheel.

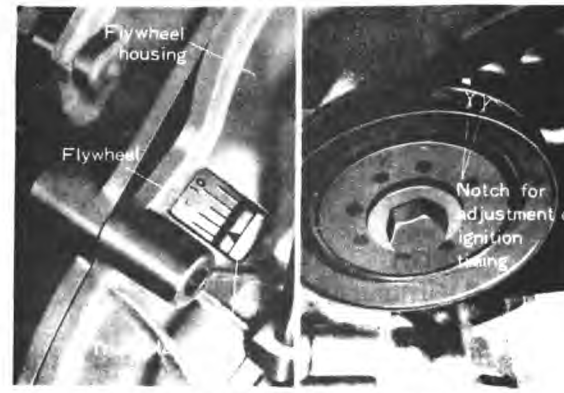


Fig. 2-16 Timing mark positions

(b) Inspection

Insure that the octane selector pointer (red triangle) is set to the standard position before checking the timing.

(1) Method using stroboscope

Connect the stroboscope to the #1 cylinder cord (spark plug), and idle the engine, illuminating the mark with the stroboscope and insuring that timing is set to the standard engine.

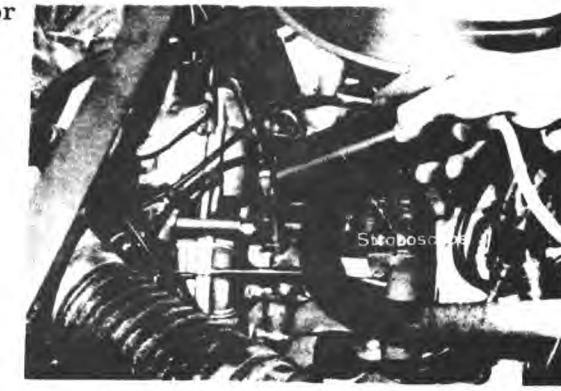


Fig. 2-17 Checking ignition timing

(2) Method using tester

Connect the ⊕ line of the tester to the primary terminal of the distributor, and the ⊖ line to the crankcase.
When the breaker point of the distributor opens, the meter needle of the tester will deflect. Insure that the mark coincides with the adjustment value at this time.

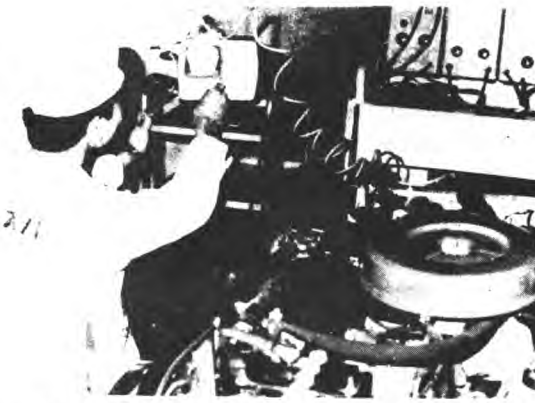


Fig. 2-18 Checking ignition timing

(3) Method without using instrument

With the key switch set to "ON", remove the distributor cap and rotate crankshaft. A spark will occur at a certain point. Insure that the timing is set to the standard angle when this spark appears.

(c) Adjustment

Loosen the 5 mm bolt on the mounting plate of the distributor, and turn the distributor housing, to adjust timing.

In this case, timing is advanced when the distributor housing is turned clockwise and is retarded when turned counterclockwise.

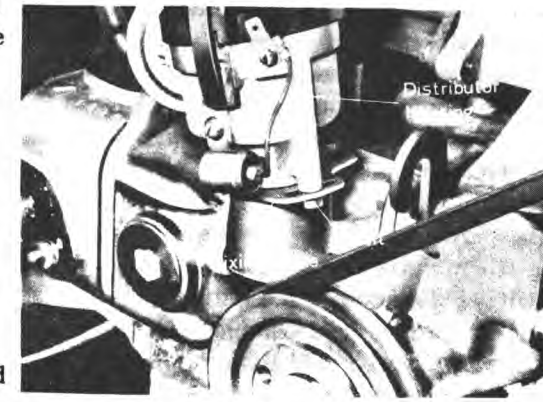


Fig. 2-19 Adjusting ignition timing

2-12 ADJUSTING OCTANE SELECTOR

Adjust the ignition timing to the optimum position in accordance with the octane number of the gasoline to be used. Adjustment is accomplished by loosening the indicator bolt and setting so that the engine knocks slightly under sudden acceleration in high gear at 20 km/h (13 mph), but rapidly returns to normal

(NOTE)
The timing is retarded when the distributor is turned in such a way that the indication moves toward "R", and is advanced when turned so that the indication moves toward "A".

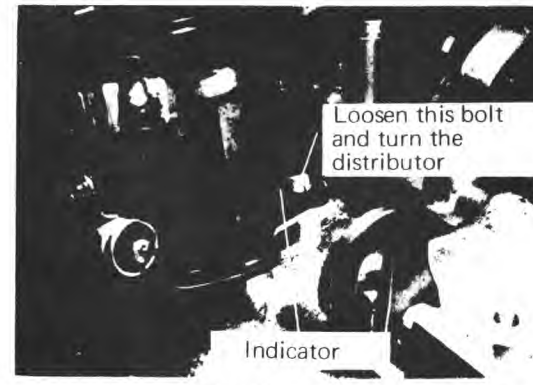


Fig. 2-20 Adjusting octane selectorr

2-13 INSPECTING DURING ENGINE WARM-UP

Warm up engine until the coolant temperature reaches a value between 76°C (168°F) 82°C (180°F). Check the following.

(a) Insure that oil pressure and charging conditions are satisfactory.

(b) Make sure that there is no oil or water leakage, or excessive noise.

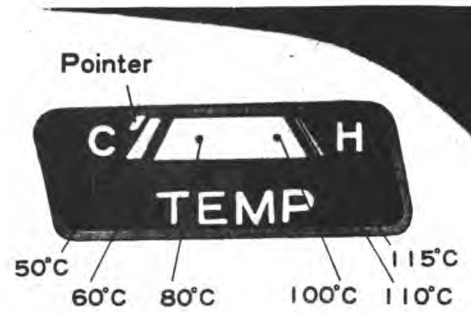


Fig. 2-21 Inspection during engine warm-up

2-14 MEASURING COMPRESSION

Hold a compression gauge in the spark plug hole and check the compression of each cylinder in turn.

Fig. 2-22 Measuring compression

(NOTE)

(i) After warming up the engine, turn off the key switch.

(ii) Fully charge the battery.

(iii) Remove spark plugs.

(iv) Fully open the throttle valve.

(v) Check the starter motor for satisfactory performance and operation.

(vi) Drive the engine by means of the starter motor, and read the (maximum) value when the gauge pointer is steady.

(vii) Perform at least two measurements per cylinder, and insure that the values are correct.

Standard Pressure:	12.5 kg/cm^2	(179.0 psi) (350 rpm)
Difference Between Cylinders:	0.5 kg/cm^2	(7.2 psi) or less
Pressure Lower Limit:	10 kg/cm^2	(143.2 psi)

2-15 INSPECTING AND ADJUSTING CARBURETOR

(a) Adjusting idling

Do not attempt to adjust engine idling until the engine is sufficiently warm.

(1) From the full in position, back off the idling adjustment screw one and one-holf turns. Turn in the throttle adjustment screw two to three turns before starting the engine.

(2) Back off the throttle adjustment screw slowly, and stop immediately before the engine speed become unstable.

(3) Next, turn the idling adjustment screw, until a position is found where the speed reaches maximum and becomes smooth.

(4) Back off the throttle adjustment screw to obtain a slower speed.

(5) Repeat the above adjustments until the most stable and smooth idling speed is found.

Idling Speed: 650 ± 50 rpm

Fig. 2-23 Adjusting idling

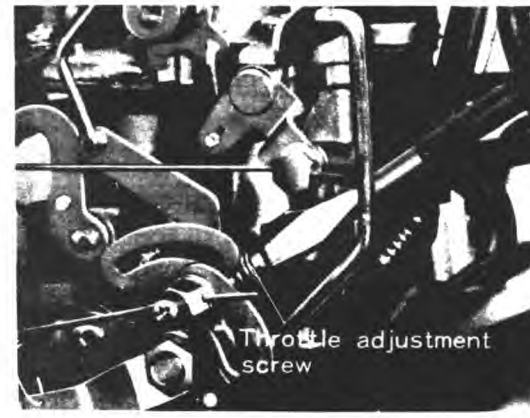


Fig. 2-24 Adjusting idling

(b) Adjusting float level

(1) Adjusting float level

Remove the choke chamber and turn it upside down. When the float seat contacts the valve stem, the dimension "H" should be 10.5 mm (0.413 in.), the normal condition. To adjust, bend the float seat slightly.

(2) Effective stroke of needle valve

When the float is fully raised, the clearance between the float seat and valve stem should be 1.3 to 1.7 mm (0.512 ~ 0.669 in.). For further adjustment, bend the float stopper.

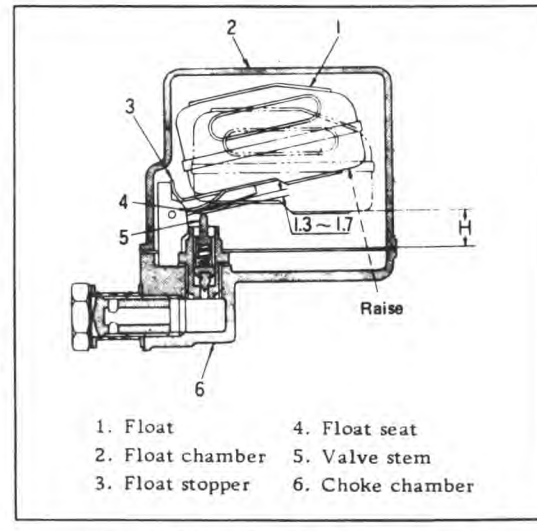


Fig. 2-25 Adjusting float level

(c) Operating conditions of accelerating pump

With the engine stopped, fully and rapidly open the throttle valve from the closed position and check the volume of spray from the pump nozzle.

Standard Volume: 7 ± 1 cc (0.20 ~ 0.27 US oz, 0.21 ~ 0.28 Imp.oz)/20 strokes

(d) Inspecting operation of choke system

Make sure that the valve opens fully and that the link mechanism operates smoothly.

2-16 MEASURING VACUUM

(a) Measure the vacuum after adequate engine warm-up.

(b) Remove the plug (1/8" x 9) from the manifold and install the vacuum gauge in its place.

(c) Maintain the engine at idling speed (650 ± 50 rpm), and read the vacuum scale.

Normal Vacuum Range:
480 ~ 510 mmHg
(19.0 ~ 20.0 in Hg)

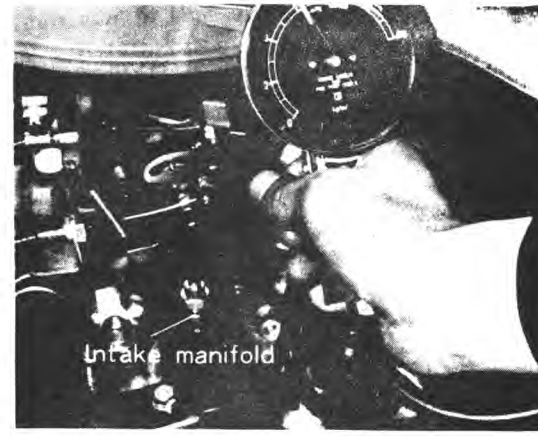


Fig. 2-26 Measuring vacuum

(d) When pointer deflection of the vacuum gauge is not normal or the deflection is inconsistent, take corrective action in accordance with Table 2-1.

Table 2-1 Vacuum Gauge Readings and Trouble Shooting Chart

No.	Vacuum Gauge	Defect
1	Pointer stops at a position lower than the normal position. This tendency becomes more pronounced as the engine temperature rises.	Leakage from the intake gasket or carburetor gasket.
2	When the engine speed is reduced slowly from a higher speed, the reading rises above normal temporarily and returns.	Back pressure too high, or exhaust muffler clogged.
3	Pointer intermittently drops from the normal position to a lower position.	Leakage from the cylinder head gasket.
4	Pointer stops at a position slightly lower than the normal position without vibrating.	Retarded ignition timing or inadequate valve clearances.

5	Pointer stops at a position slightly higher than the normal position without vibrating.	Advanced ignition timing.
6	Pointer drops slightly and intermittently from the normal position.	Valve leaking or valve clearances are not uniform.
7	Pointer drops rapidly and intermittently from the normal position.	Sticking valves.
8	When the engine speed is gradually increased, the pointer quickly vibrates at a certain range, and these vibrations increase as the engine speed increases.	Weak or broken valve spring.
9	Pointer in a narrow range above and below the normal position.	Defective ignition system or poor carburetor idling adjustment.

2- 17 TEST OPERATION

Upon completion of engine tune-up, always conduct test operations to insure that the work has been done correctly, and that all necessary repair and replacement action has been applied.

CHAPTER 3 : SUSPENSION

3-1: GENERAL DESCRIPTION OF FRONT SUSPENSION

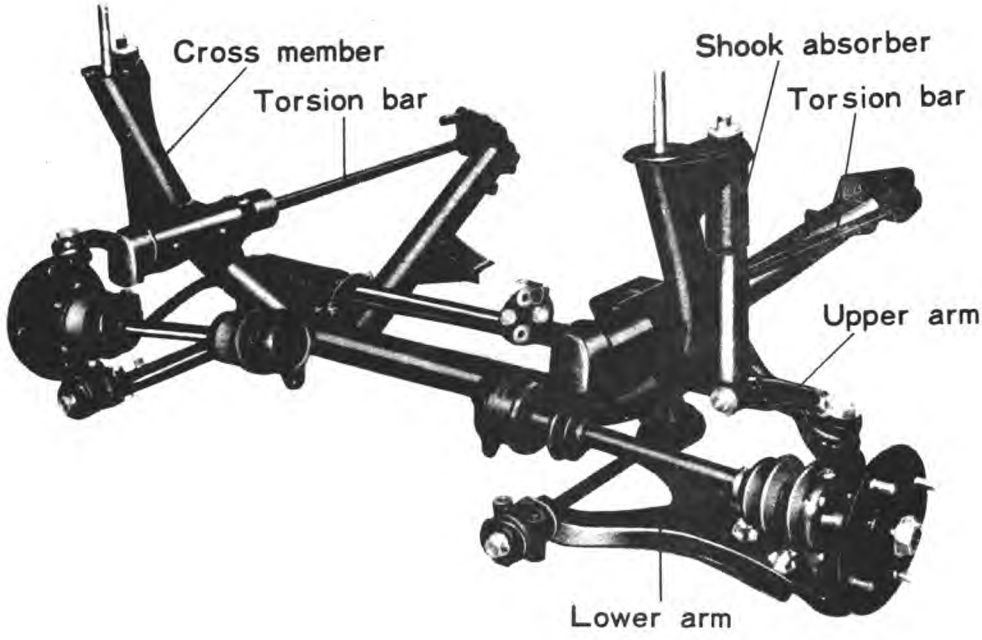
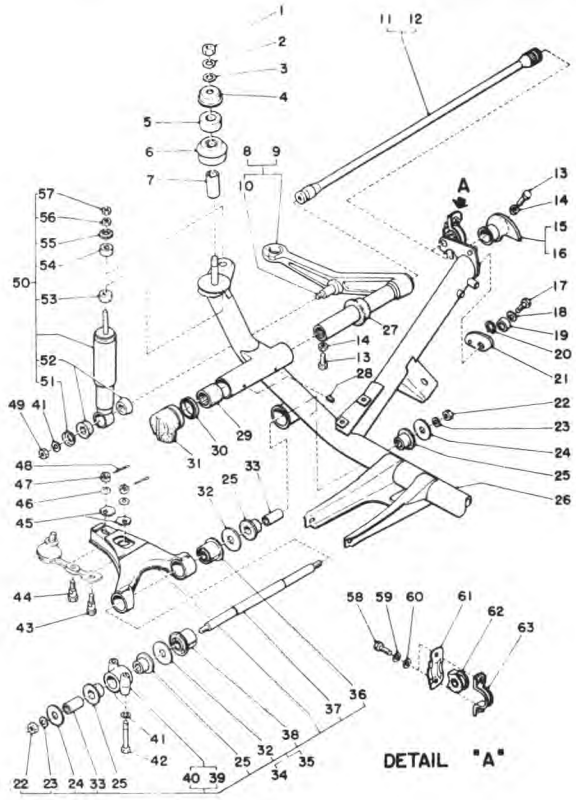


Fig. 3-1 Construction of front suspension

The front suspension is basically a "wishbone type," independent suspension system with torsion bar mounted upper arms. The recent employment of inboard front brakes, has resulted in reduction of the suspension weight beneath the spring, and improved passenger comfort. This is also advantageous for the suspension arms and the bearings from the standpoint of their service life. To fully utilize the features of the front wheel drive mechanism, a mechanical linkage has been incorporated that contributes to the improved stability and roadability of this vehicle.

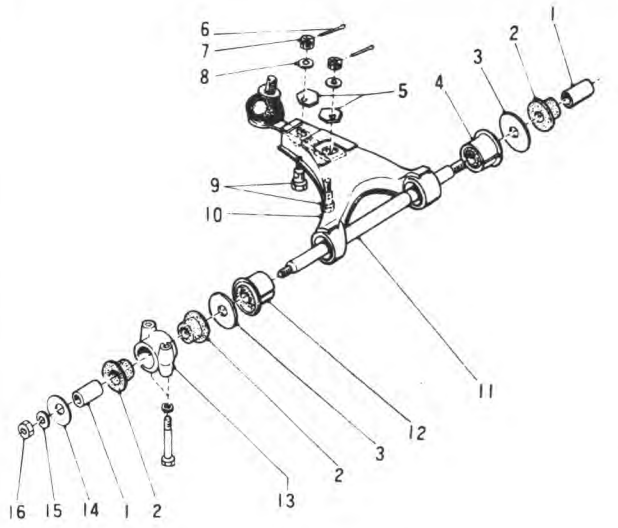
The front suspension and the cross members are attached to the body by way of a shock absorber (rubber) to prevent operation noise and vibration and to improve riding comfort.

3-2: CONSTRUCTION OF FRONT SUSPENSION



1 Nut
2 Spring washer
3 Washer
4 Cap (cushion rubber body mount A)
5 Cushion rubber B (body mount)
6 Cushion rubber A (body mount)
7 Collar A (body mount)
8 Upper arm assembly (RH)
9 Upper arm assembly (LH)
10 Pin (shock absorber)
11 Torsion bar (F.RH)
12 Torsion bar (F.LH)
13 Lock bolt
14 Nut
15 Anchor arm (RH)
16 Anchor arm (LH)
17 Bolt
18 Spring washer
19 Cap
20 Snap ring
21 Cam (cross member)
22 Nut
23 Spring washer
24 Plate
25 Bushing (lower arm)
26 Cross member assembly (F. suspension)
27 Dust seal (upper arm)
28 Plug
29 Bearing (upper arm)
30 Oil seal (upper arm)
31 Dust cover (upper arm)
32 Plate
33 Spacer
34 Lower arm assembly (RH)
35 Lower arm assembly (LH)
36 Bushing (lower arm front)
37 Shaft (lower arm)
38 Bushing (lower arm rear)
39 Bracket (lower arm RH)
40 Bracket (lower arm LH)
41 Spring washer
42 Bolt (10 x 72)
43 Bolt (10 x 36)
44 Bolt (lower arm)
45 Cam (caster camber)
46 Spring washer
47 Castle nut
48 Cotter pin
49 Nut
50 Shock absorber assmbly (front)
51 Washer (shock absorber)
52 Rubber (shock absorber)
53 Rubber (shock absorber)
54 Rubber (shock absorber)
55 Washer (shock absorber)
56 Nut
57 Nut
58 Bolt
59 Spring washer
60 Washer
61 Stopper
62 Cushion rubber
63 Bracket (cross member)

Fig. 3-2 Front suspension components



1 Spacer
2 Bushing
3 Plate
4 Bushing
5 Adjusting cam
6 Cotter pin
7 Castle nut
8 Spring washer
9 Bolt (ball joint assembly installing)
10 Lower arm
11 Shaft
12 Bushing
13 Bracket
14 Plate washer
15 Spring washer
16 Nut

Fig. 3-3 Front suspension (lower arm) components

3-3: REMOVAL AND REINSTALLATION OF FRONT SUSPENSION

1: REMOVAL REMOVING

When the front suspension assembly from the body, observe the following sequence of procedures.

(a) Remove the wheel cap while vehicle is grounded, and loosen the wheel nut as much as possible.

(b) Remove exhaust pipe. (For details, refer to the section on engine dismounting.)

(c) Remove engine front mounting rubber nut [10 mm (0. 39 in.)] and rear mounting bolts [10 mm (0. 39 in.)]. Keep the (+) side of the battery terminal disconnected.

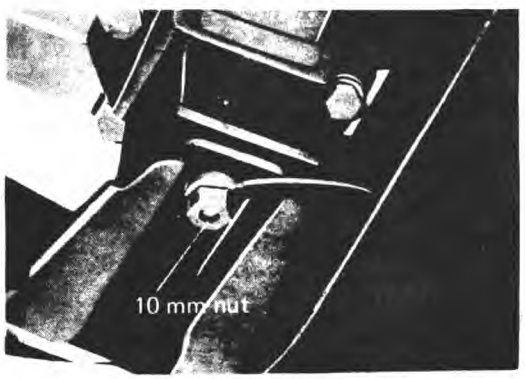


Fig. 3-4 Front mounting section

Fig. 3-5 Rear mounting section

(d) Remove wheel and splashboard center clips and bolts

Fig. 3-6 Removal of clip and bolt

(e) Remove front bumper together with bumper stay as an assembly.

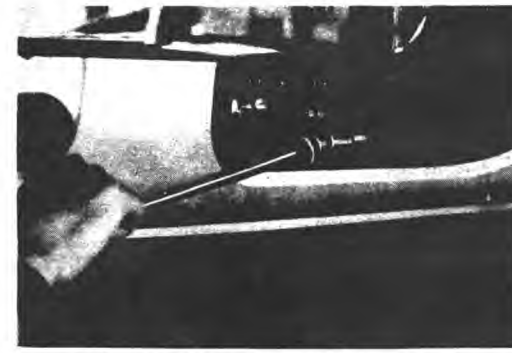


Fig. 3-7 Removal of bumper

(f) Remove front skirt. Then remove undercover.

Fig. 3-8 Removal of front skirt

(g) Remove oil pump pressure switch harness.

(h) Remove bolts on steering shaft coupling and ball stud (torque pipe), two 8 mm (0.32 in.) bolts.

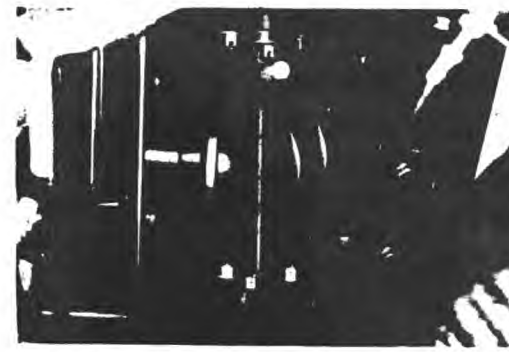


Fig. 3-9 Coupling tightening bolt and ball stud bolts [8 mm (0.32 in.)]

(i) Remove the connecting bolts on the axle shaft brake drum side (Double offset joint)

(j) Remove lower arm bracket installing bolts.

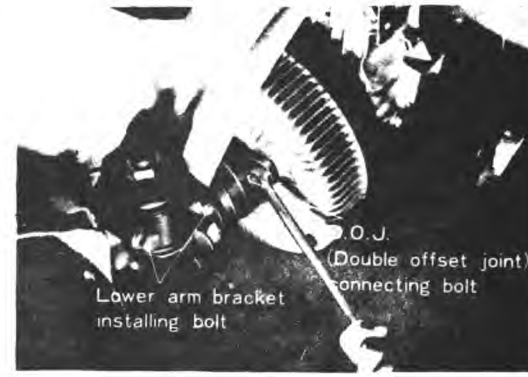


Fig. 3-10 Removal of D.O.J connecting bolt and lower arm bracket installing bolts

(k) Remove the nut from the bolts which retain the cross member and the body, and remove the brake bracket from the plate on the end of the cross member.

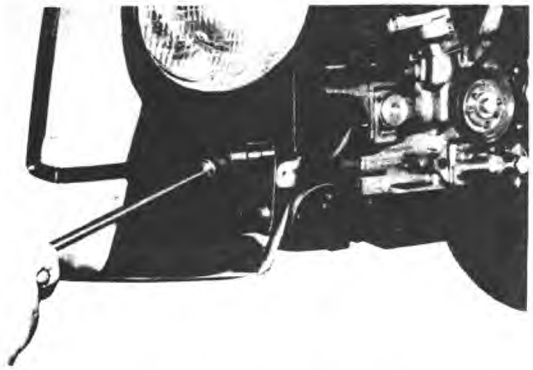
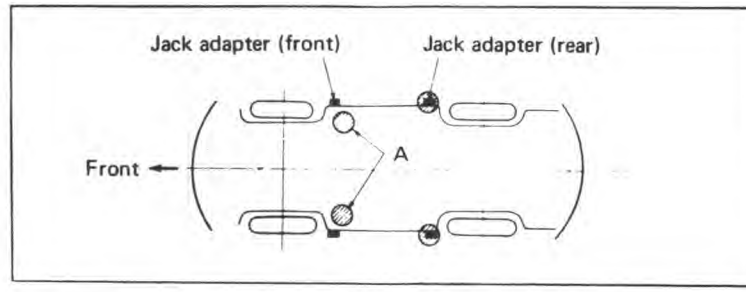


Fig. 3-11 Removal of cross member end plate bracket bolts

Fig. 3-12 Removal of cross member

After removing the engine mounting section, hoist the engine with a chain block and mount it onto an appropriate stand. Place a stand beneath the cross member and lift up the body, after which the front cross member can be separated from the vehicle body.

(NOTE) When jacking up, apply a square wooden block through the adapters "A" slightly inside and behind the front jack adapters, and through the rear jack adapters. Be careful not to apply a lift frame directly to the floor bottom. Use a 10 cm^2 (1.55 in^2) block somthing larger.



UPPER ARM AND TORSION BAR ASSEMBLY

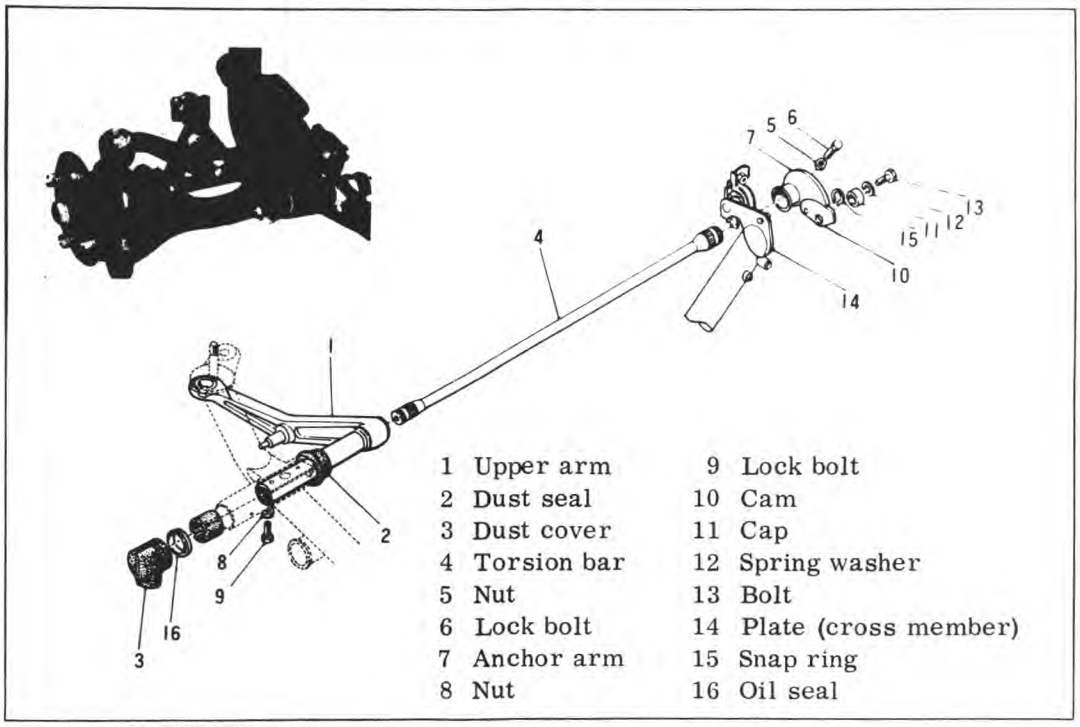


Fig. 3-13 Construction of front suspension upper arm

2: REMOVING UPPER ARM

When removing the upper arm from the cross member, observe the following sequence of procedures.

(a) Loosen posture adjusting cam. Be sure to loosen it fully by removing the end bolt.

(NOTE) When doing the job with the vehicle lifted, do not forget to loosen the cam.

(b) Remove the shock absorber upper nut, and lower nut together with washer.

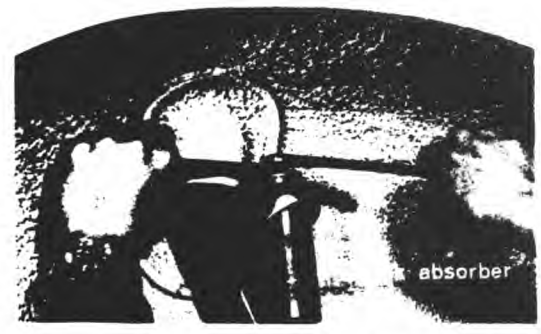


Fig. 3-14 Removal of shock absorber nut

(c) Remove upper ball joint upper nut after straightening upper ball joint locking washer.

Fig. 3-15 Straightening upper ball joint upper lock washer

(d) Remove dust cover and lock nut, and turn upper arm in the vehicle body lowering direction. Forcing the upper arm downward will release the tension on the torsion bar and it can then be removed easily by pulling on the anchor arm. When the upper arm is separated from the torsion bar, take out the upper arm proper.

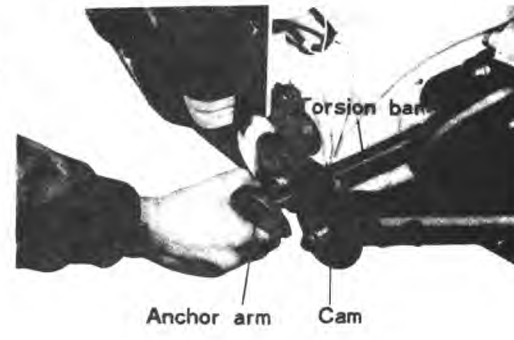


Fig. 3-16 Removal of torsion bar anchor arm

3: REMOVING TORSION BAR (IF NECESSARY)

When the torsion bar is being removed, the following procedure should be included in that for the upper arm disassembly.

The torsion bar can be removed from the anchor arm after removing the locking bolt and nut. When installing the torsion bar and the anchor arm note that one tooth is missing from the serration of the torsion bar. Match the position of the missing tooth with the projection on the serration of the anchor arm.

FRONT TORSION BAR CHARACTERISTICS

Type of vehicle \ Item		Diameter	Effective length
SUBARU 1000 sedan	A12	18.0 mm (0.71 in.)	650 mm (25.59 in.)
SUBARU 1000 station wagon	A41	18.5 mm (0.72 in.)	652 mm (26.38 in.)

4: REMOVING LOWER ARM

When removing the lower arm assembly from the front cross member, remove the nut holding the lower arm shaft to the cross member bracket, and separate the lower arm proper from the cross member. Then disconnect the lower arm from the ball joint and separate the knuckle assembly.

Then the bracket on the body side can be removed by removing the two nuts and spring washers.

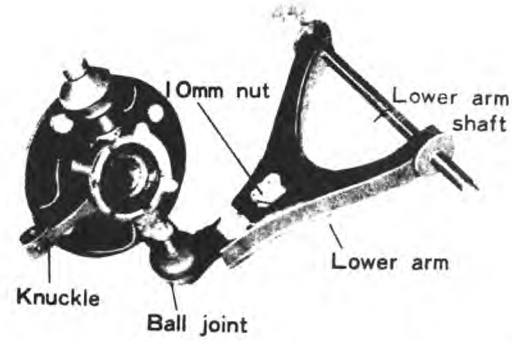


Fig. 3-17 Lower arm connected section

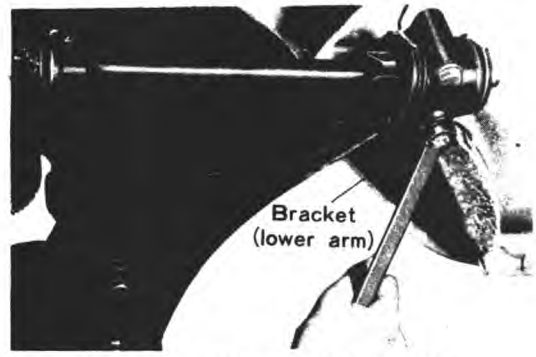


Fig. 3-18 Removal of bracket

3-4: POSTURE ADJUSTMENT

When the anchor arm is removed, adjust posture, if necessary, as illustrated on the right. For road clearance adjustment, turn the adjusting cam in either the A direction (to increase) or the B direction (to decrease).
A one notch turn of the cam corresponds to an 8 mm (0. 32 in.) change in the wheel position. The standard road clearance is from 232 ~ 242 mm (9. 13 ~ 9. 53 in.) when measured at the center of the lower arm.

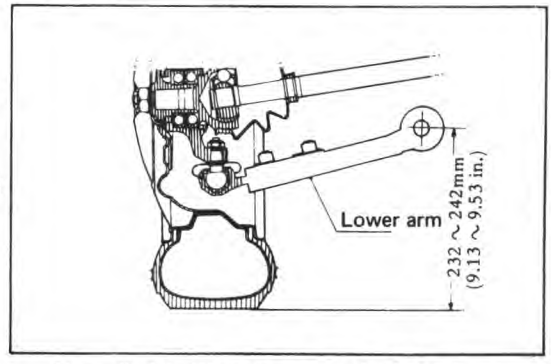


Fig. 3-19 Standard road clearance

Fig. 2-20 Posture adjustment

Fig. 3-21 Posture adjustment

(NOTE)
For the insertion of bearing and oil seal in the cross member upper arm bracket, use the installer (special tool: 925010000).

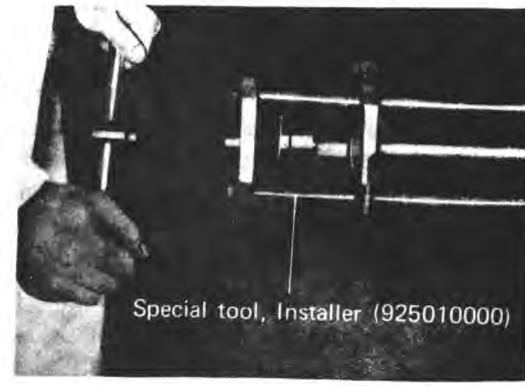


Fig. 3-22 Bearing inserting method

In the manner described above, it is possible to remove the greater part of the front suspension system. In reassembly of the front suspension system components, observe the following precautions:
Clean and check the removed parts for damage, wear, bending, and cracks. After repair or replacement of faulty parts, reassemble them. In reassembling, follow the reverse sequence of removal.

(NOTE) Do not clean the rubber bushings by soaking and washing in solvent. They should be wiped clean.

Tightening torques are shown below

Part to be tightened	Size	Tightening torque
Cross member body installing nut	14 mm (0.55 in.)	8.0 ~ 10.0 kg-m (57.87 ~ 72.33 lb-ft)
Lower arm body installing bolt	10 mm (0.39 in.)	3.4 ~ 4.5 kg-m (24.59 ~ 32.55 lb-ft)
Upper arm damper pin installing nut	10 mm (0.39 in.)	3.0 ~ 4.5 kg-m (21.70 ~ 32.55 lb-ft)
Lower arm castle nut	10 mm (0.39 in.)	4.5 ~ 7.5 kg-m (32.55 ~ 54.25 lb-ft)
Torsion bar lock nut	10 mm (0.39 in.)	3.5 ~ 4.5 kg-m (25.31 ~ 32.55 lb-ft)
Lower arm shaft tightening nut	12 mm (0.47 in.)	4.5 ~ 6.0 kg-m (32.55 ~ 43.40 lb-ft)

3-5: ADJUSTING FRONT WHEEL ALIGNMENT

When it is necessary to adjust wheel alignment, check the following points before performing the adjustment.

1. Check the air pressures in the tires.
2. Check the tires for excessive wear.
3. Check the wheels for deflection.
4. Check the joints for wear.
5. Check the bearings for wear.
6. Check the steering linkage mechanism for wear.

Check the steering system on the following points

1) Check that the steering wheel functions normally in every respect.
2) Check the steering wheel for returning condition.
3) Check the steering wheel for stability.

The front alignment will not require frequent inspection and adjustment if the vehicle has been used under normal conditions.

The normal front alignment values when the vehicle is unloaded should be as shown below.

Caster	1° 30' ~ 2°
Camber	1° 20' ~ 1° 50'
Tread	1222 mm (48.15 in.)
Slip	0 ~ 2 mm (in.) (0 ~ 0.08 in.)
Effective diameter of wheels	267 mm (10.52 in.)
Road clearance (at the center of lower arm shaft)	232 ~ 242 mm (9.12 ~ 9.53 in.)

1: **TOE-IN ADJUSTMENT**

(a) Measure toe-in

Before adjusting toe-in, check the lengths of the right and left tie-rods, and set the steering gear box alignment marking to the center position. (Refer to Fig. 3-23.)

Fig. 3-23 Gear box alignment marking

(b) Measure the center distance (B) on the rear of the front wheels, and move the vehicle forward until the measured position comes to the front side of the front wheels. In this position, measure the center distance (A) between the front wheels. The difference between B and A distances is called "toe-in", and the toe-in standard when the vehicle is unloaded is 2 ~ 8 mm. (0.08 ~ 0.32 in.)

(c) If toe-in is not in the prescribed range, loosen both sides of the tie-rod lock nut, and adjust toe-in by turning the tie-rods the proper amount. While adjusting, be sure to keep the steering wheel in the centered position.

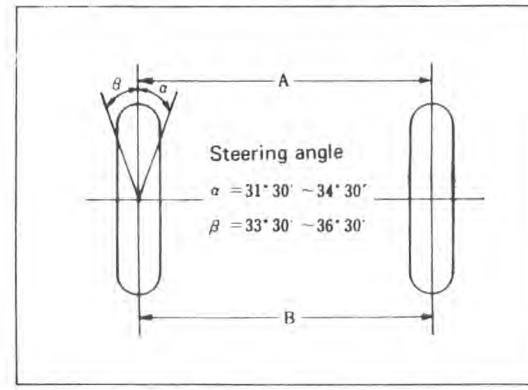


Fig. 3-24 Standard toe-in

2: CAMBER ADJUSTMENT

When adjusting camber, align the hexagonal cam as shown in Fig. 3-26 with the camber adjusting reference line. To obtain normal camber, set the mark 4 at the reference line. Camber angle under this condition is 1° 50' when the vehicle is unloaded. If the cam is turned 4 - 3 - 2 - 1, camber becomes minus (-), and if turned 4 - 5 - 6, camber becomes plus (+). Turning one stage corresponds to 30'.

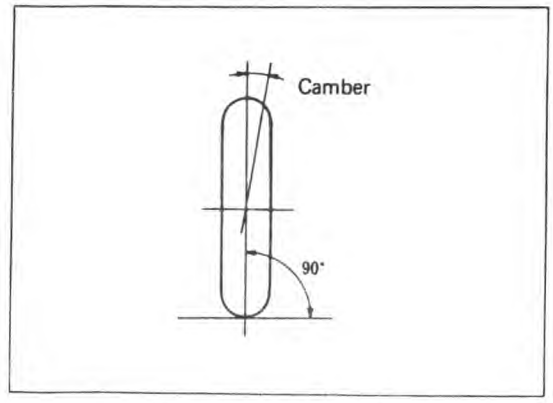


Fig. 3-25 Camber

3: CASTER ADJUSTMENT

When adjusting caster, align the hexagonal cam with the caster reference line. To obtain normal caster, set the cam mark 3 on the reference line. Caster angle under this condition is 2° when the vehicle is unloaded. If the cam is turned 3 - 2 - 1, caster becomes minus (-), and if turned 3 - 4 - 5 - 6, caster becomes plus (+). Turning one stage corresponds to 30'.

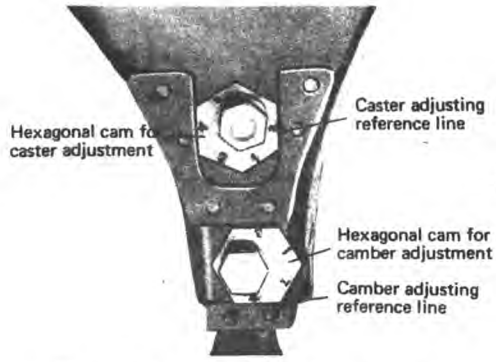


Fig. 3-26 Caster adjustment

4: POSTURE ADJUSTMENT

Refer to the section on posture adjustment.

5: MEASURING SIDE SLIP

After adjusting toe-in, caster, and camber, measure side slip with a side slip tester. The standard side slip is 0 ~ 2 mm (0 ~ 0.08 in.) when the vehicle is loaded with one passenger.

If side slip exceeds the standard value, readjust front wheel alignment.

Fig. 3-27 Steering angle adjustment

6: STEERING ANGLE ADJUSTMENT

Turn the steering wheel fully to left and right, and measure the steering angles of the front wheels.

Standard values

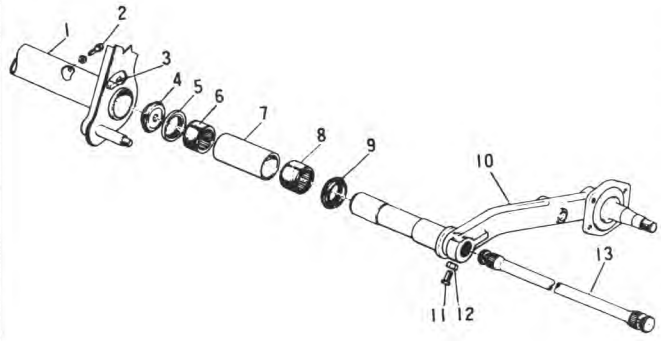
Outside wheel: 31° 30' ~ 34° 30' (with one passenger)
Inside wheel: 33° 30' ~ 36° 30' (with one passenger)

The difference between the right and left sides of the standard value should be limited to 30'.

3-6: REAR SUSPENSION

The rear suspension is based on a special trailing arm type, independent suspension system. It employs torsion bar and double-action shock absorber for the spring system. Coupled with the front suspension, this rear suspension insures greater riding comfort and highly stable vehicle operation.

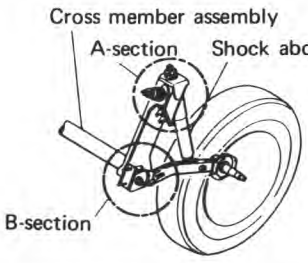
1: CONSTRUCTION OF REAR SUSPENSION

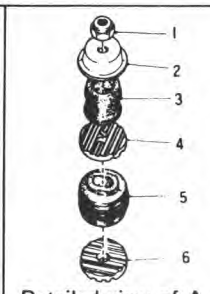


1 Cross member assembly (rear)
2 Bolt
3 Plug
4 Dust seal
5 Oil seal (inner)
6 Bearing (inner)
7 Collar
8 Bearing (outer)
9 Dust seal
10 Trailing arm assembly
11 Locking bolt
12 Nut
13 Torsion bar

Fig. 2-28 Rear suspension components

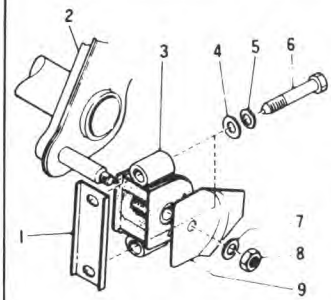
In addition, the bolt (2) in the above drawing is obsolete for Model A12 and models thereafter. Also, the shaft of the trailing arm has been shortened.





1 Nut
2 Cap
3 Cushion rubber B
4 Pad
5 Cushion rubber A
6 Pad

Detailed view of A-section



1 Plate
2 Cross member assembly
3 Rubber bushing
4 Washer
5 Spring washer
6 Bolt
7 Spring washer
8 Nut
9 Washer

Detailed view of B-section

Fig. 2-29 Detailed view of rear suspension components

3-7: REMOVING REAR SUSPENSION

When removing the rear suspension, loosen the wheel nuts and jack up the rear of the vehicle body.

(NOTE) When jacking up the rear of the vehicle body, actuate the parking brake and chock the front wheels.

(a) Remove exhaust pipe muffler

Fig. 3-30 Removal of muffler

(b) Disconnect the brake pipe from the hose.

Fig. 3-31 Disconnecting brake lines

(c) Remove the part of the cushion rubber which is secured to the vehicle body.

Fig. 3-32 Removal of cushion rubber

(d) Remove the bolt and rubber bushing.

The rear cross member can now be removed from the vehicle body.

Fig. 3-33 Removal of cross member installing bolt and rubber bushing

1: To remove the shock absorber, loosen the shock absorber upper nut, and the trailing arm pin nut and washer.

(NOTE) When removing the shock absorber with the vehicle body jacked up, be sure to completely unthread the posture adjusting bolt beforehand.

Fig. 3-34 Removal of shock absorber

2: To remove the trailing arm proper, take out the arm proper after unthreading the lock bolt.

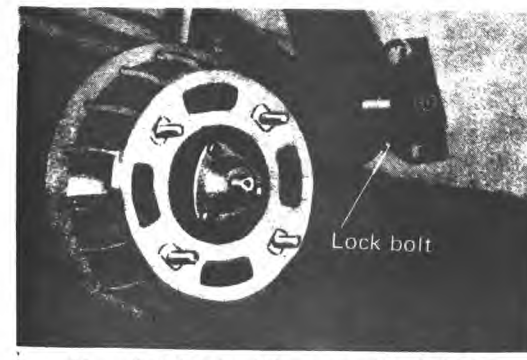


Fig. 3-35 Trailing arm lock bolt

3: When removing the torsion bar, unthread the center arm lock bolt and trailing arm lock bolt. (In addition, handle the torsion bar in the same manner as that for the front suspension.)

Fig. 3-36 Removal of torsion bar

REAR TORSION BAR CHARACTERISTICS

Type of vehicle \ Item		Diameter	Effective length
SUBARU 1000 sedan	A12	17.2 mm (0.68 in.)	450.4 mm (17.75 in.)
SUBARU 1000 station wagon	A41	20.5 mm (0.81 in.)	448 mm (17.65 in.)

4: When removing the center spring, remove adjust bolt and the center arm pin and clip.

Fig. 3-37 Removal of center spring

5: To insert the bearing and oil seal in the rear cross member, use the bearing (rear) installer (special tool: 925030000).

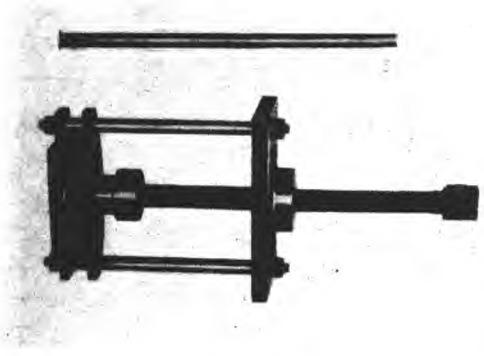


Fig. 3-38

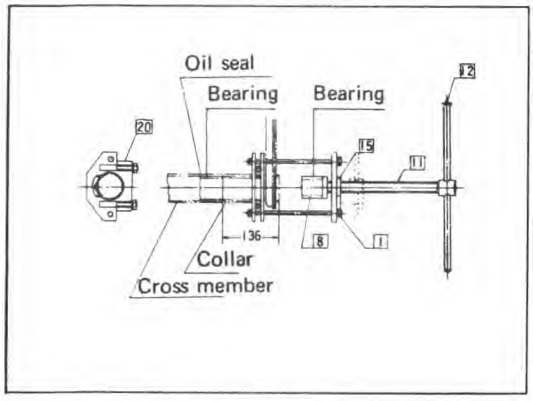


Fig. 3-39

Apply soapy water on the rear cross member bearing inserting section and on the bearing, set the special tool in alignment with the rear cross member, and tighten the nut after setting [20] from above. Insert the bearing and oil seal into [8] while turning [12] until [11] and [15], respectively, become 50 mm. (1.97 in.) In this installing process, make sure that the insertion depth of the bearing measures 136 mm (5.36 in.) from the rear cross member end surface to the oil seal end surface. In the same way, press in the bearing until it contacts the collar. When inserting the collar into the rear cross member, disconnect the inserted side of the installer and align the collar grease filling port.

This is the complete sequence of rear suspension system disassembly. For reassembling, follow the reverse sequence of disassembly. As was outlined in the front suspension reassembly procedure, the rear suspension required the following check.

Install the torsion bar with the marks R and R. RH on the right side, and the torsion bar with marks L and R. LH on the left side.

> If the torsion bars are installed on the wrong side, premature breakage of the bars may result.

3-8: ADJUSTING GROUND HEIGHT

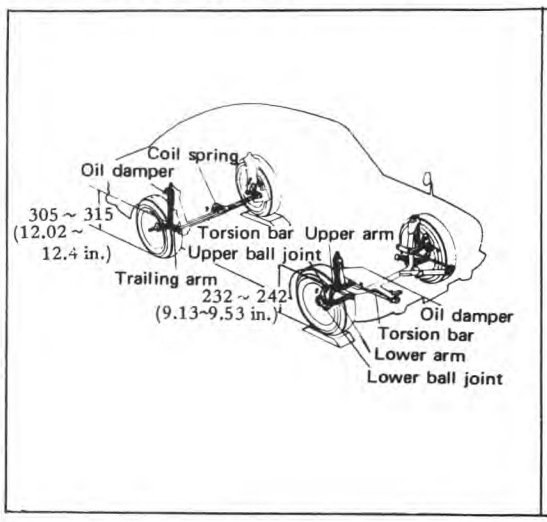


Fig. 3-40 Adjusting ground height

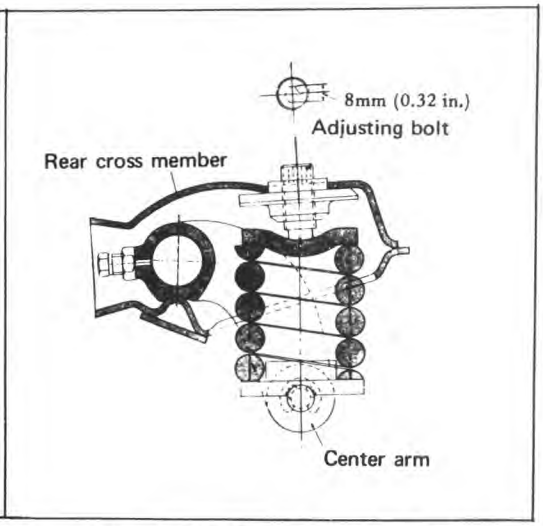


Fig. 3-41 Cross section of rear center arm

Adjust the ground height on the rear of the vehicle by turning the center arm adjust bolt built into the center of the cross member.

This adjustment is made from the inside of the trunk. The standard road clearance is 305 ~ 315 mm (12. 02 ~ 12. 41 in.) when measured at the center of the torsion bar.

Fig. 3-42 Adjusting posture (rear)

Items to be Checked Before Reassembly of Rear Suspension

(a) Check each threaded part for wear and damage.

(b) Check the various parts for breakage and cracks.

(c) Check the torsion bar and cross member proper for damage. (Check the surface coating, and if particularly worn, recoat.)

(d) Check the bearings for sufficient lubrication.

Additional precautions during reassembly

(1) Clean each bearing section

(2) Never fail to coat each threaded and serrated part with grease. Especially, grease the upper arm bracket at the grease nipple after removing the side plug. Grease until grease comes out of the other end of the hole. Grease the rear cross member until the grease comes out of the seal surface.

(3) Apply an appropriate amount of grease to the bearings ..... not too much not too little.

(4) After reassembling, do not forget to lubricate the parts requiring lubrication.

3-9: SHOCK ABSORBER

Specifications

		Front	Rear
Type		Cylindrical, double-action type	Cylindrical, double-action type
Maximum length		268 ~ 274 mm (10.55 ~ 10.79 in.)	381 ~ 387 mm (15.01 ~ 15.25 in.)
Minimum length (when it reaches the stop rubber)		229 ~ 235 mm (9.02 ~ 9.26 in.)	276 ~ 282 mm (10.87 ~ 11.11 in.)
Stroke		39 mm (1.54 in.)	105 mm (4.14 in.)
Diameter of piston		25 mm (0.98 in.)	25 mm (0.98 in.)
Damping force	Expansion side	90kg/0.3m/s 198.42lb/0.98ft/s	120kg/0.3m/s 264.55lb/0.98ft/s
	Compression side	40kg/0.3m/s 88.19lb/0.98ft/s	40kg/0.3m/s 88.19lb/0.98ft/s

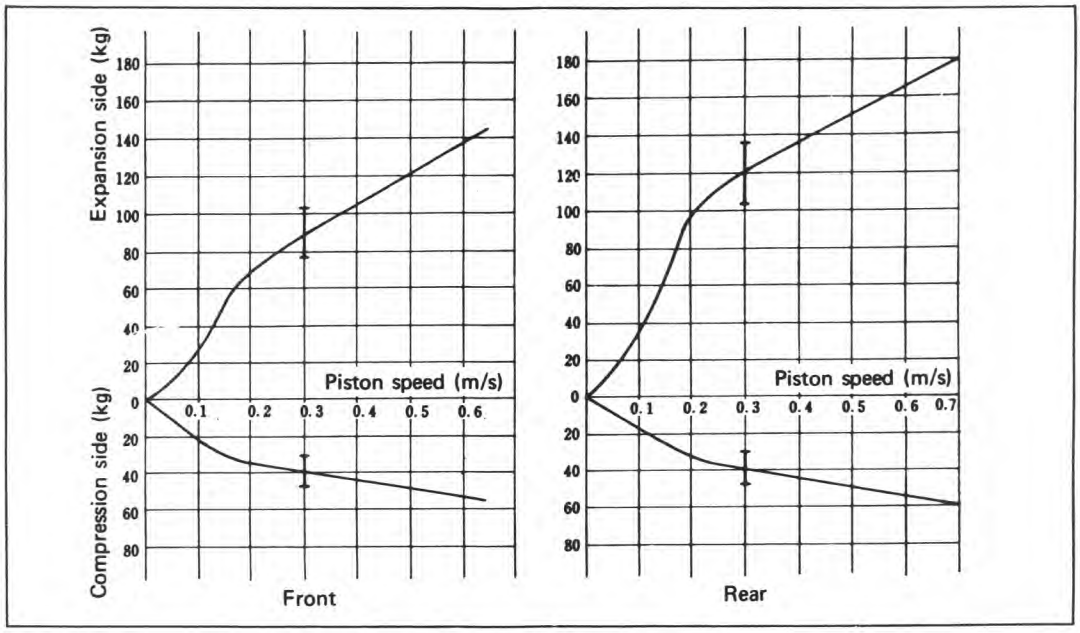
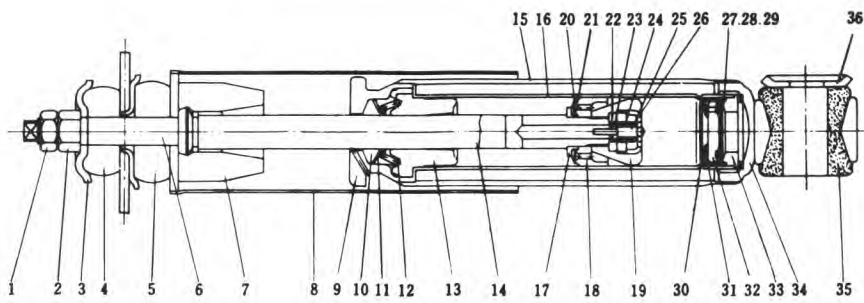


Fig. 3-43 Damping characteristic curves (front and rear)

The shock absorber (has a built-in valve mechanism for damping) is installed between the vehicle body and the wheels; is serves to absorb the various shocks, vibrations, etc. encountered during driving.



1 Nut	10 Packing	19 Nut	28 Disc
2 Nut	11 Retainer	20 Spring	29 Disc S
3 Washer	12 Spring	21 Valve	30 Guide
4 Rubber	13 Rod guide	22 Disc	31 Spring
5 Rubber	14 Rod	23 Disc S	32 Retainer
6 Bolt	15 Base shell	24 Spring	33 Body
7 Stop rubber	16 Tube	25 Guide	34 Cap
8 Cover	17 Guide	26 Retainer	35 Rubber
9 Cap	18 Piston	27 Ring	36 Washer

Fig. 3-44 Construction of shock absorber

1: **REMOVAL**

(a) Jack up the vehicle body, and remove the wheels.

(b) Remove the shock absorber upper double nut, the washer, and the upper rubber.

(NOTE) Loosen the road clearance adjusting cam (front) and adjust bolt (rear) before hand.

(c) Remove the nut from the damping pin at the bottom of the mount, and remove the shock absorber.

2: **INSPECTION**

Check operating conditions, bending of the rod, oil leakage from the packing, external damage, rubber damage, and wear. If abnormality is detected, replace as necessary.

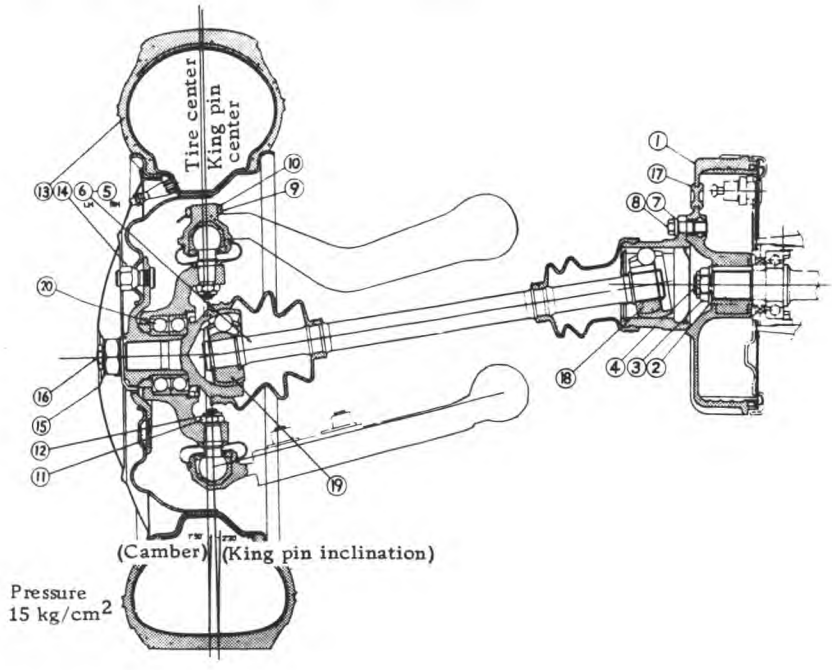
3: **INSTALLATION**

(a) Insert the rubber bushing into the upper section, insert the bolt section into the bracket hole, and temporarily tighten the lock nut through the upper side of the rubber and washer.

(b) Fit the upper mounting section on the mounting pin, and install the washer, spring washer, and nut (in this sequence), after which tighten the nut until the washer and shoulder of the pin contact.

(c) Completely tighten the upper nut and then the lock nut.

CHAPTER 4 : FRONT WHEELS AND AXLE

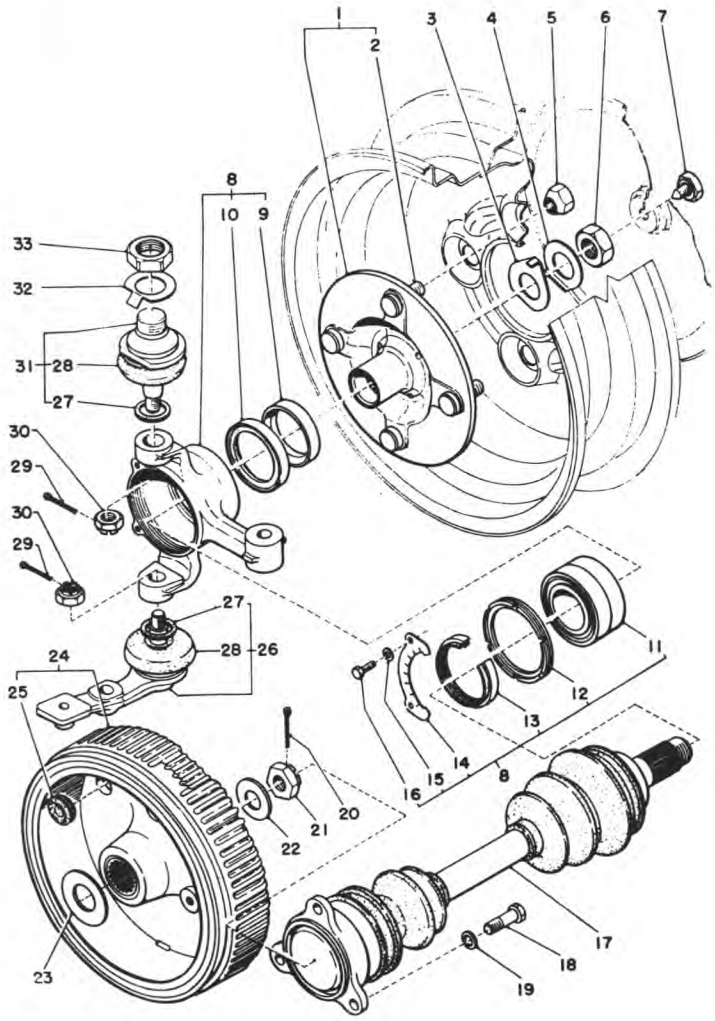


1	Brake drum	11	Castle nut
2	Washer	12	Cotter pin
3	Castle nut	13	Wheel
4	Cotter pin	14	Wheel nut
5	Front drive shaft (RH)	15	Wheel cap
6	Front drive shaft (LH)	16	Bolt (wheel cap)
7	Spring washer	17	Brake adjusting port cover (brake drum)
8	Bolt	18	D. O. J (Double offset joint)
9	Lock plate	19	C. V. J (Constant velocity joint)
10	Nut	20	Bearing

Fig. 4-1 Cross-sectional view of front wheels and axle

4-1: GENERAL DESCRIPTION

The front wheel and axle employ constant velocity joints (18) and (19) on both ends of the drive shaft (5) and (6) to improve the operating smoothness of the wheel and axle. The brake drum (1) in this inboard brake system, is installed on the engine side of the axle shaft. The employment of this brake system has simplified the wheel construction. The bearing (20) consists of two angular type ball bearings, arranged back to back. Front wheel alignment adjustment is needed after completion of repair work on the front wheels and axle.



1	Hub	13	Oil seal	25	Brake adjusting port cover (brake drum)
2	Hub bolt	14	Lock plate		
3	Washer	15	Spring washer	26	Ball joint assembly (lower)
4	Lock plate	16	Bolt		
5	Wheel nut	17	Axle shaft assembly	27	Clip
6	Hub nut	18	Bolt	28	Boot
7	Bolt (wheel cap)	19	Spring washer	29	Cotter pin
8	Knuckle assembly	20	Cotter pin	30	Castle nut
9	Spacer	21	Castle nut	31	Ball joint assembly (upper)
10	Oil seal	22	Washer		
11	Bearing assembly	23	Buffle plate	32	Lock plate
12	Nut	24	Brake drum	33	Nut

Fig. 4-2 Components of front wheel and axle

1: **REMOVAL**

(a) Actuate the parking brake and remove the wheel caps.

(b) Loosen the wheel nuts and remove the wheels after jacking up the vehicle body.

(c) Straighten the lock plate at the wheel hub (on the constant velocity joint side), loosen the wheel hub nut, and remove the nut together with the lock plate.

Fig. 4-4 Removal of nut

(d) Remove the tie-rod end from the knuckle arm.

(e) Remove the cotter pins (one each at the lower arm ball joint and the lower arm joint), castle nut, spring washer, and bolts.

Fig. 4-3 Removal of wheels

Fig. 4-5 Removal of lock plate

Fig. 4-6 Removal of tie-rod end

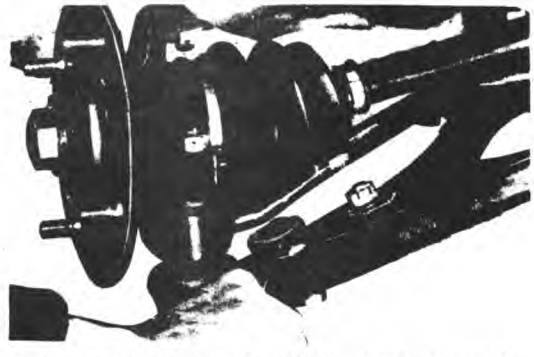


Fig. 4-7 Removal of ball joint (lower)

(NOTE) When the camber and caster adjusting cams are removed, make note of the setting to aid in reassembly.

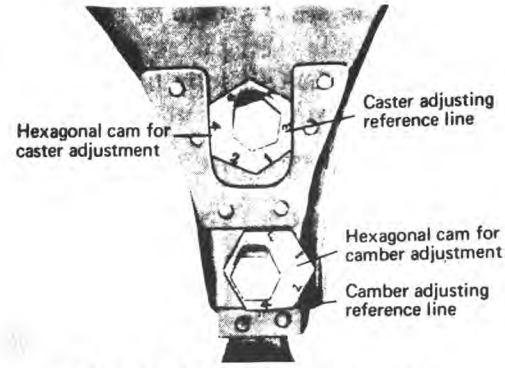


Fig. 4-8 Note for removal

(f) Remove the upper arm by straightening out the lock plate at the upper arm joint, and remove the nut and lock plate.

Fig. 4-9 Removal of ball joint (upper)

(g) Remove the hub and knuckle assembly from the splined section of the axle shaft (constant velocity joint side).

(h) Separate the hub from the knuckle with the special tool (knuckle hub installer/remover (comes in three parts)).

Special tool	925071000

Install part 2 on part 1. Place the tool on the hub assembly by aligning with the three holes, mount part 3 on the opposite side from above, and knock the assembly, then separate the knuckle and hub.

(i) Remove the ball joint (lower and upper) studs, knuckle joint cotter pin, and knuckle joint castle nut. Then remove the ball joint with a puller.

Fig. 4-10 Separating the hub-knuckle assembly

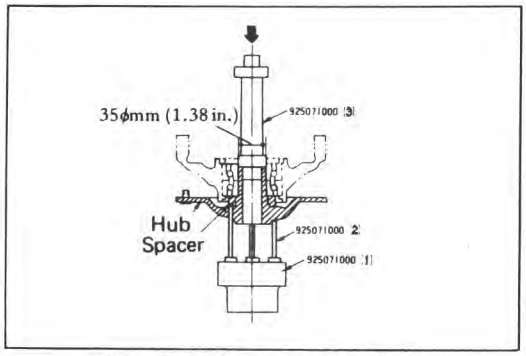


Fig. 4-11 Removal of hub

(NOTE) Removal should be performed while taking care not to damage the ball joint boot and the threaded part of the stud.

(j) REMOVING BEARING NUT

(1) Straighten out the lock plate, loosen the bolt, and remove the bolt together with the spring washer and lock plate.

(2) Remove the oil seal (inner) from the bearing nut.

(3) Remove the nut with a nut wrench (special tool 925061000) from the knuckle.

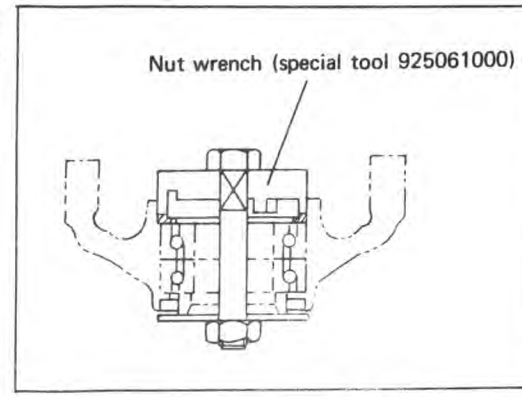


Fig. 4-12 Removal of bearing nut

(k) REMOVING BEARING

(1) Remove spacer

(2) Remove the oil seal (outer) from the knuckle.

(3) Remove the bearing from the knuckle by using the bearing knuckle installer/remover (925051000).

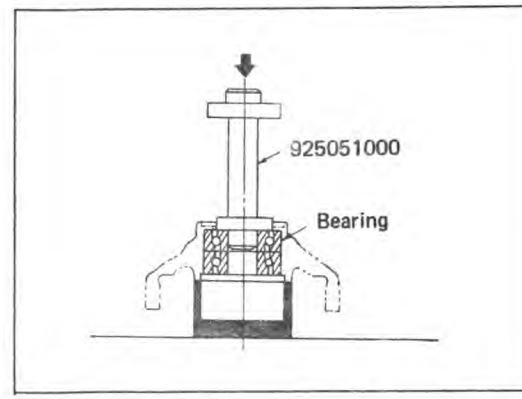


Fig. 4-13 Removal of bearing

2: INSPECTION

Clean the removed parts, and check for wear, damage, and corrosion. If faulty, repair or replace.

(1) Bearing ... seizure, corrosion, damage, and wear.

(2) Oil seal ... damage and wear.

(3) Ball joint (upper and lower) ... wear and damage

(4) Ball joint boot (upper and lower) ... warping, cracks, and wear.

(NOTE) The bearing race cannot be removed because of its peculiar construction.

3: REINSTALLATION

(a) BEARING INSERTION

(1) Press in the bearing with a bearing (knuckle) installer/remover special tool (925051000) until it reaches the bearing seat. It must be fully seated.

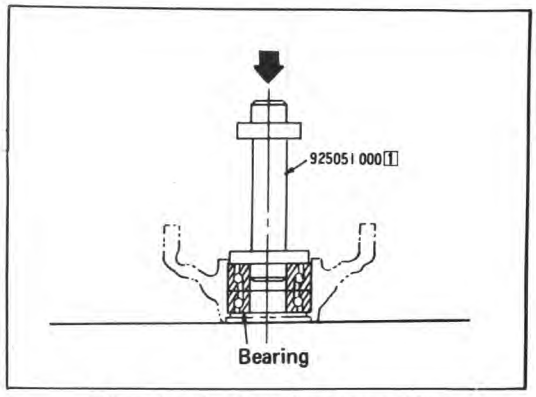


Fig. 4-14 Bearing insertion

Fig. 4-15 Bearing insertion

(b) HANDLING OF FRONT WHEEL BEARING

Do not forget to combine the two part bearing as illustrated in Fig. 4-16 (CORRECT).

(NOTE) When replacing the bearing, replace both parts together. Do not replace them individually.

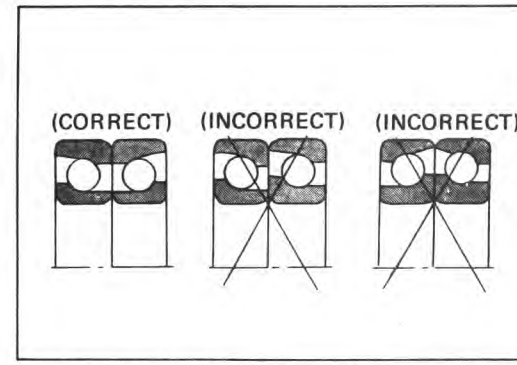


Fig. 4-16 Bearing arrangement

(c) FILLING WITH GREASE

Before inserting the bearing, fill up the bearing with grease. (Approximately 20 to 24 gr.)

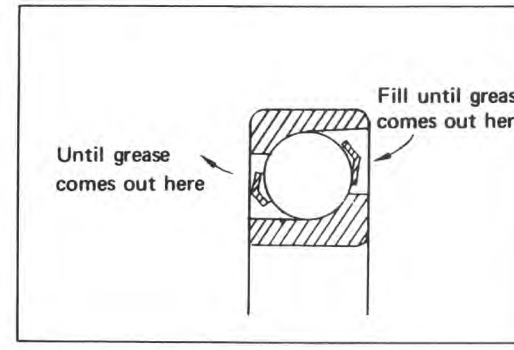


Fig. 4-17 Filling with grease

(1) Press the oil seal (outer) into the knuckle

(NOTE) Insert the oil seal (outer) so that it protrudes about 1 mm (0.04 in.) from the knuckle end surface.

(d) COATING WITH GREASE

Coat the oil seal (outer) lip with grease. When installing.

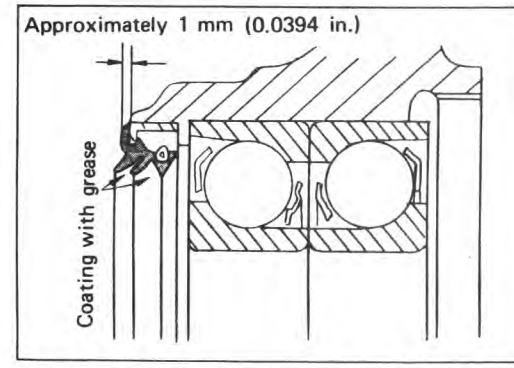


Fig. 4-18 Inserting oil seal (outer)

(e) SPACER INSERTION

(NOTE) After inserting the spacer, make sure the lip of the oil seal (outer) is not tucked up.

TIGHTENING BEARING NUT

(1) Tighten the bearing nut with a nut wrench (special tool 925061000).

Tightening torque	16 ~ 18 kg-m (115.74 ~ 130.20 lb-ft.)

Fig. 4-19 Tightening bearing nut

(2) Align the lock plate groove with the nut groove, and bend the lock plate. Then lock the nut.

Tightening torque	0.005 ~ 0.006 kg-m (0.0362 ~ 0.0434 lb-ft.)

(3) Press in the oil seal (inner) in up to the nut.

(NOTE) Be careful not to damage the side lip of the oil seal (inner).

(f) COATING WITH GREASE

Coat the oil seal (inner) lip surface with grease when installing.

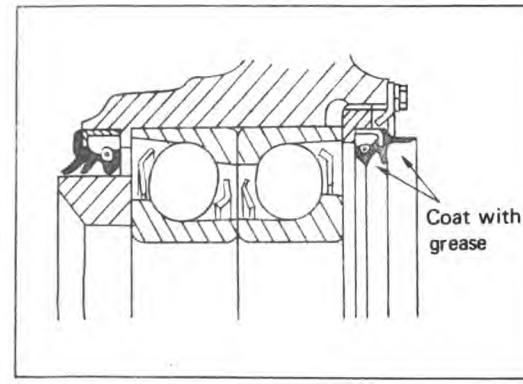


Fig. 4-20 Coating with grease

(1) Insert the ball joint (on the upper arm and knuckle assembly), tighten with castle nut, and lock the nut by bending the cotter pin.

Wrench	19 mm

Tighten with the tightening torque of 6.5 kg-m (47.02 lb-ft.) and align the pin holes in the retightening direction.

(NOTE)

(1) Use new cotter pin

(2) Bend the cotter pin to anchor shape.

(2) Recouple the hub and knuckle assembly with a knuckle/hub installer/remover, special tool 925071000.

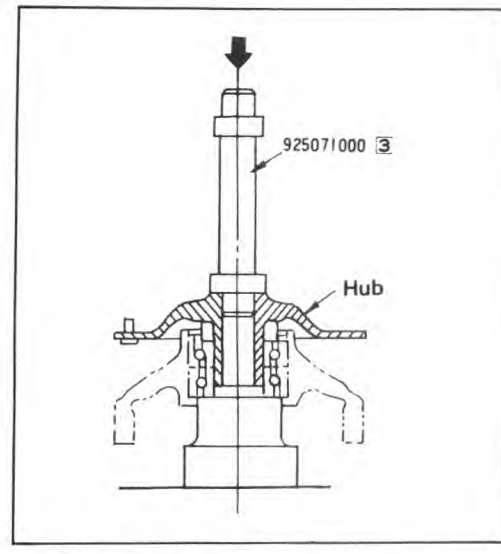


Fig. 4-21 Bearing insertion

(3) Remount the hub and knuckle as an assembly onto the splined section of the axle shaft (on the constant velocity joint side), and tighten with lock plate and nut.

(4) Connect the upper ball joint and upper arm with lock plate and nut. Tighten the nut, and lock it by bending the lock washer.

Wrench	32 mm

Fig. 4-22 Tightening nut

(NOTE)

(1) Align the ball joint and upper arm notches.

(2) Align the lock washer pawl with the upper arm notch.

(5) Connect lower ball joint and lower arm.

1) Replace the camber and caster adjusting cams and arrange them correctly (match the number on the cam to the number it was matched with before removal).

2) Tighten the lower ball joint and the lower arm with the camber and caster adjusting cams, bolt, and spring washer.

Fig. 4-23 Lower arm connection

(NOTE)

(1) Make sure that the camber and caster adjusting cams are correctly fit in the lower arm grooves, and tighten the nut.

(2) Install the cotter pin after adjusting alignment.

Wrench Wrench Wrench	14 mm 17 mm 19 mm
Tightening torque	4.5 ~ 7.5 kg-m (32.55 ~ 54.25 lb-ft.)

