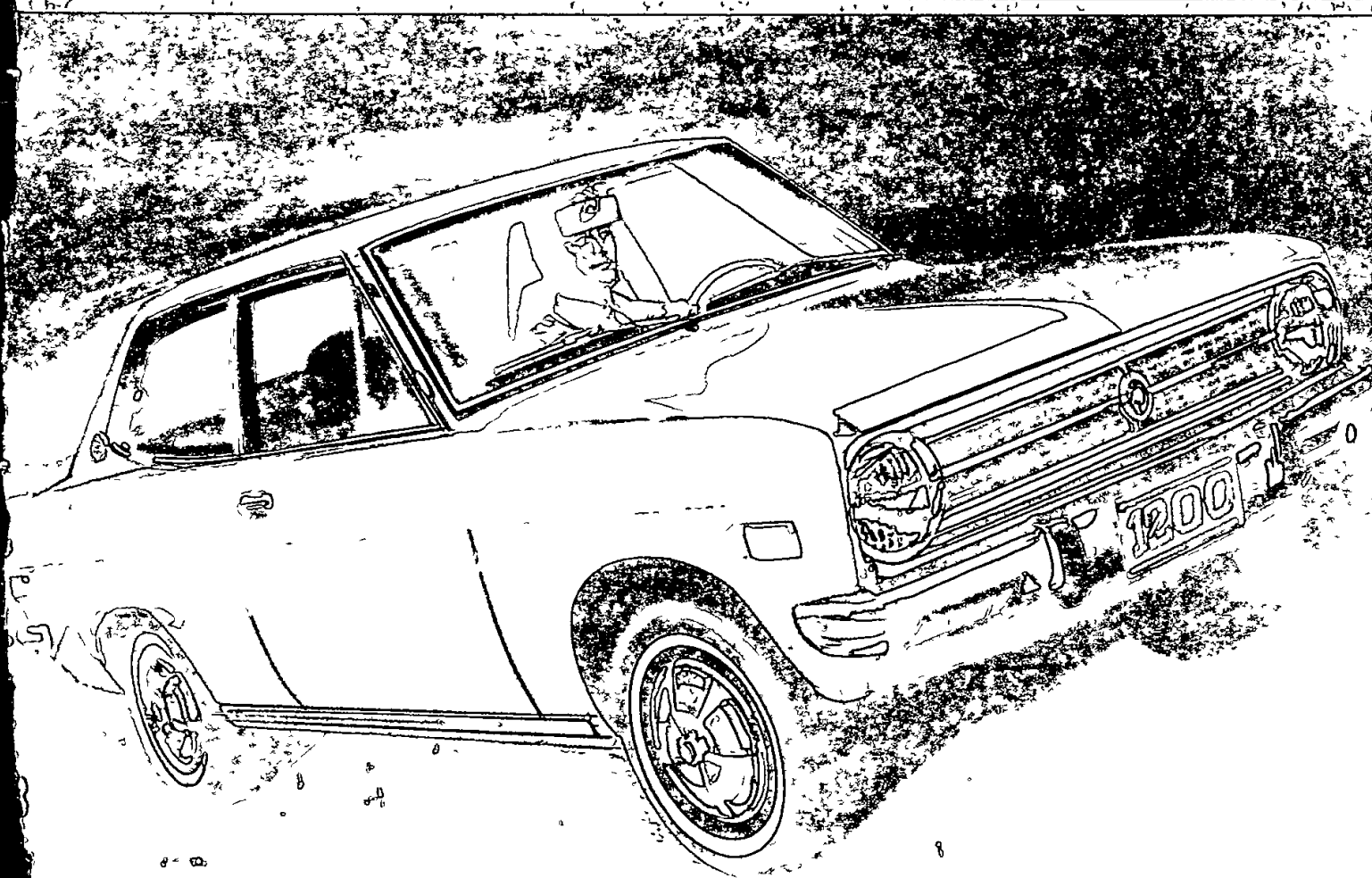


DATSUN 1200

RANGE: 1969-1973



WORKSHOP MAINTENANCE & REPAIR MANUAL

CRANE PUBLISHERS, INC.

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DATSUN 1200

RANGE: 1971-1973

WORKSHOP

MAINTENANCE & REPAIR

MANUAL

BY DRAKE AUTOMOTIVE EDITORS

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The purpose of this manual is to provide the automobile owner and mechanic with a reference source with which he can perform normal service operations

We endeavor to incorporate the latest manufacturing design changes and up-to-date specifications at the time of publication. While every effort is made to attain accuracy, the Publisher cannot be held responsible for manufacturing changes, typographical errors or omissions.

Upon compiling the information contained herein, we have tried to be brief and simple, relying on the combination of photographs, illustrations and text to make this manual a useful tool

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Maintenance & Tune-up

Maintenance & Tune-up

VALVE CLEARANCES

Valve clearance adjustment should be made while engine is stationary

To adjust proceed as follows

Start engine and run it until it is heated to operating temperature, or at least, more than 176° of engine oil temperature, then stop engine

Rotate crankshaft to bring No 1 cylinder in top dead center on its compression stroke

Remove valve rocker cover to gain access to valve operating mechanism

Adjust valve clearance at following four points while engine is still hot

1 Exhaust valve of No 1 cylinder

2 Intake valve of No 1 cylinder

3 Intake valve of No 2 cylinder

5 Exhaust valve of No 3 cylinder

Note: Numbers in parenthesis agree with those in accompanying sketch.

Again, rotate crankshaft one turn so that No 4 piston is in top dead center on its compression stroke Adjust following valves

4 Exhaust valve of No 2 cylinder

6 Intake valve of No 3 cylinder

7 Intake valve of No 4 cylinder

8 Exhaust valve of No 4 cylinder

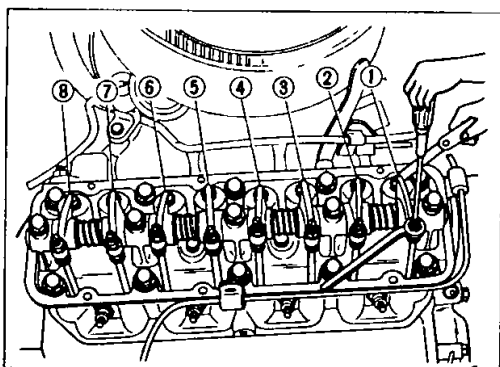


Fig 1 Adjusting valve clearance

Adjustment should be made while engine is hot After all valves have been adjusted correctly, tighten lock nut firmly to secure the adjustment

Checking and adjusting drive belt

Check for a cracked or damaged V-belt Replace if defective

Adjust the belt tension, if necessary Belt deflection when thumb pressure of 22 0 lb is applied midway between pulleys 0 394 to 0 590 in

ENGINE OIL

Oil capacity of engine (including oil filter)

Capacity

Maximum $\frac{7}{8}$ US gal, $\frac{3}{4}$ Imp gal

Minimum $\frac{5}{8}$ US gal, $\frac{1}{2}$ Imp gal

Make sure that engine oil is not deteriorated with cooling water or gasoline Drain and refill the oil, if necessary

Notes: a. A milky oil indicates the presence of cooling water.

Valve clearance

Hot	Intake	0 014 in
	Exhaust	

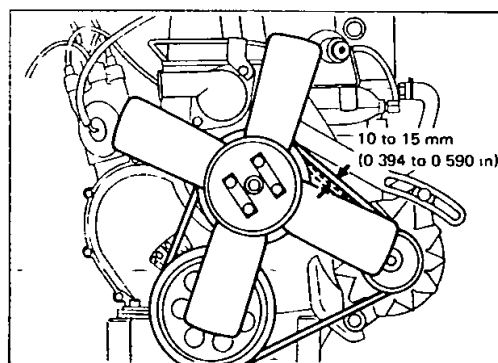


Fig. 2 Adjusting drive belt tension

Maintenance & Tune-up

Find the cause for necessary corrective action.

b. Oil with extremely low viscosity indicates dilution with gasoline.

Check oil level. If found below "L" mark, refill to "H" mark on gauge.

OIL FILTER

The oil filter is of a cartridge type.

Check for oil leaks through gasketed flange. If any leakage is found, retighten slightly. If necessary, replace filter as an assembly.

When installing an oil filter, tighten by hand.

Note: Do not overtighten oil filter, or oil leakage may result.

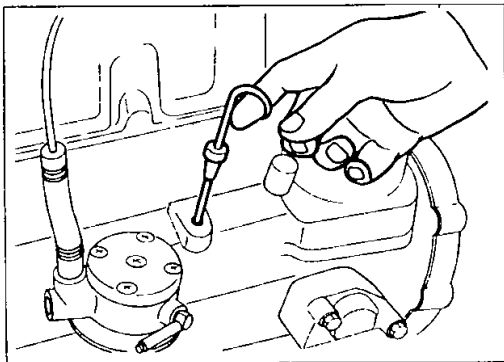


Fig 3 Checking engine oil level

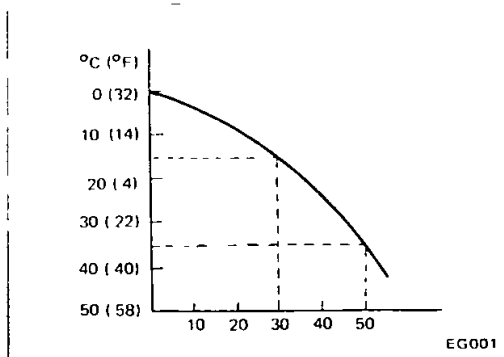


Fig 4 Protection concentration

COOLANT

LLC is an ethylene glycol base product containing chemical inhibitors to protect the cooling system from rusting and corrosion. The LLC does not contain any glycerine, ethyl or methyl alcohol. It will not evaporate or boil away and can be used with either high or low temperature thermostat. It flows freely, transfers heat efficiently, and will not clog the passages in the cooling system. The LLC must not be mixed with other products. This coolant can be used throughout the seasons of the year.

Whenever any coolant is changed, the cooling system should be flushed and refilled with a new coolant. Check the level.

COMPRESSION

Compression pressure test

Note: To test cylinder compression, remove all spark plugs and hold tester fit-

Percent concentration	Boiling point		Freeze protection
	Sea level	0.9 kg/cm ² cooling system pressure	
30%	221°F	255°F	5°F
50%	228°F	261°F	-31°F

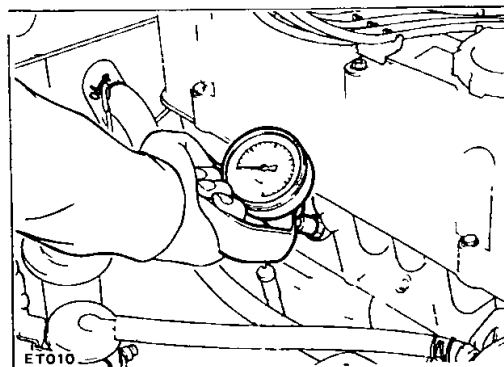


Fig 5 Testing compression pressure

Maintenance & Tune-up

ting tightly in spark plug hole of a cylinder

The tester is used to determine whether cylinder can hold compression, or whether there is excessive leakage past rings, etc

Test compression with engine warm, all spark plugs removed and throttle and choke valve opened. No cylinder compression should be less than 80% of highest cylinder's. Excessive variation between cylinders accompanied by low speed missing of the cylinder, usually indicates a valve not properly seating or a broken piston ring. Low pressures, even though uniform, may indicate worn rings. This may be accompanied by excessive oil consumption.

Test Conclusion

If one or more cylinders read low, inject about one tablespoon of engine oil on top of the pistons in low reading cylinders through spark plug hole. Repeat compression check on these cylinders.

If compression improves considerably, piston rings are defective.

If compression does not improve, valves are sticking or seating improperly.

If two adjacent cylinders indicate low compression and injecting oil on pistons does not increase compression, the cause may be a cylinder head gasket leak between the cylinders. Engine oil and coolant in cylinder could result from this problem.

Compression pressure
178 to 206 psi at 350 rpm

BATTERY

Check electrolyte level in each battery cell.

Unscrew each filler cap and inspect fluid level. If fluid level is low, add distilled water to bring level up to approximately 0.3937 to 0.7874 in above plates. Do not overfill.

Measure specific gravity of battery electrolyte.

Clean top of battery and terminals with a solution of baking soda and water. Rinse off and dry with compressed air. The top of battery must be clean to prevent current leakage between terminals and from positive terminal to hold-down clamp.

In addition to current leakage, prolonged accumulation of acid and dirt on the top of battery may cause blistering of the material covering connector straps and corrosion of straps. After tightening terminals, coat them with petrolatum (vaseline) to protect them from corrosion.

IGNITION TIMING

Check spark plugs and distributor breaker points for condition.

Thoroughly wipe off dirt and dust from timing marks on crank pulley and front cover.

Warm up engine sufficiently.

	Permissible value	Full charge value (at 68°F)
Frigid climates	Over 1.22	1.28
Tropical climates	Over 1.18	1.23
Other climates	Over 1.20	1.26

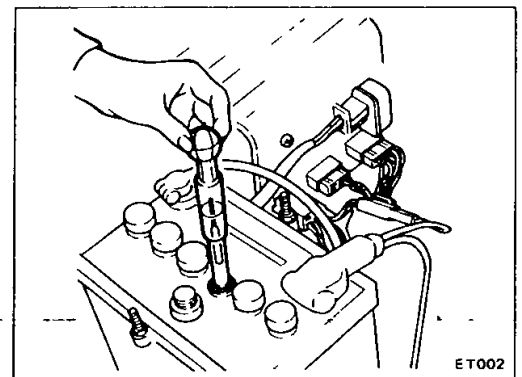


Fig-6 Checking the specific gravity of battery electrolyte

Maintenance & Tune-up

Install a timing light on No 1 cylinder spark plug wire, and install a tachometer

Set idling speed to approximately 800 rpm

Check ignition timing if it is 5° BTDC (Before Top of Dead Center) by the use of timing light

If necessary, adjust it as follows,

Loosen set screw to such an extent that distributor can be moved by hand

Adjust ignition timing to 5° BTDC

Lock distributor set screw, and make sure that timing is correct

Ignition timing (degree) 5° (B T D C)

Distributor Breaker Point

Check distributor breaker points for abnormal pitting and wear. Replace if necessary. Make sure they are in correct alignment for full contact and that point dwell and gap are correct. Clean and apply distributor grease to cam and wick.

Note: Do not apply grease excessively.

Distributor

Point gap 0.018 to 0.022 in

Dwell angle 49 to 55 degrees

Condenser

Clean outlet of condenser lead wire, and check for loose set screw. Retighten if necessary.

Check condenser capacity with a capacity meter

Condenser insulation resistance may be also checked using a tester by adjusting its range to measure large resistance value. When condenser is normal, the tester pointer swings largely and rapidly, and moves gradually back to the infinite side. When the pointer does not stay still or it points zero in resistance, replacement is necessary.

Condenser capacity

0.22 μ F (Micro Farad)

Condenser insulation resistance

5 M Ω (Mega-ohms)

Spark Plugs

Remove and clean plugs in a sand blast cleaner. Inspect each spark plug. Make sure that they are of the specified heat range. Inspect insulator for cracks and chips. Check both center and ground electrodes. If they are excessively worn, replace with new spark plugs. File center electrode flat. Set the gap to 0.031 to 0.035 in using the proper adjusting tool. Tighten plugs to 11.0 to 15.0 ft-lb torque.

CARBURETOR

Idle mixture adjustment requires the use of a "CO" meter. When preparing to adjust idle mixture, it is essential to have the meter thoroughly warmed and calibrated.

Warm up the engine sufficiently.

Continue engine operation for one minute under idling speed.

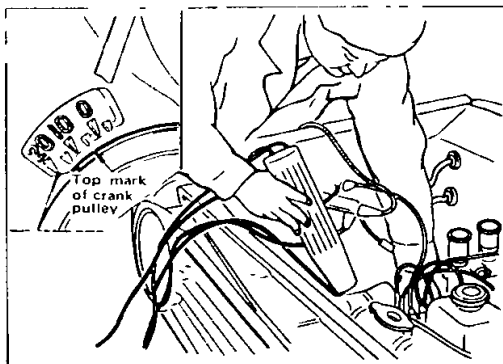


Fig 7 Checking ignition timing

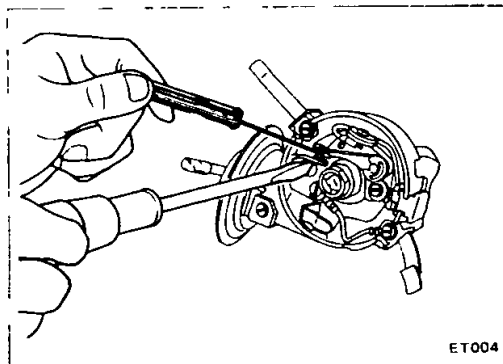


Fig 8 Checking distributor point gap

Maintenance & Tune-up

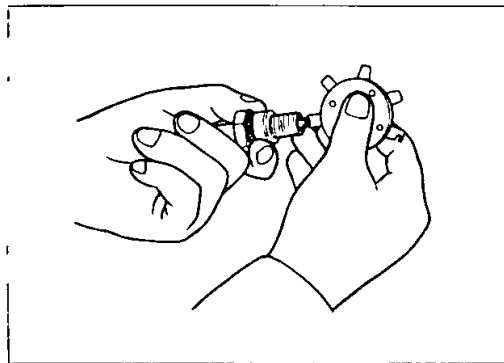


Fig 9 Checking spark plug gap

Adjust throttle adjusting screw so that engine speed is 800 rpm (in "N" position for automatic transmission)

Check ignition timing, if necessary adjust it to the specifications

Ignition timing $5^{\circ}/800$ rpm

Adjust idle adjusting screw so that CO percentage is $1.5 \pm 0.5\%$

Repeat the adjustments as described in steps 3, above so that CO percentage is $1.5 \pm 0.5\%$ at 800 rpm

Cautions: a. On automatic transmission equipped model, check must be done in the "D" position. Be sure to apply parking brake and to lock both front and rear wheels with wheel chocks.

b. Hold brake pedal while stepping down on accelerator pedal. Otherwise car will rush out dangerously

On automatic transmission equipped model, make sure that the adjustment has been made with the selector lever in "N" position

And then check the specifications with the lever in "D" position. Insure that CO percent and idle speed are as follows

Idle rpm 650

CO percentage

(with lever in "D" position) $1.5 \pm 0.5\%$

If necessary, adjust by progressively turning throttle adjusting screw and idle adjusting screw until correct adjustments are made

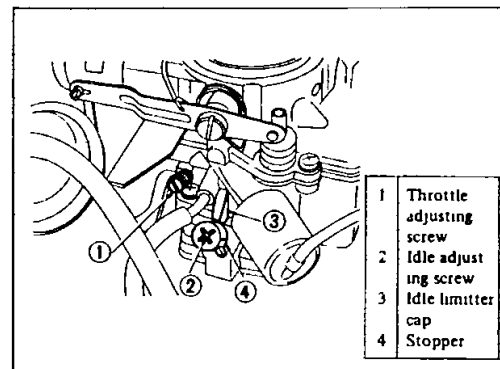


Fig. 10 Throttle adjusting screw and idle adjusting screw

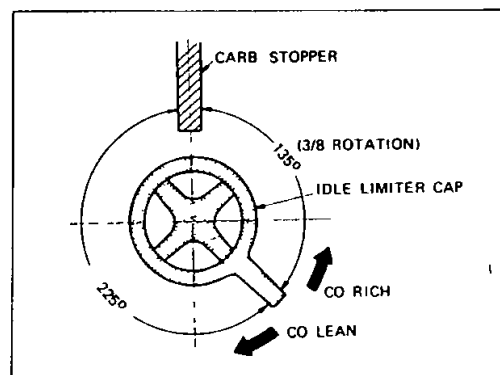


Fig. 11 Setting idle limiter cap

Notes: a. Do not attempt to screw down the idle adjusting screw completely to avoid damage to the tip, which will tend to cause malfunctions.

b. After idle adjustment has been made, shift the level to "N" or "P" position for automatic transmission.

c. Remove wheel chocks before starting the car.

Idle Limiter Cap

Do not remove this idle limiter cap unless necessary. If this unit is removed, it is necessary to re-adjust it at the time of installation. To adjust, proceed as follows

Make sure that the percentage of CO contents satisfies the specifications

Maintenance & Tune-up

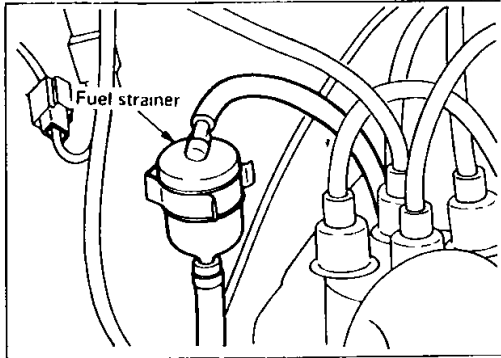


Fig 12 Fuel strainer

Install idle limiter cap in position, making sure that the adjusting screw can further turn $\frac{3}{8}$ rotation in the "CO-RICH" direction

Dash Pot (Automatic Transmission Model Only)

Check operation of dash pot, it should not be cracked or bound. It is also essential to check

to be certain that it is in correct adjustment

Check to be sure that dash pot contacts stopper lever when engine speed reaches 1,900 to 2,000 rpm

Engine should be slowed down from 3,000 to 1,000 rpm within a few seconds

Readjust dash pot or replace it with a new one if it fails to meet the above conditions

Carburetor Return Spring

Check throttle return spring for sign of damage, wear or squareness. Discard spring if found with any of above excessively beyond use

Fuel Filter

Check for a contamination element, water deposit, and defection

All engines use a cartridge type strainer. If it is found to be defective, replace as an assembly

Engine

DESCRIPTION

The A12 engine is a 71.5 cu in, in-line over head valve four-cylinder engine with 2.874 in bore and 2.765 in stroke. It features full-opened wedge shaped combustion chamber, aluminum heads and fully balanced 5-bearing crankshaft to turn out smooth, dependable power.

REMOVAL

Removing hood

Open the hood, remove four installation bolts, and remove the hood.

Disconnect the battery cable from the terminal.

Removing radiator

Drain water from the radiator, disconnect two radiator hoses, remove four radiator installation bolts, and remove the radiator.

Removing cables and hoses

Disconnect the following cables, hoses, and wires:

High voltage cable (between ignition coil and distributor)

Cable to the thermal transmitter

Cable to the oil pressure switch

Cable to the primary side of the distributor

Cable to the starting motor

Fuel hose

Cable to the alternator

Heater hose (for model with heater only)

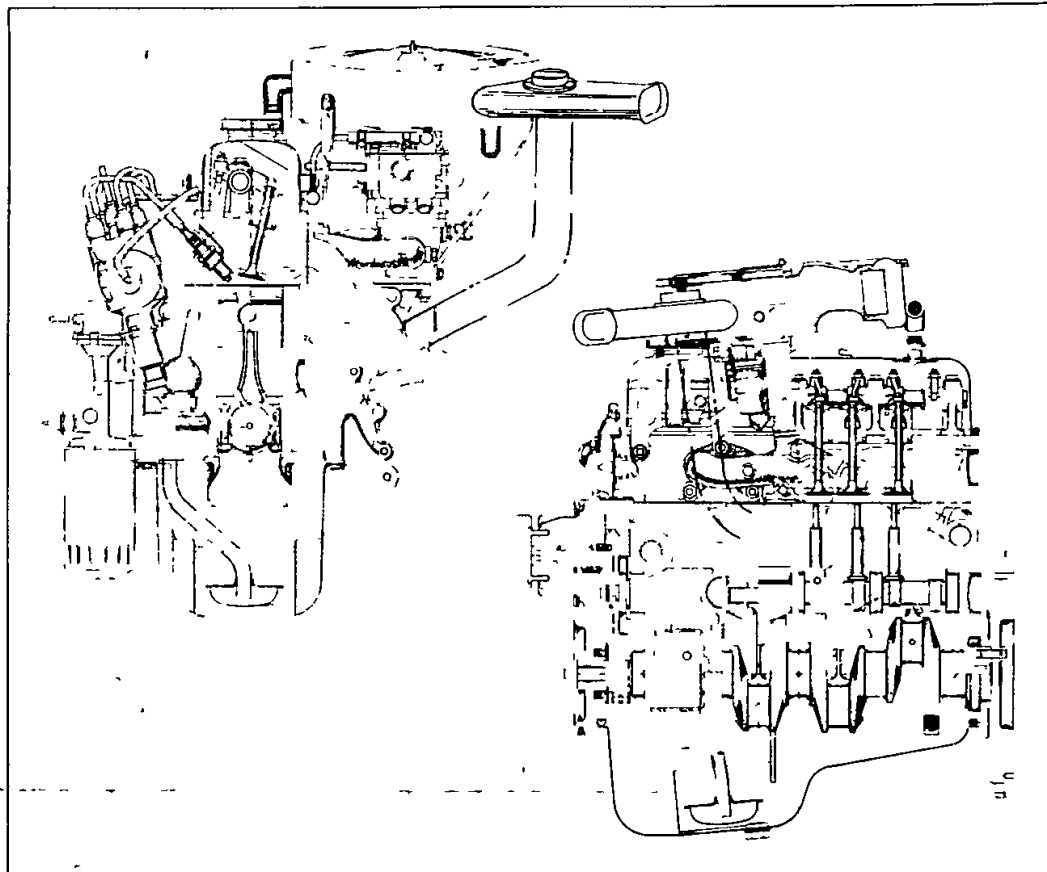


Fig 13 Sectional view of A12 Engine

Wires for accelerator and choke (The operation will be carried out more easily by removing the air cleaner)

Lift up the engine toward the front

INSTALLATION

Install the engine in reverse sequence of removal

Disconnecting clutch wire on right-hand drive model On left-hand drive model, disconnect hydraulic line from the clutch slave cylinder Disconnect the clutch wire at the portion of the withdrawal lever

Remove the exhaust front tube

Disconnect the cable to the back up lamp switch

Disconnect the speedometer cable

Remove the propeller shaft

Remove four bolts used in the differential carrier side, and withdraw the propeller shaft

Remove the shift lever

(Model with remote control shift lever)

Disconnect the remote control rod at the portion of transmission outer lever, and remove the remote control rod

(Model with floor shift lever)

Remove the boot, withdraw the lock pin, and remove the lever (The operation is carried out in the passenger compartment)

(Model with automatic transmission)

Remove pins from both ends of the cross shaft, and remove the shift rod

Suspend the engine with wire

Remove the front engine mounting installation nuts

Remove the rear engine mounting installation nuts

When removing the engine mounting installation nuts, be sure to apply a jack beneath the transmission

CLEANING AND INSPECTION

Clean the engine thoroughly before disassembly Before cleaning the engine, remove the

electrical parts, and plug up the carburetor air horn to avoid intrusion of foreign matter

The engine exterior Check the covers and bolts for breakage, rust, damage and loss

Cylinder block Check thoroughly the water jacket for cracks and breakage

Clutch housing Check for cracks

Oil pan Check for excessive rust

DISASSEMBLY

Mount engine assembly on engine stand

Remove the engine mounting bracket R H side

Install the engine attachment

Mount the engine on the stand

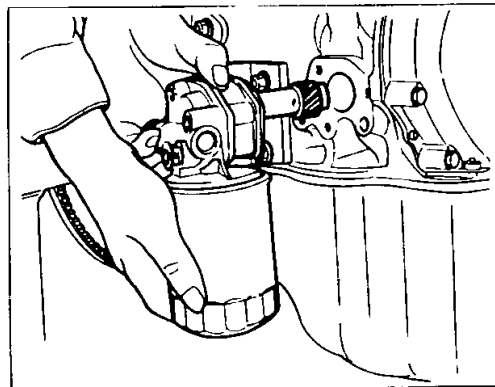


Fig. 14 Oil pump removal

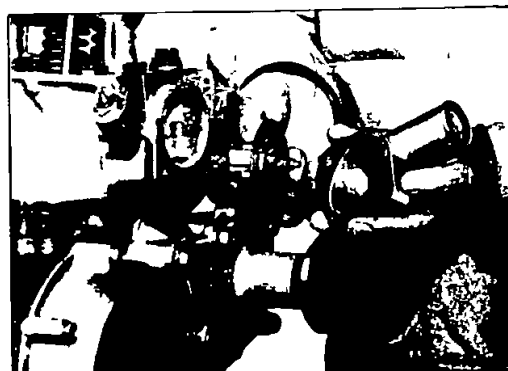


Fig. 15 Thermostat housing removal

Engine

Remove the alternator and engine mounting bracket L H side

Remove the crankshaft pulley

Remove the oil pump together with the oil filter

Remove the high tension cable (with the distributor cap on)

Remove the spark plugs

Remove the distributor assembly

Remove the carburetor

Remove the rocker cover

Remove the thermostat housing

Remove the manifolds

Remove the water pump

Remove the fuel pump

Remove the rocker shaft assembly and push rods

Remove the cylinder head assembly

Invert the engine

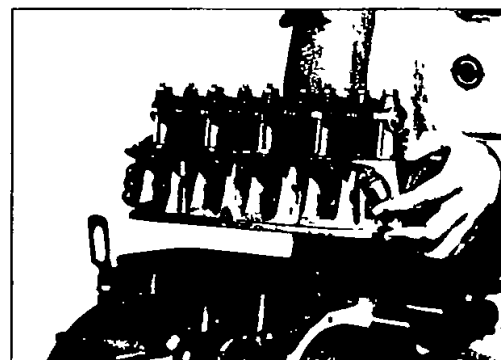


Fig 18 Rocker shaft assembly removal

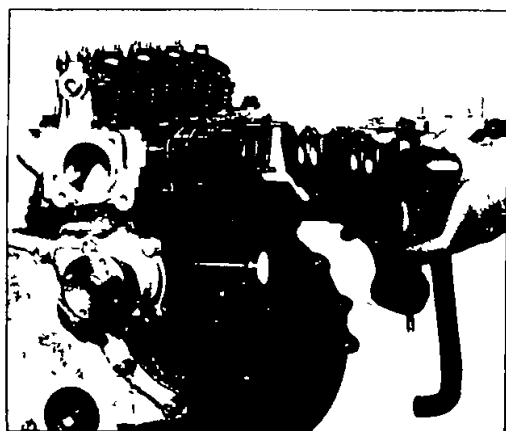


Fig 16 Manifolds removal

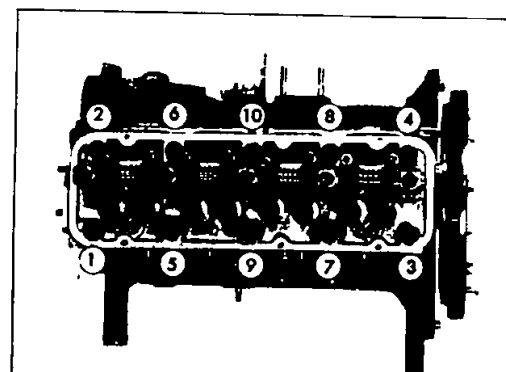


Fig 19 Cylinder head bolts removal sequence

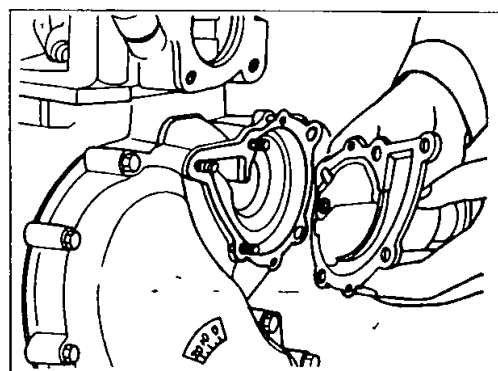


Fig 17 Water pump removal

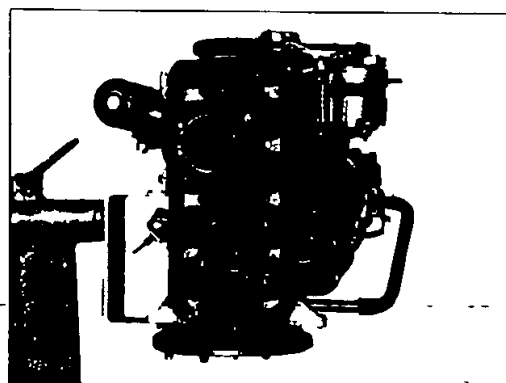


Fig 20 Oil strainer removal

Remove the oil pan and oil strainer

Remove the timing chain cover and the chain tensioner

Remove the crankshaft and camshaft sprockets together with the timing chain

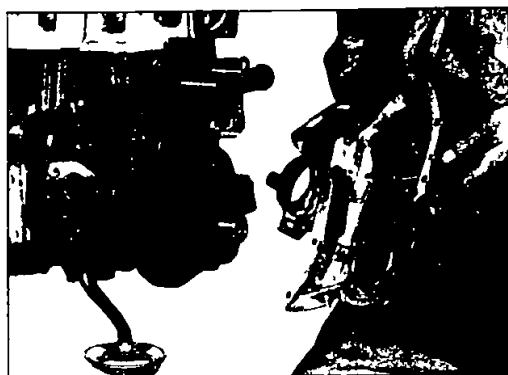


Fig 21 Timing chain cover removal

Rotate the engine a quarter turn and remove the piston and connecting rod assembly. Take off the connecting rod bearings at the same time and keep them in order.

Rotate the engine a quarter turn, and remove the flywheel.

Remove the main bearing cap and the rear oil seal.

Remove the crankshaft.

Remove the baffle plate and the crank case net.

Remove the camshaft after taking off the camshaft plate.

Remove the valve lifter.

Remove the piston rings with a ring remover.

Press out the piston pin with a piston pin remover and an arbor press.

Remove the valves using a valve lifter.

Be careful not to lose valve spring seat, oil seal, valve collet, and valve rocker spring.

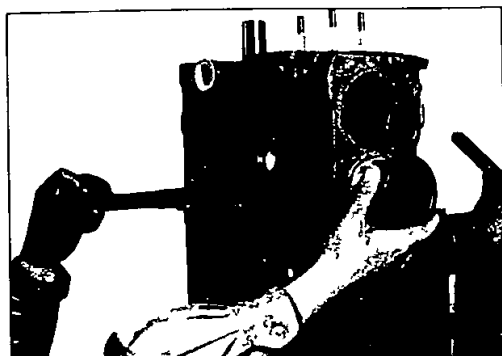


Fig 22 Piston and connecting rod assembly removal

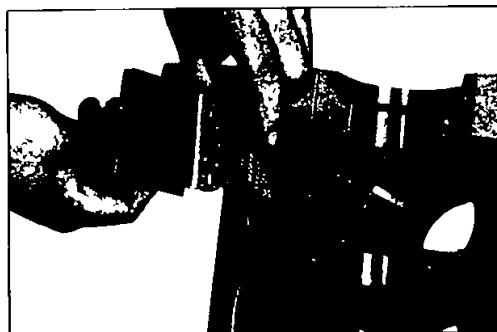


Fig. 24 Baffle plate and net removal



Fig 23 Rear oil seal removal



Fig. 25 Camshaft plate removal

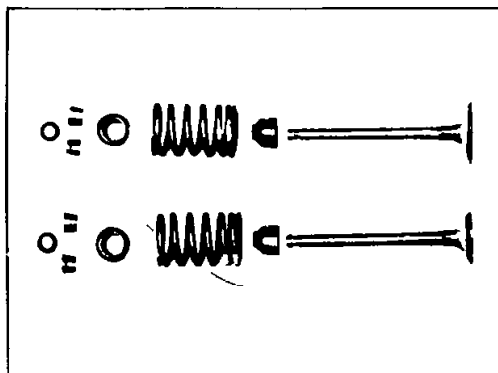


Fig 26 Valve components

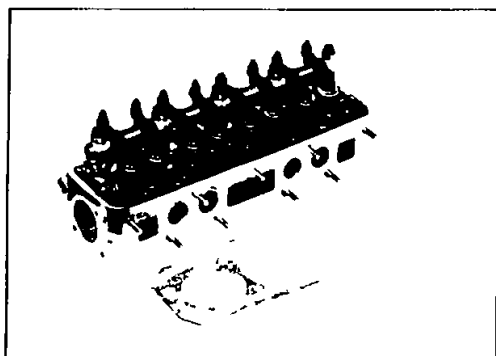


Fig 27 Cylinder head

Cylinder head surface flatness

	Standard in	Maximum in
A12 Engine	less than 0 0020	0 0039

INSPECTION AND REPAIR

Preparation

Check the cylinder head and cylinder block for traces of water leaks before cleaning

Clean all parts to remove oil stains, carbon deposits, fur and other foreign matters completely

Make sure that all oil holes are clear. Blow air into them, if required

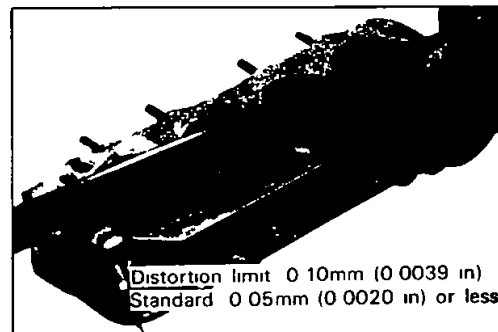


Fig. 28 Checking the cylinder head surface

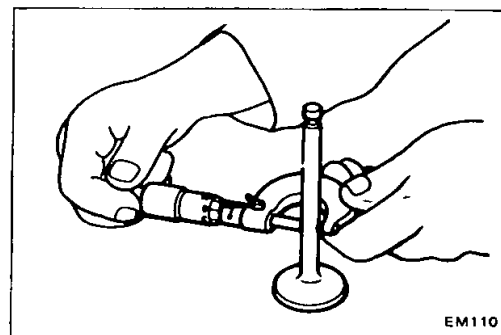


Fig 29 Checking valve stem diameter

Secure proper assembly carefully

Cylinder Head

Checking cylinder head mating face

Visually check for cracks and flaws

Measure the surface of the cylinder head (on the cylinder block side) for warping. If it exceeds the limit indicated below, regrind affected surface with a surface grinder

Valve Assembly

Check each of the intake and exhaust valve assemblies for worn, damaged or deformed valve caps and stems. Correct or replace the valve, if required.

