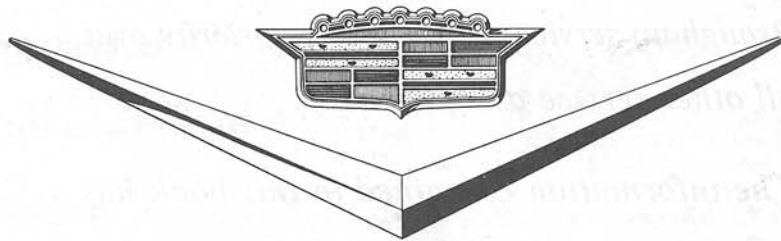


SERVICE
INFORMATION

CADILLAC

Eldorado Brougham

SERVICE INFORMATION



Service Department

CADILLAC MOTOR CAR DIVISION

General Motors Corporation

Detroit, Michigan

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General Motors Corporation

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It is with great pride that the Cadillac Motor Car Division offers the Eldorado Brougham to the motoring public.

The Brougham will be purchased by discriminating individuals who want and demand automotive perfection. The importance of proper maintenance cannot be over-estimated. Brougham service should receive priority over all other service assignments.

The information contained in this book has been prepared to assist you in maintaining the prestige and performance of every Brougham.

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Foreword

The service information contained in this publication pertains only to those features that are exclusive with the Eldorado Brougham, or differ from corresponding features of the Cadillac cars as presented in the 1957 Cadillac Shop Manual.

This Brougham service information book has been prepared for use in conjunction with the 1957 Cadillac Shop Manual. When used together, they provide complete information for servicing the Brougham.

Arrangement

Page tabs appear at the beginning of each section. Each tab corresponds to its related section as listed in the Table of Contents at the beginning of the book. The individual sections contain a brief descriptive introduction, service information, replacement procedures, charts and illustrations. In addition, any special tools required for servicing, adjusting or replacing parts on the Brougham are listed and illustrated at the end of each section, as well as special information, if

any, on specifications or torque tightness.

A complete alphabetical index is located in the back of the book.

Description of Engine Serial and Unit Numbers

a. Engine Serial Number

Each Eldorado Brougham carries an engine serial number. The engine serial number is used in license and insurance applications and in general reference to the car. This number contains ten digits, of which the first two indicate the model year, the third and fourth the series, and the last six digits indicate the order in which the car was completed in final assembly, and is referred to as the "Broadcast Number" of the car. Brougham engines are numbered in sequence with other 1957 Cadillac engines.

b. Engine Unit Number

Each Brougham engine carries an engine unit number. The letters L.C. are added to the engine unit number on all Brougham engines built to low compression standards.

Unit Identification Number Locations—(Refer to Fig. 1-1)

Engine Serial Number Location

The serial number of all 1957 Eldorado Brougham engines is stamped on the flat machined boss cast on the upper right hand corner on the front face of the right hand cylinder block. This number is also stamped on the right hand side frame member at the rear of the engine mounting bracket, and on the lubrication plate attached to the rear face of the left front body pillar.

Engine Unit Number Location

The engine unit number of all engines is stamped on the bell housing portion of the crankcase behind the left hand cylinder block.

Freon Compressor Serial Number Location

The serial number plate of the Freon compressor is located on the rear upper edge of the compressor flange.

Hydra-Matic Transmission Unit Number Location

The Hydra-Matic transmission unit number is stamped on a plate attached to the left side of the transmission case, just to the rear of the transmission throttle and manual levers.

Radio Serial Number Location

The radio serial number plate is located on the right side of the tuner unit.

Air Suspension Compressor Serial Number Location

The air suspension compressor serial number plate is located on the top surface of the compressor.

Autronic Eye Serial Number Location

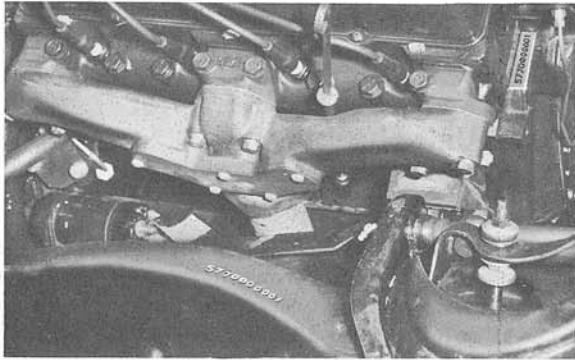
The Autronic Eye serial number plate is located on the bottom of the photo tube unit (mounted on the left side of the instrument panel).

Control Solenoid Serial Number Location

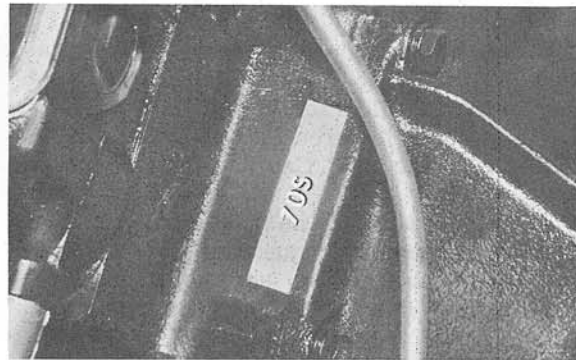
The control solenoid serial number is stamped on the rear face of the unit.

Body Name Plate (Refer to Fig. 1-2)

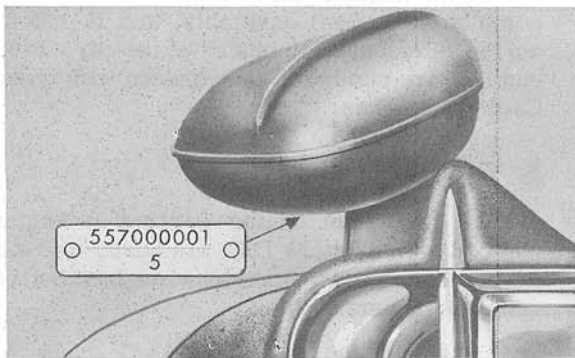
The body style number, body number, and trim and paint numbers are stamped on a plate attached to the top surface of the left air duct cover under the hood, near the cowl.



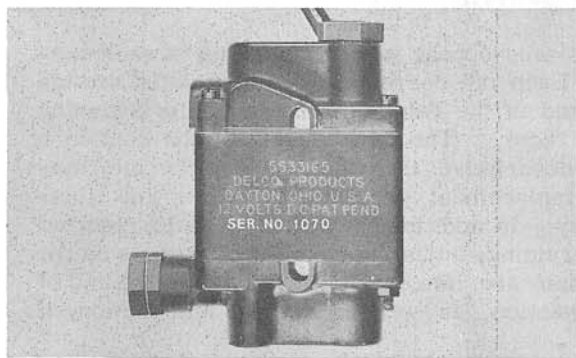
Engine Serial No. Location



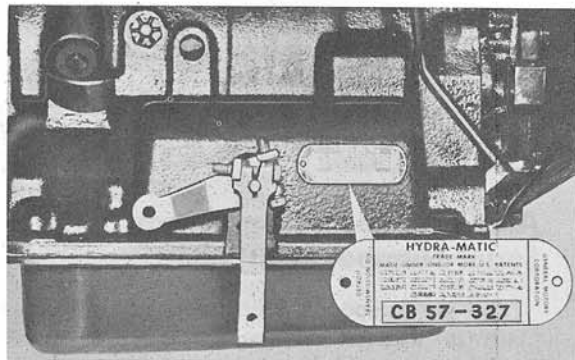
Engine Unit No. Location



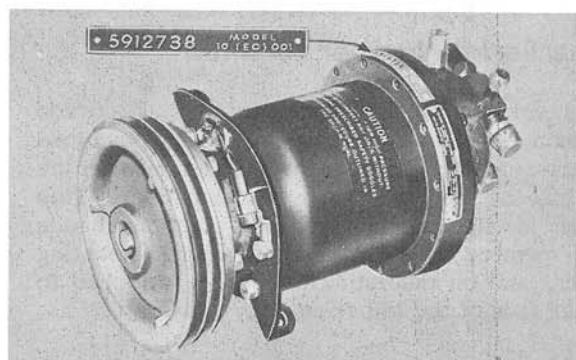
Autronic Eye Serial No. Location



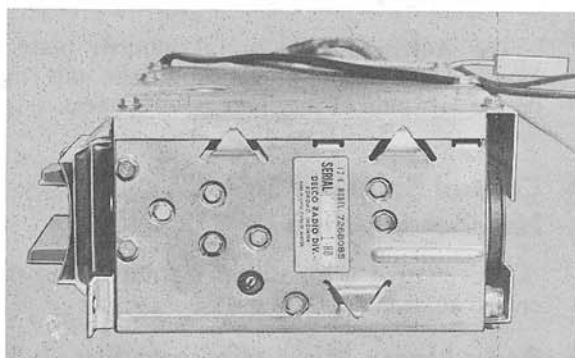
Control Solenoid Serial No. Location



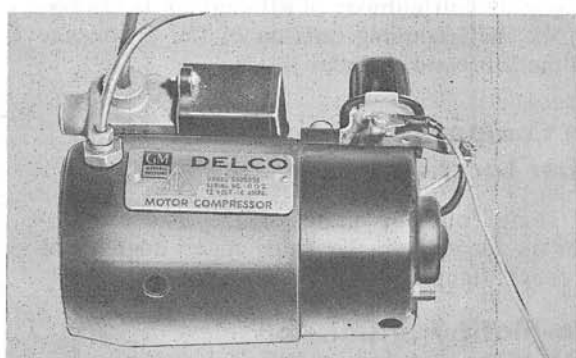
Hydra-Matic Transmission Unit No. Location



Freon Compressor Serial No. Location



Radio Serial No. Location



Air Suspension Compressor Serial No. Location

Fig. 1-1 Unit Identification Number Locations



Fig. 1-2 Body Name Plate

Rear Axle Gear Ratio

The gear ratio of the differential assembly is 3:36-1 for all Eldorado Broughams. The numeral "6" stamped on the front face of the carrier assembly serves as identification for this gear ratio.

STANDARD EQUIPMENT ITEMS

Hydra-Matic Transmission

Power Steering

Power Brakes

Air Conditioning

Dual Carburetors

Low Profile Tires

E-Z Eye Tinted Glass

Forged Aluminum Wheels

Automatic Favorite Position Seat

All Transistor Radio

Automatic Antenna

Fog Lamps

Heater - Including 2 Rear Underseat

Electric Safety Door Locks

Automatic Starter

Air Spring and Levelizing System

Center Arm Rest - Front and Rear

Parking Brake Tell-Tale Light

Generator Tell-Tale Light

Low Fuel Tell-Tale Light

Temperature Tell-Tale Light

Oil Pressure Tell-Tale Light

Air Pressure Tell-Tale Light

4 Balanced Tone Horns

Cigarette Lighters

Sun Glare Visors

Brushed Stainless Steel Top

4 Unit Headlamp System

Remote Control Left Outside Mirror

Electric Window Lifts

Power Operated Ventilator Windows

Remote Control Trunk Lock

Electric Deck Lid Opener and Closer

Electric Drum Type Clock

Directional Signals

Back-Up Lights - Dual

Windshield Washer and Coordinator

Ash Tray Receiver Lights

Full-Flow Oil Filter

Oil Bath Air Cleaner

Courtesy and Map Light

Luggage Compartment Light

Glove Box Lights - Dual

Glare Proof Rear View Mirror

Vanity, Instrument Panel Compartment, Containing:

Comb and Mirror

Lipstick Holder

Compact and Powder Puff

Coin Holder

Compartment for Loose Cigarettes

Glove Box Door Fitted With:

Stand-Up Type Mirror - Retractable

GENERAL INFORMATION

STANDARD EQUIPMENT ITEMS—(Cont.)

6 Drinking Cups in Plastic Container

Cigarette Package Holder

Tissue Dispenser

Rear Arm Rest Compartment Containing:

Filled Perfume Bottle with Plunger Type Atomizer Containing Arpege Extrait de Lanvin Perfume

Mirror Assembly

Memo Book and Pencil

SPECIFICATIONS

Series Number	Body Style Number	Body Style Name	Min. Road Clearance	Engine Unit Number	Height	Wheel-base	Width	Length
57-70	70-59	Eldorado Brougham	5.0" (at oil pan)	70S	55.5"	126"	78.5"	216-5/16"

— OTHER NOTES AND REFERENCES —

GENERAL DESCRIPTION

The lubrication and preventive maintenance requirements of the Eldorado Brougham are similar to the requirements of other 1957 series cars. There are, however, some lubrication and preventive maintenance operations that are exclusive

to the Brougham only. These operations are covered in the following service information section and illustrated in Fig. 2-1, which is a supplement to the 1957 Shop Manual lubrication chart.

SERVICE INFORMATION—LUBRICATION

(1) Hydra-Matic Transmission

The recommended maximum interval between Hydra-Matic transmission fluid changes for the Brougham is 12,000 miles or one year, whichever occurs first.

More frequent changes are recommended when the car is operated under conditions that tend to cause more rapid oxidation of the fluid. Examples are: frequent use in heavy city traffic, prolonged driving during periods of hot weather, or continual operation in mountainous country. A change interval of 6,000 miles is recommended under such operating conditions.

The Hydra-Matic transmission fluid level checking procedures and fluid changing procedures remain the same as those recommended for other 1957 series Cadillac cars.

(2) Engine Accessories

Engine Oil Filter

The engine oil filter used on the Eldorado Brougham cars is of the full-flow type. It is recommended that the oil filter element be replaced every 6,000 miles under normal operating conditions. If the car has been exposed to severe driving conditions, such as constant driving over dusty roads or excessive stop and go driving in cold weather, more frequent replacement of the filter element may be necessary.

The full-flow type oil filter filters 100% of the oil delivered by the oil pump. For this reason, it is of great importance that the recommended oil filter change intervals be followed:

a. Filter Element Replacement

1. Remove drain plug from oil filter reservoir and permit oil to drain out.
2. Remove oil filter reservoir retaining screw.
3. Remove reservoir, element, and gasket.
4. Wash and dry reservoir and make certain that gasket surfaces are clean.

5. Place a new element in reservoir, position new gasket and install reservoir. Tighten retaining screw to 40 ft. lbs. torque.

6. Install drain plug and tighten to 20 ft. lbs. torque.

7. Add 6 quarts of oil to engine crankcase.

8. Operate engine at fast idle and check for oil leaks at reservoir gasket, drain plug, and retaining screw.

9. After engine has run for 3 to 4 minutes, stop engine and check oil level.

Battery

The battery is located in a separate compartment in the right rear quarter panel and is accessible through the interior of the trunk. The battery fluid level should ordinarily be checked every 2,000 miles. In warm weather, a check should be made at two week intervals.

To check the electrolyte level, open the trunk, loosen the spare tire, release the clip retainers on the battery cover plate and remove cover. If the fluid level is found to be low, add distilled or demineralized water to bring the level up to the bottom of the slot in the well.

Carburetor Air Cleaner Description

The carburetor air cleaner used on the Brougham is of the double oil-bath type. It is recommended that the air cleaner be serviced every 2,000 miles under normal operating conditions.

a. Servicing Carburetor Air Cleaner

1. Disconnect the air suspension compressor air line at the air cleaner.
2. Remove two carburetor wing nuts, and remove air cleaner assembly from car.
3. Remove retaining nuts and separate oil filter elements and oil reservoirs from shroud.

4. Remove oil filter elements from reservoir and pour oil out of reservoir.

5. Wash reservoirs and filter elements in solvent.

6. Fill reservoirs to correct level as indicated on the inside of the reservoir. Use SAE 40 oil when the average temperature is above 32°F and SAE 20 oil when the average temperature is below 32°F.

7. Inspect the filter element to shroud gaskets and the shroud to carburetor gaskets. Replace these gaskets if they are damaged or if there is an indication of improper contact.

8. Place the filter elements in the oil reservoir and secure to shroud with retaining nuts.

9. Place the air cleaner assembly on carbure-

tors and tighten wing nuts finger tight.

10. Connect the air suspension compressor air line at the air cleaner.

Generator

The oil cups at each end of the generator should be lubricated with 8-10 drops of SAE 20W engine oil every 2,000 miles.

(3) Points Requiring No Lubrication

No lubrication is required at the water pump, the rear wheel bearings, propeller shaft bearing or the universal joints, as all of these bearings are packed at assembly.

No lubrication is required at the front or rear mounting of the rear suspension lower links or the upper control yoke.



Fig. 2-1 Lubrication Chart

SERVICE INFORMATION—PREVENTIVE MAINTENANCE

(1) Periodic Preventive Maintenance Operations**a. Air Suspension System**

1. Drain moisture from accumulator tank every 2,000 miles. Refer to Page 4-6.

2. Remove, clean, and install filters in control solenoid valve every 6 months or 6,000 miles. Refer to Section 4, Note 35.

3. Remove, clean, and install filter in air suspension compressor oil line every 6,000 miles. Refer to Section 4, Note 30.

b. Gasoline Lines and Strainers

1. Clean out twice a year, spring and fall. Replace fuel filter element every 4,000 miles.

c. Cooling System

1. Flush twice a year, spring and fall. Add rust

inhibitor and duPont Sealer.

d. Engine Oil Pan and Oil Filter

1. Remove and clean engine oil pan once a year, after the winter season. Replace filter element every 6,000 miles.

e. Tires

1. Interchange every 4,000 miles.

f. Brake System

1. Clean and flush once a year.

g. Air Conditioner—Check Before Summer Use

1. Check condenser, clean out bugs and dirt.

2. Check compressor oil level.

3. Check Freon.

4. Check belt tension.

CAPACITIES

Unit	Capacity
Engine Crankcase	5 Quarts
When Filter Element is Changed	6 Quarts
Cooling System	22-1/2 Quarts
Air Conditioner - Freon 12	4 Pounds
Compressor Oil	9 Ounces
Rear Axle	5 Pints
Gasoline Tank	20 Gallons
Hydra-Matic - Dry	11-1/2 Quarts
Refill	11 Quarts
* Tire Pressure - Front	24 Pounds
Rear	24 Pounds

*When speeds in excess of 75 MPH are anticipated, inflate to 4 pounds over this pressure.

— OTHER NOTES AND REFERENCES —

GENERAL DESCRIPTION

The frame used on the Eldorado Brougham is similar in construction to the frames used on all other 1957 series cars.

This frame has distinctive features to accommodate the air type suspension. A bracket has been added to the front cross member to support

the levelizer and solenoid valves. The number four frame cross member has been designed to support the new rear upper control yoke. The rear lower control links are fastened to a bracket on the number four body support. The main frame members have been curved outward at the rear to support the air suspension and to provide additional trunk capacity.

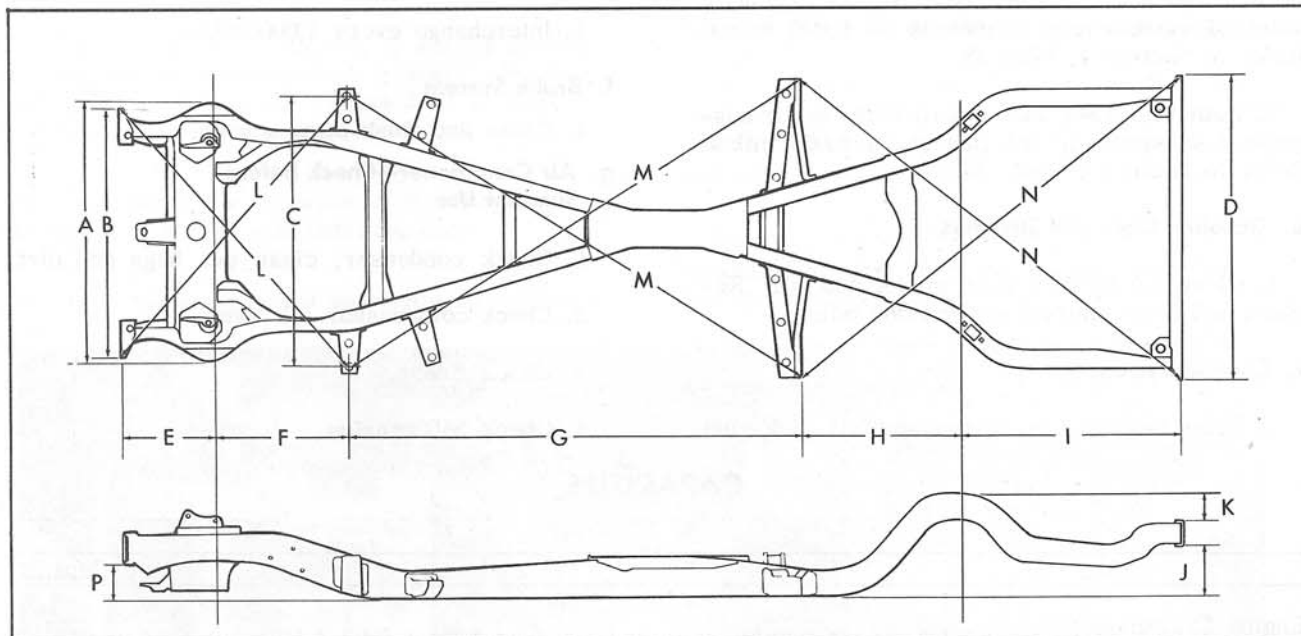


Fig. 3-1 Frame Checking Dimensions

Dimension	Measurement	Dimension	Measurement
A	44-7/8"	I	38-5/16"
B	43-3/8"	J	9-9/16"
C	46-31/32"	K	5-1/8"
D	52-1/16"	L	59-13/16"
E	16-5/8"	M	97-1/8"
F	22-1/2"	N	83-7/16"
G	76-3/4"	P	6-3/4"
H	26-3/4"		

- A - Maximum spread of frame at front cross member.
- B - Outside of front end of left front bumper bracket to outside of front end of right front bumper bracket.
- C - Left front body bolt to right front body bolt.
- D - Overall length of rear cross member - not including reinforcements.
- E - Outside face of front bumper bracket to centerline of front wheels.
- F - Centerline of front wheels to front body bolts.
- G - Front body bolts to outside rear end of number four body bracket.
- H - Outside rear end of number four body bracket to center of rear wheels.

- I - Centerline of rear wheels to rear end of rear cross member.
- J - Bottom of rear cross member at rear end to normal bottom of side bar.
- K - Top of rear cross member to top of side bar at rear wheels.
- L - Outside of front end of left front bumper bracket to right front body bolt and vice versa.
- M - Left front body bolt to outside rear end of right number four bracket and vice versa.
- N - Outside rear end of left number four body bracket to outside right rear corner of rear cross member and vice versa.
- P - Bottom of front bumper bracket to normal bottom of side bar.

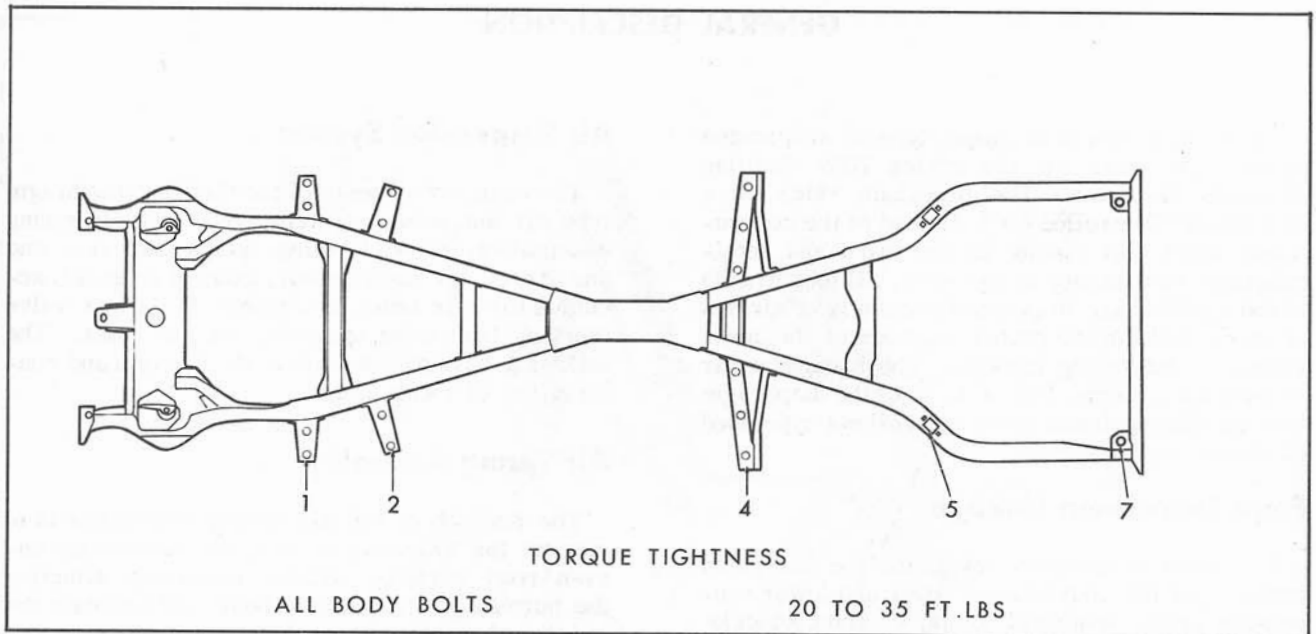


Fig. 3-2 Body Bolt Location

— OTHER NOTES AND REFERENCES —

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GENERAL DESCRIPTION

An entirely new and unique type of suspension system is used on the series 7059 Cadillac Eldorado Brougham. The Brougham rides on a cushion of "Controlled air". Instead of the conventional steel coil spring in the front and semi-elliptical leaf spring in the rear, all four wheels of the Cadillac air suspension system have springs of metal and corded rubber, with air as the cushioning or dampening medium. The Brougham air suspension system, Fig. 4-1, is of the diaphragm type as distinguished from the bellows type used on trucks and busses.

Front Suspension Linkage

The front suspension linkage on the Brougham consists of the conventional upper and lower suspension arms, spherical joints, steering knuckle, and steering arm. The 7059 front suspension differs basically from other series Cadillacs only in the type of spring and location of the shock absorber.

Conventional steel coil springs are replaced by air springs; but, the spring locations are the same. The front shock absorbers on the Brougham are mounted at their upper end in a tower which is bolted to the outside of the front frame cross-member. The lower end of the shock absorber is attached to a bracket on the rear edge of the lower suspension arm.

Rear Suspension Linkage

The rear suspension linkage on the Brougham consists of two lower control links and an upper control yoke. The front ends of the lower control links are attached to a body mounting bracket which is a welded part of the frame. The rear ends of the lower control link are attached by means of spherical joints to a bracket on the axle housing.

The two front arms of the upper control yoke are attached to a frame cross-member just forward of the rear axle. The rear end of the yoke is attached to a spherical joint which is mounted on the upper part of the differential assembly. The upper yoke is designed to take all thrust forces resulting from the car's turning or cornering.

Spherical joints are used in the axle end of both the upper control yoke and the lower control links to permit movement of the axle as the rear wheels move up and down over irregularities in the road.

The rear shock absorbers are mounted at their upper end in a frame bracket to the rear of the axle center line. The lower end of the shock absorber is attached to a bracket at the rear of the axle housing.

Air Suspension System

The basic components of the Cadillac diaphragm type air suspension system are: four air spring assemblies, three leveling valves (two rear and one front), air compressor, control solenoid, accumulator (air tank), restricted "T" check valve (serving both front springs), and air lines. The following paragraphs explain the function and construction of these units.

Air Spring Assembly

The function of the air spring assemblies is to support the weight of the car, compensate for uneven road surfaces without noticeably affecting the normal position of the body, and maintain the standing height of the vehicle regardless of car loading.

Front Air Spring Assembly

The major components of the front air spring assembly are: The air dome, rubber diaphragm, diaphragm retainer, retainer plate, and piston. The front air spring disassembled is shown in Fig. 4-2.

The front spring assembly air dome and retainer plate are bolted together. This assembly is bolted to the frame front cross-member. A diaphragm retainer is positioned on top of the piston and is held in place by locking flanges on the retainer. The diaphragm forms an air tight seal between the retainer plate and the piston. The piston rests on a phenolic resin bearing which, in turn, fits into a depression on the spring seat of the lower suspension arm to which it is attached.

Rear Air Spring Assembly

The major components of the rear spring assembly are: The air dome, rubber diaphragm, retainer plate and piston. The rear air spring disassembled is shown in Fig. 4-3.

The rear spring assembly is bolted to a bracket on the frame side member. The piston seat is retained by a pin at the lower end of the piston rod, and the piston rod is attached by means of a spring clip to a bracket welded to the rear axle.

Leveling Valve

A leveling system is incorporated in the air suspension system. Through the use of three leveling valves, a constant relationship is maintained in the distance between the sprung weight (frame and body) and the ground, regardless of car loading.

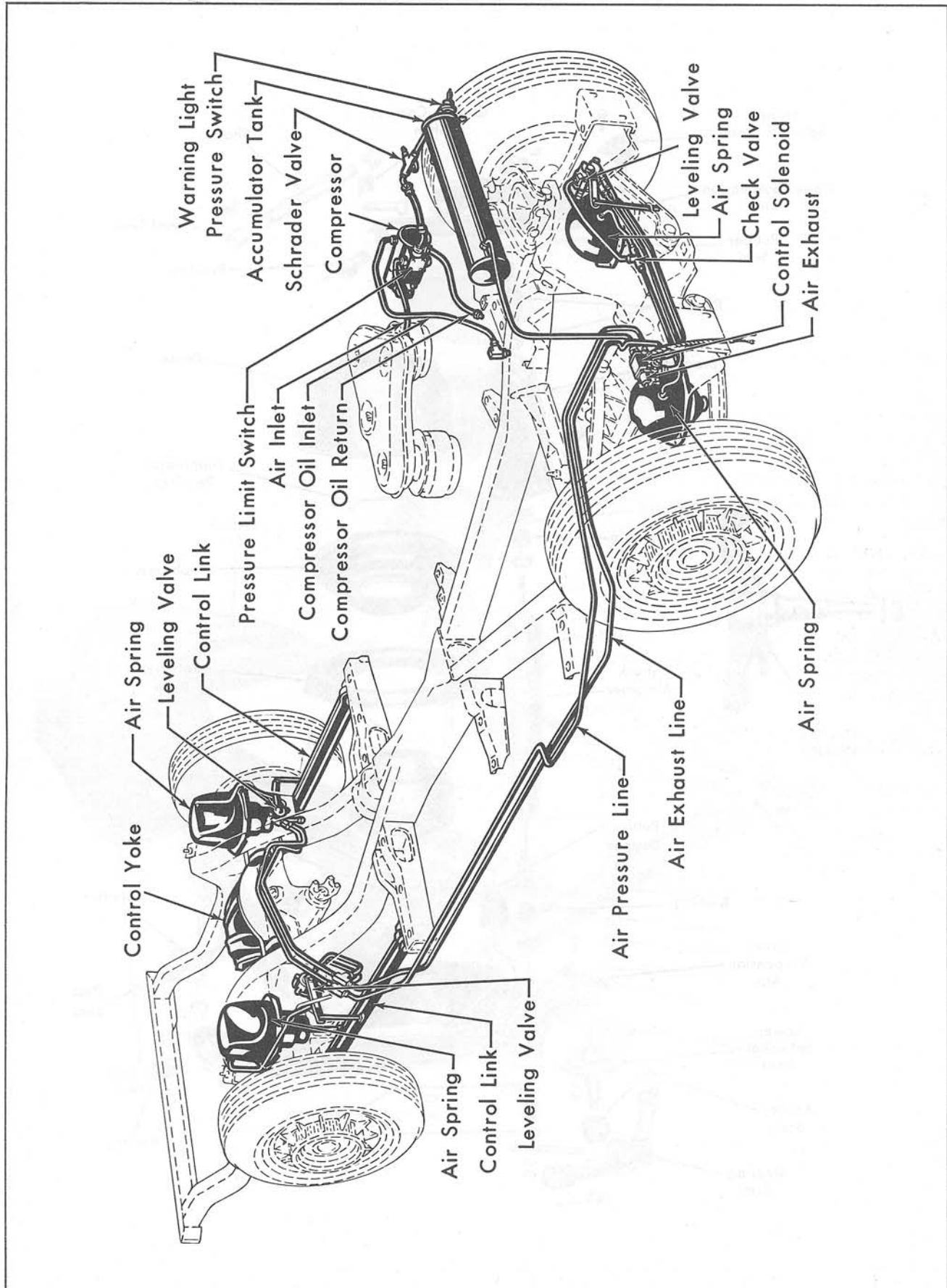


Fig. 4-1 Schematic View of Air Suspension System

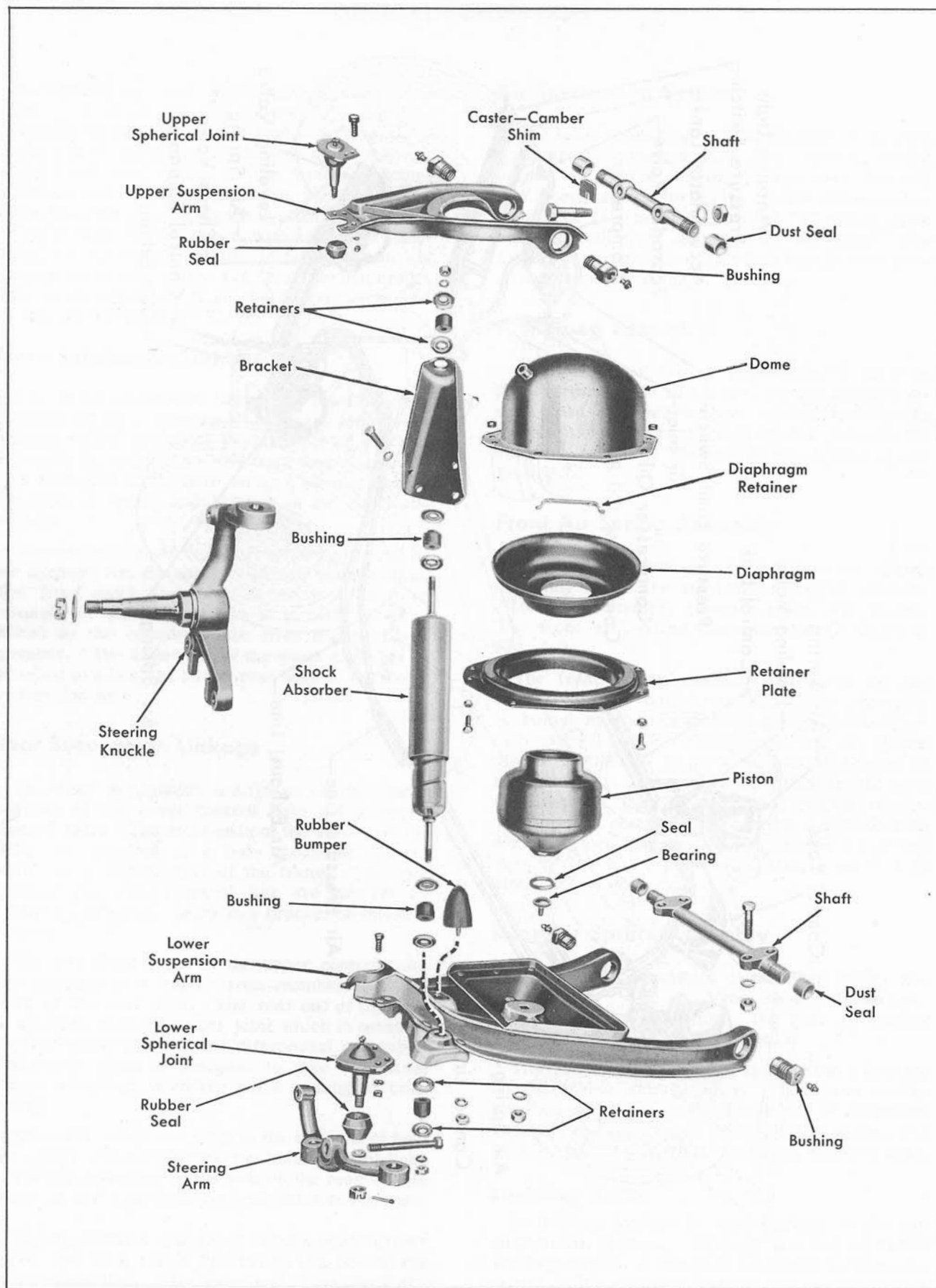


Fig. 4-2 Front Suspension Disassembled

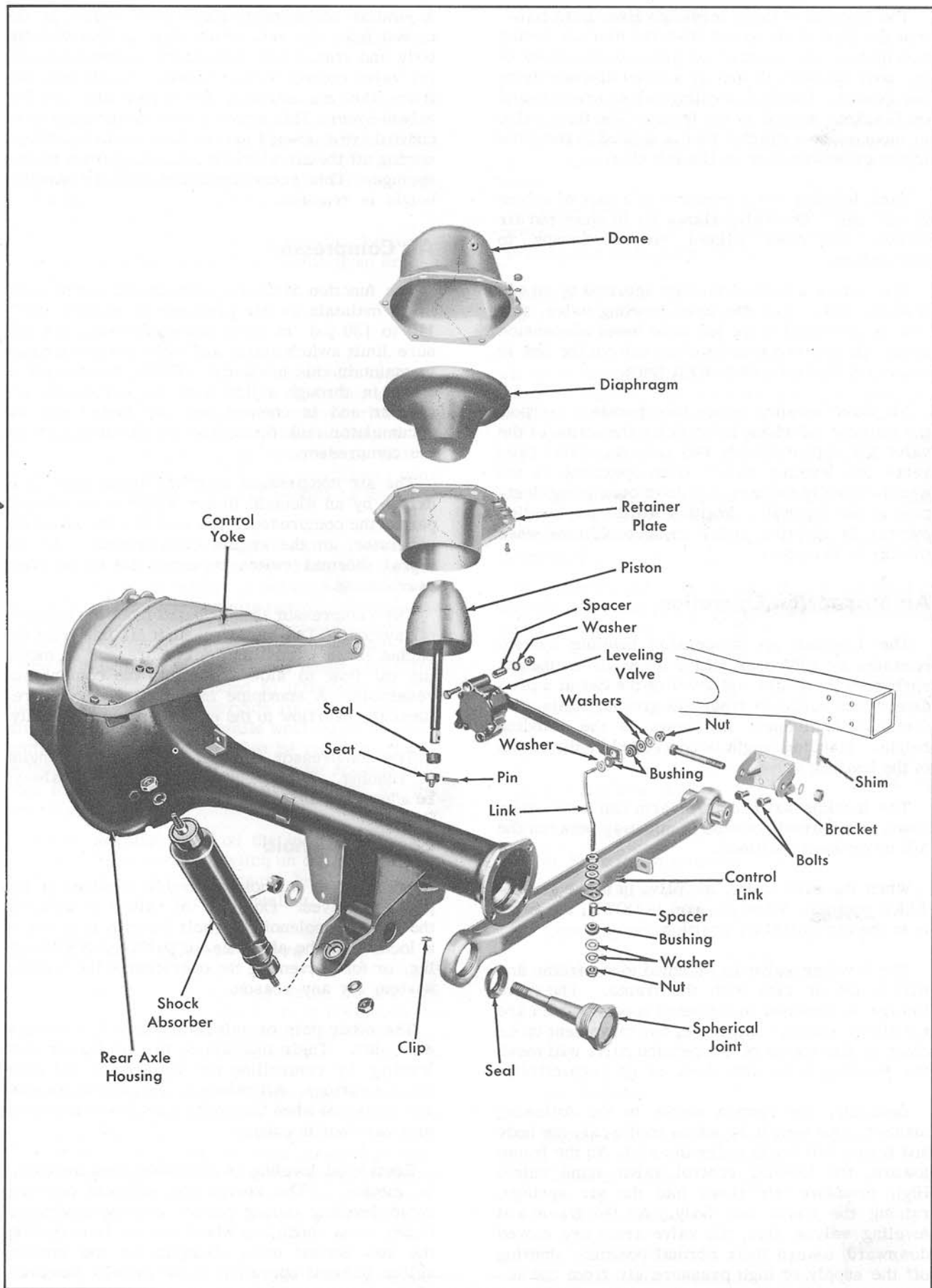


Fig. 4-3 Rear Suspension Disassembled

The function of these leveling valves is to control the flow of air to and from the four air spring assemblies as required to maintain the level of the body parallel to and at a fixed distance from the ground. The rear leveling valves are mounted on brackets welded to the frame. The front valve is mounted on a bracket that is welded to the front frame cross-member on the left side.

Each leveling valve consists of a pair of valves in one unit. One valve allows air to enter the air domes, the other allows air to escape to atmosphere.

The valves are mechanically actuated by an adjustable link. On the front leveling valve, this link is connected to the left hand lower suspension arm. On the two rear leveling valves, the link is connected to the lower control links.

All three leveling valves incorporate a dashpot, the purpose of which is to delay the action of the valve for approximately two seconds. This prevents the leveling valves from operating as the wheels rapidly move up and down over irregularities in the highway. In other words, the leveling system is inactive under most conditions when the car is in motion.

Air Suspension Operation

The Cadillac air suspension leveling system operates by adding or taking away air in the air springs to maintain the level of the car at a predetermined distance from the ground. This predetermined distance is known as the standing height. Standing height is controlled by the action of the leveling valve.

The leveling valve control arm can move up or down. Its normal position is mid-way between the full up or down positions.

When the arm is UP, the valve is in the air INTAKE position. When the arm is DOWN, the valve is in the air EXHAUST position.

The leveling valve is attached to the frame and will settle or rise with the frame. The valve linkage is attached to suspension parts which are relatively stable. Therefore, any movement up or down of the frame or suspension parts will move the leveling valve arm down or up respectively.

Basically, the system works in the following manner. As weight is added to the car, the body and frame will settle under the load. As the frame lowers, the leveling control valve arms raise. High pressure air flows into the air springs, raising the frame and body. As the frame and leveling valves rise, the valve arms are moved downward toward their normal position, shutting off the supply of high pressure air from the accumulator. This action continues until the pre-set standing height is reached.

A similar action takes place when weight is removed from the car. As weight is removed, the body and frame will rise, which causes the leveling valve control arms to lower. As air exhausts from the air springs, the frame and leveling valves lower. This action moves the leveling valve control arms upward toward their normal position, cutting off the air which is exhausting from the air springs. This action continues until the standing height is reached.

Air Compressor

The function of the low capacity air compressor is to maintain an air pressure of approximately 110 to 130 psi in the accumulator tank. A pressure limit switch starts and stops the compressor to maintain this pressure. Clean, outside air is taken in through a line from the carburetor air cleaner and is compressed and forced into the accumulator tank through an air line leading from the compressor.

The air compressor is of the piston type. It is driven by an electric motor which is an integral part of the compressor. The unit is mounted on the generator, in the engine compartment. An integral thermal switch protects the motor from overheating.

The compressor is lubricated from the engine's oil system. The high pressure oil line from the engine is restricted at the compressor to meter the oil flow to slow drops into the compressor reservoir. A standpipe in the oil reservoir returns the overflow to the engine oil pan by gravity.

The compressor can run only when the engine is running. This insures that there will always be adequate lubrication for the compressor.

Control Solenoid

The control solenoid assembly consists of two pairs of valves. One pair of valves is known as the "lockout solenoid". Their function is to act as a lockout to the air lines for parking, tire changing, or for preventing the operation of the leveling system for any reason.

The other pair of valves act as a "restriction solenoid". Their function is to give fast or slow leveling by controlling the air flow to and from the air springs. All valves in the control solenoid are activated when the ignition switch is turned on or a car door is open.

Restricted leveling is desirable when the car is in motion. The restriction solenoid prevents rapid leveling during certain driving conditions. Under most conditions where the car is in motion, the two second delay dashpots on the leveling valves prevent operation of the valves. However, when the car makes a long, sustained stop, or negotiates a long, sharp curve in the road, the

car will try to level itself after the two second delay. The restriction solenoid prevents rapid leveling under the above conditions.

The two valves in the lockout solenoid open and close together as do the two valves in the restriction solenoid. One of the two lockout solenoid valves is in the high pressure air line and the other is in the exhaust air line. The same applies to the two restriction solenoid valves.

The control solenoid is bolted to a bracket welded on the right hand side of the frame front cross-member.

Accumulator Tank

The accumulator is the air reservoir tank for the system. Its function is to store enough high pressure air to re-level the car from curb weight to a five passenger load without additional air from the compressor. The accumulator tank is mounted just forward of the air conditioner condenser on a support bracket welded to the condenser.

Constructed of welded metal with a 500 cu. in. capacity, the cylindrical accumulator also serves as a trap for oil or water. A pet cock at the lower left side of the tank permits periodic drainage of dirt and moisture. It is recommended that this be done at time of lubrication. A Schrader valve located in a T-fitting in the air line leading from the air compressor is provided to introduce air into the accumulator with a service air hose should the air supply be exhausted while working on the system. Air pressure can also be checked at this valve. An air line leading from the accumulator tank to the control solenoid provides air for the entire system.

A red warning light on the instrument panel, activated by a pressure switch on the accumulator tank, glows when the pressure level falls below the 82 psi required for car leveling.

Restricted "T" Check Valve

There is only one leveling valve for the two front air springs; therefore, it is necessary to connect the two in some manner. This is accomplished by a mechanical check valve.

The function of the check valve is to allow rapid flow of air between the front air springs and the control solenoid for fast leveling, but restrict the flow of air between the two front air springs during car roll such as while cornering. Without the check valve, air would move from one front spring to the other during a hard turn, resulting in very poor handling.

The "T" check valve is mounted on the frame front cross-member just to the right of the left radiator support frame bracket.

Air Lines and Air Flow

The function of the air lines is to carry high pressure air to the air springs and exhaust air from the air springs to atmosphere. All air lines carry air in one direction only, with the exception of the lines between the leveling valves and the air springs. Air flows in both directions in these lines.

Copper lines are used throughout the system to prevent internal rust and corrosion particles from forming and fouling the valves.

Basically, there are two classes of air lines -- high pressure and exhaust.

The high pressure lines carry high pressure air from the compressor through the accumulator, control solenoid, and leveling valves to each air spring. The exhaust lines carry air from each air spring through the leveling valves and out the control solenoid exhaust port to atmosphere.

The air lines are constructed with upset tube fittings and "O" ring seals on all ends. This construction provides a positive air tight seal at all connections.

In general, air flows through the air suspension system by means of air lines through the following parts of the System:

Intake

1. Carburetor air cleaner
2. Air compressor
3. Accumulator tank
4. Control solenoid
 - a. Restriction solenoid
 - b. Lockout solenoid
5. Leveling valves
6. Check valve (front air springs only)
7. Air springs.

Exhaust

1. Air springs
2. Check valve (front air springs only)
3. Leveling valves
4. Control solenoid
 - a. Lockout solenoid
 - b. Restriction solenoid
5. Exhaust port

Leveling Operation

Seven typical conditions encountered with the air suspension leveling system are described below.

1. All Doors Closed - Ignition Off

No leveling occurs under these conditions. The restriction solenoid and lockout solenoid are closed because they are not energized. High pressure air from the accumulator passes through the restriction in the restriction solenoid and stops at the closed lockout solenoid. The closed lockout solenoid prevents all movement of air to and from the air springs.

2. Any Door Open - Ignition Off or On - Intake

This condition would occur with passengers entering or luggage being placed in the car while any door is open and the engine is either running or stopped.

Both the restriction solenoid and the lockout solenoid are energized and open because a door is open. This allows high pressure air to flow, unrestricted, to the three leveling valves.

Due to the weight that has been added to the car, the leveling valves and domes will settle.

This movement raises the leveling valve arm, uncovering the inlet and allowing high pressure air from the accumulator to flow into the air spring.

As the domes and leveling valves rise under the increased pressure, the valve gradually closes off the inlet, thereby shutting off the high pressure air.

The leveling action stops when standing height is reached.

3. Door Open - Ignition Off or On - Exhaust

This condition would occur with passengers leaving or when luggage is removed from the car while a door is open and the engine is either running or stopped.

As in the intake condition just explained, the restriction and lockout solenoids are open.

When weight is removed from the car, the leveling valves and domes will rise. This action lowers the valve arm, uncovering the exhaust outlet and allowing air to escape from the air spring.

As the domes and leveling valves settle due to the loss of air in the air spring, the valve gradually closes off the outlet, shutting off the escaping air.

Again, the leveling action ceases when standing height is reached.

4. All Doors Closed - Ignition On

The next condition occurs as the car is in motion along the highway. Two second delay dashpots in the leveling valves prevent any leveling action from taking place when the wheels move rapidly up and down over road irregularities. Intake or exhaust action occurs only when the car is above or below normal standing height for a sustained period of more than two seconds.

5. All Doors Closed - Ignition On - Intake

The restriction solenoid is closed but the lockout solenoid is open. A small amount of air pressure from the accumulator is metered through the orifice of the restriction valve to the leveling valves. The valve inlets are open because the adjusting links have raised which moves the valve arms upward. Air is then admitted to the air springs.

6. All Doors Closed - Ignition on - Exhaust

As in the previous condition, the restriction solenoid is closed and the lockout solenoid is open, allowing a limited amount of air to be metered through the restriction valve.

When the wheels rebound from a bump, the adjusting links drop and move the valve arms downward. This uncovers the valve outlet and allows air to exhaust from the air spring.

The air then exhausts slowly to the open air through the orifice in the restriction valve.

7. Door Open - Ignition On - Uneven Loading

This situation will occur when more passengers or luggage are added to one side of the car than to the other side while a door is open. It will also take place when a door is open while the car is parked on an uneven surface. Many different conditions are possible, depending on the position of each wheel.

When more weight has been added to the left side than to the right side, both the restriction and the lockout solenoids are open. High pressure air from the accumulator flows unrestricted through the control solenoid to the leveling valves and levels the car as required by the change in weight distribution.

Leveling action depends on two factors:

1. Car loading.
2. Position of doors and ignition switch.

Either one or both of these factors must change or no leveling will result, assuming the car is at normal standing height with doors closed and ignition switch off.

For example, if the car is at standing height on a level surface and a door is opened, no leveling action will take place until weight is added to, or taken out of, the car.

Likewise, if the car is at standing height and weight is added to the rear compartment, for example, no leveling action will result unless a door is opened, or the ignition switch is on. In response to any change or shift of weight, the car will level slowly with the ignition switch on, or rapidly if any door is opened.

Special forged aluminum, chrome-plated wheels and tubeless tires are standard equipment on the Brougham.

The wheels are of the drop center type and are 15" in diameter with 6" rims. All wheels have a hump just inside the point where the outboard bead of the tire contacts the wheel rim. This raised portion helps keep the tire on the wheel during extremely severe cornering conditions. Wheel mounting studs on the left brake drums have left hand threads.

The Brougham tires are specially designed to offer greater stability and riding qualities. They have a low profile contour, 8.40 x 15 section, with a narrow white feature stripe on the sidewall. The tires are of 4 ply rayon cord construction with a Butyl liner that is an integral part of the casing.

SERVICE INFORMATION

(1) Preliminary Instructions

When servicing the chassis suspension system, first determine whether or not any leveling action is desired, depending upon the nature of the service being performed.

If no leveling action is desired, turn ignition switch off and close all doors. (As an added safety precaution, disconnect the battery ground strap.)

If slow leveling action is desired, have engine running. For fast leveling, open any door.

To exhaust all air from system, raise car and place on jack stands, allowing front and rear suspension system to hang in full rebound position. Open any door and remove Schrader valve core from T-fitting in line leading from air compressor to accumulator tank. Allow 5 to 10 minutes for air to exhaust completely.

For rapid replenishment of air supply, all wheels must be on the ground and any door open. Introduce external air at Schrader valve in compressor to accumulator line. The air supply can also be replenished by running the engine, but this is a much slower process.

If source of trouble can not be readily traced, check warning light on instrument panel. A red light will indicate when air pressure drops below the 82 psi required for car leveling. Air pressure can be restored by running the engine. Failure of warning light to go out, or continual "on" and "off" operation of light indicates an air leak in the system. To trace leak, perform Freon leak detector test as described in Note 2.

CAUTION: Never raise rear end of car with rear shock absorbers disconnected. If this were done, the car would be raised off its suspension resulting in separation of the rear air spring assemblies. If air is in the system, this would constitute a definite safety hazard to the operator as the diaphragm would be blown out of the assembly.

Rear shock absorbers serve also as rear suspension rebound stops. With the rear shock absorbers disconnected, the rubber diaphragm tends to support the axle in rebound. As the diaphragms are not designed to support this load, they will fail. This condition does not exist on the front suspension where the suspension arm travel limits the rebound.

If front or rear standing height is not within specifications, the air suspension system will not operate properly. When servicing the chassis suspension system, always check standing height and adjust if necessary. See Note 39.

(2) Freon Leak Test

If an air leak is evident and the source is unknown, perform the Freon leak test described below:

1. Open any door and allow car to reach normal standing height.
2. Leave door open and exhaust air at Schrader valve to 40 psi, checking with Air Pressure Gage Tool No. J-6840.
3. Exhaust air springs by lifting up on front and rear bumpers, in turn, until you can feel leveling

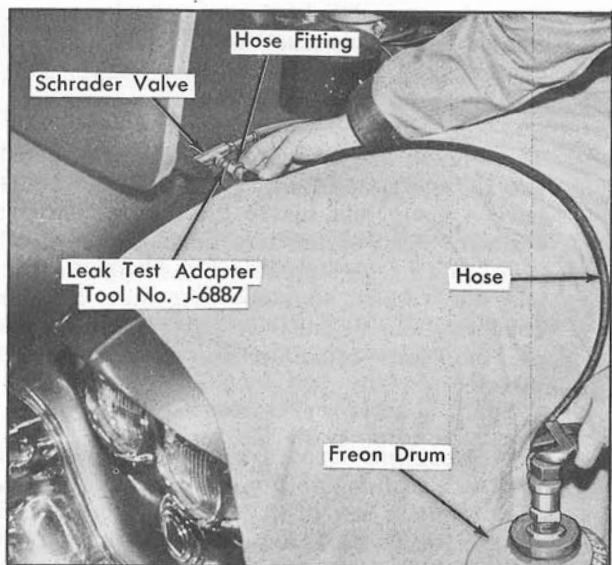


Fig. 4-4 Adding Freon to Suspension System

action trying to lower car. Check air pressure, and if necessary, refill system up to 40 psi with air hose. Car should be approximately 1" below standing height before introducing Freon.

4. Install Leak Test Adapter Tool No. J-6887 on Schrader valve and connect hose fitting on Freon Drum to Leak Test Adapter Tool, Fig. 4-4.

5. Introduce Freon into accumulator tank through Schrader valve. A minimum pressure build up of 80 psi is required; do not exceed 100 psi. Check with Air Pressure Gage Tool No. J-6840. If pressure cannot be built up sufficiently, heat Freon drum by placing the drum in a container of hot water. The temperature of the hot water should not exceed 125°F.

6. Let car assume normal standing height with aid of Freon pressure. Do not disturb static weight of car at this time.

7. Close all doors to lock system.

8. Use air hose under car to blow away any Freon vapor that may have collected in the atmosphere.

9. Proceed to check with Leak Detector, Tool No. J-6084, (in the same way as used for detecting Freon leaks in the air conditioning system), presence of Freon will change flame of Leak Detector Tool from blue to green. Check all air lines, fittings, and major components of the system.

(3) Towing Instructions

To prevent damage to the Hydra-Matic transmission, the Brougham should never be towed with the rear wheels on the ground unless the propeller shaft is disconnected.

The only exception to this rule would be when the distance is confined to only a few blocks.

When towing with the front or rear wheels raised off the ground with air in the suspension system, disconnect the battery ground strap to prevent any leveling action.

Instructions for various methods of towing are described below:

a. Towing (front end raised)—Air in Suspension System

1. Hook chain around front bumper mounting bar through opening in underside of impact bar above fog light (both sides).

2. Attach both ends of chain to tow truck spreader bar.

3. Place protective padding around front bumper impact bar extensions and hold a six foot length of 2" pipe under the bumper bar guards parallel with the front bumper, Fig. 4-5. Then, raise front end of car with truck hoist until spreader bar and chains are bearing against the length of 2" pipe and front end of car is raised sufficiently for towing purposes. Check rear end to assure ground clearance at spare tire well.

b. Towing (front end raised)—No Air in Suspension System

Attach tow chains as explained in Note 3a. Remove front wheels and lower front end of car until there is 6" clearance between lower edge of rear license plate holder and ground.

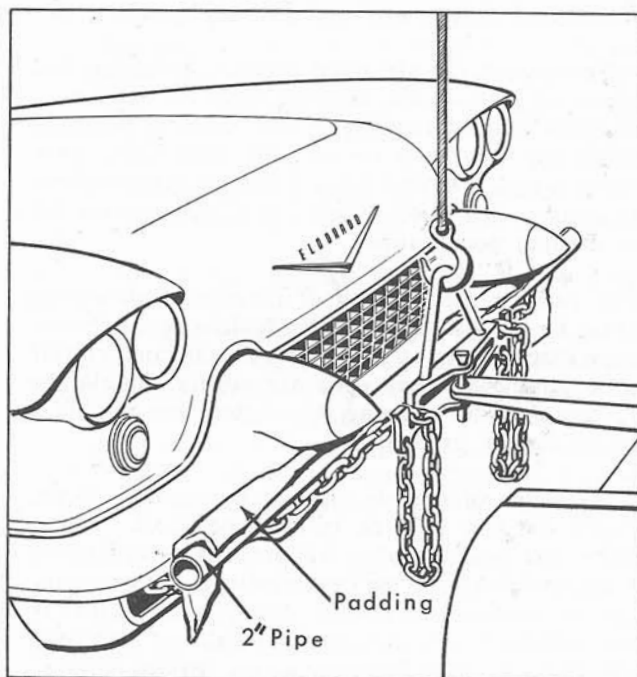


Fig. 4-5 Towing From Front

c. Towing (rear end raised)

Turn front wheels to straight ahead position and tie steering wheel securely to prevent movement of front wheels while towing.

Hook chain around rear bumper outer mounting bar through opening under rear bumper exhaust port (both sides). Place protective padding on under side of rear bumper outer impact bars where chain contacts, and connect chain to spreader bar of tow truck. Raise rear end of car with truck hoist. Before towing, make certain that front bumper is clear of ground.

d. Towing (all wheels on ground)

Hook chain around front bumper mounting bar through opening on underside of impact bar above fog light.

CAUTION: Do not tow at speeds over 10 miles per hour.

(4) Hoist Recommendations

Lifting equipment of the type that engages the suspension, axle or wheels is preferred when lifting the Eldorado Brougham.

When using a frame contact hoist, certain precautions must be observed due to the tubular center X frame construction. Special adapters must be used on the hoist rails to assure engagement with the car frame at the locations indicated by the shaded areas on Fig. 4-6.

Extreme care should be taken in positioning the front adapters to prevent contact with any part of the No. 2 body hanger as this would cause distortion exceeding allowable limits. To assure safety, contact at the rear should be made at the

outer end of the rear spring front hanger as shown in Fig. 4-6. In no case should the rear contact points be less than 40 inches apart.

CAUTION: Do not open any door or turn on the ignition when any wheel of the car is off the ground, such as when changing a tire or when the car is on a hoist. This will activate the air suspension system and permit leveling action.

(5) Front Wheel Alignment Procedure

Correct wheel alignment is necessary to keep the front wheels in the true running position and is essential for easy steering. Tire wear is affected, as far as front end alignment is concerned, only by incorrect toe-in. Incorrect caster or camber has little effect on tire wear.

The following operations should be performed in the order listed whenever the front wheel alignment is checked and adjusted.

1. Check tire pressure.
2. Check adjustment of front wheel bearings.
3. Check trueness and tracking of front and rear wheels.
4. Check front and rear standing height. See Note 39.
5. Check condition of front spherical joints and bushings (Note 15).
6. Check for looseness in steering gear and connections.
7. Check caster and camber.
8. Check toe-in and straight ahead position of steering wheel.

NOTE: Always check front end alignment whenever any front suspension part is removed and installed.

(6) Wheel Alignment Measuring Methods

All wheel alignment equipment manufacturers provide detailed instructions for checking wheel alignment and alignment equipment. These instructions should be followed exactly.

In addition to the manufacturer's instructions, be sure to observe the following recommendations.

1. Align the car on the movable plates of the alignment machine carefully so that the wheels are in the center of the plates. The car should also be square with the plates.

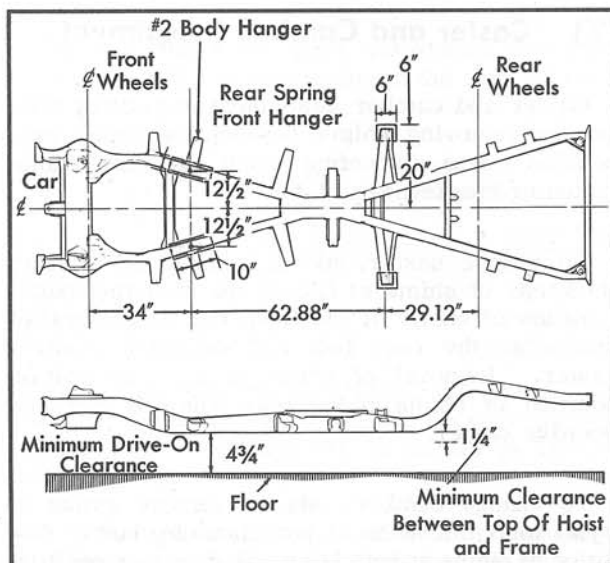


Fig. 4-6 Raising Car on Frame Contact Hoist

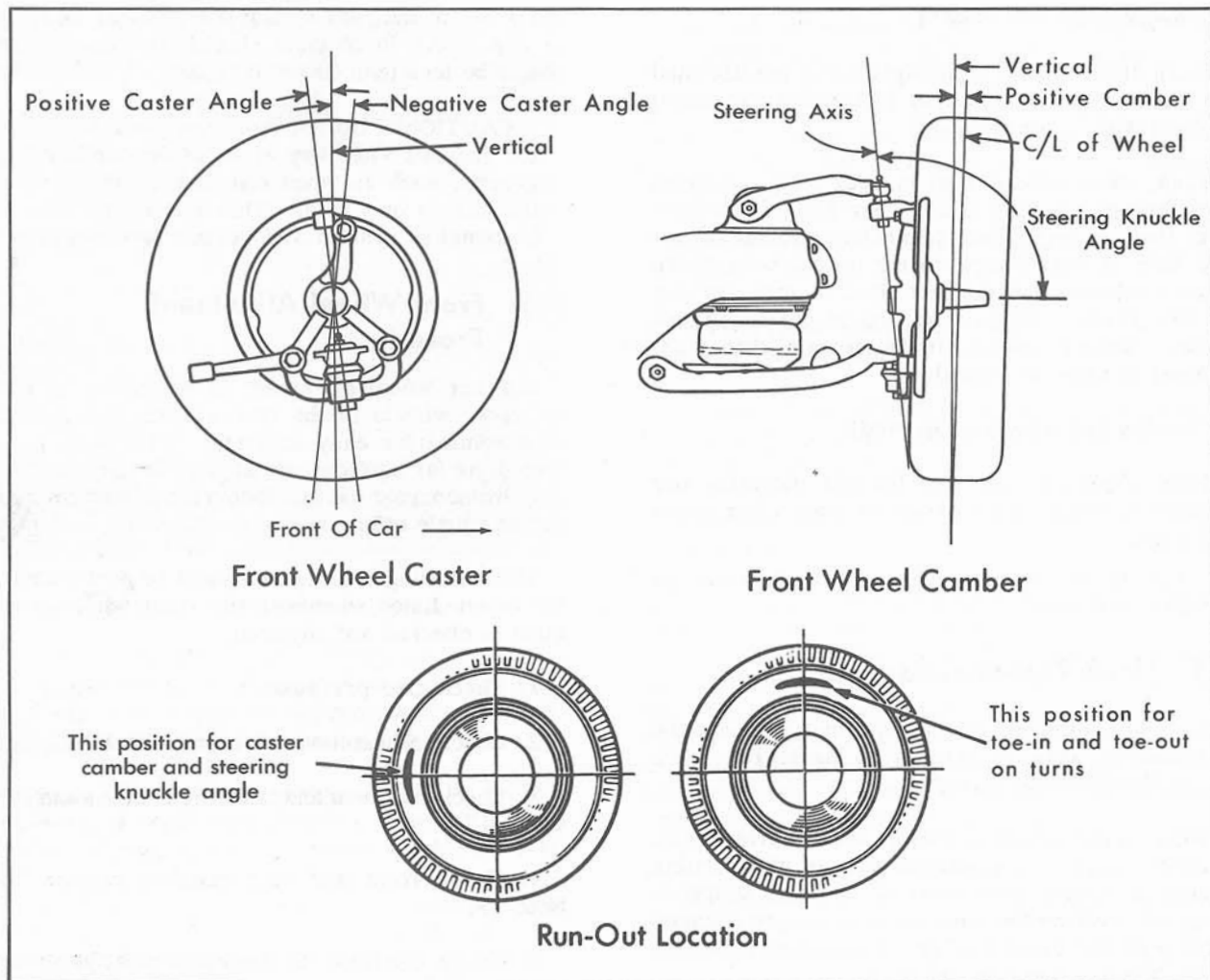


Fig. 4-7 Elements of Front Wheel Alignment

2. Inflate tires to proper pressure.
3. Block both rear wheels and set the parking brake to prevent any slight movement of the car.
4. Open any door (for fast leveling) and allow car to assume normal standing height. When leveling action stops, close the door.
5. Raise the front end and check the runout on the outer surface of the tire. Mark the spot where maximum runout occurs.
6. Place the maximum runout either to the front or rear as shown in Fig. 4-7. (This neutralizes the effect of runout on caster or camber.) Lower the front end.
7. Open any door to normalize standing height, then close the door.
8. Caster and camber may now be checked.
9. Raise front wheels and set maximum runout at top or bottom to neutralize effect on toe-in and toe-out, Fig. 4-7.

10. Lower car, open any door to allow car to assume normal standing height. Close door and check toe-in.

(7) Caster and Camber Adjustment

Caster and camber adjustment is made by adding or removing shims between the upper suspension arm mounting shaft and the frame mounting bracket, Fig. 4-8.

To change caster, add or remove the correct thickness of shims at one of the mounting bolts. Addition of shims at the front bolt or removal of shims at the rear bolt will decrease positive caster. Removal of shims at the front bolt or addition of shims at the rear bolt will increase positive caster.

To change camber, add or remove shims of equal total thickness at both mounting bolts. Addition of shims at both bolts will decrease positive camber. Removal of shims at both bolts will increase positive camber.

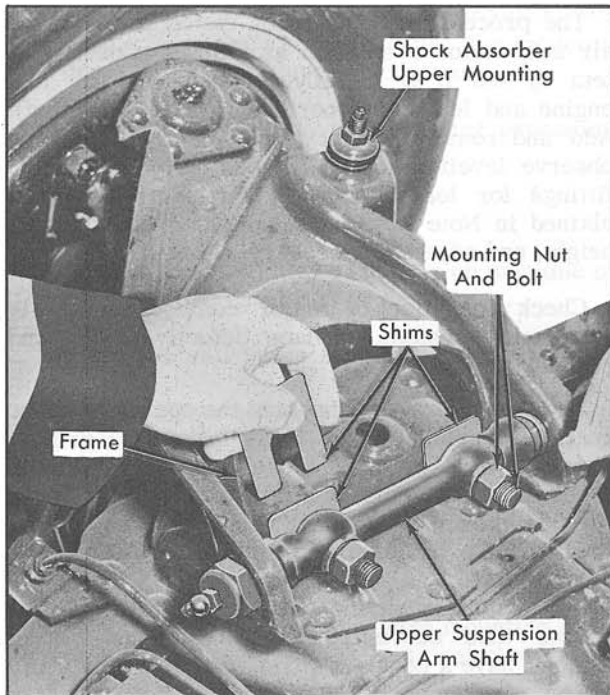


Fig. 4-8 Caster-Camber Adjustment

The shims for adjustment are available in three thicknesses: .0149", .0418", and .1046". The shims will change caster or camber by the following amounts:

Shim Size	Caster Change (Shim at one bolt)	Camber Change (Shim at both bolts)
.0149"	1/60°	1/15°
.0418"	1/20°	1/5°
.1046"	1-1/60°	1/2°

NOTE: Changing shims at one bolt to correct caster will affect camber slightly. If a large caster change is made, the resulting camber change should be taken into consideration.

The following table gives the amount of change in camber when adding shims to the front or rear bolts to change caster.

Shim Size	Camber Change When Shims are Changed at:	
	Front Bolt	Rear Bolt
.0149"	0°	1/15°
.0418"	1/60°	1/5°
.1046"	1/30°	1/2°

When possible, make caster adjustments by changing shims at the front bolt because the resulting camber change will be small, as can be seen in the table above.

NOTE: If more than 1/4" total thickness of shims are necessary to bring suspension to within specifications, check for bent or damaged parts.

To adjust caster or camber:

1. Loosen upper suspension arm mounting bolts.
2. Add or remove shims as required, Fig. 4-8.
3. Tighten mounting bolts to 130-140 ft. lbs.

NOTE: In order to avoid pulling to the right on high crowned roads, it is necessary to adjust the camber so that the left wheel has 1/4° to 1/2° more positive camber than the right wheel.

Caster should be 0° to -1°. Camber should be -3/8° to +3/8°.

(8) Toe-In Adjustment

The setting or adjustment of the front wheels where the distance between them is less at the front of the tire than at the rear is called "toe-in". The purpose of toe-in is to counteract the forces that tend to make the front wheels toe-out while the car is traveling forward.

Toe-in should be measured at the wheel rim with equipment that is used while the car is at rest. The correct setting should be 1/8" ± 1/32".

When checking toe-in, the readings should be taken only when the front wheels are in a straight ahead position and with steering gear on its high spot. Maximum tire runout should be in a vertical plane, as shown in Fig. 4-7.

Toe-in adjustment is made by turning the tie rod adjusters at the outer ends of each tie rod after loosening clamp screws. Left and right adjusting sleeves must be turned in opposite directions to provide similar adjustment. Be sure to turn both adjusters an equal amount when adjusting toe-in so that the relation of steering gear high spot to the straight ahead position of the front wheels will not be changed.

When adjustment has been completed according to recommended specifications, tighten all clamp screws.

NOTE: Be sure open sides of clamps are downward, and both tie rod ball studs and tie rod ends are in centralized position before tightening clamps.

(9) Tire Switching

Normal tire wear is uneven between the front and rear wheels because of the difference in the functions of the front and rear wheels. To minimize tire wear and noise, it is recommended that tires be switched, as shown in Fig. 4-9, at least every 4,000 miles. Utilizing the spare tire in rotation with the other four tires gives 20% more mileage before replacement tires are needed. The tires should be rotated as follows:

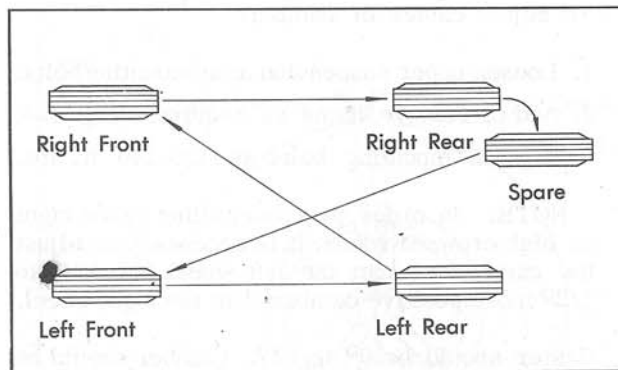


Fig. 4-9 Tire Switching

1. Place spare tire and wheel at the left front.
2. Move left front to left rear.
3. Move left rear to the right front.
4. Move right front to right rear.
5. The right rear wheel and tire should be used as the spare.

NOTE: To remove rear wheels, jack one side of the car up at a time. Remove and replace wheel and proceed to opposite side. Leave doors closed to prevent leveling action.

Do not raise entire rear end of car and attempt to remove both rear wheels at one time with car in this position.

(10) Riding Complaints

In cases of complaints of hard riding, the first items to investigate are proper front end lubrication, correct tire pressure and correct shock absorber action. If these are correct, the amount of friction in the front wheel suspension system should be checked. Also, check the operation of the air suspension system and rear suspension linkage.

The procedure for checking excessive friction in the front wheel suspension system is as follows: Lubricate suspension system, make certain ignition switch is off and doors are closed. Raise front end of car as high as possible. Slowly release the bumper and allow the car to assume normal standing height. Measure distance from floor to center of bumper. In like manner, push down on bumper, release slowly and allow car to assume normal standing height; again measure the height of the bumper.

If the difference between these two measurements is $7/8$ " or more, it indicates excessive friction in the suspension system. Probable causes could be excessive tightness in the suspension arm inner mounting shafts or spherical joints.

The procedure for checking the operation of the air suspension system is as follows: Check system to see if it is fully charged with air. Run engine and leave any door open (for fast leveling). Add and remove weight to and from the car and observe leveling action. Check all air lines and fittings for leaks, using Freon leak test as explained in Note 2. Check front and rear standing height, and adjust if necessary. Note 39.

Check operation of major components of air suspension system, replace defective units, and recheck for air leaks.

The procedure for checking the operation of the rear suspension linkage is as follows: Turn ignition switch off and close doors. Lubricate spherical joint on differential housing where upper yoke is mounted. Inspect upper yoke and lower control links for damage. Replace if necessary.

Brougham air springs are much less likely to bottom than conventional steel springs. Steel springs have a constant spring rate and only stiffen up when they strike a rubber bumper. Air springs have a variable spring rate and stiffen up on bumps and provide a softer spring action on rebound movements of the wheel, before the axle moves far enough to bottom.

Heavy loads over rough roads should not cause the air springs to bottom. The Brougham maintains a constant standing height, giving the same quality ride, regardless of loading conditions.

(11) Tire Demounting, Mounting, and Inflating Instructions

The wheels on the Brougham, as on all 1957 series Cadillac cars, are of a new design incorporating a raised hump on the inner, narrow ledge of the wheel, as shown in Fig. 4-10. The hump prevents the tire bead from breaking away from the outer rim area of the wheel during extreme conditions of cornering or in the event of the tire being subjected to side thrust due to striking a curbing.

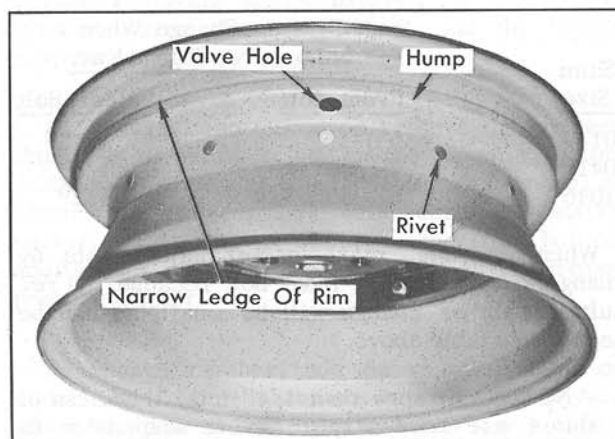


Fig. 4-10 Wheel Design

The new design has resulted in reduced rim well depth and, therefore, a special tire mounting and demounting procedure is necessary.

For maximum safety, the following procedure should be observed.

a. Demounting

1. Place tire and wheel assembly on machine or floor with the narrow ledge of the rim up.

2. Remove valve cap and core, deflating tire.

3. Using a bead breaker tool, carefully separate bead from rim.

CAUTION: The use of tire irons for breaking beads away from rim is not recommended as there is a possibility of damaging the sealing surface on the tire bead.

4. Use a liberal amount of tire mounting compound, such as vegetable oil soap solution, on the tire beads. Work outside tire bead over rim, and then remove the inside bead.

5. Remove tire valve.

b. Mounting

1. Inspect rim flanges and bead seats for dirt or rust and clean with emery cloth or steel wool. Straighten rim flange if bent.

2. Install tire valve and valve core.

3. Lubricate tire beads, rim flanges and bead ledge areas with a liberal amount of tire mounting compound, such as vegetable oil soap solution.

4. Carefully install beads over rim, using either a special tire installing tool or tire irons.

IMPORTANT: Start with narrow bead ledge of rim up at all times.

5. Place a tire mounting band around center of tread and engage it to force tire beads out against rim.

NOTE: If a tire mounting band is not available, a heavy sash cord may be installed around the circumference and tightened with a tire iron to serve the same purpose.

c. Inflating

CAUTION: Do not stand over the tire while inflating. Lock the wheel on machine when inflating. Use an extension on the air gauge and stand well back from tire for maximum safety. See Fig. 4-11.

Do not exceed 40 lbs. air pressure when inflating tire.

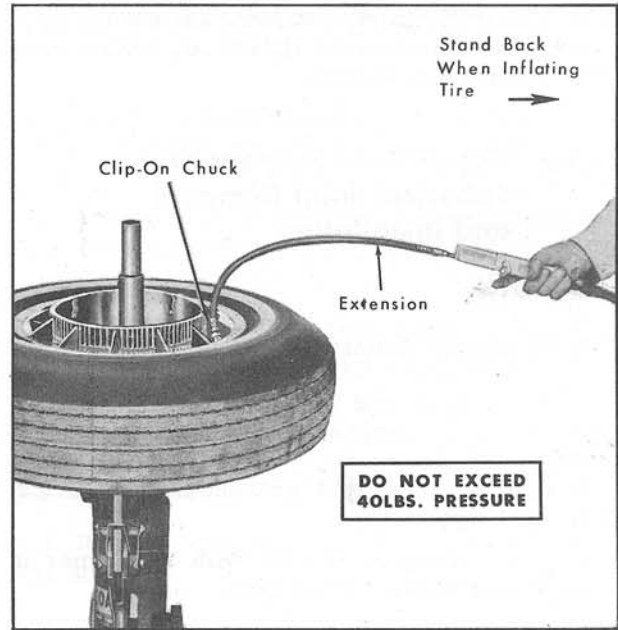


Fig. 4-11 Inflating Tire

If 40 lbs. will not seat beads properly, deflate, lubricate, center, and reinflate the tire. After beads have seated properly, reduce the pressure to recommended operating pressure (24 lbs. front and rear).

(12) Front Shock Absorber Removal and Installation

a. Removal

1. Raise front end of car and place jack stands under lower suspension arms.

2. Turn wheel to permit access to shock absorber.

3. Remove shock absorber upper retaining nut, retainer, and rubber grommet at frame tower mounting bracket.

NOTE: The shock absorber upper stem is square at the top so that it may be held by a wrench to prevent the stem from turning when removing nut.

4. Remove shock absorber lower retaining nut, lock washer, retainer, and rubber grommet at lower suspension arm mounting bracket, and remove shock absorber.

b. Installation

1. Position shock absorber assembly into upper frame tower mounting bracket.

2. Place lower end of shock absorber in position on lower suspension arm bracket and install rubber grommet, retainer, lockwasher, and nut on lower end.

3. Install grommet, retainer, and nut on upper shock absorber stem and tighten nut, holding stem from turning with wrench.

