

ROAD EMPEROR

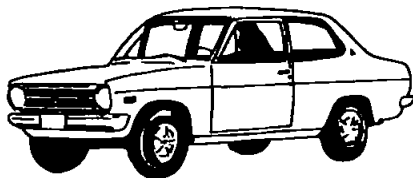
SERVICE/REPAIR HANDBOOK FOR

DATSUN

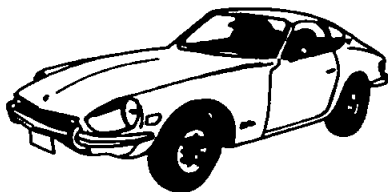
1200 .. 1968/73
B210 .. 1974/77



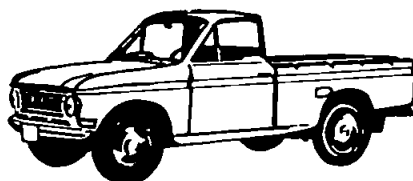
510 .. 1968/73
610 1973/76
710 1974/77



240Z .. 1970/73
260Z .. 1974
280Z .. 1975/77



L521 .. mid-1968/69
PL5 .. 1970/mid-1972
PL620 ... mid-1972/77





SERVICE/REPAIR HANDBOOK FOR
DATSUN

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ROAD EMPEROR™

SERVICE/REPAIR HANDBOOK FOR

DATSUN

CHAPTER ONE

GENERAL INFORMATION

This manual provides tune-up, maintenance, and repair information for the following Datsuns

1200 (B110), 1968-1973

B210, 1974-1977

510, 1968-1973

610, 1973-1976

710, 1974-1977

L521 pickup, mid-1968 through 1969

PL521 pickup, 1970 to mid-1972

PL620 pickup, mid-1972-1977

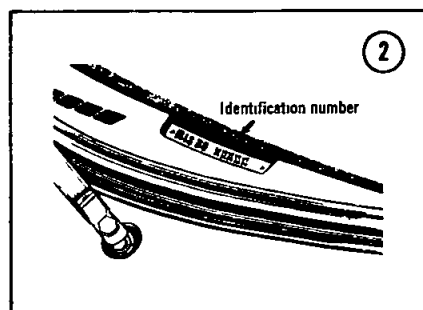
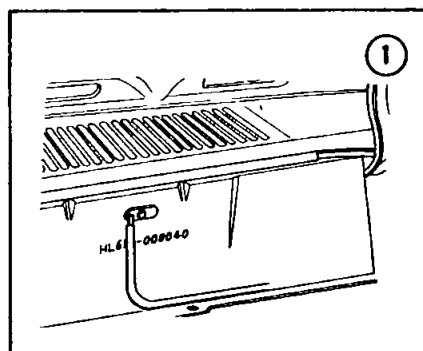
240Z, 1970-1973

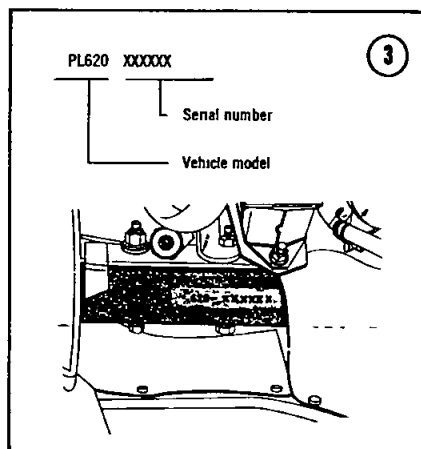
260Z, 1974

280Z, 1975-1977

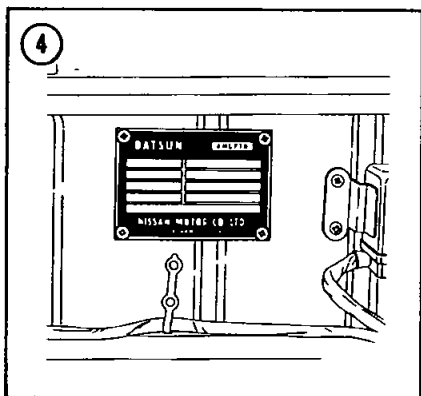
The 1200 and B210 use versions of the A-series, 4-cylinder pushrod engine. The L521 pickups use the J13 engine, another pushrod four. The 510's, 610's, 710's, PL521 pickups, and PL620 pickups use 4-cylinder versions of the overhead cam L-series engine. The Z sports cars use 6-cylinder versions of the L-series engine.

The vehicle identification number on cars is stamped on the firewall (Figure 1) as well as on a plate riveted to the instrument panel and visible from outside the car (Figure 2). The chassis number on pickup trucks is stamped on the right-hand frame member near the motor mount (Figure 3).





The body plate (Figure 4) is riveted to the right front strut housing on Z sports cars, and to the firewall on all others. The plate lists vehicle type, engine size, maximum horsepower, wheel-base, vehicle number, and engine number. The engine number on all models is also stamped on the right-hand side of the cylinder block.



SERVICE HINTS

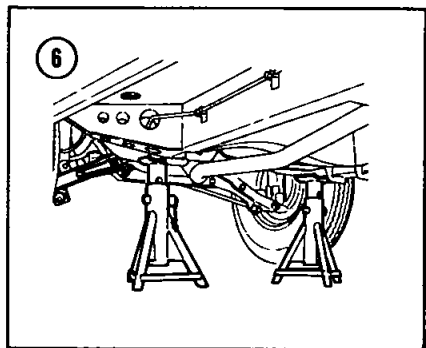
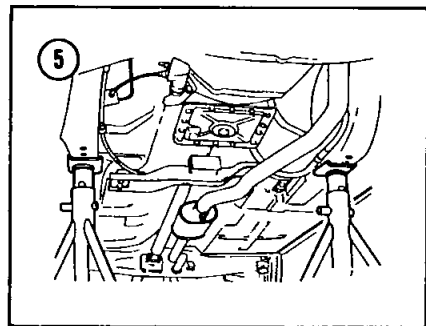
Observing the following practices will save time, effort, and frustration, as well as prevent possible injury.

1 Throughout this manual, with 2 exceptions, the word "front" refers to the front of the vehicle.

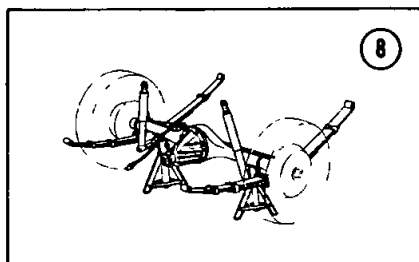
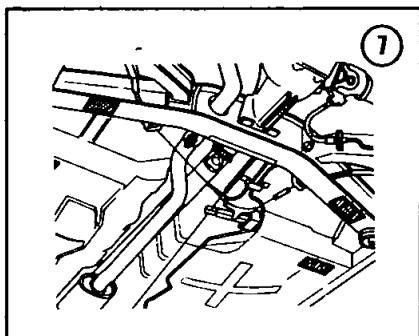
The front end of any part is the end nearest the front of the vehicle when the part is installed. The 2 exceptions are the steering wheel and the instrument panel. The front of these 2 parts is the side which faces the driver.

2 The position of the driver also determines "left" and "right." For example, the steering wheel is on the left side.

3 When working under a vehicle, do not trust a hydraulic or mechanical jack to hold the vehicle up by itself. Always use jackstands. When raising a front end, position the stands as shown in Figure 5 (cars) or Figure 6 (pickups). On cars with independent rear suspension, position the stands beneath the areas indicated in Figure 7. On rigid-axle vehicles, place jackstands beneath the axle housing (Figure 8).



4 Disconnect the battery ground cable before working near electrical connections and before disconnecting wires.



5 Avoid flames or sparks when working near a charging battery or flammable liquids such as gasoline

6 Tag all similar internal parts for location, and mark all mating parts for position. Record number and thickness of any shims as they are removed. Small parts such as bolts can be identified by placing them in plastic sandwich bags, sealed and labeled with masking tape

7 Protect finished surfaces from physical damage or corrosion. Keep gasoline and brake fluid off painted surfaces

8 Frozen or very tight bolts and screws can often be loosened by soaking with penetrating oil, then striking the bolt head a few times with a hammer and punch (or screwdriver for screws). Heat is to be avoided unless absolutely necessary, since it may melt, warp, or remove the temper from many parts

9 No parts, except those assembled with a press fit, require unusual force during assembly. If a part is hard to remove or install, find out why before proceeding

10 Cover all openings after removing parts to keep dirt, small tools, etc., from falling in

11 When assembling 2 parts, start all fasteners, then tighten them evenly

12 When buying replacement parts, always take the old part to the parts store, if possible, for comparison to the new part

13 Dimensions and capacities are expressed in inch units familiar to U.S. mechanics, as well as in metric units. *Metric tools are required to work on Datsuns*

MANUAL ORGANIZATION

This chapter provides general information for the models covered by this book

Chapter Two explains all periodic lubrication and routine maintenance necessary to keep your Datsun running well. Chapter Two also includes recommended tune-up procedures, eliminating the need to constantly consult chapters on the various subassemblies

Chapter Three provides methods and suggestions for quick and accurate diagnosis and repair of problems. Troubleshooting procedures discuss typical symptoms and logical methods to pinpoint the trouble. It also discusses equipment useful for both preventive maintenance and troubleshooting

Subsequent chapters describe specific systems such as the engine, transmission, and electrical system. Each chapter provides complete disassembly, repair, and assembly procedures in simple step-by-step form. If a repair is impractical for the home mechanic, it is so indicated. It is usually faster and cheaper to take such repairs to a Datsun dealer or other competent repair shop. Specifications concerning a particular system are covered at the end of the appropriate chapter

Some of the procedures in this manual call for special tools. In all such cases the tool is illustrated, either in actual use or alone. These tools are available from Datsun on a special order basis. A well-equipped mechanic may find he can substitute other similar tools already on hand, or can fabricate his own. Also, when a procedure requires a special tool,

a great deal of time and expense can be saved by having a dealer or repair shop perform only the step which requires the special tool, but doing the rest of the work yourself

The terms, **NOTE**, **CAUTION** and **WARNING** have specific meanings in this book. A **NOTE** provides additional information to make a step or procedure easier or clearer. Disregarding a **NOTE** could cause inconvenience, but would not cause damage or personal injury.

A **CAUTION** emphasizes areas where equipment damage could occur. Disregarding a **CAUTION** could cause permanent mechanical damage, however, personal injury is unlikely.

A **WARNING** emphasizes areas where personal injury or even death could result from negligence. Mechanical damage could also occur. **WARNINGS** are to be taken seriously. In some cases serious injury or death has been caused by mechanics disregarding similar warnings.

CHAPTER TWO

LUBRICATION, MAINTENANCE, AND TUNE-UP

This chapter deals with the normal maintenance necessary to keep your Datsun running properly. It includes a summary of service intervals in table form (Tables 1 through 4). The latter part of the chapter contains a tune-up procedure which simplifies and organizes the process.

ROUTINE CHECKS

The following checks should be done at each stop for gas.

1 Check engine oil level (Figure 1). Top up to the "H" mark on the dipstick if necessary, using a grade recommended in Tables 5 and 6.

Table 1 FUEL STOP CHECKS

Item	Procedure
Engine oil	Check level
Coolant	Check level
Battery electrolyte	Check level
Windshield washers	Check container level
Brake fluid	Check level
Tire pressures	Check

2 Check coolant level (Figure 2). It should be one inch below the filler cap.

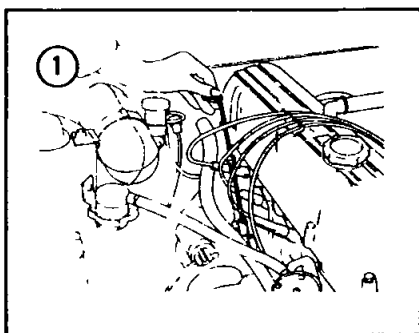


Table 6 RECOMMENDED LUBRICANTS

Engine	API Service SD or SE
Manual transmission	API GL-4
Automatic transmission	
Borg Warner Model 35	Type A
Borg Warner Model 41,	
Nissan Model 3N71B	Dexron
Differential	API GL 5
Brake and clutch fluid	DOT 3

WARNING

Do not remove the radiator cap quickly when the engine is hot. Cover the cap.

Table 2 SCHEDULED MAINTENANCE, 1968-1973

Service	Months or thousands of miles				
	3	6	12	24	30
Engine oil	X				
Manual transmission oil	X				X
Automatic transmission fluid	X				
Differential oil	X				X
Hydraulic systems	X				
Engine leak inspection		X			
Drive belts (except 240Z)		X			
Drive belts (240Z)			X		
Throttle cable or linkage		X			
Choke mechanism		X			
Steering linkage suspension (cars)		X			X
Steering linkage, suspension (pickups)	X		X		
Hinges, latches, locks		X			
PCV system			X		
Evaporative emission control system			X		
EGR system (1973 240Z only)			X		
Cooling system			X		
Vacuum lines			X		
ATC air cleaner			X		
Fuel filter*			X		
Spark timing control system*			X		
Throttle opener or BCDD			X		
Brake fluid (cars)			X		
Brake fluid (pickups)				X	
Brake booster (power brakes)			X		
Brake inspection	X		X		
Battery			X		
Shock absorbers			X		
Drive shaft			X		
Wheel alignment			X		
Pedals			X		
Coolant				X	
Air cleaner element				X	
Air injection system				X	
Proportioning valve (cars)				X	
Wheel bearings (cars)					X
Wheel bearings (pickups)			X		
Rear axle shafts (independent rear suspension)					X
Headlights					X
Drive Shaft					X
Tune-up			X		

*24 000 miles on 240Z's and 1973 pickup trucks.

Table 3 SCHEDULED MAINTENANCE 1974

Service	Months or thousands of miles				
	4	8	12	24	36
Engine oil	X				
Manual transmission oil	X				X
Automatic transmission fluid	X				
Differential oil	X				X
Hydraulic systems	X				
Engine leak inspection	X				
Drive belts			X		
Throttle cable or linkage		X			
Choke mechanism			X		
Steering linkage suspension		X		X	
Hinges latches locks		X			
PCV system			X		
Evaporative emission control system			X		
Exhaust gas recirculation system			X		
Cooling system			X		
Vacuum lines			X		
ATC air cleaner			X		
Fuel filter				X	
Spark timing control system				X	
Throttle opener or BCDD			X		
Brake fluid			X		
Brake booster			X		
Brake inspection	X		X		
Battery		X			
Shock absorbers			X		
Drive shaft			X		X
Wheel alignment		X			
Engine compression			X		
Coolant				X	
Air cleaner element				X	
Air injection system				X	
Brake proportioning valve				X	
Wheel bearings (cars)					X
Wheel bearings (pickups)			X		
Rear axle shafts (independent rear suspension)					X
Drive Shaft					X
Headlights					X
Tune-up			X		

Table 4 SCHEDULED MAINTENANCE, 1975-1977

Service	Thousands of miles (months)		
	6 25 (6)	12 5 (12)	25 (24)
Engine oil	X		
Manual transmission oil	X		X
Automatic transmission fluid	X		
Differential oil	X		X
Hydraulic systems	X		
Drive belts		X	
Choke mechanism		X	
Steering linkage suspension (cars)		X	X
Steering linkage, suspension (pickups)	X	X	
Hinges, latches, locks	X		
PCV system		X	
EGR system		X	
Evaporative emission control system		X	
Cooling system		X	
Vacuum lines		X	
ATC air cleaner		X	
Fuel filter			X
Spark timing control system			X
Throttle opener or BCDD		X	
Brake fluid		X	
Brake booster		X	
Brake inspection	X	X	
Wheel alignment		X	
Coolant			X
Air cleaner element			X
Proportioning valve (cars)	X		
Load sensing valve (1976 pickups)	X		
Wheel bearings			X
Tune-up		X	

Table 5 LUBRICANT VISCOSITY

Engine Oil

Multi viscosity

5W 30

10W 30, 10W 40

20W 40

Single viscosity

10W

20W 20

30

40

-30 -20 -10 0 10 20 30 40 °C
-22 -4 14 32 50 68 86 104 °F

Temperature Range Anticracked

Gear Oil

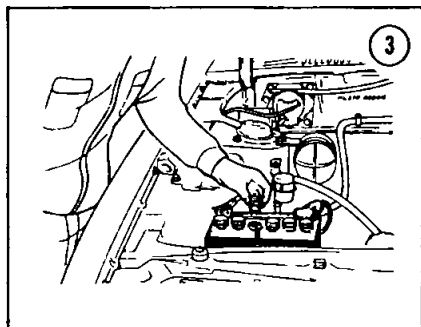
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140

-30 -20 -10 0 10 20 30 40 °C
-22 -4 14 32 50 68 86 104 °F

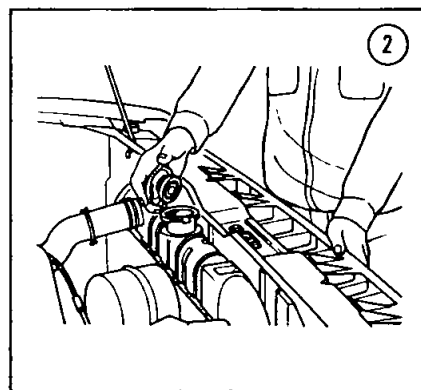
Temperature Range Anticipated



4 Check the level of the windshield washer container. It should be kept full.

CAUTION

Do not use radiator anti-freeze in the windshield washer container. The run-off may damage the vehicle's paint.



5 Check fluid level in the brake and clutch master cylinders (**Figure 4**) Since the reservoirs are translucent, this can be done at a glance. Fluid should be between the lines on the reservoirs. If low, top up with brake fluid marked DOT 3. The same fluid is used for clutch and brakes.

CAUTION

Do not remove reservoir caps unless topping up fluid. Clean the area around the caps before removing.

6 Check tire pressure This should be done when the tires are cold. Recommended pressures are listed in **Table 7**.

PERIODIC CHECKS AND MAINTENANCE

The following procedures are done at specified intervals of miles or time. The service

with a rag and turn it $\frac{1}{4}$ turn counterclockwise. After cooling system pressure has been released, press the cap down, turn counterclockwise, and remove.

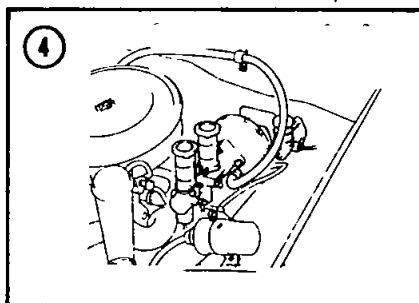


Table 7 TIRE PRESSURES

Vehicle	Front (psi)	Rear (psi)
1200 6.00-12 tires	17 ¹	17 ¹
1200 155SR 12 tires	24	24
B210 (all)	24	24
510 5.60-13 tires		
Up to 600 lb load	24 ²	28 ²
600-750 lb load	28	32
510 165SR 13	28	28
610 and 710 6.45-13 tires		
Up to 600 lb load	24 ²	28 ²
600-750 lb load	28	32
610 and 710 165SR 13 tires	28	28 ³
521 pickups		
Moderate load under 60 mph	21	25
Heavy load, under 60 mph	21	42
Moderate load, more than 60 mph	26	29
Heavy load more than 60 mph	26	46
620 pickups (6-ply rating)		
Moderate load under 60 mph	21	25
Heavy load under 60 mph	21	42
Moderate load more than 60 mph	26	32
Heavy load more than 60 mph	26	49 ⁴
620 pickups (8-ply rating)		
Moderate load under 60 mph	—	39
Heavy load under 60 mph	—	60
Moderate load more than 60 mph	—	60
Heavy load more than 60 mph	—	67
240-260Z		
Under 100 mph	28	28
More than 100 mph	32	32

1 Add 5 psi over 60 mph 3 30 psi on 1975 and later models

2 Add 4 psi over 60 mph 4 45 psi on 1977 models

schedule for 1968-1973 models is based on intervals of 3,000 miles or 3 months. The schedule for 1974 vehicles is based on intervals of 4,000 miles or 4 months. The 1975-1976 schedule is based on intervals of 6,250 miles or 6 months.

These service schedules are intended for vehicles given normal use. More frequent service is required under the following conditions:

- Stop-and-go driving
- Constant high-speed driving
- Severe dust
- Rough or salted roads
- Very hot, very cold, or rainy weather

Some maintenance procedures are included in the tune-up section at the end of the chapter, and detailed instructions will be found there. Other steps are explained in various chapters. Chapter references are included with these steps.

Engine Oil

Use an oil recommended in Tables 5 and 6. To drain the oil, first run the engine until it warms up. This allows the oil to drain freely.

Place a container under the oil pan and remove the drain plug. Let the oil drain completely (10-15 minutes). Then check the drain plug gasket and reinstall the plug.

Remove the filler cap on the valve rocker cover and fill with the recommended oil. Capacity is listed in Table 8.

Wait several minutes after filling, then check dipstick to be sure oil level is correct. Oil used must be rated "For API Service SD or SE."

On 1968-1974 vehicles, the oil filter is replaced at alternate oil changes. On 1975 and later models, the filter is replaced at every oil change.

The oil filter is a disposable cartridge type, and is replaced as a complete unit.

To remove the old filter, unscrew it by hand or use a filter wrench. Figure 5 shows an L-series oil filter being removed. The A-series and J13 filters are removed in the same manner. Clean the gasket contact point on the engine with a lint-free cloth. Coat the gasket on the new filter with clean oil and screw it in until it stops. Tighten $\frac{1}{2}$ turn further by hand. Do not over-tighten. Do not use a filter wrench.

Manual Transmission Oil

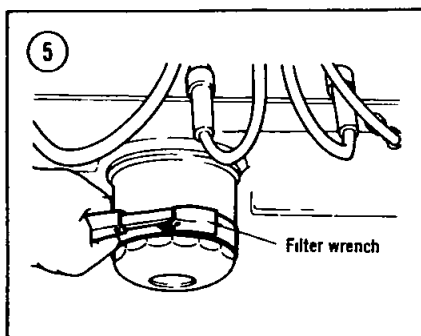
Check level at 3,000 miles (1968-1973), 4,000 miles (1974), or 6,250 miles (1975 on).

To check, remove the filler plug from the side of the transmission. Make sure the oil level is

Table 8 APPROXIMATE REFILL CAPACITIES

Engine Oil	
1200, B210 (through 1974)	
With filter change	3½ quarts
Without filter change	3 quarts
B210 (1975)	
With filter change	4¼ quarts
Without filter change	3¾ quarts
B210 (1976 on)	
With filter change	3¾ quarts
Without filter change	3¾ quarts
510 610 710 PL521 pickup, and 1972 73 PL620 pickup	
With filter change	4½ quarts
Without filter change	4 quarts
PL620 pickup (1974 on)	
With filter change	4¼ quarts
Without filter change	5 quarts
L521 pickup (J13 engine)	
With filter change	3¾ quarts
Without filter change	3¾ quarts
240Z	
With filter change	5½ quarts
Without filter change	4¾ quarts
260, 280Z	
With filter change	5 quarts
Without filter change	4¾ quarts
Transmission oil (manual)	
1200 B210 (4 speed)	2½ pints
B210 (5 speed)	3¾ pints
510, 610 1968 1973 pickup	4¾ pints
710 (through 1976)	4¾ pints
710 (1977)	3¾ pints
Pickup (1974 1977 4 speed)	3½ pints
Pickup (1977 5-speed)	4¾ pints
Z sports car (1970-1976 4-speed)	3¾ pints
Z sports car (1977, 4-speed)	3¾ pints
Z sports car (1977, 5 speed)	4¾ pints
Transmission fluid (automatic)	
	5½ quarts
Differential oil	
1200	1¾ pints
B210	1¾ pints
510, 619, independent rear suspension	1¾ pints
510, 610, 710 (rigid axle)	2¾ pints*
521 pickups	1¾ pints
620 pickup	2¾ pints

* 2 pints on 1974 610 station wagon with manual transmission.



within ¼ in. of the bottom of the filler plug threads. Top up with an oil recommended in **Tables 5 and 6** if it is low.

Change transmission oil at 30,000 miles (1968-1973), 36,000 miles (1974), or 25,000 miles (1975 on).

To change the oil, first warm it by driving the car a short distance. Remove the filler and drain plugs and drain the oil. Reinstall the drain plug and fill with an oil recommended in **Tables 5 and 6**. The easiest way to fill the transmission is to run a long tube from the engine compartment along the side of the transmission and into the filler hole.

Capacity is listed in **Table 8**. When the transmission is full, reinstall the filler plug.

NOTE Check old transmission oil for such signs of damage as gear teeth and pieces of brass from synchronizers.

Automatic Transmission Fluid

Check fluid level and condition as described in *Automatic Transmission Fluid Level Check*, Chapter Nine.

Differential Oil

Check level at 3,000 miles (1968-1973), 4,000 miles (1974), or 6,250 miles (1975 on). To check, remove the filler plug from the rear side of the differential. Make sure oil level is within ¼ in. of the filler plug threads. If necessary, top up with an oil recommended in **Tables 5 and 6**.

Change differential oil at 30,000 miles (1968-1973), 36,000 miles (1974), or 25,000 miles (1975 on). First, drive a short distance to warm the oil. Then remove the filler and drain plugs from the differential or axle housing. When the oil has drained, reinstall the drain plug and fill with gear oil recommended in Tables 5 and 6. Capacity is listed in Table 8. Reinstall the filler plug after filling.

Hydraulic Systems

Check for leaks. Inspect the brake master cylinders, calipers (disc brakes), and wheel cylinders for wetness. Do the same for the clutch master and operating cylinders, and for all hydraulic line connections.

Engine Leak Inspection

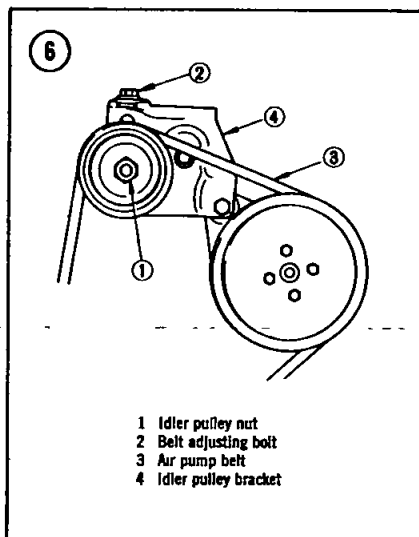
The engine should be checked visually for leaks. Check the oil pan drain plug, oil pan gasket, oil filter, and engine front cover. On L-series and A-series engines, check the oil pump. Greasy-looking dirt at these points may indicate an oil leak. Check the radiator and hose connections for coolant residue or rust. Check the fuel line connections (fuel filter, fuel pump, carburetors) for wetness that may indicate gasoline leakage.

Fan and Air Pump Belts

Check fan belt tension by pressing down on the belt between the water pump pulley and alternator. The belt should move approximately $\frac{1}{2}$ inch. If tension is incorrect, loosen the alternator mounting and adjusting arm bolts. Pull the alternator away from the engine to tighten the belt, push it toward the engine to loosen.

The L-series air pump belt (if so equipped) is adjusted in the same manner as the fan belt. Check belt tension between air pump and crankshaft pulley, move the air pump to change tension.

To adjust the A14 air pump belt (Figure 6), loosen the idler pulley nut, then turn the adjusting bolt as needed. Tighten the idler pulley nut after adjustment.



Throttle Cable or Linkage

Cars use a rod and bellcrank throttle linkage, pickups use a cable. Check the linkage or cable for binding and lubricate as needed.

Choke Mechanism

On manual chokes, check the choke cable for binding. Lubricate as needed. On automatic chokes, check the mechanism for sticking. Lubricate if necessary with a spray lube such as WD-40.

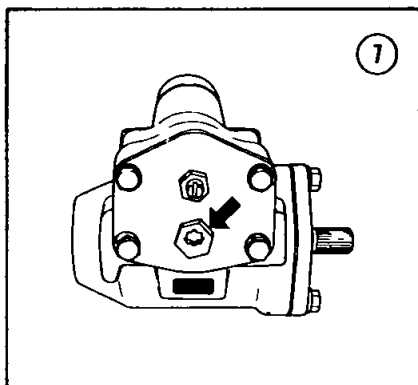
Steering Linkage, Suspension (Cars)

Check the steering gear (rack and pinion on Z sports cars) for looseness. Check all fasteners in the front and rear suspensions for looseness.

On all except Z sports cars, remove the steering gear filler plug (Figure 7). Check oil level and top up as needed. Use an oil recommended in Tables 5 and 6.

On 240Z's only, remove the grease reservoir from the rack housing. Pack the reservoir with multipurpose grease and reinstall.

At 30,000 miles (1968-1973), 24,000 miles (1974), or 25,000 miles (1975 on), lubricate the tie rod and suspension ball-joints. To do this,



remove the grease plug from each ball-joint and install a grease nipple. Inject multipurpose grease until all the old grease is forced out.

Steering Linkage, Suspension (Pickups)

Lubricate the suspension with multipurpose grease. Early pickups have suspension grease nipples, later models have plugs. The plugs must be removed and replaced with grease nipples to lubricate the suspension.

Inject grease into the screw bushings at the inner end of the upper link, the upper and lower knuckle spindle bushings, and the screw bushings at the outer end of the lower link. Refer to Chapter Twelve.

Every 12,000 miles (1968-1974) or 12,500 miles (1975 on), grease the steering linkage ball-joints.

Hinges, Latches, Locks

Lightly grease the hood latch and trunk or tailgate lock with molybdenum disulphide grease. Apply 1-2 drops of oil to hinges on doors, hood, and tailgate or trunk. Lubricate striker plates with a non-staining stick lube such as Door Ease. Lubricate lock tumblers by applying a thin coat of Lubriplate, lock oil, or graphite to the key. Insert and work the lock several times. Wipe the key clean.

PCV System

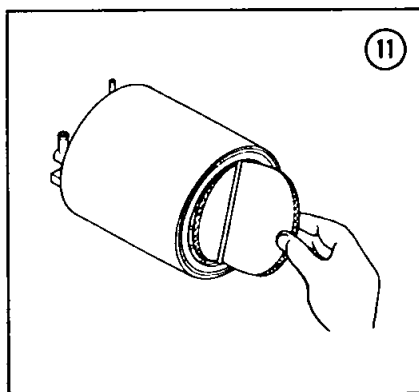
The positive crankcase ventilation (pcv) system is designed to route crankcase emissions into the combustion chambers for burning.

1 Replace the pcv valve. Figure 8 shows the valve used on L16, L18, and L20B engines. A-series and J13 valves are similar. Figure 9 shows the valve used on L24 and L26 engines. The 280Z valve is shown in Figure 10.

2 Check pcv hoses for leaks and loose connections. At alternating service periods, remove the hoses and blow them out with compressed air. Replace any hoses which cannot be unplugged.

Evaporative Emission Control System

Inspect fuel vapor lines, starting at the fuel tank and working forward. Tighten loose connections and replace damaged lines. Make sure the lines are secure in their clips and do not rub against any part of the car. On 260Z's and all 1975 and later models, replace the filter in the bottom of the carbon canister. See Figure 11.



EGR System

If equipped with exhaust gas recirculation, inspect the system as described in Chapter Five.

Cooling System

Inspect all coolant hoses and connections. Replace hoses that are cracked, deteriorated, or extremely soft. Make sure all clamps are tight.

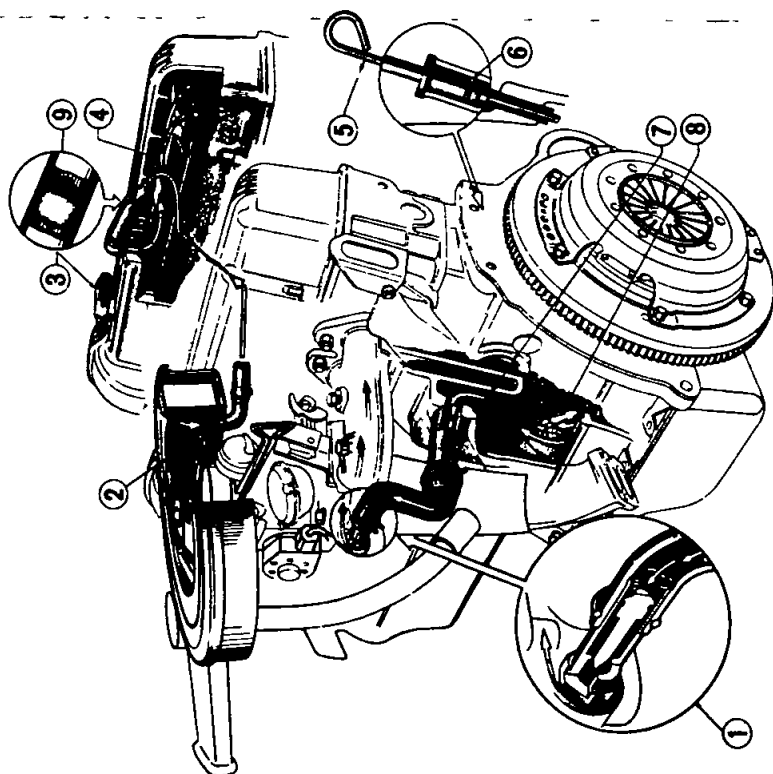
Vacuum Lines

Check emission control system vacuum lines for cracks or deterioration.

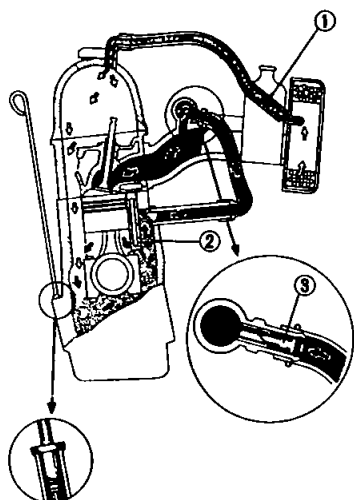
8

PCV SYSTEM
(L16, L18, AND L208)

- 1 PCV valve
- 2 Flame arrester
- 3 Sealed filler cap
- 4 Baffle plate
- 5 Oil level gauge
- 6 O ring
- 7 Oil separator
- 8 Baffle plate
- 9 Flame arrester



9

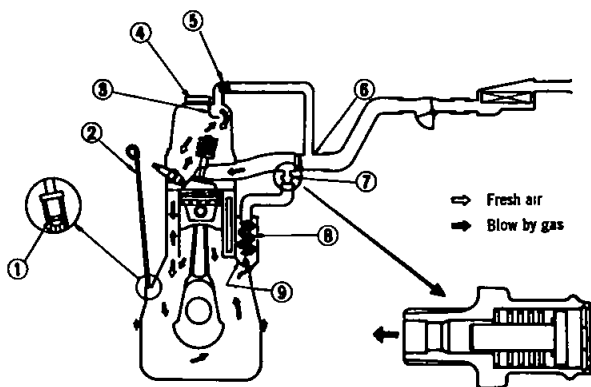


PCV SYSTEM (L24 AND L26)

- 1 Flame arrester
- 2 Baffle plate and steel net
- 3 PCV valve

Fresh air
 Blow by gas

10



PCV SYSTEM — L28

- | | | |
|-------------------|--------------------|----------------|
| 1 O-ring | 4 Oil cap | 7 PCV valve |
| 2 Oil level gauge | 5 Flame arrester | 8 Steel net |
| 3 Baffle plate | 6 Throttle chamber | 9 Baffle plate |

ATC Air Cleaner

The automatic temperature control air cleaner is used on all 1972 and later models except the 280Z. To check, look down the air cleaner throat. The flap valve should be closed when the engine is cold, and should open as the engine warms up.

Fuel Filter

On all except the 280Z, disconnect the lines, pull the filter out of its clip, and install a new filter. See Figure 12A.

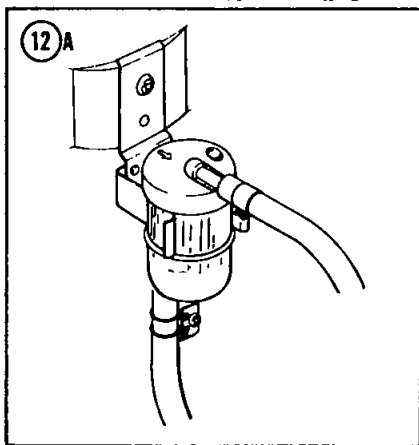


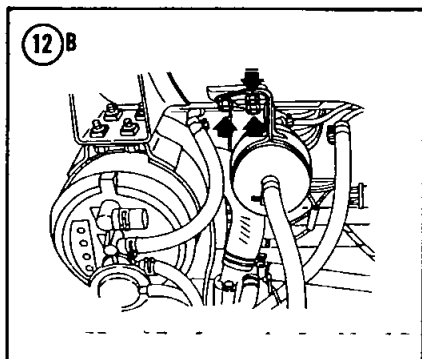
Figure 12B shows the 280Z filter. Since the fuel in the lines is under high pressure, the pressure must be relieved before the lines can be disconnected. To do this, perform Steps 1-6 of *Removal/Installation (280Z Electric Pump)*, Chapter Five. Then disconnect the lines from the filter, remove 3 bolts, and take it out. Install in the reverse order.

Spark Timing Control System

Have the system tested by a Datsun dealer or certified emission control station.

Throttle Opener or BCDD

If equipped with a throttle opener or boost controlled deceleration device, check as described in Chapter Five.



Brake Fluid

The brake fluid should be drained and replaced. Fill the hydraulic system with fluid marked DOT 3, then bleed the brakes as described in Chapter Five.

Brake Booster (Power Brakes)

Test the brake booster, check valve, and vacuum hose as described in Chapter Ten.

Brake Inspection

On cars, check front brake pads every 3,000 miles (1968-1973), 4,000 miles (1974), or 6,250 miles (1975 on). On cars and trucks, inspect drums and shoes every 12,000 miles (1968-1974) or 12,500 miles (1975 on).

Battery

Clean and inspect the battery as described in Chapter Seven.

Shock Absorbers

Check the shock absorbers for signs of fluid leakage. Front shocks on 4-cylinder cars, and all shocks on Z sports cars, are incorporated in the front suspension struts. Pickup trucks use conventional tube shocks on all 4 wheels. Push the vehicle down firmly and let it up quickly. If it bounces more than once, replace the shock absorbers as described in Chapters Eleven and Twelve.

Drive Shaft

Check the drive shaft for wear. The easiest way to do this is to shake the drive shaft while watching the universal joints. If play can be detected in the U-joints, disassemble and repair them as described in Chapter Twelve. After checking for U-joint wear, tighten the bolts attaching the drive shaft to the differential flange (and to the transmission flange on early pickups).

Wheel Alignment

Have wheel alignment checked and adjusted if necessary by a Datsun dealer or front-end specialist.

Pedal Lubrication

Using multipurpose grease, lubricate brake and clutch pedals at their pivot points. Also lubricate the pivot points (in the pedals) of the brake and clutch master cylinder pushrods.

Coolant

Drain, flush, and refill the cooling system as described in Chapter Six.

Air Cleaner Element

Remove the air cleaner element, discard it, and install a new one. Do not attempt to clean the element.

Air Injection System

If equipped with an air injection system, inspect as described in Chapter Five.

Proportioning Valve (Cars)

Inspect as described in Chapter Ten.

Wheel Bearings

Clean, repack, and adjust as described in Chapter Twelve.

Rear Axle Shafts (IRS)

Independent rear suspension (IRS) is used on 510 and 610 sedans and hardtops as well as Z sports cars. Disassemble, clean, and lubricate the axle shafts as described in Chapter Eleven.

Headlights

Have the aim of the headlights checked by a Datsun dealer or certified lamp adjusting station.

Drive Shaft

Drive shaft universal joints should be disassembled and lubricated as described in Chapter Eleven.

TUNE-UP

Under normal conditions, a complete tune-up is required every 12,000 miles (1968-1974) or 12,500 miles (1975 on). More frequent tune-ups may be required under the severe conditions described earlier in this chapter.

On 1968-1973 models, the factory recommends checking plugs, points, ignition timing, and carburetor adjustments every 3,000 miles. Valve clearances should be checked every 6,000 miles.

Since different systems in an engine interact, procedures should be done in following order:

- a Tighten cylinder head bolts (or nuts)
- b Adjust valve clearances
- c Work on ignition system
- d Adjust carburetors

Cylinder Head Bolts

Head bolt tightening procedures are given in Chapter Four, under *Cylinder Head Installation*.

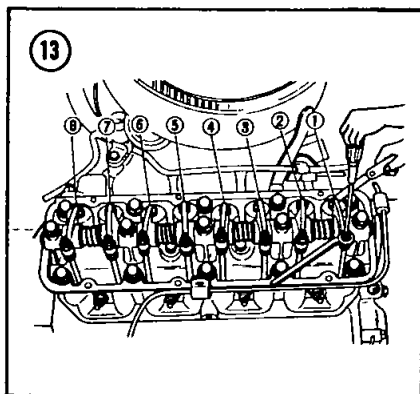
Valve Adjustment (A-Series Engines)

Adjust valves with the engine warmed to normal operating temperature, and turned off.

1 Remove the valve cover and all 4 spark plugs. Removing the plugs makes it easier to turn the engine by hand.

2 Turn the engine in its normal direction (clockwise, viewed from the front) until No. 1 piston is at top dead center (TDC) on its compression stroke. This is evident when the 0° ignition timing mark aligns with the timing pointer, and the distributor rotor points toward No. 1 terminal in the distributor cap. Be sure to check rotor position as well as the timing marks, because the 0° mark also lines up when No. 4 piston is at TDC on its compression stroke.

3 With No 1 cylinder at TDC on the compression stroke, adjust clearances on valves 1, 2, 3, and 5. Figure 13 shows valve numbers.



To adjust, loosen the locknut on the adjusting screw and insert a feeler gauge between the rocker arm and valve stem as shown. Turn the adjusting screw until clearance is correct. Retighten the locknut, holding the adjusting screw with a screwdriver to keep it from turning. Recheck the clearance.

4 Turn the crankshaft one full revolution, so No 4 cylinder is at top dead center on the compression stroke. The 0° timing mark will again line up with the pointer, and the distributor rotor will point to No 4 terminal in the distributor cap. Again, be sure to check rotor position as well as the timing marks.

5 With No 4 cylinder at TDC on its compression stroke, adjust clearances on valves 4, 6, 7, and 8. See Figure 13.

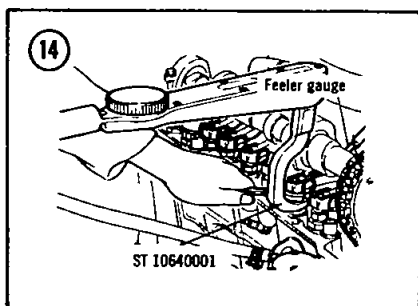
Valve Adjustment (L-Series Engines)

The valves are adjusted first with the engine cold, then at operating temperature. Adjustment is made with the engine off in both cases. Clearances are measured between the camshaft lobes and a friction surface on the center of each rocker arm. Procedures are much the same for 4-cylinder and 6-cylinder engines.

1 Remove the valve cover and spark plugs. Removing the spark plugs makes it easier to turn the engine by hand.

2 Turn the engine over until No 1 piston is at top dead center on its compression stroke. This is evident when the 0° timing mark at the front of the engine aligns with the timing pointer, and the distributor rotor points toward No 1 terminal in the distributor cap. Be sure to check rotor position, because the timing marks also line up when No 4 piston is at top dead center on its compression stroke.

3 Referring to Figure 14, loosen the locknut on the rocker arm pivot. If the 19mm crow's foot wrench shown in Figure 14 is not available, an open-end wrench can be used. However, the special wrench is necessary to tighten the locknut accurately.



4 Insert a feeler gauge between the rocker arm and camshaft lobe. Turn the pivot adjusting nut with a second wrench. Set intake valve clearances at 0.008 in. (0.20mm) and exhaust valve clearances at 0.010 in. (0.25mm). Tighten the pivot locknut to 36-43 ft.-lb. and recheck the clearance.

5 Valves for the remaining cylinders are adjusted in the same manner as No 1 cylinder. Each cylinder is at top dead center on its compression stroke when the distributor rotor points to the distributor cap terminal for that cylinder, and both valves for that cylinder are closed. If there is any doubt, place a finger on the spark plug hole while the engine is being turned. If the piston is on the compression stroke, pressure buildup will be felt. On 4-cylinder engines, the next cylinder to come to TDC on the compression stroke is No 3, followed by No 4, then by No 2. On the 6-cylinder engines, the order is 5-3-6-2-4.

6 After adjusting valve clearances with the engine cold, run the engine until it warms to normal operating temperature. Recheck the clearances. Intake valves should now be 0.010 in (0.25mm) and exhaust valves 0.012 in (0.30mm). Readjust the valve clearances if necessary.

Valve Adjustment (J13 Engine)

1 Warm the engine to normal operating temperature, then remove the valve cover.

2 Remove the spark plugs. Removing the plugs makes it easier to turn the engine by hand.

3 Turn the engine until No. 1 piston is at top dead center on its compression stroke. When this occurs, the 0° mark on the crankshaft pulley will align with the timing pointer on the front of the engine. In addition, the distributor rotor will point to No. 1 terminal in the distributor cap. Be sure to check the rotor as well as the timing marks, because the timing marks also line up when No. 4 piston is at TDC on its compression stroke.

4 Referring to Figure 15, insert a 0.014 in feeler gauge between the rocker arm and valve stem. The feeler gauge should just slip in, without noticeable looseness or binding. If it does not, loosen the locknut on the adjusting screw as shown. Turn the screw clockwise to reduce valve clearance, turn counterclockwise to increase. When clearance is correct, tighten the locknut. Recheck clearance to be sure it hasn't changed.



5 Turn the crankshaft 180°, so the 0° timing mark is at the bottom. This places No. 3

cylinder at TDC on its compression stroke. Verify this by checking the position of the distributor rotor. Adjust valves for No. 3 cylinder in the same manner as No. 1.

6 Turn the crankshaft 180°, so the 0° mark on the crankshaft pulley is again on top. Adjust the valves for No. 4 cylinder.

7 Turn the crankshaft another 180°, then adjust the valves for No. 2 cylinder.

Spark Plugs

Examine the plugs and compare their condition to Figure 16. At 12,000-mile or 12,500-mile intervals, discard the plugs. Their condition is an indicator of engine condition, and can warn of developing trouble. Check the gap on the plugs and compare to Table 9, at the end of the chapter. Adjust the gap if needed, then install the new plugs.

Distributor Cap and Rotor

Pry back the distributor cap clips and remove the cap. Label the spark plug and coil wires so they can be reconnected properly, then pull them out of the cap. Remove dirt and corrosion from the wire terminals and the terminals inside the cap. If the cap and rotor are damaged or excessively worn, replace them. Replace the wires if insulation is brittle, melted, or cracked.

Breaker Points, Condenser

Breaker point ignition is used on all 1968-1974 models except the 260Z, all 1975 and later non-California models except the 280Z, and on the 1975 California pickup truck.

1 Loosen the screw on the primary lead terminal(s). See Figure 17 (single-point distributors) or Figure 18 (dual-point distributors). Slide the primary lead wire(s) off terminal(s).

2 Remove 2 screws securing the points (2 screws from each points set on dual-point distributors). Carefully note how the points are positioned, then lift them out of the distributor. Install new points exactly as the old ones were.

3 Apply a *small* amount of distributor cam lubricant to the cam lobes.

4 Using a crayon or felt pen, make alignment marks on the distributor body and engine

16

SPARK PLUG CONDITION

**NORMAL**

- Identified by light tan or gray deposits on the firing tip
- Can be cleaned

**GAP BRIDGED**

- Identified by deposit buildup closing gap between electrodes
- Caused by oil or carbon fouling. If deposits are not excessive the plug can be cleaned

**OIL FOULED**

- Identified by wet black deposits on the insulator shell bore electrodes
- Caused by excessive oil entering combustion chamber through worn rings and pistons excessive clearance between valve guides and stems, or worn or loose bearings. Can be cleaned. If engine is not repaired use a hotter plug

**CARBON FOULED**

- Identified by black, dry fluffy carbon deposits on insulator tips exposed shell surfaces and electrodes
- Caused by too cold a plug weak ignition dirty air cleaner defective fuel pump, too rich a fuel mixture improperly operating heat riser or excessive idling. Can be cleaned

**LEAD FOULED**

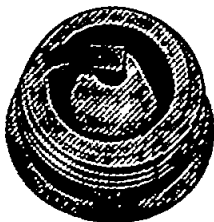
- Identified by dark gray black, yellow, or tan deposits or a fused glazed coating on the insulator tip
- Caused by highly leaded gasoline. Can be cleaned

**WORN**

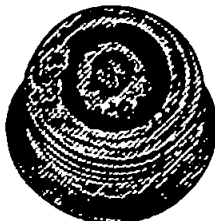
- Identified by severely eroded or worn electrodes
- Caused by normal wear. Should be replaced

**FUSED SPOT DEPOSIT**

- Identified by melted or spotty deposits resembling bubbles or blisters
- Caused by sudden acceleration. Can be cleaned

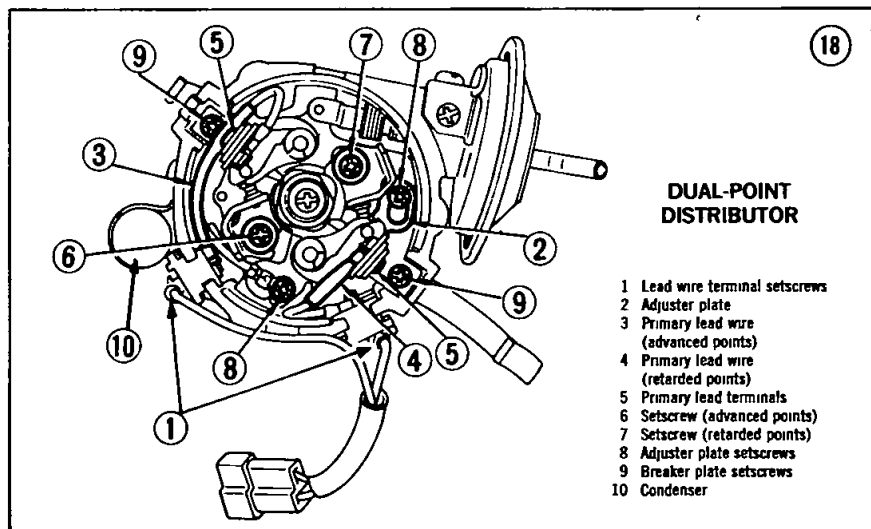
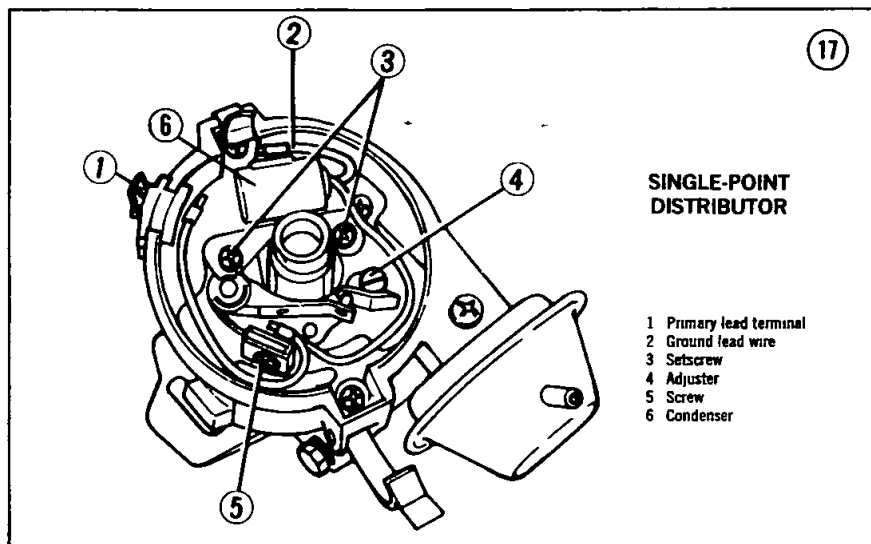
**OVERHEATING**

- Identified by a white or light gray insulator with small black or gray brown spots and with bluish burnt appearance of electrodes.
- Caused by engine overheating, wrong type of fuel loose spark plugs too hot a plug low fuel pump pressure or incorrect ignition timing. Replace the plug

**PREIGNITION**

- Identified by melted electrodes and possibly blistered insulator. Metallic deposits on insulator indicate engine damage

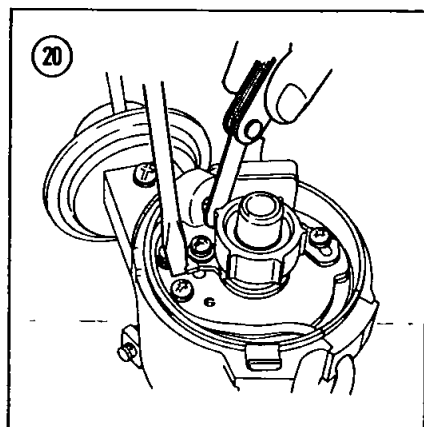
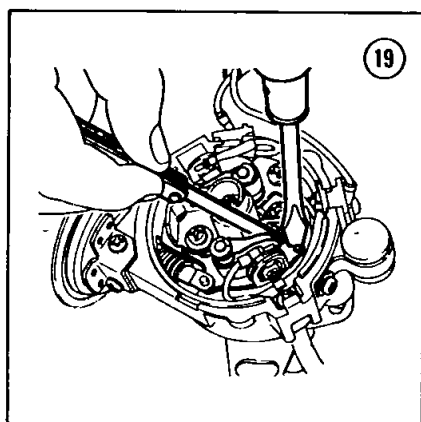
- Caused by wrong type of fuel, in correct ignition timing or advance too hot a plug, burned valves, or engine overheating. Replace the plug.



Loosen the distributor fixing bolt. Carefully turn the distributor by hand until a cam lobe opens the points to the maximum gap. Measure the gap with a feeler gauge and compare with

specifications (Table 9, end of chapter). To adjust on single-point distributors, loosen the point securing screws and turn the adjuster (4, Figure 17). To adjust on dual-point distribu-

tors, loosen the points securing screws, insert a screwdriver in the points adjusting slot, and twist (Figure 19)

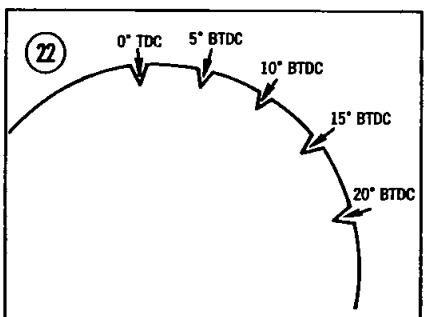
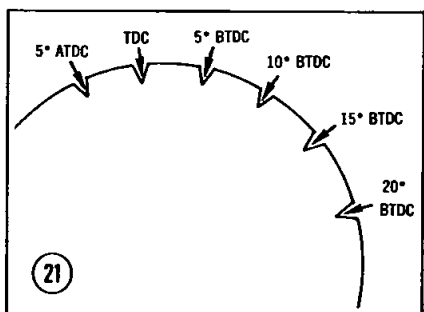


5 After setting point gap, turn the distributor back to its original position and tighten the fixing bolt

6 Replace the condenser(s)

Reluctor, Pickup Coil

The reluctor and pickup coil are part of the breakerless ignition system used on 260-280Z's and all 1975 and later California models except the 1975 pickup truck. The air gap between these parts should be checked at alternating tune-ups. To measure, insert a feeler gauge as shown in Figure 20. Compare with Table 9, end of chapter. Adjustment may be unnecessary, since there is no friction between reluctor and pickup coil. To adjust, loosen the pickup coil screw and pivot the coil in or out as needed. On dual-pickup distributors, adjust both gaps in the same manner.



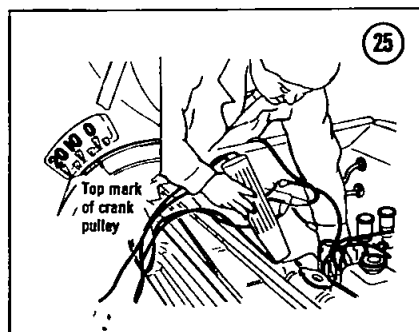
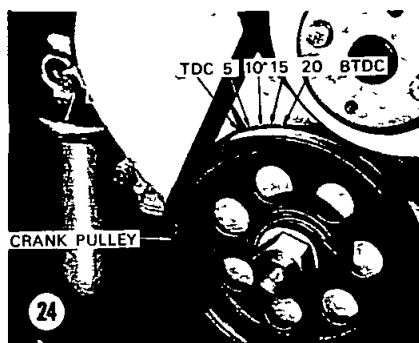
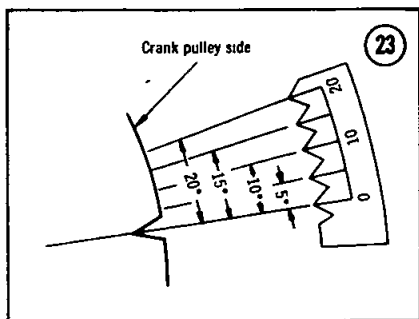
Ignition Timing

Ignition timing requires a stroboscopic timing light of the type described in Chapter Three. Connect the light according to manufacturer's instructions.

1 Clean the crankshaft pulley and timing marks. See Figure 21 (early L16), Figure 22 (early L24), Figure 23 (all late L-series), Fig-

ure 24 (early A-series), Figure 25 (late A-series), or Figure 26 (J13)

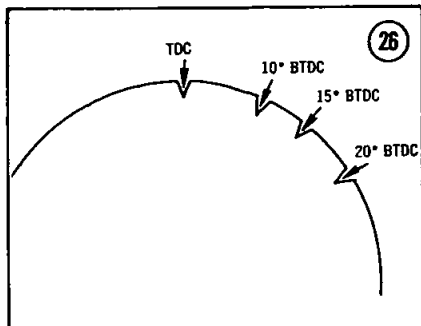
2 Find the correct timing mark in Table 9, end of chapter. Apply white paint or chalk to the



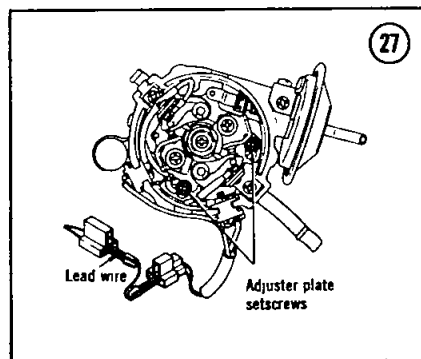
mark and to the timing pointer or crankshaft pulley notch

3 Disconnect the distributor vacuum line. Plug the line with tape

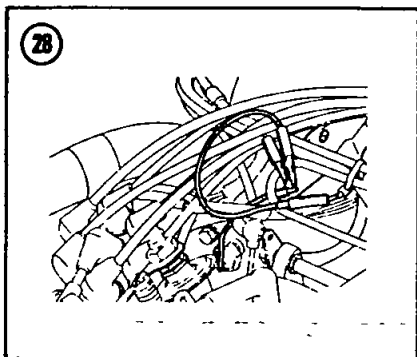
4 On 1973 510's, 610's, and pickups, automatic transmission 240-260Z's, and non-Cal-



ifornia 280Z's, the retarded points set or pickup coil functions when the engine is warm and idling. To set timing, however, the advanced points or pickup coil must be made to function. To do this on 510's, 610's, pickups, and 240Z's, disconnect the primary connector from the distributor. Connect a jumper wire as shown in Figure 27. On 260Z's, disconnect the green wire from the water temperature switch in the thermostat housing. On 280Z's, disconnect the red wire from the switch. Ground the harness end of the wire (not the switch end) to the engine with a jumper wire. See Figure 28.



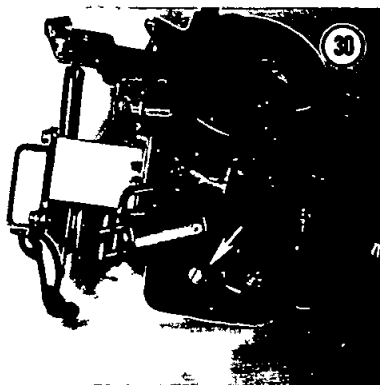
5 Start the engine. If necessary, adjust idle speed to specifications (Table 9, end of chapter). Loosen the distributor fixing bolt and turn the distributor until the correct timing mark aligns with the timing pointer. Tighten the fixing bolt, shut the engine off, and reconnect the vacuum line.



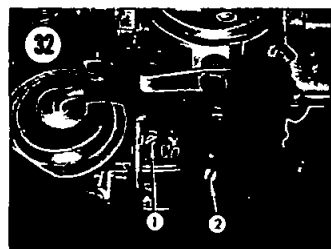
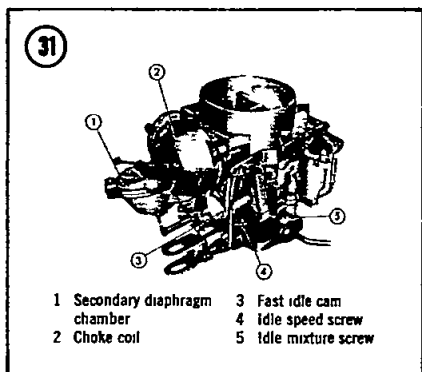
Carburetor Adjustment (J13 Engine)

1 Warm the engine to normal operating temperature. Remove the air cleaner. Connect an accurate tune-up tachometer to the engine.

2 Set idle at 700 rpm with the idle speed screw (Figure 29). Then turn the idle mixture screw (Figure 30) to obtain the smoothest idle. If necessary, reset engine speed to 700 rpm with the idle speed screw.



3 Set engine speed at 750 rpm (manual transmissions), 770 rpm (L16 with automatic), or 780 rpm (A12 with automatic). Figure 31 shows L16 adjusting screws, Figure 32 shows the A12 screws.



Carburetor Adjustment (L16 and A12 Engines, 1968-1972)

1 Warm the engine to normal operating temperature. Remove the air cleaner.

2 Run the engine at 2,000 rpm for 15 seconds (L16), then let it idle for one minute.

- | |
|----------------------|
| 1 Idle speed screw |
| 2 Idle mixture screw |

4 Adjust the idle mixture screw to obtain the smoothest possible idle. If necessary, readjust idle speed.

5 Turn the mixture screw clockwise (for a leaner mixture) until idle speed drops to specifications (Table 9, end of chapter).

6 Place automatic transmissions in DRIVE. Compare idle speed with Table 9.

Carburetor Adjustment

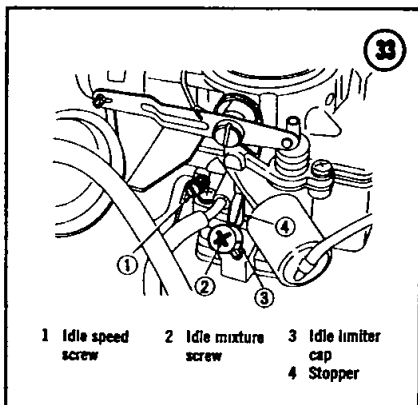
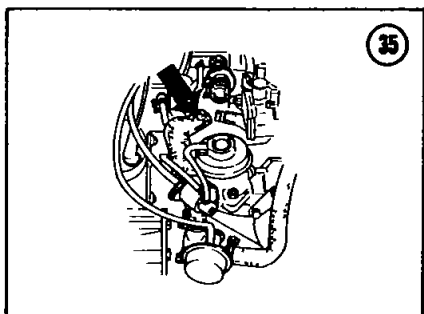
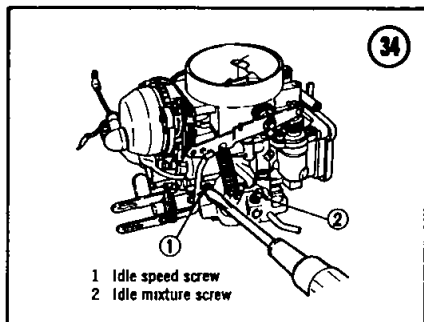
(4-Cylinder Engines, 1973-1974)

Datsun recommends using a carbon monoxide (co) meter to adjust the idle on 1973-1974 engines. Although it is possible to adjust the carburetor without the co meter, the instrument is necessary to ensure that exhaust emissions are within legal limits.

1 Warm the engine to normal operating temperature. Remove the air cleaner and connect a tune-up tachometer to the engine.

2 Let the engine idle for one minute.

3 With the transmission in neutral, set idle speed at 800 rpm (A-series, L16, L18), or 750 rpm (L20B). Figure 33 shows the L-series adjusting screws; Figure 34 shows the A-series version.



A-series), 1.5 percent (1974 L18), or 3 percent (1974 L20B).

7 If a co meter is not available, turn the mixture screw as far clockwise (lean) as possible without roughening the idle. This method should not be used unless absolutely necessary, and results should be checked on a co meter as soon as possible.

8 Compare engine speed with Table 9 (end of chapter). If necessary, readjust by turning the idle speed screw.

Carburetor Adjustment

(4-Cylinder Engines, 1975 On)

A co meter is recommended for carburetor adjustment. However, an alternate procedure can be used if the co meter isn't available.

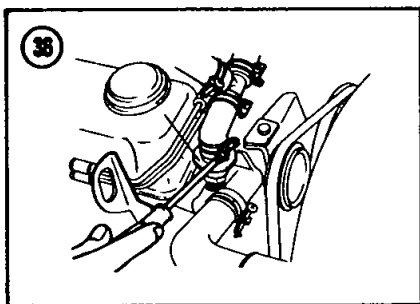
1 Disconnect the air hose from the check valve. See Figure 35 (L-series) or Figure 36 (A-series).

2 Warm the engine to normal operating temperature. Connect a tune-up tachometer.

4 On 1974 610's, disconnect the hose from the air injection check valve (Figure 35).

5 Place automatic transmissions in DRIVE.

6 Using the idle mixture screw, set co percentage at 1 to 2 percent (1973 L-series, 1973-1974



3 Race the engine 2 or 3 times at 1,500-2,000 rpm, then let it idle

4 Check idle speed. It should be 750 rpm in NEUTRAL (L-series manual), 700 rpm in NEUTRAL (A-series manual), or 650 rpm in DRIVE (all automatics). Adjust if needed with the idle speed screw. See Figure 34.

5 If a CO meter is available, set CO percentage at 1-3 per cent with the idle mixture screw. If this changes idle speed, reset with the idle speed screw.

NOTE Perform Steps 6-9 only if a CO meter is unavailable.

6 Set idle speed at 815 rpm in NEUTRAL (L-series manual), 765 rpm in NEUTRAL (A-series manual) or 670 rpm in DRIVE (all automatics).

7 Turn the idle mixture screw to obtain the fastest smooth idle.

8 Reset idle speed with the idle speed screw.

9 Turn the idle mixture screw clockwise until engine speed drops 60-70 rpm (manual) or 15-25 rpm (automatic).

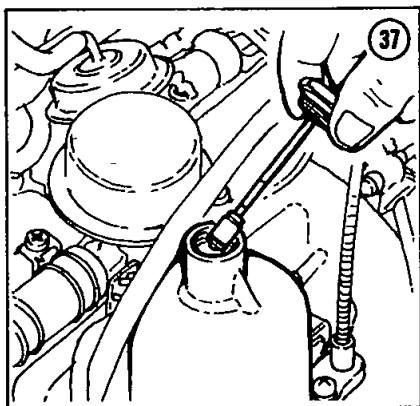
10 Reconnect the hose to the check valve. If engine speed increases, reset it with the idle speed screw.

Carburetor Adjustment (All 240Z's and Manual Transmission 260Z's)

Carburetor adjustment requires a Unisyn gauge. Since mixture adjustments are based on the percentage of carbon monoxide in the exhaust gas, a CO meter should also be used. While it is possible to adjust the carburetors without a CO meter, it is necessary to ensure that exhaust emissions are within legal limits.

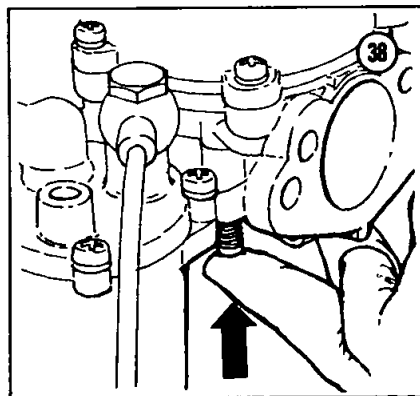
1 Drive the car for at least 20 minutes at 30 mph or more. This is necessary for correct adjustments.

2 Remove the air cleaner cover and filter element. Remove the damper oil cap as shown in Figure 37.



3 Check damper oil level. If it is below the lower line on the plunger rod, top up with SAE 20 or 10W-30 oil. Do not use a heavier grade of oil.

4 Check piston movement. On 1970-1972 cars, push up on the piston lifters (Figure 38). On 1973-1974 cars, pry the pistons up with a soft metal bar. The pistons should rise and fall smoothly. A click should be heard when the pistons hit bottom.



5 Completely loosen the balance screw and throttle opener adjusting screw. See **Figure 39** (1970-1972) or **Figure 40** (1973-1974)

6 Connect a tachometer and timing light to the engine

7 On 1970-1972 cars, set idle speed at 600-700 rpm with the front and rear throttle adjusting screws (10, **Figure 39**). The engine should be at the lowest speed at which it will run smoothly

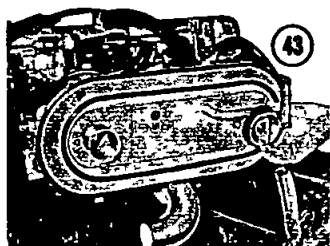
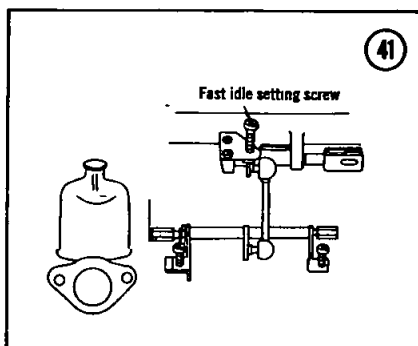
On 1973-1974 cars, set idle speed at 750 rpm with the idle speed screw (4, **Figure 40**)

NOTE Do not touch the fast idle screw. Turning this screw will unsynchronize the carburetors. **Figure 41** shows the screw on 1970-1972 carburetors, **Figure 40** shows the 1973-1974 arrangement

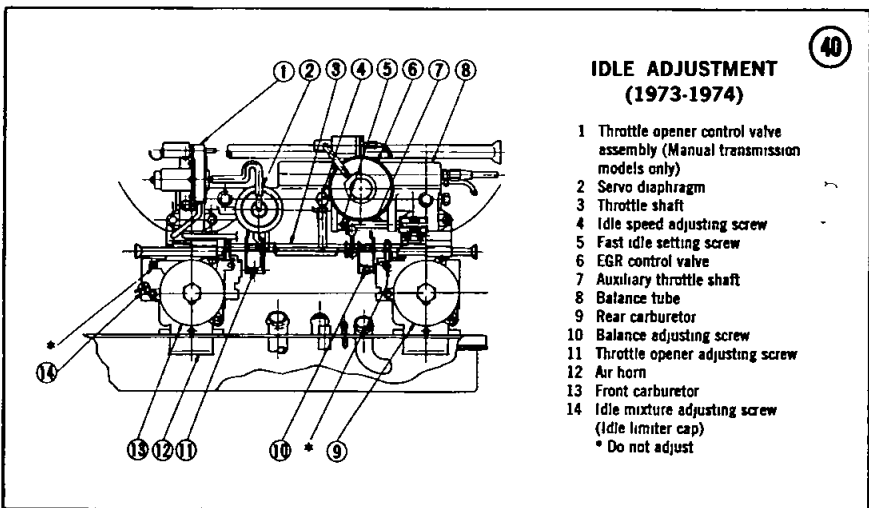
8 If engine speed cannot be reduced below 750 rpm in Step 7, check the opener and balance screws (**Figure 39** or **40**) to make sure they are not too tight. Also make sure there is play between the auxiliary throttle shaft and throttle shaft as shown in **Figure 42**

NOTE Steps 9 and 10 apply only to 1970-1972 models

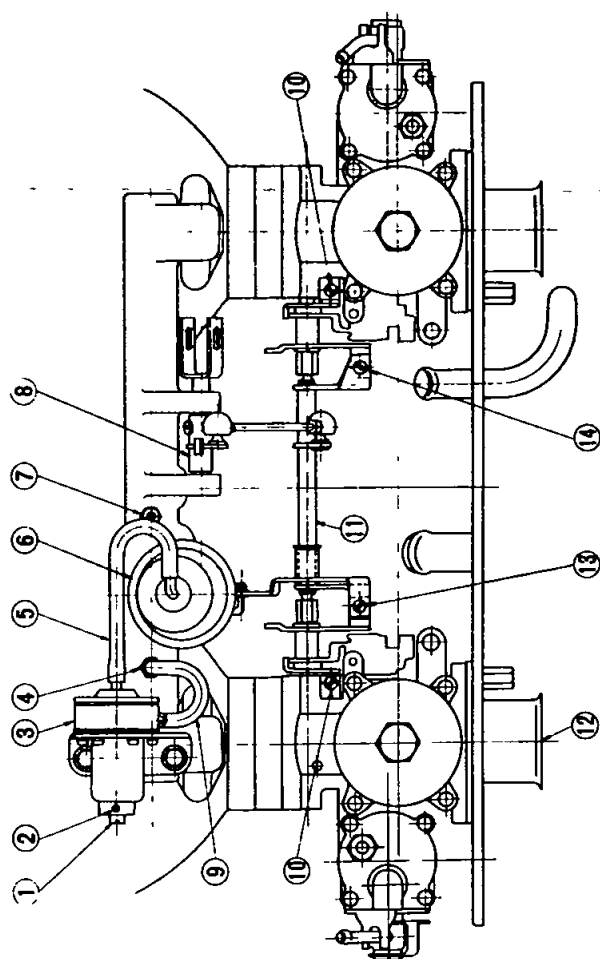
9 Apply the Unisyn gauge to one of the air horns as shown in **Figure 43**. Turn the adjuster



in the center of the gauge so the gauge float is centered in the calibrated tube

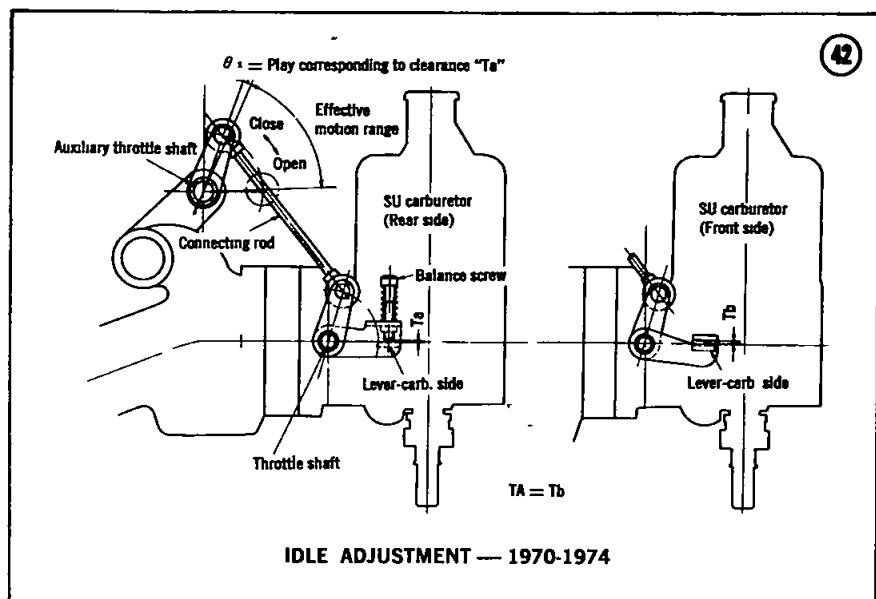


39



IDLE ADJUSTMENT — 1970-1972

- | | | |
|-----------------------------|-----------------------------|---------------------------|
| 1 Vacuum adjusting screw | 6 Servo diaphragm | 11 Throttle shaft |
| 2 Lock screw | 7 Connector A.B. valve | 12 Air cleaner, air horn |
| 3 Control valve | 8 Auxiliary throttle shaft | 13 Opener adjusting screw |
| 4 Connector control valve | 9 Vac. tube control valve | 14 Balance screw |
| 5 Vac. tube servo diaphragm | 10 Throttle adjusting screw | |



10 Apply the Unisyn to the front and rear air horns and compare the height of the gauge float. If float height is not the same for both carburetors, adjust by turning the rear throttle adjusting screw.

NOTE: Since the Unisyn restricts air flow, apply it only for 1-2 seconds at a time. Longer applications will result in inaccurate readings.

11 Check ignition timing as described earlier in this chapter. Adjust if necessary.

12 Referring to Figure 39, disconnect the control valve vacuum tube (9) from the intake manifold connection (4). Then disconnect the servo diaphragm tube (5) from the control valve and attach it to intake manifold connection (4). This will cause manifold vacuum to operate the servo diaphragm and increase engine speed.

13 Engine speed should be about 1,400 rpm. Adjust if necessary by turning throttle opener adjusting screw. See Figure 39 or 40.

14 Measure air flow at front and rear air horns with the Unisyn gauge. If uneven, adjust with the balance screw (Figure 39 or 40).

NOTE: Apply the Unisyn for only 1-2 seconds at a time to prevent inaccurate readings.

15 On 1973-1974 cars, install the air cleaner cover.

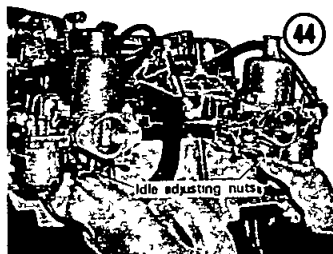
16 Race the engine briefly at 3,000 rpm, then let engine speed drop. Turn the opener adjusting screw to increase engine speed to 1,700 rpm. Then gradually lower engine speed to 1,400 rpm with the opener adjusting screw.

17 Disconnect the short hose from the air injection check valve.

18 Check CO level with the exhaust gas analyzer. It must be 1.0-1.6 percent for manual transmission models, and 0.6-1.2 percent for automatics.

19 On 1970-1972 cars, if CO level is too high, turn the idle mixture adjusting nuts (Figure 44). Turn the nuts simultaneously, $\frac{1}{4}$ turn at a time, clockwise (upward).

NOTE: If a CO meter is not available, turn the idle adjusting nuts all the way to the top, then back them off 3 turns.



Turn the nuts back up, simultaneously, $\frac{1}{4}$ turn at a time, until the engine reaches its highest, most stable speed. Do not use this procedure unless absolutely necessary.

20 On 1973-1974 cars, adjust CO level with the idle mixture screw (14, Figure 40)

21 Reconnect the tube to the air injection check valve

22 Disconnect the servo diaphragm vacuum tube (9, Figure 39) from the intake manifold connection (4, Figure 39). Cover the manifold connection with a finger, and leave the tube disconnected for a few seconds. Reconnect the tube and check the tachometer to make sure engine speed stays at 1,400 rpm. If engine speed is incorrect, adjust with the opener adjusting screw.

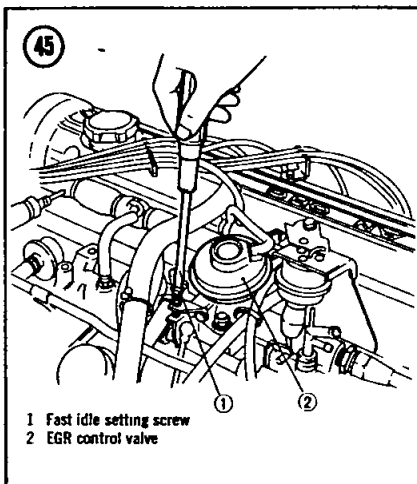
23 When the engine speed is 1,400 rpm, reconnect the throttle opener tubing in the normal position. To do this, connect the control valve tube (9, Figure 39) to intake manifold connection (4), and connect the servo diaphragm vacuum tube (5) to the control valve (3).

24 Recheck with Unisyn to make sure air flow is even for both carburetors. Make sure idle speed is correct (Table 7).

25 After adjustment, check CO percentage. It must be 1.5-2.5 percent (1970), 2 percent (1971), 3 percent or less (1972-1973), and 2.7 percent or less (1974).

Idle Speed and Mixture Adjustments (Automatic Transmission 260Z's)

1 Perform Steps 1 through 11 of the previous adjustment procedure.



1 Fast idle setting screw
2 EGR control valve

2 Raise engine speed to approximately 1,400 rpm with the fast idle screw (Figure 45).

NOTE: Count the number of turns required to raise idle speed to 1,400 rpm. Write this figure down for later use.

3 Measure air flow at both carburetors with a Unisyn gauge (Figure 43). If uneven, adjust the balance screw (10, Figure 40).

4 Install the air cleaner cover.

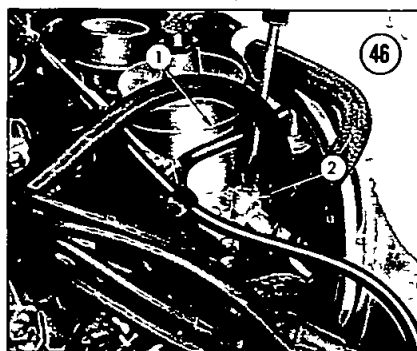
5 Race the engine briefly at 3,000 rpm. Using the fast idle screw, raise engine speed to 1,700 rpm, then lower it to 1,400 rpm.

6 Disconnect the inlet hose from the air injection check valve.

7 Check CO percentage with the exhaust gas analyzer. It should be between 0.6-1.2 percent.

8 If the gas analyzer isn't available, turn the idle mixture screw (Figure 46) counterclockwise until the engine just begins to run roughly. Turn it back just enough to obtain a smooth idle. This procedure *does not* ensure compliance with emission standards, and should not be used unless absolutely necessary.

9 Turn the fast idle screw back to its original position, referring to the figure written down in Step 2.



1 Carburetor 2 Idle mixture adjusting screw

10 Idle speed should be 600 rpm with the transmission in DRIVE. Adjust if necessary with the idle speed screw (Figure 47)

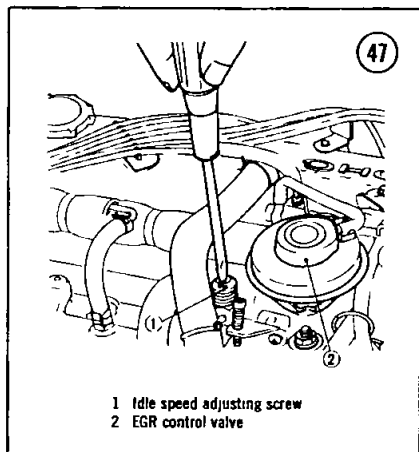
Idle Speed Adjustment (280Z)

Since idle mixture is controlled automatically by the fuel injection system, idle speed is the only fuel system adjustment on 280Z's

1 Warm the engine to normal operating temperature. Connect a tune-up tachometer.

2 On automatic transmissions, have an assistant hold the brake pedal down (or block the wheels) and shift to DRIVE. Leave manual transmissions in NEUTRAL.