The valve face or valve stem end surface should be refaced by using a valve grinder

Notes: a. Deflection of seat surface against axis should be 0.0012 in or less.

b. Correctness of right angle and out-of-round should be 0.0004 in or less.

Note: When the valve head has been reduced to 0.0197 in or less in thickness, replace the valve.

Grinding allowance for the valve stem end surface is 0.0197 in or less.

Valve spring

Measure the free length and the tension of each spring. If the measured value exceeds the specified limit, replace the spring.

Check each spring for deformation with a square. Any springs with deflection of 0.0630 in or more must be replaced.

Valve Rocker Shaft and Rocker Arm

Check the valve rocker shaft and rocker arm

for seizure and wear, and repair or replace as required.

Valve rocker arm to shaft oil clearance

0.0008 to 0.0020 in

Spring specifications

Free length	1.831 in
Valve closed	1.524 in at 52.7 lb
Valve open	1.19 in at 129 lb

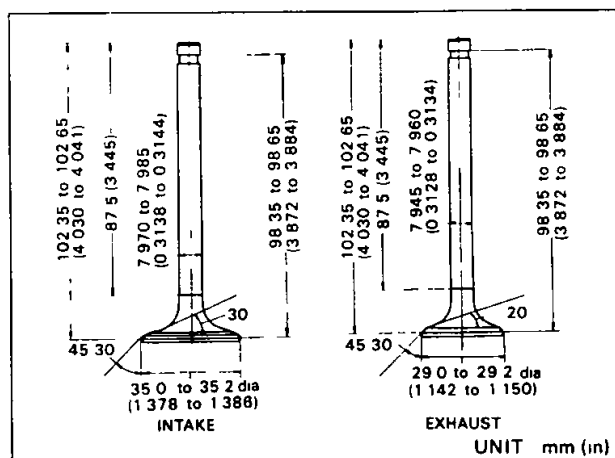


Fig. 30 The intake and exhaust valves

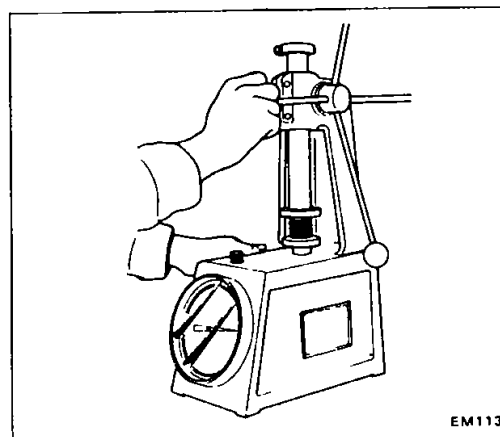


Fig. 32 Valve spring test

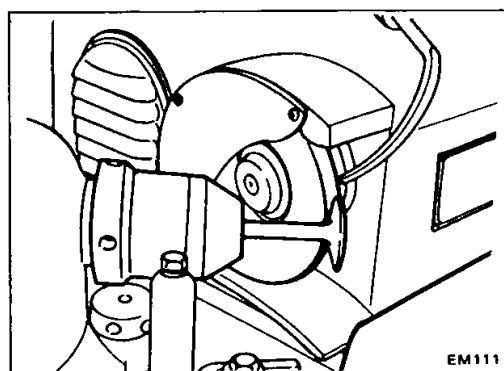


Fig. 31 Valve grinder

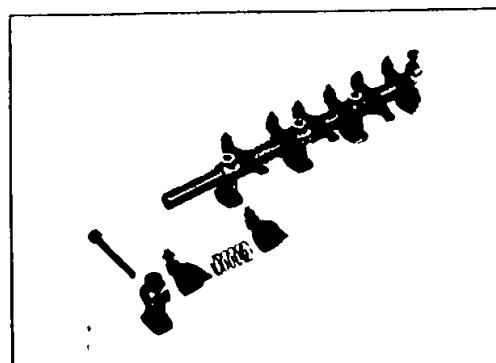


Fig. 33 Valve rocker shaft

When valve contact surface of the valve rocker arm is worn excessively in step, repair by means of a valve grinder or replace

Grinding allowance for valve contact surface of the valve rocker arm is 0.0197 in or less

Valve Lifter and Push Rod

Check the valve lifter for wear, seizure and bevel edge contact, and repair or replace as required

Measure clearance between the lifter hole on the cylinder block and valve lifter, and replace the valve lifter when clearance exceeds the limit

Check the push rod for bending and damage, and repair or replace as required

Camshaft and Camshaft Bearing

Measure inner diameter of the camshaft bearing and outer diameter of the camshaft journal

	Standard in	Maximum in
Valve lifter/ lifter hole clearance	0.0008 to 0.0020	0.0059

If camshaft bearing clearance is excessive, replace the camshaft bearings with service parts

Valve Timing

If the camshaft has no apparent damage although some valve troubles have been detected

		Standard	Wear limit
Oil clearance in	1st	0.0015 to 0.0024	0.0059
	2nd	0.0011 to 0.0020	
	3rd	0.0016 to 0.0025	
	4th	0.0011 to 0.0020	
	5th	0.0015 to 0.0024	
Inner diameter of camshaft bearing in	1st	1.7257 to 1.7261	
	2nd	1.7050 to 1.7060	
	3rd	1.6865 to 1.6868	
	4th	1.6663 to 1.6667	
	5th	1.6243 to 1.6247	

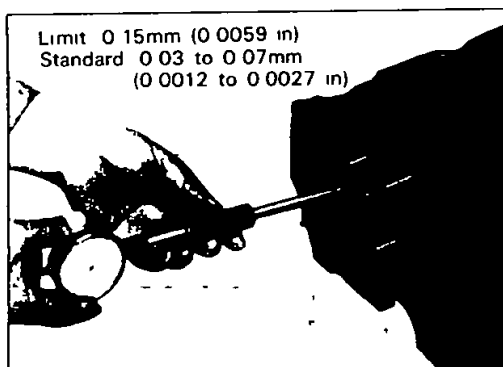


Fig. 34 Camshaft bearing check

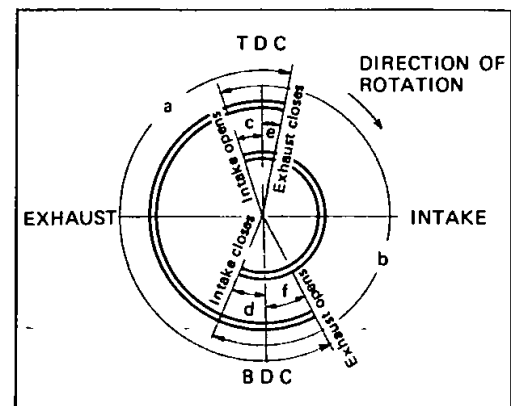


Fig. 35 Valve timing diagram

ted, compare valve timing data with the valve timing diagram to ensure that beginning and ending of stroke for all cylinders are complying with specified advance and retard figures

Cylinder Block

Check the cylinder head visually for defects such as cracks and flaws

Measure the top of the cylinder block (cylinder head mating face) for warping. If the warp exceeds the limit, correct it

Measure the cylinder bore for out-of-round and wear with a bore gauge. If wear or out-of-round is excessive, rebore the cylinder walls by means of a boring machine

Unit: degree

a	b	c	d	e	f
248	248	14	54	12	56

	Standard	Maximum tolerance
Surface flatness in	less than 0.0020	0.0039

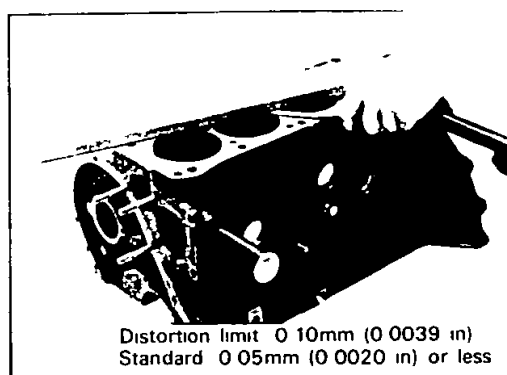


Fig. 36 Cylinder block surface check

When wear or out-of-round is minor and within the limit, remove the step from the top-most portion of the cylinder by the use of a ridge reamer or other similar tool

Piston, Piston Pin and Piston Ring

Check for seizure, scratch and wear. Replace as required

Measure side clearance of each piston ring and ring groove with the piston ring installed on the piston. Clearance of a new piston and piston ring should be as follows

Place the ring at the bottom of the ring traveled part of cylinder bore in which it will be used

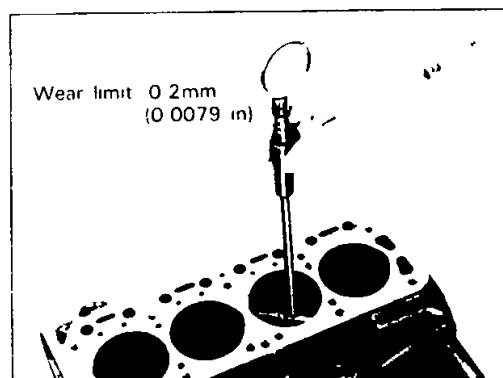


Fig. 37 Measuring the cylinder bore

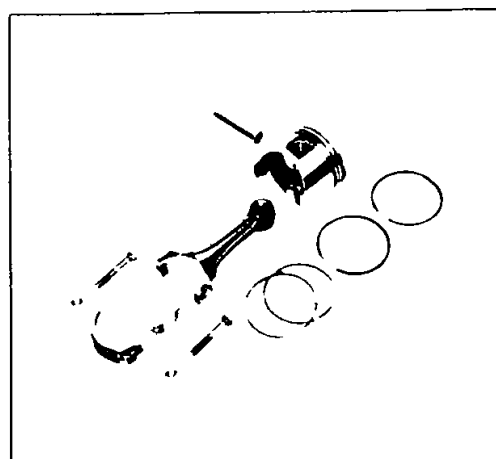


Fig. 38 Piston and connecting rod assembly

Side clearance

	Standard in	Wear limit in
Top ring	0 0015 to 0 0027	0 0079
2nd ring	0 0015 to 0 0027	0 0079
Oil ring	0 0015 to 0 0031	0 0079

Ring gap

	Standard in	Wear limit in
Top ring	0 0079 to 0 0138	0 0394
2nd ring	0 0079 to 0 0138	0 0394
Oil ring	0 0118 to 0 0354	0 0394

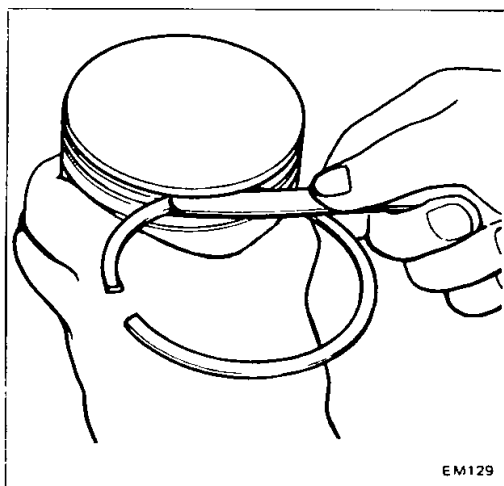


Fig 39 Side clearance measurement

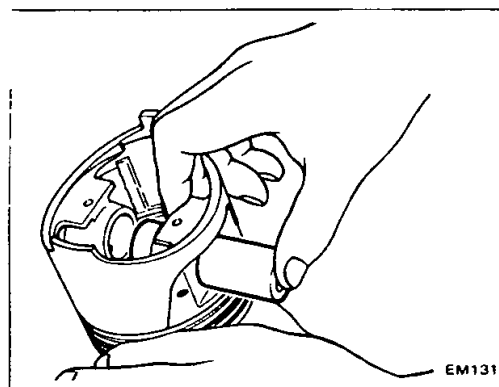


Fig 41 Piston pin fitting



Fig 40 Ring gap measurement

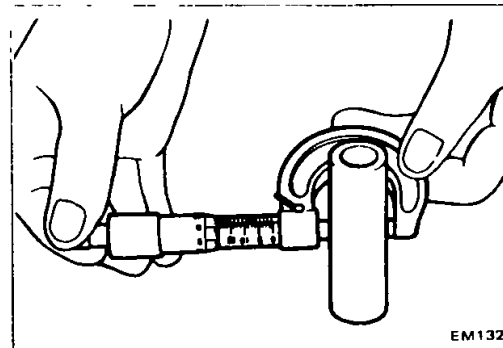


Fig. 42 Measuring piston pin diameter

Square ring in bore by pushing it into position with the head piston. Measure gap between ends of ring with feeler gauge.

Gap should be as listed above.

Note: a. When the piston ring only is to be replaced without the cylinder bore being corrected, measure gap at the bottom of the cylinder where the wear is minor.

b. Oversize piston rings are available for service (50, 100, 150 oversize).

Measure the piston pin hole in relation to the outer diameter of the pin. If wear exceeds the limit, replace such piston pin together with the piston on which it is installed.

Piston pin diameter	0.6869 to 0.6871
Piston pin length	2.5681 to 5.779
Piston pin hole diameter	0.6874 to 0.6871

Piston pin to piston clearance	0.0002 to 0.0003
Interference fit of piston pin to connecting rod	0.0008

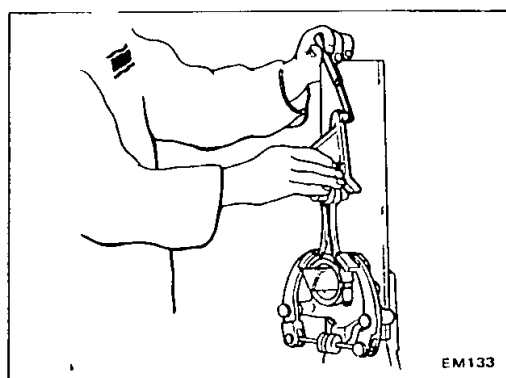


Fig. 43 Connecting rod aligner

Fitting of piston pin

Determine the fitting of the piston pin into the piston pin hole to such an extent that it can be finger pressed at room temperature. This piston pin must be tight press fitted into the connecting rod.

Connecting Rod

If a connecting rod shows any scratch or score mark or is pitted on both sides of the thrust face and the large end, correct or replace it.

Check for bend or torsion using a connecting rod aligner. If bend or torsion exceeds the limit, correct or replace the connecting rod.

When replacing the connecting rod, select the rod so that weight difference between new and old rods is within 0.18 oz in unit weight.

	Standard	Maximum
Connecting rod bend or torsion (per 100 mm or 3.94 in. length)	bend 0.0020	0.0039
	torsion 0.0028	

	Standard	Maximum
Big end play	0.0079 to 0.0118	0.0157

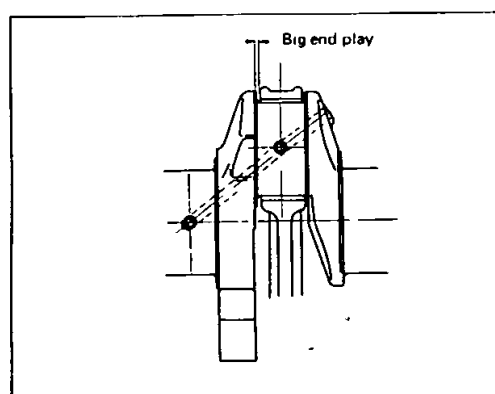


Fig. 44 Big end play check

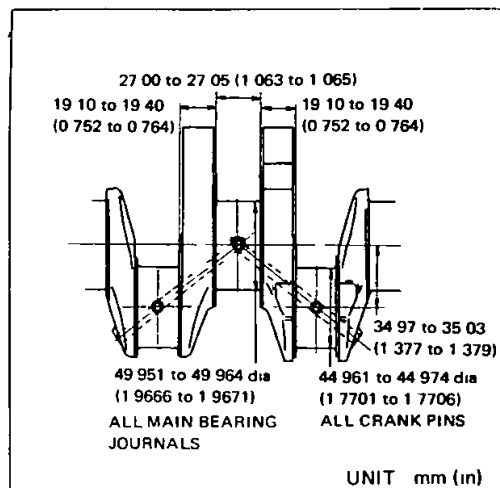


Fig 45 Crankshaft

	Standard	Maximum
Taper & out-of-round of crank journal and crank pin	0 0004	0 0012

	Standard	Maximum
Crankshaft bend in	0 0006	0 0020

Install connecting rods with bearings on to the corresponding crank pins and measure the thrust clearance. If the measured value exceeds the limit, replace such connecting rod.

Crankshaft

Check the crankshaft journal and crank pin for scars, biased wear and cracks. Repair or replace as required.

Check the crankshaft for bend. If the bend exceeds the limit, replace the crankshaft.

Note: When measuring bend, use a dial gauge.

	Standard	Limit
Crankshaft free end play in	0 0020 to 0 0059	0 0118

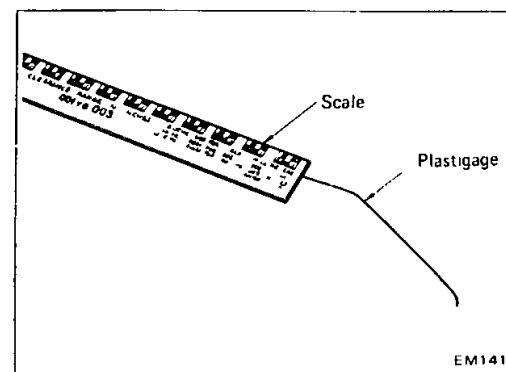


Fig 46 Plastigage

Bend value is a half of the reading obtained when the crankshaft is turned once with the dial gauge applied to its center journal.

After regrinding the crankshaft, finish it to the necessary size by using an adequate undersize bearing according to the extent of required repair.

Install the crankshaft in the cylinder block and measure the thrust clearance.

Check the main drive shaft pilot bearing at the rear end of the crankshaft for wear and damage.

Replace it, if any defects are detected.

Bushing and Bearing

Check all bearings and bushings for seizure, melt, scar and burr.

Replace bushings, if any defects are detected.

Wipe off oil and dust (especially the rear of the bushing).

Set the main bearing on the cap block.

Cut a plastigage to the width of the bearing and place it in parallel with the crank pin, getting clear of the oil hole

Install the cap on the assembly and tighten them together with the specified torque

Tightening torque
36 to 43 ft-lb

Note: Be sure not to turn the crankshaft when the plastigage is inserted.

Remove the cap, and measure width of the plastigage at its widest part with the scale printed in the plastigage envelope

Crankshaft Sprocket and Camshaft Sprocket

Check tooth surfaces for flaws and wears
Replace defective sprocket

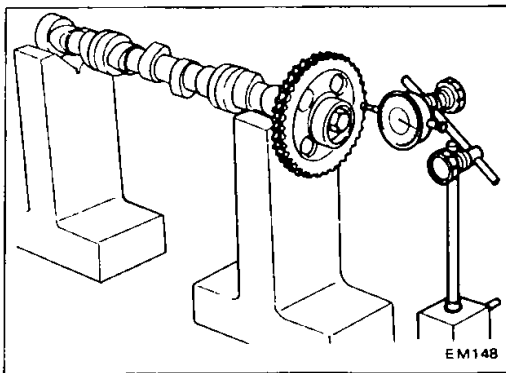


Fig 47 Camshaft sprocket run-out check

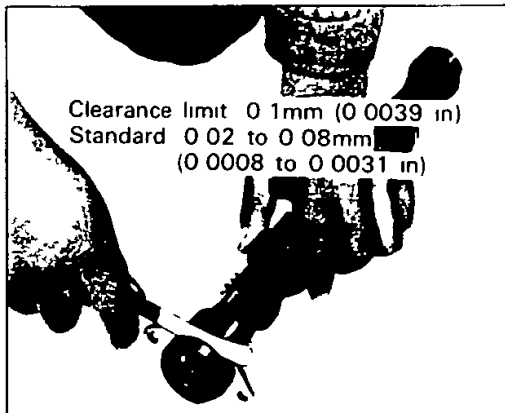


Fig 48 Check locating plate thrust clearance

Install the camshaft sprocket in position and check for run-out. If it exceeds 0.0039 in, replace the camshaft sprocket.

Check the camshaft thrust deviation. If it is deviated, replace the camshaft locating plate.

Check the chain for damage, excessive wear and stretch at its roller links. Replace chain, if defective.

Flywheel

Check the clutch disc contact surface of the flywheel for damage and wear. Repair or replace if necessary.

Measure deviation of the clutch disc contact surface with a dial gauge.

If it exceeds 0.0079 in, replace it.

Check tooth surfaces of the ring gear for flaw and wear.

Replace if necessary.

Note: Replace the ring gear at about 356 to 392°F

ASSEMBLY

Precaution

Use thoroughly cleaned parts. Particularly, make sure that oil holes are clear of foreign matter.

When installing sliding parts such as bearings, be sure to apply engine oil to them.

Use new packings and oil seals.

Keep tools and work benches clean.

Keep the necessary parts and tools near at hand.

Be sure to follow specified tightening torque and orders.

Cylinder Head

Assembly of valve and valve spring

Set the valve spring seat in position, and fit the valve guide with the oil lip seal.



Fig 49 Valve installation

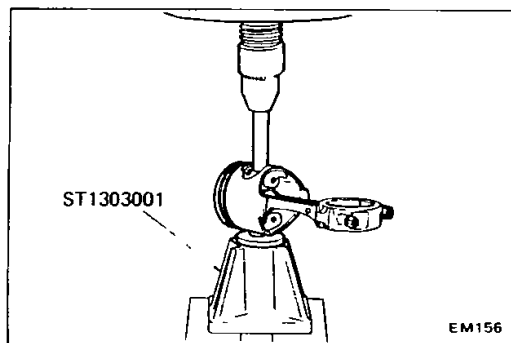


Fig 50 Piston pin installation

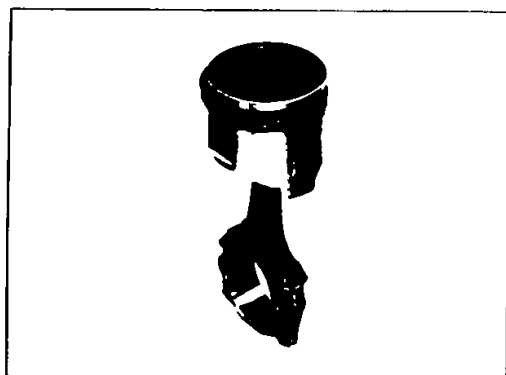


Fig 51 Piston and connecting rod assembly

Assemble the parts in order, valve spring, spring retainer, valve collet and valve rocker guide

Note: Make sure that the valve face is clear from foreign matters.

Piston and Connecting Rod

Assemble piston, piston pin and connecting rod assorted according to cylinder number for every cylinder

Notes: a. Piston pin is press fitted to the connecting rod tightly, and fitting force is from 1 to 3 tons. When fitting piston pin, special tool must be used.

When pressing the piston pin into the connecting rod, apply engine oil to the pin and the small end of the connecting rod.

b. Arrange the connecting rod so that the oil jet of the connecting rod large end is directed toward the right side of the cylinder block.

Installing piston rings

Install the top and second rings in right positions so that the marks are faced upward

Fix bearings on the connecting rod and the connecting rod cap

Note: Clean the back side of the bearing carefully.

Engine

Set the cylinder block on the working stand with the engine bottom faced upside

Install the valve lifters Install the camshaft and retain by the camshaft locate plate Locate plate tightening torque is 29 to 36 ft-lb



Fig 52 Installing camshaft locate plate

Note: Set the locate plate so as the "LOWER" mark comes to the engine bottom side.

Set the main bearings on their positions on the cylinder block

Notes. a. The center bearing (No. 3 bearing) is a flanged type for thrust force.

b. Two inner bearings (No 2 and No 4) are of the same type

c. The front bearing (No 1) is the same type as the rear bearing (No 5).

d. All bearings except for No 1 bearing, are interchangeable between upper and lower bearings.

Apply engine oil to the main bearing surfaces on both sides of the cylinder block and cap

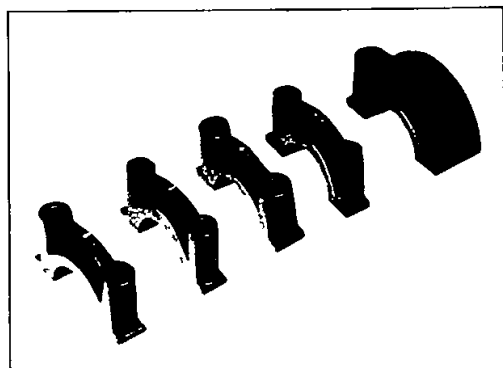


Fig 53 Main bearing caps

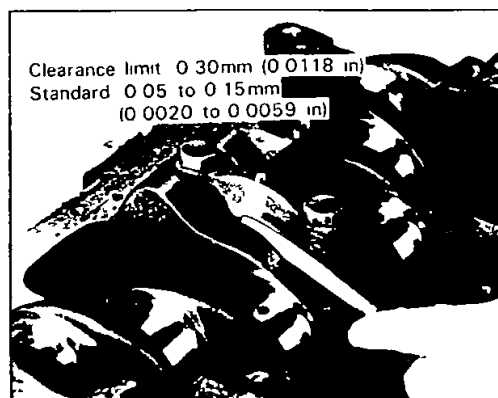


Fig 54 Crankshaft end play check

Install the crankshaft

Install the main bearing cap and tighten the bolts with specified torque

Tightening torque

36 to 43 ft-lb

Notes: a. Arrange the parts so that the arrow mark on the bearing cap is faced toward the front of the engine.

b. Prior to tightening the bearing cap bolts, place the bearing cap at a proper position by shifting the crankshaft in the axial direction.

c. Tighten the bearing cap bolts gradually in separating two to three stages and outwardly from the center bearing.

d. After securing the bearing cap bolts, ascertain that the crankshaft can be easily rotated.

Make sure that the crankshaft end play is correct

Crankshaft end play

0.0020 to 0.0059 in

Install the rear oil seal

Install the flywheel securely using the lock washers, and tighten the bolts with specified torque

Tightening torque

47 to 54 ft-lb

Rotate the engine a quarter turn and install the piston-rod assembly

Notes. a. Insert the pistons in the corresponding cylinders.

b. Apply engine oil to parts as required.

c. Arrange pistons so that the "F" mark on the piston is faced to the front of the engine.

d. Install piston rings at 180° to each other, avoiding to fit them in the thrust and piston pin axial directions

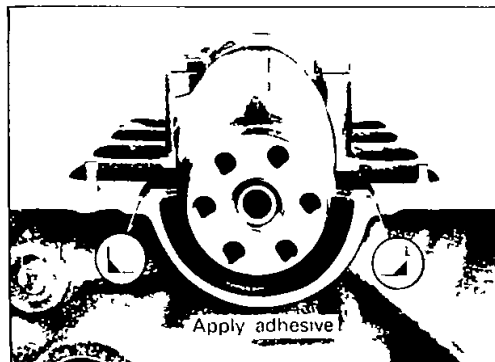


Fig 55 Applying adhesive

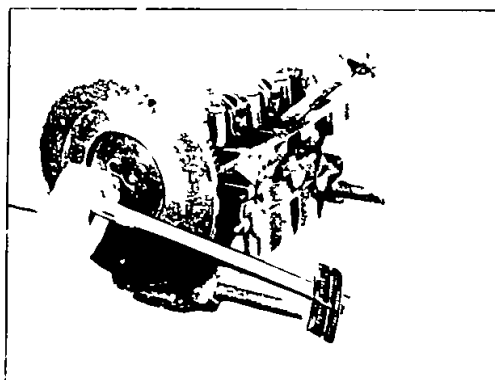


Fig 56 Flywheel installation

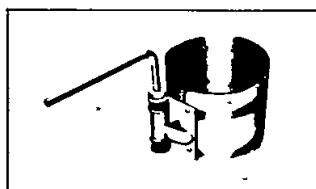
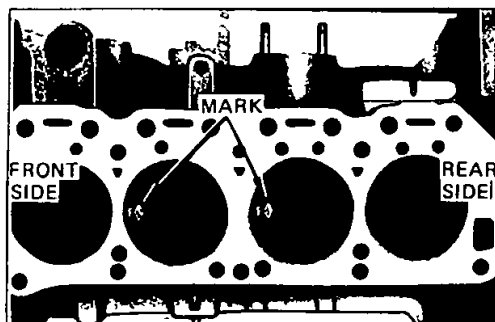


Fig 57 Piston and connecting rod assembly installation

Note: Arrange connecting rods and connecting rod caps so that the cylinder numbers are faced toward the same direction.

Install the connecting rod cap

Tightening torque

23.1 to 27.5 ft-lb

Make sure that end play of the connecting rod large end is correct

Big end play

(0.0079 to 0.0118)

Install the camshaft and crankshaft sprockets temporarily for adjustment of the tooth height by using adjusting washers

Install the timing chain and camshaft sprocket

Camshaft sprocket tightening torque

29 to 35 ft-lb



Fig 58 Connecting rod cap installation

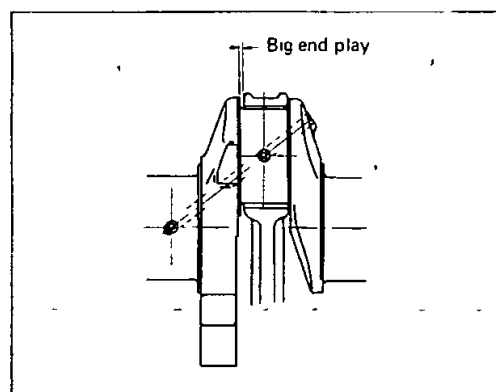


Fig. 59 Big end play check

Height difference in	less than 0.0197
Adjusting washer thickness in	0.006

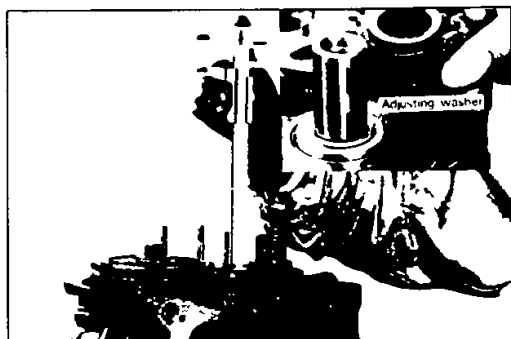


Fig 60 Adjusting sprocket tooth height

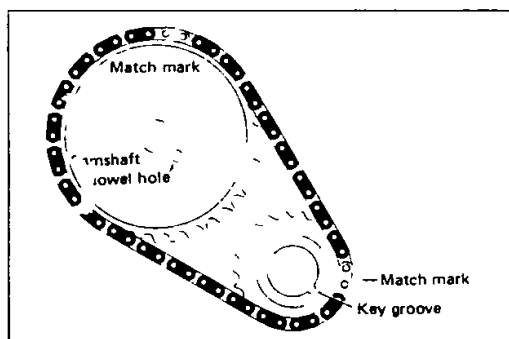


Fig 61 Setting chain



Fig. 62 Chain tensioner installation

Notes: a. Make sure that the camshaft sprocket dowel hole and crankshaft sprocket key are in line and both the dowel hole and key are located downward.

b. Set the timing chain making its mating marks meet with those of crankshaft sprocket and camshaft sprocket at the right hand side

Install the timing chain tensioner and tighten the tensioner bolts to a torque of 4.3 to 5.8 ft-lb

Install the crankshaft oil thrower

Check the tensioner spindle projection

	Wear limit
Spindle projection	0.001

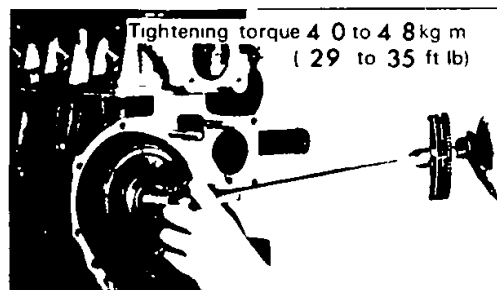


Fig 63 Cam sprocket gear installation

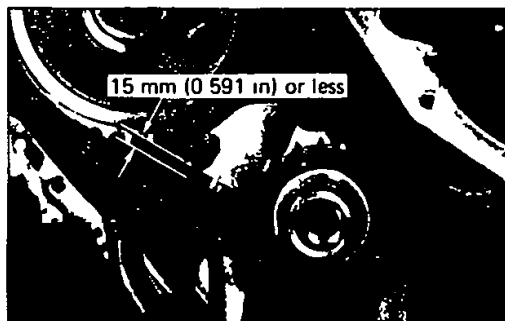


Fig 64 Checking the tension spindle projection

Install the new oil seal to the front cover (The front cover oil seal should be replaced when the front cover is disassembled)

Install the front cover, applying the sealing agent to both surfaces of the gasket

Tightening torque

3.6 to 5.1 ft-lb

Install the oil strainer and the oil pan using the gasket

Apply sealing agent on both surfaces of the gasket especially on the front and rear portions of the oil pan

Oil pan tightening torque

2.9 to 4.3 ft-lb

Invert the engine and install the cylinder head assembly and gasket

Note: Apply sealing agent overall the cylinder block surface. Place the gasket on it, and apply sealing agent to the gasket top.

Tighten the cylinder head bolts to the specified torque

The cylinder head uses two types of installation bolt, one is for the center right side, and the other is for all other positions. The bolt for the center right side has a "T" mark on its head.

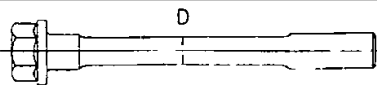
		
Bolt number	Diameter	Identification mark
①	0.3111 to 0.3189	T T mark
Except for ①	0.3492 to 0.3555	not marked

Fig 65 Head bolt segment

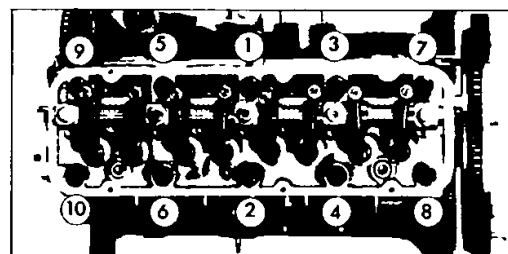
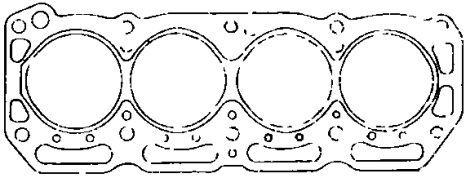
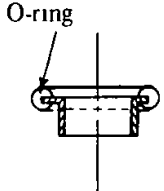
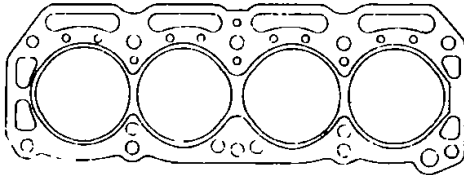
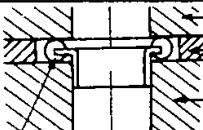


Fig 66 Tightening sequence

Cylinder block side (Steel sheet)	 Sealing agent, not required	
Cylinder head side (Joint sheet)	 Sealing agent, not required	
Remarks	Install without applying sealing agent Be careful not to damage the push rod side because this side has previously been provided with sealing agent	
	 Cylinder head Cylinder head gasket Cylinder block O ring (To be inserted into hole in cylinder block)	

Tightening torque 40 to 43 ft-lb

Install the push rods

Install the rocker shaft assembly and tighten the rocker shaft bracket bolts to the specified torque

Tightening torque

15 to 18 ft-lb

Note: Tightening operation should be made gradually in separating two or three stages and outwardly from the center bracket.