(13) Upper Front Suspension Spherical Joint Removal and Installation

a. Removal

1. Disconnect battery ground strap.
2. Raise front end of car, place jack stands under lower suspension arms, and remove wheel.
3. Remove cotter pin and nut from spherical joint stud.
4. Strike steering knuckle with a hammer in area of joint stud to loosen joint.
5. Raise upper suspension arm so that joint clears knuckle.
6. Grind off the heads and punch out all four spherical joint mounting rivets. Be careful to avoid damage to the mounting holes.
7. Remove spherical joint.

b. Installation

1. Install new spherical joint on upper suspension arm with bolts, nuts, and lockwashers provided in service replacement kit. Tighten nuts to 20–25 ft. lbs. (Install bolts from top down.)
2. Position spherical joint stud in steering knuckle.
3. Install joint stud nut and tighten to 50–60 ft. lbs. Install cotter pin.
4. Install wheel, lower car and connect battery ground strap.
5. Check standing height. If not within specifications, adjust as described in Note 39.
6. Check wheel alignment. Adjust if necessary.

(14) Lower Front Suspension Spherical Joint Removal and Installation

a. Removal

1. Disconnect battery ground strap.
2. Raise front end of car, place jack stands under lower suspension arms, and remove wheel.
3. Remove cotter pin and nut from spherical joint stud.

4. Strike steering arm with a hammer in area of joint to break joint loose.

5. Remove four lower spherical joint nuts, lockwashers, bolts, and turn stop.

6. Raise lower suspension arm sufficiently to allow spherical joint to be removed.

b. Installation

1. Install spherical joint on lower suspension arm with four bolts, lockwashers, and nuts, tightening to 35–40 ft. lbs. Replace turn stop at outer rear bolt location.

NOTE: Heads of bolts should be under joint flange.

2. Lower suspension arm to position joint stud in steering arm mounting hole.

3. Install spherical joint nut, tightening to 50–60 ft. lbs. Install cotter pin.

4. Install wheel, lower car and connect battery ground strap.

5. Check standing height. If not within specifications, adjust as described in Note 39.

6. Check wheel alignment. Adjust if necessary.

(15) Front Suspension Spherical Joint Checking Procedure

If the spherical joints show signs of looseness or wear, they may be checked by the following procedure.

a. Upper Spherical Joint

The upper spherical joint should be lubricated before checking it. Using the regular spherical joint stud nut and a second nut as a locknut, turn joint in its socket with a torque wrench. It should read 2–4 ft. lbs. Replace a joint that is too loose or too tight.

b. Lower Spherical Joint

The lower spherical joint is designed to turn freely in its socket and cannot be checked with a torque wrench. It should be checked by noting the amount of free play as the joint is worked vertically in its socket. This measurement should not exceed 1/16". Replace joint if it exceeds this limit.

NOTE: If the joints are to be cleaned, use only kerosene or carbon tetrachloride. After cleaning the joints, lubricate them immediately to prevent internal rusting.

(16) Steering Knuckle Removal and Installation

a. Removal

1. Disconnect battery ground strap.
2. Raise front end of car, place jack stands under lower suspension arms, and remove wheel and brake drum assembly.
3. Remove cotter pin and nut from upper spherical joint stud.
4. Strike steering knuckle with hammer in area of joint to break joint loose.
5. Raise upper suspension arm and allow top of knuckle to move outward.
6. Remove upper nut on knuckle and two lower nuts on the inside of the brake backing plate. Leave the two lower bolts in position.
7. Remove brake backing plate and wire it to a convenient location to prevent damage to the brake hose.
8. Remove and discard spindle gasket.
9. Remove steering knuckle from lower bolts.

b. Installation

1. Position steering knuckle on two lower bolts.
2. Install new gasket on spindle.
3. Install brake backing plate on two lower bolts and install lock washer and nuts.
4. Install upper bolt through backing plate and knuckle. Install lockwasher and nut. Tighten to 85-95 ft. lbs.
5. Tighten lower bolts to 90-100 ft. lbs.
6. Position upper spherical joint stud in steering knuckle. Install nut and cotter pin. Tighten to 50-60 ft. lbs.
7. Install wheel and brake drum assembly, lower car and connect battery ground strap.
8. Check standing height. If not within specifications, adjust as described in Note 39.
9. Check wheel alignment. Adjust if necessary.

(17) Upper Suspension Arm Removal

1. Disconnect battery ground strap.
2. Raise front end of car, place jack stands under lower suspension arms, and remove wheel.

3. Remove cotter pin and nut from spherical joint stud.

4. Strike steering knuckle with a hammer in area of spherical joint to break joint loose.

5. Remove mounting bolts at mounting shaft and remove upper suspension arm with shaft.

(18) Upper Suspension Arm Disassembly and Assembly

a. Disassembly

1. Place suspension arm shaft in vise.
2. Remove threaded steel bushings from arm and shaft.
3. Remove seals and suspension arm from shaft.
4. Place suspension arm in vise.
5. Grind off the heads and punch out the four spherical joint rivets and remove the joint.

b. Assembly

1. Install new rubber seals on mounting shaft and lubricate threads of shaft.
2. Center shaft in position in suspension arm and install bushing into arm and onto one end of shaft.

NOTE: Cleaning new bushings with carbon tetrachloride and lubricating with penetrating oil will make installation easier.

3. Tighten bushing to 140-150 ft. lbs. torque.
4. Install Upper Suspension Arm Spreader, Tool No. J-6590, between arms as shown in Fig. 4-12, and tighten finger tight. Then, using a wrench, tighten tool two additional flats.
5. Install other bushing in arm and onto shaft, tightening to 140-150 ft. lbs. torque.
6. Remove tool from arms and center shaft between arms by turning shaft in bushings.
7. Install lubrication fittings in bushings.
8. Install new spherical joint assembly, using special nuts and bolts provided in service replacement kit. Install bolts with heads on opposite side of arm.
9. Tighten nuts to 20-25 ft. lbs. torque.

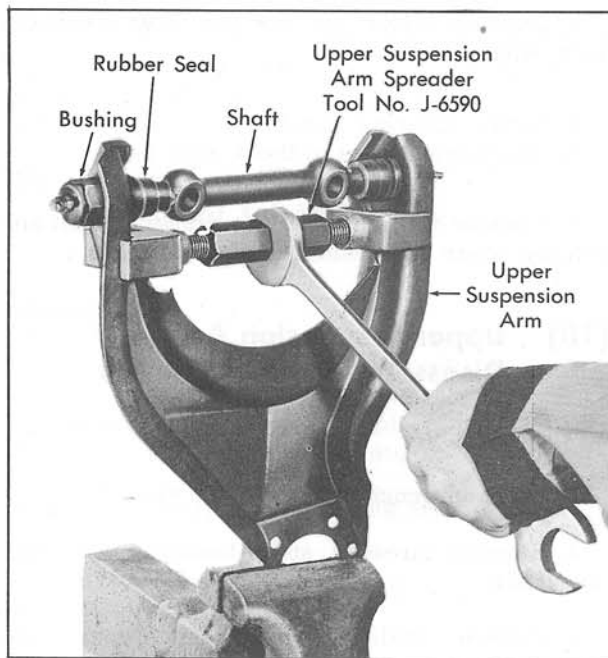


Fig. 4-12 Spreading Upper Suspension Arm

(19) Upper Suspension Arm Installation

1. Install arm in position on frame mounting bracket with mounting bolts, nuts and lock washers, tightening to 130-140 ft. lbs. Use original caster and camber shims until alignment is checked.
2. Position spherical joint stud in steering knuckle hole.
3. Install nut, tightening to 50-60 ft. lbs.
4. Install cotter pin.
5. Install wheel, lower car and connect battery ground strap.
6. Check standing height. If not within specifications, adjust as described in Note 39.
7. Check wheel alignment. Adjust if necessary.

(20) Lower Suspension Arm Removal

1. Raise front end of car, place jack stands under front frame side members, and remove wheel.
2. Disconnect stabilizer linkage from lower suspension arm.
3. Disconnect leveling valve adjusting link at lower suspension arm. Pull down on leveling valve

control arm to exhaust air from front springs. (Battery must be connected and a door open).

4. Disconnect battery ground strap, close all doors and remove air piston bearing retaining nut at lower suspension arm.
5. Disconnect air line and remove Schrader valve from front air dome, using Valve Core Remover and Installer Tool No. J-6888.
6. Disconnect shock absorber at lower suspension arm.
7. Remove lower spherical joint cotter pin and nut.
8. Strike steering arm with a hammer in the area of the spherical joint stud to break joint loose.
9. Remove four shaft mounting bolts at frame front cross member, and remove lower suspension arm.

(21) Lower Suspension Arm Disassembly and Assembly

a. Disassembly

1. Remove four spherical joint mounting nuts and bolts, and remove joint and turn stop.
2. Place mounting shaft in vise.
3. Remove threaded steel bushings from arm and shaft.
4. Remove seals and suspension arm from shaft.

b. Assembly

1. Install new rubber seals on mounting shaft and lubricate threads of shaft.
2. Center shaft in position in suspension arm and install bushing into arm and onto one end of shaft.

NOTE: Cleaning new bushings with carbon tetrachloride and lubricating with penetrating oil will make installation easier.

3. Tighten bushing to 195-205 ft. lbs.
4. Install Lower Suspension Arm Spreader, Tool J-6591, between arms as shown in Fig. 4-13. Tighten the center bar finger tight; then with a wrench, tighten two additional flats.
5. Install other bushing in arm and onto shaft, tightening to 195-205 ft. lbs.

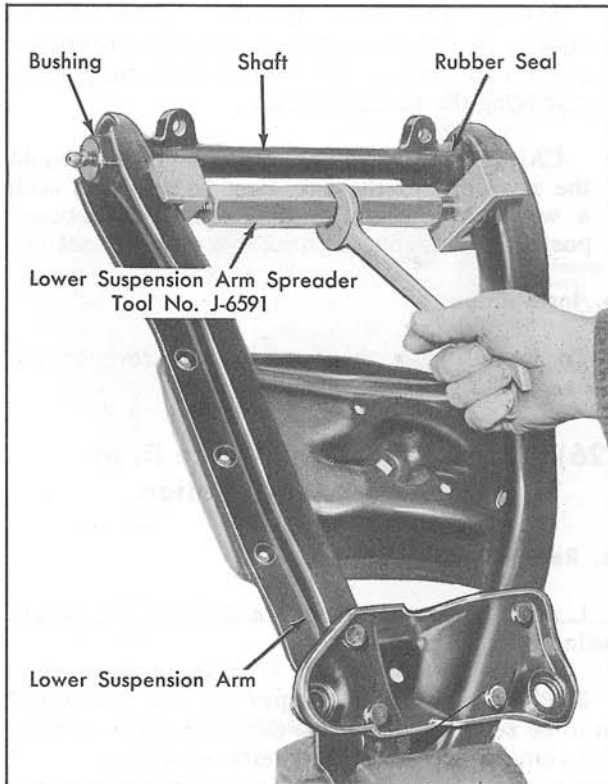


Fig. 4-13 Spreading Lower Suspension Arm

6. Remove tool and center shaft between arms by turning shaft in bushings.

7. Install lubrication fittings in bushings.

8. Install spherical joint assembly with four nuts and bolts, reinstalling turn stop at outer rear bolt location. Bolt heads should be under joint flange.

9. Tighten nuts to 35-40 ft. lbs.

(22) Lower Suspension Arm Installation

1. Install mounting shaft to frame cross member, tightening bolts to 60-70 ft. lbs. torque.

2. Guide spherical joint stud into steering knuckle, and install nut, tightening to 50-60 ft. lbs. Install cotter pin.

3. Connect shock absorber at lower suspension arm.

4. Install Schrader valve and connect air line in front air dome.

5. Install air spring piston bearing retaining nut at bottom of lower suspension arm.

6. Connect leveling valve adjusting link at lower suspension arm.

7. Connect stabilizer linkage at lower suspension arm.

8. Connect battery ground strap and open car door.

9. Install wheel, remove jack stands and lower front end of car.

10. Replenish air supply in accumulator tank through Schrader valve.

11. Check air line fitting on front dome for leakage by using a soapy water solution.

12. Check standing height. If not within specifications, adjust as described in Note 39.

13. Check wheel alignment. Adjust if necessary.

(23) Steering Arm Removal and Installation

a. Removal

1. Disconnect battery ground strap.

2. Raise front end of car, place jack stands under lower suspension arms and remove wheel and brake drum.

3. Remove cotter pin and nut from stud on tie rod end.

4. Strike portion of steering arm just above tie rod end with a hammer to break stud loose from arm.

5. Remove cotter pin and nut from lower spherical joint.

6. Strike steering arm with hammer near the joint to break joint loose from arm. Hold brake backing plate to keep it from dropping too rapidly as the arm slips off the joint stud.

7. Remove two steering arm to brake backing plate bolts and remove steering arm.

b. Installation

1. Install steering arm to brake backing plate with two bolts. Tighten bolts to 90-100 ft. lbs.

2. Position brake backing plate assembly so that the lower spherical joint stud fits in hole in steering arm and install spherical joint nut, tightening nut to 50-60 ft. lbs.

3. Install new cotter pin in spherical joint stud.

4. Guide tie rod end stud into steering arm and install nut, tighten to 50-55 ft. lbs.

5. Install new cotter pin.

6. Install wheel and brake drum, lower car and connect battery ground strap.

7. Check standing height. If not within specifications, adjust as described in Note 39.

8. Check wheel alignment. Adjust if necessary.

(24) Bent Parts Straightening

The straightening of bent parts in the front wheel suspension system should be attempted only within the following limits:

Parts should be replaced rather than straightened if they are sprung out of alignment more than five degrees. Excessive bending of parts when cold may result in stresses or cracks invisible to the naked eye, which render the part unsafe for use. Straightening with heat will destroy the effect of previous heat treatment, leaving the steel seriously weakened.

Welding of parts subjected to high stresses should never be attempted, because the welding process will change the grain structure of the metal, rendering it unsafe.

(25) Rear Shock Absorber Removal and Installation

a. Removal

1. Raise rear end of car and place jack stands under axle housing.

2. Remove upper and lower shock absorber retaining nuts and lock washers and remove shock absorber.

NOTE: The shock absorber upper stem is square at the top so that it may be held by a wrench to prevent the stem from turning when removing the retaining nut.

CAUTION: Under no circumstances should the rear end of the car ever be raised in such a way that the rear suspension is in rebound position with shock absorbers disconnected.

b. Installation

To install rear shock absorber, reverse the above procedure.

(26) Rear Wheel and Brake Drum Removal and Installation

a. Removal

1. Raise rear end of car and place jack stands under rear axle housing.

2. Place jack under bumper on side that wheel is to be removed and raise car sufficiently to permit removal of wheel, then remove wheel.

CAUTION: Do not disconnect rear shock absorber to facilitate removal of rear wheel.

3. Remove screws holding brake drum to axle shaft flange, Fig. 4-14.

4. Remove brake drum.

b. Installation

To install rear wheel and brake drum, reverse the above procedure.

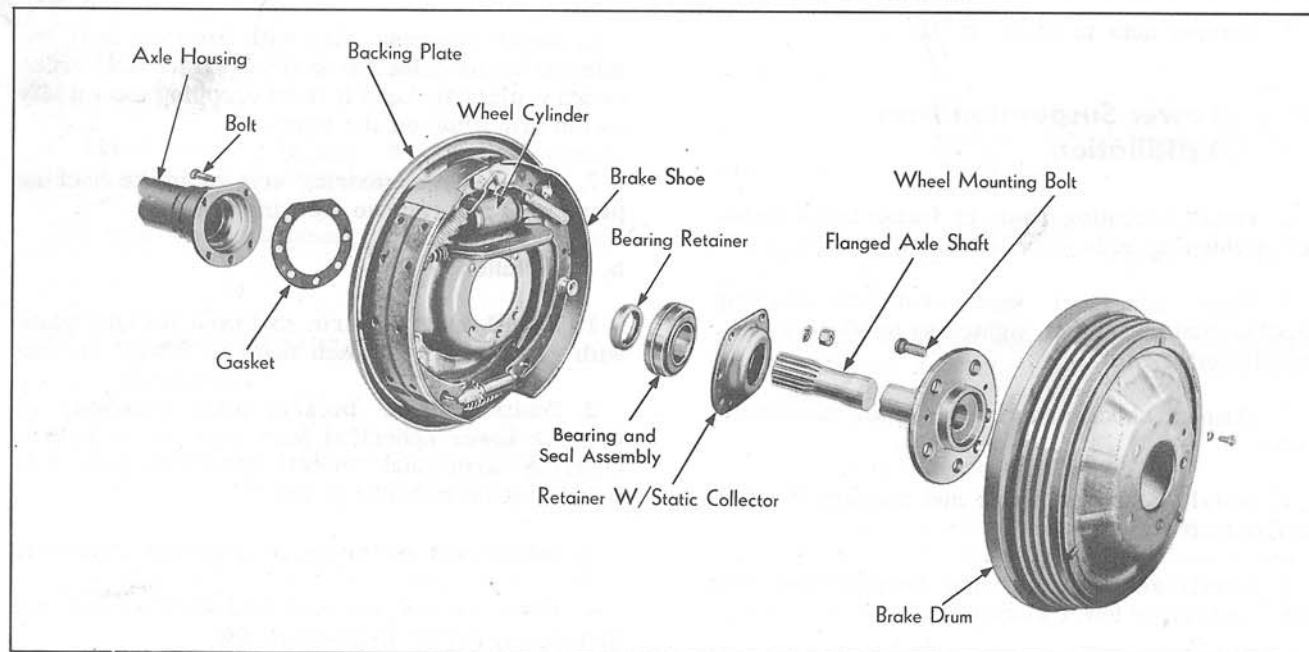


Fig. 4-14 Rear Wheel Disassembled

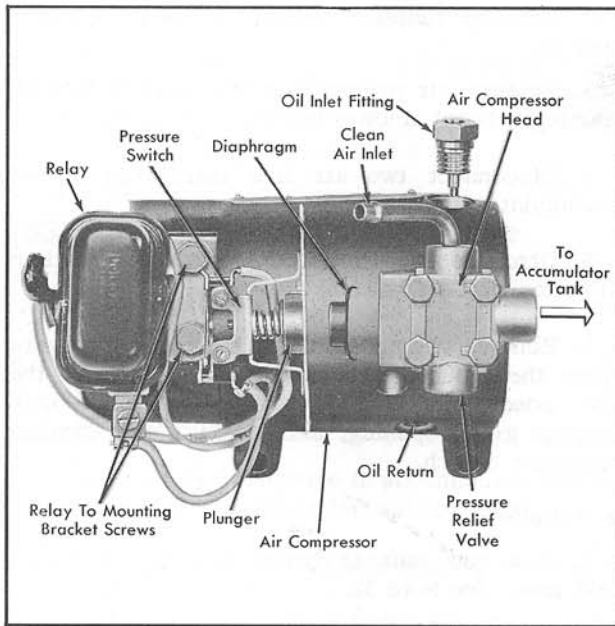


Fig. 4-15 Air Compressor Service

(27) Air Compressor Removal and Installation

a. Removal

1. Disconnect battery ground strap.
2. Exhaust air pressure in accumulator tank at Schrader valve.
3. Disconnect accumulator tank air line at compressor, Fig. 4-15.
4. Disconnect oil inlet and return lines at compressor.
5. Disconnect air cleaner hose at inlet side of compressor.
6. Disconnect harness lead (black), at relay on compressor.
7. Remove two bolts securing air compressor to mounting bracket on top of generator and remove compressor.

b. Installation

1. To install air compressor, reverse the above procedure, using a new "O" ring seal at accumulator tank air line.

2. Replenish air supply in accumulator tank through Schrader valve.

NOTE: Replace the air compressor if it is found to be defective. Do not attempt any repairs other than replacement of the pressure switch, diaphragm, relay, or oil line inlet fitting. See Notes 28, 29, and 30.

(28) Air Compressor Relay Removal and Installation

a. Removal

1. Disconnect motor lead (black) at relay.
2. Disconnect three pressure switch leads (green, white, pink) at relay.
3. Disconnect harness lead (black) at relay.
4. Remove two screws securing relay to mounting bracket on air compressor and remove relay.

b. Installation

1. To install relay, reverse the above procedure.

(29) Air Compressor Pressure Switch Removal and Installation

a. Removal

1. Disconnect three pressure switch leads (green, white, pink) at relay.
2. Remove two screws securing pressure switch cover to mounting on air compressor head, and remove switch cover.
3. Remove four screws securing pressure switch assembly to air compressor head and remove switch assembly.
4. Remove rubber diaphragm from air compressor head.

NOTE: The pressure switch cover has been removed and the pressure switch and diaphragm separated from the compressor head for illustrative purposes, Fig. 4-15.

b. Installation

To install pressure switch, reverse the above procedure, making certain that rubber diaphragm is installed with raised side facing pressure switch plunger, Fig. 4-15.

(30) Air Compressor Filter Removal, Cleaning, and Installation

The air compressor contains a pourex filter in the oil inlet fitting to prevent impurities from entering the compressor.

It is recommended that this filter be cleaned at time of oil filter change.

The procedure for cleaning filter is described below:

a. Removal

1. Make certain engine is not running.
2. Disconnect oil inlet line at top of air compressor.
3. Remove oil inlet fitting from top of air compressor, Fig. 4-15.

NOTE: Filter is an integral part of the oil inlet fitting, do not attempt to remove filter from this fitting.

b. Cleaning

1. Soak oil inlet fitting in a grease dissolving solvent and wash thoroughly.
2. Blow air through fitting with ordinary air hose and wipe dry.
3. Inspect to determine whether replacement is necessary.

c. Installation

1. Install oil inlet fitting on compressor.
2. Connect oil inlet line to fitting on top of compressor.
3. Run engine and compressor to check for oil leakage at fitting.

(31) Accumulator Tank Removal and Installation

a. Removal

1. Disconnect battery ground strap.

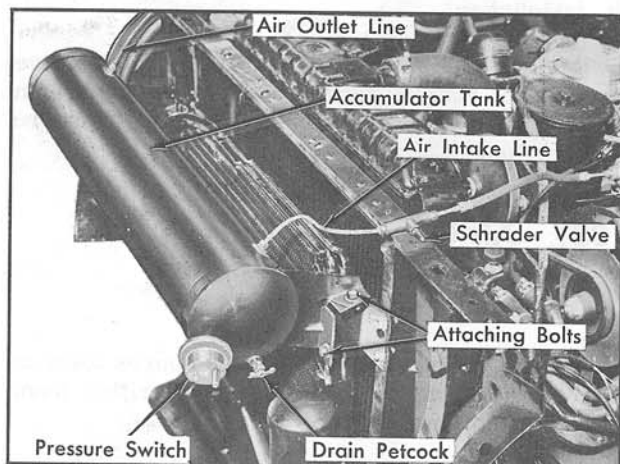


Fig. 4-16 Accumulator Tank Connections

2. Remove radiator grille, See Note 6, Section 16.

3. Release air pressure in accumulator tank by opening pet cock at lower left side of tank, Fig. 4-16.

4. Disconnect two air line fittings at top of accumulator tank.

5. Disconnect electrical lead on pressure switch at bottom left side of tank.

6. Remove two accumulator tank attaching bolts from the mounting brackets on each side of the air conditioner condenser, and remove tank through grille opening, using care not to damage pressure switch.

b. Installation

1. If a new tank is being installed, perform leak test. See Note 32.

2. Install accumulator tank by reversing the above procedure. Use new "O" rings on the ends of accumulator tank air lines.

3. Close pet cock and replenish air supply in accumulator tank through Schrader valve.

4. Test all fittings for air leakage by using a soapy water solution.

5. Connect battery ground strap.

(32) Accumulator Tank Leak Test

Before installing a new accumulator tank, perform leak test as described below: See Fig. 4-17.

1. Plug air line outlet opening with 3/8-24 plug.
2. Attach Air Dome Valve Adapter, Tool No. J-6881 to air line inlet fitting and charge tank with 80 to 130 lbs. air. Check pressure with Air Pressure Gauge, Tool No. J-6840.

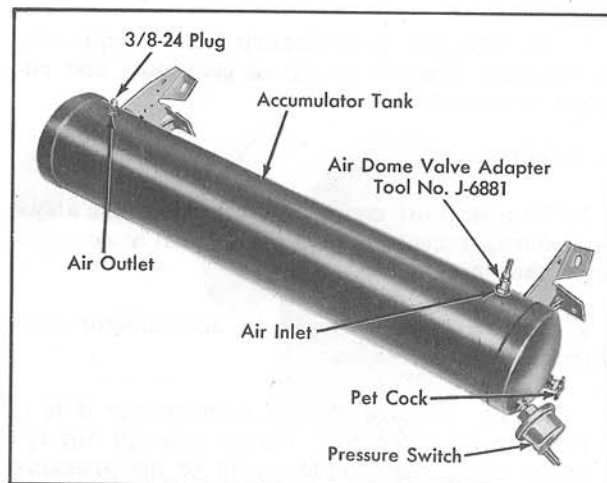


Fig. 4-17 Accumulator Tank Leak Test

3. Submerge tank in water and check for leaks.
4. Release air pressure in tank at pet cock and remove valve adapter tool.
5. Remove plug from air line outlet.

(33) Accumulator Tank Pressure Switch Removal and Installation

a. Removal

1. Disconnect battery ground strap.
2. Release air pressure in accumulator tank by opening pet cock at lower left side of tank.
3. Disconnect electrical lead at pressure switch.
4. Unscrew pressure switch and remove from tank.

b. Installation

1. Apply permatex to bolt threads at bottom of pressure switch and install switch on tank.
2. Connect electrical lead on pressure switch.
3. Close pet cock at lower left side of tank and replenish air supply in tank through Schrader valve.
4. Leak test pressure switch fitting by using a soapy water solution.
5. Connect battery ground strap.

(34) Control Solenoid Removal and Installation

a. Removal

1. Disconnect battery ground strap.
2. Raise front end of car. Place jack stands at outer end of lower suspension arms.
3. Exhaust air from accumulator tank at Schrader valve.
4. Disconnect accumulator tank air line at top left side of control solenoid, Fig. 4-18.
5. Disconnect front and rear air spring high pressure and exhaust lines from control solenoid. (When exhaust lines are disconnected, front of car may lower slightly.)
6. Disconnect two electrical leads at relay on right front fender dust shield.

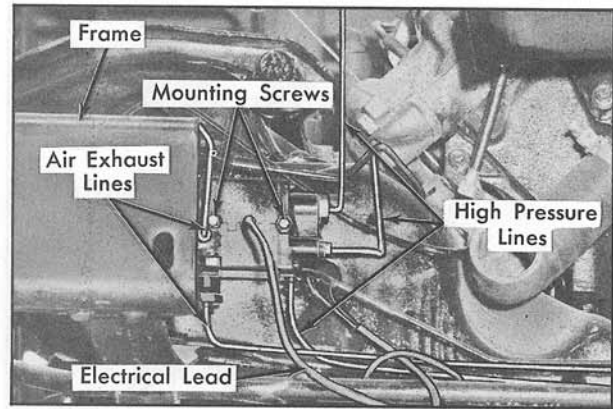


Fig. 4-18 Control Solenoid Connections

7. Remove two screws securing control solenoid to supporting bracket and remove solenoid.

b. Installation

1. To install control solenoid, reverse the above procedure, using new "O" ring seals on the ends of all air lines.
2. Lower car, connect battery ground strap and open door.
3. Replenish air supply in accumulator tank through Schrader valve.
4. Check for air leakage at all air line fittings on control solenoid using a soapy water solution.

(35) Control Solenoid Filters, Removal, Cleaning and Installation.

The control solenoid contains three pourex filters to prevent foreign particles in the air lines from entering the unit. They are located in the high pressure air line fitting at the top left side of the unit and in the two exhaust line fittings at the lower right front and bottom of the unit, Fig. 4-19.

Periodic cleaning of the filters at six-month intervals under normal driving conditions (more frequent in sandy or desert areas) is recommended.

The procedure for removal and cleaning of filters is described below:

a. Removal

1. Disconnect battery ground strap.
2. Raise front end of car. Place jack stands at outer end of lower suspension arms.

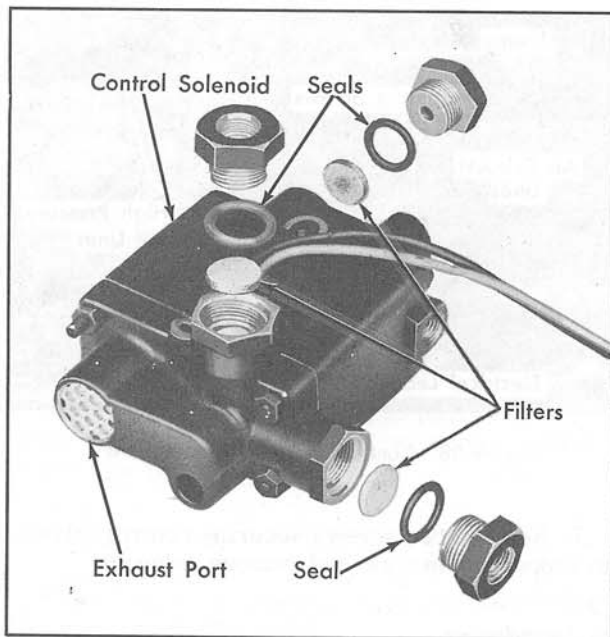


Fig. 4-19 Control Solenoid Filters

3. Exhaust air from accumulator tank at Schrader valve.

4. Disconnect high pressure air line at top left side of control solenoid.

5. Disconnect exhaust lines at lower right front and bottom of control solenoid. (When exhaust lines are disconnected, front of car will lower slightly).

6. Remove air line fittings from control solenoid where air lines were previously disconnected and lift out pourex filters, Fig. 4-19.

b. Cleaning

1. Clean filters in a suitable solvent.

2. Blow compressor air through filters and wipe dry.

c. Installation

1. Install filters in control solenoid and replace air line fittings.

2. Connect air lines using new "O" ring seals on the ends of the lines.

3. Lower front end of car.

4. Connect battery ground strap and open car door.

5. Replenish air supply in accumulator tank through Schrader valve.

6. Check for air leakage at all air line fittings on control solenoid, using a soapy water solution.

(36) Restriction "T" Check Valve Removal and Installation

a. Removal

1. Disconnect battery ground strap.

2. Raise front end of car and place jack stands at ends of lower suspension arms.

3. Disconnect leveling valve air line at top of check valve, Fig. 4-20. (All air will exhaust from the front air springs and front end of car will lower into full compression in approximately 5 minutes).

4. Wait for front end to lower, then disconnect front spring air lines at check valve.

5. Remove screw securing check valve to front frame member and remove check valve.

b. Installation

1. To install check valve, reverse the above procedure, using new "O" ring seals on the ends of all air lines.

2. Lower car, connect battery ground strap and open door. Replenish air supply in accumulator tank through Schrader valve.

3. Check for air leakage at air line fittings on check valve, using a soapy water solution.

(37) Front Leveling Valve Removal and Installation

a. Removal

1. Raise front end of car and open any door.

2. Disconnect adjusting link at leveling valve control arm and pull down on control arm to exhaust air from front springs, Fig. 4-20.

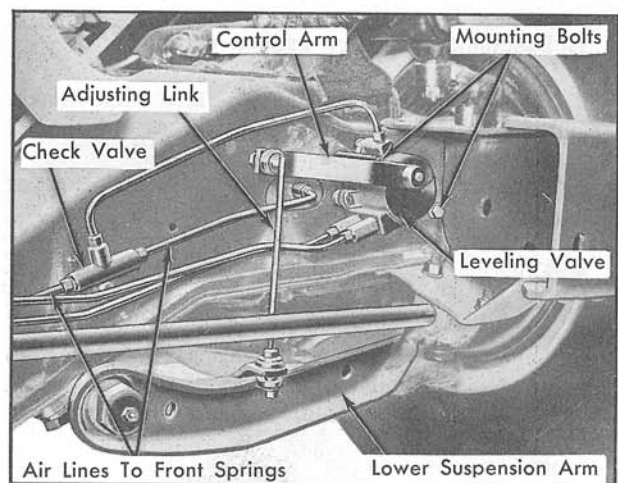


Fig. 4-20 Front Leveling Valve and Check Valve

3. Disconnect three air lines from leveling valve. A slight discharge of air may take place.

4. Remove two bolts retaining leveling valve to support bracket and remove leveling valve.

b. Installation

1. To install front leveling valve, reverse the above procedure, using new "O" ring seals on the ends of all air lines.

2. Lower car and leave any door open. Replenish air supply in accumulator tank through Schrader valve.

3. Check air line connections for leakage by using a soapy water solution.

NOTE: Check standing height. If not within specifications, adjust as described in Note 39.

(38) Rear Leveling Valve, Right or Left, Removal and Installation

a. Removal

1. Disconnect battery ground strap.

2. Raise rear end of car and place jack stands under rear frame rails.

3. Disconnect air line at rear spring air dome.

4. Disconnect adjusting link at leveling valve control arm, Fig. 4-21.

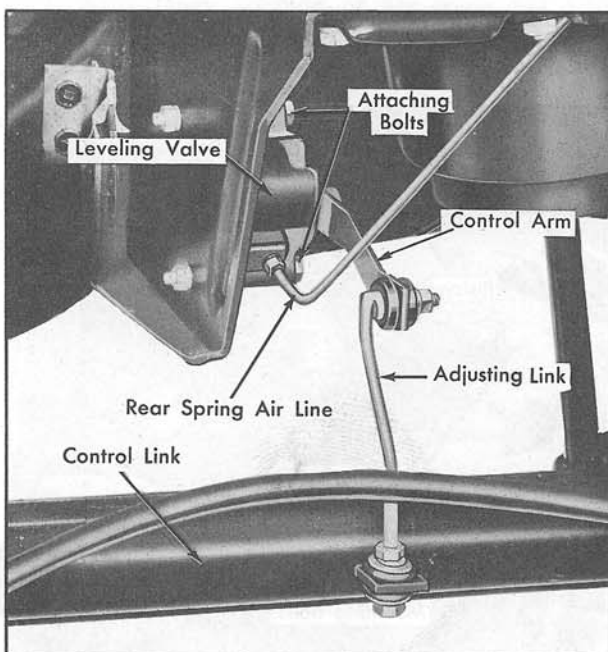


Fig. 4-21 Rear Leveling Valve

5. Disconnect three air lines from leveling valve. A slight discharge of air may take place.

6. Remove two bolts retaining leveling valve to support bracket and remove leveling valve.

7. Remove two leveling valve to support bracket spacers (Right side only).

b. Installation

1. To install rear leveling valve, reverse the above procedure, making sure to replace leveling valve to support bracket spacers (Right side only). Use a new "O" ring seal on the ends of all air lines.

2. Lower car and connect battery ground strap. Replenish air supply in accumulator tank through Schrader valve.

3. Check air line connections for leakage by using a soapy water solution.

NOTE: Check standing height. If not within specifications, adjust as described in Note 39.

(39) Standing Height Checking

NOTE: Air pressure in accumulator tank should be maintained at 90 psi or above when checking standing height.

a. Front

1. Normalize position of air springs by working the bumper up and down with car door open, permitting the car to assume its normal standing height.

2. Measure the distance from the top of the left lower suspension arm to the center of the outer lower rivet on the front of the frame. This measurement should be $3-5/8" \pm 1/16"$, Fig. 4-22. If measurement is not within specifications, proceed with Steps 3 through 5, below.

3. Loosen adjusting nuts on leveling valve adjusting link at connection on left lower suspension arm.

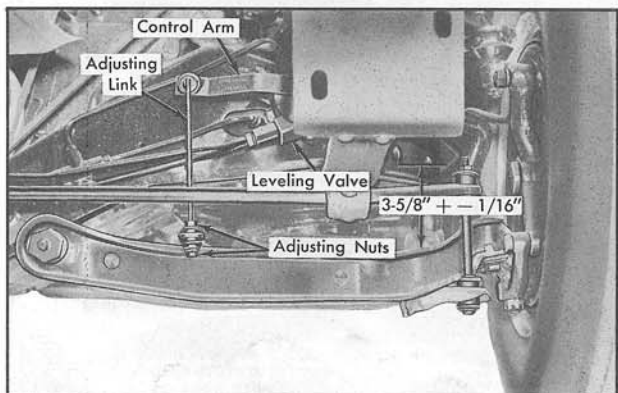


Fig. 4-22 Front Standing Height Adjustment

4. Raise or lower adjusting link until measurement between left lower suspension arm and center of rivet is within specifications. Allow sufficient time for leveling action to take place, then tighten adjusting nuts and recheck measurement.

5. Check standing height on right side. If measurement varies from left side by more than $1/4"$, check and adjust rear standing height as described below.

b. Rear

When checking rear standing height, both sides of car must be checked as described below.

1. Repeat Step 1 above.

2. Measure the distance from the top of the rear axle housing to the underside of the frame at a point directly above the axle housing. This measurement should be $4-13/16" \pm 1/16"$, Fig. 4-23. The rear standing height should be equal within $1/8"$ on both sides of car. If measurements are not within specifications, proceed with Steps 3 through 5, below.

3. Loosen adjusting nuts on leveling valve adjusting link at connection on lower control link.

4. Raise or lower adjusting link until measurement between top of rear axle housing and underside of frame is within specifications. Allow sufficient time for leveling action to take place, then tighten adjusting nuts and recheck measurement.

5. Recheck front standing height. If necessary adjust as described in procedure for front standing height adjustment.

NOTE: When checking and adjusting front or rear standing heights, it is necessary that all

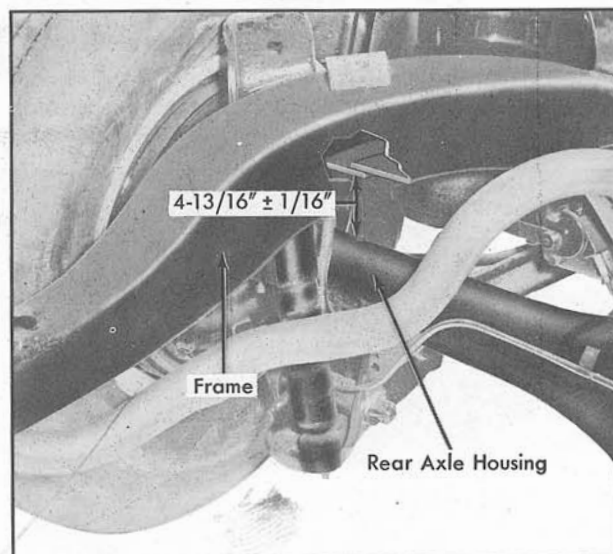


Fig. 4-23 Rear Standing Height Adjustment

wheels be on a level surface. Due to the low road clearance of the car, a suitable lifting device should be provided, such as: a drive on type hoist, wheel alignment machine, or placement of blocks of suitable height under the car wheels.

Static weight distribution in the car or luggage compartment has no effect on standing height adjustment.

(40) Front Air Spring Assembly, Right or Left, Removal and Disassembly

a. Removal

1. Raise front end of car and open any door. Place jack stands under front frame members and remove front wheel.

2. Exhaust air from accumulator tank at pet cock.

3. Disconnect adjusting link at leveling valve control arm and pull down on control arm to exhaust air from front springs. Allow sufficient time for all air to exhaust (approximately 5 minutes). Fig. 4-24.

4. Disconnect front spring air line at dome and remove Schrader valve core, using Valve Core Remover and Installer Tool No. J-6888. A slight discharge of air may take place.

5. Disconnect stabilizer linkage from lower control arm.

6. Disconnect shock absorber from lower control arm.

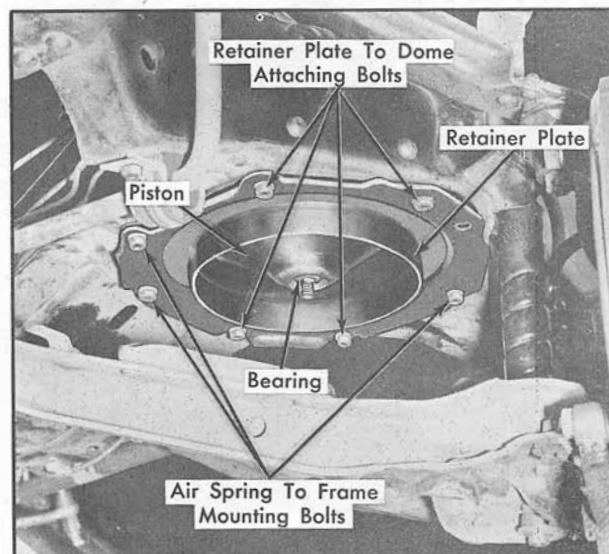


Fig. 4-24 Front Air Spring Removal

7. Remove nut securing air spring piston to lower control arm.

8. Remove cotter key and nut that holds spherical joint stud to steering arm, and tap steering arm to loosen joint.

9. Disconnect steering arm from tie rod joint.

10. Remove bolts securing lower suspension arm shaft to frame, and pull lower suspension arm outboard.

11. Remove three mounting bolts that secure air spring assembly to front frame member Fig. 4-24, and remove spring assembly.

b. Disassembly

1. Remove four attaching bolts that secure retainer plate to dome Fig. 4-24, and separate retainer plate from dome.

2. Remove "O" ring seal and phenolic resin bearing from bottom of piston.

3. Remove piston and diaphragm from air dome.

4. Remove diaphragm retainer from piston and lift diaphragm off piston.

(41) Front Air Spring Assembly, Right or Left, Assembly and Installation

a. Assembly

1. Wipe inner surface of air dome and outer surface of piston with a clean cloth. Make sure that diaphragm contact areas are free from foreign particles or sharp edges.

2. Apply DC-4 Silicone compound to outer edges of upper and lower diaphragm lips. This will make the rubber more flexible and facilitate installation of the diaphragm.

3. Install diaphragm on piston, and replace diaphragm retainer.

4. Install piston and diaphragm assembly in air dome in as straight a position as possible, using care not to distort or bend out the upper lip of the diaphragm.

5. Install retainer plate on air dome and secure with four attaching bolts, Fig. 4-24.

6. Install Schrader valve core in air dome, using Valve Core Remover and Installer Tool No. J-6888.

7. Apply a liberal amount of heavy front wheel

bearing grease in cavity at base of piston and install a new phenolic resin bushing and "O" ring seal.

b. Installation

1. Perform leak test before installing. See Note 42.

2. Install front air spring assembly by reversing removal procedure described above. Use new "O" ring seal on end of front spring air line at air dome.

3. Lower car and open any door. Replenish air supply in accumulator tank through Schrader valve.

4. Test air line fitting in dome for leakage by using a soapy water solution.

NOTE: If standing height is not within specifications, adjust as described in Note 39.

(42) Front Air Spring Assembly Leak Test (On Bench)

1. Using a vise, install front air spring assembly in Holding Fixture, Tool No. J-6885, Fig. 4-25, making sure that fixture is securely attached as it will be subjected to extreme pressure.

2. Insert Pilot Adapter, Tool No. J-6885-5, in hole at bottom of Holding Fixture.

3. Install Air Dome Valve Adapter Tool, No. J-6881, in air line fitting in dome, making sure that fitting contains valve core.

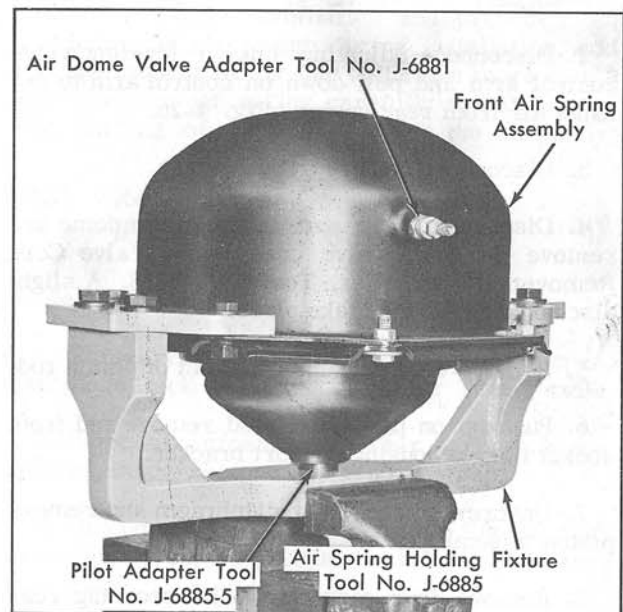


Fig. 4-25 Front Air Spring Leak Test

4. Introduce air slowly into air dome, guiding piston retaining bolt so that it seats properly in pilot adapter.

5. Continue to add air until pressure builds up to 80-100 psi, check air pressure with Pressure Gauge, Tool No. J-6840, and remove Valve Adapter Tool.

6. Remove complete assembly from vise, submerge in water, and check for leaks.

7. Release all air pressure in dome by removing Schrader valve core with Valve Core Remover and Installer, Tool No. J-6888.

8. Remove air spring from Holding Fixture, (make sure that all air has been exhausted from dome before removing air spring from Holding Fixture).

9. Install Schrader valve core in air dome.

10. To facilitate installation and prevent mispositioning of diaphragm during installation, add a small amount of air into dome. (Not more than 5 psi) Transfer air spring carefully to car to prevent shifting of the diaphragm in the assembly.

(43) Rear Air Spring Assembly, Right or Left, Removal and Disassembly

a. Removal

1. Raise rear end of car, with any door open, and place jack stands under rear frame rails. Remove rear wheel. See Note 26.

NOTE: Do not disconnect either rear shock absorber.

2. Disconnect adjusting link at leveling valve control arm and pull down on control arm to exhaust air from rear spring, Fig. 4-26.

3. Disconnect battery ground strap.

4. Disconnect rear spring air line at dome and remove Schrader valve core, using Valve Core Remover and Installer, Tool No. J-6888. A slight discharge of air may take place.

5. Remove hair pin clip at bottom of piston rod.

6. Push up on piston rod and remove rod from socket in axle housing support bracket.

7. Unscrew piston from diaphragm and remove piston assembly.

8. Remove four mounting bolts securing rear air spring assembly to frame mounting bracket, Fig. 4-26, and remove rubber bumper.

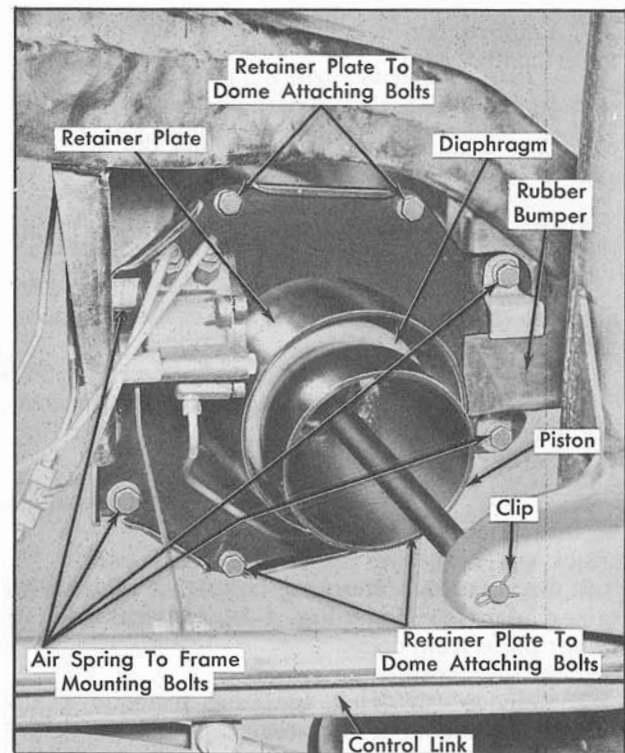


Fig. 4-26 Rear Air Spring Removal

9. Remove rear air spring assembly through wheel opening in fender.

b. Disassembly

1. In the event piston is still attached to diaphragm in air spring, unscrew piston from diaphragm.

2. Remove four attaching bolts that secure retainer plate to dome and separate retainer plate from dome, Fig. 4-26, and remove rubber bumper.

3. Remove diaphragm from air dome.

4. Remove tapered pin from lower end of piston rod and remove seat and rubber seal, Fig. 4-3.

(44) Rear Air Spring Assembly, Right or Left, Assembly and Installation

a. Assembly

1. Wipe inner surface of air dome with a clean cloth. Make sure that diaphragm contact area is free from foreign particles or sharp edges.

2. Apply DC-4 Silicone compound to outer edge of diaphragm lip. This will make the rubber more flexible and facilitate installation of the diaphragm.

3. Install diaphragm in air dome in as straight a position as possible, using care not to distort or bend out the lip of the diaphragm.

4. Install retaining plate on air dome and secure with four attaching bolts, Fig. 4-26.

5. Install Schrader valve core in air dome, using Valve Core Remover and Installer, Tool No. J-6888.

6. Install rubber seal on piston rod.

7. Fill piston rod seat with heavy front wheel bearing grease, install seat on rod and secure with tapered pin.

8. Attach piston to diaphragm, tightening as much as possible by hand only.

b. Installation

1. Perform leak test before installing. See Note 45.

2. To install rear air spring, reverse removal procedure as described in Note 43a, eliminating Step 6.

NOTE: Install rear air spring as a complete assembly with piston securely attached to diaphragm.

3. Use new "O" ring seal on end of rear spring air line at air dome.

4. Lower car, connect battery, and open any door. Replenish air supply in accumulator tank through Schrader valve.

5. Test air line fitting in dome for leakage by using a soapy water solution.

NOTE: If standing height is not within specifications, adjust as described in Note 39.

(45) Rear Air Spring Assembly Leak Test (On Bench)

1. Using a vise, install rear air spring assembly in Holding Fixture, Tool No. J-6885, Fig. 4-27, centering piston rod (with seat and rubber seal removed from lower end of piston rod) in pilot hole at bottom of Holding Fixture.

2. Insert Spacer Tool, No. J-6885-4, under Clamp, Tool No. J-6885-3, on Holding Fixture. Attach Fixture securely as it will be subjected to extreme pressure.

3. Install Air Dome Valve Adapter Tool No. J-6881, in air line fitting in dome, making sure that fitting contains valve core.

4. Introduce 80-100 psi of air into air dome, check air pressure with Pressure Gage, Tool No. J-6840, and remove Valve Adapter Tool.

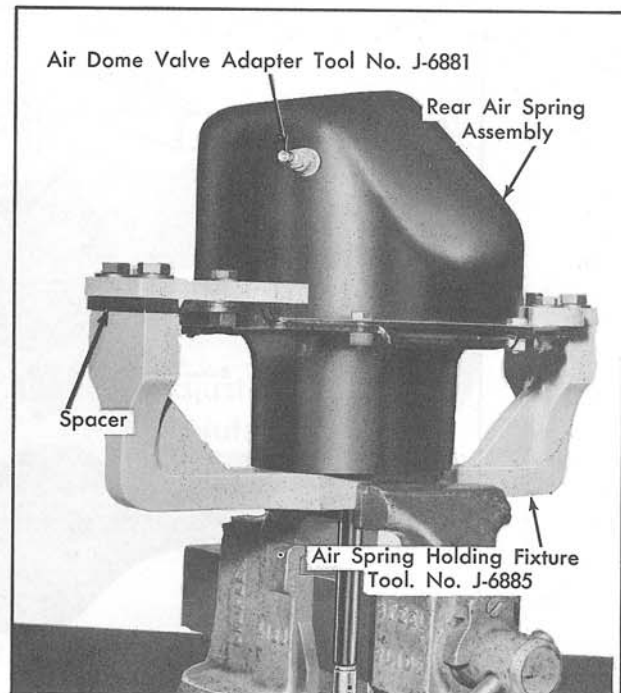


Fig. 4-27 Rear Air Spring Leak Test

5. Remove complete assembly from vise, submerge in water and check for leaks.

6. Release all air pressure in dome by removing Schrader valve core with Valve Core Remover and Installer, Tool No. J-6888.

7. Remove air spring from Holding Fixture (make sure that all air has been exhausted from air dome before removing air spring from Holding Fixture).

8. Install Schrader valve core in air dome.

9. To facilitate installation and prevent mispositioning of diaphragm during installation, add a small amount of air into dome (not more than 5 psi), transfer air spring carefully to car to prevent shifting of the diaphragm in the assembly.

(46) Rear Upper Control Yoke Removal and Installation

a. Removal

1. Raise rear end of car with one door open, and place jack stands under rear frame rails.

2. When air pressure in rear springs is exhausted, disconnect battery ground strap.

3. Disconnect both rear spring air lines at rear leveling valves. A slight discharge of air may take place.

4. Center jack under differential housing to support housing. (Do not raise housing.)

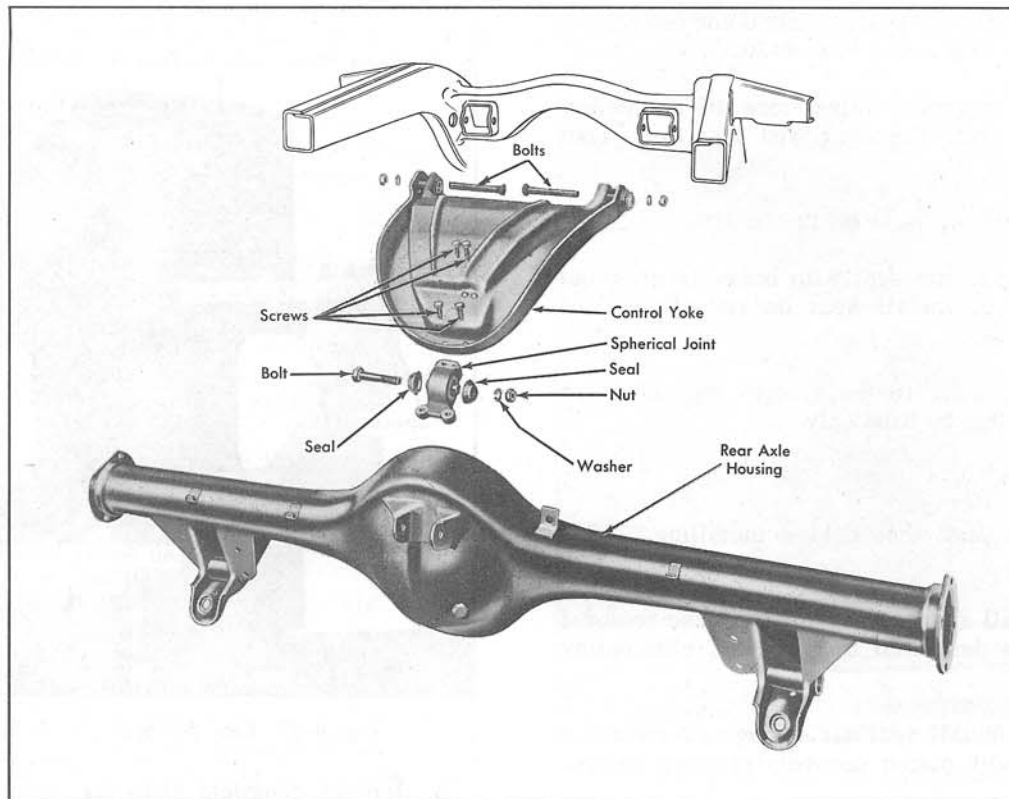


Fig. 4-28 Control Yoke Removal

5. Disconnect rear end of upper control yoke by removing four mounting screws that secure yoke to spherical joint on top of differential housing, Fig. 4-28. Yoke will spring up to its design height position. Note this position by measurement as control yoke front attaching bolts must be torqued with yoke in this position when yoke is installed.

6. Remove control yoke front attaching bolts at the frame cross member just forward of the rear axle.

7. Remove yoke over top side of differential housing.

b. Installation

1. Place control yoke in position and install the two front attaching bolts. Do not tighten the bolts.

2. Position yoke as noted in Step 5 of removal procedure and tighten front attaching bolts to 85-95 ft. lbs. torque.

3. Pull down on yoke and attach rear end to spherical joint. Secure with four bolts, tightening bolts to 35-40 ft. lbs. torque, Fig. 4-29.

NOTE: Installation of 4 bolts in rear end of yoke may be facilitated by manipulating jack under differential housing.

4. Connect both rear spring air lines at leveling valves, using new "O" rings on ends of lines.

5. Lower car, open any door, connect battery, and replenish air supply in accumulator tank through Schrader valve.

6. Test rear spring air line fittings for leakage using a soapy water solution.

7. Check standing height and adjust if necessary. See Note 39.

(47) Rear Lower Control Link, Right or Left, Removal and Installation

a. Removal

1. Raise rear end of car with one door open. Place jack stands under rear frame rails, and

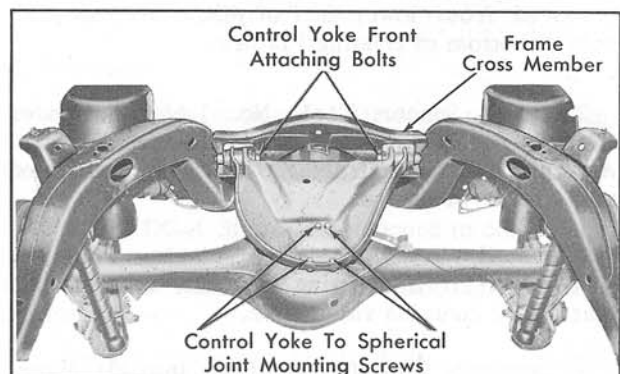


Fig. 4-29 Control Yoke Installed

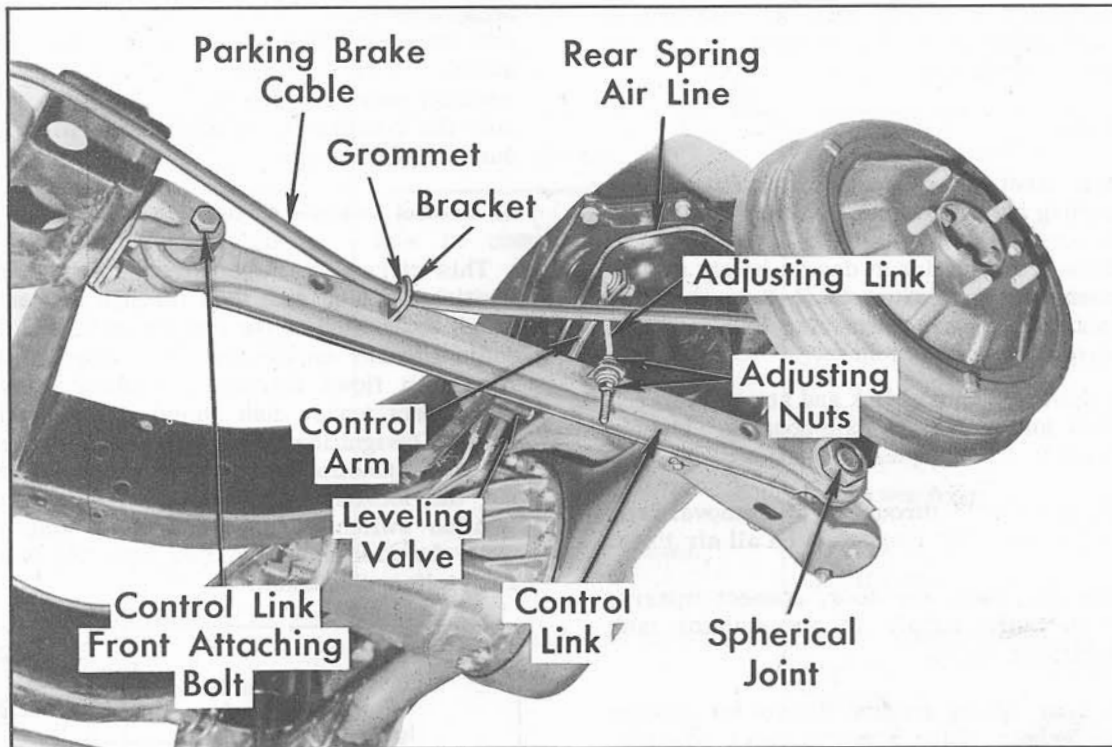


Fig. 4-30 Control Link Removal

remove rear wheel. Rear end of control link is now in rebound position, 5 inches lower than design height.

2. When air pressure in rear springs is exhausted, disconnect battery ground strap.

3. Center jack under differential housing to support housing. (Do not raise housing.)

4. Disconnect rear spring air line at leveling valve. A slight discharge of air may take place.

5. Loosen parking brake equalizer lock nut and disconnect cable.

6. Remove spring clip retaining parking brake cable at No. 4 body bracket.

7. Draw parking brake cable through grommet in bracket on outer side of control link, Fig. 4-30.

8. Disconnect leveling valve adjusting link at control link.

9. Measure distance from ground level to center line of spherical joint at rear of control link, See point "A", Fig. 4-31. Add 5 inches to this measurement to compensate for rebound distance, and note total. When control link is installed, front attaching bolt must be torqued with control link at design height.

10. Remove attaching bolt from front end of control link at body mounting bracket. See Fig. 4-30.

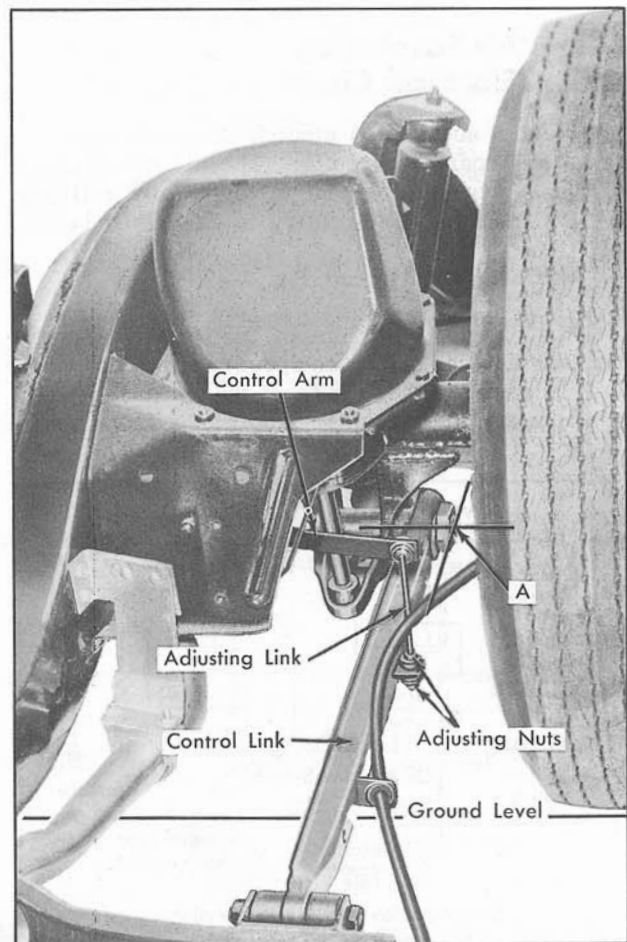


Fig. 4-31 Control Link Height

DIAGNOSIS CHART

EFFECT	CAUSE	REMEDY
Hard Steering (indicated by tightness in steering system.)	<p>Low or uneven tire pressure.</p> <p>Steering gear or connections adjusted too tight.</p> <p>Insufficient or incorrect lubricant used.</p> <p>Excessive caster or toe-in.</p> <p>Suspension arms bent or twisted.</p> <p>Spherical joints too tight.</p> <p>Frame bent or cracked.</p>	<p>Inflate tires to proper pressure.</p> <p>Test steering system for binding with front wheels off floor. Adjust as necessary.</p> <p>Lubricate steering system as required.</p> <p>Lubricate front suspension.</p> <p>Adjust caster and toe-in to specifications.</p> <p>Check wheel camber and caster. Replace bent arms with new ones.</p> <p>Replace with new joints.</p> <p>Check frame for proper alignment or cracking. Repair or replace as necessary.</p>
Excessive Play or Looseness in Steering System.	<p>Steering gear loose or worn.</p> <p>Steering gear connections adjusted too loose or worn.</p> <p>Spherical joints worn.</p> <p>Front wheel bearings incorrectly adjusted or worn.</p>	<p>Adjust or install new parts as required.</p> <p>Adjust or install new parts as necessary.</p> <p>Install new joints.</p> <p>Adjust bearings or replace with new parts as necessary.</p>
Car pulls to one side.	<p>Uneven tire pressure.</p> <p>Uneven tire wear.</p> <p>Uneven camber or caster.</p> <p>Brakes Grabbing.</p> <p>Rear wheels not tracking with front wheels.</p> <p>Shock absorbers inoperative.</p> <p>Wheel bearings adjusted too tight.</p> <p>Uneven weight distribution of body on frame.</p>	<p>Inflate tires to proper pressure.</p> <p>Interchange tires.</p> <p>Check and adjust camber or caster as necessary.</p> <p>Adjust.</p> <p>Check alignment of rear wheels with front wheels.</p> <p>Replace shock absorbers.</p> <p>Check for binding with front wheel off floor. Adjust and lubricate bearings.</p> <p>Check front and rear standing height and adjust as necessary.</p>

DIAGNOSIS CHART—(Cont'd.)

EFFECT	CAUSE	REMEDY
Car pulls to one side (Cont'd.)	Upper or lower suspension arm mounting bolts loose. Steering arm bent. Frame bent or broken.	Tighten to specified torque. Replace with new arm. Check frame for proper alignment or breakage. Repair or replace as necessary.
Scuffed tires.	Excessive speed on turns. Tires improperly inflated. Wheels or tires out of round. Toe-in incorrect. Suspension arm bent or twisted.	Advise driver. Inflate tires to proper pressure. Check for wheel and tire wobble. See that wheels and tires are properly mounted. Replace wheels or tires if necessary. Adjust toe-in to specifications. Replace arm.
Cupped tires.	Excessive tire or wheel runout. Tires improperly inflated. Wheels, tires, or brake drums out of balance. Front shock absorbers inoperative. Worn spherical joints. Incorrect drag link height. Wheel bearings incorrectly adjusted or worn.	Compensate for runout as explained in Note 6. Inflate tires to proper pressure. Balance wheels and tires. Replace shock absorbers. Replace joints. Correct according to specifications. Adjust or replace bearings as necessary.
Front wheel shimmy.	Wheels, tires, or brake drums out of balance. Wheels or tires out of round. Rough tire. Steering gear or steering connections incorrectly adjusted or worn.	Balance wheels and tires. Check for tire and wheel wobble or out of round. See that wheels and tires are properly mounted. Isolate and replace. Adjust or install new parts if necessary.

DIAGNOSIS CHART—(Cont'd.)

EFFECT	CAUSE	REMEDY
Front wheel shimmy (Cont'd.)	Incorrect caster. Worn spherical joints. Front wheel bearings incorrectly adjusted or worn. Shock absorbers inoperative.	Check and adjust to specifications. Replace joints. Adjust or replace if necessary. Check and replace if necessary.
Car wanders	Steering gear or connections adjusted too loose or worn. Drag link height incorrect. Worn spherical joints. Toe-in or caster incorrectly adjusted. Uneven weight distribution of body on frame. Tires which are not original equipment. Excess friction in front suspension. Front standing height incorrect. Upper or lower suspension arm mounting bolts loose.	Adjust or install new parts as necessary. Check and adjust to specifications. Replace joints. Adjust toe-in and caster. Check front and rear standing height and adjust as necessary. Install original equipment. Lubricate suspension and correct binding as required. Check standing height and adjust as necessary. Tighten to specified torque.
Road shocks.	High tire pressure. Steering gear or connections incorrectly adjusted. Shock absorbers inoperative. Incorrect standing height. Wrong type or size of tires used.	Deflate tire to proper pressure. Adjust steering gear and connections. Check shocks and replace if necessary. Check and adjust (Note 39.) Install new tires of correct type and size.
Air pressure warning light remains on.	Low pressure in air suspension system.	Check and correct any air leaks. Check compressor operation. Check operation of solenoid.

DIAGNOSIS CHART—(Cont'd.)

EFFECT	CAUSE	REMEDY
Air pressure warning light remains on (Cont'd.)	Grounded switch or connecting wire.	Replace switch or wire.
Air compressor operates continuously.	Pressure control switch diaphragm ruptured.	Replace diaphragm.
	Air leak in system.	Check for air leaks.
	Valve plate in head worn, or broken.	Replace compressor.
	Pressure limit switch not functioning.	Replace switch.
	Relay defective.	Replace relay.
Car will not return to level position (air pressure normal)	Front or rear leveling valve control links not adjusted properly.	Adjust front or rear standing height as required. See Note 39.
	Kink, leak or obstruction in high or low pressure lines.	Replace line or remove obstruction.
	Air compressor relay will not actuate solenoid.	Check wiring circuit for shorts or poor connections.
		Replace relay.
	Control solenoid inoperative.	Check wiring. Replace if necessary.
No leveling action with either front door open.	Open circuit between front door dome light switch and control solenoid relay.	Replace front door dome light switch.
		Replace relay.
		Check circuit wiring for loose or broken connections.
	Control solenoid inoperative.	Replace solenoid.
No leveling action with either rear door open.	Open circuit between rear door transmission interlock switch and control solenoid relay.	Replace rear door transmission interlock switch.
		Replace relay.
		Check circuit wiring for loose or broken connections.
	Control solenoid inoperative.	Replace solenoid.

DIAGNOSIS CHART—(Cont'd.)

EFFECT	CAUSE	REMEDY
Air system too sensitive resulting in excessive leveling action.	Leveling valve dashpot does not delay valve action. Control solenoid restriction valve not operating. Defective dome light switch at front door hinge or transmission interlock switch at rear door.	Replace leveling valve. Replace control solenoid. Replace switch.
Air spring inoperative.	Leaking diaphragm. Leak in air dome. Leak in air line. Defective leveling valve. Insufficient air pressure. Defective control solenoid. Defective air compressor, pressure switch or relay. Defective restriction "T" check valve. Loose electrical connection.	Leak test air spring. Replace diaphragm or correct faulty installation, as required. Leak test air line fitting, install new "O" ring seal and tighten fitting to 30-40 ft. lbs. torque. Perform Freon Leak Detector test, Note 2. Replace leveling valve. Run engine or replenish air supply at Schrader valve. Replace control solenoid. Check and replace defective unit. Replace check valve. Tighten connections at main relay and air compressor pressure switch and relay.
Hard riding	Insufficient lubrication. Tires overinflated. Shock absorbers. Incorrect standing height. Scuffed air spring diaphragm. Insufficient air pressure in system.	Lubricate front suspension and upper rear spherical joint on differential housing. Correct tire pressure. Check action and replace if necessary. Check and adjust standing height, front and rear. Replace diaphragm, piston or retainer plate as required. Replenish air supply and check for leaks.

DIAGNOSIS CHART—(Cont'd.)

EFFECT	CAUSE	REMEDY
Bottoming of rear air springs.	Incorrect standing height.	Check and adjust.
	Worn or defective rear suspension linkage.	Check and replace if necessary. Lubricate spherical joint on differential housing.
	Insufficient air pressure in system.	Replenish air supply and check for leaks.

SPECIFICATIONS

Subject and Remarks 57-7059

Steering axis inclination 4°
 Camber of front wheels* -3/8° to +3/8°
 Caster angle** 0° to 1°
 Toe-in (Car at normal standing height) 1/8" ± 1/32"
 Turning radius 20' 10"

*1/4° to 1/2° more positive camber of left wheel will help correct crowned road pull.

**Adjustment must be equal within 1/2° or less on both sides of car.

WHEEL RIMS

Diameter 15"
 Width 6"
 Eccentricity 3/64" max.
 Runout 3/64" max.

TIRES

Inflation pressure --

Front 24 lbs.

Rear 24 lbs.

Ply rating 4

Size (White Walls) 8.40 x 15

CAR WEIGHTS AND STANDING HEIGHTS

(See Note 39 for method of measuring standing height)

Curb Weight*		Front Standing Height in Inches	Rear Standing Height in Inches
Front	Rear		
L.F. 1341 R.F. <u>1465</u>	L.R. 1347 R.R. <u>1230</u>	3-5/8"	4-13/16"
TOTAL	2806 2577		
*Car fully equipped and full tank of gasoline.			

TORQUE TIGHTNESS

Application	Thread Size	Foot Pounds
Idler arm threaded bushing	Special	110-115
Knuckle to brake backing plate (upper bolt)	1/2 -20	85-95
Rubber bumper to lower suspension arm	3/8 -24	16-20
Spherical joint to knuckle (lower)	5/8 -18	50-60
Spherical joint to knuckle (upper)	9/16-18	50-60
Spherical joint to upper suspension arm (replacement only; special bolts)	5/16-18	20-25
Spherical joint to lower suspension arm	3/8 -24	35-40
Stabilizer bracket to frame	3/8 -24	25-30
Steering arm to knuckle and brake backing plate	1/2 -20	90-100
Suspension arm shaft to frame (lower)	7/16-20	60-70
Suspension arm shaft to frame (upper)	9/16-18	130-140
Suspension arm threaded bushings (lower)	---	195-205
Suspension arm threaded bushings (upper)	---	140-150
Tie rod adjuster clamp bolts	5/16-24	20
Tie rod pivots to steering arms	1/2-20	50-55
Wheel mounting nuts	1/2 -20	90-100
Front air spring piston to lower suspension arm	3/8 -16	20-25
Lower control link at front bushing	1/2 -20	85-95
Upper Control Yoke at front bushings	1/2 -20	85-95
"O" ring type fittings on air lines	5/16-24	30-34 in. lbs.
Upper control yoke to spherical joint	3/8 -24	35-40
Spherical joint to top of differential housing	1/2 -20	85-95
Rear lower link ball stud	5/8 -20	70-80
Rear air spring assembly to frame mounting brackets	3/8-24	25-30
Front air spring piston skirt to air dome	5/16-24	15-20
Front air spring assembly to front frame member	3/8 -24	25-30
Front air spring piston skirt to air dome	5/16-24	15-20
Front lower control link mounting bracket	3/8 -24	35-40

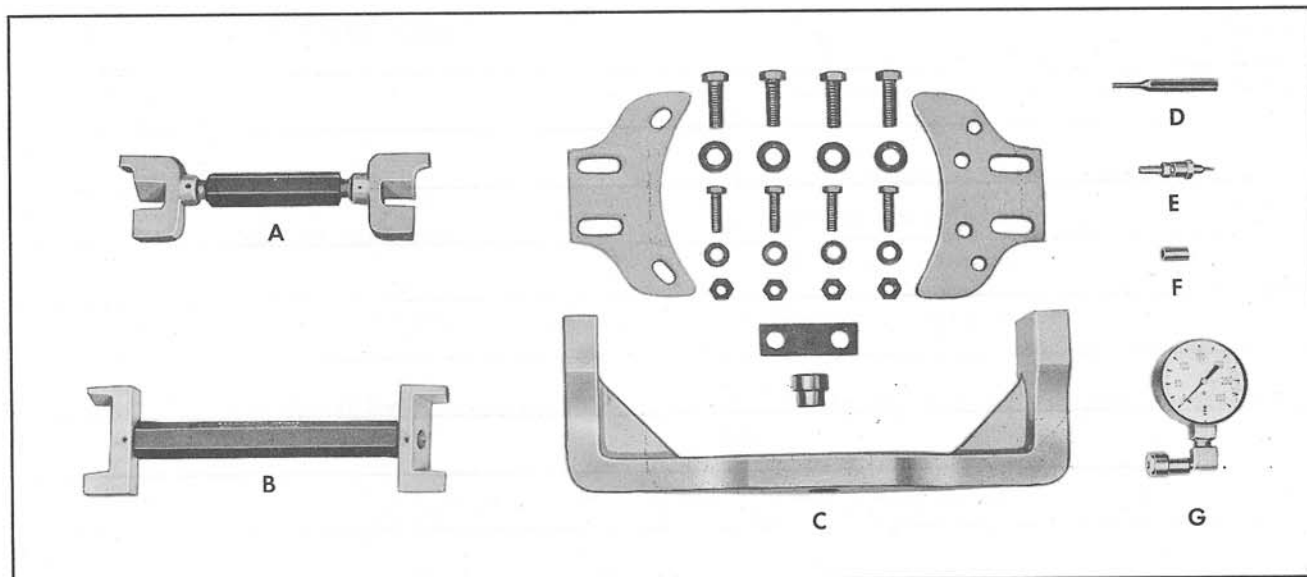


Fig. 4-35 Special Tools

Key	Tool No.	Name	Key	Tool No.	Name
A	J-6590	Upper Suspension Arm Spreader	D	J-6888	Valve Core Remover and Installer
B	J-6591	Lower Suspension Arm Spreader	E	J-6881	Air Dome Valve Adapter
C	J-6885	Air Spring Holding Fixture.	F	J-6887	Leak Test Adapter
			G	J-6840	Air Pressure Gauge

— OTHER NOTES AND REFERENCES —

GENERAL DESCRIPTION

The controlled coupling Hydra-Matic transmission used in the Eldorado Brougham is identical to the unit used in the 1957 dual carburetor equipped Eldorado series cars. The Eldorado Brougham transmission, however, is designated as a CB transmission and can be identified by the letters CB preceding the transmission serial number. The CB designation is used because all parts of the Brougham transmission have been carefully selected to provide a minimum noise level and the best possible performance.

The Brougham has a unique safety feature incorporated into the design of the transmission shift control linkage. The hand control shift lever cannot be put into any drive range when either rear door is open. In addition, the rear door will open only when the control lever is in Neutral or Park position, eliminating the possibility of a rear door being opened while the car is moving. This is accomplished by the action of a solenoid switch

and lever assembly, located on the steering column below the neutral safety switch. Refer to Section 12, Note 30.

The specifications and service procedures that apply to the 1957 CE transmission also apply to the CB transmission used on the Brougham, except for the removal and installation procedures and the transmission shift points, which are given in the following service information section.

It is of extreme importance that the ignition be off and the doors kept closed whenever a Brougham is placed on a lift or on jack stands for transmission work. If the car is expected to be on a hoist or jack stands for any length of time, it is advisable to disconnect the negative battery cable at the battery. These precautions are necessary to eliminate the possibility of actuating the air suspension system.

SERVICE INFORMATION

(1) Transmission Shift Points

The transmission shift points are indicated in MPH on the shift point chart, Fig. 6-1.

(2) Removal of Transmission from Car

1. Drain cooling system.
2. Disconnect battery.
3. Place car on hoist or jack stands.

NOTE: It is important that the ignition be off and the doors kept closed while the car is in a raised position.

4. Remove transmission filler pipe bracket bolt from right cylinder head.

5. Remove starting motor and slush deflector.

6. Clean dirt away from pipe flange and slide filler pipe out of sleeve in transmission case.

7. Remove lower flywheel housing front cover.

8. Drain transmission at Hydra-Matic oil pan and flywheel.

9. Remove propeller shaft assembly.

10. Remove intermediate frame cross member.

11. Disconnect hoses at oil cooler.

12. Disconnect speedometer cable from extension housing.

13. Disconnect TV and manual levers from shafts.

Shifts	DRIVE 4 RANGE		DRIVE 3 RANGE		LO RANGE	
	Minimum Throttle	Full Throttle	Minimum Throttle	Full Throttle	Minimum Throttle	Full Throttle
1-2	6-9	18-22	Same as Drive 4 Range		Same as Drive 4 Range	
2-3	13-16	37-40	Same as Drive 4 Range		47-53	47-53
3-4	17-21	72-79	62-69	62-69	62-68	62-69
4-3	12-16	60-66	56-62	56-62	56-64	56-62
3-2	12-15	22-25	Same as Drive 4 Range		37-43	37-43
2-1	0-5	0-5	Same as Drive 4 Range		Same as Drive 4 Range	

Fig. 6-1 Transmission Shift Point Chart

14. Remove four nuts from flywheel-to-drive plate screw.

15. Place a jack under the rear of the engine oil pan, using a wood block to prevent damage to the pan.

16. Place a transmission jack under transmission and raise it just enough to take the strain off the engine rear support.