3 Set idle speed (Table 9) to specifications with the idle speed screw. See Figure 48.



1 Idle speed adjusting screw
2 EGR control valve

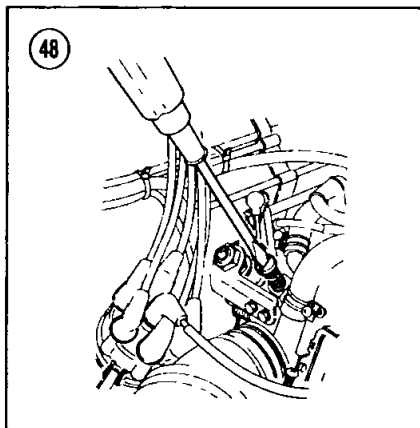


Table 9, Tune-up Specifications, on next 2 pages

Table 9 TUNE-UP SPECIFICATIONS

Valve Clearance

L series engines	
Intake, hot	0 010 in (0 25mm)
Exhaust, hot	0 012 in (0 30mm)
Intake, cold	0 008 in (0 20mm)
Exhaust, cold	0 010 in (0 25mm)
A series and J13 engines (all)	0 014 in (0 35mm)

Spark Plug Gap

L16 (1968-72), all L24, all L26	0 031-0 035 in (0 8-0 9mm)
L16, L18, L20B (1973-74)	0 028-0 031 in (0 7-0 8mm)
L20B (1975-on)	0 039-0 043 in (1 0-1 1mm)*
L28 (1975)	0 031-0 035 in (0 8-0 9mm)
L28 (1976)	0 028-0 031 in (0 7-0 8mm)
L28 (1977)	0 039-0 043 in (1 0-1 1mm)
A12 (1971)	0 028-0 031 in (0 7-0 8mm)
A12 (1972-73), A13 (1974), A14 (1975-76)	0 031-0 035 in (0 8-0 9mm)
A14 (1977)	0 039-0 043 in (1 0-1 1mm)
J13	0 028-0 031 in (0 7-0 8mm)

Points Gap

0 018-0 022 in (0 45-0 55mm)

Dwell Angle

4-cylinder engines	49-55°
240Z (manual)	35-41°
240Z (automatic)	33-39°

Reactor Air Gap

260Z	0 012-0 016 in (0 3-0 4mm)
All others	0 008-0 016 in (0 2-0 4mm)

Ignition Timing

L16 (1968-69)	5° ATDC
L16 (1970-71)	10° BTDC
L16 (1972)	7° BTDC
L16 (1973)	
Cars through chassis No PL510-429350	5° BTDC
Cars from chassis No PL510-429351	8° BTDC
Trucks through chassis No PL620-141296	5° BTDC
Trucks from chassis No PL620-141297	8° BTDC
L18 (1973)	
Through chassis No PL610-815989	5° BTDC
From chassis No PL610-815990	8° BTDC
L18 and L20B (1974-on)	12° BTDC**
L24 (1970-72)	
Manual transmission	5° BTDC
Automatic transmission	0° TDC
L24 (1973)	
Manual transmission	7° BTDC
Automatic transmission	5° BTDC

(continued)

Table 9 TUNE-UP SPECIFICATIONS (continued)

L26	
Manual transmission	7° BTDC
Automatic transmission	8° BTDC
L28 (1975-76)	
California cars	10° BTDC
Non-California cars	7° BTDC
A-series (1971-74)	5° BTDC
A series (1975-76)	
Manual transmission	10° BTDC
Automatic (California)	8° BTDC
Automatic (non-California)	10° BTDC
A series (1977)	
Manual transmission	10° BTDC
Automatic (California)	10° BTDC
Automatic (non-California)	8° BTDC
J13	0° (TDC)
Idle Speed, Manual Transmission	
L16 (1968-72)	700 rpm
L16 L18 (1973-74)	800 rpm
L20B (1974), L24 (1970-73), L26 (1974)	750 rpm
L20B (1975-on)	See text
L28	800 rpm
A12 (1971-72)	700 rpm
A12 (1973) A13 (1974)	800 rpm
A14 (1975-on)	See text
J13	700 rpm
Idle Speed, Automatic Transmission***	
L16 (1968-69)	650 rpm
L16 (1970-71)	575 rpm
L16 (1972)	600 rpm
L16 L18 (1973-74)	650 rpm
L20B (1974)	650 rpm
L20B (1975-on)	See text
L24 (1971-73), L26 (1974)	600 rpm
L28 (1975-on)	700 rpm
A12 (1972)	600 rpm
A12 (1973), A13 (1974)	650 rpm
A14 (1975-on)	See text

*0.031-0.035 in (0.8-0.9mm) on 1977 non-California pickup trucks

**10° BTDC on all 1975-1976 California pickup trucks, and on 1977 California pickups with manual transmission

***Set with transmission in DRIVE

CHAPTER THREE

TROUBLESHOOTING

Troubleshooting the Datsun can be relatively easy if done in a logical, orderly manner. The first step in any troubleshooting procedure must be defining the symptoms as closely as possible. After the symptoms are defined, areas which could cause the problems are tested and analyzed. Guessing at the cause of a problem may provide the solution, but it can easily lead to frustration, wasted time, and a series of expensive, unnecessary parts replacements.

The troubleshooting procedures in this chapter analyze typical symptoms, and show logical methods of isolating causes. These are not the only methods. There may be several ways to solve a problem, but only a systematic, methodical approach can guarantee success.

TROUBLESHOOTING INSTRUMENTS

The following equipment is necessary to troubleshoot any engine properly:

- a Voltmeter, ammeter, and ohmmeter
- b Hydrometer
- c Compression tester
- d Vacuum gauge
- e Fuel pressure gauge
- f Dwell meter

- g Tachometer
- h Strobe timing light
- i Exhaust gas analyzer

Items a-f are basic for any car. Items g-i are necessary for exhaust emission control compliance. The following is a brief description of each instrument. Consult a basic auto repair manual for more detailed information.

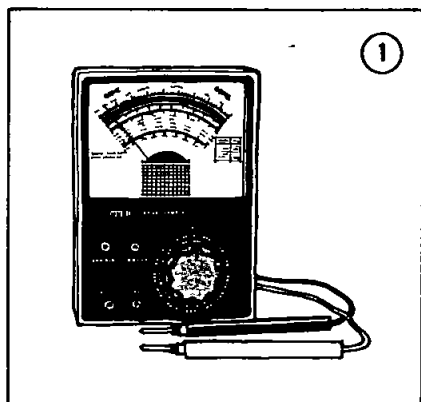
Voltmeter, Ammeter, and Ohmmeter

For testing the ignition and electrical systems, a good voltmeter is needed. A voltmeter covering 0-20 volts is satisfactory. It should have an accuracy of about $\pm 1/2$ volt, which excludes the type found in car instrument panels.

An ohmmeter measures electrical resistance. It is useful for checking continuity (open and short circuits) and testing fuses and lights.

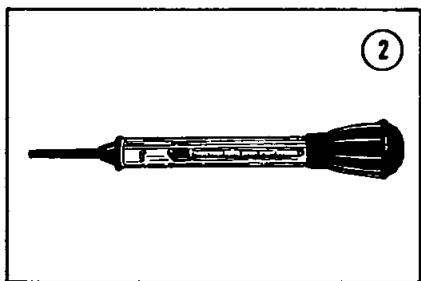
The ammeter measures electrical current. Ammeters for automotive use should cover 0-10 amperes and 0-100 amperes. These are useful for checking battery starting and charging current.

Some inexpensive volt-ohm-milliammeters combine all 3 instruments into one. The ammeter ranges are usually too small for automotive work, though. See Figure 1.



Hydrometer

The hydrometer gives a useful indication of battery condition and charge by measuring the specific gravity of the electrolyte in each cell. See Figure 2. Complete details on use and interpretation of readings are given in Chapter Seven.

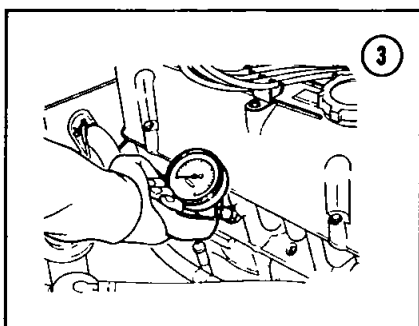


Compression Tester

The compression tester measures the compression pressure built up in each cylinder. Interpretation of compression test results can indicate general cylinder and valve condition. Figure 3 shows a compression tester in use.

There are 2 types of compression test "wet" and "dry." These tests are interpreted together to isolate problems in cylinders and valves. The dry compression test is done first. To test:

- 1 Warm the engine to normal operating temperature. Make sure choke is completely open.
- 2 Remove the spark plugs.



- 3 Connect the compression tester to one cylinder following manufacturer's instructions.
- 4 Have an assistant crank the engine over until there is no further increase in compression. Hold the accelerator to the floor while cranking.
- 5 Remove the tester and record the compression reading.
- 6 Repeat Steps 3-5 for each cylinder. Compare results with Table 1.

Table 1 COMPRESSION READINGS

	Psi	kg/cm ²
L16 (through 1972)	163-171	11.5-12.0
L16, L18, L20B (1973-on)	128-171	9.5-12.0
L24 L26	171-185	12.0-13.0
L28	163-178	11.5-12.5
A12 (1971)	142-181	10.0-12.7
A12, A13, A14 (1972-on)	178-206	12.5-14.5
J13	163	11.5

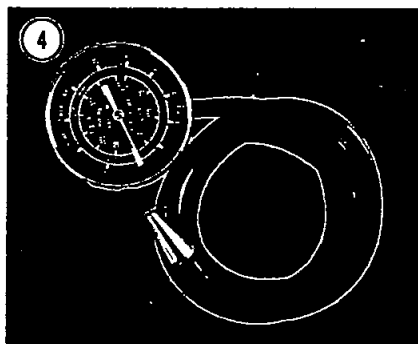
When interpreting the results, actual readings are not as important as the difference in readings. Low readings, although they may be even, are a sign of wear. Low readings in 2 adjacent cylinders may indicate a defective head gasket. No cylinder should test at less than 80 per cent of the highest cylinder. A greater difference indicates worn or broken rings, leaky or sticking valves, a defective head gasket, or a combination of all of these.

If the dry compression test indicates a problem, isolate the cause with a wet compression test. This is done in the same way as the dry

compression test, except that about one tablespoon of oil is poured down the spark plug hole before performing Steps 3-5. If the wet compression readings are much greater than the dry compression readings, the trouble is probably due to worn or broken rings. If there is little difference between wet and dry readings, the trouble is probably due to leaky or sticking valves. If 2 adjacent cylinders are low, and the wet and dry readings are close, the head gasket may be damaged.

Vacuum Gauge

The vacuum gauge (Figure 4) is used to test emission control components and power brakes. The gauge is connected to a vacuum line or component. Vacuum is then measured under specified engine conditions to determine whether a part is defective.

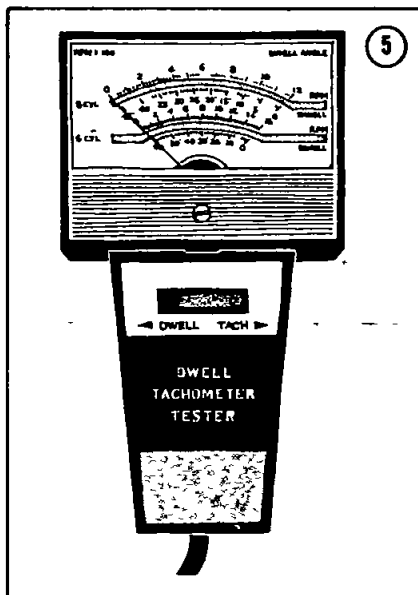


Fuel Pressure Gauge

This instrument is necessary to test fuel pump performance. Fuel pressure gauges are usually combined with vacuum gauges.

Dwell Meter

A dwell meter measures how many degrees of cam rotation that the distributor points remain closed when the engine is running. Since this angle is determined by breaker point gap, it is an accurate indication of point gap. Many tachometers intended for testing and tuning include a dwell meter (Figure 5). Follow the instrument manufacturer's instructions to measure dwell.



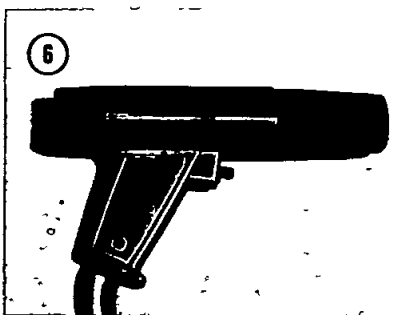
Tachometer

A tachometer is necessary for setting ignition timing and adjusting the carburetor. The best instrument for this purpose is one with a range of 0-2,000 rpm. Tachometers with an extended range (0-6,000 or 0-8,000 rpm) may lack accuracy at lower speeds. The tachometer should be able to detect changes of 25 rpm.

Strobe Timing Light

This instrument (Figure 6) is necessary for tuning and emission control adjustments. It permits very accurate ignition timing. The light flashes precisely at the same instant that No. 1 cylinder fires, so the position of the crankshaft pulley at that instant can be seen. Marks on the crankshaft pulley and engine front cover are lined up to set timing.

Suitable lights range from inexpensive neon bulb types to powerful xenon strobes. Neon timing lights are difficult to see and must be used in dimly lit areas. Xenon strobe timing lights can be used outside in bright sunlight. Timing lights should be connected according to the manufacturer's instructions.



Exhaust Analyzer

This instrument is necessary to check emission control adjustments accurately. It samples the exhaust gases from the tailpipe and indicates the amount of carbon monoxide (percentage) and unburned hydrocarbons (parts per million) in the exhaust. Exhaust analyzers are relatively expensive to buy, but some large rental dealers have them available at a modest price.

STARTER

Starter system troubles are relatively easy to isolate. The following are common symptoms and causes:

1 Engine cranks very slowly or not at all — Turn on the headlights. If the lights are very dim, the battery or connecting wires are probably the cause. Check the battery as described in Chapter Seven. Check the wiring for breaks, shorts, and dirty connections.

If the battery and connecting wires are not at fault, turn the headlights on and try to crank the engine. If the lights dim drastically, the starter may be shorted to ground. Have it tested.

If the lights remain bright or dim only slightly while trying to start the engine, the trouble may be in the starter, solenoid, or wiring. To isolate the trouble, temporarily connect the 2 large solenoid terminals together (not to the ground) with a heavy jumper wire. If the starter cranks normally, check the solenoid and wiring up to the ignition switch. If the starter still fails to crank properly, have it tested.

2 Starter turns, but does not engage with engine — This can be caused by a sticking pin-

ion or starter shift lever. Teeth on pinion and ring gear may be worn or broken. Remove the starter and check the drive mechanism for binding. Inspect pinion and ring gear teeth.

3 Starter won't disengage, even when key is turned off — This may mean the pinion is jammed in mesh with the ring gear. With manual transmissions, the pinion can temporarily be freed by rocking the vehicle in high gear. With automatic transmissions, this isn't possible; the starter must be removed.

4 Loud grinding noises when starter runs — This may mean the teeth on pinion and flywheel are not meshing properly, or it may mean the over-running clutch is broken. In the first case, remove the starter and examine the ring gear. In the latter case, remove the starter and replace the pinion drive assembly.

CHARGING SYSTEM

Charging system troubles may be in the alternator, voltage regulator, or fan belt. The following symptoms are typical:

1 Alternator light comes on (ammeter or voltmeter shows discharge) while engine is running — This usually indicates that no charging is taking place. First check fan belt tension as described in Chapter Two. Then check battery condition with a hydrometer, and check all electrical connections in the charging system. If this does not locate the trouble, check the alternator as described in Chapter Seven. If the alternator is working properly, have the voltage regulator tested.

2 Alternator warning light flashes erratically (ammeter needle moves erratically) — This usually indicates the charging system is working intermittently. Check fan belt tension, and check all electrical connections in the charging system. Check the alternator.

3 Battery requires frequent additions of water, or lamps require frequent replacement — The alternator is probably overcharging the battery. The voltage regulator is probably at fault. Have it checked by a Datsun dealer or competent electrical specialist.

4 Excessive noise from alternator — Check for loose alternator mountings. The problem

may also be worn alternator bearings or improperly seated brushes

ENGINE

These procedures are to be used when the starter cranks the engine over normally. If not, refer to the *Starter* section in this chapter.

1 Engine will not start — This problem could be caused by the ignition system or the fuel system. First find out if there is high voltage to the spark plugs. To do this, disconnect one of the spark plug wires. Hold the wire about 1/4 in. to 1/2 in. from ground (any bare metal in the engine compartment) with an insulated screwdriver. Crank the engine over. If sparks do not jump to ground, or the sparks are very weak, the problem may be in the ignition system. See the *Ignition System* section in this chapter for further details. If good sparks occur, the trouble may be in the fuel system. See the *Fuel System* section of this chapter.

2 Engine misses steadily — Disconnect one spark plug wire at a time and ground the wire. If engine miss increases, that cylinder was working properly. Reconnect the wire and check the others. When a wire is disconnected and the miss remains the same, that cylinder is not firing. Check sparks as described in Step 1. If no spark occurs for one cylinder only, check the distributor cap, wire, and spark plug. If spark occurs on the non-firing cylinder, check compression to isolate the trouble.

3 Engine misses erratically at all speeds — There are several possible causes, which may be difficult to find. The problem could be in the ignition system, exhaust system (exhaust restriction), or fuel system. Follow troubleshooting procedures for these systems carefully to isolate the trouble.

4 Engine misses at idle only — Trouble could exist anywhere in the ignition system. Follow ignition troubleshooting procedures carefully. The problem could also be in the carburetor idle adjustment. On models so equipped, the exhaust gas recirculation system could be at fault. See Chapter Five. If one cylinder misses and has a low compression reading, the cause could be broken or worn rings or defective valves.

5 Engine misses at high speed only — Problems could exist in the ignition system or fuel system. Check the fuel system as described in *Fuel System Troubleshooting*. Also check spark plugs and wires. See *Ignition System Troubleshooting*.

6 Low performance at all speeds, poor acceleration — Trouble usually exists in the ignition system or fuel system. Check both systems with appropriate procedures.

7 Excessive fuel consumption — This can be caused by many factors seemingly unrelated to fuel consumption. Check for clutch slippage, brake drag, defective wheel bearings, and poor front end alignment. Check ignition system and fuel system as described later.

8 Engine "diesels" (keeps on running) after ignition is switched off — Check anti-dieseling solenoid (if so equipped). Check idle mixture, idle speed, and float level. Check ignition timing. Be sure spark plugs are correct heat range. Check the engine for overheating. Check the valve clearance. Remove and decarbonize the cylinder head.

9 Oil pressure light does not come on when ignition is switched on (except Z sports car) — Try to start the engine. If it won't start, check the battery. If it starts, open the hood and locate the oil pressure sender by the oil filter. The sender uses a single yellow-and-black wire. Make sure the wire is connected to the sender and making good contact. Pull the wire off the sender and ground it. If the lamp lights, the sender is probably defective. If the lamp still doesn't light, check the bulb and wires.

10 Oil pressure needle does not move when engine starts (Z sports car) — Turn off the engine before doing anything else. Open the hood and check oil level on the dipstick. If oil level is adequate, locate the oil pressure sender (on the cylinder block just forward of the oil filter). Make sure the wire is connected to the sender and making good contact. Pull the wire off and ground it. If the gauge needle moves, replace the sender. If the gauge needle does not move, check the gauge fuse and wiring for continuity. If the wiring is good, the gauge is probably defective, have it checked by a Datsun dealer, or substitute a gauge known to be good.

11 Oil pressure light comes on (or gauge reading drops drastically) while engine is running — This indicates low oil pressure or no oil pressure at all **Stop the engine immediately**, coast to a stop with the clutch disengaged (manual transmission) or shift to neutral (automatic) The cause may be merely a low oil level or over-heating engine Check oil level (Chapter Two) and engine temperature Check for a shorted oil pressure sender with an ohmmeter or other continuity tester Inspect the oil pump as described in Chapter Four Listen for unusual noises from the engine, indicating bad bearings, etc Do not start the engine until the problem has been found and corrected

IGNITION SYSTEM

These procedures assume that the battery is in good enough condition to crank the engine at a normal rate

1 No spark to one plug — On breaker point ignition systems (all except the 260Z, 1975 and later California cars, and 1976 and later California pickups) the only possible causes are a defective distributor cap or spark plug wire On transistor ignition systems (260Z's, 1975 and later California cars, and 1976 and later California pickups), the reluctor may be damaged, although this is highly unlikely Ensure that the wire is making good contact with the distributor cap Check the cap for moisture, dirt, cracks, carbon tracking between the contacts, or other visible defects

2 No spark to any plugs — This could be caused by trouble in the primary or secondary circuits First remove the coil wire from the center of the distributor cap Hold the end of the wire about ¼ in from ground with an insulated screwdriver Crank the engine If sparks occur, the trouble is in the rotor or distributor cap Remove the cap and check for burns, moisture, dirt, carbon tracking, etc Check the rotor for excessive pitting, burning, wear, or cracks Replace if necessary

If the coil does not produce any spark, examine the secondary wire (the thick wire running from coil to distributor) If the wire shows signs of age or wear, it may be broken Replace it and test for spark again

NOTE The next steps apply to breaker point ignition systems only Testing transistor ignition systems requires special equipment, and the systems can easily be damaged If the preceding steps haven't located the problem, have the system tested by a Datsun dealer or competent ignition specialist

If the secondary wire is good, crank the engine so the distributor points are open Check them for excessive gap, burning, pitting, or looseness Replace or adjust the points if necessary With the points open, check voltage from the negative terminal on the coil (the one with the black wire) to ground with a voltmeter or test lamp

If voltage is present, the coil is probably bad Have it checked or substitute a coil known to be good If voltage is not present, check wire connections to the coil and distributor Temporarily disconnect the wire from the coil negative terminal and measure voltage from the terminal to ground If voltage is present, the distributor is shorted Examine breaker points and connecting wires carefully If voltage is still not present, measure voltage from the coil positive terminal to ground Voltage on the positive terminal, but not on the negative, indicates a defective coil No voltage on the positive terminal indicates an open wire between the positive terminal and the battery

3 Weak spark — If the spark is so small it cannot jump ¼-½ in to ground, check battery condition as described in Chapter Seven Other causes are bad breaker points, bad condenser, incorrect point gap (reluctor air gap on 260Z's), bad connections in the primary circuit, or dirty or burned rotor or distributor cap Distributor cam lobes may be worn

4 Missing — This is usually caused by fouled or damaged spark plugs, plugs of the wrong heat range, or incorrect plug gap Clean and regap the spark plugs This trouble can also be caused by weak spark (see symptom 3) or incorrect ignition timing

FUEL SYSTEM

This section applies to all models except the 280Z Testing the 280Z's highly complex fuel

injection system requires special training, and should be left to a Datsun dealer or mechanic familiar with Bosch fuel injection

Fuel system problems must be isolated at the carburetor, fuel pump, or fuel lines. These procedures assume the ignition system has been checked and properly adjusted

1 Engine will not start — First make sure fuel is being delivered to the carburetor(s). On all except 240-260Z's, remove the air cleaner cover, look into the carburetor throat, and operate the throttle linkage several times. There should be a stream of fuel from the accelerator pump discharge tube each time the throttle is opened. On 240-260Z's, remove the air cleaner cover and look down the air horns. The carburetor pistons should appear wet. If not, check fuel pump delivery (described later), float valve(s), and float adjustment. See Chapter Five.

If fuel is delivered and the engine still won't start, check choke operation. On 1970-1972 240Z's, the carburetor jets should move up and down as the choke handle is moved. On all other manual choke vehicles, the choke plates should open and close as the mechanism is operated. On automatic choke vehicles, check the choke for sticking or damage. If necessary, rebuild or replace the carburetor(s).

2 Engine runs at fast idle — Check choke setting, idle mixture, and idle speed adjustments. Check for a sticking throttle linkage. On 240-260Z's, check carburetor synchronization. See Chapter Two.

3 Rough idle or engine miss with frequent stalling — Check idle mixture and idle speed adjustments. On 1973 240Z's and all 1974-1977 vehicles, check the exhaust gas recirculation system. See Chapter Five.

4 Stumbling when accelerating from idle — Check idle speed and mixture adjustments. On all 4-cylinder engines, check the accelerator pump. On 240-260Z's, check carburetor damper oil level and piston movement. Examine carburetor(s) for dirt or other foreign matter that may be clogging jets and passages. See Chapter Five.

5 Engine misses at high speed or lacks power — This indicates possible fuel starvation.

Check fuel pump pressure and capacity. Check for a clogged fuel filter or air cleaner. On 4-cylinder engines, check for a clogged main jet. On all models, check float needle valve(s).

6 Black exhaust smoke — This indicates a badly overrich mixture. Check idle mixture and idle speed adjustment. On all except 1970-1972 240Z's, make sure the choke valve(s) open fully when the engine is warm. On 1970-1972 240Z's, make sure the jets rise back up when the choke lever is placed in the off position.

7 Excessive fuel consumption — Check for overrich mixture. Make sure the choke operates properly. Check for excessive fuel pump pressure, leaky float(s), or worn needle valve(s).

Mechanical Fuel Pump Pressure Testing (All Models)

- 1 Install a T-fitting in the fuel line close to the carburetor(s).
- 2 Connect a fuel pressure gauge to the fitting with a short tube.
- 3 Start the engine and run it at varying speeds. Compare fuel pressure with Table 2. If pressure is appreciably lower than specified, the cause could be a worn fuel pump arm, ruptured diaphragm, worn, warped, sticky, or dirty valves and seats, or a weak diaphragm return spring. Excessive pressure indicates the diaphragm is too tight. Replace it.

Table 2 FUEL PUMP SPECIFICATIONS

Engine	Pressure	Volume (per minute)
L16, L18 through 1973	2.5-3.4 psi	2.1 pints (1,000cc)
L18, L20B (1974)	3.0-3.8 psi	2.1 pints (1,000cc)
L24, L26	3.4-4.3 psi	3.4 pints (1,600cc)
A12	2.4 psi	1 pint (450cc)
A13	3.4 psi	1 pint (450cc)
A14 (1975)	3.8 psi	1.25 pint (600cc)
A14 (1976-on)	3.0-3.8 psi	1.25 pint (600cc)
J13	4.3-5.1 psi	2.7 pints (1,300cc)

Mechanical Fuel Pump Capacity Testing (All Models)

- 1 Disconnect fuel line from carburetor(s).
- 2 Place a graduated container of about 2 quarts capacity at the end of the fuel line.

3 Start the engine and run it at 1,000 rpm for one minute (2,000 rpm for J13 engines) There is enough fuel in the float chamber(s) for this

4 Stop the engine Compare the amount of fuel delivered with specifications in **Table 2** If no fuel, or only a very small amount, flows from the pump, the fuel filter or lines may be clogged Inspect the filter and replace if necessary Repeat the test with a source of fuel other than the gas tank If fuel flow increases, a line may be clogged On vehicles with evaporative emission control, the relief valve in the fuel filler cap may be clogged Check it as described in Chapter Five

If fuel flow is insufficient when using a fuel source other than the gas tank, the fuel pump is probably defective Repair or replace it

Electric Fuel Pump Test

This section covers the electric fuel pumps used on 260Z's and air conditioned 1977 pickups

1 Disconnect the outlet hose from the pump Connect a hose of 1/4 in (6mm) inside diameter to the outlet Do not use a smaller hose

2 Start the engine and let it idle for at least 15 seconds The pump should deliver fuel at a rate of 1,400cc (approximately 3 pints) in one minute or less

If the pump doesn't operate, use a 12-volt test lamp to make sure the pump is getting power If it isn't, check the pump wiring and relays (Chapter Five)

If the pump operates, but delivers little or no fuel, a clogged fuel line could be the cause

CLUTCH

All clutch problems, except adjustments or hydraulic system repairs, require removal of the engine or transmission to identify the cause and make repairs

1 *Slippage* — This condition is most noticeable when accelerating in high gear at relatively low speed To check slippage, drive at a steady speed in second or third gear Without letting up the accelerator, push in the clutch long enough to let engine speed increase (one or two seconds) Then let the clutch out rapidly If the

clutch is good, engine speed will drop suddenly or the car will jump forward If the clutch is slipping, engine speed will drop slowly and the car will not jump forward

Slippage results from insufficient clutch pedal free play, oil or grease on the disc, worn pressure plate, or a weak diaphragm spring Riding the clutch pedal can cause the disc surfaces to become glazed, resulting in slippage Also check the withdrawal lever to make sure it isn't binding and preventing full engagement

2 *Drag or failure to release* — This trouble usually causes difficult shifting and gear clash especially when downshifting The cause may be excessive clutch pedal free play, warped or bent pressure plate or clutch disc, air in the clutch hydraulic system, or defective clutch master and operating cylinders Also check condition of the transmission main drive gear splines

3 *Chatter or grabbing* — There are several possible causes Check the clutch hydraulic system for air or worn parts Bleed if necessary as described in Chapter Eight Check tightness of transmission-to-frame and engine-to-transmission mounting bolts Check for worn or misaligned pressure plate and clutch disc

4 *Other noises* — Noise usually indicates a dry or defective release bearing Check the bearing and replace if necessary Also check parts for misalignment or uneven wear

MANUAL TRANSMISSION

Transmission problems are usually indicated by one or more of the following symptoms

- a Difficulty shifting gears
- b Gear clash when downshifting
- c Excessive noise in neutral
- d Excessive noise in gear
- e Jumping out of gear
- f Oil leaks

Transmission symptoms are sometimes difficult to distinguish from clutch symptoms Be sure the clutch is not causing the trouble before working on the transmission Transmission procedures are described in Chapter Nine

AUTOMATIC TRANSMISSION

Automatic transmission procedures are described in Chapter Nine

BRAKES

1 *Brake pedal goes to floor* — There are numerous causes for this, including excessively worn linings, air in the hydraulic system, leaky brake lines, leaky wheel cylinders and disc brake calipers or leaky or worn master cylinder. Check for leaks and thin brake linings. Bleed and adjust the brakes. If the problem still exists, rebuild the wheel cylinders and calipers and/or master cylinder.

2 *Spongy pedal* — Normally caused by air in the system, bleed and adjust the brakes.

3 *Brakes pull* — Check brake adjustment. Also check for wet or greasy brake linings (from leaks), leaky wheel cylinders and calipers, loose calipers, frozen or seized pistons, and restricted brake lines or hoses. Check front end alignment, and look for suspension damage. Tires also affect braking, check tire pressure and condition.

4 *Brake squeal or chatter* — Check brake lining thickness and brake drum roundness. Check discs for excessive runout. Make sure the shoes are not loose. Clean away all dirt on shoes, drums, discs, and pads.

5 *Dragging brakes* — Check brake adjustment, including handbrake. Check for broken or weak shoe return springs, worn piston seals (disc brakes), swollen rubber parts due to improper brake fluid or contamination. Clean or replace defective parts.

6 *Hard pedal* — Check brake linings for contamination. Also check for restricted brake lines and hoses. If equipped with power brakes, test the brake booster (Chapter Ten).

7 *High speed fade* — Check for distorted or out-of-round brake discs or drums. Be sure recommended brake fluid is installed. Drain entire system and refill if in doubt.

8 *Pulsating pedal* — Check for distorted or out-of-round brake drums. On cars, check for excessive brake disc runout.

STEERING AND SUSPENSION

The following symptoms indicate steering or suspension trouble:

- a Steering is hard
- b Car pulls to one side
- c Car wanders or front wheels wobble
- d Steering has excessive play
- e Tire wear is abnormal

Unusual steering, pulling, or wandering is usually caused by bent or otherwise misaligned suspension parts. This is difficult to check without proper alignment equipment. See Chapter Twelve for repairs that you can perform, and those that must be left to a dealer or front-end specialist.

If the trouble seems to be excessive play, check wheel bearing adjustment first. Next, check steering free play. Check suspension and tie rod ball-joints. Check pitman arm nut and idler arm nut for looseness. See Chapter Twelve.

Tire wear may be caused by suspension troubles, but it may have many other causes. See *Tire Wear Analysis* in this chapter.

TIRE WEAR ANALYSIS

Abnormal tire wear should always be analyzed to determine its cause, which should then be corrected. The most common factors are:

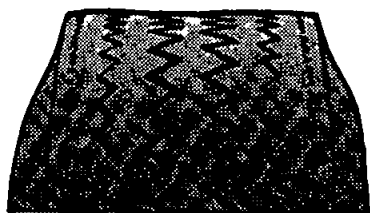
- a Incorrect tire pressure
- b Improper driving
- c Overloading
- d Bad road surfaces
- e Incorrect wheel alignment

Figure 7 identifies wear patterns and indicates the most probable causes.

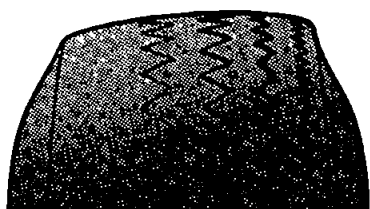
WHEEL BALANCING

All 4 wheels and tires must be in balance along 2 axes. To be in static balance (Figure 8), weight must be distributed evenly around the axis of rotation. (A) shows a statically unbalanced wheel, (B) shows the result — wheel tramp or hopping, (C) shows proper static balance.

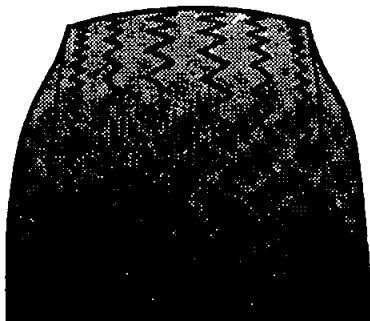
To be in dynamic balance (Figure 9), the centerline of the weight must coincide with the



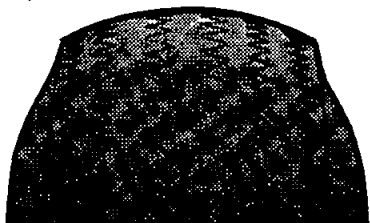
Underinflation—Worn more on sides than in center



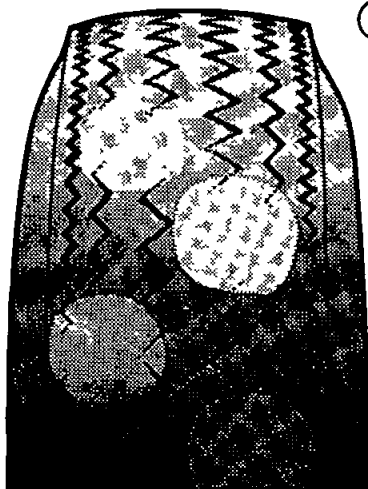
Wheel Alignment—Worn more on one side than the other. Edges of tread feathered



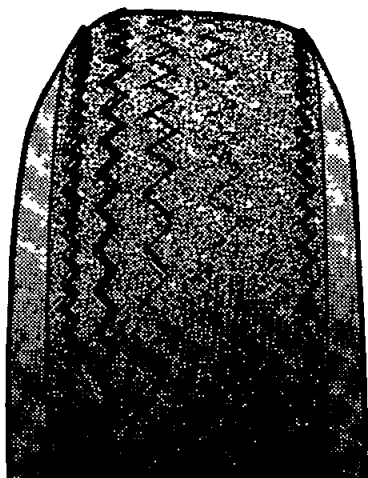
Road Abrasion—Rough wear on entire tire or in patches



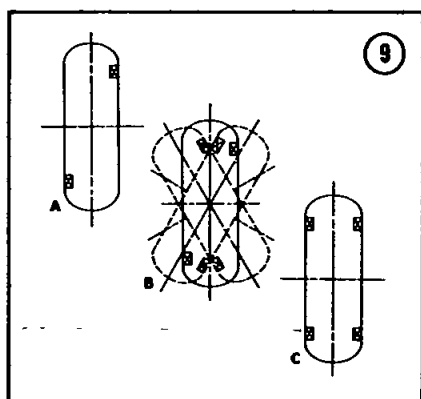
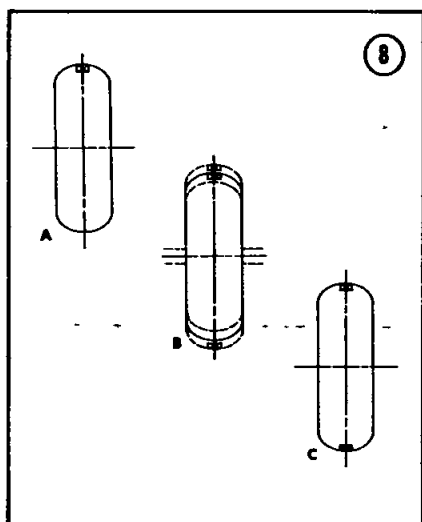
Overinflation—Worn more in center than on sides



Wheel Balance—Scalloped edges indicate wheel wobble or tramp due to wheel unbalance



Combination—Most tires exhibit a combination of the above. This tire was overinflated (center worn) and the toe-in was incorrect (feathering). The driver cornered hard at high speed (feathering, rounded shoulders) and braked rapidly (worn spots). The scaly roughness indicates a rough road surface



centerline of the wheel (A) shows a dynamically unbalanced wheel, (B) shows the result — wheel wobble or shimmy, (C) shows proper dynamic balance

CHAPTER FOUR

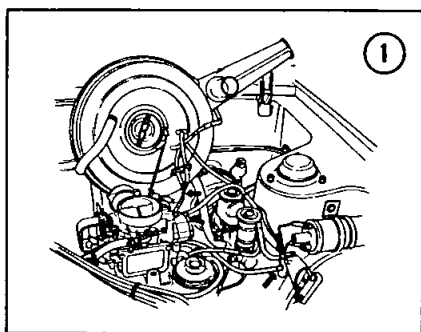
ENGINE

The vehicles covered by this book use variations of 3 basic engine designs. The L-series, an inline overhead cam engine, is produced in 4- and 6-cylinder versions. The A-series is an inline, 4-cylinder pushrod design, as is the J13 engine. **Table 1** lists engine models and vehicle applications. **Tables 2 through 7** (found at the end of the chapter) give specifications and tightening torques.

ENGINE REMOVAL

Although it is possible to remove the engine separately from the transmission, it is much easier to remove the engine and transmission as a single unit and separate them. Remove as follows:

- 1 Using a soft-lead pencil, scribe alignment marks around the hood hinges onto the hood. Remove the hood. The marks will ease hood installation.
- 2 Disconnect the negative battery cable and engine ground cable.
- 3 Completely drain the cooling system, then remove the radiator (Chapter Six).
- 4 On 1970-1974 vehicles with evaporative emission control (except 260Z), disconnect the hoses (large arrows, **Figure 1**) running from the flow guide valve to the engine and air cleaner.

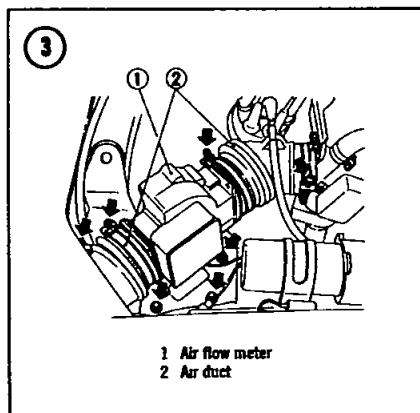
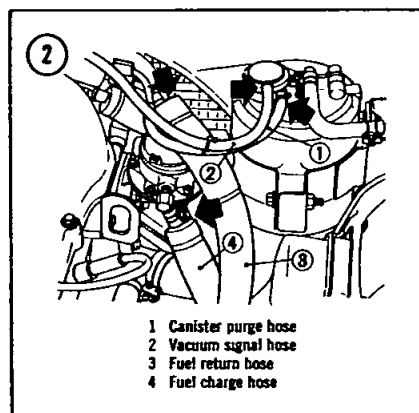


On 260Z's and all 1975 and later models, disconnect the purge hose and vacuum signal hose from the carbon canister. See **Figure 2**.

- 5 Disconnect the inlet line from the fuel pump. Plug the line so it won't siphon gas from the tank.
- 6 Disconnect the heater hoses from the engine.
- 7 Disconnect the throttle linkage or cable.
- 8 On manual choke vehicles, disconnect the choke cable. On automatic choke models, disconnect the choke electrical wire.
- 9 On all except the 280Z, label and disconnect the electrical wires attached to carburetor and intake manifold.

Table 1 ENGINE APPLICATIONS

Vehicle	Year(s)	Engine Model	Piston Displacement
1200	1971-73	A12	71.5 cu in (1,171cc)
B210	1974	A13	78.5 cu in (1,288cc)
	1975-on	A14	85.2 cu in (1,397cc)
510	1968-73	L16	97.3 cu in (1,595cc)
610	1973	L18	108 cu in (1,770cc)
	1974-76	L20B	119.1 cu in (1,995cc)
710	1974	L18	108 cu in (1,770cc)
	1975-on	L20B	108 cu in (1,770cc)
L521 pickup	1968-69	J13	79.3 cu in (1,299cc)
PL521 pickup	1970-72	L16	79.3 cu in (1,299cc)
PL620 pickup	1972-73	L16	79.3 cu in (1,299cc)
	1974	L18	79.3 cu in (1,299cc)
	1975-on	L20B	79.3 cu in (1,299cc)
240Z	1970-73	L24	146 cu in (2,393cc)
260Z	1974	L26	156.52 cu in (2,565cc)
280Z	1975-on	L28	168.0 cu in (2,753cc)



NOTE Steps 10-15 apply to 280Z's only

10 Eliminate pressure in the fuel lines. To do this, perform Steps 2-6 under *Removal/Installation (280Z Electric Pump)*.

11 Disconnect the battery cables.

12 Remove the air flow meter (Figure 3).

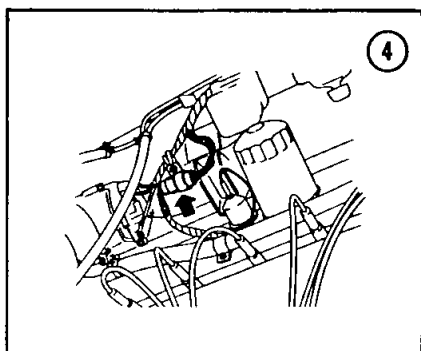
13 Label and disconnect the fuel injection system wires.

14 Disconnect the fuel inlet and return lines.

15 Disconnect the connector for oil pressure sender and manual transmission switches (Figure 4).

16 On manual transmission vehicles, disconnect the wires from the electrical switches at the right-hand side of the transmission.

17 If equipped with automatic transmission, disconnect the wires from the inhibitor switch (right-hand side of transmission) and downshift solenoid (left rear corner).



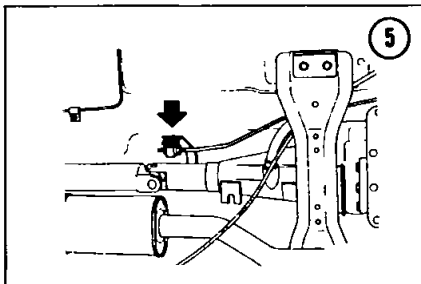
18 Disconnect the wires from starter, alternator, ignition coil, oil pressure switch (except 280Z), and coolant temperature sender

19 Remove the clutch operating cylinder (Chapter Eight)

20 Unscrew the speedometer cable from the transmission

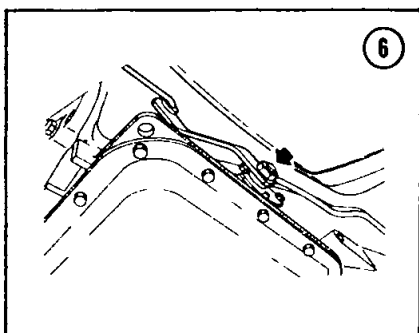
21 On manual transmissions, remove the shift lever. See *Transmission Removal/Installation*, Chapter Nine

22 On the following automatic transmission models, disconnect the lower shift rod from the transmission linkage lever (Figure 5) 1200, B210, 1974 and later 610, and 1975 and later 710



23 On the following automatic transmission models, disconnect the selector range lever from the side of the transmission (Figure 6) 510, 1973 610, 1974 710, pickup truck, and Z sports car

24 Drain the transmission oil (manual) or fluid (automatic). On automatic transmissions,



the fluid pan must be removed to drain the transmission

25 Unbolt the exhaust pipe from the manifold. On 1975 and later California B210's, remove the catalytic converter sensor protector and 2 front tube clamps. On 1975 and later California 610's and 710's, unbolt the front exhaust pipe from the catalytic converter as well

26 On 240Z's, remove the front exhaust pipe, pre-muffler, and center exhaust pipe

27 On 280Z's, disconnect the front exhaust tube bracket from the rear end of the transmission. Then unbolt the top half of the front tube's heat shield and let it hang on the tube

28 Remove the drive shaft (Chapter Eleven)

29 On 1976 pickup trucks, unbolt the idler arm bracket from the frame, then push the cross rod down. See Chapter Twelve

30 Place a jack beneath the transmission to support it. Unbolt the transmission mount from the transmission, then from the vehicle frame

31 Connect a hoist to the slinger brackets at front and rear of the engine. Crane-type hydraulic hoists, available from tool rental dealers, are effective and easy to use

32 Unbolt the motor mounts from the rubber mounting insulators

NOTE At this point, there should be no wires, hoses, or linkages attaching the engine or transmission to the vehicle. Recheck this to be sure nothing will hamper engine removal

33 Gradually lower the jack beneath the transmission while raising the engine. Remove

the jack from beneath the transmission. Continue raising the engine, tilting as necessary, until it is clear of the vehicle.

CAUTION

Do not let the engine strike equipment installed on the engine compartment sidewalls during removal.

34 Once the engine and transmission are clear of the car, lower them to a suitable support or stand and disconnect the hoist.

35 Remove the bolts attaching the transmission to the engine.

36 Check the rubber mounting insulators for wear and damage. Replace as needed.

ENGINE INSTALLATION

Engine installation is simply the reverse of removal. Fasten the engine securely to its mounts before tightening anything else. Bleed and adjust the clutch as described in Chapter Eight. Fill the engine and transmission with oils recommended in Chapter Two. Fill the cooling system with a 50/50 mixture of anti-freeze and water.

DISASSEMBLY SEQUENCES

The following 3 sequences are basic outlines that tell how much of the engine to remove and disassemble to perform a specific type of service. They are designed to keep engine disassembly to a minimum, thus avoiding unnecessary work. The major assemblies mentioned in these sequences are covered in detail under their own headings in this chapter, unless otherwise noted.

To use these sequences, first determine what type of service you plan to do (a valve job, for example). Then turn to the sequence for that type of service. To perform a step within a sequence, turn to the section covering the major assembly mentioned in that step, and perform the removal and inspection procedures. Do the same for each step until all necessary disassembly has been completed. To reassemble, reverse the sequences, performing the installation procedures for each major assembly mentioned.

Decarbonizing or Valve Service

- 1 Remove the exhaust and intake manifolds (Chapter Five).
- 2 On L-series engines, remove the rocker arms and camshaft. On A-series and J13 engines, remove the rocker assembly.
- 3 Remove the cylinder head.
- 4 Remove and inspect valves. Inspect valve guides and seats, repairing or replacing as necessary.
- 5 Assemble by reversing Steps 1-4.

Valve and Ring Service

- 1 Perform Steps 1-4 for valve service.
- 2 Remove the oil pan.
- 3 Remove the pistons together with the connecting rods.
- 4 Remove the piston rings. It is not necessary to separate the pistons from the connecting rods unless a piston, connecting rod, or piston pin needs replacement.
- 5 Assemble by reversing Steps 1-4.

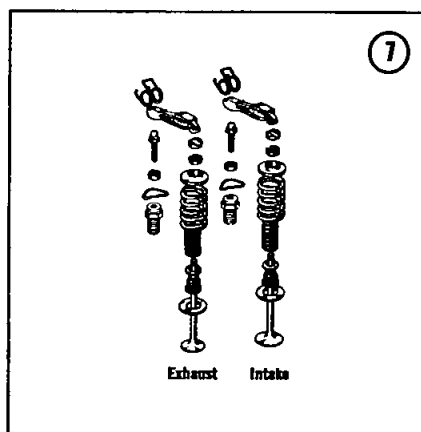
General Overhaul

- 1 Remove the engine and transmission and separate them. Remove the clutch (Chapter Eight) from manual transmission vehicles.
- 2 Remove the oil filter (and adapter on J13 engines), dipstick, and oil pressure sender from the right-hand side of the cylinder block.
- 3 Remove the motor mounts.
- 4 On all except 280Z, remove the fuel pump, carburetor, and manifolds. If equipped with an air pump, remove it also. See Chapter Five.
- 5 On 280Z's, remove the manifolds and fuel injection components.
- 6 Remove the fan, water pump, and thermostat (Chapter Six). On L-series engines, remove the thermostat housing from the cylinder head.
- 7 Remove the alternator and the distributor (Chapter Seven).
- 8 On L-series engines, remove the rocker arms and camshaft. On A-series and J13 engines, remove the rocker assembly.
- 9 Remove the cylinder head.

- 10 Remove the flywheel. On A-series and J13 engines, remove the engine rear plate.
- 11 Remove the oil pan, strainer, and oil pump. On L-series engines, remove the pump driving spindle.
- 12 Remove the engine front cover. Remove the timing chain and related parts. On J13 engines, remove the engine front plate.
- 13 Remove piston-connecting rod assemblies.
- 14 Remove the crankshaft.
- 15 Inspect the cylinder block.
- 16 Assembly is the reverse of these steps.

ROCKER ARMS (L-SERIES)

Figure 7 shows rocker arms and valve parts for 4-cylinder engines. The 6-cylinder design is basically the same.



Rocker Arm Removal/Installation

- 1 Remove the rocker arm cover.
- 2 Remove the springs looped over the tops of the rocker arms.
- 3 Loosen the locknut on the rocker arm pivot. Compress the valve springs by using a heavy-bladed screwdriver as a lever and the camshaft as a fulcrum.
- 4 Withdraw the rocker arm while holding the valve springs down with the screwdriver. Be careful not to lose the rocker arm and the top of the valve stem.

- 5 If the rocker pivot is visibly worn, unscrew it from the cylinder head, together with its locknut.
- 6 Install by reversing Steps 1-5.

Rocker Arm Inspection

Examine the rocker arm for visible wear on its cam contact surface, pivot surface, and valve contact surface. If wear or any defects can be seen, replace the rocker arm. If the rocker arm pivot is visibly worn, both the pivot and its corresponding rocker arm must be replaced.

ROCKER ASSEMBLY AND PUSHRODS (A-SERIES)

See Figure 8 for the following procedures.

Removal/Installation

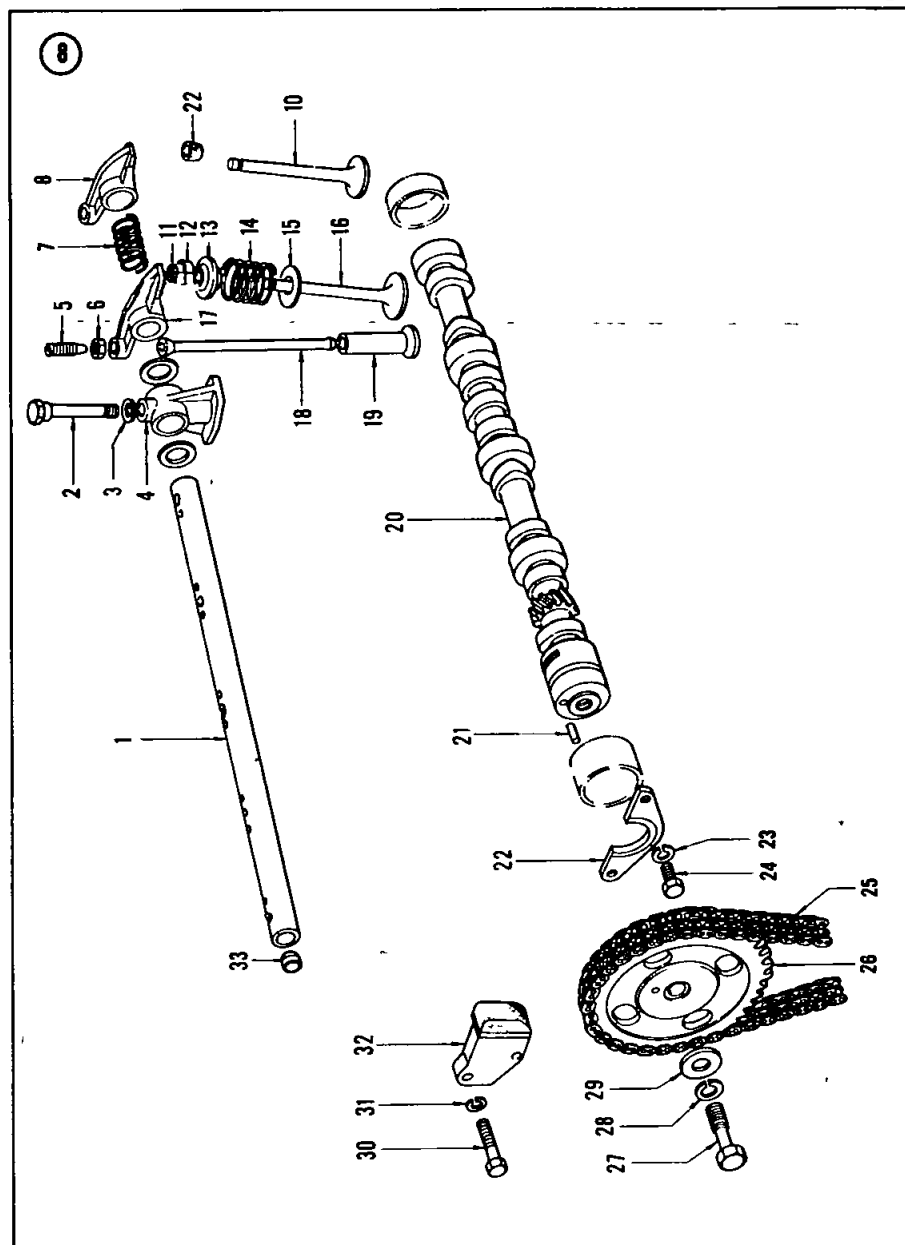
- 1 Remove the rocker cover.
- 2 Remove 5 bolts that secure the rocker assembly to the cylinder head. Lift assembly off.
- 3 Lift the pushrods out of their holes. Label them so they can be reinstalled in the holes from which they were removed.
- 4 Installation is the reverse of these steps. Tighten the bolts to 15-18 ft-lb (2.0-2.5 mkg). Tighten in several stages, working outward from the center bolt.

Disassembly/Assembly

- 1 Lift the bolts out of the rocker brackets. Slide the brackets, washers, springs, and rocker arms off the shaft.
- 2 Assemble in the reverse order. Coat all friction points with clean engine oil.

Inspection

- 1 Thoroughly clean all parts in solvent. Make sure all oil passages are clear.
- 2 Check the rocker arms and shaft for signs of seizure or wear. Clearance between the rocker arms and the shaft should be 0.0008-0.002 in (0.02-0.05mm).
- 3 Check the valve stem contact surface on the rocker arms for wear. The surface may be ground as much as 0.020 in (0.5mm) to smooth it. Beyond that point, the rocker arm must be replaced.



ROCKER ASSEMBLY AND PUSHRODS (A-SERIES ENGINES)

1	Rocker shaft	9	Valve stem shroud	18	Pushrod	26	Camshaft sprocket
2	Rocker bracket bolt	10	Valve	19	Tappet (lifter)	27	Camshaft sprocket bolt
3	Washer	11	Valve stem seal	20	Camshaft	28	Lockwasher
4	Rocker bracket	12	Valve keepers	21	Camshaft dowel pin	29	Washer
5	Valve clearance adjusting screw	13	Valve spring washer	22	Camshaft locating plate	30	Chain tensioner bolt
6	Adjusting screw locknut	14	Valve spring	23	Lockwasher	31	Lockwasher
7	Rocker arm spring	15	Valve spring seat	24	Locate plate bolt	32	Timing chain tensioner
8	Rocker arm	16	Valve	25	Timing chain	33	Rocker shaft plug
		17	Rocker arm				

4 Check springs and washers for wear or damage Replace as needed

5 Check pushrods for wear or damage, especially at the ends Replace bent, worn, or damaged pushrods

ROCKER ASSEMBLY AND PUSHRODS (J13 ENGINE)

See Figure 9 for the following procedures

Removal/Installation

- 1 Remove air cleaner and rocker arm cover
- 2 Drain the cooling system
- 3 Loosen the rocker assembly securing nuts, as well as all cylinder head nuts

NOTE Although only 4-cylinder head nuts secure the rocker assembly, all must be loosened to prevent warping the cylinder head Loosen in several stages, starting with the center nuts and working outward

4 Remove the nuts and lift the rocker assembly off the engine

5 Carefully lift the pushrods from their holes Be careful not to pull the lifters out of their bores Label the pushrods so they can be reinstalled in the holes from which they were removed

6 Installation is the reverse of these steps Tighten the cylinder head nuts as described under *Cylinder Head Installation* later in this chapter

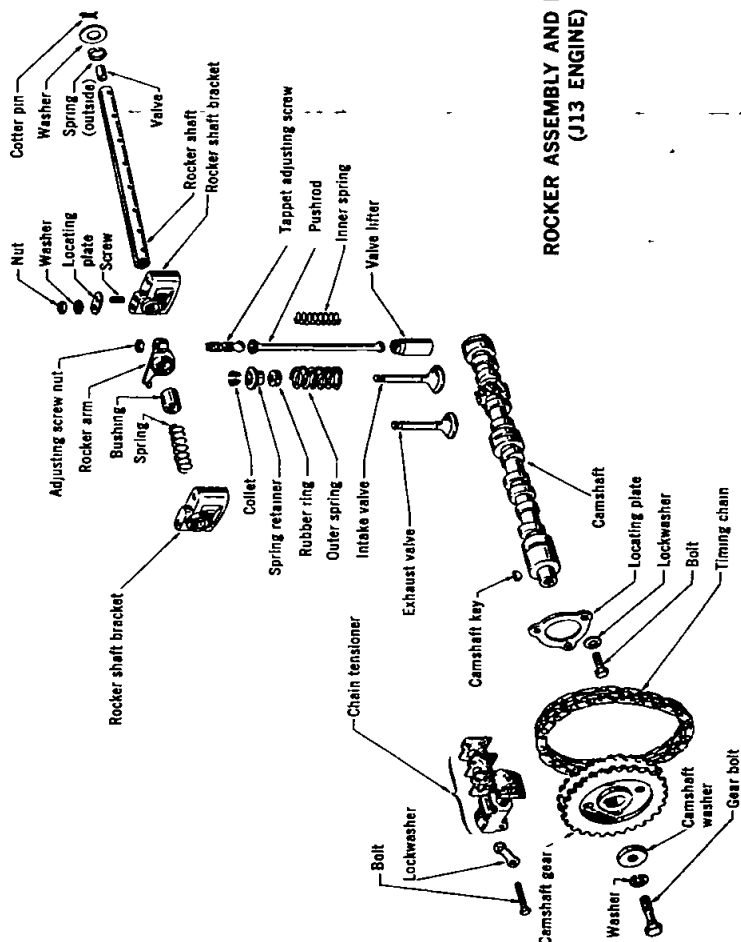
Disassembly/Assembly

1 Remove the locating plate and grub screw from the rear rocker bracket

2 Remove the cotter pin, plain washer, and spring washer from each end of the rocker shaft Slide the rocker arms, springs, and brackets off the shaft Keep all parts in order so they can be reinstalled in their original positions

3 Unscrew the threaded plug from inside the end of the rocker shaft

4 Assembly is the reverse of these steps Lubricate all friction points with clean engine oil



ROCKER ASSEMBLY AND PUSHRODS
(J13 ENGINE)

Inspection and Repair

- 1 Thoroughly clean all parts in solvent. Make sure all oil passages are clear.
- 2 Check the pushrods for wear or damage, especially at the ends. Replace bent, worn, or damaged pushrods.
- 3 Check the rocker shaft and rocker arm bushings for signs of seizure or excessive wear. Shaft-to-bushing clearance should range from 0.0004-0.002 in (0.01-0.05mm). Worn rocker arm bushings can be replaced by a machine shop.
- 4 Check the valve stem contact surface on the rocker arm for wear. Replace worn rocker arms.
- 5 Check washers and springs for wear and damage. Replace as needed.

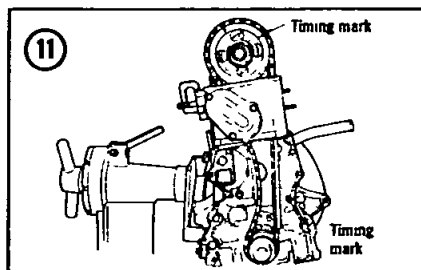
CAMSHAFT (L-SERIES ENGINES)

Figure 10 shows the 4-cylinder camshaft and related parts. The 6-cylinder version is basically the same.

Camshaft Removal

- 1 Remove the rocker arm cover.
- 2 Remove the fuel pump (Chapter Five).
- 3 Check camshaft end play. Position a dial gauge against the front end of the camshaft and slide the camshaft back and forth against the gauge pointer. Replace the camshaft locating plate if end play (the reading on the gauge) is not within specifications.
- 4 Turn the engine over by hand until the timing marks on camshaft sprocket and timing chain are aligned. See Figure 11. This will enable you to position the camshaft correctly during installation.
- 5 Remove all rocker arms as described earlier.
- 6 Remove the bolt, lockwasher, and fuel pump cam from the front end of the camshaft.
- 7 Lift the timing chain aside and remove the camshaft sprocket.

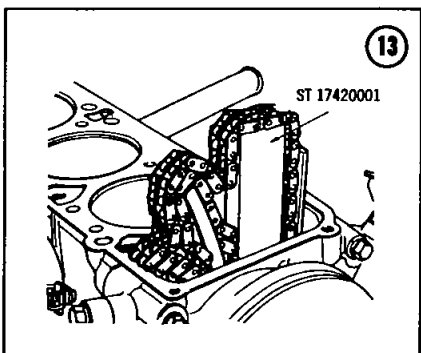
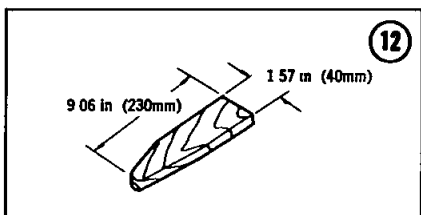
NOTE There are 3 locating holes in the camshaft sprocket, all of which will fit the locating pin on the front end of the camshaft. Carefully note which locating hole is over the locating pin.



Support the timing chain with Datsun tool ST 17420000 (Figure 12). This is a hardwood wedge which is placed between the sides of the chain (Figure 13) to keep it from slipping off the crankshaft sprocket. This is not the only way to support the chain, but the tool is reliable and can be easily fabricated.

CAUTION

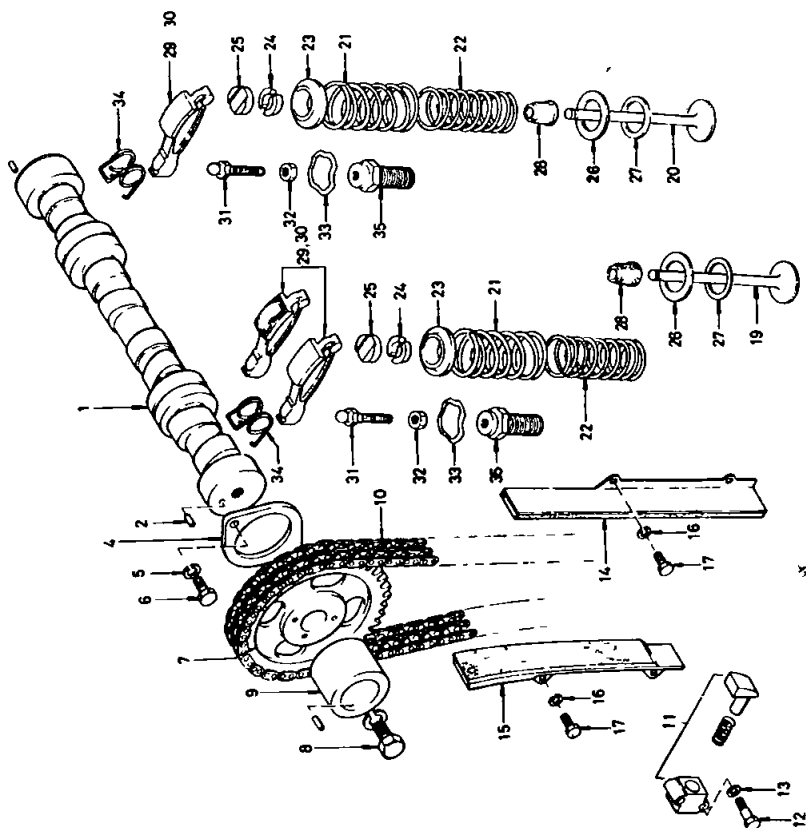
Do not allow the chain to slip off the crankshaft sprocket. If this happens, the front cover and oil pan will have to be removed to realign the chain and sprocket timing marks.



10

CAMSHAFT (L-SERIES ENGINES)

- 1 Camshaft
- 2 Camshaft dowel
- 4 Cam locating plate
- 5 Spring washer
- 6 Hex bolt
- 7 Cam sprocket
- 8 Cam gear bolt
- 9 Fuel pump cam assembly
- 10 Camshaft chain
- 11 Chain tensioner
- 12 Hex bolt
- 13 Spring washer
- 14 Chain guide
- 15 Chain guide
- 16 Spring washer
- 17 Hex bolt
- 19 Intake valve
- 20 Exhaust valve
- 21 Valve spring
- 22 Valve spring
- 23 Valve retainer
- 24 Valve keeper
- 25 Valve seat
- 26 Rocker valve guide
- 27 Inner valve seat spring
- 28 Valve oil seal
- 29 Valve rocker
- 30 Valve rocker with pad
- 31 Valve rocker pivot
- 32 Pivot locknut
- 33 Rocker retainer
- 34 Rocker valve spring
- 35 Rocker bushing



8 Remove 2 bolts and take the camshaft locating plate off the front camshaft bracket

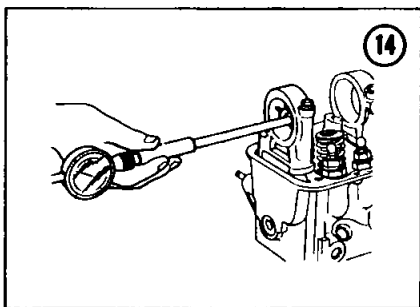
9 Carefully withdraw the camshaft toward the front of the engine. Rotate the camshaft slowly while removing. Be careful not to scratch the camshaft bearing surfaces

CAUTION

Never remove camshaft brackets from the cylinder head, even though removal looks easy. If the brackets are removed, it will be extremely difficult if not impossible to realign the bearing centers.

Camshaft Inspection

1 Measure the inner diameter of the camshaft bearings (Figure 14). This figure must be between 1.8898-1.8904 in (48.00-48.016mm). If any bearings are worn beyond the maximum, replace the entire cylinder head

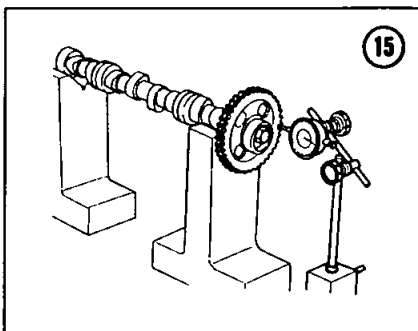


2 Measure outer diameter of the camshaft journals. Subtract these figures from the bearing inner diameter to determine oil clearance. Normal oil clearance is 0.0015-0.0026 in (0.038-0.076mm). If the bearings were within specifications in Step 1, and oil clearance exceeds 0.004 in (0.1mm), camshaft must be replaced.

3 Measure camshaft bend. Rotate the camshaft between accurate centers (such as V-blocks or a lathe) with a dial gauge contacting the center journal (6-cylinder) or second and third journal (4-cylinder). Actual bend is half the reading shown on the gauge when the camshaft is rotated one full turn. Replace the camshaft if bend exceeds 0.002 in (0.05mm).

4 Check the camshaft sprocket for runout. Measure with the sprocket installed on the cam-

shaft, as shown in Figure 15. Replace sprocket if runout exceeds 0.004 in (0.1mm).

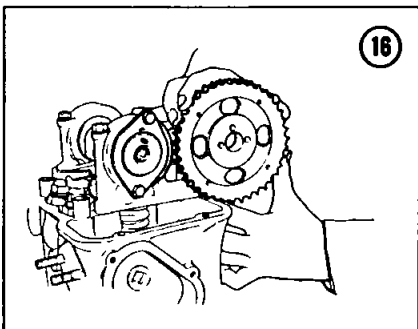


Camshaft Installation

1 Coat the camshaft journals and bearing surfaces with clean engine oil.

2 Carefully install the camshaft in the brackets. Rotate the camshaft slowly while inserting to ease installation.

3 Install the camshaft locating plate and secure it with 2 bolts. The small groove in the locating plate goes on top and faces the front (Figure 16).



4 Install the rocker arms as described earlier.

5 Lift up the timing chain and remove the support tool. Place the camshaft sprocket in the chain, making sure the timing marks on sprocket and chain are aligned.

6 Slide the sprocket onto the camshaft. Use the sprocket locating hole that was used before.

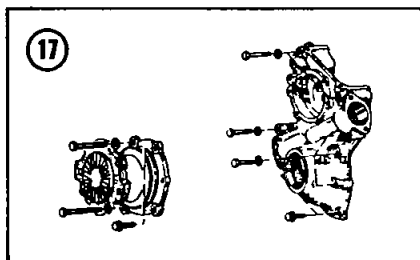
removal Install the fuel pump cam, then the sprocket bolt and lockwasher Tighten to specifications (end of chapter)

7 Install the fuel pump (Chapter Five) and rocker arm cover

FRONT COVER, TIMING CHAIN, AND SPROCKETS (L-SERIES ENGINES)

Front Cover Removal

- 1 Remove the radiator and fan (Chapter Six) Remove the air pump belt (if so equipped)
- 2 Remove the distributor (Chapter Seven)
- 3 Remove the oil pan and pump
- 4 Remove the crankshaft pulley
- 5 Remove bolts attaching the front cover to cylinder head and block See Figure 17

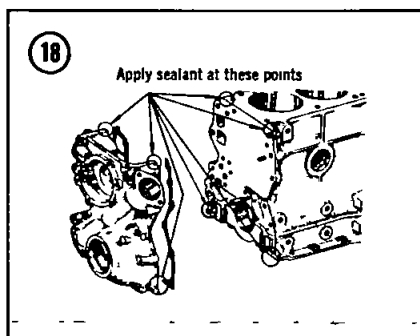


- 6 Withdraw the front cover forward and down, together with the water pump

Front Cover Installation

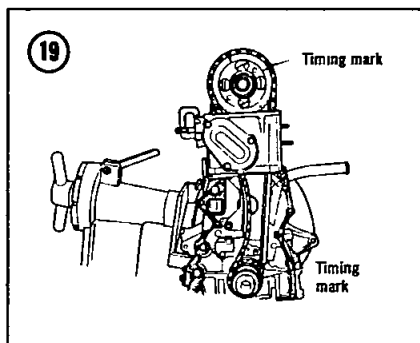
Front cover installation is the reverse of removal, plus the following

- 1 Use new left and right cover gaskets, coated on both sides with gasket sealer Apply small amounts of sealer to the corners of the front cover See Figure 18
- 2 Carefully pry out the old front cover oil seal Coat the lip and outer edge of a new seal with engine oil, then tap it into place
- 3 Take care not to bend the front portion of the head gasket when installing the cover Be sure to install the cylinder head-to-cover bolts
- 4 Fill the engine with oil and the radiator with coolant

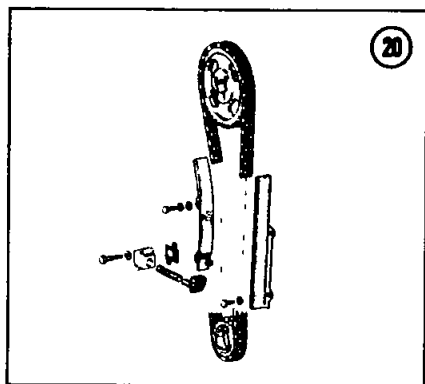


Sprocket and Chain Removal

- 1 Remove the valve rocker cover
- 2 Remove the fuel pump (Chapter Five)
- 3 Remove the front cover as described in the preceding procedure
- 4 Install the crankshaft pulley bolt in the crankshaft Put a wrench on the bolt and turn the engine over by hand until the timing marks in chain and sprockets are aligned See Figure 19



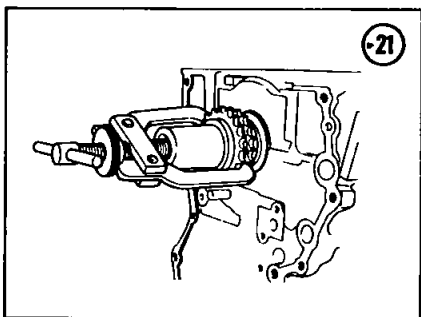
- 5 Referring to Figure 20, remove 2 bolts and lockwashers that secure the chain tensioner to the block
- 6 Remove 4 bolts and lockwashers holding the left and right chain guides to the block Remove the guides
- 7 Remove the camshaft sprocket and fuel pump cam from the front of the camshaft
- 8 Remove the timing chain from the crankshaft sprocket



9 Remove the crankshaft sprocket, distributor drive gear, and oil thrower with a puller. See Figure 21.

CAUTION

Do not rotate the crankshaft and camshaft separately, or the valves may strike the piston tops.



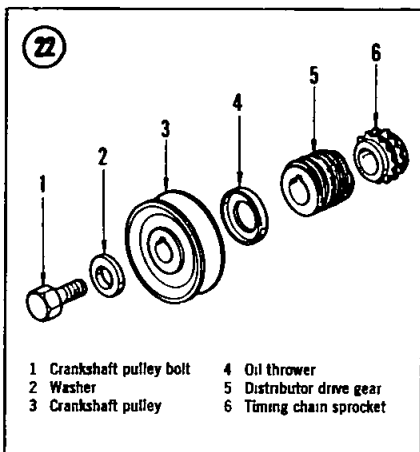
Inspection

- 1 Thoroughly clean all parts in solvent before inspection.
- 2 Check the chain tensioner assembly and chain guides for wear or damage. Replace if these are evident.
- 3 Inspect the sprockets, distributor drive gear, and oil thrower for wear or damage. Replace as needed.
- 4 Check the chain for wear, damage, or stretching of the roller links. Replace the chain

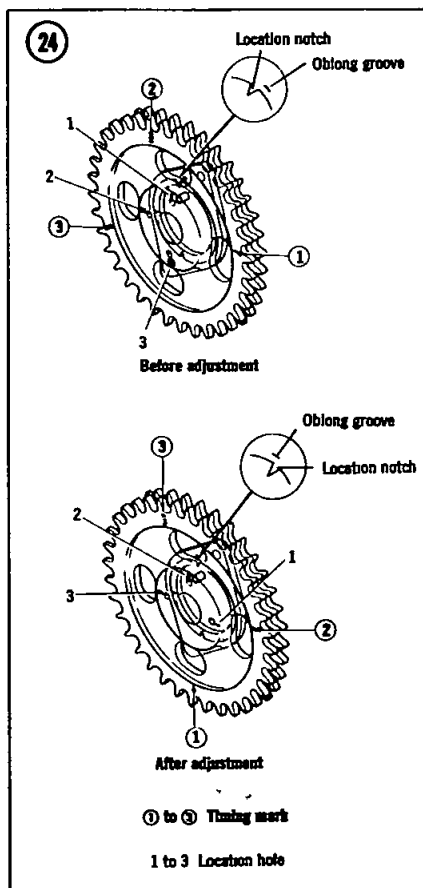
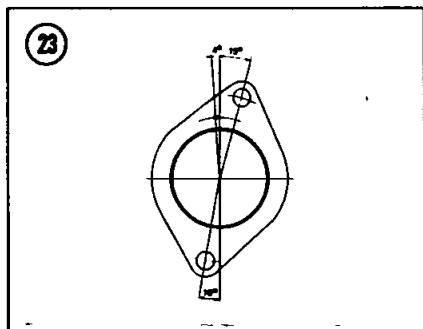
if visibly defective. Check again for stretching as described in the next procedure.

Installation and Chain Inspection

- 1 Install the Woodruff keys in the crankshaft keyways if they have been removed.
- 2 Install the crankshaft sprocket, distributor drive gear, and oil thrower. See Figure 22.



- 3 Install the timing chain over the crankshaft and camshaft sprockets. Make sure the timing marks on the chain are aligned with the timing marks on the sprockets. See Figure 19.
- 4 Slide the camshaft sprocket onto the camshaft. Make sure the Woodruff keys on the crankshaft point straight up.
- 5 Bolt the chain guides to the cylinder block.
- 6 Install the chain tensioner. Push the tensioner spindle as far into the tensioner body as possible.
- 7 Make sure that No. 1 piston is still at top dead center on its compression stroke.
- 8 Refer to Figures 23 and 24 for this step. Figure 23 shows the camshaft locating plate, Figure 24 shows the camshaft sprocket. Note that there are 3 location holes in the sprocket, each with its own location notch and timing mark. Face the engine from the front. Note the relative positions of the location notch in the sprocket and the oblong groove in the camshaft.



locating plate. If the notch is completely to the left of the groove (as shown in upper drawing, Figure 24), the timing chain is stretched excessively. Perform Steps 9-11 to adjust it. If the notch is not completely to the left (counterclockwise) of the groove, the timing chain is satisfactory and Steps 9-11 may be skipped.

9 Remove the camshaft sprocket and reinstall it, using No. 2 location hole. No. 2 notch should now be at the right (clockwise) end of the oblong groove in the camshaft locating plate.

10 If the location notch position still is not correct, remove the camshaft sprocket again and reinstall it, this time using No. 3 location hole. No. 3 hole should now be at the right end of the oblong groove.

11 If the hole still is not in the correct position, the timing chain is stretched beyond use and must be replaced. Install the new chain as described in Steps 3 and 4, using No. 1 location hole in the camshaft sprocket.

12 Install the front cover as described earlier.

13 Install the oil pan and pump.

14 Install the distributor (Chapter Seven).

15 Install the fuel pump (Chapter Five).

16 Install the rocker arm cover.

17 Install the fan and radiator (Chapter Six).

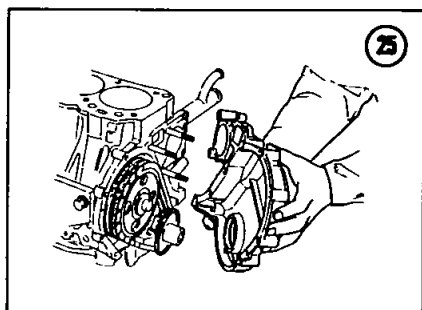
18 Fill the engine with oil and the radiator with coolant.

FRONT COVER, TIMING CHAIN, AND SPROCKETS (A-SERIES, J13)

Front Cover Removal/Installation (A-Series)

- 1 Remove the radiator and fan (Chapter Six).
- 2 Put the transmission in first gear (manual) or park (automatic) and put the handbrake on.
- 3 Remove the crankshaft pulley bolt, then the pulley.
- 4 Remove the front cover nuts and bolts. Remove the cover together with the water pump (Figure 25).

NOTE The bottom edge of the front cover is secured to the oil pan.



5 Remove all traces of old gasket and sealer from the front cover, cylinder block, and exposed portions of the oil pan

6 Carefully pry the old oil seal out of the front cover. Do not gouge the aluminum. Tap a new seal into place. Coat the seal lip with multi-purpose grease

7 Cut the front portions from 2 new oil pan gasket halves. Coat them on both sides with

gasket sealer, then place them on the exposed portions of the oil pan. Install a new front seal in the oil pan. Apply gasket sealer to the joints between front seal and oil pan gaskets

8 Install a new front cover gasket, coated on both sides with gasket sealer. Install the front cover. Tighten nuts and bolts to specifications

9 Install the crankshaft pulley, fan, and radiator. Fill the engine with coolant. Check oil level and top up if necessary

Front Cover Removal/Installation (J13)

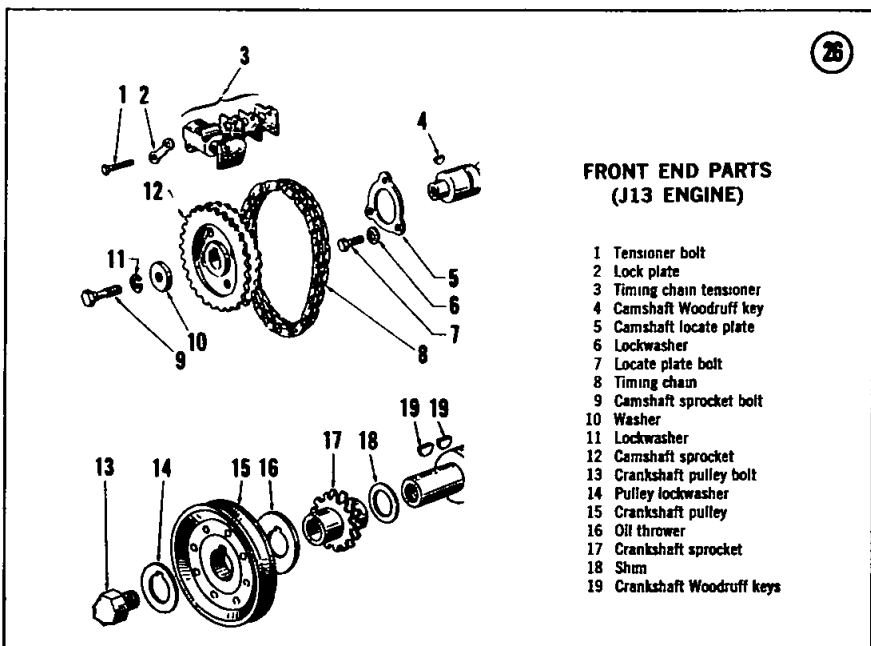
Refer to Figure 26 for this procedure

1 Remove the radiator and fan belt

2 Bend back the tab on the crankshaft pulley lockwasher. Remove the pulley bolt, then the pulley

3 Remove the front cover securing bolts. Take the cover off. Note that each bolt has a splitting lockwasher and an elongated plain washer

4 Remove all traces of old gasket and sealer from the cylinder block and front cover



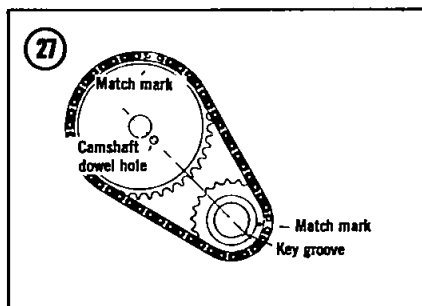
FRONT END PARTS (J13 ENGINE)

- 1 Tensioner bolt
- 2 Lock plate
- 3 Timing chain tensioner
- 4 Camshaft Woodruff key
- 5 Camshaft locate plate
- 6 Lockwasher
- 7 Locate plate bolt
- 8 Timing chain
- 9 Camshaft sprocket bolt
- 10 Washer
- 11 Lockwasher
- 12 Camshaft sprocket
- 13 Crankshaft pulley bolt
- 14 Pulley lockwasher
- 15 Crankshaft pulley
- 16 Oil thrower
- 17 Crankshaft sprocket
- 18 Shim
- 19 Crankshaft Woodruff keys

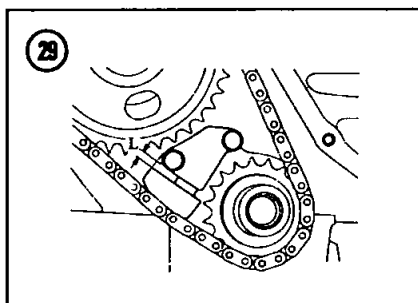
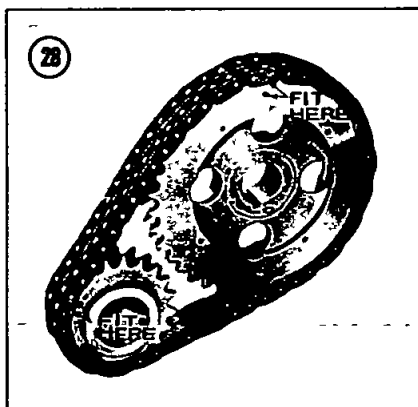
- 5 Remove the front cover oil seal and install a new one
- 6 Apply engine oil to the oil seal contact surface on the crankshaft pulley. Insert the pulley into the front cover. This will prevent the pulley from hanging up on oil seal during installation.
- 7 Coat a new front cover gasket on both sides with gasket sealer. Position the gasket on the cylinder block.
- 8 Install the front cover and crankshaft pulley simultaneously. Position the front cover and bolt it down. The elongated plain washers go next to the cover, the lockwashers go next to the bolt heads. Tighten the bolts evenly to prevent warping the cover.