(6) Install the tie-rod end on the knuckle arm

(7) Retighten the hub and axle shaft connecting nut, and lock the nut by bending the lock plate.

Torque wrench	32 mm
Tightening torque	12 ~ 14 kg-m (86.80 ~ 101.27 lb-ft.)

(NOTE) Use a torque wrench for tightening. Excessive tightening can cause damage to the bearing.

(8) Install the wheels, tighten the wheel nuts, and remove the jack. Then retighten the wheel nuts.

(9) Install the wheel caps.

(10) Measure the wheel alignment, and after adjusting this alignment, insert the cotter pin into the camber and caster adjusting cam installing bolt, and lock the nut by bending the cotter pin.

(NOTE) Use a new cotter pin.

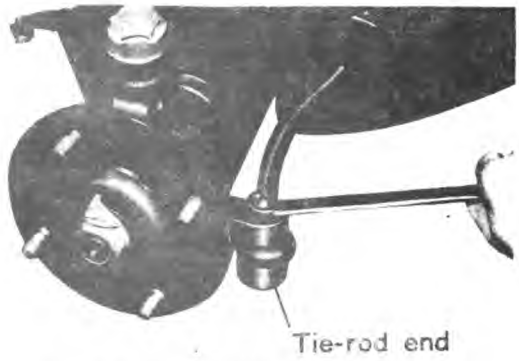


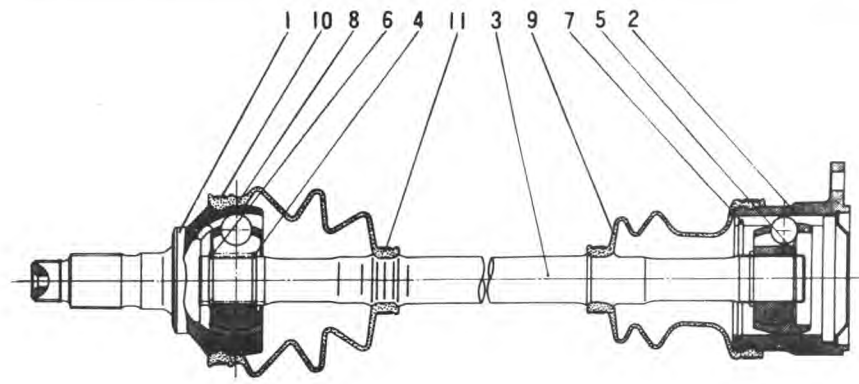
Fig. 4-24 Installing tie-rod end

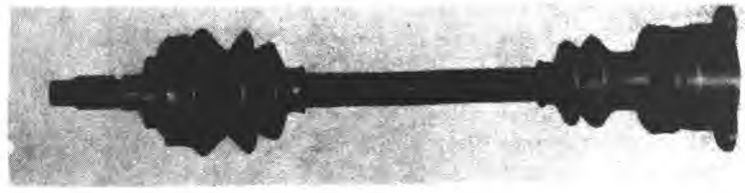
Fig. 4-25 Tightening hub nut

Fig. 4-26 Bending lock plate

Fig. 4-27 Bending cotter pin

4-2: AXLE SHAFT (CONSTANT VELOCITY JOINT)





1 C. V. J (constant velocity joint)
2 D. O. J (double offset joint)
3 Axle shaft
4 Snap ring
5 C-type snap ring
6 Circlip
7 Circlip
8 Boot (on C. V. J side)
9 Boot (on D. O. J side)
10 Band
11 Band

Fig. 4-28 Axle shaft components

1: REMOVAL

(a) Actuate the parking brake, and remove the wheel caps.

(b) Loosen the wheel nuts, jack up the vehicle, and remove the wheels.

(c) Unbend the lock plate at the hub and axle shaft on the (C. V. J side) joint, loosen the wheel hub nut, and remove the hub nut and lock plate.

Fig. 4-29 Removal of lock plate

(d) Loosen the three bolts at the axle shaft (on the D. O. J side) from front brake drum, and remove these three bolts together with the spring washers.

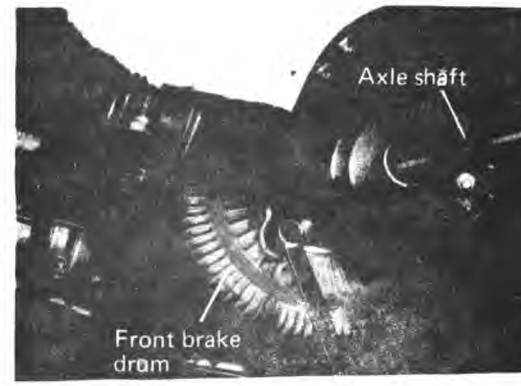


Fig. 4-30 Disconnecting axle shaft (on the D. O. J side)

(e) Remove the splashboard clip together with spring washer and washer by loosening the bolt.

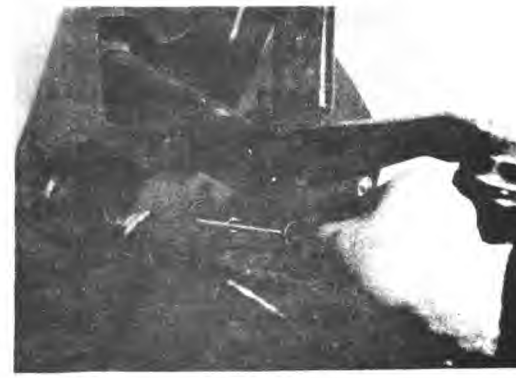


Fig. 4-31 Removal of splashboard

(f) At this point, the steering wheel should be turned "full" to the side on which you are working. Then sufficient movement of the axle shaft is allowed for removal. Push the axle shaft (on the D. O. J side) toward the engine and uncouple the axle shaft (on the C. V. J side) at the wheel hub. Then pull the shaft away from the engine to uncouple the opposite end of the shaft. It is now completely removed.

Fig. 4-32 Disconnecting the C. V. J side of axle

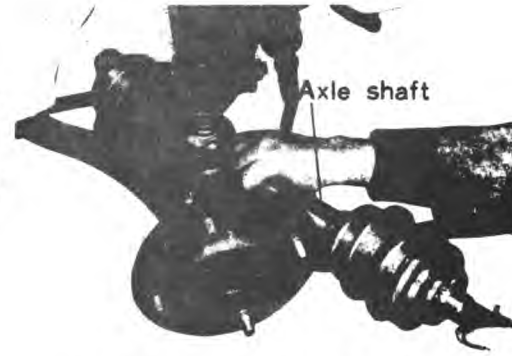


Fig. 4-33 Removal of axle shaft

2: DISASSEMBLING

(a) Removal of boot band (on the D. O. J and C. V. J sides)

(1) Unbend the band.

(2) Lightly tap the band end with a hammer, loosen the band, and wrench out the band with a screwdriver. Then disassemble the band with pliers, and remove it from the boot.

(b) Removal of circlip (D. O. J side)

(1) Disconnect the larger side (D. O. J side) of boot.

(2) Wrench out the circlip at the mouth of outer race and take out.

(c) Removal of outer race and balls (on D. O. J side)

(1) Remove the outer race (D. O. J side) from the shaft assembly.

(2) Remove the grease with cloth, take out the ball, shift the cage toward the boot.

(NOTE)

(1) When removing the cage from the inner race, turn the cage slightly (one-half pitch) against the inner race track groove and move the cage.

(2) Be careful not to lose the six balls.

(3) Do not confuse the grease (a special grease is used for the constant velocity joint).

(d) Removal of C-type snap ring and inner race (on D. O. J side)

(1) Remove the C-type snap ring connecting the inner race and shaft with special pliers.

(2) Remove the D. O. J side of the inner race.

C-type snap ring pliers

Fig. 4-34 Removal of boot band

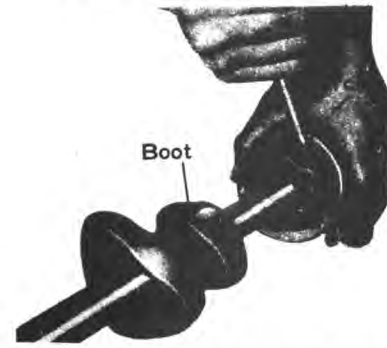


Fig. 4-35 Removal of circlip

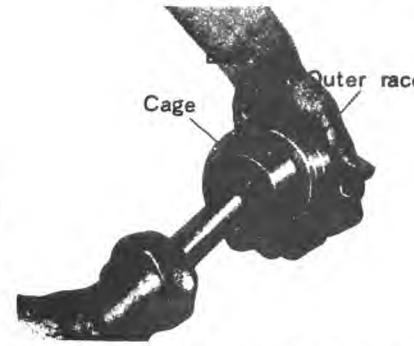


Fig. 4-36 Removal of outer race and balls

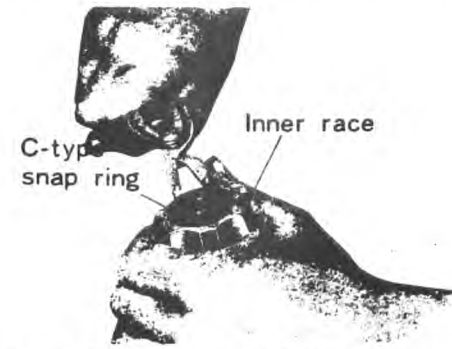


Fig. 4-37 Removal of C-type snap ring and inner race

(e) Cage (on D. O. J side) and boots (on C. V. J and D. O. J side)

D. O. J side 1) Take off the cage from the shaft.
2) Remove the boot

C. V. J side 3) Remove the boot

(NOTE) Be careful not to damage the circlip with the square circlip.

(f) Thus, disassembly of the axle is complete.

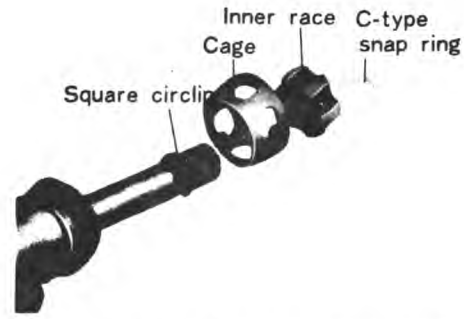


Fig. 4-38 Disassembling D. O. J

3: **INSPECTION**

Check the removed parts for damage, wear, corrosion, etc. If faulty, repair or replace.

(1) D. O. J (Double offset joint) ... seizure, corrosion, damage, wear, and excessive play.

(2) Shaft ... excessive bending and twisting, damage, and wear.

(3) C. V. J (Constant velocity joint) ... seizure, corrosion, damage, and excessive play.

(4) Boots ... wear, warping, and breakage.

4: **REASSEMBLING**

(a) Installation of boots (on C. V. J and D. O. J sides)

(1) Initially insert the C. V. J side of boot into the shaft.

(2) Insert the D. O. J side of boot into the shaft.

(3) Install the C. V. J side of boot in position.

(4) Move the D. O. J side of boot up to the center of the shaft.

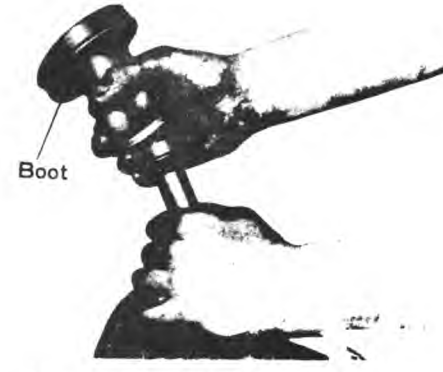


Fig. 4-39 Installing boot

(NOTE) Be careful not to damage the boot sliding it over the square circlip.

5: REPLENISHING GREASE (on C.V.J side)

(a) Open the larger end of the boot, and apply 60 ~ 70 gr (2.12 ~ 2.8 oz) of grease to the C. V. J side. In addition, do not forget to apply grease to the shaft.

Grease: Use grease specially made for the constant velocity joint

(b) Inserting the bearing cage (on D. O. J side)
Insert the cage into the shaft.

(NOTE) Insert the cage with the clearance facing the outside, see Fig. 4-40, since the cage is provided with mounting direction.

(c) Installing inner race and C-type snap ring (on D. O. J side)
Install the inner race on the shaft, and install the C-type snap ring with special pliers.

(NOTE) Confirm that the C-type snap ring is completely fit in the shaft groove.

(d) Installing the cage (on D. O. J side)
Install the cage on the inner race secured to the shaft.

(NOTE) Align the protruding part of the cage with the inner race track, insert the cage, and shift it by half a pitch.

COATING WITH GREASE (on D.O.J side)

Coat the cage pocket with the designated grease.

Grease: Use grease specially made for the constant velocity joint

(e) Inserting balls (on D. O. J side)

Insert the six balls into the cage pocket.

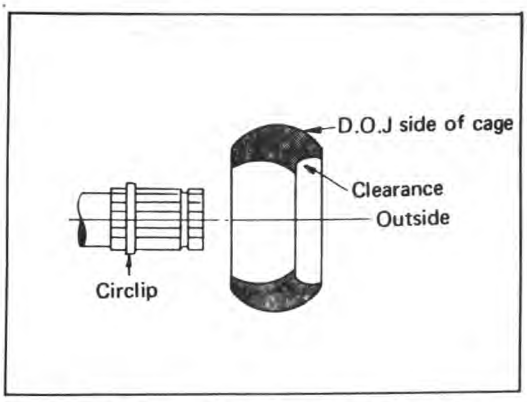


Fig. 4-40 Inserting D. O. J side of cage

Fig. 4-41 Inserting inner race and C-type snap ring

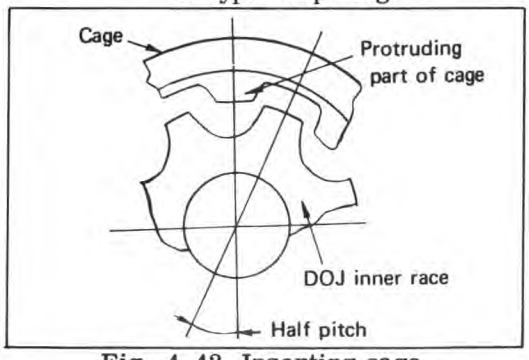


Fig. 4-42 Inserting cage

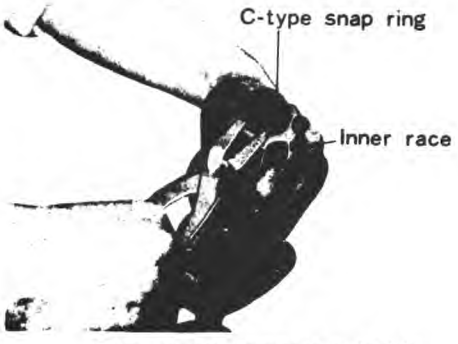


Fig. 4-43 Inserting balls

GREASE APPLICATION (on D.O.J side)

Apply the designated grease to the interior of the outer race on the D. O. J side in the amount of approximately 20 ~ 30 gr (3/4 ~ 1. 0 oz)

Grease:	Use grease specially made for the constant velocity joint.

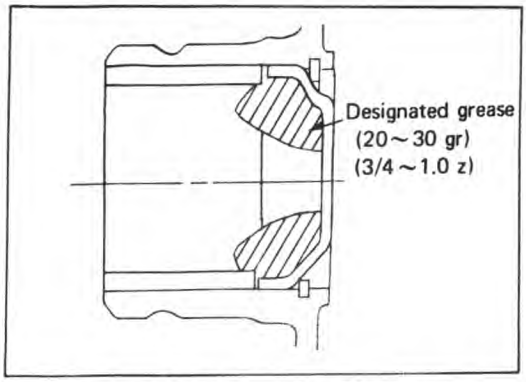


Fig. 4-44 Grease application

(f) Inserting outer race (on D. O. J side)
Align the hollow of the outer race inside with the protruding part of the balls, and insert the outer race.

Fig. 4-45 Inserting outer race

(g) Installing circlip (on D. O. J side)
Install the circlip in the groove of the outer race.

(NOTE)

(1) Make sure that balls, cage, and inner race are completely set in the side of the outer race.

(2) Be careful that the circlip properly positioned so that it does not fall on the ball groove of the outer race.

(3) Pull the shaft lightly, and make sure that the circlip is completely fit in the groove.

Fig. 4-46 Installing circlip

GREASE REPLENISHMENT (on D.O.J side)

1) Replenish 20 ~ 30 gr (3/4 ~ 1. 0 oz) of designated grease to the interior on the D. O. J side after assembling.

2) Apply 20 ~ 30 gr (3/4 ~ 1. 0 oz) of designated grease to the interior of the boot. Also, apply grease to the shaft.

Grease exclusively used for constant velocity joint

Fig. 4-47 Removing grease

(h) Installing boots (on C. V. J and D. O. J side)
Install the boots on constant velocity and double offset joint side.

(NOTE) Wipe grease, etc. off the boot groove to prevent deterioration.

(i) Installing boot bands (on D. O. J and C. V. J side)
Use special tool 925090000

(1) Insert the band in the clip, align the band with the boot groove, and wind it twice.

(NOTE) Use new band

(2) Hold band end with special pliers, and tighten the band completely while holding the clip tight.

(NOTE) When tightening the boot, make sure that the air in the boot is appropriate.

(3) Tighten the band with a band tightening tool (925090000).

(NOTE) Tighten the band to such an extent that the band does not move by hand.

(4) Knock on the clip with the punch attached to the end of the band tightening tool.

(NOTE) Be careful in knocking the clip not to damage the boot.

(5) Cut the band at a position 10 mm (0.39 in.) away from the clip, and fold the cut piece over the clip.

Fig. 4-48 Installing boot bands

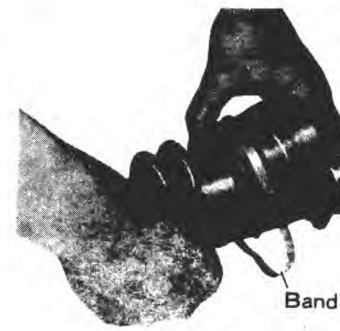


Fig. 4-49 Cutting band

6: **REINSTALLATION**

(a) Insert the C. V. J side of the axle shaft into the hub in the reverse sequence of removal.

(b) Connect the axle shaft (on the D. O. J side) and the front brake drum with three bolts and spring washers.)

Torque wrench	14 mm
Tightening torque	5.7 ~ 7.5 kg-m (41.23 ~ 55.70 lb-ft.)

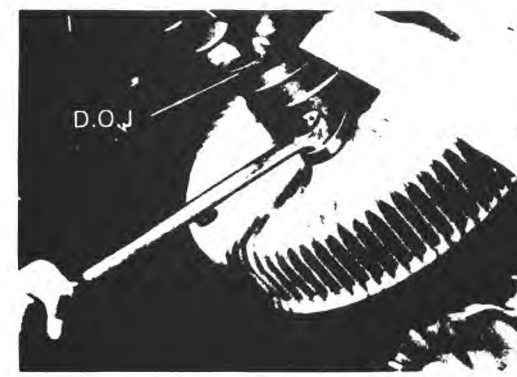


Fig. 4-50 Connecting D. O. J side

(NOTE) Be sure to align the drum and the axle shaft (on D. O. J side) faucet joint.

(c) Connect the split part of the splashboard with a clip, and tighten with bolt, spring washer, and washer.

(d) Install the wheels, tighten the wheel nuts, and remove the jack. Then retighten the wheel nuts.

(e) Tighten the wheel hub and the axle shaft (on C. V. J side) with washer, lock plate and hub nut. Then lock the wheel hub nut by bending the lock plate.

Torque wrench	32 mm
Tightening torque	12 ~ 14 kg-m (86. 80 ~ 101. 27 lb-ft.)

(NOTE) Be sure to tighten with a torque wrench.

(f) Install the wheel caps.

4-3: BALL JOINT

1: INSPECTION

(a) UPPER BALL JOINT

Jack up the vehicle body. Move the wheels back and forth. If the movement of the wheels is excessive at the bottom, replace. In addition, move the wheels vertically. If the ball joint moves excessively, replace the upper ball joint.

(NOTE) Excessive motion of wheels may also be attributable to excessively worn or damaged front wheel bearing, or to excessively loose bearing nut.

(b) LOWER BALL JOINT

Remove the stud from the knuckle. Move the stud with a finger. If there is noticeable play in the stud, replace the lower ball joint.

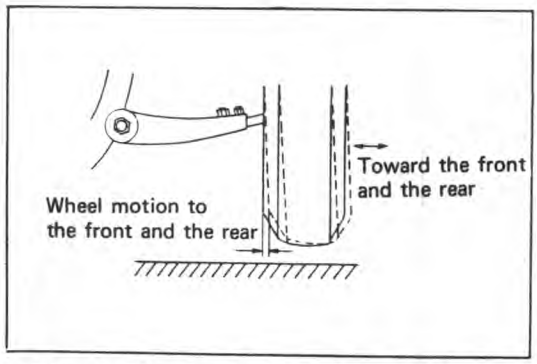


Fig. 4-51 Check the back-and-forth motion of the wheel

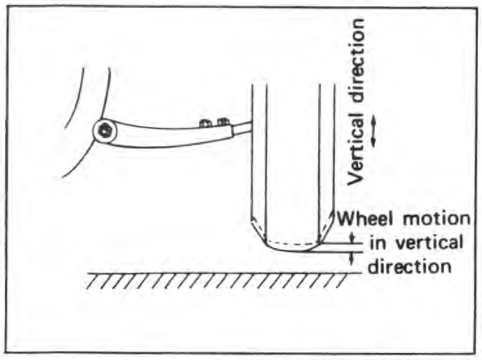


Fig. 4-52 Checking wheel motion in vertical direction

(c) BOOT (ball joint)

Check for warping and damage. If faulty, replace the boot.

GREASE REPLENISHMENT

Change grease whenever replacing the boot.

The ball joint (upper and lower) cannot be disassembled; however apply 8 ~ 10 gr (0.28 ~ 0.35 oz) of grease to the stud neck, approximately 3 gr (0.11 oz) to the boot interior, and a sufficient amount to the lip of the boot (on the smaller diameter portion).

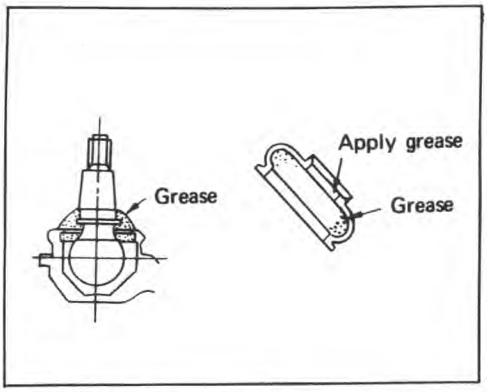
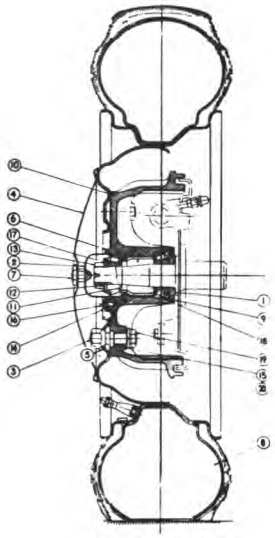


Fig. 4-53 Applying grease

4-4: REAR AXLE


REAR AXLE

1 Spacer
2 Cap
3 Bolt
4 Wheel cap
5 Wheel nut
6 Packing
7 Bolt (wheel cap)
8 Wheel
9 Oil seal
10 Brake drum
11 Washer
12 Lock washer
13 Nut
14 Washer
15 Lock washer
16 Screw (cap)
17 Tapered roller bearing
18 Tapered roller bearing
19 Nut
20 Washer

Fig. 4-54

1: **REMOVAL**

(a) Effect the parking brake, remove the wheel cap, and unthread the wheel nuts. Jack up the vehicle body, and remove the wheels.

(b) Remove the three brake drum screws, spring washers, cap, and packing.

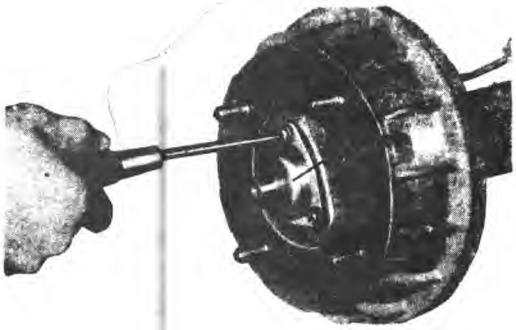


Fig. 4-55 Removing cap

(c) Unbend (straighten out) the lock washer connected through the trailing arm spindle, unthread the nut, and remove the lock washer, and washer in this sequence.

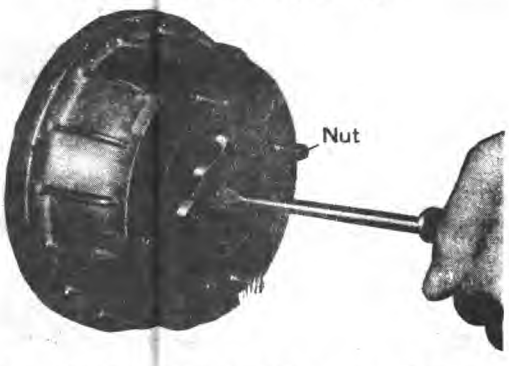


Fig. 4-56 Unbending the lock washer

(d) REMOVING THE DRUM

When the drum is taken out, the outer bearing, outer race of the inner bearing, and oil seal can be removed easily.

(e) Remove the spacer and inner race of the inner bearing with the special tool (gear puller).

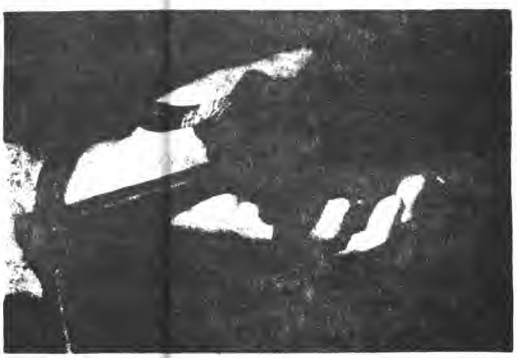


Fig. 4-57 Removing the bearing inner race

(f) Remove the outer race of the inner bearing from the drum with the special tool. In this case, remove the oil seal, also.

Fig. 4-58 Removing the outer race of inner bearing

(g) Remove the outer race of the outer bearing from the drum with the special tool.

Fig. 4-59 Removing the outer race of outer bearing

2: **INSPECTION**

Clean the removed parts and check them for wear, damage, and corrosion. If faulty, repair or replace.

Bearing ... seizure, corrosion, damage, and wear.

Oil seal ... damage and wear.

3: **INSTALLING**

(a) Press the outer race of the inner bearing into the drum with the tapered roller bearing installer (925080000) together with a press.

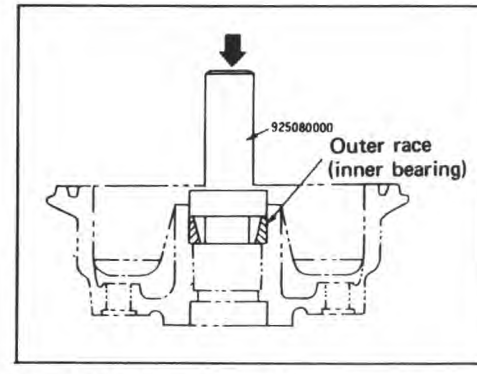


Fig. 4-60 Inserting the outer race of inner bearing

(b) Insert the oil seal into the drum.

(c) Press the outer race of the outer bearing into the drum with the tapered roller bearing installer (925080000).

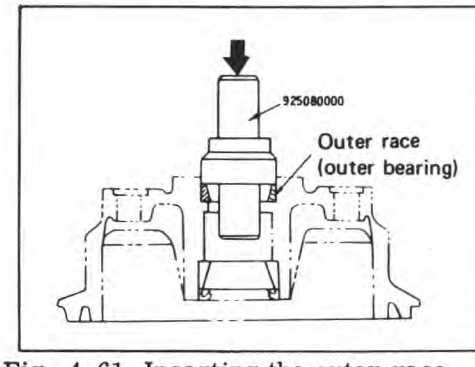


Fig. 4-61 Inserting the outer race of outer bearing

GREASE REPLENISHMENT

Apply approximately 4 gr (0.14 oz) of grease to the inner bearing and 3 gr (0.11 oz) to the outer bearing. Fill the drum interior with approximately 25 gr (0.88 oz) of grease and the drum grease cap with 15 gr. (0.530z)

Also coat the oil seal lip with grease.

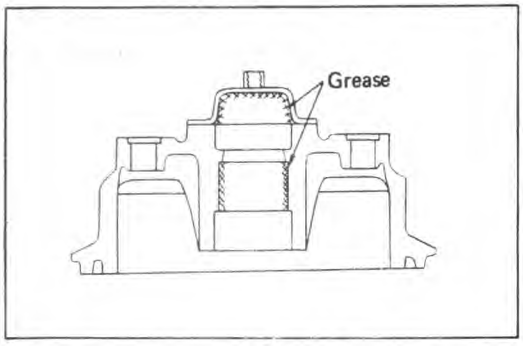


Fig. 4-62 Greasing

(d) Fit the spacer and the inner race of the inner bearing over the spindle of the trailing arm.

(e) INSTALLING THE DRUM

Install the drum on the spindle, fit the inner race of the outer bearing, and mount the washer, lock plate, and nut.

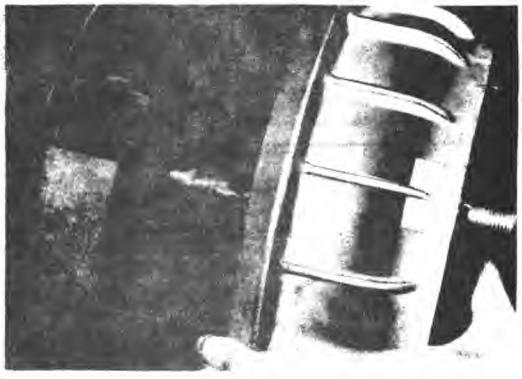


Fig. 4-63 Installing the drum

ADJUSTING THE REAR WHEEL BEARING

1) Fully tighten the nut, move the drum back and forth alternately several times, and ascertain bearing stability.

2) Back off the nut one-eight to one-tenth turn.

The recommended starting torque is 0.07 ~ 0.1 kg-m (0.0097 ~ 0.0138 lb-ft.)

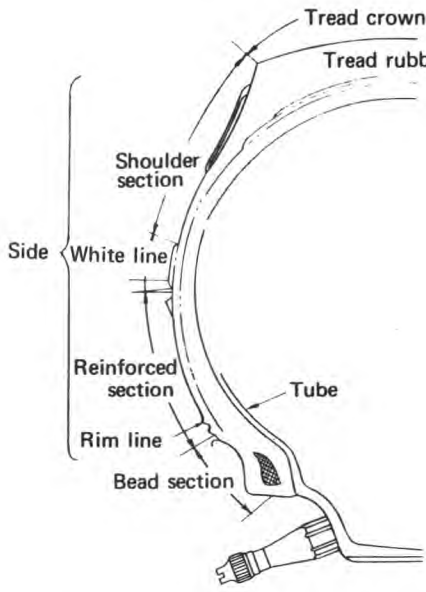
3) Bend the lock plate.

Wrench	29 mm

Be sure to use a new washer.

4) Secure the cap and packing with spring washer and screw.

Fig. 4-64 Adjusting rear wheel bearing



Type of vehicle		Type of tire
SUBARU 1000 sedan	Type A12	6.15-13-4PR
SUBARU 1000 station wagon	Type A41	6.15-13-6PR

Fig. 4-65 Sectional view of tire

1: REMOVING

(a) REMOVING THE WHEEL CAP

The wheel cap can be removed after unthreading the center bolt.

Fig. 4-66 Removing wheel cap

(b) REMOVING THE TIRES

(1) Unthread the wheel nuts

Loosen the four wheel nuts with a wheel nut wrench.

(NOTE) To prevent possible accident, remove the wheel nuts after jacking up the vehicle.

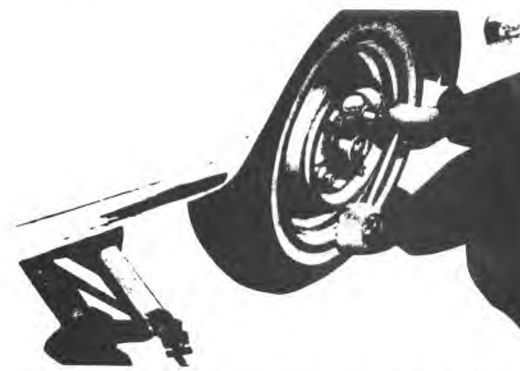


Fig. 4-67 Loosening the wheel nut

Fig. 4-68 Jacking up front

Fig. 4-69 Jacking up rear

(2) Jacking up vehicle
Place jacks beneath the vehicle body jack receivers (four), and jack up the vehicle until the tires clear the ground. The jack handles should be turned slowly.

(NOTE) Always effect the parking brake before jacking up the vehicle.

(3) Remove the wheel nuts, and remove the tires while lifting them.

(c) REMOVING THE DISK WHEEL
Lay the wheel on the ground, insert a tire lever between the disk wheel and the tire, and gradually remove the bead section from the disk wheel by wrenching it out. The disk wheel can be removed by conducting this action to the whole circumference.

(NOTE) Avoid using a hammer to prevent damaging the disk wheel and tire. If the use of such a tool is necessary, use a rubber hammer.

Fig. 4-70 Removing tires

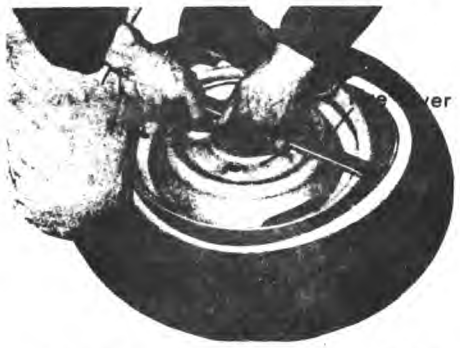


Fig. 4-71 Removing the disk wheel

TIRE ROTATION (EXCHANGE)

If the tires are maintained at the same positions for a long period of time, uneven wear results. Therefore, they should be periodically rotated. This, lengthens service life of the tires. The spare should be used in the rotation.

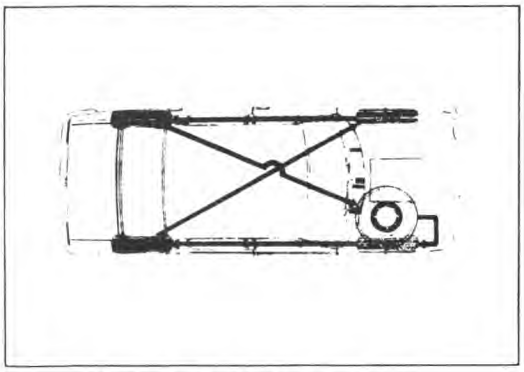


Fig. 4-72 Tire rotation

2: **INSTALLATION**

(a) INSTALLING THE DISK WHEEL

Insert a tire lever between the disk wheel and the wheel, and install the disk wheel while wrenching out the bead section.

(NOTE) Align the air valve and disk wheel valve hole when inserting the tube.

Fig. 4-73 Assembling wheel and disk wheel

WHEEL BALANCING

Unbalanced wheels (including the disk wheel, tire, and tube) can result from improper wheel alignment, sudden braking, laterial slippage, uneven wheel wear due to insufficient air pressure, and wheel or tube repair work. After tire exchange or wheel repair work has been performed, be sure to check static and dynamic balancing of wheels.

Unbalanced wheels do not greatly influence vehicle operation at low and medium speeds. At 60 km/h (37.28 mile/h) and over, however, the steering system can be influenced, the reason being, as illustrated below, force proportional to the increase in the number of wheel rotations is applied in the direction indicated by the arrow. This force causes "steering wheel shimmy" or what can otherwise be termed steering wheel instability.

CORRECTION OF WHEEL UNBALANCE

There are various ways to correct wheel unbalance. To correct precisely wheel unbalance (each wheel), use the wheel balancer. Wheels should be statically and dynamically balanced. For the weight and position of installation of each wheel balancer, refer to the separate manual covering wheel balancing.

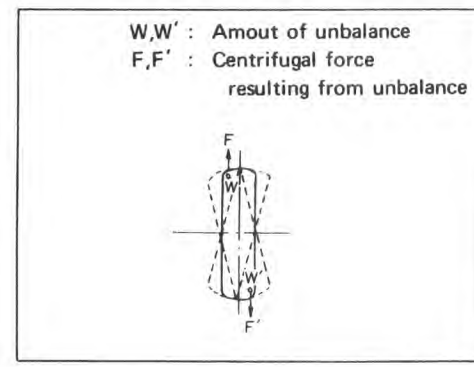


Fig. 4-74 Wheel unbalance

HANDLING PRECAUTIONS FOR WHEEL BALANCERS

(1) Correctly install the hub nut; the balancer shaft must be aligned with the center of the wheel to be corrected.

(2) Firmly seat the wheel on the arbor.

(3) Handle the disk wheel fitting section of the balance weight carefully because it is easily damaged.

(4) After installing the balance weight, position it in the groove of the disk wheel.

(5) Use genuine balance weights as shown in the table on the right.

Fig. 4-75 Installing balance weight

Part No.	Weight (gr)
623102001	20 (0.71 oz)
623102011	30 (1.06 oz)
623102021	40 (1.41 oz)
623102031	50 (1.76 oz)
623102041	10 (0.35 oz)

Wheel balance weights

INSTALLING THE WHEELS

(1) Fit the wheel over the drum bolts, and thread on the four wheel nuts with a wheel nut wrench.

(NOTE) Tighten the wheel nuts in the sequence shown in Fig. 4-76.

(2) Removing the wheel jack

Turn the jack handle slowly, lowering the vehicle body.

(3) Retightening the wheel nuts

Sufficiently tighten the wheel nuts in the above-mentioned sequence.

Tightening torque	5.5 ~ 7.5 kg-m (39.78 ~ 54.25 lb-ft.)

Fig. 4-76 Tightening sequence of wheel nuts

(4) Installing the wheel cap

Fit the stopper on the wheel stopper piece and tighten the wheel cap bolts.

Wrench	17 mm
Tightening torque	2.0 ~ 3.0 kg-m (14.47 ~ 21.70 lb-ft.)

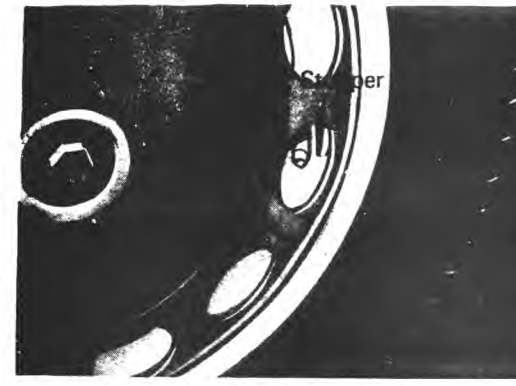


Fig. 4-77 Installing wheel cap

(5) Measuring tire air pressure

Remove the air valve cap, and place the wheel pressure gauge closely to the air valve so no leakage of air occurs. Projection of the graduated bar may at times be excessive. This being the case, apply light pressure to the tip of the bar with the end of the finger.

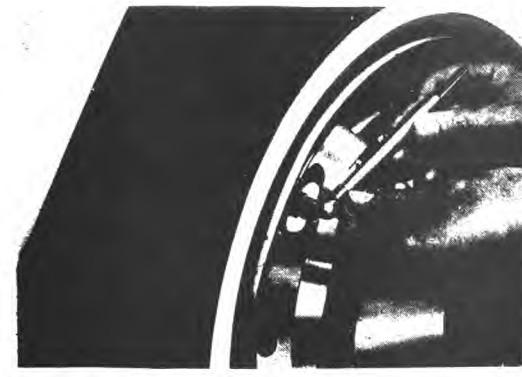


Fig. 4-78 Measuring tire air pressure

(NOTE)

(1) Adjust the tire air pressure while the tires are cool.

(2) Make sure that there is no air leakage after air pressure adjustment. Then replace the valve cap.

	Standard air pressure	Continuous high-speed drive 80 kg (176.36 lb.) or more
Front wheel	1.5 kg/cm^2 (21.3 psi)	1.7 kg/cm^2 (24.18 psi)
Rear wheel	1.0 kg/cm^2 (14.22 psi)	1.5 kg/cm^2 (21.34 psi)

ADJUSTING AIR PRESSURE

As shown above, air pressure must be adjusted to the prescribed value when the tires are cool, or before starting the vehicle, as air pressure increases as tire temperature rises during vehicle operation. This rise accounts an increase of up to 20% at times, and at such a high pressure the ride is uncomfortable, abnormal wear is promoted, various forms of damage may result, steering instability is likely, along with insufficient braking, etc. On the other hand, excessively low air pressure in the tires may result in abnormal wear, various forms of damage, loss of drive power, increased fuel consumption, etc. Tire air pressure must be adjusted in accordance with these conditions.

CHAPTER 5 : BRAKE SYSTEM

5-1: GENERAL DESCRIPTION

Two brake systems are employed, a service brake and a parking brake. The foot brake is operated hydraulically; the front is a duo-servo, single anchor type with an automatic adjuster, and the rear is a leading trailing shoe type with an automatic adjuster.

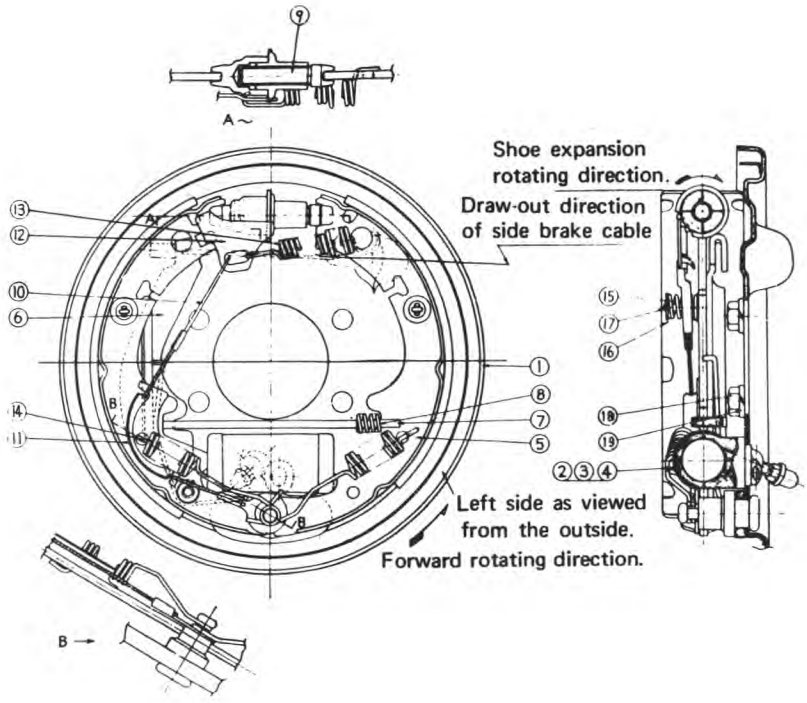
The front and rear brake drums are designed to have less weight and to give a better cooling effect. This is accomplished by joining chemically the friction surface, which is cast iron, and the outer part of the drum, which is aluminum alloy, and the outer part of the drum has fins. The brake pedal is a swing type, as is the clutch pedal, and the master cylinder is attached to the steering column.

The parking brake system is a front wheel, mechanical type, and the brake shoe of the front wheel expands in the brake drum through the parking-brake cable.

SPECIFICATIONS

	FOOT BRAKE		PARKING BRAKE
	FRONT BRAKE	REAR BRAKE	
Type	Hydraulic, internal expansion type	Hydraulic, internal expansion type	Mechanical, internal expansion type
Classification	Duo-servo, single anchor type	Leading-trailing type	Duo-servo, single anchor type
Inside diameter of brake drum	203.2mm (8in.)	180mm (7.09in.)	203.2mm(8 in.)
Brake lining material	Resin mold	Resin mold	Resin mold
Lining dimensions width x thickness x length	45 x 5 x 195mm (1.77 x 0.20 x 7.48in.)	35 x 5 x 141mm (1.38 x 0.20 x 5.55in.)	45 x 5 x 195mm (1.77 x 0.20 x 7.48in.)
Area of lining surface (one)	88cm^2 (13.64in^2.)	49cm^2 (7.60in^2.)	88cm^2 (13.64in^2.)
Inside diameter of wheel cylinder	23.8mm (15/16in.)	15.87mm (5/8in.)	
Spring specification: Free length Installing length Set load	Shoe return spring 78mm (3.07in.) 84mm (3.31in.) 14.4∿17.6kg (31.75∿38.8lb.)	Upper shoe return spring 104mm (4.09in.) 112mm (4.41in.) 3.6∿4.4kg (7.94∿9.70lb.)	
Free length Installing length Set load	Automatic adjuster spring 56.8mm (2.34in.) 59.0mm (2.32in.) 9.9∿12.1kg (21.83∿26.68lb.)	Lower shoe return spring 104mm (4.09in.) 116mm (4.57in.) 14.4∿17.6kg (31.75∿38.8lb.)	
Free length Installing length Set load	Shoe holding spring 20mm (0.79in.) 14mm (0.55in.) 7.2∿8.8kg (15.87∿19.40lb.)	Shoe holding spring 14.8mm (0.58in.) 9.2mm (0.36in.) 4.2∿5.8kg (9.26∿12.79lb.)	

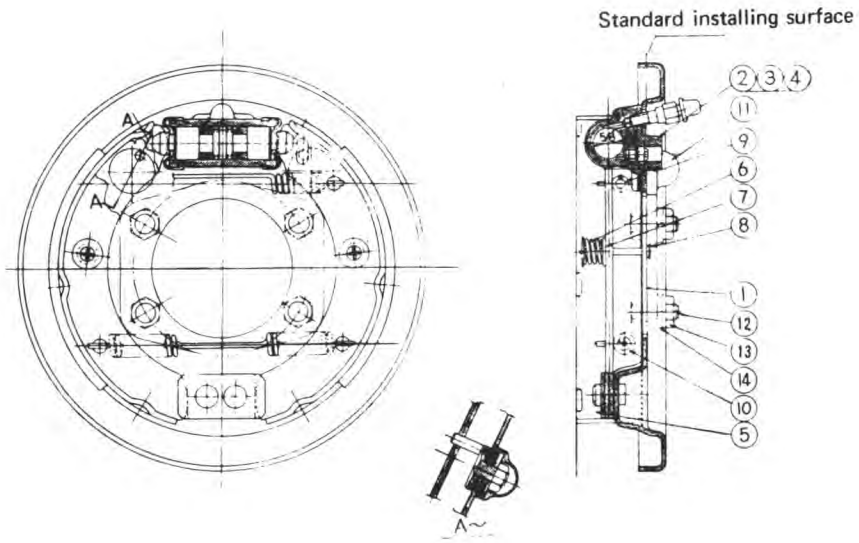
5-2: FRONT BRAKE MECHANISM



1 Back plate (F)
2 Wheel cylinder (F)
3 Lock washer
4 Nut
5 Brake shoe (F)
6 Brake shoe assembly (F)
7 Strut
8 Spring (strut)
9 Automatic adjuster
10 Cable
11 Cable guide
12 Lever (automatic adjuster)
13 Spring (automatic adjuster)
14 Spring (front shoe return)
15 Spring (front shoe hold down)
16 Cup (front shoe hold down)
17 Pin (front shoe hold down)
18 Nut
19 Spring washer

Fig. 5-1 Front brake mechanism

5-3: REAR BRAKE MECHANISM



1	Back plate	8	Pin (rear shoe hold down)
2	Wheel cylinder assembly	9	Spring (rear upper shoe return)
3	Lock washer	10	Spring (rear lower shoe return)
4	Nut	11	Cap (dust cover)
5	Brake shoe	12	Bolt
6	Spring (rear shoe hold down)	13	Nut
7	Cup (rear shoe hold down)	14	Spring washer

Fig. 5-2 Rear brake mechanism

1: DUO-SERVO SINGLE ANCHOR TYPE

(a) BRAKE OPERATION

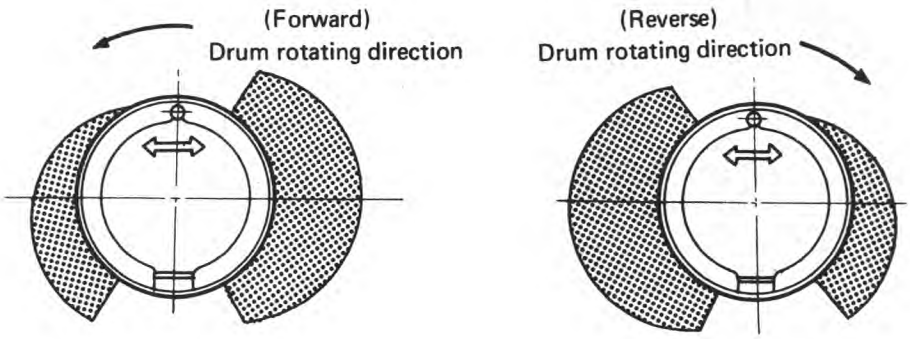


Fig. 5-3 Pressure distribution

The primary shoe (hereafter called the No. 1 shoe) and the secondary shoe (hereafter called the No. 2 shoe) are pressed with an equal amount of force by the wheel cylinder. When the brake lining is contacted with the brake drum, the friction force between the No. 1 shoe and drum is added to the pressure of the wheel cylinder, and the adjusting screw is pressed by the No. 1 shoe. Consequently, the No. 2 shoe is pressed with a force larger than that of hydraulic pressure, and under this condition, the anchor end of the No. 2 shoe is pressed against the anchor pin. Fig. 5-3 shows the distributed pressure under which the shoe is pushed against the drum. Compared to other types of brakes, the Duo-servo single anchor type brake is capable of a greater braking effect, with less brake pedal depression, because of its servo operation, which is the same for both forward and reverse movement, although the No. 1 and No. 2 shoes are reversed.

(b) AUTOMATIC ADJUSTER OPERATION

This automatic adjuster sets the drum and lining clearance when the lining is worn approximately 0.01 mm (0.0004 in.), thereby maintaining the clearance approximately 0.3 mm (0.0118 in.). There is no change in the pedal stroke as a result of this. When the lining is worn and adjustment is required, the No. 2 shoe (with the automatic adjuster) separates from the anchor pin by effecting brake in reverse.

Consequently, the cable mounted from the anchor pin, through the No. 2 shoe, to the lever is pulled, the adjusting lever is lifted, and the adjusting lever is engaged with the tooth next to the adjusting nut gear. When the brake is released, the No. 2 shoe returns to the anchor, the cable and lever are returned to their original positions with the tension of the spring, turning the adjusting nut 1/24 (15°) turn. Under this condition, the screw projects 0.05 mm, (0.0020 in.) and the lining and drum clearance is reduced approximately 0.01 mm (0.0004 in.) so that a constant clearance is always maintained. Even if the reverse brake is effected and lever is operated, the adjusting

screw does not turn until the lining is worn. When forward brake is effected, the positional relationship between the anchor and No. 2 shoe remains the same and no adjustment is performed.

Fig. 5-4

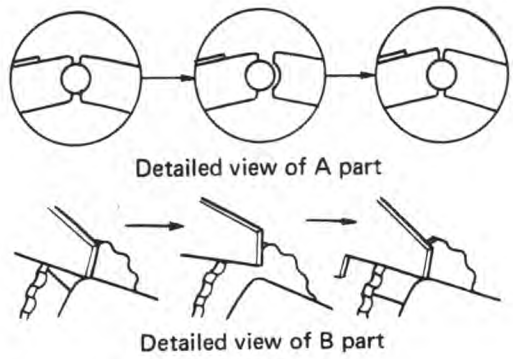


Fig. 5-5

Operating principle of automatic adjuster

2: LEADING-TRAILING BRAKE OPERATION

(a) BRAKE OPERATION

The wheel cylinder pushes the leading shoe and trailing shoe, and the braking effect is obtained by the friction with the brake drum. Unlike the front brake, there is no self servo operation, but highly stable braking operation is obtained.

(b) AUTOMATIC ADJUSTER OPERATION

The rear brake automatic adjuster is used to automatically adjust the lining and drum clearance if it is more than that prescribed. A clearance of 0.2 ~ 0.3 mm (0.0079 ~ 0.0119 in.) is maintained.

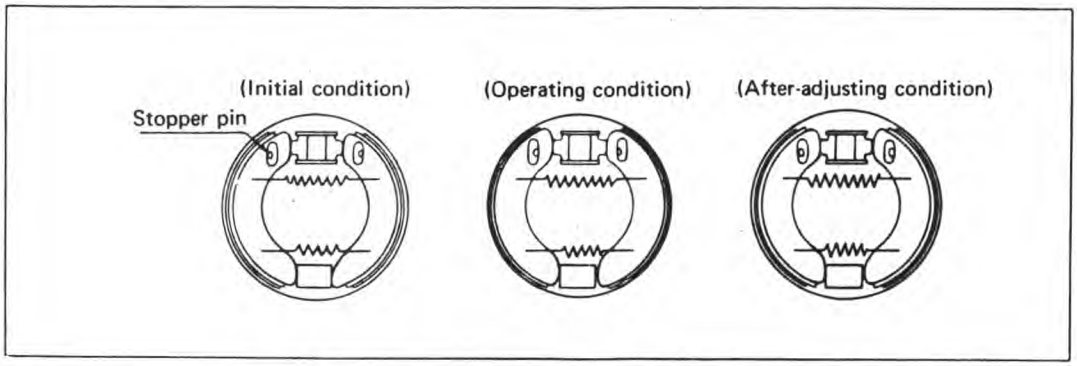


Fig. 5-6 Operating principle of automatic adjuster

Principally, each brake shoe has a stopper to prevent return. The stopper pin is secured to the back plate by friction, and moves with motion of the shoe by hydraulic pressure, but return spring tension does not move the stopper pin. There is a clearance between the shoe and stopper pin, and this corresponds to the initial clearance between the lining and drum.
Consequently, the shoe initially does not move in accordance with the stopper. If the lining is worn, the stopper pin is moved by the shoe toward the drum side in the amount of the wear when the brake is effected. When the brake is released, the shoe returns only to its stopper position. Under this condition, the shoe position is shifted from the initial location to the drum side, thereby maintaining constant clearance between the drum and the lining.

5-4: TROUBLESHOOTING

Trouble and possible cause	Corrective action
1. Insufficient braking	
1 Master cylinder oil leakage	Replace the cup, piston, and cylinder
2 Wheel cylinder oil leakage	Replace the cup, piston, and cylinder
3 Brake tube hose oil leakage	Retighten or replace
4 Worn lining	Replace the shoe assembly
5 Water or oil on the lining contacting surface	Clean or replace the shoe assembly
2. Unstable or uneven braking	
1 Oil on the lining and drum	Eliminate cause of oil leakage, clean, and replace the shoe assembly.
2 Drum eccentricity	Correct or replace the drum
3 Different lining material	Replace the shoe assembly
4 Uneven air pressure in tires	Adjust the air pressure
5 Disordered front alignment	Adjust alignment
6 Loosened back plate installing bolts	Retighten
7 Loosened rear wheel bearing	Retighten to normal tightening torque.
8 Trouble in the hydraulic system	Replace the cylinder and pipe hose
9 Uneven effect of the side brake	Check, adjust, and replace the front brake and cable system
3. Excessive pedal stroke	
1 Entry of air into the hydraulic mechanism	Bleed the air
2 Excessive play in the master cylinder push rod	Adjust
3 Oil leakage from the hydraulic mechanism	Repair or replace
4 Cracked drum	Replace
5 Trouble in the automatic adjuster	Check the cable guide hole position Check the adjusting lever position Check the adjusting spring

Trouble and possible cause	Corrective action
	Add more grease to the adjusting screw assembly Replace the adjusting spring
4. Improper brake return	
1 Insufficient pedal play 2 Improper master cylinder return 3 Clogged hydraulic system 4 Improperly adjusted side brake 5 Shoe return spring trouble	Adjust play Clean or replace the cylinder Replace Adjust Replace the spring
5. Brake noise (1) (creak sound)	
1 Hardened or deteriorated lining 2 Worn lining 3 Loosened back plate installing bolts 4 Loose rear wheel bearing 5 Dirty drum	Replace the shoe assembly Replace the shoe assembly Retighten Retighten to normal tightening torque. Clean the drum, or clean and replace the brake assembly
6. Brake noise (2) (hissing sound)	
1 Worn lining 2 Improperly installed shoe 3 Loose or bent drum	Replace the shoe assembly Replace the shoe assembly Retighten or replace
7. Brake noise (3) (click sound)	
1 In the case of the front brake, the sound made when the shoe anchor end and anchor pin contact. 2 Excessively worn shoe ridge 3 Excessively worn wheel cylinder piston 4 Lack of oil on the shoe ridge surface and anchor 5 In the case of the rear brake, the sound made when the shoe contacts the automatic adjuster stopper pin. 6 Lack of oil on the shoe and stopper pin	When shifting from forward to reverse, and vice versa, only once this sound may be heard. It is not an indication of trouble. If noticed, it is sometimes attributable to (2), (3), or (4). Replace the back plate Replace the wheel cylinder assembly Add more grease When the vehicle stops, this sound may be heard. It is not an indication of trouble. If noticed, it is sometimes attributable to (2),(3),(4), or (6). Add more grease

5-5: FRONT BRAKE OPERATION

1: REMOVING AND DISASSEMBLING

(a) Jack up, and support the vehicle with stands, and remove the wheels.

(b) Loosen the three bolts on the D. O. J (Double offset joint) side, and remove the D. O. J manually from the drum. (Refer to the Section on the front axle.)

(c) Remove the drum cover attached to the brake assembly.

(d) Remove the interior portion of the hand brake cable assembly into the engine compartment.

(e) Straighten out the brake drum castle nut locking cotter pin and remove it. Unthread the nut, and remove the drum horizontally with the splined shaft.

(f) Loosen and remove the brake pipe joint bolt.

(g) Unthread the four brake back plate bolts, and remove the brake assembly.

Fig. 5-7 Removing the brake pipe

(h) Before disassembling, make sure that automatic adjuster assembly movement is correct by pulling the cable.

(i) Lift the automatic adjuster assembly cable by pulling it to the shoe side, and remove it from the shoe hole.

(j) Remove the automatic adjuster assembly from the shoe.

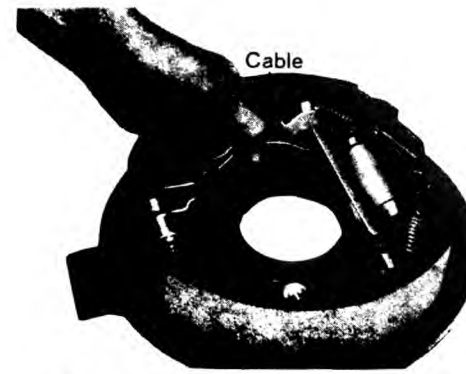


Fig. 5-8 Removing automatic adjuster

(k) Remove the shoe return spring and cable from the anchor pin by using a special tool.

Fig. 5-9 Removing spring cable

(l) Remove the shoe set spring with a special tool to set the shoe free. Then remove the hand brake cable from the shoe.

(m) Remove the hand brake shoe strut.

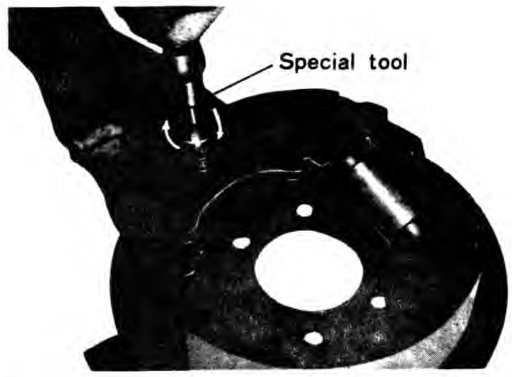


Fig. 5-10 Removing the shoe set spring

2: INSPECTION, CORRECTION, AND REPLACEMENT

(a) Check the brake lining for wear. If it is worn to 1.7 mm (0.0669 in.) or less, replace the shoe as an assembly. In this case, replace the No. 1 and No. 2 shoes and also the right and left brake shoe assemblies. If these pairs are separately replaced, uneven braking effect may occur.

(b) When the shoe return spring tension is excessively weakened, replace it. The right and left springs for No. 1 shoe are differently shaped, and they are different in shape from those used for the No. 2 shoe. Do not confuse them. If they are used in the incorrect positions, damaged drum may occur.

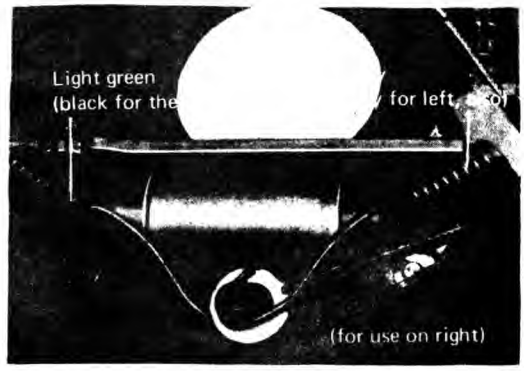


Fig. 5-11 Shoe return spring

(c) CHECK THE ADJUSTING SCREW

If the adjusting screw does not work properly, replace it or refill with grease through cleaning. Use the specified grease (quantity: 0.5g).
All surplus grease should be removed.

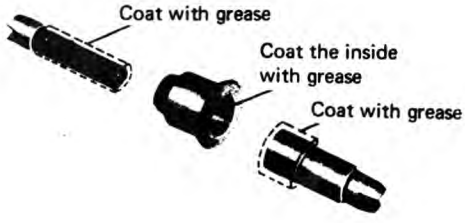


Fig. 5-12 Coating with grease

(d) Check the adjusting lever surface contacting the gear. If the surface is excessively worn, replace with a new lever.

(e) Replace the adjusting spring if its tension is excessively weakened.

(f) If the brake drum inside surface is streaked, correct the surface with emery cloth (#60). If it is unevenly worn or taperedly streaked, or if the outside of the brake drum is scarred, correct or replace.

Standard inside diameter	203.2 mm (8 in.)
Service limit	204.2 mm (8.04 in.)

(g) If the brake back plate, shoe, and lever are excessively deformed or distorted, replace it. Also replace the sliding parts if they are worn excessively.

(h) Check the adjusting hole (searcher hole) plug, slippage of the balance weight, D.O.J : (Double offset joint) oil leakage, leakage of transmission oil to the inside of the brake drum.

(i) Check the oil catcher back plate oil escape hole for clogging. If it is clogged, clean.

3: ADJUSTING, ASSEMBLING, AND INSTALLATION

(a) Install the wheel cylinder on the back plate.

Tightening torque	0.8 ~ 1.0 kg-m (5.78 ~ 7.23 lb-ft.)

Conform the right and left sides by marking (L and R) on the cylinder body.

(b) Install the No. 1 shoe with shoe set spring.

(c) Install the No. 2 shoe parking brake lever and cable completely.

(d) Install the No. 2 shoe with shoe set spring.

(e) Coat the shoe-back plate contacting surfaces with a small amount of brake grease.

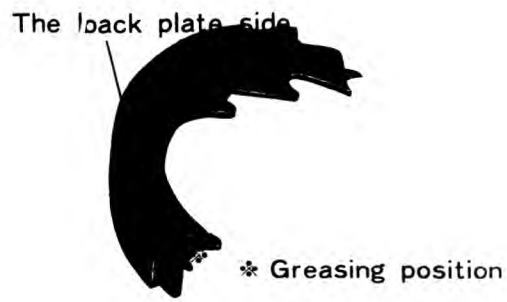


Fig. 5-13 Greasing position

(f) As illustrated in Fig. 5-14, insert the parking brake strut between the two shoes. (Be careful of direction, position, and spring.)

Fig. 5-14 Installing strut

(g) Install the shoe return spring and automatic adjusting cable on the anchor pin by using a special tool. Initially, mount the No. 1 shoe return spring, cable, and mount the cable guide on the No. 2 shoe in this sequence. After confirming that the cable guide is settled in the positioning hole, mount the No. 2 shoe return spring.

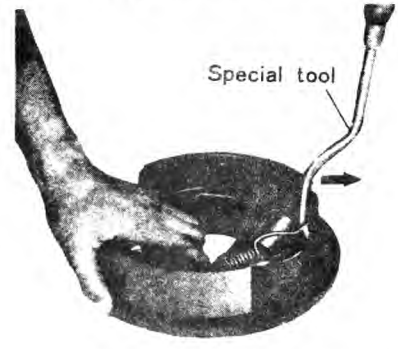


Fig. 5-15 Installing spring

(h) Adjust the automatic adjusting screw and set the shoe space to approximately 58 mm (2.28 in.).

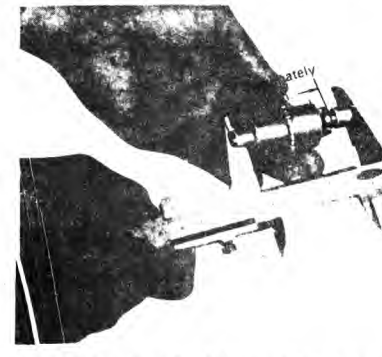


Fig. 5-16 Measuring automatic adjusting screw

(i) Assemble the cable lever spring as shown in Fig. 5-17. In this case, assemble the spring and lever and move the lever to the cable side to facilitate assembly. Insure that the cable and cable guide fitting and the spring and shoe fitting is correct, and apply grease between the cable and cable guide fitting.

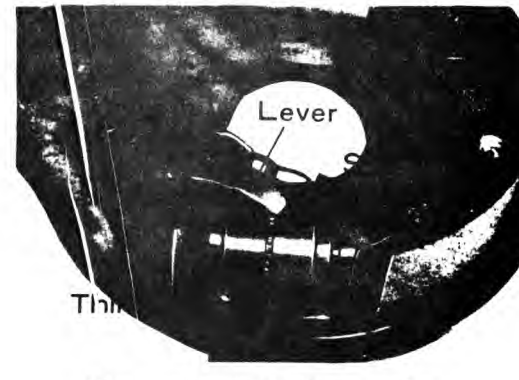


Fig. 5-17 Installing spring

(j) Insert the automatic adjusting screw between the two shoes, move the lever set as shown in (f) to the shoe side, and mount it in the hole. Then make sure that the lever and adjuster gear engagement and operation are normal.

(NOTE)

Do not mismatch the left and right side when assembling the automatic adjuster and related parts.

Identification colors

	Lever	Nut	Screw
Right	Yellow (R)	Yellow	Yellow
Left	White (L)	White	White

(k) Measure the diameter of the shoe, and adjust so that the maximum diameter (where 90° both sides of anchor pin) is 0.6 mm (0.0236 in.) smaller than the diameter of the inside of the drum.

When the drum is new	202.8 ± 0.1 mm (7.9802 ~ 7.9881 in.)

(l) Make sure that the baffle plate has been mounted. Install the baffle plate if it has not been mounted.

(m) Temporarily install the oil pipe joint bolt to the wheel cylinder.

(n) Insert the end of the parking brake cable into the compartment.

(o) Install the brake assembly with four bolts.

Tightening torque	4.2 kg-m (standard) (30.3 lb-ft.)

Be careful not to let foreign matter enter to the brake assembly

Fig. 5-18 Installing lever

Fig. 5-19 Measuring the outside diameter of brake shoe

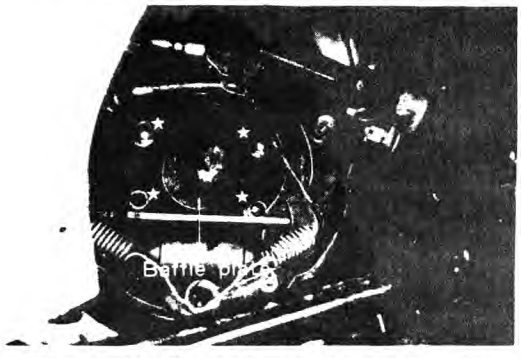


Fig. 5-20 Installing brake assembly

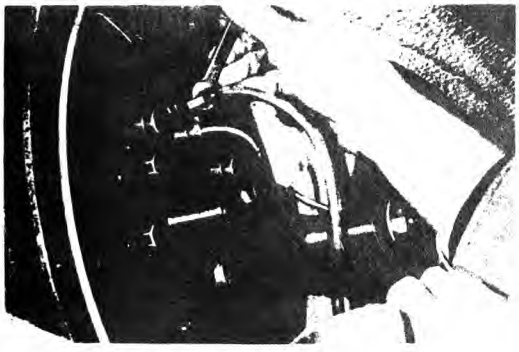


Fig. 5-21 Air bleeding

(p) Put the drum so that it becomes coaxial with the splined shaft, and push it against the splined shaft, establishing a meshed condition. Push the drum in after engagement.

(q) Insert plain washer on the bolt, and tighten the nut.

Tightening torque	16.0 ~ 18.5 kg-m (115.74 ~ 133.82 lb-ft.)

(r) Insert the nut locking cotter pin and expand the pin end to an anchor shape.

(s) Align the D. O. J (Double offset joint) with the drum, tighten the D. O. J (Double offset joint) with three bolts.

Tightening torque	5.7 ~ 7.5 kg-m (41.23 ~ 54.25 lb-ft.)

(t) Tighten the pipe joint bolt explained in (m) above.

Tightening torque	1.5 ~ 2.0 kg-m (10.85 ~ 14.47 lb-ft.)

(u) Bleed air, and then fill the oil tank with brake fluid. Be careful not to lack the brake fluid during air bleeding. Depress the pedal several times, and while doing so loosen the bleeder screw. Release the pedal after tightening the bleeder. Repeat this procedure until clear fluid, containing no bubbles, appears. The same procedure applies for the rear brakes; but be sure to begin the job of air bleeding with the wheel cylinder furtherest away from the master cylinder.

Bleeder tightening torque	0.6 ~ 0.8 kg-m (4.34 ~ 5.79 lb-ft.)

(v) Fix the end of the parking brake cable in the bracket in the compartment. The left hole is the lower bracket hole, and the right hole is the upper bracket hole.

(w) Secure the cable grommet to the toe-board.

(x) Temporarily tighten both cables with the turnbuckle, mount the pulley on the shaft, and fix the guide with a clip.

(y) Adjust the turnbuckle so that the brake is effected with 7 to 8 threads of the ratched.

(z) Install the drum cover.

Fig. 5-22 Installing parking brake cable

5-6: REAR BRAKE OPERATION

1: REMOVING AND DISASSEMBLING

(a) Jack up the body, support it with stands, and remove the wheels.

(b) Unthread and remove the brake pipe joint bolt.

(c) Remove the drum and cap assembly, straighten out the lock washer, unthread the nut, and remove the drum parallel with the shaft. Hold the inner race of the outer bearing securely to prevent it from falling.

Fig. 5-23 Removing the joint bolt

(d) Unthread the four back plate bolts, and remove the brake assembly. Keep the shaft and bearing free of dust.

Fig. 5-24 Removing brake assembly

(e) Remove the shoe set spring with the special tool, and rotate the cup while placing it in pliers. In this case, hold the pin from the reverse side of the back plate so that it does not turn.

(f) Remove the anchor side of the shoe from the anchor by pulling it once to the outside.

(g) Remove the cylinder side of the shoe.

Fig. 5-25 Removing shoe set spring

2: INSPECTION, CORRECTION, AND REPLACEMENT

(a) Measure lining wear. If it is 1.7 mm (0.0669 in.) or less, replace the shoe assembly. In this case, replace the leading and trailing shoe, or the right and left brake shoe assembly.

(b) Replace the shoe return spring if spring tension is excessively weakened. Do not mismatch the upper and lower spring.

(c) Check the operating condition of the automatic adjuster, and insure that when it is removed the diameter of the shoe is 179.4 mm (7.06 in.) or more. Remove the automatic adjuster cover, and measure the rotating torque from the reverse side. Rotating torque is 0.16 ~ 0.30 kg-m (1.16 ~ 2.17 lb-ft.). If the diameter of the shoe is less than that specified, or if the automatic adjuster moves easily, replace with a new back plate.

(d) Replace the brake back plate and shoe if they are excessively deformed or worn.

(e) If the inside of the brake drum is scratched, correct the surface with emery cloth (#60). If it is unevenly worn, deeply scored, or if the outside of the drum is noticeably damaged, repair or replace.

Standard inside diameter	180 mm (7.09 in.)
Service (wear) limit	180.5 mm (7.11 in.)

(f) If there is grease leakage from the brake drum, replace either the oil seal or the drum.

(g) Replace the drum bearing if abnormalities are found or if play is excessive.

3: ADJUSTMENT, ASSEMBLY, AND INSTALLATION

(a) Install the wheel cylinder on the back plate.

Tightening torque	0.8 ~ 1.0 kg-m (5.79 ~ 7.23 lb-ft.)

(b) Assemble the shoe with spring.

Be careful to discernment, and installing position of spring.

	Upper	Lower
Position	on the wheel cylinder side	on the anchor side
Material diameter	Thin	Thick
Position	on the back plate side	on the upper side

Fig. 5-26 Assembling shoe

(c) Apply grease to the back plate (shoe contacting surface), wheel cylinder piston (shoe contacting surface) anchor (shoe contacting surface), and automatic adjuster pin.

(d) Install the shoe assembled as shown in Fig. 5-26 on the piston and the automatic adjuster pin.

(e) Assemble the shoe in the anchor block, holding the shoe so that it does not pop up.

(f) Hold both shoes with the shoe retaining spring.

(g) Adjust the diameter of the shoe to 179.2 mm (7.0551 in.). Shoe diameter should be measured at three different shoe positions (upper, middle, and lower). To adjust shoe diameter, turn the automatic adjuster hexagonal nut on the reverse side of the back plate.

(h) Install the cover on the reverse side of the back plate. The cover should be completely secured on all sides to prevent the entry of mud and water.

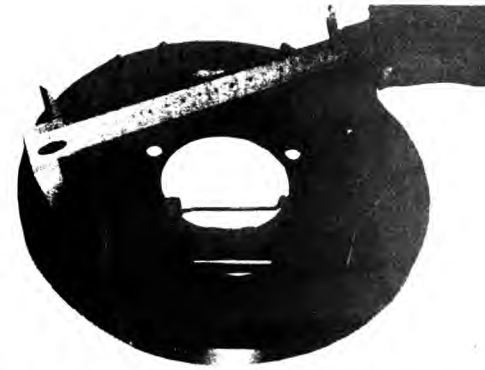


Fig. 5-27 Measuring shoe diameter

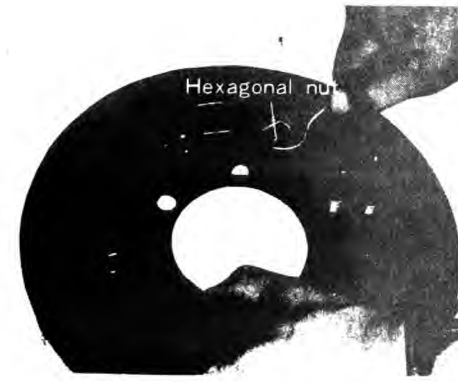


Fig. 5-28 Adjusting the shoe diameter

(i) Temporarily tighten the brake pipe joint bolt.

(j) Install the brake assembly with four bolts. Insert the bolt from the trailing arm side, and tighten with the nut on the brake assembly side.

Tightening torque	3.3 kg-m (standard) (23.87 lb-ft.)

Do not allow foreign matter to enter the brake assembly.

(k) After checking the grease on the drum, insert the drum parallel into the brake assembly. Do not allow the outer bearing to slip off.

(l) Insert the washer locking piece into the groove of the spindle.

(m) After fully tightening the nut, back it off one-eight to one-tenth turn, and make sure that the drum rotates smoothly.

(n) Bend the lock washer and lock the nut.

(o) Install the packing in the cap assembly, and install the cap assembly on the drum.

(p) Completely tighten the joint bolt in (i), above.

Tightening torque	1.5 ~ 2.0 kg-m (10.85 ~ 14.47 lb-ft.)

(q) Air bleeding (Refer to Page 5-14)

NOTE FOR OPERATION

1: USE GENUINE PARTS

(a) If the lining is worn, replace the shoe as an assembly. The material of the lining differs in accordance with wheel position (that for the front and rear is different). The front lining is finished to a special size, and use of a size deviating from this will result in uneven braking.

(b) Different grease is used for the front and rear brakes.

For front brake	Plus T Lub #2
For rear brake	Castroll #5901

2: OTHERS

(a) Do not depress the brake pedal with the drum removed, because if this is done the wheel cylinder piston is projected.

(b) Keep the lining free of oil and grease.

3: BRAKE TEST

(a) Mount the vehicle on a brake testing device, and check the braking condition of all four wheels.

(b) Brake the wheels on the road, observing the braking effect and inspecting uneven braking and the generation of unusual sounds.

