CHEVROLET

1976 CHEVROLET

LIGHT DUTY TRUCK

SERVICE and OVERHAUL MANUAL SUPPLEMENT

ST 330-76

FOREWORD

This manual has been prepared as a supplement to the 1974 Light Duty Truck Service and Overhaul Manuals. It covers, in separate sections, diagnosis, maintenance adjustments, service operations, and overhaul procedures for the 1976 10-30 Series truck models.

Complete wiring diagrams for the vehicles covered in this manual will be found in the separate 1976 Truck Wiring Diagram booklet (ST-352-76).

Any reference to brand names in this manual is intended merely as an example of the types of lubricants, tools, materials, etc., recommended for use. In all cases, an equivalent may be used.

All information, illustrations and specifications contained in this literature are based on the latest product information available at the time of publication approval. The right is reserved to make changes at any time without notice.

CHEVROLET MOTOR DIVISION

General Motors Corporation

DETROIT, MICHIGAN

IMPORTANT SAFETY NOTICE

Proper service and repair is important to the safe, reliable operation of all motor vehicles. The service procedures recommended and described in this service manual are effective methods, for performing service operations. Some of these service operations require the use of tools specially designed for the purpose. The special tools should be used when and as recommended.

It is important to note that some warnings against the use of specific service methods that can damage the vehicle or render it unsafe are stated in this service manual. It is also important to understand these warnings are not exhaustive. We could not possibly know, evaluate and advise the service trade of all conceivable ways in which service might be done or of the possible hazardous consequences of each way. Consequently, we have not undertaken any such broad evaluation. Accordingly, anyone who uses a service procedure or tool which is not recommended by the manufacturer must first satisfy himself thoroughly that neither his safety nor vehicle safety will be jeopardized by the service method he selects.

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10-30 SERIES TRUCK CHASSIS SERVICE and OVERHAUL MANUAL SUPPLEMENT

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SERVICE SECTION

The Service Section of this manual includes new or revised procedures for maintenance and adjustments, minor service operations and replacement of components.

CHEVROLET MOTOR DIVISION

General Motors Corporation

DETROIT, MICHIGAN

SECTION INDEX

Printed in U.S.A.

SECTION 0

GENERAL INFORMATION AND LUBRICATION

CONTENTS OF THIS SECTION

GENERAL INFORMATION

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Truck Model Identification

All 10-30 series models are identified by this model system. Basically the designation consists of 7 characters, 2 letters followed by five numbers. The first letter indicates a Chevrolet model and the second identifies the chassis type. The first number designates the GVW range, the second and third identify the cab-to-axle dimension or model type and the last two identify the cab or body style.

VEHICLE IDENTIFICATION NUMBER AND RATING PLATE

A combination vehicle identification number and rating plate used on all models (fig. 1) is located on the left door pillar of CK models. On Forward Control models (except P30 Motor Home Chassis) it is attached to the dash and toe panel.

The vehicle identification number stamped on the plate decodes into the information shown in Figure 2.

Plate Information

ENGINE NUMBER

The engine number indicates manufacturing plant, month and day of manufacture, and transmission type. A typical engine number would be F1210TFA, which would breakdown thus:

F - Manufacturing Plant (F-Flint, T-Tonawanda)

12 - Month of Manufacture (December)

10 - Day of Manufacture (tenth)

T - Truck

FA - Transmission and engine type

UNIT AND SERIAL NUMBER LOCATIONS

For the convenience of service technicians and engineers when writing up certain business papers such as Warranty Reports, Product Information Reports, or reporting product failures in any way, the location of the various unit numbers have been indicated. These unit numbers and their prefix or suffix are necessary on these papers for various reasons - such as accounting, follow-up on production, etc.

The prefixes on certain units identify the plant in which the unit was manufactured and thereby permits proper follow-up of the plant involved to get corrections made when necessary.

Always include the prefix in the number.

Axles

- Series 10, 20 and P30 Code is stamped on Front of Right Rear Axle Tube.
- Series C, G30 (except dual wheel) code is stamped at the Forward Upper Surface of Carrier.
- Dual Wheel Part Number and Production Code is stamped on Front of Right Axle Tube.

Transmissions

- 3-Speed Transmission Unit Number Located on Lower Left Side of Case Adjacent to Rear of Cover.
- 4-Speed Transmission Unit Number Stamped on Rear of Case, Above Output.
- Turbo Hydra-Matic 350 Transmission Unit Number Located on Right Rear Vertical Surface of Oil Pan.

TRUCK MODEL IDENTIFICATION

C C 10703+E63+LF5

1. C = Chevrolet; T = GMC Truck
2. Chassis Type
3. GVW Range
4. CA Dimension/Model Type
5. Cab or Body Style
6. Body Ordering Code
7. Engine Ordering Code

② Chassis Type

C—Conventional 4 x 2
G—Forward Control 4 x 2 (Body-Frame Integral)
K—Conventional 4 x 4 (Four Wheel Drive)
P—Forward Control 4 x 2 (Conventional)

③ Series/GVW Range

1—4800 to 7300
2—6400 to 8400
3—6400 to 14,000

④ CA Dimension/Model Type

05—Blazer, Jimmy, Step-Van, Value Van
07—42"/Pickup, Chassis-Cab
08—FC or Motor Home Chassis, Step-Van, Value Van
09—56"/Suburban, Chassis-Cab, Pickup
10—60"/FC Chassis, Chevy Van, Vandura, Sportvan, Rally Wagon, Chassis-Cab, Step-Van, Value Van
11—Motor Home Chassis
13—Chevy Van, Vandura, Sportvan, Rally Wagon, Cutaway Van, Hi-Cube Van
14—84"/FC or Motor Home Chassis, Chassis-Cab, Step-Van, Value Van
16—Cutaway Van, Hi-Cube Van
18—Motor Home Chassis

⑤ Cab or Body Style

03—Conventional Cab (C-K models)
04—Cutaway Van, Hi-Cube Van (G models)
05—Chevy Van, Vandura
06—Suburban/Sportvan, Rally Wagon with Panel Rear Doors
16—Blazer, Jimmy
32—Motor Home Chassis
42—Forward Control Chassis, Step-Van, Value Van
43—Bonus Cab
63—Crew Cab

⑥ Body Code

ZW9—Base Body
Z58—Blazer, Jimmy w/White Top
Z59—Blazer, Jimmy w/Black Top
Z64—RV Cutaway Van
E31—Hi-Cube Van (10' Steel 96" Wide)
E32—Step-Van, Value Van (Steel)
E33—Step-Van, Value Van (Aluminum)
E34—Hi-Cube Van (10' Steel 82" Wide)
E36—Hi-Cube Van (10' Aluminum)
E38—Hi-Cube Van (12' Steel)
E39—Hi-Cube Van (12' Aluminum)
E55—Suburban (w/End Gate)
E62—Stepside (Fenderside) Pickup
E63—Fleetside (Wide Side) Pickup
E94—Beauville Sportvan, Rally STX

⑦ Engine Code

LD4—250 Six
L25—292 Six
LF5—350-2 V8
LS9—350-4 V8
LF4—400-4 V8
LF8—454-4 V8

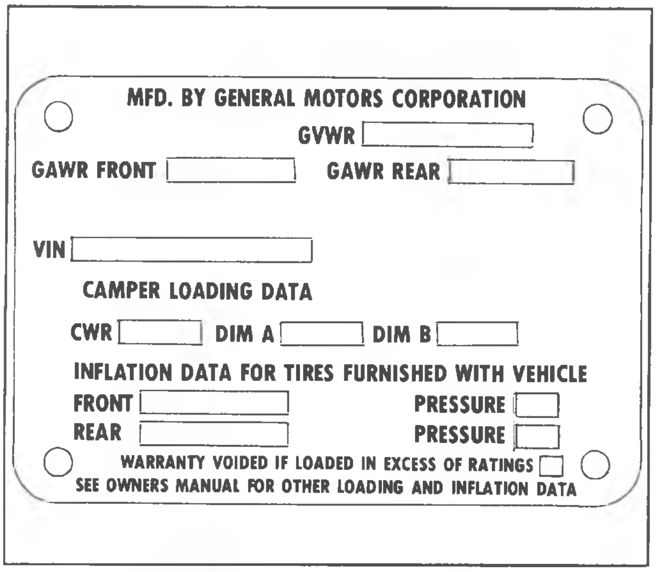

Fig. 1--Vehicle Identification Number and Rating Plate Information

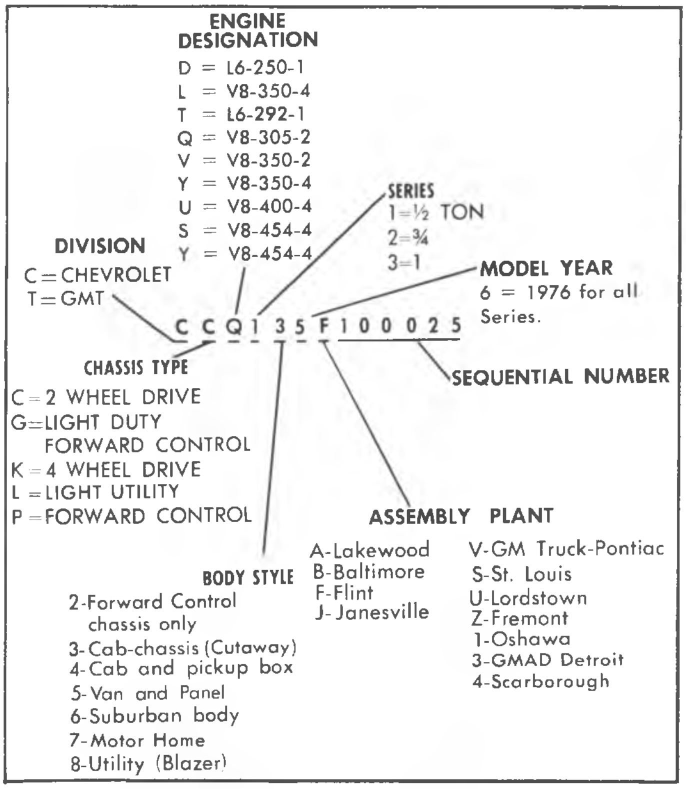

Fig. 2--Vehicle Identification Number

- The Turbo Hydra-Matic Transmission 400 Serial Number is Located on the Light Blue Plate on the Right Side of the Transmission.

Engines

- 6-Cylinder Engine Unit Number Located on Pad at Right Hand Side of Cylinder Block at Rear of Distributor.
- 8-Cylinder Engine Unit Number Located on Pad at Front, Right Hand Side of Cylinder Block.

Delcotrons

Delcotron Unit Serial Number Located at Top of Rear Housing.

Batteries

Battery Code Number Located on Cell Cover Top of Battery.

Starters

Starter Serial Number and Production Date Stamped on Outer Case, Toward Rear.

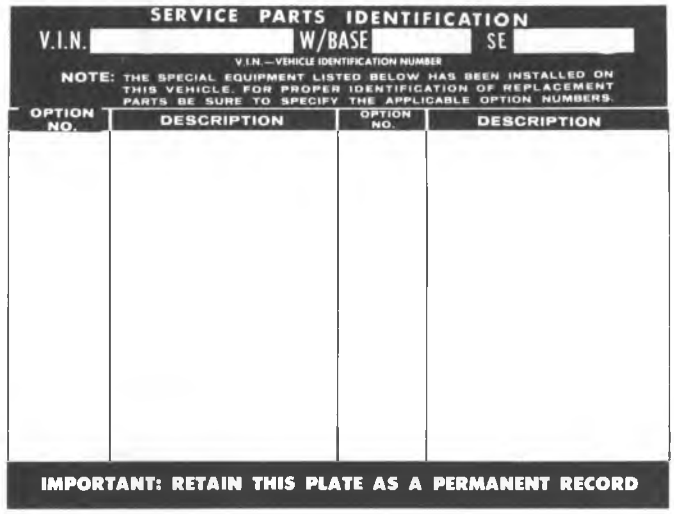

Fig. 3--Service Parts Identification Plate

SERVICE PARTS IDENTIFICATION PLATE

The Service Parts Identification Plate (fig. 3) is provided on all Truck models. On most series it will be located on the inside of the glove box door, or, on Forward Control series, it will be located on an inner body panel. The plate lists the vehicle serial number, wheelbase, and all Production options or Special Equipment on the vehicle when it was shipped from the factory including paint information. **ALWAYS REFER TO THIS INFORMATION WHEN ORDERING PARTS.**

KEYS AND LOCKS

Two keys are provided with each vehicle. Different lock cylinders operated by a separate key are available as an option for the sliding side load door and rear load doors.

EMERGENCY STARTING

- Engines in vehicles with automatic transmissions cannot be started by pushing or towing the vehicle.
- Never tow or push trucks equipped with light duty emission control systems to start engine.
- A vehicle with a discharged battery may be started by transferring electrical power from a battery in another car - called "jump starting".

Jump Starting

Jump starting may be dangerous and should be attempted only, if the following three conditions are met. If they are not, we strongly recommend that you leave the starting to a competent mechanic.

- The battery in the **OTHER** vehicle must be 12 volt and negatively grounded, like the one in **THIS** vehicle. (Check the other vehicle's owner's manual to see if it is.)
- The battery in **THIS** vehicle must be equipped with flame arrestor vents (like the original equipment Delco "Freedom" battery) or flame arrestor type filler/vent caps.
- If the battery is a Delco sealed-type battery without filler opening or caps, its charge indicator must be dark, with or without green dot showing. Do **NOT** attempt jump starting if the charge indicator has a light or bright center.

CAUTION:

Departures from these conditions or the procedure below could result in: (1) serious personal injury (particularly to eyes) or property damage from such causes as battery explosion, battery acid, or electrical burns; and/or (2) damage to electronic components of either vehicle.

Never expose battery to open flame or electric spark--batteries generate a gas which is flammable and explosive. Do not allow battery fluid to contact eyes, skin, fabrics, or painted surfaces--fluid is a corrosive acid. Flush any contacted area with water immediately and thoroughly. Be careful that metal tools, or jumper cables do not contact the positive battery terminal (or metal in contact with it) and any other metal on the vehicle, because a short circuit could occur. Batteries should always be kept out of the reach of children.

Jump Start Procedure

1. **Wear eye protection** and remove rings, metal watch bands, and other metal jewelry.
2. Set parking brake firmly. Place automatic transmission in **PARK** in both vehicles (don't let vehicles touch); and turn ignition key to **LOCK** in vehicle with discharged battery (Neutral and **OFF** in vehicles with manual transmission). Also turn off lights, heater, and all unnecessary electrical loads.
3. Attach one end of a jumper cable to one battery's positive terminal (identified by a red color "+", or "P" on the battery case, post, or clamp), and the other end of the same cable to the positive terminal of the other battery.
4. Attach the remaining jumper cable **FIRST** to the negative terminal (black color, "–", or "N") of the **OTHER** vehicle's battery, (regardless of which vehicle has the discharged battery) and N to the negative terminal of the battery in **THIS** vehicle - thus taking advantage of the flame arrestor feature on the battery in **THIS** vehicle, should a spark occur.
5. Start engine in the vehicle that is providing the jump start (if it was not running). Let run a few minutes, then start the engine in the vehicle that has the discharged battery.
6. Reverse the above sequence **EXACTLY** when removing the jumper cables; taking care to remove the cable from the negative terminal of the battery in **THIS** vehicle as the **FIRST** step.

PUSH STARTING - TRUCKS WITH HEAVY DUTY EMISSION CONTROL SYSTEMS

CAUTION: *Trucks equipped with light duty emission control systems must not be pushed or towed to start.*

If your truck is equipped with a manual 3-speed or 4-speed transmission, it can be started in an emergency by pushing. When being pushed to start the engine, turn off all unnecessary electrical loads, turn ignition to "ON", depress the clutch pedal and place the shift lever in high gear. Release the clutch pedal when speed reaches 10 to 15 miles per hour. Bumpers and other parts contacted by the pushing vehicle should be protected from damage during pushing. Never tow the truck to start.

TOWING

All Except Four Wheel Drive Trucks

Normally your vehicle may be towed with all four wheels on the ground for distances up to 50 miles at speeds of less than 35 MPH. The engine should be off and the transmission in neutral.

However, the rear wheels must be raised off the ground or the drive shaft disconnected when the transmission is not operating properly or when a speed of 35 MPH or distance of 50 miles will be exceeded.

CAUTION: *If a truck is towed on its front wheels only, the steering wheel must be secured with the wheels in a straight ahead position.*

Four Wheel Drive Trucks

It is recommended that the truck be towed with the front wheels off the ground. The truck can be towed, however, with the rear wheels off the ground if there is damage in the rear wheel area. In this event, the transmission selector lever should be placed in the "N" (neutral) position and with conventional four wheel drive the front drive disengaged. With Full Time four wheel drive the transfer case should be in high. Towing speeds should not exceed 35 MPH for distances up to 50 miles. If truck is towed on its front wheels, the steering wheel should be secured to keep the front wheels in a straight-ahead position.

When towing the vehicle at slow speeds (approx. 20 MPH), for a very short distance only, the transmission must be in NEUTRAL and with conventional four wheel drive the transfer case MUST be in "TWO WHEEL HIGH". With Full Time four wheel drive the transfer case should be in high.

When towing the vehicle at faster speeds for greater distances, the following steps MUST be taken:

- If front wheels are on the road, disconnect the front drive shaft.

- If rear wheels are on the road, disconnect the rear drive shaft.

STEEL TUBING REPLACEMENT

In the event that replacement of steel tubing is required on brake line, fuel line, evaporative emission, and transmission cooling lines, only the recommended steel replacement tubing should be used.

Only special steel tubing should be used to replace brake line. That is, a double wrapped and brazed steel tubing meeting G.M. Specification 123 M. Further, any other steel tubing should be replaced only with the released steel tubing or its equivalent. Under no condition should copper or aluminum tubing be used to replace steel tubing. Those materials do not have satisfactory fatigue durability to withstand normal vehicle vibrations.

All steel tubing should be flared using the upset (double lap) flare method which is detailed in Section 5 of this Manual.

VEHICLE LOADING

Vehicle loading must be controlled so weights do not exceed the numbers shown on the Vehicle Identification Number and Rating Plate for the vehicle.

A typical example of a truck in a loaded condition is shown in Figure 4. Note that the axle or GVW capabilities are not exceeded.

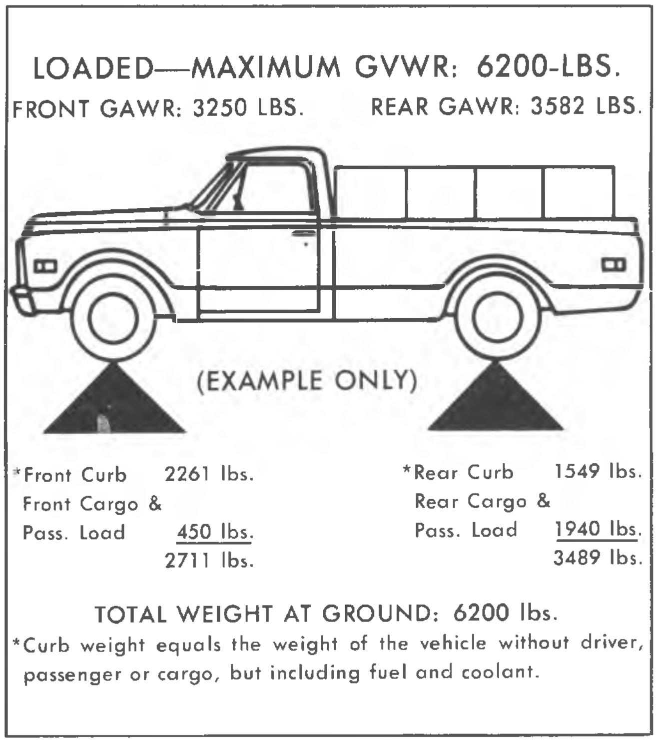

Fig. 4–Typical Vehicle Loaded Condition

LUBRICATION

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MAINTENANCE SCHEDULE

A separate maintenance folder has been provided with each vehicle which contains a complete schedule and brief explanation of the safety, emission control, lubrication and general maintenance it requires. The maintenance folder information is supplemented by this section of this manual, as well as the separate vehicle and emissions warranty booklet also furnished with each vehicle. Read all three publications for a full understanding of vehicle maintenance requirements.

The time or mileage intervals for lubrication and maintenance services outlined in this section are intended as a general guide for establishing regular maintenance and lubrication periods for trucks with light duty emission control systems (see chart). Sustained heavy duty and high speed operation or operation under adverse conditions may require more frequent servicing.

For maintenance and lubrication information on trucks designated with heavy duty emission control systems, continue to refer to Section 0 of the 1974 Light Duty Truck Shop Manual.

LIGHT AND HEAVY DUTY EMISSION CLASS VEHICLES
Light Duty Vehicle C10-Pickup (up to 6000 lbs. GVW) G-10 Van
Heavy Duty C10-Pickup (over 6000 lbs. GVW) C10-Suburban C-10-Blazer, Jimmy C20-30 All models G-20, 30 Van All K models All P models

ENGINE

Oil and Filter Recommendations

The letter designation "SE" has been established to correspond with the requirements of GM 6136-M. "SE" engine oils will be better quality and perform better than those identified with "SA" through "SD" designations and are recommended for all light-duty gasoline trucks regardless of model year and previous engine oil quality recommendations.

Oil Change Period

- Use only SE engine oil.
- Change oil each 6 months or 7,500 miles. If more than 7,500 miles are driven in a 6 month period, change oil each 7,500 miles.

- Change oil each 3 months or 3,000 miles, whichever occurs first, under the following conditions:

  –Driving in dusty conditions.

  –Trailer pulling or camper use.

  –Frequent long runs at high speeds and high ambient temperatures.

  –Motor Home use.

  –Stop and go type service such as delivery trucks, etc.

  –Extensive idling.

  –Short-trip operation at freezing temperatures (engine not thoroughly warmed-up).

- Operation in dust storms may require an immediate oil change.
- Replace the oil filter at the first oil change, and every second oil change thereafter. AC oil filters (or equivalent) provide excellent engine protection.

The above recommendations apply to the first change as well as subsequent oil changes. The oil change interval for the engine is based on the use of SE oils and quality oil filters. Oil change intervals longer than those listed above will seriously reduce engine life and may affect the manufacturer's obligation under the provisions of the New Vehicle Warranty.

A high quality SE oil was installed in the engine at the factory. It is not necessary to change this factory-installed oil prior to the recommended normal change period. However, check the oil level more frequently during the break-in period since higher oil consumption is normal until the piston rings become seated.

NOTE: Non-detergent and other low quality oils are specifically not recommended.

Oil Filter Type and Capacity

- Throwaway type, 1 quart U.S. measure, .75 quart Imperial measure.
- 250 cu. in., 292 cu. in., AC Type PF-25. 350 cu. in. 454 cu. in., AC Type PF-35.

Crankcase Capacity (Does Not Include Filter)

- 292 L6 Engine; 5 quarts U.S. measure, 4.25 quarts Imperial measure.
- All other engines; 4 quarts U.S. measure, 3.25 quarts Imperial measure.

Recommended Viscosity

Select the proper oil viscosity from the following chart:

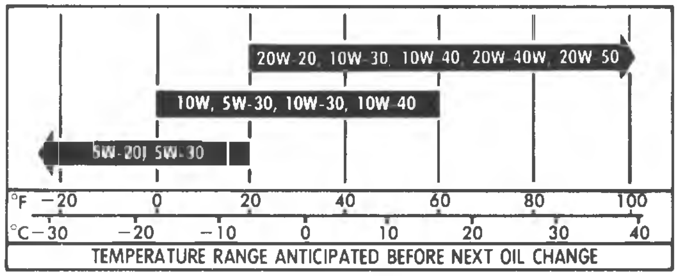
The proper oil viscosity helps assure good cold and hot starting.

Checking Oil Level

The engine oil should be maintained at proper level. The best time to check it is before operating the engine or as the last step in a fuel stop. This will allow the oil accumulation in the engine to drain back in the crankcase. To check the level, remove the oil gauge rod (dipstick), wipe it clean and reinsert it firmly for an accurate reading. The oil gauge rod is marked

To help assure good cold and hot starting, as well as maximum engine life, fuel economy, and oil economy, select the proper viscosity from the temperature range anticipated from the following chart:

RECOMMENDED SAE VISCOSITY GRADES



NOTE: SAE 5W-30 oils are recommended for all seasons in vehicles normally operated in Canada. SAE 5W-20 oils are not recommended for sustained high-speed driving. SAE 30 oils may be used at temperatures above 40°F (4°C).

"FULL" and "ADD OIL". If the oil is at or below the "ADD" mark on the dipstick, oil should be added as necessary. The oil level should be maintained in the safety margin, neither going above the "FULL" line nor below "ADD OIL" line.

NOTE: The oil gauge rod is also marked "Use SE Engine Oil" as a reminder to use only SE oils.

Supplemental Engine Oil Additives

The regular use of supplemental additives is specifically not recommended and will increase operating costs. However, supplemental additives are available that can effectively and economically solve certain specific problems without causing other difficulties. For example, if higher detergency is required to reduce varnish and sludge deposits resulting from some unusual operational difficulty, a thoroughly tested and approved additive - "G.M. Super Engine Oil Supplement" (or equivalent) - is available.

Drive Belts

Drive belts should be checked every 7,500 miles or 6 months for proper tension. A loose belt will affect water pump and generator operation.

POSITIVE CRANKCASE VENTILATION (P.C.V.) VALVE

Every 30,000 miles or 24 months the valve should be replaced. Connecting hoses, fittings and flame arrestor should be cleaned. At every oil change the system should be tested for proper function and serviced, if necessary. (Also see maintenance schedule at end of this section.)

AIR INJECTION REACTOR SYSTEM (A.I.R.)--CONTROLLED COMBUSTION SYSTEM (C.C.S.)

The Air Injection Reactor system should have the drive belt inspected for wear and tension every 24 months or 30,000 miles, whichever occurs first. In addition, complete effectiveness of either system, as well as full power and performance, depends upon idle speed, ignition timing, and idle fuel mixture being set according to specification. A quality tune-up which includes these adjustments should be performed periodically to assure normal engine efficiency, operation and performance.

EVAPORATION CONTROL SYSTEM (E.C.S.)

Every 24 months or 30,000 miles (more often under dusty conditions) the filter in the base of the canister must be replaced and the canister inspected.

EARLY FUEL EVAPORATION (E.F.E.) SYSTEM

First 7,500 miles or 6 months check valve for freedom of operation. A binding condition must be corrected. Check hoses for cracking, abrasion or deterioration. Replace parts as necessary.

AIR CLEANER

CAUTION: *Do not remove the engine air cleaner unless temporary removal is necessary during repair or maintenance of the vehicle. When the air cleaner is removed backfiring can cause fire in the engine compartment.*

NOTE: Under prolonged dusty driving conditions, it is recommended that these operations be performed more often.

Replace the engine air cleaner element under normal operating conditions every 30,000 miles.

Crankcase Ventilation Filter (Located Within Air Cleaner)

If so equipped, inspect every oil change and replace if necessary. Replace at least every 30,000 miles; more often under dusty driving conditions.

FUEL FILTER

Replace filter element located in carburetor inlet every 12 months or 15,000 miles whichever occurs first, or, if an in-line filter is also used, every 30,000 miles. Replace in-line filter every 30,000 miles.

GOVERNOR

The attaching bolts should be kept tight, the optionally available governor should be kept clean externally and the filter element should be replaced every 15,000 miles.

ACCELERATOR LINKAGE

Lubricate with engine oil every 30,000 miles as follows:

1. On V8 engine, lubricate the ball stud at the carburetor lever.
2. On L6 engine, lubricate the two ball studs at the carburetor lever and lubricate the lever mounting stud. Do not lubricate the accelerator cable.

AUTOMATIC TRANSMISSION FLUID RECOMMENDATION

Use automatic transmission fluids identified with the mark **DEXRON® II.**

Check the fluid level at each engine oil change period.

Automatic transmissions are frequently overfilled because the fluid level is checked when the fluid is cold and the dipstick indicates fluid should be added. However, the low reading is normal since the level will rise as the fluid temperature increases. A level change of over 3/4 inch will occur as fluid temperature rises from 60°F to 180°F.

Overfilling can cause foaming and loss of fluid through the vent. Slippage and transmission failure can result.

Fluid level too low can cause slipping, particularly, when the transmission is cold or the car is on a hill.

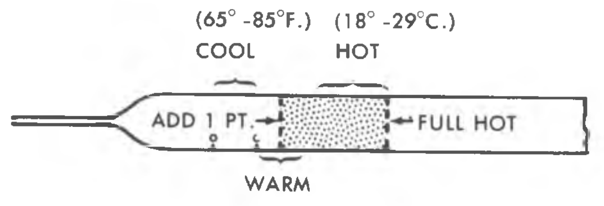
Check the transmission fluid level with engine running, the shift lever in PARK and the car level.

NOTE: If the vehicle has recently been operated for an extended period at high speed or in city traffic in hot weather or the vehicle is being used to pull a trailer, an accurate fluid level cannot be determined until the fluid has cooled down - usually about 30 minutes after the vehicle has been parked.

Remove the dipstick and touch the transmission end of the dipstick cautiously to find out if the fluid is cool, warm or hot.

Wipe it clean and re-insert until cap seats. Remove dipstick and note readings.

- If the fluid feels cool, about room temperature 65°F to 85°F the level should be 1/8 to 3/8 inch below the **ADD** mark. The dipstick has two dimples below the "**ADD**" mark to show this range.
- If it feels warm the level should be close to the **ADD** mark (either above or below).
- If it feels hot (cannot be held comfortably) the level should be between the **ADD** and **FULL** marks.



NOTE: DO NOT OVERFILL. It takes only one pint to raise level from ADD to FULL with a hot transmission.

AUTOMATIC TRANSMISSION DRAIN INTERVALS

The transmission operating temperature resulting from the type of driving conditions under which your vehicle is used is the main consideration in establishing the proper frequency of transmission fluid changes.

Change the transmission fluid and filter every 15,000 miles if the vehicle is usually driven under one or more of the following conditions which are considered severe transmission service:

- In heavy city traffic.
- Where the outside temperature regularly reaches 90°F.
- In very hilly or mountainous areas.
- Frequent trailer pulling.
- Commercial uses, such as taxi, police car or delivery service.

If you do not use your vehicle under any of these conditions, change the fluid and filter every 60,000 miles.

To Change Turbo Hydra-Matic 400 and Turbo Hydra-Matic 350 fluid, remove fluid from the transmission sump, add approximately 7.5 pints U.S. measure (6.25 pints Imperial measure) for the Turbo Hydra-Matic 400 and 2 1/2 qts. U.S. measure (2 qts. Imperial measure) for the Turbo Hydra-Matic 350 of fresh fluid, to return level to proper mark on the dipstick.

Every 60,000 Miles –the Turbo Hydra-Matic 400 transmission sump filter should be replaced.

3-AND 4-SPEED MANUAL TRANMISSION LUBRICANT

Every 6 months or 7,500 miles, whichever occurs first, check lubricant level and add lubricant, if necessary, to fill to level of filler plug hole with SAE 80W or SAE 80W-90 GL-5 Gear Lubricant. If temperatures below +32°F are expected, use SAE 80W GL-5 Gear Lubricant only. For those vehicles normally operated in Canada, use SAE 80W GL-5 Gear Lubricant only.

TRANSMISSION SHIFT LINKAGE (MANUAL AND AUTOMATIC)

Every 7,500 miles or 6 months-lubricate shift linkage and, on Manual transmission floor control, lever contacting faces with water resistant EP chassis lubricant which meets General Motors Specification GM6031-M.

Clutch

The clutch pedal free travel should be checked at regular intervals.

Lubricate the clutch cross-shaft at fitting (on Series 10 Forward Control models also lubricate the clutch linkage idler lever at fitting) every 7,500 miles or 6 months with water resistant EP chassis lubricant which meets General Motors Specification GM 6031-M.

REAR AXLES

Standard

Every 6 months or 7,500 miles, whichever occurs first, check lubricant level and add lubricant, if necessary, to fill to level of filler plug hole. Use SAE 80W or SAE 80W-90 GL-5 Gear Lubricant. For those vehicles normally operated in Canada, use SAE 80W GL-5 Gear Lubricant.

Positive Locking or Positraction

Every 6 months or 7,500 miles, whichever occurs first, check lubricant level and add lubricant, if necessary, to fill to level of filler plug hole.

Drain and refill at first 15,000 miles then maintain same as standard axle but, use only the special positraction differential lubricant.

PROPELLER SHAFT SLIP JOINTS

Propeller shaft slip joints should be lubricated every 7,500 miles or 6 months with water resistant EP chassis lubricant which meets General Motors Specification GM 6031-M.

UNIVERSAL JOINTS

All universal joints are the needle bearing type. Lubricate those universal joints (depending on truck model) equipped with lube fittings every 7,500 miles or 6 months with water resistant EP chassis lubricant which meets General Motors Specification GM 6031-M. More frequent lubes may be required on heavy duty or "Off the Road" operations.

WHEEL BEARINGS

Front

> NOTE: Use wheel bearing lubricant GM Part No. 1051344 or equivalent. This is a premium high melting point lubricant which meets all requirements of General Motors Specification GM 6031-M.

Due to the weight of the tire and wheel assembly it is recommended that they be removed from hub before lubricating bearings to prevent damage to oil seal. Then remove the front wheel hub to lubricate the bearings. The bearings should be thoroughly cleaned before repacking with lubricant.

Front wheels are equipped with tapered roller bearings on all trucks. Wheel bearings should be lubricated every 30,000 miles (12,000 miles in four wheel drive trucks). Do not mix wheel bearing lubricants.

> **CAUTION:** *"Long fibre" type greases should not be used on roller bearing front wheels.*

Rear

The rear wheel bearings receive their lubrication from the rear axle. When installing bearings which have been cleaned, prelube with wheel bearing grease.

BRAKE MASTER CYLINDER

Check master cylinder fluid level in both reservoirs every 7,500 miles or 6 months. If the fluid is low in the reservoir, it should be filled to a point about 1/4" from the top rear of each reservoir with Delco Supreme No. 11 Hydraulic Brake Fluid or equivalent.

BRAKE AND CLUTCH PEDAL SPRINGS

Lubricate brake and clutch pedal springs every 7,500 miles or 6 months with engine oil for all models.

PARKING BRAKE

Every 7,500 miles or 6 months clean and lubricate all parking brake pivot points with water resistant EP chassis lubricant which meets General Motors Specification GM 6031-M.

STEERING

Manual Steering Gear

The steering gear is factory-filled with steering gear lubricant. Seasonal change of this lubricant should not be performed and the housing should not be drained-no lubrication is required for the life of the steering gear.

Every 30,000 miles, the gear should be inspected for seal leakage (actual solid grease-not just oily film). If a seal is replaced or the gear is overhauled, the gear housing should be refilled with No. 1051052 (13 oz. container) Steering Gear Lubricant which meets GM Specification GM4673-M or its equivalent.

> NOTE: Do not use EP Chassis Lube, which meets GM Specification GM 6031-M, to lubricate the gear. DO NOT OVER-FILL the gear housing.

Power Steering System

Check the fluid level in the pump reservoir at each oil change period. Add GM Power Steering Fluid (or DEXRON® II automatic Transmission Fluid) or equivalent as necessary to bring level into proper range on filler cap indicator depending upon fluid temperature.

If at operating temperature (approximately 150°F–hot to the touch), fluid should be between "HOT" and "COLD" marks.

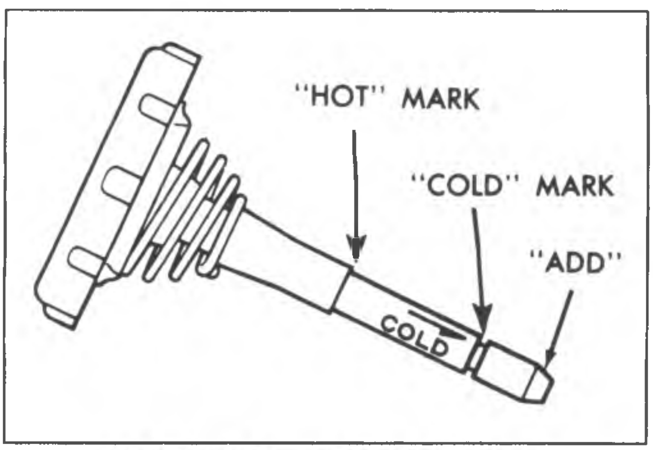


Fig. 5–Power Steering Filler Cap Indicator

If at room temperature (approximately 70°F), fluid should be between "ADD" and "COLD" marks. Fluid does not require periodic changing.

STEERING LINKAGE AND SUSPENSION

Maintain correct front end alignment to provide easy steering, longer tire life, and driving stability.

Check control arm bushings and ball joints for wear.

Lubricate tie rods, upper and lower control arms, and ball joints at fittings with water resistant EP chassis lubricant which meets General Motors Specification GM 6031-M every 7,500 miles or 6 months.

Lubricate every 3,000 miles or 3 months whichever occurs first under the following conditions:

- Driving in dusty or muddy conditions.
- Extensive off-road use.

> NOTE: Ball joints must be at +10°F. or more before lubricating.

Keep spring to axle U bolts and shackle bolts properly tightened (see Specifications Section for torque recommendations). Check U bolt nuts after the first 1,000 miles of operation if the U bolt or U bolt nuts are changed in service.

HOOD LATCH AND HOOD HINGE

Every 7,500 miles or 6 months, whichever occurs first, lubricate hood latch assembly and hood hinge assembly as follows:

1. Wipe off any accumulation of dirt or contaimination on latch parts.
2. Apply lubriplate or equivalent to latch pilot bolt and latch locking plate.
3. Apply light engine oil to all pivot points in release mechanism, as well as primary and secondary latch mechanisms.
4. Lubricate hood hinges.
5. Make hood hinge and latch mechanism functional check to assure the assembly is working correctly.

BODY LUBRICATION

Normal use of a truck causes metal-to-metal movement at certain points in the cab or body. Noise, wear and improper operation at these points will result when a protective film of lubricant is not provided.

For exposed surfaces, such as door checks, door lock bolts, lock striker plates, dovetail bumper wedges, etc. apply a thin film of light engine oil.

Where oil holes are provided in body parts a dripless oil can be safely used, but any lubricant should be used sparingly, and after application all excess should be carefully wiped off.

The seat adjusters and seat track, ordinarily overlooked, should be lubricated with water resistant EP chassis lubricant which meets General Motors Specification GM 6031-M.

There are other points on bodies which may occasionally require lubrication and which are difficult to service. window regulators and controls are confined in the space between the upholstery and the outside door panel. Easy access to the working parts may be made by removing the trim. Door weatherstrips and rubber hood bumpers should be lightly coated with a rubber lubricant.

UNDERBODY MAINTENANCE

The effects of salt and other corrosive materials used for ice and snow removal and dust control can result in accelerated rusting and deterioration of underbody components such as brake or pan, exhaust system, brackets, parking brake cables. These corrosive effects, however, can be reduced by periodic flushing of the underbody with plain water. In geographic areas having a heavy concentration of such corrosive materials, it is recommended that the complete underbody be inspected and flushed at least once a year, preferably after a winter's exposure. Particular attention should be given to cleaning out underbody members where dirt and other foreign materials may have collected.

SPEEDOMETER ADAPTER

On vehicles so equipped, lubricate adapter at fitting with water resistant EP chassis grease which meets General Motors Specification GM 6031-M every 7,500 miles.

COMPLETE VEHICLE MAINTENANCE SCHEDULE

When To Perform Services (Months or Miles, Whichever Occurs First)	Item No.	Services (For Details, See Numbered Paragraphs)
Every 6 Months or 7,500 Miles	1	*Chassis Lubrication
	2	●*Fluid Levels Check
	3	*Engine Oil Change
At 1st Oil Chg. - Then Every 2nd	4	*Oil Filter Change
See Explanation	5	Tire Rotation (Steel Belted Radial)
	6	Rear Axle Lube Change
Every 12 Months	7	Air Conditioning Check
Every 12 Months or 15,000 Miles	8	*Cooling System Check
		— Coolant Change & Hose Replacement
Every 30,000 Miles	9	Wheel Bearing Repack
	10	*Auto. Trans. Fluid & Filter Change
	11	Manual Steering Gear Check
	12	Clutch Cross Shaft Lubrication
Every 6 Months or 7,500 Miles	13	Owner Safety Checks
	14	Tire and Wheel Inspection
	15	*Exhaust System Check
	16	*Drive Belt Check
		*— Belt Replacement
	17	Suspension and Steering Check
	18	Brake and Power Steering Check
Every 12 Months or 15,000 Miles	19	Drum Brake and Parking Brake Check
	20	Throttle Linkage Check
	21	Underbody Flush & Check
	22	Bumper Check
At First 6 Months or 7,500 Miles - Then at 18 Month/ 22,500 Mile Intervals	23	Thermo. Controlled Air Cleaner Check
	24	Carburetor Choke Check
	25	Engine Idle Speed Adjustment
	26	EFE Valve Check
	27	Carburetor Mounting Torque
Every 12 Months or 15,000 Miles	28	Fuel Filter Replacement
	29	Vacuum Advance System & Hoses Check
	30	PCV System Check
		— PCV Valve & Filter Replacement
Every 18 Months or 22,500 Miles	31	Idle Stop Solenoid Check
	32	Spark Plug Wires Check
Every 22,500 Miles	33	Spark Plug Replacement
	34	Engine Timing Adjustment & Dist. Check
Every 24 Months or 30,000 Miles	35	ECS System Check & Filter Replacement
	36	Fuel Cap, Tank and Lines Check
Every 30,000 Miles	37	Air Cleaner Element Replacement

● Also A Safety Service

* Also An Emission Control Service

EXPLANATION OF COMPLETE VEHICLE MAINTENANCE SCHEDULE FOR SERIES 10, L-6 AND V-8 ENGINES AND LIGHT DUTY EMISSION SYSTEM

Presented below is a brief explanation of each of the Vehicle Maintenance services.

NORMAL VEHICLE USE --The maintenance instructions contained in this maintenance schedule are based on the assumption that vehicle will be used as designed:

- To carry passengers and cargo within the limitations indicated on the vehicle tire placard affixed to either the edge of driver's door or the inside of the glove box door.
- On reasonable road surfaces within legal operating limits.
- On a daily basis, as a general rule, for at least several miles.
- On unleaded fuel.

Unusual operating conditions will require more frequent vehicle maintenance as specified in the respective sections included below.

Refer to the appropriate section of this manual for additional details on specific services. A listing of recommended lubricants and fluids is included at the end of this listing.

SECTION A LUBE AND GENERAL MAINTENANCE

A-1 CHASSIS --Lubricate all grease fittings in front suspension steering linkage and constant velocity universal joint. Also lubricate transmission shift linkage, hood latch, hood hinges, and parking brake cable guides and linkage, clutch linkage, propellor shaft slip joint, universal joints and brake and clutch pedal springs. Lubricate suspension and steering linkage every 3 months or 3,000 miles when operating under dusty or muddy conditions and in extensive off-road use.

A-2 FLUID LEVELS --Check level of fluid in brake master cylinder*, power steering pump*, battery, engine**, axle, transmission ** and windshield washer*. Engine coolant should be checked for proper level and freeze protection to at least –20°c (–29°F) or to the lowest temperature expected during the period of vehicle operation.* Proper engine coolant also provides corrosion protection.

Any significant fluid loss in any of these systems or units could mean that a malfunction is developing and corrective action should be taken immediately. On some models, a low fluid level in the brake master cylinder front reservoir could also be an indicator that the disc brake pads need replacing.

* Also a Safety Service

** Also an Emission Control Service

A-3 ENGINE OIL **--Change each 6 months or 7,500 miles, whichever occurs first under normal driving conditions, or each 3 months or 3,000 miles when the vehicle is operated under the following conditions: (a) driving in dusty conditions, (b) trailer pulling, (c) extensive idling or (d) short-trip operation at freezing temperatures (with engine not thoroughly warmed-up). See elsewhere in this Section for additional details on engine oil.

--Replace at the first oil change and every other oil change thereafter.

A-5 TIRES --To equalize wear, rotate tires as illustrated in Section 10 of this Manual and adjust tire pressures.

A-6 REAR AXLE --Change lubricant at first 15,000 miles on Positraction axles. Change lubricant every 7,500 miles on all type rear axles or final drives when using vehicle to pull a trailer.

A-7 AIR CONDITIONING --Check condition of air conditioning system hoses and refrigerant charge at sight glass (if so equipped). Replace hoses and/or refrigerant if need is indicated.

A-8 COOLING SYSTEM **-- At 12 month or 15,000 mile intervals, wash radiator cap and filler neck with clean water, pressure test system and radiator cap for proper pressure holding capacity, tighten hose clamps and inspect condition of all cooling and heater hoses. Replace hoses if checked, swollen or otherwise deteriorated.

Also each 12 months or 15,000 miles, clean exterior of radiator core and air conditioning condenser. Every 24 months or 30,000 miles, drain, flush, and refill the cooling system with a new coolant solution.

A-9 WHEEL BEARINGS --Clean and repack front wheel bearings with a lubricant as specified in the "Recommended Fluids & Lubricants" chart at the end of this section.

A-10 MANUAL STEERING GEAR --Check for seal leakage around the pitman shaft and housing. If leakage is evident (solid grease oozing out-not just oily film), it should be corrected immediately.

A-11 CLUTCH CROSS SHAFT --Lubricate clutch cross shaft lever.

A-12 AUTOMATIC TRANSMISSION FLUID **--Under normal driving conditions, change the transmission fluid and service the sump filter (if so equipped) every 60,000 miles.

Under unusual conditions such as constant driving in heavy city traffic, trailer pulling, and commercial applications, services should be performed at 15,000 mile intervals. See elsewhere in this manual for further details on transmission care.

SECTION B--SAFETY MAINTENANCE

NOTE: Items B-1 (a) thru (w) can be checked by the owner, while Items B-2 thru B-10 should only be checked by a qualified mechanic. It is particularly important that any safety systems which may have been adversely affected in an accident be checked and repaired as necessary before the vehicle is returned to use.

B-1 SAFETY CHECKS TO BE PERFORMED BY OWNER --The following checks should be made regularly during operation at no greater interval than 6 months or 7,500 miles, whichever occurs first, and more often when the need is indicated. Any deficiencies should be brought to the attention of your dealer or another service outlet, as soon as possible, so the advice of a qualified mechanic is available regarding the need for repairs or replacements.

a. STEERING COLUMN LOCK --Check for proper operation by attempting to turn key to **LOCK** position in the various transmission gear range when the vehicle is stationary. Key should turn to **LOCK** position only when transmission control is in **PARK** on automatic transmission models or in reverse on manual transmission models. Key should be removable only in **LOCK** position.

b. PARKING BRAKE --Check parking brake holding ability by parking on a fairly steep hill and restraining the vehicle with the parking brake only.

CAUTION: *Before making checks (c) or (d) below, be sure to have a clear distance ahead and behind the vehicle, set the parking brake and firmly apply the foot brake. Do not depress accelerator pedal. Be prepared to turn off ignition switch immediately if engine should start.*

c. STARTER SAFETY SWITCH (AUTOMATIC TRANSMISSION VEHICLES) --Check starter safety switch by attempting to start the engine with the transmission in each of the driving gears. The starter should operate only in the Park ("P") or Neutral ("N") positions.

d. STARTER, SAFETY SWITCH (MANUAL TRANSMISSION VEHICLES) --To check, place the shift lever in neutral, depress the clutch halfway, and attempt to start. The starter should operate only when clutch is fully depressed.

e. TRANSMISSION SHIFT INDICATOR --Check to be sure automatic transmission shift indicator accurately indicates the shift position selected.

f. STEERING --Be alert to any changes in steering action. The need for inspection or servicing may be indicated by increased effort to turn the steering wheel, excessive free play or unusual sounds when turning or parking.

g. WHEEL ALIGNMENT AND BALANCE --In addition to uneven or abnormal tire wear, the need for wheel alignment service may be indicated by a pull to the right or left when driving on a straight and level road. The need for wheel balancing is usually indicated by a vibration of the steering wheel or seat while driving at normal highway speeds.

h. BRAKES --Be alert to illumination of the brake warning light or changes in braking action, such as repeated pulling to one side, unusual sounds either when braking or between brake applications, or increased brake pedal travel. Any of these could indicate the need for brake system inspection and/or service.

i. EXHAUST SYSTEM --Be alert to any change in the sound of the exhaust system or a smell of fumes which may indicate a leak requiring inspection and/or service. (See also Engine Exhaust Gas Caution in Item B-3 of this section.)

j. WINDSHIELD WIPER AND WASHER --Check operation of wipers, as well as condition and alignment of wiper blades. Check amount and direction of fluid sprayed by washers during use.

k. DEFROSTER --Check performance by moving controls to "DEF" and noting amount of air directed against the windshield.

l. REARVIEW MIRRORS AND SUN VISORS --Check that friction joints are properly adjusted so mirrors and sun visors stay in the selected position.

m. HORN --Blow the horn occasionally to be sure that it works. Check all button locations.

n. LAP AND SHOULDER BELTS --Check belts, buckles, latch plates, retractors, reminder systems and anchors for proper operation or damage. Check to make certain that anchor mounting bolts are tight.

o. HEAD RESTRAINTS --Check that head restraints, if present, adjust properly in the up detent positions, and that no components are missing, damaged or loose.

p. SEAT ADJUSTERS --Check that seat adjusters securely engage by pushing forward and backward whenever a manual seat is adjusted.

q. SEAT BACK LATCHES --Check to see that seat back latches are holding by pulling forward on the top of each folding seat back.

r. LIGHTS AND BUZZERS --Check all instrument panel illuminating and warning lights, seat belt reminder light and buzzer, interior lights, license plate lights, side marker lights, headlamps, parking lamps, tail lamps, brake lights, turn signals, backup lamps, and hazard warning flashers. Have headlamp aim checked every 12 months or 15,000 miles, or more often if light beams seem to be aimed improperly.

s. GLASS --Check for broken, scratched, dirty or damaged glass on vehicle that could obscure vision or become an injury hazard.

t. DOOR LATCHES --Check for positive closing, latching and locking.

u. HOODLATCHES --Check to make sure hood closes firmly by lifting on the hood after each closing. Check also for broken, damaged or missing parts which might prevent secure latching.

v. FLUID LEAKS --Check for fuel, water, oil or other fluid leaks by observing the ground beneath the vehicle after it has been parked for a while. (Water dripping from air conditioning system after use is normal.) If gasoline fumes or fluid are noticed **at any time**, the cause should be determined and corrected without delay because of the possibility of fire.

w. SPARE AND JACK --Check that spare tire assembly and jack equipment are securely stowed at all times.

B-2 TIRES AND WHEELS --To equalize wear, rotate tires as illustrated in Section 10. Adjust the tire pressures as recommended on tire placard on rear face of driver's door. Check disc brake pads and condition of rotors while wheels are removed. Check tires for excessive wear or damage. Make certain wheels are not bent or cracked and wheel nuts are tight. Check tire inflation pressure at least monthly, or more often if daily visual inspection indicates the need.

B-3 EXHAUST SYSTEM **--Check complete exhaust system and nearby body areas for broken, damaged, missing or mispositioned parts, open seams, holes, loose connections or other deterioration which could permit exhaust fumes to seep into the passenger compartment. Any defects should be corrected immediately. To help continue integrity, exhaust system pipes and resonators rearward of the muffler must be replaced whenever a new muffler is installed.

B-4 SUSPENSION AND STEERING --Check for damaged, loose or missing parts, or parts showing visible signs of excessive wear or lack of lubrication in front and rear suspension and steering system. Questionable parts noted should be replaced by a qualified mechanic without delay.

B-5 BRAKES AND POWER STEERING --Check lines and hoses for proper attachment, leaks, cracks, chafing, deterioration, etc. Any questionable parts noted should be replaced or repaired immediately. When abrasion or wear is evident on lines or hoses, the cause must be corrected.

B-6 ENGINE DRIVE BELTS **--Check belts driving fan, AIR pump, generator, power steering pump and air conditioning compressor for cracks, fraying, wear and tension. Adjust or replace as necessary.

B-7 DRUM BRAKES AND PARKING BRAKE --Check drum brake linings and other internal brake components at each wheel (drums, wheel cylinders, etc.). Parking brake adjustment also should be checked whenever drum brake linings are checked.

NOTE: More frequent brake checks should be made if driving conditions and habits result in frequent brake application.

B-8 THROTTLE LINKAGE --Check for damaged or missing parts, interference or binding. Any deficiencies should be corrected without delay by a qualified mechanic.

B-9 UNDERBODY --In geographic areas using a heavy concentration of road salt or other corrosive materials for snow removal or road dust control, flush and inspect the complete underside of the vehicle at least once each year, preferably after a winter's exposure. Particular attention should be given to cleaning out underbody members where dirt and other foreign materials may have collected.

B-10 BUMPERS --Check the front and rear bumper systems at 12-month/15,000 mile intervals to be sure that impact protection and clearance originally designed into these systems remain in a state of full readiness. They also should be checked whenever there is obvious bumper misalignment, or whenever the vehicle has been involved in a significant collision in which the bumpers were struck, even when slight or no damage to the bumper systems can be seen.

SECTION C
EMISSION CONTROL MAINTENANCE

NOTE: Additional recommended maintenance instructions relating to vehicle use, evidence of maintenance and service replacement parts are included in the New Truck Warranty Information folder.

C-1 THERMOSTATICALLY CONTROLLED AIR CLEANER --Inspect installation to make certain that all hoses and ducts are connected and correctly installed. Also check valve for proper operation.

C-2 CARBURETOR CHOKE AND HOSES --Check choke mechanism for proper operation. Any binding condition which may have developed due to petroleum gum formation on the choke shaft or from damage should be corrected. Check carburetor choke hoses for proper connection, cracking, abrasion or deterioration and correct or replace as necessary.

C-3 ENGINE IDLE SPEED --Adjust engine idle speed accurately (following the specifications shown on the label under the hood). Adjustments must be made with test equipment known to be accurate.

C-4 EARLY FUEL EVAPORATION (EFE) SYSTEM --Check valve for proper operation. A binding condition must be corrected. Check switch for proper operation. Check hoses for cracking, abrasion or deterioration. Replace parts as necessary.

C-5 CARBURETOR MOUNTING --At 7,500, 22,500, and 45,000 miles for V8 engines and 7,500, 30,000 for L-6 engines torque carburetor attaching bolts and/or nuts to compensate for compression of the gasket.

C-6 VACUUM ADVANCE SYSTEM AND HOSES --Check system for proper operation and hoses for proper connection, cracking, abrasion or deterioration. Replace parts as necessary.

C-7 FUEL FILTER --Replace filter in carburetor at designated intervals or more frequently if clogged.

C-8 POSITIVE CRANKCASE VENTILATION SYSTEM (PCV) --Check the PCV system for satisfactory operation at 12 month/15,000 mile intervals, and clean filter. Replace the PCV valve at 24 month/30,000 mile intervals and blow out PCV valve hose with compressed air. Replace deteriorated hoses.

The PCV filter (located in the air cleaner) should be replaced whenever the air cleaner element is replaced.

C-9 IDLE STOP SOLENOID --Check for proper operation. An inoperative solenoid must be replaced.

C-10 SPARK PLUG WIRES --Clean exterior of wires; remove any evidence of corrosion on end terminals. Inspect spark plug wires for evidence of checking, burning, or cracking of exterior insulation and tight fit at distributor cap and spark plugs or other deterioration. If corrosion cannot be removed or other conditions above are noted, replace wire.

C-11 SPARK PLUGS --Replace plugs at 22,500 mile intervals for V8 engines and 30,000 miles for L-6 engines with type specified in Section 6 of this manual.

C-12 TIMING AND DISTRIBUTOR CAP --Adjust ignition timing following the specifications shown on label under the hood. Also, carefully inspect the interior and exterior of the distributor cap and rotor for cracks, carbon tracking and terminal corrosion. Clean or replace as necessary.

C-13 EVAPORATION CONTROL SYSTEM (ECS) --Check all fuel and vapor lines and hoses for proper connections and correct routing as well as condition. Remove canister and check for cracks or damage. Replace damaged or deteriorated parts as necessary. Replace filter in lower section of canister.

C-14 FUEL CAP, FUEL LINES AND FUEL TANK --Inspect the fuel tank, cap and lines for damage which could cause leakage. Inspect fuel cap for correct sealing ability and indications of physical damage. Replace any damaged or malfunctioning parts.

C-15 AIR CLEANER ELEMENT --Replace the engine air cleaner element under normal operating conditions every 30,000 miles. The PCV filter should be replaced at the same interval. Operation of vehicle in dusty areas will necessitate more frequent replacements.

> **CAUTION:** *Do not operate the engine without the air cleaner unless temporary removal is necessary during repair or maintenance of the vehicle. When the air cleaner is removed, backfiring can cause fire in the engine compartment.*

RECOMMENDED FLUIDS & LUBRICANTS

USAGE	FLUID/LUBRICANT
Power steering system and pump reservoir	GM power steering fluid Part No. 1050017 – if not available use DEXRON®-II automatic transmission fluid or equivalent
Differential—standard	SAE-80W or SAE-80W-90 GL-5 gear lubricant (SAE-80W in Canada)
Differential – Positraction	Lubricant GM Part No. 1050081
Manual Steering Gear	Lubricant GM Part No. 1051052
Manual transmission	SAE-80W or SAE-80W-90 GL-5 gear lubricant (SAE-80W in Canada)
Brake system and master cylinder	Delco Supreme No. 11 or DOT-3 fluids
Clutch linkage (Man. trans. only) a. Pivot points b. Push rod to clutch fork joint, and cross shaft pressure fitting	 Engine oil Chassis grease meeting requirements of of GM 6031-M
Manual transmission shift linkage, column shift	Engine oil
Shift linkage, floor shift	Engine oil
Hood Latch assembly a. Pivots and spring anchor b. Release pawl	 Engine oil Chassis grease
Hood hinges	Engine oil
Automatic transmission shift linkage	Engine oil
Chassis lubrication	Chassis grease meeting requirements of GM 6031-M
Constant Velocity Universal Joint	GM Lubricant Part No. 1050670 or grease meeting requirements of GM-6040-M
Automatic transmission	DEXRON® -II automatic transmission fluid
Parking brake cables	Chassis grease
Front wheel bearings	Wheel bearing lubricant GM Part No. 1051344 or equivalent
Body door hinge pins, fuel door hinge, tailgate hinges	Engine oil
Windshield washer solvent	GM Optikleen washer solvent Part No. 1051515 or equivalent
Battery	Colorless, odorless, drinking water
Engine coolant	Mixture of water and a high quality Ethylene Glycol base type anti-freeze conforming to GM Spec. 1899-M

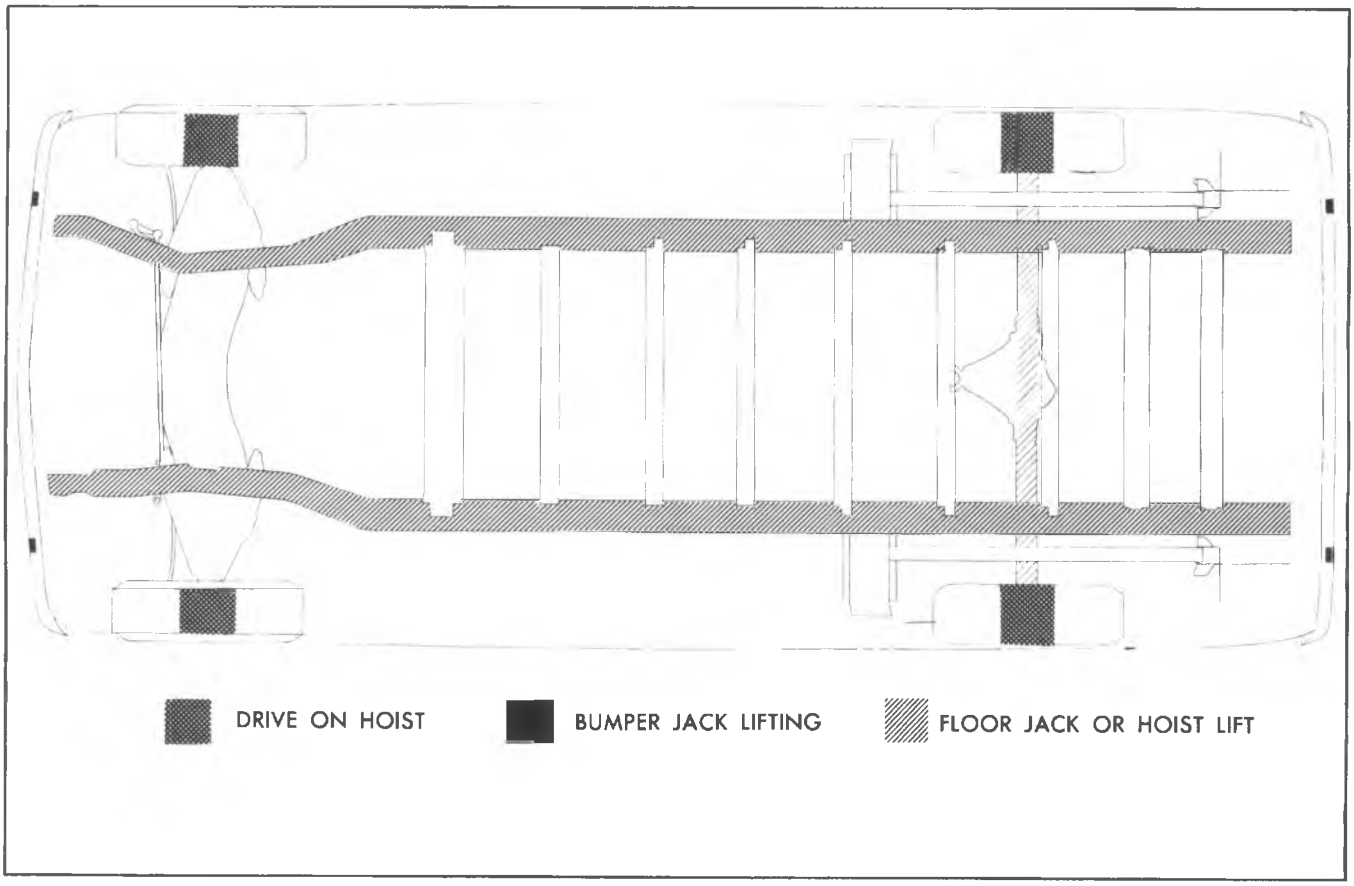
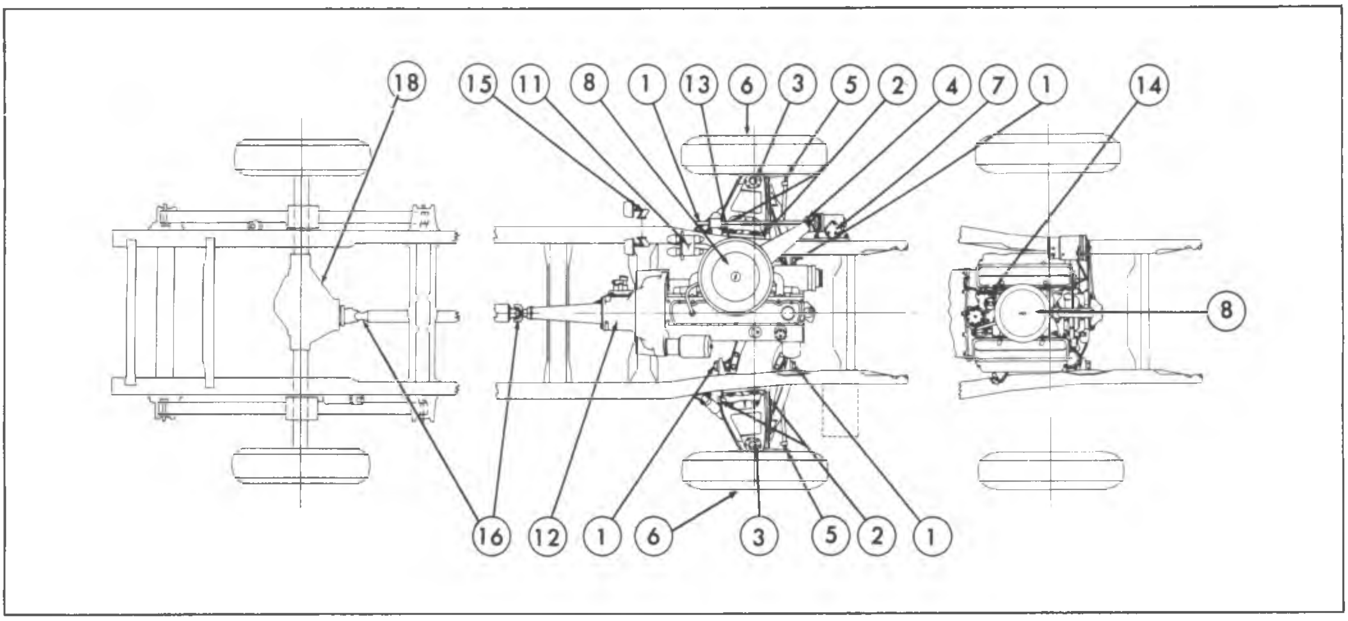
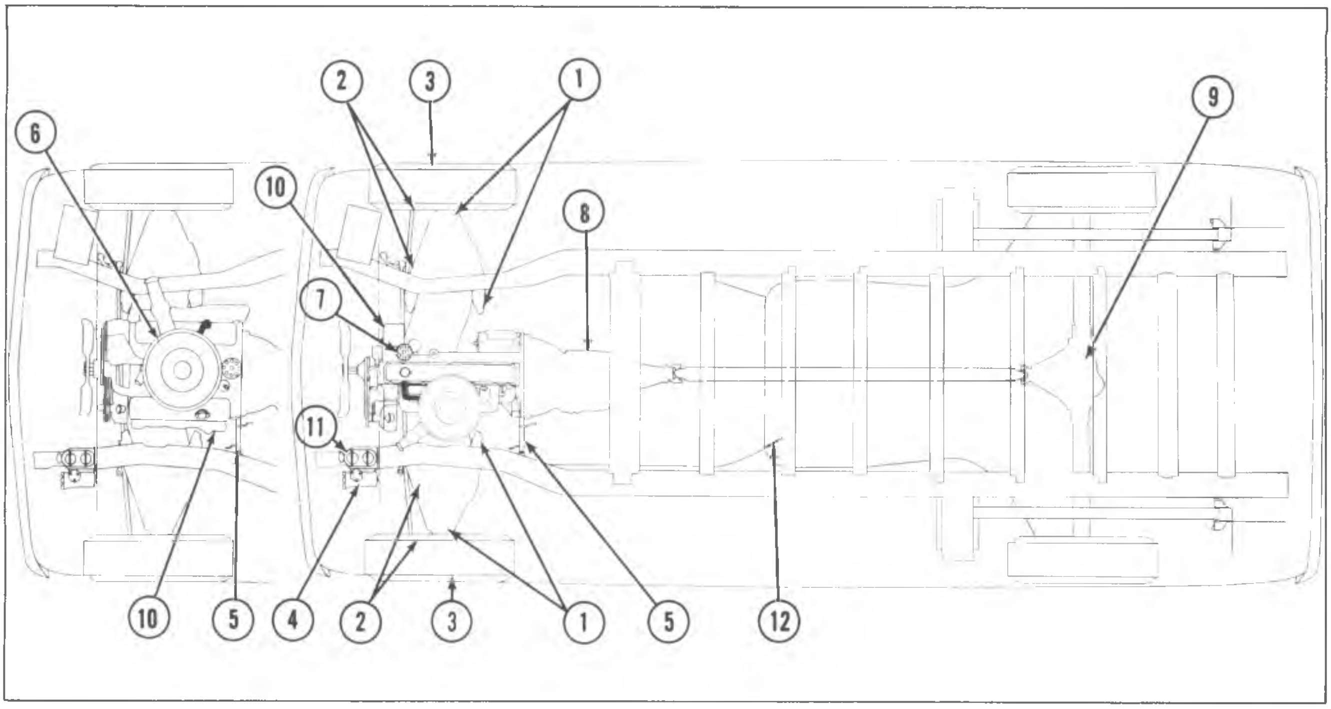


Fig. 6--G Model Lifting Points



No.	Lubrication Points	Lubrication Period	Type of Lubrication	Quantity	Remarks
1	Lower Control Arms	7,500 Miles	Chassis Lubricant	4 places as required	
2	Upper Control Arms	7,500 Miles	Chassis Lubricant	4 places as required	
3	Upper and Lower Control Arm Ball Joints	7,500 Miles	Chassis Lubricant	4 places as required	
4	Intermediate Steering Shaft (PA10)	7,500 Miles	Chassis Lubricant	2 places as required	
5	Tie Rod Ends	7,500 Miles	Chassis Lubricant	4 places as required	
6	Wheel Bearings	30,000 Miles	Whl. Brg. Lubricant	2 places as required	
7	Steering Gear	30,000 Miles			Check for Grease Leak—Do not Lubricate
8	Air Cleaner — Element	30,000 Miles			Replace—See Vehicle Maintenance Schedule
11	Master Cylinder	7,500 Miles	Delco Supreme No. 11 or DOT-3 fluids	As required	Check — add fluid when necessary
12	Transmission — Manual — Automatic	7,500 Miles 7,500 Miles	GL-5 Dexron®-II or equivalent	As required As required	Keep even w/filler plug. See Lubrication Section
13	Throttle Bell Crank — L-6	7,500 Miles	Engine Oil	As required	
14	Carburetor Linkage — V-8	7,500 Miles	Engine Oil	As required	
15	Brake and Clutch Pedal Springs	7,500 Miles	Engine Oil	As required	
16	Universal Joints	7,500 Miles	Chassis Lubricant	As required	
17	Propeller Shaft Slip Joint	7,500 Miles	Chassis Lubricant	As required	Not shown
18	Rear Axle	7,500 Miles	GL-5	As required	Check See Lubrication section

Fig. 7--Lubrication - Conventional Models - Light Duty Emission Systems



No.	Lubrication Points	Lubrication Period	Type of Lubrication	Quantity	Remarks
1	Control Arm Bushings and Ball Joints	7,500 Miles	Chassis Lubricant	12 places as required	
2	Tie Rod Ends	7,500 Miles	Chassis Lubricant	4 places as required	2 fittings each side
3	Wheel Bearings	30,000 Miles	Whl. Brg. Lubricant	2 places as required	
4	Steering Gear Clutch Cross-Shaft	30,000 Miles 7,500 Miles	Chassis Lubricant	As required	
5	Trans. Control Shaft	7,500 Miles	Chassis Lubricant	As required	
6	Air Cleaner—Element	30,000 Miles			See Vehicle Maintenance Schedule
8	Transmission—Manual —Automatic	7,500 Miles 7,500 Miles	GL-5 Dexron®-II or Equivalent	As required As required	See Lubrication Section See Lubrication Section
9	Rear Axle	7,500 Miles	GL-5	As required	See Lubrication Section
10	Oil Filter	Every Second Oil Change			
11	Brake Master Cylinder	7,500 Miles	Delco Supreme No. 11 or DOT-3 fluids	As required	Check—Add fluid when necessary
12	Parking Brake Linkage	7,500 Miles	Chassis Lubricant		Lubricate Linkage and Cables

Fig. 8--Lubrication - 1/2 Ton G Models

SECTION 1A

HEATER AND AIR CONDITIONING

CONTENTS OF THIS SECTION

GENERAL INFORMATION

Refer to the 1974 Light Duty Truck Service Manual for servicing the standard heater and auxiliary heater except as follows:

AUXILIARY HEATER - WIRING DIAGRAM

Refer to section 12 of this manual for auxiliary heater wiring diagram.

AIR CONDITIONING

Refer to the 1974 Light Duty Truck Service Manual for servicing an air conditioning system with a V8 engine or six cylinder engine except as follows:

MAIN UNITS OF THE SYSTEM

AXIAL SIX CYLINDER COMPRESSOR (Fig. 1)

Teflon Piston Ring Type Pistons

Axial six cylinder compressors used on 1975 and 1976 vehicles are equipped with a Teflon ring type piston (Fig. 2), instead of the former Carbon ring type. The basic compressor mechanism remains unchanged. The Teflon ring type piston is dimensionally the same as the carbon ring type except for the ring groove detail. The replacement procedure for the Teflon ring type piston differs from that of the carbon ring type. Refer to the Overhaul section of this manual for the proper method of replacing the Teflon ring type pistons or Teflon piston rings.

RADIAL FOUR CYLINDER COMPRESSOR

A radial four cylinder compressor (Fig. 3) is used on a vehicle with a six cylinder engine.

The compressor is mounted to the engine by mounting brackets (Fig. 4) and is belt driven by the engine when the electromagnetic clutch assembly on the compressor is energized by the air conditioning controls.

The purpose of the compressor is to pump low pressure, low temperature refrigerant vapor produced by the evaporator and compress it into a high pressure, high temperature vapor which can then be readily condensed back to a liquid state by the condenser.

The compressor has a displacement of 10.0 cu. in. The compressor has variations in the pulley rim diameter specified for the respective vehicle applications.

The basic compressor mechanism is a modified scotch yoke with four cylinders located radially in the same plane. Opposed pistons are pressed into a yoke which rides upon a slider block located on the shaft eccentric. Rotation of the shaft provides reciprocating piston motion with no "connecting rods". The mechanism is completely balanced with counterweights. Needle bearings are used for the shaft journals and the shaft eccentric. Pistons and yokes, along with the main cylinder housing and front cover, are made from aluminum to provide light weight. Teflon piston rings are used to provide both a gas compression seal and a piston-to-bore bearing surface. The outer shell is a simple steel band which encloses a large annular discharge muffler space.

Two O-rings provide a seal between the compressor shell and the compressor cylinder. A rubber seal ring seals the front head to the cylinder assembly and the shaft seal assembly provides a front head to shaft seal.

Refrigerant flows into the crankcase from the connector block at the rear, is drawn through the reeds attached to the piston top during the suction stroke, and is discharged outward through the discharge valve plate which is held in place at the top of the cylinder by a snap ring. Discharge gas flows out of the compressor muffler cavity through the connector block at the rear.

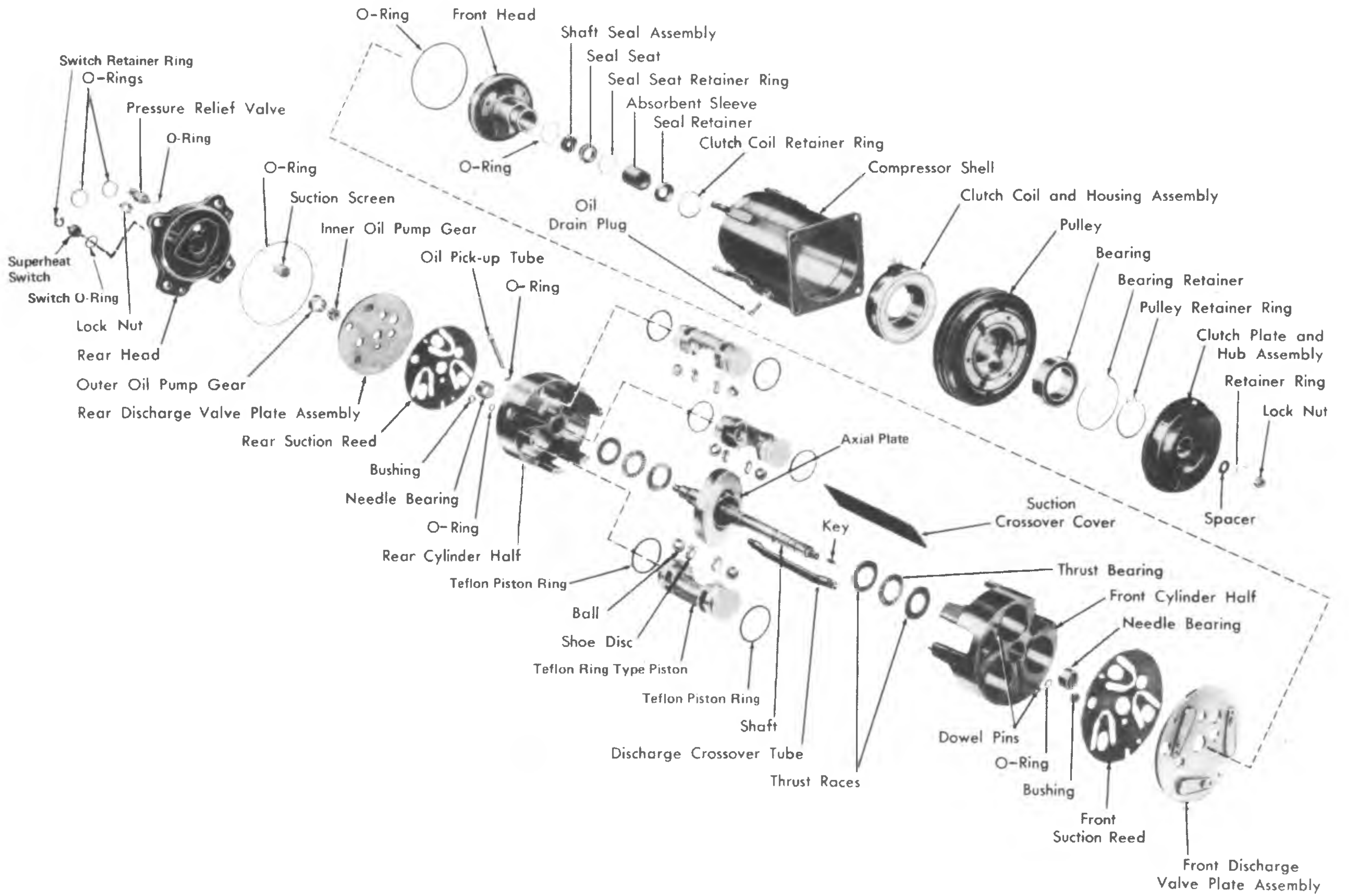


Fig. 1--Axial Six Cylinder Compressor Exploded View

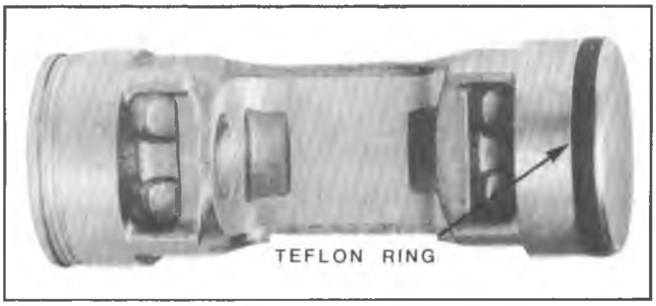


Fig. 2--Teflon Ring Type Piston

Clutch Coil

The clutch coil is molded into the steel coil housing and must be replaced as a complete assembly. Three protrusions on the rear of the housing fit into alignment holes in the compressor front head. The coil is secured to the front head by a pressed fit between the coil housing and neck portion of the front head. The coil has 3.65 ohms resistance at 80°F. ambient and will require no more than 3.2 amperes at 12 volts D.C. The clutch coil has two terminals for the power and ground leads.

Clutch-Pulley

The movable part of the clutch drive plate is in front of and adjacent to the rotor and bearing assembly. The armature plate, the movable member, is attached to the drive hub through driver springs riveted to both members. The hub of the drive plate is pressed on the compressor shaft and keyed to the shaft by a square drive key. A self-locking nut threads on the end of the shaft and is tightened against the shaft. The rotor and hub is a welded assembly and contains six threaded holes for mounting the pulley rim. The pulley rim is secured to the rear portion of the rotor by six screws and six special lock washers.

A two-row ball bearing is pressed into the rotor hub and held in place by three punch stakes, 120° apart, into the rotor hub near the hub bore. The entire clutch coil, pulley rim, rotor and bearing assembly is pressed on the front head of the compressor and secured by a retainer ring.

When power is supplied to the clutch coil the armature plate of the drive plate and hub assembly electromagnetically engages the slotted portion of the rotor face which then drives the crankshaft through the drive plate leaf springs and hub.

Shaft Seal

The main shaft seal, located in the neck of the compressor front head, consists of the seal assembly with its ceramic seal face in a spring loaded cage. An "O" ring seal, located within the ceramic seal, provides a seal to the shaft surface. The contact surface of the shaft seal seat is finished to a high polish and must be protected against nicks, scratches and even fingerprints. Any surface damage will cause a poor seal. An "O" ring, located in an internal groove in the neck of the front head provides a seal with the outer diameter of the seal seat. A retainer ring, tapered side away from the seat, secures the seat in place. The hub and armature plate must be removed to gain access to the seal. A shaft seal kit contains all necessary replacement parts for field service.

Front Head

The front head contains the front main shaft bearing pressed in place and a drilled oil hole for lubrication to the shaft seal cavity. The front head is mounted to the cylinder assembly by four screw and washer assemblies.

Thrust Washers

One thrust washer is used on the rear end of the crankshaft between the rear eccentric and the rear of the cylinder. A belleville washer, sandwiched between two thrust washers at the front of the shaft between the front eccentric and the front head controls the lateral thrust tolerance of the shaft and cylinder assembly. The two thrust washers have tangs and are assembled with the tangs facing inward to engage and cause the thrust and belleville washer assembly to rotate as a unit and not separately.

OIL CHARGE

Refer to the oil charge chart in Figure 5 for A-6 and R-4 compressor oil charge.

SYSTEM CONTROLS

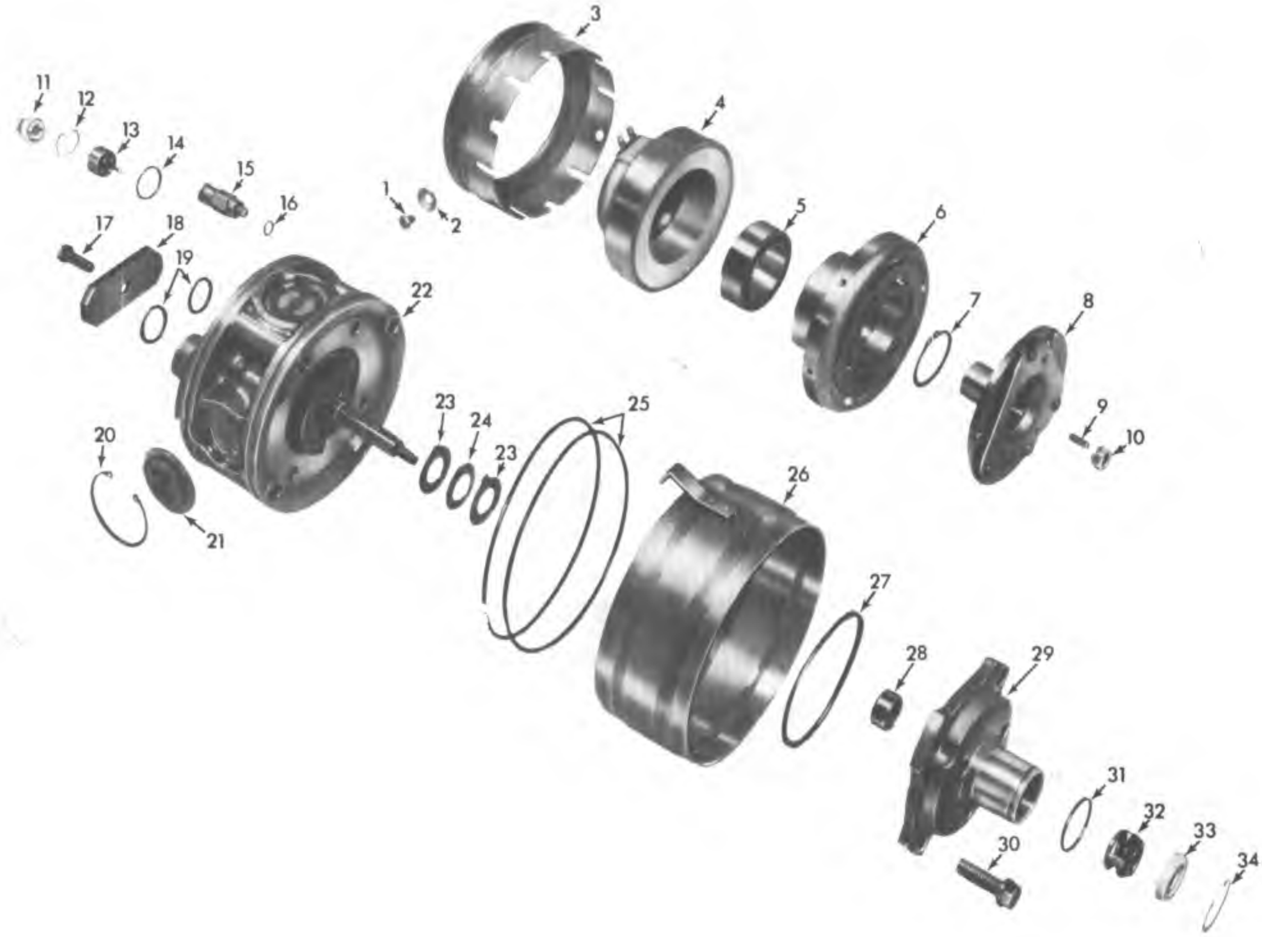
General

1976 CK Series Truck (Fig. 6) Heating and Air Conditioning mode selection has been simplified by the addition of a new "Maximum Mode position" to the previous six mode control. With the Temperature lever set to the extreme cold position and the mode selector lever positioned in MAX, maximum cooling is attained, and High blower speed is automatically selected. The new "MAX" mode setting as well as the other cooling settings (NORM and BI-LEVEL) have been grouped under an A/C heading. The VENT and HEATER settings have been grouped under an ECONOMY heading.

Selector Lever

The system selector lever (air control lever) determines the mode of operation: When the system selector lever is placed in A/C (MAX, NORM or BI-LEVEL) or DEF positions, electrical circuit connection is made to the compressor clutch through the control panel switch and the compressor discharge pressure switch. If the compressor discharge pressure switch is closed (ambient temperature above approximately 42°F, the compressor will run. In the OFF, or ECONOMY (VENT or HEATER) positions the compressor clutch is not energized.

The system selector lever also determines the direction of outlet air flow. Moving the lever from mode to mode varies the position of a vacuum valve on the control. The position of the vacuum valve will supply vacuum to, or vent, vacuum diaphragms which position the upper and lower mode and defroster air doors in the selector duct assembly. The position of these air doors determines if output air flow is from the heater purge outlet at OFF, the heater outlet with slight air flow from defroster nozzles at HEATER, heater and A/C outlets at VENT, A/C outlets only at MAX and NORM, heater A/C and defroster outlets at BI-LEVEL, or the defroster outlets with slight airflow from the heater outlet at DEF.



1. Screw
2. Locking Washer
3. Pulley Rim
4. Coil and Housing Assy.
5. Rotor Bearing
6. Rotor and Bearing Assy.
7. Retaining Ring
8. Clutch Drive Assy.
9. Clutch Hub Key
10. Shaft Nut
11. Cap
12. Retaining Ring
13. Superheat Switch
14. O-Ring
15. Pressure Relief Valve
16. O-Ring
17. Screw
18. Shipping Plate
19. O-Ring
20. Retaining Ring
21. Valve Plate Assy.
22. Cylinder and Shaft Assy.
23. Thrust Washer
24. Belleville Washer
25. O-Ring
26. Shell Assy.
27. Ring Seal
28. Main Bearing
29. Front Head Assy.
30. Screw and Washer Assy.
31. O-Ring
32. Shaft Seal
33. Seal Seat
34. Retaining Ring

Fig. 3--Radial Four Cylinder Compressor-Exploded View

When the system is in MAX A/C mode and the temperature lever is at full COLD the air inlet door is positioned to reduce the supply of outside air from approximately 100 percent to approximately 20 percent. The remainder of the air input (80 percent) to the A/C system is then taken from the interior of the passenger compartment. This recirculation of interior air (recirc operation) provides a source of fast cool down of interior temperatures.

A switch connected to the selector lever overrides the blower (FAN) switch, (in MAX A/C) and automatically provides high blower speed.

Temperature Control Lever

The temperature lever determines the temperature of outlet airflow by positioning the temperature door in the selector duct assembly, through the motion of a bowden cable linking the control panel lever to the temperature door.

> NOTE: An engine thermal switch prevents LO blower operation until the temperature at the switch reaches 95°F. This blower delay can be by-passed by placing

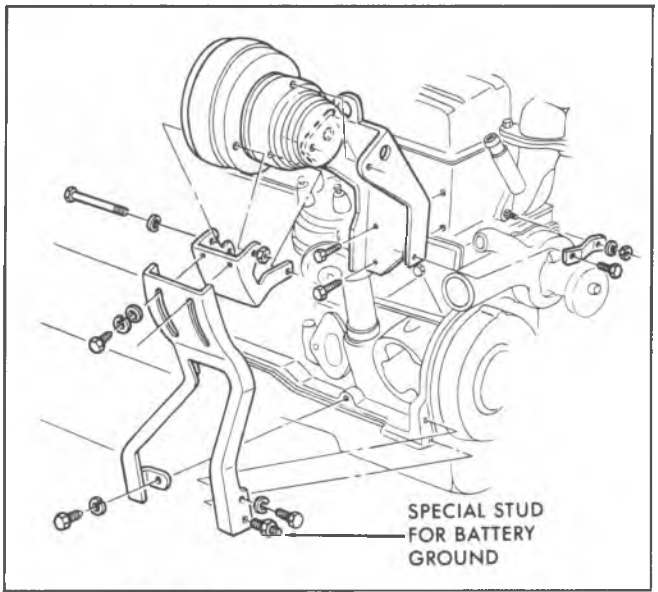


Fig. 4--Compressor mounting - L6 Engine

the fan switch in any of the other three positions.

Fan Switch

The blower FAN switch provides a means of selecting the amount of airflow from the system by regulating the speed of the blower motor. There are, however, limitations to the control of blower speed. To provide constant ventilation, the blower motor electrical circuitry prevents the blower motor from being shut off when the ignition switch is on. Therefore, the blower speeds available are HI, LO and two medium speeds.

The control panel also has a "recirc. override" switch (part of the master switch) which overrides the blower speed switch and automatically provides HI blower speed when the system selector lever is in MAX and the temperature lever is set to full COLD.

System Operation - CK Truck

System operation is as illustrated in Fig. 7.

Vacuum Schematic - CK Truck

The CK Truck air conditioning vacuum schematic is illustrated in Figure 8.

Rear A/C Blower Motor - C69 G Van

When air circulation only is desired, the rear A/C blower motor may be operated independent of the front A/C blower motor and without the cooling function. The rear blower motor resistor has been relocated to a position on the blower shroud at the rear of the vehicle. See Section 12 of this manual for A/C blower motor and heater blower motor (A/C equipped vehicles only) wiring diagram revisions for 1976.

UNIT	ADD OIL
CONDENSOR	1 OUNCE
EVAPORATOR	3 OUNCES
EE—VIR	1 OUNCE

COMPRESSOR CONDITION	AMOUNT OF OIL DRAINED FROM COMPRESSOR	AMOUNT OF OIL TO INSTALL
REPLACING COMPRESSOR WITH A NEW COMPRESSOR.	MORE THAN – 4 OZ. IN A-6 – 1/2 OZ. IN R-4	*DRAIN NEW COMPRESSOR, REFILL WITH NEW OIL (SAME AMOUNT AS DRAINED FROM OLD COMPRESSOR).
	LESS THAN – 4 OZ. IN A-6 – 1/2 OZ. IN R-4	**DRAIN NEW COMPRESSOR. INSTALL NEW OIL IN NEW COMPRESSOR – 6 OZ. IN A-6 – 3 OZ. IN R-4
REPLACING COMPRESSOR WITH A SERVICE REBUILT COMPRESSOR.	MORE THAN – 4 OZ. IN A-6 – 1/2 OZ. IN R-4	*SAME AS ABOVE PLUS AN ADDITIONAL OUNCE (MORE OIL IS RETAINED IN A DRAINED COMPRESSOR THAN ONE THAT HAS BEEN REBUILT).
	LESS THAN – 4 OZ. IN A-6 – 1/2 OZ. IN R-4	**SAME AS ABOVE PLUS AN ADDITIONAL OUNCE.
UNABLE TO RUN COMPRESSOR BEING REPLACED, PRIOR TO REMOVAL FROM CAR.	MORE THAN – 1-1/2 OZ. IN A-6 – 1/2 OZ. IN A-6 AND SYSTEM APPEARS TO HAVE LOST LITTLE OR NO OIL	*SAME AS ABOVE.
	LESS THAN – 1-1/2 OZ. IN A-6 – 1/2 OZ. IN R-4 OR SYSTEM APPEARS TO HAVE LOST MAJOR AMOUNT OF OIL.	**SAME AS ABOVE.
CONTAMINATED OIL DRAINED FROM SYSTEM.	ANY AMOUNT	DRAIN AS MUCH OIL AS POSSIBLE FROM SYSTEM. FLUSH SYSTEM WITH REFRIGERANT-11. REPLACE DRIER DESSICANT AND INSTALL NEW 525 VISCOSITY OIL IN NEW COMPRESSOR: A-6 COMP. 10-1/2 OZS. R-4 COMP. 6 OZS.

Fig. 5--Compressor Oil Charge for A-6 and R-4 Unit Replacement

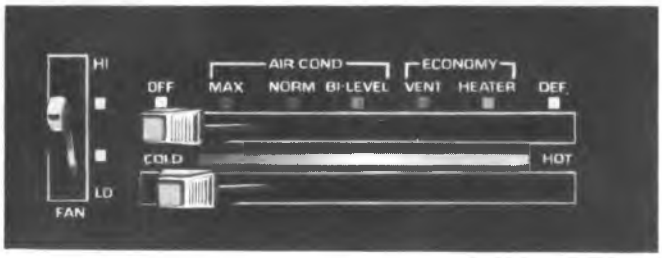


Fig. 6--Heater Air Conditioning Control Assembly - CK Truck

SYSTEM OPERATION - CK TRUCK

SELECTOR LEVER POSITION	COMPRESSOR	BLOWER SPEEDS AVAIL	AIR SOURCE	AIR ENTERS VEHICLE	HEATER A/C DOOR-OPEN TO:	HEATER DEFROSTER DOOR-OPEN TO:
OFF	OFF	LOW	OUTSIDE	FLOOR OUTLETS	HEATER	HEATER
MAX A/C	ON	HI	INSIDE%	DASH OUTLETS	A/C	HEATER
NORM A/C	ON	ALL	OUTSIDE	DASH OUTLETS	A/C	HEATER
BI-LEVEL	ON	ALL	OUTSIDE	FLOOR AND DASH OUTLETS	A/C & HEATER	HEATER
VENT	OFF	ALL	OUTSIDE	DASH OUTLETS	A/C	HEATER
HTR	OFF	ALL	OUTSIDE	FLOOR OUTLETS	HEATER	HEATER
DEF	ON	ALL	OUTSIDE	DEFROST OUTLETS	HEATER	DEFROST

NOTE % 100% Inside air is not available, some bleed through of outside air is allowed.

Fig. 7--System Operation - CK Truck

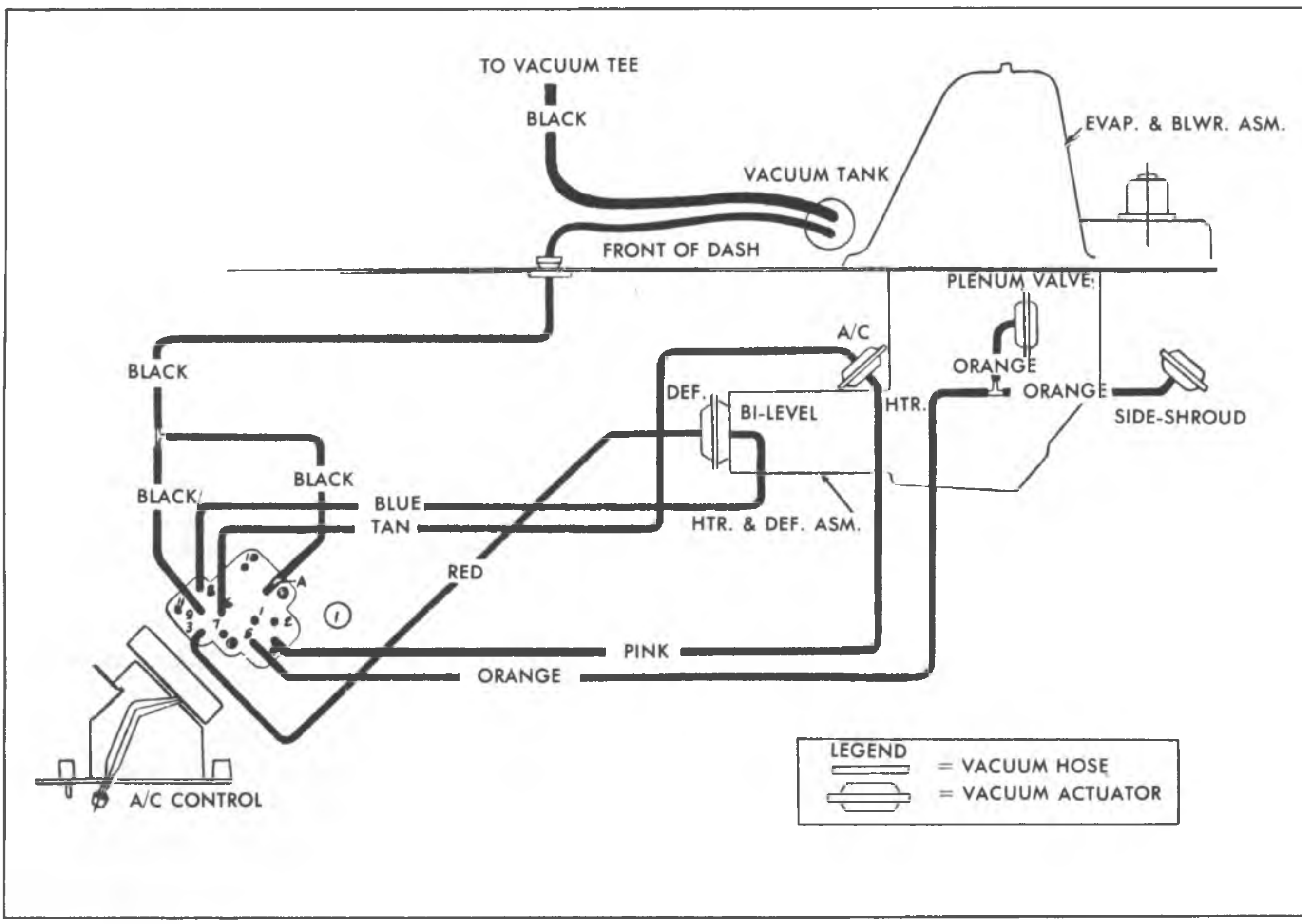


Fig. 8--Air Conditioning Vacuum Schematic - CK Truck

SERVICE OPERATIONS

CONDENSER - CK MODEL

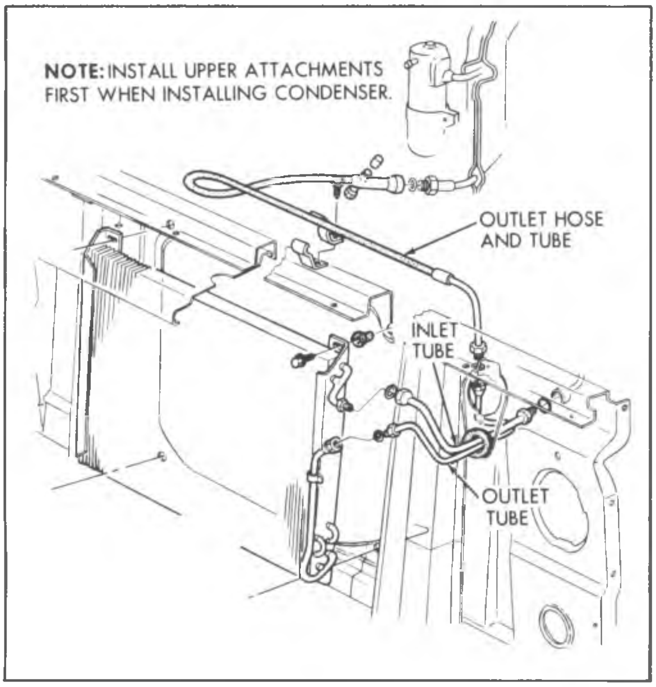


Fig. 9--Condenser Installation (C-K Models)

Replacement (Fig. 9)

1. Disconnect battery ground cable.
2. Purge the system of refrigerant.
3. Remove the grille assembly.
4. Remove the radiator grille center support.
5. Remove the left grille support to upper fender support (2) screws.
6. Disconnect the condenser inlet and outlet lines and the outlet tube line at the right end of the condenser. Cap or plug all open connections at once.
7. Remove the condenser to radiator support screws.
8. Bend the left grille support outboard to gain clearance for condenser removal.
9. Remove the condenser assembly by pulling it forward and then lowering it from the vehicle.
10. To install a new condenser, reverse Steps 1-9 above. Add one fluid ounce of clean refrigeration oil to a new condenser.

    NOTE: Use new "O" rings, coated with clean refrigeration oil, when connecting all refrigerant lines.
11. Evacuate, charge and check the system.

THERMOSTATIC SWITCH - CK TRUCK

The location of the thermostatic switch has been changed to provide more accurate sensing of refrigerant temperature and as a result improved system response and control. The sensing element is attached by means of a clamp to the inlet tube of the evaporator. The switch body is mounted on the bracket which supports the inlet tube in position at the evaporator case.

Replacement

1. Disconnect the battery ground cable.
2. Disconnect the electrical harness at the switch connector.
3. Remove the screw attaching the sensing element clamp and remove the clamp. Insulating material around sensing element may be removed at this point.
4. Remove the two screws attaching the switch body to the evaporator inlet line bracket and remove the switch and sensing element.
5. To replace reverse steps 1 to 3.

    NOTE: Insulating material removed from sensing element must be replaced with a suitable insulating compound. When replacing sensing element clamp tighten screw securely enough to provide intimate contact between sensing element and inlet tube. Do NOT over tighten.

HEATER AIR DISTRIBUTOR AND EXTENSION DUCT - G MODEL

Replacement

1. Disconnect battery ground cable.
2. Remove engine cover.
3. Remove evaporator-blower shield.
4. Remove shield bracket.
5. Remove left floor outlet deflector and bracket.
6. Loosen steering column to instrument panel reinforcement screws. Remove one screw. Torque both screws on installation.
7. Disconnect speedometer cable at meter.
8. Remove instrument panel to lower reinforcement attaching screws.
9. Move instrument panel assembly rearward.

    Disconnect radio antenna and electrical connector. Support instrument panel at right visor.

    Disconnect electrical connector at brake switch.
10. Remove blower-evaporator support bracket to door pillar and forward engine housing attaching screws. Move rearward to gain access.

11. Disconnect vacuum lines and electrical connectors. Remove heater distributor duct assembly.
12. Transfer duct and relays.
13. To reassemble, Reverse Seps 1-12.

HEATER CORE CASE AND CORE - G MODEL

Replacement

Follow Steps 1-10 of "Heater Air Distributor and Extension Duct Replacement" procedure.

11. Remove battery.
12. Disconnect heater hoses at heater core (drain pan below hoses) refill radiator upon completion.
13. Remove air inlet valve assembly.
14. Remove temperature door control cable at heater case.
15. Remove heater assembly.
16. Remove heater core. Reseal heater case.

AIR INLET VALVE - G MODEL

Replacement

Follow Steps 1-10 of "Heater Air Distributor and Extension Duct Extension Duct Replacement" procedure.

11. Remove duct assembly. Disconnect vacuum hose.
12. Remove vacuum valve.
13. To reassemble, Reverse Steps 1-12.

TEMPERATURE DOOR CABLE - G MODEL

Replacement

Follow Steps 1-10 of "Heater Air Distributor and Extension Duct Replacement" procedure.

Fig. 10--Expansion Tube - CK Model

11. Disconnect temperature door control cable at heater case.
12. Disconnect temperature door control cable at control.
13. Make up new cable.
14. To reassemble, Reverse Steps 1-13.

EXPANSION TUBE - CK MODEL (FIG. 10)

A new type expansion tube is incorporated into the air conditioning systems of 1976 CK series trucks.

Removal (Fig. 11)

1. Purge the system of refrigerant.
2. Disconnect the condenser to evaporator line at the evaporator inlet.
3. Using needle nose pliers, and gripping the plastic tip of the expansion tube, remove the expansion tube and "O" ring from the core inlet line.

Installation

1. Insert the new expansion tube into insertion tool J-26549 as illustrated in figure 12.
2. Coat a new expansion tube "O" ring with clean 525 viscosity refrigeration oil.
3. While slightly compressing the fingers of the tool around the body of the expansion tube (to facilitate entry into the inlet line) insert the expansion tube into the core inlet line and push until the tube reaches a firm stop. This will indicate proper seating of the "O" ring in the inlet line.

SECTION 1B

TRUCK BODY

NOTE: Except for the items listed below, all information found in section 1B of the 1974 Light Duty Truck Service Manual is applicable to 1976 Light Duty Trucks.

INDEX

C-K MODELS

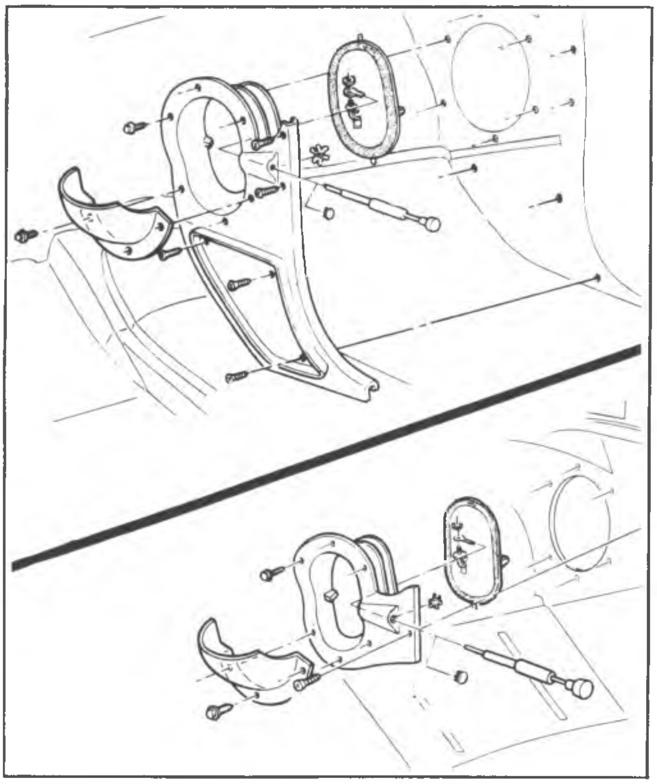


Fig. 1--Cowl Vent Valves

Fig. 2--Glass Run Channel Adjustment

COWL VENT VALVES

Two styles are shown in figure 1. Removing the attaching screws allows removal of the valve from the side panels. *Refer to page 1B-6 of the 1974 manual.*

REAR SIDE DOOR (MODELS 06 AND 03)

Glass Run Channel Adjustment

Figure 2 illustrates the front run channel. At the lower end, a slotted bracket provides for in-and-out adjustment. The screw and locknut at that bracket allow fore-and-aft adjustment.

Together, this allows proper alignment of the glass to the rear glass run channel for full up and down travel. *Refer to pages 1B-14 and 1B-15 of the 1974 manual.*

REAR DOOR CHECK STRAP

Model 06

Figure 3 shows the cloth check strap used for rear doors. The door may be completely opened by removing the strap pin from the bracket. The bracket attaches to the pillar with three screws; the strap is fastened to the door panel with two screws and an attaching bar. *Refer to page 1B-18 of the 1974 manual.*

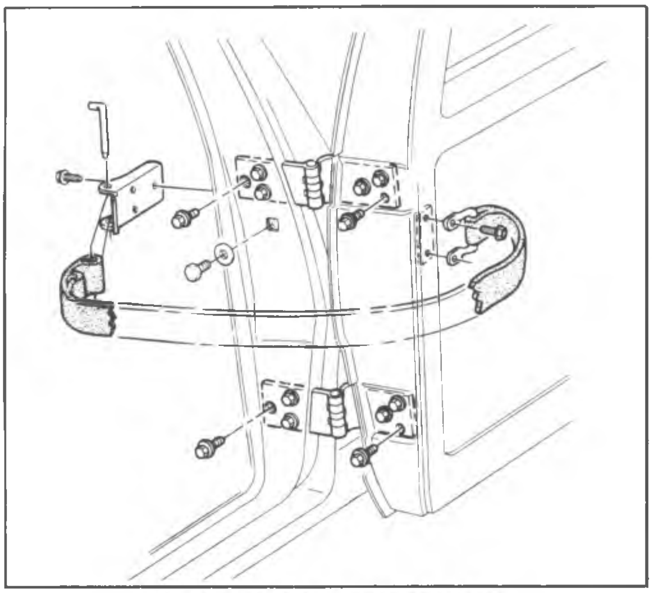


Fig. 3--Rear Door Hinges and Strap

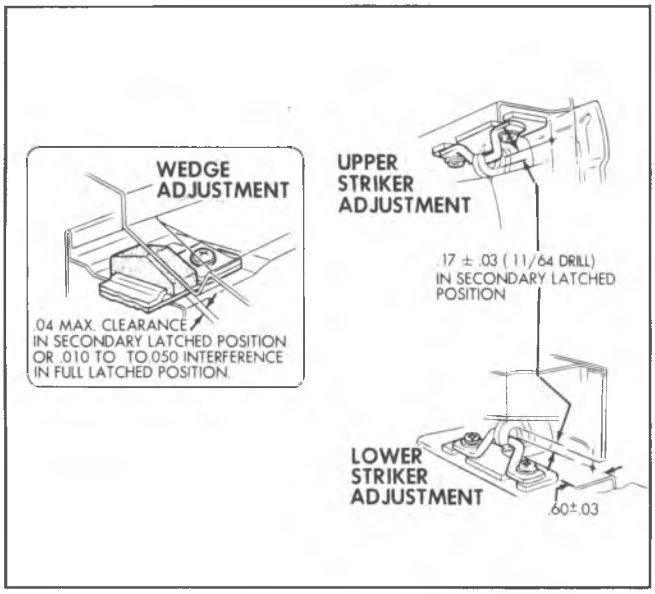


Fig. 4--Wedge and Striker Adjustments

REAR DOOR--STRIKER AND WEDGE ADJUSTMENTS

Figure 4 illustrates the rear door latch strikers and door wedges. Be sure that adjustments are as shown to insure proper latching of the rear doors. *Refer to page 1B-18, figure 48 of the 1974 manual.*

ENDGATE DISASSEMBLY

Model 06

Refer to page 1B-20 of the 1974 Light Duty Truck Service Manual.

Step 10 defines the proper method of removing the regulator on an electric-powered window. The following CAUTION emphasizes the need for following step 10 carefully:

> **CAUTION:** *Step 10 must be performed if the window is removed or disengaged from the regulator lift arms. The lift arms are under tension from the counter-balance spring, and can cause injury if the motor is removed without locking the sector gears in position.*

G MODELS

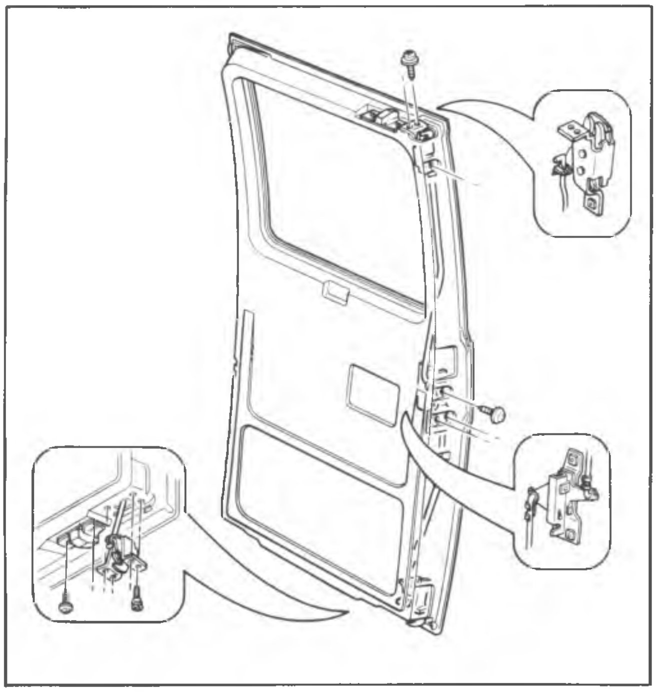


Fig. 5--Remote Control and Latches

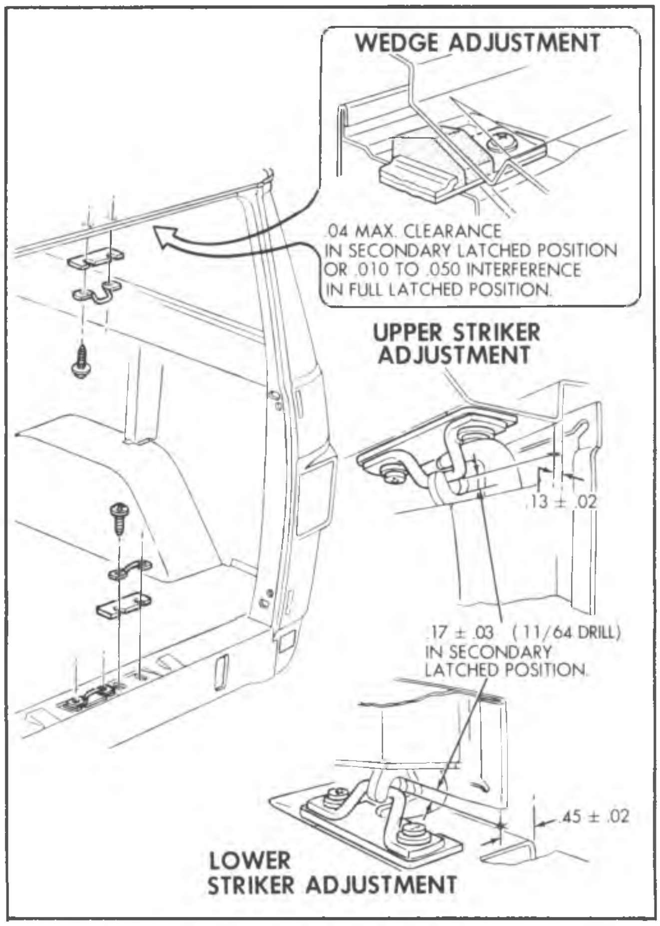


Fig. 6--Rear Door Striker and Wedge Adjustments

REAR DOOR ITEMS

Latches, Strikers and Wedges

Figures 5 and 6 illustrate the new latches, strikers, wedges and adjustment dimensions for G-Model rear doors. *Refer to pages 1B-44 and 1B-45 of the 1974 Light Duty Truck Service Manual for replacement instructions.* Note the new dimensions for striker adjustments.

QUICK RELEASE BENCH SEAT - G VAN (Fig. 7)

All models equipped with 2nd, 3rd and 4th bench seat assemblies feature a quick release mechanism which facilitates removal of the seats for added cargo space.

Instead of the conventional clamp and bolt method of seat retention, cam type latch assemblies and hooked retainers, which fit onto anchor pins in floor anchor plates are used. When the latch assemblies are depressed, their cams and the hooks of the retainers are drawn tightly onto the anchor pins for secure seat attachment.

Removal is accomplished using the following procedure:

1. Pull up on quick release latches located at lower front of seat legs (right and left hand sides).
2. Tilt up front of seat and push seat rearward to clear anchor pins located beneath floor at front and rear of seat legs.
3. Lift seat up and remove from van.
4. To replace, reverse steps 1 to 3.

CAUTION: *When replacing seats make sure that seat retainer hooks are fully engaged with anchor pins and latching assembly is fully depressed into place.*

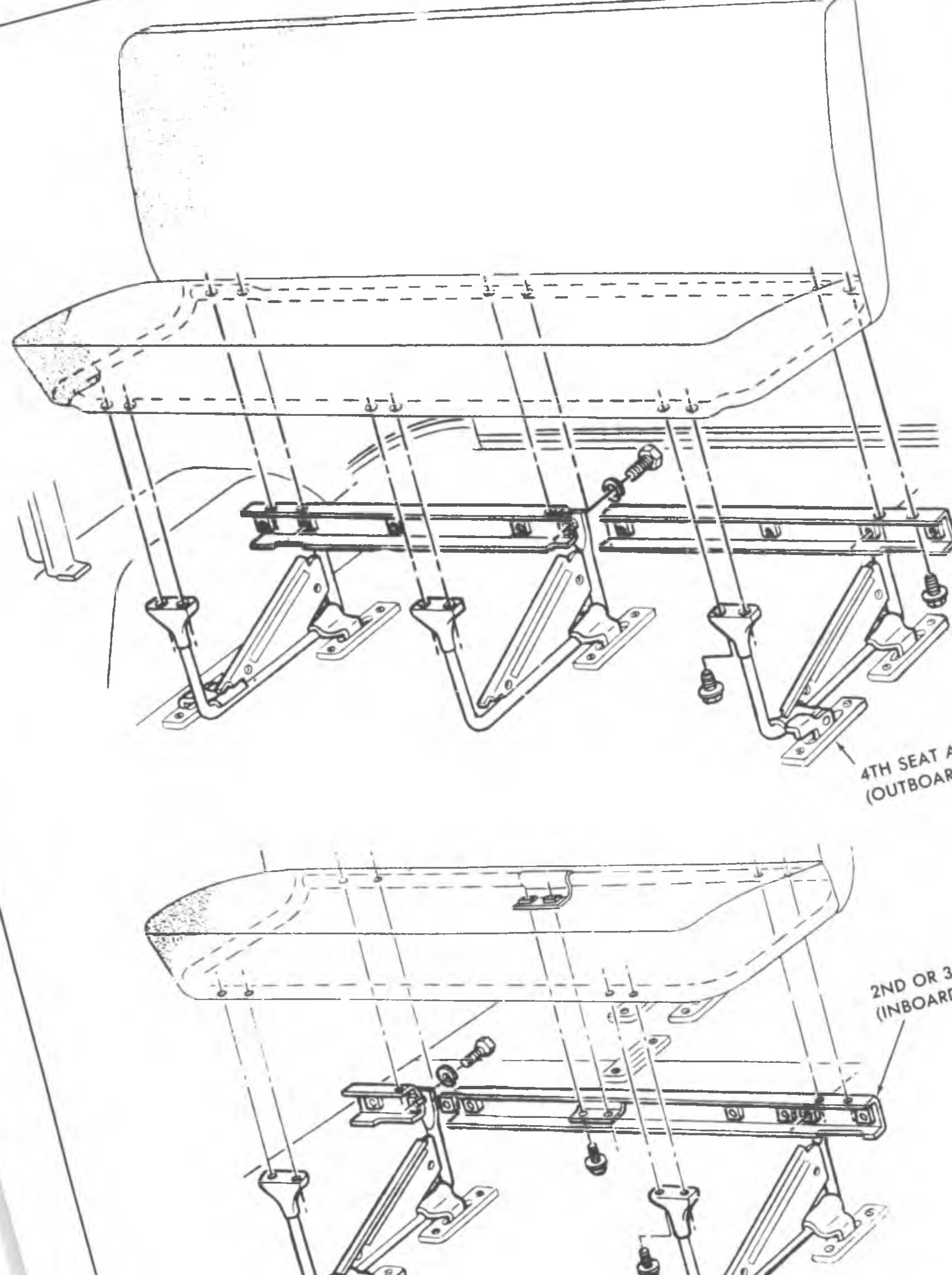


Fig. 7–Quick Release Seat Assembly

SECTION 2

FRAME

Truck frames are essentially carryover, with some models undergoing configuration and alignment reference dimension changes.

On C107 and 109 models, due to shifting the position of the catalytic converter, the left hand converter rail has been redesigned. This design change has necessitated moving the kick-up back approximately three inches.

The 10-30 series frames and related dimensions are shown in figures 1 through 3.

Model	A	B	C	D	E	F	G	H	I	J	K	L	M	N	P	R	S	T	U	V
CA107	13-3/8	15-1/4	16	19-7/8	12	13	10	14-7/8	17-3/4	17-3/4	19-7/8	16-3/4	15-5/8	17-3/4	69-5/8	76-1/2	110	16-7/8	16-7/8	14
CA109	13-3/8	15-1/4	16	19-7/8	12	13	10	14-7/8	17-3/4	17-3/4	19-7/8	16-3/4	15-5/8	17-3/4	69-5/8	86-1/2	120	16-7/8	16-7/8	14
CA209	13-3/8	15-1/4	17	19-7/8	12	13	10	14-7/8	17-3/4	17-3/4	19-7/8	16-3/4	15-5/8	17 3/4	69-5/8	86-1/2	120	16-7/8	16-7/8	14
CA 210/310	13-3/4	15-1/4	16	18-1/2	10	13	10	14-1/4	17-3/4	17-3/4	19-7/8		15-5/8	17-3/4	69-7/8	105	131	16-7/8	16-7/8	14
CA314	13-3/8	14-7/8	16	18-1/2	10	13	10	14-1/4	17-3/4	17-3/4	19-7/8		15-5/8	17-3/4	69-7/8	129	155-1/2	16-7/8	16 7/8	14
KA107	13-3/8	15-1/4	17	19-7/8	12-1/2	13	10	14-7/8	17-3/4	17-3/4	19-7/8	16-3/4	15-5/8	17-3/4	69-5/8	76-1/2	110	16-7/8	16-7/8	14
KA 109/209	13-3/8	15-1/4	17	19-7/8	12-1/2	13	10	14-7/8	17-3/4	17-3/4	19-7/8	16-3/4	15-5/8	17-3/4	69-5/8	86-1/2	120	16-7/8	16-7/8	14
PA100	7-5/8	9-3/8	11	14-5/8	9-1/2	13	10			9-1/2	13		10-7/8	13	71-7/8	36	89	16-7/8	16-7/8	14
PA 208/308	7-5/8	9-3/8	11-5/8	14-5/8	9-1/2	13	10	9-1/2	13	9-1/2	13		10-7/8	13	72-1/4	59	131	16-7/8	16-7/8	14
PA 210/310	7-5/8	9-3/8	11-5/8	14-5/8	9-1/2	13	10	9-1/2	13	9-1/2	13	10-7/8	10-7/8	13	71-7/8	67	153	16-7/8	16-7/8	14
PA314	7-5/8	9-3/8	11-5/8	14-5/8	9-1/2	13	10	9-1/2	13	9-1/2	13	10-7/8	10-7/8	13	71-7/8	91	177	16-7/8	16-7/8	14
CA105	13-3/8	15-1/4	17	19-7/8	12	13	10			14-1/4	20	17-3/4	15-5/8	17-3/4	69-5/8	46	88	16-7/8	16-7/8	14
KA105	13-3/8	15-1/4	17	19-7/8	12-1/2	13	10			14-1/4	20	17 3/4	15-5/8	17-3/4	69-5/8	46	88	16-7/8	16-7/8	14
PE 31132 (137)	9-1/8	11-1/2	10-7/8		9-1/2	13	10	9-1/2	13	9-1/2	13	10-7/8	10-7/8	13	68-1/2	71	157	16-7/8	16-7/8	14
PE 31432 (157)	9-1/8	11-1/2	10-7/8		9-1/2	13	10	9-1/2	13	9-1/2	13	9-7/8	10-7/8	13	68-1/2	92-1/2	178-1/2	16-7/8	16-7/8	14
PE 31832	9-1/8	11-1/2	10-7/8		9-1/2	13	10	9-1/2	13	9 1/2	13	10-7/8	10-7/8	13	68-1/2	112	240-3/16	16-7/8	16-7/8	14

Fig. 1--C-K-P Truck Reference Dimensions

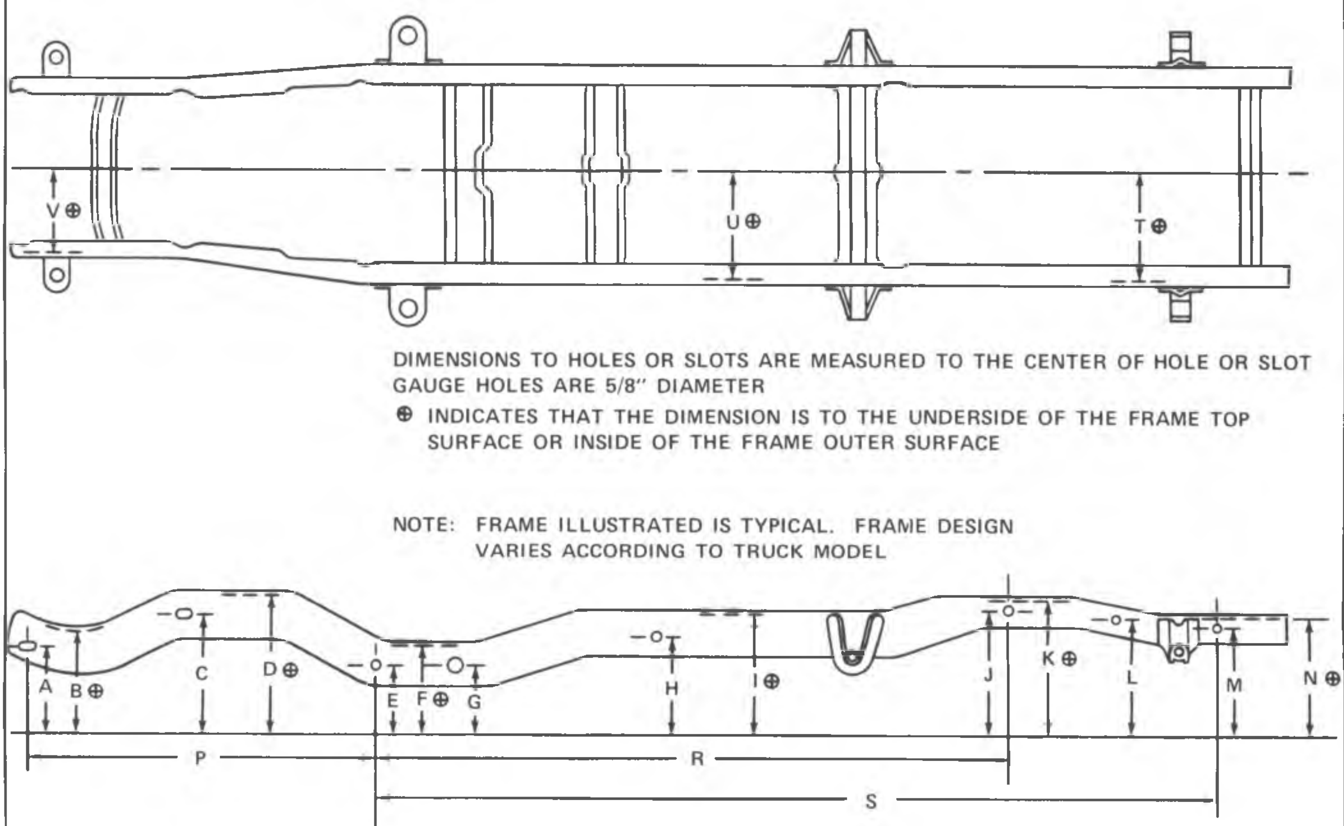


Fig. 2–C-K-P Truck Frame Reference Points

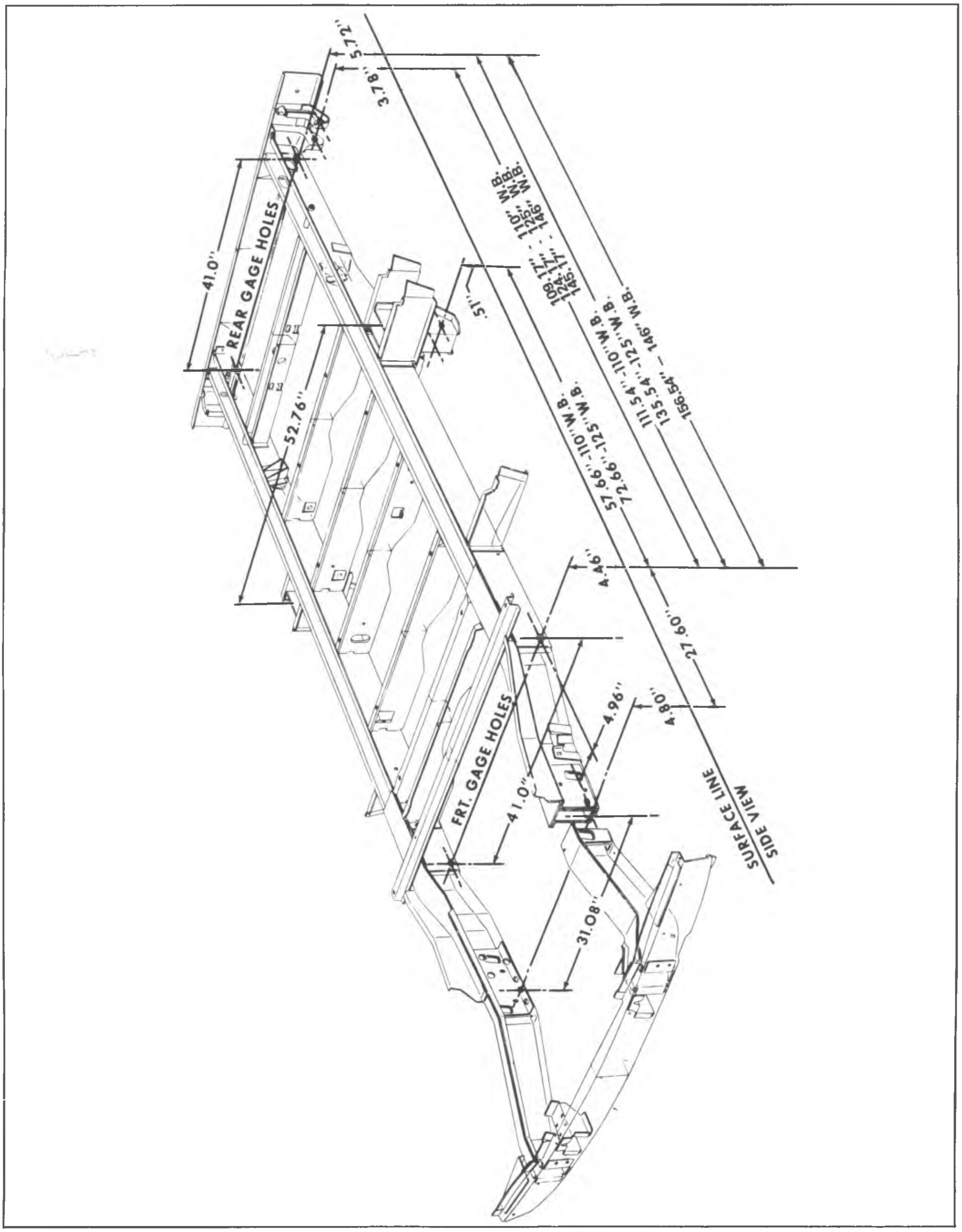


Fig. 3--G-Van Truck Frame Reference Dimensions

SECTION 3

FRONT SUSPENSION

GENERAL INFORMATION

Front suspension design and geometry are basically similar to 1974. Except for the items listed on these pages, all information in Section 3 of the 1974 Light Truck Service Manual is applicable to 1976 Light Trucks. Refer to the Specifications section of this manual for complete torque values, capacities, tolerances, alignment data, etc.

MAINTENANCE AND ADJUSTMENTS

ALIGNMENT NOTE - ALL SERIES

Front end alignment directions are given beginning on page 3-13 of the 1974 Light Truck Service Manual. It is good practice to set front-end values to specifications while the vehicle is in its **normally loaded** condition.

Trucks which are **consistently operated under heavy load conditions should have toe-in adjusted with the truck under heavy load** . This procedure should result in longer tire life.

CAMBER AND CASTER ADJUSTMENT– REMOVAL OF SHIM PACKS G10-30, C10-30

The following procedures should assist in alignment.

G10-20 Models, C10 Models with 3/4" Nut:

With vehicle on front end rack, jack at frame and raise the wheel off the ground. This will allow the upper control arm to drop down far enough to use a socket on the nuts and permit shim removal.

G30 Models, C20 and 30 Models with 7/8" Nut:

Remove the upper control arm rubber bumper; then follow same procedure as above. Reinstall bumper when alignment procedure is completed.

K-SERIES TRUCK FRONT WHEEL BEARINGS AND SPINDLE BEARINGS

Whenever front wheel bearings are lubricated, the spindle needle bearings should also be lubricated, with the same chassis grease. Under normal conditions, the lubrication interval should be 12,000 miles; off-road use such as in mud or water will require shorter intervals.

Figure 1 shows the bearings. The spindle bearings are accessible **after removing** the spindle, shown in figure 2. Refer to page 3-44 of the 1974 Light Truck Service Manual for details.

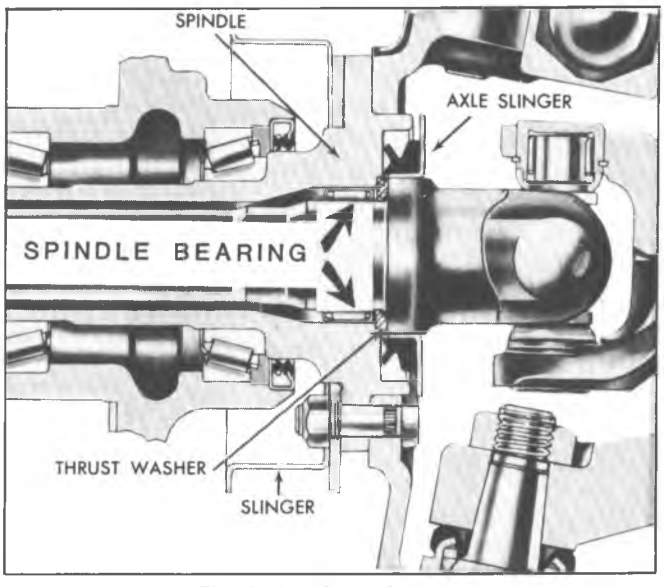


Fig. 1--Hub Cross-Section

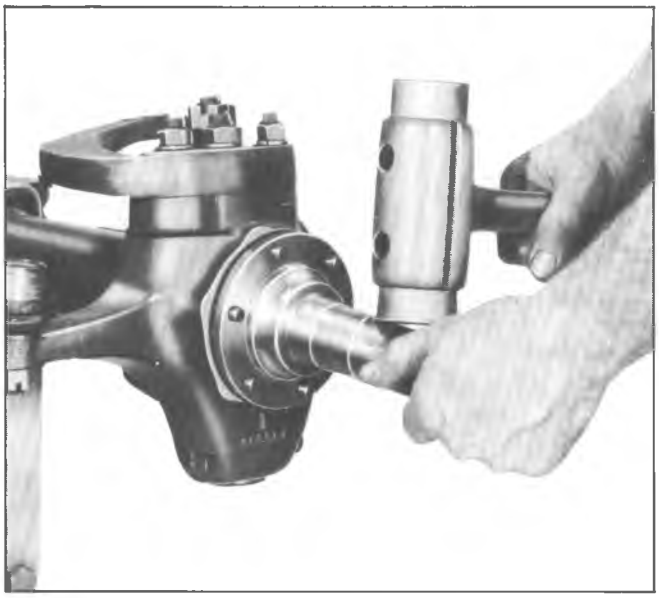


Fig. 2--Removing Spindle

FRONT AXLE– BALL JOINT ADJUSTMENT

The ball joint adjustment procedure found on page 3-39 of the 1974 Light Truck Service Manual should be modified in step 3 to read:

3. Apply a fish-scale to the tie rod mounting hole of the steering knuckle arm. With the knuckle assembly in the straight-ahead position, determine the right angle pull required to keep the knuckle assembly turning after initial break-away. This pull should not exceed 33 lbs. for each knuckle assembly, in either direction.

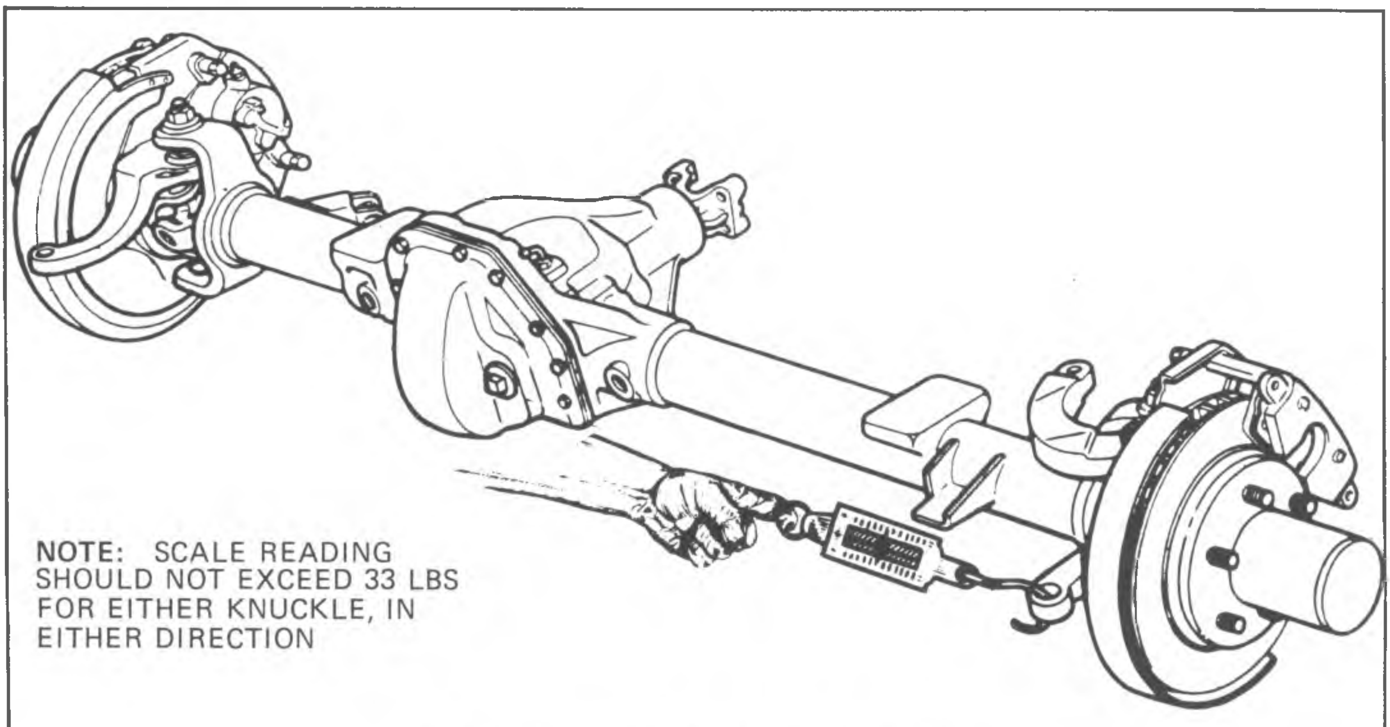


Fig. 3--Determining Front Axle Ball Joint Adjustment

SECTION 4

REAR SUSPENSION, PROPSHAFT AND AXLE

GENERAL INFORMATION

Rear suspension design is basically similar to 1974. The axle chart, figure 1, shows the application of specific axles to the various truck models.

Except for the items on the following pages, all information in Section 4 of the 1974 Light Truck Service Manual is applicable to 1976 Light Trucks.

MODEL	SOURCE	TYPE/CAPACITY	RING GEAR SIZE
C10	Chevrolet	Salisbury/3750#	8-7/8"
K10	Chevrolet	Salisbury/3750#	8-7/8"
K10	Chevrolet	Salisbury/4000#	8-7/8"
P10	Chevrolet	Salisbury/3500#	8-7/8"
G10	Chevrolet	Salisbury/3100#	8-7/8"
G10	Chevrolet	Salisbury/3100#	8-1/2"
C20 (Except Crew Cab)	Chevrolet	Salisbury/5700#	10-1/2"
C20 (Crew Cab)	Chevrolet	Salisbury/7500#	10-1/2"
K20	Chevrolet	Salisbury/5700#	10-1/2"
P20	Chevrolet	Salisbury/5700#	10-1/2"
G20	Chevrolet	Salisbury/3500#	8-7/8"
C30 (Except Dual Wheel Camper)	Chevrolet	Salisbury/7500#	10-1/2"
C30 (Dual Wheel Camper)	Dana	Salisbury/7500#	10-1/2"
P30	Chevrolet	Salisbury/7900#	10-1/2"
P30 (With H22/H23)	Chevrolet	Banjo/11,000#	12-1/4"
G30	Chevrolet	Salisbury/5700#	10-1/2"
G30 (Dual Wheel)	Dana	Salisbury/6200#	9-3/4"
G30 (Dual Wheel)	Dana	Salisbury/7500#	10-1/2"

Fig. 1--Axle Chart

MAINTENANCE ITEM

K-MODEL CV JOINT LUBRICATION

Propshaft CV joints can be lubricated while "on-the-vehicle", with the use of J-25512-1 and adaptor J-25512-2.

Access to the joint is limited and can best be accomplished by the following procedure. Figure 2 shows how the joint conceals the lube fitting (A) when it is in the downward position; and how it opens (B) when the fitting is in the upward position. Access to the lube fitting can only be gained from **above** the opened joint. This require a flex-hose that can bend between the propshaft and the underbody.

Install the rigid needle tip, J-25512-2, on the end of the flexhose. Use the tip to depress the ball into the lube fitting, then pump grease into the fitting as shown in figure 3.

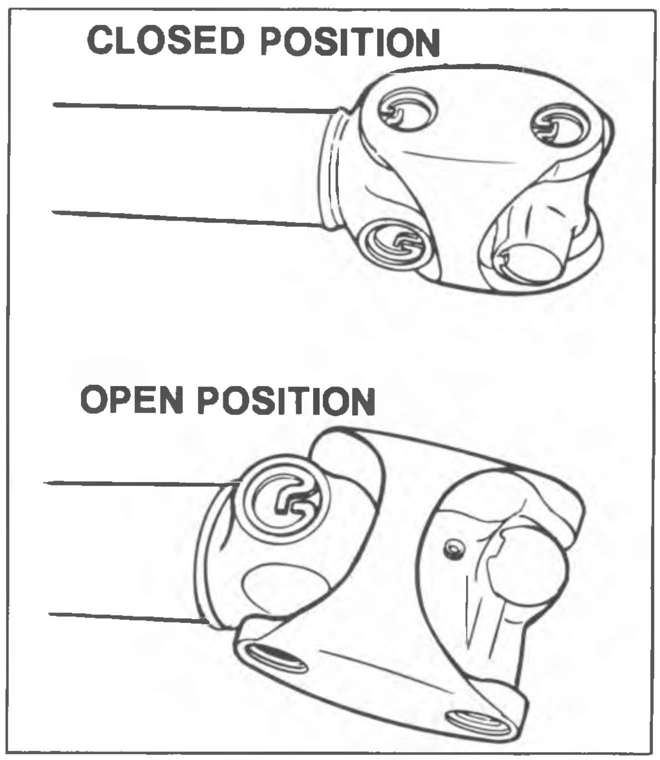


Fig. 2--Closed and Open Positions

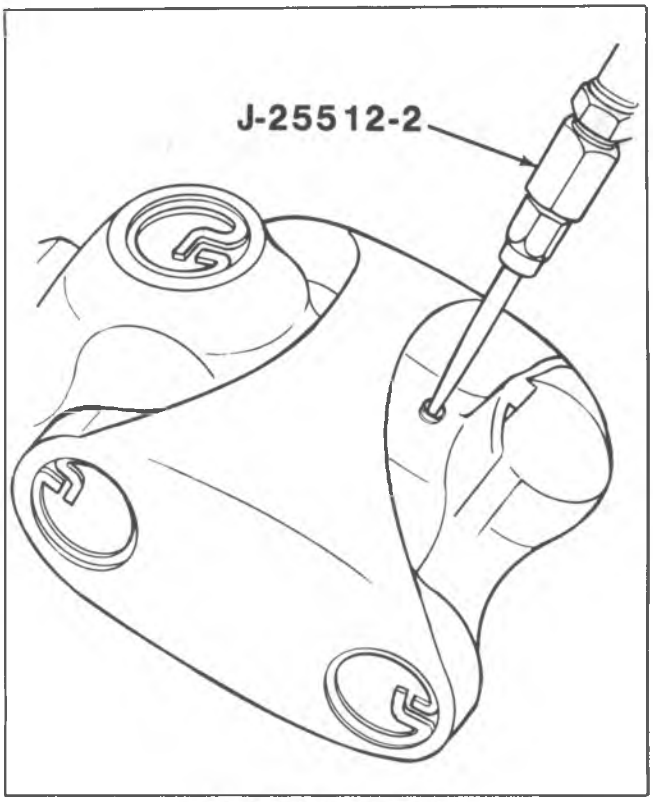


Fig. 3--Lubrication Tools

REAR SPRING U-BOLT

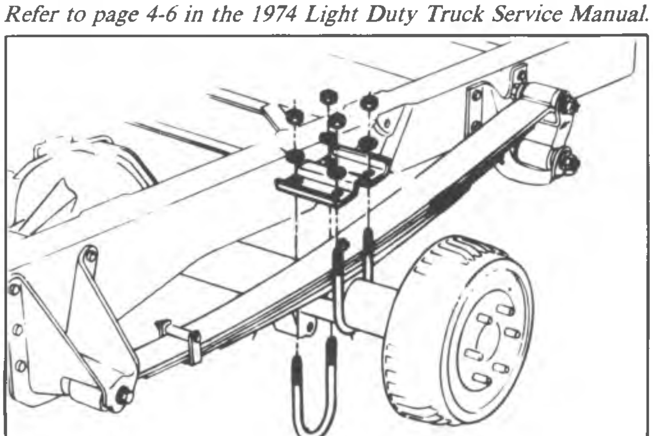
Rear spring U-bolt and anchor plate installation must be as shown in figure 4.

BUSHING REPLACEMENT-

Rear Spring, Front Eye

Heavy duty leaf springs on C20 and C30 trucks use a staked-in-place front eye bushing. Before this bushing is pressed out of the spring, the staked locations must be straightened with a chisel or drift. After a new bushing is installed, it must be staked in three equally spaced locations.

Refer to page 4-6 in the 1974 Light Duty Truck Service Manual.



NOTE: "U" BOLTS MUST BE LOCATED AROUND THE AXLE TUBE SO THAT THE LEGS PASS THE SPRING SEAT WITHIN .060.

Fig. 4--U-Bolt Installation

PROPSHAFT

Universal Joint-Repair

Two methods of retaining trunnions to universal joint yokes may be used. Each requires a different repair procedure.

The snap ring method is described on pages 4-9 through 4-10 of the 1974 Light Duty Truck Service Manual.

An injection-molded plastic retainer ring is used on other universal joints. For this type joint, the following repair procedure should be used.

Disassembly

NOTE: Never clamp propshaft tube in a vise as the tube may be dented. Always clamp on one of the yokes, and support the shaft horizontally. Avoid damaging the slip yoke sealing surface. Nicks may damage the bushing or cut the seal lip.

1. Support the propshaft in a horizontal position in line with the base plate of a press. Place the universal joint so that the lower ear of the shaft yoke is supported on a 1-1/8" socket. Place the cross press, J-9522-3, on the open horizontal bearing cups, and press the lower bearing cup out of the yoke ear as shown in figure 5. This will shear the plastic retaining the lower bearing cup.
2. If the bearing cup is not completely removed, lift the cross and insert Spacer J-9522-5 between the seal and bearing cup being removed, as shown in figure 6.

   Complete the removal of the bearing cup, by pressing it out of the yoke.
3. Rotate the propshaft, shear the opposite plastic retainer, and press the opposite bearing cup out of the yoke as before, using Spacer J-9522.

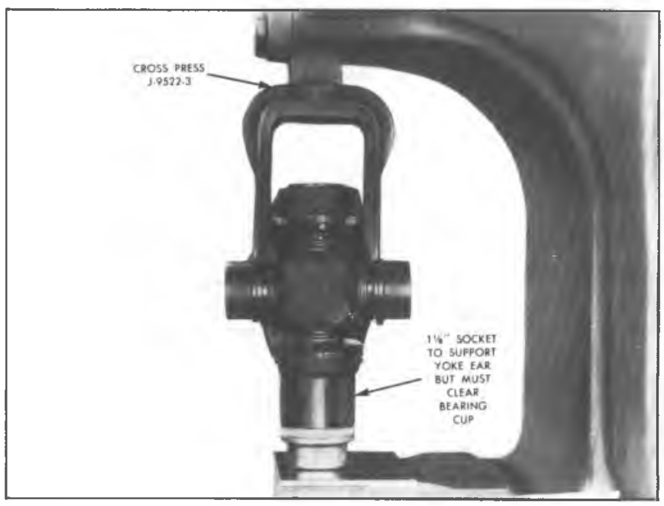


Fig. 5--Pressing Out Bearing Cup

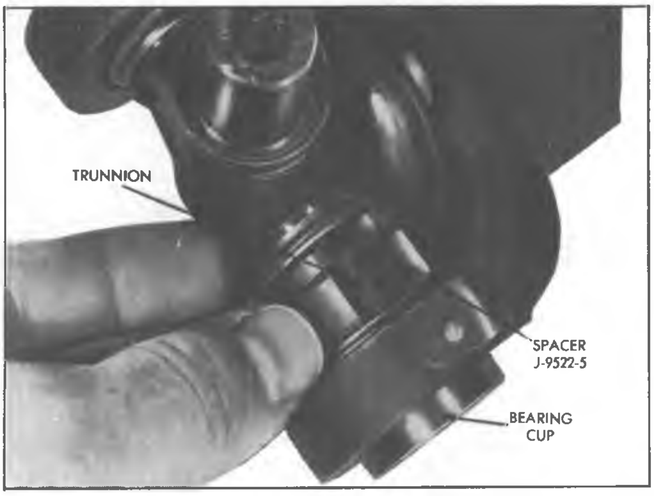


Fig. 6--Using Spacer to Remove Bearing Cup

4. Disengage cross from yoke and remove.

   NOTE: Production universal joints cannot be reassembled. There are no bearing retainer grooves in production bearing cups. Discard all universal joint parts removed.

5. Remove the remains of the sheared plastic bearing retainer from the ears of the yoke. This will aid in reassembly of the service joint bearing cups. It usually is easier to remove plastic if a small pin or punch is first driven through the injection holes.
6. If the front universal joint is being serviced, remove the pair of bearing cups from the slip yoke in the same manner.

Reassembly

A universal joint service kit is used when reassembling this joint. See figure 7. This kit includes one pregreased cross assembly, four service bearing cup assemblies with seals, needle rollers, washers, grease and four bearing retainers.

Make sure that the seals are in place on the service bearing cups to hold the needle rollers in place for handling.

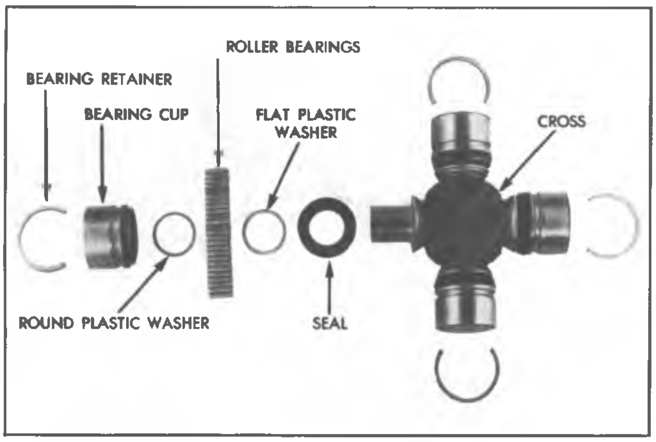


Fig. 7--Repair Kit

Fig. 8--Installing Trunnion into Yoke

1. Remove all of the remains of the sheared plastic bearing retainers from the grooves in the yokes. The sheared plastic may prevent the bearing cups from being pressed into place, and this could prevent the bearing retainers from being properly seated.
2. Install one bearing cup part way into one side of the yoke, and turn this yoke ear to the bottom.
3. Insert cross into yoke so that the trunnion seats freely into bearing cup as shown in figure 8.
4. Install opposite bearing cup part way. Make sure that both trunnions are started straight and true into both bearing cups.
5. Press against opposite bearing cups, working the cross all of the time to check for free movement of the trunnions in the bearings. If there seems to be a hang-up, stop pressing and recheck needle rollers, to determine if one or more of them has been tipped under the end of the trunnion.
6. As soon as one bearing retainer groove clears the inside of the yoke, stop pressing and snap the bearing retainer into place as shown in figure 9.

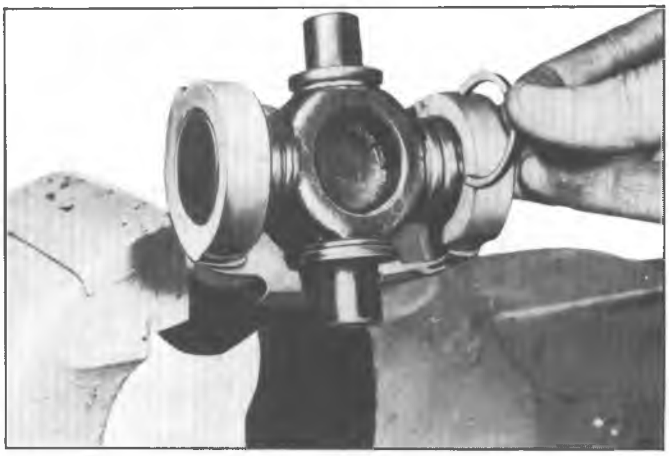


Fig. 9--Installing Snap Ring to Retain Trunnion

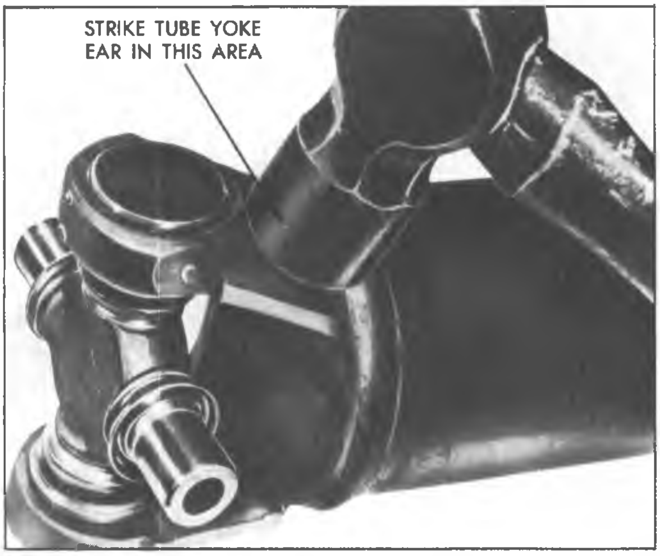


Fig. 10--Seating Snap Rings

7. Continue to press until the opposite bearing retainer can be snapped into place. If difficulty is encountered, strike the yoke firmly with a hammer to aid in seating bearing retainers. This springs the yoke ears slightly. See figure 10.
8. Assemble the other half of the universal joint in the same manner.
9. Check the freedom of the rotation of both sets of trunnions of the cross. If too tight, again rap the yoke ears as described above. This will loosen the bearings and help seat the bearing retainers.

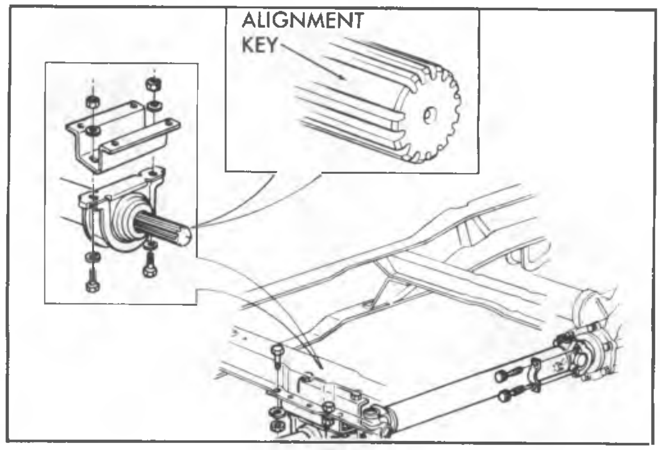


Fig. 11--Alignment Key

PROPSHAFT INSTALLATION–CORRECT PHASING

When reinstalling propshafts, it is necessary to place the shafts into particular positions to assure proper operation. This is called phasing. *Refer to procedures and illustrations on page 4-12 of the 1974 Light Duty Truck Service Manual.* For 1976 trucks, three methods of phasing are used.

All models with 32 splines use an alignment key, as shown in figure 11, to obtain proper phasing. The shafts can mate only in the correct position.

C and G models with 16 splines must be phased as shown in figure 12. The rear shaft must be rotated four splines–90°–toward the left side of the vehicle **after** aligning the trunnions vertically, as shown.

K models with 16 splines must align the trunnions vertically before installing. **Do not rotate** the shafts.

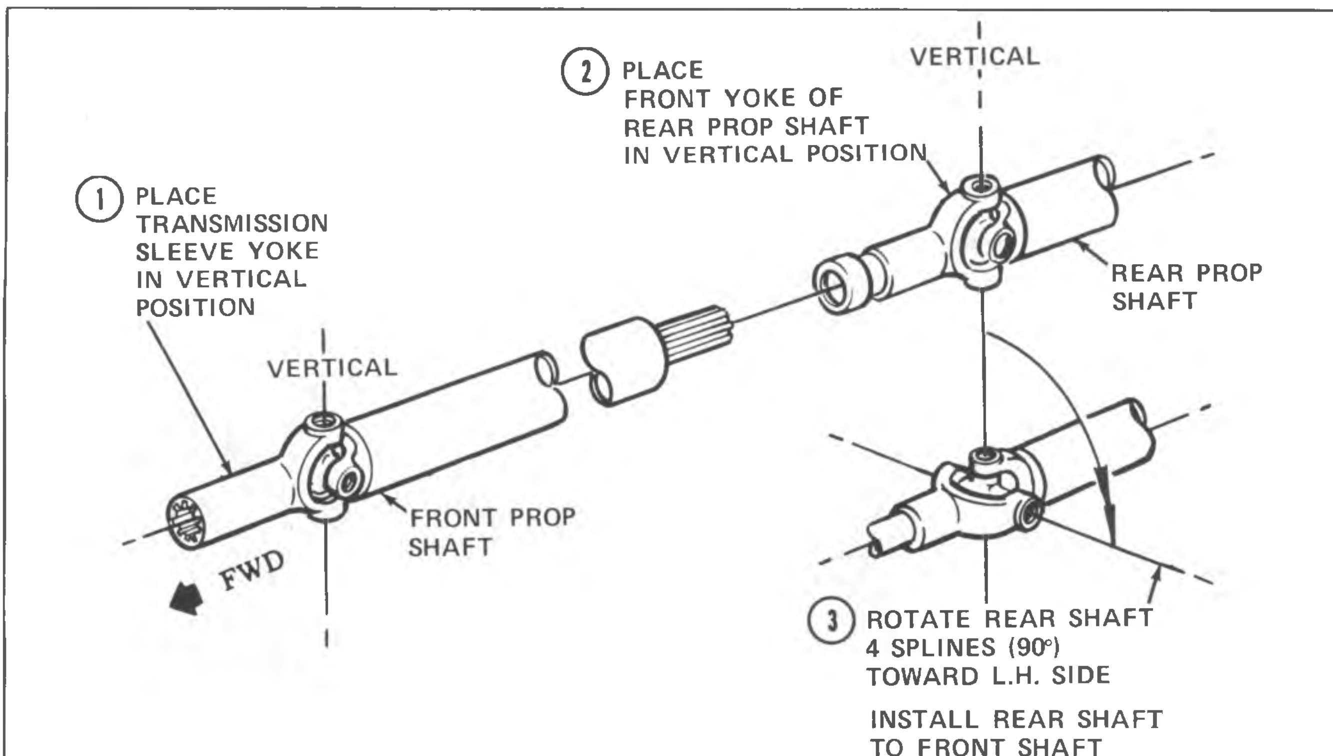


Fig. 12–Alignment for Phasing - C and G Models Only

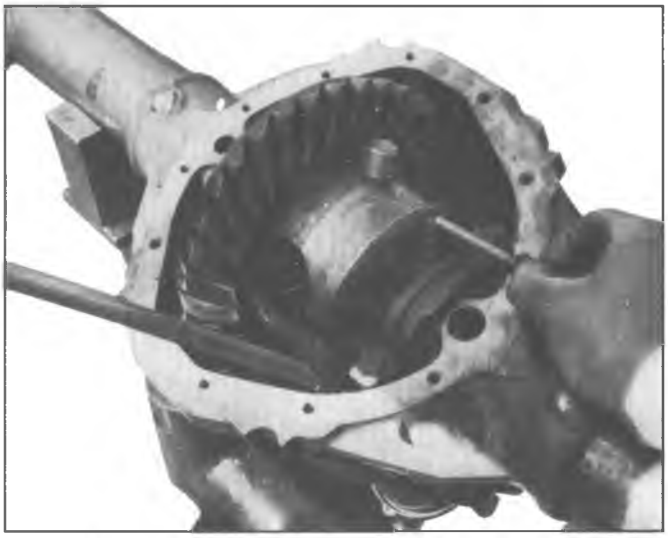


Fig. 13–Removing Lock Screw

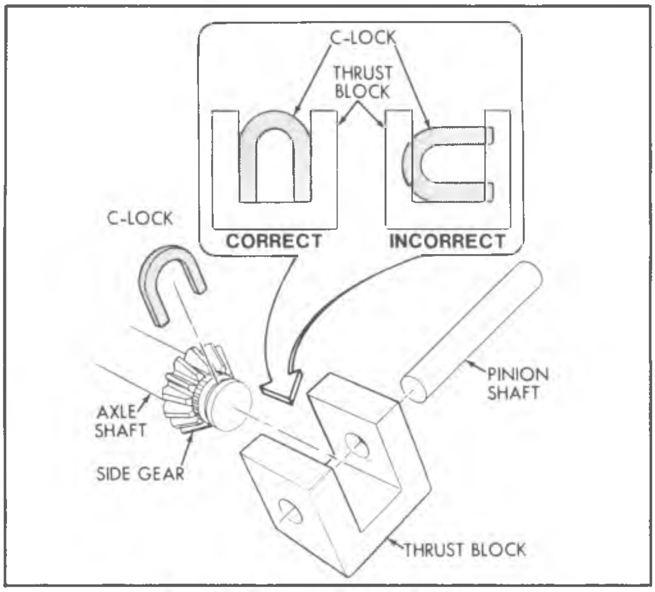


Fig. 15--Correct C-Lock Position

AXLE SHAFT

Remove and Reinstall

Axles equipped with 8-7/8" ring gears and Eaton Locking differentials use a thrust block on the pinion shaft which affects the removal of axle shafts as noted below.

1. Raise the vehicle on a hoist. Remove both rear wheel and tire assemblies and both rear brake drums.
2. Remove the rear cover and drain the lubricant.
3. Rotate the case **to the position shown in figure 13.** Support the pinion shaft so that it cannot fall into the case, then remove the lock screw.
4. Carefully withdraw the pinion shaft part-way out, as shown in figure 14. Rotate the case until the shaft touches the housing.
5. Reach into the case with a screwdriver or similar tool, and rotate the C-lock until its open end points directly inward, as shown in figure 15. The axle shaft cannot be pushed inward until the C-lock is properly positioned.

   Do not force or hammer the axle shaft in an attempt to gain clearance.
6. When the C-lock is positioned to pass through the end of the thrust block, push the axle shaft inward as shown in figure 16, and remove the C-lock. Remove the axle shaft and repeat steps 5 and 6 for the opposite axle shaft.
7. When installing C-locks keep the pinion shaft partially withdrawn. Place the C-lock in the same position shown in figure 15. Carefully withdraw the axle shaft until the C-lock is clear of the thrust block. When both locks are installed, install the pinion shaft and lock screw.

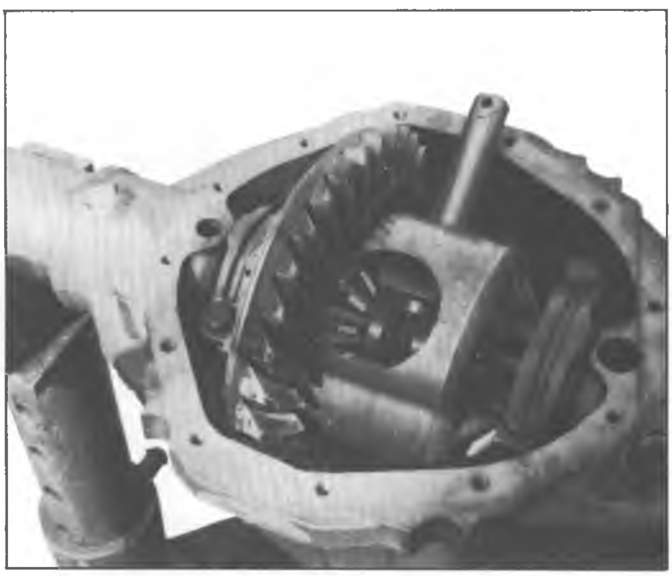


Fig. 14--Positioning Case For Best Clearance

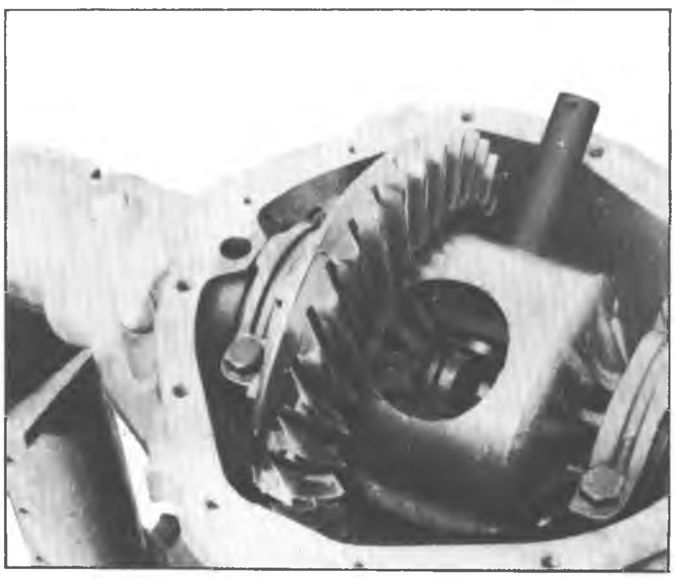


Fig. 16–Push Axle Shaft Inward

SECTION 5

BRAKES

The following caution applies to one or more steps in the assembly procedure of components in this portion of the manual as indicated at appropriate locations by the terminology "See Caution on page 1 of this section".

CAUTION: *THIS FASTENER IS AN IMPORTANT ATTACHING PART IN THAT IT COULD AFFECT THE PERFORMANCE OF VITAL COMPONENTS AND SYSTEMS, AND/OR COULD RESULT IN MAJOR REPAIR EXPENSE. IT MUST BE REPLACED WITH ONE OF THE SAME PART NUMBER OR WITH AN EQUIVALENT PART IF REPLACEMENT BECOMES NECESSARY. DO NOT USE A REPLACEMENT PART OF LESSER QUALITY OR SUBSTITUTE DESIGN. TORQUE VALUES MUST BE USED AS SPECIFIED DURING REASSEMBLY TO ASSURE PROPER RETENTION OF THIS PART*

CONTENTS OF THIS SECTION

BRAKE SYSTEM IDENTIFICATION

The following charts are included as a guide in determining vehicle brake system. The first chart describes brake systems and their basic differences. The remaining charts outline system to vehicle application.

BRAKE SYSTEM DESCRIPTION

SYSTEM	FRONT BRAKES	REAR BRAKES	BRAKE ASSIST
JB1	Disc 11.86 x 1.28	Drum 11.00 x 2.00	None (Manual Brakes)
JB3	Disc 11.86 x 1.28	Drum 11.00 x 2.00	Vacuum - Single Diaphragm
JB5	Disc 11.86 x 1.28	Drum 11.00 x 2.75	Vacuum - Dual Diaphragm
JB6	Disc 12.50 x 1.28	Drum 11.15 x 2.75	Vacuum - Dual Diaphragm
JB7	Disc 12.50 x 1.28	Drum 13.00 x 2.50	Vacuum - Dual Diaphragm
JB8	Disc 12.50 x 1.53	Drum 13.00 x 3.50	Hydraulic - Hydroboost
JB9	Disc 14.25 x 1.53	Drum 15.00 x 4.00	Hydraulic - Hydroboost

BRAKE SYSTEM APPLICATION

MODEL	TON RATING	WHEELBASE	GVW RATING	MERCHANDIZING OPTION	BRAKE SYSTEM
C10516	1/2	106.5	6050-6200	Base	JB5
C10703		117.5	4900	Base	JB1
			5300-5600	J50	JB3
			5300-6200	J55	JB5
C10903		131.5	4900	Base	JB1
			5300-5600	J50	JB3
			5300-6200	J55	JB5
C10906		129.5	6050-7000	Base	JB5
C20903	3/4	131.5	6400-7100	Base	JB6
			6400-8200	J55	JB7
C20906		129.5	7100	Base	JB6
			7100-8200	J55	JB7
C20943		164.5	7500-8200	Base	JB7
C20963			8200	Base	JB7
C30903	1	131.5	6600-8200	Base	JB7
			6600-10000	J55	JB8
C30943		164.5	9000-10000	Base	JB8
C30963			9000-10000	Base	JB8
C31003		135.5	6600-8200	Base	JB7
			6600-10000	J55	JB8
C31403		159.5	6600-8200	Base	JB7
			6600-10000	J55	JB8

BRAKE SYSTEM APPLICATION (continued)

MODEL	TON RATING	WHEELBASE	GVW RATING	MERCHANDIZING OPTION	BRAKE SYSTEM
K10516	1/2	106.5	6200-6300	Base	JB5
K10703		117.5	6200-6400	Base	JB5
K10903		131.5	6200-6400	Base	JB5
K10906		129.5	6200-7300	Base	JB5
K20903	3/4	131.5	6800	Base	JB6
			6800-8400	J55	JB7
K20906		129.5	6800	Base	JB6
			6800-8400	J55	JB7
G11005	1/2	110	4800	Base	JB1
			4800-5600	J50	JB3
G11006			5400-5600	Base	JB3
G11305		125	4900	Base	JB1
			4900-5600	J50	JB3
G11306			5600	Base	JB3
G21005	3/4	110	6400	Base	JB5
G21006			6400	Base	JB5
G21305		125	6400	Base	JB5
G21306			6400	Base	JB5
G31005	1	110	6400-7100	Base	JB6
			6400-8100	J55	JB7
G31305		125	6600-7400	Base	JB6
			6600-8400	J55	JB7
G31306			6600-7400	Base	JB6
			6600-8400	J55	JB7
G31303			6400-8400	Base	JB7
			8900	J55	JB8
G31603		146	8900-10000	Base	JB8

BRAKE SYSTEM APPLICATION (continued)

MODEL	TON RATING	WHEELBASE	GVW RATING	MERCHANDIZING OPTION	BRAKE SYSTEM
P10542	1/2	102	6200	Base	JB5
P20842	3/4	125	6800	Base	JB6
			6800-8000	J55	JB7
P21042		133	6800	Base	JB6
			6800-8000	J55	JB7
P30842	1	125	7600-8200	Base	JB7
			7600-10000	J55	JB8
			12000-14000	H22 or H23	JB9
P30832			7600-12500	Base	JB8
P31042		133	7600-8200	Base	JB7
			7600-10000	J55	JB8
			12000-14000	H22 or H23	JB9
P31132		137	7600-12500	Base	JB8
P31432		158.5	7600-12500	Base	JB8
			14000	HF7 or HF8	JB9
P31442		157	7600-8200	Base	JB7
			7600-10000	J55	JB8
			12000-14000	H22 or H23	JB9
P31832		I78	14000	Base	JB9

STANDARD BRAKES

The 1976 Light Duty Truck standard brake components are essentially the same as those described in the 1974 Light Duty Truck Service Manual. Design modifications, differing from the 1974 manual, are outlined on the following pages.

FRONT DISC BRAKE

Front disc brake rotors do not incorporate an anti-squeal groove in the disc pad contact surfaces (fig. 1).

BRAKE PEDAL ADJUSTMENT

All brake pedal push rods are non-adjustable on 1976 models except Motor Home Chassis Units – see the Hydro-boost section of the 1974 Service Manual.

STOPLAMP SWITCH INSTALLATION (C-K Models)

The stoplamp switch is mounted to a flange protruding from brake pedal support bracket.

Installation (Fig. 2)

1. Install the mounting clip in the brake pedal flange from the pedal side of the flange.
2. Depress the brake pedal and push the switch into the clip until the shoulder on the switch bottoms on the clip.

Adjustment

1. Pull the brake pedal back against switch with 15-20 lbs. force to properly adjust switch.
2. Electrical contact should be made when the brake pedal is depressed 1.00" to 1.24" from its normally released position.

PARKING BRAKE

Parking brake and cable replacement procedures remain the same as described in the 1974 Light Duty Truck Service Manual; however, cable routings, clips or guides incorporate minor changes as noted in Figures 3 thru 5.

PARKING BRAKE ADJUSTMENT

Prestretch Requirement (All Vehicles)

If a new parking brake cable has been installed in the vehicle, it should be prestretched prior to adjustment. With the equalizer installed, apply the parking brake with heavy force and release three times.

Adjustment - Foot Pedal Type

NOTE: Before adjusting parking brake, check service brake condition and adjustment.

1. Raise vehicle on a hoist.
2. Loosen the equalizer adjusting nut.
3. Apply the parking brake 4 notches from the fully released position.
4. Tighten the equalizer adjusting nut until a moderate drag is felt when the rear wheels are rotated forward.

   CAUTION: *See "Caution" on page 1 of this section.*

5. Fully release the parking brake and rotate the rear wheels. No drag should be present.

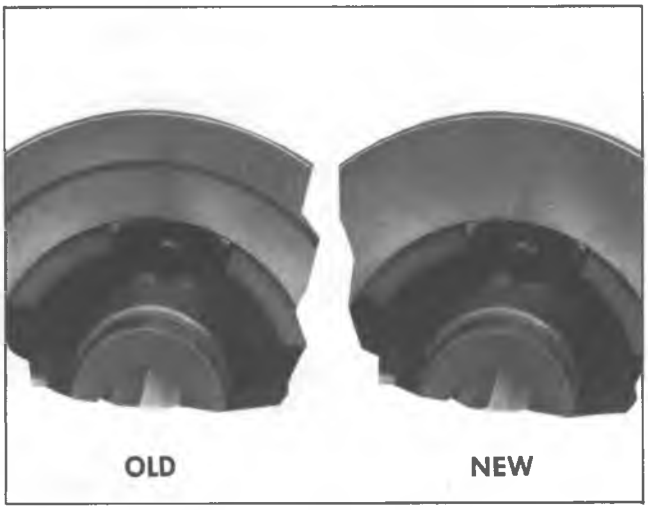


Fig. 1--Disc Brake Rotor

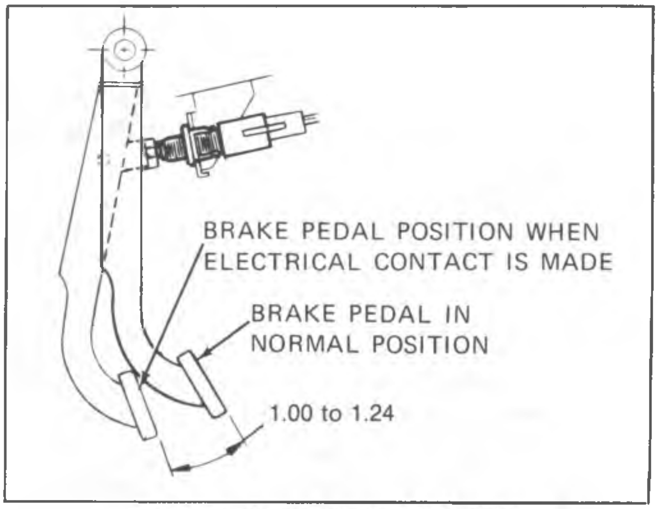


Fig. 2--Stoplamp Switch (C-K Models)

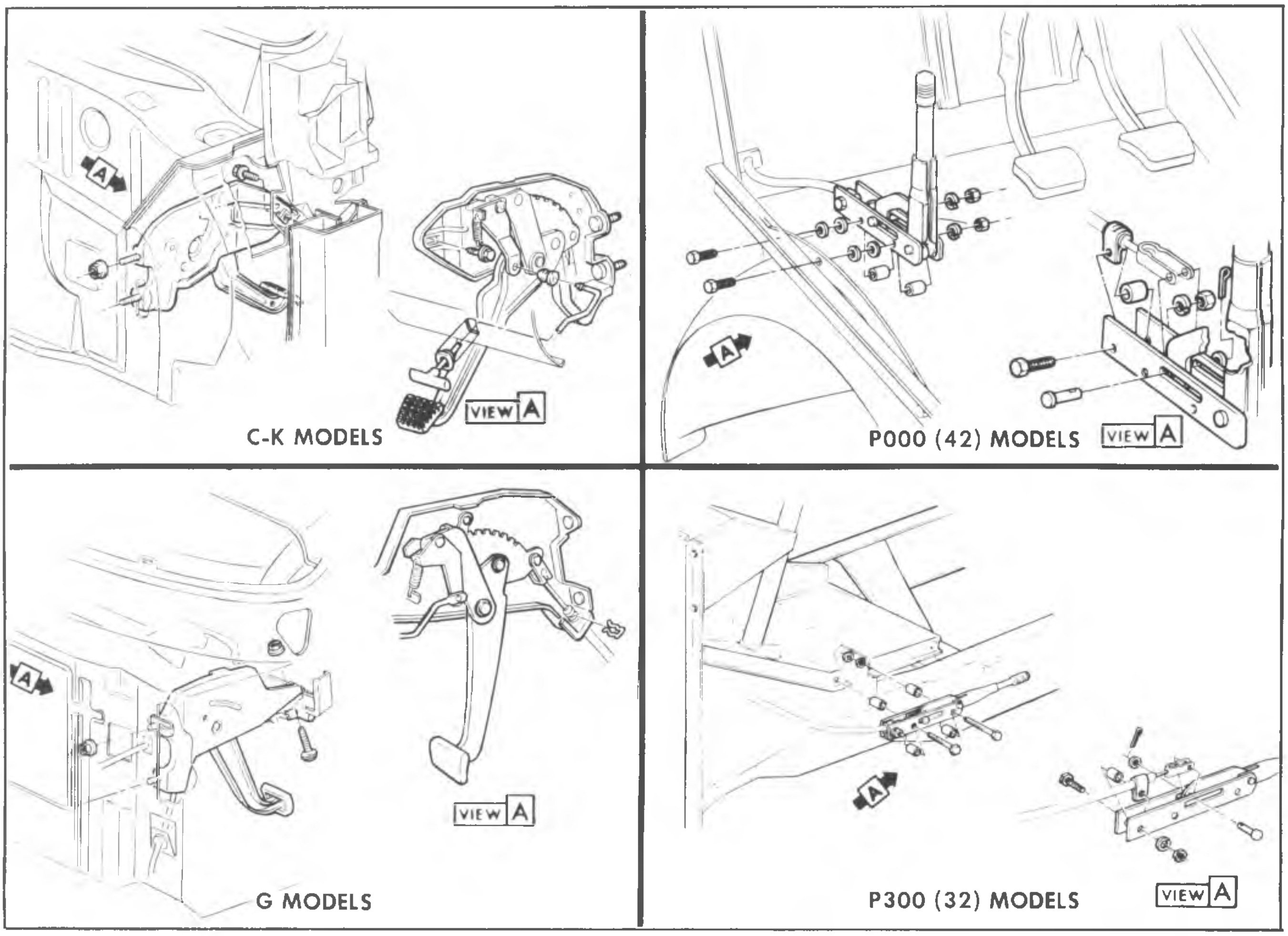


Fig. 3--Parking Brake Assembly--Typical

6. Remove vehicle from hoist.

Adjustment - Orsheln Type

Refer to the 1974 Light Duty Truck Service Manual, page 5-23.

Adjustment - (Propshaft) Internal Expanding Drum On

1. Jack up at least one rear wheel. Block wheels and release hand brake.
2. Remove cotter pin and clevis pin connecting pull rod and relay lever. This will assure freedom for full shoe release.

   CAUTION: *It may be necessary to knock out lanced area in brake drum with punch and hammer to gain entry into adjusting screw through brake drum. Be sure all metal has been removed from parking brake compartment.*

3. Rotate brake drum to bring one of access holes into line with adjusting screw at bottom of shoes (manual transmission), top of shoes (automatic transmission).
4. Expand shoes by rotating adjusting screws with screwdriver inserted through hole in drum. Move outer end of screwdriver away from drive shaft. Continue adjustment until shoes are tight against drum and drum cannot be rotated by hand. Back off adjustment ten notches and check drum for free rotation.
5. Place parking brake lever in fully released position. Take up slack in brake linkage by pulling back on cable just enough to overcome spring tension. Adjust clevis of pull rod or front cable to line up with hole in relay levers.
   a. Insert clevis pin and cotter pin, then tighten clevis locknut.
   b. Install a new metal hole cover in drum to prevent contamination of brake.
   c. Lower rear wheels. Remove jack and wheel blocks.

   CAUTION: *See "Caution" on Page 1 of this section.*

PARKING BRAKE (PROPELLER SHAFT)-INTERNAL EXPANDING

Removal

1. Remove the propeller shaft; see Section 4 of the 1974 Light Duty Truck Service Manual.
2. Remove the brake drum.

   NOTE: It may be necessary to back off the shoe adjustment before removing the drum.

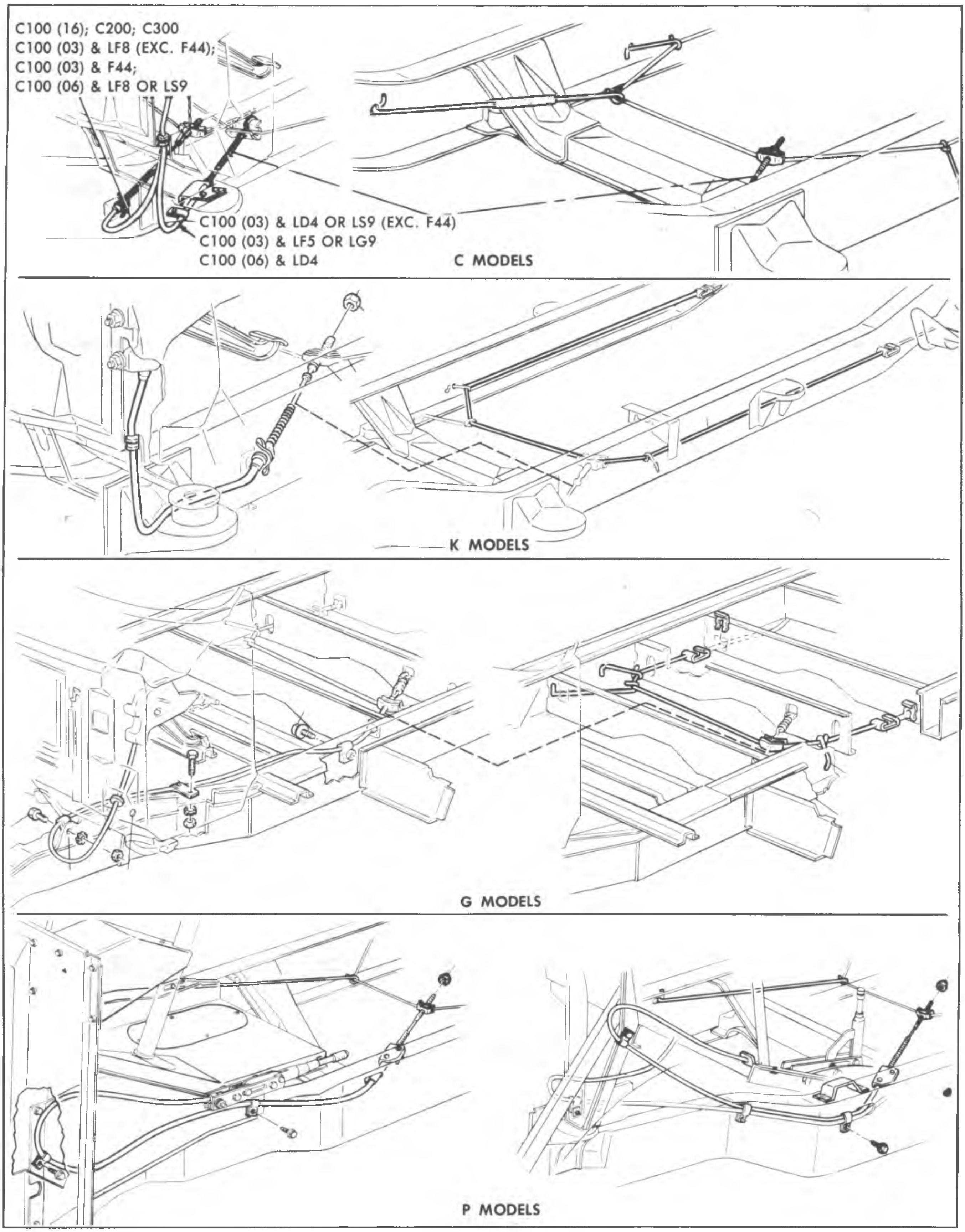


Fig. 4--Parking Brake System (Typical)

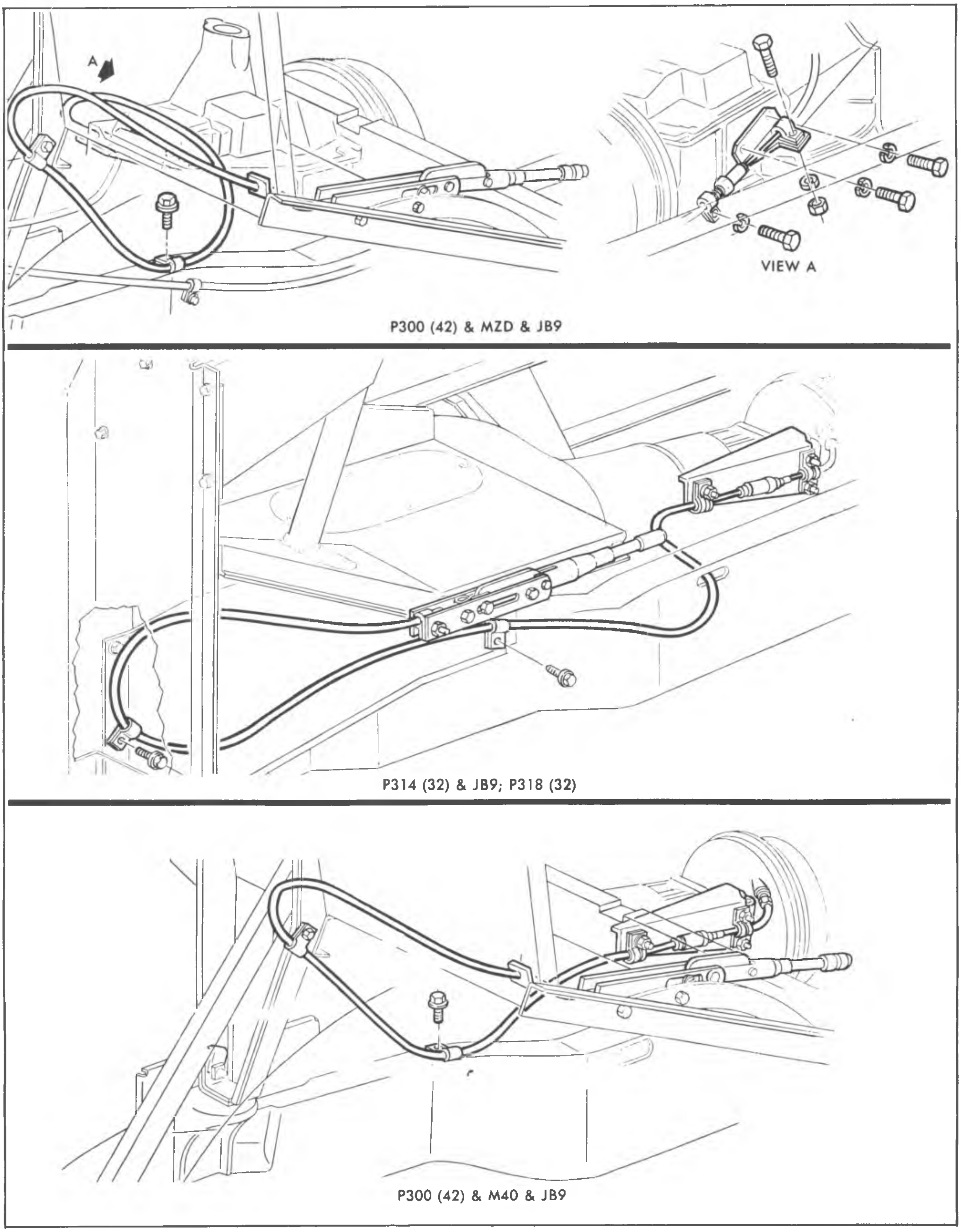


Fig. 5--Parking Brake System (Propshaft)

On automatic transmission models, the exhaust crossover pipe may be in the way. If so, loosen the transmission rear mounting bolts and jack the transmission sufficiently for brake drum to clear the pipe.