Install the intake and exhaust manifolds

Tightening torque

6.5 to 10 ft-lb

Adjust valve clearance with the specified dimensions

Install the rocker cover and carburetor assembly

Install the water pump and thermostat

Tightening torque

6.5 to 10 ft-lb

Install the crankshaft pulley

Tighten the crank pulley bolt to the specified torque

Tightening torque

109 to 116 ft-lb

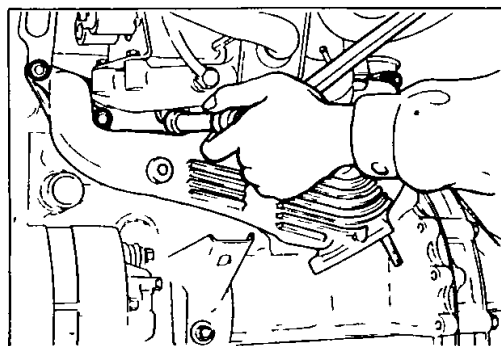


Fig 67 Installation of intake and exhaust manifolds

Intake (at cold) in	0.0138
Exhaust (at cold) in	0.0138

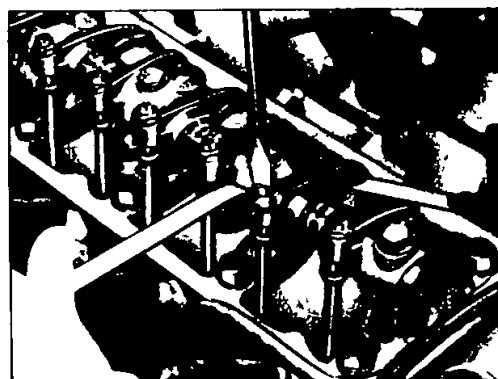


Fig 68 Valve clearance adjustment

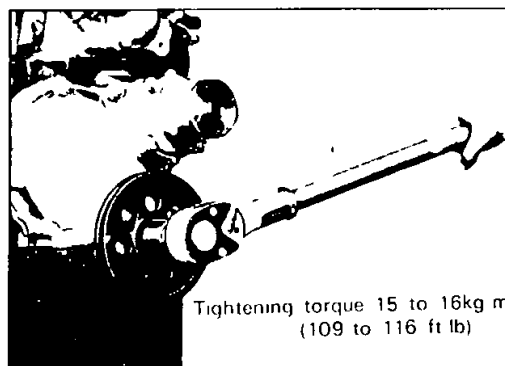


Fig 69 Crankshaft pulley installation

Install the oil pump with oil filter

Install the alternator, fan and fan belt

Install the fuel pump

Install the distributor assembly

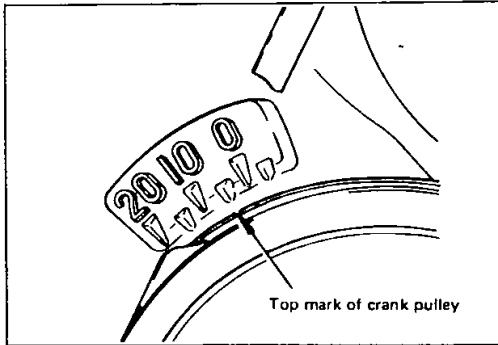


Fig 70 Timing mark

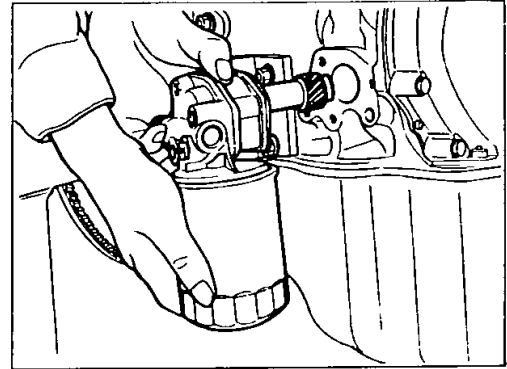


Fig 72 Removal of oil pump

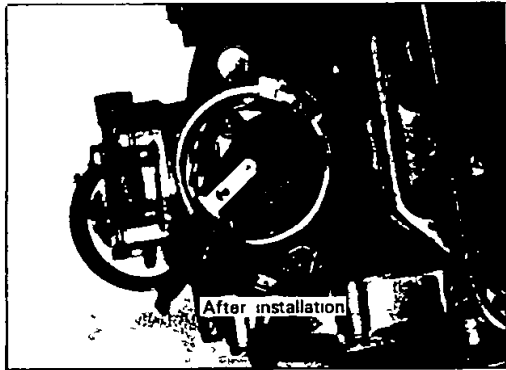


Fig 71 Distributor installation

Notes: a. Set the No. 1 piston to its top dead center of the compression stroke.

b. Before installation, return the distributor rotor approximately 60 degrees from its regular position. Insert the assembly, meshing the distributor drive gear and driven gear.

After installation, the distributor rotor should come into contact with the mark on the rotor cap fitting as shown in the Figure.

Install the spark plugs and connect the distributor to plug high tension lead wire

Install the fuel hoses and tubes

Install the clutch cover assembly

Install the engine slingers and crankcase ventilation hose

Dismount the engine from the working stand

Install the engine mountings

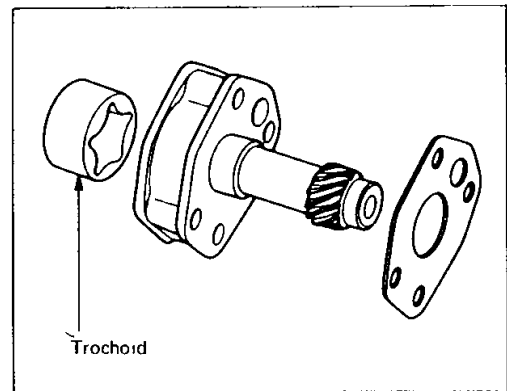


Fig 73 Oil pump

OIL PUMP

Removal (Engine in vehicle)

Drain engine oil

Remove the front stabilizer

Remove the splash shield board

Detach the oil pump body together with drive gear spindle

Disassembly

Prior to disassembling, check to determine that the pump is defective

Take out a total of 2 bolts securing the pump cover to the pump body. The outer and inner rotors and drive shaft can then be disassembled.

Applying a suitable wrench or spanner, loosen off the regulator valve

Note a. When placing the valve in a vise, use extreme care not to distort the pump body and cover in the jaws.

b. Do not pull out the drive shaft pin securing the driven shaft and inner rotor. The shaft is press fitted to the rotor with the pin calked

Inspection and Repair

Clean the disassembled parts with cleaning solvent, and inspect for defects

Inspect the drive rotor shaft for excessive wear and scores and check the following clearances

Side clearance between outer and inner rotors 0 0047 in or below

Tip clearance 0 0016 to 0 0047 in

Clearance between outer rotor and body 0 0059 to 0 0083 in

Adjusting Regulator

Insert valve in the body and measure the distance (A) from the valve end to the spring contacting face inside the plug See Figure 74

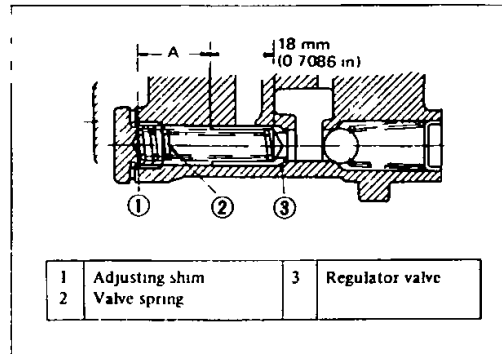


Fig 74 Regulator valve

The distance from the spring contacting face inside the valve to the valve end amounts to 0 7086 in

On inspecting the above dimensions, determine the thickness of adjusting shim

Shim thickness $[A + 0 7086 \text{ in}] - [\text{spring length at compression load } 8 09 \text{ lbs}]$

Assembly

Assembling the oil pump is the reverse order of disassembly

Note: a. Be sure no traces of grinding chips, lint or dirt remain.

b. Be sure gasket is not turned up and discontinued.

Electrical System

Electrical System

STARTER

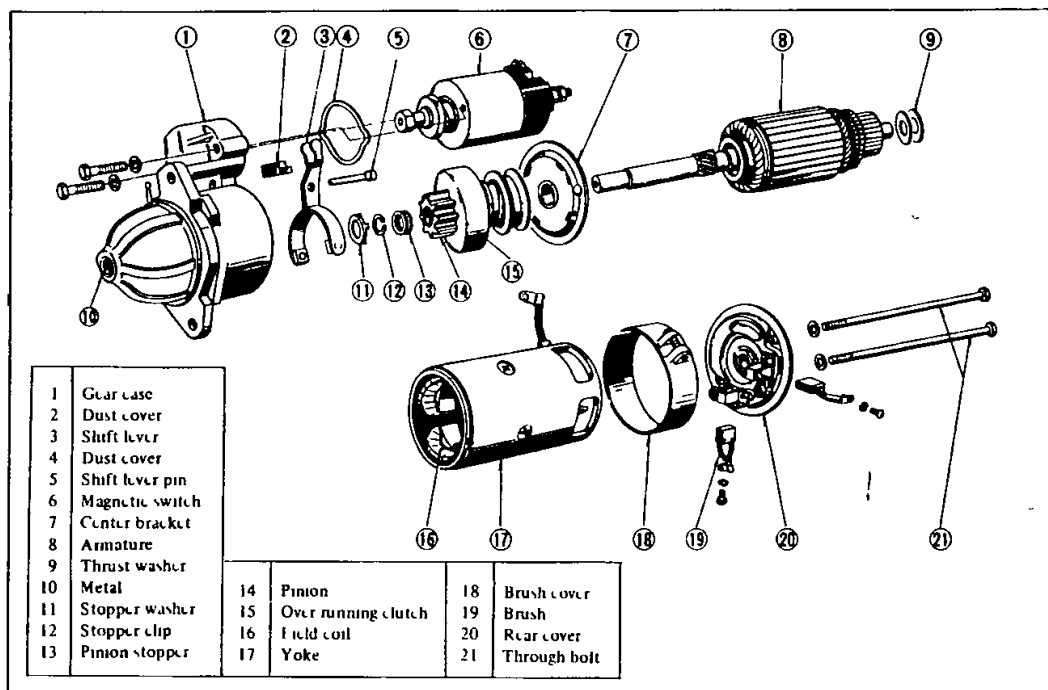


Fig 75 Exploded view of starting motor

ALTERNATOR

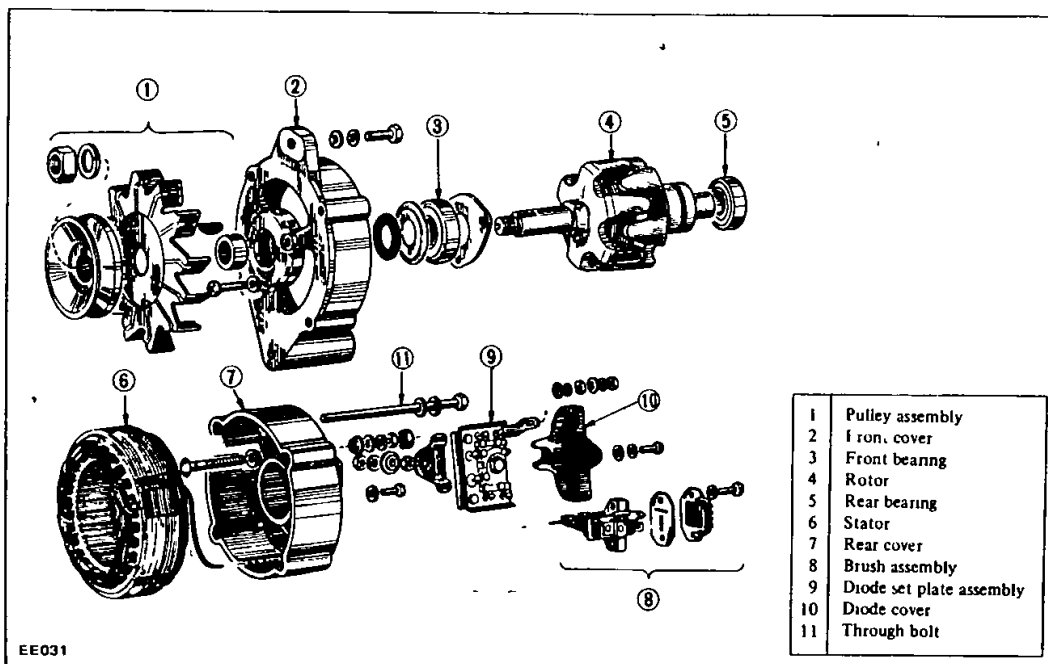


Fig 76 Exploded view of alternator

Electrical System

Removal

Disconnect the battery ground cable

Disconnect the black and yellow wire from the magnetic switch terminal, and black battery cable from the battery terminal

Remove two bolts used to secure the starting motor on the clutch housing. Pull the starter assembly forward and remove the starting motor.

Installation

Installation is the reversal of removal.

Removal

Disconnect the negative battery terminal.

Disconnect two lead wires and connector from the alternator.

Loosen the adjusting bolt.

Remove the alternator drive belt.

Remove the alternator installation bolt. Dismount the alternator from the vehicle.

Installation

Installation is the reverse of removal.

TROUBLE SHOOTING

Troubles	Trouble location	Causes	Remedies
Starting motor will not operate No magnetic switch operating sound	Battery	Defective battery	Replace battery
		Over-discharging	Measure specific gravity of electrolyte and charge or replace the battery
	Ignition switch	Defective contact	Correct or replace ignition switch
	Wiring	Faulty starting motor grounding	Correct
		Faulty battery grounding	Correct
		Broken or disconnected cable	Correct or replace
	Starter	Broken armature or field coil cable	Replace
		Broken brush pig tail	Replace
		Defective mica	Correct or replace
Magnetic switch operating sound is heard	Magnetic switch	Broken or shorted series coil	Replace
		Faulty plunger sliding	Repair or replace
	Battery	Over-discharging	Measure specific gravity of electrolyte and charge if necessary
		Faulty terminal contact or loose connection	Clean and retighten
	Wiring	Faulty B or M terminal connections	Retighten

Electrical System

	Starting motor	Shorted armature or field coil	Repair or replace
		Worn brush or improper spring pressure	Repair or replace
		Contaminated commutator or defective mica	Clean or repair
		Faulty brush connection	Repair
		Seized metal	Replace
		Armature contacted with pole core	Repair or replace
		Insufficient plunger "L" dimension	Adjust
	Magnetic switch	Faulty contact	Replace
		Broken or shorted shunt coil wire	Replace
The starting motor rotates Pinion gear does not intermesh with ring gear	Ring gear	Worn teeth	Replace
	Starting motor	Weakened pinion sleeve spring	Replace
		Worn pinion teeth	Replace
		Faulty pinion sliding	Repair
		Dropped off lever pin	Repair
		Excessive plunger "L" dimension	Adjust
Pinion intermeshes with ring gear	Starting motor	Defective over-running clutch	Replace
Starting motor rotates and pinion intermeshes with ring gear but rotation is too slow	Battery	Over-discharging	Charge battery
		Improper or loose terminal contact	Repair and retighten
	Wiring	Improperly tightened connection	Retighten
	Ignition switch	Rough contact surface	Repair or replace
	Starting motor	Shorted armature coil or field coil	Repair or replace
		Worn brush or insufficient spring pressure	Repair or replace
		Contaminated commutator or improper brush contact	Repair
		Defective mica	Repair
		Lack of metal lubrication	Repair or replace
		Armature contacted with pole core	Repair or replace

Electrical System

When starting switch is set to 'OFF' the starting motor does not stop	Ignition switch	Faulty returning	Replace
	Magnetic switch	Seized contact	Replace
		Shorted coil	Replace
		Faulty plunger sliding	Replace
	Starting motor	Pinion does not disengage from the ring gear smoothly	Repair or replace
		Pinion spline does not disengage smoothly	Repair or replace
		Seized pinion metal	Replace

REGULATOR

Description

The regulator basically consists of a voltage regulator and a charge relay. The voltage regulator has two sets of contact points, a lower set and upper set, to control alternator voltage. An armature plate placed between the two sets of contacts, moves upward or downward or vibrates. The lower contacts, when closed, complete the field circuit direct to ground, and the upper contacts, when closed, complete the field circuit to ground through a resistance (field coil), and produces alternator output.

The charge relay is similar in construction to the voltage regulator.

When the upper contacts are closed, ignition warning lamp goes on.

As for the construction, the voltage regulator is very similar to the charge relay as shown in Figure 78.

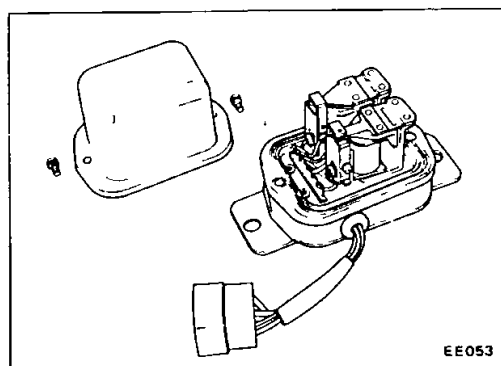


Fig 77 View of removing cover

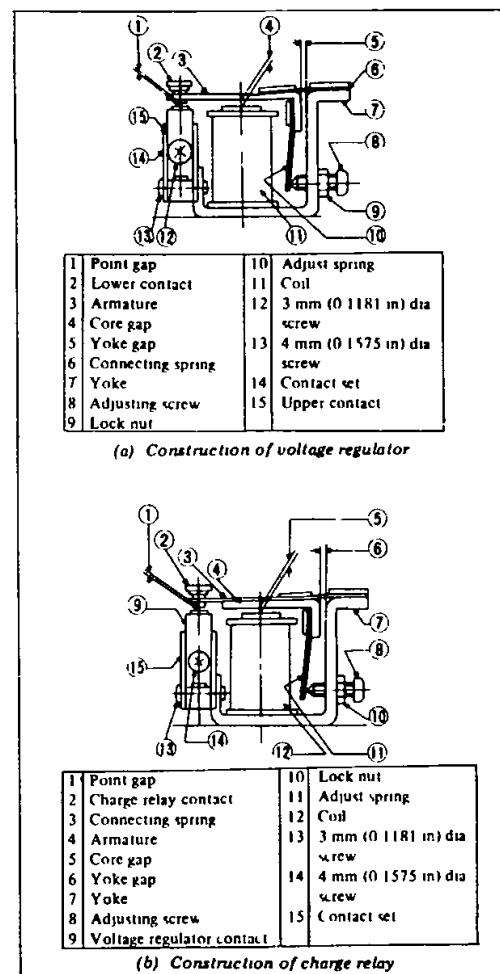


Fig 78 Structural view

Electrical System

TROUBLE SHOOTING

Troubles	Trouble location	Causes	Remedies	
Not output	Alternator	Sticking brushes	Correct or replace brush and brush spring	
		Dirty brushes and slip rings	Clean	
		Loose connections or broken leads	Retighten or solder connection Replace leads if necessary	
		Open stator coil	Repair or replace the stator coil	
		Open rotor coil	Replace the rotor	
		Defective diodes	Replace the diodes assembly	
		Shorted rotor	Replace the rotor	
		Shorted stator	Repair or replace the stator	
		Grounded "A" terminal	Replace the insulator	
		Broken fan belt	Replace the belt	
Regulator	Faulty voltage regulator point contact	Repair or replace the regulator		
	Wiring	Broken cable or disconnection of charging circuit	Repair or replace	
Low output	Alternator	Sticking brushes	Correct or replace brushes if necessary	
		Low brush spring tension	Correct or replace brush	
		Dirty slip rings	Clean	
		Partially shorted, ground or open stator coil	Replace the stator	
		Partially shorted or grounded rotor coil	Replace the rotor	
		Defective diode	Replace the diode assembly	
		Loose or worn fan belt	Retighten or replace the belt	
		Regulator	Improper voltage regulator adjustment	Check the voltage regulator operation and repair or replace as required
	Faulty voltage regulator point contact Defective operation		Repair or replace the regulator	
	Wiring		Faulty charging circuit lead wire connection	Repair or replace
			Loose battery terminal	Retighten

Electrical System

Excessive output	Alternator	Short-circuited or broken neutral wire	Replace the wire
	Regulator	Improper voltage regulator adjustment Defective operation	Check the voltage regulator operation and repair or replace as required
		Improper charge relay adjustment, defective operation, and/or faulty point contact	Check the charge relay operation and repair or replace as required

Ignition System

Ignition System

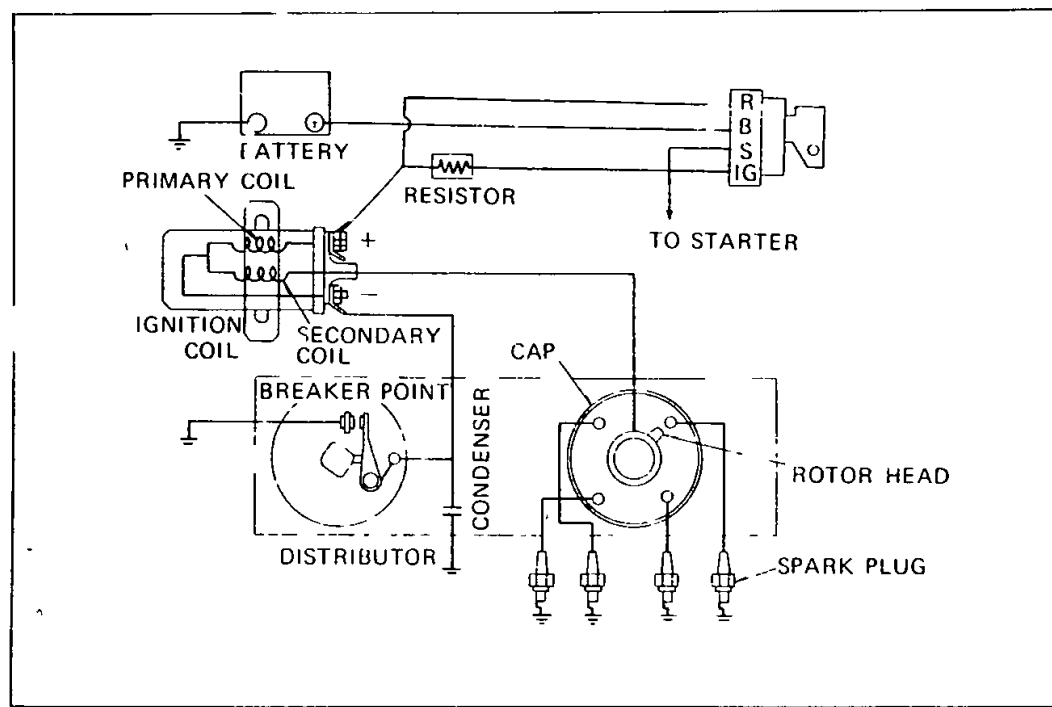


Fig. 79 Ignition system circuit diagram

The ignition circuit consists of the distributor, ignition coil, ignition switch, spark plugs, high tension cable and the battery. Figure 76 shows the ignition circuit.

DISTRIBUTOR

Construction

The distributor consists of high tension voltage part, switch off part, centrifugal advancing angle part, vacuum advance mechanical part and driving part.

Figures 77 and 78 show the construction and exploded view.

Checking and Adjustment

Cap and rotor head must always be kept clean to maintain good insulation durability since high tension voltage from the ignition coil is imposed on them. Sometimes, inside of the cap and rotor head is covered with fine carbon particles and dust. Whenever a crack or trace of leakage is found on the cap, replace with a new one.

Recommended the rotor head also be replaced with a new one if excessively damaged.

When point surface is roughened due to burning, polish with a fine emery paper (No. 500 or 600) or oil stone. When the point is worn excessively, replace. When the point is replaced with a new one, apply grease to the arm pivot receiver and cam surface. For causes of damaged (burnt) point, improper point contact, insufficient point gap, and defective condenser are considered.

The standard point gap is 0.0177 to 0.0217 in. When gap is deviated from the standard gap, adjust. Turn the shaft to a position where the breaker arm heel rides the cam lug (a position where point gap is maximum), loosen the gap adjusting screw, apply a thickness gauge between contacts, and adjust to the standard point gap.

When measuring breaker point spring tension, apply spring tension gauge to the breaker point, and position the spring tension gauge in right angle against the breaker arm.

Ignition System

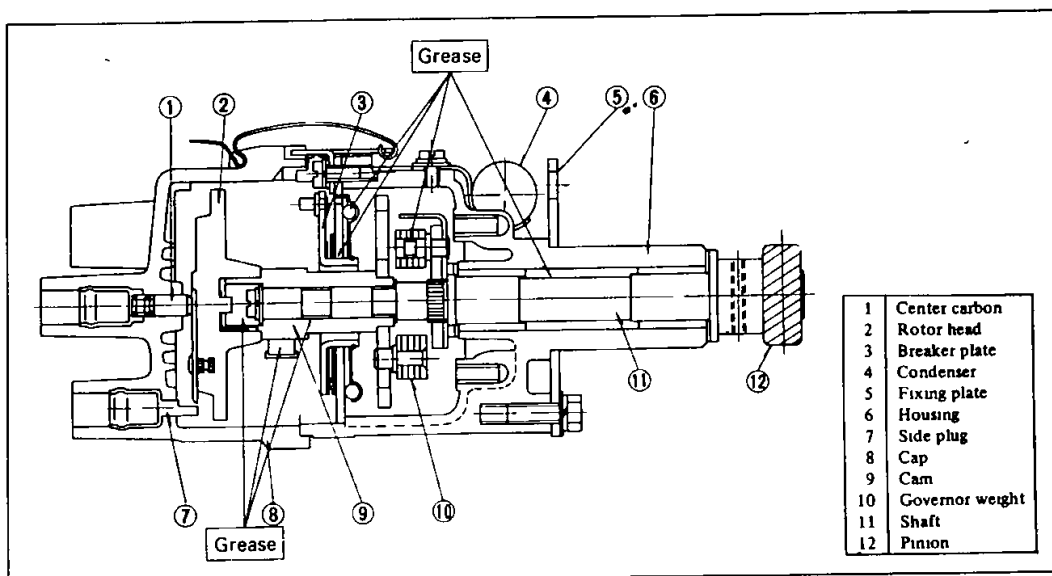


Fig 80 Structure D411-80

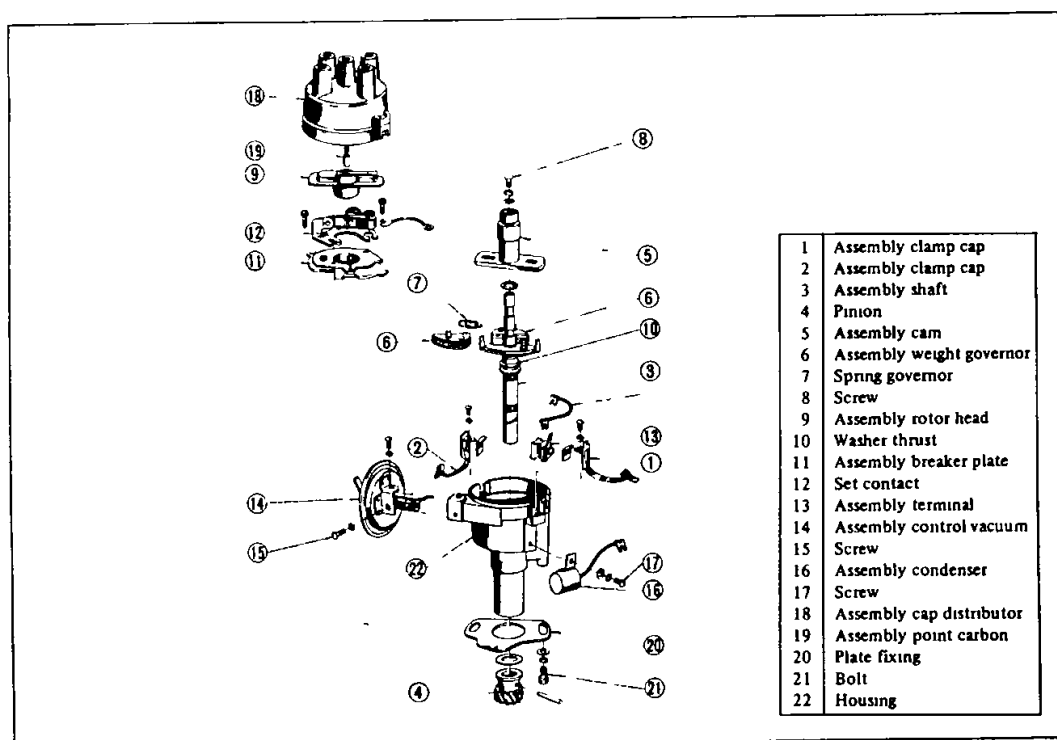


Fig 81 Exploded view of distributor D411-80

Ignition System

The standard breaker point spring tension is 1 1 to 1 4 lb

Replace if deviated

Performance of condenser is affected by improper setting, contamination and reduction of insulation resistance. Thus periodical checking is required to maintain the outlet of lead wire clean and to prevent set screw from loosening. Checking the condenser capacity is checked using a capacity meter. It may be also checked condenser isolate resistance using a tester by adjusting its range to measure large resistance value.

When the condenser is normal, the tester pointer swings largely and rapidly, and moves gradually back to the infinite side. When the pointer does not stay still or it points Zero in resistance, replacement is necessary.

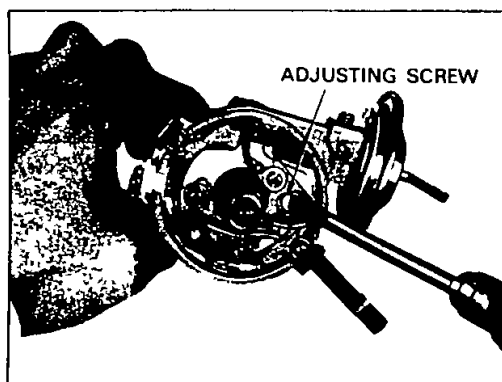


Fig 82 Adjusting point gap

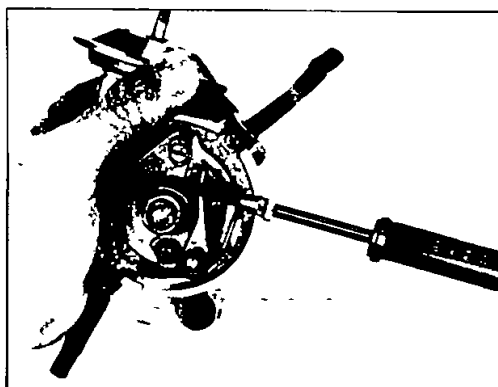


Fig 83 Measuring breaker point spring tension

SPARK PLUGS

Description

The spark plugs are of the resistor type, having 0 551 in threads and 0 031 to 0 035 in gap.

Note. All spark plugs installed on an engine, must be of the same brand and number of heat range.

Inspection

Remove spark plug wire by pulling on boot, not on wire itself.

Remove spark plugs

Check electrodes and inner and outer porcelains of plugs, noting the type of deposits and the degree of electrode erosion. Refer to Figure 85.

Normal Brown to grayish-tan deposits and slight electrode wear indicate correct spark

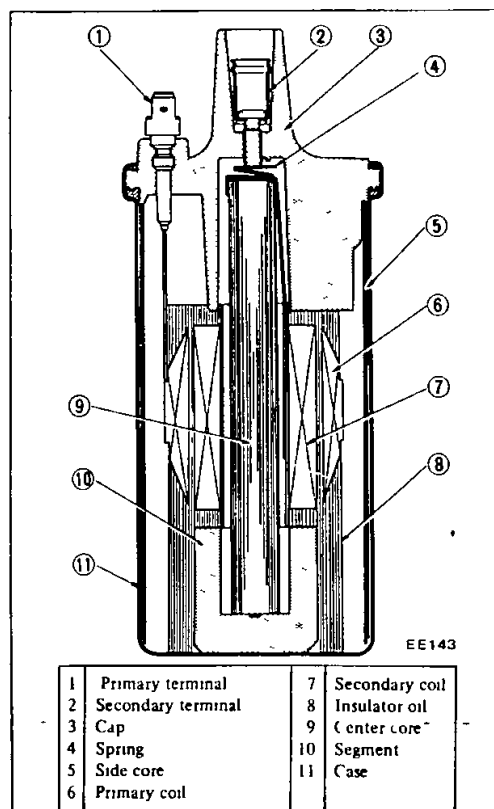


Fig 84 Construction

Ignition System

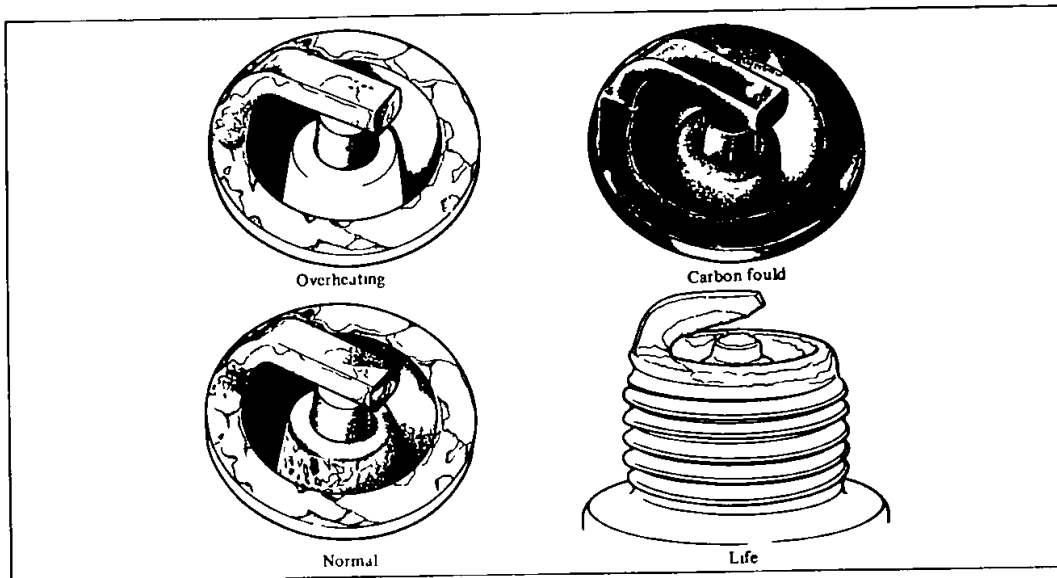


Fig 85 Spark plug

plug heat range

Carbon fouled: Dry fluffy carbon deposits on the insulator and electrode were mostly caused by slow speed driving in city, weak ignition, too rich fuel mixture, dirty air cleaner, etc

It is advisable to replace with plugs having hotter heat range

Oil fouled: Wet black deposits show excessive oil entrance into combustion chamber through worn rings and pistons or excessive clearance between valve guides and stems. If the same condition remains after repair, use a hotter plug

Overheating: White or light gray insulator with black or gray brown spots and bluish burnt electrodes indicate engine overheating. Moreover, the appearance results from incorrect ignition timing, loose spark plugs, low fuel pump pressure, wrong selection of fuel, a hotter plug, etc

It is advisable to replace with plugs having colder heat range

After cleaning, dress electrodes with a small fine file to flatten the surfaces of both center and side electrodes in parallel. Set spark plug gap to specification

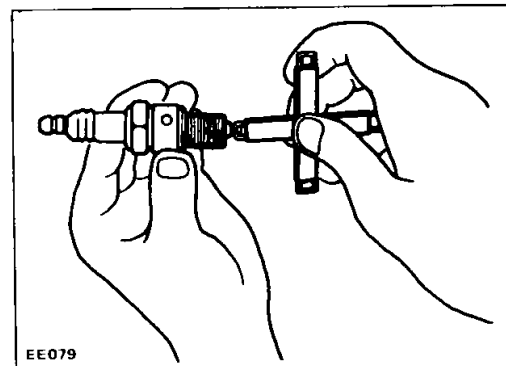


Fig 86 Setting spark plug gap

Install spark plugs and torque each plug to 11 to 15 ft-lb

Connect spark plug wires

Cleaning and Regap

Clean spark plugs in a sand blast type cleaner. Avoid excessive blasting. Clean and remove carbon or oxide deposits, but do not wear away porcelain. If deposits are too stubborn, discard plugs

After cleaning spark plugs, renew firing surface of electrodes with file mentioned above. Then gap spark plugs to 0.030 to 0.035 in using a round wire feeler gauge. All spark plugs new or used should have the gap checked and reset by bending ground electrode

Fuel System

Fuel System

FUEL FILTER DESCRIPTION

The fuel filter is of a cartridge type. It uses paper element as strainer element, which can be checked for condition from outside. This filter cannot be cleaned. Replace the filter at the specified service interval or if it becomes clogged or restricted.

REMOVAL

Disconnect inlet and outlet fuel lines from fuel filter, and remove fuel filter.

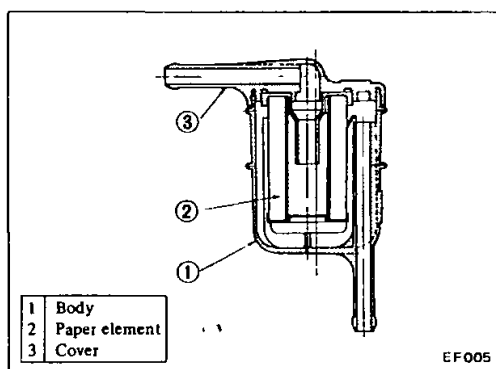


Fig 87 Sectional view of cartridge type fuel filter

Note: Before disconnecting fuel lines, use a container to receive the remaining fuel in lines.

INSTALLATION

Installation is the reverse of removal.

FUEL PUMP

Description

The fuel pump transfers gasoline from the tank to the carburetor in sufficient quantity to meet engine requirements at any speed or load.

The fuel pump is of the diaphragm type.

The fuel pump consists of a body, rocker arm and link assembly, fuel diaphragm, fuel diaphragm spring, seal, inlet and outlet valves.

The fuel diaphragm consists of specially treated rubber, which is not affected by gasoline, held together with two metal discs and a pull rod.