5-7: BRAKE LINE

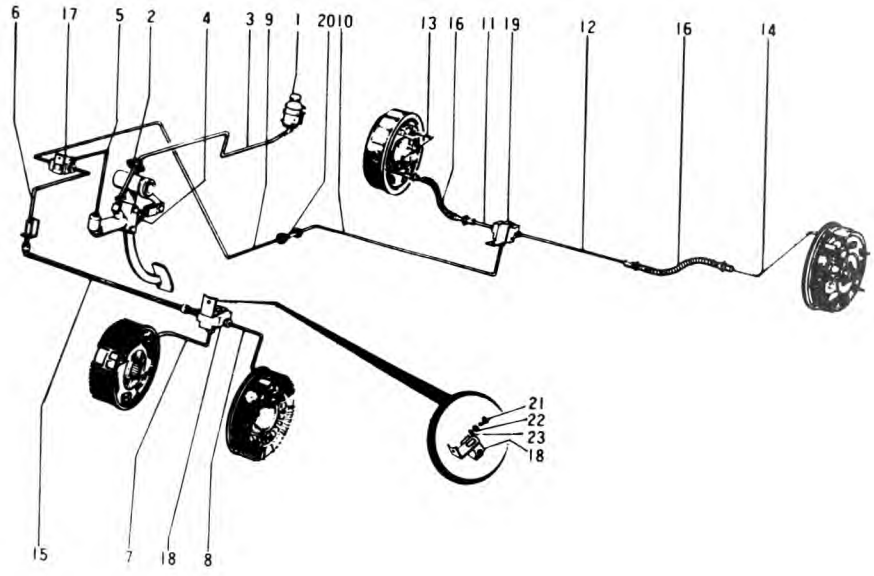
Brake Line Component Handling Instructions

1: BRAKE HOSE (FLEXIBLE)

Replace the hose if the outside surface is scarred, if it has expanded, or if brake fluid leaks from the metallic hose joint. Remove the hose after unthreading the brake pipe joint nut and loosening the hose installing nut. Installation is the reverse of removal. When installing the hose do not allow it to come in contact with other parts. Insure, also, that it is not bent along any portion of its length.

2: BRAKE PIPE

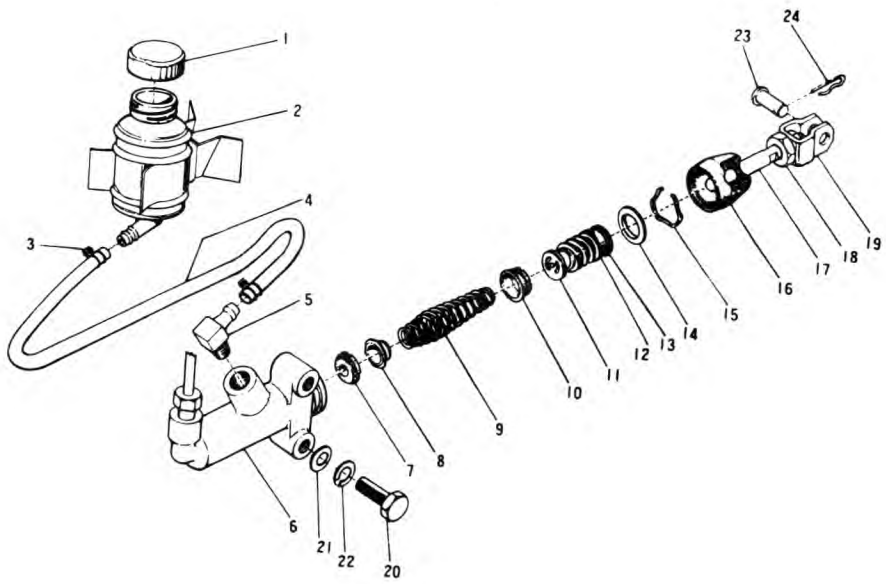
Steel pipe is used. If the pipe is found either cracked or broken, replace it. When making replacement, check pipe flare for longitudinal scarring, and when making connections lightly tighten the joint bolt or joint nut by hand, then retighten to the normal torque (1.5 ~ 2.0 kg-m) (10.85 ~ 14.47 lb-ft.).



1 Oil tank
2 Grommet
3 Connector tube
4 Master cylinder
5 Brake pipe (MC ~ 3WC)
6 Brake pipe (3WC ~ F. hose)
7 Brake pipe (F. 3WC ~ F. RH. B)
8 Brake pipe (F. 3WC ~ F. LH. B)
9 Brake pipe (3WC ~ 2WC)
10 Brake pipe (2WC ~ R. 3WC)
11 Brake pipe (R. 3WC ~ R. RH-hose)
12 Brake pipe (R. 3WC ~ R. LH. hose)
13 Brake pipe (R. hose ~ R. RH-B)
14 Brake pipe (R. hose ~ R. LH-B)
15 Front brake hose
16 Rear brake hose
17 Three-way connector
18 Three-way connector
19 Three-way connector
20 Two-way connector
21 Bolt
22 Nut
23 Spring washer

Fig. 5-29 Brake line components

5-8: MASTER CYLINDER



1	Cap (oil tank)	13	Piston
2	Brake oil tank	14	Stop washer
3	Clip	15	Stop ring
4	Connecting tube	16	Boot
5	Nipple	17	Push rod
6	Cylinder body	18	Nut
7	Valve seat	19	Yoke
8	Check valve	20	Bolt
9	Return spring	21	Washer
10	Primary cup	22	Spring washer
11	Spacer	23	Pin
12	Secondary cup	24	Cotter pin

Fig. 5-30 Master cylinder components

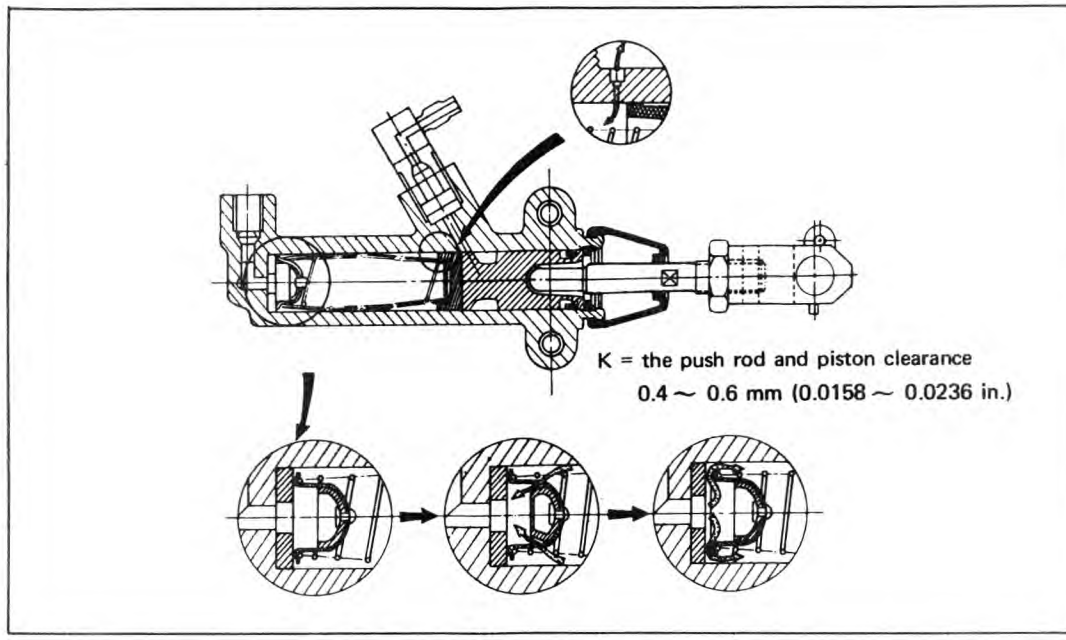


Fig. 5-31 Cross section all view of master cylinder

When the brake pedal is depressed, the piston is pushed in through the push rod. Under this condition, the small relief port leading from the cylinder side to the oil tank side is closed by the primary cup. On the pressure stroke, oil applies pressure to and opens the check valve on the end of the cylinder and passes through piping to the individual wheel cylinders. When the brake pedal is released, the piston returns as a result of spring tension. Under this condition, brake oil flows from the rear of the primary cup to the spring side. At the same time, the brake oil on the wheel cylinder side returns to the master cylinder by brake shoe return spring tension, and the valve proper moves to the piston side, then returns to the piston spring side. When the primary cup returns to its original position, oil on the spring side returns through the small hole into the oil tank. Because of the piston spring load, however, the valve is closed before all the oil on the wheel cylinder side returns to the master cylinder, and consequently oil pressure in the piping is 0.8 ~ 1.2 kg/cm^2 (11.38 ~ 17.07 psi), and this pressed the cylinder walls against the cup in the wheel cylinder, preventing the entry of air and dust and brake oil leakage. In addition, if there is no clearance between the push rod and piston, and if the cylinder small hole (relief port) is closed by the primary cup, the oil on the wheel cylinder fails to return completely, and the lining rubs against the brake drum. This must be avoided.

The push rod and piston clearance K = 0.4 ~ 0.6 mm (0.0158 ~ 0.0236 in.)

(NOTE)

If sufficient braking oil pressure is not obtained with a single depression of the pedal, return the pedal and depress it again. When the pedal is returned, the piston is returned by tension of the piston spring. Under this condition

brake oil flows through the circumference of primary cup from behind the primary cup to the spring side, since the oil pressure is negative. When the pedal is depressed again, oil pressure is increased. This oil pressure rise is attributable to the air bubbles in the piping. If it occurs, bleed the air from the piping system.

2: BRAKE FLUID

* BRAKE FLUID REQUIREMENTS

(a) Must have a high boiling point and a low solidifying point

(b) Must cause no abnormal changes (expansion, etc.) in the rubber cup

(c) Must not be reactive to metal (cylinder body, piston, and piping etc.)

(d) Must not change chemically and must have minimum evaporation characteristics.

* CAUTIONS FOR HANDLING

(a) Do not mix different types and different brands of brake fluid.
(If brake fluids are mixed the above requirements for brake fluid are lost.)

(b) Do not handle brake fluid in the open where much dust is present in the air.

(c) Always keep the brake fluid container tightly closed to prevent the entry of water.

3: REMOVING MASTER CYLINDER

(a) Separate the brake pipe at the three-way connector position.

(b) Drain the brake fluid in the oil tank.

(c) Loosen the oil tank side of the connecting tube joint clip and separate the connecting tube.

(d) Remove the push rod cotter pin and pull out the push rod pin.

Fig. 5-32 Master cylinder installing position

(e) Remove the connecting tube through-hole grommet.

(f) Remove the two master cylinder installing bolts, and remove the master cylinder from the bracket. (Be especially careful not to spill oil in the connecting tube during this operation.)

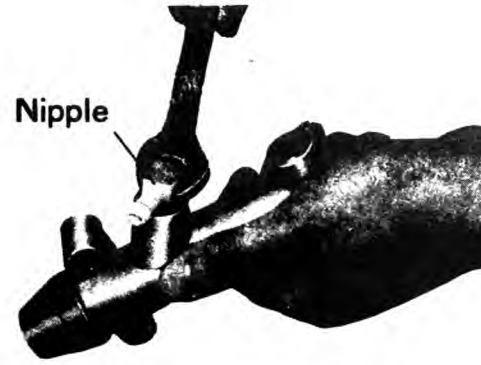


Fig. 5-33 Removing nipple

4: DISASSEMBLING MASTER CYLINDER

(a) Remove the boot from the cylinder body.

(b) Loosen the clip and remove the connecting tube and nipple (Fig. 5-33).

(c) Remove the brake pipe joint bolt.

(d) Drain the fluid in the master cylinder.

(e) Remove the stop ring and stop washer.

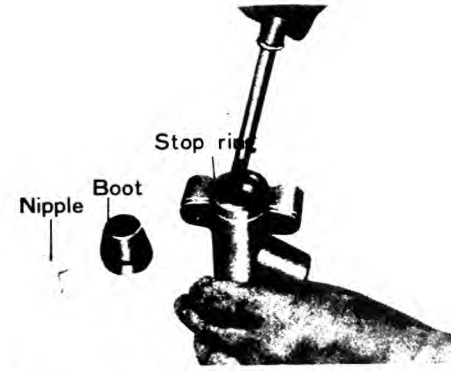


Fig. 5-34 Removing stop ring

(f) Pull out the piston assembly.

(g) Pull out the primary cup and return spring.

(h) Pull out the check valve and valve seat.

(NOTE)

(1) When removing the stop ring, do not snap the ring away and be careful not to damage the cylinder, piston, and cup with the screwdriver.

(2) If removal of the primary cup and valve seat is difficult, use compressed air.

5: CHECKING MASTER CYLINDER

Make sure the bore of the master cylinder is smooth and perfectly round. If the bore is step-worn or scarred, replace the master cylinder. It is not advisable to correct the bore using emery cloth. Use only genuine rubber parts, in addition.

The sliding parts used in the cylinder should be washed in clean brake oil before mounting. Do not allow dust or other foreign matter to enter the cylinder.

(a) Inside diameter of master cylinder: Uneven wear and damage
19.050 ~ 19.102 mm (0.7489 ~ 0.7519 in.) (standard value)

(b) Outside diameter of piston: Uneven wear and damage
18.997 ~ 19.030 mm (0.7476 ~ 0.7491 in.) (standard value)

(c) Cylinder and piston clearance: Replace if wear exceeds the limit.

Standard clearance	0.020 ~ 0.105 mm (0.0008 ~ 0.0041 in.)
Clearance limit	0.15 mm (0.0059 in.)

(d) Piston cup and check valve: Damage, deformation, and wear check the master cylinder rubber cup for scars, splits, wear, and other damage, and even if damage is only slight in the case of the rubber cup, the cup must be replaced as its function is vital to correct master cylinder functioning.

(e) Return spring: Replace if excessively worn.

Free length	73.5 mm (2.8937 in.)
Set length	52.5 mm (2.0667 in.)
Spring tension	1.8 ~ 2.2 kg (3.97 ~ 4.85 lb.)

(f) Oil tank: Replace if cracked or scarred, or if the connecting tube joint is deformed.

(g) Connecting tube: Replace if discolored, cracked, or scarred.

6: ASSEMBLY

(a) Assemble the valve seat, check valve and return spring, and insert both into the cylinder body.

(b) Insert the primary cup into the cylinder body with the open side facing in.

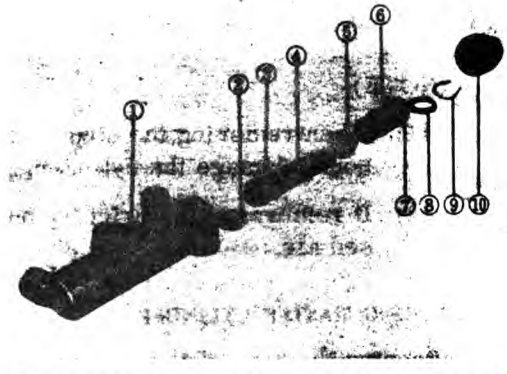


Fig. 5-35 Assembling master cylinder

① Cylinder body
② Valve seat
③ Check valve
④ Return spring
⑤ Primary cup
⑥ Piston
⑦ Secondary cup
⑧ Stop washer
⑨ Stop ring
⑩ Boot

(c) Insert the piston (with the secondary cup attached) into the cylinder body.

(d) Insert the washer and lock with the stop ring.

Fig. 5-36 Reinstalling stop ring

(e) Tighten the nipple and adjust so that the outlet faces the rear side (push rod side).

(f) Install the connecting tube and secure with a clip.

(g) Install the boot on the cylinder body.

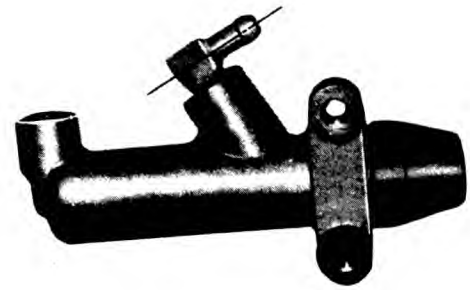


Fig. 5-37 Nipple installing direction

7: **INSTALLING**

(a) Connect the brake pipe to the outlet of the master cylinder.

(b) Fit the grommet on the connecting tube.

(c) Install the master cylinder in the steering column bracket with two bolts.

Tightening torque	1.6 ~ 2.0 kg-m (11.57 ~ 14.47 lb-ft.)

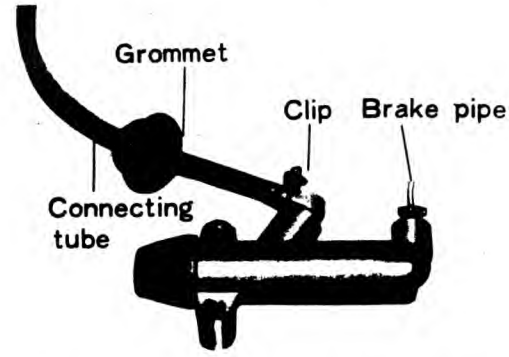


Fig. 5-38 Assembling master cylinder

(d) Insert the push rod and connect it to the pedal with pin. Then lock the pin with a cotter pin.

(e) Adjust pedal play and the length of the push rod. (Leave a clearance between the piston and push rod end, corresponding to from 2 ~ 3 mm (0.08 ~ 0.12 in.) position.)

(f) Connect the brake pipe to the connector.

(g) Insert the connecting tube into the oil tank outlet nozzle, and secure it with a clip.

(h) Fit the grommet on the shelf surface, and secure the connecting tube with a clip.

(i) Fill the tank with brake fluid.

(j) Bleed air.

Fig. 5-39 Installing master cylinder

8: BRAKE AIR BLEEDING

Do not forget to bleed the air in the brake line for all four wheels. Use a lift or pit to facilitate air bleeding. Before beginning to bleed air check pedal play and the oil level in the brake oil tank.

BEGIN AIR BLEEDING WITH THE WHEEL FARTHEST AWAY FROM THE MASTER CYLINDER.

During air bleeding, fill the oil tank with brake fluid and thereafter supply as necessary to insure that a sufficient quantity always remains in the tank.

(a) Remove the bleeder screw cap, and wipe away adhering dust. Then insert the end of the vinyl pipe into the bleeder screw end.

(b) Insert the other end of the vinyl pipe in a glass or tin receptacle containing brake fluid.

(c) Loosen the bleeder screw with a spanner, and have the person assisting you slowly depress the brake pedal.

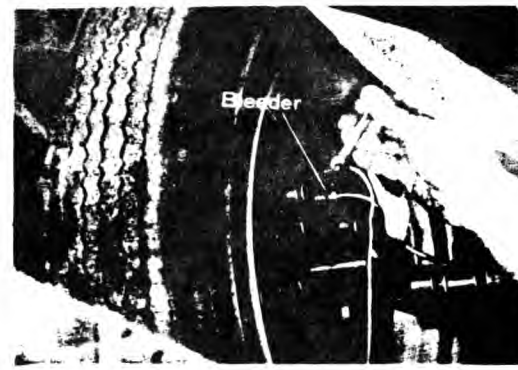


Fig. 5-40 Air bleeding

(d) Continue to depress the pedal until no air bubbles are observed in the vinyl pipe.

(e) WHEN BUBBLES ARE NO LONGER OBSERVED, TIGHTEN THE BLEEDER SCREW (WITH THE PEDAL DEPRESSED), AND AFTERWARD RELEASE THE PEDAL.

(f) Remove the vinyl pipe from the bleeder screw, mount the cap, and apply the same procedure to the next wheel.

(g) Upon completion of bleeding air from all four wheels, check the oil level and add brake fluid to the level line.

(NOTE)

Do not re-use old brake fluid.

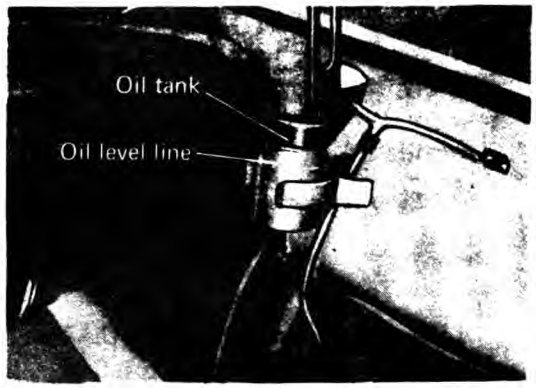
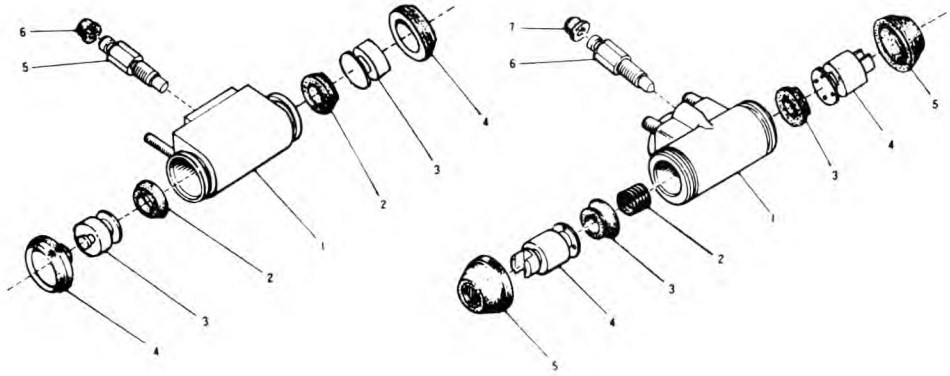


Fig. 5-41 Oil tank installing position

5-9: WHEEL CYLINDER



FRONT

1 Wheel cylinder body
2 Cup
3 Piston
4 Boot
5 Bleeder screw
6 Cap

REAR

1 Wheel cylinder body
2 Spring
3 Cup
4 Piston
5 Boot
6 Bleeder screw
7 Cap

Fig. 5-42 Wheel cylinder components

1: **DISASSEMBLING**

(a) Remove the boot, and take out the wheel cylinder which is the piston assembly with boot and cup. There are two wheel cylinders, the right and the left. A spring is inserted in the center of the wheel cylinder on the rear side.

(b) When removing the cup from the piston, be careful not to damage the cup. (Do not remove the piston unless it is to be replaced.)

2: **INSPECTION**

Like the master cylinder, the bore of the wheel cylinder must be smooth and perfectly round. If the bore is step-worn or scarred, replace the wheel cylinder. It is not advisable to correct the bore surface using emery cloth. Use only genuine rubber parts. When reinstalling, do not allow dust to enter the cylinder. ıder.

After disassembling, clean the removed parts in gasoline and dry them with compressed air. (However, if these parts are cleaned together with the cup, use alcohol or brake fluid instead of gasoline.)

Inside diameter of wheel cylinder and outside diameter of piston	Replace if unevenly worn, corroded, or otherwise damaged.
Cup	Replace if scarred, cracked, or worn excessively.
Spring	Replace if excessively worn.

* Spring specifications

Free length	33 mm (1.2992 in.)
Set length	10 mm (0.3937 in.)
Load	1.08 ~ 1.32 kg (2.38 ~ 2.91 lb.)

Wheel cylinder	Front	Rear
Inside diameter of cylinder	23.810 ~ 23.826 mm (0.9374 ~ 0.9394 in.)	15.870 ~ 15.913 mm (0.6248 ~ 0.6265 in.)
Outside diameter of piston	23.757 ~ 23.790 mm (0.9353 ~ 0.9366 in.)	15.627 ~ 15.854 mm (0.6152 ~ 0.6242 in.)
Diameter of cup lip	25.2 ~ 25.6 mm (0.9921 ~ 1.0079 in.)	17.2 ~ 17.6 mm (0.6777 ~ 0.6934 in.)
Standard piston and cylinder clearance	0.02 ~ 0.105 mm (0.0008 ~ 0.0041 in.)	0.016 ~ 0.086 mm (0.0006 ~ 0.0034 in.)
Piston and cylinder clearance limit	0.15 mm (0.0059 in.)	0.15 mm (0.0059 in.)
Cup interference (standard)	1.338 ~ 1.790 mm (0.0527 ~ 0.0705 in.)	1.287 ~ 1.730 (0.0507 ~ 0.0681 in.)
Cup interference limit	0.7 or more (0.0276 in. or more)	0.7 or more (0.0276 in. or more)

Replace the boot and air bleeder screw if they are damaged.

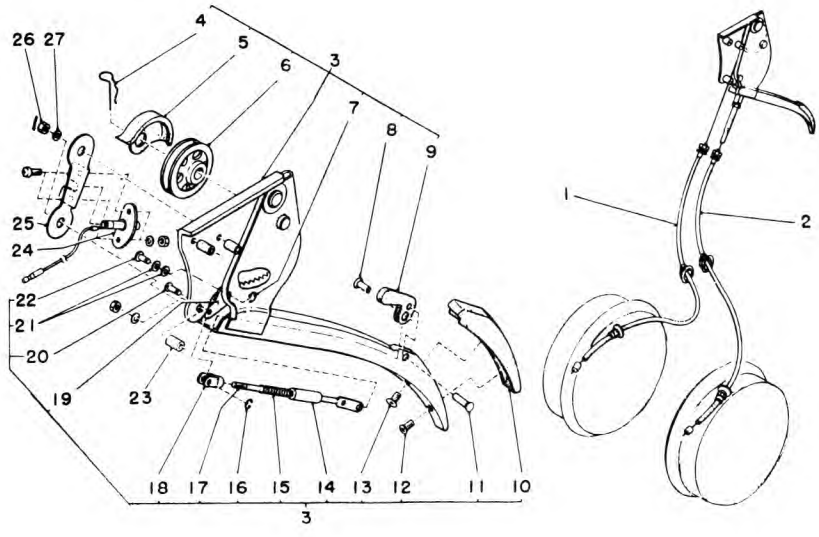
3: ASSEMBLING

Assembly is the reverse of disassembly.

(NOTE) When assembling, be sure not to allow the entry of powdered metal or dust.

5-10: PARKING BRAKE

A: COLUMN SHIFT TYPE



1	Parking brake cable	10	Cover	19	Hook
2	Parking brake cable	11	Rivet	20	Pin
3	Lever assembly	12	Screw	21	Washer
4	Clip	13	Screw	22	Pin
5	Guide	14	Tube	23	Collar
6	Pulley	15	Spring	24	Switch
7	Clip	16	Clip	25	Bracket
8	Rivet	17	Rod	26	Nut
9	Button	18	Connector	27	Spring washer

Fig. 5-43 Parking brake system components

1: **REMOVING PARKING BRAKE LEVER**

(a) Remove the speedometer.

(b) Loosen the cable turnbuckle, and separate the right and left side of the cable.

(c) Remove the clip, guide, pulley, and cable.

(d) Loosen the nut with a 14 mm box wrench, and remove the parking brake lever as an assembly.

(e) If necessary disassemble the lever assembly.

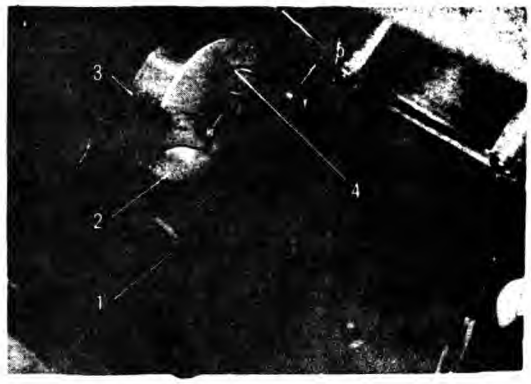


Fig. 5-44 Removing parking brake cable

① Turnbuckle
② Pulley
③ Guide
④ Clip
⑤ Lever assembly installing nut

2: **INSTALLATION**

Installation is the reverse of disassembly.

3: **REMOVING PARKING BRAKE CABLE**

(a) Loosen the cable turnbuckle, and separate the right and left side of the cable.

(b) Remove the clip, guide, pulley, and cable.

(c) Unthread the nut, and remove the cable from the bracket.

(d) Remove the cable boot from the toe-board, taking it out on the engine side.

(e) Remove the front brake assembly with cable from the transmission.

(f) Remove the cable (inner) from the brake lever. (Refer to the section on the front brake.)

(g) Remove the cable from the back plate. (Check the cable in the mounted condition (mounted on the back plate), and remove it only if replacement is to be made.)

4: **INSTALLATION**

Installation is the reverse of disassembly.

5: **PARKING BRAKE ADJUSTMENT**

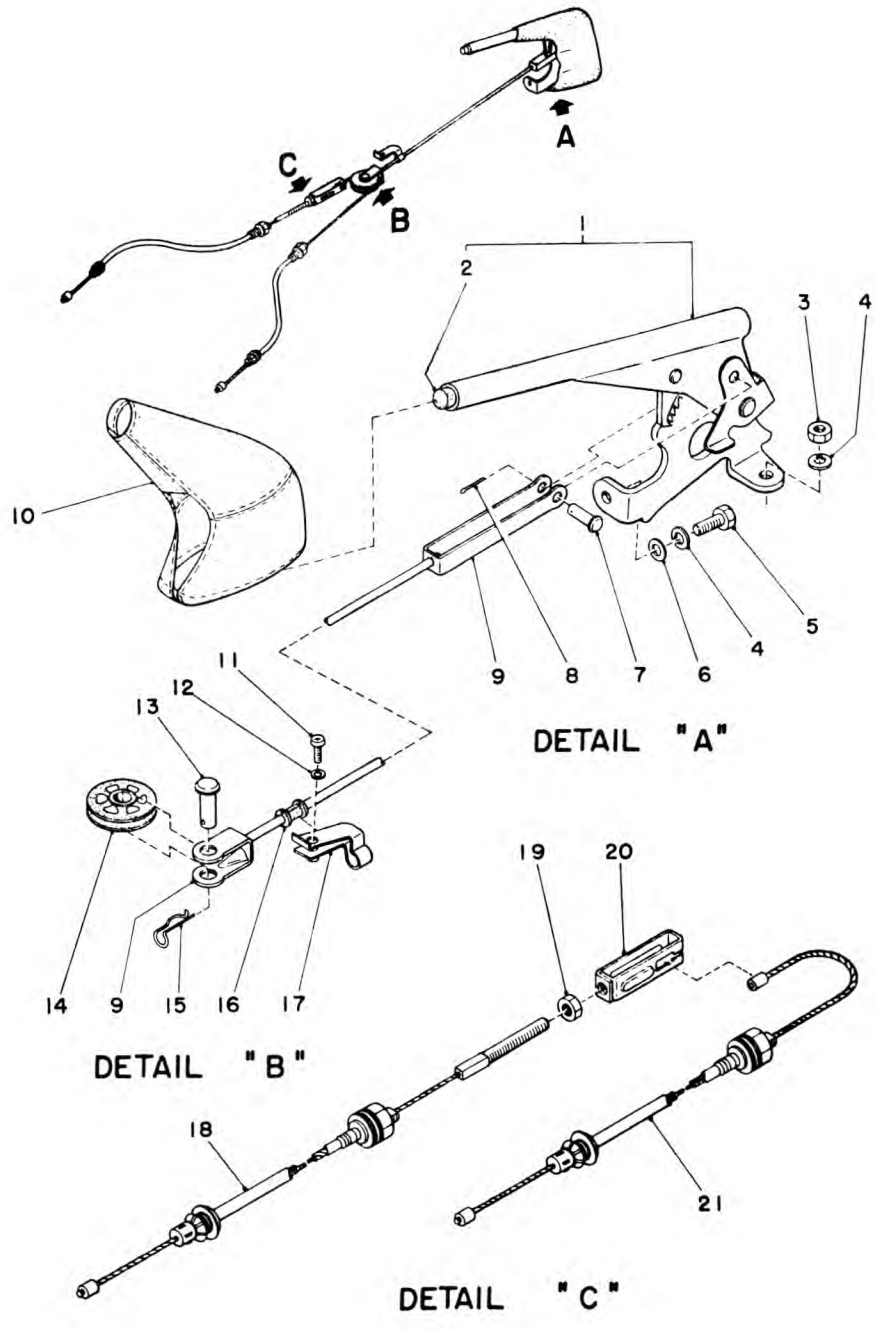
Make sure that when the parking brake lever is operated the brake moves the equivalent of 7 to 8 ratchet threads.

(a) Pull the lever three times rather forcefully.

(b) Unthread the cable lock nut, turn the turnbuckle, and adjust the length of the cable.

(c) After adjustment, make sure that the brake operation is the equivalent of 7 to 8 ratchet threads, and lock securely with the turnbuckle lock nut.

B: FLOOR SHIFT TYPE



1 Lever assembly	6 Washer	11 Pan head screw	17 Parking brake rod clip
2 Parking brake lever button	7 Clevis pin	12 Spring washer	18 Parking brake cable
3 Nut	8 Cotter pin	13 Parking brake pulley pin	19 Nut
4 Spring washer	9 Rod assembly	14 Parking brake pulley	20 Parking brake cable turn brackle
5 Bolt	10 Parking brake lever boot	15 Clip	21 Parking brake cable
		16 Parking brake rod bushing	

Fig. 5-45 Parking brake system (Floor shift)

1: DISASSEMBLING PARKING BRAKE

(a) Remove the shift rod cover
Refer to item 5 on page 7-6.

(b) Loosen the cable turnbuckle lock nut, turn the turnbuckle, and remove the left and right cables. (Fig. 5-46)

Fig. 5-46

(c) Remove the clip from the pin on the end and remove the pin and pulley.

(d) Loosen the nuts (one at the left and right) which install the cable on the toe-board and remove the nut, washer, bushing, and turnbuckle from the cable.

(e) Remove the brake cable.
Refer to item 3 on page 5-30.

(NOTE) When removing the cable. pull out the cable after removing the clip at the transmission case side.

(f) Loosen a screw of the gear shift lever pivot section and remove the rod from the bracket.

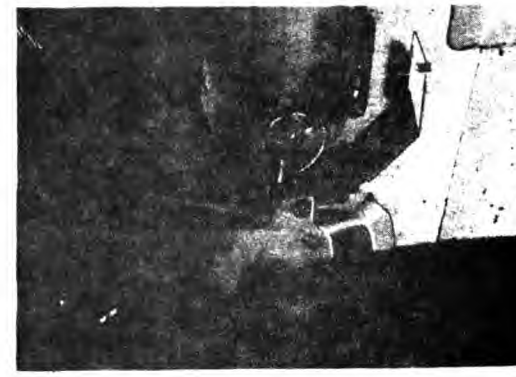


Fig. 5-47

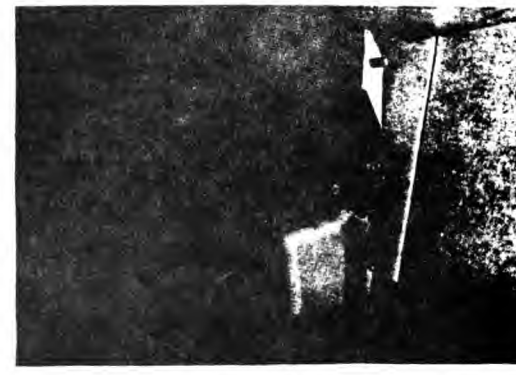


Fig. 5-48

(g) Remove the boot.

(NOTE) At this time, expose the piano wire at the bottom front of the boot and then remove the boot by pulling it to the rear.

(h) Remove the lever installing bolt and nut.

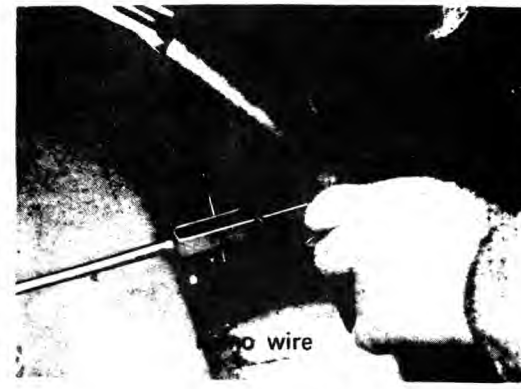


Fig. 5-49

(i) Remove the cotter pin from the pin which connects the rod to the parking brake and disassemble the rod, lever, and pin.

Fig. 5-50

2: ASSEMBLING PARKING BRAKE

Assembly is the reverse of disassembly. (However, clip the cable with the clamp to the transmission case after installing the cable to the toe-board.)

3: PARKING BRAKE ADJUSTMENT

Refer to item 5 on page 5-30.

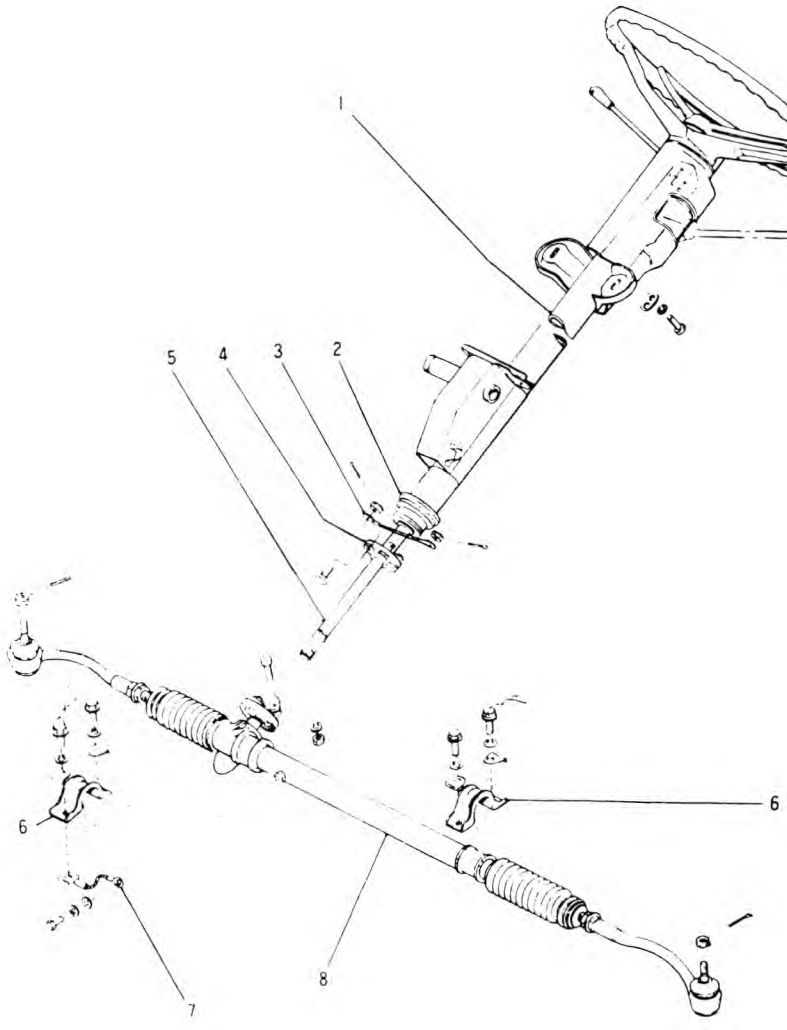
CHAPTER 6 : STEERING SYSTEM

6-1: STANDARDS AND SPECIFICATIONS OF STEERING SYSTEM

Steering type	Rack & Pinion type
Minimum turning radius	4.8 ~ 4.9 m (15.75 ~ 16.08 ft)
Steering angle (inside)	33°30' ~ 36°30'
Steering angle (outside)	31°30' ~ 34°30'
Total gear ratio	16.85 (18.43)
Steering wheel diameter	400 mm (15.75 in.)
Steering shaft diameter	20 mm (0.79 in.)
Rubber coupling	Thickness 10 x 5 (ply)
Pinion	Module 1.75 x 7
Rack	Module 1.74 x 28
Backlash	0 ~ 0.1 mm (0.0039 in.)
Tie-rod nut and bolt sizes	14 mm (0.55 in.) x 1.5 p
Toe-in (empty)	2 ~ 8 mm (0.08 ~ 0.32 in.)
Side slip (1 person)	0 mm

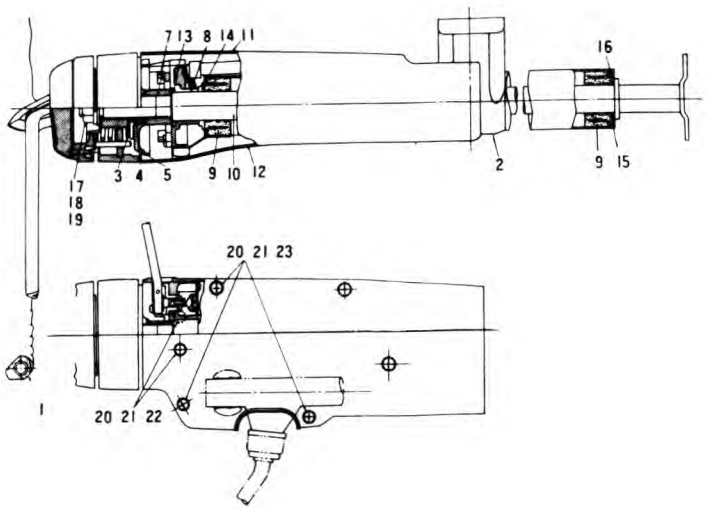
GENERAL

The steering gear box construction is a simple and reliable rack-pinion type. Toe-in adjustment is made by turning the ball joint and ball stud on both ends of the rack and fixing in place by a lock nut and lock washer (bending type).



1 Steering shaft
2 Bushing
3 Grounding wire
4 Rubber coupling
5 Shaft
6 Bracket
7 Grounding wire
8 Steering gear box

Fig. 5-1 Steering system construction and components



1	Steering wheel assembly	13	Spacer
2	Steering column	14	Spacer
3	Plate	15	Spacer
4	Bushing	16	Spacer
5	Contact plate	17	Washer
6	Cancel cam	18	Spring washer
7	Turn signal and dimmer switch	19	Nut
8	Bearing	20	Spring washer
9	Shaft assembly	21	Washer
10	Cover (upper)	22	Tapping screw
12	Cover (lower)	23	Screw

Fig. 6-2 Steering shaft construction and parts

1: REMOVING

(a) Disconnect the horn, turn signal, dimmer switch, and stop switch wiring from the wire harness at their connectors on the lower side of the instrument panel.

Fig. 6-3 Disconnection of wire and harness

(b) Remove the (steering shaft) cover, the back up light switch wirings, and change rod cotter pin. Leave the change rod in a condition where it can be removed from the steering column.

(c) Remove the right-hand luggage shelf.

Fig. 6-4 Removing (d) - (f)

(d) Remove the accelerator pedal and cable from the accelerator lever.

(e) Draw out the clutch from the clutch pedal and remove the clutch rod.

(f) Loosen the two mounting bolts on the master cylinder and remove the master cylinder from the steering column.

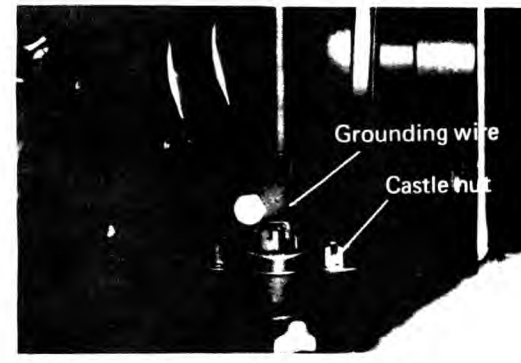


Fig. 6-5 Removing (g)

(g) Loosen the two (upper) rubber coupling bolts and separate the shaft side from the gear box side.

(h) Loosen the two steering column bolts and pull out the steering shaft assembly from the toe-board.

Fig. 6-6 Removing (h)

2. **DISASSEMBLY**

(a) Pushing the horn ring at the center, turn it clockwise and remove from the steering wheel.

(b) Unthread the steering wheel nut and pull out the steering wheel from the shaft.

Fig. 6-7 Removing steering wheel

(c) Withdraw the plate, contact plate assembly, bushing, cancel cam, spacers (two), turn-signal and dimmer switch, and spacer from the shaft (in this order).

(d) Pull out the shaft from the steering column.

(e) Remove the bearings on both ends of the steering column.

(f) Loosen the two stopper screws from the steering wheel and dismantle into spring, contact, and stopper.

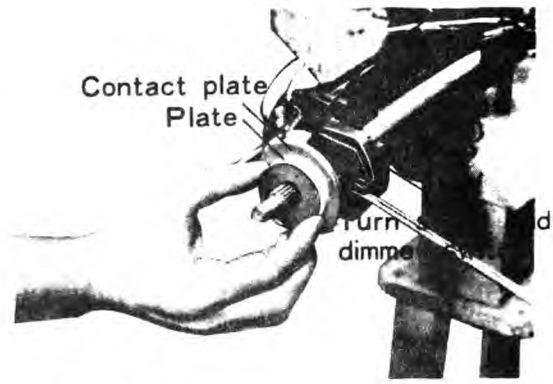


Fig. 6-8 Removing turn signal and dimmer switch

(g) Loosen the three horn ring screws from the horn ring assembly, and dismount into cap, pad, and horn ring.

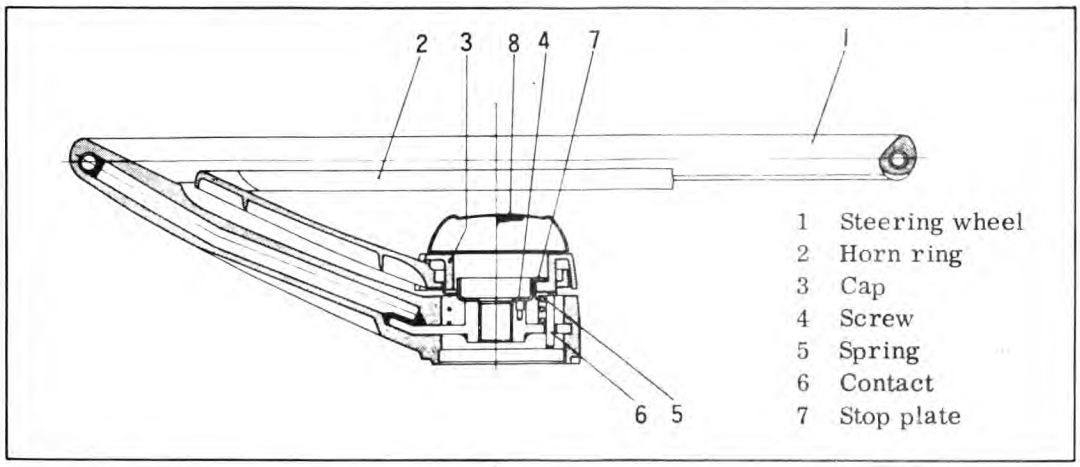


Fig. 6-9 Steering wheel cross section

3: INSPECTION

(a) Wash and inspect the removed parts, (spacer and bearing, etc.) change or repair parts which are worn, damaged or are otherwise faulty.

(b) Change the turn signal and dimmer switch, also the contact plate, when they are found to be defective.

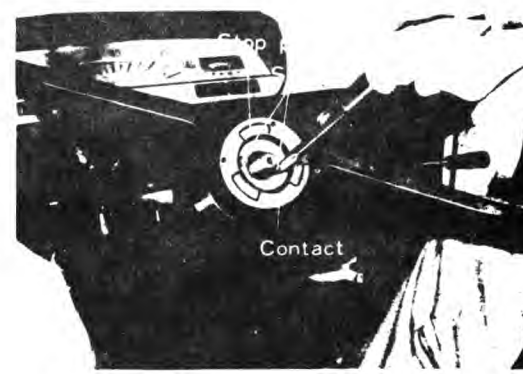


Fig. 6-10 Stop plate assembly

4: ASSEMBLY AND ADJUSTMENT

(a) Fit the cap and pad to the horn ring and tighten with the three screws.

(b) Put the spring and contact into the steering wheel and tighten the stop plate in the relative position as shown in figure 6-10 by the two screws.

(c) Fit the bearings on both ends of the steering column with a mallet.

(d) Fill the grooves (bearing grooves) of the bearings which have been fitted to the steering column with grease.

(e) Fit spacers (631103020 and 631103050) on the shaft, and the shaft into the steering column.

(f) Fit spacer (631103031), the turn signal and dimmer switch, and spacer (631103040) in the given order on the shaft which is mounted in the steering column.

(NOTE) Coat the sliding parts of the switch and shaft with grease.

(g) Adjust the spacer to the above assembly condition so that the dimensions (A) of Fig. 6-13 are 0.4 ~ 1.2 mm (0.02 ~ 0.05 in.)

Spacer thickness

Part number	Thickness
631103020	1.2 mm (0.05 in.)
631103050	0.8 mm (0.03 in.)

(h) Mount the cancel cam, bushing, contact plate, plate, and steering wheel (in this order) on the shaft.

(NOTE)

(1) Coat the sliding parts of the contact plate with grease .

*(2) The contact plate is fitted into the stopper protruding from the turn signal and dimmer switch.

(3) Fit the plate making sure that the flange is facing up.

(i) Temporarily tighten the washer and spring washer with the nut.

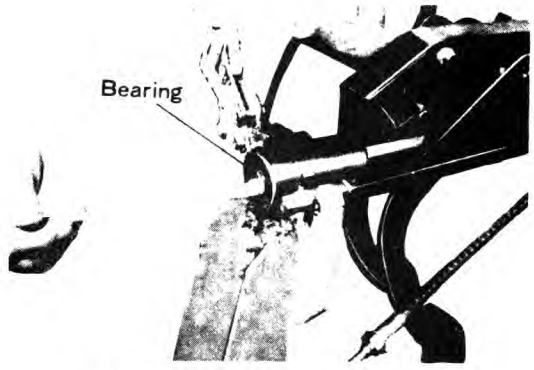


Fig. 6-11 Grease replenishment

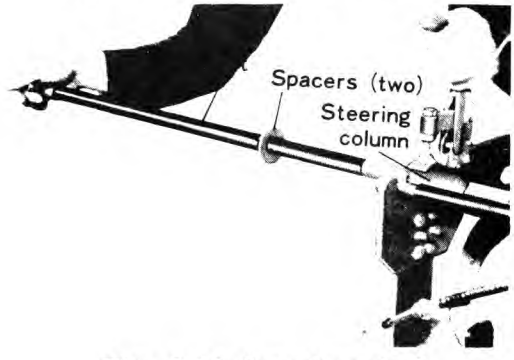


Fig. 6-12 Inserting shaft

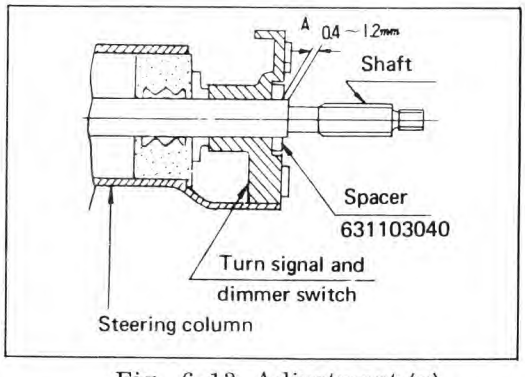


Fig. 6-13 Adjustment (g)

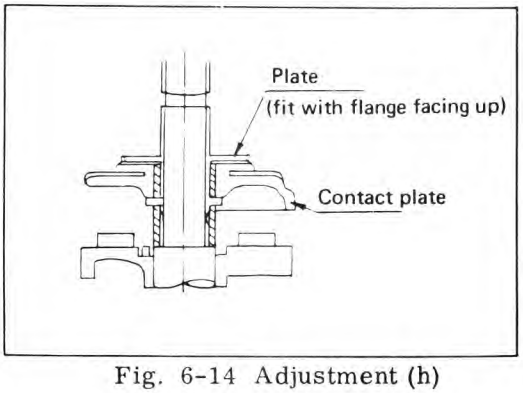


Fig. 6-14 Adjustment (h)

5: **REINSTALLATION**

(a) Insert the end of the steering shaft assembly into the toe-board, install the change rod and fit the washer and spring washer. Mount the steering shaft assembly on the bracket inside the instrument panel and temporarily tighten it with the bolts.

Fig. 6-15 Temporarily tightening steering shaft

(b) Fit the washer on the change rod, insert the cotter pin and bend over, and then connect stop light switch wiring.

(c) Replace cover

(NOTE) Use tapping screw in turn signal and dimmer switch installing

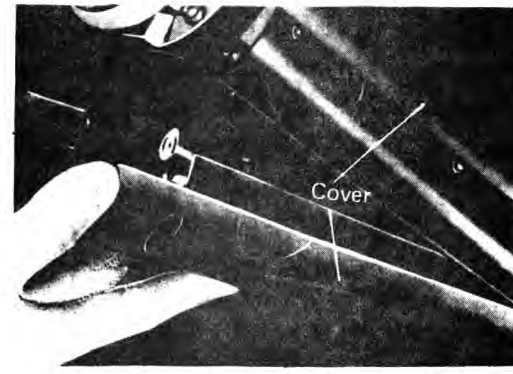


Fig. 6-16 Mounting cover

(d) Adjust the steering shaft assembly position so that the gap between the bearing which is fitted to the toe-board and the end of the change rod arm is 5 ~ 10 mm (0.20 ~ 0.39 in.).

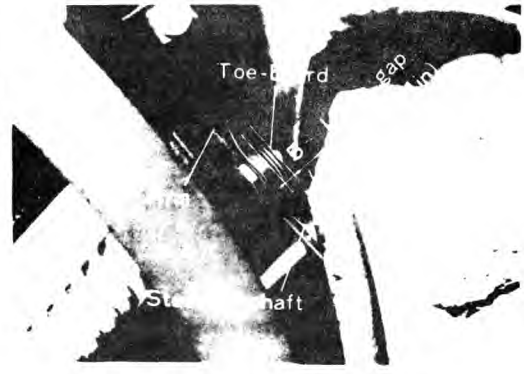


Fig. 6-17 Gap adjustment

(e) As in item (a) tighten the steering column bolts which were temporarily tightened.

(NOTE) Select a hole position for the washer so that the bolt is as far forward (from the toe-board) as possible.

Tightening torque	1.6 ~ 2.0 kg-m (11.57 ~ 14.47 lb-ft.)

(f) Secure the rubber coupling to the shaft with the bolt and castle nut.

(NOTE)

(1) Connect and secure the grounding wire to one of the bolts.

*(2) Pass the bolt through from the toe-board side.

(3) Tighten with a torque up to 0.5 kg-m (3.62 lb-ft.), then finally tighten to a position aligned with a cotter pin hole.

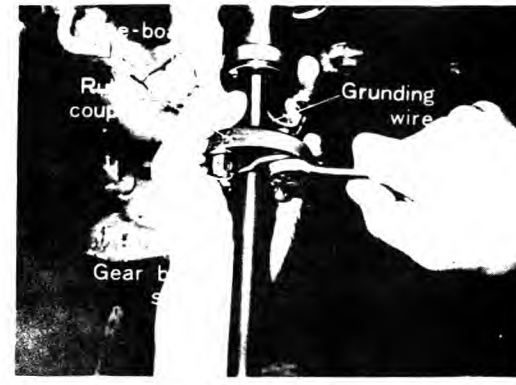


Fig. 6-18 Rubber coupling joint

(g) Use a new cotter pin in the nut.

(h) Install the master cylinder.

Tightening torque	1.6 ~ 2.0 kgm (11.57 ~ 14.47 lb-ft.)

(i) Install the clutch rod on the clutch pedal.

(j) Fit the accelerator cable and pedal on the accelerator lever.

(k) Install the luggage shelf.

(l) With the tires in a straight forward position, remove the steering wheel, plate, contact plate and bushing, and adjust the direction of the cancel cam as shown in Fig. 6-19. Then fit the steering wheel.

Fig. 6-19 Fitting cancel cam

(m) Tighten the steering wheel tightening nuts.

Tightening torque	2.8 ~ 4.0 kg-m (20.25 ~ 28.94 lb-ft.)

Fig. 6-20 Mounting steering wheel

(n) Place the horn ring assembly cut away part on the steering wheel so that the projection fits into the stopper plate flange; put them together by turning the horn ring clockwise while forcibly pressing down on it.

(NOTE) Match the horn ring notch and stopper plate flange at the position and by rotation shown in Fig. 6-21.

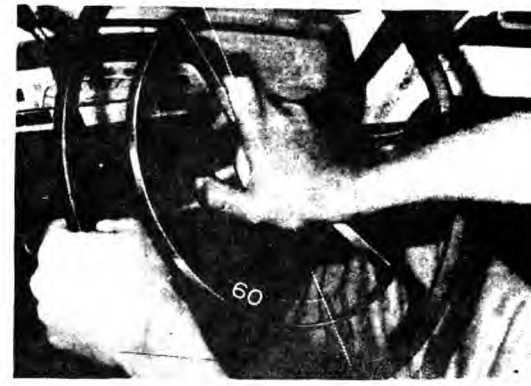


Fig. 6-21

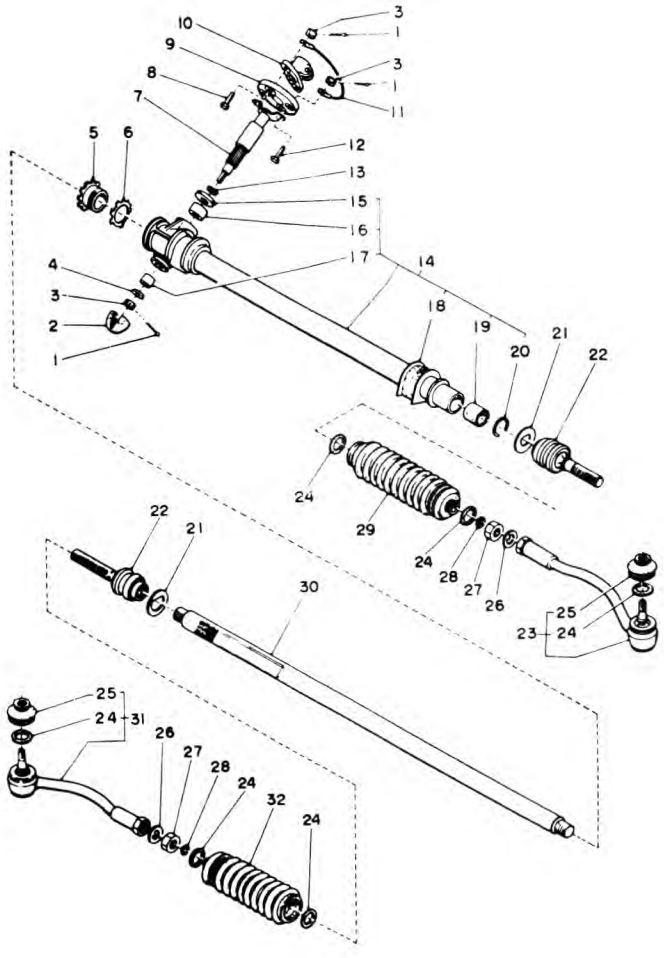
(o) Connect the horn, turn signal and dimmer switch also stop light switch wiring to the wire harness.

(p) Inspect and insure that the horn, turn signal, and dimmer switch function correctly.

(q) Inspect the handle fully turning it to the left and right.

(r) Inspect the operation of the accelerator pedal, brake pedal, clutch pedal, and change lever.

6-4: STEERING GEAR BOX



1	Cotter pin	12	Screw	23	Tie-rod assembly (LH)
2	Boot	13	Thrust washer	24	Snap ring
3	Castle nut	14	Steering gear box	25	Dust seal
4	Thrust washer	15	Oil seal	26	Lock washer
5	Bearing	16	Bushing	27	Nut
6	Lock washer	17	Bushing	28	Snap ring
7	Pinion assembly	18	Adaptor	29	Boot
8	Screw	19	Bearing	30	Rack
9	Rubber coupling	20	Clip	31	Tie-rod assembly (RH)
10	Joint	21	Lock washer	32	Boot
11	Grounding wire	22	Ball joint assembly		

Fig. 6-22 Steering gear box construction and parts

1: **REMOVAL**

(a) Put the vehicle on test bed or over a pit, jack the front wheels up and remove the tire.

(b) Remove the 8 mm (0.32 in.) bolts joining the steering rubber coupling and pinion flange and disassemble the steering shaft and gear box.

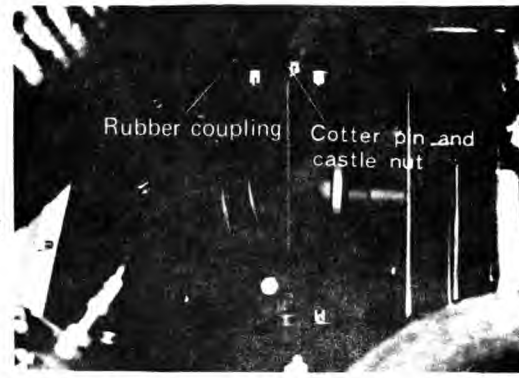


Fig. 6-23 Rubber coupling

(c) Pull out the tie-rod end and knuckle arm cotter pins, loosen the castle nut, and separate the tie-rod from the knuckle.

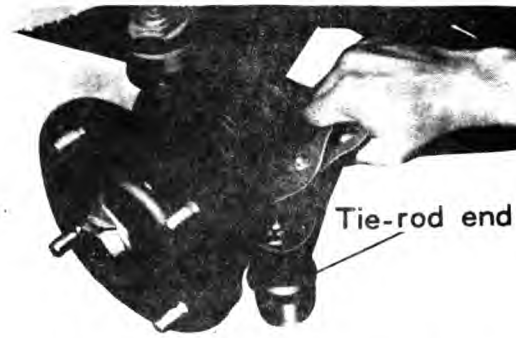


Fig. 6-24 Removing tie-rod end

(d) Remove the lock wire, unthread and remove the gear box installing bolts, and remove the gear box from the cross member.

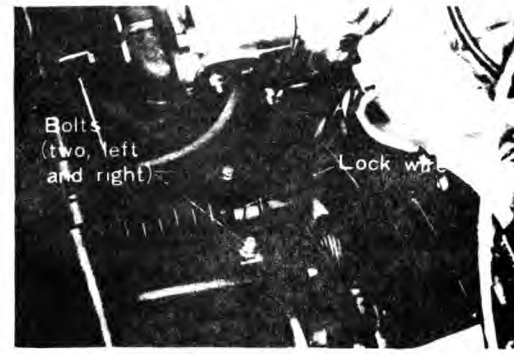


Fig. 6-25 Gear box installing

2: **DISASSEMBLE**

(a) Fix the gear box as shown in Fig. 6-26, straighten the bent lock washer, unthread the lock nut, and remove the tie-rod.

(b) Loosen the three snap rings, and remove the rubber boot.

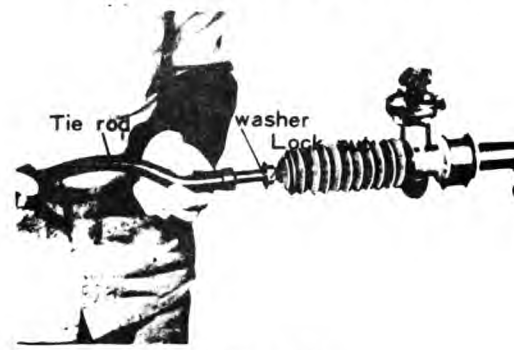


Fig. 6-26

(c) Straighten the lock washer and remove the ball joint from the rack.

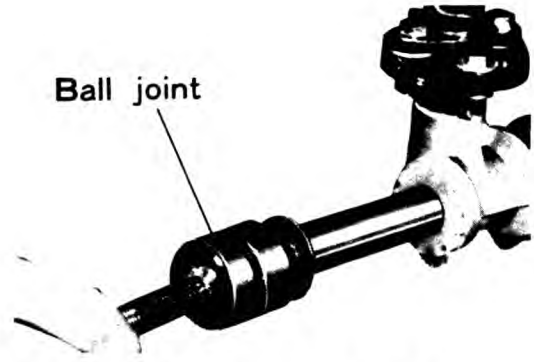


Fig. 6-27 Removing ball joint

(d) Remove the boot, pull out the cotter pin, and loosen and remove the 8 mm (0.32 in.) castle nut. After the pinion has been withdrawn, the rack can be removed.

(e) Removing bearing
Straighten the lock washer on the right-hand side and remove the threaded eccentric bushing. When the left-hand side clip has been taken off, the bearing can be removed.

(NOTE) Do not damage the bearing (made of resinous nylon material) when removing the lock washer and clip.

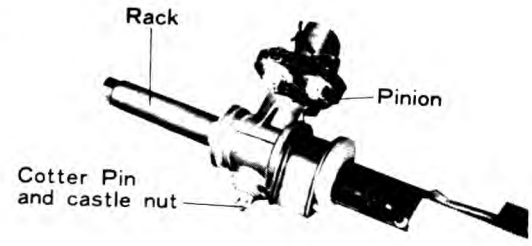


Fig. 6-28 Gear box pinion

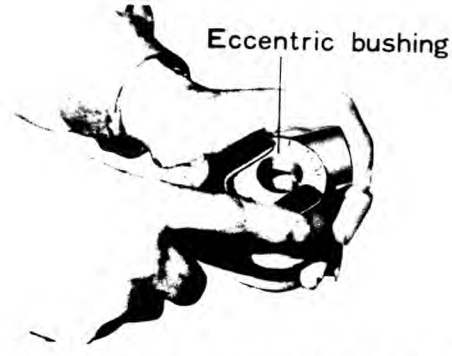


Fig. 6-29 Removing eccentric bushing

3: **INSPECTION**

Wash all removed parts, inspect for wear and other damage, and if necessary make repair or replacement.

(a) Rack and pinion: If the rack and pinion are markedly damaged, replace. (Check backlash adjustment after assembly for wear. Refer to section on assembly.)

(b) Bearing: Replace if there is marked damage, wear, or transformation (check carefully for worn or damaged delrin resin material).

Standard for inside diameter	22.113 ~ 22.146 mm (0.8713 ~ 0.8726 in.)

(c) Bushing: Replace when damaged, or worn.

(d) Ball joint: Inspect for chattering. Change if chatter is only slight.

4: **ASSEMBLY**

(a) Press the (delrin resin) bearing into the gear box pipe side and lock with a clip.

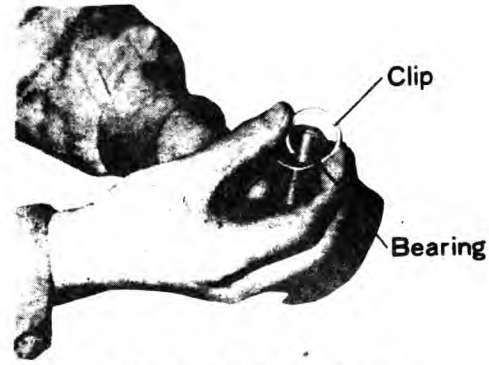


Fig. 6-30 Assembly (a)

(b) Fit the lock washer into gear box groove, screw in the nylon bearing, after it has been fully entered match the bearing groove with the gear box groove and temporarily tighten.

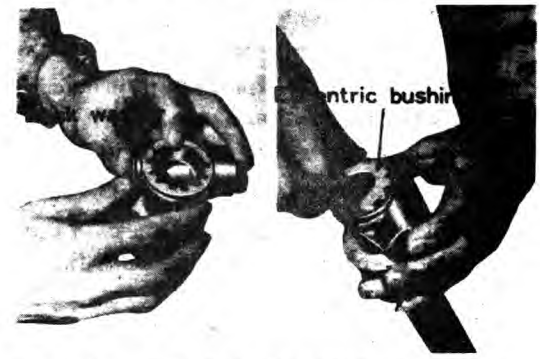


Fig. 31 Fig. 32 Installing eccentric bushing

(c) Insert the thrust washer into the gearbox, after the rack has been assembled insert the pinion.

Coat the teeth with grease.

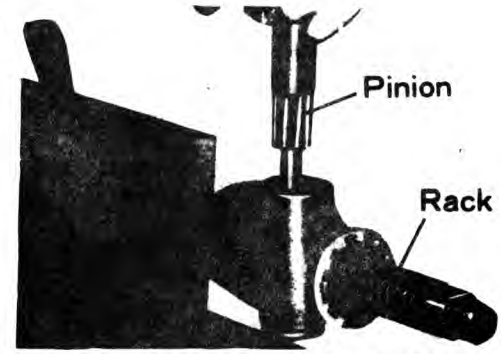


Fig. 6-33 Inserting pinion

(d) Insert the thrust washer onto the pinion bolt, lock with the castle nut and a cotter pin, and then apply the rubber boot. (Fit so that the pinion can be turned without chattering).

Fig. 6-34 Inserting thrust washer

(e) Tighten the (eccentric bushing) bearing by turning it. No play of the rack is permitted.

Backlash adjustment

Be careful not to over-tighten the eccentric bushing. If play persists after tightening, replace the part.

Backlash is below 0.1 mm (0.0039 in.)

Fig. 6-35 Backlash adjustment

(f) Lock the eccentric bushing with a lock washer in a position where there is no play of the rack.

With the lock washer claws lagging the bushing groove, suitably adjust the bushing and bend over.

Fig. 6-36 Bending lock washer

(g) Fill the ball joint rack assembly with grease, insert the lock washer onto bolt on the end of the rack, and mount the ball joint.

Ball joint tightening torque is 7 ~ 8 kg-m (50.63 ~ 57.87 lb-ft.)
Lock by bending the lock washer.

Fig. 6-37 Ball joint assembly

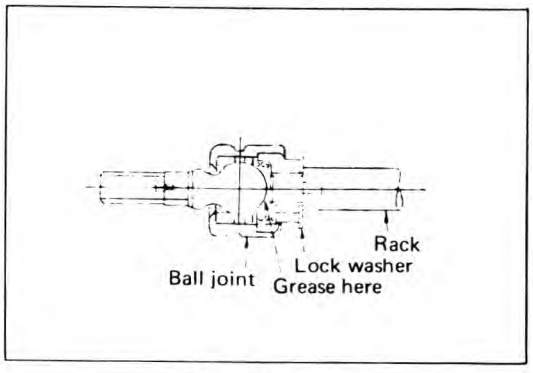


Fig. 6-38

Fig. 6-39 Bending lock washer

Fig. 6-40 Determining neutral position

Fig. 6-41 Marking

(h) After the right and left ball joints have been locked, determine the neutral position of rack and pinion.
Measure both ends of the gear box, as shown in Fig. 6-40, settle the neutral position, and mark the gear box and pinion with white paint.

(i) Insert the boot (on the left and right) gear box, and secure in three places by snap clips.

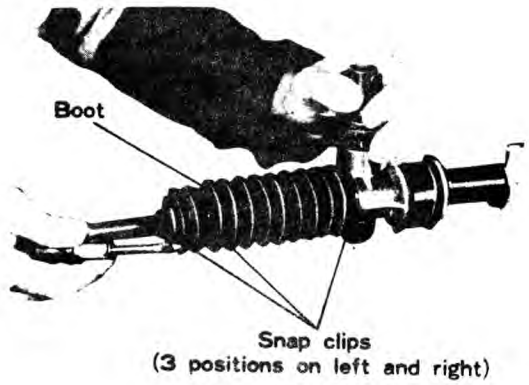


Fig. 6-42

(j) Put the lock nut and washer on the ball joint, screw on the tie-rod and completely tighten the lock nut.

(k) Confirm operation by turning the pinion.

Fig. 6-43 Tie-rod assembly

5: **REINSTALLATION**

(a) Placing gear box on cross member, fasten them by four 10 mm (0.39 in.) bolts. After tightening with a tightening torque of 4.5 ~ 5.5 kg-m (32.55 ~ 39.78 lb-ft.), align the holes and lock passing through the lock wire. However, lock after inserting the horn grounding wire to a installing bolt.

(b) Passing the tie-rod end ball stud through the knuckle arm, tighten the castle nut and secure with a cotter pin.

Fig. 6-44 Mounting tie-rod end

(c) Align the holes of the steering rubber coupling and pinion flange and enter the 8 mm (0.32 in.) bolts, tighten the castle nuts to a torque of 0.5 kg-m (3.62 lb-ft.) and lock after aligning the cotter pin holes.

(NOTE)

(1) At this time, attach the horn grounding wire to one of the bolts.

(2) Pass the bolts through from the gear box side to the steering shaft side (carefully note the bolt head direction).

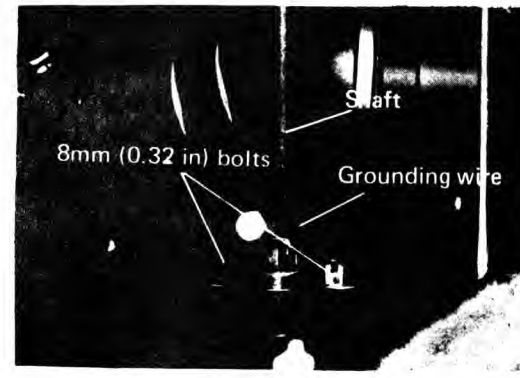


Fig. 6-45 Mounting (c)

(d) Test gear box operation by turning the handle fully left and right.

(e) Toe-in standards

The amount of toe-in is regulated by the amount of front tire slippage.

(1) Adjusting as specified.

Ground height (empty)	Front	232 ~ 242 mm (9.14 ~ 9.53 in.)	Lower arm shaft center
	Rear	305 ~ 315 mm (1.20 ~ 1.24 in.)	Torsion bar center

(2) Match the white paint mark on the lower surface of the gear box and pinion for fitting it centrally with the gear box rack.

(3) In the condition of (1) and (2) above regulate the amount of side slippage so that it is 0 (zero) when there is one person (about 55 kg (121.25 lb)) on the front right-hand side (driver's seat).
When adjustment is necessary, loosen the lock nut and turn the bolt on the boot side.
If turned in the direction of the arrow in figure 6-46, the direction of the wheels will face inward. (The value of A becomes small)

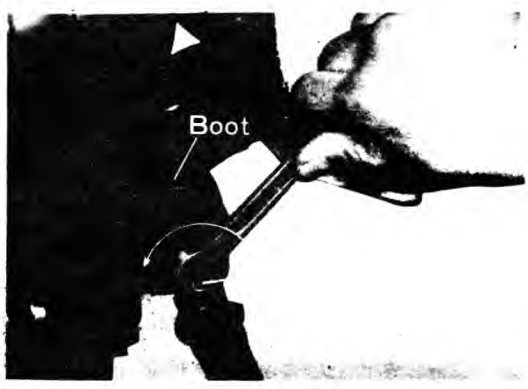


Fig. 6-46 Toe-in adjustment

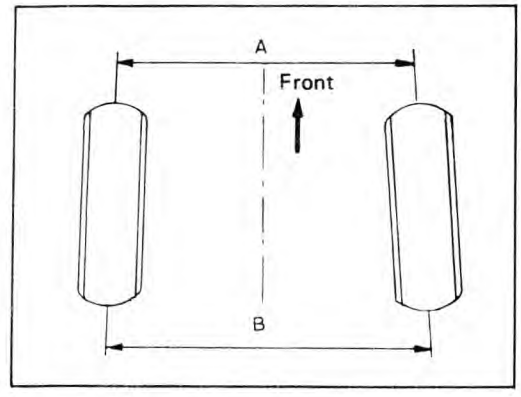


Fig. 6-47 Toe-in

(f) After toe-in had been adjusted, tighten the lock nut to a torque of 8 ~ 9 kg-m (57.87 ~ 65.10 lb-ft.) and lock by bending the lock washer.

(g) The steering angle adjustment is within a left and right difference of 30'.

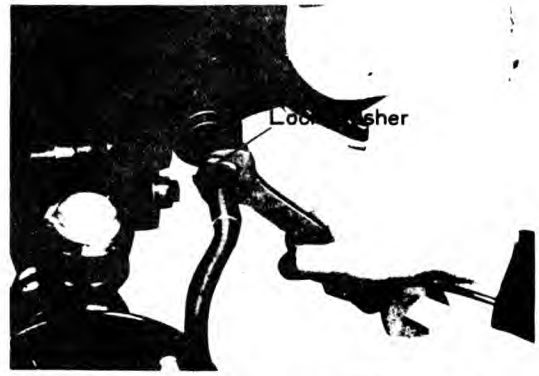


Fig. 6-48 Tightening lock nut

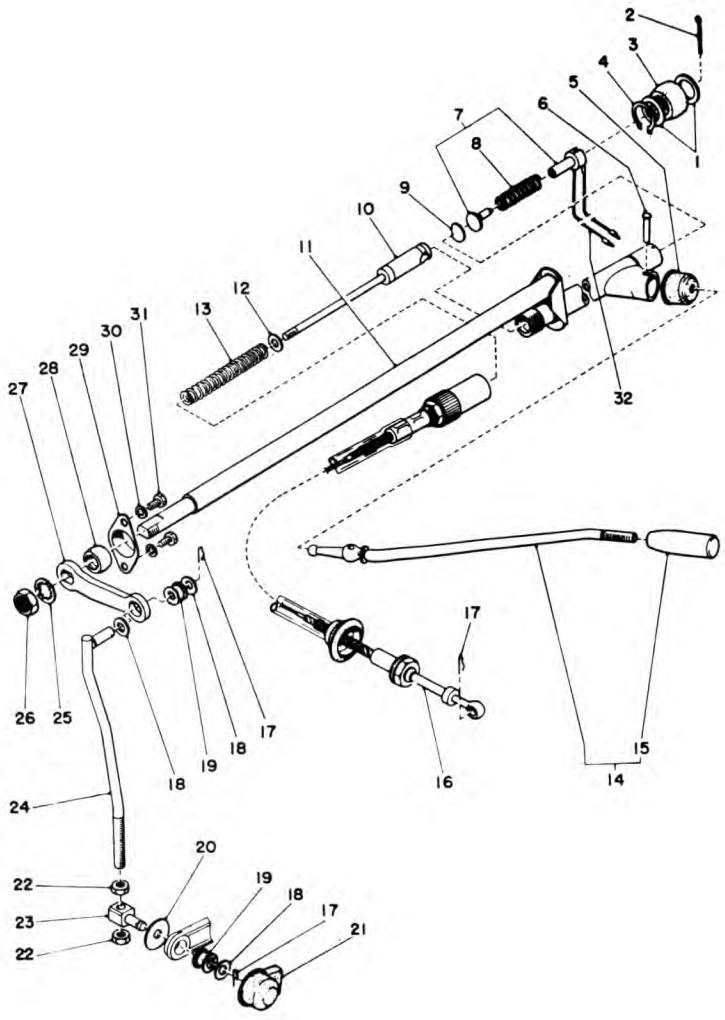
6-5: TROUBLE SHOOTING

Trouble and possible cause	Corrective action
1. Steering wheel operation is heavy Jack up and when the left and right front wheel clear the ground operate the steering wheel A) When easy — Tire pressure and suspension B) When heavy — Steering system trouble When heavy, separate the gear box and steering shaft from the rubber coupling and operate the steering wheel. A) When easy — Trouble in connection with gear box. B) When heavy — Trouble in connection with steering shaft.	
1) Tire pressure too low	Adjust to normal pressure.
2) Improper front wheel alignment	Adjust (caster and camber)
3) Stuck ball joint	Replace
4) Insufficient lubrication	Lubricate all parts
5) Incorrect adjustment or steering gear box damaged	Correct or replace
6) Worn tires	Replace
2. Steering wheel vibration This condition is manifest mostly at high speeds or when play of the steering wheel exists.	
1) Improper tire pressure	Adjust to normal pressure
2) Incorrect front wheel alignment	Adjust (caster)
3) Unbalanced wheels and tires	Correct
4) Loosen wheel nuts	Tighten to correct torque
5) Distorted wheel	Correct or replace
6) Damaged or worn wheel bearing	Repair or replace
7) Worn ball joint	Replace
8) Damaged suspension arm mounting (out of shape)	Inspect, and correct or replace
9) Jointed parts loose or damaged	Correct or replace
10) Steering shaft bearing worn or improper adjustment	Adjust or replace
11) Loose gear box mounting bolts	Tighten to correct torque
3. The steering wheel pulls to one side. This is a very dangerous vehicle condition, as any abnormality in relation to the front suspension system can easily result in an accident.	
1) Unbalanced tire pressure	Adjust to correct pressure
2) Incorrect front wheel alignment	Correct

Trouble and possible cause	Corrective action
3) Worn or incorrectly adjusted wheel bearing	Adjust or replace, accordingly
4) Front torsion bar bent or weak	Replace
5) Insufficient operation of shock absorber	Replace
6) Damaged suspension arm or improper installing	Inspect, correct or replace
7) Warped crossmember	Replace
8) Unequal left and right wheel base	Correct
4. Shock felt at the steering wheel	
1) Incorrect front wheel alignment	Adjust
2) Tire pressure too high	Adjust to normal pressure

CHAPTER 7 : GEAR SHIFT SYSTEM

7-1: GEAR SHIFT SYSTEM



1	Washer	12	Shim	23	Connector
2	Cotter pin	13	Spring	24	Rod
3	Rubber bearing	14	Lever assembly	25	Washer
4	Snap ring	15	Knob	26	Nut
5	Boot	16	Cable assembly	27	Arm
6	Pin	17	Clip	28	Bushing
7	Back-up light switch	18	Washer	29	Housing
8	Spring	19	Bushing	30	Spring washer
9	Base	20	Washer	31	Bolt
10	Shaft	21	Boot	32	Cord (back-up light switch)
11	Rod	22	Nut		

Fig. 7-1 Components of gear shift system

7-2: REMOVAL

(a) Remove the nut on the end of the gear shift rod, and separate the shift rod and gear shift arm.