Chain and Sprocket Removal/Installation

- 1 Remove the front cover as described earlier.
- 2 Turn the engine over until the match marks on the chain and sprockets are aligned. See Figure 27 (A-series) or Figure 28 (J13).

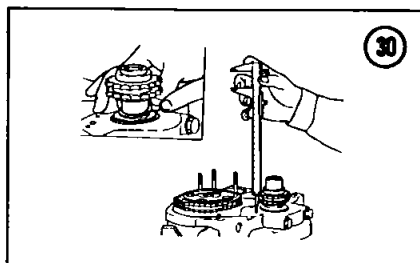


- 3 Remove the timing chain tensioner from the front of the cylinder block.
- 4 Remove the bolt from the camshaft sprocket.
- 5 If the camshaft was rotated while removing the nut, return it to the position described in Step 2.
- 6 On A-series engines, check tensioner spindle projection (Figure 29). If it exceeds 0.59 in (15mm), the timing chain is stretched excessively and must be replaced.
- 7 Remove the sprockets and timing chain together. If a puller isn't available, pry the sprockets off a little at a time with 2 large screwdrivers.



- 8 Remove the shims from behind the crankshaft sprocket. The same number of shims must be used during installation, unless a new crankshaft, camshaft, or sprocket is being installed.
- 9 Check the sprocket teeth for wear and the chain for stretching. Check the chain tensioner for wear and damage. Replace as needed.
- 10 Installation is the reverse of these steps. Be sure the timing marks on chain and sprockets are aligned. Install the oil thrower with its concave side forward.

NOTE If installing a new crankshaft, camshaft, or sprocket, install shims behind the crank sprocket so the sprocket faces will be even (Figure 30). Measure with a vernier caliper as shown, or lay a straightedge across the faces of the sprockets.

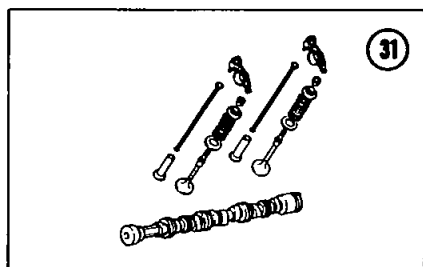


CAMSHAFT AND LIFTERS (A-SERIES, J13)

Removal/Installation (A-Series)

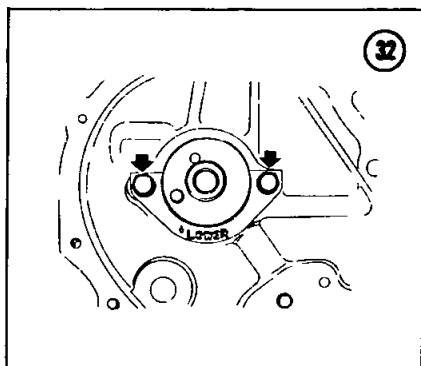
Figure 31 shows the camshaft and related parts

- 1 Remove the engine



- 2 Remove the front cover, timing chain, and sprockets as described earlier
- 3 Remove the rocker assembly and pushrods as described earlier. Make a holder to keep the pushrods in order
- 4 Remove the fuel pump (Chapter Five), distributor (Chapter Seven), and oil pump
- 5 Turn the engine upside down to prevent the lifters from obstructing camshaft removal
- 6 Unbolt the camshaft locating plate (Figure 32) and remove the camshaft. Rotating the camshaft will ease removal
- 7 To remove lifters, remove oil pan, then take the lifters out of the block. Make a holder to keep the lifters in order. They must be reinstalled in the bores from which they were removed
- 8 Installation is the reverse of these steps. Coat lifters and camshaft with engine oil before

installation. Install the locating plate with the side marked LOWER toward the bottom of the engine (Figure 32). Be sure timing marks on chain and sprockets are correctly aligned.



Removal/Installation (J13)

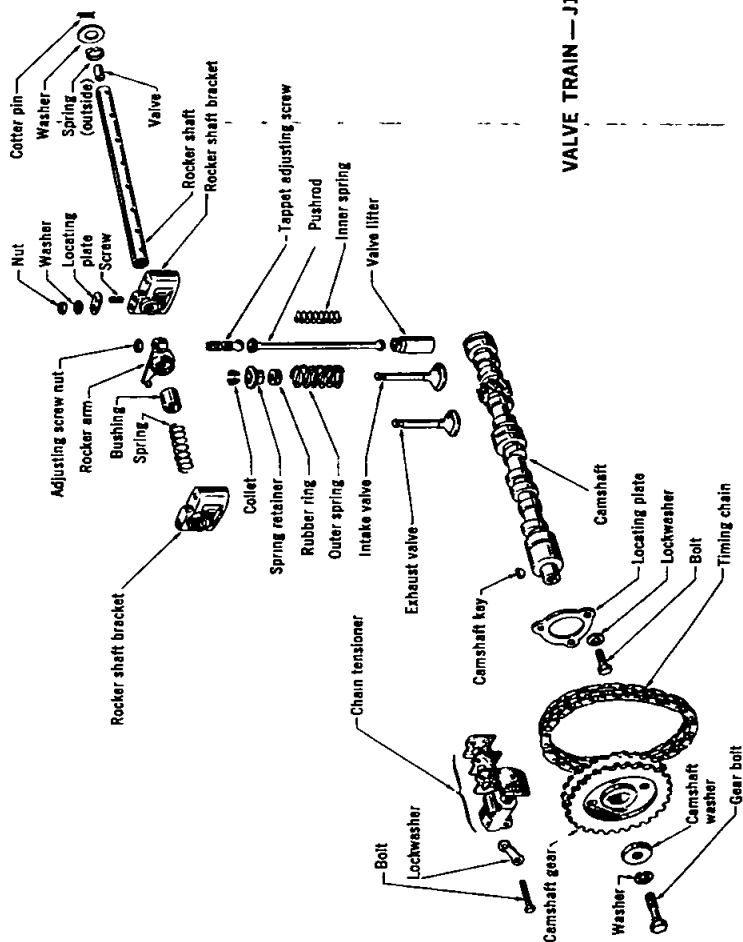
The factory suggests removing the engine before removing the camshaft. However, it is possible to remove the camshaft with the engine in place. Figure 33 shows the camshaft and its related parts.

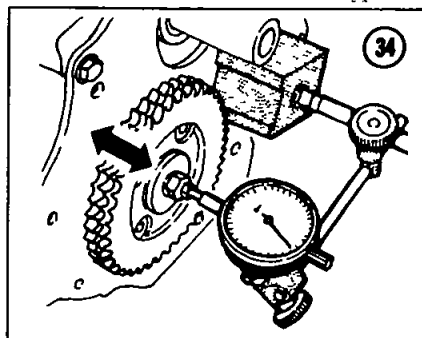
- 1 Remove the carburetor and the manifolds (Chapter Five)
- 2 Remove the rocker assembly as described previously
- 3 Remove the lifter covers from the left-hand side of the engine block. Remove the lifters from their bores.

NOTE Label the lifters or make a holder to keep them in order. They must be reinstalled in the bores from which they were removed.

- 4 Remove the distributor and its driving spindle (Chapter Seven)
- 5 Remove the oil pan and pump
- 6 Check camshaft end play. Position a dial gauge against camshaft as shown in Figure 34. Pry the camshaft back and forth and note the reading on the gauge. End play should range from 0.003-0.007 in. (0.076-0.178mm). Replace the camshaft locating plate if end play is incorrect.
- 7 Remove the timing chain and sprockets as described earlier in this chapter.

VALVE TRAIN—J13 ENGINE





8 Remove 3 setscrews securing the camshaft locating plate. Carefully withdraw the camshaft from the engine. Rotate it slowly to ease removal.

9 Installation is the reverse of these steps. Oil the camshaft and lifters before installation. Note that the small oil hole in the camshaft locating plate goes toward the right-hand side of the engine.

Inspection

1 Check camshaft bend, bearing clearance, and sprocket runout. See *L-Series Camshaft Inspection* earlier in this chapter.

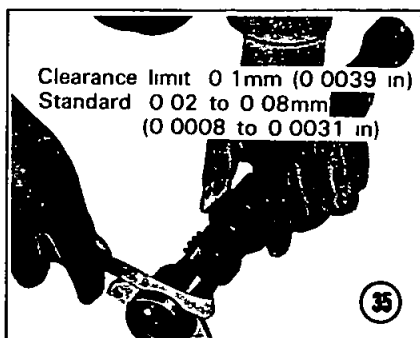
2 Check lifters for visible wear and scores. Replace as needed. Check lifter to bore clearance. When oiled, lifters should fall into the bores of their own weight, but not be loose enough to wobble. If in doubt, measure lifter and bore diameters. Determine the difference between these measurements and compare to specifications (end of chapter). Replace lifters with excessive clearance.

3 On A-series engines, measure the gap between camshaft and locating plate (Figure 35). If it exceeds 0.0039 in. (0.1 mm), replace the locating plate.

OIL PUMP

Removal/Installation (L-Series Engines)

1 Turn the engine over until No. 1 piston is at top dead center on the compression stroke. When this occurs, the timing pointer will point to the 0° mark on the crankshaft pulley (or the



crankshaft pulley notch will line up with the 0° mark on the engine timing scale). In addition, the distributor rotor will point to No. 1 spark plug's wire terminal in the distributor cap.

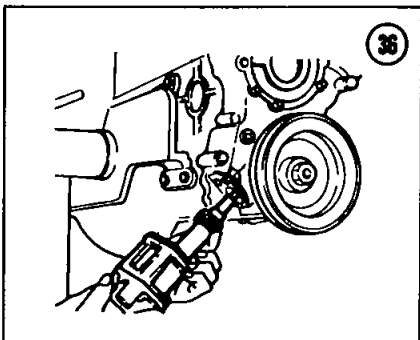
2 Remove the distributor (Chapter Seven).

3 Drain the engine oil.

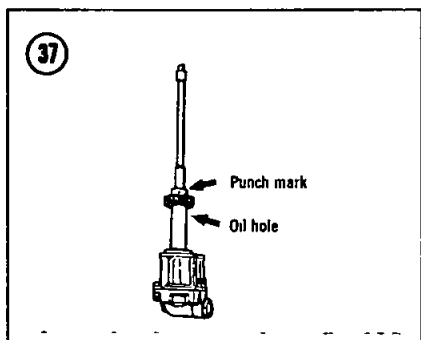
4 Remove the splash pan from under the front of the vehicle (if so equipped).

5 On 510's, remove the suspension stabilizer (Chapter Twelve).

6 Remove 4 pump mounting bolts. Take out the pump and its driving spindle. See Figure 36.

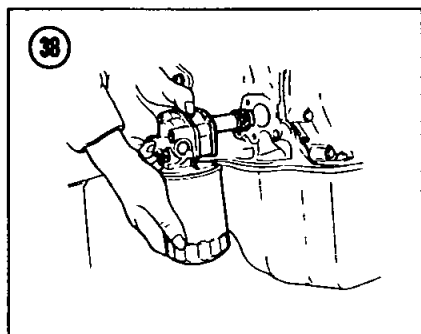


7 Installation is the reverse of these steps. Use a new gasket, coated on both sides with gasket sealer. Make sure the punched mark on the distributor driving spindle lines up with the hole in the oil pump (Figure 37). Install the distributor as described in Chapter Seven. Fill the engine with an oil recommended in Chapter Two.



Removal/Installation (A-Series Engines)

- 1 Place a container under the oil pump
- 2 Remove 3 bolts securing the pump to the cylinder block. Withdraw the oil pump and filter (Figure 38). Separate the filter and pump.



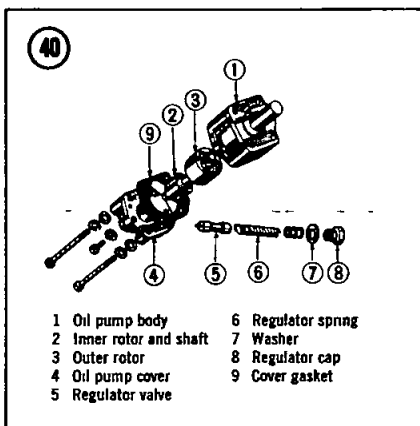
- 3 Installation is the reverse of these steps. Use a new gasket, coated on both sides with gasket sealer. Tighten the pump bolts to specifications (end of chapter).

Removal/Installation (J13 Engine)

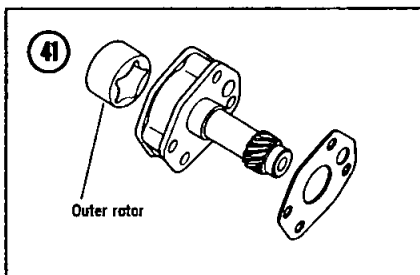
- 1 Remove the oil pan
- 2 Referring to Figure 39, unbolt the oil pump from the cylinder block. Take the oil pump out, together with its driving spindle.
- 3 Installation is the reverse of these steps. Use a new oil pump gasket, coated on both sides with multipurpose grease. Use a new oil pan gasket, coated on both sides with gasket sealer.

Inspection (L- and A-Series)

- 1 On L-series pumps, remove the cover and gasket (Figure 40). Lift out the inner and outer rotors.

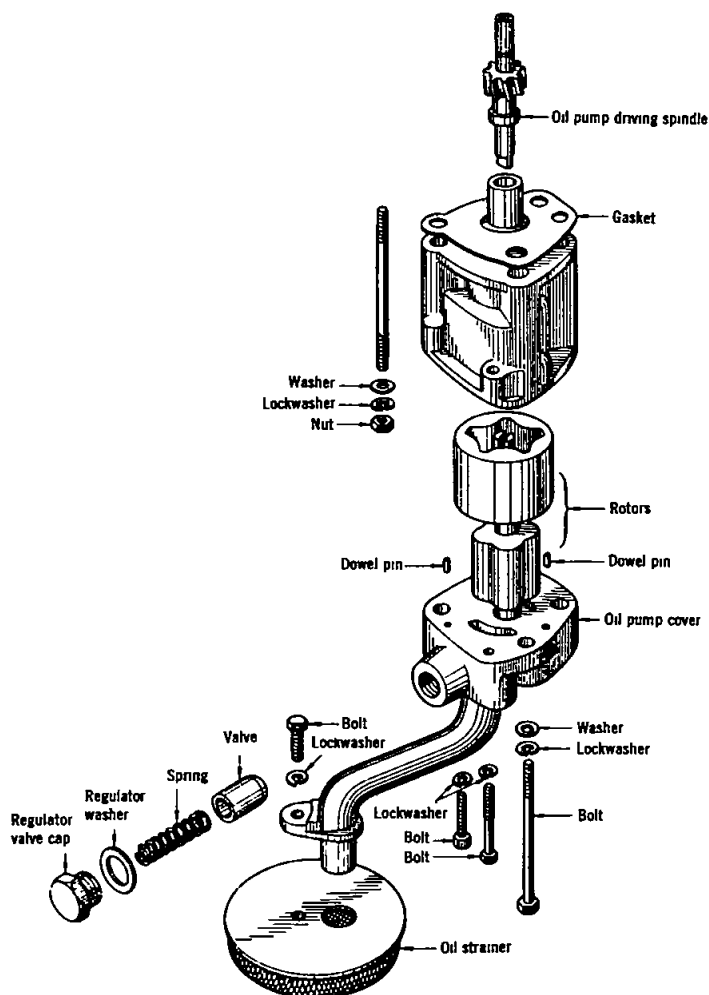


- 2 On A-series pumps, remove one bolt securing the pump body to the cover. Remove the body and outer rotor (Figure 41).

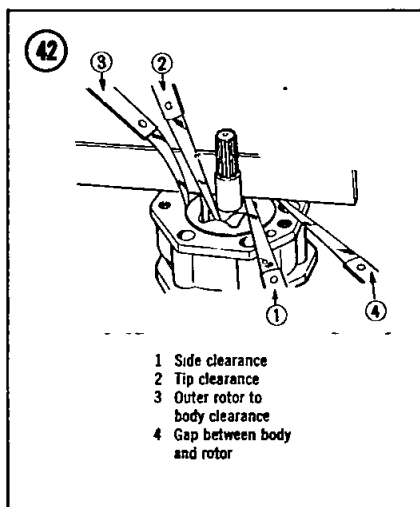


- 3 Unscrew the regulator valve cap, then take out the valve parts.
- 4 Clean all parts in solvent. Check the pump rotors for wear, scoring, or visible damage. On L-series engines, check the pump driving spindle also. Check oil pump clearance (Figure 42) and compare with specifications at the end of the chapter. Replace the pump if any clearances are excessive.
- 5 Measure the regulator valve spring free length. Compare with specifications (end of

39



OIL PUMP—J13 ENGINE



chapter) Replace the spring if it is too long or too short

6 Install the regulator valve parts. Tighten the valve cap to specifications (end of chapter)

7 Install the rotor(s) in the pump. Install a new cover gasket, coated lightly on both sides with gasket sealer. Install the pump cover. Take care not to fold the cover gasket. Tighten cover bolt(s) to specifications (end of chapter)

Inspection (J13)

1 Remove the oil strainer securing bolt. Take the oil strainer off.

2 Remove the relief valve cap nut and washer. Take out the spring and valve.

3 Remove 2 remaining cover bolts. Remove the oil pump and take the rotors out.

NOTE One end of the outer rotor is chamfered. This end must face toward the base of the oil pump body, or the cover will not fit properly.

4 Check all parts for wear and damage. Check the relief valve spring for weakness. Replace complete oil pump if any parts are worn or damaged.

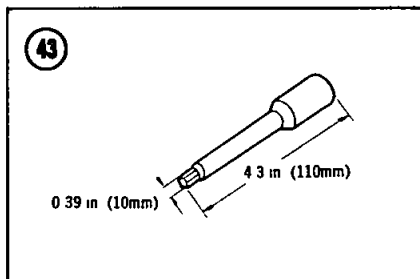
5 Assemble by reversing Steps 1-3. Be sure the chamfered end of the outer rotor faces the base of the oil pump when installed.

CYLINDER HEAD

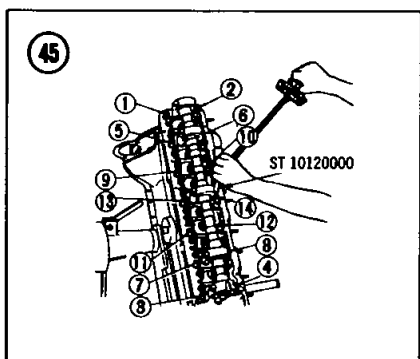
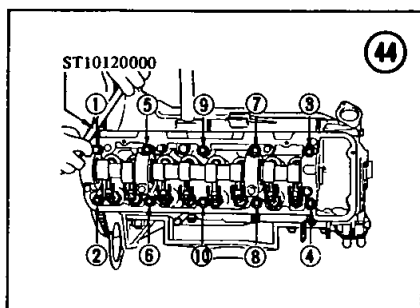
Cylinder Head Removal (L-Series)

- 1 Completely drain the cooling system
- 2 Remove all spark plugs
- 3 Remove the air cleaner (Chapter Five)
- 4 Remove the rocker arm cover
- 5 Remove the intake manifold, exhaust manifold, and fuel pump (Chapter Five)
- 6 Detach heater hoses from cylinder head
- 7 Remove the thermostat housing and water outlet elbow from left front of cylinder head
- 8 Turn the camshaft so its sprocket locating pin is straight up. This provides a reference point for later installation.
- 9 Remove the camshaft sprocket as described under *Camshaft Removal* earlier in this chapter.
- 10 Remove 2 bolts attaching the cylinder head to the engine front cover.
- 11 Remove the cylinder head bolts with a 10mm Allen socket (Figure 43). To prevent warping the cylinder head, loosen the bolts in several stages. Follow loosening order given in Figure 44 (4-cylinder) or Figure 45 (6-cylinder).

NOTE There are different lengths of cylinder head bolts. Tag them as they are removed so they can be reinstalled in the same holes later.



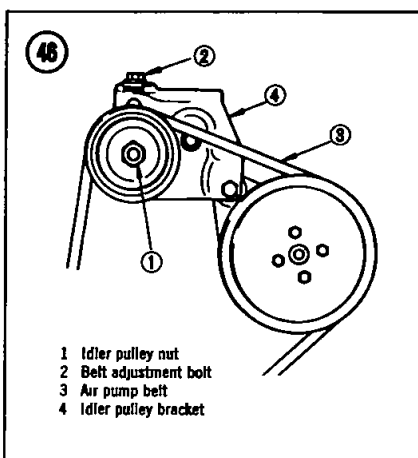
12 Once the head bolts are removed, lift the cylinder head off the engine. If the head is difficult to remove, tap it gently with a rubber mallet. If that doesn't work, try reinstalling the spark plugs and turning the engine over by hand. The compression should force the head loose.

**CAUTION**

Never remove the camshaft brackets from the cylinder head, even though removal appears easy. If the brackets are removed, it will be difficult if not impossible to realign the bearing centers.

Cylinder Head Removal (A-Series, J13)

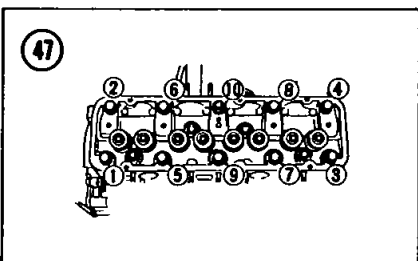
- 1 Drain the cooling system by opening the tap at the bottom of the radiator and removing the plug from the left side of the cylinder block
- 2 Remove the air cleaner, carburetor, and intake and exhaust manifolds (Chapter Five)
- 3 Detach heater hose from rear of engine
- 4 On A14 engines, remove the idler pulley, air pump belt, and idler pulley bracket (Figure 46)
- 5 Detach the radiator hose from the water outlet elbow at the front of the cylinder head. If necessary, remove the elbow and thermostat as described in Chapter Six



- 6 Label and disconnect the spark plug wires. Remove the spark plugs

- 7 Remove the rocker arm cover

- 8 On A-series engines, remove the rocker assembly as described earlier in this chapter. Then remove the cylinder head bolts in the order shown in Figure 47. Loosen in several stages to prevent warping the cylinder head.



- 9 On J13 engines, remove the rocker assembly and cylinder head securing nuts. Loosen evenly a little at a time, starting with the center nuts and working outward. This is necessary to prevent warping the cylinder head.

- 10 Lift the cylinder head off the engine. If the head is difficult to remove, tap it with a rubber mallet. If that doesn't work, reinstall the spark plugs and turn the engine over by hand. The compression should force the head loose.

Inspection (All Models)

1 Check the head gasket for signs of oil, water, and compression leaks, then throw it away. Never reuse a head gasket.

2 Check the cylinder head for leaks before cleaning.

3 Without removing valves, carefully remove all deposits from the combustion chambers, intake ports, and exhaust ports. Use solvent and a chisel-shaped piece of hardwood. Be careful not to gouge the cylinder head.

4 After all carbon is removed from combustion chambers and ports, clean the entire head in solvent. While cleaning, check for cracks or other visible damage. Look for corrosion or foreign material in oil or water passages. Clean the passages with a stiff spiral wire brush, then blow them out with compressed air.

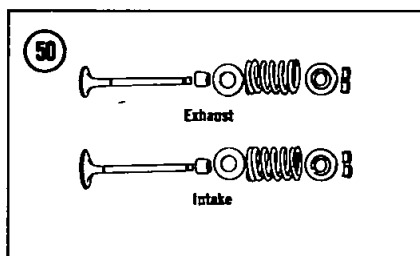
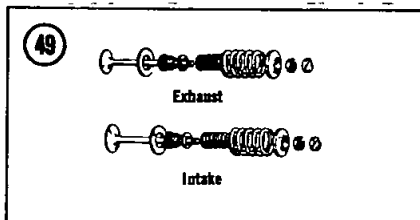
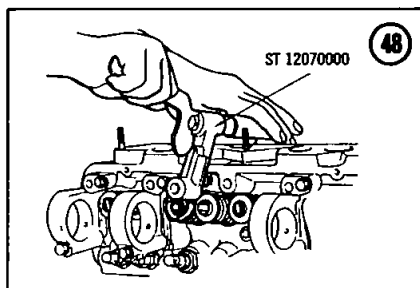
5 Check the cylinder head bottom (block mating) surface for flatness. Place an accurate straightedge across the surface. If there is any gap between the straightedge and cylinder head surface, measure it with a feeler gauge. Have the cylinder head resurfaced by a machine shop if the gap exceeds 0.004 in. (0.1 mm).

6 Check studs in the cylinder head for general condition. Replace damaged studs.

NOTE: While the following inspection steps are possible for home mechanics, they may be inconvenient and some require special equipment. The usual practice is to remove the cylinder head, perform all disassembly except valve removal, and take it to a machine shop for inspection and service.

7 Remove valves from the cylinder head. Compress valve springs with a tool like the one shown in Figure 48. These are available from rental dealers. Remove the valve keepers and release the spring tension. Remove the spring washer, oil seal(s), inner and outer valve springs (except A-series), and spring seat (except J13). Remove any burrs from valve stem ends, then remove valves. Figure 49 shows L-series valves and related parts. Figure 50 shows the A-series. Figure 51 shows the J13 version.

NOTE: Label valves to keep them in order. They must be reinstalled in the guides from which they were removed.



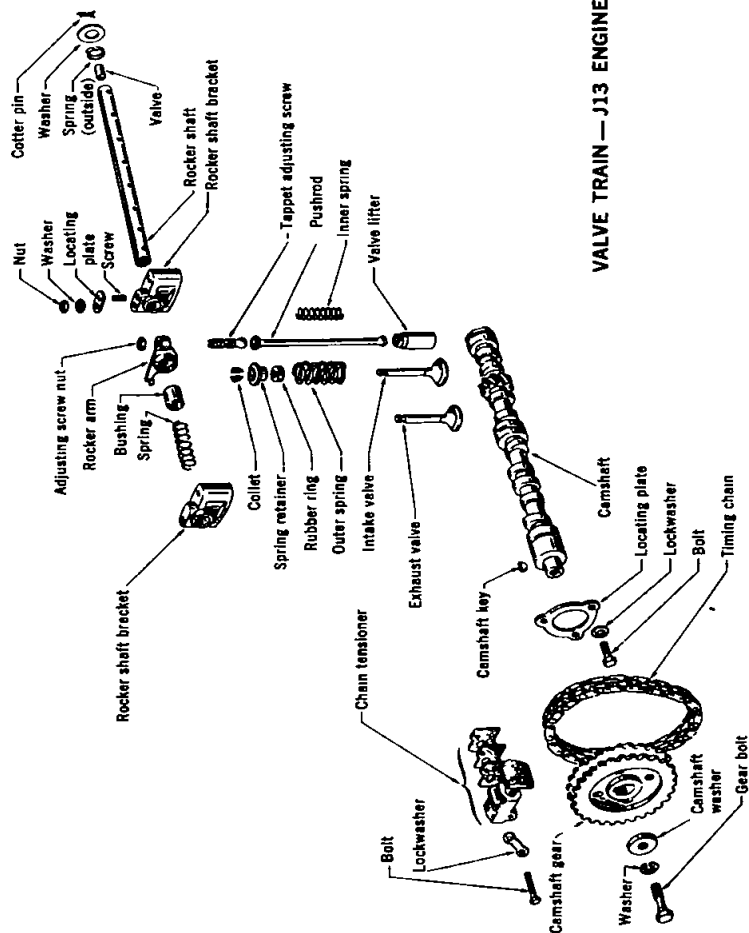
8 Clean the valves with a wire brush and solvent. Discard cracked, warped, or burned valves.

9 Check valve seats for pitting, wear, or damage. If necessary, have them reconditioned by a machine shop.

10 Clean the valve guides with a stiff spiral wire brush.

11 Insert the valves in their guides. Hold the valves just off the seats and rock them back and forth in a direction parallel with the rocker arms. This is the direction in which the greatest wear normally occurs. If the valve stem rocks more than 0.008 in. (0.2 mm), a worn valve guide or stem is indicated. If you don't have

51

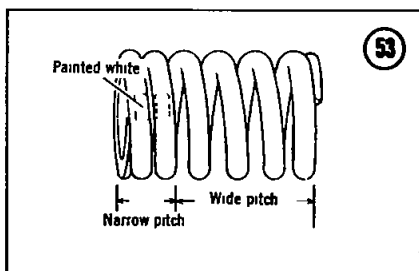
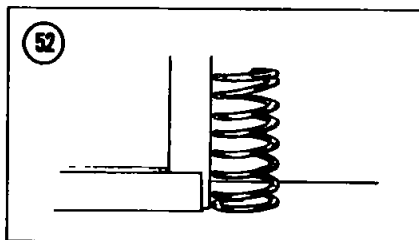


VALVE TRAIN — J13 ENGINE

precision measuring equipment, have valve stems and guides measured by a dealer or machine shop. Replace valves with worn stems, have worn guides replaced.

12 Check valve spring free length and loaded length. Replace springs that do not meet specifications. Replace J13 valve springs if visibly bent or distorted. Check bend for L- and A-series springs with a square (Figure 52). Replace any bent more than 0.063 in. (1.6 mm).

NOTE On L26 and L28 outer springs and all A-series springs, the coils at one end of the spring are closer together than the coils at the other end (Figure 53). The end with narrow-pitch coils goes downward when checking for bends and when installing the springs.



13 Coat the valves with oil and insert them in the cylinder head. Install the valve spring seats (L- and A-series), oil seals, springs, and spring washers. Compress the valve springs and install the keepers.

Cylinder Head Installation

1 Be sure the cylinder head, bores, and block are completely clean. Clean away all carbon on

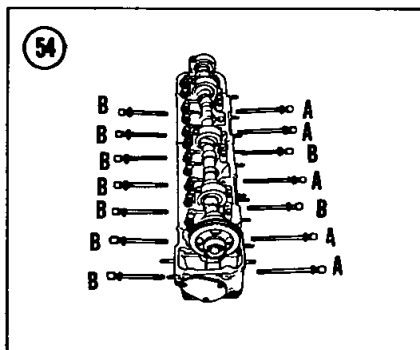
the piston tops, but don't remove the carbon ridge at the top of the cylinder bore. Check all visible oil passages for cleanliness.

2 On L-series engines, install the camshaft and rocker arms in the cylinder head (if removed). Turn the camshaft so its sprocket locating pin is straight up. This must be done before the cylinder head is installed to prevent the valves from striking the pistons tops.

3 Place the head gasket on the cylinder block. On J13 engines, the top side of the gasket is marked. Do not use gasket sealer on the head gasket.

4 Place the cylinder head on the block. On L-series engines, check the valves to make sure none are open far enough to strike piston tops.

5 On L- and A-series engines, install the cylinder head bolts. On early L-series engines (3 bolt lengths), place the bolts in their holes according to the labels made during disassembly. On late L-series engines (2 bolt lengths), place long bolts in the "A" holes and short bolts in the "B" holes. See Figure 54 (6-cylinder) or Figure 55 (4-cylinder). On A-series engines, the center bolt on the right-hand side of the engine is thinner than the others. It is identified by a "T" mark (1200) or a hollow head (B210).



6 On J13 engines, install the pushrods in the holes from which they were removed. Loosen the valve adjusting screws in the rocker arms, then install the rocker assembly.

7 On L-series engines, tighten cylinder head bolts in 3 stages as specified in Table 5 (end of chapter). Follow the sequence shown in Fig-

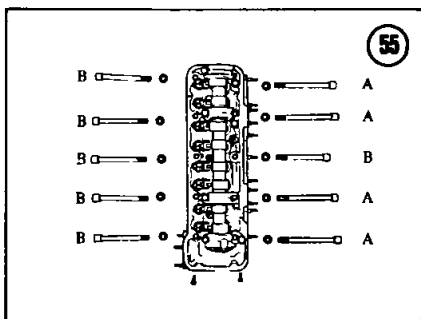
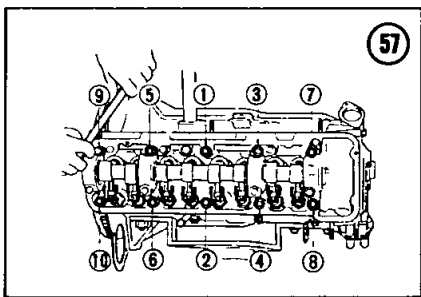
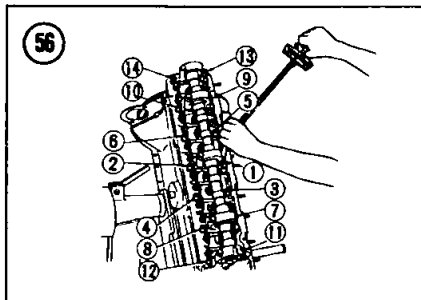


Figure 56 (4-cylinder) or Figure 57 (6-cylinder) Install 2 small bolts securing the cylinder head to the front cover



8 On A-series engines, tighten the head bolts in several stages, following the sequence shown in Figure 58 Tightening torques are listed in Table 6 (end of chapter)

9 On J13 engines, tighten cylinder head nuts in several stages, following the sequence shown in

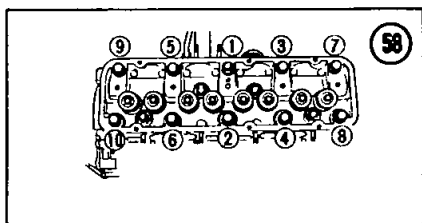
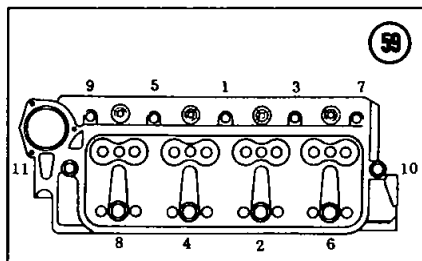


Figure 59 Tighten to 45 ft-lb (6.2 mkg) As each left-hand cylinder head nut is tightened, tighten the rocker bracket nut next to it Tighten rocker bracket nuts to 13-20 ft-lb



10 On L-series engines, install the timing chain and camshaft sprocket as described under *Camshaft Installation* earlier in this chapter

11 On A-series engines, install the pushrods in the holes from which they were removed Install the rocker assembly Tighten rocker bracket bolts in several stages, working outward from the center bolt Correct torque is 14-18 ft-lb (2.0-2.5 mkg)

12 Install the thermostat housing (L-series), thermostat, and water outlet elbows on the front of the cylinder head Connect the temperature sender wire(s)

13 Install the manifolds, carburetor(s), and fuel pump (Chapter Five)

14 Attach the heater hose(s) to the rear of the cylinder head

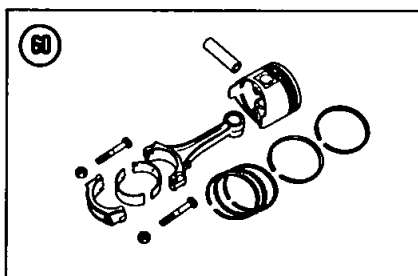
15 On A14 engines, install the idler pulley, air pump belt, and idler pulley bracket (Figure 46)

16 Install the rocker cover and spark plugs Connect the plug wires according to labels made during removal

- 17 Fill the cooling system with a 50/50 mixture of anti-freeze and water. Check oil level and top up if necessary.
- 18 Check valve clearances as described in the *Tune-up* section of Chapter Two.
- 19 On 1974 B210's, warm the engine to normal operating temperature, then tighten cylinder head bolts to 54-58 ft-lb (7.5-8.0 mkg).
- 20 Install the air cleaner.
- 21 On all L-series and A-series engines, drive 600 miles, then recheck head bolt tightness and valve clearances.

PISTON AND CONNECTING ROD ASSEMBLIES

Figure 60 shows L- and A-series piston and connecting rod parts. Figure 61 shows the J13 version.

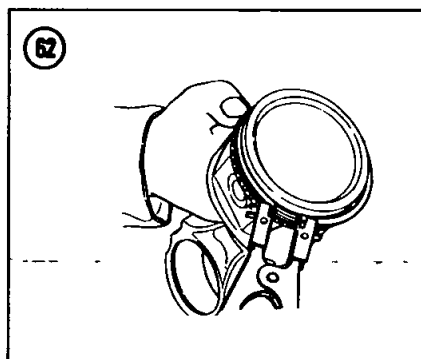


Piston Removal

- 1 Remove the cylinder head and oil pan.
- 2 Remove the carbon ridge at the top of the cylinder bores with a ridge reamer.
- 3 Rotate the crankshaft so the connecting rod is centered in the bore.
- 4 Remove the nuts securing the connecting rod cap. Lift off the cap, together with the lower bearing half.
- 5 Push the piston and connecting rod out the top of the bore with a wooden hammer handle.

NOTE Check for cylinder numbers stamped on connecting rod and cap. Make your own number marks if they are not present. Mark J13 parts on the camshaft (left) side. Mark L- and A-series parts on the right-hand side.

- 6 Remove the rings with a ring remover (see Figure 62).



Piston Pin Removal/Installation (L- and A-Series Engines)

The pistons are press fitted to the connecting rods and hand fitted to the pistons. Removal requires a press and support stand. This is a job for dealer or machine shop, which is equipped to fit the pistons to the pins, ream the pin bushings to the correct diameter, and install the pistons on the connecting rods.

Piston Pin Removal/Installation (J13 Engine)

- 1 Secure the piston upside down in a soft-jawed vise.
- 2 Referring to Figure 61, remove the clamp bolt and lockwasher from the small end of the connecting rod.

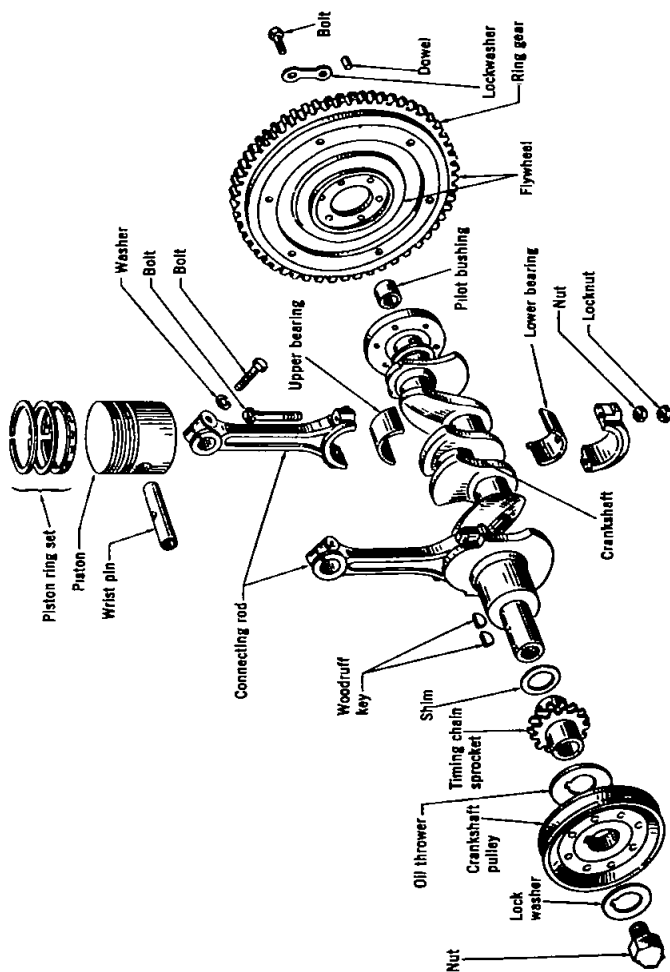
NOTE The bolt fits through a groove in the piston pin, so it must be removed, not just loosened.

- 3 Push the pin out of the piston and remove the connecting rod.
- 4 Check the fit of new pistons and pins as described in the following procedures.
- 5 Installation is the reverse of these steps. Use new lockwashers on the piston pin clamp bolts.

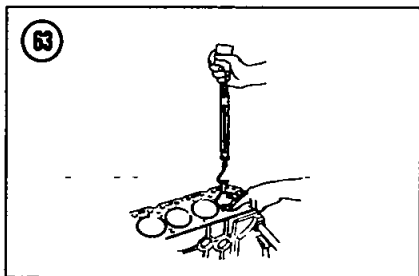
Piston Clearance Check

This procedure should be done at room temperature. Cylinder walls must be clean and dry.

PISTON AND CONNECTING ROD ASSEMBLY — J13 ENGINE



1 Referring to **Figure 63**, insert the piston without rings upside down in the cylinder bore. Insert a 0.0016 in. (0.04mm) feeler gauge between piston and cylinder wall and attach a spring scale as shown.

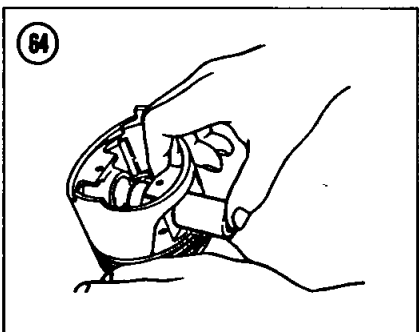


2 Pull on the spring scale. Note the amount of force required to pull the feeler gauge out of the cylinder. This should be 0.4-3.3 lb (L-series), or 1.1-3.3 lb (A-series and J13). If the required pull is greater than specified, piston clearance is less than it should be. If the pull is less, piston clearance is greater.

3 Repeat the procedure for all 4 cylinders and pistons.

Piston Pin Clearance Check

This procedure must be done at room temperature. Push the pin into the piston by hand (**Figure 64**). It should be tight enough not to wobble, but not too tight to be pressed in with a thumb. If in doubt, have pin-to-piston clearance checked by a machine shop. Replace piston and pin if clearance is excessive.

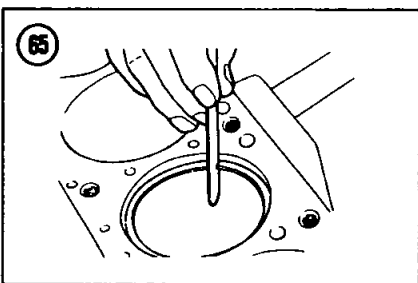


Piston Ring Fit/Installation

1 Check the ring gap of each piston ring. To do this, position the ring at the top or bottom of the ring travel area and square it by tapping gently with an inverted piston.

NOTE If the cylinders have not been rebored, check the gap at the bottom of the ring travel, where the cylinder is least worn.

2 Measure ring gap with a feeler gauge as shown in **Figure 65**. Compare with specifications at the end of the chapter.



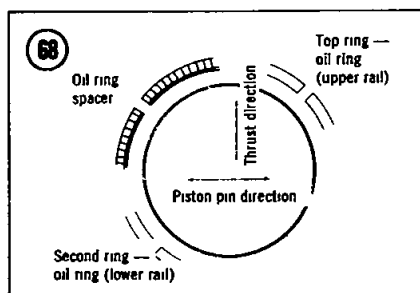
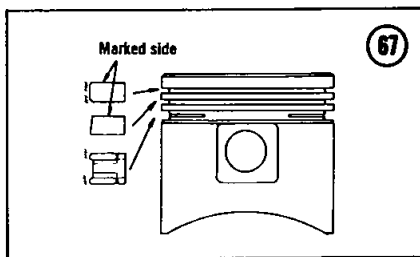
3 Check side clearance of the rings as shown in **Figure 66**. Place the feeler gauge alongside the ring all the way into the groove. Compare with specifications (end of chapter).



4 Using a ring expander tool, carefully install the oil control ring, then the compression rings. J13 and early L-series engines use a one-piece oil ring. All other models use 3-piece oil rings. The wavy segment goes between the flat segments to act as a spacer. On J13 engines, the

second compression ring has a tapered outer edge. The top compression ring does not. On L-series and A-series engines, the top compression ring has a chromed outer surface. The second compression ring is tapered. See Figure 67.

5 Position the ring gaps as shown in Figure 68.

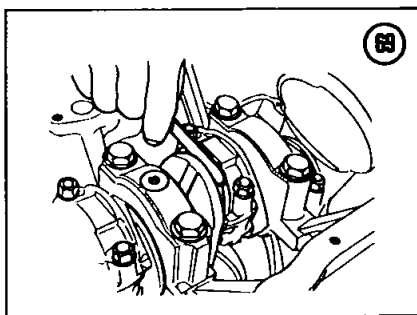


Connecting Rod Inspection

- 1 Have connecting rod straightness checked by a dealer or machine shop. Straighten or replace bent or twisted rods.
- 2 Install the connecting rods and bearings on the crankshaft. Measure clearance between the connecting rod big end and crankshaft with a feeler gauge (Figure 69). This is connecting rod big end play. Replace the connecting rod if it exceeds specifications (end of chapter).
- 3 If any connecting rods are replaced, make sure the new rods weigh within 0.25 oz (7 grams) of the old ones.

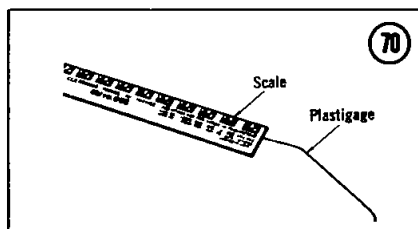
Measuring Bearing Clearance

- 1 Place connecting rods and upper bearing halves on the proper crankpins (connecting rod journals).



- 2 Cut a piece of Plastigage (Figure 70) the width of the bearing. Place the Plastigage on the crankpin, then install the lower bearing half and cap.

NOTE Do not place Plastigage over the crankpin oil hole.

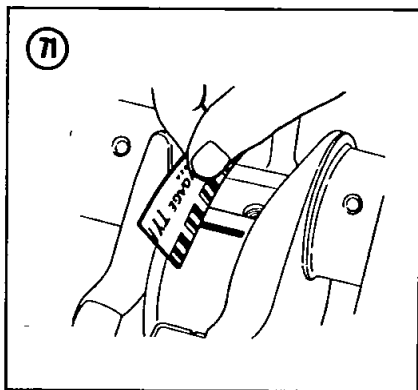


- 3 Tighten the connecting rod cap to specifications (end of chapter). Do not rotate the crankshaft while the Plastigage is in place.
- 4 Remove the connecting rod cap. Bearing clearance is determined by comparing the width of the flattened Plastigage to the markings on the envelope (Figure 71). If clearance is excessive, the crankshaft must be reground and undersize bearings installed.

Installing Piston/Connecting Rod Assembly

Refer to Figure 60 (L- and A-series) or Figure 61 (J13).

- 1 Make sure the pistons are correctly installed on the connecting rods. On 6-cylinder engines, the front side of the piston is identified by an "F" mark near the piston pin hole. On L16, L18, and L20B engines, the front side is iden-



tified by a notch in the piston top. A12 engines have an "F" mark on the piston top, A13 and A14 engines have a number which goes toward the front. On all L- and A-series engines, the oil hole in the connecting rod big end faces the right-hand side of the engine.

On J13 engines, the split in the piston skirt faces the camshaft (left) side of the engine, as does the connecting rod number mark made during removal.

2 Be sure the ring gaps are correctly positioned (Figure 68).

3 Immerse the entire piston in clean engine oil. Coat the cylinder walls with oil.

4 Slide a ring compressor over the rings. Compress the rings into the grooves.

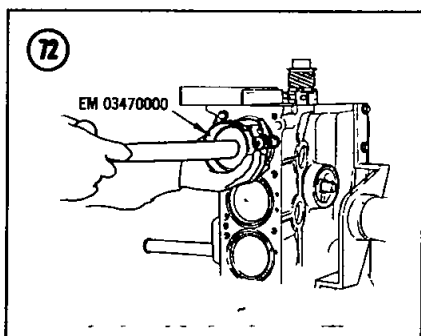
5 Install the piston/connecting rod assembly in its cylinder as shown in Figure 72. Tap lightly with a wooden hammer handle to insert the piston. Be sure the connecting rod number (or punch mark) corresponds with the cylinder number (counting from the front of the engine).

CAUTION

Use extreme care not to let the connecting rod nick the crankshaft journal.

6 Clean the connecting rod bearings carefully, including the back sides. Coat the crankpins and bearings with clean engine oil. Place the bearings in the connecting rod and cap.

7 Install the connecting rod cap. Make sure the cylinder on rod and cap are on the same



side. Tighten the cap nuts to specifications (end of chapter).

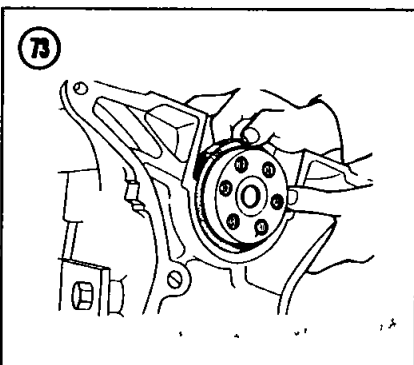
8 Recheck the connecting rod big end play as described under *Connecting Rod Inspection*, Step 2.

CRANKSHAFT

Removal

1 Unbolt the main bearing caps. Place the caps in order on a bench. A puller may be necessary to remove the center and rear main bearing caps on L-series engines, and all 3 caps on J13 engines. If you don't have such a tool, take the engine to a Datsun dealer for cap removal.

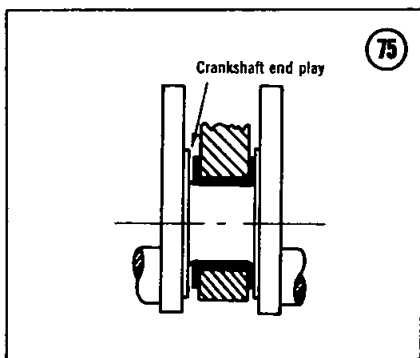
2 On L-series engines, remove 2 side oil seals, then take the rear oil seal off the crankshaft (Figure 73). A-series engines use a similar rear seal, but don't use side seals.



- 3 On J13 engines, remove the cork strips from front and rear main bearing caps. See Figure 74
- 4 Lift the crankshaft out of the engine. Lay the crankshaft, main bearings, and bearing caps in order on a clean surface.

Inspection

- 1 Clean the crankshaft thoroughly in solvent. Blow out the oil passages with compressed air or clean with a stiff spiral wire brush.
- 2 Check crankpins and main bearing journals for wear, scoring, and cracks. Even if the surfaces appear undamaged, have a machine shop check for out-of-roundness, taper, wear, and crankshaft bend. If necessary, have the crankshaft reground.
- 3 Measure crankshaft end play. Install the crankshaft in the block. Insert a feeler gauge between the crankshaft and center bearing flange (L- and A-series) or center bearing thrust washer (J13). See Figure 75. Replace the center bearing or thrust washers if the end play exceeds the specifications.



Measuring Main Bearing Clearance

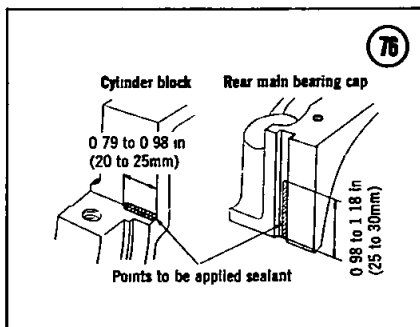
Main bearing clearance is measured in the same manner as connecting rod bearing clearance, described earlier in this chapter. Excessive bearing clearance requires that the bearings be replaced, the crankshaft be reground, or both.

Installation

- 1 Thoroughly clean bearings, including the back sides.

- 2 Install the bearings in the cylinder block and bearing caps. Be sure the small formed tangs in the bearings fit the grooves in cylinder block and caps. Be sure the oil holes in cylinder block and bearings line up. On L- and A-series engines, the center bearing is flanged. On J13 engines, crankshaft end play is controlled by 2 two-piece thrust washers. The lower thrust washer halves have locating lugs, the upper halves are plain.
- 3 Make sure the bearing locating tangs are correctly positioned in the grooves machined in cylinder block and bearing caps.
- 4 Coat the bearings liberally with clean engine oil. Lay the crankshaft in the block. Coat the crankshaft journals with engine oil.
- 5 Install the bearing caps and tighten the cap bolts slightly. On L- and A-series engines, make sure the arrow marks on the caps face the front of the engine. On J13 engines, make sure the punch marks on the caps are toward the camshaft side of the engine.

NOTE On L- and A-series engines apply small amounts of gasket sealer to the rear bearing cap. See Figure 76 (L-series) or Figure 77 (A-series). On J13 engines, install the rear seal pieces at the same time as the rear bearing cap. See Figure 74.

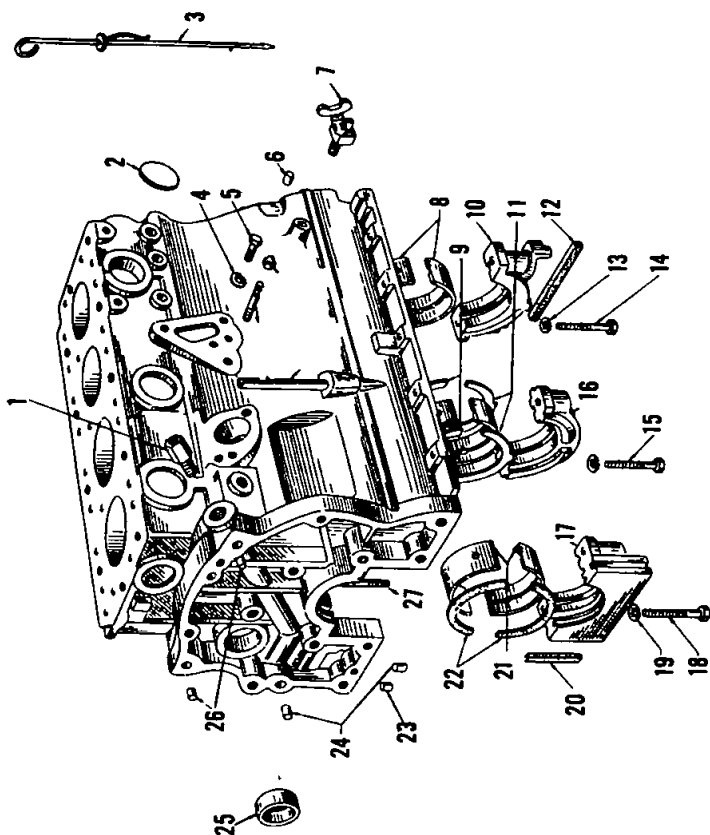


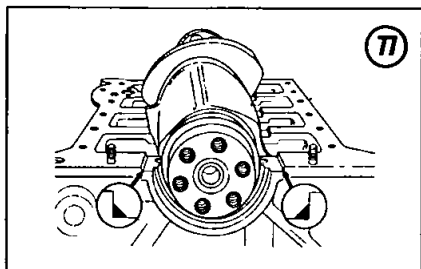
- 6 Gently push the crankshaft toward the front and rear of the engine to verify that the bearings and caps are properly aligned and seated.
- 7 Tighten the cap bolts to specifications (end of chapter). Tighten gradually in 2 or 3 separate stages, starting with the center cap and working

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J13 ENGINE

- 1 Oil pressure switch adapter
- 2 Soft plug
- 3 Dipstick
- 4 Lockwasher
- 5 Bolt
- 6 Brass oil passage plug
- 7 Coolant drain tap
- 8 Main bearings
- 9 Upper thrust washer halves
- 10 Front main bearing cap
- 11 Lower thrust washer halves
- 12 Front main bearing cap oil seal
- 13 Lockwasher
- 14 Bolt
- 15 Bolt
- 16 Center main bearing cap
- 17 Rear main bearing cap
- 18 Bolt
- 19 Lockwasher
- 20 Rear bearing cap side oil seal
- 21 Rear main bearings
- 22 Rear main oil seal halves
- 23 Brass oil passage plug
- 24 Brass oil passage plug
- 25 Soft plug
- 26 Brass oil gallery plug
- 27 Oil pump stud

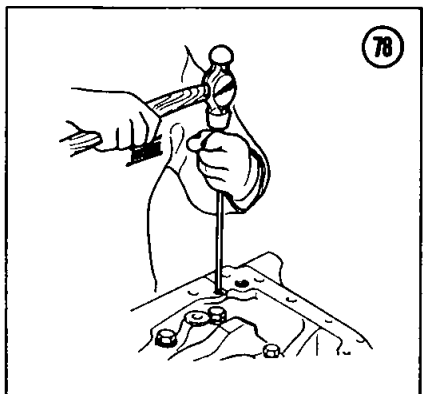




outward. Rotate the crankshaft during tightening to make sure it isn't binding. If the crankshaft is difficult to turn, stop and find out why before tightening further. Check for foreign material on bearings and journals. Make absolutely certain that bearings are the correct size, especially if the crankshaft has been reground. Never use undersize bearings if the crankshaft has not been reground.

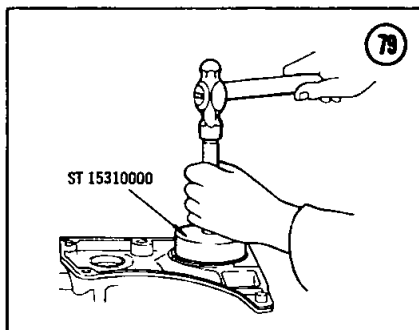
8 Recheck crankshaft end play (Figure 75)

9 On L-series engines, tap the rear side seals into place (Figure 78). On L- and A-series, install rear seal with a suitable drift (Figure 79).



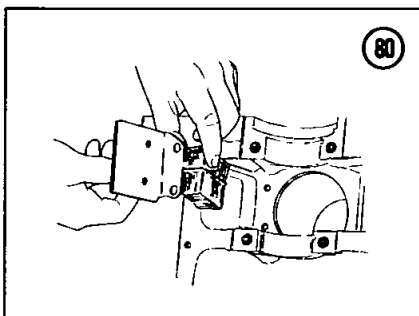
Pilot Bushing

The pilot bushing, located inside the rear end of the crankshaft, supports the transmission input shaft on manual transmission vehicles. Inspect the bushing for visible wear and damage. Have it replaced by a Datsun dealer or machine shop if defects are apparent.



CYLINDER BLOCK INSPECTION

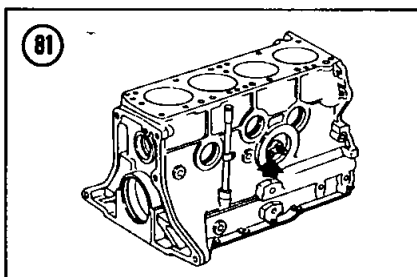
1 On L- and A-series engines, remove the crankcase oil separator prior to inspection. See Figure 80.



2 Clean the block thoroughly with solvent and check all freeze plugs for leaks. Replace any freeze plugs that are suspect. It is a good idea to replace all of them. While cleaning, check oil and water passages for dirt, sludge, and corrosion. If the passages are very dirty, the block should be boiled out by a dealer or competent machine shop.

NOTE Block boiling necessitates replacement of all freeze plugs (and cam bearings on pushrod engines). However, a block dirty enough to need boiling almost certainly needs to have these parts replaced anyway.

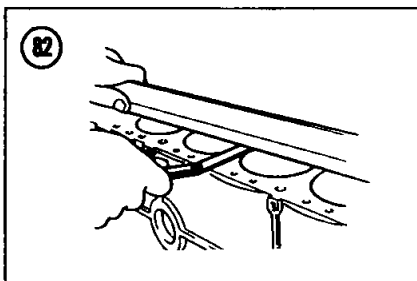
3 On L-series engines, check the oil pressure relief valve (Figure 81) for cracks or other



damage. If these can be seen, pry out the old relief valve and tap in a new one.

4 Examine the block for cracks.

5 Check flatness of the cylinder block's top surface. Use an accurate straightedge as shown in Figure 82. Have the block resurfaced if it is warped more than 0.004 in. (0.1 mm).



6 Have a machine shop measure the cylinder bores for excessive out-of-roundness, taper, and wear. If the cylinder bores exceed maximum tolerances, they must be rebored. Reboring is also necessary if the cylinder walls are badly scuffed or scored.

NOTE If one cylinder is bored out, all cylinders must be bored to the same diameter. Bore cylinders in the following order: 2-4-1-3 (4-cylinder) or 1-5-3-6-2-4 (6-cylinder).

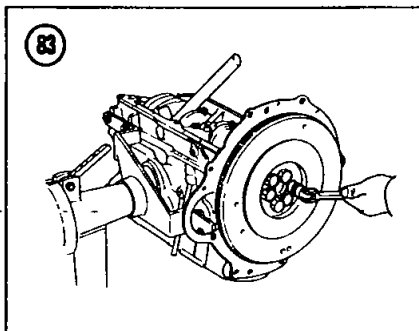
FLYWHEEL

Removal/Installation

1 Remove the engine. Separate the engine and transmission.

2 Remove the clutch from the flywheel (see Chapter Eight).

3 Unbolt the flywheel from the crankshaft (Figure 83).



4 Check for foreign material on the mating surfaces of flywheel and crankshaft. Clean as needed.

5 Install by reversing Steps 1-3. Tighten flywheel bolts to specifications (end of chapter). Tighten the bolts gradually in a diagonal pattern.

Inspection

1 Check the flywheel for scoring or wear. Have it checked for runout by a machine shop. If the surface is glazed or slightly scratched, have it resurfaced. Replace the flywheel if damage is severe.

2 Inspect the flywheel ring gear teeth. If the teeth are chipped, broken, or excessively worn, have a new starter ring shrunk onto the flywheel by a dealer or machine shop.

TORQUE CONVERTER DRIVE PLATE

The torque converter drive plate (used with automatic transmission) is bolted to the crankshaft in the same manner as the flywheel. Drive plate runout is measured in the same manner as flywheel runout. Replace the drive plate if runout exceeds 0.020 in. (0.5 mm). The drive plate must also be replaced if the ring gear is damaged or worn excessively.

Table 2 SPECIFICATIONS, L SERIES ENGINES

Valves

Head diameter, intake	
Early L16	1.50 in (38mm)
Late L16, L18, L20B, L24, L26	1.65 in (42mm)
L28	1.73 in (44mm)
Head diameter, exhaust	
L16, L24	1.30 in (33mm)
L18, L20B, L26, L28	1.38 in (35mm)
Stem diameter, intake	
Early L16, all L24	0.3138-0.3144 in (7.970-7.985mm)
Late L16, L18, L20B, L26, L28	0.3136-0.3142 in (7.965-7.980mm)
Stem diameter, exhaust	0.3128-0.3134 in (7.945-7.960mm)
Valve length, intake	
Early L16, all L24	4.563 in (115.9mm)
L18, L20B, L26, L28	4.524-4.535 in (114.9-115.2mm)
Valve length, exhaust	
Early L16, early L24	4.567 in (116.0mm)
Late L16, late L24, L18, L20B, L26, L28	4.555-4.567 in (115.7-116.0mm)
Valve spring loaded length	
Early L16, outer	1.21 in @ 105 lb (30.7mm @ 47.8 kg)
All other, outer	1.16 in @ 108 lb (29.5mm @ 49 kg)
All inner	0.96 in @ 56 lb (24.5mm @ 25.5 kg)

Valve Guides

Stem to guide clearance, maximum	0.004 in (0.1mm)
Guide inside diameter	0.3150-0.3157 in (8.000-8.018mm)
Guide hole diameter	
For standard guide	0.4718-0.4723 in (11.985-11.996mm)
For oversize guide	0.4797-0.4802 in (12.185-12.196mm)

Oil Pump

Outer rotor to body clearance	
Standard	0.006-0.008 in (0.15-0.21mm)
Maximum	0.020 in (0.5mm)
Tip clearance	
Standard	Less than 0.005 in (0.12mm)
Maximum	0.008 in (0.2mm)
Side clearance	
Standard	0.0016-0.0031 in (0.04-0.08mm)
Maximum	0.008 in (0.2mm)
Rotor to bottom cover clearance	
Standard	0.0012-0.0051 in (0.03-0.13mm)
Maximum	0.008 in (0.2mm)
Regulator valve spring length	2.067 in (52.5mm)

(continued)

Table 2 SPECIFICATIONS, L SERIES ENGINES (continued)

Camshaft	
End play	0 003 0 015 in (0 08 0 38mm)
Lobe lift	
Early L16	0 261 in (6 65mm)
All others	0 276 in (7mm)
Connecting Rods	
Big end play	0 008 0 012 in (0 2 0 3mm)
Bearing clearance normal	0 0010 0 0022 in (0 025 0 055mm)
Bearing clearance, maximum	0 005 in (0 12mm)
Pistons	
Ring gap, early L16, all L24	
Top ring	0 009 0 015 in (0 23 0 38mm)
Second and oil rings	0 006 0 012 in (0 15 0 30mm)
Ring gap late L16	
Top ring	0 010 0 016 in (0 25 0 50mm)
Second ring	0 006 0 012 in (0 15 0 30mm)
Oil ring	0 012 0 036 in (0 30 0 90mm)
Ring gap, L18	
Top ring	0 014 0 022 in (0 35 0 55mm)
Second ring	0 012 0 020 in (0 30 0 50mm)
Oil ring	0 012 0 036 in (0 30 0 90mm)
Ring gap L20B B	
Top ring	0 010 0 016 in (0 25 0 40mm)
Second ring	0 012 0 020 in (0 30 0 50mm)
Oil ring	0 012 0 036 in (0 30 0 90mm)
Ring gap L26 and L28	
Top ring	0 009 0 015 in (0 23 0 38mm)
Second ring	0 006 0 012 in (0 15 0 30mm)
Oil ring	0 012 0 036 in (0 30 0 90mm)
Maximum gap, all rings*	0 039 in (1 0mm)
Ring side clearance, L16	
Top ring	0 0016 0 0031 in (0 04 0 08mm)
Second ring	0 0012 0 0028 in (0 03 0 07mm)
Oil ring**	0 0010 0 0025 in (0 025 0 063mm)
Ring side clearance, L18	
Top ring	0 0018 0 0031 in (0 045 0 080mm)
Second ring	0 0012 0 0028 in (0 03 0 07mm)

(continued)

Table 2 SPECIFICATIONS, L-SERIES ENGINES (continued)

Pistons (continued)	
Ring side clearance, L20B	
Top ring	0 0016 0 0029 in (0 040 0 073mm)
Second ring	0 0012 0 0028 in (0 03 0 07mm)
Ring side clearance, L24 and L26	
Top ring	0 0018 0 0031 in (0 045 0 080mm)
Second ring, early	0 0012 0 0025 in (0 030 0 063mm)
Second ring, late	0 0012 0 0028 in (0 03 0 07mm)
Oil ring**	0 0010 0 0025 in (0 025 0 063mm)
Maximum side clearance all rings	0 004 in (0 1mm)
Pin to piston clearance	
L24	0 0003 0 0004 in (0 008 0 010mm)
L26	0 0002 0 0005 in (0 006 0 013mm)
All others	0 0001 0 0006 in (0 003 0 015mm)
Crankshaft	
Main bearing clearance	
L16 L18 L20B standard	0 0008-0 0024 in (0 020-0 062mm)
L24 L26 standard	0 0008-0 0028 in (0 020-0 072mm)
Maximum all engines	0 0047 in (0 12mm)
Journal diameter	
L20B	2 3599-2 3604 in (59 942 59 955mm)
All others	2 1631 2 1636 in (54 942 54 955mm)
Crankpin diameter (all)	1 9670-1 9675 in (49 961-49 974mm)
Journal crankpin out-of round and taper	
Standard	0 0004 in (0 01mm)
Maximum	0 0012 in (0 03mm)
Crankshaft end play	
Standard	0 002-0 007 in (0 05-0 18mm)
Maximum	0 012 in (0 3mm)
Crankshaft bend	0 002 in (0 05mm)
Cylinders	
Bore diameter	
L16 L24 L26	3 2677 3 2679 in (83 000-83 050mm)
L18 L20B	3 3465 3 3484 in (85 000-85 050mm)
L28	3 3858-3 3878 in (86 000-86 050mm)
Out-of round and taper	0 0006 in (0 05mm)
Maximum wear	0 008 in (0 2mm)
Maximum bore difference	0 008 in (0 2mm)
Flywheel	
Runout L24	0 043 in (0 1mm)
Runout all others	0 006 in (0 15mm)

*Late L24 oil ring 0 059 in. (1 4mm).

**Side clearance is measured only on one-piece oil rings

Table 3 SPECIFICATIONS, A-SERIES ENGINES

Valves	
Intake	
Head diameter, A12	1 378 in (35mm)
Head diameter, A13 A14	1 46 in (37mm)
Stem diameter, A12	0 3138-0 3144 in (7 970-7 985mm)
Stem diameter A13 A14	0 3128-0 3134 in (7 945-7 960mm)
Valve length	
A12, A13	4 030-4 031 in (102 35-102 65mm)
A14	4 081-4 092 in (103 65 103 95mm)
Stem to guide clearance, maximum	0 004 in (0 1mm)
Spring free length	1 831 in (46 5mm)
Spring length at load	1 19 in @ 129 lb (30 2mm @ 58 5 kg)
Exhaust	
Head diameter, A12	1 142 in (29mm)
Head diameter, A13, A14	1 18 in (30mm)
Stem diameter	0 3128-0 3134 in (7 945 7 960mm)
Spring free length	Same as intake valves
Spring loaded length	Same as intake valves
Stem to-guide clearance maximum	0 004 in (0 1mm)
Valve Guides	
Inside diameter	0 3150-0 3156 in (8 000-8 015mm)
Guide hole diameter, standard	0 4724-0 4729 in (12 000-12 011mm)
Guide hole diameter oversize	0 4803-0 4807 in (12 200-12 211mm)
Lifters	
Type	Solid
Lifter to bore clearance	
Standard	0 0008-0 0020 in (0 02-0 05mm)
Maximum	0 006 in (0 15mm)
Oil Pump	
Outer rotor to body clearance	
Standard	0 006-0 008 in (0 15-0 21mm)
Maximum	0 020 in (0 05mm)
Tip clearance	
Standard	Less than 0 005 in (0 12mm)
Maximum	0 008 in (0 2mm)
Side clearance	
Standard	0 002-0 005 in (0 05-0 12mm)
Maximum	0 008 in (0 2mm)
Rotor to bottom cover clearance	
Standard	0 002 in (0 05mm)
Maximum	0 008 in (0 2mm)
Regulator valve spring length	1 712 in (43 49mm)
Camshaft	
End play	
A12	0 0008-0 0031 in (0 02-0 08mm)
A13 A14	0 0004-0 0020 in (0 01-0 05mm)
Camshaft bend	
Standard	0 0006 in (0 015mm) or less
Maximum	0 002 in (0 05mm)
Lobe height A12	1 435-1 439 in (34 65-35 55mm)
Lobe height A13, A14	
Intake	1 425 1 427 in (36 20-36 25mm)
Exhaust	1 454-1 456 in (36 93-36 98mm)
(continued)	

Table 3 SPECIFICATIONS, A-SERIES ENGINES (continued)

Connecting Rods	
Big end play normal	0 008-0 012 in (0 2-0 3mm)
Big end play maximum	0 016 in (0 4mm)
Bearing clearance normal	0 0008-0 0020 in (0 02-0 05mm)
Bearing clearance maximum	0 0039 in (0 1mm)
Pistons	
Compression ring gap	
A14 second ring	0 006-0 012 in (0 05-0 30mm)
All others	0 008-0 014 in (0 2-0 35mm)
Oil control ring gap	0 012-0 036 in (0 3-0 9mm)
Ring side clearance	
A14 second compression	0 002-0 003 in (0 04-0 07mm)
All other compression	0 001-0 002 in (0 03-0 06mm)
Oil control (one-piece only)	0 002-0 003 in (0 04-0 08mm)
Maximum gap all rings	0 039 in (1 0mm)
Maximum side clearance all rings	0 008 in (0 2mm)
Pin to piston clearance	
A12, A13	0 0002-0 0003 in (0 006-0 008mm)
A14	0 0003-0 0005 in (0 008-0 012mm)
Crankshaft	
Main bearing clearance standard	0 0008-0 0024 in (0 020-0 062mm)
Main bearing clearance, maximum	0 0039 in (0 1mm)
Journal diameter	1 9666 1 9671 in (49 951-49 964mm)
Crankpin diameter	1 7701 1 7706 in (44 961-44 974mm)
Journal taper and out-of-round	
A12	0 0012 in (0 03mm)
A13 A14	0 0004 in (0 01mm)
Crankpin taper and out-of round	0 0012 in (0 03mm)
Crankshaft end play standard	0 002-0 006 in (0 05-0 15mm)
Crankshaft end play, maximum	0 012 in (0 3mm)
Crankshaft bend, standard	0 0006 in (0 015mm) or less
Crankshaft bend maximum	0 002 in (0 05mm)
Cylinders	
Bore diameter	
A12, A13	2 874 2 876 in (73 000-73 050mm)
A14	2 992 2 994 in (76 000-76 050mm)
Out-of round and taper	0 0006 in (0 015mm) or less
Maximum difference between bores	0 008 in (0 2mm)
Maximum wear	0 008 in (0 2mm)
Flywheel	
Runout	
A12 A13	0 008 in (0 2mm)
A14	0 004 in (0 1mm)

Table 4 SPECIFICATIONS, J13 ENGINE

Rocker Assembly	
Rocker bushing to shaft clearance	0 0004 0 002 in (0 01 0 05mm)
Valves	
Head diameter	
Intake	1 374 in (34 9mm)
Exhaust	1 181 in (30mm)
Stem diameter	0 342 in (8 7mm)
Valve length	
Intake	4 312 in (109 54mm)
Exhaust	4 281 in (108 74mm)
Spring free length	
Inner	1 968 in (50mm)
Outer	2 047 in (52mm)
Valve Guides	
Stem to guide clearance	0 0016 0 0028 in (0 04 0 07mm)
Inside diameter	0 344 0 345 in (8 74 8 76mm)
Outside diameter	0 563 0 564 in (14 31 14 33mm)
Camshaft and Lifters	
Camshaft end play	0 003 0 007 in
Lifter diameter	0 885 0 886 in (22 48 22 49mm)
Lifter bore diameter	0 886 0 887 in (22 50 22 52mm)
Connecting Rods	
Big end play	0 008 0 012 in (0 2 0 3mm)
Bearing clearance	0 0005 0 002 in (0 0127 0 0508mm)
Pistons	
Ring gap	0 008 0 013 in
Ring side clearance	
Compression rings	0 0015 0 0035 in (0 038 0 089mm)
Oil control ring	0 0016 0 0036 in (0 041 0 092mm)
Crankshaft	
Main bearing journal diameter	2 0005 2 0009 in (50 813 50 825mm)
Crankpin diameter	1 8755 1 8759 in (47 640 47 652mm)
End play	
Without flywheel	0 002 0 003 in (0 051 0 076mm)
Flywheel installed	Less than 0 002 in (less than 0 05mm)
Bend	0 001 in (0 02mm)
Main bearing clearance	0 0005 0 002 in (0 0127 0 0508mm)

Table 5 TIGHTENING TORQUES L-SERIES ENGINES

	Ft lb	Mkg
Camshaft locate plate bolts	4½-6½	0 6-0 9
Camshaft sprocket bolt		
L16 L18 L20B	87 116	12 16
L24	101 116	14 16
L26 L28	94 108	13 15
Connecting rod big end nuts		
Early L16, L18 (bolt head marked T13)	23 27	3 2 3 8
Early L24 (bolt head marked T13)	20-24	2 7 3 3
Late L16, L18 L24 (bolt head marked T12)	33-40	4 5 5 5
L26	27 31	3 7-4 3
L20B L28	33-40	4 5 5 5
Crankshaft pulley bolt		
L16 L18 L20B L24	87 116	12 16
L26 L28	94-108	13 15
Cylinder head bolts (L16 L18 L20B)		
First stage	29	4
Second stage	43	6
Third stage (early)*	43 51	6 7
Third stage (late)*	47-62	6 5 8 5
Cylinder head bolts (L24)		
First stage	33	4 5
Second stage	47	6 5
Third stage (early)*	47 51	4 5-6 0
Third stage (late)*	51-61	7 0 8 5
Cylinder head bolts (L26 and L28)		
First stage	29	4
Second stage	47	6 5
Third stage	54-61	7 5-8 5
Flywheel bolts		
Early L16 (separate lockwasher)	69 76	9 5 10 5
Late L16 (integral washer), L18, L20B, L24	101 116	14 16
L26, L28	94-108	13-15
(continued)		

Table 5 TIGHTENING TORQUES, L-SERIES ENGINES (continued)

	Ft. lb	Mkg
Front cover bolts		
M6 (small) bolts	3-4	0.4-0.6
M8 (large) bolts	7-9	1.0-1.2
Main bearing cap bolts	33-40	4.5-5.5
Motor mounts (510)		
Bracket to cylinder block	19-23	2.6-3.2
Bracket to rubber insulator	19-23	2.6-3.2
Insulator to crossmember	9½-12	1.3-1.7
Motor mounts (1973-1974 610)		
Bracket to cylinder block	18-25	2.5-3.5
Bracket to rubber insulator	18-25	2.5-3.5
Insulator to crossmember	10-13	1.4-1.8
Motor mounts (1975-1976 610, all 710)		
Bracket to cylinder block	14-19	1.9-2.6
Bracket to rubber insulator	14-19	1.9-2.6
Insulator to crossmember	7-9	0.9-1.2
Motor mounts (240Z)		
Bracket to cylinder block	30	4.1
Bracket to rubber insulator	15	2.1
Insulator to crossmember	31	4.3
Motor mounts (260Z 280Z)		
Bracket to cylinder block	22-30	3.1-4.1
Bracket to rubber insulator	12-15	1.6-2.1
Insulator to crossmember	23-31	3.2-4.3
Oil pan bolts	4½-6½	0.6-0.9
Oil pan drain plug	14-22	2-3
Oil pump cover bolts	5-7	0.7-1.0
Oil pump installation bolts	8-11	1.1-1.5
Oil pressure regulator valve cap	29-36	4-5
Rocker pivot locknuts	36-43	5-6

*Late head bolts have a circular groove around the top surface of the bolt head. Early head bolts do not.

Table 6 TIGHTENING TORQUES, A-SERIES ENGINES

	Ft.-lb	Mkg
Camshaft locate plate bolts		
A12	3-4	0 4-0 5
A13 A14	4-6	0 5-0 8
Camshaft sprocket bolt	29 35	4 0-4 8
Carburetor nuts	3-4	0 4-0 6
Connecting rod nuts	23 27	3 2 3 8
Crankshaft pulley bolt		
A12	109 116	15 16
A13, A14	109 145	15 20
Cylinder head bolts		
A12 through engine No A12-470084	33 36	4 5 5 0
A12 from engine No A12-470085	40-43	5 5 6 0
A13 (cold engine)*	51 54	7 0 7 5
A14	51 54	7 0 7 5
Flywheel bolts		
A12	47 54	6 5 7 5
A13	54-61	7 5-8 5
Fuel pump nuts	6½ 10	0 9 1 4
Main bearing cap bolts	36-43	5-6
Manifold nuts	6½ 10	0 9 1 4
Motor mount brackets to engine		
A12	12 15	1 6 2 1
A13, A14	6½ 9	0 9 1 2
Motor mount bracket to insulator	6½ 9	0 9 1 2
Motor mount insulator to crossmember	6½ 9	0 9 1 2
Oil pan bolts	3-4	0 4-0 6
Oil pan drain plug	14-22	2 3
Oil pump bolts		
A12	8 12	1 1 1 7
A13	6½ 10	0 9 1 4
Oil strainer bolts	6½ 10	0 9 1 4
Rocker bracket bolts	14 18	2 0 2 5
Water pump bolts	6½ 10	0 9 1 4

*On A13 s, warm engine to normal operating temperature, then tighten to 54 58 ft. lb (7 5-8 0 mkg). On all models, retorque head bolts and reset valve clearances after 600 miles.

Table 7 TIGHTENING TORQUES, J13 ENGINE

	Foot-pounds	Mkg
Camshaft sprocket	25 35	3 5 4 9
Connecting rods	22 25	3 1 3 4
Cylinder head nuts	45	6 2
Flywheel	35 44	4 9 6 1
Main bearing caps	75 80	10 4 11 0
Motor mounts		
Brackets to cylinder block	19 25	2 6 3 4
Brackets to front cover	10 13	1 4 1 8
Rubber insulators to brackets	10 13	1 4 1 8
Insulators to front support	10 13	1 4 1 8
Rocker brackets	13 20	1 8 2 8

CHAPTER FIVE

FUEL SYSTEM

This chapter includes service procedures for the air cleaners, carburetors, fuel pumps, and fuel system-related emission controls

AIR CLEANERS

All models use viscous paper air cleaner elements. These should be replaced at intervals specified in Chapter Two.

Removal/Installation (1200, B210)

- 1 Remove the air cleaner cover and lift out the filter element
- 2 Disconnect the hot air tube from the underside of the intake nozzle
- 3 On 1972 and later cars, disconnect the vacuum line from the top of the intake nozzle
- 4 On 1975 and later cars, disconnect the fresh air tube from the end of the intake nozzle
- 5 On 1975 and later cars, disconnect 3 large hoses (California models) or 2 large hoses (non-California models) from the side of the air cleaner
- 6 On 1975 and later California cars, unbolt the air control valve from the front side of the air cleaner. This is secured by a pair of 10mm bolts

- 7 Lift the air cleaner slightly. Label the thin hoses connected to the air cleaner bottom, then disconnect them. Lift the air cleaner off.
- 8 Install in the reverse order.

Removal/Installation (510, 610, 710, and Pickups)

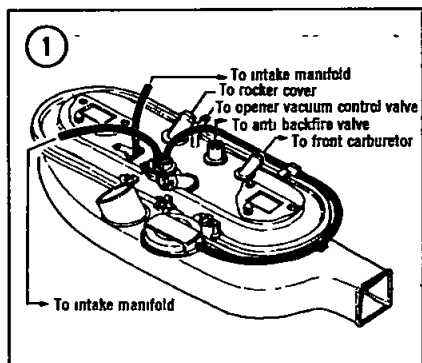
- 1 Remove the cover nut or clips, lift off the cover, and take out the filter element
- 2 Unbolt the air cleaner from its side bracket. Unscrew the band bolt at the base of the air cleaner
- 3 Disconnect the hot air tube from the underside of the air cleaner intake nozzle (if so equipped)
- 4 On 1975 and later vehicles, disconnect the fresh air tube from the end of the air cleaner intake nozzle
- 5 Lift the air cleaner up. Carefully note all connections, then disconnect the hoses from its underside. The air cleaner can then be lifted off.
- 6 Install in the reverse order.

Removal/Installation (240-260Z)

- 1 Disconnect the hot air tube from the base of the intake nozzle
- 2 Remove the cover wing nuts. Lift off the cover and filter element

3 On 1970-1972 air cleaners, remove the following from the air cleaner backplate: Air pump hose, pcv hose, float chamber overflow tubes, and tube to the flow guide valve

4 On 1973-1974 air cleaners, disconnect the following from the backplate: 2 air pump hoses, carbon canister hose, hose to front carburetor, 2 hoses to intake manifold, one hose to rocker cover, duct to exhaust manifold, and hose to throttle opener control valve (not used on automatic transmission 260Z's) See Figure 1



5 Remove the nuts attaching the backplate to the carburetors, then lift off the backplate

6 Install in the reverse order

Removal/Installation (280Z)

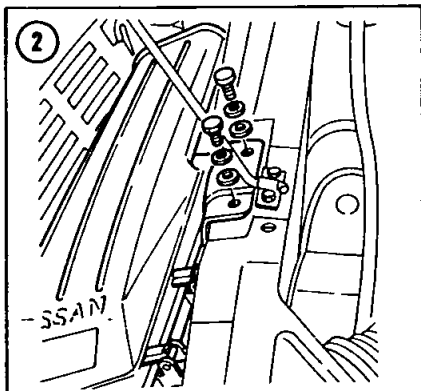
The air cleaner is mounted crossways at the front of the engine compartment. To remove, undo 2 upper bolts and 2 lower nuts (Figure 2). Detach the air cleaner from its duct and lift it out. Install in the reverse order.