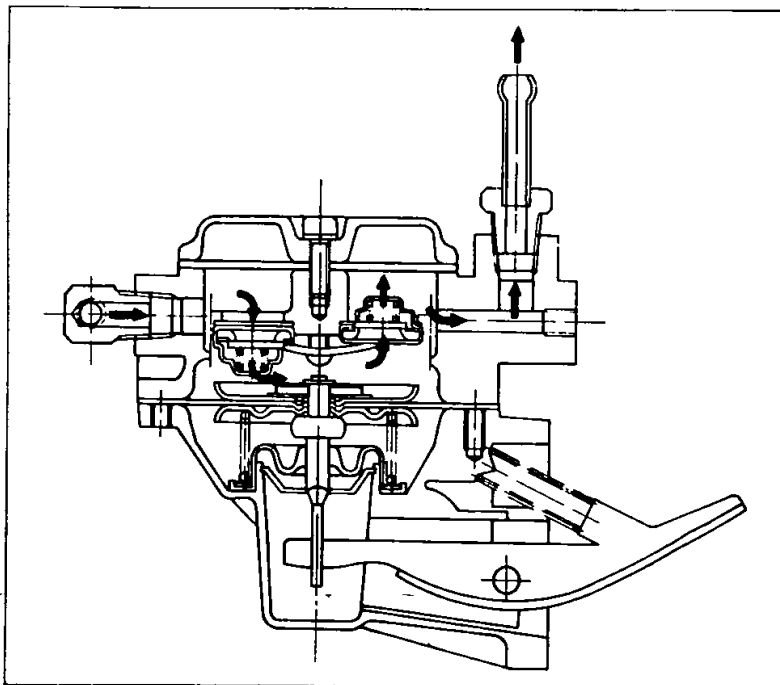


Fig 88 Schematic view of fuel pump

Testing

A fuel pump is operating properly when its pressure is within specifications and its capacity is equal to the engine's requirements at all speeds

Pressure and capacity must be determined by two tests, with the pump mounted on the engine. Be sure that there is gasoline in the tank when conducting these tests

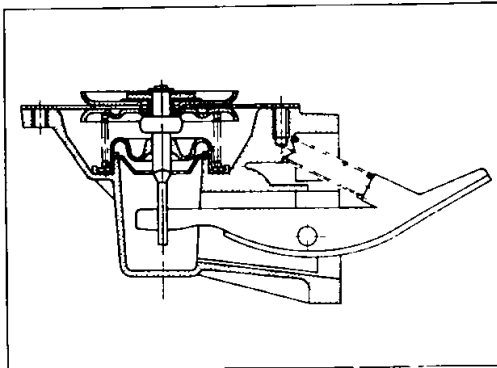


Fig. 89 Pull rod removal

Static Pressure Test

The static pressure test is conducted as follows

Disconnect the carburetor fuel line at the carburetor

Install the necessary adapter and "tee" fitting to the fuel line and attach a suitable pressure gauge

Start and run engine at varying speeds

The reading on the gauge is the static fuel pressure and this should remain within the following limits

2-6 lb/sq in

Pressure below the lower limit indicates extreme wear on one part of a small amount of wear on each working part

They also indicate a ruptured diaphragm, worn, warped, dirty or gumming valves and seats or weak diaphragm return spring. Pressure above the upper limit indicates an excessively strong diaphragm that is too tight. This condition requires removal of the fuel pump assembly for replacement or repair

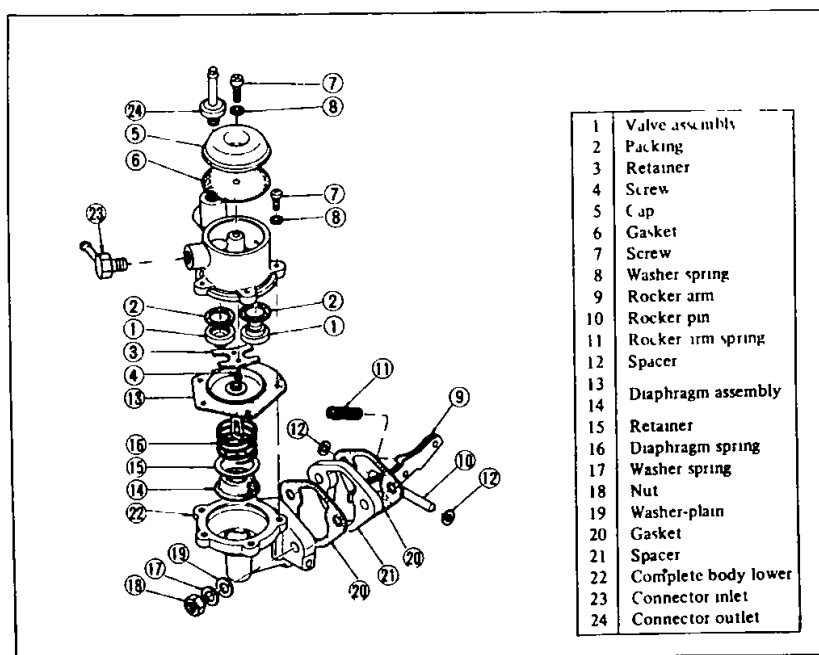


Fig. 90 Structure of fuel pump

Fuel System

Capacity Test

The capacity test is used only when the static pressure is within specifications. The capacity test is conducted as follows:

Disconnect the fuel pipe at the carburetor.

Place a suitable container at the end of the pipe.

Start the engine and run at 1,000 rpm.

The pump should deliver 1 U.S. pt. of fuel in one minute or less.

If no gasoline or only a little flows from open end of pipe, the fuel pipe is clogged or the pump is malfunctioning. Before removing the pump, remove the gas tank cap, disconnect both inlet and outlet pipes and blow through them with an air hose to make sure that they are clear.

This will eliminate possible clogged gas strainer in the fuel tank. Reconnect the pipes to the pump and retest flow.

Removal and Disassembly

Remove the fuel pump assembly by unscrewing two mounting nuts and disassemble in the following order:

Separate the upper body and the lower body by unscrewing the body set screws.

Take off the cap and the cap gasket by removing the cap screw.

Unscrew the elbow and the connector.

Take off the valve retainer by unscrewing two valve retainer screws. Two valves are easily removed.

To remove the diaphragm, diaphragm spring, lower body seal washer and lower body seal from the lower body, press down the diaphragm counter to the force of the diaphragm spring and while doing this, cant the diaphragm so that the rectangular part in the lower end of the pull rod is unhooked from the rocker arm link.

Inspection

Check the upper and lower bodies for cracks.

Check the valve assembly for wear of the valve and valve spring. Blow the valve assembly by breath to examine its function.

Check the diaphragm for small holes, cracks and wear.

Check the rocker arm for wear at the portion in contact with the camshaft.

Check the rocker arm pin for wear since a worn pin may cause oil leakage.

Check all other components for any abnormalities and replace with new parts as required.

Assembly

Assembly is done in reverse order of disassembly. For reassembly and reinstallation, the following matters should be noted:

Use new gasket.

Lubricate the rocker arm link, rocker arm pin and lever pin before installation.

To test the function, position the fuel pump assembly about 33 ft. above fuel level with a pipe connecting the fuel pump and the fuel filter and operate the rocker arm by hand. If fuel is drawn up soon after the rocker arm is released, the function of the pump is satisfactory.

CARBURETOR

Description

The carburetors are of a downdraft type, which is designed and built to increase power and fuel economy, as well as to reduce the emission of exhaust gases.

These carburetors present several distinct features of importance to the car owners.

A summary of features is as follows:

Secondary throttle valve is operated by throttle lever. The high power and good acceleration are gained with combination of the auxiliary valve.

Accelerating pump gives excellent acceleration.

The power valve mechanism is of a vacuum actuated boost type and improves high speed driving

The throttle opener control system incorporates a servo diaphragm. The servo diaphragm helps open the throttle valve at a decreasing speed so as to reduce the emission of hydrocarbons to a minimum.

An anti-dieseling solenoid is used as a means of preventing "dieseling." When the ignition key is turned off, the fuel passage involved in the slow system is closed and the fuel supply is shut down completely.

In the choke mechanism, an electric automatic choke is used to automatically control the choke valve operation during the warm-up of the engine.

The carburetor for automatic transmission is equipped with so-called dash pot, that is, it makes smooth decelerating without engine stall at any operating condition.

These carburetors are quite similar in appearance as explained above except the dash pot for the automatic transmission model.

Adjustment

Idling Adjustment

Idle mixture adjustment requires the use of a "CO" meter. When preparing to adjust idle

mixture, it is essential to have the meter thoroughly warmed and calibrated.

Warm up the engine sufficiently.

Continue engine operation for one minute under idling speed.

Adjust throttle adjusting screw so that engine speed is 800 rpm (in "N" position for automatic transmission).

Check ignition t_1 , if necessary adjust it to the specifications.

Ignition t_1 800 rpm

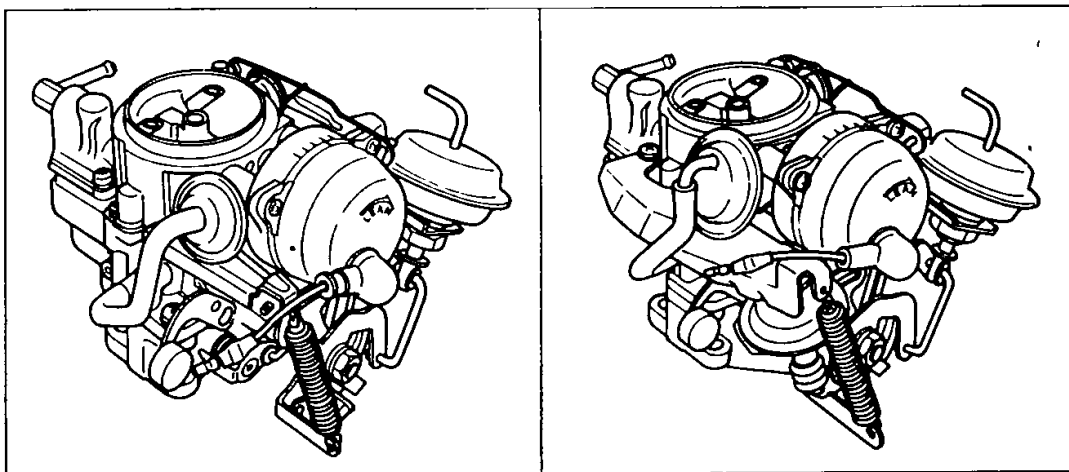
Adjust idle adjusting screw so that CO percentage is 1.5-0.5% at 800 rpm. On automatic transmission equipped model, check must be done in the "D" position. Be sure to apply parking brake and to lock both front and rear wheels with wheel chocks.

b. Hold brake pedal while stepping down on accelerator pedal. Otherwise car will rush out dangerously.

On automatic transmission equipped model, make sure that the adjustment has been made with the selector lever in "N" position.

And then check the specifications with the lever in "D" position. Insure that CO percent and idle speed are as follows.

Idle rpm 650



for Manual transmission

for Automatic transmission

Fig. 91 External view of carburetor

Fuel System

CO percentage

(with lever in "D" position) 1.5 - 0.5%

If necessary, adjust by progressively turning throttle adjusting screw and idle adjusting screw until correct adjustments are made

Notes: a. Do not attempt to screw down the idle adjusting screw completely to avoid damage to the tip, which will tend to cause malfunctions.

b. After idle adjustment has been made, shift the lever to "N" or "P" position for automatic transmission.

c. Remove wheel chocks before starting the car

Idle Limiter Cap

Do not remove this idle limiter cap unless necessary. If this unit is removed, it is

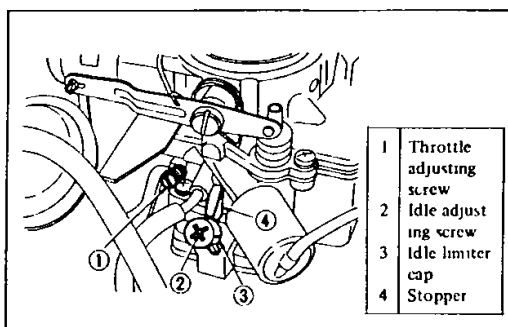


Fig 92 Throttle adjusting screw and idle adjusting screw

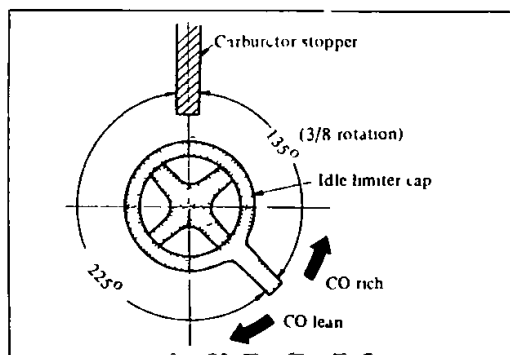


Fig 93 Setting idle limiter cap

necessary to re-adjust it at the time of installation. To adjust, proceed as follows

Make sure that the percentage of CO contents satisfies the specifications

Install idle limiter cap in position, making sure that the adjusting screw can further turn 3/8 rotation in the "CO-RICH" direction

Fuel Level Adjustment

Turn down the float chamber to allow the float coming into contact with the needle valve, and measure "H" shown in Figure 91. When the "H" is approximately 19.0 mm (0.748 in), top float position is correct. The top float position can be adjusted by bending float seat. Upon completion of the adjustment, check fuel level with the attached level gauge

Adjust bottom float position so that clearance "h" between the float seat and the needle valve stem is 0.0512 to 0.0669 in when the float is fully raised. Bend the float stopper properly as required

Fast Idle Adjustment

Remove the bi-metal cover

Place the fast idle arm on the second step of the fast idle cam. Then adjust the fast idle adjusting screw in such a way that the clearance of the throttle valve (shown at "A" in the illustration) will be the specifications. See Figure 92

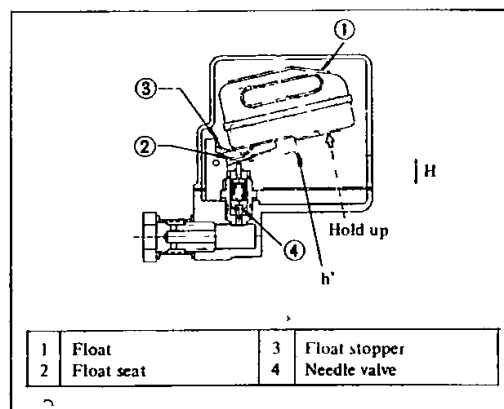


Fig 94 Adjusting float level

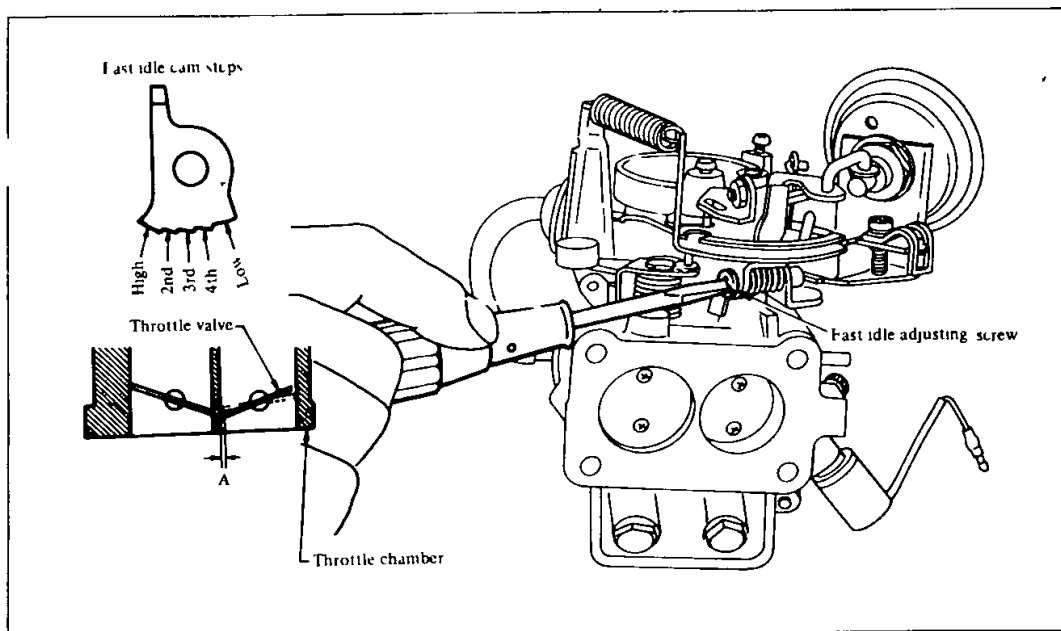


Fig 95 Adjusting fast idle

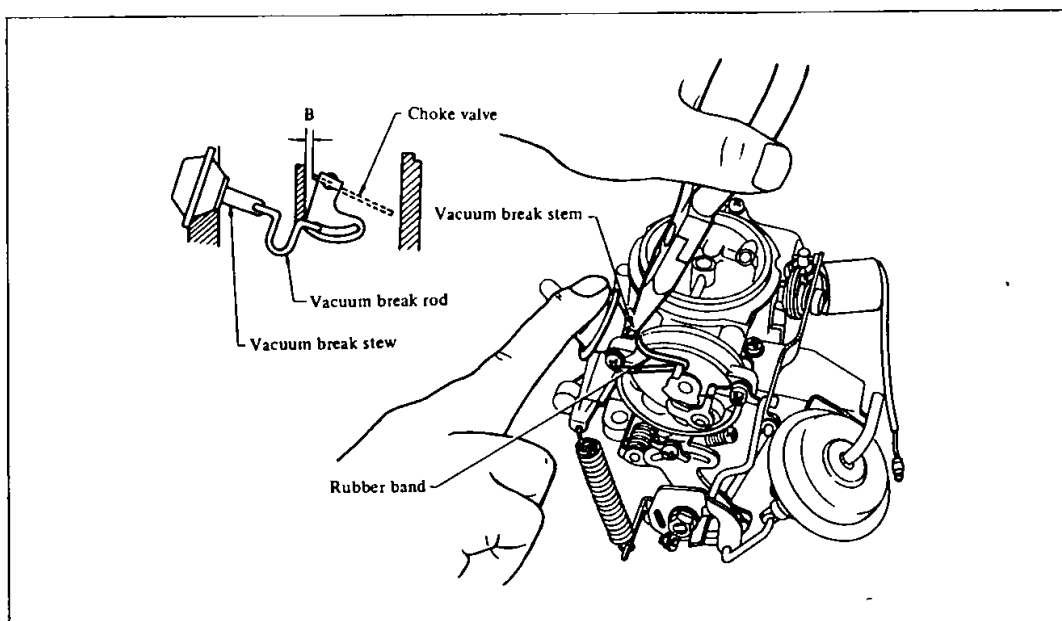


Fig. 96 Adjusting vacuum break

Fuel System

	Clearance of throttle valve "A" in	Engine revolution rpm
Manual transmission	0 0315 to 0 0346	1,750 to 2,050
Automatic transmission	0 0421 to 0 0461	2,650 to 2,950

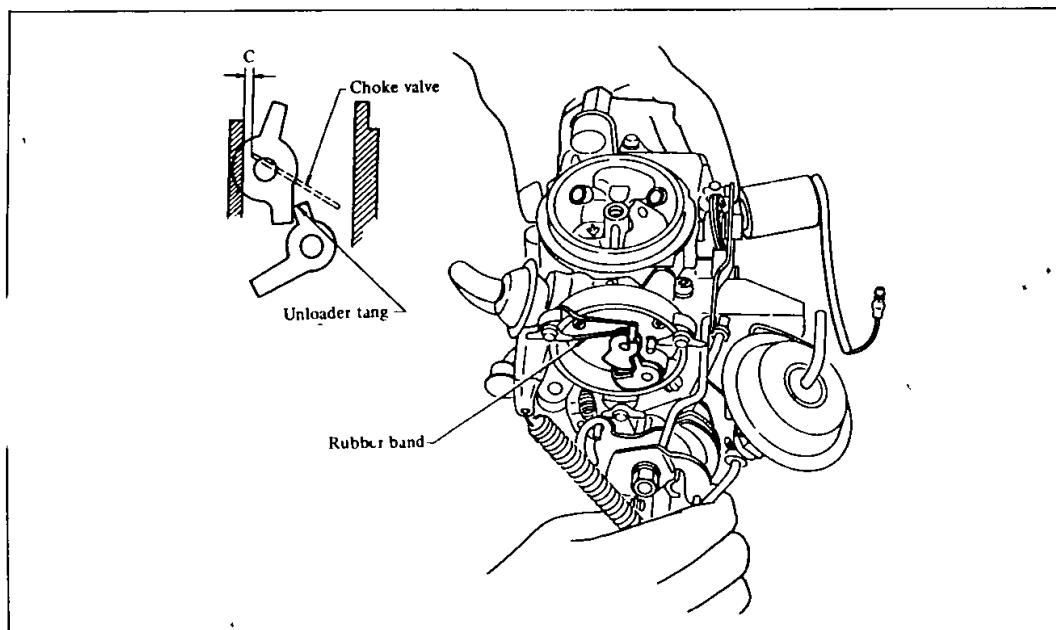


Fig 97 Adjusting choke unloader

Vacuum Break Adjustment

Completely close the choke valve

Hold the choke valve by stretching the rubber band between choke shaft lever and the stationary part of carburetor

Grip the vacuum break stem with pliers, and pull straight fully

Under this condition, adjust the gap (shown at "B" in the illustration) between the choke valve and carburetor body to 0 0449 to 0 0496 in for manual transmission car, and 0 047 to 0 053 in for automatic transmission car, by bending vacuum break rod

Choke Unloader Adjustment

Completely close the choke valve

Hold the choke valve by stretching a rubber ring between the choke shaft lever and the stationary part of the carburetor

Open the throttle lever until it fully opens

Under this condition, adjust the clearance "C" in the illustration between the choke valve and the carburetor body to 0 079 in by bending unloader tongue See Figure 94

Note: Make sure that the throttle valve fully opens when the carburetor is moun-

ted on the car. If the throttle valve fails to fully open, the unloader becomes inoperative, resulting in poor acceleration after the engine is started.

Bi-metal Setting

Measurement of bi-metal heater resistance
Install the bi-metal cover in place on the carburetor. Make sure that the resistance across the terminal and the carburetor body is in the range from 8.6 to 0.0 ohms. Measure the resistance without electric current through the heater and at about 70°F

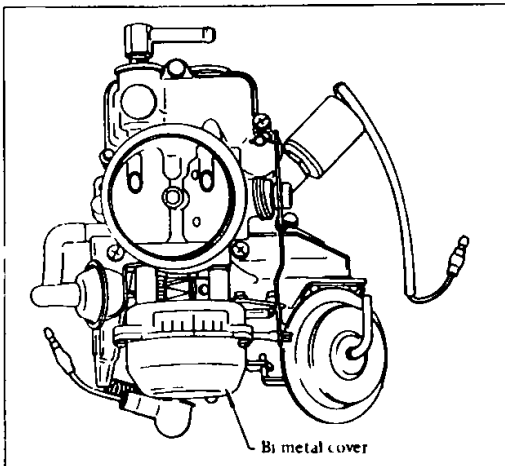


Fig 98 Setting bi-metal cover

Note: Use an accurate measuring instrument, such as a wheatstone bridge.

Bi-metal cover setting

Position the bi-metal cover until the index mark is aligned at the middle point of the scale

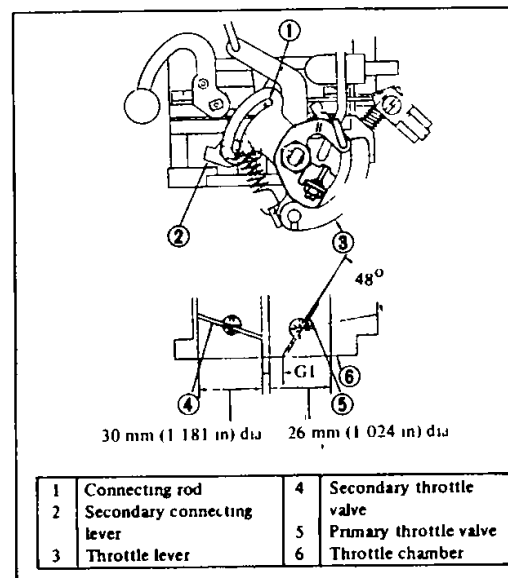


Fig 99 Adjusting interlock opening (Primary and secondary throttle valves)

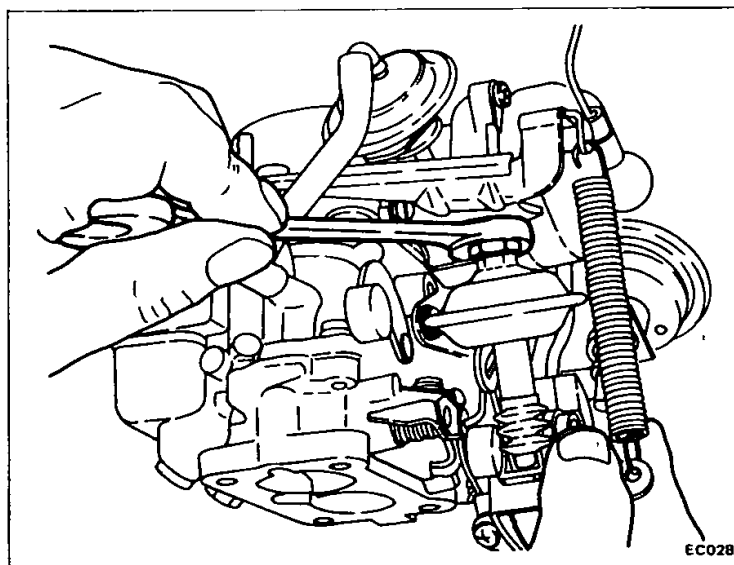


Fig 100 Adjusting dash pot

Fuel System

Note. When somewhat over-choked, set bi-metal cover after turning it clockwise slightly.

Adjustment of Interlock Opening of Primary and Secondary Throttle Valves

Open the primary side throttle valve 48° from the fully closed position, and measure clearance "GI" between the throttle valve and throttle chamber inside wall as shown in Figure 99

"GI" 0.228 in

Without disturbing the above setting, bend connecting rod as necessary so that secondary throttle valve is about to open. Upon completion of the adjustment, make sure that the link system operates smoothly

Dash Pot Adjustment (Automatic Transmission car only)

It is necessary that the idling speed of engine and mixture have been well turned up and engine is sufficiently warm

Turn throttle valve by hand, and read engine speed when the dash pot just touches the stopper lever

Adjust the position of the dash pot by turning the nut until the engine speed is in the range from 1,900 to 2,000 rpm

Make sure that the engine speed is smoothly reduced from 3,000 to 1,000 rpm within a few seconds

Removal

Remove the air cleaner

Disconnect the fuel line, vacuum line, automatic choke harness and anti-dieseling solenoid harness from carburetor

Remove the throttle lever

Remove four nuts and washers retaining the carburetor to the manifold if necessary

Lift the carburetor and remove from the manifold

Remove and discard the gasket used between the carburetor and manifold

Disassembly

The main jets and needle valves on both primary and secondary sides are accessible from outside of the carburetor for disassembly. Remove throttle return spring

Remove pump lever shaft, take out pump lever and pump connecting rod

Remove rubber pipe from choke piston

Loosen off bolts securing servo-diaphragm in position, take out diaphragm

Back off total of five bolts which hold choke in position, and remove rods of starter system, take out choke chamber

In removing chamber, exercise care to avoid damaging float

The primary and secondary emulsion tubes can be disassembled by removing the main air bleeds on the individual sides

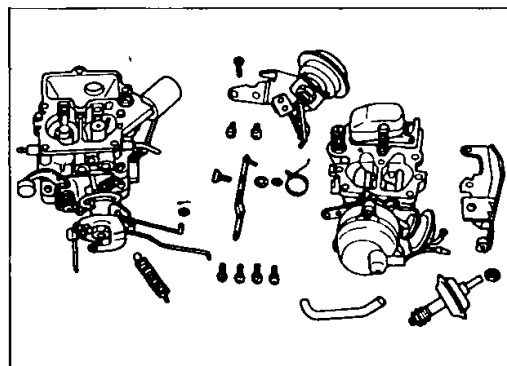


Fig 101 Removing choke chamber and servo diaphragm

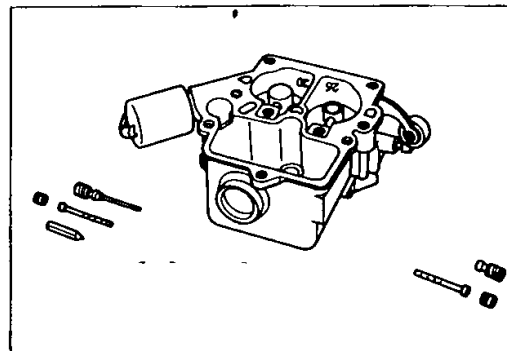


Fig 102 Removing emulsion tubes

In removing injector weight, piston return spring and ball, care should be exercised to prevent them from being scattered and lost

To check the accelerator pump, the pump cover is removed. Be careful not to lose the return spring and inlet valve (ball) provided at the lower part of the piston during disassembly

Removal of bi-metal cover is a simple matter of removing three set screws

When it becomes necessary to take out float, pull shaft from float

Note: Under no circumstances should bi-metal be moved with excessive force since this may cause a permanent set in bi-metal, making starting difficult

The throttle chamber can be detached from the float chamber by removing three set screws

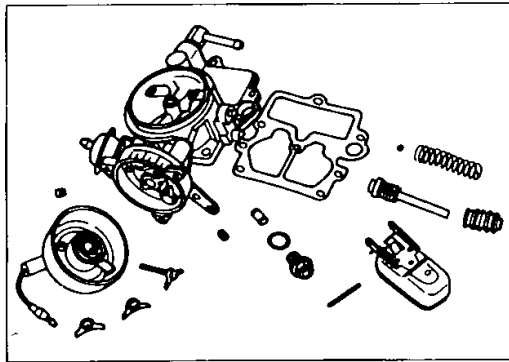


Fig 103 Disassembling accelerator pump and bi-metal cover

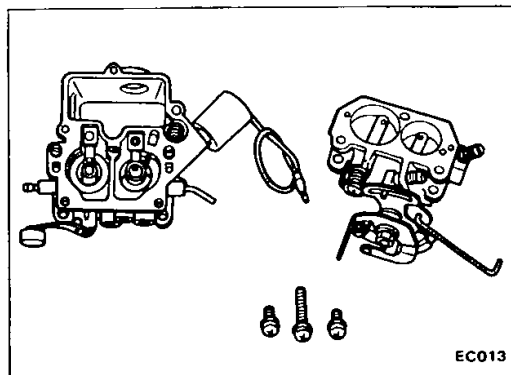


Fig 104 Removing throttle chamber

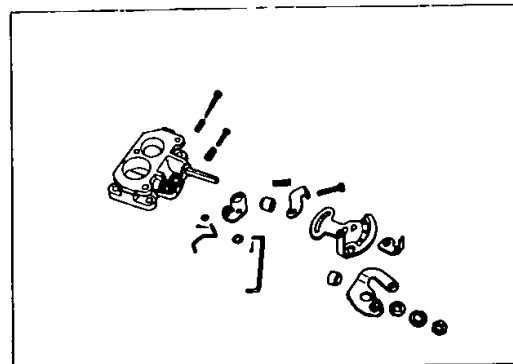


Fig. 105 Removing throttle valve

Do not remove anti-dieseling solenoid unless it is necessary to change

It is preferable to leave throttle valve intact unless otherwise required. If throttle valve must be disassembled to remedy a defect, secondary throttle valve must be installed with gap to be free

Otherwise, stable idling and slow speed performance will not be obtained

In disassembling and reassembling interlocking links, take care so that each linkage has a smooth action, and that it is not fitted in any forced position

Cleaning and Inspection

Dirt, gum, water or carbon contamination in or on the exterior moving parts of carburetor are often responsible for unsatisfactory performance

For this reason, efficient carburetor depends upon careful cleaning and inspection while servicing

Blow all passages and castings with compressed air and blow off all parts until dry

Note: Do not pass drills or wires through calibrated jets or passages as this may enlarge orifice and seriously affect carburetor calibration

Check all parts for wear. Replace worn part. Especially the following matters should be noted

Fuel System

Check float needle and seat for wear. Replace the assembly, if worn.

Check the throttle and choke bores in throttle body and cover casting for wear or out of round.

Inspect idle adjusting needles for burrs or ridges. Replace as required.

Inspect gaskets to ensure that they do not appear hard or brittle and that the edges are not turned or distorted. If any such condition is detected, they must be replaced.

Check filter screen for clogging. Clean and if it is distorted or remains plugged, replace.

Check clusters for loose or worn parts. If damage or looseness exists, replace cluster assembly.

Check the linkage for operating condition.

Inspect the operation of accelerating pump.

Pour gasoline into the float chamber and operate the throttle lever. Check condition of gasoline injection from the accelerating nozzle.

Assembly and Installation

Assemble and install the carburetor in reverse sequence of disassembly and removal.

Replace the gaskets, if necessary.

When disassembling and reassembling the interlock link and related components, be careful not to bend or deform the components.

Reassembly carefully and correctly so that all interlock links operate smoothly.

Jets

The carburetor performance depends on jets and air bleeds, and the vehicle emissions largely depends on the carburetor performance. That is why these components are manufactured with utmost care.

To clean them, use gasoline and blow air on them. Changing jet or air bleed size may cause ill vehicle emission. So they should not be changed their numbers.

Trouble Shooting

In the following table, the symptoms and causes of carburetor troubles and remedies for them are listed to facilitate quick repairs.

There are various causes of engine troubles. It sometimes happens that the completely effective carburetor seems apparently to have some troubles when electric system is defective. Therefore, whenever the engine has troubles, electric system must be checked first before adjusting the carburetor.

TROUBLE SHOOTING

Troubles	Possible causes	Remedies
Overflow	Dirt accumulated on needle valve	Clean needle valve
	Fuel pump pressure too high	Repair pump
	Needle valve seat improper	Lap or replace
Excessive fuel consumption	Fuel overflows	See above
	Each main air bleed clogged	Clean

Fuel System

Troubles	Possible causes	Remedies
	Gauge plate adjustment incorrect Choke valve does not open Outlet valve seat of accelerator pump im proper Linked opening of secondary throttle valve too early	Correct adjustment Adjust Lap or replace Adjust
Power shortage	Each main jet clogged Each throttle valve does not fully open Fuel pump operated improperly Fuel strainer clogged Vacuum jet clogged Power valve operated improperly	Clean Adjust Repair Clean Clean Adjust
Improper idling	Slow jet clogged Each throttle valve does not close Secondary throttle valve operated im properly Each throttle valve shaft wear Packing between manifold and carburetor defective Fuel overflows	Clean Adjust Overhaul and clean Replace Replace tightening See the first item
Rough engine idle or engine stop	Incorrect carburetor adjustment idle speed, idle mixture, choke setting Incorrect basic ignition timing Incorrect automatic temperature control air cleaner Defect or malfunction of ignition system (spark plug, high tension cable, breaker point, ignition coil, etc)	Adjust idle speed mixture and timing Adjust ignition timing Adjust automatic temperature control air cleaner Adjust or replace ignition system
Engine idle too fast	Trouble in throttle link and cable Incorrect throttle opener adjustment Trouble in PCV valve Trouble in automatic choke Defect or malfunction of ignition system (spark plug, high tension cable breaker point, ignition coil, etc)	Check throttle link and cable Adjust throttle opener Replace PCV valve Adjust autotmatic choke Adjust or replace ignition system

Fuel System

Troubles	Possible causes	Remedies
Engine hesitation	Each main jet slow jet clogged By-pass hole, idle passage clogged Emulsion tube clogged Idling adjustment incorrect Secondary throttle valve operated im properly	Clean Clean tube Clean Correct adjustment Overhaul and clean
Car knock when coasting	Incorrect throttle opener adjustment Trouble in PCV valve Defect or malfunction of ignition system (spark plug, high tension cable, breaker point, ignition coil, etc)	Adjust throttle opener Replace PCV valve Adjust or replace ignition system
Engine does not start	Fuel overflows No fuel Idling adjustment incorrect Fast idle adjustment incorrect Damaged anti-dieseling solenoid Bi-metal rod in contact with bi-metal case	See the first item Check pump, fuel pipe and needle valve Correct adjustment Correct adjustment Replace Adjust

Cooling System

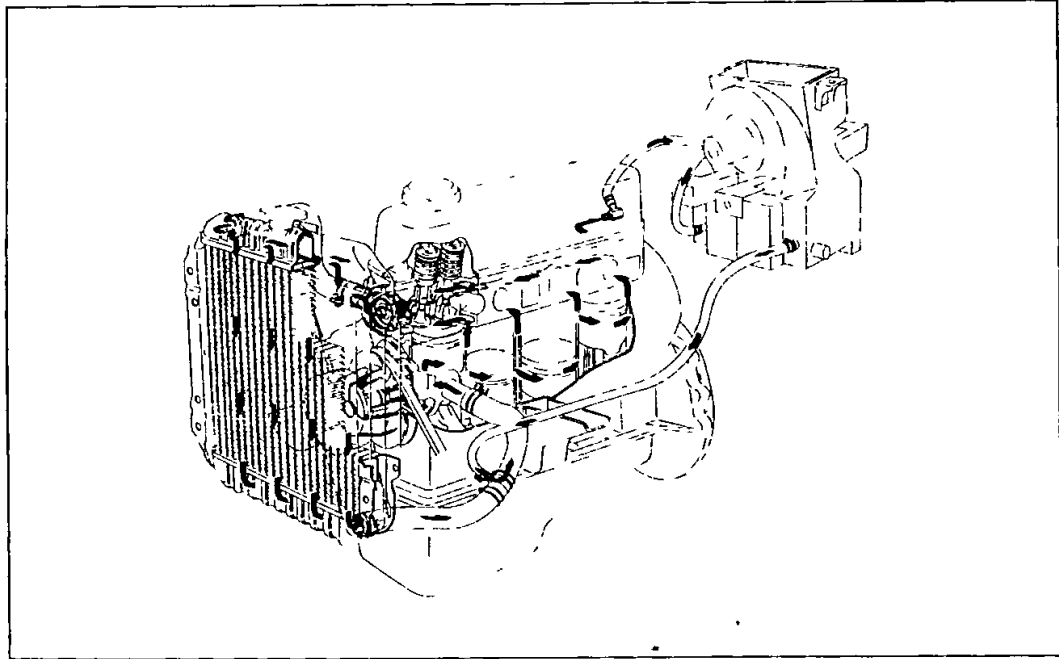


Fig 106 Cooling system

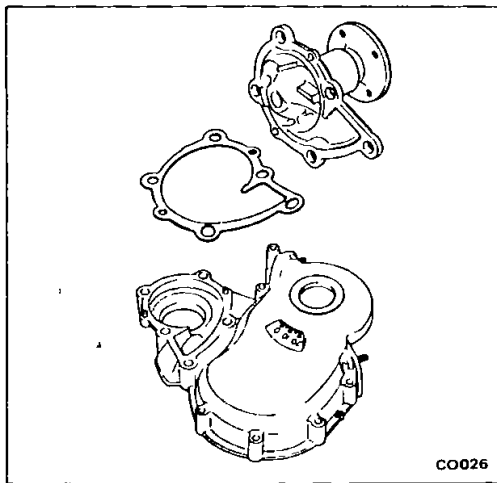


Fig 107 Water pump and front cover

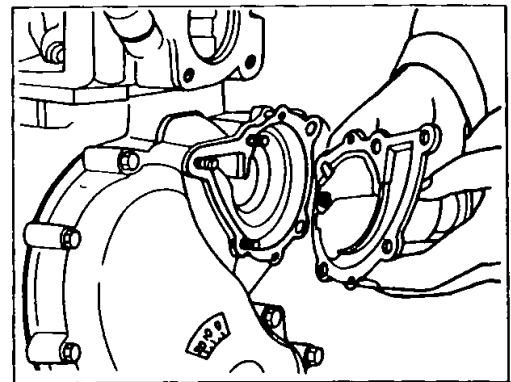


Fig 108 Water pump removal

DESCRIPTION

The cooling system is of a closed pressure type with high cooling capability. Cooling water flowing through resistance-free water passages in the cylinder head and cylinder block is maintained at adequate temperature range at all times by means of an ample capacity water pump, of a corrugated fin type

radiator with high cooling efficiency and of a pellet type thermostat

WATER PUMP

The water pump is a centrifugal type water pump with an aluminum die cast pump body. The volute chamber is built into the front cover assembly and a high pressure sealing

Cooling System

mechanism is adopted to prevent the water leakage and noise completely

Note: The water pump must not be disassembled since the bearings are shrinkage fitted to their bores. If any part of water pump is found defective, replace pump assembly.