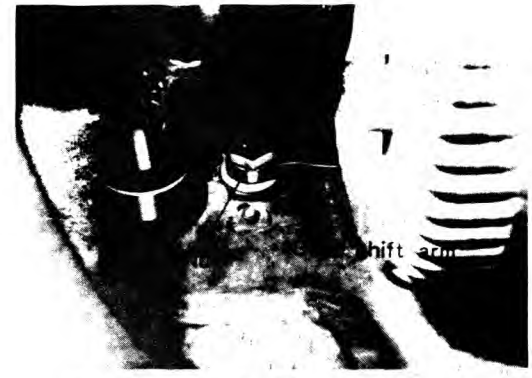


Fig. 7-2 End of gear shift rod

(b) Remove the clip at the transmission side end of the cable, and separate the select arm and select cable.

(c) Remove the select cable nut and separate the cable from the bracket.

(d) Pull back the boot on the transmission side end of the shift arm and remove the clip. Separate the shift arm and connector, and extract the gear shift link from the engine side in assembled form.

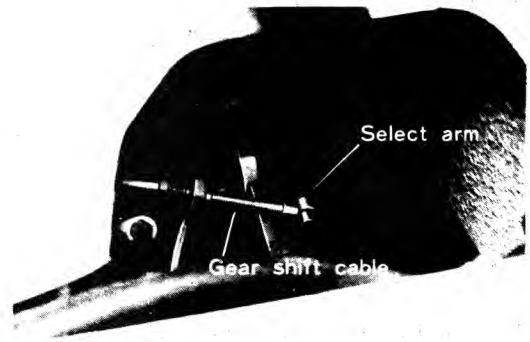


Fig. 7-3 Select arm connection

(e) Remove the steering column cover.

(f) Disconnect the back-up light switch cords.

(g) Extract the cotter pin from the end of the rod.

(h) Remove the select cable grommet from the toe-board.

(i) Remove steering column mounting bolts, enabling free downward movement of the column.

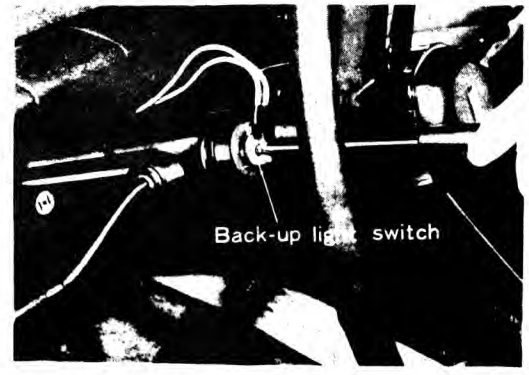


Fig. 7-4 Disconnecting cords

(j) Pull the steering column to the rear and downward and force the gear shift rod forward. Pull out the entire assembly by separating the rod from the steering column.

(k) Detach the housing and bushing from the toe-board by removing bolts.

7-3: INSPECTION

Check play and operation of the gear shift rod assembly (removed from interior) and the link (removed from the engine side). If required, disassemble further and check. Make replacement when noticeable wear or other defects exist.

7-4: INSTALLATION

Reinstallation is the reverse of removal.

(NOTE)

1. Amply coat rotating parts and parts subject to friction with grease.
2. After making sure that clearance between the arm at the end of the rod assembly and the bushing is 5 ~ 10mm (0.1968 ~ 0.3937 in.), secure the steering column in place.

Nut tightening torque:	4.4~5.6 kg-m (31.83 ~ 40.51 lb-ft)

3. In refitting the rod, make sure that the cutaway direction of the base faces in the direction of the lever, and that the action is free.

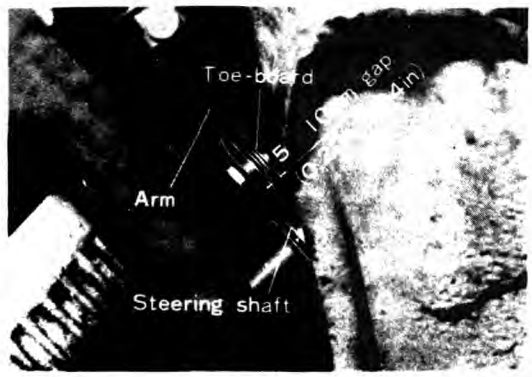


Fig. 7-5 Clearance adjustment

7-5: ADJUSTMENT

(a) Select adjustment is accomplished by turning the socket at the cable mount so that the amount of shift at the end of the lever is equal in both directions as the lever is moved back and forth in high or third gear position. After completion of adjustment, firmly lock the socket in position with the cable nut.

Fig. 7-6 Select adjustment

(b) After completion of select adjustment, make shift adjustment with the nut at the joint between the shift arm and rod on the engine side insuring that gear shifting is both positive and smooth in all positions.

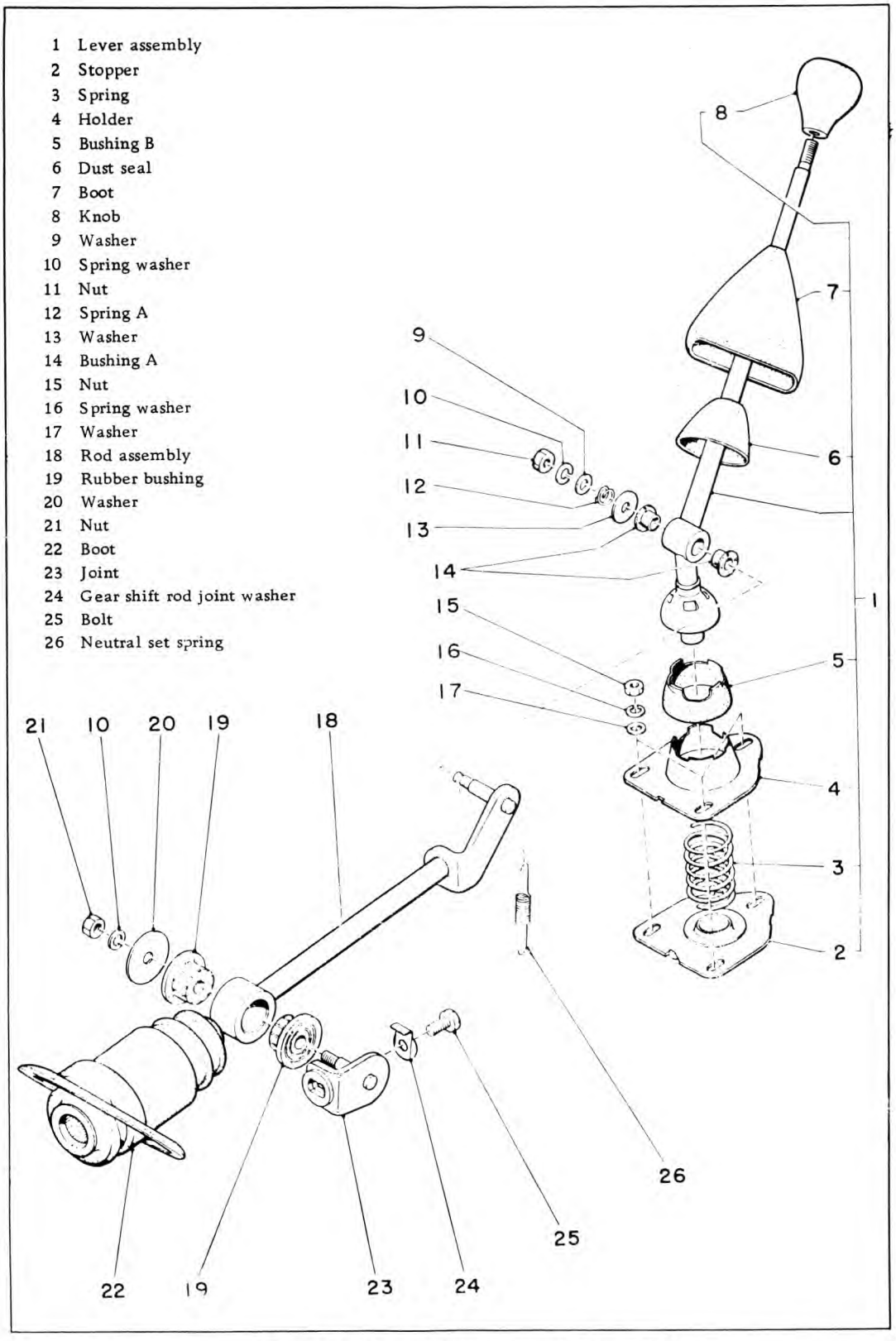


Fig. 7-7 Gear shift system (floor shift)

7-6: FLOOR SHIFT

1: Removing and reinstalling gear shift lever.

Removal

1. Remove the inspection cover by loosening the 5 screws which hold the inspection cover to the top of the shift rod cover.

Fig. 7-8 Removing inspection cover

2. Loosen the parking brake cable lock nut and loosen the cable by turning the turnbuckle.
3. Pull the parking brake lever up to full stroke.
4. Remove the left front seat (refer to the section on removal of the front seat).

Fig. 7-9 Loosening lock nut

5. Remove the shift rod cover (remove the two nuts at the left and right sides).

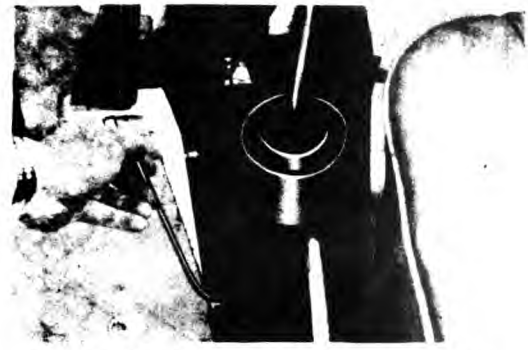


Fig. 7-10 Removing shaft rod cover

6. Remove the boot from the toe-board, pull the rod joint section toward the inside of the vehicle, remove the rod joint section nut, and remove the rod to the right side.

Fig. 7-11 Removing rod

7. Remove the bolt used to assemble the joint and shifter arm shaft (at this time refer to note 2).

8. Remove the neutral set spring, remove the 3 bolts holding the lever assembly, and then remove the lever assembly.

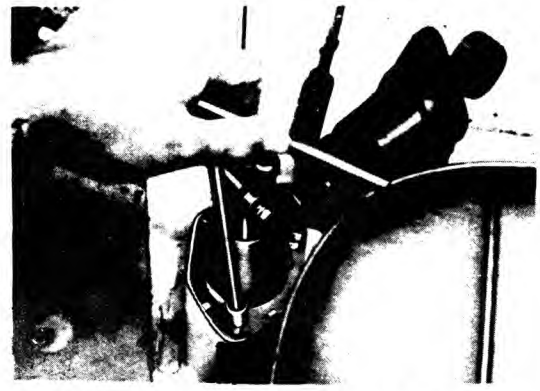


Fig. 7-12 Removing lever assembly

9. Remove the nut of the rod and lever assembly, joint section and disassemble the spring washer, plain washer (2), spring, nylon bushing, lever assembly, and rod.

Fig. 7-13 Disassembly 9

Reinstallation

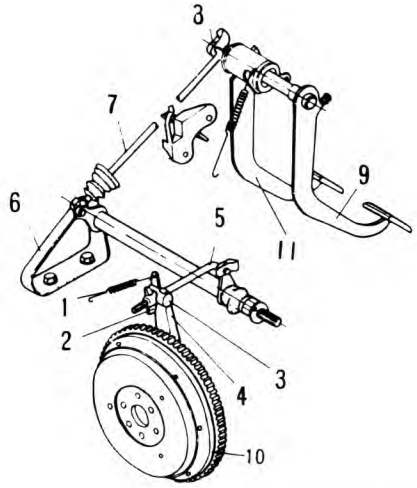
Reinstallation is the reverse of removal.

(NOTE) (1) Apply a thin coat of grease to the disassembled nylon bushing section.

(2) Shifter shaft joint bolt installation torque is 150 - 210 kg-m (10.85 - 15.19 lb-ft) (When tightening and removing, push the joint with pliers, etc. so as not to apply excessive pressure to the shifter arm shaft.)

CHAPTER 8 : BRAKE PEDAL, CLUTCH PEDAL, AND ACCELERATOR LINK

8-1: REMOVING AND INSTALLING BRAKE AND CLUTCH PEDAL



1 Return spring
2 Wing nut
3 Pin
4 Fork (Clutch release)
5 Rod lever
6 Ball stad
7 Rod
8 Arm (clutch lever)
9 Clutch pedal
10 Clutch assembly
11 Brake pedal

Fig. 8-1 Brake and clutch pedal construction (rod type)

1: REMOVAL

(a) Rod type

Remove the clip and disconnect the rod and torque pipe.
Separate the boot from the rod.

(a)' Cable type (Refer to Fig. 8-11).

(1) Loosen the two clamp fixing bolts, and remove the clamp.

(2) Remove the clip and disconnect the clutch cable.

(b) Remove the right-hand side luggage shelf.

(c) Unthread and withdraw the 16mm (0.6299 in.) nut.

(d) Unthread the steering column mounting bolt so that the column can be freely moved from left to right

(e) Push the steering column to the right-hand side and withdraw the clutch pedal from the bracket toward the left-hand side.

(f) Remove the stop light switch.

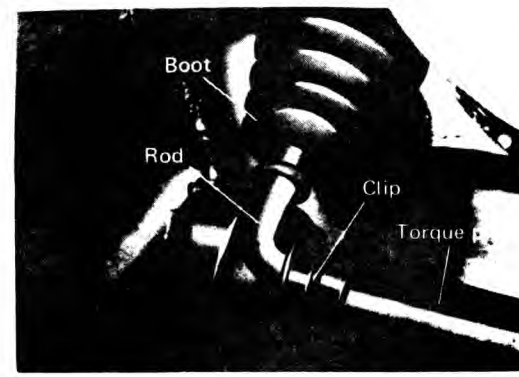


Fig. 8-2 Rod and torque pipe connection

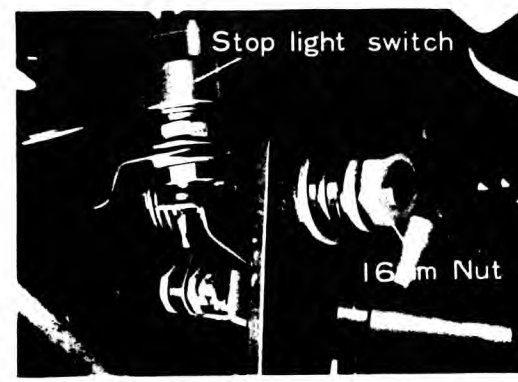


Fig. 8-3 Nut and stop lamp switch

(g) Loosen the snap ring on the brake pedal shaft and separate the hook of the brake pedal return spring from the bracket.

Fig. 8-4 Removing snap ring

(h) Withdraw the brake pedal and bushings from the shaft to the right. Then take out the master cylinder push rod together with the brake pedal.

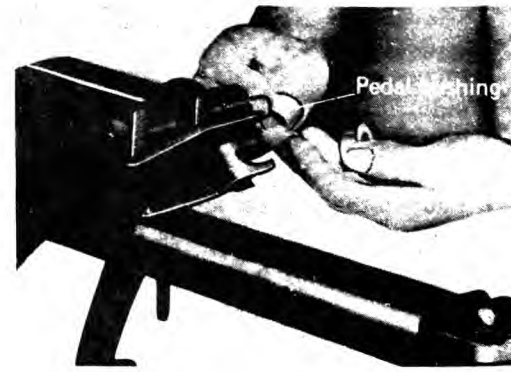


Fig. 8-5 Removing pedal bushing

2: **INSPECTION**

Inspect removed parts for wear, bending, and other damage. Replace parts as necessary.

3: **REASSEMBLING**

Reassembly is the reverse of disassembly.

(NOTE) (1) Coat all revolving and sliding parts with grease.
(2) The tightening torque for the 16mm nut (rod type) on the clutch pedal shaft is 0.7 kg-m (5.06 lb-ft).
(3) Chassis No. thereafter. The tightening torque for the clamp fixing bolt is 1.6 ~ 2.6 kg-m (11.57 ~ 14.47 lb-ft).

8-2: BRAKE PEDAL ADJUSTMENT

(NOTE) Adjust the brake pedal play as necessary to insure safe driving.

1. Adjust the pedal pad position so that it is the same as the clutch pedal pad surface position, and change the length of the stop light switch mounting.

2. The master cylinder push rod and piston play is 0.4 ~ 0.6mm (0.0158 ~ 0.0236 in.) The pedal tread position is 2 ~ 3mm (0.0787 ~ 0.1181 in.) Loosen the lock nut with a wrench and adjust. After adjustment secure with a lock nut.

8-3: REMOVING AND INSTALLING CLUTCH TORQUE PIPE

1: REMOVAL

(a) Remove the clutch pedal return spring and loosen the wing nut, disconnect rod and clutch shift fork.

Fig. 8-6 Removing return spring

(b) Withdraw the clip and disconnect torque pipe with rod (on body side) (refer to Pedal Disconnection and Connection).

(c) Loosen the two mounting bolts on the ball stad and remove them while turning the torque pipe and ball stad to the right front side.

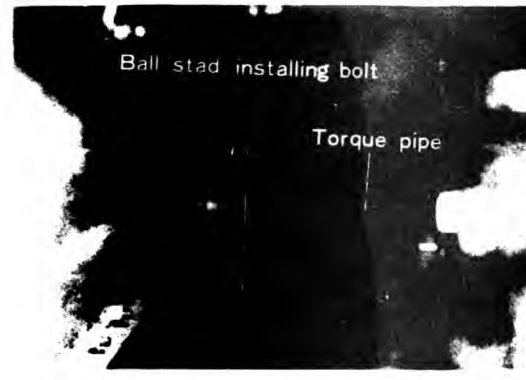


Fig. 8-7 Removing (c)

(d) Remove the ball stad on the transmission side with a 21mm wrench. (Inspect the ball surface and correct positioning if necessary. When remounting, the tightening torque is 7.0 kg-m (50.63 ft-lb)

(e) If necessary, the torque pipe (which has been removed) can be further disassembled.

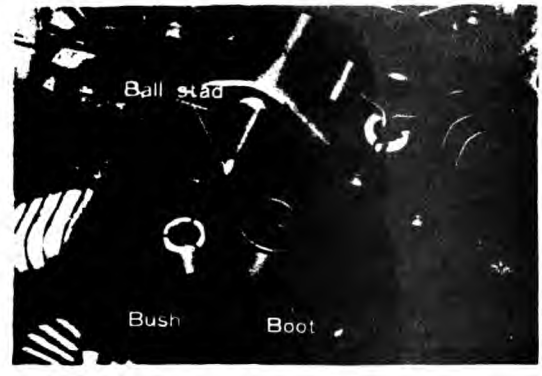


Fig. 8-8 Ball surface inspection

2: INSPECTION

Inspect removed parts for wear, surface roughness, and other damage (bushing, boot, ball stad). Replace parts as necessary.

3: REINSTALLATION

Reinstallation is the reverse of removal.

(NOTE) Coat the inside of the bushings and boots (and revolving parts) with grease.

4: CLUTCH PEDAL ADJUSTMENT

(a) Adjust and fix the return stop bolt so that the clutch pedal stroke is 125 ~ 130mm (4.92 ~ 5.12 in.)

Fig. 8-9 Clutch pedal adjustment

(b) Clutch pedal play is approximately 11 ~ 15mm (0.43 ~ 0.59 in.). When play is insufficient, the clutch slips and excessive noise occurs when changing gears.
Adjustment is made by turning the wing nut on the engine room side a half turn at a time.

Fig. 8-10 Clutch pedal play adjustment

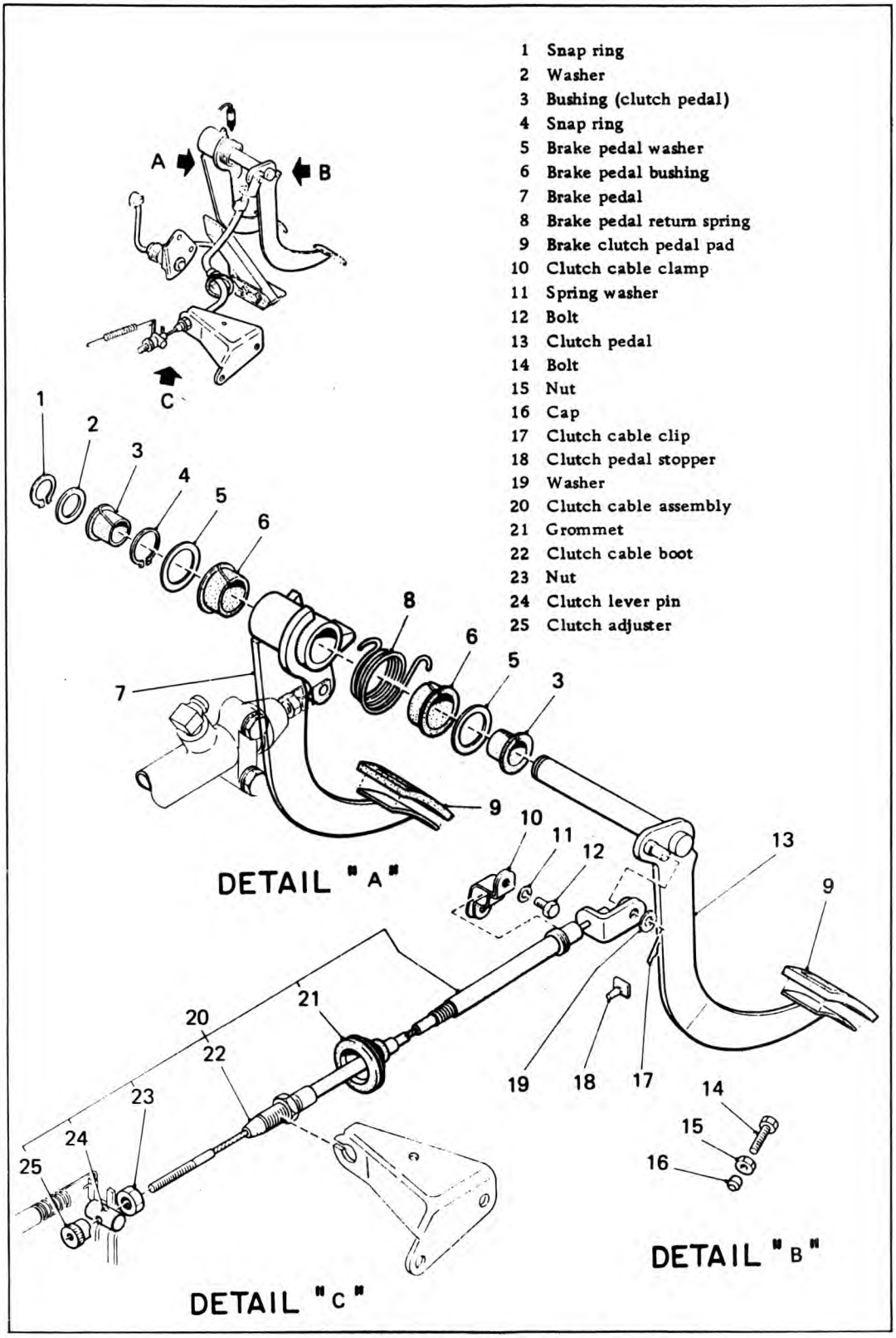
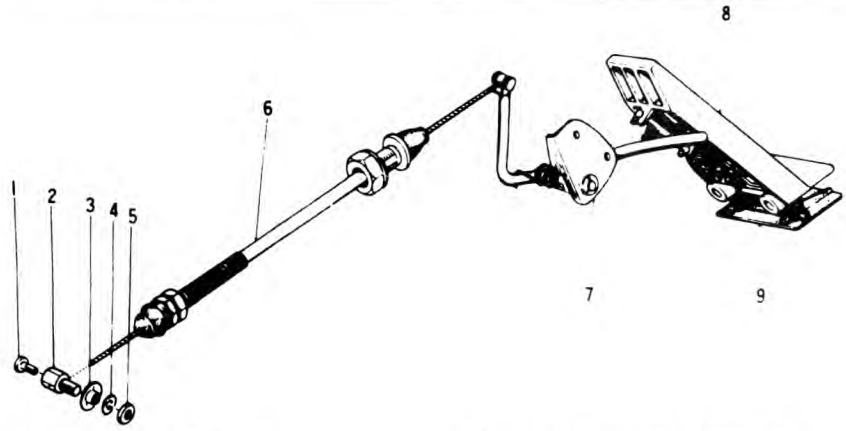


Fig. 8-11 Pedal system (cable type)

8-4: REMOVING AND REINSTALLING THE ACCELERATOR LINK

The accelerator is operated smoothly by means of a cable which incorporates a nylon tube sheath and "organ" type pedal.



1 Screw	4 Washer	7 Lever compl (accelerator)
2 Bolt	5 Nut	8 Accelerator pedal
3 Spacer	6 Accelerator cable	9 Bracket

Fig. 8-12 Accelerator construction and parts

1: REMOVAL

(a) Remove the luggage shelf.

(b) Remove the stopper and withdraw the accelerator pedal from the floor bracket.

(c) Loosen the nut fit to the lever, remove the lever compl from the bracket. Remove the inner cable by twisting the lever up, and remove the lever compl.

(d) The lever can be further disassembled if necessary.

(e) Remove the outer and inner cable from the carburetor.

(f) Loosen the outer cable nut, remove the cable from the toeboard, and withdraw from the passenger compartment.

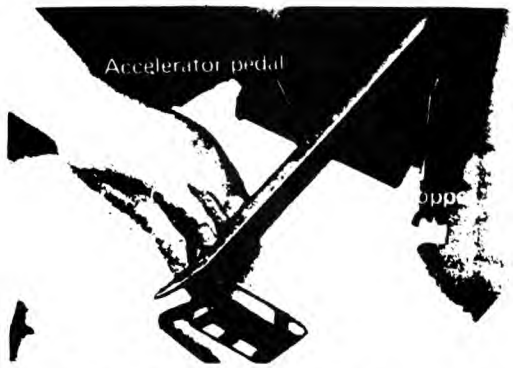


Fig. 8-13 Removing accelerator pedal

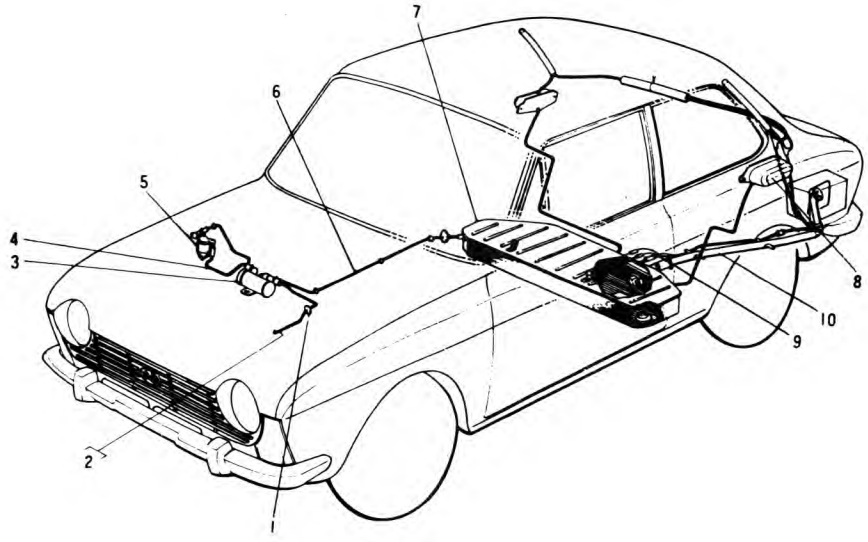
Fig. 8-14 Carburetor operation system

2: INSTALLATION

Reinstallation is the reverse of removal.

CHAPTER 9 : FUEL SYSTEM

9-1: OUTLINE OF FUEL SYSTEM



1 Grommet	6 Pipe (tank - strainer)
2 Tube (pump - carburetor)	7 Fuel tank assembly
3 Fuel pump assembly	8 Reserve tank
4 Tube (strainer - pump)	9 Pipe (air vent)
5 Fuel strainer assembly	10 Filler pipe assembly

Fig. 9-1 Fuel system

Gasoline passes through the filler pipe and to the fuel tank, where it goes through the pipe (connecting the tank and the strainer) to the fuel strainer assembly. Here, impurities are filtered by the filter element before the gasoline is fed to the carburetor by the fuel pump.

An overflow prevention device (consisting of reserve tank, air vent pipe, and drain pipe) is built into the unit to suck up gasoline forced out when air pressure rises (due to temperature rise) when the tank is full, and when the vehicle is inclined or put into a turn.

9-2: REMOVING FUEL TANK

(a) Remove the cushion and rear seat back rest.

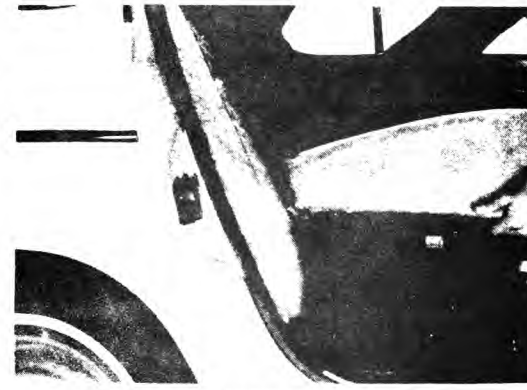


Fig. 9-2 Removing rear seat

(b) Remove the fuel tank drain plug, drain the gasoline, and return the plug.

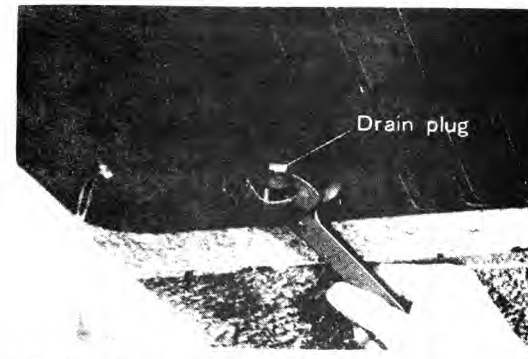


Fig. 9-3 Removing and returning drain plug

(c) Loosen the clips on the hose pipe (connected to the fuel tank).

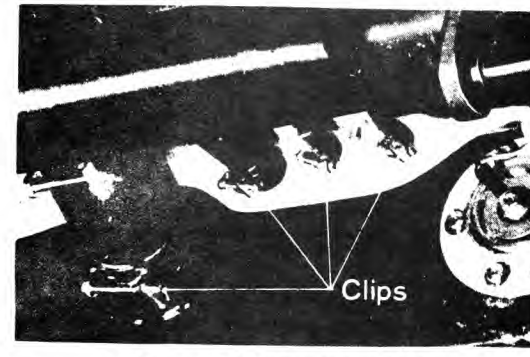


Fig. 9-4 Loosening clips

(d) Remove the thirteen bolts securing the fuel tank to the body. The two positions on the front of the seat stopper bracket are secured together with the tank.

(e) Take out the tank from the vehicle.

Fig. 9-5 Removing installing bolts

(f) Remove the fuel meter unit by unthreading the five screws in the fuel meter unit.

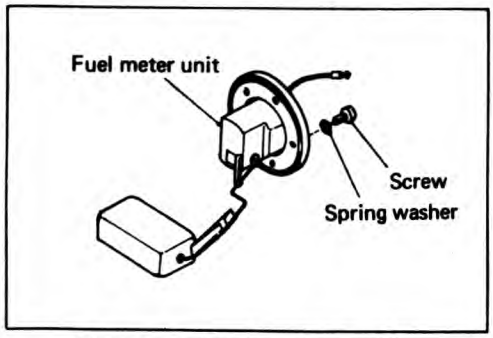


Fig. 9-6 Fuel meter unit

* Fuel tank cleaning procedure

When water and dirt accumulate in the tank in large quantity, the strainer element becomes blocked very quickly, resulting in even greater water accumulation. If this has happened, remove the tank, and remove the water, dirt, etc. from the filler pipe connection by turning the tank upside down (with the drain removed). Then wash with a detergent.

* Fuel tank leakage test

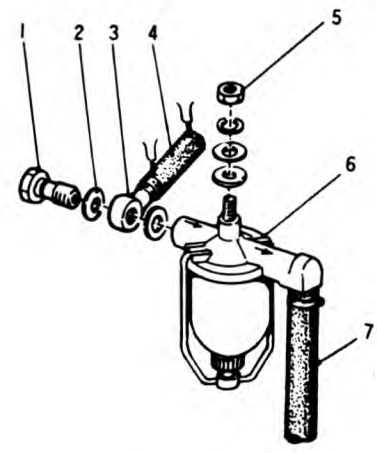
- Fill the tank up with gas.
- Block off the air escape opening (air vent pipe connection)
- Connect the pump pumping side to the tank
- Feed in gasoline from outside
- Fill the tank with gasoline and insure that there is no leakage from any part of the tank at the correct injection pumping pressure.

Fuel tank capacity	36 ℓ (9.51 U.S.gal, 7.91 Imp.gal)

9-3: REMOVING FUEL STRAINER

(a) Remove the (tank - strainer) strainer pipe connection clip and (strainer - pump) pipe connection clip.

(b) Loosen the strainer body installing nut.



1 Union bolt
2 Packing
3 Union (tank ~ strainer)
4 Pipe
5 Nut
6 Fuel strainer assembly
7 Pipe (strainer ~ pump)

Fig. 9-7 Fuel strainer

(c) The strainer can be disassembled, as shown in Fig. 9-8, to body packing, element, spring, packing, bowl, nut, and bail.

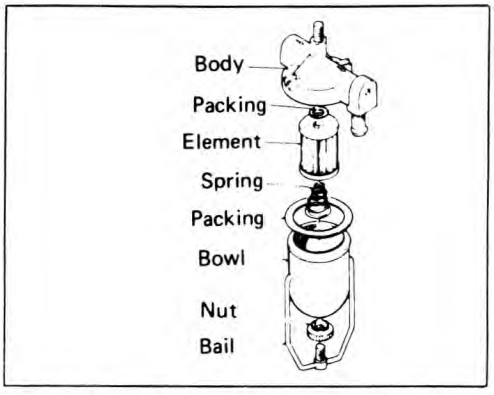


Fig. 9-8 Fuel strainer construction parts

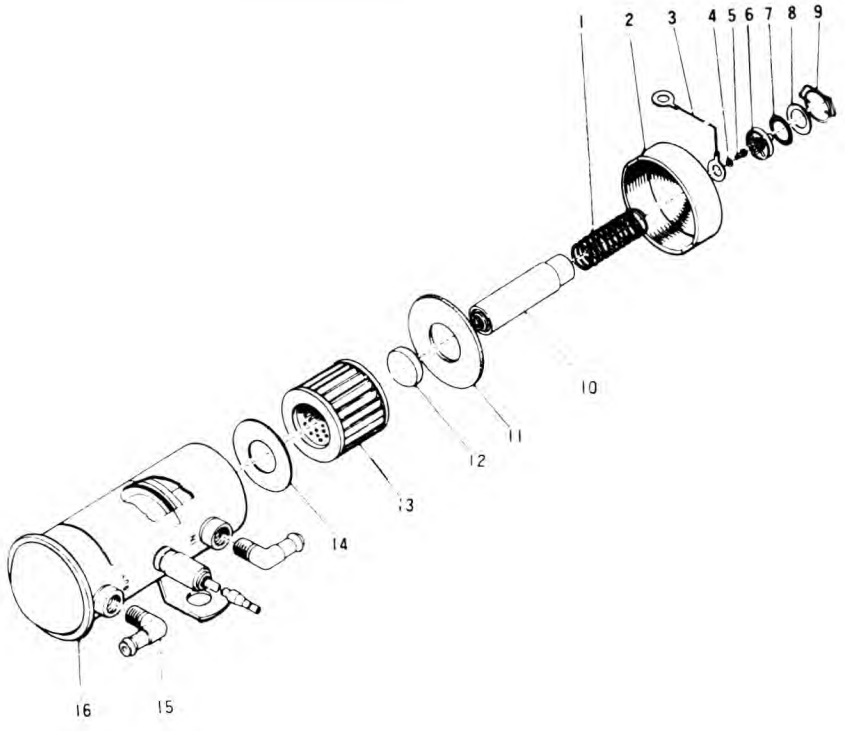
* Changing and cleaning element

. After cleaning the element in gasoline, remove dirt, dust, and gasoline by compressed air.

. Changing

Replace the element when very dirty.

9-4: FUEL PUMP



1 Plunger spring	7 O-ring	12 Cover magnet
2 Cover	8 Washer	13 Filter
3 Grounding wire	9 Spring retainer	14 Gasket
4 Spring washer	10 Plunger sub assembly	15 Elbow
5 Screw	11 Sediment bowl gasket	16 Body (fuel pump)
6 Spring cap		

Fig. 9-9 Fuel pump construction parts

The fuel pump is an electromagnetic type that feeds fuel to the carburetor. Using the battery as a power source, the pumping action causes plunger operation by way of combined electromagnetic and contact point, and fuel is fed.

The internal mechanism is safe, very durable, and is completely sealed.

1: FUEL PUMP SPECIFICATIONS

Type	Electromagnetic type (Bendix type)
Pumping pressure	0.22 kg/cm2 (3.13 psi)
Pumping volume	32 ℓ/h (8.45 US gal/h, 7.04 Imp gal/h) (when pumping pressure is 0.16 kg/cm2 (2.28 psi))
Suction pressure	0.084 kg/cm2 (1.1947 psi)
Voltage	12V

2: CONSTRUCTION AND OPERATION

Operation of the electrical type fuel pump is made by the up and down movement of plunger (1). When plunger (1) if forced up by the pumping spring (2), the pumping valve closes and the fuel in chamber 2 is pumped. At the same time, suction valve (4) opens and fuel is drawn into chamber 1 through the filter. Change-over is made electromagnetically the permanent magnet closes the contact at the designated plunger position (about half way up the inside of the guide tube of plunger (1)). Then, electromagnetic coil (7) is energized by current flow and plunger (1) drops, overcoming the force of the pumping spring by electromagnetic force. At this time, pumping valve (3) opens and the fuel in chamber 1 is transferred to chamber 2. The fuel pumping action is caused by pumping spring (2), with pumping pressure being regulated by the force of pumping spring (2) and area of plunger (1).

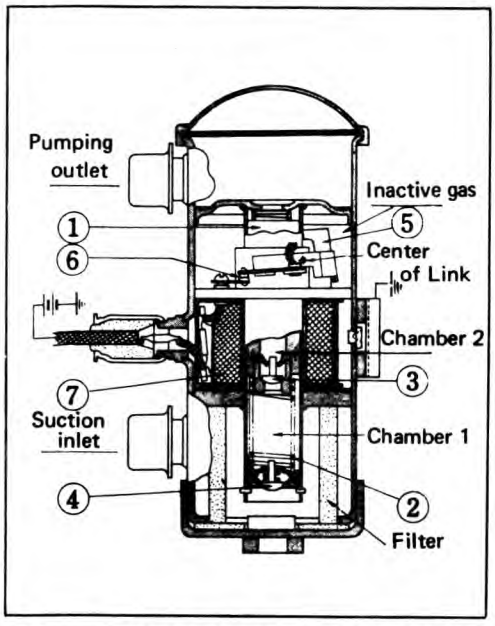


Fig. 9-10 Fuel pump construction

Accordingly, it is possible to alter pressure characteristics by changing the pumping spring.

3: OPERATING PRINCIPAL

Fig. 9-11 shows the ignition starter switch in the OFF position (the fuel pump does not operate). The permanent magnet on the end of the movable contact point lever (built into the fuel pump), attracts the plunger and the contact point changes to an ON condition, and the circuit is off at the starter switch.

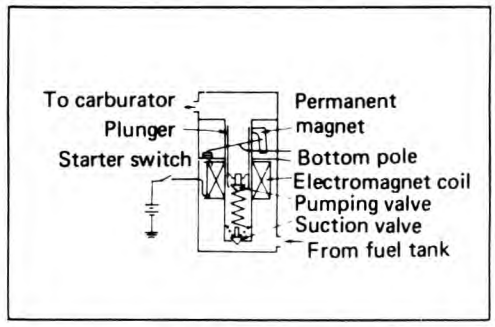


Fig. 9-11 When not operating

When the starter switch is turned on current flows as shown by the solid line in Fig. 9-12. Accordingly, the coil is excited, the force of attraction operates the plunger forcing it down (overcoming spring force), and fuel enters the plunger, pushing the pumping valve up.

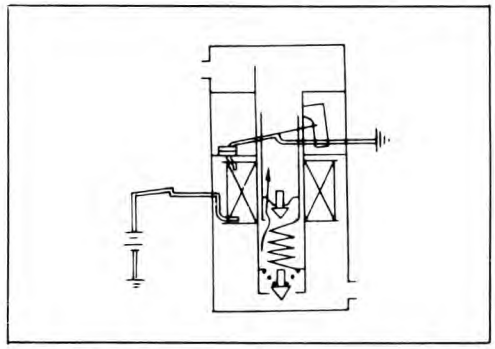


Fig. 9-12 Operation (immediately after switch is turned on)

As shown in Fig. 9-13. the plunger is attracted by the coil and when it is pulled down the attraction force between the permanent magnet on the end of the movable contact point lever and plunger ceases to operate, the permanent magnetic separates the contacts by the attraction force between the bottom pole and the weight of the magnet itself, and therefore current ceases to flow in the electromagnet; the plunger is again pushed up by the spring and fuel is fed from the outlet port by the stroke and flows into the chamber at the bottom of the plunger from the suction port by way of the suction valve. In this case, the movable contact by the action of the permanent magnet is again in the condition shown in Fig. 9-12 above. In a condition with the starter switch in the ON position, the operations shown in Figs. 9-12 ~ 9-14 are carried out automatically and fuel is continuously fed to the carburetor.

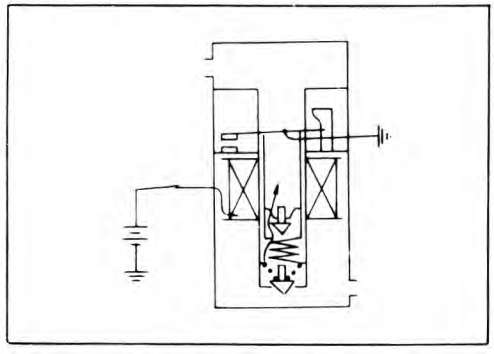


Fig. 9-13 Operation (fuel suction completed)

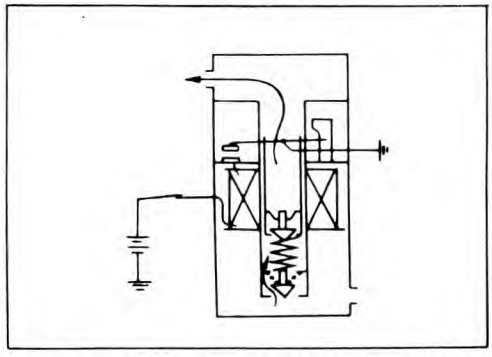


Fig. 9-14 Operation (fuel pumping)

4: REMOVING AND REINSTALLING FUEL PUMP

(a) The fuel pump is fixed by two bolts through a cushion, as shown in Fig. 9-15. (The pump grounding wire is connected to one of these bolts.)

(b) Internal parts are disassembled as shown in Fig. 9-9.

Fig. 9-15 Fuel pump installing position

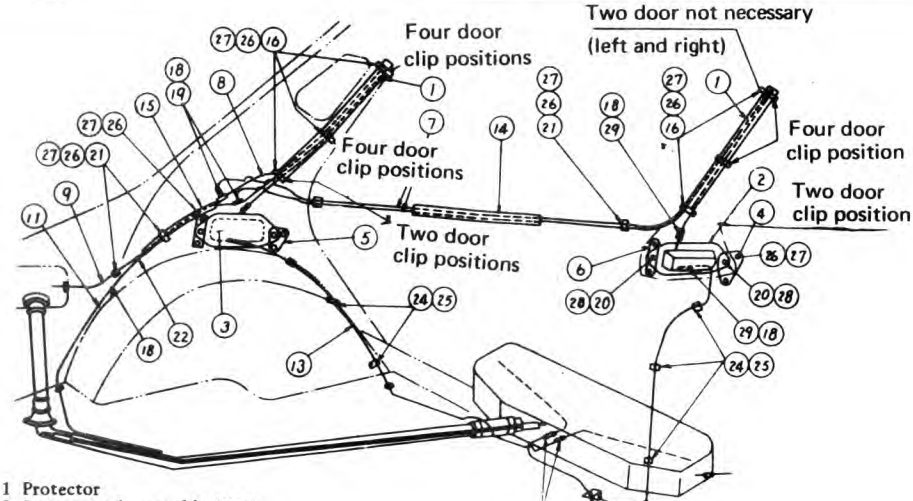
* Changing and cleaning element

Strainer element cleaning and changing are carried out in the same way.

* When operation is faulty

Remove the spring retainer from the plunger tube and take out the plunger. Next, wash the inside of the plunger and tube. If the surface of the plunger is scratched slightly so that cleaning only in gasoline is insufficient, polish gently with a soft cloth. The pump is a completely sealed type, and because of this repair and further disassembly are not possible. If either is necessary for correction, replace the part.

9-5: REMOVAL IN CONNECTION WITH THE AIR VENT



1 Protector
2 Reserve tank assembly (RH)
3 Reserve tank assembly (LH)
4 Bracket (reserve tank RH)
5 Bracket (reserve tank LH)
6 Bracket (reserve tank)
7 Air vent tube assembly (RH)
8 Air vent tube assembly (LH)
9 Pipe (air vent)
10 Binding agent
11 Tube (drain)
12 Pipe (air vent RH)
13 Pipe (air vent LH)
14 Protector
15 Protector
16 Clip
17 Hose (air vent)
18 Lock wire
19 Connector (fuel air vent pipe)
20 Bolt
21 Clip (air vent pipe)
22 Pipe
23 Clip
24 Clip
25 Tapping screw
26 Screw (panhead)
27 Spring washer
28 Spring washer
29 Hose (air vent)

Fig. 9-16

(a) Removing reserve tank

Loosen the clips fitted to the two upper and lower (air vent) hoses and remove the (air vent) hose from the reserve tank. Next, remove the bolts holding the reserve tank and withdraw.

(b) Removal in connection with the air vent pipe

Loosen the four clips on the air vent pipe joints, open all fixed clips on the body with screwdriver and remove as an assembly.

All other air vent pipe connections are removed in the same manner.

(NOTE) The connectors are fixed with lock wire and Binding agent (provided they are nylon tube connections).

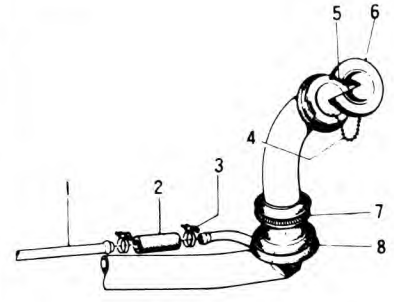
9-6: REMOVING FILLER PIPE

(a) Pull out the air vent pipe from the saucer grommet.

(b) Remove the filler pipe joint, air vent pipe joint clip, and clamp from the fuel tank.

(c) Draw out the filler pipe from beneath the floor.

(d) The filler pipe is disassembled as shown in Fig. 9-17.

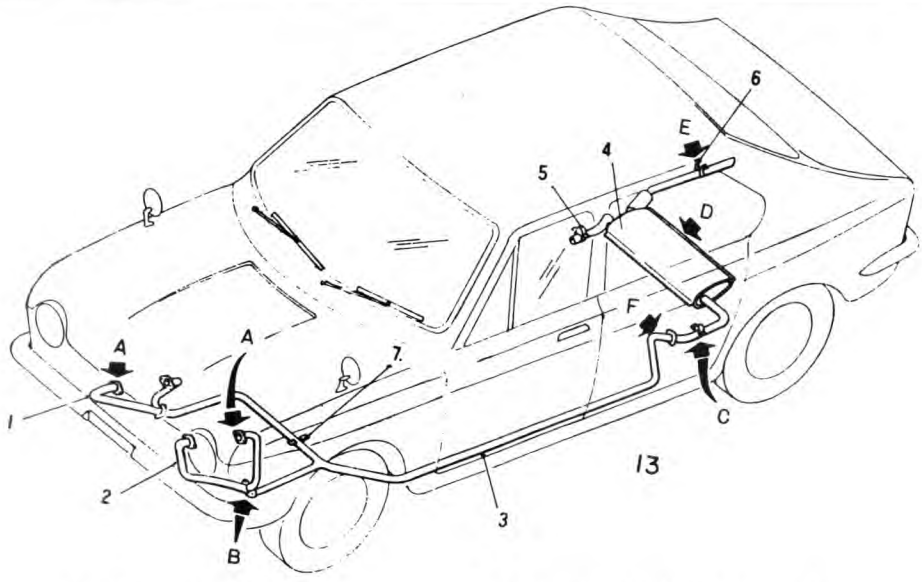


1 Pipe (air vent)
2 Hose
3 Clip
4 Chain
5 Packing
6 Cap assembly
7 Clip
8 Grommet

Fig. 9-17 Filler pipe disassembly

	Trouble and possible cause	Corrective action
Faulty fuel pump operation	(1) Will not operate	
	Defective terminal contact.	Inspect connections, especially ground, and tighten securely.
	Due to dirt and dust, foreign matter in the plunger.	Clean the inside of the plunger and plunger tube.
	Trouble in electromagnetic parts.	Replace part
	(2) Insufficient fuel supply at high speeds.	Clean or replace element.
		When air is mixed during pipe purging. Replace pump under any other conditions.
	(3) Excessive noise and vibration during operation	Replace
Fuel tank	(1) Water and dirt easily builds up in the strainer	Clean tank
	(2) Gasoline leaks from tank	Inspect all joints, and if cracks are found or openings in the welding of the tank, change (if the drain is leaking change the packing).
	(3) Faulty meter operation	Replace meter
	Dirt or water blocks strainer element	Clean or replace element
	Fuel overflows	Replace over-flow mechanism
	(1) Air vent joints plugged up Gasoline odor inside vehciel	
	(1) Faulty sealing of saucer grommet	Replace grommet
	(2) Leak from filler pipe tube joints, air vent	If clips, retighten or replace. If tubes or connectors are split, replace.
	(3) Air vents blocked (This may result in an insufficient supply of fuel during vehicle operation)	Replace the blocked parts or remove blocking material depending upon the place where the trouble exists.

CHAPTER 10 : EXHAUST SYSTEM



1 Manifold (RH)
2 Manifold (LH)
3 Exhaust pipe (rear)
4 Muffler assembly
5 Cushion (Muffler hanger)
6 Cushion (tail pipe)
7 Bracket (exhaust pipe)

Fig. 10-1 Exhaust system

Full consideration is given to exhaust system arrangement. See Fig. 10-1. Glasswool in sufficient quantitity is used to effectively silence noise.

The exhaust pipe is divided into the exhaust manifold, (RH and LH) exhaust pipe (rear), and muffler.

To prevent vibration and give a more comfortable ride, the exhaust pipe body mounting incorporates soft cushions on the two positions on the front side of the muffler and on one position on the tail pipe. Both exhaust pipe and muffler are mounted at a sufficient height above ground.

10-2: REMOVING AND REINSTALLING OF EXHAUST MANIFOLD, PIPE, AND MUFFLER

1: REMOVING MANIFOLD

Unthread the mounting nut on part A of Fig. 10-1 (manifold mounting) and remove the manifold.

Fig. 10-2 Manifold joint (part A)

Loosen part B in Fig. 10-1 (manifold and exhaust pipe joint).

(NOTE) Do not misplace the insulator and gasket inserted between the flange. Remove the exhaust pipe mounting bracket on the left lower surfaces of the transmission.

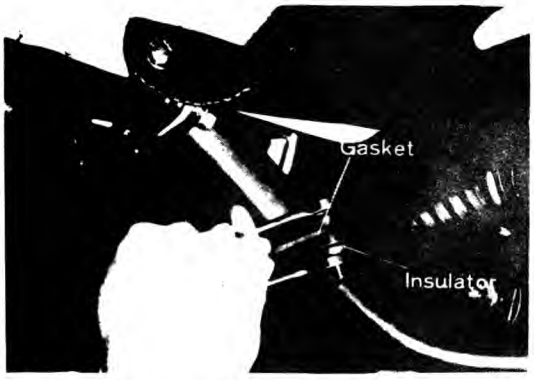


Fig. 10-3 Removing exhaust pipe

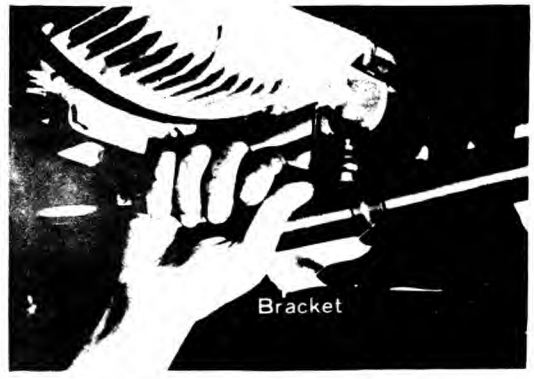


Fig. 10-4 Removing exhaust pipe

In this condition, the exhaust manifold can be withdrawn from below.

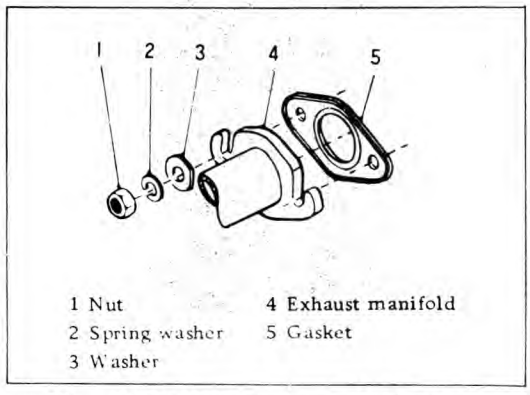


Fig. 10-5 Exhaust manifold joint (part A)

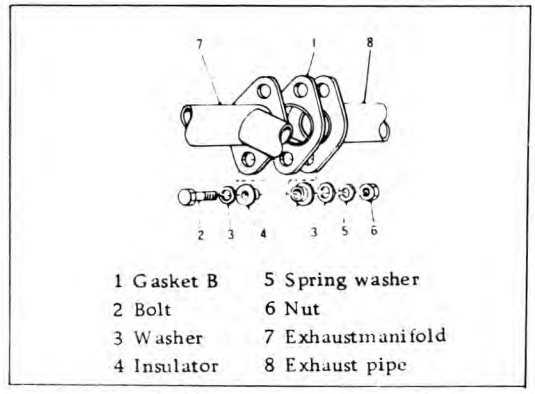


Fig. 10-6 Exhaust manifold joint (part B)

(NOTE) Do not damage the insulator for part B.

2. ASSEMBLY

(a) Assembly is the reverse of disassembly.

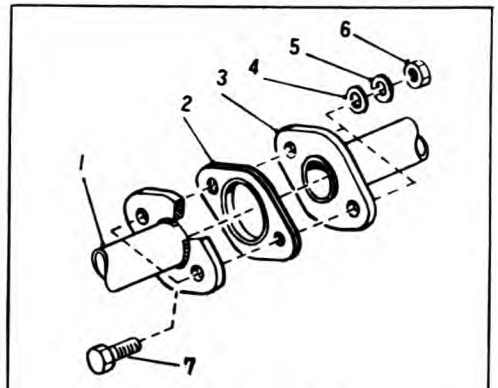
(b) Replace gaskets A or B, or the insulator if either has been damaged.

(c) Tightening torque for the flange joint bolts and nuts is 1.1 - 1.3 kg-m (7.96 - 9.4 lb-ft); when assembling ascertain a sufficient clearance between contact parts.

3: **REMOVING EXHAUST PIPE**

(a) Remove part B and F as shown in Fig. 10-1.

(b) Loosen the exhaust pipe bracket tightening bolts on the lower face of the transmission case.



1 Exhaust pipe 4 Washer
2 Gasket 5 Spring washer
3 Muffler 6 Nut 7 Bolt

Fig. 10-7 Exhaust pipe joint (part F)

4: **ASSEMBLY**

Assembly is the reverse of disassembly. Other items of assembly are the same as those in removing and refitting the manifold.

5: **REMOVING MUFFLER (includes removal of muffler hanger and tail pipe hanger)**

Fig. 10-8 Removing muffler

Fig. 10-9 Removing muffler

(a) Remove part F, shown in Fig. 10-1.

(b) Remove section C, shown in Fig. 10-1 (leave the cushion on the body).

(c) Remove section E, shown in Fig. 10-1 (unthread the bolt joining the cushion and tailpipe and leave the cushion on the body).

(d) Withdraw the removed (muffler hanger) cushion from the pipe (the pipe protrudes slightly from the rear cross member).

(e) Remove the (tail hanger) cushion; in this condition, loosen the floor joint nut.

(NOTE) At this time, take caution to secure the clearance adjust washer under storage, if there are.

6: INSTALLING MUFFLER

Installation is the reverse of removal.

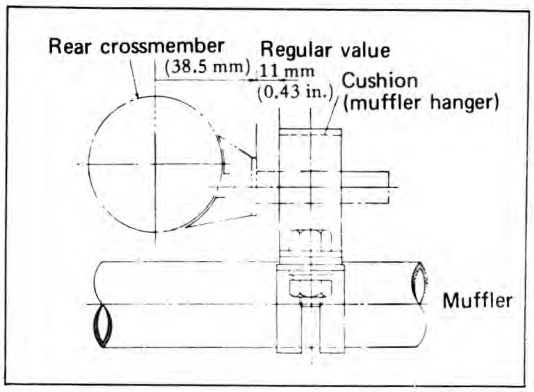


Fig. 10-10

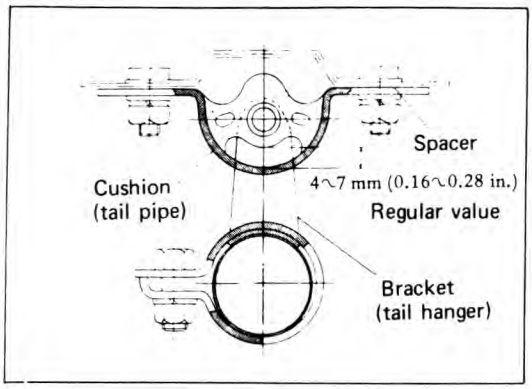


Fig. 10-11

(NOTE)

(1) When positioning the (muffler hanger) cushion, tighten after making adjustment at the elongated hole so that the load is distributed equally on the left and right of the cushion.

(2) In the case of installing the (muffler hanger) cushion, mount maintaining the regular value of 11 mm (0.43 in.) as shown in Fig. 10-10.

(3) When installing the (tail pipe) cushion adjustment is carried out as given below.

Front and rear adjustment ..... Adjust clamp and bracket to the front and rear so that the front and rear load does not hang on the rubber.

Left and right adjustment ..... Adjust the clamp and bracket turning them so that the load does not rest on the rubber.

Upper and lower adjustment .... When mounting, insert the spacer so that the regulated value is 4 ~ 7 mm (0.16 ~ 0.28 in.)
See Fig. 10-11.

Trouble and possible cause	Corrective action
1. Exhaust leakage	
(1) Poor flange joint connection	Tighten with proper torque (1.1 ~ 1.3 kg-m) (2.96 ~ 9.40 lb-ft).
(2) Damaged joint gasket or insulator	Replace
(3) Crack developing on welded joint of exhaust manifold, exhaust pipe, muffler, etc.	Repair by welding or replace.
2. Low output (no exhaust leakage)	
(1) Inside of muffler is blocked.	Replace
(2) The lower part of the exhaust pipe on the front crossmember has been damaged by stones or contact with the road surface.	Replace
3. Damaged cushion (Muffler hanger and tail hanger)	Replace

CHAPTER 11 : ENGINE COOLING SYSTEM

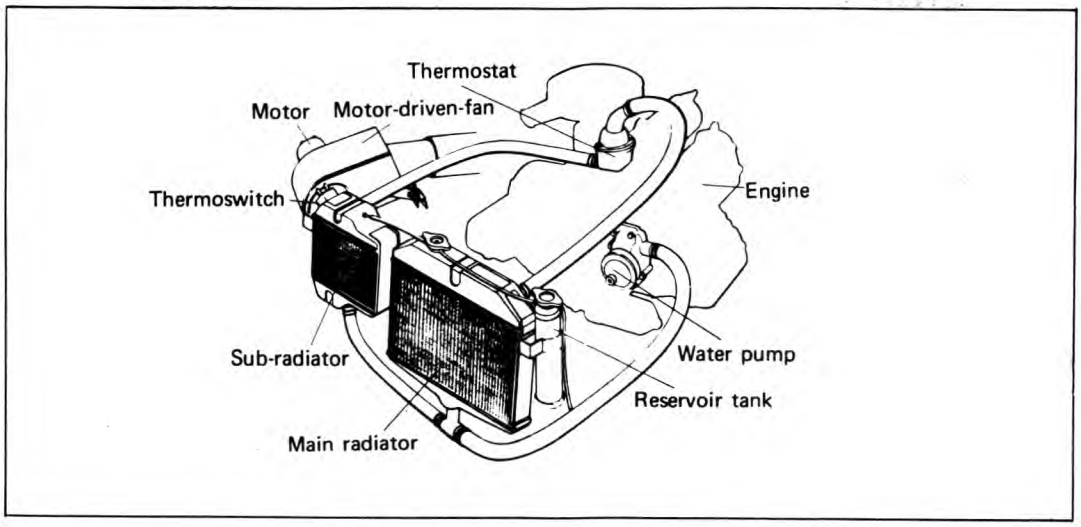


Fig. 11-1 Engine cooling system

The cooling system is of a dual-radiator type without cooling fan and consists of a main radiator, sub-radiator, and reservoir tank.
The sub-radiator is equipped with a small motor-driven fan.
The operation of this cooling system is as follows:

(1st Stage)
When the temperature of the coolant is below 82°C (179°F) the thermostat is closed. Thus, the coolant does not flow through the main radiator but flows only to the sub-radiator. As a shield exists in front of the sub-radiator, the volume of air passing is reduced, the effect of cooling is reduced, and thus the engine warm-up time is shortened.

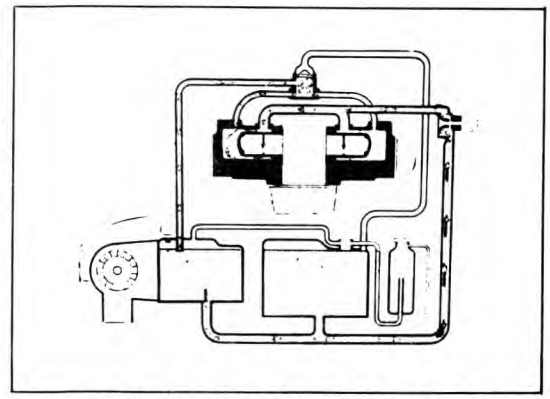


Fig. 11-2 Operation at 1st stage

(2nd Stage)
When the temperature of the coolant increases to 82°C (179°F) or higher, the thermostat opens and the coolant flows through the main radiator also. (The flow ratio at this time is approximately 2 (main radiator) to 1 (sub-radiator).)
Therefore the cooling performance is rapidly increased. The cooling performance is sufficient for general driving, and the temperature is kept between 82° to 92°C (179 ~ 198° F).

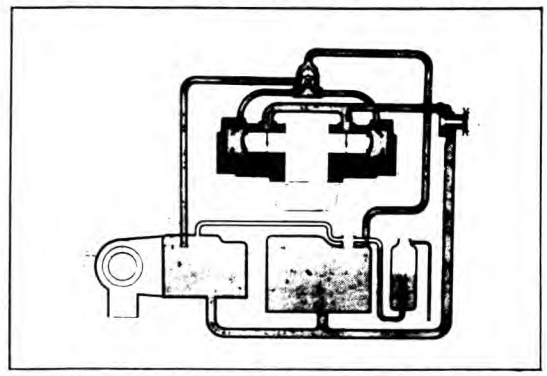


Fig. 11-3 Operation at 2nd stage

(3rd Stage)
When the coolant temperature exceeds 92°C (198°F) because of heavy-load driving or slow-speed driving, the thermoswitch on the sub-radiator operates to start the motor-driven fan. Therefore, the cooling performance of the sub-radiator is increased and the coolant temperature starts dropping. When the coolant temperature drops to 88°C (190°F), the thermostat stops the fan and the temperature rises again. Thus, during the above driving conditions, the temperature range of the coolant is kept between 88 to 92°C (190 ~ 198°F).

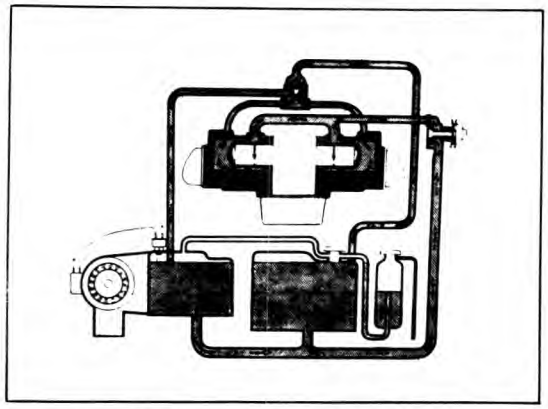


Fig. 11-4 Operation at 3rd stage

(4th Stage)
When driving under the loads heavier than at the 3rd stage or stopping for a long time under high outside temperature, the coolant temperature may exceed 92°C (198°F). In this case, the motor driven fan continues to function, the temperature increases to a temperature at which the heat transfer from the engine is balanced against the effect of the cooling system, and the temperature becomes stabilized at that point. This cooling system has a reservoir tank fitted with a relief valve of which the rated pressure is 0.9 kg/cm^2. This cooling system is capable of cooling down the engine from 115°C (239°F), adequate for all normal driving conditions.

Both main and sub-radiators are compact and they are of corrugated fin construction with a high degree of cooling efficiency. In winter, the sub-radiator may also be used as a heating source. The warm air sucked out by the motor-driven fan is led into the passenger compartment. If reservoir tank is not fitted to the radiator, the evaporated gas may blow out at a temperature of 85° to 90°C (185 ~ 194°F), or more although a 9.0 kg/cm^2 (128 psi) relief valve is equipped. In this system, however, the evaporated gas does not blow out at a temperature of 115°C (239°F) or less and the coolant is not consumed.
The main radiator and sub-radiator upper parts are joined with a connecting pipe having a 1.5 mm (0.06 in.) hole. This arrangement is to prevent lowering of the coolant level in the sub-radiator.
For the coolant, anti-freeze "SUBARU COOLANT" containing a rust-preventive agent is used. Thus, the coolant does not have to be replaced throughout the year.

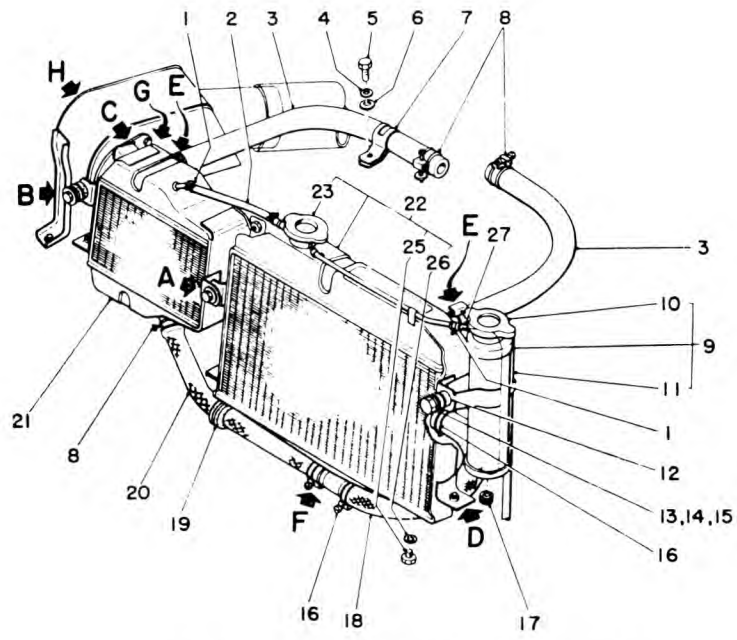
The dual radiator system has the following features:

1: Suitable cooling is provided for all driving conditions. Owing to the high efficiency of this type of system, cooling performance is outstanding.
2: Output and fuel consumption are improved, since no cooling fan is used.
3: Noise is reduced as no cooling fan is used.
4: The sub-radiator can be used as a heater, making an extra and separate heater unnecessary.
5: Engine durability is improved because of light belt load.

	TROUBLE AND POSSIBLE CAUSE	CORRECTIVE ACTION
1. Overheating	1) Insufficient coolant	Replenish coolant, inspect for leakage, and repair.
	2) Loose V-belt	Adjust V-belt tension.
	3) Oil on V-belt	Replace.
	4) Defective thermostat operation	Replace.
	5) Defective water pump performance.	Repair or replace.
	6) Clogged coolant passage	Clean.
	7) Improper ignition timing	Adjust.
	8) Clogging or leaking of radiator	Clean or repair, or replace.
	9) Improper engine oil	Replace.
	10) Mixture too thin	Inspect and repair fuel system.
	11) Excessive back pressure in exhaust system	Clean or replace.
	12) Insufficient clearance between piston and cylinder	Adjust or replace.
	13) Improper valve clearance	Adjust.
	14) Clutch slips	Replace.
	15) Dragging brake	Adjust.
	16) Improper transmission oil	Replace.
	17) Defective thermoswitch	Replace.
	18) Defective blower operation	Replace.
	19) Clogged connecting pipe	Clean.
2. Over cooling	1) Outside temperature extremely low.	Reduce the radiator ventilation area.
	2) Defective thermostat	Replace.
3. Insufficient coolant	1) Loosened or damaged connecting units on hoses	Repair or replace.
	2) Leakage from water pump.	Repair or replace.
	3) Leakage from intake manifold	Repair or replace.
	4) Leakage from the cylinder head gasket	Retighten the cylinder head bolts, or replace the gasket.
	5) Damaged or cracked cylinder head and crankcase coolant passage	Repair or replace.

	6) Damaged or cracked thermostat case	Repair or replace.
	7) Leakage from radiator	Repair or replace.
4. Noise	1) Defective V-belt	Replace.
	2) Defective motor- driven fan	Replace.
	3) Defective water pump bearing	Replace.
	4) Defective water pump mechanical seal	Replace.

11-3: CONSTRUCTION OF ENGINE COOLING SYSTEM



1 Clip
2 Hose (bypass)
3 Hose (A)
4 Spring washer
5 Bolt
6 Washer
7 Clip (D)
8 Clip (B)
9 Reservoir tank assembly
10 Cap (reservoir tank)
11 Tube (reservoir tank)
12 Cushion (B)
13 Bolt
14 Washer
15 Washer
16 Clip (A)
17 Grommet
18 Hose
19 Grommet
20 Hose
21 Sub radiator assembly
22 Main radiator assembly
23 Cap (main radiator)
25 Drain plug (main radiator)
26 Gasket (main radiator)
27 Hose (overflow)

Fig. 11-5 Engine cooling system components

11-4: RADIATOR SPECIFICATIONS

	Main radiator	Sub radiator	Reservoir tank
Total radiating area	3.94 m^2 (42.5 ft^2)	3.43 m^2 (37.0 ft^2)	
Amount of radiation	242 K cal/min. (when water volume 45 ℓ/min. (9.90 Imp. gal, 11.89 U.S. gal) temperature difference 65°C(149°F) and wind speed 8 m/sec 26.25 ft/sec))	68 K cal/min. (when water volume 20 ℓ/min. (4.40 Imp. gal, 5.28U.S. gal) temperature difference 65°C(149°F) and wind speed 3 m/sec (9.84 ft/sec))	
Capacity of cooling water	1.23 ℓ (2.65 Imp. gal, 3.18 U.S. gal)	1.15 ℓ (2.43Imp. gal, 2.92 U.S. gal)	0.25 ℓ (0.055 Imp. gal, 0.066 U.S. gal)
Valve opening pressure			0.8 ~ 1.0 kg/cm^2 (11.38 ~ 14.22 psi)
Fin shape	Corrugated type	Corrugated type	

11-5: DISASSEMBLY AND ASSEMBLY OF RADIATOR PARTS

(NOTE) Reassembly of parts is the reverse of disassembly unless instructed.

(a) Reserve tank

There is a reserve tank for reducing pressure and preventing coolant overflow.

1 : Disconnect the body side of the front grill. (Refer to "Engine Disassembly and Reassembly")
2 : Disconnect clip (1) and unthread bolt (13) on the mounting part of the reserve tank and remove the reservoir tank.
3 : The reservoir tank mounting consists of bolt (13), washers (14) and (15); cushion (12) and the lower part are fixed by entering the pin which is on the lower side (bottom) of the reservoir tank into the grommet (17) on the side of the body.
4 : The reservoir tank assembly can be disassembled into tank body (9), tube (11), and cap (10).

* Method of replenishing coolant

When replenishing coolant fill up to the level on the main tank gauge.

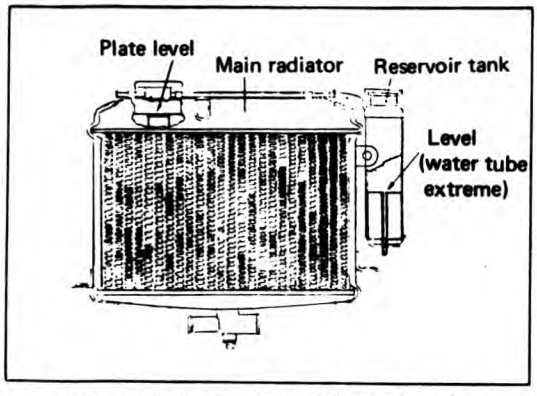


Fig. 11-6 Coolant filling level

* Reservoir with-stand pressure test

Close up cap, bypass pipe and tube tightly keep pressure at 3 kg/cm^2 (42.67 psi) for three minutes.

* Cap operation test

Put the end of the (overflow) tube into the water container, stop blower operation by disconnecting the connections, and keep engine speed at 1000 rpm for 5 ~ 8 minutes. A continuous flow of bubbles should not appear in the water container until the temperature gauge enters the red zone.

(b) MAIN RADIATOR

1 : Remove the front grill on the body side.

2 : Unthread the drain plug (25) and drain coolant.

(NOTE) Remove the main radiator cap, during this operation.