CARBURETORS

Carburetors are used on all models except the 280Z. All except the 240-260Z use down draft, 2-barrel Hitachi carburetors. The 240-260Z's use pairs of side draft, one-barrel SU-type carburetors manufactured by Hitachi.

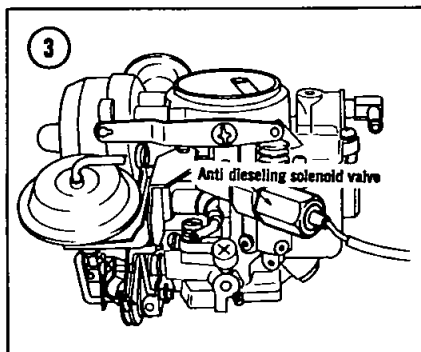
Removal/Installation (1200, B210)

- 1 Remove the air cleaner
- 2 Disconnect the fuel line, throttle opener



vacuum line, accelerator cable, and choke cable (choke heater wire on 1972 and later cars)

3 On 1972 and later cars, disconnect the anti-dieseling solenoid wire. See Figure 3



4 If equipped with an altitude compensator (optional on 1975 and later California cars) disconnect its lines from the carburetor

5 Remove 4 nuts and 4 washers that attach the carburetor to the intake manifold

6 Install in the reverse order

Removal/Installation (510, 610, 710, and Pickups)

- 1 Remove the air cleaner as described earlier in this chapter
- 2 Disconnect the choke cable (1968-1971) or choke electrical wire (1972 and later)

3 On early L16 engines, label and disconnect the fuel inlet and return lines. On all other models, disconnect the inlet line. Plug the inlet line so it won't siphon fuel from the tank.

4 On 521 pickups, disconnect the throttle switch wires (all) and coasting enricher solenoid wires (1968-1971 only).

5 On 1972 and later vehicles, disconnect the wires (and vacuum line, if so equipped) from the boost controlled deceleration device.

6 On 1973 and later vehicles, disconnect the wire from the anti-dieseling solenoid.

7 On 1974 and later vehicles, disconnect the exhaust gas recirculation vacuum line from the carburetor.

8 On 1975 and later cars, disconnect the spark timing control system vacuum line from the carburetor.

9 On 1975 and later non-California trucks with automatic transmission, disconnect the spark delay valve line from the carburetor.

10 If equipped with an altitude compensator (optional on 1975 and later California models) disconnect its 2 vacuum lines from the carburetor.

11 Disconnect the throttle linkage rod or cable.

12 Remove 4 attaching nuts and lift the carburetor off. Discard the old gasket.

13 Install in the reverse order. Use a new gasket.

Removal/Installation (1970-1972 240Z)

1 Remove the air cleaner as described earlier.

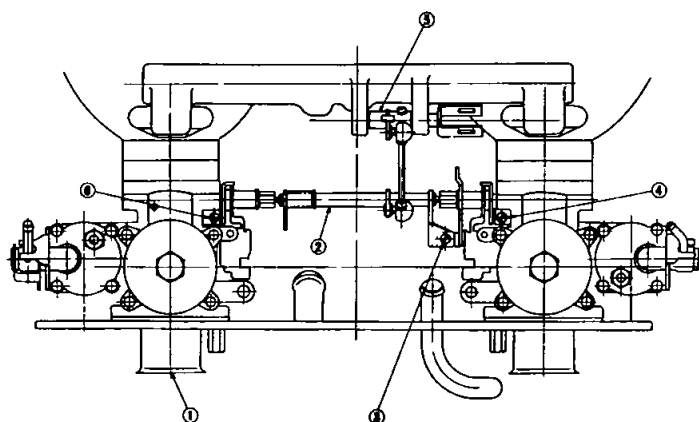
2 Detach the fuel lines from the float chambers.

3 Disconnect the servo diaphragm from the throttle linkage.

4 Disconnect the rod between the auxiliary throttle shaft and throttle shaft. See Figure 4.

5 Remove 4 nuts attaching each carburetor to the intake manifold. See Figure 5.

NOTE: On 1972 models, drain approximately 1/2 gallon of coolant to prevent coolant from seeping into the cylinders. If this happens, immediately remove all spark plugs and turn the engine over by hand until all coolant is blown out of the cylinders.

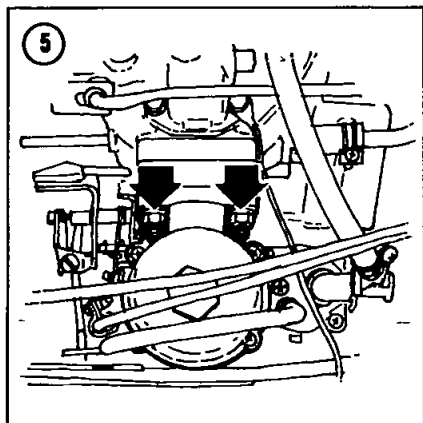


CARBURETOR — 1970-1972 240Z

1 Air cleaner, air horn
2 Throttle shaft

3 Balance screw
4 Throttle adjusting screw

5 Auxiliary throttle shaft
6 Throttle adjusting screw

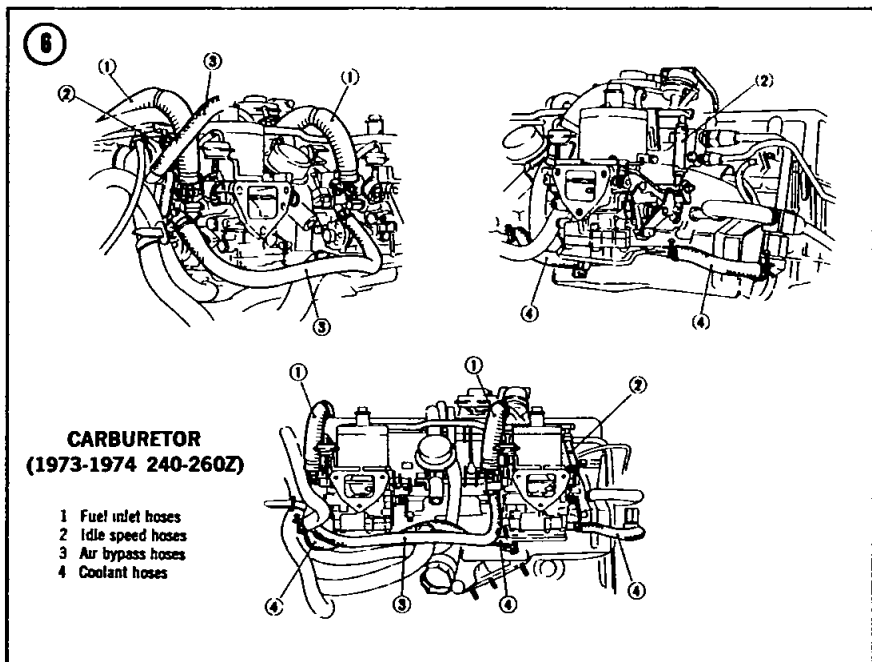


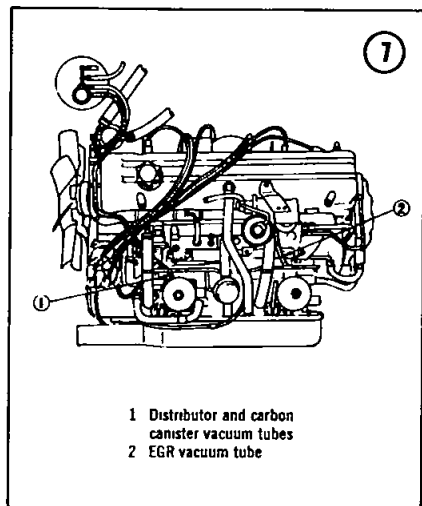
6 Lift the carburetors and throttle shaft away from the engine simultaneously. Separate the carburetors from the throttle shaft.

7 Installation is the reverse of these steps.

Removal/Installation (1973 240Z, 1974 260Z)

- 1 Remove the air cleaner
- 2 Disconnect the fuel inlet and idle speed hoses from both carburetors. Disconnect the air bypass hose from the front carburetor. See Figure 6.
- 3 Disconnect the distributor vacuum tube (Figure 7) from the front carburetor. On 260Z's, disconnect the carbon canister hose as well.
- 4 Disconnect the EGR vacuum tube the rear carburetor. See Figure 7.
- 5 Detach the coolant hoses from front and rear carburetors. Figure 6 shows the hoses.
- 6 Remove 4 nuts attaching each carburetor to the manifold. Lift both carburetors off.
- 7 To separate carburetors, remove the coolant and air bypass hoses running between them.
- 8 Install in the reverse order. Use new gaskets between carburetors and manifold.





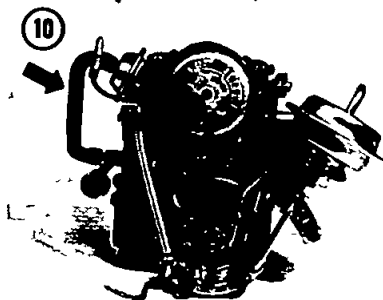
Disassembly (A-Series Engines)

Figure 8 shows the manual-choke carburetor used on 1971 cars. Figure 9 shows the automatic-choke carburetor used on 1975 and later cars. The 1972-1974 carburetors are basically the same as the 1975 and later version. Differences are illustrated as they occur.

- 1 Remove the float chamber plugs (16, Figure 8 or 32, Figure 9) to gain access to the main jets. Unscrew the jets and take them out.

NOTE The primary and secondary main jets are not interchangeable, but will fit in the wrong holes. Keep them separated so they can be reinstalled correctly.

- 2 Remove the pivot screw from the accelerator pump lever. Detach the lever from the accelerator pump piston, then from the throttle lever connecting rod.
- 3 Remove the choke lever-throttle lever connecting rod.
- 4 On 1972 and later models, remove the vacuum break hose (Figure 10).
- 5 Remove the throttle lever return spring.
- 6 On 1972 and later models, remove 3 screws and 3 clamps or washers, then lift off the choke cover.



NOTE Do not remove the choke shaft and valve.

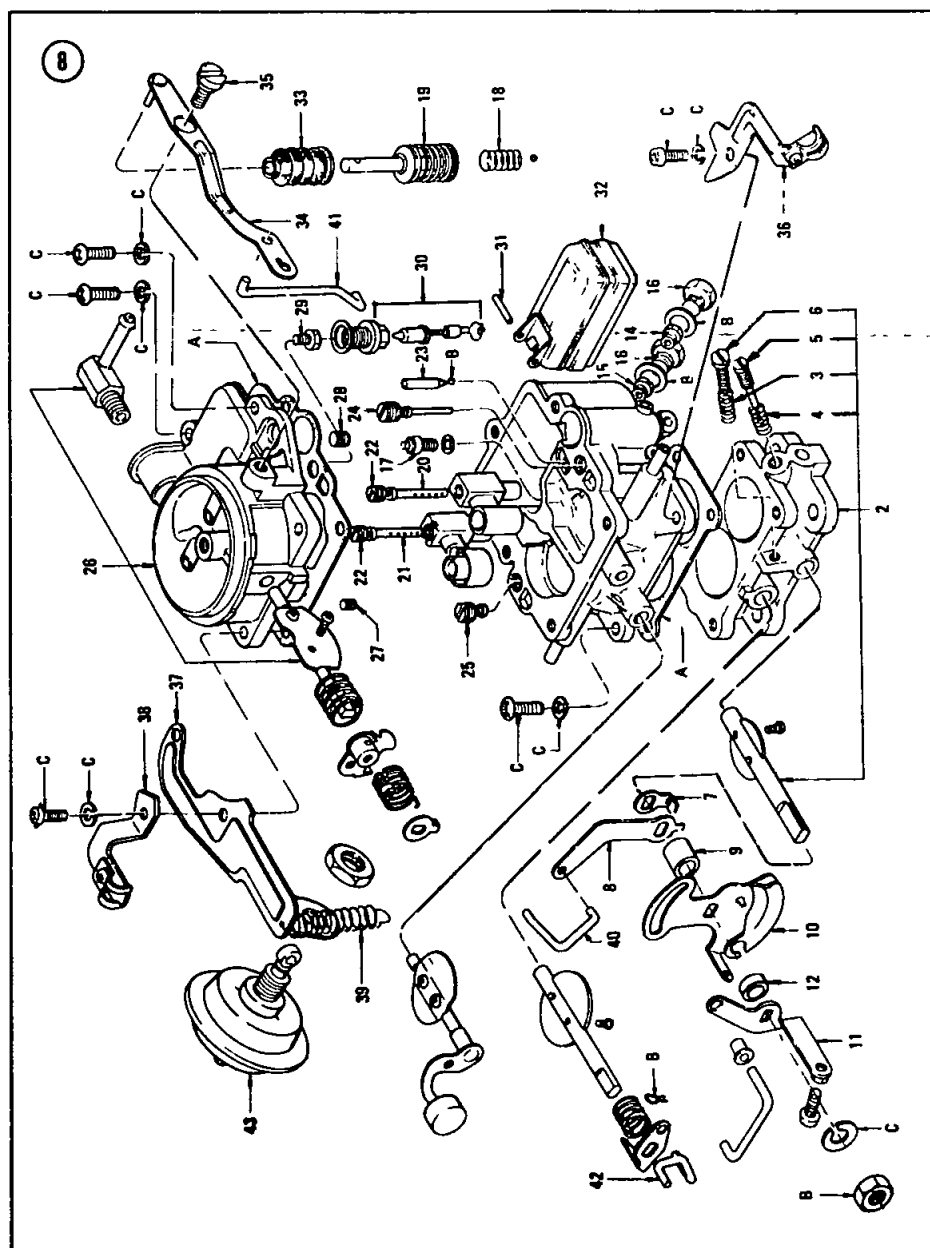
- 7 Remove 2 servo diaphragm bracket screws.
- 8 Remove 5 screws securing the choke chamber. Lift it off.
- 9 Slide out the float pivot pin and remove the float.
- 10 Remove the float needle valve, but do not disassemble it for the time being.
- 11 Carefully turn the main carburetor body upside down. Dump the following into your hand: Piston return spring and inlet valve ball (18, Figure 8, or 16, Figure 9), and injector weight and ball (23, Figure 8, or 16, Figure 9).

NOTE 1975 and later carburetors do not use a ball beneath the injector weight.

- 12 Unscrew and remove the slow air bleeds.
- 13 Unscrew and remove the slow jets.
- 14 Unscrew and remove the slow air bleeds to gain access to the emulsion tubes. Turn the carburetor upside down and dump the emulsion tubes into your hand.

NOTE The emulsion tubes are not interchangeable. Keep them separate so they can be reinstalled correctly.

- 15 Remove 3 setscrews and separate the throttle chamber from the main body.
- 16 Remove the idle mixture screw (5, Figure 8 or 25, Figure 9) together with its spring from the throttle chamber.



CARBURETOR — 1971 A-SERIES ENGINES

- | | | | |
|------------------------------|----------------------------|---------------------------|---------------------------|
| 1 Carburetor assembly | 13 Lever | 25 Slow jet | 37 Return spring bracket |
| 2 Throttle chamber | 14 Main jet | 26 Choke chamber assembly | 38 Choke cable bracket |
| 3 Spring, idle speed screw | 15 Main jet | 27 Slow air bleed | 39 Throttle return spring |
| 4 Spring, idle mixture screw | 16 Drain plugs | 28 Slow air bleed | 40 Choke connector rod |
| 5 Idle mixture screw | 17 Power valve | 29 Fuel inlet filter | 41 Accelerator pump rod |
| 6 Idle speed screw | 18 Piston return spring | 30 Needle valve assembly | 42 Connector rod |
| 7 Throttle adjusting plate | 19 Accelerator pump piston | 31 Float pivot shaft | 43 Servo diaphragm |
| 8 Starting lever | 20 Emulsion tube | 32 Float | |
| 9 Sleeve | 21 Emulsion tube | 33 Accelerator pump cover | A. Gasket set |
| 10 Throttle lever | 22 Main air bleeds | 34 Accelerator pump lever | B. Screw and washer set |
| 11 Lever | 23 Injector weight | 35 Pump lever pivot screw | C. Screw and washer set |
| 12 Sleeve | 24 Slow jet | 36 Throttle arm | |

NOTE Count the number of turns required to remove the screw to the nearest $\frac{1}{4}$ turn. Write this number down for use during assembly.

- Examine the throttle linkage parts, referring to the appropriate exploded view. Do not remove these parts unless damage or wear is obvious.

Inspection

- Clean all parts in solvent and blow dry.

CAUTION

Do not insert objects such as drill bits or pieces of wire into jets or passages while cleaning. These openings are carefully calibrated, and scratching them may seriously affect carburetor performance.

- Remove the small wire clip from the needle valve. Pull out the needle, check needle and seat for wear. Check the filter screen in the needle valve for clogging. Replace the needle valve if wear is detected.

NOTE Due to the extremely small size of the needle valve and clip, it is a good idea to reassemble the valve immediately after inspection, if it is to be reused.

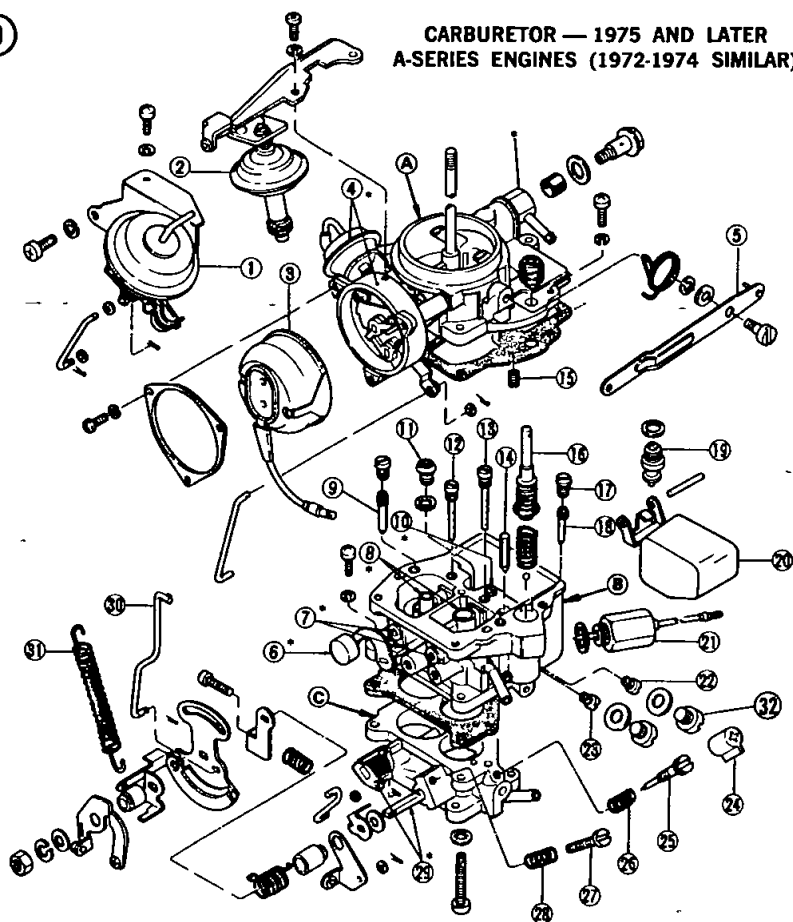
- Check the carburetor bores for wear and out-of-roundness.
- Inspect the idle mixture screw for wear at the tip. Replace the screw if wear or damage can be seen.
- Check the venturis for wear or damage. Replace them if defects are evident.

NOTE Do not remove the venturis unless they are to be replaced.

- Check all jets and passages for clogging, damage, or wear. Replace as needed.
- Check the rubber seal on the accelerator pump piston for wear, damage, or deterioration. Replace the piston if the seal is defective.
- Check the piston cover for wear, damage, or deterioration. Replace the cover as needed.
- On 1972 and later models, check the automatic choke for sticking. Check the bi-metal coil and choke heating coil for damage.

9

CARBURETOR — 1975 AND LATER A-SERIES ENGINES (1972-1974 SIMILAR)



- Ⓐ Choke chamber
- Ⓑ Center body
- Ⓒ Throttle chamber
- 1 Servo diaphragm of throttle opener
- 2 Dash pot
- 3 Automatic choke cover
- *4 Automatic choke body and diaphragm chamber
- 5 Accelerating pump lever
- *6 Auxiliary valve
- *7 Venturi stopper screw
- *8 Primary and secondary small venturi

- 9 Secondary slow jet
- *10 Safe orifice
- 11 Power valve
- 12 Secondary main air bleed
- 13 Primary main air bleed
- 14 Injector weight
- 15 Primary slow air bleed
- 16 Accelerating pump
- 17 Plug
- 18 Primary slow jet
- 19 Needle valve
- 20 Float
- 21 Anti dieseling solenoid valve
- 22 Primary main jet

- 23 Secondary main jet
 - 24 Idle limiter cap
 - 25 Idle adjust screw
 - 26 Spring
 - 27 Throttle adjust screw
 - 28 Spring
 - *29 Primary and secondary throttle valve
 - 30 Accelerating pump rod
 - 31 Throttle return spring
 - 32 Float chamber plugs
- Note Do not remove the parts marked with an asterisk (*)

10 On 1972 and later models, check the vacuum break diaphragm. To do this, hold the choke valve shut with a finger and suck on the diaphragm's vacuum line fitting. There should be a firm pull on the choke valve.

Assembly and Adjustment

Use new gaskets during assembly, and standard Datsun repair kits when needed.

1 Install the main jets and the float chamber drain plugs.

NOTE: Size numbers are stamped on the primary and secondary main jets. The larger number goes on the secondary side.

2 Attach the throttle chamber to the main carburetor body with 3 screws.

3 Install the accelerator pump inlet valve ball, return spring, and piston in the carburetor body.

4 Install the injector weight (and ball, on 1971-1974 models) in the carburetor body.

5 Install the idle mixture screw and spring in the throttle chamber. Turn the screw in the same number of turns required for removal.

CAUTION

Do not turn the idle mixture screw all the way in. Bottoming the screw will damage the tip and cause inaccurate carburetor adjustments.

6 Install the emulsion tubes and main air bleeds. Be sure they are returned to the holes from which they were removed.

7 Install the slow jets. These must also be installed in the holes from which they were removed.

8 Install the needle valve in the choke chamber. Install the float.

9 Adjust float level as described under *Float Level Adjustment (A-Series Engines)* later in this chapter.

10 Install the slow air bleeds in the bottom side of the choke chamber.

11 Install the accelerator pump cover and piston on the choke chamber.

12 Install choke chamber on carburetor body. On 1972 and later models, install only the 3 setscrews farthest from automatic choke mechanism.

13 On 1972 and later models, install the throttle return spring bracket. It is secured by the fourth choke chamber screw.

14 Install the connecting rod between the choke lever and the throttle lever.

15 On 1972 and later models, install the servo diaphragm bracket.

16 Install the connecting rod between servo diaphragm and throttle lever.

17 Attach the accelerator pump lever to the throttle lever connecting rod. Attach the other end of the pump lever to the pump piston. Install the lever return spring, pivot washer, and retaining screw.

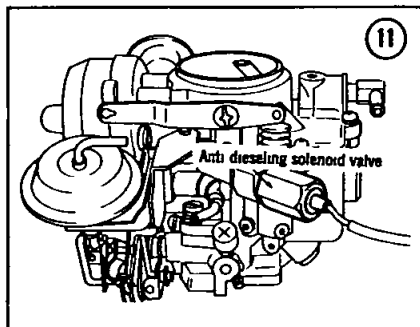
18 On 1972 and later models, install the choke cover. Be sure the hooked end of the bimetal coil engages small arm on end of choke shaft. Align index mark on choke cover with center mark on choke body.

19 Install the throttle return spring.

20 Operate the throttle linkage and make sure it moves smoothly.

Anti-Dieseling Solenoid Replacement

The anti-dieseling solenoid (Figure 11) is used on 1973 and later carburetors. It cuts off fuel flow through the slow circuit when the ignition is turned off. This prevents the engine from dieseling (running after the ignition is turned off). If the engine fails to stop when shut off, a defective solenoid is indicated.



The solenoid should not be removed unless it is defective and is being replaced

1 Disconnect the solenoid wire

2 Unscrew the solenoid with a thin 12mm open-end wrench. If this isn't available, use Vise Grips or a wrench on the solenoid body

3 As a final check on a suspect solenoid, ground the solenoid threaded area to the negative terminal of a 12-volt battery. Connect the solenoid wire to the positive terminal. The solenoid plunger should move each time the wire is connected or disconnected. If not, replace the solenoid.

4 Carefully clean the solenoid and carburetor threads

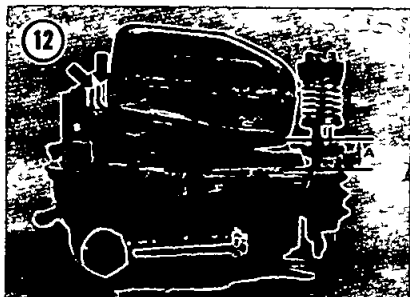
5 Thread solenoid into the carburetor 2 or 3 turns. Coat the exposed threads with Loctite

6 Thread the solenoid the rest of the way in. Tighten to 2½ to 4 ft.-lb. (1973) or 13-18 ft.-lb. (1974 and later)

Float Level Adjustment (A-Series Engines)

1 If the carburetor is on the engine, look into the sight glass on the side of the carburetor. With the engine running, fuel level should be approximately at the center of the glass. If not, remove the choke chamber from the carburetor and perform the next steps.

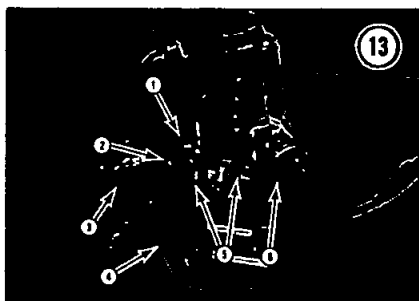
2 With the carburetor off the engine, turn the choke chamber upside down so the float rests on the needle valve. See Figure 12. Dimension "A" should be 0.472 in. (12mm) on 1971-1972 cars, 0.748 in. (19mm) on 1973-1974 cars, and 0.59 in. (15mm) on 1975-1976 models. Adjust if necessary by bending the float seat.



3 Push the float up so the float stoppers bump against the choke chamber. The gap between float seat and needle valve should be 0.051-0.067 in. (1.3-1.7mm). Adjust if necessary by bending the float stoppers.

Disassembly (J13 Engine)

1 Remove 2 screws securing the throttle switch bracket (Figure 13). Take the bracket off, together with the switch.



- | | |
|-----------------|----------------------------------|
| 1 Choke lever | 4 Throttle return spring |
| 2 Fast idle rod | 5 Throttle switch bracket screws |
| 3 Choke rod | 6 Coasting enricher solenoid |

2 Unscrew the coasting enricher solenoid (Figure 13). Use Vise Grips if necessary, but be careful not to damage the solenoid.

3 Remove the cotter pins from the choke and fast idle rods. Detach the rods from the choke lever (Figure 13).

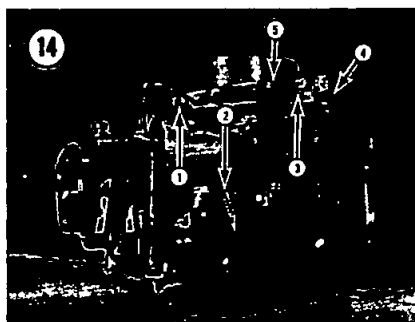
4 Unhook the throttle return spring (Figure 13). Remove the pivot screw, then lift off the choke cable bracket and lever.

NOTE There is a lockwasher under the throttle return spring bracket, and a plain washer between the bracket and lever.

5 Remove cotter pin and snap ring (Figure 14). Slide the accelerator pump arm off the pump piston.

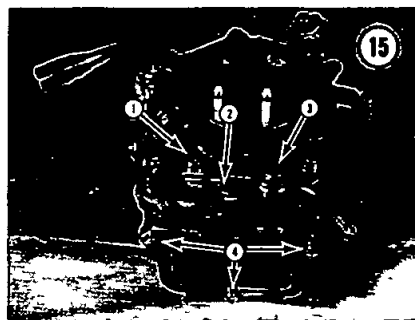
6 Remove the idle mixture screw (Figure 14).

NOTE Count the number of turns necessary to remove the screw. Write this number down for use during reassembly.



- 1 Cotter pin 4 Accelerator pump piston
2 Idle mixture screw 5 Accelerator pump arm
3 Snap ring

7 Remove one screw and take off the fuel inlet bolt lock (Figure 15) Remove the inlet bolt and bracket screw, then lift off the fuel inlet tube. Be careful not to lose the fuel screen inside the tube.



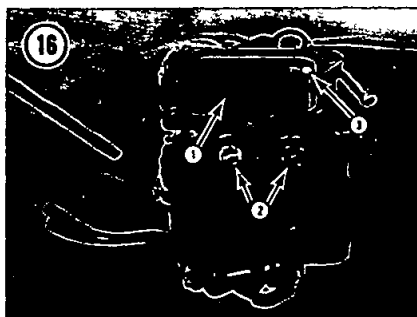
- 1 Bolt lock securing screw 3 Fuel inlet bolt
2 Fuel inlet bolt lock 4 Float chamber glass screws

8 Remove 3 screws securing the float chamber glass (Figure 15) Remove the glass frame, paper gasket, glass, and rubber seal.

9 Take the washer off the float pivot pin (Figure 16)

10 Unscrew the main jet plugs (Figure 16) The main jets can then be removed.

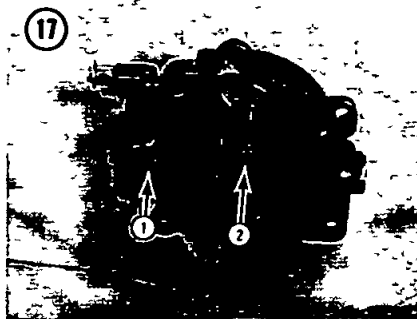
NOTE The main jets are stamped with identifying numbers. Write these down, together with the jets' locations. The



- 1 Float 2 Main jet plugs 3 Float washer

jets must be reinstalled in the holes from which they were removed

11 Remove one screw securing the choke chamber (the other 3 were removed during earlier steps) Lift off the choke chamber and gasket. Turn the choke chamber over and remove the coasting enricher jet (Figure 17) Do not attempt to remove the power valve piston.

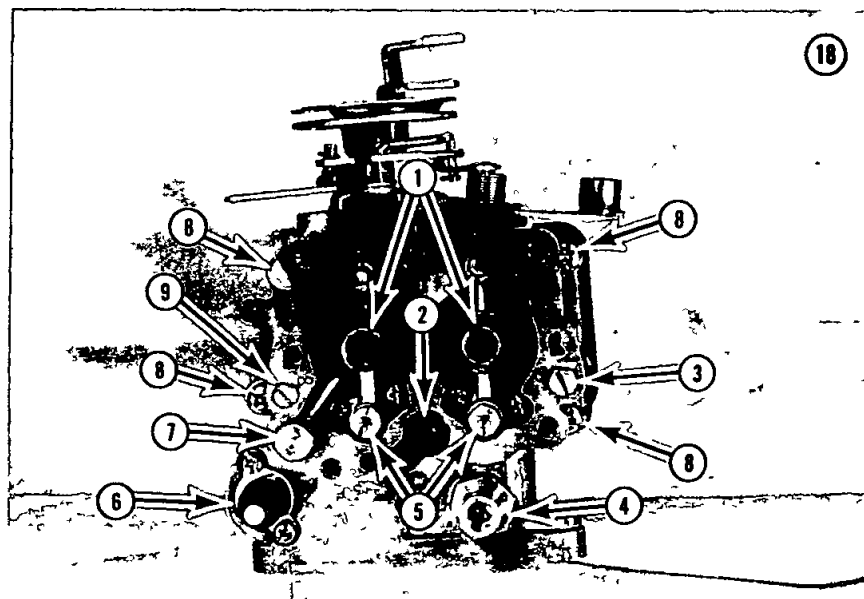


- 1 Coasting enricher jet 2 Power valve piston

12 Check the choke shaft for wear. Do not remove the shaft unless it is worn and you are sure a replacement is available. If necessary, remove 2 screws securing the choke plate to the shaft, then slide the shaft out.

13 Remove the primary and secondary slow jets (Figure 18)

14 Remove the main air bleeds (Figure 18) Take out the emulsion tubes, located beneath the air bleeds.



- 1 Venturis
2 Power valve
3 Secondary slow jet

- 4 Needle valve
5 Main air bleeds
6 Accelerator pump

- 7 Accelerator pump nozzle
8 Carburetor body securing screws
9 Primary slow jet

CAUTION

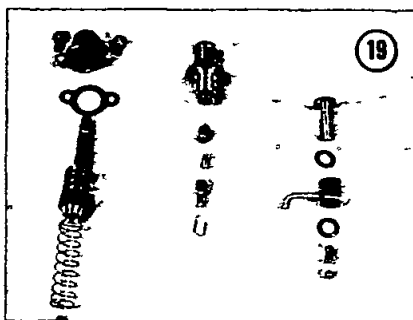
The air bleeds and emulsion tubes are not interchangeable, but will fit in the wrong holes. Write down the identifying number stamped on the top of each air bleed, and keep the bleeds away from each other.

15 Remove power valve and gasket (Figure 18)

16 Remove the accelerator pump nozzle (Figure 18). Turn the carburetor upside down and dump the brass tube and check ball into your hand. Figure 19 shows the nozzle assembly.

17 Remove the accelerator pump (Figure 18). Lift out the spring, then turn the carburetor upside down and dump the check ball into your hand. Figure 19 shows the assembly.

18 Remove the needle valve (Figure 18). Take the needle out, referring to Figure 19, and check it for wear. If it is serviceable, clean the valve assembly and put it back together. The parts are very small and easily lost.



19 Remove 2 screws securing each venturi (Figure 18). Lift the venturis out, then remove each venturi's gasket and washer.

20 Remove 4 screws securing the carburetor body (Figure 18). Lift the body and gasket off the throttle chamber.

21 If necessary, disassemble the carburetor linkage, referring to Figure 20. Linkage



disassembly is not necessary for normal carburetor overhaul, and should be avoided unless a linkage part is bent or otherwise damaged

22 Check throttle shafts for wear. Do not remove the shafts unless they are worn, and you are sure a replacement is available.

To remove, undo 2 throttle plate securing screws and slide the throttle shaft out.

Inspection (J13 Engine)

1 Clean all parts in solvent, except the accelerator pump piston assembly and coasting enricher solenoid.

CAUTION

Do not insert objects such as drill bits or pieces of wire into jets or passages while cleaning. These openings are carefully calibrated, and scratching them may seriously affect carburetor performance.

- 2 Check the fuel inlet wire screen for clogging.
- 3 Check carburetor bores for wear and out-of-roundness.
- 4 Check the idle mixture screw for wear at the tip. Replace if wear is found.
- 5 Check the venturis for damage. Replace if necessary.
- 6 Check all jets and passages for clogging or damage. Clean or replace as needed.
- 7 Check the accelerator pump piston seal and cover for wear, damage, or deterioration. Replace as needed.

8 Connect a 12-volt battery between the coasting enricher solenoid terminals. The solenoid plunger should move when current is applied.

Assembly (J13 Engine)

- 1 Install the throttle shafts and linkage (if removed).
- 2 Install the carburetor body on the throttle chamber, using a new gasket.
- 3 Referring to **Figure 18**, install the venturis and gaskets, slow jets, emulsion tubes, main air bleeds, and power valve. Be sure the emulsion tubes and air bleeds are installed in the correct holes. Refer to the identifying numbers written down during disassembly.
- 4 Install the accelerator pump nozzle, accelerator pump assembly, and needle valve assembly. See **Figures 18 and 19**.
- 5 Install the choke plate and shaft (if removed).
- 6 Install the coasting enricher jet in the bottom side of the choke chamber (**Figure 17**). Position the choke chamber on the carburetor body, using a new gasket. Install the choke chamber screw in the hole nearest the coasting enricher solenoid. The other 3 choke chamber screws will be installed during later steps.
- 7 Install the main jets and plugs (**Figure 16**). Be sure the main jets are installed in the holes from which they were removed. Refer to the identifying numbers written down during disassembly.
- 8 Slide the float onto its pivot pin and install the washer (**Figure 16**).
- 9 Install a new rubber seal in the groove around the float chamber. Position the float chamber glass, then install a new gasket and the glass frame.
- 10 Install the fuel screen in the fuel inlet tube. Position the fuel inlet tube and its bracket on the carburetor (**Figure 15**). Install the bolt and tighten securely. Install the screws in the inlet tube bracket and bolt lock.
- 11 Install the idle mixture screw (**Figure 15**). Return the screw to its original setting by turning it in the same number of turns required to remove it. This number was written down during disassembly, Step 6.

12 Slide the accelerator pump arm onto its pivot (Figure 14) Secure it with the snap ring and cotter pin

13 Install the throttle return spring bracket and choke cable lever (Figure 13) Connect the choke rod and fast idle rod to the choke shaft lever Install the throttle return spring

14 Install coarsing enricher solenoid (Figure 13)

15 Install the throttle switch bracket, together with the switch (Figure 13) Leave the bracket screws loosened slightly Turn bracket counter-clockwise until throttle shaft lever pushes switch plunger in approximately $\frac{1}{4}$ inch Tighten the bracket screws The switch should now click when throttle is opened slightly, and click again when throttle is closed

16 After the carburetor is installed, check fuel level in the float chamber It should be even with the line on the float chamber glass when the engine idles Bend the float seat up if fuel level is too high, down if fuel level is too low Reinstall the float chamber glass, run the engine, and check fuel level If necessary, readjust float level

Disassembly (L16, L18, and L20B Engines)

Figure 21 (page 106) shows the manual choke carburetor used on 1968-1971 models Figure 22 (page 108) shows the automatic choke version used on 1975 and later vehicles The 1972-1974 carburetors are basically the same as the 1975 and later design Differences are illustrated as they occur

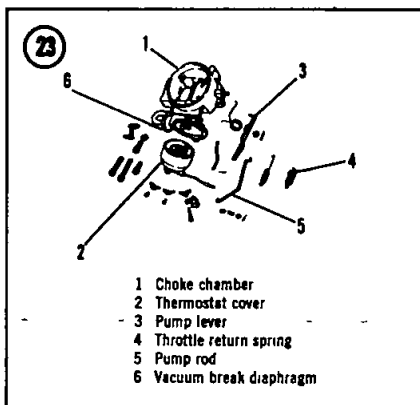
1 Remove the throttle return spring See Figure 21 (1968-1971), Figure 22 (1975 and later), or Figure 23 (1972-1974)

2 Disconnect the accelerator pump rod from the pump lever

3 Remove the snap ring from the pump lever and slide it off its pivot

4 On manual chokes, disconnect the fast idle and choke rods (107 and 118, Figure 21) from the choke lever (105) Remove the throttle return spring bracket (114)

5 On automatic chokes, disconnect the choke connecting rod, then remove the choke cover See Figure 21 (1975 and later) or Figure 22 (1972-1974)



6 Remove 4 screws securing the choke chamber, then lift it off

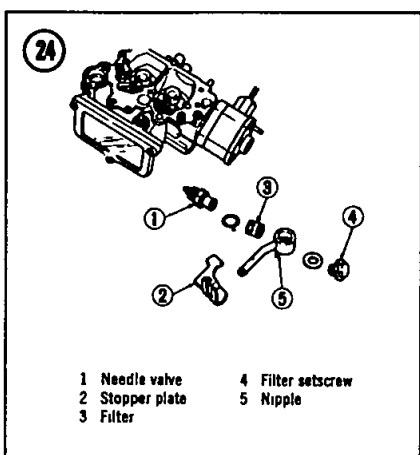
7 Remove 4 screws attaching the carburetor body to the throttle chamber, then lift it off

8 Remove 3 screws securing the float chamber glass Remove the glass frame, gasket, glass, and seal

9 Slide float off its pivot

10 Remove the secondary throttle diaphragm On automatic chokes, remove the fast idle cam

11 Remove the fuel inlet filter assembly See Figure 21 (1968-1971), Figure 22 (1975 and later), or Figure 24 (1972-1974)



12 Remove the accelerator pump piston (67, Figure 21, or 8, Figure 22) Turn the carburetor upside down and dump the check ball into your hand

13 Remove the accelerator pump discharge nozzle (73, Figure 21) or discharge valve (48, Figure 22)

14 Unscrew the main air bleeds (28 and 29, Figure 21, or 27 and 29, Figure 22) Take out the emulsion tubes, located under the air bleeds

NOTE *Main air bleeds and emulsion tubes are not interchangeable, but they will fit into the wrong holes Write down the number stamped in each air bleed, together with its location Keep each emulsion tube with its air bleed, and keep the air bleeds away from each other*

15 Unscrew the slow jets (90 and 91, Figure 21, or 23 and 31, Figure 22)

16 On late models, the secondary slow jet (31, Figure 22) is located under a plug (30)

17 Remove the main jet plugs from beneath the float chamber Unscrew the main jets (31-40, Figure 21, or 20 and 21, Figure 22)

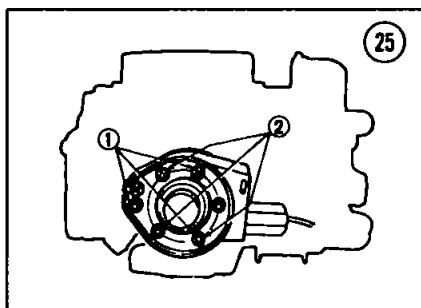
NOTE *Write down the number stamped in each main jet, together with its location The main jets must be reinstalled in the holes from which they were removed*

18 Unscrew the power valve (123, Figure 21, or 28, Figure 22)

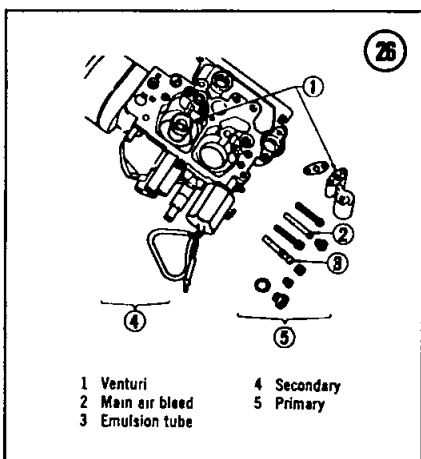
19 On early carburetors, remove 3 screws and take off the coasting enricher solenoid On later models, remove 3 screws (1, Figure 25) and take off the boost controlled deceleration device Do not remove the 3 screws that hold the device together (2, Figure 25)

20 On automatic transmission vehicles, remove the anti-stall dashpot and bracket Figure 21 shows the early design All other models are basically the same

21 On 1973 and later models, remove the anti-dieseling solenoid Unscrew round solenoids with Vise Grips, unscrew hexagonal solenoids with an ordinary wrench Be careful not to damage the solenoid



22 On early carburetors, remove the secondary venturi (26, Figure 21) On 1972-1974 models, remove both venturis (Figure 26) On 1975 and later models, do not remove the venturis

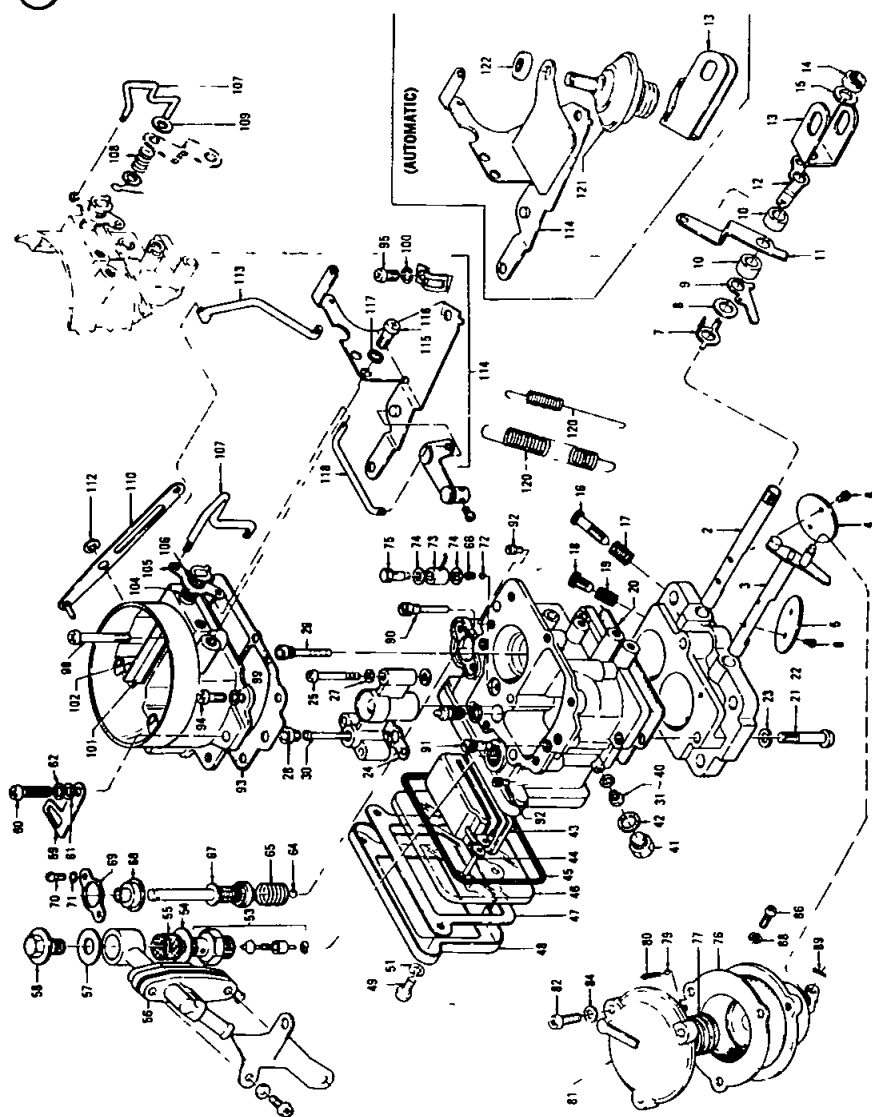


23 If necessary, disassemble the carburetor linkage, referring to Figure 21 (1968-1971) or Figure 22 (1972 and later) Linkage disassembly is unnecessary for normal carburetor overhaul, and should be avoided unless parts are bent or otherwise damaged Do not remove the throttle plates or shaft under any circumstances

Inspection (L16, L18, and L20B Engines)

- 1 Clean all parts in solvent, except following
 - a Accelerator pump piston assembly

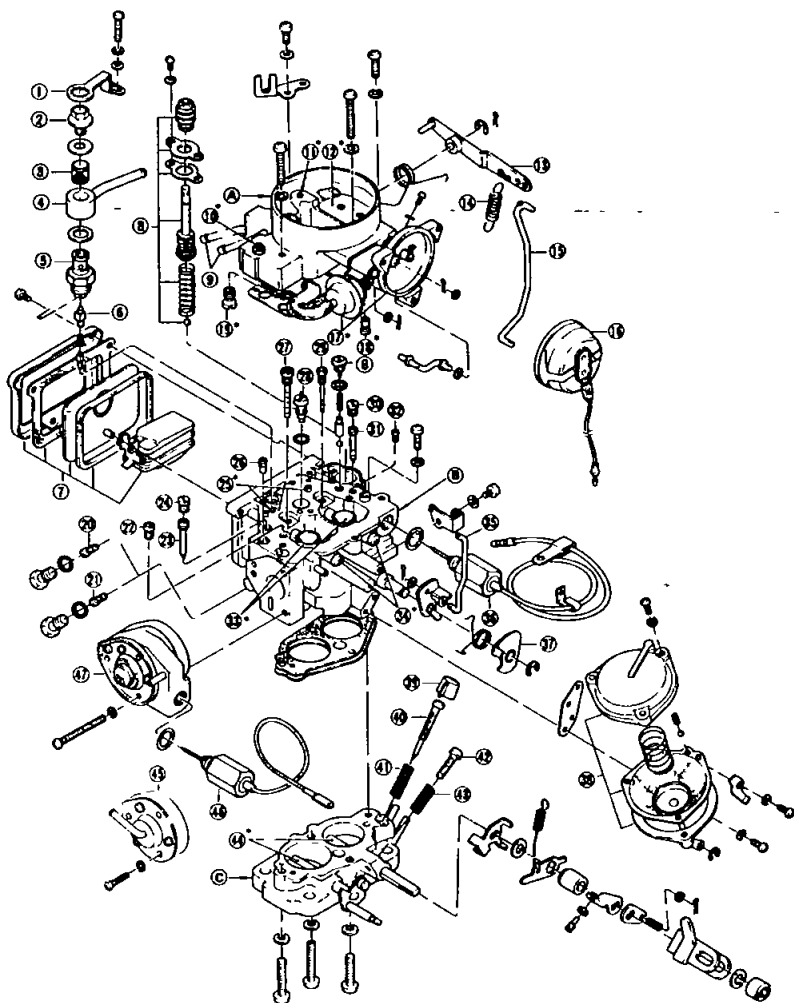
21



CARBURETOR — 1968-1971 L-SERIES ENGINES (WITH MANUAL CHOKE)

1	Carburetor assembly	44	Collar	82	Screw
2	Primary throttle shaft	45	Rubber seal	84	Spring washer
3	Secondary throttle shaft	46	Float chamber glass	86	Screw
4	Primary throttle valve	47	Float cover gasket	88	Spring washer
5	Secondary throttle valve	48	Glass frame	89	Stopper pin
6	Screw	49	Screw	90	Slow jet
7	Throttle adjustment lever	51	Spring washer	91	Slow jet
8	Washer	53	Needle valve assembly	92	Slow air bleed
9	Return plate	54	Washer	94	Screw
10	Sieve	55	Filter	95	Screw
11	Connecting lever	56	Fuel vapor discharge connector	98	Screw
12	Throttle lever	57	Washer	99	Spring washer
13	Throttle lever	58	Inlet bolt	100	Spring washer
14	Nut	59	Fuel return clamp	101	Choke shaft
15	Spring washer	60	Screw	102	Choke valve
16	Throttle adjustment screw	61	Plain washer	104	Choke lever spring
17	Throttle adjustment spring	62	Washer	105	Choke lever
18	Idle adjustment screw	64	Ball	106	Choke valve spring
19	Adjustment screw spring	65	Piston return spring	107	Fast idle rod
20	Throttle camber gasket	66	Pump injector spring	108	Rod pump spring
21	Screw	67	Piston	109	Rod choke washer
22	Screw	68	Pump cover	110	Pump lever
23	Spring washer	69	Cylinder plate	112	Ring
24	Venturi gasket	70	Screw	113	Pump rod
25	Screw	71	Spring washer	114	Throttle return spring
26	Secondary venturi	72	Ball		bracket
27	Spring washer	73	Pump nozzle	115	Screw
28	Main air bleed	74	Washer	116	Screw
29	Main air bleed	75	Nozzle setscrew	117	Spring washer
30	Secondary emulsion tube	76	Diaphragm assembly	118	Choke rod
31	Primary main jet	77	Diaphragm spring	120	Throttle return spring
32-40	Secondary main jet	79	Ball	121	Dash pot assembly
41	Drain plug	80	Valve spring	122	Nut
42	Packing	81	Diaphragm cover	123	Power valve
43	Float assembly				

22



CARBURETOR — 1975-1976 L-SERIES ENGINES WITH AUTOMATIC CHOKE (1972-1974 SIMILAR)

- 1 Lock lever
- 2 Filter set screw
- 3 Fuel filter
- 4 Fuel nipple
- 5 Needle valve body
- 6 Needle valve
- 7 Fuel chamber parts
- 8 Accelerating pump parts
- 9 Altitude compensator pipe (California models)
- 10 Coasting air bleed adjusting screw*
- 11 High speed enricher air bleed*
- 12 Choke valve*
- 13 Accelerating pump lever
- 14 Throttle return spring
- 15 Accelerating pump rod
- 16 Automatic choke cover
- 17 Automatic choke body and diaphragm chamber*
- 18 Richer jet*
- 19 Coasting air bleed*
- 20 Primary main jet
- 21 Secondary main jet
- 22 Secondary slow air bleed
- 23 Secondary slow jet
- 24 Plug
- 25 Safe orifice*
- 26 Coasting jet
- 27 Secondary main air bleed
- 28 Power valve
- 29 Primary main air bleed
- 30 Plug
- 31 Primary slow jet
- 32 No. 2 primary slow air bleed
- 33 Primary and secondary small venturi*
- 34 Venturi stopper screw*
- 35 Choke connecting rod
- 36 Anti-dieseling solenoid valve
- 37 Fast idle cam
- 38 Diaphragm chamber parts
- 39 Idle limiter cap
- 40 Idle adjust screw
- 41 Idle adjust screw spring
- 42 Throttle adjust screw
- 43 Throttle adjust screw spring
- 44 Primary and secondary throttle valve*
- 45 BCD (California models)
- 46 Vacuum control solenoid valve
- 47 BCD (non California models)
- 48 Accelerator pump discharge valve

Note Do not remove the parts marked with an asterisk (*)

- b Vacuum break diaphragm (automatic chokes)
- c Coasting enricher solenoid (early carburetors)
- d Boost controlled deceleration device (late carburetors)
- e Anti-dieseling solenoid (1973 and later carburetors)

CAUTION

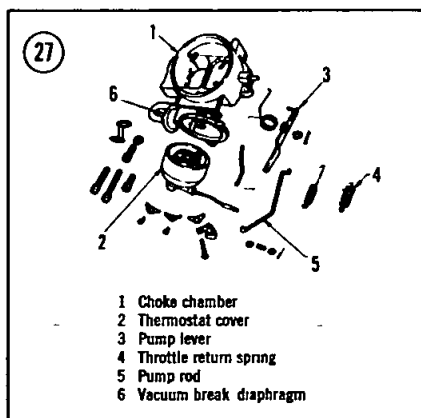
Do not insert objects such as drill bits or pieces of wire into jets or passages while cleaning. These openings are carefully calibrated, and scratching them may seriously affect carburetor performance.

- 2 Disassemble the needle valve. Inspect the needle and seat, replace them if worn.
- 3 Check the fuel inlet wire screen for clogging.
- 4 Check the carburetor bores for wear and out-of-roundness.
- 5 Check the idle mixture screw for wear at the tip. Replace if necessary.
- 6 Check the venturis for damage. Replace if necessary.
- 7 Check all jets and passages for clogging or damage. Clean or replace as needed.
- 8 Check the accelerator pump piston cover and seal for wear, damage, or deterioration. Replace as needed.
- 9 On automatic chokes, check the bimetal coil and heating coil for damage. Inspect the vacuum break diaphragm (6, Figure 27). To do this, hold choke valve shut and check on the diaphragm's vacuum tube. There should be a strong pull on the choke valve.
- 10 On carburetors which have solenoids, connect a 12-volt battery between the solenoid wires. The solenoid plunger should move when current is applied.

Assembly (L16, L18, and L20B Engines)

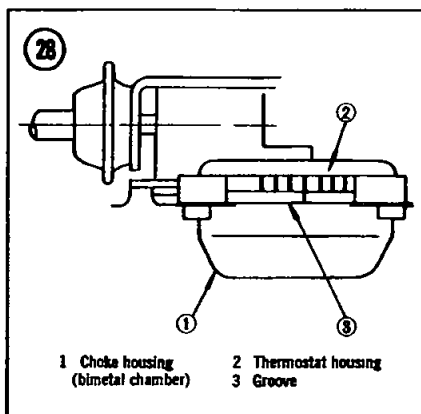
Assembly is the reverse of disassembly, plus the following:

- 1 Use new gaskets and seals.
- 2 If equipped with an anti-dieseling solenoid, use Loctite Stud Lock or equivalent on the threads when installing.



3 Be sure main jets and main air bleeds are installed in the correct holes. Refer to the numbers written down during assembly.

4 When installing the choke housing, line up the housing index mark with the center mark on the thermostat housing. See Figure 28.



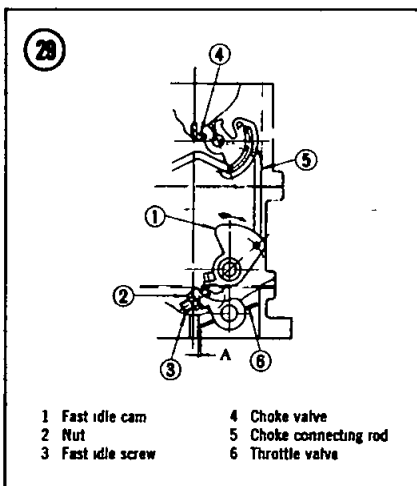
5 After assembly, adjust float level, fast idle, and anti-stall dashpot.

Fast Idle Adjustment (L16, L18, and L20B Engines)

Fast idle is the speed at which the engine idles when it is cold and the automatic choke is

operating. As the engine warms up, the idle speed automatically returns to normal.

1 Place the fast idle screw on the second step of the fast idle cam. See Figure 29.



2 Turn the screw until dimension "A" (clearance between primary throttle plate and bore) is as specified in Table 1.

Anti-stall Dashpot Adjustment (L16, L18, and L20B Engines)

The anti-stall dashpot is used on 1972-1974 automatic transmission vehicles, and on all 1975 and later models.

1 Warm the engine to normal operating temperature. Make sure idle speed and mixture are correct. If in doubt, see the *Tune-up* section of Chapter Two.

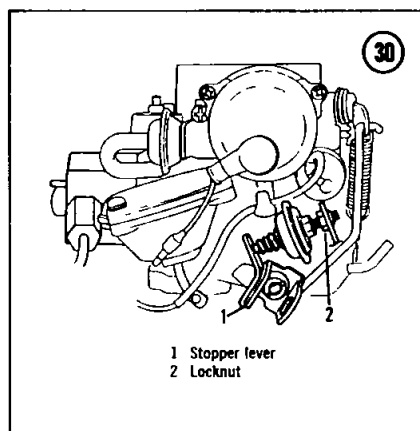
2 Move the throttle by hand until the dashpot just touches the stopper lever. See Figure 30. At that point engine speed should be 1,600-1,800 rpm (1972-1974), 1,900-2,100 rpm (1975 and later manual transmission), or 1,650-1,850 rpm (1975 and later automatic transmission).

3 If necessary, loosen the locknut and turn the dashpot until engine speed is correct. Then tighten the locknut.

4 Make sure engine speed drops from 2,000 rpm to 1,000 rpm in about 3 seconds.

Table 1 FAST IDLE CAM CLEARANCE

Model year	Inches	mm
1972	0 047	1 19
1973 1974		
Manual transmission	0 037 $\pm$ 0 002	0 95 $\pm$ 0 05
Automatic transmission	0 046 $\pm$ 0 002	1 17 $\pm$ 0 05
1975 1976		
Manual transmission	0 048 0 052	1 23 1 33
Automatic transmission	0 040-0 048	1 01 1 21
1977		
Manual transmission	0 052 0 058	1 33 1 47
Automatic transmission	0 062 0 068	1 58 1 72



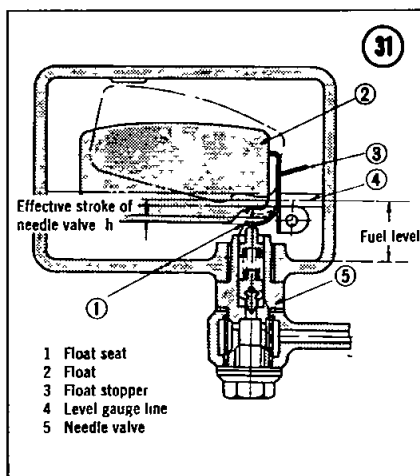
Float Level Adjustment (L16, L18, and L20B Engines)

If float level is correct, fuel level will be even with the line on the float chamber glass when the engine is idling.

To adjust, remove the float chamber glass and slide the float off its pivot. Bend the float seat (1, Figure 31) as needed to give a needle valve stroke of 0 059 in (1 5mm) on 1968-1974 models, 0 051-0 067 in (1 3-1 7mm) on 1975 and later models.

Disassembly (1970-1972 240Z)

- 1 Referring to Figure 32, unscrew the oil cap nut and lift out the plunger.
- 2 Remove 4 setscrews and lift off the suction chamber.

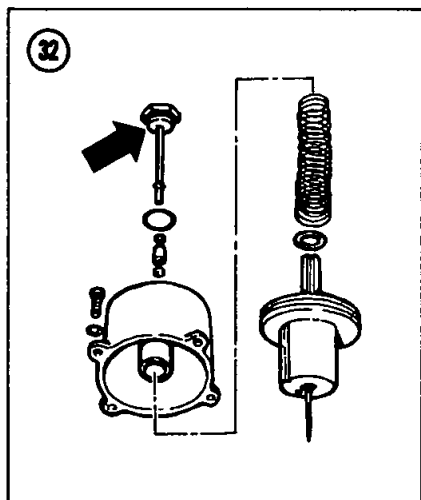


- 3 Take suction spring and nylon washer off of the piston.
- 4 Lift the piston out of the carburetor, together with the jet needle.

CAUTION

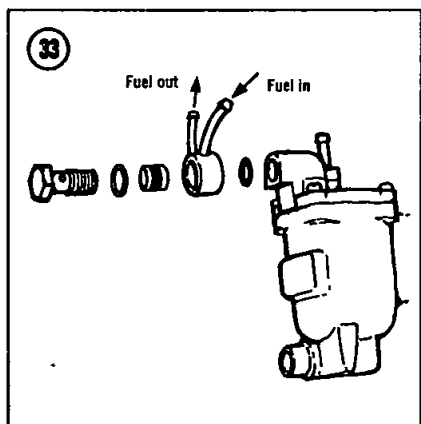
Do not bend the jet needle when removing. A bent needle will seriously affect carburetor performance.

- 5 Do not remove the jet needle from the piston unless it is worn or incorrectly installed. To remove, loosen the setscrew in the side of the piston. Then hold the needle with pliers at a point 0 08 in (2mm) or less from the piston. Turn and pull gently until the needle is out. Be careful not to bend the needle.

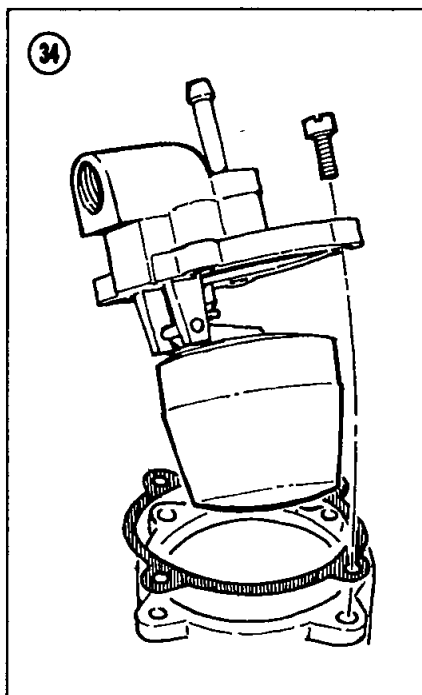


6 Detach the fuel line from the base of the float chamber. Detach the overflow tube from the top of the float chamber.

7 Referring to Figure 33, remove the fuel line fitting from the top of the float chamber. This fitting includes a fuel return tube, designed to prevent vapor lock.



8 Referring to Figure 34, remove 4 setscrews attaching the float chamber cover to the bowl. Lift off the cover together with the float.



9 Referring to Figure 35, detach the fuel line from the jet nozzle. Then remove the Phillips screw attaching the choke lever to the nozzle, and take the nozzle out.

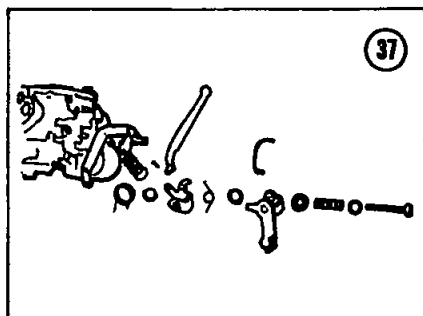
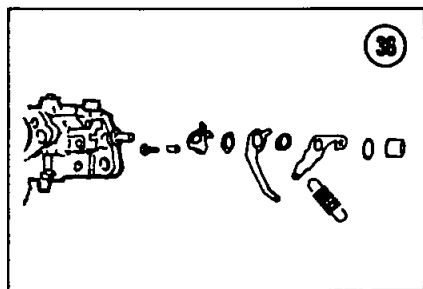
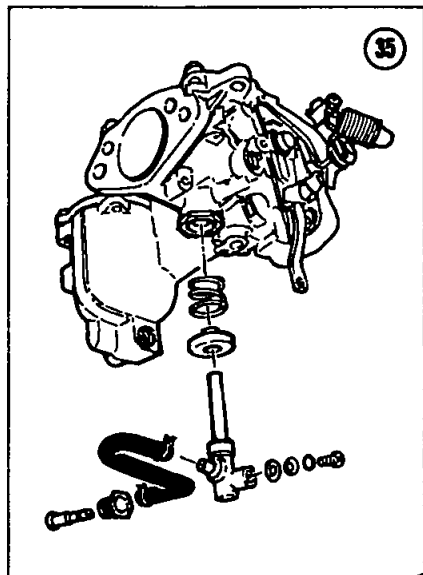
10 Unscrew the idle adjusting nut. Take the nut and spring off the nozzle sleeve.

NOTE: The nozzle sleeve is difficult to install. Do not remove it unless absolutely necessary.

11 If necessary, disassemble the throttle and choke levers. Disassembly should not be needed unless a component is bent or otherwise damaged. Figure 36 shows the throttle lever parts. Figure 37 shows the choke lever parts.

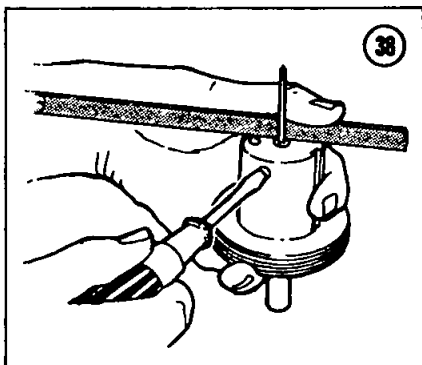
Inspection and Assembly (1970-1972 240Z)

1 Thoroughly clean all parts in solvent and blow dry with compressed air. Do not use any abrasives for cleaning.



2 Check the inside of the suction chamber and the piston friction surface for scratches, dents, and wear. Very small scratches may be removed with aluminum polish. However, excessive wear or deep scratches will affect carburetor performance. Replace pistons and suction chambers with these conditions.

3 Check the jet needle for wear. Also check for scuffs or worn streaks which indicate incorrect installation. If the needle is not worn, install it in the piston as shown in Figure 38. Use a straightedge to ensure that the shoulder of the needle is flush with the piston surface. Tighten the setscrew to lock the needle in place.



4 Install the jet nozzle sleeve (if removed), washer, and securing nut. Do not tighten the nut.

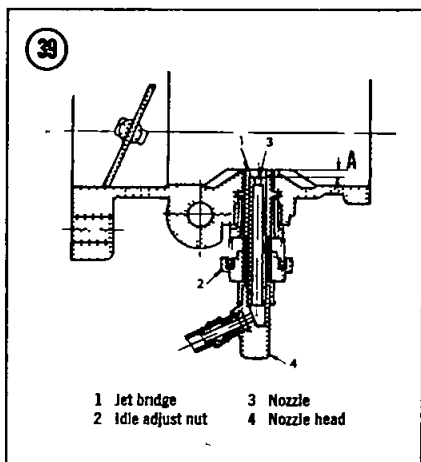
5 Check the outside surface of the jet nozzle for wear. Carefully check the inside of the nozzle bore for wear and out-of-roundness. If they are even slightly suspect, replace the nozzle and jet needle.

6 Temporarily install the jet nozzle in the sleeve without the spring or idle adjusting nut.

7 Temporarily install the suction chamber and piston without the spring.

8 Raise the piston with a finger and let it drop slowly. It should hit the bridge with an audible click. If it does not drop freely, recenter the nozzle and drop the piston again. Keep tightening the securing nut, and retesting centering, by lifting and dropping the piston until the nut is tight and the piston drops freely.

9 Remove the jet nozzle. Install the spring and idle adjusting nut. Install the jet nozzle. Turn the idle adjusting nut so the distance between the nozzle head and jet bridge (dimension "A," Figure 39) is approximately 0.087 in. (2.2mm).



10 Connect the fuel line to the base of the jet nozzle.

11 Attach the choke lever to the base of the jet nozzle. Move the choke lever slightly while inserting the screw to ensure that the small spacer is centered in the hole in the lower end of the choke lever.

12 Place the nylon washer and the spring on the piston.

13 Apply a few drops of light oil to the outside of the piston damper. Do not put any oil at all on the inside of the suction chamber, or on the friction surface of the piston.

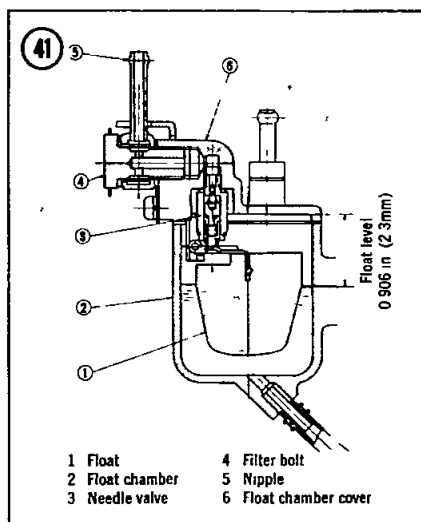
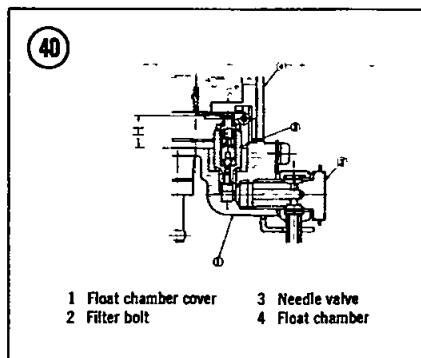
14 Install the suction chamber and secure it with 4 screws.

15 Fill damper with oil (SAE 20 or 10W-30) and install the plunger. Tighten the oil cap nut with fingers only.

16 Remove the pin holding the float to the float chamber cover. Check the needle valve for wear. Replace if worn or in doubt.

17 Check the float for dents and leaks. If the float is satisfactory, reassemble needle and float.

18 Place the float chamber cover and float on a workbench so the float is on top. Lift the float with a finger and lower it so the float just touches the needle valve. The distance from the float lever to the float chamber inside surface (dimension "H," Figure 40) should be 0.055-0.059 in. (14-15mm). This will set float level at 0.906 in. (23mm) as shown in Figure 41. If necessary, adjust float level by bending the float lever.

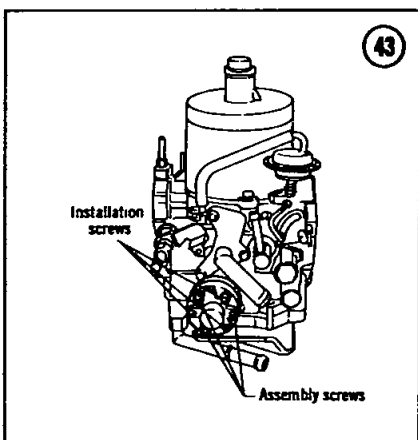
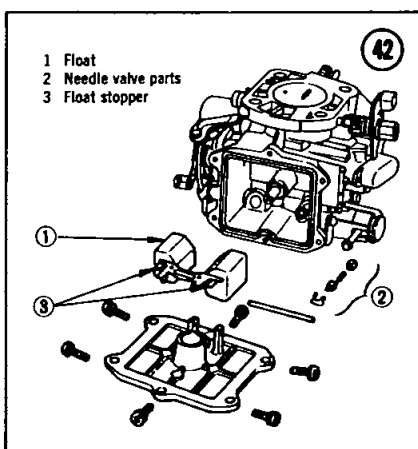


19 Install the float chamber cover and fuel line fitting.

Disassembly/Assembly (1973 240Z, 1974 260Z)

The 1973-74 Z carburetors require special equipment to assemble the fuel metering system. Because of this, Datsun does not recommend major disassembly. The only removable parts are the float chamber cover, power valve, and linkage parts.

- 1 Remove the carburetor as described earlier.
- 2 Remove the float chamber cover screws, then lift off cover and gasket, See Figure 42 (1973) or Figure 43 (1974).

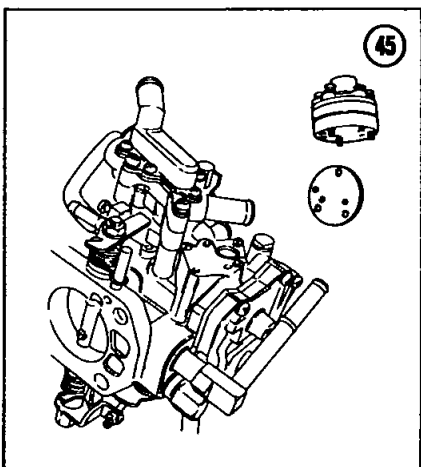
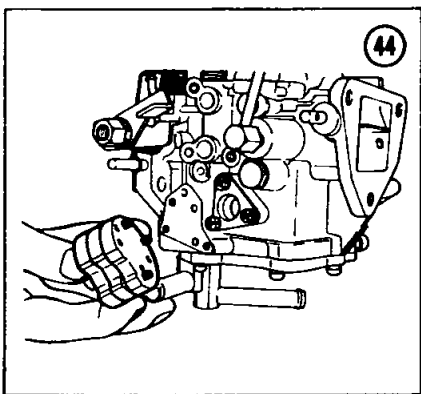


- 3 On 1973 carburetors, push out the float pivot pin, then remove the float. Remove the needle valve securing clip and take out the needle valve. Inspect all parts and replace as needed.

CAUTION

Do not move the jet needle adjusting nut or bend the float stoppers

- 4 If necessary, adjust float level as described later in this chapter.
- 5 Remove 3 screws attaching the power valve to the carburetor. See Figure 44 (1973) or Figure 45 (1974).

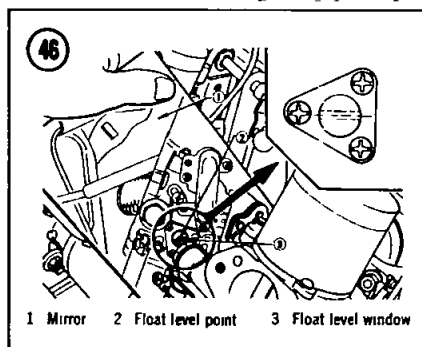


6 Remove 3 screws holding the power valve together. Remove and examine the diaphragm. Replace the power valve if the diaphragm is worn or damaged.

7 Assemble in the reverse order.

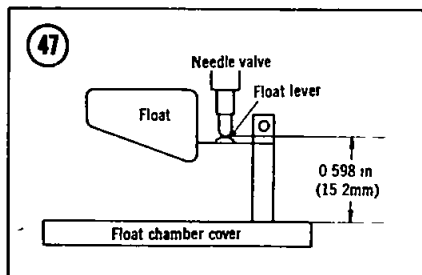
Float Level Adjustment (1973 240Z)

1 To check float level, hold a mirror up to the sight glass on the side of the carburetor while the engine is running. See **Figure 46**. Fuel level should be $\frac{1}{4}$ in. (6mm) below the center of the sight glass centerline.



2 To adjust, measure the distance from the needle valve contact surface on the float lever to the float chamber cover. See **Figure 47**. If necessary, bend the float stoppers (3, **Figure 42**) to change it.

NOTE Lowering the float stopper 0.009 in. (0.23mm) will raise the float level 0.039 in. (1mm). Raising the float stopper 0.009 in. will lower float level 0.039 in.

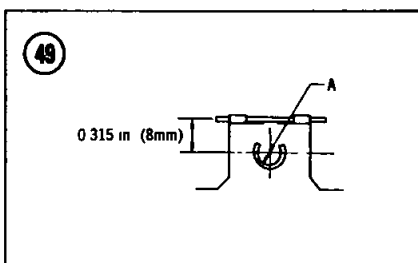
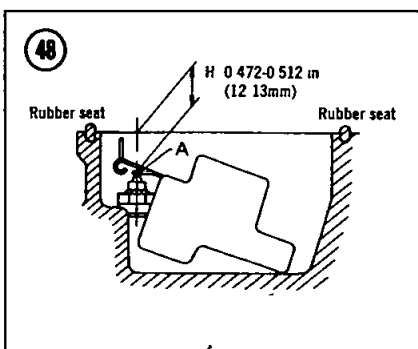


3 Install the float chamber cover, then the carburetor. Run the engine and recheck the float level.

Float Level Adjustment (1974 260Z)

1 Check float level as described in Step 1 of the previous procedure. Float level should be at the sight glass centerline.

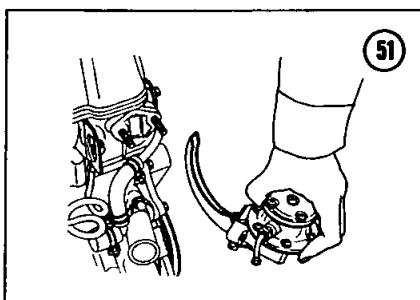
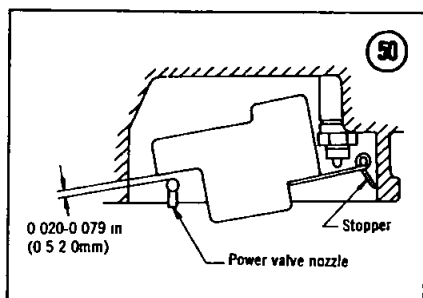
2 Remove the float chamber cover and turn the carburetor upside down. Measure dimension "H," **Figure 48**. This is the distance from point "A" of the float lever tongue to the float chamber end surface. **Figure 49** shows point "A."



3 If dimension "H" is incorrect, bend the float lever tongue as necessary to change it.

4 Turn the carburetor right side up. Measure dimension "G," **Figure 50**. If incorrect, bend the float stopper as needed to change it. Recheck dimension "H" to be sure it hasn't changed.

5 Install the float chamber cover, then the carburetor. Run the engine and recheck float level.



FUEL INJECTION (280Z)

Bosch L-Jetronic fuel injection is used on 280Z's. Unlike carburetors, which use engine vacuum to mix fuel and air, the fuel injection system forces fuel under pressure into the intake ports.

Fuel injection trouble diagnosis is too complex to be practical for home mechanics. Take the car to a Datsun dealer or a mechanic familiar with Bosch fuel injection. As with a carbureted fuel system, check valve adjustment, the ignition system, and engine compression before blaming the fuel system for a problem.

FUEL PUMP

All models except the 280Z and air-conditioned 1977 pickup use a mechanical fuel pump, driven by an eccentric lobe on the camshaft. The 280Z and pickup use electric pumps, the 260Z uses both types.

Removal/Installation (Mechanical Pump)

To remove, disconnect the fuel inlet and outlet lines from the pump. Then remove the nuts securing the pump and take it off. Figure 51 shows an L-series pump being removed. The A-series and J13 pumps are removed in the same manner. Install in the reverse order, using a new gasket.

Removal/Installation (260Z and Pickup Electric Pump)

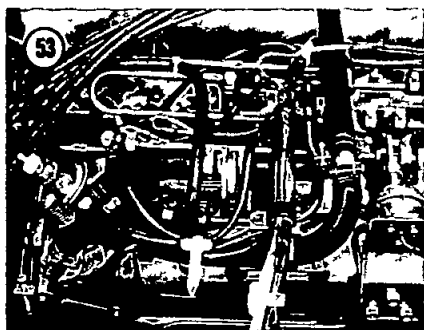
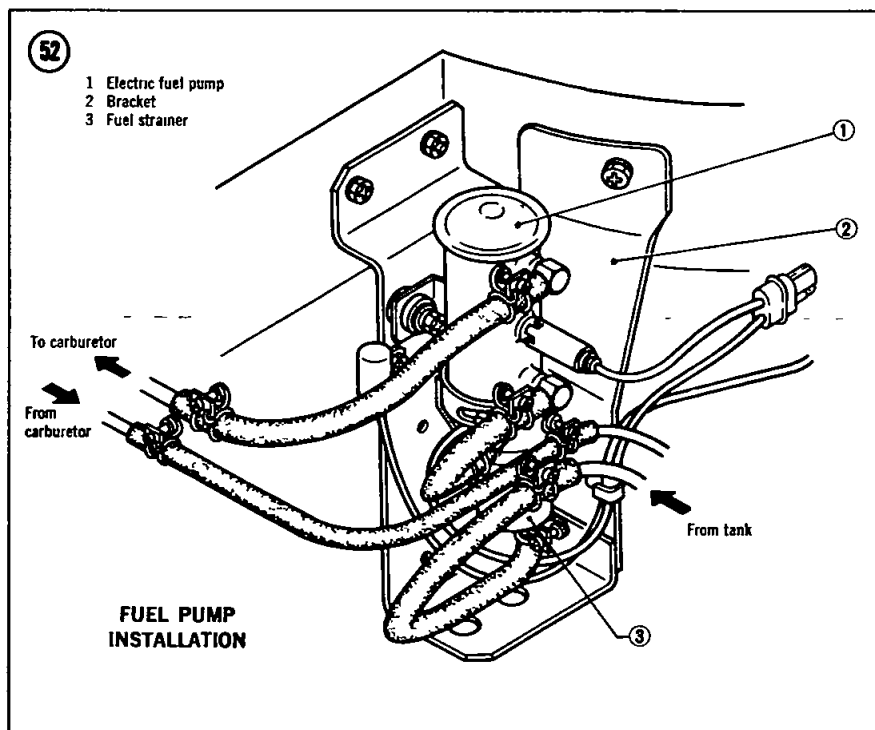
The 260Z pump is mounted near the rear axle, where the differential connects to the frame. Figure 52 shows the 260Z installation.

The pickup installation is very similar. The pump is mounted on the right-hand frame member next to the fuel tank.

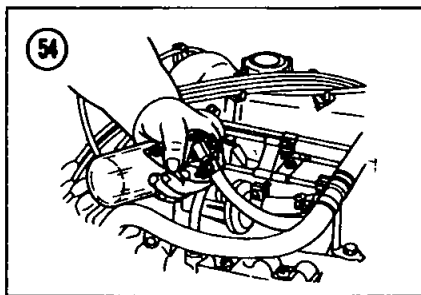
- 1 Disconnect the negative cable from battery.
- 2 Place a container beneath the pump to catch dripping gasoline. Disconnect the inlet and outlet lines from the pump.
- 3 Disconnect the pump wires.
- 4 Remove 2 screws securing the pump to the bracket. Take the pump out.
- 5 Installation is the reverse of these steps.

Removal/Installation (280Z Electric Pump)

- 1 Disconnect the negative cable from the battery.
- 2 Disconnect the wire running from the starter solenoid to the starter body. Leave the other solenoid wires connected.
- 3 Label and disconnect the fuel pump wires.
- 4 Remove 2 screws securing the cold start valve to the intake manifold (Figure 53). Place the valve in a container (Figure 54).
- 5 Reconnect the battery cable.
- 6 Turn the ignition key to START and let the fuel run into a container.
- 7 Securely block both front wheels so the car will not roll in either direction. Jack up the rear end and place it on jackstands.
- 8 Clamp or plug the fuel line. Place a container beneath the pump, then disconnect both fuel lines.
- 9 Remove 2 bracket securing screws (Figure 55). Remove the bracket from the car, then remove the pump from the bracket.