3. Remove the two pull back springs.
4. Remove the guide plate from anchor pin.
5. Remove shoe hold down cups, springs, and washers from hold down pins--remove pins.
6. Pull brake shoe and lining assemblies away from anchor pin and remove the strut and spring.
7. Lift the brake shoes and linings with the adjusting nut and bolt and connecting spring off the flange plate.
8. Move the shoes toward each other until the adjusting bolt and connecting spring drop off.
9. Remove the clip holding the brake lever to the primary shoe (shoe with short lining).
10. Compress the spring on the brake cable and remove the cable from the lever.
11. If necessary to remove the anchor pin, straighten the washer from pin hex and reinforcement. Remove reinforcement and washer with anchor pin.
12. If necessary to remove the cable, compress tangs on cable and pull assembly out of the hole in the flange plate.
13. If necessary to remove the flange plate, remove the transmission flange nut and transmission output flange. Remove bolts holding the flange plate to bearing retainer and remove the flange plate.

Inspection

Replace any worn or broken parts.

Installation

1. Place the flange plate in position on the rear bearing retainer and fasten with four bolts. Torque bolts to 24 foot pounds.

   CAUTION: *See "Caution" on Page 1 of this section.*

2. Install transmission output flange on spline of mainshaft and fasten with flange nut. Torque nut to 100 foot pounds.

   CAUTION: *See "Caution" on Page 1 of this section.*

3. Install cable assembly from back of flange plate. Push retainer through hole in flange plate until tangs securely grip the inner side of the plate.
4. Place washer and reinforcement over the threaded end of anchor pin. Hold anchor pin nut (flat side against flange on flange plate) in position behind flange plate and insert threaded end of anchor pin from front side. Thread the anchor pin into nut and tighten securely (140 foot pounds torque). Bend tang of washer over reinforcement and side of washer over hex of anchor pin.

   CAUTION: *See "Caution" on Page 1 of this section.*

5. Install lever on cable by compressing spring and inserting cable in channel of lever. Release spring.
6. Install primary shoe (short lining) to lever as follows: Place pin in lever, place washer on pin and push pin through hole in primary shoe. Fasten parts together by installing the clip in groove of pin.

   CAUTION: *See "Caution" on Page 1 of this section.*

7. Fasten two brake shoes and linings together by installing connecting spring. Move the shoes toward each other and install adjusting screw.
8. Lubricate the flange plate contact surfaces with a very light coat of Delco Brake Lube #5450032 (or equivalent).
9. Place shoe and linings in position on flange plate. NOTE: When facing the brake assembly, the shoe with the short lining should be to the left with the lever assembled to it (automatic transmission, to the right (manual transmission).
10. Pull brake shoes apart and install strut lever and spring between them. The loop on the strut spring should be in the "up" position.
11. Install hold down pins, washers, springs and cups from flange plate to shoes.
12. Place guide plate on anchor pin.
13. Install pull back springs.
14. Remove the "knock out" plug (if necessary) and install a new metal plug in the brake drum adjusting hole.
15. Install the brake drum.
16. Install the propeller shaft.

VACUUM POWER BRAKES

POWER BOOSTER - REPAIR OR REPLACE

CAUTION: *Any time the power brake vacuum booster is removed for repair or replacement, be sure to install a* **NEW** check valve.

HYDRO-BOOST POWER BRAKES

All 1976 hydro-boost vehicles will incorporate an accumulator which is integral with the booster (fig. 6).

INTEGRAL ACCUMULATOR/BOOSTER

The booster power section includes three ports (fig. 6):

1. Pressure Port (11/16-18 thread)--the high pressure line from the power steering pump is connected to this port.
2. Gear Port (5/8-18 thread)--the high pressure line leading to the power steering gear is connected to this port.
3. Return Port (for 3/8 I.D. Hose)--the return line to the power steering pump is connected to this port.

The pressure port and the gear port each contains an aluminum tube seat insert.

The accumulator valve components are assembled in the accumulator valve bore which is machined in the housing. This bore is connected by passages to the accumulator and to the pressure port.

The integral spring accumulator (fig. 7) is used in conjunction with the hydraulic brake booster. The accumulator piston assembly and spring are assembled in the accumulator bore which is machined in the housing.

WARNING: Do not attempt to disassemble or cut into the accumulator. The accumulator contains a spring compressed under high pressure.

BLEEDING HYDRO-BOOST/POWER STEERING HYDRAULIC SYSTEM

The following procedure should be used to bleed the power steering hydraulic system on hydro-boost vehicles.

NOTE: If the power steering fluid has foamed due to low fluid level, it will be necessary to park the vehicle for approximately one hour (reservoir cap loose) so that the foam can dissipate.

1. Raise the front of the vehicle on a hoist so that the tires are clear of the floor.
2. Check reservoir and fill with GM Power Steering Fluid (or equivalent).

NOTE: Leave the reservoir cap off during entire bleed procedure.

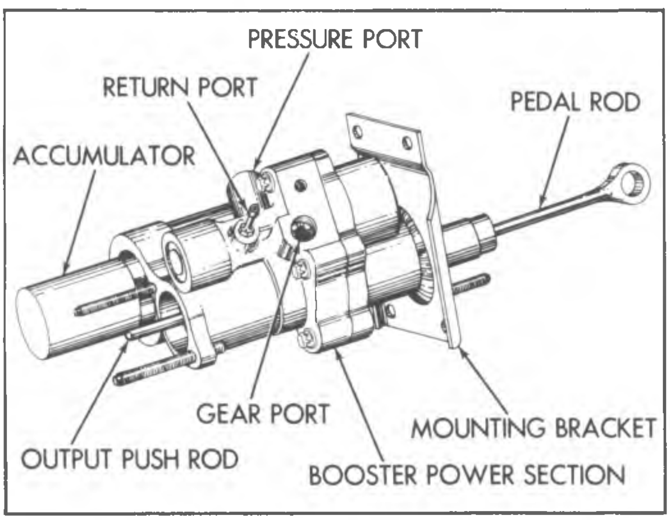


Fig. 6--Hydro-Boost With Integral Accumulator

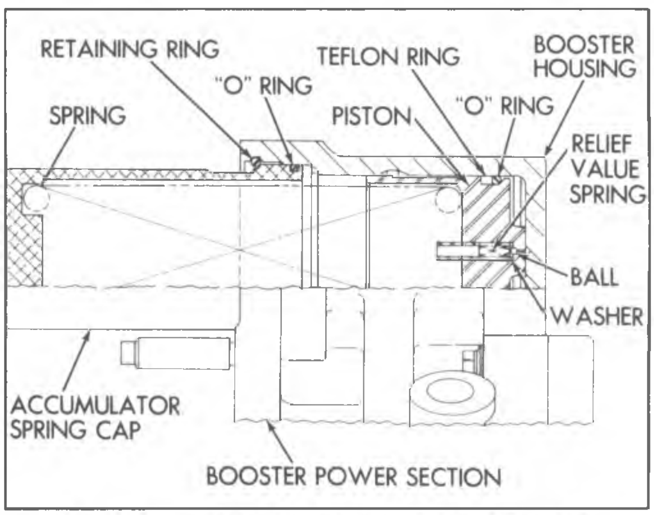


Fig. 7--Accumulator Components (Integral Booster)

3. Install a remote control starter switch so that engine can be cranked but not started.

   CAUTION: *Whenever the engine is cranked remotely at the starter, with a special jumper or other means, the distributor primary lead must be disconnected from the negative post on the coil.*

4. Crank engine for 4 to 5 second intervals while pouring fluid into the reservoir.
5. Fill reservoir and crank as in step 4 until system will no longer accept fluid. It is normal that fluid may spill when cranking stops (it is the result of air in the system trying to escape). To prevent spilling, crank engine.
6. Remove remote control starter switch. Reinstall distributor primary lead.
7. Start engine and allow to run 2 seconds.
8. Check and refill fluid reservoir if necessary.
9. Start engine and depress the brake pedal several times while rotating the steering wheel from stop to stop.
10. Turn engine off and then pump brake pedal 4-5 times to deplete accumulator pressure.
11. Check and refill fluid reservoir if necessary.
12. Repeat Steps 9, 10 and 11. Install pump reservoir cap.
13. Remove vehicle from hoist.

BRAKE PEDAL ADJUSTMENT

All hydro-boost equipped vehicles incorporate non-adjustable brake pedal rods except P30(32) models. Refer to the 1974 Light Duty Truck Service Manual for brake pedal adjustment on P30(32) models.

BOOSTER INSTALLATION

Refer to Figure 8 for booster installation.

HYDRAULIC LINE ROUTING

Refer to Figures 9 thru 11 for typical hydraulic line routings.

Mini-Master Cylinder

1976 G Series trucks (with Hydroboost) and all P Series trucks will incorporate new Bendix mini-master cylinders (fig. 12). Due to the new size, the G series master cylinder is mounted straight out from the dash rather than laterally in the vehicle as in 1975 (fig. 8). Replacement procedures remain basically unchanged to those described in the 1974 Truck Service Manual.

On four-wheel disc brake vehicles (JF9), the brake warning light switch (fig. 6) is an integral part of the mini-master cylinder assembly; it is non-serviceable. A brake line distribution block is located on the frame crossmember. It is not a combination valve; its only function is to act as a distributor for attaching front and rear brake lines.

The component parts of the mini-master cylinder differ from those of a conventional master cylinder although their functions are essentially the same. A disassembled master cylinder is shown in Figure 13.

Note that when the master cylinder is in the released position (fig. 14), the actuator of the secondary piston and the actuator of the primary piston are in contact with the compensating valve stems which project into the cylinder bore. This keeps the valves off of their seat and opens communication between the cylinder bore and the reservoir.

The initial forward movement of the pistons permits the compensating valves to seat which closes communication between the pressure chambers in the cylinder bore and the reservoirs. Any further movement of the pistons builds up pressure which is transmitted to the calipers or wheel cylinders.

Disassembly

1. Remove the reservoir cover and diaphragm, and drain the fluid from the reservoir.
2. Remove the four bolts that secure the body to the reservoir using Socket J-25085.
3. Remove the small "O" ring and the two compensating valve seals from the recessed areas on the bottom side of the reservoir.

   NOTE: Do not remove the two small filters from the inside of the reservoir unless they are damaged and are to be replaced.

4. Depress the primary piston using a tool with a smooth rounded end. Then remove the compensating valve poppets and the compensating valve springs from the compensating valve ports in the master cylinder body

WARNING: It air pressure is used to remove the secondary piston, place the open end of the cylinder bore approximately 1" from a padded workbench or other surface to catch the piston when it comes out of the bore. Apply low air pressure very carefully to ease the piston out of the bore. Never point the open end of the bore at anyone when applying air pressure. The piston may come out of the bore with considerable force and cause personal injury.

5. Using a small screwdriver, remove the snap ring at the end of the master cylinder bore. Then release the piston and remove the primary and secondary piston assemblies from the cylinder bore. It may be necessary to plug the front outlet port and to apply low air pressure to the front compensating valve port to remove the secondary piston assembly.

Cleaning and Inspection

Wash all parts to be re-used in clean brake fluid. Be sure that all foreign matter is removed from the filters in the bottom of the reservoir. If the filters do not clean up, they must be replaced.

After cleaning, inspect the parts for damage and excessive wear, and replace as required.

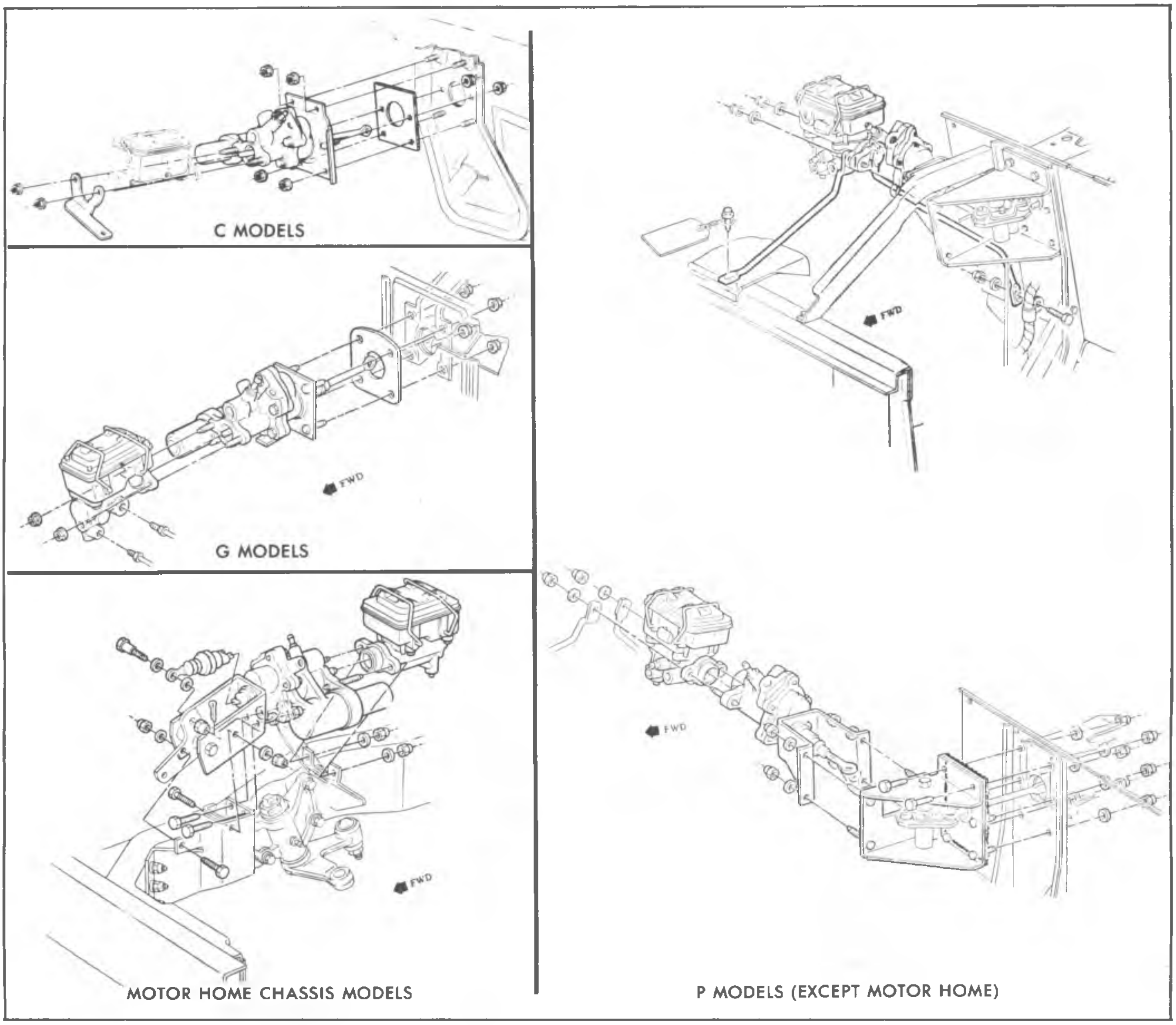


Fig. 8--Hydro-Boost Installation

Assembly

1. Lubricate the secondary piston assembly and the master cylinder bore with clean brake fluid.
2. Assemble the secondary spring (shorter of the two springs) in the open end of the secondary piston actuator, and assemble the piston return spring (longer spring) on the projection at the rear of the secondary piston.
3. Insert the secondary piston assembly, actuator end first, into the master cylinder bore, and press assembly to the bottom of the bore.
4. Lubricate the primary piston assembly with clean brake fluid. Insert the primary piston assembly, actuator end first, into the bore.
5. Place the snap ring over a smooth round ended tool and depress the pistons in the bore.
6. Assemble the retaining ring in the groove in the cylinder bore.
7. Assemble the compensating valve seals and the small "O" ring seal in the recesses on the bottom of the reservoir. Be sure that all seals are fully seated.
8. While holding the pistons depressed, assemble the compensating valve springs and the compensating valve poppets in the compensating valve ports.
9. Holding the pistons compressed, position the reservoir on the master cylinder body and secure with the four mounting bolts. Tighten the bolts to 12-15 ft. lbs.

Bench Bleeding

1. Plug the outlet ports and fasten the master cylinder in a vise with the front end tilted slightly down.
2. Fill the reservoir with clean brake fluid. Use any tool with a smooth rounded end to depress and release the

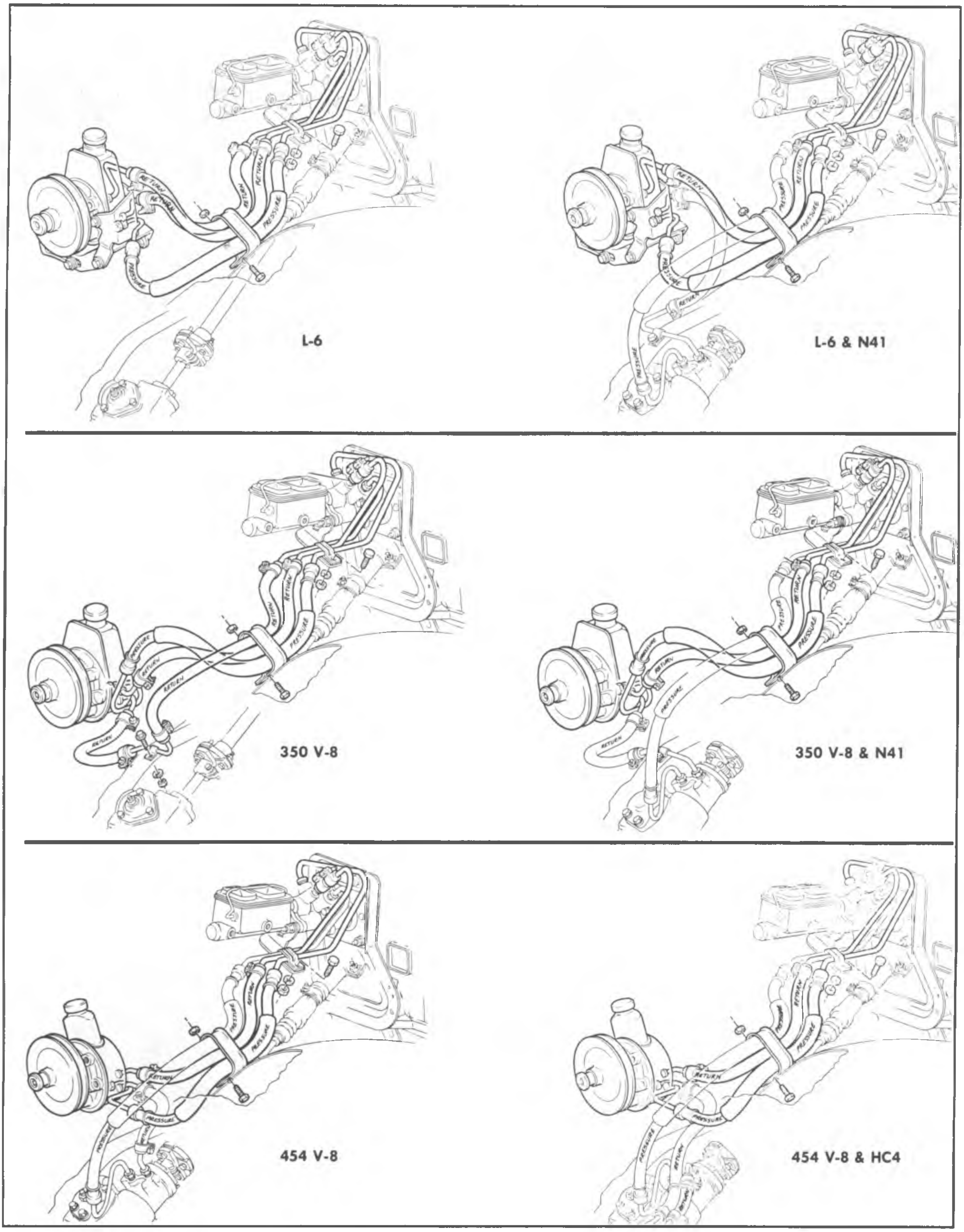


Fig. 9--Power Steering Hose Routing - C Models

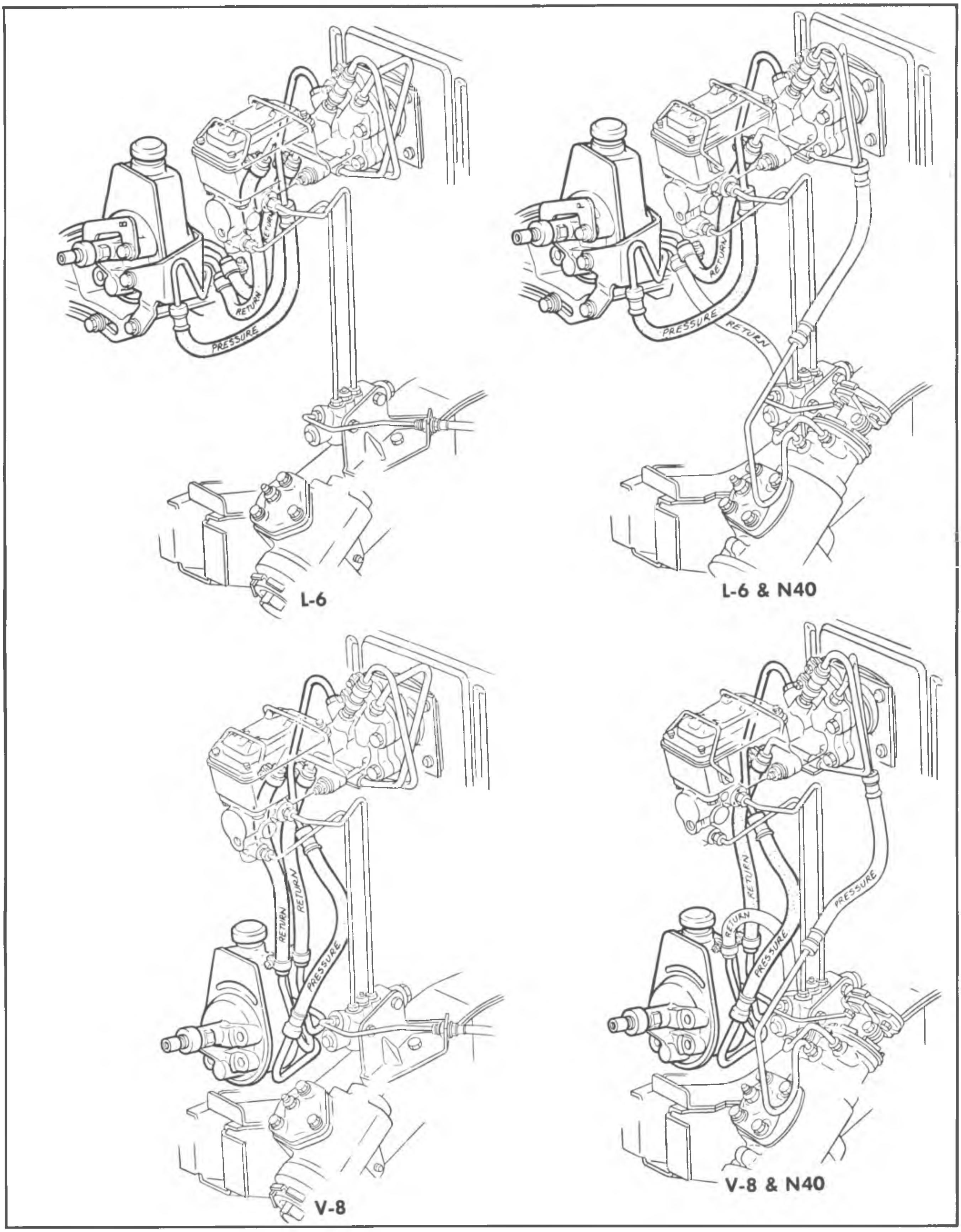


Fig. 10--Power Steering Hose Routing - G Models

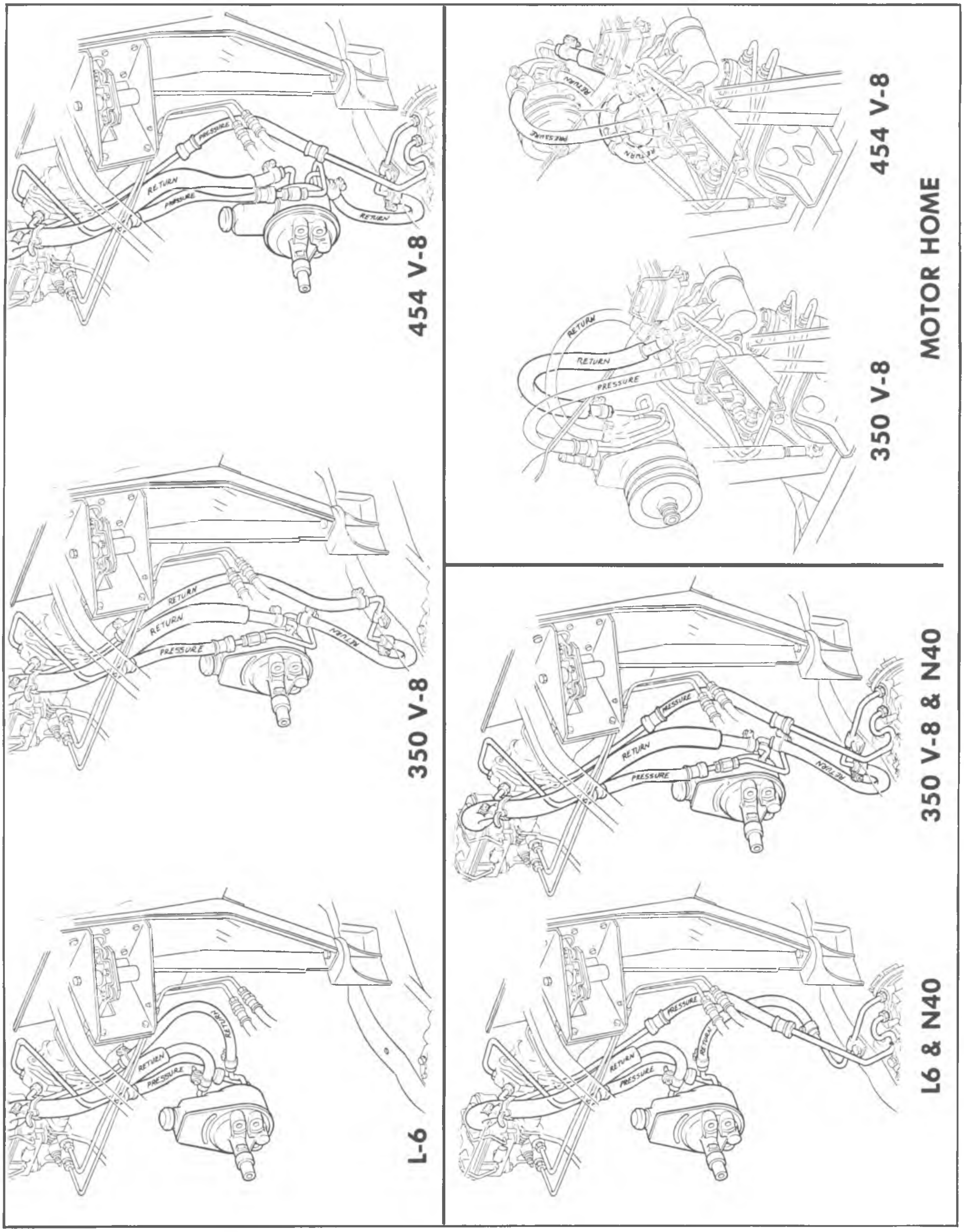


Fig. 11--Power Steering Hose Routing - P Models

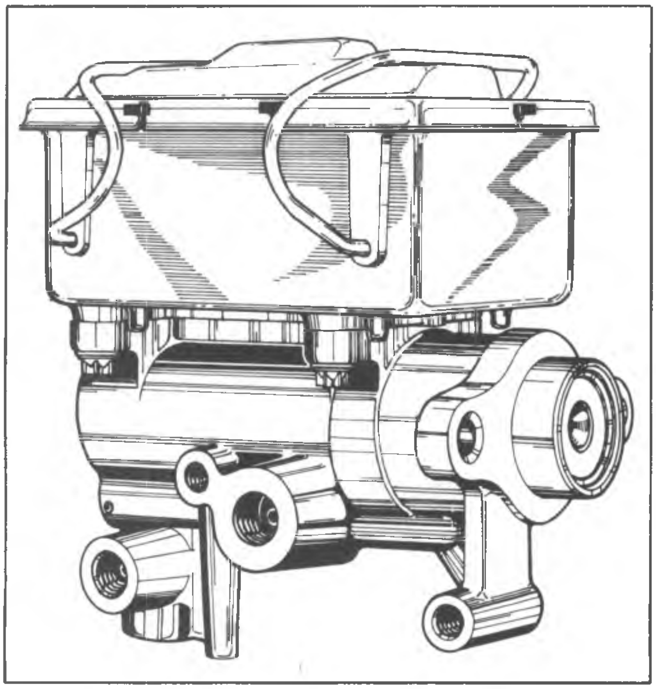


Fig. 12--Bendix Mini-Master Cylinder

primary piston several times.

3. Reposition the master cylinder in the vise with the front end tilted slightly up. Again, depress and release the primary piston several times.
4. Assemble the diaphragm and cover on the master cylinder.

   NOTE: The master cylinder is ready for installation on the vehicle. Normal bleeding procedures should be followed after the master cylinder is installed.

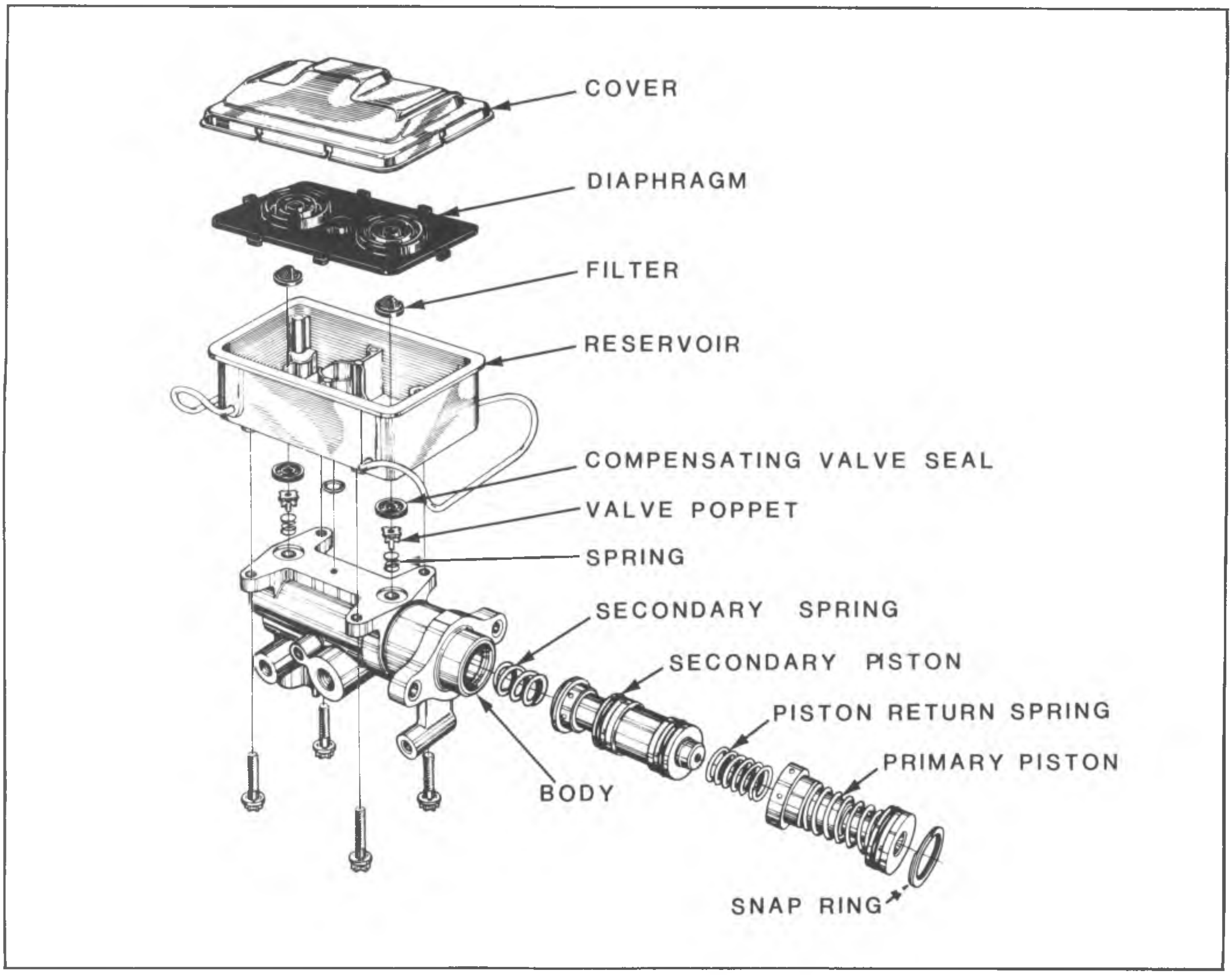


Fig. 13--Mini-Master Cylinder - Exploded View

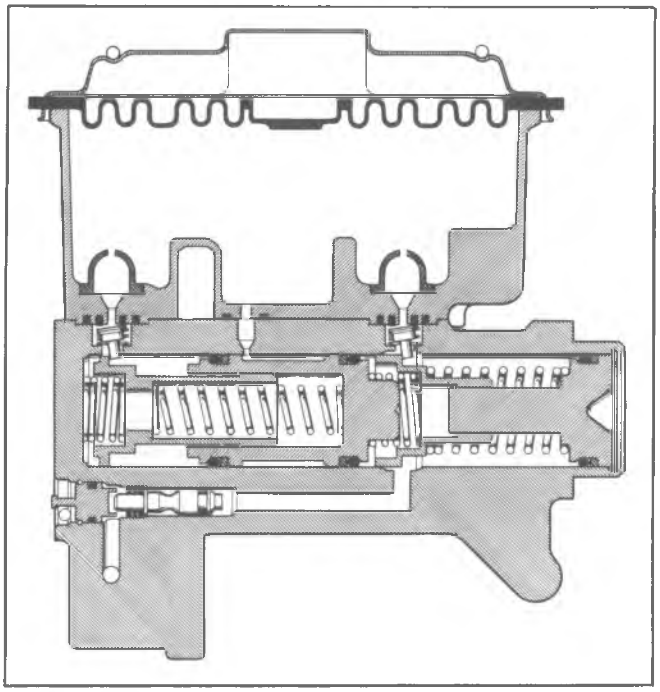


Fig. 14--Master Cylinder In Released Position

DIAGNOSIS - HYDRO - BOOST SYSTEM

NOTE: *Before checking the hydraulic power booster for the source of trouble, refer to the trouble diagnosis procedures for Standard Brakes. After these possible causes have been eliminated, check for the probable cause and remedy as outlined below:*

Normal Operating Characteristics

Brake pedal application of the Hydro-boost system differs in some respects from a vacuum type power brake system in the following manner:

1. On pedal application until booster run-out, slight power steering pump noise may be heard.
2. Pedal application through run-out will not necessarily be smooth due to the internal ratio change. It is possible to push the pedal past run-out because of the higher pedal ratio. At run-out of the vacuum booster the pedal just becomes hard.
3. On the first full application of the brake pedal, a slight hissing sound may be heard. The hiss is the accumulator charging and the noise should go away in a short period of time.
4. On a spike brake application, a slight pedal kick-back may be felt.
5. If the vehicle is started with the pedal depressed, the pedal will fall away slightly then return back to approximately the original position.

NO BOOST - HARD PEDAL

Preliminary Check

With the engine stopped, depress the brake pedal several times to eliminate all accumulator reserve from the system.

Hold the brake pedal depressed with medium pressure (25 to 35 lbs.), start the engine. If the unit is operating correctly, the brake pedal will fall slightly and then push back against the driver's foot, remaining at about the same position. If the booster is not operating correctly, the trouble may be one of the following causes:

Probable Cause	Remedy
1. Loose or broken power steering pump belt.	1. Tighten or replace the belt.
2. No fluid in power steering reservoir.	2. Fill reservoir and check for external leaks.
3. Leaks in power steering, booster or accumulator hoses.	3. Replace defective parts.
4. Leaks at tube fittings, power steering, booster or accumulator connections.	4. Tighten fittings or replace tube seats, if defective.
5. External leakage at accumulator.	5. Replace booster.
6. Faulty booster piston seal causing leakage at booster flange vent.	6. Replace all booster seals.
7. Faulty booster input rod seal with leakage at input rod end.	7. Replace all booster seals.
8. Faulty booster cover seal with leakage between housing and cover.	8. Replace all booster seals.
9. Faulty booster spool plug seal.	9. Replace all booster seals.
10. Internal leakage in booster.	10. Replace booster.
11. Contamination in power steering fluid.	11. Flush power steering system and replace with new fluid.
12. Hydraulic lines routed incorrectly.	12. Re-route lines.

DIAGNOSIS - HYDRO - BOOST SYSTEM

SLOW BRAKE PEDAL RETURN

Probable Cause	Remedy
1. Excessive seal friction in booster.	1. Replace all booster seals.
2. Faulty spool action.	2. Clean spool and replace all booster seals.
3. Broken piston return spring.	3. Replace spring.
4. Restriction in return line from booster to pump reservoir.	4. Replace line.
5. Broken spool return spring.	5. Replace spring.
6. Excessive pedal pivot friction.	6. Lubricate pivot bushings with Delco Brake Lube #5450032 (or equivalent) or replace bushings.

GRABBY BRAKES

Probable Cause	Remedy
1. Broken spool return spring.	1. Replace spring.
2. Faulty spool action caused by contamination in system.	2. Inspect, clean and replace all booster seals.
3. No cargo body on chassis.	3. Normal condition.

BOOSTER CHATTERS - PEDAL VIBRATES

Probable Cause	Remedy
1. Power steering pump belt slips.	1. Tighten belt.
2. Low fluid level in power steering pump reservoir.	2. Fill reservoir and check for external leaks.
3. Faulty spool operation caused by contamination in system.	3. Inspect, clean and replace all booster seals.
4. Excessive contamination in power steering fluid.	4. Flush power steering fluid from system and replace with new power steering fluid.
5. Air in power steering fluid.	5. Allow vehicle to stand for approximately one hour; then bleed power steering hydraulic system as described earlier in this section.

DIAGNOSIS - HYDRO-BOOST SYSTEM

POWER STEERING PUMP NOISE ON BRAKE APPLY

Probable Cause	Remedy
1. Insufficient fluid in pump reservoir.	1. Fluid level decreases approximately 1/2" on brake apply-refill to proper level. If fluid is foamy, let vehicle stand for approximately one hour; then bleed power steering hydraulic system as outlined earlier in this section.

BRAKE PEDAL PULLS DOWN SLIGHTLY ON ENGINE START

Probable Cause	Remedy
1. Restriction in gear or booster return lines.	1. Replace lines or reposition lines to eliminate restriction.

ACCUMULATOR LEAKDOWN - SYSTEM DOES NOT HOLD CHARGE

Preliminary Check

Start engine and turn the steering wheel until the wheels contact the wheel stops lightly. Hold for a maximum of five seconds. Then release the steering wheel and turn off the engine.

Depress and release the brake pedal. There should be a minimum of three power assisted brake applications before a hard pedal is obtained.

Re-start the engine and turn the steering wheel until the wheels contact the wheel stops lightly. There should be a light hissing sound as the accumulator is charged. Hold steering wheel lightly against stop for a maximum of five seconds. Then release the steering wheel, and turn off the engine.

Wait one hour and apply brake pedal (do not re-start the engine). There should still be a minimum of three power assisted brake applications before obtaining a hard pedal.

If either of these preliminary checks shows that the accumulator is not holding its charge, the trouble may be one of the following causes.

Probable Cause	Remedy
1. External leakage at accumulator welds.	1. Replace booster assembly.
2. Internal leakage in accumulator (past piston seal or relief valve).	2. Replace booster.
3. Internal leakage at booster accumulator valve (if accumulator is not leaking externally or internally).	3. Replace all booster seals and accumulator valves.

SECTION 6

ENGINE

CONTENTS OF THIS SECTION

ENGINE TUNE-UP

Refer to 1974 Service Manual for the following engine tune-up procedures:

- **Spark Plug Service**
- **Compression Test**
- **Ignition Service**
- **Battery Service**
- **Generator Service**
- **Drive Belts Service**
- **Fuel Lines and Fuel Filter Service**
- **Cooling System Service**
- **Instrument Check-Out**
- **Additional Checks and Adjustments**

CAUTION: *When performing engine diagnosis or tune-up on 1976 vehicles equipped with catalytic converters, DO NOT use the "Cylinder Balance Test" as described in 1974 Service Manual as damage to the emission control system may occur. Disregard all references to performing a Cylinder Balance Test on 1976 vehicles that may be found in past or present model service publications.*

FUEL SYSTEM SERVICE

Refer to Section 6M of this publication for fuel system, timing, idle speed and carburetor adjustment service procedures.

EMISSION SYSTEM SERVICE

Refer to Section 6T of this publication for servicing emission system related components.

IGNITION SYSTEM SERVICE

Refer to Section 6Y of this publication for servicing High Energy Ignition (HEI) system.

VEHICLE MAINTENANCE

During engine tune-up, the Complete Vehicle Maintenance Schedule (or Section 0 of this manual) should be checked and all required checks and services should be performed.

ENGINE MECHANICAL

IN-LINE ENGINES

COMPONENT REPLACEMENT AND ADJUSTMENT

EXHAUST MANIFOLD ASSEMBLY

Removal

1. Remove air cleaner.
2. Remove power steering pump and/or A.I.R. pump brackets (if so equipped).
3. Remove EFE valve bracket.
4. Disconnect throttle controls and throttle return spring.
5. Disconnect exhaust pipe at manifold flange.
6. Remove manifold attaching bolts; then, remove manifold and discard gasket.
7. Check for cracks in manifold assembly.

Installation

1. Clean gasket surfaces on cylinder head and mainfold.
2. Position new gasket on exhaust manifold.
3. Install manifold assembly bolts, while holding manifold assembly in place.
4. Clean, oil and torque all manifold to cylinder head bolts and nuts to specifications (fig. 1A).

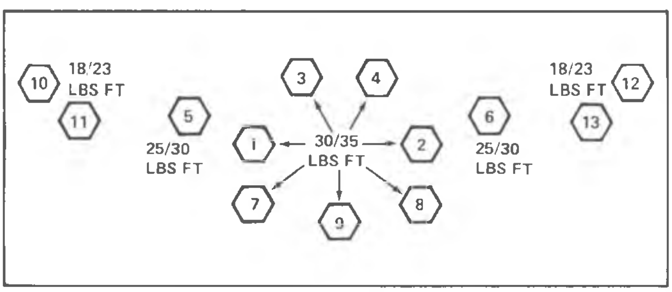


Fig. 1A--Exhaust Manifold to Cylinder Head Bolt Tightening Sequence and Torque

5. Connect exhaust pipe to manifold.
6. Connect throttle controls and throttles return spring.
7. Install air cleaner, start engine and check for leaks.

OIL PAN

Removal (Fig. 4L)

1. Disconnect battery negative cable.
2. Remove radiator upper mounting panel.
3. Place a piece of heavy cardboard between fan and radiator.
4. Raise vehicle on hoist.
5. Drain engine oil.
6. Remove starter on manual transmission equipped vehicles.
7. Remove either flywheel underpan or converter housing underpan and splash shield.
8. Remove "through" bolts from engine front mounts.
9. Use a jacking device and raise engine approximately three inches.
10. Install "through" bolts in engine mount and tighten through bolts retaining nuts just enough to prevent bolts from slipping out.
11. Lower engine until through bolts are resting on frame portion of engine mounts and then remove jacking device.
12. Remove screws securing oil pan to engine and then remove oil pan.

Installation (Fig. 4L)

1. Thoroughly clean all gasket sealing surfaces.
2. Use a new gasket set and install rear pan seal in rear main bearing cap.
3. Install front pan seal on crankcase cover, pressing tips into holes provided in cover.
4. Install side gaskets to engine block, using gasket sealer with sufficient body to act as a retainer.
5. Install oil pan by reversing the removal steps and tightening all retaining screws to specifications.

Fig. 4L--Oil Pan Replacement

ENGINE MECHANICAL

V-8 ENGINES

GENERAL INFORMATION

All vehicles utilize a high energy ignition system. Using this system, the conventional external ignition coil and other related components are eliminated.

Except for the following changes, all information listed in Section 6 Engine of the 1974 Light Truck Service Manual is applicable to the 1976 model.

COMPONENT REPLACEMENT AND ADJUSTMENT

INTAKE MANIFOLD

The intake manifold removal and installation procedure remains basically the same except that a new carburetor heat choke tube assembly is used. Upon transfering components on manifold replacement operation the choke tube assembly must be removed and (with a new gasket) transfered to new manifold.

CRANKCASE FRONT COVER

The installation procedure for the small V8 crankcase front cover has been revised. The removal procedure as outlined on page 6-46 of the 1974 Light Truck Service Manual remains the same. The revised installation procedure is as follows:

Installation

1. Clean gasket surface on block and crankcase front cover.
2. Use a sharp knife or other suitable cutting tool, to remove any excess oil pan gasket material that may be protruding at the oil pan to engine block junction.
3. Apply a 1/8" bead of silicone rubber sealer, part number 1051435 (or equivalent) to the joint formed at the oil pan and cylinder block, as well as the entire oil pan front lip (fig. 1R).
4. Apply a 1/8" bead of silicone rubber sealer, part number 1051435 (or equivalent) to the bottom of the seal and place in position on cover.
5. Loosely install cover-to-block.

   NOTE: Insert the top four bolts loosely (approximately 3 turns). Install two 1/4-20 x 1/2" screws one on each side at the lower hole in the front cover. Apply a bead of silicone sealer on the bottom of the seal and install on cover (fig. 2R).

Fig. 1R–Areas to Apply Front Cover Sealant

6. Tighten screws alternately and evenly while using drift or other suitable tool to align dowel pins in block to corresponding holes in cover (fig. 3R).
7. Remove the two 1/4-20x 1/2" screws previously used to draw up cover and install remaining cover screws.
8. Complete installation as outlined in the 1974 Light Truck Service Manual.

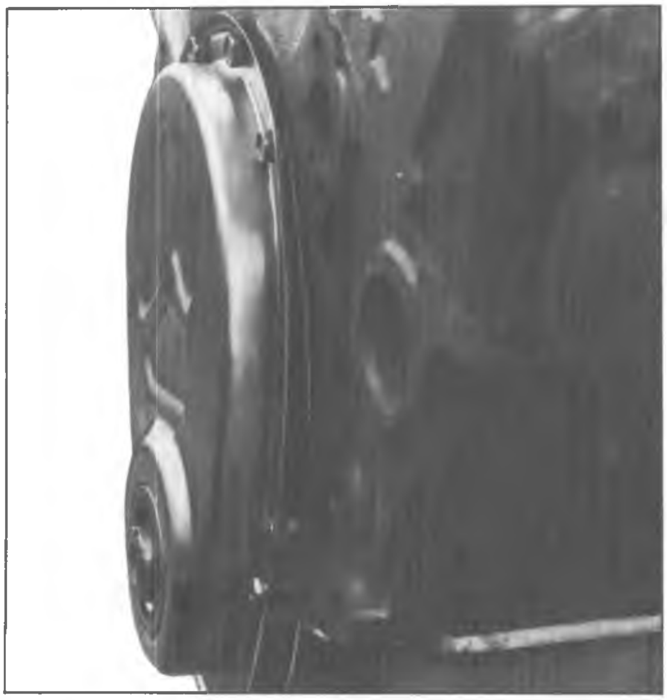


Fig. 2R–Installing Front Cover and Seal

Fig. 3R–Aligning Cover to Dowel Pins

DIAGNOSIS

ENGINE FAILS TO START

a. Clean and tighten loose battery terminal connections. Using battery hydrometer, check specific gravity, if low, recharge battery. Check battery state of charge indicator on Freedom type battery.

b. Check for broken or loose ignition wires and/or ignition switch and repair or replace as necessary.

c. Remove moisture from spark plug wires and/or distributor cap.

d. Inspect condition of distributor cap and rotor. Replace if damaged or cracked.

e. Check inspect and regap spark plugs. Replace as necessary.

f. Check for weak or faulty HEI System Coil as outlined in Section 6Y of this manual.

g. Check carburetor float level, operation of secondary vacuum break solenoid, air valve and enrichment system as outlined in Section 6M of this manual.

h. Inspect carburetor fuel filter for presence of water and/or impurities. Correct as necessary.

i. Check choke mechanism for proper operation. Any binding condition which may have developed due to petroleum gum formation on the choke shaft or from damage should be corrected.

j. Check fuel pump for leaks and proper operation. Correct as necessary.

k. Check operation of starter motor and solenoid. Repair or replace as necessary.

l. Inspect park or neutral safety switch. Adjust or replace as necessary.

m. Check operation of EFE valve as outlined in Section 6T of this manual. Repair or replace as necessary.

n. Check for air or vacuum leaks. Correct as necessary.

ENGINE LOPES WHILE IDLING

a. Check for vacuum leaks and correct as necessary.

b. Check for blown head gasket and repair as necessary.

c. Inspect condition of camshaft, timing chain and/or sprockets. Replace as necessary.

d. Check engine operating temperature and correct as necessary.

e. Check the PCV system for satisfactory operation. Correct as necessary.

f. Check fuel pump for leaks and proper operation. Correct as necessary.

g. Check operation of Exhaust Gas Recirculation valve. Repair or replace as necessary.

h. Check ignition timing and operation of the H.E.I. system as outlined in Section 6Y of this manual. Correct as necessary.

i. Check carburetor for incorrect idle speed, defective altitude compensator, sticking choke or enrichment system and adjust, repair or replace as necessary.

j. Check operation of EFE valve as outlined in Section 6T of this manual. Repair or replace as necessary.

k. Check inspect and regap spark plugs. Replace if necessary.

ENGINE MISSES WHILE IDLING

a. Check, inspect and regap spark plugs. Replace as necessary.

b. Remove moisture from spark plug wires and/or distributor cap.

c. Check for broken or loose ignition wires. Repair or replace as necessary.

d. Check condition of cylinders for uneven compression. Repair as necessary.

e. Check for weak or faulty HEI system coil as outlined in Section 6Y of this manual.

f. Inspect condition of distributor cap and rotor. Replace if damaged or cracked.

g. Check carburetor for internal obstructions, incorrect idle speed, faulty altitude, compensator sticking choke or enrichment system and adjust, repair or replace as necessary.

h. Inspect carburetor fuel filter for presence of water and/or impurities and correct as necessary.

i. Check carburetor mounting gasket for air leaks. Repair as necessary.

j. Check distributor spark advance mechanism for proper operation. Repair or replace as necessary.

k. Inspect valve train components. Adjust, repair and/or replace as necessary.

l. Check engine for low compression. Repair as necessary.

m. Check operation of exhaust gas recirculation valve. Repair or replace as necessary.

n. Check ignition timing, and condition of ignition system as outlined in Section 6Y of this manual. Correct as necessary.

o. Check for vacuum leaks. Correct as necessary.

p. Check operation of EFE valve as outlined in Section 6T of this manual. Repair or replace as necessary.

ENGINE MISSES AT VARIOUS SPEEDS

a. Inspect carburetor fuel filter for presence of water and/or impurities. Correct as necessary.

b. Check fuel system for leaks, plugged fuel lines incorrect fuel pump pressure and/or plugged carburetor jets. Correct as necessary.

c. Check ignition timing. Correct as necessary.

d. Check for excessive play in distributor shaft. Repair or replace as necessary.

e. Check for weak or faulty H.E.I. system coil as outlined in Section 6Y of this manual.

f. Check, inspect and regap spark plugs. Replace as necessary.

g. Detonation and pre-ignition may be caused by using sub-standard fuel. Correct as necessary.

h. Check for weak valve springs and condition of camshaft lobes. Repair or replace as necessary.

i. Check engine operating temperature. Correct as necessary.

j. Check operation of exhaust gas recirculation valve. Repair or replace as necessary.

k. Inspect distributor cap for evidence of carbon tracking. Replace if necessary.

l. Check for faulty altitude compensator and incorrect carburetor adjustments. Correct as necessary.

m. Check for vacuum leaks. Correct as necessary.

n. Check operation of EFE valve as outlined in Section 6T of this manual. Repair or replace as necessary.

ENGINE STALLS

a. Check carburetor for incorrect and/or misadjusted idle speed, float level, leaking needle and seat, air valve, sticking choke or enrichment system and secondary vacuum break operation. Adjust, repair or replace as necessary.

b. Inspect carburetor fuel filter for presence of water and/or impurities. Correct as necessary.

c. Check H.E.I. system as outlined in Section 6Y of this manual.

d. Check, inspect and regap spark plugs. Replace as necessary.

e. Check distributor spark advance mechanism for proper operation. Repair or replace as necessary.

f. Inspect exhaust system for restrictions. Correct as necessary.

g. Check carburetor mounting gasket for air leaks. Repair as necessary.

h. Check and adjust valve lash.

i. Check for burned, warped or sticking valves. Repair or replace as necessary.

j. Check engine for low compression. Repair as necessary.

k. Check engine operating temperature. Correct as necessary.

l. Check for loose, corroded or leaking wiring connections (bulk-head connectors etc.) Repair as necessary.

m. Check operation of exhaust gas recirculation system. Repair or replace as necessary.

n. Check fuel system for leaks and/or obstructions. Repair as necessary.

o. Check for vacuum leaks. Correct as necessary.

p. Check operation of EFE valve as outlined in Section 6T of this manual. Repair or replace as necessary.

ENGINE HAS LOW POWER

a. Check for weak or faulty H.E.I. system coil as outlined in Section 6Y of this manual.

b. Check ignition timing. Correct as necessary.

c. Check for excessive play in distributor shaft. Repair or replace as necessary.

d. Check, inspect and regap spark plugs. Replace as necessary.

e. Check carburetor for incorrect and/or misadjusted idle speed, float level, leaking needle and seat, air valve and sticking choke or enrichment system. Adjust, repair or replace as necessary.

f. Inspect carburetor fuel filter for presence of water and/or impurities. Correct as necessary.

g. Check fuel pump for leaks and proper operation. Correct as necessary.

h. Check for sticking valves, weak valve springs, incorrect valve timing, lifter noise and worn camshaft lobes. Adjust, repair or replace as necessary.

i. Check for insufficient piston to bore clearance. Correct as necessary.

j. Check condition of cylinders for uneven compression and/or blown head gasket. Repair as necessary.

k. Check power steering flow control valve operation. Repair or replace as necessary.

l. Check for clutch slippage (vehicles with manual transmissions) and adjust or replace as necessary.

m. Check hydraulic brake system for proper operation. Correct as necessary.

n. Check engine operating temperature. Correct as necessary.

o. Check pressure regulator valve (automatic transmission) for proper operation. Repair as necessary.

p. Check transmission fluid level. Correct as necessary.

q. Loss of power may be caused by using sub-standard fuel. Correct as necessary.

r. Check operation of EFE valve as outlined in Section 6T of this manual. Repair or replace as necessary.

s. Check operation of diverter valve (A.I.R. system). Repair or replace as necessary.

t. Check for engine vacuum leaks. Correct as necessary.

ENGINE DIESELING ON SHUT OFF

a. Check base idle speed for improper adjustment and correct as necessary.

b. Check ignition timing and reset to specifications if required.

c. Check idle mixture setting and correct as necessary.

d. Check accelerator and choke linkage operation and correct as necessary.

e. Check engine operating temperature and correct as necessary.

f. Check thermac valve for sticking and correct as necessary.

ENGINE DETONATION

a. Check for overadvanced ignition timing and/or faulty ignition system and correct as necessary.

b. Check for loose or improper application of spark plugs, or spark plugs with cracked or broken ceramic cores and replace as necessary.

c. Check for the use of sub-standard fuel and correct as necessary.

d. Check for foreign material in fuel lines and/or carburetor and correct as necessary.

e. Check for restricted fuel delivery to carburetor (pinched lines, faulty fuel tank cap or pick-up) and correct as necessary.

f. Check fuel pump operation and replace if necessary.

g. Check EFE system operation and repair or replace as necessary.

h. Check EGR system operation and correct as necessary.

i. Check thermostatically controlled air cleaner operation and correct as necessary.

j. Check P.C.V. system operation and correct as necessary.

k. Check for vacuum leaks and repair or replace as necessary.

l. Check engine operating temperature and correct as necessary.

m. Check for excessive combustion chamber deposits and correct as necessary.

n. Check for leaking, sticking, or broken valves and repair or replace as necessary.

EXTERNAL OIL LEAKAGE

a. Check for improperly seated or fuel pump gasket. Replace as necessary.
b. Check for improperly seated or broken push rod cover gasket. Replace as necessary.
c. Check for improperly seated or broken oil filter gasket. Replace as necessary.
d. Check for broken or improperly seated oil pan gasket. Replace as necessary.
e. Inspect gasket surface of oil pan to be bent or distorted. Repair or replace as necessary.
f. Check for improperly seated or broken timing chain cover gasket. Replace as necessary.
g. Inspect timing cover oil seal. Replace if necessary.
h. Check for worn or improperly seated rear main bearing oil seal. Replace if necessary.
i. Inspect for loose oil line plugs. Repair or replace if necessary.
j. Check for engine oil pan drain plug improperly seated. Correct as necessary.
k. Inspect camshaft rear bearing drain hole for obstructions. Correct as necessary.
l. Check for loose rocker arm cover, broken, or cover distorted or bent. Correct as necessary.
m. Check EFE valve switch for leakage. Replace if necessary.
n. Check oil pressure switch for leakage. Replace if necessary.

EXCESSIVE OIL CONSUMPTION DUE TO OIL ENTERING COMBUSTION CHAMBER THROUGH HEAD AREA

a. Check for intake valve seals to be damaged, missing or loose. Repair or replace as necessaary.
b. Check for worn valve stems or guides. Repair as necessary.
c. Inspect for plugged oil drain back holes in head. Correct as necessary.
d. Inspect PCV system operation. Correct as necessary.

EXCESSIVE OIL CONSUMPTION DUE TO OIL ENTERING COMBUSTION CHAMBER BY PASSING PISTON RINGS

a. Check engine oil level too high. Correct as necessary.
b. Check for excessive main or connecting rod bearing clearance and correct as necessary.
c. Check for piston ring gaps not staggered and correct as necessary.
d. Check for incorrect size rings installed and correct as necessary.
e. Check for piston rings out of round, broken or scored and replace as necessary.
f. Inspect insufficient piston ring tension due to engine overheating and replace as necessary.
g. Check for ring grooves or oil return slots clogged and corrected as necessary.
h. Inspect rings sticking in ring grooves of piston and correct as necessary.
i. Inspect ring grooves worn excessively in piston and correct as necessary.
j. Inspect compression rings installed upside down and correct as necessary.
k. Check for excessively worn or scored cylinder walls and correct as necessary.
l. Inspect oil too thin and replace if necessary.
m. Inspect mis-match of oil ring expander and rail and correct as necessary.

NO OIL PRESSURE WHILE IDLING

a. Check faulty oil gauge sending unit, and correct as necessary.

b. Check for oil pump not functioning properly. (Regulator ball stuck in position by foreign material) and correct as necessary.

c. Inspect for excessive clearance at main and connecting rod bearings and correct as necessary.

d. Inspect for loose camshaft bearings and correct as necessary.

e. Inspect leakage at internal oil passages and correct as necessary.

NO OIL PRESSURE WHILE ACCELERATING

a. Check low oil level in oil pan and correct as necessary.

b. Inspect leakage at internal oil passages and correct as necessary.

c. Check oil pump suction screen loose or fallen off and correct as necessary.

BURNED, STICKING OR BROKEN VALVES

a. Check for weak valve springs and replace as necessary.

b. Check for improper valve lifter clearance and adjust as necessary.

c. Check for improper valve guide clearance and/or worn valve guides and correct as necessary.

d. Check for out-of-round valve seats or incorrect valve seat width and correct as necessary.

e. Check for deposits on valve seats and/or gum formation on stems or guides and correct as necessary.

f. Check for warped valves or faulty valve forgings and correct as necessary.

g. Check for exhaust back pressure and correct as necessary.

h. Check improper spark timing and correct as necessary.

i. Check excessive idling and correct as necessary.

NOISY VALVES

a. Check and adjust valve lash if necessary.

b. Check for excessively worn, dirty or faulty valve lifters. Replace if necessary.

c. Check for worn valve guides. Repair as necessary.

d. Check for excessive run-out of valve seat or valve face. Repair as necessary.

e. Check for worn camshaft lobes. Replace camshaft if necessary.

f. Inspect for pulled or loose rocker arm studs. Repair or replace as necessary.

g. Check for bent push rods. Replace if necessary.

h. Inspect for broken valve spring. Replace if necessary.

NOISY PISTONS AND RINGS

a. Check for excessive piston to bore clearance. Correct as necessary.
b. Inspect for improper fit of piston pin. Correct as necessary.
c. Inspect for excessive accumulation of carbon in combustion chamber or on piston tops. Clean and/or repair as necessary.
d. Check for connecting rods alignment. Correct as necessary.
e. Inspect for excessive clearance between rings and grooves. Repair or replace as necessary.
f. Check for broken piston rings. Replace as necessary.

BROKEN PISTONS AND/OR RINGS

a. Check for undersize pistons. Replace if necessary.
b. Check for wrong type and/or size rings installed. Replace if necessary.
c. Check for tapered or eccentric cylinder bores. Correct as necessary.
d. Check connecting rod alignment. Replace if necessary.
e. Check for excessively worn ring grooves. Replace if necessary.
f. Check for improperly assembled piston pins. Replace as necessary.
g. Check for insufficient ring gap clearance. Correct as necessary.
h. Inspect for engine overheating. Correct as necessary.
i. Check for sub-standard fuel. Correct as necessary.
j. Check ignition timing. Correct as necessary.

NOISY CONNECTING RODS

a. Check connecting rods for improper alignment and correct as necessary.
b. Check for excessive bearing clearance and correct as necessary.
c. Check for eccentric or out-of-round crankshaft journals and correct as necessary.
d. Check for insufficient oil supply and correct as necessary.
e. Check for low oil pressure and correct as necessary.
f. Check for connecting rod bolts not tightened correctly and correct as necessary.

NOISY MAIN BEARINGS

a. Check low oil pressure and/or insufficient oil supply and correct as necessary.
b. Check for excessive bearing clearance and correct as necessary.
c. Check for excessive crankshaft end play and correct as necessary.
d. Check for eccentric or out-of-round crankshaft journals and correct as necessary.
e. Check for sprung crankshaft and replace if necessary.
f. Check for excessive belt tension and adjust as necessary.
g. Check for loose torsional damper and replace as necessary.

NOISY VALVE LIFTERS

a. Check for broken valve springs and replace as necessary.

b. Check for worn or sticking rocker arms and repair or replace as necessary.

c. Check for worn or bent push rods and replace as necessary.

d. Check for valve lifters incorrectly fitted to bore size and correct as necessary.

e. Check faulty valve lifter plunger or push rod seat and replace lifters as necessary.

f. Check for plungers excessively worn causing fast leakdown under pressure and replace as necessary.

g. Check for excessively worn camshaft lobes and replace if necessary.

h. Check valve lifter oil feed holes plugged causing internal breakdown and correct as necessary.

i. Check faulty valve lifter check ball. (nicked, flat spot, or out of round and replace as necessary.

j. Check rocker arm retaining nut to be installed upside down and correct as necessary.

k. Check for end of push rod excessively worn or flaked and replace as necessary.

SECTION 6K

ENGINE COOLING

GENERAL

With the exception of the following additions and changes, refer to Section 6K, Engine Cooling, and Section 13, Radiator and Grille, of the 1974 Light Duty Truck Service Manual for maintenance and checking the engine cooling system.

MAINTENANCE AND ADJUSTMENTS

PRESSURE CHECKING COOLING SYSTEM FOR LEAKS

The radiator cap is a pressure relief type. This cap is designed to maintain a pressure of at least 15 psi in the cooling system once the engine has attained operating temperature. The pressure cap relief valve located in the cap allows excessive pressure to escape through the overflow hose into a coolant recovery bottle.

Using a J-24460 Cooling System Pressure Tester or equivalent, a J-23699 adapter and a J-23636 hose gauge, check the system for leaks in the following manner.

1. Make a visual check of hoses and hose connections for leaks and tighten clamps as required.
2. Using normal precautions carefully remove the radiator cap. **NEVER REMOVE RADIATOR CAP WHEN ENGINE IS HOT.**
3. Wash the cap with clean water until gaskets appear clean.
4. Test cap using J-24460 Tester. Follow instructions furnished with the tester. If cap will not hold pressure within specified band, replace with a new radiator cap.
5. Clean and inspect the radiator filler neck. The coolant level in the radiator should be within a 1/2 inch of the filler neck. Fill the radiator to this level with 50 percent ethylene glycol solution and replace the radiator cap, making sure it is on completely with the locking tangs against the stops.
6. Install Hose Gauge, J-23636, on upper radiator hose.
7. Install Adapter, J-23699, on Pressure Tester, J-24460.
8. Remove coolant recovery hose from radiator neck nipple and connect hose from Adapter J-23699.
9. Pump system to 15 psi and watch for a pressure drop on pump gauge.
10. If pressure drops below 15 psi in 10 seconds, the spring washer gasket may be leaking. To check proceed to Step 11. If pressure does not drop, proceed to Step 15.
11. Remove Pressure Tester, J-24460, from Adapter, J-23699.
12. Reconnect overflow hose to radiator neck nipple and carefully open the radiator cap, thus releasing pressure from the radiator into the radiator reservoir tank.
13. Check spring washer gasket on the radiator cap. This gasket seals between the cap and the top of the radiator filler neck. If defective, replace radiator cap.
14. Reconnect adapter per Step 8 and pump system to 15 psi and again check to determine if pressure drops below 15 psi in 10 seconds.
15. To check cap and system holding pressure, wiggle upper radiator hose to stabilize Hose Gauge, J-23636 and set red washer against the movable handle.
16. Remove Pressure Tester, J-24460, from Adapter, J-23699.
17. While system is under pressure examine all hoses, hose connections, radiator, heater, water pump and all gaskets for visible signs of leaking and repair or tighten as indicated.
18. After 5 minutes, wiggle hose again and note position of movable handle.
19. If handle has not moved more than a 1/4 inch in 5 minutes, cap is holding sufficient pressure.
20. If handle has moved more than a 1/4 inch check again for leaks, repressurize per step 9, remove Pressure Tester, J-24460 per Step 11 and insert hose in a glass of water so end is below liquid level and watch for bubbles. Presence of bubbles indicates a leaking radiator cap. Replace cap, if necessary.
21. If leaking is still indicated by moving handle of Hose Gauge, J-23636 and visible external leaks have been

eliminated, then the leak must be internal and more complicated testing must be performed to determine which part must be repaired or replaced. Such internal leaks will be corrected by doing the following in this order.

a. Torque the head bolts.

b. Replace head gaskets.

c. Replace heads.

d. Replace engine block.

RADIATOR REPLACEMENT

All Except P30(32) Chassis

Refer to Figure 1 through 4 for radiator assembly positions for C, K, G and P30(42) Series vehicles.

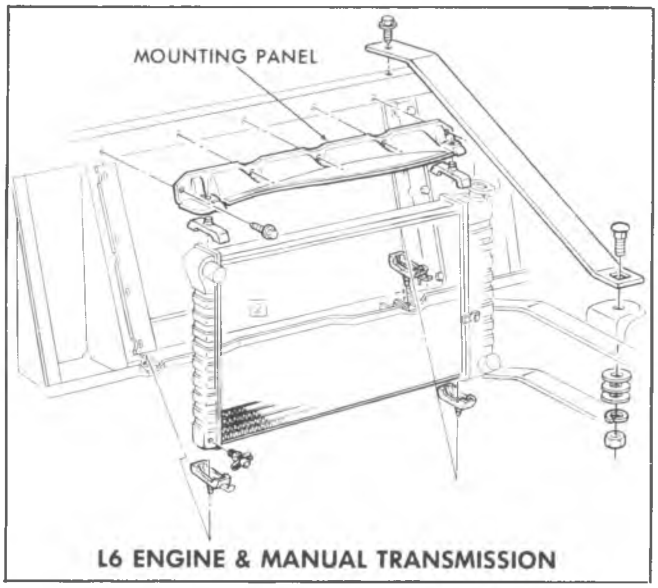


Fig. 1–Radiator Mounting - P20(42)

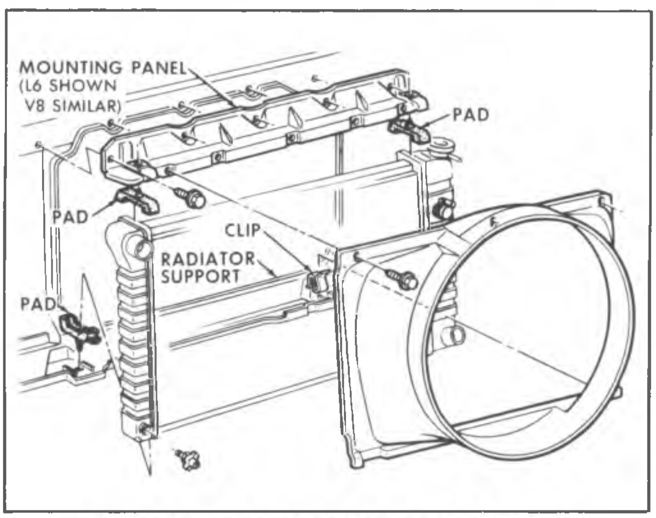


Fig. 2–Radiator and Fan Shroud - CK/P30(42)

Removal

1. Remove radiator cap when engine is cool by:
   - Slowly rotate cap counter clockwise to detent do not press down while rotating.
   - Wait until any residual pressure (indicated by a hissing sound) is relieved.
   - After hissing ceases, press down on cap while continuing to rotate counterclockwise.

   CAUTION: *To avoid the danger of being burned, do not remove radiator cap while engine and radiator are hot because scalding fluid and steam will be blown out under pressure.*
2. Open drain cock and drain radiator.
3. Disconnect upper and lower radiator hoses and transmission oil cooler lines or heater hose, if equipped.
4. Disconnect coolant recovery system hose.
5. If shroud installed, remove shroud to radiator screws and lift shroud out of lower clips and carefully hang

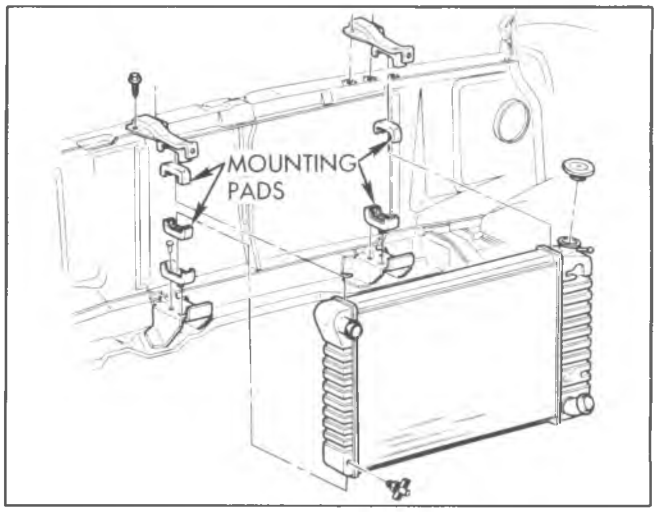


Fig. 3–Radiator Mounting - G Series

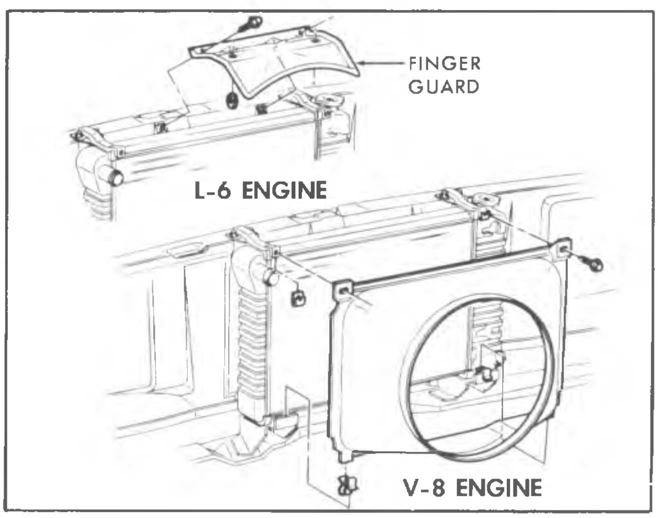


Fig. 4–Radiator Shroud - G Series

shroud over engine fan assembly to provide clearance for radiator removal.

6. Remove finger guard (G Series, L6 engine only).
7. Remove radiator upper mounting panel (retainers on G Series) from radiator support. Remove upper mounting pads.
8. Lift radiator out of the lower mountings and remove from vehicle. Lift shroud out of vehicle if applicable.

Installation

1. Inspect mounting pads and mounting panel or retainers and replace as required.
2. With fan shroud positioned over fan, lower radiator into lower mountings and install radiator upper mounting panel. On G Series with L6 engine, install finger guard.
3. Install fan shroud, if so equipped.
4. Connect upper and lower radiator hoses. Connect coolant recovery system hose. Inspect hose clamps and all hoses. Replace hoses whenever swollen, checked or otherwise deteriorated.
5. Connect transmission oil cooler lines and heater hose, if so equipped.
6. Remove coolant recovery tank and empty of fluid. Clean inside of tank thoroughly with detergent and water, scrubbing sides clean, and then flush with clean water and drain.
7. Reinstall tank.
8. (C-K Models) Insert coolant recovery hose in tank as far as the first white stripe (Fig. 5).

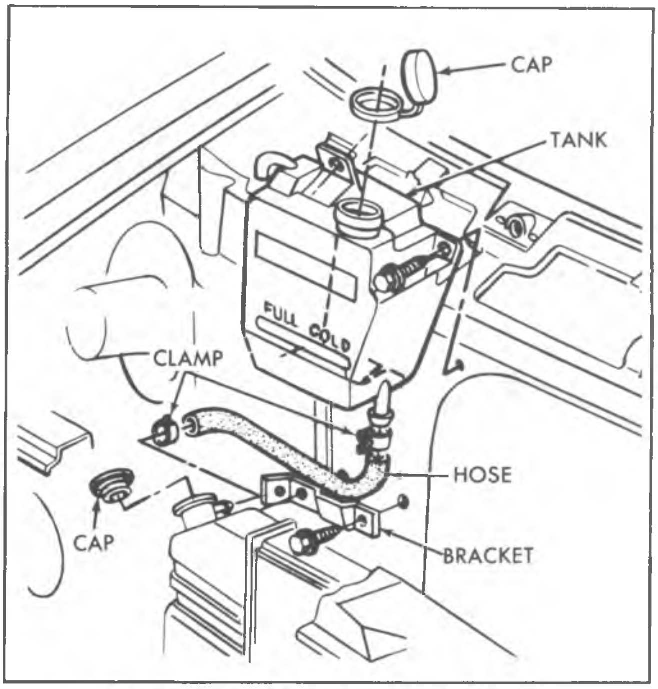


Fig. 6--Coolant Recovery System - G Series

9. Add sufficient ethylene glycol coolant, meeting GM specification 1899-M, to provide the required freezing and corrosion protection - at least a 50 percent solution (-20°F). Completely fill radiator and add sufficient coolant to the recovery tank to raise the level to the "Cold Level" mark. Reinstall recovery tank cap.
10. Pressure check cooling system.

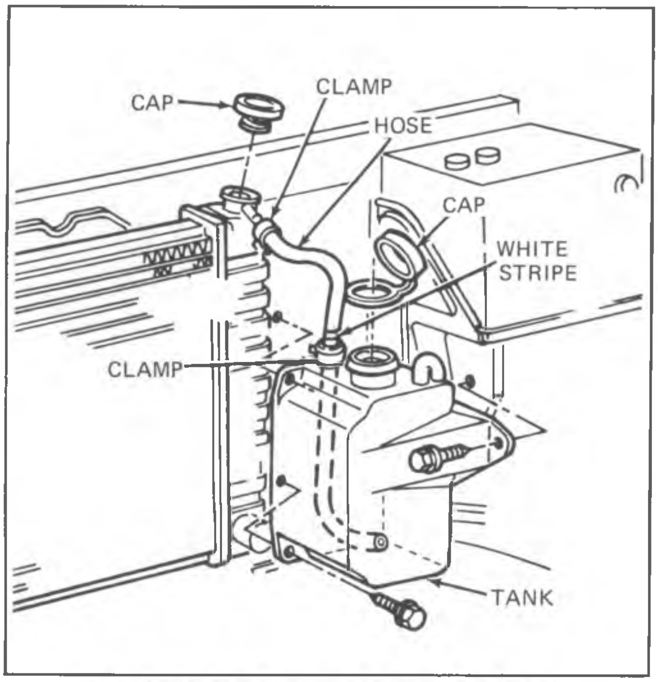


Fig. 5--Coolant Recovery System - CK Series

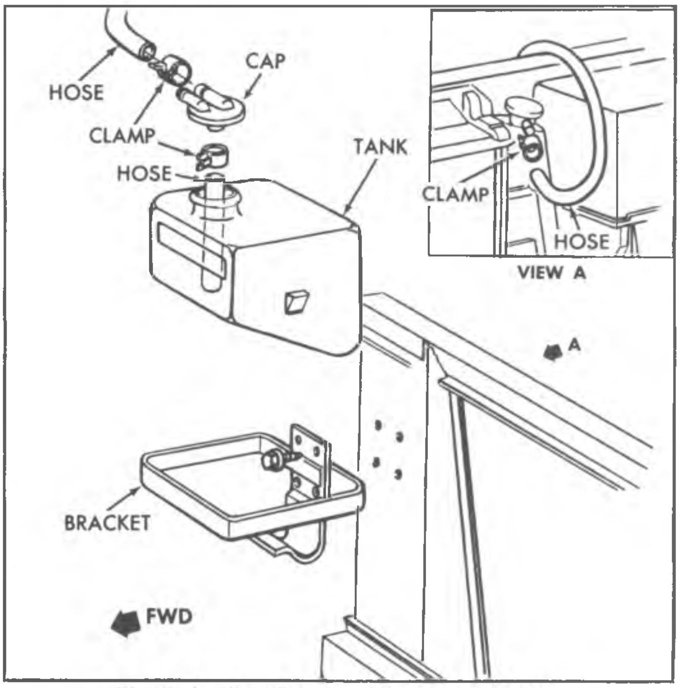


Fig. 7--Coolant Recovery System - P30(42)

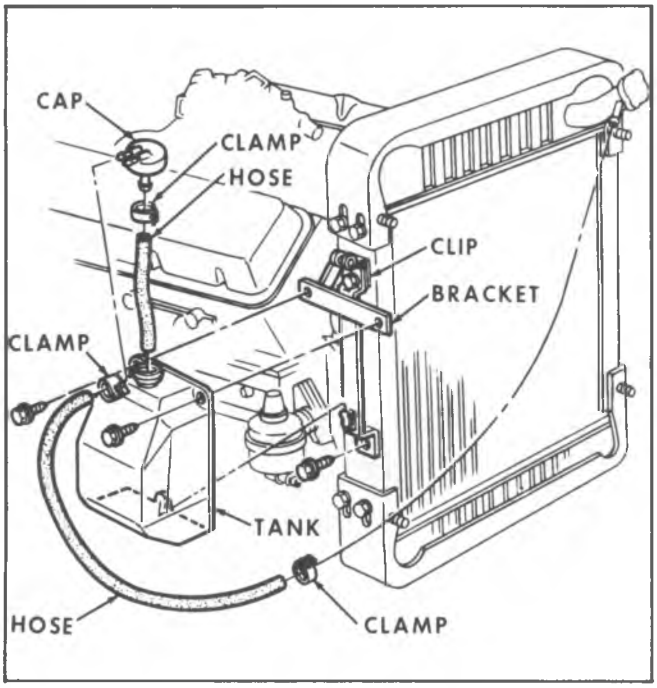


Fig. 8--Coolant Recovery System - P30(32)

COOLANT RECOVERY SYSTEM

Refer to Figures 5 through 8 for removal and installation of applicable coolant recovery system.

Inside of coolant recovery tank should be clean before installing in a vehicle.

SECTION 6M

ENGINE FUEL

CONTENTS OF THIS SECTION

1MV MONOJET CARBURETOR

INDEX

GENERAL DESCRIPTION

The Monojet carburetor is a single bore downdraft carburetor (fig. 1) using a triple venturi in conjunction with a plain tube nozzle.

The main venturi is 1-5/16" in diameter and the throttle bore is 1-11/16".

Fuel flow through the main metering system is controlled by a main well air bleed and a variable orifice jet. A power enrichment system is used to provide good performance during moderate to heavy accelerations and at higher engine speeds.

On a vehicle with automatic transmission and air conditioning, the idle system incorporates a hot idle compensator (A.T. only) to maintain smooth engine idle during periods of extreme hot engine operation.

The model MV incorporates an automatic choke system. The vacuum diaphragm units are mounted externally on the air horn and connect to the thermostatic coil lever through a connecting link.

The automatic choke coil is manifold mounted and connects to the choke valve shaft by a rod.

An integral, pleated-paper fuel inlet filter is mounted in the fuel bowl behind the fuel inlet nut to give maximum filtration of incoming fuel.

The Monojet carburetor has an aluminum throttle body for decreased weight and improved heat distribution and a thick throttle body to bowl insulator gasket to keep excessive

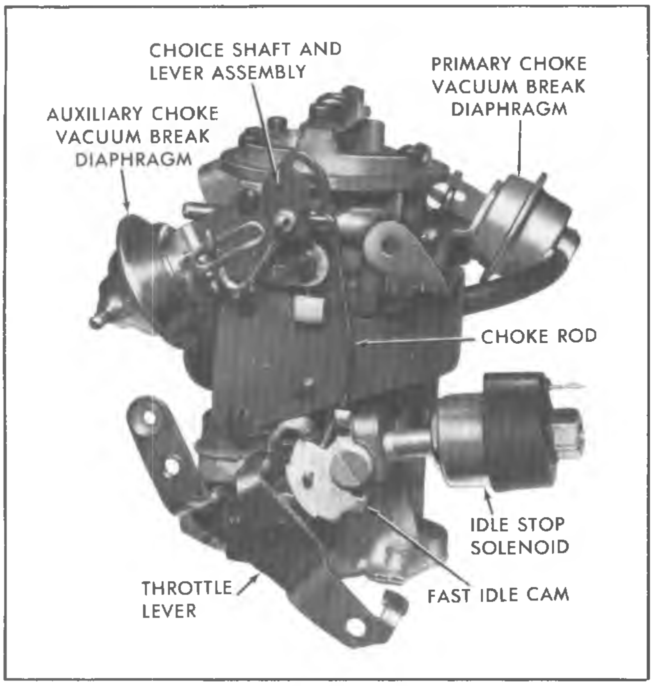


Fig. 1–1MV Monojet Carburetor

engine heat from the float bowl. The carburetor has internally balanced venting through a vent hole in the air horn, which leads from the float bowl into the bore beneath the air cleaner.

The carburetor model identification is stamped on a vertical portion of float bowl, adjacent to fuel inlet nut (Figure 1). If replacing float bowl, follow manufacturer's instructions contained in the service package so that the identification number can be transferred to the new float bowl.

An electrically operated idle stop solenoid is used on all 1MV models. Dual throttle return springs are used on all carburetors.

All carburetor models have an idle mixture-screw and limiter. The plastic limit cap permits idle mixture screw to be adjusted leaner without breaking the cap. At carburetor overhaul, the mixture may be adjusted.

CAUTION: *Do not bend the mixture screw when cutting the tang.*

To get the best idle and keep emissions within standards set by law, always follow adjustment procedures and specifications, see "Idle Mixture Adjustment".

An Exhaust Gas Recirculation system (E.G.R.) is used on all applications to control oxides of nitrogen.

The vacuum supply port necessary to operate the recirculation valve is located in the throttle body and connects through a channel to a tube which is located at the top of the air horn casting.

Six basic systems of operation are used: float, idle, main metering, power enrichment, pump and choke.

THEORY OF OPERATION

FLOAT SYSTEM (Fig. 2)

The float system controls the amount and level of the fuel in the carburetor float bowl. Higher than specified fuel levels can cause flooding, hard, hot starting, rich fuel mixtures causing poor economy, nozzle drip at idle and stalling. Therefore, it is important that the float be set to recommended specifications.

The float system on the Monojet carburetor is located adjacent to the main venturi. It is designed so that angular maneuvers such as steep hills and sharp turns will not affect proper operation by keeping an adequate supply of fuel in the bowl at all times. The float system consists of the following: a fuel inlet filter and pressure relief spring, a solid single pontoon float made of special lightweight plastic, a conventional needle and seat and a float hinge pin. The float hinge pin fits in dual slots cast in the float bowl and is held in place by compression of the air horn gasket against the upper loop of the hinge pin.

The float operates as follows: fuel from the engine fuel pump is forced through the paper fuel inlet filter, located behind the fuel inlet nut, passes from the filter chamber up through the float needle seat and spills into the float bowl; as the float bowl fills with fuel, it lifts the float pontoon upward until the correct fuel level is reached in the float bowl. At this point, the float arm forces the float needle against the float needle seat, shutting off fuel flow. As fuel is used from the float bowl, the float drops downward, allowing the float needle to move off its seat and more fuel to enter the float bowl. This cycle continues throughout engine operation, constantly maintaining a positive fuel level in the float bowl.

The fuel inlet filter has a retention spring located at the rear of the filter. It seats between the rear of the filter and the inlet casting. Should the filter become clogged from improper servicing or excess dirt in the system, the retention spring will keep the filter on its seat. This will stop complete stoppage of fuel flow to the carburetor until the filter can be replaced.

The carburetor float chamber is internally vented through a hole located in the air horn above the float chamber. The purpose of the internal vent is to balance air pressure on the fuel in the float bowl with carburetor inlet air. With this feature, a balanced air/fuel mixture ratio can be maintained during part throttle and power operation because the air pressure acting on the fuel in the float bowl will be balanced with the air flowing through the carburetor bore.

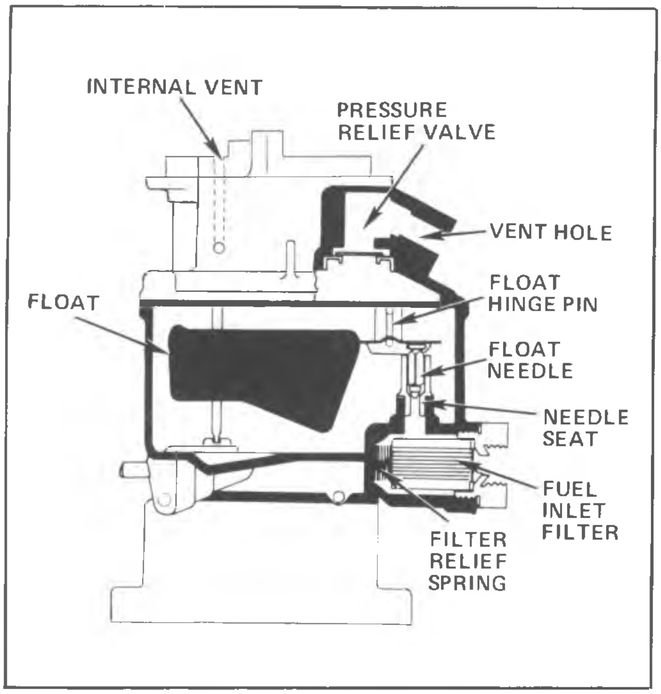


Fig. 2-Float System

The carburetor float chamber is externally vented by a small plastic pressure relief valve located at the top of the air horn. Should excessive vapor pressure build up in the float bowl during periods of hot engine idle or hot soak, the valve will be pushed off its seat, allowing the pressure to be relieved, there-by preventing fuel from being forced from the float bowl into the engine.

IDLE SYSTEM (Fig. 3)

The purpose of the idle system is to control fuel mixtures to the engine during idle and low speed operation. The idle system is needed during this period because air requirements of the engine are not great enough to obtain efficient metering from the main discharge nozzle and venturi system.

The idle system consists of a removable idle tube, idle passages, idle channel restriction, idle air bleeds, slotted off-idle port, vapor canister purge ports, exhaust gas recirculation (E.G.R.) ports and passages, idle mixture adjusting needle and the idle mixture discharge hole.

During curb idle, the throttle valve is held slightly open by the idle stop solenoid. The small amount of air, which passes between the throttle valve and bore, is regulated by solenoid to provide the correct engine idle speed. Since the engine requires very little air and fuel for idle and low speed operation, fuel is mixed by direct application of engine manifold vacuum to the idle discharge hole just below the throttle valve. With the idle discharge hole in a very low pressure area and the fuel in the float bowl vented to atmosphere, fuel flows through the idle system as follows:

Atmospheric pressure forces fuel from the float bowl down through the main metering jet into the main fuel well where it is picked up and metered at the lower tip of the idle tube. It passes up the idle tube and is mixed with air at the top

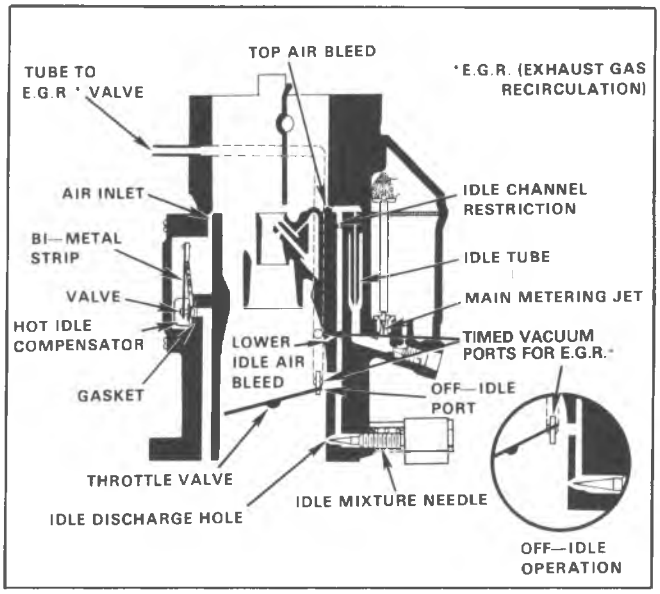


Fig. 3-Idle System

of the idle channel through the idle air bleed hole. The air/fuel mixture passes over through the cross channel and then downward through the calibrated idle channel restriction where it is further metered. The mixture continues down the idle passage past the lower idle air bleed hole and off-idle discharge port just above the throttle valve, where it is again mixed with air. The air/fuel mixture then moves downward past the idle mixture needle and out through the idle discharge hole into the carburetor bore. Here it mixes with the air passing around the slightly open throttle valve and then continues through the intake manifold into the engine cylinders as a combustible mixture.

OFF-IDLE OPERATION

As the throttle valve is opened from curb idle to increase engine speed, additional fuel is needed to combine with the extra air entering the engine. This is accomplished by the slotted off-idle port. As the throttle valve is opened, it passes the off-idle port, gradually exposing it to high vacuum below the throttle valve. The additional fuel from the off-idle port mixes with the increased air flow past the opening throttle valve to meet increased engine air and fuel demands.

Further opening of the throttle valve causes increased air flow through the carburetor bore, which causes sufficient pressure drop in the multiple venturi to start fuel delivery from the main discharge nozzle. The off-idle port fuel discharge does not cease at this transfer point but rather diminishes as fuel flow from the main discharge nozzle increases. In this way, the systems are so designed that they combine to produce a smooth fuel flow at all engine speeds.

The lower idle air bleed is used strictly as an air bleed during idle operation. It supplies additional air to the idle circuit for improved atomization and fuel control at low engine speeds.

The same air bleed is used as an additional fuel feed at higher engine speeds to supplement main discharge nozzle delivery during operation of the main metering system.

The timed spark port has one tube which supplies vacuum during the off-idle and part throttle operation of the carburetor. The tube leads to the purge valve on the vapor canister to provide a means of pulling fuel vapors from the canister during periods of higher air flow through the carburetor bore. A limited amount of canister purge is also provided by a separate tube which leads from the canister to the PCV valve hose connection.

An exhaust gas recirculation (E.C.R.) system is used on all models to control oxides of nitrogen emissions. The E.G.R. valve is operated by a vacuum signal taken from the carburetor throttle body.

A vacuum supply tube installed in the carburetor air horn connects by a passage through the float bowl to the timed vertical port in the throttle body bore. This provides a vacuum signal to the E.G.R. valve in the off-idle and part throttle operation of the carburetor. The purpose of the E.G.R. system is to supply a metered amount of exhaust gases to the combustion mixtures and lower combustion temperatures, thereby reducing oxides of nitrogen during these ranges of engine operation.

Hot Idle Compensator

The hot idle compensator (Figure 3), with automatic transmission and air conditioning only, is located in a chamber on the float bowl casting, adjacent to the carburetor bore, on the throttle lever side of the carburetor. Its purpose is to offset enrichening effects caused by changes in air density and fuel vapors generated during hot engine operation.

The compensator consists of a thermostatically controlled valve, a bi-metal strip which is heat sensitive, a valve holder and bracket. The valve closes off an air channel which leads from a hole inside the air horn to a point below the throttle valve where it exists into the throttle body bore.

Normally, the compensator valve is held closed by tension of the bi-metal strip and engine vacuum. During extreme hot engine operation, excessive fuel vapors in the carburetor can enter the engine manifold causing richer than normally required mixtures. This can result in rough engine idle and stalling. At a pre-determined temperature, when extra air is needed to offset the enrichening effects of fuel vapors, the bi-metal strip bends and unseats the compensator valve, uncovering the air channel leading from the compensator valve chamber to the throttle body bore. This allows enough air to be drawn into the engine manifold to offset the richer mixtures and maintain a smooth engine idle. When the engine cools and the extra air is not needed, the bi-metal strip closes the valve and operation returns to normal.

The compensator valve assembly is held in place by the dust cover over the valve chamber. A seal is used between the compensator valve and float bowl casting.

In order to insure proper idle adjustment when the engine is hot, the compensator valve must be closed. To check this, plug the compensator inlet hole inside the air horn bore (pencil can be used). If no drop in engine rpm is noted on a tachometer, the valve is closed; if the valve is open, leave plug in hole when adjusting idle or cool engine down to a point where the valve automatically closes for proper idle adjustment.

CAUTION: *Always remove plug used in inlet hole after completing idle adjustment, otherwise, the compensator will not operate.*

MAIN METERING SYSTEM (Fig. 4)

The main metering system supplies fuel to the engine from off-idle to wide open throttle operation. It feeds at all times when air flow through the venturi is great enough to maintain efficient fuel flow from the main discharge nozzle. The triple venturi stack-up used in the Monojet carburetor is very sensitive to air flow, which results in a finer and more stable metering control from light to heavy engine loads.

The main metering system consists of a main metering jet, mechanical and vacuum operated metering rod, main fuel well, main well air bleeds, fuel discharge nozzle and triple venturi.

The main metering system operates in the following manner:

As the throttle valve is opened beyond the off-idle range, allowing more air to enter the engine manifold, air velocity increases in the carburetor venturi. This causes a drop in pressure in the main venturi which is increased many times in the double boost venturi. Since the lower pressure (vacuum) is now in the smallest venturi, fuel flows from the main discharge nozzles in the following manner:

Fuel in the float bowl passes between the tapered metering rod and the main metering jet where it is metered and flows on into the main fuel well. In the main well the fuel is mixed with air from the air bleed at the top of the well and another air bleed which leads into the main well from the discharge nozzle cavity. After the fuel in the main well is mixed with air from the air bleeds it then passes up the discharge nozzle where it sprays into the small boost venturi. At the boost venturi, the fuel mixture then combines with air entering the engine through the carburetor bore to provide the correct air/fuel mixtures to the engine for efficient combustion.

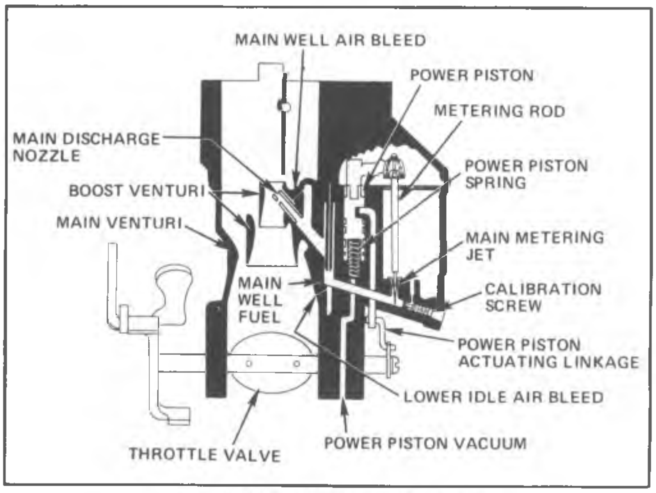


Fig. 4–Main Metering System

Fuel flow to the main discharge nozzle is controlled by a tapered metering rod which is actuated by linkage connected directly to the throttle shaft. As the throttle valve is opened from idle position, the tapered metering rod is gradually raised out of the main metering jet orifice. Fuel flow from the main discharge nozzle is controlled by throttle opening and the depth of the metering rod in the main metering jet orifice. With the fuel metering mechanically controlled by the throttle valve angle, it is possible to maintain very accurate mixture ratios throughout part throttle to wide open throttle operation. An initial metering rod adjustment is required to set the depth of the rod in the main metering jet.

CAUTION: *It should be noted here that there is a supplementary fuel feed passage in the bottom of the float bowl adjacent to the main metering jet. Fuel is picked up from the float bowl and passes through a calibrated hole, past a calibration screw and on into the same fuel passage which leads from the main metering jet to the main fuel well. The purpose of the adjustable fuel feed is to allow the factory to refine part throttle calibration to meet very accurate air/fuel mixture ratios. This adjustment is made using very sensitive instrumentation and the screw should not be tampered with or it will require complete float bowl or unit replacement.*

POWER ENRICHMENT SYSTEM (Fig. 5)

The vacuum operated power enrichment system is used to slightly enrichen mixture ratios during moderate to heavy loads during acceleration. The necessary enrichment is obtained by movement of a spring loaded vacuum piston which senses changes in manifold vacuum. The amount of enrichment is controlled by the clearance between the groove in the power piston and the diameter of the power piston drive rod.

During part throttle and cruising ranges, manifold vacuum is sufficient to hold the power piston down against spring tension. The upper part of the groove in the power piston is held down against the top side of the drive rod. This places the main metering rod lower in the jet for maximum economy. On moderate to heavy accelerations, manifold vacuum drops and the power piston spring pushes the power piston up so that the ower edge of the slot in the power piston strikes the bottom side of the drive rod. This moves the tapered metering rod slightly upward and out of the main metering jet, allowing more fuel to flow through the jet, enrichening the fuel mixture slightly.

ACCELERATING PUMP SYSTEM (Fig. 6)

Extra fuel for smooth, quick acceleration is supplied by a double spring loaded pump plunger. Rapid opening of the throttle valve, when accelerating from low speed, causes an immediate increase in air flow through the carburetor bore. Since fuel is heavier than air, it requires a short period of time for fuel flow through the main discharge nozzle to catch up with the air flow. To avoid leanness during this momentary lag in the fuel flow, the accelerator pump furnishes a metered quantity of fuel which is sprayed into the air stream. This mixes with the increased air flow to supply the extra fuel needed until the main discharge nozzles

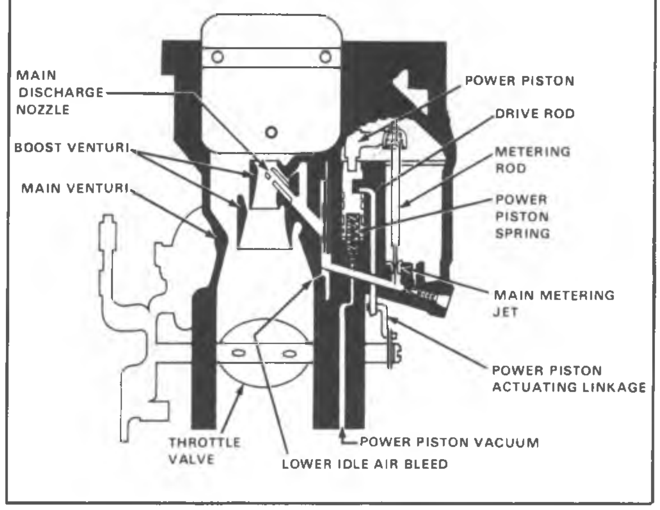


Fig. 5–Power Enrichment System

can feed the fuel required.

The accelerating pump is located at the side of the main fuel bowl, adjacent to the venturi area. It consists of a spring loaded pump plunger and pump return spring operating in a fuel well. The pump plunger is connected by linkage directly to a lever on the throttle shaft.

When the pump plunger moves upward in the pump well, as happens during throttle closing, fuel from the float bowl enters the pump well through a slot in the side of the pump well and flows past the synthetic pump cup seal into the bottom of the pump well. The pump cup is a floating type (the cup moves up and down on the pump plunger head). When the pump plunger is moved upward, the flat on the top of the cup unseats from the flat on the plunger head and allows free movement of fuel through the inside of the cup into the bottom of the pump well. This also vents any vapors

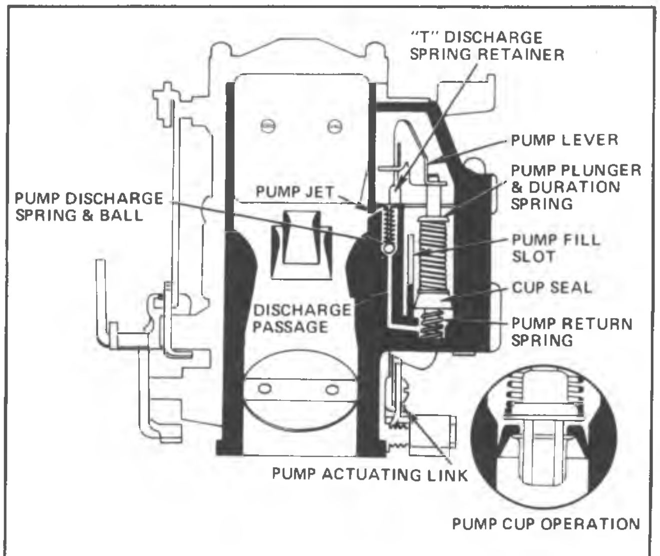


Fig. 6–Accelerating Pump System

which may be in the bottom of the pump well so that a solid charge of fuel can be maintained in the fuel well beneath the plunger head.

When the throttle valve is opened, as happens during acceleration, the connecting pump linkage forces the pump plunger downward. The pump cup seats instantly and fuel is forced through the pump discharge passage, where it unseats the pump discharge check ball and passes on through the passage to the pump jet located at the top of the float bowl, where it sprays into the boost venturi area.

The pump plunger is spring loaded; the upper duration spring is balanced with the bottom pump return spring so that a smooth sustained charge of fuel is delivered during acceleration.

The pump discharge check ball prevents any pull over or discharge of fuel from the pump jet when the accelerator pump is not in operation. It also keeps the pump discharge passage filled with fuel to prevent pump discharge lag.

The pump does not require adjustment in service as it is preset during manufacture.

CHOKE SYSTEM (Fig. 7)

The purpose of the choke system is to provide a richer mixture for cold engine starting and operation. Richer than normal mixtures are required because vaporized fuel has a tendency to condense on cold engine parts. This occurs on the inside area of the intake manifold and cylinder heads, thereby, decreasing the amount of combustible mixture available in the engine cylinders.

The model MV carburetor is equipped with a fully automatic choke control. The thermostatic coil is mounted on the head and is connected by a link to the lever on the choke valve shaft. The vacuum break units are diaphragm operated and externally mounted on the air horn casting.

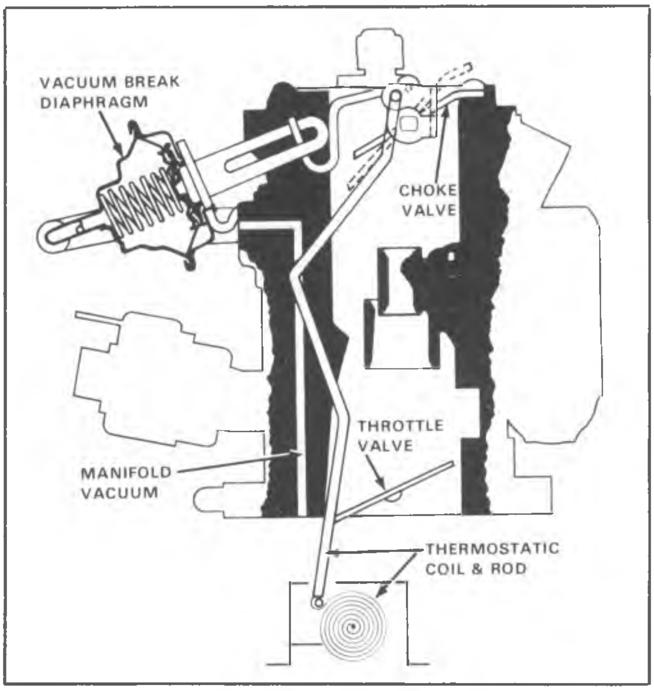


Fig. 7–Choke System

The choke system operates as follows: when the engine is cold, prior to starting, depressing the accelerator pedal to the floor opens the carburetor throttle valve. This allows tension from the thermostatic coil to close the choke valve and also rotates the fast idle cam so the high step is in line with the fast idle cam follower on the throttle lever. As the throttle is released, the fast idle cam follower comes to rest on the high step of the fast idle cam, thus providing enough throttle valve opening to keep the engine running after cold start. During cranking, engine vacuum below the choke valve pulls fuel from the idle circuit and main discharge nozzle. This provides adequate enrichment for good cold starts.

When the engine starts, manifold vacuum is transmitted through a vacuum channel to the primary vacuum break diaphragm unit mounted on the air horn casting. This moves the diaphragm plunger until it strikes the cover which, in turn, opens the choke valve to a point where the engine will run without loading or stalling. This is called the vacuum break position.

The auxiliary vacuum break unit (Fig. 8) is used to open the choke valve to a nearly wide open position during warmer temperatures above 80°F. This prevents too rich a mixture when starting a cold engine during warm temperatures due to choke coil cooling, causing the choke valve to be too far closed.

The auxiliary diaphragm unit is controlled by a vacuum switch which is operated by engine coolant temperature. When the engine is started at temperatures above 80°F., the vacuum switch opens and allows manifold vacuum to be applied to the auxiliary vacuum break diaphragm. The diaphragm unit pulls the choke valve to a nearly open position overcoming choke coil tension. At the same time the fast idle cam drops so that the fast idle cam follower tang rests on the lowest step of the fast idle cam. This maintains some fast idle until the engine warms up. When the engine is warmed up the choke coil pulls the choke valve fully open and the fast idle cam rotates so the fast idle cam follower tang drops off the low step, at which point the engine will

Fig. 8–Choke System (Auxiliary Vacuum Break)

run at curb idle speed.

As the engine warms up, the thermostatic coil is heated and gradually relaxes its spring tension so that air velocity through the air horn can continue to open the choke valve. This continues until the engine is warm. At this point the choke coil tension is completely relaxed and the choke valve is wide open.

The fast idle cam has graduated steps so that fast idle engine speed is lowered gradually during the engine warm up period. The fast idle cam follows rotation of the choke valve. When the choke valve is completely open and the engine is warm, the fast idle tang on the throttle lever will be off the steps of the fast idle cam. At this point, the idle stop solenoid controls normal engine idle speed.

An unloader mechanism is provided should the engine become flooded during the starting period. The unloader partially opens the closed choke valve to allow increased air flow through the carburetor to lean out the overly rich mixtures. This is accomplished by depressing the accelerator pedal to the floor so that wide open throttle is obtained. When this is done, a tag on the throttle lever contacts an arm on the fast idle cam and forces the choke valve partially open. The extra air leans out the fuel mixture enough so that the engine will start.

MAINTENANCE AND ADJUSTMENT

IDLE SPEED

Two idle speeds are required and are controlled and adjustable by the idle stop solenoid. The purpose of two idle speeds is to prevent dieseling when ignition is turned off.

One speed is Curb Idle Speed which is normal engine idle and solenoid is energized. The second speed is Low Idle Speed and when solenoid is de-energized the carburetor throttle plate closes further than at normal engine idle.

Low Idle and Curb Idle Speed Adjustment (Fig. 9)

Refer to Vehicle Emission Control Information label on vehicle for latest certified specification information which may differ from specifications in manual.

1. With engine at normal operating temperature, air cleaner on, choke open, and air conditioning OFF except where indicated, connect a tachometer to engine.
2. Set parking brake and block drive wheels.
3. Disconnect and plug carburetor and PCV hoses at vapor canister on vehicle with light duty emissions. Disconnect fuel tank hose at vapor canister on vehicle with heavy duty emissions.
4. Disconnect vacuum advance hose at distributor and plug hose.
5. Start engine, check timing and adjust as required.
6. On engine with full vacuum advance, connect vacuum advance hose, otherwise, leave hose disconnected and plugged.
7. On vehicle with heavy duty emissions, turn air conditioning ON.
8. Position manual transmission in Neutral. Position automatic transmission in Drive with light duty emissions or in Neutral with heavy duty emissions.

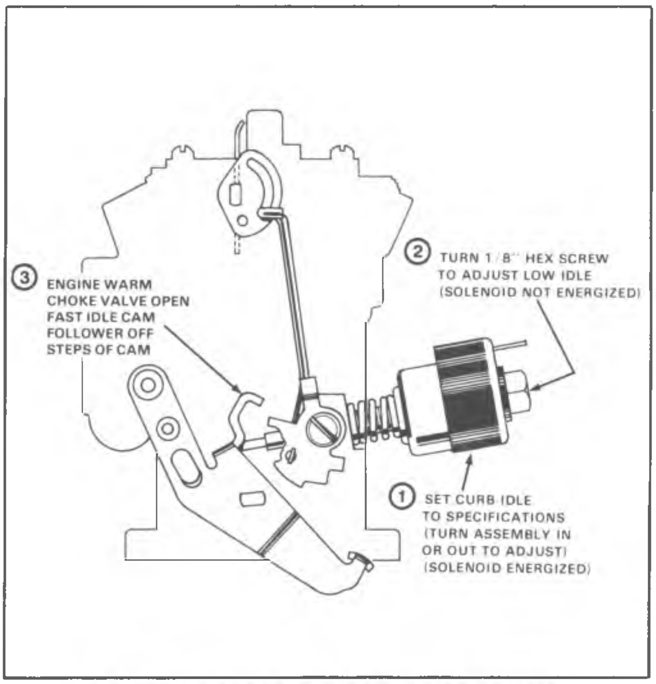


Fig. 9–Low and Curb Idle Speed Adjustment

9. Turn solenoid in or out to set curb idle speed to specified rpm.
10. Disconnect electrical connector at idle stop solenoid and turn air conditioning OFF.
11. Turn 1/8" hex screw located in end of solenoid body to set low idle speed to specified rpm.
12. Reconnect electrical connector to solenoid and crack throttle slightly.
13. Check fast idle speed referring to fast idle adjustment procedure.
14. Shut off engine and remove tachometer.

15. Unplug and connect carburetor and PCV hoses at vapor canister on light duty emissions or fuel tank hose on heavy duty emissions.
16. If disconnected, connected vacuum advance hose.

IDLE MIXTURE

The idle mixture is factory preset and idle mixture screw is capped with a plastic limiter cap. The cap permits screw to be turned about one turn leaner (clockwise) without breaking cap. The idle mixture is set to achieve the smoothest idle while maintaining emission levels within standards prescribed by Federal Law.

At major carburetor overhaul the idle mixture may be adjusted. Before suspecting idle mixture as cause of poor idle quality, check ignition system, distributor, timing, air cleaner, PCV system, evaporation emission control and compression pressures. Also check all vacuum hoses and connections for leaks and check torques of carburetor attachment bolts. Adjustment is made using a tachometer.

IDLE MIXTURE ADJUSTMENT

1. With engine at normal operating temperature, air cleaner on, choke open, and air conditioning OFF, connect a tachometer to engine.
2. Set parking brake and block drive wheels.
3. Disconnect carburetor and PCV hoses at vapor canister and plug on light duty emission vehicle or fuel tank hose at vapor canister on heavy duty vehicle.
4. Disconnect vacuum advance hose at distributor and plug hose.
5. Start engine, check timing and adjust as required. Reconnect vacuum advance hose.
6. On engine with full vacuum advance, connect vacuum advance hose, otherwise, leave hose disconnected and plugged.
7. Position automatic transmission in Drive with light duty emissions or Neutral with heavy duty emissions. Position manual transmission in Neutral.
8. Remove air cleaner and cut off tab on limiter cap. Do not remove cap from screw. Install air cleaner.
9. Turn idle mixture screw clockwise (leaner) or counterclockwise (richer) until maximum idle speed is achieved.
10. Set idle speed to higher specified rpm by turning solenoid in or out (Example **575** /550).
11. Observe tachometer and turn idle mixture screw clockwise (leaner) until idle speed is at lower specified rpm (Example 575/ **550**).
12. Shut off engine and remove tachometer.
13. Connect all hoses to vapor canister.
14. Connect vacuum advance hose if disconnected.

FAST IDLE ADJUSTMENT (Fig. 10)

1. Check low and curb idle speed and adjust as required.

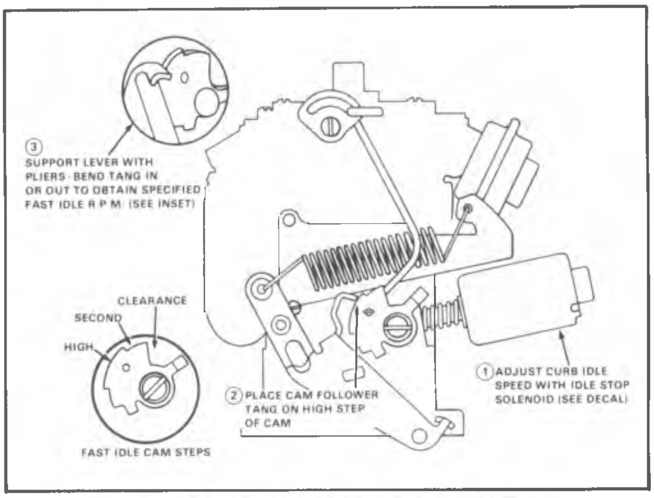


Fig. 10–Fast Idle Adjustment - 1MV

2. With engine at normal operating temperature, air cleaner on, choke open, EGR valve signal line disconnected and plugged and air conditioning OFF, connect tachometer to engine.
3. Disconnect vacuum advance hose at distributor and plug hose on an engine with ported spark vacuum advance.
4. Start engine and with transmission in Neutral, set fast idle cam follower so that tang is on high step of cam.
5. Bend tang in or out to obtain fast idle RPM.

FAST IDLE CAM ADJUSTMENT (Fig. 11)

1. Check fast idle speed and adjust as required.
2. Set fast idle cam follower firmly on second stop of cam.
3. Rotate and hold choke valve toward closed position by applying force to choke coil rod.
4. Insert specified gauge between upper edge of choke valve and inside air horn wall.
5. Bend cam-to-choke rod as required to obtain clearance.

CHOKE COIL ROD ADJUSTMENT (Fig. 12)

Light Duty Emissions (Fig. 12)

1. Disconnect upper end of choke coil rod at choke valve.
2. Completely close choke valve.
3. Push up on choke coil rod to its end of travel.
4. Bottom of rod should be even with top of lever.
5. If adjustment is required, bend rod.
6. Connect rod to choke valve.

Heavy Duty Emissions (Fig. 12A)

1. Disconnect upper end of choke coil rod at choke valve.
2. Completely close choke valve.
3. Push down on choke coil rod to its end of travel.
4. Top of rod should even with bottom of hole of choke lever.

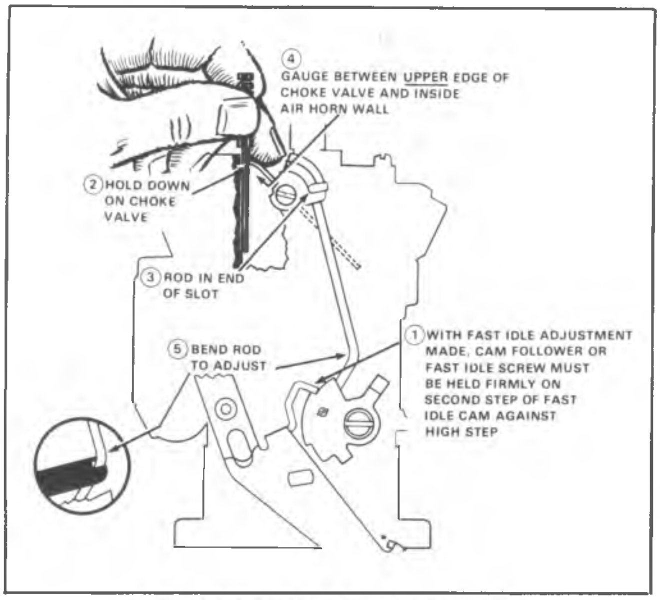


Fig. 11–Fast Idle Cam Adjustment

5. If adjustment is required, bend rod.
6. Connect rod to choke valve.

PRIMARY VACUUM BREAK ADJUSTMENT

(Fig. 14)

1. Place cam follower on highest step of fast idle cam.
2. Plug purge bleed hole with masking tape over vacuum break end cover.
3. Using an outside vacuum source, apply vacuum to primary vacuum break diaphragm until plunger is fully

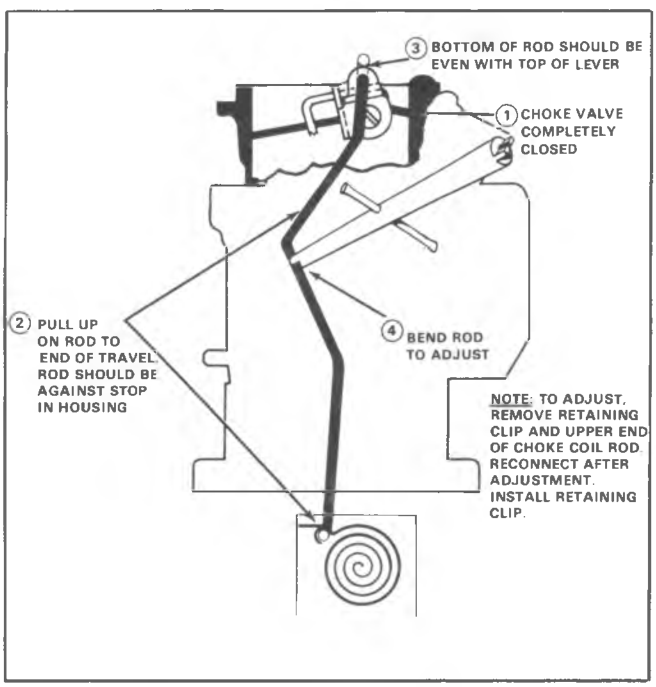


Fig. 12–Choke Coil Rod Adjustment - Lt. Duty Emissions

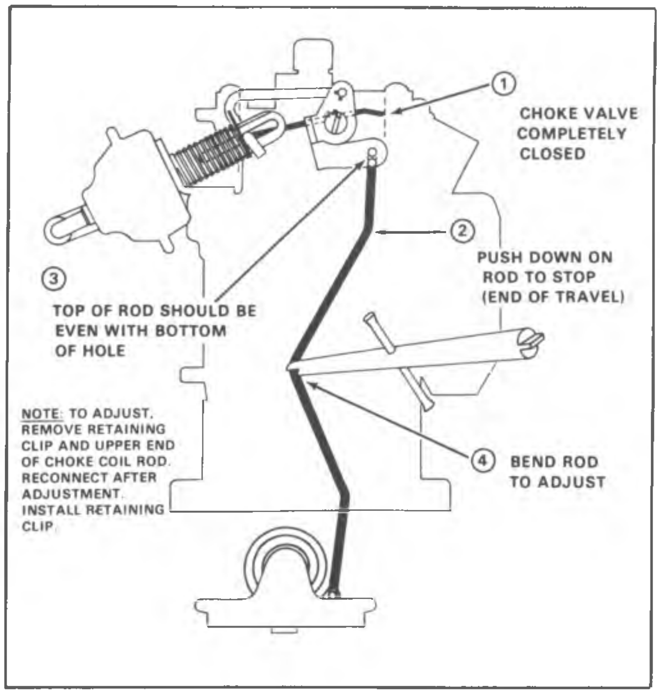


Fig. 12A–Choke Coil Rod Adjustment - Heavy Duty Emissions

seated.

4. Push up on choke coil lever rod in end of slot.
5. Insert specified gauge between upper edge of choke valve and air horn wall.
6. If adjustment is required, bend vacuum break rod.
7. After adjustment, make sure there is no interference or binding and remove tape from vacuum break end cover.

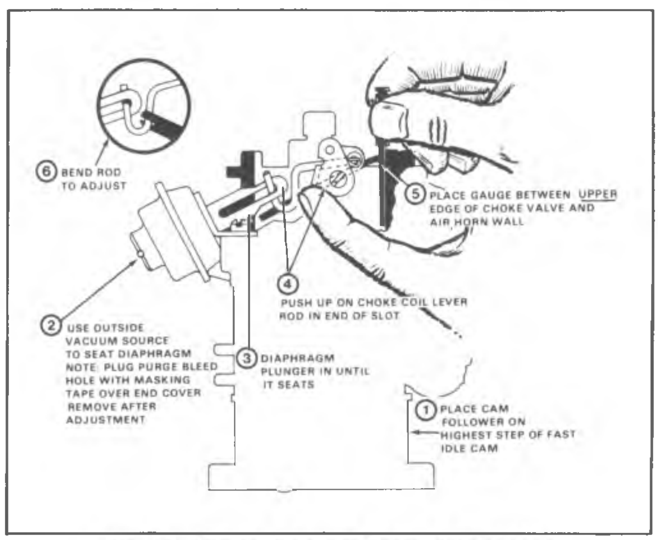


Fig. 13–Primary Vacuum Break Adjustment

AUXILIARY VACUUM BREAK ADJUSTMENT (Fig. 14)

Light Duty Emissions

1. Position cam follower on highest step of fast idle cam.
2. Using an outside vacuum source, apply vacuum to auxiliary vacuum break diaphragm until plunger is fully seated.
3. With vacuum break diaphragm in fully seated position, insert specified gauge between upper edge of choke valve and inner air horn wall.
4. If adjustment is required, bend link between vacuum break and choke valve.

CHOKE UNLOADER ADJUSTMENT (Fig. 15)

1. Hold down on choke valve by applying a light force to choke coil lever.
2. Rotate throttle valve to wide open position.
3. Insert specified gauge between upper edge of choke valve and air horn wall.
4. If adjustment is required, bend tang on throttle lever.

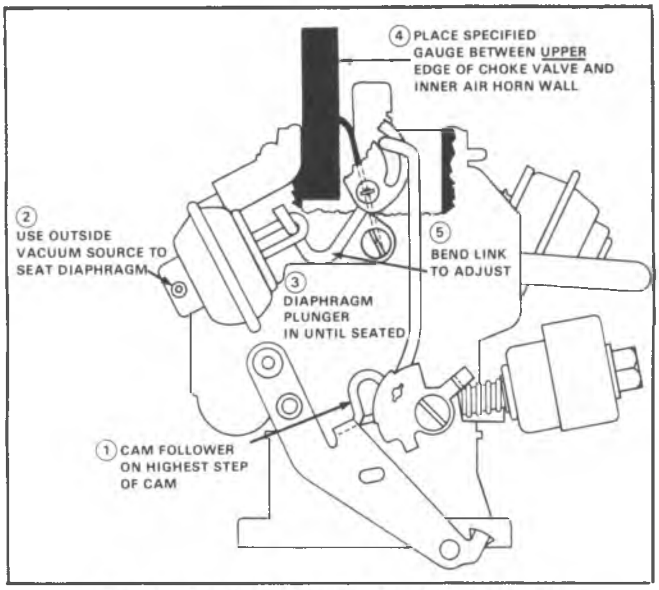


Fig. 14–Auxiliary Vacuum Break Adjustment

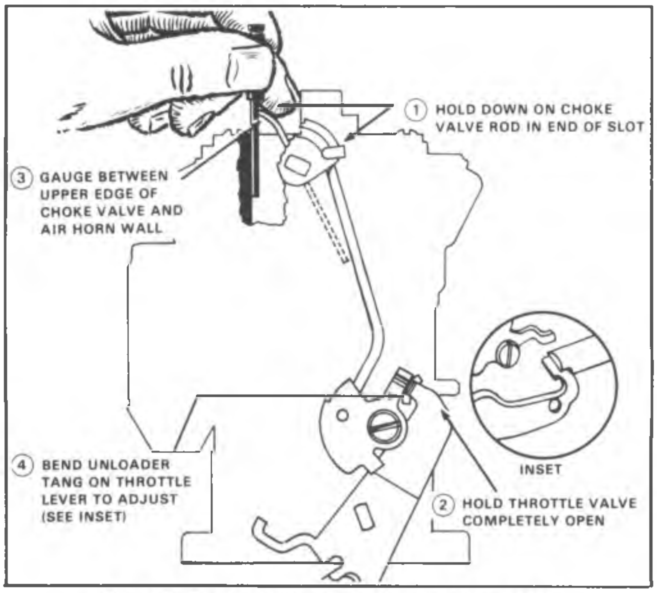


Fig. 15–Choke Unloader Adjustment - 1MV

SERVICE OPERATIONS

CARBURETOR REPLACEMENT (Fig. 16)

Removal

Flooding, stumble on acceleration and other performance complaints are, in many instances, caused by presence of dirt, water, or other foreign matter in carburetor. To aid in diagnosing cause, carburetor should be carefully removed from engine without draining fuel from bowl. Contents of fuel bowl may then be examined for contamination as carburetor is disassembled. Check filter.

1. Remove air cleaner and gasket.
2. Disconnect fuel and vacuum lines from carburetor.
3. Disconnect choke coil rod.
4. Disconnect accelerator linkage.
5. Disconnect idle stop solenoid electrical connector.
6. If equipped with automatic transmission, disconnect detent control cable.
7. Remove carburetor attaching nuts and remove carburetor and solenoid assembly attachment.
8. Remove insulator.

Installation

It is good shop practice to fill carburetor bowl before installing carburetor. This reduces strain on starting motor and battery and reduces the possibility of backfiring while attempting to start engine. A small supply of fuel will enable carburetor to be filled and the operation of float and intake needle and seat to be checked. Operate throttle lever several times and check discharge from pump jets before installing carburetor.

1. Be certain throttle body and intake manifold sealing surfaces are clean.
2. Install carburetor insulator.

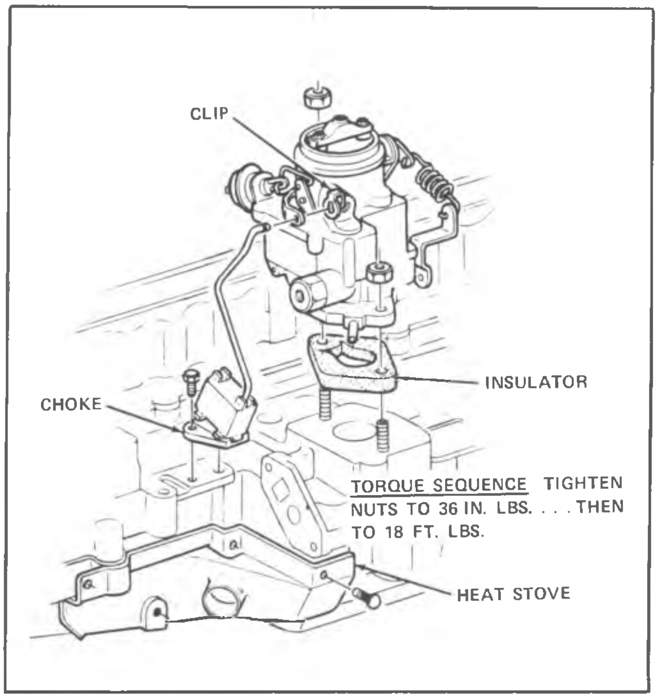


Fig. 16–Carburetor, Choke and Heat Stove

Fig. 17–Fuel Filter - Monojet

3. Install carburetor over manifold studs.
4. Install vacuum and fuel lines at carburetor.
5. Install attaching nuts and tighten securely.
6. Tighten fuel and vacuum lines.
7. Connect accelerator linkage.
8. Connect choke coil rod and idle stop solenoid electrical connector.
9. Guide vent tube into rocker cover and install air cleaner.
10. Refer to Maintenance and Adjustment and adjust low and curb idle speeds.

FUEL FILTER REPLACEMENT (Fig. 17)

A plugged fuel filter will restrict fuel flow into carburetor and will result in a loss of engine power.

1. Disconnect fuel line connection at inlet fuel filter nut.
2. Remove inlet fuel filter nut from carburetor.
3. Remove filter element and spring.
4. Install element spring and filter element in carburetor.
5. Install new gasket on inlet fitting nut and install nut in carburetor and tighten securely.
6. Install fuel line and tighten connector.

IDLE STOP SOLENOID REPLACEMENT

The idle stop solenoid should be checked to assure that it permits the throttle plate to close further when the ignition switch is turned "off". An inoperative solenoid should be replaced.

Removal

1. Remove carburetor air cleaner.
2. Disconnect electrical connector at solenoid.
3. Unscrew and remove idle stop solenoid.

Installation

1. Hold choke valve wide open so that fast idle cam follower clears fast idle cam.
2. Install idle stop solenoid and turn in until it contacts lever tang.
3. Connect electrical connector.
4. Install air cleaner.
5. Refer to Maintenance and Adjustment and adjust low and curb idle speeds.

CHOKE COIL REPLACEMENT

Choke mechanism should be checked for free operation. A binding condition may have developed from petroleum gum formation on the choke shaft or from damage. Choke shaft can usually be cleaned without disassembly by using Carbon X(X55) or equivalent.

1. Remove air cleaner and disconnect choke rod upper lever.
2. Remove bolt attaching choke coil to head, and remove choke coil and choke rod as an assembly.
3. Disconnect choke rod from choke coil.
4. Connect choke rod to new choke coil and install assembly on manifold.
5. Install bolt and tighten securely.
6. Adjust and connect choke rod as outlined.
7. Start and warm-up engine, then check operation of choke and install air cleaner.

AIR HORN TIGHTENING SEQUENCE

Refer to Figure 18 for proper air horn tightening sequence.

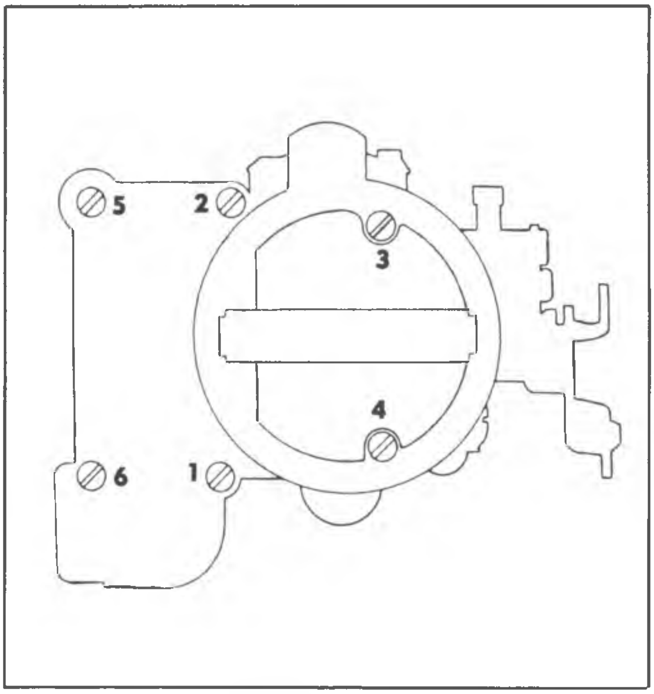


Fig. 18–Air Horn Tightening Sequence

DIAGNOSIS

GENERAL

When carburetor troubles are encountered they can usually be diagnosed and corrected with an adjustment as outlined below and under Maintenance and Adjustments.

Before diagnosing the carburetor as the trouble area, check and diagnose the following:

1. Fuel Supply
2. Fuel pump pressure and volume.
3. Plugged fuel filter or fuel lines.
4. Linkage and emission control systems.
5. Engine compression.
6. Ignition system firing voltage.
7. Ignition spark timing.
8. Spark plugs
9. Secure intake manifold.
10. Engine temperature.

Use the following tables to diagnose carburetor.

Problem: ENGINE IDLES ROUGH AND STALLS

Idle speed setting.	Re-set low and curb idle speeds under maintenance and adjustments.
Manifold vacuum hoses disconnected or improperly installed.	Check all vacuum hoses leading into the manifold or carburetor base for leaks or being disconnected. Install or replace as necessary.
Carburetor loose on intake manifold.	Torque carburetor to manifold bolts (10-14 ft. lbs.).
Intake manifold is loose or gaskets are defective.	Using a pressure oil can, spray light oil or kerosene around manifold legs and carburetor base. If engine RPM changes, tighten or replace the manifold gaskets or carburetor base gaskets as necessary.
Hot idle compensator not operating (where used.)	Normally the hot idle compensator should be closed when engine is running cold and open when engine is hot (approx. 140°F at comp.) replace if defective.
Carburetor flooding. NOTE: Also check carburetor flooding when engine cranks (turn over) but will not start or starts hard when cold.	1. Remove air horn and check float adjustment, as specified in carburetor overhaul section. 2. Check float needle and seat for proper seal. If a needle and seat tester is not available, mouth suction can be applied to the needle seat with needle installed. If the needle is defective, replace with a factory matched set. 3. Check float for being loaded with fuel, bent float hanger or binds in the float arm. NOTE: A solid float can be checked for fuel absorption by lightly squeezing between fingers. If wetness appears on surface or float feels heavy (check with known good float), replace the float assembly. 4. If excessive dirt is found in the carburetor, clean the fuel system and carburetor. Replace fuel filter as necessary.

Problem:

ENGINE CRANKS (TURNS OVER) BUT WILL NOT START OR STARTS HARD WHEN COLD.

POSSIBLE CAUSE	CORRECTIVE ACTION
Improper starting procedure used.	Check proper starting, as outlined in the owner's manual.
No fuel in gas tank	Add fuel. Check fuel gauge for proper operation.
Choke valve not closing sufficiently when cold.	Adjust the choke coil rod.
Choke valve or linkage binding or sticking.	Realign the choke valve or linkage as necessary. If caused by dirt and gum, clean with automatic choke cleaner. Do not oil choke linkage. If parts are replaced, check adjustments.
No fuel in carburetor.	1. Remove fuel line at carburetor. Connect hose to fuel line and run into metal container. Remove the high tension coil wire from center tower on distributor cap and ground. Crank over engine – if there is no fuel discharge from the fuel line, check for kinked or bent lines. Disconnect fuel line at tank and blow out with air hose, reconnect line and check again for fuel discharge. If none, replace fuel pump. Check pump for adequate flow, as outlined in service manual. 2. If fuel supply is o.k., check the following: a. Inspect fuel filter. If plugged replace. b. If filter is o.k., remove air horn and check for a bind in the float mechanism or a sticking float needle. If o.k., adjust float as specified in carburetor overhaul section.
Engine Flooded. NOTE: To check for flooding, remove the air cleaner, with the engine off, and look into the carburetor bore. Fuel will be dripping off nozzle and/or the carburetor will be very wet.	Check proper carburetor unloading procedure. Depress the accelerator to the floor and check the carburetor to determine if the choke valve is opening. If not, adjust the throttle linkage and unloader, as specified.
Carburetor flooding	NOTE: Before removing the carburetor air horn, use the following procedure which may eliminate the flooding. 1. Remove the fuel line at the carburetor and plug. Crank and run the engine until the fuel bowl runs dry. Turn off the engine and connect fuel line. Then re-start and run engine. This will usually flush dirt past the carburetor float needle and seat. 2. If dirt is in fuel system, clean the system and replace fuel filter as necessary. If excessive dirt is found, remove the carburetor unit. Disassemble and clean. 3. Check float needle and seat for proper seal. If a needle and seat tester is not available, apply mouth suction to the needle seat with needle installed. If the needle is defective, replace with a factory matched set. 4. Check float for being loaded with fuel, bent float hanger or binds in the float arm. NOTE: Check float for fuel absorption by lightly squeezing between fingers. If wetness appears on surface or float feels heavy (Check with known good float), replace the float assembly. 5. Adjust float as specified in carburetor overhaul section.

Problem: ENGINE STARTS AND STALLS

Engine does not have enough fast idle speed when cold.	Check and re-set the fast idle setting and fast idle cam.
Choke vacuum break unit is not adjusted to specification or unit is defective.	1. Adjust vacuum break to specification. 2. If adjusted O.K., check the vacuum break for proper operation as follows: On the externally mounted vacuum break unit, connect a piece of hose to the nipple on the vacuum break unit and apply suction by mouth or use tool J-23418 to apply vacuum. Plunger should move inward and hold vacuum. If not, replace the unit. NOTE: Always check the fast idle cam adjustment before adjusting vacuum break unit.
Choke coil rod out of adjustment.	Adjust choke coil rod.
Choke valve and/or linkage sticking or binding.	1. Clean and align choke valve and linkage. Replace if necessary. 2. Re-adjust if part replacement is necessary.
Idle speed setting	Adjust low and curb idle speeds to specifications on label in engine compartment.
Not enough fuel in carburetor.	1. Check fuel pump pressure and volume. 2. Check for partially plugged fuel inlet filter. Replace if dirty. 3. Remove air horn and check float adjustments as specified in carburetor overhaul section.
Carburetor flooding. NOTE: Also check carburetor flooding when engine cranks (turn over) but will not start or starts hard when cold.	1. Check float needle and seat for proper seal. If a needle and seat tester is not available, mouth suction can be applied to the needle seat with needle installed. If needle is defective, replace with a factory matched set. 2. Check float for being loaded with fuel, bent float hanger or binds in the float arm. NOTE: Check float for fuel absorption by lightly squeezing between fingers. If wetness appears on surface or float feels heavy (check with known good float), replace the float assembly. 3. Check float adjustments as specified in carburetor overhaul section. 4. If excessive dirt is found in the carburetor, clean the fuel system and carburetor. Replace fuel filter as necessary.

Problem: ENGINE RUNS UNEVEN OR SURGES

POSSIBLE CAUSE	CORRECTIVE ACTION
Fuel Restriction	Check all hoses and fuel lines for bends, kinks or leaks. Straighten and secure in position. Check all fuel filters. If plugged or dirty - replace.
Dirt or water in fuel system.	Clean fuel tank and lines. Remove and clean carburetor.
Fuel level	Adjust float as specified in carburetor overhaul section. Check for free float and float needle valve operation.
Main metering jet defective, loose or incorrect part.	Replace as necessary.
Power system in carburetor not functioning properly. Power valve sticking in down position.	Free up or replace as necessary.
Vacuum leakage	It is absolutely necessary that all vacuum hoses and gaskets are properly installed, with no air leaks. The carburetor and manifold should be evenly tightened to specified torque.

Problem: POOR FUEL ECONOMY

Engine needs complete tune-up.	Check engine compression. Examine spark plugs, (if dirty or improperly gapped, clean and re-gap or replace). Check ignition point dwell, condition, readjust ignition points if necessary and check and reset ignition timing. Clean or replace air cleaner element if dirty. Check for restricted exhaust system and intake manifold for leakage, make sure all vacuum hoses are connected correctly.
Choke valve not fully opening.	1. Clean choke and free up linkage. 2. Check choke coil rod for proper adjustment. Reset to specifications.
Fuel leaks.	Check fuel tank, fuel lines and fuel pump for any fuel leakage.
Power system in carburetor not functioning properly. Power valve sticking in up position.	Free up or replace as necessary.
High fuel level in carburetor or carburetor flooding.	1. Check for dirt in the needle and seat. Test using suction by mouth or needle seat tester. If defective, replace needle and seat assembly with factory matched set. 2. Check for loaded float. 3. Re-set carburetor float as specified in carburetor overhaul section. 4. If excessive dirt is present in the carburetor bowl, the carburetor should be cleaned.
Fuel being pulled from accelerator system into venturi through pump jet.	Run engine at RPM where nozzle is feeding fuel. Observe pump jet. If fuel is feeding from jet, check pump discharge ball for proper seating by filling cavity above ball with fuel to level of casting. No "leak down" should occur with discharge ball in place. Re-stake or replace leaking check ball, defective spring, or retainer.
Air bleeds or fuel passages in carburetor dirty or plugged.	Clean carburetor or overhaul as necessary.

Problem: ENGINE HESITATES ON ACCELERATION

Defective accelerator pump system NOTE: A quick check of the pump system can be made as follows. With the engine off, remove air cleaner and look into the carburetor bores and observe pump stream, while briskly opening throttle valve. A full stream of fuel should emit from pump jet and strike near the center of the venturi area.	1. Remove air horn and check pump cup. If cracked, scored or distorted, replace the pump plunger. 2. Check the pump discharge ball for proper seating and location. The pump discharge ball is located in a cavity next to the pump well. To check for proper seating, remove air horn and gasket and fill cavity with fuel. No "leak down" should occur. Restake and replace check ball if leaking. Make sure discharge ball, spring, and retainer are properly installed.
Dirt in pump passages or pump jet.	Clean and Blow out with compressed air.
Fuel level.	Check for sticking float needle or binding float. Free up or replace parts as necessary. Check and reset float level as specified in carburetor overhaul section.
Leaking air horn to float bowl gasket.	Torque air horn to float bowl using proper tightening procedure.
Carburetor loose on manifold.	Torque carburetor to manifold bolts. (10-14 ft. lbs.).

Problem: NO POWER ON HEAVY ACCELERATION OR AT HIGH SPEED

Carburetor throttle valve not going wide open. (Check by pushing accelerator pedal to floor).	Adjust throttle linkage to obtain wide open throttle in carburetor.
Dirty or plugged fuel filter.	Replace with a new filter element.
Power system not operating.	Check power valve for free up and down movement.
Float level too low.	1. Check and reset float level as specified in carburetor overhaul section.
Float not dropping far enough into float bowl.	Check for binding float hanger and for proper float alignment in float bowl.
Main metering jet dirty, plugged or incorrect part.	1. If the main metering jet is plugged or dirty and excessive dirt is in fuel bowl, carburetor should be completely disassembled and cleaned.

Problem: ENGINE STARTS HARD WHEN HOT

Choke valve not opening completely.	1. Check for binding choke valve and/or linkage. Clean and free-up or replace parts as necessary. Do not oil choke linkage. 2. Check and adjust choke coil rod.
Engine flooded - Carburetor flooding.	See procedure under "Engine cranks, will not start".
No fuel in carburetor.	1. Check fuel pump. Run pressure and volume test. 2. Check float needle for sticking in seat, or binding float.
Leaking float bowl.	Fill bowl with fuel and look for leaks.

2GC CARBURETOR

GENERAL DESCRIPTION

The Model 2GC (Figs. 19 and 20) is equipped with an integral choke attached to the throttle body assembly. A large drilled hole in the air horn leads from inside the air horn bore to a vapor dome located in the air horn casting above the fuel in the float bowl.

Vapor canister purge ports are located in the throttle body casting. The ports connect by a channel to a tube pressed into the throttle body casting which leads directly to the vapor canister. This provides adequate purge during engine operation to remove all fuel vapors from the vapor collection canister.

The pump system has a raised cast in boss on the floor of the float bowl, which prevents entry of dirt into the accelerator pump - power valve fuel inlet passage. The pump plunger head has an expander spring beneath the pump cup to maintain good pump wall contact during pump operation.

The end of the pump plunger stem is upset in manufacturing to provide the "clipless" retaining feature. The pump plunger assembly may be removed from the inner lever by twisting upset end with small pliers until it breaks. The service pump assembly has a grooved end and is provided with a retaining clip.

Alphabetical code letters cast next to the vacuum and air tubes identify all hose connections. As mentioned, the code letters are alphabetical and should be referred to during carburetor installation on the engine.

The carburetor part number is stamped on the flat section of the float bowl next to the fuel inlet nut. When servicing the carburetor unit, refer to the Adjustment section for proper procedures and specifications.

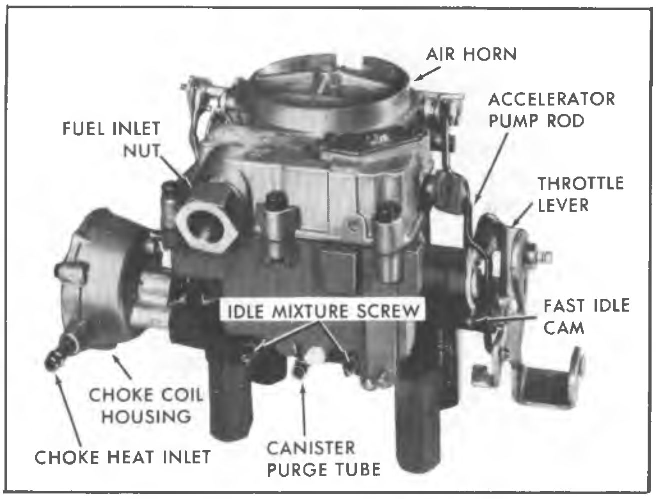


Fig. 19-2GC Carburetor - Front

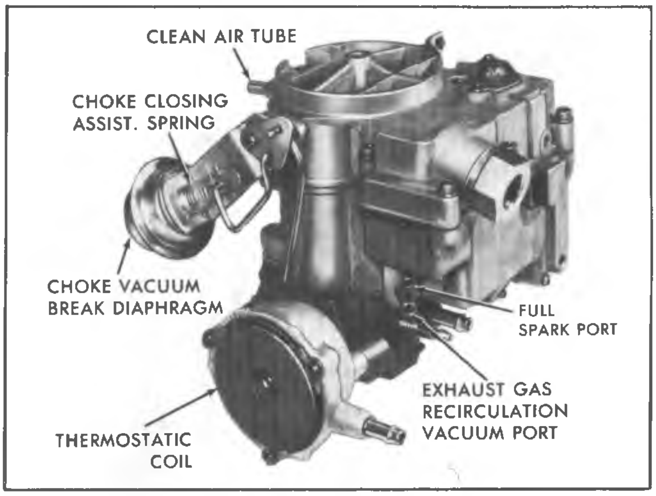


Fig. 20-2GC Carburetor - 3/4 View

THEORY OF OPERATION

FLOAT SYSTEM (Fig. 21)

The float system controls the level of the fuel in the carburetor bowl. Fuel level is very important because it must be maintained to give proper metering through all operating ranges. As fuel is used from the carburetor bowl, the plastic float drops, moving the float needle off its seat allowing more fuel to enter the bowl, thereby keeping the fuel level constant.

The fuel bowl is internally vented by a large drilled hole which leads from inside the air horn bore to a vapor dome above the fuel in the float bowl. The internal vent provides a balance in air pressure to maintain constant air/fuel mixture ratios. Also, the large internal hole vents fuel vapors that form during periods of hot engine operation for improved hot idle and restart.

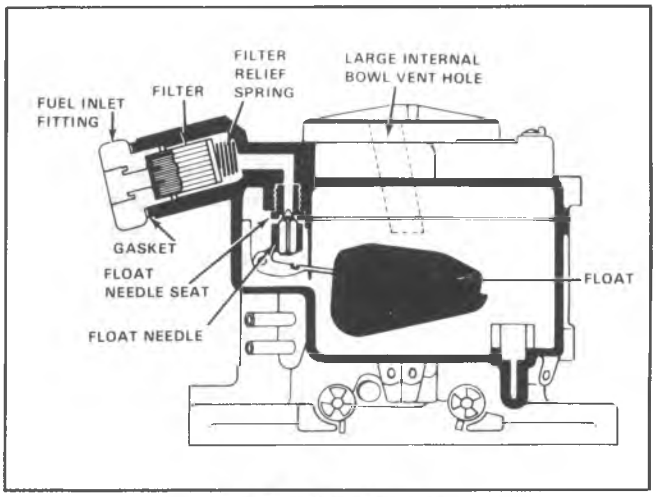


Fig. 21-Float System

IDLE (LOW SPEED) SYSTEM (Fig. 22)

The idle system is used to provide the proper mixture ratios required during idle and low speed operation of the engine.

The idle system consists of the idle tubes, idle passages, idle air bleeds, idle mixture needles, off-idle discharge ports and idle needle discharge holes.

The idle mixture needle discharge holes provide fuel for curb engine idle. As the throttle valve is opened further, the off-idle discharge ports are exposed to manifold vacuum. These ports supply additional fuel mixture for off-idle engine requirements.

The fuel vapor collection canister is purged by ports located in the carburetor throttle body. Timed purge ports are connected from the carburetor bore to a common tube pressed into the throttle body casting. The tube connects directly to the vapor canister through a hose. Timed purge ports (one in each bore), located above the throttle valve near the off-idle discharge ports, purge the canister during off-idle and part throttle ranges of operation.

An Exhaust Gas Recirculation system is used to control oxides of nitrogen. A vacuum supply tube, located just beneath the spark tube on the float bowl, connects by a channel to purge ports located just above the throttle valve in the throttle body bore.

As the throttle valve is opened beyond the idle position, the E.G.R. ports are exposed to manifold vacuum which supplies a signal to the diaphragm in the E.G.R. valve. The two ports located in the throttle body bore are timed to provide just the right amount of vacuum to the E.G.R. valve diaphragm to control exhaust gases introduced into the intake manifold air/fuel mixtures.

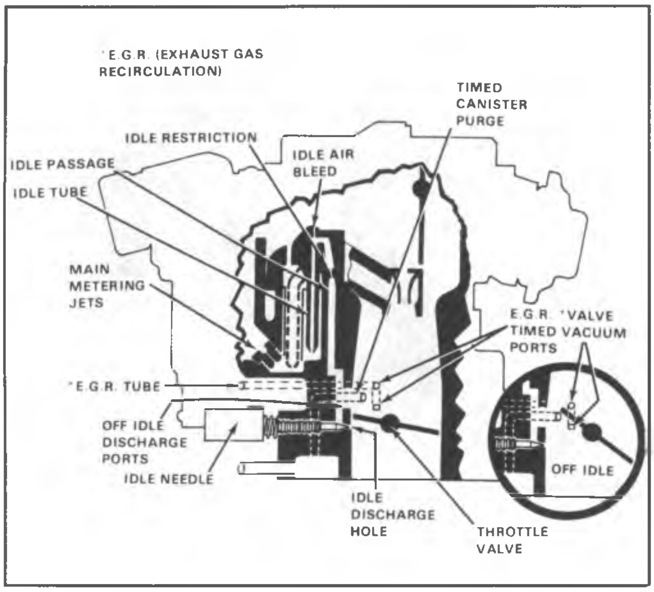


Fig. 22–Idle (Low Speed) System

MAIN METERING SYSTEM (Fig. 23)

As the throttle valves continue to open, the edge of the valves are gradually moving away from the wall of the carburetor bore, reducing the vacuum acting on the idle needle and off-idle discharge ports which gradually decreases fuel flow from the idle system.

With the increased throttle opening, there is increased air velocity in the venturi system. This causes a drop in pressure in the large venturi which is increased many times in the small venturi. Since the low pressure (high vacuum) is now in the small venturi, fuel will flow in the following manner:

Fuel from the float bowl passes through the main metering jets into the main wells and rises in the main well tubes. Plastic main well inserts are used in the main wells to provide smooth fuel flow for efficient metering. This results in improved fuel control in the off-idle, transfer, and part throttle range of operation. Air entering the main wells through the main well air bleeds is mixed with fuel through calibrated holes in the main well tube. The mixture moves up and out of the main discharge nozzles into a mixture (high speed) passage where more air is added. The mixture then travels down through the mixture passage to the small venturi where it is delivered to the air stream and on into the engine intake manifold.

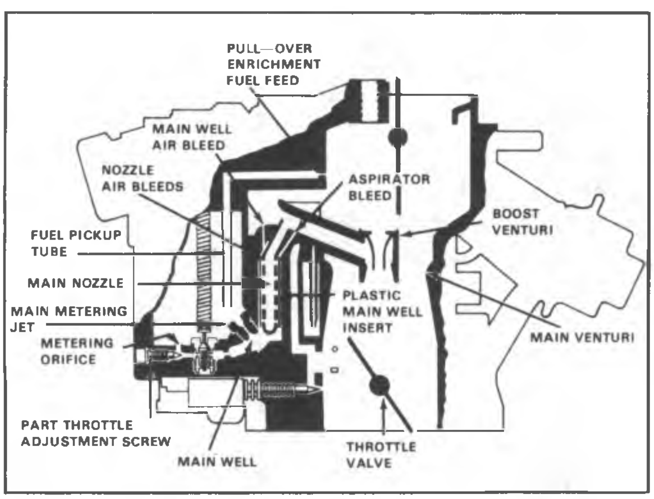


Fig. 23–Main Metering System

On some models, an additional fuel circuit, called "pull-over" enrichment (P.O.E.), has been provided which supplements the main metering system of the carburetor unit. In order to provide sufficient enrichment to the main metering system at higher air flows, two additional fuel feeds are located in the air horn just above the choke valve. They connect directly to the fuel in the float bowl, through channels which lead directly into a tube that extends into the fuel just above the main metering jets. At approximately 8 pounds of air per minute and above, the extra fuel enrichment is added to supplement the main metering system.

With the addition of the pull-over enrichment system, leaner mixtures can be maintained during the part throttle or cruising ranges and extra fuel supplied at higher air flows to meet engine demands.

POWER ENRICHMENT SYSTEM (Fig. 24)

The conventional vacuum sensitive power piston and power valve are used for power requirements. When manifold vacuum drops to a pre-determined point (called power cut-in), the power piston moves downward against spring tension to force the power valve plunger off its seat.

Fuel then flows from the float bowl down past the valve plunger through a small calibrated orifice in the valve side and on into separate fuel channels leading to the power restrictions. The fuel passes through the power restrictions into the main fuel wells for desired enrichment at the main discharge nozzles. The power valve, located at the bottom of the fuel bowl, provides the correct fuel enrichment for power requirements.

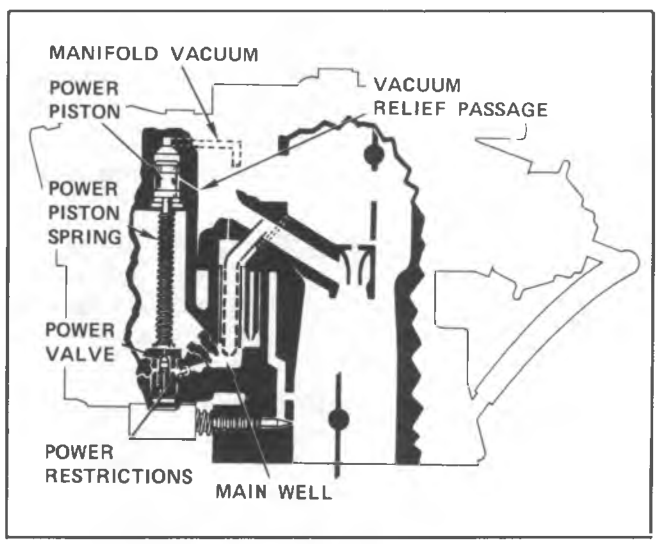


Fig. 24–Power Enrichment System

PUMP SYSTEM (Fig. 25)

When the throttle valve is opened rapidly, air flow and manifold vacuum change almost instantly, while the heavier fuel tends to lag behind causing a momentary leanness. The accelerator pump system provides the fuel necessary for smooth operation on rapid acceleration.

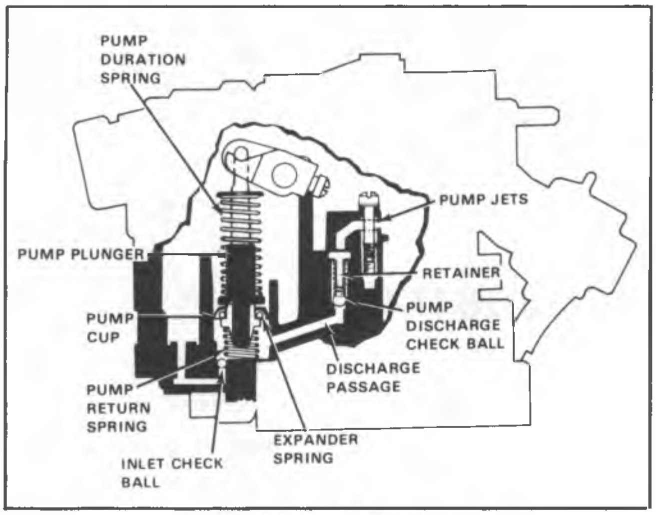


Fig. 25–Pump System

Fuel for acceleration is supplied by a double spring loaded pump plunger. The top and bottom springs combine to move the plunger so that a smooth sustained charge of fuel is delivered for acceleration.

Fuel is drawn into the pump well through the inlet check ball on the upward stroke of the pump plunger.

Downward motion of the pump plunger, as on acceleration, seats the aluminum inlet check ball and forces the fuel through the pump discharge passage where it unseats the pump discharge ball and passes on through to the pump jets, where it sprays into the venturi area.

An expander spring located beneath the pump cup ensures good contact between the lip of the pump cup and the pump well at all times. When the pump is not in operation, the pump cup unseats from the plunger head and acts as a vent for the pump well. If vapors form in the pump well during hot operation, they are vented between the head and pump cup out into the fuel bowl. Without this pump vent, vapor pressure in the pump well might force fuel from the pump system into the engine manifold, causing hard starting when the engine is hot.

The pump discharge ball in the accelerator pump passage prevents any pump pull-over or discharge of fuel from the pump nozzles when the accelerator is inoperative.

OPERATION OF CHOKE SYSTEM (Fig. 26)

The model 2GC carburetor has an integral choke housing and thermostatic coil assembly mounted on the carburetor throttle body.

The choke system operates as follows:

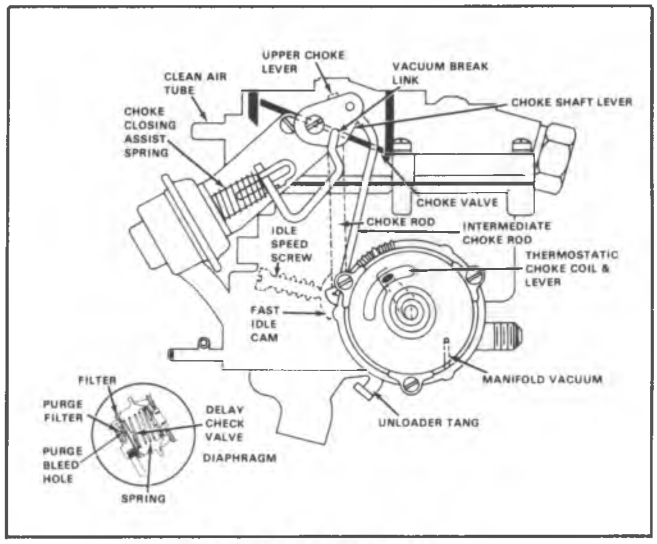


Fig. 26–Choke System

The thermostatic coil in the choke housing is calibrated to hold the choke valve closed when the engine is cold.

To close the choke valve, depress the accelerator pedal completely to allow the idle speed screw to clear the steps on the fast idle cam. At this point, tension of the thermostatic coil will rotate the choke valve to the closed position and the idle speed screw will come to rest on the highest step of the fast idle cam.

During engine starting, the high vacuum beneath the choke valve causes extra fuel to flow from the carburetor ports providing a rich mixture for quick engine starting. When the engine starts and is running, manifold vacuum is applied to the vacuum break diaphragm unit mounted on the carburetor air horn. The diaphragm unit, connected by linkage to the choke valve, opens the choke valve a predetermined amount against coil tension so that the air/fuel mixture will be lean enough so the engine will run without loading or stalling. When the choke valve moves to the vacuum break position, the fast idle cam will drop from the high step to a lower step when the throttle is opened. The vacuum break unit is delayed in operation by an internal bleed check valve. The delay check valve slows down further opening of the valve a few seconds until the engine will run on slightly leaner mixtures.

A choke closing assist spring is used on the vacuum diaphragm plunger stem. The spring assists in closing the choke valve, along with tension from the choke thermostatic coil, for improved cold starting. The choke closing assist spring only exerts pressure on the vacuum break rod to assist in closing the choke valve during engine starting. When the engine starts and the choke vacuum diaphragm seats, the closing spring retainer hits a stop on the plunger stem and no longer exerts pressure on the vacuum break rod.

A clean air purge feature is used on the vacuum break unit. The purpose of the clean air purge is to bleed air into the vacuum break passage and purge the system of any fuel vapors or dirt which might contaminate and plug the check valve located inside the diaphragm unit. The purge system consists of a small bleed hole located in the end cover of the vacuum break diaphragm.

A ball check is encased in the vacuum inlet tube. The ball seats when backfiring occurs to prevent contamination of filter. Under normal engine operation the ball is pulled off its seat by manifold vacuum.

During engine operation, vacuum acting upon the diaphragm unit pulls a small amount of filtered air through the bleed hole to purge the system.

Engine vacuum supplied through an orifice in the choke housing pulls heat from the manifold heat stove into the housing and gradually relaxes coil tension which allows the choke valve to continue opening through inlet air pressure pushing on the off-set choke valve.

The choke system is equipped with an unloader feature to partially open the choke valve should the engine become flooded or loaded.

To unload the engine, the accelerator pedal must be depressed so that the throttle valves are held wide open. A tang on the throttle lever contacts the fast idle cam and through the choke rod forces the choke valve slightly open. This allows extra air to enter the carburetor bores and pass on into the engine manifold to lean out the fuel mixtures so the engine will start.

MAINTENANCE AND ADJUSTMENT

IDLE SPEED ADJUSTMENT

1. With engine at normal operating temperature, air cleaner on, choke open, and air conditioning OFF, connect a tachometer to engine.
2. Set parking brake and block drive wheels.
3. Disconnect vacuum advance hose at distributor and plug hose.
4. Start engine, check timing and adjust as required. Reconnect vacuum advance hose.
5. With automatic transmission in Drive or manual transmission in Neutral, turn idle speed screw to specified rpm.
6. Shut off engine and remove tachometer.
7. Remove blocks from drive wheels.

IDLE MIXTURE

The idle mixture is factory preset and idle mixture screws are capped with plastic limiter caps. The cap permits screw to be turned about one turn leaner (clockwise) without breaking cap. The idle mixture is set to achieve the smoothest idle while maintaining emission levels within standards prescribed by Federal Law.

At major carburetor overhaul the idle mixture may be adjusted. Before suspecting idle mixture as cause of poor idle quality, check ignition system, distributor, timing, air cleaner, PCV system, evaporation emission control and compression pressures. Also check all vacuum hoses and connections for leaks and check torques of carburetor attachment bolts. Adjustment is made using a tachometer.

Idle Mixture Adjustment

1. With engine at normal operating temperature, air cleaner on, choke open, and air conditioning OFF, connect a tachometer to engine.
2. Set parking brake and block drive wheels.
3. Disconnect vacuum advance hose at distributor and plug hose.
4. Start engine, check timing and adjust as required. Reconnect vacuum advances hose.
5. With engine at normal operating temperature (not hot), air conditioning off, and air cleaner installed, position transmission selector in Drive (automatic transmission) or Neutral (manual transmission).
6. Break off tab on mixture cap using needle nose pliers.
7. Adjust idle rpm to the higher of the two idle speeds specified. (Example **650** /600).
8. Equally enrich (turn out) mixture screws until maximum idle speed is achieved. Reset speed if necessary to the higher specified idle speed.
9. Equally lean (turn in) mixture screws until the lower specified idle speed is achieved (Example 650/ **600**).

PUMP ROD ADJUSTMENT (Fig. 27)

1. Back out idle speed adjusting screw.
2. Hold throttle valve completely closed.
3. Gauge from top of air horn ring to top of pump rod.
4. If adjustment is required, bend rod.

INTERMEDIATE CHOKE ROD ADJUSTMENT (Fig. 28)

1. Remove thermostatic cover coil, gasket, and inside baffle plate assembly by removing three attaching screws and retainers.
2. Place idle speed screw on the highest step of fast idle cam.
3. Close choke valve by pushing up on intermediate choke lever.

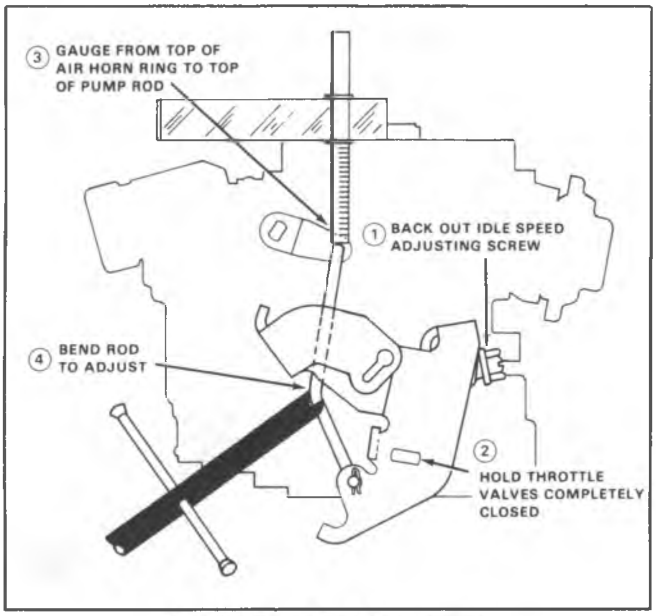


Fig. 27–Pump Rod Adjustment

4. Edge of coil lever inside choke housing must line up with edge of plug gauge.
5. Bend intermediate choke rod at point shown to adjust.
6. Install thermostatic coil and cover referring to automatic choke coil adjustment.

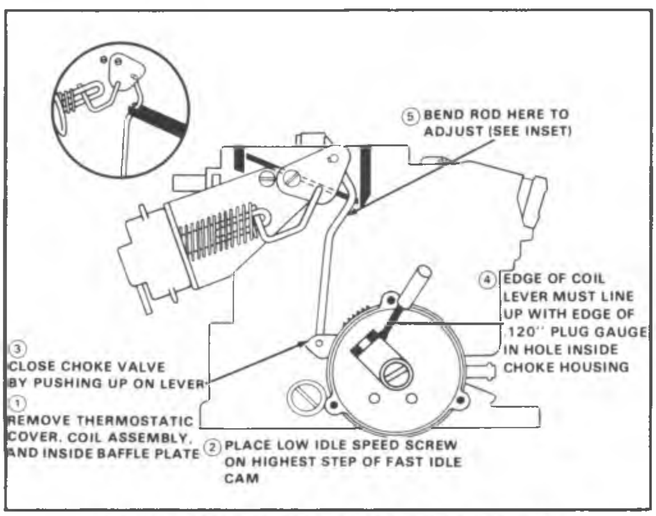


Fig. 28–Intermediate Choke Rod Adjustment

AUTOMATIC CHOKE COIL ADJUSTMENT (Fig. 29)

1. Place idle speed screw on the highest step of fast idle cam.
2. Loosen thermostatic choke coil cover retaining screws.
3. Rotate choke cover against coil tension until choke valve begins to close. Continue rotating until index mark lines up with specified point on choke housing.
4. Tighten choke cover retaining screws.

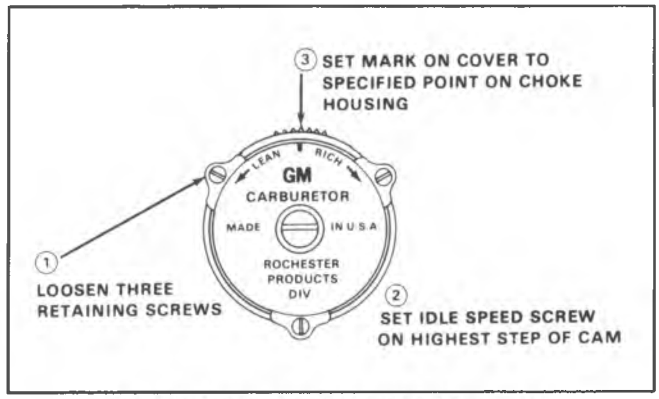


Fig. 29–Automatic Choke Coil Adjustment

FAST IDLE CAM ADJUSTMENT (Fig. 30)

1. Turn idle speed screw in until it just contacts low step of fast idle cam. Then, turn screw in one full turn.
2. Place idle speed screw on second step of fast idle cam against highest step.
3. Place gauge between upper edge of choke valve and wall of air horn.
4. If adjustment is required, bend choke lever tang.

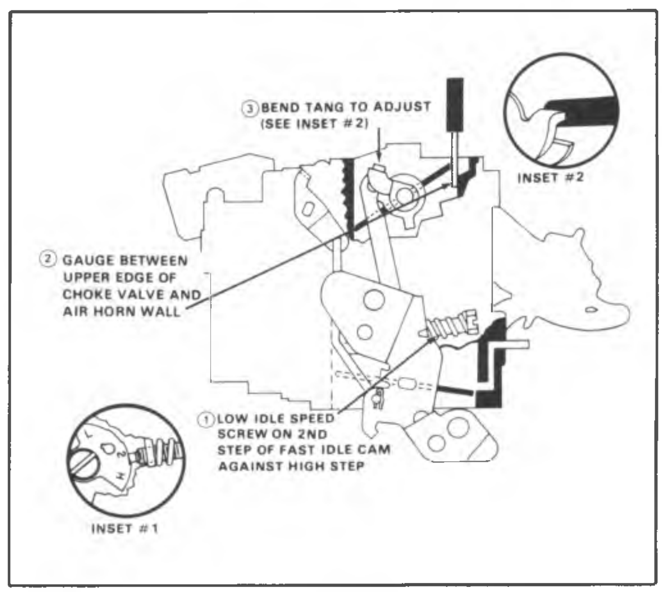


Fig. 30–Fast Idle Cam Adjustment

VACUUM BREAK ADJUSTMENT (FIG. 31)

1. Seat the vacuum break diaphragm using an outside vacuum source.
2. Cover vacuum break bleed hole as shown using a small piece of tape, so that diaphragm unit will hold inward and not bleed down.

3. Place idle speed screw on high step of fast idle cam.
4. Remove thermostatic coil and cover and hold choke coil lever inside choke housing towards the closed choke position.
5. Gauge between upper edge of choke valve and air horn wall.
6. Bend vacuum break rod at point shown to adjust.
7. After adjustment, remove piece of tape covering small bleed hole at rear of vacuum break diaphragm unit. Reconnect vacuum hose.
8. Install thermostatic coil and cover referring to automatic choke coil adjustment.

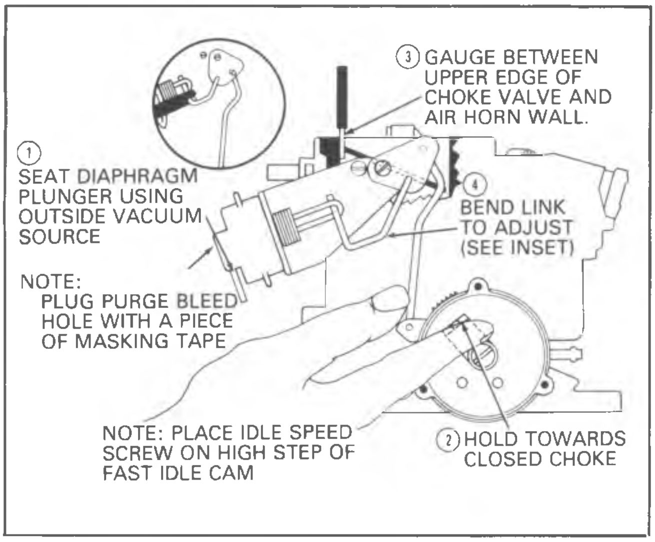


Fig. 31–Vacuum Break Adjustment

CHOKE UNLOADER ADJUSTMENT (Fig. 32)

1. With throttle valves held in wide open position, place choke valve toward closed position.
2. Place specified gauge between upper edge of choke valve and air horn casting to check clearance.
3. If adjustment is required, bend tang on throttle lever.

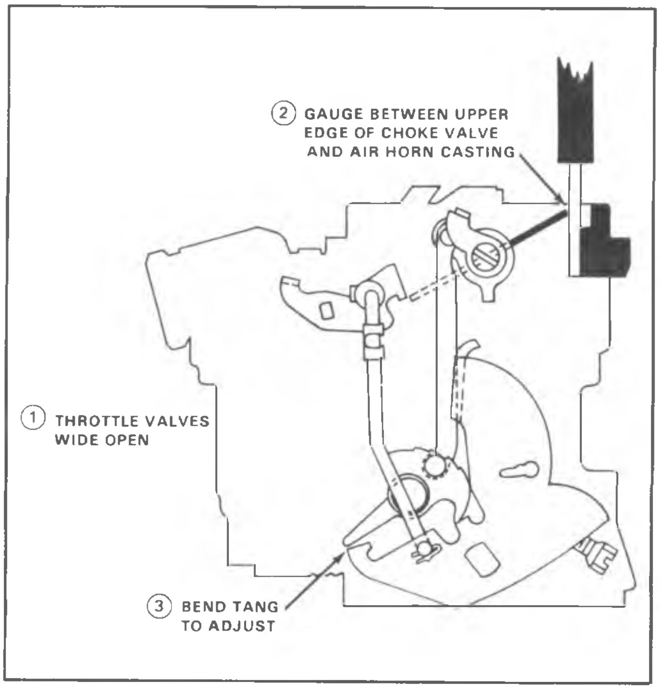


Fig. 32–Choke Unloader Adjustment

SERVICE OPERATIONS

CARBURETOR REPLACEMENT (Fig. 33)

Removal

Flooding, stumble on acceleration and other performance complaints are, in many instances, caused by presence of dirt, water, or other foreign matter in carburetor. To aid in diagnosis, carburetor should be carefully removed from engine without draining fuel from bowl. Contents of fuel bowl may then be examined for contamination as carburetor is disassembled. Check filter.

1. Remove air cleaner and gasket.
2. Disconnect fuel and vacuum lines from carburetor.
3. Disconnect fresh air hose and choke hose from choke system.
4. Disconnect accelerator linkage.
5. If equipped with automatic transmission, disconnect detent cable.
6. Remove carburetor attaching bolts and remove carburetor.
7. Remove insulator.

Installation

It is good shop practice to fill carburetor bowl before installing carburetor. This reduces strain on starting motor and battery and reduces the possibility of backfiring while attempting to start engine. A small supply of fuel will enable carburetor to be filled and the operation of float and intake needle and seat to be checked. Operate throttle lever several times and check discharge from pump jets before installing carburetor.

1. Clean throttle body and intake manifold sealing surfaces.
2. Install new insulator.

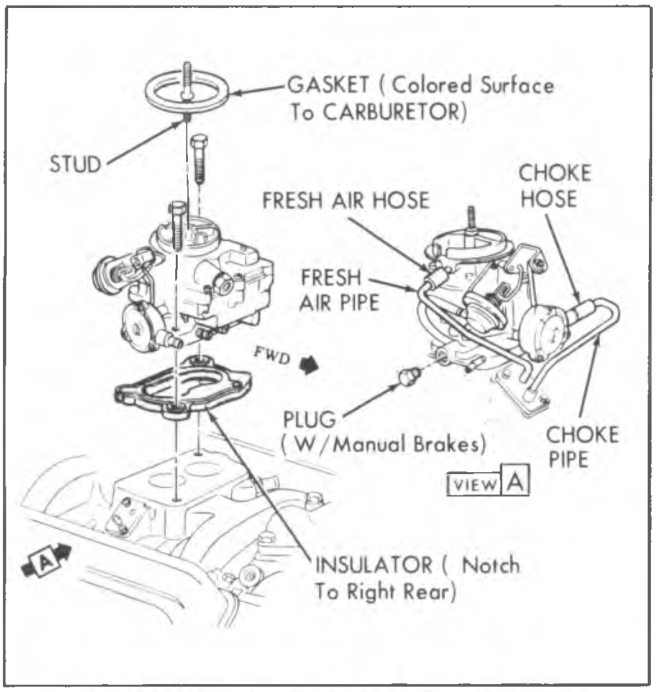


Fig. 33–Carburetor and Choke Pipes, V8, 2Bbl.

Fig. 34–Fuel Filter Replacement

3. Position carburetor over intake manifold and install bolts. Tighten bolts simultaneously to 145 in. lbs.
4. Connect detent cable and adjust as required.
5. Connect accelerator linkage.
6. Connect fresh air hose and choke hose to choke system.
7. Connect fuel and vacuum lines.
8. Install air cleaner.
9. Refer to Maintenance and Adjustment and check idle speed.

FUEL FILTER REPLACEMENT (Fig. 34)

A plugged fuel filter will restrict fuel flow into carburetor and will result in a loss of engine power.

1. Disconnect fuel line connection at inlet fuel filter nut.
2. Remove inlet fuel filter nut from carburetor.
3. Remove filter element and spring.
4. Install element spring and filter element in carburetor.
5. Install new gasket on inlet fitting nut and install nut in carburetor and tighten securely.
6. Install fuel line and tighten connector.

AIR HORN TIGHTENING SEQUENCE

Refer to figure 35 for proper air horn tightening sequence.

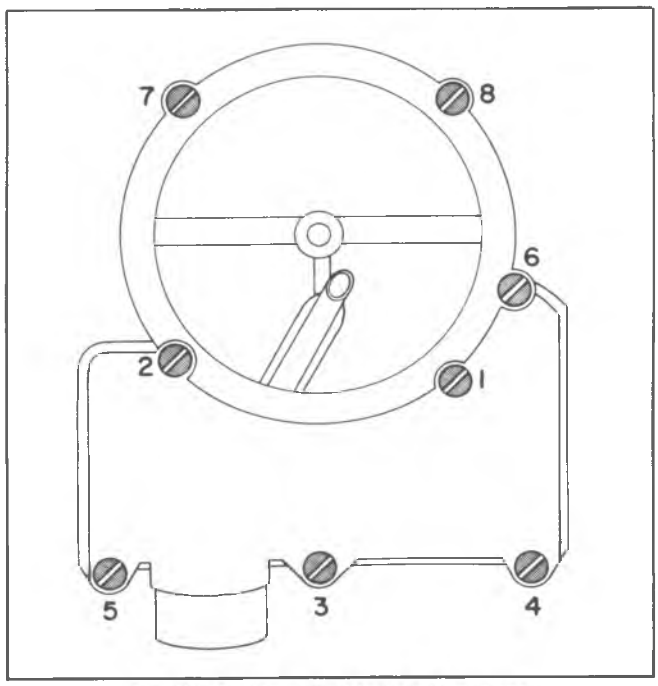


Fig. 35–Air Horn Tightening Sequence

DIAGNOSIS

GENERAL

When carburetor troubles are encountered they can usually be diagnosed and corrected with an adjustment as outlined below and under Maintenance and Adjustments.

Before diagnosing the carburetor as the trouble area, check and diagnose the following:

1. Fuel Supply
2. Fuel pump pressure and volume.
3. Plugged fuel filter or fuel lines.
4. Linkage and emission control systems.
5. Engine compression.
6. Ignition system firing voltage.
7. Ignition spark timing.
8. Spark plugs
9. Secure intake manifold.
10. Engine temperature.

Use the following tables to diagnose carburetor.

Problem: ENGINE IDLES ROUGH AND STALLS

Idle speed setting.	Re-set low and curb idle speeds under maintenance and adjustments.
Manifold vacuum hoses disconnected or improperly installed.	Check all vacuum hoses leading into the manifold or carburetor base for leaks or being disconnected. Install or replace as necessary.
Carburetor loose on intake manifold.	Torque carburetor to manifold bolts (10-14 ft. lbs.).
Intake manifold is loose or gaskets are defective.	Using a pressure oil can, spray light oil or kerosene around manifold legs and carburetor base. If engine RPM changes, tighten or replace the manifold gaskets or carburetor base gaskets as necessary.
Hot idle compensator not operating (where used.)	Normally the hot idle compensator should be closed when engine is running cold and open when engine is hot (approx. 140°F at comp.) replace if defective.
Carburetor flooding. NOTE: Also check carburetor flooding when engine cranks (turn over) but will not start or starts hard when cold.	1. Remove air horn and check float adjustment, as specified in carburetor overhaul section. 2. Check float needle and seat for proper seal. If a needle and seat tester is not available, mouth suction can be applied to the needle seat with needle installed. If the needle is defective, replace with a factory matched set. 3. Check float for being loaded with fuel, bent float hanger or binds in the float arm. NOTE: A solid float can be checked for fuel absorption by lightly squeezing between fingers. If wetness appears on surface or float feels heavy (check with known good float), replace the float assembly. 4. If excessive dirt is found in the carburetor, clean the fuel system and carburetor. Replace fuel filter as necessary.

Problem:

ENGINE CRANKS (TURNS OVER) BUT WILL NOT START OR STARTS HARD WHEN COLD.

POSSIBLE CAUSE	CORRECTIVE ACTION
Improper starting procedure used.	Check proper starting, as outlined in the owner's manual.
No fuel in gas tank	Add fuel. Check fuel gauge for proper operation.
Choke valve not closing sufficiently when cold.	Adjust the choke coil rod.
Choke valve or linkage binding or sticking.	Realign the choke valve or linkage as necessary. If caused by dirt and gum, clean with automatic choke cleaner. Do not oil choke linkage. If parts are replaced, check adjustments.
Inoperative choke or vacuum break.	1. Inspect choke and vacuum break for worn or missing parts. Replace and adjust as required. 2. Inspect choke thermostatic coil for proper operation. Replace and adjust as required.
No fuel in carburetor.	1. Remove fuel line at carburetor. Connect hose to fuel line and run into metal container. Remove the high tension coil wire from center tower on distributor cap and ground. Crank over engine – if there is no fuel discharge from the fuel line, check for kinked or bent lines. Disconnect fuel line at tank and blow out with air hose, reconnect line and check again for fuel discharge. If none, replace fuel pump. Check pump for adequate flow, as outlined in service manual. 2. If fuel supply is o.k., check the following: a. Inspect fuel filter. If plugged replace. b. If filter is o.k., remove air horn and check for a bind in the float mechanism or a sticking float needle. If o.k., adjust float as specified in carburetor overhaul section.
Engine Flooded. NOTE: To check for flooding, remove air cleaner, with engine off and look into carburetor bore. Fuel will be dripping off nozzle and/or carburetor will be very wet.	Check proper carburetor unloading procedure. Depress the accelerator to the floor and check the carburetor to determine if the choke valve is opening. If not, adjust the throttle linkage and unloader, as specified.
Carburetor flooding	NOTE: Before removing the carburetor air horn, use the following procedure which may eliminate the flooding. 1. Remove the fuel line at the carburetor and plug. Crank and run the engine until the fuel bowl runs dry. Turn off the engine and connect fuel line. Then re-start and run engine. This will usually flush dirt past the carburetor float needle and seat. 2. If dirt is in fuel system, clean the system and replace fuel filter as necessary. If excessive dirt is found, remove the carburetor unit. Disassemble and clean. 3. Check float needle and seat for proper seal. If a needle and seat tester is not available, apply mouth suction to the needle seat with needle installed. If the needle is defective, replace with a factory matched set. 4. Check float for being loaded with fuel, bent float hanger or binds in the float arm. NOTE: Check float for fuel absorption by lightly squeezing between fingers. If wetness appears on surface or float feels heavy (Check with known good float), replace the float assembly. 5. Adjust float as specified in carburetor overhaul section.

Problem: ENGINE STARTS AND STALLS

Engine does not have enough fast idle speed when cold.	Check and re-set the fast idle setting and fast idle cam.
Choke vacuum break unit is not adjusted to specification or unit is defective.	1. Adjust vacuum break to specification. 2. If adjusted O.K., check the vacuum break for proper operation as follows: On the externally mounted vacuum break unit, connect a piece of hose to the nipple on the vacuum break unit and apply suction by mouth or use tool J-23418 to apply vacuum. Plunger should move inward and hold vacuum. If not, replace the unit. NOTE: Always check the fast idle cam adjustment before adjusting vacuum break unit.
Choke coil rod out of adjustment.	Adjust choke coil rod.
Choke valve and/or linkage sticking or binding.	1. Clean and align choke valve and linkage. Replace if necessary. 2. Re-adjust if part replacement is necessary.
Idle speed setting	Adjust low and curb idle speeds to specifications on label in engine compartment.
Not enough fuel in carburetor.	1. Check fuel pump pressure and volume. 2. Check for partially plugged fuel inlet filter. Replace if dirty. 3. Remove air horn and check float adjustments as specified in carburetor overhaul section.
Carburetor flooding. NOTE: Also check carburetor flooding when engine cranks (turn over) but will not start or starts hard when cold.	1. Check float needle and seat for proper seal. If a needle and seat tester is not available, mouth suction can be applied to the needle seat with needle installed. If needle is defective, replace with a factory matched set. 2. Check float for being loaded with fuel, bent float hanger or binds in the float arm. NOTE: Check float for fuel absorption by lightly squeezing between fingers. If wetness appears on surface or float feels heavy (check with known good float), replace the float assembly. 3. Check float adjustments as specified in carburetor overhaul section. 4. If excessive dirt is found in the carburetor, clean the fuel system and carburetor. Replace fuel filter as necessary.

Problem: ENGINE RUNS UNEVEN OR SURGES

POSSIBLE CAUSE	CORRECTIVE ACTION
Fuel Restriction	Check all hoses and fuel lines for bends, kinks or leaks. Straighten and secure in position. Check all fuel filters. If plugged or dirty - replace.
Dirt or water in fuel system.	Clean fuel tank and lines. Remove and clean carburetor.
Fuel level	Adjust float as specified in carburetor overhaul section. Check for free float and float needle valve operation.
Main metering jet defective, loose or incorrect part.	Replace as necessary.
Power system in carburetor not functioning properly. Power valve sticking in down position.	Free up or replace as necessary.
Vacuum leakage	It is absolutely necessary that all vacuum hoses and gaskets are properly installed, with no air leaks. The carburetor and manifold should be evenly tightened to specified torque.

Problem: POOR FUEL ECONOMY

Engine needs complete tune-up.	Check engine compression. Examine spark plugs, (if dirty or improperly gapped, clean and re-gap or replace). Check ignition point dwell, condition, readjust ignition points if necessary and check and reset ignition timing. Clean or replace air cleaner element if dirty. Check for restricted exhaust system and intake manifold for leakage, make sure all vacuum hoses are connected correctly.
Choke valve not fully opening.	1. Clean choke and free up linkage. 2. Check choke coil rod for proper adjustment. Reset to specifications.
Fuel leaks.	Check fuel tank, fuel lines and fuel pump for any fuel leakage.
Power system in carburetor not functioning properly. Power valve sticking in up position.	Free up or replace as necessary.
High fuel level in carburetor or carburetor flooding.	1. Check for dirt in the needle and seat. Test using suction by mouth or needle seat tester. If defective, replace needle and seat assembly with factory matched set. 2. Check for loaded float. 3. Re-set carburetor float as specified in carburetor overhaul section. 4. If excessive dirt is present in the carburetor bowl, the carburetor should be cleaned.
Fuel being pulled from accelerator system into venturi through pump jet.	Run engine at RPM where nozzle is feeding fuel. Observe pump jet. If fuel is feeding from jet, check pump discharge ball for proper seating by filling cavity above ball with fuel to level of casting. No "leak down" should occur with discharge ball in place. Re-stake or replace leaking check ball, defective spring, or retainer.
Air bleeds or fuel passages in carburetor dirty or plugged.	Clean carburetor or overhaul as necessary.

Problem: ENGINE HESITATES ON ACCELERATION

Defective accelerator pump system NOTE: A quick check of the pump system can be made as follows. With the engine off, remove air cleaner and look into the carburetor bores and observe pump stream, while briskly opening throttle valve. A full stream of fuel should emit from pump jet and strike near the center of the venturi area.	1. Remove air horn and check pump cup. If cracked, scored or distorted, replace the pump plunger. 2. Check the pump discharge ball for proper seating and location. The pump discharge ball is located in a cavity next to the pump well. To check for proper seating, remove air horn and gasket and fill cavity with fuel. No "leak down" should occur. Restake and replace check ball if leaking. Make sure discharge ball, spring, and retainer are properly installed.
Dirt in pump passages or pump jet.	Clean and Blow out with compressed air.
Fuel level.	Check for sticking float needle or binding float. Free up or replace parts as necessary. Check and reset float level as specified in carburetor overhaul section.
Leaking air horn to float bowl gasket.	Torque air horn to float bowl using proper tightening procedure.
Carburetor loose on manifold.	Torque carburetor to manifold bolts. (10-14 ft. lbs.).

Problem: NO POWER ON HEAVY ACCELERATION OR AT HIGH SPEED

Carburetor throttle valve not going wide open. (Check by pushing accelerator pedal to floor).	Adjust throttle linkage to obtain wide open throttle in carburetor.
Dirty or plugged fuel filter.	Replace with a new filter element.
Power system not operating.	Check power valve for free up and down movement.
Float level too low.	1. Check and reset float level as specified in carburetor overhaul section.
Float not dropping far enough into float bowl.	Check for binding float hanger and for proper float alignment in float bowl.
Main metering jet dirty, plugged or incorrect part.	1. If the main metering jet is plugged or dirty and excessive dirt is in fuel bowl, carburetor should be completely disassembled and cleaned.

Problem: ENGINE STARTS HARD WHEN HOT

Choke valve not opening completely.	1. Check for binding choke valve and/or linkage. Clean and free-up or replace parts as necessary. Do not oil choke linkage. 2. Check and adjust choke coil rod.
Engine flooded - Carburetor flooding.	See procedure under "Engine cranks, will not start".
No fuel in carburetor.	1. Check fuel pump. Run pressure and volume test. 2. Check float needle for sticking in seat, or binding float.
Leaking float bowl.	Fill bowl with fuel and look for leaks.