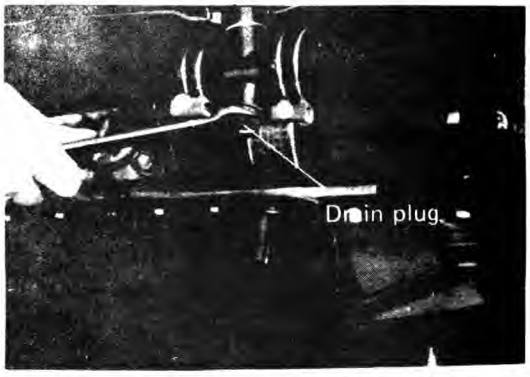


Fig. 11-7 Removing drain plug

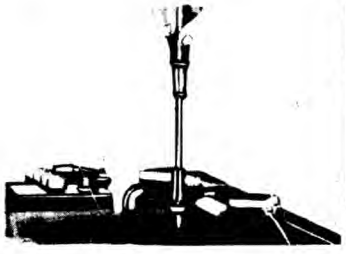


Fig. 11-8 Removing hose

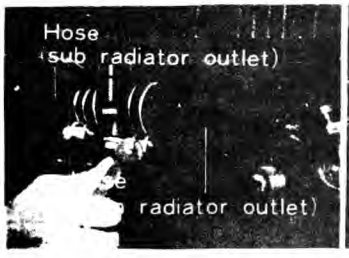


Fig. 11-9 Removing hose

Fig. 11-10 Removing hose

3 : Remove hose (bypass) clip (1) and the hose (overflow) clip.

4 : Remove the hose assembly (sub radiator outlet) (20), hose B (main radiator outlet) (18), and two clips (16) from the hose (main radiator and sub radiator inlet).

5 : Remove the main radiator and sub radiator mounting bolts and remove the radiator by pulling upward.

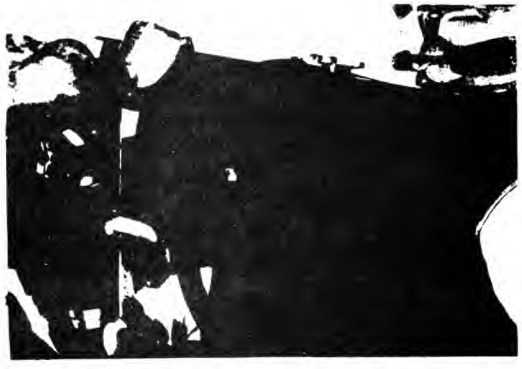


Fig. 11-11 Removing radiator

6 : The lower surface of the radiator is connected by a pin protruding from the side of the body with a cushion, as shown in Fig. 11-12.

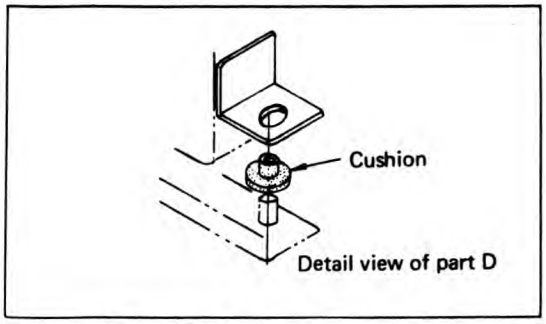


Fig. 11-12 Detail view of part D of radiator

7 : The main radiator can be disassembled into cap (23), drain plug (25), packing (26), and the radiator itself. Therefore, they can be replaced as individual parts.

8 : Hose assembly (20) consists of hose and tube. The tube side is connected to the main radiator side.
Grommet (19) of the hose assembly passes through the body.

* Testing pressure value

1. Water container

Use an instrument as shown in Fig. 11-13.

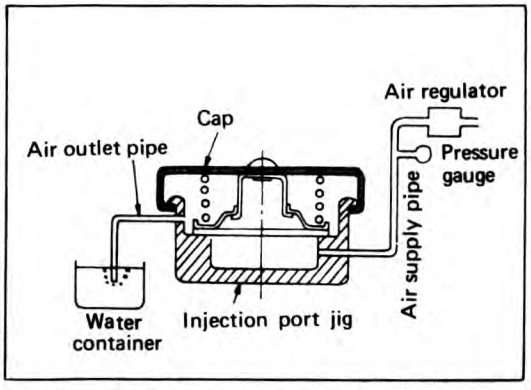


Fig. 11-13 Pressure valve tester

(Method)

Fix cap to the inspection jig, which is suitable for a regular size water inlet, and gradually increase the atmospheric pressure to a pressure not greater than 0.5 kg/cm^2 (7.11 psi) for 1 min.
Read the pressure indication on the pressure gauge when bubbles begin to come continuously from the water container.
The pressure at this period is open to a range of ±0.1 kg/cm^2 (±1.42 psi) for the standard opening pressure.

Standard opening pressure	0.9 kg/cm^2 (12.80 psi)

2. Negative pressure test

Use the air escape pipe and air supply pipe connected in a manner opposite that shown in Fig. 11-13.

(Method)

This is done in the same manner as with the pressure valve; however, gradually increase the atmospheric pressure to a value not greater than 0.04 kg/cm^2 (0.57 psi) for one minute. It is necessary at this time to open the valve below a maximum pressure (indicated) of 0.05 ~ 0.1 kg/cm^2 (0.71 ~ 1.42 psi).

3. Leakage test

Use the tester shown in Fig. 11-13. Supply air at a pressure 0.2 kg/cm^2 (2.85 psi) lower than the standard open pressure of the pressure valve; when this pressure is maintained for one minute, the continuous flow of bubbles from the water container should stop.

4. Replenishing coolant

Replenish coolant until the level reaches the plate level which can be seen from the main radiator or supply it up to the water pipe tip level of the reservoir. This radiator does not need regular replenishing or changing for approximately two years.

(NOTE)

(1) The radiator is a high pressure type. Coolant temperature is high immediately and dangerous after the engine has switched off and therefore the cap should not be removed until the engine is cool.

(2) The coolant level in the radiator will drop after the engine has been running; this drop, however, is not a sign of any defects.

(3) The coolant used is especially made for the Subaru vehicle. Avoid using any coolant other than this designated type to prevent corrosion.
(The engine is aluminum so special care is necessary.)

(4) The coolant capacity is 6.05 liters. (1.33 imp gal, 1.60 US gal)

* Radiator with-stand pressure test

Maintain airtight joints at tap outlets on all parts of the radiator. Put compressed air in at 1.5 kg/cm^2 (21.34 psi); bubbles should not appear in the radiator (which is immersed in water). (Make note of the solder joints)

(c) SUB RADIATOR AND SHROUD

1 : Remove the front grill.

2 : Remove the main radiator drain plug and drain the coolant.

3 : Remove the 3 bolts which retain the shroud and blower assembly.

Fig. 11-14 Removing shroud

4 : Remove the installing bolts of the reserve tank and radiator.

5 : Remove the sub radiator and shroud from above as they are.

6 : The sub radiator assembly can not be subdivided into small parts.

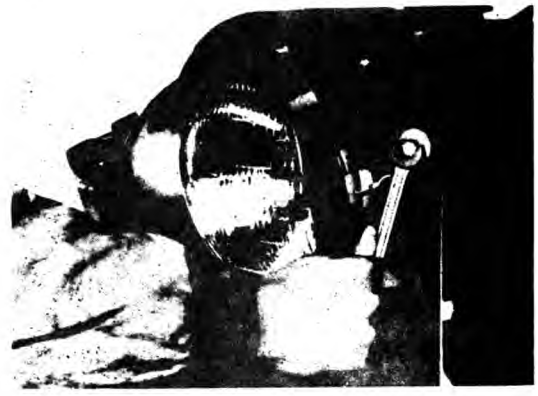
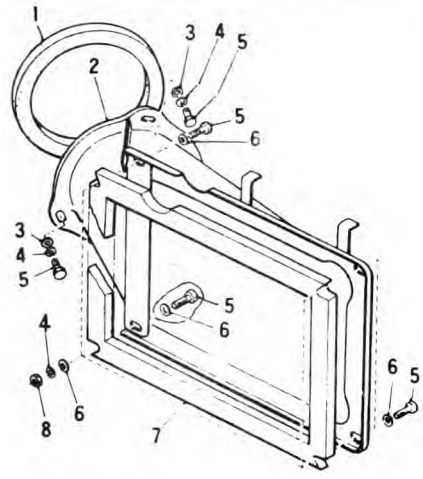


Fig. 11-15 Removing radiator

7 : Shroud assembly

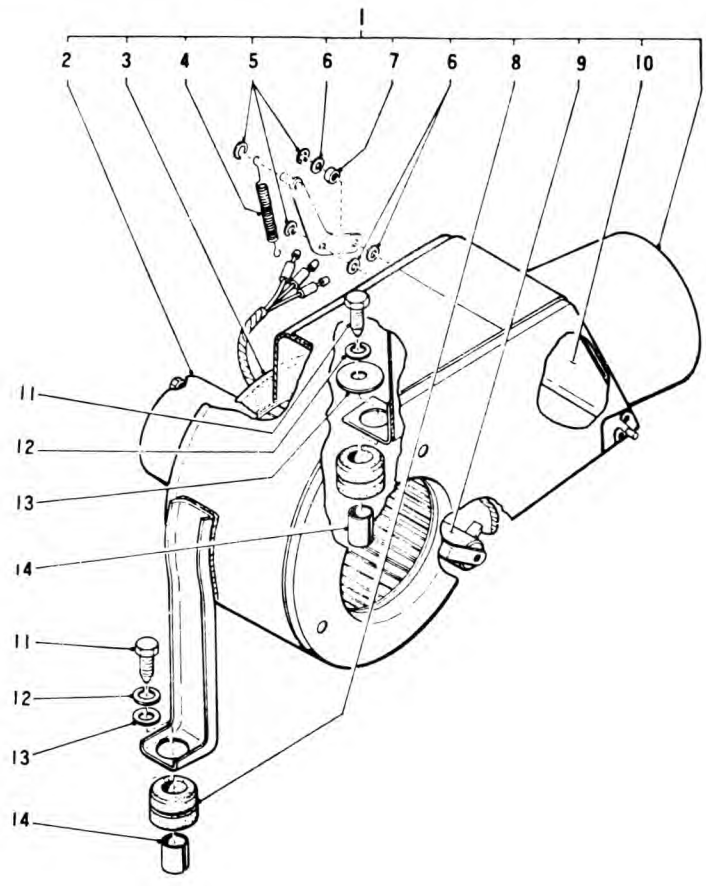
The shroud is attached to the sub radiator with two upper and two lower bolts, with gasket A (7), and heater blower assembly with three bolts, with gasket B (1).



1	Gasket B	5	Bolt
2	Shroud assembly	6	Washer
3	Washer	7	Gasket A
4	Spring washer	8	Nut

Fig. 11-16 Shroud assembly

11-6: BLOWER



1 Blower assembly	6 Washer	11 Bolt
2 Fan assembly	7 Spacer	12 Spring washer
3 Packing	8 Insulator	13 Washer
4 Spring	9 Resistor	14 Spacer
5 Clip	10 Shutter assembly	

Fig. 11-17 Blower construction

(a) The blower is bolted to the body, and can be disassembled into clip, spring, resistor, packing, and fan assembly.

(b) The fan assembly is removed by unthreading the mounting bolts (three). When removing the fan from the motor, unthread the motor shaft fixed screw on the center of the motor spindle of the fan.

* Blower Specifications

Type	H 130F-02
Air flow capacity	2.65 m^3/min (93.5 ft^3/min) (total pressure 20 mm Aq (0.79 in.Aq))
Battery voltage	12 V
Input	70 W
Weight	2.4 kg (5.29 lb)

11-7: BLOWER DISASSEMBLY AND INSPECTION

(a) Disassembly

1 : Remove the resistor fixing screw.

2 : Remove the motor retaining screw and remove the motor from the casing.

3 : Unthread the fan lock nut and remove the fan.

Fig. 11-18 Removing motor installing screw

Fig. 11-19 Removing motor

Fig. 11-20 Loosening fan lock nut

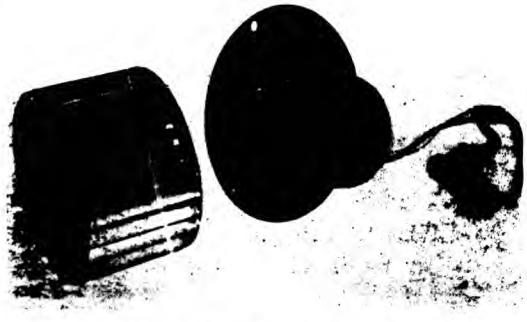


Fig. 11-21 Removing fan

4 : Remove the motor rear cover tightening nut and remove the cover.
5 : Remove the brush holder tightening nut and remove the brush holder.

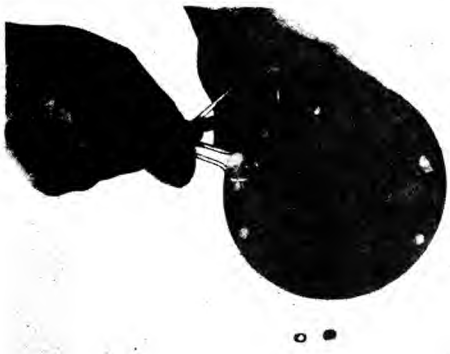


Fig. 11-22 Removing nuts

Fig. 11-23 Removing rear cover

6 : Remove the brush holder and coil connections using a soldering iron.
7 : Remove the screw retaining the shutter shaft hold down plate, and remove the shaft hold down plate.
8 : Remove the spring and remove the shutter.

Fig. 11-24 Removing brush holder tightening nut

Fig. 11-25 Removing screw

9 : Complete disassembly can be carried out by the above procedure.

Fig. 11-26 Removing shutter

Fig. 11-27 Complete disassembly

(b) Inspection and adjustment

. Brush wear

When brush length is below 10 mm (0. 39 in.), replace the brush.

Standard length 15 mm (0. 59 in.)	Maximum wear limit 5 mm (0. 20 in.)

. Bearing lubrication

Use Turbine Oil (Heavy Medium)

. Dirty commutator or wear

Replace armature when the commutator outside diameter is worn to less than 23 mm (0. 91 in.).

Standard outside diameter 25 mm (0. 98 in.)	Maximum wear limit 2 mm (0. 08 in.)

. Fan ..... clean

. Dirt inside brush holder .... clean

. Case

Clean the inside of the case. When the shutter cushion has deteriorated and is extremely dirty replace.

(c) Assembly

Assembly is the reverse of disassembly.

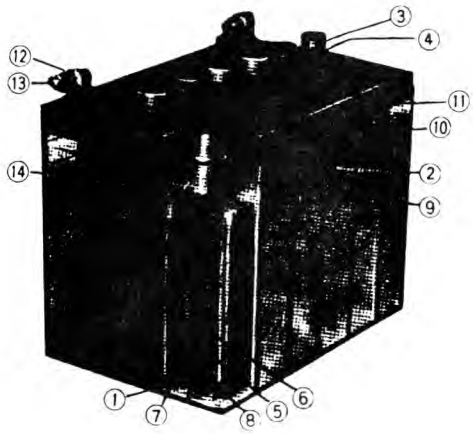
CHAPTER 12 : ELECTRICAL SYSTEM

12-1: LIST OF ELECTRICAL PARTS

Part	Description
Battery	NS40 12V - 32AH
Wiper	2 speed No-load current Low below 1.5A High below 2.5A
Combination meter	Speedometer: Revolving magnet type Fuel gauge: Bimetal, resistance type (fuel meter unit) Thermometer: Bimetal (thermometer unit) Charge warning: Pilot light Oil warning: Pilot light Turn signal: Pilot light
Horn	Spiral type Double horn 12V - 2A each
Turn signal unit	Electromagnetic thermo wire intermitting sound type 12V - 23W x 2 + 6W + 3W
Radio	Push button station selection Power consumption 6W Maximum output 2.5W (No distortion 1.5W)
Clock (Autoclock)	Current consumption: 1.3 mA
Window washer	Electric type Current consumption below 3A
Fuse box	Fuses One 25A Two 20A Two 10A
Headlights	Dual headlights type 12V - 50/40W Shield beam unit
Rear combination	One each left and right Each tail light: 12V -8W (Red) (used also as stop light) Stop light: 12V - 23W (Red) (used also as tail light) Rear turn signal light: 12V - 23W (Orange) Reflex reflector: 33 mm (1.30 in.) (Red) (built into tail light)
License light	12V - 8W white
Back-up light	12V - 23W white

Part	Description
Room light	12V -5W milk white The light is interlocked with the front door switch.
Ignition starter switch	First step ignition Second step starter
Lighiting switch	Pull type
Wiper switch	Wiper: Two stage pull type Washer: Revolving type
Stop switch	Mechanical type Installed on brake pedal
Back-up light switch	Installed on upper end of change rod (inside steering column cover)
Turn signal and dimmer switch	Turn signal: up and down (automatic return) Dimmer: Front and rear (one position type)
Heater switch	Revolving type two step strong and weak (also used as shutter switch)
Thermo switch	ON 92° C (197° F) OFF 88° C (190° F) (installed in sub radiator)
Lighter	Current consumption: 10A (switch off time 12 seconds)
Door switch	Installed on left and right front doors
Side turn signal	12V - 6W

12-2: BATTERY



1 Container
2 Top cover
3 Liquid inlet stopper
4 Liquid inlet packing
5 Positive plate
6 Negative plate
7 Distance plate
8 Fiber-glass
9 Pole plate support
10 Pole plate packing
11 Washer(facing ring)
12 Terminal
13 Terminal bolt, nut, and washer
14 Bubble prevention plate

Fig. 11-1 Battery construction

1: CONSTRUCTION

The 12V battery consists of six 2-volt cells. Main makeup is as follows:

Positive plate: Lead alloy lattice grid filled with a fine dark brown hard lead oxide. Sufficient passage is provided between the lead oxide particles to permit adequate immersion of the electrode in the electrolyte. These four plates are connected to form a plate group.

Negative plate: Lead alloy lattice grid filled with a soft gray spongy lead. These plates form one negative plate unit.

Spacer plate: A non-conducting porous plate, which acts as a separator, is inserted between positive and negative to prevent shortening. A reinforced fiber plate is used as a separator.

Electrolyte: The material action of both plates causes an electrochemical action when the electrolyte is around them. The electrolyte must be a colorless, odorless refined dilute sulfuric acid of high purity for industrial use. Water containing impurities or an electrolyte made from sulfuric acid must be carefully examined or it will corrode the plates, accelerate self discharge or shorten the life span of the plates.

2: CHEMICAL ACTION OF BATTERY

When the battery is charging, the active substance causes a chemical reaction according to the amount of discharge and when charged it returns to its normal state.

When expressed by chemical formula it is shown as follows:

Charging state				Discharging state		
$PbO2$ +	$2H_2SO_4$ +	Pb	$\rightleftarrows$	$PbSO_4$ +	$2H_2O$ +	$PbSO_4$
Positive pole (lead oxide)	Electrolyte (lead sulfate)	Negative pole (spongy lead)		Positive pole (lead sulfate)	Electrolyte (water)	Negative pole (lead sulfate)

The following figure illustrates this more clearly.

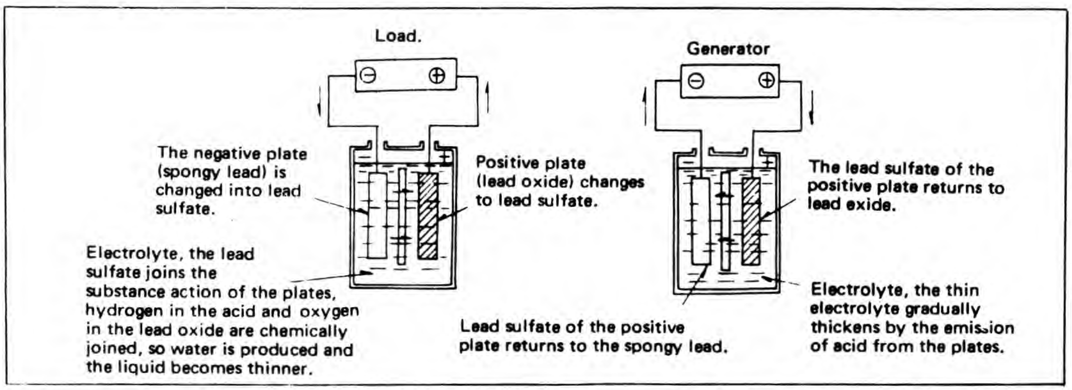


Fig. 12-2 Chemical action of battery

3: MEASURING SPECIFIC GRAVITY

The specific gravity of the electrolyte is measured with a hydrometer. Holding the glass tube vertically, as shown in Fig. 12-3, slowly draw the liquid into the tube. Take the reading at the highest point of the liquid on the float scale. On this occasion the eye is in a position level with the surface of the liquid. When there is grease on the scale the height of the liquid swell will change; therefore use it after wiping well. Moreover, you must read the scale in a condition that moves freely by giving it a slight jar. Specific gravity of the dilute sulfuric acid used in the battery changes according to temperature. The standard temperature value is considered to be 20°C. When measuring, allow for temperature variation and calculate as follows:

$S = St + 0.0007 (t-20)$

S = specific gravity when calculated at 20°C

St = measured specific gravity at t°C

t = measured temperature on centigrade scale

0.0007 = change of specific gravity for a temperature of 1°. (Temperature coefficient.)

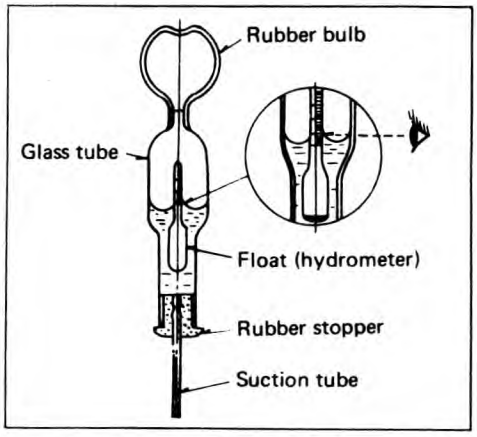


Fig. 12-3 How to read the hydrometer

4: BATTERY REPAIR

Inspect battery at least every 5000 km (3100 mile) or once a month in the following method.

(a) External inspection

Check for the existence of dirt or cracks on the battery case, cover, liquid inlet tops and terminals etc., wash with water removing traces of acid and wipe with a dry cloth. If coated with grease it prevents terminal corrosion.

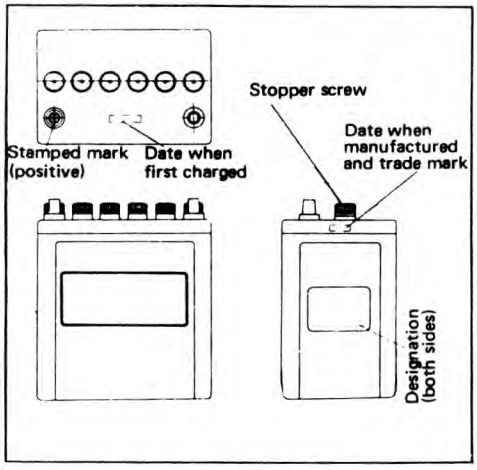


Fig. 12-4 Battery

(b) Inspection of liquid level, temperature, and specific gravity of electrolyte.

Measure the temperature and specific gravity of the electrolyte, calculate at the standard temperature of 20°C to see if it is between 1.220 and 1.280 (be careful so that it does not fall below 1.220). Check to see if the level of the electrolyte has dropped from the specified position (minimum level). If so add distilled water, check the surface of the electrolyte and

insure that the correct amount is contained in each cell. Do not fill beyond the maximum level mark. If dilute sulfuric acid is added, specific gravity of the electrolyte will rise and damage the plates and separators.

(c) Voltage measurement

The battery voltage is normally two volts per cell when there is no load (the battery is neither charging nor discharging), shown in Fig. 12-5, the voltage rise (drop) by charging (discharging) rapidly changes at first and then gradually settles, finally reaching an electromotive force (2V) which corresponds to specific gravity of the electrolyte.

For this reason, a voltage reading when there is no load is not acceptable. A simple method is use of the Excell tester (4 ~ 40V voltmeter) for 5 seconds to see whether or not the voltage difference among cells is within 0.1V, and whether or not individual cell voltage is more than 1.5V.

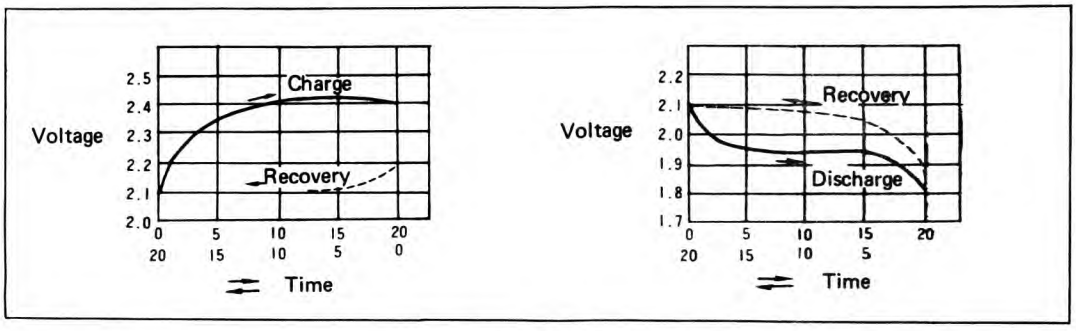


Fig. 12-5

5: NORMAL CHARGE AND QUICK CHARGE

If the specific gravity of the electrolyte used in the battery is measured, the charging condition can be recognized. The relationship between the electrolyte and charged battery condition is as shown in Fig. 12-6.

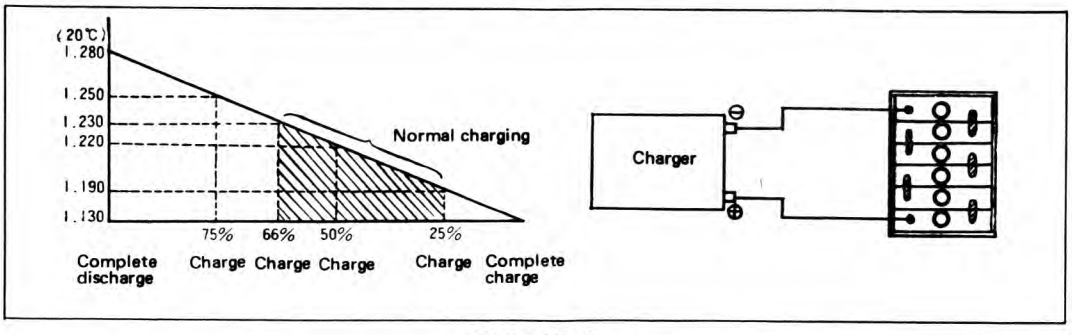


Fig. 12-6

(a) Normal charge

When specific gravity falls below 1.220 (at 20°C), normal charging must be made as soon as possible. The charger is connected to the battery as shown in Fig. 12-6, and the battery is charged until the voltage and specific gravity are the same value at a current of 3A. This value is measured every 30 minutes and after three measurements have been taken charging is made at

a fixed value.

(NOTE) In this case, gas is generated from each cell so the inlet stoppers must be removed. Do not bring an open flame near the battery at this time.

(b) Quick charge

The quick charge is a method by which the battery is charged in a short period of time. In quick charging, a relatively large current is used initially. As extreme temperature rise may cause battery damage, this type charging is not carried out for a long period. Accordingly, quick charging must be carried out within a current range that will not increase the temperature above 40°C (104°F). However, for the best results a battery should be charged for a long period at a low current; therefore quick charging is only a temporarily means of bringing battery current to a suitable value.

6: SPECIFICATIONS

Capacity (20 hrs)	12V - 32AH
Weight (with electrolyte)	10.5 kg (23.15 lb)
Electrolyte capacity	2.5 liters (5.5 Imp. gal, 6.6 U.S. gal)
Low temperature High rate discharge -15°C 150A discharge	Continuous time: above 2.5 min. Voltage on fifth second: above 8.4V
Life span number of time charged (discharging current 20A)	More than 200 times

7: WHERE TO MOUNT THE BATTERY

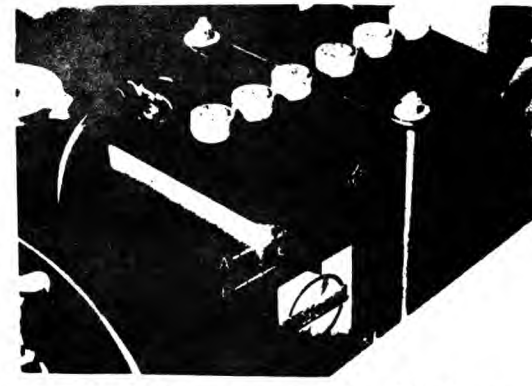


Fig. 12-7 Mounting position of battery

12-3: WIPER

1: CONSTRUCTION AND OPERATING PRINCIPLE

Construction is such that the wiper carries out its wiping action in a reciprocating motion of the wiper spindle (mounted on the blade arm) with a linkage by a rod and crank to the revolving spindle (wiper motor output spindle) reduced to the necessary revolutions by a worm reduction gear, by driving a small motor which uses a high stability ferrite magnet.

Since it is a two stage speed change type, it incorporates a method of changing the speed by changing over the commutating brush by operating a wiper switch. It is a three brush type with an extra brush for the two motor brushes. The motor is of a very reliable construction. It is simple with little trouble, and does not have any motor exciter coils; therefore, it is different from variable speed motors of the past, as the excitation is by permanent magnets.

The auto stopper is a dynamic braking type. There is absolutely no development of trouble originating in the electrical circuit or elements of unstability, etc. of the fluctuations of the dynamic stopping effect.

The linkage, arm, and blade have high rigidity and sufficient strength. It was engineered to give a safe wide wiping effect for rain conditions by the size and wiping angle of the arm, blade, and proper arm pressure. It is a sure safe construction together with all water-proof parts.

2: WIPER SPECIFICATIONS

Motor	
Indicated voltage	12V
Test voltage	13V
No-load revolutions	50 rpm 70 rpm
No-load current	below 1.5A below 2.5A
Motor restraint torque	Above 0.8 kg-m (5.79 lb-ft)
Restraint current	below 15A
Link	
Wiping method	Parallel motion type
Wiping angle	Driving seat side 92°
	Rumble seat side 107°
Arm mounting shaft	8 mm shaft (0.32 in.)
Arm	
Blade lifting pressure	350 ~ 410 gr. (12.38 ~ 14.45 oz)
Arm connection	Bolt installing type
Blade	
Type	Curved surface
Length	335 mm (13.19 in.)
Arm connection	Width 7.2 mm (0.28 in.) bayonet type

3: WIRING DIAGRAM

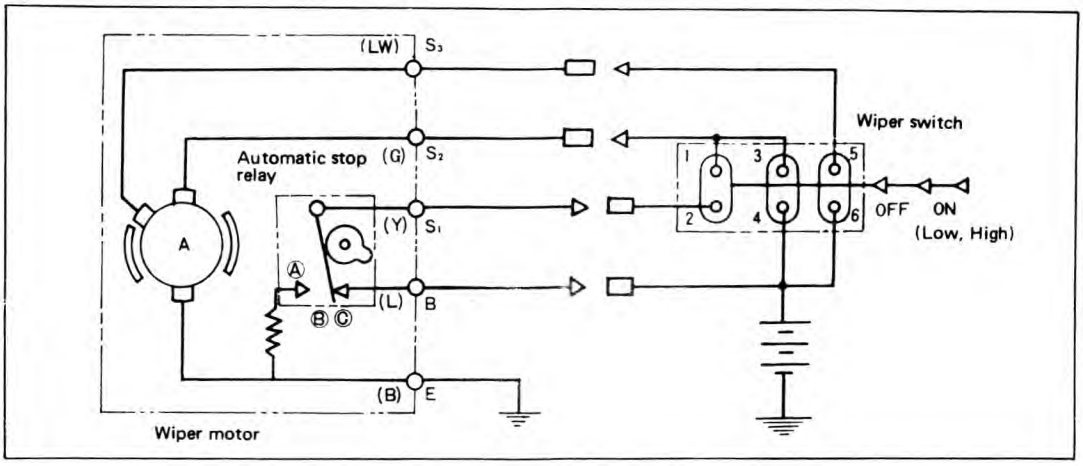


Fig. 12-8 Wiper wiring diagram

4: WIPER MOTOR CONSTRUCTION

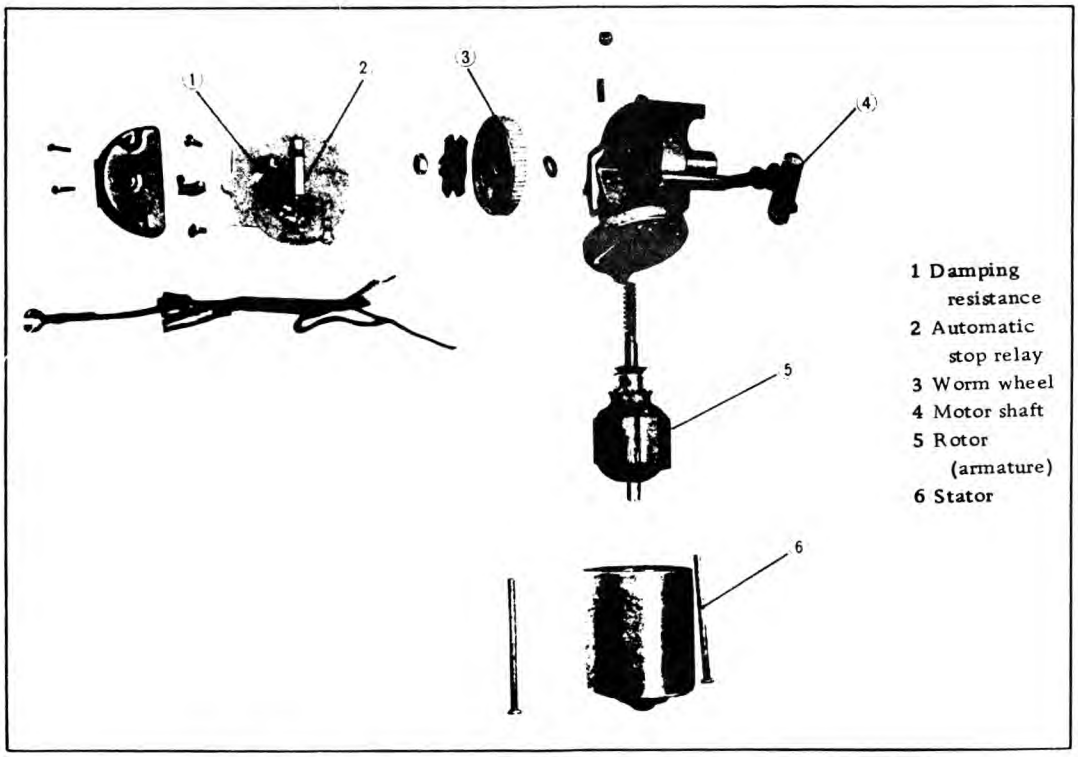


Fig. 12-9 Wiper motor construction parts

5: WINDSHIELD WIPER CONSTRUCTION

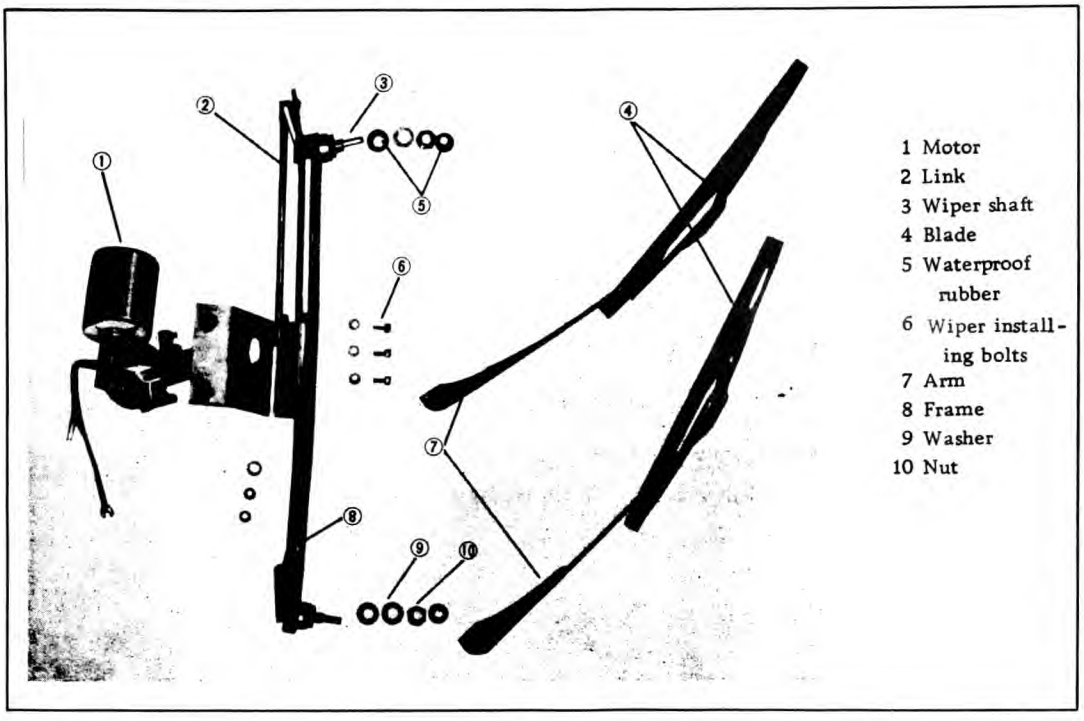


Fig. 12-10 Windshield wiper construction parts

6: SPEED CHANGEOVER AND AUTOMATIC STOP MECHANISM

(a) Wiper when stopped

The wiper at rest is shown in Fig. 12-11. There is no voltage present in the positive brush of the motor (Terminals S2 and S3 connected) at this time, and therefore no current flows to the motor.

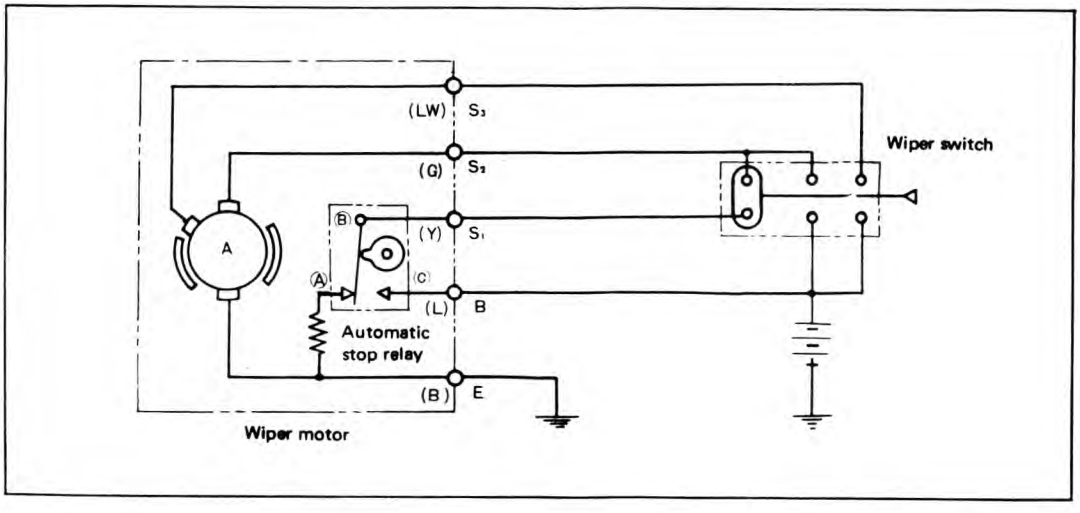


Fig. 12-11 Wiper at stopped

(d) Wiper switch when stopped

1 : When contact point (B) and (C) are connected by the automatic stop relay, current flows in the direction of the arrow as shown in Fig. 12-14 and the wiper operates at low speed.

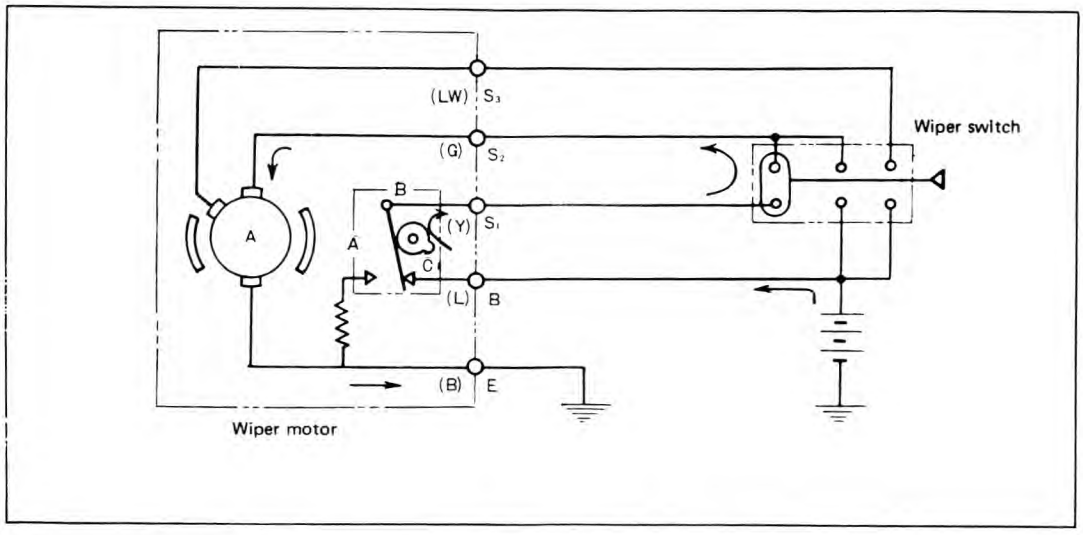


Fig. 12-14 Wiper switch when stopped

2 : When neither contact point (A) nor (C) is connected with contact point (B) in the relay, as shown in Fig. 12-15, no current flows to the motor and operation continues through inertia.

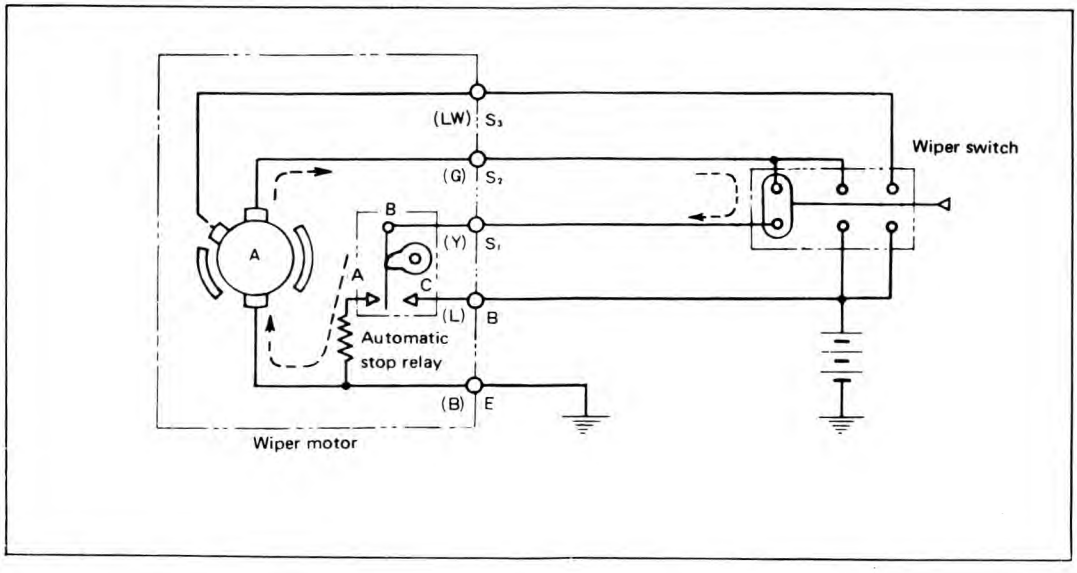


Fig. 12-15 Wiper switch when stopped

(d) Wiper switch when stopped

1 : When contact point (B) and (C) are connected by the automatic stop relay, current flows in the direction of the arrow as shown in Fig. 12-14 and the wiper operates at low speed.

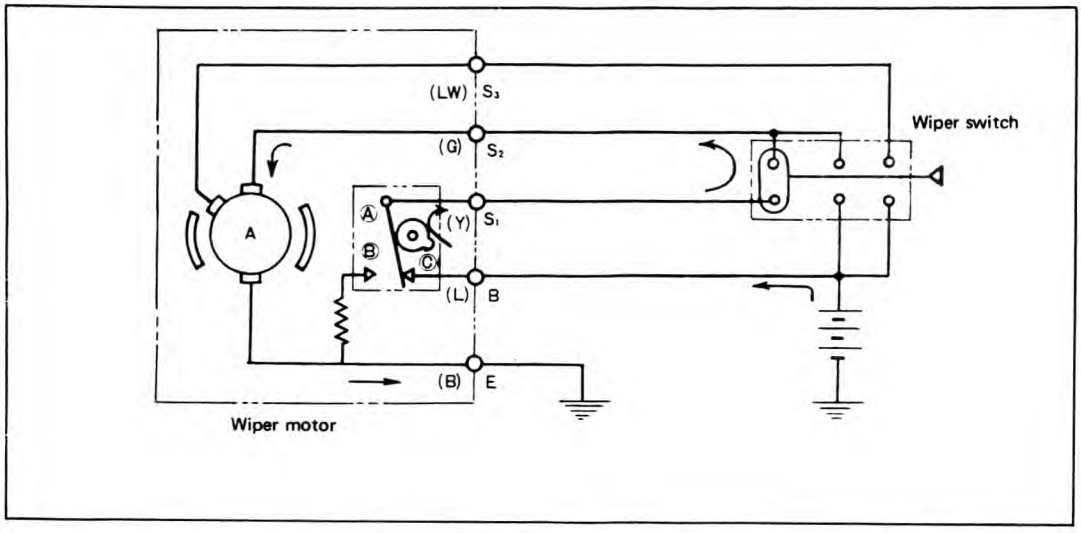


Fig. 12-14 Wiper switch when stopped

2 : When neither contact point (A) nor (C) is connected with contact point (B) in the relay, as shown in Fig. 12-15, no current flows to the motor and operation continues through inertia.

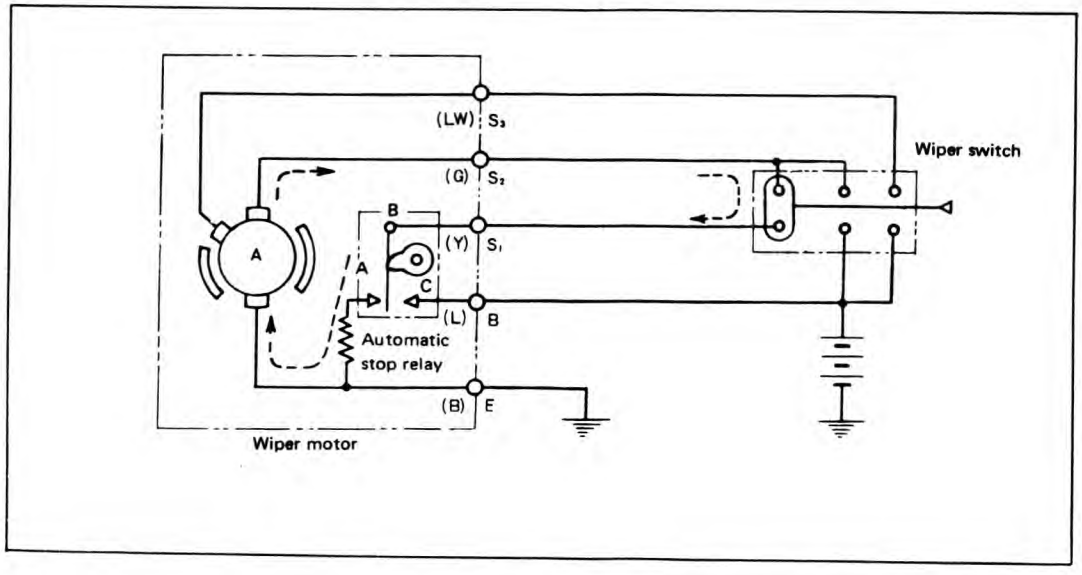


Fig. 12-15 Wiper switch when stopped

3 : When contact point (B) and (A) connected in the automatic stop relay, the rotor = resistance = terminal S1 = switch = rotor close circuit is produced as shown in Fig. 12-16.

There is an armature effect when the rotor revolves in the magnetic field and current flows in the close circuit which was related to the above by electromotive force. In other words, to keep the rotor revolving, current must flow and for this reason the rotor stops as inertia is suddenly consumed. This stopping time suits wiper stopping time (a).

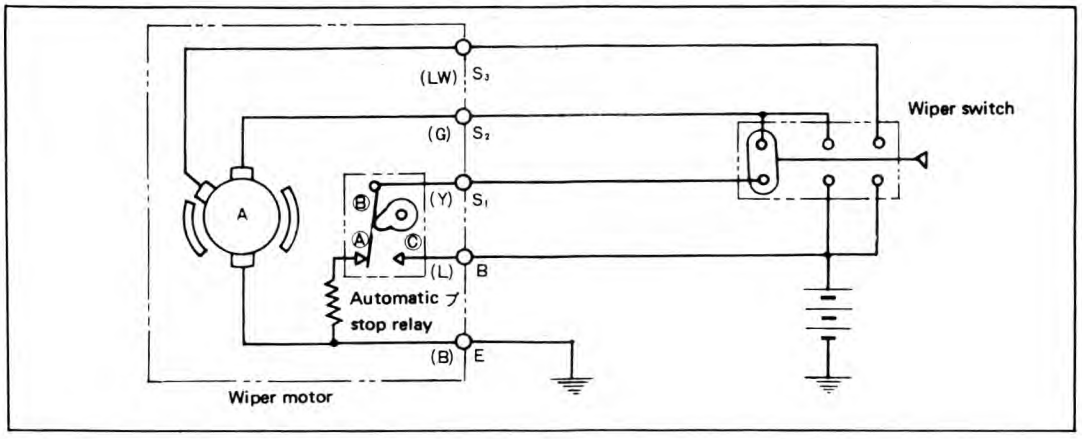


Fig. 12-16 Wiper switch when stopped

(e) Relay action and explanation

The relay functions with rising and falling of a pin by the groove undulations on the surface of the worm wheel as shown by the cross section diagram.

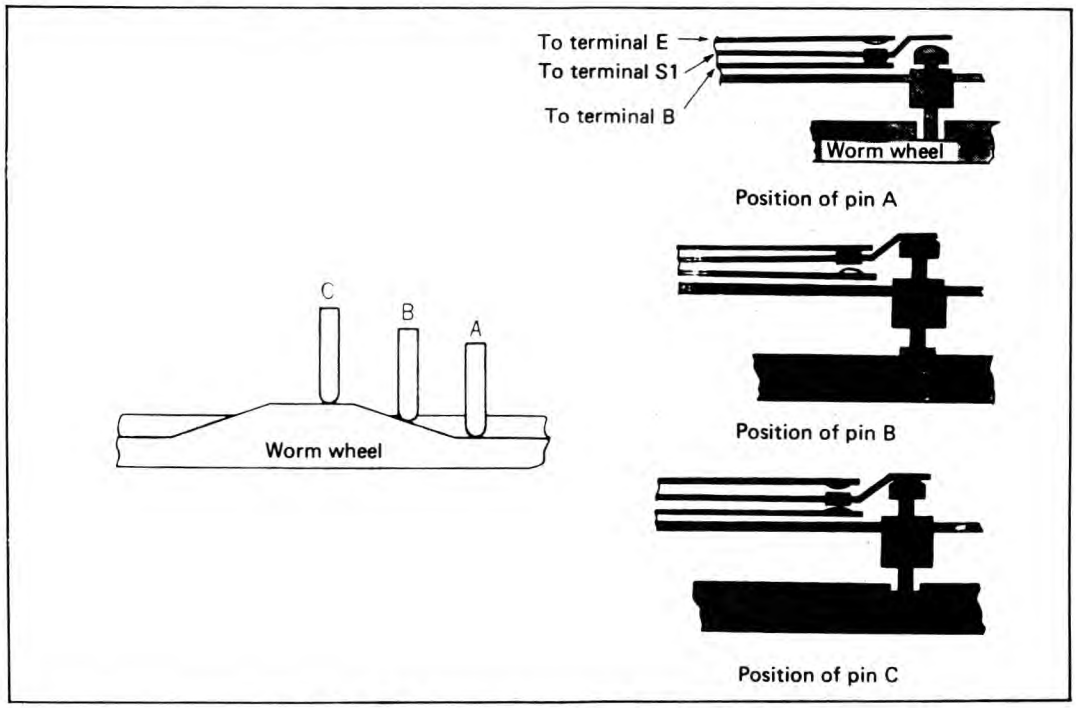


Fig. 12-17 Relay operation and explanation

12-4: WIPER TROUBLESHOOTING

Trouble		Possible cause	Check method	Corrective action
Wiper does not operate	Motor side	. Motor armature wire disconnection	Current does not flow in motor.	Replace motor or armature
		. Worn motor brush		Replace brush
		. Burnt motor shaft	Motor overheats after 4 or 5 minutes of running.	Replace motor
		. Burnt motor or short circuit in the motor	Wiper fuse soon blows.	Replace motor or repair joints
	Power supply and harness side	. Fuse blown by trouble in other part of wiper circuit	Check operation of other parts.	Repair trouble
		. Loose joints, burnt or broken wiring	Check wiring around motor, terminal (connector) insertions.	Repair
		. Faulty wiring when inspecting	Compare joints color coding.	Repair
		. Poor grounding connection	Inspect grounding.	Repair
	Switch side	. Bad switch contact	Motor will not operate.	Repair switch
	Link side	. Link rod disconnected	Current is large even if the arm is raised (3 ~ 5A).	Replace motor or armature
		. Burnt or corroded arm shaft	Check if arm shaft can be moved slightly back and forward.	Lubricate or replace

Trou-ble		Possible cause	Check method	Corrective action
Insufficient wiper speed	Motor side	. Layer-short in the motor armature	Current is heavy even if arm is raised (about 3 - 5A).	Replace motor or armature
		. Worn motor brush	The arm stops with light hand pressure.	Replace brushes
		. Burnt motor shaft	When the arm is raised, current is large (about 3 - 5A).	Replace motor or lubricate (engine oil)
	Power supply and harness side	. Low power source voltage	Check voltage and condition of other electrical parts. Check brightness of lights	Adjust source
		. Low voltage due to corrosion, loose joints	Check by external force on joint and check resistance of joint.	Remove joint corrosion, retighten the connection
		. Short circuit in the harness	Motor overheating.	Insulate joints
		. Imperfect grounding	Check grounding screw.	Retighten
	Switch side	. Poor switch contact	Check voltage drop of switch and operate several times by hand.	Replace switch
		. Motor speed restricted by current applied by switch malfunction or short circuit.	Check the contact switching. Motor overheated.	Replace switch
	Link side	. Burnt arm shaft	Motor buzzes as the arm strokes.	Lubricate or replace
	Blade side	. Blade sticks to glass surface	Lift arm and operate in a no-load condition.	Clean blade and surface of glass
				Replace blade

Trouble	Possible cause			Check method	Corrective action
Faulty wiper speed changeover	Motor side		. One brush worn on the slow or high-speed side	The speed ratio of the low and high speed differs from the 1 : 14 standard. Neither the low nor the high speed is obtained.	Replace brush
	Harness and switch side		. Harness has short-circuit	Motor overheating.	Repair
			. Loose harness connections	Check connections.	Repair
			. Poor switch changeover function	Measure the condition of the switch changeover contacts.	Replace switch
			. Faulty switch contact		
			. Incorrect connections of replaced motor	Check switch type.	Replace with designated type
			. Harness incorrectly connected	Check wiring color coding of each connection.	Correct
Faulty wiper stopping	Stops at random	Motor side	. Automatic stop relay contacts dirty, faulty contact between (B) and (C) due to foreign matter	Disassembly automatic stop cover and examine	Clean contact (do not bend relay plate)
		Harness and switch side	. S1 (yellow) or B (blue) wiring connections faulty or wiring is incorrect.	Check condition of connections	Repair
			. Faulty contact between switch 1 and 2.	Remove switch. Check to see if contact is made between 1, 2 with switch in OFF position	Replace switch

Trou-ble			Possible cause	Check method	Corrective action
Faulty wiper stopping	Does not stop	Motor side	. Automatic stop relay contact dirty, faulty contact between (A) and (B) due to foreign matter	Remove auto stop cover and check.	
			. Automatic stop between (B), (C) will not open	Remove cover and check operation condition.	Repair relay plate bending
		Harness and switch side	. When inspecting wrong wiring and connections	Check connection tips and wiring colors (often due to blown fuse).	Repair
Noise from wiper	Motor side		. Considerable noise, armature rubbing due to metal wear	When a motor rotate as disassembly condition, excessive viblation may occur.	Replace motor
			. Considerable noise due to thrust rattle on armature shaft	When motor shakes in the thrust direction noise appears.	Lightly adjust the thrust adjusting screw
	Link side		. Link metal worn	See if all metal directions are more than 0.3 mm (0.01 in.).	Replace link
			. Link interfering the movement	See if moving mechanism is lined.	Correct the faulty part
			. Rattling developing on the link	Check the link.	Replace
	Arm and blade side		. Rattling in arm mounting	Move arm lightly to left and right by hand.	Replace arm
			. Rattling in each blade	Check the blades at the rivets.	Replace blade
			. Wear in each blade	Check the relationship with the noise and wiping condition.	Replace blade

Trouble		Possible cause	Check method	Corrective action
Incorrect wiping	Arm side	. Wiper arm spring incorrect pressure due to bending damage	Measure arm pressure.	Replace arm
	Blade side	. Blade rubber weak or worn	Check the blade rubber edge.	Replace blade
		. Blade rubber out of shape (deformed)	Check the blade rubber angle.	Replace blade
		. Incorrect distribution of blade pressure	Check the blade holder joint for movement and deformation.	Replace blade or correct shape

The above is a simple check remedy procedure for troubles which may occur. The occurrence of such trouble, however, is rare. Parts are durable and were manufactured under strict quality control, therefore avoid unnecessary disassembly and assembly.

The blades and arms wear with use. Replace them with new ones at intervals of 200 ~ 300 hours of use, after one or two years of use, or every 50, 000 km (31, 000 miles).

12-5: REMOVING AND REINSTALLING WIPER

(a) Loosen heater switch bracket (with heater switch still attached)

(b) Remove the instrument panel installing stay fitted to the heater switch bracket (on the side of the wiper motor).

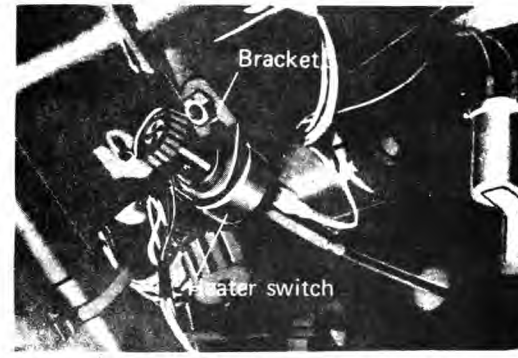


Fig. 12-18 **Heater switch bracket**

(c) Remove the electrical wiring in this area and loosen the speedometer installing spring.

Fig. 12-19 Removing spring

(d) Loosen the arm with the blade still installed.

(e) Remove the wiper shaft installing nut, rubber cap, packing and washer.

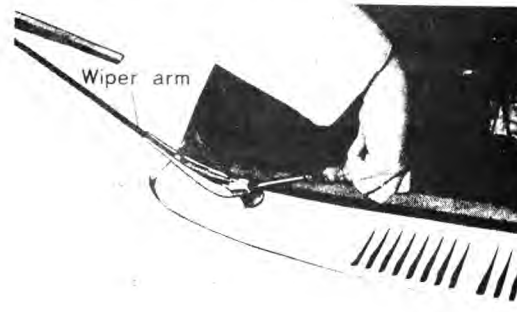


Fig. 12-20 Removing arm

(f) Unthread both wiper motor installing bolts.

(g) Remove slowly holding motor.

Reinstallation is the reverse of removal.

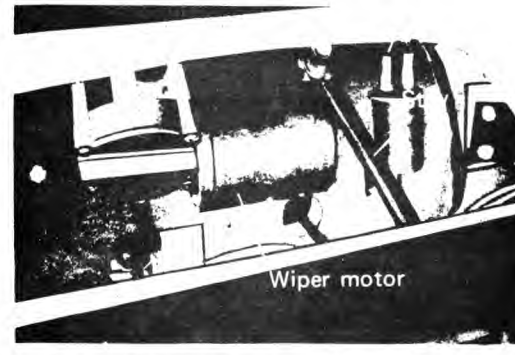
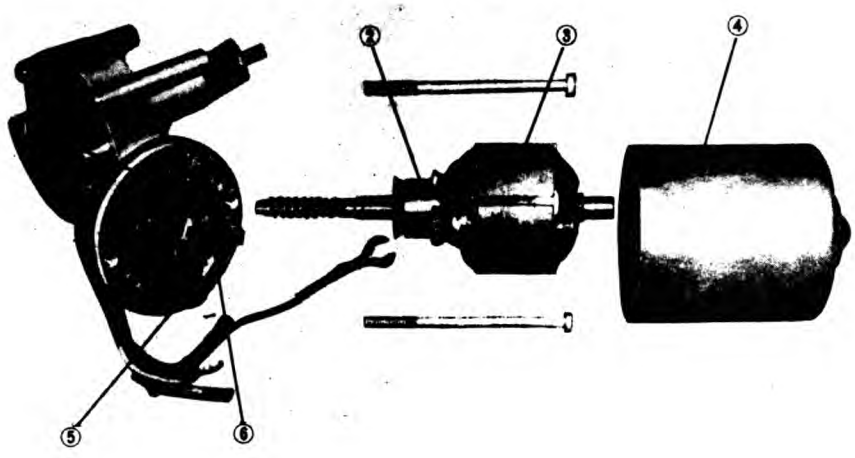


Fig. 12-21 Wiper motor and stay

12-6: WIPER MOTOR DISASSEMBLY



1 Brush (negative)
2 Commutator
3 Rotor
4 Stator (Ferrite magnet)
5 Brush (positive) for low speed
6 Third brush for high speed

Fig. 12-22 Wiper motor disassembly

(a) Changing rotor and brushes

1 : Remove the set bolt

2 : Holding link A firmly with left hand, and slowly remove the yoke.

3 : Hold the brush and remove the rotor.

(NOTE)

(1) When withdrawing the yoke be careful not to remove the rotor.

(2) When removing the rotor be careful not to let oil on the brush.

(3) Do not to misplace the ball installed on both ends of rotor.

(4) There is a thrust plate which takes the rotor ball in the bottom of the yoke so be careful not to loose it.

(5) When assembling the yoke align the protruding part of the frame with the cutaway of the yoke.

(b) Automatic stop relay disassembly

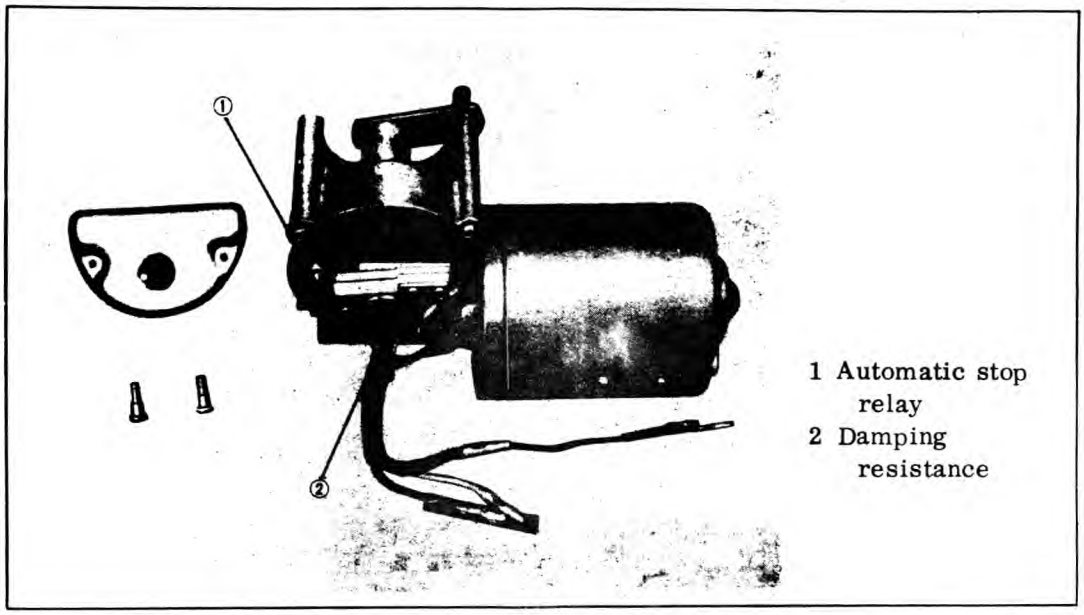


Fig. 12-23 Automatic stop relay disassembly

1 : Loosen the two tightening screws on the relay cover and remove.

(NOTE)

(1) Do not deform the metallic plates connected to the contacts.

(2) Do not loosen the screws with black paint on them.

(c) Assembly

Assembly is the reverse of disassembly.

(d) Changing wiper blades

Disassembly can be made by disengaging the boss from the arm joint and pulling. The boss can be released by depressing the arm.

o Suggestions On Use.

When installing the wiper arm, install it along the lower side of the windshield making sure that it stops automatically at the correct position by turning the motor once.

When it first begins to rain, fine scratches on the surface of the windshield (due to dirt and dust on both the windshield and rubber) can be prevented if the wiper switch is turned on after the windshield washer has been operated. During snowfall or when snow or frost freezes on the windshield do not use the wiper until the snow or ice has been removed.

12-7: COMBINATION METER

The combination meter consists of a counter mechanism, containing (1) speedometer, (2) fuel meter, (3) thermostat, (4) oil pressure warning light. (5) turn signal pilot light, (6) charge warning light.

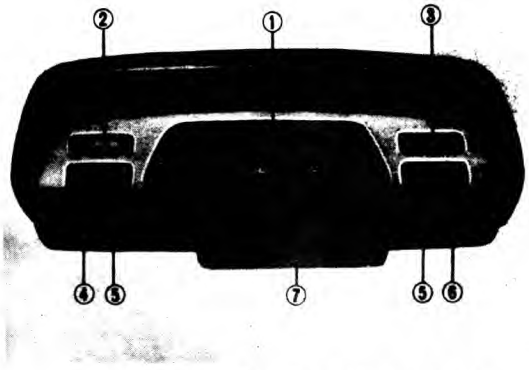


Fig. 12-24 Combination meter

1: SPEEDOMETER

The speedometer is a revolving magnetic type. When the magnet revolves, torque is set up in the rotor by the effect of electromagnetic induction and the rotor turns in the direction of the magnet by the counter action of a hair spring; the speedometer pointer is connected directly to the rotor, and thus speed is indicated.

The magnet revolves by the meter cable transmitted through the meter driven gear. This turning force varies in proportion to the speed of the magnet (that is, the vehicle speed). The hair spring and this turning force are balanced therefore the position of indicator is determined.

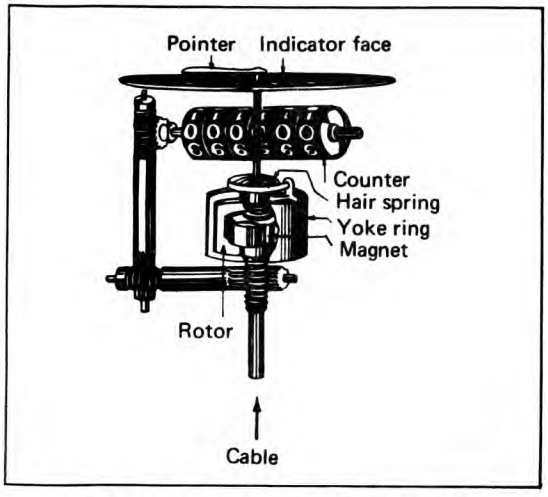


Fig. 12-25 Speedometer operation

The speedometer will indicate 60 km/hr. (37.28 mile/hr) when the number of revolutions of the speedometer shaft is 637 rpm.

2: FUEL METER

The fuel meter operates by the fuel gauge and fuel unit working together. The gauge and unit are both the bimetal strip type with a heat wire coil wound around the bimetal strips, both of the heat wire coils are connected in series.

One end of the bimetal strip on the unit side has a contact, this contact is connected to a float and lever which float in the gasoline, therefore the contact making pressure changes

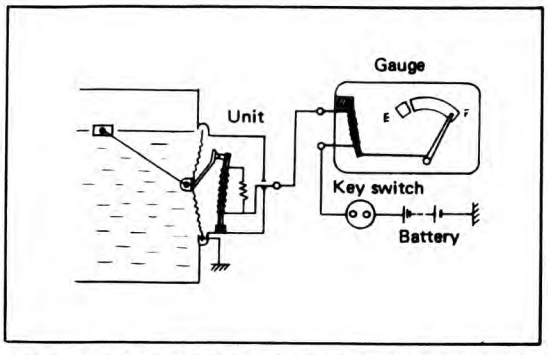


Fig. 12-26 Fuel meter operating circuit

with the rise and fall of the float. When gasoline is full the contact point contacting pressure is strong and when little gasoline remain in the tank the contact pressure is weak. Also, there is a pointer connected to one end of the bimetal strip on the gauge side and the pointer position changes with the bowing of the bimetal strip. Now, when the ignition switch is on, the current flows from the heat wire coil on the gauge side to the heat wire coil on the unit side through the contact then to ground. Heat is developed in the coils and conducted to the bimetal strip. The temperature developed by the heat wire coil increases and the bimetal strip on the unit side becomes greater than the bimetal strip bowing force out by the float and finally the contact opens.

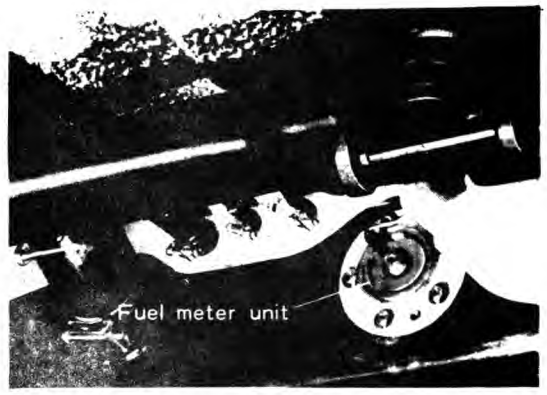


Fig. 12-27 Fuel meter unit installation

When the contact opens, the current through both heating coils is cut-off, the bimetal strip cools, the bowing of the bimetal strip becomes smaller, the contact again closes, and current flows through the heating coils. In this way, contact pressure is strong, a large amount of fuel; the contact will not open unless the amount of heat is increased by increasing the period in which current flows. On the other hand, since the current flow is small when the bowing is small (contact pressure is weak, small amount of fuel) the contact opens.

Curvature determined in proportion to the period over which current is applied to the heat wire of the gauge bimetal, i.e., the amount of heat produced thereby, is shown as a deflection of the pointer to indicate the volume of the fuel.

3: CHARGE WARNING

The charge warning light indicates whether or not the charging system is normal. This light lights when the ignition is turned on, and goes out after the start of the engine and generator. An a-c generator is used in the Subaru 1000, making operating principles of the charge warning light slightly different than in the case of a d-c generator. With a d-c generator, the charge warning lamp is located between the battery and generator terminals, and goes out when the d-c generator and battery voltages are balanced.

There is a relay inside the voltage regulator of the a-c generator system and when the engine is not running, this relay is not operated and thus the warning light lights if the ignition switch is in the ON position. After the engine starts and a-c generator output appears, the relay is operated and thus the charge warning light goes out.

In Fig. 12-28, charge light relay contacts (1) and (2) are closed when the engine is not running (when there is no a-c generator output).

If the ignition switch is ON at this time, current flows as shown by the arrow through the charge warning light and the light lights. After the engine starts and a-c generator output appears, voltage at terminal N connected to the neutral point of the star connection rises, causing contact (1) of the charge light relay to transfer to contact (3). Thus, current in the charge light circuit ceases to flow and the light goes out.

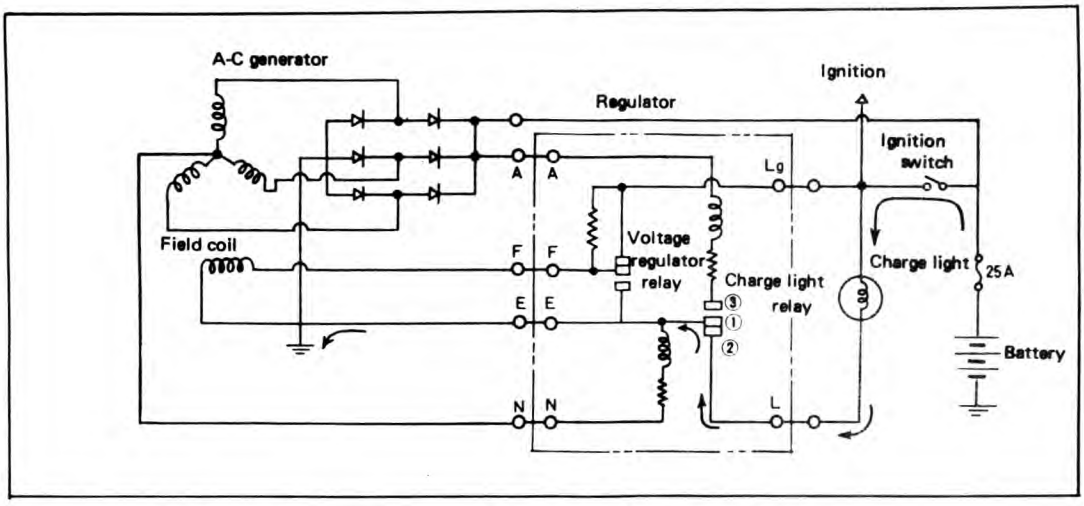


Fig. 12-28 Charge warning light operation diagram

When the charge warning light is ON while the engine is running, charging system trouble exists. The fact that the charge light is not lit does not necessarily indicate a charging state, however. In order to charge the battery, the a-c generator voltage must exceed the battery voltage. Note that the charge warning light goes out although the a-c generator voltage is less than the battery voltage.

4: OIL PRESSURE WARNING LIGHT

The oil pressure warning light indicates whether or not the oil pump is feeding oil under normal pressure to the various parts of the engine. The light is operated by the oil pressure switch located in the lubricating system.

The operation is very simple when the oil pressure is low, the contact is closed and the light lights.

Next, the engine is started and the revolutions increase. When the oil pressure reaches 0.3 kg/cm^2 (4.3 psi) it pushes the diaphragm up by overcoming the resistance of the spring; the contact open and the light goes out.

When the engine is stopped with the ignition switch in the ON position, the light will light and when the vehicle is running the light goes out. The oil pressure switch is located on the right-hand side of the oil pump on the front of the engine.

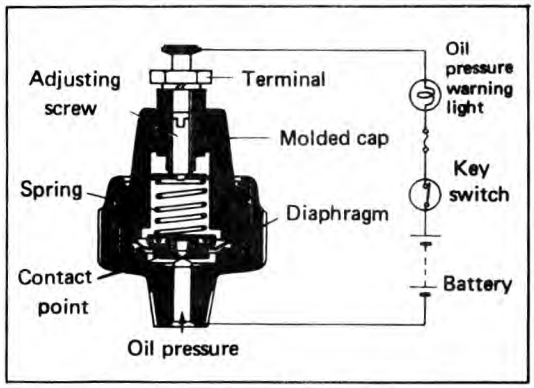


Fig. 12-29 Oil pressure switch construction and operating circuit.

Fig. 12-30 Oil pressure switch installing position

12-8: COMBINATION METER DISASSEMBLY

In the case of removing meter from instrument panel and disassembly, change the order of disassembly depending on the trouble location.

When changing the printed circuit board and each gauge.

1 : Loosen the printed circuit board mounting screws and remove the printed circuit board, fuel gauge, and thermo gauge.

(NOTE) When removing the printed circuit board be careful not to damage the gauge pointers etc..

Fig. 12-31 Removing combination meter

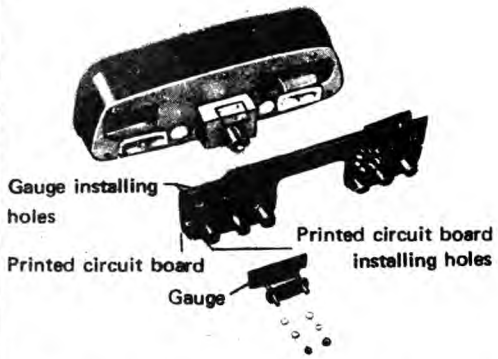


Fig. 12-32 Disassembling combination meter

12-9: REMOVING AND REINSTALLING THE COMBINATION METER

(a) Remove the speedometer cable from the underside of the instrument panel.

(b) Withdraw the wiring socket (holding the socket withdraw from below)

(c) The combination meter can be removed from the instrument panel when you loosen the spring that pulls the meter.

* Assembly is the reverse of disassembly.

* WHEN CHANGING THE SPEEDOMETER

(a) Remove the visor connecting screw and disassemble the visor and speedometer.