Removal

Drain cooling water completely

Take the fan belt off the pulley

Remove fan and pulley

Remove the water pump

Installation

Installation is the reverse of removal

Installation

When installing the thermostat, apply adhesive (Three Bond) to both sides of the packing for prevention of water leakage. Install the thermostat in reverse sequence of removal.

	USA	Canada	Other countries
Valve opening temperature °F	177 to 183	187 to 193	167 to (173)
Valve lift in/°F	0.31/203	0.31/212	0.31/194

THERMOSTAT

A pellet type thermostat is used in the water outlet passage to control the flow of coolant, providing fast engine warm-up and regulating coolant temperature. A wax pellet in the thermostat expands when heated and contracts when cooled. The pellet is connected through a piston to a valve and, when the pellet is heated, pressure is exerted against a rubber diaphragm, and the valve opens. As the pellet is cooled, the contraction allows the spring to close the valve.

Removal

Drain cooling water

Remove radiator hose

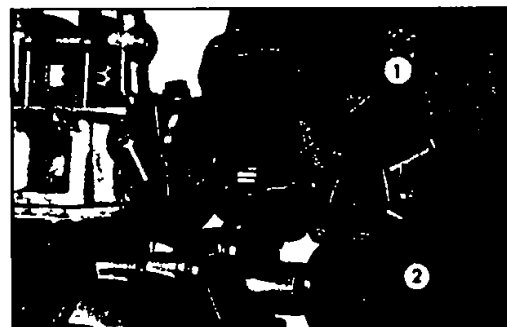
Remove water outlet elbow. Then, take out the thermostat.

Inspection

To test the thermostat for proper operating temperature, submerge the unit in a container of water. Heat the water and observe the temperature.

Measure temperature when the thermostat valve just starts rising.

If thermostat does not operate at the above specified temperatures, it must be replaced.



1 Thermostat 2 Water outlet

Fig. 109 Thermostat removal

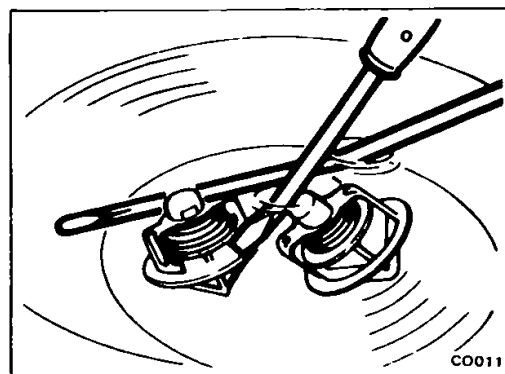


Fig. 110 Thermostat inspection

Cooling System

RADIATOR

The radiator is of a down flow type with an expansion tank located on the top of tube section

Pressure is applied to the system, and the relief valve, incorporated in the radiator filler cap, controls the pressure at approximately 13 lb/sq in

Removal

Drain cooling water

Disconnect radiator upper hose, lower hose and hose to the reservoir tank

Detach the radiator assembly by removing six fixing bolts

Inspection

Check for water leakage and cracks using a cap tester. If such defects are detected, repair



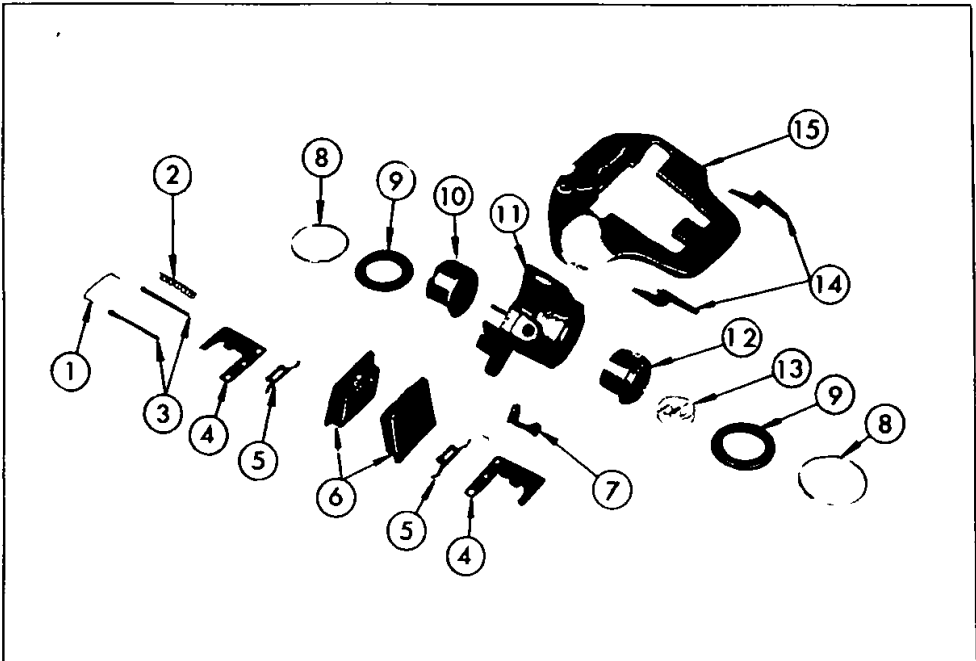
Fig 111 Radiator removal

or replace the radiator assembly

Installation

Installation is the reverse of removal

Brakes



1	Clip	6	Brake pad	11	Cylinder block
2	Spring	7	Air bleeder	12	Piston A
3	Clevis pin	8	Retaining ring	13	Bias spring
4	Shim	9	Boot	14	Yoke spring
5	Hanger spring	10	Piston B	15	Yoke

Fig 112 Front disc brake components

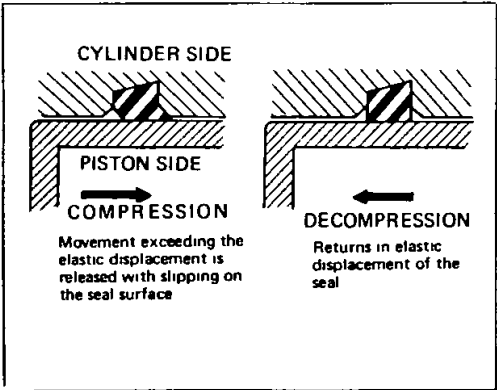
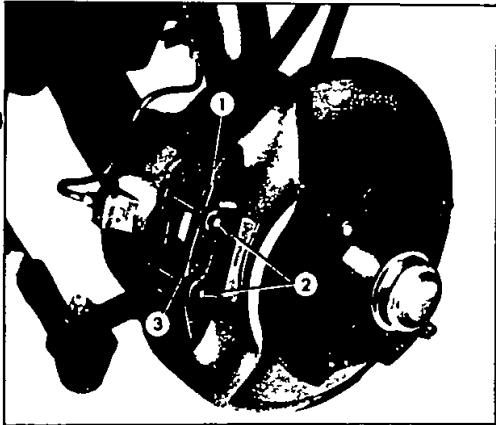


Fig 113 Piston seal automatic adjusting operation

FRONT DISC BRAKE

Rigidity of the caliper is high, brake pedal feeling is adequate, and the pad dragging is minimized. The pad is returned by elasticity of the piston seal. When the pad is worn, the



1	Brake pad	3	Clip
2	Retaining pin		

Fig 114 Removing retaining pin

piston operating stroke increases, slipping occurs on the piston seal surface, and thus, clearance is adjusted automatically.

Moreover, in order to prevent brake squealing, a shim is inserted behind the pad

BRAKE PAD

Replacement

Jack up front unit of the vehicle, and remove the front wheel

Remove clip from the retaining pin, and supporting the brake pad, remove the retaining pin and coil spring

Unhook the hanger spring, and withdraw the brake pad and shim with a pair of pliers

Note: When the brake pad is removed, do not depress the brake pedal, or otherwise the piston will come out.

Inspection

Clearance between the brake pad and rotor is adjusted automatically. Check the brake pad

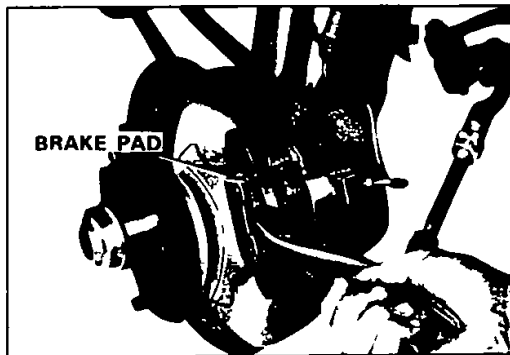


Fig 115 Withdrawing brake pad and shim

for wear after the first 6,000 miles driving and every 3,000 miles thereafter

Clean the brake pad with carbon tetrachloride or gasoline

When oil and/or grease is heavily stuck on the pad, or when deteriorated or deformed due to overheating, replace the pad with a new one

When thickness of the friction material (pad) is less than 0.0630 in, replace [Replace when total pad thickness is less than 0.2402 in]

Note. Replace pads as a set. Replacement at only one position may cause uneven brake effect. It is recommended that rotation of pads be made periodically.

Check the rotor

Reinstallation

Clean the calipers and piston pad installing parts

Note: Do not use mineral oil. Be careful not to apply oil on the rotor.

Depress the piston into the cylinder so that new pad can be installed

Note: a. Note that brake fluid may overflow from the reservoir. It is recommended that operation be carried out by loosening the breather to release brake fluid.

b. The piston can be easily pushed in by hand. But if pushed excessively the

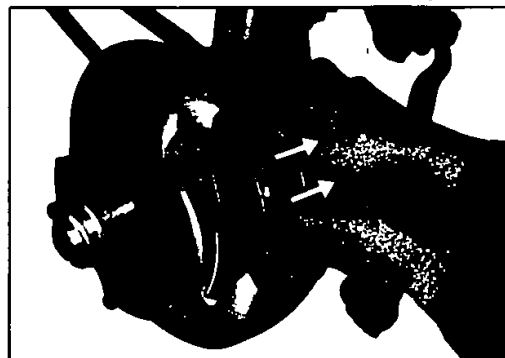
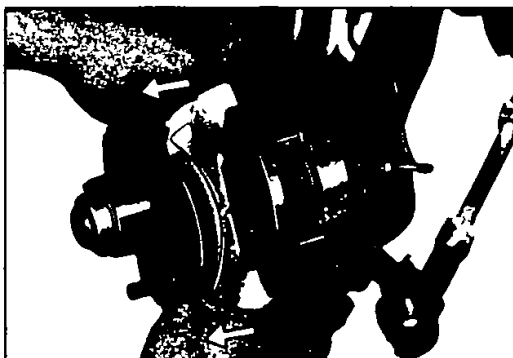


Fig. 116 Depression piston A and B into cylinder

Brakes

groove of piston goes inside of seal as shown in Figure 117 and the seal will be damaged. When the piston is pushed excessively into the cylinder, remove the brake assembly, disassemble it, push out the piston to the arrow direction as shown in Figure 117 and reassemble.

Install pad and anti-squeal shim, assemble the anti-squeal spring and retaining pin, and secure them with clip

Install the shim so that the arrow mark points the rotor forward rotating direction

Apply the coil spring to the retaining pin which is distanced from the air bleeder

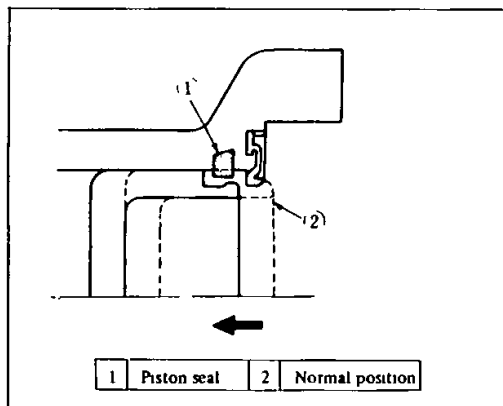


Fig 117 Piston pushing in position

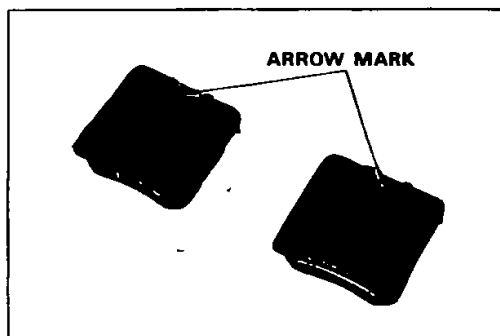


Fig 118 Arrow mark on shim

When the pad is installed, depress the brake pedal several times so as to settle down the pad in the position

CALIPER

Removal

Remove the brake pad

Disconnect the brake tube from the wheel cylinder

Remove the strut assembly and knuckle arm installation bolt so as to ease removal of the caliper assembly installation bolt

Remove the caliper assembly installation bolt, and separate it from the strut assembly

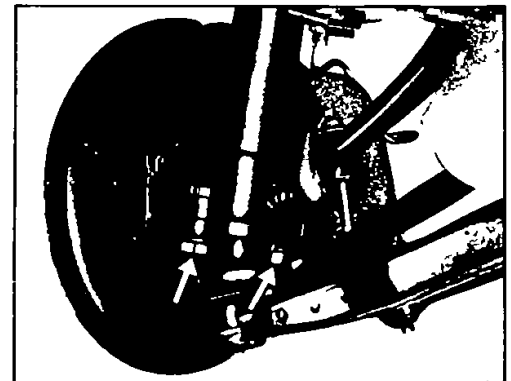


Fig 119 Removing strut assembly and knuckle arm installation bolt

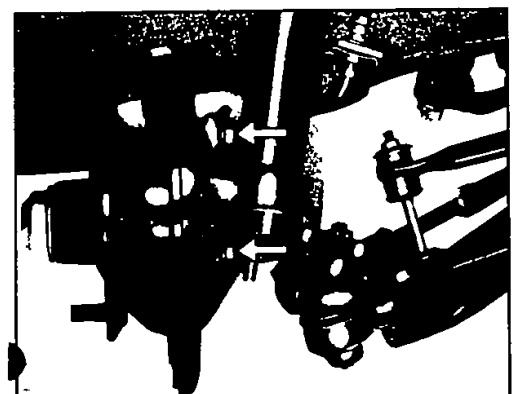


Fig 120 Removing caliper assembly installation bolt

Disassembly

Remove mud and other contaminations from the caliper assembly before disassembly

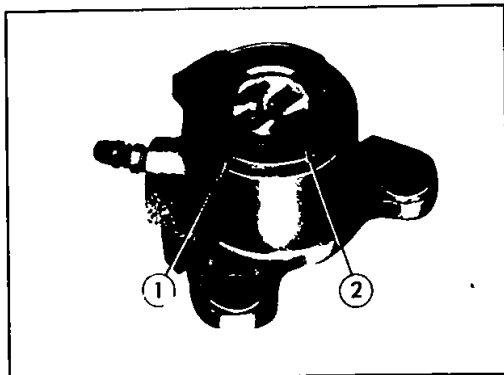
Drain brake fluid from the wheel cylinder

Loosen the air bleeder, and depress the pistons A and B into the cylinder (See Fig 125)

Secure the yoke in a vise, and tap the yoke head with a hammer. The cylinder body can then be removed from the yoke. When removing the cylinder body, be careful not to allow the piston A coming out from the cylinder



Fig 121 Tapping yoke head



1	Retaining ring	2	Boot
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Fig 122 Cylinder body and piston

Remove the bias ring from the piston A

Remove the retaining rings and boots from the pistons A and B

Depress and remove the piston from the cylinder

Remove the piston seal from the cylinder

Note: Remove the piston seal carefully with fingers so that the cylinder wall is not damaged

Remove the yoke spring and yoke bias spring from the yoke

Inspection and Repair

Thoroughly clean all disassembled parts, and check them for the following items

Note: When cleaning rubber parts, use alcohol or brake fluid. If rubber parts are cleaned with mineral oil, they will be deteriorated.

Calipers

If the cylinder wall is damaged or worn, replace. If the cylinder wall is rusted or foreign matters are accumulated on the cylinder wall, carefully polish with fine emery paper so that the cylinder wall is not damaged. If rusted or roughened excessively, replace.

Pad

See paragraph covering replacement of pad

Piston

Replace, if unevenly worn, damaged, and/or rusted

Note: The piston sliding surface is plated. Thus, do not use emery paper, although rusted or foreign matters are stuck on the sliding surface.

Seals

Primarily, replace both piston and dust seals whenever overhauling

Brakes

Note The piston seal affects not only leaking but also piston return. For this reason, replace the piston seal even if the damage is minor.

Rotor

Check the rotor and if it shows score, excessively out of round and so forth, reconditioning by machining is required. If any abnormal conditions such as crack, distortion and excessive deflection, replace the rotor.

Standard rotor thickness

0.3740 in

Limit of reconditioning rotor in thickness

0.3307 in

Deflection of the rotor

Below 0.0012 in

Reassembly

Apply the rubber grease to cylinder bore and install the piston seal.

Insert the bias ring to piston A so that the roundish portion of bias ring comes to the bottom of piston.

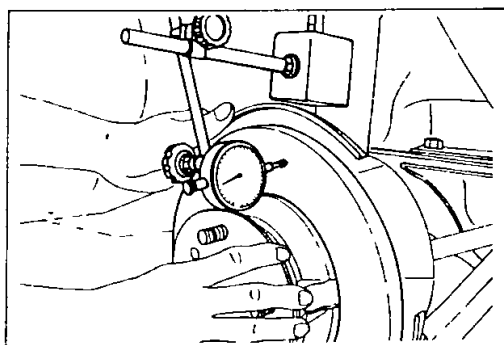


Fig 123 Measuring deflection of disc

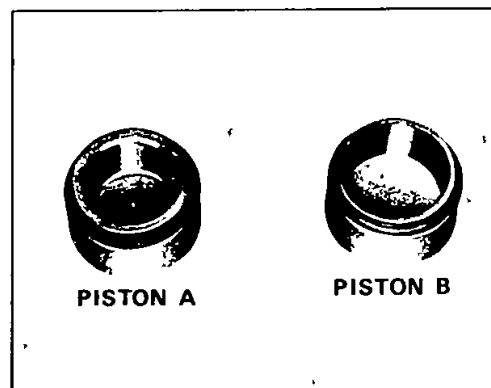


Fig 125 Piston A and B

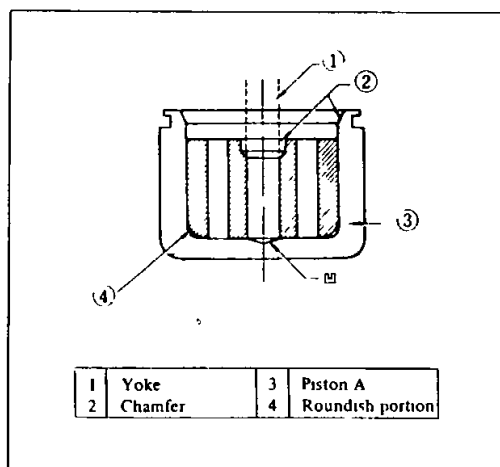


Fig 124 Installing bias ring into piston A



Fig 126 Installing boot

Note: Be careful not to confuse the piston A with B.

Apply rubber grease lightly to the sliding portion of piston and insert the piston into the cylinder

Note: When inserting the piston, be careful not to insert too far.

Install the boot and retaining ring

Install so that the yoke groove of bias ring of piston A coincides with the yoke groove of cylinder

Install so that the projected portion of yoke spring faces to disc as shown in Figures 127 and 128

Install the bias spring to yoke so that the bias spring comes to the air bleeder side of cylinder

Apply the brake grease to the yoke sliding portion of cylinder

With the yoke spring inserted to cylinder groove lightly, correct position of the bias spring so that the groove of bias spring coincides with yoke

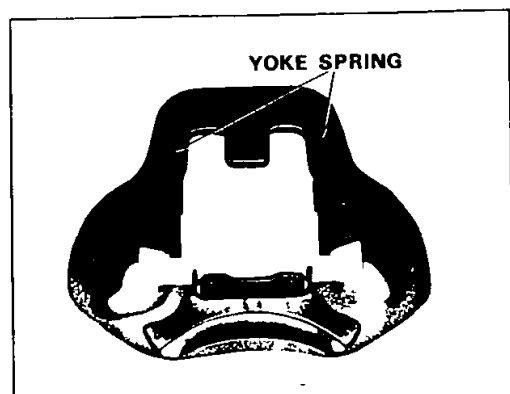


Fig 127 Installation of yoke spring (1)

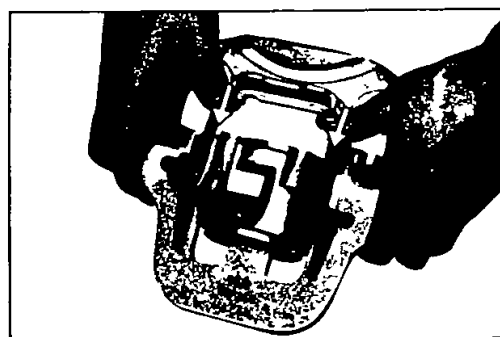


Fig 129 Correcting bias spring position

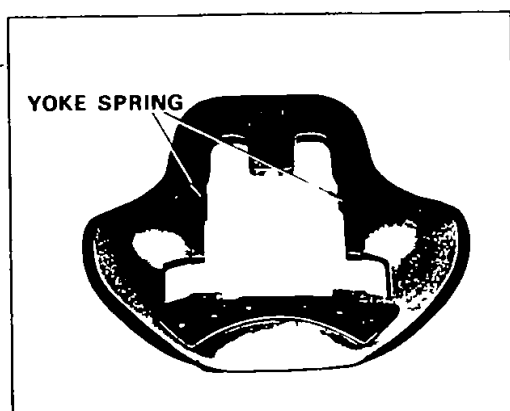


Fig 128 Installation of yoke spring (2)

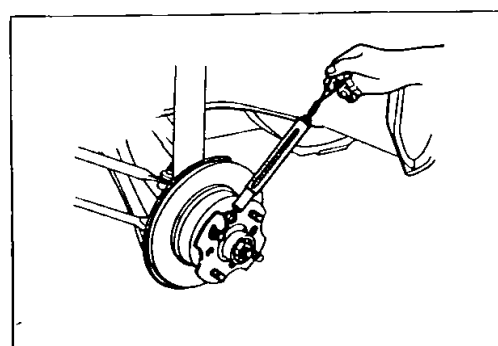


Fig 130 Measuring starting torque

Brakes

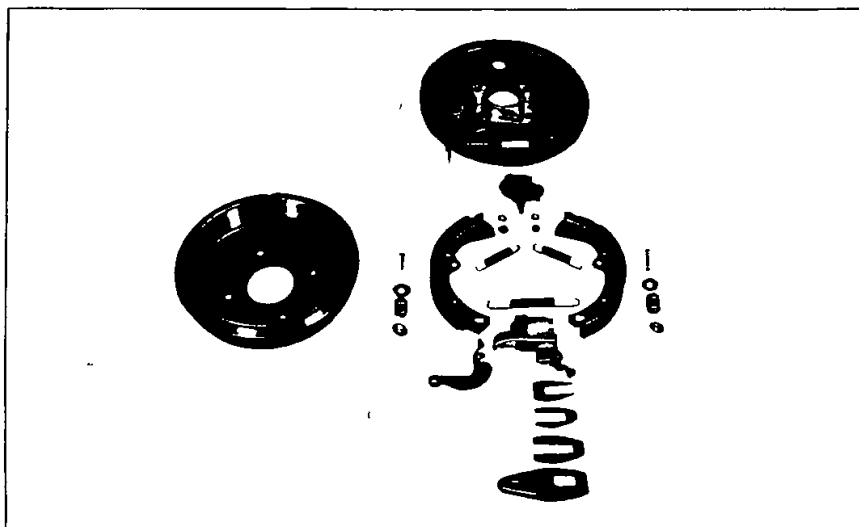


Fig 131 Rear brake construction

Assemble the cylinder body and yoke by tapping the yoke lightly

Apply the brake grease fully to the yoke sliding groove of cylinder
Install the air bleeder

Reinstallation

Reinstall the caliper assembly in reverse sequence of removal

After the pad is installed completely, bleed the hydraulic line and measure the rotation torque of disc

Starting torque

7 80 in-lb

At the hub bolt
3 45

Tightening torque

Caliper assembly installation bolt

33 3 to 44 1 ft-lb

Brake tube flare nut connected to wheel cylinder 10 8 to 13 0 ft-lb

REAR BRAKE

Removal and Disassembly

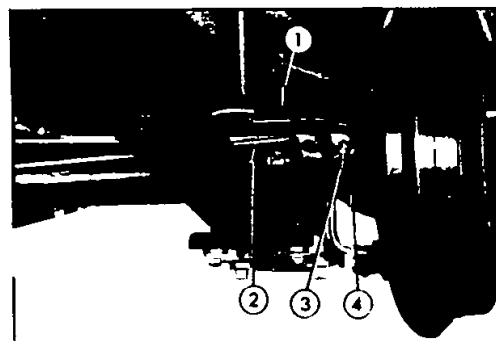
Jack up the rear side of the vehicle, support with a stand, and remove the wheel

Loosen the hand brake wire, remove the clevis pin from the rear wheel cylinder lever, and disconnect the hand brake wire. Remove the return spring (pull spring)

Remove the brake drum. Remove the shoe retainer and return spring, and remove the brake shoe assembly

Disconnect the brake tube from the wheel cylinder

Remove the dust cover, adjusting shims, and plates. The wheel cylinder can then be removed easily.



1	Return spring	3	Clevis pin
2	Hand brake wire	4	Wheel cylinder lever

Fig. 132 Removing hand brake wire

Return spring dimensions

	Wire dia x free length - active turns	Load x length
Cylinder side	0 0787 x 4 69 in -28	33 4 lb x 5 22 in
Adjuster side	0 0787 x 2 736 in -20	19 6 lb x 3 020 in

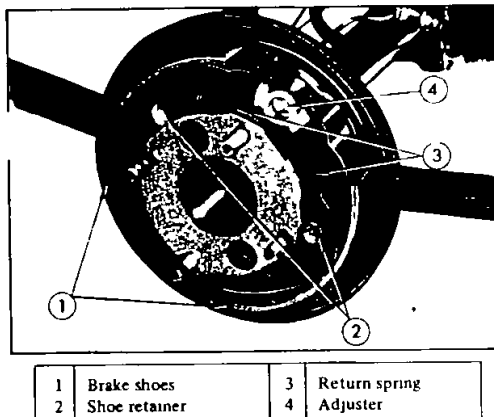


Fig 133 Rear drum brake

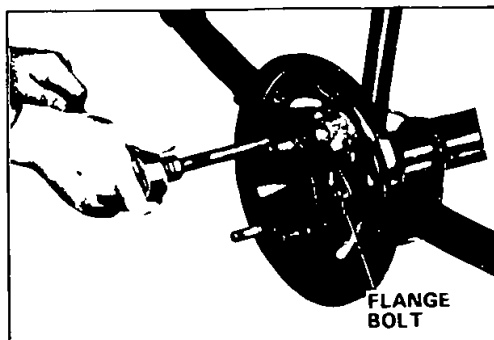


Fig 134 Removing brake disc

Remove the adjuster assembly

Remove the flange bolt from the rear axle housing, remove the rear axle shaft. The brake disc can then be removed together with the rear axle shaft.

Inspection

For the rear brake inspection, the instructions for front drum brake apply.

Reassembly and Reinstallation

Reassemble and reinstall the rear brake in reverse sequence of disassembly and removal, noting the following matters:

Measure the wheel cylinder sliding resistance with the brake tube disconnected as shown in Figure 136, and make sure that the sliding resistance is in range from 4 409 to 15 432 lb.

Note When sliding is improper, the brake shoe does not return smoothly.

Tighten the brake disc installation bolt (flange bolt) 10 8 to 14 5 ft-lb.

Tighten the adjuster assembly installation bolt 11 6 to 15 9 ft-lb.

HAND BRAKE

Removal

Loosen the turn-buckle adjusting nut, and separate the front cable from the rear cable.

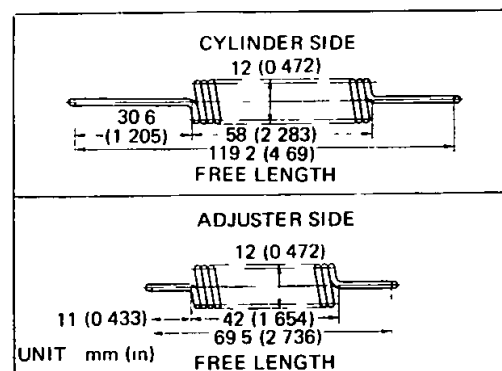


Fig 135

Brakes

Remove the lock plate located immediately in front of the turn-buckle, remove the clip in the passenger compartment side, and disconnect the front cable

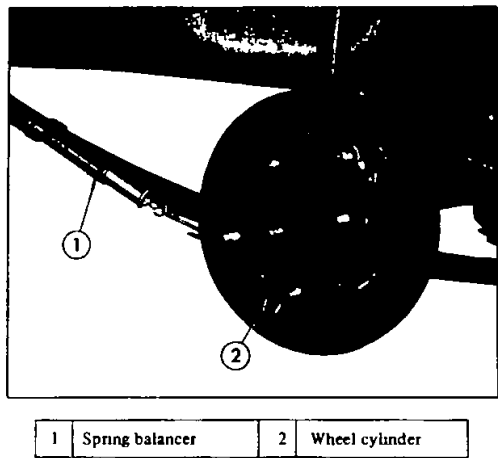


Fig 136 Measuring sliding resistance

Remove the hand brake lever cover. Remove the lever assembly with the front cable connected toward the passenger compartment side

Remove the hanger strap installation bolt, withdraw the lock plate from the axle housing bracket unit, and disconnect the rear cable

Loosen the hanger strap unit nut, and separate the parts into nut, hanger strap washer, and bracket. Disconnect the wheel cylinder lever side brake cable

Note: Do not remove the dust cover from the cable but leave it installed on the cable

Inspection

Check the cable for damage and other defective conditions, and replace if required

Replace, if sliding part is worn excessively

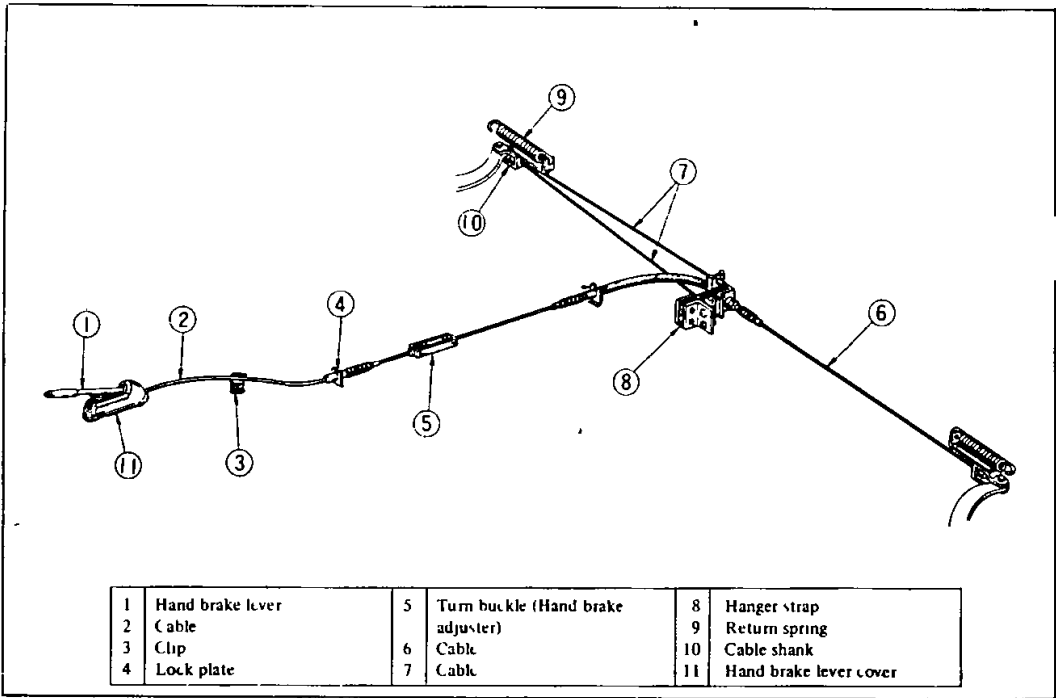


Fig 137 Hand brake construction

Make sure that the hand brake lever can be operated smoothly and that the ratchet pawl and teeth are not worn unusually or damaged

With the hand brake lever pulled, depress the push-button and make sure that the pawl disengages the teeth when the push-button is depressed 0 1969 to 0 2362 in completely

Make sure that the cable dust cover is not damaged or warped

Reinstallation

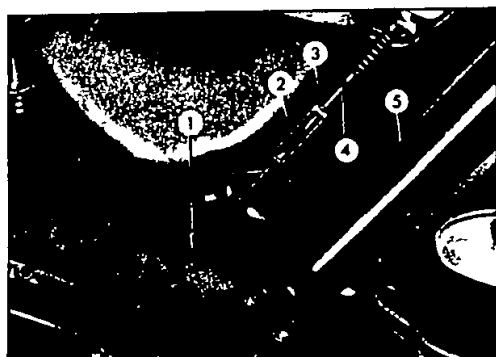
Reinstall the hand brake in reverse sequence of removal, noting the following matters

Be careful not to damage or twist the dust cover

Tighten the hanger strap and the cable connecting nut to 5 8 to 7 2 ft-lb

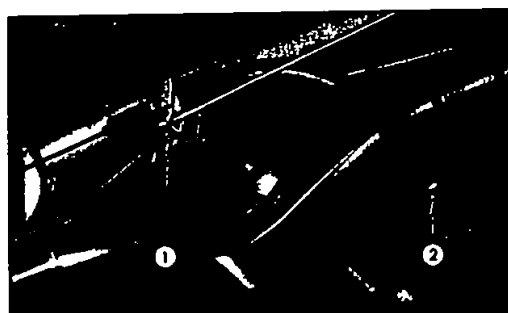
When adjusting rear brake shoe clearance, be sure to loosen the inner cable sufficiently

Grease the sliding parts with multi-purpose grease (MIL G-2108 or G10924)



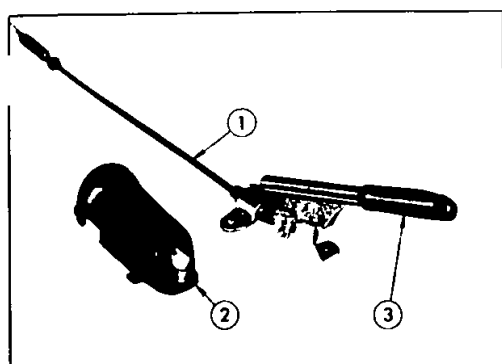
1	Rear cable	4	Front cable
2	Turn buckle	5	Propeller shaft
3	Lock nut		

Fig 138 Removing turn-buckle



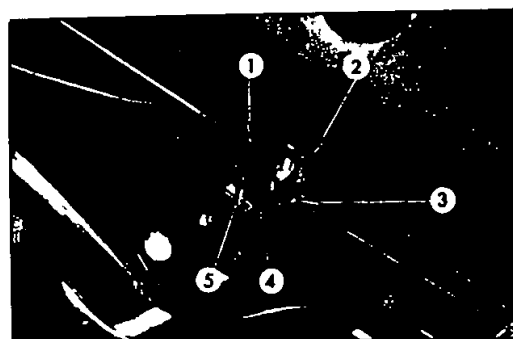
1	Hanger strap installation bolt	2	Lock plate
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Fig 140 Disconnecting rear cable from rear axle housing



1	Front cable	3	Hand brake lever
2	Cover		

Fig 139 Removing hand brake lever



1	Dust cover	4	Hanger strap
2	Hanger strap washer	5	Hanger strap installation bolt
3	Bracket		

Fig 141 Hanger strap mounted on rear axle housing

Brakes

ADJUSTMENT

Front Disc Brake

Ordinarily, adjustment is not required because clearance between pad and rotor is adjusted automatically by elasticity of the piston seal

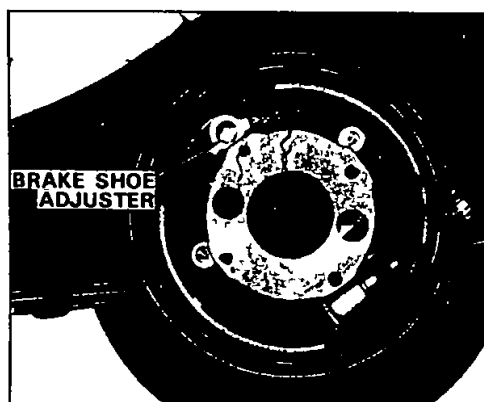


Fig 142 Adjusting rear brake shoe clearance

Rear Brake

Jack up the vehicle, and remove the wheel

Applying your hand and tool from reverse side of the brake disc, tighten the brake adjuster wedge clockwise up to such an extent that the brake shoe comes into contact with the brake drum

Return the adjuster wedge properly so that the brake shoe is separated from the brake drum slightly

Turn the brake drum, and if the brake shoe interferes the brake drum, readjust. In addition, depress the brake pedal, and make sure that the brake operates effectively and correctly

Loosen the stopper up to such extent that the brake pedal stopper is separated from the pedal arm

Brake Pedal Height

Measure height of the brake pedal head from the dash panel, and adjust the adjusting shim between the brake master cylinder and dash panel so that height is 5.65 in

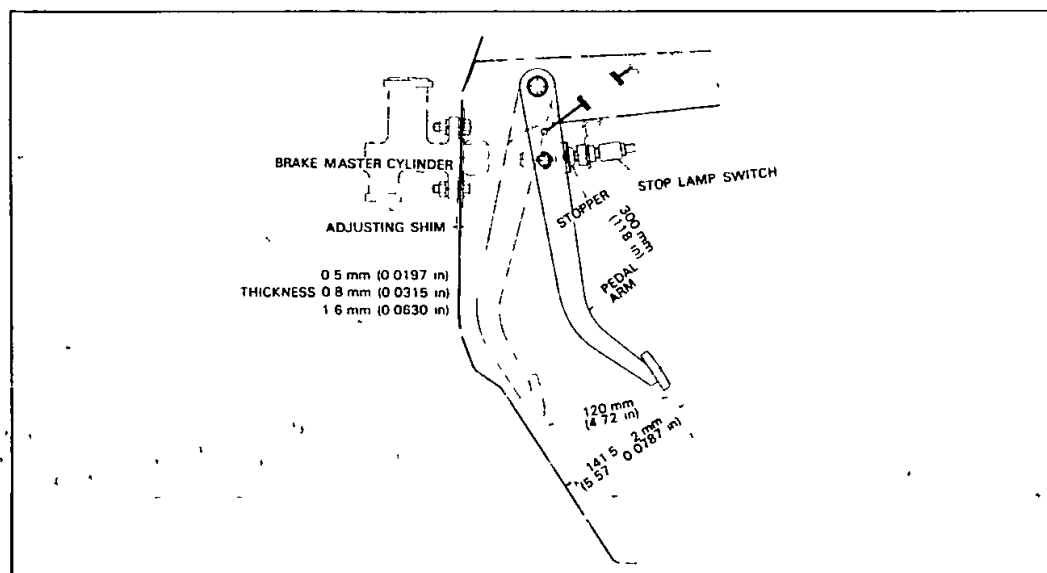


Fig 143 Brake pedal adjustment

Adjusting shim thickness for selection

0 0197 in

0 0315 in

0 0630 in

Note: When adjusting, be sure to use adjusting shims having same thickness for upper and lower brake master cylinder installation bolts

Upon completion of adjusting shim adjustment, tighten the stopper down to such an extent that height of the pedal head is 5 57 p0 0787 in, and tighten the lock nut securely

Free travel of the brake pedal is 0 197 to 0 591 in, and the stroke is 4 72 in

Hand Brake

Turn the turn-buckle properly and adjust hand brake lever operating stroke correctly so that operating stroke is 3 091 in (6 notches) at operating force of 24 3 to 33 1 lb Upon completion of adjustment, be sure to tighten the lock nut

Upon completion of the adjustment, release the hand brake lever, and make sure that the rear wheels are not braked

Normal stroke

3 091 in (6 notches)

Limited stroke

5 35 in (10 notches)

The term "Stroke" means height from the standard position 8 7 in above the hand brake lever fulcrum]

Note: Readjust hand brake stroke when it reaches the limited stroke 5.35 in (10 notches).