M4MC/M4ME QUADRAJET CARBURETOR

INDEX

GENERAL DESCRIPTION

The M4MC-M4ME model Quadrajet carburetors (fig. 36 and 36A) are two stage carburetors of downdraft design. The triple venturi system (with 1-7/32" venturi) is used on the primary side of the Quadrajet carburetor, with small 1-3/8" throttle valve bores. The triple venturi stack-up, plus small primary throttle valve bores, results in good fuel control during idle and part throttle operation.

The secondary side has two large bores (2-1/4"). Using the air valve principle in the secondary side, fuel is metered in direct proportion to the air passing through the secondary bores. The carburetor part number is stamped on a vertical section of the float bowl, near the secondary throttle lever. Refer to the part number on the bowl when servicing the carburetor. When replacing the float bowl assembly, follow the manufacturer's instructions contained in the service package so that the part number can be transferred to the new float bowl.

A throttle return control system with bracket, is used on some California light duty truck with heavy duty emissions and V8 engine. The vacuum unit and bracket assembly is mounted on the float bowl. When manifold vacuum is high, such as on deceleration, the vacuum diaphragm plunger moves outward, contacting the throttle lever, to open the primary throttle valves slightly to lean out the rich air/fuel mixture in the intake manifold. The throttle return control systems requires new adjustment procedures. Also refer to Section 6T, Emission Control System, for additional information.

The primary side of the carburetor has six systems of operation. They are float, idle, main metering, power, pump, and choke. The secondary side has one metering system which supplements the primary main metering system and receives fuel from a common float chamber.

Fig. 36–M4MC Quadrajet Carburetor

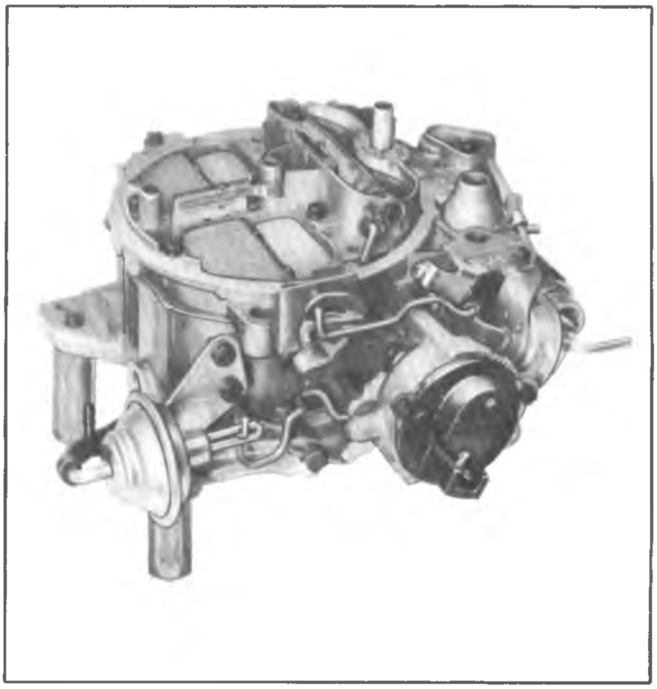


Fig. 36A–M4ME Quadrajet Carburetor

THEORY OF OPERATION

FLOAT SYSTEM (Fig. 37)

The float system operates in the following manner:

Fuel from the engine fuel pump enters the carburetor fuel inlet passage. It passes through the pleated paper filter element, fuel inlet valve, and on into the float bowl chamber. As the incoming fuel fills the float bowl to the prescribed level, the float pontoon rises and forces the fuel inlet valve closed, shutting off fuel flow. As fuel is used from the float bowl, the float drops allowing the float valve to open, when more fuel again fills the bowl. This cycle continues, maintaining a constant fuel level in the float bowl. A new float assembly is used for improved fuel handling in the float bowl.

The float pontoon is solid and is made of a light weight closed cell plastic material. This feature gives added buoyancy to allow the use of a single float to maintain constant fuel levels. A float pull clip, fastened to the float valve, hooks over the edge of the float arm at the center rear. Its purpose is to assist in lifting the float valve off its seat whenever fuel level in the float bowl is low.

CAUTION: *Do not place pull clip through small holes in top of float arm. Severe flooding will result.*

On some models, no side windows are used in the float valve seat so that all fuel will be discharged over the top of the float valve seat to control fuel turbulence in the float bowl.

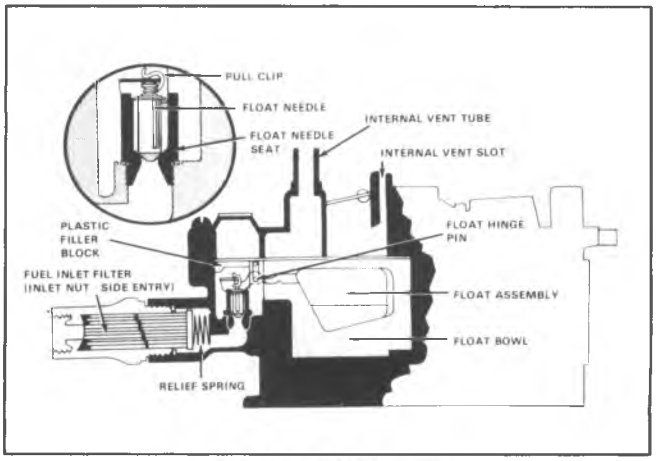


Fig. 37–Float System

The carburetor float chamber is internally vented by a vertical slot, cast in the air horn, located at the rear of the primary venturis, and by a pressed-in vent tube located in the air horn. The purpose of the vertical vent slot and vent tube is to balance air pressure acting on the fuel in the float bowl with air flow through the carburetor bores. In this way, balanced air/fuel ratios are maintained throughout all ranges of carburetor operation. Also, during periods of hot engine operation, the vents are used to relieve vapor pressures that build up in the float bowl, thereby preventing the pushing of raw fuel through the discharge nozzles into the engine to cause hard hot restarts.

An aneroid cavity insert is used in the float bowl. The insert is used to reduce fuel slosh in the float bowl.

IDLE SYSTEM

Each bore of the Quadrajet carburetor has a separate and independent idle system to supply the correct air/fuel mixture ratios during idle and off-idle operation. The idle system is used during this period because air flow through the carburetor venturi is not great enough to obtain efficient metering from the main discharge nozzles.

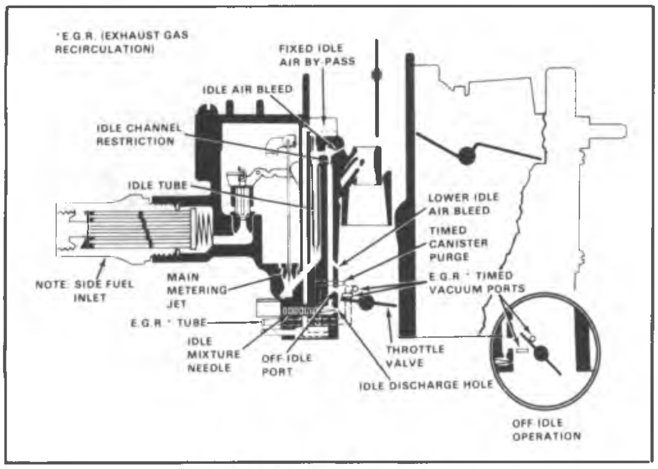


Fig. 38–Idle System

The idle system operates as follows:

During curb idle, the throttle valves are held slightly open by the idle speed screw. The small amount of air passing between the throttle valves and bores is regulated by this screw to give the engine the desired idle speed. Since the engine requires very little air for idle and low speeds, fuel is added to the air to produce a combustible mixture by the direct application of vacuum (low pressure) from the engine manifold to the idle discharge holes below the throttle valves. With the idle discharge holes in a very low pressure area and the fuel in the float bowl vented to atmosphere (high pressure), the idle system operates as follows:

Fuel flows from the float bowl down through the main metering jets into the main fuel wells. It is picked up in the main wells by the two idle tubes (one for each bore) which extend into the wells. The fuel is metered at the lower tip of each idle tube and passes up through the tube. The fuel is mixed with air at the top of each idle tube through an idle air bleed.

Then the fuel mixture crosses over to the idle down channels where it is mixed with air at the side idle bleed located just above the idle channel restriction. The mixture continues down through the calibrated idle channel restrictions, past the lower idle air bleeds and off-idle discharge ports where it is further mixed with air. The air/fuel mixture moves down to the idle mixture needle discharge holes where it enters the carburetor bores and blends with the air passing the slightly open throttle valves. The combustible air/fuel mixture then passes through the intake manifold to the engine cylinders.

The idle mixture needles are adjusted at the factory to blend the correct amount of fuel mixture from the idle system with the air entering the engine at idle. Turning the idle mixture needles inward (clockwise) decreases the idle fuel discharge and turning the mixture needles outward (counter-clockwise) enriches the engine idle mixture. Idle mixture needles are adjusted at the factory and then limiter caps are installed to discourage idle mixture needle readjustment in the field.

M4MC-M4ME carburetor models have a fixed idle air bypass system. This consists of air channels which lead from the top of each carburetor bore in the air horn to a point below each throttle valve. At normal idle, extra air passes through these channels supplementing the air passing by the slightly opened throttle valves. The purpose of the idle air bypass system is to allow reduction in the amount of air going past the throttle valves so they can be nearly closed at idle. This reduces the amount of air flowing through the carburetor venturi to prevent the main fuel nozzles from feeding during idle operation. The venturi system is very sensitive to air flow and where larger amounts of idle air are needed to maintain idle speed, the fixed idle air bypass system is used.

As the primary throttle valves are opened from curb idle to increase engine speed, additional fuel is needed to combine with the extra air entering the engine. This is accomplished by the slotted off-idle discharge ports. As the primary throttle valves open they pass by the off-idle ports, gradually exposing them to high engine vacuum below the throttle valves. The additional fuel added from the off-idle ports mixes with the increasing air flow past the opening throttle valves to meet increased engine air and fuel demands.

Further opening of the throttle valves increases the air velocity through the carburetor venturi sufficiently to cause low pressure at the lower idle air bleeds. As a result, fuel begins to discharge from the lower idle air bleed holes and continues to do so throughout operation of the part throttle to wide open throttle ranges, supplementing the main discharge nozzle delivery.

EXHAUST GAS RECIRCULATION (E.G.R.) (Fig. 38)

An Exhaust Gas Recirculation (E.G.R.) system is used on light duty emission vehicles and California heavy duty emission vehicle with 454 V8 engine to control oxides of nitrogen (NOx) emissions. The E.G.R. valve is operated by a vacuum signal taken from the carburetor. Two punched ports, one located just above the throttle valve and the other near the upper edge of the throttle body casting, provide a timed vacuum signal port for E.G.R. valve operation in the off-idle and part throttle ranges of the carburetor.

The purpose of the E.G.R. system is to supply a metered amount of exhaust gases to the combustion mixtures and lower combustion temperatures, thereby reducing oxides of nitrogen during these ranges of engine operation.

The port system operates as follows:

As the throttle valve is opened beyond the idle position, the first vacuum port for the E.G.R. system is exposed to manifold vacuum to supply a vacuum signal to the E.G.R. valve. To control the vacuum signal at the lower port, the upper port bleeds air into the vacuum channel and modulates the amount of vacuum signal supplied by the lower E.G.R. port. In this manner, the E.G.R. valve can be timed for precise metering of exhaust gases to the intake manifold, dependent upon location of the ports in the carburetor bore and degree of throttle valve opening.

As the throttle valves are opened further in the part throttle range, the upper port ceases to function as an air bleed and is gradually exposed to manifold vacuum to supplement the vacuum signal at the lower port and maintain correct E.G.R. valve position.

The upper and lower vacuum ports connect to a cavity in the throttle body which, in turn, through a passage, supply the vacuum signal to an E.G.R. tube pressed into the front corner of the throttle body casting. The tube in the throttle body is connected by a hose to the E.G.R. valve located on the intake manifold.

The E.G.R. valve remains closed during periods of engine idle and deceleration to prevent rough idle, which could be caused from excessive exhaust gas contamination in the idle air/fuel mixtures.

CANISTER PURGE (Fig. 38)

In that the fuel tank is not vented to atmosphere and fuel vapors are collected in the vapor canister, a purge port is provided in the carburetor throttle body. The purge port leads through passages to a common chamber in the throttle body to a purge tube which connects by a hose to the vapor canister. The purge port consists of a separate timed canister purge.

Timed Bleed Purge

The timed bleed purge port is located in each bore next to the off-idle discharge ports. The timed purge operates during off-idle, part throttle, and wide open throttle operation. This provides a larger purge capacity for the vapor canister and prevents over-rich mixtures from being added to the carburetor metering at any time.

MAIN METERING SYSTEM (Fig. 39)

The main metering system supplies fuel to the engine from off-idle to wide open throttle. The primary bores (two smaller bores) supply air and fuel during this range.

Separate main wells feed each fuel nozzle to improve fuel flow in the venture system.

As the primary throttle valves are opened beyond the off-idle range allowing more air to enter the engine intake manifold, air velocity increases in the carburetor venturi to cause the main metering system to operate as follows:

Fuel from the float bowl flows between the main metering rods and jets into the main fuel wells. It passes upward in the main well and is bled with air by an air bleed located at the top of the well. The fuel is further bled air through calibrated air bleeds located near the top of the well in the carburetor bores. The fuel mixture then passes from the main well through the main discharge nozzles into the boost venturi. At the boost venturi, the fuel mixture then combines with the air entering the engine through the carburetor bores. It then passes as a combustible mixture through the intake manifold and on into the engine cylinders.

The main metering system is calibrated by tapered and stepped metering rods operating in metering jets and also through the main well air bleeds.

During cruising speeds and light engine loads, manifold vacuum is high. In this period, the engine will run on leaner mixtures than required during heavy loads.

The primary main metering rods are connected to a vacuum responsive piston which operates against spring tension. Engine manifold vacuum is supplied to a power piston through a vacuum channel. When the vacuum is high, the piston is held downward against spring tension and the larger diameter of the metering rod is in the main metering jet orifice. This results in leaner fuel mixtures for economy operation. As engine load increases and engine manifold vacuum drops, spring pressure acting on the power piston overcomes the vacuum pull and gradually lifts the metering rods partially out of the main metering jets. This enrichens the fuel mixture enough to give the desired power to overcome the added load.

Adjustable Part Throttle

In order to provide a close tolerance adjustment in the main metering system, an adjustment is provided to very accurately set the depth of the metering rods in the main metering jets.

The adjustment consists of a pin pressed in the side of the power piston which extends through a slot in the side of the piston well. When the power piston is down (economy position), the side of the pin stops on top of a flat surface on the adjustment screw located in the cavity next to the power piston. The adjustment screw is held from turning by a tension spring beneath the head of the adjustment screw.

During production flow test, the adjustment screw is turned up or down which in turn raises or lowers the power piston and metering rod assembly.

This very accurately controls the fuel flow between the rods and jets to meet emission requirements.

> **CAUTION:** *No attempt should be made to change the A.P.T. adjustment in the field. If float bowl replacement is required, the new bowl assembly will include an adjustment screw pre-set by the factory.*

POWER SYSTEM (Fig. 40)

The power system provides extra mixture enrichment for heavy acceleration or high speed operation. The richer mixture is supplied through the main metering system in the primary and secondary sides of the carburetor.

The power system located in the primary side consists of a vacuum piston and spring located in a cylinder connected by a passage to intake manifold vacuum. The spring located beneath the vacuum operated power piston tends to push the piston upward against manifold vacuum.

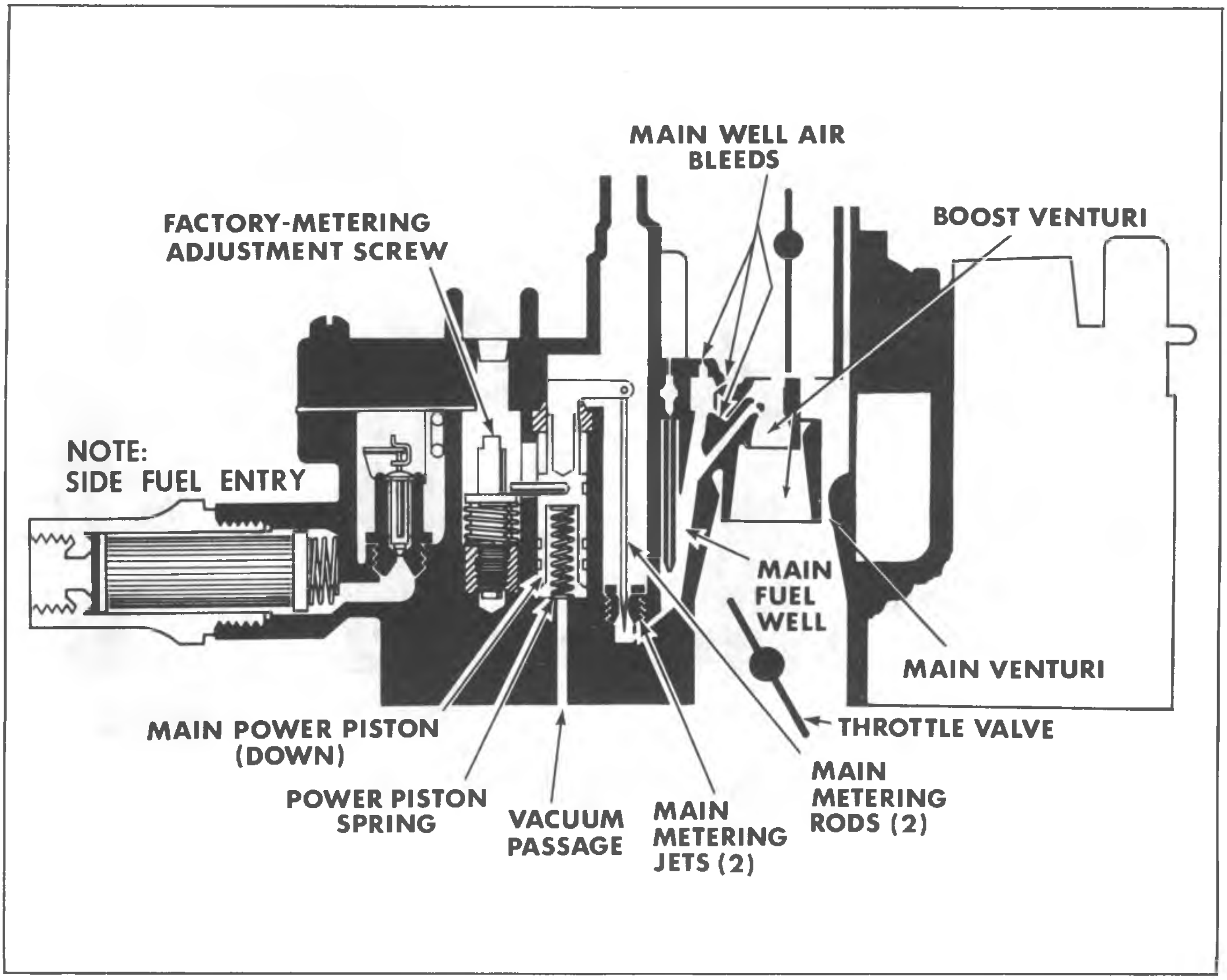


Fig. 39–Main Metering System

An adjustable part throttle allows each carburetor to be individually calibrated at time of assembly. Each carburetor is adjusted by the manufacturer to provide the most ideal air/fuel ratio for low exhaust emissions. The adjustable part throttle screw is used to raise or lower the power piston and metering rods to provide this ratio.

In part throttle and cruising ranges, manifold vacuum is sufficient to hold the power piston down against spring tension so that the larger diameter of the metering rod is held in the main metering jet orifice.

Mixture enrichment is not necessary at this point. However, as engine load is increased to a point where extra fuel enrichment is required, the spring tension overcomes the vacuum pull on the power piston and the tapered primary metering rod moves upward in the main metering jet orifice. The smaller diameter of the metering rod allows more fuel to pass through the main metering jet and enrich the mixture flowing into the primary main wells and out the main discharge nozzles.

When manifold vacuum rises and mixture enrichment is no longer needed, the vacuum overcomes the power piston spring tension and returns the larger portion of the metering rod into the metering jet orifice and back to normal economy ranges.

As the engine speed increases, the primary side of the carburetor can no longer meet the engine air and fuel requirements. To meet these demands, the secondary side of the carburetor is used.

As the secondary throttle valves are opened, engine manifold vacuum (low pressure) is applied directly beneath the air valves. Atmospheric pressure on top of the air valves forces the air valves to open against spring tension and allows metered air to pass through the secondary bores of the carburetor.

When the secondary throttle valves begin to open, the accelerating well ports are exposed to manifold vacuum. The ports immediately start to feed fuel from the accelerating wells and continue to feed fuel until the fuel in the well is gone. This prevents a momentary leanness as the air valve opens and before the secondary nozzles begin to feed fuel.

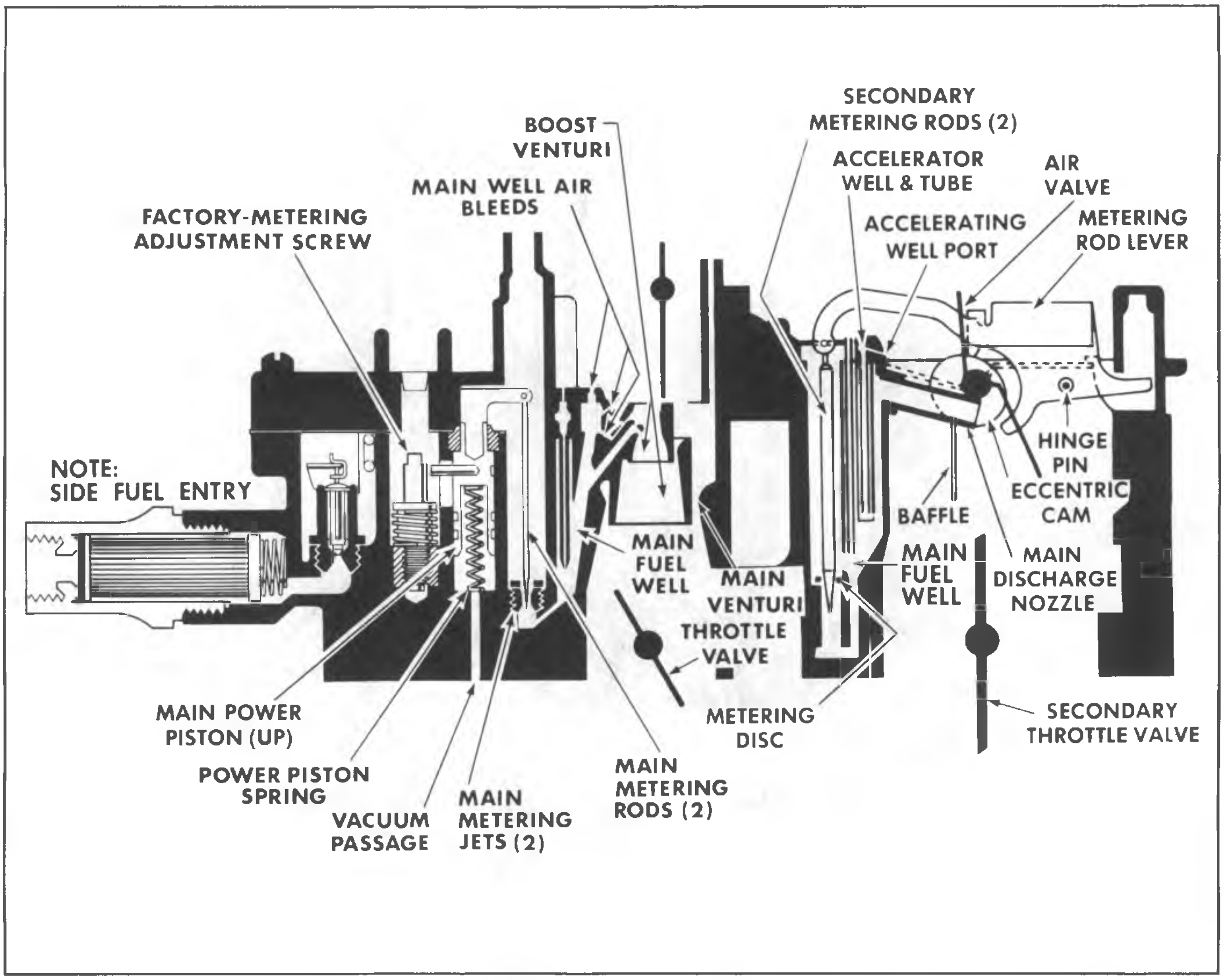


Fig. 40–Power System

As the air valves open, a plastic eccentric cam attached to the center of the air valve shaft rotates and, through the metering rod lever, lifts the secondary metering rods out of the secondary orifice plates. The fuel mixture travels from the main wells through the secondary discharge nozzles where it sprays into the secondary bores supplementing the air/fuel mixture delivered from the primary bores. In this way, correct air/fuel mixtures through the secondary bores are controlled by the position of the metering rods in the orifice plates.

There are other features incorporated in the secondary metering system as follows:

1. The main well bleed tubes extend below the fuel level in the main well. These bleed air into the fuel in the well to quickly emulsify the fuel with air for good atomization as it leaves the secondary discharge nozzles.
2. Two baffle plates are used, one in each secondary bore. They extend up and around the secondary fuel discharge nozzles. Their purpose is to provide good fuel distribution at lower air flows by preventing too much fuel from going to the front of the engine. As mentioned earlier, a baffle is added on the underneath side of the air valve on some applications to aid in good mixture distribution from the secondary side of the carburetor.

AIR VALVE DASHPOT (Fig. 41)

The air valve dashpot operates off of the front choke vacuum break diaphragm unit. The secondary air valve is connected to the vacuum break unit by a rod, to control the opening rate of the air valve. This delays the air valve opening rate to prevent secondary discharge nozzle "lag".

Whenever manifold vacuum is above approximately 5" to 6" Hg., the vacuum break diaphragm is seated (plunger is fully inward) against spring tension. At this point, the vacuum break rod is in the forward end of the slot in the air valve lever and the air valves are closed.

During acceleration or heavy engine loads, when the secondary throttle valves are open, the manifold vacuum drops. The spring located in the vacuum break diaphragm overcomes the vacuum pull and forces the plunger and link outward which, in turn, allows the air valves to open. The opening rate of the air valves is controlled by the calibrated

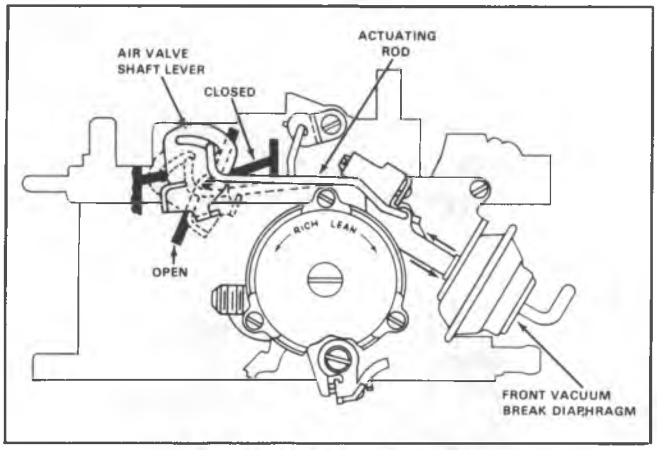


Fig. 41–Air Valve Dashpot

restriction in the vacuum inlet nipple in the diaphragm cover. This gives the dashpot action required to delay air valve opening enough for efficient fuel flow from the secondary discharge nozzles.

ACCELERATING PUMP SYSTEM (Fig. 42)

During quick acceleration when the throttle is opened rapidly, the air flow and manifold vacuum change almost instantaneously. The fuel, which is heavier, tends to lag behind causing a momentary leanness. The accelerator pump is used to provide the extra fuel necessary for smooth operation during this time.

The accelerating pump system consists of a spring loaded pump plunger and pump return spring, operating in a fuel well. The pump plunger is operated by a pump lever on the air horn which is connected directly to the throttle lever by a pump rod.

When the pump plunger moves upward in the pump well, as happens during throttle closing, fuel from the float bowl enters the pump well through a slot in the well. It flows past the synthetic pump cup seal into the bottom of the pump well. The pump cup is the floating type. (The cup moves up and down on the pump plunger head - see inset). When the pump plunger is moved upward, the flat on the top of the cup unseats from the flat on the plunger head and allows free movement of fuel through the inside of the cup into the bottom of the pump well. This also vents any vapors which may be in the bottom of the pump well so that a solid charge of fuel can be maintained in the fuel well beneath the plunger head.

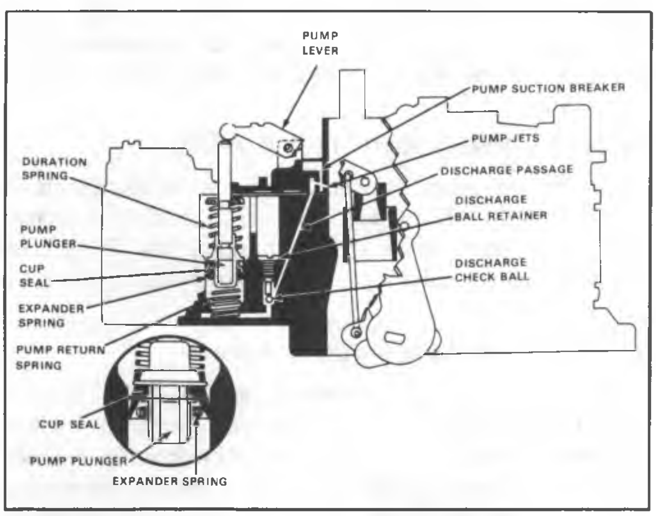


Fig. 42–Accelerating Pump System

When the throttle valves are opened, the connecting linkage forces the pump plunger downward. The pump cup seats instantly and fuel is forced through the pump discharge passage where it unseats the pump discharge check ball and passes on through the passage to the pump jets, located in the air horn, where the fuel sprays into the venturi of each bore.

An expander (garter) spring, located beneath the pump plunger cup, is used to assist in maintaining constant pump cup to pump well contact for good pump fuel delivery.

A metal baffle is installed in the slot in the pump well to prevent fuel slosh into the pump well during severe vehicle maneuvers.

The pump plunger is spring loaded - the upper duration spring is balanced with the bottom pump return spring so that a smooth sustained charge of fuel is delivered during acceleration.

The pump discharge check ball seats in the pump discharge passage during upward motion of the pump plunger so that air will not be drawn into the passage; otherwise, a momentary lag in acceleration could result.

During high speed operation, a vacuum exists at the pump jets. A cavity just beyond the pump jets is vented to the top of the air horn, outside the carburetor bores. This acts as a suction breaker so that when the pump is not in operation, fuel will not be pulled out of the pump jets into the venturi area. This insures a full pump stream when needed and prevents any fuel "pull-over" from the pump discharge passage.

CHOKE SYSTEM (Fig. 43 and 43A)

All models have an integral choke housing and thermostatic coil assembly mounted on the carburetor float bowl. The M4MC model (Fig. 43) uses manifold heated hot air for choking and a single (front) vacuum break unit.

The M4ME model (Fig. 43A) uses a electric heated choke coil assembly with dual (front and rear) vacuum break system.

The choke system operates as follows:

The thermostatic coil in the choke housing is calibrated to hold the choke valve closed when the engine is cold. To close the choke valve, depress the accelerator pedal completely to allow the fast idle cam follower lever to clear the steps of the fast idle cam. At this point, tension of the thermostatic coil will rotate the choke valve to the closed position and through rotation of the upper choke lever and movement of the choke rod, the cam follower lever comes to rest on the high step of the fast idle cam. During engine cranking, the closed choke valve restricts air flow through the carburetor

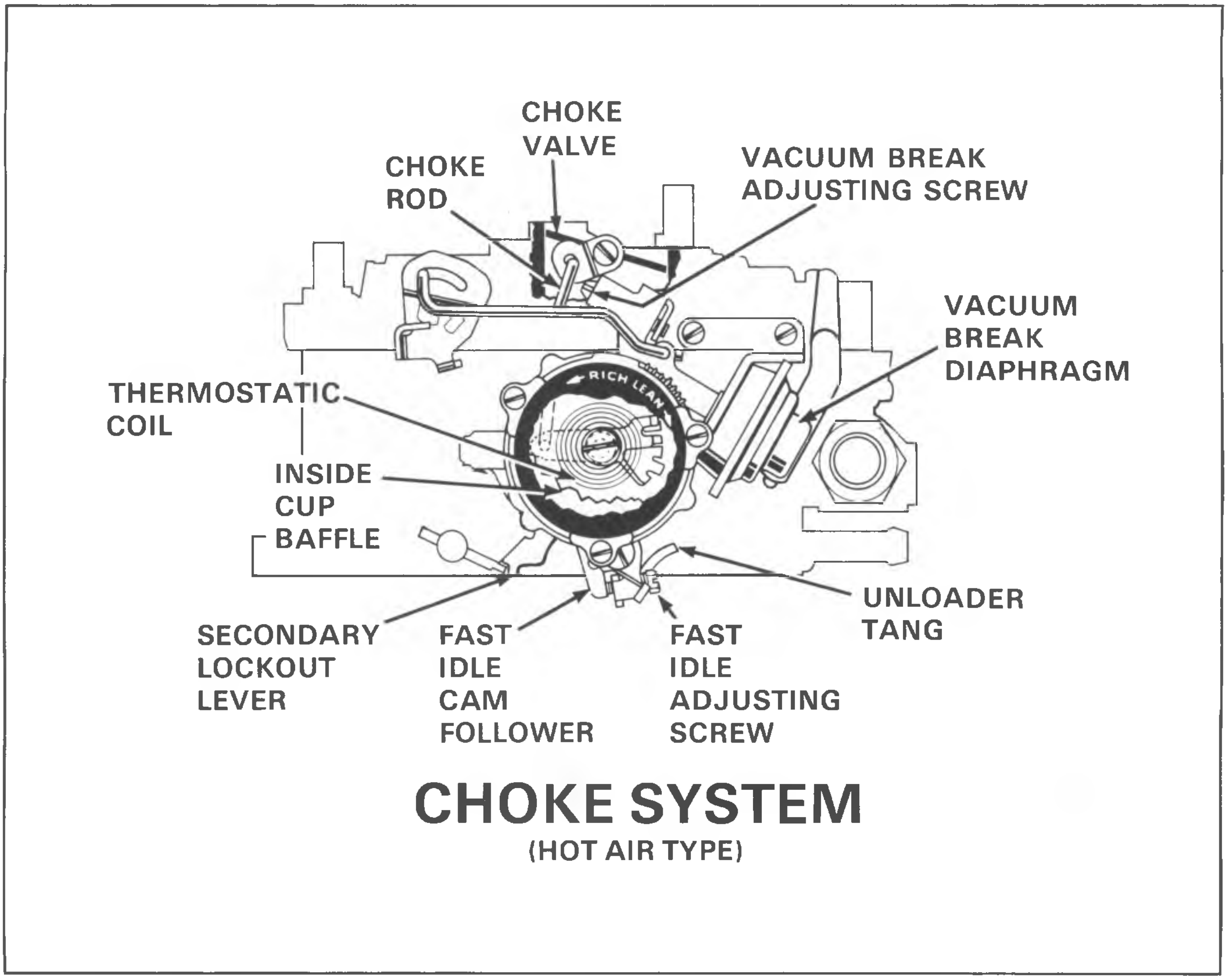


Fig. 43–Choke System - M4MC

bores to provide a richer starting mixture. When the engine starts and is running, manifold vacuum applied to the front vacuum break diaphragm (M4MC models) or rear vacuum break diaphragm (M4ME models) opens the choke valve to a point where the engine will run without loading or stalling lean ("Vacuum break position").

As the choke unit temperature increases, the fast idle cam follower will drop from the high step to the next lower step (second step) when the throttle is open.

On M4MC models, engine vacuum supplied through an orifice in the choke housing pulls heat from the manifold heat stove into the housing and heat gradually relaxes choke coil tension which allows the choke valve to continue opening through inlet air pressure pushing on the off-set choke valve and the weight of the choke linkage pulling the valve open.

On M4ME models, heating of the thermostatic coil is accomplished by an electrically actuated ceramic resistor in an electric choke assembly.

On M4ME models, the rear vacuum break diaphragm includes a tension (bucking) spring in the diaphragm plunger head to off-set tension of the thermostatic coil. The bucking spring assists in controlling choke valve opening through the thermostatic coil so that leaner mixtures (large choke opening) are maintained during warmer temperatures and richer mixtures (small choke opening) during colder temperatures.

Electric Choke Assembly (Fig. 43B)

As mentioned earlier, a ceramic resistor in the electric choke assembly on M4ME models is heated by an electric current and the resistor warms the thermostatic coil for precise timing of choke valve opening for good engine warm-up performance.

The electric choke operates as follows:

The electric choke receives an electric current operating through the engine oil pressure switch whenever the engine is running. The electric current flows to a ceramic resistor that is divided into separate sections - a small center section for gradual heating of

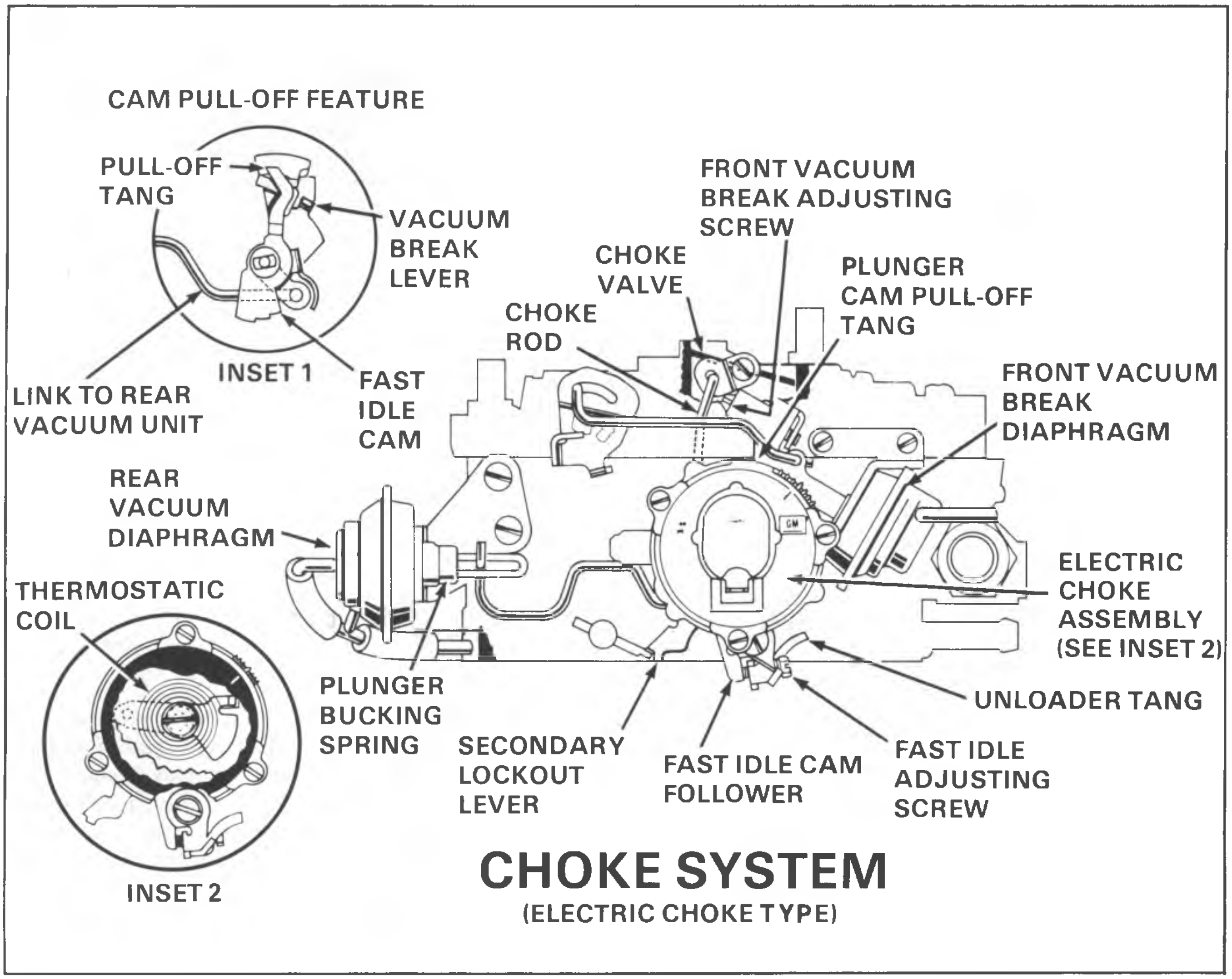


Fig. 43A–Choke System - M4ME

the thermostatic coil, and a large outer section for additional rapid heating of the thermostatic coil.

The ceramic resistor functions as follows:

AIR TEMPERATURE BELOW 50°F

Electric current, applied to the small section of the ceramic resistor causes the section to heat up and warm the thermostatic coil which allows gradual opening of the choke valve for good cold engine warm-up performance. As the small section of the ceramic resistor continues to produce heat, a temperature sensitive bi-metal disk causes a spring loaded contact to close also applying electric current to the large section of the ceramic resistor causing the large section to heat up. Heat from the larger section of the ceramic resistor increases the rate of heat flow to the thermostatic coil for more rapid opening of the choke valve.

AIR TEMPERATURE 70°F AND ABOVE

Electric current is applied directly to both the small section, and through the spring contact, to the large section of the ceramic resistor to provide a rapid heating of the thermostatic coil for greater choke valve opening when leaner air/fuel mixtures are desired at warmer ambient temperatures.

AIR TEMPERATURE BETWEEN 50° AND 70°F

Electric current, applied to the small section or both the small and large sections of the ceramic resistor depending upon the temperature, will produce the required heat to warm the thermostatic coil to control choke valve position for good engine performance in these temperature ranges.

> NOTE: Ground contact for the electric choke is provided by a metal plate located at the rear of the choke assembly. DO NOT INSTALL A CHOKE COVER GASKET BETWEEN THE ELECTRIC CHOKE ASSEMBLY AND THE CHOKE HOUSING.

The electric choke assembly is indexed properly by aligning the scribe mark on the front cover with the specified mark on the choke housing.

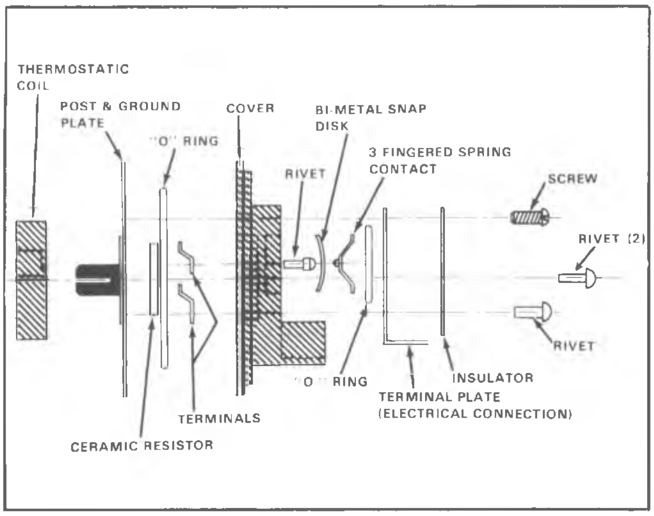


Fig. 43B--Electric Choke Assembly

As the thermostatic coil warms up, the choke coil lever in the housing moves the choke rod up in the slot in the upper choke lever to open the choke valve further to the near wide open position, while still keeping the cam follower lever on the low step of the fast idle cam. In this way, the fast idle speed is maintained long enough to keep the engine from stalling, yet allows use of a choke coil which lets the choke valve open quickly. As the thermostatic coil warms up to the fully hot position, the choke coil lever allows the fast idle cam to drop down so that the cam follower is completely off the steps of the fast idle cam.

MAINTENANCE AND ADJUSTMENT

IDLE SPEED ADJUSTMENT

Refer to Vehicle Emission Control Information label on vehicle for latest certified specification information which may differ from specifications in manual.

1. With engine at normal operating temperature, air cleaner on, choke open, and air conditioning OFF for light duty emission vehicle or air conditioning ON for heavy duty emission vehicle except 454 engine, connect a tachometer to engine.
2. Set parking brake and block drive wheels.
3. Disconnect vacuum advance hose at distributor and plug hose.
4. Start engine, check timing and adjust as required. Connect vacuum advance hose.
5. Position automatic transmission in Drive on light duty emission vehicle or in Neutral on heavy duty emission vehicle. Position manual transmission in Neutral.
6. Adjust carburetor idle speed to obtain specified rpm.
7. Check fast idle speed referring to fast idle speed adjustment.
8. Shut off engine and remove tachometer.

IDLE MIXTURE

The idle mixture is factory preset and idle mixture screws are capped with plastic limiter caps. The cap permits screw to be turned about one turn leaner (clockwise) without breaking cap. The idle mixture is set to achieve the smoothest idle while maintaining emission levels within standards prescribed by Federal Law.

At major carburetor overhaul the idle mixture may be adjusted. Before suspecting idle mixture as cause of poor idle quality, check ignition system, distributor, dwell and timing, air cleaner, PCV system, evaporation emission control and compression pressures. Also check all vacuum hoses and connections for leaks and check torques of carburetor attachment bolts. Adjustment is made using a tachometer.

Idle Mixture Adjustment

1. With engine at normal operating temperature, air cleaner on, choke open, and air conditioning OFF, connect a tachometer to engine.
2. Set parking brake and block drive wheels.
3. Disconnect vacuum advance hose at distributor and plug hose.
4. Start engine, check timing and adjust as required. Connect vacuum advance hose.
5. With engine at normal operating temperature (not hot), air conditioning off, and air cleaner installed, position transmission selector in Drive (automatic transmission and light duty emissions) or Neutral (automatic transmission an heavy duty emissions and all manual transmissions).
6. Break off tabs on mixture caps using needle nose pliers.
7. Adjust idle rpm to the higher of the two idle speeds specified. (Example **650** /600).
8. Equally enrich (turn out) mixture screws until maximum idle speed is achieved. Reset speed if necessary to the higher specified idle speed.
9. Equally lean (turn in) mixture screws until the lower specified idle speed is achieved (Example 650/ **600**).

10. Connect fuel tank vent hose.

PUMP ROD ADJUSTMENT (Fig. 44)

1. With fast idle cam follower off steps of fast idle cam, back out carburetor idle speed screw until the throttle valves are completely closed in bore.

   NOTE: Be sure secondary actuating rod is not keeping the primary throttle valves from closing. If the primary throttle valves do not completely close, bend the secondary closing tang out of position closing tang out of position and then readjust after pump adjustment.

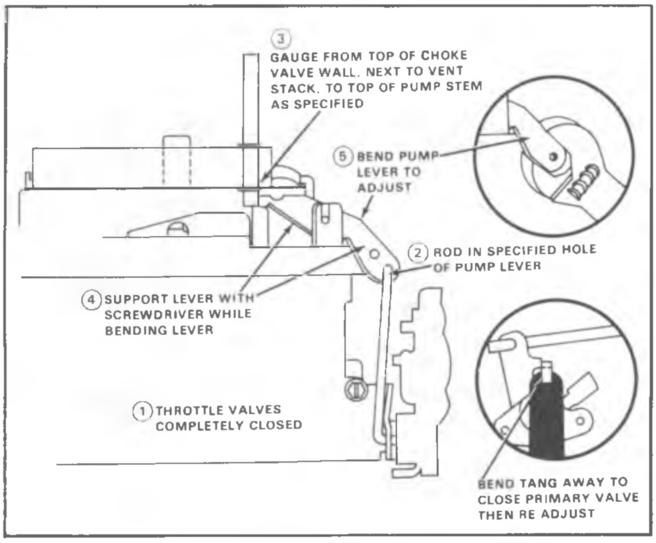


Fig. 44–Pump Rod Adjustment

2. Place pump rod in specified hole in lever.
3. Gauge from top of choke valve wall, next to vent stack, to top of pump stem.
4. To adjust, support pump lever with screwdriver and bend pump lever.
5. Adjust idle speed.

FAST IDLE ADJUSTMENT (Fig. 45)

On Bench

1. Place cam follower on high step of the fast idle cam and hold the follower against the cam.
2. While holding the follower against the high step of the fast idle cam, back out fast idle screw (counterclockwise) until it pulls away from the fast idle cam follower. Turn in fast idle screw (clockwise) until the screw just contacts the fast idle cam follower.
3. Then turn the fast idle screw in an additional 3 turns to adjust.
4. Recheck fast idle speed on the vehicle, setting to specifications listed on the underhood Vehicle Emission Control Information label.

On Vehicle

1. Connect a tachometer to the engine.

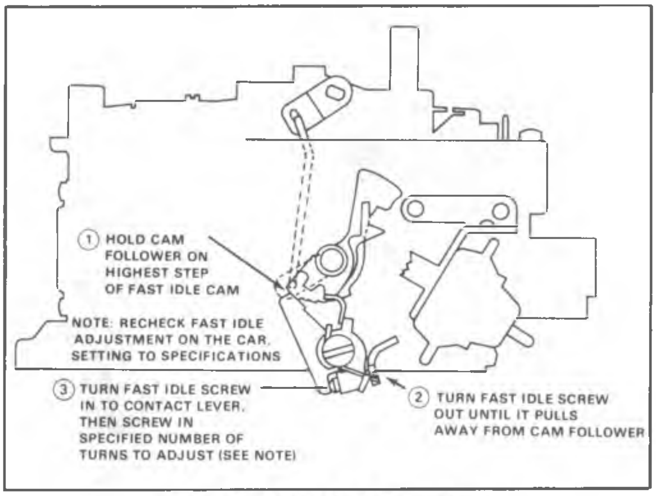


Fig. 45--Fast Idle Adjustment

2. Run engine to obtain normal operating temperature.
3. Position transmission in Park or Neutral.
4. Disconnect and plug vacuum hose at EGR valve, if equipped. On 454 engine with electric choke, disconnect and plug vacuum hose to front vacuum break unit.
5. Position cam follower lever on highest step of fast idle cam.
6. Turn fast idle screw to obtain specified rpm.
7. Remove plug and connect vacuum hose at EGR.
8. On 454 engine, remove plug and connect vacuum hose to front vacuum break unit.
9. Remove tachometer and stop engine.

CHOKE COIL LEVER ADJUSTMENT (Fig. 46)

1. Loosen three retaining screws and remove the thermostatic cover and coil assembly from choke housing.
2. Push up on thermostatic coil tang (counterclockwise) until choke valve is closed.
3. Insert specified plug gauge in hole in choke housing.
4. Lower edge of choke coil lever should just contact side of plug gauge.
5. Bend choke rod at point shown to adjust (see inset).
6. Install thermostatic cover and coil referring to automatic choke coil adjustment.

FAST IDLE CAM (CHOKE ROD) ADJUSTMENT (Fig. 47)

NOTE: Choke coil lever adjustment must be made before making the following adjustment:

1. Perform fast idle adjustment.
2. Remove coil assembly from choke housing by removing the three retaining screws and clips.
3. Place the fast idle cam follower on the second step of the fast idle cam firmly against the shoulder of the high step.

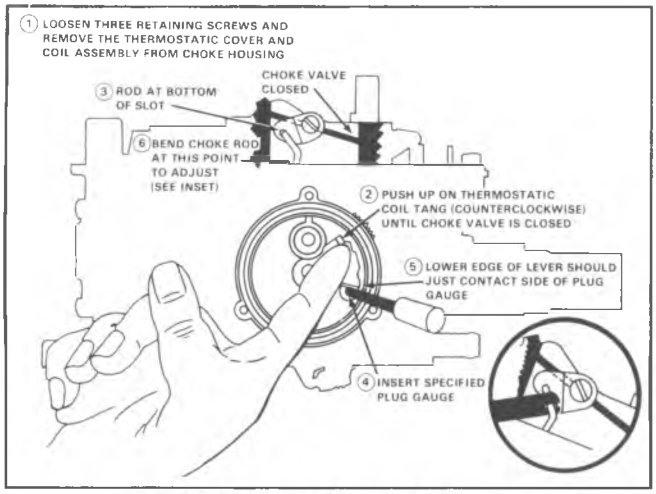


Fig. 46–Choke Coil Lever Adjustment

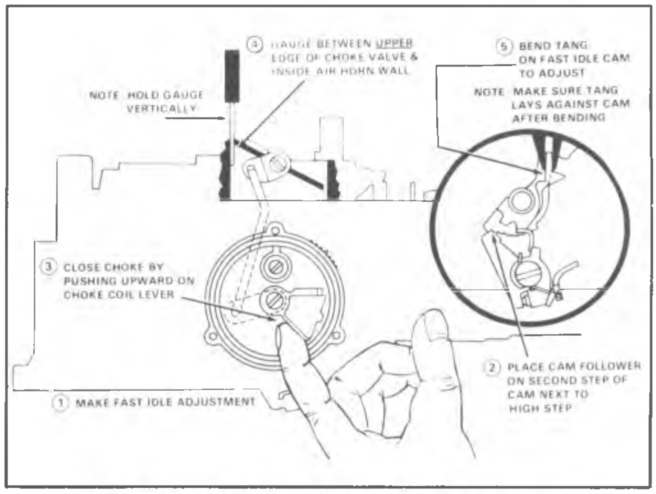


Fig. 47–Fast Idle Cam (Choke Rod) Adjustment

4. Close the choke valve by pushing upward on the choke coil lever inside the choke housing.
5. Gauge between the UPPER edge of the choke valve and inside air horn vertical wall. Gauge dimension should be as specified.
6. Bend adjusting tang on fast idle cam to obtain the dimension. Make sure tang lays against cam after bending.
7. Reinstall coil assembly into choke housing. Be sure that the coil tang picks up the choke coil lever and closes the choke valve when rotating the coil cover counterclockwise.
8. Install the screws and retainers after indexing the coil to specifications. Secure the cover to the housing at the proper index by tightening the three screws.

NOTE: Always check fast idle adjustment on vehicle by setting engine speed to specification listed on underhood Vehicle Emission Control Information label.

AIR VALVE DASHPOT ADJUSTMENT (Fig. 48)

1. Seat front vacuum break diaphragm using outside vacuum source.
2. Air valves must be closed completely.
3. Place specified gauge between air valve dashpot and end of slot in air valve lever.
4. Bend air valve dashpot rod at point shown if necessary to adjust.

FRONT VACUUM BREAK ADJUSTMENT (Fig. 49)

1. Loosen three retaining screws and remove thermostatic cover and coil assembly from choke housing.
2. Place cam follower lever on highest step of fast idle cam.
3. Seat the front vacuum diaphragm using an outside vacuum source.

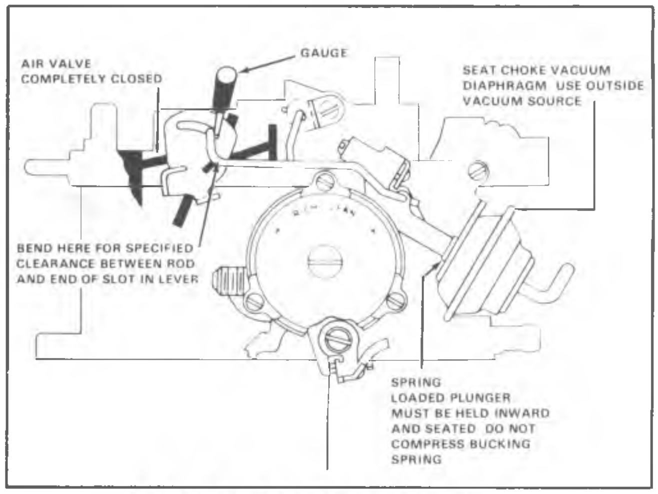


Fig. 48–Air Valve Dashpot Adjustment

4. Push inside choke coil lever counterclockwise until tang on vacuum break lever contacts tang on vacuum break stem.
5. Holding gauge vertically, place gauge between upper edge of choke valve and inside air horn wall. Dimension should be as specified.
6. To obtain correct specification, turn the adjustment screw on the vacuum break plunger lever.
7. After adjustment, install vacuum hose to vacuum break unit.
8. Install thermostatic cover and coil referring to automatic choke coil adjustment.

REAR VACUUM BREAK ADJUSTMENT (Fig. 50) (M4ME)

1. Loosen three retaining screws and remove thermostatic cover and coil assembly from choke housing.
2. Place cam follower lever on highest step of fast idle cam.
3. Seat the rear vacuum diaphragm using an outside vacuum source.

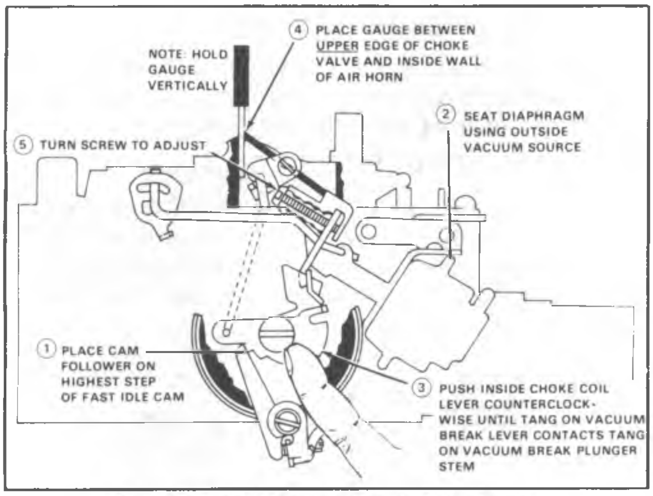


Fig. 49–Front Vacuum Break Adjustment

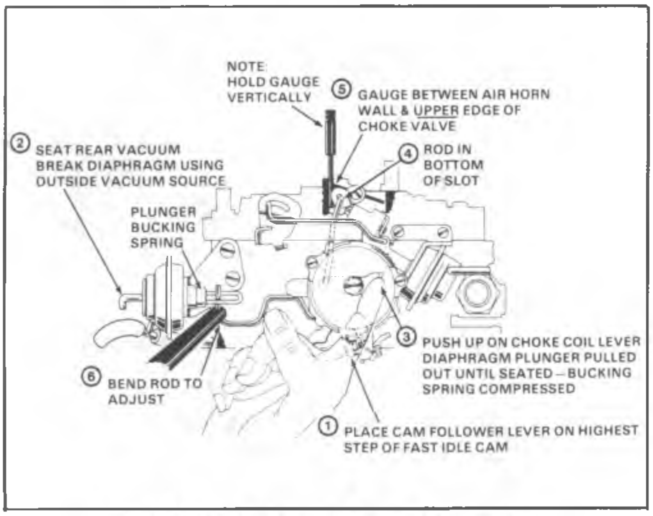


Fig. 50–Rear Vacuum Break Adjustment

4. Push up on the choke coil lever inside choke housing toward closed choke until stem is pulled out and seated - bucking spring compressed.
5. With choke rod in bottom of slot in choke lever, gauge between **upper** edge of choke valve and air horn wall. Dimension should be as specified.
6. Bend vacuum break rod at point shown if necessary to adjust.
7. After adjustment, install vacuum hose to vacuum break unit.
8. Install thermostatic cover and coil referring to automatic choke coil adjustment.

AUTOMATIC CHOKE COIL ADJUSTMENT

Hot Air (Fig. 51)

1. Install choke thermostatic coil and cover assembly with gasket between choke cover and choke housing.

   NOTE: Tang on thermostatic coil must be inserted in slot of choke coil lever pick-up arm (small block V8) or on 454 V8 make sure tang contacts bottom of side

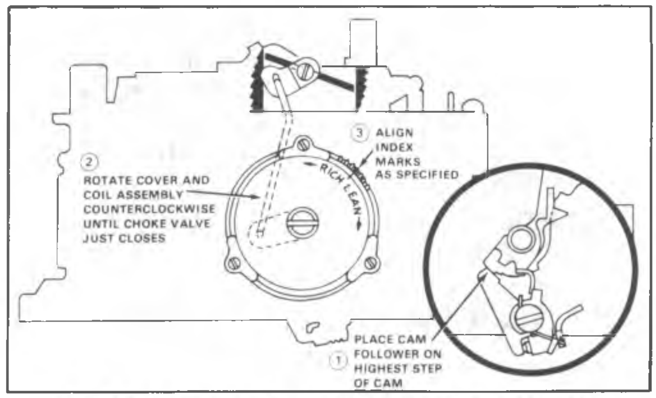


Fig. 51–Automatic Choke Coil Adjustment - Hot Air

of choke coil lever pick-up arm.

2. Place fast idle cam follower on the highest step of the fast idle cam.
3. Rotate cover and coil assembly counterclockwise until choke valve just closes.
4. Align index point on cover with specified index point on choke housing.
5. Tighten retaining screws.

Electric (Fig. 52)

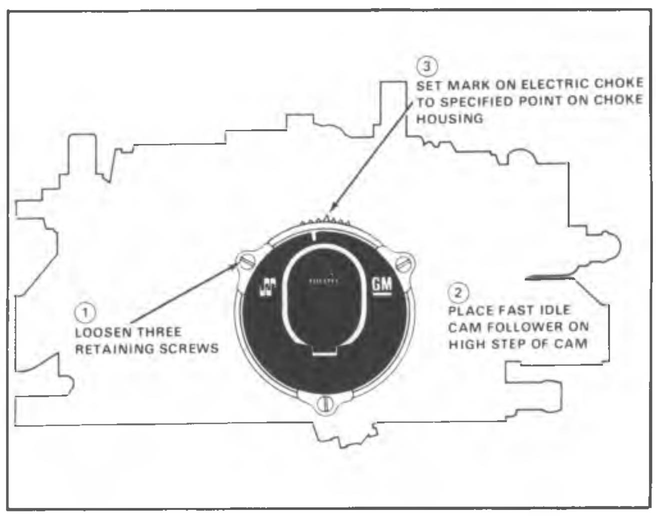


Fig. 52--Automatic Choke Coil Adjustment - Electric

1. Install the electric choke assembly in choke housing, making sure coil tang contacts bottom side of inside choke coil lever pick-up arm.
2. Place fast idle cam follower on high step of cam.
3. Rotate cover and coil assembly counterclockwise until choke valve just closes.
4. Align index point on cover with specified mark on housing.
5. Install cover retainers and screws and tighten securely.

NOTE: Ground contact for the electric choke is provided by a metal plate located at the rear of the choke assembly. DO NOT INSTALL A CHOKE COVER GASKET BETWEEN THE ELECTRIC CHOKE ASSEMBLY AND THE CHOKE HOUSING.

CAUTION: *Do not immerse the electric choke assembly in any cleaning solution or severe damage can result.*

Electric Choke Diagnosis and Checking

Procedure

In order to have good engine performance during warm up and be able to pass Federal exhaust emission standards, the electric choke must function properly.

Possible reasons for the choke not operating properly are listed below.

1. No engine oil pressure.
2. Malfunctioning oil pressure switch.
3. No current to oil pressure switch due to:
   a. Burned out 15 amp "radio-idle stop" fuse.
   b. Broken wire to switch (18 brown/double white).
4. No current between choke coil and oil pressure switch due to:
   a. Broken 18 light blue lead wire.
   b. Wire terminal not locked on coil terminal.
   c. Ground circuit incomplete between grounding plate of choke assembly and housing.
5. Failed choke coil assembly.

A voltmeter or continuity light may be used to check the circuits for continuity to the oil pressure switch and the choke coil.

If it is suspected that the choke coil assembly has failed, the following check may be made.

1. Remove coil from carburetor and cool to room temperature (above 60°F).
2. Attach a jumper wire between positive battery terminal and terminal of coil assembly. Attach a second jumper wire between negative battery terminal and grounding plate of choke coil assembly.
3. The tang of the coil should rotate 45° in 54 to 90 seconds.
4. If coil fails to rotate or exceeds the above timing specification, replace coil assembly.
5. If coil is within above timing specification then coil is good and problem is elsewhere.
6. Reinstall coil and set to proper index (Fig. 52).

If coil is cooled off suficiently the choke valve will close when throttle is opened slightly. Attach a jumper wire between the positive battery terminal and choke coil terminal. Choke coil should warm up and the choke blade can be observed opening, indicating a good and properly grounded choke coil assembly. At room temperature the choke blade should be wide open in approximately 90 seconds.

If the choke does not operate properly after the coil has been proven satisfactory, check out the other possibilities that prevent current from getting to the choke coil.

UNLOADER ADJUSTMENT (Fig. 53)

1. Install choke thermostatic coil and cover assembly with gasket in choke housing (no gasket is used on M4ME) and align index mark on cover with specified point on housing (see Automatic Choke Coil Adjustment, Figures 51 and 52).

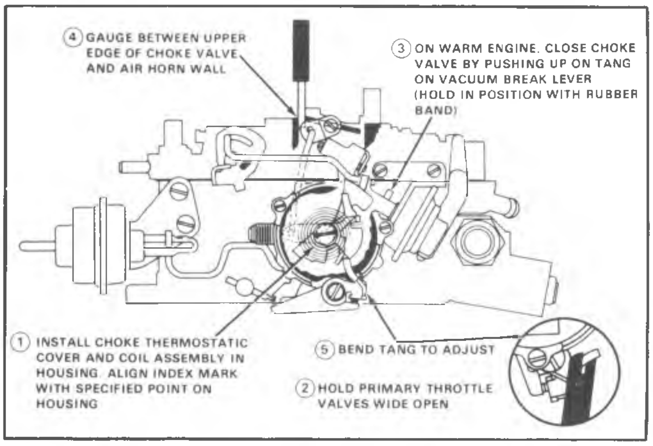


Fig. 53–Unloader Adjustment

2. With choke valve completely closed, hold throttle valves wide open.

   NOTE: On warm engine, close choke valve by pushing up on tang of intermediate choke lever that contacts fast idle cam. A rubber band may be used for this purpose.

3. Gauge between upper edge of choke valve and air horn wall.
4. Bend tang on fast idle lever as shown to adjust.

   CAUTION: *Check to be sure tang on fast idle lever is contacting center point of fast idle cam after adjustment.*

SECONDARY THROTTLE VALVE LOCK-OUT ADJUSTMENT (Fig. 54)

Secondary Lock-Out Lever Clearance

1. Hold choke valve and secondary throttle valves closed.
2. Using .015 plug gauge, measure clearance between lock-out pin and lock-out lever as shown.
3. If necessary, bend lock-out pin at point shown to obtain .015 clearance.

Opening Clearance

4. Hold choke valve wide open by pushing down on tail of fast idle cam.
5. Hold secondary throttle valves slightly open.

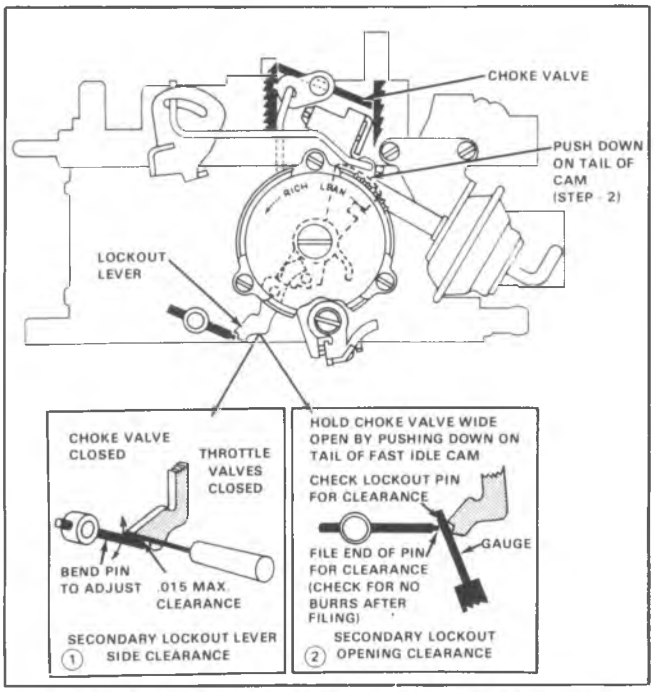


Fig. 54–Secondary Throttle Valve Lock-Out Adjustment

6. Using .015 plug gauge, measure clearance between end of lock-out pin and toe of lock-out lever as shown.
7. If necessary, file off end of lock-out pin to obtain .015 clearance.

SECONDARY CLOSING ADJUSTMENT (Fig. 55)

1. Pre-set carburetor speed screw to specifications.
2. Hold choke valve wide open with cam follower lever off steps of fast idle cam.
3. Using specified gauge, measure clearance between slot in secondary throttle valve pick up lever and secondary actuating rod.
4. Bend secondary closing tang on primary throttle lever as shown to adjust.

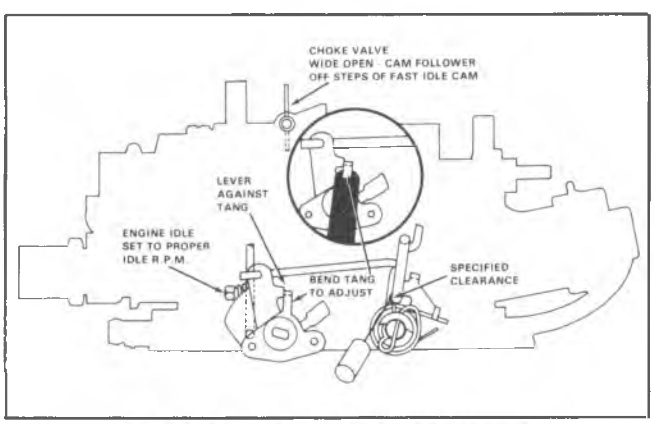


Fig. 55–Secondary Closing Adjustment

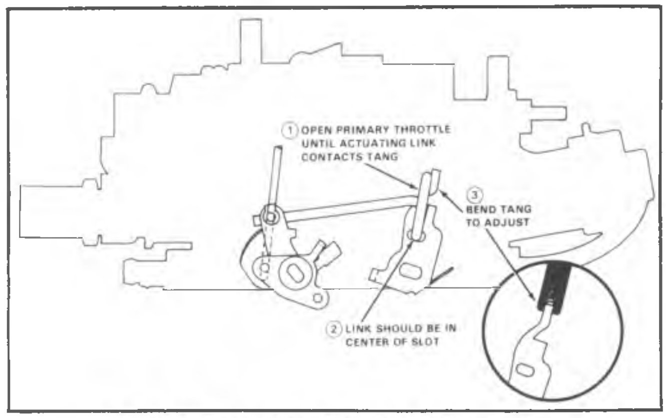


Fig. 56--Secondary Opening Adjustment

SECONDARY OPENING ADJUSTMENT (Fig. 56)

1. Lightly open primary throttle lever until link just contacts tang on secondary lever.
2. With link against tang, the link should be in center of slot in the secondary lever.
3. Bend tang on secondary lever, as shown, if necessary to adjust.

AIR VALVE SPRING WIND-UP ADJUSTMENT (Fig. 57)

NOTE: This adjustment should be made only when replacing air valve or a change in specifications.

1. Remove front vacuum break diaphragm unit and air valve dashpot rod.
2. Loosen lock screw using special hex wrench.
3. Turn tension adjusting screw counterclockwise until air valve opens part way.
4. Manually hold air valve closed.
5. Turn tension adjusting screw clockwise specified number of turns after spring contacts pin.
6. Holding adjusting screw, tighten lockscrew and replace air valve dashpot rod and front vacuum break diaphragm unit and bracket.

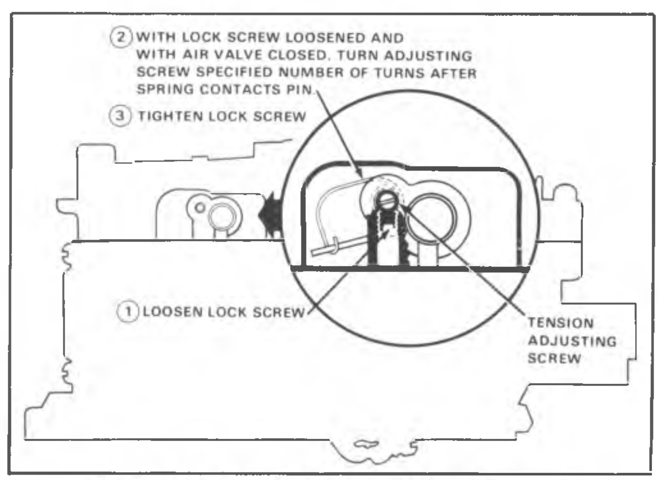


Fig. 57–Air Valve Spring Wind-Up Adjustment

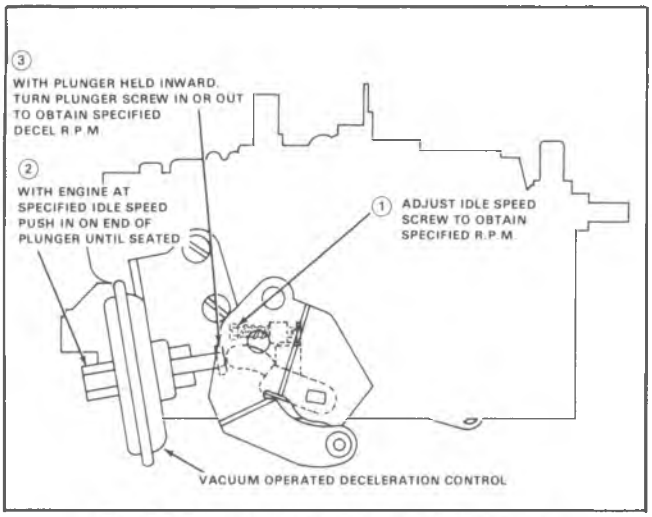


Fig. 58–Throttle Lever Actuator Adjustment

THROTTLE LEVER ACTUATOR ADJUSTMENT (Fig. 58)

1. Disconnect valve to actuator hose at valve and connect to an external vacuum source equipped with a vacuum gauge.
2. Check the throttle lever, shaft, and linkage to be sure that they operate freely without binding or sticking.
3. Start engine and run until warmed up and idle is stable. Place transmission in neutral or park.
4. Apply 20 in. Hg. vacuum to the actuator. Manually open the throttle slightly and allow to close against the extended actuator plunger. Note the engine RPM.
5. If the RPM noted above is not within the specified Throttle Return Control (TRC) speed range, then turn the screw on the actuator plunger in the appropriate direction and repeat step No. 4 until the specified TRC speed range is obtained.

SERVICE OPERATIONS

CARBURETOR REPLACEMENT (FIG. 59)

Removal

Flooding, stumble on acceleration and other performance complaints are, in many instances, caused by presence of dirt, water, or other foreign matter in carburetor. To aid in diagnosis, carburetor should be carefully removed from engine without draining fuel from bowl. Contents of fuel bowl may then be examined for contamination as carburetor is disassembled. Check filter.

1. Remove air cleaner and gasket.
2. Disconnect fuel and vacuum lines from carburetor.
3. Disconnect fresh air hose, choke hose (hot air choke) or electrical connection (electric choke) from choke system.
4. Disconnect accelerator linkage.
5. If equipped with automatic downshift cable, disconnect cable.
6. Remove carburetor attaching bolts and remove carburetor.
7. Remove insulator.

Installation

It is good shop practice to fill carburetor bowl with a small amount of unleaded fuel before installing carburetor. This reduces strain of starting motor and battery and reduce the possibility of backfiring while attempting to start engine. The carburetor float and intake needle and seat can also be checked. Operate throttle lever several times and check discharge from pump jets before installing carburetor.

1. Clean throttle body and intake manifold sealing surfaces.
2. Install new insulator.
3. Position carburetor over intake manifold and install bolts. Tighten bolts alternately to 144 in. lbs.
4. Connect downshift cable and adjust as required.
5. Connect accelerator linkage.
6. Connect fresh air hose and choke hose to choke system.
7. Connect fuel and vacuum lines.
8. Install air cleaner.
9. Refer to Maintenance and Adjustment and check idle speed.

FUEL FILTER REPLACEMENT

A plugged fuel filter will restrict fuel flow into carburetor and will result in a loss of engine power.

1. Disconnect fuel line-connection at inlet fuel filter nut.
2. Remove inlet fuel filter nut from carburetor.
3. Remove filter element and spring.
4. Install element spring and filter element in carburetor.
5. Install new gasket on inlet fitting nut and install nut in carburetor and tighten securely.
6. Install fuel line and tighten connector.

AIR HORN TIGHTENING SEQUENCE

Refer to figure 60 for proper air horn tightening sequence.

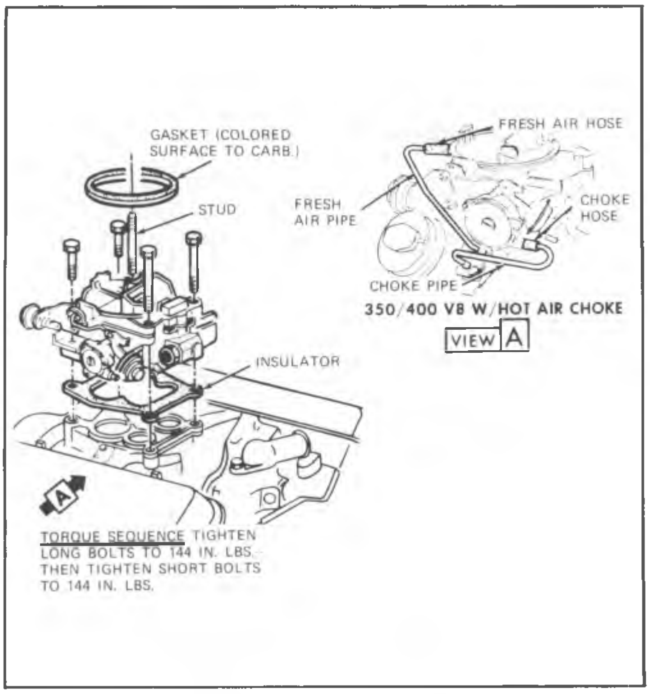


Fig. 59--Carburetor and Choke Pipes - V8, 4Bbl.

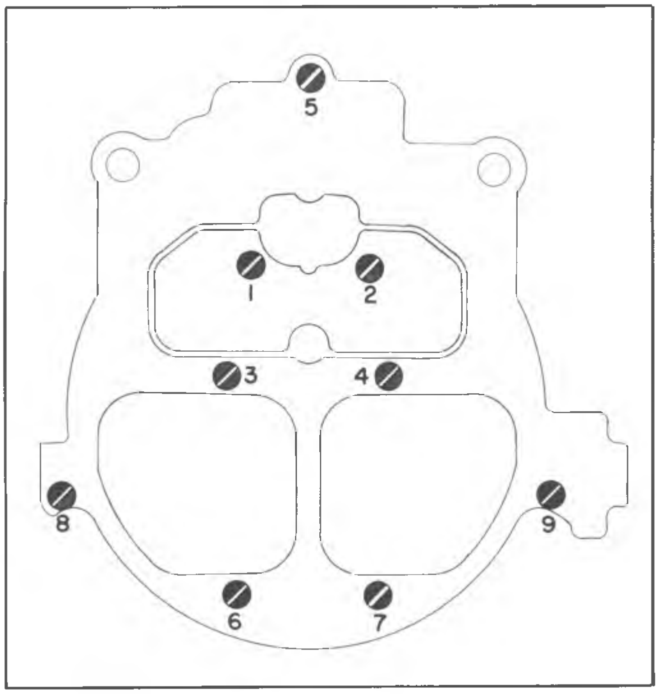


Fig. 60--Air Horn Tightening Sequence

DIAGNOSIS

GENERAL

When carburetor troubles are encountered they can usually be diagnosed and corrected with an adjustment as outlined below and under Maintenance and Adjustments.

Before diagnosing the carburetor as the trouble area, check and diagnose the following:

1. Fuel Supply
2. Fuel pump pressure and volume.
3. Plugged fuel filter or fuel lines.
4. Linkage and emission control systems.
5. Engine compression.
6. Ignition system firing voltage.
7. Ignition spark timing.
8. Spark plugs
9. Secure intake manifold.
10. Engine temperature.

Use the following tables to diagnose carburetor.

Problem: ENGINE IDLES ROUGH AND STALLS

Idle speed setting.	Re-set idle speed under maintenance and adjustment.
Manifold vacuum hoses disconnected or improperly installed.	Check all vacuum hoses leading into the manifold or carburetor base for leaks or being disconnected. Install or replace as necessary.
Carburetor loose on intake manifold.	Torque carburetor to manifold bolts.
Intake manifold is loose or gaskets are defective.	Using a pressure oil can, spray light oil or kerosene around manifold legs and carburetor base. If engine RPM changes, tighten or replace the manifold gaskets or carburetor base gaskets as necessary.
Carburetor flooding. NOTE: Also check carburetor flooding when engine cranks (turn over) but will not start or starts hard when cold.	1. Remove air horn and check float adjustments as specified in carburetor overhaul section. 2. If excessive dirt is found in the carburetor, clean the fuel system and carburetor. 3. Replace fuel filters as necessary. 4. Check float needle and seat for proper seal. If a needle and seat tester is not available, mouth suction can be applied to the needle seat with needle installed. If the needle is defective, replace with a factory matched set. 5. Check float for being loaded with fuel, bent float hanger or binds in the float arm. NOTE: A solid float can be checked for fuel absorption by lightly squeezing between fingers. If wetness appears on surface or float feels heavy (check with known good float, replace the float assembly. 6. Check metal float for leakage by shaking.
Dirt in idle channels.	If excessive dirt is found in carburetor or idle channels, clean fuel system and carburetor. Replace fuel filters as necessary.
Poor secondary throttle valve alignment.	If mis-aligned, loosen screws, align valves, tighten screws and re-stake as necessary.

Problem:

ENGINE CRANKS (TURNS OVER) BUT WILL NOT START OR STARTS HARD WHEN COLD.

POSSIBLE CAUSE	CORRECTIVE ACTION
Improper starting procedure used.	Check proper starting procedure, as outlined in the owner's manual.
No fuel in gas tank	Add fuel. Check fuel gauge for proper operation.
Choke valve not closing sufficiently when cold.	Adjust the choke thermostatic coil.
Choke valve or linkage binding or sticking.	Realign the choke valve or linkage as necessary. If caused by dirt and gum, clean with automatic choke cleaner. Do not oil choke linkage. If parts are replaced, check adjustments.
No fuel in carburetor.	1. Remove fuel line at carburetor. Connect hose to fuel line and run into metal container. Remove the high tension coil wire from center tower on distributor cap and ground. Crank over engine – if there is no fuel discharge from the fuel line, check for kinked or bent lines. Disconnect fuel line at tank and blow out with air hose, reconnect line and check again for fuel discharge. If none, replace fuel pump. Check pump for adequate flow, as outlined in service manual. 2. If fuel supply is o.k., check the following: a. Inspect fuel filter. If plugged replace. b. If filter is o.k., remove air horn and check for a bind in the float mechanism or a sticking float needle. If o.k., adjust float as specified in carburetor overhaul section.
Engine Flooded. NOTE: To check for flooding, remove the air cleaner, with the engine off, and look into the carburetor bore. Fuel will be dripping off nozzle and/or the carburetor will be very wet.	Check carburetor unloading procedure. Depress the accelerator to the floor and check the carburetor to determine if the choke valve is opening. If not, adjust unloader, as specified.
Carburetor flooding	NOTE: Before removing the carburetor air horn, use the following procedure which may eliminate the flooding. 1. Remove the fuel line at the carburetor and plug. Crank and run the engine until the fuel bowl runs dry. Turn off the engine and connect fuel line. Then re-start and run engine. This will usually flush dirt past the carburetor float needle and seat. 2. If dirt is in fuel system, clean the system and replace fuel filter as necessary. If excessive dirt is found, remove the carburetor unit. Disassemble and clean. 3. Check float needle and seat for proper seal. If a needle and seat tester is not available, apply mouth suction to the needle seat with needle installed. If the needle is defective, replace with a factory matched set. 4. Check float for being loaded with fuel, bent float hanger or binds in the float arm. NOTE: Check float for fuel absorption by lightly squeezing between fingers. If wetness appears on surface or float feels heavy (Check with known good float), replace the float assembly. 5. Adjust float as specified in carburetor overhaul section.

Problem: NO POWER ON HEAVY ACCELERATION OR AT HIGH SPEED

POSSIBLE CAUSE	CORRECTIVE ACTION
Carburetor throttle valve not going wide open. (Check by pushing accelerator pedal to floor).	Lubricate throttle linkage to obtain wide open throttle in carburetor.
Dirty or plugged fuel filter.	Replace with a new filter element.
Power system not operating.	Check power piston for free up and down movement. If power piston is sticking check power piston and cavity for dirt, or scores. Check power piston spring for distortion. Clean or replace as necessary.
Metering rod not adjusted to specification.	Adjust metering rod per carburetor overhaul section.
Float level too low.	1. Check and reset float level to specification per carburetor overhal section.
Float not dropping far enough into float bowl.	Check for binding float hanger and for proper float alignment in float bowl.
Main metering jet or metering rod dirty, plugged or incorrect part.	1. If the main metering jets are plugged or dirty and excessive dirt is in the fuel bowl, Carburetor should be completely disassembled and cleaned. 2. Check the jet or rod for being the correct part. Consult the parts list for proper usage. The last two digits stamped on the jet face are the same as the last two digits of the part number.
Air valves binding, stuck closed or wide open.	1. Free-up air valve shaft and align air valves. 2. Torque air horn screws evenly using proper tightening sequence. 3. Check air valve spring for closing tension. If defective, replace with spring kit.

Problem: ENGINE STARTS HARD WHEN HOT

Choke valve not opening completely.	1. Check for binding choke valve and/or linkage. Clean and free-up or replace parts as necessary. Do not oil choke linkage. 2. Check and adjust choke intermediate rod (fig. 29).
Engine flooded - Carburetor flooding.	See procedure under "Engine cranks, will not start".
No fuel in carburetor.	1. Check fuel pump. Run pressure and volume test. 2. Check float needle for sticking in seat, or binding float.
Leaking float bowl.	Fill bowl with fuel and look for leaks.

Problem: POOR FUEL ECONOMY

POSSIBLE CAUSE	CORRECTIVE ACTION
Engine needs complete tune-up.	Check engine compression. Examine spark plugs, (if dirty or improperly gapped, clean and re-gap or replace). Check ignition point dwell, condition, readjust ignition points if necessary and check and reset ignition timing. Clean or replace air cleaner element if dirty. Check for restricted exhaust system and intake manifold for leakage, make sure all vacuum hoses are connected correctly.
Choke valve not fully opening.	1. Clean choke and free up linkage. 2. Check intermediate choke rod for proper adjustment. Reset to specifications (fig. 29).
Fuel leaks.	Check fuel tank, fuel lines and fuel pump for any fuel leakage.
Main metering rod not adjusted to specification.	Remove carburetor air horn and gasket. Adjust metering rod as specified in carburetor overhaul section.
Metering rod bent or incorrect part. Main metering jet defective, loose or incorrect part.	Replace as necessary as specified in carburetor overhaul section.
Power system in carburetor not functioning properly. Power valve sticking in up position.	Free up or replace as necessary in carburetor overhaul section.
High fuel level in carburetor or carburetor flooding.	1. Check for dirt in the needle and seat. Test using suction by mouth or needle seat tester. If defective, replace needle and seat assembly with factory matched set. 2. Check for loaded float. 3. Re-set carburetor float as specified in carburetor overhaul section. 4. If excessive dirt is present in the carburetor bowl, the carburetor should be cleaned.
Fuel being pulled from accelerator system into venturi through pump jet.	Run engine at RPM where nozzle is feeding fuel. Observe pump jet. If fuel is feeding from jet, check pump discharge ball for proper seating by filling cavity above ball with fuel to level of casting. No "leak down" should occur with discharge ball in place. Re-stake or replace leaking check ball, defective spring, or retainer.
Air bleeds or fuel passages in carburetor dirty or plugged.	Clean carburetor or overhaul as necessary.

4MV QUADRAJET CARBURETOR

INDEX

GENERAL DESCRIPTION

The non-California and California 350/400 V8, and non-California 454 V8 vehicles of 6,000 pound gross vehicle weight (G.V.W.) and above use the 4MV qudrajet carburetor.

The 4MV model Quadrajet carburetor (Figure 1Q) is a two stage carburetor of downdraft design. The primary (fuel inlet) side uses the triple venturi system (with 1-7/32" venturi) with small 1-3/8" throttle valve bores. The triple venturi stack-up, plus the smaller primary bores, give excellent fuel control in the idle and economy stages of operation. Fuel metering in the primary side is accomplished with metering rods, operating in metering jets, positioned by a power piston responsive to manifold vacuum.

The secondary side has two large bores (2-1/4") to supplement air and fuel flow from the primary bores. Using the air valve principle in the secondary side, fuel is metered in direct proportion to the air passing through the secondary bores.

The carburetor part number is stamped on a vertical section of the float bowl, near the secondary throttle lever.

The primary side of the carburetor has six systems of operation. They are float, idle, main metering, power, pump, and choke. The secondary side has one metering system which supplements the primary main metering system and receives fuel from a common float chamber.

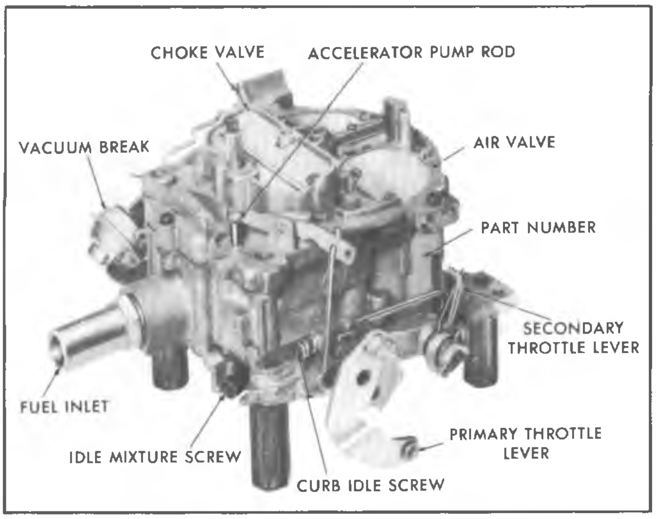


Fig. 1Q--Model 4MV Quadrajet Carburetor

THEORY OF OPERATION

FLOAT SYSTEM (FIG. 2Q)

The float system consists of a float bowl, pontoon assembly made of a closed cellular plastic material, float hinge pin, a float needle valve and seat, and a float valve pull clip.

Fuel from the engine fuel pump enters the carburetor fuel inlet passage and passes through the filter and needle seat.

As fuel fills the float bowl to the prescribed fuel level, the float pontoon rises and forces the fuel inlet valve closed, shutting off all fuel flow. As fuel is used from the float bowl, the float drops and allows more fuel to enter the float bowl until the correct fuel level is reached. This cycle continues, constantly maintaining a positive fuel level in the float bowl.

A float needle pull clip, fastened to the float valve, hooks over the center of the float arm. Its purpose is to assist in lifting the float valve off its seat whenever fuel level is low.

A plastic filler block is located in the top of the float bowl in the area just above the fuel inlet. This block prevents fuel slosh on severe brake applications or turning maneuvers. This maintains a constant fuel level during these maneuvers, to prevent stalling.

The carburetor float bowl is internally vented. The internal vent tubes are located in the primary bore section of the carburetor air horn just above the float chamber. The purpose of the internal vent is to balance incoming air pressure beneath the air cleaner with air pressure acting on fuel in the float bowl, thereby maintaing a balanced air/fuel mixture ratio during part throttle and power operation. The internal vent tubes allow the escape of fuel vapors in the float chamber during hot engine operation. This prevents fuel vaporization from causing excessive pressure buildup in the float bowl, which could result in excessive fuel spillage into the manifold.

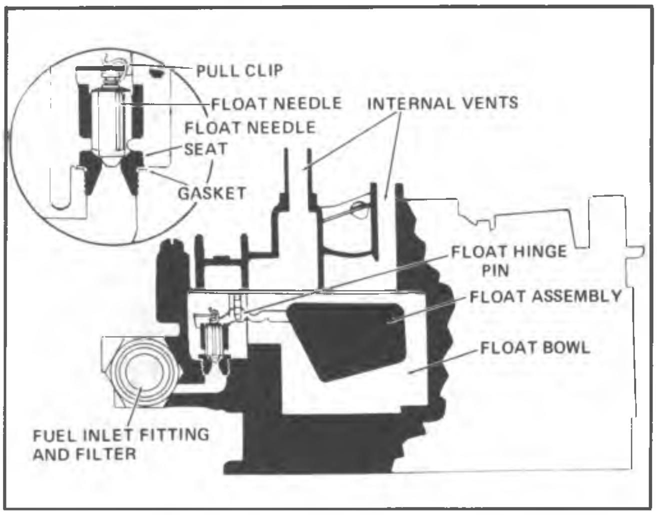


Fig. 2Q--Float System

IDLE SYSTEM (FIG. 3Q)

The idle system is on the primary side (fuel inlet side) of the carburetor, to supply the correct air/fuel mixture ratios during idle and off idle operation. The idle system is used during this period because air flow through the carburetor venturi is not great enough to obtain efficient metering from the main discharge nozzles. Each primary bore has a separate and independent idle system consisting of an idle tube, idle passages, idle air bleeds, idle channel restrictions, an idle mixture adjustment needle, and an idle discharge hole and idle air passage.

Fuel is forced from the float bowl down through the primary main metering jets into the main fuel wells. It passes from the main fuel well up through the calibrated idle tubes which

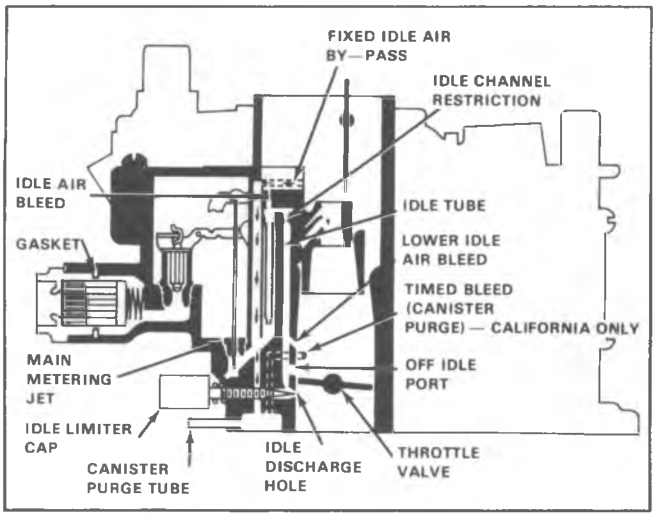


Fig. 3Q–Idle System

extend down into the well. After passing up the idle tube, the fuel is mixed with air at the top of each tube through an idle air bleed. The fuel mixture then crosses over to the idle down channels where it passes through a calibrated idle channel restriction.

It then passes down the idle channel past the lower idle air bleed holes and off idle discharge ports, just above the throttle valves, where it is mixed with more air. The air/fuel mixture then moves down to the idle needle discharge holes where it enters the carburetor bores and mixes with air passing the slightly open throttle valves.

The venturi system is very sensitive to air flow and on applications where large amounts of idle air are needed to maintain higher idle speeds, the fixed idle air by-pass system is used. This consists of air channels which lead from the top of each carburetor bore in the air horn to a point below each primary throttle valve. At normal idle, extra air passes through these channels supplementing the air passing by the slightly opened throttle valves. The purpose of the idle air by-pass system is to allow reduction in the amount of air going past the throttle valves so that they can be nearly closed at idle. This reduces the amount of air flowing through the carburetor venturi to prevent the main fuel nozzles from feeding during idle operation.

Off-Idle Operation

As the primary throttle valves are opened from curb idle to increase engine speed, additional fuel is needed to combine with the extra air entering the engine. This is accomplished by the slotted off-idle discharge ports. As the primary throttle valves open, they pass by the idle ports, gradually exposing them to high engine vacuum below the throttle valves. The additional fuel added from the off-idle ports mixes with the increasing air flow past the opening throttle valves to meet increased engine air and fuel demands.

Further opening of the throttle valves increases the air velocity through the carburetor venturi sufficiently to cause low pressure at the lower idle air bleeds. As a result, fuel begins to discharge from the lower idle air bleed holes (located at the bottom of the large venturi skirt) and continues to do so throughout operation of the part throttle to wide open throttle ranges, supplementing the main discharge nozzle delivery.

Canister Purge

On California vehicles, the fuel tank is not vented to atmosphere and all fuel vapors are collected in a vapor collection canister from the fuel tank vent. In order to remove the fuel vapors collected in the vapor canister, it is necessary to provide a means of purging the canister and burning the vapors in the engine.

Purge ports for the vapor collection canister are provided in the carburetor throttle body. The ports are located slightly above the throttle valve and lead through passages to a common chamber in the throttle body to a purge tube which connects by a hose to the vapor canister. The purge ports consist of a separate timed canister purge.

The timed bleed purge port is located in each bore next to the off-idle discharge ports. The timed purge operates during off-idle, part throttle, and wide-open throttle operation. As the throttle valves are opened to the off-idle position, the purge ports are in the low pressure area and begin to remove fuel vapors from the vapor canister. The purge ports are relatively large and provide adequate purge to remove all vapors collected in the canister. They will bleed constantly in varying amounts during off-idle, part throttle, and wide-open throttle operation of the engine.

MAIN METERING SYSTEM (FIG. 4Q)

The main metering system supplies fuel to the engine from off-idle to wide-open throttle. The two primary bores of the carburetor meter fuel through the venturi principle. This design allows the use of multiple venturi for finer, more stable, and accurate metering control during light engine loads.

The main metering system is in operation at all times when air flow through the venturi is high enough to maintain efficient fuel flow from the main fuel discharge nozzles. It begins to feed fuel when the idle system can no longer meet the engine requirements.

The main metering system consists of main metering jets; vacuum operated metering rods; main fuel well; main well air bleeds; fuel discharge nozzles; and triple venturi. The system operates as follows:

During cruising speeds and light engine loads, engine manifold vacuum is high. Manifold vacuum holds the power piston down against spring tension in contact with the adjustable part throttle screw and the larger diameter of the metering rod is in the main metering jet orifice. Fuel flow from the float bowl is metered between the metering rods and the main metering jets.

As the primary throttle valves are opened beyond the off-idle range, allowing more air to enter the engine manifold, air velocity increases in the carburetor venturi. This causes a drop in pressure in the large venturi which is increased many times in the double boost venturi. Since the low pressure (vacuum) is now in the smallest boost venturi, fuel flows from the main discharge nozzles as follows:

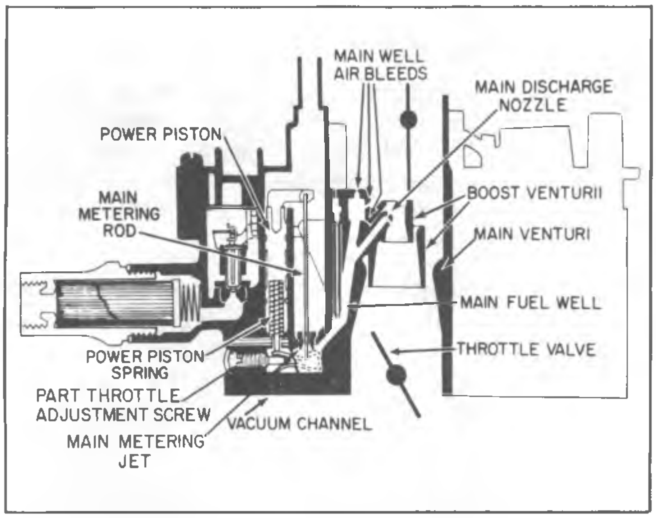


Fig. 4Q--Main Metering System

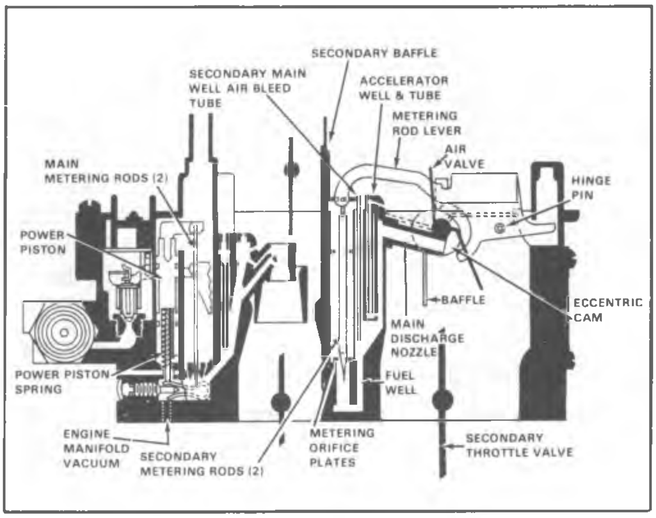


Fig. 5Q--Power System

Fuel flows from the float bowl through the main metering jets into the main fuel well and is bled with air from the vent at the top of the main well and side bleeds. The fuel in the main well is mixed with air from the main well air bleeds and then passes through the main discharge nozzle into the boost venturi. At the boost venturi the fuel mixture then combines with the air entering the engine through the carburetor bores and passes through the intake manifold and on into the engine cylinder as a combustible mixture.

The main metering system is calibrated by tapered and stepped metering rods operating in metering jets and also through the main well air bleeds.

POWER SYSTEM (FIG. 5Q)

The power system provides mixture enrichment for power requirements under acceleration high loads or high speed operation. The richer mixture is supplied through the main metering system in the primary side of the carburetor.

The power system located in the primary side consists of a vacuum piston and spring located in a cylinder connected by a passage to intake manifold vacuum. The spring located beneath the vacuum operated power piston tends to push the piston upward against manifold vacuum.

On part throttle and cruising ranges, manifold vacuum is sufficient to hold the power piston down against spring tension so that the larger diameter of the metering rod tip is held in the main metering jet orifice. Mixture enrichment is not necessary at this point. However, as engine load is increased to a point where mixture enrichment is required, the spring tension overcomes the vacuum pull on the power piston and the tapered primary metering rod tip moves upward in the main metering jet orifice. This smaller diameter of the metering rod tip allows more fuel to pass through the main metering jet and enrich the mixture flowing into the primary main wells and out the main discharge nozzles.

When manifold vacuum rises and mixture enrichment is no longer needed, the vacuum overcomes the power piston spring tension and returns the larger portion of the metering rod into the metering jet orifice and back to normal economy ranges. However, as the engine speed and load increases further, the primary side of the carburetor can no longer meet the engine air and fuel requirements.

When the engine reaches a point where the primary bores cannot meet engine air and fuel demands, the primary throttle lever, working through connecting linkage to the secondary throttle shaft lever, begins to open the secondary throttle valves. As air flows through the secondary bores creating a low pressure (vacuum) beneath the air valve, atmospheric pressure on top of the air valve forces the air valve open against spring tension. This allows the required air for increased engine speed to flow past the air valve.

When the air valve begins to open, the upper edge of the air valve passes the accelerating well discharge port. As the valve passes the port it exposes the port to manifold vacuum. The port will immediately start to feed fuel from the accelerating wells.

The accelerating ports prevent a momentary leanness as the valve opens and the secondary nozzles have not begun to feed fuel. Discharge from the ports stops after the edge of the valve has passed the port.

The secondary main discharge nozzles (one for each secondary bore) are located just below the air valve and above the secondary throttle valves. Being in an area of low pressure, they begin to feed fuel as follows:

When the air valve begins to open, it rotates a plastic cam attached to the center of the main air valve shaft. The cam pushes upward on a lever attached to the secondary metering rods, raising the metering rods out of the secondary orifice plates. Fuel flows from the float chamber through the secondary orifice plates into secondary main wells, where it is mixed with air from the main well tubes at the bottom of the main wells. The air-blended-fuel mixture travels from the main wells to the secondary discharge nozzles and into the secondary bores. Here fuel mixture is mixed with air traveling through the secondary bores to supplement the air/fuel mixture delivered from the primary bores, and then goes on into the engine manifold and on to the engine cylinders as a combustible mixture.

As the throttle valves are opened further, and engine speeds increase, increased air flow through the secondary side of the carburetor opens the air valve to a greater degree, which in turn lifts the secondary metering rods further out of the orifice plates. The metering rods are tapered so that fuel flow through the secondary metering orifice plates is directly proportional to air flow through the secondary carburetor bores. In this manner correct air/fuel mixtures to the engine through the secondary bores can be maintained by the depth of the metering rods in the orifice plates.

There are two other features incorporated in the secondary metering system which are as follows:

1. The main well bleed tubes extend below the fuel level in the main well. These bleed air into the fuel in the well to blend the fuel with air quickly for good atomization as it leaves the secondary discharge nozzles.
2. A baffle plate is used in the secondary bore. Its purpose is to provide good fuel distribution by preventing too much fuel from going to the front of the engine.

Air Valve Dashpot Operation (Fig. 6Q)

The secondary air valve is connected to a vacuum break diaphragm assembly by a rod, to control the opening rate of the air valve and prevent any secondary discharge nozzle lag.

Whenever manifold vacuum is above approximately 5" - 6" Hg, the vacuum break diaphragm system is seated. However, when the secondary valves are opened and manifold vacuum drops below the 5" - 6" point, the spring in the vacuum break unit will force the diaphragm and stem off its seat. The rate of movement of the seat is controlled by a restriction in the cover of the vacuum break unit.

When the diaphragm is seated, it pulls the rod to the front end of the slot in the air valve shaft lever. As the air valve starts to open, when the secondary throttle valves are opened, the restriction in the tube will restrict the air movement to the back side of the diaphragm and slow down the opening of the air valve.

ACCELERATING PUMP SYSTEM (FIG. 7Q)

During quick acceleration, when the throttle is opened rapidly, the air flow and manifold vacuum change almost instantaneously. The fuel, which is heavier, tends to lag behind causing a momentary leanness. The accelerator pump is used to provide the extra fuel necessary for smooth operation during this time.

The accelerating pump system is located in the primary side of the carburetor. It consists of a spring loaded pump plunger and pump return spring, operating in a fuel well. The pump plunger is operated by a pump lever on the air horn which is connected directly to the throttle lever by a pump rod.

When the pump plunger moves upward in the pump well, as happens during throttle closing, fuel from the float bowl enters the pump well through a slot in the top of the pump well. It flows past the synthetic pump cup seal into the bottom of the pump well. The pump cup is a floating type which moves up and down on the pump plunger head. When the pump plunger is moved upward, the flat on top of the cup inseats from the flat on the plunger head and allows free movement of fuel through the inside of the cup into the bottom of the pump well. This also vents any vapors which may be in the bottom of the pump well so that a solid charge of fuel can be maintained in the fuel well beneath the plunger head.

When the primary throttle valves are opened, connecting linkage forces the pump plunger downward. The pump cup seats instantly and fuel is forced through the pump discharge passage, where it unseats the pump discharge check ball and passes on through the passage to the pump jets located in the air horn where it sprays into the venturi area of each primary bore.

It should be noted the pump plunger is spring loaded. The upper duration spring is balanced with the bottom pump return spring so that a smooth sustained charge of fuel is delivered during acceleration.

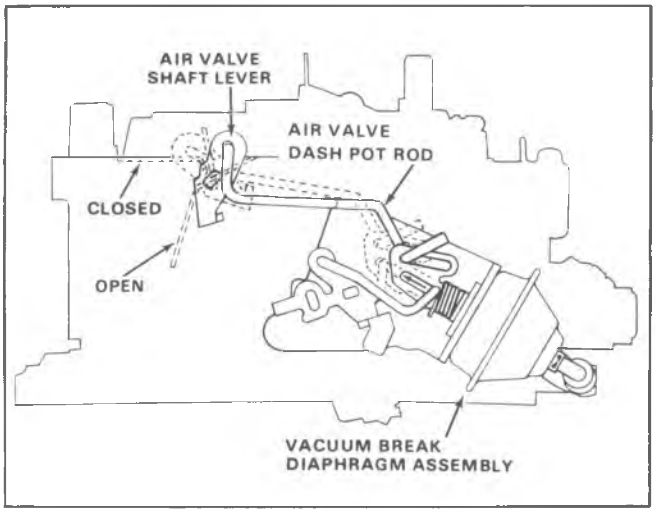


Fig. 6Q--Air Valve Dashpot Operation

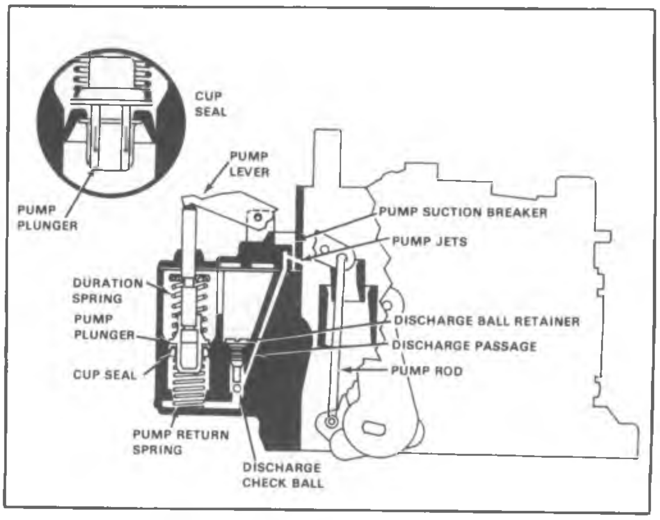


Fig. 7Q–Accelerating Pump System

The pump discharge check ball seats in the pump discharge passage during upward motion of the pump plunger so that air will not be drawn into the passage, other wise, a momentary acceleration lag could result.

During high speed operation, a vacuum exists at the pump discharge jets. A cavity just beyond the pump jets is vented to the top of the air horn, outside the carburetor bores. This acts as a suction break so that when the pump is not in operation fuel will not be pulled out of the pump jets into the venturi area. This insures a full pump stream when needed and prevents any fuel "pull over" from the pump discharge passage.

CHOKE SYSTEM (FIG. 8Q)

The Quadrajet choke valve is located in the primary side of the carburetor. It provides the correct air/fuel mixture enrichment to the engine for quick cold engine starting and during the warm-up period.

The choke system consists of a choke valve located in the primary air horn bore, a vacuum break unit, fast idle cam, connecting linkage, and a manifold mounted thermostatic coil. The thermostatic coil is connected by a choke rod to the intermediate choke shaft and lever assembly. Choke operation is controlled by the combination of intake manifold vacuum, the off-set choke valve, temperature, and throttle position.

The thermostatic coil (part of the choke assembly) located on the engine manifold is calibrated to hold the choke valve closed when the engine is cold.

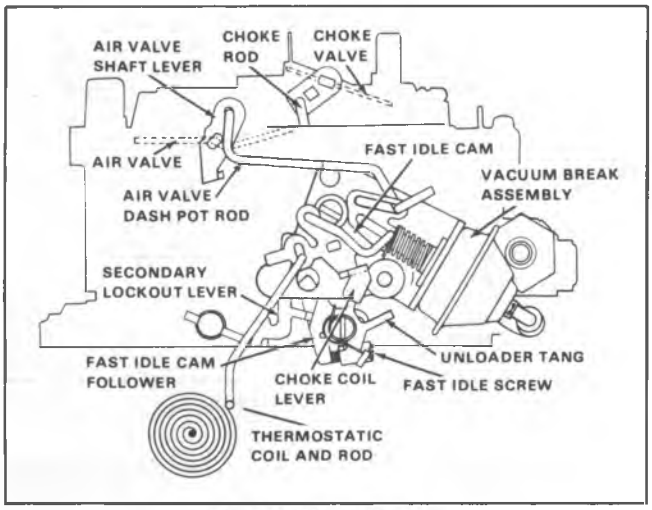


Fig. 8Q--Choke System

NOTE: To close the choke valve, the primary throttle valves have to be opened to allow the fast idle cam follower to by-pass the steps on the fast idle cam and come to rest on the highest step of the cam.

During engine cranking, the choke valve is held closed by the tension of the thermostatic coil. This restricts air flow through the carburetor to provide a richer starting mixture. When the engine starts and is running, manifold vacuum applied to the vacuum break unit mounted on the float bowl will open the choke valve to a point where the engine will run without loading or stalling.

As the thermostatic coil on the engine manifold warms up, it relaxes its tension and allows the choke valve to open further because of intake air pushing on the off-set choke valve and the counterweight effect of linkage and choke lever. Choke valve opening continues until the thermostatic coil is completely relaxed, at which point the choke valve is wide open.

A choke closing assist spring is incorporated in the vacuum break diaphragm plunger stem. The spring assists in closing the choke valve along with tension from the choke thermostatic coil for good engine starting. The choke closing assist spring only exerts pressure on the vacuum break link to assist in closing the choke valve during engine starting. When the engine starts and the vacuum break diaphragm seats, the closing spring retainer hits a stop on the plunger stem and no longer exerts pressure on the vacuum break link to assist in closing the choke valve during engine starting.

On all models, the secondary throttle valves are locked out during choke operation and the engine warm-up period. As the thermostatic coil warms up to the fully hot position, the vacuum break lever allows the fast idle cam to drop down so that the cam follower is completely off the steps of the fast idle cam. As the fast idle cam drops down, it strikes the secondary throttle valve lock-out pin. This allows the secondary throttle valves to open for hot engine power requirements.

The choke system is equipped with an unloader mechanism which is designed to open the choke valve partially if the engine should become loaded or flooded. To unload the engine, the accelerator pedal must be depressed to the floor so that the throttle valves are held wide open. A tang on a lever on the choke side of the primary throttle shaft contacts the fast idle cam and, working through the intermediate choke shaft, forces the choke valve slightly open. This allows extra air to enter the carburetor bores, pass into the engine manifold and cylinders to lean out the fuel into a combustible mixture so that the engine will start.

MAINTENANCE AND ADJUSTMENT

IDLE SPEED ADJUSTMENT

The carburetor idle speed screw is used for adjusting curb idle speed according to specifications listed on the Vehicle Emission Control Information label on the vehicle.

1. With engine at normal operating temperature, air cleaner on, choke open and air conditioning off, connect a tachometer to the engine.
2. Set parking brake and block drive wheels.
3. Disconnect fuel tank hose from vapor canister on California vehicle.
4. Disconnect and plug vacuum advance hose at distributor. Set ignition timing at specified rpm. Unplug and reconnect vacuum advance hose at distributor.
5. Place transmission in Park or Neutral, and on 350/400 V8, turn A/C "ON".
6. Turn carburetor idle speed screw to obtain specified rpm.
7. Check fast idle speed referring to fast idle adjustment.
8. Shut off engine and remove tachometer.
9. Connect fuel tank hose to vapor canister.

IDLE MIXTURE ADJUSTMENT

The idle mixture is factory preset and idle mixture screws are capped with plastic limiter caps. The cap permits screw to be turned about one turn leaner (clockwise) without breaking cap. The idle mixture is set to achieve the smoothest idle while maintaining emission levels within standards prescribed by Federal Law.

At major carburetor overhaul the idle mixture may be adjusted. Before suspecting idle mixture as case of poor idle quality, check ignition system, distributor, timing, air cleaner, PCV system, evaporation emission control and compression pressures. Also check all vacuum hoses and connections for leaks and check torques of carburetor attachment bolts. Adjustment is made using a tachometer.

Idle Mixture Adjustment

1. With engine at normal operating temperature, air cleaner on, choke open, and air conditioning OFF, connect a tachometer to engine.
2. Set parking brake and block drive wheels.
3. Disconnect fuel tank hose from vapor canister on California vehicle.
4. Disconnect vacuum advance hose at distributor and plug hose.
5. Start engine, check timing and adjust as required. Reconnect vacuum advance hose.
6. With engine at normal operating temperature (not hot), air conditioning off, and air cleaner installed, position transmission in Neutral.
7. Break off tab on mixture cap using needle nose pliers.
8. Adjust idle rpm to the higher of the two idle speeds specified. (Example **650** /600).
9. Equally enrich (turn out) mixture screws until maximum idle speed is achieved. Reset speed if necessary to the higher specified idle speed.
10. Equally lean (turn in) mixture screws until the lower specified idle speed is achieved (Example 650/ **600**).
11. Stop engine and remove tachometer.
12. Connect fuel tank vent hose.

FAST IDLE ADJUSTMENT (FIG. 9Q)

1. Check for correct idle speed.
2. Set parking brake and block drive wheels.
3. Connect tachometer, start and warm-up engine to operating temperature.
4. Position transmission in PARK or NEUTRAL.

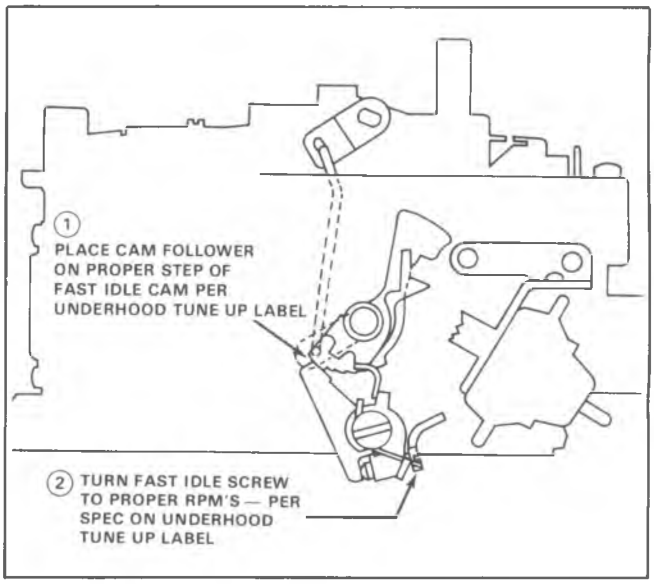


Fig. 9Q--Fast Idle Adjustment

5. Place cam follower lever on highest step of fast idle cam.
6. On California 454 V8 engine, plug vacuum hose at EGR valve.
7. Observe fast idle speed and, if necessary, turn fast idle screw to obtain specified fast idle rpm. Return engine to normal idle.
8. Shut off engine and remove tachometer.

CHOKE ROD (FAST IDLE CAM) ADJUSTMENT (FIG. 10Q)

1. Make fast idle adjustment.

2. Position cam follower lever on second step of fast idle cam held firmly against rise of high step.
3. Rotate choke valve toward closed position by pushing upward on vacuum break lever.
4. Place specified gauge between **upper** edge of choke valve and inside air horn wall.
5. If choke valve opening is incorrect, bend choke rod to obtain gauge dimension opening.
6. Recheck fast idle adjustment and adjust if required.

PUMP ROD ADJUSTMENT (FIG. 11Q)

1. Check primary throttle valves to be sure they are completely closed.
2. With pump rod in inner hole of pump lever, gauge from top of choke valve wall, next to vent stack, to top of pump stem.

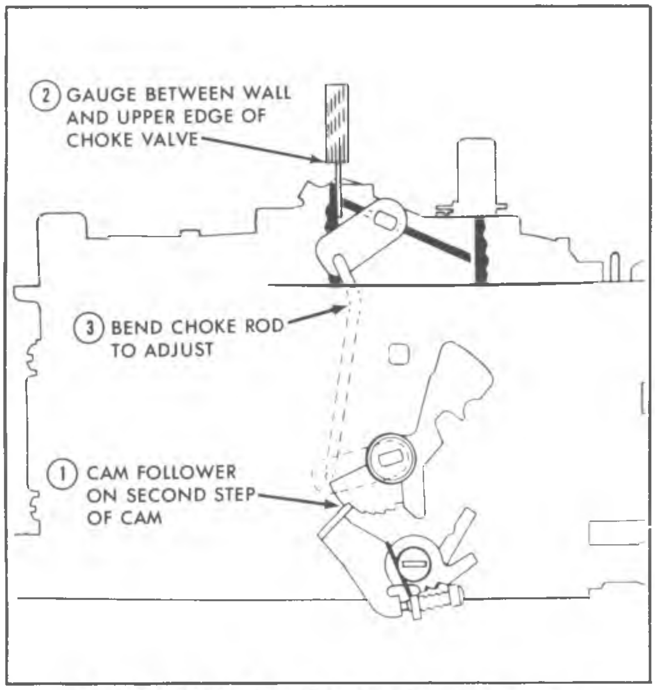


Fig. 10Q–Choke Rod (Fast Idle Cam) Adjustment

3. If adjustment is required, support pump lever with screwdriver and bend pump lever.
4. Check and adjust idle speed if required.

AIR VALVE DASHPOT ADJUSTMENT (FIG. 12Q)

1. Completely seat choke vacuum break diaphragm using an outside vacuum source.
2. With choke diaphragm seated and air valve fully closed, measure the distance between the end of slot in vacuum break plunger lever and air valve using .015" gauge.
3. Bend air valve dashpot rod as shown in figure 12Q if required to adjust.

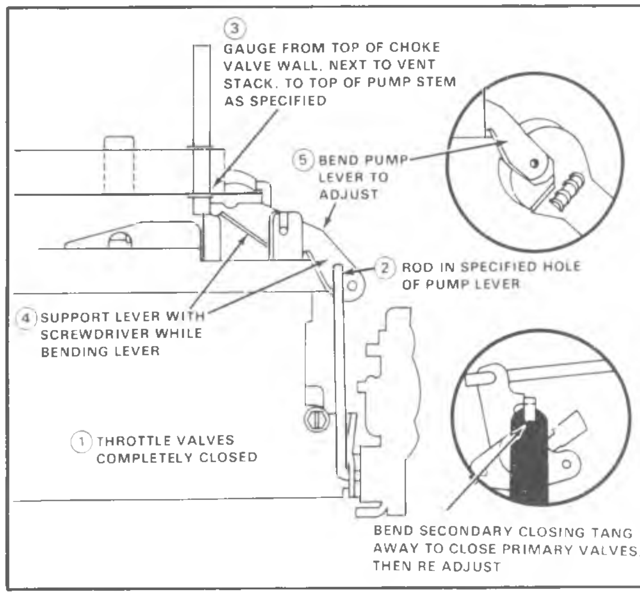


Fig. 11Q–Pump Rod Adjustment

VACUUM BREAK ADJUSTMENT (FIG. 13Q)

Before adjusting the vacuum break, check and/or adjust the fast idle, fast idle cam and air valve dashpot.

1. Seat vacuum break diaphragm using outside vacuum source.
2. Open throttle and place fast idle cam follower lever on high step of fast idle cam.
3. Lightly rotate choke coil lever counterclockwise until end of rod is in end of slot in lever.
4. Gauge distance between air horn wall and upper edge of choke valve using specified gauge.
5. Bend vacuum break rod if adjustment is required.

CHOKE UNLOADER ADJUSTMENT (FIG. 14Q)

1. Push up lightly on vacuum break lever to close choke. Hold in position with rubber band.

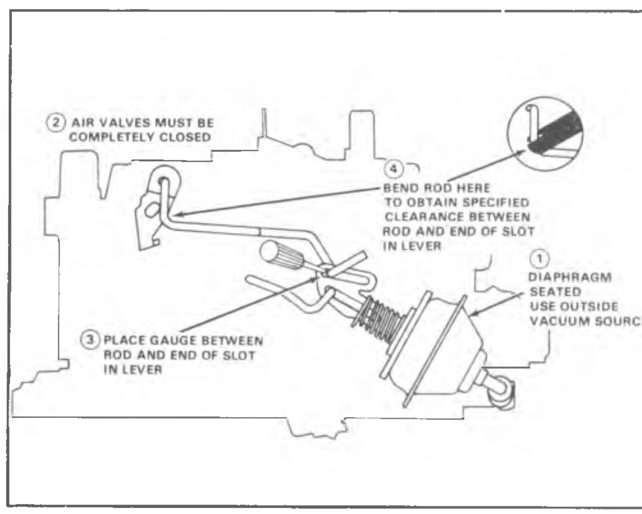


Fig. 12Q–Air Valve Dashpot Adjustment

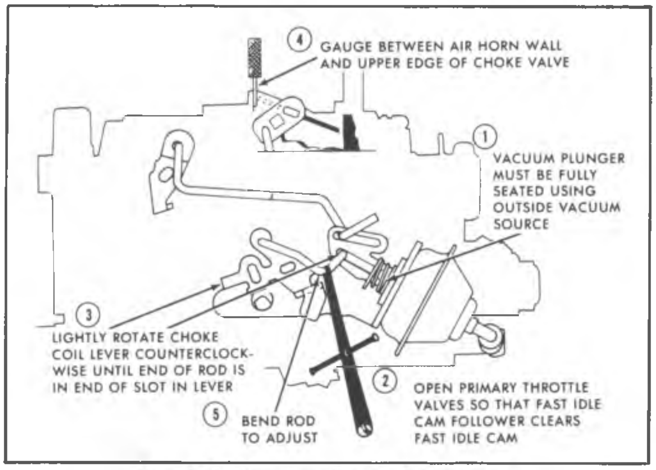


Fig. 13Q--Vacuum Break Adjustment

2. Hold primary throttle valves wide open.
3. Position specified gauge between air horn wall and upper edge of choke valve.
4. If opening is incorrect, bend tang on lever to adjust.

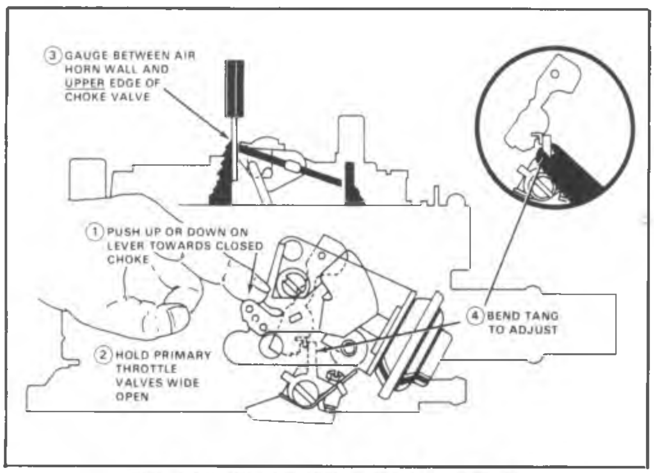


Fig. 14Q--Choke Unloader Adjustment

CHOKE COIL ROD ADJUSTMENT (FIG. 15Q)

Check choke mechanism for free operation. Any binding caused by petroleum gum formation on choke shaft or from damage should be corrected.

1. Remove thermostatic coil rod from choke coil lever.
2. Rotate coil lever counterclockwise until the choke valve is closed.
3. Hold down on choke coil rod with rod against stop.
4. Rod should fit notch in choke coil lever.
5. Bend coil rod, if necessary, to adjust.
6. Install rod to lever.

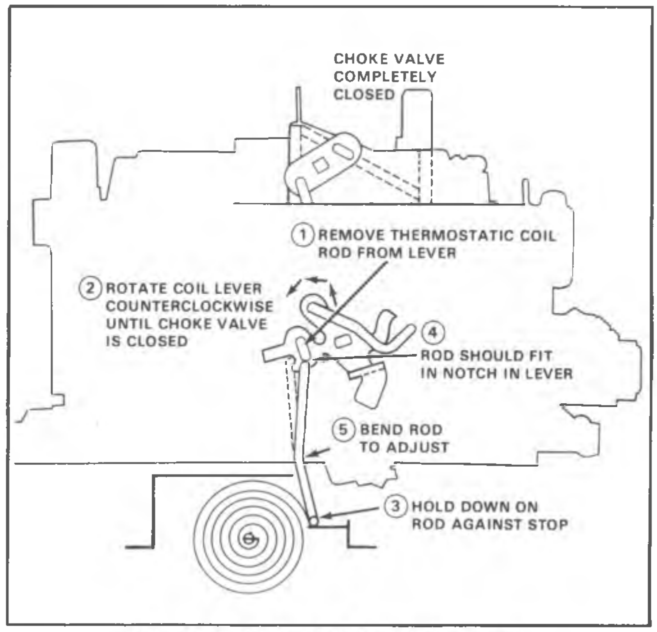


Fig. 15Q--Choke Coil Rod Adjustment

SECONDARY THROTTLE VALVE LOCK-OUT ADJUSTMENT

Secondary Lock-Out Lever Clearance

1. Hold choke valve and secondary throttle valves closed.
2. Using .015 plug gauge, measure clearance between lock-out pin and lock-out lever as shown.
3. If necessary, bend lock-out pin at point shown to obtain .015 clearance.

Opening Clearance

4. Hold choke valve wide open by pushing down on tail of fast idle cam.
5. Hold secondary throttle valves slightly open.
6. Using .015 plug gauge, measure clearance between end of lock-out pin and toe of lock-out lever as shown.
7. If necessary, file off end of lock-out pin to obtain .015 clearance.

SECONDARY CLOSING ADJUSTMENT (FIG. 16Q)

1. Pre-set carburetor idle speed screw to specifications.
2. Hold choke valve wide open with cam follower lever off steps of fast idle cam.
3. Using specified gauge, measure clearance between slot in secondary throttle valve pick up lever and secondary actuating rod.
4. Bend secondary closing tang on primary throttle lever as shown to adjust.

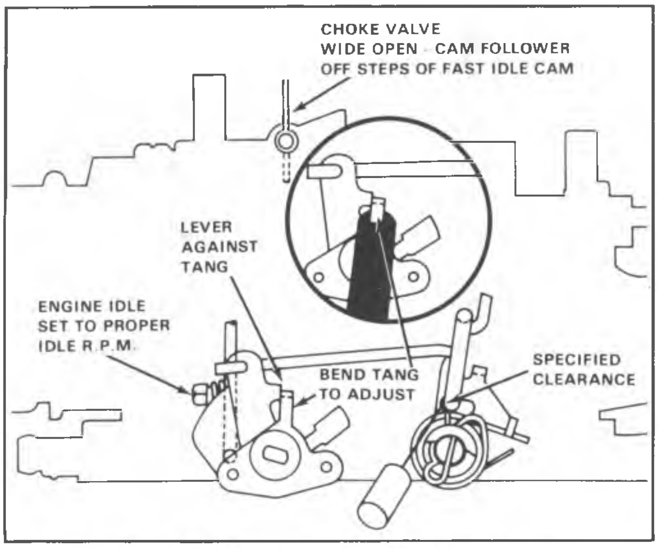


Fig. 16Q--Secondary Closing Adjustment

Secondary Opening Adjustment

1. Lightly open primary throttle lever until link just contacts tang on secondary lever.
2. With link against tang, the link should be in center of slot in the secondary lever.
3. Bend tang on secondary lever, as shown, if necessary to adjust.

Air Valve Spring Wind-Up Adjustment (Fig.17Q)

This adjustment is made only when replacing air valve. During service maintenance or normal overhaul, do not remove air valve.

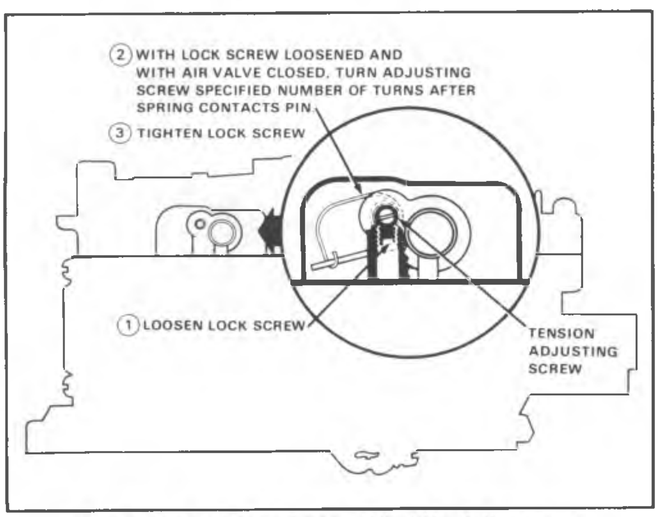


Fig. 17Q--Air Valve Spring Wind-Up Adjustment

1. Remove vacuum break diaphragm unit and air valve dashpot rod.
2. Loosen lock screw using special hex wrench.
3. Turn tension adjusting screw counterclockwise until air valve opens part way.
4. Manually hold air valve closed.
5. Turn tension adjusting screw clockwise specified number of turns after spring contacts pin.
6. Tighten lockscrew and replace air valve dashpot rod and vacuum break diaphragm unit and bracket.

Throttle Lever Actuator Adjustment (Fig. 18Q)

For additional information, refer to Section 6T, Throttle Return Control System.

1. Disconnect valve to actuator hose at valve and connect to an external vacuum source equipped with a vacuum gauge.
2. Check the throttle lever, shaft, and linkage to be sure that they operate freely without binding or sticking.
3. Start engine and run until warmed up and idle is stable. Place transmission in neutral or park.
4. Apply 20 in. Hg. vacuum to the actuator. Manually open the throttle slightly and allow to close against the extended actuator plunger. Note the engine RPM.
5. If the RPM noted above is not within the specified Throttle Return Control (TRC) speed range, then turn the screw on the actuator plunger in the appropriate direction and repeat step No. 4 until the specified TRC speed range is obtained.

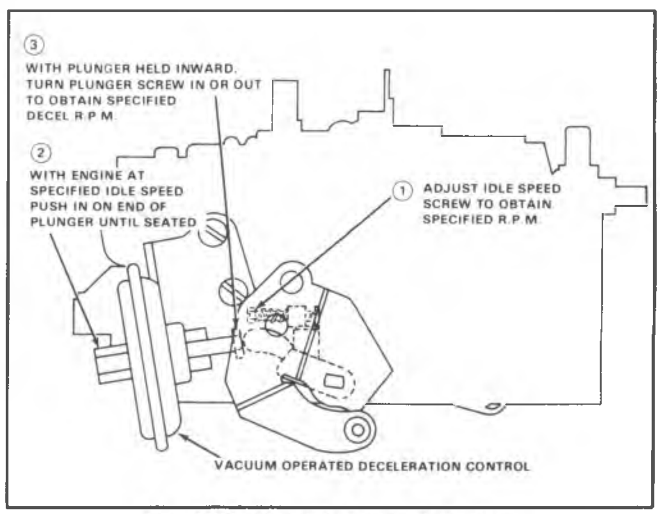


Fig. 18Q--Throttle Lever Actuator

SERVICE OPERATION

CARBURETOR REPLACEMENT (FIG. 19Q)

Removal

Flooding, stumble on acceleration and other performance complaints are, in many instances, caused by presence of dirt, water, or other foreign matter in carburetor. To aid in diagnosis, carburetor should be carefully removed from engine without draining fuel from bowl. Contents of fuel bowl may then be examined for contamination as carburetor is disassembled. Check filter.

1. Remove air cleaner and gasket.
2. Disconnect fuel and vacuum lines from carburetor.
3. Disconnect fresh air hose and choke hose from choke system.
4. Disconnect accelerator linkage.
5. If equipped with automatic downshift cable, disconnect cable.
6. Remove carburetor attaching bolts and remove carburetor.
7. Remove insulator.

Installation

It is good shop practice to fill carburetor bowl with a small amount of unleaded fuel before installing carburetor. This reduces strain of starting motor and battery and reduce the possibility of backfiring while attempting to start engine. The carburetor float and intake needle and seat can also be checked. Operate throttle lever several times and check discharge from pump jets before installing carburetor.

1. Clean throttle body and intake manifold sealing surfaces.
2. Install new insulator.
3. Position carburetor over intake manifold and install bolts. Tighten bolts alternately to 144 pound inches.
4. Connect downshift cable and adjust as required.
5. Connect accelerator linkage.
6. Connect fresh air hose and choke hose to choke system.
7. Connect fuel and vacuum lines.
8. Install air cleaner.
9. Refer to Maintenance and Adjustment and check idle speed.

FUEL FILTER REPLACEMENT

A plugged fuel filter will shut off fuel flow into carburetor.

1. Disconnect fuel line-connection at inlet fuel filter nut.
2. Remove inlet fuel filter nut from carburetor.
3. Remove filter element and spring.
4. Install element spring and filter element in carburetor.
5. Install new gasket on inlet fitting nut and install nut in carburetor and tighten securely.
6. Install fuel line and tighten connector.

AIR HORN TIGHTENING SEQUENCE

Refer to figure 20Q for proper air horn tightening sequence.

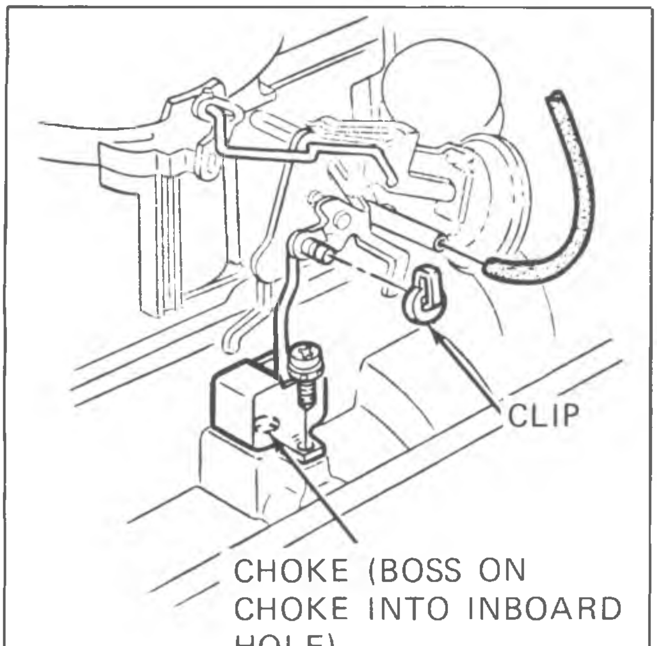


Fig. 19Q–Model 4MV Quadrajet Carburetor Choke

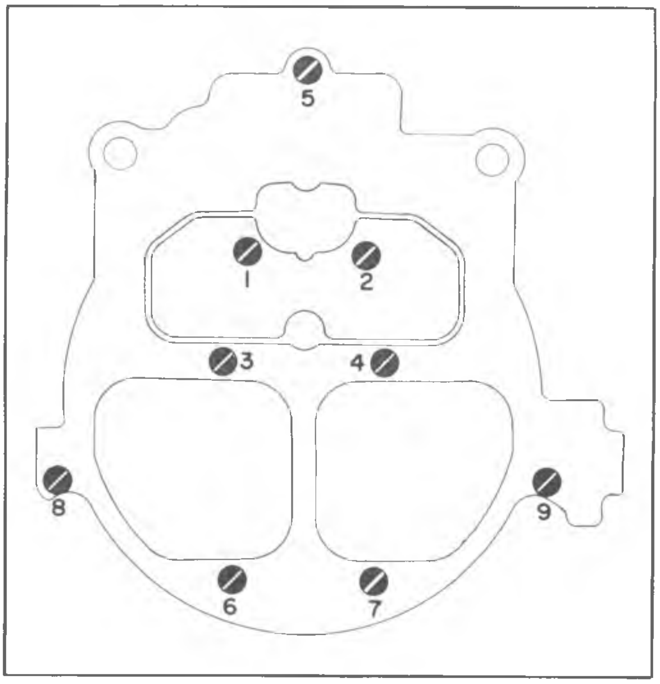


Fig. 20Q--Air Horn Tightening Sequence

DIAGNOSIS

Refer to M4MC/M4ME Quadrajet section of this manual for diagnosis of the 4MV Quadrajet.

ACCELERATOR CONTROL

GENERAL

The accelerator control system is cable type. There are no linkage adjustments. A reference between the bottom of accelerator pedal and floor pan should be used only as a check for bent bracket assembly. Check torque references. Check for correct opening and closing positions by operating accelerator pedal and if any binding is present, check routing of cable.

ACCELERATOR CONTROL CABLE

Refer to figures 1C through 4C for removal and installation of accelerator control cable.

ACCELERATOR PEDAL

Refer to figures 5C through 8C for removal and installation of accelerator pedal.

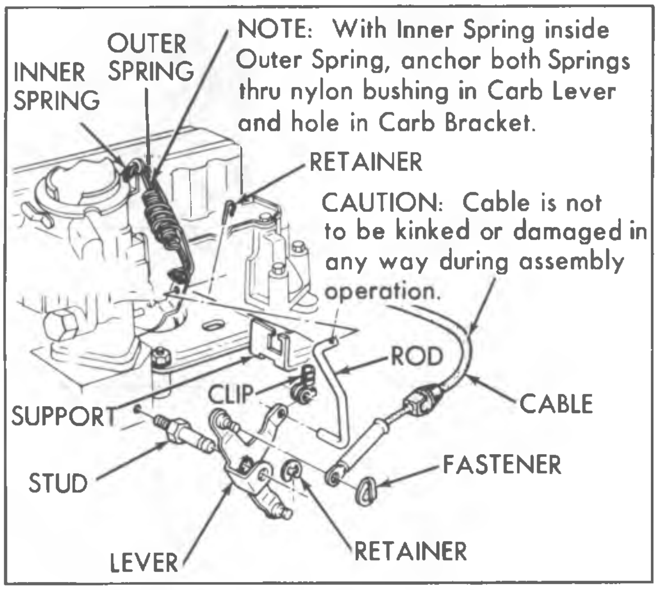


Fig. 1C–Accelerator Controls L6 - Light Duty Emissions

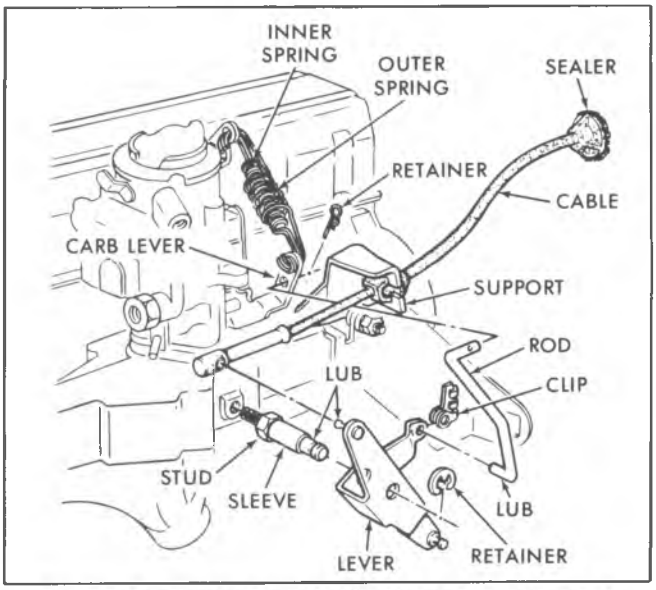


Fig. 2C–Accelerate Controls L6 - Heavy Duty Emissions

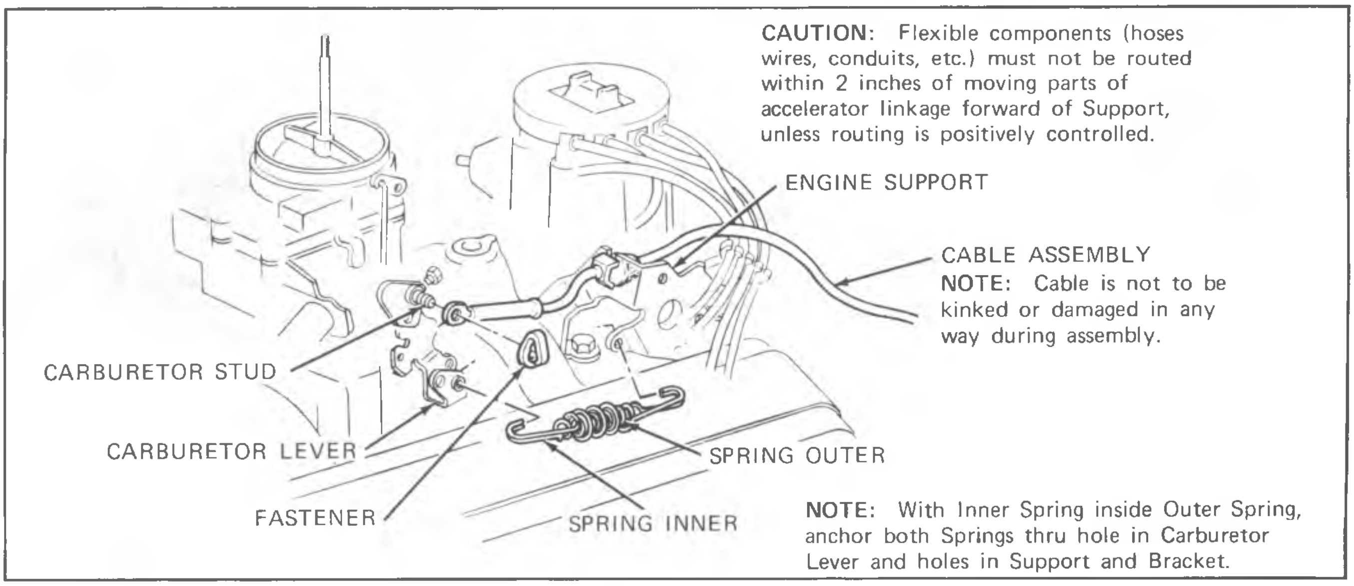


Fig. 3C–Accelerator Controls V8-2Bbl

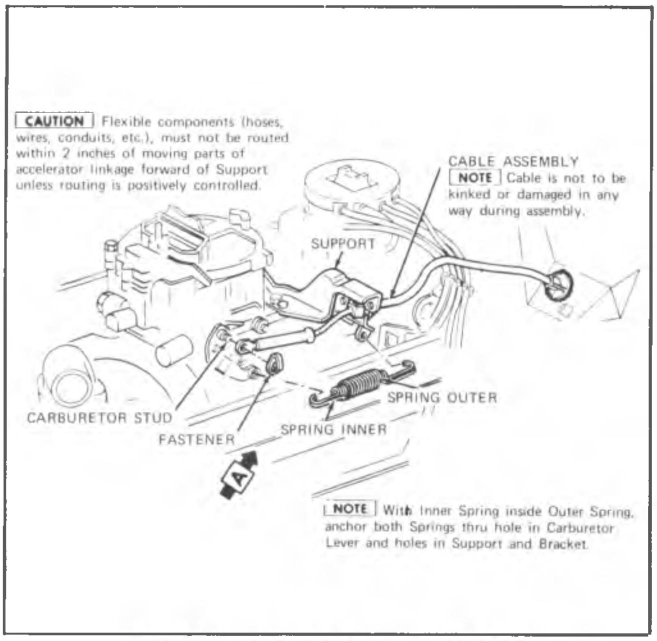


Fig. 4C–Accelerator Controls V8-4Bbl

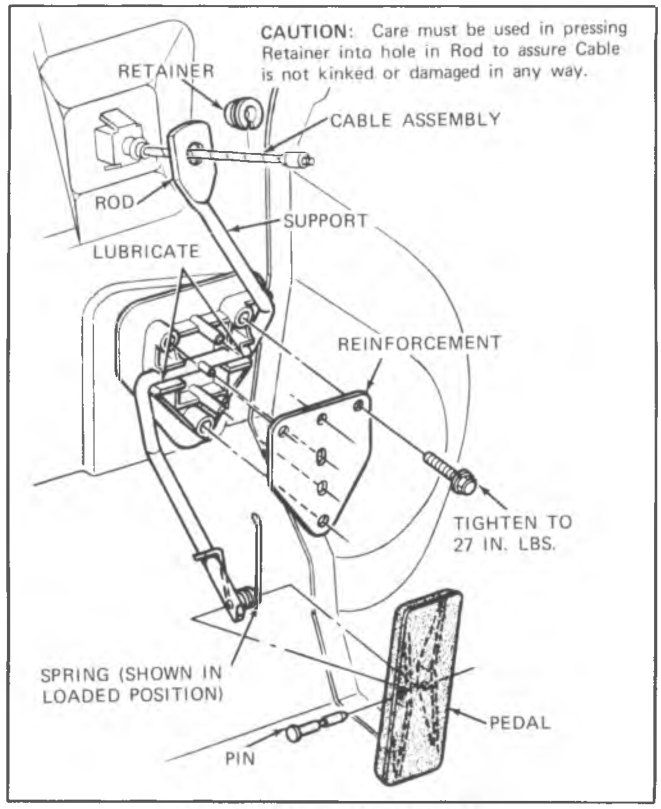


Fig. 6C–Accelerator Pedal-G

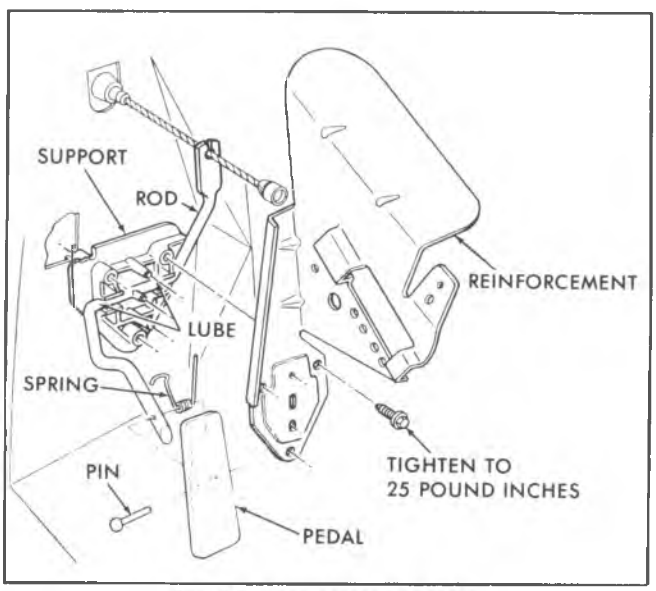


Fig. 5C–Accelerator Pedal-CK

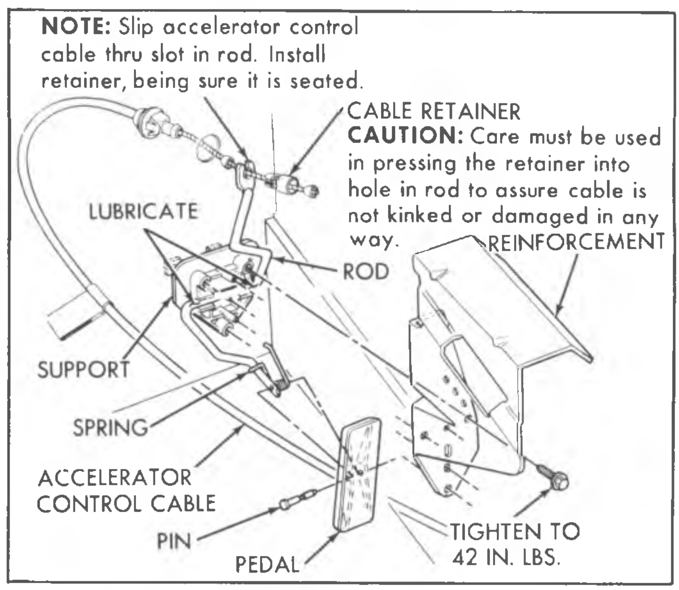


Fig. 7C–Accelerator Pedal-P42

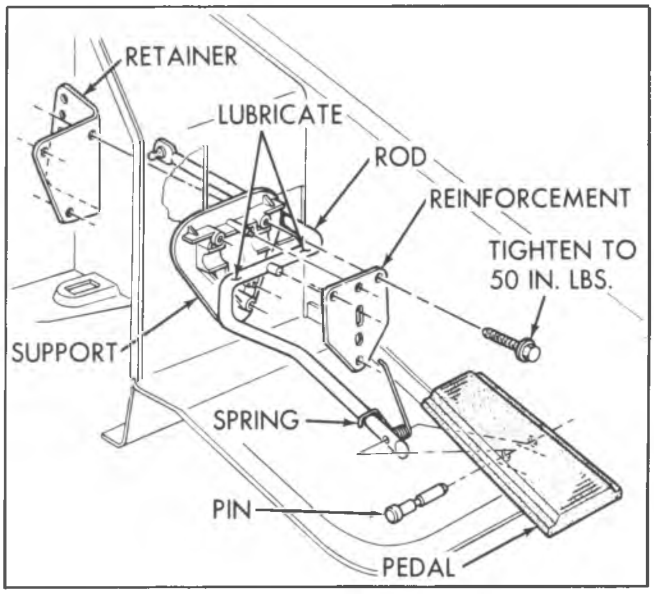


Fig. 8C–Accelerator Pedal-P32

AIR CLEANER

GENERAL

Air cleaner operates primarily to remove dust and dirt from the air that is taken into the carburetor and engine. The air cleaner is also effective in reducing engine air inlet noise.

Two types of air cleaner elements are used on trucks, an oil wetted paper element and a polywrap element.

The oil wetted paper element consists of an accordian pleated oiled paper filter supported by wire mesh with a plastisol seat on both top and bottom.

The polywrap element consists of the oil wetted paper element with an additional polyurethane band around it.

The air cleaner has an automatic air inlet temperature control device. Air temperature is automatically controlled by a thermostatic valve which selects warmed air from the heat stove and/or cooler air from the engine compartment or outside air inlet on some vehicles (Fig. 9C).

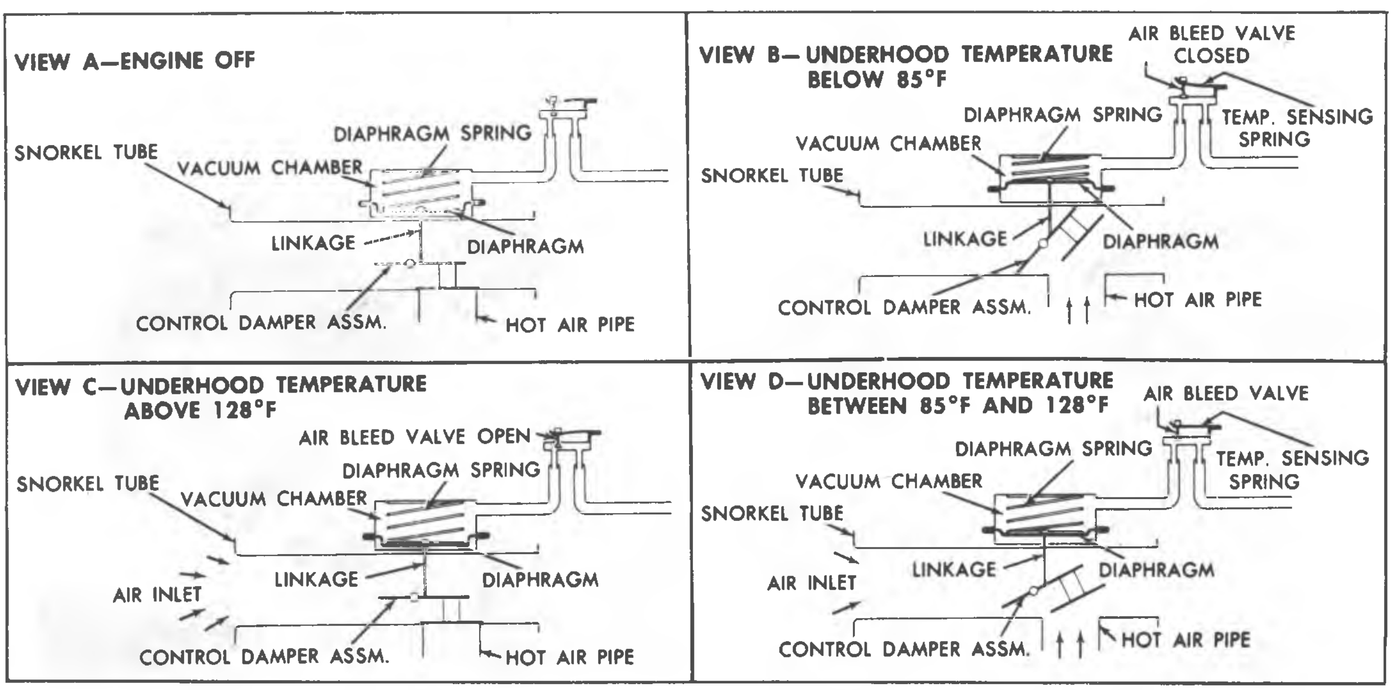


Fig. 9C–Air Cleaner Operation

This system is designed to improve carburetor operation and engine warm-up characteristics. It achieves this by keeping the air entering the carburetor at a temperature of at least 85°F (Heavy Duty Emissions) or 100°F (Light Duty Emissions) except at wide open throttle.

The thermostatic air cleaner system includes a temperature sensor, a vacuum motor and control damper assembly mounted in the air cleaner, vacuum control hoses, manifold heat stove and connecting pipes. The vacuum motor is controlled by the temperature sensor. The vacuum motor operates the air control damper assembly to regulate the flow of hot air and under hood air to carburetor. The hot air is obtained from the heat stove on the exhaust manifold.

AIR CLEANER ELEMENT REPLACEMENT

Paper Element

1. Remove air cleaner cover.
2. Remove and discard air cleaner element.
3. Clean bottom section of air cleaner and inspect cover seal for tears or cracks. Replace seal if damaged.
4. Install new element in bottom section of air cleaner with either end up.
5. Install air cleaner cover. Do not over-torque wing nut(s).

Polywrap Element

1. Remove air cleaner cover.
2. Remove element.
3. Remove polywrap band from paper element and discard element (fig. 10C).

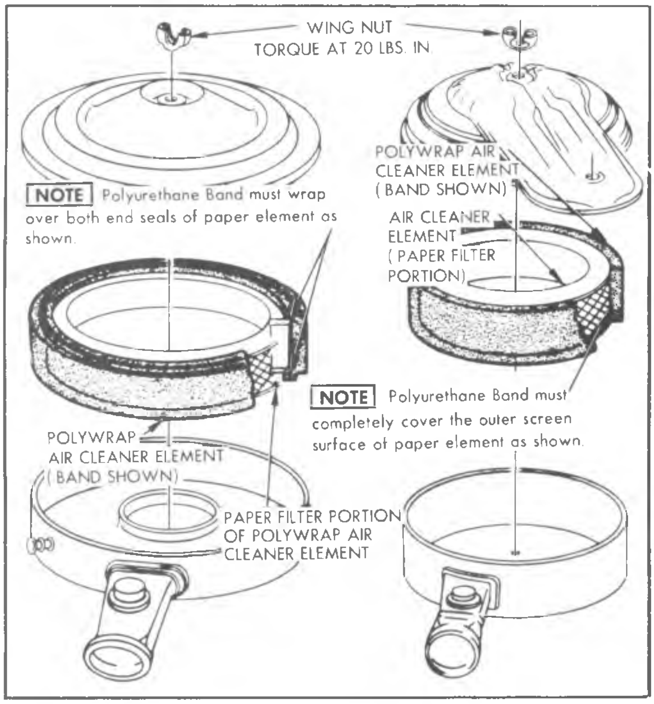


Fig. 10C–Polywrap Air Cleaner Element

4. Clean bottom section of air cleaner and inspect cover seal fro tears or cracks. Replace seal if damaged.
5. Inspect band for tears and replace if damaged.
6. If band is serviceable, wash in kerosene or mineral spirts and squeeze out excess solvent (fig. 11C).

   NOTE: Never use a hot degreaser or any solvent containing acetone or similar solvent; also, never shake, swing or wring the element to remove excess solvent as this may tear the polyurethane material. Instead, "squeeze" the excess solvent from the element.
7. Dip band into light engine oil and squeeze out excess oil.
8. Install band around outer surface of new paper element.
9. Install element in bottom section of air cleaner with either end up.
10. Install air cleaner cover. Do not over-torque wing nut(s).

AIR CLEANER

Refer to figures 12C and 13C for air cleaner used with in line L6 engine.

Refer to figure 14C for air cleaner used on CK truck with 350/400 V8 engine.

Refer to figure 15C for air cleaner used on G truck with 350/400 V8 engine.

Refer to figure 16C for air cleaner used with 454 V8 engine.

Refer to figure 17C for air cleaner used of P20(42), P30(42) and P30(32) truck with 350 V8 engine and 4MV carburetor.

Inspection

Visual

1. Check for proper, secure connections of heat pipe and hoses.
2. Check for kinked or deteriorated hoses. Repair or replace as required.

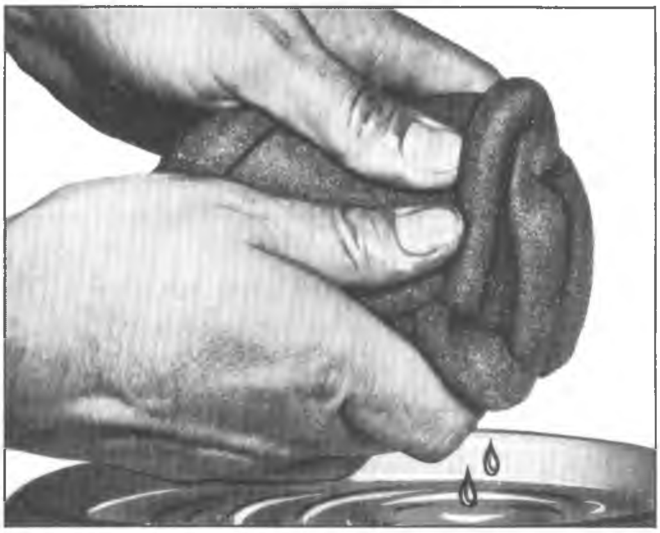


Fig. 11C–Cleaning Polywrap Band

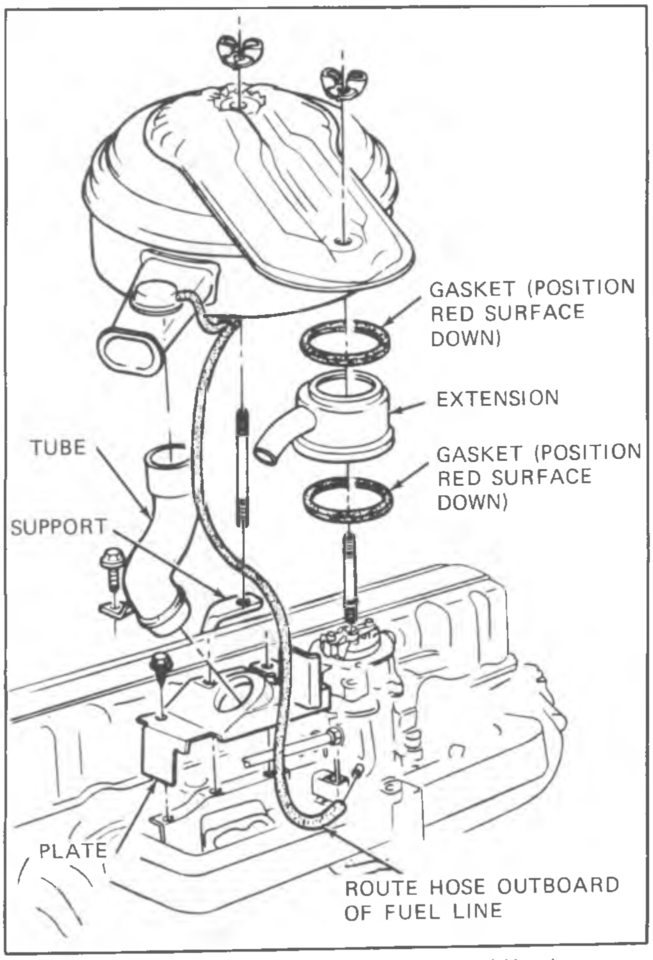


Fig. 12C–Air Cleaner - L6 - Intergrated Head

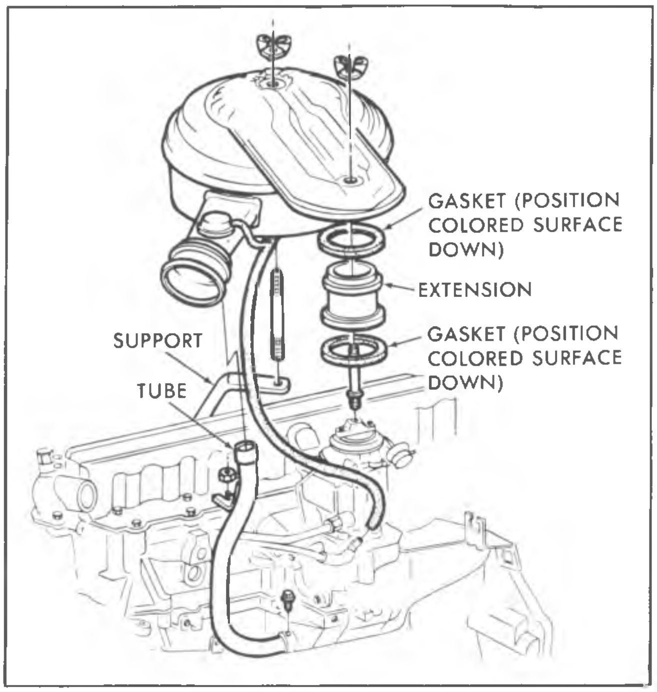


Fig. 13C–Air Cleaner - L6 - Non-Intergrated Head

Operational

1. Remove air cleaner cover and install temperature gauge (Tool J-22973) as close as possible to sensor (fig. 18C).

   Reinstall cover without wing nut. (Temperature must be below 85°F before proceeding.)

2. With the engine "Off", observe damper door position through snorkel opening. Snorkel passage should be open. (fig. 68 view A) If not, check for binds in linkage.
3. Start and idle engine. With air temperature below 85°F, snorkel passage should be closed. (fig. 9C view B) When damper door begins to open snorkel passage, remove air cleaner cover and observe thermometer reading. It should be between 85°F and 115°F.
4. If damper door does not close completely or does not open at correct temperature continue with the following vacuum motor check:
   a. Turn off engine. Disconnect diaphragm assembly vacuum hose at sensor unit.
   b. Apply at least 9 in. Hg. of vacuum to diaphragm assembly through the hose. This can be done by mouth. Damper door should completely close snorkel passage when vacuum is applied. If not, check to see if linkage is hooked up correctly. Also check for a vacuum leak.
   c. With vacuum applied, bend or clamp hose to trap vacuum in diaphragm assembly. Damper door should remain in position (closed snorkel passage). If it does not, there is a vacuum leak in diaphragm assembly.

      Replace diaphragm assembly.

5. If vacuum motor check is found satisfactory, replace sensor unit.

Vacuum Motor Replacement

Removal

1. Remove air cleaner from engine.
2. Drill out spot welds fastening vacuum motor retaining strap to snorkel tube.
3. Remove vacuum motor by lifting and unhooking linkrod from damper door.

Replacement

1. Drill 7/64" hole in snorkel tube at center of vacuum motor retaining strap (fig. 19C).
2. Connect vacuum motor linkage to damper door. Fasten retaining strap to air cleaner with sheet metal screw.
3. Replace air cleaner on engine and check operation of vacuum motor and control damper assembly.

Temperature Sensor Replacement

Removal

1. Remove air cleaner from engine and disconnect vacuum hoses at sensor.

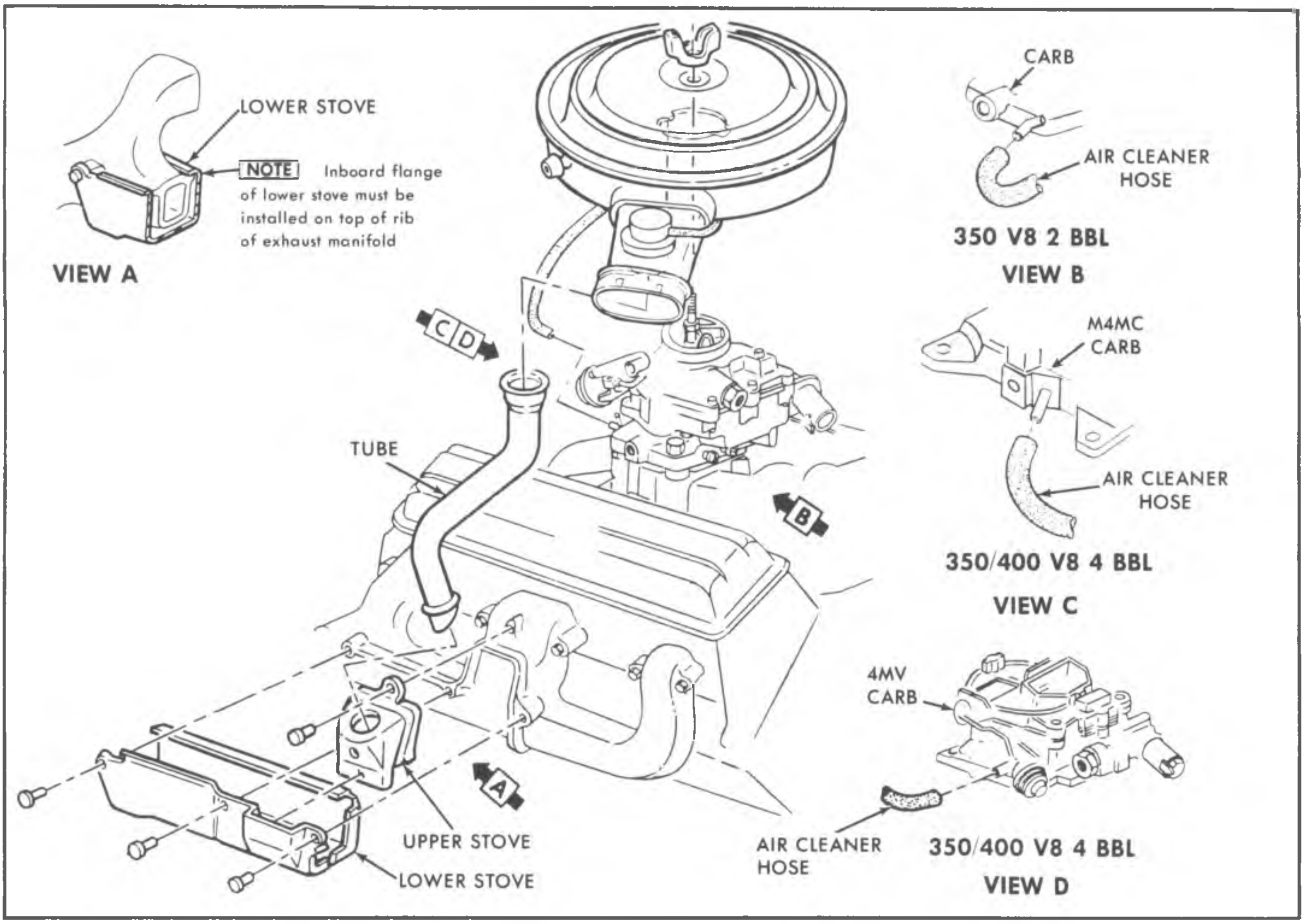


Fig. 14C–Air Cleaner-350/400 V8-CK

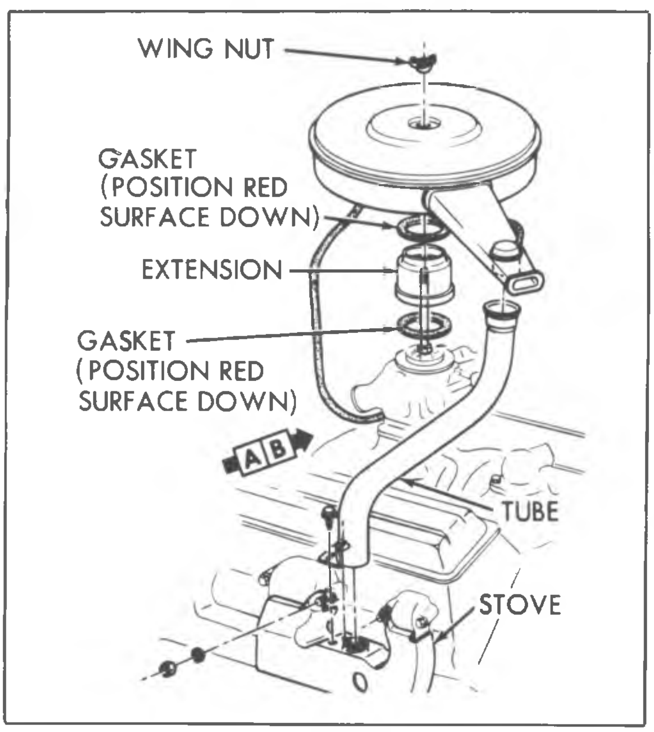


Fig. 15C–Air Cleaner 350/400 V8-G

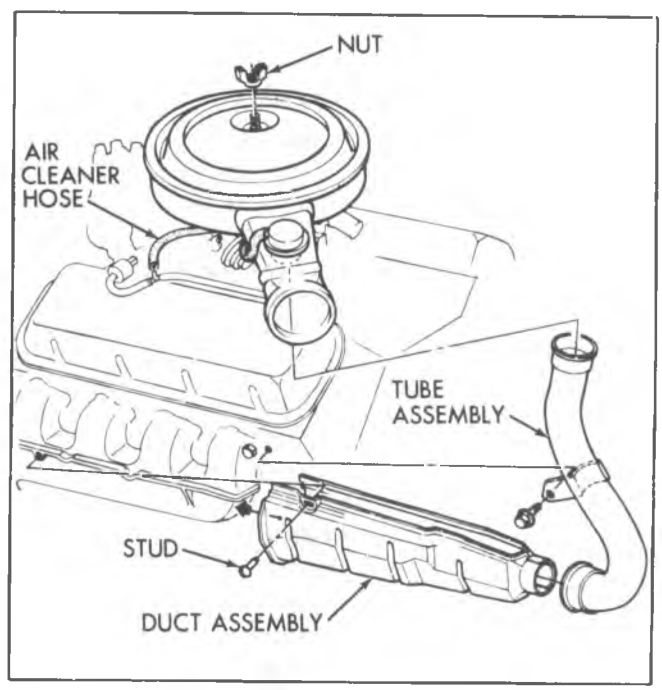


Fig. 16C–Air Cleaner-454 V8

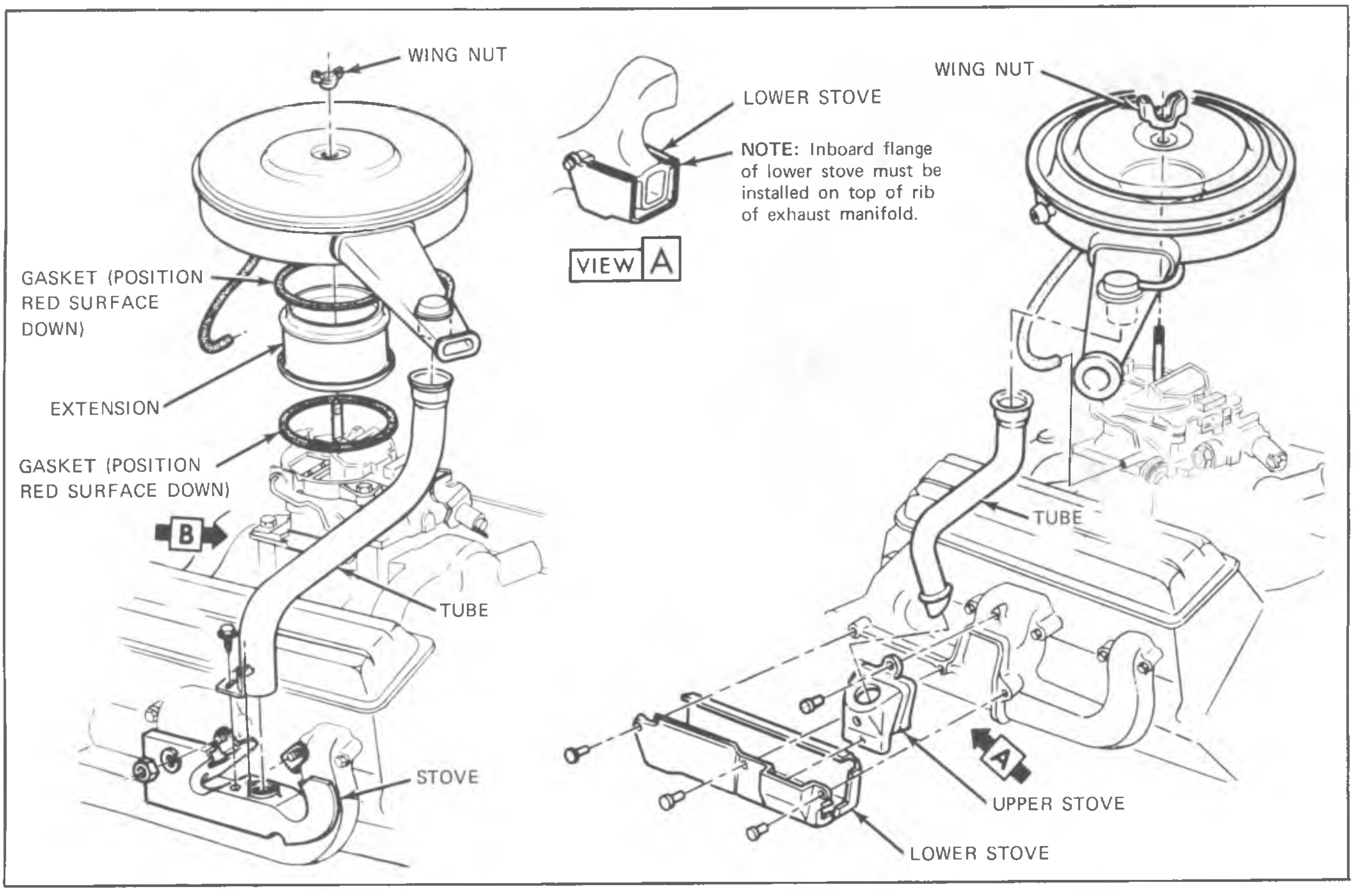


Fig. 17C–Air Cleaner-P20(42), P30(42), P30(32)

2. Pry up tabs of sensor retaining clip (fig. 20C). Observe position of sensor, new sensor must be installed in this same position.
3. Remove clip and sensor from air cleaner.

Replacement

1. Install sensor and gasket assembly in air cleaner in position as noted above.
2. Press retaining clip on sensor. Support the sensor on its sides to prevent damage to the control mechanism at the center.
3. Install air cleaner on engine and connect vacuum hoses.

CARBURETOR AIR INTAKE

Refer to figure 21C for carburetor air intake used on CK trucks.

Fig. 18C–Damper Door Thermometer Reading

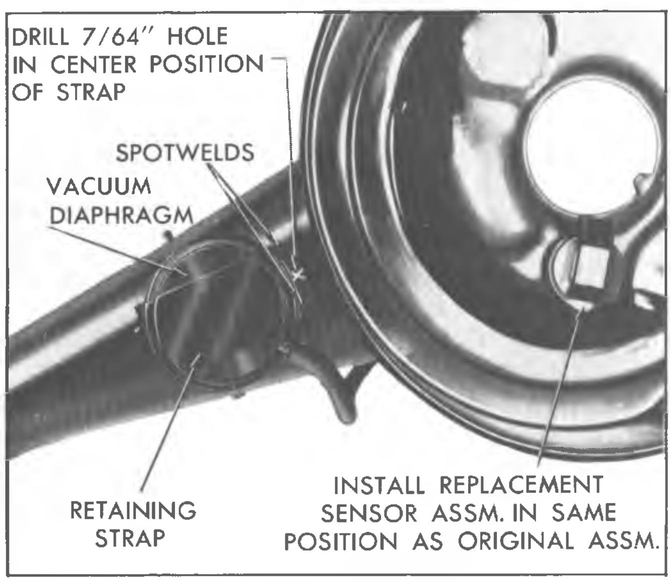


Fig. 19C–Vacuum Diaphragm Replacement

Fig. 20C–Removing Sensor Unit

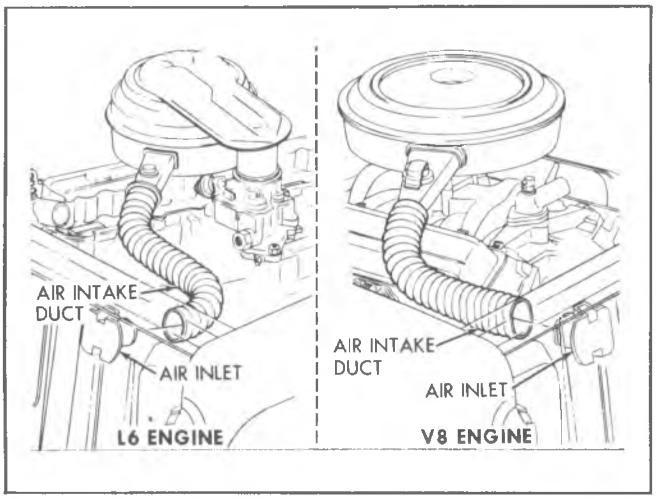


Fig. 21C–Carburetor Air Intake - CK

FUEL PUMP

GENERAL

The fuel pump is a diaphragm type. The pump is actuated by an eccentric located on engine camshaft. On in-line engine, the eccentric actuates the rocker arm. On V-8 engines, a push rod (located between camshaft eccentric and fuel pump) actuates the pump rocker arm. Because of design, this pump is serviced as an assembly only.

INSPECTION

The fuel pump (figs. 22C through 25C) should be checked to make sure mounting bolts and inlet and outlet connections are tight.

TEST

Always test pump while it is mounted on engine and be sure there is gasoline in tank.

The line from the tank to the pump is the suction side of system and the line from pump to carburetor is the pressure side of system. A leak on pressure side, therefore, would be made apparent by dripping fuel, but a leak on the suction would not be apparent except for its effect of reducing volume of fuel on pressure side.

1. Tighten any loose line connections and look for bends or kinks in lines.
2. Disconnect fuel pipe at carburetor. Disconnect distributor to coil primary wire so that engine can be cranked without firing. Place suitable container at end of pipe and crank engine a few revolutions. If little or no gasoline flows from open end of pipe, then fuel pipe is clogged or pump is inoperative. Before removing pump, disconnect fuel pipe at gas tank and outlet pipe and blow through them with an air hose to make sure they are clear. Reconnect pipes and retest while cranking engine.

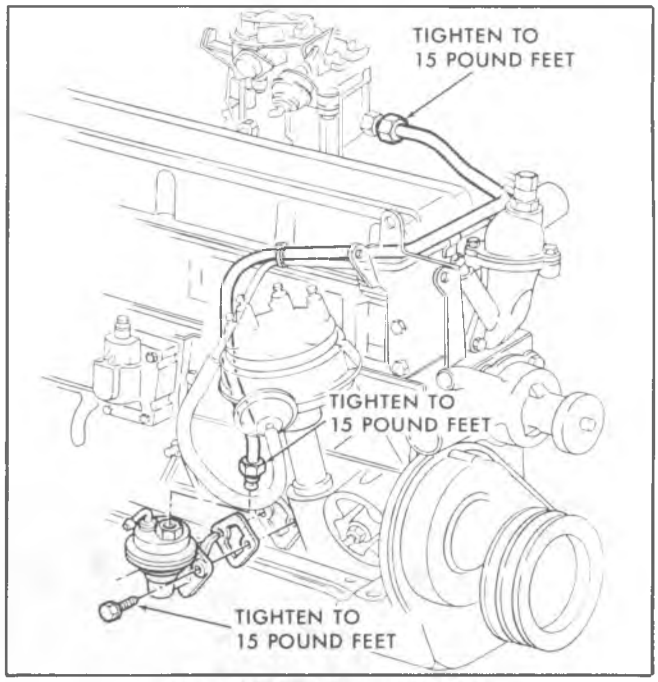


Fig. 22C–Fuel Pump - 250 L6

3. If fuel flows from pump in good volume from pipe at carburetor, check fuel delivery pressure to be certain that pump is operating within specified limits as follows:
   a. Attach a fuel pump pressure test gauge to disconnected end of pipe.
   b. Run engine at approximately 450-1,000 rpm (using gasoline in carburetor bowl) and note reading on pressure gauge.

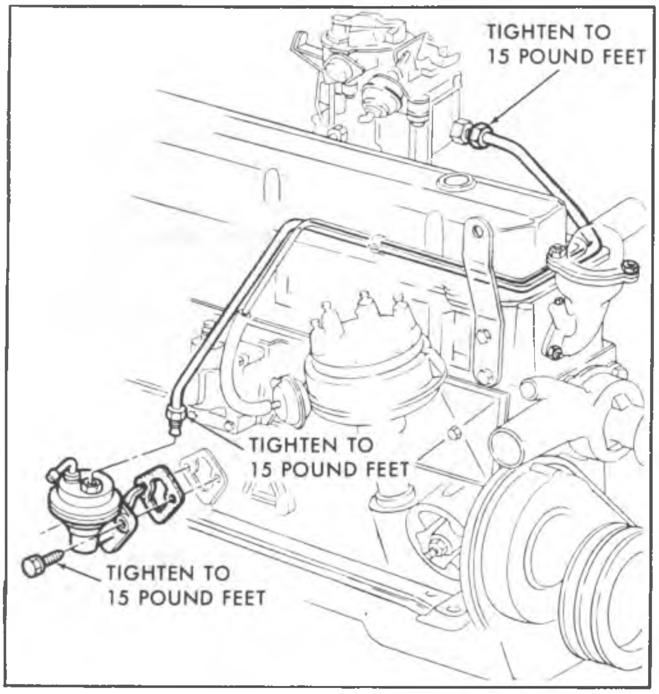


Fig. 23C--Fuel Pump - 262 L6

c. If pump is operating properly, the pressure will be within specifications and will remain constant at speeds between 450-1,000 rpm. If pressure is too low, too high, or varies significantly at different speeds, the pump should be replaced.

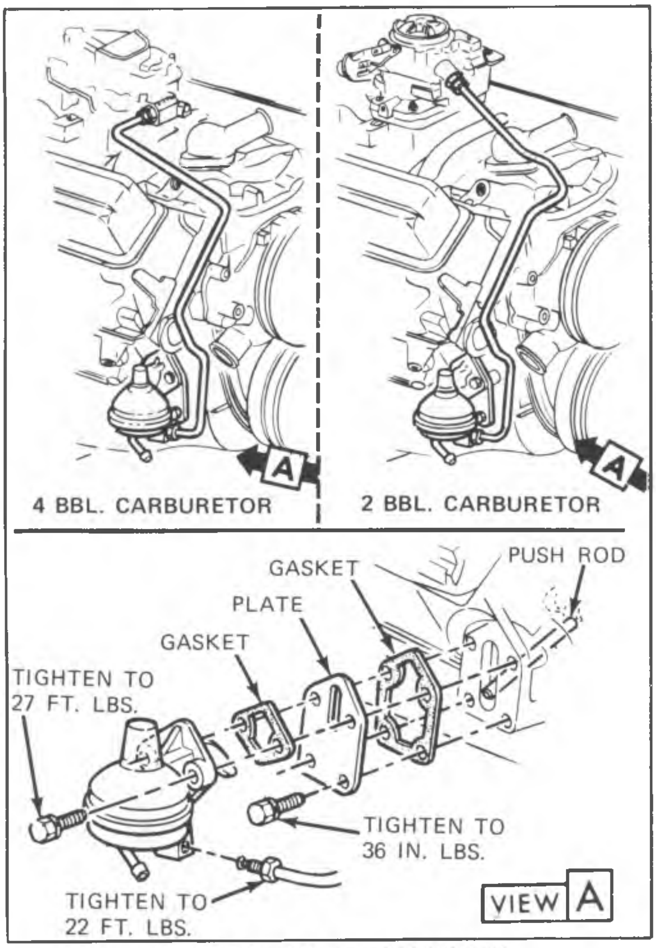


Fig. 24C–Fuel Pump - 350/400 V8

REMOVAL

NOTE: Whenever disconnecting or connecting fuel pump outlet pipe fitting, always double wrench to avoid damaging fuel pump.

1. Disconnect fuel inlet and outlet pipes at fuel pump.
2. Remove fuel pump mounting bolts and remove pump and gasket.
3. On V8 engines if push rod is to be removed, remove pipe plug and push rod (454 cu. in. engines), and fuel pump adapter and gasket and push rod (350 and 400 cu. in. engines).

INSTALLATION

1. On V8 engines, if fuel pump push rod has been removed, install push rod and pipe fitting or fuel pump adapter using gasket sealer on gasket or pipe fitting.
2. Install fuel pump using a new gasket and tighten securely. Use sealer on fuel pump mounting bolt threads.

   NOTE: On V8 engines, a pair of mechanical fingers or heavy grease may be used to hold fuel pump push rod up while installing fuel pump.

3. Connect fuel pipes to pump.
4. Start engine and check for leaks.

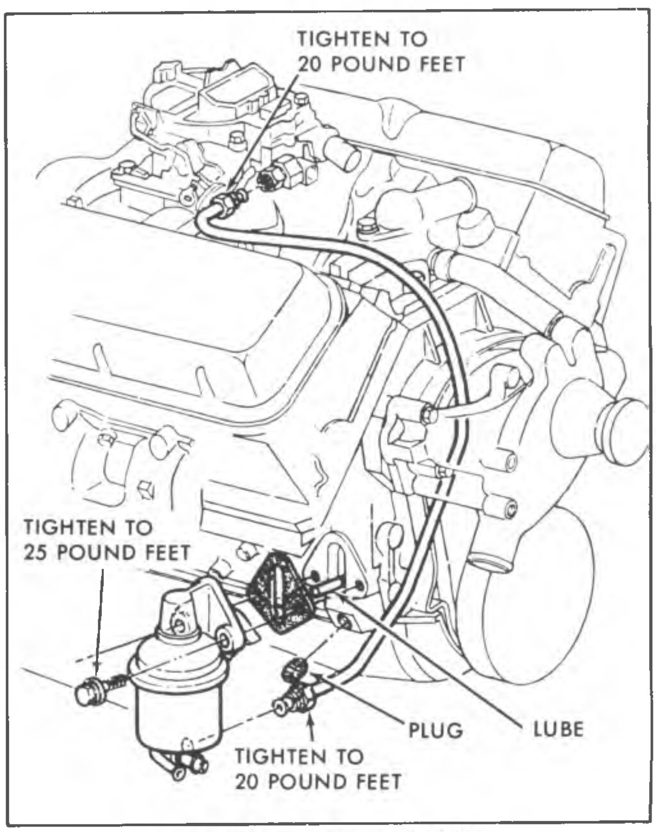


Fig. 25C–Fuel Pump - 454 V8

FUEL PUMP DIAGNOSIS

CAMSHAFT DRIVEN FUEL PUMP

Complete diagnosis of all possible causes of the trouble prior to replacement of the fuel pump will save time, expense and possibly prevent a repeat complaint.

When a fuel pump is suspected of not performing properly, the following tests must be made:

NOTE: Do not remove the pump for any of these inspections or tests. Be certain sufficient gasoline is in the tank.