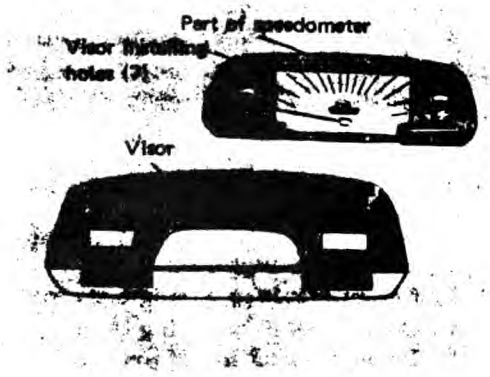


Fig. 12-33 Removing visor

(b) Loosen and remove the speedometer body installing screw from the speedometer and dismantle into speedometer body and case with bracket.

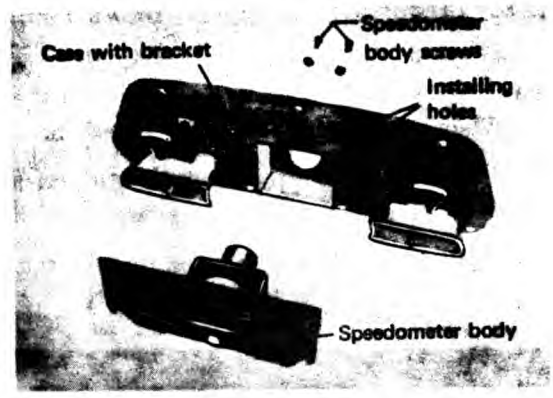


Fig. 12-34 Removing speedometer body

12-10: INSPECTION OF COMBINATION METER

(a) Speedometer

It is all right if the indicated difference when measuring the speedometer tester is within the limits in the table below. The standard indicated speed is 60 km/hr (37.28 mile/hr) when the drive shaft speed is 637 rpm.

Standard indicated speed km/h (mile/hr)	20 (12.43)	40 (24.86)	60 (37.28)	100 (62.14)	120 (74.5)
Tolerance km/h (mile/hr)	±3 (±1.86)	$+5$ -0 $(^{+3.11}_{-0})$	$+5$ -0 $(^{+3.11}_{-0})$	$+5$ -0 $(^{+3.11}_{-0})$	$+6$ -0 $(^{+3.73}_{-0})$

When the pointer swing is large, inspect as it may be thought that there is a faulty installing or meter cable.

(b) Oil warning light and oil pressure switch trouble

o When the light does not go out while engine is running

1 : Inspect amount of engine oil.
2 : Ground between pressure switch and light.
3 : Inspect the operation of pressure switch.
4 : Blockage of oil filter
5 : Oil pressure low. Check oil pressure with pressure gauge.

o When the light is on even with ignition switch in the ON position (before engine starts).

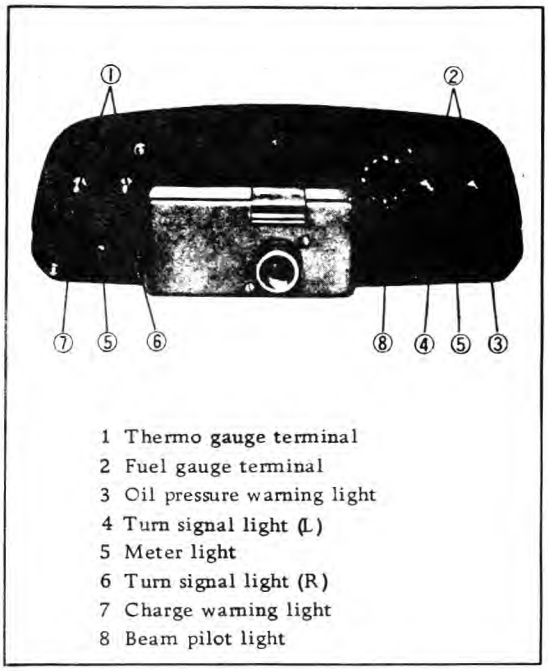
1 : Lamp filament open circuit.
2 : Open circuit in wiring between lamp and ignition switch.
3 : Open circuit in wiring between lamp and pressure switch.
4 : Inspect operation of pressure switch.

(NOTE) Oil pressure switch making and breaking (opening and closing) pressure 0.2 ~ 0.4 kg/cm^2 (2.85 ~ 5.69 lb-ft).

(c) Fuel meter trouble

1 : Examine for faulty terminal connections, open circuit, and grounding in the wiring between the gauge and unit.

2 : When the terminal connection of the unit are loose, the gauge will indicate E; if the loose lead is grounded through the pilot light (12V, 1.5W or 3W), the gauge is in good order if it gradually swings to the lower side.
At this time, if the pilot light does not light, the heat wire coil circuit is open.



1 Thermo gauge terminal
2 Fuel gauge terminal
3 Oil pressure warning light
4 Turn signal light (L)
5 Meter light
6 Turn signal light (R)
7 Charge warning light
8 Beam pilot light

Fig. 12-35 Combination meter connections

(d) Thermometer trouble

1 : Check for faulty terminal connections, open circuits and grounding in the wiring between the gauge and unit.

2 : When there are loose terminals on the unit, the gauge will indicate H. and when there is a ground to the cylinder head, through the pilot light (12V 1.5W or 3W) of the loose lead wire then if the gauge needle gradually swings over to the C side the gauge function is in order. At this time, if the pilot light does not light there is an open circuit on the heat wire.

(e) Installing combination meter

Reinstallation is the reverse of removal.

(NOTE) When installing the gauge, tighten nut so there is no inclination.

12-11: SPEEDOMETER CABLE

(a) Removal

1 : Remove the cable from the speedometer by turning the nut on the cable.

2 : Peel back the boot on the end of the transmission side gear shift arm, loosen the clip and disconnect the shift arm and connector so that the rod can be moved

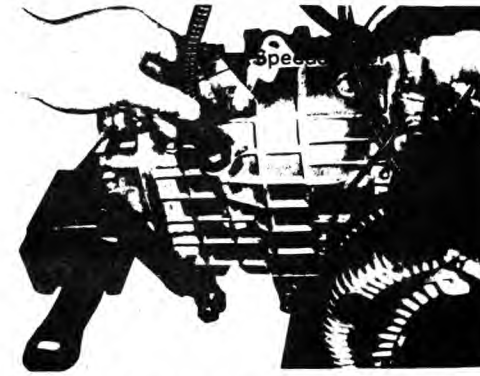


Fig. 12-36 Removing speedometer cable

from left to right. (Refer to removing and reinstalling gear shift system)

3 : Using a special tool or pliers, avoiding the gear shift rod, disconnect the cable with the transmission by turning the cable socket.

(b) Installing

Reinstallation is the reverse of removal.

12-12: HORN

(a) Principle

The existence of noise can be recognized when the range of a wave of condensation and rarefaction in the air is produced. The electrical horn (hereafter referred to as horn) operates a vibrator by an electrical force in order to produce this wave in the air. When this action is explained, it is as shown in Fig. 12-37. If the horn button is pushed, the magnet attracts the iron plate pole piece due to the current flowing in the coil and the circuit is made. In this case, due to the vibrator which is connected to the pole piece through the shaft, being suddenly pushed down in the direction of the arrow (1) the density of the air in front of the vibrator is compressed and becomes dense. When the pole piece is attracted in the direction of the magnet the current that was flowing, due to the opening of the contact is disrupted. Therefore, the pole piece tries to return to its original position by means of vibratory element repulsion. Then, the dense air in front of the vibrator becomes rough. When the pole piece and adjusting nut return to the starting position the current begins to flow in the coil and attracts the pole piece due to the closing of the contact that was open until now.

The above action produces noise due to the change of density of the air by the vibrator in the manner of dense, coarse, etc., for as long as the button is pushed.

The vibrator depending on its shape is not uniform however operates about 330 ~ 460 times per second and the value represents the interval generally called basic frequency and the unit is the cycle.

(b) Construction

The spiral type electric horn is a resonance tube wound in the shape of a vortex, and it requires a minimum of mounting space.

Main parts consists of a contact which intermittently regulates the flow of current, magnetic circuit, vibrating plate, and the spiral tube, shown in Fig. 12-37. The contact has a high switching frequency and due to the coil load and necessity for arc prevention and wear prevention high quality material and pure tungsten are used. As shown in Fig. 12-37, R represents an arc sup-

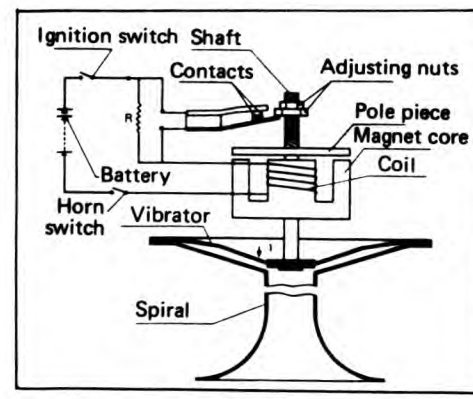


Fig. 12-37 Horn operation circuit

pression circuit resistance to prevent contact burning.

Wire is used in the coil and polyester plastic is filled into the core with the object of preventing electric corrosion. Due to the vibrator being the life of the horn it must be sufficiently strong, as it vibrates some hundreds of times per second; therefore special alloy steel is used and its thickness very strictly controlled.

A spiral is used in order to efficiently transmit the sound produced by the vibrator into the air, therefore the interior of the spiral must be airtight also aluminum is used due to the quality of material and hardness required. Moreover all parts are balanced and precisely regulated.

(c) Protection and adjustment

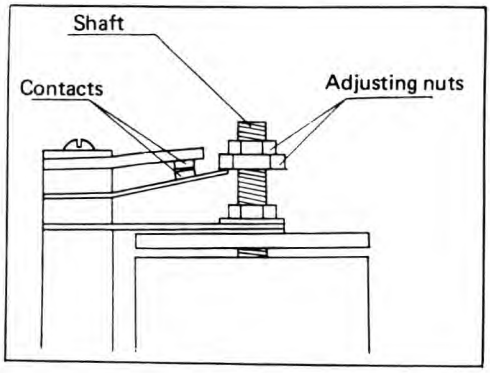


Fig. 12-38 Contact inspection and adjustment

Do not touch internal parts other than those due to the fact that the horn has been precisely regulated. Due to contact oxidization and burning by continual usage or due to dirt on the contact by humidity, (in this case the contact is a dark brown color) decrease the current otherwise the circuit will cease to function and sound disappears. In this case, remove the adjusting nut as shown in Fig. 12-38 from the shaft and when the metal contact plate is pushed down by the screwdriver or similar object the two contact separates and a gap opens. Clean the upper and lower contact surfaces, with a piece of fine grade sandpaper (above #300). The contact oxidization by burning and damage by dirt can be repaired if the contacts are polished. The current required in this case is done by connecting an ammeter across the horn; replace the adjusting nut which was removed, back onto the shaft and adjust to the required current.

* Required current

Double horn 2A each

In this case, if there was only a low volume of sound, the current is adjusted by the adjusting nut. When the nut is turned to the right the current becomes smaller and the volume also becomes smaller. In reverse, if the nut is turned to the left the current increases and the volume also increases. After current adjustment tighten the nut so that it will not loosen.

(d) Other items of attention

The horn is damaged by mud and water. For this reason be careful not to splash water when washing the vehicle. When there is water or mud on the horn, wipe it off with a cloth, etc., also when water enters the interior of the spiral, as the horn will not sound remove the wiring and horn by turning it in the direction of the spiral to drain water.

Faulty horn sounding is due to bad contact between the wiring and other terminals, however in this case disconnect the wiring and check the horn

terminals. When the terminals connections are black caused by faulty contact, repair the terminals so that they are connected well. In this case wipe the horn terminals clean with a cloth. The horn circuit is established, to sound the horn, by grounding the open end through the steering shaft. Therefore, sounding also occurs if the steering shaft is off the ground (the ground terminal of the battery).

When the horn does not sound check by tracing the circuit with a tester. When there is a faulty ground on the steering shaft, with the horn switch in the ON position and 12 bolts in the steering shaft check with a tester.

(e) Horn installing position

The horn is always installed on the engine hood and is so placed that it does not obstruct when inspecting the engine.

Fig. 12-39 Horn installing position

12-13: TURN SIGNAL UNIT

(a) The electromagnetic thermo wire sounding flasher type

The Subaru 1000 automatic switching and sounding flasher type was given the name of magnetic thermo wire sounding flasher at it produces a sound and automatic switching action by the joining of a relay and expansion and contraction of the thermo-wire (nickel chrome wire). This sound type flasher was jointly designed by the JIS standards of Japan and the SAE standards of America.

* Features are as follows.

1 : Superior durability

2 : The number of switching times is 68 ~ 92c/m by a standard voltage of 12 V DC, the switching ratio(the light time against the switching time for one cycle) is 30 ~ 60%; and with a voltage range of 16 ~ 15 V DC, the number of switching times is 50 ~ 120 c/m, a switching ratio of 30 ~ 75% is maintained.

3 : The sound operation of the flasher itself can be heard.

4 : When either of the front or rear turn signal light is open switching time becomes unusual and the sound operation disappears, the driver is able to judge a turn signal light open circuit both visually and audibly.

(b) Wiring diagram

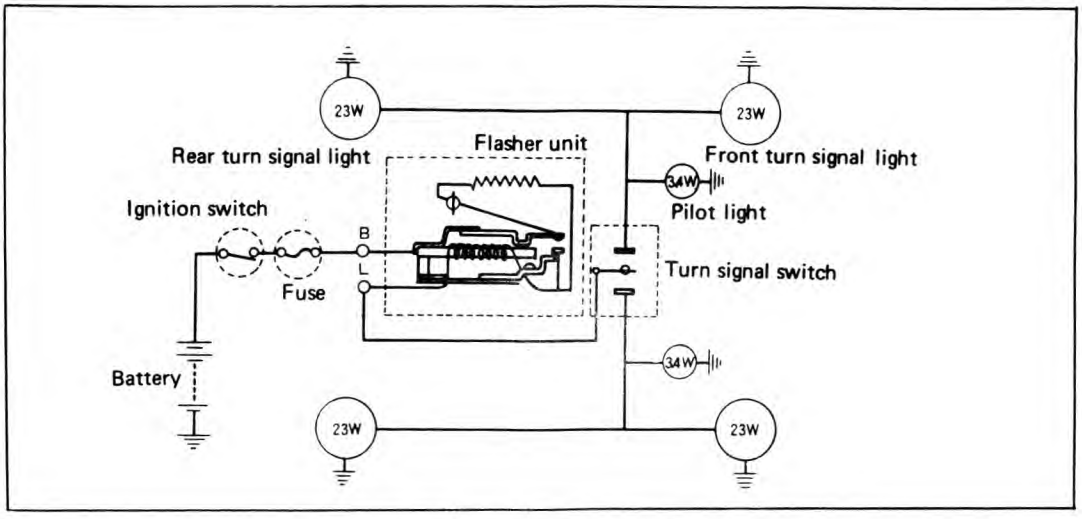


Fig. 12-40 Turn signal unit circuit

(c) Operating priciple

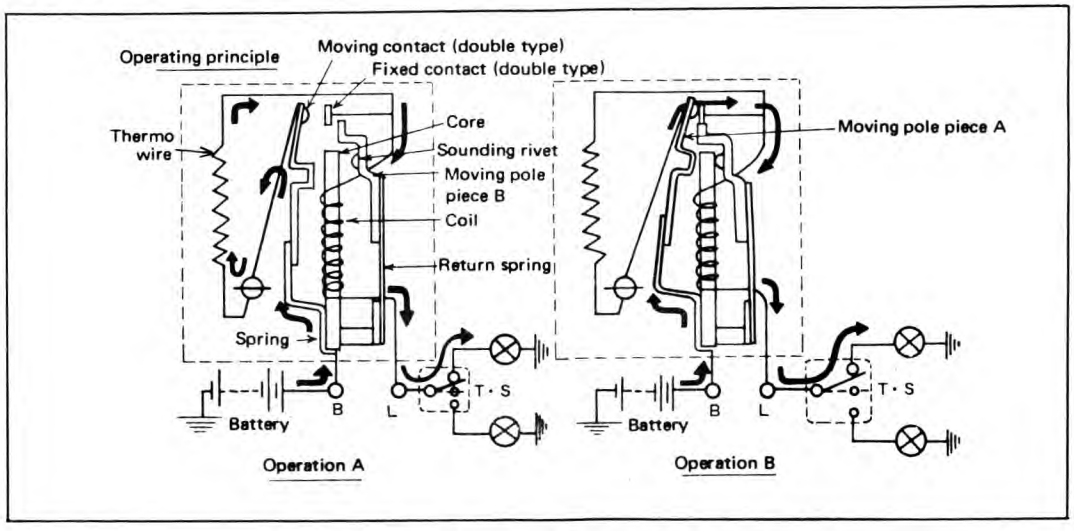


Fig. 12-41 Operating principle circuit

1 : When the turn signal switch is closed in either the right or left hand position, the current flows from the battery through terminal B, spring, moving pole piece A, thermal wire, coil, terminal L, turn signal switch and to the light (operation A).

The termperature of the thermal wire suddenly increases by the flowing of current and due to the expansion produced by the thermal wire moving pole piece A is pulled by the spring thus making switching contact.

2 : When the contact is closed the thermal wire is shorted and a large current flows in the coil and light (operation B). At the time the light lights, the coil magnetizing force increases and moving pole piece A is attracted to the core establishing contact.

Also, at the same time, movable pole piece B is attracted to the core and the sounding rivet and core contact producing the sound.

3 : While this contact is closed (when the light is lit the thermal wire is shorted) current does not flow. For this reason, the thermal wire contracts by the cooling of the surrounding air and the tension increases, when tension rises above a certain value it overcomes the magnetizing force of the coil separating movable pole piece A from its attracted condition. When the contact opens, the light goes out and the magnetizing force decreases so the sound producing pole piece B is returned to its original position by the metal return spring.

4 : When the contact is open and back to condition 1 as related to above the light switching operation will continue regularly while the turn signal switch is closed.

12-14: TURN SIGNAL CIRCUIT TROUBLE SHOOTING

Trouble and possible cause	Corrective action
1. When the left and right number of switching times is different and only operates on one side.	
(1) Bulb filament of one side open circuited	Change bulb
(2) Faulty switch	Repair or replace
(3) Different bulb wattage used on one side	Replace bulb
(4) Open ground with bulb	Repair bulb socket
(5) Faulty wiring connections	Repair wiring connection
2. When neither right nor left signal does not lights	
(1) Blown fuse	Change fuse
(2) Faulty connection or open circuit between switch and battery	Repair or replace
(3) Faulty switch	Repair or change
(4) Pilot light filament open circuit on both right and left	Replace bulb
(5) Faulty flasher unit	Replace flasher unit
3. When neither left nor right signal does not goes out.	
(1) Faulty flasher unit	Replace flasher unit
4. When number switching times is too quick	
(1) Bulb wattage smaller than required wattage	Replace bulb
(2) Poor bulb grounding	Repair
(3) Faulty flasher unit	Replace flasher unit
5. When number of switching times is too slow	
(1) Source voltage low	Charge
(2) Bulb wattage larger than stipulated wattage	Replace bulb
(3) Faulty flasher unit	Replace flasher unit

(d) Handling flasher and care while installing

1 : Use bulbs with the values listed in the table below

Front turn signal light	12V 23W (12.8V - 1.8A)
Rear turn signal light	" "
Side turn signal light	12V 6W
Pilot light	12V 3.4W (14V - 0.24A)

The electromagnetic thermal wire intermittent sound type flasher operates by the current which flows in the light.

If bulbs other than those stipulated are used the flasher switch becomes abnormal due to the different current therefore it is necessary to use the required bulb.

2 : When more than one of the turn signal light has an open circuit inspect as the sounding action disappears and abnormal flashing is caused.

3 : As the flasher unit is an electromagnetic thermal wire intermittent sound type be careful not to give it a shock when handling etc. (do not drop when installing).

4 : When the flasher continually operating heats up just like a vacuum tube it does not necessarily mean that it is out of order.

(e) Installing position

The flasher unit is installed on the under right-hand side of the instrument panel.

Fig. 12-42 Flasher unit installing position

12-15: SUBARU 1000 CAR RADIO

1: MAIN FUNCTIONS AND SPECIFICATIONS

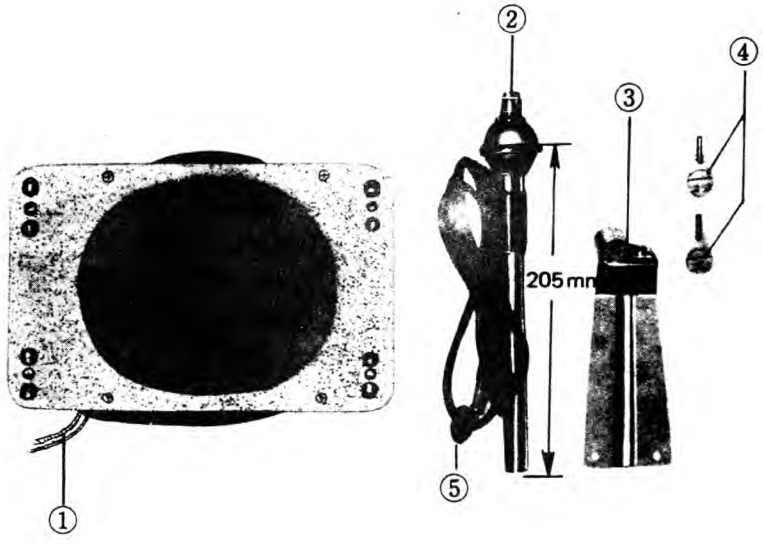
Receiving frequency range	530 ~ 1605 kc
Type of receiver	Super heterodyne type
Number of station selection buttons	5
Sensitivity	Below 20 dB
Power source	12V negative to earth automobile battery
Power consumption	Below 12V 0.6A
Weight	1.3 kg (2.87 lb)
Electrical output	15W output level at under 10% distortion
Automatic volume control	Above 50 dB (measuring point 1,000 Kc)

2: INSTALLING SUBARU 1000 CAR RADIO

Fig. 12-43 Radio installing position

(a) Speaker (5 inches)
Impedance 8 Ω (3.5W)

(b) Antenna
Five stages when totally extended:
910 mm (35.83 in.)



① Speaker cord
(length 100 mm) (3.94 in.)
② Antenna
③ Antenna bracket
④ Antenna key (2 off)
⑤ Grommet

Fig. 12-44

(c) Table of accessories

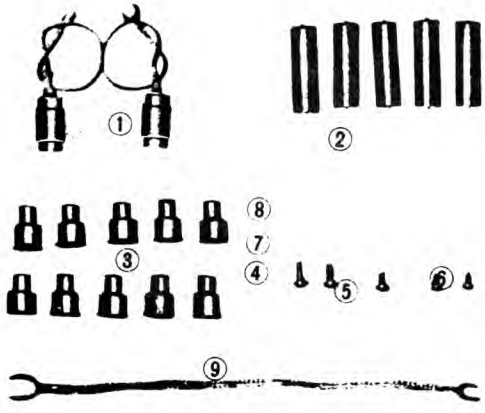


Fig. 12-45

No.	Part	Standard
1	Auto condenser	61207
2	Noise suppressor	ERA-S10 (type S)
3	Noise suppressor insulating rubber	004
4	Small crosspoint screw	5 x 12 mm (0.2 x 0.47 in.)
5	Small crosspoint screw	5 x 6 mm (0.2 x 0.24 in.)
6	Small crosspoint screw	4 x 8 mm (0.16 x 0.32 in.)
7	Flat washer	5 mm (0.20 in.)
8	Spring washer	5 mm (0.20 in.)
9	Grounding bond wire A	Length 250 mm (9.8 in.)

3: INSTALLATION PROCEDURE

(a) Antenna

1 : Remove the (vinyl chloride) plug in the antenna installing hole on the left side of the hood.

2 : Peel off the paper on the underside of the antenna installing hole and carefully clean the area around the hole to establish perfect grounding.

3 : Insert the antenna pipe from the under side of the hood and secure the antenna on the upper side.

4 : Loosen the antenna bracket screws (5 x 12 mm) (0.2 x 0.47 in.). Slip the bracket over the antenna rod and clamp it at a position 60 ~ 65 mm (2.36 ~ 2.56 in.) from the bottom of the antenna rod.

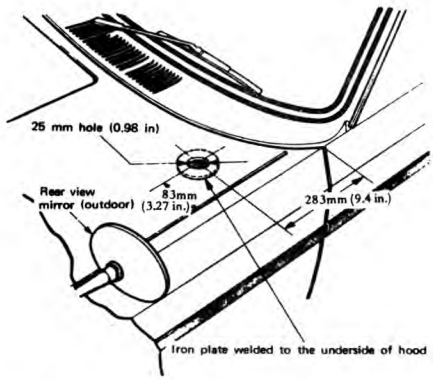


Fig. 12-46 Antenna installation hole position

5 : Fasten the antenna bracket to the bracket on the underside of the hood with two (5 x 12 mm) (0.2 x 0.47 in.) screws. The antenna bracket holes are tapped.

6 : Remove the plug in the antenna feeder hole on the left end of the dashboard. Pass the feeder through this hole into the vehicle and fit the grommet into place. With the hood fully open leave a small amount of slack in the feeder.

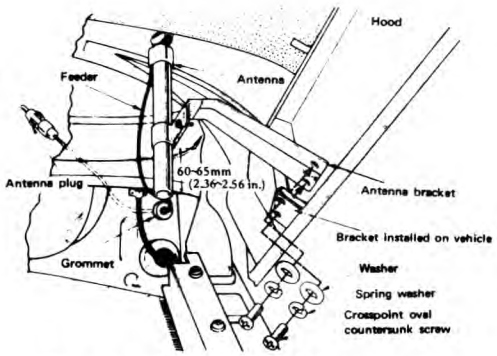


Fig. 12-47(a) Installing antenna

Roof Antenna Installation Procedure

Installation Position

Installed together with the side visor stay at the right side roof.

Installation Sequence

Install the parts with a screwdriver from the interior as shown in the above diagram.

Pass the cord through the right side front pillar and connect it to the

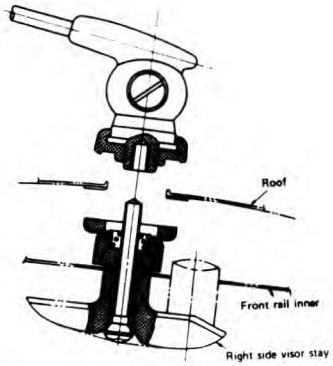


Fig. 12-47(b) Installing roof antenna

radio by passing it through the hole in the inner panel.

(b) Preparations prior to installation of the operating and speaker section.

1 : Remove the four self-tapping screws at the top and bottom and remove the control panel from the lower radio installation section at the center bottom of the instrument panel.

2 : Remove the four speaker grill nuts and remove the speaker grill.

(c) Installation of the operating section (Refer to Fig. 12-48)

1 : Fasten the operating section bracket to the operating section installation hole with the four pan head screws (4 mm x 8 mm).

2 : Insert the operating section from the rear of the installation hole, install the radio grill, and temporarily fasten it with the two lock nuts (9 mm).

3 : Fasten the rear bracket to the rear of the operating section and the side of the vehicle with the small pan head screws (5 mm x 8 mm and 5 mm x 12 mm).

4 : Tighten the lock nut and install the knobs.

5 : Secure the rear bracket firmly.

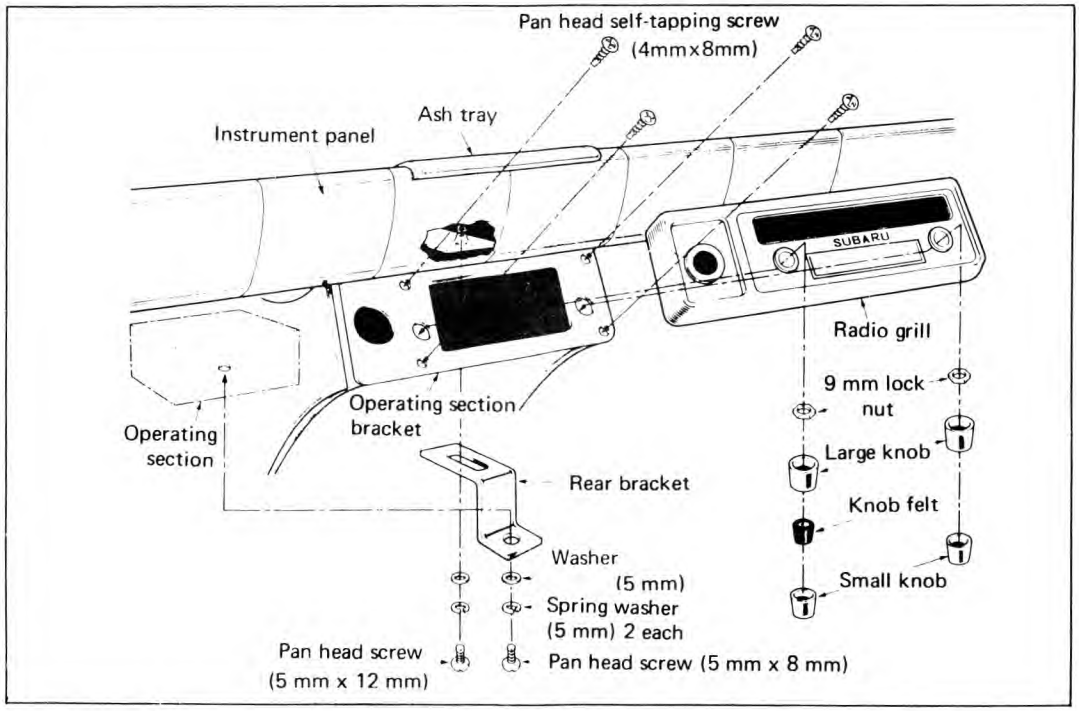


Fig. 12-48

(d) Installation of the speaker section (Refer to Fig. 12-49)

1 : Fasten the speaker to the instrument panel installation hole with the 4 small pan head screws (4 mm x 16 mm) at the hole made by removing the speaker grill in (b)-2 above.

2 : Install the speaker grill into its original location with the four nuts.

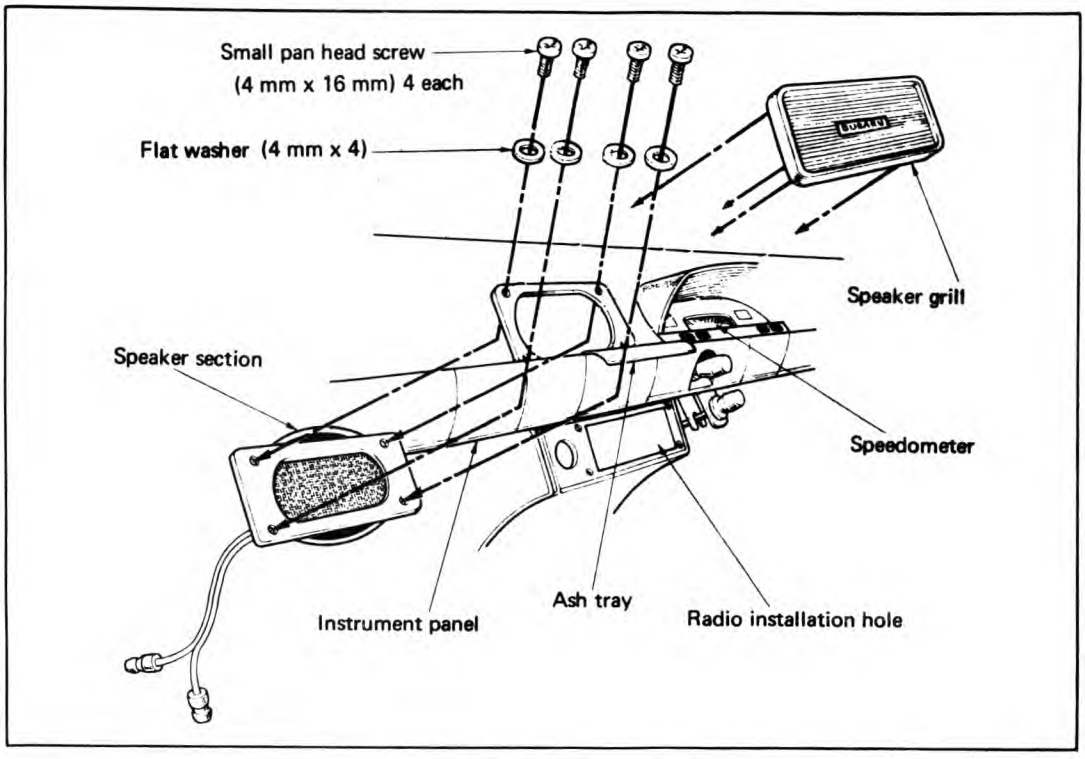


Fig. 12-49

(e) Connection procedure

1 : Push the plug from the antenna section into the lead type antenna receptacle at bottom left of the operating section.

2 : Connect the speaker cord from the speaker section to the speaker cord terminal protruding from the lower right side of the operating section.

3 : Connect the power cord (green/red) coming from the lower right side of the operating section to the radio power cord (green/red ACC terminal) coming from the wire harness at the inside center of the instrument panel.

4 : Install the control panel removed in (b)-1 above to its original location.)

(f) Noise suppressor installation procedure

1 : Install the auto condenser case to terminal E of the alternator and the lead terminal to terminal A.

2 : Install the autocondenser case using the locking screw of the ignition coil and connect the lead terminal to the (+) terminal of the ignition coil.

* Since all type vehicles in the Subaru 1000 series employ NS cords (resistance wire) in all the high voltage lines, installation of noise suppressors to the high voltage line is unnecessary.
Moreover, NS cord is indicated by "NOISE SUPPRESSOR CORD" in green.

(g) Grounding wire installation procedure

1 : Install accessory ground wire A between the rear of the engine and the blower motor case.

* Connect the U shaped terminal (large) ground wire by loosening the hex bolt at the right rear of the engine (toward advance direction) and the other terminal (small) by loosening the hex bolt which holds the duct of the blower motor case.

4: ANTENNA TRIMMER ADJUSTMENT PROCEDURE

When the antenna trimmer is not adjusted the sensitivity becomes bad about 6 dB below half and noise is easily picked up. Therefore, the following adjustment procedure must be carried out when installing.

(a) Adjustment before mounting the receiver

1 : Mount antenna PA-81 on the front fender installing position, pull the antenna cord through into the interior of the vehicle and place the receiver on the front seat, insert the antenna cord into the receiver antenna socket.

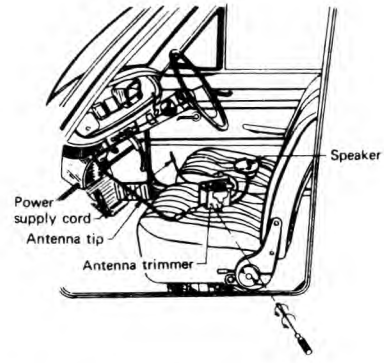


Fig. 12-50 Adjustment before installation

2 : In this way, with the set resting on the seat connect the speaker cord and the power supply cord and switch the radio on. If it does not operate it may be due in many cases to an imperfect antenna ground, therefore examine over again. When the antenna is improperly grounded the noise of the vehicle can be strongly heard.

3 : Extend the antenna to its fullest and adjust the radio volume control to a suitable volume.

4 : Next, pick up a station in the region of number 14 (1400 kc) on the radio wave band, by turning the antenna trimmer screw to the left or right stop adjustment when the station reception is best. If there is no station in the region of 1400 kc stop adjusting when the loudest external noise can be heard. (Sensitivity improves as noise increases because the radio S/N is a constant 20 dB. Thus, if noise is from one to ten the signal is from ten to one hundred.)

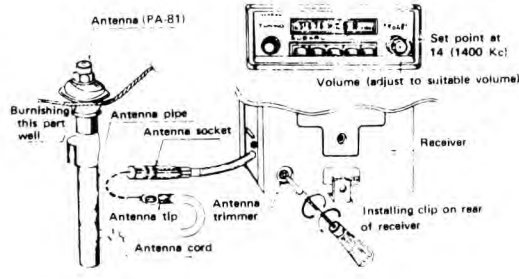


Fig. 12-51 Adjusting sensitivity

(NOTE)

(1) Necessary tools for adjustment are one small screwdriver and one medium size cross-point screwdriver.
(2) The antenna trimmer is a regulator type fitted to match the receiver and the antenna. Adjustment must be made when changing the antenna before installation or after installation.

(b) Adjusting receiver before installation

Loosen the four tapping screws left and right, upper and lower from the speaker grill on the under side of the switch panel.

When the speaker grill has been removed, adjust the receiver antenna trimmer with a driver by inserting the hand through the speaker grill hole. Follow the procedure in (a) regarding pointer positioning and volume (volume control).

12-16: WINDSHIELD WASHER

* Specifications

Type of motor	D-C magnet type motor
Type of pump	Centrifugal pump
Voltage and current	Less than 12V - 3A
Standard time	1 min
Spraying pressure	Above 0.4 kg/cm^2 (5.69 psi)
Spraying volume	Above 500 cc/min (1 pt/min)
Spraying holes	1 mm two each (0.04 in.)
Tank capacity	1.3 liters (2.86 Imp gal, 3.43 U.S. gal.)
Detergent used	designated liquid
Weight	0.63 kg (1.39 lb)

1: WINDSHIELD WASHER INSTALLING POSITION

(NOTE) The washer switch is combined with the wiper switch .

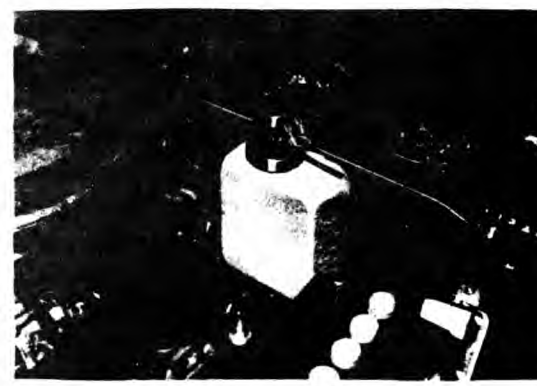


Fig. 12-52 Windshield washer installing position

12-17: WIRING HARNESS

Wiring harness inspection is made eliminating easy the vinyl tape from the outside of the wiring harness.

(a) Fuse box

The fuse box is on the left hand side of the engine compartment on the fender. Spare fuses are attached to the wiring harness at the rear of the battery.

Fig. 12-53 Fuse box installing position

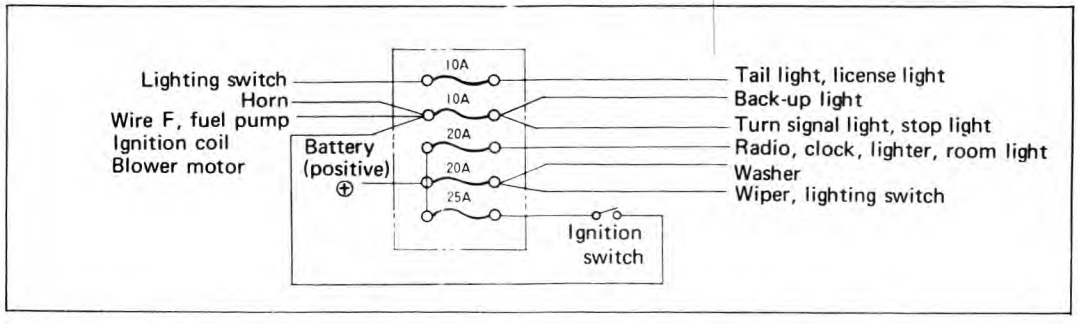


Fig. 12-54 Fuse circuit

12-18: LIGHTS

1: HEADLIGHT

Fig. 12-55

Fig. 12-56 Head light

The installing bolts of the Subaru 1000 head light are dual purpose, for installing and for lighting adjustment.

Lighting adjustment is made by opening the front hood and turning these bolts with a screwdriver or wrench.

[With the vehicle empty and the maximum intensity point of the main beam at a position 3 meters (9.84 ft) from the lights, the head light installing height should be 645 mm (25.4 in.) from the ground]. Note on this occasion, adjustment is made by loosening the three bolts from a fully tightened condition.

As stated before these bolts also have the dual purpose of mounting, therefore if they are loosened excessively there is a chance they may come off while the vehicle is running.

2: **FRONT TURN SIGNAL LIGHT**

The front turn signal light is a 12V ~ 23/7 W double filament dual purpose light used also for parking.

Fig. 12-57 Removing front turn signal light

Fig. 12-58 Changing bulb

(a) Removing

Open the front hood, loosen the screw on the upper end of the front turn signal light and withdraw from the front, after unhooking the spring at the bottom.

(b) Changing bulb

The bulb can be removed from the engine compartment side if the socket is turned to the left and withdrawn.

If it is not changed for a stipulated bulb the turn signal switching is unusual.

(c) Side turn signal light

A 12V-6W bulb is used in the side turn signal light. The bulb is changed by opening the hood, withdrawing the socket and changing the bulb

Fig. 12-59 Side turn signal light

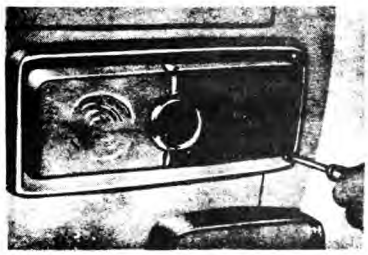
REAR COMBINATION LIGHT

The rear combination light is the tail stop light (outside) and the rear turn signal light (inside) combined to make a single unit; the back of the tail stop light can be used as lighting for the trunk. The tail stop light is a double filament 12V - 23/7W and the rear turn signal light is a single filament 12V - 23W bulb.

(a) Removing

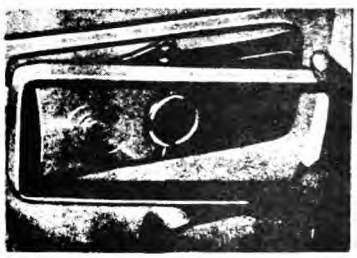
Loosen and remove the six light installing nuts from the inside of the trunk.

(b) Order of changing bulbs



① Remove the two screws

⑤ Gently pushing the bulb twist and withdraw



② Remove the rim around the outside of the lens

③ Remove the two lens screws and molding on the center of the lens

④ Remove the lens

Fig. 12-60 Order of changing bulbs

4: LICENSE LIGHT

Fig. 12-61 Removing license light

Fig. 12-62 Removing license light

(a) Removal

Loosen two screws and remove. Changing bulbs is the same as above, bulb 12V - 8W.

5: BACK UP LIGHT

a) Removing

Loosen two nuts which installed the back up light to the rear bumper, and remove the back up light.

b) Changing bulb

The bulb can be changed by loosening two lens installing screws, and removing the lens.
The bulb's a 12V - 23V.

Fig. 12-63 Changing bulb

6: ROOM LIGHT

The room light switch is a three stage type; the changover is as follows.

Position (1)
The light is kept lighted.

OFF position
The light is kept put out.

Position (2)
The room light is lit by the door switch with room light switch at this position.

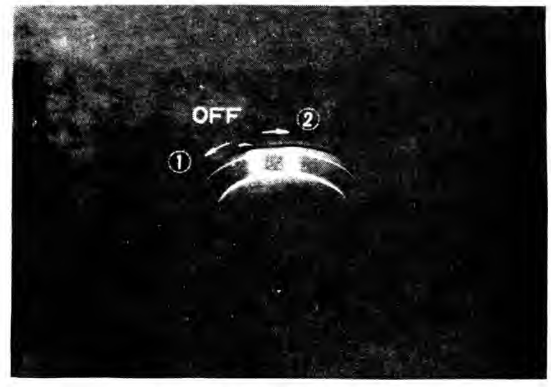


Fig. 12-64 Room light

Note that with the switch in the OFF position even with the door open the light will not light.

(a) Removing and changing bulb

The lens can be removed by turning the ❶ mark indicated on the lens or the OEW mark towards the lever and then pulled off. The bulb is a 12V - 8W.

The base may be removed by loosening two screws holding the base.

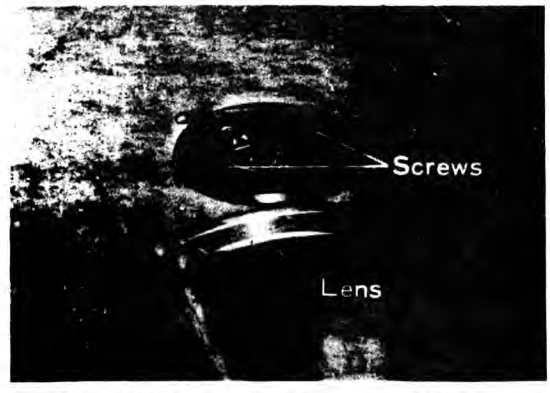


Fig. 12-65 Removing room light

12-19: SWITCHES

1: LIGHTING SWITCH AND DIMMER SWITCH

The lighting switch is a two step switch OFF, ON (first step) and ON (second step).

The first step lights all the night lights except the headlight, however the headlight (pass beam) and parking light can be changed over by operating the dimmer switch.

The second step lights the headlights in normal conditions and the dimmer switch is for normal functions (main and pass beam change over).

In this way, at dusk, with the lighting switch in the first step, the vehicle can run with only the parking light or the headlight (pass beam) by the change over operation of the dimmer switch.

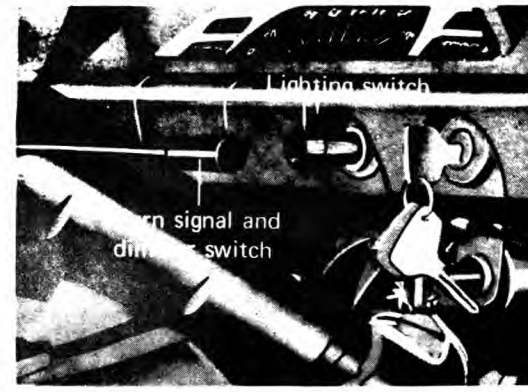


Fig. 12-66 Turn signal and dimmer switch

Therefore, the beam pilot is made to light with the main beam on. However, it also lights when the pass beam is lit in order to indicate switching between the parking and pass beam.

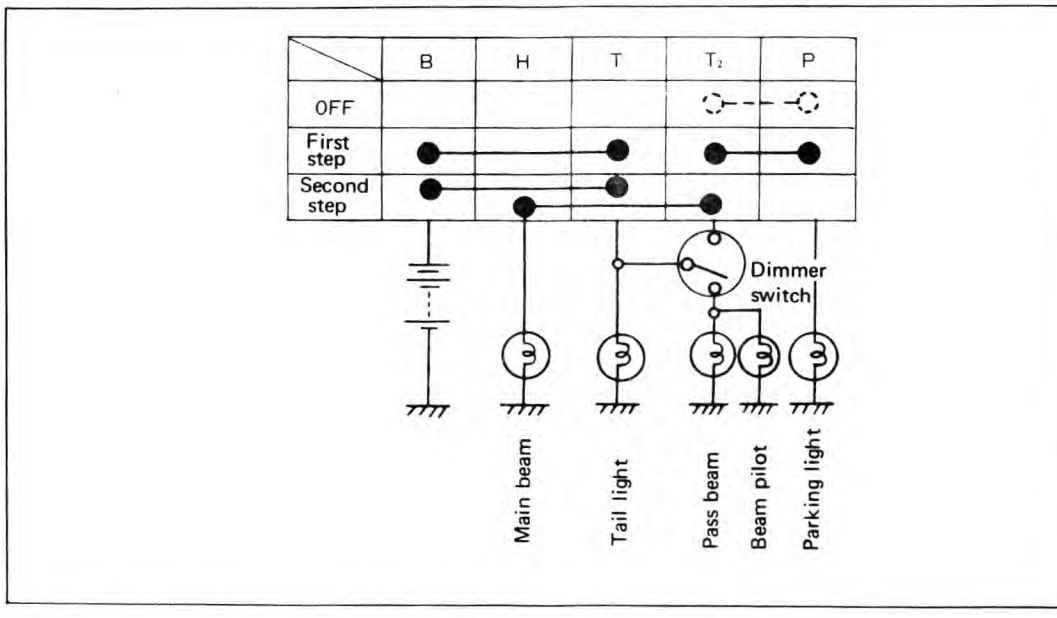


Fig. 12-67 Lighting switch and dimmer switch connection diagram

2: BACK UP LIGHT SWITCH

The Subaru 1000 back up light switch as shown in Fig. 12-68 is installed on the upper end of the change rod and is designed for all kinds of trouble prevention, increased durability, and easy removing and refitting.

Inspection is carried out by removing the steering column cover.

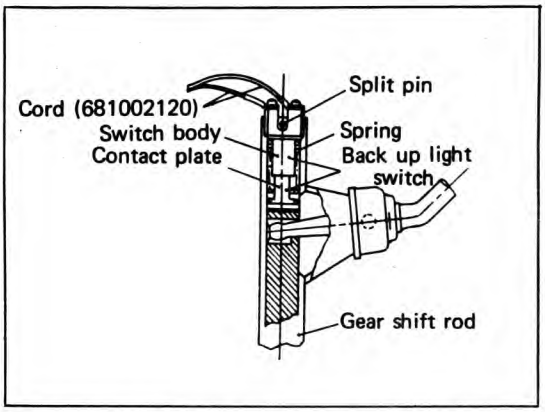


Fig. 12-68 Back up light switch

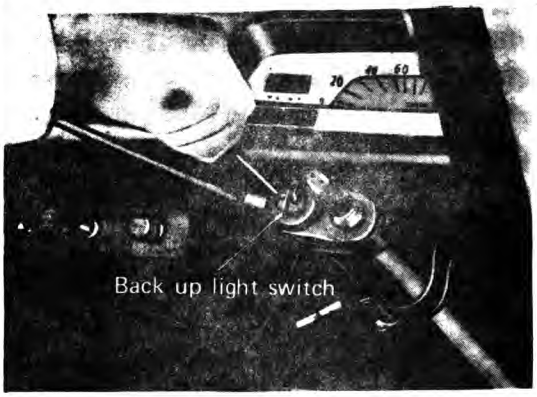


Fig. 12-69 Inspection of back up light switch

3: HEATER SWITCH AND THERMO SWITCH

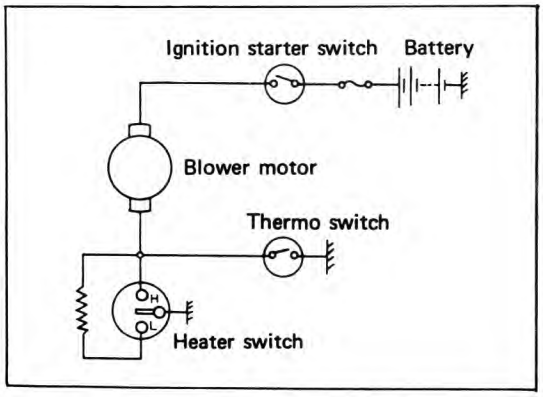


Fig. 12-70 Blower motor operating circuit

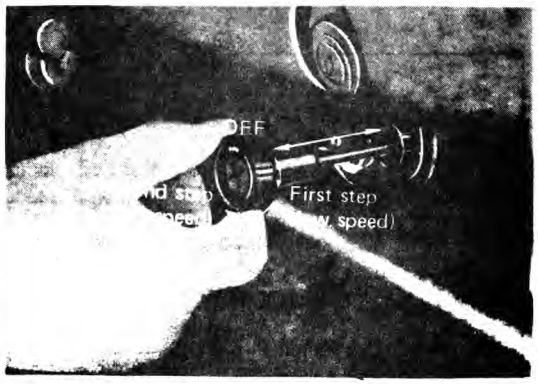


Fig. 12-71 Handling heater switch

When the heater switch is used for heating, firstly it is pulled out. Then the shutter inside of the heater is opened and the hot air is induced into the inside of the vehicle. (In this position, a little hot air enters the inside of the vehicle.)

Next, when the switch is turned to the right (first step) the blower motor operates at low speed (slight heating) and when it is turned one more step it operates at high speed (strong heating).

(NOTE)

(1) Pull and push the switch in the OFF position when operating the shutter inside of the heater.

(2) When the switch is turn on, do not put it in the middle position as the shutter only operates when fully open or fully closed.

4: THERMO SWITCH

Fig. 12-72 Thermo switch installing position

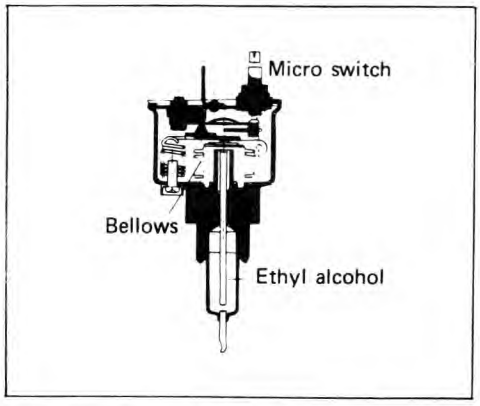


Fig. 12-73 Thermo switch

The thermo switch is installed on the upper part of the sub radiator, when the sub radiator liquid temperature reaches 92° C (198° F) the thermo switch operates and the blower motor starts. When the temperature falls below 88° C (190° F) the thermoswitch again operates and the blower motor stops. Accordingly, when at normal running the engine horse power can be economized as the fan is not operating.

The fan motor operates when running slowly or climbing a long slope for controlling the temperature of the liquid.

Moreover, thermoswitch and heater switch are in parallel therefore the cooling system can also be operated by hand.

The thermoswitch makes use of the change of temperature by the vapor pressure of ethyl alcohol, therefore the operating temperature is accurate and it has an operating life of more than hundred thousand times.

CHAPTER 13: BODY

13-1: BODY CONSTRUCTION

The body is monocoque type, constructed of sheet steel 0.8 ~ 2.3 mm thick for main parts. The body itself is lightweight, but has excellent strength and rigidity characteristics due to monocoque type.

* Body parts

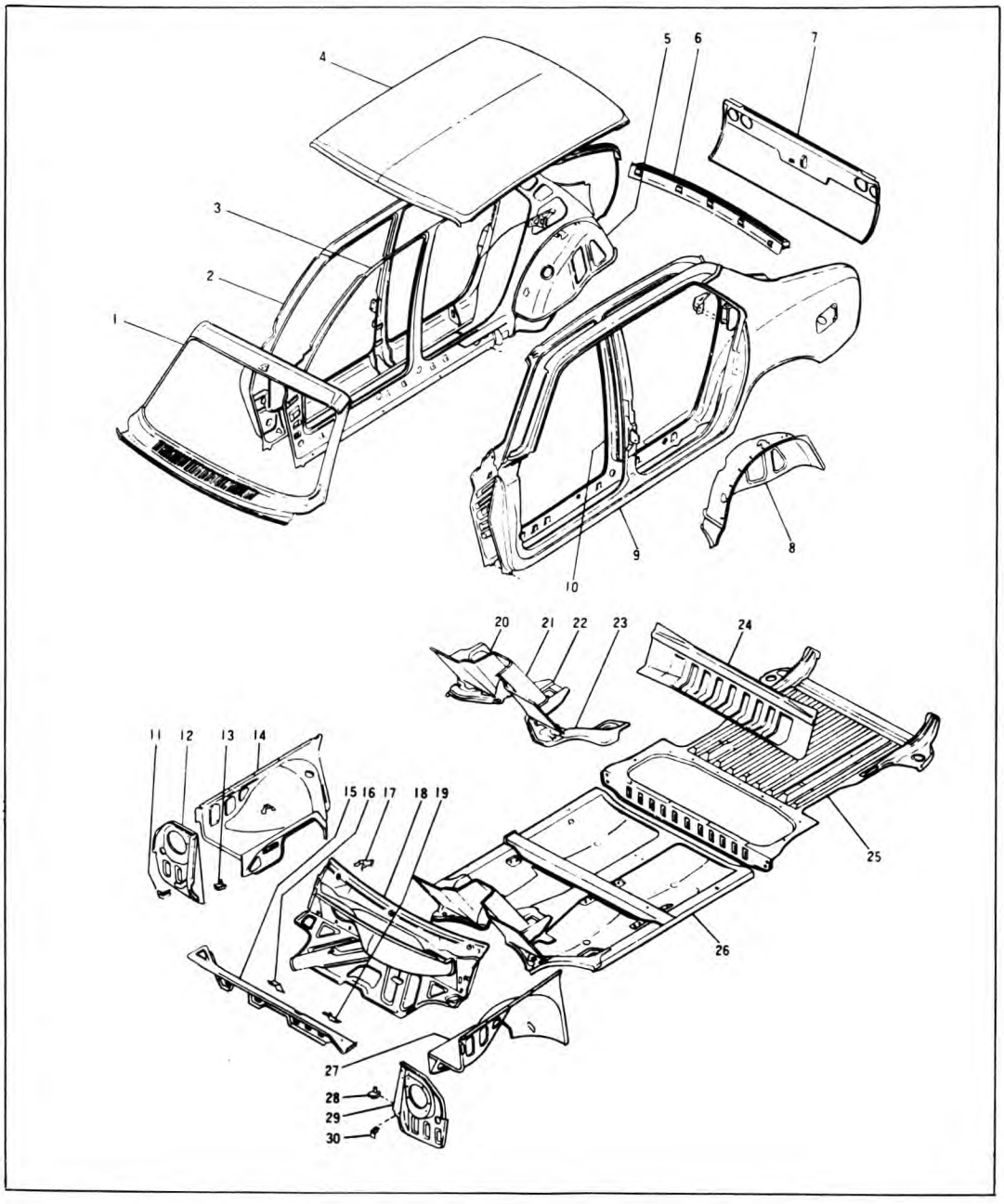


Fig. 13-1 Body construction parts

1 Front panel
2 Outer panel (RH)
3 Inner panel (RH)
4 Roof panel
5 Wheel apron (RH)
6 Rear panel
7 Rear skirt
8 Wheel apron (rear RH)
9 Outer panel (LH)
10 Inner panel (LH)
11 Bracket (skirt RH)
12 Bracket (headlight RH)
13 Bracket (radiator RH)
14 Wheel apron (front RH)
15 Separator
16 Bracket (spare wheel)
17 Bracket (brake oil tank)
18 Front structure
19 Bracket (jack)
20 Bracket (lower arm RH)
21 Toe-board
22 Bracket (engine mounting)
23 Bracket (lower arm LH)
24 Bulkhead (rear)
25 Floor (rear)
26 Floor (front)
27 Wheel apron (front LH)
28 Bracket (radiator LH)
29 Bracket (headlight LH)
30 Bracket (skirt LH)

13-2: BODY DATUM POINTS (SUSPENSION AND BODY INSTALLING)

(NOTE) The datum points are the 39 mm (1.54 in.) gauge holes at the front floor, and the edge of the plate at the joint of the side structure and floor.

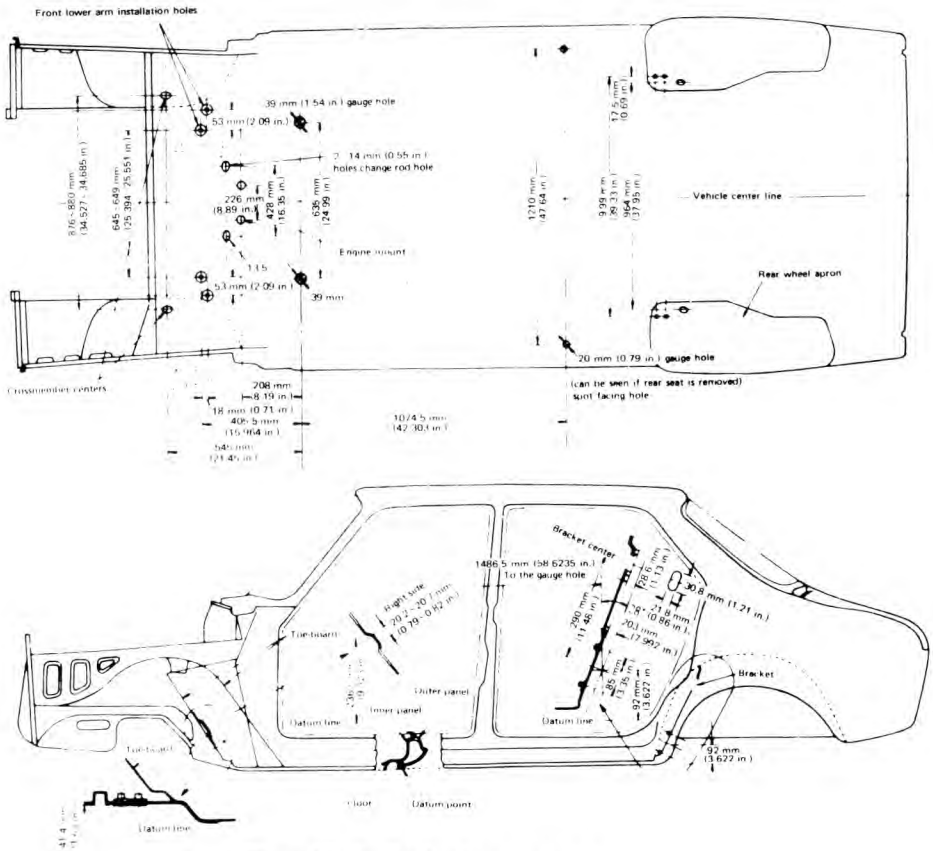
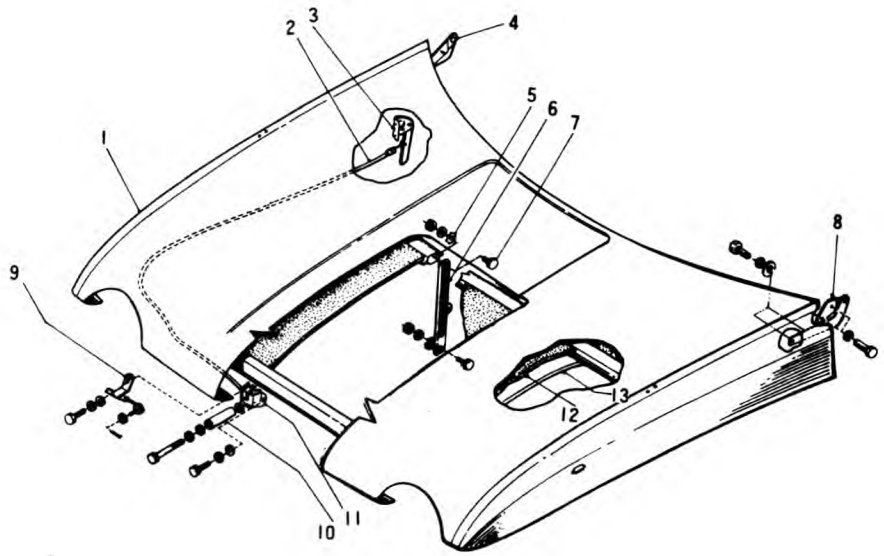


Fig. 13-2 Body datum points

13-3: FRONT HOOD AND HOOD LOCK



1 Hood assembly (front)
2 Cable (hood lock release)
3 Handle (hood lock release)
4 Hinge (front hood RH)
5 Wavewasher (stay)
6 Stay (front hood)
7 Bolt (stay)
8 Hinge (front hood LH)
9 Clip (hood lock release)
10 Spacer (hood lock)
11 Lock (front hood)
12 Insulator (front hood)
13 Bow (front hood)

Fig. 13-3 Front hood and hood lock construction

1: FRONT HOOD

(a) Removal

1 : Open the hood, disconnect the hood stay, antenna and horn cords, loosen the hood and hood hinge tightening bolts and remove the hood.

2 : Loosen the hood hinge tightening bolts on the body side and remove the hood hinge.

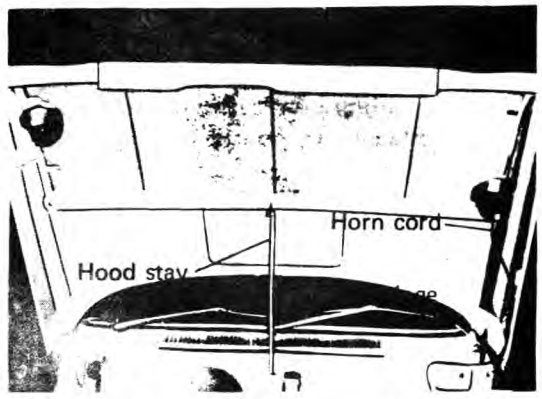


Fig. 13-4 Removing hood

(b) Reinstalling

Reinstallation is the reverse of removal.

(c) Adjustment

1 : Back and front hood position adjustment is carried out by loosening the hood and hood hinge tightening bolts.

2 : Upper and lower adjustment is carried out by loosening the hood lock installing bolt and moving the hood lock up or down. Upper and lower adjustment is carried out when the hood is closed so that the hood makes good contact with buffer on top of the fender.

3 : Hood hooking is carried out when closed so that the hooking and locking are the same.

(NOTE) When the rear of the hood is down too much the front end will slightly open there be careful to this.

Fig. 13-5 Hood adjusting position (front and back)

Fig. 13-6 Hood adjusting position (upper and lower)

2: **INSULATOR**

(a) Removing

1 : Holding bow with pliers, remove by gently tapping it with a hammer.

2 : Remove insulator.

(b) Reinstalling

1 : Reinstallation is the reverse of removal.

2 : The insulator is bonded with an agent of the Chloraprene group.

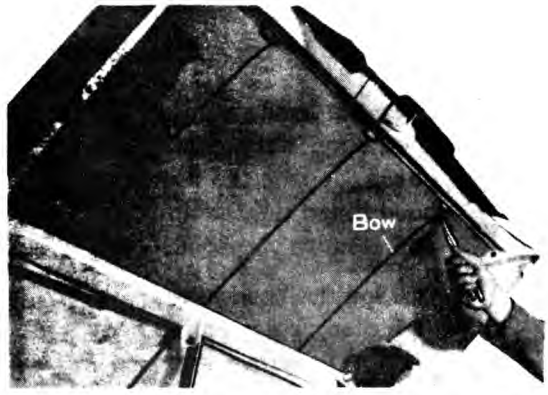


Fig. 13-7 Removing bow

3: **HOOD LOCK**

(a) Removal

1 : Loosen the three bolts and remove the hood lock assembly.

2 : Loosen the cable assembly holding clip, withdraw the cotter pin and remove the cable.

(b) Reinstalling

1 : Reinstallation is the reverse of removal.

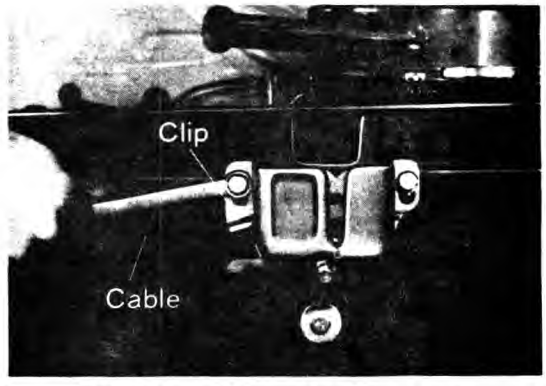


Fig. 13-8 Removing hood lock

2 : When installing, insert the end of the cable assembly holding clip into the hood lock hole.

(NOTE) Refer to item (C) of hood section for hood lock adjustment.

4: **HOOD LOCK RELEASE HANDLE AND CABLE ASSEMBLY**

(a) Removing

1 : Remove the hood lock release handle assembly by loosening the two screws.

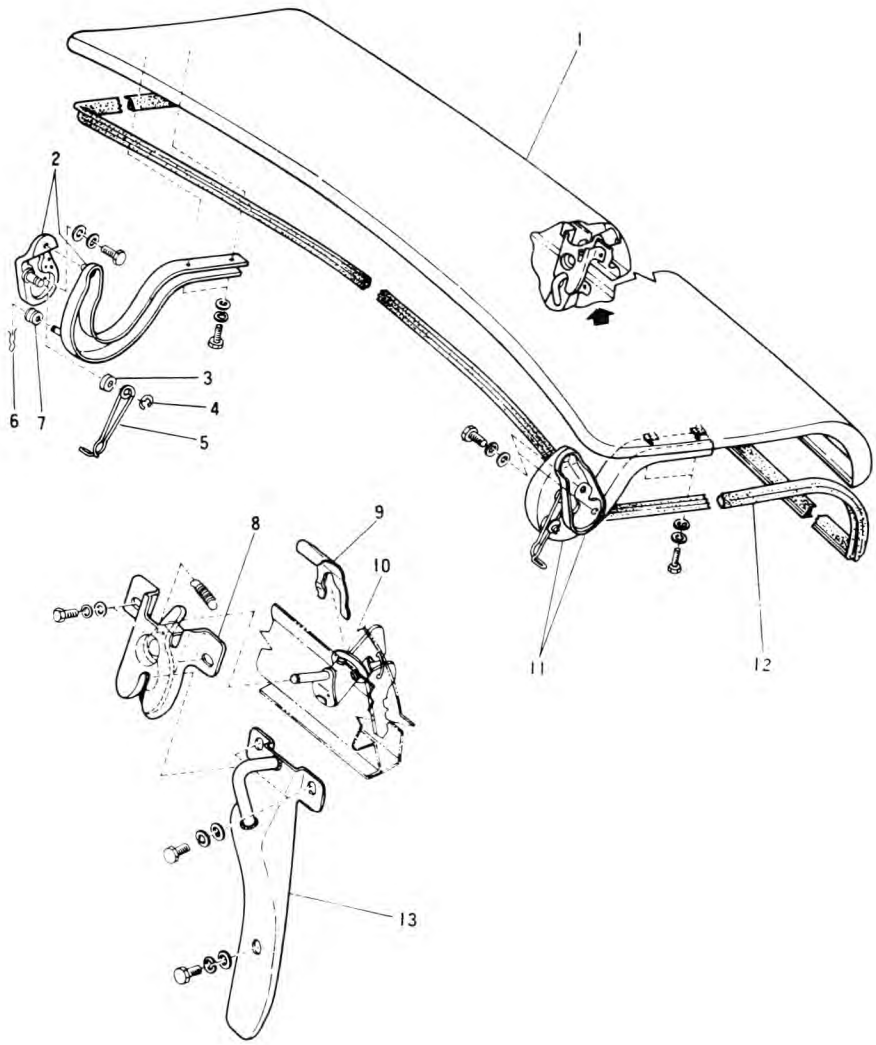
2 : Removal of the cable is carried out by pulling off the rubber stopper on the handle.

(b) Reinstalling

1 : Reinstallation is the reverse of removal.

Fig. 13-9 Removing release handle

13-4: TRUNK LID



1 Trunk lid
2 Hinge (RH)
3 Roller
4 Clip
5 Stay (trunk lid)
6 Spring (trunk lid stay)
7 Spacer (trunk lid stay)
8 Lock (trunk lid)
9 Clip (trunk lid)
10 Key lock (trunk lid)
11 Hinge assembly (LH)
12 Weather strip (trunk lid)
13 Striker (trunk lid lock)

Fig. 13-10 Trunk lid construction

1: TRUNK LID

(a) Removing

Open the trunk lid, remove the trunk lid by withdrawing the hinge arm tightening bolts.

(b) Reinstalling

Reinstallation is the reverse of removal.

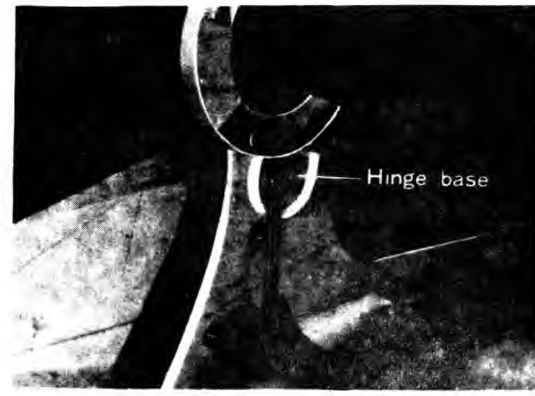


Fig. 13-11 Removing hinge base

(c) Adjustment

1 : The upper, lower, and rear, front trunk lid adjustment is carried out by loosening body side bolts (trunk hinge assembly base set).

2 : The left and right trunk lid adjustment is carried out by loosening the trunk lid side bolts (hinge arm set).

Fig. 13-12 Left and right adjustment of trunk lid.

2: TRUNK KEY LOCK

(a) Removal

Loosen and withdraw the key lock cylinder clip and remove the key lock.

(b) Reinstalling

Reinstallation is the reverse of removal.

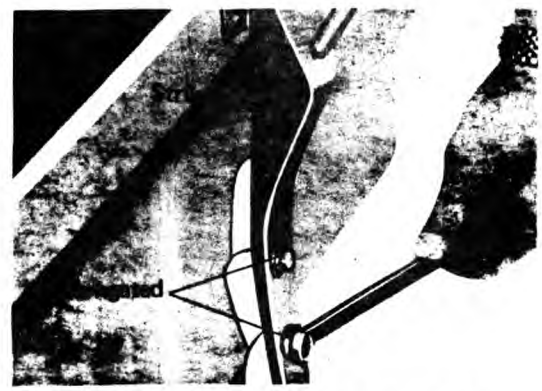


Fig. 13-13 Trunk lid fastening condition

3: TRUNK LOCK AND TRUNK STRIKER

Removal and reinstallation are carried out by removing or replacing the two trunk lock set bolts and four trunk striker set bolts.

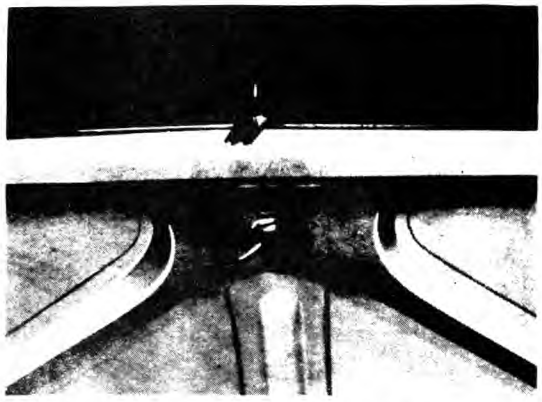


Fig. 13-14 Trunk lock

(a) Adjustment

The trunk lid fastening condition is adjusted by shifting the position of the trunk lock or trunk striker.

Moreover, the trunk lock adjusting holes are to the right and left and the trunk striker adjusting holes at the top and bottom.

4: TRUNK WEATHER STRIP

(a) Installing

1 : Coat the body side of the weather strip fixing face with a binding agent

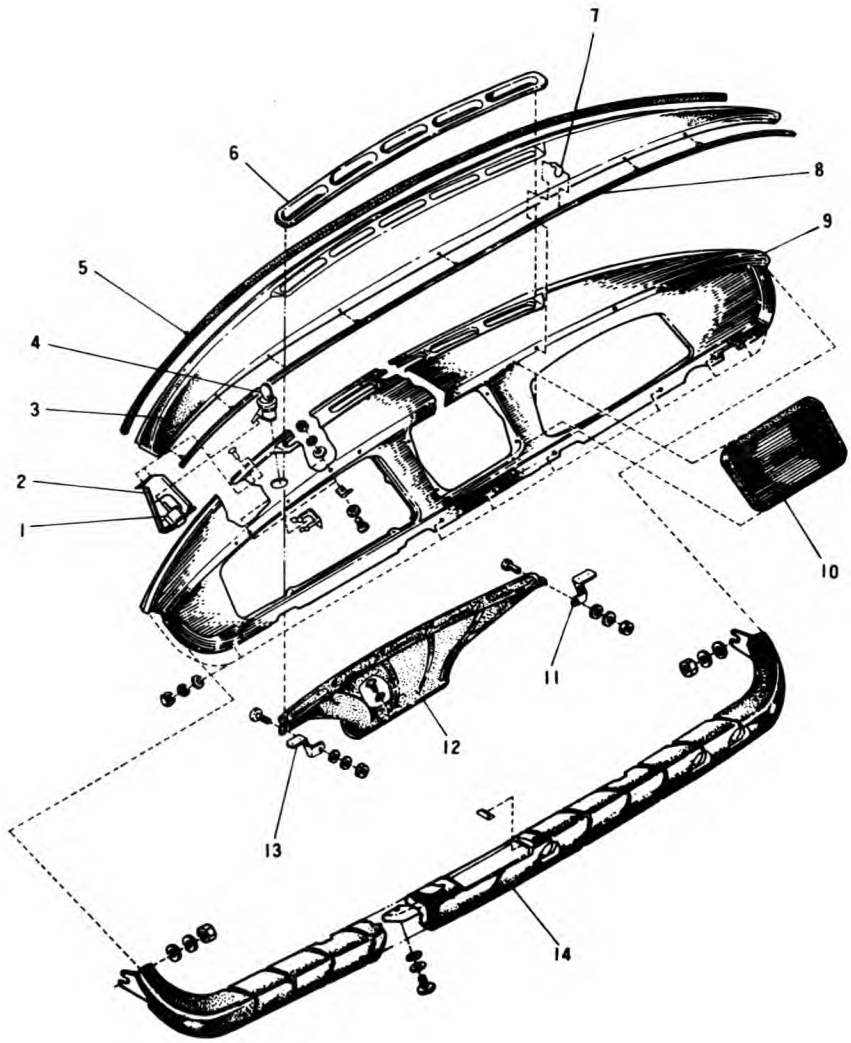
(NOTE) Do not coat the rear skirt retainer (where weather strip is inserted) with binding agent.

2 : Fit the weather strip into the rear skirt retainer and stick it to all sides.

(NOTE)

(1) The weather strip rear lower side fitting is carried out by inserting it fully into the rear skirt retainer and making the joint as near as possible to the center of the body.

(2) Installing the weather strip on all sides (including the rear bottom corners) except the rear bottom side is done by putting the weather strip fin into the ends of the cowling on the body side.