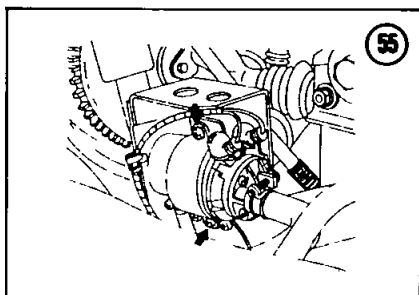
10 Install in the reverse order. Use new hose clamps on the fuel lines. Be sure the short rubber hose running from the fuel pump to the fuel damper's metal line is pushed all the way onto the pump. Tighten clamps to one ft.-lb. (0.13



mkg) After installation, run the engine and check for leaks.

AIR INJECTION SYSTEM

The air injection system is used on 1968-1971 L16 engines, and on all A14, L20B, L24, and



L26 engines The system is designed to pump fresh air into each exhaust port, so combustion can continue for a longer time and reduce emissions

The system consists of an air pump (driven by the crankshaft through a belt), a check valve, tubing, hoses, and an anti-backfire valve. 1975 and later California models (except the 1975 pickup) also use an air control valve and emergency air relief valve. These valves are designed to prevent excessively high catalytic converter temperatures. For details, refer to the following illustrations.

Figure 56 — This design is used with 1968-1971 L16 engines and 1974 L20B engines

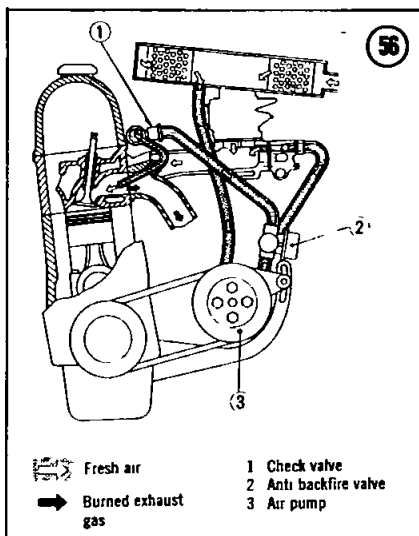


Figure 57 — This design is used with L24 and L26 engines

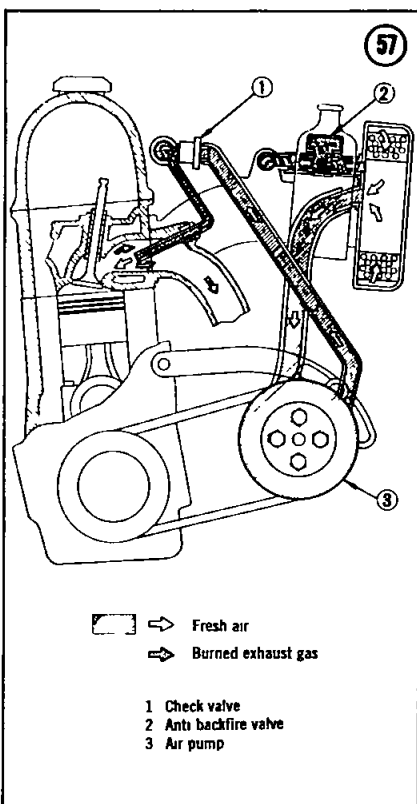
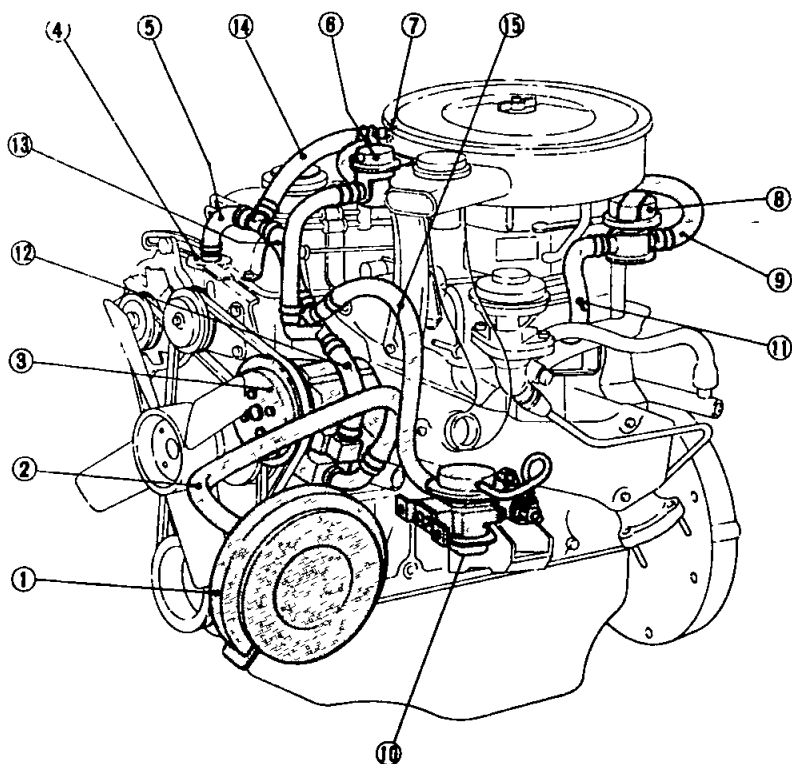


Figure 58 — This design is used with California A14 engines. The non-California design is the same, but does not use the air control valve or emergency air relief valve.

Figure 59 — This design is used with 1975 and later California L20B engines, except the 1975 pickup. The 1975 and later non-California version — and all 1975 pickups — use the same design without the air control valve or emergency air relief valve.

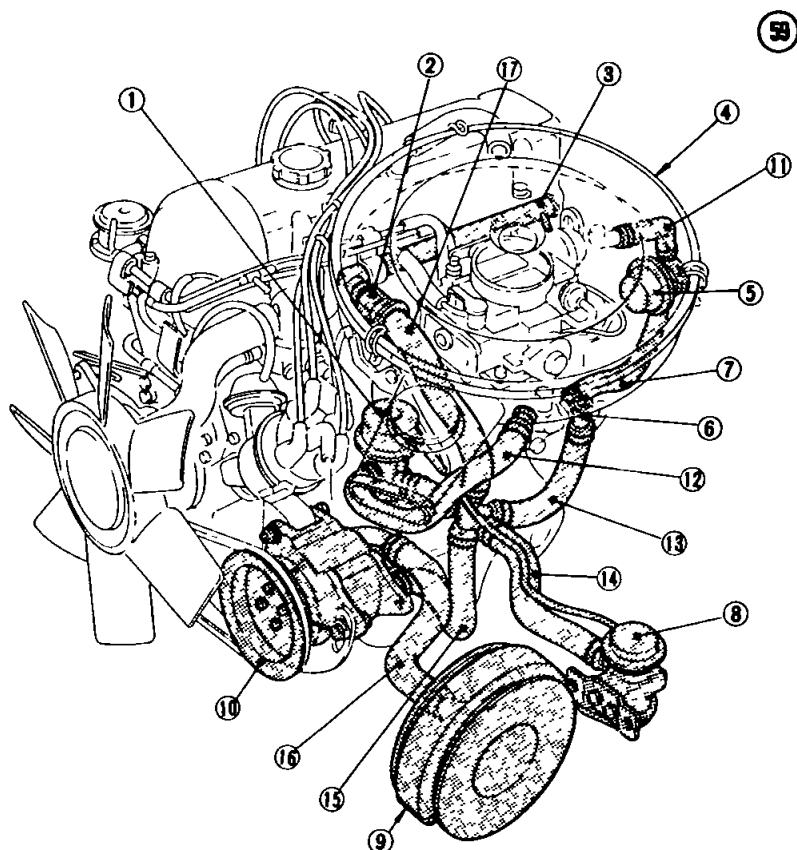
Air pump repair requires special equipment and should be left to a Datsun dealer or other competent mechanic. No other system components are repairable.

58



- 1 Air pump air cleaner
- 2 Air hose (air pump air cleaner to air pump)
- 3 Air pump
- 4 Check valve
- 5 Air hose (check valve to air hose connector)
- 6 Air control valve
- 7 Air relief valve
- 8 Anti backfire valve (AB valve)
- 9 Air hose (AB valve to carburetor air cleaner)

- 10 Emergency air relief valve (EARV)
- 11 Air hose (AB valve to intake manifold)
- 12 Air hose (air pump to air hose connector)
- 13 Air hose (air hose connector to air hose connector)
- 14 Air hose (air hose connector to air relief valve)
- 15 Air hose (air hose connector to EARV)



- 1 Air control valve
- 2 Check valve
- 3 Air gallery pipe
- 4 Automatic temperature control air cleaner
- 5 Anti backfire valve (AB valve)
- 6 Air relief valve
- 7 Air hose (AB valve to intake manifold)

- 8 Emergency air relief valve
- 9 Air pump air cleaner
- 10 Air pump
- 11 Air hose (carburetor air cleaner to AB valve)
- 12 Air hose (carburetor air cleaner to air control valve)
- 13 Air hose (air relief valve to air hose connector)

- 14 Air hose (air hose connector to emergency air relief valve)
- 15 Air hose (air hose connector to air pump)
- 16 Air hose (air pump to air pump air cleaner)
- 17 Air hose (check valve to air hose connector)

Air Pump Removal/Installation

- 1 Disconnect the hoses from the air pump
- 2 Remove the nut attaching the air pump to its adjusting bracket
- 3 Remove the bolt attaching the air pump to its mounting bracket. Remove the air pump belt
- 4 Lift the air pump up and out of the engine compartment
- 5 Installation is the reverse of these steps

Anti-Backfire Valve Test (Through 1974)

- 1 Warm the engine to normal operating temperature
- 2 Check all system hoses for leaks. Replace as needed
- 3 Disconnect the hose running from the anti-backfire valve to the intake manifold. Plug the hose so it is airtight
- 4 Working the throttle linkage by hand, open and close the throttle rapidly. Air should flow from the valve for 1-2 seconds. No air flow or continuous air flow indicates a defective valve. Replace it

Anti-Backfire Valve Test (1975 and Later)

- 1 Disconnect the anti-backfire valve hose from the air cleaner
- 2 Run the engine at 3,000 rpm, then release the throttle quickly. Suction should be felt at the disconnected hose end. If not, replace the anti-backfire valve

Check Valve Test

- 1 Warm the engine to normal operating temperature
- 2 Check air injection hoses for leaks. Replace as needed
- 3 Disconnect the hose from the check valve. Look inside the valve. The valve plate should be against its seat (toward you away from the engine). Push the valve plate in. It should return to its seat without binding
- 4 With the hose disconnected, start the engine and watch the valve plate. Plate vibration at idle is permissible. Raise engine speed to

1,500-2,000 rpm. There should be no exhaust gas leakage past the plate. If there is, replace the check valve.

Emergency Air Relief Valve

This valve is used on 1975 and later California models (except the 1975 pickup).

- 1 Warm the engine to normal operating temperature
- 2 Check all hoses for leaks or damage. Tighten or replace as needed
- 3 Run the engine at 2,000 rpm. Place a hand over the air outlet at the top of the EAR valve. No air should be felt
- 4 Disconnect the vacuum (thin) hose from the EAR valve. There should now be air flow from the valve outlet at 2,000 rpm. If not, replace the valve

Air Control Valve

This valve is used on 1975 and later California models (except the 1975 pickup).

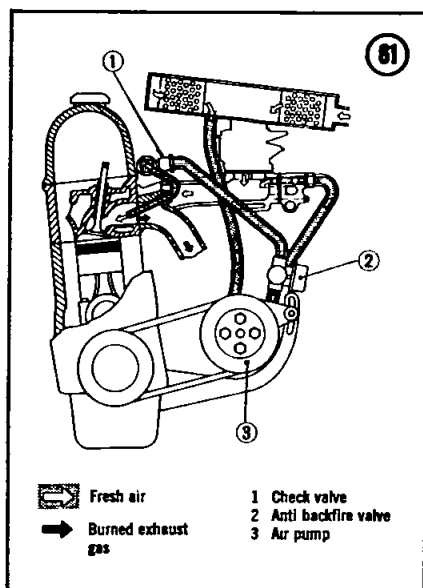
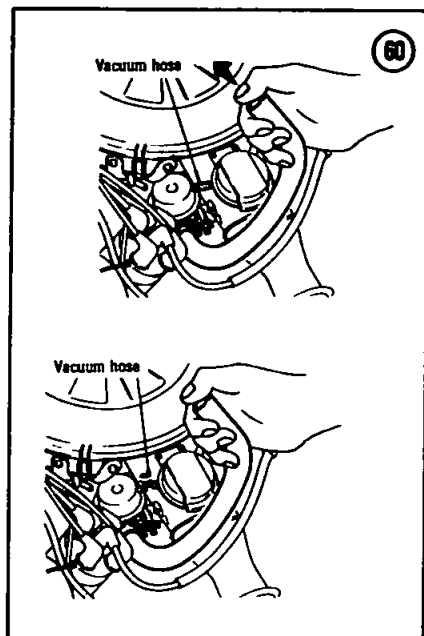
- 1 Warm the engine to normal operating temperature
- 2 Check all hoses for leaks or damage. Replace as needed
- 3 With the engine idling, disconnect the valve's outlet hose (Figure 60). If there is no air flow from the hose, replace the valve
- 4 Disconnect the vacuum (thin) hose from the valve. Air flow at idle should stop. If not, replace the valve

Air Injection Tubing (Except B210)

Removal of the air injection tubing is very difficult without bending the tubes. Removal should not be attempted unless the tubes are damaged. To remove, disconnect the short air hose from the check valve, then unscrew the check valve from the air gallery. Remove the nuts attaching the small injector tubes to the exhaust manifold. Install in the reverse order.

EXHAUST GAS RECIRCULATION SYSTEM

This system is used on 1973 240Z's and all 1974 and later vehicles except the non-California 280Z. It routes exhaust gas into the intake



manifold to lower combustion temperature. This reduces nitrogen oxide emissions.

Figure 61 shows the 1974 4-cylinder system. The 1975 and latter 4-cylinder system (Figure 62) is much the same, but uses a thermal vacuum valve instead of the 1974 system's solenoid and temperature switch. This valve (or solenoid and switch) deactivates the EGR system at low temperatures.

Figure 63 (page 124) shows the 1973-1974 6-cylinder system. Figure 64 (page 125) shows the 1975 and later 6-cylinder design.

Inspection

Models which use unleaded fuel do not require scheduled EGR system inspection. All other models require inspection at intervals specified in Chapter Two.

1 Visually inspect the EGR system. Replace cracked or worn hoses and tubes. Replace any parts showing obvious mechanical damage.

2 On 1973-1974 vehicles, make sure the solenoid wire is securely connected.

3 Warm the engine to normal operating temperature.

4 Increase engine speed to 3,000-3,500 rpm. The control valve shaft (visible inside the lower part of the control valve) should rise.

5 On 1973-1974 models, disconnect the solenoid wire. Connect it to the battery positive terminal with a jumper wire. Again, increase engine speed to 3,000-3,500 rpm. The control valve shaft should not rise. If it does, replace the solenoid.

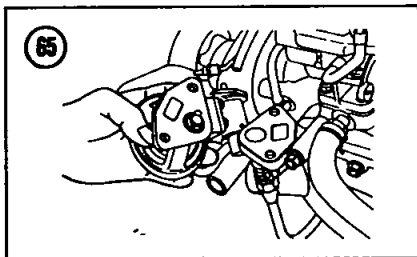
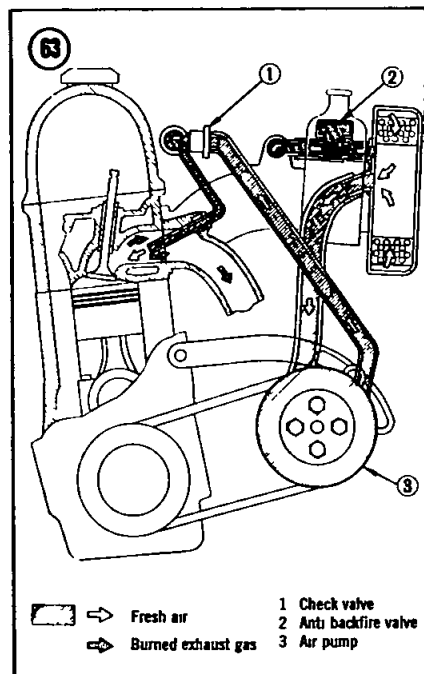
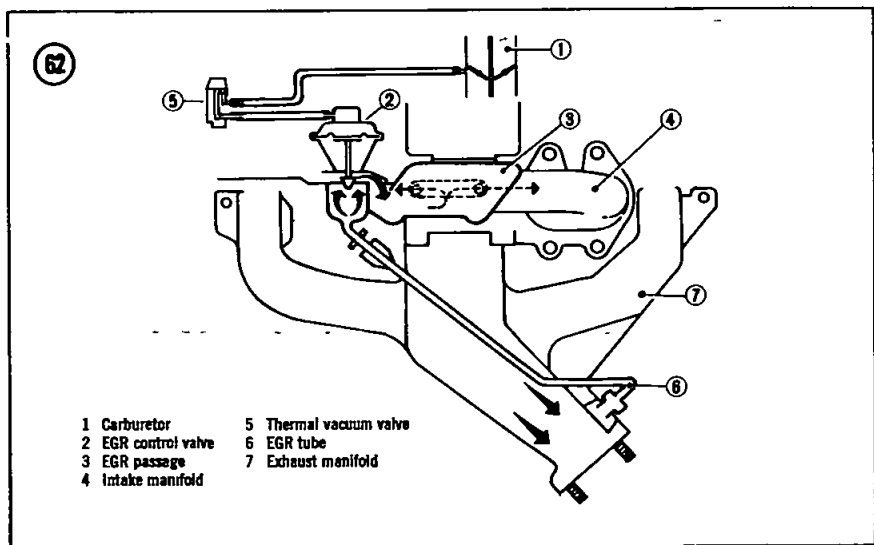
WARNING

The control valve and surrounding area will be hot. Use a screwdriver or similar tool to perform the next step.

6 With the engine idling, reach inside the control valve and raise the diaphragm. The idle should become unstable.

7 Disconnect the control valve vacuum hose, remove the attaching nuts, and lift the control valve off the engine. See Figure 65.

8 Check the control valve for visible wear or damage. Clean the base of the valve with a wire brush and compressed air. Check the intake

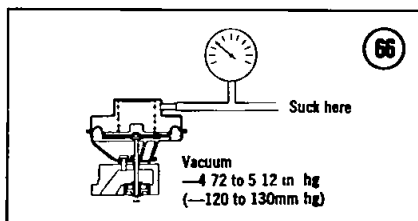
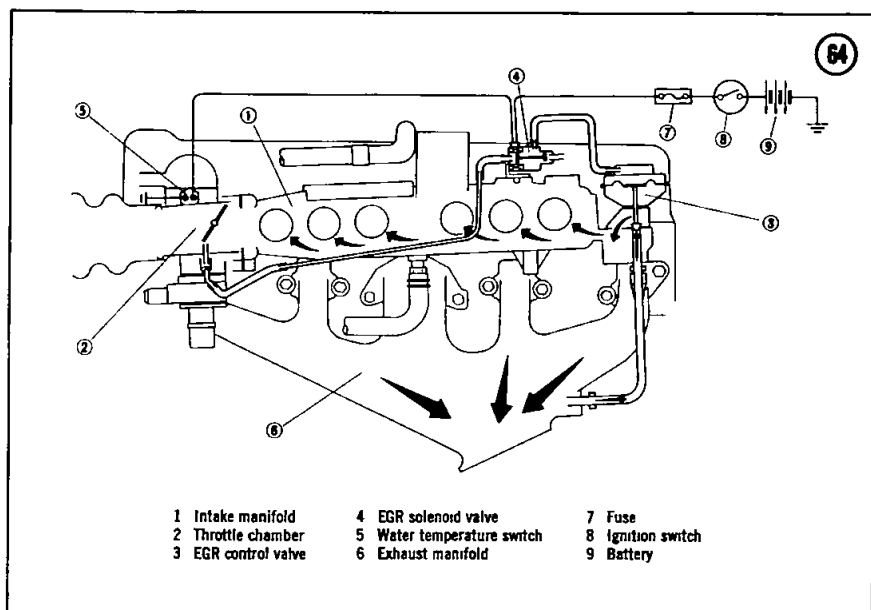


manifold passage for excessive carbon buildup. Clean the passage if necessary.

9 Connect a vacuum gauge to the control valve, using a T-fitting as shown in Figure 66. Suck on the end of the tube and note the gauge reading. The valve shaft should rise at approximately 5 in. vacuum, then stay up for more than 30 seconds after vacuum is released. If not, replace it.

THROTTLE OPENER

This device is used on 240Z's, manual transmission 260Z's, 1200's, and manual transmission 1975 and later B210's. It opens the throttle valve(s) slightly when the engine is



decelerating This allows air-fuel mixture into the engine, extending combustion time to minimize unburned hydrocarbons in the exhaust

An improperly adjusted throttle opener can cause engine speed to drop too slowly during deceleration. Adjustment is complex and seldom necessary. Take the job to a dealer or other competent shop.

BOOST CONTROLLED DECELERATION DEVICE

Like the throttle opener, this device allows additional fuel mixture into the engine during

deceleration. The lengthened combustion time reduces unburned hydrocarbons in the exhaust.

The device is used on 1972 and later 510's, 610's, 710's, and pickups, as well as the 280Z. Improper adjustment can cause a slow return to idle speed, or a fast or rough idle. Adjustment should be left to a dealer or other competent mechanic.

EVAPORATIVE EMISSION CONTROL SYSTEM

This system is designed to prevent gasoline vapor from escaping into the atmosphere. It is used on all 1970 and later California vehicles, and on all non-California models built after May, 1970. The only regular maintenance is replacement of the carbon canister filter on 260Z's and all 1975 and later models. This is described in Chapter Two. A leaky system may cause gasoline fumes around the car. A clogged system may cause fuel starvation or a deformed fuel tank. If these symptoms occur, have the system tested by a Datsun dealer or certified emission control station.

CHAPTER SIX

COOLING SYSTEM

Cooling systems on all models use a centrifugal water pump to propel coolant through the radiator, engine, and heating system. A pellet-type thermostat controls coolant flow.

Some 1970-1971 510's use clutch type fans. All other models use fluid drive or fixed blade fans.

The 1976 and later 280Z uses a coolant recovery system. A reservoir tank mounted on the radiator support catches any coolant overflow from the radiator.

This chapter includes service procedures for the thermostat, radiator, and water pump. Cooling system flushing procedures are also described.

Figure 1 shows the cooling system for 4-cylinder L-series engines. The 6-cylinder cooling system is similar. **Figure 2** shows the A12 cooling system. The A13 and A14 system is the same, except for the front fitting on the left heater hose. **Figure 3** shows the J13 cooling system.

COOLING SYSTEM FLUSHING

The recommended coolant for all models is a 50/50 mixture of ethylene glycol-based antifreeze and water. This protects the system to -31°F (-35°C). The system should be drained, flushed with clean water, and refilled at in-

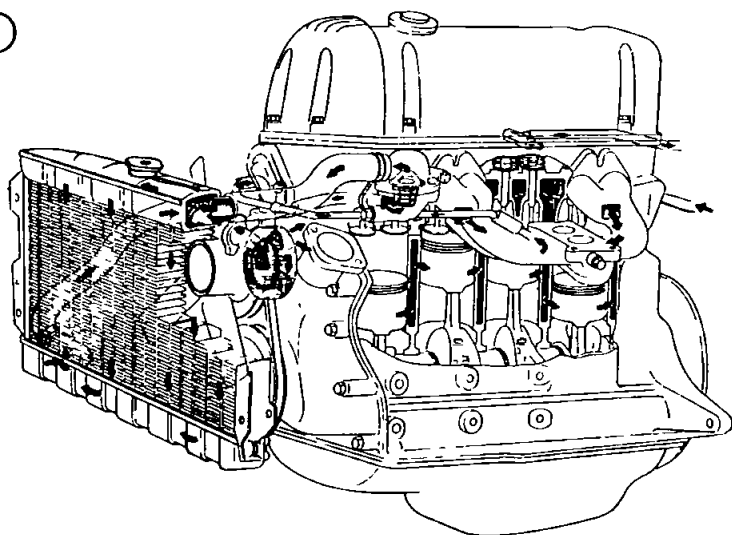
tervals specified in Chapter Two. If desired, a chemical flushing agent may be used, following manufacturer's instructions, prior to the flushing method described here. However, make sure the flushing agent is compatible with the aluminum parts in the engine before using.

Flushing

Refer to **Figure 1, 2, or 3**

- 1 Drain the cooling system by opening the drain tap at the bottom of the radiator. Do not remove the drain plug from the left side of the engine block (L-series and A-series) or open the tap on the right side (J13).
- 2 Remove the radiator cap.
- 3 Disconnect the heater hose from the connection at the rear of the engine. The hose will be a drain during flushing.
- 4 Turn the heater control on the instrument panel to maximum.
- 5 Remove the thermostat as described under *Thermostat Removal and Testing* later in this chapter. Temporarily reinstall the water outlet elbow without the thermostat.
- 6 Connect a water supply such as a garden hose to the fitting from which the heater hose was disconnected. This does not have to be a positive fit, as long as most of the water enters

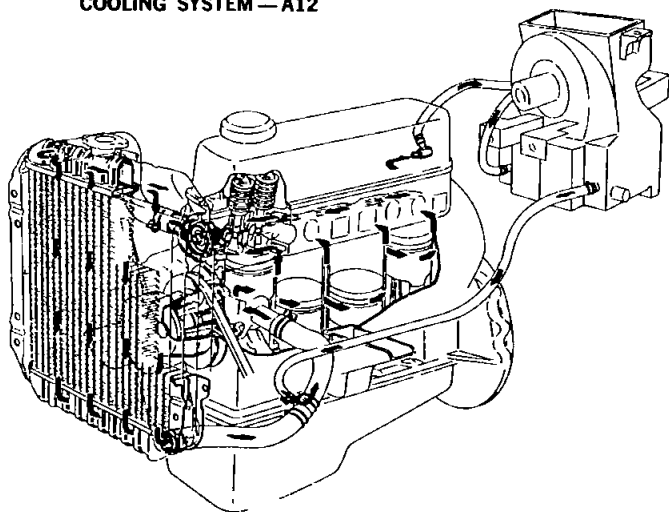
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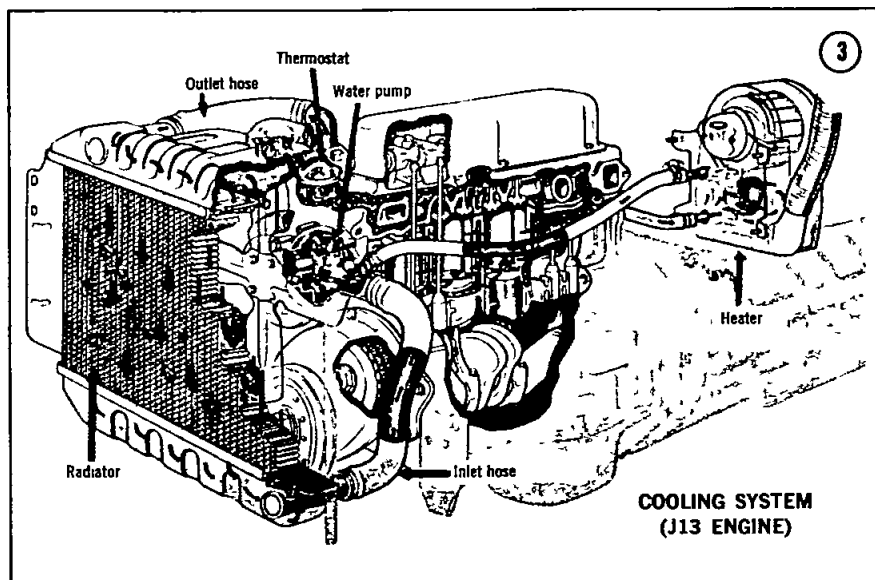


COOLING SYSTEM — 4-CYLINDER L-SERIES

②

COOLING SYSTEM — A12





the engine. If necessary, temporarily connect a length of heater hose to the fitting to make the garden hose connection more convenient.

7 Turn the water on and flush for 3 to 5 minutes. Do not run the engine. During the last minute of flushing, repeatedly squeeze the upper radiator hose to expel all trapped coolant.

8 Turn off the water and reconnect the heater hose to the engine.

9 Drain the entire system by opening the radiator drain tap. On L-series and A-series engines, also remove the threaded plug from the left side of the cylinder block; on J13 engines, open the tap on the right side of the block.

Refilling

1 Be sure all hoses are connected, and all drains closed.

2 Fill the cooling system with a 50/50 mixture of ethylene glycol-based anti-freeze and water, even if you live in climate which doesn't require this degree of freeze protection. The anti-freeze is also a good corrosion inhibitor. Coolant capacity is given in Table 1.

Table 1 APPROXIMATE COOLANT CAPACITY

	Quarts	Liters
1200, 1974 B210	5 ³ / ₁₆	4.9
1975 and later B210		
Manual transmission	6 ¹ / ₄	5.9
Automatic transmission	6	5.7
510	7 ¹ / ₄	6.8
1973 610	6 ⁷ / ₈	6.5
1974 and later 610	7 ¹ / ₄	6.8
1974 710	6 ⁷ / ₈	6.5
1975 and later 710	7 ¹ / ₄	6.8
521 pickup		
J13 engine	7	6.6
L16 engine	7 ¹ / ₄	6.8
610 pickup		
1972-1974	6 ³ / ₈	6.0
1975 and later		
manual transmission	8 ¹ / ₄	7.8
1975 and later		
automatic transmission	8 ¹ / ₂	8.0
Z sports car		
1970-1973	10 ¹ / ₂	9.9
1974-1975	10	9.4
1976	11	10.4

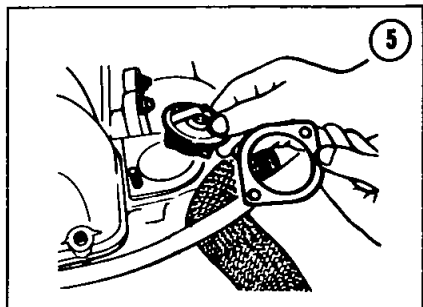
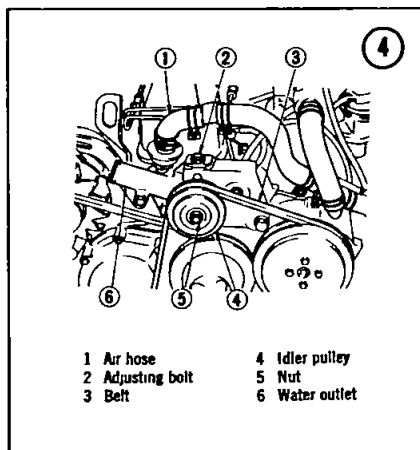
- 3 When system is full, replace radiator cap
- 4 Run the engine at a fast idle and recheck coolant level in the radiator. Top up if more than one inch below the filler neck. Also check the system for leaks.
- 5 After driving several miles, recheck the coolant level. It takes some time for all the air to be removed from the system.

THERMOSTAT

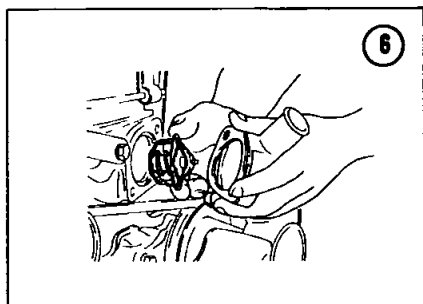
When the engine is cold, the thermostat blocks coolant flow to the radiator, thus speeding engine warm-up. When the engine is warm, the thermostat opens, allowing coolant to circulate through the radiator.

Removal and Testing

- 1 Make sure the engine is cool enough to touch before starting this procedure.
- 2 Drain approximately $\frac{1}{2}$ gallon of coolant from the radiator. If the coolant is good, drain it into a clean container and reuse it.
- 3 On 1975 and later B210's, disconnect the air hose (1, Figure 4) from the check valve. Loosen the idler pulley nut (5) and adjusting bolt (2). Then remove the idler pulley bracket from the engine.



- 4 Remove the water outlet elbow and take out the thermostat. Figure 5 shows the L-series.



- 5 Submerge the thermostat in water with a thermometer.

- 6 Heat the water until the thermostat just begins to open, then check the water temperature. Compare with specifications (Table 2). If the valve opens at the wrong temperature or fails to open, replace the thermostat.

Table 2 THERMOSTAT OPENING TEMPERATURES*

Engine Model	Degrees F	Degrees C
A12 A13 L16 L18 L20B L24	180	82
L26 L28		
Standard	180	82
For cold areas	190	88
For tropical areas	170	76.5
J13		
Standard	170	76.5
For cold areas	180	82

* Actual opening temperature may vary slightly from that shown. This does not indicate a defective thermostat.

design. The J13 is similar, but is secured by 3 nuts. Figure 6 shows the A-series elbow.

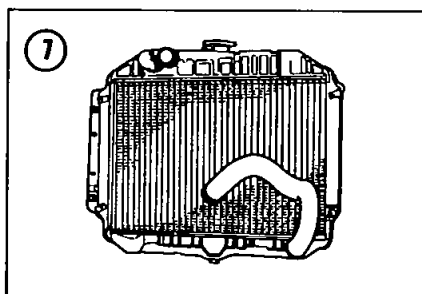
7 On L-series and A-series engines, measure the maximum lift of the thermostat valve. To do this, mark a screwdriver at a point 0.315 in (8mm) from the tip. The screwdriver is used as a measuring device. Heat the water to specified opening temperature and measure the lift of the valve with the marked screwdriver. If valve lift is less than 0.315 in (8mm), replace thermostat.

Installation

- 1 If a new thermostat is being installed, test before installation as described in the previous procedure.
- 2 Install the thermostat in its housing.
- 3 Install the water outlet elbow, using a new gasket coated on both sides with gasket sealer.
- 4 Tighten the outlet elbow securing nuts or bolts. Reconnect the hose to the elbow.
- 5 On 1975 and later B210's, reinstall the idler pulley bracket and connect the air hose to the check valve. Adjust belt tension as described in Chapter Two.
- 6 Top up coolant. Drive several miles and check for leaks. Recheck coolant level and top up as needed.

RADIATOR

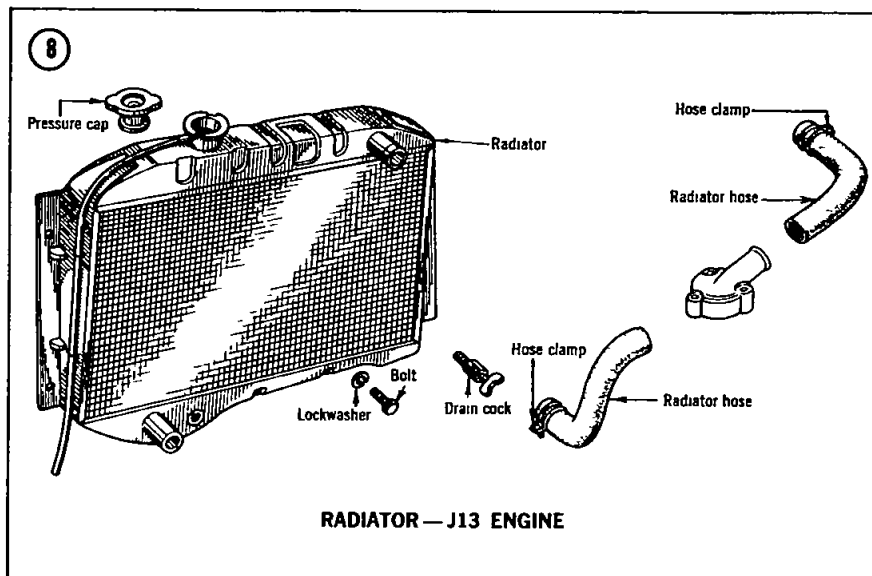
Figure 7 shows an L-series radiator. The A-series version is similar, but the inlet and outlet hoses are on the opposite sides. Figure 8 shows the J13 radiator.



- 1 Remove the radiator cap. Drain coolant by opening the tap at the bottom of the radiator.

CAUTION

Coolant can stain concrete and injure plants. Park the vehicle where it can drain freely, or place a container beneath the radiator.



RADIATOR — J13 ENGINE

2 Disconnect the upper and lower hoses from the radiator. On automatic transmission vehicles (except 1200 and 1974 B210), disconnect the transmission fluid cooler lines from the bottom of the radiator.

3 Remove the fan shroud (if so equipped). On Z sports cars, only the bottom half of the shroud need be removed.

4 If necessary, remove the grille to gain access to the radiator bolts.

5 Remove the radiator bolts. Lift the radiator up and out.

6 Install by reversing Steps 1-5. Fill the radiator with a 50/50 mixture of ethylene glycol-based anti-freeze and water. Run the engine and check for leaks.

WATER PUMP

L-series and A-series engines use an aluminum-bodied, non-repairable water pump. On 610's, 710's, and pickups with fluid drive fans, the fan hub is an integral part of the water pump. On Z sports cars, the fan hub is removable, as is the fan clutch used on some 1970-1971 510's.

J13 water pumps are repairable, but it is usually more practical for the home mechanic to buy a rebuilt unit.

Removal/Installation

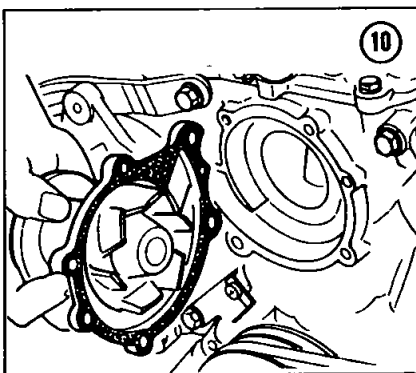
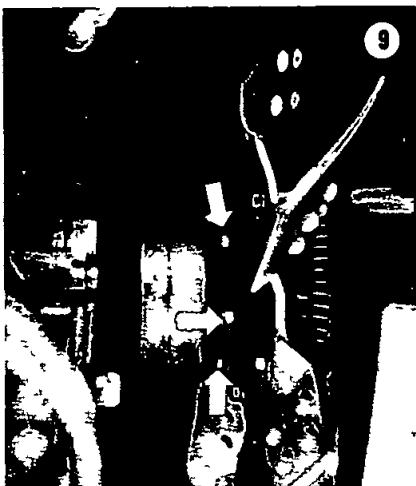
1 Remove the radiator as described earlier.

2 On all except Z sports cars, remove 4 fan securing bolts and take the fan off. Remove the fan pulley (fixed-blade and clutch-type fans) and fan clutch (if so equipped). On vehicles with fluid drive fans, the fan hub and pulley are not removable.

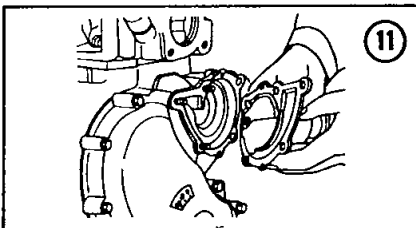
3 On Z sports cars, remove the fan pulley securing nuts (Figure 9). Take off the fan, hub, and pulley.

4 Undo the water pump securing bolts and remove the pump. Figure 10 shows an L-series water pump being removed, Figure 11 shows an A-series pump. The J13 water pump is removed in the same manner.

NOTE Inspect the water pump after removal. Replace it if the vanes are badly corroded.



5 Installation is the reverse of these steps. Use a new gasket, coated on both sides with gasket sealer.



CHAPTER SEVEN

ELECTRICAL SYSTEM

All models use a 12-volt battery, negative ground, and a 3-phase alternator. This chapter includes service procedures for the battery, starter, charging system, lighting system, ignition system, fuses, and windshield wipers.

BATTERY

Care and Inspection

- 1 Disconnect both battery cables and remove the battery.
- 2 Clean the top of the battery with a baking soda and water solution. Scrub with a stiff bristle brush. Wipe battery clean with a soft cloth moistened in ammonia or baking soda solution.

CAUTION

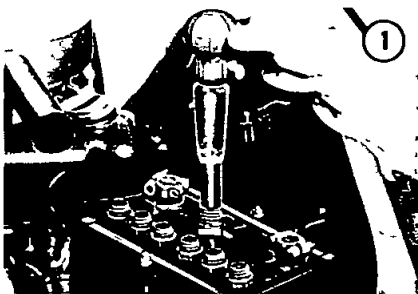
Keep cleaning solution out of battery cells or the electrolyte will be seriously weakened.

- 3 Clean battery terminals with a stiff wire brush or one of the many tools made for this purpose.
- 4 Examine entire battery case for cracks.
- 5 Install the battery and reconnect the cables. Be sure the cables are connected to the proper terminals.
- 6 Coat the battery connections with light mineral grease or Vaseline.

- 7 Check electrolyte level and top up with distilled water if necessary.

Testing

Hydrometer testing is the best way to check battery condition. Use a hydrometer with numbered graduations from 1.100 to 1.300, rather than one with just color-coded bands. To use the hydrometer, squeeze the rubber ball, insert the tip in the cell and release the ball (Figure 1).



Draw enough electrolyte to float the weighted float inside the hydrometer. Note the number in line with the surface of the electrolyte. This is the specific gravity for the cell. Re-

turn the electrolyte to the cell from which it came

The specific gravity of the electrolyte in each battery cell is an excellent indicator of that cell's condition. A fully charged cell will read from 1.240 to 1.260 at 68°F (20°C). If the cells test below 1.200, the battery must be recharged. Recharging is also necessary if the specific gravity varies more than 0.025 from cell to cell. **Table 1** converts specific gravity readings into charge percentages.

CAUTION

Battery electrolyte must be fully topped up and the negative battery cable disconnected before charging. Keep electrolyte temperature below 113°F during charging.

The hydrometer, together with **Table 1**, can be used to check the progress of the charging operation.

ALTERNATOR

The alternator generates 3-phase alternating current in the armature coils. Silicon diodes act as one-way valves for the alternating current, letting only charging current through. In this manner, the AC is converted to DC. Early models of all vehicles except the 1200 use 6 removable diodes, mounted in positive and negative heat sinks (**Figure 2**). The 1200's and late models of other Datsuns use a one-piece diode assembly (**Figure 3**).

Alternator Output Test

This test requires a 30-volt voltmeter and a fully-charged battery.

- 1 Disconnect the alternator wires.
- 2 Connect the voltmeter positive lead to the alternator "N" terminal. Connect the negative lead to ground. The voltmeter must indicate battery voltage.
- 3 Set up the test circuit shown in **Figure 4**.
- 4 Start the engine. Gradually increase engine speed to 1,100 rpm, then note voltmeter reading.

CAUTION

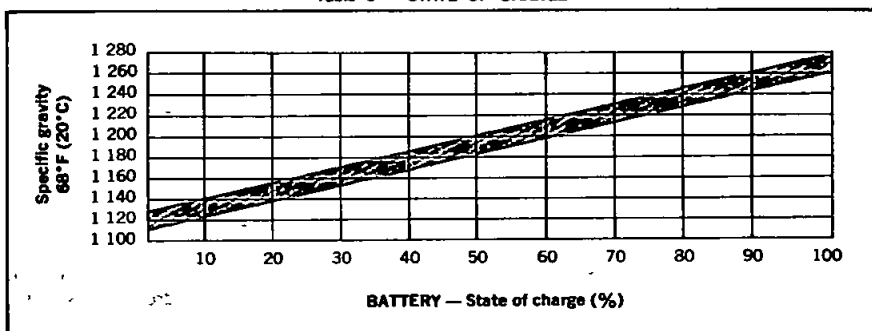
Do not run the engine at speeds above 1,100 rpm. Do not race the engine.

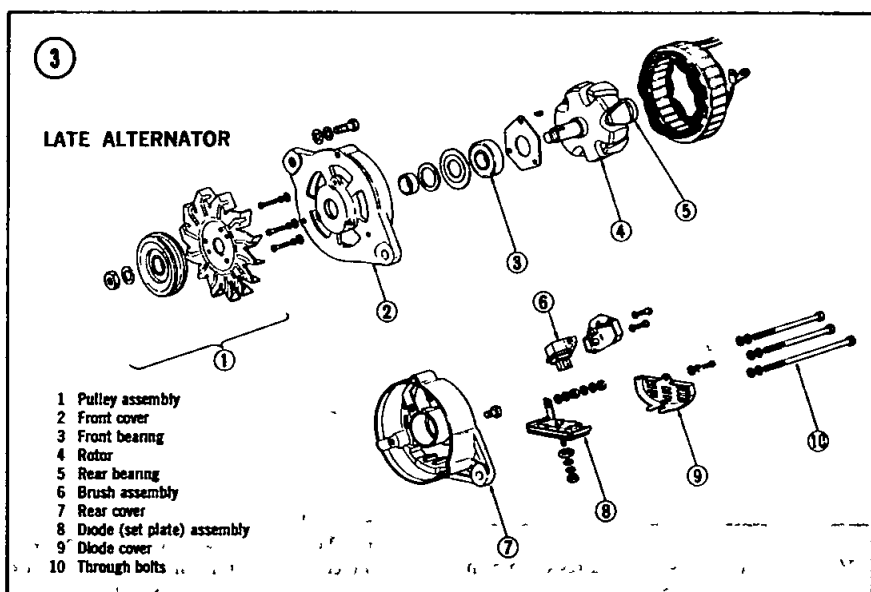
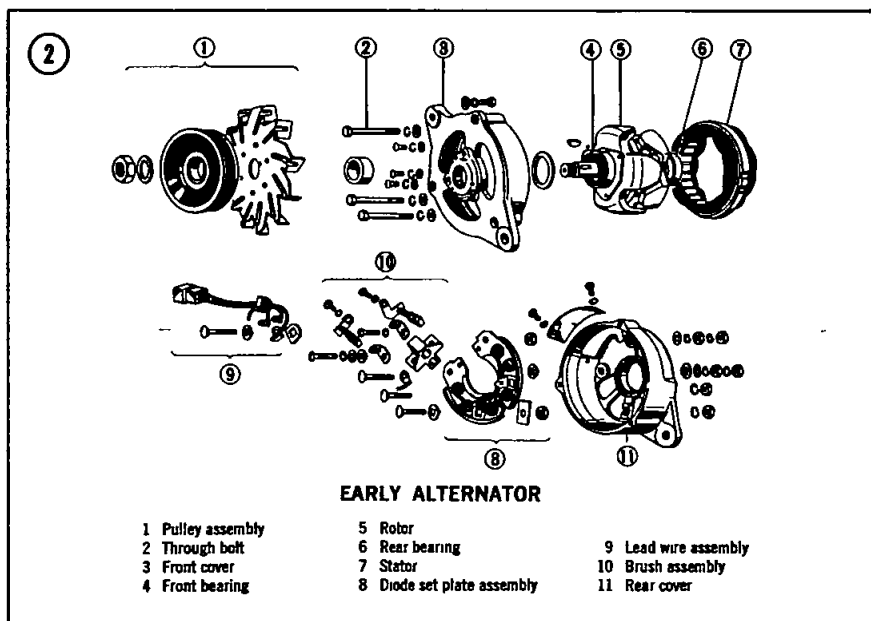
The voltmeter should indicate 12.5 volts or more. If the reading is low, the alternator is defective.

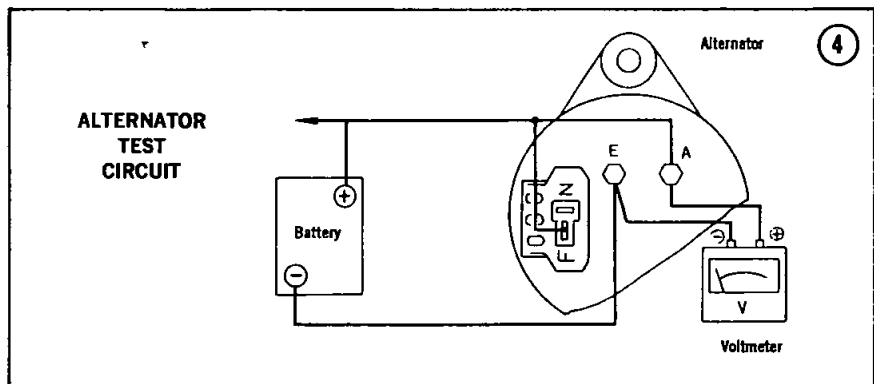
Alternator Removal/Installation

- 1 Disconnect the negative battery cable.
- 2 Detach the electrical connector from the alternator. Label and detach the single wires.
- 3 Loosen the alternator mounting bolts and remove the fan belt from the alternator pulley.
- 4 Remove the alternator mounting bolts and take the alternator out.
- 5 Installation is the reverse of these steps. After installation, adjust fan belt tension as described in Chapter Two.

Table 1 STATE OF CHARGE





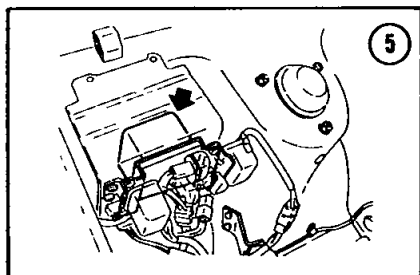


Alternator Disassembly

Alternator disassembly and testing require specialized equipment and skills. While disassembly is possible, it is generally more practical for the home mechanic to have the alternator serviced by a Datsun dealer or automotive electrical shop. If you wish to overhaul the alternator, refer to Figure 2 or 3.

VOLTAGE REGULATOR

On 1200's, the voltage regulator is mounted on the left-hand strut housing. On 1974 B210's, 510's, 1973 610's, Z sports cars, and pickups, the regulator is mounted on the right-hand engine compartment sidewall. On 1974 610's and 710's, and 1975 and later B210's, the regulator is mounted on the relay bracket forward of the right-hand strut housing (Figure 5).



Voltage regulator testing requires equipment not usually possessed by the home mechanic.

Take the job to a Datsun dealer or other competent garage. Some regulator problems can be corrected by adjustment. However, the cost should be compared to the price of a new regulator before choosing a course of action.

Removal/Installation

To remove, disconnect the wiring connector from the regulator and remove 2 attaching screws. Install in the reverse order.

STARTER

Datsuns use one of 2 starter designs. The first type (Figure 6) is used on the following models:

- a 1200
- b 1974 B210
- c 510, 610, 710, and pickup through 1974
- d All manual transmission Z sports cars
- e Automatic transmission 240Z's through 1972

The second type (Figure 7) is used on the following:

- a 1975 and later B210, 610, 710, and pickup
- b 1973 and later automatic transmission Z sports car

Removal/Installation

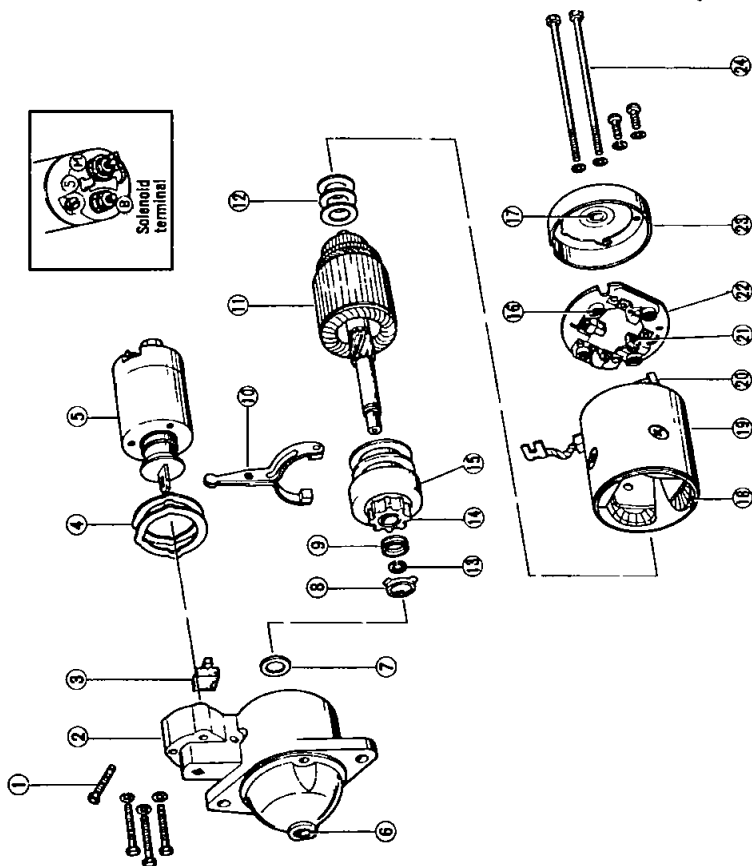
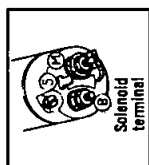
- 1 Disconnect the negative cable from the battery.
- 2 Disconnect the thin wire from the starter solenoid (Figure 8). Disconnect the thick wire that connects to a wiring harness (not the thick wire that connects to the starter body).

6

STARTER

(See text for application)

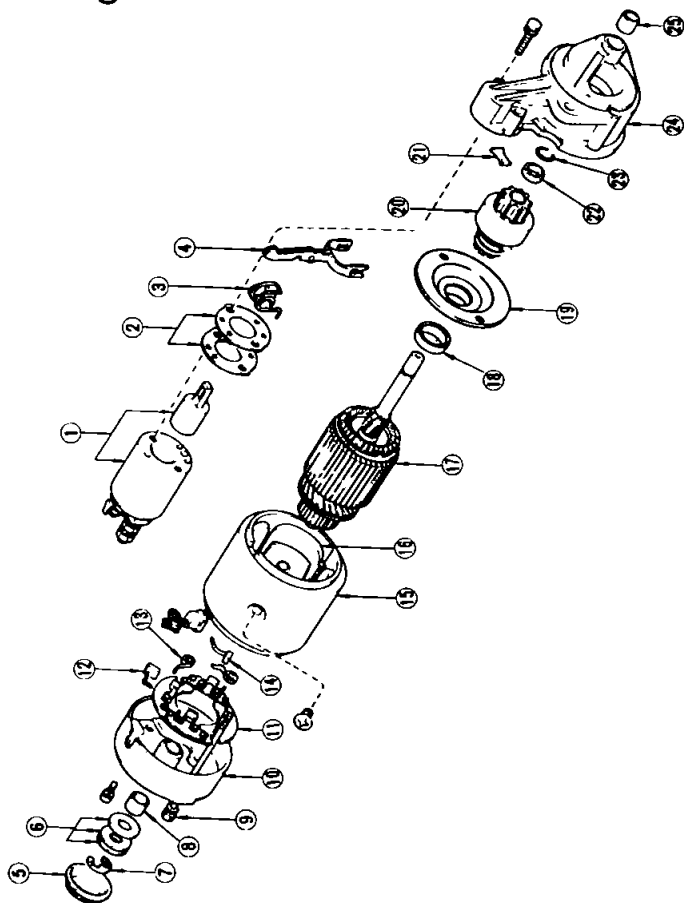
- 1 Shift lever pin
- 2 Gear case
- 3 Dust cover
- 4 Dust cover
- 5 Magnetic switch assembly
- 6 Bushing
- 7 Thrust washer
- 8 Stopper washer
- 9 Pinion stopper
- 10 Shift lever
- 11 Armature
- 12 Thrust washer
- 13 Stopper clip
- 14 Pinion
- 15 Overrunning clutch
- 16 Brush spring
- 17 Bushing
- 18 Field coil
- 19 Yoke
- 20 Brush (positive)
- 21 Brush (negative)
- 22 Brush holder assembly
- 23 Rear cover
- 24 Through bolt

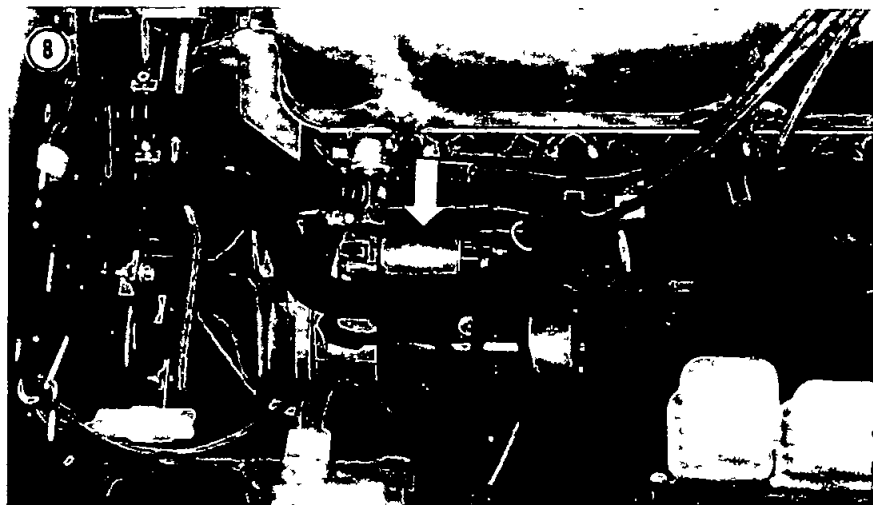


STARTER

(See text for application)

- 1 Magnetic switch assembly
- 2 Dust cover (adjusting washer)
- 3 Torsion spring
- 4 Shift lever
- 5 Dust cover
- 6 Thrust washer
- 7 E ring
- 8 Rear cover metal
- 9 Through bolt
- 10 Rear cover
- 11 Brush holder assembly
- 12 Brush (—)
- 13 Brush spring
- 14 Brush (+)
- 15 Yoke
- 16 Field coil assembly
- 17 Armature assembly
- 18 Center bearing
- 19 Center bracket
- 20 Pinion assembly
- 21 Dust cover
- 22 Pinion stopper
- 23 Stopper clip
- 24 Gearcase
- 25 Gearcase metal





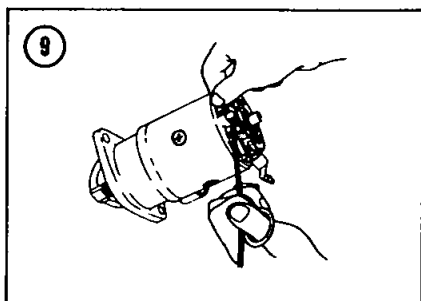
- 3 Remove 2 starter securing bolts Pull the starter forward until it is clear, then lift it out
- 4 Install by reversing Steps 1-3

Solenoid Replacement

- 1 Remove the starter as described earlier
- 2 Disconnect the wire running from the solenoid to the starter
- 3 Remove 3 solenoid attaching bolts
- 4 Unhook the solenoid plunger from the shift lever inside the starter Lift the solenoid off
- 5 Installation is the reverse of these steps

Brush Replacement

- 1 Remove the starter as described earlier
- 2 On second type starters, remove the dust cover, snap ring, and thrust washers from the starter front end
- 3 Remove 2 through bolts and 2 setscrews, then take off the end cover
- 4 Make a wire hook and pull back the brush springs (Figure 9) Slide the brushes out of their slots
- 5 Measure brush length Compare with Table 2 Replace brushes if worn below the minimum Always replace brushes in full sets



- 6 Check brush movement in the slots Clean the slots and brushes if the movement is not smooth Examine brush springs Replace if weak or damaged
- 7 Check the brush holder for shorts to ground with an ohmmeter or self-powered test lamp Touch one tester lead to the brush holder and the other to the positive brush slots If the ohmmeter shows continuity (test lamp lights), a short circuit exists Replace brush holder
- 8 Install brushes by reversing Steps 1-4

CAUTION

Use resin core solder when resoldering brush leads Do not use acid core solder

Table 2 STARTER BRUSH LENGTH

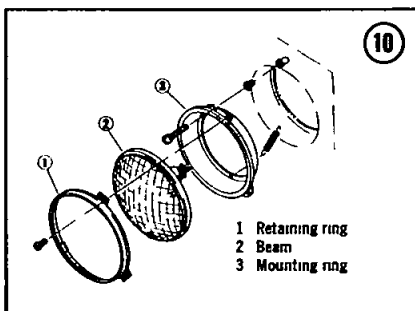
	inches	mm
All 1200, 1974 B210		
Manual transmission	0.256	6.5
Automatic transmission	0.18	4.5
1975 and later B210	0.472	12
All 510, 1973-1974		
610 1974 710,	0.492	12.5
1968-1974 pickup		
1975 and later 610,	0.472	12
710, pickup		
Z sports car		
1973 and later		
automatic transmission	0.472	12
All others	0.492	12.5

LIGHTING SYSTEM

Headlight Replacement (1200 and B210)

Refer to Figure 10 for this procedure

- 1 Working in the engine compartment, disconnect the headlight wires



- 2 On 1200 coupes and B210's, remove the radiator grille. This is not necessary on 1200 sedans

- 3 Remove 3 headlight rim securing screws and take the headlight rim off

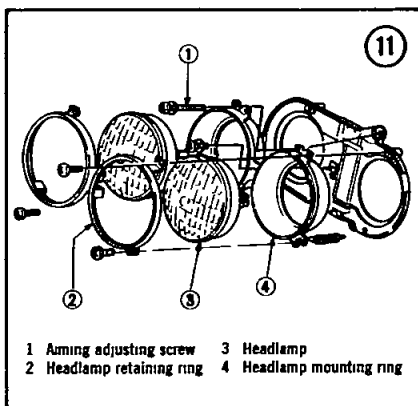
- 4 Loosen the retaining ring screws. Rotate the retaining ring clockwise and remove it. The bulb can then be taken out

- 5 Installation is the reverse of these steps. Be sure the TOP mark on the headlight bulb is positioned correctly. After installation, have headlights adjusted according to local regulations

Headlight Replacement (510, 610, 710, and Pickup)

Refer to Figure 11 for this procedure

- 1 On cars and 620 pickups, remove the radiator grille. On 521 pickups, remove the headlight trim piece



- 2 On 521 pickups, reach inside the fender and disconnect the headlight wires

- 3 On 610's, disconnect side marker light wires

- 4 Loosen 3 screws securing the headlight retaining ring. Rotate the ring clockwise and take it off

- 5 Take the bulb out of its socket. On cars and 620 pickups, disconnect the wires

- 6 Installation is the reverse of these steps. The 3 locating tabs in the bulb fit into the indentations in the mounting ring. Be sure the word TOP (molded in the lens) is up

- 7 After installation, have headlights adjusted according to local traffic regulations

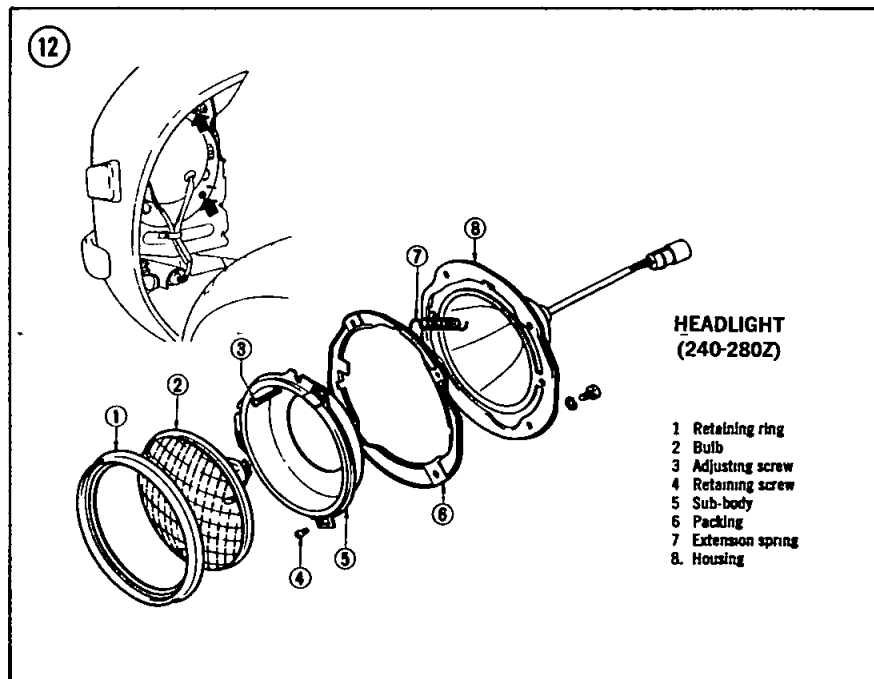
Headlight Replacement (Z Sports Car)

Refer to Figure 12 for this procedure

- 1 Working inside the wheel well, remove 4 installation screws

- 2 Remove headlight assembly from body

- 3 Loosen 3 screws securing the headlight retaining ring. Turn the retaining ring clockwise and take it off



4 Take the headlight bulb far enough out of the socket to unplug the headlight wires, then remove the bulb

5 Install in the reverse order. Have headlights adjusted according to local traffic regulations

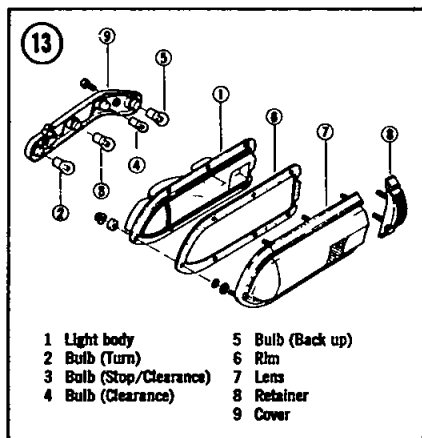
Rear Combination Lights (1200, B210)

1 On 1200's and B210 coupes, turn the bulb socket counterclockwise and remove it from the taillight body. Push the bulb into the socket and turn counterclockwise to remove. Install in the reverse order.

2 On B210 sedans, remove the bulb holder (9, Figure 13). Push the bulb into the holder, turn counterclockwise, and remove. Install in the reverse order.

Rear Combination Lights (510, 610, 710, and Pickups)

1 To replace bulbs on sedans and pickup trucks, turn the bulb socket counterclockwise



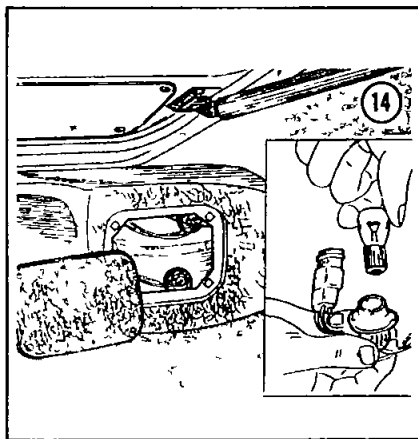
and remove it from the lamp body. Push the bulb into the socket, turn counterclockwise, and remove. Install in the reverse order.

2 To replace bulbs on station wagons, remove the lens securing screws and lens. Push the bulb into the socket, turn counterclockwise, and remove. Install in the reverse order.

3 On 710 station wagons, remove 3 screws and take off the lens. Then turn the bulb socket counterclockwise and remove it from the lamp body. Push the bulb into the socket and turn counterclockwise to remove. Install in the reverse order.

Rear Combination Light (Z Sports Car)

Remove the rear interior trim panel to expose the lamp assembly (Figure 14). Remove the bulb socket, then press the bulb into the socket and turn counterclockwise to remove. Install in the reverse order.



Side Marker Lights and Front Combination Lights

1 On all except 240-260Z front combination lights, remove the lens securing screws and take off the lens. Push the bulb into the socket and turn counterclockwise to remove. Install in the reverse order.

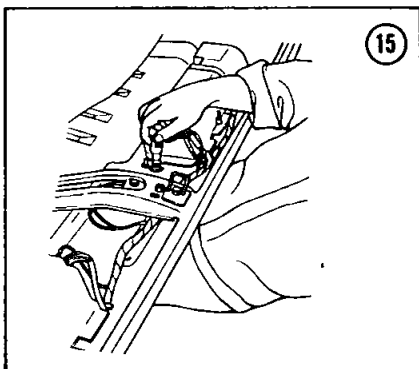
2 On 240-260Z front combination lights, reach inside the fender and turn the bulb socket counterclockwise to remove it. Press the bulb into its socket and turn counterclockwise to remove. Install in the reverse order.

License Plate Light

1 1200, 510, 610 hardtop and station wagon, 710 sedan and hardtop — Remove the lens securing screws and lens. Press the bulb into the socket and turn counterclockwise to remove. Install in the reverse order.

2 B210 — Remove 2 screws and take off the bulb cover. Press the bulb into the socket and turn counterclockwise to remove. Install in the reverse order.

3 610 sedan — Open the trunk. Turn the bulb socket counterclockwise and remove. See Figure 15. Push the bulb into the socket and turn counterclockwise to remove. Install in the reverse order.



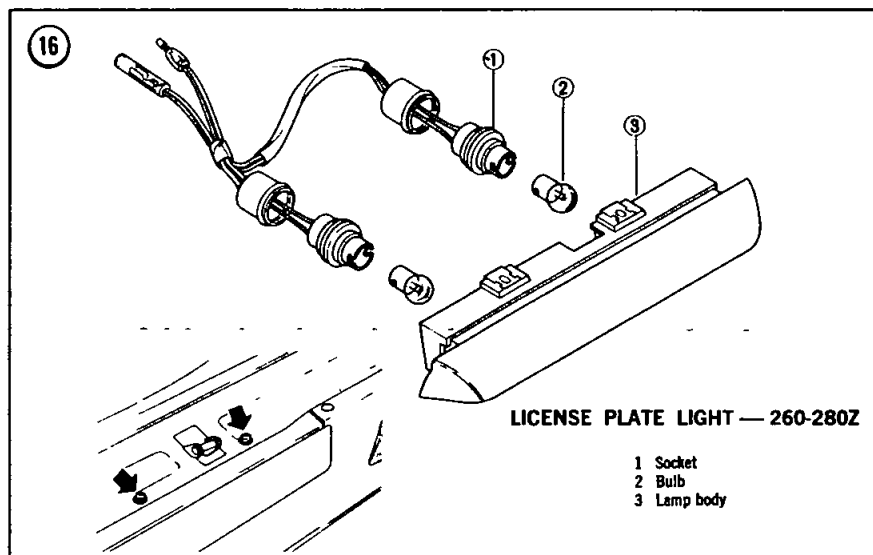
4 710 wagon — Remove 2 screws and take off the lens(es). Push the bulb(s) in, turn counterclockwise, and pull out. Install in the reverse order.

5 240Z — Remove 3 screws and take off the light cover. Press the bulb into the socket and turn counterclockwise to remove. Install in the reverse order.

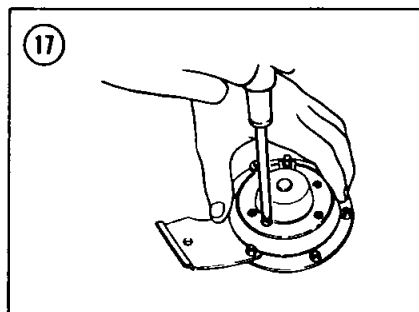
6 260-280Z — Remove 2 screws securing the light body and take it out (Figure 16). Push the bulb socket in, turn counterclockwise, and remove the socket. Press the bulb into the socket and turn counterclockwise to remove.

HORN

All models use 2 horns, mounted at the front of the engine compartment. If the horns work,



but are not loud enough, make sure the wires are making good contact and the horns are properly grounded to the body. Horn volume can be adjusted by turning the screw at the back of the horn (Figure 17).



If only one horn works, check the wiring to the non-working horn. If the horn is receiving current and is grounded properly, it is probably defective.

If neither horn works, check the horn fuse, then the battery. If they are good, connect a jumper wire between the horn relay "H" and

"B" terminals. If the horn sounds, the relay is probably defective. Replace it as described later.

If the horn still doesn't work, ground the relay "S" terminal with a jumper wire. If the horn sounds, the horn switch (horn button) is probably defective, have it tested by a dealer or an electrical shop.

Horn Relay Replacement

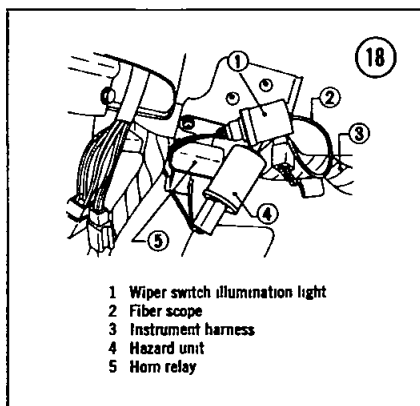
The 1200 and B210 horn relays are located under the instrument panel. Figure 18 shows the B210 horn relay. The 1200 installation is similar.

On 510's, the horn relay is located at the left rear corner of the engine compartment. It can be identified by its wire colors, green, green-and-yellow, and green-and-black.

On 1973-1974 610's and 710's, the horn relay is mounted on the bracket forward of the right-hand strut housing (Figure 19).

On 1975 and later 610's and 710's, the relay is on the same bracket, but in a different location (Figure 20).

On 521 pickups, the horn relay is mounted on the right-hand side of the engine compartment.



On early 240Z's, the horn relay is located above the hood release handle, on the left-hand side of the driver footwell. On late 240Z's and 260Z's, the horn relay is mounted on a bracket at the right-hand side of the passenger footwell. It can be identified by its wires: green, green-and-red, and green-and-black on 240-260Z's, green-and-white, green-and-red, and green-and-black on 280Z's.

On early models with separate relay wires, disconnect one wire at a time and connect it to the new relay. This ensures that the wires will be connected properly.

On late models with a one-piece wiring connector, simply remove the old relay, install the new one, and attach the wiring connector.

FUSES AND FUSIBLE LINKS

Fuse Replacement

Fuse blocks are located as follows:

1200 and 620 pickup — beneath the instrument panel, to the right of the steering column.

B210 — beneath left end of instrument panel.

510 and 521 pickup — at the right rear corner of the engine compartment.

610, 710, and 260-280Z — on the right-hand side of the passenger footwell.

240Z — beneath the ashtray.

Fuse specifications are printed on the inside or outside of the fuse block cover.

Whenever a fuse blows, find out the cause before replacing. Usually the trouble is a short-circuit in the wiring. This may be caused by worn-through insulation or by a wire that works its way loose and shorts to ground. Carry several spare fuses in the glove compartment.

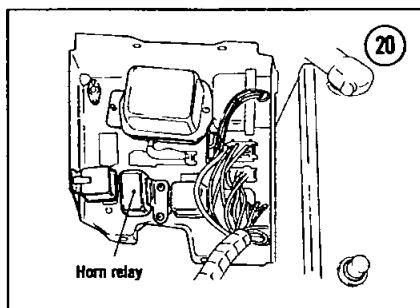
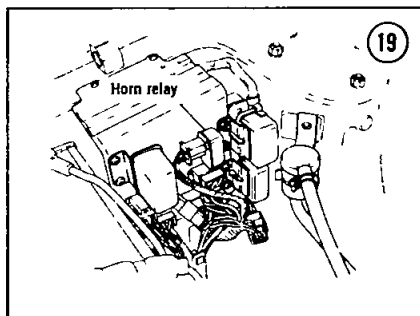
CAUTION

Never substitute tin-foil or wire for a fuse. An overload could cause a fire and complete loss of the vehicle.

Fusible Link Replacement

Fusible links are short sections of thin wire in a larger wire. They are intended to burn out if an overload occurs, thus protecting the wiring harnesses.

Figure 21 shows the 1200 and B210 fusible link. 510 and 620 pickup installations are similar.



It can be identified by its wires, green, green-and-blue, and light green-and-black.

On 620 pickups, the horn relay is mounted on the radiator support. Its wires are colored green, green-and-white, and light green.

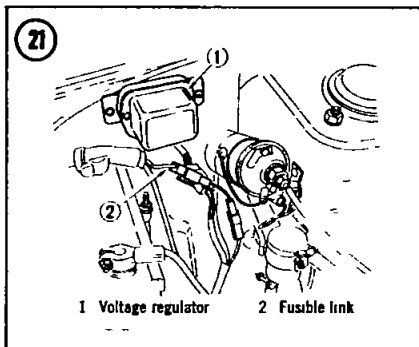
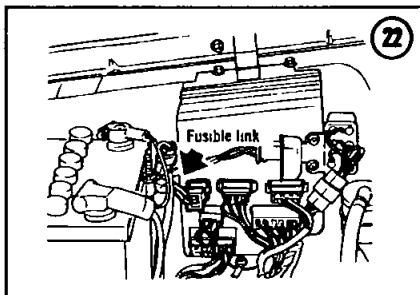


Figure 22 shows the 610 fusible links, Figure 23 shows the 710 links

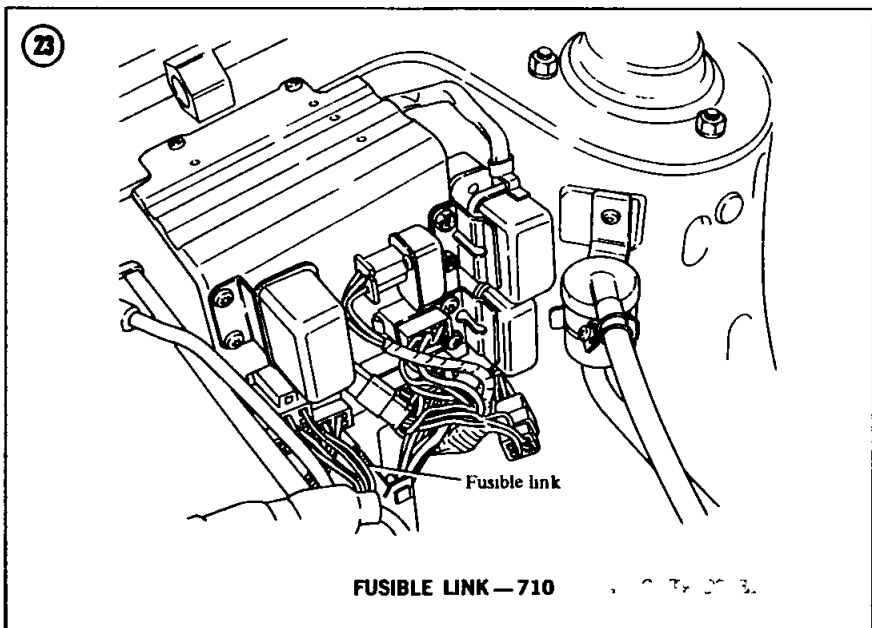
The 240Z uses a single link in the wire running from the starter solenoid "B" terminal. The 260Z uses 2 links in a box at the right rear corner of the engine compartment (Figure 24). The 280Z uses 5 links, 4 in boxes and one in the white wire running from the battery positive terminal. See Figure 25.

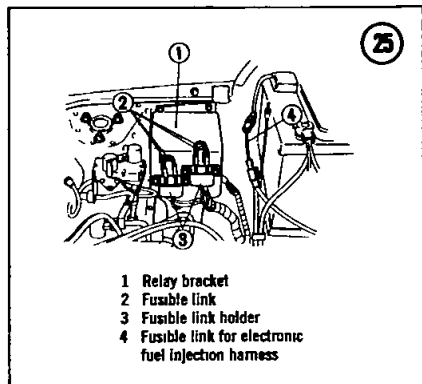
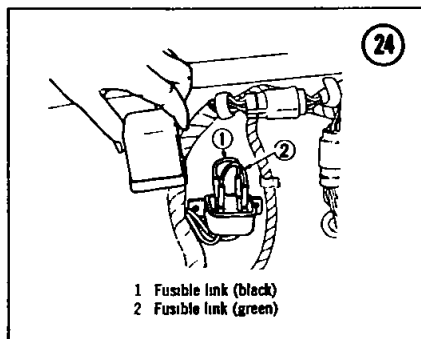


Burned-out fusible links can usually be detected by melted or burned insulation. Suspect fusible links with no apparent damage can be tested for continuity with an ohmmeter or a self-powered test lamp. If a link burns out, unplug it and plug in a new one. Be sure the new fusible link is the same color as the old one.

CAUTION

Never replace a fusible link with one of larger capacity. Never wrap fusible links with tape.





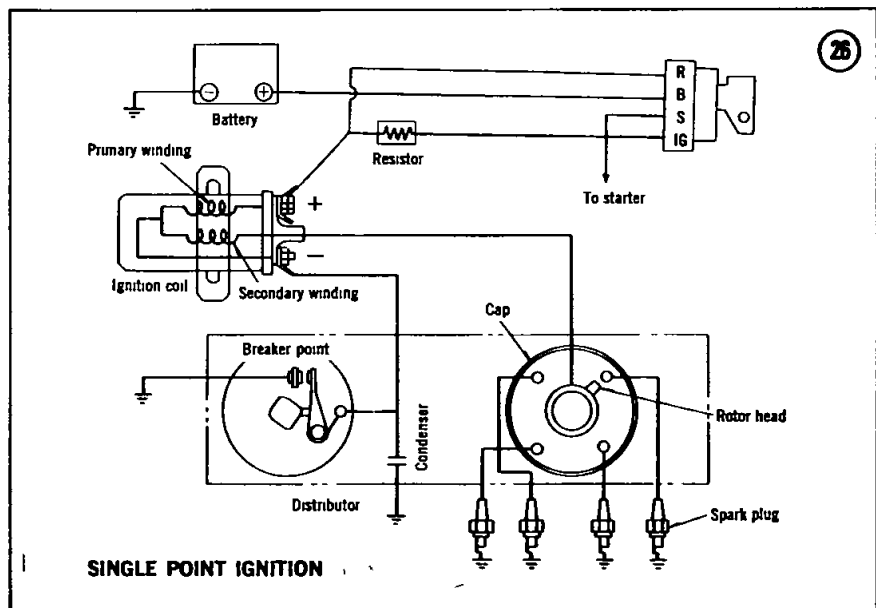
IGNITION SYSTEM

Transistorized breakerless ignition is used on 1975 and later California models (except the 1975 pickup), and all 260-280Z's. All other models use a conventional breaker point system. Some breaker point systems use dual points. Figure 26 shows a single-point system, Figure 27, a dual-point system, and Figure 28, a breakerless system.

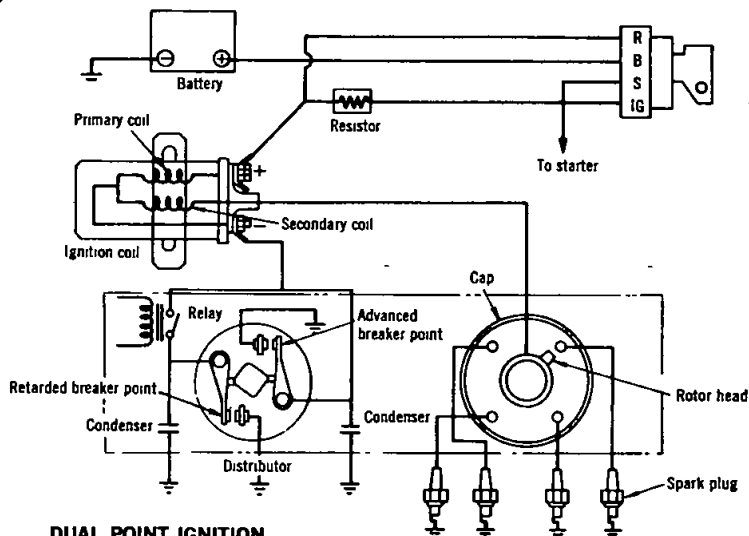
The following sections describe replacement procedures. No ignition components except the distributor are repairable.