17. Disconnect engine rear support cushion and retainer from the transmission extension housing. Remove cross-member that supports the transmission.

18. Remove six screws that secure flywheel housing to engine. The transmission and engine can be lowered far enough below normal position to enable the upper two flywheel housing to cylinder block screws to be reached with a 5/8" flex socket and a 2-1/2 foot, 3/8 drive extension.

19. Remove transmission and flywheel housing as a unit by moving assembly toward rear of car, disengaging the flywheel housing from the locating dowels on the engine and tilting the front of the transmission downward to lower it from the car. Remove washer from pilot hole in crankshaft. Remove four shims from flywheel to drive plate screws.

(3) Installation of Transmission in Car

1. Install spacer washer in pilot hole in crankshaft, and place shims on flywheel to drive plate screws.

2. Raise transmission into position carefully with a transmission jack. Align the drive plate with four torus cover screws, and the dowel holes in flywheel housing with dowels on engine.

3. Install six flywheel housing to crankcase

screws. Be certain flywheel is as far forward as possible.

4. Install four nuts which attach drive plate to flywheel and tighten to 15-20 ft. lbs. torque. Tighten drain plugs in flywheel and Hydra-Matic oil pan.

5. Lift engine and transmission to about 1" above its normal height and secure rear engine support bracket to frame.

6. Lower transmission carefully and install support screws. Remove jacks from under engine pan and transmission.

7. Install flywheel housing front cover.

8. Install starting motor.

9. Place filler tube in transmission with support bracket properly positioned on cylinder head.

10. Connect manual and TV levers, making certain that the serrations on the levers line up with the serrations on their respective shafts and tighten securely.

11. Install slush deflector.

12. Install speedometer cable.

13. Connect and tighten oil cooler hoses.

14. Install intermediate frame cross member.

15. Install propeller shaft.

16. Lower car and connect battery cable.

17. Install filler pipe bracket screw in right cylinder head.

18. Fill cooling system and add fluid to transmission.

19. Adjust manual and TV linkage.

— OTHER NOTES AND REFERENCES —

GENERAL DESCRIPTION

The basic design of the rear axle assembly used on the Eldorado Brougham is similar to the design of the assembly used on other 1957 Series cars. Some distinctive features in the axle housing are necessary, however, to accomodate the linkage type rear suspension. Brackets are mounted at either end of the axle housing to support the rear suspension lower control links and the rear air spring piston rod assemblies. Another special bracket is mounted on the rear axle housing to support the upper control yoke spherical joint. The frame to rear axle bumper is mounted directly above the front end of the differential case on the number four frame cross member, eliminating the necessity for a rear axle bumper arm.

The Brougham rear axle assembly can be identified by a letter "B" stamped on the front face of the carrier assembly next to the gear ratio identification number. The "B" designation is used because all the Brougham rear axle gear sets are

specially selected to provide minimum noise level and the best possible performance.

The power and braking forces are transmitted to the frame through the rear suspension lower control links. Reaction forces on the inclined upper control yoke aid in supporting the rear end during acceleration (anti-squat) and hold the rear end down while braking (anti-dive).

A 3:36 to 1 ratio rear axle assembly is used on all Eldorado Brougham cars.

It is of extreme importance that the ignition be off and the doors kept closed whenever a Brougham is placed on a lift or on jack stands for rear axle work. If the car is expected to be on a hoist or jack stands for any length of time, it is advisable to disconnect the negative battery cable at the battery. These precautions are necessary to eliminate the possibility of actuating the air suspension leveling system.

SERVICE INFORMATION

(1) Axle Gear Ratio Identification

The gear ratio of the rear axle assembly on all Eldorado Brougham cars is 3:36 to 1 and can be identified by the number "6" stamped on the front face of the carrier assembly adjacent to the pinion oil seal.

(2) Measurement of Rear Axle Backlash

1. Place car on hoist. Refer to Section 4, Note 4 for instructions on lifting the Brougham.

2. Fasten one end of a piece of bar stock to the differential pinion yoke, and the other end to one of the main frame members by means of "C" clamps to prevent rotation of the pinion yoke.

3. Apply the parking brake on one of the rear wheels.

4. Measure the rotation (backlash) of the opposite wheel in inches at outer circumference of tire tread. A stiff wire pointer fastened to the fender will aid in this measurement.

5. Maximum backlash under the above conditions should not exceed 1/2".

SPECIFICATIONS

Axle Shaft Length		
Left Side	.....	29-1/64"
Right Side	.....	31-5/8"
Gear Ratio	.....	3:36 to 1
Propeller Shaft Length		
Front Section	.....	28-5/8"
Rear Section	.....	28-1/2"

TORQUE TIGHTNESS

Location	Size	Ft. Lbs. Min.	Ft. Lbs. Max.
Brake Backing Plate to Axle Housing	3/8-24	35	40
Differential Carrier to Axle Housing	3/8-24	30	40
Pinion Shaft Nut	7/8-14	200 Min.	
Universal Joint Nuts	5/16-24	14	17
Propeller Shaft Center Bearing Nut	1-9/16-18	40	60
Propeller Shaft Mounting Nuts	5/16-24	13	18

GENERAL DESCRIPTION

The braking system on the Eldorado Brougham is almost identical to the braking system used on all 1957 series Cadillac cars.

The only variation is the positioning of the power brake assembly in the car and the relocation of the hydraulic fluid output line fitting to the top of the residual check valve end cap.

The power brake assembly is mounted in the same

location as on other 1957 series cars but is positioned crosswise on the cowl, with the end cap facing outboard to the left. Hook bolts are used instead of carriage bolts to secure the power cylinder shell to the end plate.

Information pertaining to service of the braking system is substantially the same as described in the 1957 Cadillac Shop Manual.

— OTHER NOTES AND REFERENCES —

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Specifications and service procedures as outlined in the 1957 Cadillac Shop Manual also apply to the Eldorado Brougham engine.

— OTHER NOTES AND REFERENCES —

GENERAL DESCRIPTION

The fuel and exhaust systems on the Eldorado Brougham are almost identical to the fuel and exhaust systems on 1957 Eldorado series cars; the only exceptions being the type and location of the fuel pump, and the use of dual carburetors as standard, rather than optional equipment.

The fuel pump is an electric motor driven centrifugal pusher type unit suspended in the fuel tank. Cooling and lubrication are provided by the fuel flowing through the pump.

Fuel enters the pump through the outer strainer, Fig. 10-1, and flows down into the primary pump throat. At the same time, a smaller amount of fuel enters through the bottom strainer and flows up into the secondary throat. When the circuit is closed, the impeller rotates, throwing fuel outward into the volute casing formed by the upper and lower volutes. Due to the restricted volume of the volute casing, a pressure is created and fuel is forced through the outlet tube to the carburetor.

The required fuel circulation through the motor is taken from the impeller cavity, Fig. 10-2, through an inlet passage in the pump body to a sediment chamber. An outlet passage is provided in the bottom of the sediment chamber. The outlet restriction is smaller than the inlet restriction so that a considerable pressure is maintained in the field case by fuel passing through the inside strainer. Fuel under pressure is forced through

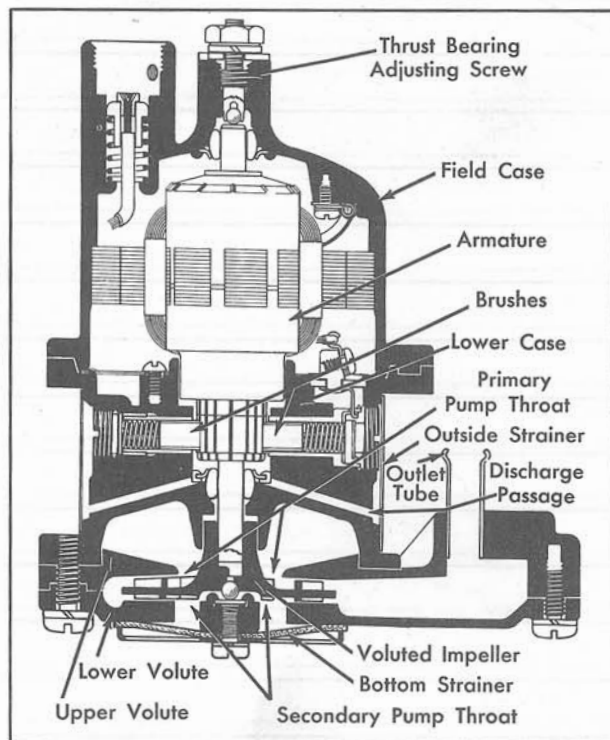


Fig. 10-1 Fuel Pump Side View

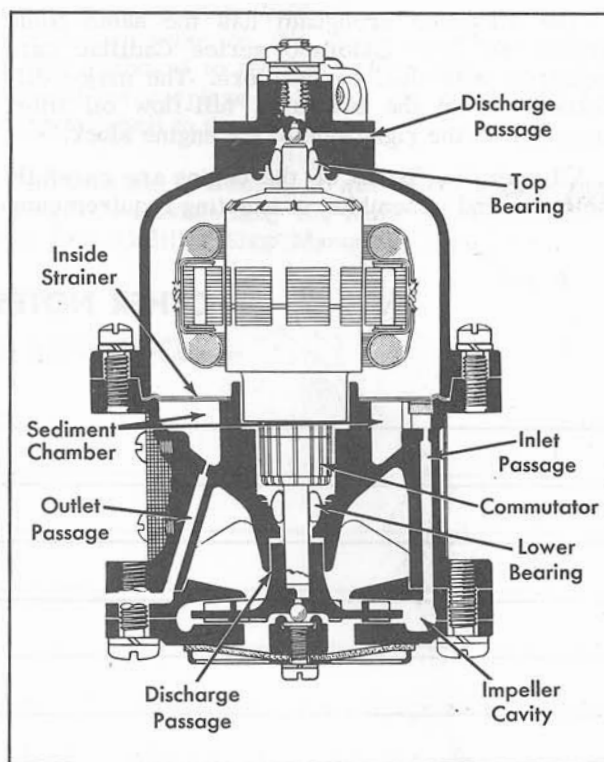


Fig. 10-2 Fuel Pump Front View

the top bearing, providing lubrication and then returns to the fuel tank through discharge passages. A portion of the fuel from the field case flows down through the opening formed by the armature and the lower case. Fuel under pressure from the commutator pocket lubricates the lower bearing and is passed to the primary throat through discharge passages, Fig. 10-1 and Fig. 10-2.

The following safety features are incorporated in the pump: the surfaces of contact between the brushes and the commutator are the only normal sources of electric arc. When the pump is operating, the brushes and commutator are completely immersed in gasoline, and due to the lack of oxygen, explosive mixtures do not exist. When the fuel level is below the commutator and the pump is not operating, air is allowed to enter the commutator pocket, and when the pump is first started, the incoming gasoline may mix with the oxygen and cause a pop, or small explosion. This, however, is suppressed by the design of the passages and the strainers which act as fire screens so that no flame can leave the interior of the pump.

The gasoline line is attached to the fuel outlet fitting and extends to the rear of the tank. It continues to the right side of the tank, then forward and around the front of the spare tire well to the right body rail where it extends forward to the engine compartment.

A red tell-tale light on the fuel gage lights up when there is less than 2-1/2 gallons of gasoline in the fuel tank.

Service information pertaining to the engine fuel

and exhaust system on the Brougham is substantially the same as described in the 1957 Cadillac Shop Manual. Characteristics and procedures that differ are covered under "Service Information" in this section.

SERVICE INFORMATION

(1) Fuel Tank Removal and Installation

a. Removal

1. Drain gasoline from tank.
2. Raise rear end of car, and disconnect battery ground strap to prevent any leveling action while car is raised.
3. Remove left rear bumper as outlined in Section 16, Note 10.
4. Disconnect filler pipe from tank.
5. Disconnect vent pipe from tank.
6. Remove license plate and frame assembly.
7. Remove tank support straps and lower tank from car until fuel gage, wires, tell-tale light wire, electric fuel pump wire and fuel outlet fitting are accessible.
8. Disconnect fuel gage wires, tell-tale light wire, and electric fuel pump wire. Tape wires as a precautionary measure so that no spark can ignite fumes in or about tank.
9. Disconnect fuel line from fuel outlet fitting and remove fuel tank.

b. Installation

1. Using a new line spacer to insure a tight fuel line to fuel tank seal, reverse removal procedure as outlined above.

NOTE: Check warning light operation before and after filling fuel tank.

2. Check fuel gage operation.
3. Check for leaks at filler pipe, vent pipe, and fuel line connections.

(2) Fuel Pump Assembly Removal

1. Remove fuel tank as outlined in Note 1.
2. Remove eight screws from the outside of the fuel pump cover plate, and lift cover plate, together with fuel pump and hanger assembly, from fuel tank.

(3) Fuel Pump Assembly—Disassembly and Assembly

a. Disassembly

1. Remove fuel outlet hose, Fig. 10-3.
2. Remove outside strainer.
3. Remove three attaching screws that secure cover plate to mounting insulator posts, and remove cover plate.
4. Remove mounting insulator posts.
5. Loosen cable lock screw and remove cable attaching screw, freeing cover plate and cable assembly completely from pump assembly.
6. Remove fuel outlet fitting.
7. Remove thrust bearing adjusting screw.
8. Remove screw plugs and brushes.
9. Remove mounting insulator retainer with mounting insulators. (Remove insulators from retainer)

NOTE: It is advisable to scribe a small mark on either the field housing or the pump body near the remaining attaching screw, to facilitate proper positioning of screw during assembly of pump.

10. Remove remaining screw that attaches field housing to pump body and separate the two parts slightly, making lead wire attaching screw accessible.
11. Remove lead wire attaching screw and washer, completely freeing field housing.
12. Remove inside strainer frame and strainer.
13. Remove bottom strainer frame and strainer.
14. Remove lower volute and wear plate assembly, impeller and ball assembly, and upper volute and tube assembly.

b. Assembly

1. To assemble fuel pump, reverse disassembly procedure.

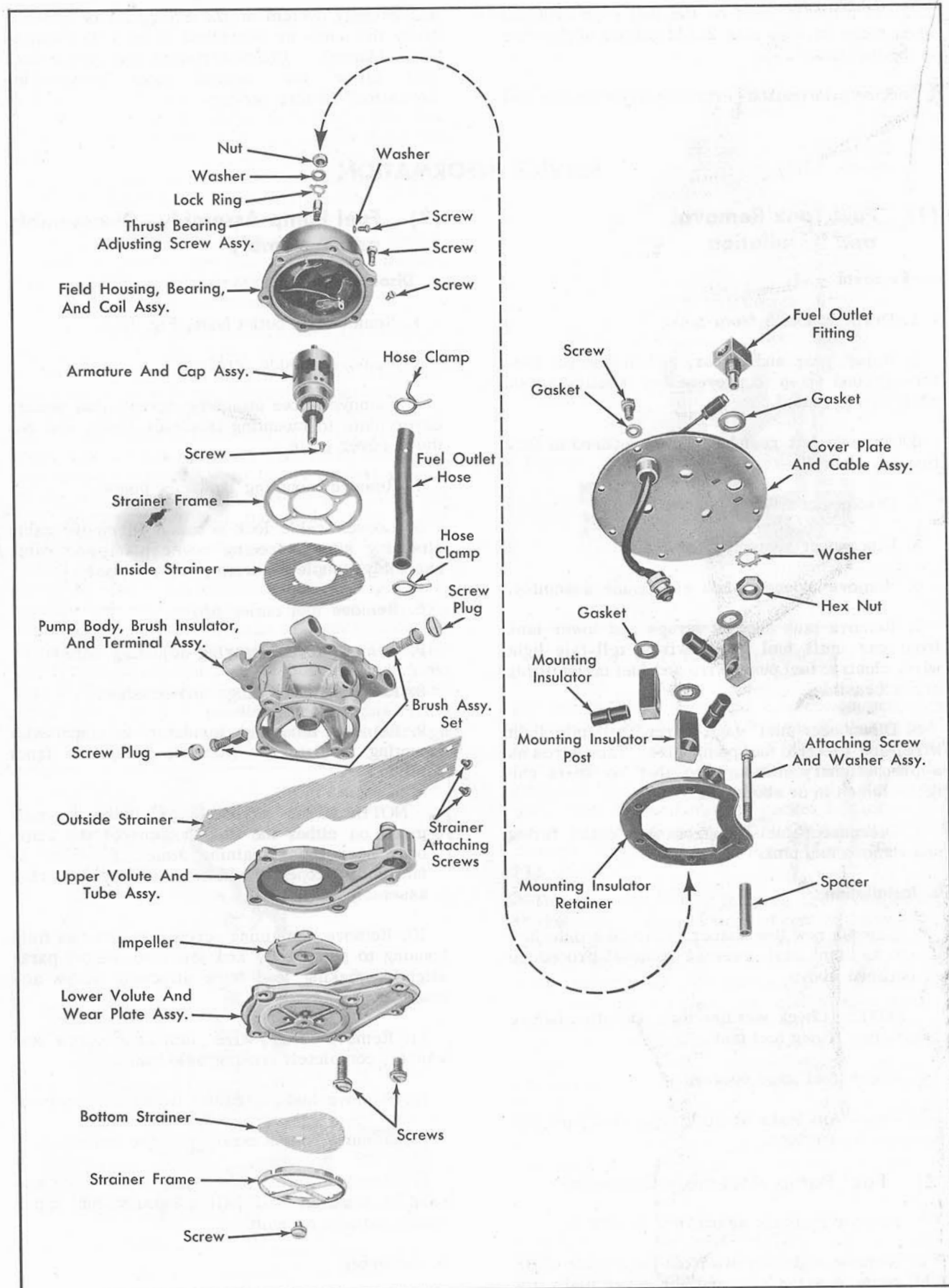


Fig. 10-3 Fuel Pump Disassembled

— OTHER NOTES AND REFERENCES —

GENERAL DESCRIPTION

The cooling system on the Eldorado Brougham engine is almost identical to the cooling system on the Cadillac engine as described in the 1957 Shop Manual. Procedures that differ are covered under Service Information in this Section.

Air is drawn through the radiator core by a six-bladed aluminum fan.

The transmission oil cooler is used as a bypass for the water pump. When the thermostat is closed, coolant from the cylinder heads is forced through the transmission oil cooler and circulates through the cylinder block.

The crankshaft and fan pulleys have four grooves to accommodate the two air conditioning

compressor drive belts, the power steering pump drive belt and the generator drive belt.

The radiator filler cap is offset to the rear of the radiator and is somewhat lower than on the other 1957 model cars. This is to compensate for the lower hood line.

The radiator drain plug is located on the fan side of the radiator at the bottom on the left side, and must be removed before removing the radiator assembly.

Air vents on the top rear portion of the front fenders, provide additional engine compartment ventilation.

SERVICE INFORMATION**(1) Thermostat Removal**

1. Drain radiator until water level is below level of thermostat.

2. Disconnect upper radiator hose at thermostat housing.

3. Remove four cap screws from thermostat housing at top of water pump body.

4. Loosen power steering pump bracket screw and lift bracket off thermostat housing.

5. Remove thermostat housing and gasket.

6. Remove thermostat from top of water pump body.

(2) Thermostat Installation

1. Scrape old gasket material from surface of water pump and thermostat housings.

2. Remove any foreign particles from seat in water pump housing.

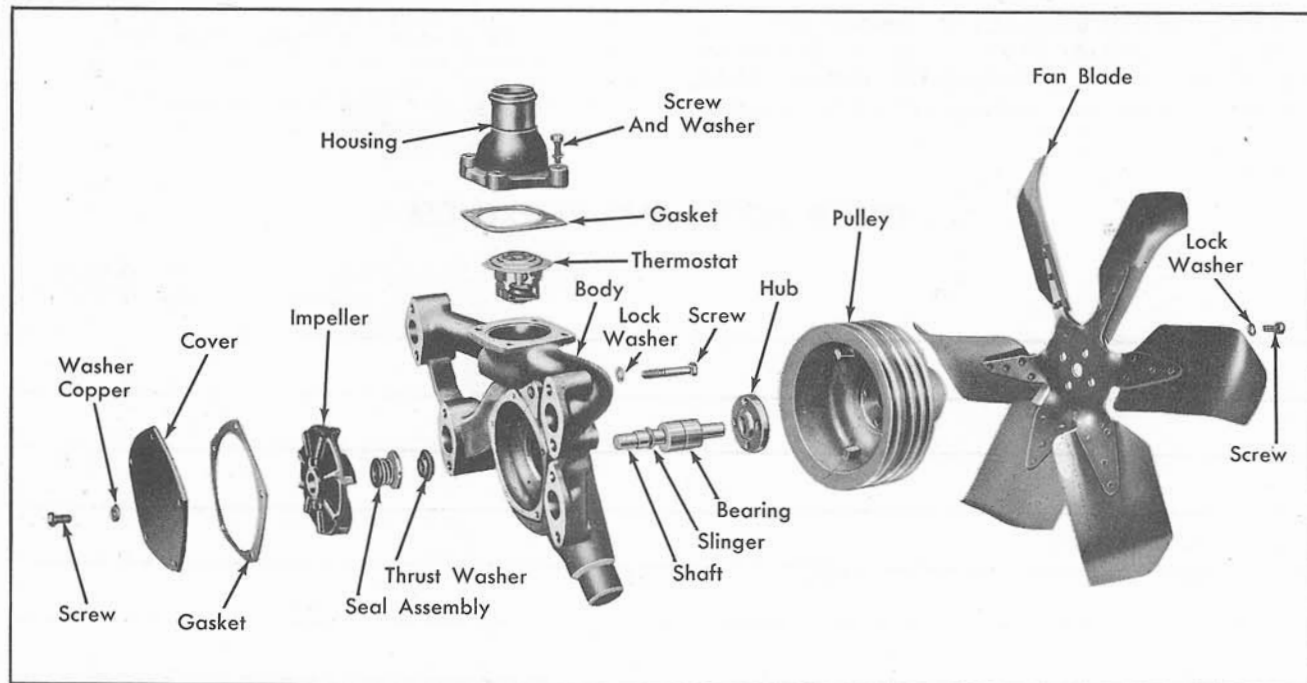


Fig. 11-1 Water Pump Disassembled

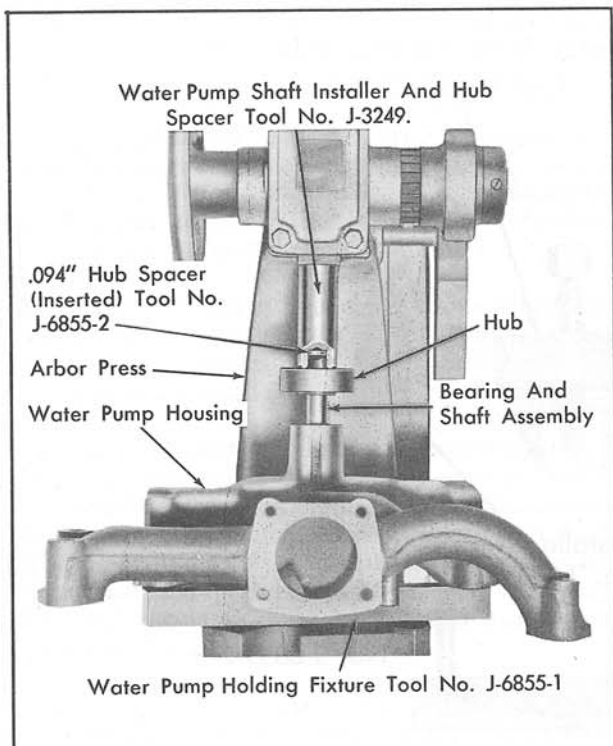


Fig. 11-2 Pressing Hub on Bearing Shaft

3. Install thermostat in opening at top of water pump with valve up.

NOTE: Be sure that the thermostatic spring strap is parallel to the centerline of the car (fore and aft). This will reduce the possibility of the right hand bank running at a higher temperature than the left hand bank.

4. Install a new thermostat gasket, coated with gasket cement, on water pump housing.

5. Install thermostat housing on water pump.

6. Reposition power steering pump bracket on top of thermostat housing.

7. Install four thermostat housing cap screws, tightening them to 15-20 ft. lbs. torque.

8. Tighten power steering pump bracket screw.

9. Install upper radiator hose on thermostat housing.

10. Fill cooling system until the water level can be seen in the filler neck.

(3) Fan Shroud Removal and Installation

a. Removal

1. Remove the screws, one on each side, that hold the fan shroud segments together.

2. Remove two screws that hold top fan shroud segment to supporting brackets on radiator and remove top segment.

3. Remove two screws that hold bottom fan shroud segment to supporting brackets on radiator and remove bottom segment.

NOTE: Always remove fan shroud before attempting to remove radiator assembly.

b. Installation

To install, reverse the above procedure, making sure that the fan shroud segment screws are replaced securely.

NOTE: Always install radiator assembly before installing fan shroud.

Removal and installation of radiator is substantially the same as described in the 1957 Cadillac Shop Manual.

(4) Water Pump Assembly

1. If bearing, shaft, and slinger assembly, Fig. 11-1, has been removed from the water pump, replace by pressing new assembly into body, using Water Pump Shaft Installer and Hub Spacer, Tool No. J-3249.

2. Install washer and seal assembly over driving lugs of slinger. Washer should slide freely over lugs of slinger.

3. Press impeller on shaft until outer face of impeller is .005 to .010 inches below back face of water pump.

4. Press new hub on bearing shaft, Fig. 11-2, using Water Pump Holding Fixture, Tool No. J-6855-1; Hub Spacer Tool, No. J-3249; with .094" Hub Spacer, Tool No. J-6855-2, inserted, Fig. 11-3, until tool bottoms on shaft. Spacer assures proper positioning of hub on bearing shaft so that there is sufficient clearance between the fan pulley and the water pump housing.

5. Brush gasket cement on pump and cover. Assemble cover gasket and cover to pump.

6. Spin shaft in pump to be sure impeller has clearance.

7. Install pulley and six-blade fan on water pump shaft hub.

8. Install thermostat in pump body and coat thermostat housing and pump flange with gasket cement. Install gasket and housing, tightening screws to 15 to 20 ft. lbs. torque.

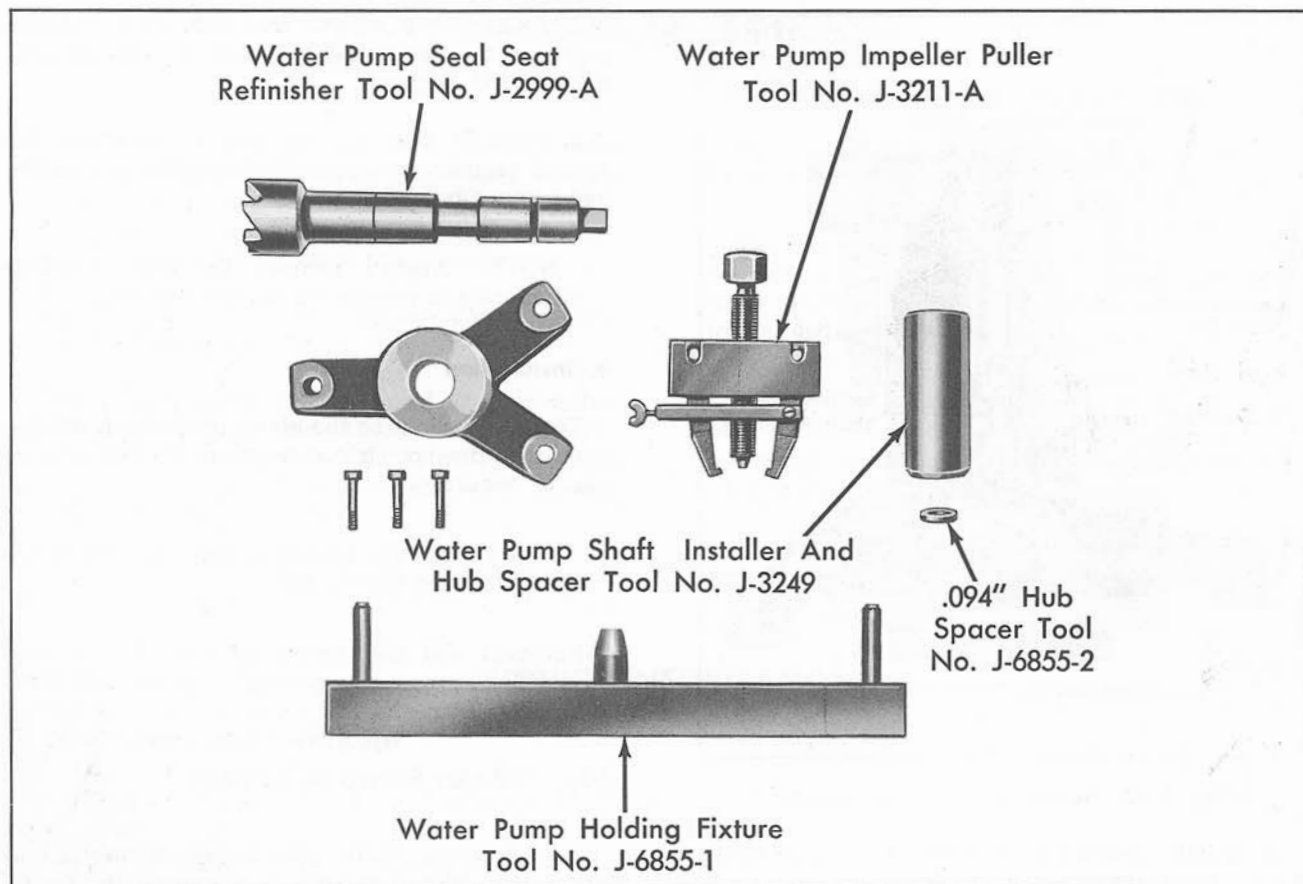


Fig. 11-3 Special Tools

TORQUE TIGHTNESS

Location	Size	Min.	Max.
Hose Clamp	Special	15 in. lbs.	20 in. lbs.
Radiator Anchorage Nut	5/8-18	35 ft. lbs.	50 ft. lbs.
Thermostat Housing	5/16-18	15 ft. lbs.	20 ft. lbs.
Water Pump to Crankcase	3/8-16	25 ft. lbs.	30 ft. lbs.
Water Pump to Cylinder Head	3/8-16	25 ft. lbs.	30 ft. lbs.
Water Pump Cover to Body	1/4-20	10 ft. lbs.	15 ft. lbs.

SPECIFICATIONS

Subject and Remarks	Eldorado Brougham
FAN	
Belts	
Length - Pitch Circumference	
Freon Compressor (Two)	65.39"
Power Steering Pump	52.08"
Generator Drive	59.68"
Width (All) . . . . .	.380"
Type (All)	Wedge
Distance from Fan Hub to End of Fan Shaft . . . . .	.2355"
Drive Ratio	1.1 to 1.0
Number of Blades	6
COOLING SYSTEM	
Capacity	22-1/2 qts.

GENERAL DESCRIPTION

The Brougham is equipped with a 12 volt, 11 plate, 72 ampere hour, heavy duty battery which is located in a separate compartment in the right rear quarter panel. The battery is accessible through the trunk compartment.

A 55 ampere output generator with a three and one-half inch pulley is standard equipment on the Brougham. The generator is located at the front of the left exhaust manifold.

A 55 ampere double contact generator regulator, similar to the double contact unit used on some other 1957 series cars, is used on the Brougham. The regulator is mounted on the right fender dust shield close to the Freon compressor. The special precautions and procedures designated for this particular regulator must be followed exactly as outlined in this section.

The Brougham starting motor is similar to the unit used on other 1957 series cars, except that the solenoid is mounted straight down to provide clearance for the full-flow type engine oil filter.

An automatic starting relay has been incorporated in the starting system of the Brougham. The relay is both electric and vacuum controlled. The starting motor will automatically crank when the ignition key is moved to the right and the transmission is in neutral or park. The starting solenoid automatically disengages when the engine starts.

The distributor and coil are similar to the units used on other 1957 series cars. The coil is mounted on the cowl panel just to the right of the centerline of the car. Distributor and timing recommendations remain the same as those given for other 1957 series dual carburetor equipped cars. Type 44 spark plugs are installed as original equipment on the Brougham.

The fuse panel is mounted on the cowl insulating board behind the radio speaker housing. The turn signal, back-up, instrument, body feed, air ride, radio, antenna, heater, and air conditioning fuses are all mounted on this panel, Fig. 12-1. In addition, the turn signal flasher unit is mounted on the fuse panel. One additional fuse for the electric fuel pump is located at the left side of the radio speaker housing.

The Brougham is equipped with the new Cadillac four headlamp system. In this system, the two outer lamps operate on low beam, while all four lamps operate on high beam.

Four specially tone-matched solenoid type horns are standard equipment on the Brougham. These horns are assembled in a cluster and are

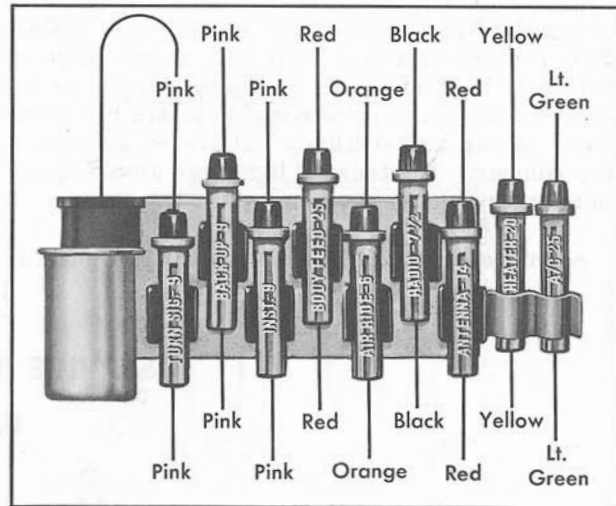


Fig. 12-1 Fuse Panel

mounted under the left front fender behind the headlamp assembly. Two horn relays are incorporated in the horn circuit and are mounted on the left inside surface of the radiator support, Fig. 12-25.

The Brougham instrument cluster is unique in that it incorporates gages with 270 degree faces for oil pressure, engine temperature, fuel, and generator charging. In addition to these gages, there are tell-tale lights indicating low oil pressure, low fuel level, low charging rate, high engine temperature, and low air suspension air pressure, plus the conventional trunk, high-beam and brake warning lights. A drum type clock is standard equipment on the Brougham.

A map light is located under the instrument panel overhang directly over the radio dials. It is manually controlled by a switch at the light. This light also is operated automatically by the door jamb switches and thus serves as a courtesy light when either front door is opened.

Side roof rail lamps are located on the side roof rails at the center of the car. They are controlled manually by a switch integral with the lamp and operate automatically when a door is opened.

Two lights are provided in the glove compartment. They are mounted in the left side and in the top of the box and are covered by lenses that are flush with the compartment surface.

Fog lamps are standard equipment on the Brougham, and are mounted in the lower section of the bumper. The front parking and turn signal lights are located inside the fog lamp assemblies.

Two lights are provided to illuminate the rear license plate. The two separate light fixtures are

mounted in the underside of the rear end panel.

The Brougham has a total of six lamps in the rear. A vertically mounted lamp assembly is mounted in the trailing edge of each rear fender. This serves as a tail, stop, and signal lamp. A reflector is mounted in the lower section of the lamp assembly. In addition, there are two round stop, signal and auxiliary tail lamps, located in the bumper. The back-up lights are also mounted in the rear bumper sections.

A unique electrical feature on the Brougham is

the transmission interlock system. This system prevents movement of the transmission shift lever into any drive range when either rear door is open. In addition, the rear door can only be opened when the Hydra-Matic shift control lever is in Neutral or Park position, eliminating the possibility of the rear door being opened while the car is moving. This is accomplished by the action of a solenoid switch and lever assembly, located on the steering column below the neutral switch and by solenoids in each rear door. The rear doors can be opened from the outside with the shift lever in any position.

SERVICE INFORMATION

BATTERY

(1) Battery Filling Instructions

The battery is located in a separate compartment in the right rear quarter panel and is accessible through the interior of the trunk. The battery fluid level should ordinarily be checked every 2,000 miles. In warm weather, a check should be made at two-week intervals.

To check the electrolyte level, open the trunk, loosen the spare tire, release the clip retainers on the battery cover, and remove the cover. If the fluid level is found to be low, add distilled or demineralized water to bring the level up to the bottom of the slots in the wells.

Extreme care should be exercised when filling the battery to eliminate the possibility of overfilling or spilling electrolyte on the trunk compartment trim material.

(2) Battery Visual Inspection

1. Inspect the positive (insulated) cable and negative ground strap for corrosion or damage. The ground strap runs from the negative battery post through an opening in the trunk floor to the frame. The two-piece positive cable runs from the positive battery post through the trunk floor and the right rocker sill to a terminal block on the frame and from the terminal block to the starter terminal. The positive battery cable should be checked periodically for stone cuts or chafing, and for tightness of the cable at the terminal block.

2. Inspect the battery posts and cable terminals for corrosion. If corroded, wipe off the posts and terminals with a cloth dampened with household ammonia or a solution of water and baking soda. If there is an excessive amount of corrosion around the terminals, the battery should

be removed from the car, cleaned, and flushed with water.

3. Inspect the battery and hold down clamps for corrosion. If corrosion exists it will be necessary to remove the battery from the car and pour a warm water and baking soda solution over the corroded areas in order to loosen the copper sulphate. Flush the battery with water.

CAUTION: Care should be taken to keep cleaning solutions out of battery cells, otherwise the electrolyte will become permanently weakened.

4. Examine the battery for cracks in case, raised cells, and excessive tightness or looseness in carrier.

(3) Battery Removal and Installation

a. Removal

1. Open trunk, loosen spare tire, release clip retainer on the battery cover and remove cover.

2. Disconnect ground strap and positive cable.

3. Remove two wing nuts and battery hold down clamps.

4. Remove battery, being careful not to spill electrolyte on the trunk compartment trim material.

b. Installation

1. Install battery by reversing above procedure.

NOTE: Care should be taken to tighten the wing nuts just enough to prevent vibration of the battery. Avoid over-tightening.

CHARGING SYSTEM

(4) Generator Tests

CAUTION: Never ground the generator field with the regulator connected to the generator. This would instantly burn up the lower set of contact points on the voltage regulator.

a. Generator Output Test

1. Disconnect the field lead from the regulator "F" terminal.
2. Connect a 25 ohm, 25 watt variable resistance (with an open position) between the field lead and ground.
3. Connect a voltmeter and an ammeter into the charging circuit, as shown in Fig. 12-2.
4. Turn on all necessary load (lights, radio, etc.) and connect an additional load (such as a carbon pile or a bank of lights) across the battery if additional load is required to obtain 55 amperes.
5. Operate the engine at 1500 RPM, and then turn field variable resistance toward the direct position until the voltage reaches 16 volts or all resistance is cut out. Ammeter will indicate generator output. Output should be 55 amperes.

CAUTION: Never allow the voltmeter reading to exceed 16 volts. Exceeding this voltage may result in burning up or damaging the resistor unit (field circuit resistor) under the base of the regulator.

6. Turn variable resistance to the "open" position.

b. Generator Circuit Resistance Test

7. Turn off all accessory load and disconnect any added load as shown in Fig. 12-2.
8. Adjust engine speed to 1000 RPM.
9. Adjust the field variable resistance until the ammeter indicates exactly 20 amperes. Do not allow voltage to exceed 16 volts. It may be necessary to place a load directly across the battery to obtain the 20 ampere load.
10. To test the insulated side of the circuit, connect the voltmeter leads between the ungrounded battery post and the armature terminal of the generator. Voltmeter reading should not exceed 0.6 volts. A standard 18 gage automotive wire is sufficient to be used with the voltmeter.

NOTE: The voltage drop across the test ammeter should be measured and subtracted from the voltmeter reading to give the actual drop of the wiring in this part of the charging circuit.

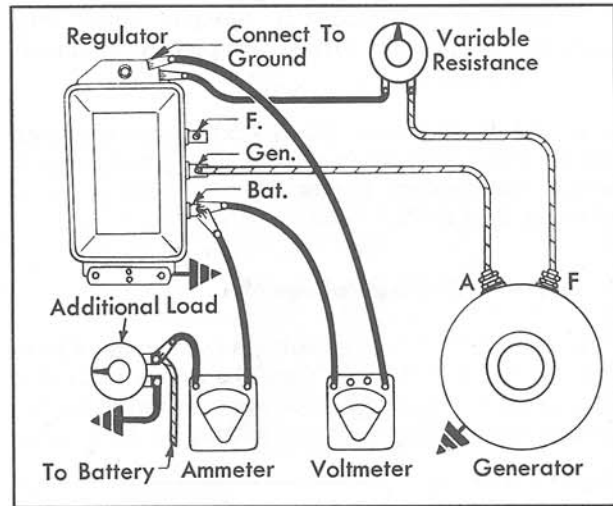


Fig. 12-2 Generator Tests

11. To test the ground side of the circuit, connect the voltmeter leads between the grounded battery post and the generator ground. Voltmeter reading should not exceed 0.2 volts.

12. Return the field variable resistance to open position and stop engine.

(5) Regulator Tests and Adjustments

CAUTION: Never ground the generator field with the regulator connected to the generator. This would instantly burn up the lower set of contact points on the voltage regulator.

CUT-OUT RELAY**a. Closing Voltage Tests**

1. Connect a voltmeter between the regulator "GEN" terminal and ground, Fig. 12-3.

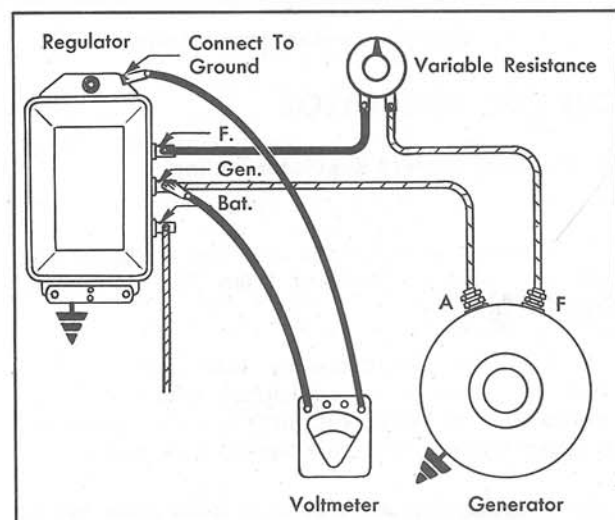


Fig. 12-3 Checking Cut-Out Relay Closing Voltage

2. Connect a 25 ohm, 25 watt variable resistance (which has an "open" position) between regulator "F" (field) terminal and field lead from generator.

3. Operate generator at medium speed with variable resistance turned completely in (maximum resistance).

4. Slowly decrease (turn out) resistance until cutout relay points close, and note the voltage at which the contact points close. Points should close at 11.8 to 13.5 volts.

b. Adjusting Closing Voltage.

1. Adjust the closing voltage by turning adjusting screw, Fig. 12-4. Turn the screw clockwise to increase setting and counter-clockwise to decrease the setting. Adjust setting to 12.8 volts.

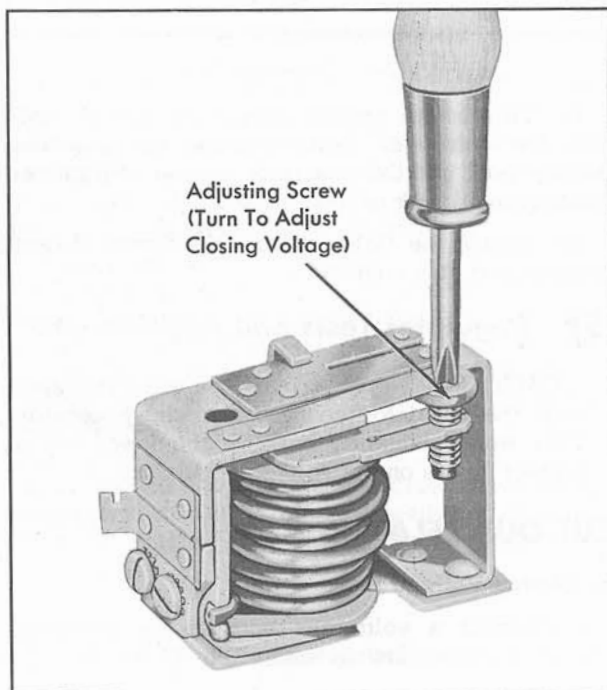


Fig. 12-4 Adjusting Cut-Out Relay Closing Voltage

CURRENT REGULATOR

a. Checking Current Regulator Setting

1. Connect an ammeter into the charging circuit and connect voltmeter from "Bat" to ground, Fig. 12-5.

2. Turn on all accessory load (lights, radio, etc.) and connect an additional load (such as a carbon pile or bank of lights) across the battery to bring system voltage down to 13.0 volts.

3. Operate the generator at 2350 RPM for 15 minutes to establish operating temperature. The regulator cover should be in place.

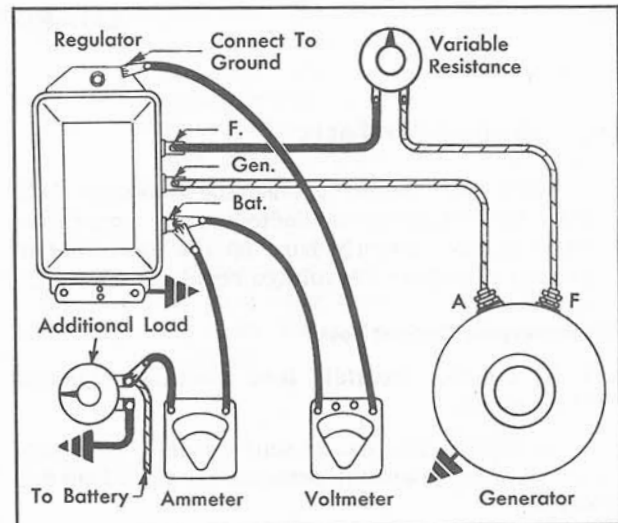


Fig. 12-5 Checking Current Regulator

4. Cycle the generator by turning the variable resistance to the "open" position momentarily, then slowly decrease (turn out all) resistance, note current regulator setting. Setting should be 53-57 amperes.

b. Adjusting Current Setting

To adjust current setting, turn the adjusting screw in the same manner as described for the voltage regulator. Turn clockwise to increase current setting and counter-clockwise to decrease setting. Adjust setting to 55 amperes, Fig. 12-7.

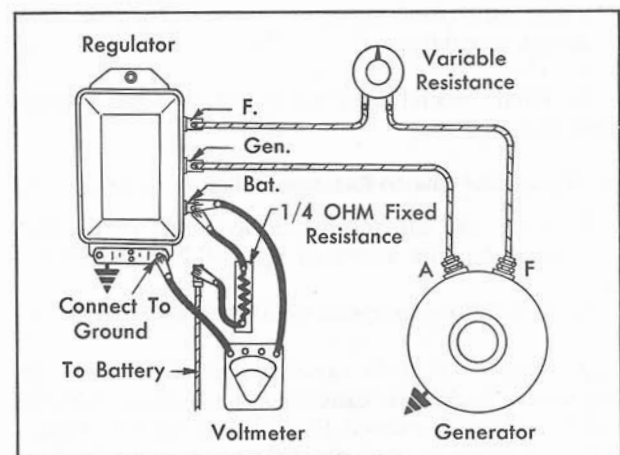


Fig. 12-6 Checking Voltage Regulator

VOLTAGE REGULATOR

a. Checking and Adjusting Voltage Regulator

1. To check the voltage regulator properly, the battery must be fully charged to limit the charge rate to 1 to 10 amperes. If above 10 amperes, insert a 1/4 ohm fixed resistor into the charging circuit at "Bat" terminal of regulator in series with the battery, Fig. 12-6.

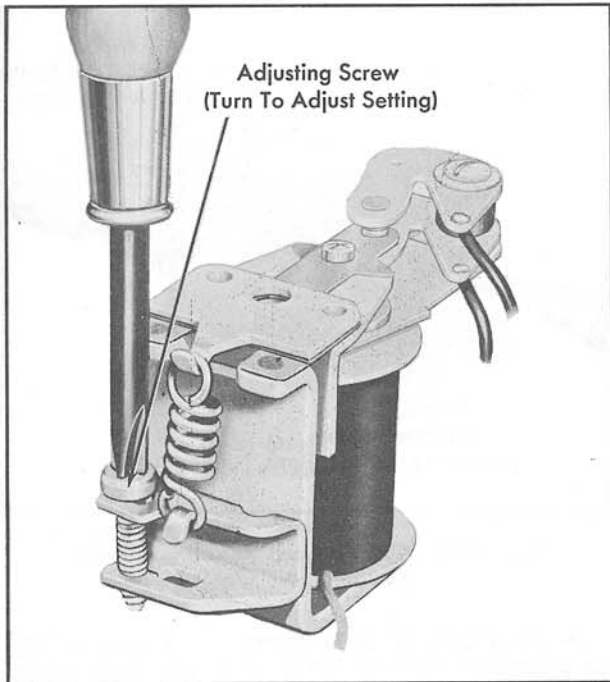


Fig. 12-7 Adjusting Voltage Regulator Lower Contacts

2. Connect a voltmeter from regulator "Bat" terminal to ground.

3. Connect a 25 ohm, 25 watt variable resistance (which has an open position) in field circuit as shown in Fig. 12-6.

4. With variable resistance turned out (minimum resistance), start engine and run at 1500 RPM to normalize temperature of voltage regulator unit.

NOTE: The regulator cover must be in place during this operation. The system must be operated for 15 minutes with the voltage regulator operating to allow proper warm-up of the regulator. All lights and accessories should be off.

5. Cycle the generator by turning the variable resistance to the "Open" position momentarily, then slowly decrease (turn out) resistance. Regulator should be operating on lower set of contacts between 14.0 and 14.6 volts.

6. Turn adjusting screw clockwise to raise voltage to 14.0-14.6 volts. If setting is above 14.6 volts, loosen screw until voltage drops to 14.0 volts and make final adjustment by increasing the voltage, Fig. 12-7.

7. Recheck voltage setting after cover is installed as in Step 5.

8. Increase (turn in) variable resistance slowly until voltage regulator begins to operate on the upper set of contact points. The upper set should operate .3 to .5 volts below the lower set of contact points.

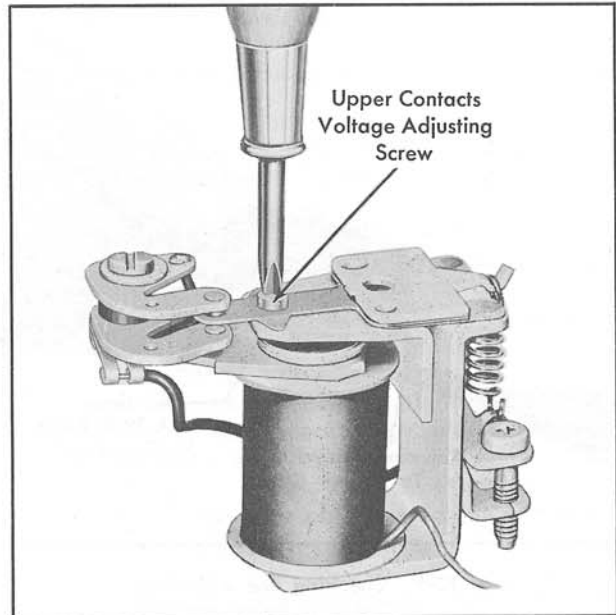


Fig. 12-8 Adjusting Voltage Regulator Upper Contacts

NOTE: The voltage "difference" between the operation of lower and upper set of contacts is increased by turning the air gap adjusting screw (located on the armature of the voltage regulator) in a clockwise direction and decreased by turning the screw counter-clockwise. The screw should not be turned more than 3/4 of a turn counter-clockwise from the maximum clockwise position, Fig. 12-8.

CAUTION: NEVER GROUND the generator field with the regulator connected to the generator. This would instantly burn up the lower set of contact points of the voltage regulator.

(6) Regulator Repair and Mechanical Adjustment

a. Contact Point Cleaning

The regulator contact points will not operate indefinitely without some attention. The majority of regulator troubles can be eliminated by simply cleaning the voltage and regulator contact points.

1. Clean the voltage regulator and cutout relay contact points with crocus cloth or flexible abrasive material.

NOTE: These contacts are made of a soft alloy material and should not be cleaned with a riffler file.

2. Thoroughly wash contact points with clear carbon tetrachloride to remove any foreign materials.

3. The large flat current regulator contact point should be cleaned with a spoon or riffler file. It is not necessary to have a flat surface on this

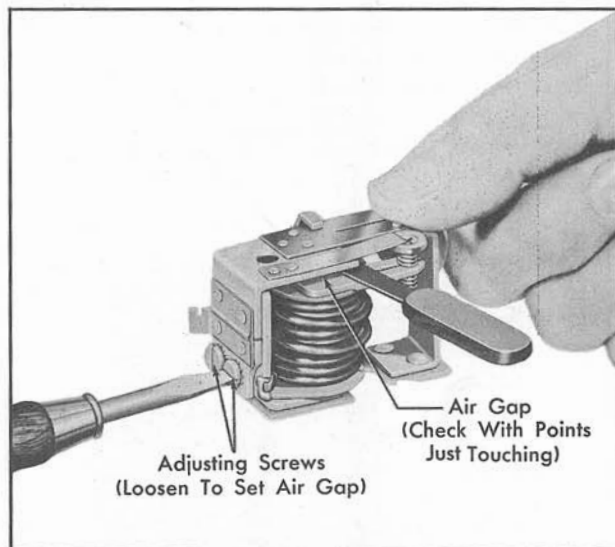


Fig. 12-9 Checking and Adjusting Cut-Out Relay Air Gap

contact point, but all oxides should be removed with a riffler file so that pure metal is exposed. This should be followed by a thorough wash with clear carbon tetrachloride.

4. The small soft alloy current regulator contact point should be cleaned in accordance with the procedures recommended in steps 1 and 2 above for voltage regulator and cutout relay contacts.

b. Air Gap—Cut-Out Relay

1. Place finger on cut-out relay armature directly above contacts and move armature down until points just close.

2. Measure air gap between armature and center of core as shown in Fig. 12-9. Air gap should be .020". Check to see that both points close simultaneously; bend contact arms slightly if necessary.

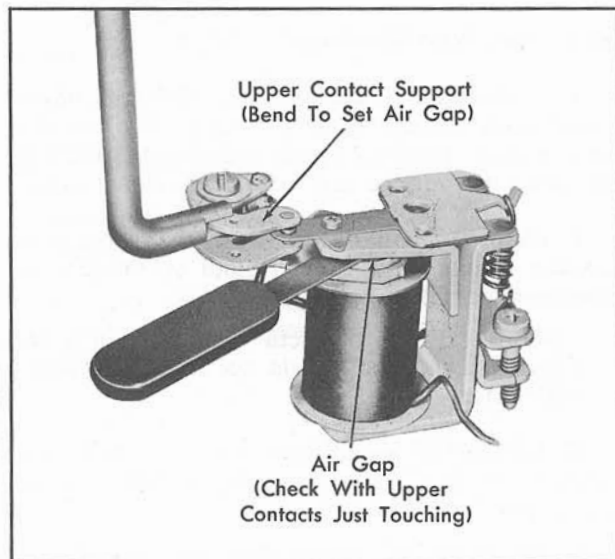


Fig. 12-10 Checking Voltage Regulator Air Gap

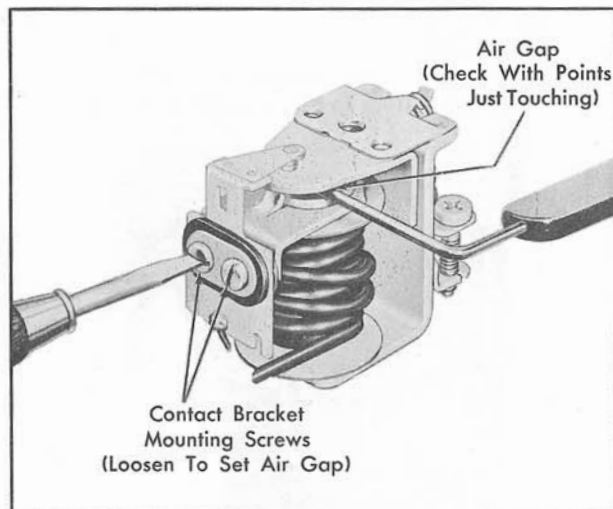


Fig. 12-11 Checking and Adjusting Current Regulator Air Gap

3. To adjust air gap, loosen two screws in back of relay and raise or lower armature as required, Fig. 12-9. Tighten screws securely after adjustment.

c. Air Gap—Voltage Regulator

Make sure the air gap adjusting screw on top of the voltage regulator armature is turned all the way in a clockwise direction before checking air gap.

1. With upper contacts just touching, measure air gap between armature and winding core as shown in Fig. 12-10. Gap should be .080".

2. Adjust by bending the upper contact support.

d. Air Gap—Current Regulator

1. Push current regulator armature until contact points are just touching. Measure air gap between armature and winding core, Fig. 12-11. Gap should be .075".

2. Adjust by loosening contact mounting screws

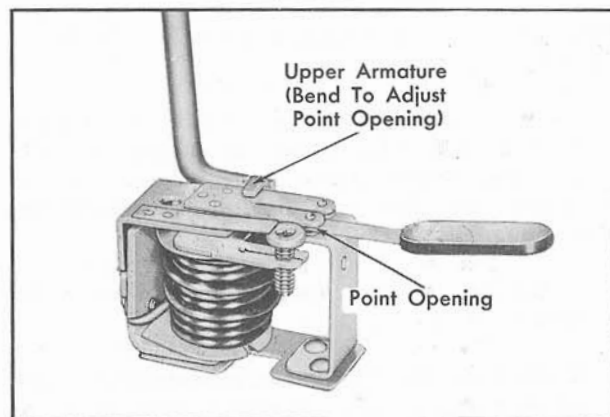


Fig. 12-12 Checking and Adjusting Cut-Out Relay Point Opening

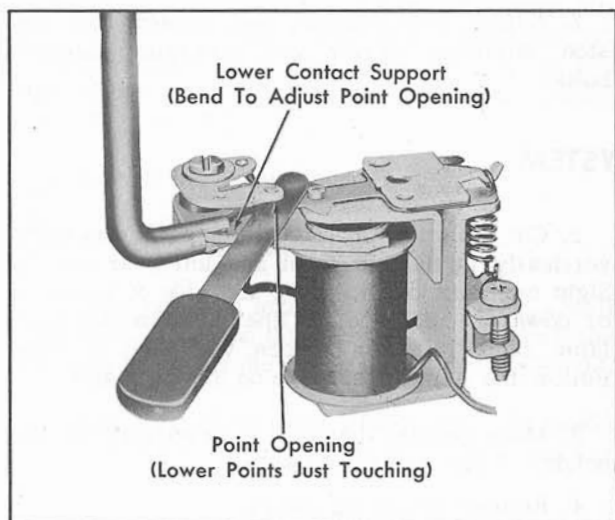


Fig. 12-13 Checking and Adjusting Voltage Regulator Point Opening

and raising or lowering contact mounting bracket as required.

CAUTION: Be sure the contact points are aligned and screws securely tightened after adjustment.

e. Point Opening—Cut-Out Relay

Check cut-out relay point opening and adjust by bending the upper armature stop as shown in Fig. 12-12. Point opening should be .020".

f. Point Opening—Voltage Regulator

1. Push armature down until lower set of contacts are just touching, measure point opening between upper set of contacts, Fig. 12-13. Point opening should be .016".

2. Adjust by bending the lower contact support.

(7) Removal of Generator

1. Disconnect battery ground strap.
2. Remove air suspension compressor. Refer to Section 4, Note 27.
3. Disconnect generator wires.
4. Remove belt tension adjusting screw, and generator belt.
5. Remove two generator mounting bolts and nuts, and remove generator.

(8) Disassembly of Generator

1. Place generator in a bench vise, using vise as a holding fixture only, being careful not to damage frame.

2. Remove the coverband.

3. Remove two thru-bolts and commutator end frame.

4. Remove drive end frame and armature assembly from generator frame.

5. Inspect brush holders in frame to see that they are not loose and that they are properly aligned. Check brushes for wear. If worn to less than half their original length, they should be replaced.

6. Remove bearing retainer plate screws, retainer plate, gasket, loading spring, and bearing from commutator end frame.

7. Remove generator pulley attaching nut, lock-washer, and pulley from armature.

8. Remove key from shaft, and slide collar off the shaft.

9. Remove drive end frame, with bearing and bearing retainer plates, from the armature shaft.

10. Remove bearing retainer plate screws and nuts, retainer plates, and gasket from drive end frame.

11. Remove bearing from drive end frame.

12. Remove field and armature terminal nuts, insulating washers, and bushing. Then push terminal studs through frame.

13. Remove two pole shoe screws in each pole shoe by using a pole shoe screwdriver and remove field coils.

CAUTION: Mark pole shoes for identification so they can be reinstalled in their original positions.

(9) Assembly of Generator

1. To assemble the generator, reverse the removal procedure.

NOTE: Pack both ball bearings with Delco-Remy Cam and Ball Bearing Lubricant.

(10) Installation of Generator

1. Install generator on left exhaust manifold bracket and loosely install two mounting screws and generator belt tension adjusting screw.

2. Install generator belt.

3. Install air suspension compressor. Refer to Section 4, Note 27.

4. Connect generator wires.

5. Connect battery ground strap.

6. Momentarily connect a jumper lead on regulator, across "Gen" and "Bat" terminals before starting engine, to assure correct polarity.

7. Adjust belt tension, and tighten belt tension adjusting screw and generator mounting bolts.

LIGHTING SYSTEM

(11) Headlamp Aiming

The factory recommended headlamp aiming specifications are listed below. However, individual State laws may vary, and dealers may want to check with local authorities to insure compliance.

a. Screen Diagram

Make a headlamp aiming screen according to the dimensions and layout shown in Fig. 12-14.

b. Equipment Set Up

Make sure the headlamp aiming screen is mounted at a point where there will be an ample level area in front of the screen. It is important that the floor level at the aiming screen is of the same level as the point where the car is positioned.

c. Headlamp Aiming Adjustment

1. Position car so that headlamps are exactly 25 feet from the aiming screen and car is in line with centerline on screen. To position car, sight through rear window, lining up centerline of rear window reveal molding escutcheon with inside rear view mirror bracket and the car centerline on the screen.

2. Cut two sticks 31-7/16" long. Position sticks vertically at the left front and left rear wheels. Sight over sticks and move left side of screen up or down, as required, to line up horizontal headlamp center line on screen with line of sight. Follow the same procedure on the right side.

3. Make certain that car is at normal standing height. Refer to Section 4.

4. Remove headlamp doors.

5. Set headlamps on high beam.

6. Cover left side headlamps and right side outer lamp and adjust right inner lamp as required until hot spot centers at point "A" on screen, Fig. 12-14.

7. Cover right side headlamps and left side outer lamp and adjust left inner lamp as required until hot spot centers at point "B" on screen, Fig. 12-14.

8. Set headlamps on low beam.

9. Cover left side headlamps and adjust right outer lamp as required until top of hot spot "C" is on horizontal centerline of headlamps and left edge of hot spot is on vertical centerline of outer lamp, Fig. 12-14.

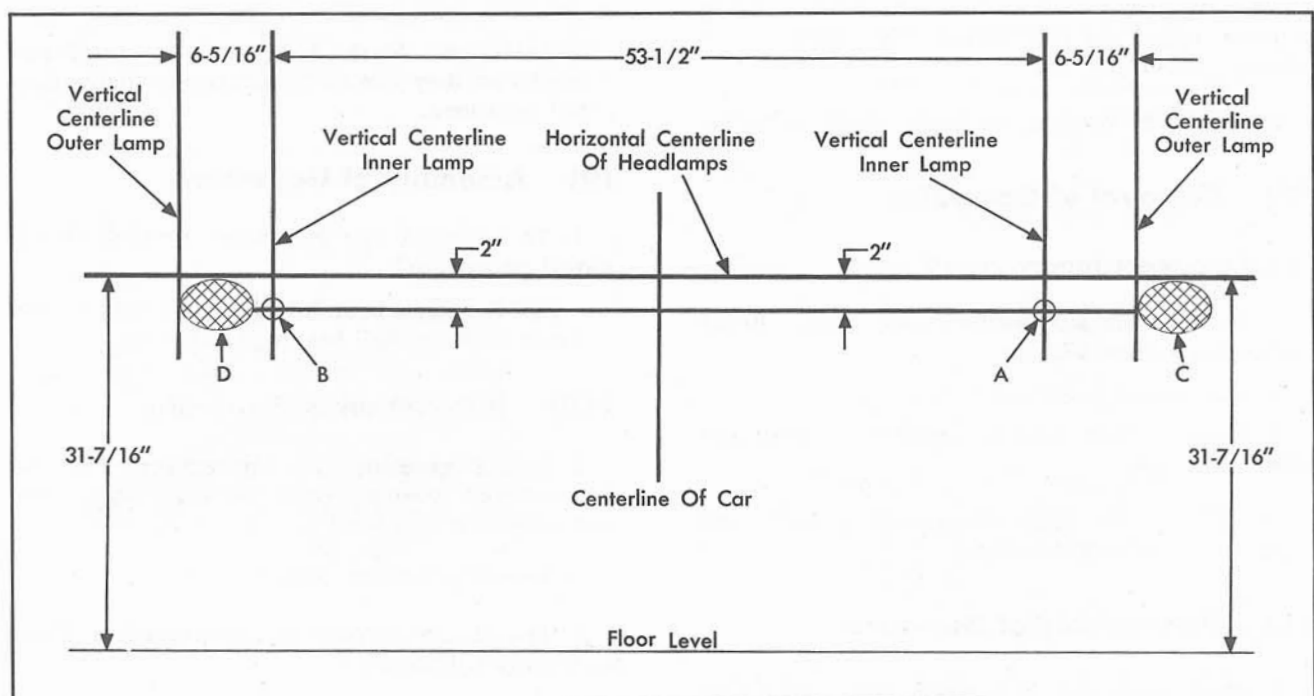


Fig. 12-14 Headlamp Aiming

10. Cover right side headlamps and adjust left outer lamp as required until top of hot spot "D" is on horizontal centerline of headlamps, and left edge of hot spot is on vertical centerline of outer lamp, Fig. 12-14.

11. Install headlamp doors.

(12) Fog Lamp Aiming

1. Place car on a level floor 25 feet from a wall or screen. Draw on this surface a horizontal line the same height as the centerline of the fog lamps.

2. Sight through the rear window over the inside rear view mirror and draw a vertical centerline of car.

3. Measure distance between lamp centers and draw vertical lamp center lines on screen.

4. Remove lower dust shield extensions located behind the fog light assemblies.

5. Loosen aiming screws located at back of fog lamp housing and adjust lamp until top of beam is four inches below horizontal centerline of fog lamp and centered on its vertical centerline.

NOTE: The above aiming specifications comply with the minimum average state requirements. Where permissible by state law, the lighting may be improved to a degree by raising the beam parallel with the road, or with center of fog lamp beam on horizontal centerline of lamps on the aiming screen.

(13) Replacement of Sealed Beam Unit

1. Remove three headlamp door screws and remove door.

2. Remove three screws and remove individual sealed beam unit retaining rings.

3. Remove connector plug from sealed beam unit and remove unit from car.

4. Install new sealed beam unit by reversing Steps 1 through 3.

(14) Replacement of Bulbs

The complete list of replacement bulbs required for the Brougham is given in the bulb data chart, Page 12-19. Procedures for replacing bulbs are as follows:

a. Front Parking, Signal and Fog Lamps

Remove the four lamp lens retaining screws from front of lamp assembly, and remove lens to gain access to bulbs.

b. Rear Tail, Stop, Back-Up and Auxiliary Lights

Remove two lens retaining screws and remove lens to gain access to bulbs.

c. License Plate Lamp

Remove lamp assembly from rear end panel by removing two attaching screws and pulling assembly down from rear end panel. Access to the bulbs can be gained by separating the bulb socket from the housing and glass assembly. The two parts can be separated by prying at the flanged area with a screwdriver.

d. Instrument Lamps

The bulbs in the instrument panel cluster are accessible from under the dash panel, through the air conditioning or heater control openings or after a partial removal of the instrument cluster.

Remove instrument bulbs by pulling sockets and bulbs out of the holes in the back of the cluster, Fig. 12-15.

Bulbs in the air conditioner or heater control panel can be replaced by removing the control panel retaining screws and pulling the control panel away from the instrument panel.

e. Map Light

The map light bulb can be replaced by removing the two screws from the lens and removing the lens.

f. Side Roof Rail Lamps

Side roof rail lamp bulbs can be replaced after removing the lamp lens. The lens is retained by four plastic tabs and can be removed by prying lightly at each of the four corners.

g. Glove Box Light Bulbs

Remove two lens retaining screws and remove lens to gain access to bulbs.

h. Trunk Compartment Light Bulb

Remove two lens retaining screws and remove lens to gain access to bulbs.

(15) Removal and Installation of Tail and Stop Light Assembly

1. Remove two lens retaining screws and remove lens.

2. Remove upper and lower mounting screws and pull assembly away from fender.

3. Disconnect the tail and stop light assembly lead wire at the connector inside the trunk and

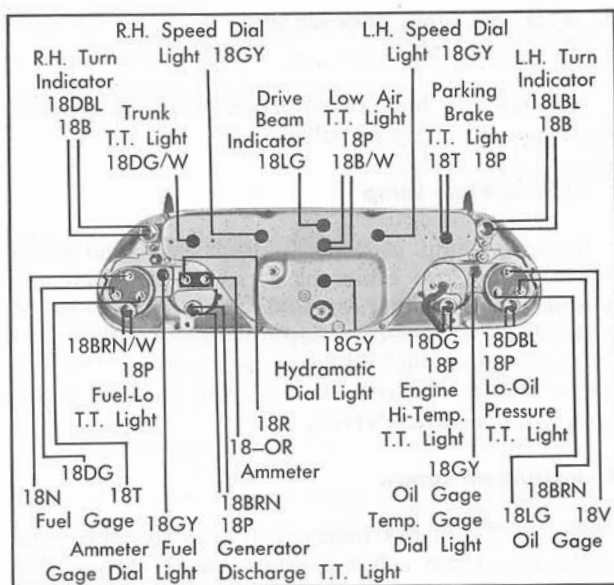


Fig. 12-15 Cluster Wiring

remove assembly, feeding wire through fender opening.

4. Install tail and stop light assembly by reversing Steps 1 through 3.

(16) Removal and Installation of Back-Up Light Assembly

1. Remove two lens retaining screws and remove lens.

2. Remove two mounting screws and pull the assembly out, away from the bumper section.

3. Disconnect the back-up light lead wire at its connector under the fender and remove assembly, feeding wire through bumper opening.

4. Install back-up light assembly by reversing Steps 1 through 3.

(17) Removal and Installation of Auxiliary Stop and Signal Light Assembly

1. Remove two lens retaining screws and remove lens.

2. Remove two mounting screws and pull the assembly out, away from the bumper section.

3. Disconnect the auxiliary stop and signal light lead wire at its connector under the fender, feeding wire through bumper opening.

4. Install auxiliary stop and signal light assembly by reversing Steps 1 through 3.

GAGES, HORNS, CLOCKS, SWITCHES AND RELAYS

(18) Removal of Instrument Panel Cluster

a. Partial Removal

NOTE: Use this procedure for replacement of cluster assembly components where complete removal of cluster assembly is unnecessary.

1. Disconnect negative battery cable at battery.
2. Remove lower steering column cover and remove Hydra-Matic dial indicator pointer.
3. Remove steering column "U" clamp stud nuts and lower the steering column.
4. Disconnect trip odometer reset stem.
5. Place a cloth over the steering column and remove four cluster mounting screws.
6. Cluster may now be pulled out partially.

b. Complete Removal

NOTE: Use partial removal above with the following additional steps for complete removal of the cluster assembly.

1. Disconnect speedometer cable from speedometer head.

2. Remove all bulbs from rear cluster assembly.

3. Remove all wires from gage terminals.

4. Remove thermo gage bulb unit at the rear of right cylinder head, Fig. 12-22.

5. Remove cluster, feeding thermo gage tube and bulb unit through cowl grommet.

(19) Removal and Installation of Instrument Panel Gages

a. Removal and Installation of Oil and Temperature Gages

1. Remove screw from rear of cluster between oil and temperature gages.
2. Remove oil and temperature gages through front of cluster.
3. Remove 2 screws from rear of lens housing to separate gages from housing.

4. Remove two screws from rear of oil and temperature gage retaining plate to remove temperature gage.

5. Remove three brass connectors from rear of oil and temperature gage retaining plate to remove oil gage.

6. Remove turn signal indicator.

7. Remove screw from rear center of temperature and oil gage housing and remove lenses.

8. Install oil and temperature gages by reversing Steps 1 through 7.

b. Removal and Installation of Fuel Gage and Ammeter

1. Remove screw from rear of cluster between fuel gage and ammeter.

2. Remove fuel gage and ammeter through front of cluster.

3. Remove 2 screws from rear of lens housing to separate fuel gage and ammeter from housing.

4. Remove two brass connectors from the rear of retaining plate to remove ammeter.

5. Remove three brass connectors from rear of retaining plate to remove fuel gage.

6. Remove turn signal indicator.

7. Remove screw from rear center of fuel gage and ammeter housing and remove lenses.

8. Install fuel gage and ammeter by reversing Steps 1 through 7.

(20) Installation of Instrument Panel Cluster Assembly

NOTE: When the complete cluster assembly is removed as outlined in Note 18, Steps "a" and "b", it will be necessary to follow procedures "a" and "b" below. When the cluster has been partially removed as in Note 18, Step "a", use procedure "b" below.

a. Complete Installation

1. With a cloth placed over the steering column, place the cluster assembly in position in front of the opening in the instrument panel.

2. Feed thermo gage tube and bulb unit through grommet in cowl and install bulb unit in the cylinder head, Fig. 12-22.

3. Connect gage wires to gage terminals according to the wiring code tabs on the rear of the individual gages.

4. Connect speedometer cable.

5. Install bulbs in rear of cluster assembly, being careful to get bulbs in the correct holes, Fig. 12-15.

b. Partial Installation

1. Install cluster assembly in instrument panel opening with four mounting screws.

2. Connect trip odometer reset stem.

3. With rubber insulator in place, raise steering column into position, guiding "U" clamps over studs, and install stud nuts.

4. Install Hydra-Matic dial indicator pointer and lower steering column cover.

5. Connect negative battery cable.

(21) Fuel Gage Service

When checking a fuel gage, first determine whether the unit wiring is at fault. To check for a defective tank unit, disconnect the dash unit to tank unit harness at the connector in the trunk compartment and connect a known good gage to the dash unit connector, Fig. 12-16.

With Hydra-Matic selector in "dr" (Drive) and ignition switch "On", the tester arm should be moved from "full" to "empty" position. If dash unit then works correctly, tank unit is at fault. A gage whose needle just touches either edge of "full" or "empty" marks on the dial may be considered as satisfactory.

If the dash unit operates incorrectly, the difficulty is either due to the dash unit or the wiring from the dash unit to the tank unit. Faulty wiring may be checked by connecting jumper wires from the corresponding color terminals on the rear of

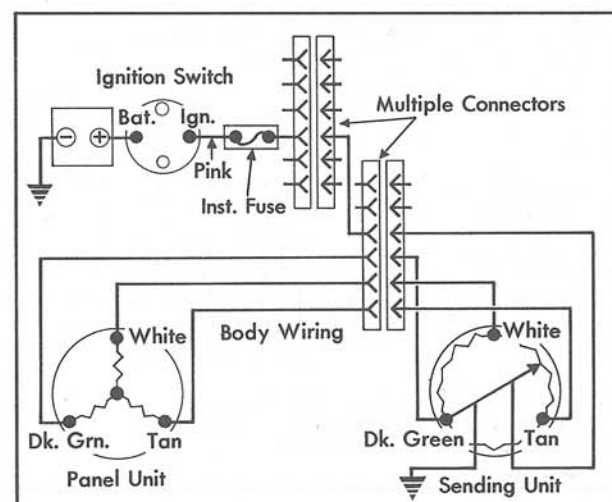


Fig. 12-16 Fuel Gage Circuit

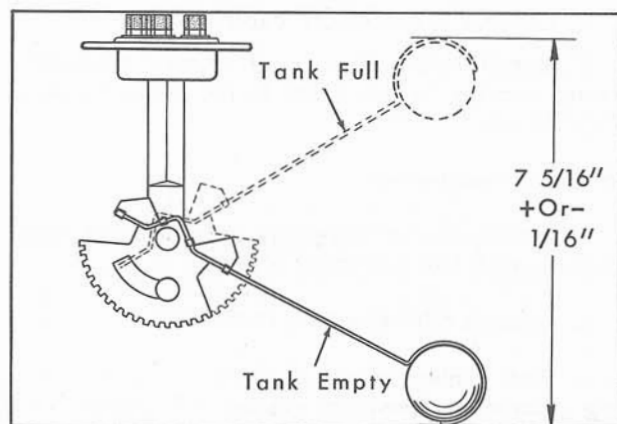


Fig. 12-17 Checking Gage Float Arm

the gage to their mating terminals at the tank unit harness connector. The insulating tape on the connector can be folded back to expose wire colors. The pink wire at the connector should be connected to the red wire on the ammeter by means of a jumper wire. If gage dash unit then operates correctly, the wiring is either grounded or open.

Although the above tests will show which unit or wiring is at fault, other checks should be made before replacing either the tank or the dash unit.

Before replacing a tank unit, make sure that the mounting screws are tight and that the gasoline tank is grounded to the body. Check tank unit for a bent float arm by measuring the distance from the top edge of the float in the full position to the bottom edge of the float in the empty position. This distance should be 7-5/16" plus or minus 1/16", Fig. 12-17.