1 Lock (instrument panel)
2 Reinforcement
3 Pad upper
4 Key assembly (lid)
5 Seal
6 Grill (defroster)
7 Clip
8 Molding
9 Panel (instrument RH)
10 Grill (speaker)
11 Bracket (heater duct RH)
12 Duct (defroster)
13 Bracket (heater duct LH)
14 Pad (lower)

Fig. 13-16 Instrument panel construction

(a) Removing instrument panel

1 : Remove both nuts which are installed on the body side.

Fig. 13-17 Removing nuts

2 : Remove the two bolts which are installed to the heater control box side.

Fig. 13-18 Removing bolts

3 : Remove the radio.

4 : Remove cover (heater control box) and withdraw defroster duct.

5 : Remove combination meter.

6 : Disconnect ignition, starter switch and clock connections.

7 : After the above operation have been completed, remove the instrument panel.

Fig. 13-19 Removing instrument panel

(b) Reinstalling instrument panel

Reinstallation is the reverse of removal.

(c) Removing ignition and starter switch

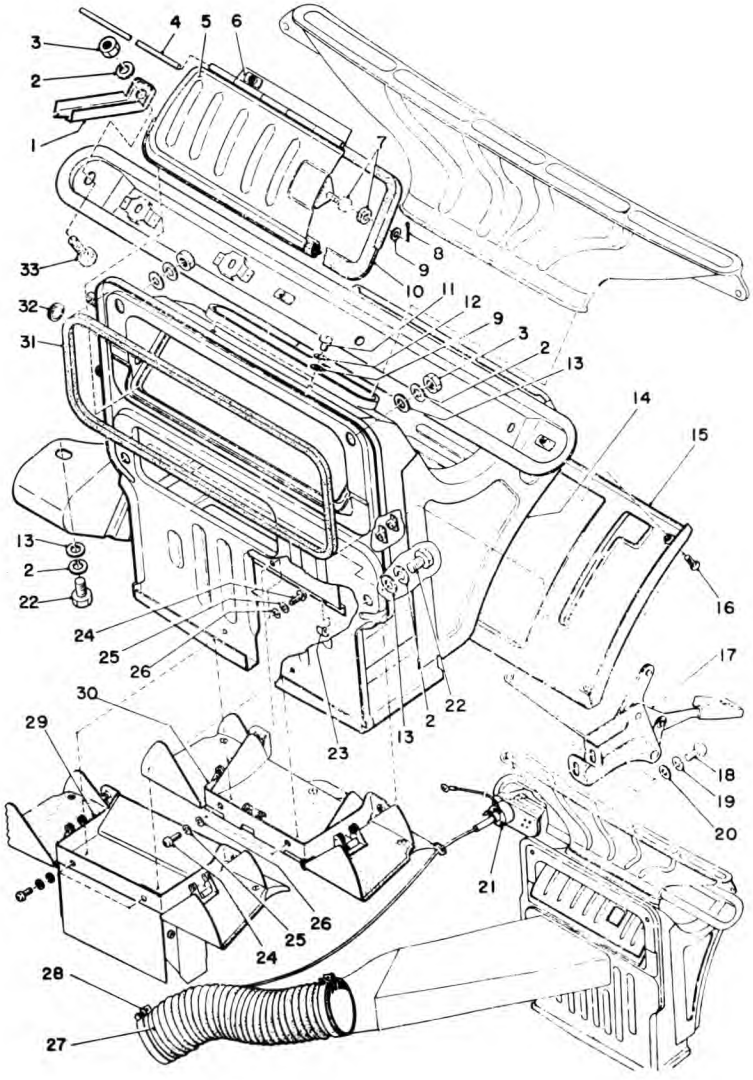
1 : Remove round nut

2 : Disconnect switch wiring, and remove from rear of instrument panel.

(d) Reinstalling ignition and starter switch

Reinstallation is the reverse of removal.

13-6: HEATER CONSTROL SYSTEM



1 Stay (heater control box)	12 Spring washer	23 Stopper (heater duct shutter)
2 Spring washer	13 Washer	24 Screw (pan head)
3 Nut	14 Duct assembly (heater)	25 Spring washer
4 Rod (ventilator)	15 Cover (heater duct)	26 Washer
5 Shutter assembly (ventilator)	16 Screw (oval head)	27 Hose (heater duct)
6 Hinge (ventilator)	17 Lever assembly (heater control)	28 Band (heater duct)
7 Rubber washer	18 Screw (pan head)	29 Shutter assembly (heater duct)
8 Cotter pin	19 Spring washer	30 Shutter assembly (heater duct)
9 Washer	20 Washer	31 Weather strip A (heater duct)
10 Weather strip B (heater duct)	21 Heater switch assembly	32 Plug
11 Screw (pan head)	22 Bolt	33 Bolt

Fig. 13-20 Heater control system construction

* HEATER CONTROL BOX

(a) Removing

Fig. 13-21 Removing luggage shelf

Fig. 13-22 Removing parking brake cable

1 : Remove instrument panel.

2 : Remove front left and right luggage shelf

3 : Loosen parking brake cable.

4 : Loosen and remove the two nuts and the three bolts.

Fig. 13-23 Removing heater control box

(b) Reinstalling

Reinstallation is the reverse of removal.

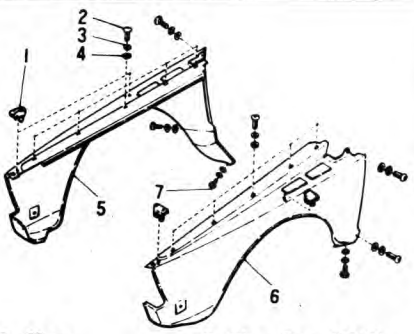
(c) Adjustment

Adjustment when the ventilator lever is heavy is carried out by loosening the two ventilator lever base bracket screws and moving the bracket up. The lower position is the reverse of this.

(NOTE) The amount of bracket adjustment movement when the upper shutter on the heater control box is closed is such that there is no gap in the weather strip (B).

13-7: BODY PARTS

(a) Fender



1 Buffer
2 Screw
3 Spring washer
4 Washer
5 Fender (RH)
6 Fender (LH)
7 Bolt

Fig. 13-24 Fender installing parts

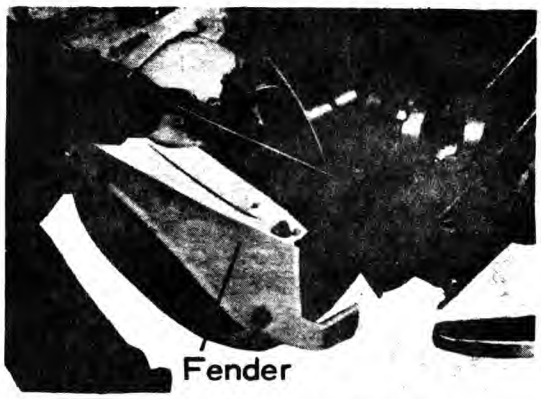
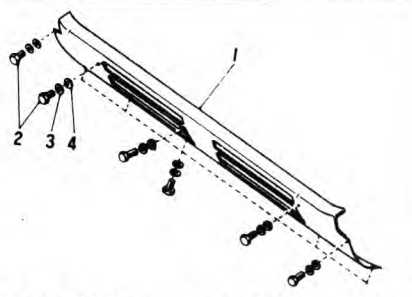


Fig. 13-25 Removing and reinstalling fender

(b) Front skirt

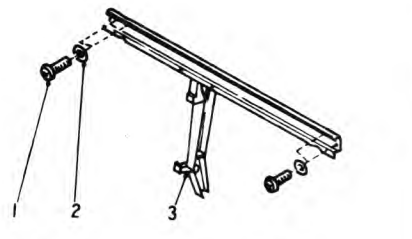


1 Front skirt
2 Bolt
3 Spring washer
4 Washer

Fig. 13-26 Front skirt installing parts

Fig. 13-27 Installing and removing front skirt

(c) Radiator bracket



1 Bolt
2 Spring washer
3 Radiator bracket

Fig. 13-28 Radiator bracket installing parts

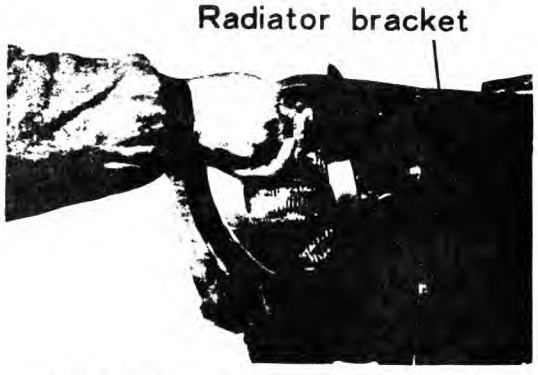
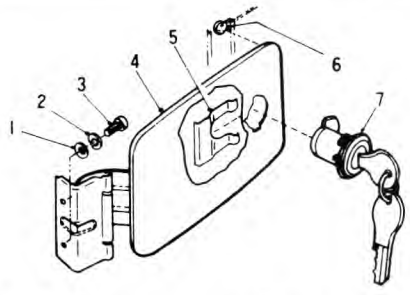


Fig. 13-29 Removing and reinstalling radiator bracket

(d) Flap



1 Washer
2 Spring washer
3 Screw
4 Flap
5 Clip
6 Stopper
7 Key lock assembly

Fig. 13-30 Flap installing parts

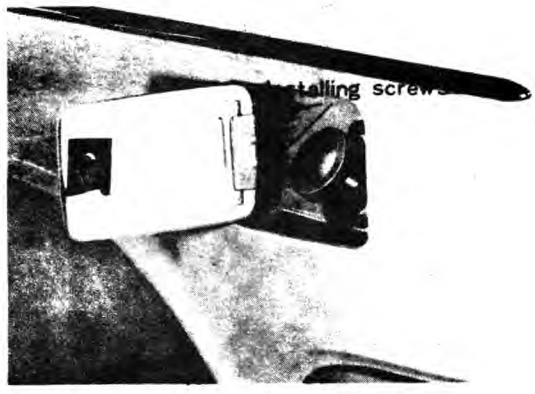
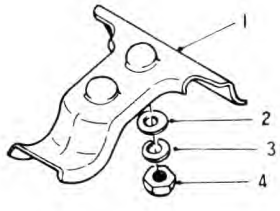


Fig. 13-31 Flap installing position

(e) Tractive hook



1 Tractive hook
2 Washer
3 Spring washer
4 Nut

Fig. 13-32 Tractive hook installing parts

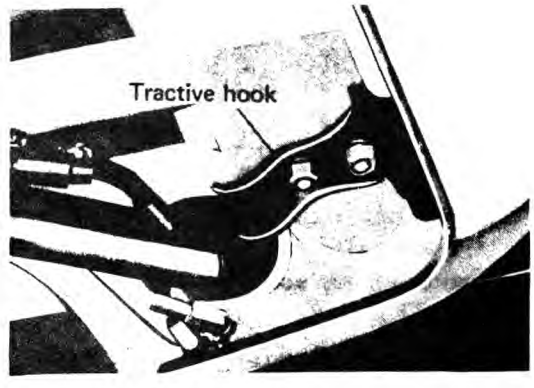
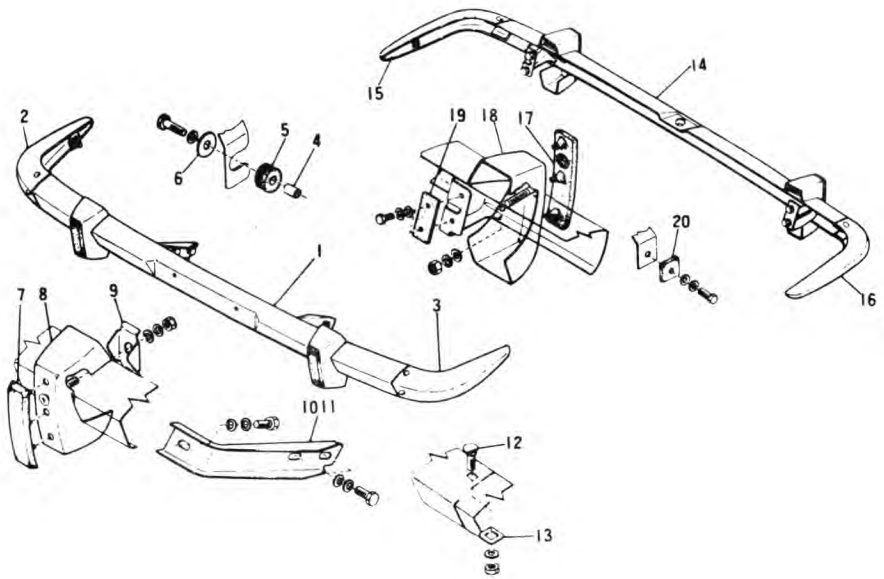


Fig. 13-33 Tractive hook installing position



1 Bumper (front center)
2 Bumper (side RH)
3 Bumper (side LH)
4 Spacer (front bumper side)
5 Rubber cushion (front bumper)
6 Washer
7 Cushion rubber (front bumper guard)
8 Bumper guard (front)
9 Bracket
10 Bumper stay (front RH)
11 Bumper stay (front LH)
12 Bolt
13 Washer (bumper)
14 Bumper (rear center)
15 Bumper (side RH)
16 Bumper (side LH)
17 Cushion rubber (bumper guard)
18 Bumper guard (rear)
19 Rubber cushion (rear bumper)
20 Rubber cushion (bumper side)

Fig. 13-34 Bumper construction parts

1: FRONT BUMPER

(a) Removing

1 : Remove the bumper stay clip (right side) which holds the wiring harness (oil pressure switch).

2 : Loosen the four bumper stay bolts and remove with the bumper stay still fixed to the bumper

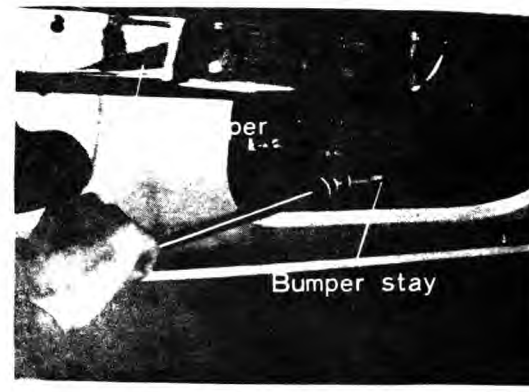


Fig. 13-35 Removing and reinstalling front bumper

(b) Reinstalling

Reinstallation is the reverse of removal.

(NOTE) When installing, set the bracket into the groove on the rubber cushion which is installed on the fender.

2: REAR BUMPER

(a) Removal

Fig. 13-36 Removing and reinstalling the rear bumper

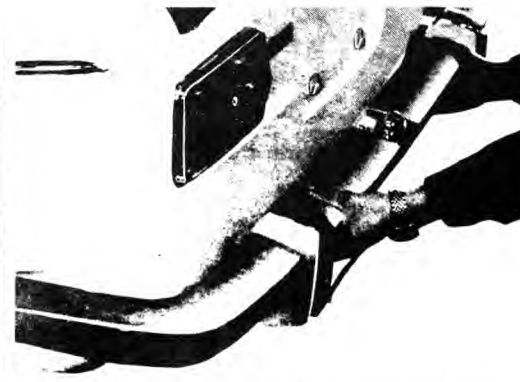


Fig. 13-37 Removing and installing rear bumper

1 : Loosen the license light and wiring harness connections and withdraw cords.

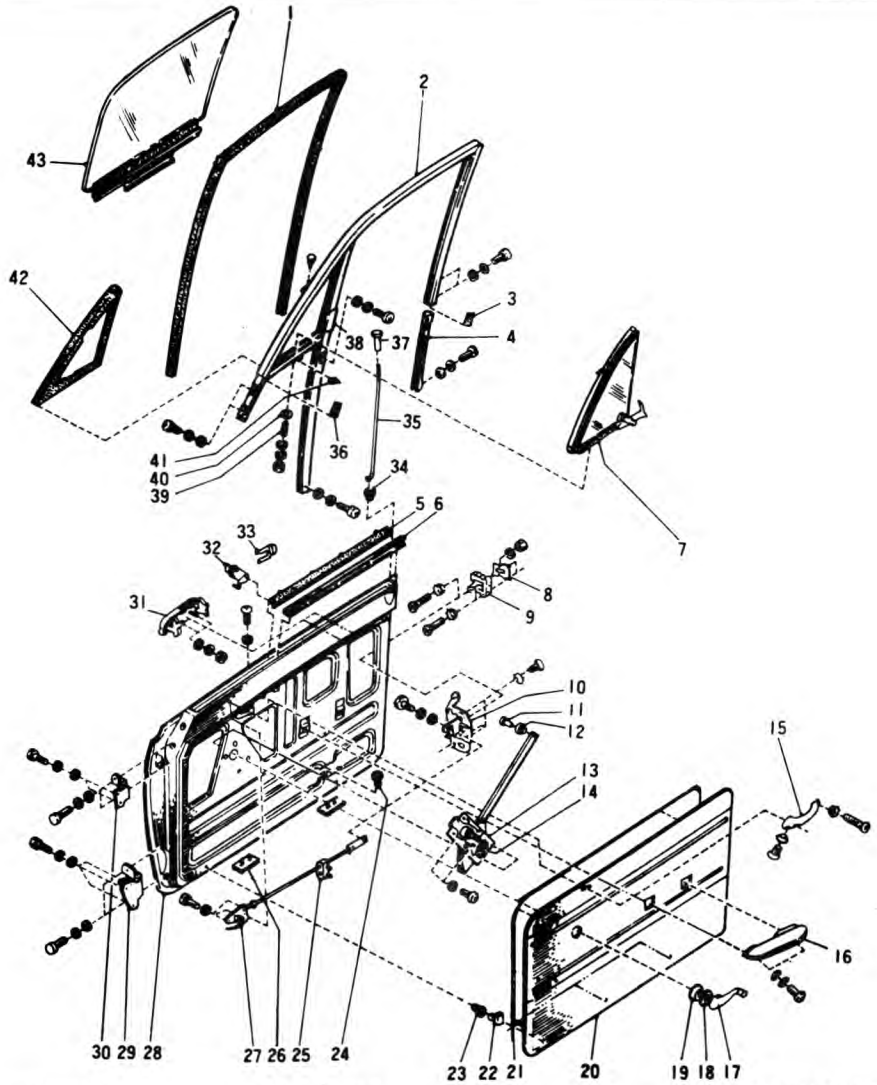
2 : Loosen the back up light and wiring harness connections and withdraw cords.

3 : Loosen the six bolts from inside the trunk and remove the bumper.

(b) Reinstalling

Reinstallation is the reverse of removal.

13-9: FRONT DOOR



1 Run channel
2 Sash assembly
3 Weather strip
4 Sash lower
5 Weather strip
6 Glass channel
7 Ventilator
8 Spacer
9 Striker
10 Door lock
11 Pin
12 Roller
13 Regulator
14 Balancing spring
15 Pull handle
16 Arm rest
17 Handle (regulator)
18 Washer
19 Escutcheon
20 Trim panel
21 Sealing cover
22 Clip
23 Cover (clip)
24 Stopper (regulator)
25 Holder
26 Cover
27 Inner remote control assembly
28 Door panel
29 Hinge assembly (lower)
30 Hinge assembly (upper)
31 Door handle (outer)
32 Key lock assembly
33 Clip
34 Cover
35 Rod
36 Weather strip
37 Knob
38 Plate
39 Spring
40 Friction washer (A)
41 Friction washer (B)
42 Weather strip
43 Slide glass assembly

Fig. 13-38 Front door construction parts

1: TRIM PANEL (FRONT DOOR)

(a) Removal

1 : Remove arm rest, remove installing screws and remove the arm rest by turning it upward.

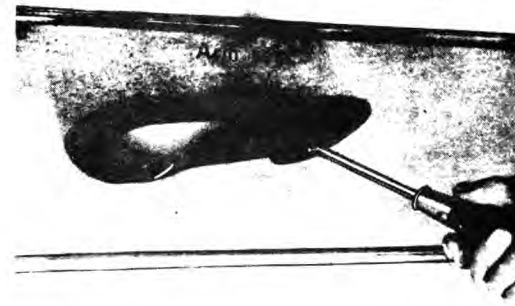


Fig. 13-39 Removing arm rest

2 : Remove pull handle.

Fig. 13-40 Removing pull handle

3 : Remove handle (regulator)

(NOTE) The handle can be removed if the retainer spring is withdrawn in the direction of the arrow as shown in Fig. 13-41.

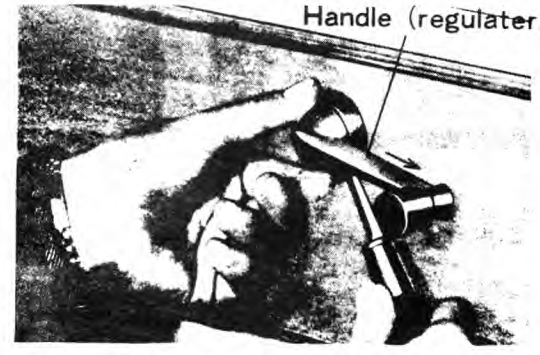


Fig. 13-41 Removing handle (regulator)

4 : Remove the clip (trim panel) with a screwdriver, loosen the clips on the three positions at the back end and slide the trim panel forward and remove the trim panel so that it is not damaged by the lever (Inner limit).

Fig. 13-42 Removing trim panel

(b) Reinstalling

Reinstallation is the reverse of removal.

(NOTE)

(1) Trim panel installation.
   1) First, pass the lever (inner remote control) through the prescribed hole.
   2) Next, fit the clips on the back end three positions.
   3) Finally, tap down the clips gently by hand.

(2) The arm rest is hung on the projection on top of the bracket and forced on by turning it downward.

(3) Reinstalling the handle (regulator). Firstly, the retainer spring is put onto the handle and it is strongly pushed onto the shaft.
The installing angle when the slide glass is fully closed is so that it faces forward from directly below.

2: **SLIDE GLASS (FRONT DOOR)**

((a) Removing

1 : Removing trim panel.

2 : Peel off sealing cover

3 : Remove sash (lower).
Loosen one lower bolt and pull out from below.

4 : Loosen the six sash installing bolts and withdraw the glass from above.

Fig. 13-43 Removing sealing cover

(NOTE)

(1) Leave the regulator arm at the top. (Glass totally closed condition).

(2) When the slide glass is separated from the regulator roller, as the sliding glass is free hold with hand so as not to let it drop.

(3) When the front and back sash is turned 90° after they have been withdrawn from the door panel the center sash can be easily removed.

Fig. 13-44 Removing the slide glass

5 : Changing the slide glass

Change the slide glass assembly.

(b) Reinstalling

Reinstallation is the reverse of removal.

(NOTE) If the sealing cover is not dirty after it has been peeled off it can be returned as it is, but when it is a little unstable, coat lightly with binding agent (nitrile group) and stick firmly.

When it is not struck properly the trim panel may be damaged due to leaking water inside the vehicle.

3: RUN CHANNEL

(a) Removing

1 : Remove trim panel.
2 : Peel off sealing cover.
3 : Remove sash.
4 : Remove slide glass and withdraw run channel.

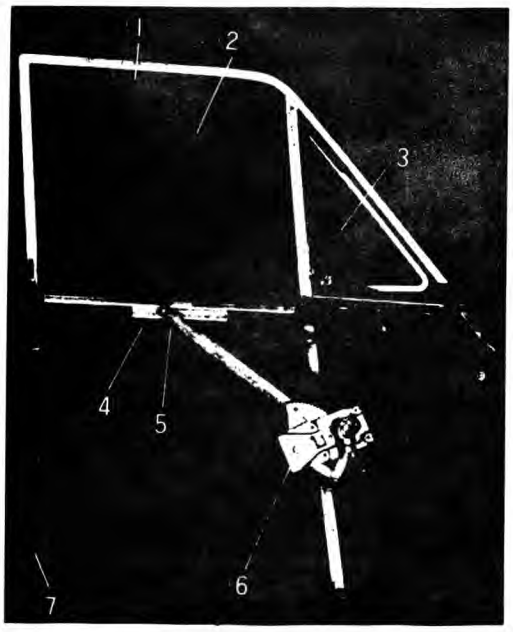
(b) Reinstalling

Put the run channel correctly into the sash. (Be careful of twisting and bulges. It is better to insert from the corners)

(NOTE) When repairing bulges stick one that has already been fitted to the run channel so that it is held correctly. (Use a Neoprene bond.)

Other installing operations are carried out by the reverse procedure to removal.

4: REGULATOR (FRONT DOOR)



1 Sash assembly
2 Slide glass assembly
3 Ventilator
4 Holder
5 Roller
6 Regulator
7 Run channel

Fig. 13-45 Door regulator slide glass construction parts

(a) Removal

1 : Remove trim panel (front door)

2 : Peel off sealing cover (only the necessary parts)

3 : Loosen and remove the four regulator installing screws and withdraw roller from holder.

4 : Remove the regulator through the hole (provided at the bottom for operation).

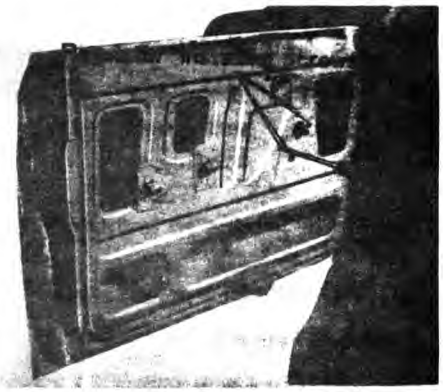


Fig. 13-46 Removing screws

(NOTE)

(1) When removing the regulator be careful not to bend the remote control wire.

(2) When withdrawing the roller from the holder, lower the slide glass to its lowest position.

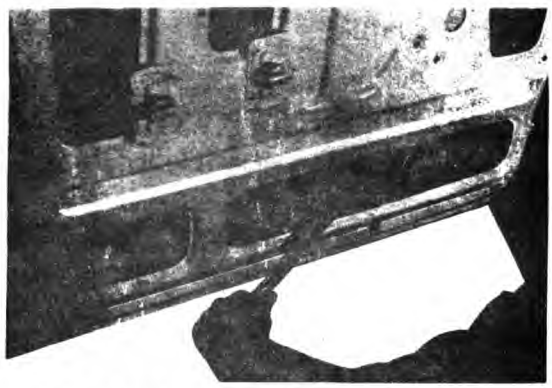


Fig. 13-47 Removing the regulator

(b) Reinstalling

Reinstallation is the reverse of removal.

(NOTE) When the installing holes are not aligned, by using the handle (regulator) it can be easily set if it is turned a little to the left or right.

5: VENTILATOR (FRONT DOOR)

(a) Removal

1 : Remove trim panel.
2 : Peel off sealing cover.
3 : Remove sash (lower).
4 : Remove the slide glass assembly together with the sash

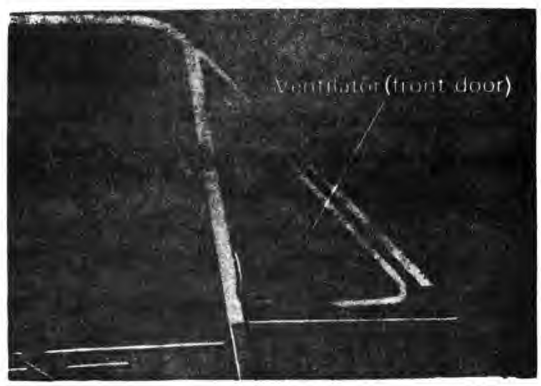


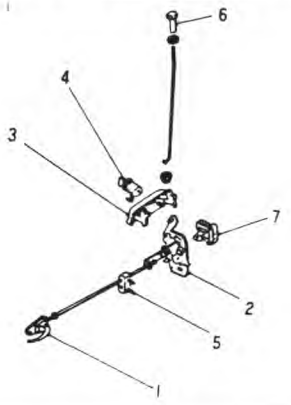
Fig. 13-48 Ventilator

5 : Remove rivet.
6 : Loosen nut and spring and withdraw ventilator, as there are two friction washers A and B be careful not to drop them.

(b) Reinstalling

Reinstallation is the reverse of removal.

6: FRONT DOOR LOCK MECHANISM



1 Inner remote control
2 Door lock
3 Handle (outer)
4 Key lock assembly
5 Holder
6 Safety knob
7 Striker

Fig. 13-49 Front door lock mechanism

1. Inner Remote Control

(a) Removal

1 : Remove trim panel (front door).

2 : Peel off sealing cover (only necessary parts).

3 : Remove the connector.

4 : Withdraw one leg of the holder and remove the wire.

5 : Withdraw the inner remote control to the front.

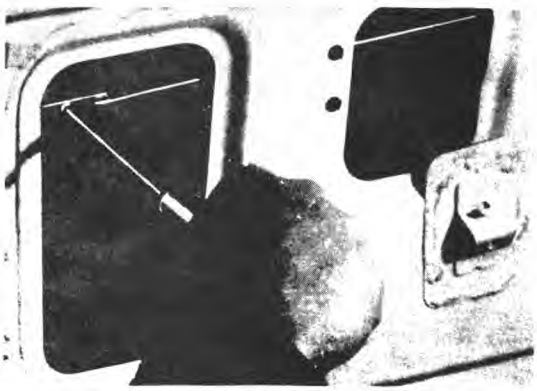


Fig. 13-50 Removing connector

(b) Reinstalling

Reinstallation is the reverse of removal.

(NOTE)

(1) Be careful not to bend the inner remote control wire.

(2) Door lock connection should not be too loose nor too tight.

Fig. 13-51 Removing inner remote control

2. Door Lock

(a) Removal

1 : Remove the trim panel.

2 : Peel off the sealing cover (only necessary part).

3 : Remove the inner remote control wire connection.

4 : Remove key lock connecting part. (Done by lowering the retainer down one step with pliers).

5 : Remove safety knob.

6 : Loose the three door lock installing screws and remove the door lock.

Fig. 13-52 Removing key lock

Fig. 13-53 Removing safety knob

(b) Reinstalling

Reinstallation is the reverse of removal.

(NOTE) Raise the key lock retainer up one step, with it in the installing condition, push in the key lock base (leg).

Fig. 13-54 Removing and reinstalling door lock

Fig. 13-55 Removing (outer) handle

3. Handle (outer)

(a) Removing

1 : Remove trim panel.
2 : Peel off sealing cover (only necessary part).
3 : Remove door lock.
4 : Loosen the (outer) handle installing nuts and remove handle from outside.

(b) Reinstalling

Reinstallation is the reverse of removal.

(NOTE) Always install the handle (outer) before installing door lock.

4. Key Lock Assembly

(a) Removing

1 : Remove trim panel.
2 : Peel off sealing cover (only the necessary part).
3 : Remove the door lock connection.
4 : Withdraw the retainer spring.
5 : Remove key lock assembly from the outside.

(b) Reinstalling

Reinstallation is the reverse of removal.

5. Door Hinge (upper, lower)

(a) Removing

1 : Loosen the installing both on the pillar side and remove the door assembly complete.
2 : Loosen the door side installing bolt and remove the hinge.

(NOTE) When removing the (lower) hinge installing bolts on the pillar side loosen the screws at the extreme back end of the front fender and lift the fender up a little.

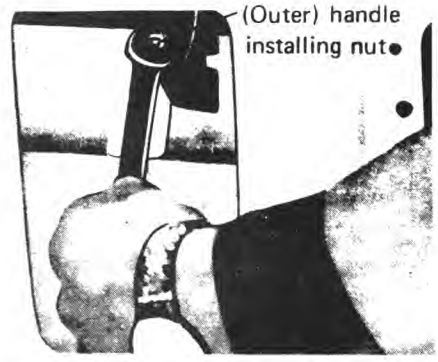


Fig. 13-56 Removing (outer) handle

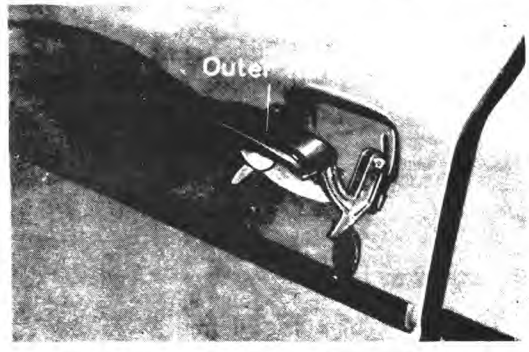


Fig. 13-57 Removing (outer) handle

Fig. 12-58 Removing key lock assembly

Fig. 13-59 Removing hinge

(b) Reinstalling

1 : Install the hinge on the door first.

Tightening torque	2.0 ~ 2.6 kg-m (14.47 ~ 18.81 lb-ft)

Make sure to see if the hinge is in the correct position.

(NOTE) Confirmation procedure of hinge installing position.

Fig. 13-60 Installing hinge

1. Install (upper and lower) hinge to the door (temporarily tighten).
2. With the door in a installed condition the installing surface of the upper and lower hinge on the piller side 1) is parallel 2) the hinge protrudes 3 mm (0.12 in.)
3. 1) and 2) are completed when the turning angle of the upper and lower hinges are the same. Confirm full closing and opening.

6. Striker

(a) Removing, installing

1 : Removing and installing is carried out by loosening and tightening the three screws.

(NOTE)

Tightening torque	0.5 kg-m (3.62 lb-ft)

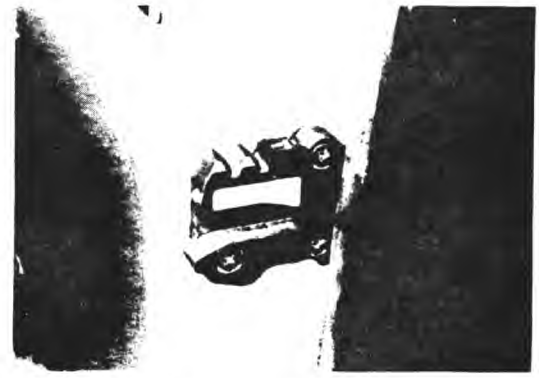


Fig. 13-61 Removing and reinstalling striker

(b) Adjustment

Striker adjustment has an effect on the tighteness of the door. Adjustment is as shown below.

1 : Outside drop $\theta > 0$

2 : The gap between the striker and the lower surface of the wedge is 0.5 ~ 1.0 mm (0.02 ~ 0.04 in.) at the outside and almost 0 at the inside.

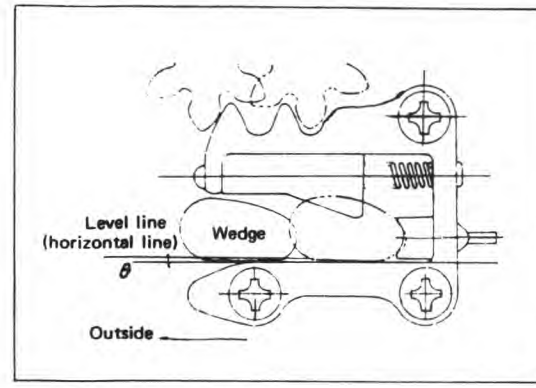


Fig. 13-62 Striker adjustment

7. Front Door Inspection and Adjustment

(a) Inspection

Inspect the following parts and change if faulty.

1 : Wear on striker tooth and slider slide action.

2 : (Upper and lower) door hinge rattling (worn pin etc.).

3 : Other damage and unfitted parts.

(b) Adjustment

1 : Upper and lower, back and front direction of the door adjustment is carried out by loosening the hinge installing bolts on the pillar side.

2 : Left and right direction of door (the front end of the front fender and front hood step difference) is carried out by loosening the hinge installing bolts on the door side

(NOTE)

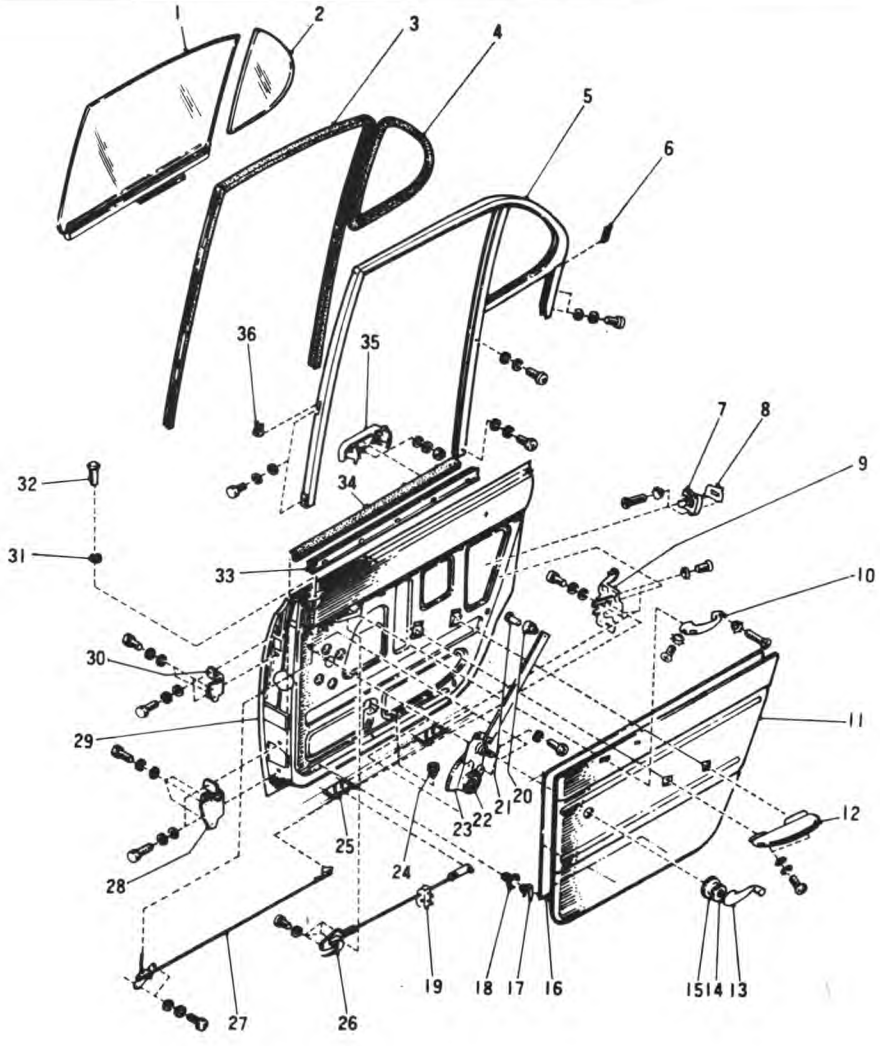
(1) Adjustment of 1) and 2) is carried out by loosening the (upper and lower) hinge.

(2) Adjustment of 1 is carried out by loosening the (upper and lower) hinge on the door side. In this case do not loosen the pillar side. (Hinge centering is adversely effected if this is done).

3 : Adjusting sash preset is carried out when the door is closed so that the sash does not vibrate.

4 : Adjusting tightness is chiefly carried out by the striker. Refer to striker section for striker adjustment.

13-10: REAR DOOR



1	Slide glass	13	Handle (regulator)	25	Cover
2	Glass (fixed)	14	Washer	26	Inner limote control
3	Run channel	15	Escutcheon	27	Safety limote control
4	Weather strip	16	Sealing cover	28	Hinge (lower)
5	Sash assembly	17	Clip	29	Door panel
6	Weather strip	18	Cover (clip)	30	Hinge (upper)
7	Striker	19	Holder	31	Cover
8	Spacer	20	Roller	32	Knob
9	Door lock	21	Pin	33	Glass channel
10	Pull handle	22	Balancing spring	34	Weather strip
11	Trim panel	23	Regulator	35	Door handle (outer)
12	Arm rest	24	Stopper	36	Weather strip

Fig. 13-63 Rear door construction parts

* Employ the front door adjustment procedures unless otherwise specified.

1: SLIDE GLASS

(a) Removing

1 : Remove the arm rest.
2 : Remove the pull handle.
3 : Remove the (regulator) handle.
4 : Remove the trim panel.
5 : Peel off the sealing cover.
6 : Remove the slide glass assembly together with the sash assembly.
(The above is carried in the manner used for the front door).
7 : Remove center sash run channel.
8 : Remove center sash.
9 : Remove the weather strip (fixed glass) together with the fixed glass.
10 : Remove the glass from the weather strip.

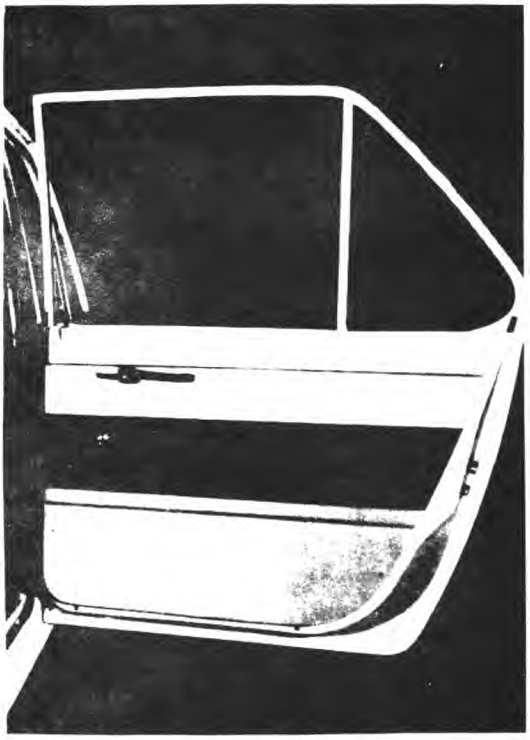
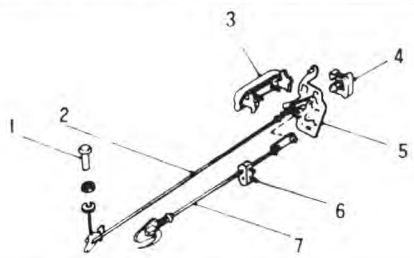


Fig. 13-64

(b) Reinstalling

Reinstallation is the reverse of removal.

2: REAR DOOR LOCK MECHANISM



1 Safety knob
2 Safety remote control
3 (Outer) handle
4 Striker
5 Door lock
6 Holder
7 Inner remote control

Fig. 13-65 Rear door lock mechanism

1. Safety Remote Control

(a) Removing

1 : Remove the trim panel.
2 : Peel off the sealing cover (necessary part only).
3 : Remove the door lock connection.
4 : Remove the wire from the holder (remote control wire).

5 : Remove safety knob.
6 : Remove safety remote control.

(b) Reinstalling

Reinstallation is the reverse of removal.

2. Rear Door Inspection and Adjustment

Inspection and adjustment are the same as that for the front door.

13-11: WINDSHIELD GLASS

(a) Removing

1 : Push wiper arm to the front.
2 : Remove the (front window) metal moulding.
3 : Insert work cord onto the glass between the flange surface and weather strip from the inside of the body, remove the windshield glass with the weather strip attached.

Fig. 13-66 Removing the windshield

(NOTE) Insert the work cord sufficiently into the weather strip over the top of the glass and the corners.

(b) Reinstalling.

1 : Fit the weather strip onto the windshield and insert the work cord into the weather strip.

(NOTE)

(1) Overlap the ends of the work cord at the top of the glass.

(2) After the work cord is fitted to the weather strip, coat all around with clean gasoline.

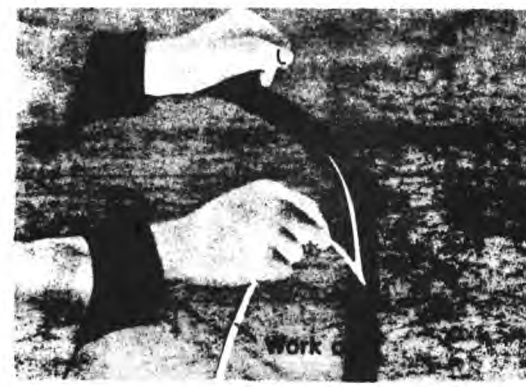


Fig. 13-67 Fitting the work cord

2 : Put the glass into the correct position from the outside, put the work cord in the inside of the body.

3 : Pushing the glass from the outside, gradually pulling the work cord at right angles to the glass.

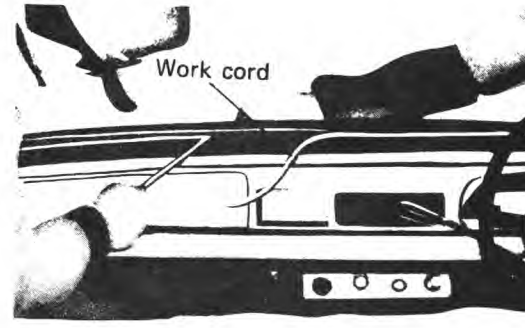


Fig. 13-68 Installing the windshield glass

(NOTE)

(1) Fitting is carried out from the upper center of the glass to the left and right.

(2) Install the glass sufficiently to the body, gently tapping it with a rubber hammer from the outside.

(3) Fit the weather strip on the outside of the body correctly.

4 : Install the metal moulding onto the weather strip (front window).

Fig. 13-69 Installing metal moulding

(NOTE)

(1) Raise the installing groove filet on the weather strip metal moulding (front window) on the outside.

(2) The metal moulding installing operation is made easier by running gasoline along the installing groove of the weather strip metal moulding.

5 : Return wiper arm to surface of glass.

* REAR GLASS

(a) Removing

Removal is the same as that for the windshield glass.

Fig. 13-70 Removing rear glass

(b) Reinstalling

Reinstallation procedure is the same as that for the windshield glass, however it is installed pressing it down by hand from the top and the glass material is not tapped with a rubber hammer.

Fig. 13-71 Installing rear glass

* SIDE WINDOW

(a) Removal

1 : Loosen the two installing screws on the lock from the inside and push open the side window to the outside.

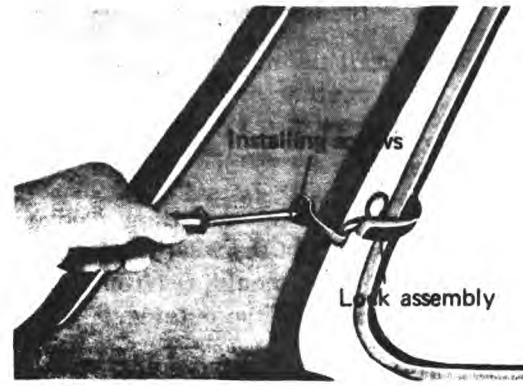


Fig. 13-72 Removing lock assembly

2 : When the upper hinge installing screw is removed the side window assembly can be removed.

(b) Reinstalling

Reinstallation is the reverse of removal.

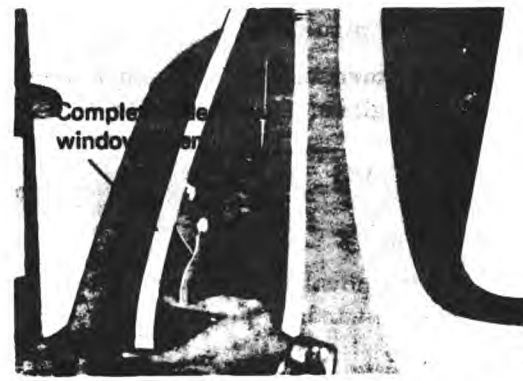


Fig. 13-73 Removing side window

13-12: TYPE A-41 SUBARU 1000 STATION WAGON BACK DOOR

1: BACK DOOR DISASSEMBLY AND REMOVAL

(a) Removing outer handle

1 : Remove the inside cover.

Fig. 13-74 Removing cover

2 : When the two screws are loosened by insert a plus driver from the hole, the outer handle which has no connection with the door lock can be independently removed.

(NOTE) Operation is carried out as up right as possible so that the screws do not fall inside the door.

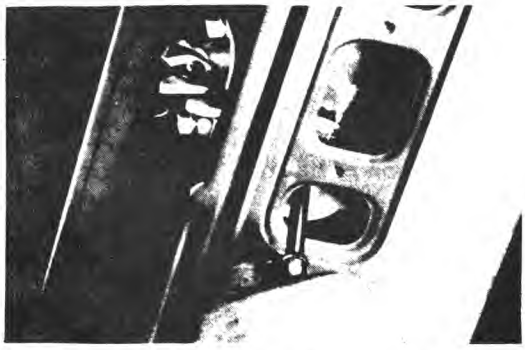


Fig. 13-75 Removing the outer handle

(b) Removing the (upper back) door lock

When the two door lock installing bolts are removed, it can be simply removed.

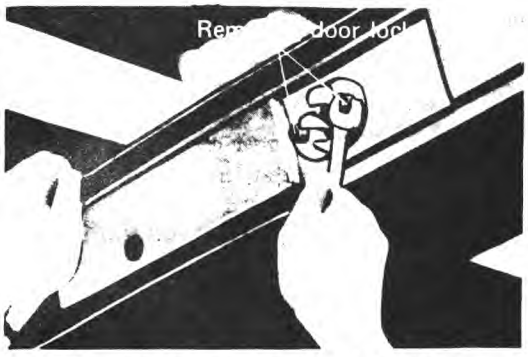


Fig. 13-76 Removing door lock

(c) Removing back door (upper)

Insert the pin into the torsion rubber bracket hole and secure torsion bar, when the three left and right 8 mm (0.32 in.) hinge mounting bolts are removed the back door can be withdrawn.

(NOTE) If the pin is not inserted when loosening hinge installing bolts the torsion bar is loose and is dangerous, also be especially careful because it may damage the body.

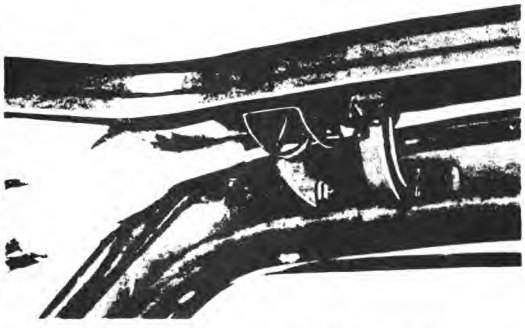


Fig. 13-77 Removing back door (upper)

(d) Removing torsion bar

After the back door has been removed the operation is as follows:

1 : Twist the torsion bar causing a little play in the pin.
2 : Withdraw the pin.
3 : Gradually return it to a free state.
4 : When it has be restored to a free state remove the torsion bar.

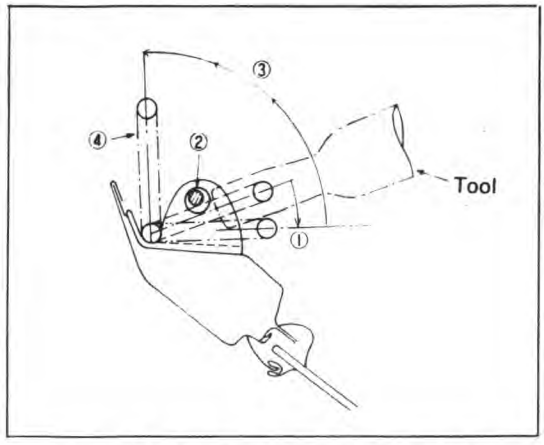


Fig. 13-78 Removing torsion bar

(e) Torsion bar pressure adjustment and installation

The torsion bar has a vinyl tube cover over the end. The method of hanging the hinge is shown by the position of the figure.

Part A - normal hanging position
Part B - when the torsion bar output is very low this position is according to the degree of output decrease.

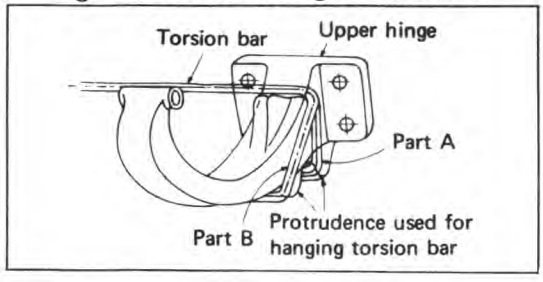


Fig. 13-79 Method of hanging hinge

2: **REINSTALLING BACK DOOR (UPPER)**

Reinstalling is carried out by the reverse procedure to (a) (b) (c) and (d); however on the occasion of removing the torsion bar fixing pin do not forget to hang the torsion bar on the link.

3: **BACK DOOR (LOWER) DISASSEMBLY AND REMOVAL**

(a) Open up license plate

When the two screws which fix the hinge inside the back door are removed the license plate can be opened upward.

The rear holes behind the license plate are utilized for back door disassembly.

(NOTE) Do not let the screws fall between the door walls.

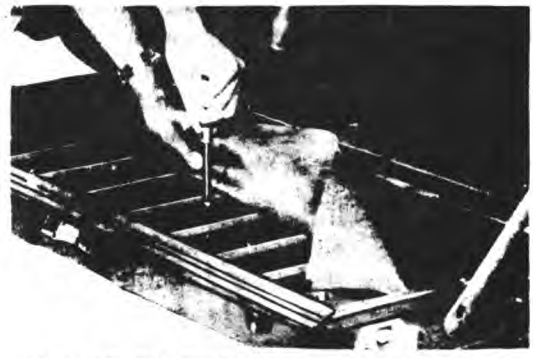


Fig. 13-80 Undoing license plate and removing hinge.

(b) Removing suspender and door lock

1 : Loosen the two screws and undo the lever and connector connections.

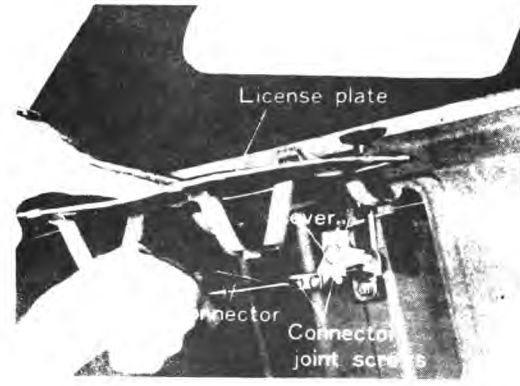


Fig. 13-81 Removing lever and connector connections

2 : When the suspender and door lock fixing screws are loosened, remove the suspender and when the inside screw is removed the door lock and the connector can be withdrawn.

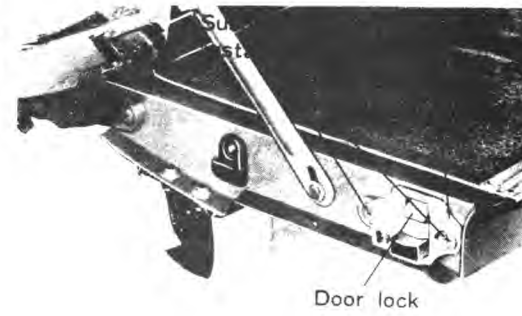


Fig. 13-82 Removing suspender and door lock

(c) Removing knob

Loosen the clip and withdraw from above.

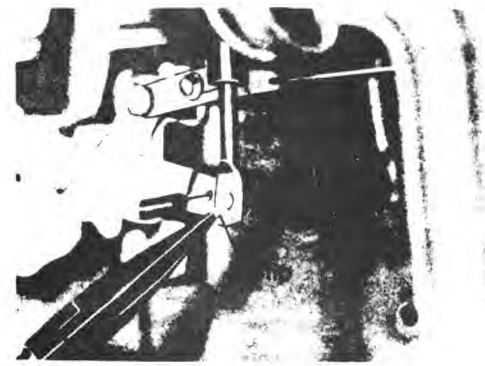


Fig. 13-83 Removing clip

(d) Removing the lever

After operations (a), (b), and (c) have been completed, the lever can be removed when the fixing screws are removed.

Fig. 13-84 Removing lever

(e) Removing stay

Loosen and remove the retainer clips at both ends.

It is better only to remove the door side when removing the back door (lower).

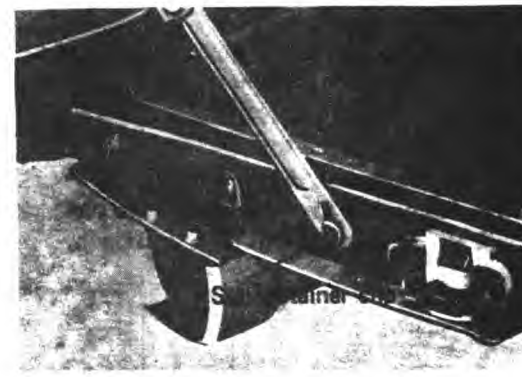


Fig. 13-85 Removing the stay

(f) Removing back door

Normally, it is removed by loosening the two screws on the door side.

(NOTE)

(1) Remove the screws on the door side to avoid damaging the door and the body.

(2) On the occasion of removing the door disconnect the license light harness.

4: REINSTALLING BACK DOOR

Reinstallation is the reverse of removal.

(NOTE) After removing or reinstalling ascertain the condition of the door operation.

5: BACK DOOR (LOWER) ADJUSTMENT

(NOTE) The order of back door adjustment is from lower side to upper side.

(a) Amount of door lock slider movement

The amount of slider movement is carried out by turning the rod to the dimensions as

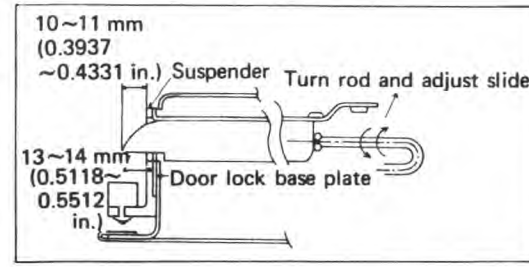


Fig. 13-86 Adjustment of slider projection length

shown in Fig. 13-86. When adjusting after the door lock has been installed, adjustment is carried out by turning the rod from the hole behind the license plate (adjust before connecting the lever and connector).

(b) Take care when installing the lever

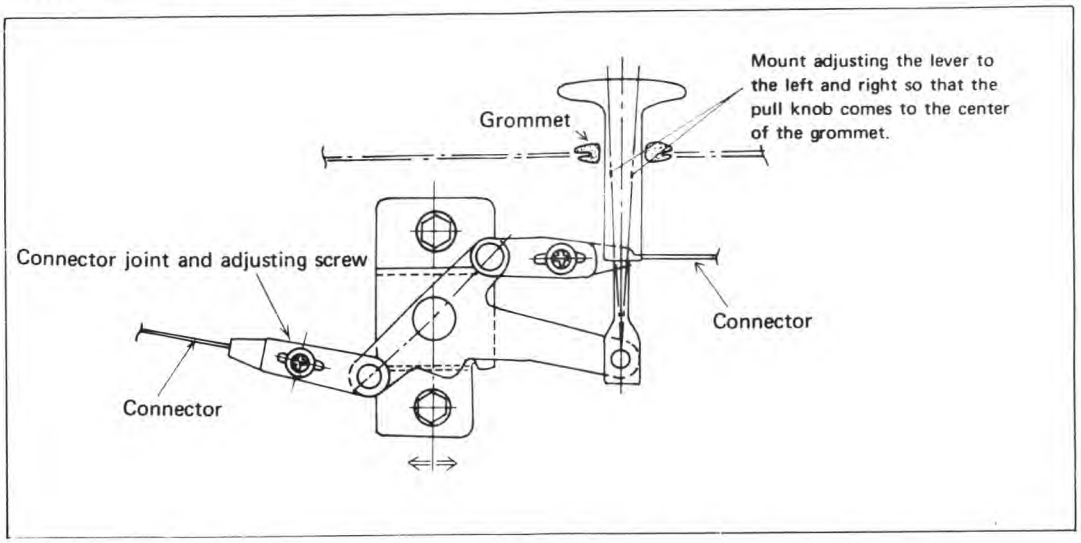


Fig. 13-87 Lever adjustment

(c) Suggestions on connector connection

When the connector has been stretched and the joint slackened, adjustment is carried out by tightening the screw. Moreover at this time if the connect is pulled too much be careful so that the door lock slider does not interfere with portion "A".

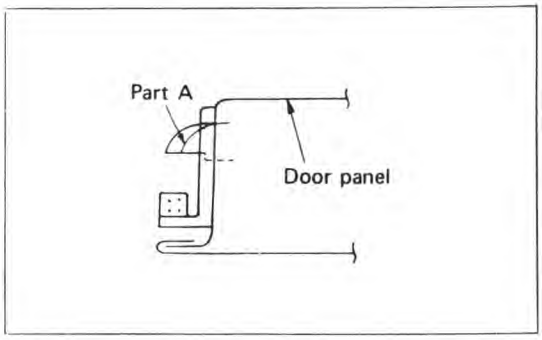


Fig. 13-88 Slider projection length

(d) Striker adjustment

It is possible to adjust the striker up or down and forward or back. Therefore, when the door closing is tight, adjust by loosening the striker installing screws in the A direction when there is play (door play) in the B direction. Fix the position of the striker so that slight contact is made with the spacer.

Tightening torque	1.0 ~ 1.3 kg-m (7.23 ~ 9.40 lb-ft)

Fig. 13-89 Adjusting striker (body side)

When the indicated fitting bed is insufficient insert a spacer into the striker side.

Interferences between the striker and the suspender and between the striker and the door lock are as follows:

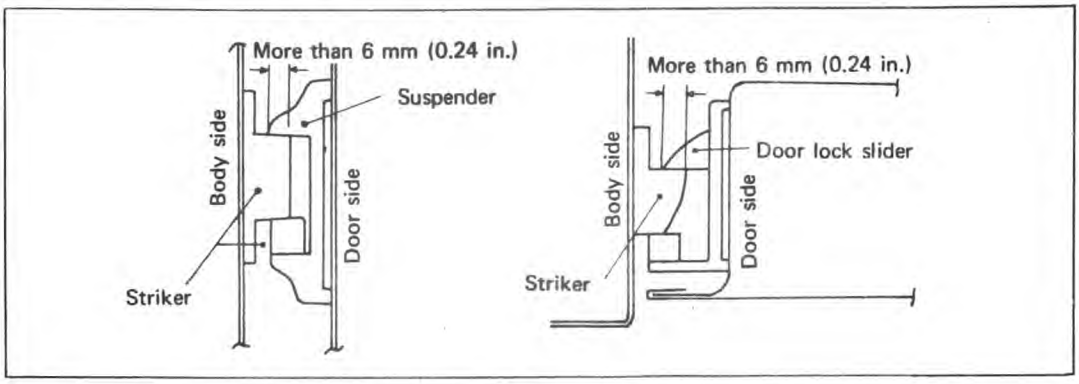


Fig. 13-90

(e) Adjusting door hinge and stay tension

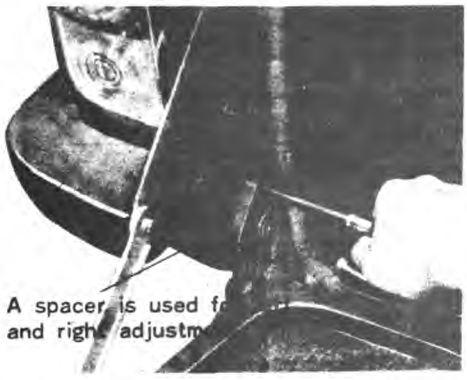


Fig. 13-91 Adjusting tension

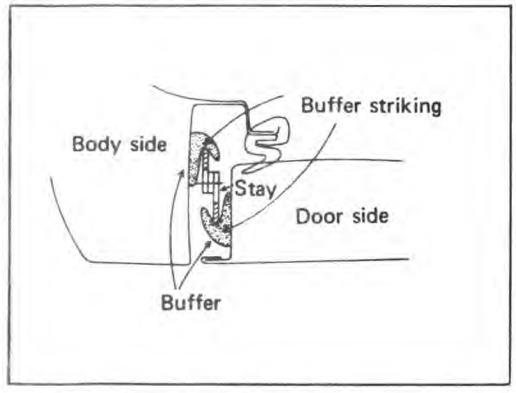


Fig. 13-92 Buffer striking

When setting the door, adjust by loosening the three body side hinge installing screws. At this time, a spacer is used for left and right stay adjustment.

Tightening torque	1.0 ~ 1.3 kg-m (7.23 ~ 9.40 lb-ft)

(NOTE) Consider the balance of the left and right and buffer striking when the door is closed.

6: ADJUSTING UPPER BACK DOOR

(a) Adjusting outer handle and door lock push

Before installing the outer handle adjust the height of the adjustor screw so that the push button play is 0.5 ~ 1.0 mm (0.02 ~ 0.04 in.).

(NOTE) When the play is too much even if the push button is fully pushed the door will not close, or when the screw has been extended to much the lever has to be pushed first, therefore take care as the lock is unsafe.

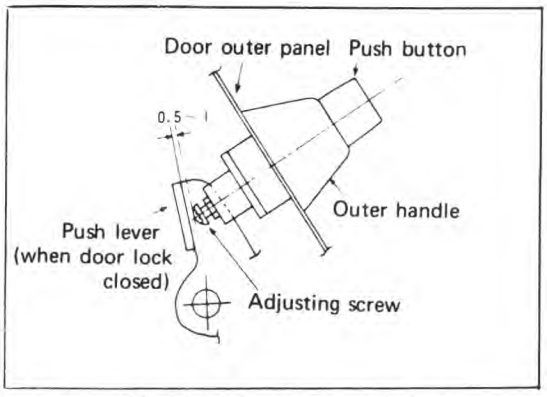


Fig. 13-93 Adjusting push button

(b) Adjusting buffer

When the buffer door contact is faulty due to wear, insert a spacer. Fix it strongly so that the door does not rise up.

(NOTE) Be very careful as improper door contact is the cause of vibration.

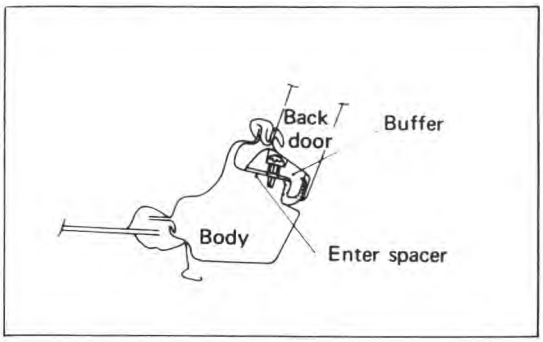


Fig. 13-94 Adjusting buffer

(c) Adjusting suspender

Adjustment can be done when the two 6 mm (0.24 in.) screws are loosened. If the wedge contact is poor, fit it stronger so that the door will not rise. Poor contact is the cause of push and also door vibrations, therefore adjustment is carried out carefully, after adjustment securely tighten the screws.

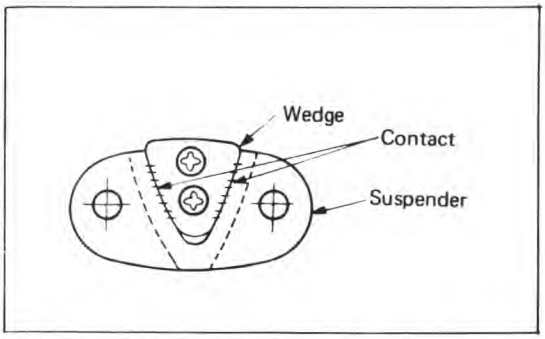


Fig. 13-95 Adjusting suspender

(d) Adjusting striker

The upper back door striker is installed on the upper side of the lower back door with movable nuts, therefore adjustment can be made by loosening the two bolts.

When door closing is tight,

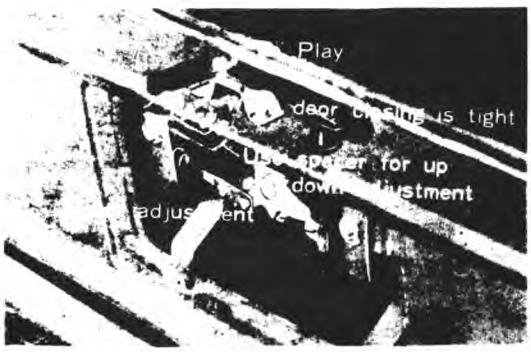


Fig. 13-96 Adjusting striker

adjust in the A direction when there is play in the B direction.

Use a spacer for upper and lower adjustment.

When door vibration becomes a problem adjust by moving in the B direction and tighten the closing more.

(NOTE) Moreover when closing the door, adjust being careful that there is no interference at the arrowed part. Interference may affect the opening of the door. After adjustment, tighten the bolt securely.

Tightening torque	0.8 ~ 1.0 kg-m (0.11 ~ 0.14 lb-ft)

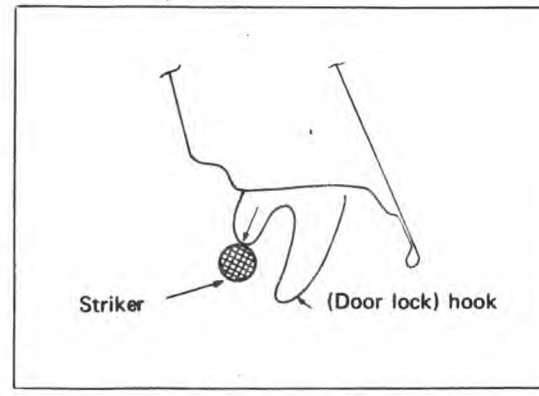


Fig. 13-97 Adjusting striker

(e) Adjusting door hinge

When door setting is necessary it is carried out by loosening the three 8 mm (0.32 in.) bolts which mount the hinge to the body side. However, on this occasion do not forget to insert the pin into the torsion bar bracket, just as was noted in the section relating to the upper back door removal. Carry out adjustment after torsion movement has been secured.

Fig. 13-98 Adjusting door hinge

Use a spacer when front and back adjustment is required. Moreover, remove the link when setting the door, as it is an obstruction. After adjustment, securely tighten all bolts.

Tightening torque	1.0 ~ 1.3 kg-m (7.23 ~ 9.40 lb-ft)

(f) Adjusting link (torsion bar spring)

Adjust the link after locking the torsion bar by inserting the pin in the bracket.

Adjustment can be carried out by loosening the two 8 mm (0.32 in.) link installing bolts. For left and right position, move the link to the center of the torsion bar; while keeping it straight position the link vertically in accordance with the following.

To raise or lower the dead point of the door action, shift the link upward (downward). This applies to both the right and left side. Firmly tighten all bolts in completion of adjustment.

Tightening torque	1.0 ~ 1.3 kg-m (7.23 ~ 9.40 lb-ft)

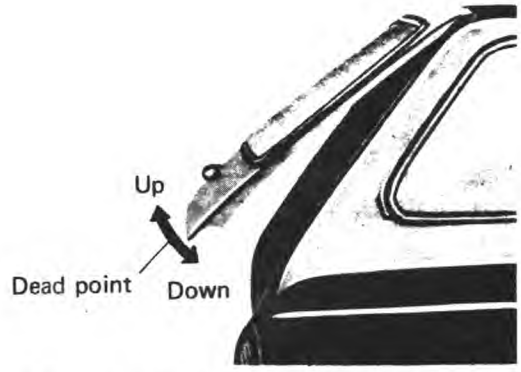


Fig. 13-99 Adjusting dead point

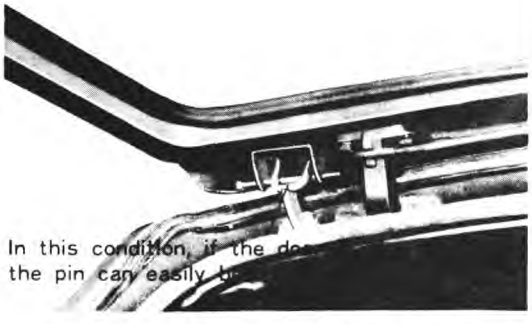


Fig. 13-100 Torsion bar meshing

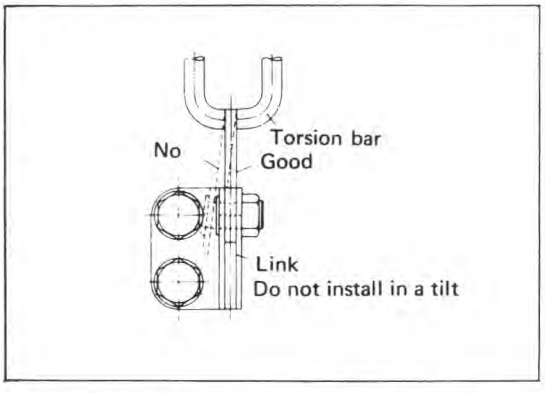


Fig. 13-101 Link installing procedure

Torsion bar meshing after link adjustment is as shown in Fig. 13-102.

(g) Torsion bar fixing pin and twisting tool.

1 : Pin [a 6 ~ 8 mm (0.24 ~ 0.32 in.) bolt can be used). A driver may be used for normal door removal and reinstalling as well as link adjustment; however in setting the door with the torsion bar fixed in order to fully close the door a driver cannot be used.

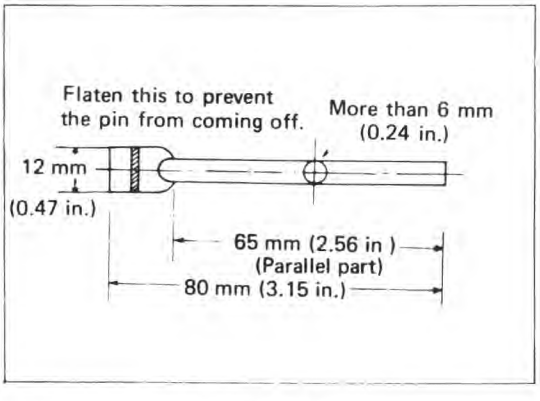


Fig. 13-102

2 : Twisting Tool

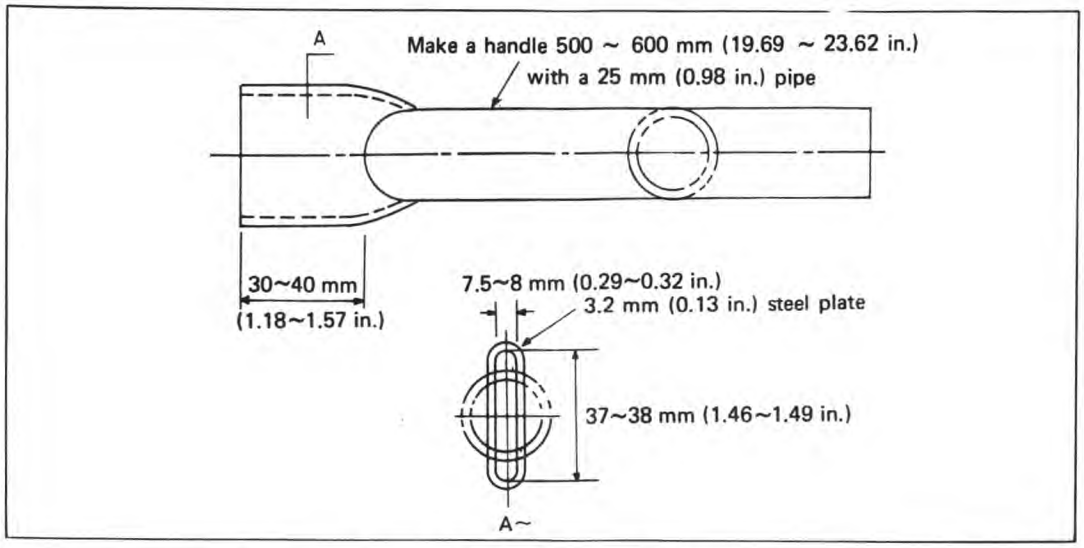


Fig. 13-103 Twisting tool

13-13: BODY LINING

1: (INNER) ACCESSORY

(a) Sunvisor

Sunvisor installing and removal is carried out by the two set screws.

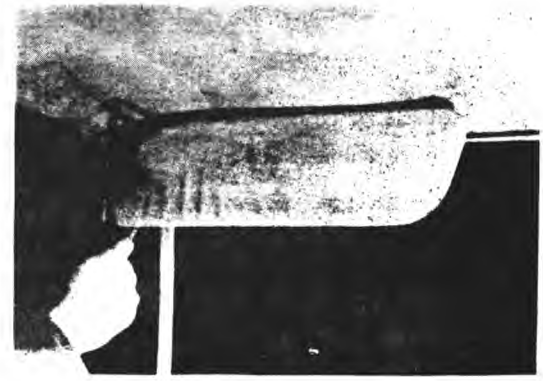


Fig. 13-104 Removal and Reinstalling sunvisor

(b) Rear view mirror (inner) installing and removing the rear view mirror is carried out by one set screw.

Fig. 13-105 Removing and Reinstalling rear view mirror

(c) Assisting rail

Assisting rail install and removal is carried out by strongly pulling the grip cover off and loosening or tightening the two set screws.

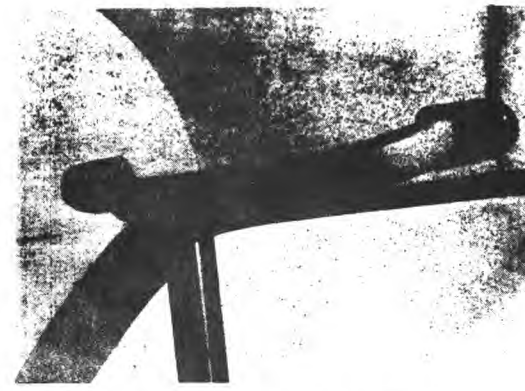


Fig. 13-106 Assisting rail

(d) Ashtray (instrument panel)

The ashtray is installed on the surface of the instrument panel by a spring action, therefore, by pushing or pulling the installing surface it can be either installed or removed.

Fig. 13-107 Ashtray (instrument panel)

2: **FRONT LUGGAGE SHELF (RH)**

(a) Removal

1 : Loosen the screws fixing the frame and control box.

2 : Loosen the taping screws holding the control box and trim panel.