INITIAL INSPECTION

1. Be certain all fittings and connections are tight and cannot leak fuel between the pump and the carburetor or air between the gas tank and the pump.
2. Look for kinks in the fuel lines.
3. With engine idling, look for leaks:
   a. In the line between the pump and the carburetor.
   b. At the diaphragm flange on the pump.
   c. At the breather holes in the pump casting.
   d. At the sheet metal cover (pump) and its fittings.
   If leaks are evident in the lines or fittings, tighten or replace as necessary. If the fuel pump leaks (diaphragm flange, sheet metal cover, or pump casting breather holes), replace the pump.

If the above steps do not cure the problem, proceed to the next test.

VACUUM TEST:

This will determine if the pump has the ability to pump fuel:

1. Disconnect the fuel line at the carburetor. Install a rubber hose on to the fuel line and run it back into the gas tank.
2. Disconnect the inlet fuel line at the pump. Fasten the inlet line in an up position so fuel will not run out. Install a vacuum gage on to the inlet of the pump.
3. With engine idling (using fuel in the carburetor float bowl), the vacuum should be at least 12" Hg.
4. If the vacuum is less than 12" Hg., replace pump. If the vacuum is okay, proceed to the next test.

NOTE: Do not be concerned if vacuum drops off after the engine is stopped. Many pumps have valves with a bleed hole that allows vapors to bleed back to the gasoline tank.

PRESSURE TEST:

This will determine if the pump can deliver fuel at the proper pressure to the carburetor:

1. Reconnect the inlet fuel line to the pump.
2. Reconnect the fuel line at the carburetor. Idle engine for two minutes so the carburetor float bowl can be refilled. (This step may be omitted if enough fuel remains in the carburetor after vacuum test.)
3. Disconnect fuel line at the carburetor and install a pressure gage into the end of this fuel line. If the pump has a vapor return line, pinch the line closed.
4. With the engine idling (using fuel in the carburetor float bowl), the pressure gage when held at the level of the pump outlet should read at least 3½ psi.
5. If the pressure is less than this value, determine if the line from the pump to the carburetor is restricted. If this line is restricted, replace or clean it. If the line is not restricted, remove the pump and install a new one.
6. If the pressure is okay, determine if fuel can be pulled up to the pump. Disconnect the fuel line at both the fuel pump inlet and the gas tank outlet. Blow air into the fuel pump end of the line to determine if fuel can flow through this line.

NOTE: Failure to disconnect the fuel line at the gasoline tank prior to blowing air, can damage the tank strainer. If the line is restricted, replace or clean it. If the line was not restricted, proceed to other areas such as gas tank or carburetor. The fuel pump is not at fault.

SPECIAL TOOLS

J-22973 THER-MAC THERMOMETOR

J-8328 CARBURETOR HOLDING TOOL
(Set of 4)

J-9789-01 UNIVERSAL CARBURETOR GAUGE SET

J-5197 BENDING TOOL

J-25322 PUMP LEVER PIN DRIVE PUNCH

J-23417 CHOKE LEVER INSTALLING TOOL

Fig. 1ST–Special Tools

SECTION 6T

EMISSION CONTROL SYSTEM

CONTENTS OF THIS SECTION

GENERAL

LIGHT DUTY EMISSIONS

The following emission control systems are used on a light duty truck with light duty emissions:

Positive Crankcase Ventilation - PCV

All Vehicles

Withdraws oil vapor and gas vapor from the various cavities throughout the engine for burning in all combustion cycle. Refer to 1974 Light Duty Truck Service Manual for service procedures.

Exhaust Gas Recirculation - EGR

All Vehicles

Meters exhaust gas into induction system for recirculation through the combustion cycle to reduce oxides of nitrogen emissions. Refer to 1974 Light Duty Truck Service Manual for service procedures.

Evaporation Control System - ECS

All Vehicles

Controls emission of gasoline vapor to the atmosphere by means of an integral separator with the fuel tank that separates vapor from liquid fuel - a filler cap that doesn't permit venting into the atmosphere - a canister for storage of vapors - lines, hoses and valves to control and transport vapors from fuel tank to storage, and finally, to the carburetor for utilization in running the engine. Refer to Section 8 in the 1974 Light Duty Truck Service Manual for service procedures.

Carburetor Hot Air

All Vehicles

Meters and mixes heated air with incoming cold air to optimize fuel vaporization. Refer to Section 6M for service procedures of air cleaner and air intake duct.

Controlled Combustion System - CCS

Federal

Increases combustion efficiency through leaner carburetor mixtures and revised distributor calibration. Thermostatically controlled damper, in the air cleaner silencer maintains warm air intake to carburetor. Refer to Section 6M for air cleaner service procedures.

Underfloor Converter

All Vehicles except 454 V8

The flow of exhaust gases down through the catalyst, within the converter, effectively controls the hydrocarbon and carbon monoxide to a more desirable emission. Refer to Section 8 for service procedures.

Air Injection Reactor - A.I.R.

C10 and G10 350 V8 - Cal.

Compresses, regulates and distributes quantities of air to the exhaust to more completely burn carbon monixide and hydrocarbon emissions. With exception of the pipe installation which is included in this section, refer to the 1974 Light Duty Truck Service Manual for service procedures.

Early Fuel Evaporation - EFE

System is designed to produce a very short engine warm-up cycle to improve vehicle driveability and reduce exhaust emissions. Service procedures are included in this section.

HEAVY DUTY EMISSIONS

The following emission control systems are used on a light duty truck with heavy duty emissions:

Positive Crankcase Ventilation - PVC

Withdraws oil vapor and gas vapor from the various cavities throughout the engine for burning in all combustion cycle. Refer to 1974 Light Duty Truck Service Manual for service procedures.

Exhaust Gas Recirculation - EGR

California with 454 V8

Meters exhaust gas into induction system for recirculation through the combustion cycle to reduce oxides of nitrogen emissions. Refer to 1974 Light Duty Truck Service Manual for service procedures.

Evaporation Control System - ECS

California Vehicle

Controls emission of gasoline vapor to the atmosphere by means of an integral separator with the fuel tank that separates vapor from liquid fuel - a filler cap that doesn't permit venting into the atmosphere - a canister for storage of vapors - lines, hoses and valves to control and transport vapors from fuel tank to storage, and finally, to the carburetor for utilization in running the engine. Refer to Section 8 in the 1974 Light Duty Truck Service Manual for service procedures.

Carburetor Hot Air

Meters and mixes heated air with incoming cold air to optimize fuel vaporization. Refer to Section 6M for service procedures of air cleaner and air intake duct.

Controlled Combustion System - CCS

Increases combustion efficiency through leaner carburetor mixtures and revised distributor calibration. Thermostatically controlled damper, in the air cleaner silencer maintains warm air intake to carburetor. Refer to Section 6M for air cleaner service procedures.

Air Injection Reactor - A.I.R.

California Except L6 Engine

Compresses, regulates and distributes quantities of air to the exhaust to more completely burn carbon monoxide and hydrocarbon emissions. Refer to 1974 Light Duty Truck Service Manual for service procedures.

Throttle Return Control - TRC

When vehicle is coasting against engine, throttle lever actuator pushes throttle lever slightly open to reduce hydrocarbon emission during coast down. Service procedures are included in this section.

AIR INJECTION REACTOR SYSTEM

The air injection reactor system remains basically the same in theory and operation with the following addition: Air is injected into the front exhaust pipe forward of the catalytic converter. Refer to figures 1 and 2 for pipe installation on C10 and G10 with 350 V8 in California and light duty emissions.

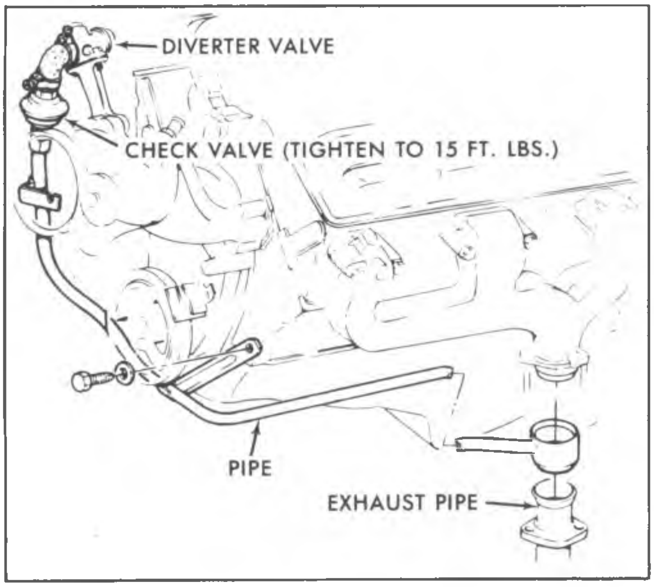


Fig. 1--A.I.R. Pipe Installation - C10 and 350 V8 Cal.

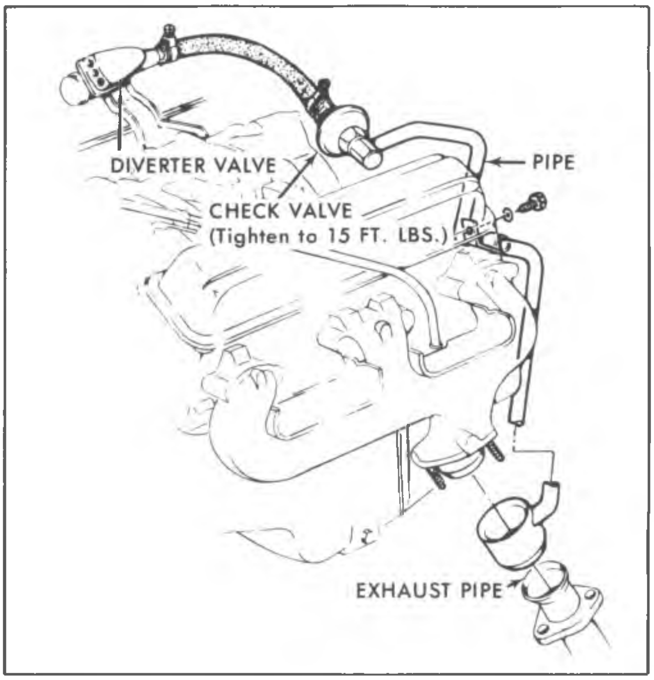


Fig. 2--A.I.R. Pipe Installation - G10 and 350 V8 Cal.

EMISSION HOSE ROUTINGS

Refer to figures 3 and 4 for emission hose routing on V8 engines.

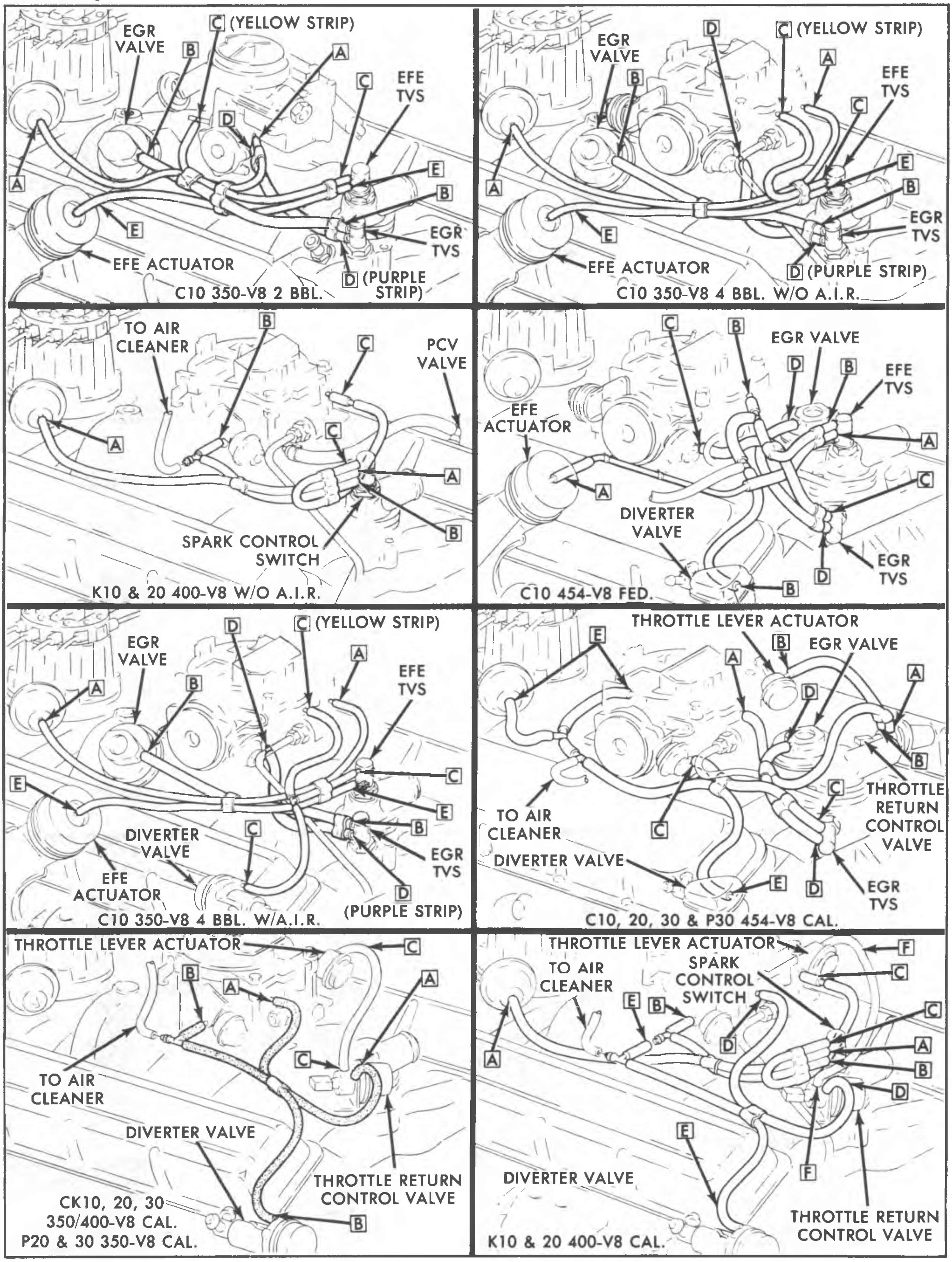


Fig. 3--Emission Hose Routings - CKP

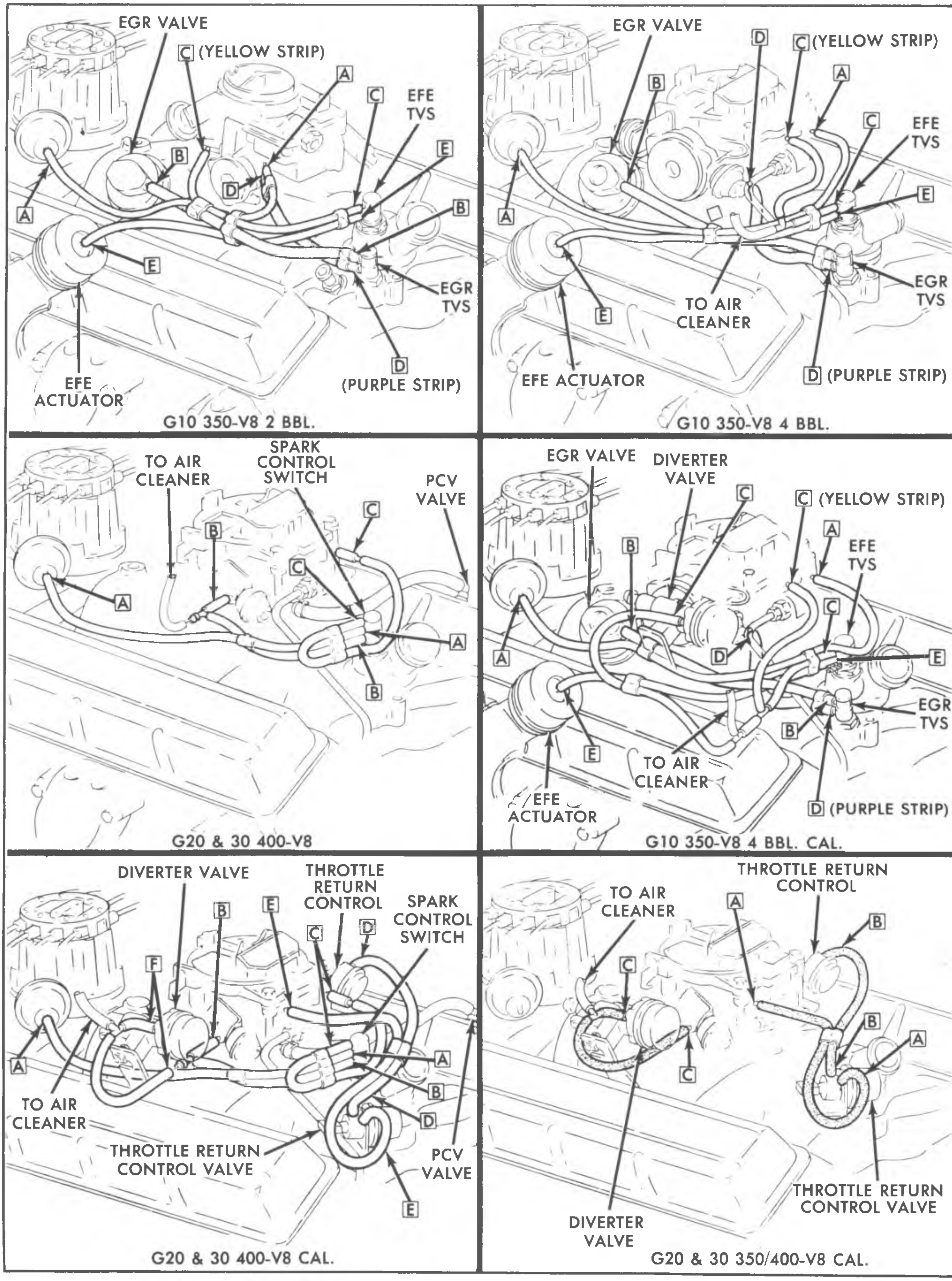


Fig. 4–Emission Hose Routings - G

EARLY FUEL EVAPORATION SYSTEM - EFE

GENERAL

The early fuel evaporation (EFE) system improves cold engine warm-up by routing hot exhaust gases under the base of the carburetor which results in better atomization of fuel in a cold engine and helps reduce exhaust emissions during cold drive away.

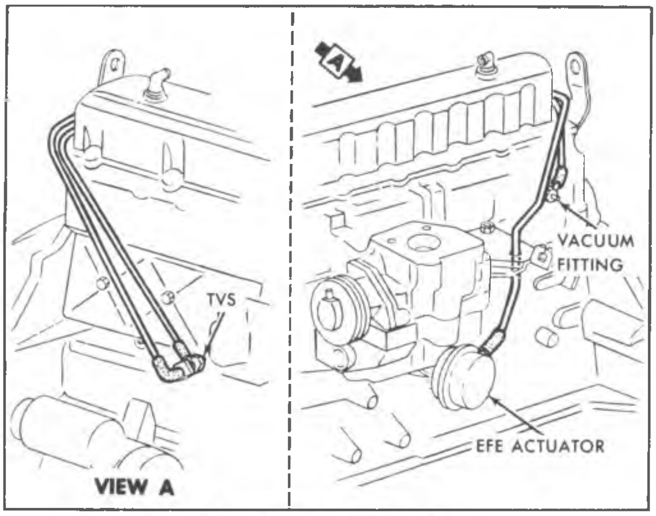


Fig. 5--EFE System - L6

The EFE system consists of a vacuum controlled actuator which is linked to a stainless steel exhaust heat valve and a method of controlling vacuum source. When a cold engine is started, full vacuum pulls the spring-loaded diaphragm in the actuator and actuator rod closes the exhaust heat valve. This causes hot gases to be routed to the base of the carburetor.

On six cylinder engine, the vacuum to the EFE actuator is controlled by an oil temperature thermal vacuum switch (TCS) located in the right hand oil gallery (fig. 5). When oil temperature reaches 150°F the switch opens and shuts-off vacuum to the EFE actuator. On small block V8 and 454 V8 the EFE actuator is controlled by a thermal vacuum switch (TVS) located on the engine inlet manifold (figs. 3 and 4). When coolant temperature reaches 180°F, the switch shuts-off vacuum to the EFE actuator.

Without vacuum, the vent on actuator opens, internal spring in actuator pushes the diaphragm back to its "at rest" position and actuator rod opens the exhaust heat valve. Spring loaded valve will remain open.

SERVICE PROCEDURES

INSPECTION

- Visually inspect exhaust heat valve for damage or binding linkage.
- Check that linkage is connected and vacuum hoses are properly routed and connected.
- Move exhaust heat valve by hand. If binding or stuck, free with manifold heat valve lubricant, GM Part No. 1050422 or equivalent. If valve cannot be freed, replace valve.

THERMAL VACUUM SWITCH (TVS) - V8

Coolant Temperature

The TVS is located on the engine coolant outlet housing or front of inlet manifold.

Replacement

1. Drain coolant below level of engine coolant outlet housing.
2. Disconnect hoses at TVS ports.
3. Remove TVS.
4. Apply a soft setting sealant uniformly on replacement TVS male threads. No sealant should be applied to sensor end of TVS.
5. Install TVS, tighten to 120 pound inches and then hand torque clockwise as required to align TVS to accomodate hoses.
6. Connect hoses to TVS ports.
7. Add coolant as required.

THERMAL VACUUM SWITCH (TVS) - L6

Oil Temperature

The TVS is located on right hand oil gallery.

Replacement

1. Disconnect hoses at TVS ports.
2. Remove TVS switch.

3. Install TVS switch.
4. Connect hoses to TVS ports.

ACTUATOR AND ROD ASSEMBLY

The actuator and rod assembly is located on a bracket attached to right exhaust manifold on V8 engines (figs. 6 and 7) and on left side attached to exhaust manifold on L6 engine (fig. 8).

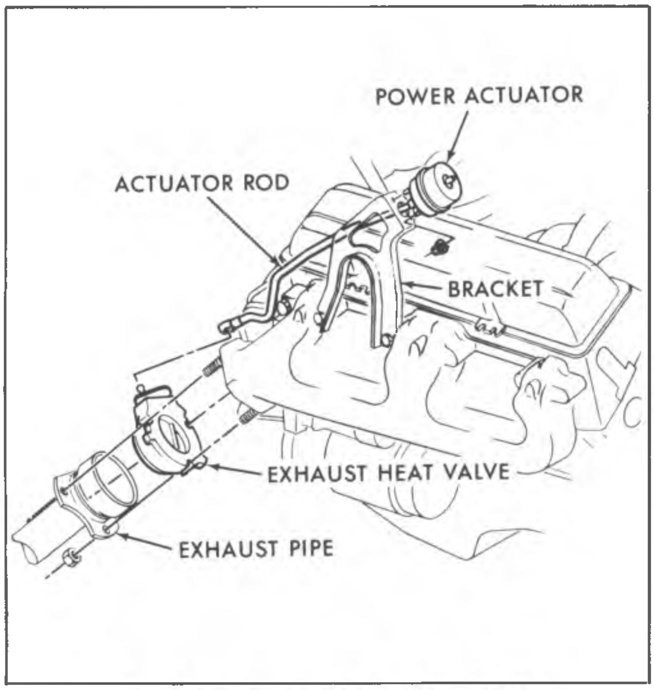


Fig. 6--Actuator and Rod - 350/400 V8

Replacement

1. Disconnect hose from actuator.
2. Remove 2 nuts attaching actuator-to-bracket.
3. Disconnect rod from valve and remove actuator and rod.
4. Install actuator and rod reversing steps 1 through 3. Tighten nuts to 25 pound inches.

EXHAUST HEAT VALVE - V8

Replacement

1. Remove crossover exhaust pipe. Refer to Section 8 for removal and installation.
2. Disconnect rod from valve.
3. Remove valve.
4. Install valve and connect rod.
5. Install crossover exhaust pipe.

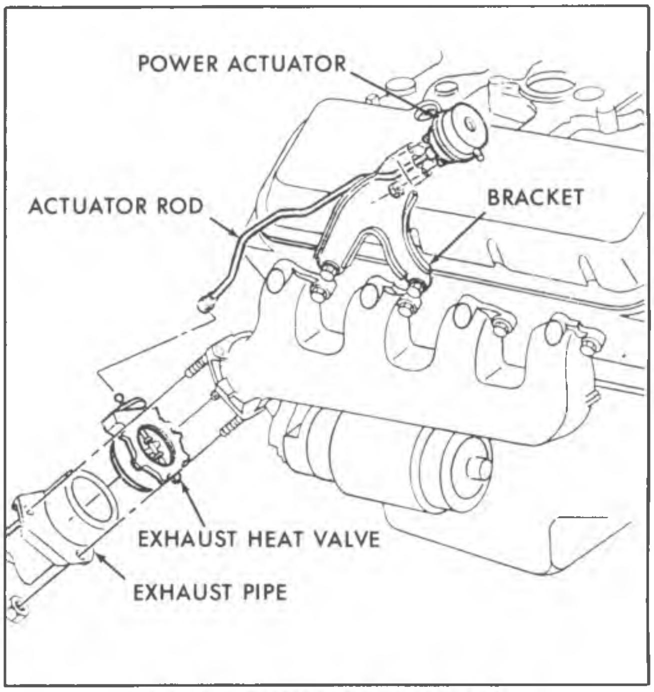


Fig. 7--Actuator and Rod - 454 V8

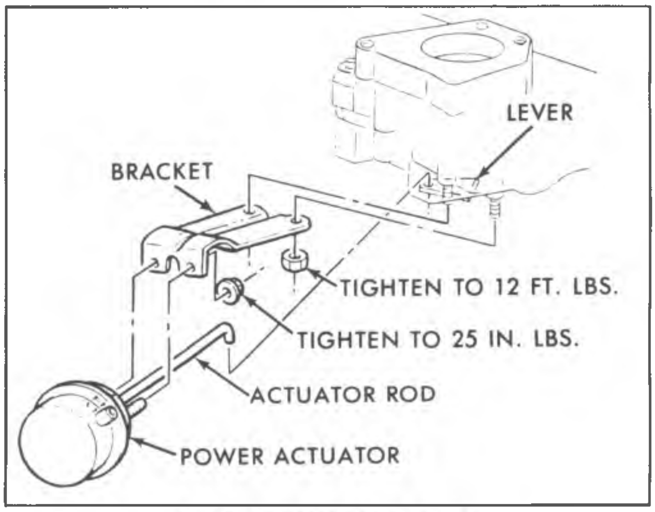


Fig. 8--Actuator and Rod - L6

EXHAUST HEAT VALVE - L6

Replacement

1. Remove 2 nuts attaching actuator bracket-to-valve and exhaust manifold.
2. Remove bracket and disconnect rod from valve.
3. Remove 2 additional nuts from valve and remove valve.
4. Install valve reversing steps 1 through 3.

DIAGNOSIS

CHECKING EFE SYSTEM

1. With engine cold, position transmission in neutral or park and apply parking brake.
2. Start engine and observe movement of actuator rod and exhaust heat valve. Valve should move to its closed position.
3. If valve does not close, disconnect hose at actuator and check for vacuum.
   - If there is vacuum, replace actuator.
   - If there is no vacuum disconnect hose at TVS-to-vacuum source.
   - If there is vacuum at hose, replace TVS.
   - If there is no vacuum, check for deteriorated hose and vacuum source to determine lack of vacuum.
4. When coolant reaches 180°F (small block V8 or 454 V8) or oil reaches 150°F (six cylinder), the exhaust heat valve should move to its open position.
5. If valve does not move, disconnect hose at actuator and check for vacuum.
   - If there is vacuum, replace TVS.
   - If there is no vacuum, replace actuator.

THROTTLE RETURN CONTROL SYSTEM - TRC

GENERAL

A throttle return control system (TRC) is used on a Light Duty Truck in California with V8 engine and heavy duty emissions.

When vehicle is coasting against engine, the control valve will be open to allow vacuum to operate throttle lever actuator. The throttle lever actuator then pushes throttle lever slightly open, thus reducing hydro-carbon emission during coast down. When manifold vacuum drops below a pre-determined level the control valve closes, the throttle actuator retracts and throttle lever closes to idle position.

SERVICE PROCEDURE

CONTROL VALVE (Fig. 9)

Check Diagnosis and Adjustment

1. Disconnect valve to carburetor hose at carburetor and connect to an external vacuum source equipped with a vacuum gauge.
2. Disconnect control valve to actuator hose at actuator and connect to a vacuum gauge.
3. Place finger firmly over end of bleed fitting (the foam air filter need not be removed).
4. Apply a minimum of 23 in. Hg. vacuum to control valve and seal off vacuum source. The gauge on actuator side should read the same as source gauge. It not, then control valve needs adjustment. If vacuum drops off on either gauge (finger still on bleed fitting), valve is leaking and must be replaced.

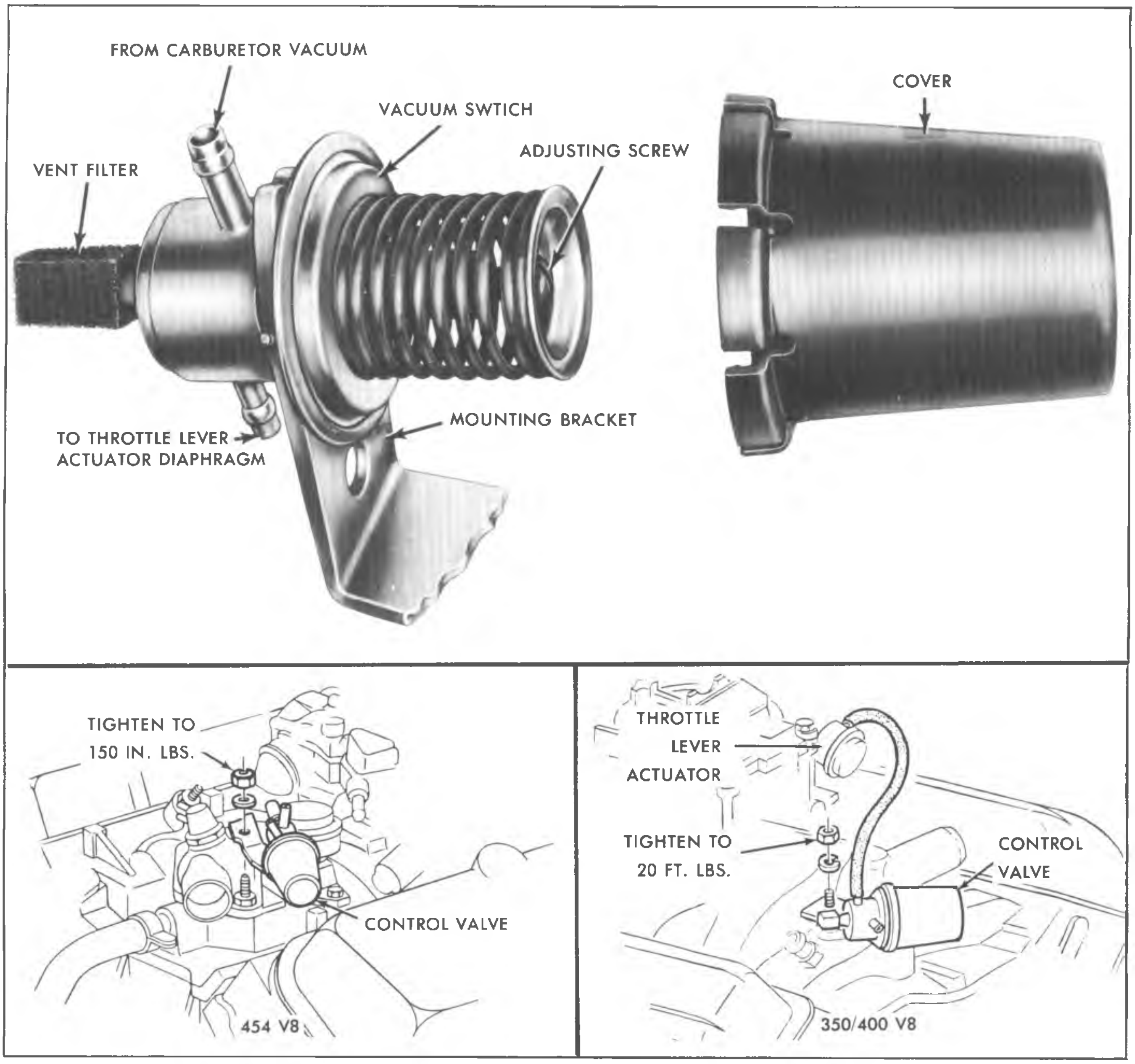


Fig. 9--Throttle Return Control Valve

5. With a minimum 23 in. Hg. vacuum level in control valve, remove finger from bleed fitting. The vacuum reading on actuator side will drop to zero and reading on source gauge will drop to a value which is the *valve set point*. The valve set point for a 350/400 V8 is 21.5 in. Hg. and for a 454 V8 is 21.0 in. Hg.

   If this value is not within .50 in. Hg. of the specified valve set point, then the valve must be adjusted.

6. To adjust the valve set point:
   a. Gently pry off the conical plastic cover.
   b. Turn the adjusting screw in (clockwise) to raise the set point or out (counterclockwise) to lower the set point value.
   c. Recheck the valve set point per steps No. 3 and 5.
   d. Repeat steps 6b and c as necessary to obtain the specified value within .50 in. Hg.
8. Reinstall plastic cover.
9. If the valve cannot be adjusted it must be replaced.

Replacement

Disconnect vacuum hoses at control valve. Remove nut, washer and control valve. Reverse procedure to install and check operation of control valve.

THROTTLE LEVER ACTUATOR (Fig. 10)

Check and Diagnosis

1. Disconnect valve to actuator hose at valve and connect to an external vacuum source equipped with a vacuum gauge.
2. Apply 20 in. Hg. vacuum to actuator and seal off the vacuum source. If vacuum gauge reading drops, then actuator is leaking and must be replaced.
3. To check actuator for proper operation:
   a. Check throttle lever, shaft, and linkage to be sure that they operate freely without binding or sticking.
   b. Start engine and run until warmed up and idle is stable with transmission in neutral or park. Note idle rpm.
   c. Apply 20 in. Hg. vacuum to the actuator. Manually open the throttle slightly and allow to close against the extended actuator plunger. Note engine rpm.
   d. Release and reapply 20 in. Hg. vacuum to actuator and note rpm to which engine speed increases (do not assist actuator).
   e. If rpm obtained in step 3d is not within 150 rpm of that obtained in step 3c, then the actuator plunger may be binding due to dirt, corrosion, varnish, etc. or actuator diaphragm may be too weak. If binding is not indicated or cannot be corrected then the actuator must be replaced.
   f. Release the vacuum from the actuator and the engine speed should return to within 50 rpm of the idle speed noted in step 3b. If it does not, the plunger may be binding due to dirt, corrosion, varnish, etc. It the problem cannot be corrected, the actuator must be replaced.
4. If the engine rpm noted in 3c is not within the specified TRC speed range, adjust throttle lever actuator.

Replacement

Disconnect vacuum hose at actuator. Remove two screws and actuator. Reverse procedure to install and refer to throttle lever actuator for adjustment.

Adjustment (Fig. 11)

1. Disconnect valve to actuator hose at valve and connect to an external vacuum source equipped with a vacuum gauge.
2. Check throttle lever, shaft, and linkage to be sure that they operate freely without binding or sticking.
3. Start engine and run until warmed up and idle is stable. Place transmission in neutral or park.
4. Apply 20 in. Hg. vacuum to actuator. Manually open throttle slightly and allow to close against the extended actuator plunger. Note the engine rpm.
5. If rpm noted above is not within specified TRC speed range, then turn plunger screw on actuator plunger in the appropriate direction and repeat step No. 4 until specified TRC speed range is obtained.

   The TRC speed range for a 350/400 V8 is 1500 rpm and for a 454 V8 is 1400 rpm.

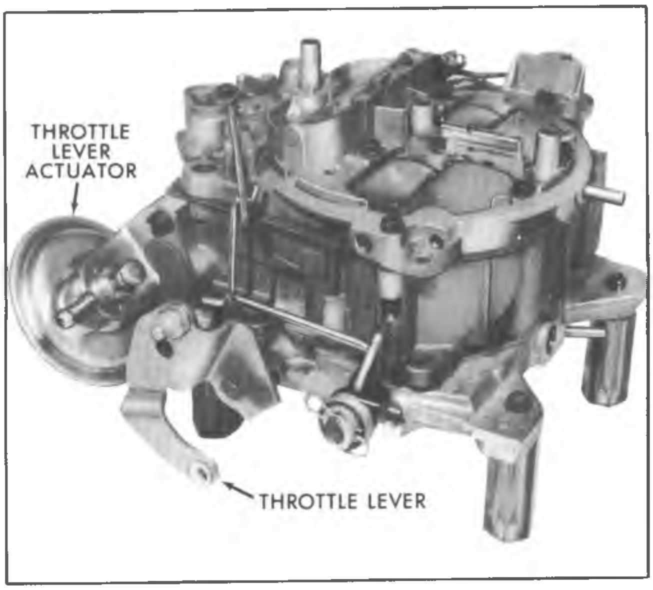


Fig. 10--Throttle Lever Actuator

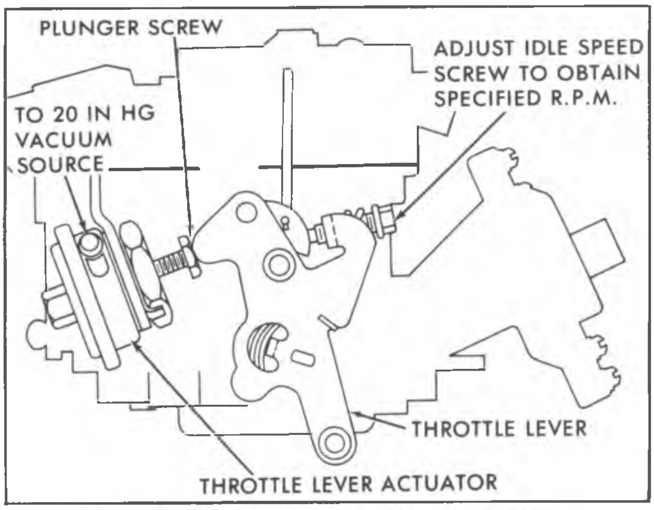


Fig. 11--Throttle Lever Actuator Adjustment

SECTION 6Y

ENGINE ELECTRICAL

NOTE: Except for the following changes, all information listed in Section 6Y of the 1974 Truck Service Manual is applicable to 1976 light duty trucks. Refer to 1974 Truck Service Manual for any service procedure not contained herein.

Illustrations showing complete engine wiring for each truck line are shown in figures 1 through 11.

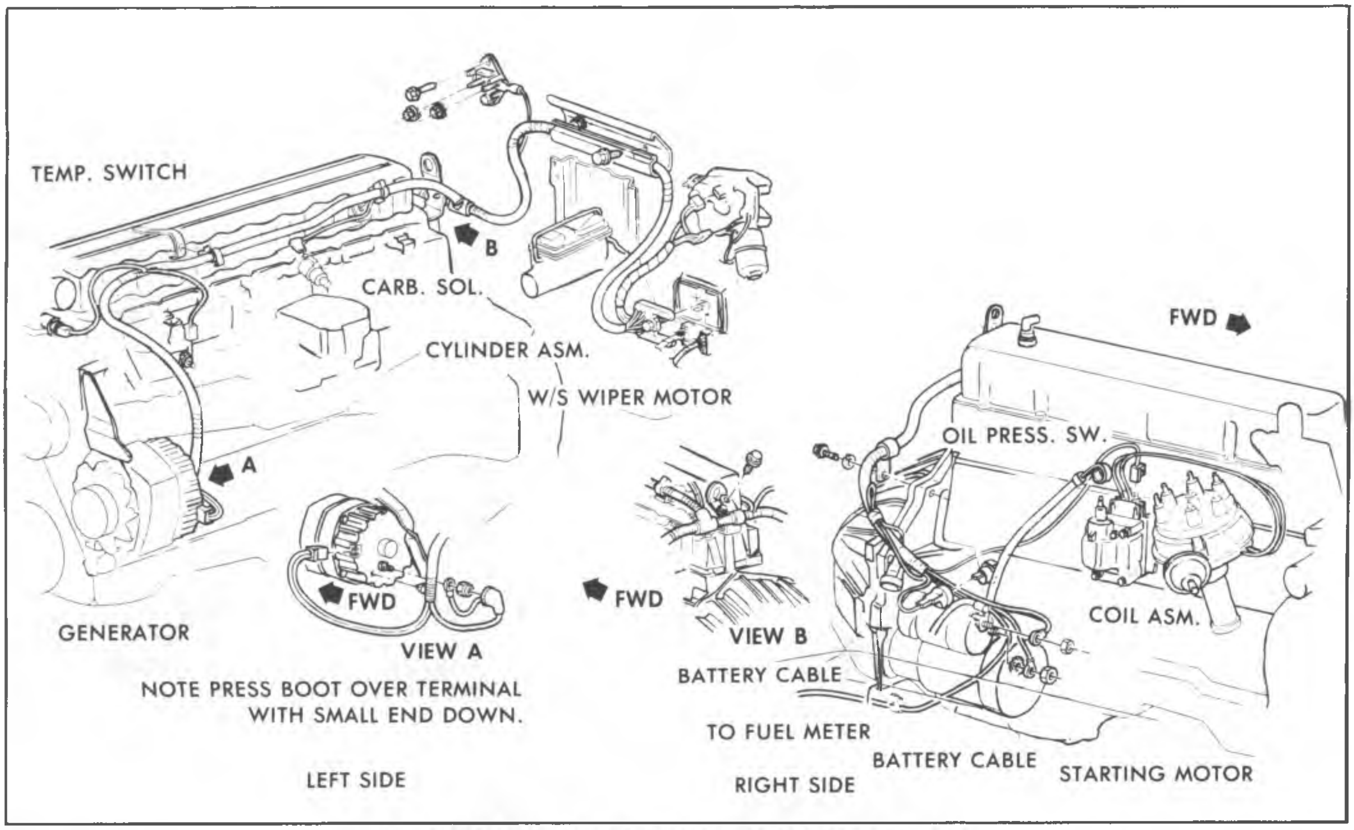


Fig. 1–C-10 (03) Truck L-6 (LD4) w/o F44 Engine Wiring

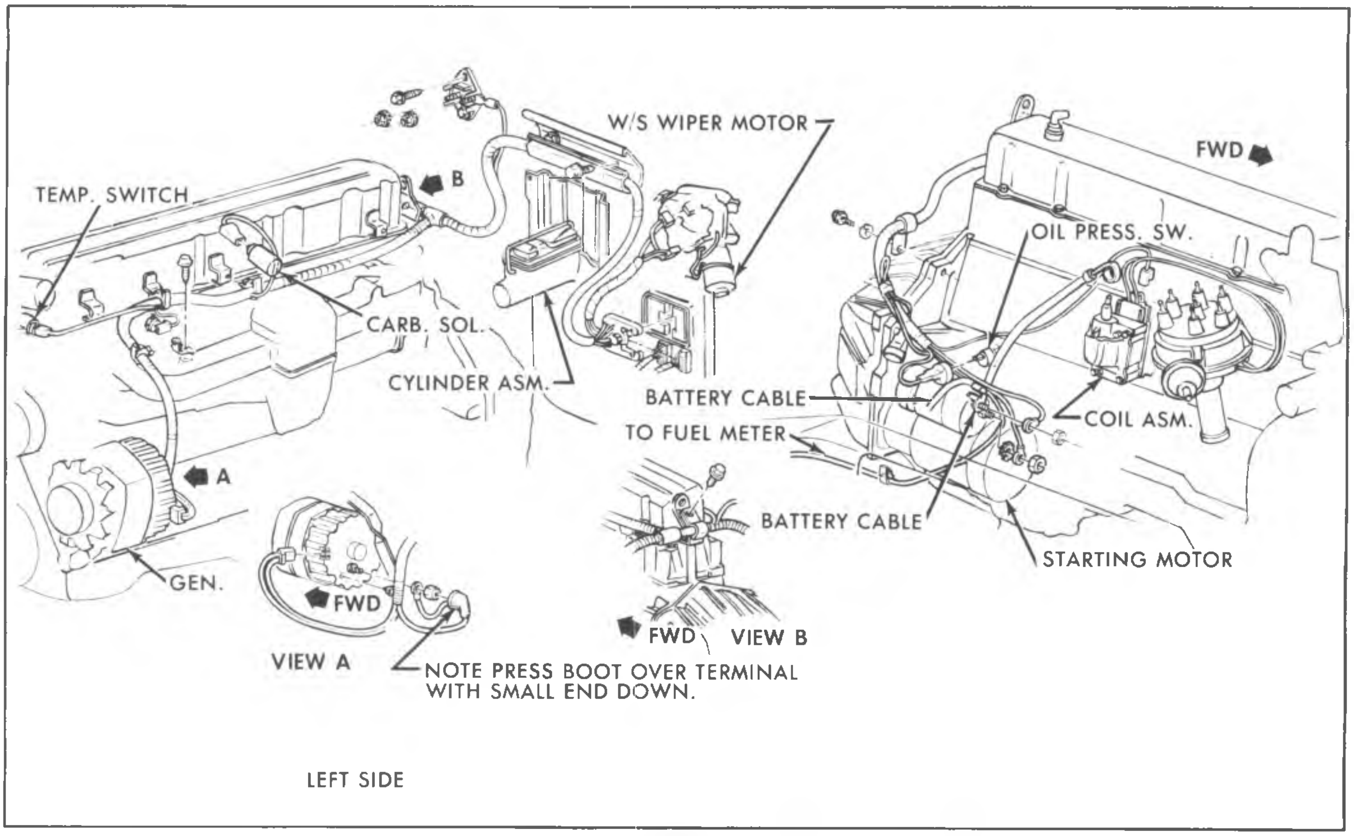


Fig. 2--C-10 (03) w/F44, C-10 (06) & (16) and K-10 L-6 (LD4) Engine Wiring

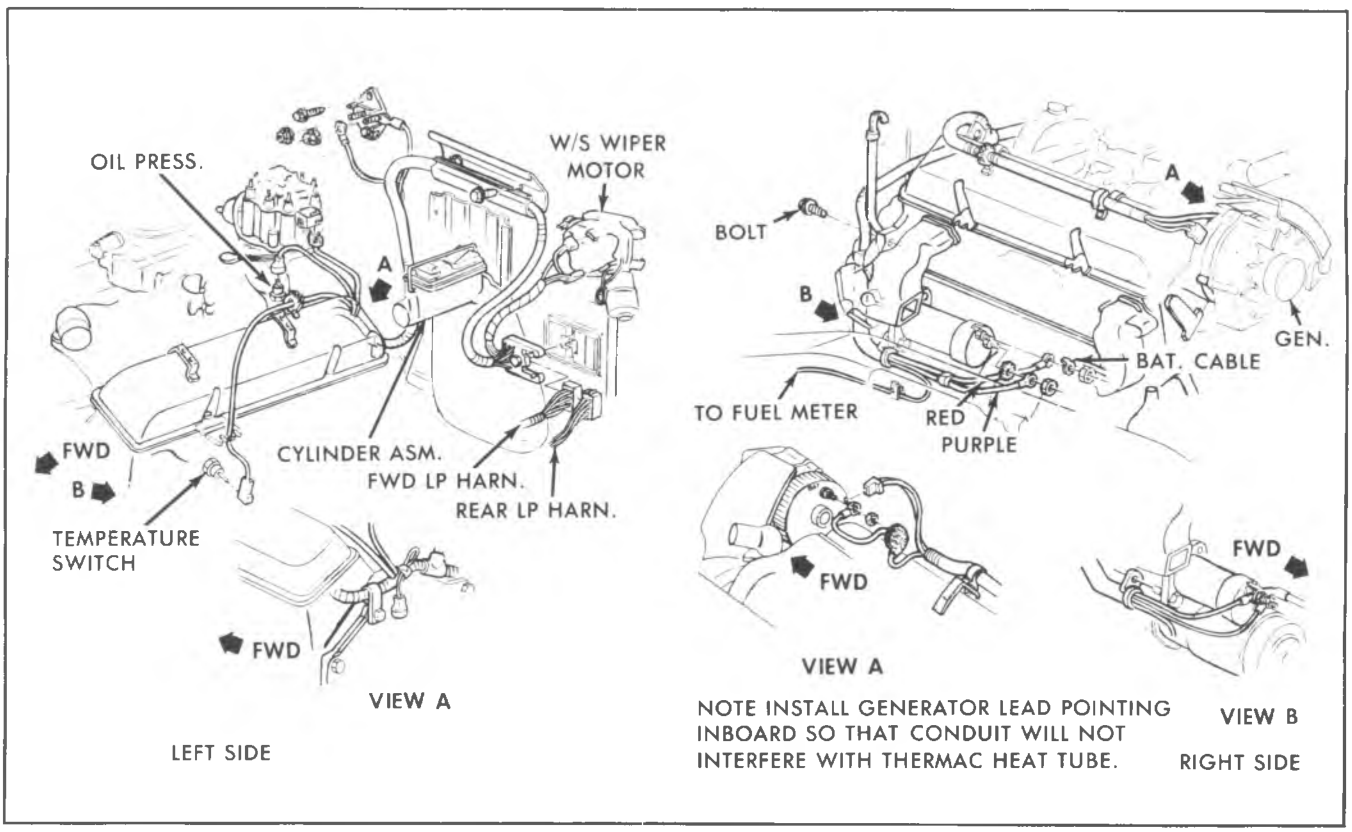


Fig. 3--C-K-10 thru 30 Truck V-8 (LF4/LG9/LS9) Engine Wiring

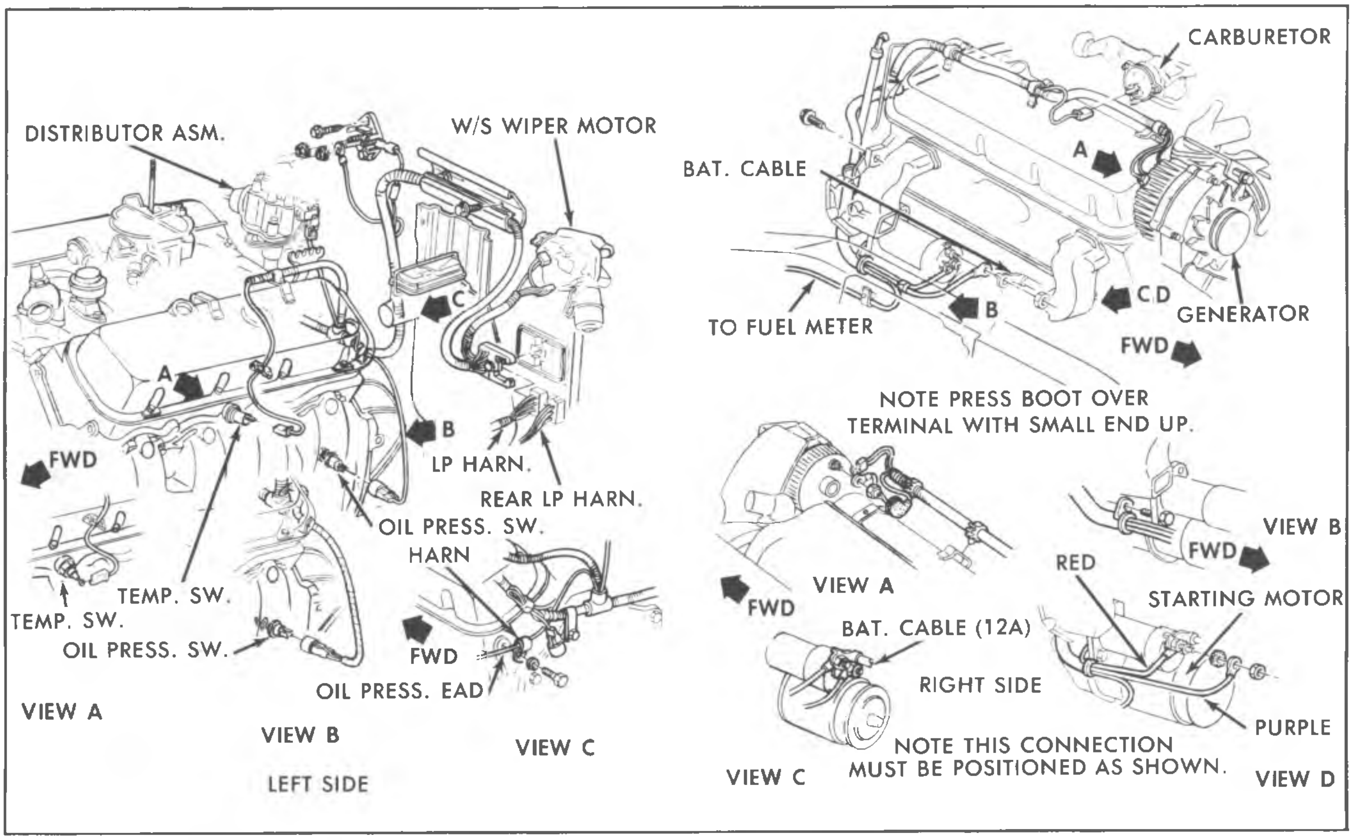


Fig. 4--C-10 thru 30 Truck V-8 (LF8) Engine Wiring

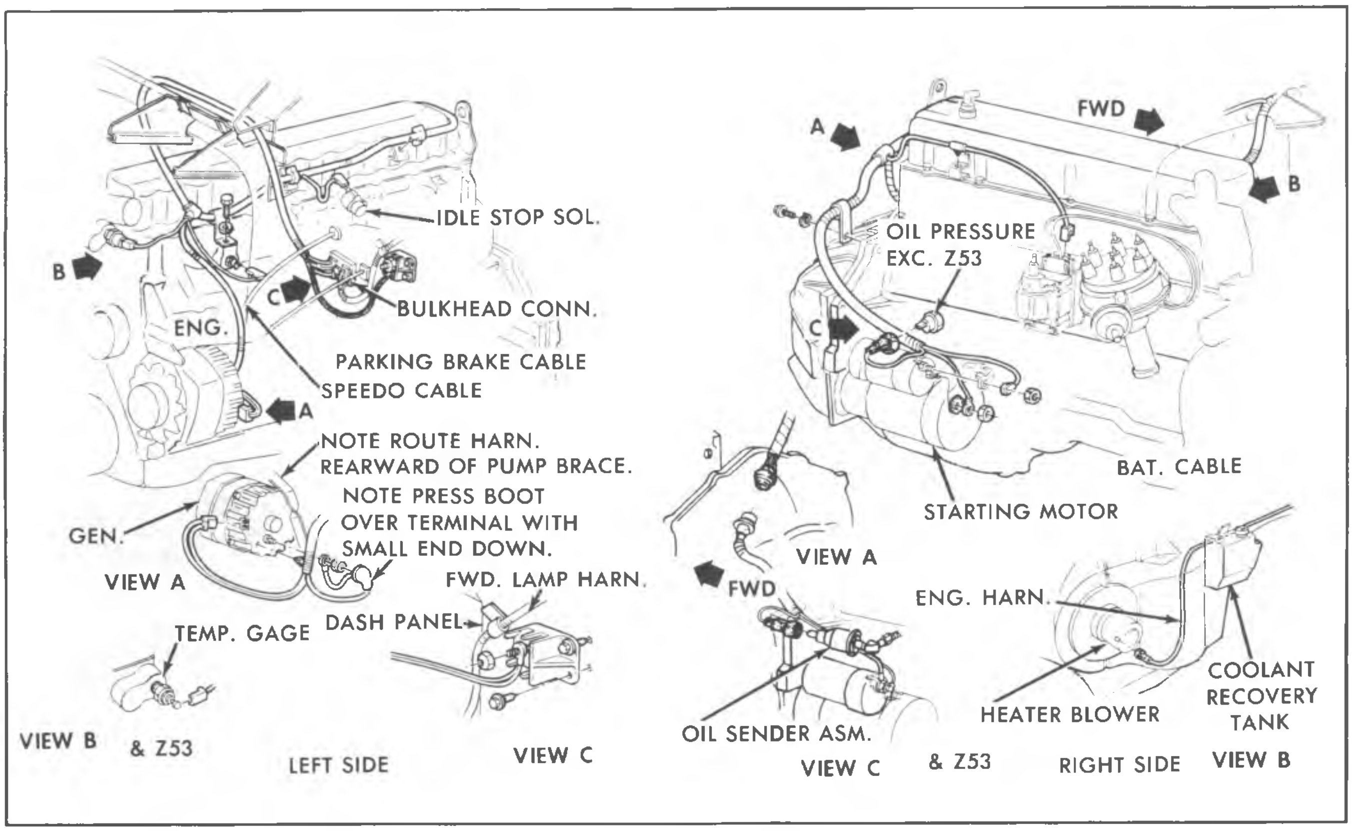


Fig. 5--G-10 thru 30 Truck L-6 (LD4) Engine Wiring

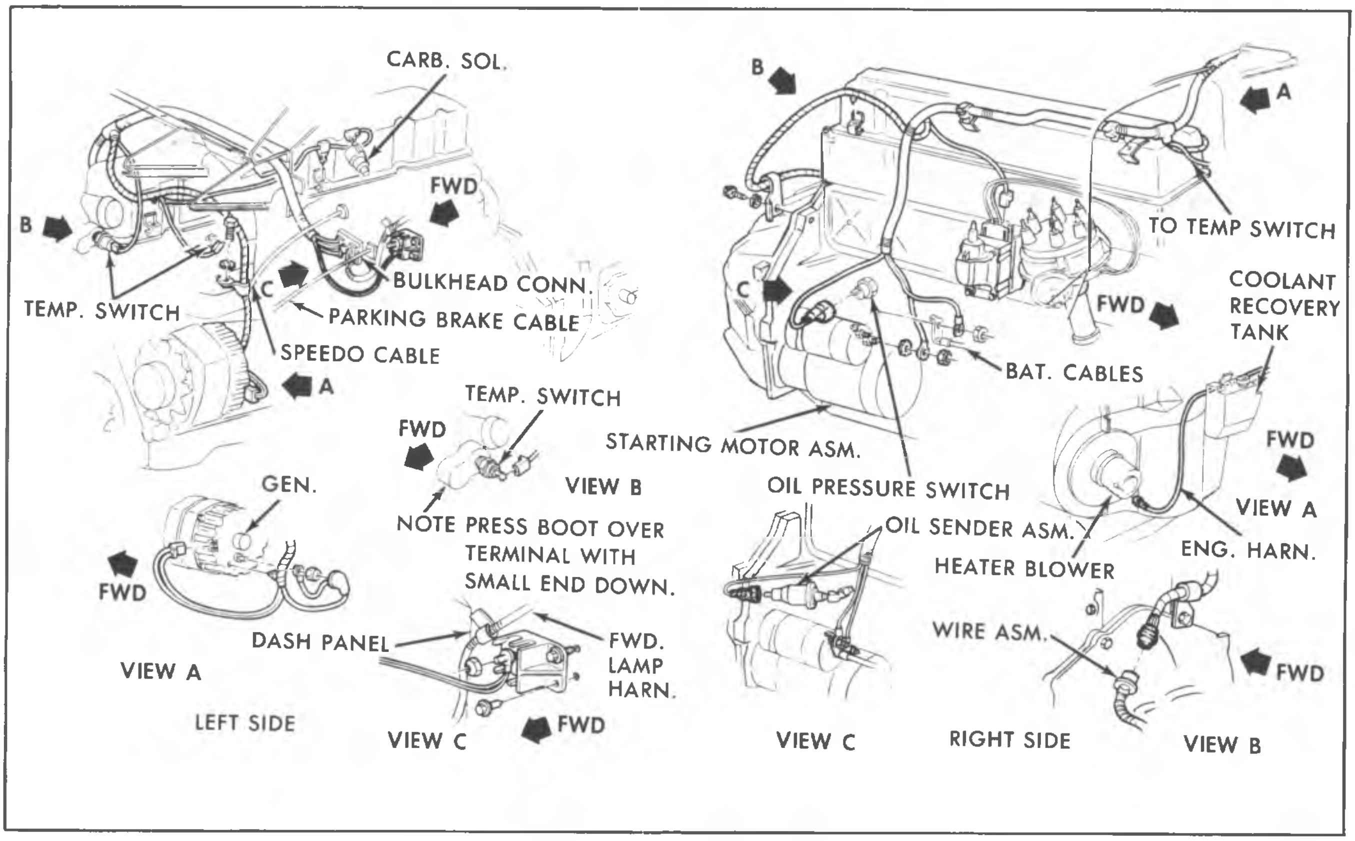


Fig. 6--G-10 thru 30 Truck L-6 (L25) Engine Wiring

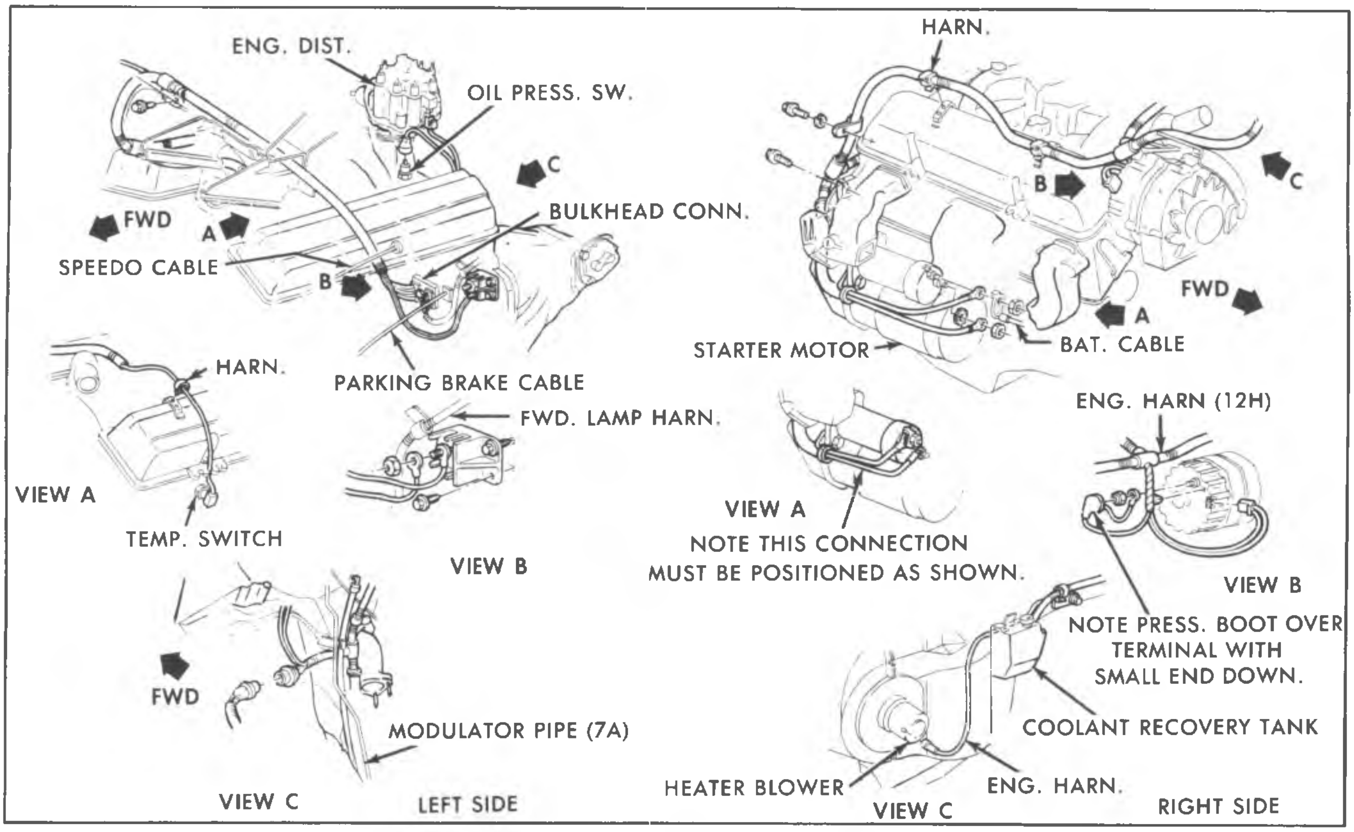


Fig. 7--G-10 thru 30 Truck V-8 (LF4/LG9/LS9) Engine Wiring

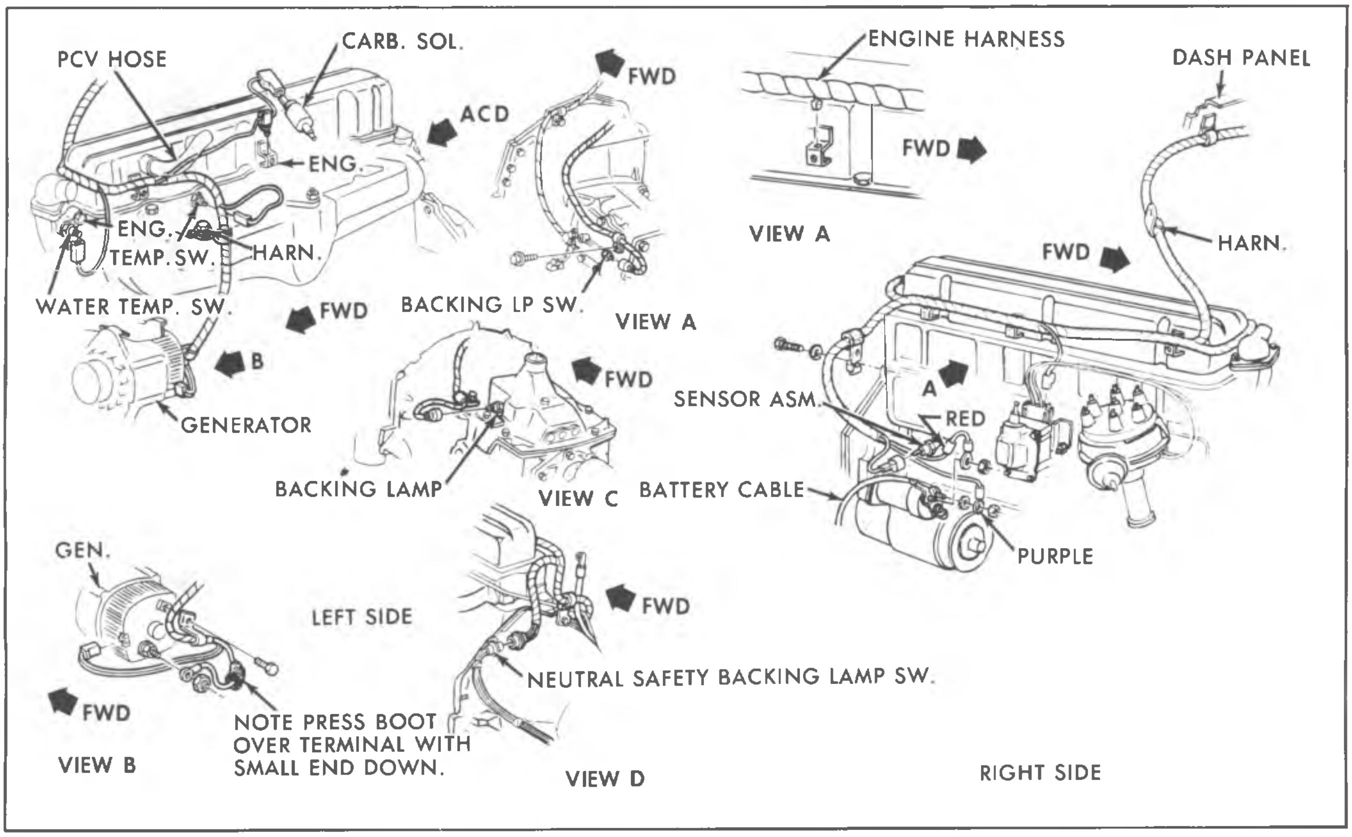


Fig. 8--P-10 thru 30 Truck L-6 (L25) Engine Wiring

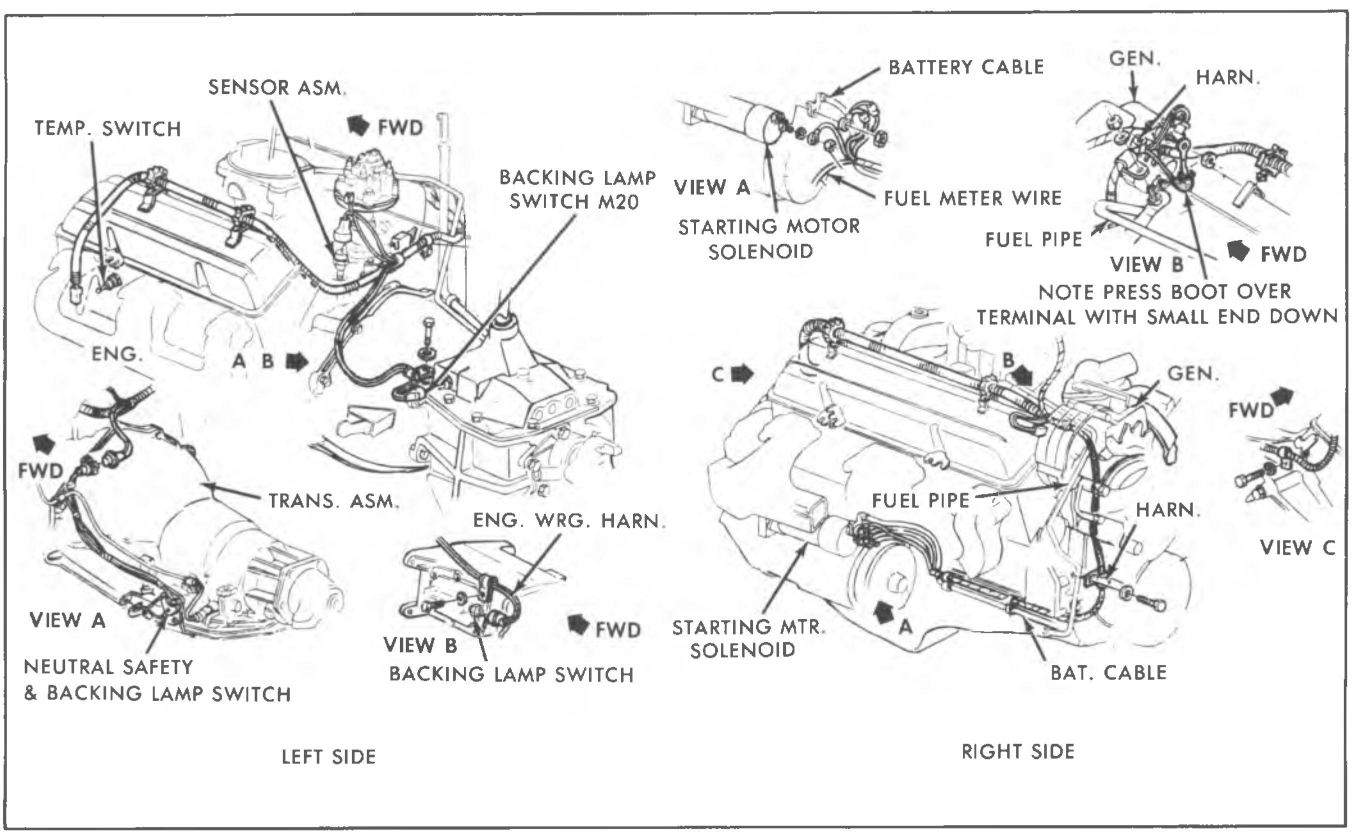


Fig. 9--P-10 thru 30 Truck (Except 32) Truck V-8 (LS9) Engine Wiring

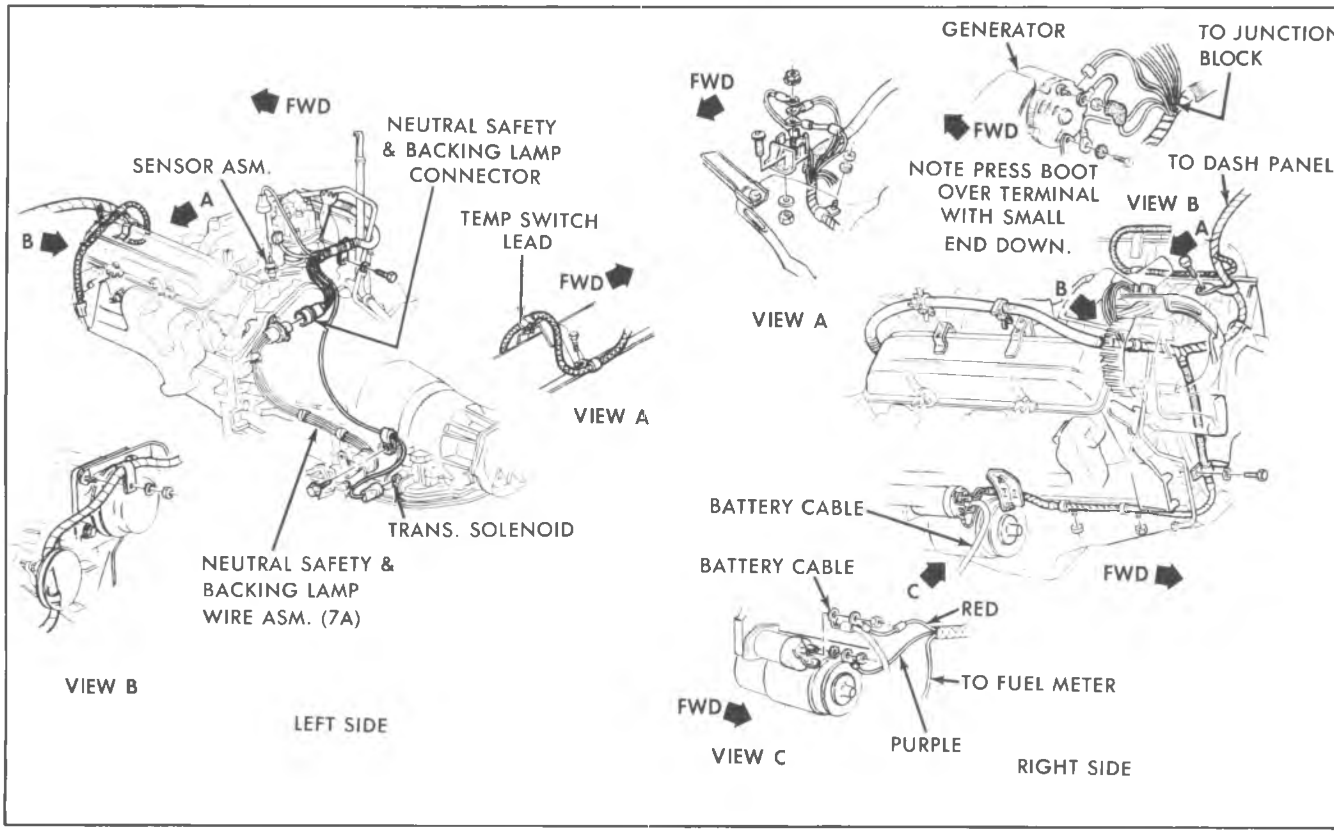


Fig. 10--P-30 (32) Truck V-8 (LS9) Engine Wiring

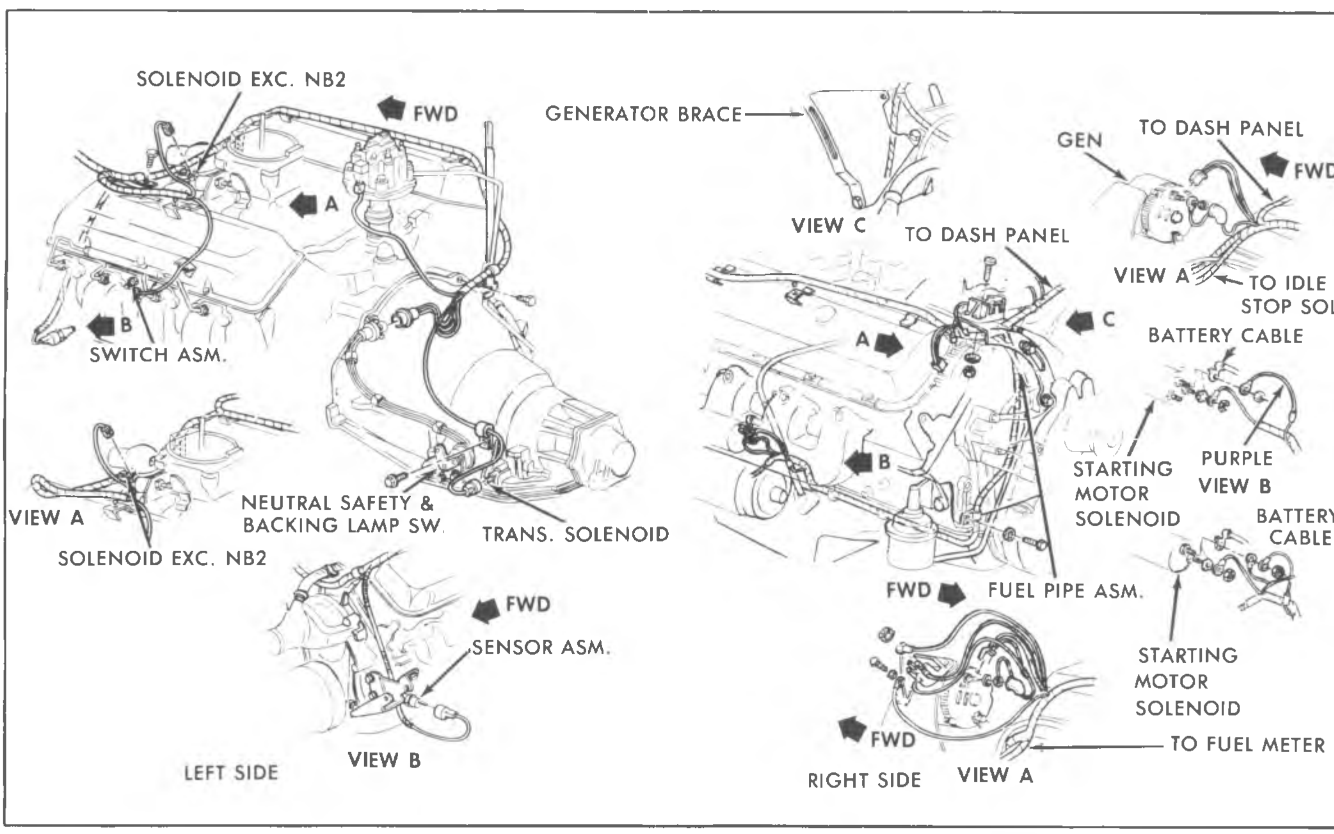


Fig. 11--P-30 Truck V-8 (LF8) Engine Wiring

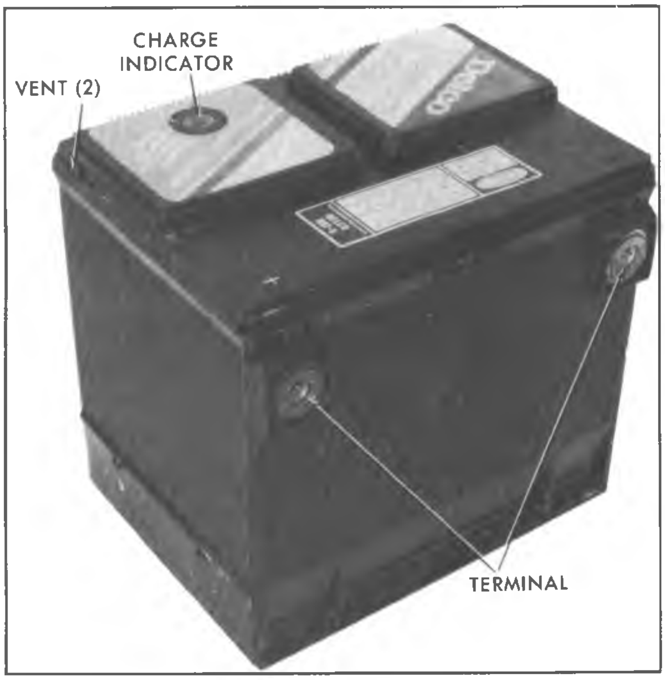


Fig. 1b--Freedom Battery

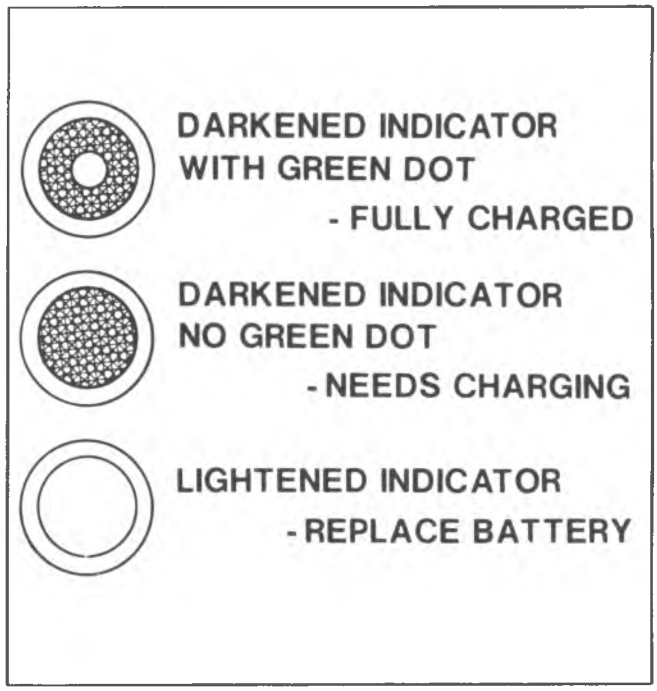


Fig. 2b--Battery Charge Indicator

FREEDOM BATTERY

The Freedom (Maintenance Free) Battery (fig. 1b) has more electrolyte in the cells than regular vent cap type batteries. With the reduced water usage, water never needs to be added. Actually, water can not be added. There are no vent plugs in the cover. The battery is completely sealed except for 2 small vent holes on the side. These vent holes allow what small amount of gases that are produced in the battery to escape. The special chemical composition inside the battery reduces the production of gas to an extremely small amount at normal charging voltages.

A charge indicator located in the cover indicates state of charge. This feature will be fully explained in the following paragraph.

Testing Freedom Battery

Visual Inspection

Check for obvious damage, such as a cracked or broken case or cover that could permit loss of electrolyte. If obvious physical damage is noted, replace battery. Also, determine cause of damage and correct as required.

Charge Indicator - Dark (Green Dot Visible) (Fig. 2b)

If the charge indicator is dark and has a green dot in the center, the battery is sufficiently charged for testing.

Charge Indicator - Dark (Green Dot Not Visible) (Fig. 2b)

If the charge indicator is dark and the green dot is not visible, charge battery until dot appears, but not more than 60 ampere-hours (for example, 15 amperes for four hours).

> NOTE: Some chargers are constant current chargers while others are constant voltage chargers. If a constant voltage charger is used for charging the battery and the green dot fails to appear after prolonged charging, it may be necessary to tip the battery slightly from side to side a few times for the green dot to appear.

Charge Indicator - Light (Fig. 2b)

If the charge indicator is light replace battery. DO NOT attempt to charge or "jump" when charge indicator is light.

> NOTE: A battery that failed prematurely, and exhibited a light charge indicator condition, may indicate a need for checking the charging system of the vehicle.

Remove Surface Charge

Connect a 300 ampere load across battery terminals for 15 seconds to remove surface charge from battery.

Load Test

1. Connect voltmeter and an ampere load across battery terminals as indicated below:

BATTERY TYPE	AMPS FOR LOAD TEST
R85-5	170
Y85-4	130
R87-5	210

2. Read voltage after 15 seconds with load connected and then disconnect load.
3. If minimum voltage is 9.6* volts or more, battery is good.
4. If minimum voltage is less than 9.6* volts, replace battery.

* *This voltage is to be used for battery ambient temperatures of 70°F and above. For temperatures below 70°F, use the following:*

MINIMUM VOLTAGE						
60° F	50° F	40° F	30° F	20° F	10° F	0° F
9.5	9.4	9.3	9.1	8.9	8.7	8.5

10-SI SERIES GENERATOR

The 1976 10-SI generator is mostly carryover from 1974. The only difference being that a 40-ohm resistor has been added to the warning indicator circuit (figs. 1c and 2c). The purpose of this resistor is to provide a definite warning indicator light in the case of an open field circuit in the generator. Refer to Section 6Y of the 1974 Truck Service Manual for all service procedures.

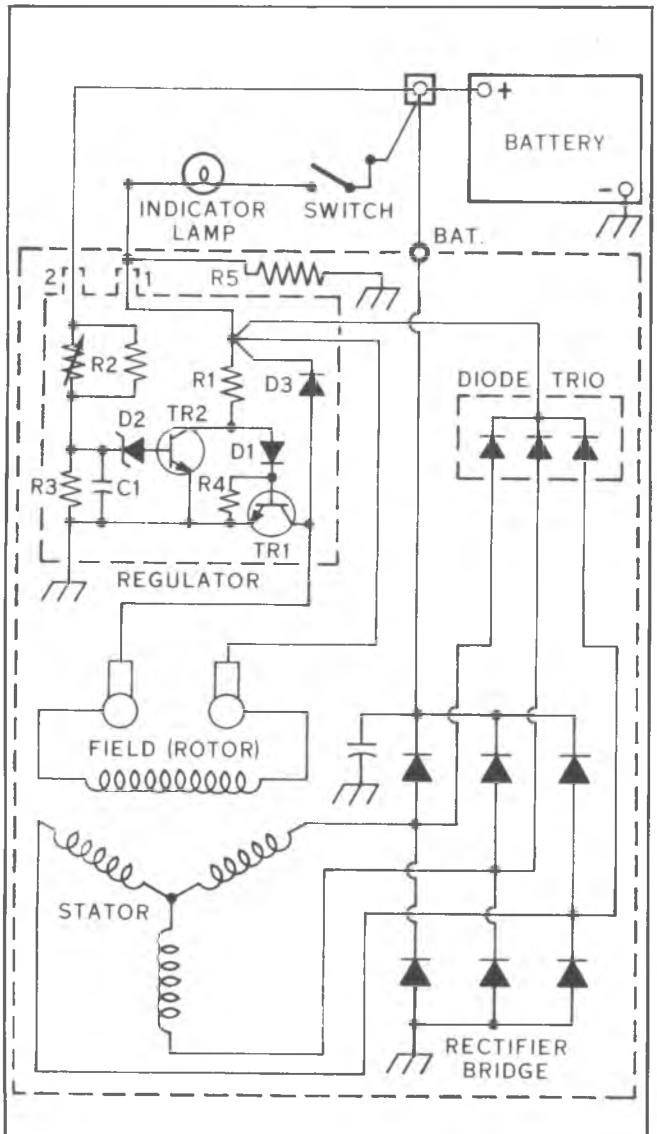


Fig. 1C–Integral Charging System Circuitry

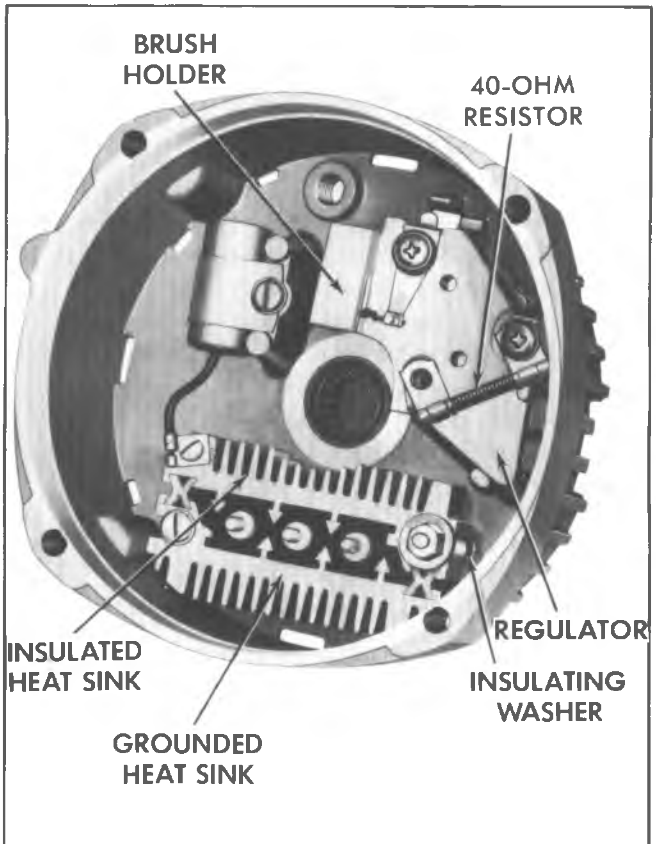


Fig. 2C–Resistor Location

STARTER SYSTEM

The 1976 starter is mostly carryover from 1974. The only difference being that the "R" terminal of the starter solenoid has been removed. This terminal was removed because with the High Energy Ignition System there is no longer any requirement for the electrical lead from the starter solenoid to the ignition coil. Refer to Section 6Y of the 1974 Truck Service Manual for all service procedures.

HIGH ENERGY IGNITION SYSTEM

INDEX

GENERAL DESCRIPTION

There are two types of High Energy Ignition (HEI) distributors. The 8 cylinder distributor (fig. 1i) combines all ignition components in one unit. The ignition coil is in the distributor cap and connects directly to the rotor. The 6 cylinder distributor (fig. 2i) has an external mounted coil. Both operate basically in the same manner as a conventional ignition system except the module and pick-up coil of the HEI system replace the contact points of the conventional system.

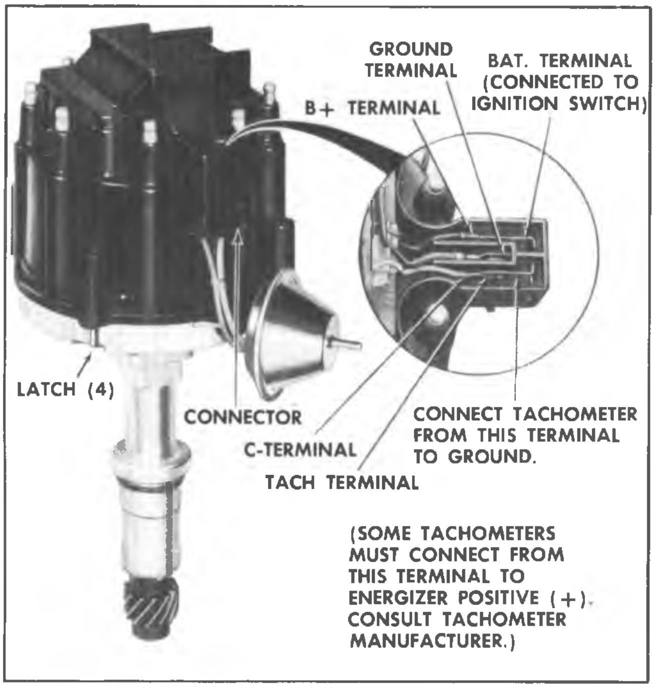


Fig. 1i–8 Cylinder HEI Distributor

The High Energy Igntion is a pulse triggered, transistor controlled, inductive discharge ignition system. The magnetic pick-up assembly located inside the distributor contains a permanent magnet, a pole piece with internal teeth, and a pick-up coil. When the teeth of the timer core rotating inside the pole piece line up with teeth of the pole piece, an induced voltage in the pick-up coil signals the all electronic module to open the coil primary circuit. The primary current decreases and a high voltage is induced in the ignition coil secondary winding which is directed through the rotor and high voltage leads to fire the spark plugs. The capacitor in the distributor is for radio noise suppression.

The module automatically controls the dwell period, stretching it with increasing engine speed. The HEI system also features a longer spark duration, made possible by the higher amount of energy stored in the coil primary. This is desirable for firing lean and EGR diluted mixtures.

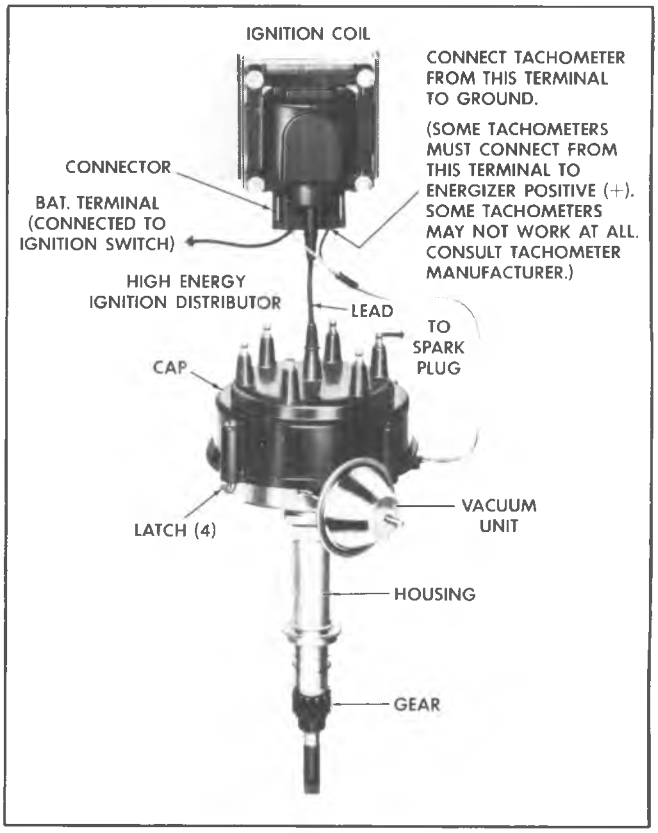


Fig. 2i–6 Cylinder HEI Distributor

Ignition Coil

In the 8 cylinder HEI system, the igntion coil is built into the distributor cap. In the 6 cylinder HEI system, the ignition coil is mounted externally. The coil is somewhat smaller physically than a conventional coil, but has more primary and secondary windings. It is built more like a true transformer with the windings surrounded by the laminated iron core. A conventional coil has the iron core inside the windings. Although the HEI coil operates in basically the same way as a conventional coil, it is more effective in generating higher secondary voltage when the primary circuit is broken.

Electronic Module

The electronic module is a solid state unit containing five complete circuits which control spark triggering, switching, current limiting, dwell control and distributor pick-up. Dwell angle is controlled by a transistor circuit within the module and is varied in direct relation to engine speed.

Pick-Up Assembly

The pick-up assembly consists of the following:

1. A rotating timer core with external teeth which is turned by the distributor shaft.

2. A stationary pole piece with internal teeth.
3. A pick-up coil and magnet which are located between the pole piece and a bottom plate.

Centrifugal and Vacuum Advance

The centrifugal and vacuum advance mechanisms are basically the same types of units that provide spark advance in the breaker-type system. Centrifugal advance is achieved through the rotation of the timer core in relation to the distributor shaft. Vacuum advance is achieved by attaching the pick-up coil and pole piece to the vacuum advance unit actuating arm.

THEORY OF OPERATION

The pick-up coil is connected to transistors in the electronic module. The electronic module is connected to the primary windings in the coil. As the distributor shaft turns the timer core teeth out of alignment with the teeth of the pole piece a voltage is created in the magnetic field of the pick-up coil.

The pick-up coil sends this voltage signal to the electronic module, which determines from RPM when to start current building in the primary windings of the ignition coil.

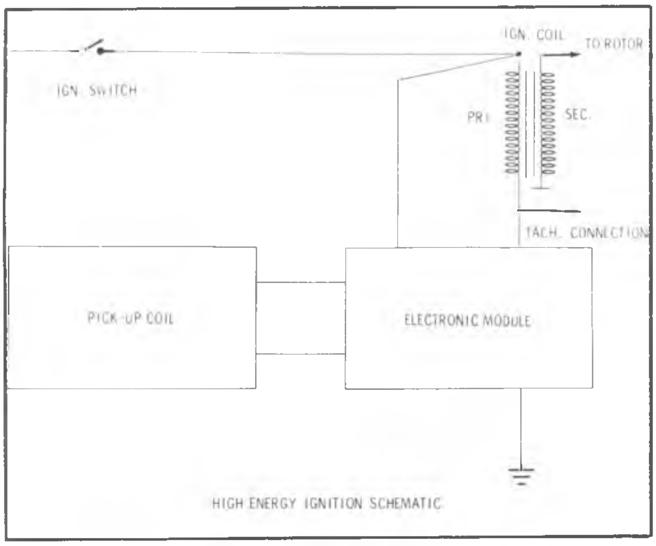


Fig. 3i–High Energy Ignition Basic Wiring

Each time the timer core teeth align with the pole piece teeth the pick-up coil magnetic field is changed creating a different voltage. The pick-up coil sends this different voltage signal the electronic module which electronically shuts off the ignition coil primary circuit. This in turn collapses the coil magnetic field, induces high secondary voltage and fires one spark plug.

The electronic module delivers full battery voltage to the ignition coil which is limited to five to six amperes. There is no primary resistance wire in the HEI system. The electronic module triggers the closing and opening of the primary circuit instantaneously with no energy lost due to breaker point arcing or capacitor charging time lag. The capacitor in the HEI unit functions only as a radio noise suppressor.

This instantaneous and efficient circuit triggering enables the HEI system to deliver up to approximately 35,000 volts through the secondary wiring to the spark plugs.

Because of the higher voltage, the HEI system has larger diameter (8 millimeter) spark plug wires with silicone insulation. The silicone wire is orange in color, more heat resistant than standard black wire and less vulnerable to deterioration. Silicone insulation is soft, however, and must not be mishandled.

SERVICE OPERATIONS

Routine Maintenance

The HEI system is designed to be free from routine maintenance. If component part replacement should become necessary, however, several items specific to the HEI system should be noted.

Electronic Module

The electronic module is serviced by complete replacement only. When replacing the module a liberal coating of special silicone grease MUST be applied to the metal mounting surface on which the module will be installed. If this grease is not applied the module will not cool properly which can cause the module to malfunction. A tube of this special silicone grease is supplied with each replacement module.

Spark Plug Wires (Figs. 4i, 5i)

The 8 millimeter silicone insulation spark plug wire boots seal more tightly to the spark plugs. Twist the boot about a half turn in either direction to break the seal before pulling on the boot to remove the wire.

> **WARNING**: Do Not remove spark plug wires with the engine running. The higher secondary voltage is capable of jumping an arc of greater distance and could cause an electric shock.

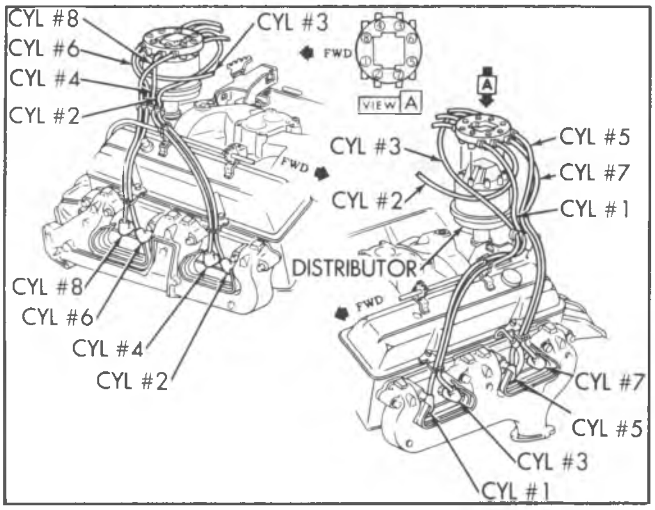


Fig. 4i-8 Cylinder HEI Ignition Wiring

Timing Light Connections

Timing light connections should be made in parallel using an adapter at the distributor number one terminal.

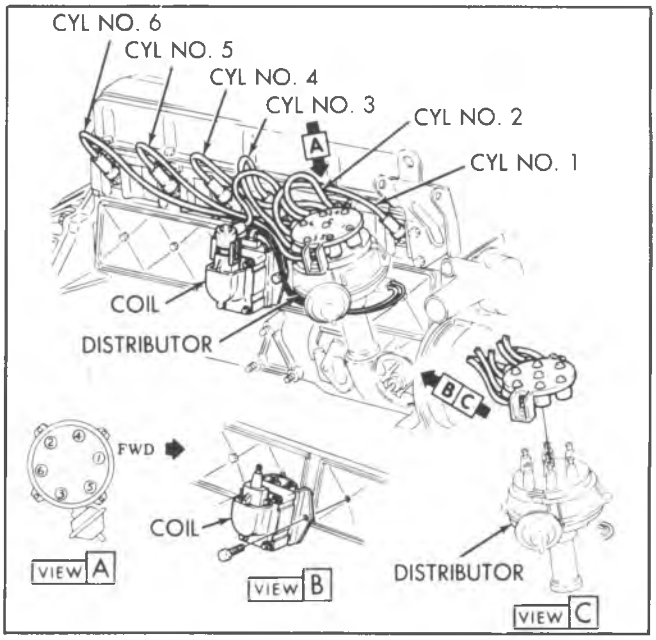


Fig. 5i-6 Cylinder HEI Ignition Wiring

Tachometer Connections

In the distributor cap connector is a "tach" terminal. Connect the tachometer to this terminal and to ground. Some tachometers must connect from the "tach" terminal to the battery positive (+) terminal. Follow tachometer manufacturer's instructions.

> **CAUTION:** *Grounding "tach" terminal could damage the HEI electronic module.*

Other Test Equipment

Oscilliscopes require special adaptors. Distributor machines require a special amplifier. The equipment manufacturers have instructions and details necessary to modify test equipment for HEI diagnosis.

Vacuum and Centrifugal Advance Specifications

Vacuum and centrifugal advance specifications are listed in the Specifications Section of this manual.

Distributor

Removal

1. Disconnect wiring harness connectors at side of distributor cap.
2. Remove distributor cap and position out of way.
3. Disconnect vacuum advance hose from vacuum advance mechanism.
4. Scribe a mark on the engine in line with rotor. Note approximate position of distributor housing in relation to engine.

5. Remove distributor hold-down nut and clamp.
6. Lift distributor from engine.

Installation

1. Install distributor using same procedure as for standard distributor.
2. Install distributor hold-down clamp and snugly install nut.
3. Move distributor housing to approximate position relative to engine noted during removal.
4. Position distributor cap to housing with tab in base of cap aligned with notch in housing and secure with four latches.
5. Connect wiring harness connector to terminals on side of distributor cap. Connector will fit only one way.
6. Adjust ignition timing as described in Specification Section of this manual.

Distributor

Disassembly (Figs. 6i – 8i)

1. Remove distributor as described above.
2. Remove rotor from distributor shaft by removing two screws.
3. Remove two advance springs, weight retainer, and advance weights.
4. Remove two screws holding module to housing and move module to a position where connector may be removed from 'B' and 'C' terminals.
5. Remove wires from "W" and "G" terminals of module.
6. Remove roll pin from drive gear.

   CAUTION: *Distributor gear should be supported in such a way that no damage will occur to distributor shaft while removing pin.*

7. Remove gear, shim and tanged washer from distributor shaft. Remove any burrs that may have been caused by removal of pin.
8. Remove distributor shaft from housing.
9. Remove washer from upper end of distributor housing.
10. Remove lock ring at top of housing and remove pole piece and plate assembly and felt washer.

    NOTE: No attempt should be made to service the shaft bushings in the housing.

11. Remove vacuum advance mechanism by removing two screws.
12. Disconnect capacitor lead and remove capacitor by removing one screw.
13. Remove wiring harness from distributor housing.

Assembly (Figs. 6i - 9i)

1. Position vacuum advance unit to housing and secure with two screws.
2. Position felt washer over lubricant reservoir at top of housing.

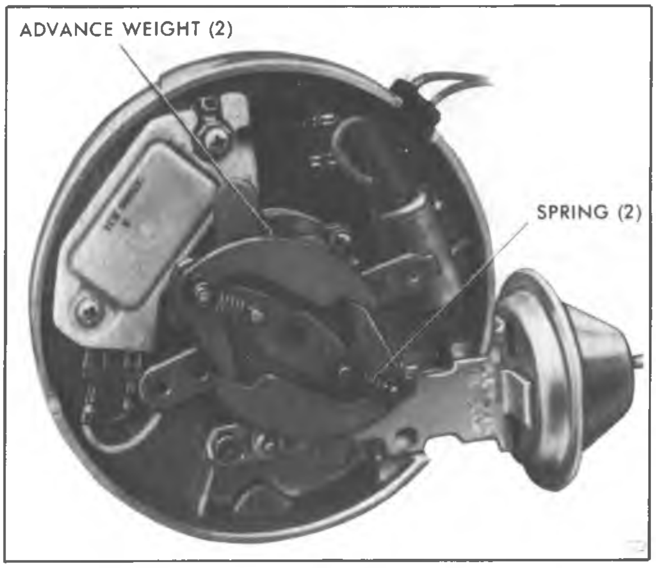


Fig. 6i–Distributor Centrifugal Advance

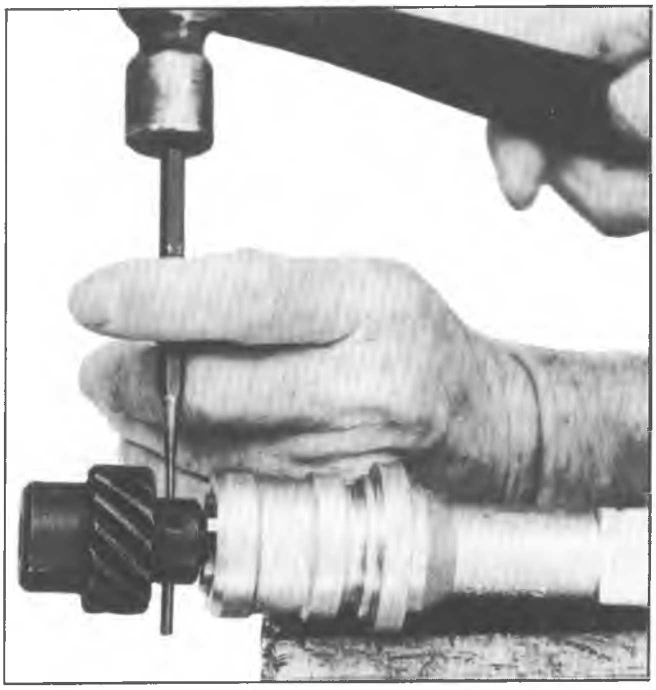


Fig. 7i–Roll Pin Removal

3. Lubricate felt wick with a few drops of motor oil and install replacement pole piece and plate assembly over upper bushing and vacuum advance unit. Make sure the retainer (bow) that holds the white and green electrical leads together is color coded yellow.
4. Install lock ring pole piece and plate assembly.
5. Place distributor shaft (with rotor attached) in distributor housing.
6. On 8 cylinder distributors, install tanged washer, shim and drive gear on distributor shaft.
7. On 6 cylinder distributors, install drive gear on distributor shaft.

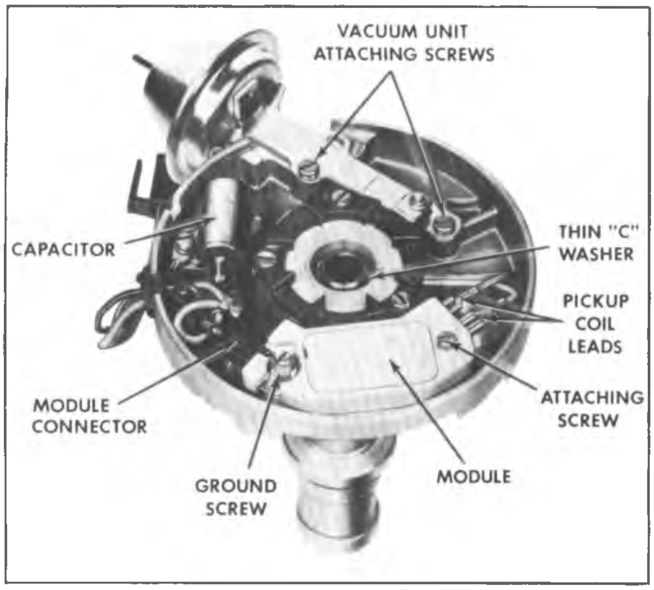


Fig. 8i–Top View of Distributor Housing

8. Align holes of drive gear with hole of distributor shaft so that locating mark on drive gear is in line with tip of rotor. Support distributor shaft on a wooden block or other suitable object and install roll pin. Make sure distributor is supported in such a way that no damage will occur to distributor shaft while installing roll pin.
9. Check to make sure shaft is not binding by spinning shaft a few times by hand.
10. Position capacitor to housing and loosely install one mounting screw.
11. Install connector to "B" and "C" terminals on module with tab on top.
12. Apply special silicone lubricant liberally to bottom of module and secure with two screws.
13. Position wiring harness with grommet in housing notch.
14. Connect pink wire to capacitor stud, and black wire to capacitor mounting screw. Tighten screw.
15. Connect white wire from pick-up coil to terminal "W" module.
16. Connect green wire from pick-up coil to terminal "G" of module.
17. Install centrifugal advance weights, weight retainer (dimple facing down), and springs.
18. Install rotor and secure with two screws.

    CAUTION: *Notch on side of rotor must engage tab on cam weight base.*

19. Install distributor as described above.

Electronic Module

Replacement (Fig. 8i)

The electronic module is serviced by complete replacement only. When replacing the module a liberal coating of special silicone grease MUST be applied to the metal mounting surface on which the module will be installed. If this grease is not applied, the module will not cool properly, which can cause the module to malfunction. A tube of this special silicone grease is supplied with each replacement module.

1. Raise hood and remove air cleaner.
2. Release distributor cap and place aside in an out-of-the-way place.
3. Remove two screws and remove rotor from distributor shaft.
4. Remove two screws holding module to housing and move module to a position where electrical connector may be removed from B and C terminals of module.
5. Use needle nose pliers or similar tool to remove pole piece and plate assembly electrical leads from W (White) and G (Green) terminals of module. Do not remove leads by pulling on the wires as damage to the leads may occur.
6. Install replacement module in reverse order of removal. During installation, make sure a liberal amount of special silicone grease is applied to the metal mounting surface of module to insure proper cooling.
7. Check operation of new module by starting and running vehicle.

Pole Piece and Plate Assembly

Replacement (Figs. 7i - 9i)

The pole piece and plate assembly is serviced by complete replacement only. The three screws securing stationary pole piece and permanent magnet should not be disturbed except under extreme conditions since the pole piece is adjusted by the factory to critical dimensions. During replacement, make sure the replacement pole piece and plate assembly is the correct specified part. One quick method of assuring a correct part is to observe the retainer (bow) that holds the white and green electrical leads together is color coded yellow. The correct pole piece and plate assembly for all 6 and 8 cylinder engines are color coded yellow.

1. Remove distributor as described previously in this section.
2. Support distributor gear on a block of wood or other suitable object (fig. 7i) and drive roll pin from drive gear. Make sure distributor is supported in such a way that no damage will occur to distributor shaft while removing roll pin.
3. On 8 cylinder distributors, remove drive gear, shim and tanged washer from distributor shaft.
4. On 6 cylinder distributors, remove drive gear from distributor shaft.
5. Remove any burrs that may have been caused by removal of roll pin and remove shaft (with rotor attached) from distributor housing.
6. Use needle nose pliers or similar tool to remove pole piece and plate assembly electrical leads from W (White) and G (Green) terminals of module. Do not remove leads by pulling on the wires as damage to the leads may occur.

7. Remove lock ring from top of pole piece and plate assembly (fig. 8i) and remove pole piece and plate assembly from distributor housing.
8. Lubricate felt wick with a few drops of motor oil and install replacement pole piece and plate assembly over upper bushing and vacuum advance unit. Make sure the retainer (bow) that holds the white and green electrical leads together is color coded yellow.
9. Install lock ring (fig. 8i) and then connect green electrical lead of pole piece and plate assembly to G terminal of module. Then connect white lead of pole piece and plate assembly to W terminal of module.
10. Place distributor shaft (with rotor attached) in distributor housing.
11. On 8 cylinder distributors, install tanged washer, shim and drive gear on distributor shaft.
12. On 6 cylinder distributors, install drive gear on distributor shaft.
13. Align holes of drive gear with hole of distributor shaft so that locating mark on drive gear is in line with tip of rotor. Support distributor shaft on a wooden block or other suitable object and install roll pin. Make sure distributor is supported in such a way that no damage will occur to distributor shaft while installing roll pin.

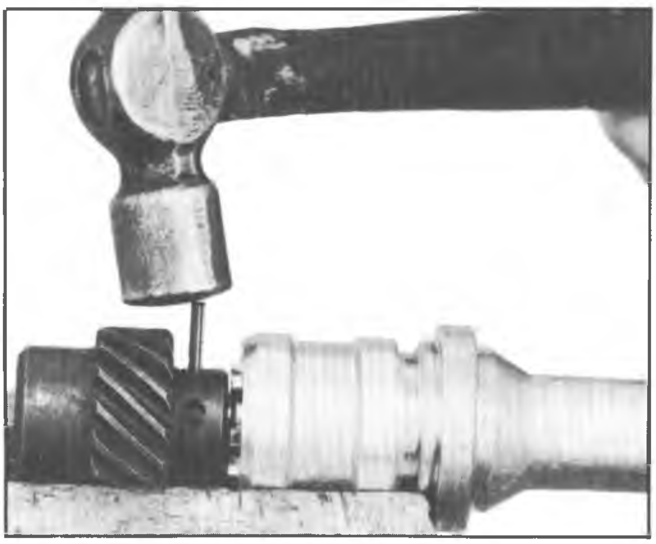


Fig. 9i–Roll Pin Installation

14. Check to make sure shaft is not binding by spinning shaft a few times by hand.
15. Install distributor as described previously in this section.

Ignition Coil–8 Cylinder

Removal (Fig. 10i)

1. Disconnect battery wire and harness connector from distributor cap.
2. Remove three screws securing coil cover to distributor cap.
3. Remove four screws securing ignition coil to distributor cap.
4. Remove ground wire from coil.
5. Push coil leads from under side of connectors and remove coil from distributor cap.

Installation (Fig. 10i)

1. Position coil into distributor cap with terminals over connector at side of cap.
2. Push coil lead wires into connector on side of cap as follows: black (ground) in center; brown next to vacuum advance unit; pink opposite vacuum advance unit.
3. Secure ignition coil with four screws. Place ground wire under coil mounting screw.
4. Install coil cover onto distributor cap and secure with three screws.

Ignition Coil–6 Cylinder

Removal (Fig. 5i)

1. Disconnect ignition switch to coil lead at coil.
2. Disconnect coil to distributor leads at coil.
3. Remove 4 screws securing coil to side of engine and remove coil.

Installation (Fig. 5i)

1. Install coil to side of engine with 4 screws.
2. Connect coil to distributor leads at coil.
3. Connect ignition switch to coil lead at coil.

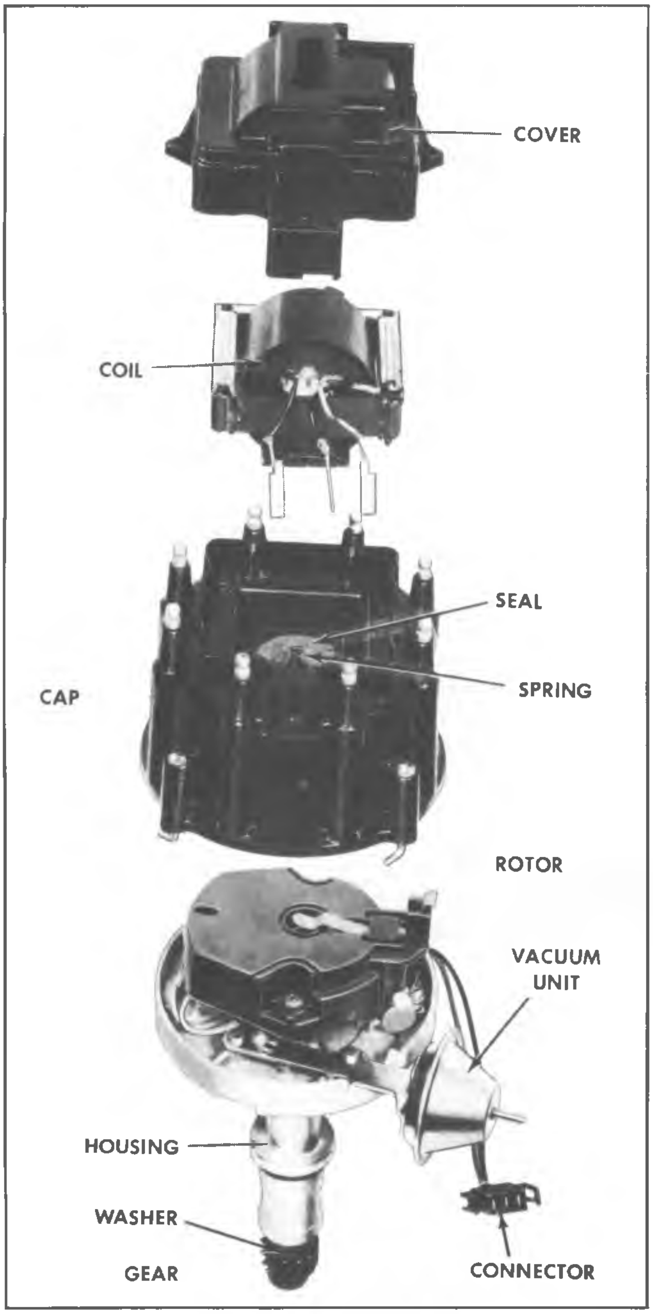
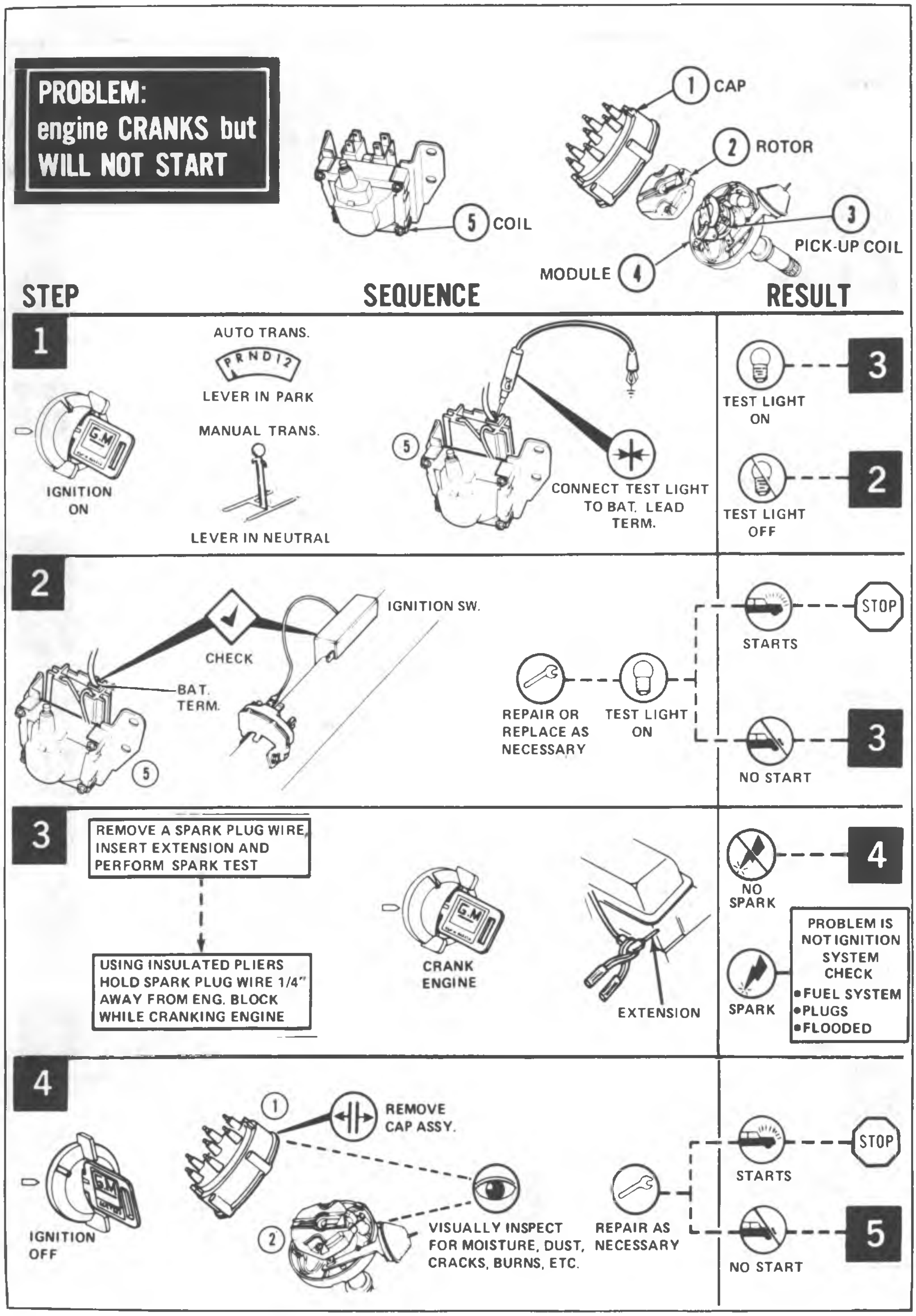


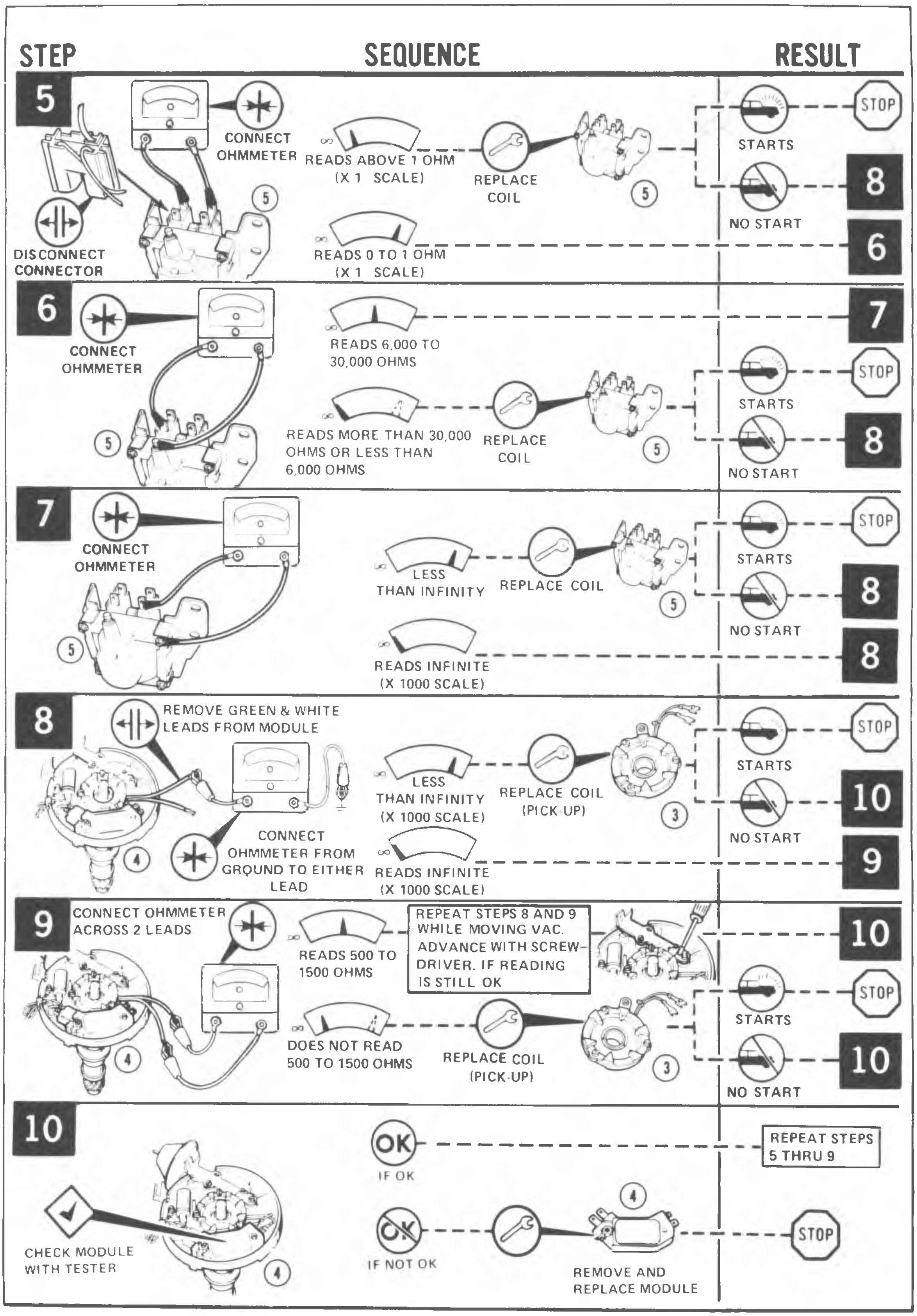
Fig. 10i–Exploded View of 8 Cylinder HEI Distributor

DIAGNOSIS

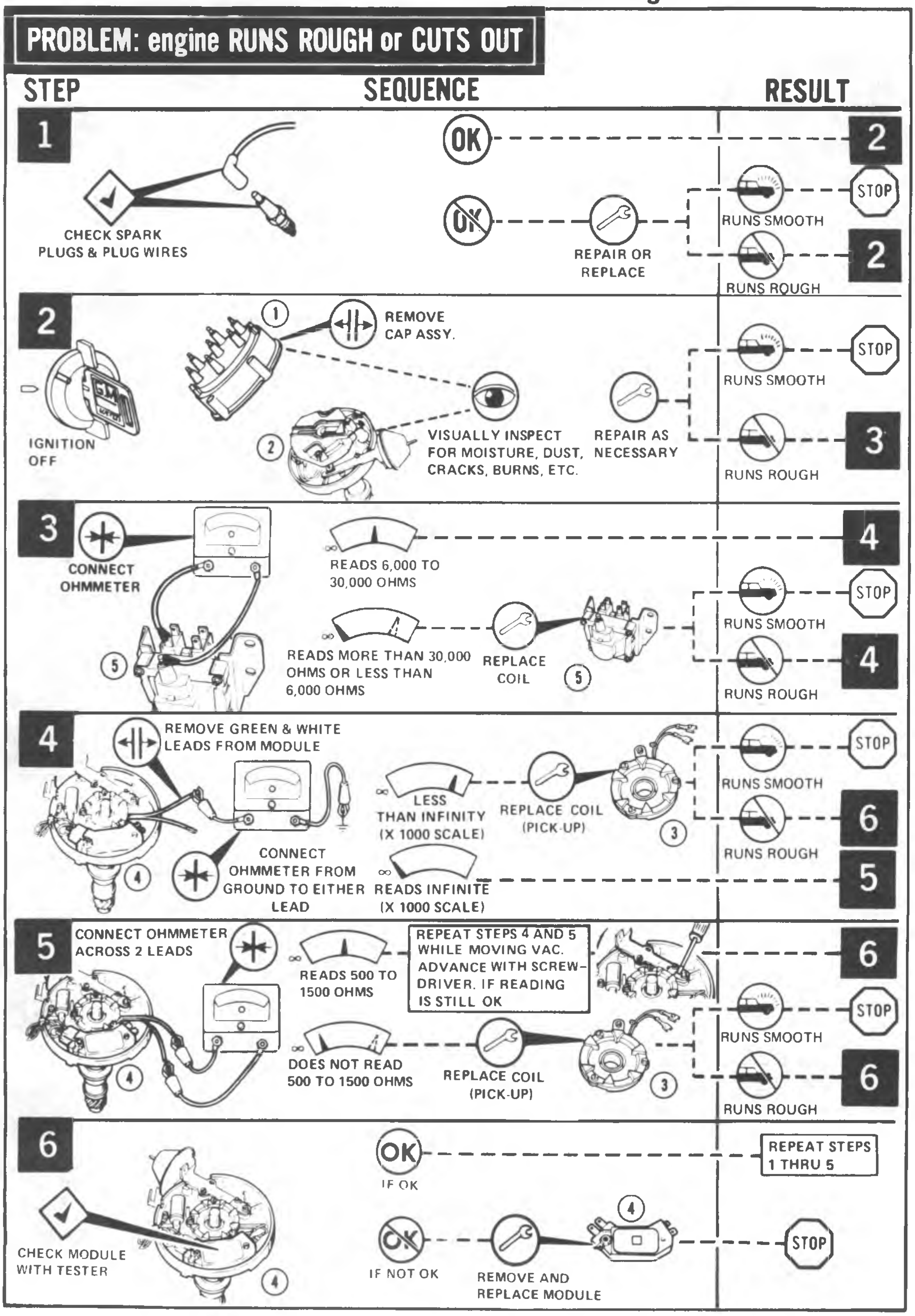
HIGH ENERGY IGNITION SYSTEM L-6 engines



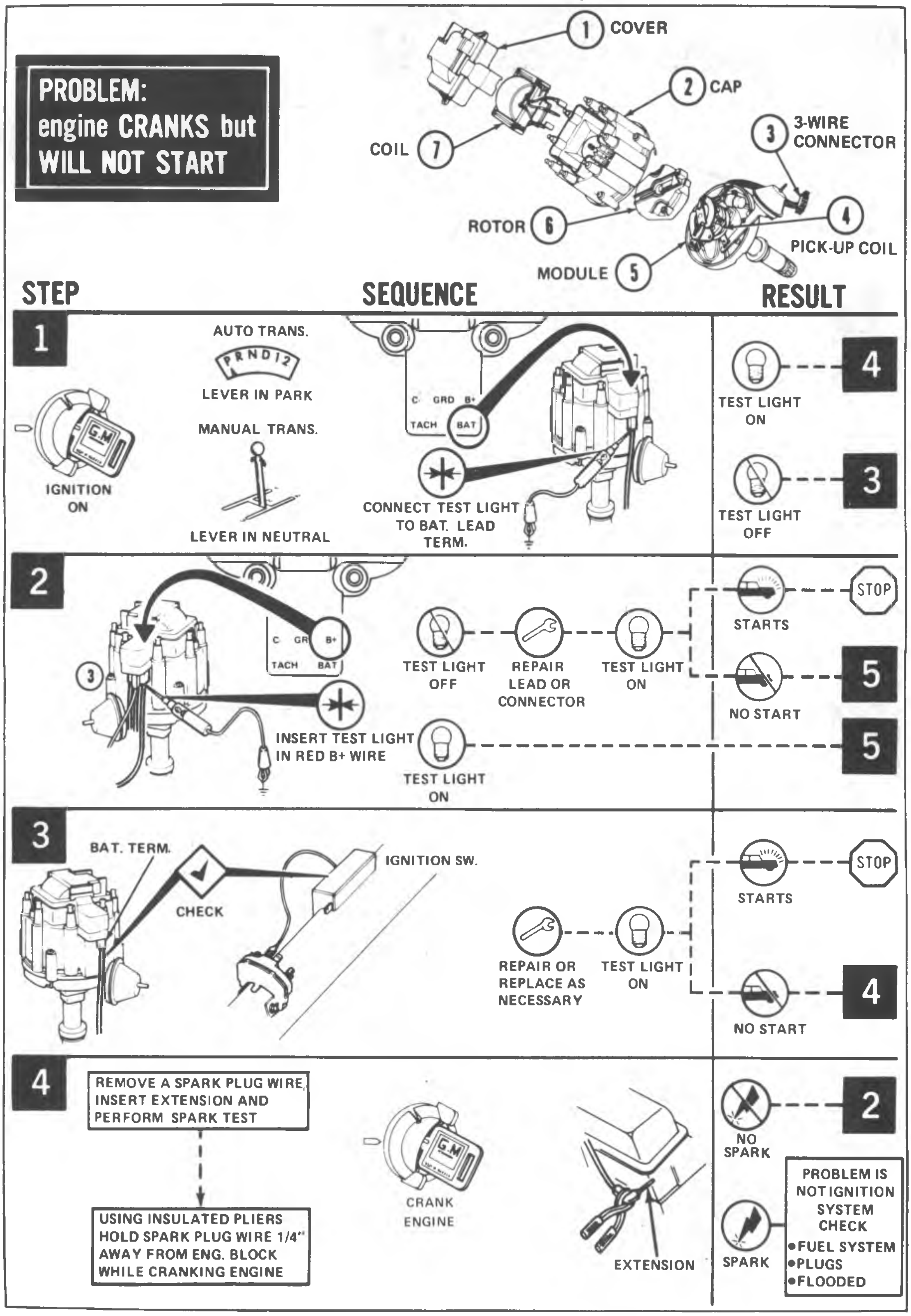
HIGH ENERGY IGNITION SYSTEM L-6 engines



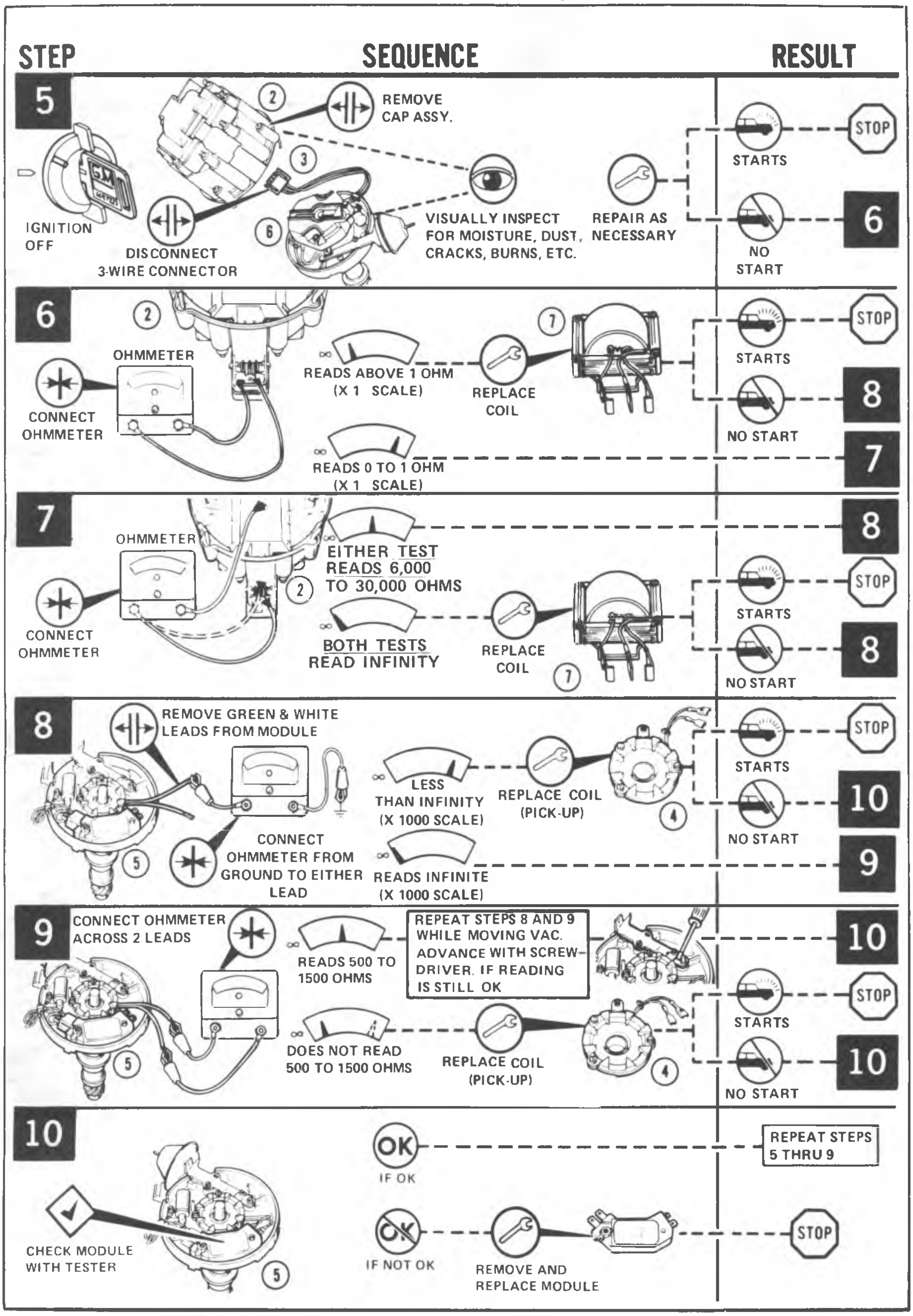
HIGH ENERGY IGNITION SYSTEM L-6 engines



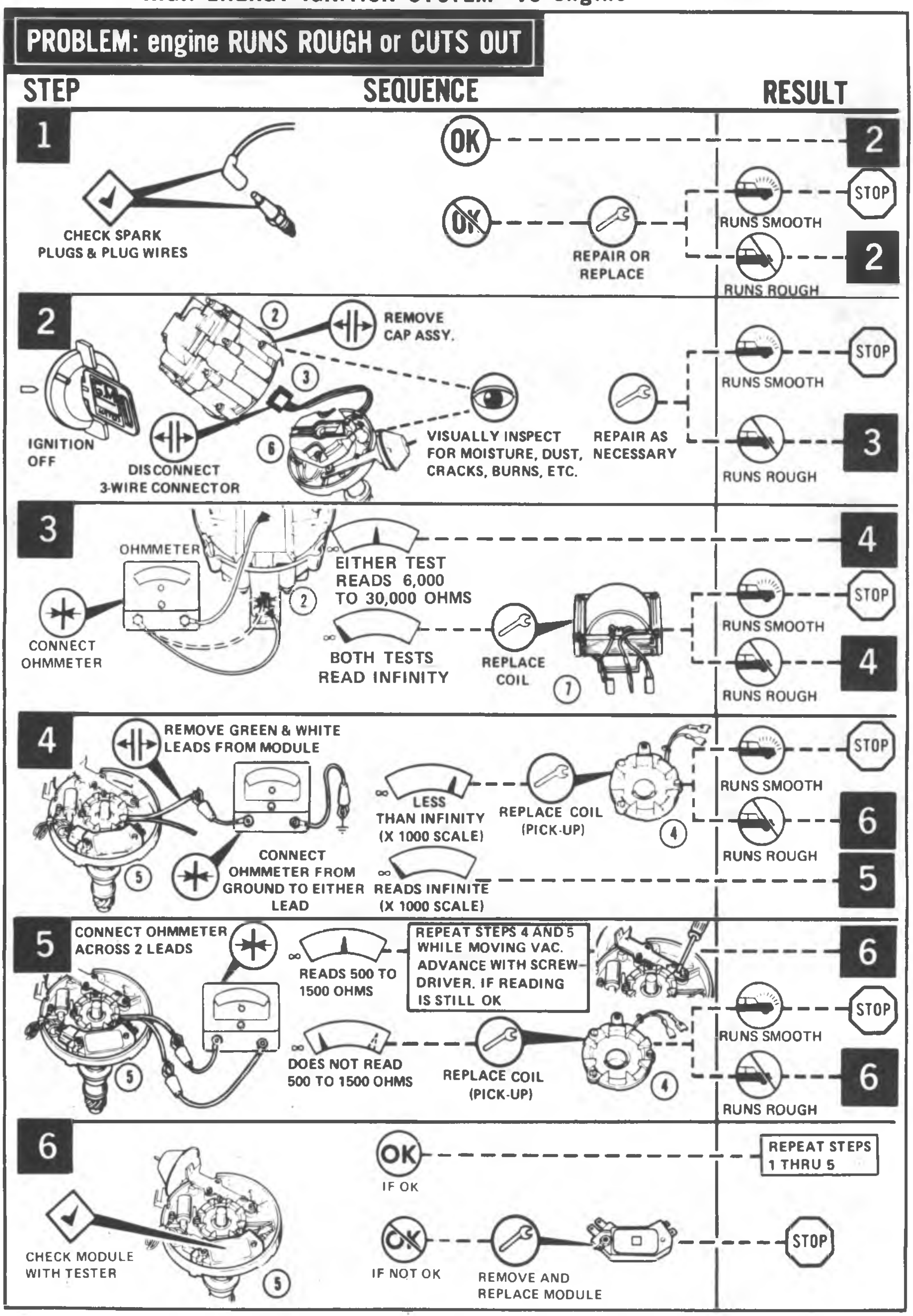
HIGH ENERGY IGNITION SYSTEM V8 engine



HIGH ENERGY IGNITION SYSTEM V8 engine



HIGH ENERGY IGNITION SYSTEM V8 engine



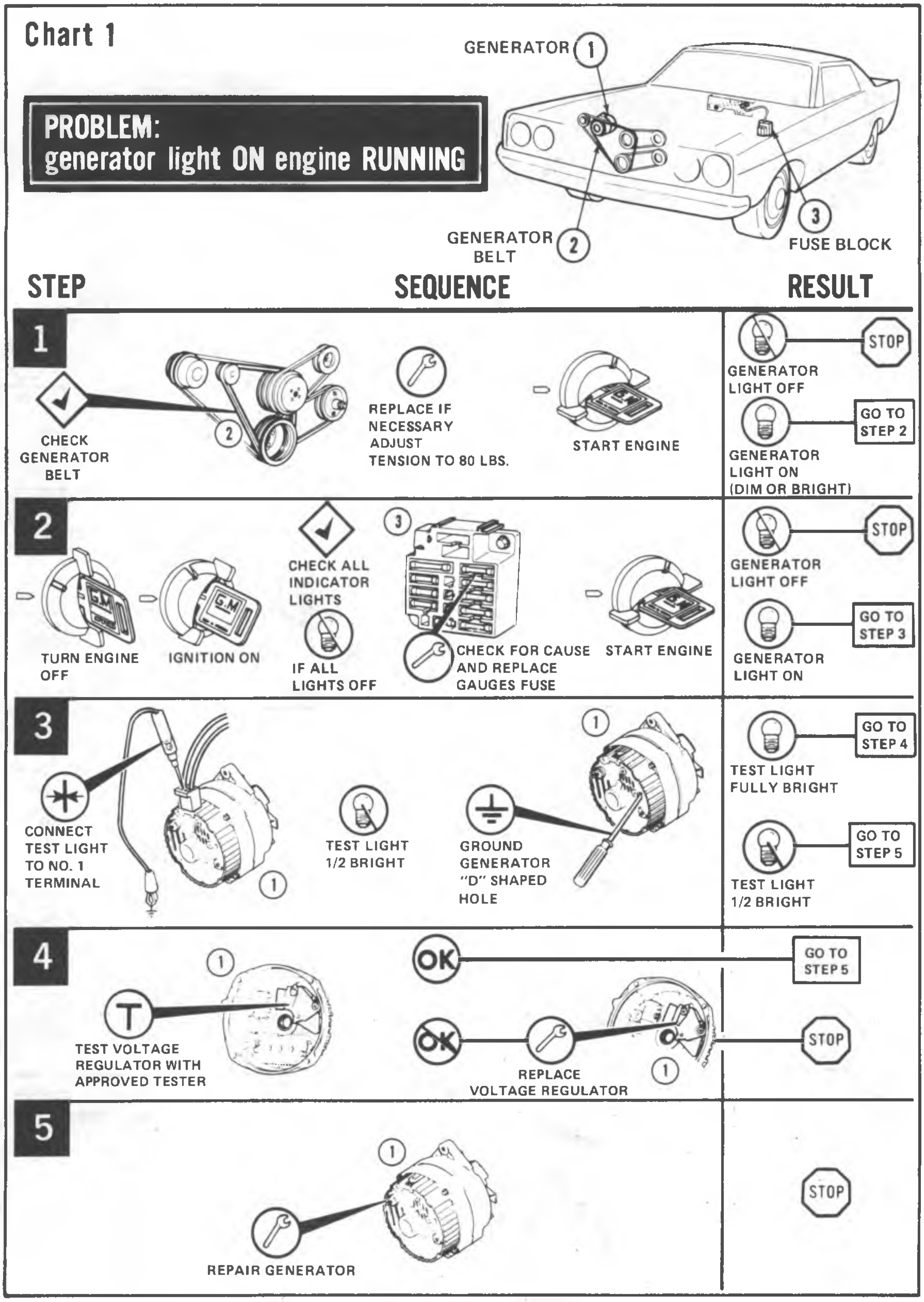


Chart 1
PROBLEM:
generator light ON engine RUNNING
GENERATOR 1
GENERATOR BELT 2
3 FUSE BLOCK
STEP
SEQUENCE
RESULT
1
CHECK GENERATOR BELT
2
REPLACE IF NECESSARY ADJUST TENSION TO 80 LBS.
START ENGINE
GENERATOR LIGHT OFF
STOP
GENERATOR LIGHT ON (DIM OR BRIGHT)
GO TO STEP 2
2
TURN ENGINE OFF
IGNITION ON
CHECK ALL INDICATOR LIGHTS
IF ALL LIGHTS OFF
3
CHECK FOR CAUSE AND REPLACE GAUGES FUSE
START ENGINE
GENERATOR LIGHT OFF
STOP
GENERATOR LIGHT ON
GO TO STEP 3
3
CONNECT TEST LIGHT TO NO. 1 TERMINAL
1
TEST LIGHT 1/2 BRIGHT
GROUND GENERATOR "D" SHAPED HOLE
1
TEST LIGHT FULLY BRIGHT
GO TO STEP 4
TEST LIGHT 1/2 BRIGHT
GO TO STEP 5
4
1
TEST VOLTAGE REGULATOR WITH APPROVED TESTER
OK
GO TO STEP 5
OK
REPLACE VOLTAGE REGULATOR
1
STOP
5
1
REPAIR GENERATOR
STOP

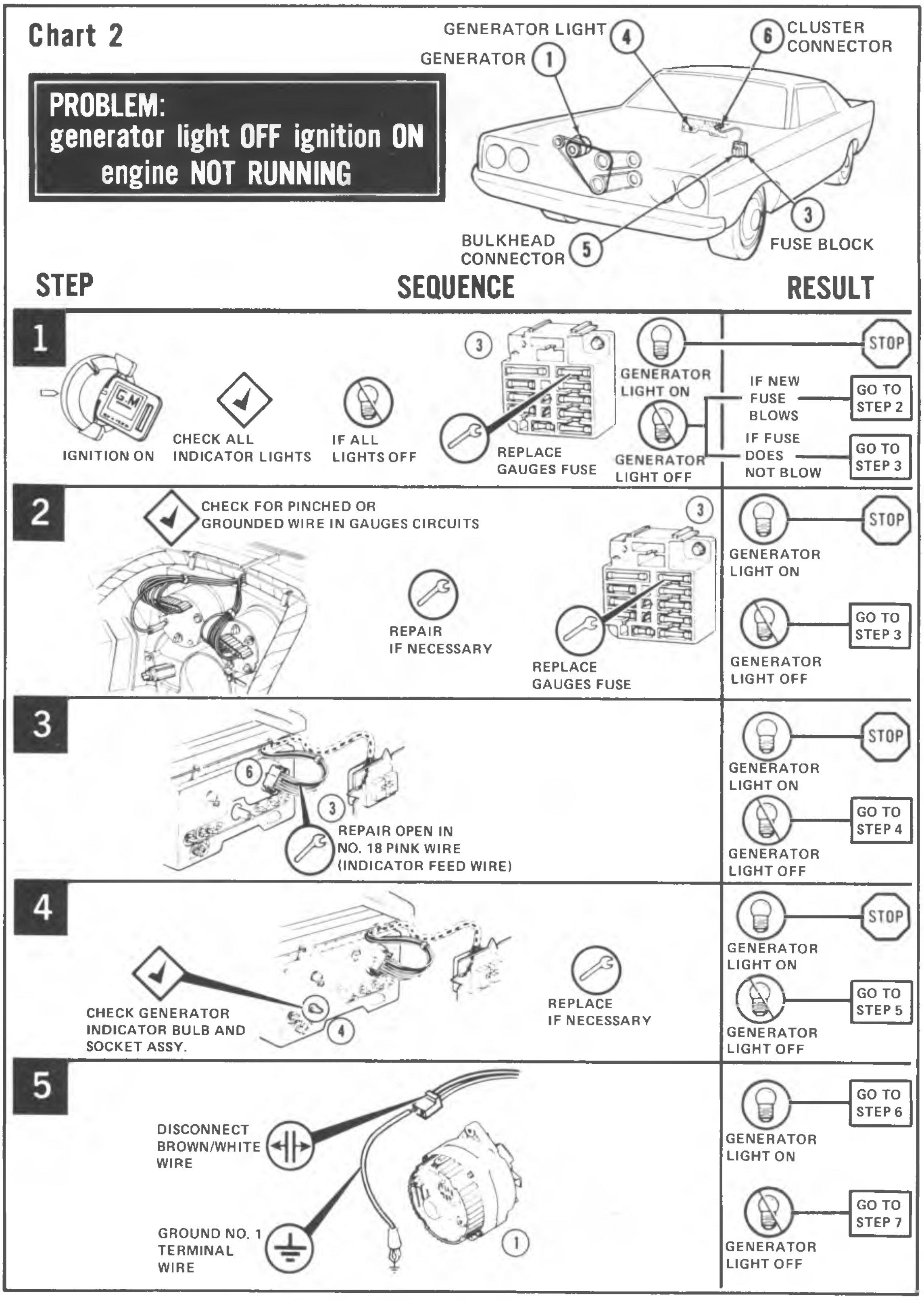


Chart 2
PROBLEM:
generator light OFF ignition ON
engine NOT RUNNING
GENERATOR LIGHT 4
GENERATOR 1
6 CLUSTER CONNECTOR
BULKHEAD CONNECTOR 5
3 FUSE BLOCK
STEP
SEQUENCE
RESULT
1
IGNITION ON
CHECK ALL INDICATOR LIGHTS
IF ALL LIGHTS OFF
REPLACE GAUGES FUSE
GENERATOR LIGHT ON
STOP
GENERATOR LIGHT OFF
IF NEW FUSE BLOWS
GO TO STEP 2
IF FUSE DOES NOT BLOW
GO TO STEP 3
2
CHECK FOR PINCHED OR GROUNDED WIRE IN GAUGES CIRCUITS
REPAIR IF NECESSARY
REPLACE GAUGES FUSE
GENERATOR LIGHT ON
STOP
GENERATOR LIGHT OFF
GO TO STEP 3
3
REPAIR OPEN IN NO. 18 PINK WIRE (INDICATOR FEED WIRE)
GENERATOR LIGHT ON
STOP
GENERATOR LIGHT OFF
GO TO STEP 4
4
CHECK GENERATOR INDICATOR BULB AND SOCKET ASSY.
REPLACE IF NECESSARY
GENERATOR LIGHT ON
STOP
GENERATOR LIGHT OFF
GO TO STEP 5
5
DISCONNECT BROWN/WHITE WIRE
GROUND NO. 1 TERMINAL WIRE
GENERATOR LIGHT ON
GO TO STEP 6
GENERATOR LIGHT OFF
GO TO STEP 7

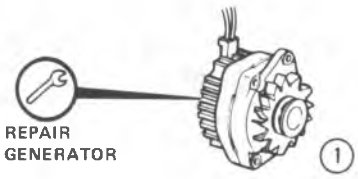
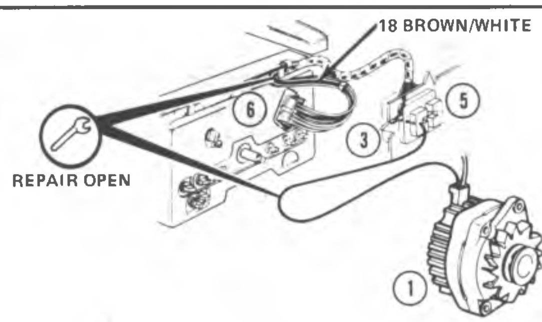
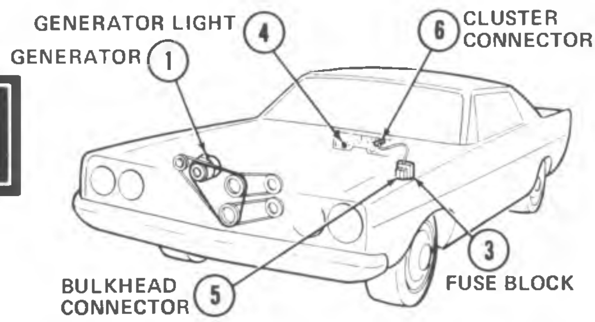
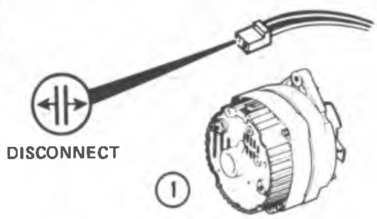
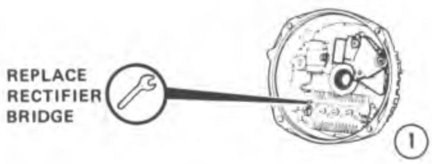
STEP	SEQUENCE	RESULT
6		STOP
7		STOP

Chart 3

PROBLEM:
generator light ON ignition OFF



STEP	SEQUENCE	RESULT
1	 GENERATOR LIGHT ON → REPAIR SHORT BETWEEN NO. 1 (BROWN) WIRE AND NO. 2 (RED) WIRE GENERATOR LIGHT OFF	STOP GO TO STEP 2
2		STOP

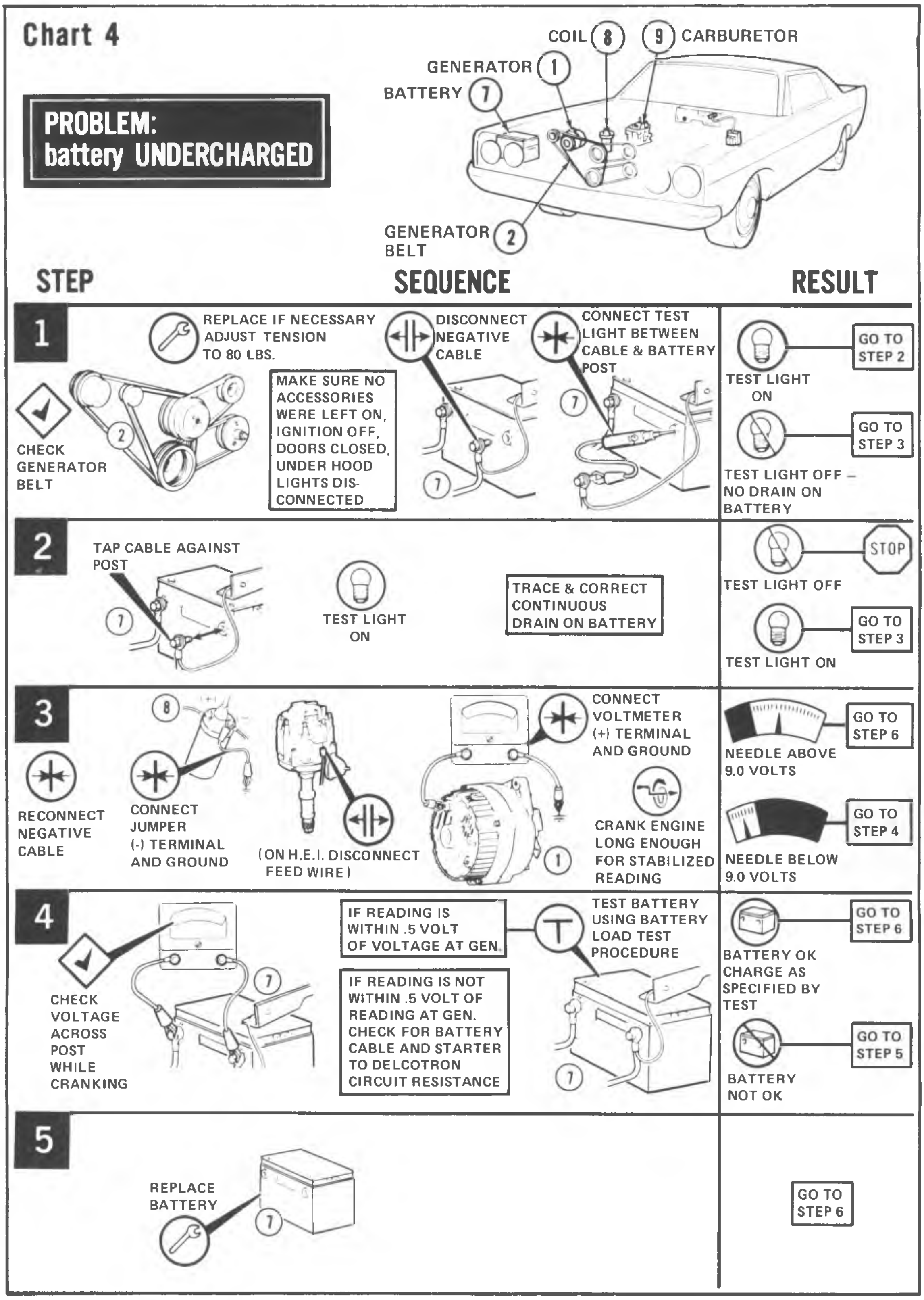
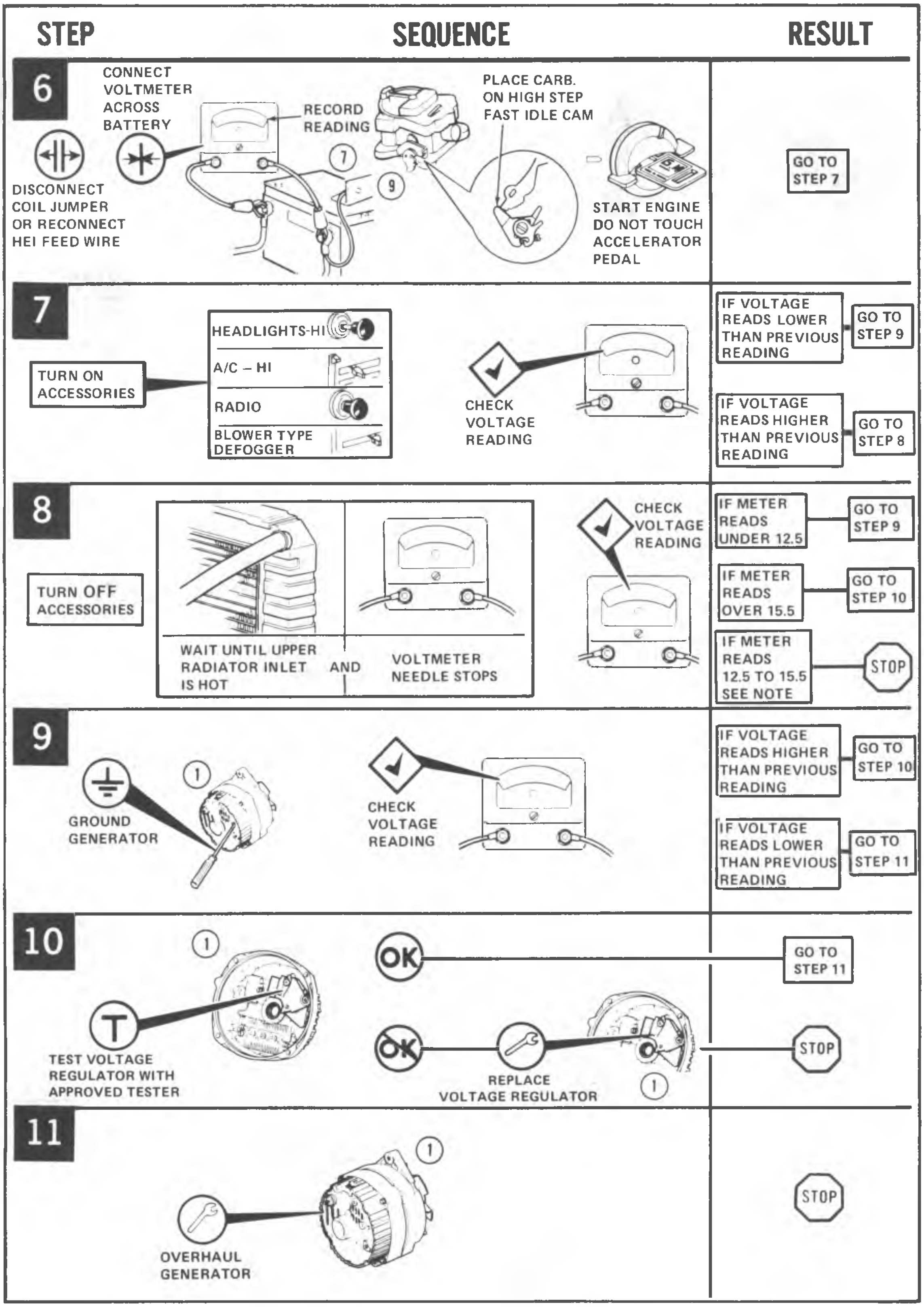


Chart 4
PROBLEM: battery UNDERCHARGED
COIL 8
9 CARBURETOR
GENERATOR 1
BATTERY 7
GENERATOR BELT 2
STEP
SEQUENCE
RESULT
1
CHECK GENERATOR BELT
REPLACE IF NECESSARY ADJUST TENSION TO 80 LBS.
MAKE SURE NO ACCESSORIES WERE LEFT ON, IGNITION OFF, DOORS CLOSED, UNDER HOOD LIGHTS DISCONNECTED
DISCONNECT NEGATIVE CABLE
CONNECT TEST LIGHT BETWEEN CABLE & BATTERY POST
TEST LIGHT ON
GO TO STEP 2
TEST LIGHT OFF – NO DRAIN ON BATTERY
GO TO STEP 3
2
TAP CABLE AGAINST POST
TEST LIGHT ON
TRACE & CORRECT CONTINUOUS DRAIN ON BATTERY
TEST LIGHT OFF
STOP
TEST LIGHT ON
GO TO STEP 3
3
RECONNECT NEGATIVE CABLE
CONNECT JUMPER (-) TERMINAL AND GROUND
(ON H.E.I. DISCONNECT FEED WIRE)
CONNECT VOLTMETER (+) TERMINAL AND GROUND
CRANK ENGINE LONG ENOUGH FOR STABILIZED READING
NEEDLE ABOVE 9.0 VOLTS
GO TO STEP 6
NEEDLE BELOW 9.0 VOLTS
GO TO STEP 4
4
CHECK VOLTAGE ACROSS POST WHILE CRANKING
IF READING IS WITHIN .5 VOLT OF VOLTAGE AT GEN.
IF READING IS NOT WITHIN .5 VOLT OF READING AT GEN. CHECK FOR BATTERY CABLE AND STARTER TO DELCOTRON CIRCUIT RESISTANCE
TEST BATTERY USING BATTERY LOAD TEST PROCEDURE
BATTERY OK CHARGE AS SPECIFIED BY TEST
GO TO STEP 6
BATTERY NOT OK
GO TO STEP 5
5
REPLACE BATTERY
GO TO STEP 6



NOTE: IF NOTHING HAS BEEN FOUND RE-EDUCATE OWNER ON EXCESSIVE IDLING, SLOW OR SHORT DISTANCE DRIVING WITH ALL ACCESSORIES ON.

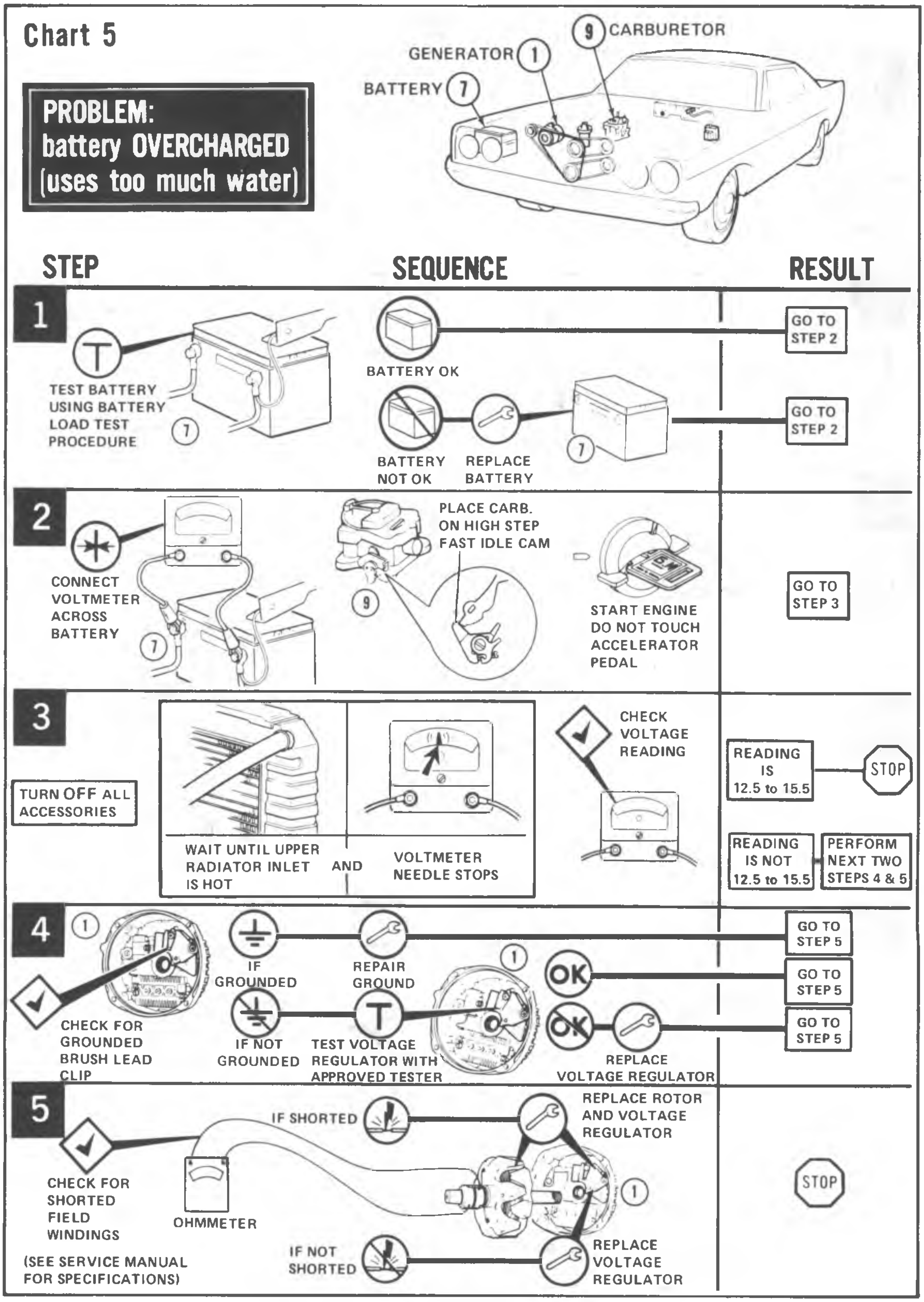


Chart 5
PROBLEM:
battery OVERCHARGED
(uses too much water)
9 CARBURETOR
GENERATOR 1
BATTERY 7
STEP
SEQUENCE
RESULT
1
TEST BATTERY USING BATTERY LOAD TEST PROCEDURE
7
BATTERY OK
GO TO STEP 2
BATTERY NOT OK
REPLACE BATTERY
GO TO STEP 2
2
CONNECT VOLTMETER ACROSS BATTERY
PLACE CARB. ON HIGH STEP FAST IDLE CAM
9
START ENGINE DO NOT TOUCH ACCELERATOR PEDAL
GO TO STEP 3
3
TURN OFF ALL ACCESSORIES
WAIT UNTIL UPPER RADIATOR INLET IS HOT
AND
VOLTMETER NEEDLE STOPS
CHECK VOLTAGE READING
READING IS 12.5 to 15.5
STOP
READING IS NOT 12.5 to 15.5
PERFORM NEXT TWO STEPS 4 & 5
4
1
CHECK FOR GROUNDED BRUSH LEAD CLIP
IF GROUNDED
REPAIR GROUND
GO TO STEP 5
IF NOT GROUNDED
TEST VOLTAGE REGULATOR WITH APPROVED TESTER
OK
GO TO STEP 5
REPLACE VOLTAGE REGULATOR
GO TO STEP 5
5
CHECK FOR SHORTED FIELD WINDINGS
(SEE SERVICE MANUAL FOR SPECIFICATIONS)
OHMMETER
IF SHORTED
REPLACE ROTOR AND VOLTAGE REGULATOR
IF NOT SHORTED
REPLACE VOLTAGE REGULATOR
STOP

SECTION 7M

CLUTCHES AND MANUAL TRANSMISSIONS

CONTENTS OF THIS SECTION

CLUTCH CONTROLS

GENERAL DESCRIPTION

The clutch operating controls for "G" models (fig. 1T) are a mechanical type consisting of a pendant type pedal, return spring, pedal pull rod, cross-shaft, fork push rod, clutch fork and throwout bearing. The pedal pull rod is routed vertically from the clutch pedal lever down through the toe panel to the cross shaft. When the pedal is depressed, the pedal pull rod moves rotating the cross shaft, pushing the clutch fork rod rearward and pivoting the clutch fork. This action moves the throwout bearing against the clutch release fingers, releasing the clutch.

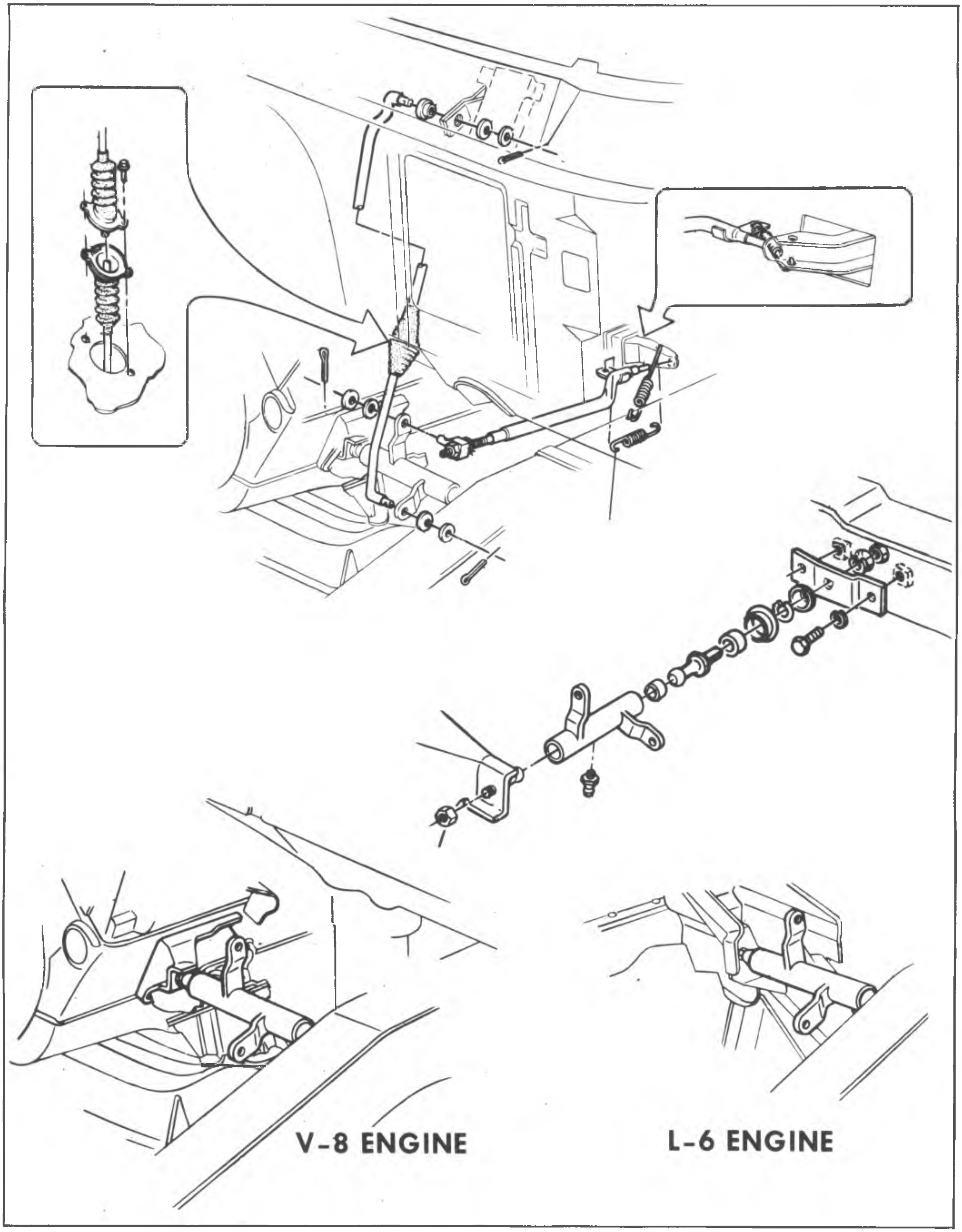


Fig. 1T–Clutch Linkage Assembly - G Models

MANUAL TRANSMISSIONS

SERVICE OPERATIONS

The service procedures for the Tremec 3 speed will be the same as 3 speed listed in the 1974 Service Manual.

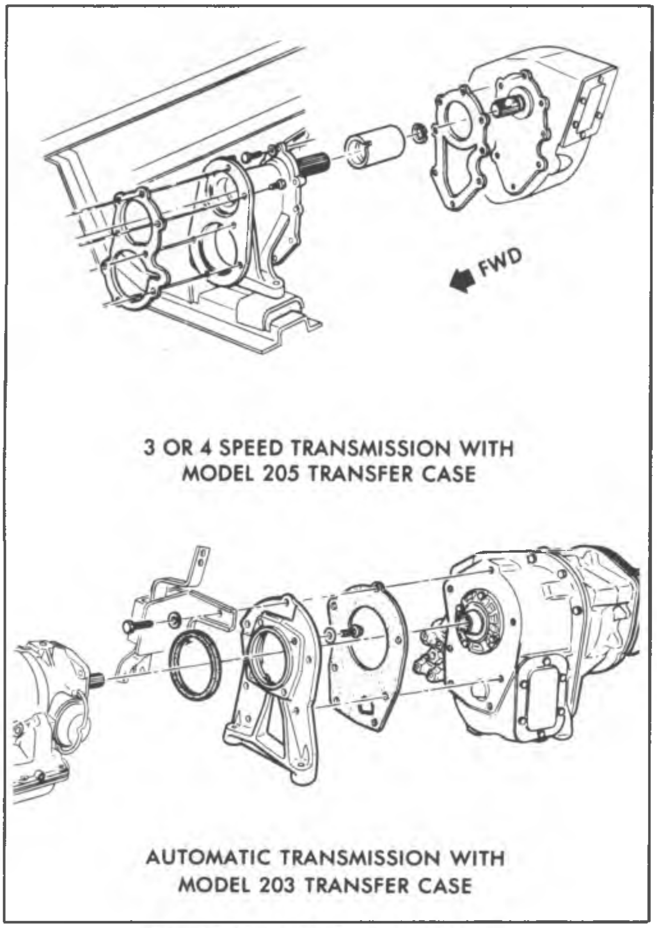


Fig. 1Q–Transfer Case Installation

TRANSFER CASE REPLACEMENT (Figs. 1Q-2Q)

Removal

1. Raise and support vehicle on hoist. Drain transfer case.
2. Disconnect speedometer cable, back-up lamp and TCS switch.
3. Remove skid plate and crossmember supports as necessary.
4. Disconnect rear prop shaft from transfer case and tie up away from work area.
5. Disconnect front prop shaft from transfer case and tie up shaft away from work area.
6. Disconnect shift lever rod from shift rail link. On full time 4 wheel drive models, disconnect shift levers at transfer case.
7. Support transfer case and remove bolts attaching transfer case to transmission adapter.
8. Move transfer case to rear until input shaft clears adapter and lower assembly from vehicle.

Installation

1. Support transfer case in suitable stand and position case to transmission adapter. Install bolts attaching case to adapter and torque to 45 ft. lbs.
2. Remove stand as required and install bolts attaching transfer case to frame rail. Bend lock tabs after assembly.
3. Install connecting rod to shift rail link or connect shift levers to transfer case, as applicable.
4. Connect front prop shaft to transfer case front output shaft.
5. Connect rear prop shaft to transfer case rear output shaft.
6. Install crossmember support and skid plate, if removed.
7. Connect speedometer cable, back-up lamp and TCS switch.
8. Fill transfer case to proper level with lubricant specified in the lubricant section of the Truck Chassis Service Manual.
9. Lower and remove vehicle from hoist.

   CAUTION: *Check and tighten all bolts to specified torques.*

   NOTE: Before connecting prop shafts to companion flanges be sure locknuts are torqued to specifications.

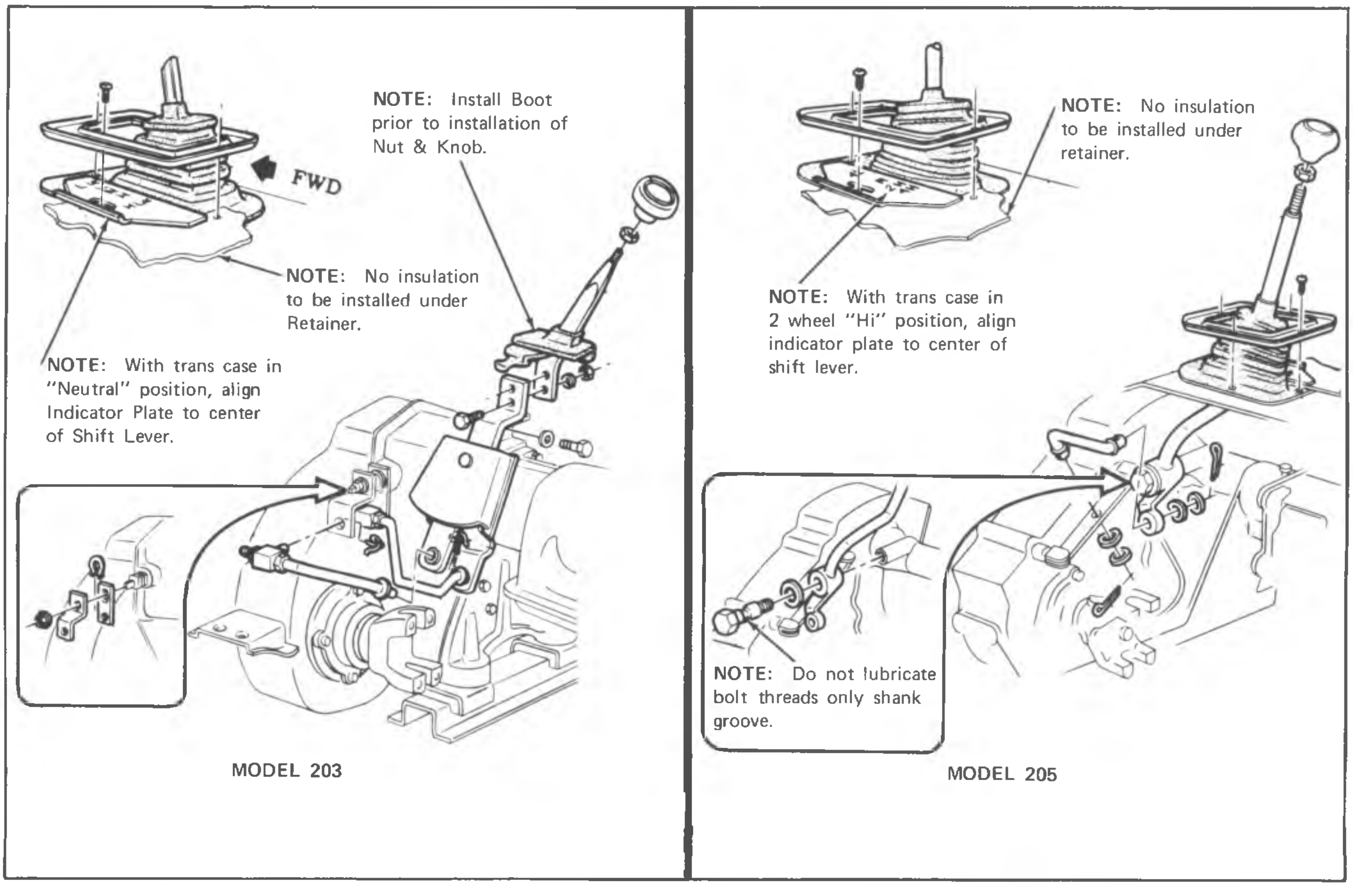


Fig. 2Q–Transfer Case Controls

SECTION 7A

AUTOMATIC TRANSMISSION

CONTENTS OF THIS SECTION

TURBO HYDRA-MATIC 350 TRANSMISSION

INDEX

GENERAL DESCRIPTION

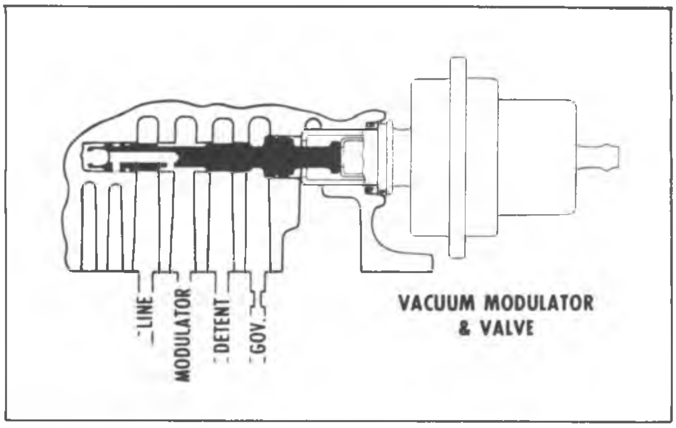


Fig. 1G–Vacuum Modulator Assembly

VACUUM MODULATOR ASSEMBLY (FIG. 1G)

The engine vacuum signal is provided by the vacuum modulator, which consists of a diaphragm and one spring. The external spring applies a force which acts on the modulator valve. This force acts on the modulator valve so that it increases modulator pressure. Engine vacuum acts in the opposite direction to decrease modulator, or low engine vacuum, high modulator pressure. High engine vacuum, and low modulator pressure.

MAINTENANCE AND ADJUSTMENTS

TRANSMISSION FLUID

Draining and Refilling Transmission

The oil pan should be drained and the strainer, cleaned every 30,000 miles and fresh fluid added to obtain the proper lever on indicator. For vehicles subjected to heavy city traffic during hot weather, or in commercial use, when the engine is regularly idled for prolonged periods or when vehicle is used for towing the oil pan should be drained and the strainer cleaned every 15,000 miles.

Drain fluid immediately after operation before it has had an apportunity to cool.

> **WARNING:** Transmission fluid temperature can exceed 350F.

SHIFT CONTROLS

Column Shift Linkage - G Series (Fig. 2G)

1. The shift tube and lever assembly must be free in the mast jacket.
2. Set transmission lever (C) in "neutral" position by one of the following optional methods.

   NOTE: Obtain "neutral" position by moving transmission lever (C) counter-clockwise to "L1" detent, then clockwise three detent positions to "neutral" or obtain "neutral" position by moving transmission lever (C) clockwise to the "park" detent then counter-clockwise two detents to "neutral".
3. Set the column shift lever in "neutral" position. This is obtained by rotating shift lever until it locks into mechanical stop in the column assembly.

   NOTE: Do not use indicator pointer as a reference to position the shift lever.
4. Attach rod (A) to shaft assembly (B) as shown (fig. 2G).
5. Slide swivel (D) and clamp (E) onto rod (A) align the column shift lever and loosely attach as shown.
6. Hold column lever against "neutral" stop "park" position side.
7. Tighten nut (F) to 18 foot pounds.
8. Readjust indicator needle if necessary to agree with the transmission detent positions.
9. Readjust neutral start switch if necessary to provide the correct relationship to the transmission detent positions.

   CAUTION: *Any inaccuracies in the above adjustments may result in premature failure of the transmission due to operation without controls in full detent. Such operation results in reduced oil pressure and in turn partial engagement of the affected clutches. Partial engagement of the clutches with sufficient pressure to cause apparent normal operation of the vehicle will result in failure of the clutches or other internal parts after only a few miles of operation.*

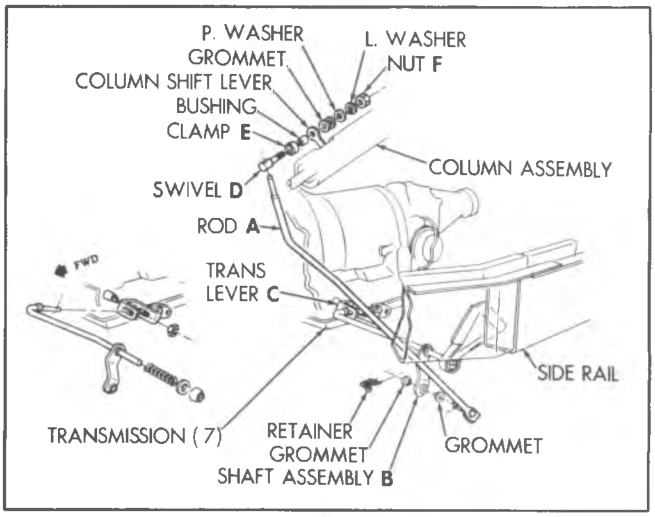


Fig. 2G--Column Shift Linkage - G Series

DETENT DOWNSHIFT CABLE (Figs. 3G and 4G)

Removal

1. Push up on bottom of snap-lock and release lock and detent downshift cable.
2. Disconnect cable from carburetor lever.
3. Compress locking tabs and disconnect snap-lock assembly from bracket.
4. Remove clamp around filler tube, remove screw and washer securing cable to transmission and disconnect detent downshift cable.

Installation

1. Install new seal on detent downshift cable lubricant seal with transmission fluid.
2. Connect transmission end of detent downshift cable and secure transmission case with bolt and washer tightened to 75 inch pounds.
3. Route cable in front of filler tube and install clamp around filler tube, modulator pipe and detent downshift cable. Locate clamp approximately 2 inches above filler tube bracket.
4. Pass cable through bracket and engage locking tabs of snap-lock on bracket.
5. Connect cable to carburetor lever.

Adjustment

With snap-lock disengaged, position carburetor to wide open throttle (W.O.T.) position and push snap-lock downward until top is flush with rest of cable.

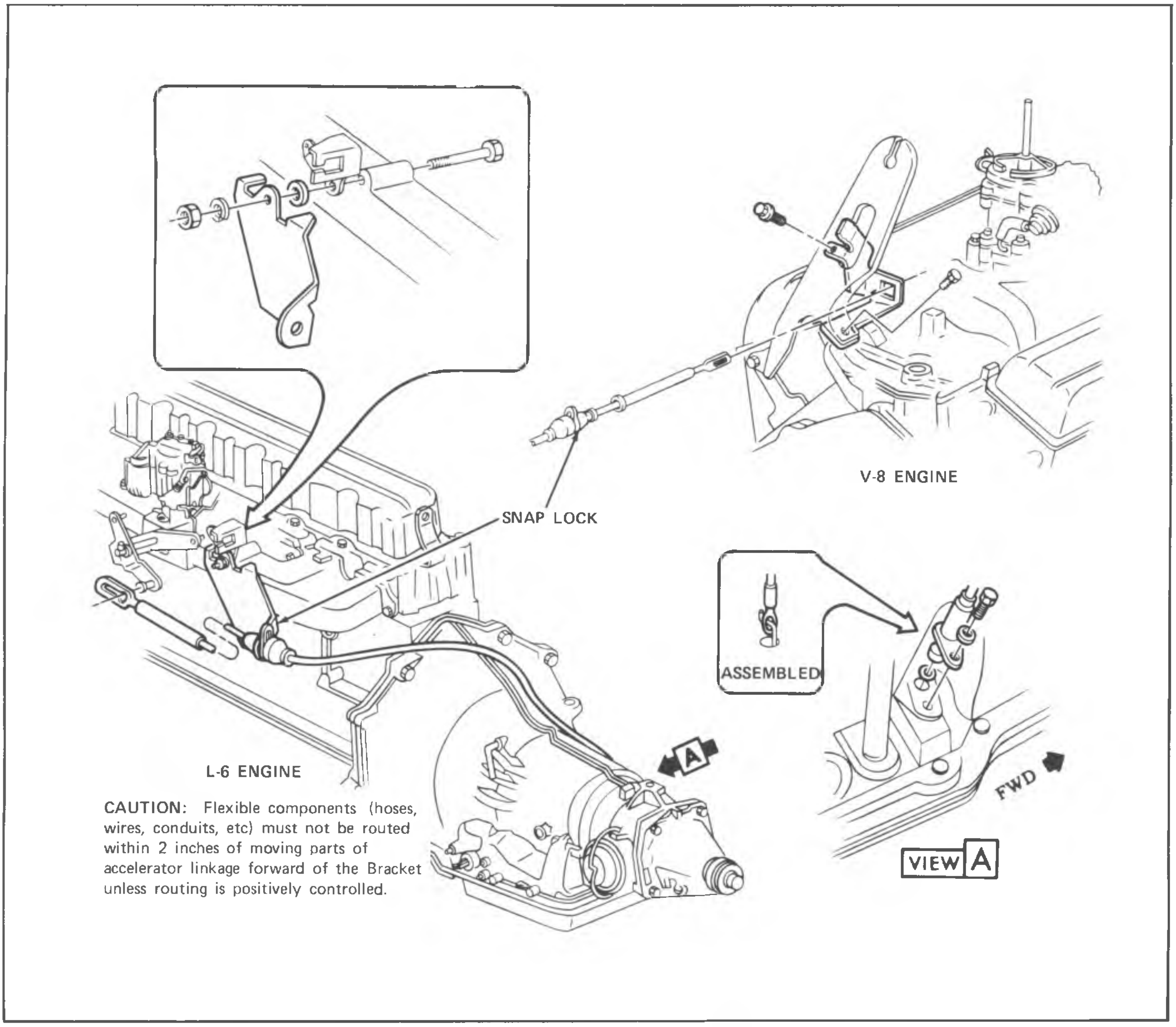


Fig. 3G--Detent Downshift Cable - G Series

MANUAL SHAFT, RANGE SELECTOR INNER LEVER AND PARKING LINKAGE ASSEMBLIES

The procedure for removal and installation remains the same with the addition of this notation:

NOTE: Before installing the propeller shaft, liberally lubricate splines of the transmission yoke with a Lithium soap base lubricant. The lubricant should seep from the vent hole (rear cap of yoke) when installing yoke on transmission output shaft. It is essential that the vent hole is not obstructed.