Ignition Switch and Steering Lock Replacement

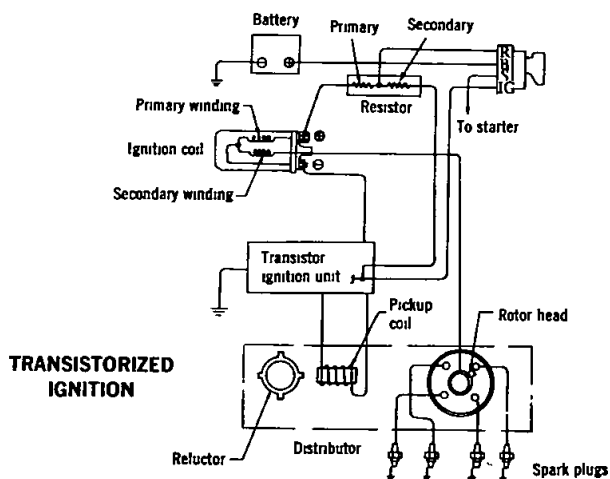
The ignition switch is combined into a unit with the steering lock. The switch itself is



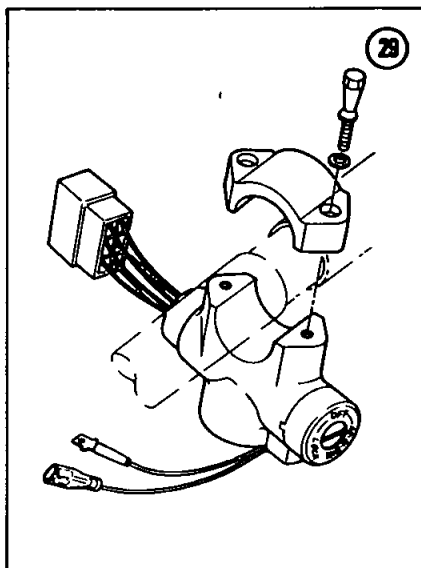
27



28



secured to the lock with a single screw. **Figure 29** shows a typical car ignition switch, **Figure 30** shows a pickup truck switch.

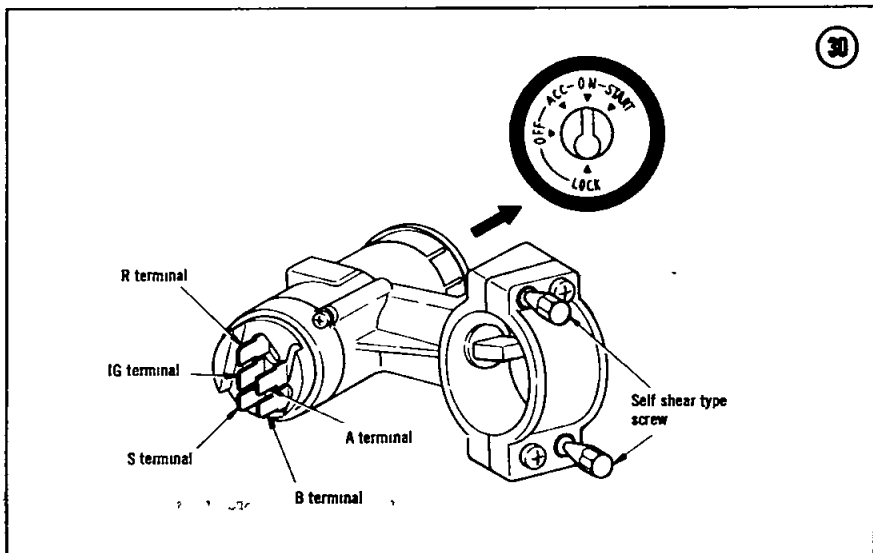


- 1 Remove the steering column shell
- 2 Place ignition key in unlocked position
- 3 Disconnect the ignition switch wiring connector. If equipped with a key warning buzzer, disconnect both of its wires
- 4 Drill out the self-shearing screws and remove them with a screw remover. Remove the 2 plain screws (if used)
- 5 If necessary, remove the screw securing the ignition switch to the steering lock. Take the switch off
- 6 Install in the reverse order. Use new self-shearing screws and tighten them until the heads snap off

Ignition Coil Replacement

On 1200's and 1974 B210's, the ignition coil is mounted forward of the right-hand strut housing. On 1975 and later B210's, the coil is mounted on the relay bracket. On pickups with J13 engines, the coil is mounted at the right rear corner of the engine compartment. On all other models, the coil is mounted on the left side.

The coil and its resistor should be replaced as a matched set. To replace the coil, disconnect



its wires and remove it from its bracket. Install the new coil and resistor and reconnect the wires.

DISTRIBUTOR

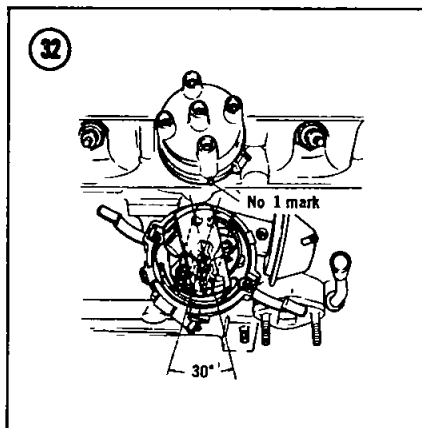
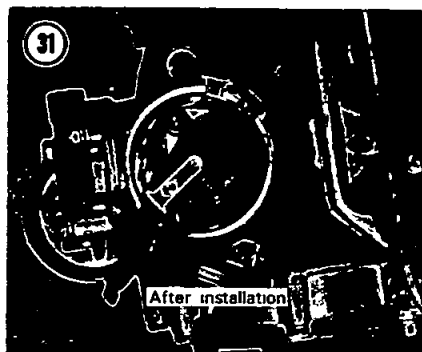
Proper engine operation depends very heavily on distributor advance characteristics. Advance is controlled by centrifugal and vacuum mechanisms, as well as the spark timing control system on some models. Adjustment of the advance mechanisms is critical and requires special test fixtures. Take the job to a Datsun dealer or automotive electrical specialist.

Removal (All Models)

- 1 Disconnect the distributor cap clips and take off the cap.
- 2 Disconnect the primary lead wire(s) from the distributor terminal(s).
- 3 Disconnect the vacuum line from the vacuum advance unit.
- 4 Turn the engine over until No. 1 piston is at top dead center on its compression stroke. This occurs when the 0° timing mark at the front of the engine aligns with the timing pointer, and the distributor rotor points to No. 1 terminal in the distributor cap. Be sure to check rotor position as well as the timing marks, because the 0° mark also lines up when No. 1 cylinder is at TDC on its exhaust stroke.
- 5 To simplify installation, make alignment marks on the distributor body and engine.
- 6 Remove the distributor body setscrew(s). Lift the distributor out of the engine.

Installation (A-Series Engines)

- 1 If the engine was turned over after distributor removal, position No. 1 cylinder at top dead center on its compression stroke. To be sure the cylinder is on its compression stroke, place a finger over the spark plug hole while the engine is being turned. When pressure buildup can be felt, the piston is on its compression stroke.
- 2 Note the position of the distributor rotor in **Figure 31** (1200) or **Figure 32** (B210). This is the position the rotor should be in once the distributor is installed.



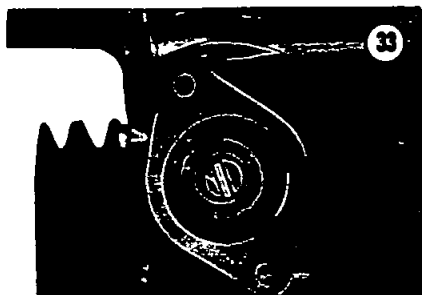
- 3 Hold the distributor over the engine. Turn the rotor clockwise from the installed position approximately 60° (1200) or 30° (B210).
- 4 Insert the distributor until it engages with the camshaft. The rotor should now point toward No. 1 terminal in the distributor cap.
- 5 Install the setscrew and distributor cap. Connect the primary lead to the ignition coil.
- 6 Adjust the ignition timing as described in Chapter Two.

Installation (L-Series and J13 Engines)

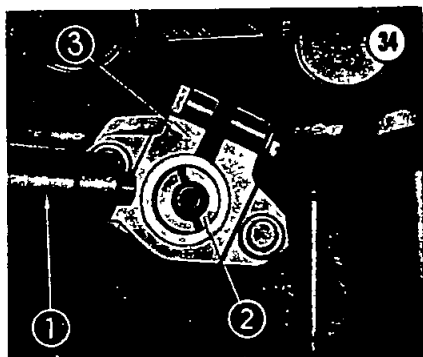
- 1 If the engine was turned over after distributor removal, place No. 1 piston at top dead center on its compression stroke. To be

sure the piston is on its compression stroke, place a finger over the spark plug hole while the engine is being turned. When pressure buildup can be felt, the cylinder is on its compression stroke.

2 Note the position of the distributor driving spindle. See Figure 33 (L-series) or Figure 34 (J13). Note that the spindle tooth (or notch) is slightly offset toward the front of the engine.



3 Insert the distributor so it engages with the driving spindle. Make sure the rotor points to



- 1 Distributor shaft
- 2 Distributor drive shaft
- 3 Distributor fixing plate

No. 1 terminal in the distributor cap. Align the marks on engine and distributor body.

4 Install the body setscrews and distributor cap. Connect primary lead(s) to distributor.

5 Adjust the ignition timing as described in Chapter Two.

CHAPTER EIGHT

CLUTCH

All models use a single-dry-plate clutch with diaphragm spring. Major components are the pressure plate, disc, release mechanism, and hydraulic linkage. Figure 1 shows the clutch parts.

The release mechanism, which controls engagement and disengagement, consists of a bearing, sleeve, and withdrawal lever. The release mechanism is in turn controlled by the hydraulic linkage, which transmits pedal pressure through the clutch master cylinder, hydraulic line, and operating cylinder. The operating cylinder pushrod moves the withdrawal lever.

This chapter includes service procedures for the clutch pedal, hydraulic linkage, release mechanism, pressure plate, and disc.

Tightening torques (Table 1) are found at the end of the chapter.

PART IDENTIFICATION

Many clutch parts have 2 or more names. To prevent confusion, the following list gives part names used in this chapter and common synonyms.

Withdrawal lever — release lever,
throw-out arm

Release bearing — throw-out bearing

Operating cylinder — slave cylinder

Pressure plate — pressure plate assembly,
clutch cover assembly

Disc — driven plate

CLUTCH PEDAL

Adjustment (510 and Z Sports Car)

1 On early Z's without pedal stoppers, loosen the pushrod locknut (1, Figure 2). Rotate the pushrod to change its length, raising or lowering the pedal. Correct pedal pad height is 8 ± 0.197 in (202 ± 5 mm). Tighten the locknut after adjusting.

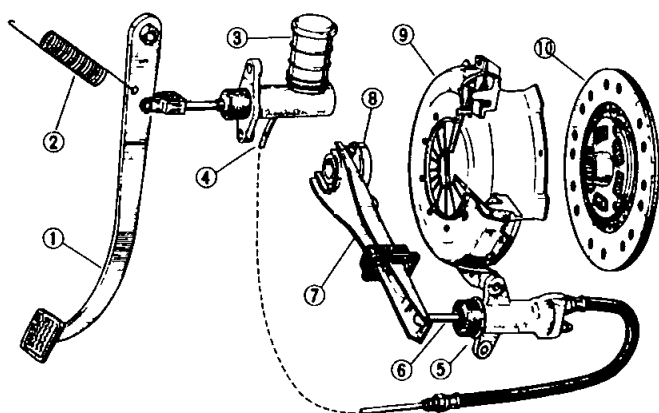
2 On 510's and later Z sports cars, back off the pedal stopper (Figure 3) until it is clear of the pedal.

3 Loosen the locknut on the master cylinder pushrod. Rotate the pushrod to set pedal pad height at 8.22 in (209 mm) on 510's, or 8.9 in (226 mm) on Z sports cars.

4 Lower the pedal by turning the pedal stopper. Correct height on 510's is 8.15 in (207 mm). Correct height on Z sports cars is 8.78 in (223 mm). Tighten the pedal stopper locknut.

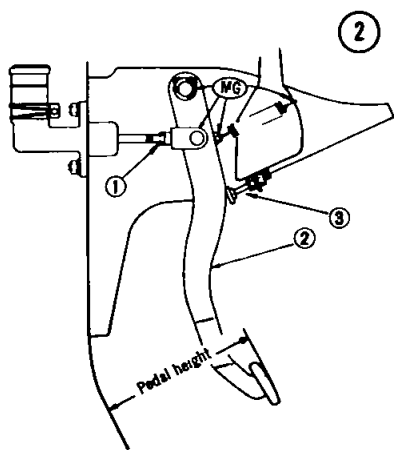
Adjustment (521 Pickup, 1200)

1 Back off the pedal stopper until it is clear of the pedal. See Figure 3.

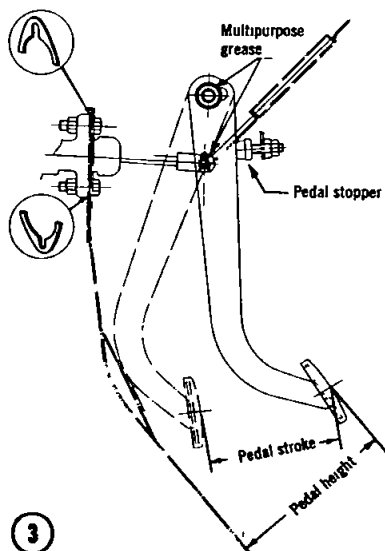


CLUTCH PARTS

- | | | |
|--------------------------|----------------------|-------------------|
| 1 Clutch pedal | 5 Operating cylinder | 8 Release bearing |
| 2 Return spring | 6 Pushrod | 9 Clutch cover |
| 3 Clutch master cylinder | 7 Withdrawal lever | 10 Clutch disc |
| 4 Fluid line | | |



- 1 Adjusting nut
2 Pedal lever
3 Pedal stopper
MG = Multipurpose grease



2 Measure pedal pad height from the floor. It should be 6.02 in (153mm) on 521 pickups, 5.65 in (143.5mm) on 1200's. If necessary, change pedal height by inserting adjusting shims between master cylinder and firewall. Be sure upper and lower shims are of the same thickness.

3 Turn the pedal stopper to lower the pedal. Correct height is 5.91 in (150mm) on 521 pickups, 5.57 in (141.5mm) on 1200's. Tighten the pedal stopper locknut.

Adjustment

(610, 710, B210, 620 Pickup)

- 1 Loosen the pedal stopper locknut (Figure 4)
- 2 Measure pedal height and compare with Table 2. Adjust if necessary by turning the pedal stopper in or out.

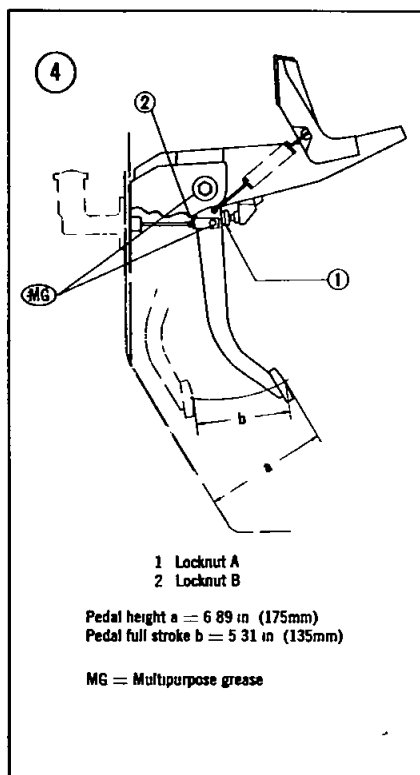


Table 2 PEDAL HEIGHT

	Inches	mm
1973-1974 610	6.89	175
1975 and later 610, all 710	7.09	180
B210	6.02-6.26	153-159
1972-1973 620 pickup	6.42	163
1974 and later 620 pickup	6.02	153

- 3 Tighten the pedal stopper locknut.
- 4 Loosen the locknut on the master cylinder pushrod. Rotate the pushrod in or out to adjust play at the clevis pin. After adjustment, you should be able to move the pedal slightly without moving the master cylinder pushrod. Specified pedal movement is 0.04-0.20 in (1-5mm) on 610's and 710's, and 0.04-0.12 in (1-3mm) on B210's and 620 pickups.

MASTER CYLINDER

Figure 5 shows the master cylinder design typical of all except 1976-1977 B210's and 280Z's. Figure 6 shows the 1976-1977 B210 and 280Z version.

Removal/Installation

- 1 Remove the clevis pin attaching the master cylinder pushrod to the clutch pedal.
- 2 With a container handy to catch dripping hydraulic fluid, disconnect the hydraulic line from the master cylinder.

CAUTION

Hydraulic fluid will damage paint. Wipe up any spilled fluid immediately, then wash the area of the spill with soap and water.

- 3 Remove both master cylinder installation nuts and lift the cylinder out.
- 4 Installation is the reverse of these steps. Adjust pedal height. Bleed air out of the hydraulic system as described later in this chapter.

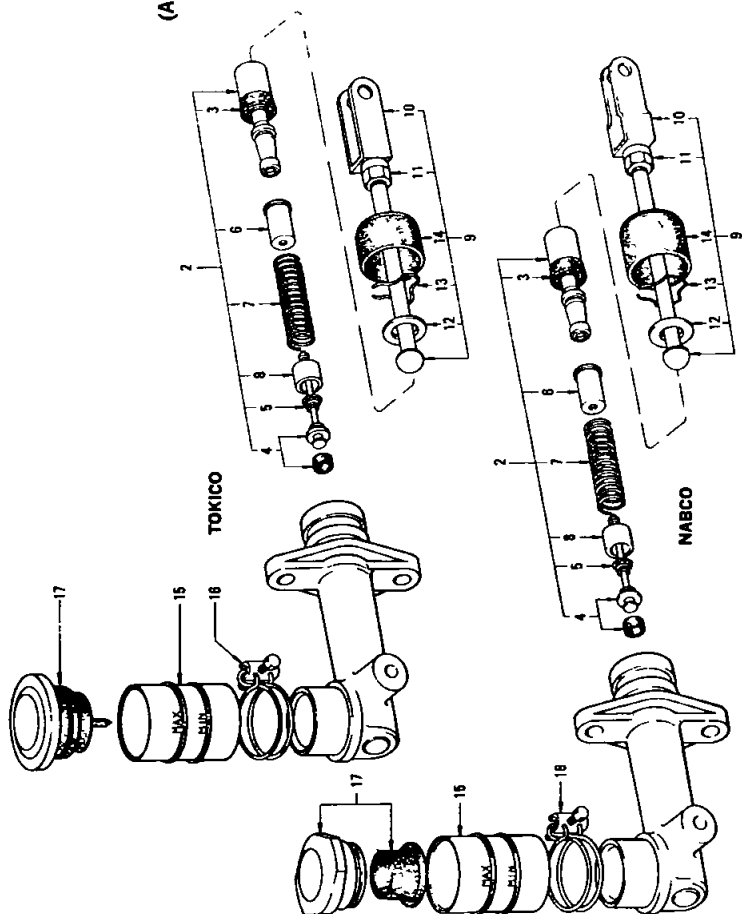
Disassembly

Refer to Figure 5 or Figure 6.

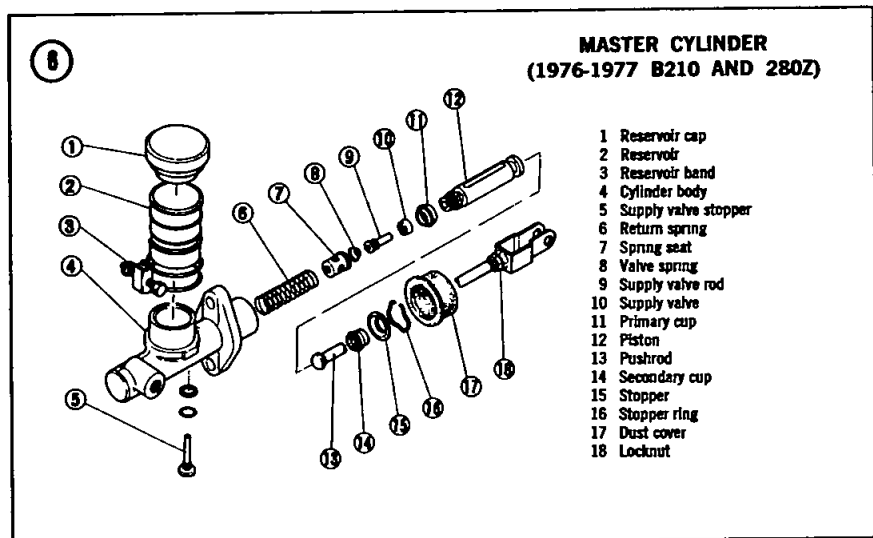
- 1 Remove the filler cap from the fluid reservoir. Pour the fluid from the cylinder.

**MASTER CYLINDER
(ALL EXCEPT 1976-1977
B210 AND 280Z)**

- 2 Piston assembly
- 3 Piston cup
- 4 Valve assembly
- 5 Valve spring
- 6 Spring seat
- 7 Return spring
- 8 Spring seat
- 9 Push rod assembly
- 10 Push rod head
- 11 Nut
- 12 Stopper
- 13 Stopper ring
- 14 Dust cover
- 15 Oil reservoir
- 16 Reservoir band assembly
- 17 Reservoir cap



5



2 Pull back the dust cover and remove the stopper ring

3 Take the stopper out of the cylinder. Remove the pushrod, then the piston assembly

4 Take the piston cup off the piston and discard it

NOTE Do not remove the fluid reservoir unless absolutely necessary

detected. Check the fluid reservoir, filler cap, and hydraulic line for wear or damage. Replace as needed.

Assembly

1 Coat the cylinder bore with hydraulic fluid

2 Install the piston return spring assembly

3 Soak the piston cup with hydraulic fluid, then install it on the piston. The lip of the cup faces the front of the car when the piston is installed.

4 Coat the piston with hydraulic fluid and insert it into the cylinder. Be careful not to bend back the lip of the piston cup.

5 Place the dust cover on the pushrod. Insert the pushrod and stopper into the cylinder. Install the stopper ring and push the lip of the dust cover over the cylinder.

Inspection

1 Thoroughly clean all parts in brake fluid before inspection. Never use gasoline or kerosene for cleaning.

2 Check the piston for excessive or uneven wear, scoring, cracks, or corrosion. Replace the piston if any of these defects are found.

3 Check the cylinder bore for wear, cracks, scoring, or corrosion. Replace the cylinder if defects are visible.

4 As a final check on a suspect cylinder and piston, measure the outside diameter of the piston and inside diameter of the cylinder. If the difference between these measurements exceeds 0.006 in. (0.15mm), replace the master cylinder.

5 Check the dust cover for wear, cracks, or signs of deterioration. Replace if these are

OPERATING CYLINDER

Adjustable operating cylinders are used on the 510's, 521 pickups, early 240Z's, 1200's, and B210's. On these cylinders, effective length of the cylinder pushrod is regulated by an adjusting nut on the pushrod. Other models use a non-adjustable cylinder.

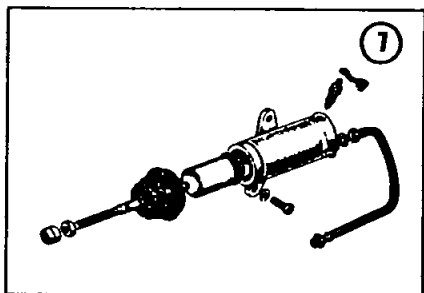
Removal/Installation

- 1 If the cylinder has an external return spring, unhook it
- 2 With a container handy to catch dripping brake fluid, disconnect the flexible clutch line from the metal tube. See Figure 1
- 3 Disconnect the flexible clutch line from the operating cylinder
- 4 Remove 2 cylinder mounting bolts. Separate the pushrod from the clutch withdrawal lever. Take the cylinder out
- 5 Installation is the reverse of these steps. Adjust withdrawal lever play (if applicable). Bleed the clutch as described later in this chapter

Disassembly and Inspection

Figure 7 shows a typical operating cylinder

- 1 Remove the dust cover



- 2 Remove the snap ring (if so equipped), then take out the piston and cup. Discard the cup
- 3 Remove the internal spring (if so equipped)
- 4 Remove the bleed valve
- 5 Thoroughly clean all parts in brake fluid. Do not use gasoline or kerosene
- 6 Check the piston for excessive or uneven wear, scoring, cracks, or corrosion. Replace the piston if these conditions are found
- 7 Check the cylinder bore for the defects described in Step 6. Replace the entire cylinder if any of these are found

Assembly

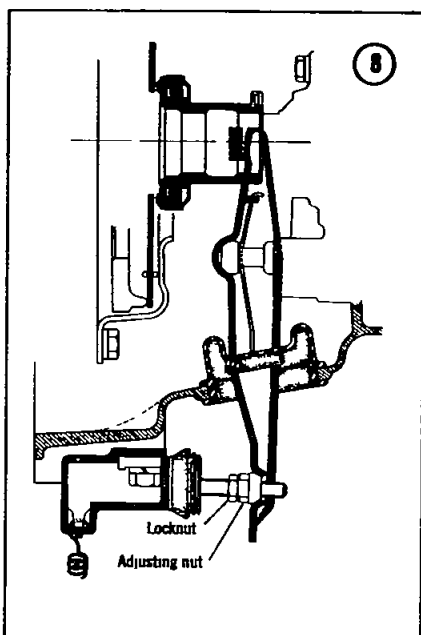
Assembly is the reverse of the disassembly procedure, plus the following

- 1 Soak the piston cup in brake fluid before installing. Make sure the lip of the cup faces into the cylinder
- 2 On cylinders with an internal spring, assemble the spring to the piston before installing
- 3 Coat the cylinder bore and piston with brake fluid before installing the piston

WITHDRAWAL LEVER PLAY

Withdrawal lever play is regulated by the length of the operating cylinder pushrod. On adjustable-pushrod models, adjustment is necessary whenever the operating cylinder is removed

Figure 8 shows the operating cylinder, withdrawal lever, and release bearing. Refer to it as needed for this procedure



- 1 Loosen the locknut. Rotate the adjusting nut until the top of the withdrawal lever contacts the release bearing inside the clutch housing. All withdrawal lever play should be eliminated

- 2 Back off the adjusting nut $1\frac{1}{4}$ turns (1200 and B210), $1\frac{1}{2}$ turns (240Z), or $1\frac{3}{4}$ turns (all others) Secure adjusting nut with locknut

BLEEDING THE CLUTCH

Bleeding air out of the clutch hydraulic system is necessary whenever air enters the system. This occurs when the hydraulic line is disconnected at either end. It can also result from a very low clutch fluid level, or from defective master or operating cylinders. Air in the system can make shifting gears very difficult.

NOTE *This procedure requires 2 people, one to operate the clutch pedal and the other to open and close the bleed valve*

- 1 Remove the dust cap from the bleed valve on the operating cylinder
- 2 Attach a plastic tube to the bleed valve. Place the other end of the tube in a clear glass jar containing several inches of clean brake fluid

NOTE *Do not allow the end of the tube to come out of the brake fluid during bleeding. If this happens, air may be sucked into the system, and the procedure will have to be repeated*

- 3 Top up the clutch master cylinder reservoir with fluid
- 4 Have an assistant pump the clutch pedal 2 or 3 times, then hold it to the floor
- 5 While the pedal is down, open the bleed valve to let air escape. Close the valve before letting the pedal up
- 6 Repeat Steps 4 and 5 until the fluid entering the jar is free of air bubbles. Remove the tube, put the dust cover on the bleed valve, and top up the master cylinder

CLUTCH REMOVAL

The engine and clutch housing must be separated to remove the clutch. This can be done either by removing the engine and transmission and separating them (Chapter Four) or by removing only the transmission

(Chapter Nine). The release mechanism is incorporated in the clutch housing (front part of the transmission).

Once the engine and transmission have been separated, do the following:

- 1 Mark the edges of the pressure plate and flywheel so they may be reassembled in the same relative positions
- 2 Remove the clutch cover bolts gradually in a diagonal pattern to prevent warping the pressure plate

CLUTCH INSPECTION

Clutch Disc

Check the clutch disc for the following:

- a Oil or grease on the facings
- b Glazed facings
- c Warped facings
- d Loose or missing rivets
- e Facings worn to within 0.012 in. (0.3 mm) of any rivet
- f Broken springs
- g Loose fit or rough movement on transmission main drive shaft splines

Small amounts of oil or grease may be removed from the disc with trichloroethylene, and the facings dressed with a wire brush. However, the disc must be replaced if the facings are soaked with oil or grease. The disc must also be replaced if any of the other defects are present, or if facings are worn and a new pressure plate is being installed.

Pressure Plate

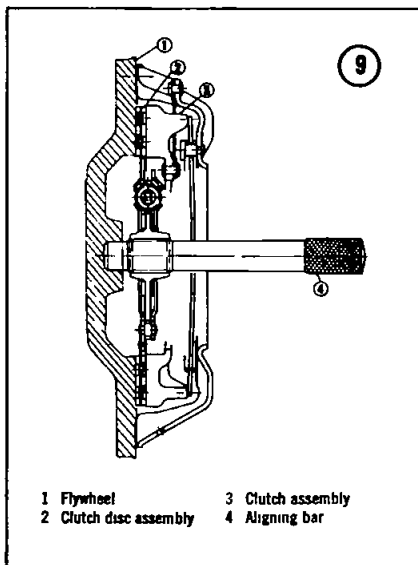
Check the pressure plate for:

- a Scoring
- b Burn marks (blue-tinted areas)
- c Cracks

Replace the pressure plate if these are evident. If the clutch trouble still is not apparent, take the pressure plate and disc to a competent garage. Have the disc and pressure plate checked for excessive runout, and the diaphragm spring for incorrect finger height. Do not attempt to readjust the fingers or dismantle the pressure plate without proper tools and experience.

CLUTCH INSTALLATION

- 1 Be sure your hands are clean
- 2 Inspect the disc facings, pressure plate, and flywheel to be sure they are free of grease, oil, or other foreign material
- 3 Clean the clutch pilot bushing and fill it with multipurpose grease
- 4 Place the clutch disc and pressure plate in position on the flywheel. The long side of the disc hub faces the rear of the car. Line up the alignment marks made during removal
- 5 Center the disc and pressure plate with an aligning bar such as the one shown in Figure 9. A main drive shaft from a junk transmission can be substituted if the special tool isn't available



- 6 Install the clutch cover bolts, tightening gradually in a diagonal pattern. Tighten to specifications given at the end of the chapter

RELEASE MECHANISM

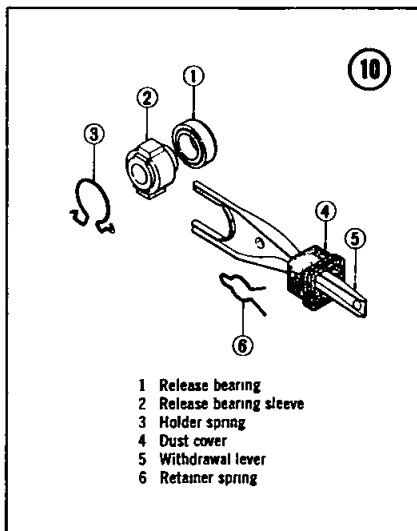
Removal

As with the clutch, release mechanism removal requires that the engine and transmis-

sion be separated first. The release mechanism is mounted in the clutch housing. Either remove the engine and transmission as a unit and separate them (Chapter Four) or remove only the transmission (Chapter Nine).

Disassembly

- 1 Referring to Figure 10, remove the dust cover from the clutch housing



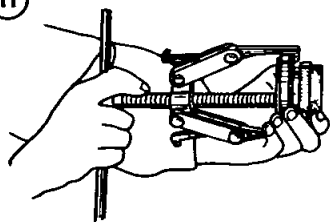
- 2 Remove the holder spring. Take out the release bearing and sleeve
- 3 If the operating cylinder has an external return spring, unhook it from the withdrawal lever
- 4 Detach the retainer spring from the withdrawal lever (all except 1200 and B210). Remove the withdrawal lever from its ball pin
- 5 Remove the release bearing from its sleeve with a puller (Figure 11). The bearing is a press fit on the sleeve

Inspection

Check release mechanism for the following

- 1 Wear at the contact point of the withdrawal lever and release bearing sleeve. Replace the sleeve or lever if worn

11



2 Grease leaking from the release bearing
Replace the bearing if this is evident

CAUTION

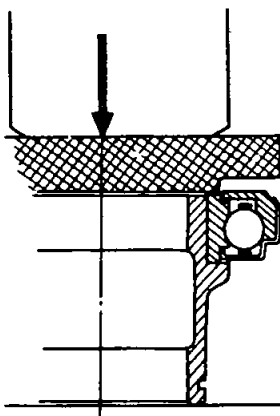
Do not clean the release bearing in solvent, since it is prelubricated at the factory. Clean with a lint-free cloth.

3 A worn release bearing To check, hold the inner race with fingers and rotate the outer race while applying light pressure to it. If the bearing feels rough or makes noise, replace it.

Assembly

1 Press the release bearing onto the sleeve (Figure 12). When it is in place, rotate it to make sure it operates smoothly.

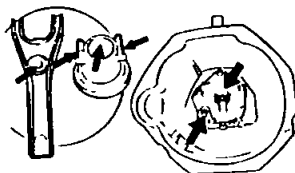
12



2 Referring to Figure 13, apply a *light* coat of multipurpose grease to the following:

- a Contact points of withdrawal lever and bearing sleeve

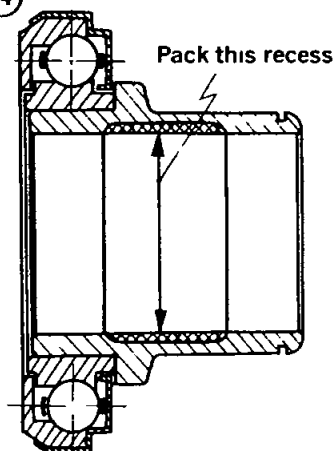
13



- b Contact points of withdrawal lever and ball pin
- c Contact points of release bearing sleeve and transmission front cover

3 Pack the recess inside the bearing sleeve with multipurpose grease. See Figure 14.

14



4 Apply a small amount of molybdenum disulphide grease to the transmission main drive shaft splines.

5 Place the withdrawal lever in position over the transmission main drive shaft, with the operating cylinder end through the hole in the clutch housing

6 Position the release bearing and sleeve on the withdrawal lever. Install the holder spring

7 Install the dust cover in the clutch housing

8 If the operating cylinder uses an external spring, attach it to the withdrawal lever

9 Install the transmission as described in Chapter Nine

10 Bleed air from the clutch hydraulic system as described earlier in this chapter

11 Check and adjust pedal height as described previously

12 On cars with adjustable operating cylinders, adjust withdrawal lever play as described earlier

Table 1 TIGHTENING TORQUES

	Ft.-lb.	Mkg
Clutch cover bolts		
1200	11-16	15-22
B210	12-15	16-21
510	17½-19	24-26
1973-1974 610, all 620 pickups	12-16	16-22
1975 and later 610 all 710	12-15	16-21
Z sports car	11-16	15-22
Master cylinder bolts	6-9	0.8-1.2
Operating cylinder bolts		
1200, B210 1975 and later	22-30	31-41
610, all 710		
1973-1974 610 all	18-22	25-31
Z sports cars		
Pickup trucks	18-25	25-35

CHAPTER NINE

TRANSMISSION

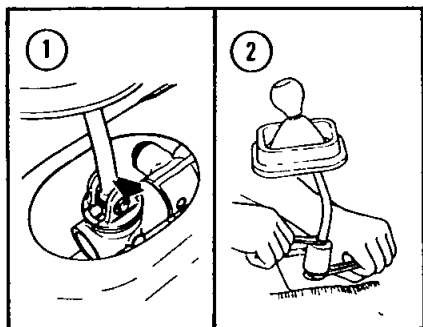
The 1968-1976 Datsuns are equipped with either a 4-speed manual transmission or a 3-speed automatic. A 5-speed manual transmission is optional on 1977 models. Variations of the same basic manual transmission design are used in the 1200, B210, Z sports car, and 1974-1977 pickups. Another design is used in manual transmission 510's, 610's, 710's, and 1968-1973 pickups. Early 510's use Borg Warner automatic transmissions. Late 510's and all other automatic models use the Nissan Model 3N71B.

Tightening torques (Table 1) are found at the end of the chapter.

MANUAL TRANSMISSION

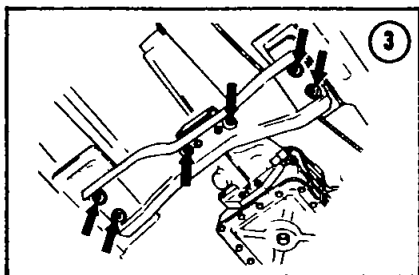
Removal/Installation

- 1 Disconnect negative cable from battery.
- 2 Remove the console (if so equipped). Remove the shift lever hole cover from the floor.
- 3 Remove the shift lever. On 1200's, B210's, late Z's, and 1974-1977 pickups, remove the pivot pin (Figure 1) and lift the lever out. On all other models, remove the attaching nut from the base of the shift lever (Figure 2).
- 4 Jack up all 4 corners of the vehicle and place it on jackstands. Position the stands carefully so the car won't fall.

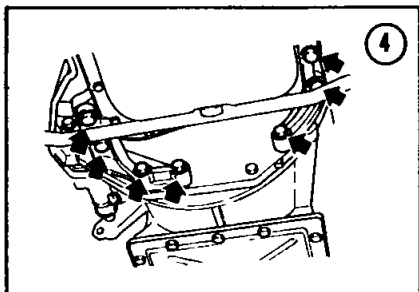


- 5 Drain the transmission oil. If this isn't done, the oil will run onto the floor when the transmission is removed.
- 6 Remove the drive shaft (Chapter Eleven).
- 7 Disconnect the wires from the electrical switch(es) on the right-hand side of the transmission.
- 8 Detach the speedometer cable from the rear extension.
- 9 Remove the clutch operating cylinder (see Chapter Eight).
- 10 Remove the starter (Chapter Seven).
- 11 Place jacks beneath the engine and transmission. Use a block of wood on top of each jack to prevent damage.

12 Detach the transmission mounting member from the transmission, then from the frame. Figure 3 shows a typical mounting member.



13 On 610 sedans and hardtops, all 710's, and all B210's, unbolt the gussets from engine block and clutch housing (Figure 4).



14 Remove the engine-to-transmission bolts.

15 Lower the jacks beneath engine and transmission. Slide the transmission backward and down until it is clear of the engine. Lower the transmission and take it out from under the car.

CAUTION

To prevent damage to the transmission main drive shaft, never remove the transmission part of the way. Be sure the main drive shaft separates completely from engine when removing transmission.

16 Install by reversing Steps 1-15. Tighten nuts and bolts to specifications given in Table 1 (end of chapter). Fill the transmission with an oil recommended in Chapter Two. Fill and bleed the clutch hydraulic system. If the vehicle

has an adjustable-pushrod operating cylinder, adjust withdrawal lever play. See Chapter Eight.

Inspection

1 Before cleaning, check the transmission for oil leaks. Check at front and rear ends of the transmission, as well as at the mating surfaces of the transmission case and rear extension.

2 Clean the transmission with solvent.

3 Examine the clutch release mechanism (Chapter Eight). This is also a good time to inspect the clutch disc and pressure plate, especially if the transmission front seal has been leaking oil.

4 Check the shaft at each end of the transmission for movement. Loose, wobbly shafts indicate worn transmission bearings.

5 On 510's, 610's, 710's, and 1968-1973 pickups, remove the inspection cover from the bottom of the transmission. Loosen the bolts a little at a time to prevent warping the cover. Check the internal transmission parts for obvious wear or damage. If the transmission isn't being replaced or overhauled, be sure to use a new gasket when installing the cover.

AUTOMATIC TRANSMISSION

Sedans through car No. PL510-117463 and wagons through car No. WPL510-853594 use the British-made Borg Warner Model 35 (Letchworth) automatic transmission.

Sedans from car No. PL510-117464 and wagons from car No. WPL510-853595 use the American-made Borg Warner Model 41 (Muncie) automatic. However, the Model 35 torque converter is still used.

The 1972 and later vehicles use the Nissan Model 3N71B automatic, made by Japan Automatic Transmission Company.

Many automatic transmission problems can be corrected by the simple adjustments described in this section. Automatic transmission repair, however, requires professional skills, many special tools, and extremely high standards of cleanliness. Jobs requiring disassembly should be left to a Datsun dealer or competent automatic transmission specialist.

Fluid Level Check

1 Warm the engine to normal operating temperature. Do this by driving at least 15 miles (Borg Warner) or letting the engine idle for at least 10 minutes (3N71B).

NOTE On some models, the dipstick has 2 scales, labeled HOT and COLD. The cold scale may be used instead of warming up the engine.

2 Move the shift lever through all gear positions to P. Leave the engine running.

NOTE On Borg Warner Model 41 transmissions, the fluid level can be checked with the engine off. The level shown on the dipstick will be approximately $\frac{1}{4}$ in. higher than it would be with the engine running.

3 Pull out the dipstick, located at the rear of the engine compartment on the right-hand side. Fluid level should be at the H or F mark. If necessary, add fluid through the dipstick tube to raise fluid level. Use Type A fluid *only* in Model 35 transmissions, use Dexron fluid *only* in Model 41 and 3N71B.

CAUTION

Do not fill the transmission past the upper line on the dipstick. Overfilling can cause the fluid to foam, resulting in wear and damage.

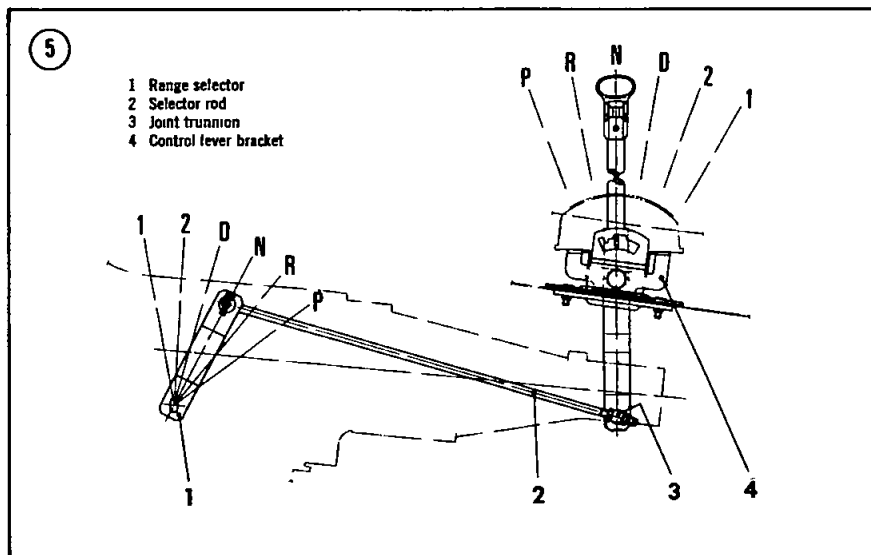
4 Examine the fluid on the dipstick. Clean transmission fluid is a transparent red. If the fluid has deteriorated to a varnish-like condition, it may cause the control valves to stick. Black fluid may indicate a burned clutch or a burned brake band.

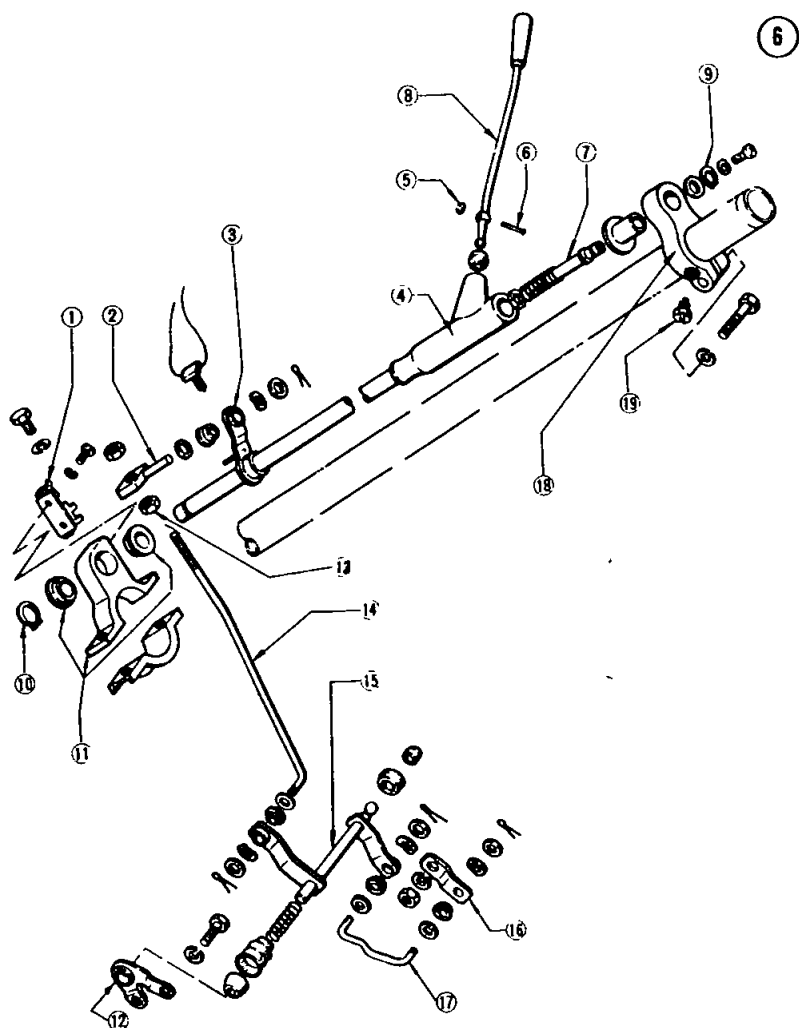
Linkage Adjustment

1 Move the shift lever back and forth from 1 to P (or L to P) several times. A slight click should be heard and felt at each gear position.

2 Place shift lever in N. Detach shift lever from linkage. Figure 5 shows floor shift linkage, Figure 6 shows column shift linkage.

3 Working beneath the car, make sure the range selector lever on the side of the transmission is in N. On Borg Warner transmissions, this occurs when the lever is in the center of the 5 detents. On 3N71B transmissions, this occurs when the slot in the range selector lever is vertical.





SHIFT LINKAGE

- | | | |
|------------------------|--------------------------------|--------------------------|
| 1 Position plate | 8 Gear selector hand lever | 14 Upper selector rod |
| 2 Trunnion joint | 9 Snap ring | 15 Cross shaft |
| 3 Selector lever | 10 Snap ring | 16 Range selector lever |
| 4 Control rod assembly | 11 Lower support bracket | 17 Lower selector rod |
| 5 Snap ring | 12 Cross shaft bracket | 18 Upper support bracket |
| 6 Pin | 13 Selector rod adjustment nut | 19 Locating screw |
| 7 Control rod insert | | |

4 Adjust the linkage so the shift lever in the car and the range selector lever on the transmission are in N at the same time. Adjust floor linkages with the joint trunnion nuts (4, Figure 5). Adjust column linkages with the selector rod adjusting nut (13, Figure 6).

Starter Inhibitor Switch (Borg Warner)

If the starter operates in any gear other than N or P, or if the reverse lamps light in any gear other than R, check linkage adjustment. If the linkage is adjusted properly, check the starter inhibitor switch. The switch is mounted on the left side of the transmission case.

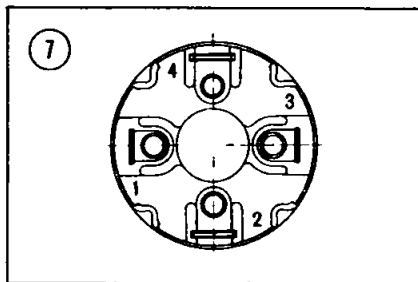
1 Securely block both front wheels so vehicle will not roll in either direction. Jack up rear end and place jackstands beneath axle.

2 Sketch the inhibitor switch wires so they can be reconnected properly, then disconnect them from the switch.

3 Connect the wires from terminals 1 and 3 together. Do the same with the wires from terminals 2 and 4. Figure 7 shows the terminal numbers. The starter and reverse lamps should now operate in any gear position.

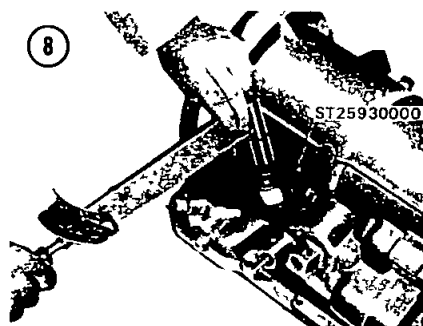
WARNING

Lower the car onto its wheels before operating the starter. Otherwise, the vibration may knock the car off the jackstands. Do not operate the starter in any gear other than N or P, or the car may take off suddenly.



If the starter and reverse lamps now operate, the starter inhibitor switch is probably out of adjustment. If the problem still exists, the car's wiring may be defective.

4 Loosen the locknuts behind the switch. Use an open-end wrench or a special socket such as a crow's foot (Datsun tool ST 25390000, Figure 8).



5 On Model 35 transmissions, connect an ohmmeter or self-powered test lamp across terminals 2 and 4. On Model 41 transmissions, connect the tester across terminals 1 and 3. Screw the switch in until the test lamp goes out (ohmmeter shows open circuit). At this point, make match marks on switch body and transmission case.

6 Move the tester wires to the 2 remaining switch terminals. Again, screw the switch in until the test lamp goes out (ohmmeter shows open circuit). Mark the switch position in relation to the transmission case.

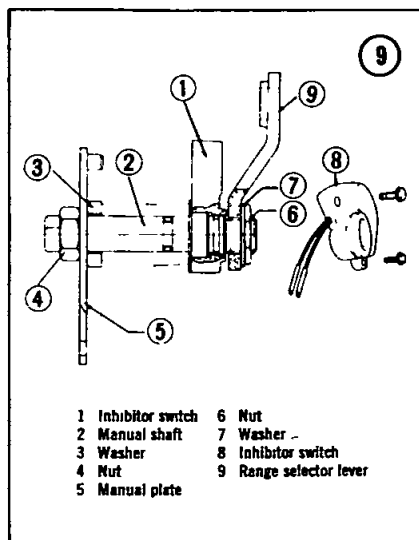
7 Turn the switch back to halfway between the 2 marks, then tighten the locknut to 5 ft.-lb. Connect the wires to the switch.

8 Make sure starter operates only in N and P, and reverse lamps light only in R. If problem still exists, replace starter inhibitor switch.

Starter Inhibitor Switch (3N71B)

If the starter operates in any gear other than N or P, or if the reverse lamps light in any gear other than R, check linkage adjustment. If the linkage is adjusted correctly, check the inhibitor switch.

1 Detach the range selector lever (9, Figure 9) from the transmission shift linkage. Move the range selector lever to the N position. This occurs when the slot in the lever is vertical.



2 Attach an ohmmeter or self-powered test lamp to the black-and-yellow inhibitor switch wires. The ohmmeter should indicate continuity (test lamp should light) while the range selector lever is within 3° of the N position.

3 Repeat Step 2 with the range selector lever in the P position.

4 Move the lever to the R position, and connect the tester to the red-and-black wires on the inhibitor switch. Again, the tester should indicate continuity in a 3° range on either side of the R position.

5 If the tester shows continuity when the lever is obviously more than 3° away from the N, R, or P positions, adjust the inhibitor switch. To do this, first move the range selector lever to the N position. Then remove the lever retaining nut (6, Figure 9), 2 inhibitor switch installation bolts, and the machine screw hole under the switch. Align the machine screw hole with the pinhole in the manual shaft (2, Figure 9). Check the alignment by inserting a drill bit or piece of wire 0.059 in. (1.5 mm) thick through the 2 holes. Then install the switch bolts, pull out the wire, and install the machine screw. Install the nut on the manual shaft and recheck switch adjustment as described in Steps 2, 3, and 4.

6 If the switch doesn't work properly after adjustment, replace it.

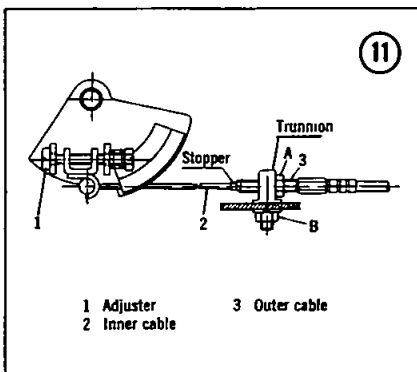
Kickdown Cable Adjustment (Borg Warner Model 35)

1 Connect an oil pressure gauge to the line pressure outlet at the left rear corner of the transmission case (Figure 10). This is an inch fitting (not metric). Place the gauge where it can be seen from the driver's seat.



2 Start the car and place it in D. When engine speed is increased from 500 rpm to 1,000 rpm, line pressure should rise 15-20 psi. If pressure increase is below 15 psi, turn the adjuster on the carburetor end of the cable (Figure 11) to decrease effective cable length. If pressure increases more than 20 psi, turn the adjuster to increase the cable's effective length.

NOTE The cable is impregnated with molybdenum disulfide or graphite. Do not oil it.

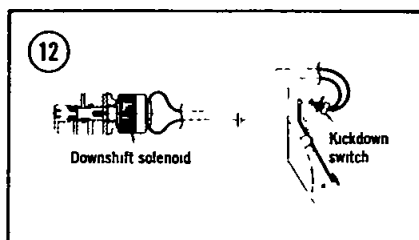


Kickdown Switch Adjustment (Borg Warner Model 41 and Jatco Model 3N71B)

The kickdown switch is located on a bracket beneath the instrument panel. Figure 12 shows the Jatco switch and downshift solenoid. The Borg Warner version is similar.

1 Disconnect the wires from the kickdown switch. Connect an ohmmeter or self-powered test lamp between them.

2 Floor the accelerator. The ohmmeter should show continuity (test lamp should light). If not,



adjust switch position. Replace the switch if it fails to respond to adjustment.

Table 1 MANUAL TRANSMISSION TIGHTENING TORQUES

	Ft.-lb	Mkg
Transmission-to-engine		
1200, B210	12-16	16-22
510	18-29	25-40
610, 710	29-35	40-48
Pickup (1968-1973)	17-20	24-28
Pickup (1974-on)	30-36	40-50
Z sports car	32-43	43-59
Gusset to-transmission		
B210 (1974)	27-36	37-50
B210 (1975-on)	22-30	31-41
610, 710	2-3	0.32-0.44
Gusset to-engine		
B210 (1974)	13-18	18-25
B210 (1975-on)	12-16	16-22
Mounting insulator-to-transmission		
1200, B210	14-19	19-26
510	19-23	26-32
610 (1973-1974)	6½-9	09-12
610 (1975-on) and all 710	10-13	14-18
Pickup	23-27	32-37
Z sports car	23-31	32-43
Mounting insulator to-bracket		
1200, B210	4-6	06-08
510	9-11	13-16
610, 710	6½-9	09-12
Pickup	23-27	32-37
Z sports car	23-31	32-43
Bracket-to-frame		
1200, B210	23-29	32-40
510	28-37	39-52
610, 710	14-19	19-26
Pickup	12-16	16-22
Z sports car	23-31	32-43
Bottom cover		
510	8-13	11-18
610, 710, and 1968-1973 pickup	6-7	08-10

CHAPTER TEN

BRAKES

All cars use disc brakes at the front and drum brakes at the rear. Pickup trucks use drum brakes at all 4 wheels. The front brakes on 1200's, B210's, and Z sports cars use dual-piston calipers. The 510's, 610's, and 710's use single-piston calipers. Rear brakes on cars and front brakes on pickups use single-piston wheel cylinders. Pickup rear brakes use dual-piston wheel cylinders.

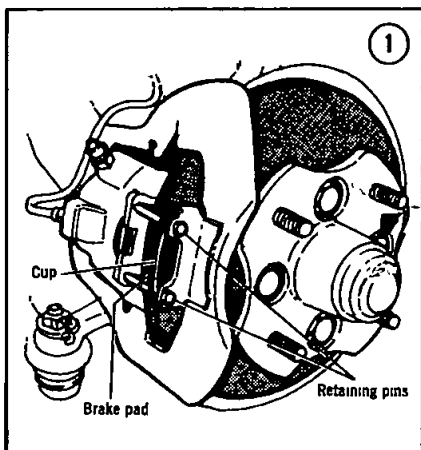
A Master-Vac brake booster is used on B210's, 610's, 710's, Z sports cars, and late model pickups. A proportioning valve is used with disc brakes to prevent premature rear wheel lockup. 1976 and later pickups use a load sensing valve for the same purpose. The hand-brake on all models is a mechanical type that operates the rear brakes. Specifications are listed in Table 1 (end of chapter).

DISC BRAKE PAD REPLACEMENT

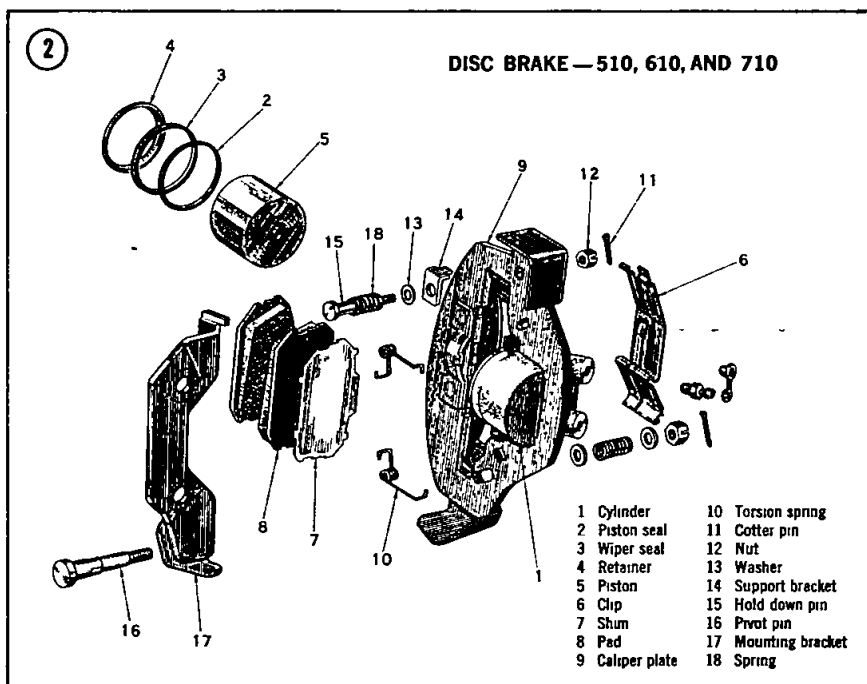
The pads should be checked for wear at intervals specified in Chapter Two. Pads should be replaced when the friction material is worn to 0.063 in (1.6mm) on 1200's and B210's, 0.039 in (1mm) on 510's, 610's, and 710's, and 0.079 in (2mm) on Z sports cars.

1 Loosen the front wheel nuts, jack up the front end of the car, place it on jackstands, and remove the front wheels.

2 On 1200's, B210's, and 1975 and later 610's, remove the clips and pad retaining pins (Figure 1). Unhook the hanger springs, then pull the pads out with pliers. 1200's use shims behind the pads, B210's don't.



3 On 1968-1974 510's, 610's, and 710's, remove the pad retaining clip (Figure 2). Use a screwdriver between the outer pad and caliper plate to pry the caliper plate outward. Pull the pads out. The 510's use a shim behind the outer brake pad.



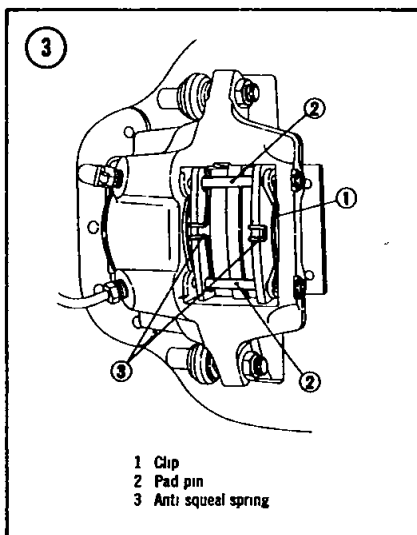
4 On 1975 and later 710's, remove the clip (1, Figure 3) securing the pad retaining pins. Hold down the anti-squeal springs and pull out the pins. Release the springs and pull out the pads.

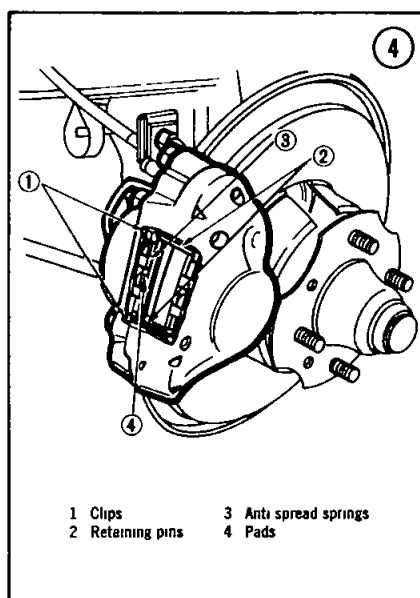
CAUTION

Do not press the brake pedal with the pads removed, or the pistons may fall out.

5 On Z sports cars, remove the clips, retaining pins, and anti-squeal springs (Figure 4). Pull the pads out, together with the anti-squeal shims.

6 Check the pads for wear and damage caused by overheating. Check for grease, oil, or brake fluid on the friction material. If the pads are only slightly oily or greasy, and not excessively worn, they may be cleaned in trichloroethylene and reused. If they are saturated with oil or grease, wet with brake fluid, or damaged from overheating, replace the pads. Always replace pads in full sets.

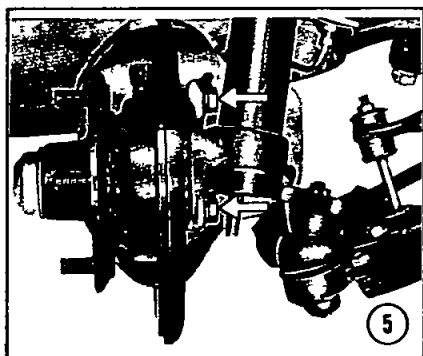




DISC BRAKE CALIPERS

Removal (1200, B210, 1975 and Later 610)

- 1 Remove the brake pads as described earlier
- 2 Disconnect the brake line from the caliper
- 3 On 1200's, remove the ball-joint-to-strut bolts (Chapter Twelve), then separate the ball-joint from the strut. This gives access to the caliper securing bolts. It is not necessary on B210's
- 4 Remove the caliper securing bolts (Figure 5). Pull the caliper free.



7 Carefully clean out the space which holds the pads. Inspect the cylinder(s). Dirty or rusty pistons indicate possible piston seal damage. Overhaul the caliper as described later. The caliper must also be overhauled if brake fluid has been leaking past the piston seals.

8 Place rags beneath the master cylinder in case it overflows. Open the caliper bleed valve to let brake fluid escape.

9 Press the piston(s) in far enough to install the pads. Don't press the pistons in further than necessary, or they may hang up on the seals. The caliper will then have to be disassembled to get the piston out.

10 Install the pads and their shims (if so equipped). On 1200's and Z sports cars, the arrows on the shims point in the forward rotating direction of the brake disc.

11 Press the brake pedal several times to seat the pads.

12 Drive the car enough to make sure the brakes work properly and that no air has entered the hydraulic system. Bleed brakes if necessary.

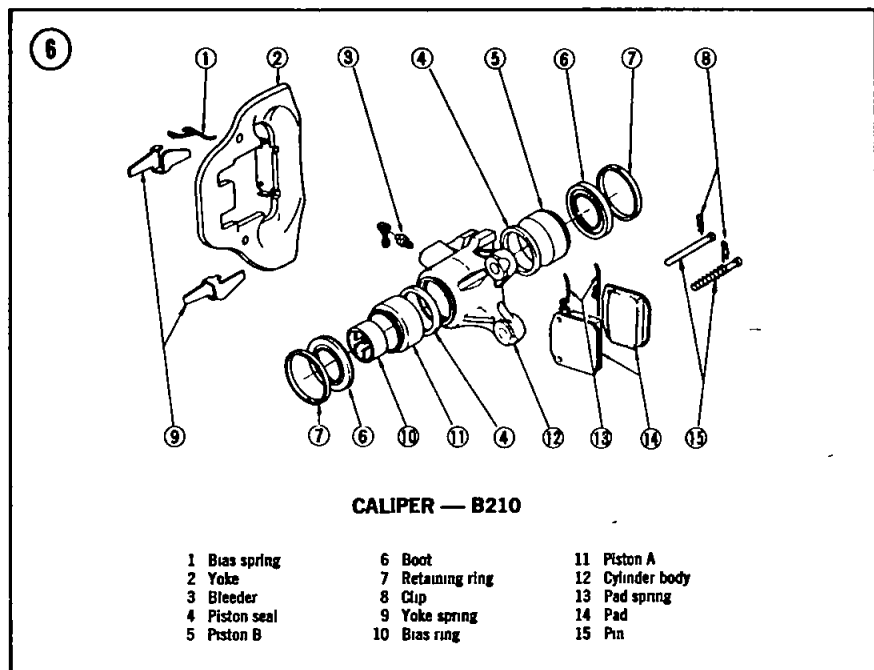
Installation (1200, B210, 1975 and Later 610)

Installation is the reverse of removal, plus the following:

- 1 Tighten caliper securing bolts to proper torques (Table 2, end of chapter). On 1200's, tighten the ball-joint-to-strut bolts to 34-44 ft-lb.
- 2 Bleed the brakes as described later in this chapter.
- 3 Pump the brake pedal several times to seat the pads. Drive the car enough to make sure the brakes work properly.

Overhaul (1200, B210, 1975 and Later 610)

Figure 6 shows a B210 caliper. 1200 and 1975 and later 610 calipers are basically the same. The 1200 design used pad shims and a single retaining pin clip.



1 Clean the caliper thoroughly with alcohol before taking it apart. Drain the brake fluid from the cylinder body.

2 Place the caliper yoke in a vise and tap it lightly with a hammer (Figure 7). This will free the cylinder body so it can be removed.

CAUTION

Don't let the lower piston fall out while tapping the caliper yoke.

3 Remove the bias ring (10, Figure 6) from the "A" (inner) piston. Remove the retaining rings and boots from both pistons.

4 Remove the pistons from the cylinder body. If necessary, blow them out with compressed air. Use a service station air hose if you don't have a compressor.

WARNING

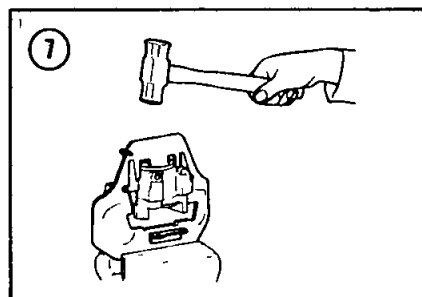
The pistons may come out with considerable force. Be careful where you point the cylinder body.

5 Remove the piston seals from the cylinders.

6 Remove the yoke springs (9, Figure 6) from the caliper yoke.

7 Clean internal parts with alcohol. Discard piston seals and dust seals.

8 Inspect pistons and cylinder walls. Replace the cylinder assembly if they are scored or worn. Small amounts of dirt or corrosion may be removed from cylinder walls with fine emery.



paper. Pistons are chrome plated, if they cannot be cleaned without abrasives, they must be replaced.

9 Coat cylinder bores with brake fluid. Install new piston seals.

10 Place the bias ring (10, Figure 6) in the "A" piston (11, Figure 6). The hollow side of the bias ring faces out.

11 Coat the pistons in brake fluid, then install them in the cylinders. Be sure the "A" piston (with the dimple in its inside bottom surface) goes in the inner cylinder.

12 Refer to Figure 6 to be sure the pistons are installed in the right cylinders.

CAUTION

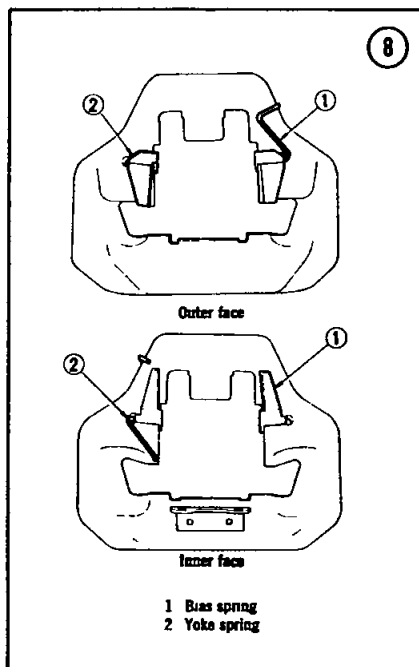
Don't push the pistons in any further than necessary to install the brake pads. Otherwise, the pistons may hang up on the seals. This necessitates disassembly of the caliper and replacement of the seals.

13 Install the boots and retaining rings on the pistons.

14 Install the yoke springs as shown in Figure 8. Position the springs so the projecting ends will face the brake disc when the caliper is on the car.

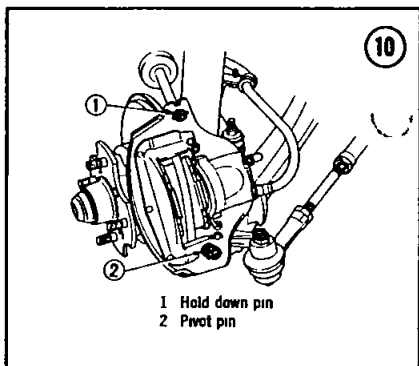
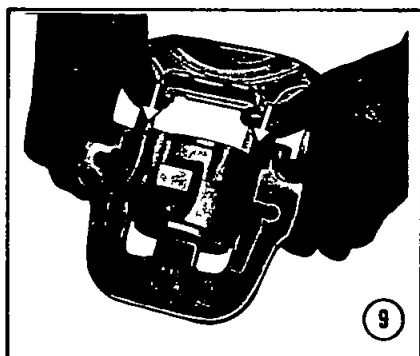
15 Grease the yoke grooves in the cylinder body. Install the cylinder body in the yoke (Figure 9). Be sure the bleed valve is on the same side of the yoke as the brake pad bracket.

16 Install the bleed valve.



Removal (1968-1974 510, 610, 710)

- 1 Remove the brake pads as described earlier. Disconnect the brake hose from the caliper.
- 2 Remove the cotter pins from the hold-down and pivot pins (Figure 10). Remove the nuts and take the pins out.



3 Separate the caliper assembly from its mounting bracket. If necessary, remove 2 bolts securing the mounting bracket and take it off.

Installation (1968-1974 510, 610, 710)

1 If the caliper mounting bracket was removed, bolt it to the steering knuckle. Tighten the bolts to 53-65 ft-lb (7.3-9.0 mkg) on 510's, 53-71 ft-lb (7.3-9.9 mkg) on 610's and 710's.

2 Position the caliper plate next to the mounting bracket. Secure it with the pivot pin and hold-down pin.

3 Install the brake pads and bleed the brakes.

4 Press the brake pedal several times to seat the pads. Drive the car enough to make sure the brakes work properly.

Overhaul (1968-1974 510, 610, 710)

Figure 11 is an exploded view of the 510, 610, and 710 caliper. The 510 uses a shim behind the outer pad.

1 Thoroughly clean the outside of the caliper with alcohol before taking it apart.

2 Remove the torsion springs. Take the cylinder out of the caliper plate.

3 Blow compressed air into the brake hose hole to force the piston out. Use a service station air hose if you don't have a compressor.

WARNING

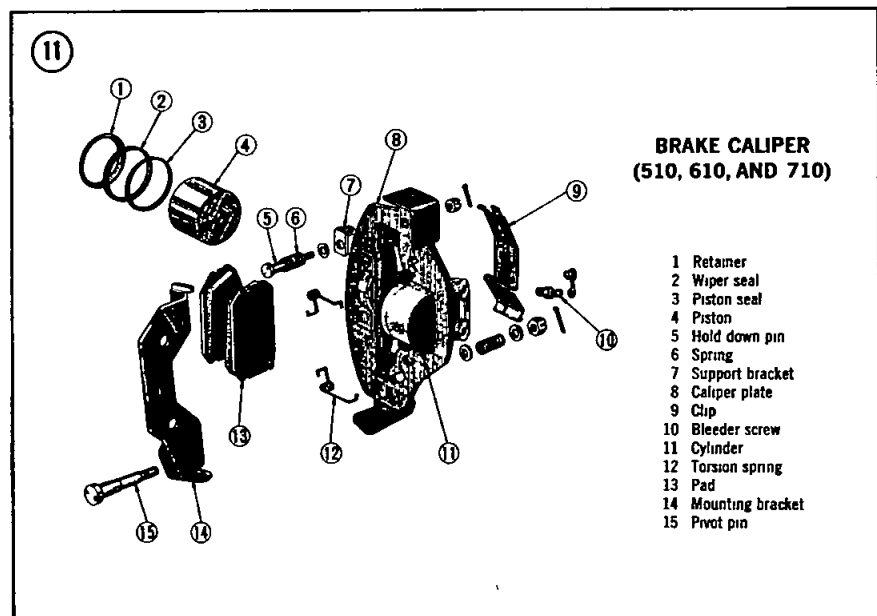
The piston may come out with considerable force. Be careful where you point the cylinder.

4 Clean internal parts in alcohol. Discard the piston seal and wiper seal.

5 Inspect the cylinder wall and piston. Replace the cylinder assembly if they are scored or worn. Slight amounts of dirt or corrosion may be removed from cylinder walls with fine emery paper. Pistons are chrome plated; if they cannot be cleaned without abrasives, they must be replaced.

6 Coat a new piston seal with brake fluid. Install the piston seal, a new wiper seal, and seal retainer in the cylinder.

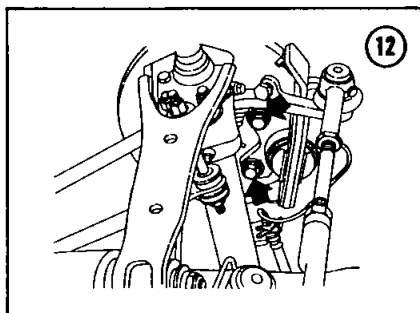
7 Coat the piston and cylinder bore with brake fluid. Install the piston.



- 8 Slide the cylinder into the caliper plate. Install the torsion springs

Caliper Removal/Installation (1975 and Later 710)

- 1 Remove the brake pads
 - 2 Disconnect the brake line from the caliper
 - 3 Remove the caliper mounting bolts (Figure 12)
- Lift the caliper off



- 4 Install in the reverse order. Tighten the mounting bolts to 53-72 ft -lb (7.3-9.9 mkg)
- 5 Bleed the brakes as described under *Brake Bleeding* later in this chapter

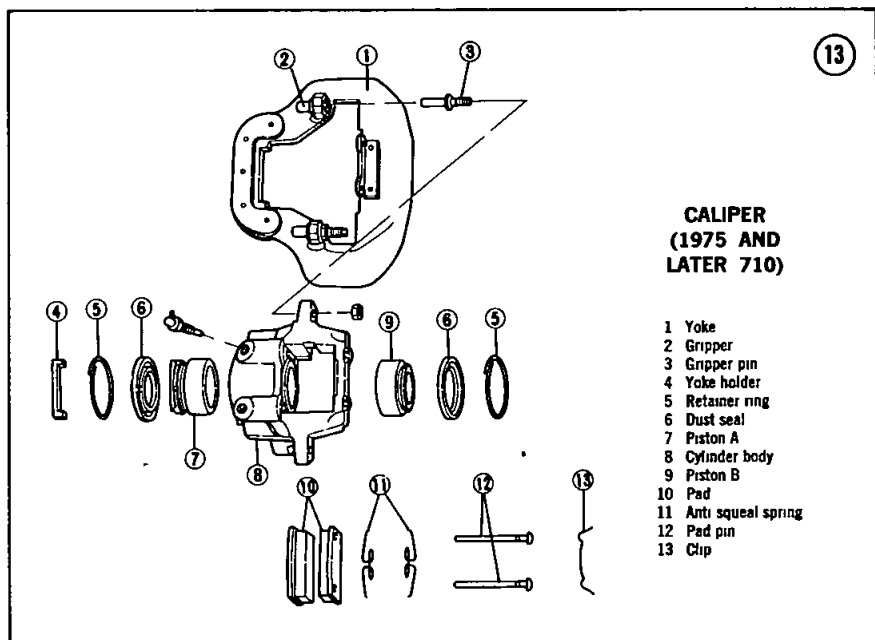
Caliper Overhaul (1975 and Later 710)

Refer to Figure 13 for this procedure

- 1 Pour the brake fluid out of the caliper. Clean the outside of the caliper with rubbing alcohol
- 2 Remove the nut from each gripper pin (3, Figure 13). Take the cylinder body out of the yoke
- 3 Remove the yoke holder (4, Figure 13) from piston A. Remove the retaining ring and dust seal from each end of the cylinder body
- 4 Remove the pistons. If necessary, force the pistons out with compressed air. Service station air hoses work well for this

WARNING

The pistons may shoot out with extreme force. Place a block of wood in the



space which holds the brake pads. Point piston A (7, Figure 13) at a block of wood on the ground. Apply compressed air gradually.

5 Once the pistons are out, remove the piston seals. Use fingers only so the cylinder bore won't be scratched.

6 If the grippers are worn or damaged, remove them from the yoke. Otherwise, leave them in place.

7 Check the yoke for wear, cracks, or other defects. Replace if any of these can be seen. If serviceable, clean the yoke with rubbing alcohol.

8 Inspect the cylinder bore. Replace the cylinder body if wear or damage can be seen. Light rust or dirt may be removed with fine emery paper. Replace the cylinder body if dirt or rust is severe. If serviceable, clean the cylinder body with rubbing alcohol.

9 Inspect the pistons. Since they are chrome plated, they cannot be sanded. If the pistons can't be cleaned with chrome cleaner and a rag, replace them.

10 Install new piston seals, using fingers only so the cylinder won't be scratched.

NOTE *Never reuse piston seals. In addition to stopping leaks, the seals retract the pistons when the brake pedal is let up. Very minor damage or deterioration can ruin the seals.*

11 Coat the cylinder bore with brake fluid. Apply rubber grease or brake fluid to the pistons, then insert them into the cylinder.

NOTE *Pistons A and B are not interchangeable. Refer to Figure 12 to make sure that they are installed correctly.*

12 Align the yoke grooves in piston A with those in the cylinder body.

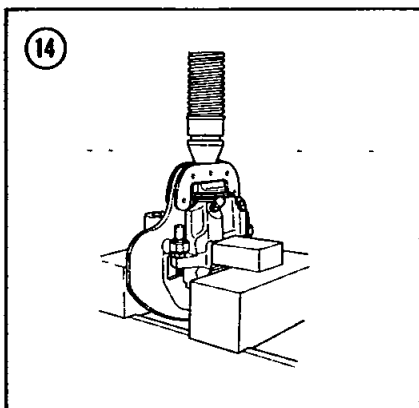
13 Apply disc brake grease to the sealing surfaces on the dust seals. Install the dust seals and retaining rings. Wipe off any excess grease with rubbing alcohol.

14 Install the yoke holder (4, Figure 13) in piston A.

15 If the grippers were removed, install them. Use a 1% soap solution (one teaspoon soap in 2

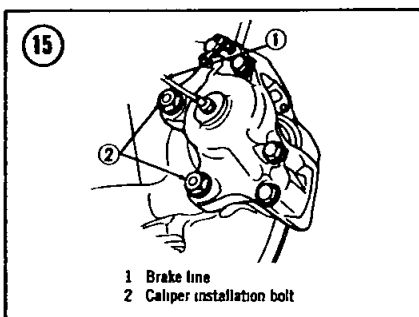
cups of water) to lubricate the grippers. Do not use a stronger soap solution.

16 Position the cylinder body in the yoke. Align the yoke holder with the yoke, then press them together (Figure 14). This requires a force of 44-66 lb (20-30 kg).



Caliper Removal/Installation (Z Sports Car)

- 1 Remove the brake pads as described earlier.
- 2 Disconnect caliper brake line (1, Figure 15). Remove the caliper installation bolts (2), then the caliper.



- 3 Install by reversing Steps 1 and 2. Tighten the caliper installation bolts to 53-71 ft-lb (7.3-9.9 mkg). Bleed the brakes and pump the brake pedal several times to seat the pads. Drive the car enough to make sure brakes work properly.

Overhaul

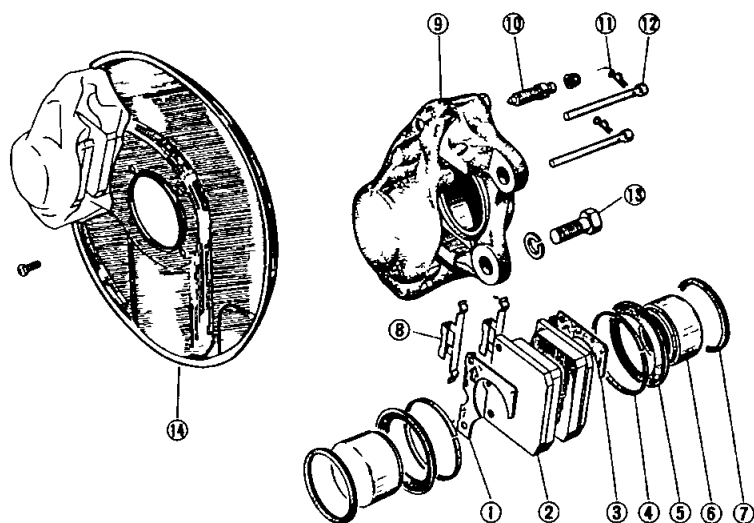
Figure 16 is an exploded view of a Z brake caliper

- 1 Thoroughly clean the outside of the caliper with alcohol before taking it apart
- 2 Remove the retaining rings and dust covers from the cylinders
- 3 Insert a thin piece of wood between the caliper pistons. Blow compressed air into the brake hose hole to force the pistons out. Use a service station air hose if you don't have a compressor. If one piston moves more easily than the other, hold it down with the wood so the air will loosen the other piston

WARNING

The pistons may come out with considerable force. Be sure your fingers are out of the way

- 4 Clean internal parts with alcohol. Discard piston seals and dust covers
- 5 Inspect pistons and cylinder walls. Replace the caliper if they are scored or worn. Small amounts of dirt or corrosion may be removed from cylinder walls with fine emery paper. Pistons are chrome plated; if they can't be cleaned without abrasives, they must be replaced
- 6 Coat new piston seals with brake fluid. Install them in the cylinders. Coat pistons and



BRAKE CALIPER — Z CARS

- | | | |
|--------------------|----------------------|------------------------|
| 1 Anti-squeal shim | 6 Piston | 11 Clip |
| 2 Pad | 7 Piston seal | 12 Retaining pin |
| 3 Anti-squeal shim | 8 Anti-squeal spring | 13 Caliper fixing bolt |
| 4 Retaining ring | 9 Caliper assembly | 14 Backing plate |
| 5 Dust cover | 10 Bleeder | |

cylinder walls with brake fluid. Install the dust covers on the pistons. Insert the pistons into the cylinders. Secure the dust covers with their retaining rings.

BRAKE DISCS

Inspection

- 1 Loosen the front wheel nuts, jack up the front end of the car, place it on jackstands, and remove the front wheels.
- 2 Remove the caliper as described earlier.
- 3 Check wheel bearing adjustment as described in Chapter Twelve.
- 4 With a dial indicator contacting the center of the disc's swept area, rotate the disc one full turn and measure runout. Compare with specifications Table 1 at the end of the chapter.
- 5 Using a micrometer, measure disc thickness at several points around the center of the disc's swept area. Note the smallest measurement, as well as the variation between readings. Compare both with specifications at the end of the chapter.
- 6 If the disc is thinner than the minimum, replace it. If runout or thickness variation exceed the maximum, have the disc turned by a machine shop. Do not cut the disc thinner than the minimum specification.

Disc Removal/Installation

- 1 Loosen the front wheel nuts, jack up the front end of the car, place it on jackstands, and remove the front wheels.
- 2 Remove the caliper as described earlier.
- 3 Remove the wheel bearing grease cap and locknut as described in Chapter Twelve.
- 4 Grasp the brake disc with both hands. Pull it off, together with the wheel hub.
- 5 Remove 4 bolts and separate the brake disc from the hub.
- 6 Bolt the disc to the hub. Tighten the bolts to specifications given in Table 2 at the end of the chapter.
- 7 Pack the wheel bearings with grease as described in Chapter Twelve.
- 8 Install the hub and brake disc on the bearing

spindle. Adjust the bearing preload as described in Chapter Twelve.