3 : Loosen the taping screws holding the bulkhead and shelf.

4 : Withdraw shelf from inner panel

(b) Reinstalling

Reinstallation is the reverse of removal.

3: FRONT LUGGAGE SHELF (LH)

Removing and installing are carried out in exactly the same order as given for the RH side.

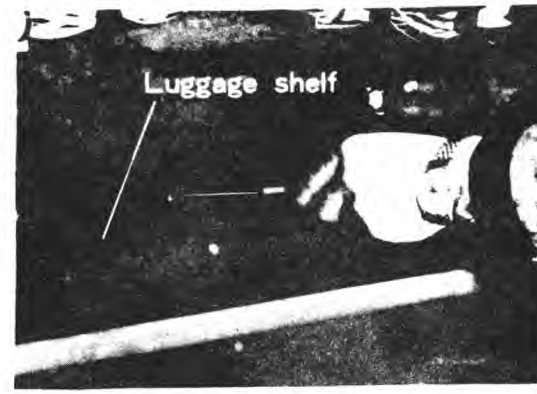


Fig. 13-108 Removing front luggage shelf

4: REAR LUGGAGE SHELF

(a) Removing

1 : Remove the rear seat back rest.

2 : Loosen and remove the taping screw and plastic clip on the rear pillar trim panel.

3 : Loosen the four rear luggage shelf set screws and by taping the upper side of the rear windshield glass when the flange hanger has been removed the luggage shelf can be withdrawn.

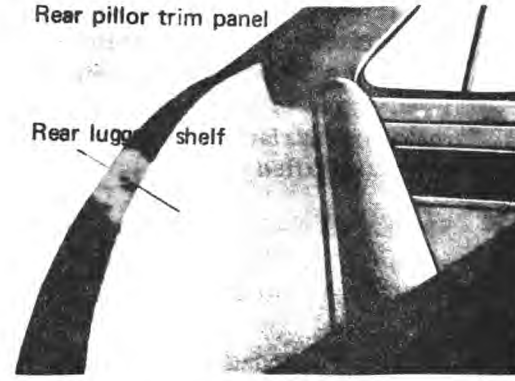


Fig. 13-109 Rear luggage shelf

(b) Reinstalling

Reinstallation is the reverse of removal.

5: ROOF HEAD LINING

(a) Removal

1 : Remove the front and rear windshield glass (refer to windshield section).

2 : Remove sunvisor, rear view mirror, assisting rail, and room light.

3 : Peel off the part stuck to the front and rear windshield flanges.

Fig. 13-110 Peeling off flange part

4 : Pull out part a, as shown in Fig. 13-111, on the left and right side with a screwdriver and radio pliers; while holding part a, insert the special tool into part b, while pushing it upward and head lining can be withdrawn if parts a and b are pulled out together.
This operation can be made easier if the door weather strip is removed.

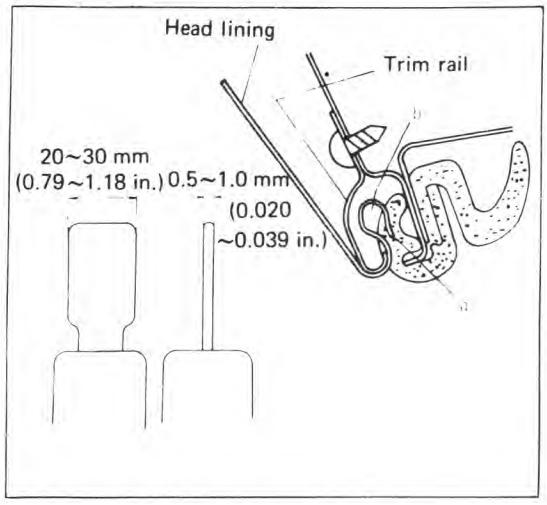


Fig. 13-111 Special tools

5 : The head lining can be removed when the clips holding the head lining wire are opened.

6 : Remove the trim rail by loosening the taping screws.

7 : Remove the insulator peeling off the stuck surface.

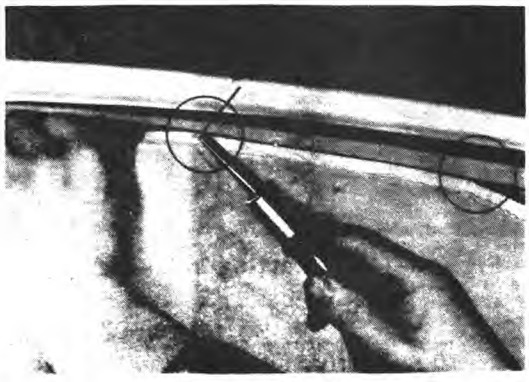


Fig. 13-112 Opening clips

(b) Refitting

1 : Apply binding agent to the insulator.

2 : Fix trim rail with the taping screws.

3 : Judge the front and rear hanging position of the head lining.

4 : Begin hanging from the front.

5 : Fix head lining by bending the center claw over the cut out in the center of the head lining.

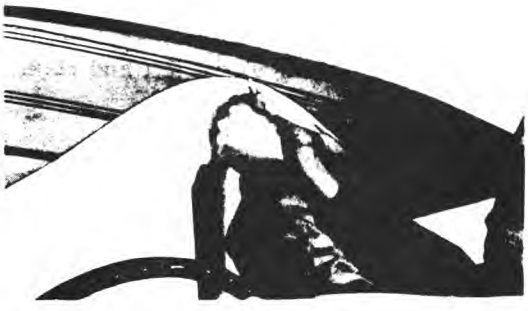


Fig. 13-113 Hanging the center part

6 : After the central part has been hung, stretch it left and right so that no wrinkles form, fix the left and right claws alternatly and secure bend over the claws.

7 : Continue in order moving to the rear until all the claws have been fixed.

8 : Begin from the left and right side fixing around the lining.

Fig. 13-114 Cutting

9 : When the head lining has been stretched insert the cut-ins at a pitch of 30 ~ 50 mm (1.18 ~ 1.97 in.) parallel to the head lining seams so that they are hidden.

Fig. 13-115 Inserting in places

Fig. 13-116 Cutting off

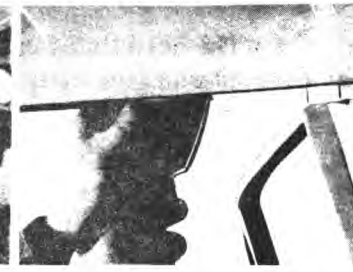


Fig. 13-117 Complete insertion

10 : Firstly, according to the five positions of the seam, pull from the front in order and from the center of the vehicle to the sides, so that wrinkles do not form, insert by using the special tool as shown in Fig. 13-111 in the reverse procedure of removal, item 4. Next, insert in places other than the seams, it is not necessary to insert all of the head lining, after suitable stretching stop inserting, cut off the part not yet inserted and fully insert the remaining parts with the special tool.

11 : Next, sufficiently insert the back side by the above procedure finishing the stretching to the left and right.

Fig. 13-118 Coating body flange with binding agent

Fig. 13-119 Coating head lining with binding agent

Fig. 13-120 Sticking head lining

12 : At the front part pull the head lining to the front and cut off the four unnecessary corners.

13 : Coat the body flange and part of the head lining with binding agent, and stick it while pulling so that wrinkles do not form.

14 : Cutting the head lining where necessary refit the sunvisor rear view mirror, assisting rail and room light.

15 : Reinstall the front and rear windshield.

16 : When there are wrinkles on the head lining apply heat to the wrinkled part to a degree that can just be endured by hand (electric lamp, infra red lamp and steam, generally a hair drier is best) thus, it gradually shrinks thus becoming tense.

Fig. 13-121 Refitting room light

6: INNER TRIMMING WEATHER STRIP AND OTHERS

1 : Remove and reinstalling scarf by taping screws.

2 : The weather strip is removed by peeling off the stuck part on the front of the flange. Best install conditions are obtained when vinyl chloride insertion part is slightly stretched apart and the long side is inserted by sufficiently shrinking it while inserting.

3 : Removing and reinstalling the front pillar lower trim panel is done by the taping screw.

4 : Reinstall front pillar trim sheet with binding agent.

5 : Reinstall center pillar trim sheet with binding agent.

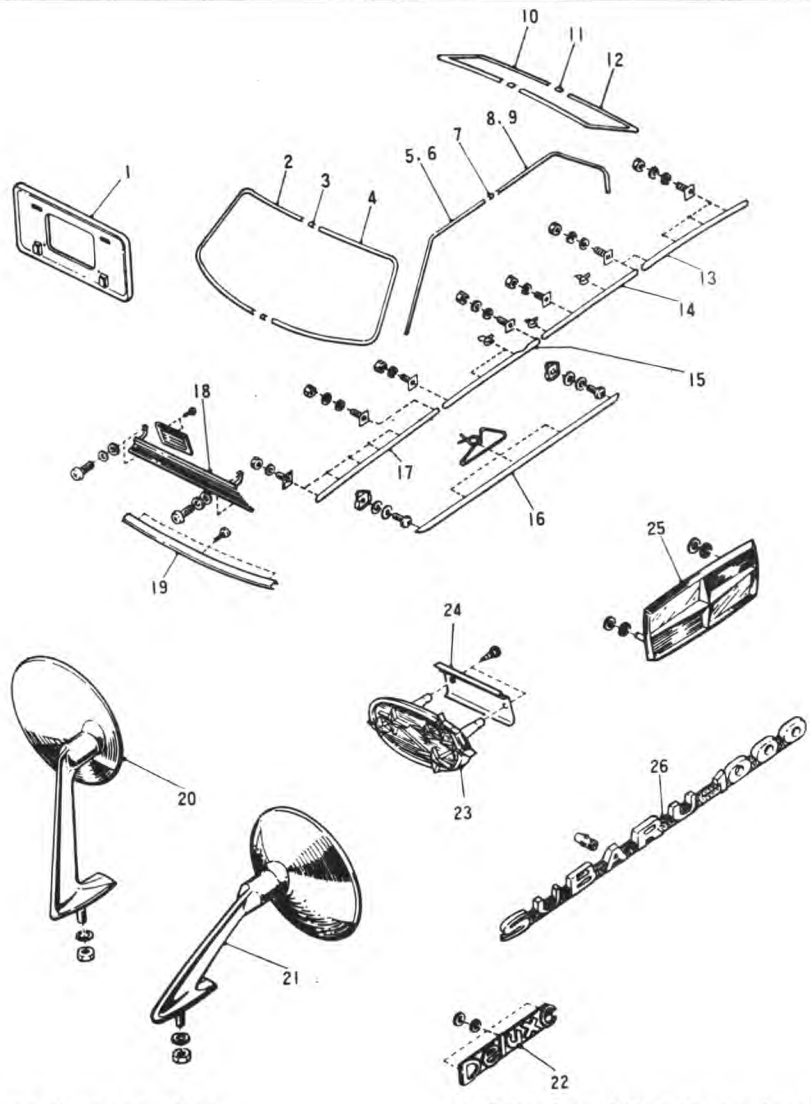
7: FLOOR FITTING

1 : Prize off silencer by either heating or not heating a screwdriver or spatula. When installing place the silencer on the body and heat at a temperature of 120° ~ 150° C (248° ~ 302° F) for 20 ~ 30 minutes generally the silencer heats up and is made soft, apply thinners or gasoline to the contact surface of the silencer thus making it sticky, while still heating slide fit to the body.

2 : The insulator is held down by clipping the covering for the bulkhead and toe-board, just placing the floor part and applying binding agent to the part under the rear seat.

3 : The mat is held by using binding agent only on the front wheel apron, under the rear seat is held by clips and other parts are either hooked or just placed down.

4 : The sub mats are either held by hooks or just placed down.



1 Base (license plate)
2 Metal molding (front RH)
3 Cover (joint)
4 Metal molding (front LH)
5 Metal molding
6 Metal molding
7 Cover (joint)
8 Metal molding
9 Metal molding
10 Metal molding
11 Cover (joint)
12 Metal molding
13 Metal molding (rear side)
14 Metal molding (rear door)
15 Metal molding (front door)
16 Metal molding (side seal)
17 Metal molding (front hood)
18 Grill
19 Metal molding (front skirt)
20 Rear view mirror (RH)
21 Rear view mirror (LH)
22 Ornament (rear skirt, deluxe)
23 Ornament (front)
24 Plate (front ornament)
25 Ornament (rear pillar)
26 Ornament (trunk lid)

Fig. 13-122 Parts connected with outer body accessories

1: REAR VIEW MIRROR (OUTER)

The rear view mirror is removed or installed by opening the hood and loosening or tightening the nut as the case may be.

2: GRILL (FRONT)

The installing or removing of the front grill is carried out by four screws on the front of the body.

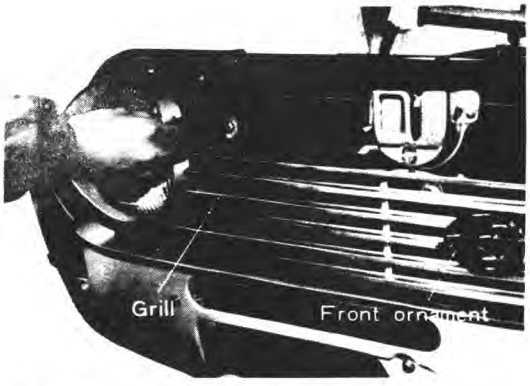


Fig. 13-123 Removing or reinstalling grill

3: ORNAMENT FRONT

(a) Removing

1 : Removing complete grill is done by loosening the four screws.

2 : Remove the two taping screws from the grill and withdraw front ornament.

(b) Reinstalling

Reinstallation is the reverse of removal.

4: REAR PILLAR ORNAMENT

(a) Removing

1 : Remove rear pillar trim panel.

2 : Loosen the three speed nuts from the inside and remove the rear pillar ornament.

(b) Reinstalling

Reinstallation is the reverse of removal.

5: TRUNK LID ORNAMENT

Pry loose the ornament installing clip with a screwdriver from the outside of the body. Installation is made by setting the ornament on the designated hole position and pushing in.

6: REAR SKIRT ORNAMENT

Ornament installing or removal is made by the three speed nuts from inside of the trunk.

(NOTE) After installing the speed nuts, seal with a rubber binding agent.

Fig. 13-124 Removing and Reinstalling metal molding (door)

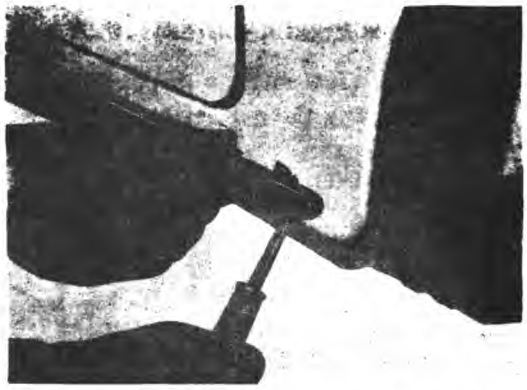


Fig. 13-125 Removing and Reinstalling side seal metal molding

(a) Removing

Remove the nut and withdraw the clip together with the metal molding.

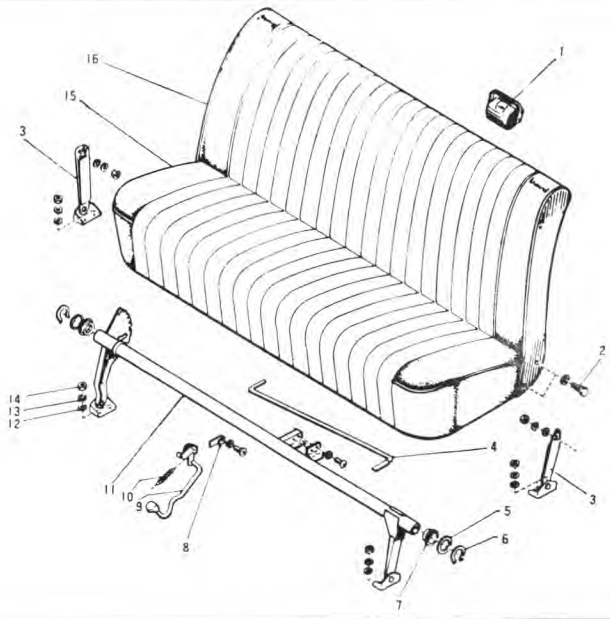
(NOTE) Carry out operation by removing the front and rear door trim panel.

(b) Reinstalling

Reinstallation is the reverse of removal.

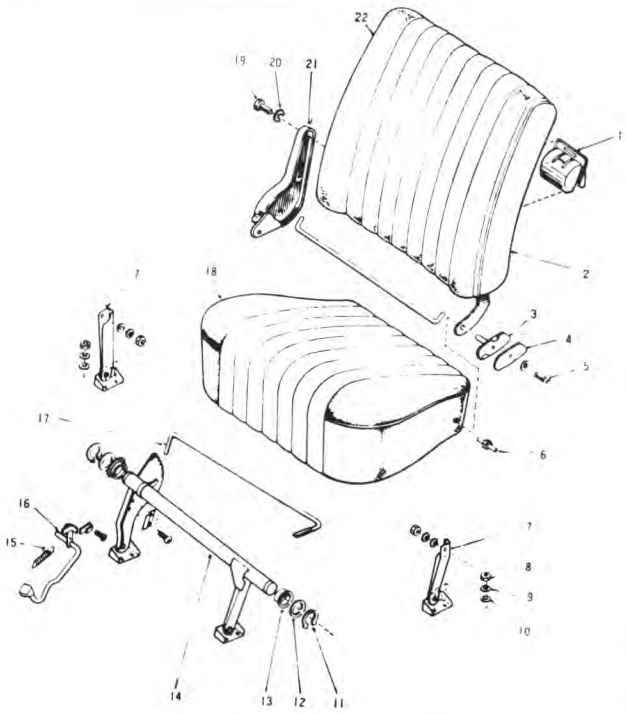
(NOTE) Installing roof metal molding is carried out by inserting the molding into the rain gutter flange and gently tapping it with a rubber hammer. Put the cover over the metal mold in the same procedure.

Fig. 13-126 Installing roof metal molding



1 Ashtray
2 Bolt
3 Link
4 Torsion bar
5 Washer
6 Clip
7 Bushing
8 Guide
9 Lever
10 Spring
11 Front link
12 Washer
13 Spring washer
14 Nut
15 Seat cushion
16 Seat back rest

Fig. 13-127 Front seat (column shift) construction parts



1 Ashtray
2 Seat back rest
3 Torque control
4 Cover
5 Screw
6 Pin
7 Link
8 Nut
9 Spring washer
10 Washer
11 Clip
12 Washer
13 Bushing
14 Front link assembly
15 Spring
16 Lever assembly
17 Torsion bar
18 Seat cushion
19 Screw
20 Lock washer
21 Hinge assembly
22 Seat back rest

Fig. 13-128 Front seat (floor shift) construction parts

(a) Removing

If the eight fixing bolts are removed from the floor, the seat can be easily removed.

(b) Disassembly

* Removing back rest

o Floor and column shift vehicle

Loosen the cushion stitching and when the four bolts are removed the back rest can be withdrawn.

o Floor shift vehicle

Loosen the four bolts and remove hinge assembly.

When the screws are loosened the cover can be removed and when the stopper pin is loosened the torsion bar torque becomes zero, withdraw the pin and the torsion bar can be removed. When the torsion bar has been removed, disassembly is completed by removing the back rest at the same time as the torque controller.

Reinstallation is the reverse of removal.

o Removing ashtray

First, remove the plastic inside; if the spring plate is pushed from inside the square hole, the outer part can be pulled out to the front.

If the lower end of the outer part is put in place and pushed down, installation is completed by the clipping of the spring plate.

Confirm this clipping noise.

o Removing the front link

Remove torsion bar (after the guide has been removed), withdraw the lever assembly, and the spring can be removed easily. Loosen the front stitching a little, withdraw the circlip and remove the washer and bushing on both sides; if the front link sector wheel is pushed in the opposite direction it can be removed from the sector wheel side to the outside of the frame. Reinstallation is the reverse of removal.

o Removing the rear link

The rear link can be removed by unthreading the nut.

13-16: REAR SEAT

(a) Removing the cushion seat

While pushing to the rear and lift up it can be easily removed. Reinstallation is the reverse of removal.

Fig. 13-129 Removing cushion seat

(b) Removing back rest

Pulling the bottom side of the back rest insertion forward and lifting the upper hanger up, the back rest can be remove. Reinstallation is the reverse of removal.

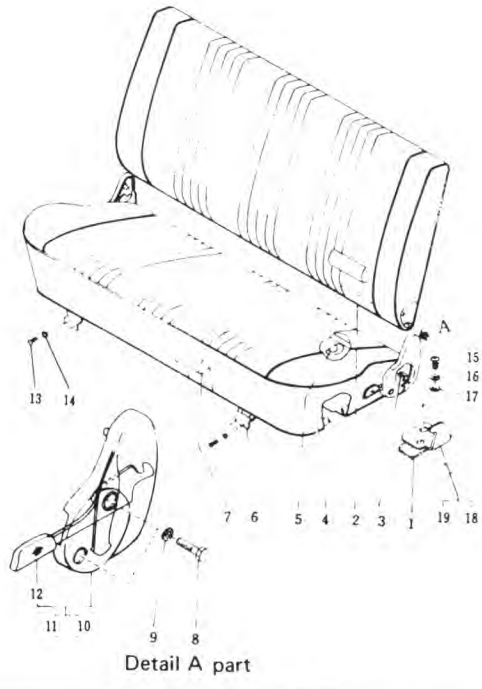
Fig. 13-130 Removing back rest

SUBARU 1000 STATION WAGON (Type A41)

1. Front seat

The same as sedan bench type seat.

2. Rear seat



1 Cushion rubber
2 Back rest
3 Arm
4 Cushion rubber
5 Cushion rubber
6 Hinge
7 Cushion
8 Bolt
9 Lock washer
10 Hinge (RH)
11 Hinge (LH)
12 Knob
13 Screw
14 Lock washer
15 Screw
16 Spring washer
17 Washer
18 Stopper (RH)
19 Stopper (LH)

Fig. 13-132 Type A41 Rear seat construction and parts

1: REMOVING REAR SEAT

Pull up knob, at the same time as loosening floor hook the back rest will fall forward, if the four installing screws on the front part of the body are loosened the seat can be removed easily.

2: **REAR SEAT DISASSEMBLY**

(a) Removing back rest

Remove the two hinge bolts on one side and when the hinge is removed the back rest can be removed from one side.

(b) Removing connecting pipe

Remove the hinges from both sides, loosen the nut on the end of the pipe and when the arm is withdrawn (welded to each side) the pipe can be pulled off in the opposite direction.

(c) Removing the cushion panel

When the front butterfly hinge and the five installing screws around the rear of the cushion rubber are removed the cushion panel can be withdrawn. (There is no need to remove the thin cushion rubber.)

3: Reinstallation is the reverse of removal, but special care is necessary. Confirm that the pin on the end of the arm has entered the groove on the lock lever.

CHAPTER 14: SPECIAL TOOLS

14-1: TOOLS FOR SUSPENSION

Item / Set classification	Tool number	Tool name	Place of application
A	925010000	Installer	Front crossmember and upper arm bracket bearing

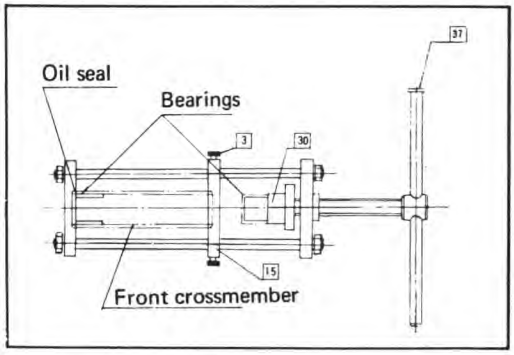


Fig. 14-1

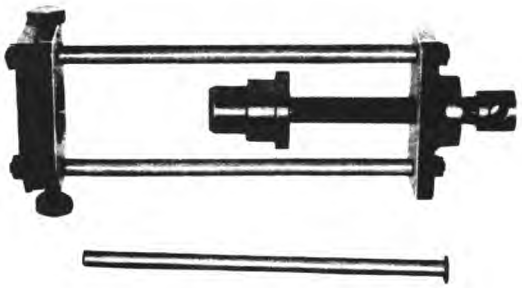


Fig. 14-2

Coat the crossmember bearing pressure section and bearing with soapy water, fit the bearing installer onto the crossmember, set the installer by turning (3), insert the bearing into (30), turn handle (37) until the end surface of (30) touches (15), and press the bearing. Use the same procedure and press on the oil seal until it touches to the bearing.

The oil seal should be pressed until there is 2 mm (0.08 in.) between the surface of the crossmember and the end surface of the oil seal.

Item / Set classification	Tool number	Tool name	Place of application
A	925020000	Puller	Front and rear crossmember bearings

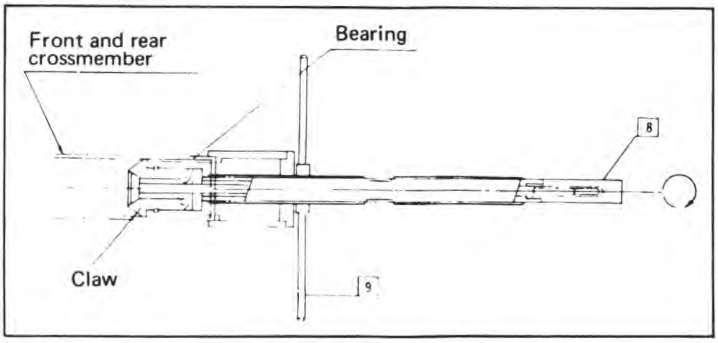


Fig. 14-3

Adjust the puller claw to its smallest size and insert it into the front or rear crossmember, set the puller by pulling and turning (8) to open the claw.
Then withdraw the bearing by turning (9).

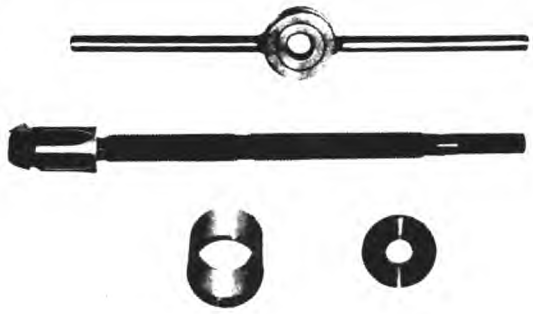


Fig. 14-4

Item / Set classification	Tool number	Tool name	Place of application
A	925030000	Installer	Rear crossmember bearing

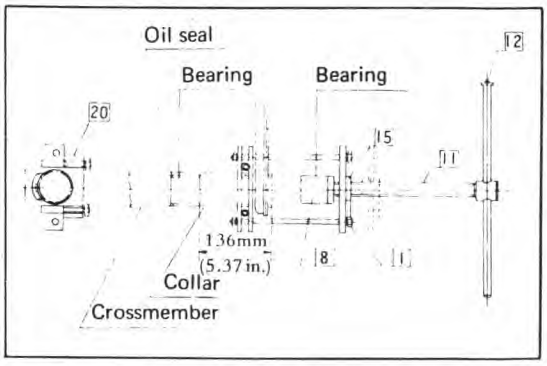


Fig. 14-5

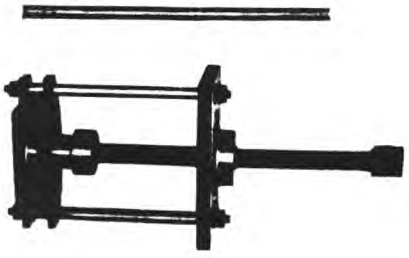


Fig. 14-6

Coat the rear crossmember bearing pressure section and bearing with soapy water, and fit the bearing installer onto the crossmember. Set (20) from the upper side, securely tighten the mounting nut, insert the bearing oil seal into (8), and press on while turning (12) until the size of the screw (11) is 50 mm (1.97 in.) from the outside surface of (15). Press the bearing until there is 136 mm (5.37 in.) between the end of the crossmember and the end of the oil seal. Use the same procedure and press on the bearing until it touches the collar.

When inserting the collar to the crossmember, remove the installer press on the side once and set the collar grease inserting hole.

Item / Set classification	Tool number	Tool name	Place of application
A. B.	925040000	Adjuster	Front ground clearance

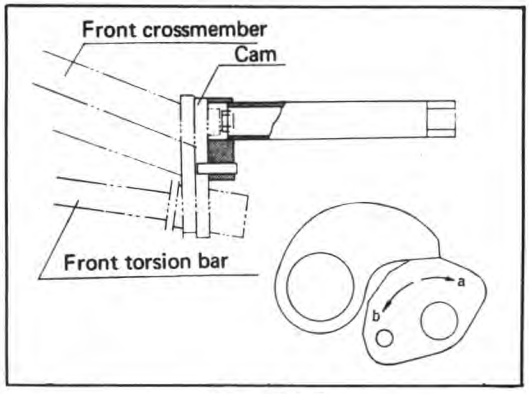


Fig. 14-7

Fig. 14-8

Set the road clearance adjuster to the cam, if the cam is turned in direction "a" the road clearance can be increased and if turned in the direction "b" the road clearance can be decreased. (The amount of change of cam face 1 moves the wheel position 8 mm (0. 32 in.).)

Item / Set classification	Tool number	Tool name	Place of application
A. B	925051000	Bearing replacer	Knuckle bearing

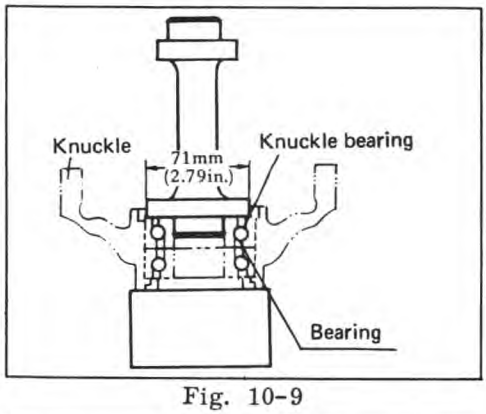


Fig. 10-9

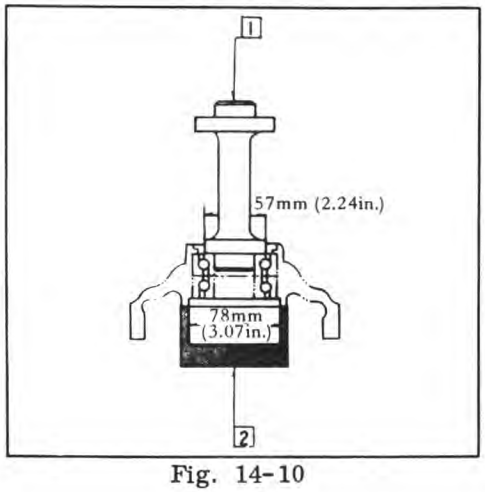


Fig. 14-10

1: Pressing on the knuckle bearing

Align the knuckle bearing and set it, fit the 71 mm (2. 79 in.) side of the tool onto the bearing, set the bearing into the inside diameter of the knuckle and press it on with a hammer until it touches the bottom of the knuckle.

2: Withdrawing the knuckle bearing

Place the knuckle on cradle (2), fit the 57 mm (2. 24 in.) side of the tool onto the bearing from the upper side and with a hammer remove the bearing.

Fig. 14-11

Item / Set classification	Tool number	Tool name	Place of application
A. B.	925061000	wrench	Knuckle bearing nut

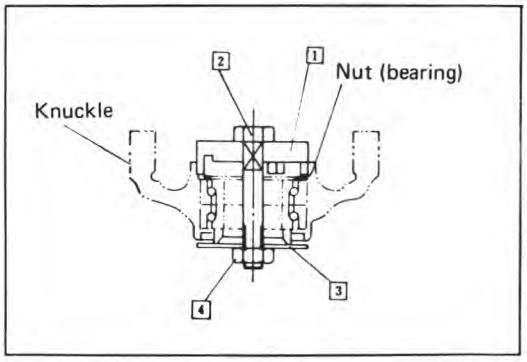


Fig. 14-12

Fig. 14-13

After the knuckle bearing has been pressed on, temporary tighten the (bearing) nut, then tighten or loosen the nut as necessary with the tool.

Item / Set classification	Tool number	Tool name	Place of application
A. B	925071000	Installer	Knuckle and the hub

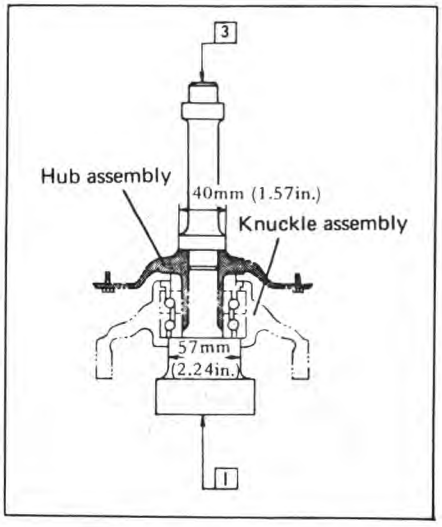


Fig. 14-14

Fig. 14-15

1: Pressing on the knuckle and hub assembly

Set the knuckle on cradle (1), fit the hub onto the knuckle, set (3) onto the hub, and hammer from above.

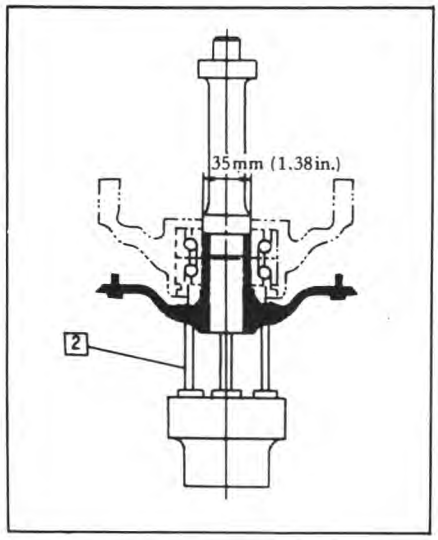


Fig. 14-16

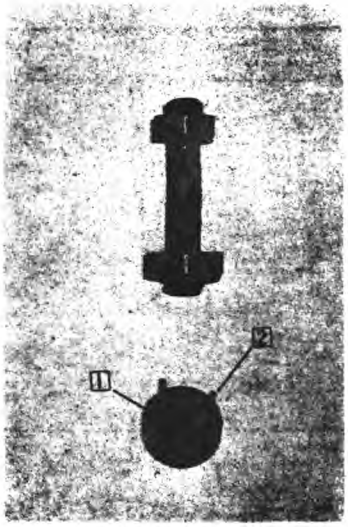


Fig. 14-17

2: Withdrawing the knuckle and hub assembly

Assemble (1) to (2) by fitting (2) to the three holes in the hub assembly, join them together by hitting (3) from above, and disassemble the knuckle and hub assembly.

14-2: TOOLS FOR BRAKES

Item / Set classification	Tool number	Tool name	Place of application
A. B	925080000	Installer	Rear brake drum inner bearing

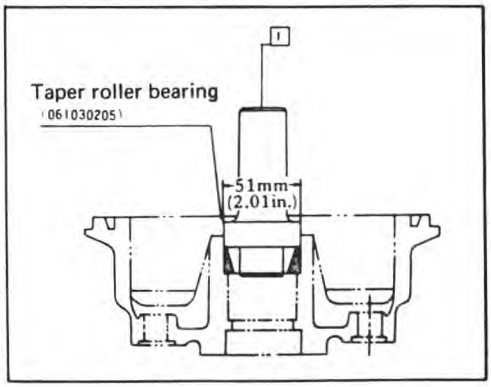


Fig. 14-18

Fig. 14-19

1: Pressing the taper roller bearing onto the brake drum assembly.

Set the brake drum, fit the outer taper roller bearing, fit (1) to the bearing, and hammer from above.

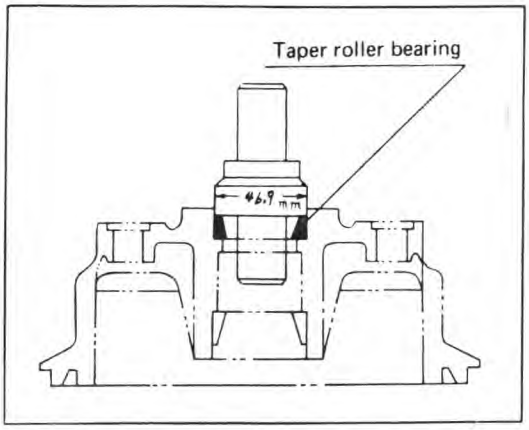


Fig. 14-20

2: Press fit the taper roller bearing into the rear brake drum assembly.

Replacing tool 921130000 (special tool for Subaru 360) is used since the taper roller bearing is the same as that for the Subaru 360 sedan front brake taper roller bearing.

14-3: TOOLS FOR AXLE

Item / Set classification	Tool number	Tool name	Place of application
A. B.	925090000	Tightener	Front axle boot clip

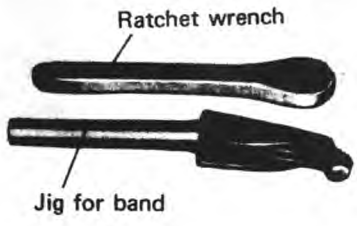


Fig. 14-21

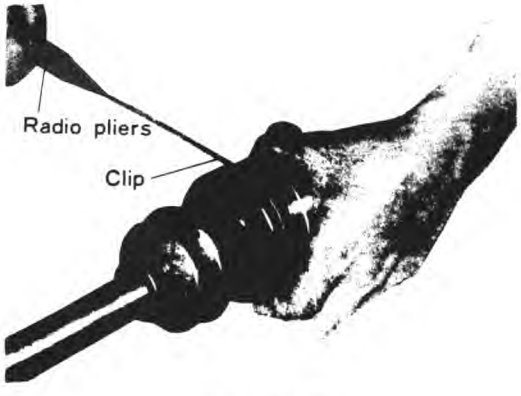


Fig. 14-22

1: Pass the band through the clip, fit it into the boot groove and wind it around twice.

2: Holding the end of the band with radio pliers, press the clip down and sufficiently tighten.

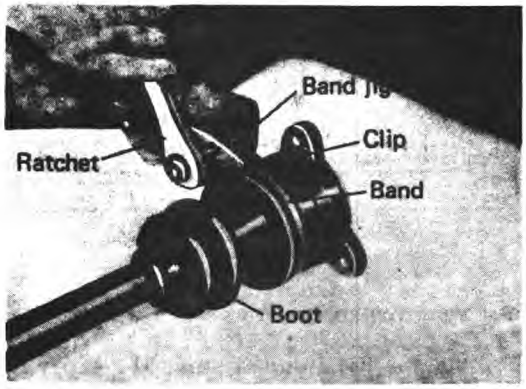


Fig. 14-23

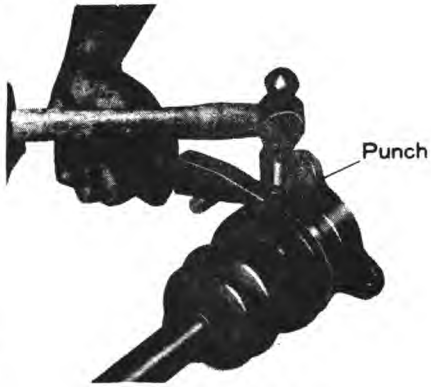


Fig. 14-24

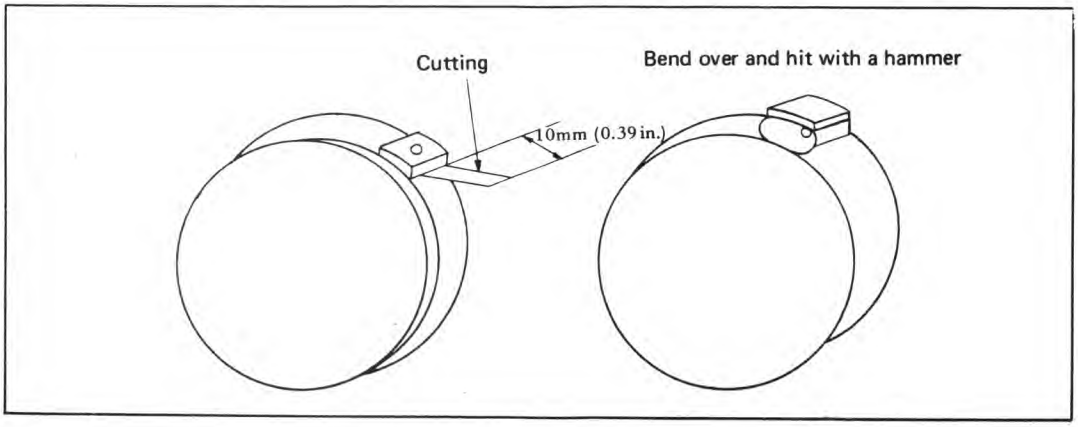


Fig. 14-25

3: Hold the band in the band jig and ratchet

4: Tighten the band with the ratchet (moving the band by hand until it ceases to move).

5: Tap the top of the clip with punch. (Do not damage the boot.)

6: Cut off the band about 10 mm (0. 39 in.) from the clip.

7: Bend the end of the cutting over onto the clip and tap with a hammer.

Item / Set classification	Tool number	Tool name	Place of application
A. B.	925100000	Wrench	Speedometer cable

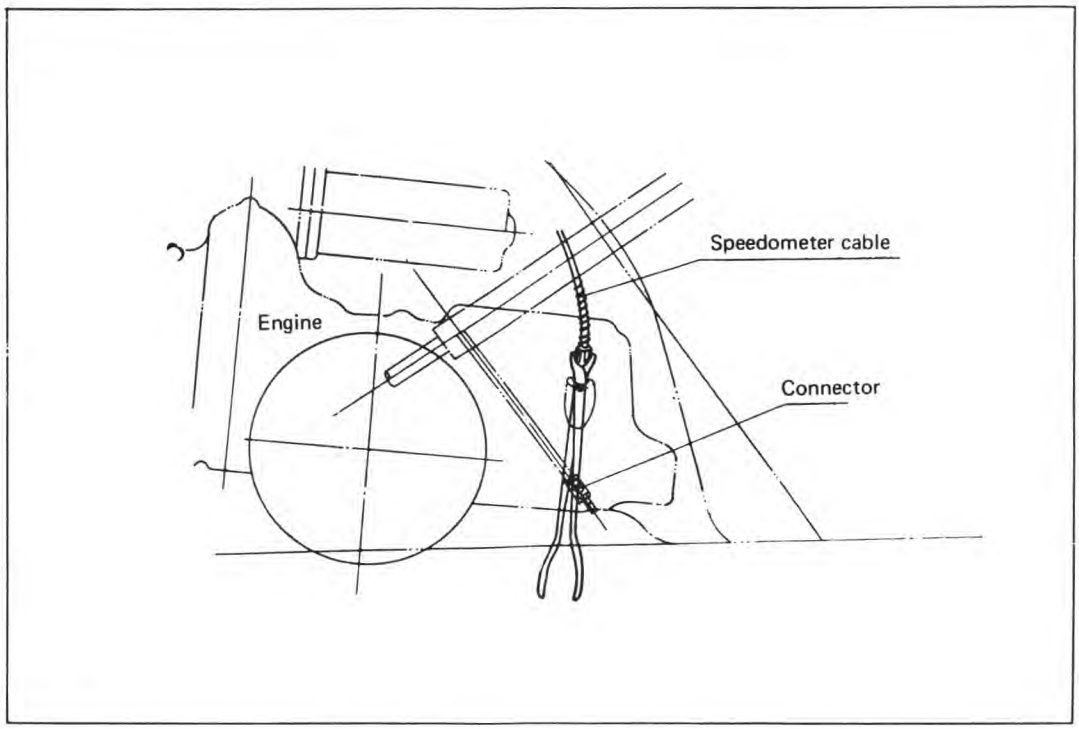


Fig. 14-26

Remove the gear shift connector. The speedometer cable is removed by using the tool from under the floor.

CHAPTER 15 : STANDARD ADJUSTMENT TABLE

15-1: STANDARD BOLT TIGHTENING TORQUE TABLE

Bolt stock number	Nominal diameter mm (in.)	Pitch mm (in.)	Standard tightening torque kg-m (lb-ft)	
			Standard value	Range of tightening allowance
015606OOO	6 (0.24)	1.0 (0.04)	0.70 (5.06)	0.36 ~ 0.90 (2.60 ~ 6.51)
015608OOO	8 (0.32)	1.25 (0.05)	1.80 (13.02)	0.90 ~ 2.20 (6.51 ~ 15.91)
015610OOO	10 (0.39)	1.25 (0.05)	3.70 (26.76)	1.80 ~ 4.70 (13.02 ~ 33.99)
015612OOO	12 (0.47)	1.5 (0.06)	6.40 (46.29)	3.20 ~ 8.10 (23.15 ~ 58.59)
015614OOO	14 (0.55)	1.5 (0.06)	11.0 (79.57)	5.30 ~ 13.00 (38.34 ~ 94.03)
015616OOO	16 (0.63)	1.5 (0.06)	16.0 (115.74)	8.10 ~ 21.00 (58.59 ~ 51.90)
016506OOO	6 (0.24)	1.0 (0.04)	0.45 (3.26)	0.23 ~ 0.58 (1.66 ~ 4.20)
016503OOO	8 (0.32)	1.25 (0.05)	1.10 (7.96)	0.56 ~ 1.40 (4.05 ~ 10.13)
016510OOO	10 (0.39)	1.25 (0.05)	2.30 (16.64)	1.20 ~ 3.00 (8.68 ~ 21.7)
016512OOO	12 (0.47)	1.5 (0.06)	4.10 (29.66)	2.00 ~ 5.10 (14.47 ~ 36.89)
016514OOO	14 (0.55)	1.5 (0.06)	6.70 (48.46)	3.40 ~ 8.50 (24.59 ~ 61.49)
016516OOO	16 (0.63)	1.5 (0.06)	10.0 (72.33)	5.20 ~ 13.00 (37.61 ~ 94.03)

(NOTE) The last three units of the bolt stock number (as shown in chart by OOO) represent the length; if the numbers of the first six units are the same, the tightening torque is the same.

15-2: TIGHTENING TORQUE TABLE

Classification	Tightening position	Nominal diameter mm (in.)	Tightening torque kg-m (lb-ft)
Steering relationship	Steering wheel	12 (0.47)	2.80 ~ 4.00 (20.25 ~ 28.93)
	Steering shaft	8 (0.32)	1.60 ~ 2.00 (11.57 ~ 14.47)
	Gear box	10 (0.39)	4.50 ~ 5.50 (32.55 ~ 39.78)
	Rubber coupling joint	8 (0.32)	1.60 ~ 1.80 (11.57 ~ 13.02)
	Tie-rod lock nut	14 (0.55)	8.00 ~ 9.00 (57.87 ~ 65.10)
	Rubber coupling	8 (0.32)	0.50 ~ 0.60 (3.62 ~ 4.34)
Suspension and axle relationship	Lower arm body installing	10 (0.39)	3.50 ~ 4.50 (25.32 ~ 32.55)
	Lower arm shaft installing	12 (0.47)	4.50 ~ 6.00 (32.55 ~ 43.40)
	Trailing arm lock bolt	10 (0.39)	2.50 ~ 4.00 (18.08 ~ 28.93)
	Front suspension body mounting	14 (0.55)	8.00 ~ 10.00 (57.87 ~ 72.33)
	Rear suspension body upper part	10 (0.39)	2.50 ~ 4.00 (18.08 ~ 28.93)
	Lower arm castle nut (camber and caster)	10 (0.39)	4.50 ~ 7.50 (82.55 ~ 54.25)
	Rear suspension lower part of body	12 (0.47)	7.00 ~ 9.00 (50.63 ~ 65.10)
	Torsion bar lock bolt	10 (0.39)	3.50 ~ 4.50 (25.32 ~ 32.55)
	Front hub and C.V.J. joint	22 (0.43)	12.00 ~ 14.00 (86.80 ~ 101.27)
	Shock absorber tightening nut	10 (0.39)	3.00 ~ 4.50 (21.70 ~ 32.55)
	Upper arm and ball stud.	24 (0.94)	16.00 ~ 18.50 (115.74 ~ 133.82)
	Wheel nut (wheel installing)	12 (0.47)	5.50 ~ 7.50 (39.78 ~ 54.25)

15-3: FRONT AXLE

Vehicle type			A12	A41
Front wheel bearing tightening torque		Inside wheels	12.00 ~ 14.00 kg-m (86.80 ~ 101.27 lb-ft)	12.00 ~ 14.00 kg-m (86.80 ~ 101.27 lb-ft)
		Outside wheels	16.00 ~ 18.00 kg-m (115.74 ~ 130.20 lb-ft)	16.00 ~ 18.00 kg-m (115.74 ~ 130.20 lb-ft)
Wheel alignment	Caster	When vehicle is empty	1°30' ~ 2°	1°30' ~ 2°
	Camber	When vehicle is empty	1°20' ~ 1°50'	1°20' ~ 1°50'
	King pin angle	When vehicle is empty	-1°50' ~ -2°50'	-1°50' ~ -2°50'
	Toe-in	When vehicle is empty	2 ~ 8 mm (0.08 ~ 0.32 in.)	2 ~ 8 mm (0.08 ~ 0.32 in.)
	Steering angle	Inside wheels	36°20' ±30'	36°20' ±30'
		Outside wheels	34°20' ±30'	34°20' ±30'

15-4: WHEEL

Vehicle type			A12	A41			
Tire size		Front wheels Rear wheels	6.15-13-4PR 6.15-13-4PR	6.15-13-6PR 6.15-13-6PR			
Standard air pressure	Usual running [a full 80 km/h. (49.8 mile/h)]	Front wheels Rear wheels	1.4 ~ 1.6 kg/cm^2 (19.91 ~ 22.76 psi) 1.0 ~ 1.2 kg/cm^2 (14.22 ~ 17.07 psi)	Light carrying load	1.4 (19.91 psi) 1.2 (17.07 psi)	Regular carrying load	1.4 (19.91 psi) 2.1 (29.87 psi)

Vehicle type			A12	A41
Standard air pressure	Top running speed [above 80 km/h (49.80 mile/h)]	Front wheels	1.6 ~ 1.7 kg/cm^2 (22.76 ~ 24.18 psi)	As shown above increase the front and rear wheels by a pressure of 0.2 kg/cm^2 (2.85 psi)
		Rear wheels	1.4 ~ 1.5 kg/cm^2 (19.91 ~ 21.34 psi)	

15-5: FRONT SUSPENSION

Vehicle type			A12	A41
Torsion bar	Diameter Effective length		18 mm (0.71 in.) 647 mm (25.49 in.)	18.5 mm (0.73 in.) 652 mm (25.69 in.)
Shock absorber	Stroke Maximum length Minimum length		39 mm (1.54 in.) 271 mm (10.68 in.) 232 mm (9.14 in.)	39 mm (1.54 in.) 271 mm (10.68 in.) 232 mm (9.14 in.)
	Damping force	Expansion	90 kg (0.3 m/sec) (198.42 lb (9.84 ft/s))	150 kg (0.3 m/sec) (330.69 lb (9.84 ft/s))
		Compression	40 kg (0.3 m/sec) (88.19 lb (9.84 ft/s))	50 kg (0.3 m/sec) (110.23 lb (9.84 ft/s))

15-6: REAR SUSPENSION

Vehicle type		A12	A41
Torsion bar	Diameter Effective length	17.2 mm (0.68 in.) 405.4 mm (15.97 in.)	20.5 mm (0.81 in.) 448 mm (17.65 in.)
Center spring	Free length Installing length Installing load	84 mm (3.31 in.) 74 mm (2.92 in.) 817 kg (1800 lb)	88 mm (3.47 in.) 76.4 mm (3.01 in.) 814 kg (1790 lb)

Vehicle type			A12	A41
Shock absorber	Stroke Maximum length Minimum length		100 mm (3.94 in.) 384 mm (15.13 in.) 284 mm (11.18 in.)	97 mm (3.82 in.) 412 mm (16.23 in.) 315 mm (12.41 in.)
	Damping force	Expansion	120 kg (0.3 m/sec) (264.55 lb (9.84 ft/s))	180 kg (0.3 m/sec) (396.83 lb (9.84 ft/s))
		Compression	40 kg (0.3 m/sec) (88.19 lb (9.84 ft/s))	60 kg (0.3 m/sec) (132.28 lb (9.84 ft/s))
Tightening of rear drum bearing			Tighten nut completely, turn about 1/8 - 1/10 and bend locking washer. In this condition the starting torque after is 0.07 ~ 0.1 kg-m (0.51 ~ 0.72 lb-ft)	Tighten nut completely, turn about 1/8 - 1/10 and bend locking washer. In this condition the starting torque after is 0.07 ~ 0.1 kg-m (0.51 ~ 0.72 lb-ft)

15-7: STEERING

Vehicle type		A12	A41
Outside diameter of steering wheel Steering wheel play (In straight position) Gear ratio		400 mm (15.76 in.) Under 30 mm (Under 1.18 in.) 18.43	400 mm (15.76 in.) Under 30 mm (Under 1.18 in.) 18.43
Pinion and rack back lash		Under 0.1 mm (Under 0.0039 in.)	Under 0.1 mm (Under 0.0039 in.)
Steering gear Box pinion Torque	Central rack [± 30 mm (± 1.18 in.)]	Under 0.09 kg-m (Under 0.65 lb-ft)	Under 0.09 kg-m (Under 0.65 lb-ft)
	Total amount of operation	Under 0.22 kg-m (Under 1.59 lb-ft)	Under 0.22 kg-m (Under 1.59 lb-ft)

15-8: BRAKE

* Master Cylinder

Vehicle type		A12	A41
Inside diameter		19.050 ~ 19.052 mm (0.7505 ~ 0.7506 in.)	19.050 ~ 19.052 mm (0.7505 ~ 0.7506 in.)
Piston outside diameter		19.030 ~ 18.997 mm (0.7497 ~ 0.7485 in.)	19.030 ~ 18.997 mm (0.7497 ~ 0.7485 in.)
Piston gap		0.020 ~ 0.105 mm (0.0008 ~ 0.0041 in.)	0.020 ~ 0.105 mm (0.0008 ~ 0.0041 in.)
Spring (return)	Free length Installing length Installing load	73.5 mm (2.8959 in.) 52.5 mm (2.0685 in.) 2 kg (4.41 lb)	73.5 mm (2.8959 in.) 52.5 mm (2.0685 in.) 2 kg (4.41 lb)

* Brake

Vehicle type			A12	A41
Brake pedal		Pedal height	190 mm (0.75 in.)	190 mm (0.75 in.)
Parking brake		Cable length	Right 815 ~ 819 mm (32.11 ~ 32.27 in.) Left 706 ~ 710 mm (27.82 ~ 27.97 in.)	829 ~ 833 mm (32.66 ~ 32.82 in.) 714 ~ 718 mm (28.13 ~ 28.29 in.)
		Lever pull back stroke	7 ~ 8 ratch	7 ~ 8 ratch
Front brake	Drum	Inside diameter Minimum inside diameter	203.2 mm (8.01 in.) 205.2 mm (8.08 in.)	228.6 mm (9.01 in.) 229.6 mm (9.04 in.)

Vehicle type				A12	A41
Front Brake	Lining		Thickness Minimum thickness Width	5 mm (0.20 in.) 1.8 mm (0.07 in.) 45 mm (1.79 in.)	5 mm (0.20 in.) 1.8 mm (0.07 in.) 40 mm (1.57 in.)
	Wheel cylinder		Inside diameter Piston outside diameter Piston gap	23.810 ~ 23.862 mm (0.9381 ~ 0.9401 in.) 23.757 ~ 23.790 mm (0.9359 ~ 0.9373 in.) 0.02 ~ 0.105 mm (0.0008 ~ 0.0041 in.)	23.810 ~ 23.862 mm (0.9381 ~ 0.9401 in.) 23.757 ~ 23.790 mm (0.9359 ~ 0.9373 in.) 0.02 ~ 0.105 mm (0.0008 ~ 0.0041 in.)
	Shoe Return Spring	No.1 Primary	Free length Installing length Installing load	78 mm (3.07 in.) 84 mm (3.31 in.) 14.4 ~ 17.6 kg (31.75 ~ 38.8 lb)	90 mm (3.54 in.) 98 mm (3.86 in.) 10.8 ~ 13.2 kg (23.81 ~ 30.42 lb)
		No.2 Secondary	Free length Installing length Installing load	78 mm (3.07 in.) 84 mm (3.31 in.) 14.4 ~ 17.6 kg (31.75 ~ 38.8 lb)	90 mm (3.54 in.) 98 mm (3.86 in.) 10.8 ~ 13.2 kg (23.81 ~ 30.42 lb)
	Automatic adjusting spring		Free length Installing length Installing load	56.8 mm (2.24 in.) 59.0 mm (2.32 in.) 9.9 ~ 12.1 kg (21.83 ~ 26.68 lb)	85.0 mm (3.35 in.) 93.0 mm (3.66 in.) 9.9 ~ 13.0 kg (21.83 ~ 28.66 lb)
	Shoe hold down spring		Free length Installing length Installing load	20 mm (0.79 in.) 14 mm (0.55 in.) 7.2 ~ 8.8 kg (15.87 ~ 19.40 lb)	20 mm (0.79 in.) 14 mm (0.55 in.) 7.2 ~ 8.8 kg (15.87 ~ 19.40 lb)
	Automatic adjuster		2 Shoes Outside diameter	Drum diameter -0.3 ~ -0.6 mm (-0.012 ~ -0.024 in.)	Drum diameter -0.3 ~ -0.6 mm (-0.012 ~ -0.024 in.)

				A12	A41
Front Brake	Automatic adjuster		2 Shoes Outside diameter	With new assembly 202.7 ~ 202.9 mm (7.983 ~ 7.9881 in.)	With new assembly 202.7 ~ 202.9 mm (7.983 ~ 7.9881 in.)
Rear brake	Drum		Inside diameter Minimum diameter	180 mm (7.09 in.) 182 mm (7.17 in.)	180 mm (7.09 in.) 182 mm (7.17 in.)
	Lining		Thickness Minimum thickness Width	5 mm (0.20 in.) 1.8 mm (0.07 in.) 35 mm (1.38 in.)	5 mm (0.20 in.) 1.8 mm (0.07 in.) 30 mm (1.18 in.)
	Wheel cylinder		Inside diameter Piston outside diameter Piston gap	15.870 ~ 15.913 mm (0.6253 ~ 0.6269 in.) 15.827 ~ 15.854 mm (0.6236 ~ 0.6246 in.) 0.016 ~ 0.086 mm (0.0006 ~ 0.0034 in.)	17.460 ~ 17.503 mm (0.6880 ~ 0.6900 in.) 17.417 ~ 17.444 mm (0.6862 ~ 0.6870 in.) 0.016 ~ 0.086 mm (0.0006 ~ 0.0034 in.)
		Compression spring	Free length Installing length Installing load	33 mm (1.29 in.) 10 mm (0.39 in.) 1.2 kg (2.65 lb)	33 mm (1.29 in.) 10 mm (0.39 in.) 1.2 kg (2.65 lb)
	Shoe return spring	Upper (Wheel cylinder side)	Free length Installing length Installing load	104 mm (4.09 in.) 112 mm (4.42 in.) 3.6 ~ 4.4 kg (7.94 ~ 9.70 lb)	90.8 mm (3.58 in.) 98.0 mm (3.86 in.) 5 kg (11.02 lb)
		Lower (Anchor side)	Free length Installing length Installing load	104 mm (4.09 in.) 116 mm (4.57 in.) 14.4 ~ 17.6 kg (31.75 ~ 38.8 lb)	85.8 mm (3.38 in.) 94.8 mm (3.74 in.) 18 kg (39.68 lb)
	Automatic adjustment	Outside diameter of both shoes		179.5 mm (7.07 in.)	179.5 mm (7.07 in.)

15-9: INSPECTION AND LUBRICATION CHART

●; Replacement

	INSPECTION ITEM	First 1,000 km (600 mi)	First 3,000 km (1,800 mi)	Every 5,000 km (3,000 mi)	Every 10,000 km (6,000 mi)	Every 20,000 km (12,000 mi)	Every 40,000 km (24,000 mi)
1	QUANTITY & SPECIFIC GRAVITY OF BATTERY ELECTROLYTE; inspection BATTERY TERMINAL; cleaning	O	O	O	O	O	O
2	QUANTITY OF COOLANT; inspection	O	O	O	O	O	
3	COOLANT; replacement						●
4	BRAKE FLUID; inspection and supplement	O	O	O	O	O	O
5	AIR CLEANER ELEMENT; replacement						●
6	AIR CLEANER; inspection for installation				O	O	O
7	V BELT; inspection and adjustment	O		O	O	O	O
8	IGNITION TIMING; inspection	O			O	O	O
9	DISTRIBUTOR; inspection, cleaning and adjustment		O	O	O	O	O
10	SPARK PLUG; inspection, adjustment & cleaning		O	O	O		
11	SPARK PLUG; replacement					●	●
12	WIRING CONNECTORS, RUBBER SEALS; inspection		O			O	O
13	STARTER, GENERATOR & REGULATOR; inspection					O	O

	INSPECTION ITEM	First 1,000 km (600 mi)	First 3,000 km (1,800 mi)	Every 5,000 km (3,000 mi)	Every 10,000 km (6,000 mi)	Every 20,000 km (12,000 mi)	Every 40,000 km (24,000 mi)
14	ELECTRIC CHARGING PERFORMANCE & OIL PRESSURE; inspection				O	O	O
15	FUEL STRAINER; inspection & cleaning	O	O	O	O	O	O
16	FUEL PUMP; inspection		O			O	O
17	CARBURETOR; inspection & adjustment						O
18	ENGINE IDLING; inspection & adjustment	O	O	O	O	O	O
19	CYLINDER HEAD TIGHTENING BOLTS; retightening	O	O		O	O	O
20	VALVE CLEARANCE; inspection & adjustment	O	O		O	O	O
21	OIL FILTER ELEMENT; replacement		●		●	●	●
22	COMPRESSION PRESSURE OF COMBUSTION CHAMBER; measurement						O
23	BOLTS & NUTS TIGHTENING FOR ENGINE & EXHAUST SYSTEM; inspection	O			O	O	O
24	WORKING OF CONTROL CABLES; inspection & adjustment	O			O	O	O
25	WORKING OF CLUTCH (STROKE AND PLAY); inspection & adjustment		O		O	O	O
26	TRANSMISSION OPERATING MECHANISM; inspection					O	O

	INSPECTION ITEM	First 1,000 km (600 mi)	First 3,000 km (1,800 mi)	Every 5,000 km (3,000 mi)	Every 10,000 km (6,000 mi)	Every 20,000 km (12,000 mi)	Every 40,000 km (24,000 mi)
27	BLOWER; inspection & cleaning						O
28	WORKING OF BLOWER & HEATING SYSTEM; inspection	O	O			O	O
29	PARKING BRAKE; inspection & adjustment	O				O	O
30	BRAKE & CLUTCH PEDALS; inspection & adjustment	O					O
31	GEAR SHIFT SYSTEM; inspection & adjustment	O				O	O
32	WHEEL NUT; inspection & retightening	O	O	O	O	O	O
33	TIRE PRESSURE; inspection & adjustment	O	O	O	O	O	O
34	WHEEL; rotation		O	O	O	O	O
35	FRONT AXLE SYSTEM; inspection & adjusting	O	O	O	O	O	O
36	SUSPENSION PARTS; inspection (tightening)	O	O	O	O	O	O
37	WHEEL BEARING; inspection				O	O	O
38	ABRASION OF BRAKE LINING; inspection					O	O
39	BRAKE PIPING & CONNECTION PARTS; inspection	O	O	O	O	O	O

	INSPECTION ITEM	First 1,000 km (600 mi)	First 3,000 km (1,800 mi)	Every 5,000 km (3,000 mi)	Every 10,000 km (6,000 mi)	Every 20,000 km (12,000 mi)	Every 40,000 km (24,000 mi)
40	STEERING SYSTEM; inspection & adjustment	O	O	O	O	O	O
41	WHEEL ALIGNMENT; inspection & adjustment	O	O	O	O	O	O
42	WORKING OF LIGHTS, WIPER & HORN; inspection & adjustment	O	O	O	O	O	O
43	HEADLIGHT AIMING; inspection & adjustment	O			O	O	O
44	WIRING HARNESS & TERMINALS; inspection		O		O	O	O
45	DAMAGE OF BODY PARTS; inspection				O	O	O
46	LEAKAGE OF FUEL, OIL & COOLANT etc.; inspection	O	O	O	O	O	O

	INSPECTION ITEM	First 1,000 km (600 mi)	First 3,000 km (1,800 mi)	Every 5,000 km (3,000 mi)	Every 10,000 km (6,000 mi)	Every 20,000 km (12,000 mi)	Every 40,000 km (24,000 mi)
1	ENGINE OIL REPLACEMENT	●	●	●	●	●	●
2	TRANSMISSION OIL INSPECTION		O		O	O	
3	TRANSMISSION OIL REPLACEMENT	●					●
4	DISTRIBUTOR ROTOR SHAFT, CAM and ARM SHAFT GREASING				O	O	O

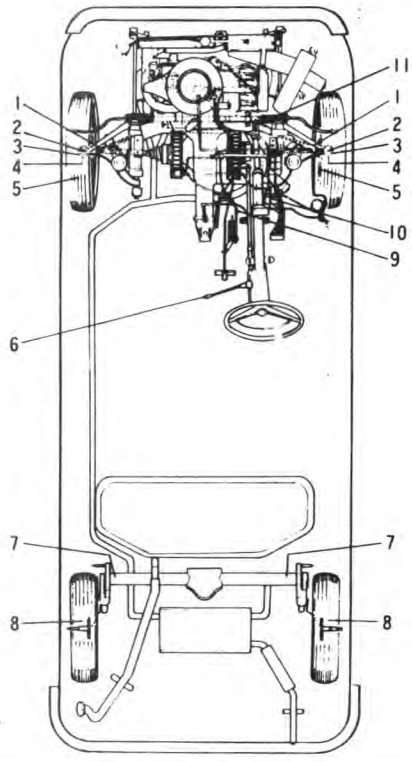
	INSPECTION ITEM	First 1,000 km (600 mi)	First 3,000 km (1,800 mi)	Every 5,000 km (3,000 mi)	Every 10,000 km (6,000 mi)	Every 20,000 km (12,000 mi)	Every 40,000 km (24,000 mi)
5	DISTRIBUTOR TIMING ADVANCING MECHANISM: INSPECTION & GREASING					O	O
6	PEDAL SYSTEM GREASING				O	O	O
7	RESPECTIVE PARTS OF BODY GREASING				O	O	O
8	WHEEL BEARING GREASING, UPPER ARM BEARING GREASING & TRAILING ARM BEARING GREASING						O
9	BLOWER GREASING						O

15-10: PERIODICAL INSPECTION CHART

Item	Every 6 Mo.	Every 12 Mo.
Quantity of Battery Electrolyte	O	O
Leakage of Coolant	O	O
Quantity of Brake Fluid	O	O
Air Cleaner Installation	O	O
V-Belt Tightness and Damage	O	O
Ignition Timing		O
Distributor Contact Point	O	O
Function of Timing Advance Mechanism		O
Electrode of Spark Plug	O	O
Looseness & Damage of Wiring Connectors & Rubber Seals	O	O
Starter Installation & Pinion Gearing		O
Electric Charging Performance	O	O
Fuel Strainer Element		O
Working of Fuel Pump	O	O
Leakage of Fuel Pipe	O	O
Engine Idling & Acceleration	O	O
Engine Starting, Noises and Exhaust	O	O
Leakage of Fuel, Oil & Coolant	O	O
Engine Intake & Exhaust System, Bolts, Nuts and Muffler Installation	O	O
Working of Control Cables	O	O
Working of Clutch (Stroke & Play)	O	O
Leakage of Transmission Oil	O	O
Working of Blower and Cleaning	O	O
Cooling, Switches for Heating System and Working of Shutter	O	O
Play of Parking Brake	O	O
Working of Brake & Clutch Pedal and Play	O	O
Looseness of Transmission Operating Mechanism		O
Looseness of Wheel Nuts	O	O

Item	Every 6 Mo.	Every 12 Mo.
Tire Pressure, Wear and Damage	O	O
Damage of Rim	O	O
Front Axle System	O	O
Fatigue of Torsion Bar	O	O
Leakage of Shock Absorber		O
Suspension System	O	O
Looseness of Front Wheel Bearing	O	
Looseness of Rear Wheel Bearing		O
Working of Service and Parking Brake	O	O
Wear of Brake Lining		O
Clearance Between Brake Drum & Lining	O	O
Function of Master and Wheel Cylinder		O
Wear & Damage of Parking Brake Lever Ratchet		O
Brake Piping & Connector	O	O
Play of Steering Wheel and Working	O	O
Looseness of Steering Gear Box Installation		O
Looseness & Damage of Steering Wheel Rubber Joint		O
Wheel Alignment	O	O
Working of Lights, Wiper, Horn and Switches	O	O
Headlight Aiming	O	O
Damage of Electric Harness & Looseness of Clamps	O	O
Damage of Body Parts		O
Rear View Mirror	O	O
Working of Meters	O	O

15-11: OIL AND GREASE POSITIONS



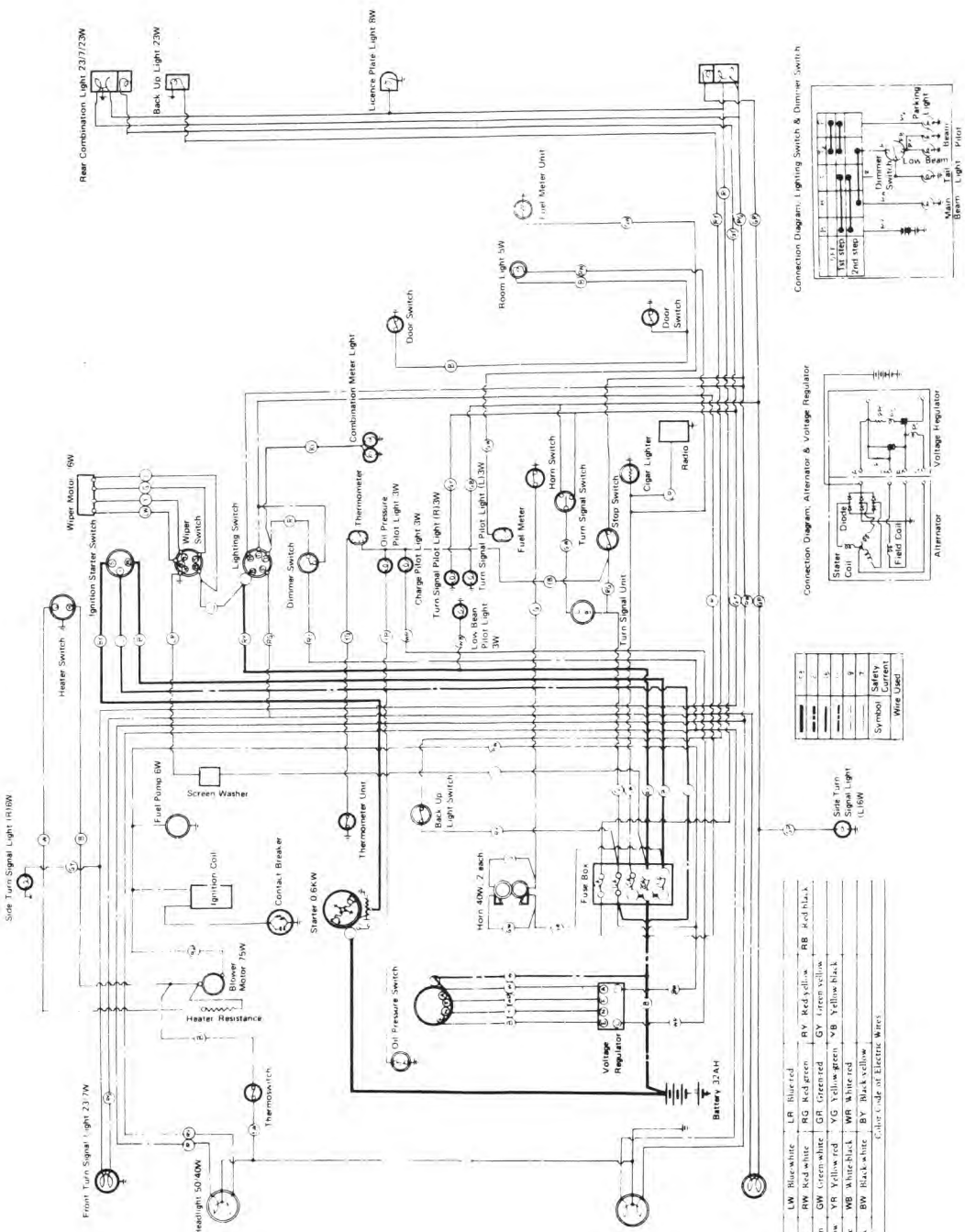
1. Upper arm bearing
2. Upper ball joint
3. Lower ball joint
4. Constant velocity joint
5. Front wheel bearing
6. Change gear
7. Cross member (Trailing arm bearing)
8. Rear wheel bearing
9. Hand brake cable
10. Pedal shaft
11. Gear box

(NOTE)

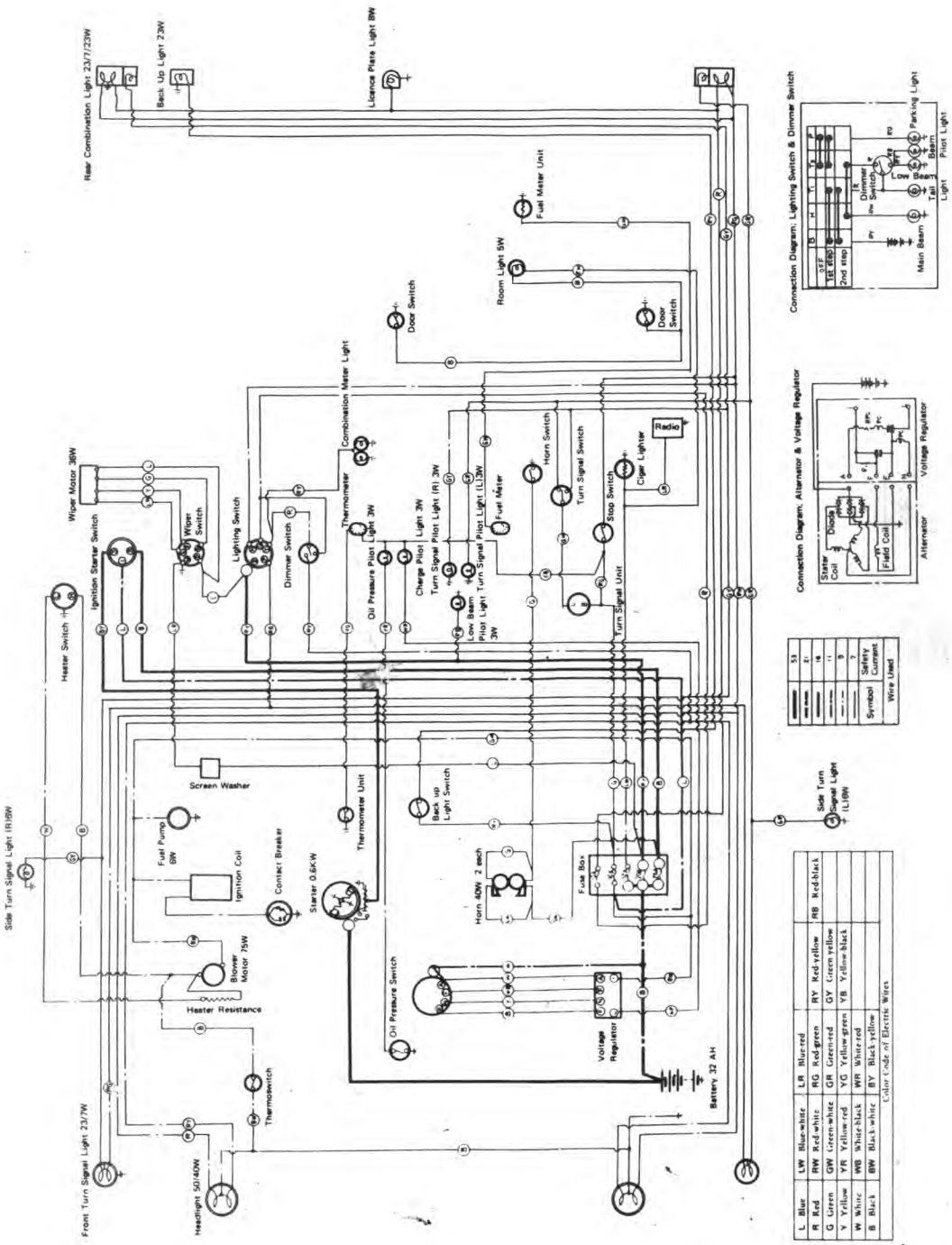
Remove the plug on the upper arm bearing, crossmember (trailing arm bearing) and grease.

WIRING DIAGRAM

WIRING DIAGRAM Type A12



WIRING DIAGRAM Type A41



L Blue	LW Blue-white	LR Blue-red		RY Red-yellow	RB Red-black		
R Red	RW Red-white	RG Red-green					
G Green	GW Green-white	GR Green-red		GY Green-yellow			
Y Yellow	YR Yellow-red	YG Yellow-green		YB Yellow-black			
W White	WB White-black	WR White-red					
B Black	BW Black-white	BY Black-yellow					
Color Code of Electric Wires							