TRANSMISSION REPLACEMENT

The procedure for transmission replacement remains the same with the addition of this note:

NOTE: If necessary, the catalytic converter may have to be disconnected to provide adequate clearance for transmission removal. This procedure will include removal of the converter support bracket.

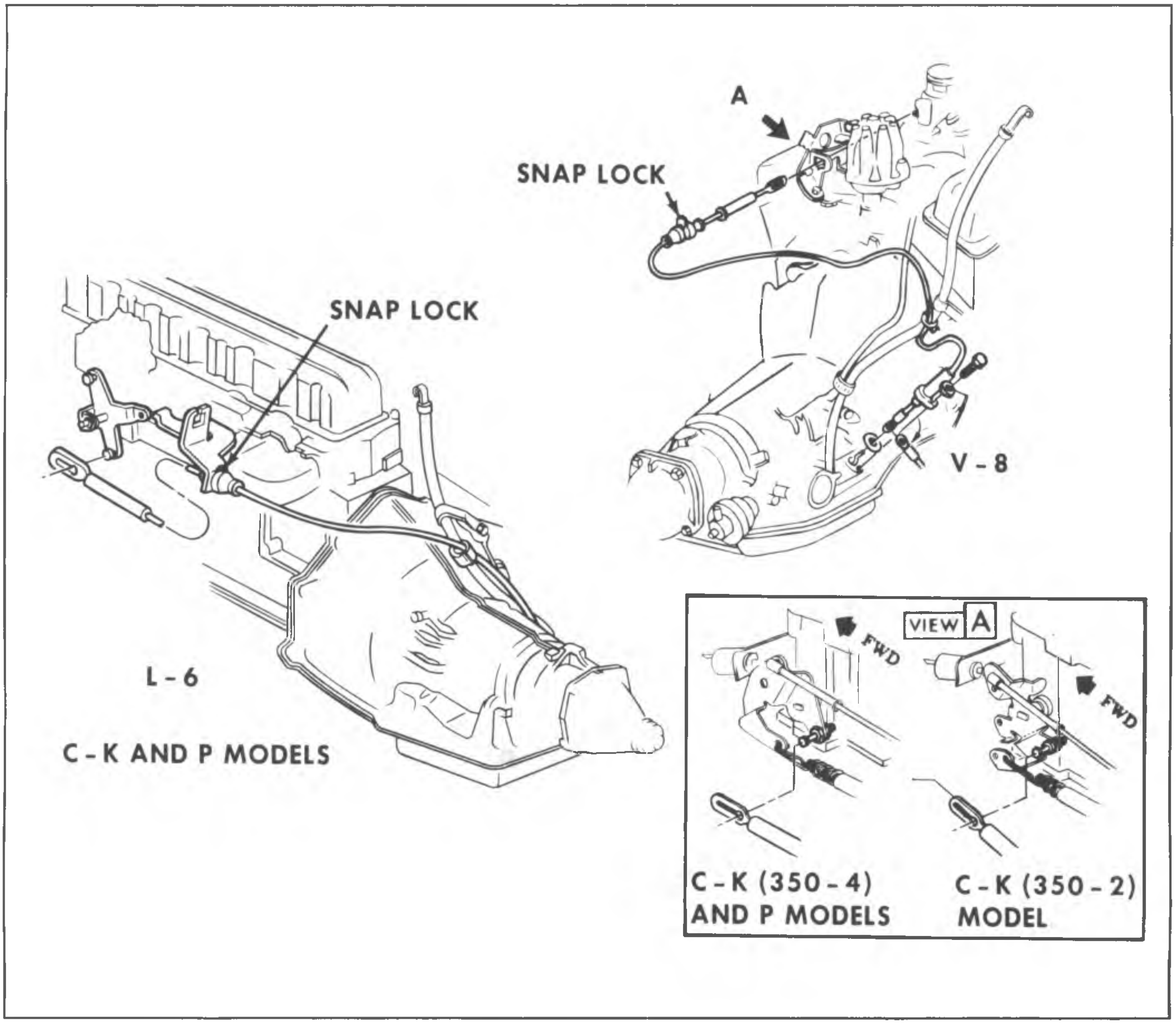


Fig. 4G–Detent Downshift Cable CK and P Series

DIAGNOSIS

OIL PRESSURE CHECK

While vehicle is stationary (service brake on), engine speed set to 1200 rpm, transmission oil pressure gauge attached, and vacuum modulator tube disconnected the transmission to line pressure tap should read 167 psi in drive, 166 psi in L1 or L2, and 254 psi in reverse for the 350 V-8.

While vehicle is stationary (service brake on), engine speed set to maintain 12 inches hg. absolute manifold pressure, transmission oil pressure gauge attached, and vacuum modulator tube connected, the transmission should read 85 psi in drive. 105 psi in L1 or L2, and 129 psi in reverse for the 350 V-8.

SPRING TENSION COMPARISON CHECK

Using tool J-2466, as shown in Figure 5G, compare the load of a known good modulator with the assembly in question.

a. Install the modulator that is known to be acceptable on either end of the tool.

b. Install the modulator in question on the opposite end of the tool.

c. Holding the modulators in a horizontal position, bring them together under pressure until either modulator sleeve just touches the tool. The indicator in the gage will show white if the modulator

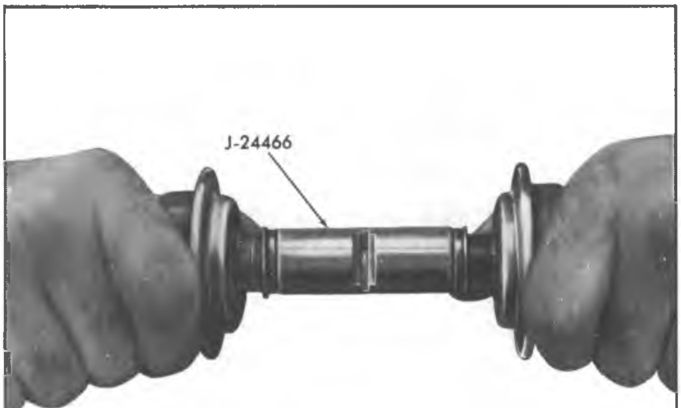


Fig. 5G--Spring Tension Comparison

acceptable. A non-conforming modulator will cause the indicator to shift, thus showing blue. If white does not appear, the modulator in question should be replaced.

TURBO HYDRA-MATIC 400/475 TRANSMISSION

INDEX

MAINTENANCE AND ADJUSTMENTS

TRANSMISSION FLUID

Draining and Refilling Transmission

The oil pan should be drained and filter replaced every 30,000 miles and fresh fluid added to obtain the proper level on indicator. For vehicles subjected to heavy city traffic during hot weather, or in commercial use, when the engine is regularly idled for prolonged periods or when vehicle is used for towing, oil pan should be drained and filter replaced every 15,000 miles.

Drain fluid immediately after operation before it has had an opportunity to cool.

WARNING: Transmission fluid temperature can exceed 350°F.

DETENT DOWNSHIFT SWITCH

1. Install switch as shown in Figure 1L.
2. After installing the switch, press the switch plunger as far forward as possible. This presets the switch for adjustment. The switch will then adjust itself with the first idle open throttle application of the accelerator pedal.

REAR SEAL

Removal

1. Remove propeller shaft.
2. Pry seal out with screw driver.

Installation-

All Models Except CL

1. Use a non-hardening sealer on outside of seal body; and using Tool J-21359, drive seal in place.

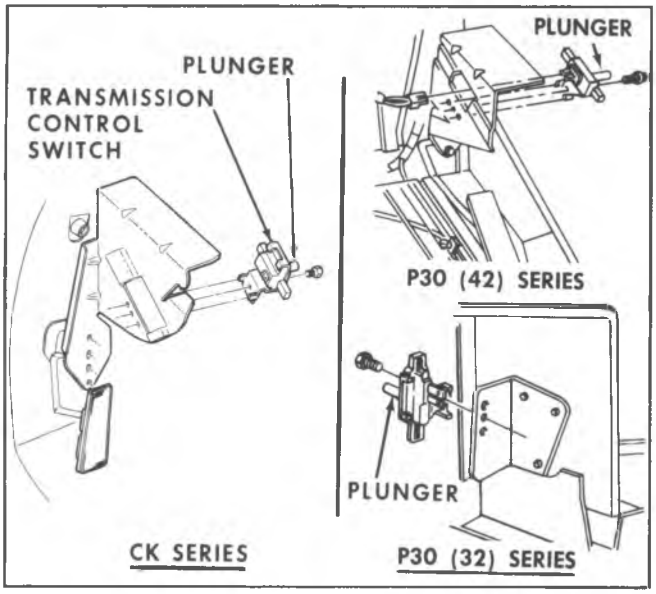


Fig. 1L–Detent Downshift Switch

2. Re-install propeller shaft.

Model CL

1. Use a non-hardening sealer on outside of seal body; and using Tool J-24057 drive seal in place.
2. Re-install propeller shaft.

TRANSMISSION REPLACEMENT

The procedure for transmission replacement remains the same with the addition of this note:

> NOTE: If necessary, the catalytic converter may have to be disconnected to provide adequate clearance for transmission removal. This procedure will include removal of the converter support bracket.

SECTION 8

FUEL TANK AND EXHAUST SYSTEM

CONTENTS OF THIS SECTION

FUEL TANK

Refer to the 1974 Light Duty Truck Service Manual for servicing of the fuel tank and evaporation control system with the following exception:

COMPONENT PART REPLACEMENT

P MODELS AND 1 TON CHASSIS (FRAME) MOUNTED TANKS

Refer to the 1974 Service Manual for 30 gallon fuel tank mounted on a P20 or P30 model. Refer to Figure 1 for a 50 gallon fuel tank mounted on a P30 model.

Removal and Installation

1. Drain tank.
2. Remove filler neck.

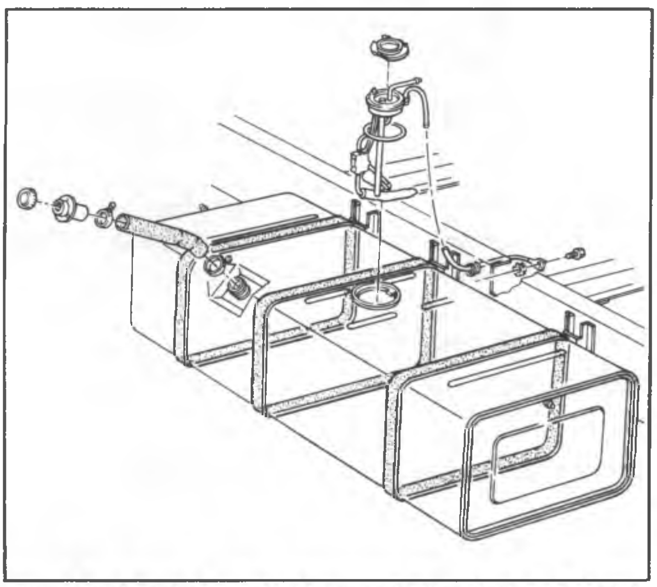


Fig. 1–Fuel Tank (50 Gal.), Meter and Filler Neck-P30 Model

3. Disconnect gauge unit fuel line and wiring. Ignition switch must be in OFF position.
4. Remove bolts attaching tank supports to frame.
5. Remove tank complete with mounting brackets and support straps.
6. Remove tank from brackets and support straps, if necessary.
7. To install, reverse the removal procedures. Replace all anti-squeak material.

FUEL FEED AND VAPOR PIPES

Fuel pipes are secured to the underbody with clamp and screw assemblies. Flexible hoses are located at fuel tank fuel, vapor and return lines and fuel pump.

The pipes should be inspected occasionally for leaks, kinks or dents. If evidence of dirt or foreign material is found in carburetor, fuel pump or pipes, pipe should be disconnected and blown out. Dirt or foreign material may be caused by a damaged or omitted fuel strainer in fuel tank.

Replacement

If replacement of a fuel feed pipe, vapor pipe or return pipe is required, use only double wrap and brazed steel tubing meeting GM Specification 123M or its equivalent. Under no condition use copper or aluminum tubing to replace steel tubing. Those materials do not have satisfactory fatique durability to withstand normal vehicle vibrations.

Repair

1. Do not use fuel hose for pipe repair within 4 inches of any part of the exhaust system.
2. In repairable areas, cut fuel hose 4 inches longer than the portion of pipe removed. Use only hose stated for

fuel usage by the manufacturer.

If more than a 6-inch length of pipe is removed, use a combination of steel pipe and hose so that hose lengths will not be longer than 10 inches.

3. The fuel hose should extend 2 inches on each pipe and be clamped at each end. Pipes must be properly secured to the frame to prevent chafing.

EXHAUST SYSTEM

GENERAL DESCRIPTION

For alignment purposes, the muffler outlet flange is notched and mates to a welded tab located on the outside diameter of the tailpipe. The exhaust pipes and muffler use locater tabs for alignment.

The C10 with light duty emissions (except 454 V8) and G10 vehicles have an exhaust system with a catalytic converter between the front exhaust pipe and the rear exhaust pipe.

The catalytic converter is an emission control device added to the exhaust system to reduce hydrocarbon and carbon monoxide pollutants from the exhaust gas stream. The converter contains beads which are coated with a catalytic material containing platinum and palladium.

The catalytic converter requires the use of unleaded fuel only.

Periodic maintenance of the exhaust system is not required; however, if the car is raised for other service, it is advisable to check the general condition of the catalytic converter, pipes and mufflers.

> **CAUTION:** *When jacking or lifting vehicle from frame side rails, be certain lift pads do not contact catalytic converter as damage to converter will result.*

COMPONENT PART REPLACEMENT

GENERAL

Exhaust System Pipes and Resonators Rearward of the Mufflers Must Be Replaced Whenever A New Muffler Is Installed.

> NOTE: When a muffler is replaced use sealing compound at the clamped joint to prevent leaks.

Truck exhaust systems vary according to series and model designation. Series 10-30 trucks use a split-joint design system in which the exhaust pipe-to-muffler are clamped together and muffler-to-tailpipe connections are welded together. All mufflers and tailpipes are welded assemblies (no clamps) in 1976.

> NOTE: All 10-20-30 series exhaust systems are aluminized steel except: (1) "C" Series exhaust pipes and (2) stainless steel exhaust pipes on vehicles equipped with underfloor catalytic converters. Always use correct replacement parts when servicing these systems.

When installing a new exhaust pipe or muffler and tailpipe, on any model, care should be taken to have the correct alignment and relationship of the components to each other. Particular care should be given to the installation of the exhaust pipe and crossover pipe assembly on V-8 engine single exhaust systems. Incorrectly assembled parts of the exhaust system are frequently the cause of annoying noises and rattles due to improper clearances or obstructions to the normal flow of gases. Leave all clamp bolts and muffler bolts loose until all parts are properly aligned and then tighten, working from front to rear.

Exhaust system hangers, hanger brackets, and clamps which are damaged should be replaced to maintain proper exhaust system alignment.

> NOTE: When reinstalling exhaust pipe to manifold, always use new packings and nuts. Be sure to clean manifold stud threads with a wire brush when installing the new nuts.

CONVERTER HEAT SHIELD

C 10 Model

Refer to Figure 2 for converter heat shield.

CATALYTIC CONVERTER (FIGS. 3 and 4)

C10 and G10 Model

Removal

1. Raise vehicle on hoist.

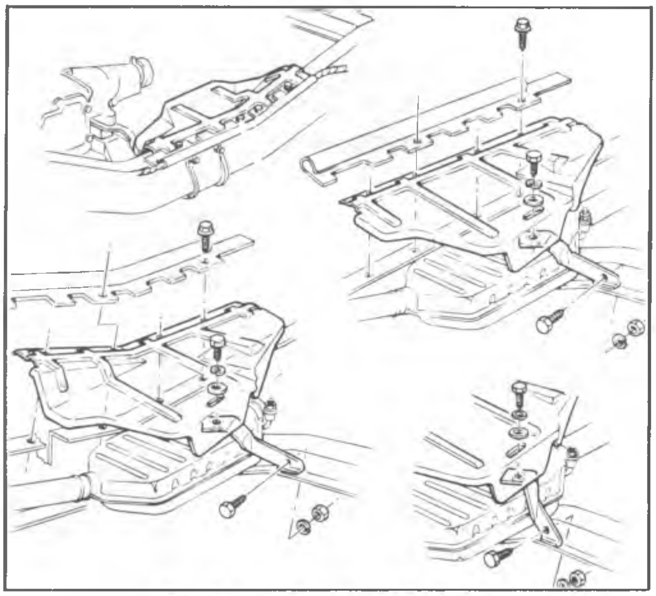


Fig. 2–Heat Shield - C10 Model

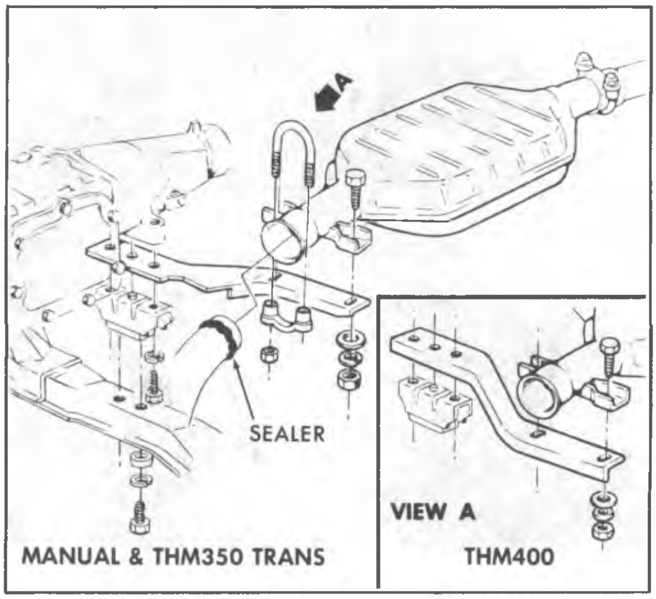


Fig. 3–Catalytic Converter - C10 Model

2. Remove clamps at front and rear of converter.
3. Cut converter pipes at front and rear of converter and remove converter.
4. On C10 models, remove support attaching converter-to-transmission.
5. Remove converter pipe-to-front-exhaust pipe and converter pipe-to-rear exhaust pipe.

Installation

1. With sealer on exhaust pipes, install pipes into converter.
2. On C10 model, loosely connect support attaching converter-to-transmission.
3. Install new "U" bolts and clamps at front and rear of converter.
4. Check all clearance and tighten clamps and upport.
5. Lower vehicle and remove from hoist.

Catalyst Removal

If necessary, the catalyst in the converter can be replaced on the truck with Tool No. J-25077.

1. Install aspirator J-25077-2 (Fig. 5).
2. Connect air supply line to aspirator to create a vacuum in the converter to hold beads in place when fill plug is removed.
3. Remove converter fill plug with 3/4" hex wrench or Tool J-25077-3 and 4 (Fig. 6).

> **WARNING:** To prevent serious burns, avoid contact with hot catalyst.

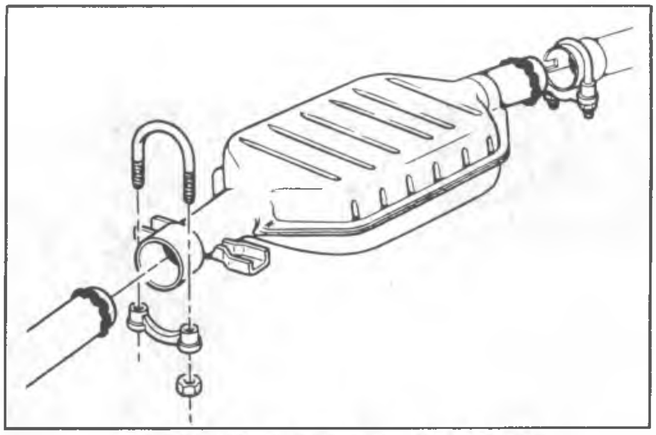


Fig. 4–Catalytic Converter - G10 Model

4. Clamp on vibrator J-25077-1 (Fig. 7).
5. Install empty catalyst container to converter (Fig. 8).
6. Disconnect air supply to aspirator and connect air supply to vibrator. Catalyst will now drain from the converter into the empty container.
7. When all the catalyst has been removed from the converter, disconnect air supply to vibrator and remove container from the converter.
8. Discard used catalyst.

Catalyst Installation

1. Fill container with approved replacement catalyst.
2. Install fill tube extension to the fixture J-25077-1 (Fig. 9).
3. Connect air supply to aspirator and vibrator.
4. Attach catalyst container to the fixture.
5. After the catalyst stops flowing, disconnect air supply to the vibrator.

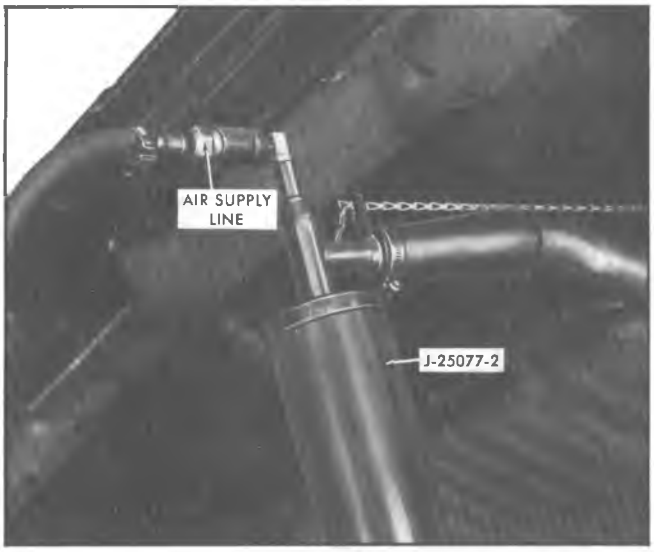


Fig. 5–Installing Aspirator

Fig. 6–Removing Fill Plug

6. Remove vibrator and check that catalyst has filled converter flush with fill plug hole. Add catalyst if required.
7. Apply an anti-seize compound to the fill plug; install and tighten to 50 pound feet.

Bottom Cover

If, for any reason, the bottom cover of the converter is torn or severely damaged, it can be replaced with a repair kit.

Bottom Cover Replacement

1. Remove bottom cover by cutting close to the bottom outside edge, Figure 10 and 11. Do not remove the fill plug. The depth of the cut must be very shallow to prevent damage to the inner shell of the converter.
2. Remove insulation (Fig. 12).
3. Inspect inner shell of the converter for damage. If there is damage in the inner shell, the converter assembly must be replaced (Fig. 13).
4. Place new insulation in the replacement cover. Apply sealing compound, all around the cover after the insulation is in position. Apply extra sealer at the front and rear opening for the pipes (Fig. 14).
5. Install replacement cover on converter (Fig. 14).
6. Install cover retaining channels on both sides of the converter (Fig. 15).
7. Attach 2 clamps over retaining channels at each end of the converter (Fig. 16).

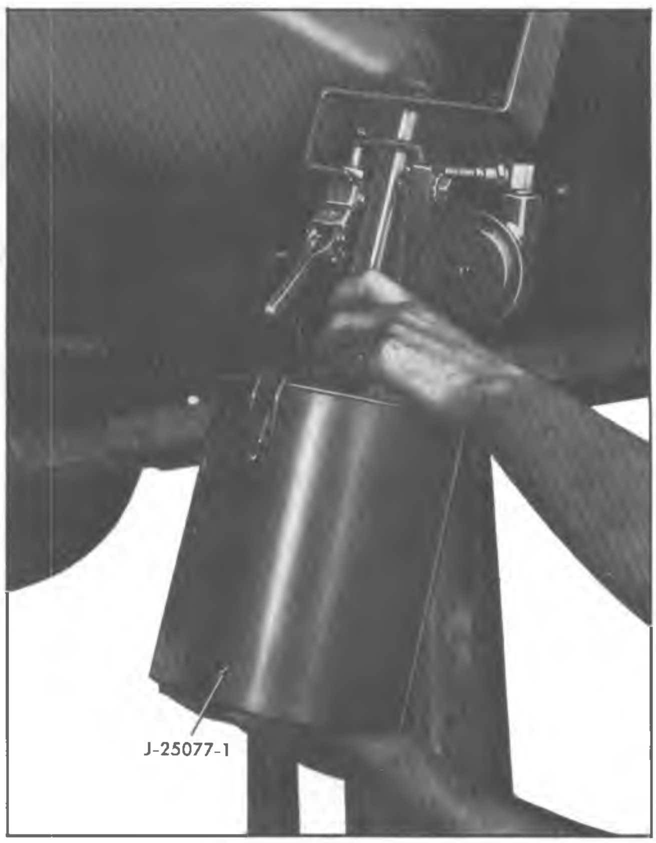


Fig. 7—Installing Vibrator

Fig. 8–Container Installed on Vibrator

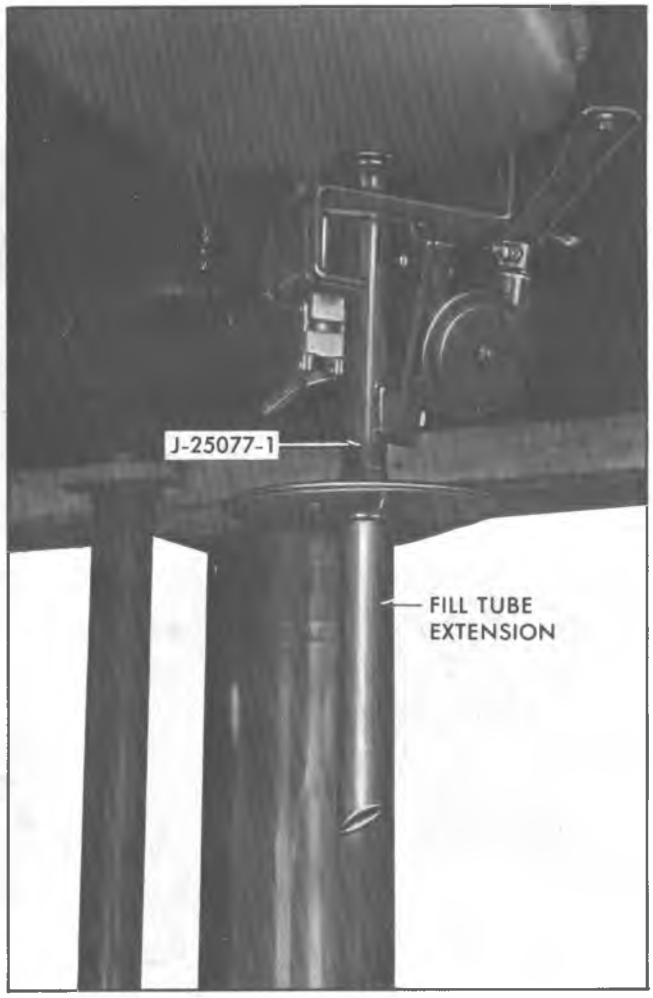


Fig. 9–Fill Tube Extension

Fig. 10–Removing Bottom Cover

Fig. 11–Removing Bottom Cover

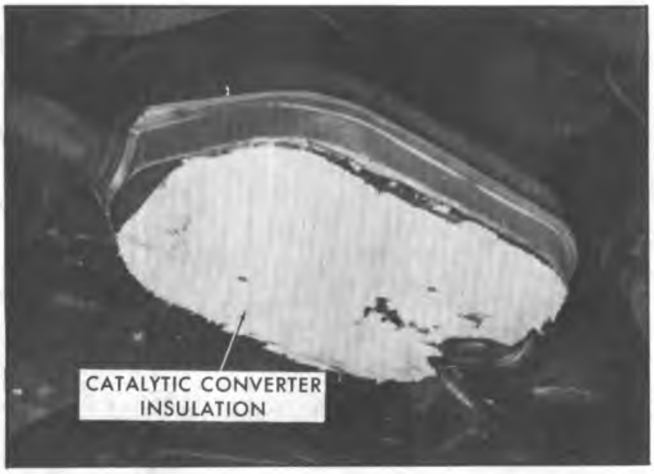


Fig. 12–Catalytic Converter Insulation

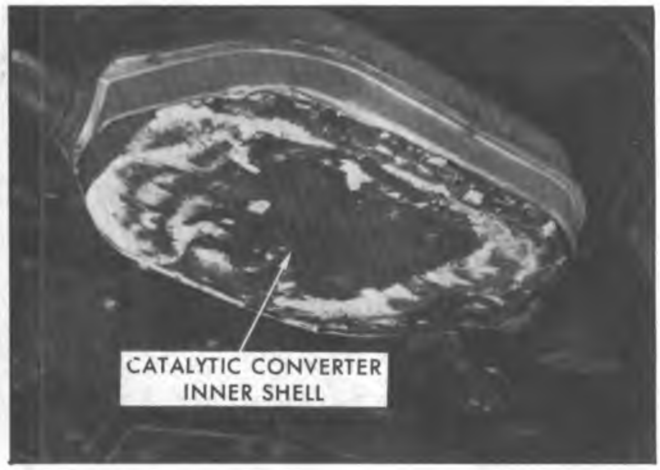


Fig. 13–Catalytic Converter Inner Shell

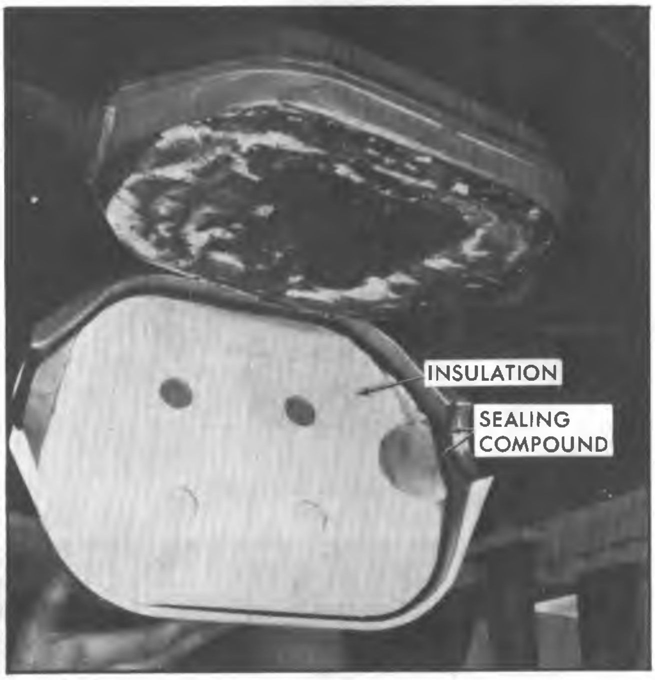


Fig. 14–Installing Bottom Cover Replacement

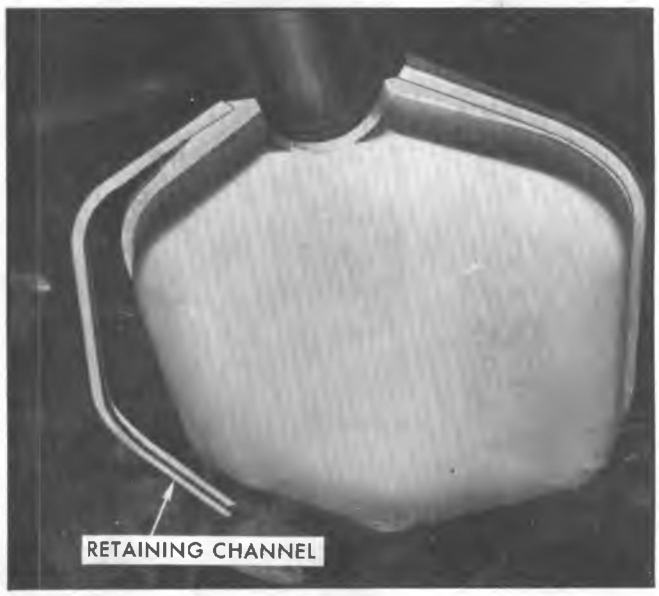


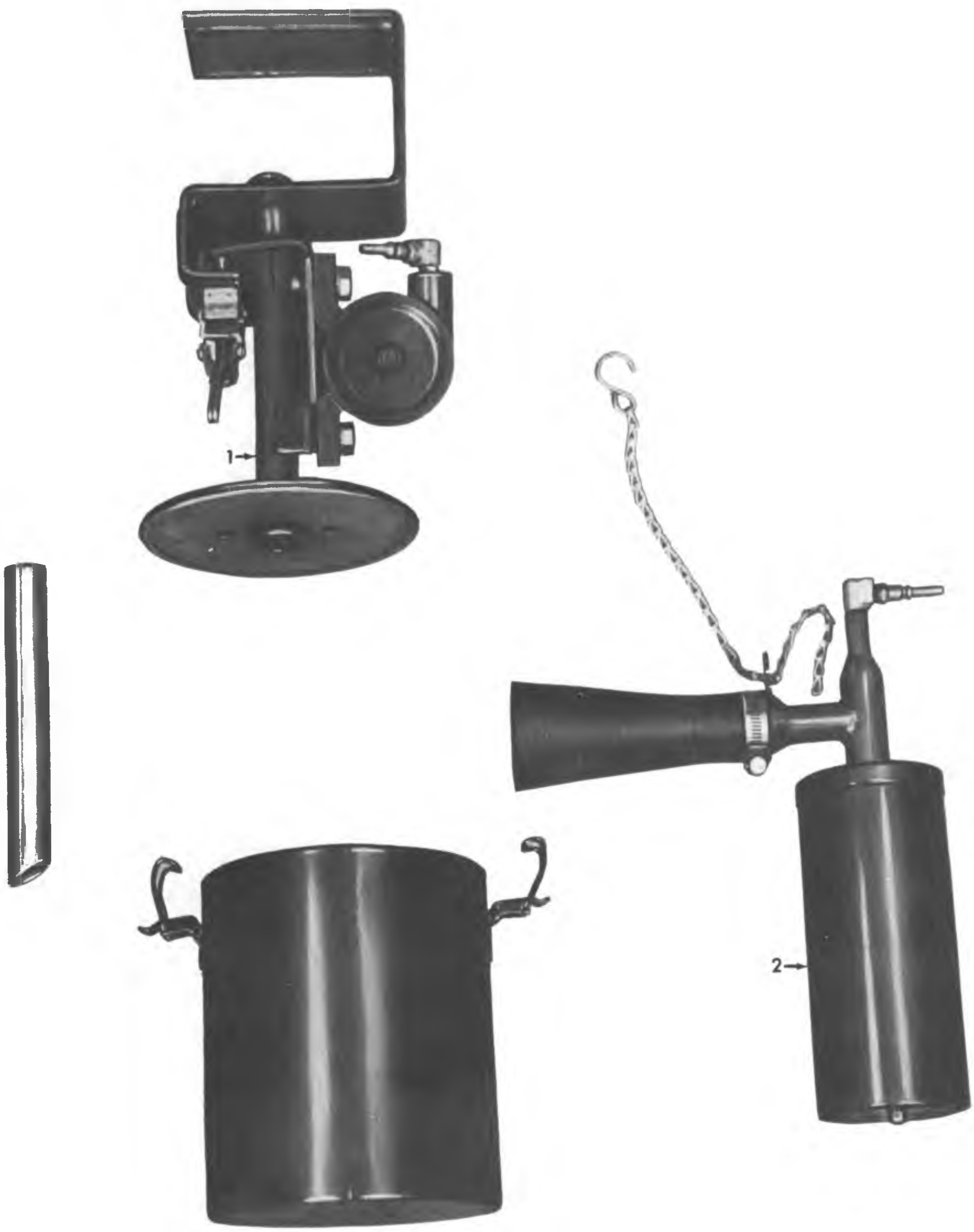
Fig. 15–Installing Bottom Cover Retaining Channels

Fig. 16–Installing Bottom Cover Clamps

DIAGNOSIS
EXHAUST SYSTEM

CONDITION	POSSIBLE CAUSE	CORRECTION
Leaking Exhaust Gases	Leaks at pipe joints.	Tighten U-bolt nuts at leaking joints to 30 foot-pounds.
	Damaged or improperly installed seals or packing.	Replace seals or packing as necessary.
	Loose exhaust pipe heat tube extension connections.	Replace seals or packing as required. Tighten stud nuts or bolts to specifications.
	Burned or rusted out exhaust pipe heat tube extensions.	Replace heat tube extensions as required.
Exhaust Noises	Leaks at manifold or pipe connections.	Tighten clamps at leaking connections to specified torque. Replace gasket or packing as required.
	Burned or blown out muffler.	Replace muffler assembly.
	Burned or rusted out exhaust pipe.	Replace exhaust pipe.
	Exhaust pipe leaking at manifold flange.	Tighten attaching bolts nuts to 17 foot-pounds.
	Exhaust manifold cracked or broken.	Replace manifold.
	Leak between manifold and cylinder head.	Tighten manifold to cylinder head stud nuts or bolts to specifications.
Loss of engine power and/or internal rattles in muffler.	Dislodged turning tubes and or baffles in muffler.	Replace muffler.
Loss of engine power.	Imploding (inner wall collapse) of exhaust pipe (C Truck)	Replace exhaust pipe.

SPECIAL TOOLS



1. J-25077-1 Vibrator — Include Catalyst Container and Fill Tube Extension
2. J-25077-2 Aspirator

Fig. 1ST–Special Tools

SECTION 9

STEERING

The following caution applies to one or more steps in the assembly procedure of components in this portion of the manual as indicated at appropriate locations by the terminology "See Caution on Page 1 of this Section".

CAUTION: *THIS FASTENER IS AN IMPORTANT ATTACHING PART IN THAT IT COULD AFFECT THE PERFORMANCE OF VITAL COMPONENTS AND SYSTEMS, AND/OR COULD RESULT IN MAJOR REPAIR EXPENSE. IT MUST BE REPLACED WITH ONE OF THE SAME PART NUMBER OR WITH AN EQUIVALENT PART IF REPLACEMENT BECOMES NECESSARY. DO NOT USE A REPLACEMENT PART OF LESSER QUALITY OR SUBSTITUTE DESIGN. TORQUE VALUES MUST BE USED AS SPECIFIED DURING REASSEMBLY TO ASSURE PROPER RETENTION OF THIS PART.*

INDEX

GENERAL DESCRIPTION

All 1976 truck models have basically the same steering systems as the 1974 models. All service procedures outlined in the 1974 Light Duty Truck Service Manual apply as well to the 1976 truck steering systems except the following procedures.

MAINTENANCE AND ADJUSTMENTS

POWER STEERING PUMP BELT ADJUSTMENT

Power steering belt adjustment for 1976 truck models is identical to the procedure outlined in the 1974 Light Duty Truck Service Manual, Section 9, Page 9-27 with the exception of a 1/2" spuare hole in the support bracket on some engines to aid in belt adjustment as shown in Fig. 8. Use a 1/2" drive ratchet or breaker bar handle, inserted in the hole to assist on obtaining proper belt adjustment.

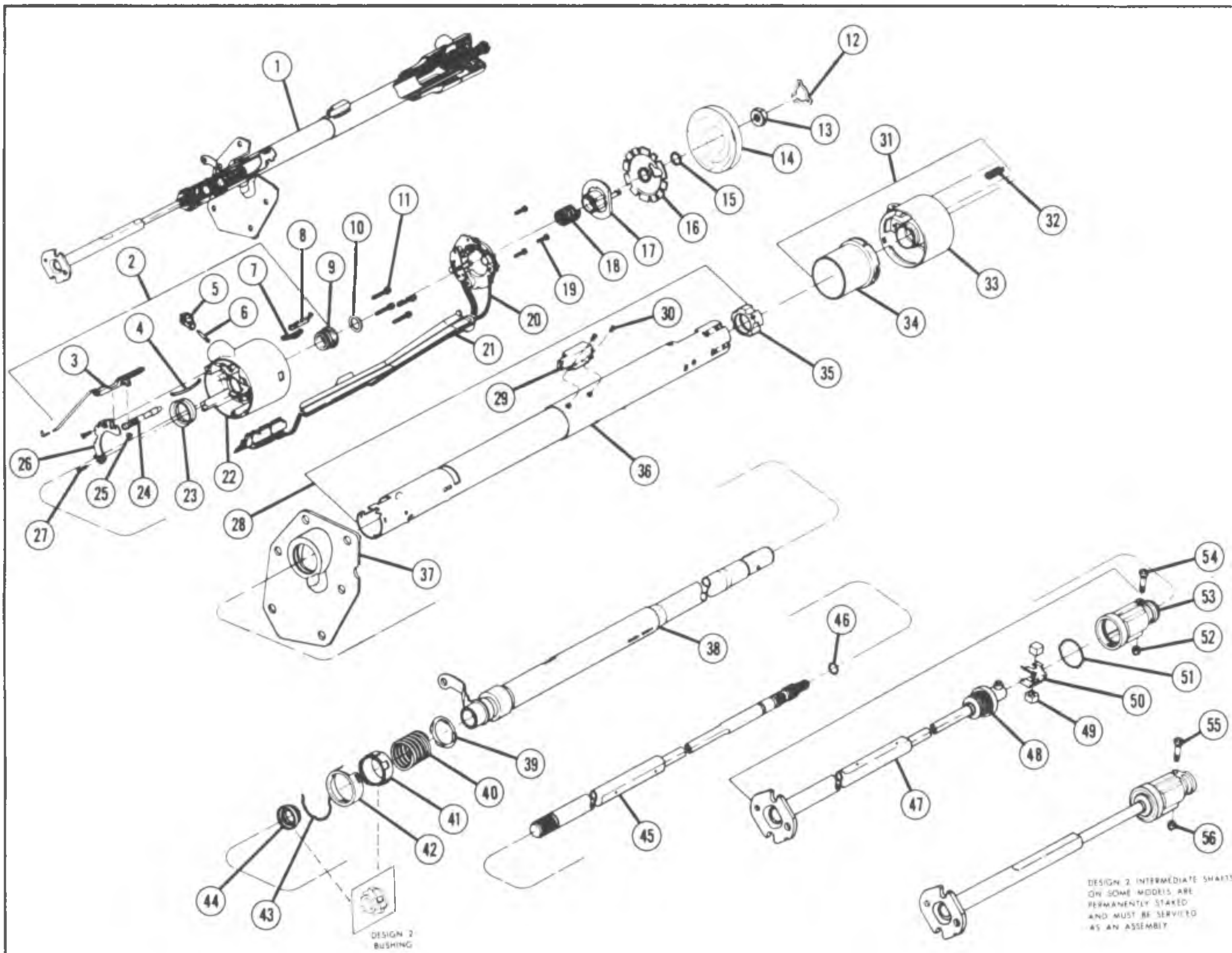
POWER STEERING GEAR

Adjustment of the power steering gear in the vehicle is discouraged because of the difficulty involved in adjusting the worm thrust bearing preload and the confusing effects of the hydraulic fluid in the gear. The steering gear adjustment is made only as a correction and not as a required periodic adjustment.

The effect of improperly adjusted worm thrust bearings or an improperly adjusted over-center preload could cause a handling stability complaint.

To properly adjust the power steering gear, the assembly MUST be removed from the vehicle and adjustments performed as outlined in the 1974 Overhaul Manual, Section 9.

For removal of the power steering gear assembly follow the procedure as outlined under "Power Steering Gear", in the 1974 Light Duty Truck Service Manual, Section 9.



Key No. Part Name

1 – COLUMN ASM
2 – HOUSING ASM
3 – RACK ASM
4 – SPRING
5 – SECTOR
6 – SHAFT
7 – CLIP
8 – SWITCH
9 – BEARING
10 – WASHER
11 – SCREW (4)
12 – RETAINING RING
13 – NUT
14 – COVER ASM (SHIPPED SEPARATELY)
15 – RING
16 – LOCK
17 – CAM ASM
18 – SPRING
SCREW (3)

Key No. Part Name

20 – SWITCH ASM
21 – PROTECTOR WIRE
22 – HOUSING
23 – CUP
24 – BOLT ASM
25 – WASHER
26 – GATE
27 – SCREW (2)
28 – JACKET ASM
29 – SWITCH ASM, IGNITION
30 – SCREW (2)
31 – BOWL ASM
32 – SPRING
33 – BOWL
34 – SHROUD
35 – BEARING
36 – JACKET ASM
37 – SEAL-DASH
38 – TUBE ASM

Key No. Part Name

39 – WASHER
40 – SPRING
41 – ADAPTER
42 – RETAINER
43 – BEARING
44 – RING
45 – SHAFT ASM
46 – CLIP
47 – SHAFT ASM
48 – COUPLING ASM
49 – BOLT
50 – NUT
51 – RING
52 – SPRING
53 – BEARING (2)
54 – ABRASION SHIELD
55 – BOLT
56 – NUT

Fig. 1--Typical Standard Column

SERVICE OPERATIONS

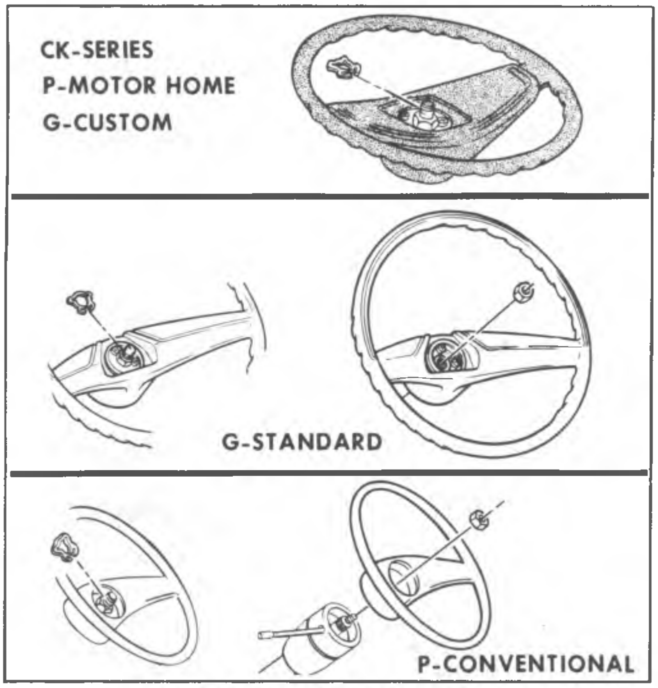


Fig. 2--Steering Wheel Snap Ring

STEERING WHEEL (Fig. 2)

Removal

The service procedures for the removal and installation of the steering wheel are identical to the procedures outlined in the 1974 Light Duty Truck Service Manual, Section 9 with the exception of the addition of a steering wheel snap ring as shown in Figure 2. Refer to Page 9-29 of the 1974 Light Duty Truck Service Manual for proper removal procedure.

When removing the steering wheel, remove the snap ring as Step 3 in the removal procedure.

Installation

When installing the steering wheel, replace the snap ring after tightening the steering wheel nut to proper torque specifications.

DIRECTIONAL SIGNAL SWITCH

Standard Column

The service procedure for the removal and installation of the directional signal switch is identical to the 1974 vehicle with the exception of the lock plate cover as shown in Figure 3.

Removal procedure, step number 3, for standard steering columns should read:

3. Position screwdriver blade into cover slot (fig. 3). Pry up and out to free cover from lock plate.

Installation Procedure, step 7 for standard column should read:

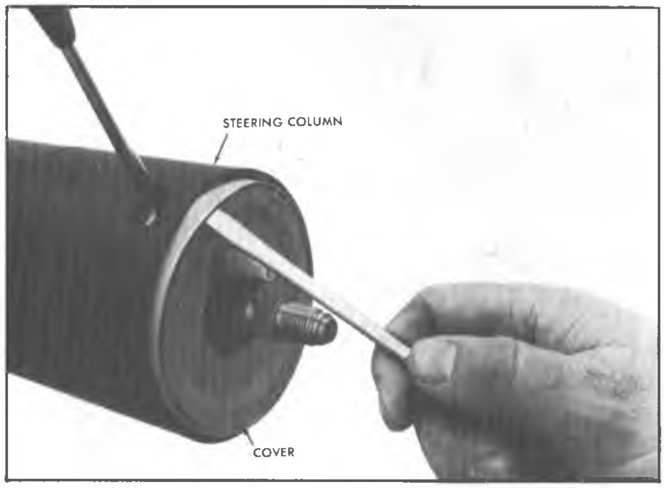


Fig. 3--Removing Lock Plate Cover

7. Place cover on the lockplate and snap into position.

STEERING LINKAGE

All service procedure for the 1976 steering linkage are identical with those outlined in the 1974 Light Duty Truck Service Manual, Section 9.

Figure 4 shows the latest linkage used on the G-Series truck and the P-Series, Motor Home models.

IDLER ARM

Use of the proper diagnosis and checking procedure is essential to prevent needless replacement of good idler arms.

The proper checking procedure is as follows:

1. Raise the vehicle in such a manner as to allow the front wheels to rotate freely and the steering mechanism freedom to turn. Position the wheels in a straight ahead position.
2. Using a push pull type spring scale located as near the relay rod end of the idler arm as possible, exert a 25 lb. force upward and then downward while noticing the total distance the end of the arm moves. This distance should not exceed 1/8 inch (Figure 3A). It is necessary to ensure that the correct load is applied to the arm since it will move more when higher loads are applied. It is also necessary that a scale or ruler be rested against the frame and used to determine the amount of movement since observers tend to over-estimate the actual movement when a scale is not used. The idler arm should always be replaced if it fails this test.

   NOTE: Jerking the right front wheel and tire assembly back and forth thus causing an up and down movement in the idler arm is not an acceptable method of checking since there is no control on the amount of force being applied.

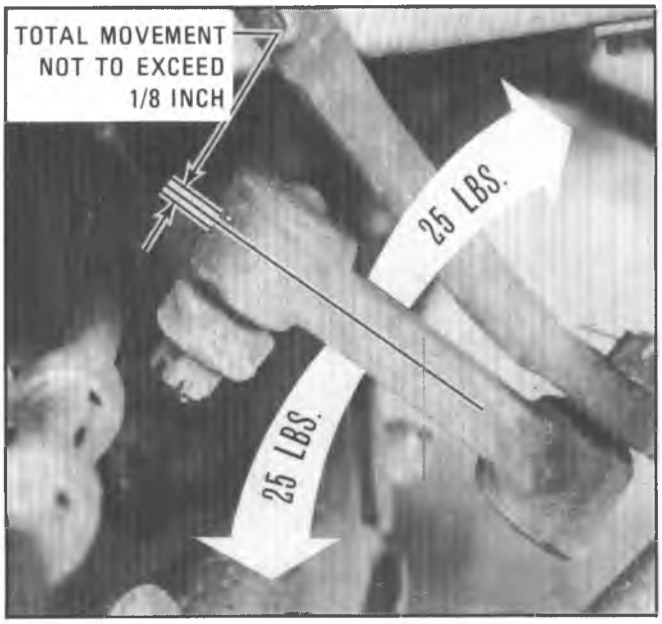


Fig 3A--Checking Idler Movement

Caution should be used in assuming shimmy complaints are caused by loose idler arms. Before suspecting suspension or steering components, technicians should eliminate shimmy excitation factors, such as dynamic imbalance, run-out or force variation of wheel and tire assemblies and road surface irregularities.

TIE RODS

Service procedures for the 1976 tie rod assemblies are identical to those outlined in the 1974 Light Duty Truck Service Manual, Section 9.

Figure 5 shows the updated tie rod clamp relationships for 1976 models.

POWER STEERING PUMP (Figs. 6-12)

Removal

1. Disconnect hoses at pump. When hoses are disconnected, secure ends in raised position to prevent drainage of oil. Cap or tape the ends of the hoses to prevent entrance of dirt. On models with remote reservoir, disconnect reservoir hose at pump and secure in raised position. Cap hose pump fittings.
2. Install two caps at hose fittings to prevent drainage of oil from pump.
3. Loosen bracket-to-pump mounting nuts.
4. Remove pump belt.
5. Remove pump from attaching parts and remove pump from vehicle.

Installation

1. Position pump assembly on vehicle (Fig. 6) and install attaching parts loosely.
2. Connect and tighten hose fittings.
3. Fill reservoir. Bleed pump by turning pulley backward (counter-clockwise as viewed from the front) until air bubbles cease to appear.
4. Install pump belt over pulley.
5. Tension belt as outlined under "Pump Belt Tension Adjustment".
6. Bleed as outlined under "Bleeding Power Steering System".

POWER STEERING HOSES

When servicing the power steering hoses be sure to align the hoses in their correct position as shown in Figs. 13-28.

It is important that the power steering hoses be installed correctly. Hoses installed out of position may be subjected to chafing or other abuses during sharp turns. Do not twist hoses unnecessarily during installation.

> **CAUTION:** *Do not start engine with any power steering hose disconnected.*

BLEEDING POWER STEERING SYSTEMS

When a power steering pump or power gear has been installed, the air that has entered the system must be bled out before the vehicle is again operated. If air is allowed to remain in the power steering fluid system, noisy and unsatisfactory operation of the system will result. Bleed air from the hydraulic system as follows:

> NOTE: When power steering fluid is added to power steering system, only clean new power steering fluid should be used (GM #1050017).

1. Fill oil reservoir to proper level and let oil remain undisturbed for at least two minutes.
2. Start engine and run momentarily.
3. Add oil, if necessary.
4. Repeat above procedure until oil level remains constant after running engine.
5. Raise front end of vehicle so that wheels are off the ground.
6. Turn the wheels (off ground) right and left, lightly contacting the wheel stops.
7. Add oil if necessary.
8. Lower the vehicle and turn wheels right and left on the ground.
9. Check oil level and refill as required.
10. If oil is extremely foamy, allow vehicle to stand a few minutes with engine off and repeat above procedure.
    a. Check belt tightness and check for a bent pulley. (Pulley should not wobble with engine running.)
    b. Check to make sure hoses are not touching any other parts of the vehicle, particularly sheet metal.
    c. Check oil level, filling to proper level if necessary, following operations 1 through 10. This step and Step "d" are extremely important as low oil level and/or air in the oil are the most frequent causes of objectionable pump noises.

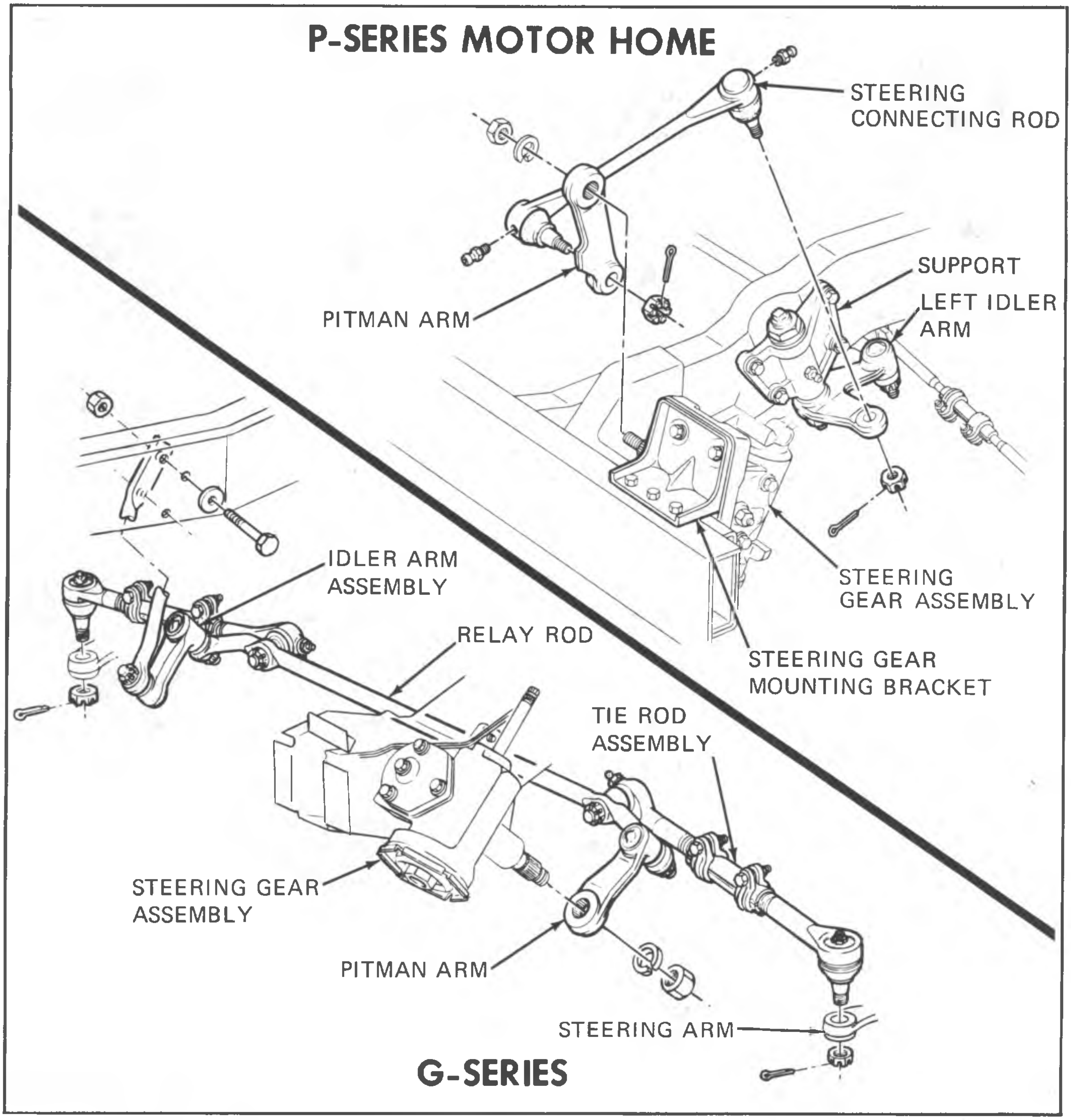


Fig. 4--Steering Linkage

d. Check the presence of air in the oil. Air will show up as milky appearing oil. If air is present, attempt to bleed system as described in operations 1 through 10.

11. The presence of trapped air in the system will cause the fluid level in the pump to rise when the engine is turned off. Continue to bleed system until this condition no longer occurs.

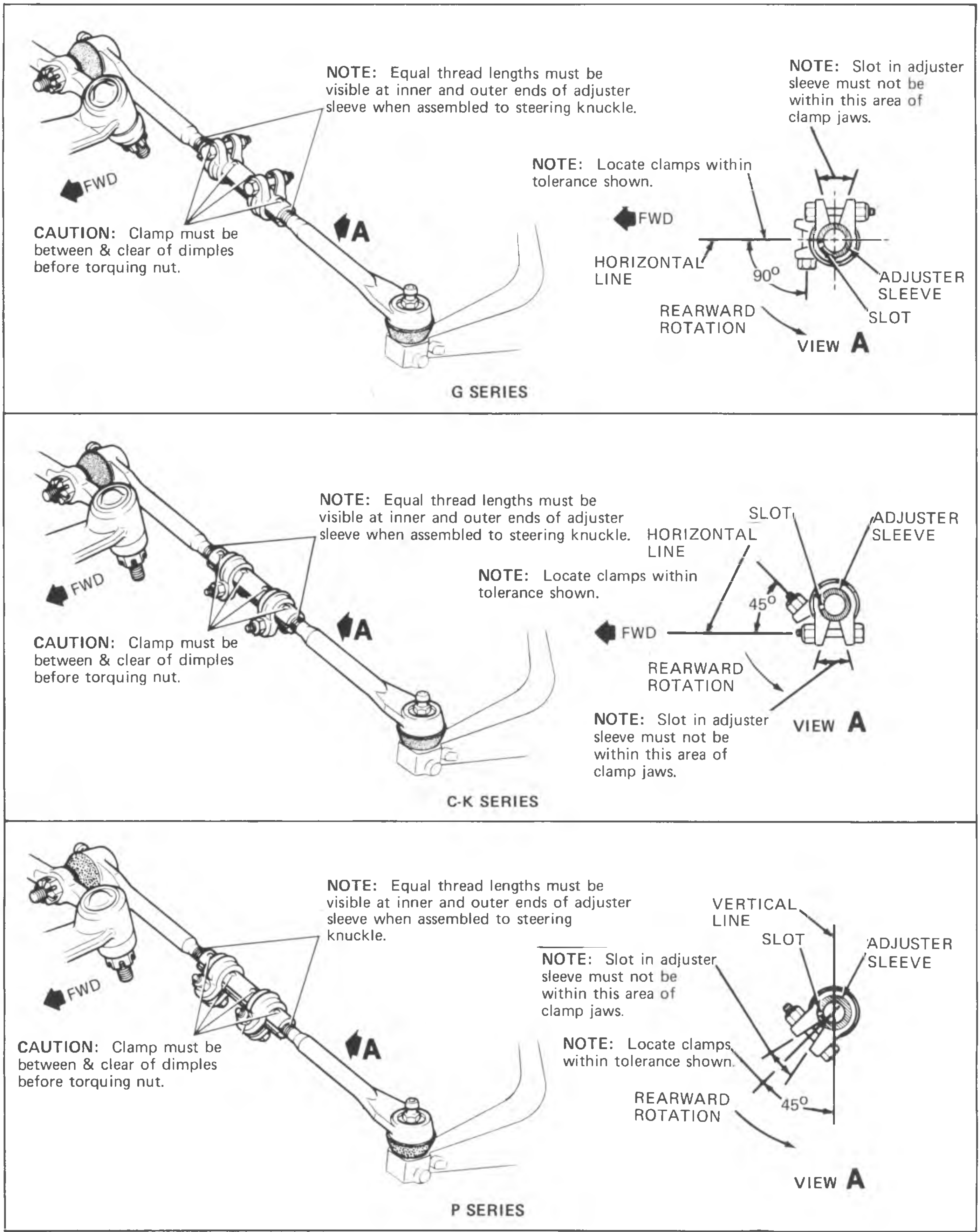


Fig. 5--Tie Rod Clamps

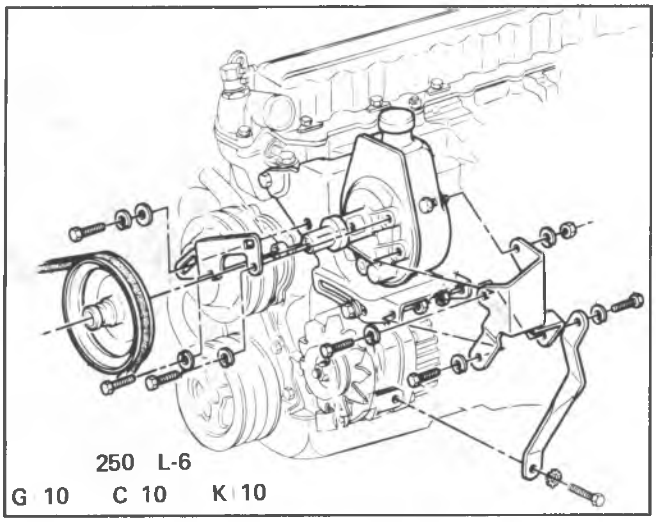


Fig. 6--Power Steering Pump

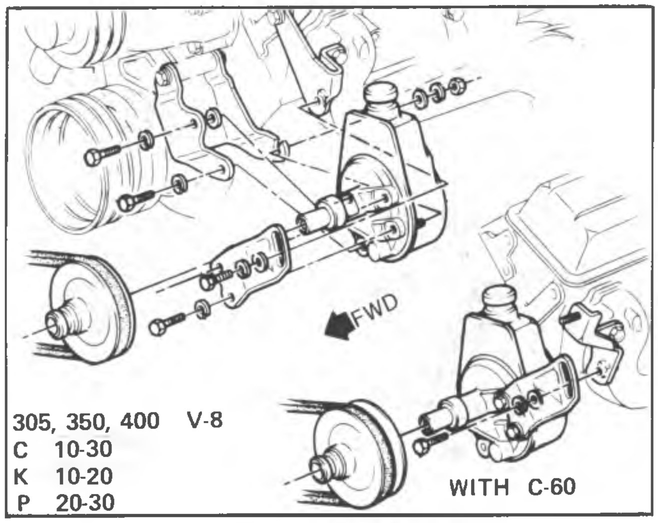


Fig. 9--Power Steering Pump

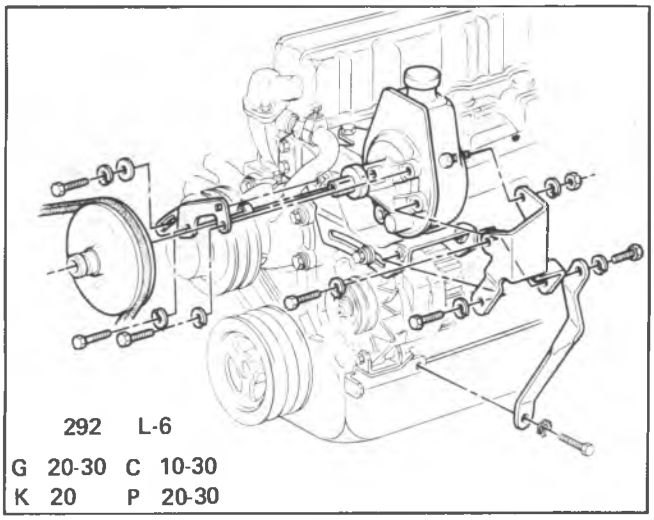


Fig. 7--Power Steering Pump

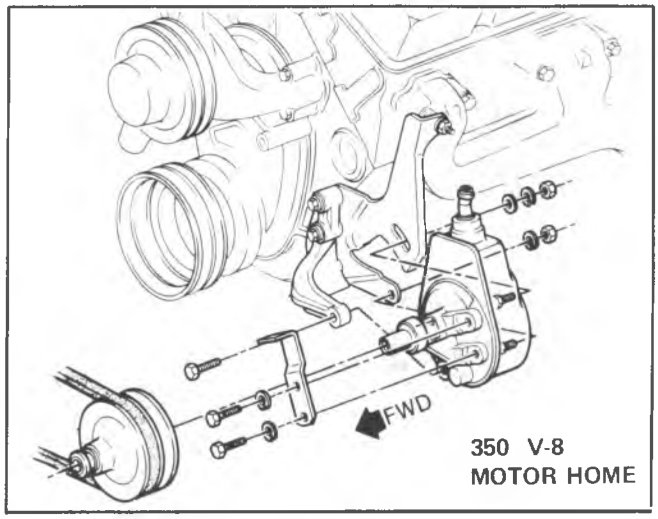


Fig. 10--Power Steering Pump

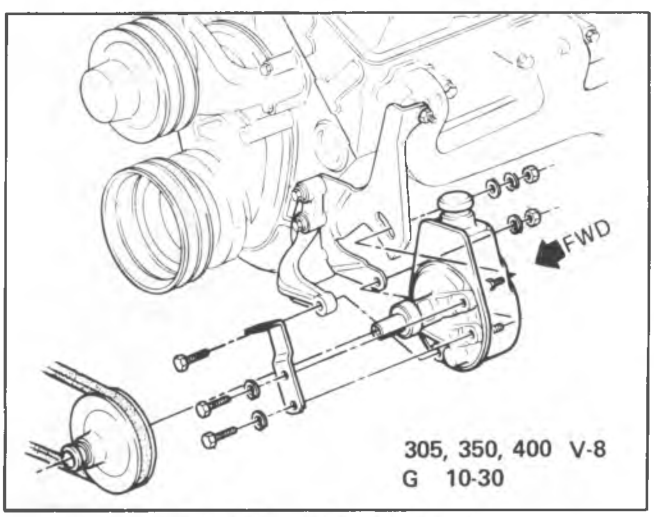


Fig. 8--Power Steering Pump

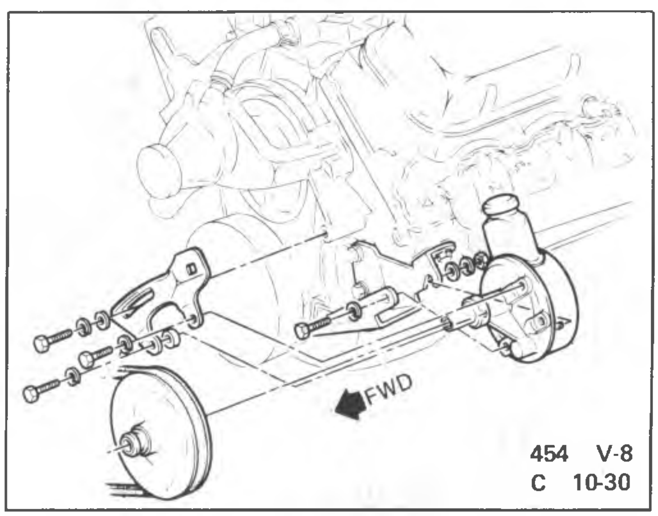


Fig. 11--Power Steering Pump

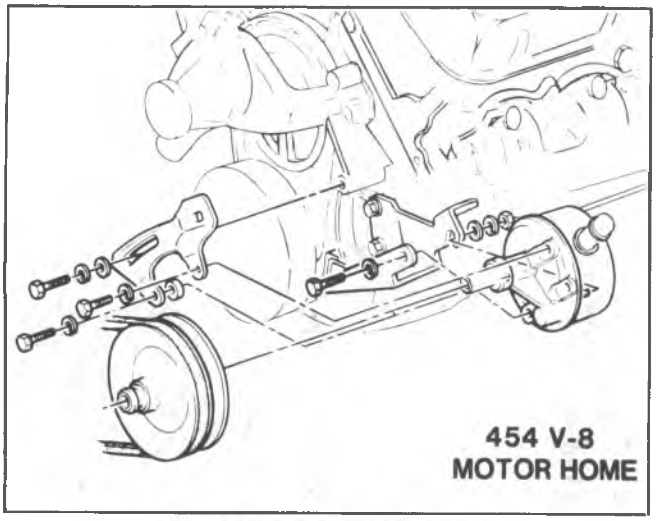


Fig. 12--Power Steering Pump

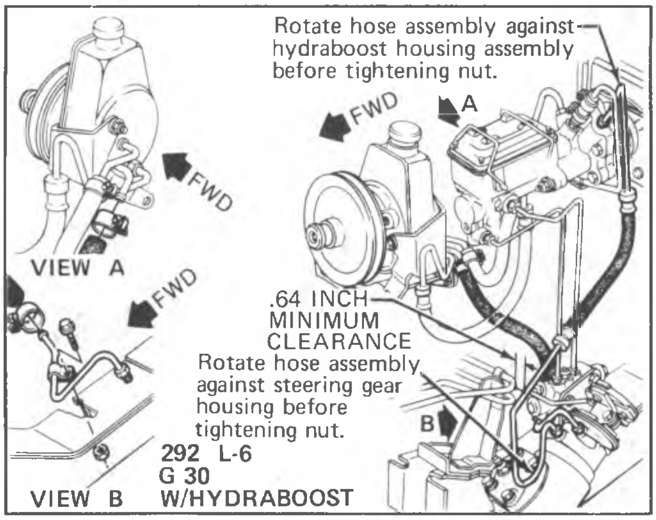


Fig. 15--Power Steering Hose Routing

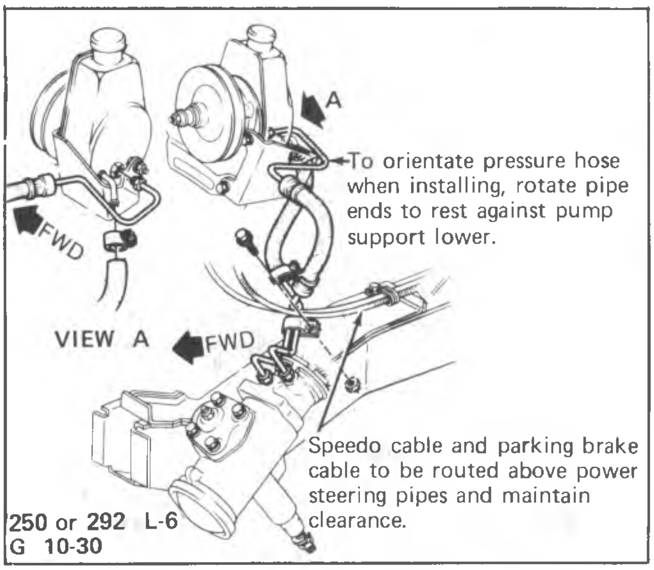


Fig. 13--Power Steering Hose Routing

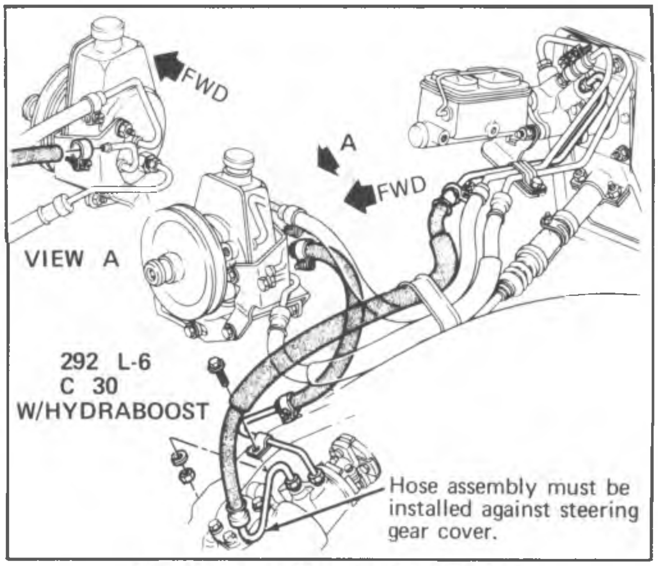


Fig. 16--Power Steering Hose Routing

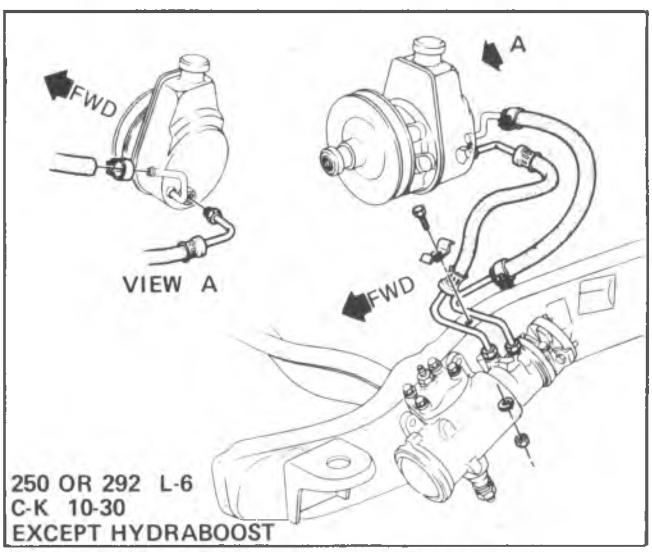


Fig. 14--Power Steering Hose Routing

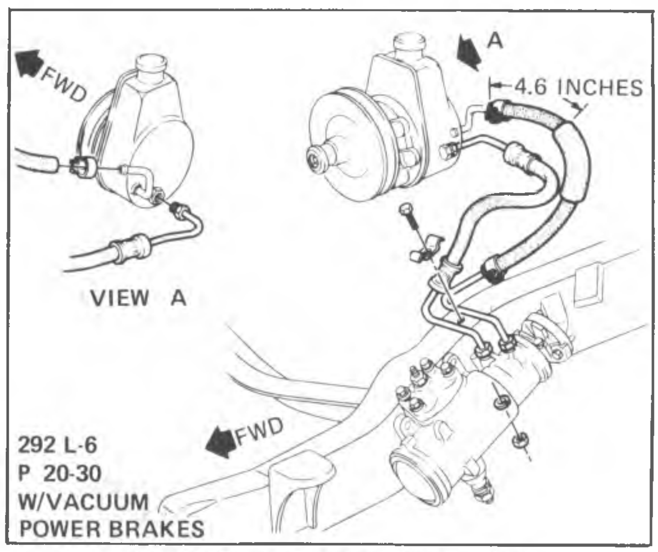


Fig. 17--Power Steering Hose Routing

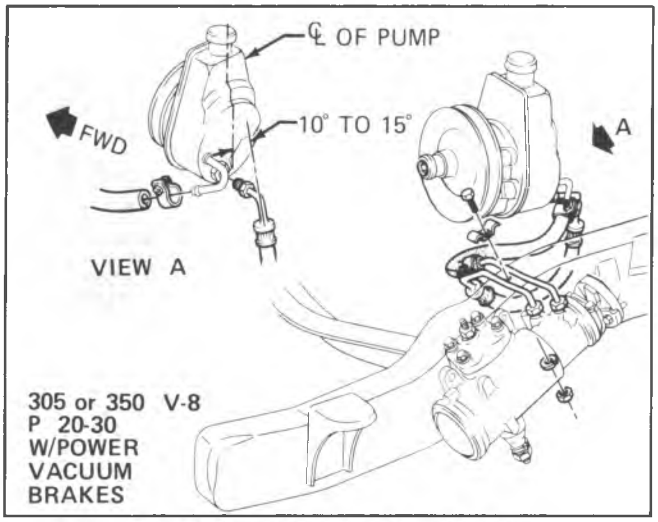


Fig. 18--Power Steering Hose Routing

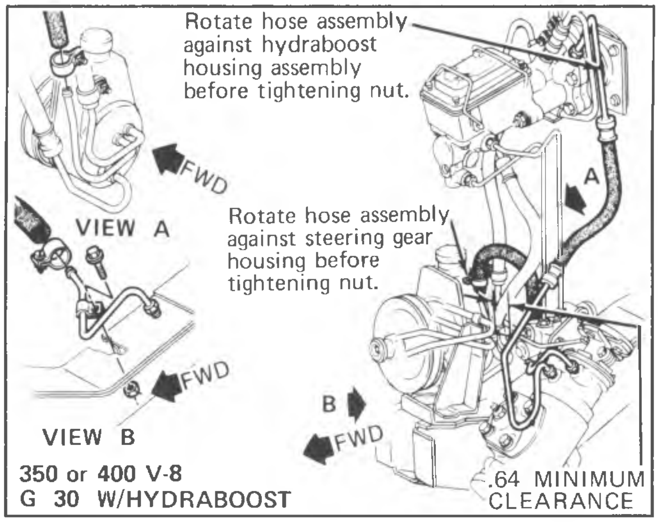


Fig. 21--Power Steering Hose Routing

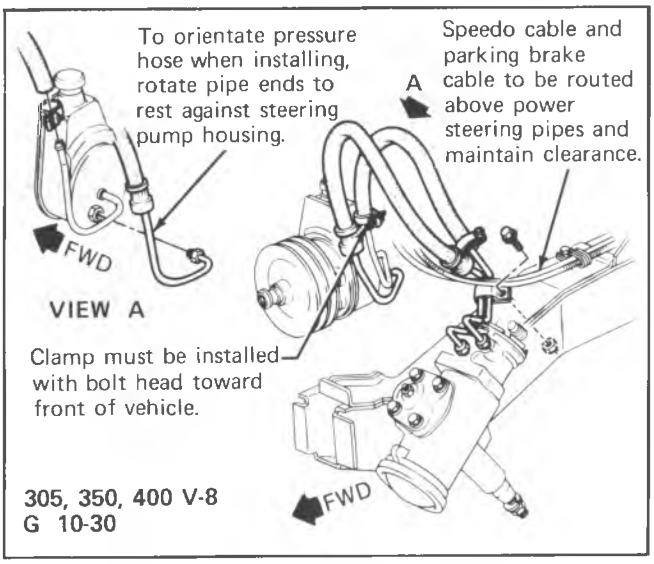


Fig. 19--Power Steering Hose Routing

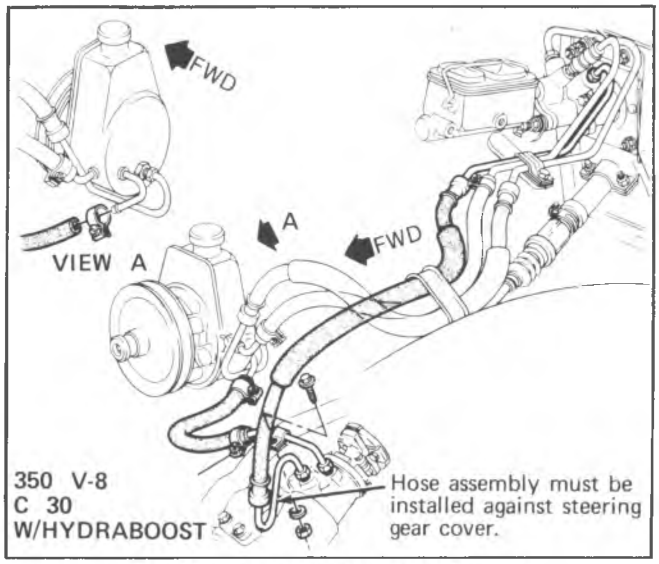


Fig. 22--Power Steering Hose Routing

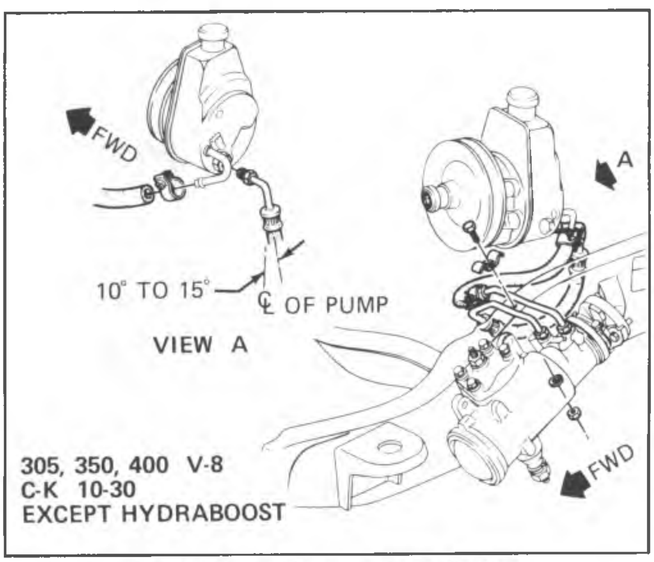


Fig. 20--Power Steering Hose Routing

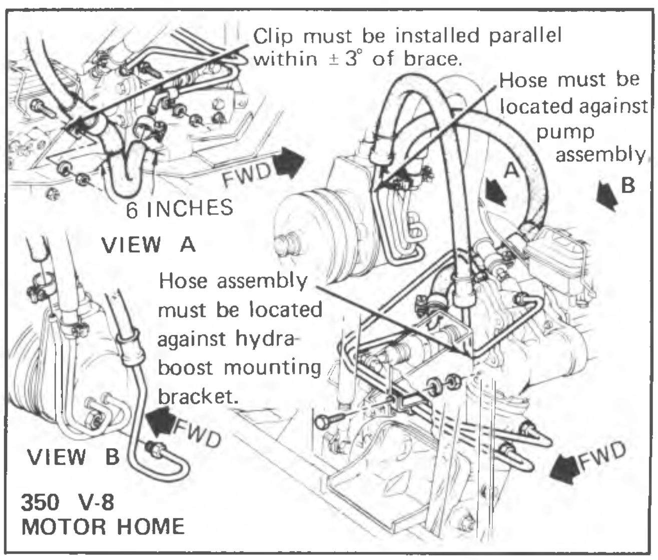


Fig. 23--Power Steering Hose Routing

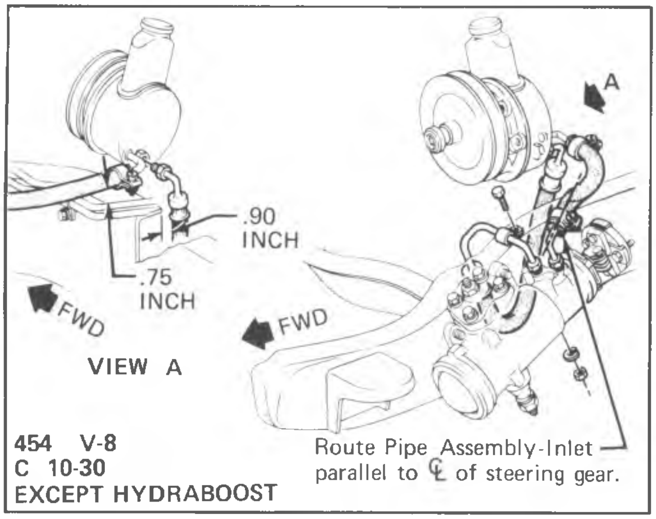


Fig. 24--Power Steering Hose Routing

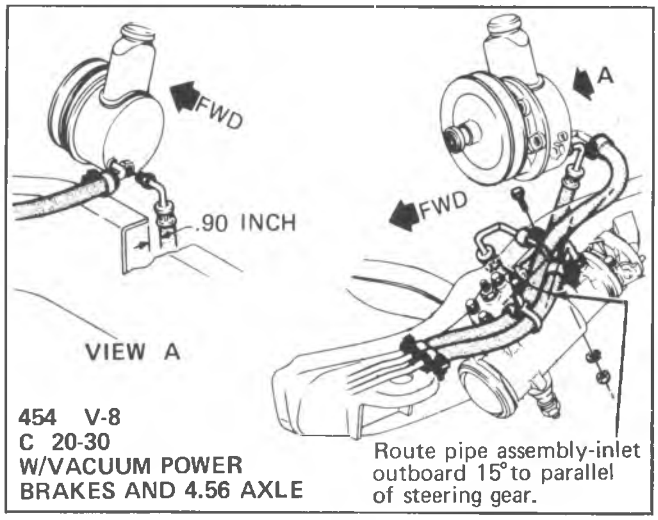


Fig. 27--Power Steering Hose Routing

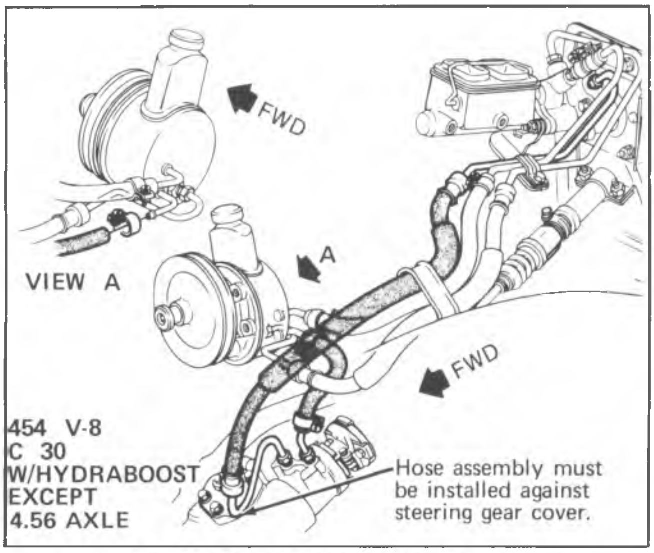


Fig. 25--Power Steering Hose Routing

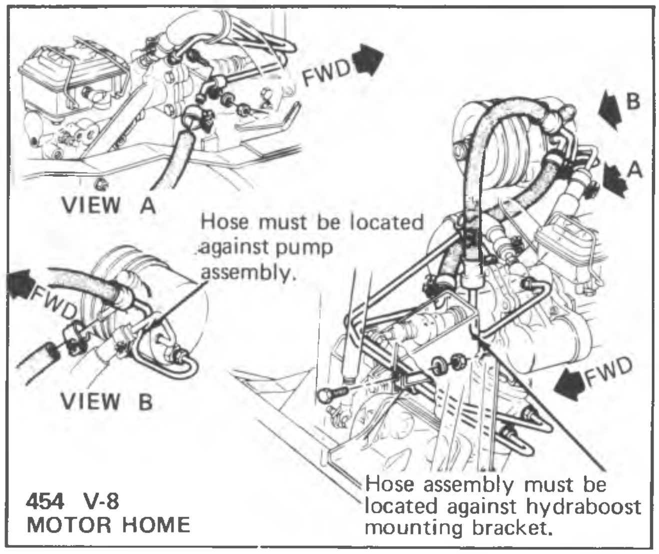


Fig. 28--Power Steering Hose Routing

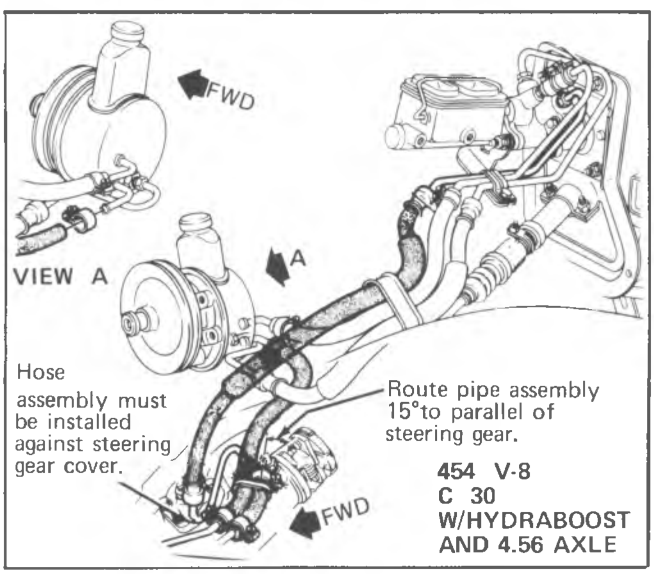


Fig. 26--Power Steering Hose Routing

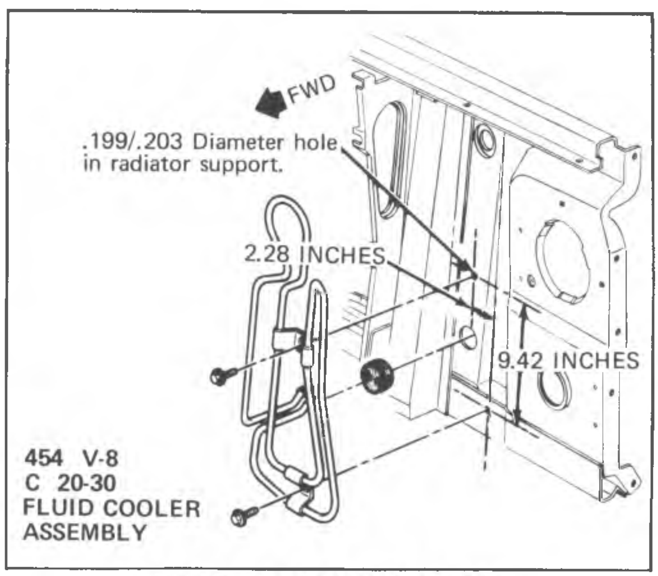


Fig. 29--Fluid Cooler Line Routing

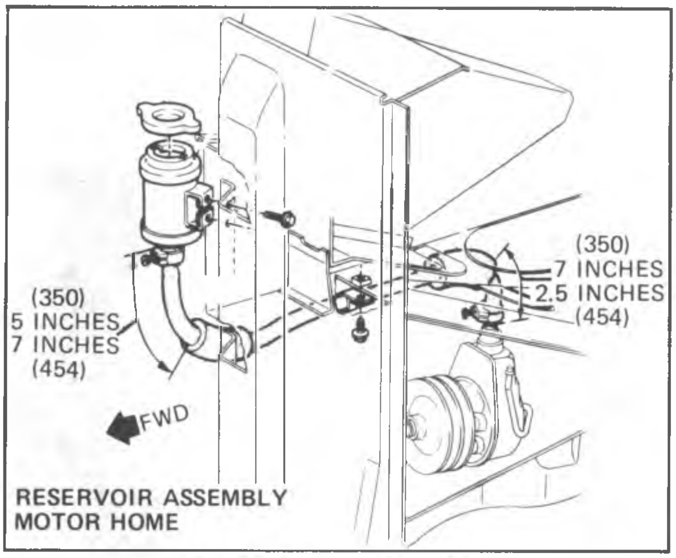


Fig. 30--Reservoir Assembly

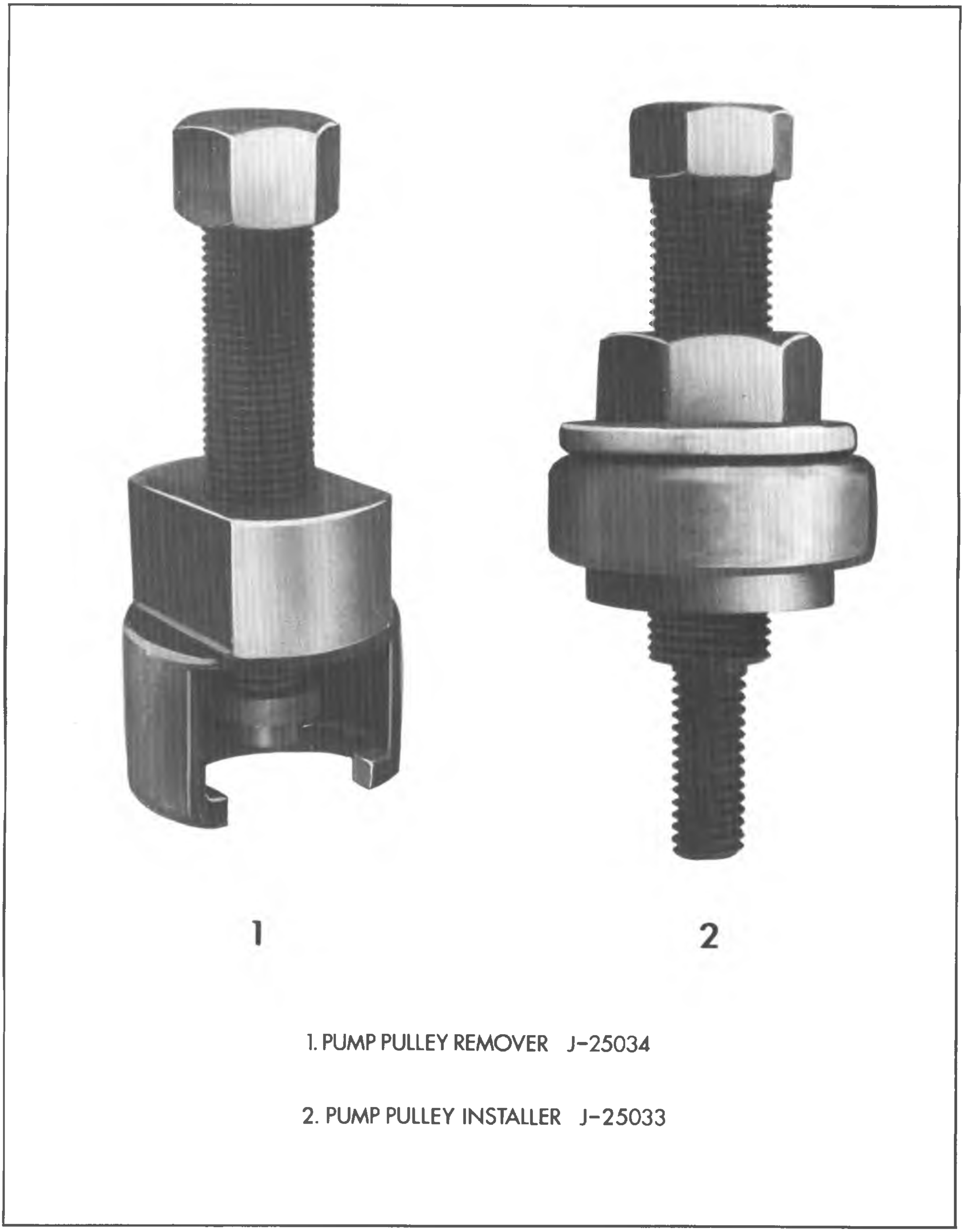


Fig. 31--Special Tools

SECTION 10

WHEELS AND TIRES

The 1976 wheel and tire maintenance and service operations remain essentially the same as outlined in the 1974 Truck Service Manual. Tire Inflation Pressure Tables and additional information for torquing dual wheels on P300 models have been revised as listed below to 1976 specifications.

ATTACHMENT OF DUAL WHEELS ON P300 MODELS

To assure secure attachment of the dual disc wheels, it is important that all dirt or rust scale be removed from the mating surface of the wheels, hub, and clamp ring as well as the stud and nut. POWER DRIVE NUTS THEN MANUALLY INSPECT TORQUE AT 130-180 FT. LBS. MANUAL TORQUE ONLY: 150-200 FT. LB.

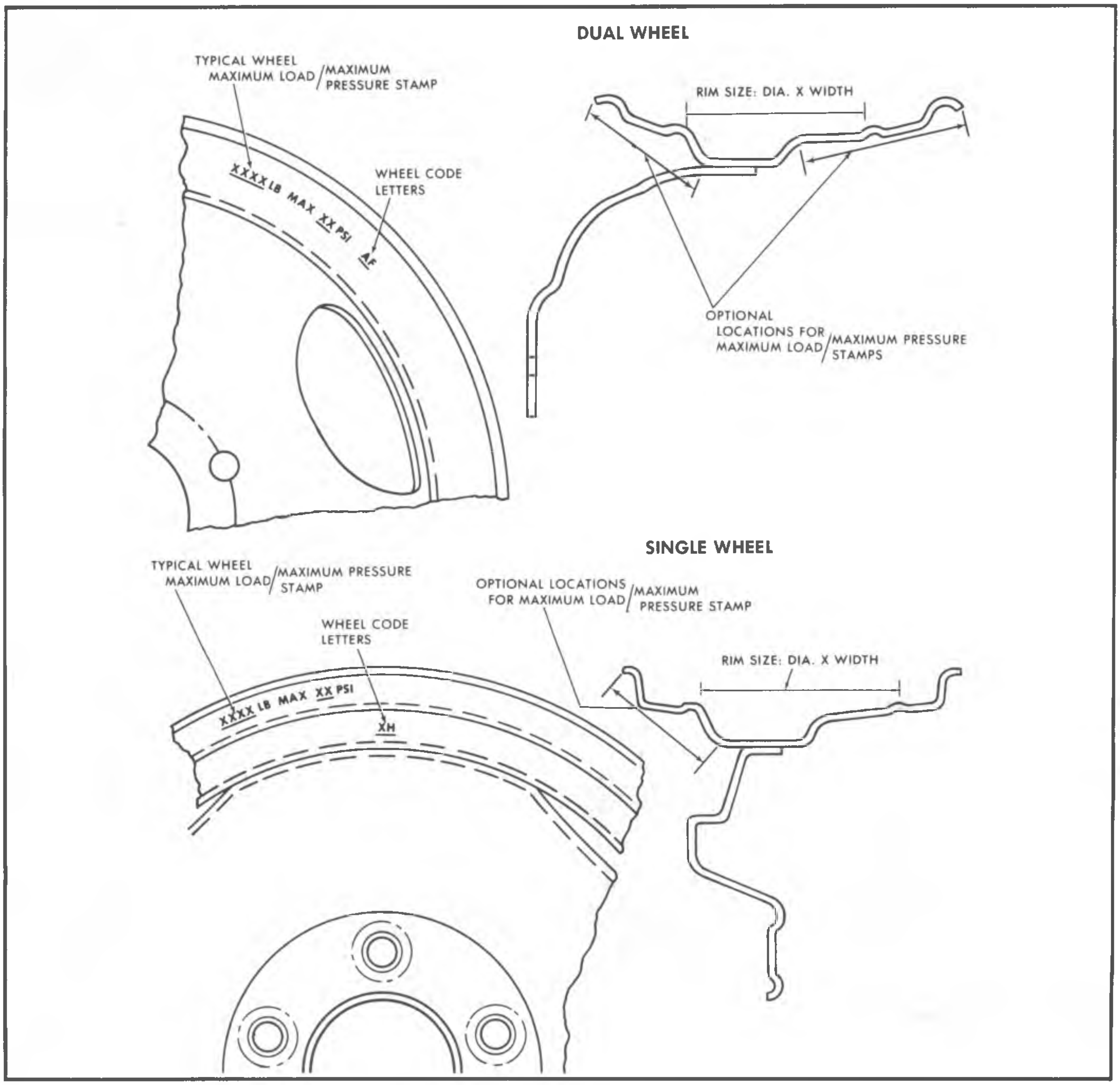


Fig. 1–Wheel Code Location

TIRE LOAD & INFLATION PRESSURE

PASSENGER TYPE TIRES FOR LIGHT TRUCKS USED IN HIGHWAY SERVICE

Tire Size	Range Load	Tire Load Limits at Various Inflation Pressures										
		20	22	24	26	28	30	32	34	36	38	40
E78-15	B	970	1030	1080	1130	1180	1230	1270				
F78-15	B	1060	1110	1160	1220	1270	1320	1370				
G78-15	B	1140	1190	1260	1310	1370	1420	1470				
G78-15	D	1140	1190	1260	1310	1370	1420	1470	1530	1570	1620	1670
GR78-15	B	1140	1190	1260	1310	1370	1420	1470				
H78-15	B	1240	1310	1370	1440	1500	1560	1610				
H78-15	D	1240	1310	1370	1440	1500	1560	1610	1670	1720	1770	1830
J78-15	B	1300	1370	1440	1500	1570	1630	1690				
JR78-15	B	1300	1370	1440	1500	1570	1630	1690				
L78-15	B	1380	1460	1530	1590	1670	1730	1790				
LR78-15	C	1380	1460	1530	1590	1670	1730	1790	1860	1910		
L78-15	C	1380	1460	1530	1590	1670	1730	1790	1860	1910		
L78-15	D	1380	1460	1530	1590	1670	1730	1790	1860	1910	1970	2030
8.25-15	D	1140	1190	1260	1310	1370	1420	1470	1530	1570	1620	1670

TIRES FOR LIGHT TRUCKS USED IN HIGHWAY SERVICE

TIRES USED AS SINGLES

Tire Size	Load Range	Tire Load Limits at Various Inflation Pressures									
		30	35	40	45	50	55	60	65	60	75
TUBE TYPE TIRES MOUNTED ON 5° TAPERED BEAD SEAT RIMS											
6.50-16	C	1270	1390	1500	1610						
7.00-15	C	1350	1480	1610	1720						
7.00-15	D	1350	1480	1610	1720	1830	1940	2040			
7.00-16	C	1430	1560	1680	1800						
7.50-16	C	1620	1770	1930	2060						
7.50-16	D'	1620	1770	1930	2060	2190	2310	2440			
7.50-16	E	1620	1770	1930	2060	2190	2310	2410	2560	2670	2780
TUBELESS TIRES MOUNTED ON 15° TAPERED BEAD SEAT DROP CENTER RIMS											
8-17.5	D	1640	1790	1940	2075	2205	2335	2455	—	—	—
8-19.5	D		—	—	—	2110	2270	2410	2540	2680	2800

WIDE BASE TUBELESS TIRES USED AS SINGLES

Tire Size	Load Range	Tire Load Limits at Various Inflation Pressures									
		20	22	24	26	28	30	32	34	36	38
10-15	B	1390	1470	1540	1620	1690	1760				

Tire Size	Load Range	Tire Load Limits at Various Inflation Pressures									
		30	35	40	45	50	55	60	65	70	75
C78-15LT	C	1080	1180	1280	1370						
H78-15LT	C	1440	1580	1710	1830						
8.00-16.5	C	1360	1490	1610	1730						
8.00-16.5	D	1360	1490	1610	1730	1840	1945	2045			
8.00-16.5	E	1360	1490	1610	1730	1840	1945	2045	2145	2240	2330
8.75-16.5	C	1570	1720	1850	1990						
8.75-16.5	D	1570	1720	1850	1990	2110	2240	2350			
8.75-16.5	E	1570	1720	1850	1990	2110	2240	2350	2470	2570	2680
9.50-16.5	D	1860	2030	2190	2350	2500	2650	2780			
9.50-16.5	E	1860	2030	2190	2350	2500	2650	2780	2920	3050	3170
10-16.5	C	1840	2010	2170	2330						
10-16.5	D	1840	2010	2170	2330	2480	2620	2750			

TIRES USED AS DUALS

Tire Size	Load Range	Tire Load Limits at Various Inflation Pressures									
		30	35	40	45	50	55	60	65	70	75
TUBE TYPE TIRES MOUNTED ON 5° TAPERED BEAD SEAT RIMS											
6.50-16	C	1120	1225	1320	1420						
7.00-16	C	1260	1365	1475	1580						
7.00-16	D	1260	1365	1475	1580	1685	1780	1870			
7.50-16	C	1430	1565	1690	1815						
7.50-16	D	1430	1565	1690	1815	1930	2040	2140			
TUBELESS TIRES MOUNTED ON 15° TAPERED BEAD SEAT DROP CENTER RIMS											
8-17.5	D	1445	1575	1700	1820	1935	2050	2155			
8-19.5	D	—	—	1850	1990	2110	2230	2350	2460		
8-19.5	E	—	—	1850	1990	2110	2230	2350	2460	2570	2680 (#)

(Refer to Tire Load and Inflation Pressure Notes)

(#) 2780 lbs. at 80 lbs. pressure.

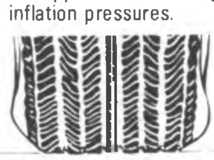
TIRE LOAD AND INFLATION PRESSURE
TIRES FOR LIGHT TRUCKS USED IN HIGHWAY SERVICE (Cont'd)

WIDE BASE TUBELESS TIRES USED AS DUALS

Tire Size	Load Range	Tire Load Limits at Various Inflation Pressures									
		30	35	40	45	50	55	60	65	70	75
8.00-16.5	C	1195	1310	1415	1520						
8.00-16.5	D	1195	1310	1415	1520	1620	1710	1800			
8.75-16.5	C	1380	1515	1630	1750						
8.75-16.5	D	1380	1515	1630	1750	1855	1970	2070			
8.75-16.5	E	1380	1515	1630	1750	1855	1970	2070	2175	2260	2360

Tire Load and Inflation Pressure Notes

1. The "cold" tire inflation pressure rating applies to the tire pressure when the vehicle has not been driven for three hours or more, or driven less than one mile.
2. It is normal for tire pressures to increase 4-8 PSI, or more, when the tires become "hot" from driving. Do not "bleed", or reduce tire inflation pressures after driving your vehicle. Bleeding serves to reduce "cold" inflation pressure and increase tire flexing which can result in tire damage and failure.
3. For sustained driving over 75 mph with passenger car type tires or when using passenger car type snow tires, cold inflation pressures should be increased 4 PSI above the recommended cold inflation pressures in the Tire/Wheel Load and Inflation Pressure Chart for the load being carried up to a maximum of 32 PSI for load range B tires, 36 PSI for load range C, and 40 PSI for load range D. Sustained speeds above 75 mph are not recommended when the 4 PSI adjustment exceeds the maximum pressures stated above.
4. For sustained driving over 65 mph with truck type tires or when using truck type snow tires, cold inflation pressures should be increased 10 PSI above those specified in the Tire/Wheel Load and Inflation Pressure charts for the load being carried. Where the 10 PSI pressure increase is limited by the maximum wheel capacity shown in the Wheel Code and Limits Chart, speed must be limited to 65 mph or the tire load reduced to the tire load limit indicated in the Tire/Wheel Load and Inflation Pressure Chart for 10 PSI less cold inflation pressure. For special operating conditions such as carrying slide-in campers or other high center of gravity loads, cold inflation pressures may be increased up to 10 PSI above those shown in the table with no increase in loads. The total increase in cold inflation pressures shall not exceed 10 PSI above the proper pressures for the load being carried and must not exceed the wheel inflation pressure and load capacity shown on the wheel code and limits chart, shown in this section.
5. Always use a tire pressure gauge (a pocket type gauge is recommended) when checking inflation pressures. Radial tires may have the appearance of being under-inflated when at recommended cold inflation pressures.



PROPERLY INFLATED RADIAL TIRE

PROPERLY INFLATED BIAS OR BIAS-BELTED TIRE

6. Be sure to reinstall the tire inflation valve caps, if so equipped, to prevent dirt and moisture from entering the valve core which could cause air leakage.

WHEEL CODE AND LIMITS

CODE	SIZE OF WHEEL	WHEEL LIMITS	
		MAX. LOAD (LBS)	MAX. PRESS (PSI)
BT	15 x 7 JJ	2040	70
BJ	15 x 8JJ	1760	40
BC	15 x 7 JJ	1910	70
BS	15 x 8.00 JJ	1760	40
DT	15 x 6 JJ	1670	55
FJ	16.5 x 6.0	2680	85
XH	15 x 6 JJ	1670	55
XL	16 x 5K	1800	55
XU	15 x 6 JJ	1670	55
BR	16 x 5K	1800	55
CY	19.5 x 5.25	2460	75
CF	16 x 5.50 F	2440	70
DK	16.5 x 6.0	2350	70
DJ	16.5 x 6.75	3170	85
XS	16 x 6½L	2780	85
BH	16.5 x 8.25	2750	70
FT	15 x 6JJ	1910	70
AX	15 x 6 JJ	2040	70
AB	19.5 x 6.75	2780	85
YW	16 x 6K	2440	75
CU	19.5 x 5.25	2800	85
CM	17.5 x 5.25	2155	70

Load Range	Replaces Ply Rating
A	2
B	4
C	6
D	8
E	10

SECTION 11

CHASSIS SHEET METAL

INDEX

GENERAL DESCRIPTION

The service procedures for all 1976 truck chassis sheet metal are essentially the same as those outlined in the 1974 Light Duty Truck Service Manual, Section 11, except as described below.

MAINTENANCE AND ADJUSTMENTS

To repair or replace either the hood lock assembly or the carburetor outside air inlet snorkels, the radiator grille must be removed prior to disassembly.

Refer to Section 13, Radiator and Grille, of the 1976 Light Duty Truck Service and Overhaul Manual for proper procedures.

HOOD LOCK ASSEMBLY

Service procedure for the 1976 CK Series hood lock is essentially the same as outlined in the 1974 Light Duty Truck Service Manual, Section 11, except for the slight modification to the lock assembly due to the new radiator grille, as shown in Fig. 1.

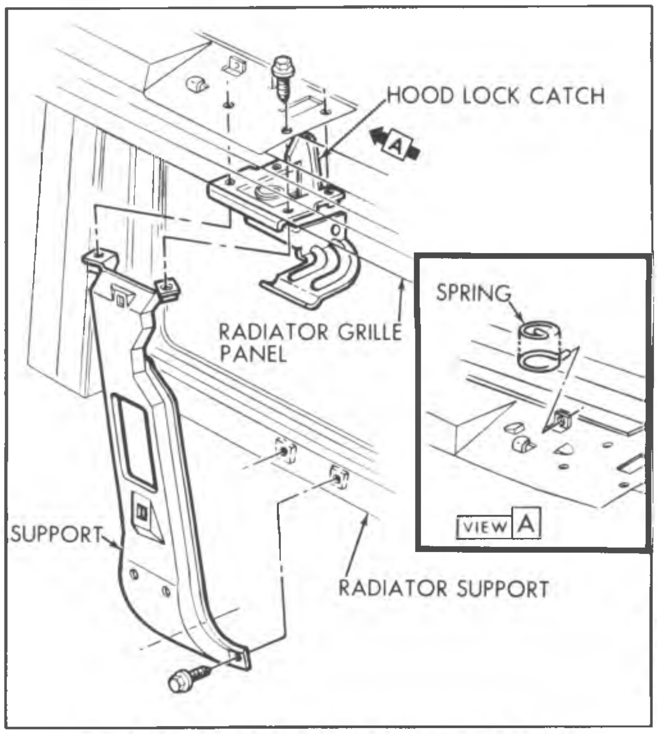


Fig. 1--Hood Lock Catch and Support-CK Series

CARBURETOR OUTSIDE AIR INLET SNORKELS (Fig. 2)

Removal

1. Raise hood and remove carburetor air duct from air snorkel by sliding duct rearward.
2. Remove two (2) screws attaching air snorkel to radiator support and remove from vehicle.

Installation

Reverse removal procedure to install snorkel.

REAR FENDER CK-SERIES

Refer to Figs. 3 and 4 for removal and installation of rear fenders and fender braces for both C and K Series Trucks.

RUNNING BOARDS CK-SERIES

Refer to Fig. 5 for removal and installation of running boards and hangers.

HOOD ROD SUPPORT - G-SERIES

Refer to Fig. 6 for removal and installation of hood rod support.

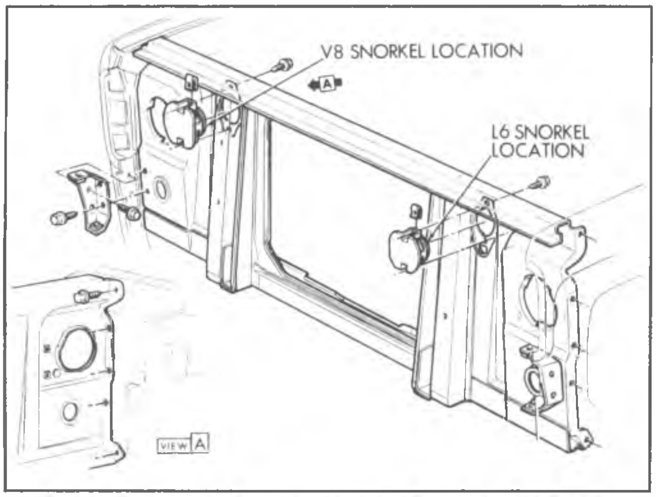


Fig. 2--Carburetor Outside Air Inlet Snorkels–CK Series

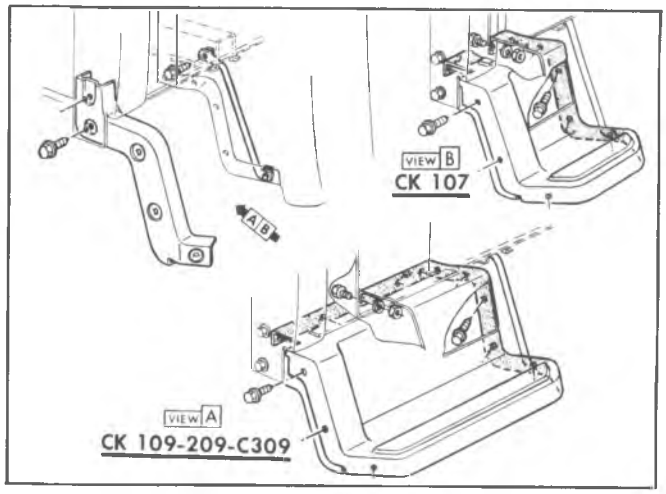


Fig. 5--Running Board, Hanger, and Brace–CK Series

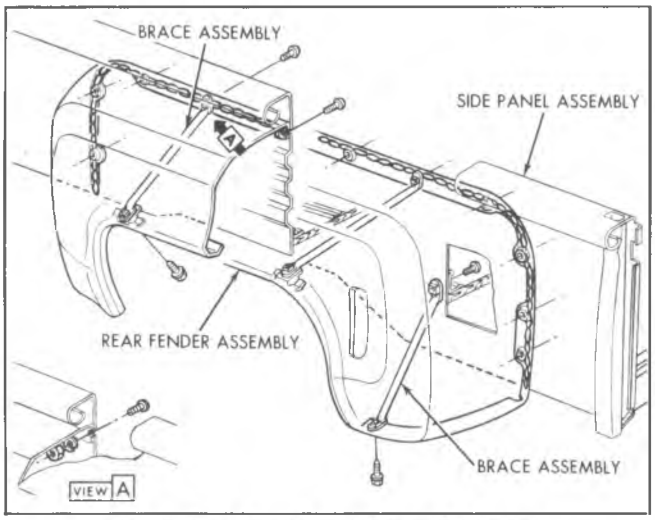


Fig. 3--Rear Fender and Brace–CK Series

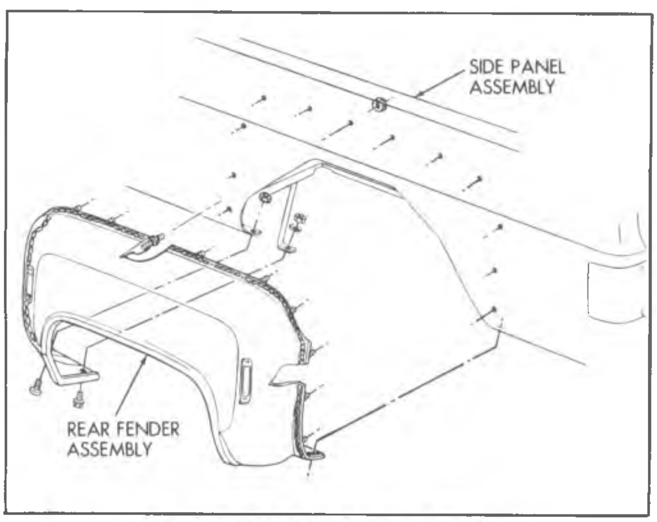


Fig. 4--Dual Wheel Fender–C Series

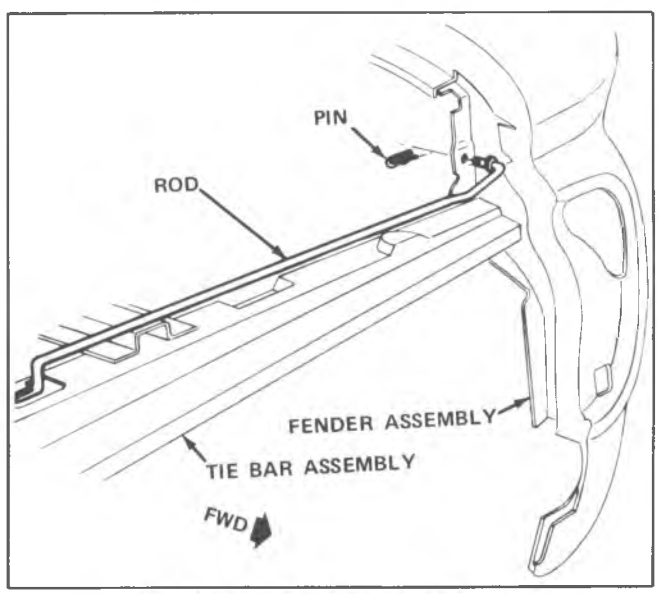


Fig. 6--Hood Rod Support - G-Series

SECTION 12

ELECTRICAL-BODY AND CHASSIS

NOTE: Except for the following changes, all information listed in Section 12 of the 1974 Light Duty Truck Service Manual is applicable to 1976 light duty trucks. Refer to 1974 Light Duty Truck Service Manual for any service procedure not contained herein.

LIGHTING SYSTEM

MAINTENANCE AND ADJUSTMENTS

HEADLAMP ADJUSTMENT

HEADLAMP AIMING

The headlamps must be properly aimed in order to provide maximum allowable road illumination. Headlamps should be checked for proper aim at new car predelivery, every 12 months, after installing a new sealed beam unit or if front end sheet metal is adjusted or repaired.

Some state and local authorities have special or additional requirements for headlamp aiming and these requirements should be followed.

Horizontal and vertical aiming of each sealed beam unit is provided by two adjusting screws which move the mounting ring in the body against the tension of the coil spring (fig. 1). Both circular and rectangular headlamps are aimed in the same manner. There is no adjustment for focus since the sealed beam unit is set for proper focus during manufacturing assembly.

Before headlamp aiming process begins, it is necessary to prepare vehicle as follows:

1. Remove any large amounts of mud or ice from underside of fenders.
2. Place vehicle on a fairly level flat surface. It is not necessary that this surface be exactly level.
3. Make sure tires are properly inflated.
4. Clean headlamp lenses.
5. Fuel tank should be one half full. If heavy load is normally carried in load area, it should remain there.
6. Driver should remain in vehicle or an equivalent weight placed in driver's seat.
7. "Rock" vehicle sideways so as to equalize the springs. Also check springs for sag, broken leaves or coils.

Using headlamp aiming device J-25300, aim headlamps as follows:

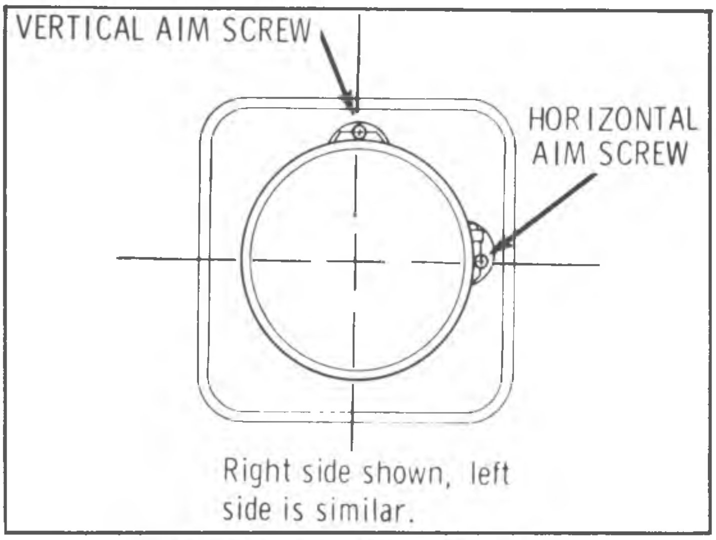


Fig. 1–Headlamp Aiming Screws

1. Attach a floor slope adapter–J-25300-6 (fig. 2) to each of the headlamp aimers–J-25300-1, -2 (fig. 3). The adapters will easily snap into position on the aimer when properly positioned.
2. Place aimers with floor slope adapters attached at the center line of each wheel on one side of the vehicle (fig. 4). Aimers must be placed facing each other. Make sure dials of all three adjusting knobs are set at "0" (zero).
3. Level each aimer unit by turning knob of floor slope adapter (fig. 2) either clockwise or counterclockwise until the top level vial bubble of the headlamp aimer registers in the centered (level) position.
4. Look into the top sight opening of either the front or rear aiming unit and turn horizontal knob in both directions until the split image is aligned.
5. Transfer the plus or minus reading indicated on the horizontal dial to the floor slope offset dial (fig. 3). Then return horizontal dial to a zero setting.

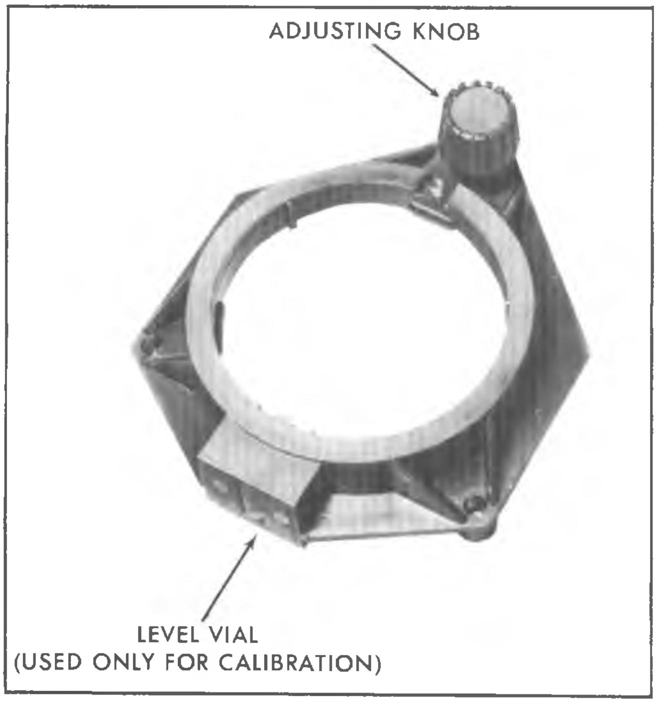


Fig. 2–Floor Slope Adapter J-25300-6

6. Repeat steps 3 thru 5 for other unit.

   NOTE: Unless the floor is abnormally sloped, it is not necessary to obtain floor slope readings for both sides of the vehicle. If for some reason floor is abnormally sloped, it may require that different readings be used for each side of the vehicle. In this instance, determine the floor level for BOTH sides of the vehicle. It is then necessary to set the floor slope offset dial of EACH aimer half-way between the two readings obtained. For instance:

   +5 and –5 Readings Equal 0 Average

   +4 and –2 Readings Equal +1 Average

   +2 and –4 Readings Equal –1 Average

   Also, if one area is regularly used to aim headlamps the floor slope adjustment procedures can be eliminated by using tape or paint to indicate on the floor the center line for the rear wheel of all vehicles. Then check the floor level for several vehicles with varying wheelbase measurements. Indicate on the floor a front wheel center line for each wheelbase along with the plus or minus reading for that position. Thereafter, each time the headlamps are aimed, merely place the rear wheels of the vehicle on the rear wheel center line and transfer the plus or minus reading of the front wheel center line to the floor slope dial of the aiming unit.

7. Remove floor slope adapters from each unit and attach a headlamp adapter (fig. 5) as determined by type of headlamps on the vehicle. There is an adapter for all standard size and shape sealed beam units.

8. Position aimer with headlamp adapter attached so that the three guide points of the lamp are in contact with the three steel inserts inside the headlamp adapter. Secure aimer to headlamp by pushing locking handle (fig. 3) forward to engage rubber suction cap and then immediately pull locking handle rearward until it locks in place. Headlamp aimers must always be used in pairs and installed so that they face each other (fig. 6).

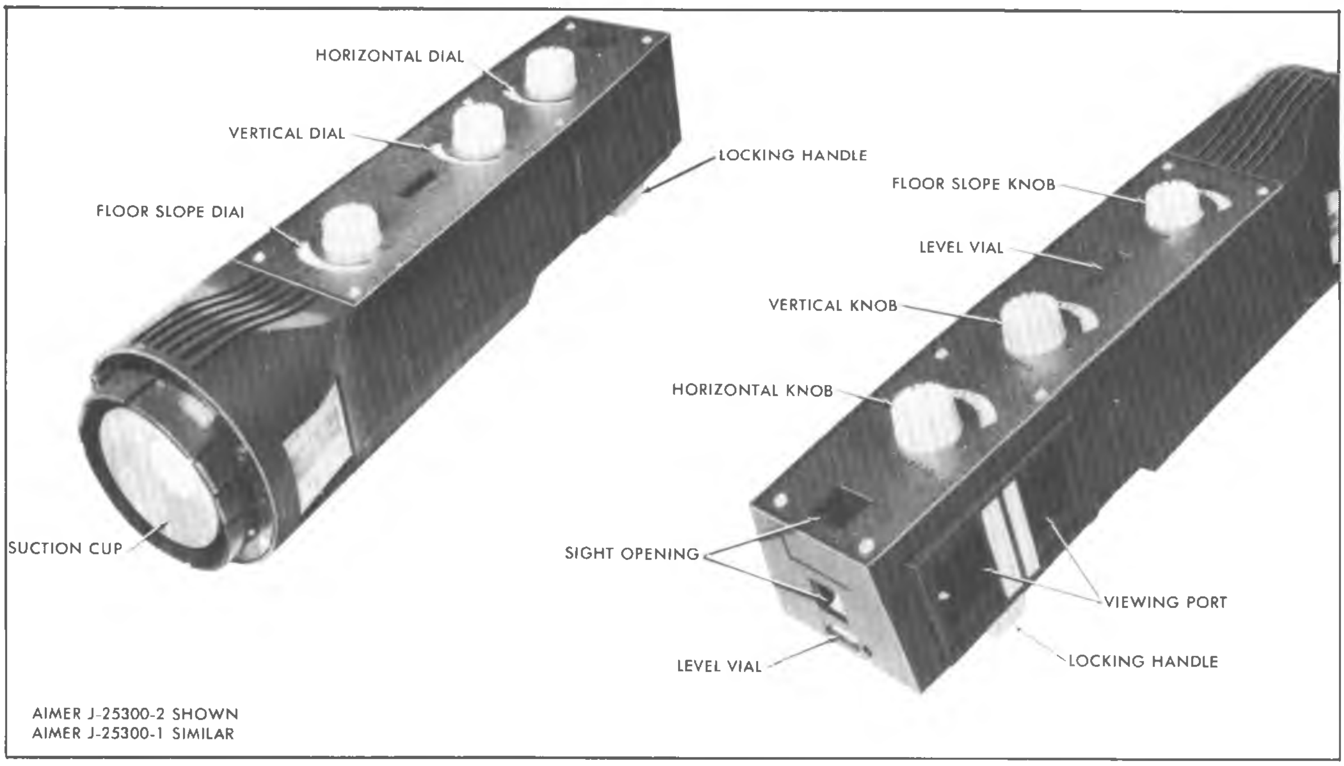


Fig. 3–Headlamp Aimer

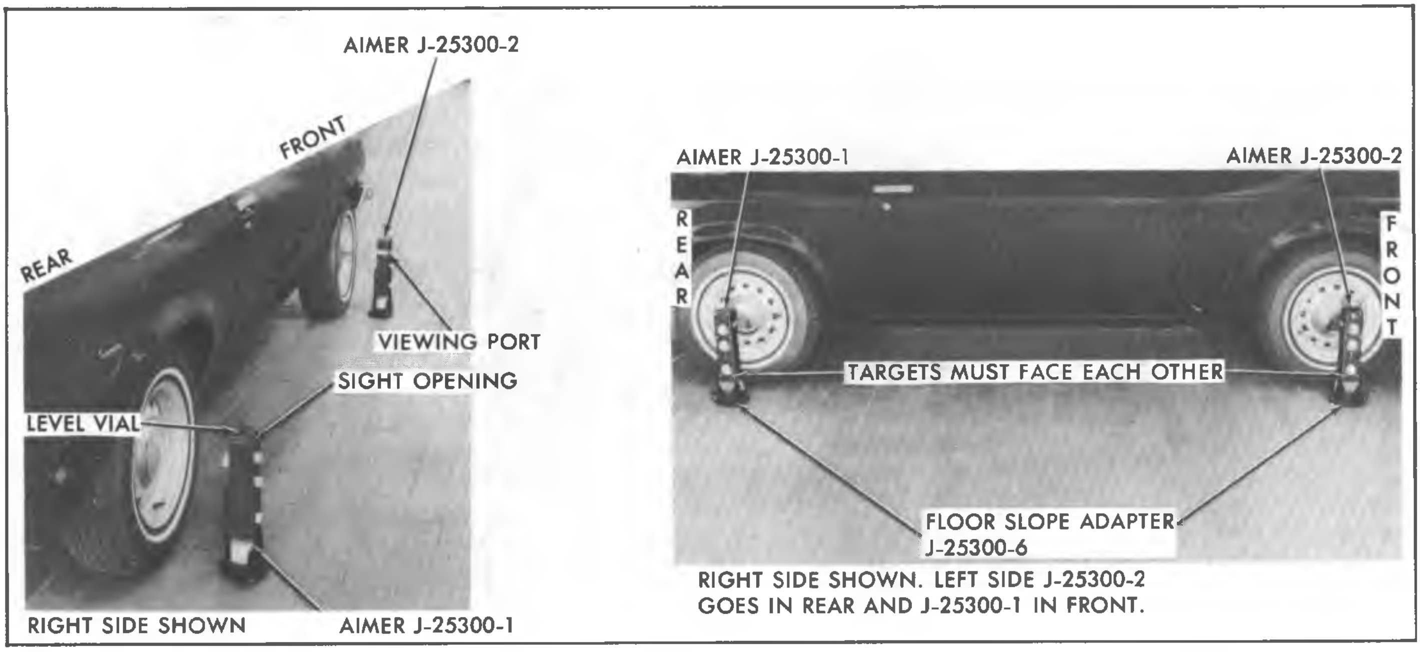


Fig. 4–Floor Slope Adjustment (Typical)

9. Check to make sure floor slope dials of the aimers obtained in step 5 has not been disturbed. Make sure horizontal dial is at zero.
10. Look into top sight opening of the aimer to see that the split image target lines are visible in the viewing port. If necessary, rotate each aimer slightly to locate target.
11. Turn horizontal adjusting screw of headlamp (fig. 1) until split image of target line appears in sight opening as one solid line. To remove "backlash" make final adjustment by turning horizontal adjusting screw in a clockwise direction.
12. Repeat steps 9 thru 11 for other aimer.
13. Make sure vertical dial is at zero.

    NOTE: A zero setting is generally required. Some state or local authorities have special requirements. Consult those authorities and use the special requirement as required.
14. Turn headlamp vertical screw (fig. 1) until the top level vial bubble registers in the centered (level) position.
15. Repeat steps 13 and 14 for opposite aimer and headlamp.
16. Recheck target alignment on both aimers and readjust horizontal aim if necessary.
17. Remove aimers by holding aimer securely with one hand while pressing the vacuum release button located on locking handle of aimer with the other hand.

If headlamp aiming equipment is not available, use procedure described in Section 12 of 1974 Service Manual.

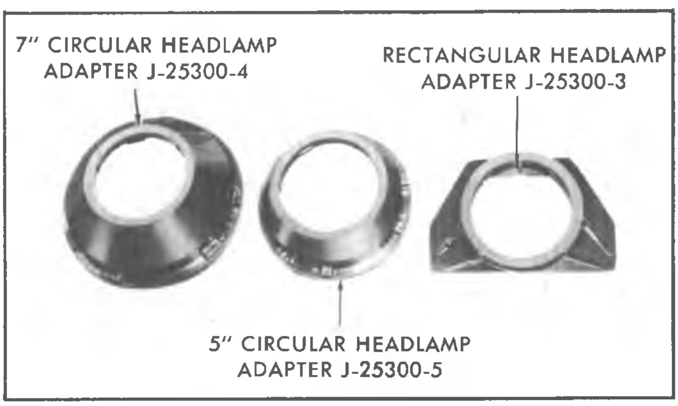


Fig. 5–Headlamp Adapters

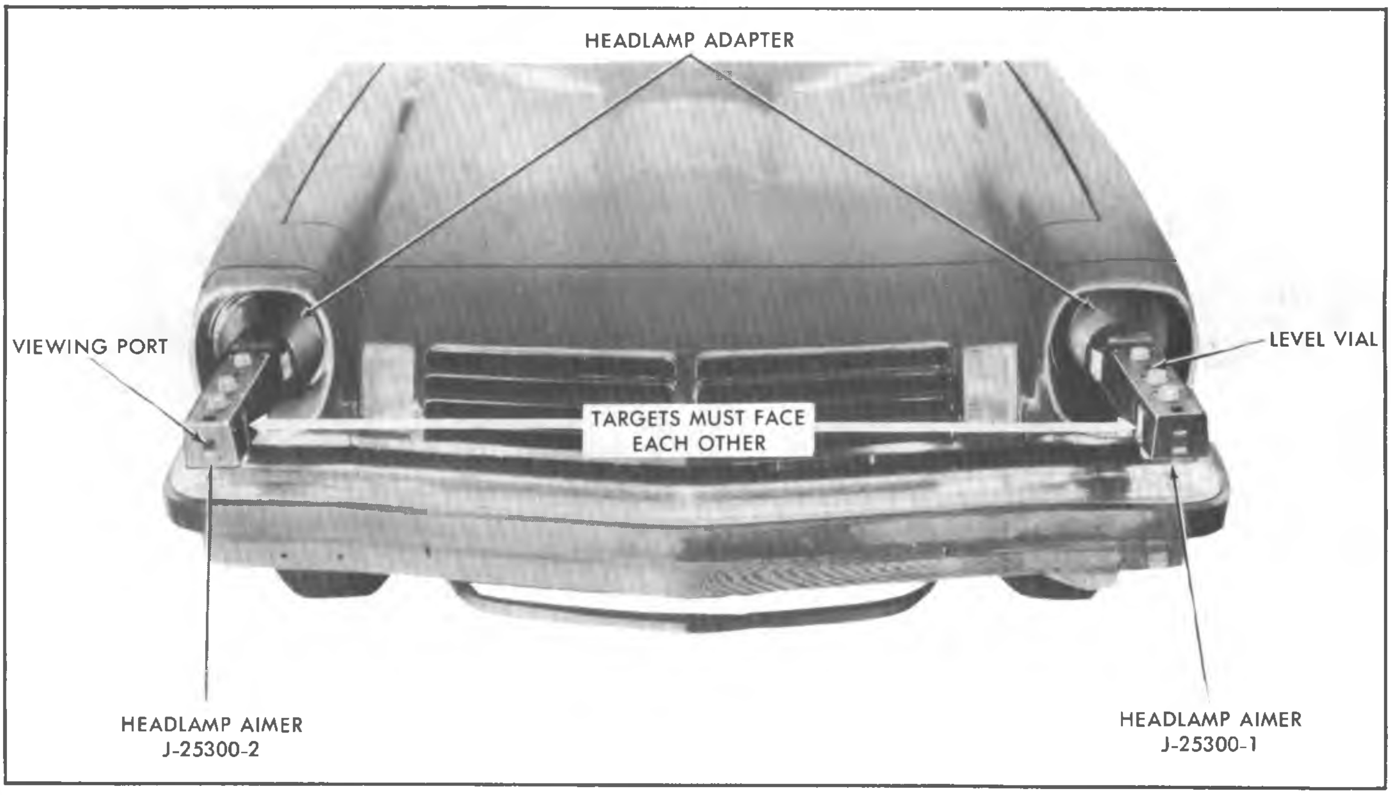


Fig. 6–Headlamp Aiming (Typical)

SERVICE OPERATIONS

HEADLAMPS WARNING BUZZER

Replacement (Fig. 7).

1. Disconnect electrical connector from LPS (Lamps) socket of fuse panel.

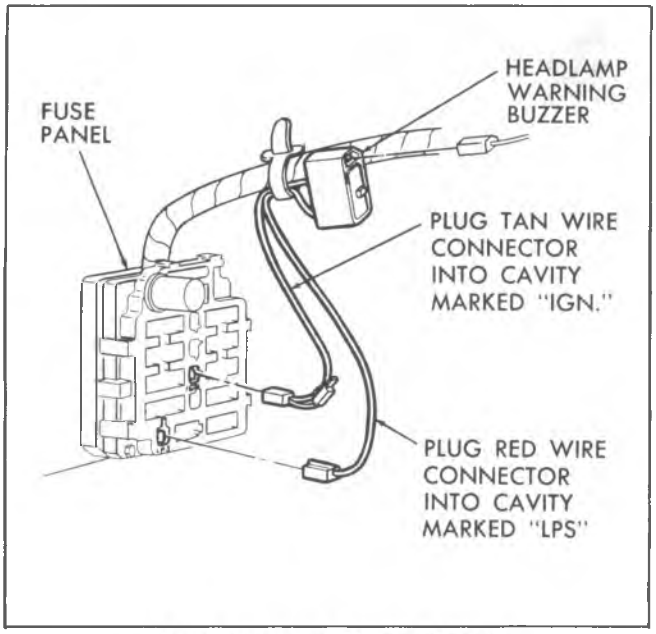


Fig. 7–Headlamp Warning Buzzer

2. Disconnect electrical connector from IGN (Ignition) socket of fuse panel.
3. Disconnect electrical connector to instrument panel harness.
4. Remove strap securing buzzer to instrument panel harness.
5. Install replacement headlamp warning buzzer in reverse sequence of removal.

SEAT BELT WARNING SYSTEM

All 1976 C-K type light duty trucks have a non-sequential timer controlled seat belt warning system. This new system will have an instrument panel warning light that will illuminate every time the ignition switch is turned on, whether or not the driver's seat belt is buckled, but will automatically go off after 4-8 seconds. The buzzer will also be controlled by the 4-8 second timer, but will operate only if the driver has not buckled-up prior to turning on the ignition. If no attempt is made to buckle-up after turning on the ignition, the buzzer will also shut-off automatically after 4-8 seconds.

A trouble shooting diagnostic chart and wiring schematic are shown in Figures 8 and 9.

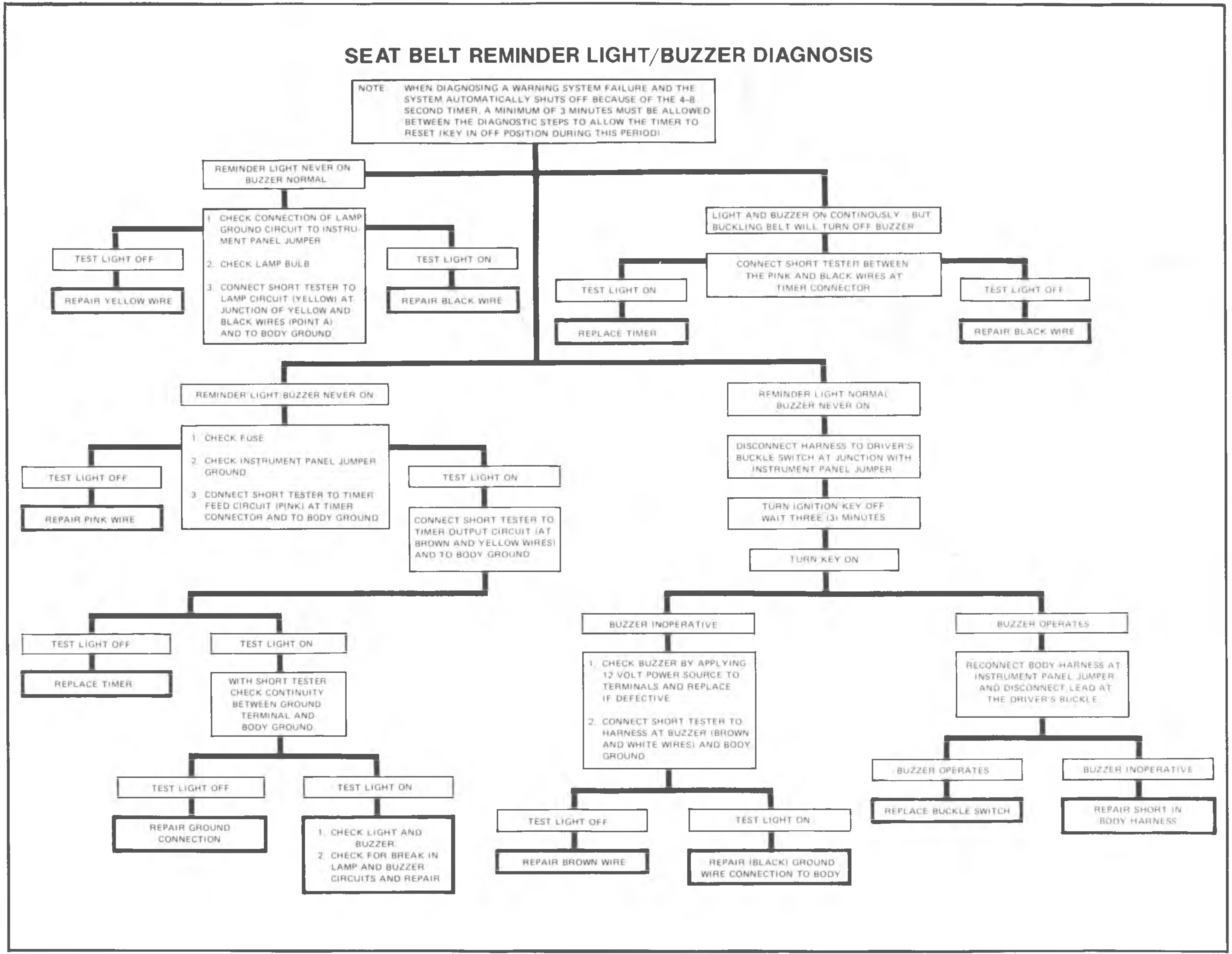


Fig. 8--Seat Belt Reminder System Diagnosis

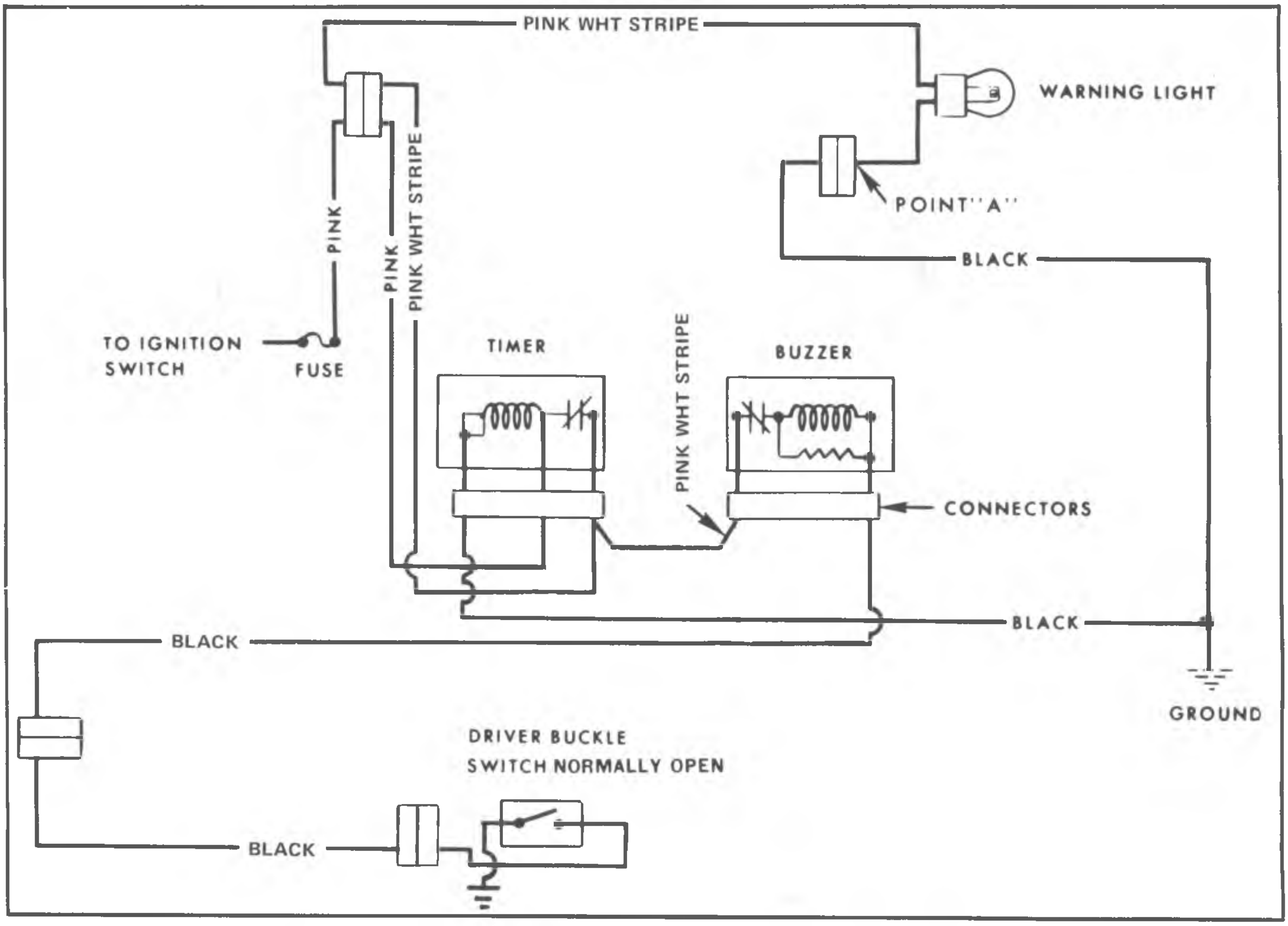


Fig. 9--Seat Belt Reminder System Schematic

INSTRUMENTS AND GAGES

AMMETER-VOLTMETER

The ammeter for all light duty trucks has been cancelled for 1976 and is being replaced by a voltmeter. The difference between the two is mainly that an ammeter shows the actual charging rate of the battery whereby a voltmeter indicates the condition (voltage level) of the charging system and battery. Service (replacement) procedures are the same for voltmeter as for the ammeter.

WIRING DIAGRAMS

Truck wiring diagrams are shown in 1976 Light, Medium and Heavy Duty Truck Wiring Diagram Manual.

SECTION 14

BUMPERS

Service procedures for the 1976 Light Duty Truck are basically carryover except for the G model truck bumper procedures listed below.

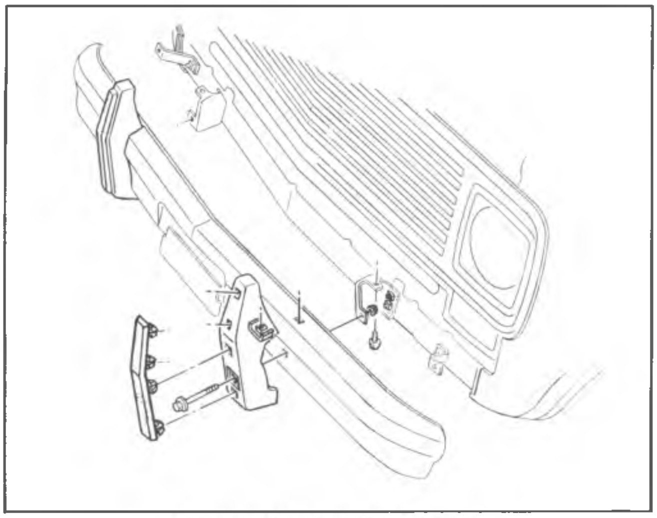


Fig. 1--G-Model Front Bumper

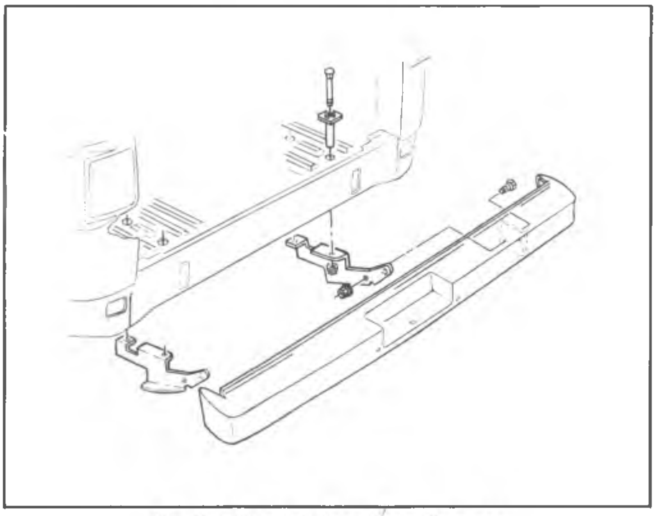


Fig. 2--G-Model Rear Step Bumper

FRONT BUMPER (Fig. 1)

Removal

1. Remove nuts securing bumpers to brackets and braces from left and right side. Remove bumper.
2. Remove the license plate support nut and bolts.
3. If necessary to remove the braces and brackets, remove screws securing brackets and braces to sheet metal.

   NOTE: The bumper may be removed with the brackets and braces attached.
4. If equipped with bumper guards (Fig. 1) they may be removed from the face bar at this time.

Installation

Reverse removal steps to install bumpers. Refer to torque specifications for proper torque values.

REAR STEP BUMPER (Fig. 2)

Removal

1. Remove nuts securing bumper to brackets and braces and remove bumper.
2. Remove bracket and braces from vehicle.

   NOTE: The bumper may be removed with brackets and braces attached if necessary.

Installation

Install in reverse order of removal. Refer to torque specification for correct torque values.

SECTION 15

ACCESSORIES

NOTE: Except for the following changes, all information listed in Section 15 of the 1974 Light Duty Truck Service Manual is applicable to 1976 light duty trucks. Refer to 1974 Light Duty Truck Service Manual for any service procedure not contained herein.

CRUISE MASTER

INDEX

GENERAL DESCRIPTION

The Cruise Master is a speed control system which employs engine manifold vacuum to power the throttle servo unit. The servo moves the throttle, when speed adjustment is necessary, by receiving a varying amount of controlled vacuum from the regulator unit. The speedometer cable (from the transmission) drives the regulator, and a cable (from the regulator) drives the instrument panel speedometer. The engagement of the regulator unit is controlled by an engagement switch located at the end of the turn signal lever. On "Dealer Installed Cruise Systems", the engage switch is mounted on the lower part of the instrument panel to the left of the steering column. Two brake release switches are provided: an electric switch disengages the regulator unit and a vacuum valve decreases the vacuum in the servo unit to quickly return the throttle to idle position.

The operation of each unit of the system and the operation of the entire system under various circumstances is described under "Theory of Operation" below.

THEORY OF OPERATION

The purpose of the Cruise Master system is to allow the driver to maintain a constant highway speed without the necessity of continually applying foot pressure to the accelerator pedal. Speed changes are easily made and override features allow the vehicle to be stopped, slowed or accelerated as described below.

Engaging the Cruise System

The driver accelerates to the speed at which he desires to cruise and partially depresses and releases the cruise control engagement switch button located at the end of the directional signal lever (on dealer installed systems, this switch will be on the instrument panel). The cruise system takes over speed control, and within engine limitation, maintains this speed regardless of changes in terrain.

The Engagement Switch button performs these functions:

1. Above 30 mph, when partially depressed and released, it engages the cruise system.
2. When depressed fully and held there, it disengages the system.
3. When released slowly from the fully depressed position, it will engage the system at the existing speed and cruise at that speed (above 30 mph).

   NOTE: See Fig. 1C "Engage Switch Operation".

Speed Changes

Override -The accelerator pedal may be depressed at any time to override the cruise system. Release of the accelerator pedal will return the vehicle to the previous cruise speed.

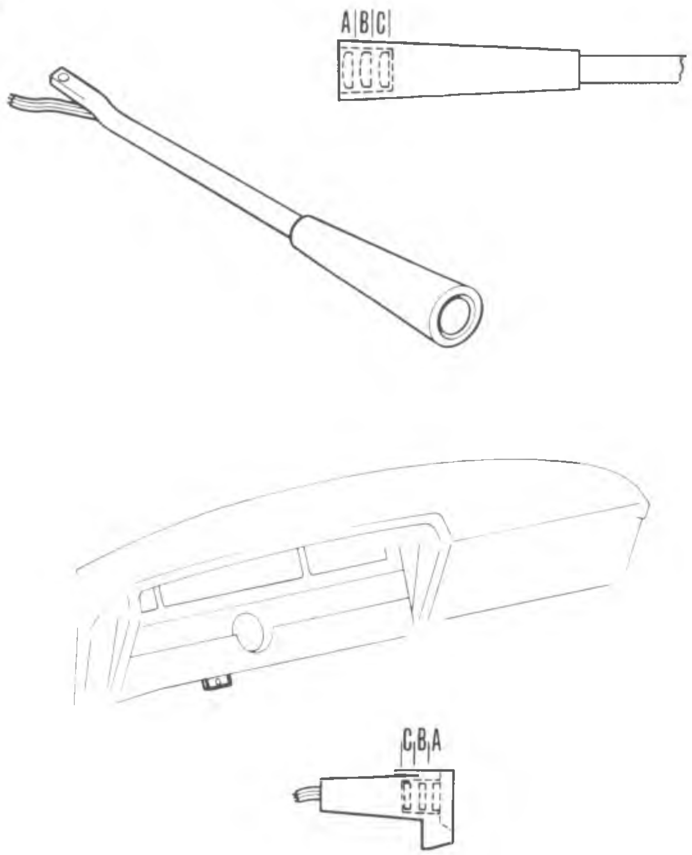
To Cruise At A Higher Speed -Depress the accelerator pedal to reach the new desired speed. Then, fully depress and slowly release the cruise control engagement switch button. The system re-engages at the higher speed when the button is slowly released.

To Cruise At A Lower Speed -Disengage the system by depressing the engagement switch button fully and holding it there until the vehicle has decelerated to the new desired speed; then release the button slowly. The system re-engages at the lower speed when the button is slowly released.

CRUISE MASTER UNITS

Figures 3C and 4C show the units in the installed position on the vehicles.

1. The Engagement Switch, which is located at the end of the directional signal lever (or bottom on instrument panel), is used to control the system and for upward and downward speed adjustments.
2. The Regulator (fig. 2C) is mounted in the speedometer cable line. It is a combination speed sensing device and control unit. When engaged, it senses vehicle speed and positions the Servo Unit to maintain the selected speed.
3. The Servo Unit is mounted on the left front inner fender and is connected by a cable to the throttle linkage. It opens or closes the throttle as dictated by the Regulator.



THE CRUISE CONTROL ENGAGE SWITCH ASSEMBLIES, BOTH TURN SIGNAL & INSTRUMENT PANEL MOUNTED TYPES, INCORPORATE THREE POSITION SWITCHES. THESE POSITIONS ARE:
(A) THE "RELEASED" OR NORMAL POSITION
(B) THE "ENGAGE" POSITION
(C) THE "TRIM-DOWN" POSITION.

PARTIALLY DEPRESSING THE ENGAGE SWITCH WILL ACTIVATE THE SYSTEM AND IT WILL REMAIN ACTIVITED WHEN THE SWITCH IS RELEASED. THE CRUISE SYSTEM IS DEACTIVATED WHEN THE BRAKES ARE APPLIED OR WHEN THE ENGAGE SWITCH IS DEPRESSED FULLY AND HELD IN THE "TRIM-DOWN" POSITION.

THE "TRIM-DOWN" SWITCH POSITION IS NORMALLY USED TO DECREASE THE CRUISING SPEED. WHILE THE SWITCH IS HELD IN THE "TRIM-DOWN" POSITION THE CRUISE SYSTEM IS "OFF" AND THE CAR SPEED WILL GRADUALLY DECREASE. WHEN THE DESIRED CRUISING SPEED IS REACHED, THE SWITCH IS SLOWLY RELEASED AND THE CRUISE SYSTEM WILL RE-ENGAGE. IF THE SWITCH IS RELEASED FROM THE "TRIM-DOWN" POSITION VERY RAPIDLY, IT IS QUITE LIKELY THAT THE SYSTEM WILL NOT RE-ENGAGE. THIS IS NORMAL AND IS AVOIDED BY A SLOWER, MORE DELIBERATE RELEASE OF THE SWITCH FROM THE "TRIM-DOWN" POSITION.

NOTE: A SPEED-SWITCH BUILT INTO THE REGULATOR ASSEMBLY PREVENTS ENGAGING THE CRUISE SYSTEM BELOW APPROX. 30 MPH.

Fig. 1C--Cruise Master Engagement Switches

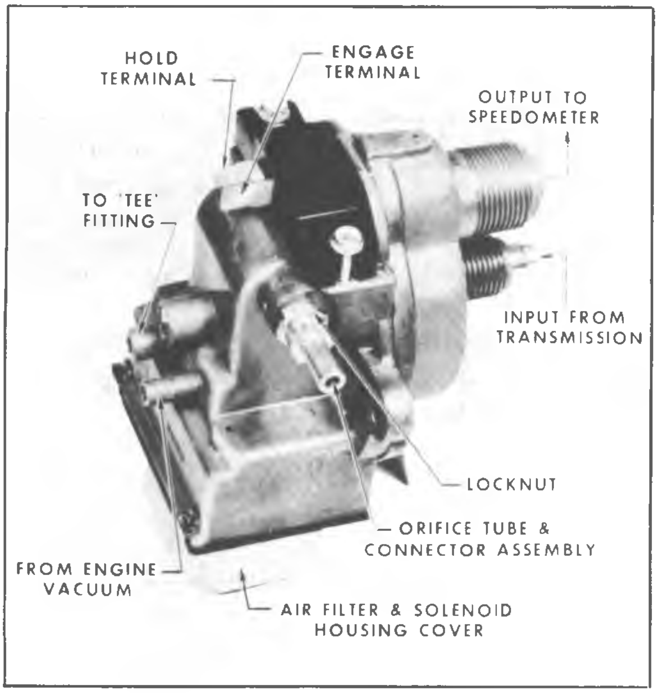


Fig. 2C--Regulator Unit

4. The Cruise Brake Release Switch, which is mounted on the brake pedal bracket, disengages the system electrically when the brake pedal is depressed.
5. The Cruise Brake Release Valve, which is mounted on the brake pedal bracket, disengages the system pneumatically when the brake pedal is depressed.
6. The Cable and Casing Assemblies drive the regulator and speedometer.

MAINTENANCE AND ADJUSTMENTS

The components of the Cruise-Master System are designed to be replaced should they become inoperative. The Regulator is cali brated in such a manner during manufacturing that overhaul operations are impractical. However, one adjustment may be made to the Regulator to correct speed drop or increase at the time of engagement.

REGULATOR (FIG. 3C)

One regulator adjustment is possible - Engagement Cruising Speed Zeroing (to remove any difference between engagement and cruising speed). No regulator adjustment should be made, however, until the Servo Cable adjustment has been checked and vacuum hoses are checked for leaks, kinks, or other restrictions.

If the vehicle cruises at a speed a few mph above or below the engagement speed, this error can be corrected with a simple adjustment of the orifice tube in the regulator (see fig. 2C).

CAUTION: *Never remove orifice tube from casting. It cannot be reinstalled once it has been removed.*

1. To check cruise speed error, engage Cruise-Master at 60 mph.
2. If vehicle cruises **below** engagement speed, screw orifice tube **outward** .
3. If vehicle cruises **above** engagement speed, screw orifice tube **inward** .

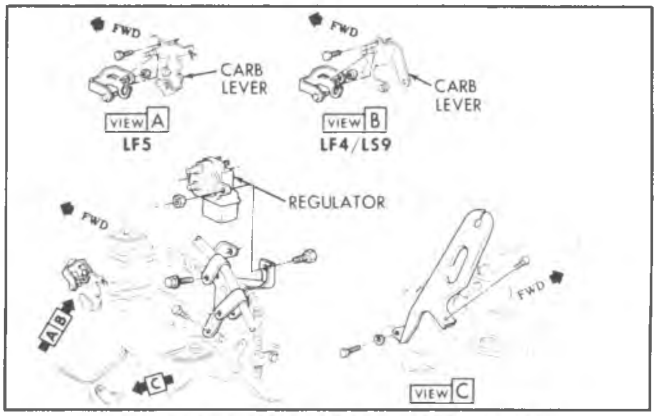


Fig. 3C–Regulator and Brackets (G Truck)

NOTE: Each 1/4 turn of the orifice tube will change cruise speed approximately one mph. Snug-up lock nut after each adjustment.

If a Regulator is found to be defective and not simply out-of-adjustment, it must be replaced. During replacement, check the hoses which connect to the Regulator and replace any which are cracked or deteriorated.

SERVO UNIT (FIG. 4C)

Before adjusting the Servo Cable, make sure the carburetor is set at its lowest idle throttle position by manually setting the fast idle cam at its lowest step with the ignition switch

"OFF". Adjust the cable so there is as little lost motion at the Servo as possible (see Fig. 4C).

If the Servo Unit is found to be defective, replacement is required. Note the condition of the hoses and replace any which are cracked or deteriorated.

BRAKE RELEASE SWITCHES (Fig. 4C)

Electric

The Cruise Master brake release switch electrical contacts must be switched open when the brake pedal is depressed .38" to .64", measured at the brake pedal.

An inoperative switch must be replaced. Switch replacement procedure is similar to standard brake lamp switch replacement.

Vacuum

The vacuum valve plunger must clear the pedal arm when the arm is moved 5/16 inch, measured at the switch (fig. 6C).

An inoperative (sticking, plugged, or leaking) vacuum valve must be replaced. Vacuum valve replacement is similar to brake lamp switch replacement. Be certain that the hose to the valve is connected firmly and is not cracked or deteriorated.

COLUMN MOUNTED ENGAGEMENT SWITCH

The engagement switch is serviced only by replacement of the turn signal lever assembly.

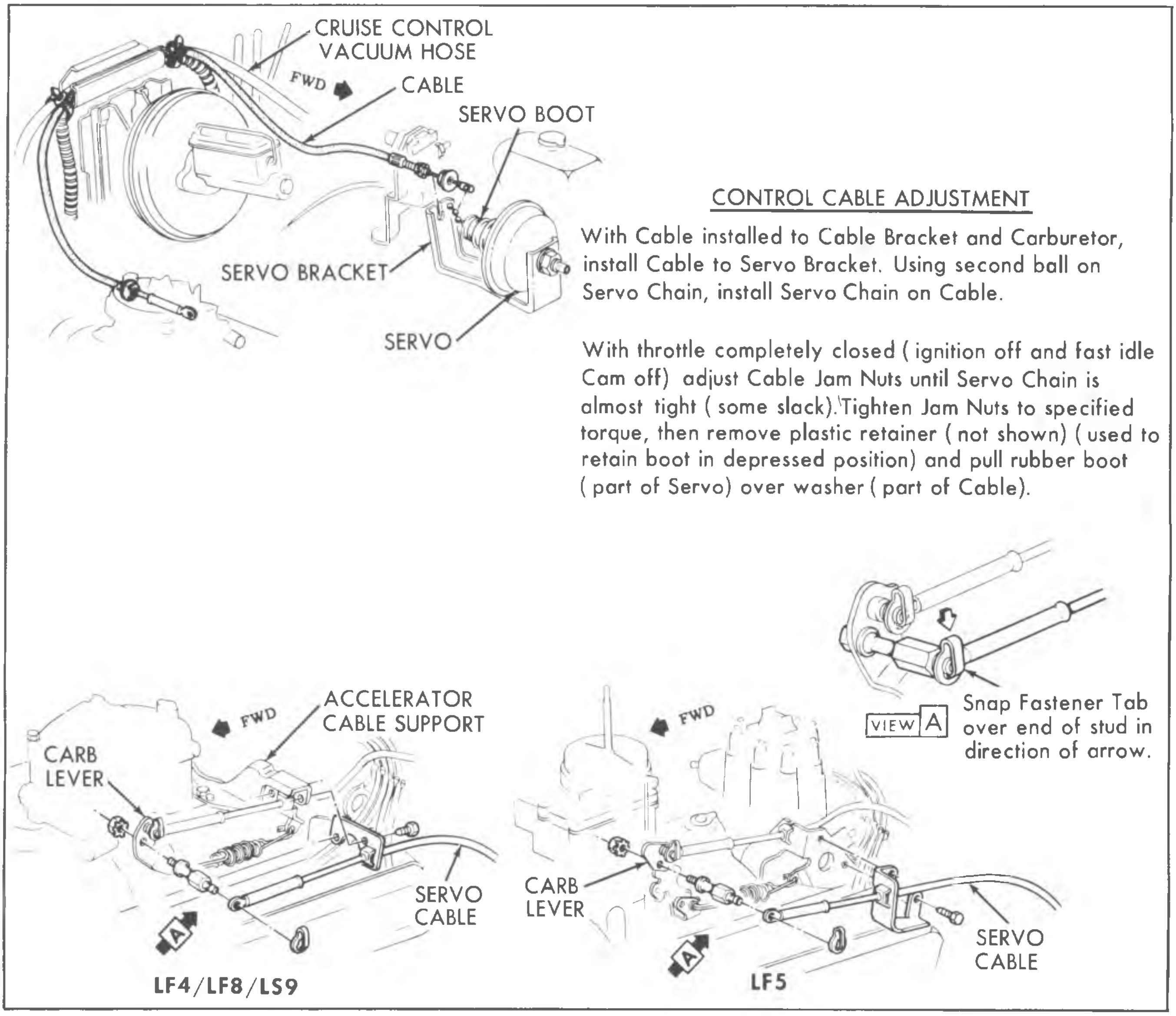


Fig. 4C--Servo Composite (C-K Trucks)

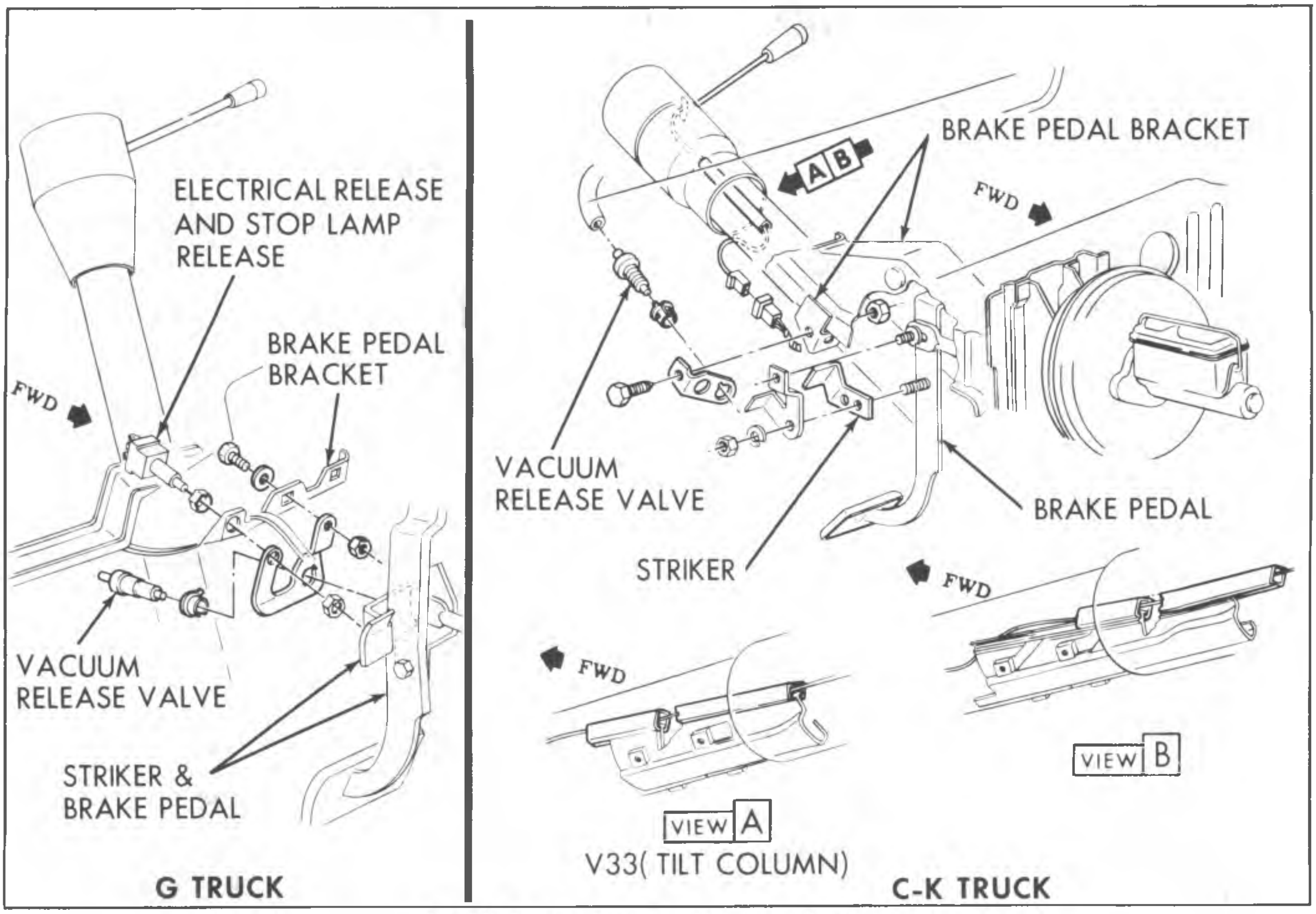
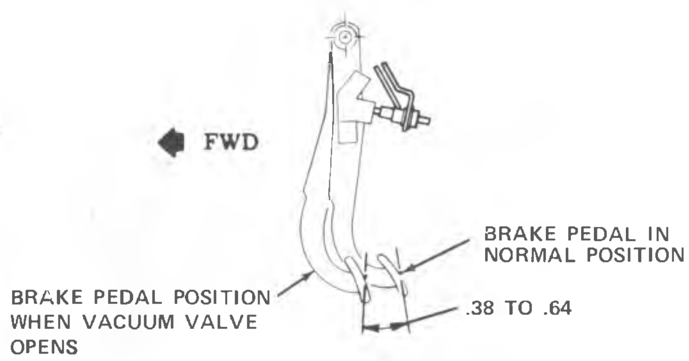


Fig. 5C–Release Switches, Valve and Brackets



INSTALLATION OF SELF-ADJUSTING VACUUM RELEASE VALVE

1. Install mounting clip into bracket.
2. Depress brake pedal & push valve into clip until shoulder on valve asm bottoms out against clip.
3. Adjust valve by bringing pedal to normal position so that valve is open when pedal is depressed to dimension shown.

Fig. 6C–Vacuum Valve

COMPONENT PART REPLACEMENT

REGULATOR

Replacement

1. Disconnect battery ground cable.
2. Disconnect speedometer cables at regulator.
3. Disconnect vacuum and wiring harness at regulator body.
4. Remove regulator to bracket screws and remove regulator.
5. To install, reverse Steps 1-4 above.

SERVO

Replacement

1. Disconnect battery ground cable.
2. Disconnect vacuum line at servo can.
3. Remove servo cover. Disconnect ball chain from cable retainer.
4. Remove servo to bracket screw(s) and remove servo.
5. To install, reverse Steps 1-4 above.
6. Adjust the servo cable as outlined in Figure 4C.

COLUMN MOUNTED ENGAGEMENT SWITCH

Removal

1. Disconnect the battery ground cable.
2. Disconnect cruise master engagement switch wiring harness plug on steering column.
3. Remove plastic protector from cruise master wiring harness on column.
4. Remove turn signal lever (see Section 9 of this Manual).
5. Connect a 15" piece of piano wire to cruise master wiring harness plug for installation before easing turn signal lever assembly up and out of the column.

Installation

1. Attach new engagement switch harness plug to piano wire routed through column.
2. Pull connector and wire gently down column to prevent scraping wire insulation.
3. Install turn signal lever (see Section 9 of this Manual).
4. Slide plastic wiring protector over harness and up column.
5. Connect cruise master wiring harness on column.
6. Connect battery ground cable.

DIAGNOSIS

ELECTRICAL SYSTEM TROUBLESHOOTING

1. Check fuse and connector.
2. Check electric brake switch as follows:
   a. Unplug connector at switch.
   b. Connect ohmmeter across cruise master contacts on brake switch. The ohmmeter must indicate no continuity when the pedal is depressed and continuity when pedal is released. The cruise release brake switch (electric) is adjusted as is the standard stop light brake switch.
   c. Replace electric brake switch if needed.
3. Check clutch release switch (manual transmission only) same as electric release switch above.

Engagement Switch Test

Check engagement switch and connecting wiring as follows: Unplug engagement switch connector (brown, blue, black) at electrical wiring harness connector then perform the following tests (fig. 7C).

Test#1–Connect ohmmeter between terminal #1 (brown wire) and terminal#2 (blue wire). Continuity shall be maintained until switch is depressed all the way in.

Test#2–Connect ohmmeter between terminal#1 (brown wire) and terminal#3 (black wire). No continuity shall be shown; however, when the button is partially depressed, continuity shall be indicated. When the button is pressed all the way down, no continuity shall be shown.

Test#3–Connect ohmmeter between terminal#2 (blue wire) and terminal#3 (black wire). Button released, no continuity; however, when the button is depressed partially and fully, continuity shall be shown.

Harness Test (see Fig. 7C)

1. Disconnect engage switch wire harness connector from the main harness connector (red, brown/white, and white wires).

2. Connect ohmmeter between point C (brown/white stripe wire in main wire harness) and ground. Make sure the Regulator is well grounded to the chassis. The ohmmeter should read between 42 and 49 ohms. If a resistance either above or below the value indicated is shown, then disconnect the connector from the Regulator and measure the resistance of the brown/white stripe wire from point C to D. It should measure 40 ohms ± 2 ohms.
3. If a resistance either above or below the value indicated is shown, the main wiring harness should be replaced.

   NOTE: When disconnecting or reconnecting the main wiring harness connector from the Regulator, care should be exercised so as not to damage the blade connectors or the wiring harness. The disconnect may be facilitated by prying carefully on the plastic connector with a small screwdriver.
4. Measuring the solenoid coil circuit resistance between point E (Hold Terminal) and ground, the ideal resistance should be between 5 and 6 ohms. A reading of less than 4 ohms indicates shorting in the coil circuit. A reading of more than 7 ohms indicates excessive resistance in the coil circuit. Either extremity indicates replacement of the Regulator assembly. The main harness wiring from point F to G (white wire) should also be checked for continuity.

Servo and Vacuum System Test

To determine the condition of the diaphragm, remove hose from the Servo Unit and apply 14 inches of vacuum to the tube opening and hold in for one minute. The vacuum shall not leak down more than 5 inches of vacuum in one minute. If leakage is detected, replace the Servo. To utilize engine as a vacuum source, proceed as follows:

1. Disconnect Servo cable at carburetor and vacuum hose from the Servo, then connect engine vacuum directly to the Servo fitting.
2. Note position of Servo diaphragm.
3. Start engine--the diaphragm should pull in.
4. Clamp off engine vacuum supply line and check for leakage.

The cruise release brake valve (vacuum) and connecting hoses can likewise be checked using a vacuum pump.

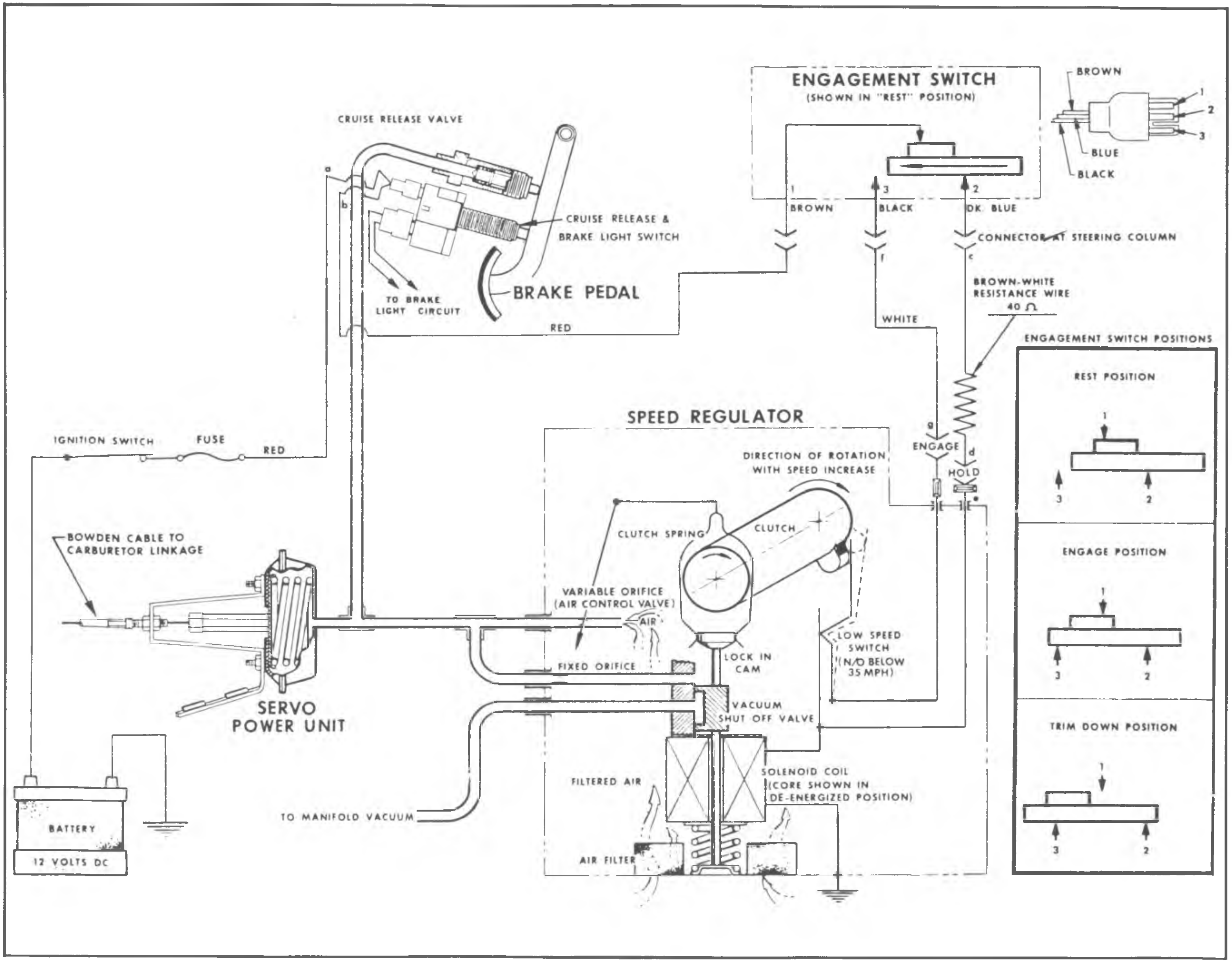


Fig. 7C–Electro-Pneumatic Schematic

CRUISE MASTER TROUBLESHOOTING

CHECK I FOR SYSTEMS WITH ERRATIC CRUISE PERFORMANCE

CHECK II FOR INOPERATIVE SYSTEMS MAKE ALL TESTS WITH TRANSMISSION SELECTOR IN "PARK" & PARKING BRAKE ON EXCEPT WHERE INDICATED OTHERWISE. RECONNECT ANY DISCONNECTED HOSES AND/OR ELECTRICAL CONNECTORS IN PROPER MANNER AT THE COMPLETION OF TEST.

FIG. 8

FIG. 9

CHECK I

1. CHECK SERVO CABLE ADJUSTMENT - MUST HAVE MINIMUM AMOUNT OF LOST MOTION (SEE SERVICE ADJUSTMENT PROCEDURE, FIG. 4)
2. CHECK FOR PINCHED, KINKED, PLUGGED, OR DAMAGED VACUUM HOSES. ALSO CHECK VACUUM FITTINGS.
3. CHECK SPEEDOMETER CABLE ROUTING. IT MUST NOT BE KINKED OR HAVE TOO SHARP A TURNING RADIUS (NOT LESS THAN 6" RADIUS). CHECK DRIVE CABLE FOR DISTORTED OR BENT TIPS. FERRULES MUST BE SNUG.
4. CHECK FOR A BINDING THROTTLE LINKAGE CONDITION.
5. CHECK ADJUSTMENT OF BRAKE RELEASE SWITCH & VACUUM RELEASE VALVE. (SEE SERVICE & ADJUSTMENTS)
6. CHECK FOR PROPER OPERATING PROCEDURE OF THE ENGAGE SWITCH (SEE FIG. 1)
7. IF STEPS 1 THROUGH 6 DO NOT SOLVE THE PROBLEM PROCEED WITH CHECK II.

SPECIAL NOTE PERTAINING TO ENGAGEMENT-CRUISING SPEED ZEROING.

IF THE CAR CRUISES BELOW ENGAGEMENT SPEED, SCREW THE ORIFICE TUBE OUTWARD. IF THE CAR CRUISES ABOVE THE ENGAGEMENT SPEED, SCREW THE ORIFICE TUBE INWARD. EACH 1/4 TURN WILL CHANGE THE CAR SPEED APPROXIMATELY ONE MPH. ENGAGEMENT ACCURACY TESTING TO BE DONE AT 60 MPH. SNUG UP LOCK NUT AFTER EACH ADJUSTMENT.

CAUTION: DO NOT REMOVE ORIFICE TUBE FROM CASTING.

Fig. 8C--System Diagnosis Chart No. 1

CHECK II

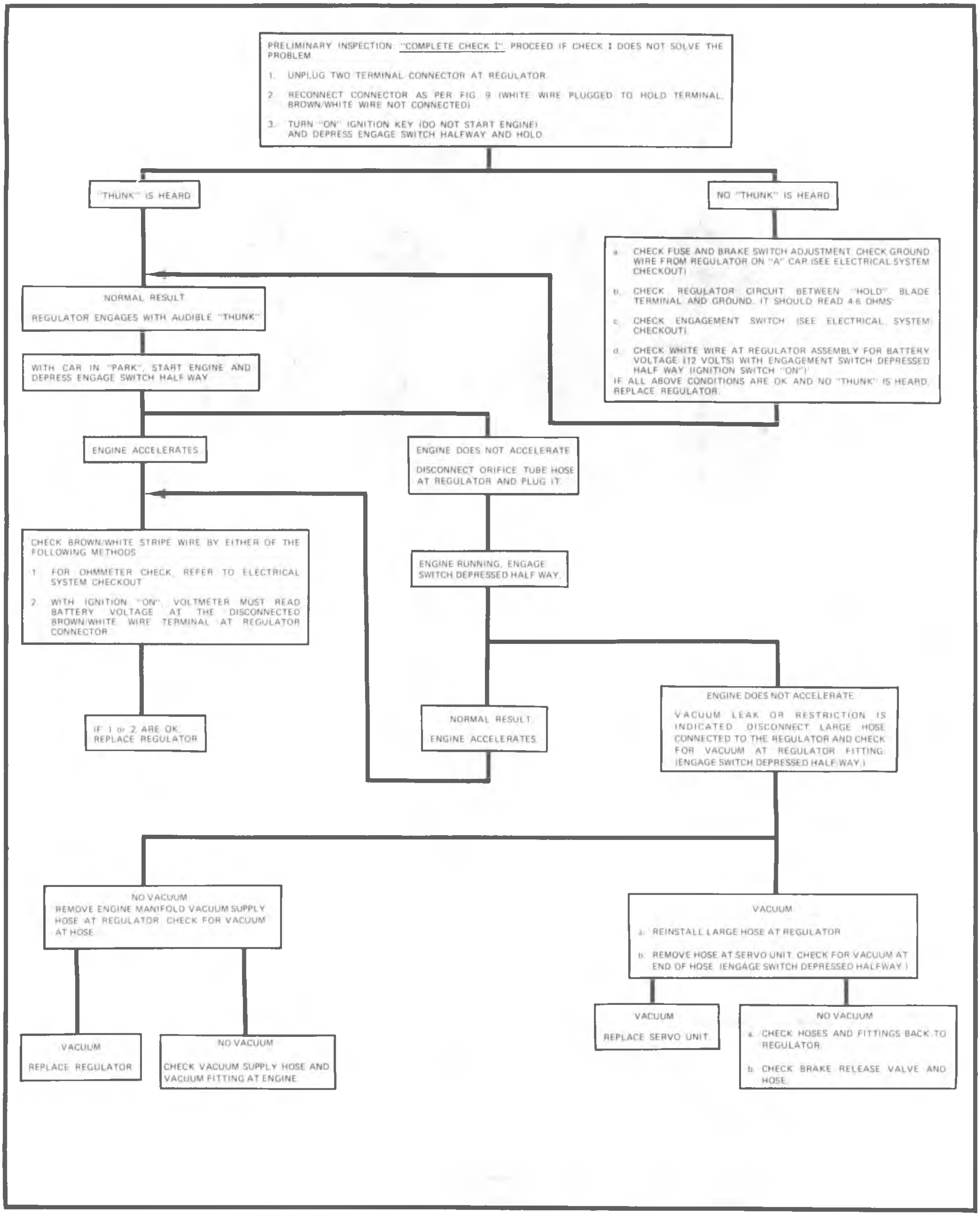


Fig. 9C--System Diagnosis Chart No.2

1976
10-30 SERIES
TRUCK
CHASSIS SERVICE
and
OVERHAUL MANUAL
SUPPLEMENT

OVERHAUL SECTION

The overhaul section of this manual includes new or revised procedures involved in disassembly and assembly of major components.

SECTION INDEX

Printed In U.S.A.

SECTION 1

AIR CONDITIONING

CONTENTS OF THIS SECTION

AXIAL SIX-CYLINDER COMPRESSOR

INDEX

For Compressor REMOVAL AND INSTALLATION, see 1974 Service Manual (page 1A-58).

For all practical purposes, all V8 engine equipped vehicles make use of the same air conditioning 6 cylinder compressor.

Actual differences between compressors are found in their mounting brackets, pulleys, connector assemblies and compressor capacities, none of which will affect the following Overhaul Procedures.

MINOR REPAIR PROCEDURES

The following operations to the Compressor Clutch Plate and Hub, Pulley and Bearing, and Coil Housing are covered as "Minor" because they may be performed WITHOUT FIRST PURGING THE SYSTEM OR REMOVING THE COMPRESSOR from the vehicle.

The Compressor Shaft Seal assembly and Pressure Relief Valve may also be serviced WITHOUT REMOVING THE COMPRESSOR from the vehicle but these operations are covered later in this section as "Major Repair Procedures" because the system MUST FIRST BE PURGED of Refrigerant.

Illustrations used in describing these operations show the compressor removed from the vehicle only to more clearly illustrate the various operations.

When servicing the compressor, remove only the necessary components that preliminary diagnosis indicates are in need of service. Refer to Fig. 1 and Fig. 2 for information relative to parts nomenclature and location.

Removal and installation of external compressor components and disassembly and assembly of internal components must be performed on a clean workbench. **The work area, tools, and parts must be kept clean at all times.** Parts Tray J-9402 (see Fig. 33) should be used for all parts being removed, as well as for replacement parts.

Although certain service operations can be performed without completely removing the compressor from the car, the operations described herein are based on bench over-haul with the compressor removed from the car. They have been prepared in sequence in order of accessibility of the components.

Pad fender/skirt and secure compressor near top of fender skirt with wire, rope, etc.