BLEEDING HYDRAULIC SYSTEM

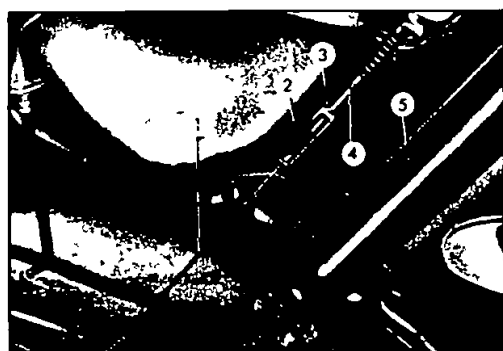
Bleeding the hydraulic brake system deserves much attention as it is an essential factor for regular service brake operation

As a matter of fact, during the brake service, air is likely to creep into the circuit with the result that the fluid action is altered and the brake pedal becomes spongy at the travel end

Bleeding should be carried out at first with the master cylinder, then from the longest line from the master cylinder, and then finish up with the shortest

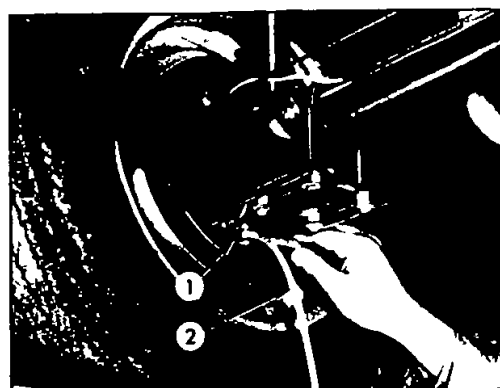
Note: Always clear away any dirt around master cylinder reservoir cover before removing cover for any reason Never depress pedal while brake drums are removed unless bleeder valve is open.

Top up the reservoir master cylinder with fluid of the recommended type



1	Rear cable	4	Front cable
2	Turn buckle	5	Propeller shaft
3	Lock nut		

Fig 144 Adjusting turn-buckle



1	Air bleeder	2	Vinyl hose
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Fig 145 Connecting vinyl hose to air bleeder (rear)

Brakes

Thoroughly wipe the bleeder screw and from any mud or dust present, so that the outlet hole is free from foreign matter

Attach a vinyl hose to the wheel cylinder bleeder screw. Dip the end of the vinyl hose in a jar containing some brake fluid

Depress the brake pedal two to three times, and keep the pedal fully depressed

With the brake pedal fully depressed, loosen the bleeder screw, exhaust air, and retighten the bleeder screw quickly

Return the brake pedal slowly

Repeat the operations above. Air will no longer come out from the bleeder screw but brake fluid comes out. When air still exists in brake fluid, it appears white due to air bubble

Conduct air bleeding on other wheel cylinders in the same manner

Note: a. Check the reservoir for fluid level during bleeding operation.

b. Fluid withdrawn in the bleeding operation should not be used again for refilling.

c. When the master cylinder is disassembled or replaced, conduct air bleeding on the wheel cylinder which is located most near the master cylinder.

d. Ordinarily, air bleeding is performed in the following sequence:

Rear left - Rear right - Front left - Front right

e. Do not return the brake pedal before retightening the bleeder screw.

TROUBLE SHOOTING

Condition	Probable cause	Corrective action
Spongy pedal	Air in brake lines	Bleed thoroughly
	Swollen hose due to deterioration or use of poor quality brake fluid	Replace hose and bleed the system
	Use of a brake fluid with a boiling point which is too low	Change with the specified brake fluid and bleed system
	Reservoir filler cap vent hole clogged. This promotes a vacuum in master cylinder that sucks in air through rear seal	Clean reservoir filler cap and bleed the system
Pedal yields under slight pressure	Deteriorated check valve	Fit a new check valve and bleed the system
	External leaks	Check master cylinder, piping and wheel cylinder for leaks and make necessary repairs
	Master cylinder leaks through primary cap	Overhaul master cylinder

Excessive pedal travel	System has not been bled Improperly adjusted clearance Fluid level in master cylinder is too low Thermal expansion of drums due to over-heating	Bleed the system Adjust shoe-to-drum clearance Full up with specified brake fluid Bleed the system if required Allow drums to cool off Check brake shoe linings and drums Replace damaged parts
All brakes drag	Insufficient shoe-to-drum clearance Weak shoe return springs Brake shoe return no free travel Seized master cylinder piston	Adjust clearance Replace the springs Adjust pedal height Service the master cylinder, replace the piston and bleed the system
One brake drags	Loose or damaged wheel bearings Weak, broken or unhooked brake shoe return springs Insufficient clearance between brake shoe and drum	Adjust or replace wheel bearings Replace spring Adjust brakes
Unbalanced brakes	Grease or oil on linings Seized piston in wheel cylinder Tires improperly inflated Loose wheel bearing Front suspension faulty	Clean brake mechanism, replace lining and correct cause of grease or oil getting on lining Service the wheel cylinder and bleed the system Inflate tires to correct pressure Adjust wheel bearing Thoroughly check and adjust all front suspension components
Excessive pedal pressure required, poor brakes	Grease, mud or water on linings Full area of linings not contacting drums Scored brake drums	Remove drums Clean and dry linings or replace Replace shoes Reface drums and install new linings
Brake chatter, squeak or squeal	Dust on drums or oil soiled linings Weak shoe return springs Drum out of round Worn linings	Remove and clean drums thoroughly Eliminate oil leak Check springs and replace as required Turn drums on lathe Replace linings

Front Suspension

Front Suspension

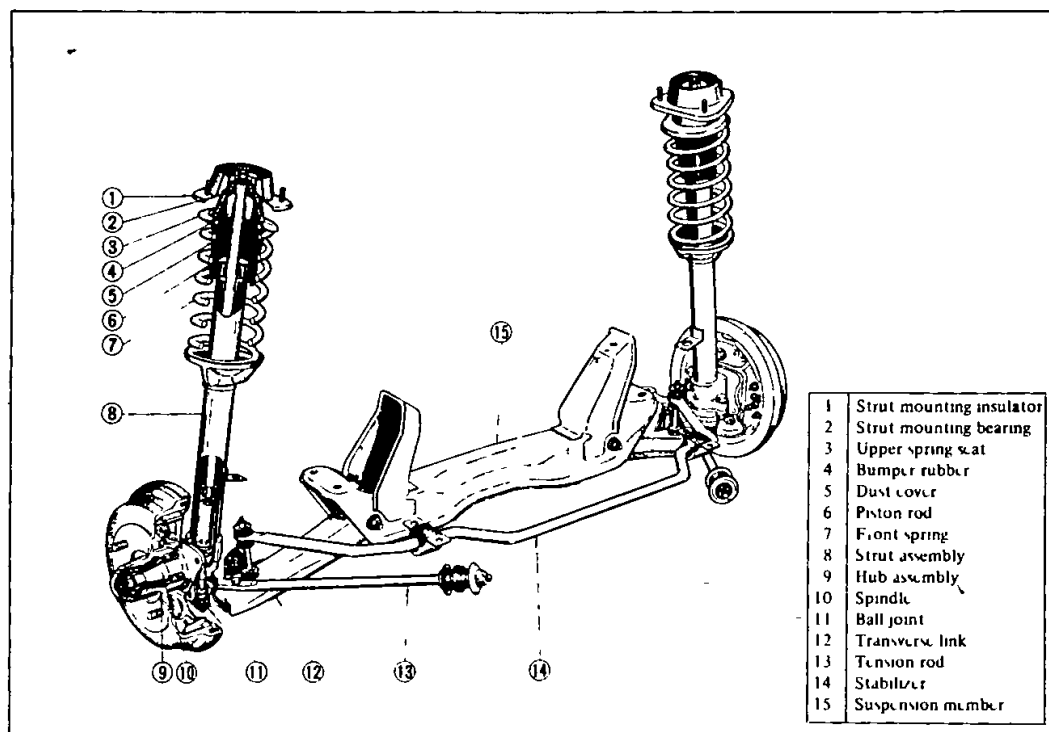


Fig 146 Front axle and suspension assembly

DESCRIPTION

The front suspension is of a strut type. The shock absorber and spindle are combined to a single unit which is supported by the coil spring at the upper end and by the transverse link at the lower end.

The spindle is installed on the bottom of the strut outer casing by means of welding.

A ball-joint is attached to the lower part of the spindle. The ball-joint and the transverse link (lower link) are connected and they are fitted to the suspension member through a rubber bushing. The shock absorber mechanism is built in the strut outer casing. A coil spring is applied between the upper spring seat fitted to the upper end of the piston rod and spring seat welded to the outer casing. These components, assembled to a single unit, are fitted to the chassis frame at their upper part through the thrust bearing. Moreover, the transverse link supports the

overall forward and backward strut movements by means of the tension rod fitted to the chassis frame through a rubber bushing. The rubber bushing adopts a non-linear shape with which the forward and rearward rigidities are changed. The torsion-bar type stabilizer adopted in this suspension system is used so that the strut maintains connection between both side struts.

Thus, this suspension mechanism absorbs shocks toward all directions into the chassis effectively and efficiently, the tension rod absorbs forward and backward shocks, the strut absorbs vertical shock, and the transverse-link absorbs shock applied toward sideway.

RECOMMENDATIONS

Due to the need for a large number of special tools and alignment equipment, it is recommended that repairs to the front end be left to a completely equipped shop.

Front Suspension

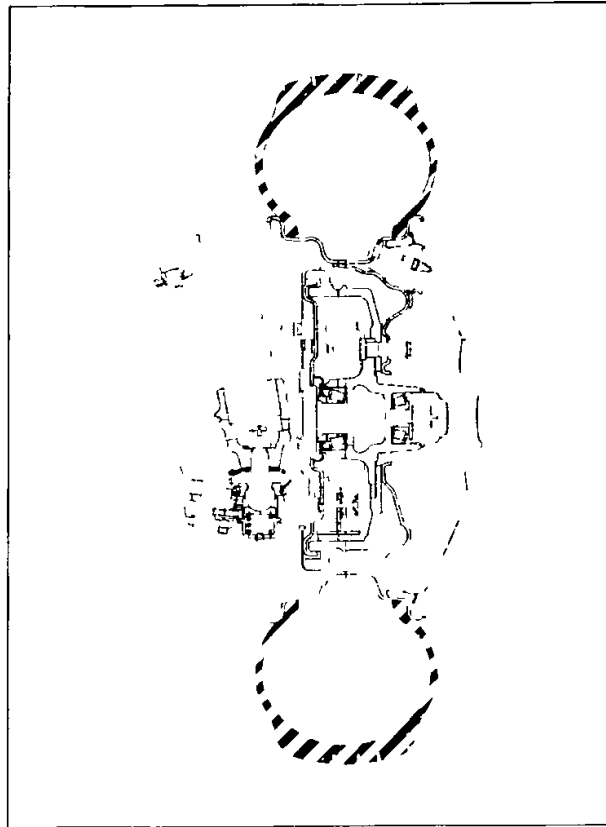


Fig 147 Cross-sectional view of front axle (Drum type brake)

TROUBLE SHOOTING

Condition	Probable cause	Corrective action
Vibration, shock and shimmying of steering wheel	Improper air pressure of tire	Adjust
	Unbalance and deformation of road-wheel	Correct the unbalance or replace
	Unevenly worn tire or insufficient tightening	Replace or tighten
	Improperly adjusted or worn front wheel bearing	Adjust or tighten
	Faulty wheel alignment	Adjust
Vibration Loose connection of the seration parts and rubber coupling parts, defective rubber coupling and wear of each part of linkage and vibration of front wheels are, in many cases, transmitted to the steering wheel This is very noticeable when travelling over rough road		

Front Suspension

Shock When the front wheels are travelling over bumpy roads, the play of the steering linkage is transmitted to the steering wheel. This is especially noticeable when travelling rough road.	Worn fitting transverse link bushings	Replace
	Insufficiently tightened steering gear housing.	Retighten
Shimmying Abnormal vibrations of the front suspension group and the whole steering linkage, which occur when a specific speed is attained. Vehicle pulls to right or left When driving with hands off the steering wheel over a flat road, the vehicle gently swerves to right or left. Note A defective rear suspension may also be the cause of this trouble and, therefore, see also the chapter dealing with the rear suspension.	Wear of steering linkage	Replace defective parts
	Worn suspension ball-joint	Replace
	Excessive backlash due to improper adjustment of the retainer parts	Adjust correctly
	Worn column bearing, weakened column bearing spring, or loose clamp	Check and repair correctly
	Malfunction of shock absorber (inside the strut) or loose installation bolts	Replace or retighten
	Unbalance of vehicle level	Correct the unbalance
	Improper air-pressure of tire or insufficient tightening of wheel nuts	Adjust or tighten
	Difference in height of right and left tire treads	Replace tires
	Incorrect adjustment or abrasion of front wheel bearing	Adjust or replace
	Collapsed or twisted front spring	Replace
Instability of vehicle	Incorrect wheel alignment	Adjust
	Incorrect brake adjustment (binding)	Adjust
	Worn rubber bushings for transverse link and tension rod	Replace
	Deformed steering linkage and suspension link	Replace
	Unbalanced vehicle level	Correct the unbalance
	Improper air pressure of tire	Adjust
	Worn rubber bushings for transverse link and tension rod	Adjust
Stiff steering wheel (checking up procedure) Jack up front wheels, detach the steering gear and operate the steering wheel, and,	Incorrect wheel alignment	Adjust
	Worn or deformed steering linkage and suspension link	Replace
	Incorrect adjustment of steering gear	Adjust
	Deformed unbalanced wheel	Correct or replace
	Improper air pressure of tire	Adjust
	Insufficient lubricants or mixing impurities in steering linkage or excessively worn steering linkage	Replenish grease or replace the part

Front Suspension

If it is light, check steering linkage and suspension groups If it is heavy check steering gear and steering column groups	Stiff or damaged suspension ball-joint or lack of grease	Replace
	Worn or incorrectly adjusted wheel bearing	Replace or adjust
	Worn damaged steering gear and bearing	Replace
	Incorrectly adjusted steering gear	Adjust
	Deformed steering linkage	Replace
	Incorrect wheel alignment	Adjust
	Damaged strut upper end bearing	Replace
	Damaged or stiff piston or shock absorber rod (in the strut)	Replace
	Interference of steering column with turn signal switch	Adjust
Excessive steering wheel play	Incorrectly adjusted steering gear housing	Adjust
	Worn steering linkage	Replace
	Improperly fitted gear box	Retighten
	Incorrectly adjusted wheel bearing	Adjust
	Worn transverse link and tension rod fitting bushings	Replace
Noises	Improper air pressure of tire	Adjust
	Insufficient lubricating oil and grease for suspension ball joint and steering linkage or their breakage	Replenish lubrication oil and grease, or replace
	Loose steering gear bolts, linkage and suspension groups	Retighten
	Defective shock absorber (inside the strut)	Replace
	Defective wheel bearing	Replace
	Worn steering linkage	Replace
	Worn transverse link and tension rod fitting bushings	Replace
	Broken collapsed coil spring	Replace
	Loose strut mounting insulator tightening nuts	Retighten
Grating tire noise	Improper air pressure of tire	Adjust
	Incorrect wheel alignment	Adjust
	Deformed knuckle spindle and suspension linkage	Replace

Front Suspension

Jumping of disc wheel	Improper air pressure of tire	Adjust
	Unbalanced wheels	Adjust
	Defective shock absorber	Replace
	Defective tire	Replace
	Deformed wheel rim	Replace
Excessively or partially worn tire	Improper air pressure of tire	Adjust
	Incorrect wheel alignment	Adjust
	Defective wheel bearing	Replace
	Incorrect brake adjustment	Adjust
	Improper tire shifting (rotation)	Adjust
	Rough and improper driving manner	Drive more gently

Steering

Steering

DESCRIPTION

The steering system consists of recirculating ball type gear box and parallelogram linkage

These systems give good response, light handling and utmost durability Moreover, the steering linkage is equipped with a torsion rubber system idler arm which absorbs shock from the wheel

Check the lubricant of gear box every 6,000

miles and replenish recommended oil as required

The steering linkage should be greased up with wheel bearing grease every 30,000 miles

RECOMMENDATIONS

Due to the need for a large number of special tools and alignment equipment, it is recommended that repairs to the steering components be left to a completely equipped shop

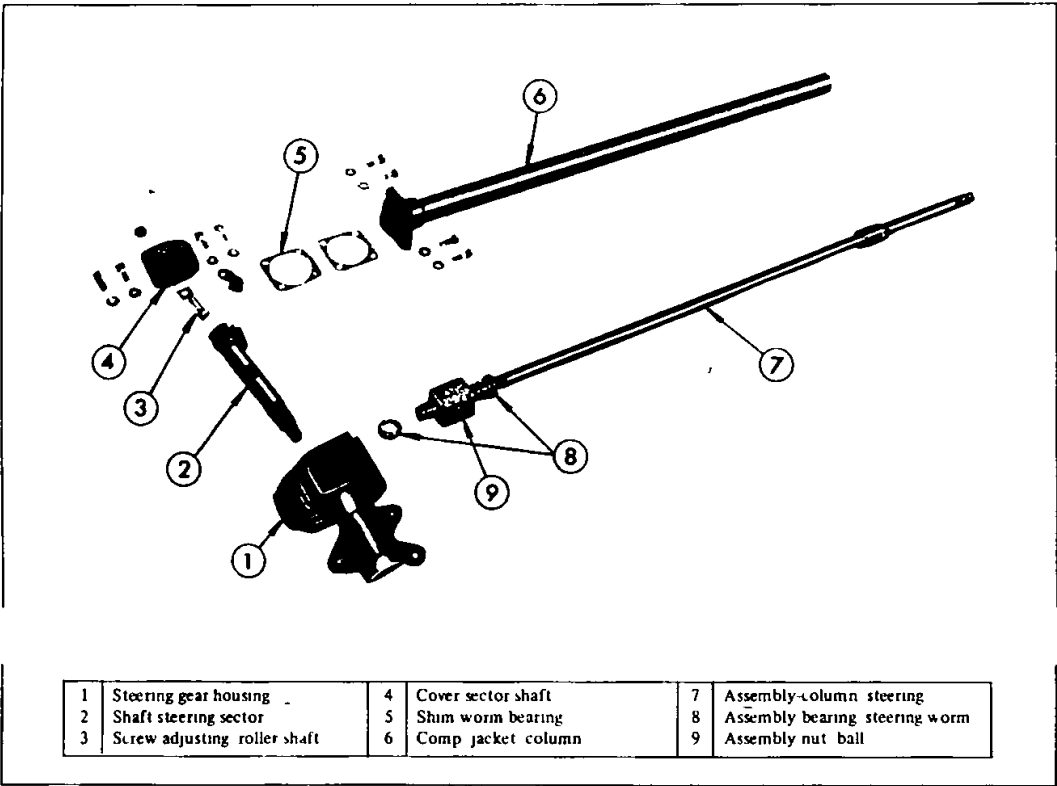


Fig 148 Steering gear components

TROUBLE SHOOTING

Condition	Probable cause	Corrective action
Heavy steering	Low tire pressure Incorrect front wheel alignment Lack of lubricant Firm sticking of the ball joint and strut bearing Improper adjustment and damage of steering gear housing Hard locking of column bearing	Inflate tires to recommended pressure Adjust to specifications Lubricate steering gear and ball joints or replace worn ball joint Replace Adjust or replace Lubricate with bearing grease
Loose steering	Incorrect front wheel bearing adjustment Loose steering linkage connections Loose steering gear housing mounting Incorrect adjustment of adjust nut	Adjust or replace as required Inspect, replace worn parts, if any, and tighten nuts to recommended torque Tighten mounting bolts to proper torque Adjust
Pull to one side	Incorrect tire pressure Incorrect front wheel alignment Incorrect front wheel bearing adjustment Unequal brake adjustment Weak front suspension units Deformation or improper fitting of suspension	Inflate to recommended pressure Inspect and correct front wheel alignment Adjust bearings Adjust brakes Replace Check, correct or replace
Steering shock	Incorrect front wheel alignment Loose front wheel bearings Loose steering linkage connection and transverse link Incorrect adjustment of ball nut Wheels out of balance	Inspect and correct front wheel alignment Adjust bearings Inspect, replace worn parts, if any, and tighten nuts to proper torque. Adjust steering gear Inspect and correct wheel balance

Rear Drive & Suspension

Rear Drive & Suspension

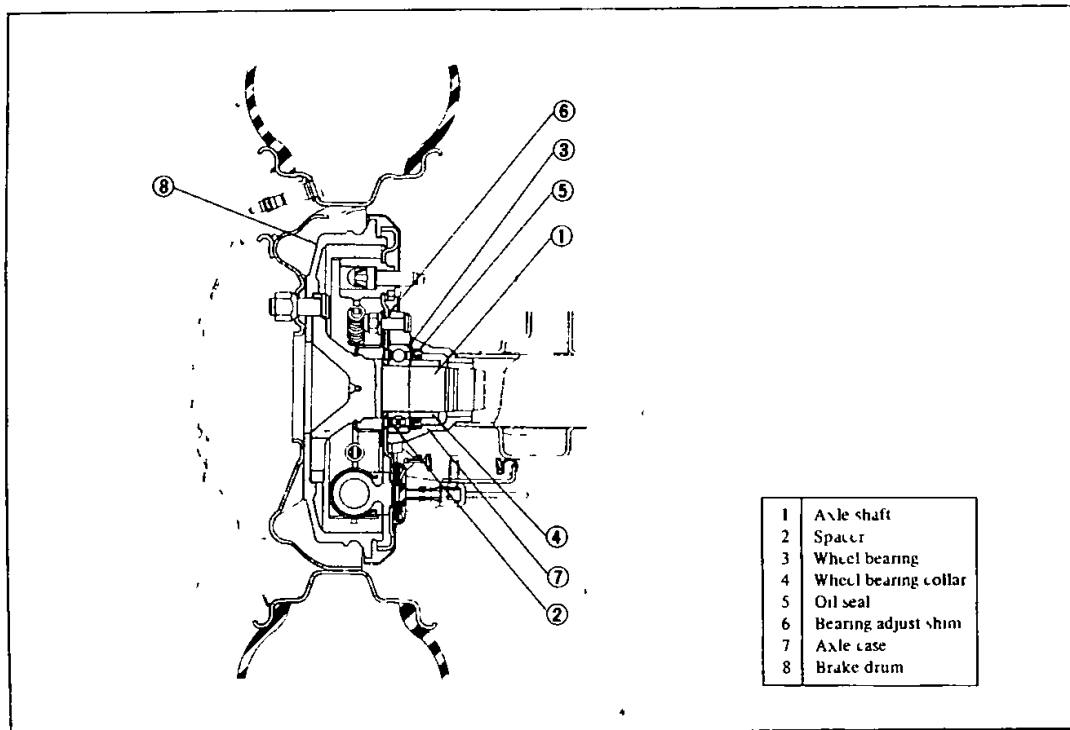


Fig 149 Sectional view of rear axle

REAR AXLE

The rear axle is of a semi-floating type. The axle housing is a press steel "Banjo" type housing. It is light in weight and is sufficiently strong to withstand all torsional and bending loads.

The rear wheel bearings are of presealed types. Therefore, no frequent lubricating service is required. However, when the rear axle is disassembled, the wheel bearings should be packed with an approved grease prior to the reinstallation, being careful not to damage the sealing rubber.

DIFFERENTIAL

The gear carrier is made of light and strong aluminum alloy metal and hypoid bevel gear is used.

Adjust drive pinion bearing preload with non-adjusting type spacer, and pinion height and side bearing adjustment with spacer shim(s).

Millimeter standardization still remains for all the screw threads of this unit. Therefore, adjustment figures stamped on screws, adjusting shims, washers, differential case, drive pinion and carrier are in millimeters in accordance with the millimeter standardization of parts.

The proper lubrication to the gear housing is necessary, otherwise it would shorten the durability of the gear and cause other troubles. The lubricant should be checked each 3,000 miles and replenished each 30,000 miles.

The lubricant should be drained and refilled at the end of the first 600 miles to eliminate

Rear Drive & Suspension

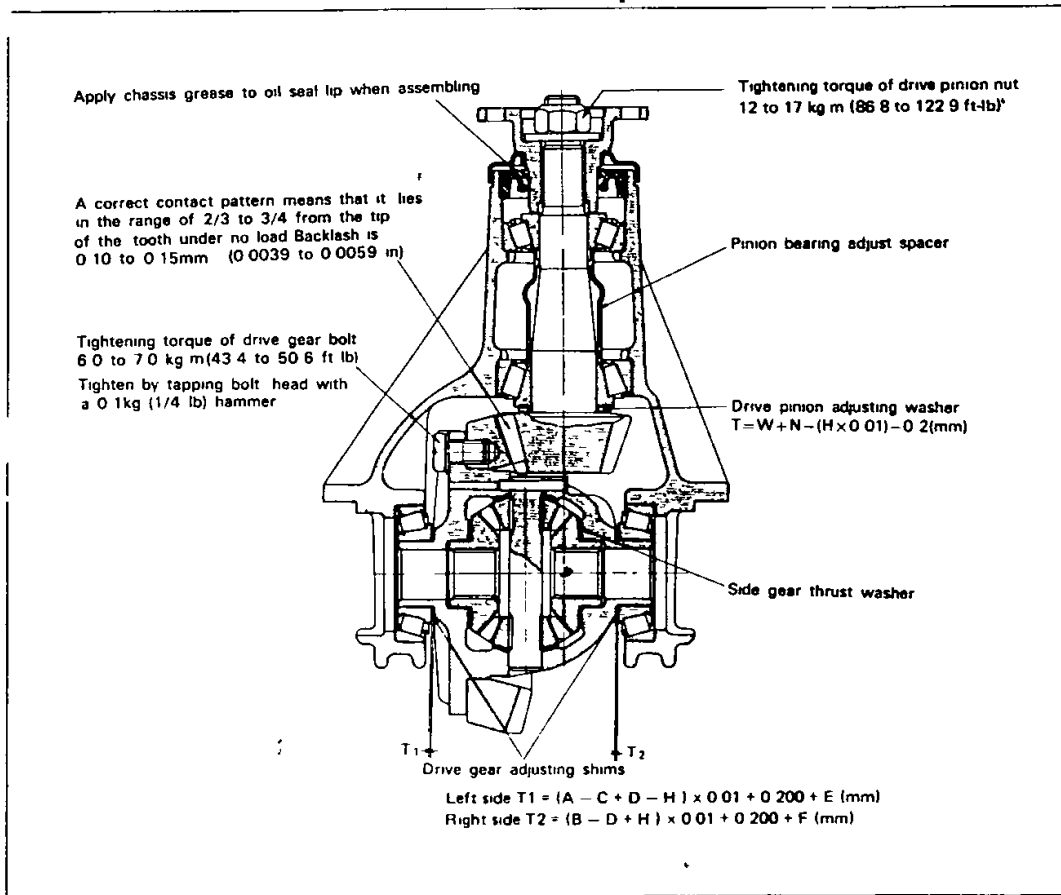


Fig 150 Sectional view of differential carrier

any loose material from the sump which results from "breaking" Differential lubricant should be changed at least every 30,000 miles

Considerations should be given to the following matters

Nominated hypoid gear oil must be used

It is prohibited to use any gear oil of different viscosity

The same brand must always be selected
The standard oil capacity is about 0.198 US gal

REAR SUSPENSION

Rear suspension consists of semi-elliptic leaf

springs, telescopic hydraulic shock absorbers and rubber bumpers

The rear spring center-pin is off-set 4.33 in toward the front from the center of the spring. This is done to reduce spring wind-up and to decrease the arc while the rear wheel swings through. Thereby minimizing the possibility of the rear suspension affecting vehicle stability.

Iso-clamp devices are used for attaching the axle housing to the spring.

The leaf springs, shock absorbers and rear axle housing are mounted on rubber bushings at each end to minimize noise and vibration of the transmission to the car body and passenger compartment.

Rear Drive & Suspension

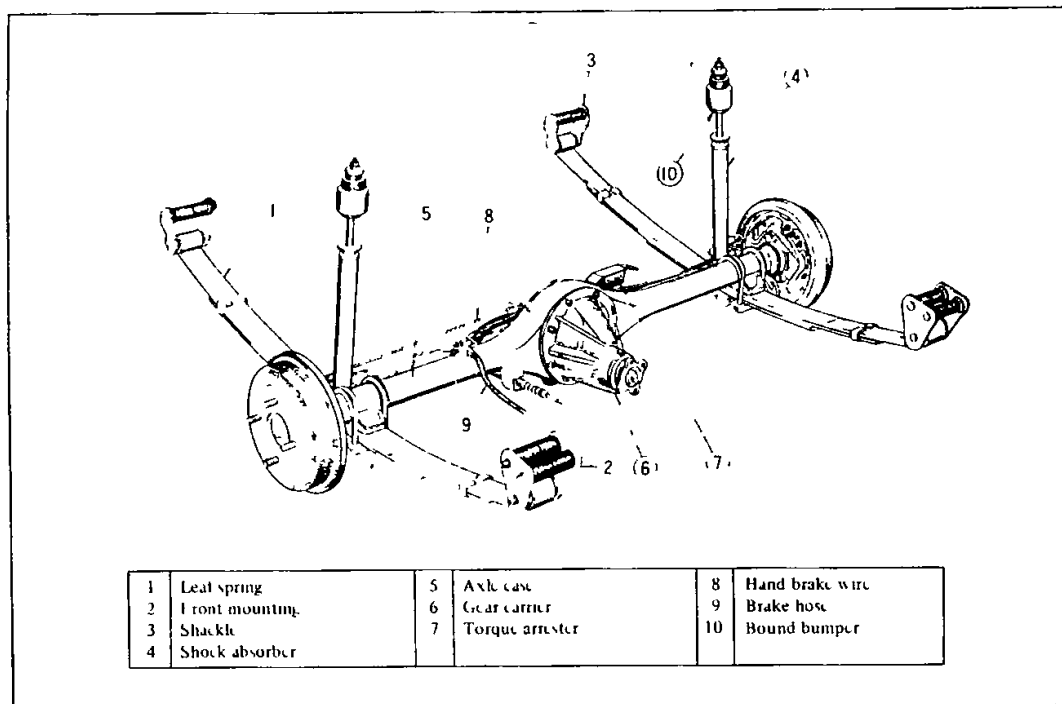


Fig 151 Rear suspension

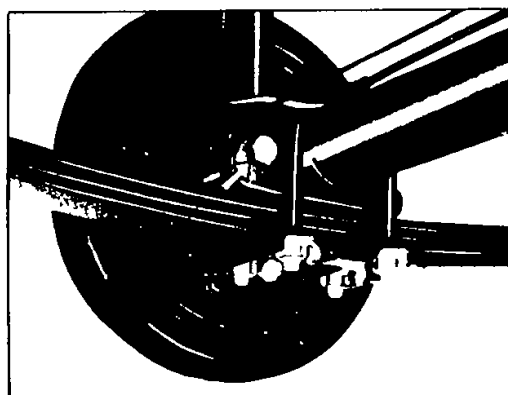


Fig 152 Removing the shock absorber lower end

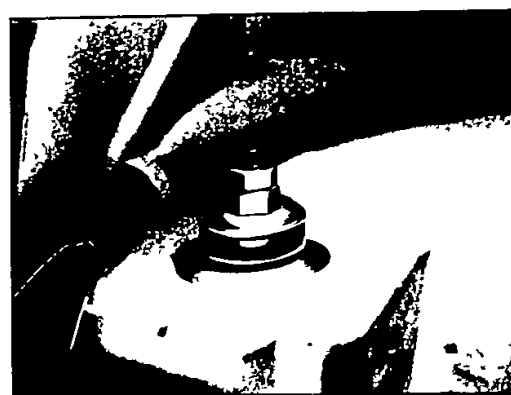


Fig 153 Removing shock absorber upper bracket

REAR SHOCK ABSORBER

Replacement

Jack up the center of the rear axle and support the axle housing with stands

Remove the lower end of the rear shock absorber from the spring seat (See Figure 152)

Remove the rear shock absorber installing nut located under the rear seat back

Rear Drive & Suspension

Install rear shock absorber in reverse sequence of removal

Inspection

Test the shock absorber and replace if necessary

Check for leakage, cracks and the shaft for straightness

Inspect the rubber bushings for damage,

cracks, and excessive deformation. Replace the defective parts, if necessary

RECOMMENDATIONS

Due to the large number of special tools required and the advanced knowledge necessary, it is recommended that the overhaul of the differential be left to a properly equipped shop

DESCRIPTION

The clutch is a single dry disc diaphragm spring type clutch. The major components are clutch cover, pressure plate, diaphragm spring, and wire rings. The clutch disc is provided with riveted plates on both surfaces and coil springs arranged in a link. The coil springs absorb shock while engaging the clutch, softening and smoothing clutch engagement.

Release bearing, sleeve, and withdrawal lever are used to control clutch engagement and disengagement.

Each part of the clutch assembly is secured with rivets. Therefore, when a trouble is uncorrectable, replace the clutch assembly with a new assembly.

CLUTCH PEDAL

Removal

Remove the return spring.

Loosen the lock nut of the master cylinder push rod, and disconnect the push rod end.

Remove the lock nut and washer of the pedal shaft and remove the pedal lever.

Inspection

Thoroughly clean all disassembled parts (indicated below) and carefully check them for wear, damage and other abnormal conditions. Repair or replace them with new ones, if required.