If gasoline gage does not register when ignition switch is turned "On", check for:

1. Open circuit between dash unit and ignition switch.

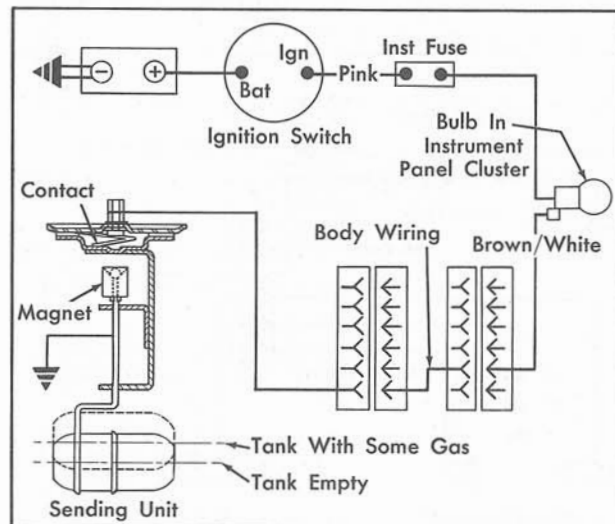


Fig. 12-18 Fuel Low Level Circuit

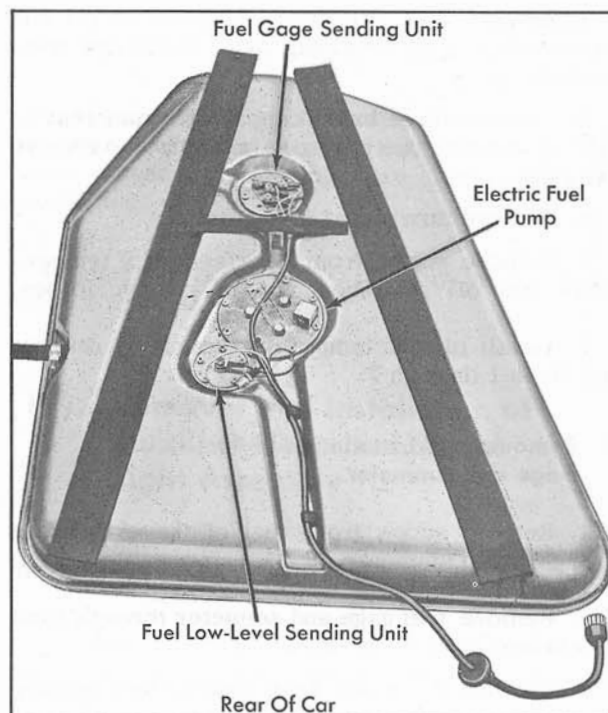


Fig. 12-19 Fuel Tank

2. Open circuit in No. 3 coil of panel gage.

If the gage shows full under all conditions, check for:

1. Open circuit between dash unit and tank unit.
2. Tank unit burned out.
3. Tank unit improperly grounded or tank itself is not grounded.

If gage shows empty under all conditions, check for:

1. Wires improperly connected on dash unit.
2. Ungrounded dash unit.
3. Grounded lead to tank unit or grounded tank unit rheostat.
4. Open circuit in No. 3 coil.

(22) Fuel Low-Level Unit Service

The tell-tale fuel low level indicator light is connected in a circuit with the ignition switch and a float-type tank sending unit, Fig. 12-18. The tell-tale light comes on when the fuel level drops to approximately 3 gallons. At this point the driver has approximately 2 gallons of usable fuel left in the tank.

a. Fuel Low—Light Not On

1. Check for a burned out bulb.

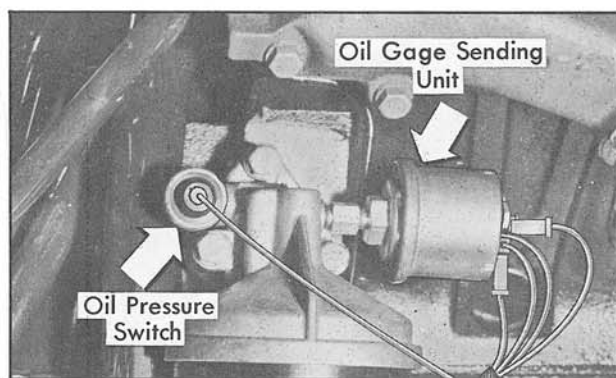


Fig. 12-20 Oil Pressure Switch and Oil Gage Sending Unit Location

2. Disconnect brown and white wire at fuel gage harness connector in trunk, and ground the wire. If the light goes on with the wire grounded, replace the tank sending unit. If the light does not go on, check the wiring using a 2 wire insulated socket and bulb similar to tell-tale light unit. Connect one wire of the socket assembly to a hot wire and the other wire to the brown and white tank unit wire. If the light goes on, check the harness wiring for an open or a short.

b. Fuel Level Not Low—Light On

1. Disconnect brown and white wire at fuel gage harness in trunk. If the light stays on, check for a ground between panel light and connector. If the light goes out, replace the tank sending unit.

(23) Oil Gage

The oil gage is controlled by a sending unit that is threaded into the oil filter housing, Fig. 12-20. Engine oil pressure acts on a diaphragm in the sending switch. This action varies the flow of current through the coils of the sending unit and the dash unit which in turn moves the pointer, Fig. 12-21.

(24) Oil Pressure Indicator

The tell-tale oil pressure indicator light is connected in a circuit with the ignition switch and a pressure operated switch that is threaded into the oil filter housing, Fig. 12-20. The light comes on to warn the driver of low oil pressure when the pressure drops to between 6 to 10 pounds.

To check the oil pressure indicator, check following possible problems.

a. Light On—Engine Running

1. Check for a grounded circuit between "tell-tale" light and oil pressure switch.
2. Check for a shorted switch. Replace switch if shorted.
3. Check for an improperly calibrated switch. Increase engine speed slightly and check to see if

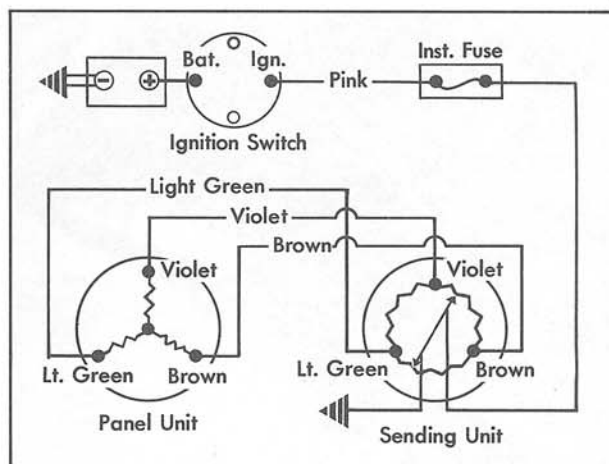


Fig. 12-21 Oil Gage Circuit

light goes off with increased pressure. Replace switch if improperly calibrated.

4. Check for low oil pressure. Remove switch and test pressure with a reliable pressure gage. Repair as necessary.

b. Ignition On—Hydra-Matic Selector in "Dr" (Drive)—Engine Not Running—Light Off

1. Check for a burned out bulb.
2. Check for an open circuit between ignition switch and light or light and pressure switch.
3. Check for an improperly grounded switch. Check for presence of sealing compound on threads of switch.
4. Check for a stuck switch.

(25) Ammeter

The ammeter is made up of a frame with an attached pole piece, permanent magnet armature, and a pointer assembly. In a condition where no current flows through the ammeter, the magnet holds the armature and pointer at the center of the dial. When current passes through the ammeter in either direction, the magnetic field attracts the armature, opposing the effect of the permanent magnet, giving a reading proportional to the current flow.

The ammeter dial is marked with a "D" on one side of the center and a "C" on the other side. Movement of the needle to either side indicates the direction of the flow of current and the relative amount, but is not intended to indicate the current flow in amperes.

(26) Generator Charging Indicator

The charge indicator "tell-tale" light is located in the ammeter dial. The light is actuated by the generator tell-tale relay located on the right

(29) Automatic Starter

The automatic starter relay is connected into a circuit with the ignition switch and the starting motor solenoid, Fig. 12-24. When the selector lever is in "N" (neutral) or "P" (park) and the ignition key is turned to the ignition side of the switch, the battery terminal of the automatic starter relay is energized, closing the circuit through the relay winding, allowing current to flow through the automatic starter relay to the generator armature terminal where it is grounded. This closes the automatic starter coil contact permitting current to flow through the solenoid terminal, through the neutral switch to the starter solenoid, cranking the engine.

The automatic starter is automatically turned off by engine vacuum after the engine is started. Engine vacuum is applied to the relay and opens the contacts on the relay, thus opening the circuit. Generator voltage is applied to the ground side of the relay coil when the generator is charging, preventing the starter from engaging.

If the engine stalls when the car is in gear, it can be restarted by shifting the selector lever back to "N" (neutral) position. A time delay dash pot in the automatic starter relay prevents the starter from re-engaging before the flywheel stops turning.

In the event of a failure of the automatic starter, the engine can be started in the conventional manner by turning the key to the extreme right position.

To service the automatic starter, proceed as follows:

a. Automatic Starter Will Not Turn Off

1. Remove pink wire at "Bat" terminal on automatic starter relay.
2. Tape the pink wire. Conventional starting procedures can be used.
3. Replace automatic starter relay.

b. Automatic Starter Will Not Operate—Selector Lever in Neutral

1. Check for an open circuit between ignition terminal on the ignition switch and the solenoid terminal on the automatic starter relay.
2. Check and tighten all terminals.
3. If the automatic starter still does not operate, replace the unit.

(30) Removal, Installation, Disassembly, Assembly, and Adjustment of Transmission Interlock**a. Removal and Installation**

1. Disconnect solenoid wire at its connector at the foot of the steering column.

2. Remove two mounting bolts at the mounting flange on steering column and remove assembly.

3. Install interlock assembly by reversing the removal procedure.

b. Disassembly and Assembly

1. Remove pin that secures lever assembly to solenoid actuating rod. Punch pin out of place with the tip of a screwdriver, and pull pin completely out with needle nose pliers.

2. Remove pin that secures lever assembly to support assembly.

3. Assemble transmission interlock by reversing removal procedure. Tap pins in place with a ball peen hammer.

c. Adjustment

1. Set Hydra-Matic selector half-way between "N" (neutral) and "Dr" (drive).

2. With interlock assembly positioned on steering column and lever inserted in the shifter tube slot, shift assembly to the left until the left side of the lever contacts the left inside surface of the shifter tube slot. Solenoid can be energized by opening one of the rear doors to aid in positioning assembly.

3. Check to see that the car will not move with the transmission selector lever in the extreme position toward drive allowed by the locking mechanism.

(31) Location of Relays

The following relays are located in the engine compartment; automatic starter, generator tell-tale, antenna, air ride, air compressor, air ride protective, Autronic Eye, fuel pump, and two horn relays. Refer to Fig. 12-25 for exact location.

The following relays are located under the instrument panel: the air ride tell-tale checking relay mounted on the cowl insulating board directly above the left side of the radio speaker housing, the accessory disconnect relay mounted on the cowl insulating board on the left side of the radio speaker housing, and the temperature and fuel low-level tell-tale checking relay mounted on the cowl insulating board to the right of the radio speaker housing.

(32) Removal and Installation of Headlamp Switch

1. Disconnect negative battery cable.
2. Remove the two upper door hinge cover plate screws and move the cover plate to the left.

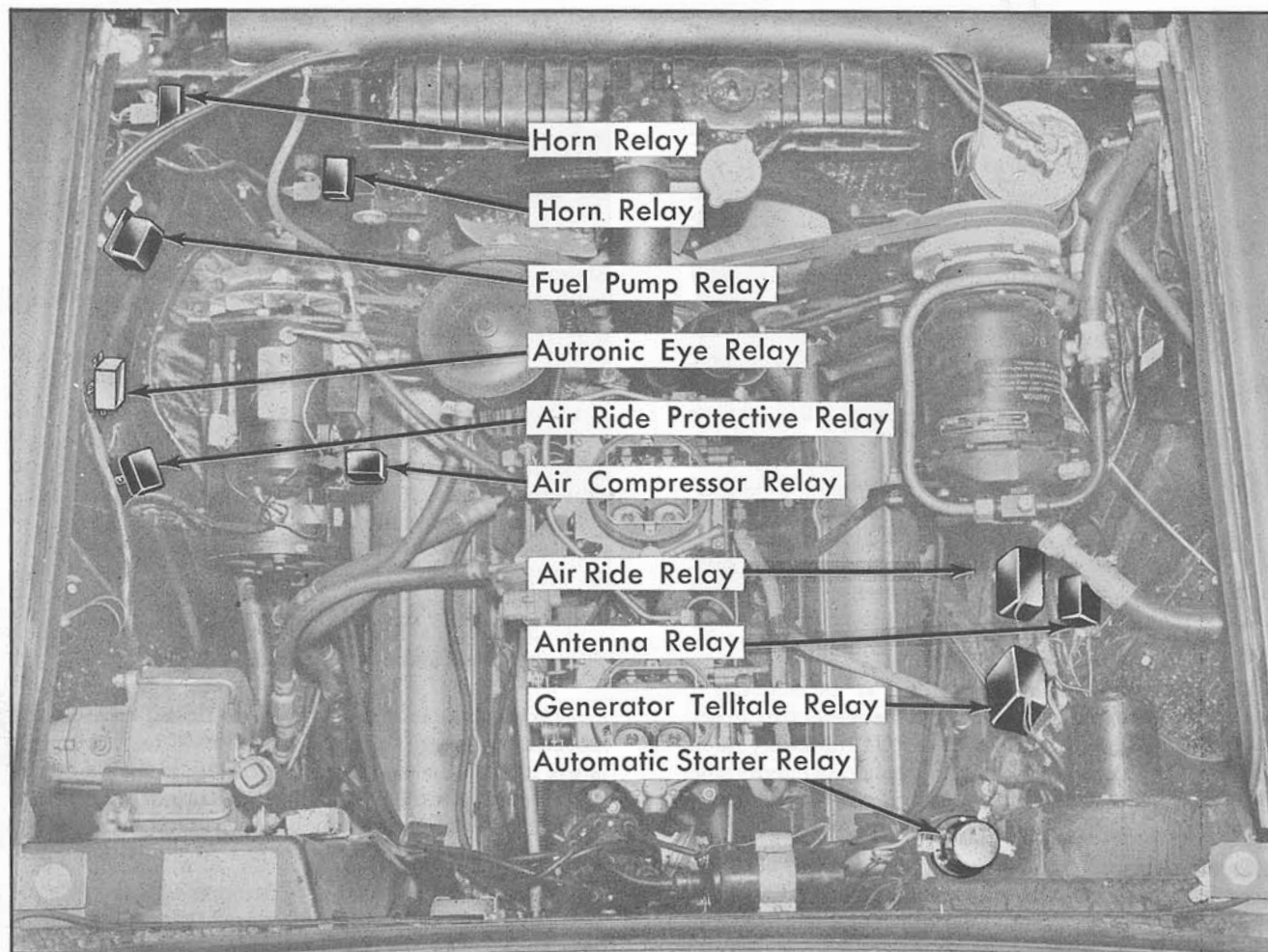


Fig. 12-25 Location of Relays

3. Depress spring loaded button on top surface of switch, and pull out headlight control knob.

4. Pry off fog lamp knob.

5. Remove fog light switch and headlight switch retaining nut, using Tool No. J-6486.

6. Reach up through upper hinge opening and disconnect wires.

7. Remove switch through hinge opening.

8. Install headlamp switch by reversing the removal procedure.

(33) Removal and Installation of Horns

a. Removal

1. Remove three headlamp door screws and remove left front headlamp door.

2. Remove six headlamp assembly mounting screws and separate headlamp assembly from fender.

3. Disconnect horn wire at the horn to be removed.

4. Remove two horn mounting bolts and remove individual horn.

b. Installation

1. Position horn on mounting bracket and install two mounting bolts.

2. Connect horn wire.

3. Position headlamp assembly in fender opening and install six mounting screws.

4. Aim left headlamp.

5. Install headlamp door.

BROUGHAM ELECTRICAL SPECIFICATIONS**Battery**

Capacity, Ampere Hours	72
Plates, Number of	11
Terminal Grounded	Negative

Starting Motor

Brush Spring Tension, Oz.	35 Min.
Lock Amperage	300-360
Lock Voltage	3.5
Free Speed:	
Volts	10.6
Amperes	65-100
R.P.M.	3,600-5,100

Solenoid Switch

Hold in Winding	10-12 amp. @ 10V
Both Windings	40-45 amp. @ 10V

Generator

Brush Spring Tension, Oz.	20
Cold Output:	
Amperes	55
Volts	13
Generator Speed R.P.M.	1,580
Field Current Draw:	
Amperes	2.14-2.28
Volts	12
Temperature - F	80°

Regulator

Cut-Out Relay	
Air Gap, In.	.020
Contact Point Opening, In.	.020
Closing Voltage	11.8-13.5
Voltage Regulator	
Air Gap, In.	.080
Lower Contact Opening, In.	.016
Normal Range, Volts	14.0-14.6
Upper Contact Point Setting, Volts	.3-.5 lower than lower contact setting

Current Regulator

Air Gap, In.	.075
Current Setting, Amperes	53-57

Distributor

Distributor Advance - Engine Degrees:	
Centrifugal Advance - Engine R.P.M.	22° - 26° @ 4150
Vacuum Advance, Degrees	22-26
Firing Order	1-8-4-3-6-5-7-2
Condenser Capacity in Microfarads	.18-.23
Dwell Angle, Degrees	28-32
Set To, Degrees	30
Timing Mark, Ahead of Center, Degrees	5

Coil

Amperes Draw Engine Running	1.25
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Spark Plugs

A.C. Type Number	44
Gap, In.	.035
Thread	14 MM

BROUGHAM ELECTRICAL SPECIFICATIONS (Cont'd.)

Relays

Air Ride

Air Gap, In. . . . .	.014
Point Opening, In. . . . .	.022
Closing Voltage Range	7.0-8.0
Opening Voltage	2.0 Min.

Tell-Tale, Checking

Air Gap, In. . . . .	.011
Point Opening, In. . . . .	.025
Closing Voltage Range	3.7-5.0
Opening Voltage . . . . .	.6 Min.

Charge Indicator

Air Gap, In. . . . .	.022
Opening Voltage Range	12.0-13.5

Electric Antenna

Air Gap, In. . . . .	.012
Point Opening, In. . . . .	.020
Closing Voltage Range	7.0-9.0

Accessory Disconnect

Point Opening, In. . . . .	.025
Closing Voltage Range	1.2 Min.
Opening Voltage Range	6-7

Electric Fuel Pump

Air Gap, In. . . . .	.010
Point Opening, In. . . . .	.020
Closing Voltage	7.0-9.0

Air Compressor

Air Gap, In. . . . .	.030
Opening Voltage Range	8-10

Horn

Air Gap, In. . . . .	.014
Point Opening, In. . . . .	.027
Closing Voltage Range	5.0-9.5

Horns

Current Draw (Amperes) at 12.0 Volts

Trumpet (1999589)	12 Min.
Very High Note (9000407)	6.5-12.0
High Note (9000322)	7-12
Low Note (9000329)	7-12

TORQUE TIGHTNESS

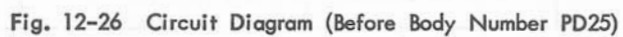
Application	Size	Ft. Lbs. Min.	Ft. Lbs. Max.
Distributor Clamp Nut	5/16-24	15	18
Generator Bracket to Exhaust Manifold Nut	3/8-24	25	30
Generator to Adjusting Link	5/16-24	15	18
Generator Mounting	5/16-24	12	15
Generator Terminal Nut	No. 12-24	12 in. lbs.	15 in. lbs.
Ignition Coil Mounting Screw	5/16-18	15	18
Regulator Mounting	1/4-20	2	3
Spark Plugs	14 mm	20	25
Starter Mounting	7/16-14	45	50
Starter Solenoid Terminal Nut	8-32	15 in. lbs.	18 in. lbs.

BROUGHAM BULB DATA CHART

Unit	Bulb Number	Candle Power	Unit	Bulb Number	Candle Power
Ash Tray	53	1	Parking Lamp	67	3
Beam Indicator	53	1	Roof Rail Lamps	1004	15
Back-Up Light	1073	32	Stop, Signal, and Tail Lights	1034	32-4
Clock Light	53	1	Summer Vent and AC Control	57	2
Cluster, Instrument Panel	57	2	Trunk Compartment	1003	15
Fog Lamp	1044	35W-32	Turn Signal Indicator	57	2
Glove Box Light	57	2	Tell-Tale Lights		
Headlamps	37.5W-50W		Generator	57	2
Headlamp Switch Escutcheon	53	1	Oil Pressure	57	2
Heater Control	57	2	Low Fuel	57	2
Hydra-Matic Indicator	57	2	Temperature	57	2
Ignition Switch	53	1	Low Air	57	2
License Plate Lamp	67	3	Trunk Open	57	2
Map and Courtesy Lights	90	6	Parking Brake	57	2

BROUGHAM FUSE DATA CHART

Unit	Size	Location	Unit	Size	Location
Air Conditioner	25A	Fuse Panel	Glove Box Lights	25A	Body Fuse - Fuse Panel
Air Ride	6A	Fuse Panel	Headlamps	25A(CB)	Headlamp Switch
Air Ride Relay	9A	Instrument Fuse - Fuse Panel	Heater	20A	Fuse Panel
Antenna	14A	Fuse Panel	Instruments	9A	Fuse Panel
Ash Tray Lights	25A(CB)	Headlamp Switch	Instruments Lights	25A(CB)	Headlamp Switch
Back-Up Lights	9A	Fuse Panel	Low Air		
Body Feed	25A	Fuse Panel	Tell-Tale	9A	Instrument Fuse - Fuse Panel
Cigar Lighters	25A	Body Fuse - Fuse Panel	Low Oil Tell-Tale	9A	Instrument Fuse - Fuse Panel
Clock	25A	Body Fuse - Fuse Panel	Map Light	25A	Body Fuse - Fuse Panel
Engine High - Temperature Tell-Tale	9A	Instrument Fuse - Fuse Panel	Parking Lights	25A(CB)	Headlamp Switch
Fog Lamps	25A(CB)	Headlamp Switch	Parking Brake		
Fuel Pump	6A	Left Side - Front Speaker Housing	Tell-Tale	9A	Instrument Fuse - Fuse Panel
Fuel Gage	9A	Instrument Fuse - Fuse Panel	Power Windows and Seat	40A(CB)	Behind Left Kick Pad
Fuel Low Level Tell-Tale	9A	Instrument Fuse - Fuse Panel	Radio	7-1/2A	Fuse Panel
Generator Dis - charge Tell-Tale	9A	Instrument Fuse - Fuse Panel	Roof Rail Lamps	25A	Body Fuse - Fuse Panel
			Stop Lights	25A(CB)	Headlamp Switch
			Turn Signals	9A	Fuse Panel



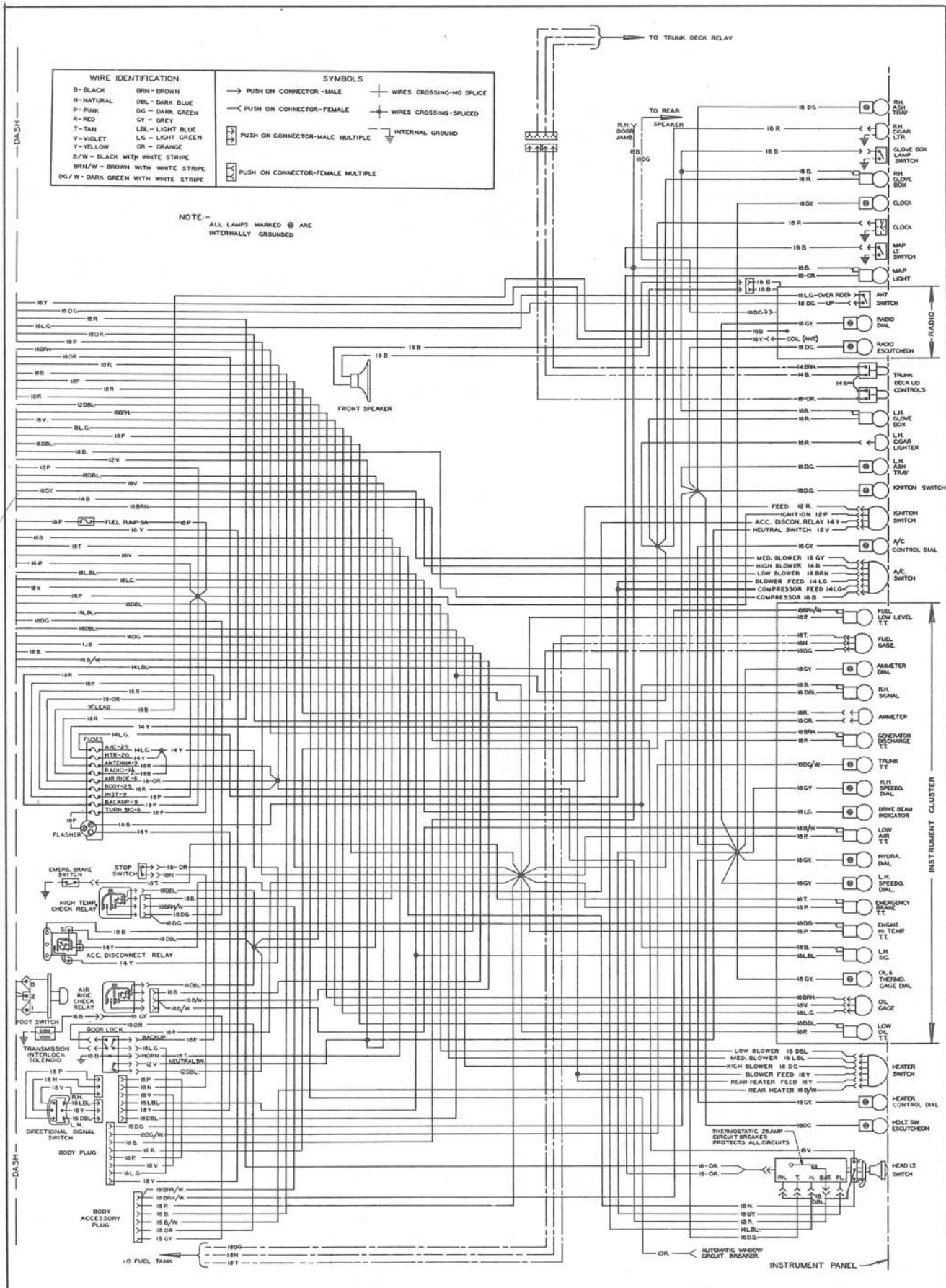
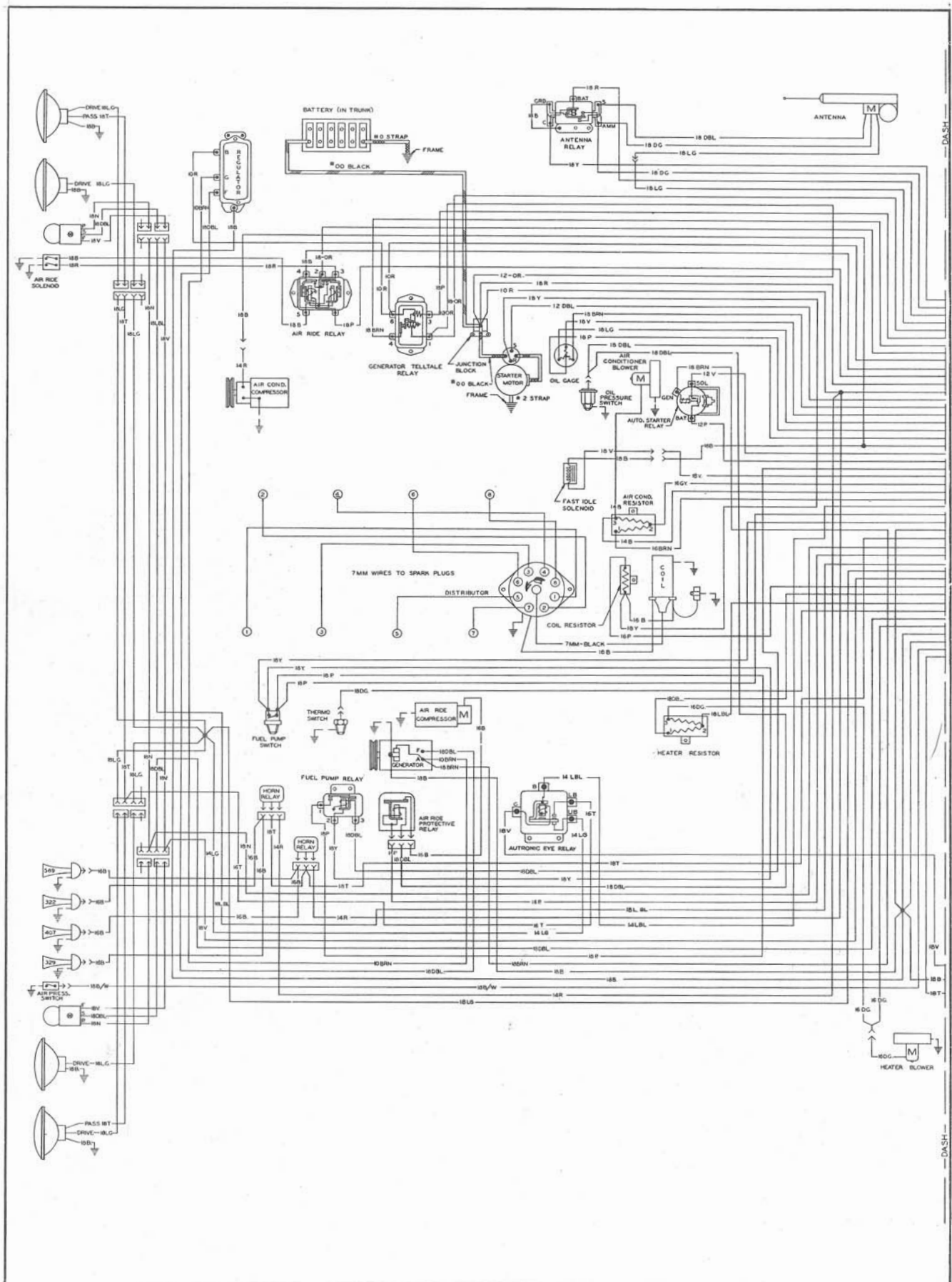


Fig. 12-26 Circuit Diagram (Before Body Number PD25)





GENERAL DESCRIPTION

An Air Conditioner is provided as standard equipment on the Eldorado Brougham. The system is a factory installed assembly, identical in operation to the Air Conditioner in 1957 Cadillac cars, other than the Series 75. The cooling principles and working parts, as well as the location of the various units in the car, are the same as those of the 60 and 62 series cars.

The service information contained in Section 13 of the 1957 Cadillac Shop Manual can also be ap-

plied to the Brougham Air Conditioner, with the exception of the instructions for the removal and installation of the dehydrator-receiver and condenser units. Instructions for the removal and installation of these units are included in this Section under Service Information.

Also included at the end of this section is a revised Air Conditioner Diagnosis Chart that may be used for all 1957 series Cadillac cars.

SERVICE INFORMATION

(1) Dehydrator-Receiver, Removal and Installation

The purpose of the dehydrator is to absorb moisture and to trap foreign matter. When the filter becomes saturated with moisture or clogged with foreign matter, replacement is necessary. The receiver area of the unit stores Freon-12 for use as needed. No service should be attempted on the dehydrator assembly.

To gain access to the unit, it is necessary to remove the grille. Proceed as follows:

a. Removal

1. Purge the system as described in the 1957 Cadillac Shop Manual, Section 13, Note 4.

2. Remove four front license plate frame attaching bolts from underside of bumper and remove license plate frame.

3. Remove ten grille to supporting bracket screws, using care not to misplace the spring clip type Tinnerman nuts, and lift out grille.

4. Disconnect condenser pipe from dehydrator.

5. Disconnect sight glass hose from dehydrator.

6. Remove two dehydrator to supporting bracket attaching bolts, and remove dehydrator through grille opening.

b. Installation

NOTE: Do not uncap the new assembly until it is in position for installation, as it will quickly absorb moisture from the air and decrease its efficiency in the system.

1. To install the dehydrator-receiver, reverse Steps 4-5-6 of the removal procedure.

2. Apply sufficient drum pressure to the system to obtain a good leak test of all connections.

3. Evacuate the system as described in Section 13, Note 5 of the 1957 Cadillac Shop Manual.

4. Add refrigerant as described in Section 13, Note 6c of the 1957 Cadillac Shop Manual.

5. Check performance of system, then remove the evacuating and charging equipment.

6. Replace grille, making sure that spring clip Tinnerman nuts are on all supporting brackets.

7. Replace front license plate frame.

(2) Condenser, Removal and Installation

NOTE: Before removing the condenser, it is necessary to remove the dehydrator-receiver and the air suspension accumulator tank that is mounted on the top front of the condenser.

a. Removal

1. Remove the dehydrator-receiver as described in Note 1, Items 1 through 6. Cap the fittings if original dehydrator-receiver is to be reinstalled.

2. Disconnect battery ground strap to prevent leveling action.

3. Release pressure in the accumulator tank by opening pet cock at lower left side of tank.

4. Disconnect electrical lead (Black wire with white tracer) from pressure switch at lower left front side of tank.

5. Disconnect two air line fittings at top of accumulator tank, using care not to misplace "O" rings.

6. Remove four accumulator tank to mounting bracket bolts, and remove tank through grille opening, being careful not to damage pressure switch.

7. Disconnect compressor to condenser hose at flare nut fitting.

8. Remove six condenser mounting bolts, and remove condenser through grille opening.

b. Installation

To install condenser unit, reverse steps 4 through 8 of the above procedure and repeat steps 1 through 7 in Note 1b, Dehydrator-receiver Installation. Then connect battery ground strap.

NOTE: When connecting air line fittings at top of accumulator tank, make sure that "O" rings are replaced and pet cock is closed.

For quicker air build-up in the accumulator tank, air may be introduced at air valve in "T" fitting on hose leading from air suspension compressor to accumulator tank.

(3) By-Pass Valve Cable Adjustment

1. Check to insure cable is not kinked and operates freely, then disconnect return spring.

2. Disconnect the control cable from the lever and loosen the control cable clamp on the by-pass valve bracket.

3. Loosen the lock screw on the lever assembly.

4. Set lever against the stop and position the cam so that it just touches the nylon plunger. Tighten the lock screw in this position.

5. Set the lower lever (Temp. Control) on the Air Conditioner Control Panel inside the car, to extreme left position.

6. Install the control wire coil over the lever pin and while pulling the cable conduit away from the lever, tighten the cable clamp. Install return spring.

7. Move the (Temp. Control) lever in the car back and then forward again and check to make sure that the cam is against the nylon plunger.

(4) By-Pass Valve Adjustment

The nominal setting of the by-pass valve is 30 psi. The valve, however, does not control exactly to this pressure under all conditions. It is influenced by head pressure. At 200 psi head pressure, the valve should control at 30 psi. At higher head pressures the valve will control to as low as 27 psi. At lower head pressures it will

control to as high as 33 psi. The following figures give an approximate relationship of valve control pressures and head pressures:

Head Pressure	Valve Control Pressure
150	32
175	31
200	30
225	29
250	28
275	27

To adjust the valve to a correct setting, the engine must be run fast enough to allow the compressor to bring the evaporator pressure down to the point where the valve, set in its coldest setting, will open up and control. Then the air flow to the condenser must either be blocked off partially or boosted with a fan to bring the head pressure to 200 psi. The valve, if correctly adjusted, will control the evaporator pressure at 30 psi under these conditions.

To adjust the by-pass valve, proceed as follows:

1. Remove cap from gage fitting on the lower side of the by-pass valve. (Equalizer line fitting)

2. Install adapter, Tool J-5420, on lower pressure gage line and connect the adapter to the gage fitting.

3. Purge the gage and hose by opening the low pressure gage valve for a few seconds.

4. Start engine and allow to run at 1500 RPM. Move "Temp" lever to coldest setting and set "Air Cond" lever to "low".

5. Observe pressure gage and adjust only if reading is not 29-1/2 to 30-1/4 psi. If adjustment is necessary, continue with the following steps.

6. Disconnect return spring and Bowden cable.

7. Remove control lever by removing retaining clip and sliding pivot pin out. Remove nylon plunger.

8. Using Tool J-6389, turn adjusting screw clockwise to increase pressure; counter-clockwise to decrease pressure, to obtain 30 psi, Fig. 13-1.

NOTE: Turn adjusting screw 1/4 turn and allow time for gage to settle. Repeat if necessary. This is important as the gage does not immediately indicate the actual setting.

9. With engine off, remove gage hose from pressure fitting and replace cap.

10. Adjust by-pass valve cable as described in Note 3.

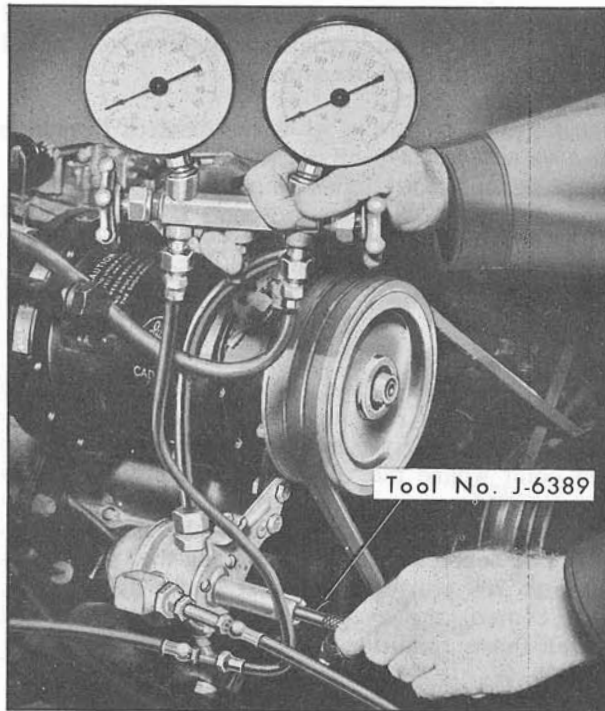


Fig. 13-1 By-Pass Valve Adjustment

(5) Air Conditioner System Trouble Shooting

The majority of troubles encountered fall into three categories:

1. Insufficient cooling.
2. Poor temperature control.
3. Noise or vibration.

A Diagnosis Chart, Fig. 13-5, provides a convenient means of trouble shooting the system. By following it, minimum effort will be used in tracing the trouble.

Diagnosis procedures, which follow in general the outline in the Diagnosis Chart but are more detailed, are described in Notes 6, 7 and 8.

(6) Insufficient Cooling

a. Airflow

Turn on the Air Conditioner by moving both levers fully to the left. Open all outlet doors. Run the engine fast enough to obtain normal operating battery voltage. Check the air flow from the three outlets to determine whether it is normal. If possible, compare to other Air Conditioned cars that have been operating satisfactorily.

1. BLOWER NOT OPERATING

Check the following possibilities, and correct as required:

- a. Air Conditioner fuse blown.
- b. Wires pulled off blower switch on the control panel.
- c. Blower switch not operated by lever arm.
- d. Blower switch defective.
- e. Wire loose at resistor on dash.
- f. Poor ground at motor.
- g. Blower motor defective.

2. AIRFLOW LESS THAN NORMAL

Check the following possibilities, and correct as required:

- a. Blower not operating at top speed. Check by using jumper wire between battery and blower. If this is the case, the blower switch is probably maladjusted or defective.
- b. Obstructions at blower intake.
- c. Blower capacity low because of defective motor or interference with fan wheel.
- d. Flexible hose to evaporator loose.
- e. Evaporator air valve not fully open. Check by removing fender dustshield to gain access to evaporator.
- f. Evaporator air baffle out of place. This should be spaced 1/2" from face of core.
- g. Evaporator discharge boot collapsed or not properly assembled.
- h. Air leakage from discharge duct under instrument panel - it may be necessary to remove the entire upper instrument panel to properly inspect and seal this duct.

3. EVAPORATOR ICING

If the by-pass valve is allowing the evaporator pressure to drop too low, ice will form between the fins of the evaporator core and, after extended operation, airflow through the core will be reduced or completely blocked. Run Performance Test, as explained in Note 9, and compare evaporator pressure obtained to that on Performance Chart, Fig. 13-2. If pressure is low, readjust by-pass valve as explained in Note 4.

b. Discharge Air Temperature

If the airflow is normal, then the discharge air temperature must be high if the system is not operating as designed.

COWL INLET AIR	HUMIDITY	DISCHARGE AIR-°F.	RETURN PRESSURE	HEAD PRESSURE
70° F.	10%	34-36	31½-32½	155-165
	30%	36-38	30½-31½	175-185
	50%	39-41	29½-30½	195-205
	70%	41-43	28½-29½	220-230
	90%	43-46	28-29	250-260
80° F.	10%	38-40	29½-30½	195-205
	30%	40-42	28½-29½	225-235
	50%	43-45	27½-28½	255-265
	70%	45-47	27½-28½	275-285
	90%	47-50	27-28	280-290
90° F.	10%	40-42	28-29	215-225
	30%	42-44	27½-28½	245-255
	50%	47-49	27-28	295-305
	70%	54-56	27-28	300 +
	90%	59-64	27-28	300 +
100° F.	10%	47-49	27-28	255-265
	30%	50-52	27-28	295-305
	50%	54-56	27-28	300 +
	70%	58-60	27-28	300 +
	90%	62-65	27-28	300 +

Fig. 13-2 Performance Chart

To determine whether the discharge air temperature is too high, run a Performance Test, Note 9.

If the discharge air temperature is normal, it is still possible that the high pressure is higher than normal and might reduce the system capacity at other operating conditions. Compare the high pressure obtained in the test to that on the Performance Chart, Fig. 13-2. If the high pressure is considerably higher, check for the following defects and correct:

1. Excessive bugs or dust on condenser.
2. Air in system - momentarily purge system on high side with engine not running; then operate system and recheck pressure. Repeat as necessary.
3. Excessive Freon charge - purge as required.
4. Restriction in high side between compressor and receiver - remove parts, inspect for restrictions, and clean or replace.

If the high pressure is normal, it is possible that the trouble is caused by leakage of hot air into the passenger compartment through holes in the dash or from the heater or defroster. Check for leakage and eliminate.

If the system is still not functioning as it should, follow the procedure outlined below:

1. IF THE DISCHARGE AIR TEMPERATURE IS HIGH, check for insufficient Freon in the system by running the engine just fast enough to maintain the evaporator pressure at 35 psi. If there are bubbles in the sight glass, the system is probably low on Freon. Check for leaks, re-

pair them and add Freon to the system, one-half pound at a time until there are no bubbles in the sight glass. Then add one-half pound extra. If the bubbles cannot be made to disappear by adding Freon and the operating pressures observed during the performance test are normal, it is possible there is a restriction between the condenser and the sight glass. Check for a kinked hose or pipe. If there are no obvious restrictions, remove the receiver and liquid line hose and inspect for restrictions. Install new receiver.

If there is sufficient Freon in the system and the discharge air temperature is still high, compare the evaporator pressure obtained in the performance test to that on the Performance Chart, Fig. 13-2.

2. IF THE EVAPORATOR PRESSURE IS NORMAL, clamp the by-pass hose closed with two small blocks of wood with smooth edges and a "C" clamp or a pair of large vise-grip pliers, as shown in Fig. 13-3. WEAR GOGGLES.

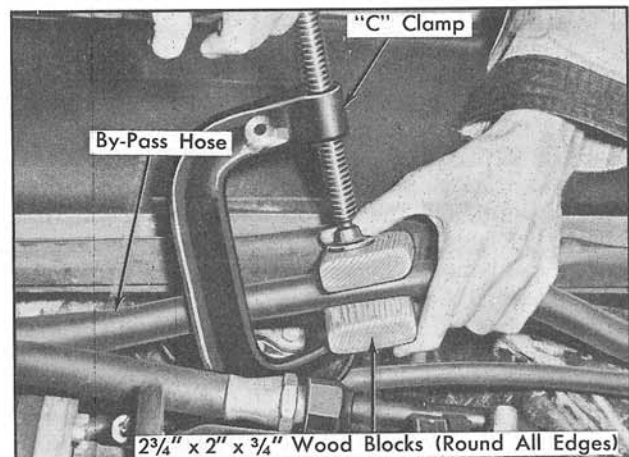


Fig. 13-3 Clamping By-Pass Hose

Apply only sufficient pressure to close off the hose. Do not clamp more than once in the same spot on the hose. With by-pass flow thus cut off, start the performance test again. If the evaporator pressure quickly drops below its former value, the expansion valve is either plugged up or defective, or there is a restriction preventing flow of Freon to the evaporator. Check for kinks in hoses or pipes. If there were bubbles in the sight glass or only gaseous Freon in the sight glass during this test, the restriction is between the condenser and the sight glass. Locate the restriction by removing parts and inspecting them. If there was solid liquid Freon in the sight glass during the test, the expansion valve is either plugged or defective. Fig. 13-4 shows how to determine whether there is all liquid Freon or all gaseous Freon in the sight glass.

3. IF THE EVAPORATOR PRESSURE IS LOW, ice may be forming on the evaporator core. Move the temperature lever to a slightly warmer position to bring the evaporator pressure up to

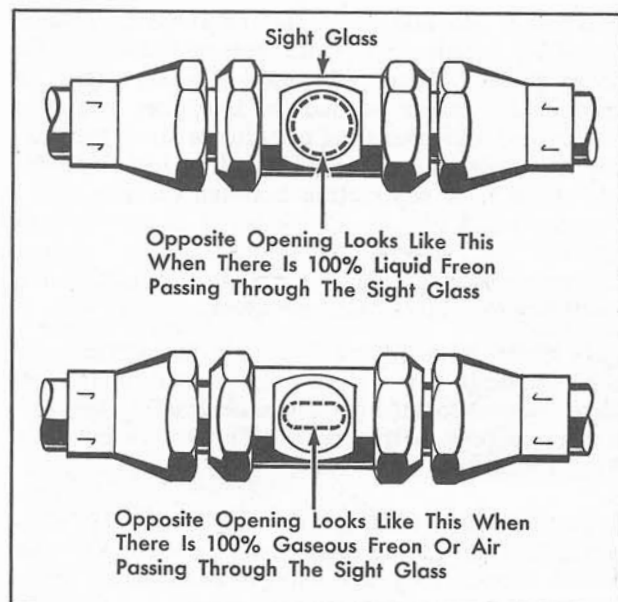


Fig. 13-4 Presence of Liquid or Gaseous Freon in Sight Glass

where it should be. If this corrects the trouble, readjust the by-pass valve, as described in Note 4.

4. IF THE EVAPORATOR PRESSURE IS HIGH, re-run the performance test, and at the end of the test, clamp off the by-pass line as described above. If the evaporator pressure drops as the hose is clamped, Freon gas is being by-passed when it should not be. With the clamp removed, try to adjust the by-pass valve to lower the evaporator pressure to where it should be. If the valve does not respond to adjustment, replace it.

5. IF THE EVAPORATOR PRESSURE DID NOT DROP OFF when the by-pass hose was clamped closed, it is possible the high evaporator pressure was caused by excessively high head pressure.

Compare the high pressure obtained during the test to that on the Performance Chart, Fig. 13-2. If this pressure is considerably higher, check for the following defects and correct:

- a. Excessive bugs or dust on condenser.
- b. Air in Freon system.
- c. Excessive Freon charge.
- d. Restrictions in high side between compressor and receiver.

6. IF THE HIGH PRESSURE IS NORMAL OR LOW, either the compressor is not pumping at full capacity or the expansion valve is allowing too much Freon flow to the evaporator.

To determine whether the compressor capacity is normal or not, clamp off both the by-pass and

the liquid hose between the sight glass and the evaporator. Then, run the system at 1000 engine RPM. If the compressor is pumping at full capacity, the evaporator pressure will drop to approximately 20" of vacuum in two to three minutes.

7. IF THE EVAPORATOR PRESSURE DOES NOT DROP TO 20" VACUUM, check for clutch slippage or belt slippage. If no slippage is found, remove and inspect the valves on the valve plate. Repair or replace the compressor.

8. IF THE EVAPORATOR PRESSURE DOES DROP TO 20" VACUUM, the expansion valve is either stuck open or defective. Replace the valve in either event.

(7) Poor Temperature Control

a. Too Cold

Check for one of the following defects and correct:

1. Compressor clutch not disengaged when either lever is moved to "Off" position. This can be caused by a defective compressor switch on the control panel, a defective compressor clutch, or an incorrect air gap at the clutch.

2. Blower speed cannot be reduced. Check for defective blower switch or improper switch wiring. Switch is color-coded.

3. By-pass valve not operating properly - check Bowden cable adjustment-install gauge set and check to see that the evaporator pressure changes from 30 to approximately 50 psi as the temperature control lever is moved back and forth fully. If it does not, replace valve.

b. Too Much or Too Little Cold Air to Floor

Tape over openings or enlarge openings in floor outlets.

(8) Vibration and Noise

a. Blower Noisy

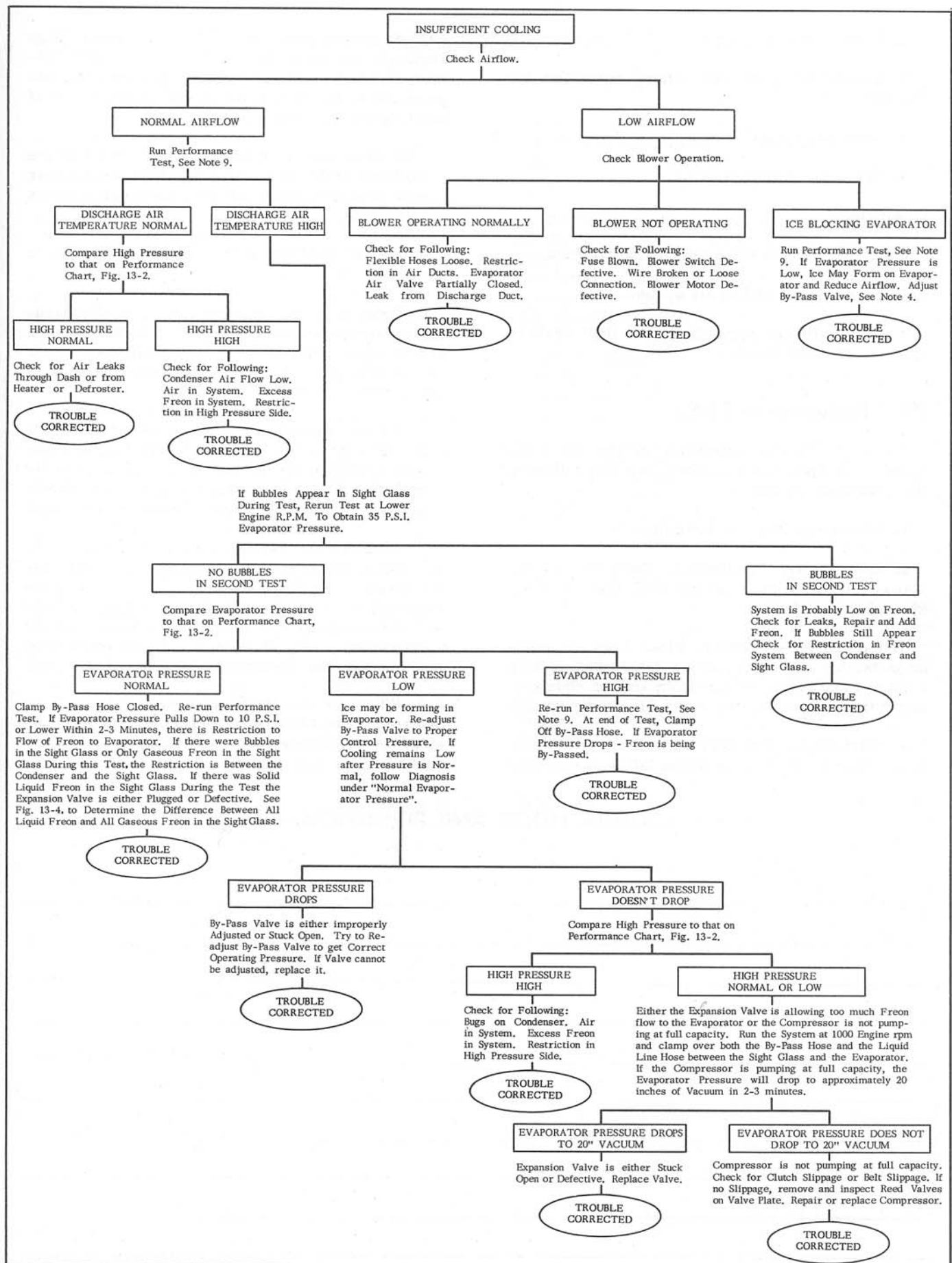
Check for the following defects and correct:

1. Fan wheel loose on shaft.
2. Fan wheel strikes housing.
3. Foreign material in wheel.
4. Motor bearings or mounts loose or worn.

b. Compressor Noisy

Check for the following defects and correct:

1. Mounting brackets loose.



GENERAL DESCRIPTION

The Heating System on the Eldorado Brougham is composed of three heater units. The units consist of a combination heater and defroster unit located behind the left cowl kick pad, and two recirculating heater units located under the rear seat. Each rear seat heater unit contains its own blower and heater core.

Warm air is circulated through the front compartment by means of outlet grilles mounted in each cowl kick pad. Warm air is directed from the heater to the right outlet grille by means of a duct beneath the instrument panel. There are no air ducts in the front doors.

A blower assembly mounted on the dash in front of the heater unit, provides a constant flow of air to the heater for warming and distribution to the car interior. Outside air for the heater enters through an air intake located horizontally along the outside cowl top panel between the rear of the hood and the lower windshield reveal molding. Air entering the intake is directed first against a series of baffles which force any water in the air to drop into a drain gutter provided for this purpose. The water thus collected is routed to the ground through drain hoses.

Rear seat heater blowers draw cool air from the car interior through the heater cores, and circulate warm air into the rear compartment by means of horizontal grilles located in front of the rear seat heaters on the kick panel below the rear seat. Switches on the rear heater grilles control blower motor speed for the convenience of the rear seat passengers. "On" and "Off" operation is controlled by the "Heat" lever (lower) in conjunction with the front heater blower motor.

The temperature of the air discharged from the heater is controlled by a thermostatic water valve, mounted inside the front heater casing, which regulates the flow of water to the heaters. The valve has a capillary tube located directly in front of the left hand cowl heater core. In addition, the thermostatic control valve is equipped with an override mechanism which holds the valve fully open when the "Defr" lever is all the way to the right, regardless of the "Heat" lever position. This permits maximum heat for de-icing even when the "Heat" lever is in the "Off" position.

Two levers, mounted below the instrument panel cluster and to the left of the steering column, control the operation of the heating system.

The "Heat" lever (lower) controls the front blower motor speed, and the "On" and "Off" operation of both rear seat heater blower motors. This lever regulates the interior temperature of the car by operating the thermostatic water valve,

and also controls the amount of air delivered to the front compartment by regulating the heater air valves and by operating the three speed blower switch.

The "Defr" lever (upper) controls the operation of the front blower motor and the air flow for upper level summer and winter ventilation and defrosting of the windshield. This lever is also connected to the three speed blower switch and the thermostat override.

These controls are connected through the ignition switch so that the system is turned on, if the levers are in "On" positions, when the ignition switch is in either the "On" or "Accessory" position.

There are no provisions for summer ventilation to the lower level of the front compartment as the Brougham is Air Conditioned.

Water Flow

The flow of water through the automatic heating system is illustrated in Fig. 14-1. The water flows from the upper water pump fitting to the thermostatic water valve and then to the right hand rear seat heater core. From there it flows to the left hand rear seat heater core and then to the front heater core and the water pump intake. It is then recirculated through the engine cooling system.

Air Flow

The flow of air through the heater and defroster system and the rear seat heater units is illustrated in Fig. 14-2. Outside air is drawn in through

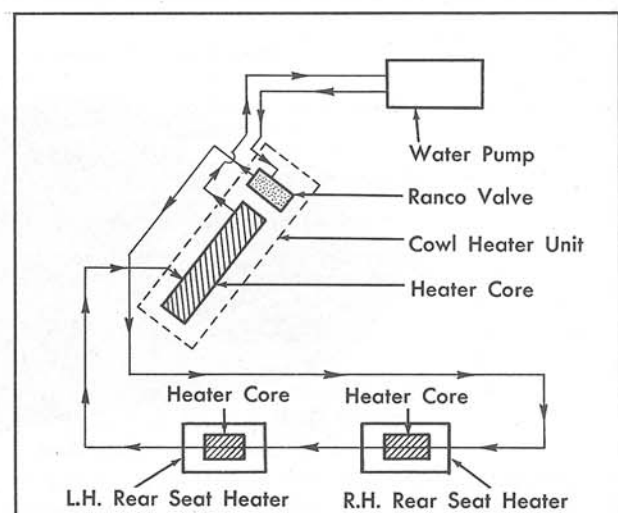


Fig. 14-1 Water Flow

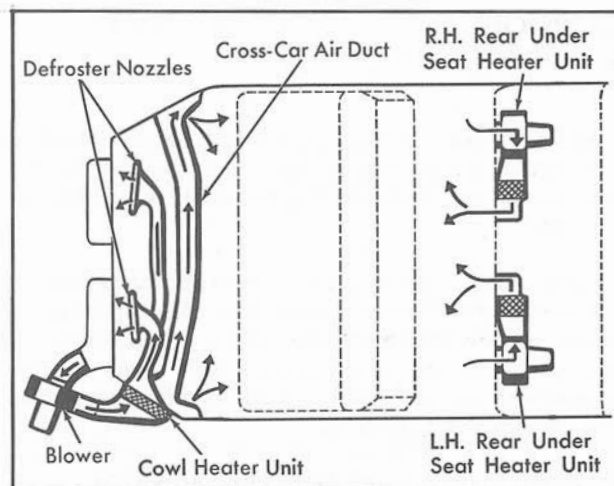


Fig. 14-2 Air Flow

the cowl air scoop to the ventilating blister and from the blister to the front heater unit, and directed out through the cowl kick pad grilles. Air is drawn from the interior of the car to the rear seat heater units by blowers located on the outboard sides of the heater grilles and directed out through the inboard sides of the heater grilles.

At all times, when interior temperatures are below 65° F, the thermostatic water valve permits circulation of water through the heater core, regardless of the "Heat" lever position. This provides immediate heat when the "Heat" lever is moved to the "On" position.

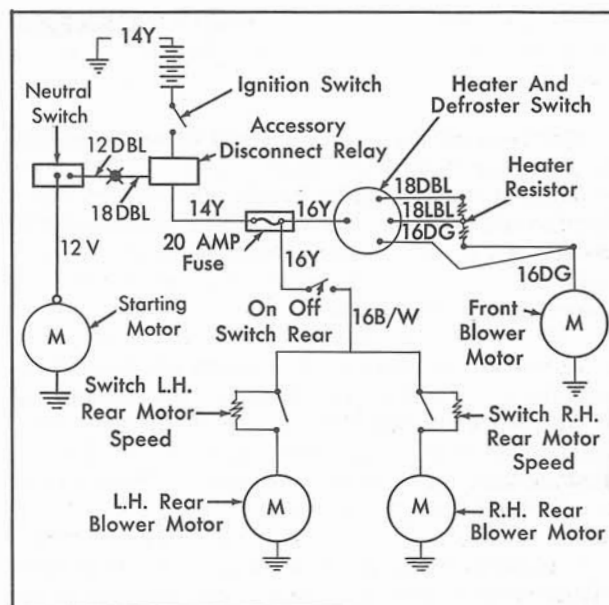


Fig. 14-3 Heater Circuit Diagram

Heater Electrical Circuit

The heater electrical circuit is illustrated in Fig. 14-3. The circuit runs from the battery through the ignition switch, through a 20 amp. fuse, to the "Heat" and "Defr" speed control switch. This control switch is operated by either the "Heat" or "Defr" levers.

SERVICE INFORMATION

(1) Rear Underseat Heater, Removal and Installation (Right or Left Side)

a. Removal—Refer to Fig. 14-4

1. Disconnect battery ground strap at battery.

2. Drain cooling system.

3. Raise rear of car and place on stands.

4. Remove one screw from supporting bracket on blower housing. (This bracket serves as a ground for the blower motor.)

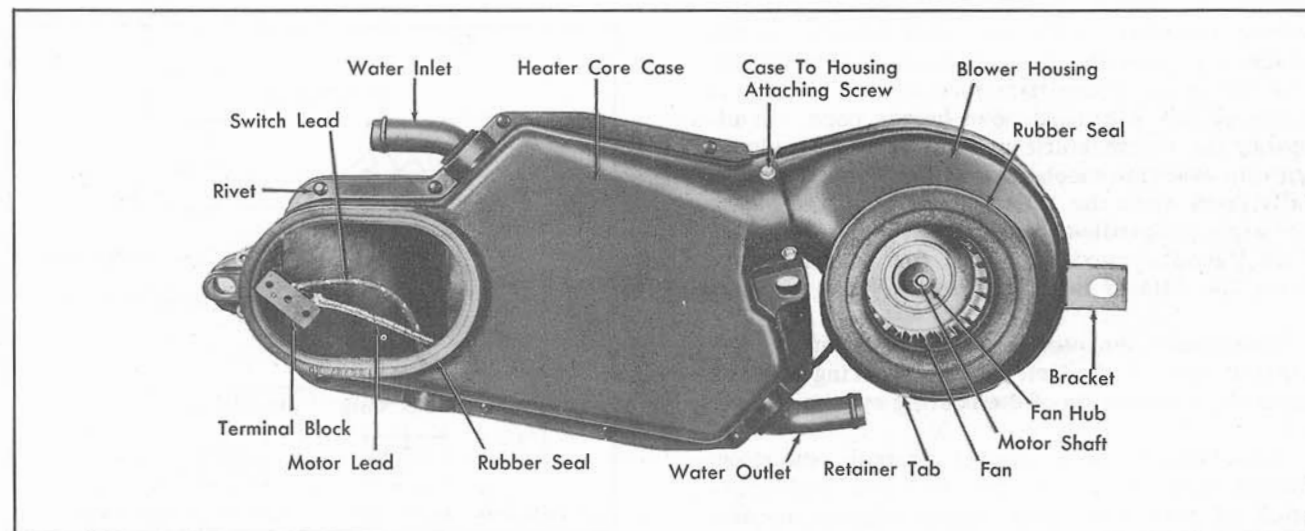


Fig. 14-4 Rear Under Seat Heater, Left Hand

5. Remove two supporting screws from heater core case and drop heater unit down for easier access.

6. Remove hose clamps and disconnect water inlet and outlet hoses.

7. Disconnect blower motor switch at pin type terminal block.

8. Disconnect feed wire (black) from switch lead (black with yellow tracer) at connection on front of heater core case.

9. Remove heater unit.

b. Installation

1. To install underseat heater unit, reverse the above procedure, making sure that ground bracket and attaching surface are clean and free of paint or grease.

NOTE: Removal and installation of the front heater unit is substantially the same as described in the 1957 Cadillac Shop Manual.

(2) Rear Underseat Heater Core, Removal and Installation (Right or Left Side)

a. Removal—Refer to Fig. 14-4

1. Remove heater unit as described in Note 1.
2. Remove rubber grommet in front of heater core case.
3. Leave motor and switch leads and terminal block intact, and remove them through grommet hole.

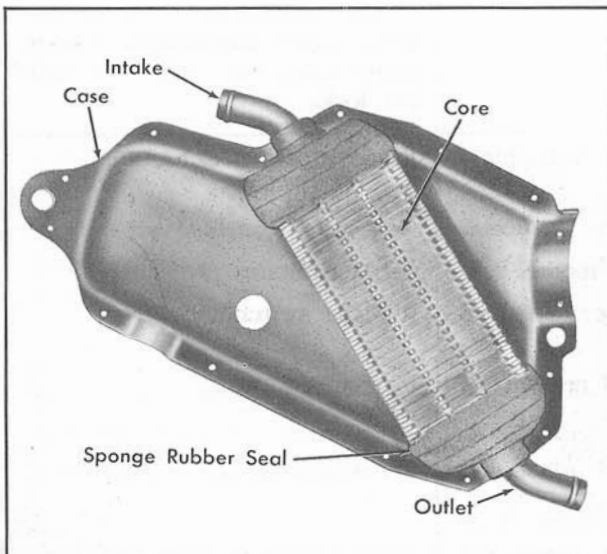


Fig. 14-5 Rear Heater Case Section and Core

4. Disconnect switch lead fitting from spring clip on front of heater core case.

5. Remove four hex head heater core case attaching screws.

6. Separate blower housing and motor from heater core case.

7. Drill out the twelve metal rivets that join the two heater core case sections, separate sections, and remove core, Fig. 14-5.

b. Installation

1. To install heater core, reverse the above procedure. Apply body sealer to mating flanges of core case sections and replace the twelve metal rivets with #6-32 x 5/8 machine screws, external tooth lock washers and hex nuts.

NOTE: Make sure that sponge rubber seal around core and water inlet and outlet tubes is properly installed to prevent air leakage past core.

(3) Rear Underseat Heater Motor and Blower Fan, Removal and Installation (Left or Right Side)

a. Removal—Refer to Fig. 14-4

1. Remove heater unit and blower assembly as described in Note 1, and Steps 1 through 6, Note 2.
2. Bend back eight blower housing retainer tabs and separate the upper and lower blower housing covers, using care not to break tabs.
3. Loosen Allen screw in blower fan hub and remove fan from motor shaft.
4. Remove two blower motor to housing retainer nuts and washers and remove motor and cushioning gaskets.

b. Installation

1. To install heater motor and blower fan, reverse above procedure.

NOTE: All retainer tabs and joints of duct and blower housing must be tight.

(4) Rear Underseat Heater Switch Removal and Installation (Left or Right Side)

A blower motor toggle type speed control switch is mounted on each of the two rear underseat heater outlet grilles on the kick panel, below the rear seat.

a. Removal

1. Remove four attaching Phillips screws from outlet grille on kick panel and remove grille.

2. Disconnect blower motor speed control switch at pin type terminal block.

3. Remove four spring clips between switch and mounting brackets by inserting pointed tool in holes on brackets.

4. Lift out switch.

Installation

1. To install rear underseat heater switch, reverse above procedure.

NOTE: Be sure to replace the four spring clips that hold switch in mounting brackets.

HEATER DIAGNOSIS CHART

CONDITION	CAUSE	REMEDY
1. Insufficient heat.	a. Failure of cooling system to warm up. b. Kinked heater hoses. c. Obstructed heater ducts at cowl kick pads. d. Incorrect operation of controls. e. Dirt in cores. f. Solder obstructing water flow in core. g. Defect in wiring circuit. h. Defective thermostatic temperature control. i. Obstruction in cowl air blister. j. Control cables not properly secured to thermostatic valve. k. Low water level.	Check radiator thermostat and replace if required. Remove kink. Remove obstruction. Instruct operator. Remove lint and blow out dirt. Replace core. Trace defect. Replace unit. Remove obstruction. Adjust control cables. Check radiator and fill to proper level, open thermostatic water valve wide, run engine to clear air lock.
2. Inadequate fog removal.	a. Obstructions in windshield outlets. b. Blower motor not connected. c. Defective blower motor. d. Defective blower motor switch. e. Defroster control not pushed over far enough. f. Open or shorted electrical circuit. g. Defroster valve does not open fully.	Remove obstruction. Connect motor feed wire. Replace motor. Replace switch. Instruct operator. Check circuit and repair. Repair valve or re-adjust operating linkage.

HEATER DIAGNOSIS CHART (Cont'd.)

CONDITION	CAUSE	REMEDY
3. Inadequate ice removal.	a. Thermostatic valve control unit poppet valve not opened. b. Defective blower motor. c. Defect in wiring. d. Insufficient heat.	Check lever adjustment. Replace. Repair. Check operation of heater controls and heat control lever.
4. Too warm in car.	a. Obstruction in air duct to defroster outlets. b. Temperature control unit defective. c. Incorrect operation of controls. d. Mispositioned capillary tube.	Check for air flow through this duct and repair if obstructed. Replace. Instruct operator. Reroute as required.
5. Cold floor.	a. Air leaks. b. Hoses rerouted incorrectly. c. Open circuit. d. Defective switch.	Repair leaks. Also see condition 1. Connect as in Fig. 14-1. Repair circuit between ignition switch, blower switch, and blower motor. Replace switch.
6. Coolant leaks.	a. Hose leak at connections. b. Core leaks. c. Temperature control unit leaks.	Replace or tighten clamps, replace hose, repair or replace nipple. Repair if possible, otherwise replace. Replace.
7. Blown fuses.	a. Short in electrical system.	Disconnect at ignition switch, blower switches, and blower motors, connect progressively to locate short.
8. Rear underseat heaters inoperative.	a. Defective switch. b. Defective motor. c. Fan loose on shaft.	Replace switch. See Note 4. Replace motor. See Note 3. Tighten fan hub. See Note 3.

GENERAL DESCRIPTION

An all transistor, three unit, signal seeking, pre-selector radio is standard equipment on the Eldorado Brougham. Transistors are used in place of tubes and serve the same purpose as tubes do in conventional radios. Transistor life is considerably greater and battery drain is considerably reduced.

The car battery and generator provide all the power for the radio. The use of transformers has been eliminated as power is transmitted to the transistors directly at battery voltage.

The radio controls are identical to, and operate in the same manner as those on the other 1957 Cadillac cars. They are connected through the ignition switch so that the radio will shut off automatically when the ignition switch is turned off. The radio can be turned on only when the ignition switch is either in the "On" or "Accessory" position.

The radio antenna is automatic and is electrically operated. When the radio is turned on, a special relay (mounted on the R.H. fender dust shield back cover) automatically extends the antenna mast to midway position. The mast may be extended further, electrically, by pushing in on the manual selector control knob. When the radio is turned off, the mast automatically retracts, but can be stopped at any desired height above midway by turning the radio on again. Otherwise, it will return to full retracted position. When the mast is fully extended, the elevating motor will continue to run as long as the manual selector control knob is depressed. In the event the motor is allowed to run continuously or becomes overloaded, an automatic resetting circuit breaker will open to prevent damage to the motor. Allow approximately twenty seconds for this circuit breaker

to close before again attempting to operate the antenna.

The antenna is also connected through the ignition switch and in the event that the radio is left on, the mast will automatically retract when the ignition switch is turned off. In like manner, the antenna will extend when the ignition switch is turned to the "On" or "Accessory" position when the radio has been left on.

CAUTION: Do not attempt to raise or lower the antenna by hand. Always use the antenna control knob to prevent damage to the raising mechanism.

The front and rear seat speakers are specially designed to match the push pull output stage of the transistor radio. They are 6" x 9" in size, elliptical shaped, and of permanent magnet type.

The front seat speaker is contained in a sheet metal housing with a chrome plated grille. The speaker housing is painted to match the carpet and is located on the transmission tunnel directly in front of the fire wall.

The rear seat speaker is located at the top center of the rear seat and is protected by a chrome plated grille.

A speaker fader ring, located on the manual selector control knob on the right hand shaft, directs sound to either or both speakers. When the fader ring is turned to the right, the front speaker is predominant. As the fader ring is turned to the left, the front speaker volume gradually decreases while the rear speaker volume increases. Thus, the sound can be balanced to suit both front and rear seat passengers.

SERVICE INFORMATION

(1) Minor Adjustments

a. Antenna Trimmer Adjustment

1. Turn radio on. Reception is instantaneous, making it unnecessary to wait for set to heat up before adjusting antenna trimmer.

2. Fully extend antenna and set sensitivity control at maximum.

3. Tune in a weak station near 600 KC and set volume control at maximum.

4. Adjust the antenna trimmer screw, located

at the rear of the receiver unit between the tuning pulleys, to maximum volume.

NOTE: If, during adjustment, the station becomes strong, tune to a weaker station and continue adjustment.

b. Push Button Station Selection

1. Tune in the desired station nearest the left end of the dial with the selector bar or the manual tuning knob.

2. Move the first button to the left and pull out, then push back in to calibrate the button to that station. The button will now tune in the station.

3. Repeat the above procedure for the four remaining buttons, going from left to right for both the buttons and the stations.

(2) Minor Repair Procedure

Many of the troubles that affect the satisfactory operation of the radio can be corrected without removing any of the units from the car. Check the condition, and with the aid of the diagnosis chart at the end of this section, perform the operation or operations necessary to correct the trouble. Only the following repairs should be attempted on the transistor radio.

CAUTION: Before turning radio on, make sure that all units are connected (tuner unit, audio unit, both speaker units and antenna lead). Otherwise, extensive damage may result to output transistors in audio unit.

a. Fuse

Turn radio on and check to see if the radio pilot light will light. If fuse is open or blown, check for shorts in power supply wiring and then replace fuse with one of the correct amperage.

b. Battery

Check battery and make sure that it is fully charged.

c. Antenna

Use a test antenna and lead-in plugged into the set with the test antenna held outside the car. If the radio works satisfactorily with this test assembly, the antenna should be checked for a short or ground and the lead-in should be checked for continuity. Test the antenna mast to ground while wiggling the antenna. If a ground is indicated in this test, disassemble the antenna and check for defective insulators or presence of water or moisture in the body tube. Test with ohmmeter from end of lead-in tip to ground. This test should indicate an open circuit. If lead-in tests show a ground, replace the lead-in.

The conditions mentioned above will cause a weak or intermittent signal in the radio set and will cause the signal seeker in the radio to sweep back and forth across the dial continually, trying to pick up a station. The signal seeker will also sweep back and forth across the dial when the tuning bar is depressed while the car is in an unusually weak signal area such as in a building or under a viaduct. Do not remove the set to correct this condition until all previous checks on the antenna have been made with the car in a fair signal area.

d. Antenna Trimmer

If antenna is not peaked, it will cause the set

to have weak reception. This operation should always be performed after any repair work is completed. See Note 1a.

e. Worn or Defective Parts

Static in the radio may be due to worn static collectors in the wheels, or a defective distributor rotor suppressor, broken ground straps from engine to cowl, or a defective generator condenser. Static due to defective wheel static collectors will be noticed only when the car is in motion, while static due to a defective distributor rotor suppressor will be timed with the ignition. Static due to the defective generator condenser is higher in frequency and tone.

f. Leads and Cables

Check all leads and interconnecting cables to see that they are properly connected.

If these minor repairs do not correct the condition, the unit or units at fault should be removed from the car and returned to the factory for repair.

(3) Tuner Unit Removal and Installation

1. Remove glove compartment. Refer to Section 17, Note 7.

2. Disconnect radio lead (black) from fuse connector.

3. Disconnect front speaker feed leads (black) at connector for speaker unit.

4. Disconnect two shielded plugs that connect tuner unit to audio unit.

5. Disconnect antenna relay lead (yellow) from connector (not fused).

6. Disconnect rear speaker lead (green) from harness connector.

7. Remove antenna control connectors at bottom left rear of tuner unit (lt. green).

8. Remove antenna lead-in at rear right bottom of tuner unit.

9. Remove manual selector control knob, spring, and speaker fader ring from right shaft. Following the same procedure, remove volume control knob and tone control ring from left shaft.

10. Remove spanner nuts that retain the shafts, and remove screw that supports tuner unit to mounting bracket.

11. Remove tuner unit through glove compartment, disconnecting two dial lights from top of unit.

12. To install, reverse above procedure and check operation of radio.

(4) Audio Unit Removal and Installation

1. Remove instrument panel cluster.
2. Disconnect two shielded plugs that connect audio unit to tuner unit at rear and center of chassis. Being careful not to damage small black transistor in center of chassis.
3. Remove end bolt from left side of audio unit that supports unit to mounting bracket.
4. Remove two bolts from right side of audio unit that support unit to mounting bracket.
5. Remove audio unit through instrument panel cluster opening.
6. To install audio unit, reverse above procedure. Be sure to connect the two shielded bayonet connections on the audio unit and check operation of radio before installing instrument panel cluster.

(5) Front Speaker Removal and Installation

a. Removal

1. Remove two sheet metal screws from slotted holes at bottom left and right side of speaker housing.
2. Remove two sheet metal screws from slotted holes at top left and right side of speaker housing.
3. Remove speaker housing.
4. Disconnect speaker leads, (black and black with green tracer), at connector.
5. Remove four speaker to speaker housing holding screws.
6. Remove speaker.

b. Installation

To install front speaker, reverse the above procedure.

(6) Rear Speaker and Grille Removal and Installation

Access to the rear seat speaker and grille is gained through the trunk compartment.

a. Removal

1. Remove six Phillips screws that hold trunk liner panel to back of rear seat and remove panel.
2. Disconnect speaker lead (green) from pin type connector on terminal block.

3. Remove four speaker to baffle supporting nuts and lift out speaker.

4. Remove two nuts that hold rear speaker grille to supporting flanges.

NOTE: It is not necessary to remove rear speaker grille when removing speaker, unless it is to be replaced.

b. Installation

To install rear speaker and grille, reverse the above procedure.

(7) Antenna Removal and Installation

a. Removal

1. Fully lower antenna.
2. Disconnect two switch leads at relay located on R.H. fender dust shield back cover (dark green and dark blue). Note position of leads on relay.
3. Disconnect antenna control lead (light green) at connector adjacent to relay.
4. Remove escutcheon and shim at antenna opening in fender, using Tool No. J-6624.
5. Remove the screw that attaches both the motor ground lead and the antenna motor and housing assembly to the bracket under the right front fender.
6. Disconnect lead-in cable from plug receptacle on antenna body tube.
7. Disconnect noise suppressor ground lead at top of antenna body tube.
8. In the event that the mast is extended and will not retract, remove the cord guide cover at the base of the body tube on the motor and housing assembly. Cut the nylon cord and retract the mast by hand.
9. Remove antenna assembly through hood opening.

b. Installation

To install antenna, reverse above procedure, making sure that both ground leads are connected and that switch leads are connected correctly at relay. Mispositioning of switch leads will cause antenna to be inoperative.