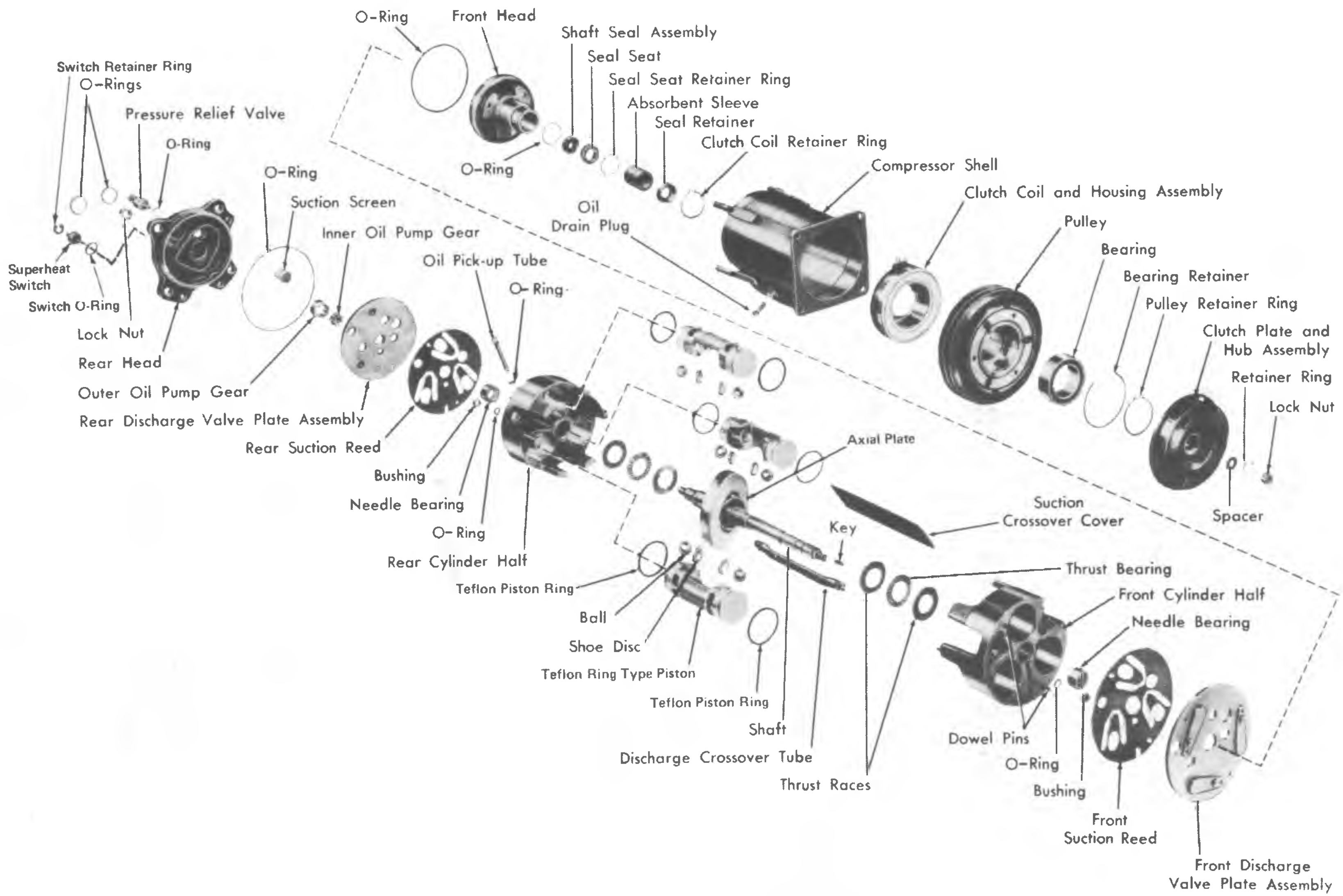


Fig. 1--Exploded View of A-6 Compressor

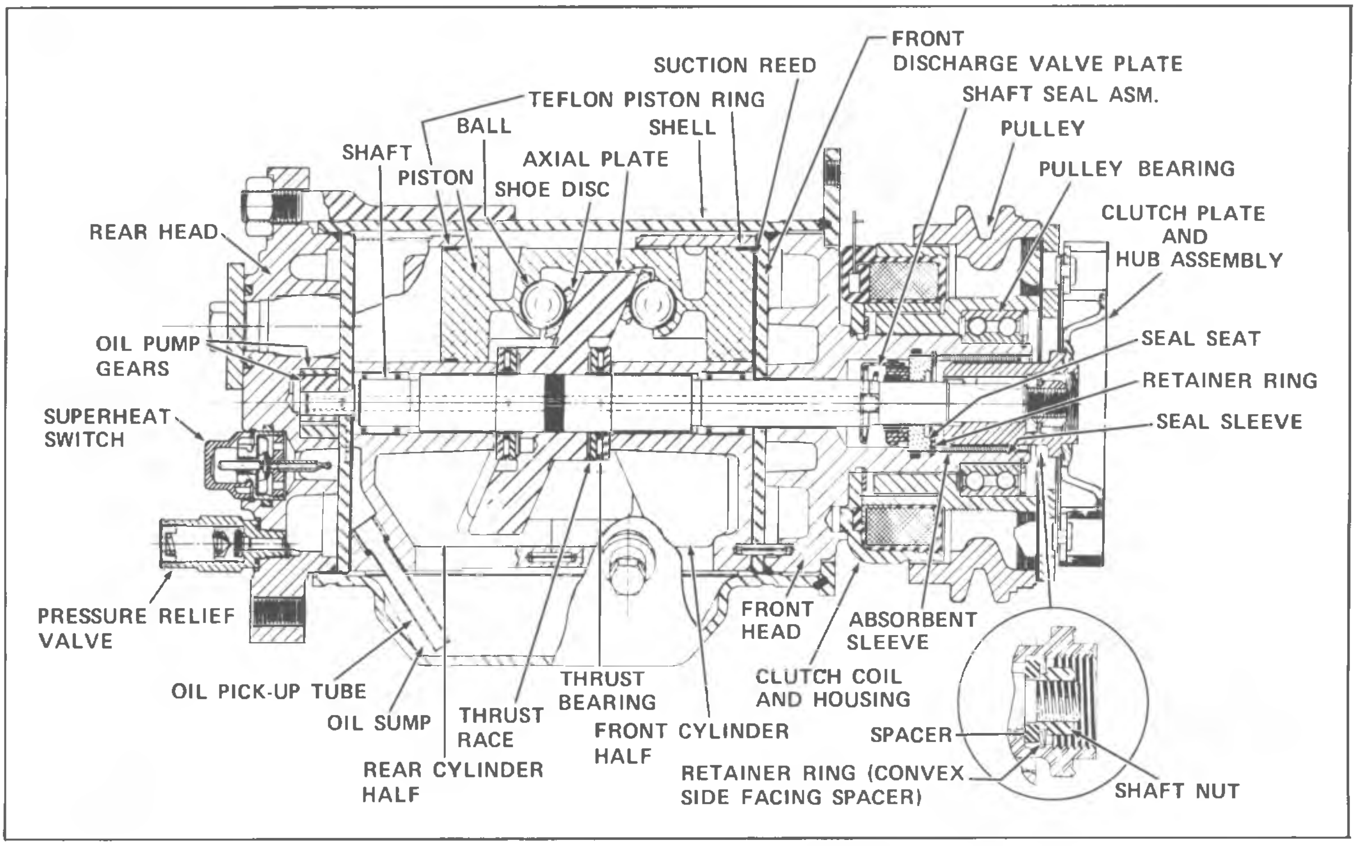


Fig. 2--A-6 Compressor Cross Section

CAUTION: *Do not kink or place excessive tension on lines or hoses.*

When a compressor is removed from the car for servicing, the amount of oil remaining in the compressor should be drained **and measured.** This oil should then be discarded and new 525 viscosity refrigerant oil added to the compressor.

CLUTCH PLATE AND HUB ASSEMBLY

Remove

1. Place Holding Fixture J-9396 in a vise and clamp the compressor in the Holding Fixture.
2. Keep clutch hub from turning with Clutch Hub Holder J-25030 or J-9403, and remove locknut from end of shaft using Thin Wall Socket J-9399 (Fig. 3).

   CAUTION: *To avoid internal damage to the compressor, DO NOT DRIVE OR POUND on the Clutch Plate and Hub assembly OR on the end of the shaft. If proper tools to remove and replace clutch parts are not used, it is possible to disturb the position of the axial plate (keyed to the main shaft), resulting in compressor damage and seal leakage due to shifting of the crankshaft.*

3. Thread Clutch Plate and Hub assembly Remover J-9401 into hub. Hold body of Remover with a wrench and tighten center screw to remove Clutch Plate and Hub assembly (Fig. 4).

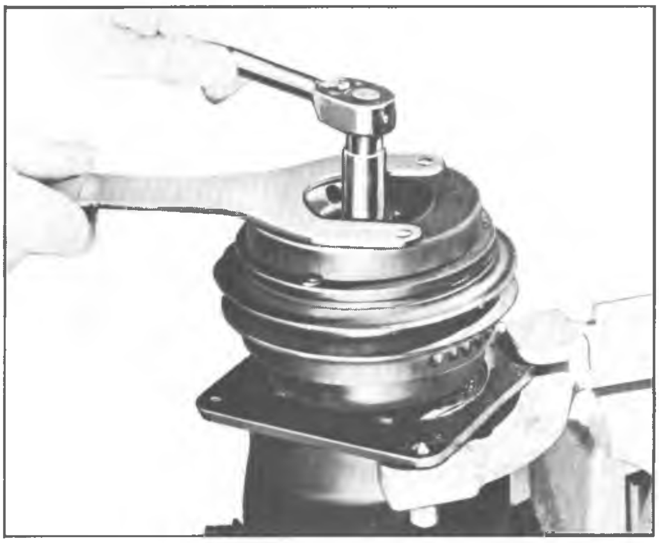


Fig. 3--Removing Shaft Lock Nut

4. Remove square drive key from shaft or drive plate hub.
5. Remove hub spacer retainer ring using Snap-Ring Pliers J-5403(#21), and then remove hub spacer (Fig. 5).
6. Inspect driven plate for cracks or stresses in the drive surface. Do not replace driven plate for a scoring condition. (Fig. 6).

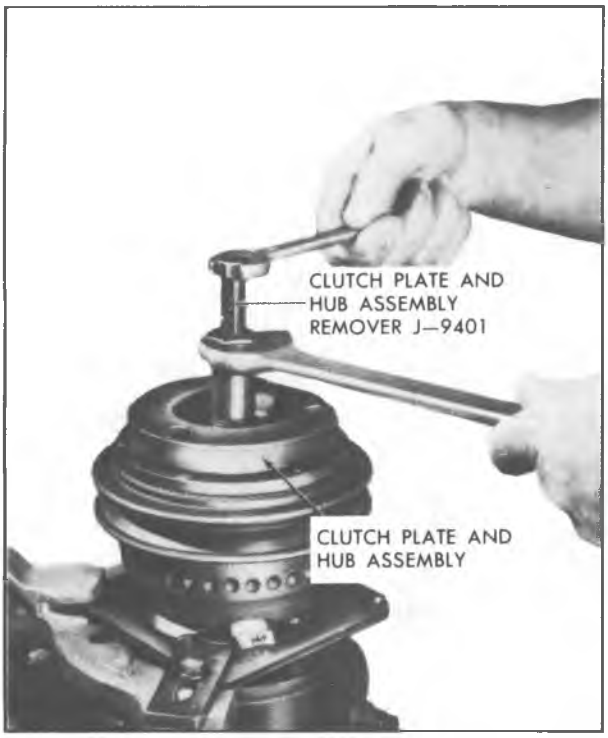


Fig. 4--Removing Clutch Plate and Hub Assembly

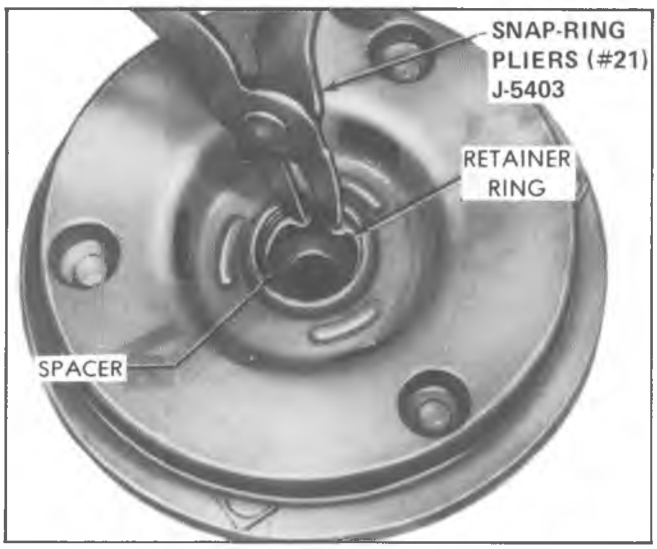


Fig. 5--Removing or Installing Retainer Ring in A-6 Clutch Drive Plate

If the frictional surface shows signs of damage due to excessive heat, the clutch plate and hub and pulley and bearing should be replaced. Check further for the underlying cause of the damage (i.e. low coil voltage - coil should draw 3.2 amps at 12 volts) or binding of the compressor internal mechanism, clutch air gap too wide, broken drive plate to hub asm. springs, etc.

Replace

1. Insert the square drive key into the hub of driven plate; allow it to project approximately 3/16" out of the keyway.
2. Line up the key in the hub with keyway **in the shaft** (Fig. 7).
3. Position the Drive Plate Installer J-9480-1 on the threaded end of the shaft. The Spacer J-9480-2 should be in place **under** the hex nut on the tool. This tool has a left hand thread on the body. (Fig. 8).
4. Press the driven plate onto the shaft until there is approximately 3/32" space between the frictional faces of the clutch drive plate and pulley.

   CAUTION: *Make certain key remains in place when pressing hub on shaft.*

   A ZERO thrust race is approximately 3/32" thick and may be used to roughly gage this operation. Use Clutch Hub Holder J-25030 or J-9403 to hold clutch plate and hub if necessary.
5. Install the hub spacer and, using Snap-Ring Pliers J-5403 (#21), install the retainer ring (see installed Retainer Ring in inset of Fig. 2), with convex side of ring facing spacer.
6. Use Thin-Wall Socket J-9399 and Clutch Hub Holder J-25030 or J-9403 to install a new shaft locknut **with shoulder or circular projection on the locknut facing towards retainer ring.** Tighten the nut to 14-26 lb. ft. torque. Air gap between the frictional faces should now be .022" to .057"(Fig. 9). If not, check for mispositioned key or shaft.
7. The pulley should now rotate freely.
8. Operate the refrigeration system under MAXimum load conditions and engine speed at 2000 RPM. Rapidly cycle the clutch by turning the air conditioning on-and-off at least 15 times at approximately one second intervals to burnish the mating parts of the clutch.

PULLEY AND BEARING ASSEMBLY

Remove

1. Remove clutch plate and hub assembly as described in "Compressor Clutch Plate and Hub Asm." Removal procedure.
2. Remove pulley retainer ring using Snap-Ring Pliers J-6435 (#26), Fig. 10.
3. Pry out absorbent sleeve retainer, and remove absorbent sleeve from compressor neck.
4. Place Puller Pilot J-9395 over end of compressor shaft.

   CAUTION: *It is important that Puller Pilot J-9395 be used to prevent internal damage to compressor when removing pulley.* **Under no circumstances should Puller be used DIRECTLY against drilled end of shaft .**
5. Remove Pulley and Bearing Assembly using Pulley Puller J-8433 (Fig. 11).

Inspection

Check the appearance of the pulley and bearing assembly. See Fig. 6. The frictional surfaces of the pulley and bearing assembly should be cleaned with a suitable solvent before reinstallation.

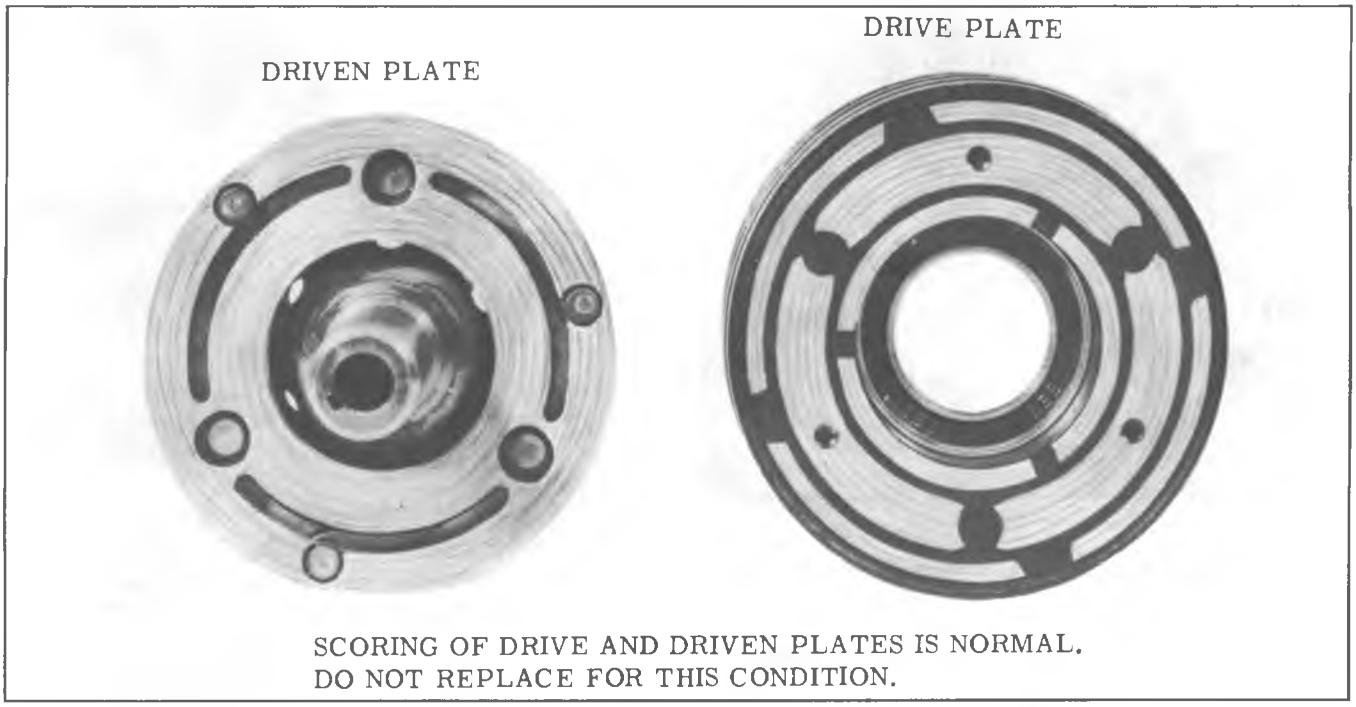


Fig. 6--Clutch Driven Plate and Drive Plate

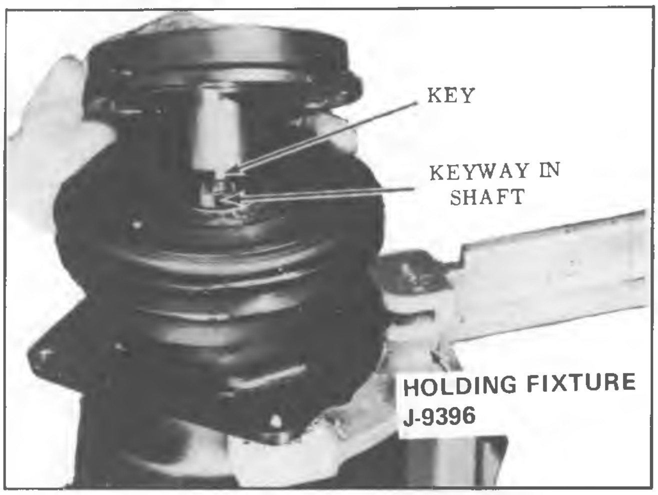


Fig. 7--Aligning Drive Plate Key

Fig. 8--Installing Drive Plate

Replace

1. If original pulley and bearing assembly is to be reinstalled, wipe frictional surface of pulley clean. If frictional surface of pulley shows any indication of damage due to overheating, the pulley and bearing should be replaced.
2. Check bearing for brinelling, excessive looseness, noise, and lubricant leakage. If any of these conditions exist, bearing should be replaced.See "Compressor Pulley Bearing" Replacement Procedure.
3. Press or tap pulley and bearing assembly on neck of compressor until it seats, using Pulley and Bearing Installer J-9481 with Universal Handle J-8092 (Fig. 12). The Installer will apply force to inner race of bearing and prevent damage to bearing.
4. Check pulley for binding or roughness. Pulley should rotate freely.
5. Install retainer ring, using Snap Ring Pliers J-6435 (#26).
6. Install absorbent sleeve in compressor neck.
7. Install absorbent sleeve retainer in neck of compressor. Using sleeve from Seal Seat Remover-Installer J-23128, install retainer so that outer edge is recessed 1/32" from compressor neck face.
8. Install clutch plate and hub assembly as described in "Compressor Clutch Plate and Hub Asm."Replacement Procedure.

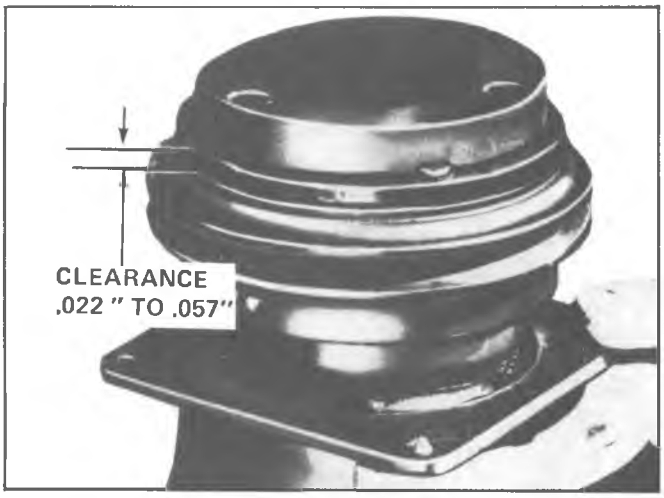


Fig. 9--Checking Air Gap

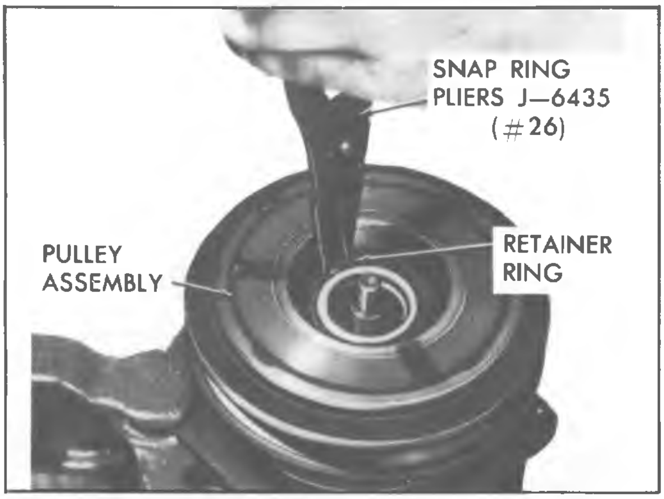


Fig. 10--Removing Pulley Retainer Ring

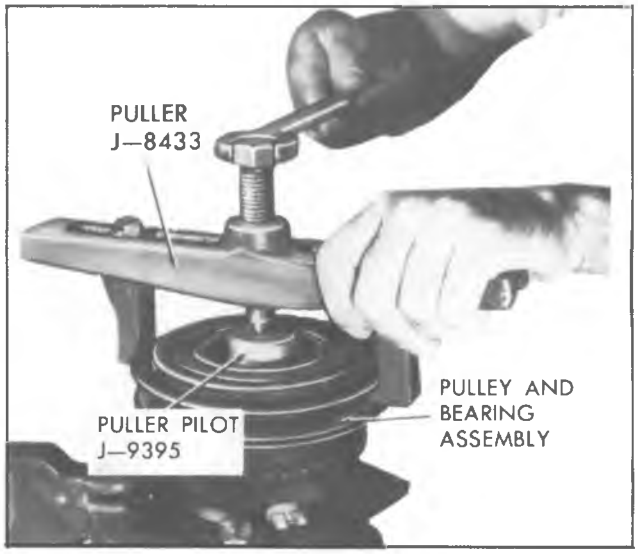


Fig. 11--Removing Pulley and Bearing Assembly

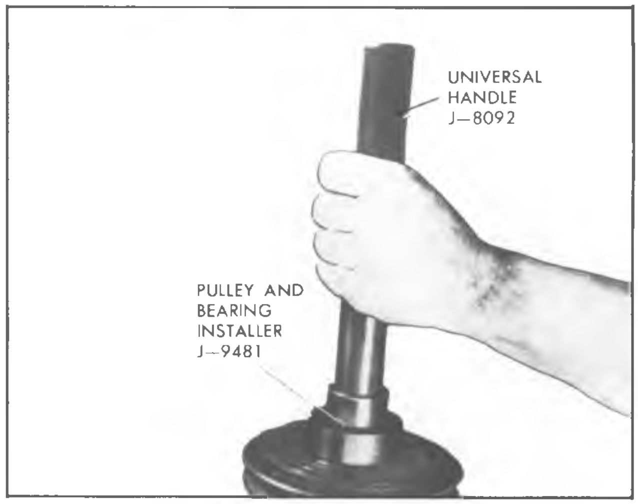


Fig. 12--Installing Pulley and Bearing Assembly

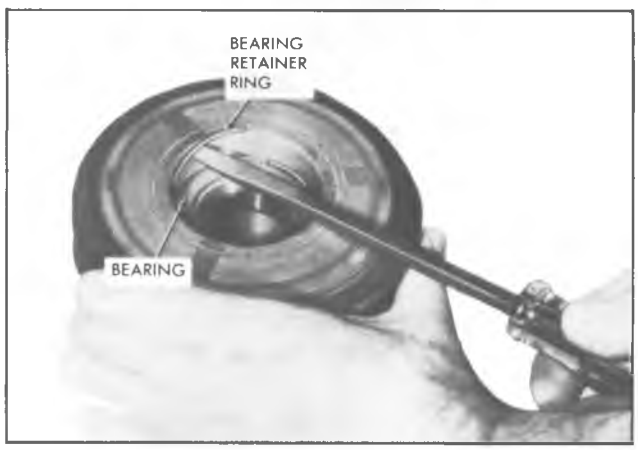


Fig. 13--Removing Pulley and Bearing Retainer Ring

PULLEY BEARING

Remove

1. Remove clutch plate and hub assembly as described in "Compressor Clutch Plate and Hub Asm." Removal procedure.
2. Remove pulley and bearing assembly as described in "Compressor Pulley and Bearing Asm." Removal procedure.
3. Remove pulley bearing retainer ring with a small screwdriver or pointed tool (Fig. 13).
4. Place pulley and bearing assembly on inverted Support Block J-21352 and, using Pulley Bearing Remover J-9398 with Universal Handle J-8092, drive Bearing assembly out of pulley (Fig. 14).

Replace

1. Install new bearing in pulley using Pulley and Bearing Installer J-9481 with Universal Handle J-8092 (Fig. 15). The Installer will apply the force to the outer race of the bearing.

CAUTION: *DO NOT CLEAN NEW BEARING ASSEMBLY WITH ANY TYPE OF SOLVENT. Bearing is supplied with correct lubricant when assembled and requires no other lubricant at any time.*

2. Install bearing retainer ring, making certain that it is properly seated in ring groove.
3. Install pulley and bearing assembly as described in "Compressor Pulley and Bearing Asm." Replacement procedure.
4. Install clutch plate and hub assembly as described in "Compressor Clutch Plate and Hub Asm." Replacement procedure.

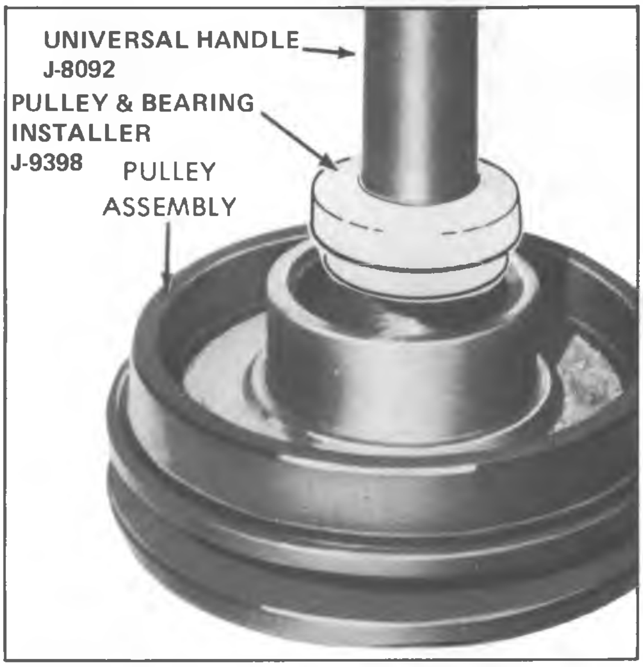


Fig. 14--Removing Bearing from Pulley Assembly

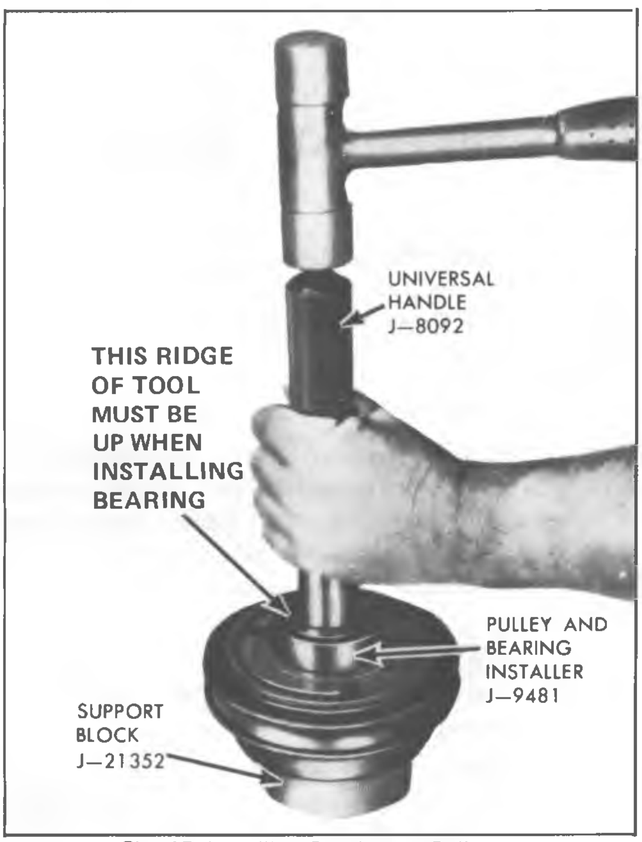


Fig. 15--Installing Bearing on Pulley

CLUTCH COIL AND HOUSING ASSEMBLY

Remove

1. Remove clutch plate and hub assembly as described in "Compressor Clutch Plate and Hub Asm." Removal procedure.
2. Remove pulley and bearing assembly as described in "Compressor Pulley and Bearing Asm." Removal procedure.
3. **Note position of terminals on coil housing and scribe location on compressor front head casting .**
4. Remove coil housing retaining ring using Snap-Ring Pliers J-6435 (#26) (Fig. 16).
5. Lift Coil and Housing assembly off compressor.

Replace

1. Position coil and housing assembly on compressor front head casting so that electrical terminals line up with marks previously scribed on compressor (Fig. 17).
2. Align locating extrusions on coil housing with holes in front head casting.
3. Install coil housing retainer ring **with flat side of ring facing coil** , using Snap-Ring Pliers J-6435 (#26).
4. Install pulley and bearing assembly as described in "Compressor Pulley and Bearing Asm." Replacement procedure.
5. Install clutch plate and hub assembly as described in "Compressor Clutch Plate and Hub Asm." Replacement Procedure.

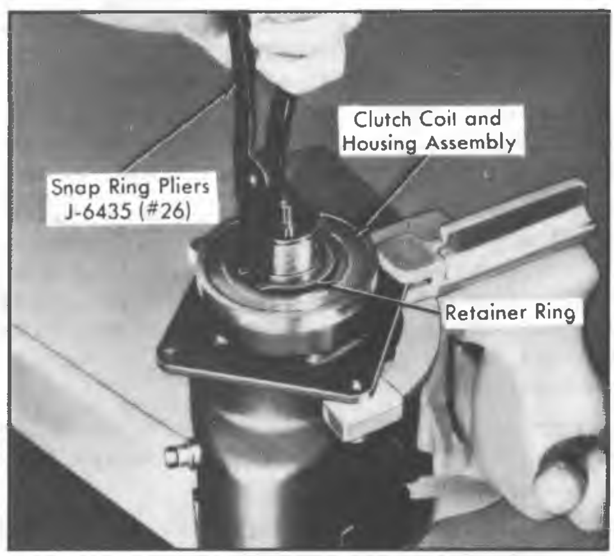


Fig. 16–Removing Coil Housing Retainer Ring

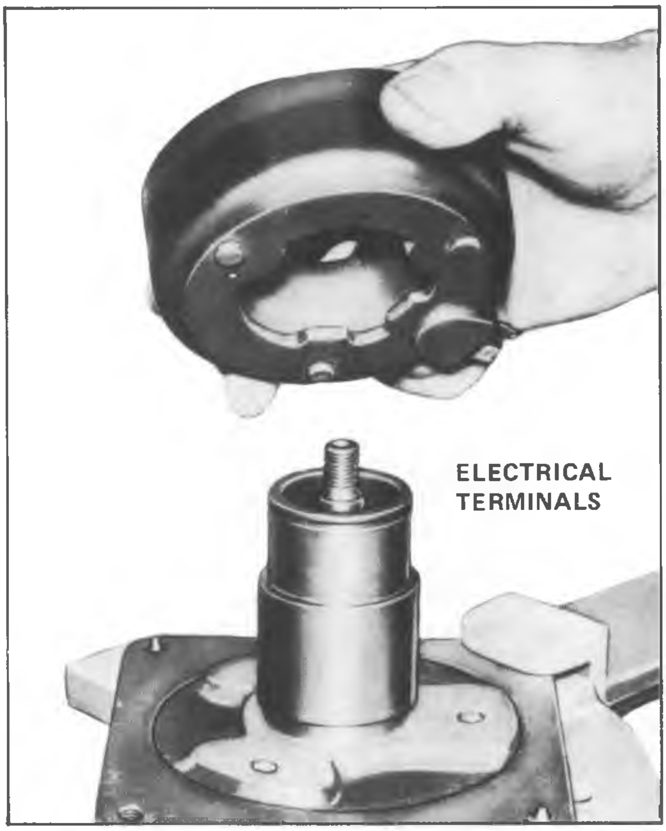


Fig. 17--Installing Coil Housing

MAJOR A-6 COMPRESSOR REPAIR PROCEDURES

Service repair procedures to the Compressor Shaft Seal, Pressure Relief Valve and Superheat Switch, or disassembly of the Internal Compressor Mechanism are considered "MAJOR" SINCE THE REFRIGERATION SYSTEM MUST BE COMPLETELY PURGED OF REFRIGERANT before proceeding and/or because major internal operating and sealing components of the compressor are being disassembled and serviced.

A clean workbench, preferably covered with a sheet of clean paper, orderliness in the work area and a place for all parts being removed and replaced is of great importance, as is the use of the proper, clean service tools. Any attempt to use make-shift or inadequate equipment may result in damage and/or improper compressor operation.

These procedures are based on the use of the proper service tools and the condition that an adequate stock of service parts is available.

All parts required for servicing are protected by a preservation process and packaged in a manner which will eliminate the necessity of cleaning, washing or flushing of the parts. The parts can be used in the mechanism assembly just as they are removed from the service package.

Piston shoe discs and shaft thrust races will be identified by "number" on the parts themselves for reference to determine their size and dimension (see Fig. 41).

SHAFT SEAL

Seal Leak Detection

A SHAFT SEAL SHOULD NOT BE CHANGED BECAUSE OF AN OIL-LINE ON THE HOOD INSULATOR. The seal is designed to seep some oil for lubrication purposes. Only change a shaft seal when a leak is detected by the following procedure .

When refrigerant system components other than the compressor are replaced, the compressor must be removed and oil drained from the compressor if oil was sprayed in large amounts due to leaks or a broken shaft seal.

Compressor shaft seals, unless replaced during a compressor overhaul, are to be replaced only on the basis of actual refrigerant leakage as determined by test with an electronic-type leak detector.

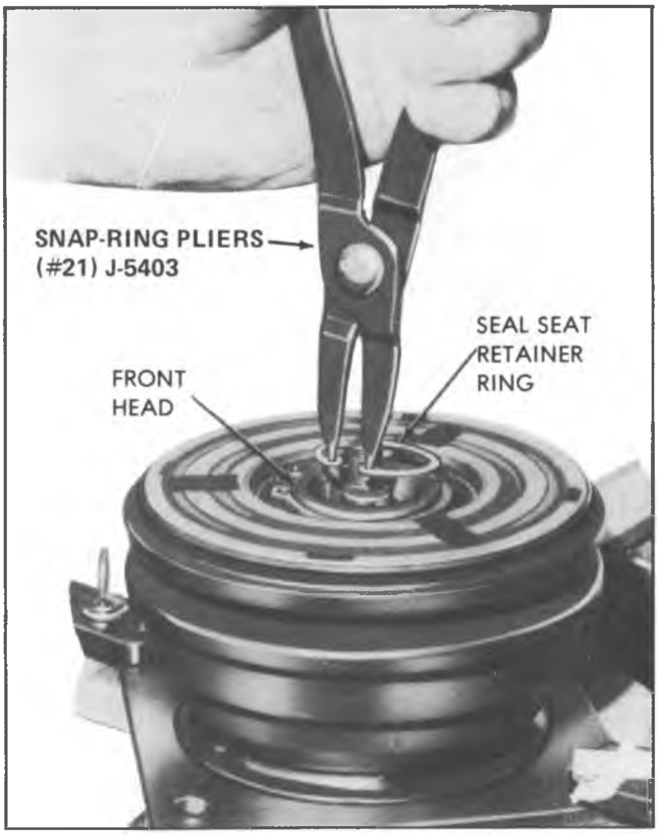


Fig. 18--Removing or Installing Shaft Seal Seat Retaining Ring

WHEN REPLACING THE SHAFT SEAL ASSEMBLY, even if the compressor remains on the vehicle during the operation, IT WILL BE NECESSARY TO PURGE THE SYSTEM OF REFRIGERANT as outlined earlier in the Service Manual.

Remove

1. After first purging the system of refrigerant, remove the clutch plate and hub assembly and shaft key as described in "Compressor Clutch Plate and Hub Asm." Removal procedure.
2. Pry out the sleeve retainer and remove the absorbent sleeve. Remove the shaft seal seat retaining ring, using Snap-Ring Pliers J-5403 (#21). See Fig. 18.
3. Thoroughly clean inside of compressor neck area surrounding the shaft, the exposed portion of the seal seat and the shaft itself. **This is absolutely necessary to prevent any dirt or foreign material from getting into compressor** .
4. Place Seal Protector J-22974 over the end of the shaft to prevent chipping the ceramic seat. Fully engage the knurled tangs of Seal Seat Remover-Installer J-23128 into the recessed portion of the seal seat by turning the handle **clockwise** . Lift the seat from the compressor with a rotary motion (Fig. 19).

   CAUTION: *DO NOT tighten the handle with a wrench or pliers; however, the handle must be hand-tightened securely to remove the seat.*

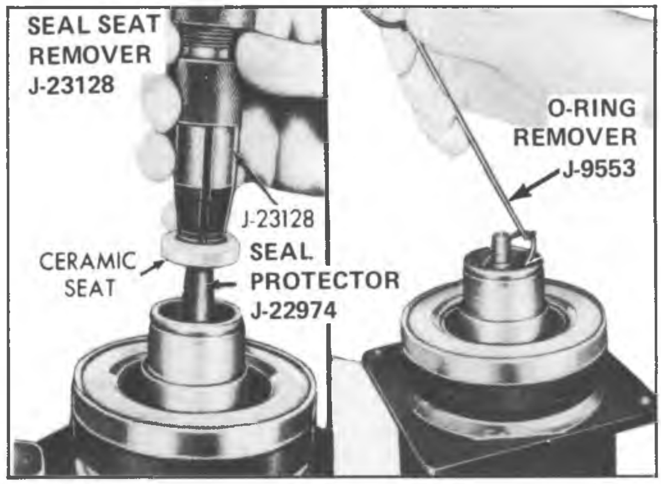


Fig. 19--Removing Shaft Seal Seat and O-Ring

5. With Seal Protector J-22974 still over the end of the shaft, engage the tabs on the seal assembly with the tangs on Seal Installer J-9392 by twisting the tool **clockwise, while pressing the tool down** . Then lift the seal assembly out (see Fig. 20).
6. Remove the seal seat O-ring from the compressor neck using O-Ring Remover J-9533 (See Fig. 19).
7. Recheck the shaft and inside of the compressor neck for dirt or foreign material and be sure these areas are perfectly clean before installing new parts.

Inspection

SEALS SHOULD NOT BE REUSED. ALWAYS USE A NEW SEAL KIT ON REBUILD. Be extremely careful that the face of the seal to be installed is not scratched or damaged in any way . Make sure that the seal seat and seal are free of lint and dirt that could damage the seal surface or prevent sealing.

Replace

1. Coat new seal seat O-ring with clean 525 viscosity refrigerant oil and install in compressor neck, **making certain it is installed in bottom groove** (Fig. 20 and Fig. 21). Top groove is for retainer ring. Use O-Ring Installer J-21508.
2. Coat the O-ring and seal face of the new seal assembly with clean 525 viscosity refrigerant oil. Carefully mount the seal assembly to Seal Installer J-9392 by engaging the tabs of the seal with the tangs of the tool (Fig. 20).
3. Place Seal Protector J-22974 (Fig. 20) over end of shaft and **carefully slide the new seal assembly onto the shaft. Gently twist the tool CLOCK-WISE, while pushing the seal assembly down the shaft** until the seal assembly engages the flats on the shaft and is seated in place. Disengage the tool by pressing downward and twisting tool counterclockwise.
4. Coat the seal face of the new seal seat with clean 525 viscosity refrigerant oil. Mount the seal seat on Seal Seat Remover-Installer J-23128 and install it in the compressor neck, taking care not to dislodge the seal

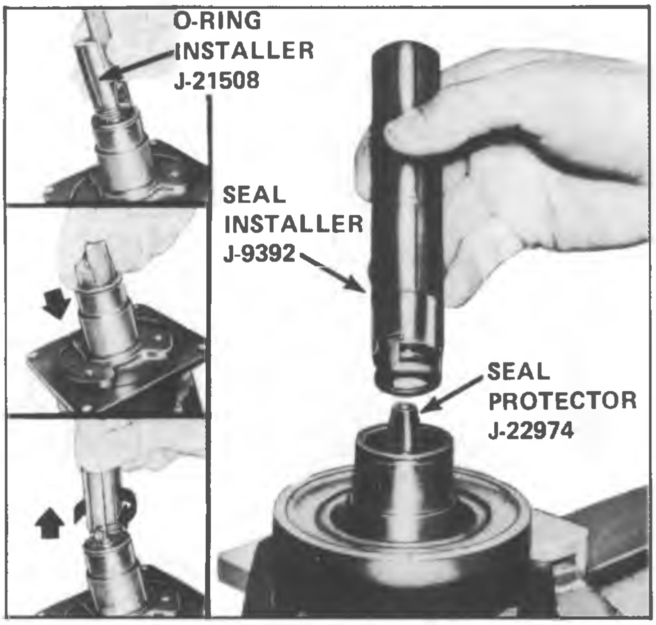


Fig. 20--Replacing Seal and O-Ring

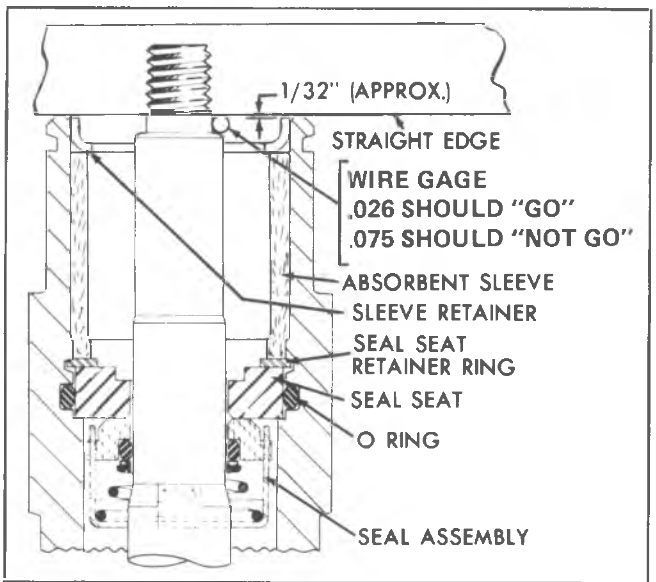


Fig. 21--Compressor Shaft and Seal

seat O-ring and being sure the seal seat makes a good seal with the O-ring. Remove Seal Protector J-22974 from the end of the shaft (see Fig. 19).

5. Install the new seal seat retainer ring **with its flat side against the seal seat**, using Snap-Ring Pliers J-5403 (#21). See Fig. 18. Use the sleeve from Seal Seat Remover-Installer J-23128 (Fig. 19) to press in on the seal seat retainer ring so that it snaps into its groove.

6. Install Compressor Leak Test Fixture J-9625 on rear head of compressor and connect gage charging lines as shown for bench test in Fig. 22 or pressurize SUCTION SIDE of compressor on car with Refrigerant-12 vapor to equalize pressure to the drum pressure. Temporarily install the shaft nut and, with compressor in horizontal

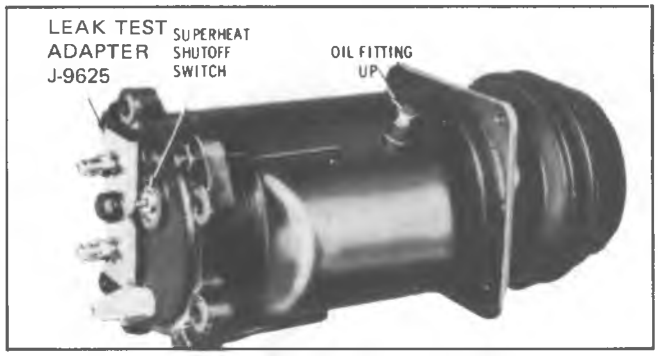


Fig. 22--Leak Testing A-6 Compressor

position and oil sump down, rotate the compressor shaft in normal direction of rotation several times by hand. Leak test the seal with an electronic-type Leak Detector. Correct any leak found. Remove and discard the shaft nut.

7. Remove any excess oil, resulting from installing the new seal parts, from the shaft and inside the compressor neck.

8. Install the new absorbent sleeve by rolling the material into a cylinder, overlapping the ends, and then slipping the sleeve into the compressor neck with the overlap towards the top of the compressor. With a small screwdriver or similar instrument, carefully spread the sleeve until the ends of the sleeve butt at the top vertical centerline.

9. Position the new metal sleeve retainer so that its flange face will be against the front end of the sleeve. Pulley Puller Pilot J-9395 (See Fig. 11) may be used to install the retainer. Press and tap with a mallet, setting the retainer and sleeve into place (retainer should be recessed approximately 1/32" from the face of the compressor neck). See Fig. 21.

10. Reinstall the clutch plate and hub assembly as described in"Compressor Clutch Plate and Hub Asm." Replacement procedure.

Some compressor shaft seal leaks may be the result of mispositioning of the axial plate on the compressor shaft. The mispositioning of the axial plate may be caused by improper procedures used during pulley and driven plate removal, pounding, collisions or dropping the compressor. If the axial plate is mispositioned, the carbon face of the shaft seal assembly may not contact the seal seat and the rear thrust races and bearing may be damaged.

If there appears to be too much or insufficient air gap between the drive and driven plates, dislocation of the shaft should be suspected. If the carbon seal is not seating against the seal seat, it will not be possible to completely evacuate the system as outlined under "Evacuating the Refrigeration System."

To check for proper positioning of the axial plate on the shaft, remove the clutch driven plate and measure the distance between the front head extension and the flat

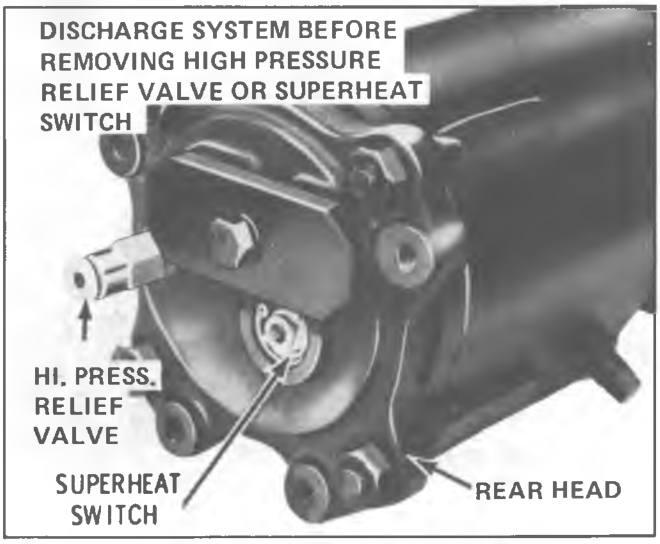


Fig. 23--Hi. Press. Relief Valve Location

shoulder on the shaft as shown in Fig. 21. To measure this distance, use a wire gage **(the clearance should be between .026" and .075")**. If the shaft has been pushed back in the axial plate (measurement greater than .075"), disassemble the compressor and replace the shaft and axial plate assembly rear thrust races and thrust bearing.

11. Evacuate and charge system as outlined under "Evacuating and Charging the Refrigeration System".

PRESSURE RELIEF VALVE

When necessary to replace the pressure relief valve, located in the compressor rear head casting, the valve assembly should be removed after PURGING THE SYSTEM OF REFRIGERANT and a new valve and gasket installed. The entire system should then be "Evacuated and Recharged." (Fig. 23).

INTERNAL MECHANISM

Service operations to the rear head or internal mechanism of the compressor **should be performed with the compressor removed from the vehicle** to insure that the necessary degree of cleanliness may be maintained. Clean hands, clean tools and a clean bench, preferably covered with clean paper, are of extreme importance.

An inspection should be made of the internal mechanism assembly to determine if any service operations should be performed. A detailed inspection of parts should be made to determine if it is economically feasible to replace them.

Remove

1. Before proceeding with disassembly, wipe exterior surface of compressor clean.
2. All oil in compressor should be drained and measured. Assist draining by positioning compressor with oil drain plug down. **Record the amount of oil drained from the compressor.**

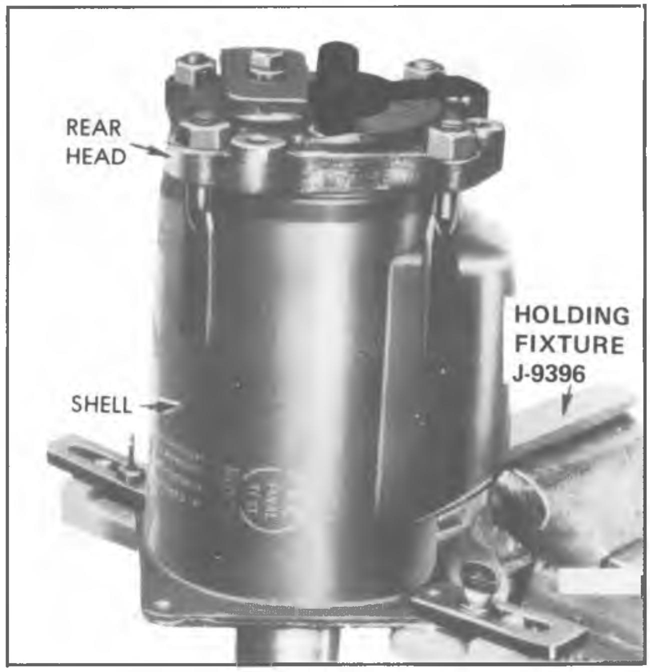


Fig. 24--Compressor Installed in Holding Fixture

3. Invert compressor and Holding Fixture J-9396 with front end of compressor shaft facing downward. (Fig. 24).

   Additional oil may leak from compressor at this time. All oil must be drained into a container so that TOTAL amount can be measured. A liquid measuring cup may be used for this purpose. Drained oil should then be discarded.

4. Remove four locknuts from threaded studs on compressor shell and remove rear head. Tap uniformly around rear head if head is binding. (Fig. 24)
5. Wipe excess oil from all sealing surfaces on rear head casting webs, and examine sealing surfaces (Fig. 25). If any damage is observed, the head should be replaced.
6. Remove suction screen and examine for any damage or contamination. Clean or replace if necessary.
7. Paint an identifying mark on exposed face of inner and outer oil pump gears and then remove gears. Identifying marks are to assure that gears, if reused, will be installed on identical position.
8. Remove and discard rear head to shell O-ring.
9. Carefully remove rear discharge valve plate assembly. Use two small screwdrivers under reed retainers to pry up on assembly (Fig. 26). **Do not position screwdrivers between reeds and reed seats** .
10. Examine valve reeds and seats. Replace entire assembly if any reeds or seats are damaged.
11. Using two small screwdrivers, carefully remove rear suction reed (Fig. 27). **Do not pry up on horseshoe-shaped reed valves** .

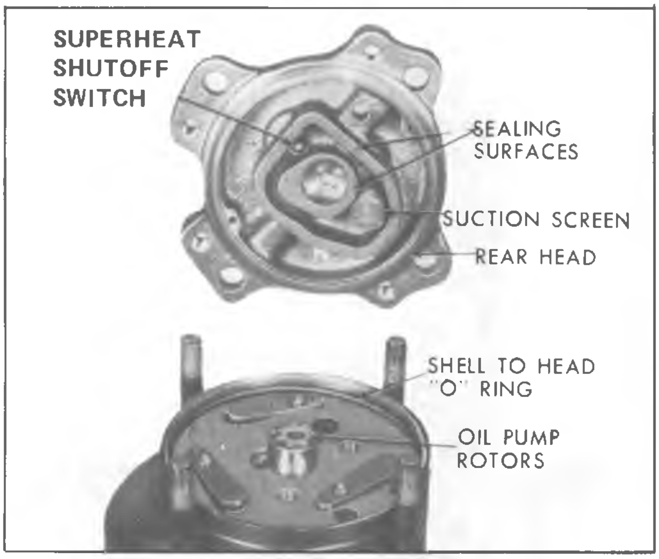


Fig. 25--Rear Head Removal

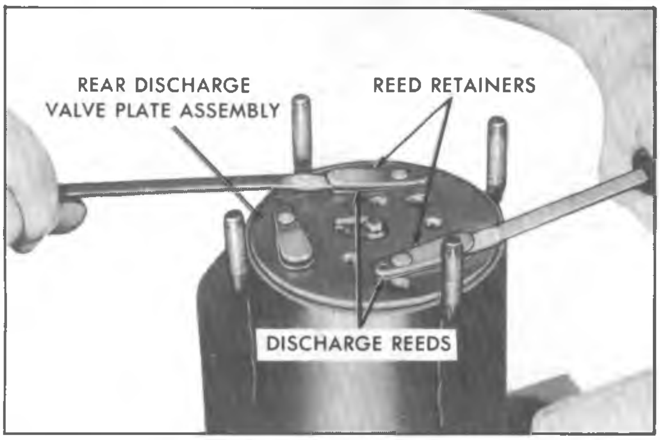


Fig. 26--Removing Rear Discharge Valve Plate

Fig. 27--Removing Rear Suction Reed

12. Examine reeds for damage, and replace if necessary.
13. Using Oil Pick-Up Tube Remover J-5139 (Fig. 28), remove oil pick-up tube. Remove O-ring from oil inlet.
14. Loosen compressor from Holding Fixture J-9396, place Internal Assembly Support Block J-21352 over oil pump end of shaft and, holding Support Block in position with one hand, lift compressor from Holding Fixture with other hand. Invert compressor and position on bench with Internal Assembly Support Block resting on bench.

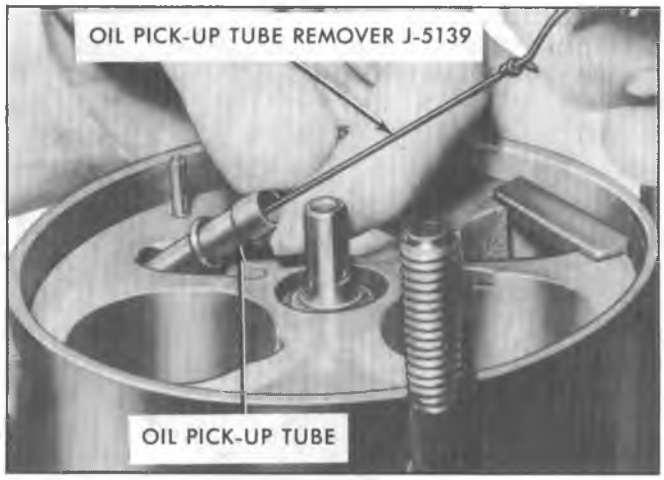


Fig. 28--Removing Oil Pick-Up Tube

15. Lift front head and compressor shell assembly up, leaving internal mechanism resting on Internal Assembly Support Block.

    CAUTION: *To prevent damage to shaft, DO NOT TAP ON END OF COMPRESSOR SHAFT to remove internal mechanism. If mechanism will not slide out of compressor shell, tap on front head with a plastic hammer.*

16. Rest compressor shell on its side and push front head assembly through compressor shell, **being careful not to damage sealing areas on inner side of front head.** Discard O-ring.

    It may be necessary to tap on outside of front head, using a plastic hammer, to overcome friction of O-ring seal between front head and compressor shell.

17. Wipe excess oil from sealing surfaces on front head casting webs and examine sealing surface. If any surface damage is observed, the head should be replaced.
18. Remove front discharge valve plate assembly and front suction reed plate. Examine reeds and seats. Replace necessary parts.
19. Remove suction cross-over cover by prying with screwdriver between cylinder casting and cover (Fig. 29).
20. Examine internal mechanism for any obvious damage. If internal mechanism has sustained major damage, due to loss of refrigerant or oil, it may be necessary to use the Service internal mechanism Assembly rather than replace individual parts.

INTERNAL MECHANISM

Disassembly

Use Parts Tray J-9402 (Fig. 33) to retain compressor parts during disassembly.

1. Remove internal mechanism from compressor as described in "Compressor Internal Mechanism" Removal procedure.

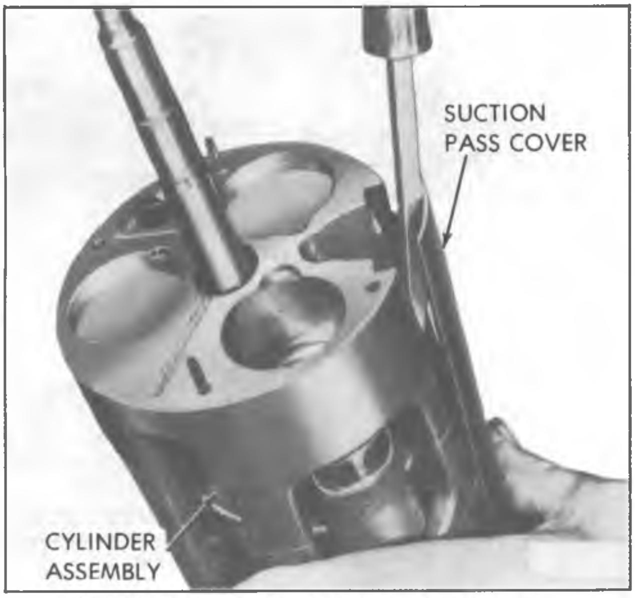


Fig. 29--Removing Suction Cross Over Cover

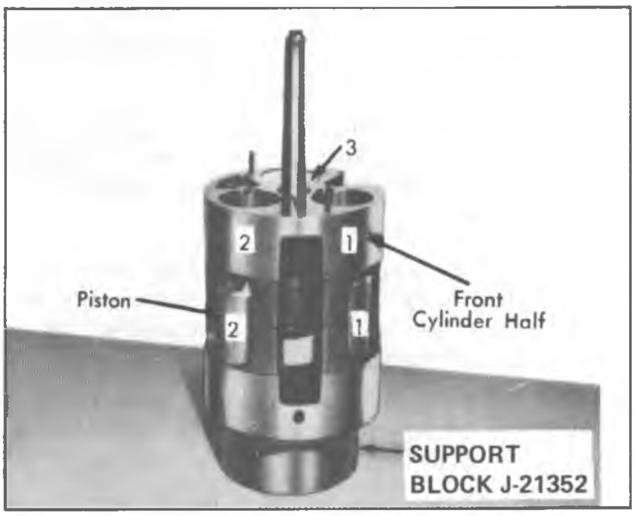


Fig. 30--Numbering Piston and Cylinder Bores

2. Identify by pencil mark, or some other suitable means, each piston numbering them as 1, 2, and 3 (Fig. 30).

   Number the piston bores in the front cylinder half in like manner, so that pistons can be replaced in their original locations.

3. Separate cylinder halves, using a wood block and mallet (Fig. 31). Make certain that discharge cross-over tube does not contact axial plate when separating cylinder halves (a new Service discharge cross-over tube will be installed later).

   CAUTION: *UNDER NO CIRCUMSTANCES SHOULD SHAFT BE STRUCK AT EITHER END in an effort to separate upper and lower cylinder halves because the shaft and the axial plate could be damaged.*

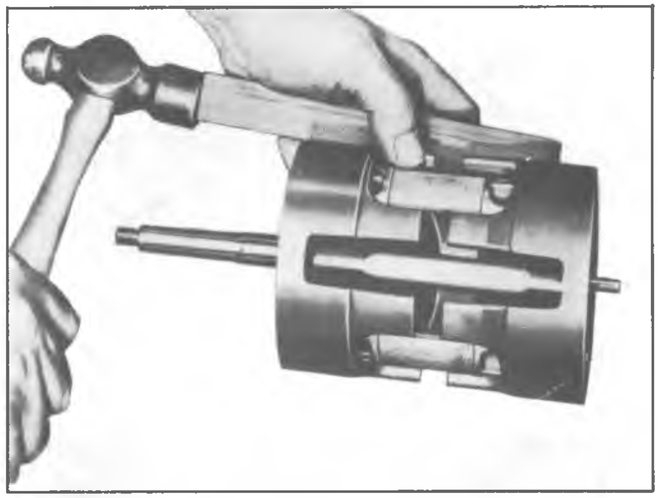


Fig. 31--Separating Cylinder Halves

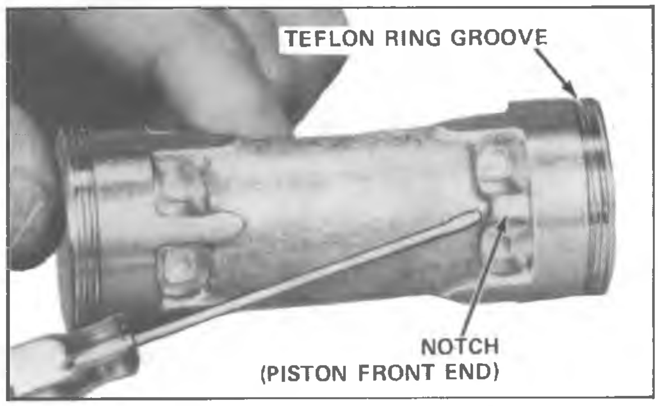


Fig. 32--Notch Identifying Front End of A-6 Piston

4. Carefully remove the rear half of the cylinder from the pistons and set the front cylinder half, with the piston, shaft and axial plate in Compressing Fixture J-9397.
5. Pull up on compressor shaft and remove piston previously identified as No. 1, with balls and shoe discs, from axial plate.
   a. **Inspect the Teflon piston rings** for nicks, cuts or metal particles imbedded in exposed ring surface and replace the piston rings as required if either condition exists. See "Teflon Piston Ring" Replacement procedure.
6. Remove and discard the piston shoe discs.
7. Remove and examine piston balls, and if satisfactory for re-use, place balls in No. 1 compartment of Parts Tray J-9402 (Fig. 33).
8. Place piston in No. 1 compartment of Parts Tray J-9402, with notch in casting web at front end of piston (Fig. 32) into the dimpled groove of Parts Tray compartment.
9. Repeat Steps 5 through 9 for Pistons No. 2 and No. 3.
10. Remove rear combination of thrust races and thrust bearing from shaft. Discard races and bearing.

Fig. 33–A-6 Parts Tray

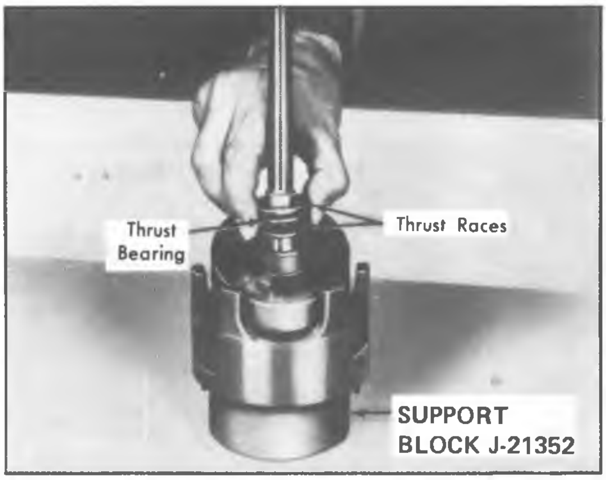


Fig. 34–Removing Front Thrust Races and Bearings

11. Remove shaft assembly from front cylinder half. If the discharge cross-over tube remained in the front cylinder half, it may be necessary to bend discharge cross-over tube slightly in order to remove shaft.
12. Remove front combination of thrust races and bearing from shaft. Discard races and bearing.
13. Examine surface of axial plate and shaft. Replace **as an assembly** , if necessary.

    A certain amount of shoe disc wear on axial plate is normal, as well as some markings indicating load of needle bearings on shaft.
14. Remove discharge cross-over tube from cylinder half, using self-clamping pliers.

    This is necessary only on original factory equipment, as ends of the tube are swedged into cylinder halves. The discharge cross-over tube in internal mechanism assemblies that have been **previously** serviced have an O-ring and bushing at EACH END of the tube, and can be easily removed by hand (see Fig. 53).
15. Examine piston bores and needle bearings in front and rear cylinder halves. Replace front and rear cylinders if any cylinder bore is deeply scored or damaged.

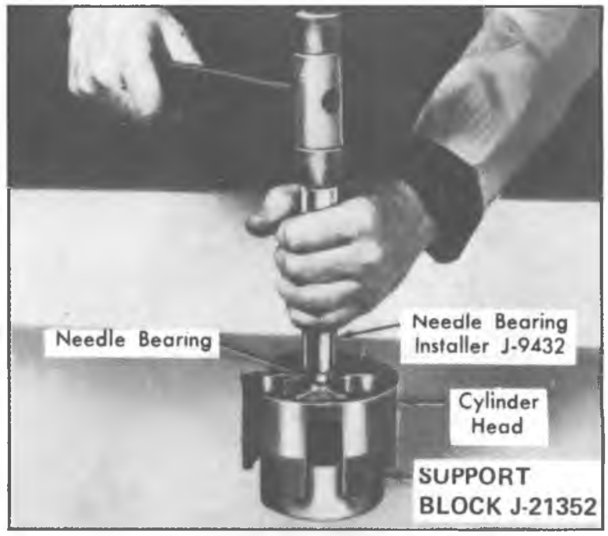


Fig. 35--Installing Needle Bearing

16. Needle bearings may be removed if necessary by driving them out with special Thin-Wall Socket J-9399. Insert socket in hub end (inner side) of cylinder head and drive bearing out. To install needle bearing, place cylinder half on Support Block J-21352, and insert bearing in end of cylinder head with bearing **identification marks UP.** Use Needle Bearing Installer J-9432 and drive bearing into cylinder head (Fig. 35), until tool bottoms on the cylinder face.

    Two different width needle bearings are used in Production compressors - a 1/2" size and a 5/8" size. **The bearings ARE interchangeable.** Service replacement bearings are all 1/2".
17. Wash all parts to be re-used with trichlorethylene, stoddard solvent, kerosene, or a similar solvent. Air-dry parts using a source of clean, dry air.

    Compressor internal components may be identified by referring to Fig. 1 and Fig. 2.

INTERNAL MECHANISM

Gaging Operation

1. Install Compressing Fixture J-9397 on Holding Fixture J-9396 in vise. Place front cylinder half in Compressing Fixture, flat side down. Front cylinder half has long slot extending out from shaft hole.
2. Secure from Service parts stock **four** ZERO thrust races and **three** ZERO shoe discs.
3. Install a ZERO thrust race, thrust bearing, and a second ZERO thrust race on front end of compressor shaft. Lubricate races and bearing with petrolatum.
4. Insert threaded end of shaft through needle bearing in front cylinder half, and allow thrust race and bearing assembly to rest on hub of cylinder.
5. Now install a ZERO thrust race on rear end of compressor shaft (Fig. 36), so that it rests on hub of axial plate. Then install thrust bearing and a second ZERO thrust race. Lubricate races and bearing with petrolatum.

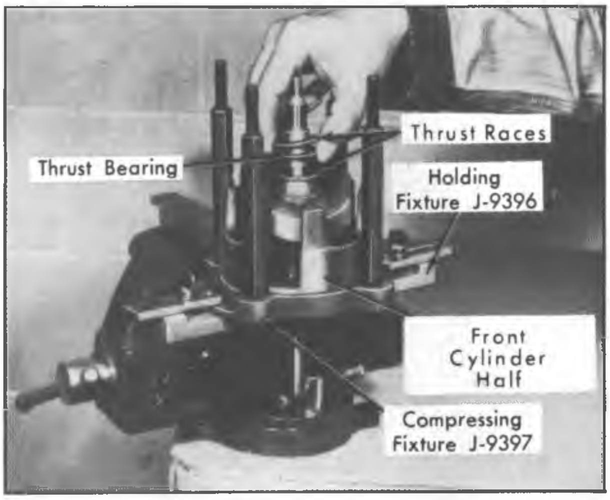


Fig. 36--Installing Rear Thrust Races and Bearings

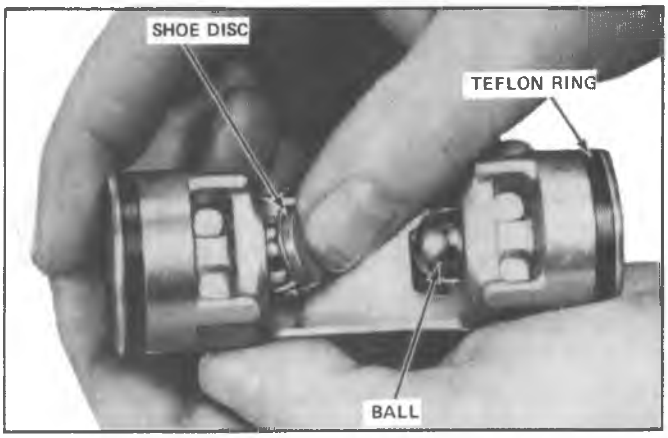


Fig. 37--Installing FRONT Shoe Disc

6. Lubricate ball pockets of the No. 1 Piston with 525 viscosity refrigerant oil and place a ball in each socket. Use balls previously removed if they are to be re-used.
7. Lubricate cavity of a ZERO shoe disc with 525 viscosity refrigerant oil and place shoe disc over ball in **front end** of piston (Fig. 37). **Front end of piston has an identifying notch in casting web** (Fig. 32).

   CAUTION: *Exercise care in handling the Piston and Ring Assembly, particularly during assembly into and removal from the cylinder bores to prevent damage to the Teflon piston rings.*

   Shoe discs should not be installed on rear of piston during following "Gaging" operation.

8. Rotate shaft and axial plate until high point of axial plate is over the No. 1 Piston cylinder bore.
9. Lift shaft assembly up and hold front thrust race and bearing assembly against axial plate hub.

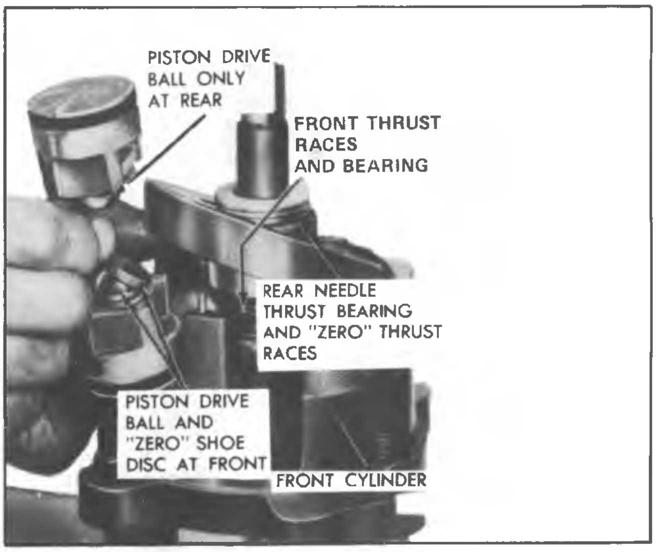


Fig. 38--Installing Piston During Gaging Operation

10. Position piston over No. 1 cylinder bore (notched end of piston being on bottom and piston straddling axial plate) and lower the shaft to allow piston to drop into its bore (Fig. 38).
11. Repeat Steps 6 through 10 for Pistons No. 2 and No. 3.
12. Install rear cylinder half on pistons, aligning cylinder with discharge cross-over tube hole in front cylinder. Tap into place using a plastic mallet or piece of clean wood and hammer (Fig. 39).
13. Position discharge cross-over tube opening between a pair of Compressing Fixture bolts to permit access for feeler gage.
14. Install top plate on Compressing Fixture J-9397. Tighten nuts to 15 lb. ft. torque using a 0-25 lb. ft. torque wrench.

Gaging Procedure (Steps 15 thru 18)

The gaging operations which follow have been worked out on a simple basis to establish and provide necessary running tolerances. Two gaging procedures are necessary.

The first is made to choose the proper size shoe discs to provide, at each piston, a .0016" to .0024" total preload between the seats and the axial plate at the tightest place through the 360-degree rotation of the axial plate at the tightest plate. The bronze shoe discs are provided in .0005" variations, including a basic ZERO shoe.

The second, performed at the rear shaft thrust bearing and race pack, is designed to obtain .0025" to .0030" preload between the hub surfaces of the axial plate and the front and rear hubs of the cylinder. A total of 14 steel thrust races, including a basic ZERO race, are provided in increments of .0005" thickness to provide the required fit.

Feeler Gage Set J-9564 or J-9661-01 may be used for gaging proper shoe disc size. Feeler Gage Set J-9564-01 or Dial Indicator Set J-8001-3 may be used to determine proper

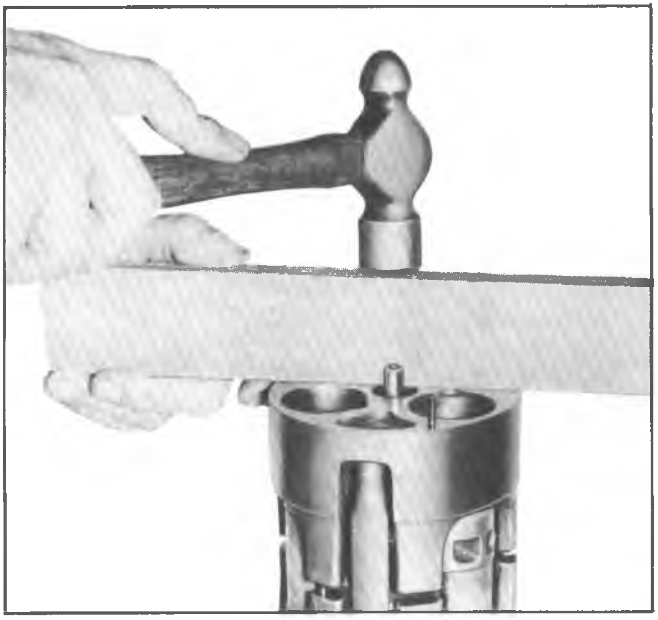


Fig. 39--Assembling Cylinder Halves

thrust race size.

PROPER SELECTION OF THRUST RACES AND BALL SEATS IS OF EXTREME IMPORTANCE.

15. Measure clearance between rear ball of No. 1 Piston and axial plate, in following manner:
    a. Select a suitable combination of well-oiled Feeler Gage leaves to fit snugly between ball and axial plate.
    b. Attach a spring scale, reading in 1-ounce increments, to the feeler gage. A distributor point checking scale or Spring Scale J-544 may be used.
    c. Pull on Spring Scale to slide Feeler Gage stock out from between ball and axial plate, and note reading on Spring Scale as Feeler Gage is removed (Fig. 40). **Reading should be between 4 and 8 ounces.**
    d. If reading in Step c. above is under 4 OR over 8 ounces, reduce or increase thickness of Feeler Gage leaves and repeat Steps a. through c. above until a reading of 4 to 8 ounces is obtained. Record clearance between ball and axial plate that results in th 4 to 8-ounce pull on Spring Scale.
16. Now rotate shaft 120° and repeat Step 15 between same ball and axial plate. Record this measurement.

    If shaft is hard to rotate, install shaft nut onto shaft and turn shaft with wrench.
17. Rotate shaft another 120° and again repeat Step 15 between these same parts and record measurements.
18. Select a "numbered" shoe disc corresponding to minimum feeler gage reading recorded in the three checks above. (See example in Fig. 42). Place shoe discs in Parts Tray J-9402 compartment corresponding to Piston No. 1 and rear ball pocket position.

    Shoe discs are provided in .0005" (one-half thousandths) variations, There are a total of 11 sizes available for field servicing. All shoe discs are marked with the shoe size,

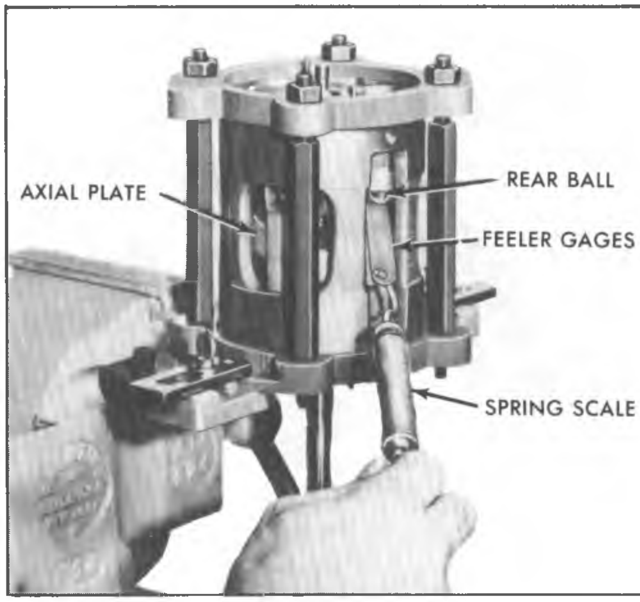


Fig. 40--Gaging Rear Piston Ball

which corresponds to the last three digits of the piece part number. (See Shoe Disc size Chart in Fig. 41 above.)

Once a proper selection of the shoe has been made, THE MATCHED COMBINATION OF SHOE DISC TO REAR BALL AND SPHERICAL CAVITY IN PISTON MUST BE KEPT IN PROPER RELATIONSHIP during disassembly after gaging operation, and during final assembly of internal mechanism.

19. Repeat in detail the same gaging procedure outlined in Steps 15 through 18 for Piston No. 2 and No. 3.
20. Mount Dial Indicator J-8001-3 on edge of Compressing Fixture J-9397 with Clamp J-8001-1 and Sleeve J-8001-2 (Fig. 43). Position Dial Indicator on rear end of shaft and adjust to "zero".

    Apply full hand-force at end of mainshaft a few times before reading clearance. This will help squeeze the oil out from/between mating parts. Push upward and record measurement. Dial Indicator increments are .001"; therefore, reading must be estimated to nearest .0005".

    An alternate method of selecting a proper race is to use Gage Set J-9661-01, selecting a suitable feeler gage leaf until the result is a 4 to 8 ounce pull on the scale between the rear thrust bearing and upper (or outer rear) thrust race (Fig. 44). If the pull is just less than 4 ounces, add .0005" to the thickness of the feeler stock used to measure the clearance. If the pull on the scale reads just over 8 ounces, then subtract .0005" from the thickness of the feeler stock. **Select a race TWO (2) FULL SIZES LARGER than feeler gage thickness** (If feeler gage is .007", select a No. 9 or 090 race).
21. **Select a thrust race with a "number" corresponding to TWO (2) FULL SIZES LARGER than Dial Indicator or feeler gage measurement of the amount of end play shown.** (If measurement is .007", select a No. 9

SHOE DISC			THRUST BEARING RACE		
PART NO. ENDING IN	IDENTIFICATION STAMP	MIN. FEELER GAGE READING	PART NO. ENDING IN	IDENTIFICATION STAMP	DIAL INDICATOR READING
000	0	.0000	000	0	.0000
175	17-1/2	.0175	050	5	.0050
180	18	.0180	055	5-1/2	.0055
185	18-1/2	.0185	060	6	.0060
190	19	.0190	065	6-1/2	.0065
195	19-1/2	.0195	070	7	.0070
200	20	.0200	075	7-1/2	.0075
205	20-1/2	.0205	080	8	.0080
210	21	.0210	085	8-1/2	.0085
215	21-1/2	.0215	090	9	.0090
220	22	.0220	095	9-1/2	.0095
			100	10	.0100
			105	10-1/2	.0105
			110	11	.0110
			115	11-1/2	.0115
			120	12	.0120

Fig. 41--Available A-6 Service Shoes and Thrust Races

	POSITION 1	POSITION 2	POSITION 3	SELECT AND USE SHOE NO.
PISTON NO. 1	.019"	.0195"	.019"	19
PISTON NO. 2	.020"	.020"	.020"	20
PISTON NO. 3	.021"	.021"	.022"	21

Fig. 42--Selection of Proper A-6 Shoe Disc

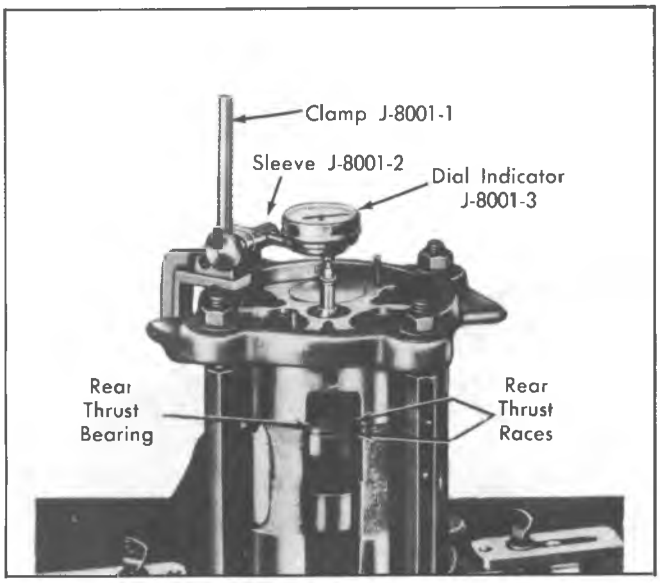


Fig. 43--Gaging Rear Thrust Race

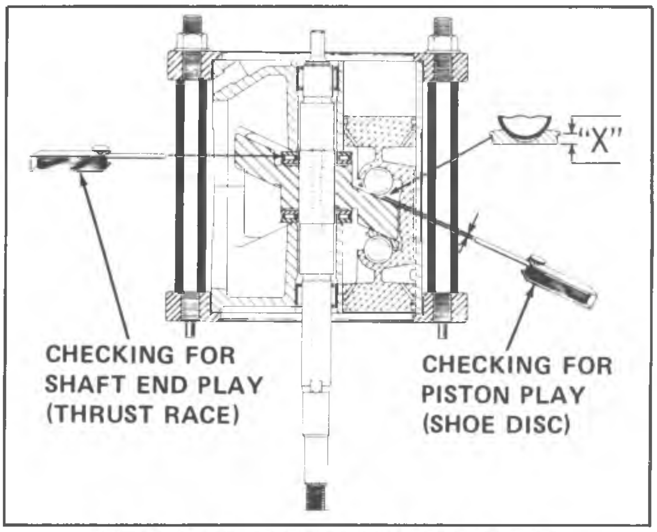


Fig. 44--Checking Piston and Shaft End Play

or 090 race). **Place thrust race in right-hand slot at bottom center of Parts Tray J-9402 .**

Fifteen (15) thrust races are provided in increments of .0005" (one-half thousandths) thickness and one ZERO gage thickness, providing a total of 16 sizes available for field service. Thrust races are identified on the part by their thickness in thousandths, in excess of the thickness of the ZERO thrust race.

This "number" also corresponds to the last three digits of the piece part number. See Thrust Race size Chart in Fig. 41.

22. Remove nuts from top plate of Compressing Fixture J-9397, and remove top plate.
23. Separate cylinder halves while unit is in Fixture. It may be necessary to use a wood block and mallet.
24. **Remove rear cylinder half and carefully remove one piston at a time from axial plate and front cylinder half. DO NOT LOSE THE RELATIONSHIP of the front ball and shoe disc and rear ball. Transfer each piston, ball, and shoe disc to its proper place in Parts**

Tray J-9402.

25. Remove rear outer ZERO thrust race from shaft and install thrust race just selected.

    The ZERO thrust race may be put aside for re-use in additional gaging or rebuilding operations.

A-6 Teflon Piston Ring Replacement

The Teflon piston ring installing, sizing and gaging tools are shown in Fig. 45.

1. Remove the old piston rings by CAREFULLY slicing through the ring with a knife or sharp instrument, holding the blade almost flat with the piston surface. Be careful not to damage the aluminum piston OR piston groove in cutting to remove the ring.

> **WARNING:** Exercise personal care in cutting the piston ring for removal.

2. Clean the piston and piston ring grooves with a recommended cleaning solvent and blow the piston dry with dry air (Trichlorethylene, stoddard solvent, kerosene, or equivalent).
3. Set the piston on end on a clean, flat surface and install the Ring Installer Guide J-24608-2 on the end of the piston (Fig. 46).
4. Install a Teflon ring on the Ring Installer Guide J-24605-2 as shown in Fig. 46, **with the dished or dull-side down and glossy-side up.**
5. Push the Ring Installer J-24608-5 down over the Installer Guide J-24608-2 to install the Teflon ring in the piston ring groove (Fig. 47). If the Teflon ring is slightly off position in the ring groove, it can be positioned into place by fingernail or blunt-edged tool that will not damage the piston.

   The Ring Installer J-24608-5 will retain the Installer Guide J-24608-2 internally when the Teflon ring is installed on the piston. Remove the Installer Guide from the Ring Installer and **DO NOT STORE THE INSTALLER GUIDE IN THE RING INSTALLER, as the Ring Installer Segment Retainer O-Ring J-24608-3 will be stretched and possibly weakened during storage.** This could result in the O-Ring J-24608-3 not holding the Ring Installer segments tight enough to the Installer Guide J-24608-2 to properly install the Teflon ring on the piston.
6. Lubricate the piston ring area with 525 viscosity refrigerant oil and rotate the Piston and Ring Assembly into the Ring Sizer J-24608-6 **at a slight angle** (Fig. 49). Rotate the piston, while pushing inward, until the piston is inserted against the center stop of the Ring Sizer J-23608-6.

Fig. 45--Teflon A-6 Piston Ring Installing, Sizing and Gaging Tools

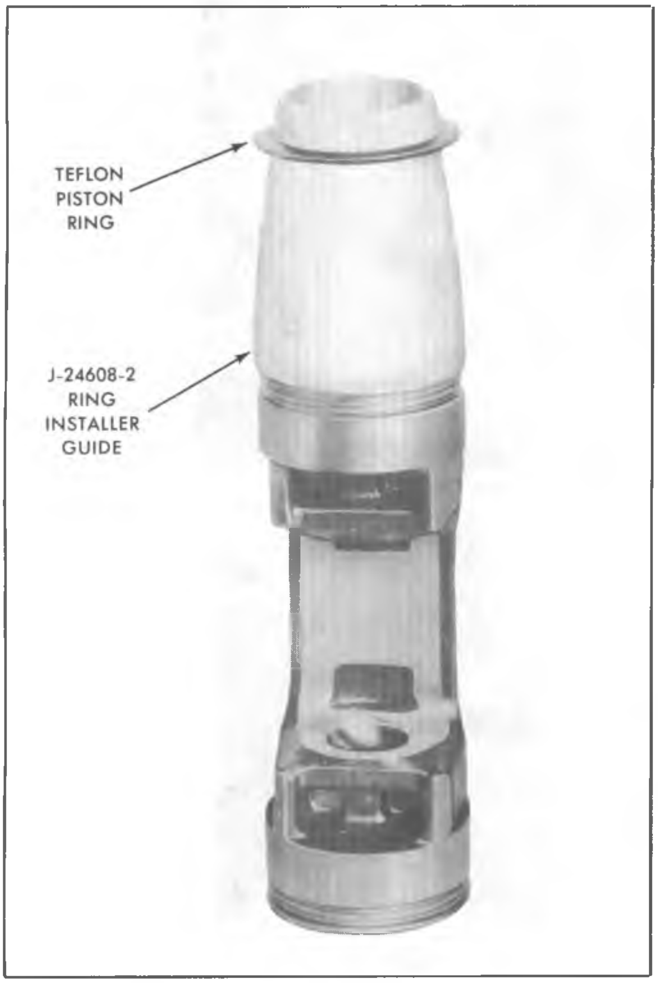


Fig. 46--Teflon Piston Ring Positioned on Ring Installer Guide

CAUTION: *DO NOT push the Piston and Ring Assembly into the Ring Sizer J-24608-6 without proper positioning and rotating as described above, as the ends of the needle bearings of the Ring Sizer may damage the end of the piston.*

7. Rotate the Piston and Ring Assembly in the Ring Sizer J-24608-6 several COMPLETE turns, until the Assembly rotates relatively free in the Ring Sizer (Fig. 49).
8. Remove the Piston and Ring Assembly, wipe the end of the piston and ring area with a clean cloth and then push the Piston and Ring Assembly into the Ring Gage J-24608-1 (Fig. 50). The piston should go through the Ring Gage with a 6-lb. force or less without lubrication. If not, repeat Steps 6 and 7.
9. Repeat the procedure for the opposite end of the piston.

CAUTION: *DO NOT lay the piston down on a dirty surface where dirt or metal chips might become imbedded in the Teflon ring surface.*

10. Lubricate BOTH ENDS of the piston with 525 viscosity refrigerant oil before inserting the piston into the cylinder bore.

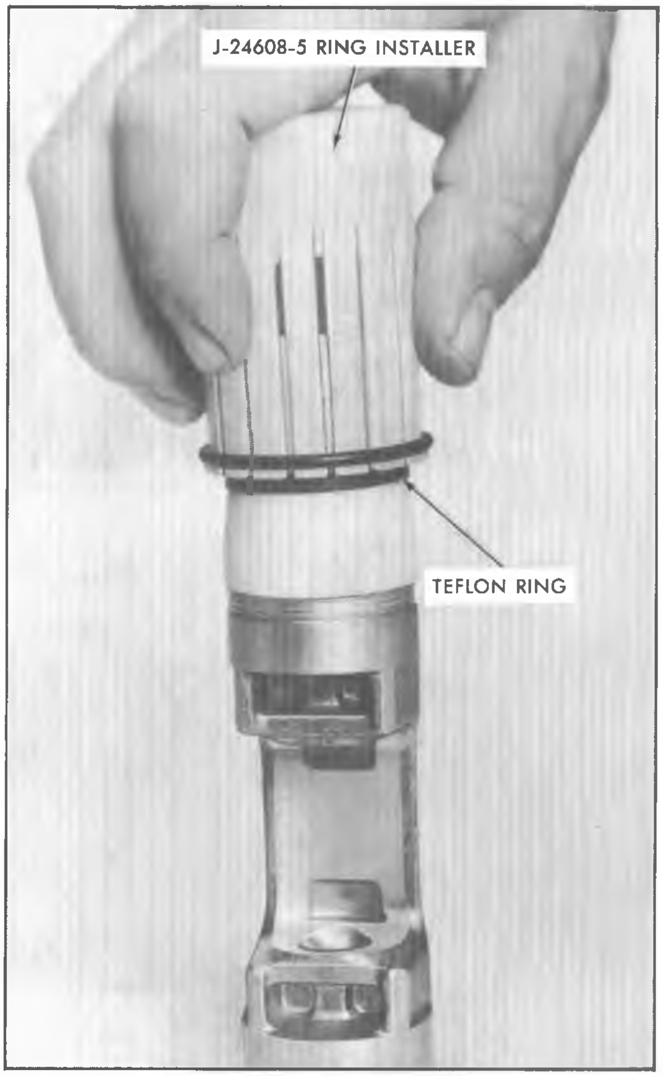


Fig. 47--Installing Teflon Piston Ring

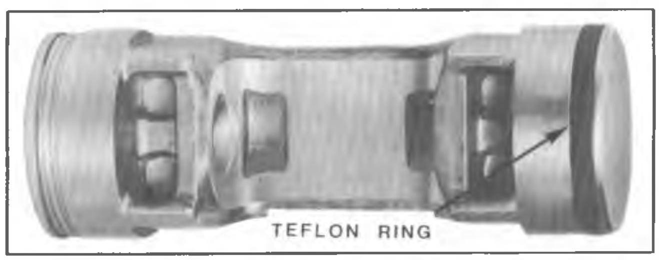


Fig. 48--Teflon A-6 Piston Ring Installed in Piston Groove

CAUTION: *Reasonable care should be exercised in installing the piston into the cylinder bore to prevent damage to the Teflon ring.*

A-6 COMPRESSOR INTERNAL MECHANISM

Assembly

After properly performing the "Gaging Procedure", choosing the correct shoe discs and thrust races, and installing any needed Teflon Piston Rings, the cylinder assembly may now be reassembled. Be sure to install all NEW seals and O-rings. All are included in the compressor

Fig. 49–Turning Piston and Ring Asm. into Ring Sizing Tool

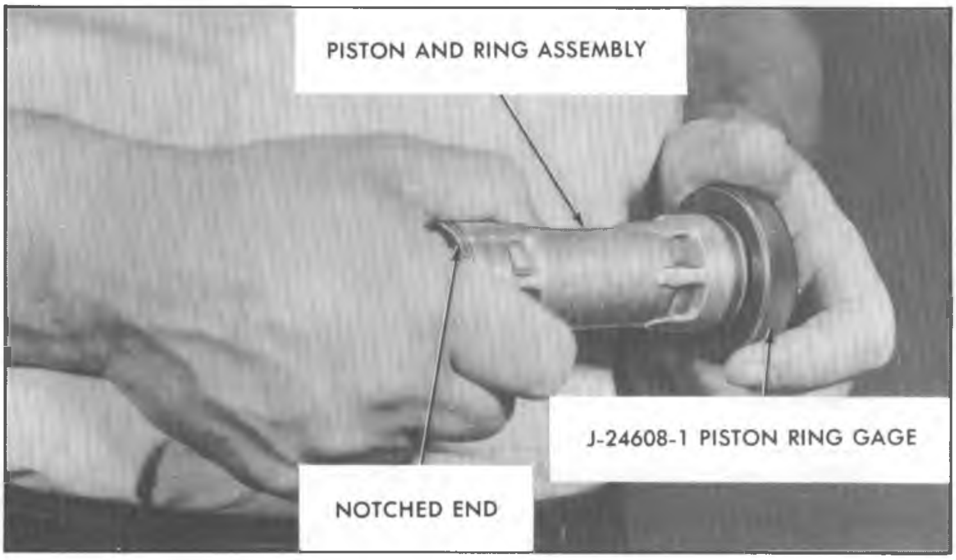


Fig. 50--Gaging Piston Ring Size

O-Ring Service Kit.

Assembly procedure is as follows:

1. Support the FRONT half of the cylinder assembly on Compressing Fixture J-9397. Install the shaft and axial plate, threaded end **down** , with its front bearing race pack (ZERO race, bearing NUMBERED race), if this was not already done at the end of the "Gaging Procedure".
2. Apply a light smear of petroleum jelly to the "numbered" shoe discs chosen in the gaging procedure and install all balls and shoe discs in their proper place in the piston assembly.
3. Rotate the axial plate so that the high point is above cylinder bore No. 1. Carefully assemble Piston No. 1, complete with ball and ZERO shoe disc on the **front** AND ball and NUMBERED shoe disc on the **rear** , over the axial plate. Hold front thrust bearing pack tightly against axial plate hub while lifting hub. Insert the Piston Assembly into the front cylinder half (Fig. 51).
4. Repeat this operation for Pistons No. 2 and No. 3 (Fig. 52).
5. Without installing any O-rings or bushings, assemble one end of the new Service discharge cross-over tube into the hole in the front cylinder half (Fig. 53 and 54).

   Be sure the flattened portion of this tube faces the **inside** of the compressor to allow for axial plate clearance (Fig. 54).
6. Now rotate the shaft to position the pistons in a stair-step arrangement; then **carefully** place the rear cylinder half over the shaft and start the pistons into the cylinder bores (Fig. 55).
7. When all three Piston and Ring assemblies are in their respective cylinders, align the end of the discharge cross-over tube with the hole in the rear half of the cylinder.
8. When all parts are in proper alignment, tap with a clean wood block and mallet to seat the rear half of the cylinder over the locating dowel pins. If necessary, clamp the cylinder in Compressing Fixture J-9397, to

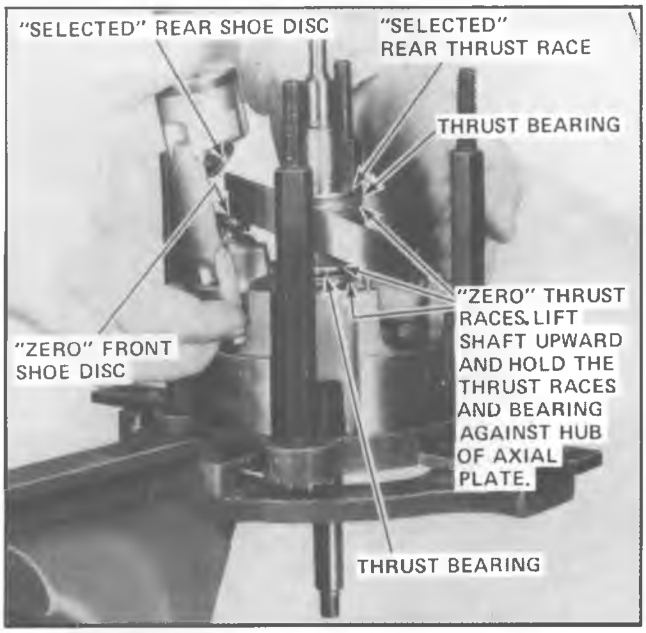


Fig. 51--Installing 1st A-6 Piston Assembly Into Front Cylinder Half

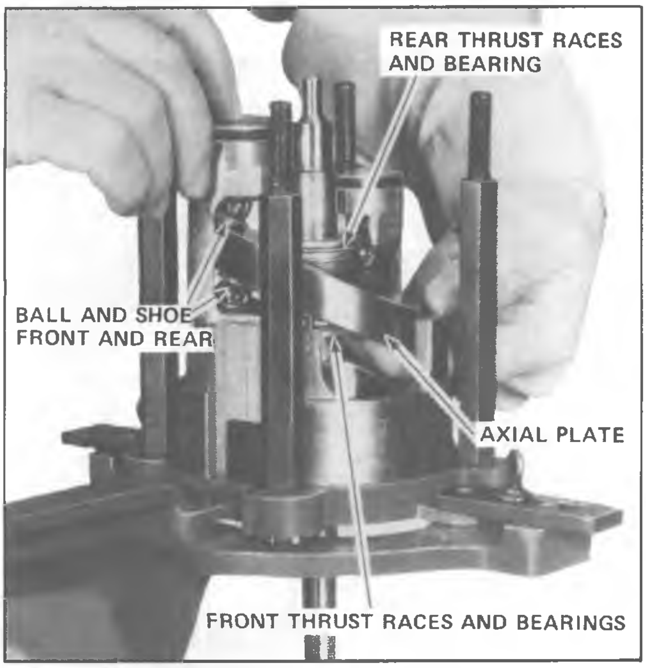


Fig. 52--Installing 2nd A-6 Piston

complete drawing the cylinder halves together.

9. Generously lubricate all moving parts with clean 525 viscosity refrigerant oil and check for free rotation of the parts.

10. Replace the suction cross-over cover (Fig. 56). Compress the cover as shown to start it into the slot, and then press or carefully tap it in until flush on both ends.

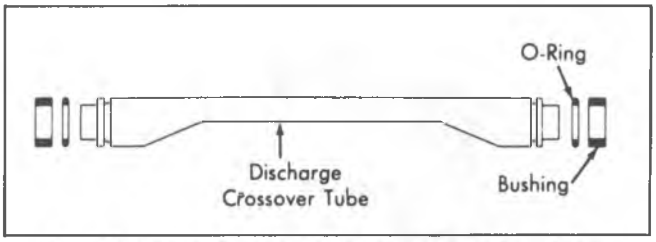


Fig. 53--Service-Type A-6 Discharge Cross-Over Tube

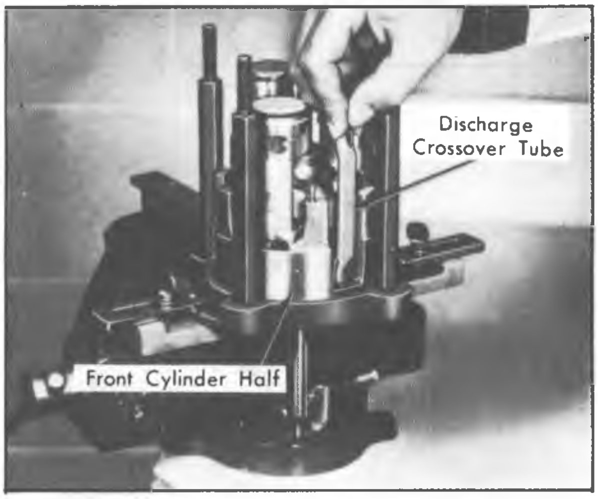


Fig. 54--Installing Discharge Crossover Tube

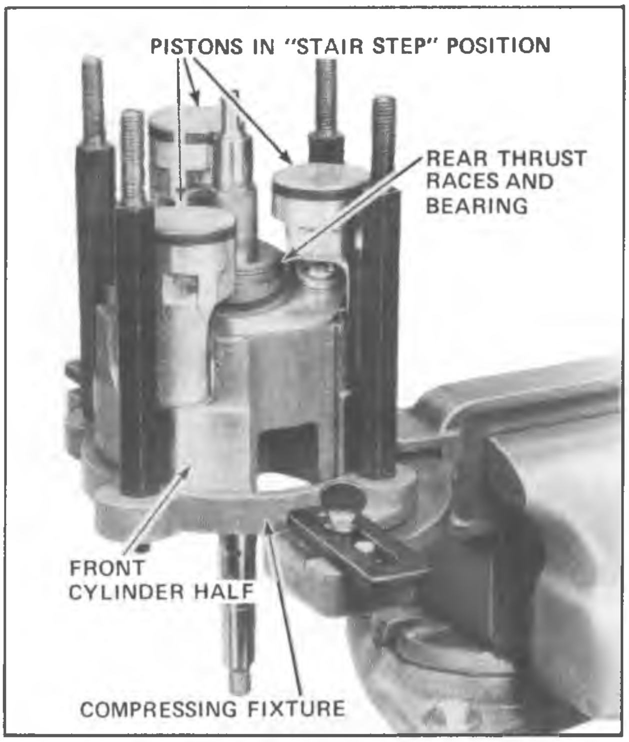


Fig. 55--A-6 Pistons Positioned in Stair-Step Arrangement

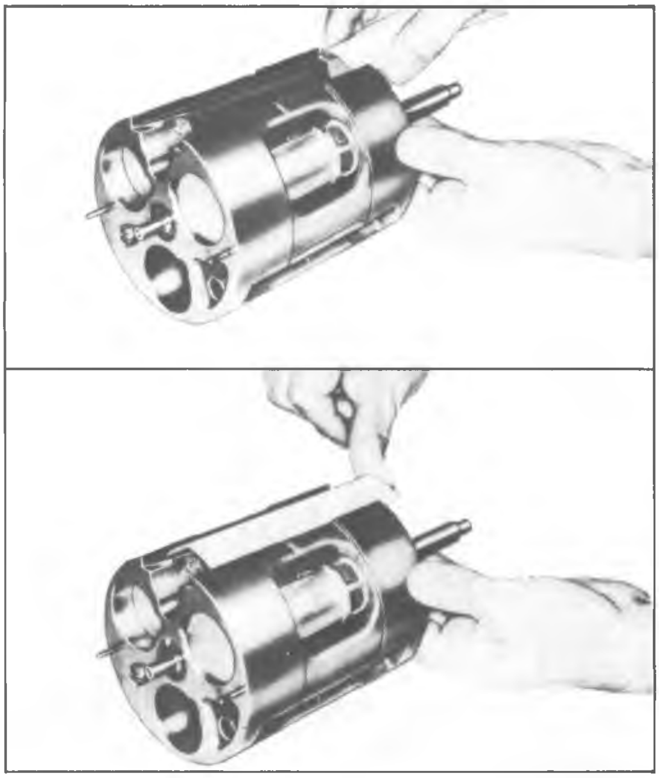


Fig. 56--Installing Suction Cross-over Cover

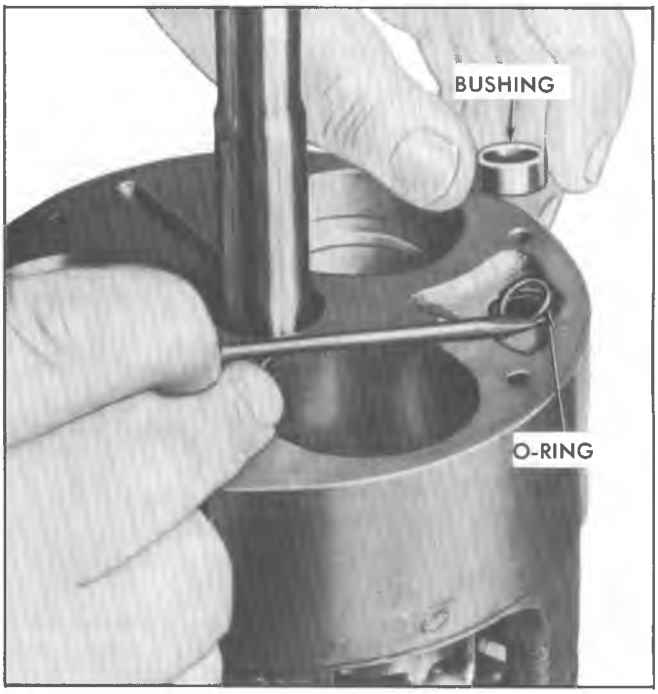


Fig. 57--Installing O-Ring On Discharge Cross-over Tube

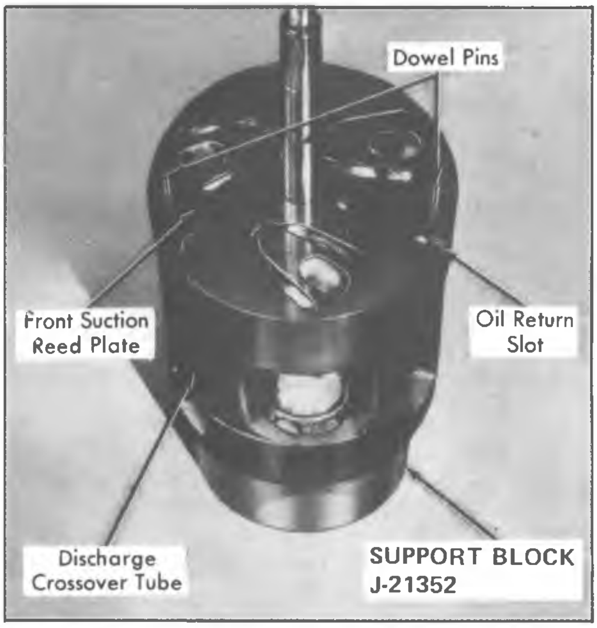


Fig. 58--Installing Front Suction Reed

A-6 COMPRESSOR INTERNAL MECHANISM

Re-Install

1. Place internal mechanism on Internal Assembly Support Block J-21352, with **rear-end** of shaft in block hole.
2. Now install new O-ring and bushing on **front-end** of discharge cross-over tube (Fig. 57). The O-ring and bushing are Service parts only for internal mechanisms that have been disassembled in the field (see Fig. 53).
3. Install new dowel pins in front cylinder half, if previously removed.
4. Install front suction reed plate on front cylinder half. Align with dowel pins, suction ports, oil return slot, and discharge cross-over tube (Fig. 58).
5. Install front discharge valve plate assembly, aligning holes with dowel pins and proper openings in front suction reed plate (Fig. 59).

   Front discharge plate has a large diameter hole in the center (Fig. 60).
6. Coat sealing surfaces on webs of compressor front head casting with 525 viscosity refrigerant oil.
7. Determine **exact** position of front head casting in relation to dowel pins on internal mechanism. Mark position of dowel pins on sides of front head assembly and on sides of internal mechanism with a grease pencil. Carefully lower front head casting into position (Fig. 62), **making certain that sealing area around center bore of head assembly does not contact shaft** as head assembly is lowered. **Do not rotate head assembly** to line up with dowel pins, as the sealing areas would contact reed retainers.
8. Generously lubricate new O-ring and angled groove at lower edge of front head casting with 525 viscosity refrigerant oil and install new O-ring into groove (Fig. 62).
9. Coat inside machined surfaces of compressor shell with 525 viscosity refrigerant oil and position shell on internal mechanism, resting on O-ring seal.

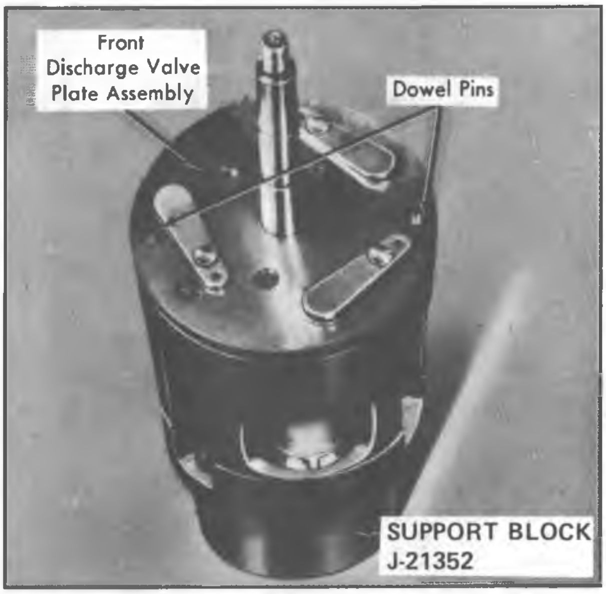


Fig. 59--Installing Front Discharge Valve Plate

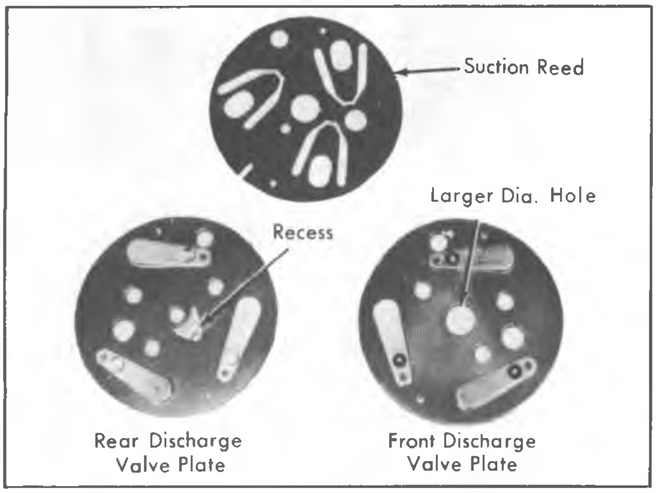


Fig. 60--Front and Rear Discharge Valve Plates

10. Using flat-side of a small screwdriver, gently position O-ring in around circumference of internal mechanism until compressor shell slides down over internal mechanism. As shell slides down, line up oil sump with oil intake tube hole (Fig. 63).
11. Holding Support Block, invert assembly and place back into Holding Fixture with front end of shaft down. Remove Support Block.
12. Install new dowel pins in rear cylinder half, if previously removed.
13. Install new O-ring in oil pick-up tube cavity.
14. Lubricate oil pick-up tube with 525 viscosity refrigerant oil and install into cavity, rotating compressor mechanism to align tube with hole in shell baffle (Fig. 64).
15. Install new O-ring and bushing on **rear-end** of discharge cross-over tube (See Fig. 53).

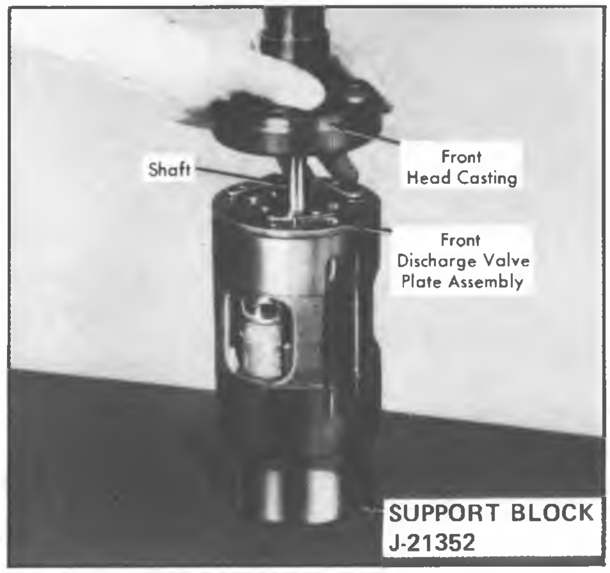


Fig. 61--Installing Front Head Casting

Fig. 62--Front Head O-Ring Installed

16. Install rear suction reed over dowel pins, **with slot TOWARDS sump.**
17. Install rear discharge valve plate assembly over dowel pins, **with reed retainers UP** .
18. Position inner oil pump gear over shaft with previously applied identification **mark UP**.
19. Position outer oil pump gear over inner gear with previously applied identification **mark UP** and, when standing facing oil sump, position outer gear so that it meshes with inner gear at the 9-o'clock position, and resulting cavity between gear teeth is then at 3-o'clock position (Fig. 65).
20. Generously oil rear discharge valve plate assembly with 525 viscosity refrigerant oil around outer edge where large diameter O-ring will be placed. Oil the valve reeds,

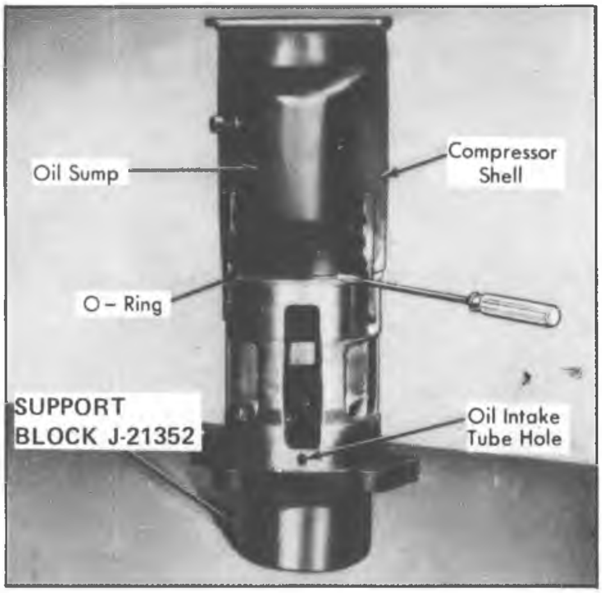


Fig. 63--Installing A-6 Compressor Shell

Fig. 64–Installing Oil Pick-Up Tube

pump gears, and area where sealing surface will contact rear discharge valve plate.

21. Using the 525 oil, lubricate new head to-shell O-ring and install on rear discharge valve plate, in contact with shell (Fig. 66).
22. Install suction screen in rear head casting, using care not to damage screen.
23. Coat sealing surface on webs of compressor rear head casting with 525 viscosity refrigerant oil.
24. Install rear head assembly over studs on compressor shell. **The two lower threaded compressor mounting holes should be in alignment with the compressor sump.**

    Make certain that suction screen does not drop out of place when lowering rear head into position (Fig. 67).

    If rear head assembly will not slide down over dowels in internal mechanism, twist front head assembly back-and-forth very slightly by-hand until rear head drops over dowel pins.

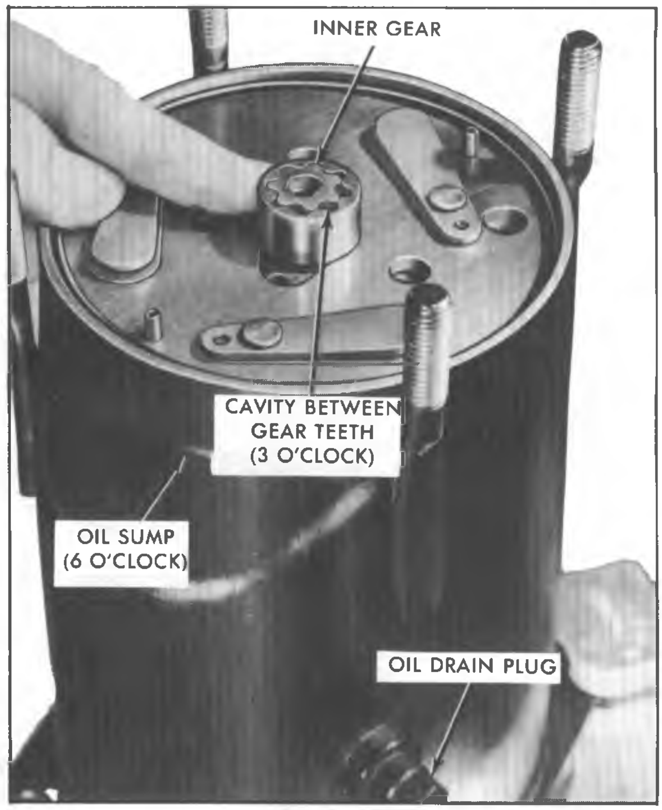


Fig. 65--Positioning Oil Pump Gears

25. Install nuts on threaded shell studs and tighten evenly to 19-25 lb. ft. torque using a 0-50 lb. ft. torque wrench.
26. Invert compressor in Holding Fixture and install compressor shaft seal as described in "Compressor Shaft Seal" Replacement procedure.
27. Install compressor clutch coil and housing assembly as described in "Compressor Clutch Coil and Housing Asm." Replacement procedure.
28. Install compressor pulley and bearing assembly as described in "Compressor Pulley and Bearing" Replacement procedure.
29. Install compressor clutch plate and hub assembly as described in "Compressor Clutch Plate and Hub Asm." Replacement procedure.
30. Add required amount of 525 viscosity refrigerant oil. Refer to compressor oil charge, Figure 5 Section 1A, this manual.
31. Check for external and internal leaks as described in the following"Compressor Leak Testing" procedure.

COMPRESSOR LEAK TESTING - EXTERNAL AND INTERNAL

A-6 and R-4 Compressors

Bench-Check Procedure

1. Install Test Plate J-9625 on rear head of compressor.
2. Attach center hose of gage manifold set on Charging Station to a refrigerant drum standing in an upright

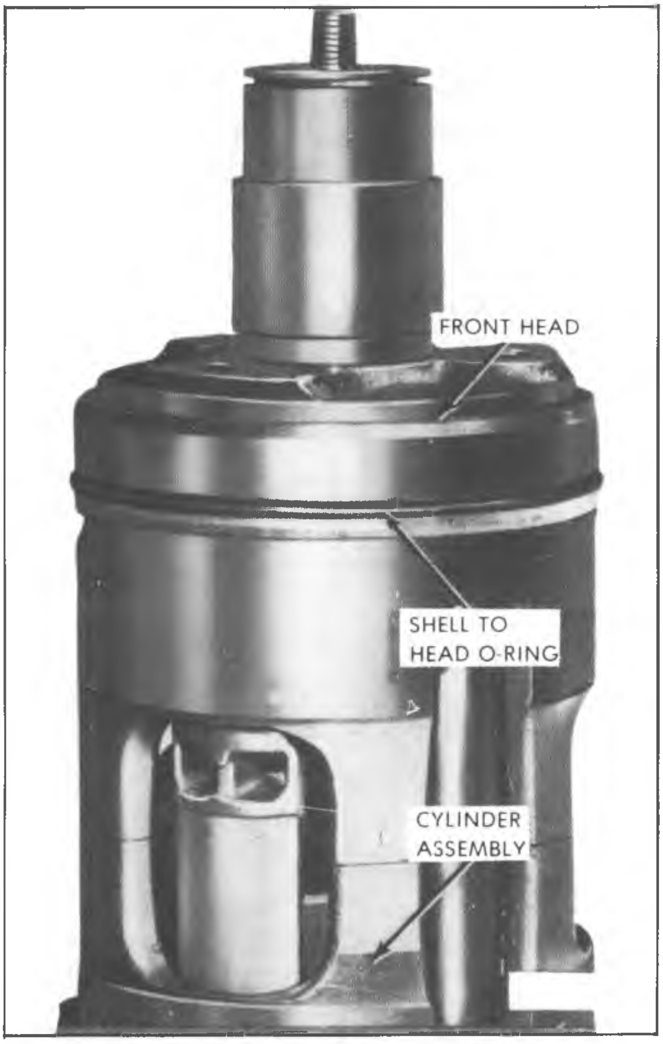


Fig. 66--A-6 Shell-To-Front Head O-Ring Installation

position and open valve on drum.

3. Connect Charging Station HIGH and LOW pressure lines to corresponding fittings on Test Plate J-9625, using J-5420 Gage Adapters.

   NOTE: Suction port of compressor has large internal opening. Discharge port has small internal opening into compressor.

4. Open LOW pressure control, HIGH pressure control and REFRIGERANT control on Charging Station to allow refrigerant vapor to flow into compressor.
5. Using electronic-type Leak Detector, check for leaks at pressure relief valve, superheat switch, compressor shell to cylinder, compressor front head seal (and also rear head seal and oil charge port on A-6 compressor), and compressor shaft seal. After checking, shut off LOW pressure control and HIGH pressure control on Charging Station.
6. If an external leak is present, perform the necessary corrective measures and recheck for leaks to make certain the leak has been corrected.

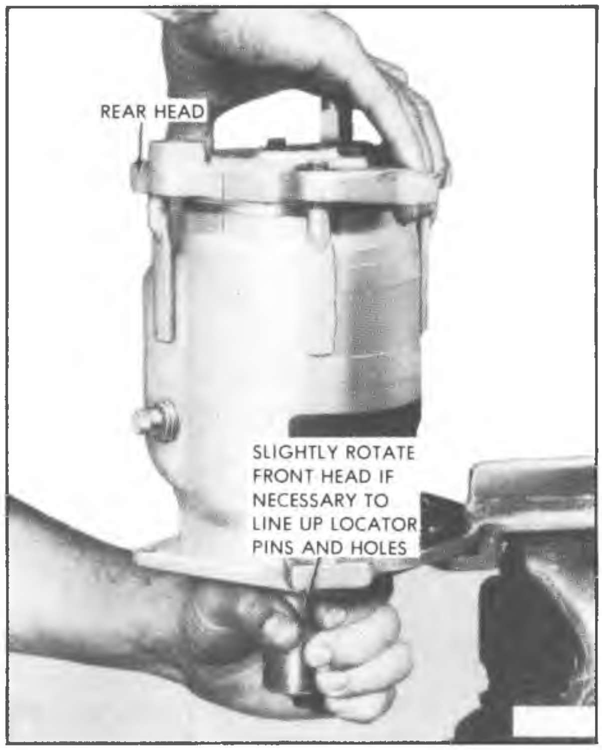


Fig. 67--Installing Rear Head

7. Loosen the manifold gage hose connections to the Gage Adapters J-5420 connected to the LOW and HIGH sides and allow the vapor pressure to release from the compressor.
8. Disconnect both Gage Adapters J-5420 from the Test Plate J-9625.
9. Rotate the complete compressor assembly (**not the crankshaft or drive plate hub**) slowly several turns to distribute oil to all cylinder and piston areas.
10. Install a shaft nut on the compressor crankshaft if the drive plate and clutch assembly are not installed.
11. Using a box-end wrench or socket and handle, rotate the compressor crankshaft or clutch drive plate on the crankshaft several turns to ensure piston assembly to cylinder wall lubrication.
12. Connect the Charging Station HIGH pressure line or a HIGH pressure gage and Gage Adapter J-5420 to the Test Plate J-9625 HIGH side connector.
13. Attach a Adapter J-5420 to the suction or LOW pressure port of the Test Plate J-9625 to open the schrader-type valve.

    NOTE: Oil will drain out of the compressor suction port adapter if the compressor is positioned with the suction port down.

14. Attach the compressor to the Holding Fixture J-25008-1, (R-4 compressor) and J-9396 (A-6 compressor), and clamp the fixture in a vise so that the compressor can be manually turned with a wrench.

15. Using a wrench, rotate the compressor crankshaft or drive plate hub 10 complete revolutions at a speed of approximately one revolution per second.

    NOTE: Turning the compressor at less than one revolution per second can result in a lower pump-up pressure and disqualify a good pumping compressor.

16. Observe the reading on the HIGH pressure gage at the completion of the tenth revolution of the compressor. The pressure reading for a good pumping compressor should be 50 p.s.i. or above for the R-4 and 60 p.s.i. or above for the A-6 compressor. **A pressure reading of less than 45 p.s.i. for the R-4 or 50 p.s.i. for the A-6 would indicate one or more suction and/or discharge valves leaking, an internal leak, or an inoperative valve and the compressor should be disassembled and checked for cause of leak.** Repair as needed, reassemble and repeat the pump-up test.

    Externally leak test with the electronic-type Leak Detector.

17. When the pressure pump-up test is completed, release the air pressure from the HIGH side and remove the Gage Adapters J-5420 and Test Plate J-9625.

18. On the R-4, tilt the compressor so that the compressor suction and discharge ports are down. Drain the oil from the compressor.

    On the A-6, remove oil charge screw and drain the oil sump.

19. Allow the compressor to drain for 10 minutes, then charge with the proper amount of oil. The oil may be poured into the suction port.

    NOTE: If further assembly or processing is required, a shipping plate or Test Plate J-9625 should be installed to keep out air, dirt and moisture until the compressor is installed.

R4-COMPRESSOR OVERHAUL

GENERAL

When servicing a compressor, it is essential that steps be taken to prevent dirt or foreign material from getting on or into compressor parts and system during disassembly or reassembly of compressor. Clean tools, a clean workbench and a clean work area are very important for proper service. The compressor connection areas and exterior of compressor should be cleaned off as much as possible prior to any "on vehicle" repairs or removing compressor for workbench service. The parts must be kept clean at all times and any parts to be reassembled should be cleaned with clean solvent (trichlorethylene, or stoddard solvent) and dried with dry air. When necessary to use a cloth on any part, it should be of a non-lint producing type. Refer to Figure 68 for the exploded view of the compressor parts and nomenclature.

When a compressor is removed from the vehicle for servicing, the amount of oil remaining in the compressor should be drained through compressor suction-discharge ports and measured. This oil should then be discarded and new oil added to the compressor before compressor is again placed in operation on vehicle. Refer to Figure 5, Section 1A of this manual for compressor oil charge.

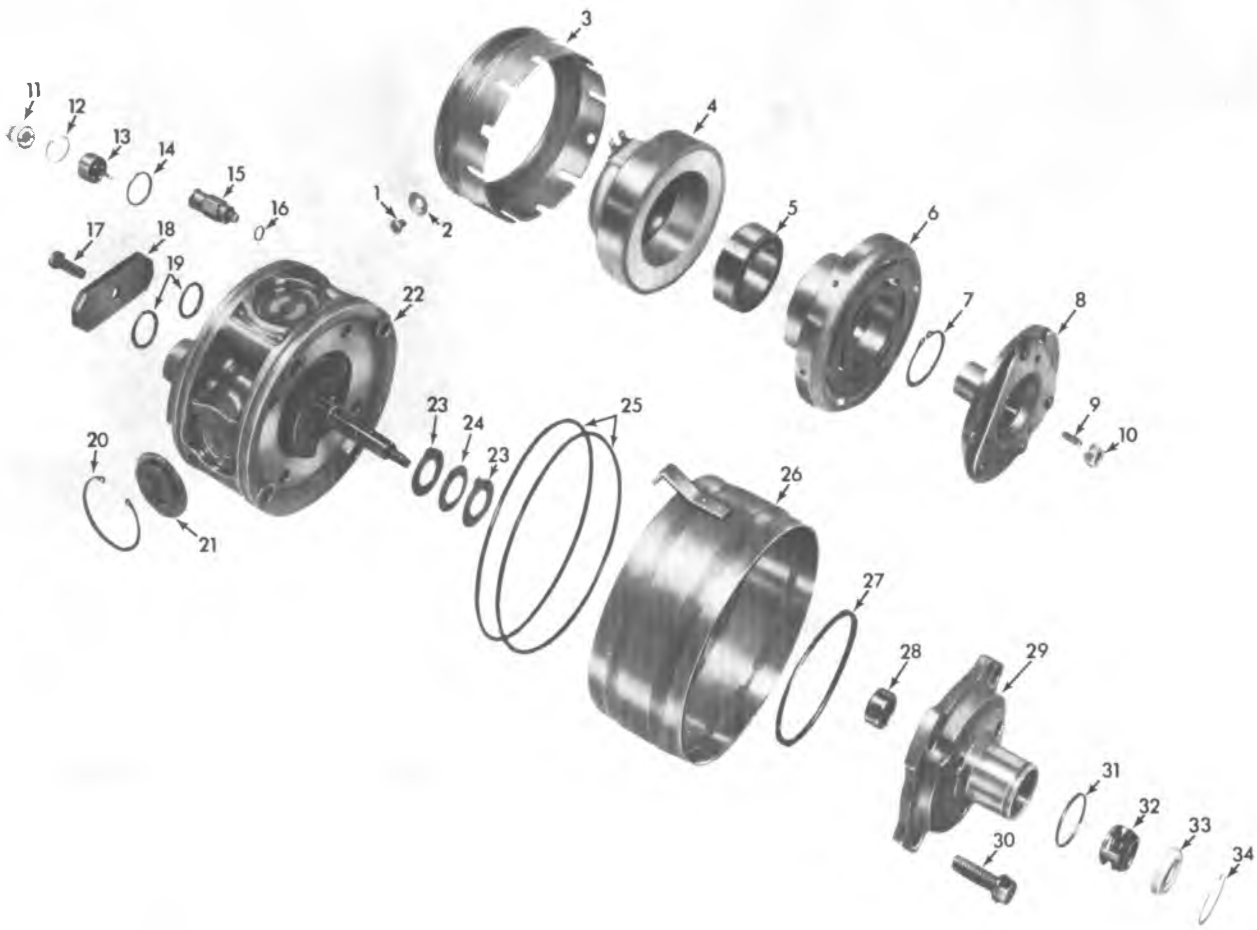
If for any reason the R-4 compressor air conditioning hose assembly is removed from the compressor, care must be taken to insure that the hose plate is fully seated to the compressor during re-installation. Should the plate be cocked and the retainer bolt driven, metal flanges in the O-Ring cavities could damage the seal surface of the compressor.

Some service operations can be performed without disturbing the internal mechanism, completely removing the compressor from vehicle or discharging the system. Among them are replacement of the clutch drive plate and hub assembly, clutch rotor and bearing assembly and clutch coil and pulley rim where "on vehicle" space permits. The system must be discharged, evacuated and charged to replace the compressor shaft seal, pressure relief valve and superheat switch whether the compressor is removed from vehicle or not. See Evacuation and Charging Procedure. The service operations shown in the following procedure are based on bench overhaul with compressor removed from vehicle.

For those operations possible to be performed with compressor "on the vehicle", the procedure is essentially the same. The procedures are basically in order of the normal sequence of removal for the accessibility of the components.

When necessary to adjust the compressor belt tension, DO NOT pry on the compressor shell, lift at square hole on the compressor mounting bracket.

It is recommended that compressor holding fixture J-295008-1 (Fig. 69) be used for all "workbench" procedures to keep the compressor assembly off the workbench and help prevent any possible dirt contamination of parts. The compressor holding fixture may be clamped in a vise with shaft end of compressor in a vertical, horizontal or down position for service, depending on service to be performed.



1. Screw
2. Locking Washer
3. Pulley Rim
4. Coil and Housing Assy.
5. Rotor Bearing
6. Rotor and Bearing Assy.
7. Retaining Ring
8. Clutch Drive Assy.
9. Clutch Hub Key
10. Shaft Nut
11. Cap
12. Retaining Ring
13. Superheat Switch
14. O-Ring
15. Pressure Relief Valve
16. O-Ring
17. Screw
18. Shipping Plate
19. O-Ring
20. Retaining Ring
21. Valve Plate Assy.
22. Cylinder and Shaft Assy.
23. Thrust Washer
24. Belleville Washer
25. O-Ring
26. Shell Assy.
27. Ring Seal
28. Main Bearing
29. Front Head Assy.
30. Screw and Washer Assy.
31. O-Ring
32. Shaft Seal
33. Seal Seat
34. Retaining Ring

Fig. 68--Radial Four Cylinder Compressor - Exploded View

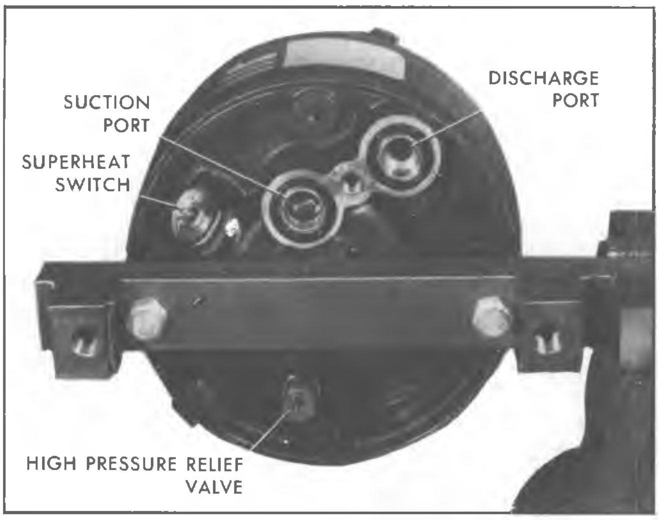


Fig. 69--Installing Holding Fixture

COMPRESSOR CLUTCH PLATE AND HUB ASSEMBLY

Removal

1. Attach compressor to holding fixture, J-25008-1 (Fig. 69) and clamp fixture in a vise.
2. Keeping clutch hub from turning with clutch hub holding tool J-25030, remove and discard shaft nut using Thin Wall Socket J-9399 (Fig. 70).
3. Thread clutch plate and hub assembly remover J-9401 into hub. Hold body of tool with a wrench and turn center screw into J-9401 remover to remove clutch plate and hub assembly (Fig. 71).
4. Remove the shaft key.

Installation

1. Install shaft key into hub key groove (Fig. 72). Allow key to project approximately 3/16" out of keyway. Shaft key is curved slightly to provide an interference fit in shaft key groove, to permit key projection without falling out.
2. Be sure frictional surface of clutch plate and clutch rotor are clean before installing clutch plate and hub assembly.
3. Align shaft key with shaft keyway and assemble clutch plate and hub assembly on compressor shaft.

   CAUTION: *To avoid internal damage to compressor, do not drive or pound on clutch hub or shaft.*

4. Place spacer bearing J-9480-2 on hub and insert end of clutch plate and hub assembly installer J-9480-1 through spacer J-9480-2 and thread tool onto end of compressor shaft (Fig. 73).
5. Hold hex portion of tool body with a wrench and tighten center screw to press hub onto shaft until there is a .020 to .040 inch air gap between the frictional surfaces of clutch plate and clutch rotor (Fig. 6).

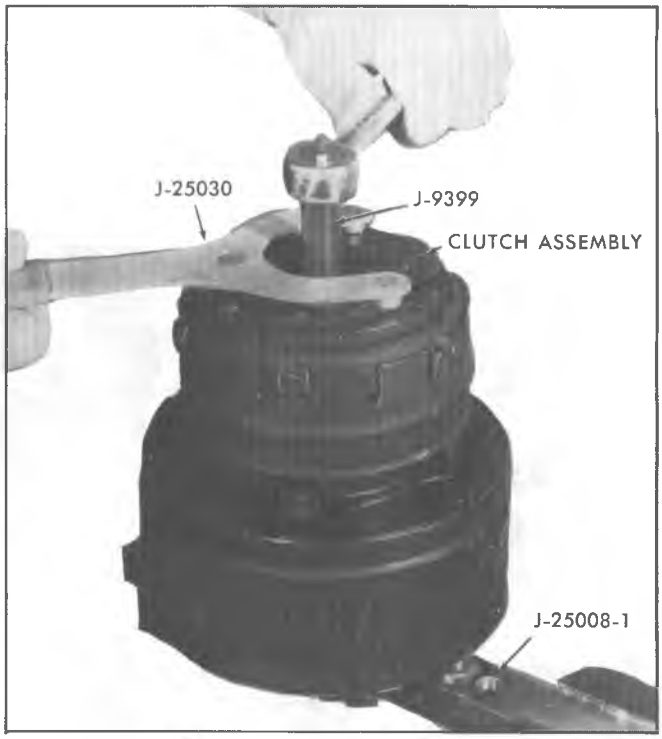


Fig. 70--Removing Shaft Locknut

6. Install a new shaft nut with the small diameter boss of nut against crankshaft shoulder, using special thin wall socket J-9399. Hold clutch plate and hub assembly with clutch hub holding tool J-25030 and tighten to 8-12 foot pounds torque.

COMPRESSOR SHAFT SEAL ASSEMBLY

Removal

When replacing shaft seal assembly, it will be necessary to discharge the refrigerant from the system before replacing shaft seal assembly or removing compressor from vehicle.

1. Discharge the system and remove clutch plate and hub assembly as described under "Compressor Clutch Plate and Hub Assembly".
2. Remove shaft seal seat retainer ring using snap ring pliers J-5403.
3. Thoroughly clean the inside of compressor neck area surrounding compressor shaft, seal seat and shaft, to remove all dirt and foreign material before removing seal seat.
4. Insert seal seat remover and install tool J-23128 (Fig. 74) over the shaft into the recessed area of seal seat and tighten tool clockwise to securely engage knurled tangs of tool with the seal seat. Remove seal seat with a twisting and pull motion. Discard seat.
5. Insert seal remover and installer J-9392 (Fig. 75) over shaft and engage shaft seal by pressing downward on tool to overcome shaft seal spring pressure and turn tool clockwise to engage seal assembly tabs with tangs of tool. Remove seal assembly by pulling straight out from compressor shaft. Discard seal.

Fig. 71--Removing Clutch Plate and Hub Assembly

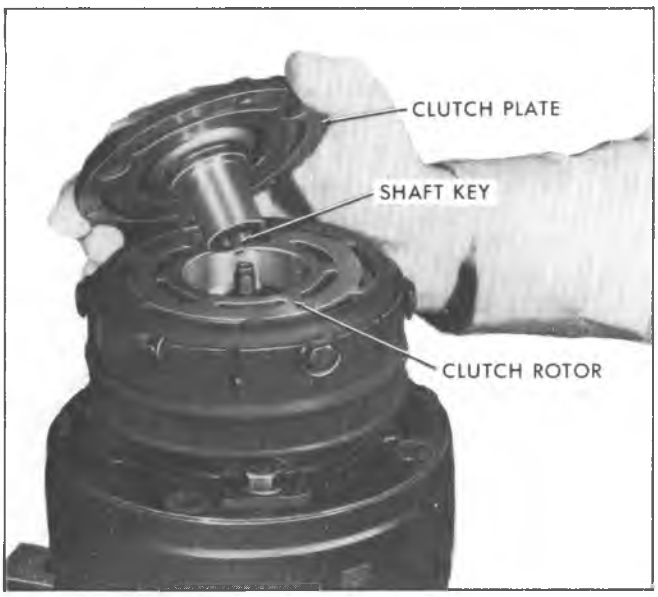


Fig. 72--Installing Shaft Key

6. Remove seal seat "O" ring from compressor neck using tool J-9553. Discard "O" ring.

Installation

Inspect the inside of compressor neck and shaft area for any lint, dirt or foreign material and be sure these areas are perfectly clean before installing new seal parts. Be sure seal

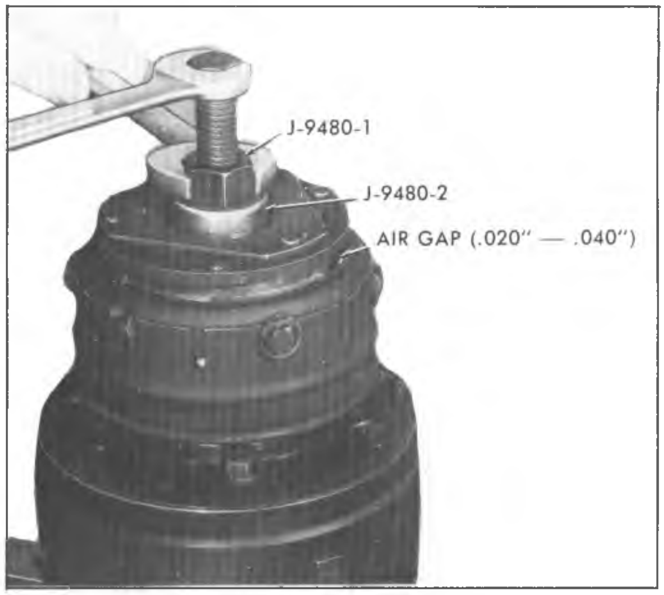


Fig. 73--Installing Clutch Plate and Hub Assembly

Fig. 74--Removing Seal Seat

remover and installer J-9392, seal protector J-22974 and "O" ring installer J-21508 are clean internally and externally. The seal seat "O" ring, shaft seal and seal seat should be dipped in clean 525 Viscosity oil and not handled any more than is absolutely necessary by hand, particularly the mating surfaces. Any dirt or lint on sealing surfaces could cause a seal leak or seal damage.

1. Dip new seal seat "O" ring in clean 525 Viscosity oil and assemble onto "O" ring installer J-21508 (Fig. 76).
2. Insert "O" ring installer J-21508 into the compressor neck until the tool "bottoms". Lower the movable slide of "O" ring installer to release "O" ring into seal seat

Fig. 75--Removing Shaft Seal

Fig. 76--Installing Seal Seat "O" Ring

"O" ring groove. Rotate installer tool to seat "O" ring and remove tool. Inspect the internal neck area for cleanliness and proper "O" ring positioning.

3. Dip new shaft seal "O" ring and seal face in clean 525 Viscosity oil and carefully engage shaft seal assembly with locking tangs of seal remover and installer J-9392 (Fig. 8).
4. Install shaft seal protector J-22974 over the end of compressor shaft and slide shaft seal onto compressor shaft. Slowly turn the tool clockwise while applying light pressure until seal engages the flats of compressor shaft and can be seated into place. Rotate tool J-9392 counterclockwise to disengage from seal tabs and remove tool.
5. Attach ceramic seal seat to the seal seat remover and installer J-23128 and dip ceramic seat in clean 525 viscosity oil to coat seal face and outer surface. Carefully install seat over compressor shaft and seal protector J-22974 and push seat into place with a rotary motion. Remove tools J-23128 and J-22974.
6. Install new seal seat retainer ring with snap ring pliers J-5403.
7. Leak test compressor as described under "Leak Testing the Compressor" and correct any leaks found.
8. Reinstall clutch plate and hub assembly as described under "Compressor Clutch Plate and Hub Assembly".

COMPRESSOR CLUTCH ROTOR & BEARING

Compressor Clutch Rotor & Bearing

1. Remove the clutch plate and hub assembly as described under "Compressor Clutch Plate and Hub Assembly".
2. Remove rotor and bearing assembly retaining ring using snap ring pliers J-6083 (Fig. 77). Mark the location of clutch coil terminals. If clutch rotor and/or rotor bearing only are to be replaced, bend the lockwashers away from pulley rim mounting screws (Fig. 78) and remove the six mounting screws and special lockwashers before proceeding with Step 3. Discard special lockwashers.
3. Install rotor and bearing puller guide J-25031-1 over the end of compressor shaft and seat on the front head of compressor (Fig. 78).
4. Install rotor and bearing puller J-25031-2 down into rotor until the puller arms engage the recessed edge of rotor hub. Hold puller and arms in place and tighten puller screw against puller guide to remove clutch rotor and assembly parts (Fig. 79). If pulley rim mounting screws and washers were removed in Step 2, only clutch rotor and bearing assembly will be removed for replacement.

   The clutch coil and housing assembly is pressed onto front head of compressor with an interference fit and will not be removed unless pulley rim mounting screws are left securely in place and pulley rim pulls coil and housing assembly off with total clutch rotor and pulley rim assembly (Fig. 80).

CLUTCH ROTOR BEARING REPLACEMENT

Removal

1. Perform "Compressor Clutch Rotor and Bearing Assembly Removal" and remove the pulley rim mounting screws as described in Step 2.
2. Place rotor and bearing assembly on blocks (Fig. 82) and drive bearing out of rotor hub with rotor bearing remover and rotor assembly installer J-25029. It will not be necessary to remove the staking at the rear of the

Fig. 77--Removing Bearing Retaining Ring

Fig. 78--Installing Rotor and Bearing Puller Guide

Fig. 79--Installing Rotor and Bearing Puller


Fig. 80--Clutch Coil and Housing Assembly

rotor hub to remove the bearing. See Figure 81.

Installation

1. Place rotor and hub assembly face down on a clean, flat and firm surface (Fig. 83).
2. Align new bearing squarely with hub bore and using pulley and bearing installer J-9481 with Universal Handle J-8092, drive bearing fully into hub. The tool will apply force to outer race of bearing.
3. Stake bearing in place with a 45° angle punch (Fig. 81) but do not stake too deep (.045 - .055 inch) and possibly distort the outer race of bearing. Use new stake locations 120° apart. Do not use old stake locations.
4. **Recommended Method**

   Press rotor and bearing assembly onto the front head of the compressor, using Rotor and Bearing Assembly Installer J-25029 (Fig. 84). The Installer will apply force to the inner race of the rotor bearing when installing the

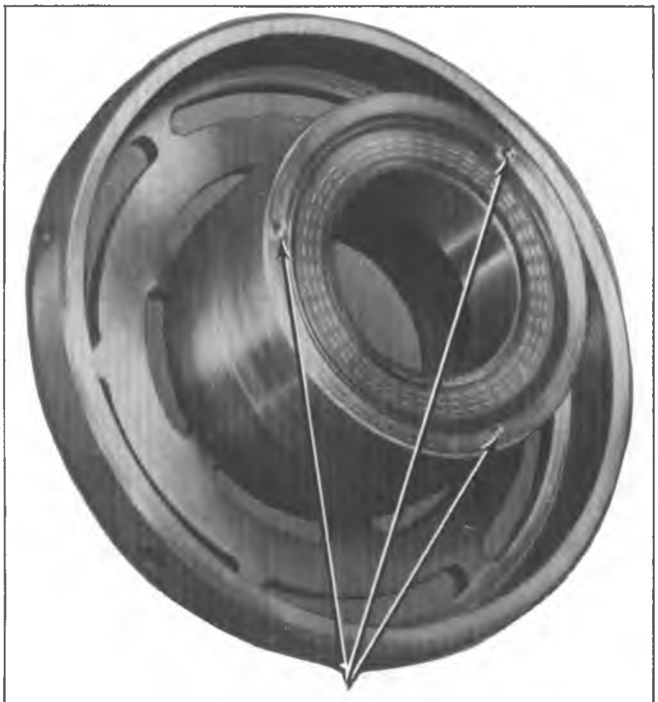


Fig. 81--Bearing Stake Locations

assembly onto the front head.

Alternate method

Reassemble the rotor and bearing assembly to the front head of the compressor using Rotor Bearing Remover and Rotor Assembly Installer J-25029. With Installer assembled to the Universal Handle J-8092 as shown in Fig. 85, force will be applied to the inner race of the bearing when installing the assembly on the front head of the compressor.

5. Install rotor and bearing using Snap Ring Pliers J-6083.
6. Assemble and fully seat pulley rim to clutch rotor and bearing assembly as shown in Figure 84, using Loctite RC-75 or equivalent on screw threads and use new lockwashers. Do not torque mounting screws to final torque limits until pulley rim is checked to be rotating "in line".
7. Tighten pulley rim mounting screws to a 100 inch pounds torque and lock screw heads in place as shown in Figure 84.
8. Assemble clutch plate and hub assembly as described under "Compressor Clutch Plate and Hub Assembly".

CLUTCH COIL AND PULLEY RIM REPLACEMENT

Removal

1. Perform "Compressor Clutch Rotor and Bearing Assembly Removal" but do not loosen or remove pulley rim mounting screws until clutch rotor, coil and pulley rim assembly have been removed from front head in Step 4.
2. Remove pulley rim mounting screws and slide pulley rim off rotor and hub assembly. The pulley rim and clutch coil are replaceable at this point.

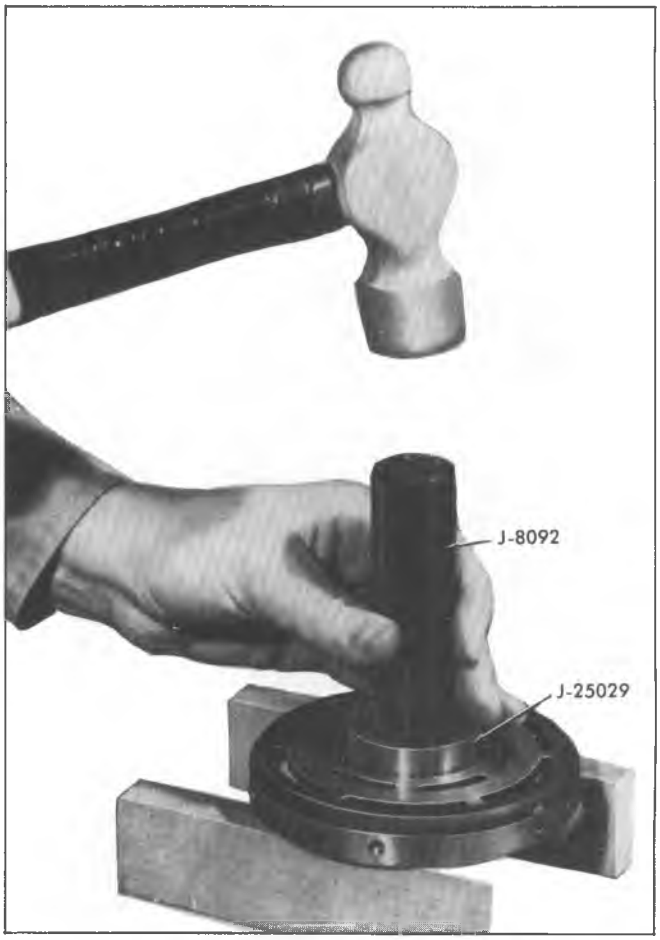


Fig. 82--Removing Clutch Rotor Bearing

Installation

1. Assemble clutch coil, pulley rim and clutch rotor and bearing assembly as shown in Figure 80, using Loctite RC-75 or equivalent on screw threads and using new lockwashers, but do not lock screw heads in place.
2. Place assembly on neck of front head and seat into place using rotor bearing remover and rotor assembly installer J-25029 as shown in Figure 84. Before fully seating the assembly on front head, be sure the clutch coil terminals are in the proper location in relation to compressor and that the three protrusions on the rear of the clutch coil align with the locator holes in front head.
3. Install rotor and bearing assembly retaining ring and reassemble clutch plate and hub assembly.
4. Rotate pulley rim and rotor to be sure pulley rim is rotating "in line" and adjust or replace as required. Tighten pulley rim mounting screws to 100 inch pounds torque and lock screw heads in place.

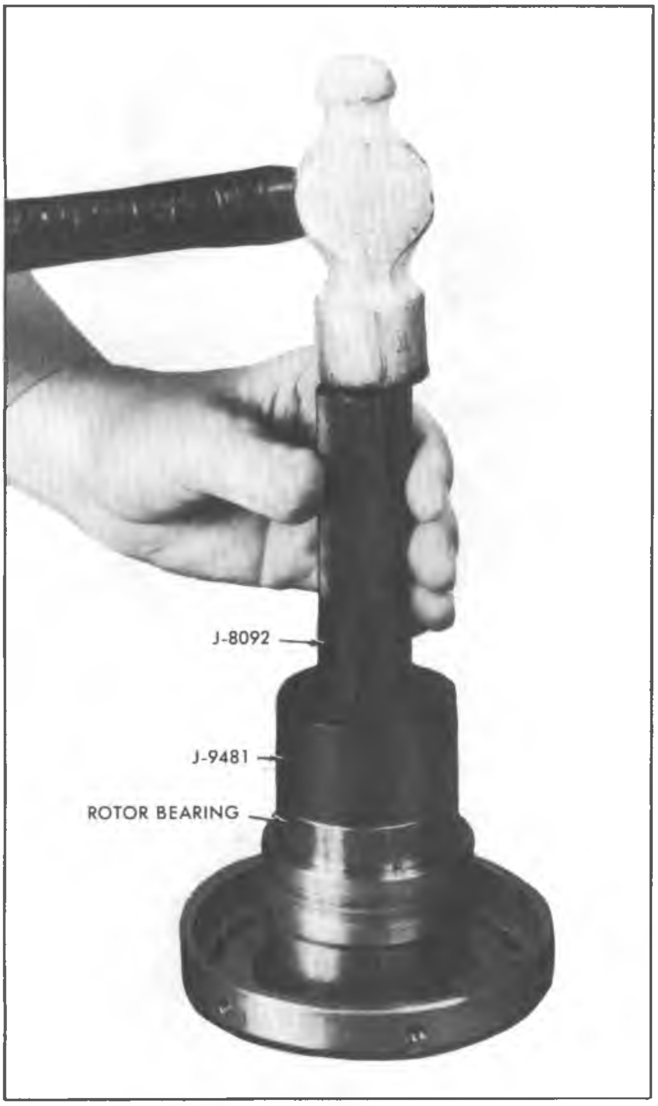


Fig. 83--Installing Clutch Rotor Bearing

FRONT HEAD AND MAIN BEARING ASSEMBLY

Removal

1. Remove clutch rotor and bearing assembly but do not loosen or remove pulley rim mounting screws and remove clutch rotor, coil and pulley rim assembly as a total assembly.
2. Remove compressor shaft seal.
3. Remove the four front head mounting screws (Fig. 86) and remove front head assembly and discard seal ring. At this point front head and bearing assembly, front head seal ring (Fig. 87) or the Belleville and thrust washers may be replaced.

Installation

1. Check front head and compressor cylinder area for any dirt or lint and install a new thrust washer kit if required.

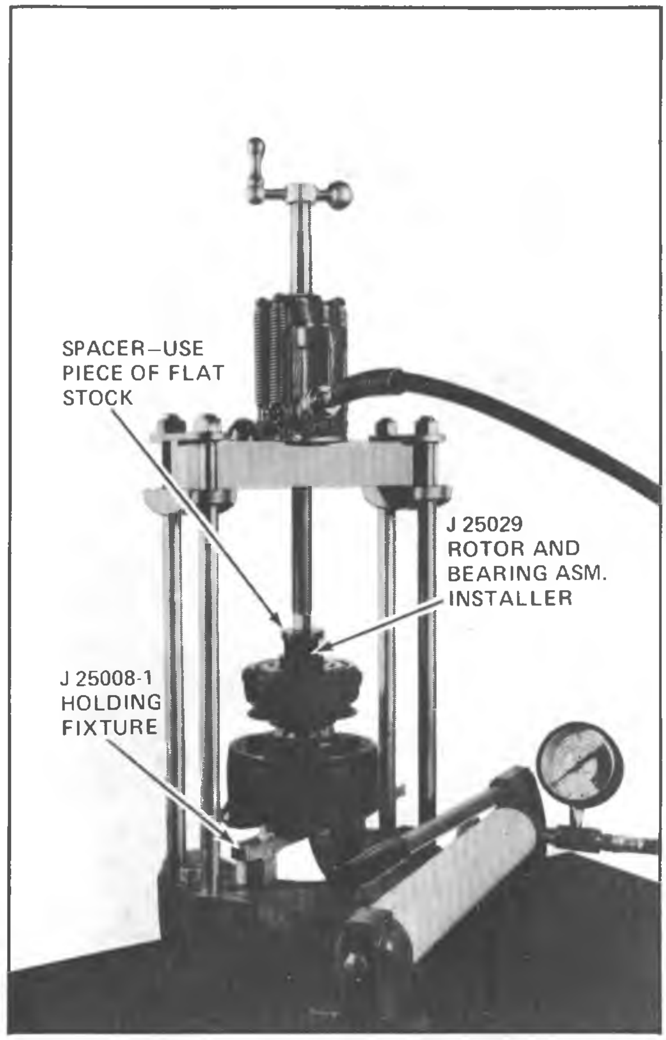


Fig. 84--Installing Rotor and Bearing Assembly

2. Dip new front head seal ring in 525 Viscosity oil and install seal in seal groove of front head (Fig. 87).
3. Position oil hole in front head to be "up" when assembled to compressor cylinder to correspond with "up" position of compressor. Install front head on compressor shaft. Be sure seal ring stays in place and front head seats correctly to cylinder. Tighten front head mounting screws to 18-22 foot pounds.
4. Install a new compressor shaft seal.
5. Install clutch rotor and bearing assembly, clutch coil and pulley rim assembly to front head (Fig. 84). Before fully seating the assembly on front head be sure clutch coil terminals are in the proper location in relation to compressor and that the three protrusions on rear of clutch coil align with the locator holes in front head.
6. Install rotor and bearing assembly retaining ring and reassemble clutch plate and hub assembly.
7. Leak test compressor as described under "Leak Testing the Compressor" and correct any leaks found.

Fig. 85--Alternate Installation of R-4 Rotor and Bearing Assembly

THRUST AND BELLEVILLE WASHER REPLACEMENT

1. Remove two thrust and one belleville washer from compressor shaft. Note the assembled position of the washers.
2. Install a new thrust washer on compressor shaft with thrust washer tang pointing up (Fig. 88).
3. Install the new belleville washer on shaft with the high center of the washer up (Fig. 88).
4. Install the remaining thrust washer on shaft with the tang pointing down (Fig. 88).
5. Lubricate the three washers with clean oil (525 Viscosity) and assemble front head to cylinder.

MAIN BEARING REPLACEMENT

Removal

1. Remove front head assembly.
2. Place front head assembly on two blocks (Fig. 89) and using main bearing remover J-24896 drive bearing out of front head.

Installation

1. Place front head with neck end down on a flat, solid surface.

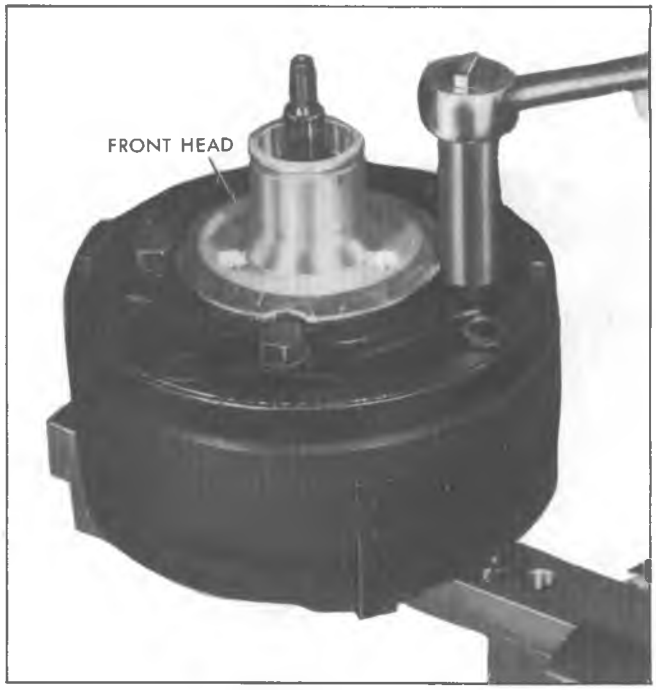


Fig. 86--Remove Front Head Assembly

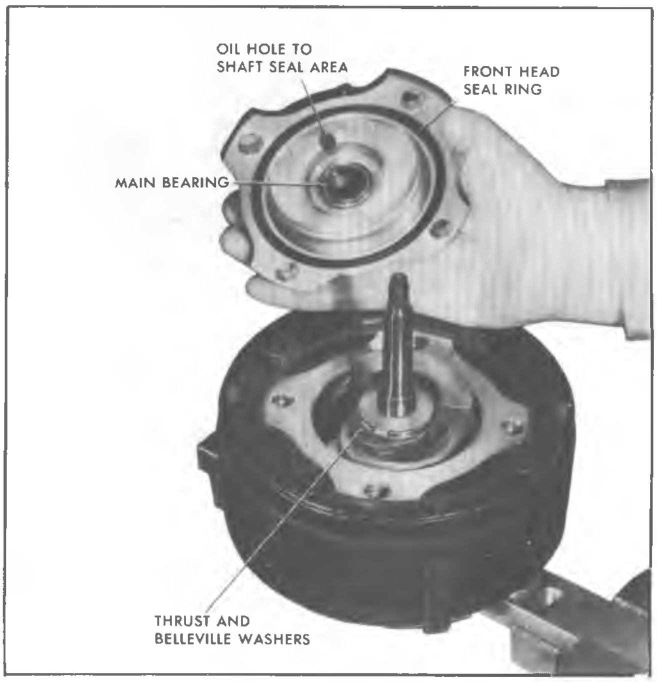


Fig. 87--Installing Front Head

2. Align new bearing and bearing installer J-24895 squarely with bearing bore of front head and drive bearing into front head (Fig. 90). The tool J-24895 must seat against front head to insert bearing to proper clearance depth.
3. Assemble front head to cylinder and complete the assembly.

Fig. 88--Replacing Thrust and Belleville Washers

Fig. 89--Removing Main Bearing

COMPRESSOR SHELL, CYLINDER "O" RING AND VALVE PLATE REPLACEMENT

The clutch plate and hub assembly, the clutch rotor and bearing assembly, the clutch coil and pulley rim must be removed before compressor shell can be removed or replaced. The location of clutch coil terminals should be marked for reference on reassembly. Allow compressor to cool to room temperature before attempting to remove

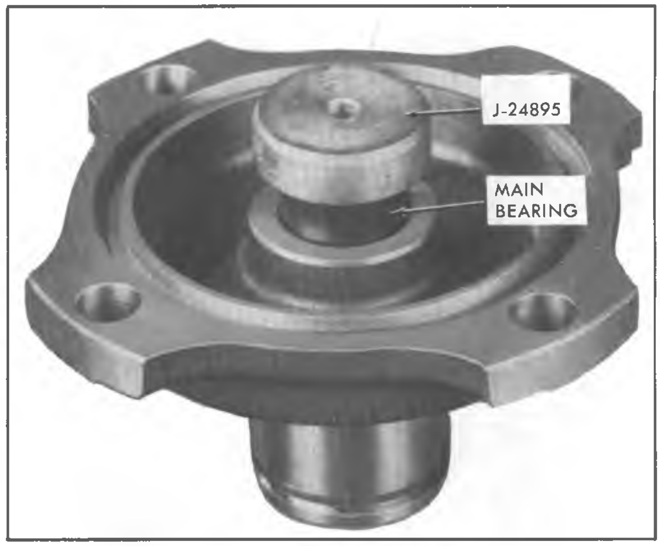


Fig. 90--Installing Main Bearing

Fig. 91--Releasing Retaining Strap

compressor shell as greater force will be required to remove the compressor shell when hot due to metal expansion difference between the aluminum cylinder and steel compressor shell.

1. Pry shell retaining strap away from cylinder and position the strap high enough to clear cylinder as shell is removed (Fig. 91).

2. Remove compressor holding fixture J-25008-1 and reverse holding fixture step block protrusions engaging compressor shell. Install medium length bolts through holding fixture and thread them into compressor cylinder until the step of the fixture protrusions contact

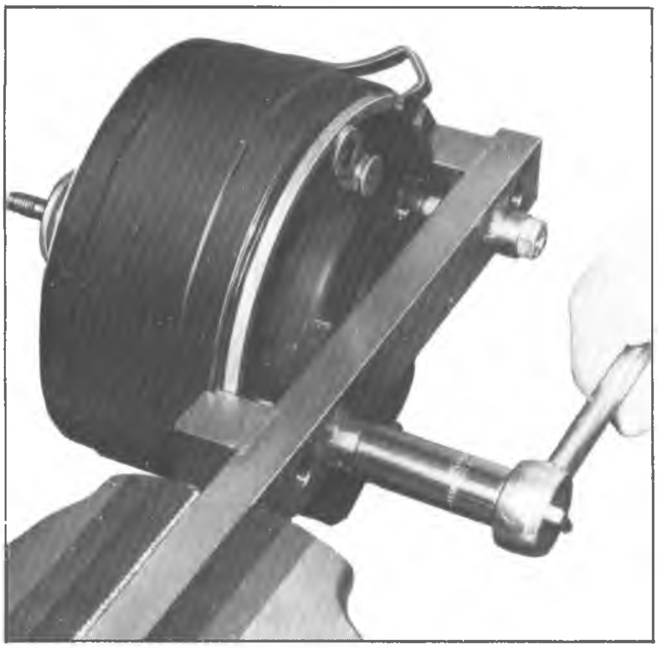


Fig. 92--Removing Shell Assembly

compressor shell, finger tight, both sides (Fig. 92). Check to be sure the step protrusions do not overlap the cylinder but will pass both sides.

3. Using a wrench, alternately tighten each bolt approximately 1/4 turn to push shell free of "O" rings on cylinder.

   If one screw appears to require more force to turn than the other, immediately turn the other screw to bring the screw threading sequence in step or the shell will be cocked and made more difficult to remove. Normal removal does not require much force on wrench if the screws are kept in step while turning. The shell can be removed by hand as soon as shell is free of shell to cylinder "O" rings. Do not turn screws any further than necessary to release shell.

4. Remove compressor shell, remove holding fixture J-25008-1 from compressor, reverse fixture to again hold compressor by the opposite side using the short length screws.

   At this point the valve plate retainer ring may be removed using internal snap ring pliers, J-4245 (Fig. 93) and remove the compressor valve plate (Fig. 94) for replacement or piston inspection.

Installation

1. Remove old cylinder to shell "O" rings and discard. Check compressor assembly and interior of compressor shell to be sure they are free of lint or dirt.
2. Dip a cylinder to shell "O" ring in 525 Viscosity oil and install in rear "O" ring groove of cylinder. Be careful in moving "O" ring across cylinder surface to prevent damaging "O" ring.

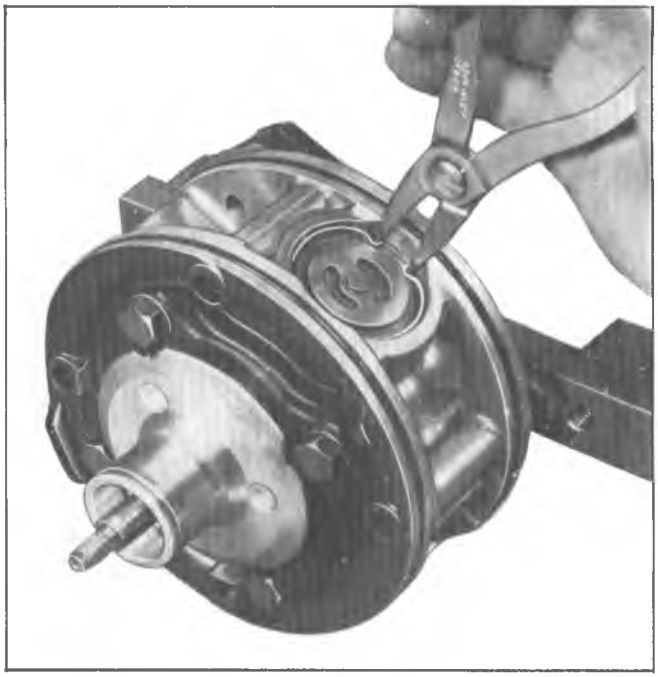


Fig. 93--Removing Valve Plate

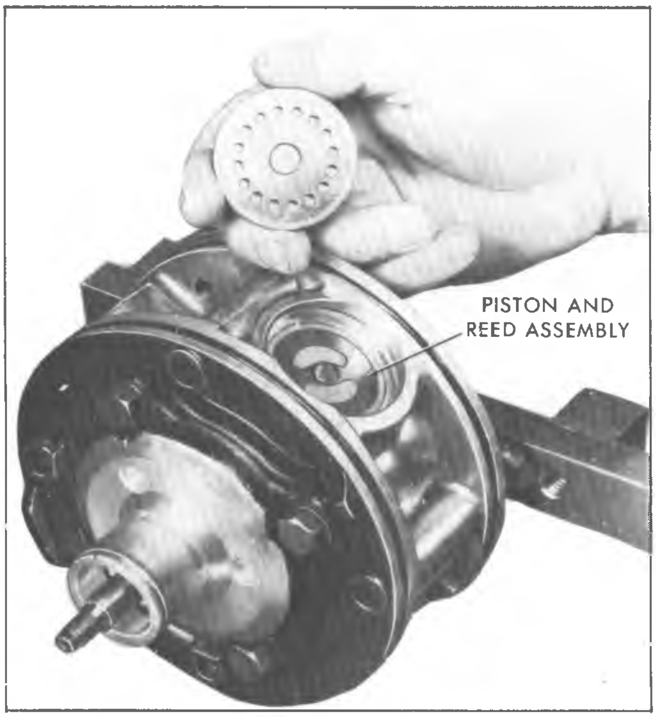


Fig. 94--Inspecting Piston and Reed Assembly

3. Dip remaining cylinder to shell "O" ring in oil and install it in front "O" ring groove of cylinder.
4. Place compressor shell on cylinder and rotate retaining strap to its original location (Fig. 92).
5. Attach shell installing fixture J-25008-2 to the holding fixture J-25008-1, using the long bolts and plate washers of tool set.

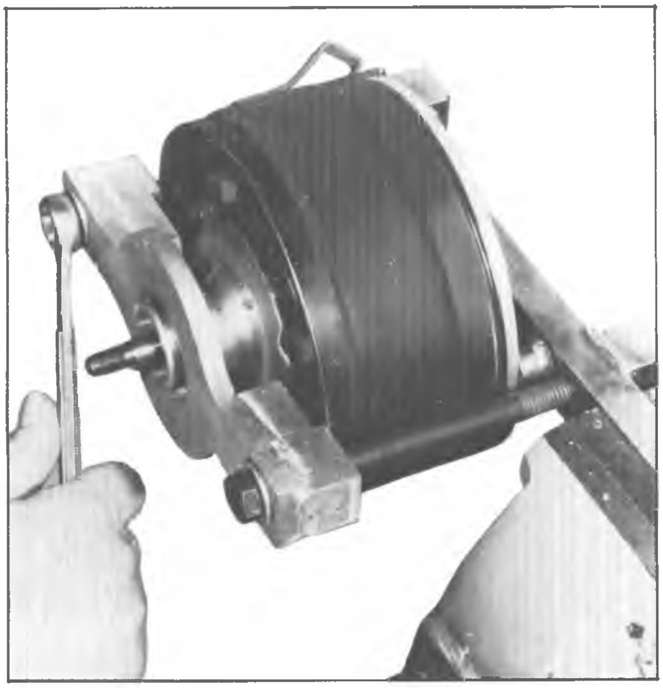


Fig. 95--Installing Shell Assembly

Align the step projections of shell installing fixture J-25008-2 to contact compressor shell evenly both sides.

6. Push compressor shell as close to "O" ring (Fig. 95) as possible by hand and check for equal alignment of shell around cylinder. Tighten fixture screws finger tight.
7. Using a wrench, alternately tighten each bolt approximately 1/4 turn to push compressor shell over "O" rings and back against shell stop flange at the rear of compressor cylinder.

   If one screw appears to require more force to turn than the other, immediately turn the other screw to bring the screw threading sequence in step or the shell will be cocked and made more difficult to install. Normal installation does not require much force on wrench if screws are kept in step while turning.
8. When shell is seated against the stops, bend shell retaining strap down into place by tapping gently with a hammer.
9. Remove shell installing fixture J-25008-2 and leak test compressor.

OIL CHARGE

The radial four cylinder compressor is charged with 6.0 ounces of 525 viscosity oil. During normal operation a certain amount of oil will circulate with the Refrigerant 12 (R-12) in the system.

When necessary to replace a system component it is recommended that oil be added to the system in accordance to the following procedure.

If compressor is operable, idle vehicle for 10 minutes with the A/C controls set for Maximum Cooling and High Blower prior to discharging the system.

Add additional oil as indicated in Section 1A of this manual.

Oil Charge-Compressor Replacement

1. Gravity drain oil from a new compressor.

   Position compressor with shaft end "up" and drain compressor suction and discharge ports. The compressor should gravity drain for 10 minutes.

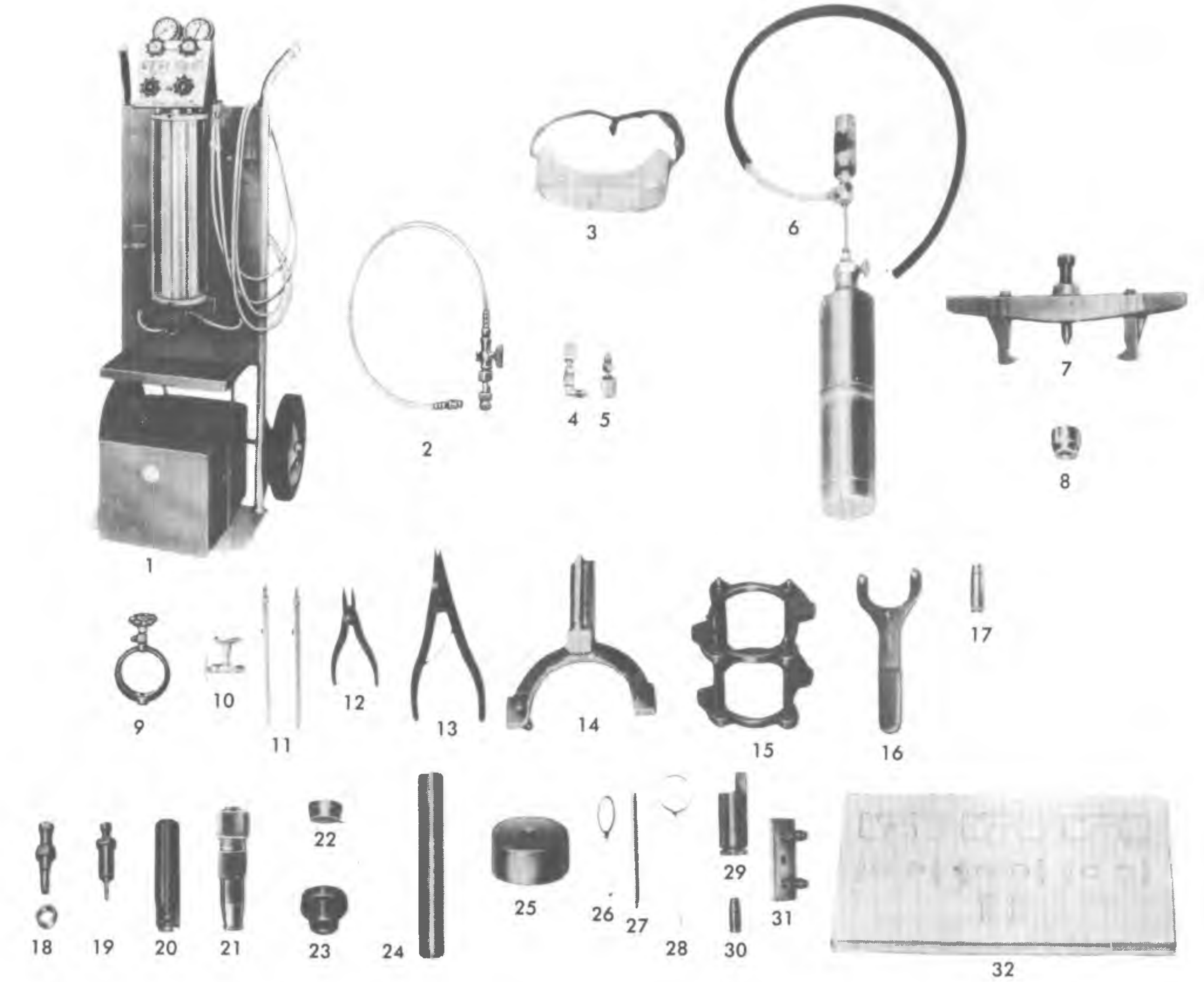
   Add additional oil as indicated in Section 1A of this manual.

   When necessary to flush system with R-11, drain assembly and blow dry with air prior to the installation of a new compressor. It is not necessary to drain oil from the replacement compressor.
2. The refrigerant 12 (R-12) is to be slowly discharged from the system.
3. Remove original compressor from vehicle, gravity drain the oil from compressor as in Step 1 and determine the amount of oil drained from the original compressor. Refer to the oil usage chart in the service section of this manual for proper amount of oil to be added.

SYSTEM PERFORMANCE EVALUATION

When system performance, efficiency and proper oil charge is in doubt and must be evaluated accurately, it is recommended that the system be flushed with R-11 and the exact oil charge (6 ounces) of 525 viscosity oil be added to the compressor prior to any further checks of the system.

SPECIAL TOOLS



1.	J-8393	Charging Station
2.	J-24095	Oil Inducer
3.	J-5453	Goggles
4.	J-9459	7/16"-20 90° Gauge Line
	J-25499	3/8"-24 Adapter
5.	J-5420	7/16"-20 Straight Gauge Line
	J-25498	3/8" Adapter
6.	J-6084	Leak Detector
7.	J-8433	Puller
8.	J-9395	Puller Pilot
9.	J-23595	Refrigerant Can Valve (Side-Tap)
10.	J-6271-01	Refrigerant Can Valve (Top-Tap)
11.	J-5421-02	Pocket Thermometers (2)
12.	J-5403	No. 21 Snap Ring Pliers
13.	J-6435	No. 26 Snap Ring Pliers
14.	J-9396	Compressor Holding Fixture
15.	J-25030	Compressing Fixture
16.	J-9403	Clutch Hub Holding Tool
17.	J-9399	9/16" Thin Wall Socket
18.	J-9401	Hub and Drive Plate Assembly Remover
19.	J-9480-01	Hub and Drive Plate Assembly Installer
20.	J-9392	Seal Remover
21.	J-23128	Seal Seat Remover
22.	J-9398	Pulley Bearing Remover
23.	J-9481	Pulley and Bearing Installer
24.	J-8092	Handle
25.	J-21352	Internal Assembly Support Block
26.	J-5139	Oil Pickup Tube Remover
27.	J-9432	Needle Bearing Installer
28.	J-9553-01	Seal Seat "O" Ring Remover
29.	J-21508	Seal Seat "O" Ring Installer
30.	J-22974	Shaft Seal Protector
31.	J-9625	Pressure Test Connector
32.	J-9402	Parts Tray

Fig. 96–Air Conditioning Special Tools

SECTION 3

FRONT AXLE

K10, K20 FRONT AXLE

INNER OIL SEAL INSTALLATION TOOL

The procedure for oil seal replacement on page 3-1 of the 1974 Overhaul Manual should be revised to include special tool J-25111 for installing the oil seals. The seals are illustrated as item 28 in figure 1 below:

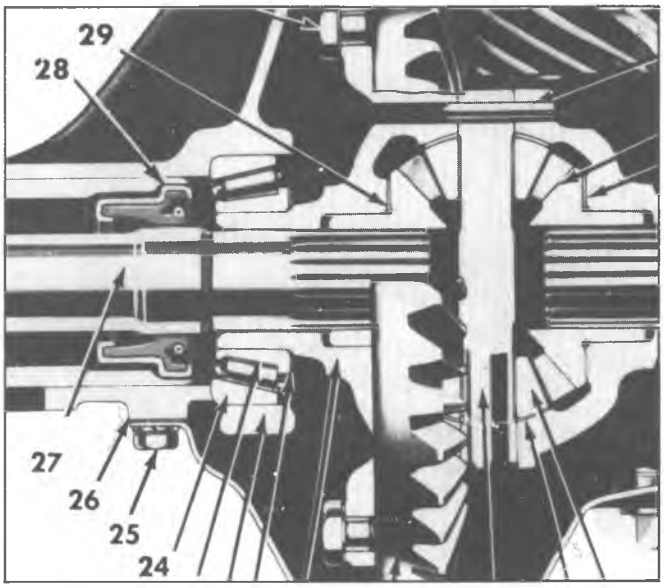


Fig. 1--Inner Oil Seal

SECTION 4

REAR AXLE DIFFERENTIAL

OVERHAUL

GENERAL INFORMATION

Except for one modification (in the Dana 10-1/2" Axle), all overhaul procedures found in section 4 of the 1974 Overhaul Manual are applicable to 1976 differentials. Two items should be noted:

- Note the 8-1/2" axles on G10 models in figure 1. Procedures for these units are listed under "Passenger Car 8-1/2" Ring Gear" in the 1974 Overhaul manual.
- The 6200# Dana differential is overhauled in an identical manner to the 7500# Dana.

DANA 10-1/2 RING GEAR DIFFERENTIAL

Modification

The differential shown on page 4-55 of the 1974 Overhaul Manual has been modified *for some vehicles* . For these modified units,

1. The differential case (item 14 on page 4-55) is now a one-piece design.
2. The pinion spider (item 21) is now a pinion shaft, using two pinion gears rather than four.

PINION DEPTH SETTING – USE OF DIAL INDICATOR

It is important to use a dial indicator correctly when determining pinion depth requirements.

Be sure to record the number indicated by the indicator needle; do not record the amount of travel of the needle.

After "zeroing" the dial indicator on the highest point of deflection on the gauge plate, the indicator probe is swung off the gauge plate, allowing the needle to move. The number which the needle points toward is the correct shim thickness required for a nominal pinion. See figure 2.

MODEL	SOURCE	TYPE/CAPACITY	RING GEAR SIZE
C10	Chevrolet	Salisbury/3750#	8-7/8"
K10	Chevrolet	Salisbury/3750#	8-7/8"
K10	Chevrolet	Salisbury/4000#	8-7/8"
P10	Chevrolet	Salisbury/3500#	8-7/8"
G10	Chevrolet	Salisbury/3100#	8-7/8"
G10	Chevrolet	Salisbury/3100#	8-1/2"
C20 (Except Crew Cab)	Chevrolet	Salisbury/5700#	10-1/2"
C20 (Crew Cab)	Chevrolet	Salisbury/7500#	10-1/2"
K20	Chevrolet	Salisbury/5700#	10-1/2"
P20	Chevrolet	Salisbury/5700#	10-1/2"
G20	Chevrolet	Salisbury/3500#	8-7/8"
C30 (Except Dual Wheel Camper)	Chevrolet	Salisbury/7500#	10-1/2"
C30 (Dual Wheel Camper)	Dana	Salisbury/7500#	10-1/2"
P30	Chevrolet	Salisbury/7900#	10-1/2"
P30 (With H22/H23)	Chevrolet	Banjo/11,000#	12-1/4"
G30	Chevrolet	Salisbury/5700#	10-1/2"
G30 (Dual Wheel)	Dana	Salisbury/6200#	9-3/4"
G30 (Dual Wheel)	Dana	Salisbury/7500#	10-1/2"

Fig. 1--Axle Chart

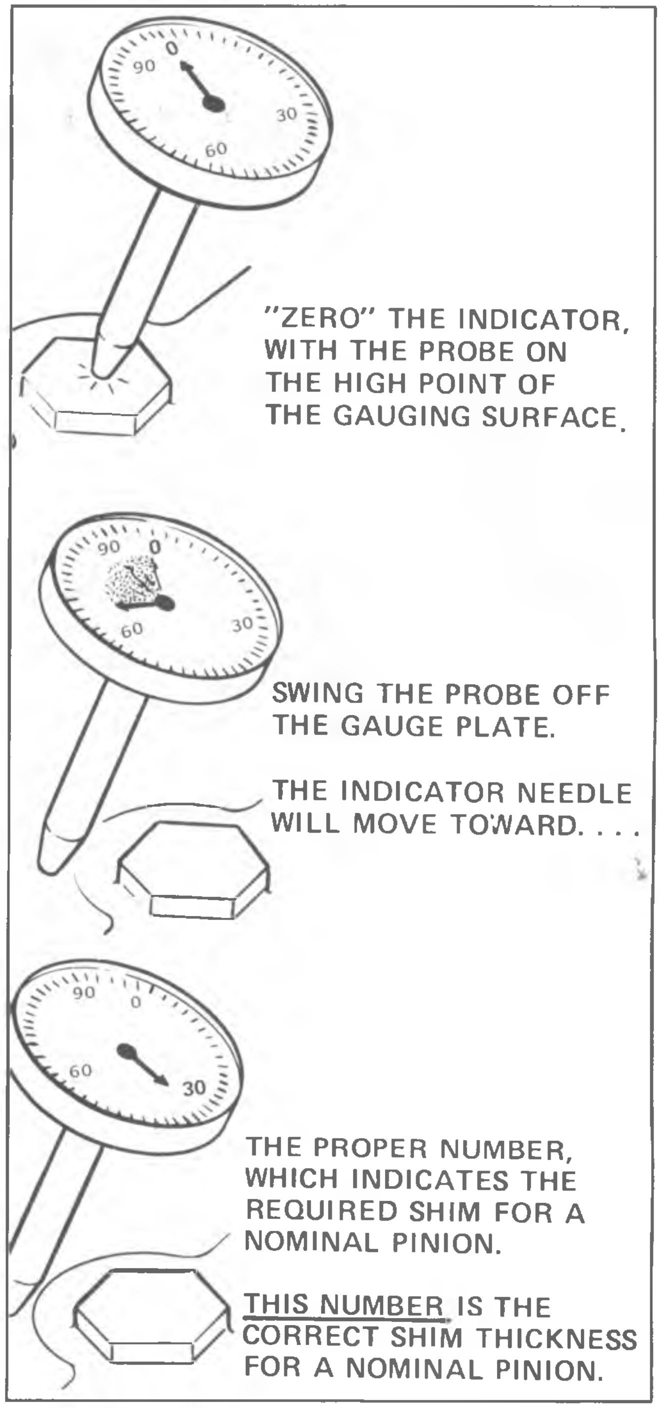


Fig. 2--Correct Use of Dial Indicator

SECTION 5

BRAKES

The 1976 brake boosters are essentially the same as those described in the 1974 Overhaul Manual, with the following exceptions.

DELCO SINGLE DIAPHRAGM BOOSTER

POWER PISTON GROUP ASSEMBLY

The assembly procedure is the same as outlined in the 1974 Overhaul Manual; however, when assembling the support plate to the power piston be sure to press down and rotate the support plate clockwise until the locking lugs of the power piston come against the stops on the support plate.

GAUGING

All 1976 master cylinders incorporate shallow socket primary pistons; therefore, all gauging procedures should incorporate the use of Gauge J-22647.

DELCO SINGLE AND DUAL DIAPHRAGM BOOSTERS

STAKING FRONT AND REAR CYLINDER HOUSINGS

Delco single and dual diaphragm booster cylinder housings are staked in two places 180° apart (fig. 1). When reassembling cylinder housings, be sure the housings are fully locked. Using a 1/8" diameter rod (or equivalent tool), stake the two housings in two places 180° apart.

> **CAUTION:** *The interlock tabs* **should not** be used for staking a second time; stake two of the remaining tabs. When all tabs have been staked once, the housing **must** be replaced.

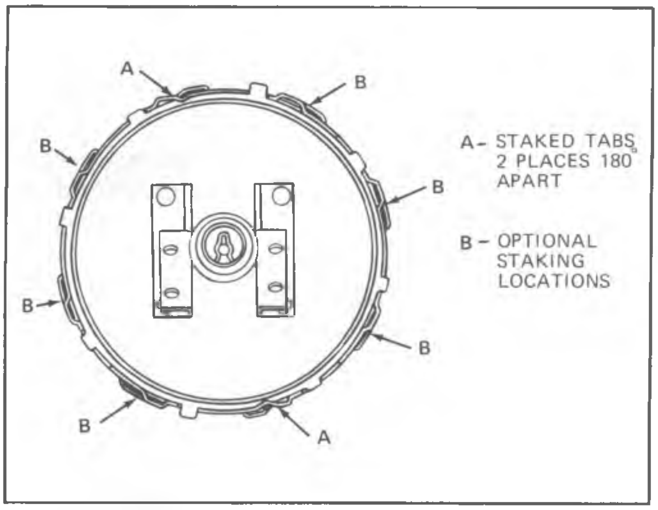


Fig. 1--Delco Booster With Staked Tabs

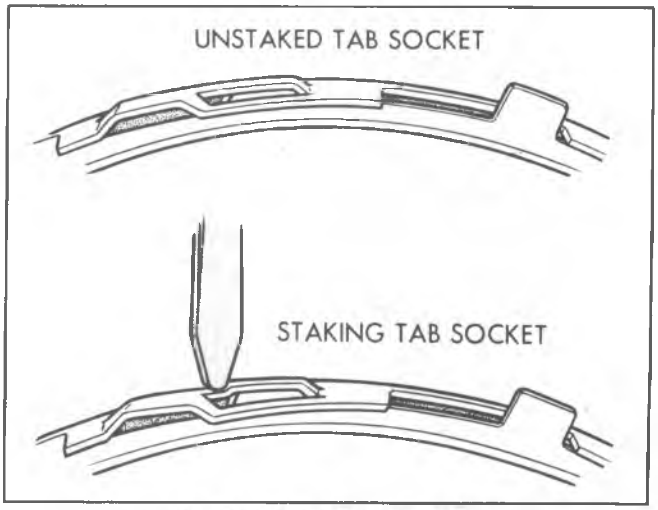


Fig. 2--Staking Booster Tabs

BENDIX

HYDRAULIC BRAKE BOOSTER (HYDRO-BOOST)

INDEX

OVERHAUL OPERATIONS

The Bendix Hydraulic Brake Booster utilizes the hydraulic pressure supplied by the power steering pump to provide power assist for brake applications (fig. 3). The dual master cylinder is mounted to the output push rod end of the booster.

The procedures below include removal of the mounting bracket even though it is not necessary to remove the bracket for overhaul of the internal assembly.

Disassembly (Fig. 4)

1. Secure the booster in a vise (bracket end up) and use a hammer and chisel to cut the bracket nut that secures the mounting bracket to the power section (cut the nut at the open slot in the threaded portion of the housing). Be careful to avoid damage to the threads on the booster hub. Spread the nut and remove it from the power section. Then remove the mounting bracket.