Pedal head rubber

Return spring

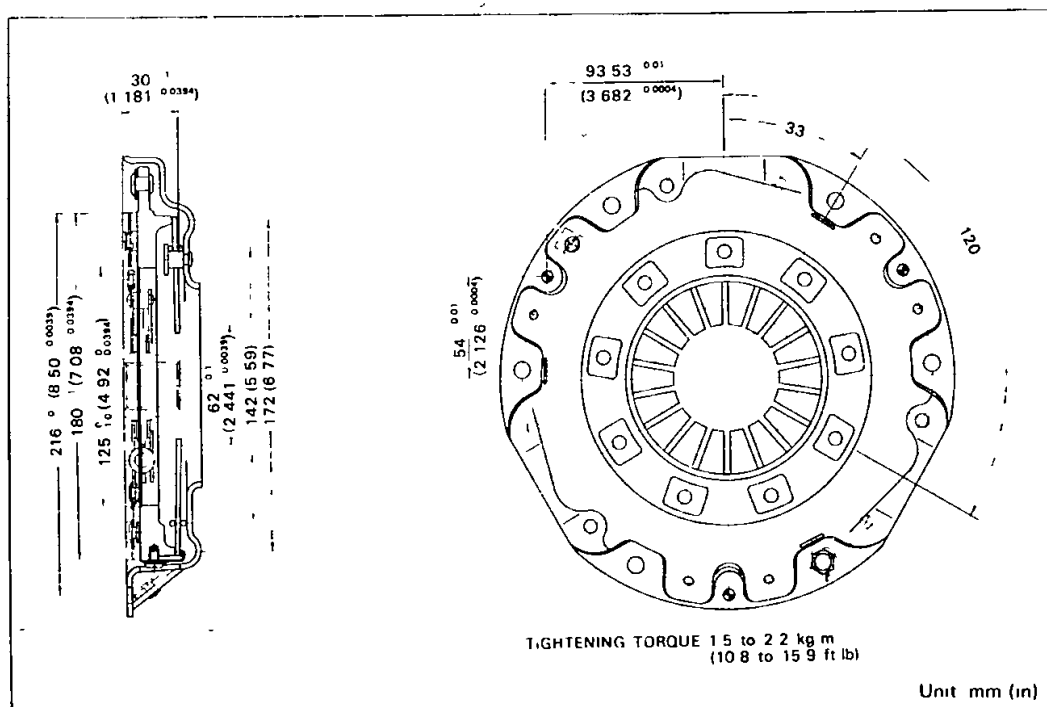


Fig 154 Construction of clutch

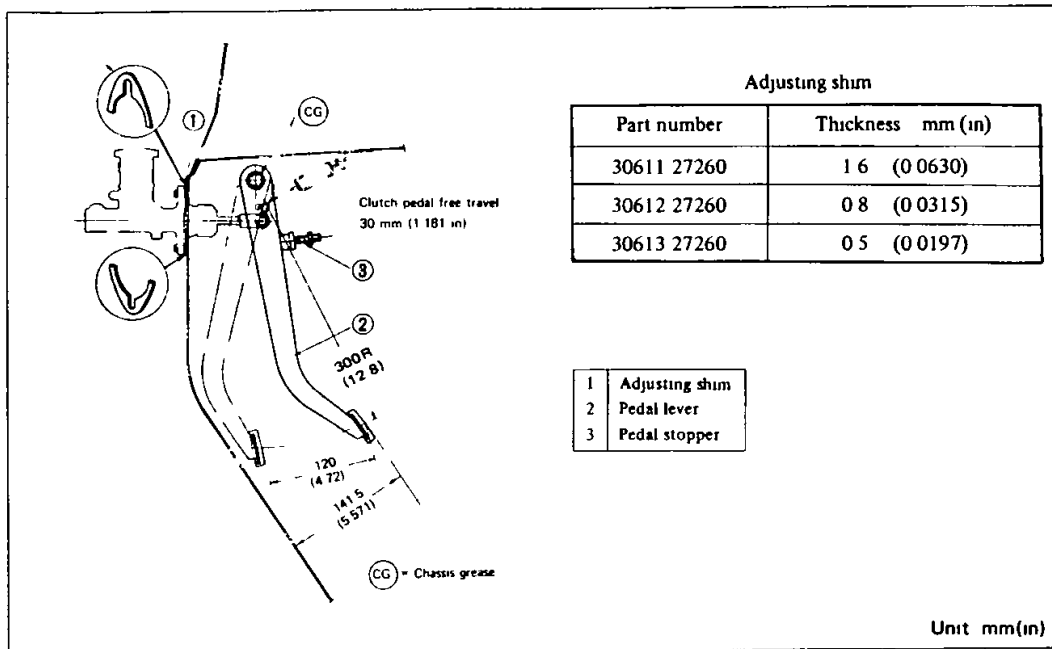


Fig 155 Pedal height adjustment

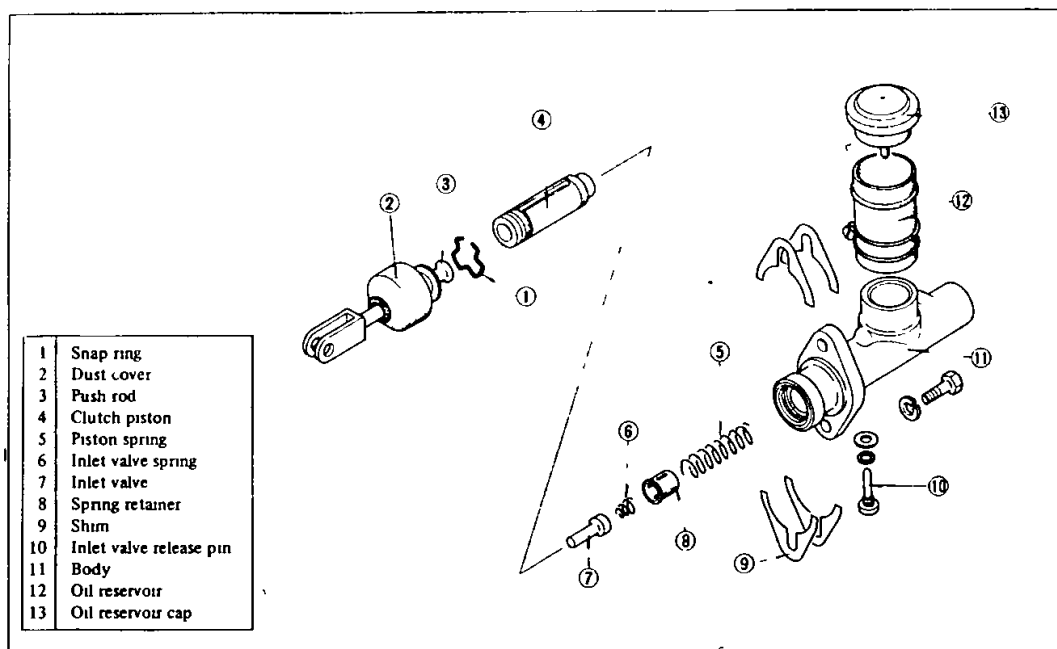


Fig 156 Clutch master cylinder

Pedal lever bush
Fulcrum pedal pin, etc

Reinstallation

Reinstall the clutch pedal in reverse sequence of removal

Adjustment

Adjust pedal pad height to 5.65 in without stopper. The adjustment is made by selecting and applying shim(s) having adequate thickness.

Be sure to use shims having same thickness for both upper and lower.

Next, adjust the pedal stopper properly so that the pedal pad height is 5.57 in, and secure the position with lock nut.

Note Make sure that chassis grease has been applied to the (CG) marked portions (two places). Grease if required.

CLUTCH MASTER CYLINDER

Removal

Disconnect the push rod from the clevis.

Disconnect the clutch line from the master cylinder, and drain fluid.

Remove the securing bolts and remove the master cylinder assembly from the vehicle.

Disassembly

Remove the filler cap and drain fluid.

Pull back the dust cover and remove the snap ring. The stopper, push rod, piston assembly, primary cup and return spring assembly can be removed.

Inspection

Thoroughly clean all parts with brake fluid before inspection.

Check the cylinder and piston for uneven wear or damage. Replace if required.

When clearance between the cylinder and piston is more than 0.0059 in, replace the cylinder.

Replace the piston cup, primarily, whenever the master cylinder is disassembled. It must also be replaced when wear or deformation due to fatigue or damage is found.

Check the dust cover, oil reservoir, filler cap, and clutch line for damage or deformation. If abnormal condition is found, replace with new one.

Reassembly

Reassemble the master cylinder assembly in reverse sequence of disassembly noting the following matters:

The piston cup should be soaked in brake fluid before reassembly. Install the piston cup carefully so that it is correctly faced.

Apply brake fluid sufficiently to the cylinder and piston, and assemble them.

Reinstallation

Reinstall the master cylinder assembly in reverse sequence of removal, and adjust as follows:

Adjust the pedal height by changing the push rod length.

Bleed air out of the hydraulic system.

BLEEDING CLUTCH SYSTEM

Remove the bleed screw dust cap from the operating cylinder.

Open the bleed screw approximately three-quarters of a turn. Attach a tube immersing the open end into a clean container which contains a small amount of brake fluid.

Fill the master cylinder reservoir with the recommended fluid.

Depress the clutch pedal quickly while keeping it down retighten the bleed screw, and allow it to return slowly. Repeat this pumping action until the fluid entering the container is free from air bubbles.

Screw up the bleed screw on a down stroke of the pedal, remove the bleed tube and replace the dust cap.

Transmission

Transmission

FOUR SPEED TRANSMISSION

The transmission assembly consists of transmission case which contains gear assembly, and rear extension

The cast iron adapter plate supports each end of the main shaft, counter shaft, and reverse

idler shaft, and front side of the transmission case supports the other ends

Moreover, the rear extension supports the main shaft rear end

The gear assembly can be disassembled with the gear assembly installed on the adapter plate

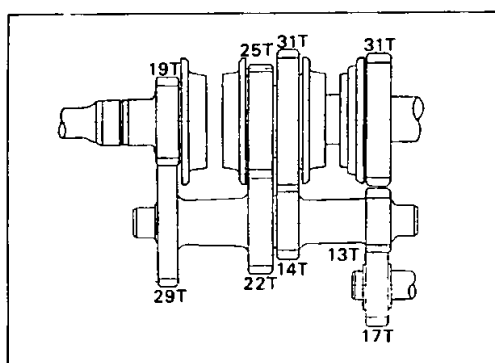


Fig 157 R3W56 gear train

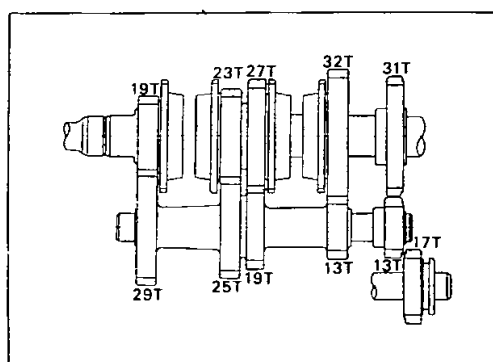


Fig 158 F4W56 gear train

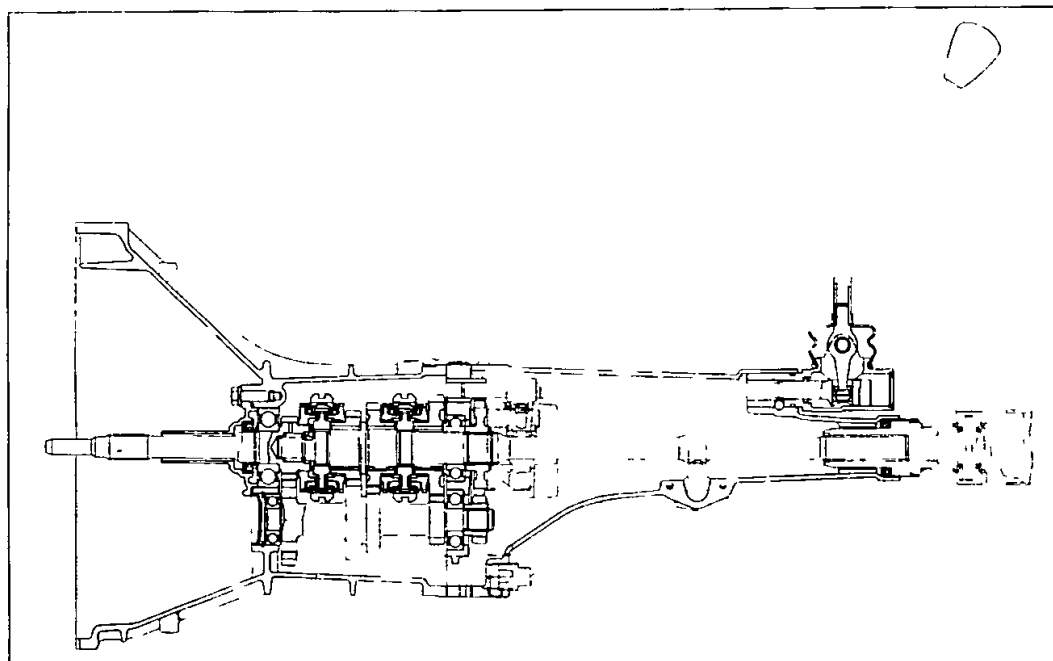


Fig 159 F4W56 transmission

THREE SPEED TRANSMISSION

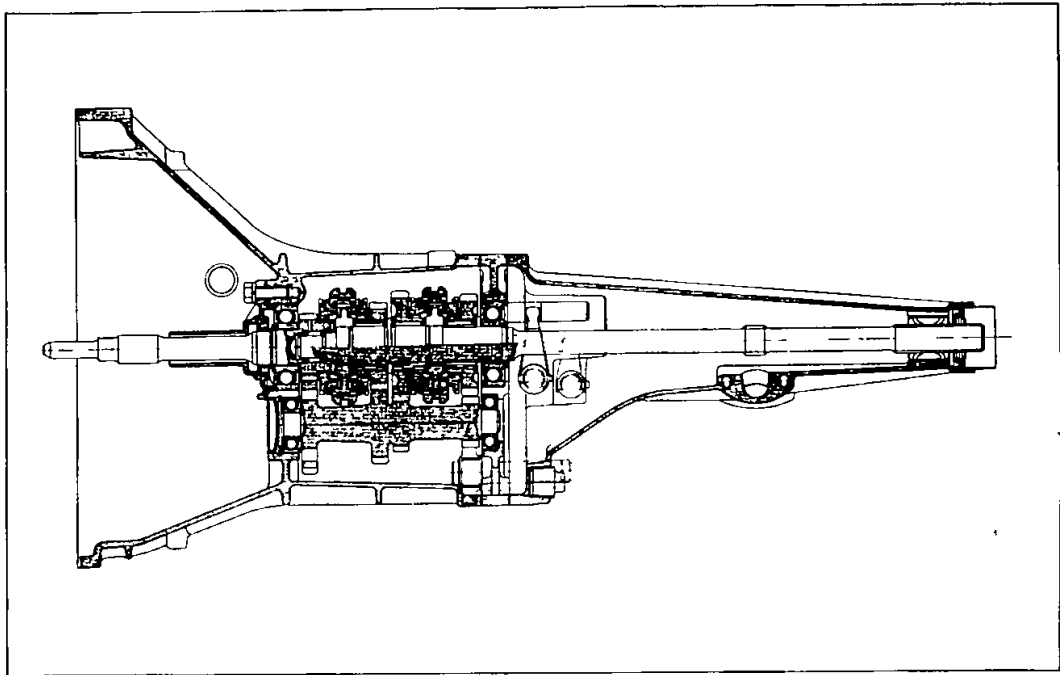


Fig 160 R3W56 transmission

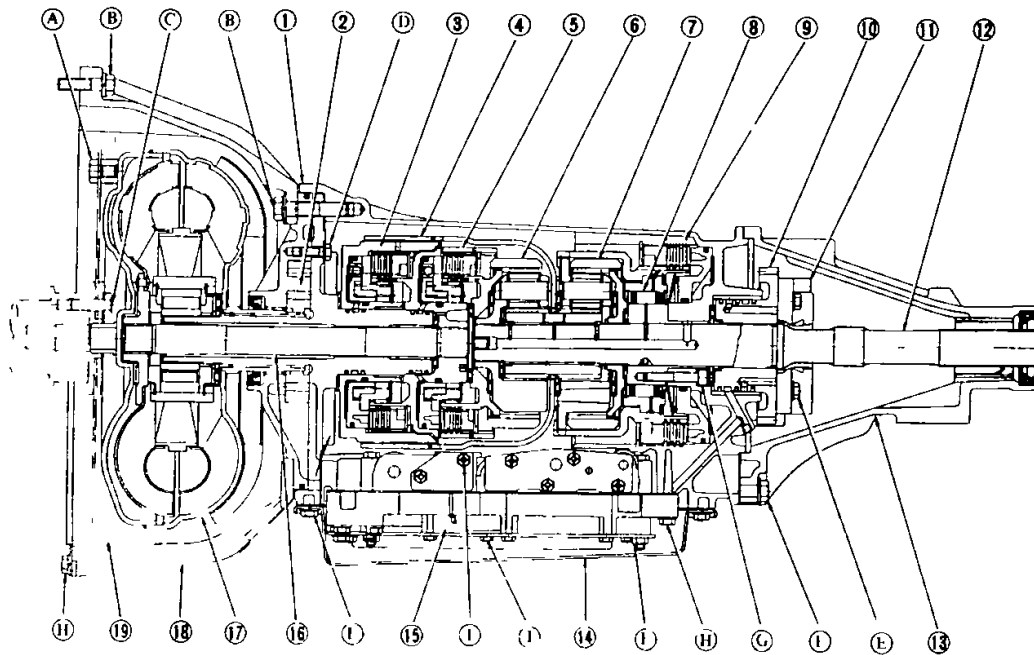
TROUBLE SHOOTING

Symptom and possible cause	Corrective action
Difficult to intermesh gears Causes for difficult gear shifting are classified to troubles concerning the control system and transmission. When the gear shift lever is heavy and it is difficult to shift gears, clutch disengagement may also be unsmooth. First, make sure that the clutch operates correctly, and inspect the transmission.	

Transmission

Worn gears, shaft, and/or bearing	Replace
Insufficient operating stroke due to worn or loose sliding part	Repair or replace
Defective or damaged synchronizer	Replace
Gear slips out of mesh In the most cases, this trouble occurs when the interlock plunger, check ball, and/or spring is worn or weakened, or when the control system is defective. In this case, the trouble cannot be corrected by replacing gears, and therefore, trouble shooting must be carried out carefully. It should also be noted that gear slips out of mesh due to vibration generated by weakened front and rear engine mounts.	
Worn interlock plunger	Replace
Worn check ball and/or weakened or broken spring	Replace
Worn fork rod ball groove	Replace
Worn or damaged bearing	Replace
Worn or damaged gear	Replace
Noise When noise occurs under engine idling and stops while the clutch is disengaged, or when noise occurs while shifting gears, it may be judged that the noise is from the transmission.	
Insufficient or improper lubricant	Add oil or replace with designated oil
Oil leaking due to defective oil seal and gasket, clogged breather, etc	Clean or replace
Worn bearing (High humming occurs at a high speed)	Replace
Damaged bearing (Cyclic knocking sound occurs also at a low speed)	Replace
Worn each spline	Replace
Worn each bushing	Replace

AUTOMATIC TRANSMISSION DESCRIPTION



AT270

- | | | | |
|------------------------|----------------------|---|------------------------------------|
| 1 Transmission case | 11 Governor | Tightening torque (T) of bolts and nuts: kg·m (ft·lb) | Ⓘ T = 0.5 to 0.7
(3.6 to 5.1) |
| 2 Oil pump | 12 Output shaft | | Ⓜ I = 2.0 to 2.5
(14 to 18) |
| 3 Front clutch | 13 Rear extension | | Ⓝ I = 1.3 to 1.8
(9.4 to 13) |
| 4 Band brake | 14 Oil pan | | Ⓢ I = 0.55 to 0.75
(4.0 to 5.4) |
| 5 Rear clutch | 15 Control valve | | Ⓣ T = 0.25 to 0.35
(1.9 to 2.5) |
| 6 Front planetary gear | 16 Input shaft | Ⓐ I = 0.8 to 1.0
(5.8 to 7.2) | |
| 7 Rear planetary gear | 17 Torque converter | Ⓑ I = 4 to 5
(29 to 36) | |
| 8 One way clutch | 18 Converter housing | Ⓒ I = 6.5 to 7.5
(47 to 54) | |
| 9 Low & Reverse brake | 19 Drive plate | Ⓓ I = 0.6 to 0.8
(4.3 to 5.8) | |
| 10 Oil distributor | | | |

Fig. 161 Cross-sectional view of 3N71B automatic transmission

Transmission

AUTOMATIC TRANSMISSION

The model 3N71B automatic transmission is a fully automatic unit consisting primarily of 3-element hydraulic torque converter and two planetary gear sets. Two multiple-disc clutches, a multiple-disc brake, a band brake and a one way sprag clutch provide the friction elements required to obtain the desired function of the two planetary gear sets.

The two planetary gear sets give three forward ratios and one reverse. Changing of the gear ratios is fully automatic in relation to vehicle speed and engine torque input. Vehicle speed and engine manifold vacuum signals are constantly fed to the transmission to provide the proper gear ratio for maximum efficiency and performance at all throttle openings.

The Model 3N71B has six selector positions P, R, N, D, 2, 1.

"P" — Park position positively locks the output shaft to the transmission case by means of a locking pawl to prevent the vehicle from rolling either direction.

This position should be selected whenever the driver leaves the vehicle.

The engine may be started in Park position.

"R" — Reverse range enables the vehicle to be operated in a reverse direction.

"N" — Neutral position enables the engine to be started and run without driving the vehicle.

"D" — Drive range is used for all normal driving conditions. Drive range has three gear ratios, from the starting ratio to direct drive.

"2" — "2" range provides performance for driving on slippery surfaces. "2" range can also be used for engine braking.

"2" range can be selected at any vehicle speed, and prevents the transmission from shifting out of second gear.

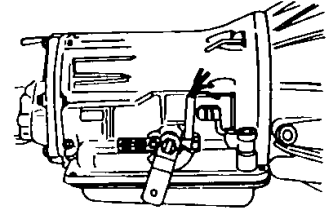


Fig. 162 Identification number

"1" — "1" range can be selected at any vehicle speed and the transmission will shift to second gear and remain in second until vehicle speed is reduced to approximately 25 to 31 MPH.

"1" range position prevents the transmission from shifting out of low gear. This is particularly beneficial for maintaining maximum engine braking, when continuous low gear operation is desirable.

The torque converter assembly is of welded construction and can not be disassembled for service.

Fluid Recommendation

Use automatic transmission fluid having "DEXRON" identifications only in the 3N71B automatic transmission.

Identification Number

Stamped position

The plate attached to the right hand side of transmission case as shown in Figure 161.

Identification of number arrangements

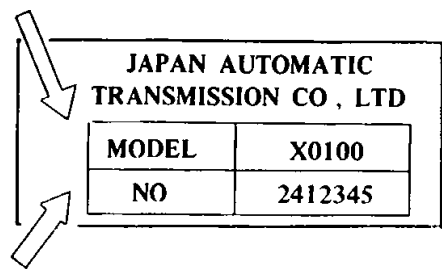
See Page 109.

RECOMMENDATIONS

Due to the complexity of setting up a disassembled transmission as well as the special tools necessary, it is recommended that internal repairs be left to a fully equipped shop.

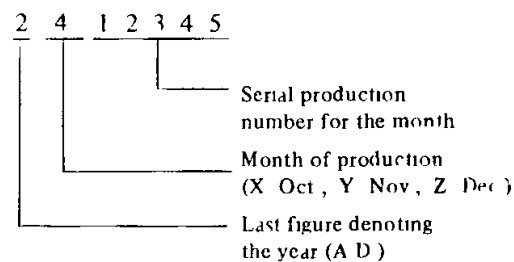
AUTOMATIC TRANSMISSION IDENTIFICATION

Model code



Unit number

Number designation



Body Work

Body Work

HOOD

Removal

Disconnect the windshield washer hose at the nozzle

In order to protect the hood from damaging, place rag in both sides of the hood rear end, loosen the hood hinge installation bolts, and remove the hood, supporting it from both sides as shown in the following figure (Two workers are required)

Installation

Install the hood in reverse sequence of removal carefully so that the hood is flush

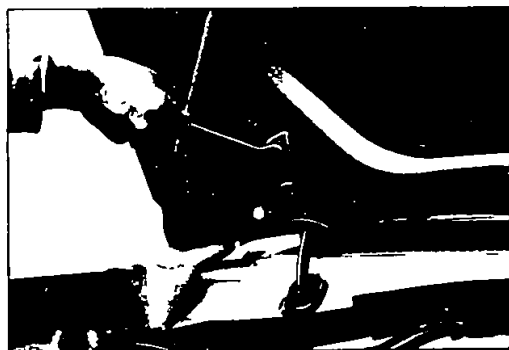


Fig 163 Removing hood hinge



Fig 164 Removing hood

with the fender top and clearance between the hood and fender is aligned evenly toward overall circumference of the hood when the hood is closed

HOOD LOCK

Removal

Remove the radiator grille, loosen the installation bolts, and remove the male side of the hood lock

Disconnect the hood lock wire from the female side of the hood lock, and remove the female side of the hood lock

Remove three screws, and remove the hood lock control lever

Adjustment

Centering the Hood Lock

The male side hook lock is provided with a 0 118 in adjusting stroke toward left and right sides of the vehicle, and the female side with a 0 118 in adjusting stroke toward front and rear sides of the vehicle. Loosen the installation bolts, and align the center correctly

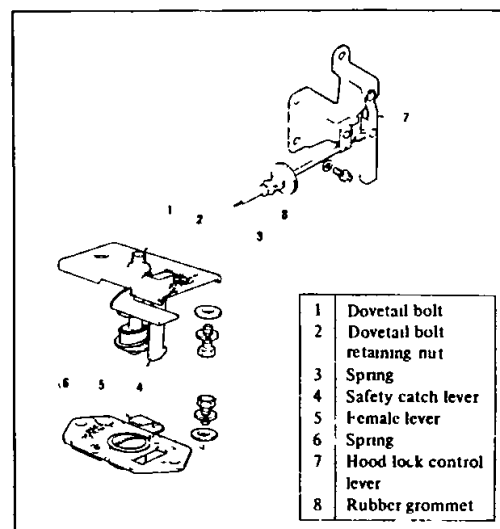


Fig 165 Hood lock mechanism

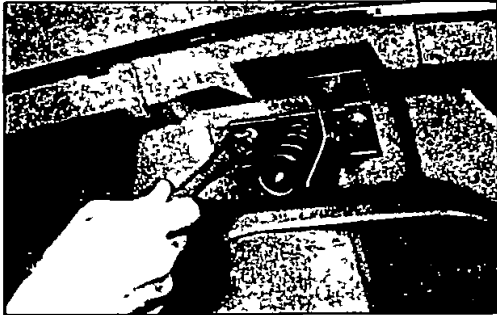


Fig 166 Removing male side of the hood lock

Adjusting Hood Lock Control Lever Operating Force

When the control lever operating force is excessive, loosen the dove-tail bolt retaining nut (2), increase dove-tail bolt (1) installed length, and reduce tension of the spring

Tightening torque

Dove-tail bolt retaining nut
10.8 to 18.1 ft-lb

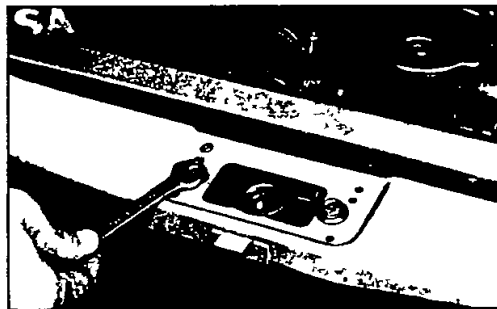


Fig 167 Removing female side of the hood lock

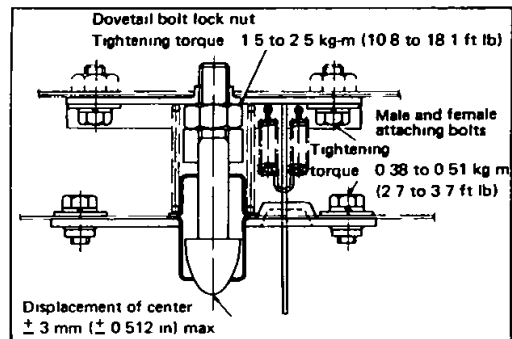


Fig 169 Section view of hood lock



Fig 168 Removing hood lock control lever

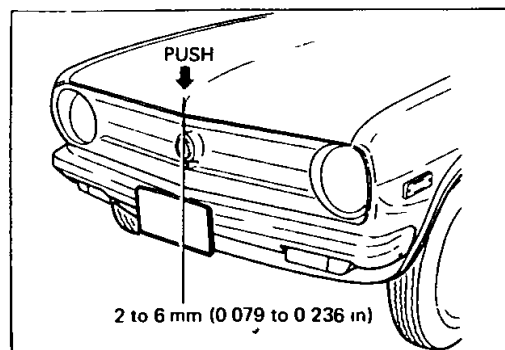


Fig 170 Checking free play of hood panel



Fig 171 Adjusting dove-tail bolt

Adjusting Hood Tightness

After closing the hood panel completely, push the center of the front portion of it by hand and check whether there is a free play of 0.079 to 0.236 in.

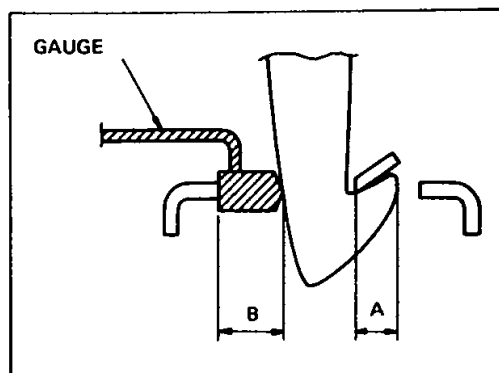
If it is out of the above mentioned range, adjust the length of the dove-tail bolt (1) to increase or decrease tension of the spring.

After adjusting, tighten the dove-tail bolt retaining nut to above the tightening torque.

Notes: When inspecting the hood lock, note the following matters:

- a. Check to be sure that dove-tail bolt retaining nut (2) is tightened securely with specified tightening torque.
- b. Check catcher of the safety catch lever for wear and the spring (3) for weakness and break. If the spring is broken, the hood may be unlocked and rapidly open during driving.
- c. Check the female lever for smooth and correct operation and the spring (6) for weakness and break.

If the female lever does not move smoothly, engaging stroke with the dove-tail bolt will be reduced, and it may be disengaged.



A 5.0 mm (0.197 in)

B 8.5 mm (0.335 in)

Fig 172 Safety catch lever position

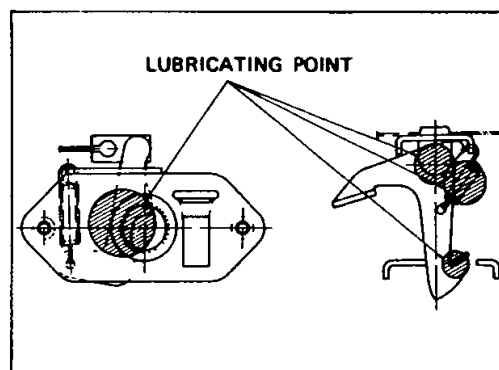


Fig 173 Lubricating points

- d. Measure the dimension "B" to check the dimension "A." The dimension "B" should be more than 0.335 in.

Lubrication

When check or adjust the hood lock, lubricate the pivot, catcher and return spring (3) of the safety catch lever (4) thoroughly. Also, lubricate the lever of the hood lock femel (5) for smooth and correct operation. See Figure 173.

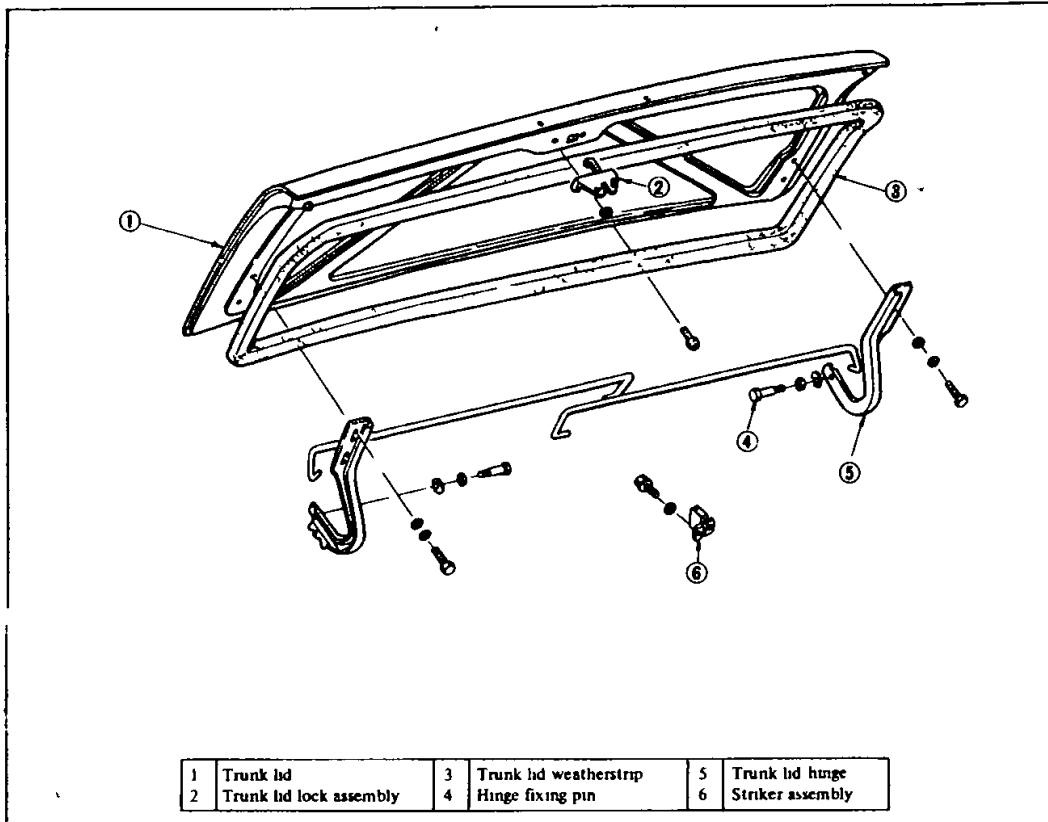


Fig 174 Trunk lid and hinge construction (Sedan)

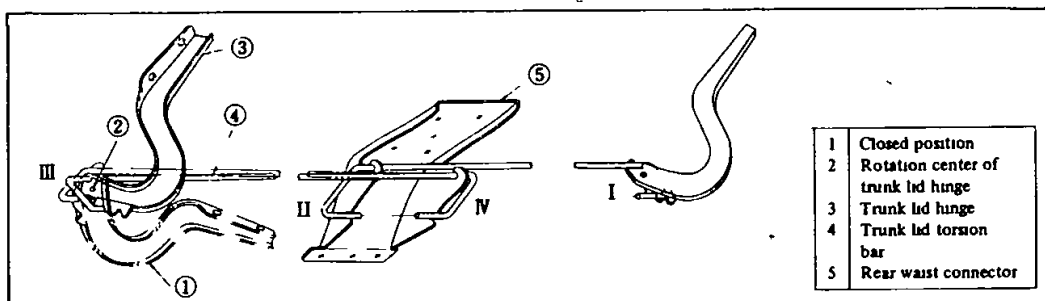


Fig 175 Installing torsion bar

Body Work

TRUNK LID LOCK

Removal

Loosen installation bolts and remove the striker and lock from the body

Remove the leaf clip (used to secure the trunk lid lock cylinder on the body), and remove the trunk lid lock cylinder

Adjustment

Sedan

When adjusting engagement between the lock and striker, set the lock stationarily, and properly adjust striker position. Adjusting stroke toward left and right sides direction is 0.1890 in. and 0.3150 in. toward vertical direction

Coupe

When adjusting engagement between the lock and striker, adjust striker position toward left and right sides [adjusting stroke 0.2362 in], and lock position for vertical direction [adjusting stroke 0.3150 in]

Tightening torque

Lock and striker fixing bolt
0.87 to 1.45 ft-lb

TRUNK LID TORSION BAR

The procedures of installing torsion bar are indicated as follows

Note: When installing the torsion bar, use a torsion bar wrench.