(8) Antenna Disassembly

1. Remove three screws from side of motor and housing assembly cover, and lift off cover. Refer to Fig. 15-1.

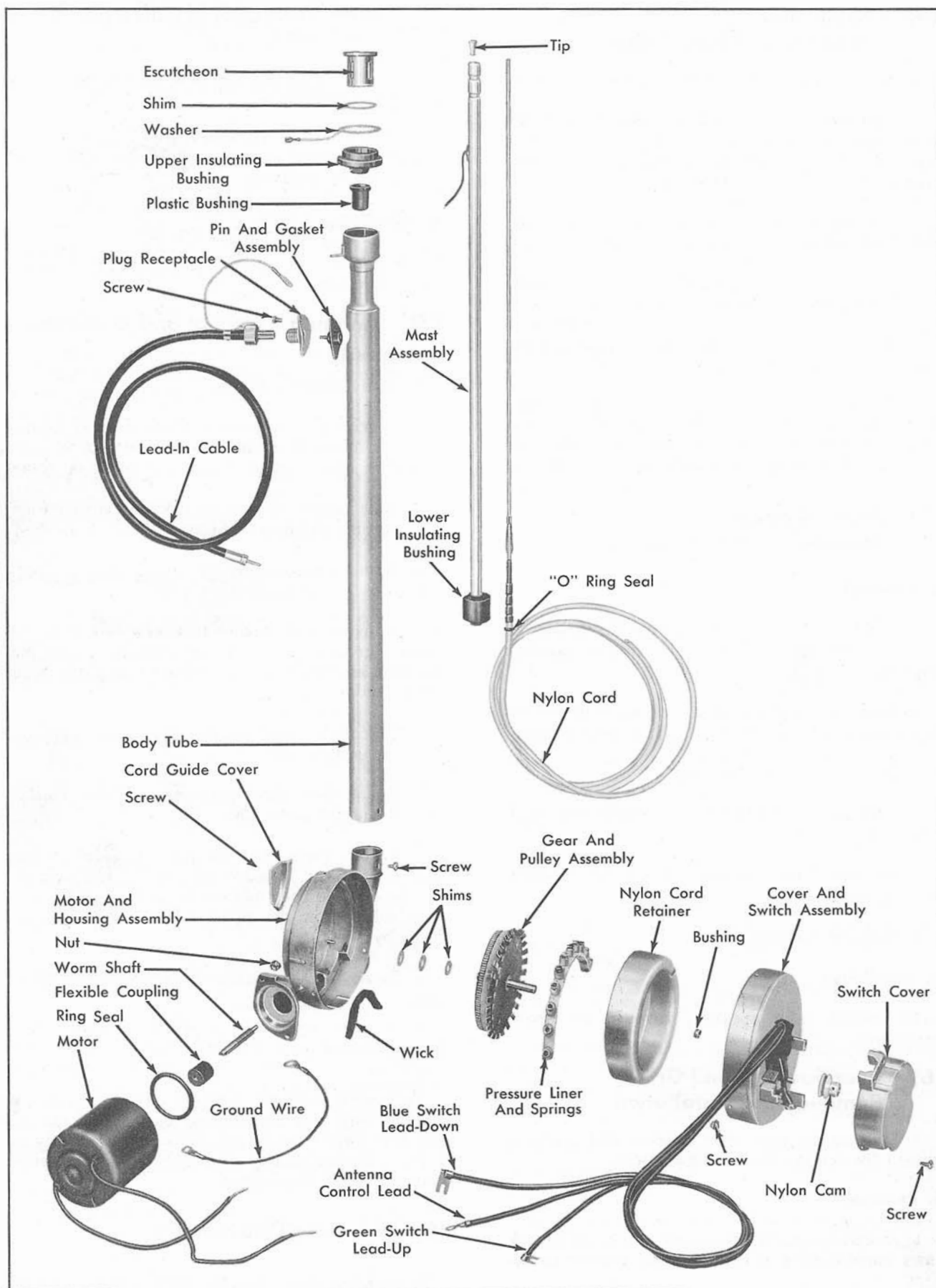


Fig. 15-1 Antenna Disassembled

2. Remove steel bushing from shaft.
3. Remove two motor attaching nuts from motor and housing assembly.
4. Remove motor ground lead, motor, "O" ring seal and flexible coupling.
5. Pull out nylon cord retainer and disconnect cord by prying open metal crimp.
6. Remove pressure liner, being careful not to lose springs as it is removed.
7. Note and mark position of body tube on housing. Remove two screws at base of antenna body tube and remove tube from motor and housing assembly, pulling nylon cord out of housing.
8. Lift out gear and pulley assembly. Remove shims noting number and position of shims.
9. Remove worm shaft from motor and housing assembly.
10. Remove felt breather wick from motor and housing assembly.
11. Remove four screws that hold switch cover to motor and housing assembly cover.
12. Remove switch cover.
13. Loosen Allen set screw in cam collar, and remove collar and nylon cam assembly, being careful not to disturb switch contacts. Refer to Fig. 15-2.

NOTE: Do not attempt to disassemble switch assembly.

(9) Antenna Assembly

1. Assemble flexible coupling and worm shaft to motor drive shaft.
2. Seat "O" ring in position on motor and housing assembly.
3. Install motor assembly in motor housing.
4. Connect motor ground lead and install two motor attaching nuts.
5. Install gear and pulley assembly and shims.
6. Insert nylon cord through antenna body tube opening in motor and housing assembly.
7. Position body tube in housing. Align and secure with two screws at base of body tube.
8. Wrap nylon cord around pulley groove, inserting end under retaining pin. Pull through a sufficient length of cord to permit attachment to nylon cord retainer.
9. Replace pressure liner and eleven springs.

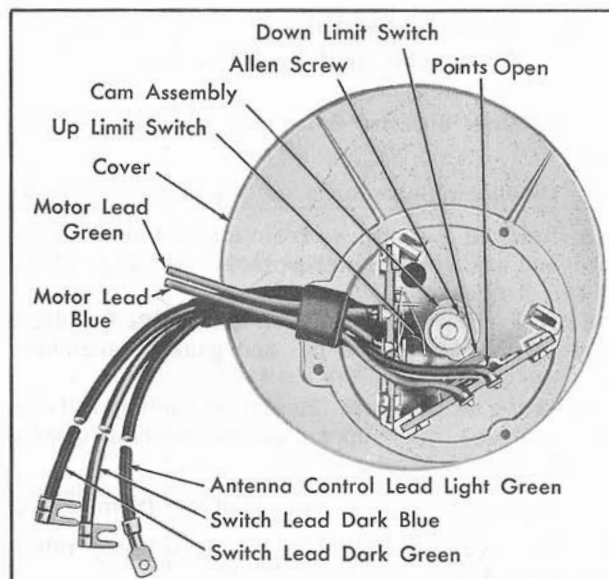


Fig. 15-2 Antenna Switch Assembly

10. Thread end of nylon cord under metal crimp in cord retainer and stake. Coil surplus cord inside of cord retainer being careful not to twist or kink cord.
 11. Replace felt breather wick in slots in motor and housing assembly.
 12. Replace steel bushing on pulley shaft.
 13. Replace motor and housing assembly cover. Secure with three screws on side of cover.
 14. Test antenna.
 - a. Connect motor ground lead to negative battery terminal.
 - b. Touch dark green switch lead to positive battery terminal to extend antenna to midway position.
 - c. Touch light green antenna control lead to positive battery terminal to fully extend antenna.
 - d. Touch dark blue switch lead to positive battery terminal to retract antenna.
 15. Retract antenna to within one inch of fully retracted position.
 16. Install nylon cam assembly. Rotate cam assembly clockwise until outer cam opens contacts on "down" limit switch. See Fig. 15-2. Hold cam in this position and tighten Allen set screw.
 17. Check operation as described in Step 14 above. Dark blue switch lead should fully retract antenna and open upper points.
- NOTE: Do not attempt to repair defective switches. Install new cover and switch assembly.
18. Coat switch cover flange with 3M Weather-strip Adhesive. Replace cover and install four switch cover to motor and housing assembly cover screws.

(10) Mast Assembly Removal and Installation

1. Remove antenna from car as described in Note 7.
2. Disassemble antenna as described in Note 8.
3. Remove two screws from top of antenna body tube and remove plug receptacle. See Fig. 15-1.
4. Pull out pin and gasket assembly, unsolder lead wire and remove pin and gasket assembly.
5. Press in on lower insulating bushing at base of body tube until upper plastic bushing comes out at top of body tube.
6. Remove upper plastic bushing from mast.
7. Remove mast through bottom of body tube.
8. Unscrew tip from inner telescopic section of mast.
9. Grasp nylon cord firmly at bottom of lower insulating bushing, and with a jerking motion, remove nylon cord, "O" ring and inner telescopic section from mast assembly.
10. To install mast assembly, reverse the above procedure.
11. Assemble antenna as described in Note 9.
12. Install antenna as described in Note 7.

(11) Antenna Maintenance and Repair Procedures

Many antenna troubles can be prevented by cleaning the antenna rod on all cars at periodic intervals. This is easily performed during a lubrication period, or when a car is being washed,

by extending mast fully and wiping the rod with a soft cloth.

a. Moisture in Cylinder

Weak reception or fading is often caused by moisture in the antenna body tube, due to condensation or leakage through the insulating bushings.

If trouble has been traced to moisture in the body tube, the antenna must be removed, disassembled and thoroughly cleaned. All moisture can be removed by blowing it out with compressed air, then pushing a clean, dry cloth through the body tube, as far as possible. Before assembling the antenna, check the drain holes in the motor housing below the body tube mounting point to be sure they are not obstructed.

NOTE: Cover drain holes and housing wick before undercoating car.

b. Antenna Mast Will Not Raise or Lower

Inability of the antenna mast to raise or lower is usually due to a blown fuse, loose electrical connections on the relay or at the antenna motor, a bent antenna mast or a defective nylon cord. If a check of these causes does not reveal the condition, disassemble the antenna and replace any defective or inoperative parts.

c. Antenna Mast Will Not Raise Above Midway Point

1. Check connectors (green) at tuner unit. Make sure they are tight and properly connected.
2. Check connector (green) adjacent to relay to see if it is loose.
3. Check position of manual selector knob on shaft. Make sure push in travel is adequate.

DIAGNOSIS OF ANTENNA TROUBLES

TROUBLE	CAUSE	REMEDY
Antenna mast will not extend or retract properly.	Blown fuse. Antenna open or shorted. Poor ground. Power supply to antenna open. Antenna trimmer not adjusted. Poor antenna connection. Low Battery. Installation defects. Motor circuit breaker open. Nylon cord or mast damaged. Nylon cam assembly not properly adjusted. Defective switch on housing assembly. Antenna mast dirty.	Check fuse. See Note 2a. Check antenna. See Note 2c. Check all ground connections. Check connections at switch. Adjust trimmer. See Note 1a. Tighten antenna connections. Charge battery. Check installation. Allow 20 seconds for circuit breaker to close. Replace mast assembly. Adjust. See Note 9, Step 16. Replace switch assembly. Clean with soft cloth.

DIAGNOSIS OF RADIO TROUBLES

TROUBLE	CAUSE	REMEDY
Dead	<p>Blown fuse.</p> <p>Antenna open or shorted.</p> <p>Poor ground.</p> <p>Power supply to radio open.</p> <p>Transistor or circuit trouble.</p> <p>Speaker.</p>	<p>Check fuse. See Note 2a.</p> <p>Check antenna. See Note 2c.</p> <p>Check all ground connections.</p> <p>Check connections at switch.</p> <p>Return defective unit or units to factory for replacement.</p> <p>Check wiring for shorts - check interconnecting leads at set and trunk. Check control knob - substitute test speaker.</p>
Weak	<p>Antenna not extended.</p> <p>Antenna trimmer not adjusted.</p> <p>Antenna open, shorted.</p> <p>Low battery.</p> <p>Poor ground.</p> <p>Poor antenna connection.</p>	<p>Extend antenna.</p> <p>Adjust trimmer. See Note 2d.</p> <p>Test antenna. See Note 2c.</p> <p>Charge battery.</p> <p>Check ground connections.</p> <p>Tighten antenna connections.</p>
Noisy	<p>Antenna not extended.</p> <p>Local interference.</p> <p>Station signal weak.</p> <p>Antenna open, shorted.</p> <p>Static noise.</p> <p>Spark noise.</p> <p>Generator noise.</p> <p>Installation defects.</p>	<p>Extend Antenna</p> <p>Explain to owner.</p> <p>Explain to owner.</p> <p>Check antenna. See Note 2c.</p> <p>Identify type of noise. Replace defective static collectors.</p> <p>Check distributor rotor suppressor. See Note 2e.</p> <p>Check generator condenser. See Note 2e.</p> <p>Check installation.</p>
Intermittent	Loose antenna connection.	Tighten connections.
Poor Tone	Low battery.	Charge battery.

GENERAL DESCRIPTION

The hood panel on the Eldorado Brougham is hinged at the front and opens from the cowl. The hood is unlocked from inside the car by pulling the hood release handle located on the instrument panel below the heater and defroster control assembly on the left side of the steering column. The hood lock pilot is mounted slightly to left of center along the cowl edge of the hood; the lock is mounted on the cowl.

The front bumper assembly consists of six bolted-together sections: the lower impact bar, the outer impact bars, the rubber bumper inserts, and the license plate frame.

The rear bumper consists of three separate

sections: the right and left bumper ends and the license plate frame.

The radiator grille assembly, consisting of closely spaced horizontal and vertical fins, is removable separately from the front bumper assembly. Horizontal or vertical fins may be replaced individually.

The two front fenders are joined by a sheet metal cross over panel between the grille and hood to form a one-piece welded-together assembly. This assembly, is removed and installed as a unit. Service replacement of any one of these component parts is possible by the method as described in the Service Information section below.

SERVICE INFORMATION

(1) Adjustment of the Hood Lock Mechanism

All necessary adjustment between the hood lock striker and the hood lock assembly is performed at the striker assembly.

The striker assembly consists of two bolted together sections. Fig. 16-1. Elongated holes in these sections provide, "fore and aft", and "up and down" adjustment of the striker.

When the striker assembly has been removed, the mounting screws loosened, or the hood alignment changed, it is important that the proper

adjustment be performed before the hood is closed to prevent damage to the locking assemblies.

NOTE: Never use a standard hex nut on the hood striker adjustment bolts. The original equipment locking nuts must be used.

(2) Removal and Installation of Hood Panel**a. Removal**

1. Unlatch and raise hood.
2. Scribe hinge location on underside of hood to aid in repositioning hood upon installation.
3. Remove two screws holding each side of hood hinge assembly to hood panel.
4. Remove hood, being careful not to damage finish.

b. Installation

1. Place hood in position on hood hinge assembly, and loosely install two screws on each side.
2. Position hood so that hinges line up with scribe marks, and tighten screws on each side.
3. Lower hood and check spacing.

NOTE: Hood panel to fender and cowl lines must be evenly spaced. If further adjustment is needed, refer to adjustment procedure outlined in Note 3.

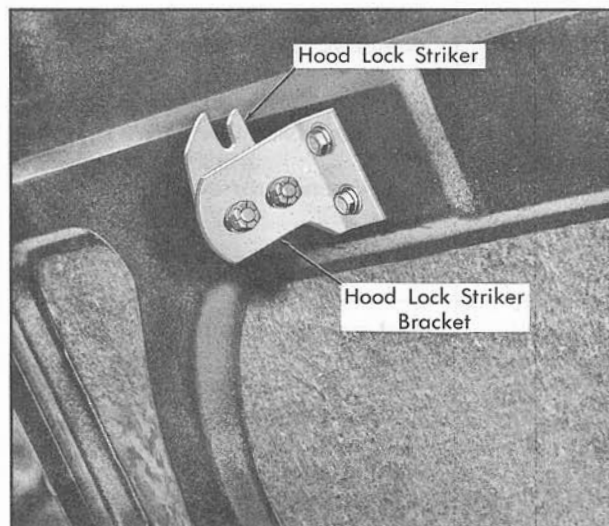


Fig. 16-1 Hood Lock Striker

(3) Hood Adjustment

a. Hood Panel to Cowl Adjustment

1. Loosen two hood hinge to hood panel attaching screws at each side. Elongated holes in hood hinge arm provide fore, aft, and side to side adjustment of the hood.

2. Move hood forward or rearward until clearance between rear edge of hood panel and body cowl ledge is equal on both sides.

3. Position rubber bumpers Fig. 16-2, in channel along the top of the cowl ledge so hood is 1/16" below cowl from center of car to 25" from center-line. From this point outward, the hood should taper from 1/16" to flush in relation to cowl.

NOTE: Variable thickness rubber bumpers are available from the factory Parts Warehouse.

4. Adjust the rubber spacers located near the cross-over panel so hood panel is flush with cross-over panel.

b. Adjustment of Fenders to Hood and Doors

1. Loosen fender and dust shield mounting screws at frame, radiator support, rocker sill and cowl.

2. Position fender so space between fenders and hood is equal at front and rear and the hood and fenders are the same height in the area where the fender is attached to the radiator support.

NOTE: The clearance between the door and and fender at the top and bottom should also be checked and adjusted to prevent interference.

(4) Removal of Hood Hinge Assembly

1. Remove hood panel as outlined in Note 2.

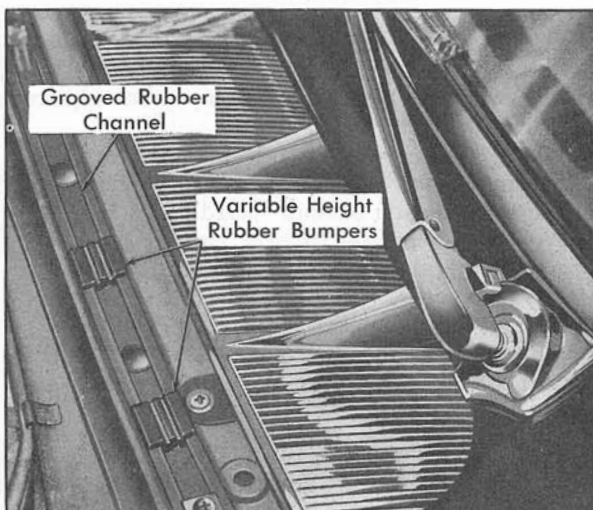


Fig. 16-2 Adjusting Hood To Cowl

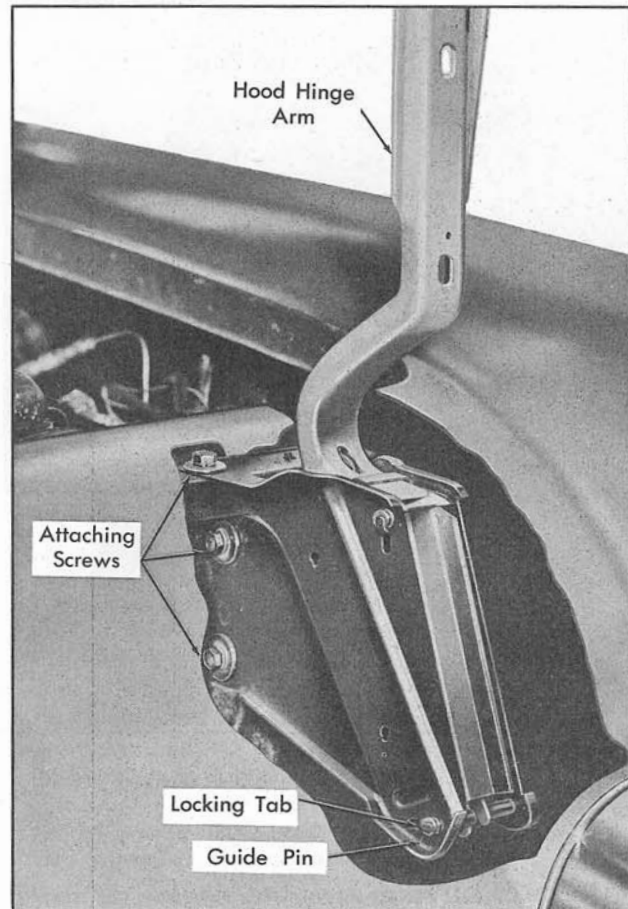


Fig. 16-3 Hood Hinge Removal

2. Remove four screws on side of hinge assembly and one screw holding assembly to radiator support, Fig. 16-3.

3. Loosen front end sheet metal as needed to allow hinge assembly to be removed.

4. Remove assembly.

5. To install hinge assembly, reverse the above procedure.

(5) Removal of Hood Spring

1. Remove grille assembly as outlined in Note 6.

2. Open hood.

NOTE: Hood must be open to relieve tension on spring.

3. Bend locking tab away from lower pin on hinge assembly, Fig. 16-3.

4. With punch, drive lower pin from hinge assembly.

CAUTION: Block spring to prevent spring and retainer from jumping out.

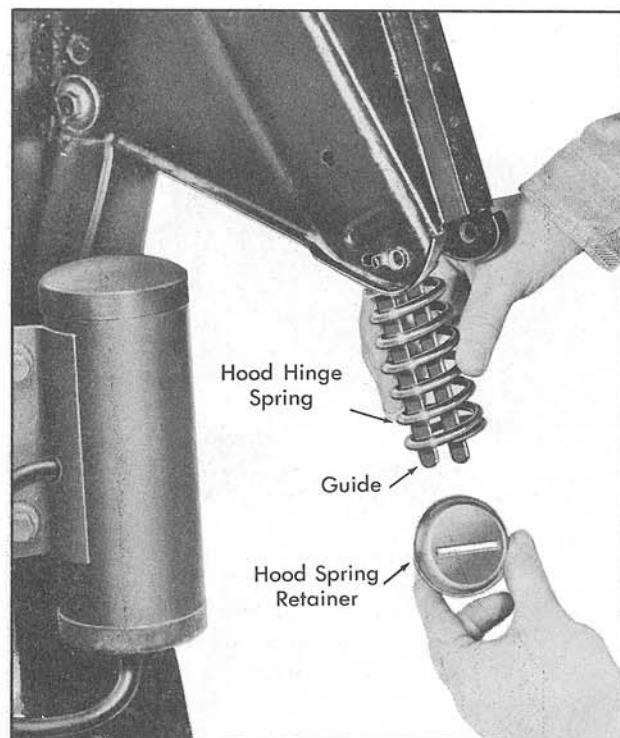


Fig. 16-4 Hood Hinge - Disassembled

5. Remove spring and retainer, Fig. 16-4.
6. To install hinge assembly, reverse the above procedure.

(6) Removal and Installation of Radiator Grille

1. Remove the six cross headed screws from bottom of grille that retain grille to bumper, Fig. 16-5.
2. Remove two cross headed screws, each side, that retain grille to outer impact bars.
3. Remove grille.
4. To install, reverse the above procedure.

(7) Disassembly and Assembly of Radiator Grille

1. Remove grille as described in Note 6.
2. Remove necessary screws and clips securing upper grille retainer and remove retainer.
3. Individual vertical or horizontal fins may be removed from the grille for replacement by removing the straight slotted vertical fins that lock the grille together.
4. To assemble, reverse the above procedure.

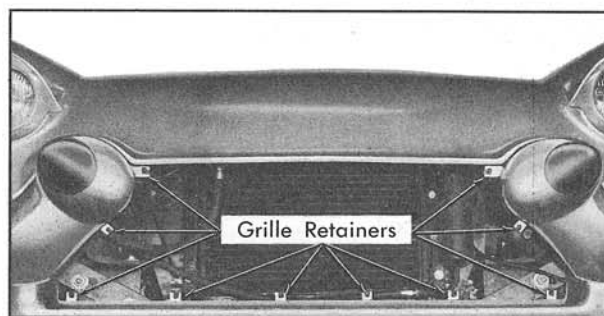


Fig. 16-5 Grille Retainer Locations

(8) Removal and Installation of Front Bumper

a. Removal

1. Remove grille as described in Note 6.
2. Disconnect parking and fog lamps at their plastic connectors.
3. Remove two bumper bracket to frame bolts from each side.
4. Remove bumper guard to frame bracket bolt from each side.
5. Remove bumper assembly.
6. To install, reverse the above procedure.

(9) Disassembly and Assembly of Front Bumper Sections

1. Remove two bumper guard to bumper mounting bracket bolts from each side.
2. Remove three bolts, each side, that retain bumper guard and impact bar to support bracket.
3. Remove four bumper guard to bumper impact bar bolts on each side, and remove impact bar guards.
4. Remove three fog lamp to impact bar attaching screws, and remove fog lamp assembly from each impact bar.
5. Remove two bumper guard to grille support brackets from each bumper guard.
6. Remove six lower impact bar to grille retaining brackets.
7. Remove two bolts that retain "L" shaped support bracket to lower impact bar, each side.
8. Remove 2 screws retaining license plate bracket to impact bar.
9. Remove screw securing rubber bumper insert to bumper guard, and remove insert.

10. To assemble, reverse the above procedure.

(10) Removal and Installation of Rear Bumper Sections

a. Right or Left End Section

1. Remove rear wheel shield.
2. Remove screw from bottom of bumper end that retains the exhaust deflector, and the frame to bumper support bracket.
3. Remove remaining screw that secures support bracket to frame side bar, and remove bracket.
4. Remove back-up light lens and retaining plate.
5. Through back-up light opening, remove bumper support bar to frame screw.
6. Remove frame to bumper screw.
7. Disconnect tail lamp wires at plastic connectors in trunk.
8. Remove bumper.
9. To install, reverse the above procedure.

b. Center Section

1. Raise deck lid and disconnect license plate lamp wires.
2. Remove four screws retaining cover over trunk lid power closing unit.
3. Through access holes located on each side of the power closing unit, loosen the two screws retaining license plate frame to center section, and remove frame with license plate.
4. Through center section opening, remove four screws, two each side, retaining center section to frame and remove section.
5. To install, reverse the above procedure.

(11) Front End Sheet Metal Assembly Removal and Installation

1. Disconnect battery.
2. Remove windshield wiper arms.
3. Remove windshield wiper escutcheons, using Special Tool No. J-6592.
4. Remove hood panel as outlined in Note 2.

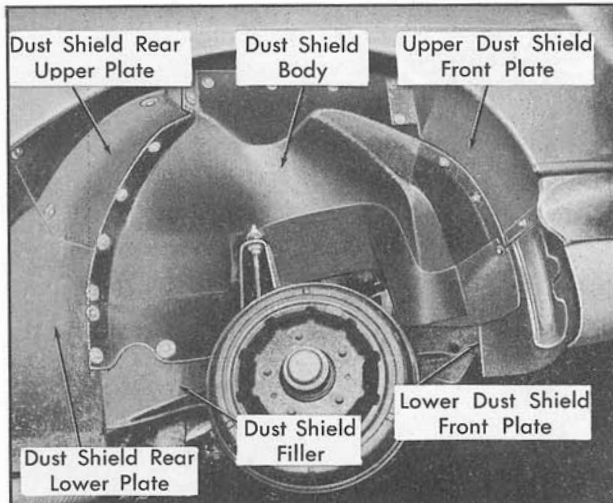


Fig. 16-6 Front Fender Dust Shields

NOTE: It is not necessary to remove either dust shield body with components when removing complete front end assembly.

5. Raise front end of car.
6. Remove both front wheels.
7. Remove screws retaining lower rear dust shield plate to fender, and remove dust shield, Fig. 16-6.
8. Remove screws retaining upper rear dust shield plate and remove dust shield.
9. Remove attaching screws from dust shield body and remove shield.
10. Remove screws from lower front dust shield, and remove shield.
11. Remove screw from fender to cowl bracket.
12. Open door and remove screw holding fender to hinge pillar, Fig. 16-7.
13. Remove screws holding fender to rocker sill bracket.
14. Using Special Tool No. J-6624, remove antenna escutcheon on right fender.
15. Disconnect headlamps and fog lamps at the plastic connectors.
16. Remove front fender to cradle support screws.
17. Remove complete assembly from car, by pulling outward at the rear of each front fender and sliding complete assembly forward, using caution not to damage finish.
18. To install, reverse the above procedure,



Fig. 16-7 Fender To Hinge Pillar Attachment

being careful to align antenna when assembly is placed in position.

NOTE: Before tightening fender retaining screws, check fender to hood and fender to door alignment and adjust as necessary. Refer to Note 3b.

(12) Replacement of Individual Front End Sheet Metal Sections

The front fenders and cross-over panel are removed from the car as a complete assembly for some service operations. There will be some cases, however, such as in collision damage, when it may be necessary to replace a front fender or

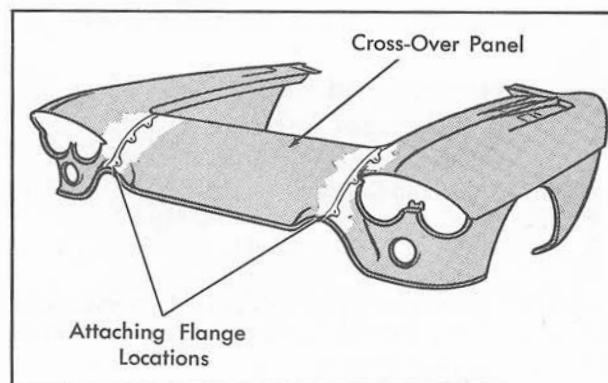


Fig. 16-8 Front End Sheet Metal

the cross-over panel rather than the complete assembly. The component sections of the assembly are available from the factory Parts Warehouse.

This note is not intended to provide a descriptive, step by step procedure on replacement of individual sections, but does offer a guide to Servicemen.

Each fender is secured to the cross-over panel by three screws. The visible joints are then welded and solder filled.

It is important, when doing metal work that requires separation of the fenders from the cross-over panel, that all cutting be done in the damaged section as near as possible to the production weld, Fig. 16-8. Then, remove the retaining screws and using a hand grinder, remove surplus metal down to the attaching flange. The new section is then attached to the assembly with the retaining screws. The joint should be welded, ground, and solder filled using accepted body repair procedures.

The car and undamaged sections may be used as an alignment fixture when installing the replacement parts.

TORQUE TIGHTNESS

Location	Size	Ft. Lbs. Min.	Ft. Lbs. Max.
Front bumper guard to support	3/8-24	30	35
Front bumper support to frame	1/2-20	80	90
Hood crest	- - - -	3 in. lbs.	3 in. lbs.
Front fender to radiator cradle	3/8-16	25	30
Hood hinge to hood	5/16-24	15	20
Front fender to cowl	3/8-16	25	30
Rear bumper to brackets	1/2-20	80	90
Rear bumper license guard bracket to frame	3/8-24	25	30

GENERAL DESCRIPTION

The 7059 Cadillac Eldorado Brougham is a four door, five passenger sedan. An entirely new body, with a brushed stainless steel roof, distinguishes the Brougham from the other models in the Cadillac line.

An extra large curved windshield and a wide angle rear window increases the driver's visibility.

Both interior and exterior styling are entirely new, providing a possible 45 interior combinations with 15 acrylic colors available in exterior colors.

The instrument panel has been redesigned with personal comfort in mind. All instruments are easily viewed and all operating controls are within easy reach of the driver. The instrument compartment door is custom fitted with such personal items as cigarette case, tissue dispenser, vanity compact and lipstick holder, stick cologne, four metal magnetized chrome-finished drinking cups with plastic retainer, and a full length metal backed acrylic vanity mirror that folds outward, forming a horizontal metal shelf. The compartment will be illuminated by recessed lights.

In addition to the personal effects found in the instrument compartment door, the rear center arm rest conceals a small storage compartment containing the following: a note pad and mechanical pencil, portable vanity mirror, and a perfume atomizer containing Arpege Extrait de Lanvin perfume.

All windows, including the vent windows, are power operated and may be operated regardless of the ignition switch position.

An exclusive feature of the series 7059 is the operation of the electric door locks, which are

controlled from the front seat. By depressing the button located in the center of either front door locking lever, the locks on all doors move to the locked position. However, they must be unlocked manually. A switch is incorporated in each rear door lock, which automatically prevents shifting the transmission selector lever into a driving position when either rear door is open and the ignition switch in "On".

The power operated rear deck lid is remote controlled from a switch located in the glove box. The lid may be unlocked and raised to the full open position and then closed and locked again without the operator leaving the car. In addition, however, access to the luggage compartment may be obtained by opening the lid in the conventional manner with the key.

The six-way front seat has been redesigned and an automatic favorite position provided to increase personal comfort.

The front seat control switch is located in the left door arm rest. The switch consists of three control knobs which are preset to adjust the seat to the desired driving position for two persons who drive the car most frequently. In addition, the unit is designed to operate the front seat assembly to the extreme downward and rearward position when either of the front doors are opened. This allows greater convenience in entering or leaving the car. The unit will also return the seat automatically to the original driving position when the driver re-enters the car, sits in the driving position on the front seat cushion and closes both front doors. Refer to Note 17-74 for pre-setting of the favorite position seat.

SERVICE INFORMATION

(1) Windshield Reveal Moldings Removal and Installation

a. Upper Reveal Moldings

1. On inside of body, remove upper garnish molding; then working through access holes, remove barrel nuts, Fig. 17-1, securing reveal molding.

2. On outside of body, carefully slide upper escutcheon, Fig. 17-2, over either of the moldings.

3. At each windshield side pillar remove reveal molding attaching screws; then carefully remove molding.

4. To install molding(s), apply medium-bodied sealer around screw attaching holes at windshield side pillar as shown at "1", Fig. 17-3, and if necessary, replace sealing washers on bolt and clip assemblies; then reverse removal procedure.

b. Lower Reveal Moldings

1. Apply protective covering over hood and front fenders, and apply masking tape to panel along lower edge of reveal moldings to protect paint finish.

2. Loosen lower end of each upper reveal molding as required to gain access to screw securing outer end of each lower reveal molding, Fig. 17-2, and remove screw.

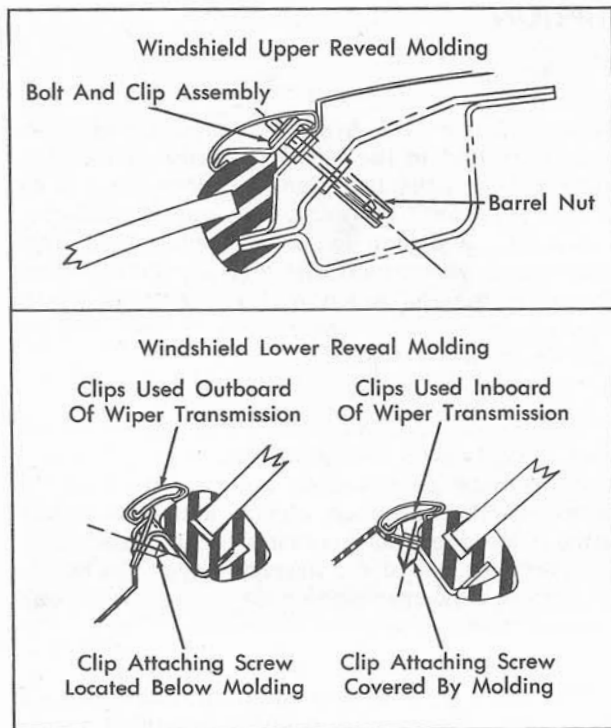


Fig. 17-1 Windshield Reveal Moldings and Attaching Clips

3. Remove wiper arm and blade assembly from each transmission; then, using Tool No. J-6592, remove wiper transmission escutcheon spanner nut, escutcheon, and cam.

4. Open front door and remove exposed screw, securing lower reveal molding outer clip, Fig. 17-2.

NOTE: Two types of slide-on clips secure the lower reveal moldings. The attaching screw for the two outer clips is exposed and is located below the molding, while the attaching screw for the remaining clips is covered by the molding, Fig. 17-1.

5. Carefully slide lower escutcheon over one of the moldings to expose center clip attaching screw and remove screw.

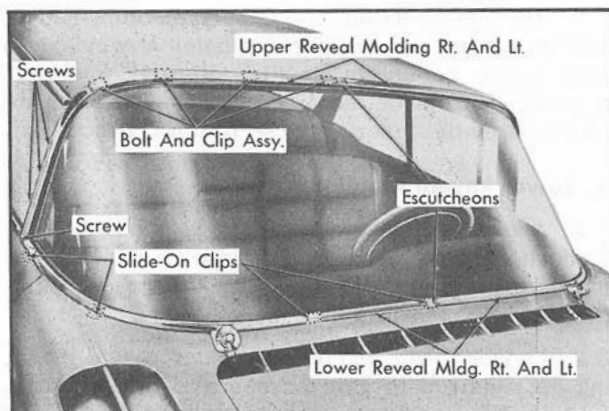


Fig. 17-2 Windshield Reveal Molding Attachment

6. Loosen the fender upper attaching bolts; then carefully position fender so that the clip located outboard of the wiper transmission, Fig. 17-1 can be removed; then remove clip attaching screw.

7. Slide molding outboard until molding is disengaged from the remaining attaching clips and remove molding.

8. To install moldings, apply medium-bodied sealer around clip and molding attaching holes as shown at "2", Fig. 17-3, and reverse removal procedure.

9. Remove protective covering and clean up sealer as required.

(2) Windshield Garnish Moldings Removal and Installation

NOTE: The windshield garnish moldings consist of the moldings below, which are removed and installed in the listed sequence.

1. Windshield Upper Garnish Molding.
2. Windshield Side Garnish Molding - Right and Left.
3. Windshield Side Garnish Lower Molding and Cover Assembly - Right and Left.
4. Windshield Lower Center Garnish Molding and Cover Assembly.

a. Removal and Installation

1. Loosen screw securing sunshade to support; then remove sunshade panel from support. Using Tool No. J-6608, remove support and escutcheon.

2. Remove upper garnish molding attaching screws, and screws retaining rear view mirror support. Remove molding and mirror support.

3. Depress front body hinge pillar weather-strip to gain access to side garnish molding outer attaching screws and remove screws.

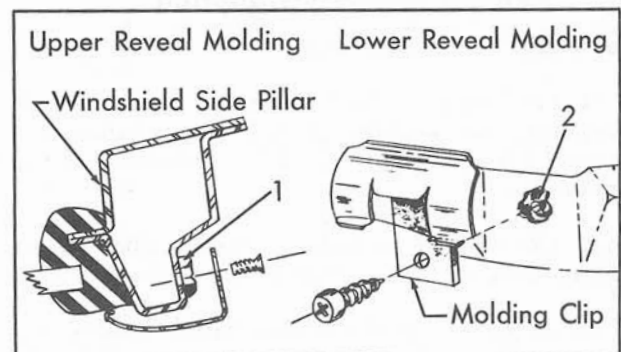


Fig. 17-3 Sealing of Reveal Moldings

4. Loosen front end of side roof rail molding as required, then remove remainder of side garnish molding attaching screws and remove molding.

5. Remove lower garnish molding escutcheons and attaching screws, and remove lower molding.

6. Remove lower side garnish molding and cover assembly attaching screws and remove molding by lifting upward to disengage lower tab.

NOTE: When removing left molding and cover assembly, disengage wiper control assembly from molding.

7. Remove windshield lower center garnish molding and cover assembly attaching screws, and remove moldings.

8. To install moldings, reverse removal procedure.

(3) Windshield Glass Removal, Checking, and Installation

a. Removal

1. Apply protective covering to instrument panel, hood, front fenders and front seat assembly. Apply masking tape to body panel beneath windshield lower reveal moldings.

2. On inside of body, remove all garnish moldings. On outside of body, remove windshield reveal moldings.

3. Remove screws securing lower reveal molding attaching clips and remove clips from body.

4. On inside of body, loosen lip of rubber channel from pinchweld flange along top and sides of windshield by carefully applying pressure with palm of hand to edge of glass as shown in Fig. 17-4. At same time, use a putty knife or other suitable tool and carefully assist lip of rubber channel over pinchweld flange.

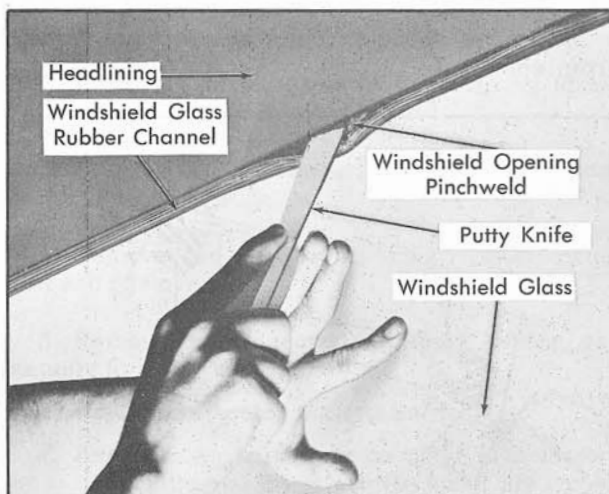


Fig. 17-4 Windshield Glass Removal

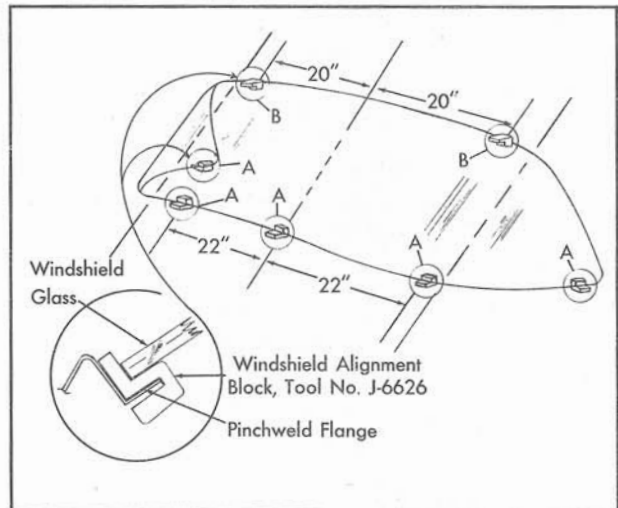


Fig. 17-5 Checking Windshield Glass to Pinchweld Alignment

5. After windshield rubber channel is free from pinchweld flange, lift windshield assembly from body opening. Place windshield on covered bench and remove rubber channel from glass.

b. Checking the body windshield opening

NOTE: Due to the size and contour of the windshield, it is important that the body windshield opening be checked thoroughly before the installation of a replacement windshield glass. The procedure below outlines the method used to check the windshield opening.

1. Check windshield rubber channel for any irregularities.

2. Clean off old sealer from around windshield opening and check entire body opening flange.

3. Check new windshield glass to opening by supporting glass with Windshield Alignment Blocks, Tool No. J-6626, as shown in Fig. 17-5.

NOTE: Care should be exercised to make certain that glass does not strike body metal during this temporary installation. Edge chips can lead to future breaks.

4. With windshield glass supported and centered in opening by alignment blocks, check relationship of glass to body opening around entire perimeter of glass.

Fig. 17-6 shows typical section taken through glass and body opening. Check glass to body relationship as follows:

a. Inside surface of glass should be uniform distance from body flange. Dimension should be from $3/16$ " to $1/4$ ".

b. Outer edge of glass should be uniform distance from body metal, measured in plane of glass. Dimension should be from $5/16$ " to $7/16$ ".

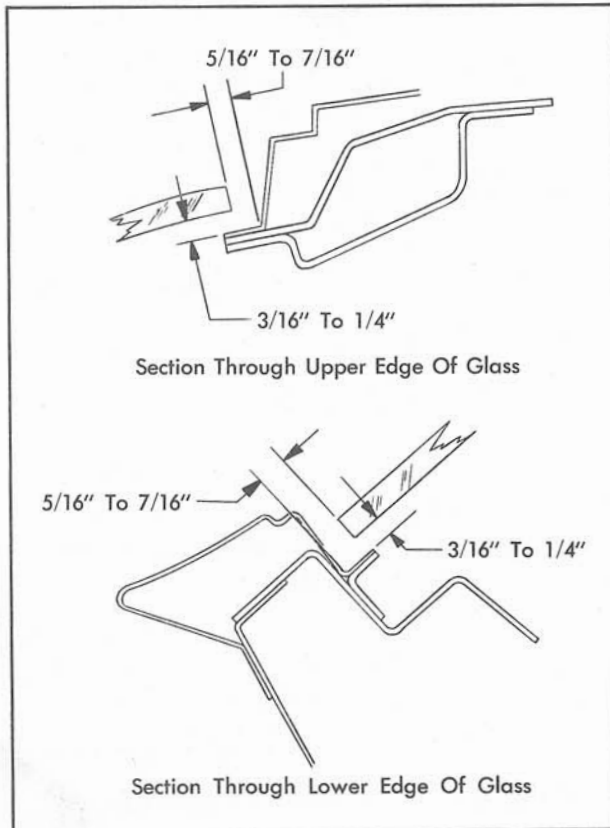


Fig. 17-6 Windshield Checking Dimensions

5. Mark any sections of body to be re-formed, remove glass and re-form opening as required.

6. Check windshield opening again as outlined in Step 4. Then mark glass and body so that glass can be accurately centered in opening when installed.

c. Installation

1. Check windshield drain gutter and drain hose at each end of gutter for any obstructions, and clean out if necessary.

2. Assemble rubber channel to glass; then insert strong cord into pinchweld cavity along length of channel. Tie ends of cord and tape to inner side of glass at top and bottom center of windshield as shown in Fig. 17-7.

3. Apply ribbon of medium-bodied sealer completely around base of rubber channel as indicated at "1", and around windshield opening as indicated at "2", Fig. 17-8.

4. With aid of helper, carefully place and center windshield assembly in windshield opening.

CAUTION: Do Not Position Glass By Tapping And/Or Hammering At Any Time. The Channel And Glass Should Be Secured In The Opening By Pulling The Inner Lip Of The Channel Over The Pinchweld As Outlined In Step 5.

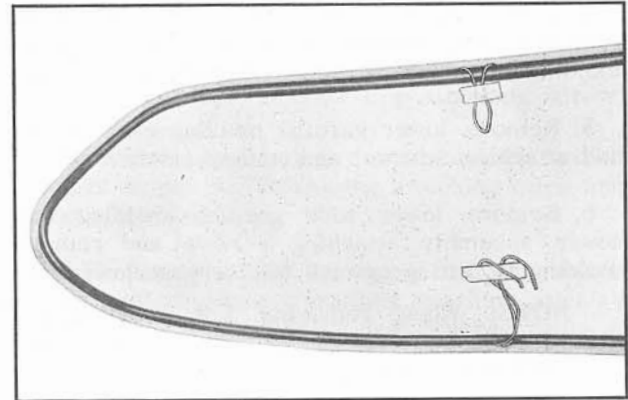


Fig. 17-7 Windshield Glass Channel Installation

5. When glass and channel is properly positioned in the opening, slowly pull ends of cord from bottom center of windshield, to seat lip of rubber channel over pinchweld flange. The string should be pulled in the following sequence.

a. From bottom center to right and left wiper transmission.

b. From top center to right and left wiper transmission.

6. Seal outside lip of rubber channel to glass with weatherstrip cement as indicated at "3" in Fig. 17-8.

7. Install previously removed parts and clean off excessive sealer using mineral spirits.

8. Remove protective coverings.

(4) Door Window and Vent Control Switch Assembly Removal and Installation

1. Remove remote control knob from spindle using Special Tool No. J-6009. Refer to Note 8.

2. Remove ferrule retaining ring and ferrule from spindle.

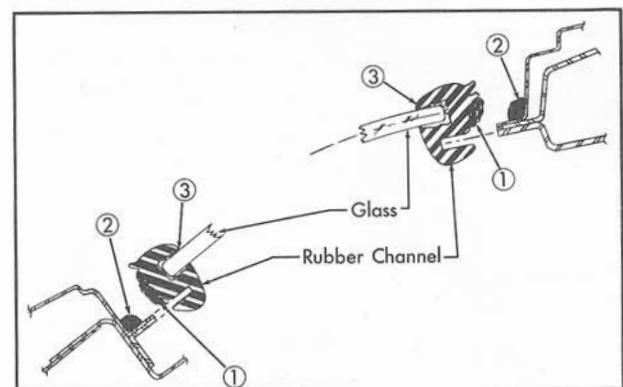


Fig. 17-8 Windshield Assembly Sealing

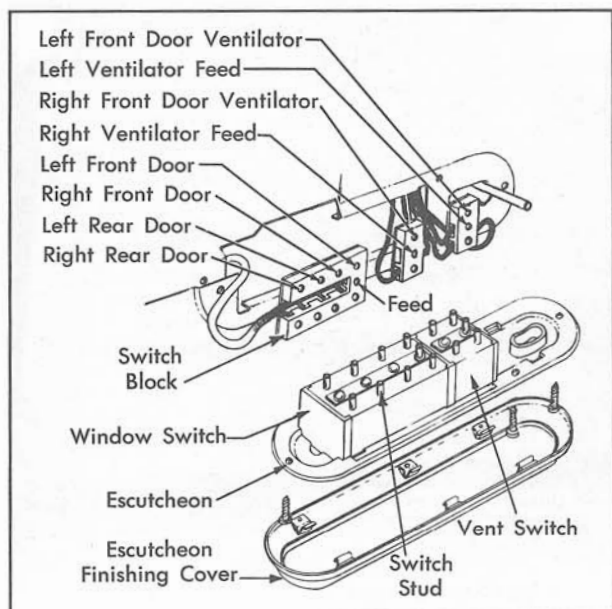


Fig. 17-9 Left Door Master Control Switch

3. Apply masking tape on finishing panel along top and bottom edge of switch cover to protect panel.

4. Insert putty knife or similar flat-bladed tool beneath cover and carefully pry cover from panel.

5. Remove escutcheon attaching screws and carefully disengage switch studs from switch block, Fig. 17-9.

6. To remove switch from escutcheon, depress clip at sides of switch with pointed tool inserted through holes in escutcheon, and remove switch.

7. To install, reverse removal procedure.

(5) Instrument Panel Upper Section Removal and Installation

1. Remove windshield garnish moldings. Refer to Note 2.

2. Carefully remove four bolts securing upper instrument panel along front edge.

3. Remove screws securing upper instrument panel along rear edge.

4. Remove two screws securing right side kick pad and remove kick pad.

5. Remove two screws retaining center assembly to upper section.

6. Disconnect heater outlet hose.

7. Remove two screws from right side bottom of instrument panel lower section about six inches ahead of windshield pillar and drop right side of panel slightly.

8. Disconnect air conditioning outlet hose.

9. Carefully lift upper section of the panel from the lower section; then remove panel from body.

10. To install upper section of instrument panel, reverse removal procedure.

(6) Instrument Panel Compartment Door Removal, Installation and Adjustment

a. Removal and Installation

1. Scribe location of instrument panel compartment door hinge on instrument panel.

2. Open door and remove articles from door compartment.

3. Remove door stop attaching screws at each end of door, and screws securing door hinge to instrument panel; then remove door.

4. To install door, reverse removal procedure.

b. Adjustment

1. To adjust the door up or down or from side to side, loosen the door hinge to instrument panel attaching screws, Fig. 17-10, and adjust door as required; then tighten screws.

2. To adjust top edge of door in or out, loosen door lock striker attaching screws and adjust striker as required; then tighten screws.

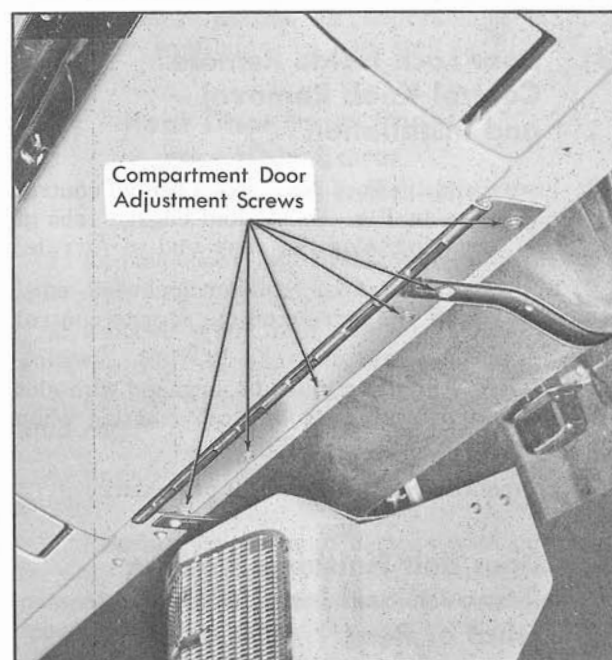


Fig. 17-10 Compartment Door Adjusting Screws

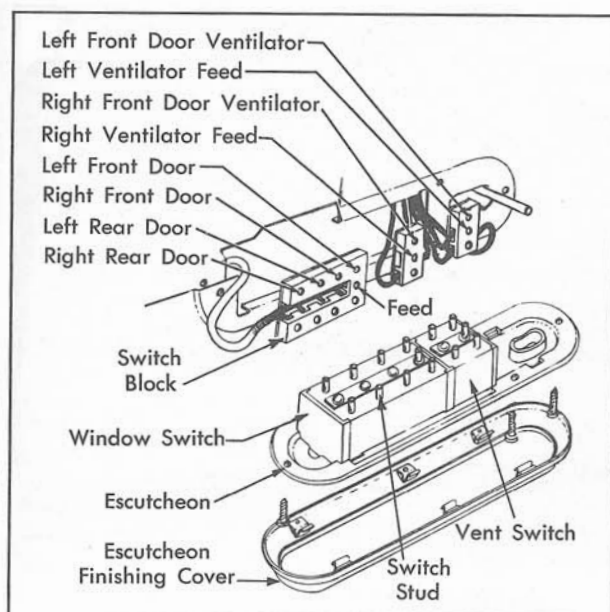


Fig. 17-9 Left Door Master Control Switch

3. Apply masking tape on finishing panel along top and bottom edge of switch cover to protect panel.

4. Insert putty knife or similar flat-bladed tool beneath cover and carefully pry cover from panel.

5. Remove escutcheon attaching screws and carefully disengage switch studs from switch block, Fig. 17-9.

6. To remove switch from escutcheon, depress clip at sides of switch with pointed tool inserted through holes in escutcheon, and remove switch.

7. To install, reverse removal procedure.

(5) Instrument Panel Upper Section Removal and Installation

1. Remove windshield garnish moldings. Refer to Note 2.

2. Carefully remove four bolts securing upper instrument panel along front edge.

3. Remove screws securing upper instrument panel along rear edge.

4. Remove two screws securing right side kick pad and remove kick pad.

5. Remove two screws retaining center assembly to upper section.

6. Disconnect heater outlet hose.

7. Remove two screws from right side bottom of instrument panel lower section about six inches ahead of windshield pillar and drop right side of panel slightly.

8. Disconnect air conditioning outlet hose.

9. Carefully lift upper section of the panel from the lower section; then remove panel from body.

10. To install upper section of instrument panel, reverse removal procedure.

(6) Instrument Panel Compartment Door Removal, Installation and Adjustment

a. Removal and Installation

1. Scribe location of instrument panel compartment door hinge on instrument panel.

2. Open door and remove articles from door compartment.

3. Remove door stop attaching screws at each end of door, and screws securing door hinge to instrument panel; then remove door.

4. To install door, reverse removal procedure.

b. Adjustment

1. To adjust the door up or down or from side to side, loosen the door hinge to instrument panel attaching screws, Fig. 17-10, and adjust door as required; then tighten screws.

2. To adjust top edge of door in or out, loosen door lock striker attaching screws and adjust striker as required; then tighten screws.

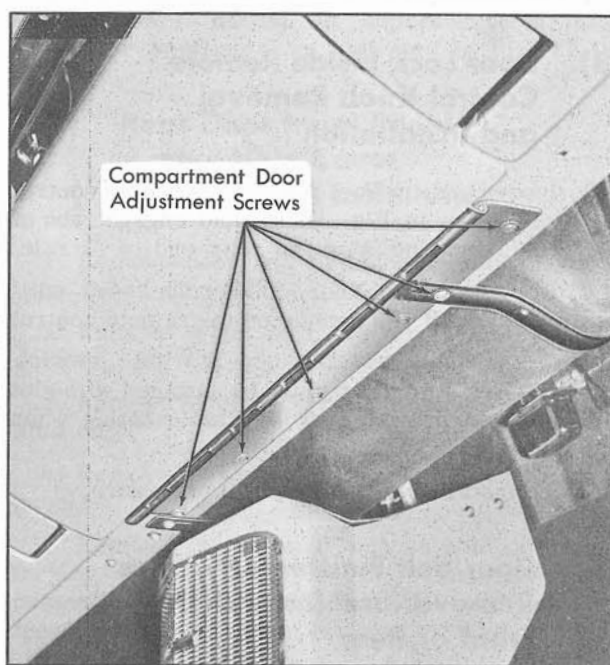


Fig. 17-10 Compartment Door Adjusting Screws



Fig. 17-11 Remote Control Knob Removal

(7) Instrument Panel Compartment Box Removal and Installation

1. From inside of compartment box remove screws securing top section of box to bottom section of box; then disengage switch and light wiring and remove top section through compartment door opening.

2. Remove screws securing bottom section of box to instrument panel flanges; then remove box through compartment door opening.

3. To install, reverse removal procedure.

(8) Door Lock Inside Remote Control Knob Removal and Installation

1. Insert end of Tool No. J-6609 behind control knob as shown in Fig. 17-11, and engage tabs of tool into engaging slots in rear end of ferrule.

2. Rotate control knob counterclockwise until knob screws off the ferrule on the remote control spindle.

NOTE: Tool tabs must be engaged with slot in ferrule to prevent ferrule from rotating when removing knob.

3. To install, reverse removal procedure.

(9) Door Belt Finishing Molding Removal and Installation, Front or Rear

1. Remove door inside locking control knob, Note 8.

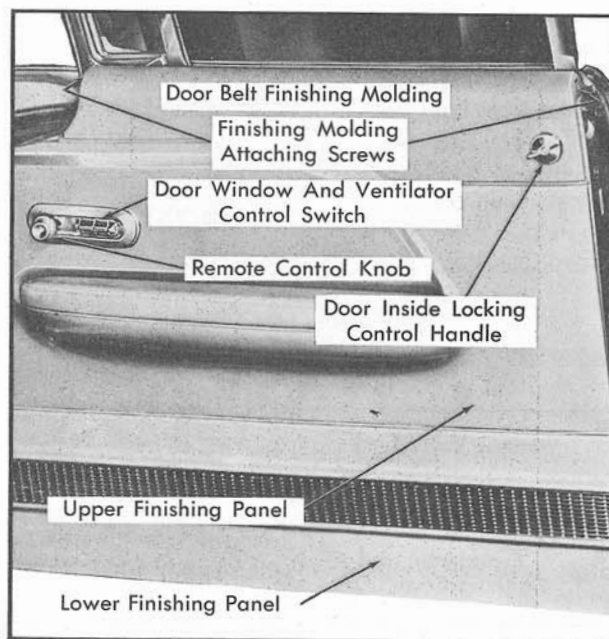


Fig. 17-12 Front Door Inside Trim and Hardware

2. Remove screws securing molding to door and carefully lift molding upward over retaining clips and remove from door, Fig. 17-12.

3. To install, reverse removal procedure.

(10) Door Trim Finishing Panel Removal and Installation, Front or Rear

1. Remove door belt finishing molding and door window control switches.

2. Remove two screws at bottom of door securing lower finishing panel attaching tabs to door panel.

3. Pull lower finishing panel downward to disengage it from retainer on door.

4. Remove screws securing top and bottom edge of upper finishing panel to door.

5. Remove panel attaching screws from depression in arm rest panel; then disengage panel assembly from door.

6. To remove trimmed portion of arm rest, remove screws securing arm rest to base.

7. To install, reverse removal procedure.

(11) Front Door Inner Panel Access Hole Cover Removal and Installation

1. Remove door belt finishing molding and door trim finishing panels.

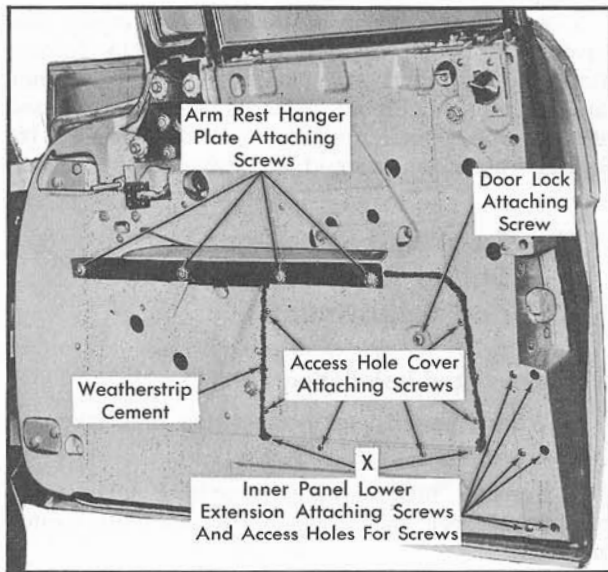


Fig. 17-13 Access Hole Cover Removal

2. Remove arm rest hanger plate attaching screws, Fig. 17-13, and remove hanger plate.

3. Remove door lock attaching screw, Fig. 17-13.

4. Remove inner panel access hole cover attaching screws. Carefully break cement bond around access hole cover and remove cover from inner panel.

5. To install front door inner panel access hole cover, reverse removal procedure.

NOTE: After installation of cover, apply a coating of an approved weatherstrip cement along the top and side joints of cover to inner panel. Apply cement at the lower corners and offset area, indicated at "X" in Fig. 17-13. Special attention should be given this area.

(12) Front Door Inner Panel Sealing

NOTE: Whenever any work is performed on a door in which any of the weatherseals are disturbed, the disturbed areas must be resealed before the door finishing panels are installed. The following procedure illustrates how the front door is sealed to prevent water leakage and possible damage to the finishing panels.

The numbered items listed below refer to the numbered arrows in Fig. 17-14.

1. Apply waterproof tape over access holes, gage holes, and any hardware attaching holes not in use.

2. Apply body caulking compound to all hardware attaching holes.

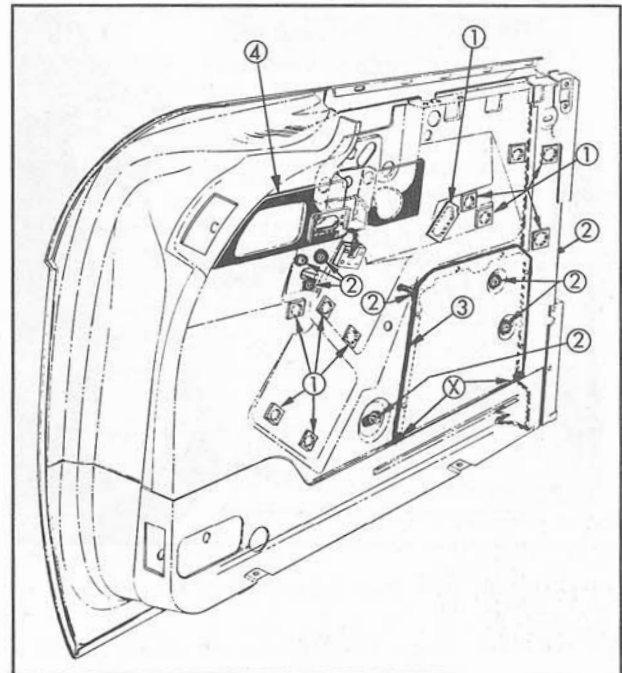


Fig. 17-14 Front Door Inner Panel Sealing

3. Before installation of door lock, apply a bead of body caulking compound (approximately 3/16 inch in diameter) across face of door lock frame just above rotary bolt housing and upper attaching screw hole. After installation of inner panel access hole cover, apply an approved weatherstrip cement along the top and side joints of cover to inner panel. Apply cement at the lower corners and offset areas, indicated at "X" in Fig. 17-14. Special attention should be given these areas.

4. Cement a piece of waterproof paper to door inner panel (over upper hinge access hole and across lower portion of depressions in inner panel for ventilator) as indicated in Fig. 17-14.

(13) Rear Door Inner Panel Access Hole Cover Removal and Installation

1. Remove door belt finishing molding and door trim finishing panel.

2. Remove arm rest hanger plate attaching screws, Fig. 17-15, and remove hanger plate.

3. Remove door lock remote control attaching stud nut.

4. Remove screw securing door lock to inner panel.

5. Remove inner panel access hole cover attaching screws, Fig. 17-15. Carefully break cement bond around access hole cover and remove cover from door.

6. To install rear door inner panel access hole cover, reverse removal procedure.

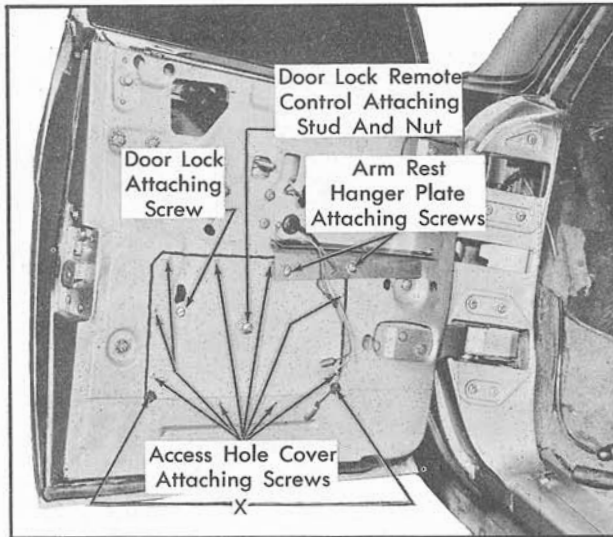


Fig. 17-15 Rear Door Access Hole Cover Removal

NOTE: After installation of cover, apply a coating of an approved weatherstrip cement along the top and side joints of cover to inner panel. Apply cement at the lower corners and offset area, indicated at "X" in Fig. 17-15. Special attention should be given this area.

(14) Rear Door Inner Panel Sealing

NOTE: Whenever any work is performed on a door in which any of the weatherseals are disturbed, the disturbed areas must be resealed before the door finishing panels are installed. The following procedure illustrates how the rear door is sealed to prevent water leakage and possible damage to the finishing panels.

The numbered items listed below refer to the numbered arrows in Fig. 17-16.

1. Apply waterproof tape over access holes, gage holes, and any hardware attaching holes not in use.

2. Apply body caulking compound to all hardware attaching holes. Before installation of door lock, apply a bead of body caulking compound (approximately 3/16 inch in diameter) across face of door lock frame just above rotary bolt housing and upper attaching screw hole.

3. After installation of inner panel access hole cover, apply an approved weatherstrip cement along the top and side joints of cover to inner panel. Apply cement at the lower corners and offset areas, indicated at "X" in Fig. 17-16. Special attention should be given these areas.

(15) Front and Rear Door Lock Striker Removal, Installation and Adjustment

a. Removal and Installation

1. With a pencil, scribe position of striker on center pillar.

2. Remove three striker attaching screws and remove striker and adjusting plates from center pillar.

3. To install, place striker and adjusting plates within scribe marks on center pillar and tighten screws.

IMPORTANT: Whenever the center pillar or a door has been removed and installed, or re-aligned, the door **SHOULD NOT** be closed completely until a visual check is made to determine if the lock extension will engage in the striker notch. Where required, temporary door lock striker spacers should be installed so that door can be closed and an accurate check made to determine spacer requirements.

b. Adjustments

NOTE: Make certain doors and center pillar are properly aligned before adjusting strikers.

1. To adjust striker "up" or "down" or "in" or "out" loosen striker plate screws and shift striker and adjusting plates as required, then tighten screws.

2. To determine if door lock striker spacers are required, apply modeling clay or body caulking compound in the door lock striker notch where the lock extension engages and then close the door to form a measurable impression in the clay or caulking compound, as shown in Fig. 17-17.

3. When dimension "A" from inside face of striker teeth to center of lock extension is less than 3/16", install spacers and proper length striker attaching screws as directed below:

Dimension "A"	No. of Spacers Required	Spacer Thickness	Striker Attaching Screws*
3/16" to 1/8"	1	1/16"	Original Screw
1/8" to 1/16"	1	1/8"	Emergency Screw (1/16" longer)

NOTE: Dimension "B", Fig. 17-17, from center of lock extension to inside face of striker should never be less than 1/16".

*Zinc or cadmium plated flat head cross-recess screw with countersunk washer.

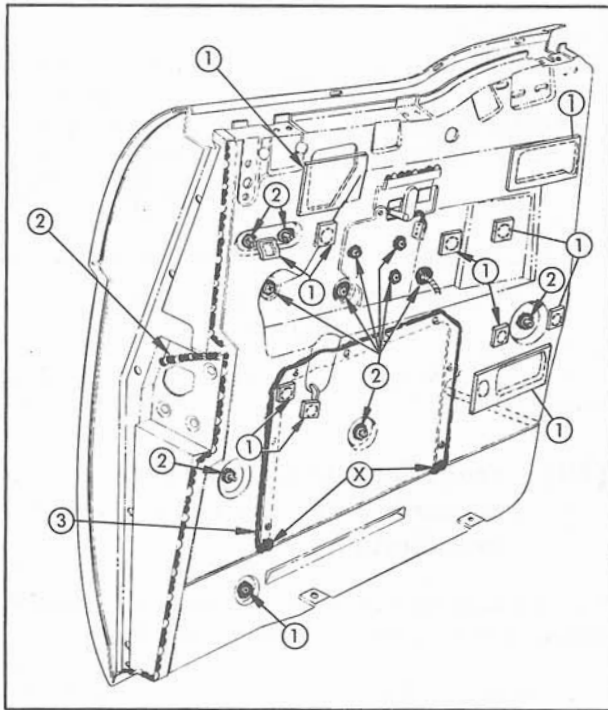


Fig. 17-16 Rear Door Inner Panel Sealing

(16) Front Door Outside Handle Assembly Removal and Installation

1. Raise door window. Remove door belt finishing molding and door trim finishing panels. Remove inner panel access hole cover.

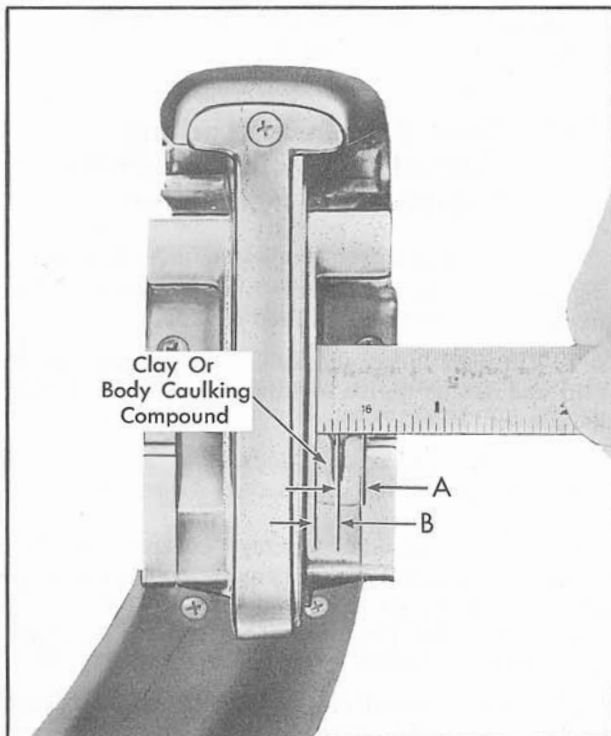


Fig. 17-17 Door Lock Striker Adjustments

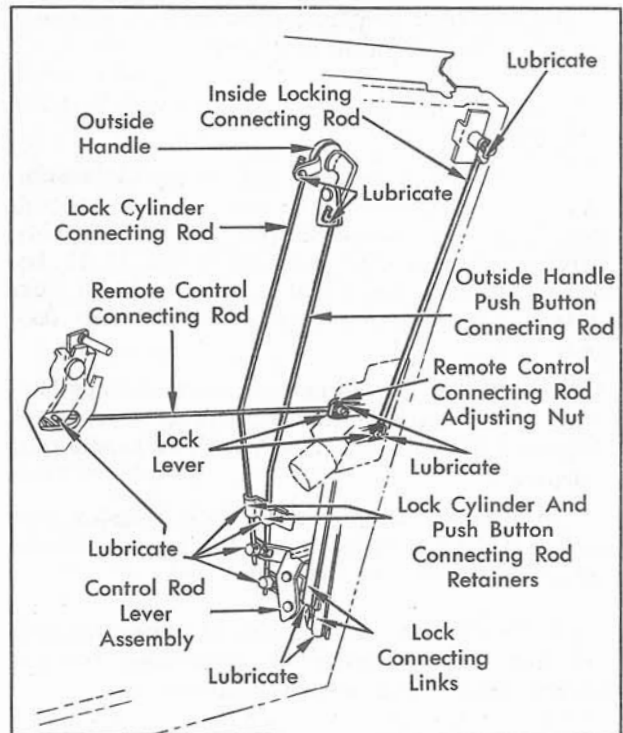


Fig. 17-18 Front Door Locking Mechanism

2. Through large access hole disengage spring clips and detach handle push button connecting rod and lock cylinder connecting rod from control rod lever assembly.

3. With a screw driver or suitable tool carefully remove (snap off) lock cylinder and push button connecting rod retainers, Fig. 17-18, from door lock pillar.

4. Through access holes shown in Fig. 17-19, remove outside handle attaching screws.

NOTE: In some cases it may be necessary to loosen the rear cam upper attaching stud and

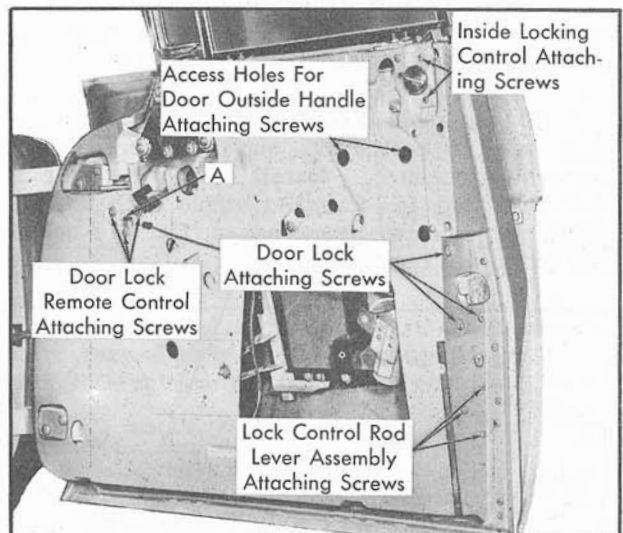


Fig. 17-19 Front Door Lock Attachment

nut and adjust cam rearward to gain access to the handle rear attaching screw.

5. Remove handle with connecting rods attached from door.

6. To install front door outside handle assembly reverse removal procedure. If connecting rods have been removed from handle assembly, install rods to handle as shown in Fig. 17-18, before installing assembly to door. Make sure gaskets are installed between handle and door outer panel.

NOTE: Adjust adjusting nut on outside handle push button connecting rod to provide between 1/32" to 1/8" free travel of handle push button.

7. Adjust adjusting nut on lock cylinder connecting rod to provide proper locking and unlocking action of lock cylinder.

8. Lubricate attaching points of connecting rods and frictional surfaces of connecting rod retainers, Fig. 17-18, with Lubriplate.

9. Check all operations of door lock before installing door trim and inside hardware.

10. Seal door inner panel access hole cover as specified in Note 12.

(17) Front Door Outside Handle Disassembly and Assembly

1. Remove door outside handle assembly as described in Note 16

2. While maintaining pressure to hold component parts within handle, use a suitable tool and remove spring retainer, then remove parts as shown in Fig. 17-20.

To disengage pawl from bell crank and support, rotate pawl to proper cut-outs in bell crank support and remove.

3. To assemble door outside handle, first engage pawl to bell crank support; then reverse removal procedure. Install spring retainer so that open end is located at nipple on bell crank support. Lubricate frictional surfaces of handle assembly with Lubriplate.

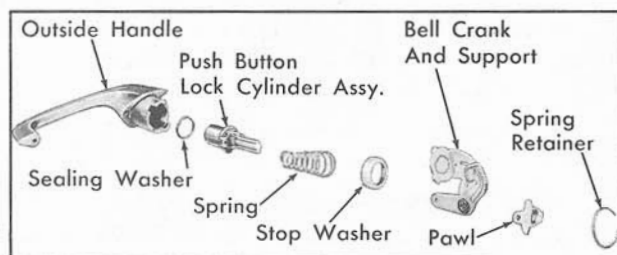


Fig. 17-20 Front Door Outside Handle Disassembled

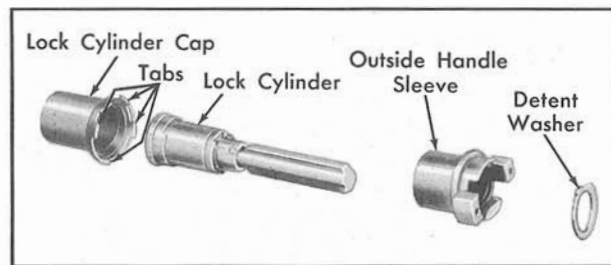


Fig. 17-21 Front Door Outside Handle Lock-Disassembled

4. Install handle assembly as described in Note 16.

(18) Front Door Lock Cylinder Assembly Removal and Installation

1. Remove and disassemble front door outside handle assembly as described in Note 16.

2. With a suitable tool, remove detent washer from outside handle sleeve, Fig. 17-21.

3. Carefully bend out tabs securing lock cylinder cap and remove lock cylinder sleeve and lock cylinder, Fig. 17-21.

4. To assemble lock cylinder assembly, reverse removal procedure.

NOTE: When installing detent spring, make certain raised portions of spring rest in depressions in sleeve.

5. Assemble, lubricate and install door outside handle and adjust connecting rod adjusting nuts as described in Notes 16 and 17.

(19) Front Door Inside Locking Control and Switch Assembly Removal and Installation

1. Raise door window. Remove door belt finishing molding and door trim finishing panels. Remove inner panel access hole cover.

2. Through large access hole disengage spring clip and detach inside locking connecting rod from lock lever, Fig. 17-18.

3. Disconnect inside locking control switch wires at connectors and detach wires from clips.

4. Remove inside locking control attaching screws, Fig. 17-19, and remove control with attached connecting rod and switch from door. Switch may be removed from control assembly as a bench operation.

5. Prior to installing inside locking control and switch assembly, first install switch and connecting rod to locking control, then lubricate connecting rod attaching point with Lubriplate.

6. To install inside locking control and switch assembly, reverse removal procedure. Check all operations of door lock before installing door trim and inside hardware.

7. Seal door inner panel access hole cover as specified in Note 11.

(20) Front Door Lock Assembly Removal and Installation

1. Raise door window, remove door belt finishing molding and door trim finishing panels. Remove inner panel access hole cover.

2. Remove window rear guide support plate, secured to lock pillar with one screw and to rear cam with one screw.

3. Disengage spring clips and detach lock connecting links from control rod lever assembly, Fig. 17-18. Disengage spring clips and detach remote control connecting rod and inside locking rod from lock.

4. Disconnect lead wire from inside locking solenoid.

5. Remove lock attaching screws from face of door lock pillar, Fig. 17-19, and remove lock assembly from door through access hole.

NOTE: To remove inside locking solenoid from lock assembly, refer to Note 32.

6. Prior to installing door lock, apply a ribbon of body caulking compound (approximately 1/8" in diameter) across face of door lock frame 1/2" above rotary bolt housing.

7. Lubricate attaching points of lock connecting links and rods with Lubriplate. Also lubricate lock cylinder connecting rod and push button connecting rod retainers. Refer to Fig. 17-18.

8. To install door lock assembly, reverse removal procedure.

NOTE: When aligning remote control connecting rod adjusting nut with hole in lock lever, move lock lever forward and connecting rod rearward sufficiently to remove slack in linkages.

9. Check all operations of door lock before installing door trim and inside hardware parts.

10. Seal door inner panel access hole cover as specified in Note 12.

(21) Front Door Lock Remote Control Assembly Removal, Installation and Adjustment

a. Removal and Installation

1. Remove door belt finishing molding and door trim finishing panels.

2. Through access hole "A", shown in Fig. 17-19, disengage spring clip and detach remote control connecting rod from remote control.

3. Remove remote control attaching screws, Fig. 17-19, and remove remote control through upper hinge strap access hole.

4. To install remote control assembly, first lubricate all friction points of control with Lubriplate then reverse removal procedure.

5. Check all operations of door lock before installing door trim and inside hardware parts.

6. Seal remote control attaching screws with an approved rubber cement.

b. Adjustment

NOTE: The door lock remote control knob spindle is adjustable "up or down" for proper alignment with the slot in the switch escutcheon finishing cover on the door trim finishing panel. To adjust the knob spindle proceed as follows:

1. Remove remote control knob using Special Tool No. J-6609 and carefully pry switch escutcheon finishing cover from door trim finishing panel.

2. Loosen lock nut at base of knob spindle. Move spindle up or down as required, then tighten lock nut.

3. Position switch escutcheon finishing cover on door trim finishing panel; check alignment of remote control knob spindle and operation of remote control; readjust if necessary.

(22) Front Door Lock Remote Control Connecting Rod Removal and Installation

1. Raise door window. Remove door belt finishing molding and door trim finishing panels. Remove inner panel access hole cover.

2. Through large access hole disengage spring clip and detach remote control connecting rod adjusting nut from lock lever, Fig. 17-18.

3. Through access hole "A", shown in Fig. 17-19, disengage spring clip and detach remote control connecting rod from remote control.

4. Slide connecting rod forward sufficiently to start rear end of rod out through large access hole, then remove rod from door.