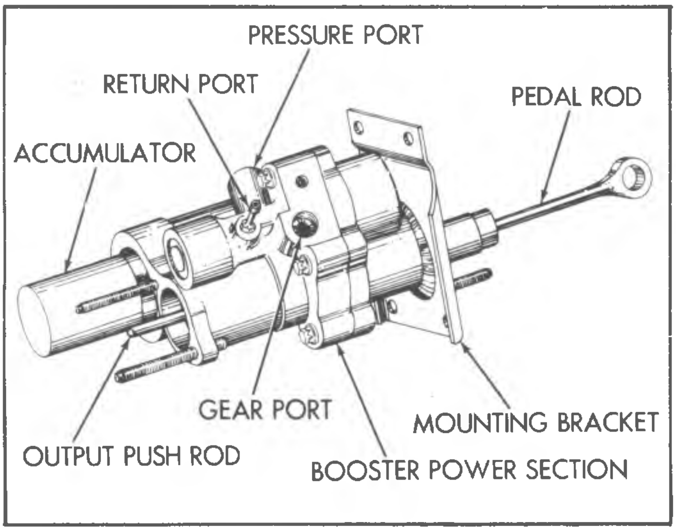
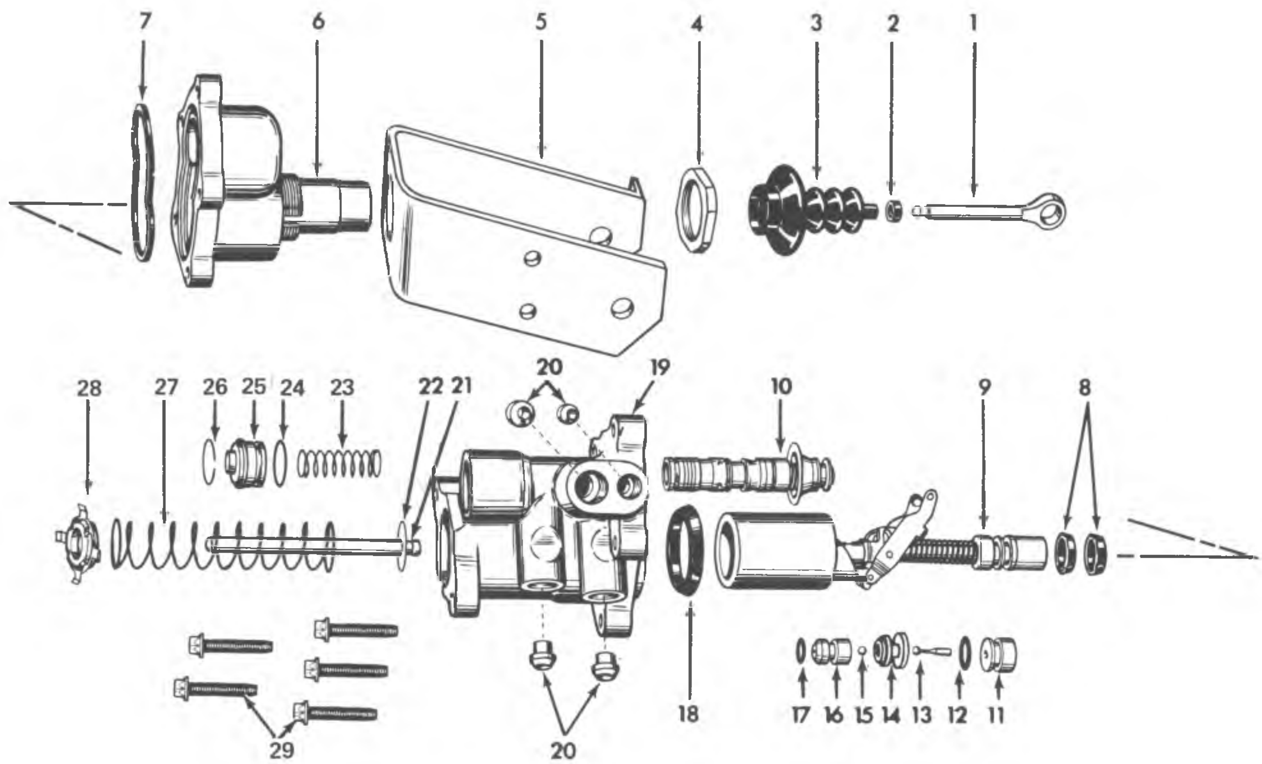


Fig. 3--Bendix Hydro-Boost Brake Booster

2. Remove the pedal rod boot (if equipped) by pulling it off over the pedal rod eyelet.
3. Place Tool J-24569 around the pedal rod and resting on the input rod end as shown in Figure 5.
4. Place a punch (or similar tool) through the pedal rod from the lower side of Tool J-24569. Push the punch on through to rest on the higher side of the tool. Lift up on the punch to shear the pedal rod retainer; remove the pedal rod.
5. Remove the remnants of the rubber grommet from the groove near the end of the pedal rod and from the groove inside the input rod end.
6. With a small screwdriver, pry the plastic guide out of the output push rod retainer. Disengage the tabs of the spring retainer from the ledge inside the opening near the master cylinder mounting flange of the booster. Remove the retainer and the piston return spring from the opening.
7. Pull straight out on the output push rod to remove the push rod and push rod retainer from inside the booster piston.
8. Press in on spool plug, and using a small screwdriver, remove the snap ring from the housing bore.
9. Use pliers to remove the spool plug from the bore. Remove the "O" ring seal from the plug; discard the "O" ring. Remove the spool spring from the bore.
10. Place the booster cover in a vise equipped with soft jawed devices. Using special socket J-25085, remove the five screws that secure the booster housing to the cover.
11. Remove the booster assembly from the vise and while holding the unit over a pan, separate the cover from the housing. Remove the large seal ring from the groove in the cover; discard the seal.
12. Remove the input rod and piston assembly, and the spool assembly from the booster housing.



1. Pedal Push Rod
2. Pedal Rod Retainer
3. Boot
4. Bracket Nut
5. Linkage Bracket
6. Booster Cover
7. Cover to Housing Seal
8. Input Rod Seals
9. Input Rod and Piston Assy.
10. Spool Assembly
11. Plunger Seat
12. "O" Ring Seal
13. Plunger
14. Spacer
15. Check Valve Ball
16. Accumulator Check Valve
17. "O" Ring Seal
18. Piston Seal
19. Booster Housing
20. Tube Seat Inserts
21. Output Push Rod
22. Push Rod Retainer
23. Spool Spring
24. Plug "O" Ring
25. Spool Plug
26. Snap Ring
27. Piston Return Spring
28. Spring Retainer
29. Housing to Cover Bolts

Fig. 4–Power Booster Components (Typical)

13. Remove the input rod seals from the input rod end, and the piston seal from the piston bore in the housing; discard the seals.
14. Remove the plunger, seat, spacer and ball from the accumulator valve bore in the flange of the booster housing. Remove the "O" ring from the seat; discard the "O" ring.
15. Thread a screw extractor into the opening in the check valve in the bottom of the accumulator valve bore, and remove the check valve from the bottom of the bore. Discard the check valve and "O" ring.

    NOTE: Using a screw extractor damages the seat in the check valve. A new charging valve kit must be installed whenever the check valve is removed from the accumulator valve bore.

16. Use a 1/4" or a 5/16" spiral flute type screw extractor to remove the tube seats from the booster ports.

Cleaning and Inspection

1. Clean all metal parts in a suitable solvent. Be careful to avoid losing small parts.
2. Inspect the valve spool and the valve spool bore in the booster housing for corrosion, nicks, scoring or other damage. Discoloration of the spool or bore, particularly in the grooves, is not harmful and is no cause for concern.
3. If the valve spool or the valve spool bore has nicks or scoring that can be felt with a fingernail, particularly on the lands, the entire booster should be replaced as an assembly.

    NOTE: The clearance between the valve spool and the spool bore of the housing assembly is important. Because of this, the valve spool and the housing assembly make up a selective assembly (the valve spool is selected to match the spool bore).

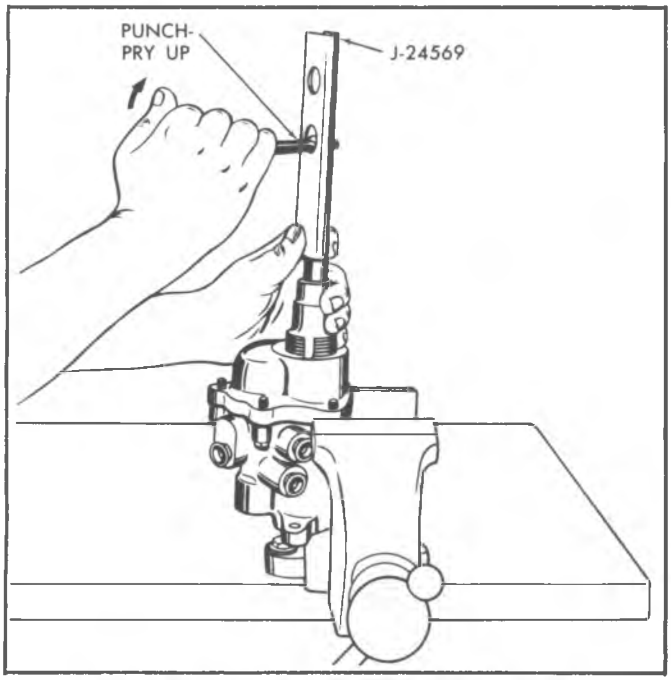


Fig. 5--Removing Booster Pedal Rod (Typical)

4. Inspect the input rod and piston assembly for corrosion, nicks, scoring or excessive wear. If the piston is damaged, the input rod and piston assembly should be replaced.
5. Inspect the piston bore in the booster housing for corrosion, nicks, scoring or other damage. If the bore is damaged, the entire booster must be replaced as an assembly.

Assembly

CAUTION: *Be sure to keep parts clean until reassembly. Re-wash at reassembly if there is any occasion to doubt cleanliness - such as parts dropped or left exposed for eight hours or longer.*

Lubricate all seals and metal friction points with power steering fluid.

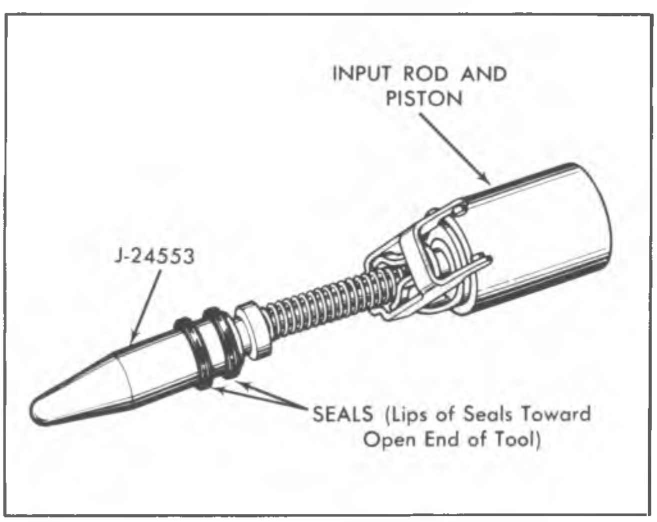


Fig. 6--Installing Input Rod Seals

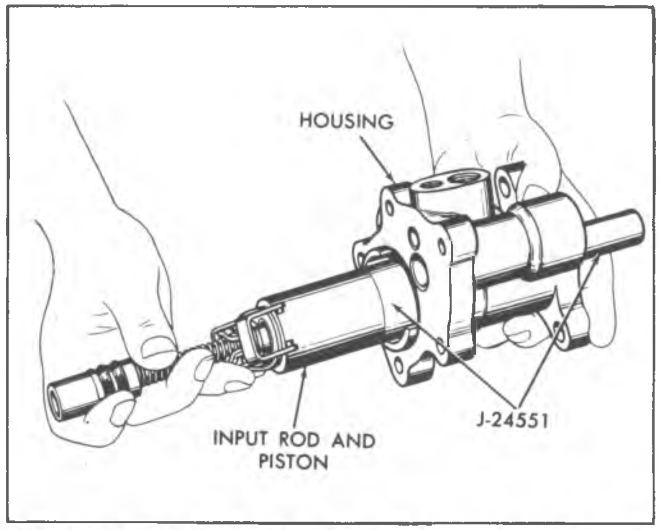


Fig. 7--Installing Input Rod and Piston Assembly into Booster (Typical)

Whenever the booster is disassembled, all seals, tube inserts and bracket nut should be replaced. All of these parts are included in a seal kit. If any of the accumulator valve components are damaged or lost, replace all valve components (all are included in charging valve kit).

1. Position a **NEW** tube seat in each booster port and screw a spare tube nut in each port to press the seat down into the port. Do not tighten the tube nuts in the port as this may deface the seats.
2. Remove the spare tube nuts and check for aluminum chips in the ports. Be sure that any foreign matter is removed.
3. Coat the piston bore and the piston seal with clean power steering fluid, and assemble the **NEW** seal in the bore. The lip of the seal must be toward the rear (away from the master cylinder mounting flange). Be sure the seal is fully seated in the housing.
4. Lubricate the input rod end, **NEW** input rod seals and Seal Installer Tool J-24553 with clean power steering fluid. Slide the seals on the tool with the lip of the cups toward the open end of the tool (fig. 6).
5. Slide the tool over the input rod end and down to the second groove; then slide the forward seal off the tool and into the groove. Assemble the other seal in the first groove. Be sure that both seals are fully seated.
6. Lubricate the piston and Piston Installing Tool J-24551 with clean power steering fluid. Insert the large end of the tool into the piston (fig. 7), and slide the tool and piston into the piston bore and through the piston seal.
7. Assemble the **NEW** "O" ring onto the **NEW** accumulator check valve, and dip the assembly in clean power steering fluid. Insert the check valve into the accumulator valve recess in the housing flange.
8. Assemble the new ball and spacer in the same recess.

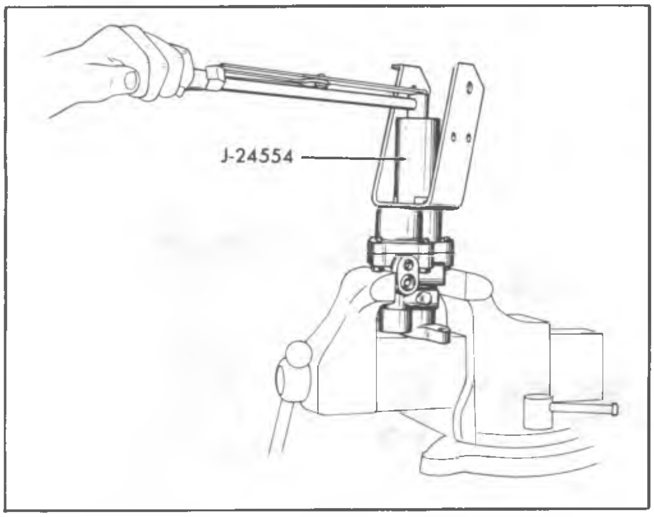


Fig. 8--Installing Mounting Bracket Nut (Typical)

9. Assemble the **NEW** "O" ring onto the charging valve plunger seat and insert the plunger into the seat. Dip the assembly in clean power steering fluid, and insert it into the charging valve recess.
10. Dip the spool assembly in clean power steering fluid, and insert the assembly into the spool bore in the housing. Be sure that the pivot pins on the upper end of the input rod lever assembly are engaged in the groove in the sleeve. Remove Tool J-24551 from the piston assembly.
11. Position a **NEW** housing seal in the groove in the housing cover. Then join the booster housing and cover and secure with five screws. Tighten the screws to 18-26 ft. lbs. using Special Socket J-25085.

    CAUTION: *See "Caution" on Page 1 of this section.*
12. Assemble a **NEW** "O" ring seal on the spool plug. Insert the spool spring and the spool plug in the forward end of the spool bore. Press in on plug and assemble the plug snap ring in the groove in the bore.
13. Position the mounting bracket on the booster. The tab on the inside diameter of the large hole in the bracket should fit into a slot in the threaded portion of the booster hub.
14. Install the **NEW** bracket nut with the staking groove outward on the threaded hub of the booster. Using Tool J-24554 and a torque wrench (fig. 8), tighten the nut to 95-120 ft. lbs.

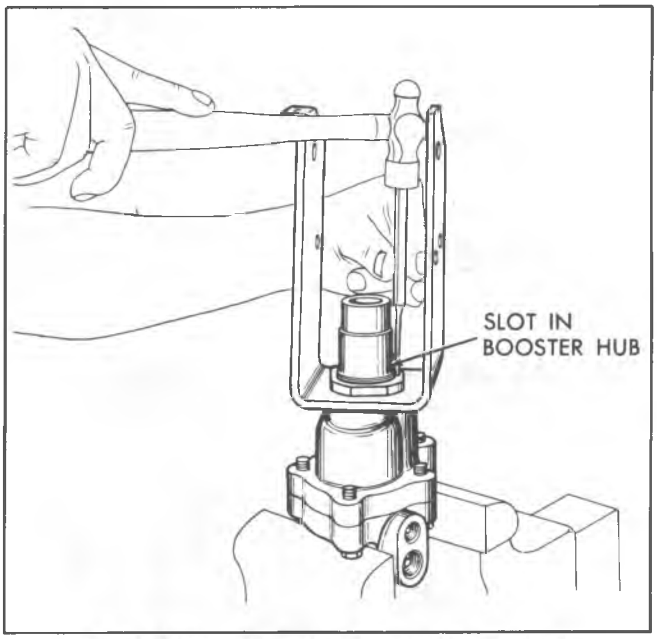
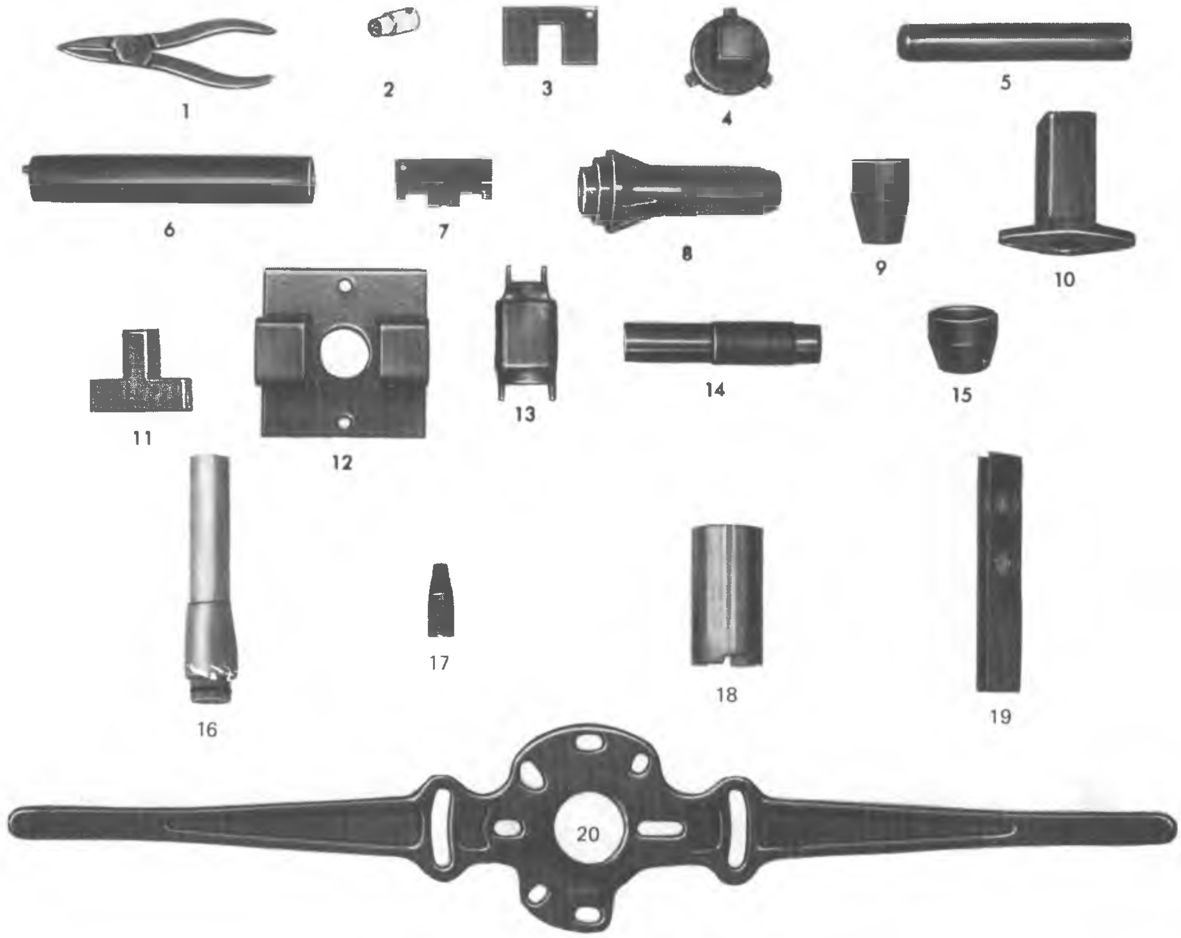


Fig. 9--Staking Mounting Bracket Nut (Typical)

    CAUTION: *See "Caution" on Page 1 of this section.*
15. Use a hammer and a small punch inserted into the staking groove of the nut, at the slot in the booster hub (fig. 9), to stake the nut in place. Be sure that the outer thread of the nut is upset.
16. Assemble a NEW boot (if used) on the pedal rod. Then assemble a NEW grommet in the groove near the end of the pedal rod.
17. Moisten the grommet with water (to ease assembly), and insert the grommet end of the pedal rod into the input rod end of the booster housing. Push on the end of the pedal rod to seat the grommet in the groove inside the housing.

    NOTE: When the grommet is fully seated, the pedal rod will rotate freely with no binding.
18. Slide the boot on the pedal rod and assemble the large end of the boot onto the hub of the power section.

SPECIAL TOOLS



1.	J-4880	Snap Ring Pliers
2.	J-25085	Special Socket
3.	J-21183	Height Gauge
4.	J-21524	Power Piston Remover and Installer
5.	J-21601	Power Brake Retainer and Installer
6.	J-22657	Bushing Retainer Socket
7.	J-22647	Height Gauge
8.	J-22677	Power Cylinder Seal Installer
9.	J-22733	Seal Installer and Protector
10.	J-22805	Power Cylinder Holding Fixture
11.	J-22839	Front Plate Holding Fixture
12.	J-22893	Booster Separating Adapter
13.	J-23101	Power Piston Holding Tool
14.	J-23175	Control Valve Installer
15.	J-23188	Secondary Bearing Protector
16.	J-24551	Piston Installer
17.	J-24553	Input Rod Seal Installer
18.	J-24554	Socket
19.	J-24569	Pedal Push Rod Remover
20.	J-9504	Power Cylinder Spanner Wrench

Fig. 10--Special Tools

SECTION 6

ENGINE

REPAIR PROCEDURES

CAMSHAFT

Inspection

When checking the camshaft for alignment, using the "V" block method, the dial indicator will indicate the exact amount the camshaft is out of true. If it is out more than .001" dial indicator reading, the camshaft should be replaced.

REPAIRS

Piston Selection

Piston-to-bore clearance for all engines is increased by .0010" for 1976. Refer to page 6-35 (fig. 74) in the 1974 Overhaul Manual.

SECTION 6M

CARBURETOR

CONTENTS OF THIS SECTION

INTRODUCTION

A carburetor is designed to meet the particular requirements of the engine, transmission and vehicle and although they may look alike, they are not always interchangeable. Refer to carburetor part number and/or specifications.

This section, divided into sub-sections by carburetor model, covers the repair procedures for the various carburetors, assembly and disassembly procedures and internal carburetor adjustment. Although illustrations showing bench operations are used, most single operations, when not part of a general overhaul, should be performed (if practical) with the carburetor on the engine. Typical illustrations and procedures are used except where specific illustrations or procedures are necessary to clarify the operation.

Refer to 1974 Overhaul Manual for overhaul procedures on the Rochester 4MV carburetor.

Refer to Light Duty Truck Service Section for external carburetor adjustment procedures.

ROCHESTER 1MV CARBURETOR

INDEX

DISASSEMBLY

Air Horn

Removal

1. Remove auxiliary vacuum break diaphragm assembly from air horn by removing two attaching screws. Remove auxiliary vacuum break diaphragm plunger from vacuum diaphragm link which is permanently attached to the choke lever. The lever and link assembly can be removed, if desired, during choke valve removal (Fig. 1).
2. Remove fast idle cam from boss on float bowl by removing attaching screw. Then, remove fast idle cam from choke rod and choke rod from upper choke lever (Fig. 2). Note position of rod and cam for ease in reassembly.

   NOTE: Upper choke lever is spun on end of choke shaft and cannot be removed.
3. Remove six air horn to bowl attaching screws and lockwashers (three long and three short screws).

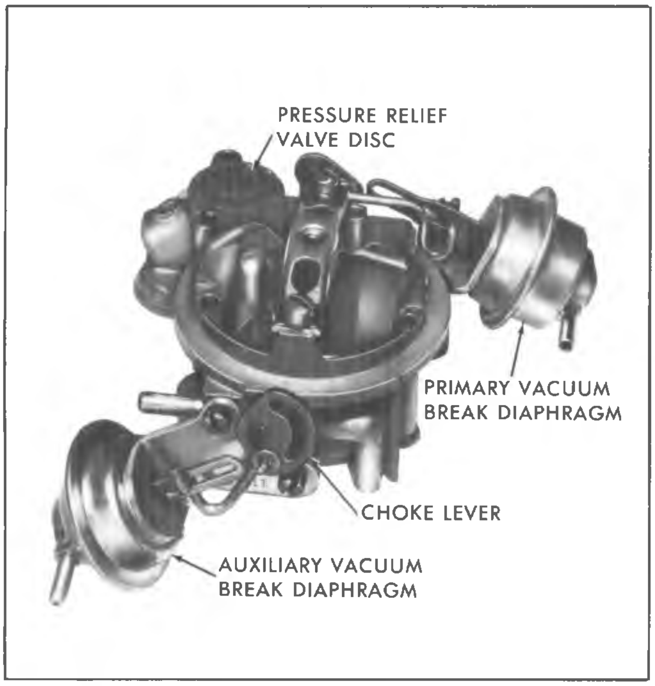


Fig. 1–Air Horn Assembly

4. Remove primary vacuum break diaphragm unit from the air horn casting. Then, remove the vacuum break hose assembly and link from slotted diaphragm plunger stem.
5. Remove air horn by lifting straight up, invert and place on clean bench. Air horn to float bowl gasket can remain on bowl for removal later.

Disassembly

1. If desired, the choke valve and choke shaft can be removed from air horn by first removing the thermostatic coil lever from the end of choke shaft by removing attaching screw.

   Remove the two choke valve attaching screws; then, remove the choke valve and choke shaft from air horn.

   The choke valve screws are held in place by Loctite or equivalent so it will be necessary to restake or use Loctite or equivalent during assembly.
2. No further disassembly of the air horn is necessary. The pressure relief valve disc need not be removed from the top of the air horn for cleaning purposes.

Float Bowl (Fig. 3)

1. Remove air horn to float bowl gasket. Gasket is slit next to metering rod lever so that it can be slid over lever for ease in removal.
2. Remove float assembly from float bowl by lifting upward on float hinge pin. Remove hinge pin from float arm (Fig. 4).
3. Remove float needle from seat.
4. Disconnect accelerator pump and power piston actuator lever from end of throttle shaft by removing lever attaching screw (Fig. 4).
5. Hold down on power piston while removing lever. Power piston spring and metering rod assembly may now be removed from float bowl (Fig. 4).
6. Remove lower end of power piston link from actuator lever by rotating until tang on rod slides out of notch

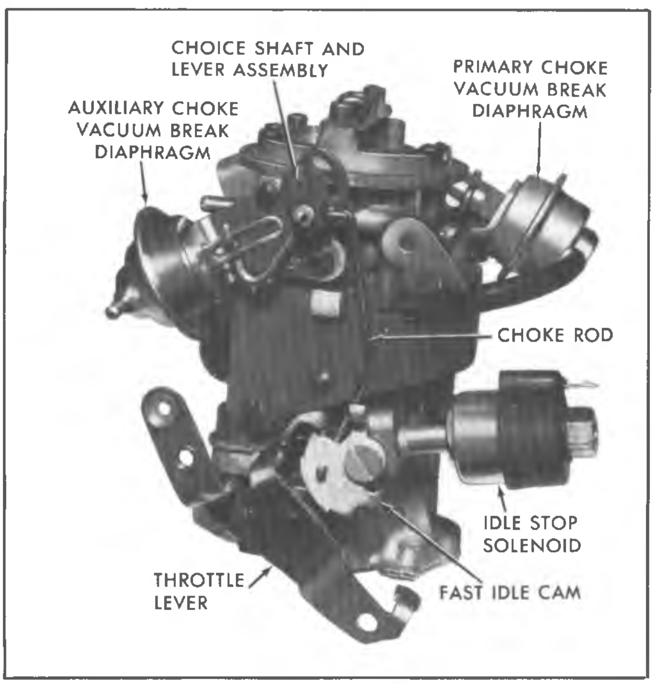


Fig. 2–1MV Carburetor

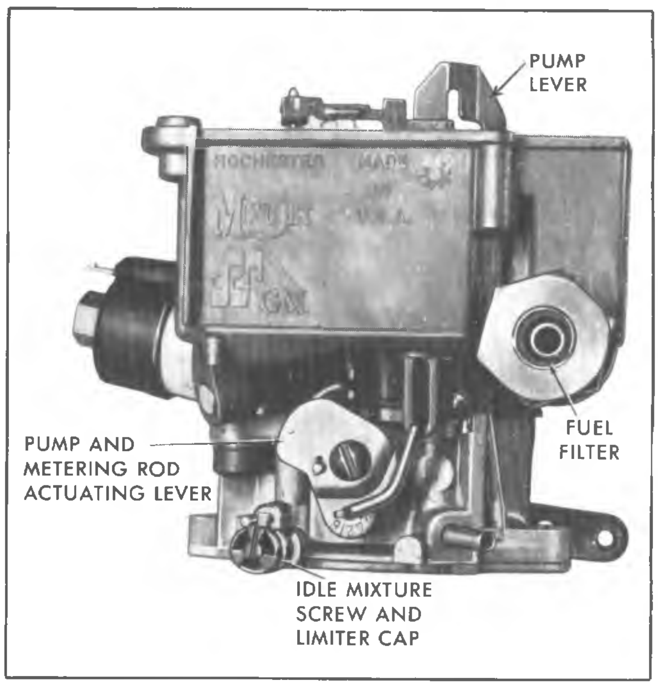


Fig. 3–Float Bowl Assembly

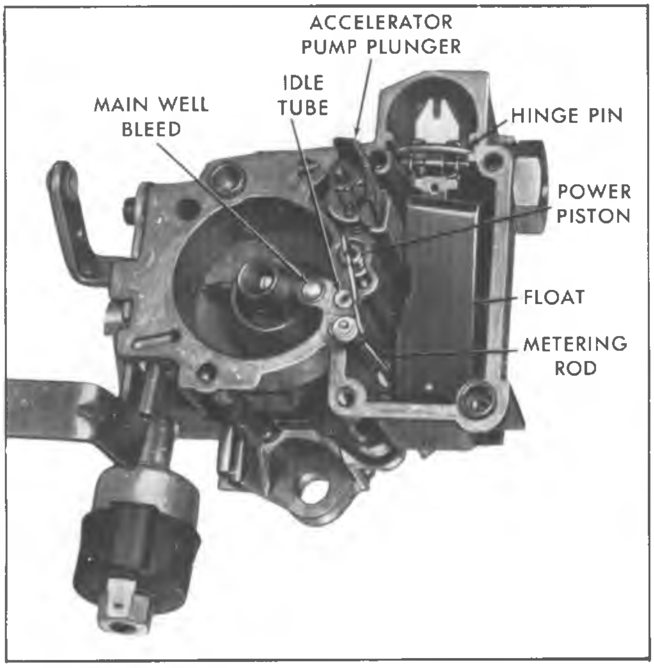


Fig. 4–Float and Accelerator Pump

in lever.

7. Remove actuator lever from lower end of accelerator pump link in same manner.
8. Push down on accelerator pump and remove actuator link by rotating until tang on rod is aligned with slot on pump plunger lever. Remove the link.
9. Remove pump assembly from float bowl.
10. Remove pump return spring and power piston spring from float bowl.
11. Remove "T" guide and pump discharge spring using needle nose pliers.
12. Pump discharge ball and idle tube can be removed at the same time by inverting the bowl.
13. Remove main metering jet from bottom of fuel bowl.
14. Remove float needle seat and gasket.
15. Remove two screws from idle compensator cover (A.T. only). Then remove cover, hot idle compensator and seal from recess in bowl.
16. The idle stop solenoid can be removed at this time, if desired.
17. Remove the fuel inlet nut and gasket; then, remove the filter and relief spring.

No further disassembly of the float bowl is required.

Throttle Body (Fig. 6)

1. Invert carburetor bowl on bench and remove two throttle body to bowl attaching screws and lockwashers. Throttle body and insulator gasket may now be removed.

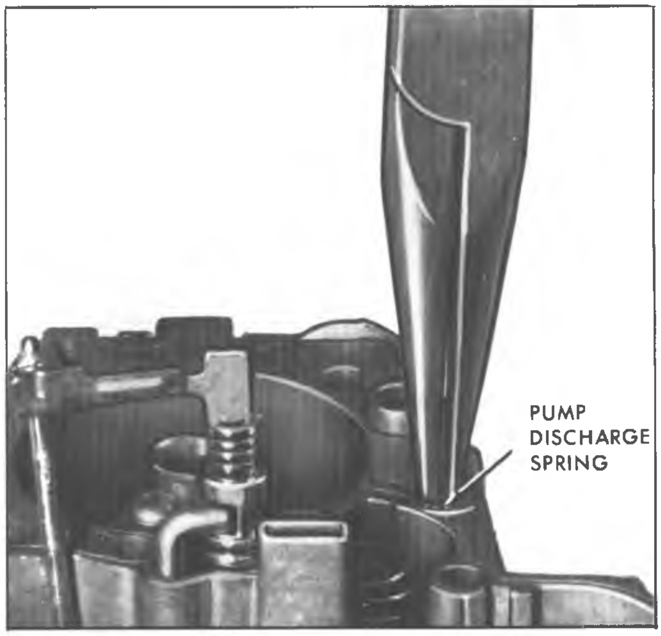


Fig. 5–Removing Pump Discharge Spring

2. No further disassembly of the throttle body is necessary unless the idle mixture needle is damaged or the idle channels need cleaning. If necessary to remove the idle mixture needle, cut the tang from the plastic limiter cap. Do not install a replacement cap as a bare mixture screw is sufficient to indicate that the mixture has been readjusted.

NOTE: Due to the close tolerance fit of the throttle valve in the bore of the throttle body, do not remove the throttle valve or shaft.

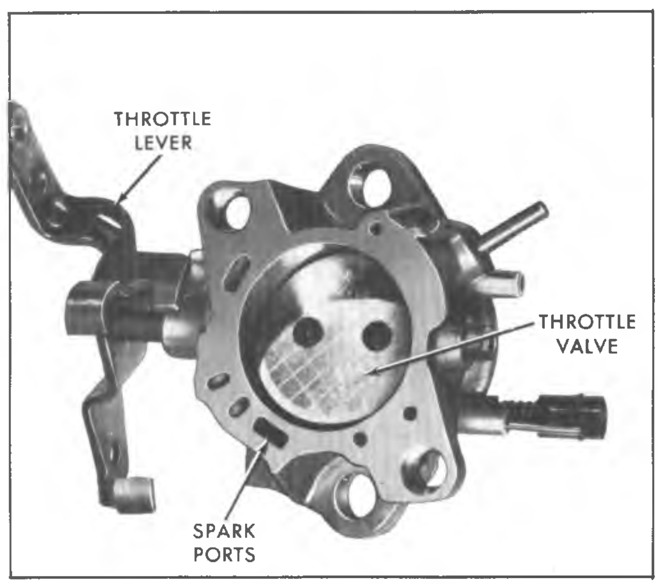


Fig. 6–Throttle Body Assembly

CLEANING AND INSPECTION

The carburetor should be cleaned in a cold immersion type cleaner.

1. Thoroughly clean carburetor castings and metal parts in an approved carburetor cleaner such as Carbon X (X-55) or its equivalent.

   Rubber and plastic parts should not be immersed in carburetor cleaner. However, the air horn which has the plastic relief valve will withstand normal cleaning in carburetor cleaner.
2. Blow out all passages in castings with compressed air. Do not pass drills through jets or passages.
3. Examine float needle and seat assembly for wear. Install a new factory matched set if worn.
4. Inspect upper and lower casting sealing surfaces for damage.
5. Inspect holes in levers for excessive wear or out of round condition. If levers are worn they should be replaced.
6. Examine fast idle cam for excessive wear or damage.
7. Check throttle and choke levers and valves for binds and other damage.
8. Check all springs for distortion or loss in tension; replace as necessary.

   NOTE: When carburetor has been disassembled, new gaskets and filter must be used.

ASSEMBLY

Throttle Body

1. Invert float bowl and install new throttle body to bowl insulator gasket.
2. Install throttle body on bowl gasket so that all holes in throttle body are aligned with holes in gasket.
3. Install two throttle body to bowl attaching screws and lockwashers. Tighten even and securely to 15 ft. lbs.

Float Bowl

1. Install idle stop solenoid, if removed.
2. (A.T. only) Install seal into recess in idle compensator cavity in float bowl, then install compensator assembly.
3. Install idle compensator cover, retaining with two attaching screws. Tighten securely.
4. Install main metering jet into bottom of fuel bowl. Tighten securely.
5. Install needle seat and gasket.
6. Install idle tube flush with bowl casting.
7. Install pump ball, spring and "T" into pump discharge hole.
8. Push down on pump discharge "T" until flush with bowl casting. (Fig. 4).
9. Install fuel filter spring, filter, inlet nut and gasket.
10. Install accelerator pump return spring.
11. Install power piston return spring into piston cavity in the bowl.
12. Install power piston actuating rod (right angle end) into slot in the power piston.
13. Install piston, metering rod and actuating rod assembly into the float bowl. End of actuating rod must enter hole in bowl. Locate metering rod into jet orifice.
14. Install pump plunger assembly into pump well with actuating lever protruding through bottom of bowl casting. Push downward on pump lever and install pump assembly drive link into slot in lower end of shaft. Ends of drive link point inboard toward carburetor bore. Tang on upper end of link retains link to pump shaft. (Fig. 4).
15. Install lower end of pump link into actuator lever which fits on throttle shaft.
16. Install curved power piston actuator link into throttle actuator lever. End protrudes outward away from throttle bore and has tang which retains link to lever.
17. Before fastening power piston and pump actuator lever to end of throttle shaft, hold power piston assembly down and slide upper end of curved power piston actuator link into lower end of power piston actuator rod.
18. Install actuating lever on end of throttle shaft by aligning flats on lever with flats on shaft. Install lever retaining screw and tighten securely.
19. Install float needle valve into needle seat.
20. Install float hinge pin into float arm. Then install float and hinge pin into float bowl.

Float Level Adjustment (Fig. 7)

1. Hold float retaining pin firmly in place and push down on float arm at outer end against top of float needle.
2. Use adjustable "T" scale and measure distance from top of float at index point on toe to float bowl gasket surface (gasket removed).

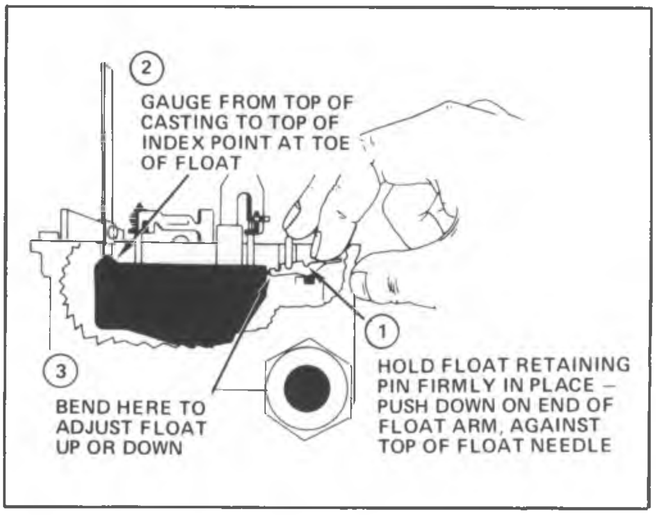


Fig. 7–Float Level Adjustment

3. Bend float pontoon up or down at float arm junction to adjust.

Metering Rod Adjustment (Fig. 8)

1. Open throttle valve, slide metering rod out of holder and remove from main metering jet.
2. To check adjustment, back out idle stop solenoid and rotate fast idle cam so that fast idle cam follower is not contacting steps on cam.
3. With throttle valve completely closed, apply pressure to top of power piston and hold piston down against its stop.
4. Holding downward pressure on power piston, swing metering rod holder over flat surface of bowl casting next to carburetor bore.
5. Insert gauge between bowl casting and lower surface of metering rod holder. Gauge should have a slide fit between both surfaces, as shown.

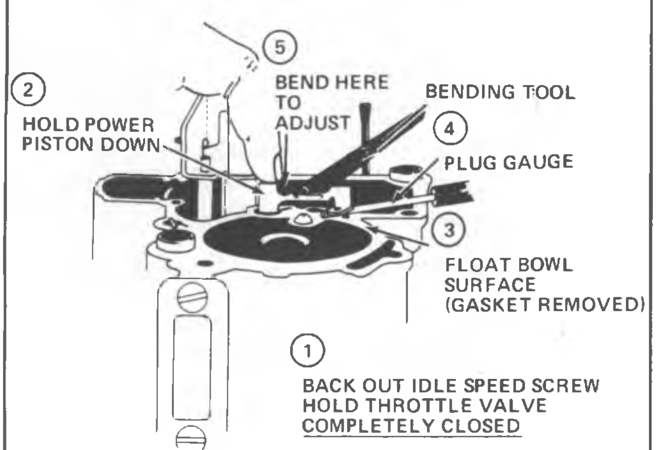


Fig. 8–Metering Rod Adjustment

6. To adjust, carefully bend metering rod holder up or down.
7. After adjustment, install metering rod and spring assembly. Install rod in jet, then install in hanger.
8. Install air horn gasket on float bowl by carefully sliding slit portion of gasket over metering rod holder. Then align gasket with dowels provided on top of bowl casting and press gasket firmly in place.

Air Horn

1. Install choke shaft assembly and choke valve into air horn, if removed. Align choke valve, tighten two retaining screws and stake securely or use Loctite or equivalent.
2. Install air horn to float bowl by lowering gently onto float bowl until seated. Install three long and three short air horn to float bowl attaching screws and lockwashers. Tighten screws securely.

   Install the primary choke vacuum break diaphragm assembly under the two short air horn screws next to the thermostatic coil lever. Connect the choke vacuum break diaphragm link to slotted diaphragm plunger stem and install lever to the end of the choke shaft, using retaining screw. Tighten all screws securely.
3. Install the choke vacuum break diaphragm hose to the diaphragm on air horn and tube on float bowl.
4. Assemble choke rod into the slot in the upper choke lever. End of rod points away from air horn casting when installed properly.
5. Install lower end of choke rod into fast idle cam. Steps on fast idle cam should face fast idle tang on throttle lever. Install fast idle cam to boss on float bowl with attaching screw. Tighten securely.
6. Install auxiliary vacuum break diaphragm link attached to the choke lever to slot in the diaphragm plunger stem. Then, install the auxiliary vacuum break diaphragm unit to air horn using two attaching screws. Tighten securely.

ROCHESTER 2GC

INDEX

GENERAL

Flooding, stumble on acceleration and other performance complaints are, in many instances, caused by the presence of dirt, water or other foreign material in the carburetor. To aid in diagnosing the cause of complaint, the carburetor should be carefully removed from the engine without draining fuel from the bowl. The contents of the fuel may then be examined for dirt or water problems as the carburetor is disassembled.

The following is a step-by-step sequence by which the model 2GC carburetor (Fig. 1C) may be completely disassembled and reassembled. Adjustments may be made and various parts of the carburetor may be serviced without completely disassembling the entire unit. Refer to service section for external adjustments.

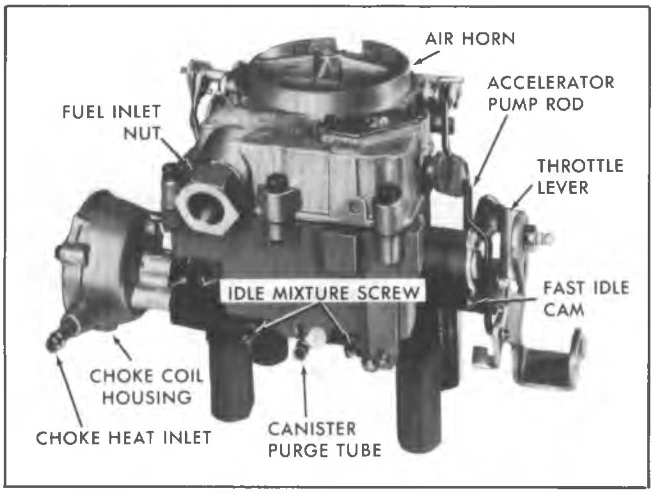


Fig. 1C–Rochester 2GC Carburetor

DISASSEMBLY

Air Horn

1. Remove fuel inlet filter nut and gasket, and remove filter and spring.
2. Disconnect lower end of pump rod from throttle lever by removing spring clip (Fig. 2C).
3. Remove upper end of pump rod from pump lever by rotating rod out of hole in lever.
4. Remove the vacuum break diaphragm hose from tube on throttle body and tube on vacuum break diaphragm unit. Then remove the vacuum break diaphragm assembly from air horn by removing two attaching screws. Remove diaphragm and link assembly from lever on end of choke shaft.
5. Remove vacuum break lever from end of choke shaft by removing retaining screw in end of shaft. Then, remove the intermediate choke rod from the vacuum break lever and from the lever on the thermostatic coil housing.
6. Remove fast idle cam attaching screw from side of float bowl. Remove fast idle cam from end of choke rod by rotating rod out of hole in fast idle cam. The upper end of the choke rod cannot be removed from the choke lever until after the air horn has been removed from the float bowl.

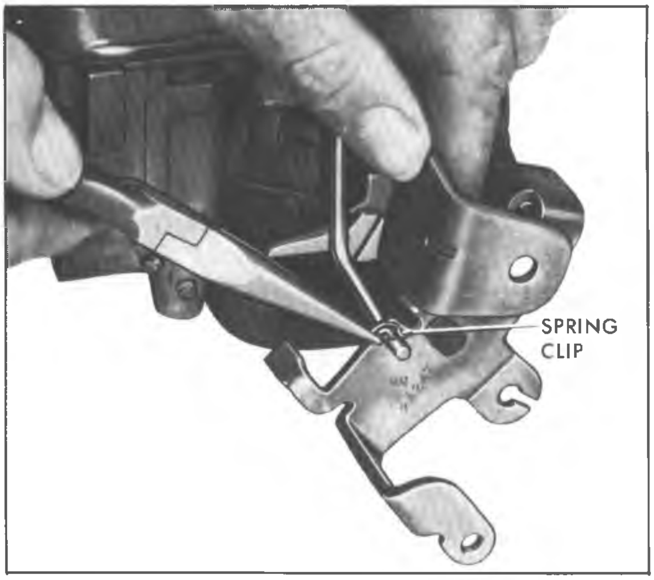


Fig. 2C–Removing Pump Rod Spring Clip

7. Remove eight air horn attaching screws and lockwashers, then lift air horn from float bowl (Fig. 3C).
8. Place air horn on flat surface. Remove float hinge pin and lift float from air horn. Float needle, and pull clip (if used), may now be removed from float arm (Fig. 4C).
9. Remove float needle seat and gasket with a wide blade screwdriver.
10. Remove power piston by depressing stem and allowing it to snap free. Use care not to bend the power piston stem.

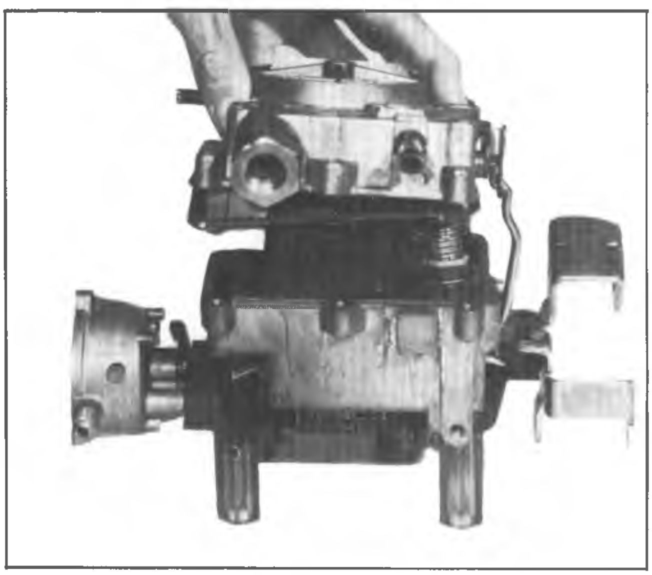


Fig. 3C–Removing Air Horn

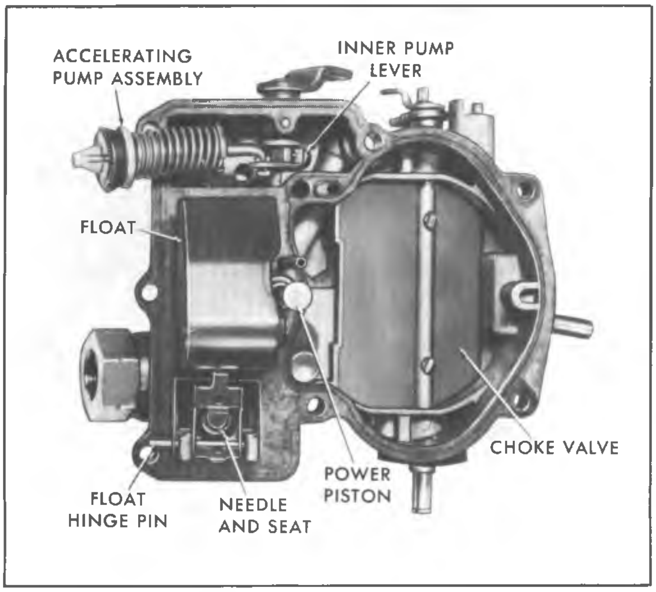


Fig. 4C–Air Horn

11. Remove the pump plunger assembly and inner pump lever from pump shaft by loosening set screw on inner lever. To remove the pump plunger stem from the inner pump lever it will be necessary to break off the swedged or flattened end of the pump plunger stem. This should not be done unless pump assembly replacement is necessary, such as during overhaul. The service pump assembly uses a grooved pump plunger stem and retaining clip. After removing the inner pump lever and pump assembly, remove the outer pump lever and shaft assembly from air horn. Remove the plastic washer on pump plunger shaft.
12. Remove air horn gasket from air horn.
13. Remove fuel inlet baffle next to needle seat.
14. Remove two choke valve attaching screws, then remove choke valve. Care should be taken when removing attaching screws so that the choke shaft will not be bent. It may be necessary to file off staked ends on choke valve screws before removing.
15. Remove choke valve shaft from air horn.
16. Remove the fast idle cam rod and lever from the choke shaft.

Float Bowl

1. Remove pump plunger return spring from inside pump well. Then remove aluminum check ball from bottom of pump well by inverting bowl (Fig. 5C).
2. Remove main metering jets, power valve and gasket from inside float bowl.
3. Remove three screws holding venturi cluster to float bowl and remove cluster and gasket. Then remove the plastic main well inserts in the main well cavity.
4. Using a pair of long nosed pliers, remove pump discharge spring retainer (Fig. 6C). Then, spring and check ball may also be removed from discharge passage.

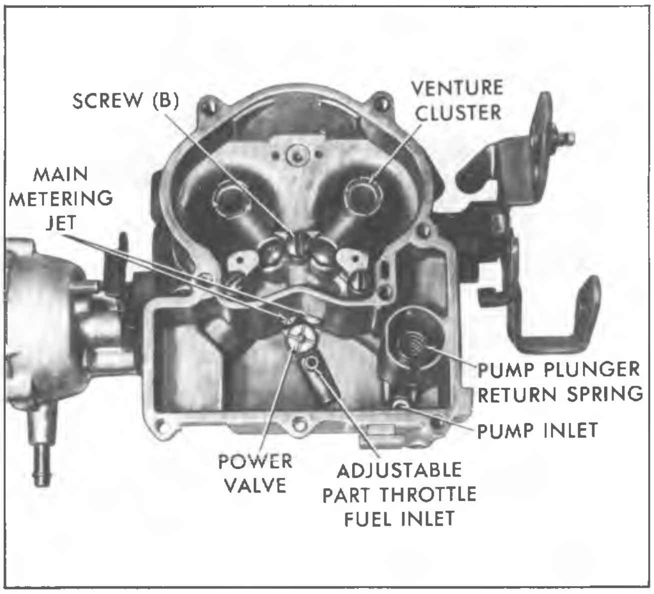


Fig. 5C–Float Bowl

5. Invert carburetor and remove three large throttle body to bowl attaching screws and lockwashers. Throttle body and gasket may now be removed.

Throttle Body

1. Remove the three choke cover attaching screws and retainers, then remove thermostatic coil and cover assembly and gasket from choke housing (Fig. 7C).

   CAUTION: *Do not remove cup baffle from beneath thermostatic coil cover because coil distortion may result.*

2. Remove baffle plate from inside choke housing (Fig. 8C).
3. Remove the two choke housing attaching screws from inside choke housing, then remove choke housing and gasket from throttle body casting.

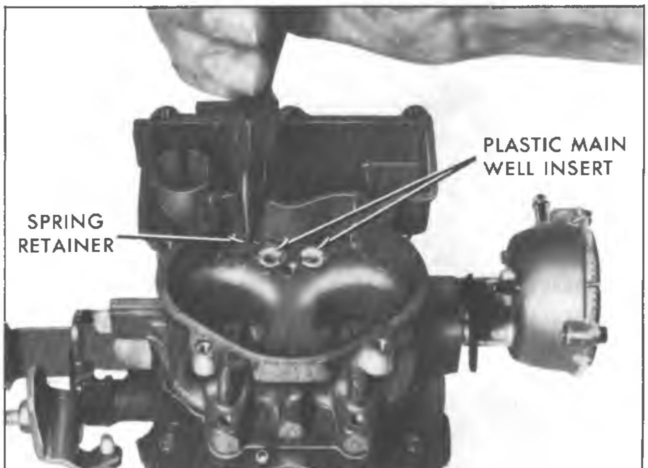


Fig. 6C–Removing Spring Retainer

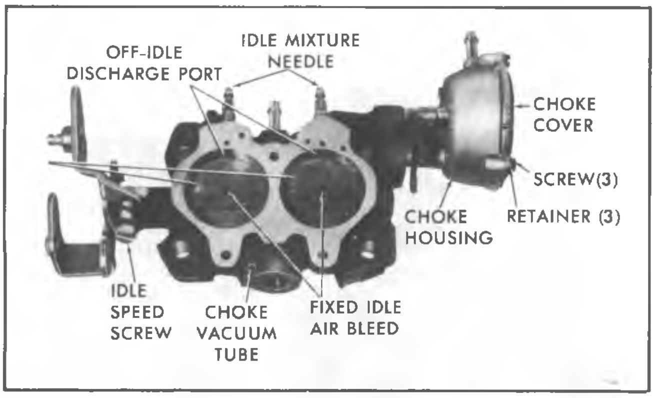


Fig. 7C–Throttle Body

4. Remove screw from end of intermediate choke shaft and remove intermediate choke lever from shaft (Fig. 9C). Remove inner choke coil lever and shaft assembly from choke housing. Remove rubber dust seal from inside choke housing.
5. The idle mixture needles have been adjusted and set at the factory and capped, to prevent excessive adjustment in the field. However, the carburetor has a limited idle mixture adjustment. If it is necessary to remove the idle mixture needles for cleaning purposes or if they are defective, the following procedure should be used:

   Using a pair of side cutter pliers, clip off the limit tang on the limiter cap. Then unscrew the idle mixture screw and spring from throttle body. If new idle mixture needles are installed, no plastic limiter caps are required. If the original idle mixture needles had to be removed, install the idle mixture needle and springs into throttle body as described under Assembly. No further disassembly of the throttle body is necessary.

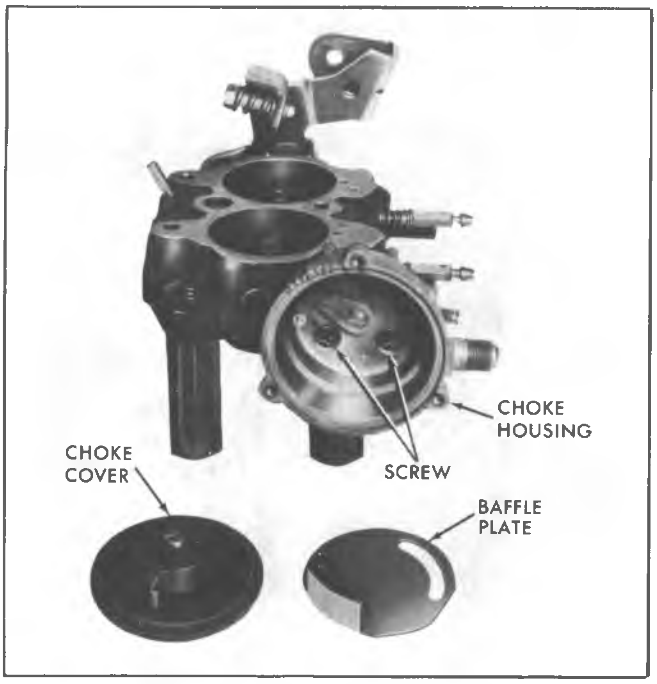


Fig. 8C–Carburetor Choke

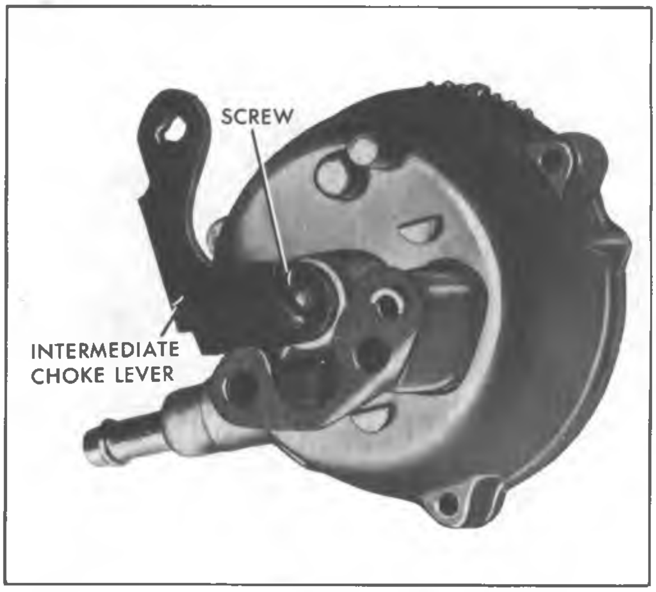


Fig. 9C–Choke Housing

CAUTION: *No attempt should be made to remove the throttle valves or shaft as it may be impossible to reassemble the throttle valves correctly in relation to the idle discharge orifices.*

CLEANING AND INSPECTION

Dirt, gum, water or carbon contamination in or on exterior moving parts of the carburetor are often responsible for unsatisfactory performance. For this reason, efficient carburetion depends upon careful cleaning and inspection while servicing.

1. Thoroughly clean carburetor casting and metal parts in an approved carburetor cleaning solution. (Example: X-55 or equivalent).

   CAUTION: *Any rubber parts, plastic parts, diaphragm assemblies, pump plungers, should not be immersed in carburetor cleaner.*

2. Blow out all passages in castings dry with compressed air and blow off all parts until they are dry.

   CAUTION: *Do not pass drills or wires through calibrated jets or passages as they may enlarge orifices and seriously affect carburetor calibration.*

3. Check all parts for wear. If wear is noted, defective parts must be replaced. Note especially the following:
   a. Check float needle and seat for wear. If wear is noted, the assembly must be replaced.
   b. Check float lip for wear and float for damage. Repair or replace as necessary.
   c. Visually check throttle and choke shaft bores in throttle body and cover castings for wear and out of round. Repair or replace as necessary.
   d. Inspect idle adjusting needles (if removed) for burrs or ridges, or being bent. Such a condition requires replacement.

e. Inspect fast idle cam. If wear is noted on steps of cam, it should be replaced as it may upset engine idle speed during the warm-up period.

f. Inspect the pump plunger cup and expander spring. Replace plunger if cup or spring is damaged or distorted.

g. Inspect power piston and spring for burrs or being bent. Replace as necessary.

4. Check filters for dirt or lint. Replace as necessary.
5. Inspect venturi cluster casting. If any parts in casting are loose or damaged, the cluster assembly must be replaced.
6. Use new gaskets in reassembly.

ASSEMBLY

Throttle Body

1. Install idle speed screw and spring assembly in throttle body if removed (Fig. 7C).
2. If it was necessary to remove the idle mixture needles, install the idle mixture needles and springs into the throttle body until finger tight and seated. Back out screws four turns as a preliminary idle adjustment.
3. Install new rubber dust seal into cavity inside choke housing (Fig. 9C). Lip on seal faces towards carburetor after the housing is installed.
4. Install inner choke coil lever and shaft assembly into choke housing.
5. With the choke coil lever and shaft assembly installed into housing, install the intermediate choke lever on flats of intermediate choke shaft and retain with screw. Tighten securely.
6. Install new choke housing to carburetor gasket.
7. Position choke housing on throttle body and retain with two attaching screws. Tighten securely (Fig. 8C).
8. Before installing the choke cover coil and baffle plate assembly, refer to intermediate choke rod adjustment (Service) to adjust intermediate choke rod so that with the choke valve closed, the lever inside the choke housing lines up with gauge.
9. Install choke thermostatic coil and cover assembly with new gaskets and end of coil below plastic tang on the inner choke housing lever. Refer to automatic choke coil adjustment (Service) to index cover. Install three choke thermostatic coil retainers and screws. Tighten securely (Fig. 7C).
10. Place a new gasket on the bottom of the float bowl with holes in gasket aligned with holes in casting, then position the throttle body on gasket and install the three attaching screws. Tighten screws evenly and securely.

Float Bowl

1. Install two main metering jets into bottom of float bowl (Fig. 5C).
2. Install power valve and gasket into bottom of float bowl using slotted screwdriver. Tighten securely.
3. Drop small aluminum inlet check ball into hole in pump well. install pump return spring, pressing with finger to center in pump well.
4. Drop steel pump discharge ball into pump discharge hole located beneath the venturi cluster. Ball is 3/16" diameter (do not confuse with aluminum inlet ball). Install pump discharge ball spring and retainer.
5. Install plastic main well inserts into the main fuel wells located beneath the venturi cluster and make sure they are seated in recesses provided (Fig. 6C). Then install venturi cluster and gasket, tighten three screws evenly and securely. Make certain center screw is fitted with a gasket to prevent pump discharge leakage.

Air Horn (Fig. 4C)

1. Install the upper choke rod lever and collar assembly on to choke shaft. Then install the choke shaft assembly into the air horn from the throttle lever side. Then install the choke valve onto the choke shaft with the letters "RP" or part number facing upward.

   Install the choke valve attaching screws. Center the choke valve before tightening choke valve screws. Tighten choke valve screws and stake lightly in place. Check choke and shaft for freedom of movement.
2. If removed, install the outer pump shaft and lever assembly into air horn casting. Make sure the plastic washer is in place before installing the outer pump shaft and lever assembly.
3. Install the pump plunger to the inner lever and retain with clip provided in the repair kit. End of pump plunger shaft should point inward towards center of carburetor when installed correctly. Then install inner pump lever onto the pump shaft and tighten set screws securely.
4. Position the float needle seat gasket on the needle seat and install seat in the air horn. Tighten securely.
5. Install the power piston assembly into the air horn casting and lightly stake the retaining washer to casting. Make sure the piston travels up and down freely and is not bent.
6. Install fuel inlet baffle next to needle seat. Make sure baffle is seated in grooves in air horn casting.
7. Install air horn gasket onto air horn casting.
8. Install float needle into needle seat. Then install float assembly on air horn and insert hinge pin. Check float action and for free movement of needle in the seat.
9. Check float level and drop adjustments.

Float Level Adjustment

With air horn inverted, gasket in place and needle seated measure distance from lip at toe of float to air horn gasket. Adjust float to specifications by bending the float arm at point shown (Fig. 10C).

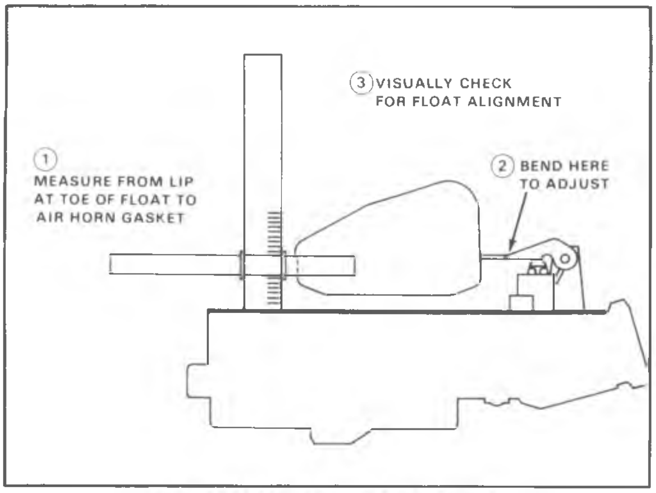


Fig. 10C–Float Level Adjustment

Float Drop Adjustment

With air horn right side up so that float can hang free, measure distance from lip at toe of float air horn gasket. Adjust float drop to specifications by bending tang (Fig. 11C) at the rear of the float hanger.

10. Install choke rod in upper choke lever and collar assembly rotating rod until squirt in end of rod aligns with slot in lever.

Air Horn to Float Bowl

1. Place the air horn assembly on bowl, making certain that the accelerator pump plunger is correctly positioned into pump well and will move freely.
2. Install lockwashers and tighten eight air horn attaching screws evenly and securely (Fig. 12C).

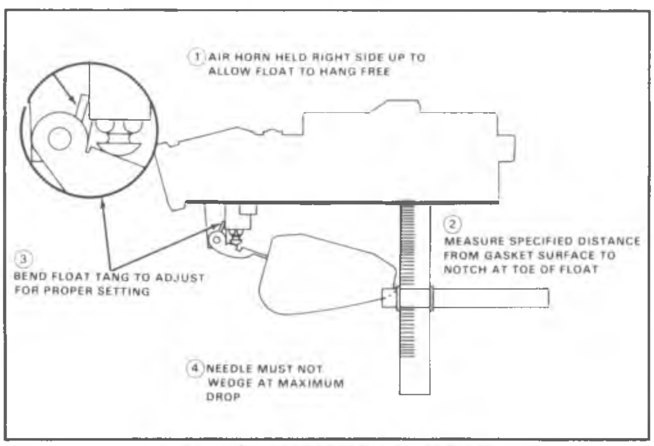


Fig. 11C–Float Drop Adjustment

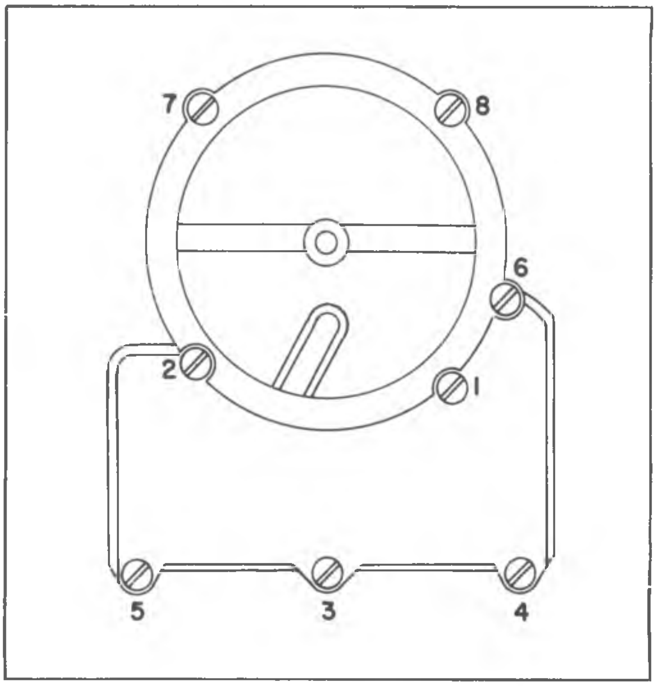


Fig. 12C–Air Horn Tightening Sequence

3. Install filter pressure relief spring into air horn casting, then install fuel inlet filter (gasket end facing nut) and fuel inlet nut and gasket. Tighten nut to 25 ft. lbs.
4. Install fast idle cam to lower end of choke rod (part number or identification faces outward on fast idle cam assembly). Then install the fast idle cam to float bowl retaining with the fast idle cam attaching screw. Tighten securely.

   Move linkage up and down to make sure that the cam will fall freely.
5. Install pump rod into upper pump lever by rotating offset end into hole in lever and install lower end of pump rod to throttle lever and retain with a spring clip (Fig. 2C).
6. Install vacuum break diaphragm assembly onto air horn with two attaching screws. Tighten securely.
7. Install lower end of intermediate choke rod into intermediate choke lever on choke housing and connect upper end of rod to vacuum break lever. Install vacuum break diaphragm rod into stem of vacuum break diaphragm and vacuum break lever.
8. Install the vacuum break lever onto end of choke shaft making sure that the lever fits over flats on shaft. Install attaching screw and tighten securely.
9. Connect vacuum break hose to diaphragm unit and vacuum tube on throttle body.

After complete carburetor assembly, check and re-set (if necessary) all choke adjustments and pump rod adjustments.

M4MC/M4ME QUADRAJET CARBURETOR

INDEX

GENERAL

Before performing any service on the carburetor, it is essential that the carburetor be placed on a holding fixture such as Tool J-8328. Without the use of the holding fixture, it is possible to bend or nick throttle valves (Fig. 1MQ and 1MQ-A).

DISASSEMBLY

Throttle Lever Actuator

Remove the throttle lever actuator vacuum unit and bracket assembly used on some truck applications.

CAUTION: *The throttle lever actuator should not be immersed in any type of carburetor cleaner and should always be removed before complete carburetor overhaul.*

Air Horn

1. Remove upper choke lever from the end of choke shaft by removing retaining screw (Fig. 2MQ). Then rotate upper choke lever to remove choke rod from slot in lever.
2. Remove choke rod from lower lever inside the float bowl casting by holding lower lever outward with small screwdriver and twisting rod counterclockwise.
3. Remove secondary metering rods by removing the small screw in the top of the metering rod hanger. Lift upward on metering rod hanger until the secondary metering rods are completely out of the air horn. Metering rods may be disassembled from the hanger by rotating ends out of the holes in the end of the hanger. (Fig. 3MQ).
4. Using special tool J-25322, drive small roll pin (pump lever pivot pin) inward just enough until pump lever can be removed from air horn. Then remove pump lever from pump rod (Fig. 4MQ).

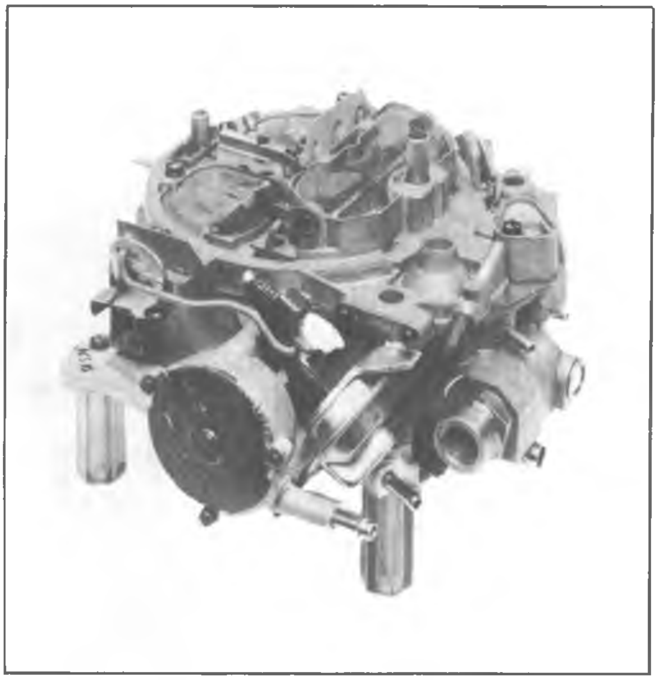


Fig. 1MQ–M4MC Quadrajet Carburetor

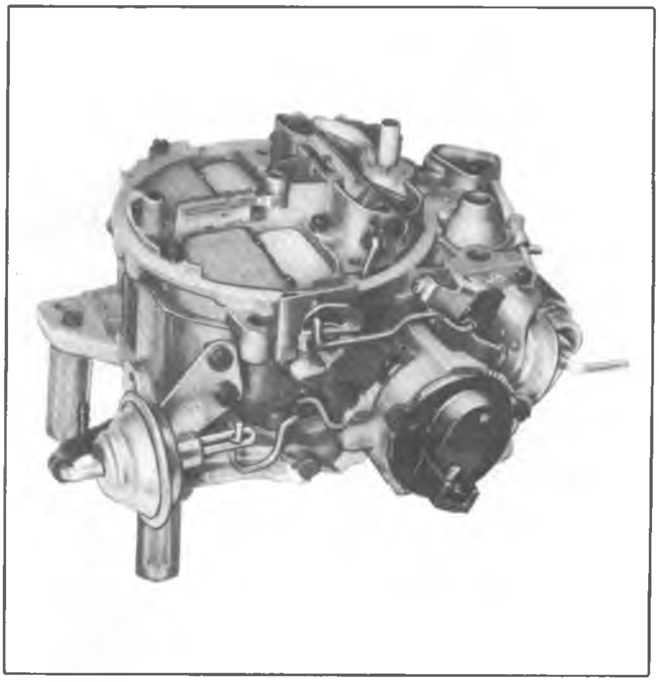


Fig. 1MQ-A--M4ME Quadrajet Carburetor

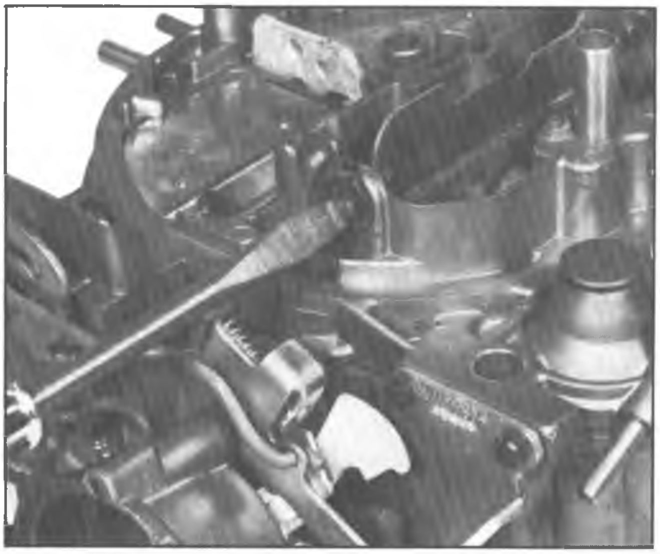


Fig. 2MQ–Removing Upper Choke Lever

CAUTION: *Use care in removing small roll pin to prevent damage to pump lever casting bosses in air horn.*

5. Remove nine air horn to bowl attaching screws; two attaching screws are located next to the venturi. (Two long screws, five short screws, and two countersunk screws). (Fig. 5MQ).
6. Remove air horn from float bowl by lifting straight up. The air horn gasket should remain on the float bowl for removal later (Fig. 6MQ).

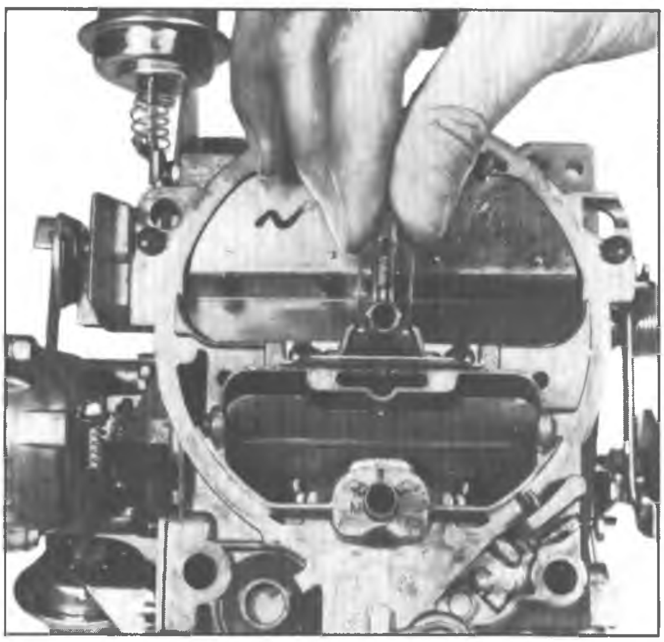


Fig. 3MQ–Removing Secondary Metering Rods

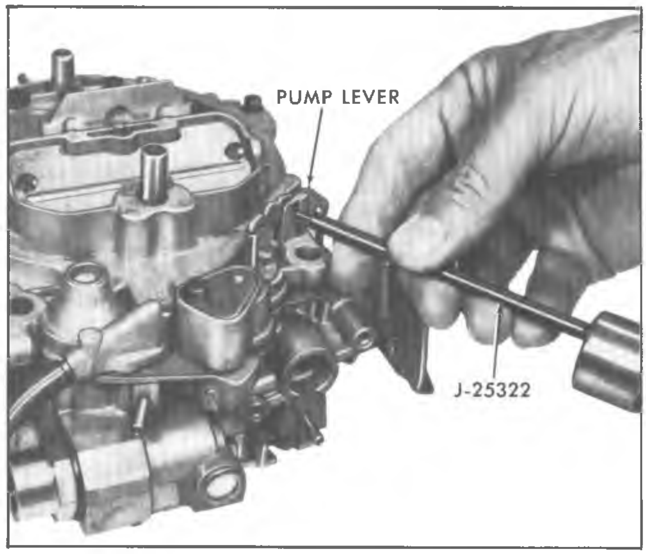


Fig. 4MQ–Removing Pump Lever

CAUTION: *When removing air horn from float bowl, use care to prevent bending the small tubes protruding from the air horn. These tubes are permanently pressed into the air horn casting. DO NOT REMOVE.*

Air Horn Disassembly

Remove front vacuum break bracket attaching screws. The diaphragm assembly may now be removed from the air valve dashpot rod and the dashpot rod from the air valve lever (Fig. 7MQ).

CAUTION: *Do not place vacuum break assembly in carburetor cleaner.*

Further disassembly of the air horn is not required for cleaning purposes. If part replacement is required, proceed as follows:

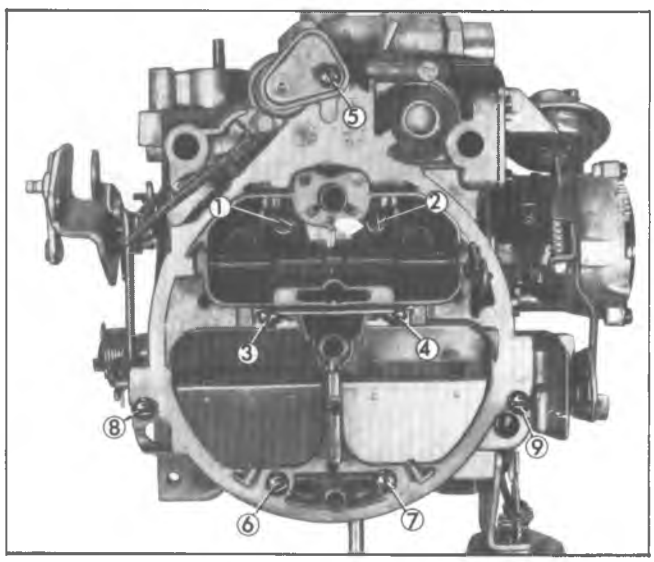


Fig. 5MQ–Removing Air Horn Screws

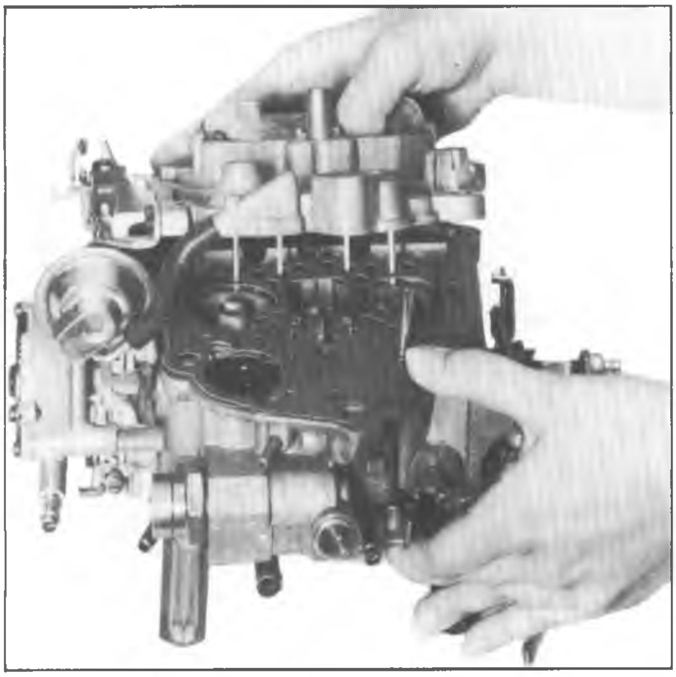


Fig. 6MQ–Removing Air Horn

1. Remove staking on two choke valve attaching screws, then remove choke valve and shaft from air horn.
2. Air valves and air valve shaft should not be removed.
3. If it is necessary to replace the air valve closing spring or center plastic eccentric cam, a repair kit is available. Instructions for assembly are included in the repair kit.

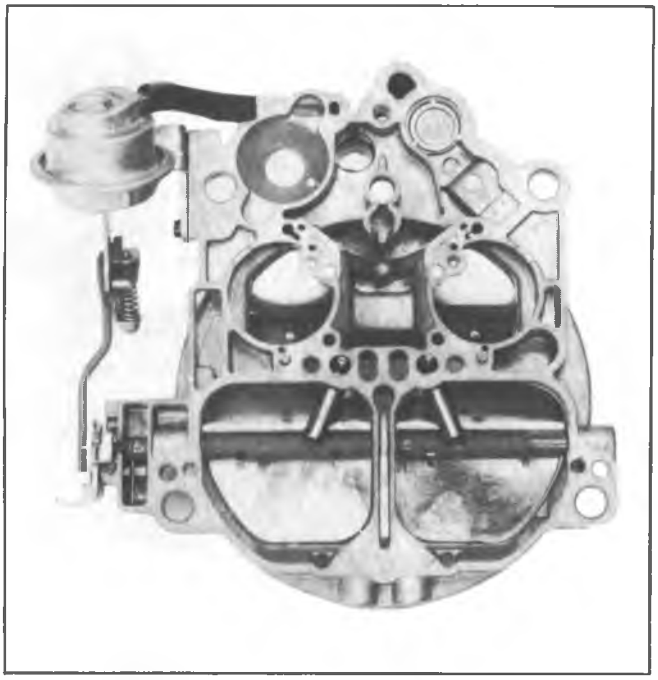


Fig. 7MQ–Removing Front Vacuum Break

Float Bowl

1. Remove air horn gasket by lifting out of dowel locating pins and lifting tab of gasket from beneath the power piston hanger, being careful not to distort springs holding the main metering rods (Fig. 8MQ).
2. Remove pump plunger from pump well.
3. Remove pump return spring from pump well.
4. Remove power piston and metering rods by depressing piston stem and allowing it to snap free (Fig. 9MQ).

   The power piston can be easily removed by pressing the piston down and releasing it with a snap. This will cause the power piston spring to snap the piston up against the retainer. This procedure may have to be repeated several times.

   CAUTION: *Do not remove power piston by using pliers on metering rod hanger.*

   Remove the power piston spring from the well.

   CAUTION: *The A.P.T. metering rod adjustment screw is pre-set at the factory and no attempt should be made to change this adjustment in the field. If float bowl replacement is required during service, the new bowl assembly will be supplied with an A.P.T. metering rod screw which will be pre-set as required.*

5. Remove metering rods from power piston by disconnecting tension spring from top of each rod, then rotate rod to remove from hanger (Fig. 10MQ).

   CAUTION: *Use care when disassembling rods to prevent distortion of tension spring and/or metering rods. Note carefully position of tension spring for later reassembly.*

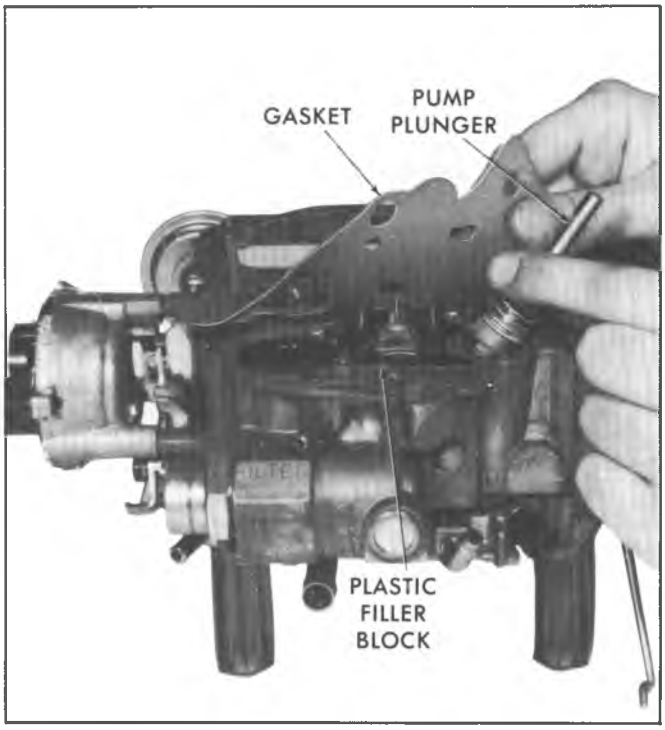


Fig. 8MQ–Removing Air Horn Gasket and Pump Plunger

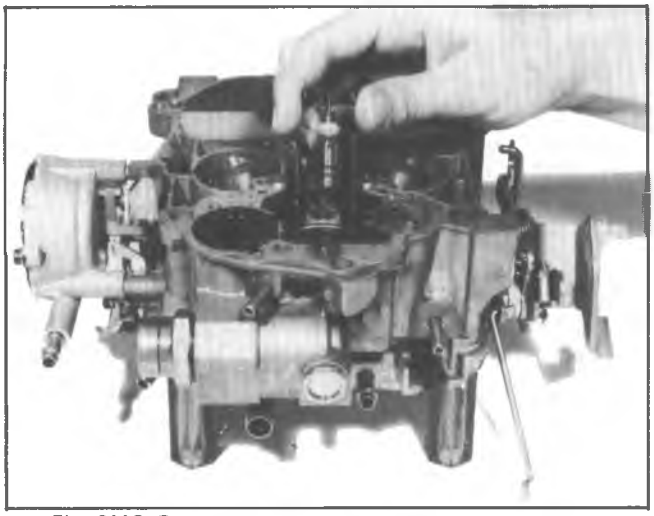


Fig. 9MQ–Removing Power Piston and Metering Rods

6. Remove plastic filler block over float valve.
7. Remove float assembly and float needle by pulling up on retaining pin. Remove float needle seat and gasket. (Fig. 11MQ).
8. Remove aneroid cavity insert from float bowl (Fig. 12MQ).
9. Remove primary main metering jets (Fig. 13MQ).

   NOTE: No attempt should be made to remove the secondary metering orifice plates. These jets are fixed and, if damaged, bowl replacement is required.
10. Remove pump discharge check ball retainer and check ball.

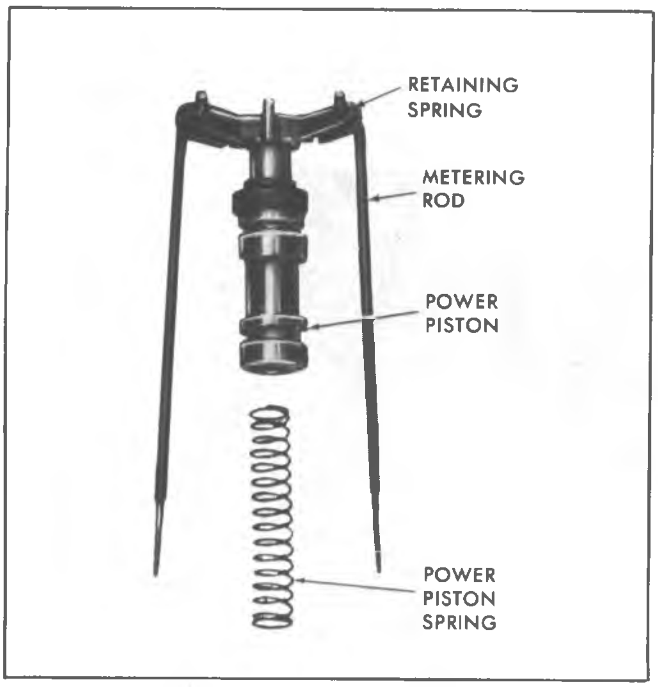


Fig. 10MQ–Power Piston and Metering Rods

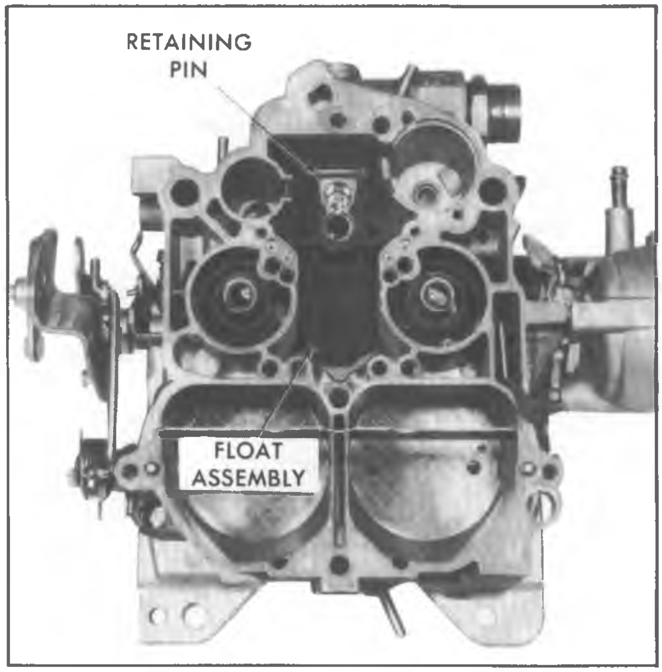


Fig. 11MQ–Float Assembly

M4ME Model With Rear Vacuum Break

11. Remove hose from rear vacuum break control assembly. Remove two screws from rear vacuum break bracket and rotate the assembly to remove vacuum break rod from slot in plunger head (Fig. 14MQ).

    CAUTION: *Do not place vacuum break assembly in carburetor cleaner.*

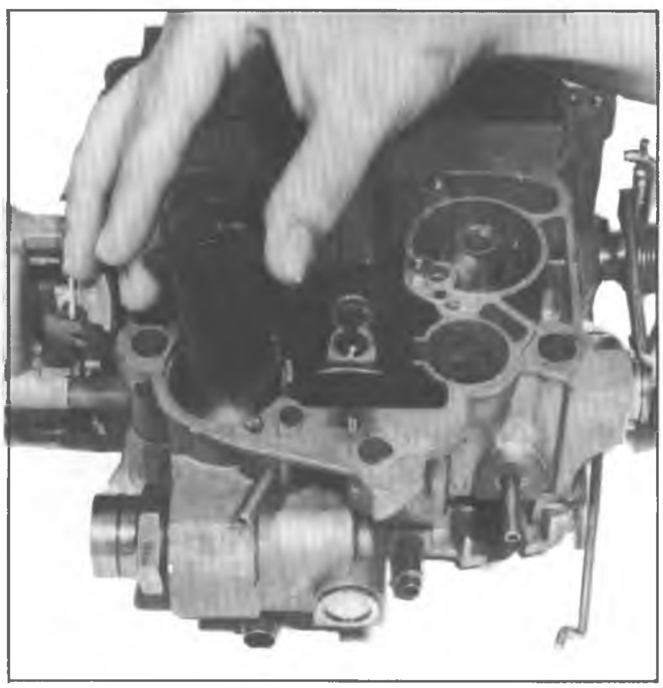


Fig. 12MQ–Removing Aneroid Cavity Insert

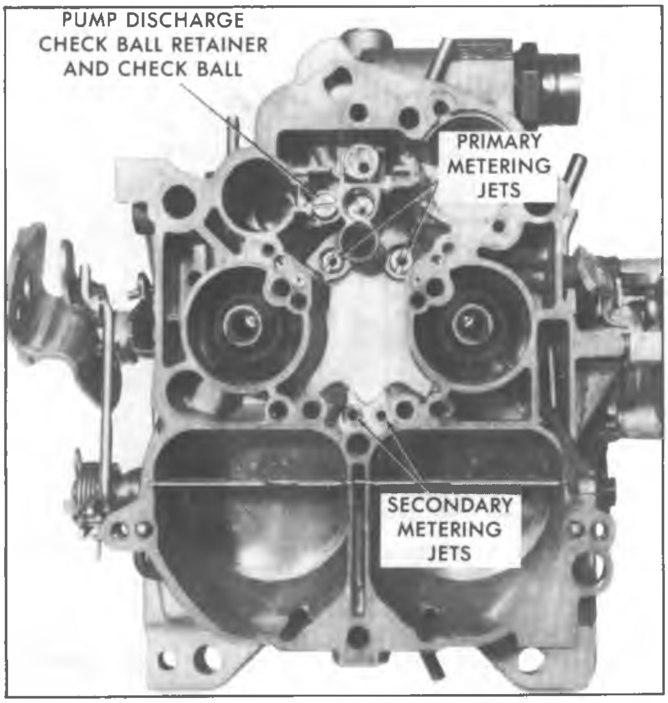


Fig. 13MQ–Float Bowl Jets

12. Remove vacuum break rod by holding down on fast idle cam (hot idle position); move end of vacuum break rod away from float bowl; then disengage rod from hole in intermediate choke lever.

Choke

1. Remove three attaching screws and retainers from choke cover and coil assembly. Then pull straight outward and remove cover and coil assembly from choke housing. Remove choke cover gasket, if used.

On M4MC hot air choke model, it is not necessary to remove baffle plate from beneath the thermostatic coil. Distortion of the thermostatic coil may result if forced off the center retaining post on the choke cover.

2. Remove choke housing assembly from float bowl by removing retaining screw and washer inside the choke housing (Fig. 15MQ). The complete choke assembly can be removed from the float bowl by sliding outward.
3. Remove secondary throttle valve lock-out lever from float bowl. (Fig. 16MQ).
4. Remove lower choke lever from inside float bowl cavity by inverting bowl.
5. Remove plastic tube seal from choke housing (Fig. 16MQ).

CAUTION: *Plastic tube seal should not be immersed in carburetor cleaner.*

6. To disassemble intermediate choke shaft from choke housing, remove coil lever retaining screw at end of shaft inside the choke housing (Fig. 15MQ). Then remove thermostatic coil lever from flats on intermediate choke shaft. Remove intermediate choke shaft from the choke housing by sliding outward. The fast idle cam can now be removed from the intermediate choke shaft (Fig. 16MQ).

CAUTION: *Remove the cup seal from inside choke housing shaft hole if the housing is to be immersed in carburetor cleaner. Also, remove the cup seal from the float bowl plastic insert for bowl cleaning purposes. DO NOT ATTEMPT TO REMOVE PLASTIC INSERT.*

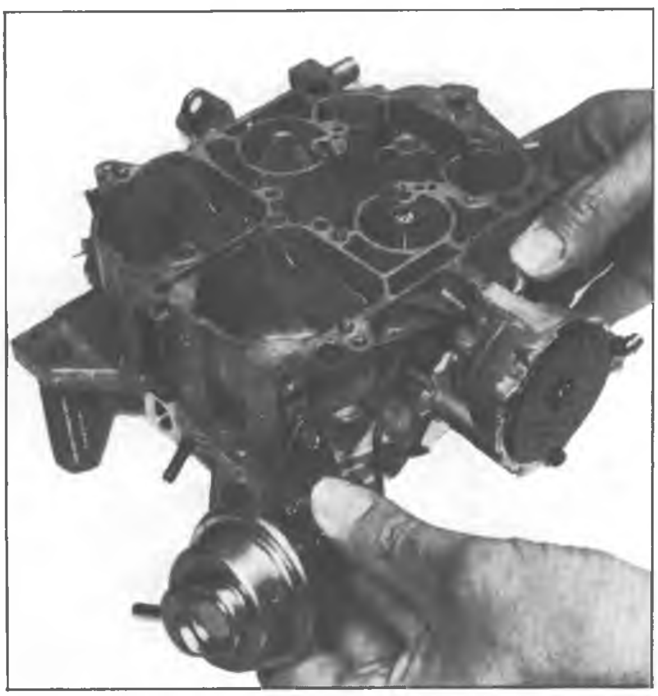


Fig. 14MQ–Rear Vacuum Break

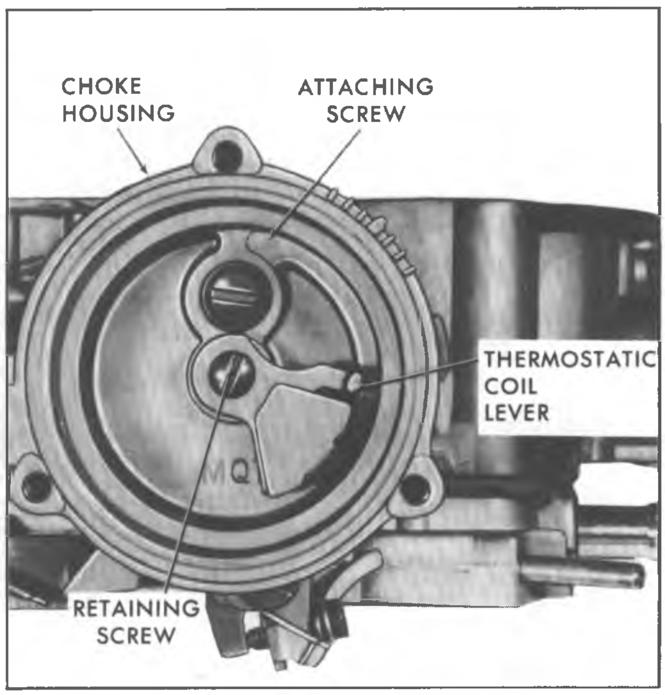


Fig. 15MQ–Removing Choke Housing

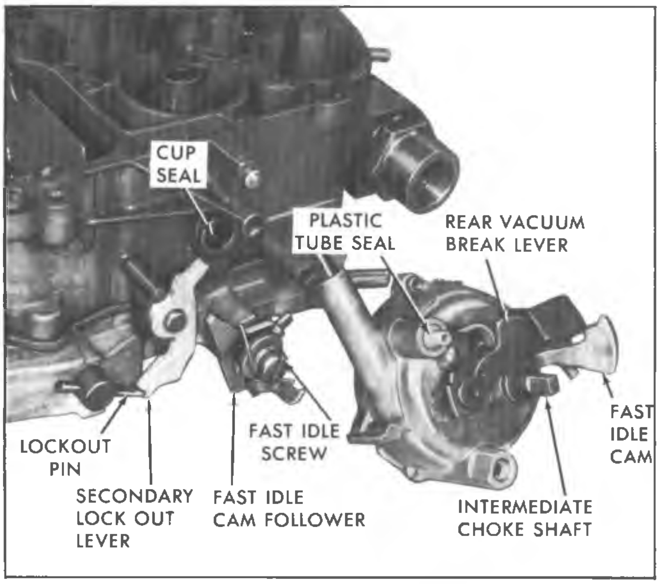


Fig. 16MQ–Choke Housing Assembly

Float Bowl Disassembly

1. Remove fuel inlet nut, gasket and filter (Fig. 17MQ).
2. Remove secondary air baffle, if replacement is required.
3. Remove pump well fill slot baffle, if replacement is required.
4. Remove throttle body by removing throttle body to bowl attaching screws (Fig. 18MQ).
5. Remove throttle body to bowl insulator gasket (Fig. 19MQ).

Throttle Body Disassembly

1. Remove pump rod from throttle lever.
2. DO NOT REMOVE idle mixture limiter caps, unless it is necessary to replace the mixture needles or normal soaking and air pressure fails to clean the idle passages. If the idle mixture needles are removed, refer to Service Section for adjustment procedure. If necessary to remove the idle mixture needle, destroy plastic limiter cap. Do not install a replacement cap as a bare mixture screw is sufficient to indicate that the mixture has been re-adjusted.

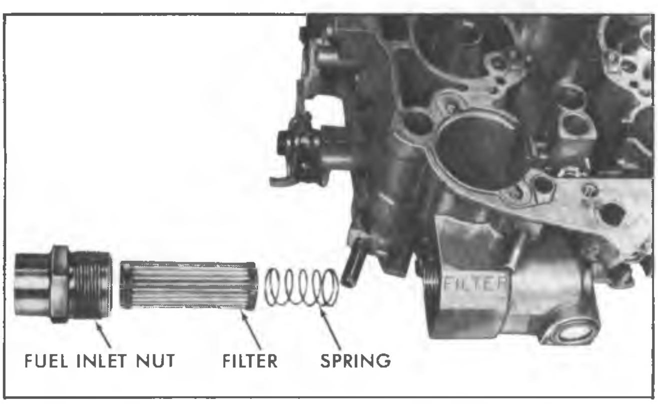


Fig. 17MQ–Fuel Filter

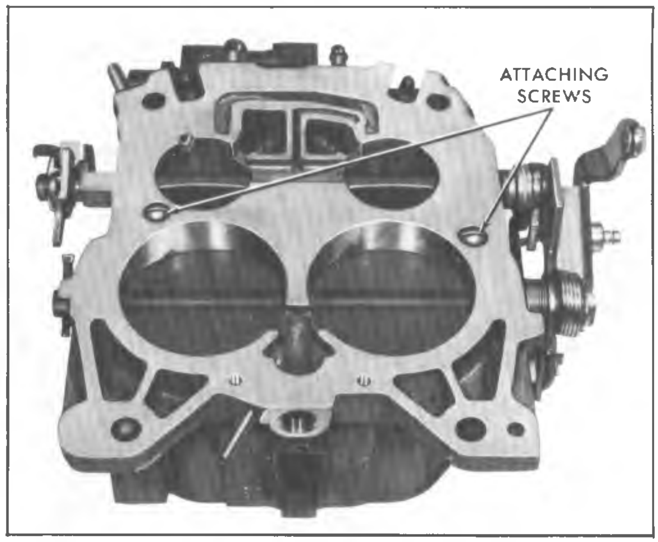


Fig. 18MQ–Removing Throttle Body

CLEANING AND INSPECTION

1. Thoroughly clean carburetor castings and metal parts in an approved carburetor cleaner, such as Carbon X(X-55) or its equivalent.

   CAUTION: *The throttle lever actuator, electric choke rubber parts, filter plastic parts, pump plunger, and choke vacuum break(s) should not be immersed in carburetor cleaner. However, the throttle valve shafts will withstand normal cleaning in carburetor cleaner.*

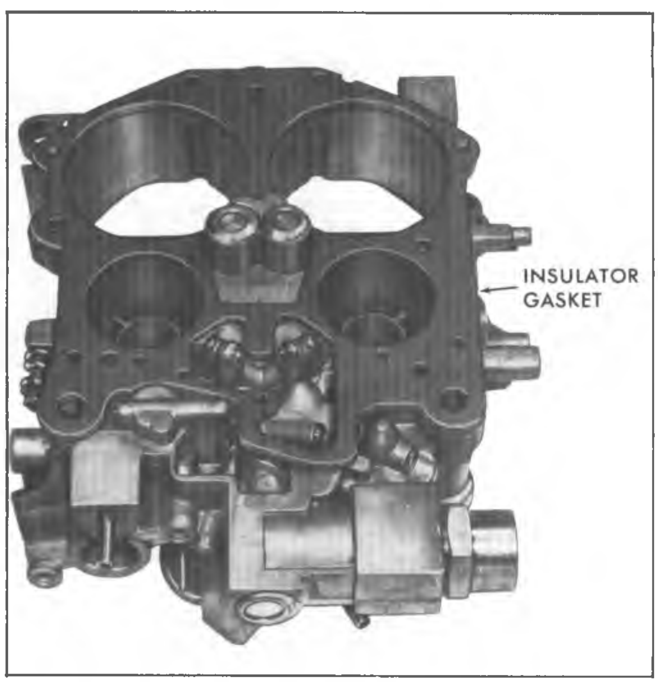


Fig. 19MQ–Removing Insulator Gasket

2. Blow out all passages in castings with compressed air.

   CAUTION: *Do not pass drills through jets or passages.*

3. Examine float needle and seat for wear. Replace, if necessary, with new float needle and seat assembly.
4. Inspect upper and lower surfaces of carburetor castings for damage.
5. Inspect holes in levers for excessive wear or out of round conditions. If worn, levers should be replaced.
6. Examine fast idle cam for wear or damage.
7. Check air valve for binding conditions. If air valve is damaged, air horn assembly must be replaced.
8. Check all throttle levers and valves for binds or other damage.

ASSEMBLY

Throttle Body

1. If removed, install idle mixture needles and springs until seated. Back out the mixture needles 4 turns as a preliminary idle adjustment. Final adjustment must be made on the engine using the procedures described under slow idle adjustment.
2. Install lower end of pump rod in throttle lever by aligning tang on rod with slot in lever. End of rod should point outwards towards throttle lever.

Float Bowl Assembly

1. Install new throttle body to bowl gasket over two locating dowels on bowl.
2. Install throttle body making certain throttle body is properly located over dowels on float bowl, then install throttle body to bowl screws and tighten evenly and securely (Fig. 18MQ).
3. Place carburetor on proper holding fixture J-8328.
4. Install fuel inlet filter spring, filter, new gasket and inlet nut and tighten nut to 18 pounds feet (Fig. 17MQ).

   NOTE: Ribs on closed end of filter element prevent filter from being installed incorrectly unless forced.

   CAUTION: *Tightening beyond specified torque can damage nylon gasket.*

Choke

1. Install new cup seal into plastic insert on side of float bowl for intermediate choke shaft. Lip on cup seal faces outward.
2. Install secondary throttle valve lock-out lever on boss on float bowl with recess in hole in lever facing inward.
3. Install new cup seal into inside choke housing shaft hole. Lips on seal face inward, towards inside of housing.
4. Install fast idle cam onto the intermediate choke shaft (steps on fast idle cam face downward) (Fig. 16MQ).
5. Carefully install fast idle cam and intermediate choke shaft assembly through seal in choke housing; then install thermostatic coil lever onto flats on intermediate choke shaft. Inside thermostatic choke coil lever is properly aligned when both inside and outside levers face towards fuel inlet. Install inside lever retaining screw into end of intermediate choke shaft. Tighten securely.
6. Using Tool J-23417, install lower choke rod lever into cavity in float bowl. Install plastic tube seal into cavity on choke housing before assembling choke housing to bowl. Install choke housing to bowl sliding intermediate choke shaft into lower choke lever (Fig. 20MQ).

   NOTE: The intermediate choke shaft lever and fast idle cam are in correct relation when the tang on lever is beneath the fast idle cam. Do not install choke cover and coil assembly until inside coil lever is adjusted. Refer to Service Section for adjustment procedures.

Float Bowl

M4ME Model With Rear Vacuum Break

1. Holding down on fast idle cam (hot idle position), install end of vacuum break rod in hole in intermediate choke lever.
2. Install end of vacuum break rod in slot in rear vacuum break plunger head. Then install rear vacuum break control and bracket assembly to float bowl using two attaching screws (Fig. 14MQ). Tighten securely.

   NOTE: Do not attach vacuum break hose until after the vacuum break adjustment is complete. Refer to Service Section for adjustment procedure.

All Models

3. If removed, install air baffle in secondary side of float bowl with notches toward the top. Top edge of baffle must be flush with bowl casting.

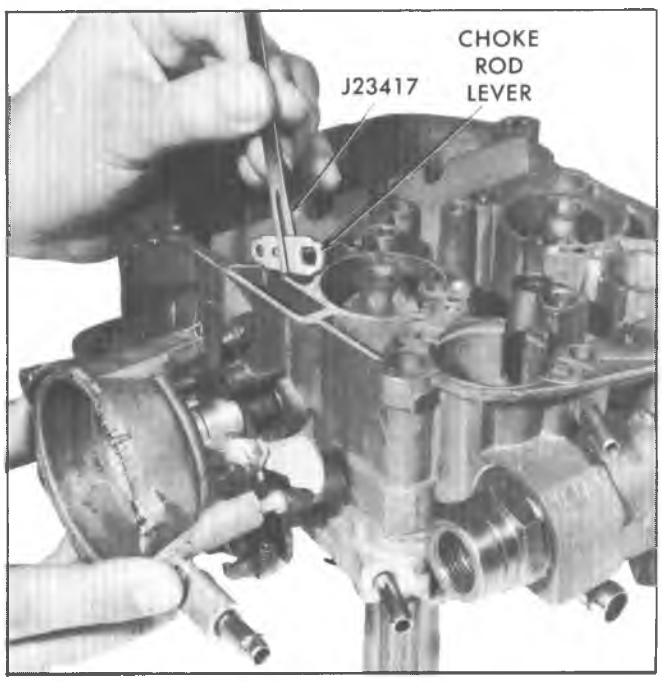


Fig. 20MQ–Installing Choke Rod Lever

4. If removed, install baffle in pump well fill slot.
5. Install pump discharge check ball and retainer in passage next to pump well. Tighten retainer securely.
6. Install primary main metering jets (Fig. 13MQ).
7. Install aneroid cavity insert into float bowl.
8. Install new needle seat assembly, with gasket.
9. To make adjustment easier, bend float arm upward at notch in arm before assembly.

   Install needle by sliding float lever under needle pull clip--correct installation of the needle pull clip is to hook the clip over the edge of the float on the float arm facing the float pontoon (Fig. 21MQ). With float lever in pull clip, hold float assembly at toe and install retaining pin from aneroid cavity side (ends of retaining pin face the accelerating pump well).

   CAUTION: *Do not install float needle pull clip into holes in float arm.*

10. Adjust float level.

Float Level (Fig. 22MQ)

a. Hold float retainer firmly in place.

b. Push float down lightly against needle.

c. With adjustable T-scale, gauge from top of float bowl casting (air horn gasket removed) to top of float gauging point 1/16" back from end of float at toe.

d. Bend float arm as necessary for proper adjustment by pushing on pontoon. Refer to adjustment chart for specification.

e. Visually check float alignment after adjustment.

11. Install plastic filler block over float needle, pressing downward until properly seated.

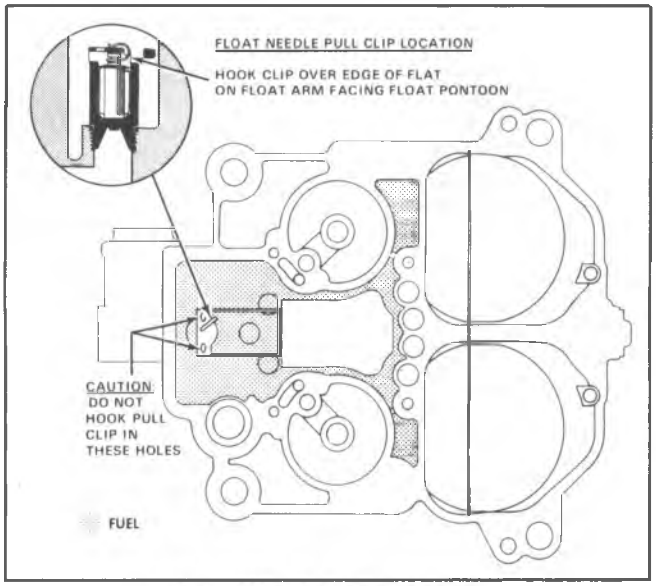


Fig. 21MQ–Pull Clip Location

12. Install power piston spring in power piston well. If main metering rods were removed from hanger, reinstall making sure tension spring is connected to top of each rod (Fig. 9MQ). Install power piston assembly in well (aligning pin on piston with slot in well) with metering rods properly positioned in metering jets. Press down firmly on plastic power piston retainer to make sure the retainer is seated in recess in bowl and the top is flush with the top of the bowl casting. If necessary, using a drift punch and small hammer, tap retainer lightly in place.
13. Install pump return spring in pump well.
14. Install air horn gasket by carefully sliding tab of gasket around main metering rods and beneath the power piston hanger. Position gasket over the two dowel pins on the float bowl.
15. Carefully lift one corner of the air horn gasket and install pump plunger in the pump well by pushing the plunger to the bottom of the well against return spring tension. While holding in this position, align pump plunger stem with hole in gasket and press gasket in place.

Air Horn

1. If removed, install choke shaft, choke valve, and two attaching screws. Tighten screws securely and stake lightly in place.
2. Check choke valve for freedom of movement and proper alignment before staking screws in place.

Air Horn to Bowl Installation

1. Holding down on air horn gasket at pump plunger location, carefully lower air horn assembly onto float bowl making sure that the bleed tubes, accelerating well tubes, pull-over enrichment tubes (if used), and pump plunger stem are positioned properly through the holes in the air horn gasket.

   CAUTION: *Do not force the air horn assembly onto the bowl but rather lightly lower in place.*

2. Install two long air horn screws, five short screws, and two coutersunk screws into primary venturi area.

   All air horn screws must be tightened evenly and securely. See Figure 5MQ for proper tightening sequence.

3. Install vacuum break diaphragm rod into the slot in lever on the end of the air valve shaft. Then install the other end of rod into hole in the front vacuum break diaphragm plunger. Install front vacuum break control and bracket assembly to air horn using two retaining screws through the bracket. Tighten screws securely.

   NOTE: Do not attach vacuum break hose until vacuum break adjustment is completed. Refer to Service Section for adjustment procedure.

4. Connect upper end of pump rod to pump lever by placing rod in specified hole in lever. Align hole in pump lever with hole in air horn casting using J-25322. Using small screwdriver, push pump lever roll pin back

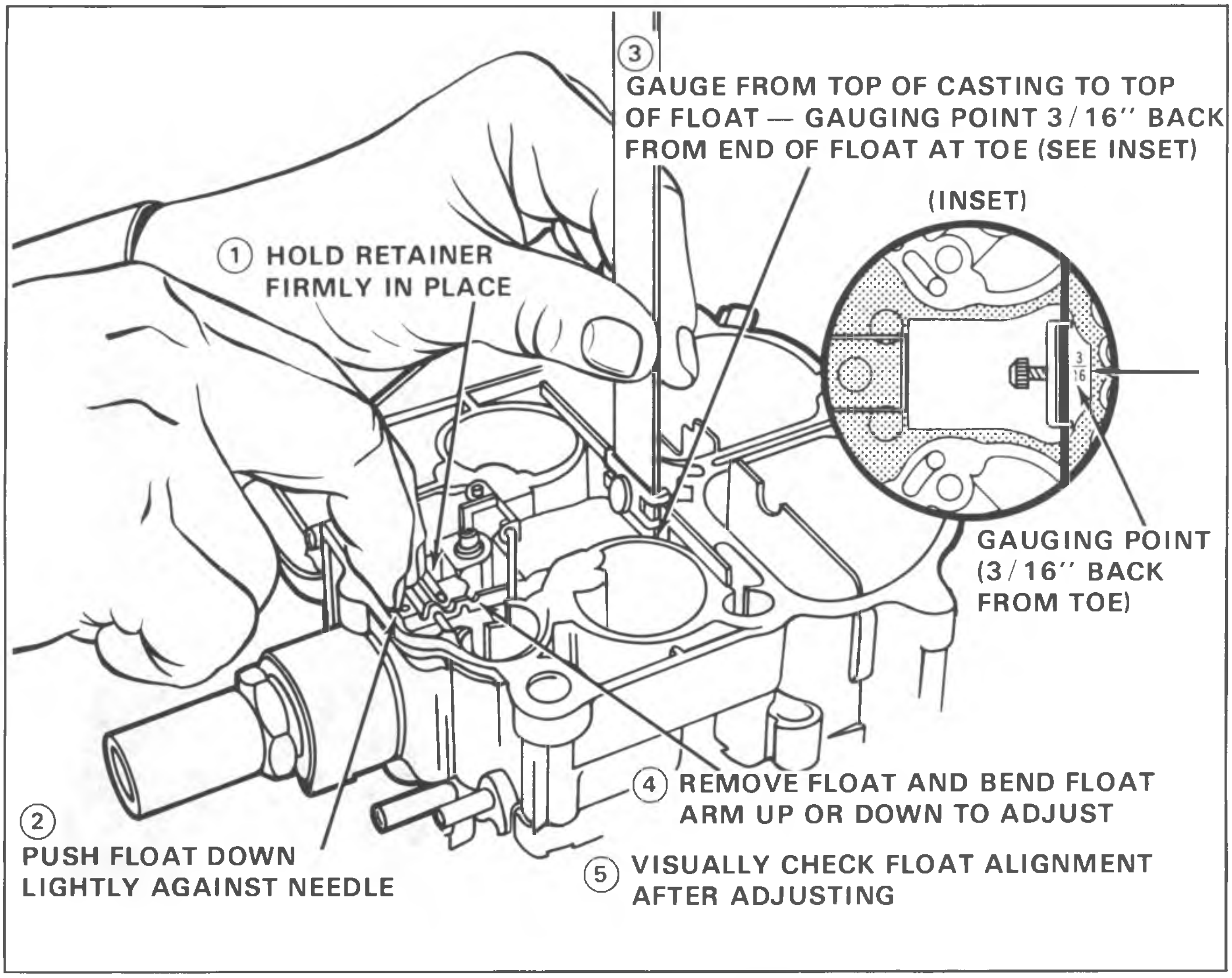


Fig. 22MQ–Float Level Adjustment

through casting until end of pin is flush with casting bosses in air horn.

CAUTION: *Use care installing the small roll pin to prevent damage to pump lever casting bosses.*

5. Install two secondary metering rods into the secondary metering rod hanger (upper end of rods point toward each other). Install secondary metering rod holder, with rods, onto air valve cam follower. Install retaining screw end tighten securely. Work air valves up and down several times to make sure they are free in all positions.
6. Connect check rod into lower choke lever inside bowl cavity; they install choke rod into slot in upper choke lever and retain the choke lever to the end of the choke shaft with attaching screw. Tighten securely.

   Make sure that the flats on the end of the choke shaft align with flats in the choke lever.

   The front and rear vacuum break units, fast idle cam (choke rod), and inside thermostatic choke coil lever must be adjusted properly before installing the choke thermostatic coil and cover assembly and gasket. Refer to the Adjustment Procedures, in Service Section.
7. After the vacuum break, fast idle cam (choke rod), and inside thermostatic coil lever are adjusted, the thermostatic coil and cover, and gasket on hot air choke model, should be installed and the cover assembly rotated until the choke valve just closes.

   On all models (except 454 V8), tang on thermostatic coil must be installed in slot in inside choke coil lever pick-up arm. On M4ME electric choke model, coil tang contacts bottom side of inside choke coil lever pick-up arm.

   CAUTION: *On M4ME electric choke model, do not install a choke cover gasket between the electric choke assembly and the choke housing.*

   Align index point on cover with specified mark on housing as shown on adjustment chart.

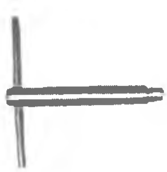
   Install three choke cover retainers and screws and tighten securely.
8. If used, position and retain throttle lever actuator.

SPECIAL TOOLS

J-22973 THER-MAC THERMOMETOR

J-8328 CARBURETOR HOLDING TOOL
(Set of 4)

J-9789-01 UNIVERSAL CARBURETOR GAUGE SET



J-5197 BENDING TOOL

J-25322 PUMP LEVER PIN DRIVE PUNCH

J-23417 CHOKE LEVER INSTALLING TOOL

Fig. 1ST--Special Tools

SECTION 6Y

ENGINE ELECTRICAL

NOTE: Except for the following changes, all information listed in Section 6Y of the 1974 Light Duty Truck Overhaul Manual is applicable to 1976 light duty trucks. Refer to 1974 Overhaul Manual for any overhaul procedure not contained herein.

STARTING MOTOR

The 1976 starter is mostly carryover from 1974. The only difference being that the "R" terminal of the starter solenoid has been removed. This terminal was removed because with the High Energy Ignition System there is no longer any requirement for the electrical lead from the starter solenoid to the ignition coil. Refer to Section 6Y of the 1974 Overhaul Manual for all overhaul procedures.

10-SI SERIES 100 TYPE GENERATOR

The 1976 10-SI generator is mostly carryover from 1974. The only difference being that a 40-ohm resistor has been added to the warning and indicator circuit (see Section 6Y in service section of this manual). The purpose of this resistor is to provide a definite warning indicator light in the case of an open field circuit in the generator. Refer to Section 6Y of the 1974 Overhaul Manual for all overhaul procedures.

STARTING SOLENOID

The 1976 starter solenoid is mostly carryover from 1974. The only difference being that the "R" terminal of the solenoid has been removed. This terminal was removed because with the High Energy Ignition System there is no longer any requirement for the electrical lead from the starter solenoid to the ignition coil. Refer to Section 6Y of the 1974 Overhaul Manual for all overhaul procedures.

SECTION 7M

MANUAL TRANSMISSIONS

CONTENTS OF THIS SECTION

3 SPEED - TREMEC MANUAL TRANSMISSION

INDEX

OVERHAUL OPERATIONS

TRANSMISSION DISASSEMBLY

1. Remove lower extension housing bolt and drain transmission (fig. 3R).
2. Remove top cover and gasket from case.
3. Remove long spring that retains the detent plug in the case (fig. 4R). Remove the detent plug with a small magnet.
4. Remove extension housing and gasket.

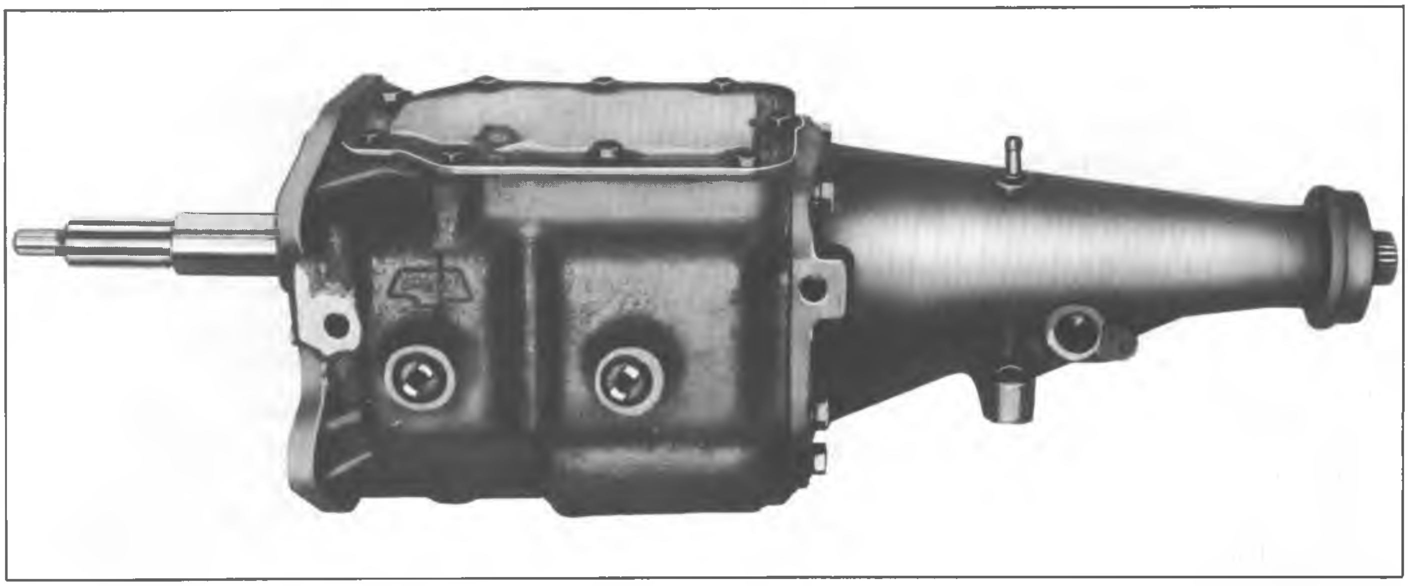


Fig. 1R–3-Speed Tremec

5. Press down on speedometer gear retainer and remove speedometer drive gear and retainer from output shaft.
6. Remove fill plug from right side of case (fig. 3R). Working through the plug opening drive out countergear roll pin with a 3/16 inch pin punch that has been chamfered slightly.

   NOTE: Do not attempt to retrieve pin at this time. Pin can easily be retrieved after output shaft assembly is removed.
7. Insert dummy shaft tool J-25232 into bore at front of case, tap lightly on tool to push countershaft out rear of case (fig. 5R).

   NOTE: With countershaft removed, allow countergear to lie at bottom of case.
8. Punch alignment mark in front bearing retainer and transmission case to ensure correct assembly and remove front bearing retainer and gasket (fig. 6R).
9. Remove large locating snap ring from front bearing and smaller snap ring from clutch gear shaft.
10. Remove clutch shaft front bearing using tool J-6654-01 and tool J-8433-1 (fig. 7R).

    NOTE: It may be necessary to alternate the tightening of the bolts between tools J-6654-01 and J-8433-1 to remove the front bearing.
11. Remove large locating snap ring from rear bearing and smaller retaining snap ring from output shaft.

    NOTE: It may be necessary to place a screwdriver or a piece of bar stock between the case and the first-reverse sleeve and gear assembly. This will hold the output shaft assembly in place while removing the rear bearing.
12. Remove rear bearing from output shaft using tool J-8157-01 (fig. 8R).
13. Remove set screw from First-Reverse shifter fork and slide shift rail out rear of case.
14. Shift First-Reverse sleeve and gear all the way forward and rotate First-Reverse shifter fork upward and out of case. Remove First-Reverse Detent plug from case.
15. Shift Second-Third Shifter fork rearward to gain access to setscrew, remove setscrew, rotate shift rail 90° with pliers to clear bottom detent plug and remove interlock plug with magnet (fig. 9R).
16. Using a long thin punch (1/4 inch diameter or less) insert through access hole in rear case to drive out shift rail and expansion plug located in shift rail bore at front of case.
17. Rotate second-third shifter fork upward and out of case.
18. Remove the bottom detent plug and short detent spring from case.
19. Separate clutch gear from output shaft and remove output shaft assembly (fig. 10R); tilt spline end of shaft downward and lift gear end upward and out of case.

    NOTE: First and reverse sleeve and gear must pass through notch at right rear end of case.
20. Remove clutch gear through top of case.
21. Remove both shifter fork shafts (fig. 11R).
22. Remove countergear (with tool in place), thrust washers and roll pin.
23. Remove reverse idler gear and thrust washers by tapping shaft with hammer until end of idler gear shaft (end with roll pin) clears counterbore in rear of case and remove shaft (fig. 12R).
24. From the bottom of the case retrieve, clutch shaft roller bearing or countergear needle bearing that may have fallen into case during disassembly.

MAINSHAFT DISASSEMBLY

1. Remove snap ring from front of output shaft and remove Second-Third synchronizer assembly and second gear. Mark hub and sleeve for correct assembly.
2. Remove snap ring and tabbed thrust washer from shaft and remove first gear and blocking ring.
3. Remove First-Reverse hub retaining snap ring.

   NOTE: Observe position of spring and keys before removal, also, mark hub and sleeve for correct assembly.
4. Remove sleeve and gear, spring and three keys from hub (fig. 13R).
5. Using an arbor press, remove hub from output shaft.

CLEANING AND INSPECTION

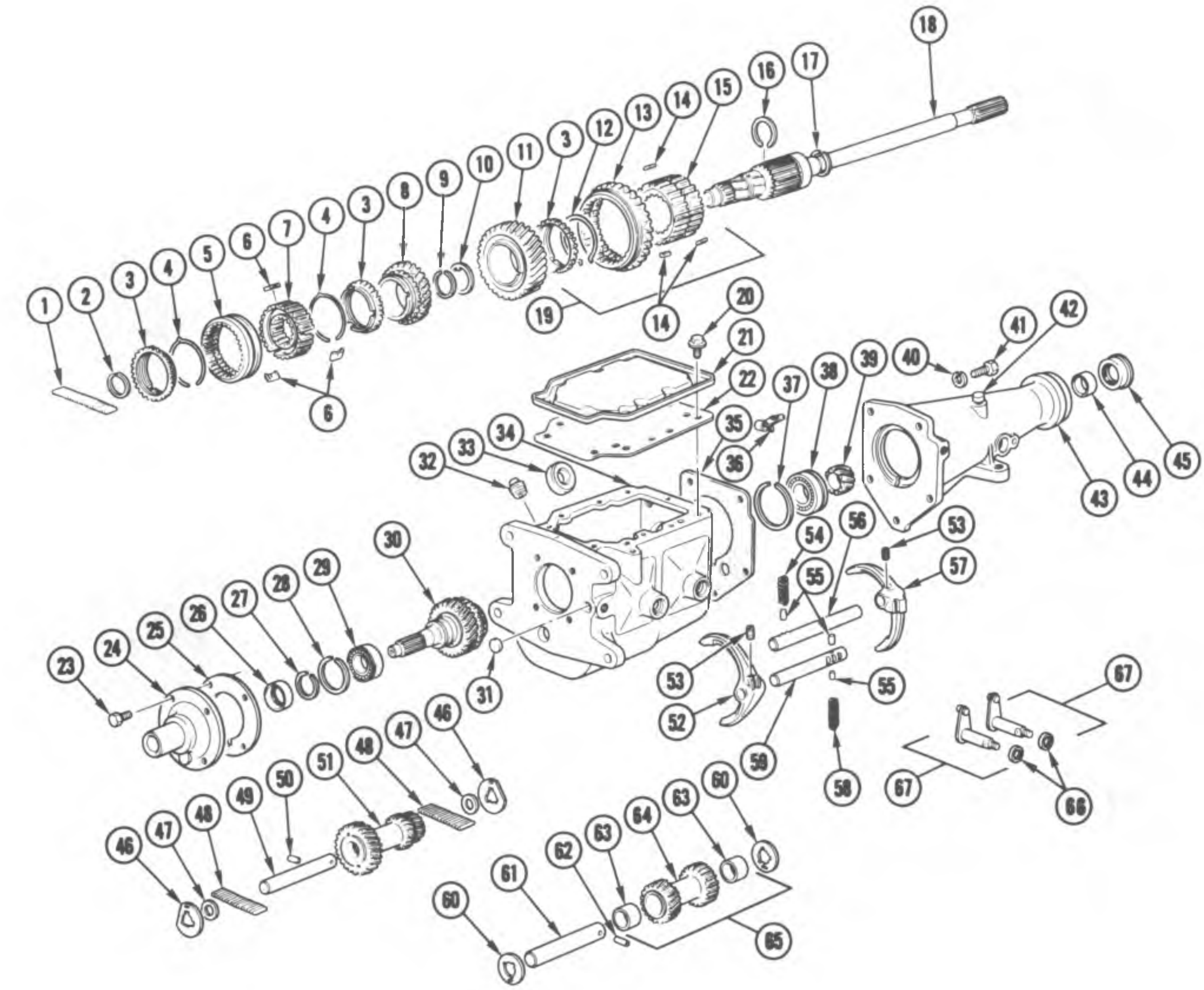
Transmission Case

1. Wash the transmission thoroughly inside and outside with cleaning solvent, then inspect the case for cracks.
2. Check the front and rear faces for burrs, and if present, dress them off with a fine mill file.

Front and Rear Bearings

1. Wash the front and rear ball bearings thoroughly in a cleaning solvent.
2. Blow out bearings with compressed air.

   CAUTION: *Do not allow the bearings to spin, turn them slowly by hand. Spinning bearings will damage the race and balls.*
3. Make sure bearings are clean, then lubricate with light engine oil and check them for roughness by slowly turning the race by hand.



1. MAINSHAFT ROLLER BEARINGS
2. 2ND & 3RD SYNCHRONIZER RETAINING RING
3. SYNCHRONIZER BLOCKER RINGS
4. 2ND & 3RD SYNCHRONIZER SPRING
5. 2ND & 3RD SYNCHRONIZER SLEEVE
6. 2ND & 3RD SYNCHRONIZER KEYS
7. 2ND & 3RD SYNCHRONIZER HUB
8. SECOND SPEED GEAR
9. 1ST SPEED GEAR RETAINING RING
10. 1ST SPEED GEAR TABBED WASHER
11. 1ST SPEED GEAR
12. REVERSE SYNCHRONIZER SPRING
13. 1ST & REVERSE SYNCHRONIZER SLEEVE & GEAR
14. REVERSE SYNCHRONIZER KEYS
15. 1ST & REVERSE SYNCHRONIZER HUB
16. 1ST & REVERSE SYNCHRONIZER RETAINING RING
17. REAR BEARING RETAINING RING
18. TRANSMISSION MAINSHAFT
19. REVERSE-SYNCHRONIZER ASSEMBLY
20. ACCESS COVER BOLTS
21. ACCESS COVER
22. ACCESS COVER GASKET
23. BEARING RETAINER - TO CASE BOLTS
24. BEARING RETAINER - CLUTCH GEAR
25. GASKET - CLUTCH GEAR BEARING RETAINER
26. SEAL ASSEMBLY - CLUTCH GEAR BEARING RETAINER
27. CLUTCH GEAR BEARING RETAINING RING
28. CLUTCH GEAR BEARING LOCK RING
29. CLUTCH GEAR BEARING ASSEMBLY
30. CLUTCH GEAR
31. EXPANSION PLUG
32. FILLER PLUG
33. TRANSMISSION CASE MAGNET
34. CASE
35. EXTENSION HOUSING TO CASE GASKET
36. SPEEDOMETER DRIVER GEAR RETAINING CLIP
37. TRANSMISSION REAR BEARING LOCK RING
38. MAINSHAFT BEARING ASSEMBLY
39. SPEEDOMETER DRIVE GEAR
40. EXTENSION TO CASE WASHER
41. EXTENSION TO CASE BOLT
42. TRANSMISSION EXTENSION VENTILATOR ASSEMBLY
43. EXTENSION HOUSING ASSEMBLY
44. EXTENSION HOUSING BUSHING
45. EXTENSION HOUSING OIL SEAL ASSEMBLY
46. COUNTERGEAR THRUST WASHER
47. COUNTERGEAR SPACER
48. COUNTERGEAR ROLLET BEARINGS
49. COUNTERGEAR SHAFT
50. COUNTERGEAR SPRING PIN
51. COUNTERGEAR
52. 2ND & 3RD SHIFTER FORK
53. SHIFT FORK LOCKING SCREW
54. 1ST & 2ND SHIFTER INTERLOCK SPRING
55. SHIFTER INTERLOCK PIN
56. 1ST & REVERSE SHIFT RAIL
57. 1ST & REVERSE SHIFT FORK
58. 2ND & 3RD SHIFTER INTERLOCK SPRING
59. 2ND & 3RD SHIFT RAIL
60. REVERSE IDLER GEAR THRUST WASHER
61. REVERSE IDLER GEAR SHAFT
62. SPRING PIN IDLER GEAR SHAFT
63. REVERSE IDLER GEAR BUSHING
64. REVERSE IDLER GEAR
65. REVERSE IDLER GEAR ASSEMBLY
66. SEAL TRANSMISSION SHIFTER
67. TRANSMISSION SHIFTER SHAFT & LEVER ASSEMBLY

Fig. 2R--Exploded View Tremec 3-Speed

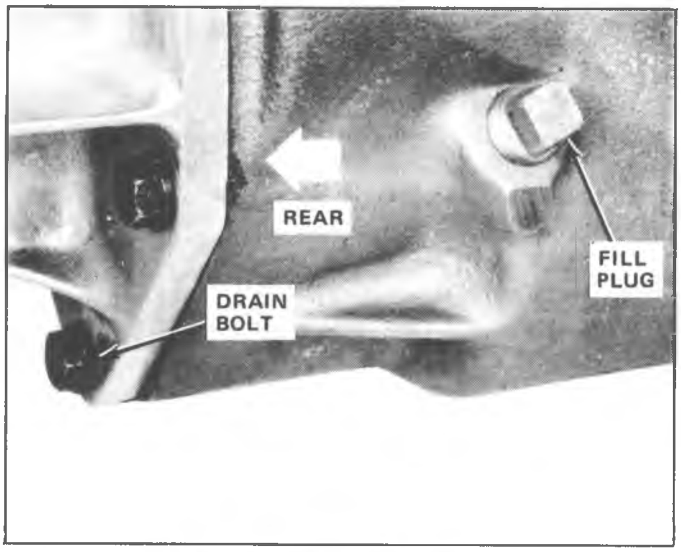


Fig. 3R–Drain Transmission

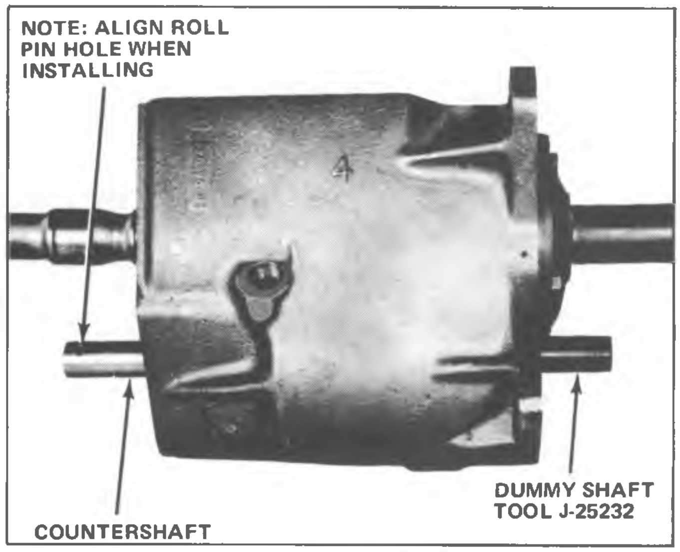


Fig. 5R–Removing Countershaft

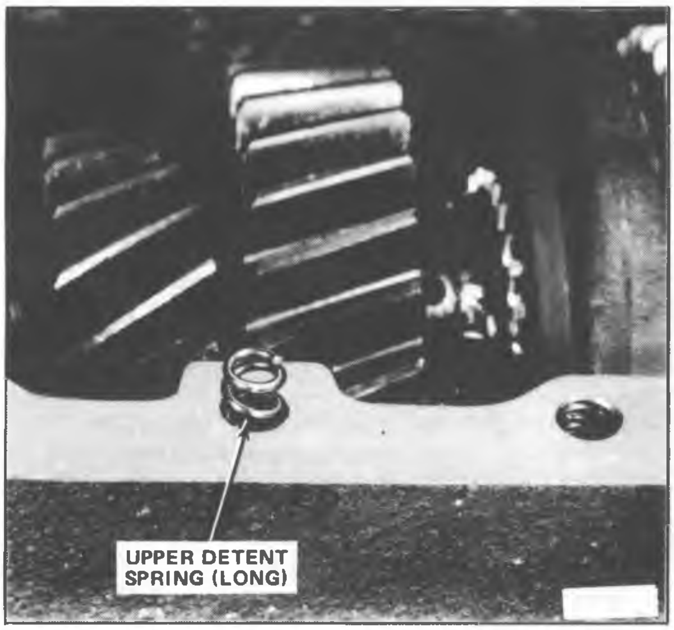


Fig. 4R–Location of Upper Detent Spring

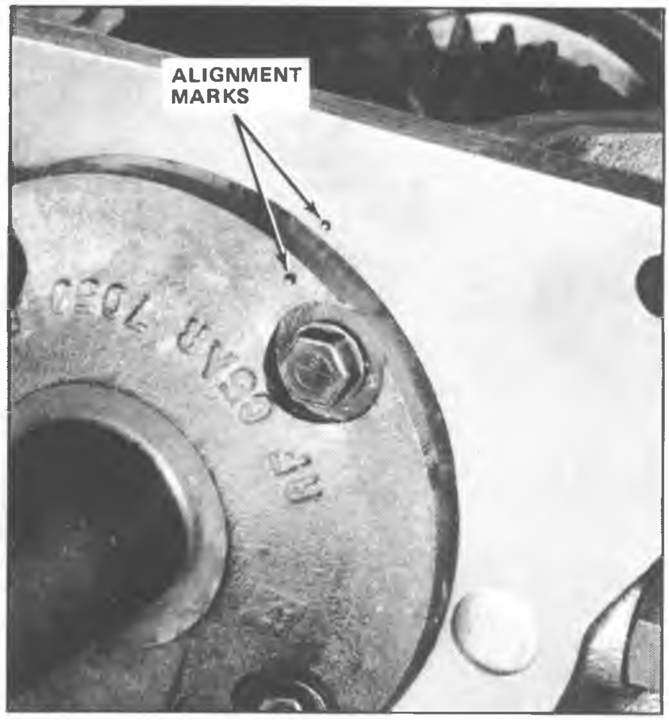


Fig. 6R–Removing Front Bearing Retainer

Bearing Rollers

All clutch gear and countergear bearing rollers should be inspected closely and replaced if they show wear. Inspect countershaft and reverse idler shaft at the same time, replace if necessary. Replace all worn washers.

Gears

1. Inspect all gears for excessive wear, chips, or cracks and replace any that are worn or damaged.
2. Check both clutch sleeves to see that they slide freely on their hubs.

REPAIRS

Synchronizer Keys and Spring

Replacement

1. Mark hub and sleeve so they can be matched upon reassembly.
2. Push the hub from the sliding sleeve, the keys and the springs may be easily removed.
3. Install one spring into second-third hub. Be sure spring covers all three key slots in hub. Align second-third sleeve to hub using marks made during disassembly, and

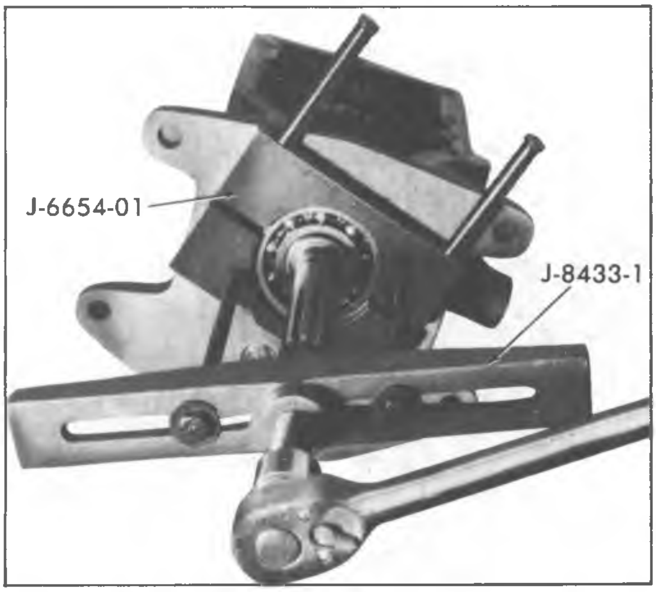


Fig. 7R--Removing Front Bearing

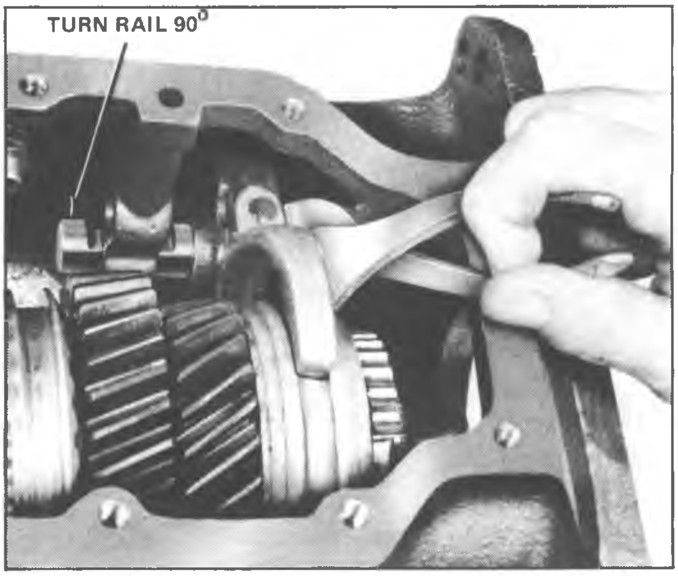


Fig. 9R--Rotating Shift Rail

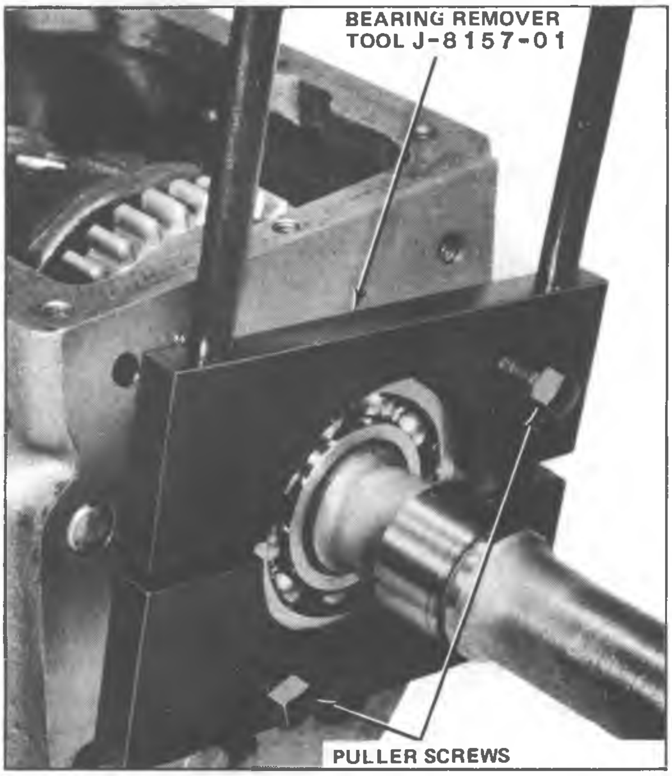


Fig. 8R--Removing Rear Bearing

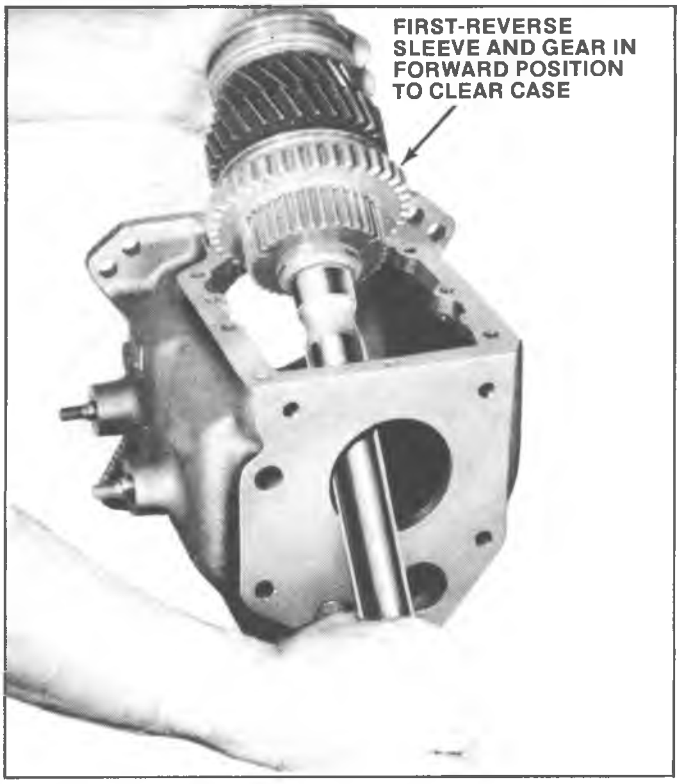


Fig. 10R--Removing Output Shaft Assembly

start sleeve onto hub.

4. Place the three keys into hub slots and on top of spring, then push sleeve fully onto hub to engage keys in sleeve (fig. 14).
5. Install remaining spring in exact same position as first spring. Ends of both spring must cover same slots in hub and not be staggered.

NOTE: Keys have small lip on each end. When correctly installed, this lip will fit over spring (fig. 14R).

Extension Oil Seal or Bushing

If bushing in rear of extension requires replacement, remove seal and use Tool J-5778 to drive bushing into extension housing (fig. 15R). Using the same tool, drive new bushing in from the rear. Coat I.D. of bushing and seal with transmission lubricant, then install new oil seal using Tool

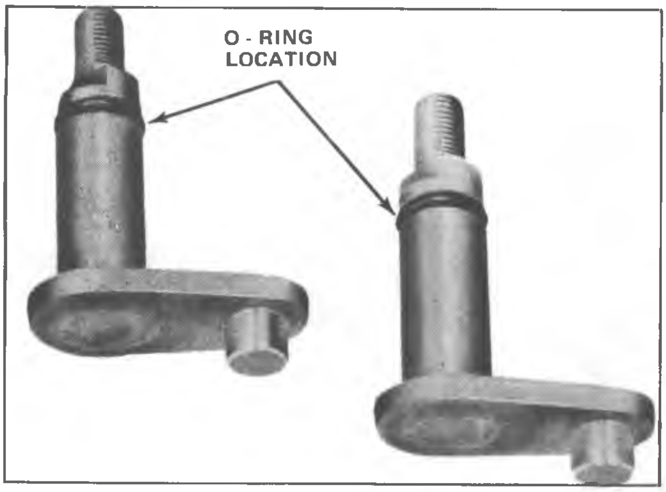


Fig. 11R--Shift Fork Shafts

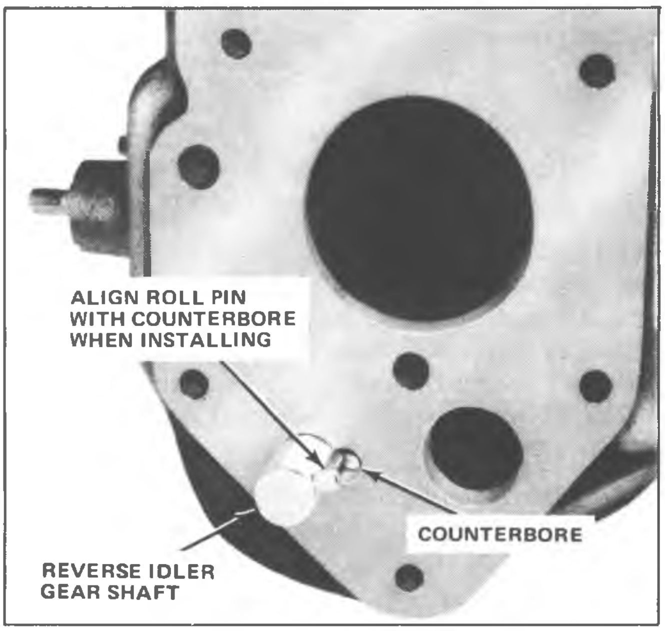


Fig. 12R--Removing Reverse Idler Gear Shaft

J-5154 (fig. 16R).

Clutch Bearing Retainer Oil Seal

If the lip seal in the retainer needs replacement; pry the old seal out and replace with a new seal using Installer Tool J-25233, or similar tool, until seal seats in its bore (fig. 17R).

ASSEMBLY OF MAINSHAFT

1. Install First-Reverse synchronizer hub on output shaft splines by hand. Slotted end of hub should face front of shaft. Use an arbor press to complete hub installation on shaft and install retaining snap ring (in most rearward groove).

   CAUTION: *DO NOT attempt to drive hub onto shaft with hammer. Hammer blows will damage hub and splines.*

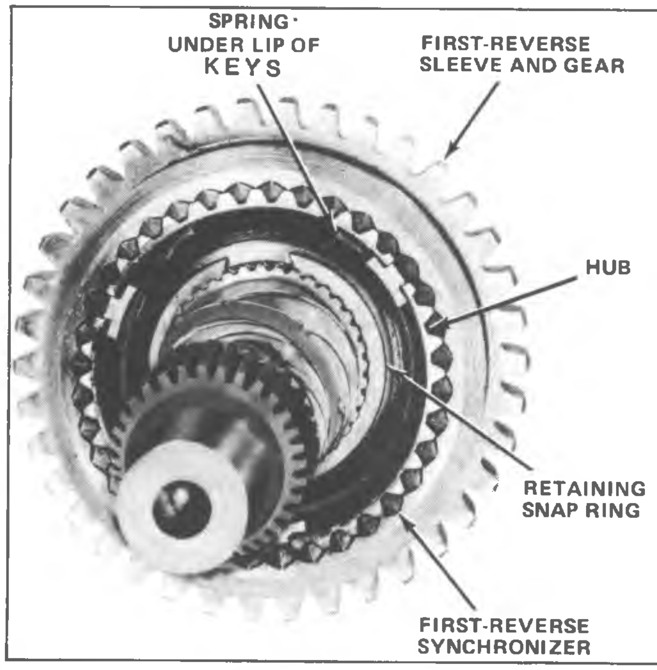


Fig. 13R--First-Reverse Synchronizer Hub

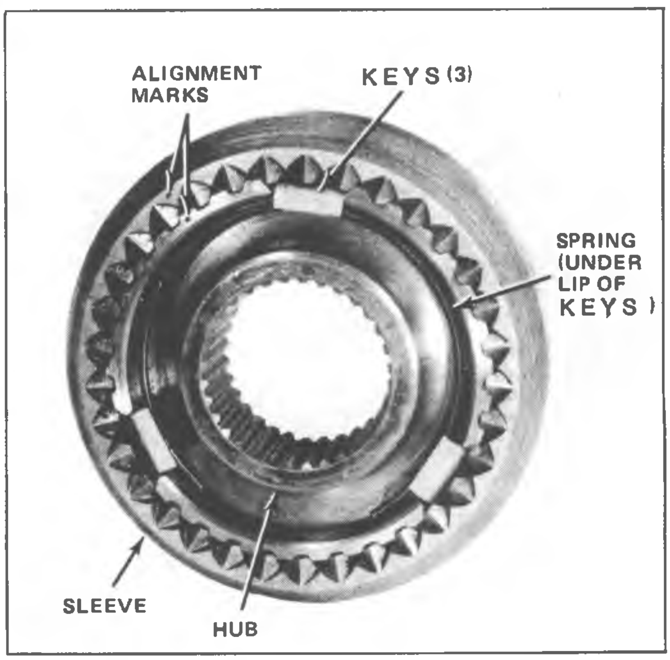


Fig. 14R--Second-Third Synchronizer Assembly

2. Install First-Reverse sleeve and gear half-way onto hub with gear end of sleeve facing rear of shaft. Index sleeve to hub with marks made during disassembly.
3. Install spring in First-Reverse hub. (Make sure spring is bottomed in hub and covers all three key slots.) Position three synchronizer keys in hub, with small ends in hub slots and large ends inside hub. Push keys fully into hub so they seat on spring. Then slide First-Reverse sleeve and gear over keys until the keys engage in the

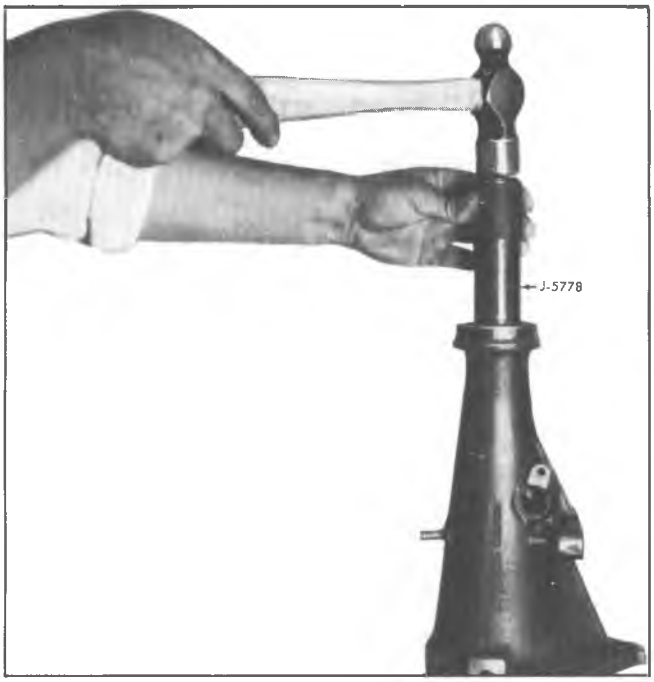


Fig. 15R--Installing Extension Housing Bushing

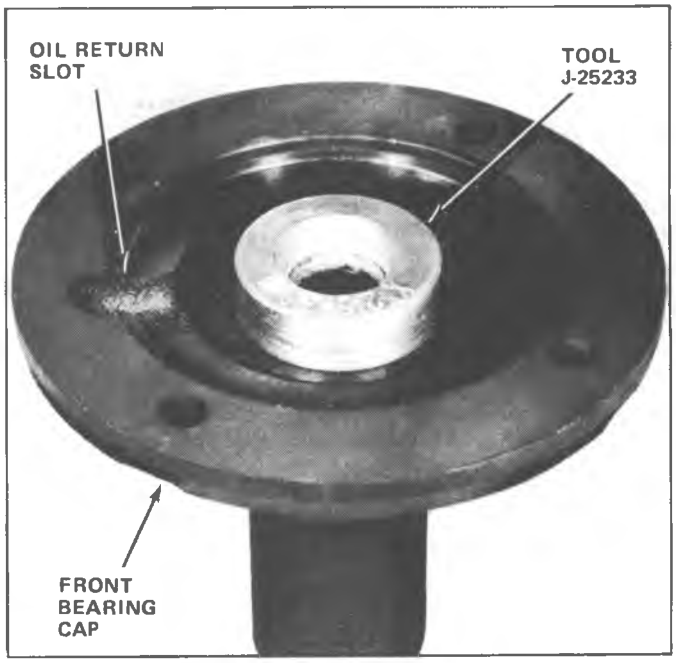


Fig. 17R--Installing Clutch Bearing Retainer Seal

Fig. 16R--Installing Extension Housing Seal

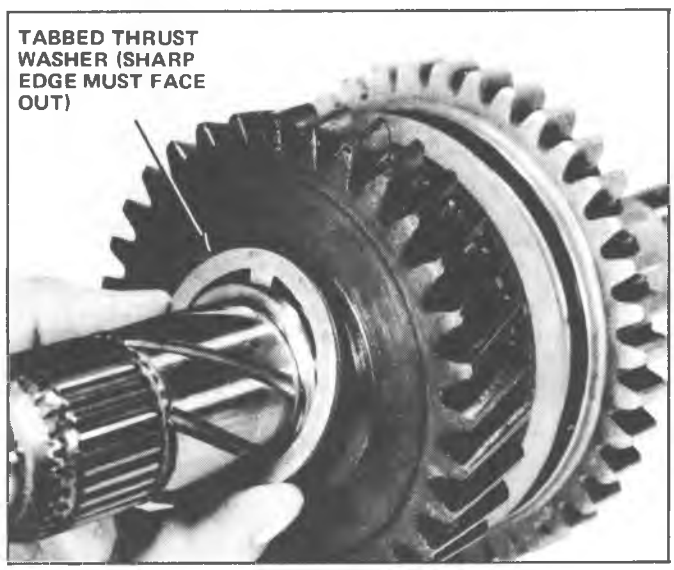


Fig. 18R--Installing Tabbed Thrust Washer

synchronizer sleeve (fig. 13R).

4. Place first gear blocking ring on tapered surface of gear. Install First gear on output shaft. Rotate gear until notches in blocking ring engages keys in First-Reverse hub.

5. Install tabbed thrust washer (sharp edge facing out) and retaining snap ring on output shaft (fig. 18R).

6. Place second gear blocking ring on tapered surface of gear and install second gear on output shaft with tapered surface of gear facing front of output shaft (fig. 19R).

7. Install Second-Third synchronizer assembly with flat portion of synchronizer hub facing rearward on output shaft. Rotate Second gear until notches in blocking ring engages keys in Second-Third synchronizer assembly.

   NOTE: It may be necessary to tap synchronizer with a plastic hammer to ease assembly.

8. Install retaining snap ring on output shaft and measure end play between snap ring and Second-Third synchronizer hub with feeler gauge (fig. 20R). End play

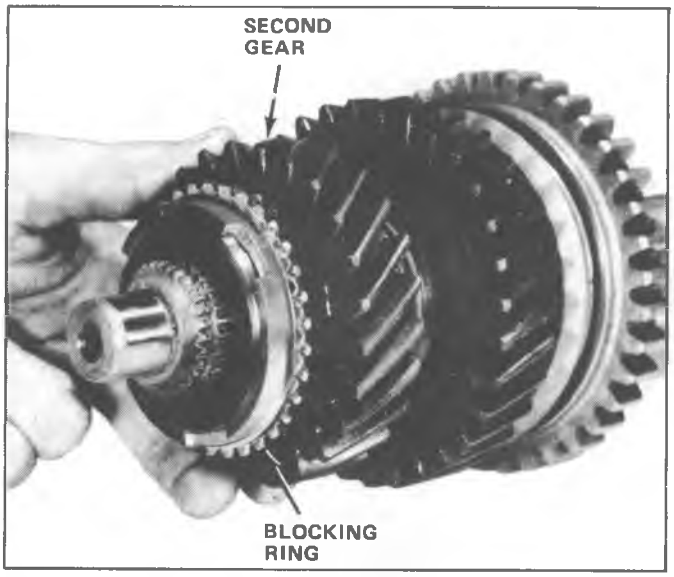


Fig. 19R--Installing Second Gear

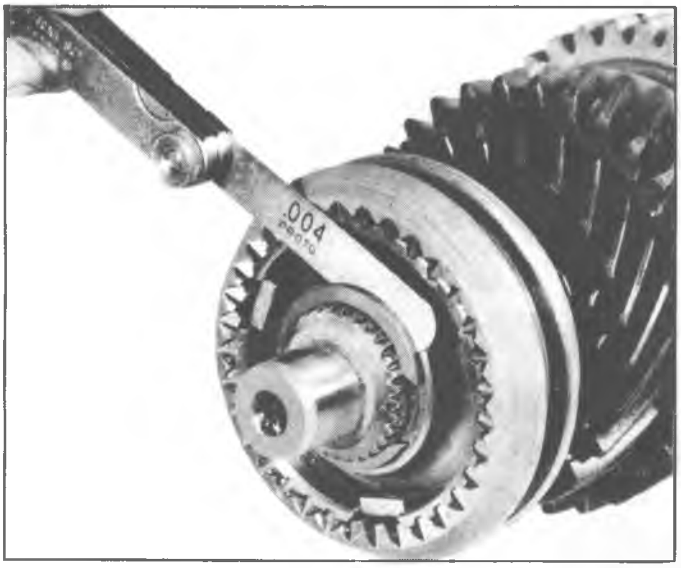


Fig. 20R–Measuring Output Shaft End Play

should be 0.004 to 0.0014 inch. If end play exceeds 0.014 inch, replace thrust washer and all snap rings on output shaft assembly.

ASSEMBLY OF TRANSMISSION

1. Coat transmission case reverse idler gear thrust washer surfaces with Vaseline (or equivalent) and position thrust washer in case.

   NOTE: Be sure to engage locating tabs on thrust washers in locating slots in case.

2. Install reverse idler gear with helical cut gear towards front of case. Align gear bore, thrust washers, case bores, and install reverse idler gear shaft from rear of case.

   NOTE: Be sure to align and seat roll pin in shaft into counterbore in rear of case.

3. Measure reverse idler gear end play by inserting feeler gauge between thrust washer and gear. End play should be 0.004 to 0.018 inch. If end play exceeds 0.018 inch, remove idler gear and replace thrust washer.
4. Install shaft tool J-25232 in bore of countergear and load a row of needle bearing (25) in each end of gear. Use heavy grease or equivalent to hold them in place. Install one needle bearing retainer on each end of gear.
5. Position countergear thrust washer in case, use vaseline or equivalent to hold washers in place.

   NOTE: Be sure to engage locating tabs on thrust washer in locating slots in case.

6. Insert countershaft into bore at rear of case just far enough to hold rear thrust washer from being displaced when the countergear is installed.
7. Align bore in countergear with countershaft and front thrust washer, then start countershaft into countergear. Before countershaft is completely installed make sure that roll pin hole in countershaft is aligned with hole in case. When holes are aligned, tap countershaft into place, remove tool J-25232 (fig. 5R).
8. Measure countershaft end play by inserting feeler gauge between thrust washer and countergear. End play should be 0.004 to 0.018 inch. If end play exceeds 0.018 inch, remove gear and replace thrust washers.
9. After correct end play has been obtained, install roll pin in case.

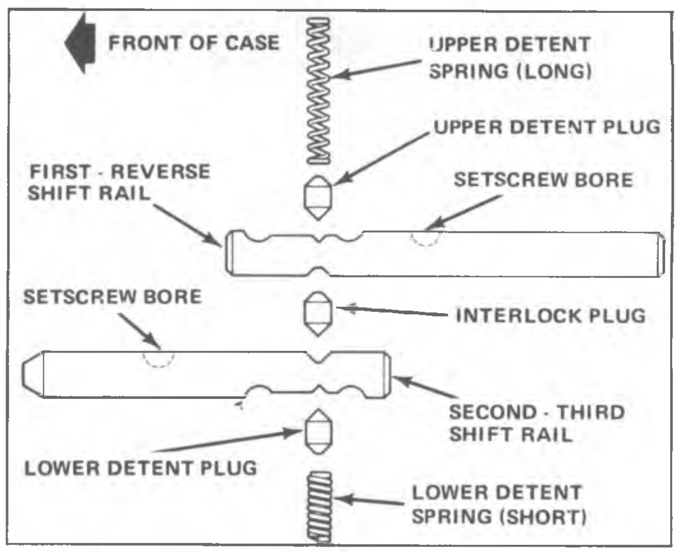


Fig. 21R–Installation Sequence - Detent Plugs and Springs

10. Lower shorter detent spring in detent bore in case (fig. 21R). Allow spring to drop into place at bottom of Second-Third shift rail bore. Insert lower detent plug in detent bore on top of spring.

11. Install shifter fork shafts in their case bores with the pivot lug facing up.

    NOTE: Shifter fork shafts are interchangeable.

12. Install (15) roller bearings in clutch shaft bore. Use vaseline (or equivalent) to hold bearings in place.

    CAUTION: *Do not use chassis grease or a similar "heavy" grease in clutch shaft bore. Heavy grease will plug the lubricant holes in the shaft and prevent proper lubrication of the roller bearing.*

13. Install blocking ring on clutch gear and place clutch gear through top of case and position in front case bore.
14. Install output shaft assembly in case. Be sure First-Reverse sleeve and gear is in Neutral (centered) position on hub so gear end of sleeve will clear notch in top of case when output shaft assembly is installed.
15. Assemble the clutch gear to the output shaft.
16. Move Second-Third sleeve rearward to Second gear position and position Second-Third shifter fork in groove of sleeve. Be sure setscrew hold in shifter fork is facing up.

    NOTE: Second-Third fork is the smaller of the two shifter forks.

17. Engage Second-Third shifter fork in shifter fork shaft and insert Second-Third shift rail through front case bore and into shifter fork.

    NOTE: Tapered end of rail faces front of case.

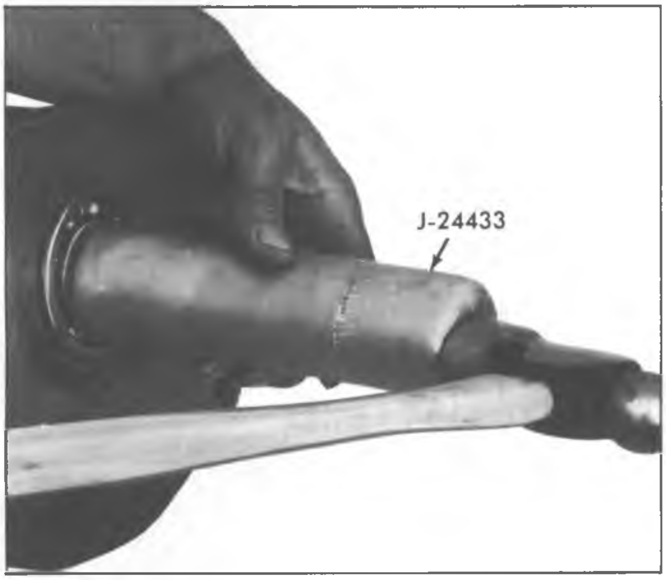


Fig. 22R--Installing Front Bearing

18. Turn shift rail until detent notches in rail face bottom of case. Insert a phillips screwdriver in detent bore to depress lower detent plug and push shift rail into rear bore. Move rail inward until detent plug engages forward notch in shift rail (second gear position).
19. Secure fork to rail with setscrew and move second-third synchronizer to Neutral (centered) position.

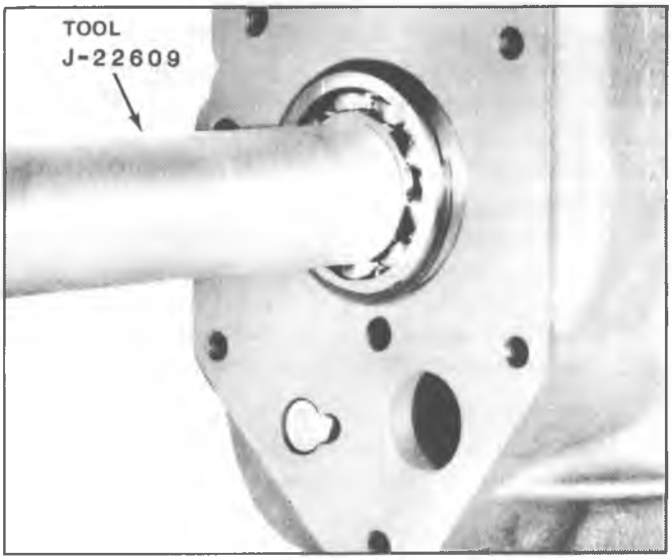


Fig. 23R--Installing Rear Bearing

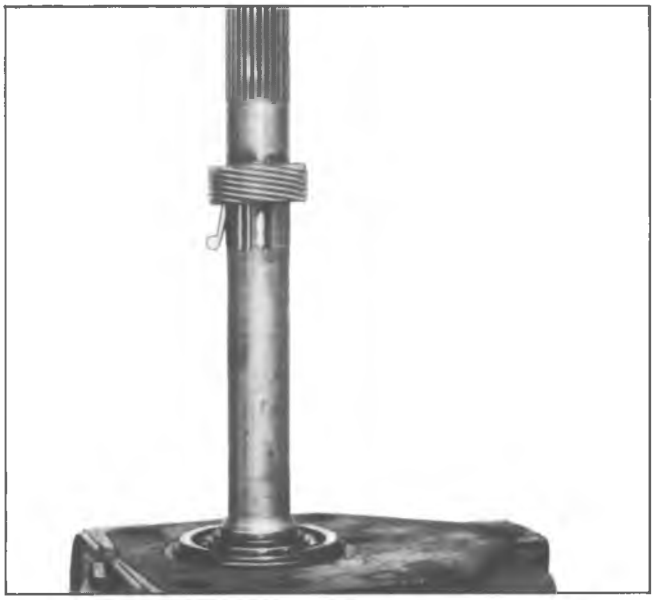
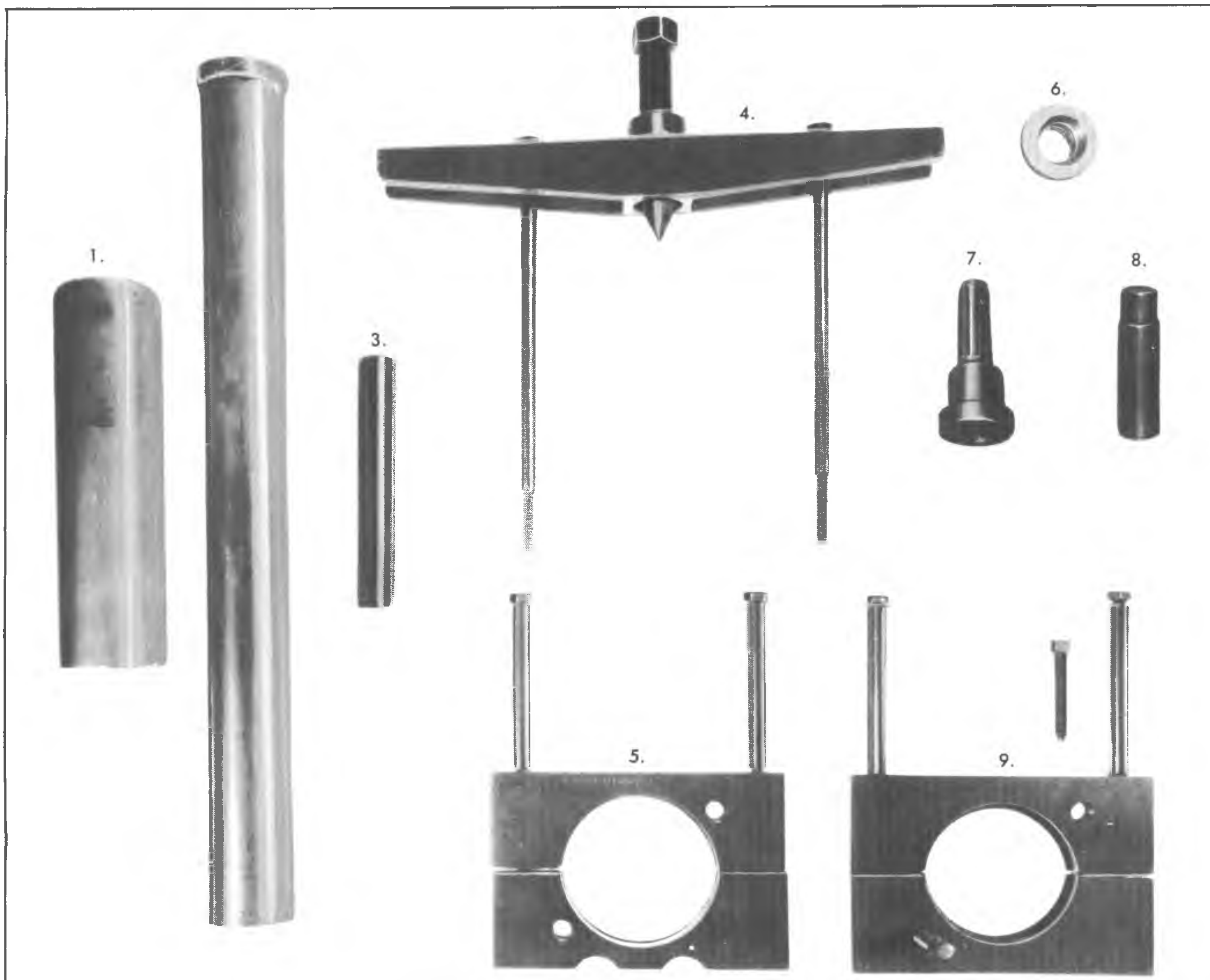


Fig. 24R--Installing Speedometer Retainer and Gear

20. Install interlock plug in detent bore. With Second-Third synchronizer in Neutral position, top of plug will be slightly below surface of First-Reverse shift rail bore.
21. Move first reverse synchronizer forward to first gear position. Place First-Reverse shifter fork in groove of sleeve. Be sure setscrew hole in fork is facing up. Rotate fork into position in case, engage fork in shifter fork shaft, and insert First-Reverse shift rail through rear case bore and shifter fork.
22. Turn shift rail until detent notches in rail face upward. Move rail inward until setscrew hole in fork and setscrew bore in shift rail are aligned. Secure fork to rail with setscrew and place First Reverse sleeve and gear into Neutral (centered) position (fig. 20R).

23. Install large snap ring on front bearing.
24. Install front bearing on clutch gear shaft by hand drive bearing on clutch gear shaft using tool J-24433 (fig. 22R).
25. Install smaller snap ring on clutch gear shaft.
26. Position bearing retainer gasket on case. Be sure cut-out in gasket is aligned with oil return hole in case.
27. Install front bearing retainer and tighten attaching bolts to 30 to 36 foot-pounds of torque. Be sure to index cap to case with alignment marks, and that oil return slot in cap is aligned with oil return hole in case.
28. Install large snap ring on rear bearing.
29. Install rear bearing on output shaft by hand. Drive bearing onto shaft and into case with tool J-22609, make sure snap ring groove is facing rear of shaft (fig. 23R).
30. Install smaller snap ring on output shaft to hold rear bearing in place.
31. Engage speedometer gear retainer in hole provided in output shaft, with retainer loop forward, slide speedometer gear over output shaft and into position (fig. 24R).
32. Position extension housing gasket on case and install extension housing to case. Tighten bolts to 42 to 50 foot pounds torque.
33. Install expansion plug in Second-Third shift rail bore in front of case. Be sure plug is fully seated in bore and is approximately 1/16 inch below front face of case.
34. Install upper detent plug in detent bore, then install long detent spring on top of plug. Install transmission fill plug and tighten 10 to 20 foot pounds torque.
35. Install top cover and gasket on case and secure with attaching bolts. Tighten bolts 20 to 25 foot pounds torque.
36. If removed, install backup light switch in extension housing and TCS switch in case. Tighten switches to 15 to 20 foot pounds torque.

SPECIAL TOOLS



1. J-24433 FRONT BEARING INSTALLER
2. J-22609 REAR BEARING INSTALLER
3. J-25232 COUNTER GEAR DUMMY SHAFT
4. J-8433-1 FRONT BEARING REMOVER
5. J-6654-1 FRONT BEARING REMOVER
6. J-25233 BEARING RETAINER OIL SEAL INSTALLER
7. J-5154 EXTENSION HOUSING SEAL INSTALLER
8. J-5778 EXTENSION HOUSING BUSHING INSTALLER
9. J-8157-01 REAR BEARING REMOVER

Fig. 25R--Tremec Special Tools

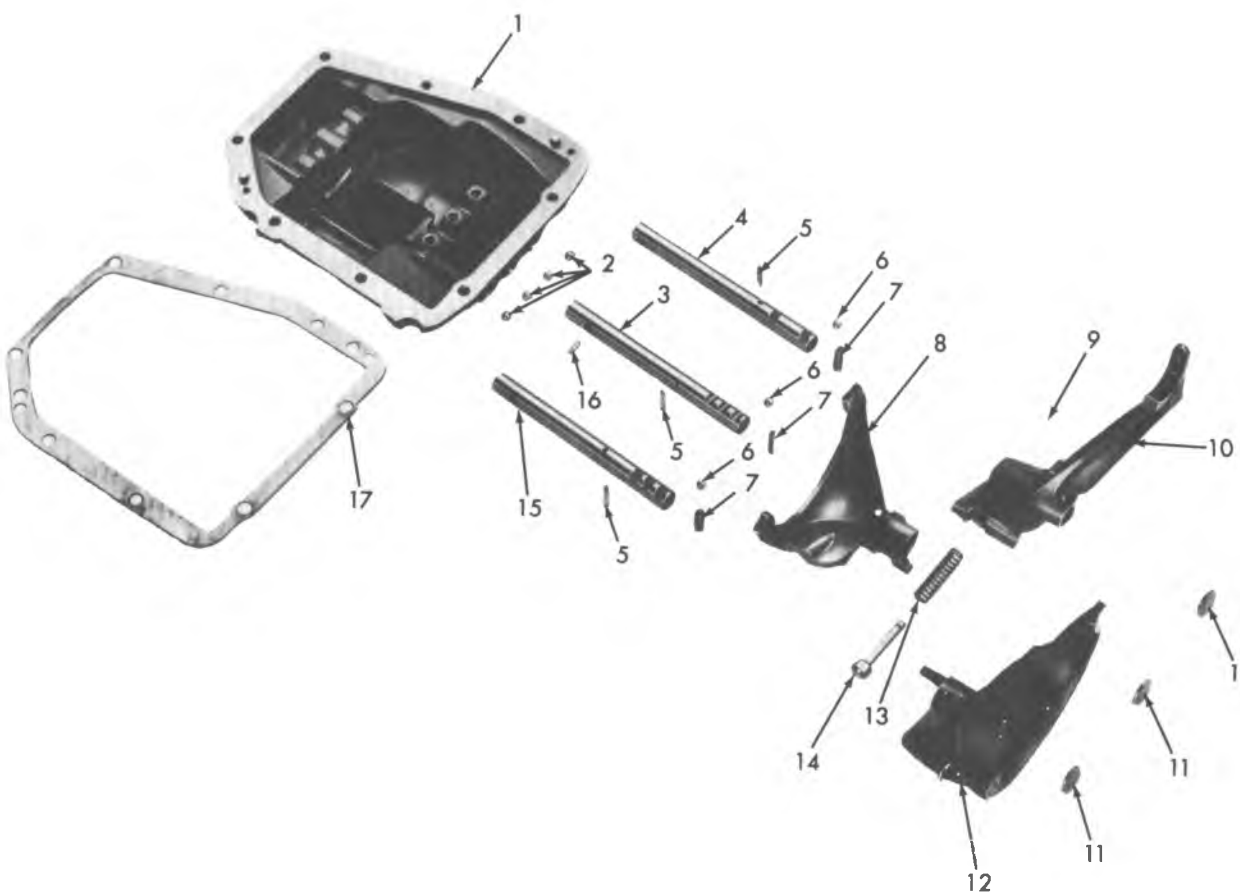
FOUR-SPEED MUNCIE TRANSMISSION (CH 465)

INDEX

ASSEMBLY (Fig. 1X)

1. In reassembling the transmission cover, care must be used in installing the shifter shafts. They should be installed in the order shown in Fig. 2X, namely, reverse 3rd-4th and 1st-2nd. Figure 1X illustrates difference between shafts.
2. Place fork detent ball springs and balls in position in holes in cover.
3. Start shifter shafts into cover; depress dentent balls with small punch and push shafts on over balls. (See Fig. 2X).

   Hold reverse fork in position and push shaft through yoke. Install split pin in fork and shaft; then, push fork in neutral position.
4. Hold 3rd and 4th fork in position and push shaft through yoke, but not through front support bore.
5. Place two (2) interlock balls in cross-bore in front support boss between reverse and 3rd and 4th shifter shaft. Install the interlock pin in the 3rd and 4th shifter shaft hole and grease to hold in place. Push 3rd and 4th



1. Transmission Cover
2. Interlock Balls
3. 3rd-4th Shifter Shaft
4. Reverse Shifter Shaft
5. Fork Retaining Pin
6. Detent Ball
7. Detent Spring
8. 3rd-4th Shifter Fork
9. "C" Ring Lock Clip
10. Reverse Shifter Fork
11. Shifter Shaft Hole Plugs
12. 1st-2nd Shifter Fork
13. Interlock Plunger Spring
14. Reverse Interlock Plunger
15. 1st-2nd Shifter Shaft
16. Interlock Pin
17. Cover Gasket

Fig. 1X--Cover Assembly - Exploded View

shaft through fork and cover bore keeping both balls and pin in position between shafts until retaining holes line up in fork and shaft. Install retaining pin and move to neutral position.

6. Place two (2) interlock balls between the 1st and 2nd shift shaft and 3rd and 4th shifter shaft in the cross-bore of the front support boss. Hold 1st and 2nd fork in position and push shaft through cover bore in fork until retainer hole and fork line up with hole in shaft. Install retainer pin and move to neutral position.
7. Install new shifter shaft hole expansion plugs and expand in place.

MAINSHAFT ASSEMBLY

Disassembly (Fig. 3X)

1. Remove first speed gear and thrust washer.
2. Remove snap ring in front of 3rd-4th synchronizer assembly.
3. Remove reverse driven gear.
4. Press behind second speed gear to remove 3rd-4th synchronizer assembly, 3rd speed gear and 2nd speed gear along with 3rd speed gear bushing and thrust washer (fig. 4X).
5. Remove 2nd speed synchronizer ring.
6. Supporting 2nd speed synchronizer hub at front face, press mainshaft through removing 1st speed gear bushing and 2nd speed synchronizer hub.
7. Split 2nd speed gear bushing with chisel and remove bushing from shaft.

CAUTION: *Exercise care not to damage mainshaft.*

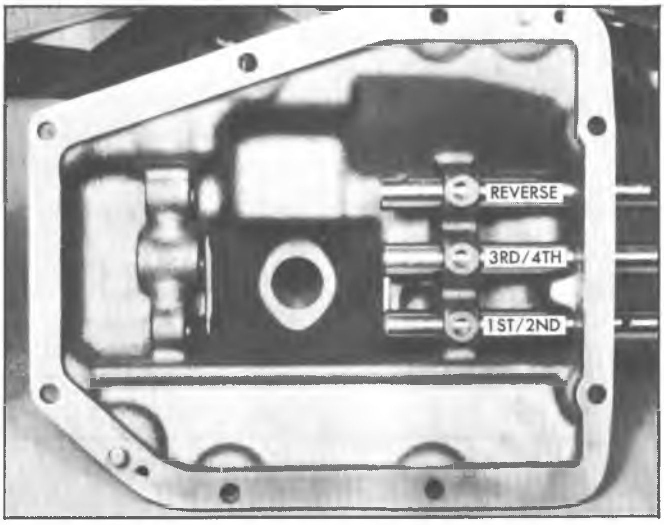
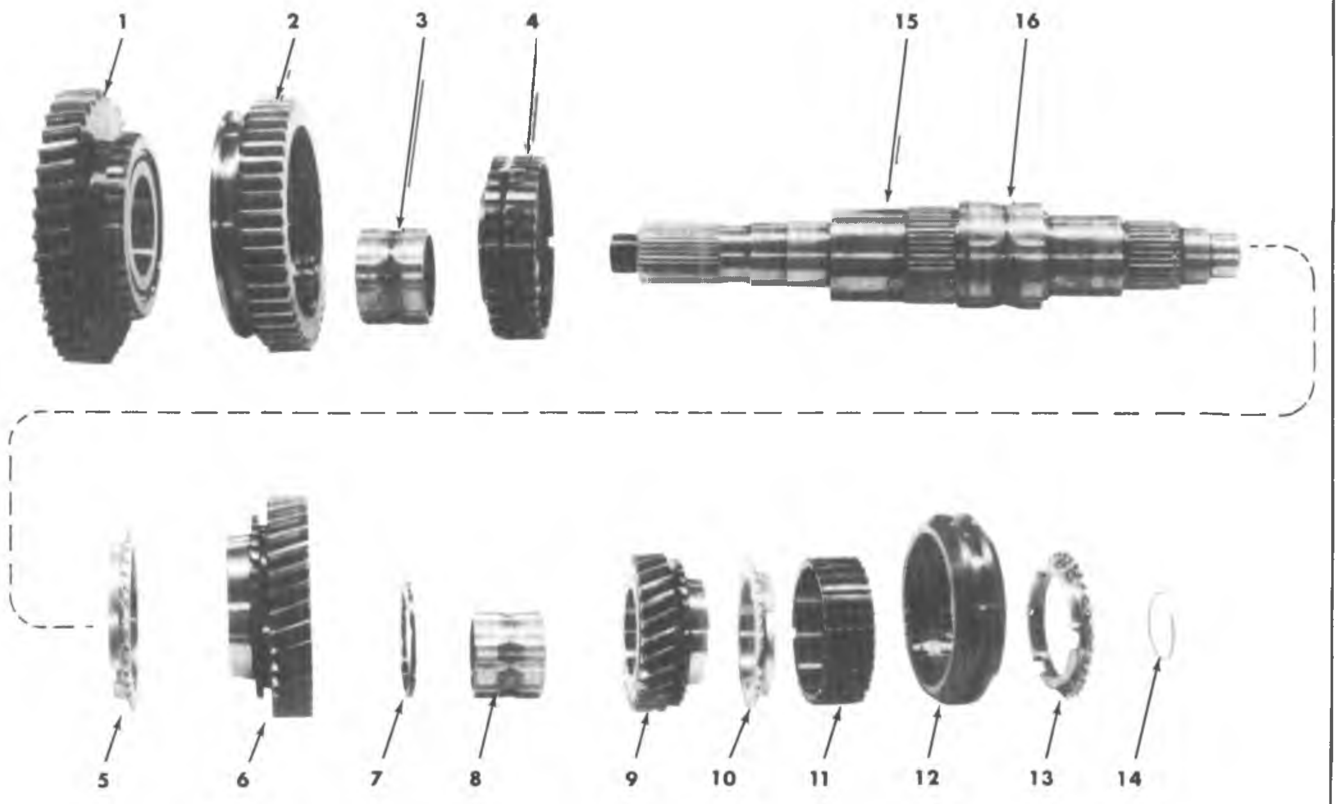


Fig. 2X–Shifter Shaft Installation



1. 1st Speed Gear
2. Reverse Driven Gear
3. 1st Gear Bushing
4. 1st-2nd Gear Synchronizer Hub Assembly
5. 2nd Speed Blocker Ring
6. 2nd Speed Gear
7. Thrust Washer
8. 3rd Speed Bushing
9. 3rd Speed Gear
10. 3rd Speed Blocker Ring
11. 3rd-4th Speed Synchronizer Hub Assembly
12. 3rd-4th Speed Synchronizer Sleeve
13. 4th Speed Blocker Ring
14. Snap Ring
15. Mainshaft
16. 2nd Speed Gear Bushing

Fig. 3X--Mainshaft Assembly Exploded View

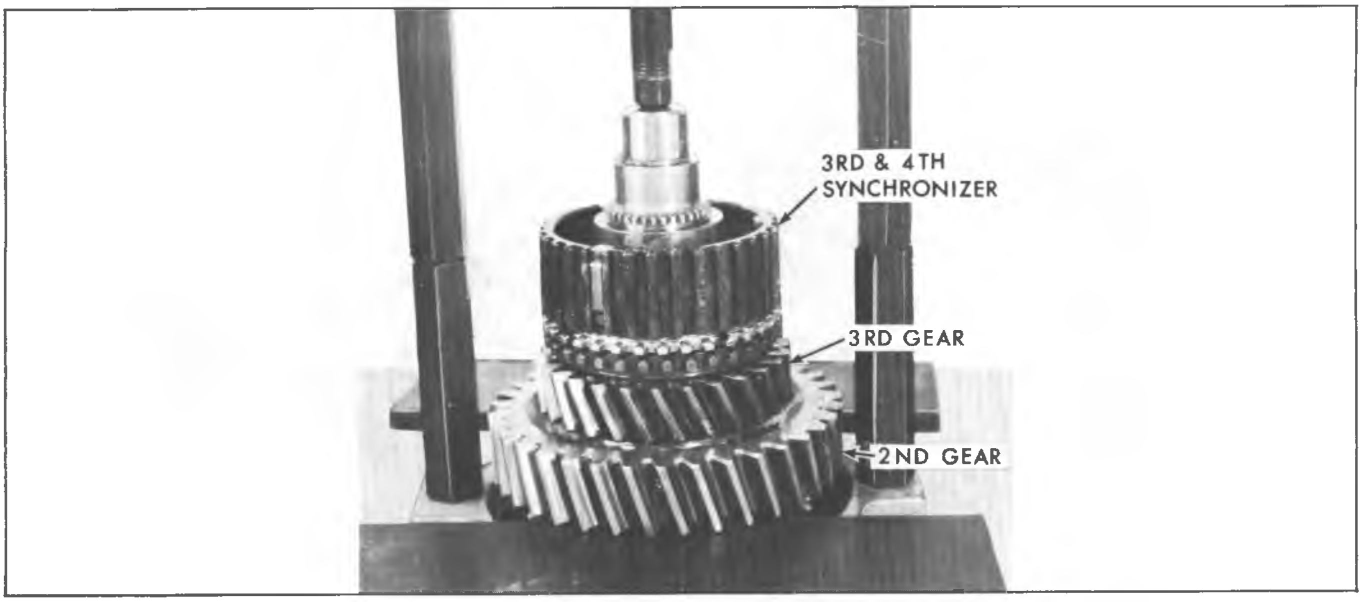


Fig. 4X--Disassembly of Mainshaft

NEW PROCESS TRANSFER CASE MODEL 203

INDEX

DISASSEMBLY OF TRANSFER CASE

Refer to figures 1F and 2F for cross sectional

1. Position transfer case on work bench or suitable work table (Fig. 3F and 4F).

   NOTE: If lubricant was not drained from unit prior to removal from vehicle, remove front output rear cover and P.T.O. cover lower bolts and drain lubricant into waste container.