9 Install the caliper.

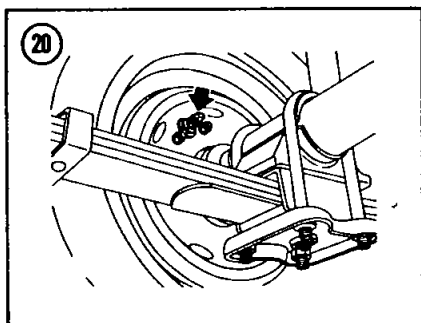
10 Install the front wheels, lower the car, and bleed the brakes.

REAR DRUM BRAKES (CARS)

Figure 17 shows the rear brakes used on 1200's and B210's. Figure 18 shows the 510 and 610 rear brakes. The 710 brakes are basically the same, but the upper return spring has only one coil. Figure 19 shows the Z sports car rear brakes.

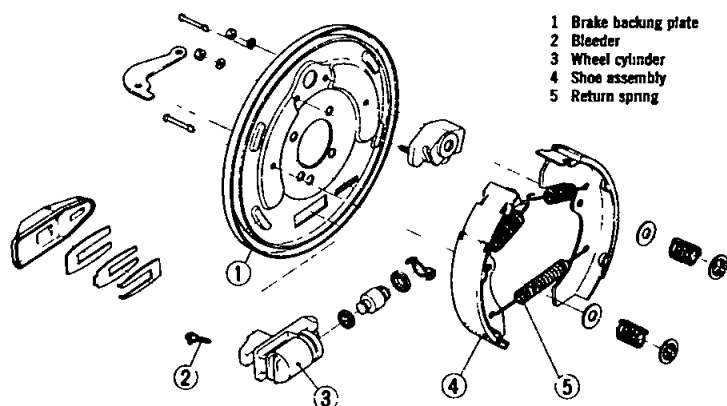
Removal

- 1 Loosen the front wheel nuts, jack up the front end of the car, place it on jackstands, and remove the front wheels.
- 2 Make sure the handbrake is all the way off.
- 3 Pull the drum off. If the drum is difficult to remove (all except Z sports car) back off the adjuster cam (Figure 20). On Z sports cars, disconnect the handbrake cable from the wheel cylinder lever. Pull the rubber plug out of the brake drum. Insert a screwdriver in the adjusting hole and push the self-adjuster lever away from the adjuster wheel (Figure 21, page 179). Turn the adjuster wheel downward to loosen the shoes.



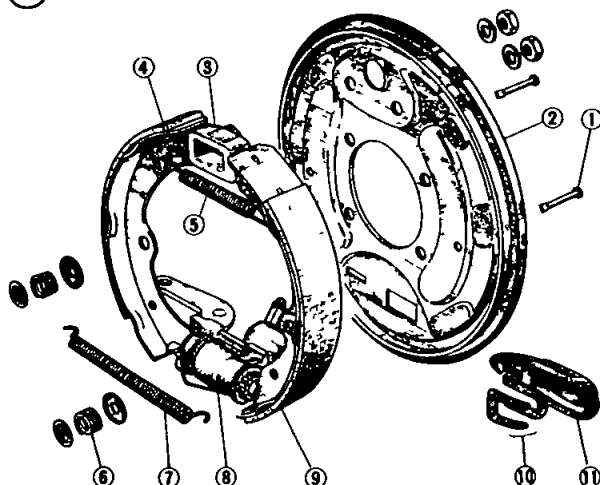
- 4 Twist the anti-rattle pins $\frac{1}{4}$ turn with pliers. Remove the pins, retaining washers, springs, and spring washers.
- 5 Remove the return springs. Lift the brake shoes off.

17

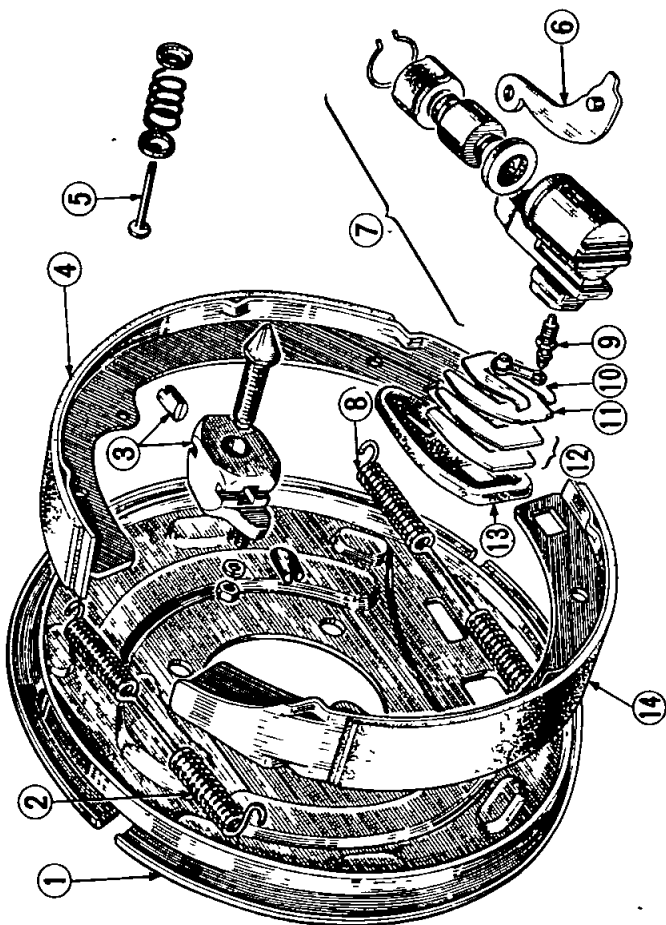


REAR DRUM BRAKES—1200 AND B210

19

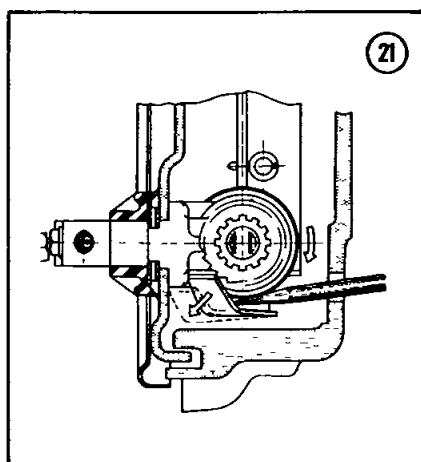
REAR DRUM BRAKES
(Z CARS)

18



REAR DRUM BRAKES — 510 AND 610

- | | | |
|-------------------------------|-------------------------------|------------------------|
| 1 Backing plate | 6 Lever | 11 Lock plate B |
| 2 Return spring adjuster side | 7 Rear wheel cylinder | 12 Lock plate C and D |
| 3 Brake shoe adjuster | 8 Return spring cylinder side | 13 Dust cover |
| 4 Brake shoe assembly | 9 Bleeder | 14 Brake shoe assembly |
| 5 Anti rattle pin | 10 Lock plate A | |



- 6 On all except Z sports cars, remove the adjuster securing nut(s) and take the adjuster off
- 7 If wheel cylinder overhaul is planned, disconnect the brake line from the cylinder. Detach the handbrake rod or cable, remove the lock plates, and take the cylinder out
- 8 Backing plate removal requires removal of the rear axle shaft or spindle. Removal is rarely necessary for normal brake service. If it is necessary, refer to procedures in Chapter Eleven

Inspection

- 1 Clean all parts except the wheel cylinder in alcohol
- 2 Check drums for visible scoring, excessive or uneven wear, or corrosion. Measure the drums for wear and out-of-roundness. Compare with specifications in Table 1 (end of chapter). If the drum is out-of-round or otherwise defective, it can be turned by a machine shop. However, drum diameter must not exceed the maximum specified in Table 1
- 3 Inspect the lining material on the brake shoes. Make sure it is not cracked, unevenly worn, or separated from the shoes. If linings are only slightly oily or greasy, and not excessively worn, they may be cleaned in trichloroethylene and reused. If linings are saturated with oil or grease, or contaminated

with brake fluid, they must be replaced. Linings must also be replaced if worn thinner than $\frac{1}{16}$ in (1.5mm)

- 4 Check the anti-rattle springs, adjuster parts, and handbrake operating arm for wear or damage. Replace as needed
- 5 Check return springs for weakness or deformation. Replace if there is doubt about spring condition

Wheel Cylinder Overhaul

Figure 22 shows the wheel cylinder used on 1200's, B210's, 510's, and 610's. The 710 cylinder is basically the same, but uses a slightly different snap ring and dust cover.

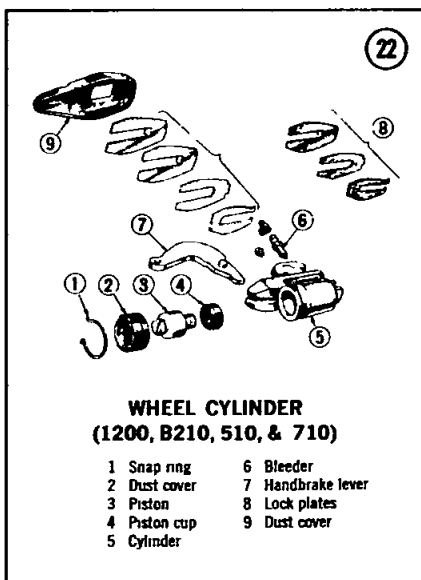
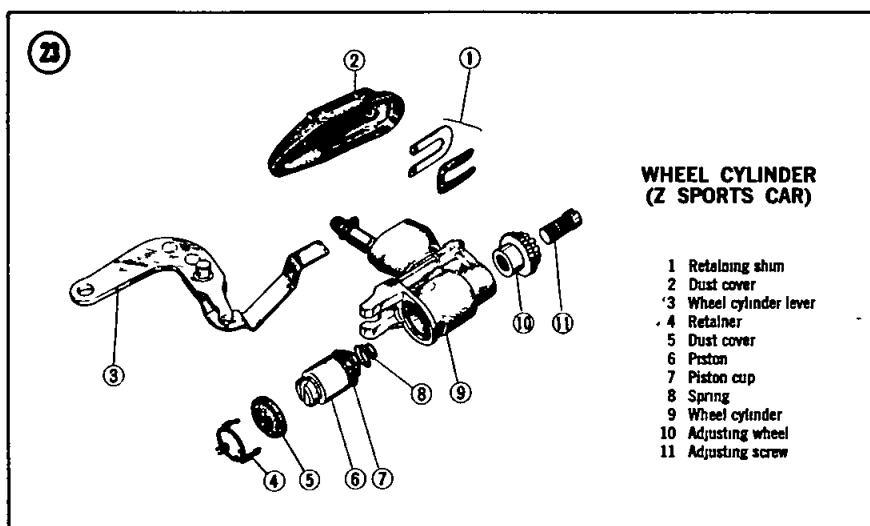


Figure 23 shows a 240Z wheel cylinder. The 260-280Z version is the same except for a modified clip ring and dust cover.

- 1 Remove the snap ring and dust cover. Take out the piston and cup. If so equipped, remove the return spring
- 2 Discard the piston cup
- 3 On Z sports cars, remove the adjuster wheel and screw from the cylinder



4 Clean the cylinder parts in alcohol. Do not immerse rubber parts in alcohol for more than 30 seconds.

5 Check the cylinder bore and piston for scoring, cracks, corrosion, dirt, or excessive wear. Check the outside of the cylinder for wear at its contact points with the brake shoes. Replace as needed.

6 As a final check on a suspect cylinder and piston, measure the cylinder bore and piston diameter. If the difference between these figures is more than 0.006 in. (0.15mm), replace the wheel cylinder.

7 Coat a new piston cup with brake fluid. Install it on the piston. The lip of the cup faces into the cylinder.

8 Coat the cylinder bore with brake fluid.

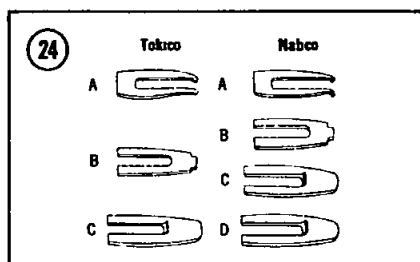
9 Install the return spring (if so equipped). Install the piston and cup. Install the dust cover and secure it with the snap ring. On Z sports cars, install the adjuster wheel and screw.

Brake Installation

Installation is the reverse of the removal procedure, plus the following:

1 Tokico wheel cylinders use 3 lock plates, Nabco wheel cylinders use 4 (all except the Z

sports car). Install the lock plates in the order and direction shown in Figure 24.



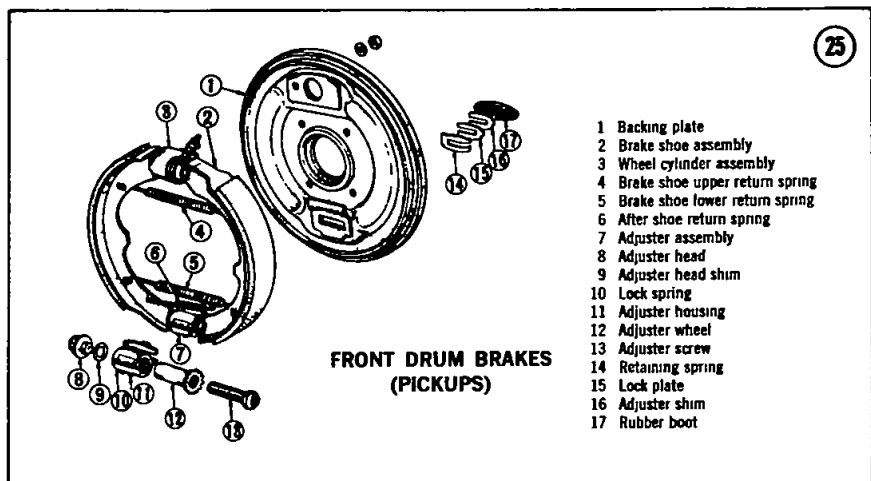
2 Apply brake grease to the metal-to-metal friction points in the brake assembly. Do not let grease touch the brake linings.

3 On all except 240-260Z's, tighten adjuster securing nut(s) to specifications (end of chapter).

4 After installation, bleed and adjust the brakes as described later in this chapter.

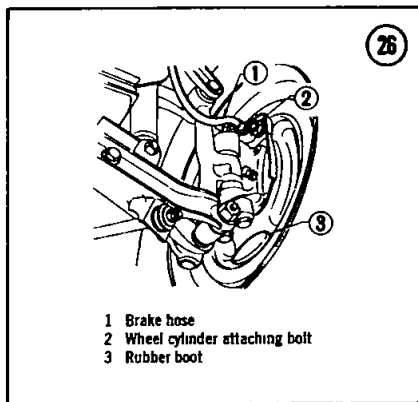
FRONT DRUM BRAKES (PICKUPS)

Figure 25 shows the front brakes used on 521 and 620 pickups.



Removal

- 1 Loosen the front wheel nuts, jack up the front end of the truck, place it on jackstands, and remove the front wheels
- 2 Pull the brake drum off. If the drum does not come off easily, remove the boot from the adjuster (Figure 26). Turn the adjuster wheel upward to loosen the shoes.



- 3 Remove the hub assembly (Chapter Twelve)
- 4 Unhook the shoe return springs, then remove the brake shoes.

- 5 If wheel cylinder overhaul is planned, disconnect the hose from the wheel cylinder (see Figure 26). Remove the cylinder attaching nut and take the cylinder out of the backing plate.
- 6 Remove the retaining spring, shim, and lock plate securing the adjuster. Take adjuster out.
- 7 If necessary, remove 4 bolts and lift the brake backing plate off the spindle. Backing plate removal is rarely necessary for normal brake service.

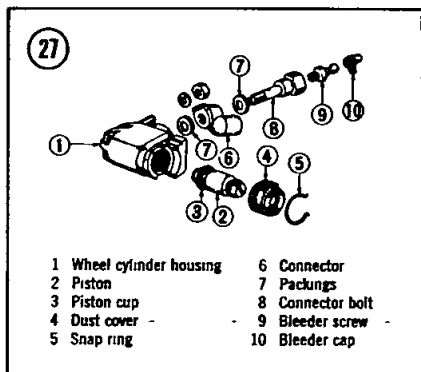
Inspection

Inspection is basically the same as for the car rear brakes, described earlier in this chapter. Maximum permissible drum diameter is 10.059 in (255.5mm). Minimum lining thickness is 0.039 in (1mm).

Wheel Cylinder Overhaul

Figure 27 shows the wheel cylinder parts.

- 1 Remove the snap ring and dust cover.
- 2 Remove the piston and cup. Take the cup off the piston and discard it.
- 3 Remove the bleed valve, connector bolt, and connector.
- 4 Clean all parts in alcohol. Do not immerse rubber parts in alcohol for more than 30 seconds.



5 Check the cylinder bore and piston for scoring, cracks, corrosion, dirt, or excessive wear. Check cylinder body and piston for wear in their brake shoe slots. Replace the cylinder assembly if any of these conditions are found.

6 As a final check on a suspect cylinder and piston, measure diameter of the piston and cylinder bore. If the difference between these measurements is more than 0.006 in (0.15mm), replace the cylinder assembly.

7 Coat a new piston cup with brake fluid. Install it on the piston. The lip of the cup faces in to the cylinder.

8 Coat the piston and cylinder bore with brake fluid. Install the piston, then the dust cover and snap ring.

9 Install the connector and bolt. Then tighten to 14-18 ft-lb (1.9-2.5 mkg).

Brake Installation

Installation is the reverse of the removal procedure, plus the following:

1 Apply brake grease to the adjuster housing bore, adjuster wheel and adjuster screw. Apply brake grease to the metal-to-metal friction points in the brake assembly. Don't let grease touch the brake linings.

2 Be sure the wheel cylinder marked "L" goes on the left side of the truck, the cylinder marked "R" goes on the right. Tighten the wheel cylinder nut to 39-48 ft-lb (5.4-6.6 mkg).

3 If the hub was removed, adjust the front wheel bearings (Chapter Twelve).

4 After installation, adjust and bleed the brakes as described later in this chapter.

REAR DRUM BRAKES (PICKUPS)

Figure 28 shows the rear drum brakes used on 521 and 620 pickups.

Removal

1 Loosen the rear wheel nuts, jack up the rear end of the truck, place it on jackstands, and remove the rear wheels.

2 Make sure the handbrake is off, then remove the brake drum. If the drum is difficult to remove, turn the adjuster wheel upward to loosen the shoes.

3 Turn the anti-rattle springs 90° with pliers. Remove the pins, retaining collars, springs, and spring washers.

4 Spread the brake shoes and remove the extension link.

5 Remove the return springs, then the brake shoes. The rear shoe must be pulled partway off, then separated from the toggle lever.

6 Disconnect the toggle lever from the hand-brake cable.

7 Remove the lock plate, adjuster shim, and adjuster spring. Take the adjuster out.

8 If wheel cylinder overhaul is planned, disconnect the brake line and remove the cylinder attaching nuts. Take cylinder out of the backing plate.

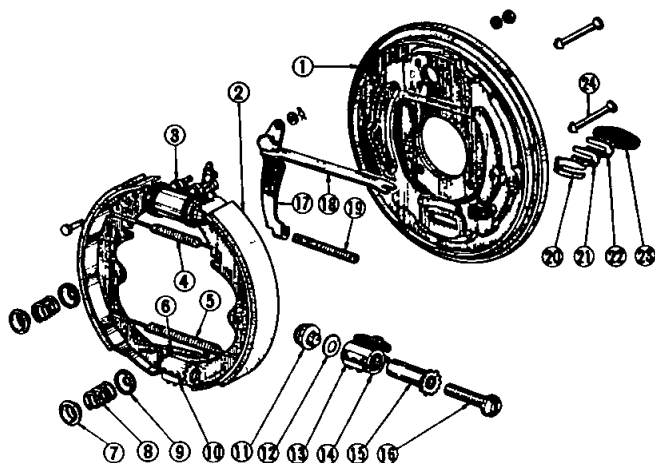
9 Backing plate removal — rarely necessary for brake service — requires removal of the rear axle shaft and wheel bearing. See Chapter Eleven for removal procedures.

Inspection

Inspection is basically the same as for car rear brakes, described earlier in this chapter. Maximum permissible drum diameter is 10.059 in (255.5mm). Minimum lining thickness is 0.039 in (1mm).

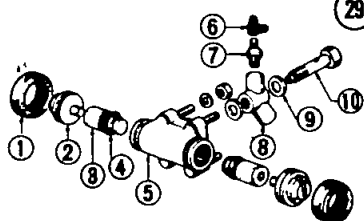
Wheel Cylinder Overhaul

Figure 29 shows the rear wheel cylinder parts. Overhaul procedures are basically the same as



REAR DRUM BRAKES — PICKUPS

- | | | |
|----------------------------|-----------------------|--------------------|
| 1 Backing plate | 9 Spring seat | 17 Toggle lever |
| 2 Brake shoe assembly | 10 Adjuster assembly | 18 Extension link |
| 3 Wheel cylinder assembly | 11 Adjuster head | 19 Return spring |
| 4 Return upper spring | 12 Adjuster head shim | 20 Adjuster spring |
| 5 Return lower spring | 13 Lock spring | 21 Lock plate |
| 6 After shoe return spring | 14 Adjuster housing | 22 Adjuster shim |
| 7 Retainer | 15 Adjuster wheel | 23 Rubber boot |
| 8 Anti rattle spring | 16 Adjuster screw | 24 Anti rattle pin |



- | | |
|--------------------------|-------------------|
| 1 Dust cover | 6 Bleeder cap |
| 2 Piston head | 7 Bleeder screw |
| 3 Piston | 8 Connector |
| 4 Piston cup | 9 Washer |
| 5 Wheel cylinder housing | 10 Connector bolt |

for truck front wheel cylinders, described earlier in this chapter

Brake Installation

Installation is the reverse of the removal procedure, plus the following

- 1 Clearance between the rearmost brake shoe and toggle lever must range from zero to 0.012 in (0-0.3mm). If necessary, adjust by installing a thicker or thinner washer on the toggle lever pivot pin.
- 2 Apply brake grease to all metal-to-metal friction points in the rear brakes. Don't let grease touch the brake linings.
- 3 Tighten the wheel cylinder attaching nuts to 11-13 ft-lb (1.5-1.8 mkg).

4 After installation, adjust and bleed the brakes as described later in this chapter

MASTER CYLINDER

Datsun master cylinders are manufactured by Nabco and Tokico. All cars and late model pickups use a dual-piston master cylinder. Early pickups use single-piston master cylinders. **Figure 30** shows a typical Nabco master cylinder, **Figure 31** shows a Tokico master cylinder. **Figure 32** shows the single-piston cylinder used in early pickups.

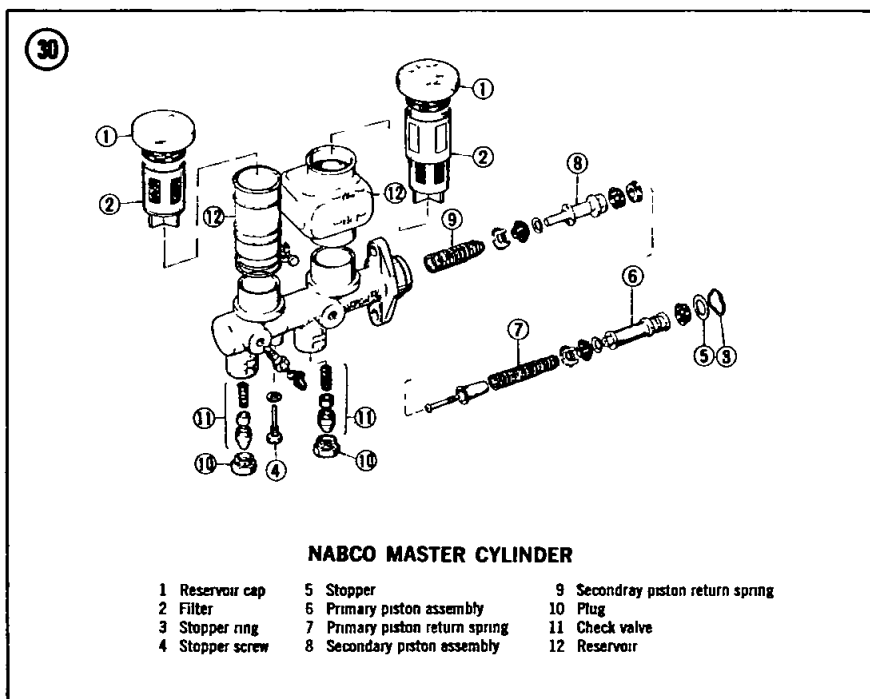
Removal/Installation

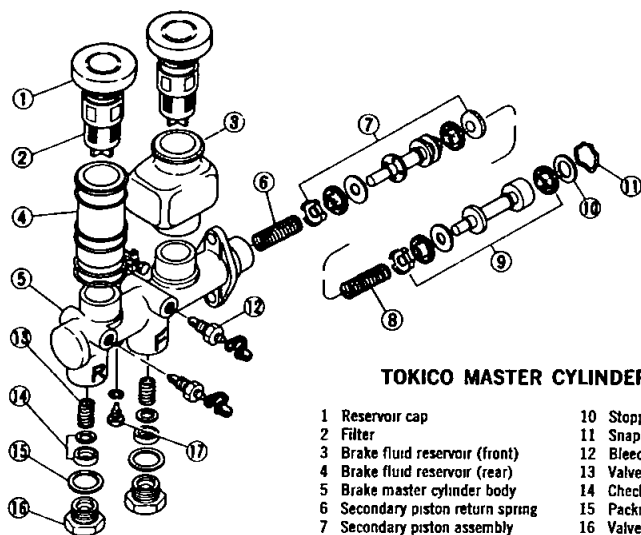
- 1 On cars without power brakes, disconnect the pushrod from the brake pedal.
- 2 Disconnect the brake lines from the master cylinder.

CAUTION

Place rags beneath the master cylinder to keep brake fluid off the paint.

- 3 Remove 2 master cylinder installation nuts, then lift the cylinder out. **Figure 33** shows a typical power brake master cylinder. The non-power version is similar, but is attached to the firewall instead of the brake booster.

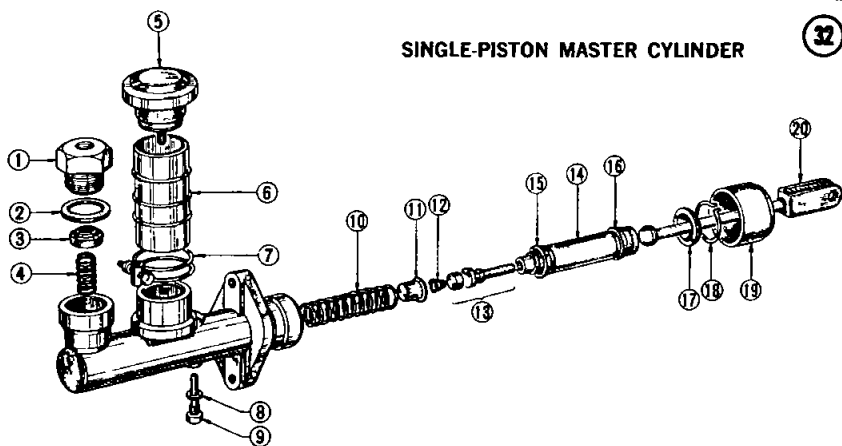




31

TOKICO MASTER CYLINDER

- | | |
|----------------------------------|-------------------------|
| 1 Reservoir cap | 10 Stopper |
| 2 Filter | 11 Snap ring |
| 3 Brake fluid reservoir (front) | 12 Bleeder |
| 4 Brake fluid reservoir (rear) | 13 Valve spring |
| 5 Brake master cylinder body | 14 Check valve assembly |
| 6 Secondary piston return spring | 15 Packing |
| 7 Secondary piston assembly | 16 Valve cap |
| 8 Primary piston return spring | 17 Stopper screw |
| 9 Primary piston assembly | |



32

SINGLE-PISTON MASTER CYLINDER

- | | | | |
|----------------------|-------------------------|-----------------------|-------------------------|
| 1 Valve cap | 6 Reservoir | 11 Spring seat | 16 Secondary piston cup |
| 2 Valve cap gasket | 7 Reservoir band | 12 Spring | 17 Stopper ring |
| 3 Check valve | 8 Packing | 13 Valve | 18 Snap ring |
| 4 Check valve spring | 9 Stopper bolt | 14 Piston | 19 Rubber boot |
| 5 Oil reservoir cap | 10 Piston return spring | 15 Primary piston cup | 20 Pushrod |

4 Installation is the reverse of these steps
Bleed the brakes and check pedal height after installation

Disassembly

Refer to the appropriate exploded view for this procedure

- 1 Remove the stopper bolt(s) and drain the brake fluid from the cylinder
- 2 Remove the snap ring. Take out the stopper, pushrod (non-power brakes), piston assemblies, and return springs

CAUTION

Remove the piston(s) carefully to prevent damage to the piston and cylinder friction surfaces

- 3 Remove the cap screw(s). Take out the check valve(s) and spring(s)

NOTE *Do not remove the brake fluid reservoirs unless installing new ones*

Inspection

- 1 Thoroughly clean all parts in alcohol or brake fluid. Do not immerse rubber parts in alcohol for more than 30 seconds
- 2 Discard the piston cups, check valves, and packing rings

Check the cylinder bore and pistons for excessive or uneven wear, scoring, or corrosion. Wear is excessive if clearance between cylinder wall and piston exceeds 0.006 in (0.15mm). Replace the master cylinder if these conditions are evident

- 3 Check springs for wear, damage, or weakness. Replace as needed
- 4 Inspect the bleed valves, stopper screws, check valve cap screws, and fluid reservoirs for wear or damage. Replace as needed

Assembly

Assembly is the reverse of the disassembly procedure, plus the following

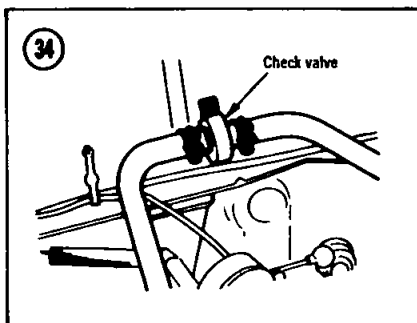
- 1 Coat the cylinder bore, pistons, and cups with brake fluid before assembly
- 2 After installation, bleed the brakes and check for brake fluid leaks

BRAKE BOOSTER

The Master-Vac brake booster uses intake manifold vacuum to reduce braking effort. The booster is used on B210's, 610's, 710's, late model pickups, and Z sports cars. The booster and its check valve should be tested at intervals specified in Chapter Two.

Check Valve Test

- 1 Remove the check valve from its clip on the firewall (Figure 34)

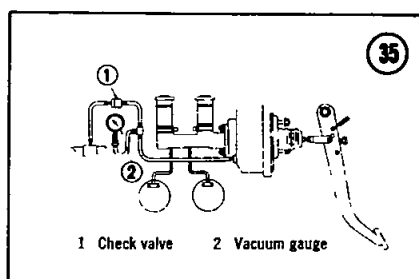


- 2 Disconnect the vacuum line from the booster side of the valve. Connect a vacuum gauge in its place

- 3 Run the engine at a fast idle. Turn the engine off when vacuum reaches about 20 in (500mm)
- 4 With the engine off, watch the vacuum gauge for 15 seconds. Any vacuum drop, even a slight one, indicates a defective check valve or vacuum line. If no defect can be seen in the vacuum line, replace the check valve

Air-tightness Test (No Load)

- 1 Using a T-fitting, connect a vacuum gauge into the line between check valve and brake booster. See Figure 35
- 2 Run the engine at a fast idle. Turn it off when vacuum reaches about 20 in (500mm)
- 3 With the engine off, watch the vacuum gauge for 15 seconds. Any vacuum drop indicates a defective vacuum line or brake booster. If no defects can be found in the vacuum line, the brake booster must be overhauled or replaced



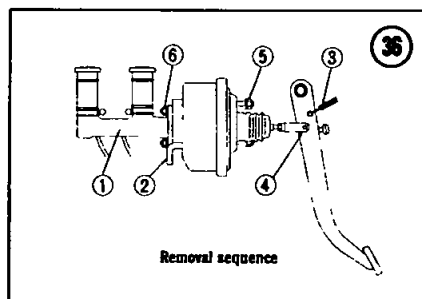
Air-tightness Test (Under Load)

- 1 Connect a vacuum gauge as described in Step 1 of the previous procedure. Place the gauge where it can be seen from the driver's seat, or have an assistant watch it for you.
- 2 With the engine running, press the brake pedal as far as it will go.
- 3 When vacuum reaches approximately 20 in (500mm), shut the engine off. Keep the brake pedal down.
- 4 Watch the gauge for 15 seconds after the engine is shut off. Any vacuum drop indicates a defective brake booster. Overhaul or replacement is necessary.

Booster Removal/Installation

Refer to **Figure 36** for this procedure.

- 1 Disconnect the brake lines (1, **Figure 36**) from the master cylinder.



- 2 Detach the vacuum line from the fitting on the brake booster (2).
- 3 Detach the return spring (3) and pushrod (4) from the pedal.

- 4 Remove the nuts attaching the booster to the firewall (5).
- 5 Lift the booster out of the engine compartment.

- 6 Remove the nuts attaching the master cylinder to the booster (6). Separate the master cylinder and booster.

6 Installation is the reverse of these steps. After installation, bleed the brakes, test the booster as described earlier, and check pedal height. If necessary, adjust pedal height as described later in this chapter.

PROPORTIONING VALVE

The proportioning valve, used on cars with disc brakes, prevents premature rear wheel lockup.

Testing

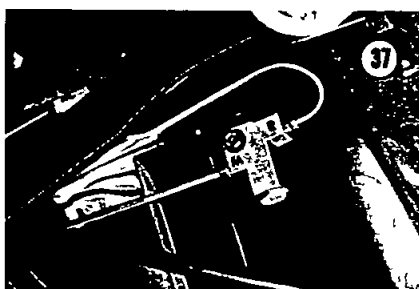
Test the proportioning valve at intervals specified in Chapter Two. To test, drive the car at a speed in excess of 31 mph (50 kph). Brake hard enough to lock the wheels *slightly*. If the front wheels lock before or at the same time as the rear wheels, the valve is working properly. If the rear wheels lock first, the valve is defective and must be replaced.

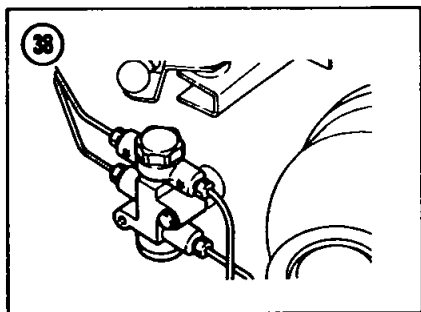
CAUTION

Do not lock the wheels completely when braking, or the tires will be flat-spotted.

Replacement

On early cars, the proportioning valve is mounted near the rear axle (**Figure 37**). On later cars, the valve is mounted on the firewall. **Figure 38** shows a typical installation.





To remove the valve, disconnect the brake lines, noting carefully how they are connected. Remove the securing bolt and take the valve out. Bleed the brakes after installing the new valve.

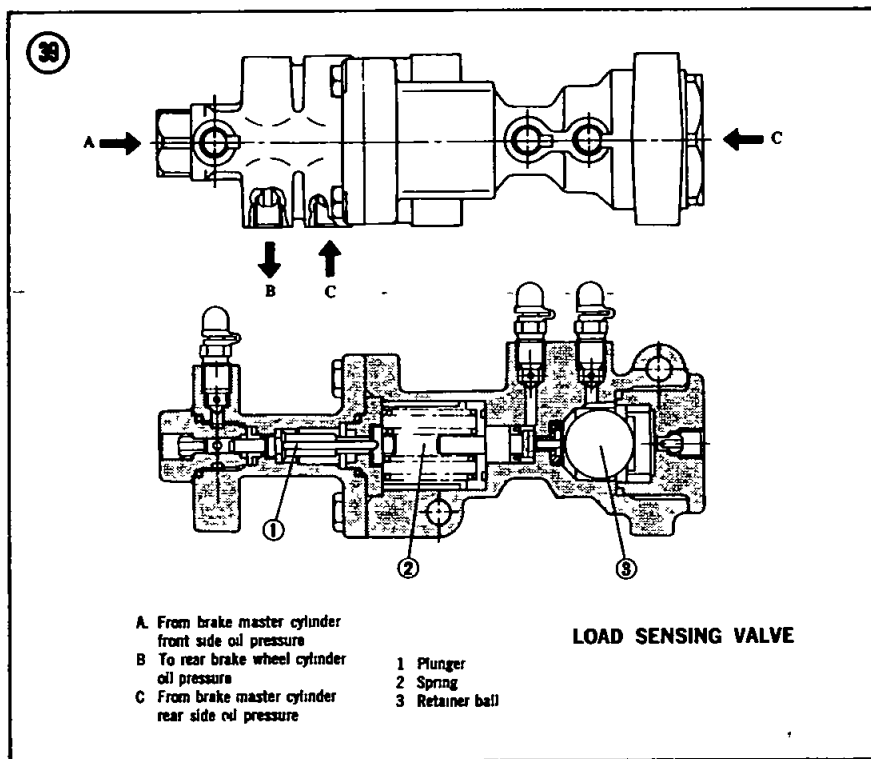
LOAD SENSING VALVE

This valve, used on 1976 models, prevents premature rear wheel lockup by regulating pressure to the front and rear brakes. When the truck is lightly loaded, pressure to the rear brakes is reduced. As the load increases, pressure to the rear brakes increases accordingly. Figure 39 shows the valve.

Valve Test

The braking system must be in good condition to test the valve accurately. Make any necessary repairs before testing.

1. Drive at 30 mph with the truck unloaded. Apply the brakes hard enough to lock the wheels *slightly*. Stopping distance must be 43 ft (13.1 m) or less, and the front wheels must lock before or at the same time as the rear wheels.



2 Repeat the test with a load in the truck's bed. Again, stopping distance should be less than 43 ft, and the rear wheels must not lock before the front wheels.

3 If the valve fails either part of this test, replace it.

BRAKE BLEEDING

The hydraulic system should be bled whenever air enters it, reducing braking effectiveness. If the pedal feels spongy, or if pedal travel increases considerably, brake bleeding is usually called for. Bleeding is also necessary whenever a hydraulic line is disconnected.

This procedure requires handling brake fluid. Be careful not to get any fluid on brake pads, shoes, drums, or discs. Clean all dirt from bleed valves before beginning. Two people are required, one to operate the brake pedal and the other to open and close the bleed valves.

Bleeding should be conducted in the following order: master cylinder, right rear, left rear, right front, left front.

1 Clean away any dirt around the master cylinder reservoir. Top up the reservoir with brake fluid marked DOT 3 or DOT 4.

2 Attach a plastic tube to the bleed valve. Dip the end of the tube in a jar containing several inches of clean brake fluid.

NOTE: Do not allow the end of the tube to come out of the brake fluid during bleeding. This could allow air into the system, requiring that the bleeding process be repeated.

3 Press the brake pedal as far as it will go 2 or 3 times, then hold it down.

4 With the brake pedal down, open the bleed valve until the pedal goes to the floor, then close the bleed valve. Do not let the pedal up until the bleed valve is closed.

5 Let the pedal back up slowly.

6 Repeat Steps 3-5 until the fluid entering the jar is free of air bubbles.

7 Repeat the process for the other bleed valves.

NOTE: Keep an eye on the brake fluid level in the master cylinder during --

bleeding. If the reservoirs are allowed to become empty, air will be sucked into the hydraulic system and the entire bleeding procedure will have to be repeated.

ADJUSTMENTS

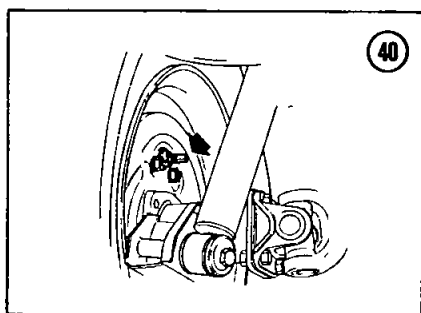
Disc Brakes

Datsun disc brakes never need adjustment, and no means of manual adjustment is provided.

Rear Drum Brakes

(1200, B210, 510, 610, 710)

Rear drum brakes are adjusted by turning a cam (Figure 40).



1 Jack up the rear end of the car and place it on jackstands.

2 Tighten the adjuster cam with a wrench until the brake shoes begin to drag.

3 Back off the adjuster cam just enough so the shoes don't drag. Remove the jackstands and lower the car.

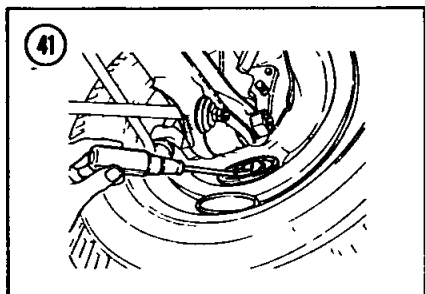
Front and Rear Drum Brakes (Pickups)

Figure 41 shows the adjusting hole for pickup front brakes. The rear adjusting hole is similar.

1 Jack up the truck and place it on jackstands. Remove the rubber plug from the adjusting hole.

2 Reach through the hole with a screwdriver. Tap the adjuster lightly to free it, then push it toward the front of the truck.

3 Turn the adjuster wheel downward to spread the brake shoes. At the same time, spin the tire by hand until a strong drag is felt. At this point,



stop spinning the tire. Keep turning the adjuster wheel until the brake drums locked.

4 Turn the adjuster wheel upward 12 notches. This gives the correct clearance between brake shoes and drum.

5 Spin the tire. Make sure it spins smoothly without excessive brake drag. Back the adjuster off further if necessary.

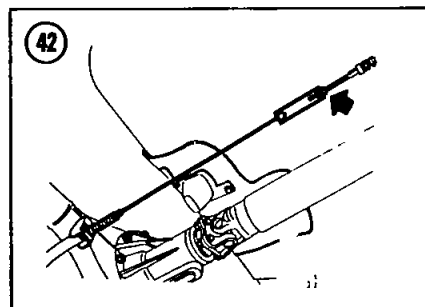
6 Install adjusting hole plug. Lower the truck.

Rear Drum Brakes (Z Sports Car)

The rear drum brakes are self-adjusting. Adjustment is usually unnecessary, except after brake service. To adjust, simply pull the handbrake lever until no more clicks are heard from the adjuster mechanisms at the rear wheels.

Handbrake (1200 and B210)

The handbrake is adjusted by a turnbuckle located alongside the drive shaft (Figure 42). It should be readjusted whenever the lever can be raised 10 notches.

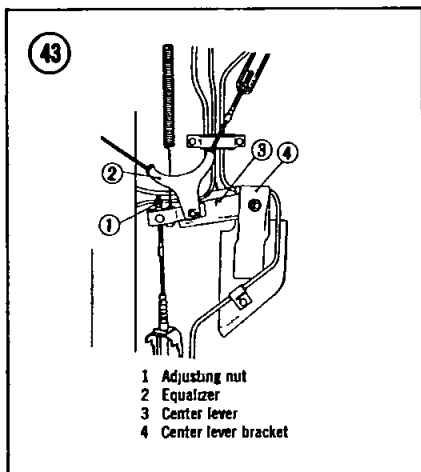


To adjust, tighten or loosen the turnbuckle so the handbrake can be raised 6 notches with a pull of 25-33 pounds. After adjusting, tighten the locknut on the turnbuckle. Make sure the handbrake releases completely.

Handbrake (510 and 610 Sedan and Hardtop)

1 If necessary, tighten the rear cable adjuster (Figure 43) to take up slack in the rear cable.

NOTE: Do not tighten cable enough to move the wheel cylinder levers.



2 Check the stroke of the handbrake lever or control stem. A 44 pound pull should give a stroke of $3\frac{1}{2}$ to $3\frac{3}{4}$ in. (510), $3\frac{1}{2}$ to 4 in. (1973 610), or $3\frac{1}{4}$ to $3\frac{3}{4}$ in. (1974-1976 610).

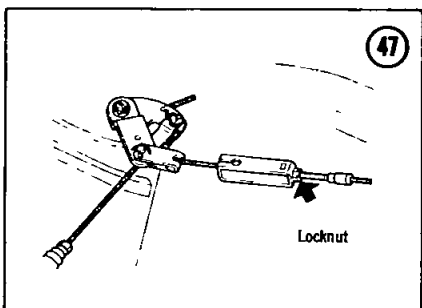
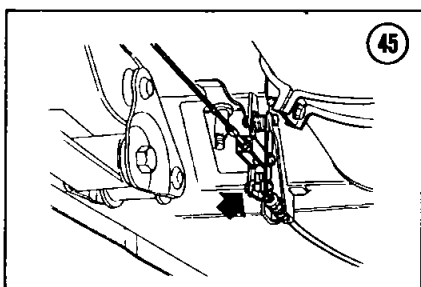
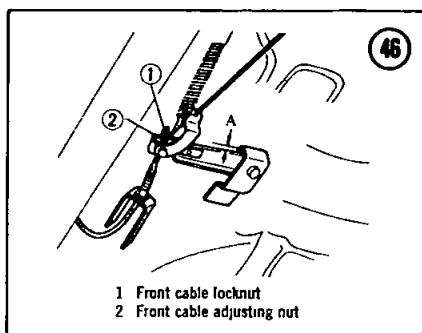
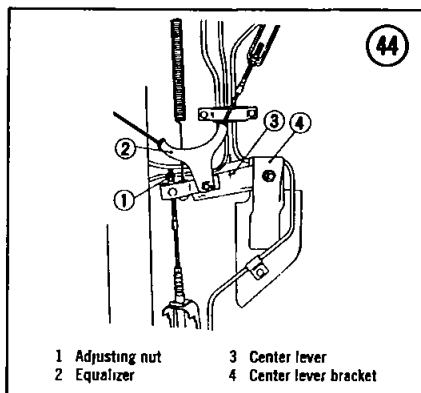
3 If necessary, turn the adjusting nuts on the handbrake rod (Figure 44) to change the stroke length.

4 Make sure handbrake releases completely.

Handbrake (510 and 610 Station Wagons)

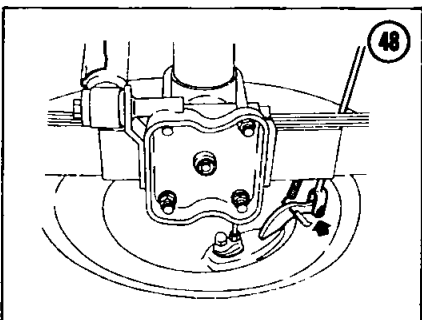
1 Check control stem or lever stroke. A 44 pound pull should give a stroke of 2-3 in. (510 wagon) or $3\frac{1}{4}$ to $3\frac{3}{4}$ in. (610 wagon).

2 If necessary, adjust the front cable or rod to change stroke length. Figure 45 shows the 610 adjusting nuts. The 510 arrangement is similar.



Handbrake (710)

- 1 Before adjusting the handbrake, adjust the rear brakes as described earlier in the *Adjustments* section of this chapter
- 2 Check handbrake stroke. A 44-lb (20 kg) pull should raise the handbrake lever to the 6th or 7th notch
- 3 To adjust the stroke on sedans and hardtops, loosen the locknut and adjusting nut (Figure 46). Turn the adjusting nut as needed, then secure with the locknut. After adjustment, dimension "A" in Figure 46 should be about 0.2 in (5mm).
- 4 To adjust the stroke on station wagons, loosen the locknut (Figure 47) and rotate the turnbuckle as needed. Then tighten the locknut.
- 5 After adjustment, make sure the wheel cylinder levers (Figure 48) return to their original position when the handbrake is released.



Handbrake (521 Pickup)

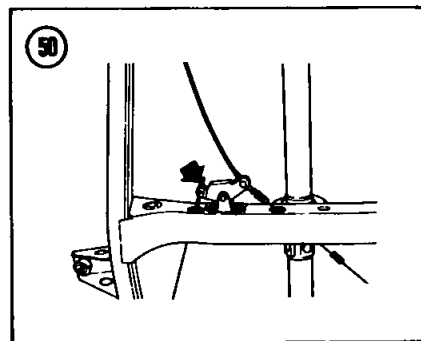
- 1 Loosen the locknut on the cable equalizer link (A, Figure 49). Turn the equalizer rod in or out of the link to adjust its length. After adjustment, the rod should protrude 1.161 in (29.5mm) forward of the frame member (dimension L, Figure 49).



2 Check handbrake control stem stroke. A pull of 44-66 pounds should give a stroke of $3\frac{1}{4}$ to 4 in. If necessary, adjust the front cable to change stroke length. The front cable is adjusted at the turnbuckle (B, Figure 49).

Handbrake (620 Pickup)

1 Check handbrake control stem stroke. A 44 pound pull should give a stroke of $3\frac{1}{4}$ to 4 in.
2 If adjustment is necessary, loosen the locknut (Figure 50). Rotate the adjusting nut to change cable length, then tighten the locknut.



Handbrake (Z Sports Car)

1 Release the handbrake lever. Make sure the handbrake operating arms (at the rear wheel cylinders) release all the way.
2 Turn the adjusting nut on the handbrake rod (1, Figure 51) to eliminate any play in the handbrake linkage.

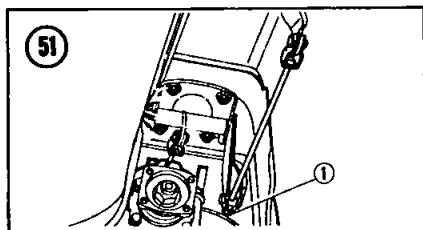


Table 1 BRAKE SPECIFICATIONS

Front Brake Discs (Cars)

Maximum runout	
1200	0.0012 in (0.03mm)
B210, 610	0.0048 in (0.12mm)
510, 710	0.0024 in (0.06mm)
240Z, 260Z	0.0059 in (0.15mm)
280Z	0.004 in (0.1mm)
Minimum thickness	
1200, B210, 510, 610, 710	0.331 in (8.4mm)
240Z, 260Z	0.413 in (10.5mm)
Maximum thickness variation	0.0028 in (0.07mm)

Brake Drums

Out-of-round	
1200, B210, 610, 710 pickups	0.0008 in (0.02mm)
510, Z sports car	0.002 in (0.05mm)
Maximum drum diameter	
1200, B210	8.051 in (204.5mm)
510, 610, 710, Z sports car	9.055 in (230mm)
Pickups	10.059 in (255.5mm)

Table 2 TIGHTENING TORQUES

	FT-lb	Mkg
Brake Lines		
1200	11-13	1.5-1.8
510, 521 pickup	12-14	1.7-2.0
610, 710, 620 pickup, Z sports car, B210		
Metal lines	11-13	1.5-1.8
Flexible hoses	12-14	1.7-2.0
Caliper bracket bolts		
510	53-65	7.3-9.0
610, 710, and Z sports car	53-71	7.3-9.9
Disc-to-hub bolts		
1200	32-43	4.4-5.9
B210, 510, 610, 710, Z sports car	28-38	3.9-5.3
Front backing plate bolts pickups	30-36	4.2-5.0

CHAPTER ELEVEN

DRIVE SHAFT, DIFFERENTIAL, AND REAR SUSPENSION

The 510 and 610 sedans and hardtops use a semi-trailing arm independent suspension at the rear. The Z sports car uses McPherson struts. All other models use a rigid axle supported by leaf springs. All except Z sports cars use conventional tube shock absorbers.

On cars equipped with independent rear suspension (IRS), the differential is attached to mounting members at front and rear. On rigid-axle vehicles, the differential is mounted in the axle housing.

Cars with IRS use exposed axle shafts, with universal joints at the ends and ball splines in the centers. This allows the axle shafts to move vertically and change length as needed. Rigid axle shafts are enclosed in the axle housing.

Pickups and 610 station wagons use a 3-joint drive shaft, supported in the center by a bearing. All other models use a 2-joint drive shaft.

Table 1, at the end of the chapter, gives specifications.

DRIVE SHAFT

Removal/Installation

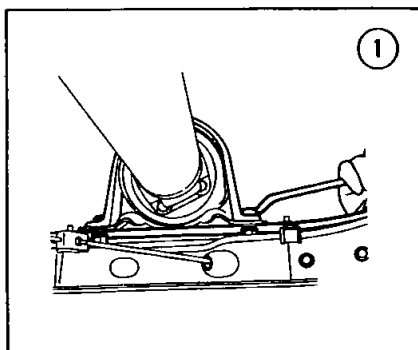
1 Securely block both front wheels so the car will not roll in either direction. Jack up the rear end of the vehicle and place it on jackstands.

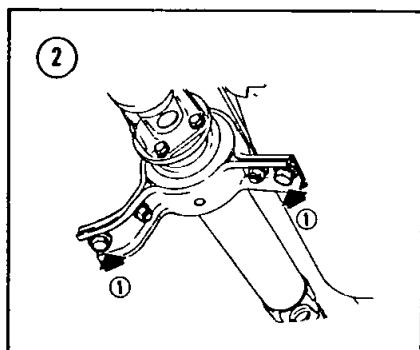
2 On 510's, loosen the clamps on premuffler and center exhaust pipe. Twist the muffler and pipe to the left to provide removal clearance for the drive shaft.

3 On Z sports cars, remove the premuffler or catalytic converter.

4 Make match marks on the drive shaft and differential flanges so they can be reassembled in the same relative positions. On 521 pickups, mark the transmission flange as well.

5 On pickups and 610 wagons, unbolt the center bearing bracket from the vehicle. See Figure 1 (pickup) or Figure 2 (610 wagon).





6 Remove 4 bolts attaching the drive shaft to the differential

7 On 521 pickups, unbolt the drive shaft from the transmission flange. On 620 pickups and cars, slide the drive shaft rearward out of the transmission

8 Installation is the reverse of these steps. Tighten all nuts and bolts to specifications in Table 1 (end of chapter)

Universal Joint Repair

The drive shaft should not be disassembled unless the U-joints are worn. Center bearing replacement (3-joint drive shafts) requires special equipment and should be left to a Datsun dealer. The B210 drive shafts cannot be disassembled; replace the entire drive shaft if the U-joints are worn.

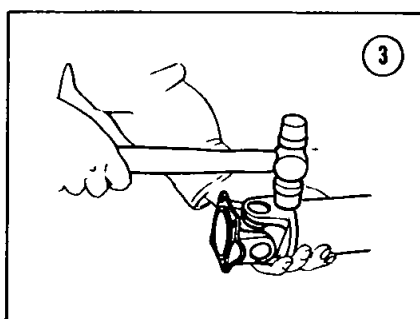
1 Before disassembly, mark all parts so they can be reassembled in the same relative position.

2 Remove 4 snap rings from each of the universal joints.

3 Place the drive shaft in a vise as near the U-joint as possible. Be careful not to distort the shaft.

4 Lightly tap the base of the yoke with a hammer (Figure 3). Withdraw the opposite bearing race. Do the same for the remaining bearing races. Carefully separate the crosses and yokes.

5 Check universal joint components for wear, damage, pitting, rust, or distortion. Replace as needed. If the drive shaft shows signs of damage, have it checked for balance by a dealer.



6 Assemble by reversing Steps 1-4. Apply grease liberally to the bearings and races.

AXLE SHAFTS (INDEPENDENT REAR SUSPENSION)

The axle shafts should be disassembled and lubricated with multipurpose grease at intervals specified in Chapter Two. Except for this, no maintenance is required. The shafts must be replaced as assemblies if defective, since repair parts are not available.

Removal/Installation

1 Securely block both front wheels so the car will not roll in either direction. Jack up the rear end of the car and place it on jackstands. If necessary, remove wheels to provide working room.

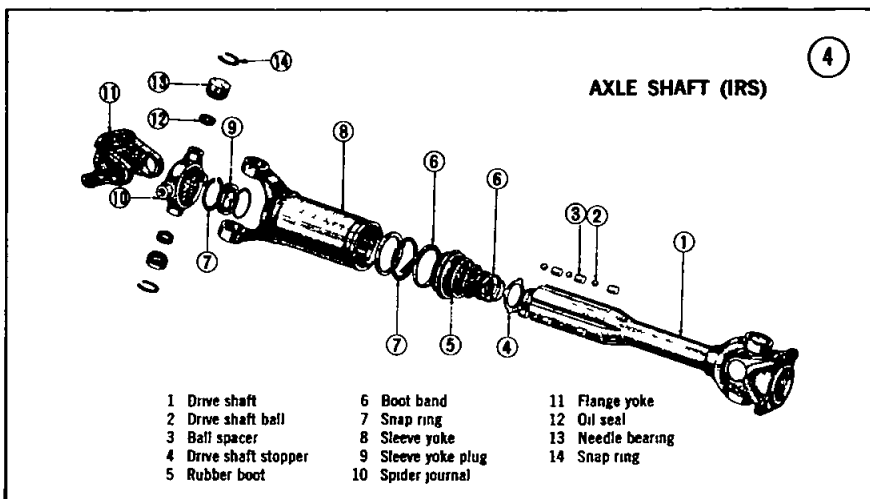
2 Unbolt the axle shaft from bearing spindle and differential. Cars through 1973, and all 280Z's, use 4 bolts at each end of the axle shaft. The 1974 models, and later 610's, use a single bolt at the inner end.

3 Remove the axle shaft from under the car. Be careful not to drop the shaft. It is easily damaged.

4 Installation is the reverse of these steps. Tighten bolts to specifications (end of chapter).

Disassembly/Assembly

Figure 4 shows the axle shaft design used on all 1968-1973 models, as well as all 280Z's. All 1974 models, and 1975 and later 610's, use a single bolt to secure the inner end to the differential.



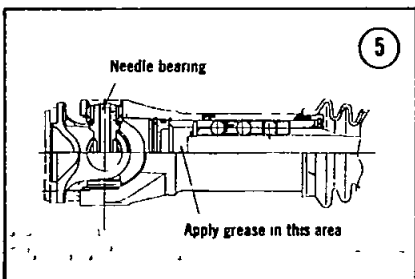
1 Disassemble and inspect universal joints in the same manner as the drive shaft universal joints

2 Referring to **Figure 4**, remove the snap ring (7) from the sleeve yoke plug (9)

3 Compress the axle shaft and remove the snap ring from the stopper (4) Remove the stopper

4 Detach the rubber boot and separate the axle shaft sections Be careful not to lose any of the balls or spacers, since they cannot be replaced

5 Assembly is the reverse of these steps Apply multipurpose grease to the universal joints and ball splines Also grease the area shown in **Figure 5** Make sure the balls and spacers are assembled in the order shown in **Figure 4**



Inspection

1 Check the boot and the O-ring next to the sleeve yoke plug for damage Replace as needed

2 Check the shaft for bending, cracks, wear, damage, or distortion Replace the complete shaft assembly if these are detected

3 Check the steel balls and spacers for wear, damage, or distortion Replace the complete shaft assembly if these are found

4 Check the sleeve yoke (8, **Figure 4**) for wear, damage, or distortion Replace the complete axle shaft if these conditions are found

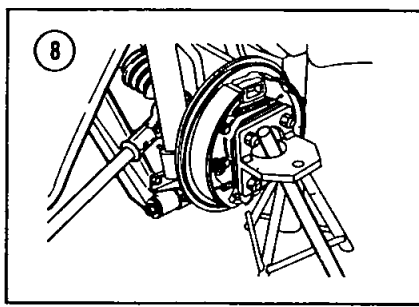
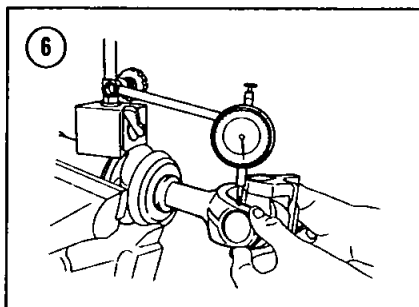
5 Check the universal joints for play If play can be detected in an assembled universal joint, replace the axle shaft

6 Place the axle shaft in a soft-jawed vise and connect a dial gauge as shown in **Figure 6** Fully compress the axle shaft and measure play Replace the complete shaft if play is more than 0.004 in (0.1 mm)

WHEEL BEARINGS AND SPINDLES (INDEPENDENT REAR SUSPENSION)

Removal/Installation

1 Securely block both front wheels so the car will not roll in either direction

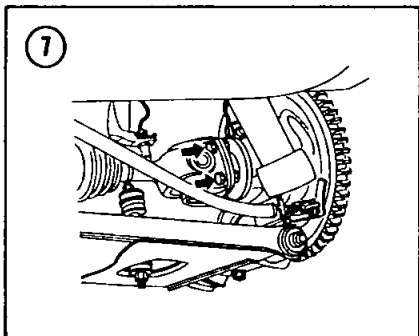
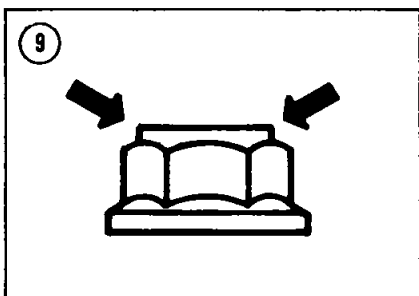


- 2 Loosen the rear wheel nuts, jack up the rear of the car, place it on jackstands, and remove the rear wheels

CAUTION

This procedure requires undoing the wheel bearing locknuts, which are torqued to 181-239 ft-lb. Make sure the front wheels are securely blocked. Use good quality jackstands, positioned solidly beneath the car frame. Otherwise, the force required to undo the nuts could knock the car off the jackstands.

- 3 Detach the axle shaft from the spindle flange (Figure 7). Lower the axle shaft out of the way.



- 4 Remove the wheel bearing locknut with a socket and long breaker bar (Figure 8). Hold the wheel from turning with a slide hammer adapter and a metal bar as shown. If these tools aren't available, install the wheels and lower the car. Apply the handbrake and loosen the nut. Put the car up on jackstands again.

NOTE The nut is locked by bending the lip against the spindle threads with a punch (Figure 9). Do not attempt to bend the lip away from the threads or otherwise unlock the nut before removing it. Simply undo nut.

- 5 Attach a slide hammer to the adapter and pull the spindle out. If these tools aren't available, drive the spindle out from the inside. Use a soft metal drift.

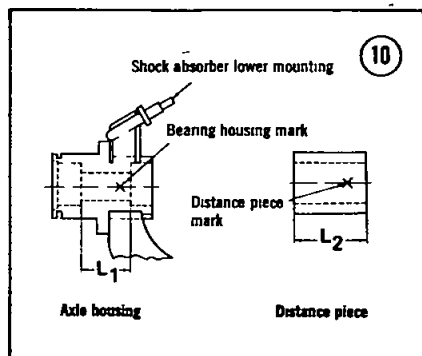
- 6 Remove the spacer and flange from the bearing housing.

- 7 Take out the inner bearing and oil seal.

- 8 Remove the oil seal and inner bearing from the housing. If necessary, drive the bearing out with a drift (such as a piece of pipe) the same diameter as the bearing.

Inspection

- 1 Clean all parts thoroughly in solvent before inspection. Discard bearing oil seals.
- 2 Check the bearings for play and wear by holding the inner race with fingers and rotating



the outer race. Check bearing friction surfaces for wear, chips, scoring, signs of seizure, and the bluish tint that indicates overheating. Replace any bearings with these defects.

3 If the outer bearing or its oil seal need replacement, remove the bearing with a gear puller or have a machine shop press it off.

NOTE 510 and 610 outer bearings may not be reused once they have been removed from the spindle.

4 Check the ends of the bearing spacer. Replace spacers showing signs of compression, distortion, or wear.

5 Check the bearing spindles for signs of wear or damage. Replace if these conditions are evident.

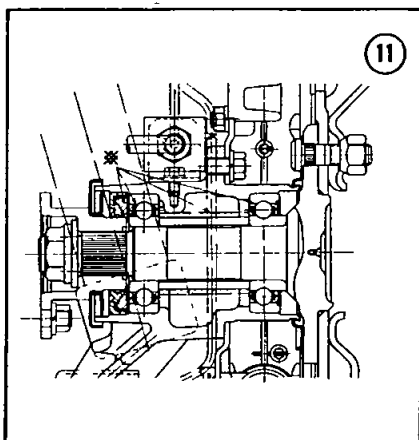
Assembly/Installation

Assembly and installation are the reverse of the removal and disassembly procedures, plus the following:

1 On sealed-type bearings, the sealed side of the outer bearing faces the wheel and the sealed side of the inner bearing faces the differential.

2 If new bearing spacers are being used, select them according to the marks shown in Figure 10. Bearing housings are marked "A", "B", or "C" at the point shown in the figure. Select a spacer with a corresponding mark.

3 Before installing the spindle, apply multipurpose grease to the points marked with an asterisk in Figure 11. Pack each bearing with grease, working as much as possible into the spaces between balls and races.



4 After the spindle and bearings are installed in the housing, tighten the wheel bearing locknut to 181-239 ft-lb (25-33 mkg). This should result in spindle end play of zero-0.006 in (zero-0.15mm). Turn the spindle with a spring scale attached to one of the lug nut studs. Force required to turn the spindle should be 28 oz (790 grams) or less. If necessary, tighten or loosen the bearing locknut to adjust. However, the tightness of the nut must remain between 181-239 ft-lb.

5 After tightening the locknut, bend the lip in to the spindle threads at 2 points with a drift (see Figure 9).

RIGID REAR AXLES

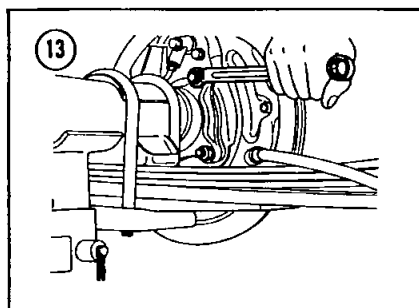
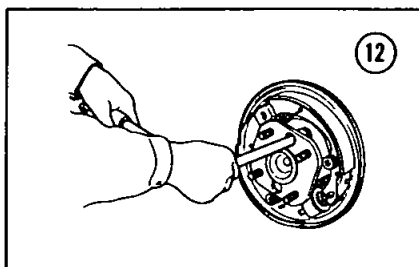
Rigid axles are used on 510 and 610 station wagons, B210's, 1200's, 710's, and pickups.

Axle Shaft Removal

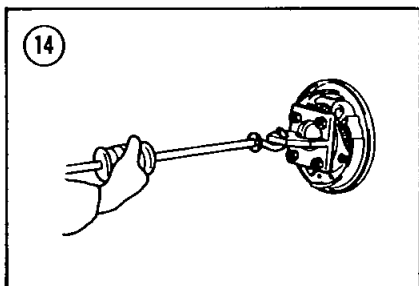
1 Loosen the rear wheel nuts, jack up the rear end of the vehicle, place it on jackstands, and remove the rear wheels.

2 Remove the brake drums (Chapter Ten). Disconnect the brake lines and handbrake cables from the rear brakes.

3 Remove 4 nuts or bolts securing the brake backing plate to the axle housing. See Figure 12 (cars) or Figure 13 (pickups).



4 Remove the axle shaft, together with the brake backing plate. Use a slide hammer and adapter like the ones shown in **Figure 14**. Similar tools are available from rental dealers.

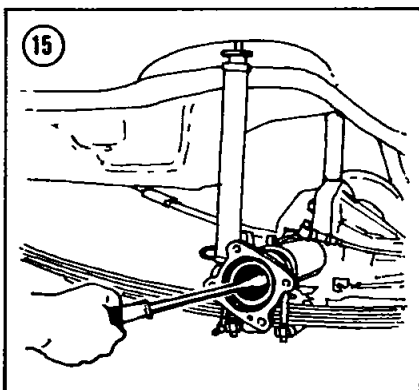


Rear Axle Shaft Inspection

- 1 Carefully examine the machined surfaces of the axle shaft and housing for wear. Check the shaft for bending, twisting, or damaged splines.
- 2 Inspect the rear wheel bearing. Rotate it and check for noise, roughness, or excessive play. If in doubt about the bearing, replace it.

Axle Oil Seal Replacement

- 1 Remove the axle shaft as described earlier.
- 2 Pry out the old oil seal with a screwdriver (**Figure 15**).



- 3 Drive the new seal in with a suitable drift.
- 4 Pack the space between the seal lips with multipurpose grease.

Rear Wheel Bearing Replacement (Cars)

This procedure requires special equipment for removal and installation, including a press capable of several thousand pounds. It is included in case you are not near a dealer, and your local machine shop is unfamiliar with Datsuns.

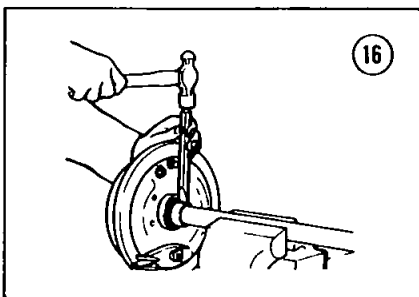
- 1 Remove the axle shaft as described earlier.
- 2 Using a hammer and cold chisel, make several deep nicks in the bearing retaining collar (**Figure 16**). It will then slide easily. The retaining collar must not be reused.

CAUTION

Do not hit the axle shaft with the cold chisel when nicking the bearing retaining collar.

- 3 Press off the bearing and retaining collar, using the support tool shown in **Figure 17**.
- 4 Line up the bearing spacer, new wheel bearing, and bearing retaining collar on axle shaft.

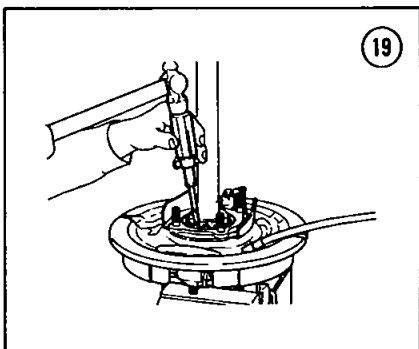
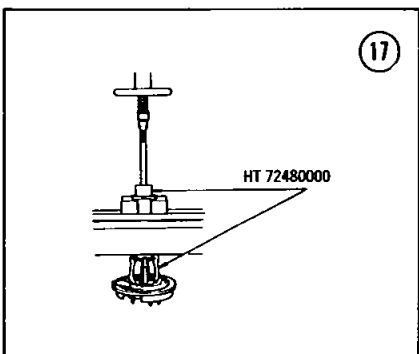
NOTE On sealed-type bearings, be sure the sealed side faces the wheel.



Rear Wheel Bearing Replacement (Pickups)

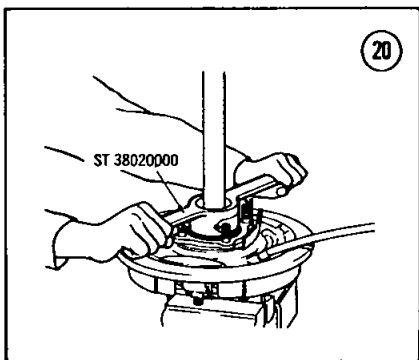
As with cars, this procedure requires special equipment. Take the job to a dealer or competent machine shop.

- 1 Remove rear axle shaft as described earlier
- 2 Bend back the tabs on the wheel bearing lockwasher (Figure 19)



- 3 Remove wheel bearing locknut (Figure 20)

NOTE The nut is tightened to 108-145 ft.-lb. A wrench like the one shown in Figure 20 must be used to remove it.



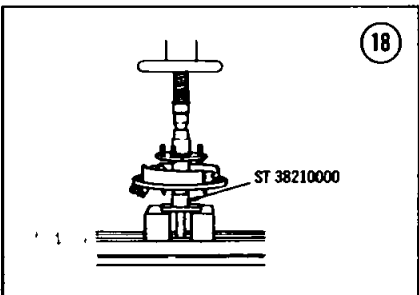
- 4 Remove the wheel bearing, bearing cage, and brake backing plate. Use a puller like the one shown in Figure 21.

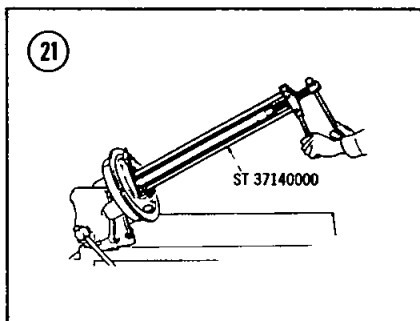
5 Inspect the oil seal in the bearing cage. Replace if necessary.

- 5 Place the lined-up parts on a press stand such as ST 38210000 (Figure 18). Press the spacer, bearing, and retaining collar onto the shaft.

NOTE If the collar can be pressed on with less than 6 600 pounds force, it is too loose.

- 6 Pack the bearing with multipurpose grease.





6 Drive the bearing outer race from its seat with a brass drift. Install a new outer race with the same tool.

7 Carefully drive a new seal into place in the bearing cage. Fill the space between the seal lips with multipurpose grease.

8 Place the bearing cage and brake backing plate on the axle shaft. Position a new bearing cone, then gently tap it into place with a brass drift.

9 Install a new lockwasher. Install the bearing locknut with its beveled side toward the washer. Tighten locknut to 108-145 ft-lb (15-20 mkg), using the tool shown in Figure 20. Bend up the lockwasher to secure the nut.

10 Pack the bearing with grease. Apply grease to the bearing recess in the axle housing.

Axle Shaft Installation

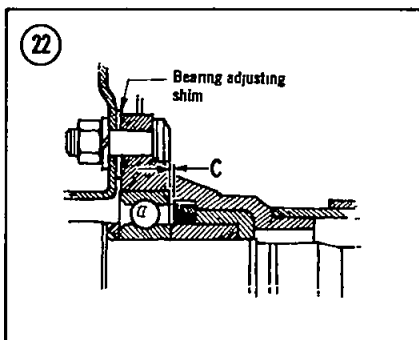
1 Install a new axle housing oil seal as described earlier. Make sure the wheel bearing is packed with grease.

2 Install the axle shaft in the housing. Be careful not to damage the housing oil seal.

3 On cars, check clearance between the wheel bearing and housing face (clearance C, Figure 22). It should be 0.004 in (0.1mm) or less. If necessary, add or remove shims to adjust.

4 On pickups, install the axle shaft on one side and measure its end play. It should range from 0.012-0.035 in (0.3-0.9mm). If necessary, add or remove shims between axle housing and bearing cage to adjust.

The other axle shaft's end play should now be 0.008-0.0059 in (0.02-0.15mm). If neces-



sary, adjust by adding or removing shims between bearing cage and axle housing.

5 Tighten the axle shaft securing nuts to specifications (end of chapter).

6 Install the brake drum and wheel. Connect the brake line and handbrake cable. Lower the car and tighten the wheel nuts.

DIFFERENTIAL

This section includes removal, inspection, and installation procedures. Differential repair requires special skills and tools, and should be left to a dealer. The inspection procedures will tell you if repair is necessary.

Removal/Installation (Z Sports Car)

1 Securely block both front wheels so the car will not roll in either direction. Jack up the rear end of the car and place it on jackstands.

2 Remove the main muffler.

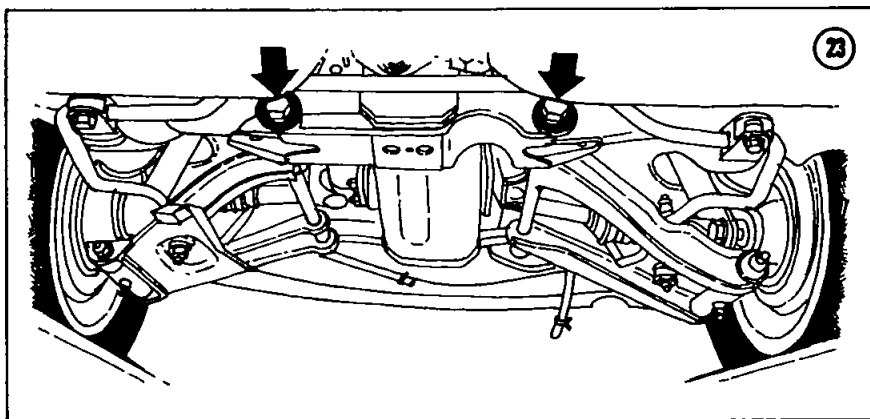
3 Unbolt the drive shaft from the differential.

4 Loosen the inner front transverse link bolts (Figure 23).

WARNING

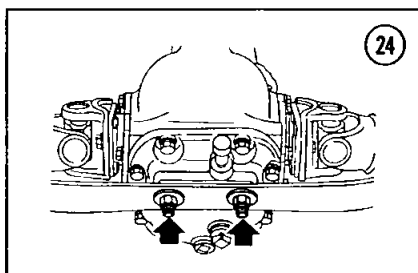
The bolts are tightened to 94-101 ft-lb. Be careful not to knock the car off the jackstands while loosening.

5 On 240Z's and 280Z's, remove 4 bolts attaching each axle shaft to the differential. On 260Z's, unbolt the axle shafts from the wheel bearing flanges, then from the differential.

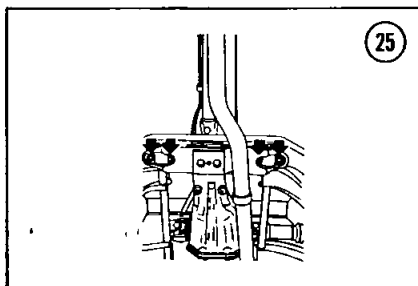


6 Place a transmission jack beneath the differential. These are available at many rental dealers.

7 Remove the nuts securing the differential to its rear mounting member. See Figure 24.



8 Unbolt the differential front mounting member from the car. See Figure 25.



9 Remove the differential downward and to the rear.

10 If necessary, separate the front mounting member from the differential. If this is done, carefully note the locations of the spacers beneath the mounting member bolts.

11 Installation is the reverse of these steps. Tighten all nuts and bolts to specifications (end of chapter). Be sure the mounting member spacers are correctly installed.

Removal/Installation (510 and 610, Independent Rear Suspension)

1 Securely block both front wheels so the car will not roll in either direction. Jack up the rear end of the car and place it on jackstands.

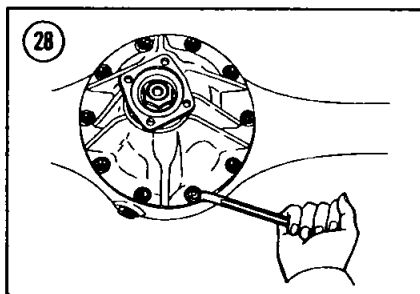
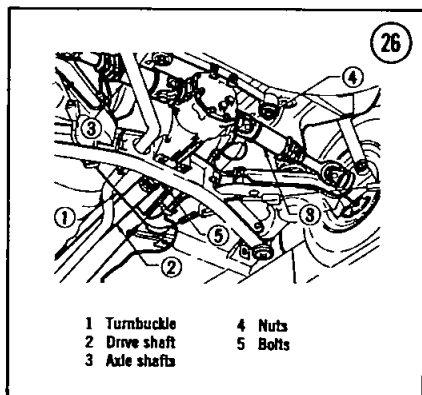
2 Disconnect the rear handbrake cable and drive shaft (1 and 2, Figure 26).

3 Disconnect the axle shafts (3, Figure 26). On 1968-1973 cars, unbolt the inner ends of the shafts from the differential. On 1974 cars, unbolt the outer ends of the shafts, then the inner ends.

4 Place a transmission jack under the differential. Transmission jacks are available from rental dealers.

5 Remove 2 nuts attaching the differential member to the car (4, Figure 26).

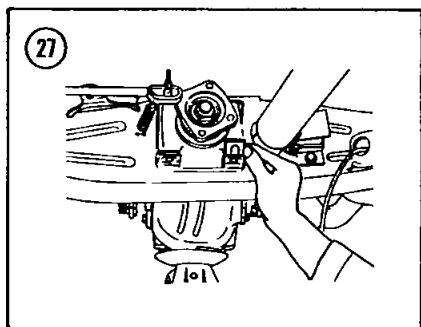
6 Remove 4 bolts (5, Figure 26) attaching the front end of differential to mounting member.



housing. Tighten all nuts and bolts to specifications (end of chapter)

7 Remove the differential downward and to the rear

8 Installation is the reverse of these steps. Be sure to insert the front bolt spacers (Figure 27). Tighten all nuts and bolts to specifications (end of chapter)



Removal/Installation (Rigid Axle Vehicles)

- 1 Securely block both front wheels so the vehicle will not roll in either direction. Jack up the rear end and place it on jackstands.
- 2 Disconnect drive shaft from differential.
- 3 Remove rear axle shafts as described earlier.
- 4 Remove the differential attaching nuts (Figure 28). Lift the differential out.
- 5 Installation is the reverse of these steps. Use a new gasket between differential and axle

Inspection (All Models)

- 1 Drain the gear oil from the differential.
- 2 Place the differential on a workbench. On IRS cars, remove the inspection cover.
- 3 Look for visible wear or damage and check the gears for chipped or missing teeth.
- 4 Check the ring gear wear pattern. Any visible wear should be approximately in the center of the teeth. If wear marks are at the top, bottom, or either end of the teeth, the differential should be disassembled and adjusted.
- 5 Connect a dial gauge as shown in Figure 29 and measure backlash of the pinion and ring gear. To measure, hold the pinion from turning and move the ring gear while noting the reading on the gauge. Compare this reading with backlash specifications (Table 2). Excessive or insufficient backlash requires disassembly and adjustment of the differential.

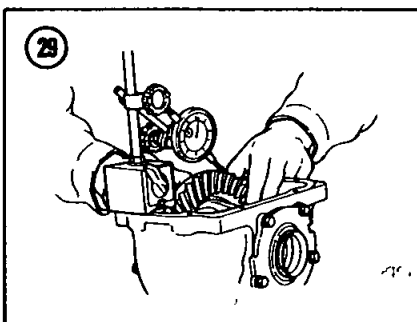


Table 2 RING GEAR BACKLASH

Model	Inches	Millimeters
1200, B210	0 004-0 006	0 10-0 15
510 sedan and hardtop	0 004-0 008	0 10-0 20
510 wagon	0 006-0 008	0 15-0 20
610 sedan and hardtop	0 004-0 008	0 10-0 20
610 wagon		
1973	0 005-0 007	0 13-0 18
1974 and later manual	0 006-0 008	0 15-0 20
1974 automatic	0 004-0 006	0 10-0 15
1975 and later automatic	0 006-0 008	0 15-0 20
710	0 004-0 006	0 10 0 15
240Z, 260Z	0 004-0 008	0 10-0 20
521 pickup	0 005 0 007	0 13 0 18
620 pickup	0 006-0 008	0 15 0 20

REAR SUSPENSION**Shock Absorber Replacement
(Z Sports Car)**

The rear shock absorbers are located inside the suspension struts. Replacement of the shock absorbers requires special tools, and should be left to a Datsun dealer. Much expense can be saved by removing the struts yourself and taking them to a dealer for shock absorber replacement.

1 Securely block both front wheels so the car will not roll in either direction. Loosen the rear wheel nuts, jack up the rear end of the car, place it on jackstands, and remove the rear wheels.

2 Disconnect the brake line and handbrake cable from each wheel.

3 On 260Z's and 280Z's, detach the stabilizer bar from the transverse link (**Figure 30**).

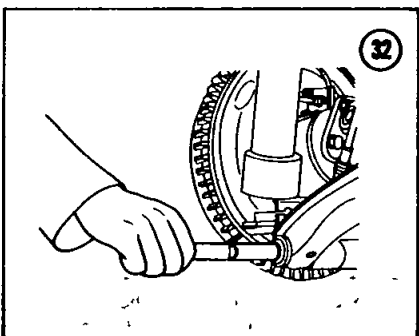
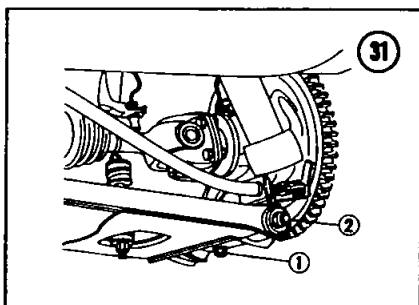
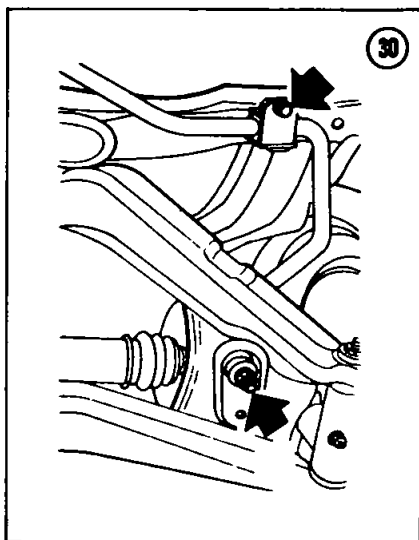
4 Remove the lock bolt and 2 self-locking nuts (1 and 2, **Figure 31**) from the transverse link.