5. To install remote control connecting rod, reverse removal procedure.

NOTE: When aligning connecting rod adjusting nut with hole in lock lever, move lock lever forward and connecting rod rearward sufficiently to remove slack in linkages.

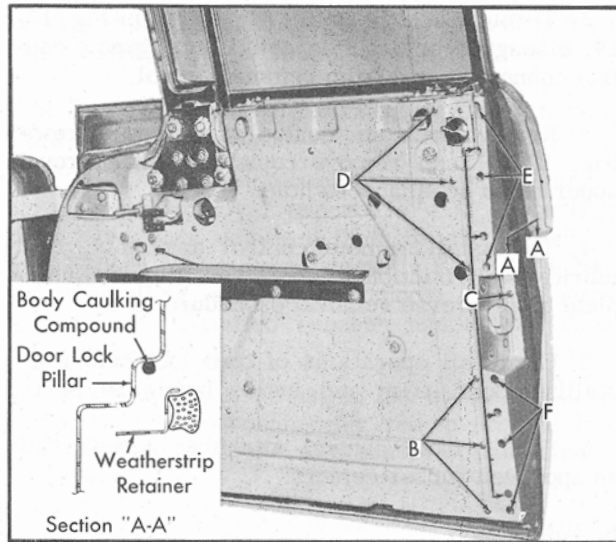


Fig. 17-22 Front Door Weatherstrip Attachment

6. Check all operations of door lock before installing door trim and inside hardware parts.

(23) Front Door Lock Control Rod Lever Assembly Removal and Installation

1. Raise Door Window. Remove door belt finishing molding and door trim finishing panels. Remove door inner panel access hole cover.

2. Disengage spring clips and detach outside handle push button connecting rod and lock cylinder connecting rod from lever assembly. Disengage lock connecting links from lever assembly.

3. Remove door inner panel lower extension screws "B", Fig. 17-22, and remove extension. Remove control rod lever assembly attaching screws, Fig. 17-19, from face of door lock pillar and remove lever assembly from door.

4. Lubricate attaching points of lock connecting links and rod with Lubriplate. Also lubricate frictional points of lock cylinder and push button connecting rod retainers, Fig. 17-18.

5. Seal door inner panel access hole cover as specified in Note 12.

6. To install control rod lever assembly, reverse removal procedure.

NOTE: Adjust adjusting nut on outside handle push button connecting rod to provide between 1/32" to 1/8" free travel of handle push button. Adjust adjusting nut on lock cylinder connecting rod to provide proper locking and unlocking action of the lock cylinder.

7. Check all operations of door lock before installing door trim and inside hardware parts.

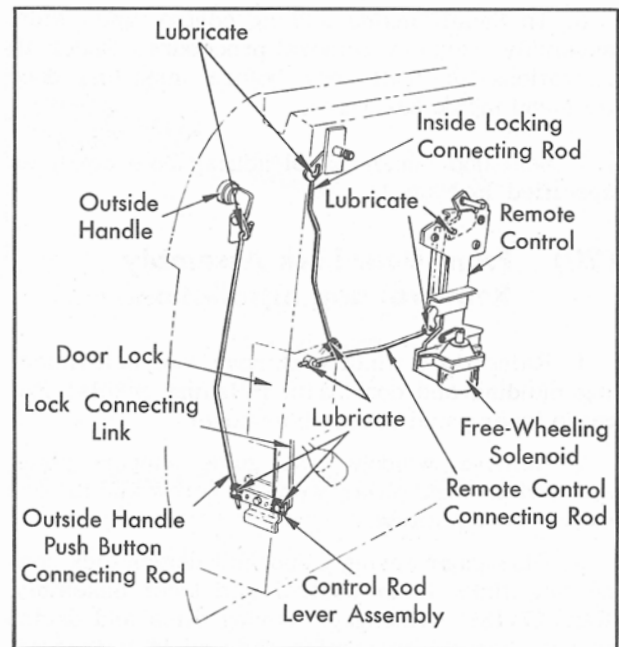


Fig. 17-23 Rear Door Locking Mechanism

(24) Rear Door Outside Handle Assembly Removal and Installation

1. Raise rear door window. Remove door belt finishing molding and door trim finishing panel. Remove inner panel access hole cover.

2. Disengage spring clip and detach outside handle push button connecting rod from control rod lever, Fig. 17-23.

3. Through access holes indicated in Fig. 17-24, remove outside handle attaching screws and remove handle with attached connecting rod from door.

4. Before installing door outside handle assembly, lubricate frictional points of handle with Lubriplate.

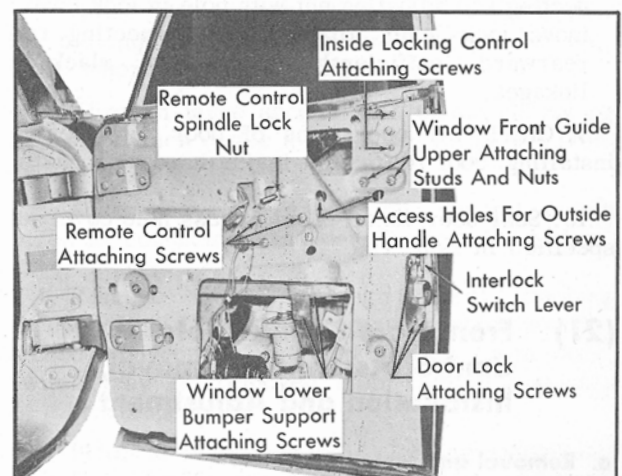


Fig. 17-24 Rear Door Lock Attachment

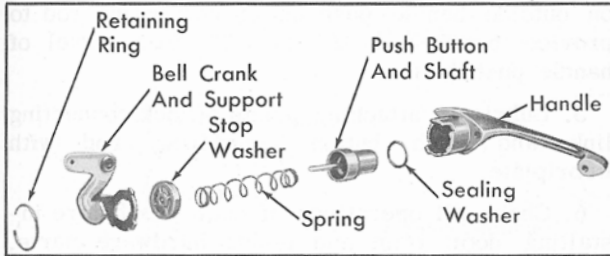


Fig. 17-25 Rear Door Outside Handle-Disassembled

5. To install door outside handle assembly, reverse removal procedure making sure gaskets are installed between handle and door outer panel.

6. Adjust adjusting nut on push button connecting rod to provide between 1/32" to 1/8" free travel of outside handle push button.

7. Lubricate attaching points of connecting rod with Lubriplate.

8. Check all operations of door lock before installing door trim and inside hardware parts.

9. Seal door inner panel access hole cover as specified in Note 14.

(25) Rear Door Outside Handle Disassembly and Assembly

1. Remove door outside handle, as described in Note 24, and remove push button connecting rod from handle.

2. Remove retaining ring, bell crank and support, stop washer, spring, push button and shaft, and sealing washer, Fig. 17-25, from handle assembly.

3. To assemble rear door outside handle, reverse removal procedure.

4. Install handle as described in Note 24 and lubricate handle and rod connecting point. Adjust connecting rod adjusting nut as described in Note 24.

(26) Rear Door Lock Assembly Removal and Installation

1. Raise rear door window. Remove door belt finishing molding and door trim finishing panel. Remove inner panel access hole cover.

2. Disconnect safety interlock switch connector from lock and disconnect lock solenoid feed wire at connector, Fig. 17-26.

3. Disengage spring clips and detach remote control connecting rod and inside locking connecting rod from lock. Detach lock connecting link from control rod lever assembly, Fig. 17-23.

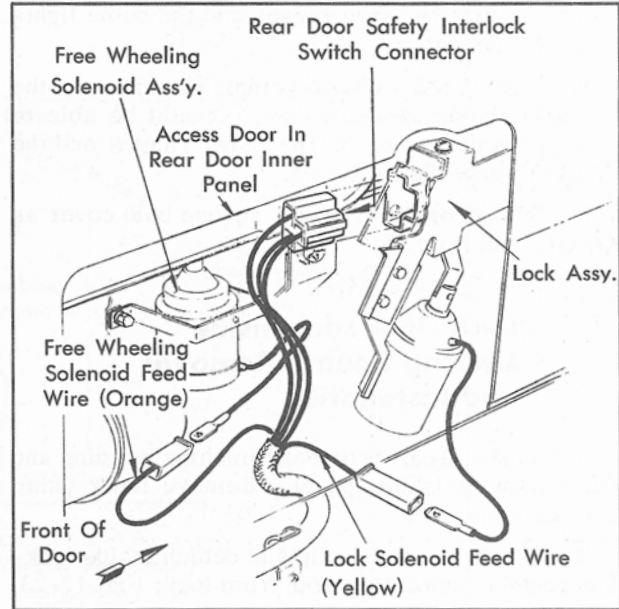


Fig. 17-26 Rear Door Lock Assembly

4. Suitably mark safety interlock switch lever and lever shaft so lever can be reinstalled in same position. Remove set screw and carefully pry interlock switch lever from shaft, Fig. 17-24.

5. Remove window front guide assembly as described in Note 52.

6. Remove door lock attaching screws from face of door lock pillar, Fig. 17-24, and remove lock from door through large access hole.

7. Prior to installing door lock, apply a ribbon of body caulking compound (approximately 1/8 inch in diameter across face of the door lock frame 1/2" above rotary bolt housing.

8. To install door lock assembly, reverse removal procedure.

NOTE: When aligning remote control connecting rod adjusting nut with hole in lock lever, move lock lever forward and connecting rod rearward sufficiently to remove slack in linkages.

With door opened to safety catch position there should be a very small gap (1/64" or less) between the safety interlock switch lever and the door lock striker. This can be checked with the front door open. Where necessary, remove and reinstall lever to obtain correct position.

9. Lubricate attaching points of lock connecting links and rods with Lubriplate, Fig. 17-23.

10. Check all operations of door lock before installing door trim and inside hardware parts.

NOTE: With either rear door opened to safety catch position or any other open position, the transmission selector lever should not go

into any of the drive ranges and the dome lights should be on.

With both rear doors completely closed, the transmission selector lever should be able to be moved to any of the drive ranges and the dome lights should be off.

11. Seal door inner panel access hole cover as specified in Note 14.

(27) Rear Door Lock Inside Locking Control Removal and Installation

1. Remove rear door belt finishing molding and door trim finishing panel. Remove inner panel access hole cover.

2. Disengage spring clip and detach inside locking control connecting rod from lock, Fig. 17-23.

3. Remove window front guide upper attaching studs and nuts, Fig. 17-24.

4. Remove inside locking control attaching screws, Fig. 17-24; then remove inside locking control with attached connecting rod from door.

5. To install inside locking control assembly, reverse removal procedure.

NOTE: When aligning connecting rod adjusting nut with hole in lock lever, adjust nut so that control will completely actuate the lock lever into the locked and unlocked positions.

6. Lubricate attaching points of connecting rod with Lubriplate.

7. Check all operations of inside locking control and door lock before installing door trim and inside hardware parts.

8. Seal door inner panel as specified in Note 14.

(28) Rear Door Control Rod Lever Assembly Removal and Installation

1. Remove rear door belt finishing molding and door trim finishing panel. Remove inner panel access hole cover.

2. Disengage spring clips and detach lock connecting link and outside handle push button connecting rod from control rod lever assembly, Fig. 17-23.

3. On inside of door, remove four screws and lock washers securing control rod lever assembly to door lock pillar and remove lever assembly from door.

4. To install control rod lever assembly, reverse removal procedure. Adjust adjusting nut

on outside handle push button connecting rod to provide between 1/32" to 1/8" free travel of handle push button.

5. Lubricate attaching points of lock connecting link and push button connecting rod with Lubriplate.

6. Check all operations of door lock before installing door trim and inside hardware parts.

7. Seal door inner panel access hole cover as specified in Note 14.

(29) Rear Door Lock Remote Control Assembly Removal, Installation and Adjustment

a. Removal and Installation

1. Raise rear door window. Remove door belt finishing molding and door trim finishing panel. Remove inner panel access hole cover.

2. Disconnect free-wheeling solenoid wire at connector, Fig. 17-27.

3. Remove window lower bumper support attaching screws and remove bumper and support assembly, Fig. 17-24.

4. Disengage spring clip and detach remote control connecting rod from remote control, Fig. 17-23.

5. Remove remote control attaching screws, Fig. 17-24, and remove assembly through large access hole.

6. To install door lock remote control assembly, reverse removal procedure.

7. Lubricate attaching points of remote control connecting link and rod with Lubriplate, Fig. 17-23.

8. Check all operations of remote control and door lock before installing door trim and inside hardware parts.

NOTE: If necessary to adjust remote control connecting rod adjusting nut at lock, move lock lever forward and connecting rod rearward sufficiently to remove slack in linkages.

9. Seal door inner panel as specified in Note 14.

b. Adjustment

NOTE: The remote control knob spindle can be adjusted "up or down" for proper alignment with the slot in the spindle escutcheon on the door trim finishing panel. To adjust the knob spindle proceed as follows:

1. Remove door belt finishing molding and carefully pry switch escutcheon finishing cover from door trim finishing panel.

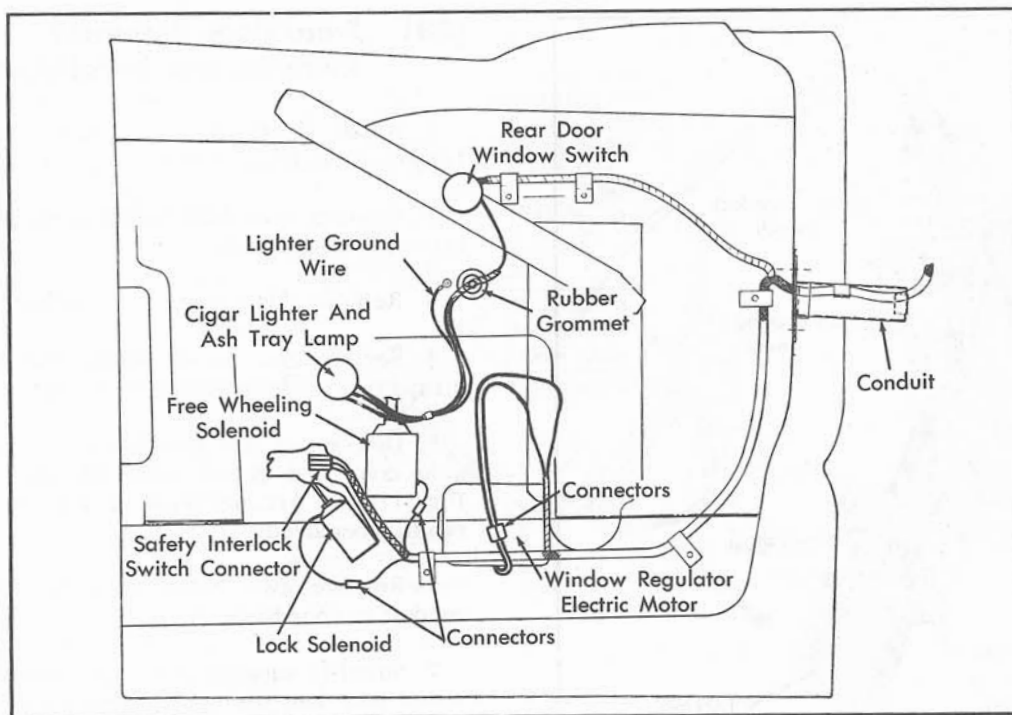


Fig. 17-27 Rear Door Wiring Harness Locations

2. Loosen lock nut at base of knob spindle. Move spindle "up or down" as required, then tighten lock nut, Fig. 17-24.

3. Position switch escutcheon finishing cover on door trim finishing panel; check alignment of remote control knob spindle and operation of remote control. Readjust if necessary.

(30) Rear Door Lock Remote Control Free-Wheeling Solenoid Removal and Installation

1. Remove rear door lock remote control as described in Note 29.

2. Carefully remove rivet securing remote control linkage to solenoid plunger, Fig. 17-28.

3. Remove solenoid attaching nuts and bolts, Fig. 17-28, and remove solenoid from remote control assembly.

4. To install remote control free-wheeling solenoid, reverse removal procedure.

IMPORTANT: Before installing remote control and solenoid assembly into door, check operation of free-wheeling solenoid. With solenoid not energized the remote control should be out of free-wheeling (the door should open by the remote control). With the solenoid energized the remote control should be in free-wheeling. (The door should not open by the remote control). The solenoid can be adjusted "up or down" to provide proper operation of the remote control assembly.

5. Lubricate frictional surfaces of remote control assembly with Lubriplate.

6. Seal door inner panel as specified in Note 14.

(31) Door Inside Locking Control Handle Removal and Installation

1. Insert Special Tool J-4614, between handle

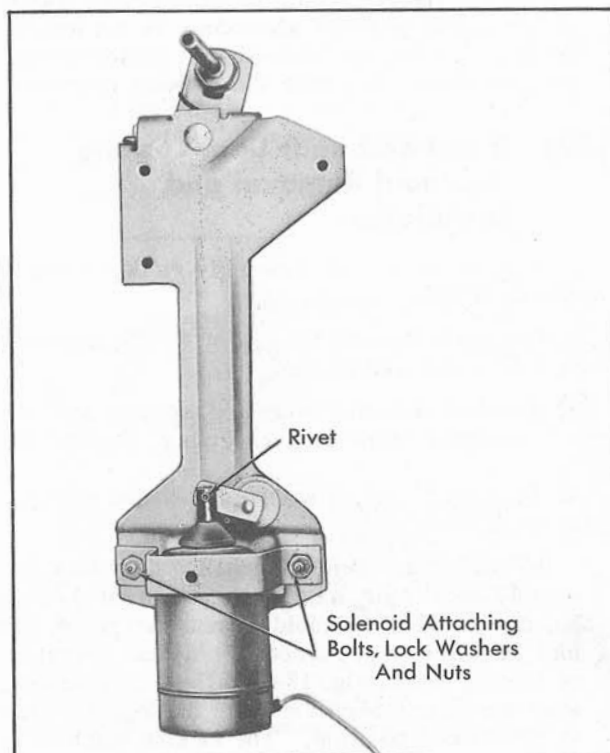


Fig. 17-28 Rear Door Lock Remote Control Assembly

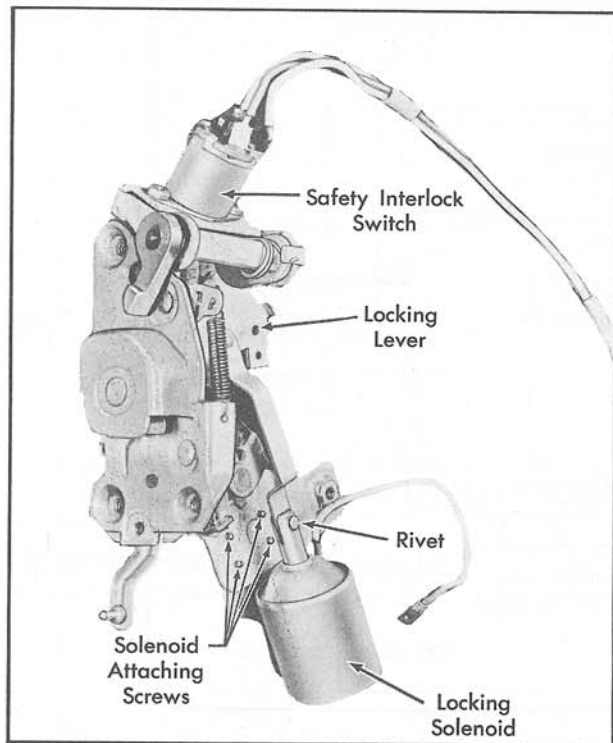


Fig. 17-29 Rear Door Lock Assembly

and belt finishing molding and remove retaining clip; then remove handle from spindle.

2. To install, insert retaining clip into groove in handle and push handle onto shaft until retaining clip is engaged and handle is secured.

NOTE: Handle should be installed with knob in horizontal position when door is not locked. On front doors, the knob should point forward; on rear doors, the knob should point rearward.

(32) Front and Rear Door Locking Solenoid Removal and Installation

1. Remove door lock assembly as described in Notes 20 or 26.

2. Carefully remove rivet, Fig. 17-29, securing lock link to solenoid plunger.

3. Remove solenoid attaching screws and remove solenoid from lock assembly, Fig. 17-29.

4. To install locking solenoid, reverse removal procedure.

IMPORTANT: Before installing door lock assembly into door, check operation of locking solenoid. When solenoid is not energized, the lock should lock and unlock by manual operation of locking lever, Fig. 17-29. The lock solenoid, when energized, should actuate the locking lever to the locked position. The locking solenoid is adjustable "up or down" to provide proper locking action.

(33) Front Door Assembly Removal and Installation

1. Raise door window. Disconnect positive battery cable from battery.

2. Remove door belt finishing molding and door trim finishing panel.

3. Remove door inner panel access hole cover.

4. Scribe location of upper and lower hinge straps on attaching surfaces of door.

5. Disconnect all wire harness connectors inside door and detach wire harness from clips, Fig. 17-30. Arrange wire harness so door can be readily removed.

6. Remove two bolts securing wire harness conduit to door hinge pillar.

7. Suitably support door for removal. Remove lower and then the upper hinge strap-to-door attaching bolts, Fig. 17-31.

8. With aid of a helper carefully remove door from hinge straps sufficiently to allow removal of wire harness from door; then complete removal of door assembly from body.

9. To install front door assembly, first apply heavy-bodied sealer to attaching surface of upper and lower hinge straps; then reverse removal procedure. Align hinge straps with scribe marks.

(34) Front Door Adjustments

The front door may be adjusted "up or down" and "fore or aft" at the hinge strap-to-door attachment. "In or out" adjustment at the door hinges may be performed at hinge to front body pillar attachment.

When checking a door that is misaligned, remove the door lock striker from the center pillar to allow the door to hang freely on its hinges, then check the spacing at the sides and bottom of the door. Procedure for adjusting a door is outlined below.

IMPORTANT: After performing any door adjustments the front door ventilator and window should be checked for proper alignment with the side roof rail weatherstrip and adjusted where required. In addition, the door lock extension-to-striker engagement should be checked, as described in Note 15, and adjusted if required.

To adjust the front door "up or down" or "fore or aft" proceed as follows:

1. Remove door belt finishing molding and door trim finishing panels.

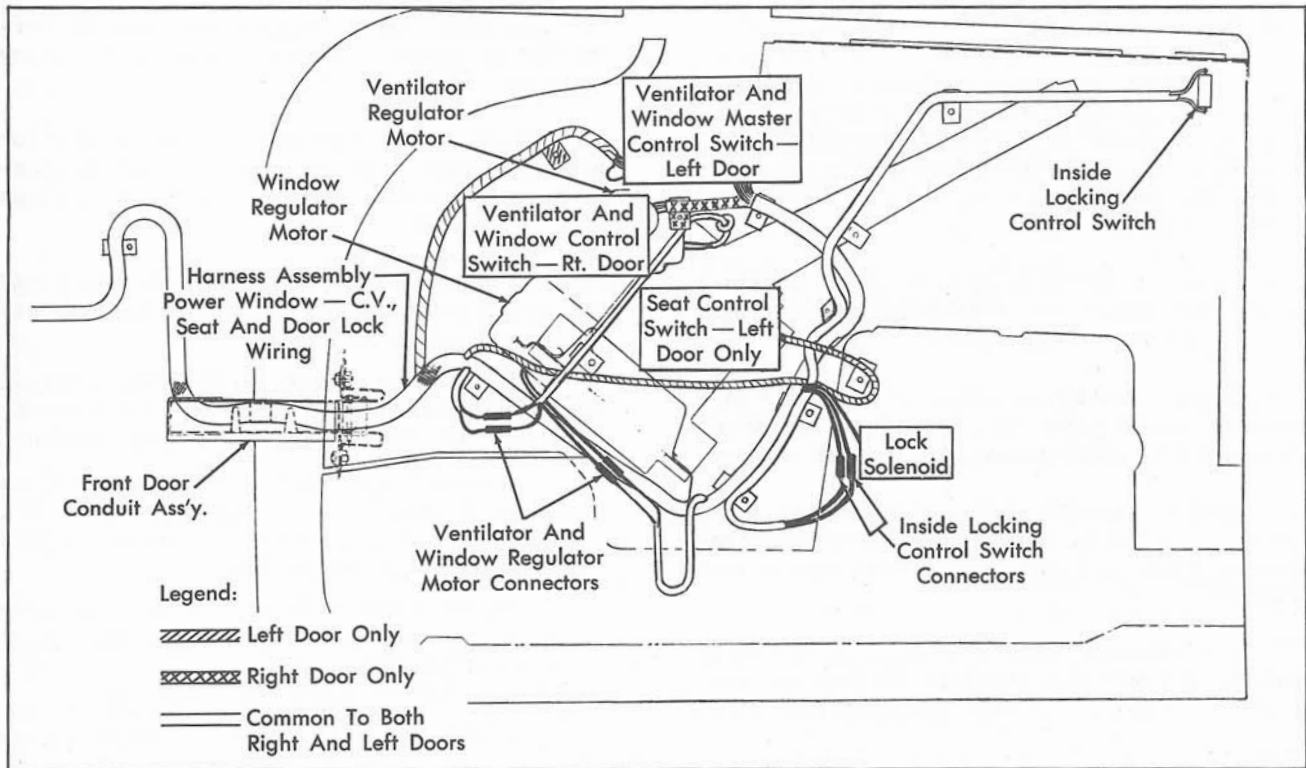


Fig. 17-30 Front Door Wiring Harness Locations

2. Loosen front door hinge pillar conduit guide attaching screws, Fig. 17-31.

3. Scribe location of upper and lower hinge straps on door panel.

4. Loosen upper and lower hinge strap attaching bolts, Fig. 17-31, shift door to desired position and tighten attaching bolts.

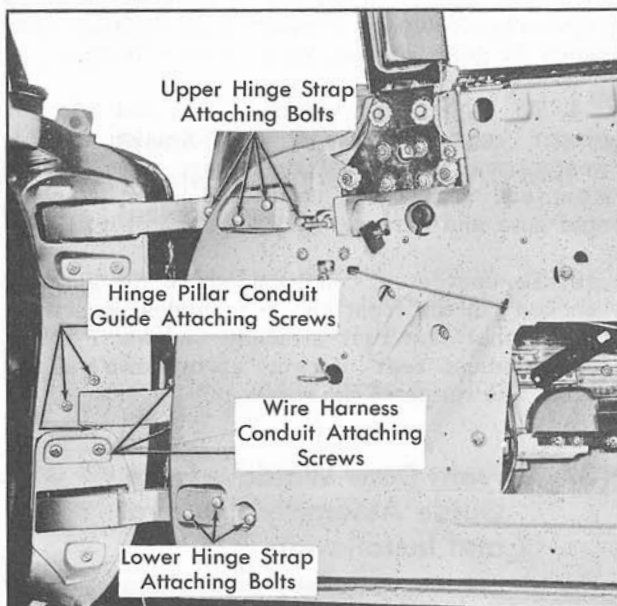


Fig. 17-31 Front Door Hinge Strap Location

(35) Front Door Window Assembly Removal and Installation

1. Raise front door window. Remove door belt finishing molding and door trim finishing panels. Remove inner panel access hole cover.

2. Remove both window cushions and adjusting plates. Through access holes "D", Fig. 17-32, remove lower sash channel front cam attaching screws "L", rear cam attaching screws "M", sash channel front and rear stop attaching screws "N" and remove stops from door.

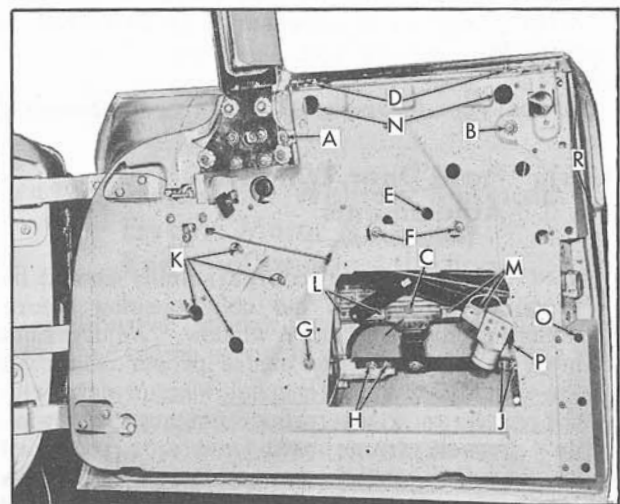


Fig. 17-32 Window and Regulator Assembly Removal

3. Lower door window.

CAUTION: Disconnect window regulator harness connector from motor to prevent operation of motor after window assembly is disengaged from regulator. Operation of the motor with the load removed may damage the unit and make it inoperative.

4. Remove window front guide upper attaching screw "A" and window rear guide attaching stud and nut "B", Fig. 17-32.

5. Remove window center guide-to-window sash channel attaching nut "C", Fig. 17-32, and detach center guide from window lower sash channel.

6. Remove window lower sash channel front cam rear attaching screw and rear cam front attaching screw, and detach cams from window sash channel.

7. Lift window assembly upward, disengage rollers on lower sash channel from front and rear guides, and remove window assembly from door.

8. To install front door window assembly, reverse removal procedure.

NOTE: Prior to installation of window, lubricate channel portion of all cams and guide cams with Lubriplate. Also lubricate frictional surface of window lower sash channel on which center guide rotates.

When engaging window rollers in front and rear guide cams make sure anti-rattle spring clips are installed in channel of cams with rollers. If center guide has been removed from shoe, make sure anti-rattle spring clip is installed in channel of guide cam with shoe.

After installation of window assembly and prior to installation of door trim and hardware, check operation of window. Check for proper window frame contact with the side roof rail weatherstrip. Adjust, if necessary, as described in Note 36.

9. Seal door inner panel as specified in Note 12.

(36) Front Door Window Adjustments

NOTE: The front door assembly should be properly aligned in the body opening before adjusting the front door window. Adjustments have been provided to insure proper contact of the window division channel weatherstrip with the ventilator glass, proper contact of the window upper frame with the side roof rail weatherstrip, and proper contact of the window lower frame with the door glass run inner and outer sealing strips and to provide proper operation of the window assembly.

Front door window adjustments may be performed as follows: After adjustments reseal any seals which have been disturbed.

1. To limit the "up" travel of the window for proper contact with the side roof rail weatherstrip, adjust window cushions and adjusting plates "D", Fig. 17-32.

2. To adjust the top of the window "in or out" for proper contact with the side roof rail weatherstrip, proceed as follows:

a. Raise door window to full "up" position. Remove inner panel lower extension attaching screws "B", Fig. 17-22, and remove extension.

b. Loosen front guide lower attaching stud nut and rear guide lower attaching screw "O", Fig. 17-32. Working through large access hole loosen center guide shoe jam nut.

c. Adjust lower ends of front and rear guide "in or out" and center guide shoe stud "in or out" as required.

NOTE: Center guide shoe stud can be adjusted with cross head screw driver through access hole, shown at "E" in Fig. 17-32.

Adjustment of all three guides should be coordinated so as not to create a condition of the window binding in the guides. Tighten front, center and rear guide attaching stud nuts, jam nuts and screws.

3. To adjust the window lower sash channel frame "in or out" for proper contact with the door glass run inner and outer sealing strips, remove the front guide upper attaching screw "A" and loosen the rear guide upper attaching stud nut "B", Fig. 17-32. Adjust the upper ends of the guide "in or out" as required. To adjust the upper end of the front guide "in or out" emergency spacers (washers) should be "removed or installed" between the guide support and ventilator frame.

4. To adjust the window "fore and aft" for proper contact of the window division channel weatherstrip with the ventilator glass, loosen front and rear guide upper and lower attaching stud nuts and screws, A, B, G, and P, Fig. 17-32.

5. To correct a condition where the glass is "cocked" in the front and rear guides, loosen the inner panel cam rear attaching screws "F", Fig. 17-32; adjust rear of cam "up or down" as required and retighten the screw.

(37) Front Door Window Front Guide Assembly Removal and Installation

1. Raise front door window. Remove door belt finishing molding and door trim finishing panels. Remove inner panel access hole cover.

2. Remove front guide upper attaching screw "A" and lower attaching stud and nut "G", Fig. 17-32.

3. Through large access hole, remove window front guide to rear guide brace front attaching screws "H", Fig. 17-32.

4. Carefully lower front guide sufficiently to detach guide from two shoes on window lower sash channel frame and remove guide assembly from door.

5. To install window front guide assembly, first lubricate channel portion of guide with Lubriplate, then reverse removal procedure.

NOTE: When engaging guide cam on window rollers, make sure spring anti-rattle clips are installed in channel of cam with rollers.

(38) Front Door Window Center Guide Assembly Removal and Installation

1. Lower front door window. Remove door belt finishing molding and door trim finishing panels. Remove inner panel access hole cover.

2. Remove window center guide-to-sash channel attaching nut "C", Fig. 17-32, disengage center guide from window lower sash channel and from shoe assembly and remove guide assembly from door.

3. To install window center guide assembly, first lubricate channel portion of guide cam with Lubriplate, then reverse removal procedure.

NOTE: When installing guide cam on shoe assembly make sure spring anti-rattle clip is installed in channel of cam with shoe.

(39) Front Door Window Rear Guide Assembly Removal and Installation

1. Raise front door window. Remove door belt finishing molding and door trim finishing panels; remove inner panel access hole cover.

2. Remove rear guide upper attaching stud and nut "B", Fig. 17-32.

3. Remove rear guide lower attaching screw "O" and, through large access hole, remove rear guide to support attaching screw "P", Fig. 17-32.

4. Carefully lower rear guide sufficiently to detach cam from two shoes on window lower sash channel frame and remove guide assembly from door.

5. To install window rear guide assembly, first lubricate channel portion of guide cam with Lubriplate, then reverse removal procedure.

NOTE: When engaging guide cam on window rollers, make sure spring anti-rattle clips are installed in channel of cam with rollers.

(40) Front Door Window Regulator Assembly Removal and Installation

1. Lower door window. Remove door belt finishing molding and door trim finishing panels. Remove inner panel access hole cover.

2. Remove window assembly and window front guide assembly.

CAUTION: DO NOT OPERATE REGULATOR MOTOR after the window assembly is disengaged from the regulator, or as a bench operation after the regulator is removed from the door. Operation of the motor, with the load removed, may damage the unit and make it inoperative.

3. Remove front guide-to-rear guide brace rear attaching screws "J", Fig. 17-32.

4. Disconnect regulator motor lead wires at connector.

5. Remove inner panel cam attaching screws "F", Fig. 17-32, and detach cam from regulator balance arm.

6. Through access holes "K", shown in Fig. 17-32, remove regulator attaching screws and remove regulator assembly through large access hole.

NOTE: Instructions for removing the motor from the regulator assembly are outlined under Note 41.

7. To install front door window regulator assembly, reverse removal procedure. Seal door inner panel as specified under Note 12.

(41) Front Door Window Regulator Electric Motor Assembly Removal and Installation

1. Remove window regulator assembly from door and clamp securely in vise.

CAUTION: BE SURE TO PERFORM STEPS 2 AND 3 BEFORE ATTEMPTING TO REMOVE THE MOTOR ASSEMBLY FROM THE REGULATOR. The regulator lift arm, which is under tension from the counterbalance spring, can cause serious injury if the motor assembly is removed without locking the sector in position.

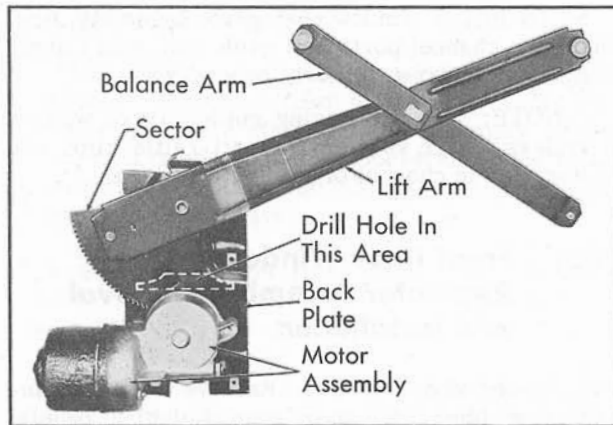


Fig. 17-33 Front Door Window Regulator

2. Drill a 1/4" hole through back plate and sector within area indicated by dotted line in Fig. 17-33. Location of hole depends on position of lift arm.

NOTE: Do not drill into motor housing. Locate hole not less than 3/4" away from edge of back plate or sector.

3. Insert a 3/16" bolt through hole in back plate and sector and install nut to bolt. (Do not tighten nut.)

4. Remove the three motor attaching bolts and remove motor assembly from regulator.

NOTE: Clean steel chips off the regulator sector and motor pinion gear.

5. To install motor assembly, reverse removal procedure. Be sure to remove nut and bolt locking the sector before reinstalling the regulator.

(42) Front Door Ventilator Assembly Removal and Installation

1. Remove front door ventilator regulator and motor assembly.

2. Lower front door window. Remove window front guide upper attaching screw.

3. Remove ventilator attaching studs and nuts and attaching screws, Fig. 17-34.

4. Carefully lift ventilator upward and remove from door.

5. To install ventilator assembly, reverse removal procedure.

(43) Front Door Ventilator Adjustment

NOTE: The ventilator assembly may be adjusted "fore or aft" for alignment with the front body pillar and "up or down" "in or out" at the

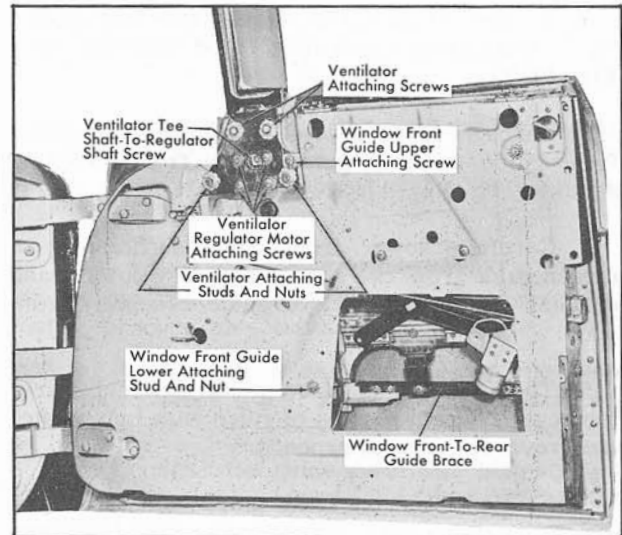


Fig. 17-34 Door Ventilator Attachment

top for proper contact with the side roof rail weatherstrip. After performing any door ventilator adjustments the front door window should be checked for proper alignment with the ventilator assembly and, where required, adjusted as described in Note 36.

a. "Fore" or "Aft" and "Up" or "Down"

To adjust ventilator assembly "fore or aft" and "up or down" proceed as follows:

1. Remove door belt finishing molding and door trim finishing panel.

2. Loosen window front guide upper attaching screw.

3. Loosen ventilator attaching screws and stud nuts, Fig. 17-34.

4. Shift ventilator assembly "fore" or "aft" and/or "up" or "down", as required, then tighten ventilator attaching screws and stud nuts. Check alignment of door window front frame and weatherstrip with ventilator and, where required, adjust door window assembly.

b. "In" or "Out"

1. Remove door belt finishing molding and door trim finishing panel.

2. Loosen window front guide upper attaching screw.

3. Loosen ventilator attaching stud nuts. Turn adjusting studs "in or out" to provide proper ventilator frame contact with the side roof rail weatherstrip, then tighten stud nuts.

4. Check alignment of door window front frame and weatherstrip with ventilator and, where required, adjust door window assembly.

(44) Front Door Ventilator Regulator and Motor Assembly Removal and Installation

1. Remove door belt finishing molding and door trim finishing panels.
2. Remove inner panel access hole cover and disconnect switch and lead wires from ventilator regulator motor wires.
3. Remove ventilator tee shaft attaching screw, Fig. 17-34.
4. Remove ventilator regulator attaching screws.
5. With window in "up" position disengage regulator shaft from ventilator tee shaft and remove regulator and motor assembly from door through large access hole.
6. To install ventilator regulator and motor assembly, reverse removal procedure.

(45) Front Door Window Rear Run Channel Assembly Removal and Installation

1. Raise door window. Remove door belt finishing molding and door trim finishing panels. Remove door inner panel access hole cover.
2. Remove channel upper and lower attaching screws "R", from face of door lock pillar, Fig. 17-32.
3. Carefully disengage guide from behind window frame and remove from door through large access hole.
4. To install window rear glass run channel assembly, reverse removal procedure.

(46) Rear Door Assembly Removal and Installation

1. Raise door window. Disconnect positive battery cable from battery.
2. Remove door belt finishing molding, door trim finishing panel and door inner panel access hole cover. Remove tape covering hinge access holes.
3. Remove door hinge pillar conduit attaching screws, Fig. 17-35.
4. Scribe location of upper and lower hinge straps on door.
5. Disconnect all harness feed wire connectors from inside door and detach wire harness from clips, Fig. 17-27. Carefully pull wire harness from door through hole in door hinge pillar.

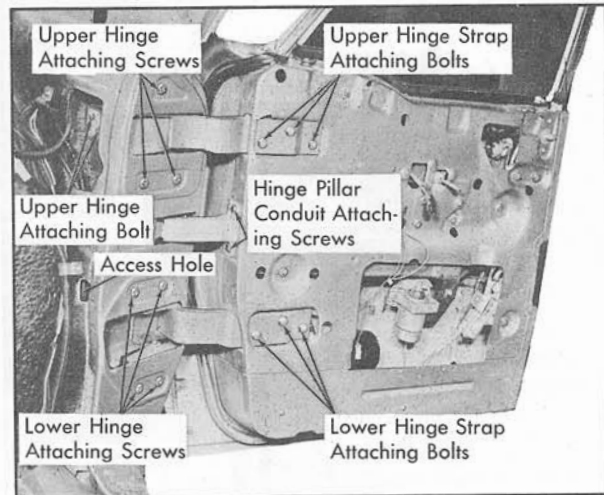


Fig. 17-35 Rear Door Hinge Attachment

6. Suitably support door for removal. Remove lower then upper hinge strap-to-door attaching bolts, Fig. 17-35.
7. With aid of a helper carefully remove door from hinge straps and from body.
8. To install rear door assembly, first apply heavy-bodied sealer to attaching surfaces of upper and lower hinges; then reverse removal procedure. Align hinge straps with scribe marks.

(47) Rear Door Hinges Removal and Installation

1. Remove rear door assembly as described in Note 46. Scribe location of hinges on front body hinge pillar.
2. Remove rear quarter trim assembly.
3. Through rear quarter inner panel access holes, Fig. 17-35, remove bolt securing upper and/or lower hinge to hinge connecting torque bar. See Fig. 17-36.
4. If removing lower hinge assembly remove two hinge bolts installed from inside rear wheel-house opening.
 - a. If removing upper hinge remove two hinge attaching bolts, Fig. 17-35.
5. Remove hinge attaching screws, Fig. 17-35. Disengage hinge from connecting torque bar and remove hinge from body.
6. To install front door hinges, first apply heavy-bodied sealer to attaching surfaces of hinges, then reverse removal procedure. Align hinges within scribe marks.

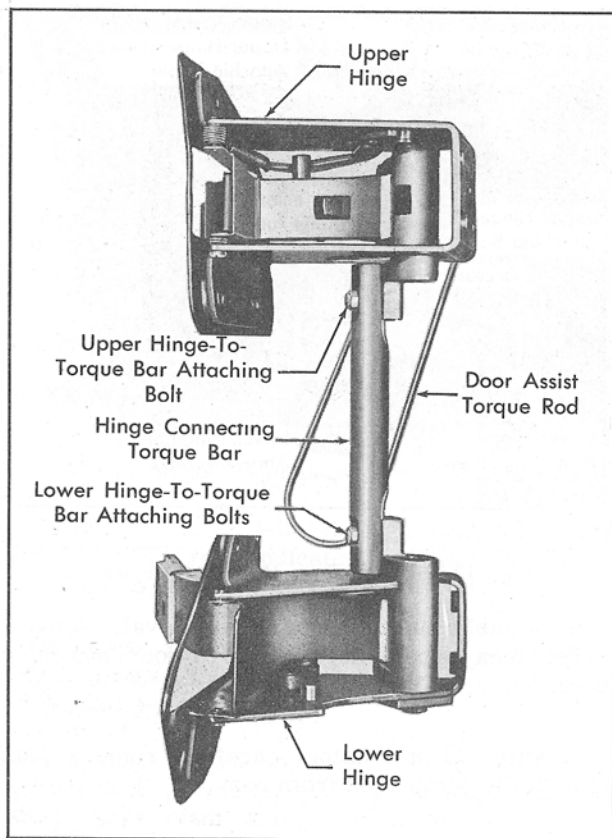


Fig. 17-36 Rear Door Hinges and Connecting Torque Bar

(48) Rear Door and Hinge Adjustment

NOTE: The rear door assembly may be adjusted "up or down" and "fore or aft" at the door hinge straps or the door and hinges may be adjusted "in or out" at the hinge-to-rear body hinge pillar.

When checking the door for alignment, remove the door lock striker from the body pillar to allow the door to hang free on its hinges. Procedure for adjusting the door is outlined below.

After performing any door adjustments, the rear door window should be checked for proper alignment with the side roof rail weatherstrip and adjusted where required. In addition the door lock extension-to-striker engagement should be checked, and adjusted, if necessary.

a. "Up or Down" or "Fore or Aft" Adjustment

1. Remove door belt finishing molding and door trim finishing panel. Remove tape covering hinge access holes.

2. Scribe location of upper and lower hinge strap on door.

3. Loosen hinge strap attaching bolts, Fig. 17-35; adjust door "up or down" or "fore or aft" as required and tighten bolts.

4. Install waterproof body tape over hinge access holes, then install door trim and inside hardware parts.

b. "In or Out" Adjustment

NOTE: Whenever rear door hinge adjustments are made at the rear body lock pillar, both the upper and lower hinge attaching bolts and screws should be loosened to allow the hinge connecting torque bar to maintain the correct center pivot point of both hinges throughout adjustment.

1. Scribe location of upper and lower hinges on rear body hinge pillar.

2. At upper hinge, push hinge hole cover plate in and loosen two hinge attaching bolts inside hinge box.

3. From inside rear wheelhouse loosen two lower hinge attaching bolts.

4. Loosen lower and upper hinge attaching screws at face of body hinge pillar then shift door and hinges "in or out" as required.

5. While maintaining door and hinges in proper position tighten upper and lower hinge attaching screws and bolts.

(49) Rear Door Window Assembly Removal and Installation

1. Raise rear door window. Remove rear door belt finishing molding and door trim finishing panel. Remove door inner panel access hole cover.

2. Through access holes, Fig. 17-37, remove female wedge plate attaching screws and remove wedge plate through access hole "A"

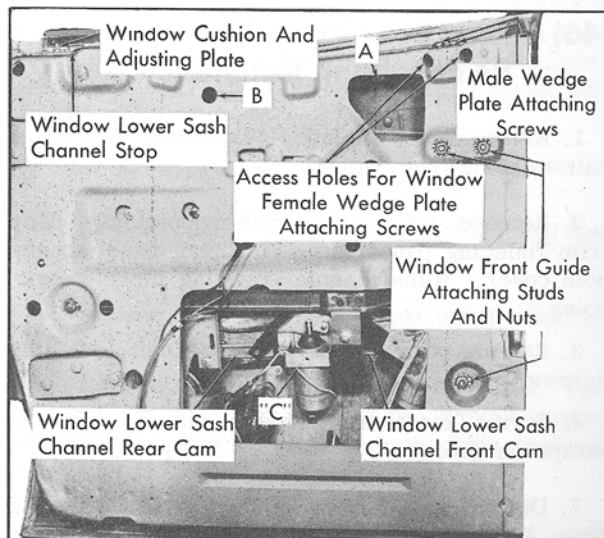


Fig. 17-37 Rear Door Window Attachment

3. Remove window cushion and adjusting plate, Fig. 17-37. Remove window lower sash channel stop attaching screws and remove stop.

4. Remove window front guide attaching screws. Working through large access hole, disengage window front guide from roller on window lower sash channel frame and remove guide from door.

5. Through access hole "A", remove window lower sash channel front cam rear attaching screw. Through access hole "B", remove rear cam rear attaching screw, Fig. 17-37.

6. Lower window to a position where the window lower sash channel front cam front attaching screw and rear cam front attaching screw can be removed.

7. At location "C" remove rear door window center guide to window sash channel attaching nut and bolt.

8. Disengage cams from window lower sash channel. Lift window upward; disengage window front roller from front guide and remove window assembly from body.

9. Prior to installing window assembly, lubricate window guides and cams.

10. To install window assembly, reverse removal procedure.

NOTE: Prior to installing inner panel access hole cover adjust rear door window as described in Note 50.

11. Seal door inner panel and access hole cover as specified in Note 14.

(50) Rear Door Window Adjustments

NOTE: The rear door assembly should be properly aligned in the body opening before adjusting the rear door window.

Rear door window adjustments have been provided to insure proper contact of the rear door window frame with the side roof rail weatherstrip, the glass run channel inner and outer sealing strips and also proper contact of the rear door window front frame sealing strip with the front door window rear frame weatherstrip. Adjustments are provided to insure proper operation of the window.

Rear door window adjustments may be performed as follows: After adjustments, reseal any seals which have been disturbed.

1. "IN OR OUT" Top of window - To provide proper contact of window upper frame with side roof rail weatherstrip:

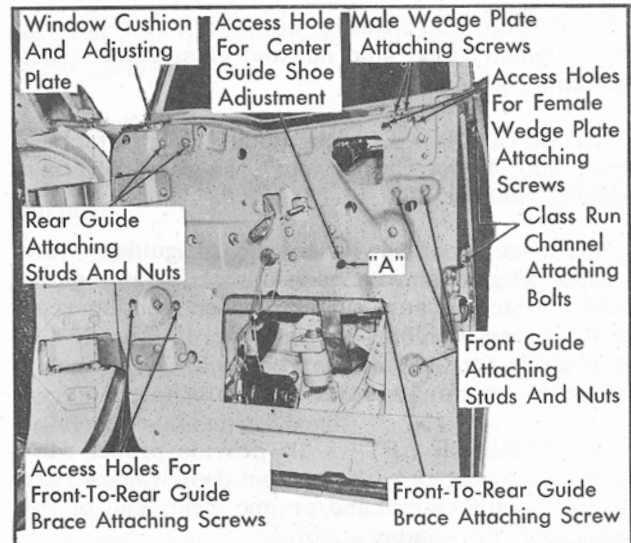


Fig. 17-38 Rear Door Window Adjustments

Raise door window. Loosen male wedge plate screws. Through large access hole loosen center guide shoe jamb nut. With a screw driver inserted through access hole "A", Fig. 17-38, adjust center guide shoe in or out as required; then tighten center guide shoe jamb nut. With window in full up position, tighten male wedge plate screws.

2. "IN OR OUT" Bottom front of window - To provide proper window alignment between the door glass run sealing strips and proper contact with the front door window rear frame weatherstrip:

Raise rear door window. Loosen male wedge plate screws. Loosen front guide upper attaching stud nuts and glass run channel attaching screws. Adjust guide upper studs and position glass run channel in or out, as required; then tighten guide stud nuts and glass run channel attaching screws. With window in full up position, tighten male wedge plate screws.

3. "IN OR OUT" Bottom rear window - To provide proper window alignment between the door glass run sealing strips and proper contact with the rear end of the side roof rail weatherstrip:

Raise rear door window. Loosen rear guide upper attaching studs and nuts. Adjust studs in or out, as required, then tighten stud nuts, Fig. 17-38.

4. "FRONT AND REAR GUIDE ADJUSTMENTS" - To eliminate window binding in guides and glass run channel.

a. "In or Out" Lower end of guides - to coordinate front and rear guides with center guide:

FRONT GUIDE - Loosen guide lower attaching stud nut and glass run channel lower attaching screw, Fig. 17-38. Adjust guide stud and lower

end of glass run channel "in or out", as required, then tighten guide stud nut and glass run channel attaching screw.

REAR GUIDE - Loosen guide lower attaching stud nut, adjust "in or out", as required; then tighten stud nut, Fig. 17-38.

b. "Fore or Aft" lower end of guides - for proper alignment with each other. Loosen guide lower attaching stud nut and loosen front-to-rear guide brace attaching screws, Fig. 17-38, and adjust guide fore or aft, as required. Then tighten all guide attaching screws and stud nuts.

5. "FORE OR AFT" - To provide proper window frame contact with the front door window rear frame weatherstrip and/or the rear end of the side roof rail weatherstrip.

Raise rear door window. Loosen male wedge plate screws, Fig. 17-38. Loosen front and rear guide upper attaching stud nuts. Move window and upper ends of guides "fore or aft" as required; then tighten guide stud nuts. With window in full up position tighten male wedge plate screws.

6. "UP OR DOWN" - To provide proper window frame contact with the side roof rail weatherstrip.

a. Front of Window - Loosen female wedge plate screws, operate window to proper position then tighten female wedge plate screws, Fig. 17-38.

b. Rear of Window - Adjust window cushion "up or down", as required and adjust cushion and adjusting plate "in or out" as required for proper contact with window lower sash channel stop.

(51) Rear Door Window Glass Run Channel Assembly

1. Raise rear door window. Remove door belt finishing molding and trim finishing panel. Remove door inner panel access hole cover.

2. Remove glass run channel attaching bolts, Fig. 17-38.

3. Disengage channel from behind window frame and remove through large access hole.

4. To install glass run channel, reverse removal procedure.

(52) Rear Door Window Front or Rear Guide Removal and Installation

1. Raise rear door window. Remove door belt finishing molding and trim finishing panel. Remove door inner panel access hole cover.

2. Remove window guide upper and lower attaching studs and nuts.

3. Remove screw securing guide to front-to-rear guide brace, Fig. 17-38.

4. Disengage guide from roller on window lower sash channel frame and remove guide from door through large access hole.

5. To install window front or rear guide, reverse removal procedure.

NOTE: Lubricate window guides and adjust guides as outlined in Note 50 and seal door inner panel access hole cover and window guide attaching stud and nuts as specified in Note 14.

(53) Rear Door Window Regulator Assembly Removal and Installation

1. Raise window. Remove door belt finishing molding and door trim finishing panel. Remove inner panel access hole cover.

2. Through access hole "A" remove window lower sash channel front cam rear attaching screw. Through access hole "B", remove rear cam rear attaching screw, Fig. 17-19.

3. Lower window to a position where, through the large access hole, the window lower sash channel front cam front attaching screw and rear cam front attaching screw can be removed. Disconnect window regulator motor wiring harness connector.

4. Disengage window lower sash channel front and rear cams from window lower sash channel and from window regulator arms and remove cams from door. Lift window and "prop" in up position.

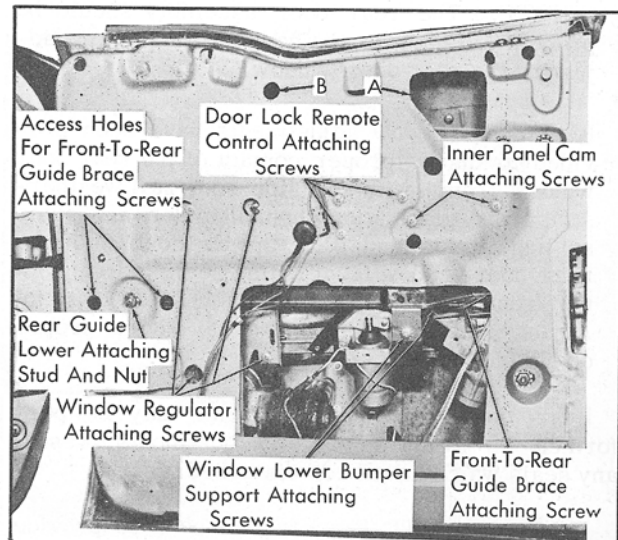


Fig. 17-39 . Rear Door Window Regulator Attachment

CAUTION: DO NOT OPERATE REGULATOR MOTOR after the window assembly is disengaged from the regulator, or as a bench operation after the regulator is removed from the door. Operation of the motor with the load removed may damage the unit and make it inoperative.

5. Remove window lower bumper support attaching screws, Fig. 17-39, and remove support from door.

6. Disconnect door lock remote control free-wheeling solenoid feed wire at connector. Disengage spring clip and detach remote control connecting rod from remote control. Remove remote control attaching screws, Fig. 17-39; disengage remote control handle shaft from hole in door inner panel and remove assembly through large access hole.

7. Remove window rear guide lower attaching stud and nut. Remove front-to-rear guide brace attaching screws and remove front-to-rear guide brace from door, Fig. 17-39.

8. Remove inner panel cam attaching screws, Fig. 17-39, disconnect cam from window regulator arm and remove cam from door.

9. Remove window regulator attaching screws, Fig. 17-39. Position regulator assembly so that motor end of regulator can be started out of access hole first; then remove window regulator assembly from door.

NOTE: Instructions for removing the motor from the rear window regulator assembly are the same as outlined in NOTE 41 for the front window.

10. To install rear door window regulator assembly, reverse removal procedure. Install and adjust door lock remote control assembly as described in Note 29.

Prior to installation of door trim panels and inside hardware parts, check operation of window and door lock remote control operation and seal door inner panel as specified in Note 14.

(54) Front Door Hinge Pillar and Bottom Weatherstrip Removal and Installation

a. Removal

1. Remove screw securing weatherstrip tab at top of ventilator.

2. Using a screw driver or suitable tool, carefully remove three stud fasteners securing weatherstrip at cove area.

3. At bottom of door, bend down retainer tabs securing hinge pillar and bottom weatherstrip.

4. With a flat bladed tool, carefully break weatherstrip cement bond and remove weatherstrip from door.

b. Installation

1. Clean off old cement from cementing surfaces.

2. Apply an approved weatherstrip cement to cementing surfaces of door and weatherstrip.

3. Starting at top of ventilator, position weatherstrip to ventilator, door hinge pillar and bottom of door. Press or roll weatherstrip to assure a good cement bond.

4. Install screw securing weatherstrip tab at top of ventilator, three stud fasteners at cove area and clinch (bend up) metal retainer tabs along bottom of door.

(55) Front Door Lock Pillar and Bottom Weatherstrip Removal, Installation and Adjustment

a. Removal

1. Starting at the top of the door lock pillar and using a narrow flat bladed tool, carefully break cement bond securing weatherstrip to retainer. At each weatherstrip clip use Weatherstrip Clip Inserting Tool No. J-5757 to snap clips out of holes in retainer.

2. Along bottom of door, bend down retainer tabs securing lock pillar and bottom weatherstrip.

3. With a flat bladed tool carefully break cement bond along bottom of door and remove weatherstrip from door.

b. Installation

1. Clean off old cement from cementing surfaces.

2. Apply an approved weatherstrip cement to cementing surfaces of weatherstrip retainer and corresponding surface of weatherstrip. Position weatherstrip to door lock pillar and install weatherstrip clips into retainer clip holes along door lock pillar using Weatherstrip Clip Inserting Tool No. J-5757.

NOTE: Do not use excessive force or strike tool when pushing clips into holes as it may distort shape of clip resulting in improper weatherstrip retention.

3. Apply an approved weatherstrip cement to cementing surfaces along bottom of door and corresponding surface of weatherstrip.

4. Position weatherstrip along bottom of door and press or roll weatherstrip to assure a good cement bond.

5. Clinch (bend up) metal retainer tabs along bottom of door.

c. Adjustment

NOTE: The front door lock pillar and bottom weatherstrip may be adjusted "in or out" of the door lock pillar to provide proper contact with the rear door lock pillar sealing strip assembly. To adjust weatherstrip proceed as follows:

1. Remove door belt finishing molding and door trim panel.

2. Through access holes "E" and "F", Fig. 17-22, in door inner panel upper and lower extensions, loosen weatherstrip retainer attaching screws sufficiently to adjust weatherstrip in or out of door lock pillar.

3. When weatherstrip is properly adjusted retighten retainer attaching screws and install door trim and inside hardware parts.

(56) Front Door Window Front Frame Weatherstrip Removal and Installation

1. Raise front door window and open ventilator.
2. Remove five weatherstrip attaching screws and remove weatherstrip from window frame.

NOTE: It is necessary to lower window slightly to remove upper attaching screw.

3. To install window front frame weatherstrip, first apply medium bodied sealer along the weatherstrip contacting surface of the window front frame, then reverse removal procedure. Clean excess sealer from window frame and weatherstrip.

(57) Front Door Window Rear Frame Weatherstrip Removal and Installation

1. Remove front door window assembly.
2. Slide weatherstrip downward in window frame channel and remove from window.
3. To install window frame weatherstrip apply weatherstrip cement to the upper two inches of the weatherstrip; then insert weatherstrip into channel of window frame and slide weatherstrip into position. Install front door window assembly.

(58) Front Door Lock Pillar and Bottom Weatherstrip Retainer Removal and Installation

1. Remove door belt finishing molding and door trim panel.

2. Remove door inner panel upper and lower extension attaching screws "B" and "D", Fig. 17-22, and remove lower extension.

NOTE: Three attaching screws of both the upper and lower extensions are accessible through access holes "E" and "F" in the extension, Fig. 17-22.

3. Using Weatherstrip Clip Inserting Tool No. J-5757, carefully insert end of tool under weatherstrip and snap clips out of holes in retainer along door lock pillar.

4. Remove retainer attaching screws "C", Fig. 17-22, and remove retainer from door.

5. Prior to installing weatherstrip retainer, apply a bead of body caulking compound (approximately 3/16 inch diameter) along the full length of the door lock pillar rabbit, shown in inset of Fig. 17-22.

6. To install weatherstrip retainer, reverse removal procedure.

NOTE: Prior to installing door inner panel extensions, adjust weatherstrip retainer for proper weatherstrip contact with the rear door lock pillar sealing strip assembly.

(59) Rear Door Weatherstrip Removal and Installation

a. Removal

1. Remove door belt finishing molding and door trim finishing panel. Remove door inner panel access hole cover.

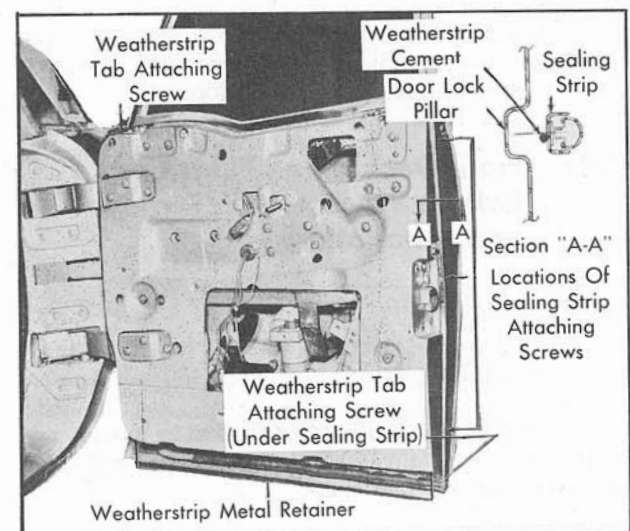


Fig. 17-40 Rear Door Weatherstrip Attachment

2. Loosen rear door lock pillar sealing strip attaching screws sufficiently to remove weatherstrip tab attaching screw located under lower end of sealing strip, Fig. 17-40.

3. Remove screw securing weatherstrip tab at top of door hinge pillar.

4. Carefully bend down tabs of metal retainer along bottom of door, Fig. 17-40.

5. With a flat-bladed tool, carefully break weatherstrip cement bond along hinge pillar and bottom of door and remove weatherstrip from door.

b. Installation

1. Clean off old cement from cementing surfaces.

2. Apply an approved weatherstrip cement to cementing surfaces of door and weatherstrip.

3. Position weatherstrip to door, install weatherstrip tab attaching screws at top of hinge pillar and bottom of lock pillar. Press or roll weatherstrip to assure a good cement bond.

4. Clinch (bend up) metal retainer tabs along bottom of door. Allow specified drying time for weatherstrip cement.

(60) Rear Door Lock Pillar Sealing Strip Removal and Installation

1. Remove door belt finishing molding and door trim finishing panel.

2. Remove inner panel access hole cover.

3. Through inner panel access hole, remove three nuts and cup washers securing sealing strip to door lock pillar at locations indicated in Fig. 17-40. Then, carefully break cement seal and remove sealing strip from door.

4. To install rear door lock pillar sealing strip, first apply a bead of weatherstrip cement (approximately 3/16" in diameter) along the entire length of the sealing strip just inboard of the attaching studs, as shown in inset of Fig. 17-40, then reverse removal procedure.

(61) Side Roof Rail Weatherstrip Retainer Removal and Installation

a. Removal

1. Remove side roof rail weatherstrip as described in Note 62.

2. Remove screws securing retainer to side roof rail and remove retainer.

NOTE: Exercise extreme care to insure that retainer is not bent during removal operations as this may affect proper weatherseal.

b. Installation

1. Clean old sealer off roof drip and reveal molding to insure a clean surface.

2. Apply bead of medium-bodied sealer to outboard edge of retainer along its entire length.

3. Place retainer into position, making certain front end of retainer is butted against front body hinge pillar. Then, secure retainer in position by installing a screw at front, center and rear of retainer.

4. Install remaining screws and install side roof rail weatherstrip as described in Note 62.

(62) Side Roof Rail Weatherstrip Removal, Installation and Adjustments

a. Removal

1. Open front and rear doors.

2. With flat-bladed tool, break seal between front end of weatherstrip and front body hinge pillar.

3. At rear end of weatherstrip, remove screw securing weatherstrip tab from side roof rail.

4. Starting at either end of weatherstrip, disengage weatherstrip from outer flange of retainer. Position tip of weatherstrip inserting tool or other suitable tool under weatherstrip at each clip location and snap clip out of hole. Detach weatherstrip from retainer and remove from body.

b. Installation

1. Check clips for proper contour and if necessary reform clip using Weatherstrip Clip Reformer Tool No. J-5984. Position weatherstrip to retainer so that reinforced section of weatherstrip is over front edge of rear door window upper frame.

2. While positioning inboard edge of weatherstrip into inner flange of retainer, install weatherstrip clips into clip holes using Weatherstrip Clip Inserting Tool No. J-5757. To install clips into holes, place "V-shaped" tip of tool on loop of clip and push clip into hole, as shown in Fig. 17-41, until it snaps into position.

NOTE: Do not use excessive force or strike tool when pushing clips into holes as it may distort shape of clips resulting in improper weatherstrip retention.

3. Engage weatherstrip in flange of retainer along entire length of retainer.

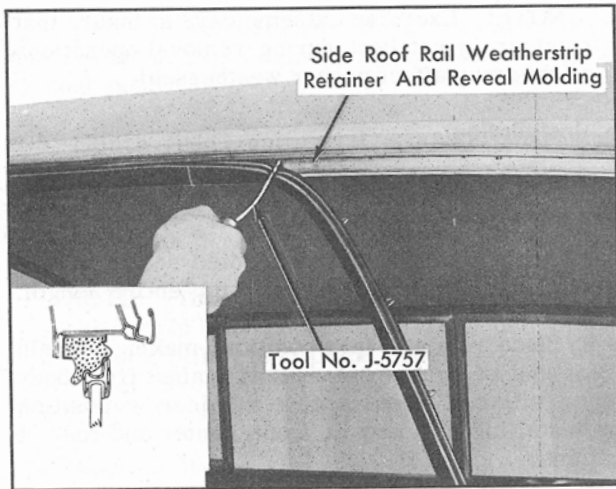


Fig. 17-41 Side Roof Rail Weatherstrip

4. If necessary when installing new weatherstrip, carefully trim front end of weatherstrip to form a flush fit with front body hinge pillar. Apply weatherstrip cement to front end of weatherstrip and to attaching area on front body hinge pillar and cement weatherstrip into position.

5. At rear end of weatherstrip, install screw securing weatherstrip to side roof rail.

6. With doors and windows closed, the ventilator and front and rear door upper frames should make an even, continuous contact with side roof rail weatherstrip. If necessary, adjust ventilator and/or front and rear door windows to obtain proper weatherstrip contact.

c. "In" and "Out" Adjustment

A slight "in" and "out" adjustment of the side roof rail weatherstrip is available to obtain proper contact between the weatherstrip and the door windows and ventilator frames. However, before attempting to adjust the side roof rail weatherstrip as outlined below, check the ventilator and windows for proper alignment and make any necessary adjustments.

1. Determine and mark retainer at area(s) to be adjusted. Then, remove side roof rail weatherstrip from retainer.

2. Loosen retainer attaching screws at area(s) to be adjusted.

3. Place wooden block against edge of outer flange and tap wooden block lightly to position retainer.

4. Tighten retainer attaching screws and install weatherstrip.

d. "Down" Adjustment

1. Mark area(s) on retainer to be adjusted downward and remove weatherstrip from retainer.

2. Loosen screws securing retainer sufficiently to allow installation of waterproof shims between roof drip, the reveal molding and weatherstrip retainer.

NOTE: Shims may be cut to size from a piece of door window glass channel sealing strip.

3. Clean sealer from roof drip and reveal molding in affected area and securely cement shims to molding.

CAUTION: Shims should be well tapered and long enough to provide a continuous sealing surface along the length of the retainer. Shims which are not tapered or too short may cause local irregularities in the sealing surface.

4. Apply a bead of medium-bodied sealer along outboard edge of retainer at area(s) where sealer was removed.

5. Tighten screws securing retainer to side roof rail and install weatherstrip to retainer.

(63) Center Pillar Assembly Removal, Installation and Adjustment

a. Removal and Installation

1. Remove front sill plate.

2. Turn back floor carpeting sufficiently to gain access to center pillar attaching bolts.

3. Scribe location of center pillar on floor pan.

4. Remove five center pillar attaching screws, Fig. 17-42, and remove center pillar assembly.

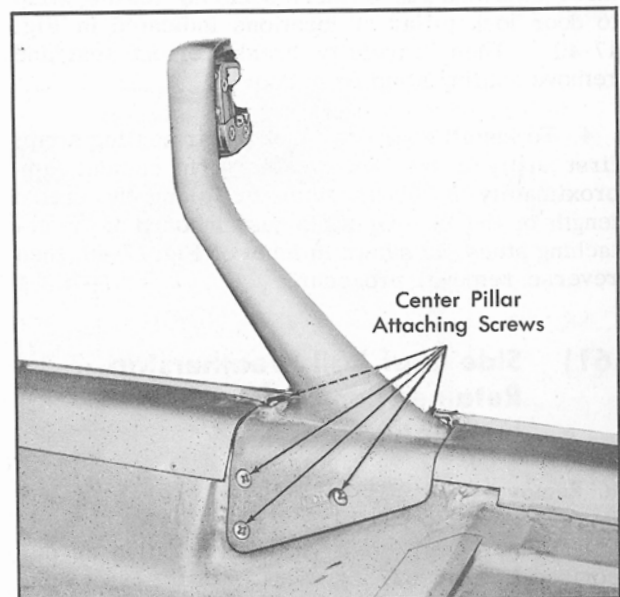


Fig. 17-42 Center Pillar Attachment

Center pillar trim and hardware parts may be removed, as required.

5. Prior to installing center pillar assembly, clean off old sealer from contacting surfaces of center pillar and floor pan.

Apply (brush coat) heavy-bodied sealer to contacting surface of center pillar and floor pan, then install center pillar assembly aligning assembly within scribe marks. Clean off excess sealer.

Before installing sill plate and carpeting, check to see if front and rear door lock extension will engage in striker notch. Where required, center pillar should be adjusted "fore or aft" to obtain proper engagement of both the front and rear door lock extensions in their respective striker notches.

b. Adjustment

NOTE: To provide proper alignment of the center pillar with the front and rear doors, the center pillar may be adjusted "fore or aft" as follows:

1. Remove front sill plate.
2. Turn back floor carpeting sufficiently to gain access to center pillar attaching bolts.
3. Scribe location of center pillar on floor pan.
4. Loosen five center pillar attaching screws. Move center pillar assembly "fore or aft" as required for proper alignment then tighten attaching screws.

(64) Center Pillar Lower Finishing Molding Removal and Installation

1. Open both front and rear doors.
2. Remove both front and rear door lock strikers.
3. Remove lower finishing molding attaching screws, Fig. 17-43.
4. Carefully disengage lower flange of center pillar lower finishing molding from center pillar.
5. To install lower finishing molding, reverse removal procedure.

NOTE: Make sure spacers are installed between molding and center pillar at the six lower attaching screws.

(65) Center Pillar Upper Finishing Cover Removal and Installation

1. Open both front and rear doors.
2. Remove both front and rear door lock strikers.

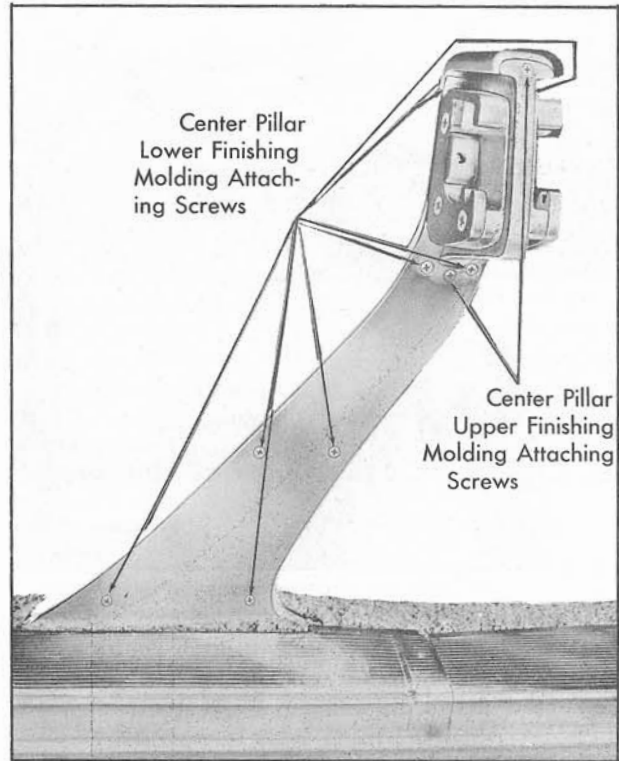


Fig. 17-43 Center Pillar Finishing Moldings

3. Detach center pillar lower finishing molding sufficiently to remove upper finishing molding lower attaching screw, Fig. 17-43.

4. Remove upper finishing molding upper attaching screw, and remove molding from center pillar.

5. To install upper finishing molding, reverse removal procedure.

(66) Center Pillar Finishing Cover Removal and Installation

NOTE: The center pillar finishing cover is a vinyl coated fabric formed to the contour of the center pillar. The edges or flanges of the cover are cemented to the center pillar and are also secured by the center pillar finishing moldings.

1. Remove center pillar lower finishing molding and upper finishing molding.

2. Remove cap securing upper edge of finishing cover.

3. Carefully break cement bond securing edges of finishing cover and remove cover from center pillar.

4. To install center pillar finishing cover clean off cementing area of center pillar. Apply an approved trim cement to cementing surfaces of

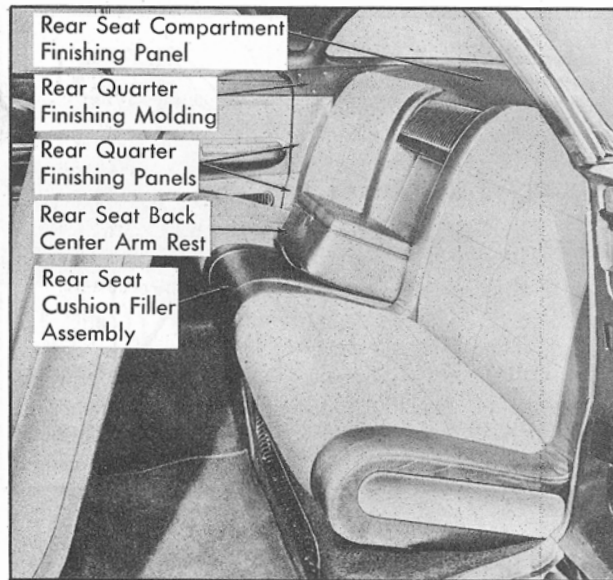


Fig. 17-44 Rear Quarter Area

finishing cover and center pillar. Position finishing cover to center pillar then press or roll cemented areas to assure a good cement bond.

5. Install previously removed center pillar hardware.

(67) Rear Quarter Trim and Hardware Removal and Installation

1. To remove rear quarter finishing molding, Fig. 17-44, remove rear seat frame assembly; then remove finishing molding attaching screws, lift upward to disengage tabs from lower panel and remove from body.

2. To remove rear quarter finishing panel, remove finishing molding as outlined in Step 1. Remove rear sill plate and two screws securing bottom trim finishing panel; then remove screws securing finishing panel along top and lower edge.

3. To install finishing panels and molding, reverse removal procedure.

(68) Front Seat Finishing Molding Removal and Installation

1. Remove seat cushion and seat back.

2. Through access holes, remove molding attaching nuts and remove molding.

3. To install finishing molding, reverse removal procedure.

(69) Front Seat Back Robe Cord Removal and Installation

NOTE: The seat back cord is secured to the seat back frame by retainers installed within the sides of the seat back frame.

1. Remove screws securing escutcheon at each end of robe cord and slide escutcheon toward center of robe cord, Fig. 17-45.

2. Obtain an approximately ten inch length of 1/8" or 3/16" diameter rod and bend 3/4" of rod at one end to form a hook.

3. Perform the following steps at each end of the robe cord:

a. Using a flashlight, sight between robe cord and seat back panel and into side of seat frame to locate robe cord retaining pin.

b. Engage hooked end of tool with retaining pin and pull pin toward center-line of seat and, at the same time, push end of robe cord outboard of seat center-line and move rearward to disengage robe cord from pin.

4. To install robe cord, reverse removal procedure.

(70) Front Seat Back Panel Removal and Installation

The front seat back panel is secured to the seat frame by tabs which are exposed after the seat back is removed. In addition the bottom edge of the panel is secured to the seat frame by tacks and hog rings.

1. Remove seat assembly minus adjusters from body.

2. Remove seat back cushion from seat frame and disengage ends of robe cord from retainers in sides of seat frame. Refer to Note 69.

3. Remove hog rings and tacks securing bottom edge of trim seat frame; then, carefully pull panel downward and remove from seat frame.

4. To install, reverse removal procedure.

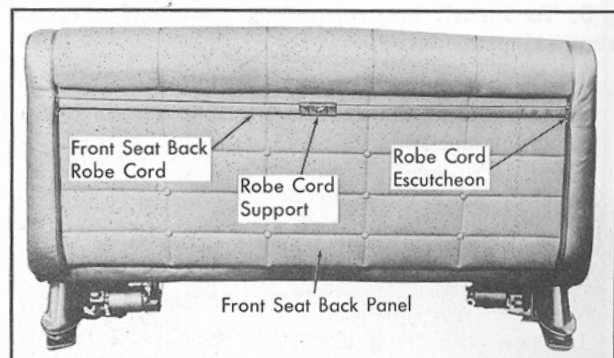


Fig. 17-45 Rear View of Front Seat

(71) Front Seat Back Center Arm Rest Removal, Installation and Adjustment

a. Removal and Installation

1. Remove front seat cushion and seat back.
2. Remove screws securing top edge of center arm rest trim panel to frame. Then, remove four nuts and bolts securing arm rest assembly to seat frame, and remove arm rest assembly.
3. To install arm rest, reverse removal procedure.

b. Adjustment

The arm rest may be adjusted up or down for proper alignment with the arm rest opening in the seat back. To adjust arm rest, remove front seat cushion and back and loosen four arm rest attaching bolts; then, adjust arm rest as required and tighten attaching bolts.