2. Using Tool J-8614-1, loosen rear output shaft flange retaining nut.
3. Using Tool J-8614-1, remove front output shaft flange retaining nut, washer and flange.

   NOTE: Tap dust shield rearward on shaft (away from bolts) to obtain clearance to remove bolts from flange and allow installation of Tool J-8614-1.

4. Remove bolts retaining front output shaft front bearing retainer. Remove bearing retainer and gasket from transfer case. Discard gasket.

5. Using a hoist or other suitable lifting tool, position assembly on blocks.

6. Remove bolts retaining rear section of rear output housing assembly from front section of rear output housing and disengage. Remove shims and speedometer gear from output shaft.

7. Remove bolts retaining front section of rear output housing assembly from transfer case. Remove housing from transfer case.

8. Remove "O" ring seal from front section of rear output housing and discard.

9. Disengage rear output shaft from differential carrier assembly.

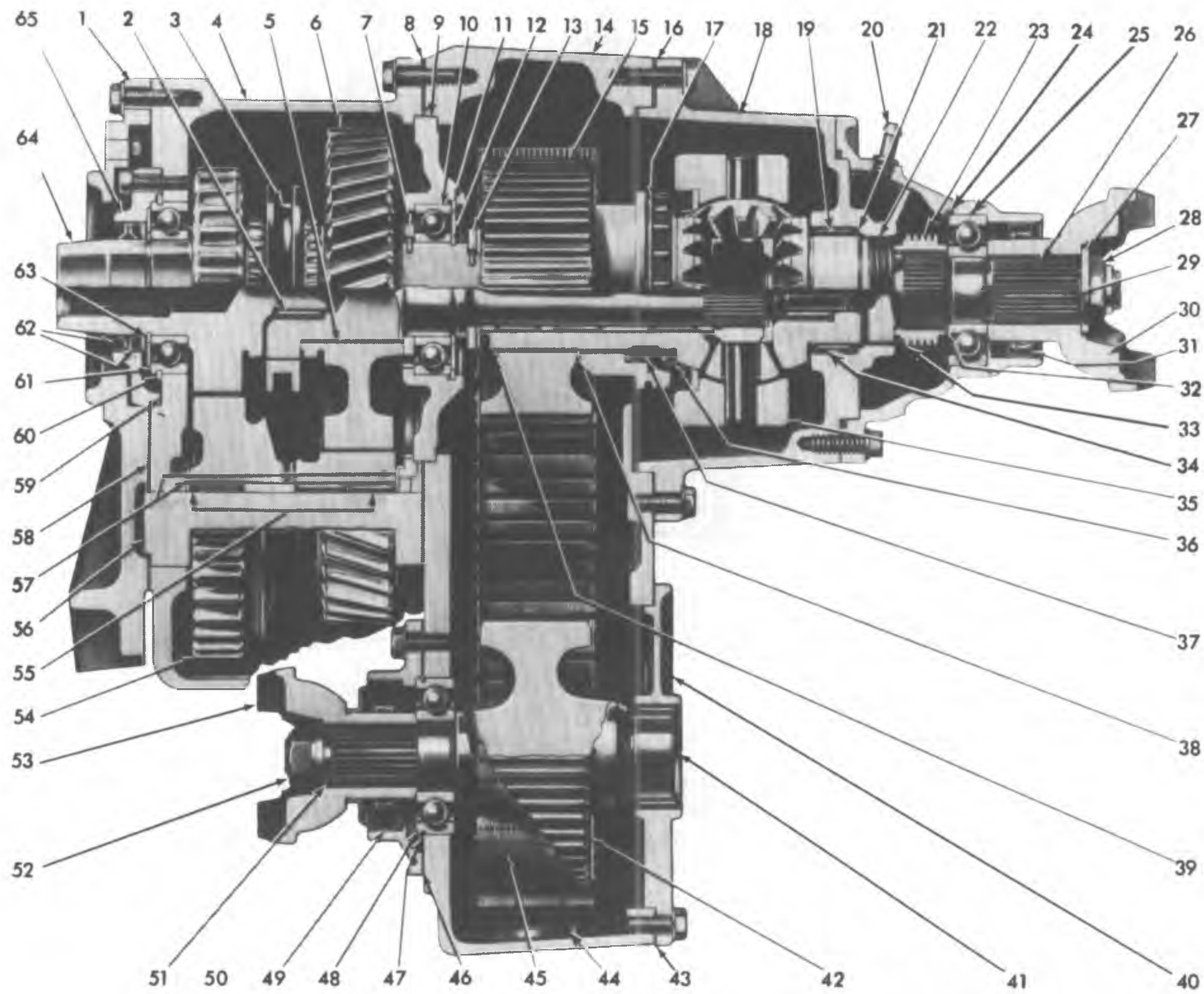
10. Slide carrier unit from shaft.

    NOTE: A 1-1/2" to 2" water hose band type clamp may be installed on the input shaft at this time to prevent loosing bearings when removing input shaft assembly from the range box.

11. Raise shift rail and drive out pin retaining shift fork to rail.
12. Remove shift rail poppet ball plug, gasket spring and ball from case.

A small magnet may be used to remove ball from case.

13. Push shift rail down, lift up on lockout clutch and remove shift fork from clutch assembly.
14. Remove bolts retaining front ouput shaft rear bearing retainer to transfer case. Tap on front of shaft or carefully pry retainer away from case. Remove retainer from shaft and discard gasket. Recover any roller bearings which may fall from rear cover.



1. Adapter
2. Input Drive Gear Pilot Brgs.
3. Range Selector Sliding Clutch
4. Range Selector Housing
5. Low Speed Gear Bushing
6. Low Speed Gear
7. Thrust Washer & Locating Pin
8. Gasket
9. Input Brg. Retainer
10. Input Brg.
11. Brg. Outer Ring
12. Brg. Retaining Ring
13. Thrust Washer, Locating Pin, Lubricating Washer & Spacer
14. Intermediate (Chain Housing)
15. Drive Shaft Sprocket
16. Gasket
17. Sliding Lock Clutch
18. Rear Output Housing
19. Rear Output Front Brg.
20. Vent
21. Oil Seal
22. Oil Pump
23. Speedometer Drive Gear
24. Brg. Retainer Ring
25. Rear Output Rear Brg.
26. Rear Output Shaft
27. Washer
28. Locknut
29. Rubber Spline Seal
30. Rear Output Yoke
31. Rear Output Seal
32. Shims
33. Input Shaft "O" Ring
34. Input Shaft Pilot Bearings
35. Differential Carrier Assembly
36. Spring Washer Cup
37. Lockout Clutch Spring
38. Snap Ring
39. Snap Ring
40. Front Output Rear Brg. Cover
41. Front Output Rear Brg.
42. Front Output Drive Sprocket
43. Gasket
44. Magnet
45. Drive Chain
46. Gasket
47. Brg. Outer Ring
48. Front Output Front Brg.
49. Front Output Shaft Seal
50. Front Output Brg. Retainer
51. Rubber Spline Seal
52. Locknut
53. Front Output Yoke
54. Countergear
55. Countergear Spacers and Brgs.
56. Countergear Shaft
57. Countergear Thrust Washer
58. Gasket
59. Brg. Retainer Gasket
60. Brg. Outer Ring
61. Input Gear Brg.
62. Input Gear Seals (2)
63. Brg. Snap Ring
64. Input Gear
65. Input Gear Brg. Retainer

Fig. 1F–New Process Transfer Case - Cross Section

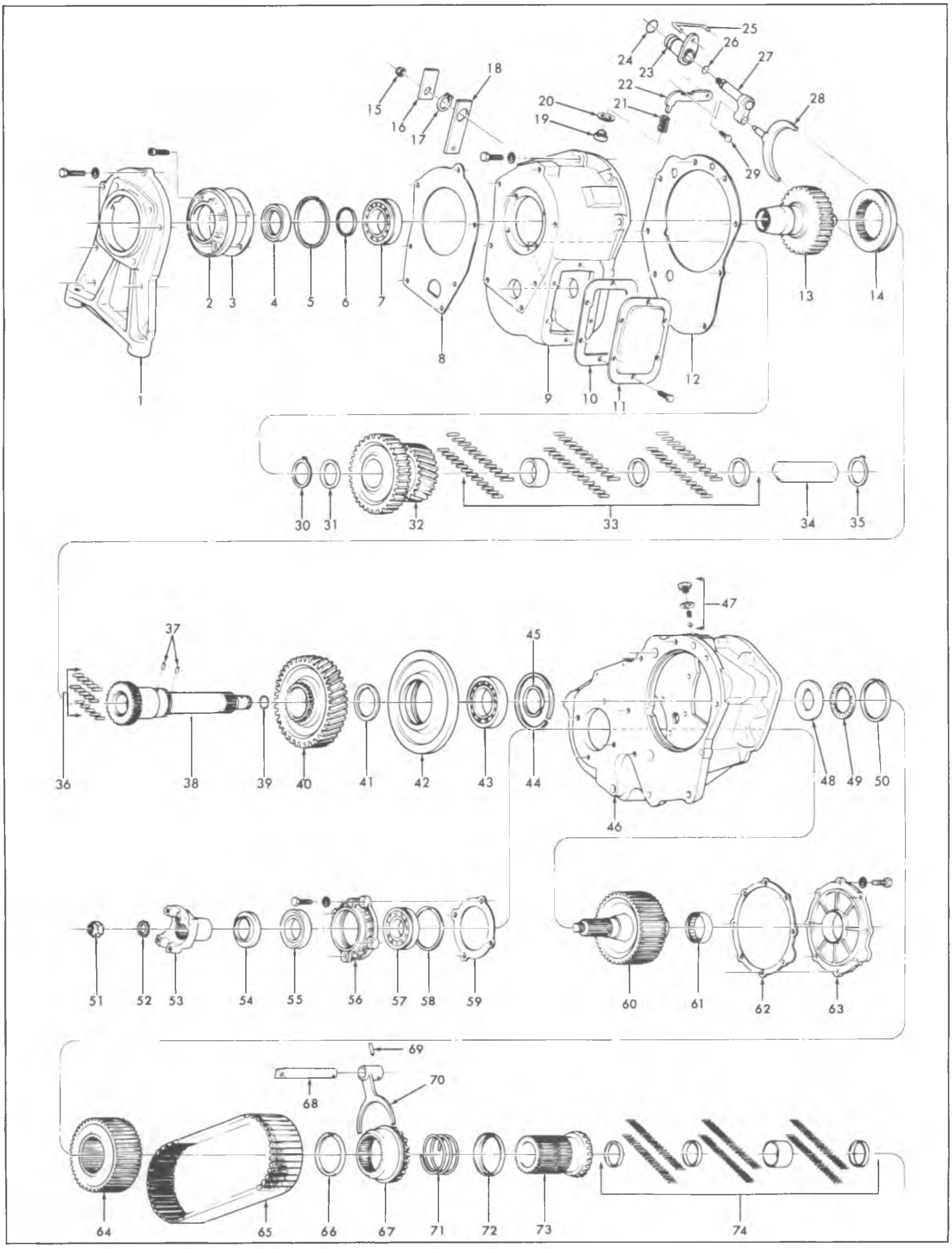
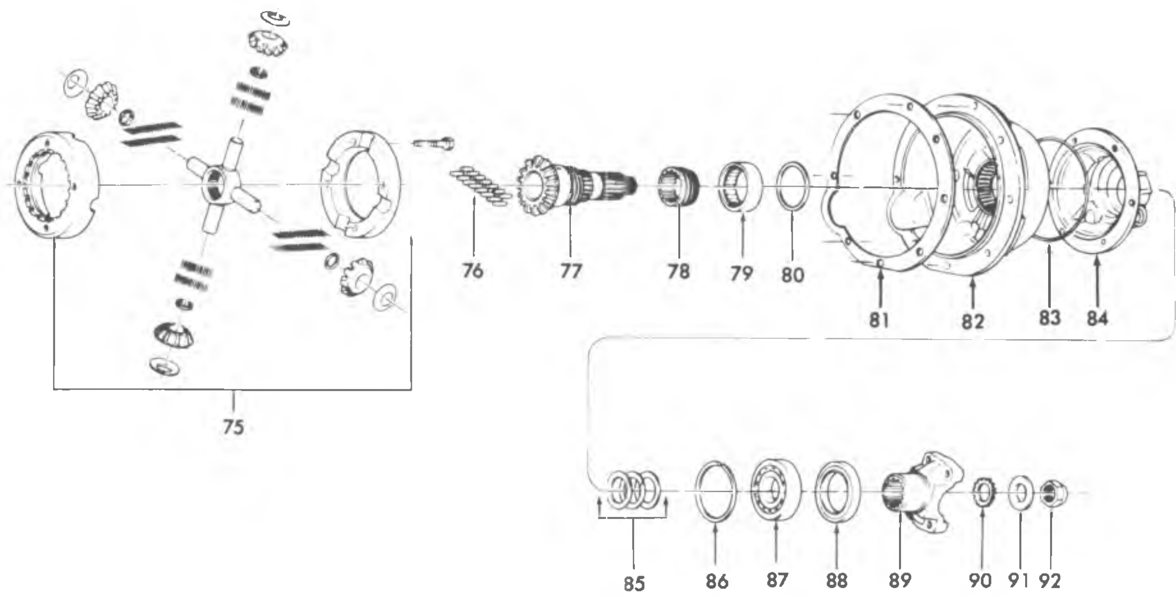


Fig. 2F-1–Transfer Case Exploded View



1. Adapter
2. Input Gear Bearing Retainer
3. Input Gear Bearing Retainer Gasket
4. Input Gear Bearing Retainer Seals
5. Bearing Outer Ring
6. Bearing to Shaft Retaining Ring
7. Input Gear Bearing
8. Adapter to Selector Housing Gasket
9. Range Selector Housing (Range Box)
10. P.T.O. Cover Gasket
11. P.T.O. Cover
12. Selector Housing to Chain Housing Gasket
13. Main Drive Input Gear
14. Range Selector Sliding Clutch
15. Shift Lever Lock Nut
16. Range Selector Shift Lever
17. Shift Lever Retaining Ring
18. Lockout Shift Lever
19. Detent Plate Spring Plug
20. Detent Plate Spring Plug Gasket
21. Detent Plate Spring
22. Detent Plate
23. Lockout Shifter Shaft
24. "O" Ring Seal
25. Lockout Shaft Connector Link
26. "O" Ring Seal
27. Range Selector Shifter Shaft
28. Range Selector Shift Fork
29. Detent Plate Pivot Pin
30. Thrust Washer
31. Spacer (short)
32. Range Selector Counter Gear
33. Countergear Roller Bearings and Spacers (72 Bearings Req'd.)
34. Countergear Shaft
35. Thrust Washer
36. Input Shaft Roller Bearings (15 Req'd.)
37. Thrust Washer Pins (2 Req'd.)
38. Input Shaft
39. "O" Ring Seal
40. Low Speed Gear and Bushing
41. Thrust Washer
42. Input Shaft Bearing Retainer
43. Input Shaft Bearing
44. Input Shaft Bearing Retaining Ring (Large)
45. Input Shaft Bearing Retaining Ring
46. Chain Drive Housing
47. Lockout Shift Rail Poppet Plug, Gasket, Spring and Ball.
48. Thrust Washer
49. Lubricating Thrust Washer
50. Retaining Ring
51. Flange Lock Nut
52. Seal
53. Front Output Yoke
54. Dust Shield
55. Front Output Shaft Bearing Retainer Seal
56. Front Output Shaft Bearing Retainer
57. Front Output Shaft Bearing
58. Bearing Outer Ring
59. Bearing Retainer Gasket
60. Front Output Shaft
61. Front Output Shaft Rear Bearing
62. Front Output Rear Bearing Retainer Cover Gasket
63. Front Output Rear Bearing Retainer
64. Drive Shaft Sprocket
65. Drive Chain
66. Retaining Ring
67. Sliding Lock Clutch
68. Lockout Shift Rail
69. Shift Fork Retaining Pin
70. Lockout Shift Fork
71. Lockout Clutch Spring
72. Spring Washer Cup
73. Front Side Gear
74. Front Side Gear Bearing and Spaces (123 Bearings Req'd.)
75. Differential Carrier Assembly (132 Bearings Req'd.)
76. Rear Output Shaft Roller Bearings (15 Req'd.)
77. Rear Output Shaft
78. Speedometer Drive Gear
79. Rear Output Shaft Front Roller Bearing
80. Oil Pump "O" Ring Seal
81. Rear Output Housing Gasket
82. Rear Output Housing (Front)
83. "O" Ring Seal
84. Rear Output Housing (Rear)
85. Shim Pack
86. Bearing Retainer
87. Rear Output Rear Bearing
88. Rear Output Shaft Seal
89. Rear Output Flange
90. Rear Output Shaft Rubber Seal
91. Washer
92. Flange Nut

Fig. 2F-2–Transfer Case Exploded View

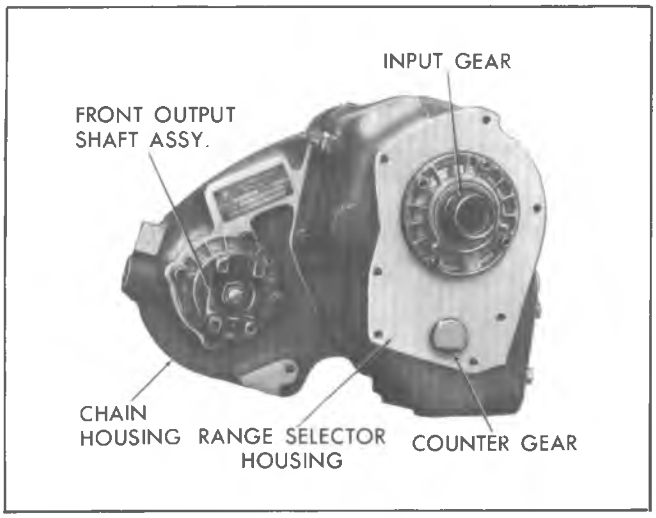


Fig. 3F–Front View of Transfer Case

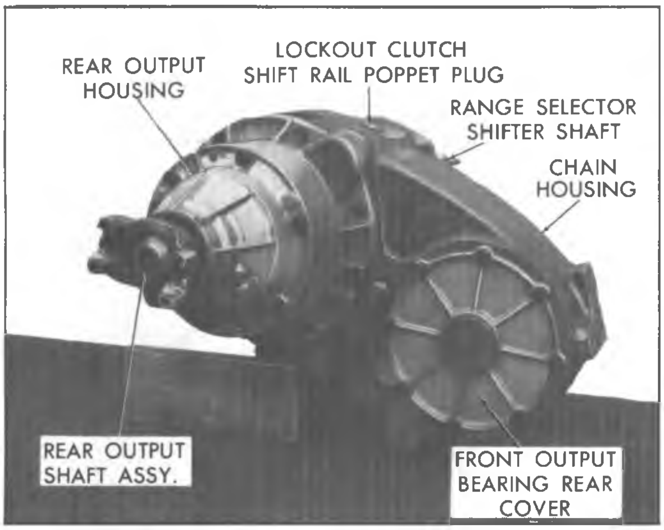


Fig. 4F–Rear View of Transfer Case

NOTE: If necessary to replace rear bearing, support cover and press bearing from cover. Position new bearing to outside face of cover and press bearing into cover with a .06 overhang.

15. From lower side of case, remove (pry) output shaft front bearing.
16. Disengage front output shaft from chain and remove shaft from transfer case.
17. Remove bolts attaching intermediate chain housing to range box. Lift or using a chain hoist, remove intermediate housing from range box.
18. Remove chain from intermediate housing.
19. Remove lockout clutch, drive gear and input shaft assembly from range box.

    NOTE: A 1-1/2" to 2" hose clamp may be installed on end of the input shaft to prevent loosing the roller bearings (123) which may fall out of clutch assembly if it is pulled off the input shaft.

20. Pull up on shift rail and disconnect rail from link.
21. Remove (lift) input shaft assembly from range box.

    NOTE: At this point the transfer case is completely disassembled into its subassemblies. Each of these subassemblies should then be disassembled for cleaning and inspection.

REAR OUTPUT SHAFT HOUSING (REAR) ASSEMBLY

Disassembly

1. Remove speedometer driven gear from rear section of rear output housing.
2. Pry old seal out of bore, using a screwdriver or other suitable tool.
3. Using a screwdriver, pry behind open ends of snap ring and remove snap ring retaining rear bearing in housing (Fig. 5F).

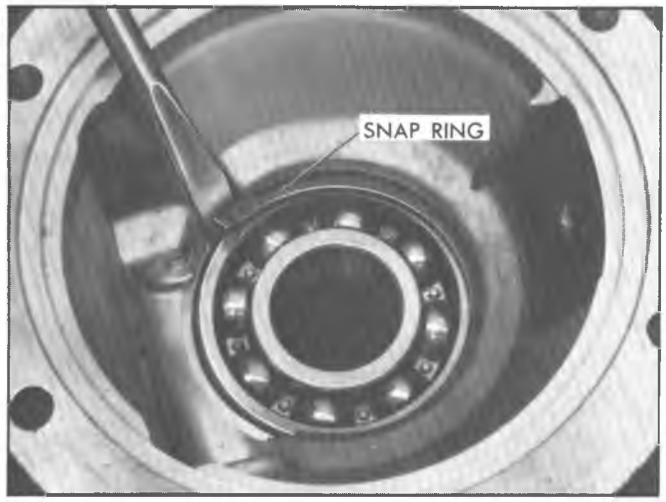


Fig. 5F–Removing Rear Output Bearing Retaining Ring

4. Pull or tap bearing from housing.
5. To remove the front bearing, insert a long drift through rear opening and drive bearing from housing (Fig. 6F). Remove and discard rubber seal.

Assembly

1. Position rear bearing in housing and tap into place.
2. Install snap ring retaining bearing to case.

    NOTE: Retaining Ring is a select fit. Use service ring size A, B, C or D as required to provide tightest fit.

3. Position rear seal to bore and drive into place using tool J-22388 (Fig. 7F) or other suitable tool until approximately 1/8" to 3/16" below housing face.
4. If the vent seal falls out or is knocked out during disassembly, reinstall new seal or thoroughly clean and dry the area and re-cement the old seal in place.

Fig. 6F–Removing Rear Output Shaft From Bearing

Fig. 7F–Installing Rear Output Housing Seal

REAR OUTPUT SHAFT HOUSING (FRONT)

Disassembly

1. Remove "O" ring from rear output shaft housing (front) and discard.
2. To remove roller bearings from housing, insert a long drift through rear opening and drive bearing from housing (Fig. 6F). Remove and discard rubber seal.

Assembly

1. Position rubber seal in bearing bore. Use grease to hold in place. Position roller bearing in bore and press into place until bearing bottoms out in housing.
2. Position new "O" ring on housing.

ASSEMBLY OF TRANSFER CASE (FIGS. 1F

1. Place range box on blocks, with input gear side toward bench.
2. Position range box-to-transfer case housing gasket on input housing.
3. Install lockout clutch and drive sprocket assembly on the input shaft assembly.

   NOTE: A 2" band clamp may be installed on end of shaft to prevent loosing bearings from clutch assembly.
4. Install input shaft, lockout clutch and drive sprocket assembly in the range box, aligning tab on bearing retainer with notch in gasket.
5. Connect lockout clutch shift rail to the connector link and position rail in housing bore. Rotate shifter shaft lowering shift rail into the housing, to prevent the link and rail from being disconnected.
6. Install drive chain in chain housing, positioning the chain around the outer wall of the housing.
7. Install the chain housing on the range box engaging the shift rail channel of the housing to the shift rail. Position chain on the input drive sprocket.
8. Install the front output sprocket in the case, engaging the drive chain to the sprocket. Rotate clutch drive gear to assist in positioning chain on the drive sprocket.
9. Install the shift fork on the clutch assembly and the shift rail, then push the clutch assembly fully into the drive sprocket. Install roll pin retaining shift fork to shift rail.
10. Install front output shaft bearing.
11. Install front output shaft bearing retainer, gasket and retaining bolts.
12. Install the front output shaft flange, gasket, seal, washer and retaining nut. Tap dust shield back in place after installing bolts in flange.
13. Install front output shaft rear bearing retainer, gasket and retaining bolts. NOTE: If rear bearing was removed, position new bearing to outside face of cover and press into cover until bearing is flush with opening.
14. Install differential carrier assembly on the input shaft. Carrier bolt heads should face rear of shaft.
15. Position rear output shaft to differential carrier assembly (load bearings in pinion shaft).
16. Install rear output housing (front) assembly, gasket, and retaining bolts.
17. Install speedometer gear and shims (approximately .050 inch thickness) on output shaft.

18. Position rear output housing (rear) assembly to rear output housing (front). Be sure "O" ring is in proper position on front section of output housing.

    NOTE: Be sure vent is in upward position.

19. Install flange, washer, and retaining nut. Leave nut loose (approximately .060 inch) until shim requirements are determined.
20. Install shim pack onto shaft, in front of rear bearing, to control end play to within 0 to .005". Hold rear flange and rotate front output shaft to check for binding of the rear output shaft.
21. Install speedometer driven gear in housing.
22. Install lockout clutch shift rail poppet ball, spring and screw plug in case.
23. Install poppet plate spring, gasket and plug, if not installed during reassembly of range box.
24. Install shift levers on the range box shifter shaft, if not left on linkage in vehicle.
25. Torque all bolts, locknuts and plugs (except filler plug) to specifications.
26. Fill transfer case to proper level with specified lubricant.
27. Install and tighten filler plug to specifications.

SECTION 7A

AUTOMATIC TRANSMISSIONS

CONTENTS OF THIS SECTION

TURBO HYDRA-MATIC 350 TRANSMISSION

DISASSEMBLY

1. Install Holding Fixture J-8763-02 on transmission and place into Holding Tool base J-3289-20 with converter facing upward.

   NOTE: Cleanliness is an important factor in the overhaul of the transmission. Before attempting any disassembly operation, the exterior of the case should be thoroughly cleaned to prevent the possibility of dirt entering the transmission internal mechanism. During disassembly, all parts should be thoroughly cleaned in cleaning fluid and then air dried. Wiping cloths or rags should not be used to dry parts.

   CAUTION: *Do not use solvents which could damage rubber seals or clutch facings.*

2. With transmission in holding fixture remove torque converter assembly.
3. Remove vacuum modulator assembly attaching bolt and retainer.
4. Remove vacuum modulator assembly, "O" ring seal, and modulator valve from case (fig. 1A). Discard "O" ring.

INSPECTION OF CONVERTER

1. Check converter for leaks as follows (fig. 3A):
   a. Install Tool J-21369 and tighten.
   b. Apply 80 psi air pressure to tool.
   c. Submerge in water and check for leaks.
2. Check converter hub surfaces for signs of scoring or wear.

CONVERTER END CLEARANCE CHECK (Figs. 4A and 5A)

1. Fully release collet end of Tool J-21371-8.
2. Install collet end of Tool J-21371-8 into converter hub until it bottoms; then tighten cap nut to 5ft. lbs. (fig. 4A).

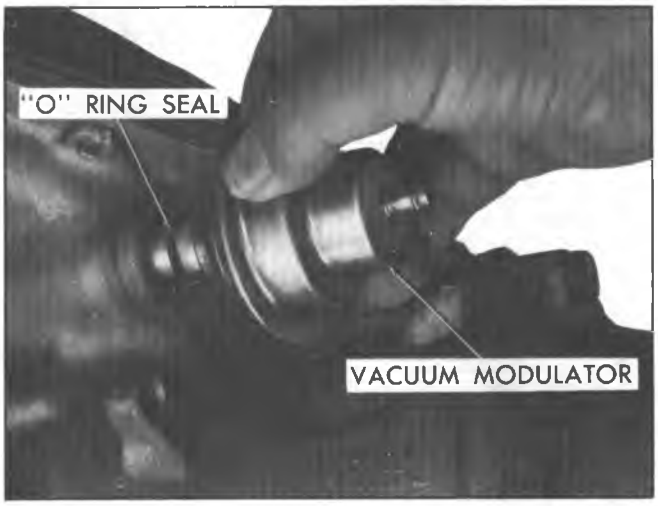


Fig. 1A–Removing Vacuum modulator Assembly

3. Install Tool J-21371-3 and tighten hex nut to 3 ft. lbs. (fig. 5A).
4. Install Dial Indicator J-8001 and set it at "zero", while its plunger rests on the cap nut of Tool J-21371-8.
5. Loosen hex nut while holding cap nut stationary. With the hex nut loosened and holding Tool J-21371-3 firmly against the converter hub, the reading obtained on the dial indicator will be the converter end clearance. End clearance should be less than .050". If the end clearance is .050" or greater, the converter must be replaced.

CLUTCH ASSEMBLIES FOR THM 350

CLUTCH	DRIVE PLATE	DRIVEN PLATES	CUSHION SPRING
FORWARD			
250 L-6, 262-305 V-8	4	4	1
350 V-8, 400 V-8 TAXI AND TRUCK	5	5	1
INTERMEDIATE			
250 L-6, 262 V-8	2	2	1
305-350 V-8, 400 V-8 TAXI AND TRUCK	3	3	1
DIRECT			
250 L-6, 262 V-8	3	3	NONE
305-350 V-8, 400 V-8 TAXI AND TRUCK	4	4	NONE
REVERSE			
250 L-6, 262-305 V-8	4	4	NONE
350 V-8, 400 V-8 TAXI AND TRUCK	5	5	NONE

Fig. 2A–Automatic Clutch Chart

Fig. 3A–Air Checking Converter

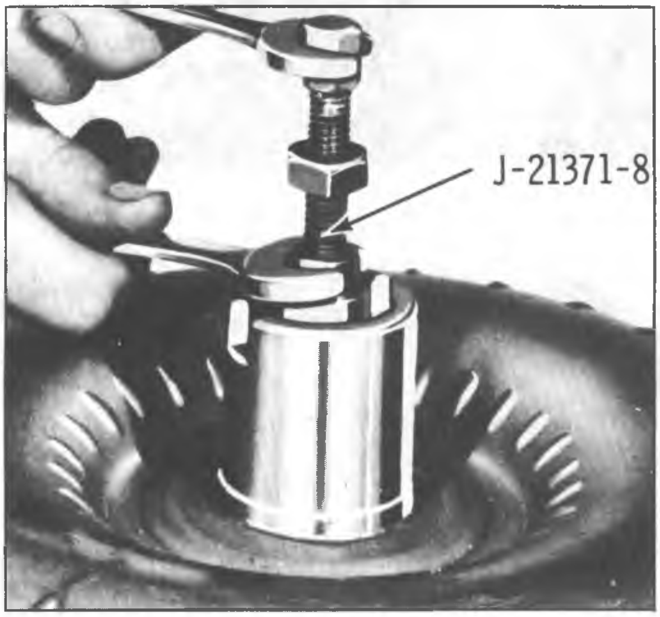


Fig. 4A–Loosening Collet on Tool J-21571-8

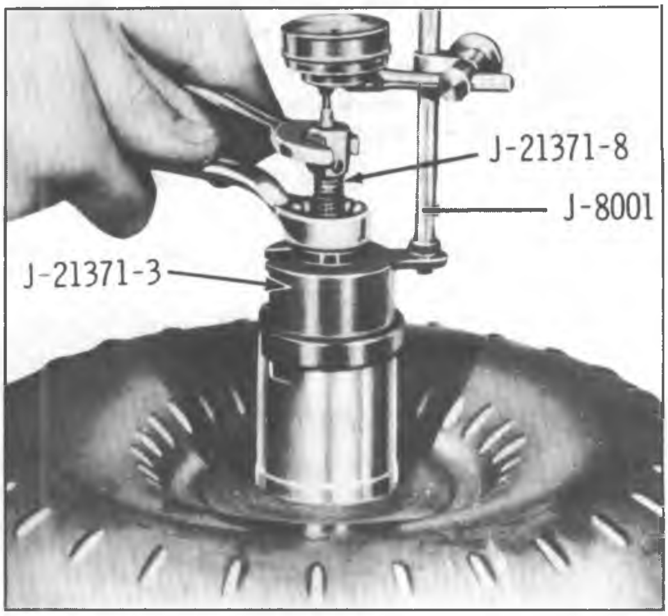


Fig. 5A–Checking Converter End Clearance

TURBO HYDRA-MATIC 375/400/475 TRANSMISSION

INDEX

REAR SERVO, VALVE BODY SPACER, GASKET AND FRONT SERVO

Removal

1. Remove rear servo cover attaching screws, servo cover and gasket. Discard gasket.
2. Remove rear servo assembly from case (fig. 1B).
3. Remove rear servo accumulator spring.

Rear Band Apply Pin Selection Model "CL"

4. Make band apply pin selection check to determine possible cause of malfunction.

NOTE: There are six selective pins identified as shown in figure 3B. Selecting proper pin is equivalent to adjusting band.

a. Attach band apply pin selection gauge (J-21370-9 and J-21370-6), to transmission case (lever pivot pin to rear) with rear servo cover attaching screws (fig. 2B).
b. Attach tool attaching screws finger tight and check freeness of selective pin. Torque attaching screws to 15 foot-pounds and recheck pin to make certain it does not bind.
c. Apply 25 foot-pounds torque to the lever on Tool J-21370-6 (fig. 2B). Selection of the proper rear band apply pin is determined by the relation of the flat on Tool J-21370-9 to the flat machined area around the

hole on Tool J-21370-6.

d. Before removing gauging tool make note of the proper band apply pin to be used during assembly of the transmission as determined by the six selective pins identified as shown in figure 3B.

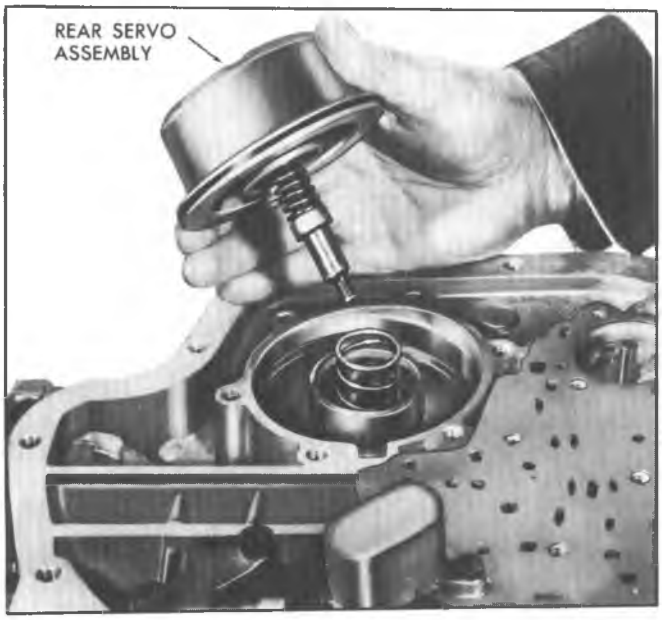


Fig. 1B–Removing Rear Servo Assembly

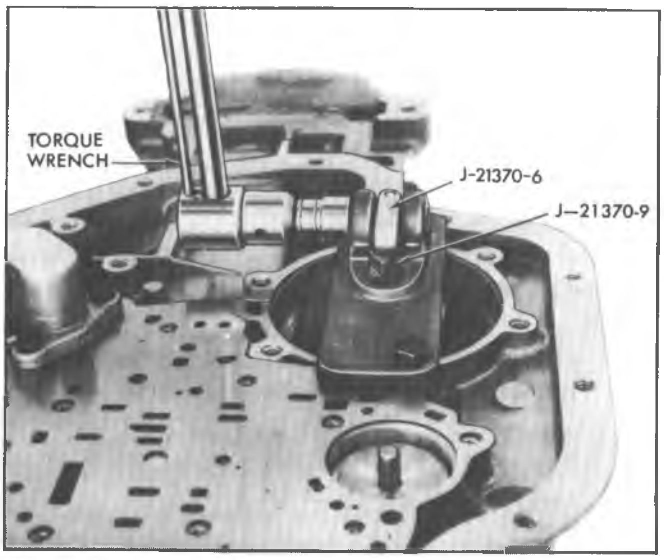


Fig. 2B–Checking Rear Band Apply Pin - Model "CL"

"All Models Except CL"

a. Attach band apply pin selection Gauge J-21370-5 and J-21370-6 to transmission case with attaching screws checking to make certain the gauge pin does not bind in servo pin hole (fig. 4B).

b. Apply 25 ft. lb. torque and select proper pin to be used during assembly of transmission.

Selecting proper length pin is equivalent to adjusting band. The band lug end of each selective apply pin bears identification in the form of one, two or three rings.

c. If both steps of J-21370-5 are below the gauge surface, the long pin, identified by 3 rings, should be used.

d. If the gauge surface is between the steps, the medium pin, identified by 2 rings, should be used.

e. If both steps are above the gauge surface, the short pin, identified by 1 ring, should be used.

NOTE: If the transmission is in the vehicle, be careful when the detent solenoid is removed as it prevents the spacer plate and gasket and check balls from dropping down.

5. Remove detent solenoid attaching screws, detent solenoid and gasket.
6. Withdraw electrical connector and "O" ring seal.
7. Remove control valve assembly spacer plate and gasket.
8. Remove six (6) check balls from cored passages in transmission case.

   NOTE: Mark location of balls for aid in reassembly.
9. Remove front servo piston, retainer ring, washer, pin, spring retainer and spring from transmission case.

OIL PUMP AND INTERNAL CASE COMPONENTS

Removal

Delete step number 13 from removal procedure as found in 1974 Overhaul Manual.

SPEEDOMETER DRIVE GEAR

Replacement

If removal and installation or replacement of the speedometer drive gear is necessary, proceed as follows:

Nylon Speedometer Drive Gear

1. Depress clip and slide speedometer drive gear off output shaft.
2. To install, place clip (square end toward flange of shaft) into hole in output shaft. Align slot in speedometer drive gear with clip and install gear.

   NOTE: The nylon speedometer drive gear is installed at the factory only. ALL service replacement speedometer drive gears are STEEL. When replacing the nylon speedometer drive gear with a steel gear, discard the retaining clip and refer to Step "2" of steel speedometer drive gear installation.

Steel Speedometer Drive Gear

1. Install speedometer drive gear remover Tool J-21427-01 and J-9539 bolts with J-8105 or suitable puller on output shaft, and remove speedometer drive gear (fig. 5B).
2. Install new steel speedometer drive gear and drive to location (5-43/64" below end of output shaft for all models except CA, CG and CR) (11-15/64" below end

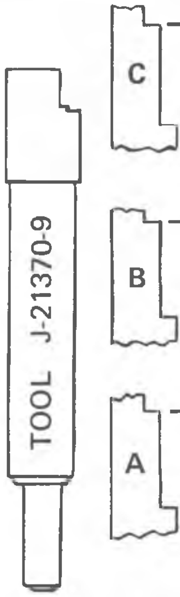
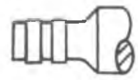
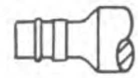
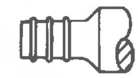
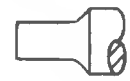
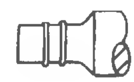
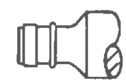
GAGING STEPS LOCATED ON THREE SIDES OF TOOL J-21370-9	PART NO.	PIN IDENTIFICATION
 C LONGEST PIN	THIS STEP: USE PIN NO. 8627195	
	THIS STEP: SIDES B TO C USE PIN NO. 8627194	
B	THIS STEP: USE PIN NO. 8624141	
	THIS STEP: SIDES A TO B USE PIN NO. 8627193	
A	THIS STEP: USE PIN NO. 8624140	
LOWER STEP SHORTEST PIN	LOWER STEP: USE PIN NO. 8627192	
Note: The Identification Rings are .030" and .100" wide.		

Fig. 3B–Rear Band Apply Pin Identification

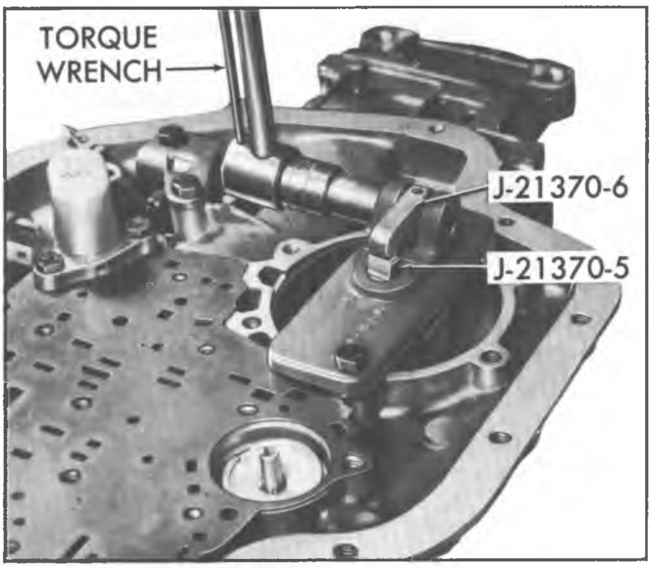


Fig. 4B–Checking Rear Band Apply Pin "All Models Except CL"

of output shaft for models CA) (11-29/64 below end of output shaft for models CG and CR) using J-5590 (fig. 6B).

CONTROL VALVE

Disassembly

1. Position control valve assembly with cored face up and accumulator pocket nearest operator.

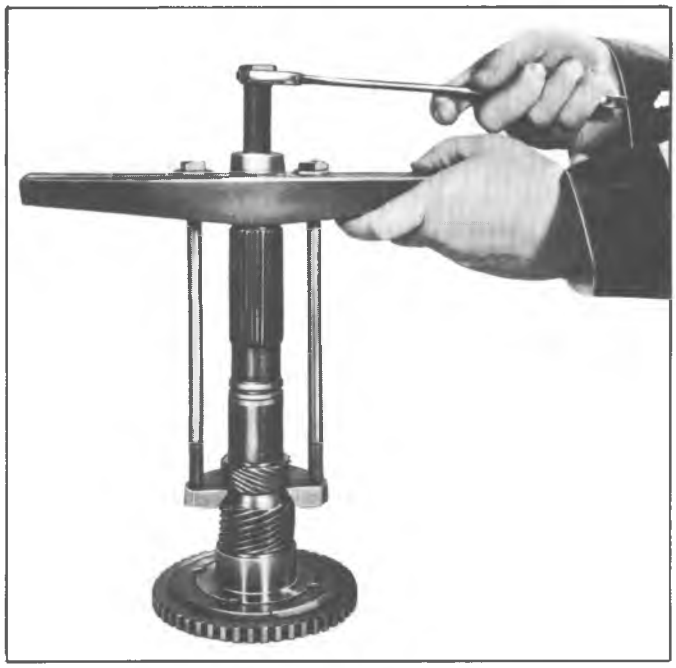


Fig. 5B–Removing Steel Speedometer Drive Gear

2. Remove manual valve from upper bore.

3. Install Special Tools J-22269 and J-24675, on accumulator piston and remove retaining ring (fig. 8B).

A- ccumulator Piston

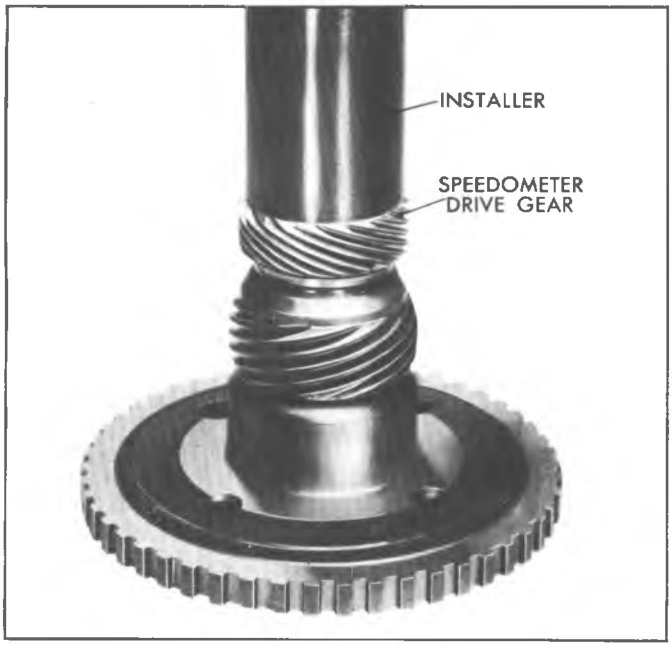


Fig. 6B–Installing Steel Speedometer Drive Gear

4. Remove front accumulator piston and spring (fig. 9B).
5. On the right side adjacent to the manual valve, remove the 1-2 valve train as follows:
   a. All models except CJ and CP, remove the retaining pin, 1-2 modulator bushing, 1-2 regulator valve, 1-2 regulator spring, 1-2 detent valve and 1-2 shift valve.
   b. Models CJ and CP, remove the retaining pin, 1-2 modulator bushing, 1-2 modulator spring, 1-2 modulator valve and 1-2 shift valve.
6. From next bore down, remove retaining pin, 2-3 shift valve spring, 2-3 modulator valve bushing, 2-3 modulator valve, 3-2 intermediate spring, and 2-3 shift valve.
7. From next bore down remove retaining pin, bore plug, spring, spacer, and 3-2 valve.
8. At other end of assembly, top bore, remove retaining pin and bore plug, detent valve, detent regulator valve, spring and spacer.
9. From the next bore down, remove the 1-2 accumulator valve train as follows:
   a. (Models CA, CG, CP and CR) remove the grooved retaining pin, bore plug, 1-2 accumulator valve and spring.
   b. (Models CJ and CL) Remove the grooved retaining pin, bore plug, 1-2 accumulator valve.
   c. (Models CT, CM and CZ) Remove the grooved retaining pin, bore plug, 1-2 accumulator secondary spring and 1-2 accumulator valve.

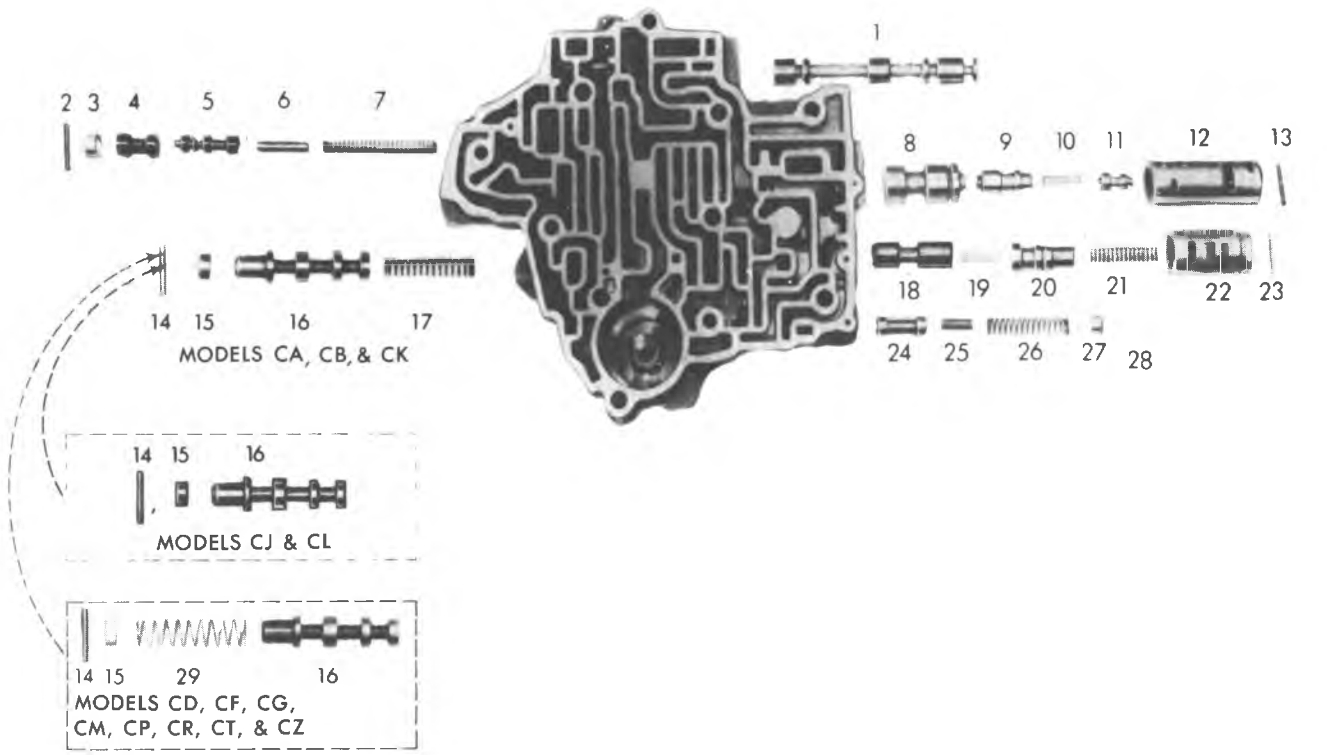
Inspection

NOTE: See figure 9B. Do not remove the teflon oil seal ring from the front accumulator piston unless the oil seal ring requires replacement. For service, the oil seal ring is cast iron.

1. Inspect all valves for scoring, cracks and free movement in their respective bores.
2. Inspect bushings for cracks, scratches or distortion.
3. Inspect body for cracks, or scored bores.
4. Check all springs for distortion or collapsed coils.
5. Inspect accumulator piston and oil seal ring for damage.

Assembly

1. Install front accumulator spring and piston into valve body.
2. Install Special Tools J-22269 and J-24675 and compress spring and piston and secure with retaining "E" ring.
3. Install the 1-2 accumulator valve train into the lower left hand bore as follows:
   a. (Model CA, CG, CP and CR) Install the 1-2 accumulator spring and 1-2 accumulator valve, stem end out, into bore. Place the bore plug into valve bore and install grooved retaining pin from cast surface side of the valve body, with the groove entering the pin holes last. Tap pin with a hammer until flush with cast surface of valve body.
   b. (Models CJ and CL) Install 1-2 accumulator valve stem end out, into bore. Place bore plug into valve bore and install grooved retaining pin from cast surface side of the valve body, with the groove entering the pin holes last. Tap pin with a hammer until flush with cast surface.
   c. (Models CT, CM and CZ) Install the 1-2 accumulator valve, stem end out, and 1-2 accumulator secondary spring. Install the bore plug and compress spring until grooved retaining pin can be inserted from the cast surface side of the valve body. Install retaining pin with the grooved end entering the pin hole last and tap in place until flush with cast surface of the valve body.
4. In next bore up, install detent spring and spacer. Compress spring and secure with small screwdriver (fig. 10B).
5. Install detent regulator valve, wide land first.
6. Install detent valve, narrow land first.
7. Install bore plug (hole out), depress spring by pressing in on plug, install retaining pin, and remove screwdriver.
8. In lower right hand bore, install 3-2 valve.
9. Install 3-2 spring, spacer, bore plug (hole out) and retaining pin.
10. In next bore up, install the 2-3 shift valve, open end out, into the bore and install 3-2 intermediate spring.



1. Manual Valve
2. Retaining Pin
3. Bore Plug
4. Detent Valve
5. Detent Regulator Valve
6. Spacer
7. Detent Regulator Valve Spring
8. 1-2 Shift Valve
9. 1-2 Detent Valve
10. 1-2 Regulator Valve Spring
11. 1-2 Regulator Valve
12. 1-2 Modulator Bushing
13. Retaining Pin
14. Retaining Pin
15. Bore Plug
16. 1-2 Accumulator Valve
17. 1-2 Primary Accumulator Spring
18. 2-3 Shift Valve
19. 3-2 Intermediate Spring
20. 2-3 Modulator Valve
21. 2-3 Shift Valve Spring
22. 2-3 Modulator Bushing
23. Retaining Pin
24. 3-2 Valve
25. Spacer
26. 3-2 Valve Spring
27. Bore Plug
28. Retaining Pin
29. 1-2 Accumulator Valve Sec. Spring

Fig. 7B–Control Valve Assembly - Exploded View

11. Install 2-3 modulator valve into 2-3 accumulator bushing and install both parts into valve body bore.
12. Install 2-3 valve spring and retaining pin.
13. In next bore up, install 1-2 valve train as follows:
    a. All models except CJ and CP, install the 1-2 shift valve, stem end out. Install the 1-2 regulator valve, larger stem end first, 1-2 regulator spring and 1-2 detent valve, open hole first, into the 1-2 modulator bushing, aligning the spring in the bore of the detent valve. Install these parts into the valve body bore.
    b. Models CJ and CP install the 1-2 shift valve, stem end out. Install 1-2 modulator valve, 1-2 modulator spring, aligning spring in valve. Install the 1-2 modulator bushing.
14. Compress bushing against spring and install retaining pin.
15. Install manual valve with detent pin groove to the right.

FORWARD CLUTCH

The procedure for disassembly, inspection, and assembly remains the same with the exception of these changes:

Disassembly

a. (Model CA) Remove four (4) radial grooved composition-faced, three (3) thin (.0775") flat steel and one (1) waved steel clutch plates from forward clutch housing.

b. (Models CJ, CM, CP, CT and CZ) Remove five (5) radial grooved composition-faced, four (4) thin (.0775") flat steel and one (1) waved steel clutch plates

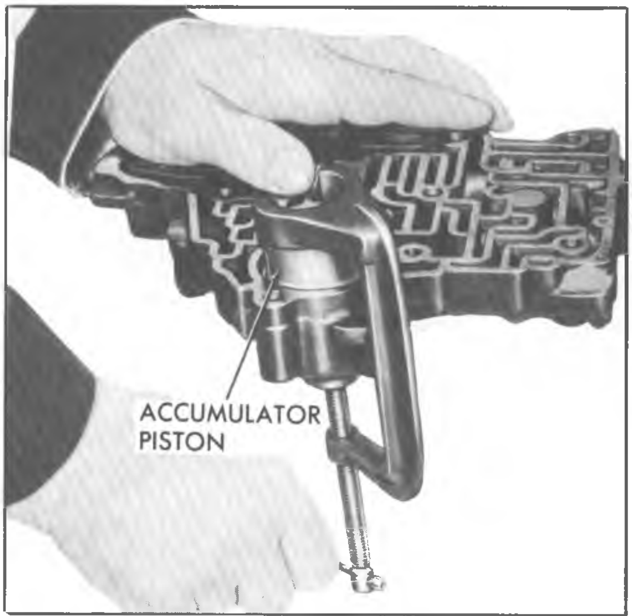


Fig. 8B--Installing Compressor Tool to Front Accumulator Piston

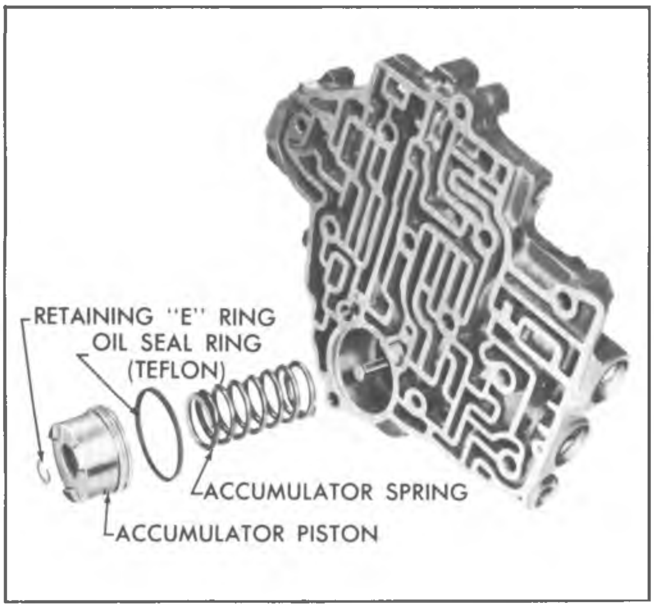


Fig. 9B–Front Accumulator Assembly - Exploded

from the forward clutch housing.

c. (Models CG and CR) Remove five (5) radial grooved composition- faced, four (4) thick (.0915") flat steel and one (1) waved steel clutch plates from forward clutch housing.

d. (Model CL) Remove five (5) radial grooved composition-faced and five (5) thick (.0915") flat steel clutch plates.

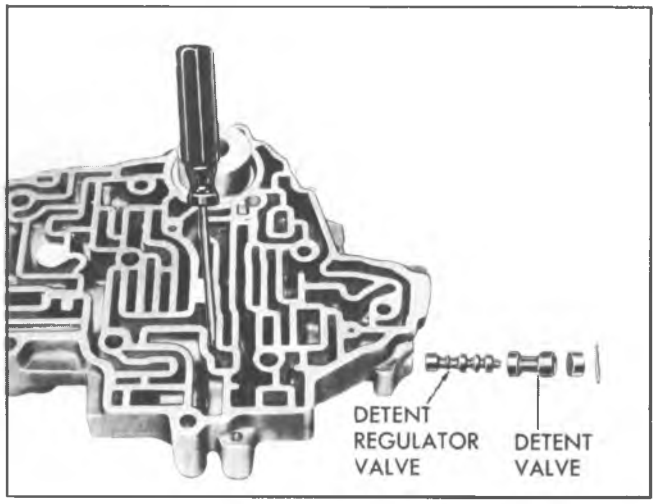


Fig. 10B–Installing Detent Regulator Valve and Detent Valve

NOTE: The production built transmissions use a direct clutch piston without a check ball. The forward and direct clutch pistons look almost the same. Make sure the forward clutch piston is identified during disassembly so it will be reassembled into the forward clutch housing.

The production built forward clutch piston will be aluminum or stamped steel.

Assembly

Assembly procedure, step number 10 should read:

10. Install forward clutch plates.

a. (Model CA) Install one (1) waved steel (plate with "U" notch), four (4) composition and three (3) thin (.0775") flat steel clutch plates, starting with waved plate and alternating composition-faced and steel clutch plates.

b. (Models CJ, CM, CP, CT and CZ) Install one (1) waved steel (plate with "U" notch), five (5) composition-faced and four (4) thin (.0775") flat steel clutch plates, starting with waved plate and alternating composition-faced and steel clutch plates.

c. (Models CG and CR) Install one (1) waved steel (plate with "U" notch), five (5) composition and four (4) thick (.0915") flat steel clutch plates, starting with waved plate and alternating composition-faced and steel clutch plates.

d. (Model CL) Install five (5) thick (.0915") flat steel and five (5) composition-faced clutch plates, starting with flat steel and alternating composition-faced and flat steel clutch plates.

NOTE: The model "CL" forward clutch composition-faced plates are different from the other models. Refer to parts catalog book for correct usage.

DIRECT CLUTCH AND INTERMEDIATE CLUTCH

The procedure for disassembly, inspection, and assembly remains the same with the exception of these changes or additions:

Disassembly

Disassembly procedure, step number 4 and 5 should read:

4. Remove direct clutch backing plate.
5. Remove direct clutch plates as follows:
   a. (Model CA) Remove four (4) composition-faced, and four (4) flat steel clutch plates from the direct clutch housing.
   b. (Models CG, CJ, CM, CP, CR and CT) Remove five (5) composition-faced and five (5) flat steel clutch plates from the direct clutch housing.
   c. (Models CL and CZ) Remove six (6) composition-faced and six (6) flat steel clutch plates from the direct clutch housing.

   NOTE: The production built transmissions use a direct clutch piston without a check ball. The forward and direct clutch pistons look almost the same. Make sure the direct clutch piston is identified during disassembly so it will be re-assembled into the direct clutch housing. The service replacement direct clutch piston contains a check ball. (Models CL and CZ contain 2 check balls.)

   The production built direct clutch piston will be aluminum or stamped steel.

Inspection

Inspection procedure add steps number 6, 7 and 8 which will read:

6. Inspect clutch piston for cracks.
7. Inspect fourteen (14) release springs for collapsed coils or signs of distortion.

   NOTE: The 14 direct clutch release springs are not serviced. If one or more of these springs require replacement, discard all of them and install the 16 service direct clutch release springs.
8. Inspect housing for free operation of check ball.

Assembly

Assembly procedure, caution should read:

CAUTION: *The direct clutch housing for the CL and CZ models use the 6 plate clutch assembly (Fig. 11B).*

Production built transmissions now use a direct clutch housing with a check ball (see Fig. 10B). If the housing requires replacement and the replacement housing does not contain a check ball, replace the direct clutch piston with the service piston which has a check ball (Models CL and CZ service piston has 2 check balls). EITHER THE DIRECT CLUTCH HOUSING AND/OR THE PISTON MUST CONTAIN A CHECK BALL(S).

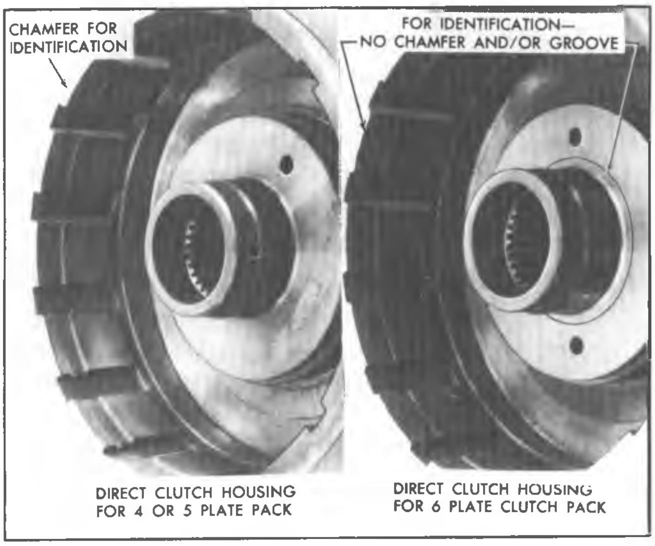


Fig. 11B--Direct Clutch Housing Plate Pack

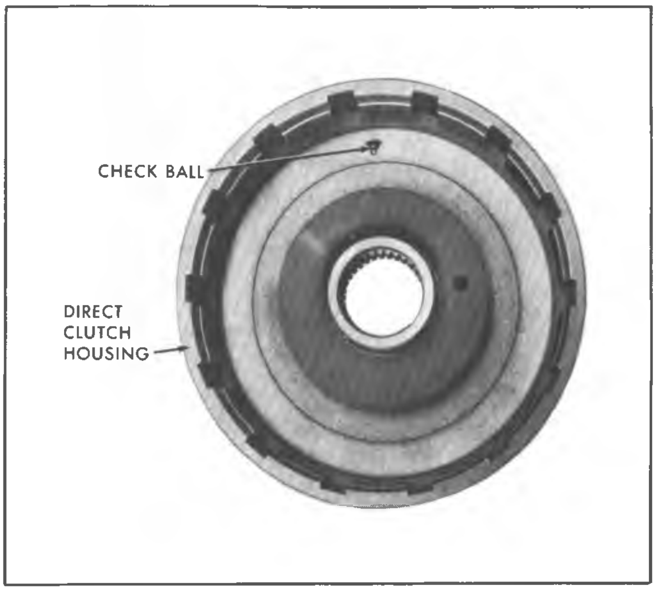


Fig. 12B–Direct Clutch Housing

Assembly procedure, step number 5, should read:

5. Install fourteen (14) springs into piston leaving two pockets diametrically opposite with no springs.

Assembly procedure, step number 8, should read:

8. Install direct clutch plates.
   a. (Model CA) Oil and install four (4) composition-faced, and four (4) flat steel clutch plates starting with a flat steel plate and alternating composition-faced and flat steel clutch plates.
   b. (Models CG, CJ, CM, CP, CR and CT) Oil and install five (5) composition-faced and five (5) flat steel clutch plates, starting with a flat steel plate and alternating composition-faced and flat steel clutch plates.
   c. (Models CL and CZ) Oil and install six (6) composition-faced and six (6) flat steel clutch plates, starting with a flat steel plate and alternating

composition-faced and flat steel clutch plates.

NOTE: All direct clutch flat steel clutch plates are the thick (.0915") type.

The model "CL" direct clutch composition-faced lates are different from the other models. Refer to parts catalog book for correct usage.

Assembly procedure, Step number 11 should read:

11. Install the intermediate clutch outer race with a clockwise turning motion.

    NOTE: Intermediate roller clutch is not released for the CL and CZ models. The sprag assembly is released for these models.

CENTER SUPPORT

The procedure for disassembly, inspection and assembly remains the same with the following exception:

Assembly

Assembly procedure, Step number 7, should read:

7. Install four (4) oil seal rings on the center support.

   NOTE: When installing teflon oil seal rings, make sure slit ends are assembled in same relation as cut (Fig. 13B). Also, make sure oil seal rings are seated in ring grooves to prevent damage to rings during re-assembly of mating parts over rings. Retain with petrolatum.

Fig. 13B–Teflon Rings

REACTION CARRIER, ROLLER CLUTCH AND OUTPUT CARRIER ASSEMBLY

The procedure for inspection remains the same with the following addition:

Inspection procedure, step number 1, should read:

1. If the reaction carrier has a spacer ring in an undercut at the bottom of the roller cam ramps, inspect it for damage (Fig. 14B).

NOTE: The reaction carrier with the undercut and spacer ring is used optionally and interchangeably with the reaction carrier which does not have an undercut and spacer ring.

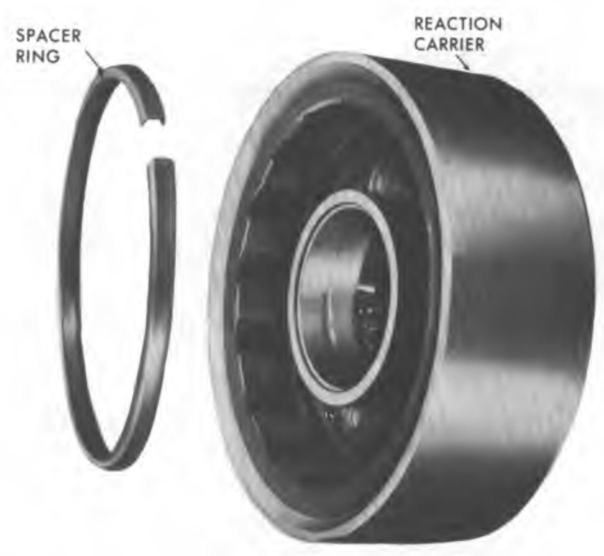


Fig. 14B–Inspecting Spacer Ring

FRONT AND REAR BANDS, SUPPORT TO CASE SPACER

Inspection

1. Inspect lining for cracks, flaking, burning, or looseness.
2. Inspect bands for cracks or distortion.
3. Inspect end for damage at anchor lugs or apply lugs.
4. Inspect support to case spacer for burrs or raised edges, if present remove with stone or fine abrasive.

CASE EXTENSION (EXCEPT CL MODEL)

Inspection

The procedure for inspection remains the same with the following exception:

Inspection procedure, Step number 1, should read:

1. Inspect bushing for excessive wear or damage. If replacement is necessary, remove rear seal and with extension housing properly supported, remove bushing as follows:

   a. (All except CA and CB Models) Using Tool J-21465-17 with Driver Handle J-8092, drive or press replacement bushing into place, flush to .010 below oil seal counter bore area. Stake bushing, using tool J-21465-10. Stake marks to be in bushing lubrication grooves.

   b. (CA Model) Using Tool J-21424-9 with Driver Handle J-8092, drive or press replacement bushing into place flush to .010 below oil seal counter bore area. Stake bushing, using tool J-21465-10 (or J-8400-22). Stake marks to be in bushing lubrication grooves.

CASE EXTENSION–CL MODEL (Fig. 15B)

Inspection

1. Inspect seal (case extension to case) groove for amage.
2. Inspect for cracks, or porosity.
3. Inspect dowel pin in rear face for damage.
4. Inspect oil seal for damage. If replacement is required, proceed as follows:
   a. Pry oil seal from extension.
   b. Apply non-hardening sealer to outside of new oil seal, and install oil seal into case extension using tool (J-24057).
5. Inspect ball bearing assemblies. If they are damaged, or if they require cleaning, proceed as follows:
   a. Remove rear seal.
   b. Remove snap ring.
   c. Remove ball bearings and bearing spacer, using a brass rod on the outside race of bearing. An arbor press can be used if tool to press bearing out is located on outer race of bearing.

   CAUTION: *DO NOT locate against inner race or balls.*

   d. Install ball bearing assembly and spacer, bearing first.
   e. Install ball bearing assembly and snap ring.
   f. Install new rear oil seal.

CASE ASSEMBLY

The procedure for inspection remains the same with the following addition:

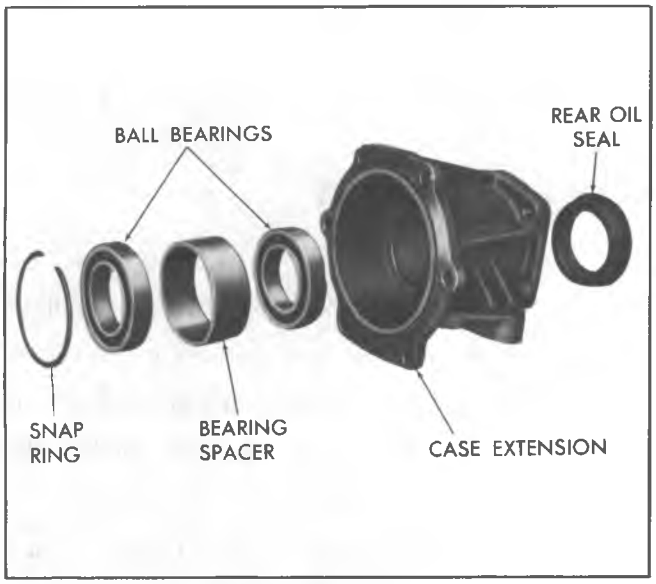


Fig. 15B–Model CL Case Extension

Inspection

Inspection procedure, step number 4 and 5 should read:

4. On model CL inspect studs for thread damage, and make sure they are tight.

   NOTE: The two (2) studs at 9 o'clock and 11 o'clock (when viewed from the rear of case and transmission in vehicle) are approximately 1/4" longer than the other four (4) studs. These two longer studs are required to accommodate the parking brake actuating cable bracket.

5. Inspect intermediate clutch driven plate lugs for age or brinneling.

   NOTE: If the case assembly requires replacement, remove the nameplate from the old case and re-install it on the new case, using the truss head nameplate attaching screw that is serviced with the case.

REAR UNIT

The procedure for assembly remains the same with the following addition:

Assembly

11. Install reaction carrier to output carrier metal or non-metal thrust washer with tabs facing down in pockets of output carrier and retain with petrolatum.

    NOTE: The production built transmissions use a non-metal washer here. However, the service replacement washer is made of metal.

ASSEMBLY OF UNITS TO TRANSMISSION CASE

The procedure for assembly remains the same with the following exception:

Assembly procedure, Step number 12, should read:

12. Install intermediate clutch plates.
    a. (All models except CL and CZ) Lubricate with transmission oil two (2) flat steel and one (1) waved steel plates and three (3) composition-faced intermediate clutch plates and install, starting with waved steel plate and alternating composition-faced and flat steel plates (fig. 16B).
    b. (Models CL and CZ) Lubricate with transmission oil three (3) flat steel and three (3) composition-faced intermediate clutch plates and install, starting with flat steel and alternating composition-faced and flat steel plates (Fig. 16B).

    NOTE: The models CL and CZ intermediate composition-faced plates are different from the other models. Refer to parts catalog for correct usage.

CASE EXTENSION ASSEMBLY

1. Install new case extension housing to case gasket on extension housing. Model CL uses a seal between the extension housing and case extension.
2. Attach extension housing to case using attaching bolts and/or studs. Torque bolts to 20-25 ft. lbs.

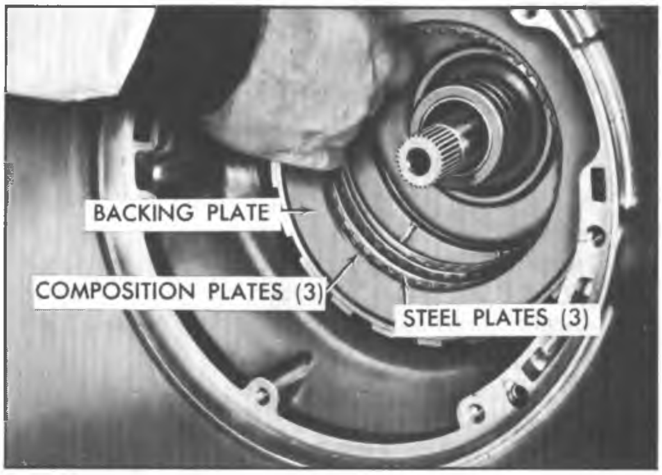


Fig. 16B–Installing Intermediate Backing Plate and Clutch Plates

NOTE: Models CA, CG and CR use two (2) studs at 5 o'clock and 7 o'clock positions (when viewed from the rear of case and transmission in vehicle). These studs are for the installation of the catalytic converter. Torque the studs to 20-25 ft. lbs.

3. If necessary, install a new seal as follows:
   a. (All except CA and CL Models) use a non-hardening sealer on outside of seal body; and using Tool J-21359, drive seal in place (fig. 17B).
   b. (Model CL) use a non-hardening sealer on outside of seal body; and using Tool J-24057 drive seal in place (fig. 17B).
   c. (Model CA) use a non-hardening sealer on outside of seal body; and using Tool J-21426, drive seal in place (fig. 17B).

CHECK BALLS, CONTROL VALVE SPACER PLATE AND GASKET, DETENT SOLENOID, FRONT SERVO ASSEMBLY, AND ELECTRICAL CONNECTOR

The procedure for assembly remains the same with the following additions:

Assembly

Assembly procedure, steps number 3 and 4 should read:

3. Install control valve spacer plate-to-case gasket (gasket with extension for detent solenoid and a "C" near front servo location).
4. Install control valve spacer plate and control valve to spacer plate gasket (gasket identified with a a "VB" near front servo).

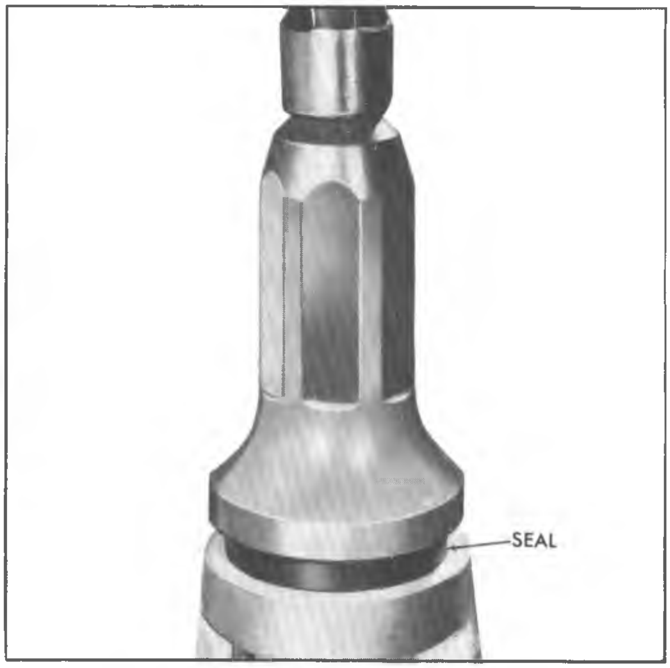


Fig. 17B–Installing Extension Oil Seal (Typical)

MODULATOR VALVE AND VACUUM MODULATOR

Installation

1. Install modulator valve into case, stem end out.
2. Install "O" ring seal on vacuum modulator.
3. Install vacuum modulator into case.

   NOTE: Models CA and CZ use a modulator that is different than the modulator used on the other models. Refer to parts catalog book for correct usage.

4. Install modulator retainer and attaching bolt. Torque bolt 18 ft. lbs.

CONVERTER ASSEMBLY

Installation

With the transmission in cradle or portable jack, install the converter assembly into the pump assembly making certain that the converter hub drive slots are fully engaged with the pump drive gear tangs and the converter installed fully towards the rear of the transmission.

NOTE: The converter used in the CL, CM, CT, and CZ models has six (6) mounting lugs.

SECTION 9

STEERING

INDEX

OVERHAUL OPERATIONS

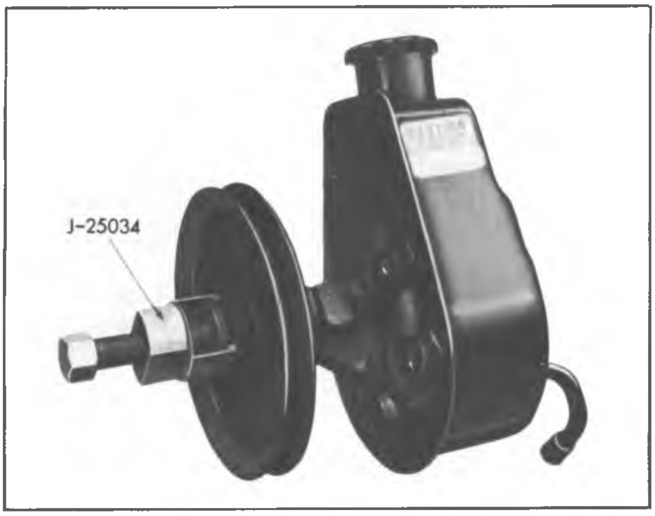


Fig. 1—Power Steering Pump Pulley Removal

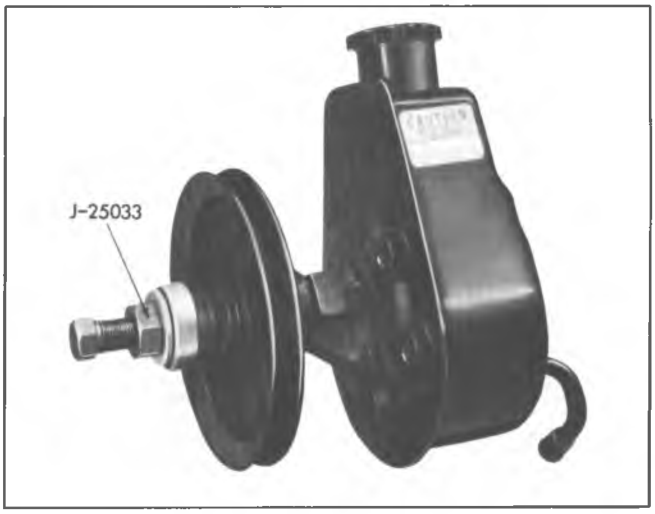


Fig. 2—Power Steering Pump Pulley Installation

All service overhaul procedures for 1976 Light Duty Truck are identical to the procedures outlined in the 1974 Overhaul Manual, Section 9, with the exception of the following procedures.

POWER STEERING PUMP

Disassembly

1. Remove pump pulley by using tool J-25034 as shown in Figure 1.

   NOTE: Steps 2-15 are identical to the 1974 Overhaul Manual, Section 9, Page 9-8.

Assembly

NOTE: Steps 1-19 are identical to the 1974 Overhaul Manual, Section 9, Pages 9-11 and 9-12.

20. Install pump pulley by inserting tool J-25033 through pulley hub and threading the bolt into the power steering pulley shaft as shown in Figure 2.

    NOTE: Pulley must be flush with end of shaft.

    CAUTION: *DO NOT hammer on pump shaft. Use special tools to prevent possible damage to internal pump components. Take care to avoid nicks or scratches on pump pulley shaft.*

POWER STEERING GEAR (INTEGRAL)

Adjuster Plug

Disassembly

1. If the oil seal ONLY is to be replaced, and not the needle bearing, install the adjuster plug (Fig. 3) loosely in the gear housing. Remove the retaining ring with Internal Pliers J-4245. With a screwdriver, pry the dust seal and oil seal from the bore of the adjuster plug being careful not to score the seal bore. Discard the oil seal.

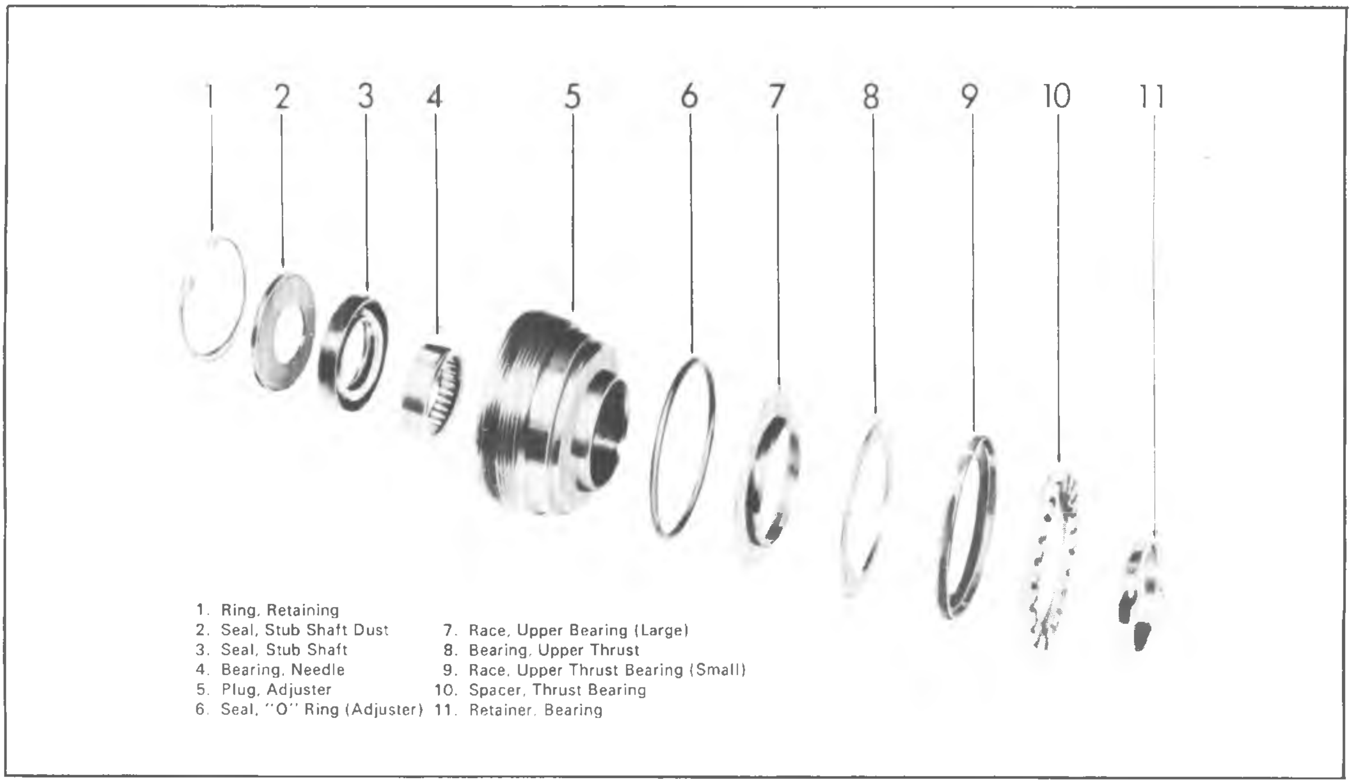


Fig. 3--Adjuster Plug

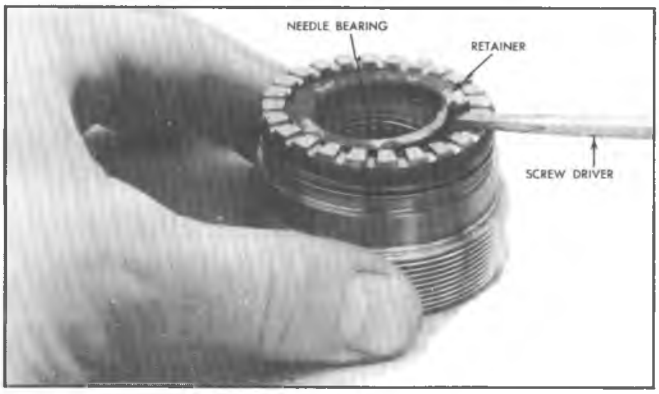


Fig. 4--Removing Retainer

2. If the thrust bearing ONLY is to be removed, pry the thrust bearing retainer at the two raised areas with a small screwdriver (Fig. 4). Remove the spacer, thrust bearing race, thrust bearing and the flanged thrust bearing race.
3. If the needle bearing is to be replaced, remove the retaining ring using Internal Pliers J-4245. Remove thrust bearing as outlined in Step 2 above. Drive needle bearing, dust seal and oil seal from adjuster plug using Bearing Remover J-8524-2 and Driver J-7079-2 as shown in Fig. 5. Discard the seals.
4. Wash all parts in clean solvent and dry parts with compressed air.
5. Inspect thrust bearing spacer for wear or cracks. Replace if damaged.
6. Inspect thrust bearing rollers and thrust races for wear, pitting or scoring. If any of these conditions exist, replace the bearing, thrust races, spacer, and retainer.

Assembly

1. If the needle bearing was removed, place new needle bearing over Tool J-8524-1 and J-7079-2, with the bearing manufacturer's identification against the tool, and drive the bearing into the adjuster plug until the tool bottoms in the housing (Fig. 6).

   CAUTION: *Place a block of wood under the adjuster plug to protect it during driving of the bearing.*

2. Place dust seal and a new stub shaft seal on Tool J-8524-1 (face of seal with part number against tool), Lubricate seal with Power Steering Fluid and drive or press seal into adjuster plug until seated (Fig. 7). When properly installed, the stub shaft seal under the dust seal and the inner dust seal lip is not bottomed on the stub shaft assembly.
3. Install retaining ring with Internal Pliers J-4245.
4. Lubricate the thrust bearing assembly with Power Steering Fluid. Place the flanged thrust bearing race on the adjuster plug hub, then install the thrust bearing, small bearing race (flanged side up) and spacer (grooves of spacer away from bearing race).
5. Install bearing retainer on the adjuster plug by carefully tapping on the flat surace of the retainer (Fig. 8).

   CAUTION: *The projections must not extend beyond the spacer when the retainer is sealed to prevent*

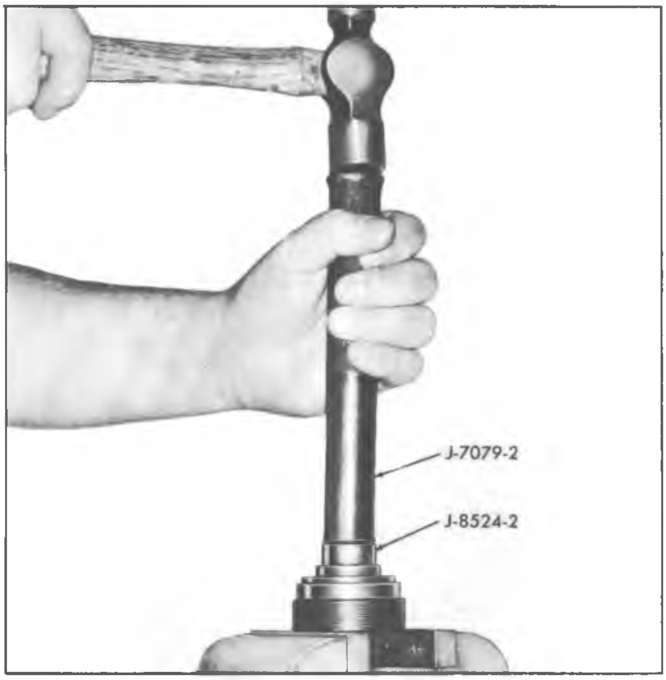


Fig. 5--Removing Bearing and Seal

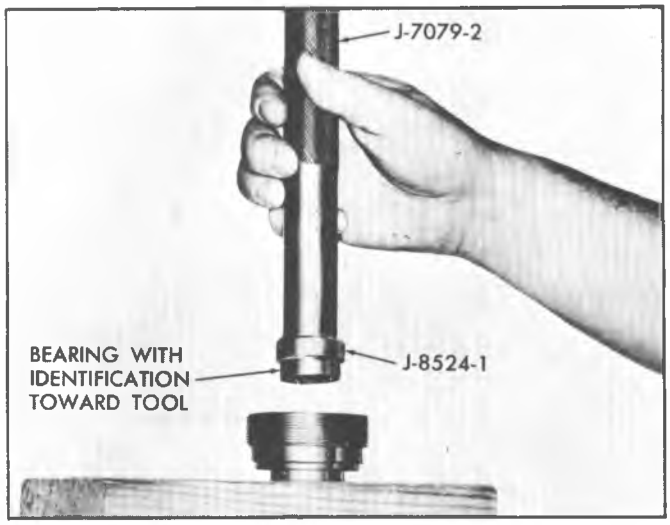


Fig. 6--Installing Bearing

interference with valve body. The spacer must be free to rotate.

Power Steering Gear Adjustment Procedure

Adjustment of the steering gear in the vehicle is discouraged because of the difficulty encountered in adjusting the worm thrust bearing preload and the confusing effects of the hydraulic fluid in the gear. Since a gear adjustment is made only as a correction and not as a periodic adjustment, it is better to take the extra time and make the adjustment correctly the first time.

Since a handling stability complaint can be caused by improperly adjusted worm bearings as well as an improper gear over-center adjustment, it is necessary that the steering gear assembly be removed from the vehicle and both thrust bearing and over-center preload be checked and corrected as necessary. An in-vehicle check of the steering gear will not pin-point a thrust bearing looseness.

Thrust Bearing Adjustment

If a gear is known to contain the new thrust bearing parts, thrust bearing adjustment in service is simplified.

Recommended procedure:

1. Drain power steering fluid from gear by rotating the stub shaft full travel in both directions several times.
2. Loosen and remove adjuster plug lock nut (Fig. 9 and 10).
3. Using spanner wrench J-7624, turn the adjuster plug in (clockwise) until the plug and thrust bearings are firmly bottomed approximately 20 foot-pounds (Fig. 11).
4. Mark the housing even with one of the holes in the face of the adjuster plug (Fig. 12).
5. Measure back (CCW direction) 1/2 inch (12.5 millimetres) and place a second mark on the housing (Fig. 13).
6. Turn adjuster plug counterclockwise until the hole in the face of the adjuster plug, which was even with the first mark is in line with second mark (Fig. 14).
7. Tighten lock nut securely. Hold (or have held) adjuster plug to maintain alignment of hole with mark (Fig. 15).

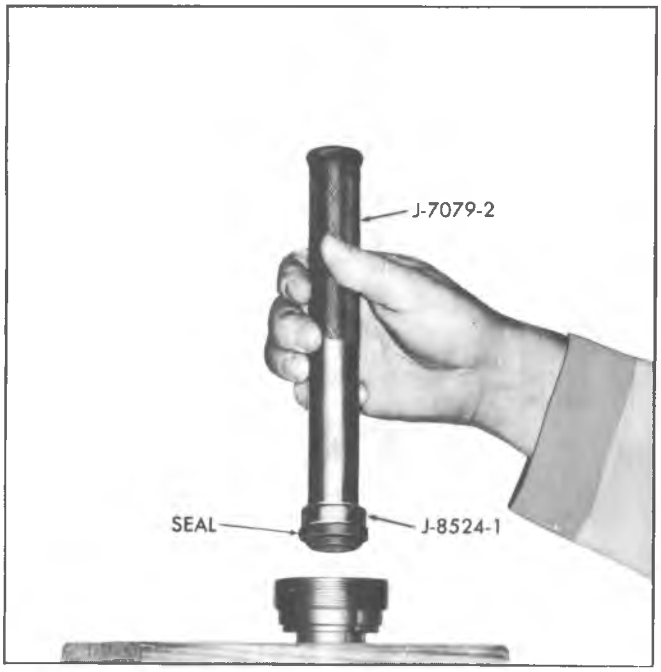


Fig. 7--Installing Adjuster Plug Seal


Fig. 8--Installing Retainer

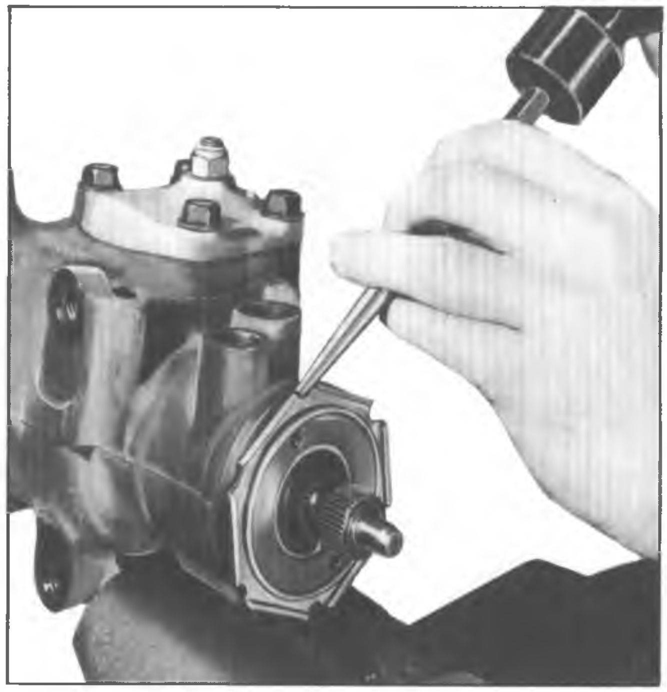


Fig. 9--Loosening Lock Nut

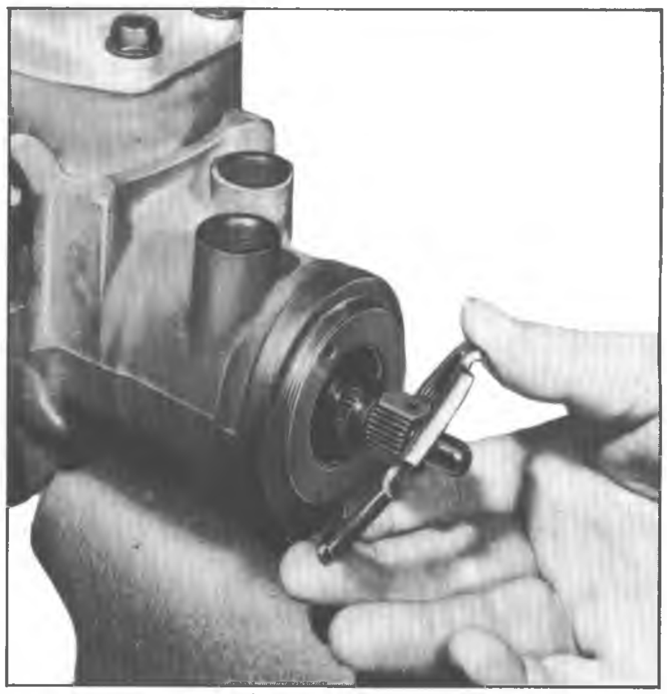


Fig. 10--Removing Lock Nut

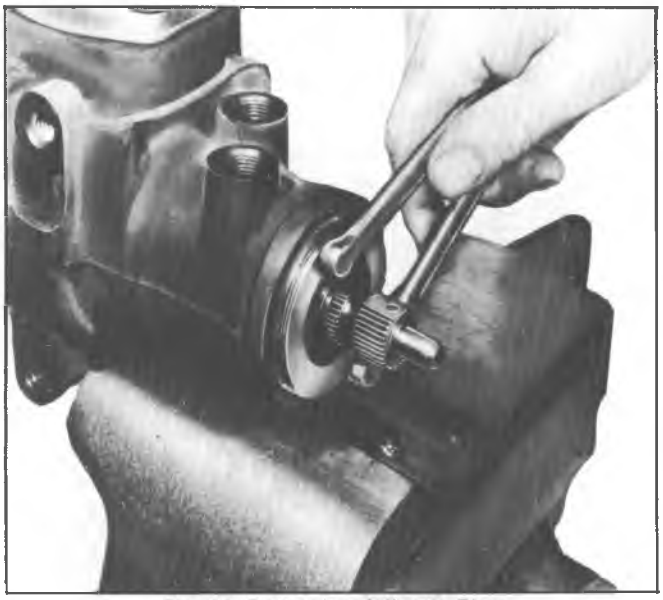


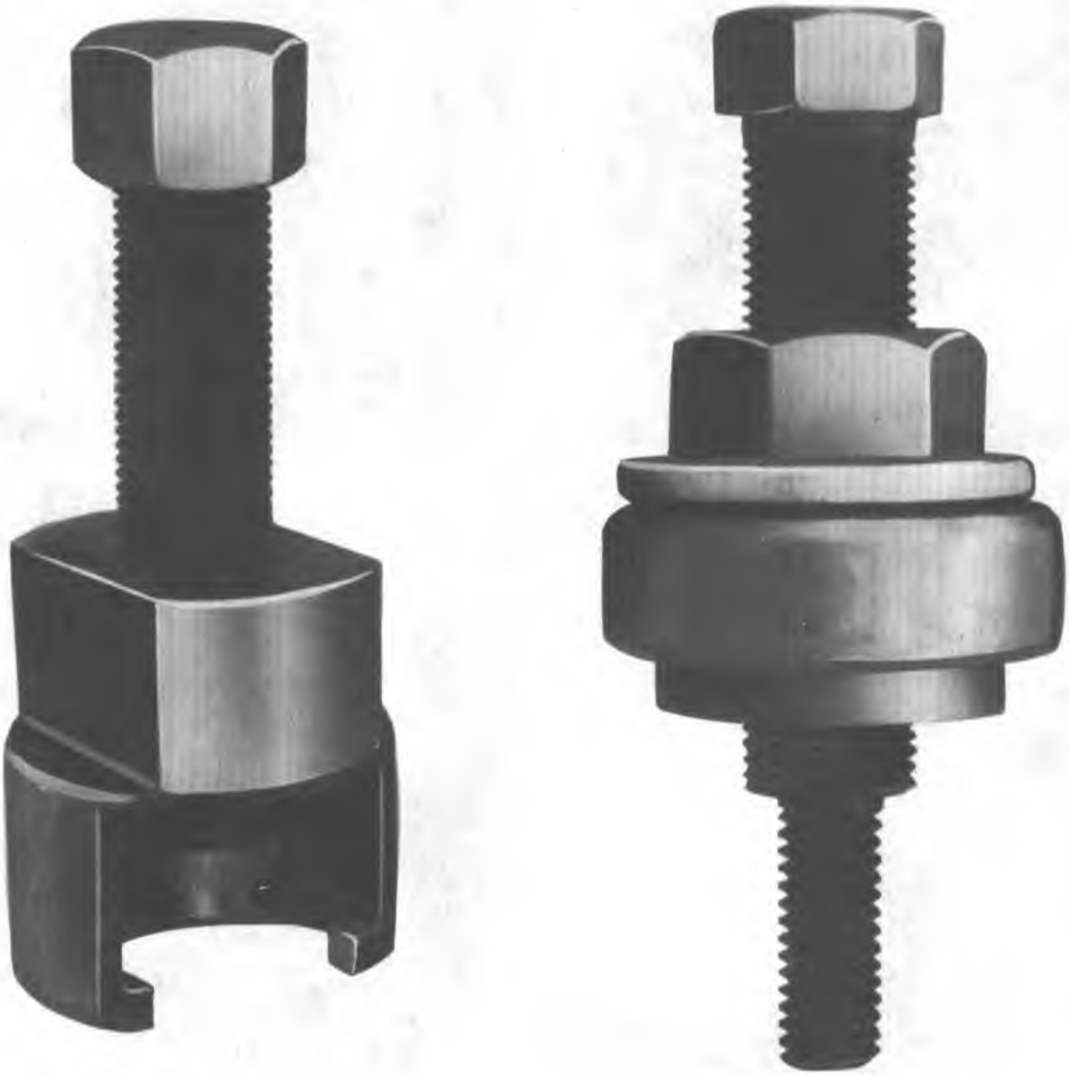
Fig. 11--Bottoming Adjuster Plug


Fig. 12--Marking Housing


Fig. 13--Measure Back and Remark Housing


Fig. 14--Align Hole With Second Mark


Fig. 15--Tighten Lock Nut



1 2

1. PUMP PULLEY REMOVER J-25034

2. PUMP PULLEY INSTALLER J-25033

Fig. 16--Special Tools

SPECIFICATIONS

HEATING AND AIR CONDITIONING

SECTION 1A

HEATER

	Volts	Amps. (Cold)	RPM (Cold)
Blower Motor			
C-K Models	13.5	6.25 Max.	2550 Min. 2950 Max.
G Models	13.5	7.1 Max.	2850 Min. 3250 Max.

Fuses

C-K Models . . . . . 20 Amp.
G Models . . . . . 20 Amp.

AUXILIARY HEATER

	Volts	Amps. (Cold)	RPM (Cold)
Blower Motor	13.5	9.6 Max.	2700 Min.

AIR CONDITIONING

Compressor

Make . . . . . Frigidaire
Type . . . . . 6 Cylinder Axial
4 Cylinder Radial

Displacement
- 6 Cylinder Axial . . . . . 12.6 Cu. In.
- 5 Cylinder Radial . . . . . 10.0 Cu. In.

Rotation . . . . . Clockwise

	Volts	Amps. (Cold)	RPM (Cold)
Blower Motor			
C-K Four Season	12.0	12.8 Max.	3400 Min.
C-K-G Overhead, G Floor and Motor Home Units	12.0	13.7 Max.	3400 Min.

Compressor Clutch Coil

Ohms (at 80°F) 3.70
Amps. (at 80°F) . . . . . 3.33 @ 12 volts

System Capacities

Refrigerant 12
- C-K Four-Season System . . . . . 3 lbs. 12 oz.
- C-K-G Overhead Systems . . . . . 5 lbs. 4 oz.
- G Model C60 System . . . . . 3 lbs.
- Motor Home Chassis Unit . . . . . 3 lbs. 4 oz.

525 Viscosity Compressor Oil
- 6 Cylinder Axial . . . . . 10.5 Fluid oz.
- 4 Cylinder Radial . . . . . 6.0 Fluid oz.
- Overhead Systems . . . . . 13 oz.

Torque Specifications

Compressor Suction and Discharge
Connector Bolt . . . . . 22 ft. lbs.
Rear Head to Shell Stud Nuts (6 Cyl.) . . . . . 23 ft. lbs.
Shaft Mounting Nut (6 Cyl.) . . . . . 20 ft. lbs.
Shaft Mounting Nut (4 Cyl.) . . . . . 8–12 ft. lbs.
High Pressure Relief Valve (6 Cyl.) . . . . . 12 ft. lbs.
Oil Charge Screw (6 Cyl.) . . . . . 14 ft. lbs.
Air Gap on Clutch (6 Cyl.) . . . . . .022 to .057 in.
Compressor Mounting Bracket Bolts
(6 Cyl.) . . . . . 20 ft. lbs.
Front Bracket to Compressor Bolts
(6 Cyl.) . . . . . 20 ft. lbs.
Compressor Mounting Bracket Bolts
(4 Cyl.) . . . . . 18 ft. lbs.
Belt Tension . . . . . See Tune-Up Chart

Fuses

Fuse Block–
- C-K Systems . . . . . 25 Amp.
- Motor Home Chassis Unit . . . . . 20 Amp.

In-Line–
- C-K Four-Season Systems . . . . . 30 Amp.
- C-K Overhead System . . . . .
- Motor Home Chassis Unit . . . . . None

Circuit Breaker
- G Model Systems . . . . . 35 Amp.

BODY
SECTION 1B
C AND K MODELS

FRONT END

Windshield Wiper Linkage to Plenum .... 25 in. lb.
Sunshade Support .... 20 in. lb.
Inside Rear View Mirror to Bracket .... 45 in. lb.
Outside Rear View Mirror to Door Panel –
  Base Mirror .... 25 in. lb.
  West Coast Mirror–Lower Bracket to Door ... 20 in. lb.
    –Upper Bracket to Door.... 45 in. lb.

DOORS

Window Regulator Assembly to Door Panel ...... 85 in. lb.
Remote Control Door Lock to Door Panel .... 45 in. lb.
Lock Striker to Body Pillar .... 45 ft. lb.
Outside Door Handle .... 85 in. lb.
Inside Door Handle .... 85 in. lb.
Hinges to Body and Door .... 35 ft. lb.
Front Door–Window Run Channel–to–Door .... 85 in. lb.
Front Door–Ventilator Assembly
  Top Vent Screw .... 18 in. lb.
  Side Vent Screws and Spacers .... 25 in. lb.
  Lower Vent Channel Bolts .... 40 in. lb.
Side Rear Door–Run Channel
  Front Upper to Door .... 40 in. lb.
  Rear Upper to Door .... 20 in. lb.
  Front and Rear Lower to Door .... 85 in. lb.
  Lock Lever to Door .... 85 in. lb.
Rear Door–Lock Striker (06) .... 95 in. lb.
Rear Door–Latch L.H. and R.H. to Door (06) .... 85 in. lb.
Rear Door–Latch Control Assembly to Door (06)
  –Upper Assembly .... 85 in. lb.
  –Lower Assembly .... 90 in. lb.
Rear Door–Weatherstrip L.H. (06) .... 18 in. lb.
  –Check Arm
    –Strap–to–Door .... 45 in. lb.
    –Bracket–to–Body .... 45 in. lb.

END GATE (14)(16)

Hinges–Body Half and Gate Half .... 35 ft. lb.
Support Assembly–Body to End Gate .... 25 ft. lb.
Torque Rod–Retainer Assembly .... 85 in. lb.
  –Anchor Assembly .... 18 ft. lb.
Latch Assembly to End Gate .... 85 in. lb.
Latch Control Assembly to End Gate .... 40 in. lb.
Access Cover .... 18 in. lb.
Handle to Latch Control Assembly .... 45 in. lb.
Glass Channel Assembly to End Gate .... 85 in. lb.
Cap Assembly to Channel Assembly .... 40 in. lb.
Striker–Body Mounted .... 18 ft. lb.

END GATE (06)

Hinges–Hinge to Body .... 35 ft. lb.
  –Hinge to End Gate .... 20 ft. lb.
Support Cable Bolts .... 25 ft. lb.
Torque Rod–Silencer Bracket .... 40 in. lb.
  – End Support Bracket .... 90 in. lb.
Latch Assembly to End Gate .... 20 ft. lb.
Latch Remote Control Assembly to End Gate .... 40 in. lb.
Access Cover .... 18 in. lb.
Outside Handle .... 55 in. lb.
Glass Channel .... 45 in. lb.

TAILGATE (03, 63–with E63)

Trunnion Assembly .... 18 ft. lb.
Linkage and Striker Assembly–Support .... 25 in. lb.

TAILGATE (03, 63–with E62)

Trunnion Assembly .... 35 ft. lb.
Chain Support Assembly .... 90 in. lb.

SEATS

Front Bench Seat (03, 06, 63)
  Adjuster-to-Seat .... 155 in. lb.
  Adjuster-to-Floor .... 25 ft. lb.
Front Bucket Type (14, 03)
  Driver
    Adjuster-to-Seat .... 18 ft. lb.
    Adjuster-to-Floor .... 25 ft. lb.
  Passenger (03)
    Support-to-Seat .... 18 ft. lb.
    Support-to-Floor (Front) .... 25 ft. lb.
    Support-to-Floor (Rear) .... 40 ft. lb.
  Passenger (14)
    Latch Support-to-Seat (Rear) .... 18 ft. lb.
    Striker-to-Floor (Rear) .... 25 ft. lb.
    Support (Upper)-to-Seat (Front) ...... 18 ft. lb.
    Support (Lower)-to-Floor (Front) ...... 25 ft. lb.
    Support (Upper)-to-Support (Lower) .... 18 ft. lb.
Rear Bench (06, 14)
  Support-to-Seat .... 18 ft. lb.
  Support-to-Floor .... 40 ft. lb.
Rear Bench (63)
  Support-to-Seat .... 150 in. lb.
  Support-to-Floor .... 18 in. lb.
Folding Rear Seat (06)
  Support Asm-to-Floor .... 150 in. lb.
  Seat-to-Support Asm .... 18 in. lb.

BODY MOUNTING (C-K MODELS)–FT. LBS.

Model	#1	#2	#3	#4	#5	#6
(03)	45	45	–	–	–	–
(06)	55	35	–	35	–	35
(14)(16)	55	45	35	35	–	–
(63)	55	35	55	–	–	–

G MODELS

MIRRORS AND SUNSHADE

Inside Rear View Mirror to Bracket . . . . 15 in. lb.
Outside Rear View Mirror to Door Panel . . . . 25 in. lb.
Sunshade Support to Header Panel . . . . 15 in. lb.

SIDE WINDOW (SWINGOUT)

Latch to Body . . . . 40 in. lb.
Latch to Glass . . . . 40 in. lb.
Hinge to Body . . . . 50 in. lb.

FRONT SIDE DOORS

Door Hinges . . . . 30 ft. lb.
Door Hinge Access Hole Cover . . . . 18 in. lb.
Door Lock Striker . . . . 45 ft. lb.
Door Lock to Door . . . . 20 ft. lb.
Outside Door Handle . . . . 45 in. lb.

REAR DOOR

Hinge Strap to Door . . . . 45 in. lb.
Hinge Strap Bracket to Body . . . . 45 in. lb.
Hinge (to body and door) . . . . 30 ft. lb.
Remote Control Retaining Screws . . . . 85 in. lb.
Latch-to-Door Retaining Screws . . . . 90 in. lb.
Door Strikers-to-Body . . . . 90 in. lb.
Outside Door Handle . . . . 45 in. lb.

SLIDING SIDE DOOR

Remote Control (front latch) to Door . . . . 90 in. lb.
Rear Latch to Door . . . . 90 in. lb.
Rear Plate to Door . . . . 90 in. lb.
Lower Front Roller and Roller Support
  Support-to-Door . . . . 24 ft. lb.
  Support to Roller Bracket . . . . 24 ft. lb.
  Roller to Roller Bracket . . . . 20 ft. lb.
  Catch to Roller Bracket . . . . 45 in. lb.
Upper Front Roller Bracket
  Bracket to Door . . . . 24 ft. lb.
  Roller to Bracket . . . . 20 ft. lb.
Upper Left Hinge (Door Half)
  Hinge to Door . . . . 25 ft. lb.
Upper Left Hinge (Body Half)
  Roller to Hinge . . . . 20 ft. lb.
  Guide Block to Hinge . . . . 40 in. lb.
  Lever Arm-to-Hinge Retaining Nut . . . . 120 in. lb.
  Lever Retaining Screw . . . . 40 in. lb.
  Striker to Body . . . . 20 ft. lb.
Rear Striker Bolt (Body Mounted) . . . . 45 ft. lb.
Front Striker Retaining Screws (Body Mounted) . . 90 in. lb.

SEATS

Seat Belt to Seat . . . . 37 ft. lb.
Passenger and Drivers
  Seat to Adjuster (Mounting Bracket) . . . . 18 ft. lb.
  Seat to Riser . . . . 18 ft. lb.
  Seat Riser-to-Floor . . . . 50 ft. lb.
Bench Seats
  Seat to Seat Support . . . . 18 ft. lb.
  Seat Support to Floor Clamps . . . . 40 ft. lb.

FRONT SUSPENSION

SECTION 3

WHEEL ALIGNMENT SPECIFICATIONS

	CASTER*										
	DIMENSION "A" IN INCHES*										
MODELS	2 1/2"	2 3/4"	3"	3 1/4"	3 1/2"	3 3/4"	4"	4 1/4"	4 1/2"	4 3/4"	5"
C10			+2°	+1 1/2°	+1 1/4°	+1°	+3/4°	+1/2°	+1/4°	0°	-1/2°
C20,C30	+1 1/2°	+1 1/4°	+1°	+3/4°	+1/2°	+1/4°	0°	-1/4°	-1/2°	-3/4°	-1°
K10,K20	+4° (NO ADJUSTMENT PROVISION)										
G10,G20,G30	+2 1/4°	+2°	+1 1/2°	+1 1/4°	+1°	+3/4°	+1/2°	+1/4°	0°	-1/4°	-1/2°
P10,P20,P30	+2 1/2°	+2 1/4°	+2°	+1 3/4°	+1 1/2°	+1°	+3/4°	+1/2°	+1/4°	0°	-1/4°
MOTOR HOME (32)	+5 3/4	+5 1/2	+5	+5	+4 1/2	+4 1/4	+4	+4	+3 1/2	+3 1/4	+3

	CAMBER												
C10,C20,C30	+1/4°												
K10,K20	+1 1/2° NO ADJUSTMENT PROVISION												
G10,G20,G30	+1/4°												
	Camber on P-Truck is dependent on dimension 'A', as explained on page 3-15 of the 1974 Light Duty Truck Service Manual. After measuring dimension 'A' set camber as follows:												
	2 1/2"	2 3/4"	3"	3 1/4"	3 1/2"	3 3/4"	4"	4 1/4"	4 1/2"	4 3/4"	5"	5 1/4"	5 1/2"
P10	0	0	+1/4°	+1/4°	+1/4°	+1/4°	+1/4°	0°	0°	0°	-1/4°	-1/2°	-3/4°
P20,P30	0	0	+1/4°	+1/4°	+1/4°	+1/4°	+1/4°	+1/4°	0°	0°	-1/4°	-1/2°	-3/4°
MOTOR HOME (32)	0	0	+ 1/4°	+ 1/4°	+ 1/4°	+ 1/4°	0°	0°	0°	- 1/4°	- 1/2°	- 3/4°	-1°

TOE-IN	
C10,C20,C30	3/16"
K10,K20	0
G10,G20,G30	3/16"
P10,P20,P30	3/16"
MOTORHOME P30 (32)	5/16"

ALIGNMENT TOLERANCES			
	WARRANTY REPAIR CHECKING	RESETTING TARGET	PERIODIC MOTOR VEHICLE INSPECTION
CASTER	±1°	±1/2°	±2°
CAMBER	±3/4°	±1/2°	±1 1/2°
TOE-IN	±1/8"	±1/16"	±3/8°

*Refer to page 3-15 of the 1974 Light Duty Truck Service Manual.

FRONT SUSPENSION BOLT TORQUE (Ft. Lbs.) $

	CP-10	CP-20-30	K-All	G-10-20	G-30
Lower Control Arm Shaft U-Bolt	85	85	—	45	85
Upper Control Arm Shaft Nuts	70	105	—	70	105
Control Arm Rubber Bushings	140	—	—	140	
Upper Control Arm Bushing Steel $$		New 190 Used 115	—	w/Spacer 160 No Spacer 95	w/Spacer 190 No Spacer 115
Lower Control Arm Bushing Steel $$		New 280 Used 130	—	w/Spacer 280 No Spacer 130	w/Spacer 280 No Spacer 130
Upper Ball Joint Nut	*50	**90	**100	*50	**90
Lower Ball Joint Nut	**90	**90	***80	**90	**90
Crossmember to Side Rail	65	65	—	65	65
Crossmember to Bottom Rail	100	100	—	100	100
Crossmember Brake Support Struts		60			60
Stabilizer Bar to Control Arm	25	25	ANCHOR PLATE — 130	25	
Stabilizer Bar to Frame	25	25	.55	25	
Shock Absorber Upper End	140	140	65	75	
Shock Absorber Lower End	60	60	65	75	
Brake Splash Shield to Knuckle	120 In. Lbs.	120 In. Lbs.	120 In. Lbs.	120 In. Lbs.	
Wheel Bearing Adjustment	—	—	Inner # - 35 Outer -50	—	
Wheel Bearing Preload	Zero	Zero	Zero	Zero	
Wheel Bearing End Movement	.001 - .005"	.001 - .005"	.001 - .010"	.001 - .005	
Caliper Mounting Bolt	35	35	35	35	
Spring - Front Eye Bolt	—	—	90	—	
Spring - Rear Eye Bolt	—	—	50	—	
Spring - To Rear Shackle Bolt	—	—	50	—	
Spring - To Axle U-Bolt	—	—	150	—	
Spring - Front Support to Frame	—	—	25	—	
Suspension Bumper	15	15	25	15	
Stabilizer to Spring Plate	—	—	130	—	

* Plus additional torque to align cotter pin. Not to exceed 90 ft. lbs. maximum.
** Plus additional torque to align cotter pin. Not to exceed 130 ft. lbs. maximum.
*** Plus additional torque to align cotter pin.
\# Back nut off to align cotter pin at nearest slot.
$ All specifications are given in foot pounds of Torque unless indicated otherwise.
$$ C10, G10-20 Rubber Bushings; C20-30, G30, P10-30 Steel Bushings.

FOUR WHEEL DRIVE

Axle	5500# (Dana)		Bolt Torques (Ft. Lbs.)
Gear Backlash Preferred	.004" - .009"	Carrier Cover	35
Min. and Max.	.004" - .009"	Ring Gear	110
New Pinion Bearing Preload	20-40 in. lbs.	Differential Bearing Caps	85
Used Pinion Bearing Preload	10-20 in. lbs.	Filler Plugs	10
		Drive Pinion Nut	255
		Brake - Backing Plate	35
		Axle Shaft To Hub Bolts	60

REAR SUSPENSION

SECTION 4

REAR WHEEL BEARING ADJUSTMENT SPECIFICATION

Ring Gear Size	Bearing Adjusting Nut Torque*	Adjusting Nut Back-off*	Outer Locknut Torque	Resulting Bearing Adjustment	Type of Bearing
10-1/2" and 9-3/4"	50 Ft. Lbs.	**	65 Ft. Lbs.	.001 to .010 End Play	Tapered Roller
12-1/4"	90 Ft. Lbs.	1/8 *	250 Ft. Lbs.	Slight Preloaded	Barrel Roller

** Back-off nut and retighten to 35 Ft. Lbs. then, back-off nut 1/4 turn.
* With wheel rotating.

UNIVERSAL JOINT ATTACHMENT TORQUE SPECIFICATIONS	
Strap Attachments	15 Ft. Lbs.
"U" Bolt Attachment.	20 Ft. Lbs.

Ring Gear Size	Lubricant Capacity
8-1/2"	4.2 Pints
8-7/8"	3.5 Pints
Chevrolet 10-1/2"	5.4 Pints
Dana 10-1/2"	7.2 Pints
Dana 9-3/4	6.0 Pints
12-1/4"	14.0 Pints

DIFFERENTIAL SPECIFICATIONS

	8-1/2"	8-7/8"	10-1/2" 9-3/4" Dana	10-1/2" Chevrolet	12-1/4"
Gear Backlash Preferred	.005"-.008"	.005"-.008"	.004"-.009"	.005"-.008"	.005"-.008"
Min. and Max.	.003"-.010"	.003"-.010"	.004"-.009"	.003"-.012"	.003"-.012"
Pinion Bearing Preload (In. Lbs.) — New	15-30	15-30	20-40	25-35	
—Used	5-10	5-10	10-20	5-15	

Bolt Torques (Ft. Lbs.) ▲

	8-1/2"	8-7/8"	10-1/2" 9-3/4" Dana	10-1/2" Chevrolet	12-1/4"
Carrier Cover	20"#	20"#	35"#	30"#	—
Ring Gear	80	50	110	130	105
Differential Bearing Caps	55	55	85	135	205

▲Except where noted otherwise.

Bolt Torques (Ft. Lbs.) ▲	8-1/2"	8-7/8"	10-1/2" 9-3/4" Dana	10-1/2" Chevrolet	12-1/4"
Filler Plugs	25	18	10	18	10
Differential Pinion Lock	20"#	20"#	—	—	—
Drive Pinion Nut		—	*	*	220
Differential Carrier to Axle Housing		—	—	—	85
Differential Bearing Adjusting Lock		—	—	20	15
Pinion Bearing Cage To Carrier		—	—	65	165
Thrust Pad Lock Nut		—	—	—	135
Brake - Backing Plate	35	35	105	105	155
Axle Shaft To Hub Bolts		—	115	115	15

*Torque as necessary to obtain correct preload.

TORQUE SPECIFICATIONS (FT. LBS.) (CONT'D.)

	C-K	G	P
Spring-to-Axle "U" Bolt Nuts	140	G10 120 G20 120 G30 150	P10 140 P20 140 P30 170 (Exc. w/3/4" Bolt) 200 (W/3/4" Bolt)
Leaf Spring —Front Bushing Bolt	90	90/135* (G316. . .90)	90
—Rear Shackle Bolt	90	90/135* (G316. . .90)	90
Shock Absorber —Upper Attachment	140	75	P10 25 P20 140 P30 50
—Lower Attachment	115	75	115
Propeller Shaft To Rear Axle (Strap) To Rear Axle ("U" Bolt) Bearing Support-to-Hanger Hanger-to-Frame	 12-17 18-22 20-30 40-50	 12-17 18-22 20-30 —	 12-17 18-22 20-30 —
Rear Stabilizer-to-Anchor Plate	20-30	—	20-30

* 90 Ft. Lbs. when tightening the nut.
135 Ft. Lbs. when tightening the bolt.

BRAKES

SECTION 5
TORQUE SPECIFICATIONS

	C	K	G	P
Master Cylinder - to Dash or Booster	25 ft. lbs.			
Booster to Dash or Frame	25 ft. lbs.			
Combination Valve - Mounting Bolts	150 in. lbs.	115 in. lbs.	17 ft. lbs.	17 ft. lbs.
- Bracket to Frame	-	-	25 ft. lbs.	25 ft. lbs.
Caliper - Mounting Bolt	35 ft. lbs.			
- Support Plate to Knuckle	140 in. lbs.			
Brake Pedal - Bracket to Dash	25 ft. lbs.	25 ft. lbs.	150 in. lbs.	25 ft. lbs.
- Bracket to I.P.	25 in. lbs.	25 in. lbs.	-	-
- Pivot Bolt Nut	25 ft. lbs.	25 ft. lbs.	-	45 ft. lbs.
- Sleeve to Bracket	-	-	-	100 in. lbs.
- Stoplamp Switch Bracket	25 ft. lbs.	25 ft. lbs.	25 ft. lbs.	-
- Push Rod to Pedal	-	-	-	25 ft. lbs.
- Push Rod Adjusting Nut	-	-	-	22 ft. lbs.
Parking Brake - to Dash	100 in lbs.	100 in. lbs.	100 in. lbs.	-
- to I.P., Kick Panel or Floorpan	150 in. lbs.	150 in. lbs.	100 in. lbs.	18 ft. lbs.
- Cable Clips - Screws	150 in. lbs.	-	100 in. lbs.	150 in. lbs.
- Bolts	-	-	18 ft. lbs.	55 in. lbs.
Propshaft Parking Brake - Adjusting Nut	-	-	-	30 ft. lbs.
- Bracket to Trans.	-	-	-	20 ft. lbs.
- Cable Clip to Frame	-	-	-	150 in. lbs.
- Cable Clip to Dash	-	-	-	55 in. lbs.
- Cable Clip to Trans. Brkt.	-	-	-	20 ft. lbs.
- Flange Plate	-	-	-	30 ft. lbs.
- Drum	-	-	-	80 ft. lbs.
Wheel Cylinder to Flange Plate Bolt	50 in. lbs.			
Rear Brake Anchor Pin	140 ft. lbs.			
Front Brake Hose - to Caliper	22 ft. lbs.			
- to Frame Nut	58 in. lbs.			
- Bracket Bolt	150 in. lbs.	-	150 in. lbs.	150 in. lbs.
Rear Brake Hose - to Axle Bracket	150 in. lbs.	150 in. lbs.	90 in. lbs.	150 in. lbs. (P10)*
- Bracket to Axle	150 in. lbs.	150 in. lbs.	-	150 in. lbs.
Brake Line - Attaching Nuts	150 in. lbs.			
- Retaining Clips - Screws	150 in. lbs.	150 in. lbs.	100 in. lbs.	150 in. lbs.
- Bolts	-	-	150 in. lbs.	18 ft. lbs.
Brake Bleeder Valves	Torque to seal or 100 in. lbs. max. Replace valve if it will not seal at 100 in. lbs.			
Hydro-Boost - Pedal Rod - P30(32) Models	-	-	-	25 ft. lbs.
- Pedal Rod Boot - P30(32)Models	-	-	-	15 in. lbs.
- Pivot Lever Rod Retainer	-	-	-	25 ft. lbs.
- Pivot Lever Bolt	-	-	-	45 ft. lbs.
- Booster Brackets	-	-	-	25 ft. lbs.
- Booster Brace at Dash or Rad. Supt.	-	-	-	150 in. lbs.
- Power Steering Pump to Booster Line	25 ft. lbs.	-	25 ft. lbs.	25 ft. lbs.
- Booster to Gear Line	25 ft. lbs.	-	25 ft. lbs.	25 ft. lbs.
- Return Line at Booster & Gear	25 ft. lbs.	-	25 ft. lbs.	25 ft. lbs.
- Return Line Clamp Screw	15 in. lbs.	-	15 in. lbs.	15 in. lbs.
- Line Clamp to Bracket Screw	150 in. lbs.	-	150 ft. lbs.	150 in. lbs.
- Hose Clamp to Skirt Screw	40 in. lbs.	-	-	-
- Line Clamp to Frame Bolt	-	-	-	18 ft. lbs.

*20 ft. lbs. (P20-30)

ENGINE

SECTION 6

<table>
<tr><td colspan="4">GENERAL DATA:</td><td colspan="4"></td></tr>
<tr><td colspan="4">Type</td><td colspan="2">In Line</td><td colspan="2">V8</td></tr>
<tr><td colspan="4">Displacement (cu. in.)</td><td>250</td><td>292</td><td>350</td><td>454</td></tr>
<tr><td colspan="4">Bore</td><td colspan="2">3 7/8</td><td>4</td><td>4 1/4</td></tr>
<tr><td colspan="4">Stroke</td><td>3.53</td><td>4.12</td><td>3.48</td><td>4</td></tr>
<tr><td colspan="4">Compression Ratio</td><td>8.25:1</td><td>8.0:1</td><td>8.5:1</td><td>8.25:1</td></tr>
<tr><td colspan="4">Firing Order</td><td colspan="2">1-5-3-6-2-4</td><td colspan="2">1-8-4-3-6-5-7-2</td></tr>
<tr><td colspan="4">CYLINDER BORE:</td><td colspan="4"></td></tr>
<tr><td colspan="4">Diameter</td><td colspan="2">3.8745 - 3.8775</td><td>3.9995 - 4.0025</td><td>4.2495 - 4.2525</td></tr>
<tr><td rowspan="2">Out of Round</td><td colspan="3">Production</td><td colspan="2">.0005 Max.</td><td colspan="2">.001 Max</td></tr>
<tr><td colspan="3">Service</td><td colspan="4">.002 Max.</td></tr>
<tr><td rowspan="3">Taper</td><td rowspan="2">Production</td><td colspan="2">Thrust Side</td><td colspan="4">.0005 Max.</td></tr>
<tr><td colspan="2">Relief Side</td><td colspan="2">.0005 Max.</td><td colspan="2">.001 Max.</td></tr>
<tr><td colspan="3">Service</td><td colspan="4">.005 Max.</td></tr>
<tr><td colspan="4">PISTON:</td><td colspan="4"></td></tr>
<tr><td rowspan="2">Clearance</td><td colspan="3">Production</td><td>.0005-.0015</td><td>.0026-.0036</td><td>.0007-.0013</td><td>.0018-.0028</td></tr>
<tr><td colspan="3">Service</td><td>.0025 Max.</td><td>.0045 Max.</td><td>.0027 Max.</td><td>.0035 Max.</td></tr>
<tr><td colspan="4">PISTON RING:</td><td colspan="4"></td></tr>
<tr><td rowspan="6">COMPRESSION</td><td rowspan="3">Clearance Groove</td><td rowspan="2">Production</td><td>Top</td><td>.0012 - .0027</td><td rowspan="2">.0020-.0040</td><td rowspan="2">.0012 - .0032</td><td rowspan="2">.0017 - .0032</td></tr>
<tr><td>2nd</td><td>.0012-.0032</td></tr>
<tr><td colspan="2">Service</td><td colspan="4">Hi Limit Production + .001</td></tr>
<tr><td rowspan="3">Gap</td><td rowspan="2">Production</td><td>Top</td><td colspan="4">.010 - .020</td></tr>
<tr><td>2nd</td><td colspan="2">.010 - .020</td><td>.013 - .025</td><td>.010 - .020</td></tr>
<tr><td colspan="2">Service</td><td colspan="4">Hi Limit Production + .01</td></tr>
<tr><td rowspan="4">OIL</td><td rowspan="2">Groove Clearance</td><td colspan="2">Production</td><td>.005 Max.</td><td>.005-.0055</td><td>.002 - .007</td><td>.0005 - .0065</td></tr>
<tr><td colspan="2">Service</td><td colspan="4">Hi Limit Production + .001</td></tr>
<tr><td rowspan="2">Gap</td><td colspan="2">Production</td><td colspan="3">.015 - .055</td><td>.010 - .030</td></tr>
<tr><td colspan="2">Service</td><td colspan="4">Hi Limit Production + .01</td></tr>
<tr><td colspan="4">PISTON PIN:</td><td colspan="4"></td></tr>
<tr><td colspan="4">Diameter</td><td colspan="3">.9270 - .9273</td><td>.9895 - .9898</td></tr>
<tr><td rowspan="2">Clearance</td><td colspan="3">Production</td><td colspan="3">.00015 - .00025</td><td>.00025 - .00035</td></tr>
<tr><td colspan="3">Service</td><td colspan="4">.001 Max.</td></tr>
<tr><td colspan="4">Fit in Rod</td><td colspan="4">.0008 - .0016 Interference</td></tr>
</table>

CRANKSHAFT:							
Main Journal	Diameter		All 2.2983 - 2.2993		#1-2-3-4 2.4484 - 2.4493 #5 2.4479 - 2.4488		#1 2.7485 - 2.7494 #2-3-4 2.7481 - 2.7490 #5 2.7478 - 2.7488
	Taper	Production	.0002 (Max.)				
		Service	.001 (Max.)				
	Out of Round	Production	.0002 (Max.)				
		Service	.001 (Max.)				
Main Bearing Clearance	Production		All .0003 — .0029	All .0008 — .0034	#1 .0008 - .0020 #2-3-4 .0011 - .0023 #5 .0017 - .0033		#1-2-3-4 .0013 - .0025 #5 .0024 - .0040
	Service		#1 - .002 (Max.) All Others .0035 (Max.)				
Crankshaft End Play			.002 - .006				.006 - .010
Crank-pin	Diameter		1.999 - 1.2000	2.099 - 2.100	2.199 - 2.200		2.1985 - 2.1995
	Taper	Production	.0003 (Max.)				
		Service	.001 (Max.)				
	Out of Round	Production	.0002 (Max.)				
		Service	.001 (Max.)				
Rod Bearing Clearance	Production		.0007 - .0027		.0013 - .0035		.0009 - .0025
	Service		.0035 (Max.)				
Rod Side Clearance			.0006 - .0017		.008 - .014		.013 - .023
CAMSHAFT:							
Lobe Lift ± .002″	Intake		.2217	.2315	.2600		.2343
	Exhaust		.2217	.2315	.2733		.2343
Journal Diameter			1.8682 - 1.8692				1.9482 -1.9492
Camshaft Runout			.0015 Max.				
Camshaft End Play			.001 - .005 (In-Line Engine)				
VALVE SYSTEM:							
Lifter			Hydraulic				
Rocker Arm Ratio			1.75:1		1.50:1		1.70:1
Valve Lash	Intake		One Turn Down From Zero Lash				
	Exhaust						
Face Angle (Int. & Exch.)			45°				
Seat Angle (Int. & Exh.)			46°				
Seat Runout (Int. & Exh.)			.002 (Max.)				
Seat Width	Intake		1/32 - 1/16				
	Exhaust		1/16 - 3/32				
Stem Clearance	Production	Int.	.0010 - .0027				
		Exh.	.0015 - .0032		.0010 - .0027		.0012 - .0029
	Service		Hi Limit Production + .001 Intake - + .002 Exhaust				
Valve Spring (Outer)	Free Length		190		Exhaust 1.91	Inlet 2.03	2.12
	Pressure lbs. @ in.	Closed	55-64 @ 1.66	85-93 @ 1.69	76-84 @ 1.61	76-84 @ 1.70	74-86 @ 1.88
		Open	180-192 @ 1.27	174-184 @ 1.30	183-195 @ 1.20	194-206 @ 1.25	288-312 @ 1.38
	Installed Height ± 1/32″		1-21/32	1-5/8	1-5/8	1-23/32	1-7/8
Damper	Free Length		—	1.94			1.86
	Approx. # of Coils		—	4			4

TUNE-UP CHART

ENGINE	Type	In Line		V8	
	Displacement	250	292	350	454
COMPRESSION ①		130 psi		150 psi	
SPARK PLUG	Make & Number	AC–R46TS	AC-R44T	AC–R45TS	
	Gap	.035	.035	.045	
DISTRIBUTOR	Timing ②	SEE IGNITION SPECIFICATIONS			
DRIVE BELT ③	Fan P/S and Air Pump	50 lb. Min 75±5 lbs. (Used)125±5 lbs.(New)Using Strand Tension Gauge			
	A/C Compressor	65 lbs. Min 95±5 lbs. (Used)140±5lbs. (New)Using Strand Tension Gauge			
AIR CLEANER ④		Refer to Section 0 of this Manual			
VALVE LASH		Hydraulic - 1 turn down from zero lash			
IDLE RPM		Refer to Exhaust Emission Tune-Up Label			
FUEL PUMP ⑤	Pressure in lbs.	3-1/2 to 4-1/2		7 to 8-1/2	
	Volume	1 pint in 30-45 seconds @ cranking speed			
CRANKCASE VENTILATION		Refer to Section 0 of this Manual			

① PSI At Cranking Speed, throttle wide open - Maximum variation, 20 PSI between cylinders.

② At idle speed with vacuum advance line disconnected and plugged. On Step Van vehicles, use number two cylinder and timing tab on bottom of cover.

③ Do not pry against A.I.R. pump housing.

④ CAUTION: In addition to its function of filtering air drawn into the engine through the carburetor, the air cleaner also acts as a flame arrestor in the event the engine backfires. Because backfiring may cause fire in the engine compartment, the air cleaner should be installed at all times unless its removal is necessary for repair or maintenance services.

⑤ Replace filter element located in carburetor inlet as indicated in Section 0 of this Manual.

ENGINE TORQUES

<table>
<tr><th rowspan="2" colspan="2">Size</th><th rowspan="2">Usage</th><th colspan="2">In Line</th><th>Small V-8</th><th>Mark IV V-8</th></tr>
<tr><th>250</th><th>292</th><th>262 & 350</th><th>454</th></tr>
<tr><td rowspan="8" colspan="2">1/4-20</td><td>Camshaft Thrust Plate</td><td colspan="2">80 lb. in.</td><td colspan="2"></td></tr>
<tr><td>Crankcase Front Cover</td><td colspan="4">80 lb. in.</td></tr>
<tr><td>Flywheel Housing Cover</td><td colspan="4">80 lb. in.</td></tr>
<tr><td>Oil Filler Bypass Valve</td><td colspan="2"></td><td colspan="2">80 lb. in.</td></tr>
<tr><td>Oil Pan (To Crankcase)</td><td colspan="3">80 lb. in.</td><td></td></tr>
<tr><td>Oil Pan (To Front Cover)</td><td colspan="2">50 lb. in.</td><td></td><td>55 lb. in.</td></tr>
<tr><td>Oil Pump Cover</td><td colspan="2">70 lb. in.</td><td colspan="2">80 lb. in.</td></tr>
<tr><td>Rocker Arm Cover</td><td colspan="3">45 lb. in.</td><td>50 lb. in.</td></tr>
<tr><td colspan="2">11/32-24</td><td>Connecting Rod Cap</td><td>35 lb. ft.</td><td colspan="3"></td></tr>
<tr><td rowspan="6" colspan="2">5/16-18</td><td>Camshaft Sprocket</td><td colspan="2"></td><td colspan="2">20 lb. ft.</td></tr>
<tr><td>Clutch Pressure Plate</td><td>20 lb. ft.</td><td colspan="3"></td></tr>
<tr><td>Oil Pan (To Crankcase)</td><td colspan="2">75 lb. in.</td><td>65 lb. in.</td><td>135 lb. in.</td></tr>
<tr><td>Oil Pump</td><td colspan="2">115 lb. in.</td><td colspan="2"></td></tr>
<tr><td>Push Rod Cover</td><td colspan="2">50 lb. in.</td><td colspan="2"></td></tr>
<tr><td>Water Pump</td><td colspan="2">15 lb. in.</td><td colspan="2"></td></tr>
<tr><td rowspan="10" colspan="2">3/8-16</td><td>Clutch Pressure Plate</td><td></td><td colspan="3">35 lb. ft.</td></tr>
<tr><td>Distributor Clamp</td><td colspan="4">20 lb. ft.</td></tr>
<tr><td>Flywheel Housing</td><td colspan="4">30 lb. ft.</td></tr>
<tr><td>Manifold (Exhaust)</td><td>30 lb. ft.②</td><td></td><td colspan="2">20 lb. ft.①</td></tr>
<tr><td>Manifold (Exhaust to Inlet)</td><td></td><td>30 lb. ft.</td><td colspan="2"></td></tr>
<tr><td>Manifold (Inlet)</td><td colspan="2"></td><td colspan="2">30 lb. ft.</td></tr>
<tr><td>Manifold-to-head</td><td></td><td>35 lb. ft.</td><td colspan="2"></td></tr>
<tr><td>Thermostat Housing</td><td colspan="2">30 lb. ft.</td><td colspan="2"></td></tr>
<tr><td>Water Outlet</td><td colspan="4">30 lb. ft.</td></tr>
<tr><td>Water Pump</td><td colspan="2"></td><td colspan="2">30 lb. ft.</td></tr>
<tr><td colspan="2">3/8-24</td><td>Connecting Rod Cap</td><td></td><td>40 lb. ft.</td><td>45 lb. ft.</td><td>50 lb. ft.</td></tr>
<tr><td rowspan="4" colspan="2">7/16-14</td><td>Cylinder Head</td><td colspan="2"></td><td>65 lb. ft.</td><td>80 lb. ft.</td></tr>
<tr><td>Main Bearing Cap</td><td colspan="2">65 lb. ft.</td><td>70 lb. ft.</td><td></td></tr>
<tr><td>Oil Pump</td><td colspan="2"></td><td colspan="2">65 lb. ft.</td></tr>
<tr><td>Rocker Arm Stud</td><td colspan="3"></td><td>50 lb. ft.</td></tr>
<tr><td rowspan="2" colspan="2">7/16-20</td><td>Flywheel</td><td>60 lb. ft.</td><td></td><td>60 lb. ft.</td><td>65 lb. ft.</td></tr>
<tr><td>Torsional Damper</td><td></td><td colspan="2">60 lb. ft.</td><td></td></tr>
<tr><td rowspan="2" colspan="2">1/2-13</td><td>Cylinder Head</td><td colspan="2">95 lb. ft.</td><td colspan="2"></td></tr>
<tr><td>Main Bearing Cap</td><td colspan="3"></td><td>110 lb. ft.</td></tr>
<tr><td colspan="2">1/2-14</td><td>Temperature Sending Unit</td><td colspan="4">20 lb. ft.</td></tr>
<tr><td rowspan="4" colspan="2">1/2-20</td><td>Torsional Damper</td><td colspan="3"></td><td>85 lb. ft.</td></tr>
<tr><td>Oil Filter</td><td colspan="2">Hand Tight</td><td colspan="2">25 lb. ft.</td></tr>
<tr><td>Oil Pan Drain Plug</td><td colspan="4">20 lb. ft.</td></tr>
<tr><td>Flywheel</td><td></td><td>110 lb. ft.</td><td colspan="2"></td></tr>
<tr><td>14mm</td><td>5/8</td><td>Spark Plug</td><td colspan="4">15 lb. ft.</td></tr>
</table>

① Inside bolts on 350 engine 30 lb. ft.
② Outer bolts (Integral Head) 20 lb. ft.

CARBURETOR

SECTION 6M

IDENTIFICATION

VEHICLE				ENGINE			CARBURETOR				
C	K	P	G	Displacement and Type		RPO	Barrel and Type	Federal Manual	Federal Automatic	California Manual	California Automatic
10			10	250L6	LD	LD4	1MV	17056003	17056002	17056303	17056302
10	10			250L6	HD	LD4	1MV	17056007	17056006*	–	–
20-30	20	20-30	20-30	292L6	HD	L25	1MV	17056009	17056008	17056309	17056308
10				350V8	LD	LF5	2GC	17056115	17056116	–	–
			10	350V8	LD	LF5	2GC	17056123	17056124	–	–
10				350V8	LD	LS9	M4MC	17056209	17056208	17056509	17056508
			10	350V8	LD	LS9	M4MC	17056219	17056218	17056519	17056518
			20-30	350V8	HD	LS9	4MV	7045214	7045214	7045584	7045584
		20-30		350V8	HD	LS9	4MV	7045216	7045216	7045586	7045586
10-20-30	10-20			350V8	HD	LS9	4MV	7045213	7045213	7045583	7045583
		30MH		350V8	HD	LS9	4MV	–	7045215	–	7045585
			20-30	400V8	HD	LF4	4MV	–	7045225	–	7045589
	10-20			400V8	HD	LF4	4MV	–	7045229	–	7045588
10				454V8	LD	LF8	M4ME	–	17056221	–	–
10-20		30MH		454V8	HD	LF8	4MV	–	17056212	–	–
20-30				454V8	HD	LF8	4MV	17056212	17056212	–	–
		30		454V8	HD	LF8	4MV	–	17056217	–	–
10-20		30MH		454V8	HD	LF8	M4MC	–	–	–	17056512
20-30				454V8	HD	LF8	M4MC	–	–	17056512	17056512
		30		454V8	HD	LF8	M4MC	–	–	–	17056517

*17056004 on CID with air conditioning.

CARBURETOR ADJUSTMENTS

2GC Carburetor

NUMBER (A) Automatic Trans. (M) Manual Trans.	Float Level	Float Drop	Pump Rod	Choke Rod (Fast Idle Cam)	Vacuum Break	Unloader	Choke Setting
17056115(M)	21/32	1-9/32	1-11/16	.260	.130	.325	INDEX
17056116(A)	21/32	1-9/32	1-11/16	.260	.130	.325	1NR
17056123(M)	21/32	1-9/32	1-11/16	.260	.130	.325	INDEX
17056124(A)	21/32	1-9/32	1-11/16	.260	.130	.325	1NR

CARBURETOR ADJUSTMENTS

1MV Carburetor							
NUMBER (A) Automatic Trans. (M) Manual Trans.	Float Level	Metering Rod	Choke Rod (Fast Idle Cam)	Primary Vacuum Break	Auxiliary Vacuum Break	Unloader	Choke Setting
17056002(A)	11/32	.080	.130	.165	.265	.335	Refer to Section 6M for Service Procedure
17056003(M)	11/32	.080	.145	.180	W.O.	.335	
17056004(A)	11/32	.080	.130	.165	.265	.335	
17056006(A)	1/4	.080	.130	.165	—	.270	
17056007(M)	1/4	.070	.130	.165	—	.275	
17056008(A)	1/4	.070	.150	.190	—	.275	
17056009(M)	1/4	.070	.150	.190	—	.275	
17056302(A)	11/32	.080	.155	.190	W.O.	.325	
17056303(M)	11/32	.080	.180	.225	W.O.	.325	
17056308(A)	1/4	.070	.150	.190	—	.275	
17056309(M)	1/4	.070	.150	.190	—	.275	

4MV Carburetor								
NUMBER (A) Automatic Trans. (M) Manual Trans.	Float Level	Pump Rod*	Choke Rod (Fast Idle Cam)	Air Valve Dashpot	Vacuum Break	Air Valve Spring Windup	Un-loader	Choke Set-ting
7045213(A/M)	11/32	9/32	.290	.015	.145	7/8	.295	Refer to Section 6M for Choke Rod Adjust.
7045214(A/M)	11/32	9/32	.290	.015	.145	7/8	.295	
7045215(A)	11/32	9/32	.290	.015	.145	7/8	.295	
7045216(A/M)	11/32	9/32	.290	.015	.145	7/8	.295	
7045225(A)	11/32	9/32	.290	.015	.138	3/4	.295	
7045229(A)	11/32	9/32	.290	.015	.138	3/4	.295	
7045583(A/M)	11/32	9/32	.290	.015	.155	7/8	.295	
7045584(A/M)	11/32	9/32	.290	.015	.155	7/8	.295	
7045585(A)	11/32	9/32	.290	.015	.155	7/8	.295	
7045586(A/M)	11/32	9/32	.290	.015	.155	7/8	.295	
7045588(A)	11/32	9/32	.290	.015	.155	3/4	.295	
7045589(A)	11/32	9/32	.290	.015	.155	3/4	.295	
17056212(A/M)	3/8	9/32	.290	.015	.155	7/16	.295	
17056217(A)	3/8	9/32	.290	.015	.155	7/16	.295	

CARBURETOR ADJUSTMENTS - Continued

M4MC Carburetor										
NUMBER (A) Automatic Trans.	Float Level	Pump Rod*	Choke Coil Lever	Choke Rod (Fast Idle Cam)	Air Valve Dashpot	Front Vacuum Break	Rear Vacuum Break	Air Valve Spring Windup	Un-loader	Choke Set-ting
17056208(A)	**	9/32	.120	.325	.015	.185	—	7/8	.325	2NL
17056209(M)	**	9/32	.120	.325	.015	.185	—	7/8	.325	3NL
17056218(A)	5/16	9/32	.120	.325	.015	.185	—	7/8	.325	2NL
17056219(M)	5/16	9/32	.120	.325	.015	.185	—	7/8	.325	3NL
17056508(A)	**	9/32	.120	.325	.015	.185	—	7/8	.325	2NL
17056509(M)	**	9/32	.120	.325	.015	.185	—	7/8	.325	1NL
17056512(A/M)	7/16	9/32	.120	.325	.015	.185	—	7/8	.275	INDEX
17056517(A)	7/16	9/32	.120	.325	.015	.185	—	7/8	.275	INDEX
17056518(A)	5/16	9/32	.120	.325	.015	.185	—	7/8	.325	2NL
17056519(M)	5/16	9/32	.120	.325	.015	.185	—	7/8	.325	1NL

**Needle Seat with Groove at upper edge 5/16.
Needle Seat without Groove at upper edge 7/16.

M4ME Carburetor										
17056221(A)	7/16	9/32	.120	.300	.015	—	.160	7/8	.325	2NR

* Inner Pump Rod Location

IDLE SPECIFICATIONS

SHOWN IN RPM

LIGHT DUTY EMISSION REQUIREMENTS

ENGINE DISPLACE-MENT C.I.D.	BBL.	TRANS.	USAGE	LOW (BASE) IDLE	CURB IDLE	FAST IDLE	IDLE MIXTURE	EMIS-SION FAMILY
250	1	AUTO	FED	425DR	550DR	2100N +	575/550DR	12F1U
250	1	MAN	FED	425N	900N	2100N +	1075/900N	12F1U
250	1	AUTO	CAL	425DR	600DR	2100N +	630/600DR	12F1U
250	1	MAN	CAL	425N	1000N	2100N +	1150/1000N	12F1U
350	2	AUTO	FED	—	600DR	—	650/600DR	12J2
350	2	MAN	FED	—	800N	—	900/800N	12J2
350	4	AUTO	FED	—	600DR	1600N	650/600DR	12J4B
350	4	MAN	FED	—	800N	1600N	900/800N	12J4B
350	4	AUTO	CAL	—	600DR	1600N	650/600DR	12J4
350	4	MAN	CAL	—	800N	1600N	900/800N	12J4
454	4	AUTO	FED	—	600DR	1600N	650/600DR	12R4D

HEAVY DUTY EMISSION REQUIREMENTS

250	1	A/M	FED	450	600N	2400N	700/600	GM111
292	1	A/M	F/C	450	600N	2400N	700/600	GM112A
350	4	A/M	FED	—	600N	1600N	750/600	GM113
350	4	A/M	CAL	—	700N**	1600N	800/700	GM113
400	4	AUTO	F/C	—	700N**	1600N	770/700	GM113
454	4	A/M	FED	—	700N	1700N	800/700	GM115
454	4	A/M	CAL	—	700N*	1700N	750/700	GM115

\+ With vacuum advance hose connected and EGR hose disconnected and plugged.
* 1400 rpm for throttle return control system with vacuum applied to diaphragm and distributor vacuum and EGR connected.
** 1500 rpm for throttle return control system with vacuum applied to diaphragm and distributor vacuum and EGR connected.

TORQUE SPECIFICATIONS

1MV Carburetor

Screw	Torque (in. lbs.)
Air Horn to Bowl	45
Air Cleaner Bridge	70
Throttle Body to Bowl	180
Needle Seat	45
Metering Jet	40
Fuel Inlet Nut	400
Fast Idle Cam	50
Choke Lever	25
Pump Lever	30*

*Loctite AVV or equivalent

M4MC/M4ME Carburetor

Screw	Torque (in. lbs.)
THROTTLE BODY	
Throttle Body to Bowl	46
CHOKE HOUSING	
Choke Lever	14
Choke Housing Attaching	46
Choke Housing Cover	26
AIR HORN	
Air Horn to Bowl 10-32	46
Air Horn to Bowl 8-32	26
Air Horn to Throttle Body	46
Choke Lever	14
Vacuum Break Unit	26
Fuel Inlet Nut	400
Needle Seat	45
Metering Jet	40
Solenoid Bracket	71

2GC Carburetor

Screw	Torque (in. lbs.)
THROTTLE BODY	
Throttle Body to Bowl	72
BOWL	
Cluster	46
Fast Idle Cam	58
Metering Jet	40
CHOKE HOUSING	
Choke Lever	14
Choke Hsg. to Throttle Body	46
Choke Housing Cover	26
AIR HORN	
Air Horn to Bowl	46
Vacuum Break Unit	26
Choke Shaft	14
Fuel Inlet Nut	400
Needle Seat	45

4MV Carburetor

Screw	Torque (in. lbs.)
Air Horn to Bowl 10-32	46
Air Horn to Bowl 8-32	26
Air Horn to Throttle Body	46
Throttle Body to Bowl	46
Vacuum Break Unit	26
Solenoid Bracket	71
Fuel Inlet Nut	400
Metering Jet	40
Needle Seat	45

ENGINE ELECTRICAL

SECTION 6Y

STARTING MOTOR

Model No.	Application	Spec. No.	Battery Size	Free Speed		
				Volts	Amperes	RPM
1108778	250 L-6 (LD4) (C & K-10)	3573	2300 Watts	9	50-80*	5500-10500
1108779	250 L-6 (LD4) (G-Van)	3573	2300 Watts	9	50-80*	5500-10500
1108780	292 L-6 (L25)	2438	2900 Watts	9	50-80*	3500-6000
1108781	350 & 400 V8 (LF4,LF5,LS9)	3563	2900 Watts	9	65-90*	7500-10500
1108781	454 V8 (LF8) (Exc P30032)	3563	4000 Watts	9	65-90*	7500-10500
1108782	454 V8 (LF8) (P30032)	3563	4000 Watts	9	65-90*	7500-10500

*Includes Solenoid

GENERATORS

Model No.	Application	Delco Remy Spec. No.	Field Current Amps (80°F) @ 12 Volts	Cold Output* Amps @ 5000 RPM	Rated Hot Output** Amps
1102491	All 250 L-6 (Base). G-Truck 292 L-6 (Base).	4519	4.0 - 4.5	33	37
1102478	All L-6 - with C42	4520	4.0 - 4.5	51	55
1102479	All V-8 - with C42	4520	4.0 - 4.5	51	55
1102480	All V-8 - with K76. P31832 Truck 454 V-8 (Base). G30003 Truck 350 V-8 (Base)	4522	4.0 - 4.5	57	61
1102489	All L-6 - with K79. P-Truck 292 L-6 (Base)	4521	4.0 - 4.5	38	42
1102490	All L-6 - with K76	4522	4.0 - 4.5	57	61
1102394	All C-K-G Truck (Exc G30003) V-8 (Base)	4519	4.0 - 4.5	33	37
1102841	All P-Truck (Exc P31832) V-8 (Base) All V-8 - with K79.	4521	4.0 - 4.5	38	42

* Generator temperature approximately 80°F.
** Ambient Temperature 80°F.

DISTRIBUTOR

MODEL NO.	APPLICATION	EMISS CLASS L.D.	EMISS CLASS H.D.	CENTRIFUGAL ADVANCE	VACUUM ADVANCE	INITIAL TIMING	SPARK PLUG (TYPE & GAP)
1112863	L-6 250 (LD4) C-10 (03) 4-Spd Trans C-10 (03) & C-10 Auto Trans	Federal		0° @ 1100 7° @ 2300 16° @ 4200	0° @ 4″ Hg 18° @ 12″ Hg	10° BTC	R46TS (.035)
1110667	L-6 250 (LD4) C & G-10 Manual Trans	Calif		0° @ 1000 7° @ 1600 20° @ 4200	0° @ 4″ Hg 15° @ 12″ Hg	6° BTC	R46TS (.035)
1110650	L-6 250 (LD4) C & G-10 Auto Trans	Calif		0° @ 1100 7° @ 2300 16° @ 4200	0° @ 4″ Hg 15° @ 12″ Hg	10° BTC	R46TS (.035)
1110666	L-6 250 (LD4) C & G-10 3-Spd Trans	Federal		0° @ 1000 7° @ 1600 20° @ 4200	0° @ 4″ Hg 24° @ 15″ Hg	6° BTC	R46TS (.035)
1112887	L-6 250 (LD4) C & K-10 All Trans		Federal	0° @ 1100 14° @ 2300 24° @ 4100	0° @ 10″ Hg 10° @ 13″ Hg	6° BTC	R46T (.035)
	L-6 292 (L25) C,K,G & P-20, 30 All Trans					8° BTC	R44T (.035)
1110664	L-6 292 (L25) C & P-10-20-30 G-20-30: K-20 Manual Trans C-10-20-30 G-20-30 P-10-20 K-20 Auto Trans		Calif	0° @ 1100 6° @ 2000 14° @ 2300 24° @ 4100	0° @ 10″ Hg 10° @ 13″ Hg	8° BTC	R44T (.035)
1112880	V-8 350 2BBL (LF5) Auto Trans	Federal		0° @ 1200 12° @ 2000 22° @ 4200	0° @ 4" Hg 18° @ 12" Hg	6° BTC	R45TS (.045)
	Man Trans					2° BTC	
1112905	V-8 350 4BBL (LS9)	Calif		0° @ 1200 12° @ 2000 22° @ 4200	0° @ 6″ Hg 15° @ 12″ Hg	6° BTC	R45TS (.045)
1112888	V-8 350 4BBL (LS9)	Federal		0° @ 1100 12° @ 1600 16° @ 2400	0° @ 4″ Hg 18° @ 12″ Hg	8° BTC	R45TS (.045)

DISTRIBUTOR — Continued

MODEL NO.	APPLICATION	EMISS CLASS L.D.	EMISS CLASS H.D.	CENTRIFUGAL ADVANCE	VACUUM ADVANCE	INITIAL TIMING	SPARK PLUG (TYPE & GAP)
1112884	V-8 350 4BBL (LS9) V-8 400 4BBL (LF4)		Calif	0° @ 1150 17° @ 2900 22° @ 4200	0° @ 8″ Hg 10° @ 13″ Hg	2° BTC	R44TX (.060)
1112940	V-8 350 4BBL (LS9)		Federal	0° @ 1200 15° @ 2700 20° @ 4200	0° @ 8″ Hg 15° @ 15.5″ Hg	8° BTC	R44TX (.060)
1112941	V-8 400 4BBL (LF4)		Federal	0° @ 1000 8° @ 1600 19° @ 3450	0° @ 8″ Hg 10° @ 13″ Hg	4° BTC	R44TX (.060)
1112886	V-8 454 4BBL (LF8) C-10 P/U w/ Cat Converter	Federal		0° @ 1300 12° @ 4200	0° @ 4″ Hg 18° @ 7″ Hg	12° BTC	R45TS (.045)
1112494	V-8 454 4BBL (LF8) C-10 P/U w/o Cat Converter	Federal		0° @ 1100 14° @ 2800 20° @ 4200	0° @ 10″ Hg 15° @ 17″ Hg	8° BTC	R45TS (.045)
	V-8 454 4BBL (LF8) C-10 P/U w/RPO F44 C-10 Suburban C20-30 & P-30		Federal				R44T (.045)
1112869	V-8 454 4BBL (LF8) C-10 P/U w/o Cat Converter or w/RPO F44 C-10 Suburban C20-30 & P-30		Calif	0° @ 1100 14° @ 2800 20° @ 4200	0° @ 6″ Hg 20° @ 15″ Hg	8° BTC	R44T (.045)

* - None (Electronically Governed)

BATTERY

Model No.	Application	Cold Crank Rate	Cranking Power @ 0° F. (Watts)	25 Amp. Reserve Capacity (Minutes)
Y87P	250 L-6	275A @ 0° F	2500	60
R87P	292 L-6 305 & 350 V-8	350A @ 0° F	3200	80
R89WP	454 V-8 & RPO Option	465A @ 0° F	4000	125
R89-5	RPO UA1	465A @ 0° F	4000	125
R87-5	RPO TP2	430A @ 0° F	3500	100

CLUTCH AND MANUAL TRANSMISSION

SECTION 7M

THREE SPEED SAGINAW

Clutch Gear Retainer to Case Bolts	15 ft. lbs.
Side Cover to Case Bolts	15 ft. lbs.
Extension to Case Bolts................	45 ft. lbs.
Shift Lever to Shifter Shaft Bolts	25 ft. lbs.
Lubrication Filler Plug	13 ft. lbs.
Transmission Case to Clutch Housing Bolts . .	75 ft. lbs.
Crossmember to Frame Nuts	25 ft. lbs.
Crossmember to Mount Bolts	40 ft. lbs.
2-3 Cross Over Shaft Bracket Retaining Nut .	18 ft. lbs.
1-Rev. Swivel Attaching Bolt	20 ft. lbs.
Mount to Transmission Bolt	50 ft. lbs.

THREE SPEED TREMEC

Clutch Gear Retainer to Case Bolts	35 ft. lbs.
Top Cover to Case Bolts	30 ft. lbs.
Extension to Case Bolts	45 ft. lbs.
Shift Lever to Shifter Shaft Bolts	25 ft. lbs.
Lubrication Filler Plug	15 ft. lbs.
Transmission Case to Clutch Housing Bolts . .	75 ft. lbs.
Crossmember to Frame Nuts	25 ft. lbs.
Crossmember to Mount Bolts	40 ft. lbs.
2-3 Cross Over Shaft Bracket Retaining Nut .	18 ft. lbs.
1- Rev. Swivel Attaching Bolt	20 ft. lbs.
Mount to Transmission Bolt	50 ft. lbs.

THREE SPEED MUNCIE

Clutch Gear Retainer to Case Bolts	15 ft. lbs.
Side Cover to Case Bolts	15 ft. lbs.
Extension to Case Bolts	45 ft. lbs.
Shaft Lever to Shifter Shaft Bolts	25 ft. lbs.
Lubrication Filler Plugs...............	13 ft. lbs.
Transmission Case to Clutch Housing Bolts . .	75 ft. lbs.
Crossmember to Frame Nuts	25 ft. lbs.
Crossmember to Mount Bolts...........	40 ft. lbs.
Transmission Drain Plug	30 ft. lbs.
2-3 Cross Over Shaft Bracket Retaining Nut.	18 ft. lbs.
1-Rev. Swivel Attaching Bolt	20 ft. lbs.
Mount to Transmission Bolt	50 ft. lbs.

FOUR SPEED MUNCIE (CH 465)

Rear Bearing Retainer	123 ft. lbs.
Cover Bolts......................	23 ft. lbs.
Filler Plug	33 ft. lbs.
Drain Plug	33 ft. lbs.
Clutch Gear Bearing Retainer Bolts.......	14 ft. lbs.
Universal Joint Front Flange Nut	95 ft. lbs.
Power Take Off Cover Bolts	17 ft. lbs.
Parking Brake	22 ft. lbs.
Countergear Front Cover Screws.........	25 in. lbs.
Rr. Mainshaft Lock Nut (4 Whl. Drive Mdls.)	100 ft. lbs.
Transmission To Clutch Housing Bolts	75 ft. lbs.
Crossmember to Mount...............	40 ft. lbs.
Mount to Transmission	50 ft. lbs.

NEW PROCESS TRANSFER CASE MODEL 205

Idler Shaft Lock Nut	200 ft. lbs.
Idler Shaft Cover Bolts	18 ft. lbs.
Front Output Shaft Front Bearing Retainer Bolts..................	30 ft. lbs.
Front Output Shaft Yoke Lock Nut	200 ft. lbs.
Rear Output Shaft Bearing Retainer Bolts. . .	30 ft. lbs.
Rear Output Shaft Housing Bolts	30 ft. lbs.
Rear Output Shaft Yoke Lock Nut	150 ft. lbs.
P.T.O. Cover Bolts	15 ft. lbs.
Front Output Shaft Rear Bearing Retainer Bolts	30 ft. lbs.
Drain and Filler Plugs	30 ft. lbs.
Transfer Case to Frame Bolts	130 ft. lbs.
Transfer Case to Adapter Bolts	25 ft. lbs.
Adapter Mount Bolts	25 ft. lbs.
Transfer Case Bracket to Frame Nuts (Upper)	30 ft. lbs.
Transfer Case Bracket to Frame Nuts (Lower)	65 ft. lbs.
Adapter to Transmission Bolts -(Manual Transmission)	22 ft. lbs.
Adapter to Transmission Bolts - (Automatic Transmission)	35 ft. lbs.
Transfer Case Control Mounting Bolt	100 ft. lbs.

AUTOMATIC TRANSMISSIONS

SECTION 7A

NEW PROCESS TRANSFER CASE MODEL 203

Adapter to Transfer Case Attaching Bolts	38 ft. lbs.
Adapter to Transmission Attaching Bolts	40 ft. lbs.
Transfer Case Bracket to Frame nuts (upper)	50 ft. lbs.
Transfer Case Bracket to Frame nuts (lower)	65 ft. lbs.
Transfer Case Shift Lever Attaching Nuts	25 ft. lbs.
Transfer Case Shift Lever Rod Swivel Lock Nuts	50 ft. lbs.
Transfer Case Shift Lever Locking Arm Nut	150 in. lbs.
Skid Plate Attaching Bolt Retaining Nuts	45 ft. lbs.
Crossmember Support Attaching Bolt Retaining Nut	45 ft. lbs.
Adapter Mount Bolts	25 ft. lbs.
Intermediate Case to Range Box Bolts	30 ft. lbs.
Front Output Bearing Retainer Bolts	30 ft. lbs.
Output Shaft Yoke Nuts	150 ft. lbs.
Front Output Rear Bearing Retainer Bolts	30 ft. lbs.
Differential Assembly Screws	45 ft. lbs.
Rear Output Shaft Housing	30 ft. lbs.
Poppet Ball Retainer Nut	15 ft. lbs.
Power Take Off Cover Bolts	15 ft. lbs.
Front Input Bearing Retainer Bolts	20 ft. lbs.
Filler Plug	25 ft. lbs.

TURBO HYDRA-MATIC 350

Pump Cover to Pump Body	17 ft. lbs.
Pump Assembly to Case	18-1/2 ft. lbs.
Valve Body and Support Plate	130 in. lbs.
Parking Lock Bracket	29 ft. lbs.
Oil Suction Screen	40 in. lbs.
Oil Pan to Case	130 in. lbs.
Extension to Case	25 ft. lbs.
Modulator Retainer to Case	130 in. lbs.
Inner Selector Lever to Shaft	25 ft. lbs.
Detent Valve Actuating Bracket	52 in. lbs.
Converter to Flywheel Bolts	35 ft. lbs.
Under Pan to Transmission Case	110 in. lbs.
Transmission Case to Engine	35 ft. lbs.
Oil Cooler Pipe Connectors to Transmission Case (straight pipe fitting)	25 ft. lbs.
(tapered pipe fitting)	15 ft. lbs.
Oil Cooler Pipe to Connectors	10 ft. lbs.
Detent Cable to Transmission	75 in. lbs.
Detent Cable to Carb	112 in. lbs.

TURBO HYDRA-MATIC 400/475

Pump Cover Bolts	18 ft. lbs.
Parking Pawl Bracket Bolts	18 ft. lbs.
Center Support Bolt	23 ft. lbs.
Pump to Case Attaching Bolts	18 ft. lbs.
Extension Housing to Case Attaching Bolts	23 ft. lbs.
Rear Servo Cover Bolts	18 ft. lbs.
Detent Solenoid Bolts	7 ft. lbs.
Control Valve Body Bolts	8 ft. lbs.
Bottom Pan Attaching Screws	12 ft. lbs.
Modulator Retainer Bolt	18 ft. lbs.
Governor Cover Bolts	18 ft. lbs.
Manual Lever to Manual Shaft Nut	8 ft. lbs.
Manual Shaft to Inside Detent Lever	18 ft. lbs.
Linkage Swivel Clamp Nut	43 ft. lbs.
Converter Dust Shield Screws	93 ft. lbs.
Transmission to Engine Mounting Bolts	35 ft. lbs.
Converter to Flywheel Bolts	35 ft. lbs.
Rear Mount to Transmission Bolts	40 ft. lbs.
Rear Mount to Crossmember Bolt	40 ft. lbs.
Crossmember Mounting Bolts	25 ft. lbs.
Oil Cooler Line	10 ft. lbs.
Line Pressure Take-Off Plug	13 ft. lbs.
Strainer Retainer Bolt	10 ft. lbs.
Oil Cooler Pipe Connectors to Transmission Case	28 ft. lbs.
Oil Cooler Pipe to Connector	10 in. lbs.
Downshift Switch to Bracket	22 in. lbs.

STEERING

SECTION 9

STEERING GEAR RATIOS

Vehicle	Manual		Power	
	Gear Ratio	Overall Ratio	Gear Ratio	Overall Ratio
G10-20	24:1	29.4:1 to 36.7:1	17.5:1	21.4:1 to 26.7:1
G30	24:1	29.4:1 to 36.4:1	17.5:1	21.4:1 to 26.5:1
P10	24:1	29.1:1 to 35.5:1	17.5:1	21.2:1 to 25.7:1
P20-30	24:1	29.1:1 to 35.3:1	17.5:1	21.2:1 to 25.7:1
Motor Home	—	—	14:1	16.0:1 to 21.9:1
C 10	24:1	29.1:1 to 37.0:1	16:1 to 13:1	16.9:1 to 20.2:1
C20-30	24:1	29.4:1 to 36.3:1	16:1 to 13:1	17.2:1 to 20.6:1
K10-20	24:1	24.6:1 to 28.0:1	16:1 to 13:1	13.2:1 to 17.2:1

MANUAL STEERING GEAR

Components	G10 - 30	C10 - 30 P10	K10 - 20	P20 - 30
Thrust Bearing Preload	6 to 11 lbs. in.	4 to 6 lbs. in.		9 to 12 lbs. in.
Adjuster Plug Lock Nut	85 lbs. ft.			
Over Center Preload	5 to 11 lbs. in.*	4 to 10 lbs. in.*		9 to 13 lbs. in.*
Over Center Lock Nut	25 lbs. ft.			
Total Steering Gear Preload	18 lbs. in. Max.	14 lbs. in. Max.		25 lbs. in. Max.

*In excess of thrust bearing preload.

POWER STEERING GEAR

Components	All C, P, K and G
Steering Gear Ball Drag	3 lbs. in. Max.
Thrust Bearing Preload	1/2 to 2 lbs. in.*
Adjuster Plug Locknut	80 lbs. ft.
Over-Center Preload	lbs. in.
Over-Center Adjusting Screw Locknut	35 lbs. ft.
Total Steering Gear Preload	14 lbs. in. Max.

*In excess of ball drag.
**In excess of ball drag and thrust bearing preload.

POWER STEERING PUMP PRESSURES

Vehicle	Pressure
C10-30	1200 - 1300 psi
G10-20	900 - 1000 psi
G30	1200 - 1300 psi
P10-30	1200 - 1300 psi
Motor Home & K	1350 - 1450 psi

TORQUE SPECIFICATIONS

Component	C10-30	G10-30	K10-20	P10-30	MotorHome
Steering Wheel Nut	30 ft. lbs.	30 ft. lbs.	30 ft. lbs.	30 ft. lbs.	30 ft. lbs.
Turn Signal Lever Screw	20 in. lbs.	20 in. lbs.	20 in. lbs.	20 in. lbs.	20 in. lbs.
Tilt Wheel Lever	35 in. lbs.	35 in. lbs.	35 in. lbs.	35 in. lbs.	35 in. lbs.
Ignition Switch Screw	35 in. lbs.	—	35 in. lbs.	—	—
Turn Signal Switch Screws	25 in. lbs.	25 in. lbs.	25 in. lbs.	25 in. lbs.	25 in. lbs.
Turn Signal Housing Screws	45 in. lbs.	—	45 in. lbs.	—	45 in. lbs.
Lock Bolt Spring Screw (Tilt)	35 in. lbs.	35 in. lbs.	35 in. lbs.	35 in. lbs.	35 in. lbs.
Bearing Housing Support Screws (Tilt)	60 in. lbs.	60 in. lbs.	60 in. lbs.	60 in. lbs.	60 in. lbs.
Steering Column Bracket Screws	—	—	—	120 in. lbs.	120 in. lbs.
Column Support to Column Bracket Stud Nuts	20 ft. lbs.	—	20 ft. lbs.	—	—
Column Support to Column Bolts	23 ft. lbs.	—	23 ft. lbs.	—	—
Column to Dash Panel Clamp Screws	—	174 in. lbs.	—	120 in. lbs.	120 in. lbs.
Firewall (Toe Panel) Bracket Clamp Bolt	17 ft. lbs.	—	17 ft. lbs.	98 in. lbs.	98 in. lbs.
Floor Pan Cover Screws	35 in. lbs.	—	35 in. lbs.	—	—
Floor Pan Cover Clamp Screws	35 in. lbs.	—	35 in. lbs.	—	—
Toe Panel Cover Screws	20 in. lbs.	30 in. lbs.	20 in. lbs.	25 in. lbs.	43 in. lbs.
Lower Coupling to Wormshaft Clamp Bolt	30 ft. lbs.	30 ft. lbs.	30 ft. lbs.	—	—
Upper and Lower Univesal Joint Clamp	—	—	—	75 ft. lbs.	75 ft. lbs.
Lower Bearing Adjusting Ring Bolt	—	70 in. lbs.	—	70 in. lbs.	70 in. lbs.
Upper Steering Shaft Clamp	—	—	—	18 ft. lbs.	18 ft. lbs.
Lower Mast Jacket Bearing Clamp Bolt	—		—	34 ft. lbs.	48 ft. lbs.
Flexible Coupling Stud Nuts	20 ft. lbs.	18 ft. lbs.	20 ft. lbs.	—	18 ft. lbs.
Steering Gear Mounting Bolt Nuts	65 ft. lbs.	110 ft. lbs.	65 ft. lbs.	65 ft. lbs.	65 ft. lbs.
Steering Gear Support Reinforcement Bolts	—	—	—	30 ft. lbs.	30 ft. lbs.

TORQUE SPECIFICATIONS

Component	C10-30	G10-30	K10-20	P10-30	MotorHome
Tie Rod End Stud Nuts	45 ft. lbs.*	45 ft. lbs.*	45 ft. lbs.*	45 ft. lbs.*	45 ft. lbs.*
Pitman Shaft Nut	185 ft. lbs.	185 ft. lbs.	90 ft. lbs.	185 ft. lbs.	125 ft. lbs.
Idler Arm to Frame Bolts	30 ft. lbs.	30 ft. lbs.	—	30 ft. lbs.	30 ft. lbs.
Idler Arm to Relay Rod Stud Nut	60 ft. lbs.	70 ft. lbs.	—	60 ft. lbs.	60 ft. lbs.
Pitman Arm to Relay Rod Nut	60 ft. lbs.	70 ft. lbs.	—	60 ft. lbs.	60 ft. lbs.
Pitman Arm to Idler Support Arm Nut	—	—	—	125 ft. lbs.	125 ft. lbs.
Relay Support Assembly to Frame Nut	—	—	—	48 ft. lbs.	48 ft. lbs.
Steering Connecting Rod Nuts	—	—	50 ft. lbs.	70 ft. lbs.	70 ft. lbs.▲
Steering Connecting Rod Clamp Nuts	—	—	40 ft. lbs.	—	—
Tie Rod Clamp Bolt Nuts	22 ft. lbs.	22 ft. lbs.	22 ft. lbs.	22 ft. lbs.	22 ft. lbs.
Absorber to Axles Stud Nut	—	—	80 ft. lbs.	—	—
Absorber to Tie Rod Stud Nut	—	—	45 ft. lbs.*	—	—
Power Steering Pump Mounting Bracket Bolts	(L-6) 18 ft. lbs. (V-8) 25 ft. lbs.	(L-6) 18 ft. lbs. (V-8) 25 ft. lbs.	(L-6) 18 ft. lbs. (V-8) 25 ft. lbs.	(L-6) 18 ft. lbs. (V-8) 25 ft. lbs.	(L-6) 18 ft. lbs. (V-8) 25 ft. lbs.
Power Stering Pump Mounting Bolts	(L-6) 18 ft. lbs. (V-8) 25 ft. lbs.	(L-6) 18 ft. lbs. (V-8) 25 ft. lbs.	(L-6) 18 ft. lbs. (V-8) 25 ft. lbs.	(L-6) 18 ft. lbs. (V-8) 25 ft. lbs.	(L-6) 18 ft. lbs. (V-8) 25 ft. lbs.
Power Steering Pump Mounting Stud Nut	(L-6) 18 ft. lbs. (V-8) 25 ft. lbs.	(L-6) 18 ft. lbs. (V-8) 25 ft. lbs.	(L-6) 18 ft. lbs. (V-8) 25 ft. lbs.	(L-6) 18 ft. lbs. (V-8) 25 ft. lbs.	(L-6) 18 ft. lbs. (V-8) 25 ft. lbs.
Power Steering Hose Clamp Screws	15 in. lbs.	15 in. lbs.	15 in. lbs.	15 in. lbs.	15 in. lbs.
Power Steering Gear Hose Fittings	25 ft. lbs.	25 ft. lbs.	25 ft. lbs.	25 ft. lbs.	165 in. lbs.
Power Steering Hose Clamp Nut	150 in. lbs.	—	150 in. lbs.	150 in. lbs.	—
Power Steering Hose Clip Nut	150 in. lbs.	150 in. lbs.	150 in. lbs.	—	18 ft. lbs.
Oil Cooler to Radiator Support	30 in. lbs.	—	—	—	—
Reservoir Attaching Screws	—	—	—	—	15 in. lbs.
Reservoir Hose Clamp Screws	—	—	—	—	150 in. lbs.

*Plus additional torque required to align castellation with cotter pin hole in stud (not to exceed 60 ft. lbs. maximum)
▲Plus additional torque required to align castellation with cotter pin hole in stud (not to exceed 100 ft. lbs. maximum)

WHEELS AND TIRES

SECTION 10

WHEELS

Wheel Nut Torque - 10-30 Series

SERIES	DESCRIPTION	TORQUE
K10, 15	7/16" Bolts (6)	70- 90 Ft. Lbs.
C, P10, 15	1/2" Bolts (5)	75-100 Ft. Lbs.
C, P20, 25, 30, 35 Single Wheels	9/16" Bolts (8)	90-120 Ft. Lbs.
C, P20, 25, 30, 35 Dual Wheels	9/16" Bolts (8)	110-140 Ft. Lbs.
	Heavy Duty Wheels 5/8" Bolts (10)	130-180 Ft. Lbs.

SERIES	DESCRIPTION	TORQUE
G10, 15	7/16" Bolts (6)	55- 75 Ft. Lbs.
G20, 25	1/2" Bolts (5)	75-100 Ft. Lbs.
G30, 35 Single Wheels	9/16" Bolts (8)	90-120 Ft. Lbs.
G30, 35 Dual Wheels	9/16" Bolts (8)	110-140 Ft. Lbs.

TIRES

See "Minimum Tire Inflation" and "Tire Load and Inflation Pressure" Charts in Section 10 of this Manual.

SHEET METAL

SECTION 11

TORQUE SPECIFICATIONS

	CK	G	P
Lock Support to Hood	150 in. lbs.	150 in. lbs.	
Lock Bolt Nut	30 ft. lbs.	40 ft. lbs.	
Bumper Bolt Nut	85 in. lbs.	150 in. lbs.	
Hood Hinge	35 ft. lbs.	18 ft. lbs.	
Hood Lock Catch	150 in. lbs.	18 ft. lbs.	
Hood Stop Bolt	25 ft. lbs.		
Hood Support Rod Assembly		85 ft. lbs.	
Lock Support to Rad. Support	150 in. lbs.	18 ft. lbs.	
Rad. Support to Frame	35 ft. lbs.		30 ft. lbs.
Radiator Support Bracket to Fender	50 in. lbs.		
Radiator Support to Fender	150 in. lbs.		
Rad. Grille Panel	150 in. lbs.		
Tie Bar Assembly		90 in. lbs.	
Radiator Support Cover Plate			30 in. lbs.
Fender Skirt to Fender	150 in. lbs.		150 in. lbs.
Fender to Cowl	35 ft. lbs.		
Fender Skirt to Underbody	35 ft. lbs.		
Fender Skirt Rear Support to Frame			65 in. lbs.
Rear Fender to Side Panel	92 in. lbs.		
Rear Fender Brace to Fender	150 in. lbs.		
Dual Wheel Fender to Side Panel	150 in. lbs.		
Running board, Hangers, and Braces	150 in. lbs.		

BODY AND CHASSIS ELECTRICAL

SECTION 12

FUSES—CIRCUIT BREAKERS

The wiring circuits are protected from short circuits by a combination of fuses, circuit breakers, and fusible thermal links in the wiring itself. This greatly reduces the hazard of electrically caused fires in the vehicles.

The headlamp circuits are protected by a circuit breaker in the light switch. An electrical overload on the breaker will cause the lamps to go on and off, or in some cases to remain off.

In addition to a fuse, the windshield wiper motor is also protected by a circuit breaker. If the motor overheats, due to overloading caused by heavy snow, etc., the wipers will remain stopped until the motor cools.

Fuses located in the Junction Block beneath the dash on the drivers side are:

C-K TRUCK

Heater, Front A/C, Generator Warning Lamp	20 Amp
Idle Stop Solenoid, Aux. Battery, Radio, Time Delay Relay, Emission Control Solenoid, Transmission Downshift (M40)	15 Amp
Cigarette Lighter, Clock, Dome Lamp, Cargo Lamp	20 Amp
Fuel Gauge, Brake Warning Lamp, Temperature Warning Lamp, Oil Pressure Warning Lamp	4 Amp
Courtesy Lamp, Roof Marker Lamp, License Plate Lamp, Parking Lamp, Side Marker Lamp, Tail Lamp, Clearance Lamp	20 Amp
Directional Signal Indicator Lamp, Stop Lamp, Traffic Hazard	15 Amp
Instrument Cluster Lamp, Heater Dial Lamp, Radio Dial Lamp, Cruise Control Lamp, Windshield Wiper Switch Lamp	4 Amp
Windshield Wiper/Washer	25 Amp
Cruise Control, Rear Window, Aux. Fuel Tank, Tachometer, Back-up Lamp, Directional Signal Indicator Lamp, Directional Signal Lamp, Headlamp Buzzer	15 Amp

P TRUCK

Heater†, Air Conditioning†	25 Amp
Instrument Cluster Lamp, Windshield Wiper Switch Lamp	3 Amp
Directional Signal Indicator Lamp, Stop Lamp, Traffic Hazard	15 Amp
Fuel Gauge, Brake Warning Lamp	3 Amp
License Plate Lamp, Parking Lamp, Side Marker Lamp, Tail Lamp, Clearance Lamp, Identification Lamp	15 Amp
Windshield Washer/Wiper	25 Amp
Cigarette Lighter†, Clock†, Courtesy†, Dome Lamp†	15 Amp
Auxiliary Battery†, Back-up Lamp, Radio	15 Amp
Idle Stop Solenoid, Cruise Control†, Directional Signal Lamp, Time Delay Relay, Emission Control Solenoid, Transmission Downshift (M40)	10 Amp

In-line fuses are located in the auxiliary heater circuits (C-K-P models) and underhood lamp, front and rear A/C circuits (C-K models).

†When incorporated by body builder.

Do not use fuses of higher amperage than those recommended above.

The following wiring harnesses are protected by a "fusible link" which is a special wire incorporated in the circuit: headlamp hi-beam indicator, horn and ignition circuits (C-K-P models); starter solenoid (pull-in and hold) circuit (C-K models). Should an electrical overload occur, this wire will fail and prevent damage to the major harness.

G TRUCK

Heater, A/C	25 amp
Idle Stop Solenoid, Cruise Control, Directional Signal Lamp, Directional Signal Indicator Lamp, Transmission Downshift (M40)	10 amp
Cigarette Lighter, Dome Lamp, Spot Lamp	15 amp
Fuel Gauge, Brake Warning Lamp, Temperature Warning Lamp, Generator Warning Lamp, Oil Pressure Warning Lamp	3 amp
Stop Lamp, Traffic Hazard	15 amp
Auxiliary Battery, Backing Lamp, Radio Dial Lamp, Radio	15 amp
Instrument Cluster Lamp, Heater Dial Lamp, Transmission Control Lamp with Tilt Wheel, Cruise Control Lamp, W/S Wiper Switch Lamp, Headlamp Buzzer	3 amp
License Lamp, Parking Lamp, Side Marker Lamp Tail Lamp	15 amp
Windshield Wiper	25 amp

An in-Line fuse is located in the Ammeter and the auxiliary heater circuits.

Do not use fuses of higher amperage rating than those recommended above.

The following wiring harnesses are protected by a "fusible link" which is a special wire incorporated in the circuit; ignition, horn and headlamp hi-beam indicator circuits. Should an electrical overload occur, this wire will fail and prevent damage to the major harness.

CIRCUIT BREAKERS

Device or circuit protected	Models	Amperes	Location
Headlamp and parking lamp circuit	C-K-P-G	15	Light switch
Tailgate window motor	C-K	30	Dash (forward side)
Rear A/C (C69overhead)	G	35	Dash (forward side)

LAMP BULB DATA
C-K-P TRUCK

Used in	Quantity	Trade #	Power
Dome lamps:			
Cab	1	1003	15 CP
Blazer, Jimmy & Suburban	1	211-2	12 CP
Oil Pressure indicator lamp[1]	1	168	3 CP
Generator indicator lamp[1]	1	168	3 CP
Instrument cluster lamps[2]	5	168	3 CP
Headlamp beam indicator lamp	1	168	3 CP
Lamp assembly — tail & stop lamp	2	1157	3-32 CP
License lamp[4]	1	67	4 CP
Directional signal (front park lamps)[6]	2	1157	3-32 CP
Head Lamps	2	6014	50-60 W
Temperature indicator lamp	1	168	3 CP
Directional signal indicator lamp	2	168	3 CP
Clearance and marker lamps	4	168	3 CP
Roof marker lamps[5]	5	194	2 CP
Brake Warning Indicator	1	168	3 CP
Transmission Control	1	1445	0.7 CP
Backing lamp	2	1156	32 CP
Heater or A/C	1	1445	0.7 CP
Corner marker lamps	7	67	4 CP
Cargo lamp	1	1142	21 CP
Radio Dial lamp — AM	1	1816	3 CP
— AM/FM	1	216	1 CP
Cruise Control lamp	1	53	1 CP
Courtesy lamp	1	1003	15 CP
Windshield wiper switch	1	161	1 CP
Clock	1	168	3 CP
Rear Identification[7]	10	1895	2 CP
Underhood lamp	1	93	15 CP
Seat belt warning	1	168	3 CP
Cargo/dome lamp	2	211-2	12 CP

1 On CA, KA 10-35 instrument clusters only.
2 3 lamps used on instrument cluster on P models or C-K w/o gauges.
3 Double filament sealed beam 60W high beam, 50W low beam.
4 2 lamps used with step bumper and P models.
5 4 required on P models.
6 1157 NA, 2.2-24 CP on C-K models.
7 Wideside Pickup.

LAMP BULB DATA
G TRUCK

Used in	Quantity	Trade #	Power
Dome lamps	2	211-2	12 CP
Oil pressure indicator lamp	1	168	3 CP
Generator indicator lamp	1	168	3 CP
Instrument cluster lamps	3	168	3 CP
Headlamp beam indicator lamp	1	168	3 CP
Park, directional signal lamps	2	1157	3-32 CP
Tail, stop lamps	2	1157	3-32 CP
License lamp	1	67	4 CP
Head Lamps[1]	2	6014	50-60W
Temperature Indicator Lamp	1	168	3 CP
Directional signal indicator lamp	2	168	3 CP
Marker lamps	4	168	3 CP
Brake warning indicator lamp	1	168	3 CP
Back-up lamp	2	1156	32 CP
Radio dial lamp	1	1893	2 CP
Heater or A/C Contro.	1	1895	2 CP
Transmission Control w/Tilt Wheel	1	1445	0.7 CP
Cruise control	1	53	1 CP
W/S wiper switch lamp	1	161	1 CP

1 Double filament sealed beam 60W high beam, 50W low beam.

RADIATOR AND GRILLE

SECTION 13

TORQUE SPECIFICATIONS

		CK	G	P
Grille to Tie Bar		—	96 in. lbs.	—
Grille		12 in. lbs.	96 in. lbs. (bolts) 50 in. lbs. (screws)	—
Grille Bracket to Radiator Support		150 in. lbs.	—	—
Fan Shroud		50 in. lbs.	42 in. lbs.	120 in. lbs. P(32) 50 in. lbs. P(42)
Fan Guard		—	96 in. lbs.	—
Coolant Recovery Tank Brkt.		30 in. lbs.	23 in. lbs.	28 in. lbs.
Drain Plug		112 in. lbs.	112 in. lbs.	112 in. lbs.
Hose Clamps		17 in. lbs.	17 in. lbs.	18 in. lbs.
Radiator Mounting Panel		150 in. lbs.	18 ft. lbs.	150 in. lbs.
Radiator Mounting Bracket and Brace (Motor Home)	To Radiator	—	—	150 in. lbs.
	To Frame			25 ft. lbs.
Radiator Support Bracket To Frame		—	—	35 ft. lbs.
Radiator Baffle		—	96 in. lbs.	—
Radiator Baffle Seal Retainer		—	—	150 in. lbs.
Radiator Mounting Strap		—	—	150 in. lbs. (upper) 30 ft. lbs. (lower)
Filler Neck Support		—	—	85 in. lbs.
Support Bracket to Radiator support		—	—	42 in. lbs.

BUMPERS

SECTION 14

TORQUE SPECIFICATIONS C, P AND K

Front Bumper . . . . 35 ft. lbs.
Front Bumper Bracket and Brace . . . . 70 ft. lbs.
Rear Bumper to Outer Bracket . . . . 35 ft. lbs.
Rear Bumper Outer Bracket and Brace . . . . 50 ft. lbs.
License Plate Bracket . . . . 18 ft. lbs.
Gravel Deflector . . . . 85 in. lbs.
Rear Step Bumper to Bracket or Frame . . . . 40 ft. lbs.

TORQUE SPECIFICATIONS G

Front Face Bar to Bracket . . . . 24 ft. lbs.
Bracket to Cross Sill . . . . 24 ft. lbs.
License Plate Bracket to Face Bar . . . . .100 in. lbs.
Rear Face Bar to Brackets . . . . 55 ft. lbs.
Bracket to Floor . . . . 55 ft. lbs.

ACCESSORIES

SECTION 15

CRUISE-MASTER

Solenoid Resistance . . . . 5 ohms ± 1/4 ohm
Solenoid Wire Resistance . . . . 40 ohms
Maximum allowable Vacuum Leakage rate for Servo unit . . . . 5 inches of Vacuum Per Minute
Not Greater than 1 inch of Vacuum per 10 seconds
Operational Test Speed . . . . 55 MPH

CHEVROLET

SERVICE