(VAN)

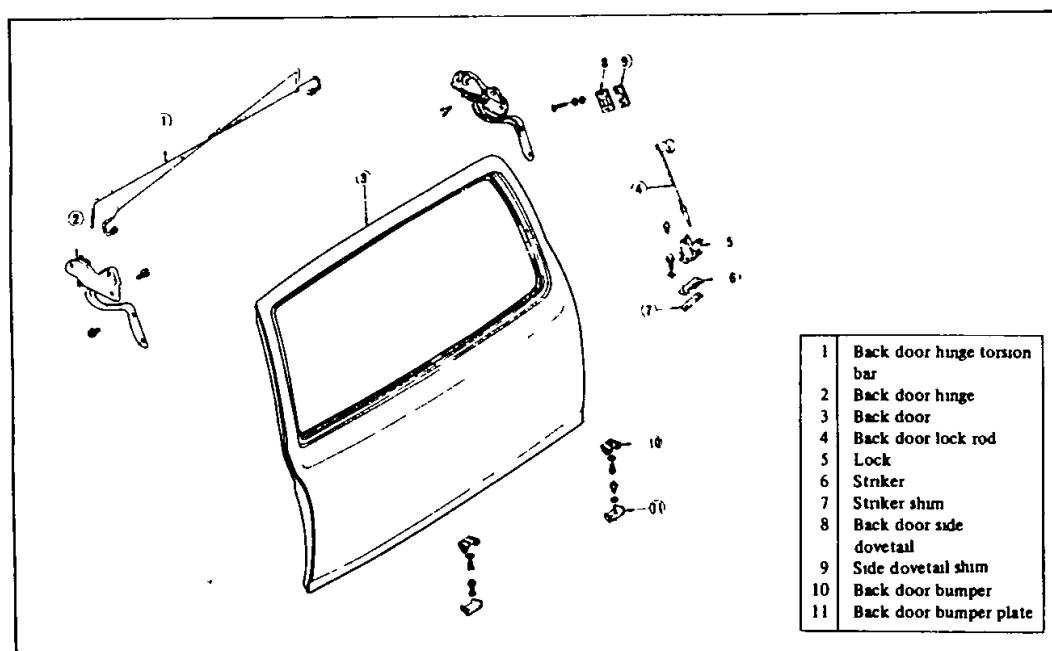


Fig 176 Back door and hinge constructions

DOOR CONSTRUCTION

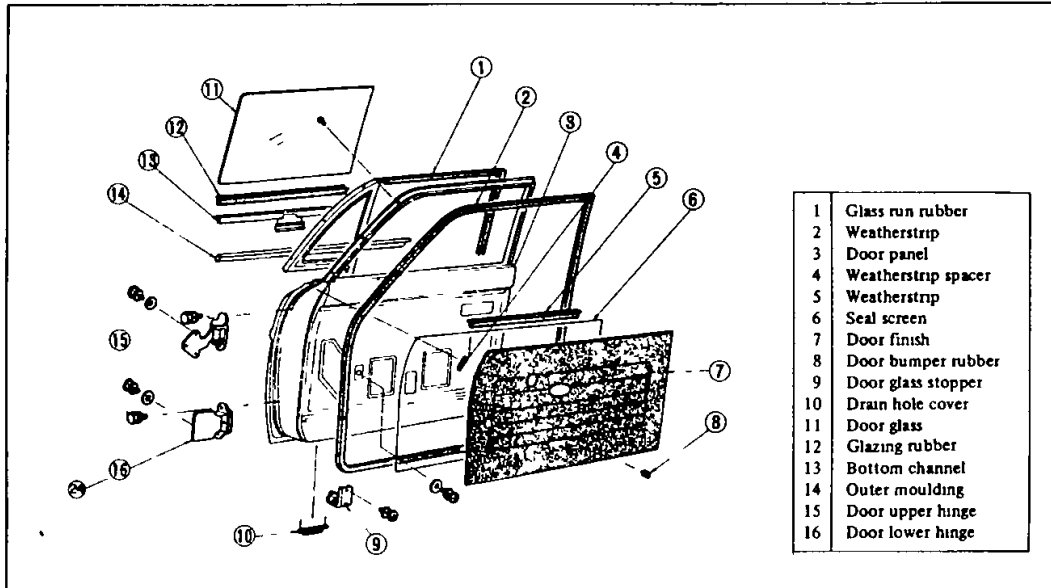


Fig 177 Front door construction

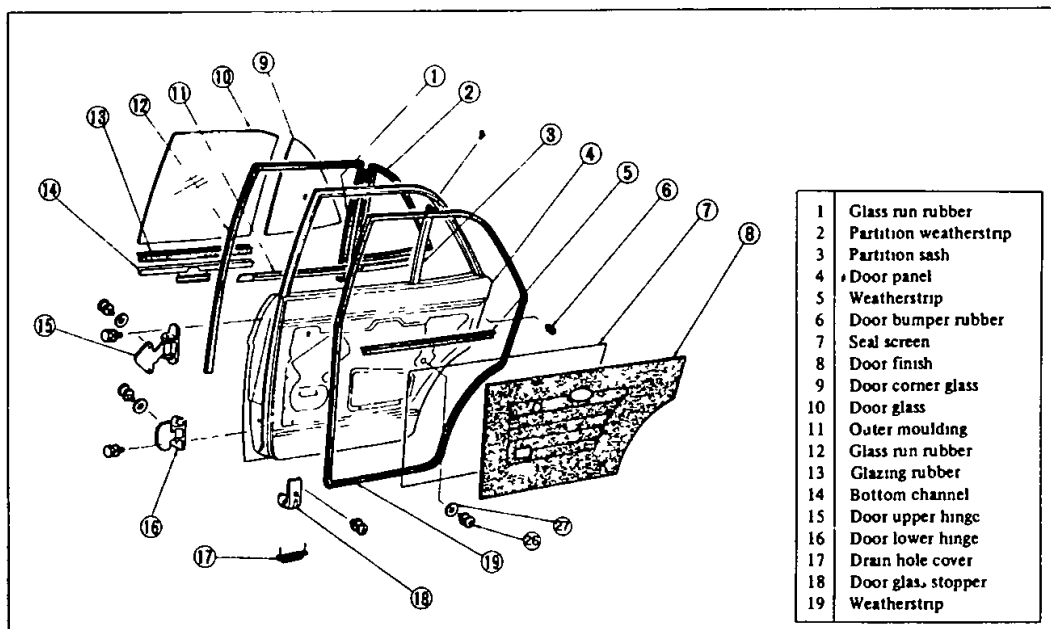


Fig 178 Rear door construction

WIRING DIAGRAM (Manual Transmission)

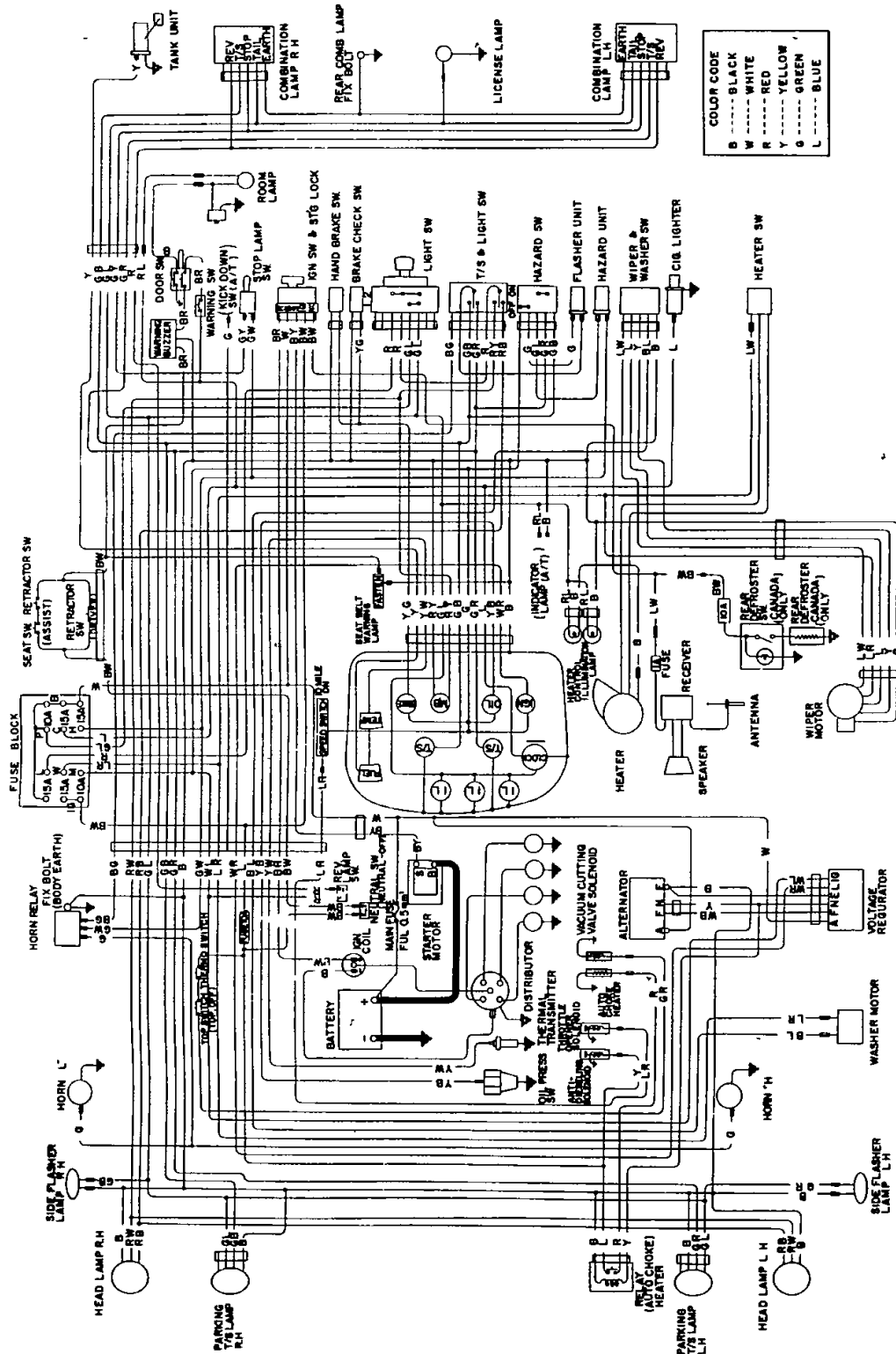


Fig 179 Wiring diagram for manual transmission model

WIRING DIAGRAM (Automatic Transmission)

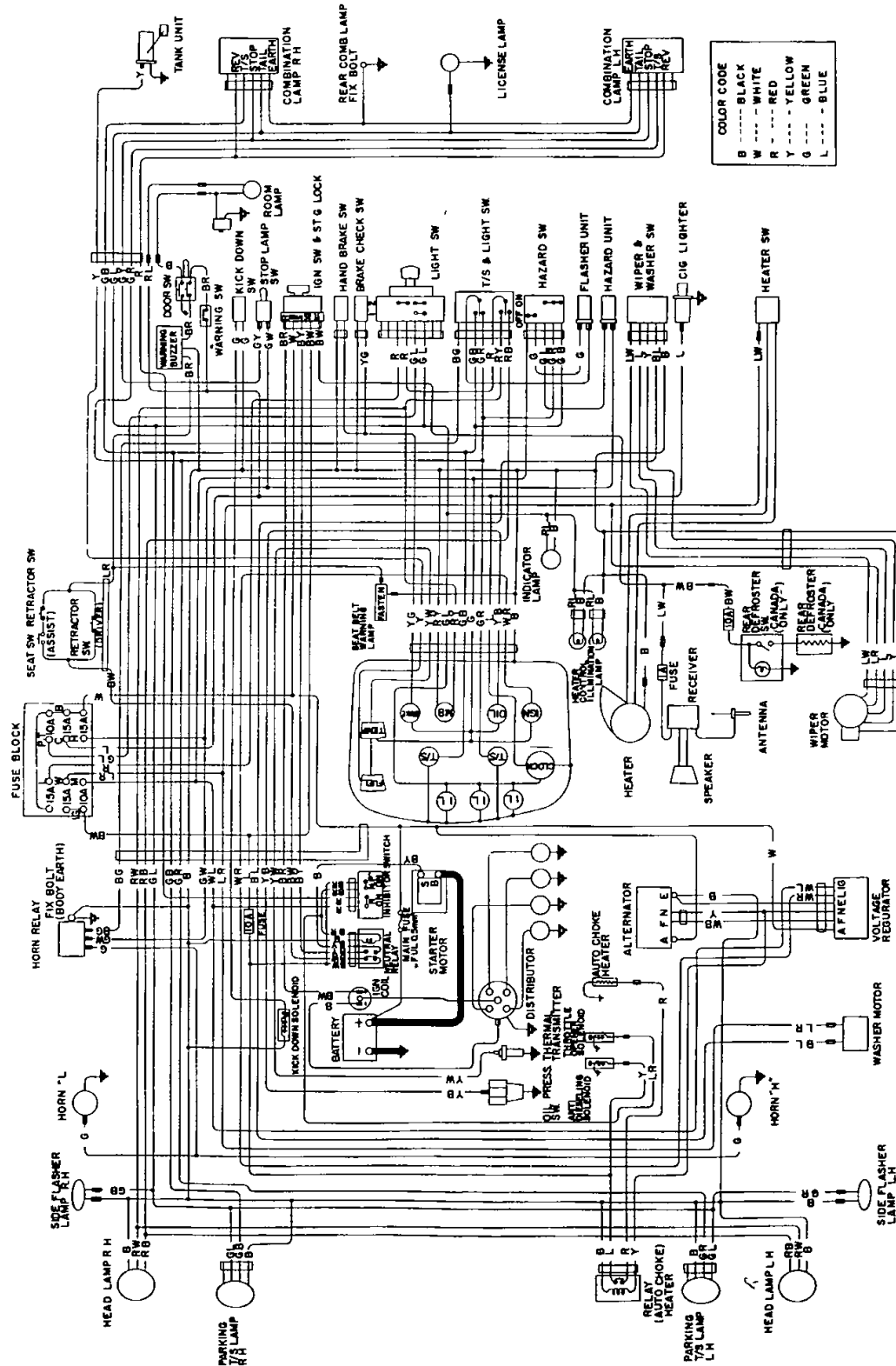


Fig 180 Wiring diagram for automatic transmission model

Body Work

BULB SPECIFICATIONS

	Specifications	SAE Trade-Number
Headlight unit	12V-50/40W	6012
Directional and parking light	12V-23/8W	1034
Side marker light	12V-8W	67
License plate light	12V-7 5W	89
Rear combination light		
Taillight	12V-23/8W	1034
Stop (brake) light	12V-23/8W	
Turn signal light	12V-23W	1073
Back-up light	12V-23W	
Meter illuminating lamp	12V-1 7W	161
Wiper/Washer illumination lamp	12V-3 4W	158
Heater control illumination lamp	12V-3 4W	57
Ignition warning light	12V-1 7W	161
Turn signal indicator light	12V-1 7W	161
Headlight beam indicator light	12V-1 7W	161
Oil pressure warning light	12V-1 7W	161
Brake warning light	12V-1 7W	161
Room light	12V-10W	—

Head lamp

Condition	Probable cause	Method of inspection	Corrective action
All lamps do not light	Blown off fuse or faulty contact	Check the fuse block and white cable for contact	Repair as required
		Check the fuse for fusing and faulty contact	When fused, detect and repair the cause, and replace the fuse
	Faulty lighting switch terminal connector	Check the connector for contact	Repair as required
	Defective lighting switch	Conduct continuity test	If the lighting switch is defective, replace
The head lamp does not light for both high and low beams	Blown off fuse or faulty contact	Check the fuse for fusing and faulty contact	When fused, detect and repair the cause, and replace the fuse
	Improper dimmer switch contact Defective dimmer switch	Check the connector for contact Conduct continuity test	Repair as required If the dimmer switch is defective, replace

Thermometer and fuel meter

Condition	Probable cause	Method of inspection	Corrective action
Both thermometer and fuel meter do not operate	Blown-off fuse, or improper connection	Check the fuse for fusing and improper contact	Replace after correcting the cause, if fused Correct contact
	Defective voltage regulator (Damaged, fused, or open contact)		The voltage regulator is combined with the thermometer to a single unit When the voltage regulator is defective, replace it together with the thermometer
Both thermometer and fuel meter indicate inaccurately	Defective voltage regulator (Broken heat wire, seized contact and/or improper grounding)	Meter operates excessively	Replace together with thermometer
	Improper cable contact	Meter operates slightly	Check the cable between fuse and meter for improper contact, and repair if required

Thermometer	The thermometer does not operate	Defective thermal transmitter	The pointer deflects when thermal transmitter yellow/white cable is grounded	Replace the thermal transmitter
		Defective thermometer	The pointer does not deflect when thermal transmitter yellow/white cable is grounded	Replace the thermometer
The pointer indicates maximum temperature	Defective thermal transmitter	Defective thermometer	The pointer moves to the low limit when the ignition switch is turned off	Replace the thermal transmitter
			The pointer indicates maximum temperature even after the ignition switch is turned off	Replace the thermometer

Body Work

The thermometer does not operate accurately	Defective thermometer	The thermometer is serviceable when a 100 Ω resistance is applied to the thermal transmitter yellow/white cable, the cable is grounded, and the thermometer indicates approximately 50°C (122°F) When the thermometer is normal through the above inspection The thermometer indicates a temperature slightly lower than the actual temperature	Replace, if defective Replace the thermal-transmitter Check the cable from the thermometer to the thermal transmitter for cable being about to break, poor contact, and faulty grounding, and repair as required
	Defective thermal transmitter Improper cable contact.		
Fuel meter Fuel meter does not operate.	Defective tank unit	The pointer deflects when the tank unit yellow cable is grounded The pointer does not deflect through the above inspection	Replace the tank unit Replace the fuel meter with a new one
	Defective fuel meter		

The pointer indicates "Full" position.	Defective tank unit	The pointer lowers below the empty limit when the ignition switch is turned off	Replace the tank unit
	Defective fuel meter	The pointer still indicates "Full" position through the above inspection.	Replace the fuel meter
Fuel meter functions improperly	Defective tank unit	The pointer indicates a half level when a 35 Ω resistance is applied to the tank unit yellow cable and the cable is grounded	Replace if defective
	Defective fuel meter	The pointer does not indicate a half level through the above inspection	Replace the fuel meter
	Improper cable contact	The fuel meter indicates a level slightly lower than the actual level	Check the cable from the fuel meter to the tank unit for cable being about to break, poor contact, and faulty grounding, and repair as required

Oil pressure and ignition warning lamps

Condition	Probable cause	Method of inspection	Corrective action
Oil pressure warning lamp The lamp does not light when the ignition switch is set to "ON"	Blown off fuse or faulty contact	Check the fuse for fusing and faulty contact	Replace after correcting the fuse the cause, if fused
	Broken lamp bulb filament or faulty cable contact	The warning lamp does not light when oil pressure switch yellow/black cable is grounded	Check the light bulb for burnt out filament, and replace as required
	Defective oil pressure switch	The warning lamp lights through the above inspection	Replace the oil pressure switch
The lamp does not go out while the engine is being operated	Oil pressure is too low.	Inspect the engine oil pressure system.	Add oil
	Lack of engine oil Defective oil pressure switch	Check oil level Continuity exists on the oil pressure switch when the engine is being operated	Replace the oil pressure switch

Ignition warning lamp The lamp does not light when the ignition switch is set to "ON"	Blown off fuse or faulty contact Burnt out light bulb filament or faulty cable contact	Check the fuse for fusing and faulty contact The pilot lamp does not light when the voltage regulator connector is disconnected, the white/red cable is grounded and the ignition switch is set to "ON"	Repair or replace as required Check the bulb for burnt out filament, and replace as required
The lamp does not go out when the engine is started	Faulty charging system	Inspect the charging system	

Specifications

Specifications

RECOMMENDED LUBRICANT SPECIFICATIONS

Item		Specifications	Remarks
Gasoline engine oil		SAE Classification SD or SE	Furthermore refer to SAE recommended viscosity table See Page GI 5
Gear oil	Transmission and steering	API GL-4	_____
	Differential	API GL 5	_____
Automatic T/M fluid		Type DEXRON	_____
Multipurpose grease		NLGI 2	Lithium soap base
Brake and clutch fluid		DOT 3	_____
Antifreeze coolant		(Long Life Coolant)	_____

SERVICE DATA AND SPECIFICATIONS

Type		Recirculating ball type
Gear ratio		15:1
Steering wheel diameter	mm (in)	400 (15.7)
Oil capacity	L (US pt) Imp pt)	0.24 (1/2 3/8)
Steering angle	inner wheel	43°
	outer wheel	36°
Play steering wheel	mm (in)	20 to 25 (0.787 to 0.984)
Standard thickness of worm bearing shims	mm (in)	0.5 (0.0197)
Initial turning torque of column assembly	kg-cm (in-oz)	2.0 to 5.0 (27.8 to 69.4)
Clearance of adjusting screw to sector shaft	mm (in)	0.05 (0.0020)
Length of side rod	mm (in)	296.8 (11.69)
Tightening torque		
Steering wheel lock nut	kg-m (ft-lb)	3.0 to 3.5 (21.7 to 25.3)
Steering post clamp to steering post bracket bolts	kg-m (ft-lb)	0.8 to 1.0 (5.8 to 7.2)
(Collapsible)	kg-m (ft-lb)	1.5 to 1.8 (10.8 to 13)
Steering column hole cover bolts	kg-m (ft-lb)	0.8 to 1.0 (5.8 to 7.2)
Column to gear housing bolts	kg-m (ft-lb)	1.5 to 2.5 (10.8 to 18.1)
Side cover to gear housing bolts	kg-m (ft-lb)	1.7 to 2.8 (12.3 to 20.2)
Adjusting screw lock nut	kg-m (ft-lb)	2.0 to 3.0 (14.5 to 21.7)
Sector shaft to pitman arm nut	kg-m (ft-lb)	14 (101)
Gear housing to side main bar bolts and nuts	kg-m (ft-lb)	1.9 to 2.6 (13.7 to 18.8)
Idler arm nut	kg-m (ft-lb)	5.7 to 6.3 (41.2 to 45.6)
Idler arm to side main bar bolts and nuts	kg-m (ft-lb)	1.9 to 2.6 (13.7 to 18.8)
Ball stud nuts	kg-m (ft-lb)	3.0 to 5.0 (21.7 to 36.2)
Side rod bar lock nuts	kg-m (ft-lb)	8.0 to 10.0 (57.8 to 72.3)

Specifications

SERVICE DATA

Valve clearance		
'Hot	Intake	mm (in)
	Exhaust	mm (in)
Fan belt tension		mm (in)/kg (lb)
Tightening torque (Cold)		
Cylinder head bolts		kg m (ft lb)
	1st turn	
	2nd turn	
Re tightening torque (Hot)		
Manifold nuts		
Carburetor nuts		
Spark plugs		
Oil capacity of engine (including oil filter)		
Maximum		ℓ (US gal, Imp gal)
Minimum		ℓ (US gal, Imp gal)
Water capacity of cooling system		
Without heater		ℓ (US gal, Imp gal)
With heater		ℓ (US gal, Imp gal)
Compression pressure at rpm		kg/cm ² (psi)
Battery specific gravity		

	Permissible value	Fully charged value (at 20°C, 68°F)
Frigid climates	Over 1.22	1.28
Tropical climates	Over 1.18	1.23
Other climates	Over 1.20	1.26

Specifications

Ignition timing (degree)		5° (B T D C)
Distributor		
Point gap	mm (in)	0.45 to 0.55 (0.018 to 0.022)
Dwell angle	degrees	49 to 55
Condenser capacity	μF (Micro Farad)	0.22
Condenser insulation resistance	MΩ (Mega-ohms)	5
Spark plugs		
Gap	mm (in)	0.8 to 0.9 (0.031 to 0.035)
Idle CO/Idle speed		
Manual transmission	%/rpm	1.5 ± 0.5/800
Automatic transmission	%/rpm	1.5 ± 0.5/650 in "D" position
Dash pot		
Setting engine speed	rpm	1,900 to 2,000
Throttle opener (at sea level)		
Setting vacuum pressure		
Manual transmission	mmHg (in Hg)	500 to 540 (19.7 to 21.3)
Automatic transmission	mmHg (in Hg)	480 to 520 (18.9 to 20.5)
Setting engine speed (no load)	rpm	1,650 to 1,850
Servo diaphragm full stroke	mm (in)	5 (0.1969)
Thermo switch (Temperature rises from low to high)		
	°C (°F)	above 5 (41)
Flow guide valve		
Operating pressure	mmHg (in Hg)	10 (0.4)

Specifications

ENGINE

GENERAL SPECIFICATION

Cylinder arrangement		4 in line
Displacement	cc (cu in)	1,171 (71.5)
Bore and stroke	mm (in)	73 x 70 (2.874 x 2.756)
Valve arrangement		Over head valve
Firing order		1-3-4-2
Engine idle	rpm	800 – Manual transmission 650 in "D" – Automatic transmission
Compression ratio		8.5
Oil pressure (Hot at 2,000 rpm)	kg/cm ² (lb/sq in)	3.0 to 3.5 (43 to 50)

TIGHTENING TORQUE

	Unit	kg m (ft-lb)
Cylinder head bolts		5.5 to 6.0 (40 to 43)
Connecting rod nuts		3.2 to 3.8 (23 to 28)
Flywheel bolts		6.5 to 7.5 (47 to 54)
Main bearing cap bolts		5.0 to 6.0 (36 to 43)
Camshaft gear bolts		4.0 to 4.8 (29 to 35)
Oil pan bolts		0.4 to 0.6 (2.9 to 4.3)
Oil pump bolts		1.1 to 1.7 (8.0 to 12)
Oil strainer bolts		0.9 to 1.4 (6.5 to 10)
Crank pulley bolts		15 to 16 (108 to 116)

SPECIFICATION

a) Valve mechanism

Valve clearance (Hot)	mm (in)	
Intake		0.35 (0.0138)
Exhaust		0.35 (0.0138)
Valve clearance (Cold)	mm (in)	
Intake		0.25 (0.0098)
Exhaust		0.25 (0.0098)
Valve head diameter	mm (in)	
Intake		35 (1.378)
Exhaust		29 (1.142)
Valve stem diameter	mm (in)	
Intake		7.970 to 7.985 (0.3138 to 0.3144)
Exhaust		7.945 to 7.960 (0.3128 to 0.3134)
Valve length	mm (in)	
Intake		102.35 to 102.65 (4.030 to 4.041)
Exhaust		102.35 to 102.65 (4.030 to 4.041)
Valve lift	mm (in)	8.5 (0.3346)
Valve spring free length	mm (in)	46.5 (1.831)
Valve spring loaded length	mm/kg (in/lb)	30.2/58.5 (1.199/129)
Valve spring assembled height	mm/kg (in/lb)	38.7/23.9 (1.524/52.7)
Valve spring effective turns		5.0
Valve spring wire diameter	mm (in)	4.100 (0.1614)
Valve spring coil diameter	mm (in)	26.4 (1.039)
Valve guide length	mm (in)	53 (2.087)
Valve guide height from head surface	mm (in)	18 (0.709)
Valve guide inner diameter	mm (in)	
Intake		8.015 to 8.000 (0.3156 to 0.3150)
Exhaust		8.015 to 8.000 (0.3156 to 0.3150)

Specifications

Valve guide outer diameter	mm (in)	
Intake		12 044 to 12 033 (0 4737 to 0 4733)
Exhaust		12 044 to 12 033 (0 4737 to 0 4733)
Valve guide to stem clearance	mm (in)	
Intake		0 015 to 0 045 (0 0006 to 0 0018)
Exhaust		0 040 to 0 070 (0 0016 to 0 0028)
Valve seat width	mm (in)	
Intake		1 3 (0 0512)
Exhaust		1 8 (0 0709)
Valve seat angle	Intake	45°
	Exhaust	45°
Valve seat interference fit	mm (in)	
Intake		0 064 to 0 096 (0 0025 to 0 0038)
Exhaust		0 064 to 0 096 (0 0025 to 0 0038)
Valve guide interference fit	mm (in)	
Intake		0 022 to 0 044 (0 0009 to 0 0017)
Exhaust		0 022 to 0 044 (0 0009 to 0 0017)
b) Camshaft and timing chain		
Camshaft end play	mm (in)	0 02 to 0 08 (0 0008 to 0 0031)
Camshaft lobe lift	mm (in)	5 65 (0 222)
Camshaft journal diameter	mm (in)	
1st		43 783 to 43 796 (1 7237 to 1 7242)
2nd		43 283 to 43 296 (1 7041 to 1 7046)
3rd		42 783 to 42 796 (1 6844 to 1 6849)
4th		42 283 to 42 296 (1 6647 to 1 6652)
5th		41 208 to 41 221 (1 6224 to 1 6229)
Camshaft bend	mm (in)	0 015 (0 0006)
Camshaft bearing inner diameter	mm (in)	
1st		43 843 to 43 833 (1 7261 to 1 7257)

Specifications

2nd		43 333 to 43 323 (1 7060 to 1 7050)
3rd		42 846 to 42 836 (1 6868 to 1 6865)
4th		42 333 to 42 323 (1 6667 to 1 6663)
5th		41 268 to 41 258 (1 6247 to 1 6243)
c) Rocker arm lever ratio		1 42
d) Connecting rod		
Center distance	mm (in)	121 47 to 121 53 (4 7812 to 4 7788)
Bearing thickness	mm (in)	1 500 to 1 508 (0 0591 to 0 0594)
Big end end play	mm (in)	0 2 to 0 3 (0 0079 to 0 0012) [less than 0 4 (0 016)]
Connecting rod bearing clearance	mm (in)	0 020 to 0 050 (0 0008 to 0 0020)
Connecting rod bend	mm (in)	0 05 to 0 10 (0 0020 to 0 0039)
e) Crankshaft and main bearing		
Journal diameter	mm (in)	49 951 to 49 964 (1 9666 to 1 9671)
Journal taper and out of round	mm (in)	less than 0 03 (0 0012)
Crankshaft end play	mm (in)	0 05 to 0 15 (0 0020 to 0 0059)
Maximum service limit of crankshaft end play	mm (in)	0 3 (0 0118)
Crankpin diameter	mm (in)	44 974 to 44 961 (1 7706 to 1 7701)
Crankpin taper and out of round	mm (in)	less than 0 03 (0 0012)
Main bearing thickness	mm (in)	1 835 to 1 827 (0 0722 to 0 0719)
Main bearing clearance	mm (in)	0 020 to 0 062 (0 0008 to 0 0024)
Maximum service limit of main bearing clearance	mm (in)	0 15 (0 0059)
Crankshaft bend	mm (in)	0 015 to 0 05 (0 0006 to 0 0020)
f) Piston		

Specifications

Piston diameter	standard	mm (in)	72 967 to 73 017 (2 8727 to 2 8747)
	Oversize	50 mm (in)	73 467 to 73 517 (2 8924 to 2 8944)
	Oversize	100 mm (in)	73 967 to 74 017 (2 9121 to 2 9140)
	Oversize	150 mm (in)	74 467 to 74 517 (2 9318 to 2 9337)
Ellipse difference		mm (in)	0 01 to 0 03 (0 0004 to 0 0012)
Ring groove width		mm (in)	
	Top		2 0 (0 0787)
	2nd		2 0 (0 0787)
	Oil		4 0 (0 1575)
Piston to bore clearance		mm (in)	0 023 to 0 043 (0 0009 to 0 0017)
g) Piston pin			
Pin diameter		mm (in)	17 447 to 17 452 (0 6869 to 0 6871) (0 6869 to 0 6871)
Pin length		mm (in)	65 23 to 65 48 (2 5681 to 2 5779)
Piston pin to piston clearance		mm (in)	0 006 to 0 008 (0 0002 to 0 0003) [at 20°C (68°F)]
Interference fit of piston pin to connecting rod bushing		mm (in)	0 017 to 0 034 (0 0007 to 0 0013)
h) Piston ring			
Ring height		mm (in)	
	Top		2 0 (0 0787)
	2nd		2 0 (0 0787)
	Oil		4 0 (0 1575)
Side clearance		mm (in)	
	Top		0 04 to 0 07 (0 0016 to 0 0027)
	2nd		0 04 to 0 07 (0 0016 to 0 0027)
	Oil		0 04 to 0 08 (0 0016 to 0 0031)
Ring gap		mm (in)	
	Top		0 2 to 0 35 (0 0079 to 0 0138)
	2nd		0 2 to 0 35 (0 0079 to 0 0138)
	Oil		0 3 to 0 90 (0 0118 to 0 0354)

COOLING SYSTEM

Dimensions of radiator core (Height x Width x Thickness)	mm (in)	330 x 344 x 32 (13 0 x 13 5 x 1 26)
Type		Corrugate fin type
Radiator fin spacing	mm (in)	2 5 (0 098)
Radiator capacity	K cal/h°C	335
Cap working pressure	kg/cm ² (lb/sq in)	0 9 ± 0 1 (13 ± 1 4)
Water capacity with heater	ℓ (US qt, Imp qt)	4 9 (5 3/16, 4 5/16)

Specifications

SPECIFICATIONS AND SERVICE DATA

Make		NGK	HITACHI
Model		BP5ES	L46PW
Size (Screw dia x Reach)	mm (in)	14 x 19 (0.55 x 0.75)	
Plug gap	mm (in)	0.8 to 0.9 (0.031 to 0.035)	
Tightening torque	kg-m (ft lb)	1.5 to 2.5 (11.0 to 15.0)	

FUEL SYSTEM

Carburetor model		DCH306-4 (for Manual transmission)	
Applied engine		DCH306.5 (for Automatic transmission)	
Type		Downdraft	
		Primary	Secondary
Outlet diameter	mm (in)	26 (1.024)	30 (1.181)
Venturi diameter	mm (in)	20 (0.787)	26 (1.024)
Main jet		# 95	# 140
Main air bleed		# 80	# 80
Slow jet		# 43	# 50
Slow air bleed		# 215	# 100
Power jet		# 60	
Float level ("H")	mm (in)	18 to 20 (0.709 to 0.748)	

Specifications

Interlock opening of primary and secondary throttle valve "G1" (Throttle valve opening 48")		mm (in)	5.8 (0.2283)
Auto choke			
Fast idle setting clearance "A"		mm (in)	
Manual transmission			0.80 to 0.88 (0.0315 to 0.0346)
Automatic transmission			1.07 to 1.17 (0.0421 to 0.0461)
Vacuum break gap between choke valve and carburetor body "B"		mm (in)	
Manual transmission			1.140 to 1.260 (0.0449 to 0.0496)
Automatic transmission			1.205 to 1.335 (0.0474 to 0.0526)
Choke unloader clearance C between choke valve and carburetor body		mm (in)	2.01 (0.0791)
Bi metal resistance		ohms	8.6 to 9.0
Accelerator pump			
Injector hole		mm (in)	0.5 (0.0197)
Return spring		g/mm (lb/in)	78 (1.1)
Fuel pressure		kg/cm ² (psi)	0.18 (2.6)
Weight		kg (lb)	2.8 (6.2) (Manual transmission)
			2.9 (6.39) (Automatic transmission)
Example * # 215 represents 215/100 = 2.15 mm (0.0846 in) diameter			

Specifications

STARTER

		Manual Transmission	Automatic Transmission
Make and type		HITACHI S114-87M	HITACHI S114 156
Nominal output	KW	1 0	1 0
System voltage	V	12	12
Weight	kg (lb)	4 6 (10 1)	5 4 (11 9)
No load			
Terminal voltage	V	12	12
Current	A	less than 60	less than 60
Revolution	rpm	more than 7,000	more than 6,000
Load			
Terminal voltage	V	6 3	6 3
Current	A	less than 420	less than 420
Torque	kg-m (ft-lb)	more than 0 9 (6 5)	more than 1 0 (7 2)
Shifting type of pinion gear		Magnetic shift	Magnetic shift
Number of teeth on pinion gear		9	9

Specifications

ALTERNATOR

Make and type		HITACHI LT135 13B
Nominal output	V A	12-35
Pole		Negative ground
Revolution	rpm	1,000 to 13,500
No-load minimum revolution	rpm	less than 1,000
Output current	A (V, rpm)	more than 28 (14, 2,500)
Weight	kg (lb)	3.4 (7.5)
Applied regulator		TL1Z 57

APPROXIMATE REFILL CAPACITY

	Liter	US A measure	Imp measure
Fuel tank Sedan	40 L	10 1/2 gal	8 3/4 gal
Coupe	38 L	10 gal	8 1/2 gal
Cooling system with heater	4.9 L	5 1/16 qt	4 1/16 qt
without heater	4.2 L	4 1/16 qt	3 1/16 qt
Oil pan	2.7 L	2 3/8 qt	2 3/8 qt
Oil filter	0.54 L	1 1/8 pt	1 pt
Transmission case Manual	1.2 L	2 1/2 pt	2 1/2 pt
Automatic	5.5 L	5 3/8 qt	4 1/2 qt
Differential case	0.75 L	1 3/8 pt	1 3/8 pt
Steering gear box	0.24 L	1/2 pt	3/8 pt

Specifications

REGULATOR

Voltage regulator		
Model		HITACHI TL1Z 57
Regulating voltage (with fully charged battery and regulator faced downward)	V	*14.3 to 15.3 [at 20°C (68°F)]
Voltage coil resistance	Ω	10.5 [at 20°C (68°F)]
Rotor coil inserting resistance	Ω	10
Voltage coil series resistance		31
Smoothing resistance	Ω	40
Core gap	mm (in)	0.6 to 1.0 (0.0236 to 0.0394)
Point gap	mm (in)	0.3 to 0.4 (0.0118 to 0.0157)
Charge relay		
Release voltage	V	4.2 to 5.2 at "N" terminal
Voltage coil resistance	Ω	37.8 [at 20°C (68°F)]
Core gap	mm (in)	0.8 to 1.0 (0.0315 to 0.0394)
Point gap	mm (in)	0.4 to 0.6 (0.0157 to 0.0236)

*Standard temperature gradient -0.015 V/°C

DISTRIBUTOR

Make and type	D412-80 for Manual Transmission	D412-89 for Automatic Transmission
Firing order	1 3-4-2	1 3-4-2
Rotating direction	Counterclockwise	Counterclockwise
Dwell angle	49-55°	49-55°
Condenser capacity μF	0.20 to 0.24	0.20 to 0.24

IGNITION COIL

Make and type	HANSHIN H5 15.2	HITACHI C6R 601
Primary voltage V	12	12
Spark gap mm (in)	more than 7 (0.28)	more than 7 (0.28)
Primary resistance at 20°C (68°F) Ω	1.17 to 1.43	1.17 to 1.43
Secondary resistance at 20°C (68°F) $K\Omega$	11.2 to 16.8	11.2 to 16.8
External resistor at 20°C (68°F) Ω	1.3 to 1.7	1.3 to 1.7
Applied resistor	RC-15	5560R 1510

Specifications

CLUTCH

	Hydraulic clutch	Mechanical clutch
Clutch release lever		
Release bearing-to-diaphragm spring (withdrawal lever) clearance	0.7 to 1.4 mm (0.0276 to 0.0551 in)	0.9 to 1.2 mm (0.0354 to 0.0472 in)
Diaphragm spring to-flywheel height	29 to 31 mm (1.142 to 1.220 in)	—
Clutch disc		
Facing size		
Outer dia × inside dia × thickness	180 × 125 × 3.5 mm (7.09 × 4.92 × 0.140 in)	—
Total friction area	264 cm ² (40.92 sq in)	—
Thickness of disc assembly		
Free	7.6 to 8.0 mm (0.2992 to 0.3150 in)	—
Compressed	6.7 to 7.0 mm (0.2638 to 0.2756 in)	—
Number of torsion spring	6	—
Allowable minimum depth of rivet head from facing surface	0.3 mm (0.0118 in)	—
Allowable facing run-out	0.5 mm (0.0197 in) at radius 85 mm (3.346 in)	—
Allowable free play of spline	0.4 mm (0.0157 in)	—
Clutch pedal		
Pedal height when not depressed	141.5 mm (5.57 in)	136.5 to 146.5 mm (5.4 to 5.8 in)
Free travel of pedal head	30 mm (1.181 in)	11 to 15 mm (0.433 to 0.591 in)
Pressing strength at full stroke	10.8 kg (23.8 lb)	8.3 kg (18.3 lb)
Master cylinder — clutch		
Master cylinder diameter	15.87 mm (5/8 in)	—
Allowable maximum clearance between cylinder and piston	0.15 mm (0.0059 in)	—
Operating cylinder — clutch		
Operating cylinder diameter	19.05 mm (0.750 in)	—
Tightening torque		
Clutch assembly securing bolt	1.5 to 2.2 kg-m (10.8 to 15.9 ft-lb)	—

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