(72) Front Seat Cushion Back and Frame Assembly Removal and Installation (Without Adjusters and Pedestal)

NOTE: The seat frame assembly is secured to the seat adjusters with four attaching bolts at each adjuster. Each adjuster is riveted to a pedestal which is secured to the body floor pan with four bolts, Fig. 17-46. The seat assembly may be removed from the adjusters, or the complete seat assembly with the adjusters and pedestal may be removed from the body as outlined:

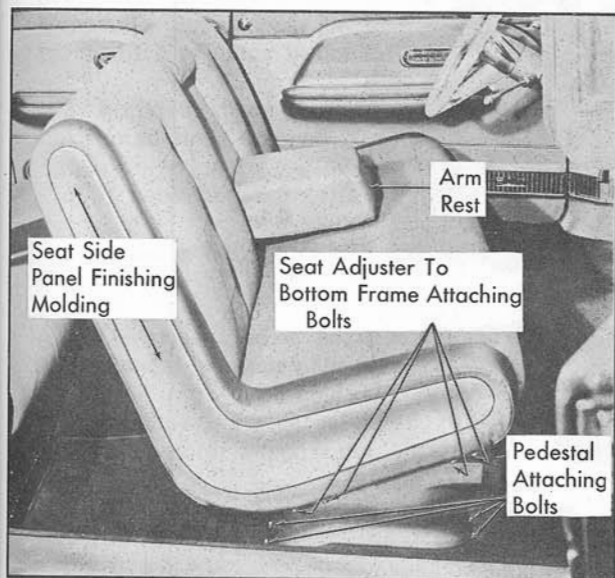


Fig. 17-46 Front Seat Installation

1. Remove seat cushion from seat frame assembly by lifting front edge of cushion upward. Disconnect seat bottom switch wire connectors; then pull cushion forward and remove seat from frame.

2. To remove seat back from frame assembly, remove seat cushion; then remove two screws securing lower edge of seat back to frame. Pull bottom edge of seat back cushion forward and lift upward; then remove back from frame assembly.

3. To remove seat frame from adjusters, remove seat cushion; then remove four bolts securing each seat adjuster to seat bottom frame, Fig. 17-46. Suitably identify wiring for proper installation; then disconnect seat harness wiring from control relay and seat actuator motors, and remove frame assembly.

4. To install, reverse removal procedure. When installing harness connectors to relay box, line up key on harness plugs with slot on relay box plugs.

(73) Front Seat Assembly Removal and Installation (With Adjusters and Pedestal)

NOTE: The lower track of each seat adjuster assembly is secured to the pedestal with two rivets; therefore, when removing the seat assembly with adjusters from the body, it is necessary to also remove the pedestal which is secured to the floor pan with four bolts at each side of the seat, Fig. 17-46.

1. Remove front seat cushion; then turn back floor carpets to expose four pedestal to floor pan attaching bolts on each side of seat and remove bolts.

2. Suitably identify wiring for proper installation; then disconnect seat wire harness from seat control relay box and seat actuator motors and remove complete assembly from body.

3. To install, reverse removal procedure. Check operation of seat assembly after connecting wire harness to relay box and actuator motor. When installing harness connectors to relay box, line up key on harness plugs with slots on relay box plugs.

(74) Pre-Setting of Favorite Position Seat Controls

Encircling each control knob on the seat control switch are two lenses, Fig. 17-47. The inner lens contains a green arrowhead and a red arrowhead, which change position as the control knob is rotated. The outer lens contains a stationary clear arrowhead. Above each control knob are two small push buttons, one red and one green.

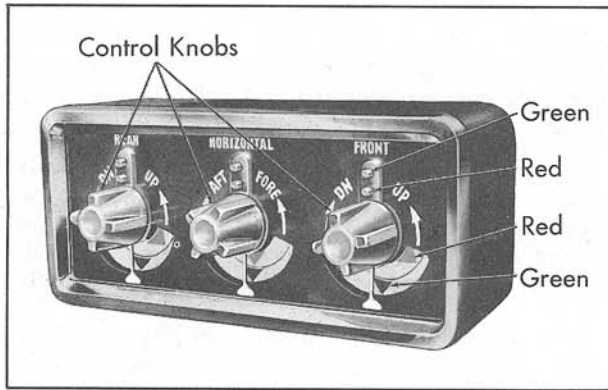


Fig. 17-47 Dial Selector Control Switch

To pre-set the automatic favorite position seat, proceed as follows:

1. Enter car, close both front doors and sit in driving position on the front seat cushion.
2. Choose one color (red or green) for the driver's use in setting the controls.
3. Rotate each control knob until the arrowhead of the chosen color is lined up with the stationary arrowhead in the outer lens.
4. Depress the button of the chosen color behind the first control knob, with a dull pointed tool.
5. While holding the button down, rotate this control knob until the seat is in the desired position. Repeat this procedure with the buttons

behind the other control knobs. The seat will now return to the favorite position of this driver each time he enters the car and indexes the three arrowheads of the chosen color.

NOTE: The seat can also be pre-set to return to the favorite position of a second person. Each of the two persons adjusting the seat controls must choose a color to control the seat adjustment, and each must follow the procedure outlined above. Other persons who drive the car can turn the knobs to control the 6-way positioning of the seat as desired.

(75) Front Seat Adjuster Assembly Removal and Installation

NOTE: The seat adjuster assembly consists of a right and left six-way seat adjuster, a torque tube assembly and two actuator units as shown in Fig. 17-48 and Fig. 17-49.

The right actuator assembly consists of a 12 volt reversible type motor, jack screw and two spinning nut assemblies, and controls the vertical adjustment of the front and/or rear edge of the seat. The left actuator assembly consists of a twelve volt reversible type motor, jack screw and one spinning nut assembly, and controls the horizontal adjustment of the seat.

The complete seat assembly may be adjusted to one of seven available horizontal adjustments, while the front and/or rear edge of the seat may be adjusted to one of five available vertical adjustments. Although the adjustments of the seat

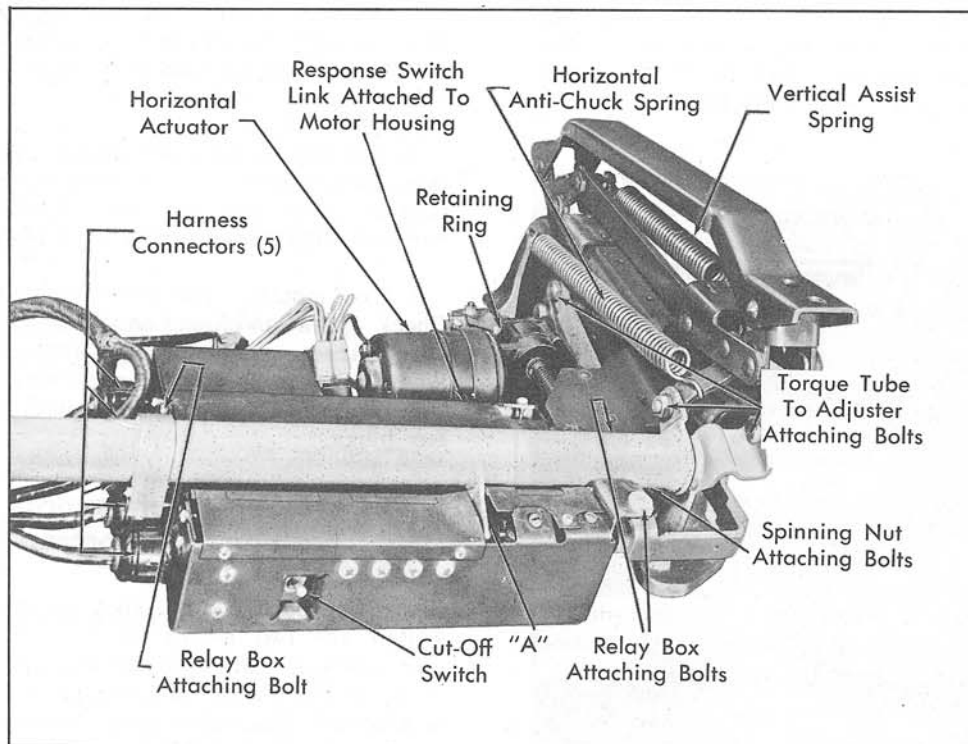


Fig. 17-48 Left Seat Adjuster and Switch Control Box

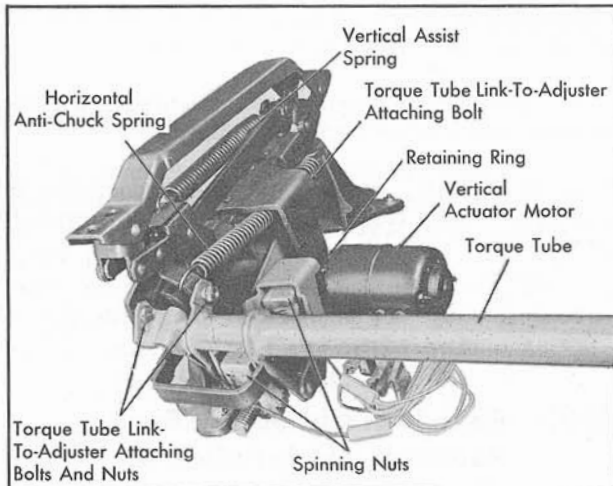


Fig. 17-49 Right Seat Adjuster

are similar to the adjustments available on six-way seat adjusters designed with one actuator motor, the seat adjuster assembly requires two actuator units to provide simultaneous rearward and downward adjustment when the door is opened.

Each adjuster assembly is attached to a pedestal which is secured to the floor pan by four bolts. The lower track of the adjuster is secured to the pedestal by four rivets. The upper portion of the adjuster is secured to the lower portion by the engagement of the upper and lower seat adjuster tracks. The seat actuator motors and spinning nuts are energized by the seat relay and response switch control box located beneath the left side of the seat cushion.

1. Remove seat assembly minus adjusters and pedestals from body. Refer to Note 72. Operate seat to full "up" position.

2. Detach vertical assist spring and remove horizontal anti-chuck spring from adjuster being removed. Support torque tube assembly on side from which adjuster is being removed.

3. Remove three bolts securing torque tube links to adjuster and pedestal.

4. If removing left adjuster proceed as follows:

- a. Remove bolts securing relay box to adjuster, Fig. 17-48.

- b. Disconnect wire harness from motor relay and solenoid feed wire from solenoid.

5. If removing right adjuster, remove retaining ring from motor support pin.

6. Disengage adjuster from torque tube links and remove adjuster. If removing left adjuster, remove adjuster and horizontal regulator from body. Remove regulator assembly from left adjuster as a bench operation.

7. To install adjuster, reverse removal procedure. Check all operations of seat to extreme limit of travel.

(76) Vertical Actuator Assembly Removal and Installation

1. Operate seat to full "up" position. Remove complete front seat assembly with adjusters and pedestal from body, and place upside down on covered bench. Refer to Note 73.

2. Remove retaining ring from motor support pin.

3. Remove anti-creep springs from spinning nut assemblies.

4. Remove screws securing torque tube links to spinning nut assemblies, Fig. 17-49.

5. Disengage actuator from support pin, and spinning nut assemblies from between the torque tube links and remove from body.

6. To remove spinning nut assembly from jack screw refer to Note 78.

7. To install, reverse removal procedure.

(77) Horizontal Actuator Assembly Removal and Installation

1. Operate seat to full "up" and "rearward" positions. Remove complete front seat assembly with adjusters and pedestal from body, and place upside down on a covered bench. Refer to Note 73.

2. Remove bolts securing torque tube links to spinning nut assembly and disengage anti-creep spring from spinning nut assembly.

3. Remove retaining ring from motor support pin and disengage motor to response switch connecting link.

4. Disengage motor from support pin and spinning nut assembly from support; then, remove actuator assembly from seat adjuster.

5. To remove spinning nut assembly from jack screw, refer to Note 78.

6. To install actuator, reverse removal procedure.

(78) Vertical and Horizontal Actuator Spinning Nut Assemblies Removal and Installation

1. Remove affected actuator assembly from seat adjuster assembly. See Notes 76 and 77.

2. As a bench operation, carefully drive roll pins located in front of spinning nut out of jack screw.

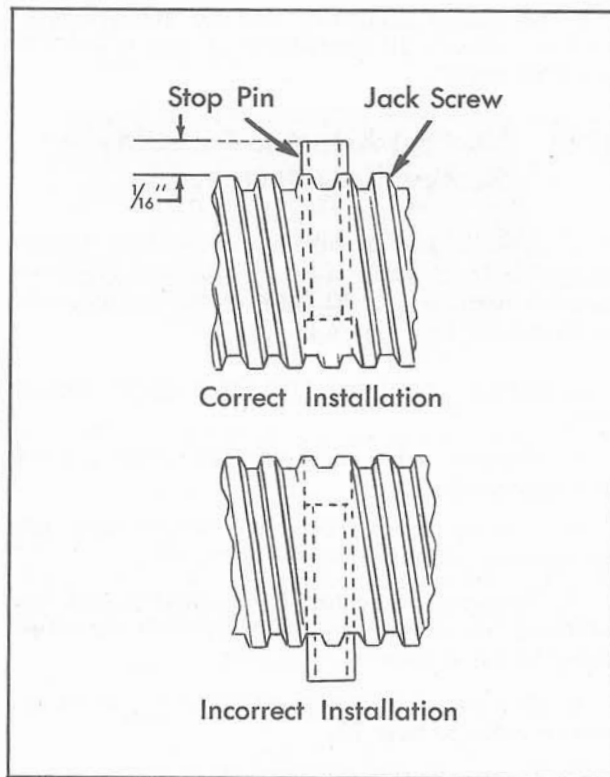


Fig. 17-50 Seat Adjuster Jack Screw Installation

3. Insert drift punch or suitable tool into one of the spinning nut frame mounting holes. Rotate spinning nut frame slowly until drift punch engages in locking notch in spinning nut; then rotate spinning nut until it runs off the jack screw.

NOTE: In cases where the motor operates, it may be actuated to rotate the jack screw while the spinning nut is held stationary.

4. To install spinning nut assembly, reverse removal procedure.

IMPORTANT: When installing roll pins into jack screw, install pins so that the center of protruding end of pin is located between threads of jack screw. Leave 1/16" of roll pin protruding above jack screw threads. Fig. 17-50 shows the roll pin correctly and incorrectly installed.

(79) Relay and Response Switch Control Assembly Removal and Installation

1. Remove seat cushion assembly from seat frame.

2. Suitably identify harness connectors for proper installation then disconnect from relay box.

3. Disengage horizontal response switch connecting link from torque tube at "A". In addition,

disengage connecting links at outboard side of relay box from torque tube, Fig. 17-48.

4. Remove three relay box attaching bolts and remove box from adjuster assembly.

5. To install, engage harness connectors to connectors on relay box and reverse removal procedure.

NOTE: When connecting harness to relay box, line up key in harness plug with slot on relay plug.

(80) Rear Seat Cushion or Back Removal and Installation (Right or Left)

1. To remove either rear seat cushion, lift front edge of cushion upward and pull forward to disengage it from seat back frame.

2. To remove rear seat back proceed as follows:

a. Inside of rear compartment, loosen upper edge of rear compartment front trim to expose seat back upper attaching tabs, and bend tabs down.

b. Inside of body, pull top edge of seat back forward; then lift upward and remove seat back from body.

3. To install cushion or back, reverse removal procedure.

(81) Rear Seat Frame Assembly Removal and Installation

1. Remove seat cushion and back as described in Note 80.

2. Remove four bolts that secure seat frame to body on each side.

3. Remove frame.

4. To install, reverse removal procedure.

(82) Rear Seat Back Center Arm Rest Removal, Installation and Adjustment

a. Removal and Installation

1. Lower arm rest. Depress top edge of filler panel rearward to expose two filler panel attaching screws.

2. Remove filler panel attaching screws; then disengage trim from seat back reinforcement to expose four arm rest attaching screws.

3. Remove four screws and remove arm rest.

4. To install arm rest, reverse removal procedure.

b. Adjustment

The arm rest attaching holes are slotted vertically to provide vertical adjustment of arm rest as required to align arm rest with opening in filler panel.

(83) Rear Seat Compartment Finishing Panel Removal and Installation

1. Remove rear seat frame assemblies.
2. Remove back window side garnish moldings and back window lower garnish molding.
3. Lower rear seat back center arm rest and depress top edge of filler panel, Fig. 17-44, rearward to expose two filler panel attaching screws; then remove screws.
4. Remove screws securing finishing panel and carefully remove panel from body.
5. To install panel, reverse removal procedure.

(84) Headlining Assembly Removal

NOTE: The headlining assembly is secured to the body by listing wires which are inserted through listing pockets sewn to the headlining. The ends of the listing wires are installed into retainers inserted into holes in the side roof rails. In addition, the edges of the headlining are cemented and tacked to trimsticks along the windshield and back window openings. They are also tacked to trimsticks along the side roof rails. The tacks securing the headlining and the ends of the listing wires are concealed by side roof rail finishing moldings and the back window and windshield garnish moldings. The removal and installation of the headlining is similar to the procedure performed on headlinings installed in other styles.

1. Remove back window upper and side garnish moldings and windshield upper and side garnish moldings.
2. Disengage side roof rail lamp assembly from each side roof rail; then remove side roof rail finishing moldings.
3. Remove tacks securing headlining along side roof rails and windshield and back window opening.
4. Starting at windshield, detach headlining listing wires from clips in side roof rails; gather or roll headlining with exposed surface inward to keep it clean, then remove it from body.

5. Place headlining on clean bench and if necessary detach listing wires from headlining pockets.

(85) Headlining Assembly Installation

1. Install listing wires if previously removed from headlining.
2. Place complete headlining assembly into body; then starting at rear of the body and working forward, insert ends of listing wires into clips in side roof rails.
3. Center and align headlining relative to the windshield opening and back window opening; then apply cement to headlining tacking surfaces at windshield and back window.
4. Position headlining as required and stay-tack headlining to attaching trim-sticks. After headlining is properly positioned and stretched free of all wrinkles, permanently tack all areas previously stay-tacked.
5. Install all previously removed parts.

(86) Back Window and Rear End Reveal Moldings Removal and Installation

NOTE: The back window reveal moldings consist of a right and left molding. The junctions of these moldings at the center line of the body are covered by an upper and lower escutcheon. The upper section of each molding is secured to the body by pinchweld-type clips, Fig. 17-51. The corner of each molding is secured by two bolt and clip assemblies, and the lower section of each molding is secured

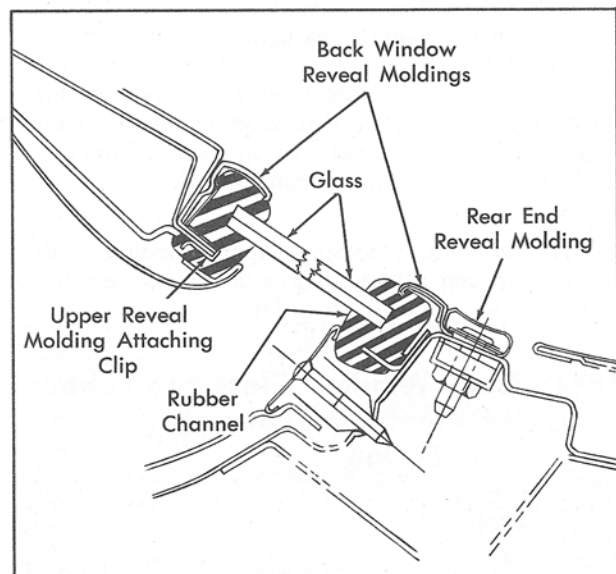


Fig. 17-51 Back Window and Molding Attachment

to the body by screws located beneath the rear end reveal molding.

The rear end reveal molding is a one-piece molding and is secured to the body by bolt and clip assemblies and attaching nuts and with snap-on clips at each end.

1. Place suitable protective covering over rear end of body below rear end reveal molding.

2. On inside of body remove both rear seat cushions, backs, and frame assemblies.

3. Loosen lower ends of back window upper garnish molding and rear end of each side roof rail finishing molding. Then remove each back window side garnish molding and rear quarter belt finishing molding.

4. Through access hole in each rear quarter inner panel, remove nut and washer securing rear end of roof drip and reveal molding; then, remove nut and washer securing each end of rear end reveal molding.

5. At each corner of back window, turn back lip of rubber channel and remove one nut securing upper section and one nut securing lower section of back window reveal molding.

6. Inside rear compartment, loosen front portion of rear compartment side trim at lid hinges and remove nuts and washers securing rear end reveal molding to body. Then at each end of molding, carefully insert wide-bladed putty knife or similar flat-bladed tool between lower edge of molding and body metal and carefully disengage molding with clips from body.

7. Remove screws securing each lower section of right and left back window reveal molding.

8. Slide back window top escutcheon onto right or left back window reveal molding and remove back window bottom escutcheon.

9. Across top of back window, insert putty knife or similar flat-bladed tool between rubber channel and lower edge of each reveal molding and carefully pry each molding from pinchweld-clips and remove from body.

10. To install molding, apply medium-bodied sealer around all molding attaching screw holes and reverse removal procedure.

(87) Back Window Glass and Rubber Channel Removal and Installation

a. Removal

1. Place protective covering over rear end of body below rear end reveal molding and on inside of body over parcel shelf finishing molding.

2. Remove back window upper, lower, and side garnish moldings.

3. Remove rear end and back window reveal moldings. Refer to Note 86. Using a suitable dull edge tool, break seal between pinchweld and inner lip of rubber channel around perimeter of window.

4. From inside of body, carefully push upper edge of window and rubber channel outward until lip of rubber channel is disengaged from pinchweld flange; then, with aid of helper, lift window assembly from body opening and place it on a protected bench.

5. Remove rubber channel from glass.

b. Installation

1. Clean original sealer from back window opening and rubber channel. Check pinchweld flange around window opening and correct any irregularities. Check back window gutter and drain hoses for any obstructions and clean out, if necessary.

2. Assemble rubber channel to glass. Then insert strong cord into pinchweld cavity around entire perimeter or rubber channel, tying ends together at bottom center of glass and taping cord to glass.

3. Apply bead of medium-bodied sealer completely around perimeter of rubber channel as indicated at "1" in Section "A-A", Fig. 17-52.

4. Check installation of pinchweld-clips. If replacing clips, apply medium-bodied sealer to opening rabbit as indicated at "2" in View "B", Fig. 17-52, prior to assembly.

5. Apply bead of medium-bodied sealer completely around back window opening in corner of pinchweld flange as indicated at "3" in Section "A-A".

NOTE: Where a pinchweld-clip has been replaced, apply a bead of medium-bodied sealer in corner of clip and connect this bead of sealer with sealer previously applied to rabbit of pinchweld flange as indicated at "3" in View "B", Fig. 17-52.

6. With aid of helper place back window assembly into body opening.

7. With helper applying pressure to outside surface of glass, carefully pull ends of cord inside of body to seat lip of rubber channel over pinchweld flange around the perimeter of glass.

8. Apply medium-bodied sealer to base of reveal molding bolt and clip assembly studs, and around screw holes along lower portion of reveal moldings; then install moldings.

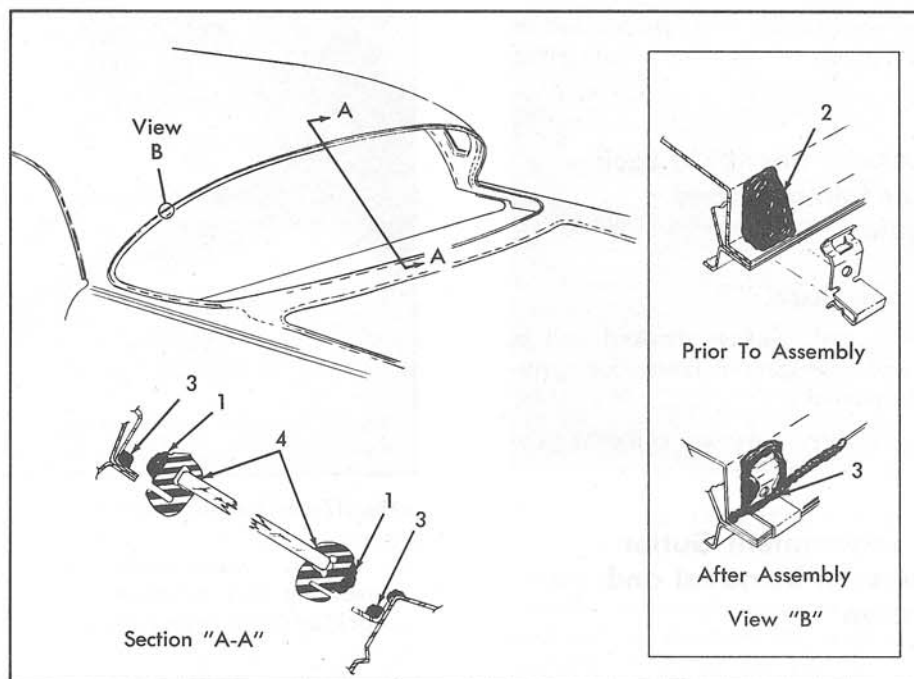


Fig. 17-52 Sealing of Back Window Assembly

9. Apply approved weatherstrip cement between glass and outer lip of rubber channel completely around perimeter of glass, as indicated at "4" in Section "A-A", Fig. 17-52.

10. Clean off excessive cement and sealer, install garnish moldings, and remove protective coverings.

(88) Rear Compartment Lid Removal, Installation and Adjustment

a. Removal and Installation

1. Open lid and place protective covering along edges of rear compartment opening to prevent damage to painted surface.

2. Remove screws securing rear compartment lid trim at each hinge location to expose hinge attaching bolts.

3. Remove screws securing rear compartment lid inner panel access hole cover and remove cover. Detach leads from harness to power closing unit and disengage harness from clips on rear compartment lid inner panel.

4. At right hinge remove harness from rear compartment lid.

5. Scribe location of hinge straps on lid inner panel.

6. Remove two bolts securing each hinge strap to rear compartment lid, Fig. 17-53. With aid of helper remove lid.

7. To install, position lid within scribe marks and reverse removal procedure.

NOTE: Check operation of power closing unit before completing installation.

b. Adjustments

1. To adjust compartment lid forward or rearward or from side to side in body opening, loosen bolts securing each hinge strap to rear compartment lid, adjust lid as required, then tighten bolts.

2. To adjust compartment lid up or down at hinge area, install shims between lid inner panel and hinge straps as follows:

a. To raise front edge of lid at hinge area, place shim between lid inner panel and forward portion of one or both hinge straps.

b. To lower front edge of lid at hinge area, place shim between lid inner panel and rearward portion of one or both hinge straps.

3. To check lid lock engagement with striker on power closing unit refer to Note 96.

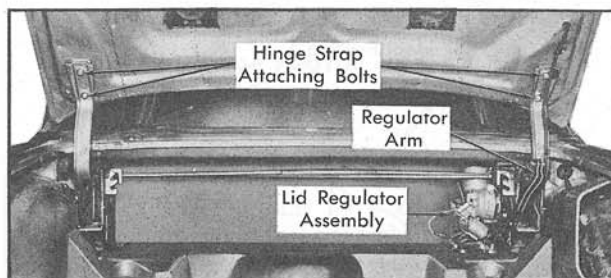


Fig. 17-53 Rear Compartment Lid Hinges

4. To adjust compartment lid guide, loosen screws and adjust guide as required, then tighten screws.

(89) Rear Compartment Lid Lock Cylinder Removal and Installation

1. Remove luggage guard.
2. With suitable tool, engage hooked end of sliding retainer and disengage it from lock cylinder; then remove cylinder.
3. To install cylinder, reverse removal procedure.

(90) Rear Compartment Gutter Weatherstrip Removal and Installation

a. Removal

1. Separate "butt" ends of weatherstrip at bottom of compartment opening and with suitable flat tool, carefully remove weatherstrip from gutter across the bottom, up the sides and across the top of compartment opening.

b. Installation

1. Check gutter around rear compartment opening to make certain surface is clean and smooth.

2. Using pressure type gun, flow bead of weatherstrip cement into outer lower corner of rear compartment gutter around entire opening as indicated by "1" in Section "C-C", Fig. 17-54.

3. Position and center weatherstrip at point "A", using color identification mark at center of weatherstrip as starting point.

4. Using flat-bladed tool with rounded corners, insert weatherstrip across top of rear compartment opening starting at color identification mark, Fig. 17-54.

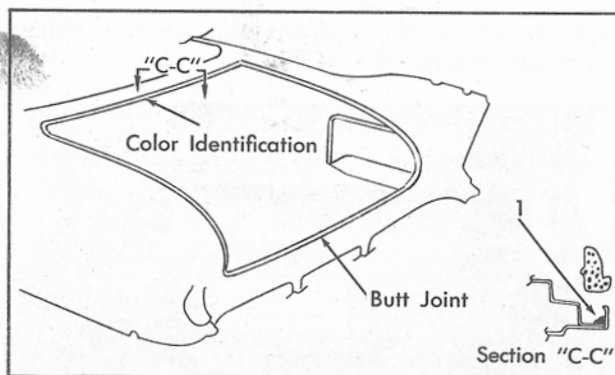


Fig. 17-54 Rear Compartment Weatherstrip

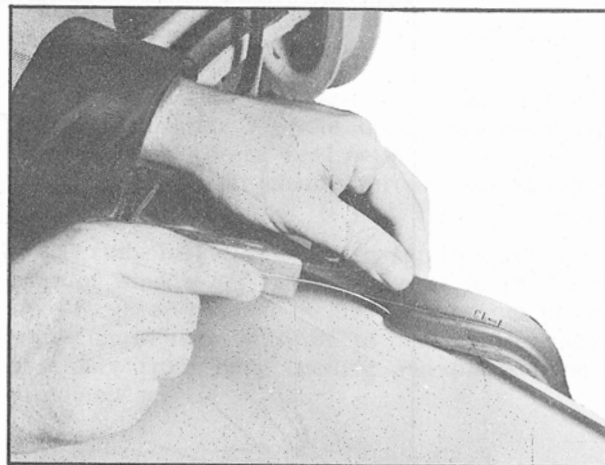


Fig. 17-55 Installing Rear Compartment Weatherstrip

NOTE: When inserting weatherstrip, apply inserting tool to inner portion of weatherstrip, working from rear compartment opening.

5. When installing remainder of weatherstrip, insert edge of weatherstrip into gutter before using inserter tool in manner shown in Fig. 17-55.

6. Trim end of weatherstrip to form butt joint at center line of body. Brush weatherstrip cement on both ends of weatherstrip and secure ends together.

(91) Rear Compartment Lid Hinge Removal, Installation and Adjustment

a. Removal

1. Place protective covering over rear compartment front panel to protect paint finish, then provide support for lid on side where hinge is to be removed.

2. On right hinge, remove retainer from hinge pin securing regulator arm to hinge strap. Remove hinge pin and two spring washers and lower regulator arm.

3. Loosen necessary trim from lid inner panel to expose hinge attaching strap. Scribe location of hinge strap on lid inner panel and remove bolts securing lid to hinge strap.

4. Loosen rear compartment trim at hinge boxes.

5. Remove screws securing hinge strap cover plate on affected hinge and remove plate. If removing right hinge, disengage wire harness from hinge.

6. With a suitable length of pipe, disengage torque rod from notched retainer on inboard face of opposite hinge box.

NOTE: Mark retainer notch before removing torque rod to insure rod is installed in same position.

7. Disengage opposite end of torque rod from lower moveable portion of hinge strap.

8. Bend up tab on hinge box at retaining pin location, remove pin, and remove hinge from box.

b. Installation

1. Position hinge in hinge box and install hinge pin. Bend over retaining tab to secure hinge pin.

2. Position hinge strap within scribe marks on lid inner panel and install attaching bolts.

3. Install "U-shaped" end of torque rod to hinge box. Make certain end of rod is engaged in hole in outboard face of hinge box.

4. Engage torque rod to hinge and engage other end of rod to correct retaining notch on inboard side of opposite hinge box.

5. Install hinge strap cover plate and install regulator arm to right hinge strap.

NOTE: If right hinge was removed, locate wire harness in original position on right hinge before installing cover plate.

6. Check alignment of rear compartment lid and make any necessary adjustments.

7. Replace all previously removed trim.

c. Adjustments

The torque rods on the rear compartment lid hinge assemblies can be adjusted to obtain the desired effort required to MANUALLY open and close the lid. With the torque rod set in Position #1, a decrease in the effort required to open the lid can be had by adjusting the torque rod to Positions #2 or #3, Fig. 17-56. A corresponding



Fig. 17-56 Torque Rod Removal and Adjustment

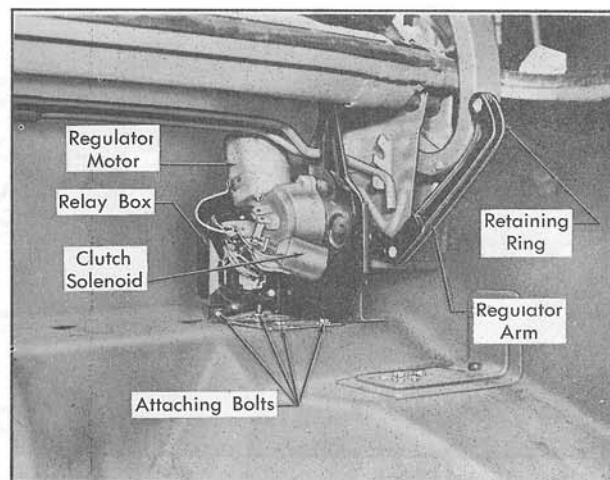


Fig. 17-57 Regulator Assembly

increase in the effort required to close the lid results from this adjustment. With the torque rod set in Position #3, a decrease in the effort required to close the lid can be had by adjusting the torque rod to Positions #2 or #1. A corresponding increase in the effort required to open the lid results from this adjustment. It is NOT necessary to adjust the left and right hand torque rods at the same time or to the same final position of adjustment.

(92) Rear Compartment Lid Motor and Regulator Assembly Removal and Installation

1. Loosen rear compartment trim at right hinge area to expose regulator assembly.

2. With suitable tool, disengage retaining ring from pin securing regulator arm; then remove pin, Fig. 17-57.

3. Disconnect wire harness from relay box, and disconnect wire leads from limit switches and regulator motor.

4. Remove bolts securing regulator support to floor pan supports and remove complete assembly from rear compartment.

5. To install regulator, reverse removal procedure. Be sure to connect wires to original locations.

(93) Rear Compartment Lid Regulator Motor and Clutch Assembly Removal and Installation

NOTE: The clutch is a component part of the regulator motor assembly which is secured to the regulator support with three screws.

1. Remove regulator assembly from body.

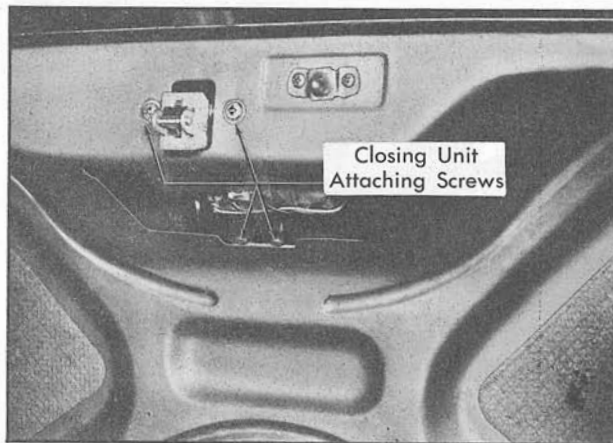


Fig. 17-58 Power Closing Unit

2. Remove three screws and cover plate securing motor and clutch assembly to support plate and remove from support.

3. To install, reverse removal procedure.

(94) Rear Compartment Lid Power Closing Unit Removal and Installation

1. Remove access hole cover from rear compartment lid.

2. Disconnect wire harness from power closing unit.

3. Remove four screws securing unit to lid; then, remove unit from between lid inner panels through access hole, Fig. 17-58.

4. To install unit, reverse removal procedure. Check operation of unit before installing access hole cover.

(95) Rear Compartment Lid Power Control Lock Assembly Removal and Installation

1. Remove luggage guard attaching screws and remove guard.

2. Disconnect wire harness from connector on lock assembly and scribe location of lock on support.

3. Remove lock cylinder; then, remove screws securing lock assembly and remove lock, Fig. 17-59.

4. To install lock, position it within scribe marks and reverse removal procedure. Before installing luggage guard, check operation of complete unit.

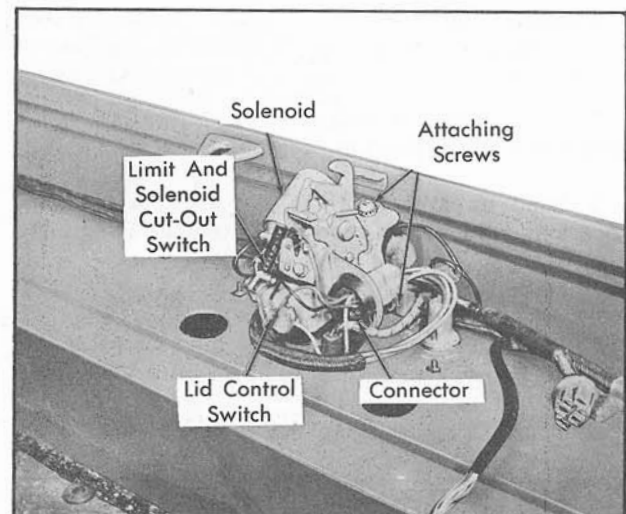


Fig. 17-59 Power Lock Assembly

(96) Power Closing Unit and Power Lock Engagement Check and Adjustment

NOTE: The power closing unit attaching holes are slotted to permit lateral and forward or rearward adjustment of the unit.

To check for proper engagement of the rear compartment lid lock bolt with the closing unit striker, use the following procedure.

1. Insert a small quantity of modeling clay at bottom of the bolt slot, Fig. 17-60, and close lid.

2. Open lid and check amount of engagement of lock bolt with striker as indicated by compression of clay. With rule, carefully measure distance between base of "U" in clay to base of "U" in lock bolt. This dimension should be 1/8" to 5/32".

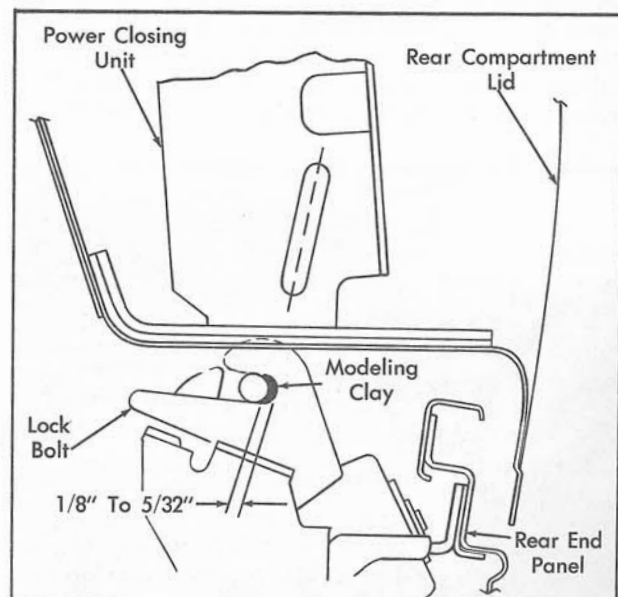


Fig. 17-60 Checking Engagement of Lock and Power Closing Unit

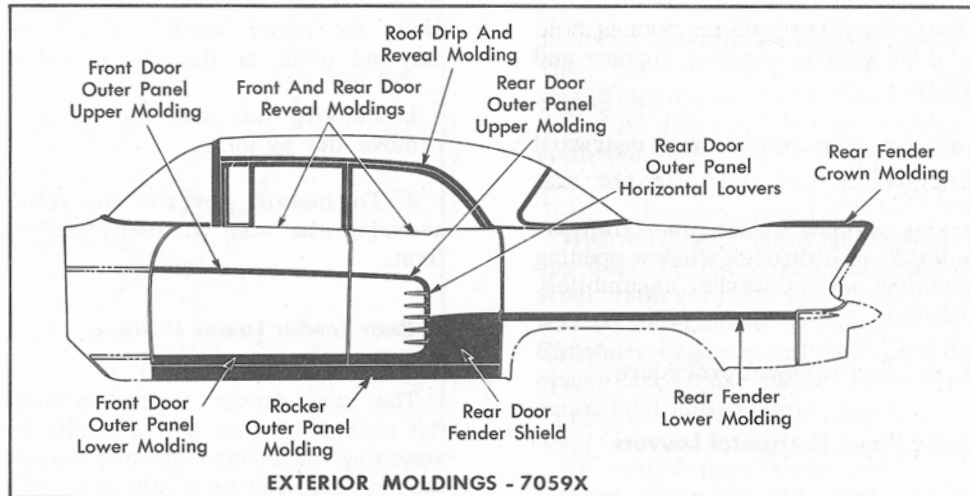


Fig. 17-61 Exterior Moldings

3. If engagement is not as specified, loosen four power closing unit attaching bolts and adjust unit as required.

IMPORTANT: The lid lock bolt should contact the center-line of the power closing unit striker when the lid is closed to insure proper operation of power closing unit. This adjustment can be checked visually by lowering the lid manually until the striker contacts lock bolt.

(97) Exterior Moldings— Removal and Installation

NOTE: The exterior moldings are secured to the body by any one of a combination of screws, clips and bolt or clip assemblies. Before removing any molding which has to be pried from the body, apply a strip of masking tape to the painted surface adjacent to the molding to prevent possible damage to the paint finish. When installing moldings apply medium-bodied sealer around the attaching holes whenever necessary. Refer to Fig. 17-61 for locations of exterior moldings.

a. Front and Rear Door Reveal Moldings

Both the front and rear door reveal moldings are secured to the return flange of the door outer panel by screws.

1. Remove the door finishing panels, access hole cover, and the window lower stop bumper.
2. On front doors also remove the door ventilator assembly.
3. Lower the window to the extreme down position.
4. Remove the screws securing the molding to the outer panel return flange and remove the molding from the door.
5. To install reverse the removal procedure.

b. Front Door Outer Panel Upper Molding

The front door outer panel upper molding is secured to the door outer panel by molding studs which are secured in place by nut and washer assemblies.

1. Remove door finishing panels, access hole cover and front door window bumper support and weld nut assembly.
2. Remove nut and washer assembly at forward edge of door.
3. Through access hole, remove second nut and washer assembly.
4. Lower window to extreme down position. Insert a suitable tool through window opening and remove remaining nut and washer assemblies; then remove molding from door.
5. To install, reverse removal procedure.

c. Front Door Outer Panel Lower Molding

The molding is secured to the door outer panel by bolt and clip assemblies and attaching nuts and washers.

1. Remove the door finishing panels and the access hole cover.
2. Remove the front attaching nut and washer at the door hemming flange; then working through the access hole remove the remaining attaching nuts and washers.
3. To install, reverse the removal procedure.

d. Rear Door Outer Panel Upper Molding

The rear door outer panel upper molding is secured to the door outer panel by molding studs which are secured in place by nut and washer assemblies.

1. Remove door finishing panels, access hole cover and rear door window bumper support and weld nut assembly.

2. Through access hole remove two rearward nut and washer assemblies.

3. After lowering window to extreme down position, place suitable tool through window opening and remove remaining nut and washer assemblies. Then remove molding.

4. To install, reverse removal procedure.

e. Rear Door Outer Panel Horizontal Louvers

Each of the louvers is secured to the rear door outer panel by two molding studs. The forward stud is secured to the inner side of the door outer panel by a Tinnerman nut, while the rear stud is secured by a nut and washer.

1. Remove the door finishing panels, and access hole cover.

2. Remove the Tinnerman nut with a flat-bladed tool; then remove the nut and washer and remove the louver from the door.

3. To install, reverse the removal procedure.

f. Rear Door Fender Shield

The rear door fender shield is secured to the door outer panel by nuts and washers.

1. Remove the rear door finishing panels and access hole cover.

2. From inside the door remove the attaching nuts and sealing washers securing the shield and loosen the lowermost nut securing the rear fender lower molding.

3. Along the hemming flange at the rear of the door remove the remaining nuts and lock washers, then remove the molding.

4. To install, reverse the removal procedure.

g. Rocker Outer Panel Molding

The molding is attached to the rocker panel by screws.

1. Remove the front and rear door sill plates; then remove the screws securing the upper and lower edges of the molding and remove the molding.

2. To install, reverse the removal procedure.

h. Rear Fender Crown Molding

The rear fender crown molding is secured to the inner side of the fender by nuts and washers

along the upper portion of the molding and by a nut and plate at the lower end of the molding.

1. Remove the nuts and washers or plate and remove the molding.

2. To install, reverse the removal procedure securing the stud at the "Vee" in the molding first.

i. Rear Fender Lower Molding

The rear fender lower molding is secured to the rear fender by bolt and clip assemblies with attaching nuts and washers along the length of the molding and by a clip assembly located at the forward end of the molding.

1. Remove the nut and washer assemblies; then slide the molding forward to disengage the molding from the clip and remove the molding.

2. To install, reverse the removal procedure.

j. Roof Drip and Reveal Molding

The roof drip and reveal molding is secured to the side roof rail by self-tapping metal screws and to the rear quarter panel by a bolt and clip assembly.

1. Remove the side roof rail weatherstrip and retainer, rear seat cushion and back, back window side garnish molding and the rear quarter belt finishing molding.

2. Through the access hole on the inside of the body remove the nut, washer and sealing washer that secures the end of the molding to the rear quarter outer panel.

3. Remove the screws securing the molding to the side roof rail and remove the molding.

4. To install, first apply a bead of medium-bodied sealer along the entire length of the molding at the two locations indicated by "1" and "2" in Fig. 17-62; then reverse the removal procedure.

NOTE: Prior to installing the side roof rail weatherstrip retainer, apply a bead of medium-bodied sealer along the entire length of the retainer at the location indicated by "3" in Fig. 17-62.

(98) Stainless Steel Roof Panel

The stainless steel roof panel is entirely new in appearance and involves new service procedures. The stainless steel used in the fabrication of the roof panel has many characteristics unlike those of mild steel. For example, it is

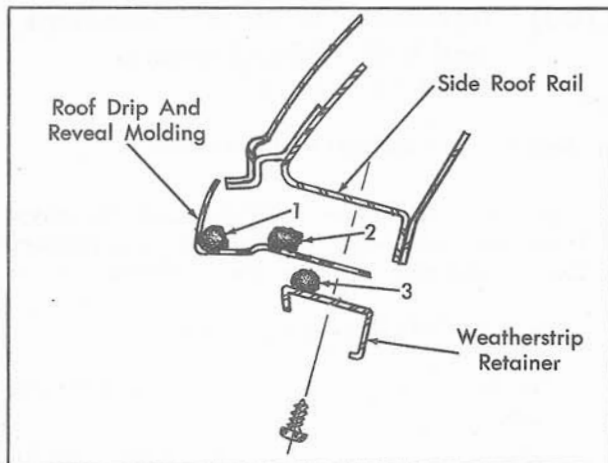


Fig. 17-62 Sealing Roof Drip Reveal Molding

approximately two and one-half times as hard as the mild steel used in other roof panels which results in a noticeable increase in the amount of corrective force required to straighten the metal. As the straightening operations progress, the metal will have a tendency to become increasingly harder due to the work hardening characteristics of this type of stainless steel. If prolonged hammering is performed in one area, the metal will work harden to the extent that it may crack or split. For this reason all straightening operations should be carefully organized to minimize the amount of hammering. The effects of heat when applied as a corrective force must also be taken into consideration during the repair operation. The heat distortion problem encountered when working mild steel is much greater when working stainless steel, which has a high rate of thermal expansion and a low rate of heat conductivity. Any excessive concentration of heat applied to the panel will cause heat distortion or buckling in the panel. The temperature required to distort this type of stainless steel is far below the normal temperatures used for solder filling operations on mild steel.

In view of the above facts, the application of heat as a corrective force is recommended only under carefully controlled conditions. For example, shrinking can be performed by a skilled metal man if only small areas are involved. Do not try to shrink large areas with one large shrink spot; rather use two or three smaller spots to eliminate the possibility of excessive heat distortion. Avoid rapid quenching of shrinks as much as possible. Many of the small shrinking operations require no quenching at all.

a. Roughing

The roughing operations recommended for stainless steel are basically the same as those used when working mild steel. All of the characteristics of the metal should be taken into consideration and the damaged area carefully diagnosed before the repair operations are

started. The hand tools required are the same as those used on mild steel, with one exception. The vixen file used for mild steel and solder should not be used on stainless steel. The cutting action of this type of file is much too coarse for stainless steel. Use a Heller's #3001 curved lathe file for all filing operations to be performed.

Hydraulic body jacks and various body jack hook ups may be used very successfully on stainless steel, however, the application of these hook ups will be determined by the severity of the damage. Carefully organize all jack hook ups so as not to create additional panel distortion as this could cause additional rework time.

As stated previously, heat applied as a corrective force is not recommended, therefore, avoid the use of heat during all phases of the roughing operation.

Welding operations, using standard oxyacetylene welding equipment, can be performed only in certain areas by an experienced welder. Refer to Note 101b. Welding is not recommended on any exposed area of the roof panel, due to the distortion and discoloration of the steel which will result.

b. Bumping

The best results are achieved using standard hammer and dolly methods. Avoid picking during the bumping operation as this may cause additional panel distortion. One very important fact to be remembered during all phases of the repair operation is the roof panel will not be painted at the conclusion of the repair. Therefore, extreme caution must be exercised throughout the repair operation and the recommendations carefully followed. The use of power tools, such as disc sanders, should be avoided during the bumping operations. The sanding pattern produced by the disc sander is objectionable and very difficult to remove from stainless steel.

c. Metal Finishing

During metal finishing, all surface irregularities such as small high and low spots, and scratches, are removed to prepare the surface for the final abrasive line finish. As stated in the roughing section, use standard hammer and dolly methods and use the Heller's #3001 curved lathe file for all filing operations. File only in the direction of the original abrasive line finish. The use of a belt sander is recommended during metal finishing for the final smoothing of the metal, however, the surface can be finished using a hand sanding block. All sanding must be done in the direction of the original abrasive lines.

For the application procedure concerning the final abrasive line finish, refer to Note 100b.

(99) Cleaning of Stainless Steel Roof Panel

Recommendations for stain removal are as follows:

a. Paint Stains

Paint stains can be removed using lacquer thinner or lacquer removing solvent. Undercoats, if air dried, are soluble using a volatile cleaner; if baked, lacquer thinner or removing solvent can be used. When stains have been removed, wash with mild soap and water and wax area.

CAUTION: Care should be taken to prevent thinner or lacquer removing solvents from contacting painted surfaces of the body.

b. Body Adhesives, Sealers, Road Tar, Oil Stains and Old Wax

Body adhesives, sealers, road tar, oil stains and old wax can be removed using a good grade volatile cleaner. After removing stains, the area should be washed using mild soap and water, then dried thoroughly to prevent water spots. Wax the affected area.

CAUTION: When using volatile cleaners work in a well ventilated area and avoid breathing fumes. DO NOT USE VOLATILE CLEANERS NEAR SPARKS OR OPEN FLAMES. VOLATILE CLEANERS FOR THE MOST PART ARE HIGHLY INFLAMMABLE MATERIALS.

c. Road Grime, Hand Prints, Perspiration Stains, Tree Sap, etc.

Road grime, hand prints, perspiration stains, tree sap, etc. that cannot be removed with mild soap and water can be removed using a mild household cleaner. It is important that this material be used in a direction parallel to the abrasive line finish to avoid scratches or highlights on the panel. When stains have been removed, wash area with mild soap and water, dry, and wax surface.

d. Procedure For Waxing Stainless Steel Roof Panel

The procedure for waxing the stainless steel roof panel is the same as that used when waxing painted surfaces, with one exception. When removing excess wax, do not use a circular motion, polishing must be done only in the direction of the abrasive line finish. A good grade of wax such as Cadillac Blue Coral Sealer should be used. DO NOT USE LIQUID OR POWDERED WAXES.

CAUTION: Do not attempt to use a power polisher or buffer for this waxing operation. Power polishing will produce undesirable highlights on the panel.

(100) Removing Scratches, Abrasions and Refinishing Stainless Steel Roof Panel

a. Removal of Scratches and Abrasions

NOTE: To remove scratches and abrasions from stainless steel top, it will be necessary for Servicemen to have the following items:

Heller's #3001 curved lathe file.

(1) Belt sander (Sill #449 or comparable type unit).

Sanding belts #80, #100, #150, #180 and #220.

Water pail or bucket, sponge or rags.

(1) Rubber cushioned hand sanding block.

(1) Guide fixture.

(1) Aluminum faced sanding block.

Aluminum oxide cloth #120 grit.

1. Using a Heller's #3001 curved lathe file, carefully file in the direction of the original abrasive line finish to remove scratch. Use only fore and aft strokes. Considerable rework time is required to eliminate any file marks not in the direction of the original finish. Keep filing operations confined to the smallest possible area.

2. After the filing operations have been completed, the area must be belt sanded to insure proper smoothness of the surface. The belt sanding operation is started with a #80 grit belt, followed by #100, #150, #180 and #220.

CAUTION: Do not use a disc type sander for this operation. The sanding pattern created by this type of sander is very difficult to remove during final finishing.

3. Begin the belt sanding operation by placing the sander on the roof panel and moving fore and aft in the direction of the original finish. Do not use excessive downward pressure on the sander as this may heat the panel and cause distortion. To insure finishing without heat distortion, the surface should not be permitted to become uncomfortably warm when touched. The surface can be kept cool by using a sponge or rag and cold water. Continue belt sanding until there are no traces of the original scratch or damage.

4. The belt sanding operation is followed by hand sanding. Use a wood block to which a soft rubber pad has been cemented, Fig. 17-63, and #120 aluminum oxide cloth for this sanding operation. Carefully place block on panel in repair area, hold block firmly to panel and use fore and aft strokes as in Steps 1 and 2. Continue to block

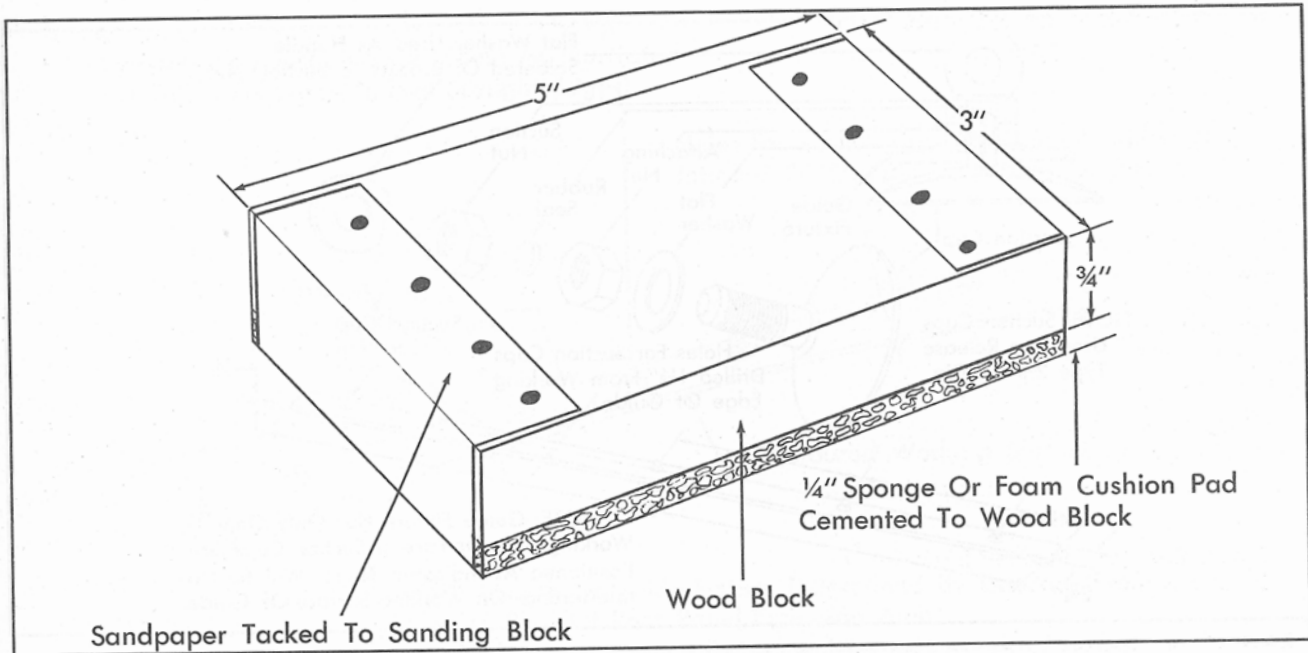


Fig. 17-63 Wooden Hand Sanding Block

sand in this manner until there are no scratches visible other than those being made by this sanding operation. Any visible scratches not in the direction of the abrasive line finish must be completely removed.

IMPORTANT: The abrasive lines which will be applied to the panel are very important since this will be the final finish. The pattern must blend accurately with the original finish, and the parallelism of the lines must be maintained.

b. Refinishing Roof Panel

NOTE: The application of the abrasive line finish requires two pieces of equipment; a

straight edge guide fixture which makes possible the application of the straightline finish and the aluminum faced sanding block used in conjunction with the guide fixture. Both pieces of equipment may be constructed as shown in Figs. 17-64 and 17-65.

1. Place the guide fixture on the roof panel. Carefully align the straight edge of the guide on one side of the repair to the original pattern of abrasive lines. Depress the suction cups to secure guide in position. Insert on the sanding block a sheet of #120 aluminum oxide cloth. Place the block with the aluminum face extending 4" or 5" into the original finish. At the end of each stroke, lift block from panel to prevent tails or

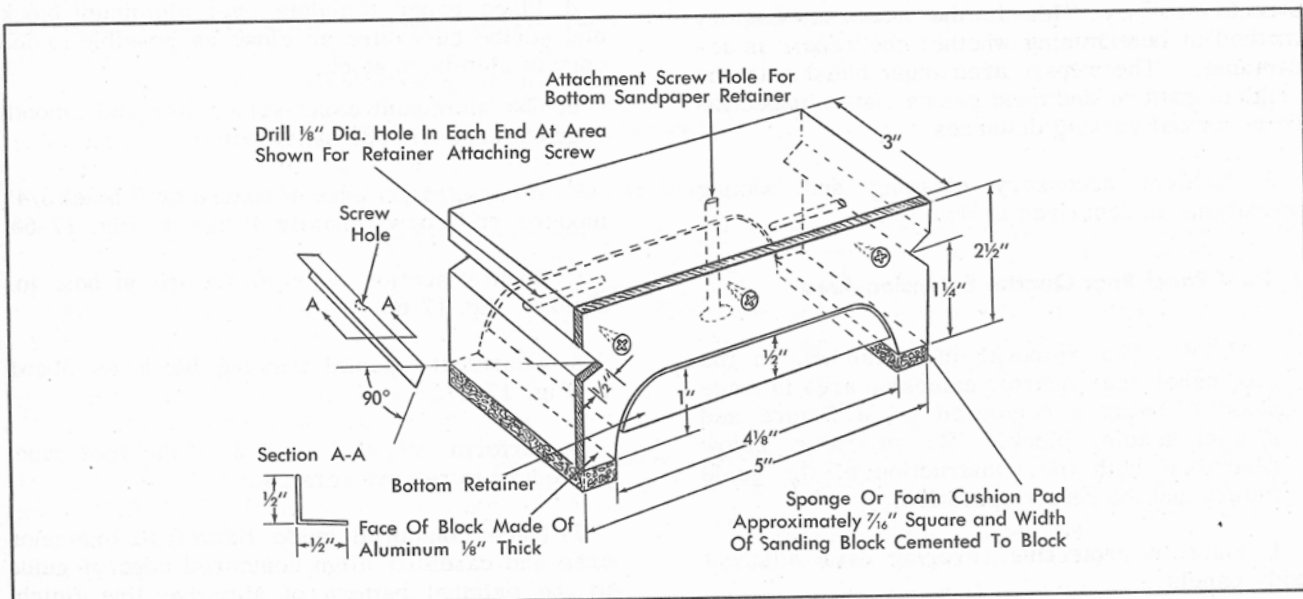


Fig. 17-64 Aluminum Hand Sanding Block

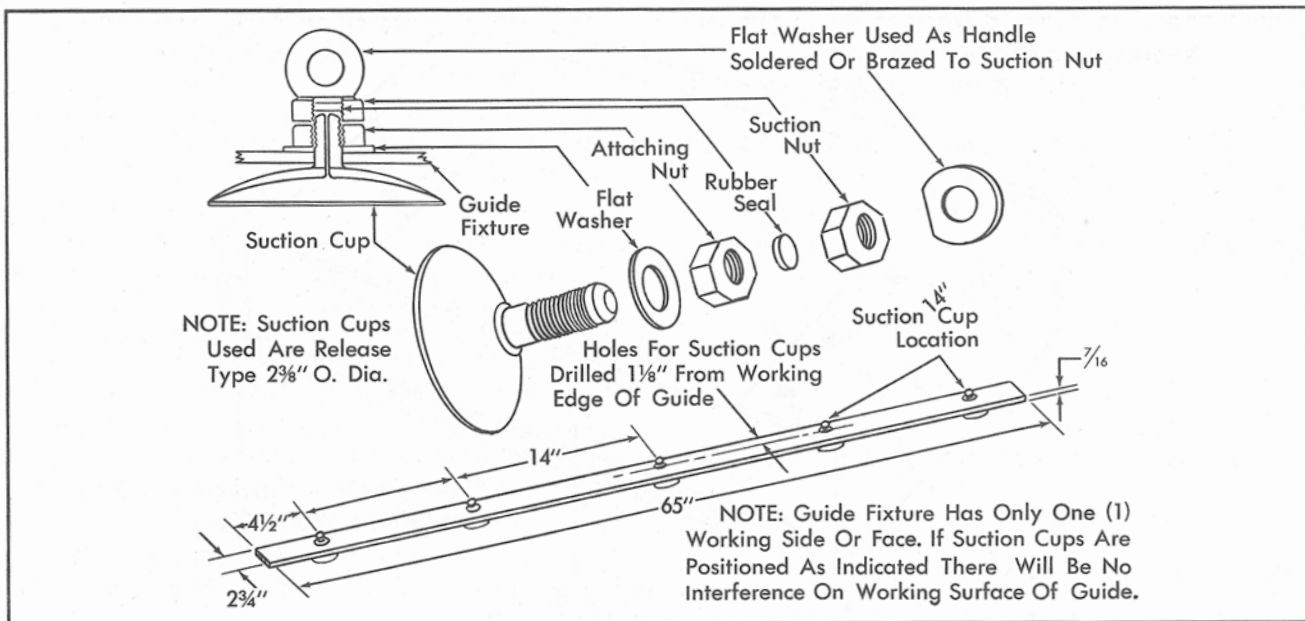


Fig. 17-65 Sanding Guide Fixture

tiny swirl marks. This will produce the necessary blending of the new finish to the old which is very important if a satisfactory repair is to be achieved.

NOTE: It is important that block be held firmly against the guide during the sanding operation to insure a uniform straightline finish. Continue by moving the guide fixture across the repair area, overlapping each increment by $\frac{1}{4}$ of its width.

IMPORTANT: Change abrasive cloth on block frequently to insure a uniform pattern or cutting action.

2. When Step 1 has been completed, remove guide fixture and view the repair area from different angles. This is the most satisfactory method of determining whether the repair is acceptable. The repair area must blend with the original pattern and must pass a visual inspection from normal viewing distances.

3. Perform necessary cleaning and waxing operations as described in Note 99.

c. Roof Panel Rear Quarter Extension Area

NOTE: The removal of scratches in the roof panel rear quarter extension area is made possible using a contoured guide fixture and special sanding block. The procedure below describes both the construction of the guide fixture and the repair operation.

1. Place a protective covering over adjacent body panels.

2. Remove roof drip and reveal moldings.

3. Remove back window and reveal moldings.

4. Construct contoured guide fixture as follows:

a. Place a piece of transparent paper over the roof panel extension area covering the damaged area and extending from front to rear of extension. Secure paper with masking tape.

b. Trace curvature of original abrasive line finish in affected area. Remove paper template from body.

c. Obtain aluminum stock $\frac{3}{16}$ " thick, 4" wide, and of sufficient length to extend from front to rear of roof panel extension area.

d. Place paper template over aluminum stock and scribe curvature as close as possible to one edge of aluminum stock.

e. Cut aluminum along scribe line and smooth edges using a file and sandpaper.

f. Along straight edge of fixture drill holes $\frac{3}{4}$ " inboard and approximately 4" apart, Fig. 17-66.

g. Secure suction cups to fixture at hole locations, Fig. 17-66.

5. Construct special sanding block as shown in Fig. 17-67.

6. Perform Steps 2 and 3 of the roof panel procedure to remove scratch.

7. Place contoured guide fixture in extension area and carefully align contoured edge of guide to the original pattern of abrasive line finish. Depress suction cups to secure guide fixture in position.

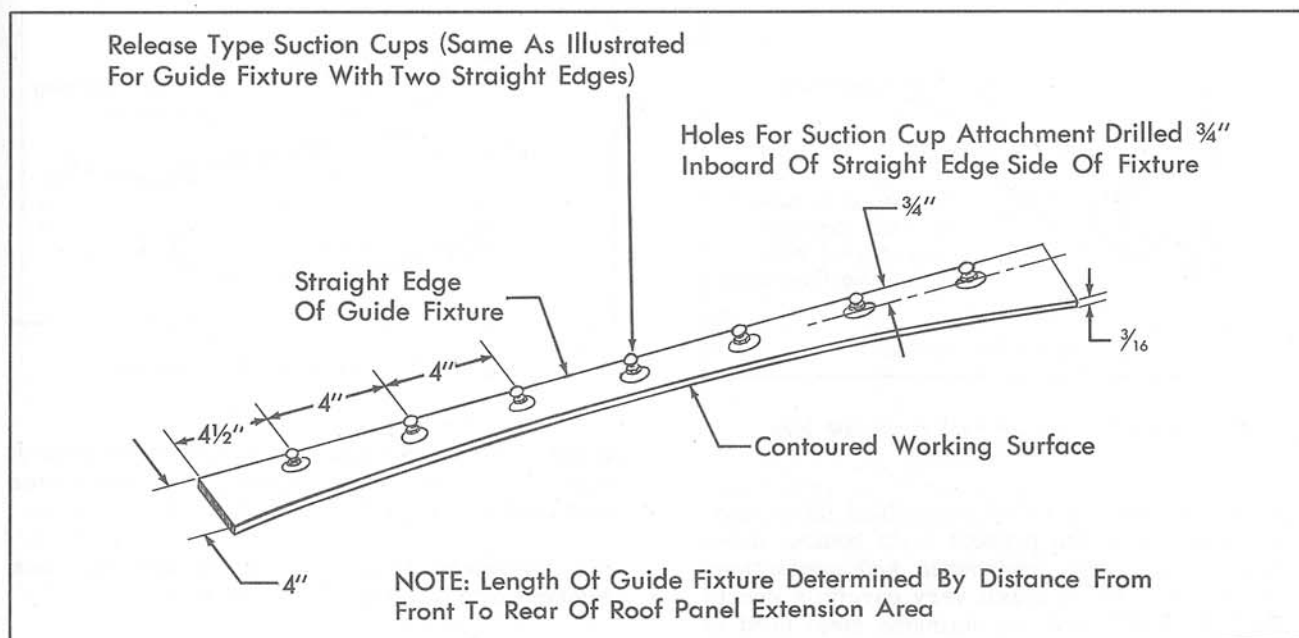


Fig. 17-66 Roof Panel Sanding Guide Special Fixture

8. Place sanding block firmly against contoured edge of fixture and make three or four strokes extending from front to rear of extension. Continue until pattern of abrasive lines being made matches the original finish. Use #120 grit aluminum oxide sandpaper for this operation.

9. Continue by moving guide fixture down extension area overlapping each increment by $\frac{1}{4}$ of its width.

10. Install previously removed parts.

11. Perform necessary cleaning and waxing operations as described in Note 99.

NOTE: In the removal of scuff marks and minor abrasions, it is not always necessary to

perform file and belt sanding operations. If the abrasion is of a minor nature, the finish can be restored using only hand sanding operations. For this type of repair use the rubber cushioned sanding block, followed by the aluminum faced block and guide fixture as outlined in Step 4 of Note 100a.

(101) Removal and Installation of Stainless Steel Roof Panel

NOTE: The following has been prepared in order to present a recommended service procedure covering the replacement of the stainless steel roof panel. While the procedure, in

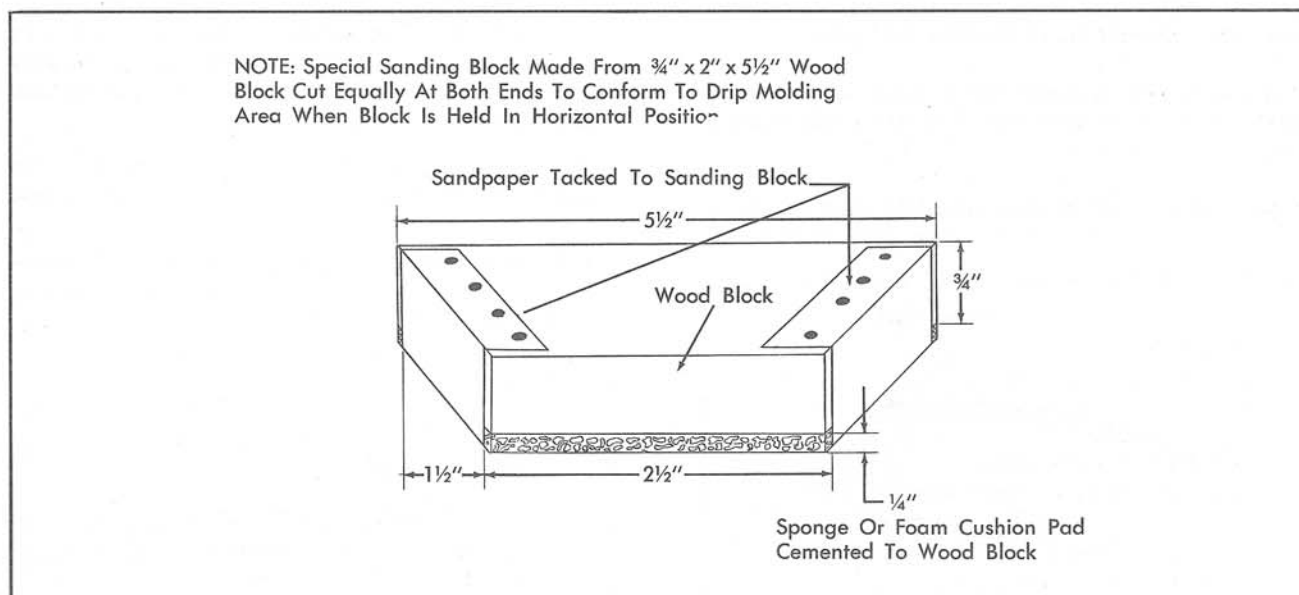


Fig. 17-67 Sanding Block for Roof Panel Extension Area

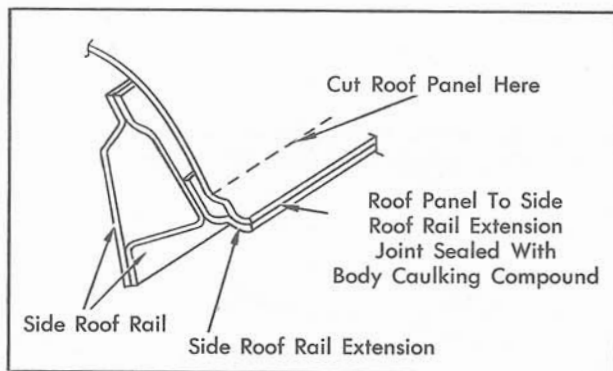


Fig. 17-68 Removal of Roof Panel and Side Roof Rail Extension

some respects, closely resembles those used on some past and present style bodies, there are certain new procedures and precautions which must be followed very carefully due to the new design and the stainless steel used in this roof panel.

a. Removal

1. Remove the front seat assembly from the adjusters. Also remove the rear seat.
2. Remove the door assemblies.
3. Remove the windshield glass and moldings.
4. Remove the back window and moldings.
5. Remove the sun visors, side moldings, and headlining.
6. Remove the roof drip and reveal moldings.
7. Before proceeding with the removal of the roof panel, it is important that all body alignment and necessary roughing operations be completed to insure a proper fit of the new roof panel.
8. Cut the roof panel along the sides approximately one inch above the drip moldings; using a panel or impact cutter, Fig. 17-68.
9. Drill the spot welds in the following locations in the order listed below. Use only high-speed

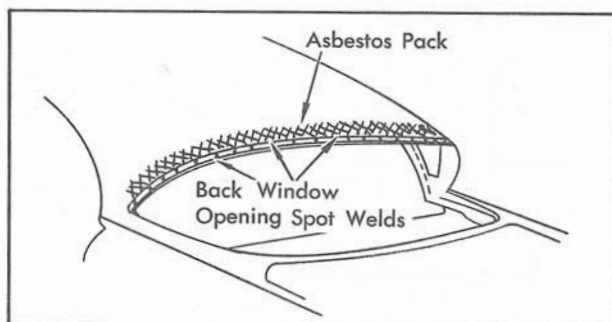


Fig. 17-69 Roof Panel at Back Window

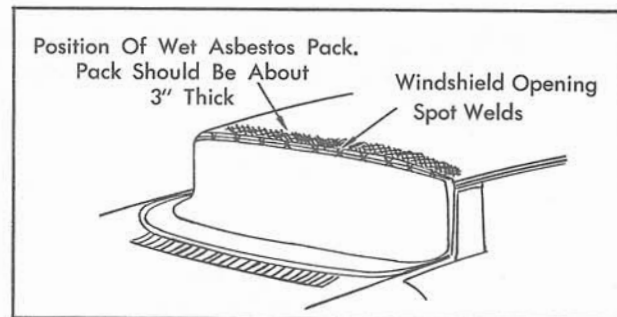


Fig. 17-70 Roof Panel at Windshield

drills. When the drilling has been completed, separate the roof panel, using a spot weld cutter or a chisel.

a. Pinch weld flanges of windshield and back window openings, Fig. 17-69 and 70.

b. Lower portion of roof panel extensions, Fig. 17-71.

c. Welds securing side roof rail extensions to side roof rail, Fig. 17-72.

NOTE: Scribing a line along the upper edge of the side roof rail extensions before drilling the welds, will aid in aligning the new extensions.

b. Installation

1. Drill holes, approximately 1-1/2" apart, along the center of the new roof panel extension attaching flange with a 1/4" drill, Fig. 17-73.
2. Align the new extension to the side roof rail and clamp it in position, using vise grip or welding pliers. Weld the extension to the side roof rail at the holes.

CAUTION: The welds in this area are very important since the roof panel depends largely on this area for the necessary strength and rigidity.

3. Install the new roof panel; placing the side flanges on the new side roof rail extensions and

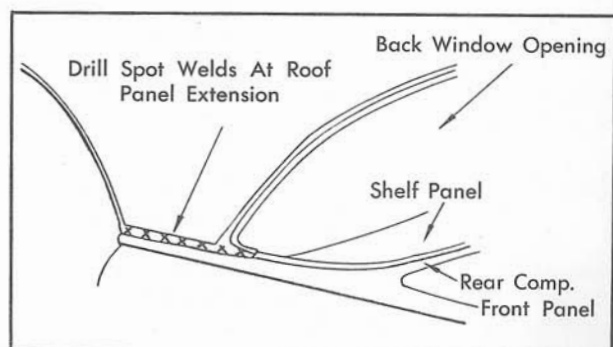


Fig. 17-71 Removal of Roof Panel at Rear Quarter

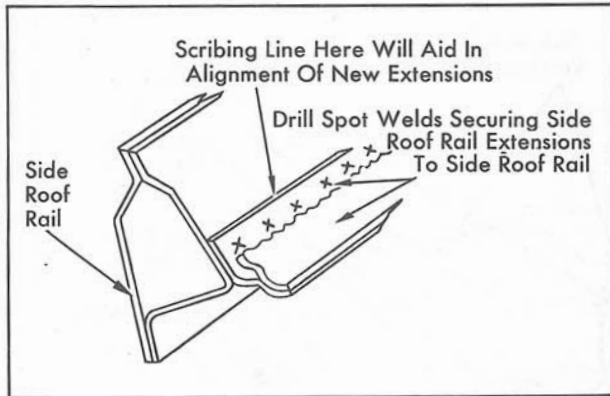


Fig. 17-72 Removal of Side Roof Rail Extension

mating the front and rear flanges with the windshield inner upper frame and reinforcement and the back window opening inner panel and reinforcement. Use vise grip or welding pliers to secure the roof panel at the front and rear.

4. Align the new roof panel to the side roof rail extensions so that the edges are flush from front to rear, and clamp it in position. Obtain powdered asbestos, wet it with water and pack the roof panel at the side roof rail areas. Use cold water as a coolant with the powdered asbestos to avoid heat distortion. For thickness and position of packs, refer to Fig. 17-74. Before starting the welding operation, re-check all body alignments to insure proper fit of the windshield, back glass, and doors. Using standard oxyacetylene welding equipment, tack weld the roof panel to the side roof rail extensions at 6" intervals from front to rear. The application of a fusion weld in this area has been found to produce the most satisfactory results.

NOTE: A fusion weld may be defined as the joining of two or more pieces of sheet metal by melting and flowing together the edges. No rod is used for this type of operation.

CAUTION: Extreme care must be exercised during this welding operation - keep the powdered asbestos wet at all times. Do not let the flame of the torch come in contact with the roof

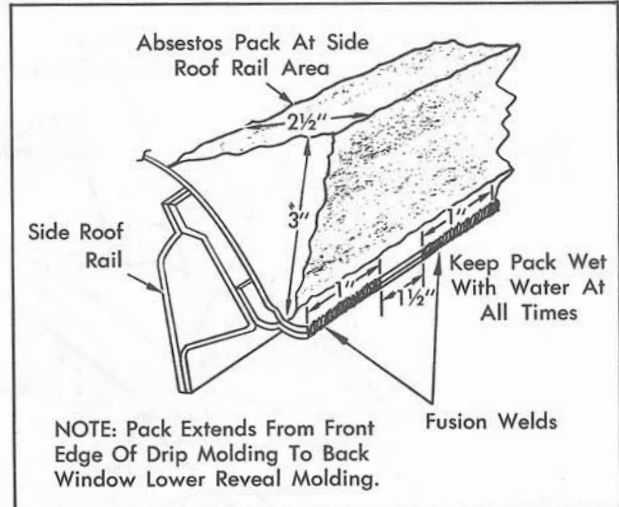


Fig. 17-74 Installation of Roof Panel to Side Roof Rail Extension

panel above the asbestos pack at any time, as this could cause heat distortion and considerable re-work time would be required.