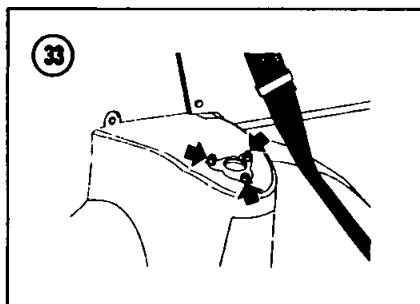
5 Pull the spindle out of the transverse link (**Figure 32**).

6 Unbolt the outer end of the axle shaft from the bearing spindle flange.

7 Place a jack beneath the strut assembly to support it.

8 Working inside the car, remove 3 self-locking-nuts-from-the-top-of the strut (**Figure 33**).





Lower the strut, together with the rear brake assembly, clear of the car

9 Take the strut to a Datsun dealer for shock absorber replacement

10 Install by reversing Steps 1-8 Tighten all nuts and bolts to specifications (end of chapter)

Shock Absorber Replacement (All Except Z Sports Car)

Replace shock absorbers as follows

1 Securely block both front wheels so the vehicle will not roll in either direction Jack up the rear end and place jackstands beneath the frame

2 Place a jack beneath the axle (wheel bearing housing on IRS cars) The jack is used to raise or lower the axle

3 Detach the lower end of the shock absorber, then the upper end Remove it from the vehicle

4 Install by reversing Steps 1-3 Tighten all nuts and bolts to specifications On 510's and 610's, tighten the lower end nuts with the car's weight resting on the wheels On 710's and pickups, tighten both ends with the weight on the wheels

Refer to the following illustrations

Figure 34 — 1200 and B210 sedan

Figure 35 — 1200 and B210 coupe

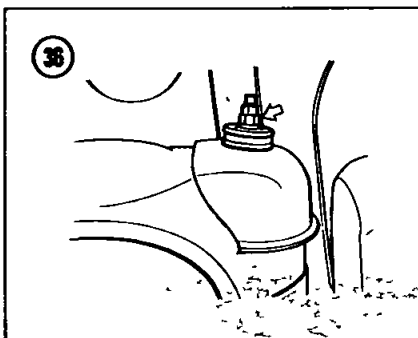
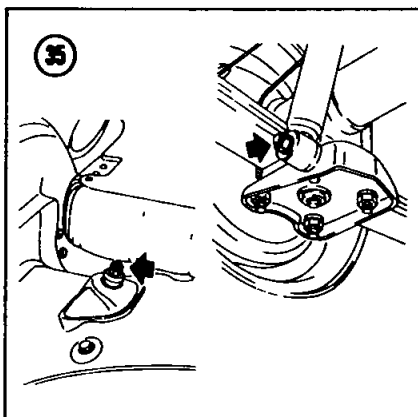
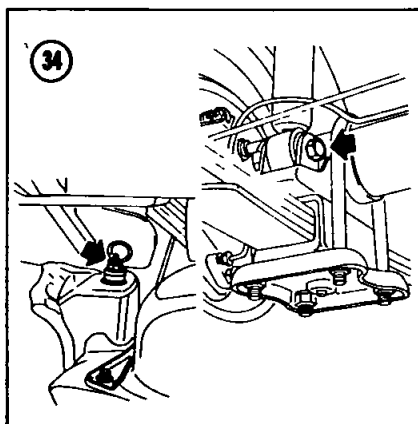
Figure 36 and Figure 37 — 510 and 610 sedan and hardtop

Figure 38 — 710 sedan and hardtop

Figure 39 and Figure 40 — 510 station wagon

Figure 41 — 610 and 710 station wagon

Figure 42 — Pickup truck



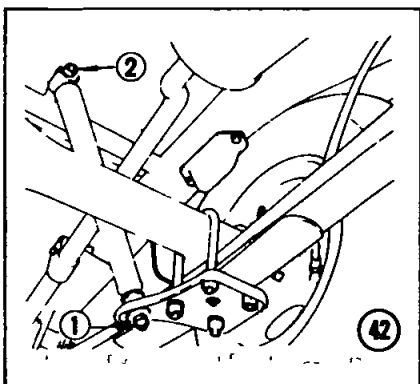
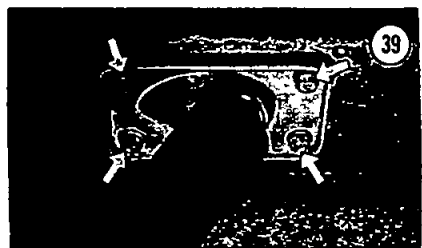
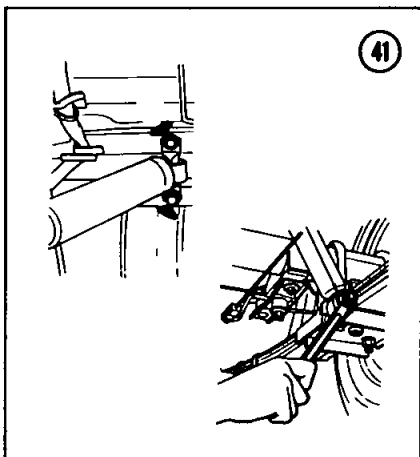
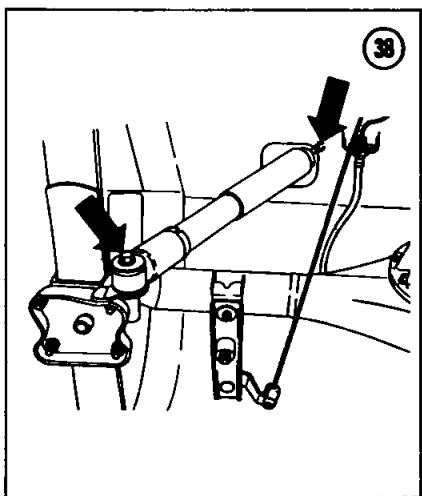
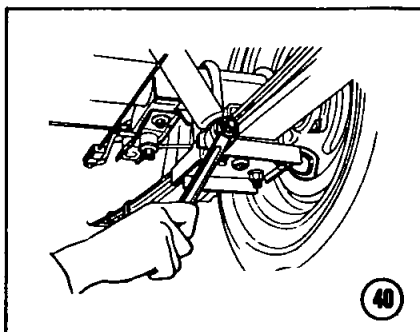
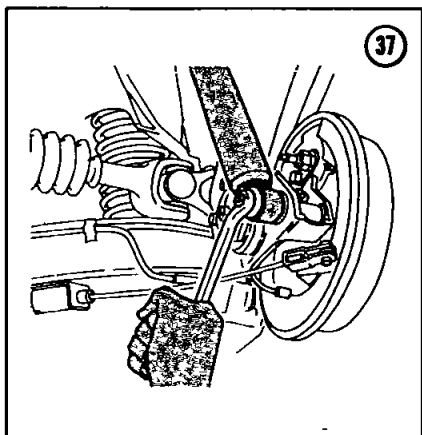


Table 1 TIGHTENING TORQUES

	FL-lb	Mkg		FL-lb	Mkg
Drive Shaft			Z sports car		
1200 flange bolts	15-20	2 0-2 7	Front member to car (240Z)	23-31	3 2-4 3
B210 flange bolts	17 24	2 4-3 3	Front member to car (260Z)	22 33	3 0-4 6
510 flange bolts	15-20	2 0-2 7	Front member to car (280Z)	33-44	4 6-6 1
1973 610			Differential to front insulator	23-31	3 2-4 3
Flange bolts, all	15-20	2 0-2 7	Rear member to car	54-69	7 5-9 5
Center bracket nuts wagon	14-19	1 9-2 6	Differential to rear member	54-69	7 5-9 5
Center bracket bolts wagon	26-35	3 6-4 8	Differential (Rigid Axles)		
1974 and later 610			Attaching nuts		
Flange bolts, all	17 24	2 4-3 3	1200, B210	12 18	1 7-2 5
Center bracket nuts, wagon	14-19	1 9-2 6	510 wagon	14-16	2 0-2 2
Center bracket bolts wagon	26-35	3 6-4 8	610 wagon 710	14-18	2 0-2 5
1974-1975 710 flange bolts	18-23	2 5-3 2	521 pickup	12 17	1 6-2 4
1976 710 flange bolts	17 24	2 4-3 3	620 pickup	13-20	1 7-2 7
240Z 260Z flange bolts	18-23	2 5-3 2	Shock Absorbers		
280Z flange bolts	29-33	4 0-5 0	1200 sedan*	26-33	3 6-4 5
521 pickup			B210 sedan*		
Flange bolts	18-22	2 5-3 0	Upper	14-17	1 9-2 4
Bearing bracket bolts	17 20	2 4-2 7	Lower	26-33	3 6-4 5
620 pickup			1200 B210 hardtops*	7-9	1 0-1 2
Center flange bolts	18-23	2 5-3 2	510 sedan and hardtop		
Rear flange bolts	15-20	2 0-2 7	Upper	17	2 3
Bearing bracket bolts	12 16	1 6-2 2	Lower*	17	2 3
Axle Shafts, IRS			510 wagon		
All outer bolts	36-43	5 0-6 0	Upper nuts	12 16	1 7-2 2
Inner bolts (4-bolt axles)	36-43	5 0-6 0	Mounting plate bolts	11-18	1 5-2 5
Inner bolt (single-bolt axles)	23-31	3 2-4 3	Lower nuts*	25-33	3 5-4 5
Axle Shafts, Rigid Axle			610 sedan and hardtop		
1200 B210	11 15	1 5-2 0	Upper	12 16	1 6-2 2
510 wagon	21 28	2 8-3 9	Lower*	12-16	1 6-2 2
610 wagon 710	16-20	2 2-2 7	610 wagon		
1968-1973 pickups	27 35	3 7-4 8	Upper	6½ 9	0 9-1 2
1974 and later pickups	39-46	5 4-6 4	Lower*	25-33	3 5-4 5
Differential (IRS)			710*		
510 sedan and hardtop			Upper (sedan and hardtop)	Tighten until threads are used up then secure with locknut	
Differential to suspension member	43-51	6 0-7 0	Upper (station wagon)	6½ 9	0 9-1 2
Differential to rear member	43-58	6 0-7 0	Lower	12 16	1 6-2 2
Rear member to car	62	8 5	521 pickup*		
Inspection cover bolts	14-19	1 9-2 6	Upper	26-31	3 6-4 3
610 sedan and hardtop			Lower	10-12	1 4-1 6
Differential to suspension member	36-51	5 0-7 0	620 pickup*		
Differential to rear member	43 58	6 0-8 0	Upper	22 30	3 1-4 1
Rear member to car	51 72	7 0-10 0	Lower	12 16	1 6-2 2
Inspection cover bolts	14-19	1 9-2 6	Struts (Z sports car only)		
			Upper nuts	12 15	1 6-2 1
			Spindle lockbolt	7 9	1 0-1 2
			Spindle locknuts**	54-69	7 5-9 5

*Tighten with vehicle's weight on wheels.

**Tighten with car on ground and carrying two 150-pound passengers.

CHAPTER TWELVE

FRONT SUSPENSION, WHEEL BEARINGS, AND STEERING

Datsun cars use a McPherson strut front suspension. The shock absorbers and springs are combined into a single unit, with the bearing spindles permanently attached at the bottom. The struts are bolted to the inner wheel wells at the top and through ball-joints to the transverse links at the bottom. The front-rear movements of the transverse links are controlled by compression or tension rods. A stabilizer connects the transverse links.

Pickup trucks use double suspension links (A-arms), tube shock absorbers, and torsion bar springs. Each wheel and front brake assembly is attached to a knuckle spindle. The knuckle spindle pivots on a kingpin and rides on a support piece. The knuckle spindle support is attached to the outer ends of the suspension links by falcum pins.

WHEEL ALIGNMENT

Several front suspension angles affect the running and steering of the front wheels. These angles must be properly aligned to prevent excessive wear, as well as to maintain directional stability and ease of steering. The angles are as follows:

- a - Caster-- - --
- b - Camber
- c - Toe-in

- d - Steering axis inclination
(kingpin inclination)

- e - Steering angle

On cars, the caster, camber, and steering axis inclination are built in and cannot be adjusted. These angles are measured to check for bent suspension parts. Steering angle should not be adjusted without a front end rack. Toe-in can be adjusted as described later in this chapter.

On pickups, the caster, camber, steering angle, and toe-in are adjustable. However, all but toe-in require a front-end rack. Take the job to a dealer or front-end specialist.

Pre-alignment Check

Adjustment of the steering and various suspension angles is affected by several factors. Perform the following steps before any adjustments are attempted:

- 1 Check tire pressure and wear. See *Tire Wear Analysis*, Chapter Three.
- 2 Check play in front wheel bearings. Adjust if necessary.
- 3 Check play in ball-joints. See Chapter Three.
- 4 Check for broken springs.
- 5 Remove any excessive load.
- 6 Check shock absorbers.

- 7 Check for play in steering linkage
- 8 Check wheel balance
- 9 Check rear suspension for looseness

Front tire wear patterns can indicate several alignment problems. These are covered under *Tire Wear Analysis*, Chapter Three.

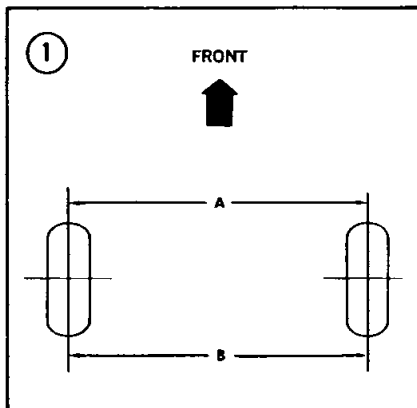
Caster and Camber

Caster is the inclination from vertical of the line through the ball-joints or kingpins. Positive caster shifts the wheel forward, negative caster shifts the wheel rearward. Caster causes the wheels to return to the straight-ahead position after a turn. It also prevents the wheels from wandering due to wind, potholes, or uneven road surfaces.

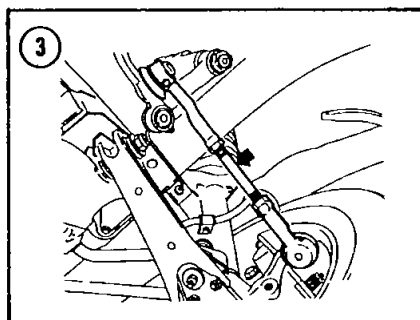
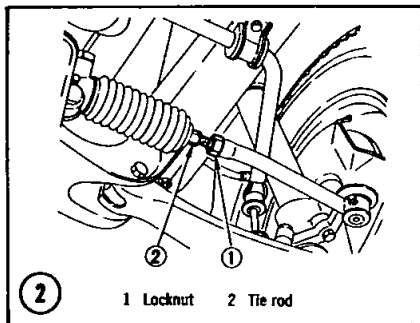
Camber is the inclination of the wheels from vertical. With positive camber, the top of the tire leans outward. With negative camber, the top of the tire leans inward.

Toe-in

Since the front wheels tend to point outward when the vehicle is moving forward, the distance between the front ends of the tires (A, Figure 1) is slightly less than the distance between the rear ends (B).

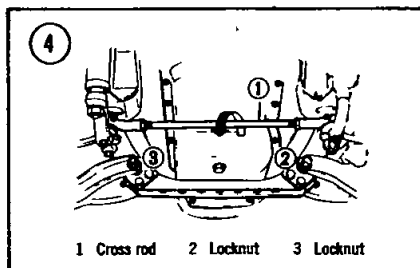


To adjust toe-in on cars, loosen the tie rod locknuts. See Figure 2 (Z sports car) or Figure 3 (all other cars). Rotate the tie rods or adjusting bars as needed to increase or reduce toe-in.



On pickups, loosen the cross rod locknuts (Figure 4). Rotate the cross rod forward to reduce toe-in, or back to increase it.

Table 1 gives specifications.

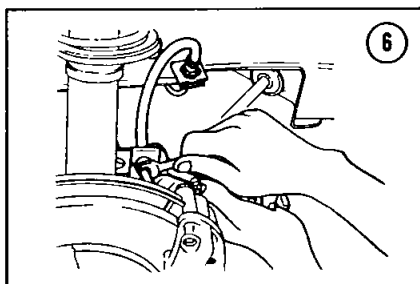
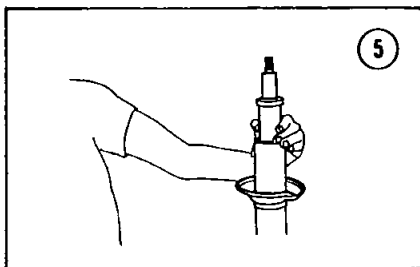


Steering Axis or Kingpin Inclination

On cars, steering axis inclination is the inward or outward lean of the struts. On pickups, it is the inward or outward lean of the kingpins. The angle is not adjustable on cars or trucks.

Table 1 TOE-IN

Vehicle	Inches	mm
1200	0 158-0 236	4-6
B210	0 079-0 157	2-4
510		
Sedans	0 118-0 236	3-6
Wagon through 1972	0 079-0 197	2-5
1973 wagon	0 158-0 276	4-7
610		
1973 sedans hardtop	0 236-0 254	6-9
1973 wagon	0 315-0 433	8-11
1974 1975 all	0 433-0 551	11-14
1976 radial tires	0 16-0 24	4-6
1976, bias ply tires	0 24-0 31	6-8
710		
1974	0 551-0 669	14-17
1975	0 315-0 433	8-11
1976 radial tires	0 16-0 24	4-6
1976 bias ply tires	0 24-0 31	6-8
Pickup trucks	0 039-0 157	1-5
240Z	1/16 7/32	1.59-5.56
260Z	0 079-0 197	2-5
280Z	Zero-1/8	Zero-3



Steering Angle

When a vehicle turns, the inside wheel makes a smaller circle than the outside wheel. Because of this, the inside wheel turns at a sharper angle than the outside wheel. Steering angle is adjustable on all models, but should be left to a dealer or front-end specialist.

FRONT SHOCK ABSORBER REPLACEMENT

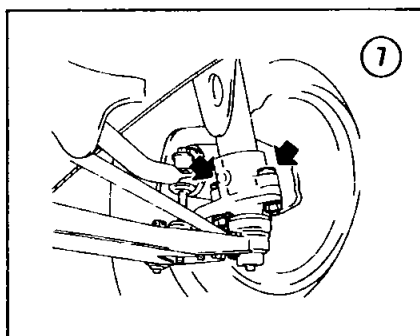
Cars

The front shock absorbers are located inside the suspension struts (Figure 5). Replacement requires several special tools. However, much expense can be saved by removing the strut assemblies yourself and taking them to a Dat-sun dealer for shock absorber replacement.

1 Loosen the front wheel nuts, jack up the front end of the car, place it on jackstands, and remove the front wheels.

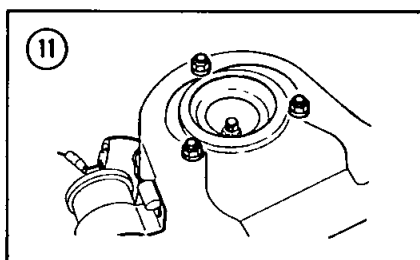
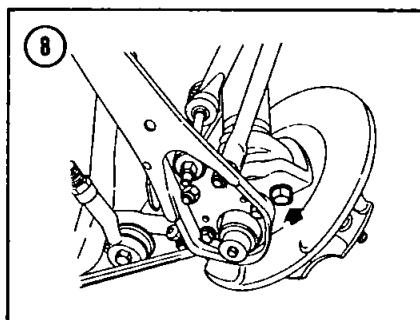
2 On all models except Z sports cars, remove the brake caliper (Chapter Ten). On Z sports cars, disconnect the caliper brake line at its bracket on the strut (Figure 6).

3 Remove 2 bolts attaching the knuckle arm to the strut. See Figure 7 (1200 and B210) or Figure 8 (all others).

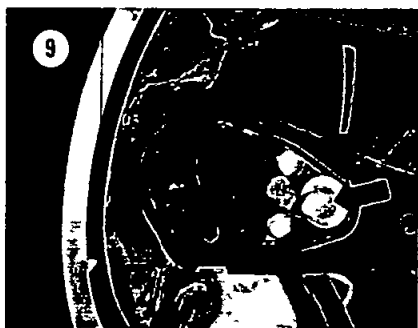


4 On Z sports cars, detach the compression rod and stabilizer from the transverse link (Figure 9).

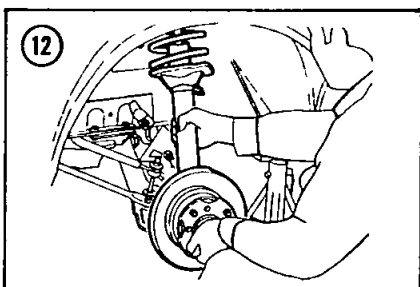
5 Lower the transverse link away from the bottom of the strut. On all Z sports cars, pry the transverse link down with a strong steel bar (Figure 10).



coil spring to fly out and cause serious injury



7 Lower the jack beneath the strut and take it out (Figure 12)



8 Have new shock absorbers installed in the struts by a Datsun dealer

9 Installation is the reverse of these steps. Use new self-locking nuts at the top of the strut. Before bolting the knuckle arm to the strut, apply gasket sealer to the strut base as shown in Figure 13. Tighten all fasteners to torque specifications (end of chapter). Bleed the brakes after installation.

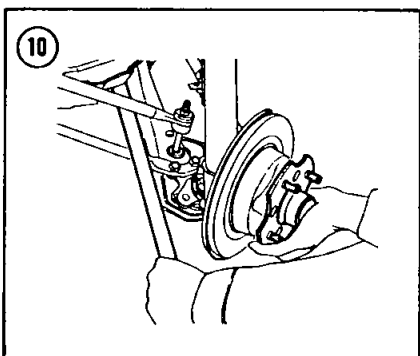
Pickup Trucks

1 Loosen the front wheel nuts, jack up the front end of the truck, place it on jackstands, and remove the front wheels.

2 Spray the shock absorber nuts and bolt with penetrating oil. See Figure 14.

3 Hold the shock absorber stem from turning and remove upper nuts, washers, and bushings.

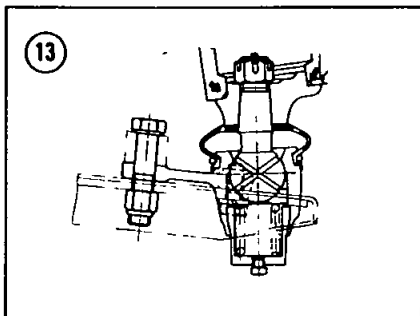
4 Remove the nut and bolt from the lower end of the shock absorber. Take shock out.



6 Place a jack beneath the strut to support it. Remove 3 self-locking nuts securing the top of the strut to the fender well (Figure 11).

WARNING

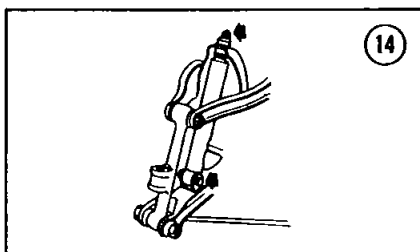
Do not remove the center nut from the top of the strut. This could allow the



front of the truck. Tighten nuts and bolts to specifications (end of chapter).

COIL SPRING REPLACEMENT (CARS)

The coil spring is part of the strut assembly. To replace the spring, follow the shock absorber procedure. Since the procedure requires special tools, it is best to remove the strut assembly yourself and let a dealer install the new spring. Then install the strut using the same procedure.



TORSION BARS (PICKUPS)

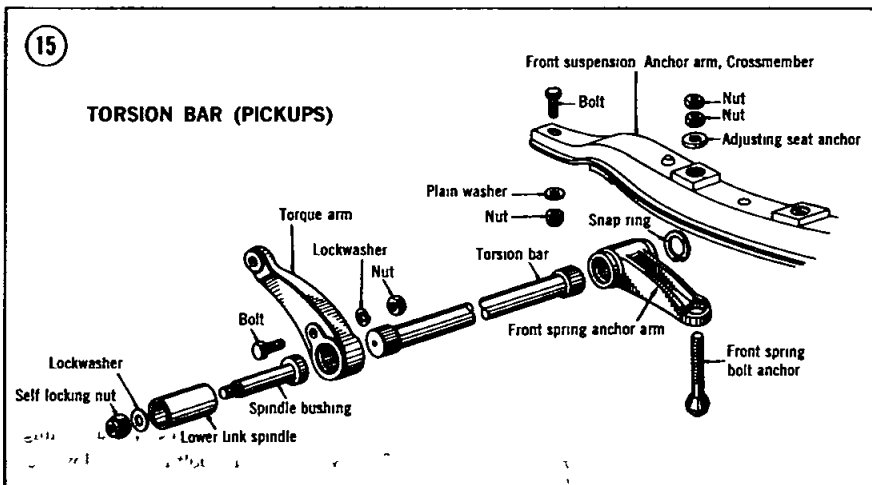
The torsion bars are attached at their front ends to torque arms, which in turn are attached to the lower suspension links. At the rear, the torsion bars are attached to a crossmember. As the suspension links move up and down, they twist the torsion bars. This provides a spring effect. Figure 15 shows a torsion bar and its related parts.

5 Inspect bushings and attaching hardware. Replace as needed.

6 Installation is the reverse of these steps. Install the lower bolt with its head toward the

Removal

1 Loosen the front wheel nuts, jack up the front end of the truck, place it on jackstands, and remove the front wheels.



- 2 Remove the anchor bolt from the anchor arm
- 3 Remove the dust cover and snap ring from the rear side of the anchor arm. Throw the snap ring away. It must not be reused.
- 4 Slide the anchor arm off the torsion bar. Slide the torsion bar rearward out of the torque arm.

Inspection

Check torsion bars for wear, twisting, bending, or damaged splines. Replace if any of these conditions are found.

Installation and Adjustment

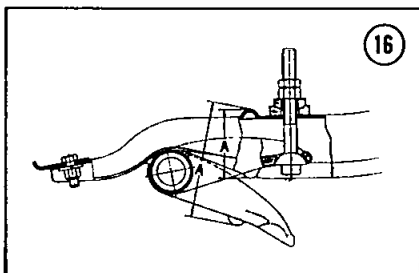
- 1 Make sure the lower suspension link is resting on its rubber rebound bumper.
- 2 Grease the splines at both ends of the torsion bar. Install it in the torque arm.

NOTE Left and right torsion bars are not interchangeable. They can be identified by "L" and "R" marks stamped on the ends.

- 3 Install the anchor bolt in the anchor arm.

NOTE Steps 4-7 apply to 521 pickups only. If you have a 620 pickup, skip these steps.

- 4 Install anchor arm on torsion bar. The anchor arm is pointed in the right direction when dimension "A" (Figure 16) is 3.5 in (90mm).



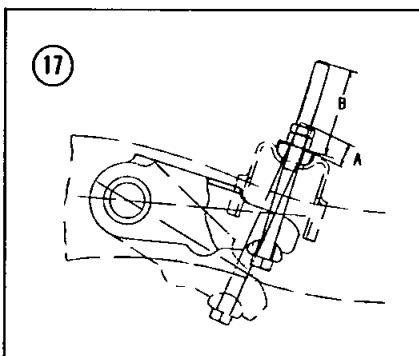
- 5 Install a new snap ring and the dust cover in the rear side of the anchor arm.
- 6 Place a jack beneath the anchor arm. Raise it until dimension "A" is reduced to 2.70 in

(68.5mm). This preloads the torsion bar, causing it to push the lower suspension link downward. When the truck is lowered onto the wheels, the preloaded torsion bars hold it at its normal ride height.

- 7 Install the anchor bolt adjusting nut and locknut. Hold the adjusting nut steady and tighten locknut against it 29-36 ft-lb (4-5 mkg).

NOTE Steps 8-10 apply to 620 pickups only. If you have a 521 pickup, skip these steps.

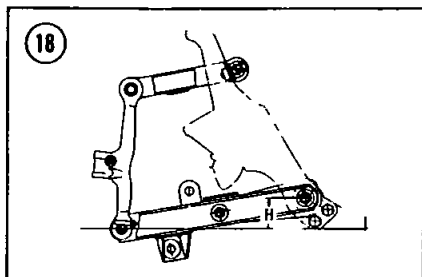
- 8 Install the anchor arm to the torsion bar. The anchor arm is pointed in the right direction when the anchor bolt protrudes 0.2-0.6 in (5-15mm) from the top of the crossmember. See dimension "A", Figure 17.



- 9 Install a new snap ring in the rear side of the anchor arm.
- 10 Install the adjusting nut on the anchor bolt. Tighten until dimension "B" (Figure 17) is 2.36-2.75 in (60-70mm). Install the locknut and tighten to 23-30 ft-lb (3.1-4.1 mkg).

NOTE The next steps apply to all pickups.

- 11 Install the wheels and lower the truck.
- 12 With the wheels on the ground, measure dimension "H" (Figure 18). This must be done with the fuel tank full, the spare tire and jack in their stowed positions, and no other weight in the truck. On 521 pickups, this should be 2.99-3.19 in (76-81mm). On 620 pickups, it should be 3.07-3.23 in (78-82mm).

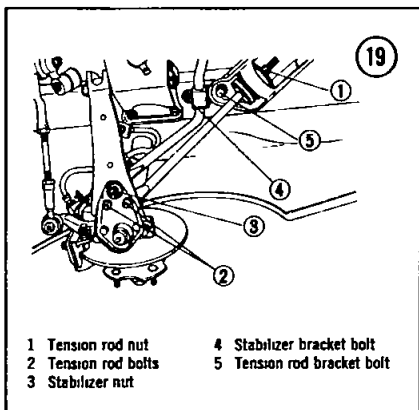


13 If dimension "H" is incorrect, tighten or loosen the anchor bolt adjusting nut to change it

STABILIZER

Removal

- 1 Jack up the front end of the vehicle and place it on jackstands
- 2 Detach the stabilizer brackets from the vehicle frame. **Figure 19** shows a typical car installation. Pickups are similar

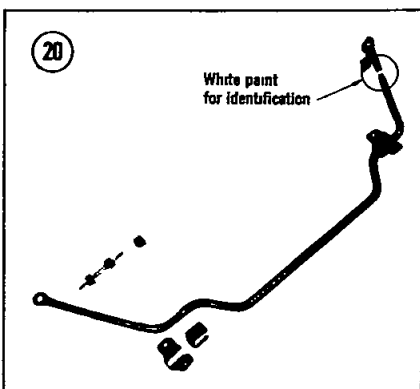


- 3 Detach the stabilizer from the transverse links or lower suspension links, then take it out
- 4 Check the rubber bushings for wear, cracks, or general deterioration. Replace as needed

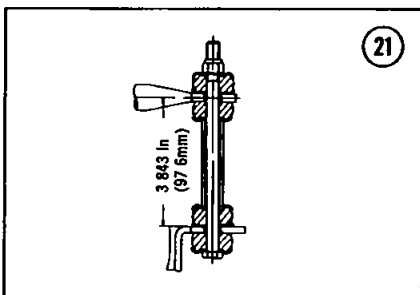
Installation

Installation is the reverse of the removal procedure, plus the following

- 1 On 1200's, be sure the stabilizer end with the white paint mark goes on the left side of the car (**Figure 20**)



- 2 Make sure the stabilizer is centered in the brackets
- 3 On pickups, tighten the stabilizer connecting rod nut until the distance from bracket to stabilizer is 3 84 in (97.6mm). See **Figure 21**



- 4 Tighten all nuts and bolts to specifications (end of chapter)

TENSION RODS

Tension rods are used on all models except the Z sports car

Removal/Installation (Cars)

- 1 Jack up the front end of the car and place it on jackstands

2 Remove tension rod nut and bolts (1 and 2, **Figure 19**) Take the tension rod out

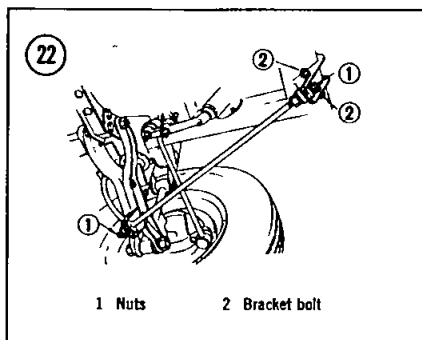
3 The 610's, 710's, and B210's, use removable tension rod brackets. If necessary, remove the bracket bolts (5, **Figure 19**) and take the bracket off

4 Installation is the reverse of these steps. Be sure the tension rod bushings are compressed evenly. Tighten all nuts and bolts to specifications (end of chapter)

Removal/Installation (Pickups)

1 Jack up the front end of the truck and place it on jackstands

2 Remove the nuts from both ends of the tension rod (1, **Figure 22**)



3 Remove the tension rod bracket bolts (2, **Figure 22**) Remove the tension rod and bracket

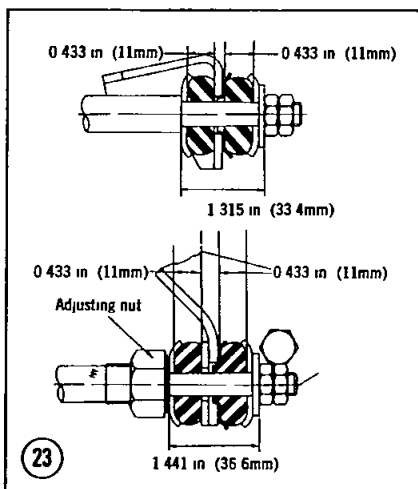
4 Installation is the reverse of these steps. Be sure the tension rod bushings are compressed to the dimension shown in **Figure 23**. Tighten locknuts and bracket bolts to 11-15 ft-lb on 521 pickups, 12-16 ft-lb on 620 pickups

COMPRESSION RODS (240-260Z)

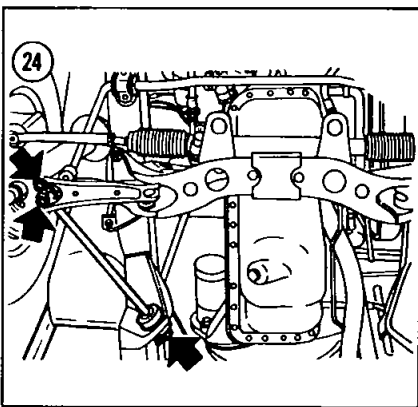
The 240-260Z's use compression rods, rather than the tension rods used on the other models

Removal/Installation

1 Jack up the front end of the car and place it on jackstands



2 Detach the compression rod from the frame (**Figure 24**). Then unbolt it from the transverse link and take it out



3 Inspect the rubber bushings for cracks, wear, and general deterioration. Replace as needed

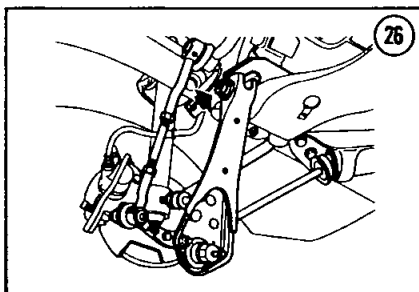
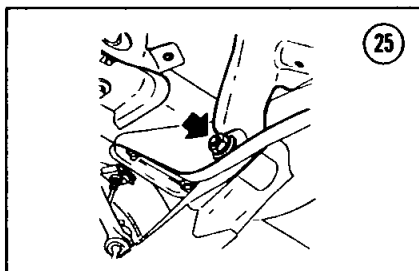
4 Insert the compression rod and bushings into the frame. Do not tighten the nut yet

5 Bolt the compression rod to the transverse link. Tighten the nut and bolts to specifications (end of chapter). Lower the car

TRANSVERSE LINKS AND BALL-JOINTS (CARS)

Removal

- 1 Loosen the front wheel nuts, jack up the front end of the car, place it on jackstands, and remove the front wheels
- 2 Detach the stabilizer and tension or compression rod from the transverse link
- 3 Detach the tie rod from the knuckle arm
- 4 Remove 2 bolts securing the knuckle arm to the strut. See Figure 7 (1200 and B210) or Figure 8 (all others). This separates the knuckle arm, ball-joint, and transverse link outer end from the strut assembly
- 5 On 1200's and Z sports cars, remove the transverse link mounting bolt (Figure 25). On all others, remove the transverse link nut. Figure 26 shows a typical installation



- 6 Place the transverse link in a vise. Remove the cotter pin and nut from the ball-joint stud. Separate the knuckle arm from the ball-joint
- 7 Unbolt the ball-joint from the transverse link and take it out

8 Installation is the reverse of these steps. Tighten the transverse link nut or pivot bolt to specifications with the car's weight on the wheels

Inspection

- 1 Check the knuckle arm for wear, cracks, and other visible defects. Replace if these are found
- 2 Check the transverse link bushing for wear and damage. If worn, have it replaced by a Dat-sun dealer or machine shop. If the rubber is melted or the bushing metal is cracked, replace the transverse link
- 3 Check the transverse link for bending, cracks, or other damage. Replace if these are found
- 4 Check the ball-joint for a cracked rubber boot or other visible damage. Place the ball-joint in a vise with the stud pointing upward. Pull the stud up and down and note the movement. If it moves more than slightly, replace the ball-joint

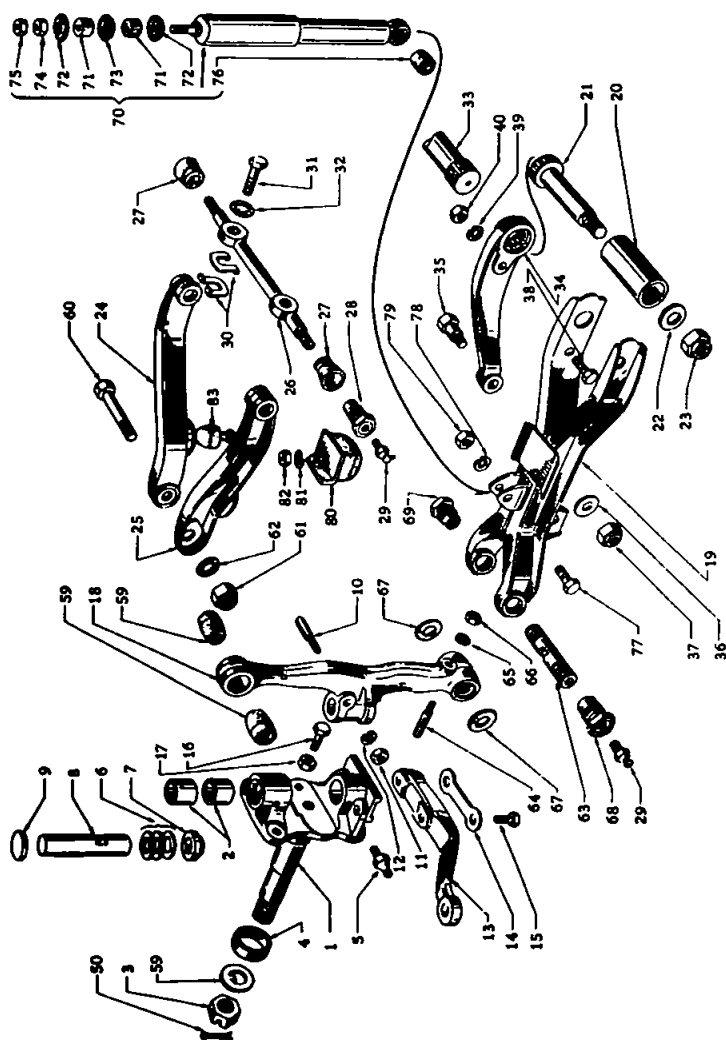
KINGPINS AND KNUCKLE ARMS (PICKUPS)

Figure 27 shows the suspension parts for one side. Refer to it as needed for the following procedures

Removal

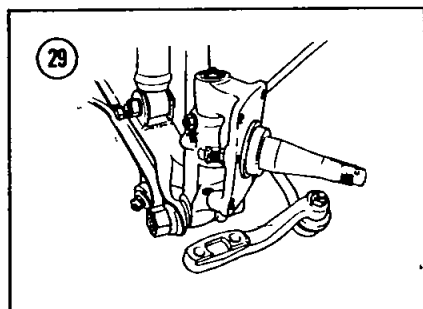
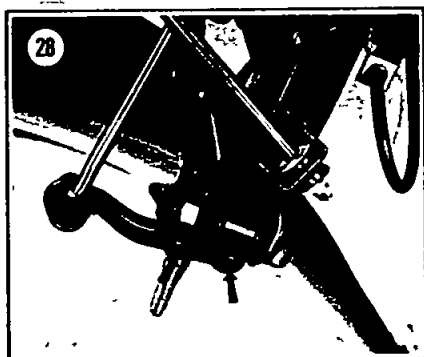
- 1 Loosen the front wheel nuts, jack up the front end of the truck, place it on jackstands, and remove the front wheels
- 2 Disconnect the brake hose from the wheel cylinder. Remove the brake drum as described in Chapter Ten
- 3 Remove the wheel bearings and related parts as described later in this chapter
- 4 Remove 4 bolts securing the brake backing plate to the knuckle spindle. Remove the front brake assembly as described in Chapter Ten
- 5 Remove 2 bolts securing the knuckle arm to the bottom of the knuckle spindle (Figure 28). It is not necessary to detach the knuckle arm from the tie rod
- 6 Remove the kingpin locknut and bolt (see Figure 29)

27

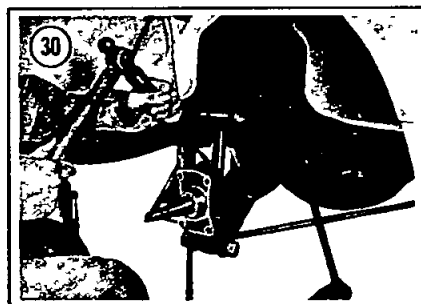


KINGPINS AND KNUCKLE SPINDLE — PICKUPS

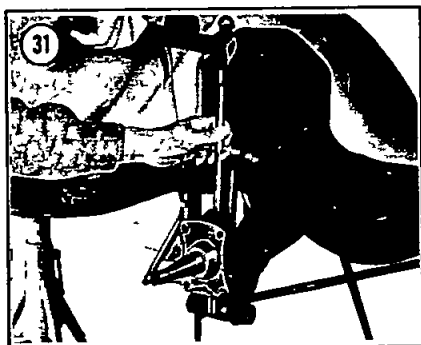
1	Knuckle spindle assembly with nut	22	Special lower link washer	62	Lockwasher
2	Front spindle bushing	23	Self locking nut	63	Front suspension lower link fulcrum pin
3	Knuckle spindle nut	24	Front suspension upper link assembly (rear)	64	Taper pin
4	Front spindle collar	25	Front suspension upper link assembly (front)	65	Lockwasher
5	Grease plug or nipple	26	Front suspension upper link spindle	66	Nut
6	Front spindle shims	27	Upper link bushing dust seal	67	Lower link fulcrum pin ring
7	Front spindle thrust washer assembly	28	Front suspension upper link bushing assembly	68	Front suspension lower link bushing assembly (front)
8	King pin	29	Grease plug or nipple	69	Front suspension lower link bushing assembly (rear)
9	Front spindle plug	30	Camber shim A	70	Front shock absorber kit
10	Bolt	31	Upper link spindle bolt	71	Shock absorber rubber bushing
11	Nut	32	Lockwasher	72	Shock absorber special washer
12	Lockwasher	33	Front spring	73	Special washer
13	Knuckle arm	34	Front spring torque arm	74	Nut
14	Lock plate	35	Front suspension torque arm bolt	75	Locknut
15	Knuckle arm bolt	36	Plain washer	76	Front shock absorber bushing assembly
16	Bolt	37	Self locking nut	77	Front shock absorber clamp bolt
17	Nut	38	Bolt	78	Lockwasher
18	Knuckle spindle support	39	Lockwasher	79	Nut
19	Front suspension lower link assembly	40	Nut	80	Front suspension rebound bumper assembly
20	Front suspension lower link bushing assembly	59	Upper link bushing assembly	81	Lockwasher
21	Front suspension lower link spindle	60	Upper link fulcrum bolt	82	Nut
		61	Self locking nut	83	Front suspension rebound bumper



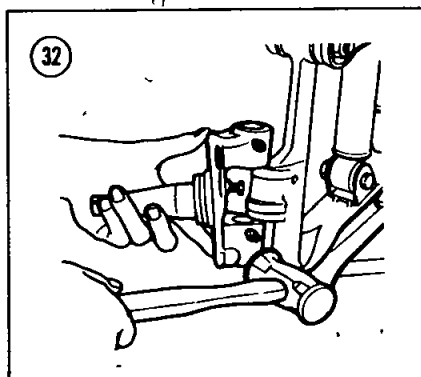
7 Drive a pointed tool into the upper kingpin plug and pry it out (Figure 30) As an alternative, drill and tap the plug, thread in a bolt, and pull on the bolt to remove the plug



8 Using a hammer and drift, drive the kingpin and its lower plug out of the knuckle spindle See Figure 31



9 Gently tap the knuckle spindle loose from the knuckle spindle support (Figure 32)



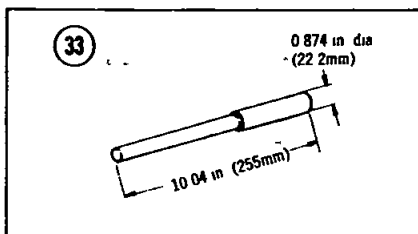
Inspection

1 Check the kingpin and bushings for visible wear and damage Replace if these conditions are found

NOTE Steps 2-6 can be done by a dealer or machine shop if you do not have the necessary equipment

2 If there is any doubt about kingpin and bushing condition, measure bushing bore and kingpin diameter Maximum clearance between kingpins and bushings is 0.006 in (0.15mm) Normal kingpin diameter is 0.7866-0.7874 in (19.979-20.00mm) The normal bushing bore is 0.7878-0.7888 in (20.010-20.035mm) Replace worn parts

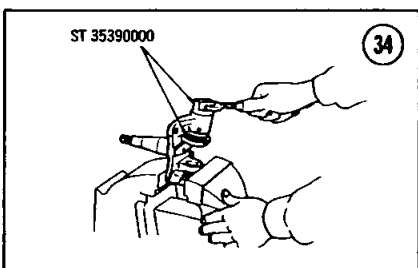
3 If the bushings are worn, drive them out with a hammer and drift such as Datsun tool ST 35380000 (Figure 33) On 620 pickups, remove the upper bushing grease seal at the same time



4 Press new bushings in with the drift used for removal. If the new bushings have grease holes, line them up with the knuckle spindle grease nipples. If there are no holes, drill new ones after installing the bushings. Use a 0.118 in (3mm) drill. Clean away all shavings and burrs after drilling.

5 Ream new bushings to specifications (Step 2). Use the lower bushing as a pilot while reaming the upper bushing, use the upper bushing as a pilot while reaming the lower bushing. This keeps the bushing centers aligned.

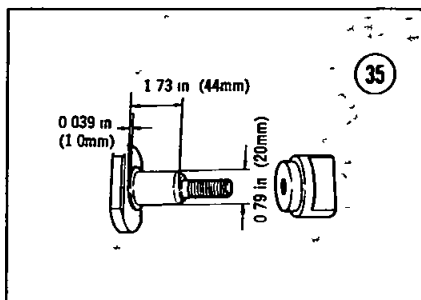
6 On 620 pickups, install a new upper bushing grease seal. Use a tool such as ST 35390000 (Figures 34 and 35).



7 Inspect wheel bearings as described later in this chapter.

Installation

Apply multipurpose grease to all friction points during assembly.



1 Grease an O-ring and install it on the lower side of the knuckle spindle support. The grease will keep the O-ring in place.

2 Temporarily install the knuckle spindle and thrust bearing on the knuckle spindle support. Be sure the covered side of the bearing faces up. Place a jack beneath the knuckle spindle and raise it slightly. Measure the gap between the knuckle spindle support and knuckle spindle with a feeler gauge. Select shims to reduce this gap to 0.004 in (0.1mm) or less.

3 Remove the knuckle spindle and thrust bearing. Install the shims, then reinstall the knuckle spindle and thrust bearing.

4 Insert the kingpin into the knuckle spindle and support. Line up the lock bolt notch with the holes in the knuckle spindle support. Install the lock bolt and nut and tighten to 15-18 ft-lb (2.1-2.5 mkg).

5 Make sure knuckle spindle moves smoothly back and forth. If necessary, add or remove knuckle spindle shims.

6 Coat the outer edges of the upper and lower knuckle spindle plugs with gasket sealer, then install the plugs. On 521 pickups, stake the plugs into place with a hammer and punch.

7 Bolt the knuckle arm to the knuckle spindle, using a new lock plate. Tighten the bolts 81-95 ft-lb on 521 pickups, 75-88 ft-lb on 620 pickups.

8 Install the grease nipples on the knuckle spindle. Inject multipurpose grease until it is forced out between the knuckle spindle and knuckle spindle support.

9 Install the brake assembly as described in Chapter Ten.

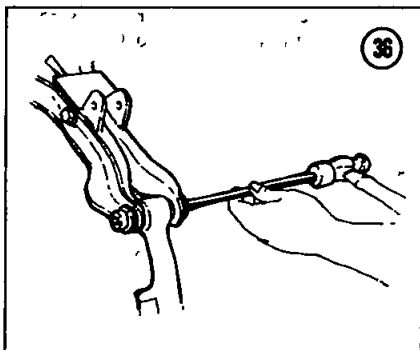
- 10 Install and adjust the wheel bearings as described later in this chapter
- 11 Install the brake drum and wheel. Lower the truck

SUSPENSION LINKS (PICKUPS)

See Figure 27 for the following procedures

NOTE Some of the following steps require unusually tight torque settings. Read through the procedure and determine whether you can obtain the necessary tools before starting

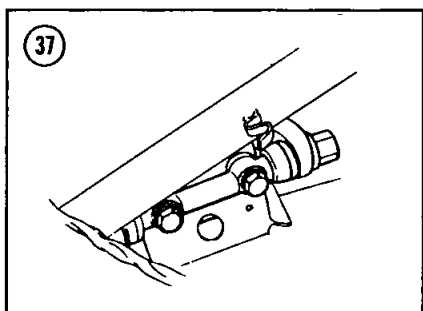
- 1 Loosen the front wheel nuts, jack up the front end of the truck, place it on jackstands, and remove the front wheels
- 2 Remove the brake drum (Chapter Ten)
- 3 Remove the wheel bearings and hub as described later in this chapter
- 4 Remove front brake assembly (Chapter Ten)
- 5 Unbolt the knuckle arm from the bottom of the knuckle spindle (Figure 28)
- 6 Remove the torsion bar as described earlier
- 7 Disconnect the stabilizer from the lower suspension link
- 8 Remove the shock absorber and tension rod as described earlier
- 9 Remove the nut and bolt attaching the knuckle spindle support to the upper suspension link. Pull the knuckle spindle support outward, away from the suspension link. Remove the bushings from the upper end of the knuckle spindle support
- 10 Remove the screw bushings (68 and 69, Figure 27) from the lower link fulcrum pin. These bushings are torqued to 174-181 ft-lb on 521 pickups, 145-217 ft-lb on 620 pickups. Brace the lower link by placing a jack beneath it. Use a socket and breaker bar to loosen the bushings. If necessary, place a pipe over the bar to increase leverage
- 11 Remove the nut and lock pin (64 and 66, Figure 27) from the lower fulcrum pin
- 12 Drive the fulcrum pin out with a hammer and drift (Figure 36). Separate the knuckle



spindle support from the lower link. Remove 2 dust seals (67, Figure 27) from the bottom end of the knuckle spindle support

- 13 Remove 2 bolts securing the upper link spindle (Figure 37). Remove the upper link, spindle, and wheel alignment shims

NOTE Record the locations and positions of all shims. They must be reinstalled exactly as they were



- 14 Remove the self-locking nut and washer from the lower link spindle (21, Figure 27). Remove the spindle and lower link
- 15 Separate the upper suspension link halves from the link spindle. Place the link halves in a vise and remove the screw bushings

NOTE These bushings are torqued to 174-181 ft-lb on 521 pickups, 253-398 ft-lb on 620 pickups. If you don't have the equipment necessary for removal, have this step done by a Datsun dealer

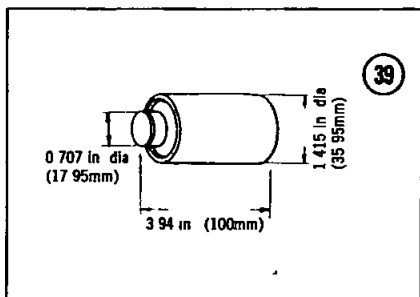
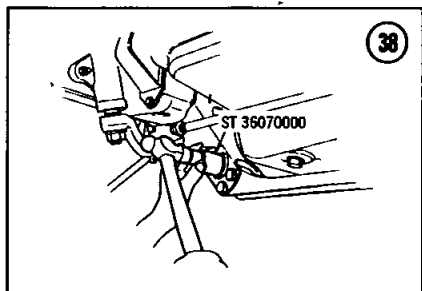
16 After removing the screw bushings, remove and discard the dust covers and dust seals

Inspection

1 Clean all metal parts in solvent. While cleaning, check for obvious wear or damage. Replace parts with these conditions:

2 Carefully check suspension links, spindles, and the knuckle spindle support for bends, cracks or wear. Replace if these conditions can be detected.

3 Check all bushings for wear and damage. Replace bushings if there is any doubt about their condition. If the lower link spindle bushing must be replaced, drive it out with a hammer and drift such as ST 36070000. Figure 38 shows the drift in use, Figure 39 gives its dimensions. Remove any rust from the bushing hole before installing the bushing.



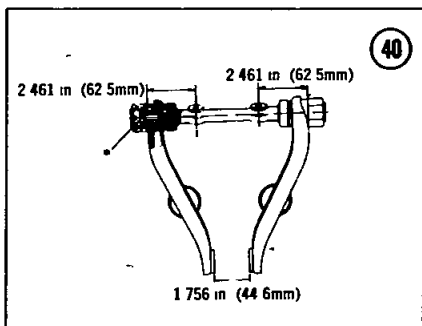
4 Inspect all threaded parts. Clean dirty or rusty threads. Slightly damaged threads may be cleaned with a tap or die. Replace parts that have badly damaged threads.

Installation

1 Place the upper link halves in a vise and install the screw bushings.

NOTE: These bushings are tightened to unusually high torques. If you do not have the equipment necessary for installation, have the screw bushings installed by a Datsun dealer.

2 Coat the insides of the screw bushings and the upper link spindle threads with multipurpose grease. Install the upper link halves on the upper link spindle. Center the halves on the spindle as shown in Figure 40.



3 Coat the lower link spindle with multipurpose grease. Position the lower link on its mounting bracket and insert the spindle. Secure with the washer and a new self-locking nut. Tighten the nut to specifications (end of chapter).

4 Bolt the upper link spindle to its mounting bracket. Be sure to install the wheel alignment shims in their original locations and positions. Tighten bolts to specifications (end of chapter).

5 Remove the grease filler plugs from the upper link screw bushings. Install a grease nipple in place of each plug, then inject multipurpose grease into the bushings. Remove the grease nipples and reinstall the plugs.

6 Install the dust seals in the bottom end of the knuckle spindle support.

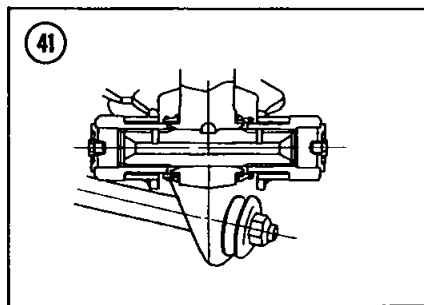
7 Position the knuckle spindle support in the outer end of the lower link.

8 Start the lower link fulcrum pin into the lower link. Line up the taper pin notch in the

fulcrum pin with the taper pin hole in the knuckle spindle support. Tap the fulcrum pin through the knuckle spindle support and lower link.

9 Insert the taper pin into the knuckle spindle support and fulcrum pin. Install the nut and lockwasher onto the taper pin. Tighten the nut to 3-4 ft.-lb. on 521 pickups, 6-8 ft.-lb. on 620 pickups.

10 Coat the lower link screw bushing threads with multipurpose grease. Remove the grease filler plugs from the bushings. Thread the bushings in by hand until the knuckle spindle support is centered in the lower link (**Figure 41**), then tighten the screw bushings to 174-181 ft.-lb. (521 pickup) or 145-217 ft.-lb. (620 pickup). Use a 150 ft.-lb. torque wrench and a range extender to tighten the screw bushings.



11 Install a grease nipple in place of each grease filler plug. Inject multipurpose grease into the bushings until it is forced out past the seals. Remove grease nipples and reinstall plugs.

12 Install the upper link bushings in the knuckle spindle support.

13 Position the upper end of the knuckle spindle support between the upper link halves. Insert the fulcrum bolt into the upper link halves and knuckle spindle support.

NOTE Insert the fulcrum bolt from the rear side of the truck.

14 Secure the fulcrum bolt with a new washer and self-locking nut. Tighten the nut to specifications (end of chapter).

15 Install the shock absorber and tension rod as described earlier in this chapter.

16 Attach stabilizer to lower suspension link.

17 Install the torsion bar as described earlier in this chapter.

18 Bolt the knuckle arm to the bottom of the knuckle spindle (**Figure 28**). Tighten the bolts to specifications (end of chapter).

19 Install front brake assembly (Chapter Ten).

20 Install the wheel bearings and hub as described later in this chapter.

21 Install the brake drum. Install the wheels and lower the truck.

CROSSMEMBER (CARS)

Removal/Installation

1 Loosen the front wheel nuts, jack up the front end of the car, place it on jackstands, and remove the front wheels.

NOTE Position the jackstands so they will not obstruct crossmember removal.

2 Detach the inner ends of the transverse links from the crossmember. See Step 5, *Transverse Link Removal*.

3 Support the engine with a hoist.

NOTE Use a hoist which can be locked in one position, and which is capable of supporting engine throughout this procedure. Hydraulic hoists, available from tool rental dealers, are effective and easy to use.

4 Unbolt motor mounts from crossmember.

5 Make sure the hoist is supporting the engine fully, then remove the crossmember-to-frame bolts. **Figure 42** shows the bolts for one side.

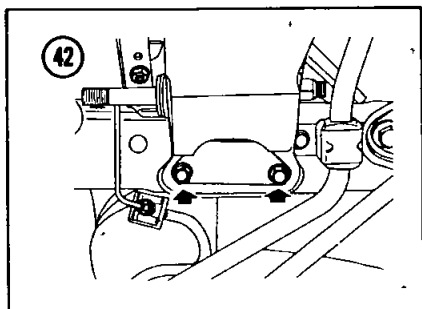
6 Installation is the reverse of these steps. Tighten bolts to specifications (end of chapter).

WHEEL BEARINGS

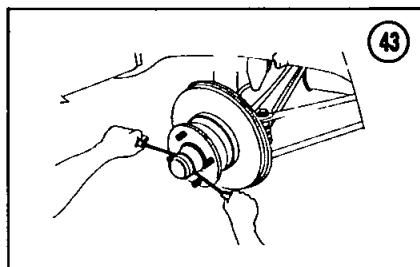
Removal

1 Loosen the front wheel nuts, jack up the front end of the vehicle, place it on jackstands, and remove the front wheels.

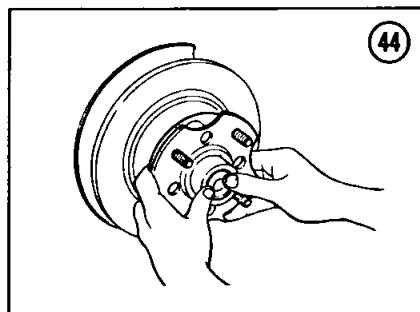
2 On cars, remove the brake caliper (see Chapter Ten).



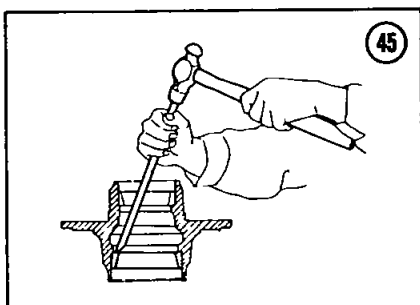
- 3 On pickup trucks, remove the brake drum
- 4 Remove the grease cap from the wheel hub (Figure 43)



- 5 Remove the cotter pin from the wheel bearing locknut (early models) or stamped metal nut lock (later models). Remove the wheel bearing nut from the spindle
- 6 On cars, pull the hub and brake disc off the spindle (Figure 44). Pickup truck hubs are removed in a similar manner



- 7 Pry the grease seal out of the hub with a screwdriver. Remove the bearing cones
- 8 Using a hammer and brass bar, tap the bearing outer races out of the hub (Figure 45)

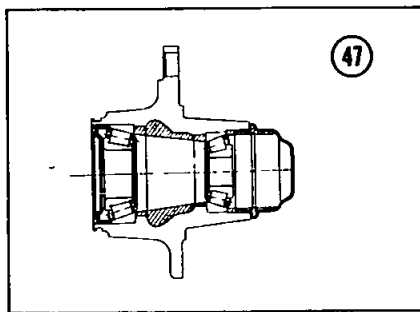


Inspection

- 1 Thoroughly clean the wheel bearing and hub in solvent
- 2 Inspect the inner and outer races for rust, galling, and the bluish tint that indicates overheating. Rotate the bearings and check for roughness and excessive noise. Compare the races and rollers to the defective bearing parts shown in Figure 46. Replace any bearings that have similar defects

Installation

- 1 Tape the outer bearing races into place in the hub. Use a drift (such as a piece of pipe) with the same diameter as the outer race
- 2 Fill the hub and grease cap to the points shown in Figure 47. Use multipurpose lithium grease



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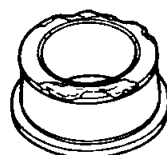
WHEEL BEARING WEAR



Inner race flaking



Roller flaking



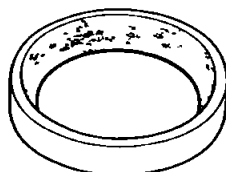
Cracked inner race



Cracked roller



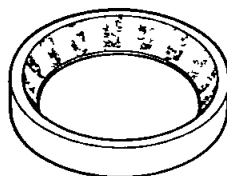
Recess on inner race



Recess on outer race

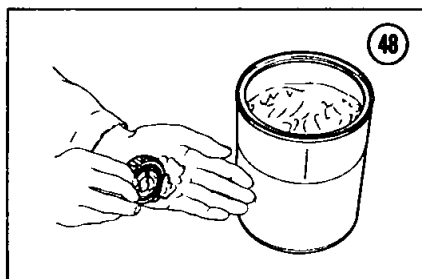


Recess on roller



Rust on outer race

- 3 Work as much grease as possible between the wheel bearings and rollers (Figure 48)



- 4 Install the inner wheel bearing in the hub, then install the grease seal. Coat the grease seal lips with grease.
- 5 Apply a light coat of grease to the bearing spindle, including the threaded area. Install the hub (together with the brake disc on cars).
- 6 Install the outer wheel bearing. Lightly grease the bearing washer and the spindle nut threads. Install the washer and nut.
- 7 Adjust wheel bearings as described in the following procedure.

Adjustment

- 1 Tighten the spindle nut to specifications (Table 2)

Table 2 WHEEL BEARING TORQUES

1200	16-17½ ft. lb (2 2 2 4 mkg)
B210, 510 1973 610 and pickups	22 25 ft. lb (3 0 3 5 mkg)
Z sports car, 710, and 1974 and later, 610	18-22 ft. lb (2 5-3 0 mkg)

- 2 Rotate the hub several turns in both directions, then retighten to specifications.

NOTE Later models use a plain nut and stamped metal nut lock. Adjustment procedures are the same as for castellated locknuts.

- 3 On 1200's and pickup trucks, back off the locknut 40-70°, until the cotter pin holes in nut and spindle are aligned.

- 4 On B210's, 1968-1973 510's, and 1973 610's, back off the locknut 90°. Tighten until the cotter pin holes in nut and spindle are aligned. Do not tighten more than 15°.

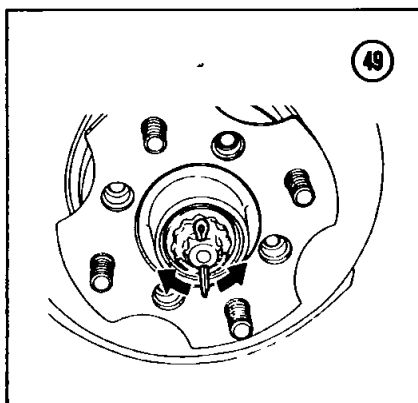
- 5 On 1974's and later 610's and 710's, back off the locknut 60°, then tighten until the cotter pin holes in nut and spindle are aligned. Do not tighten more than 15°.

- 6 On Z sports cars, back off the locknut 60°. If necessary, loosen the locknut as much as 15° more to align the holes in nut and spindle. Do not loosen more than 75° total.

- 7 Rotate the hub. Check for rough movement or excessive noise. If these are present, remove wheel bearings and check for foreign material.

- 8 Grasp the hub firmly in both hands and try to shake it up, down, and sideways. There should be no play in the bearings.

- 9 Install a cotter pin and spread it. See Figure 49.



- 10 Install the grease cap in the hub.
- 11 On cars, install the brake caliper. On pickup trucks, install the brake drum. See Chapter Ten.
- 12 Install the wheel(s) and lower the vehicle.

STEERING

Steering Wheel Removal/Installation

- 1 Disconnect negative cable from battery.
- 2 Turn the steering wheel to the straight-ahead position.

3 Remove the horn pad as follows

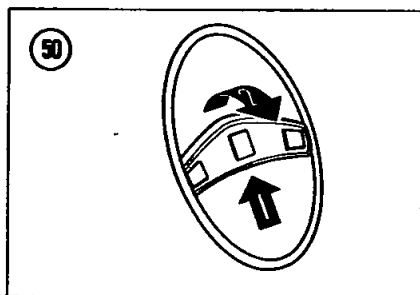
510, 521 pickup, 260-280Z — push down, turn counterclockwise, and pull off

1200, B210, 620 pickup — remove screws from back of steering wheel

1973-1974 610, 2-spoke steering wheels and steering wheels stamped NP — pull horn pad off

1973-1974 610, horn pad without letters NP — push down, turn counterclockwise, and pull off

1975 and later 610, all 710, 2-spoke pad — slide pad up, then pull out See Figure 50



1975 and later 610, all 710, 3-spoke horn pad — pull pad off
240Z — pull horn pad off

4 Remove the steering wheel nut

5 Make alignment marks on steering wheel and column, then remove the wheel

6 Installation is the reverse of these steps. Be sure to align the match marks on steering wheel and column. Tighten the steering wheel nut to specifications (end of chapter)

Steering Linkage Lubrication (Except Z Sports Car)

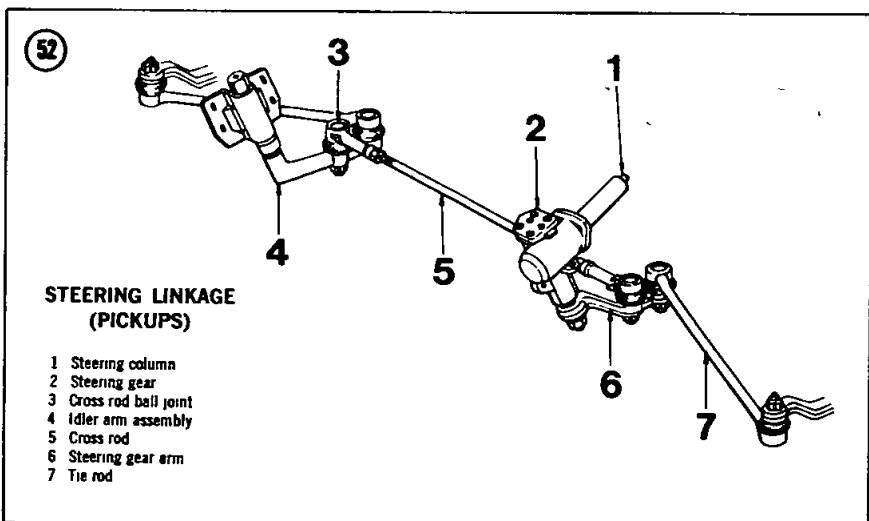
Figure 51 shows the steering linkage used on cars. Figure 52 shows the pickup truck linkage.

1 Remove the grease filler plugs from the tie rod ball-joints. On cars, remove the plugs from the suspension ball-joints, located beneath the knuckle arms. On pickups, remove the kingpin and suspension link grease plugs. See Figure 27

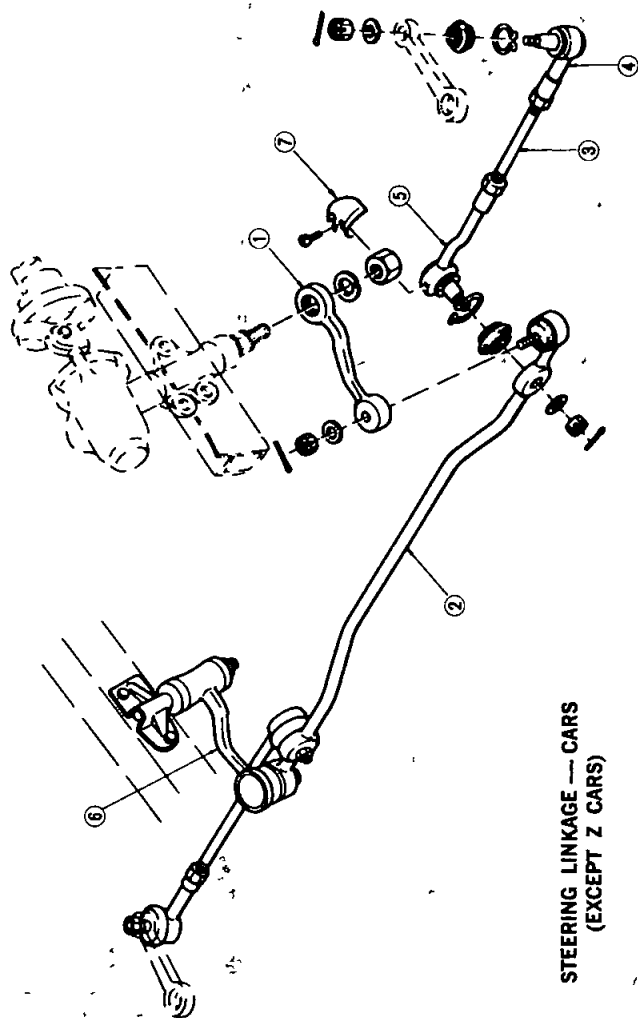
2 Install a grease nipple in place of each plug. The grease nipple may be transferred from one lubrication point to another.

3 Use a grease gun to inject new grease until the old grease is forced out.

4 Remove the grease nipple and install the filler plug.



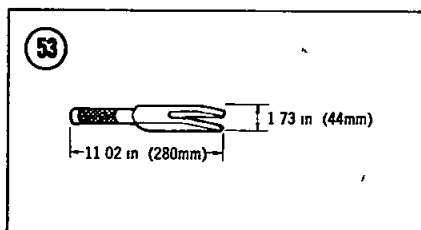
51



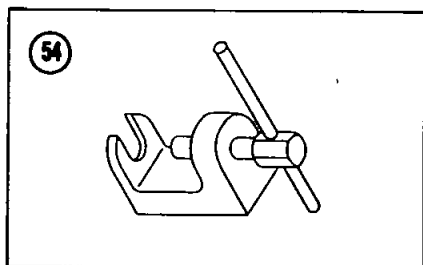
Steering Linkage Overhaul (Except Z Sports Car)

If the steering linkage shows signs of looseness, it should be overhauled as follows

- 1 Loosen the front wheel nuts, jack up the front end of the vehicle, place it on jackstands, and remove the front wheels
- 2 Remove the cotter pins and locknuts from the outer tie rod ball-joints
- 3 Detach the tie rod ball-joints from the knuckle arms. If available, use a fork-type separator such as ST 27850000 (Figure 53). If the special tool isn't available, hold a hammer or heavy steel body against the knuckle arm boss (the part the ball-joint stud goes through) and tap the other side of the boss with a soft-metal hammer. Do not tap the ball-joint stud, ball-joint socket, or tie rod.



- 4 Scribe match marks on the steering gear arm and steering gear. Detach the gear arm from the gear with a puller such as ST 27200000 (Figure 54). Use a small gear puller if the special tool isn't available.



- 5 Remove 2 bolts securing the idler arm assembly to the frame
- 6 Remove the steering linkage as an assembly

7 Separate the remaining steering linkage ball-joints as described in Step 3. Remove the nut (screw bushing on pickup trucks) from the idler arm assembly.

8 Clean metal parts in solvent. Do not immerse ball-joints. Wipe them with a rag dipped in solvent.

9 Check tie rods and the cross rod for bends, cracks, or damaged threads. Replace if these conditions are found.

10 Check the idler arm bushing for wear or damage. Replace as needed.

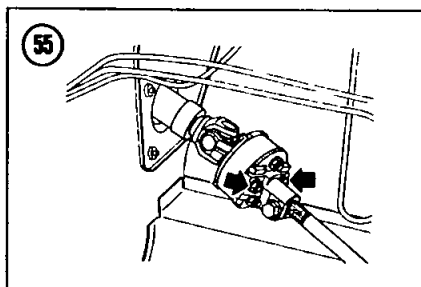
11 Place each ball-joint in a vise with the stud pointing upward. Set up a dial gauge with a pointer contacting the end of the stud. Pull the stud up and down and measure the movement. This is ball-joint axial play. Permissible play is 0.004-0.032 in. on 1200's, 0.004-0.020 in. on all others. Replace any ball-joints whose play is not within specifications.

12 Assemble and install by reversing Steps 1-7. Tighten all nuts and bolts to specifications (end of chapter).

Steering Rack Replacement (Z Sports Car)

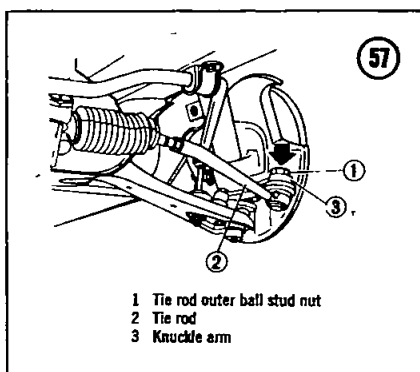
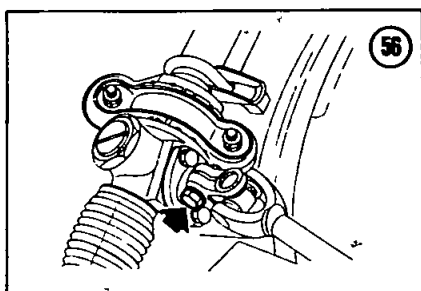
1 Loosen the front wheel nuts, jack up the front end of the car, place it on jackstands, and remove the front wheels.

2 Disconnect the lower joint assembly from the steering column (Figure 55).



3 Remove the clamp bolt from the lower joint assembly (Figure 56). Detach the lower joint assembly from the steering gear pinion.

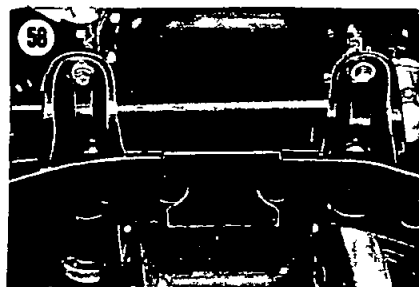
4 Remove the splash pan from under the front of the car.



5 Disconnect the tie rods from the knuckle arms (**Figure 57**) Use a fork-type separator tool if available. If not, place a heavy hammer on one side of the knuckle arm boss (the part the ball-joint stud goes through). Tap the other side of the boss with a soft-metal hammer. This will free the ball-joint stud. Do not tap on the ball-joint stud or tie rod.

6 Unbolt the rack-and-pinion assembly from the suspension crossmember (**Figure 58**). Lift the assembly up slightly, then remove it to one side.

7 Install by reversing Steps 1-6. Tighten all nuts and bolts to specifications (end of chapter).



Tightening torques are given in Tables 3 and 4 on the following two pages.

Table 3 CAR TIGHTENING TORQUES

	Fl. lb	Mkg		Fl. lb	Mkg
Stabilizer to transverse link*			Strut to body		
1200	6½-9	0-9.2	1200	12-15	16-21
B210, 510, 610, 710	9-12	12-17	510	28-38	39-52
240Z	14-19	19-26	B210 610, 710,	18-25	25-35
260Z, 280Z	9-20	12-27	Z sports car		
Stabilizer to frame			Steering gear to body		
1200	6½-9	0-9.2	1200	14-19	19-26
B210	12-15	16-21	B210, 1973 610	44-58	60-80
510 610, 710	10-13	14-18	510	72	100
Z sports car	14-18	19-25	1974 and later 610, 710	51-58	78
Tension rod to frame bracket			Steering rack to crossmember		
1200	40-47	55-65	240Z	16-22	22-30
B210, 510, 610 710	33-40	45-55	260Z	19-22	26-30
Tension rod to transverse link			280Z (bolt to welded nut)	19-22	26-30
1200	16-22	22-30	280Z (locknut)	22-25	30-35
B210, 510, 610, 710	35-46	49-63	Steering gear arm nut		
Tension rod bracket to frame**			1200 610, 710	101	14
B210	23-31	32-43	B210	94-108	13-15
510, 610, 710	37-50	51-69	510	90-101	12.5-14.0
Compression rod to transverse link			Idle arm nut		
240Z	36-45	50-62	1200	41-46	57-63
260Z, 280Z	44-51	61-71	B210	29-36	40-50
Compression rod to frame			510	40-55	55-76
(Z sports car)	33-40	45-55	610 and 710	32-44	44-61
Transverse link to crossmember			Idle arm bracket bolts		
1200	29-36	40-50	1200	14-19	19-26
B210, 510, 610, 710	65-72	90-100	B210	43-58	60-80
240Z	80-94	11-13	510, 610, 710	32-44	44-61
260Z, 280Z	80-101	11-14	Steering linkage ball-joint nuts		
Crossmember to frame			1200	22-36	30-50
1200	23-29	32-40	B210, 510, 1973 610	40-55	55-76
B210	23-31	32-43	1974 and later, 610 710	40-72	55-100
510	14-18	19-25	Tie rod ball-joint nuts		
610, 710	29-36	40-50	1200, B210, 260Z	58-72	80-100
240Z	30-36	45	240Z	65	90
260Z, 280Z	33-36	45-50	510 and 1973 610	40-55	55-76
Ball-joint to transverse link***			1974 and later 610, 710	40-72	55-100
1200	16-22	22-30	Column to gear housing U-joint		
B210, 510, 610 710	14-18	19-25	clamp bolt (510 only)	22	3
240Z	35-46	49-63	Column to gear housing rubber		
260Z	44-51	61-71	coupling clamp bolt (B210,		
280Z	14-18	19-25	610, and 710)	29-36	40-50
Ball-joint to knuckle arm			Rubber coupling securing bolts		
1200, 1974 B210	40-54	55-75	B210 610 and 710	11-16	15-22
Z sports car			240Z	29-36	40-50
510, 610, 710,	40-55	55-76	260Z, 280Z	17-20	23-27
1975 and later B210			Lower joint clamp bolt		
Strut to knuckle arm			(Z sports car)	29-36	40-50
1200	33-44	46-61	Steering wheel nut		
510	44-58	60-80	1200, B210	22-25	30-35
B210, 610, 710	53-72	73-99	510, 610, 710, 240Z	29-36	40-50
Z sports car			260Z 280Z	36-51	50-70

*On 240Z's, tighten the stabilizer to connecting rod nut to 9-20 ft.-lb

**Does not apply to 1200 or 510

***On 710's, ball-joint bolt which also secures tension rod is tightened to 35-46 ft.-lb

Table 4. PICKUP TRUCK TIGHTENING TORQUES

	ft.-lb	mtg
Shock absorber upper end		
521	11 15	1 5 2 1
620	12 16	1 6-2 2
Shock absorber lower end		
521	26-31	3 6-4 3
620	22 30	3 1 4 1
Stabilizer brackets		
521	11 15	1 5-2 1
620	12 16	1 6-2 2
Tension rod nuts and bracket bolts		
521	11 15	1 5 2 1
620	12 16	1 6-2 2
Torque arm end		
521	18 22	2 5-3 1
620	20-27	2 7 3 7
Torque arm serration boss		
521	6-9	0 8-1 2
620	13 19	1 8-2 6
Anchor bolt locknut		
521	29-36	4-5
620	22 30	3 1 4 1
Rubber bumper		
521	8-12	1 1-1 6
620	6-8	0 8-1 1
Kingpin lock bolt	15 18	2 1-2 5
Knuckle arm		
521	81 95	11 2 13 2
620	74-88	10 3-12 1
Lower link spindle nut		
521	62-69	8 5-9 5
620	54-58	7 4-8 0
Lower link screw bushings		
521	174 181	24-25
620	145 217	20-30
Upper link spindle bolts		
521	40-45	5 5-6 2
620	51-65	7 9
Upper link screw bushings		
521	174 181	24-25
620	253 398	35-55
Steering gear housing to body		
521	23 27	3 2 3 7
620	33 38	4 6-5 3
Gear arm nut		
521	101	14
620	94-108	13-15
Cross rod and tie rod ball joint nuts		
521	44-51	6-7
620 (1972-1974)	40-55	5 5 7 6
620 (1975 and later)	40-72	5 5 10 0
Steering wheel nut	51 54	7 0-7 5

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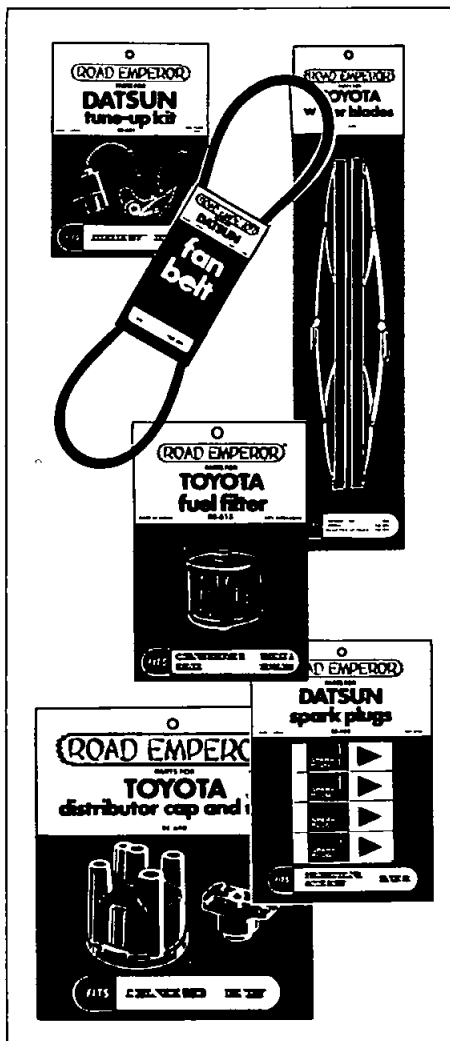
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