5. After the roof panel has been tack welded along both sides to the extensions, proceed by placing the fusion welds 1" long at 1-1/2" intervals from front to rear along the roof panel.

6. When the sides are completed, carefully check the alignment of the roof panel at the windshield and back window openings to insure that the edges along the pinchweld flanges are flush. Using wet asbestos, place a pack extending from the front edge of the rabbet section inboard approximately 3". This pack, if properly placed, will eliminate any concentration of heat on the top or the exposed section of the roof panel during the welding operation. Tack welds should be placed at the windshield and back window openings at 6" intervals. Refer to Figs. 17-69 and 17-70 for the proper position of the asbestos pack. As used along the sides of the roof panel, the fusion weld is found to be the most effective in this area.

7. After welding operations have been completed at the front, rear, and along the sides, the welds should be finished using a curved mill file.

8. Attach the lower edge of the roof panel extension to the rear quarter side outer panel, Fig. 17-71, using 6 cross-recess truss head screws 1/2" long. The screws should be spaced evenly in this area to insure proper support of the roof panel.

CAUTION: Use only those screws recommended in this procedure. The above specified screws are used to insure proper molding fit at the quarter area.

9. Seal the roof panel-to-side roof rail extension joint with body caulking compound as required. Fig. 17-68.

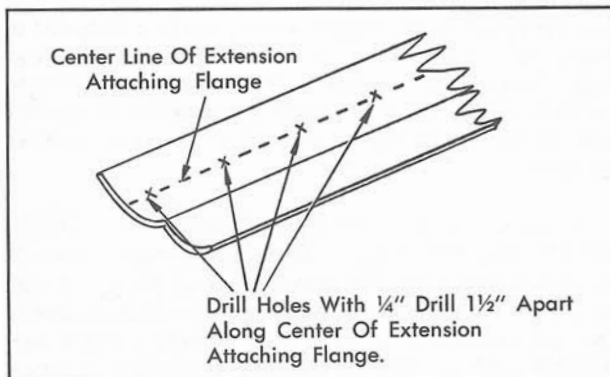


Fig. 17-73 Installation of Side Roof Rail Extension

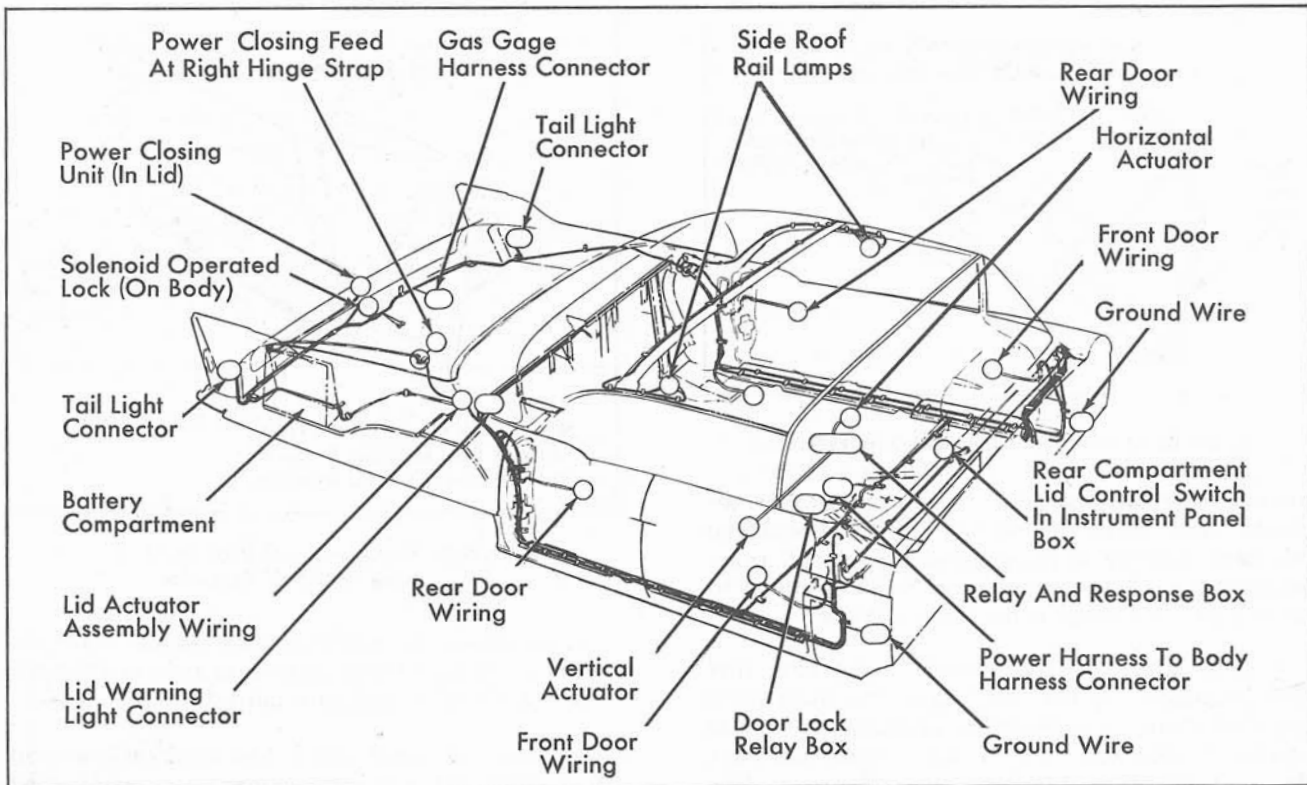


Fig. 17-75 Body Wiring

10. Install the roof drip and reveal molding and seal as required.

11. Clean and wax the roof panel.

12. Reverse operations 1 through 5 of removal procedure.

(102) Body Electrical Circuits

NOTE: The major electrical circuits incorporated in the 7059 series are as follows:

1. Power Window and Ventilator Circuit
2. Door Lock Circuits
3. Rear Compartment Lid Power Unit Circuit
4. Automatic Seat Circuit

All of these circuits are powered by a twelve volt battery which is installed at the right side of the rear compartment. The routing of the body harness is shown in Fig. 17-75. Each of the circuits is set up separately with typical conditions and corrective steps which are described in the following notes. In cases of complete electrical failure, check the battery as described in Section 12, Note 5.

(103) Power Window and Ventilator Circuit

The power window circuit for the 7059 is very similar to the power window circuits used in other

series Cadillac cars, as shown in the circuit diagram, Fig. 17-76. The electrical circuit to the power ventilator motor is very similar to that of the power window motors; therefore, the trouble shooting procedures are the same as outlined for the power window circuits as described in Section 17, Note 94 of the 1957 Shop Manual.

(104) Door Lock Circuits

The electrical circuits which are controlled by the door lock relay box, located beneath the right side of the front seat cushion, are shown in Fig. 17-77.

The circuits shown and the purpose of each circuit are listed below.

1. **DRIVE SELECTOR LOCK CIRCUIT** - The selector lock is energized when a switch secured to each rear door lock, is actuated by opening the rear door. The purpose of the drive selector lock is to prevent the drive lever from being shifted to one of the drive positions while the rear door(s) is open.

2. **REAR DOOR REMOTE CONTROL FREE-WHEELING CIRCUIT** - The free-wheeling circuit is completed when the drive lever is placed in one of the drive positions. With the circuit completed, the solenoids on the rear door remote control assembly are energized, thereby providing a free-wheeling movement of the remote control knob. The purpose of this feature is to prevent the rear

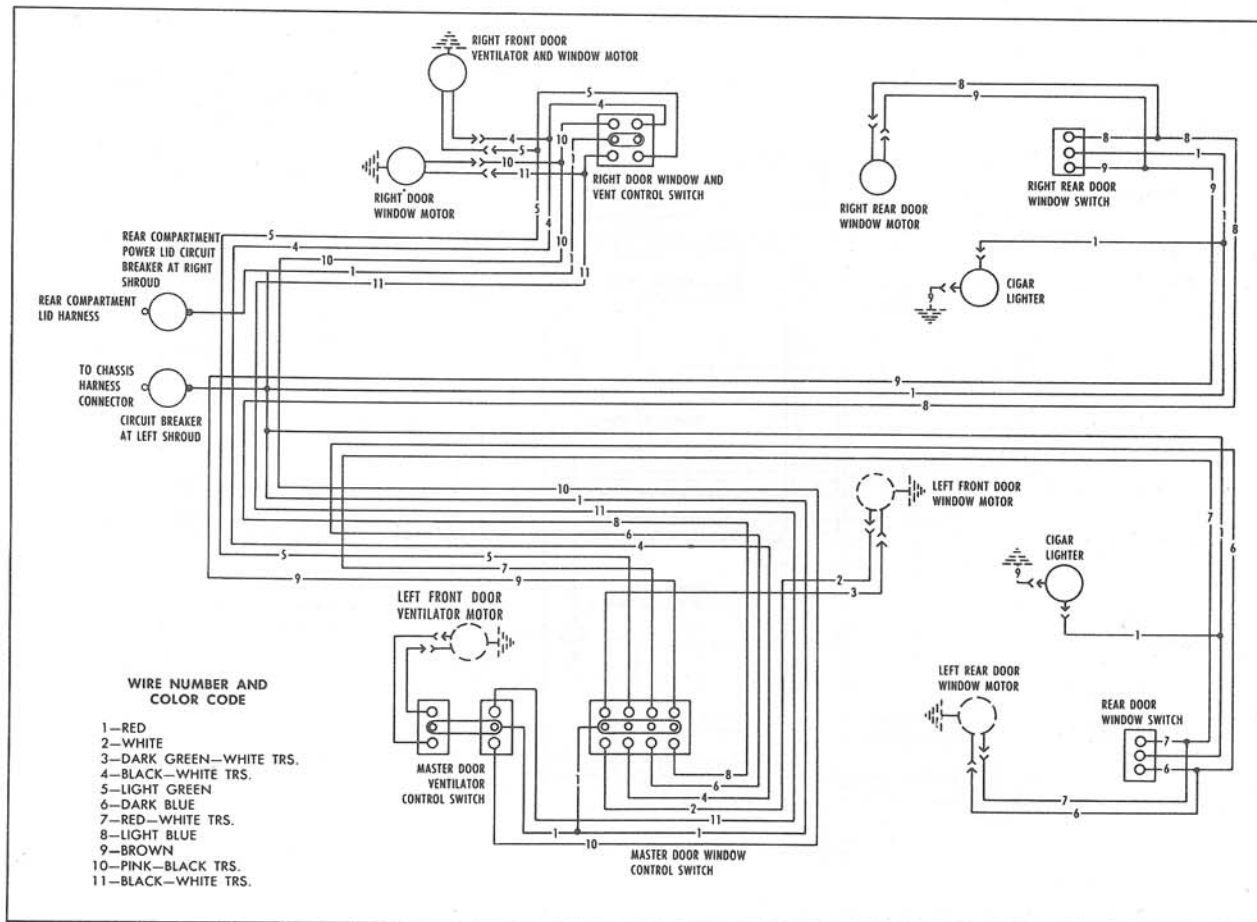


Fig. 17-76 Door Window and Ventilator Circuit Diagram

doors from being opened from inside the body while the car is in motion.

3. DOOR INSIDE REMOTE LOCKING CIRCUIT - The circuit is completed by Relay "C", Fig. 17-77, which is energized when the plunger on either front door inside locking switch lever is depressed. The relay provides current to a locking solenoid in each of the four door locks. The purpose of this feature is to provide simultaneous locking of all four doors by actuating one switch. To unlock the doors, it is necessary to unlock each door individually by actuating the inside locking levers manually.

4. SIDE ROOF RAIL LAMP AND COURTESY LIGHT CIRCUIT - The circuit is completed by Relay "A", Fig. 17-77, which is energized when one of the door jamb switches is actuated by opening the door.

5. CAR LEVELING SYSTEM CIRCUIT - The circuit is completed by Relay "B", Fig. 17-77, which is energized when one of the door jamb switches is actuated by opening the door. For information concerning the Car Leveling System, refer to Section 4.

NOTE: In cases where none of the above listed circuits is operating properly, the condition is probably caused by a defective lock

relay box assembly or an open circuit breaker between the relay feed from the circuit breaker to the relay box. Check engagement of harness connectors before proceeding with an extensive checking procedure.

(105) Door Lock Circuit Trouble Shooting

a. Drive Selector Lever Lock Circuit

For information concerning the operation of the selector lever, refer to Section 12. The safety interlock switch, Fig. 17-78, which completes the drive selector lever lock circuit and thereby actuates the selector lever lock is secured to the rear door lock, and is incorporated in the same jamb switch which completes the map lights and side roof rail lamp circuits. A three way connector which is exposed after the door panel access hole cover is removed, is used to connect the wires from the body harness to the switch. In the event of an electrical failure, the connectors should be checked for proper attachment.

b. Door Inside Remote Control Locking System

The circuit for the locking system is shown in the master diagram, Fig. 17-77, and is also shown

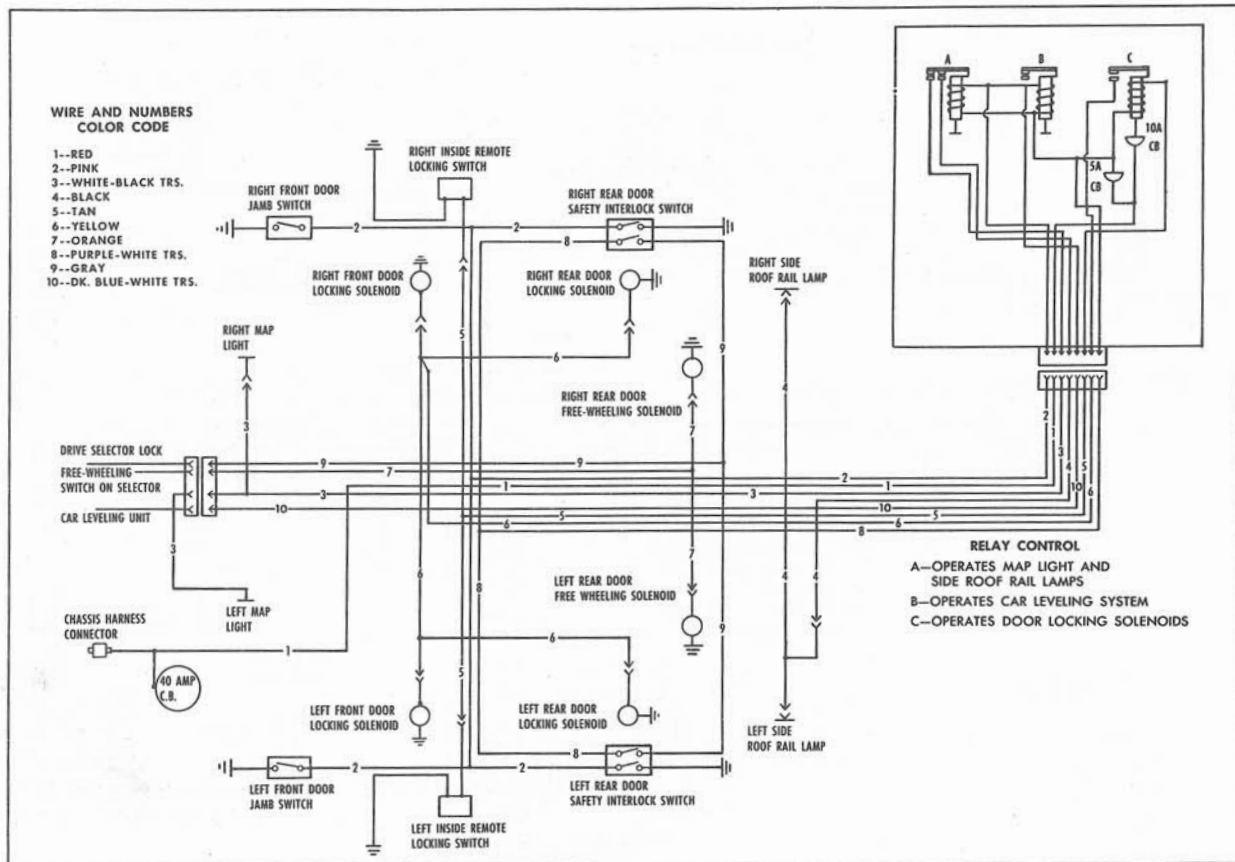


Fig. 17-77 Door Lock Relay Box and Related Circuits

separately in Fig. 17-79. The system operates electrically as follows:

When the switch plunger on the locking lever

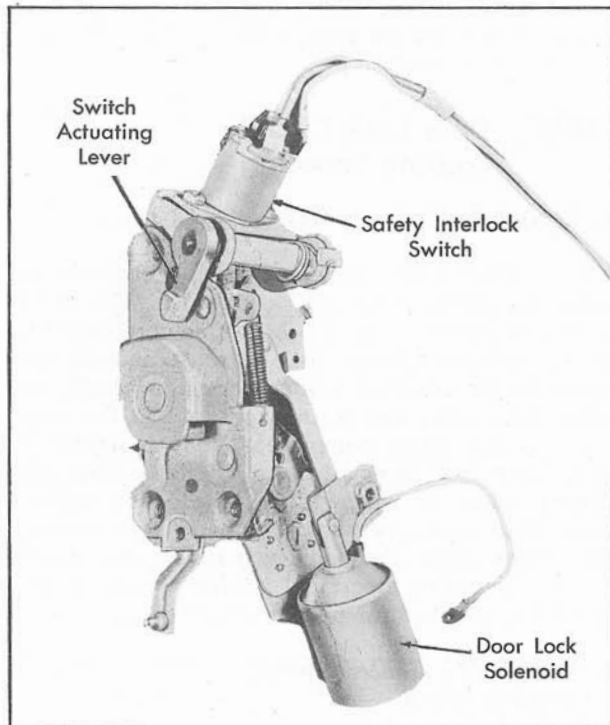


Fig. 17-78 Rear Door Lock

of either front door is actuated, the field circuit of Relay "C" is grounded, thereby closing the contacts of Relay "C", Fig. 17-77, and providing current to the lock solenoids in all four doors. When the door lock solenoids are energized, the lock levers are moved to the locked position. To unlock the doors, each locking lever has to be actuated separately.

c. Rear Door Remote Control Free-Wheeling System

The circuit for the rear door remote control free-wheeling system is shown in the master diagram, Fig. 17-77, and is also shown separately in Fig. 17-80. The system operates electrically as follows:

When the drive lever is placed in one of the drive positions, the switch on the shift lever is actuated and the circuit to the remote control solenoids is completed, thereby energizing the remote control solenoids. When the solenoids are energized, the remote control linkage is adjusted to a free-wheeling position.

d. Door Lock Relay Box

The box is located beneath the right side of the front seat cushion and incorporates three relays

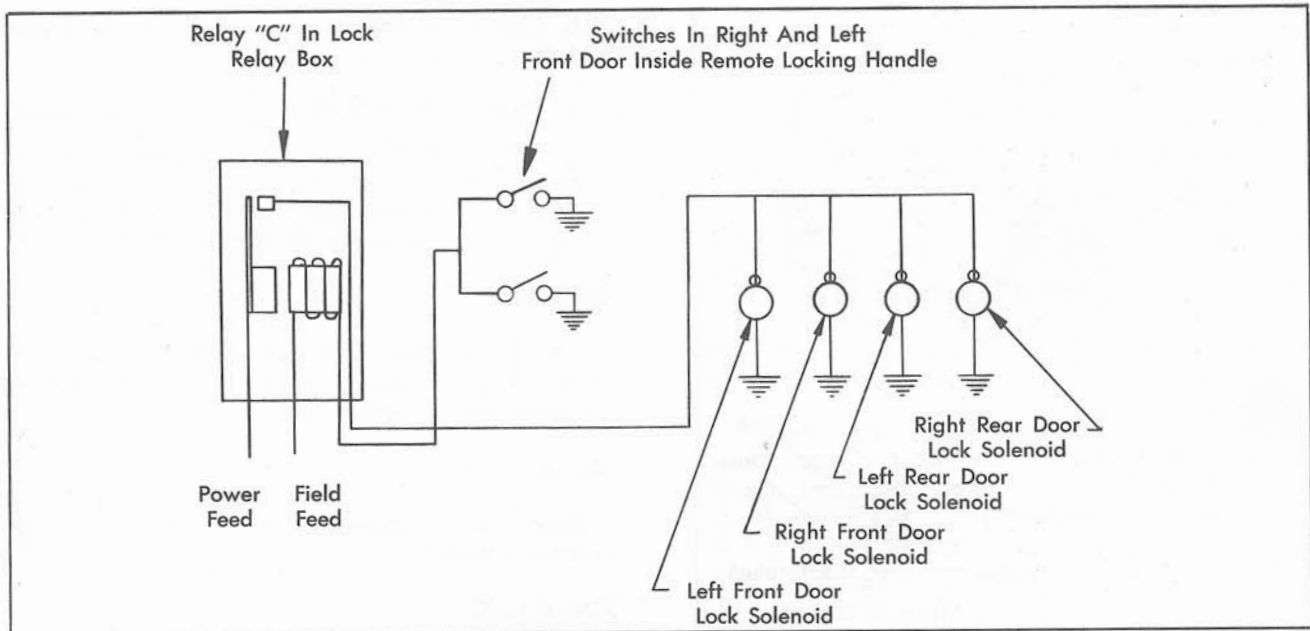


Fig. 17-79 Door Locking System Circuit Diagram

as shown in Fig. 17-77. The power "feed" for the relay box is routed from the circuit breaker on the left shroud.

The function of each relay is as follows:

Relay A - Completes the side roof rail lamp and map light circuits when its coil is grounded by the door jamb switches (door open).

Relay B - Completes the car leveling system circuit when its coil is grounded by one of the door jamb switches (doors open).

NOTE: Relays "A" and "B" are grounded simultaneously.

Relay C - Completes door inside remote locking system when its coil is grounded by actuating one of the front door inside locking lever switches.

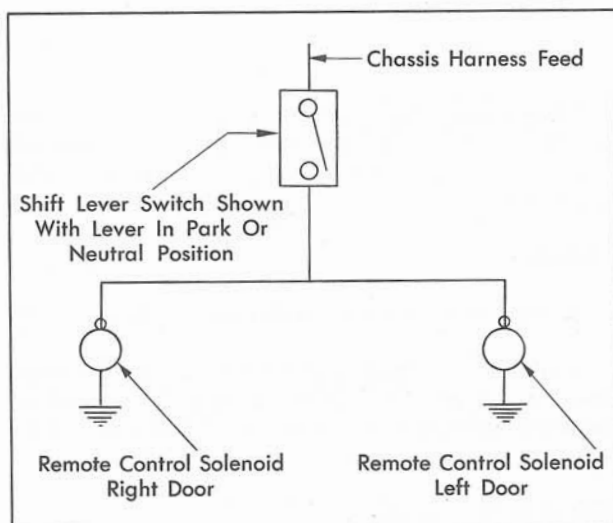


Fig. 17-80 Remote Control Free-Wheeling Circuit Diagram

In addition to the above circuits, the relay box provides current to the safety interlock switches on the rear door locks. The circuit to the lock at the drive lever is completed when one of the rear doors is opened.

To check the operation of the relay box, perform the following steps, first making certain that the harness connectors are properly engaged.

1. With light tester, check for current at feed terminal in harness connector. If current is present, check operation of box as indicated in the following steps.

2. Connect one end of a #12 gauge jumper wire to the relay box #1 terminal and the other end to the power source, Fig. 17-81.

3. With #12 gauge jumper, ground #8 wire terminal of relay connector.

4. With light tester check for current at the #6, #7, and #4 terminals on lock connector. Tester should light at all three of the terminals checked. If tester does not light, relay A and/or B are inoperative.

5. With light tester, check for current at the #5 terminal on box connector. Tester should light.

NOTE: This terminal feeds the selector lever lock circuit.

6. With #12 gauge jumper wire, ground #2 terminal on relay box connectors; then with light tester, check for current at #3 wire terminal on lock connector. Tester should light. If tester does not light, Relay "C" is inoperative.

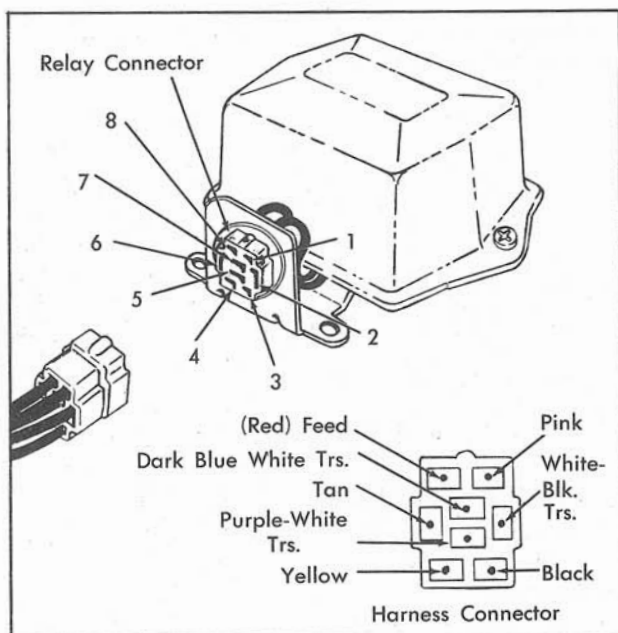


Fig. 17-81 Door Relay Box

(106) Door Lock Circuit Diagnosis

Condition I

None of the door locks lock electrically,

Cause:

Inoperative or defective relay "C" in door lock relay box.

Correction:

Check operation of relay box as outlined in Step e.

Condition II

All of the door locks lock electrically from the left front door switch, but do not lock electrically from the right front door switch.

Cause:

a. An open circuit between relay "C" and right front door locking lever switch.

b. Ground wire from right control switch not grounded at right shroud.

NOTE: Each control switch has its own ground lead which terminates at the right shroud behind the shroud side trim panel.

c. Inoperative or defective control switch.

Correction:

a. Check feed circuit from relay "C" to right door control switch for open circuit.

b. Check ground lead attachment behind shroud side trim panel.

c. Check operation of switch with light tester.

NOTE: With plunger not depressed, current should be present at one terminal of switch. With button depressed, current should be present at both terminals of switch.

Condition III

All of the door lock solenoids are energized (door locks locked) even though the control switches are not actuated.

Cause:

Short circuit between relay "C" and one of the control switches.

Correction:

Locate and eliminate short circuit.

Condition IV

Three of the four door locks lock electrically. One door lock locks mechanically, but does not lock electrically.

Cause:

a. Open circuit between relay "C" and affected lock solenoid.

b. Defective lock solenoid.

Correction:

a. Locate and eliminate open circuit. Check engagement of harness connectors.

b. Check operation of solenoid by connecting one end of #12 jumper wire to "hot" lead and other end to solenoid.

Condition V

The drive lever can be placed in a drive position, even though the rear doors are opened. The remaining electrical circuits operate satisfactorily.

Cause:

a. Defective and/or inoperative selector lock.

b. Open or short circuit between feed circuit from relay box to switches in rear door locks, or between switches in rear door locks and drive selector lock.

Correction:

a. Check operation of selector lock.

b. Locate and eliminate short or open circuit between lock relay box and selector lock. Check body harness to lock connector engagement.

Condition VI

The drive lever can be placed in a drive position when the left rear door is opened; however, the lever is locked in a parked or neutral position when the right rear door is opened. In addition, the side roof rail lamps and courtesy lamps do not light when the left rear door is opened. The remaining electrical circuits operate satisfactorily.

Cause:

a. Open circuit between relay box and left rear door lock switch.

b. Inoperative or defective switch or actuating mechanism in left rear door lock.

Correction:

a. Locate and eliminate open circuit. Check engagement of harness connectors at lock.

b. Check switch actuating mechanism on lock and operation of jamb switch.

Condition VII

The rear door(s) open when the remote control assembly is actuated while the shift lever is in a drive position.

Cause:

a. Mechanical failure of remote control assembly.

b. Open or short circuit in free-wheeling circuit.

c. Defective solenoid.

Correction:

a. Check electrical system for short or open circuit.

b. Check remote control assembly for mechanical failure.

c. Check operation of solenoid with #12 gauge jumper wire.

(107) Automatic Front Seat and Dial Selector Control Switch Circuits

The circuit diagram of the automatic seat system is shown in Fig. 17-82 and 17-83. In addition to a simplified circuit diagram of the control

switch and response switches in the relay control box is shown in Fig. 17-84.

The major parts of the automatic seat system and their function in the systems are listed below:

1. Vertical Actuator Motor - Operates the front and/or rear edge of the seat up and down and is located at the right adjuster.

2. Horizontal Actuator Motor - Operates the complete seat assembly forward or rearward and is located at the left adjuster.

3. Front Seat Bottom Switch - Controls circuit from power source to selector control switch. The complete system is inoperative when the doors are closed and this switch is open as shown in Fig. 17-84. The switch is located in the spring construction at the driver's side of the front seat cushions, Fig. 17-85. When the driver sits on the cushion, the switch is closed. When the driver is not sitting on the cushion, the switch is open.

4. Door Jamb Switches - Directs current from power source to dial selector control switch when doors are closed as shown in Fig. 17-84 and to the automatic circuit, when one or both of the doors are opened. The jamb switches, Fig. 17-86 and 17-87, are located at the front body hinge pillar, below the door jamb switches which actuate the lock relay box.

5. Seat Relay and Response Switch Control Box - The box consists of seven control relays and three response switches. The relays energize the actuator motors and spinning nut solenoid to operate the seat. However, these relays must first be energized by the current from one of the response switches. There is a response switch for each major movement of the seat assembly as shown in Fig. 17-84. Current flows from the dial control switch circuit or the automatic circuit, energizing the bars on the response switch, which in turn energize the control relays in the box. The response switch remains energized until the feed from the power source to the relay is broken by the gap in the switch bars. The response switches are rotated by connecting links which are attached to the seat adjuster torque tubes.

6. Dial Selector Control Switch - The control switch is installed on the left front door arm rest and is designed with three knobs, each of which energizes a particular response switch in the control box. As shown in Fig. 17-84, there are five contacts for adjustment of the front and rear vertical travel and seven contacts for adjustment of the horizontal travel. When the doors are closed, and the seat bottom switch is actuated (driver's seat is occupied) current flows to the three control knobs in the switch. From the control knobs, the current flows through one side of the response switch bar which energizes the affected relay.

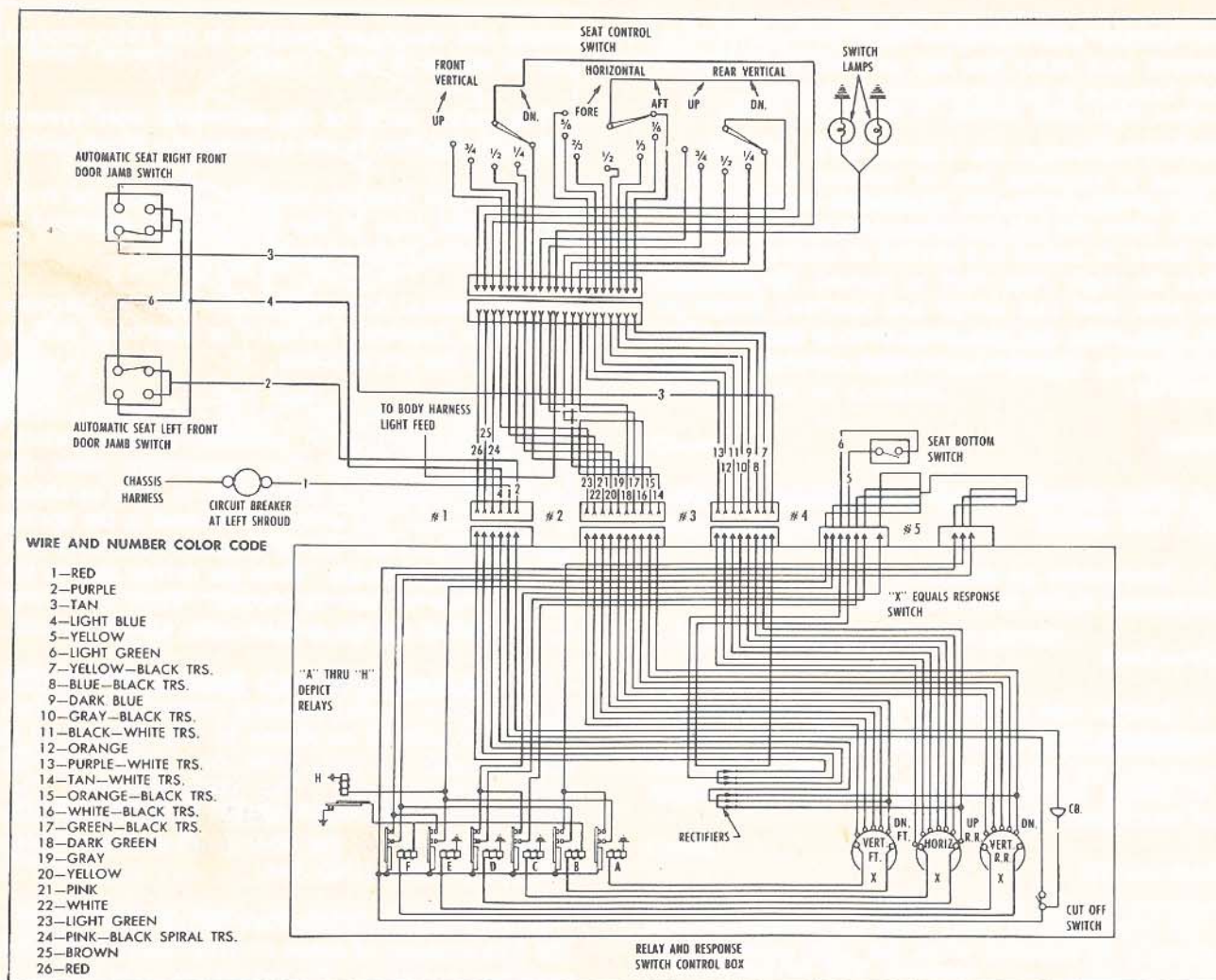


Fig. 17-82 Seat Control Circuit Diagram

a. Operation of Seat By Adjusting the Dial Selector Control Switch

Current from the power source flows through the door jamb switches (with doors closed),

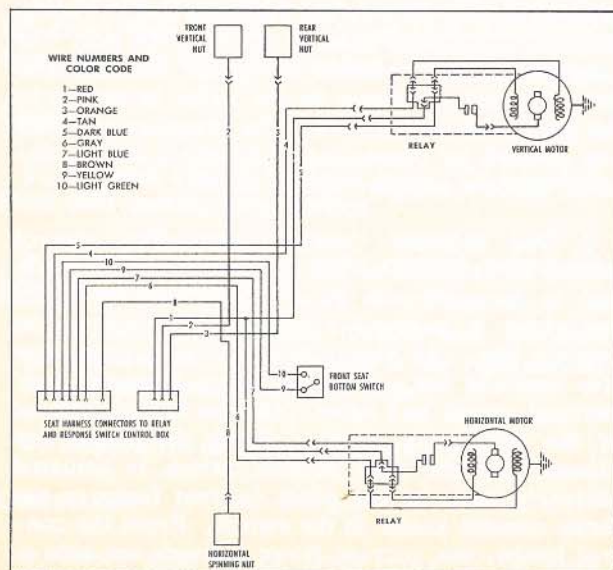


Fig. 17-83 Seat Wiring Harness Circuit

through the seat bottom switch (when closed) and then to the three control knobs of the control switch. If the front vertical control knob is adjusted to operate the seat to the extreme up position, the current flows from the switch indicator, through the extreme "up" wire circuit to the left half of the response switch bar, thereby energizing relay "A" which energizes the "up" field coil in the vertical motor, and the front vertical spinning nut solenoid. The response switch rotates, due to the connecting link being attached to the torque tube, until the gap between the switch bars opens the circuit between the feed from the control switch to the response switch. This principle is used in all of the operations of the seat system.

b. Automatic Operation of Seat

When one of the front doors is opened, the current from the power source is directed from the selector control switch to the automatic circuit which simultaneously energizes the extreme down and rear adjustment circuits of the response switches, Fig. 17-84. The seat then operates to the extreme down and rear positions and automatically

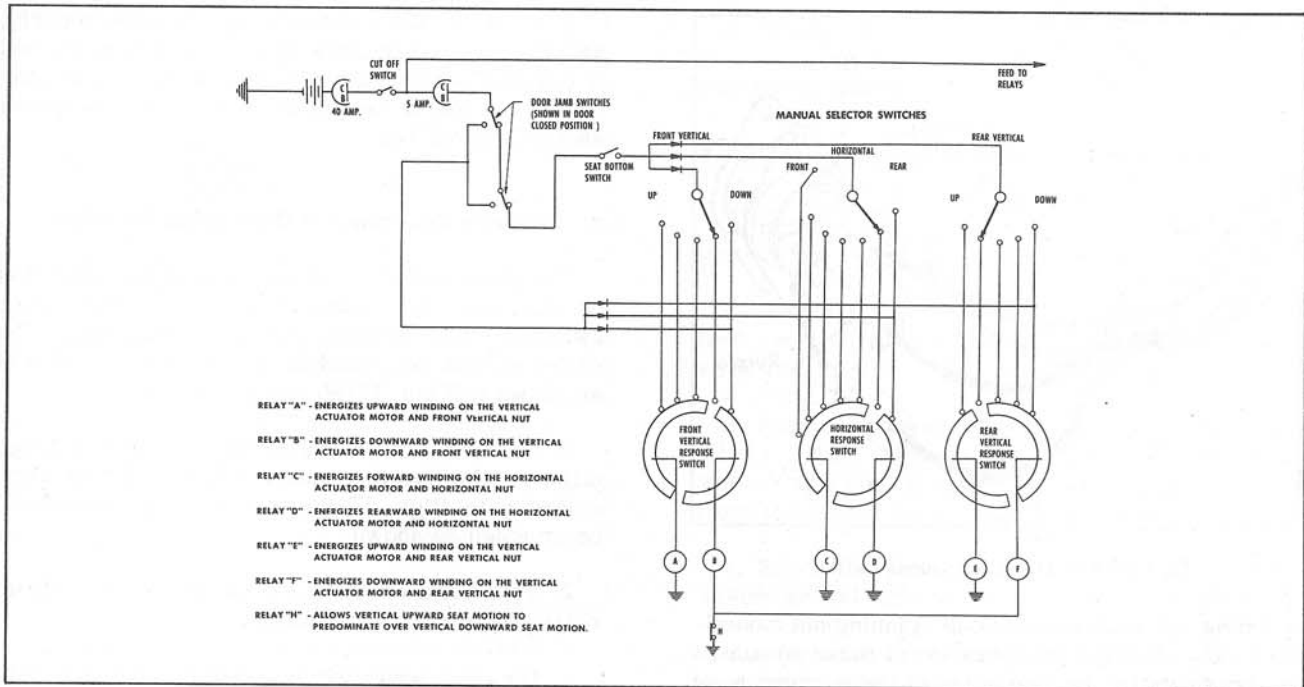


Fig. 17-84 Dial Selector Switch Circuit Diagram

stops when the gap in each of the response switches opens the circuit.

When the driver enters the car, sits in the driving position on the front seat cushion and closes both front doors, the current from the power source is directed from the automatic circuit to the dial control switch circuit; then the seat operates back to its original position (the position the seat was in before the driver left the car).

c. Adjustment of Seat When the Relay and Response Switch Control Box Becomes Inoperative

In some cases, it may be necessary to adjust the seat to a driving position when the relay and response switch control box is inoperative. To

adjust the seat under such conditions, remove the seat cushion from the front seat frame assembly. Then, using a #12 gage jumper wire, energize the seat actuator motor and spinning nut assembly which will provide the required seat adjustment. Energize the affected seat actuator motor and spinning nut as described in Note 108h.

(108) Automatic Front Seat Trouble Shooting

Each of the seat actuators consist of a twelve volt reversible type motor with a built-in circuit breaker, a relay, gear box and jack screw. In addition, the vertical actuator incorporates two spinning nut assemblies, while the horizontal

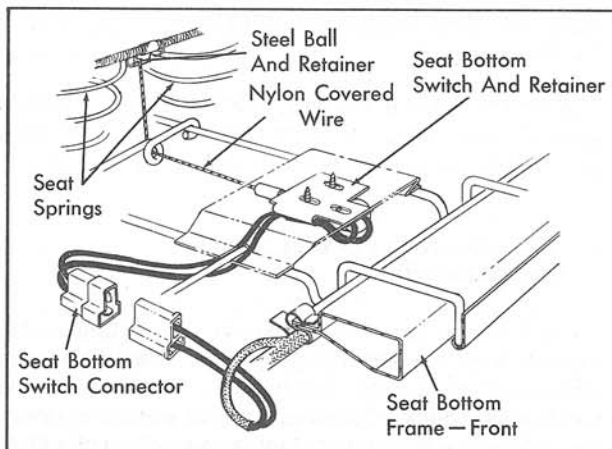


Fig. 17-85 Seat Bottom Switch Installation

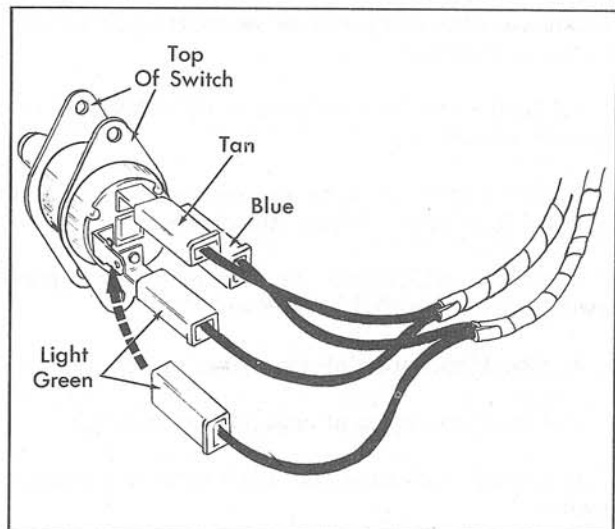


Fig. 17-86 Right Door Jamb Switch

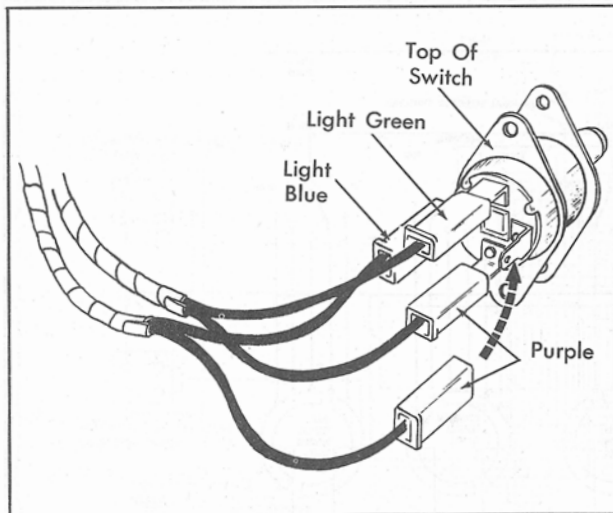


Fig. 17-87 Left Door Jamb Switch

spinning nut incorporates one spinning nut assembly. The principle of operation of these actuators is the same as the operation of the actuator used on the standard six-way seat assembly which is as follows:

When the relay in the control box is actuated to energize the field coil in one of the actuators, the spinning nut solenoid(s) is/are energized simultaneously. With one of the actuator motor field coils energized, the contacts of the control relay on the actuator motor are closed, thereby completing the motor circuit and operating the motor.

Before proceeding with steps to locate an electrical failure, the complete seat adjuster assembly and the relay box to torque tube connecting linkage should be checked for mechanical failure and loose wire connections. If an electrical failure is encountered in the seat system, and the cause of the failure is not evident, it is suggested that the following steps be performed in the sequence shown to determine whether the failure is located in the relay box or whether it is located in the seat system.

1. Turn "On" cut off switch on relay and response switch box.
2. Check connector #1 for presence of current at main feed wire. See circuit diagram.
3. Check attachment of wires at door jamb switch. Refer to Figs. 17-86 and 17-87.
4. Check operation of door jamb switch.
5. Check operation of seat bottom switch.
6. Check operation of dial selector control switch.
7. Check operation of seat actuator motors and motor control relays.

If all of the above components operate properly, and the wire connectors are engaged properly and if current is present at the main feed wire at connector #1, the failure is in the relay and response switch control box.

a. Checking Operation of Door Jamb Switches

The jamb switches which control the operation of the seat are located below the door jamb switches which control the lock relay box. The wires should be attached to the switch contacts as shown in Figs. 17-86 and 17-87.

1. Remove both switches from front body hinge pillar. Do not disconnect wiring. Check wire colors with Figs. 17-86 and 17-87. Wires should be attached as shown.

2. To check whether circuit is complete from relay box, proceed as follows:

a. Depress both switch plungers and with light tester, check for current at both purple wire terminals on left switch and both green wire terminals on right switch. Light tester should show current at the terminals checked. If current is not present at these terminals, there is an open or short circuit between feed from relay box and switches.

b. To check operation of left switch, depress plunger and with light tester, check for current at both purple wire and light green wire terminal. Tester should light.

Release plunger and with tester, check for current at purple and blue wire terminal. Tester should light.

c. Depress left front door jamb switch plunger, and check operation of right switch in the same manner.

With switch plunger depressed, tester should light on both green terminals and the brown terminal.

With the switch plunger released, tester should light at both green wire terminals and blue wire terminals.

b. Check Operation of Dial Selector Control Switch

Each of the control knobs on the switch is designed with a separate feed wire routed through connector #1 on the relay box. To simulate the conditions under which the control switch is operated, depress both front door jamb switch plungers and actuate the seat bottom switch to complete the electrical circuit.

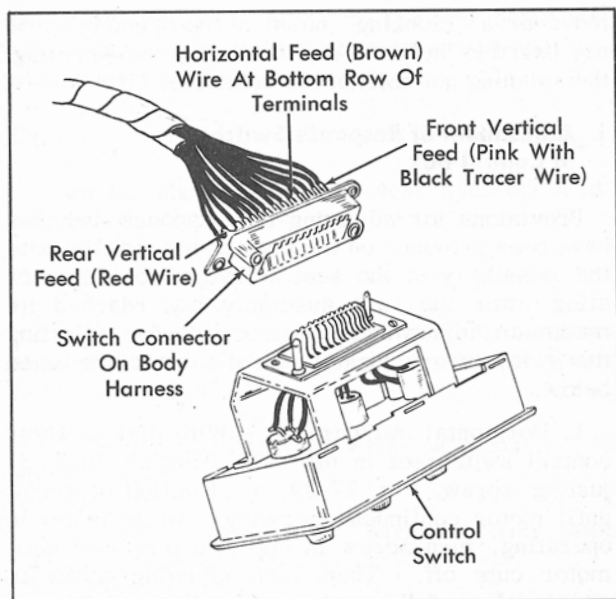


Fig. 17-88 Removal of Dial Selector Control Switch

1. Remove two plugs from bottom of arm rest and remove two switch attaching screws. Do not disengage harness connector from switch.

2. With light tester, check for current at the following "feed" wire terminals on the control switch, Fig. 17-88.

a. Front Vertical Switch - Feed terminal is located at extreme end of switch (pink wire with black tracer).

b. Rear Vertical Control Switch - Feed terminal is located at extreme opposite end of switch (red wire).

c. Horizontal Control Switch - Feed terminal is located at extreme end of the bottom row of terminals (brown wire).

NOTE: Light tester should show current at each of the above terminals when doors are closed (door jamb switch plungers depressed) and seat switch is actuated. If tester does not light, there is an open or short circuit between feed from jamb switch into relay box and control switch feed.

c. Checking Operation of Front Vertical Switch

1. Rotate knob counter-clockwise (extreme "up" position).

2. With light tester, check for current at switch feed (pink with black tracer wire) and adjacent terminal (light green wire). Tester should light.

3. Rotate knob clockwise one position (click). With light tester, check for current at second (white wire) terminal from the switch feed. Tester should light.

4. Repeat Step 3 with all of the switch contacts. If tester does not light at a terminal when it is energized, repair or replace the switch assembly.

d. Checking Operation of Rear Vertical Switch

1. Rotate knob clockwise (extreme "down" position).

2. With light tester, check for current at switch feed (red wire) and adjacent terminal (tan with white tracer wire). Tester should light.

3. Rotate knob counter-clockwise one position (click). With light tester, check for current at second terminal (orange with black tracer wire) from the switch feed. Tester should light.

4. Repeat Step 3 with all of the switch contacts. Tester should light at terminal which is energized.

If tester does not light at a terminal when it is energized, repair or replace the switch assembly.

e. Checking Horizontal Control Switch

1. Rotate knob counter-clockwise (extreme forward position).

2. With light tester, check for current at switch feed (tan wire) and adjacent terminal (purple with white tracer wire). Tester should light.

3. Rotate knob clockwise one position (click). With light tester, check for current at second (orange wire) terminal from the switch feed. Tester should light.

4. Repeat Step 3 with all of the switch contacts. If tester does not light at a terminal when it is energized, repair or replace the switch.

f. Checking Operation of Seat Bottom Switch

The seat bottom switch is designed with a nylon covered wire attached to one end of the switch. The other end of the cord is attached to a steel ball which is secured to a cross-wire in the seat construction, as shown in Fig. 17-85. When the driver sits on the seat cushion, the tension on the cord is released and the switch spring closes the switch contact, completing the circuit.

When the driver leaves the car, the tension on the nylon cord opens the switch contact, thereby opening the seat circuit. To check operation of switch, disconnect seat switch wires and remove seat cushion from car; then proceed as follows:

1. With #12 gage jumper wire, energize yellow wire terminal at switch connector.

2. Depress cushion in driver's seat area, and with light tester, check for current at green wire terminal of switch connector. With cushion depressed, tester should light. When cushion is not depressed, tester should not light.

3. If tester does not light, check installation of switch and nylon cord attachment.

g. Checking Operation of Control Relay on Seat Actuator Motor

The relay used on the seat actuator motor is the same type of relay as used on the standard six-way seat actuator. The relay contact points are closed when one of the field feed terminals is energized and the other field terminal is grounded. To check operation of relay, proceed as follows:

1. With light tester, check for current at motor control relay feed (red) wire. These circuits are powered by current from connector #5 of the relay box.

2. Disconnect one of the motor field wires from the control relay.

NOTE: Make sure the other motor field wire is connected to the relay to insure a good connection.

3. With a #12 gage jumper wire, energize the open field terminal from which the wire was disconnected; then, with light tester, check armature feed stud on relay for presence of current. Tester should light.

If armature stud is not energized, when one field terminal is energized and the other grounded, the relay is inoperative.

h. Checking Operation of Seat Actuator Motor and Spinning Nut Solenoid

1. Check operation of relay as described in Note g.

2. Disconnect one of the motor field feeds and the motor armature feed from the control relay, and energize both leads with #12 gage jumper wire. Motor should operate.

3. Repeat Step 2 energizing the other motor field lead and armature lead. Motor should operate in opposite direction. If motor operates only in one direction, one of the motor field coils is defective.

4. To check operation of spinning nut solenoid, energize one of the motor field feeds and armature feed to operate motor and simultaneously energize the spinning nut solenoid lead wire. Seat actuator should adjust seat. If the seat adjuster is at one of the extreme adjustments, a "clunking" noise will be heard.

If the motor operates, but the seat does not

move or a "clunking" noise in the spinning nut is not heard to indicate the nut is in free-wheeling, the spinning nut solenoid is defective.

i. Adjustment of Response Switches in Control Box

Provisions for adjusting the response switches have been provided on the control box, to eliminate the possibility of the seat actuator motors operating after the seat assembly has reached its maximum adjustment. Instructions for adjusting the switches are located on the box and are listed below.

1. Horizontal Adjustment - With dial selector control switch set in full rear position, turn adjusting screw, Fig. 17-89, in direction of arrow until motor continues operating. While motor is operating, turn screw in opposite direction until motor cuts off. Then, turn adjusting screw an additional one full turn in same direction.

2. Vertical Adjustment - With dial selector switch set in full down position, turn adjusting screw on response switch in direction of arrow until motor continues operating. While motor is operating, turn screw in opposite direction until motor cuts off; then, turn adjusting screw an additional one full turn in same direction.

(109) Automatic Front Seat Diagnosis

The typical failures listed below are peculiar to the seat system used in the 7059 style. It should be noted that various types of failures could occur that are not listed; however, the principle involved in correcting these failures is similar to the corrective procedures performed for the failures which are listed.

Condition I

The complete seat system is inoperative. The seat does not operate by the operation of the

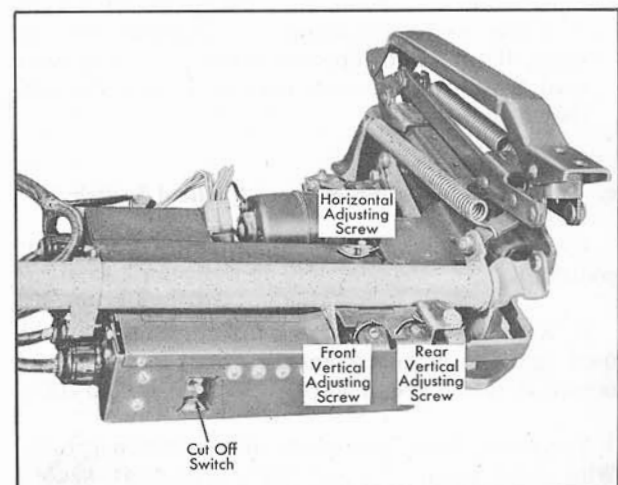


Fig. 17-89 Relay and Response Switch Seat Control Box

selector control switch or by the automatic feature. However, the seat actuator motor operates when energized by a jumper wire.

Cause:

Open or short circuit in seat system "feed" circuit.

Correction:

1. On diagram, follow main "feed" circuit from shroud circuit breaker through relay box rectifiers, Fig. 17-82.

2. Check attachment of wires at connector #1 of relay box.

3. Check attachment of wires at door jamb switches. Refer to Figs. 17-86 and 17-87.

NOTE: The lower door jamb switch on the front body hinge pillar controls the operation of the seat.

Condition II

The seat operates satisfactorily during its automatic operation, but does not operate from the dial selector control switch.

Cause:

Open or short circuit between "feed" wire from door jamb switch and dial selector control switch.

Correction:

1. Check connections and attachment of wires at the automatic seat door jamb switches. Check operation of the switches.

2. Check attachment of wires and engagement of connectors at relay box.

3. Check attachment of wires and engagement of connectors at the dial selector control switch and the seat bottom switch. Check operation of dial selector control switch and seat bottom switch.

Condition III

Seat operates satisfactorily with control switch, but the automatic circuit does not operate.

Cause:

Open or short circuit between feed from door jamb switch to the extreme adjustment contacts on the response switches.

Correction:

1. Check attachment of wires at door jamb switches.

2. Check operation of switch. Check wires and engagement of connector #1 at relay box.

Condition IV

When driver enters the car, closes both front doors and sits on the front seat cushion, the seat operates to the extreme downward and rearward position. When the driver opens the front door, the seat operates to the driving position, (position that the dial control switch is adjusted to).

Cause:

Wires at the door jamb switches improperly attached.

Correction:

Attach wires to jamb switches as shown in drawings, Figs. 17-86 and 17-87.

Condition V

Vertical actuator motor does not stop operating when the front edge of the seat has reached its maximum downward adjustment.

Cause:

Improperly adjusted front vertical response switch.

Correction:

Adjust front vertical response switch as indicated on relay box.

Condition VI

Vertical actuator motor operates front and/or rear edge of seat up, but will not operate seat down.

Cause:

1. Defective actuator motor or control relay on motor.

2. Open or short circuit between relay box connector #4 and control relay on motor.

Correction:

1. Check operation of actuator motor.

2. Check wires at connector #4 on relay box.

(110) Rear Compartment Power Unit Circuits

NOTE: The rear compartment power units consist of the following assemblies:

1. Rear compartment lid motor and regulator assembly.

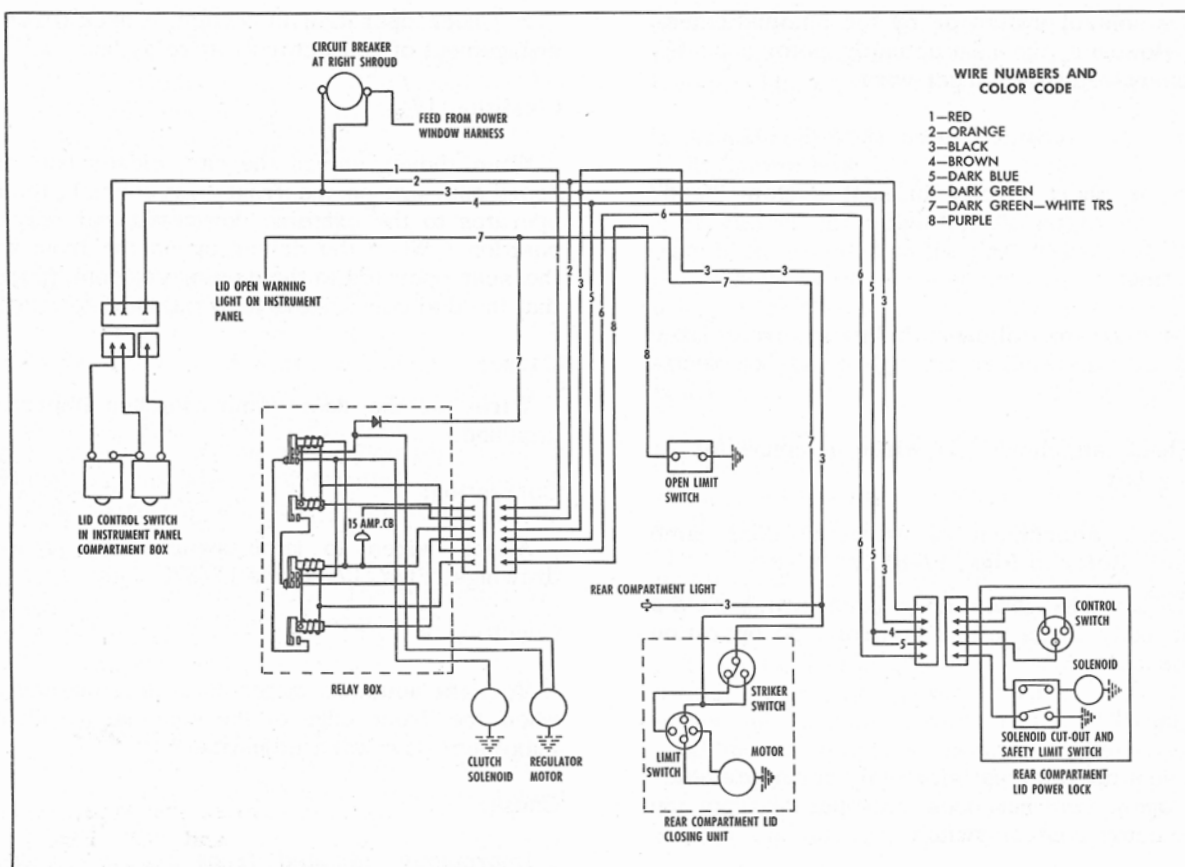


Fig. 17-90 Power Lid Circuit Diagram

2. Rear compartment lid power closing unit.
3. Rear compartment lid power control lock assembly.

The function and mechanical operation of the units are outlined in Note 112. The location of the rear compartment lid power harness is shown in Fig. 17-75. The circuit diagram of the power units is shown in Fig. 17-90.

(111) Electrical Operation of Rear Compartment Lid Regulator and Control Switches

a. To Open Lid

When the opening cycle control switch in the instrument panel compartment box or at the rear compartment lid lock is actuated to open the lid, the solenoid at the lid lock is energized, retracting the lock bolt. When the lock bolt is retracted, the following action takes place.

1. The power closing unit is energized, extending the striker and opening the lid slightly.
2. The solenoid circuit is opened by the switch on the lock.
3. The lid regulator relay circuit which operates the lid to the open position is grounded by the switch on the lock.

Simultaneously, the relay box at the lid regu-

lator assembly is energized, which in turn energizes the clutch solenoid and motor assembly to open lid. The motor and clutch assembly remain energized until the lid hinge contacts the lid opening cycle limit switch in the lid hinge box to open the circuit.

b. To Close Lid

The system operates in a similar manner as when the lid is opened except that a different set of relays is energized to close the lid, and the closing limit switch in the lock is actuated to open the circuit. The regulator assembly lowers the lid sufficiently to enable the power closing unit to trip the lock bolt and energize the closing unit to lock the lid.

NOTE: Before attempting to locate and correct an electrical failure in the rear compartment power unit circuit, review the mechanical operation of the units in Note 112, and the circuit diagram shown in Fig. 17-90.

(112) Rear Compartment Power Lid Unit Trouble Shooting

a. Checking Operation of Rear Compartment Lid Motor and Regulator Assembly

The regulator assembly includes a twelve volt reversible type motor and solenoid and clutch

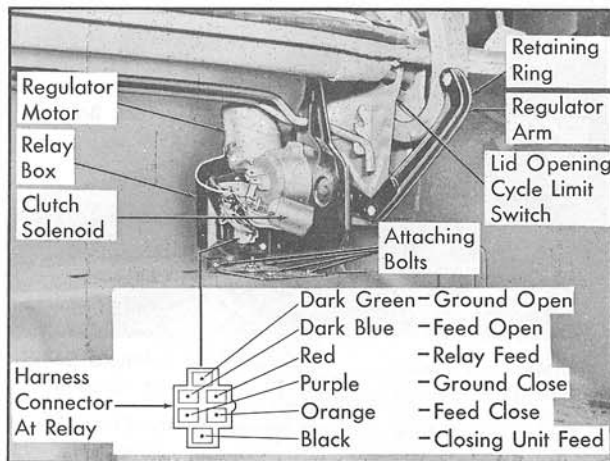


Fig. 17-91 Compartment Lid Regulator Assembly

assembly. The clutch solenoid and motor are energized simultaneously when the compartment lid control switch at instrument panel or lid lock is actuated to open or lower the lid. When the clutch solenoid is energized, the clutch is engaged and the action of the motor operates the regulator arm to open or lower the lid. The operation of the motor and clutch solenoid is controlled by the relay box installed to the regulator frame. The current for the operation of the relay assembly and the lid control switches is obtained from the power window circuit and is routed through to a circuit breaker installed at the right shroud side panel.

1. Disconnect motor and solenoid wire connectors from relay box.

2. Using #12 gage jumper wire, connect power source to one of the motor leads and solenoid lead. The regulator should raise or lower lid.

a. If the motor operates and regulator does not move lid, the clutch solenoid is inoperative, Fig. 17-91.

b. If motor does not operate, it is defective and should be repaired or replaced.

c. If motor and solenoid operate satisfactorily with jumper wire, but do not operate as required with control switches, the failure may be due to an inoperative or defective relay box.

b. Checking Circuit Between Control Switches, Circuit Breaker and Relay Box

1. Disengage harness connector from relay box.

2. With light tester, check for current at red wire terminal of connector. Tester should light. If tester does not light, there is an open or short circuit between power source and circuit breaker.

3. Insert light tester in blue wire terminal of connector and have helper actuate control switch to open lid. Tester should light. If tester does not light, the control switch is inoperative or there is an open or short circuit between connector and power source to or from the control switches.

4. Insert light tester in orange wire terminal of connector and have helper actuate control switch to close lid. Tester should light. If tester does not light, the control switch is inoperative or there is an open or short circuit between connector and power source to or from the control switches.

5. To check ground circuit of relay coils, perform the following check: Make sure the "open" limit switch plunger is not depressed and lid lock bolt is in open position. Then, connect one end of light tester to power source and connect other end to dark green or purple wire terminal of connector. Tester should light. If tester does not light, the ground circuit of the relays which control the opening of the lid is not complete.

c. Checking Operation of Relay Assembly

The relay box incorporates two types of relay assemblies. Relays "A" and "C", Fig. 17-92, are "hold-down" relays which keep the power relays "B" and "D" energized after the switch in the instrument panel or in the lock cylinder has been actuated and then released. With this design, it is not necessary to keep the switch actuated until the lid is completely opened or closed.

The function of each relay is outlined below:

Relay A - Keeps relay "B" energized until compartment lid is completely opened.

Relay B - When energized, relay supplies current to the regulator motor and clutch solenoid to open lid.

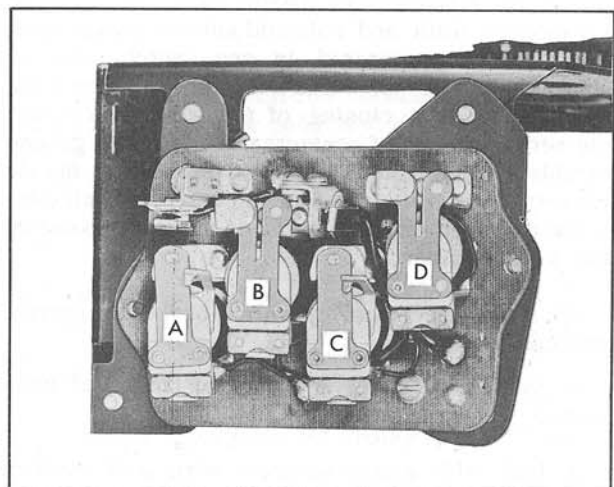


Fig. 17-92 Compartment Lid Regulator Relay Box

Relay C - Keeps relay "D" energized until compartment lid is completely closed.

Relay D - When energized, relay supplies current to the regulator motor and clutch solenoid to close lid.

To check operation of relay assembly, proceed as follows:

1. Disconnect motor and solenoid connector and harness connector from relay box.
2. Connect one end of #12 gauge jumper wire to power source and other end to red wire terminal of connector on relay, Fig. 17-91.
3. Connect a second jumper wire to body ground and to dark green wire terminal of connector on relay. Then, momentarily connect power source to dark blue wire terminal.
4. With light tester, check for current at yellow wire (opening cycle) motor terminal and solenoid wire terminal on relay box. Tester should light. If tester does not light, relays "A" and/or "B" are inoperative.
5. Disconnect ground wire from dark green wire terminal and connect it to purple wire terminal of relay connector. Then, momentarily connect power source to orange wire terminal of relay box.
6. With light tester, check for current at black wire (closing cycle) motor terminal and solenoid wire terminal on relay box. Tester should light. If tester does not light, relays "C" and/or "B" are inoperative.

d. Checking Operation of Lid Power Control Lock Assembly

The lock assembly incorporates a solenoid which provides the electrical unlocking feature of the lid, and two switches which energize relays in the relay box to open and/or close the lid. The lid closing limit and solenoid cut-out switch contacts are incorporated in one switch case as shown in Fig. 17-93. One set of contacts controls the opening and closing of the solenoid circuit; the remaining set of contacts completes the ground circuit for the relays and also serves as the lid closing limit switch. The lid control switch controls the opening and closing of the lid by rotating the lock cylinder.

To check electrical operation of the lock parts, proceed as follows:

1. Disconnect harness connector from lock connector, Fig. 17-93.
2. Use #12 gauge jumper wire and connect power source to black wire terminal of lock connector. Then, insert key into lock cylinder.

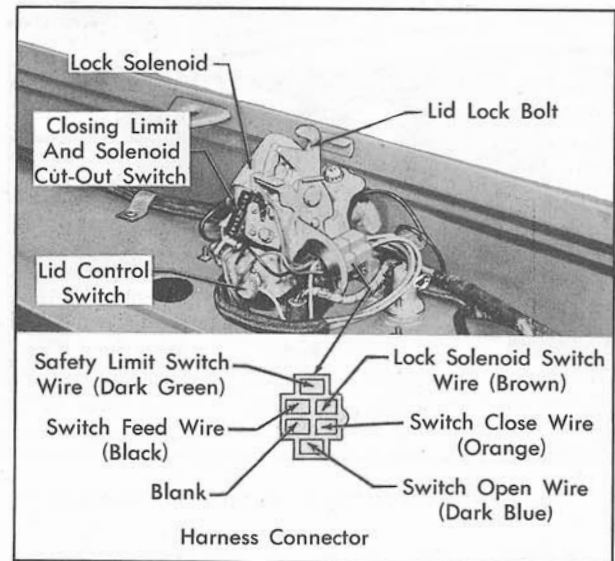


Fig. 17-93 Rear Compartment Lid Lock

3. Turn cylinder clockwise and with light tester, check for current at dark blue wire terminal. Tester should light. Turn cylinder counter-clockwise, and with tester, check for current at orange wire terminal of connector. Tester should light. If tester does not light, the switch is inoperative.

4. Position lock bolt to lid closed position; then, using #12 gauge jumper wire, connect power source to solenoid wire (brown) terminal of lock connector. The solenoid should retract lock bolt to lid open position. In addition, check for current at input side of solenoid cut-out switch. Current should be present at only input end of switch when lock bolt is in lid open position.

5. To check operation of lid closing limit switch, connect one end of light tester to power source and other end to dark green wire terminal of lock connector. With lock bolt in lid open position, tester should light. With lock bolt in lid closed position, tester should not light.

e. Checking Operation of Power Closing Unit

1. Checking power unit striker switch. To perform this procedure, remove unit from compartment lid and place on bench. Using #12 gauge jumper wire, connect power source to unit feed (black) wire and make sure striker switch knob is in released position.

- a. Ground one light tester lead and connect other lead to white wire terminal (#1) of limit switch, Fig. 17-94.

- b. If tester does not light, failure is located in white wire or striker switch.

- c. To check switch operation for closing unit, depress switch knob and simultaneously connect

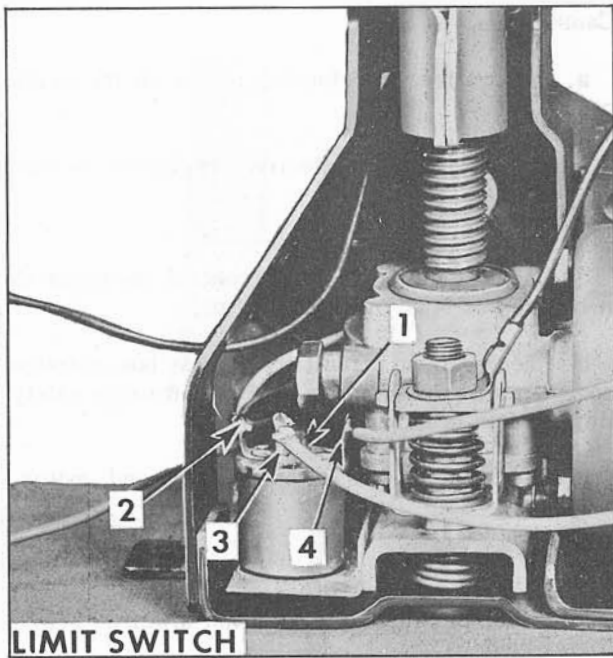


Fig. 17-94 Checking Current at Limit Switch

light tester to red wire terminal (#2) on limit switch.

d. If tester does not light, failure is located in red wire or striker switch.

2. Checking warning light on instrument panel. The light installed on the instrument panel should light up when the lid is unlocked. If the light is inoperative, proceed as follows:

a. Remove bulb and with light tester, check for current at bulb socket. If tester lights, the bulb is defective.

b. If tester does not light, the failure is located in the wire between the light socket and limit switch.

3. Checking power unit limit switch. To perform Steps a and b in this procedure, the striker switch knob should be in the released position.

a. Ground one lead of light tester and connect other lead to the red (2), orange (3) and green (4) terminals of limit switch. Check each terminal individually, Fig. 17-94.

b. The light tester should not light up. If tester lights up at any of these terminals, the limit switch is defective.

c. If tester does not light up in Step b, depress striker switch knob to simulate lid closed position.

d. Simultaneously connect light tester lead to green terminal of limit switch. If tester does not light, limit switch is defective.

4. Checking the power unit motor.

a. Using a #12 gage jumper wire, connect one end to either of the motor leads (orange or green).

b. If motor does not operate, check ground connection. If motor still is inoperative, failure is located in motor. Repair motor or replace power unit as required.

NOTE: Certain component parts of the motor assembly are available for service replacement as in the past.

(113) Rear Compartment Power Lid Unit Diagnosis

Condition I

The rear compartment lid will not open or close electrically. None of the rear compartment lid units operate electrically. The power window circuit operates satisfactorily.

Cause:

a. Open or short circuit between power source from power window harness and circuit breaker at right shroud side panel.

b. Inoperative or defective circuit breaker.

Correction:

a. Check feed wire from power window harness to circuit breaker for failure.

b. Check circuit for proper operation.

Condition II

The rear compartment lid regulator assembly will not lower or raise the lid; however, the power closing unit and the solenoid operated lock operate satisfactorily.

Cause:

a. Open or short circuit between circuit breaker on right shroud side panel and relay box.

b. Inoperative relays in control box.

c. Inoperative control switches.

Correction:

a. Check "feed" from circuit breaker to relay box for open or short circuit.

b. Check operation of relay box. Refer to Note 112c.

c. Check operation of switches.

Condition III

The rear compartment lid regulator assembly raises and lowers the lid satisfactorily; however, the power closing unit does not retract or extend the striker when the striker switch is actuated.

Cause:

a. Open or short circuit between circuit breaker and feed terminal of power closing unit.

b. Inoperative or defective power closing unit.

Correction:

a. Check circuit between circuit breaker at right shroud side panel and power closing unit for open or short circuit.

b. Check operation of power closing unit. Refer to Note 112e.

Condition IV

The compartment lid opens and closes satisfactorily when the switch at the lock cylinder is actuated, but will not operate when the switch in the instrument panel compartment box is actuated.

Cause:

a. Open or short circuit between circuit breaker and control switch in instrument panel compartment box or control switch and relay box.

b. Defective switch assembly.

c. Inoperative or defective solenoid at lock assembly.

Correction

a. Check affected circuits for open or short circuit.

b. Check operation of switch.

c. Check operation of lock solenoid.

Condition V

The regulator motor lowers the lid satisfactorily from either control switch; however, the motor will not raise the lid.

Cause:

a. Inoperative or defective relays in the relay box.

b. Inoperative or defective regulator motor.

Correction:

a. Check feed wire from control switches to relay box for open or short circuit.

b. Check ground circuit from relay box, through open limit switch in hinge box; then through safety limit switch in lock assembly.

c. Check operation of relay box and motor.

Condition VI

The regulator motor operates in both directions, but the compartment lid does not lower or raise.

Cause:

a. Clutch solenoid is inoperative or defective.

Correction:

a. Check circuit from relay to clutch solenoid for failure.

b. Check operation of solenoid.

c. Check clutch for mechanical failure.

Condition VII

The regulator motor continues operating after the lid has reached the maximum open position.

Cause:

a. "Open" limit switch in hinge box inoperative.

b. Short circuit in wire from relay box to limit switch in hinge box.

Correction:

a. Check adjustment of limit switch for proper contact with hinge when lid is opened.

b. Check wire from relay box to limit switch for ground.

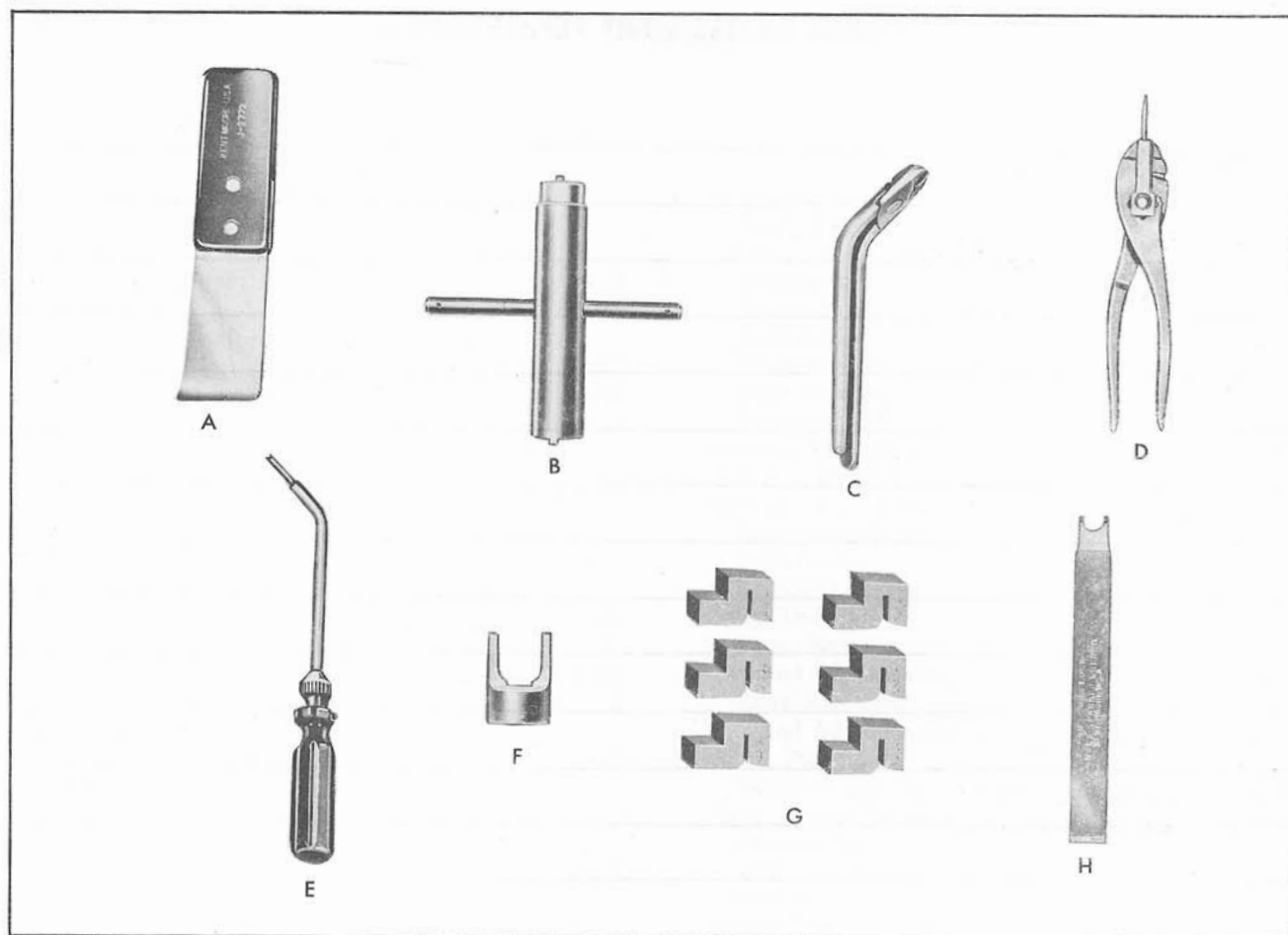


Fig. 17-95 Special Tools

Key	Tool No.	Name
A	J-2772	Headlining Installer
B	J-6592	Windshield Wiper Transmission Spanner Wrench
C	J-4600	Hog Ring Pliers
D	J-5984	Weatherstrip Retaining Clip Reformer
E	J-5757	Weatherstrip Installer
F	J-6608	Sunshade Support Spanner Socket
G	J-6626	Windshield Alignment Block Set
H	J-6609	Door Handle Spanner Wrench

— OTHER NOTES AND REFERENCES —

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