SECTION B

45-46-48-49000 FRONT SUSPENSION

CONTENTS

DIVISION I SPECIFICATIONS AND ADJUSTMENTS

30-5 BOLT TORQUE SPECIFICATIONS

Use a reliable torque wrench to tighten the parts listed to insure proper tightness without straining or distorting parts. These specifications are for clean and lightly lubricated threads only; dry or dirty threads produce increased friction which prevents accurate measurement of tightness.

Parts	Location	Torque Lb. Ft.
Nut & Bolt	Brake Reaction Rod to Lower Control Arm	45-60
Nut	Brake Reaction Rod to Frame	40-60
Bolt & Nut	Front Shock to Lower Control Arm	30-40
Nut	Front Shock to Frame	5-10
Bolt	Stabilizer Bushing to Frame	40-60
Nut	Upper Control Arm Shaft to Frame	75-100
Nut	Upper Ball Joint to Knuckle	30-40
Bolt & Nut	Front Lower Control Arm to Frame	80-120
Nut	Lower Ball Joint to Knuckle	60-95
Nut	Stabilizer Link to Lower Control Arm	5-10

30-6 DIMENSIONAL SPECIFICATIONS

Stabilizer Bar Diameter	25/32"
Steering Knuckle Spindle	
Large End	1.3743-1.7348
Small End	8.430-8.435

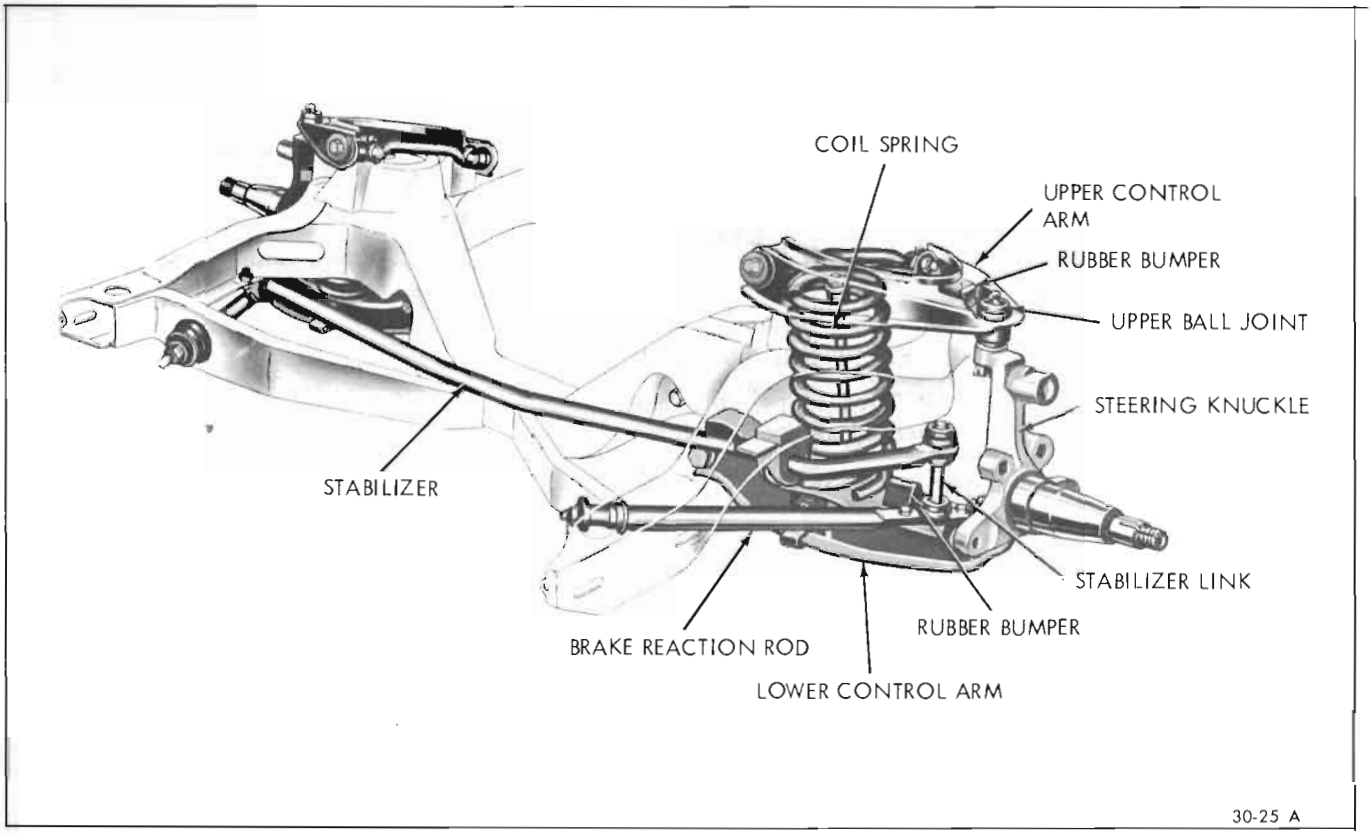


Figure 30-25—Front Suspension

DIVISION II
DESCRIPTION AND OPERATION

30-7 SUSPENSION DESCRIPTION

The front suspension on the 1966 Buick is designed to allow each wheel to compensate for changes in the road surface level without appreciably affecting the opposite wheel. Each wheel is independently connected to the frame by a steering knuckle, ball joint assemblies, and upper and lower control arms. The control arms are specifically designed and positioned to allow the steering knuckles to move only in a vertical arc. The front wheels are held in proper relationship to each other by two tie rods which are connected to steering arms on the knuckles and to an intermediate rod.

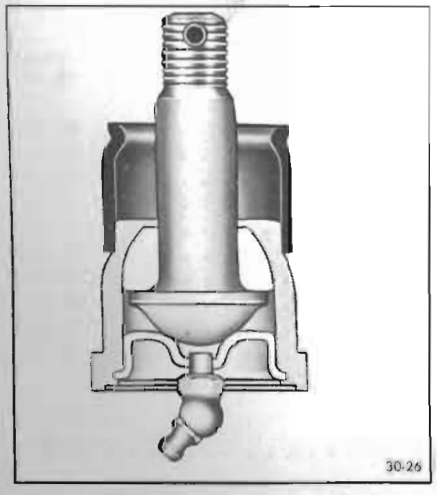


Figure 30-26—Upper Ball Joint

Coil chassis springs are mounted between the spring housings on the frame and the lower control arms. Ride control is provided by double direct acting shock absorbers mounted inside the coil springs and attached to the lower control arm by bolts. The upper portion of each shock absorber extends through the spring housing and is secured with two grommets, two grommet retainers, and a nut.

Side roll of the front suspension is controlled by a spring steel stabilizer shaft. It is mounted in rubber bushings which are held

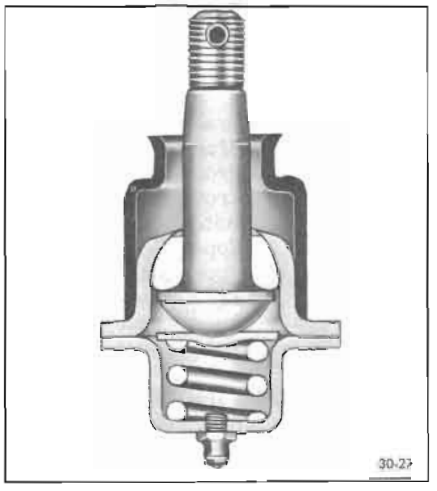


Figure 30-27—Lower Ball Joint

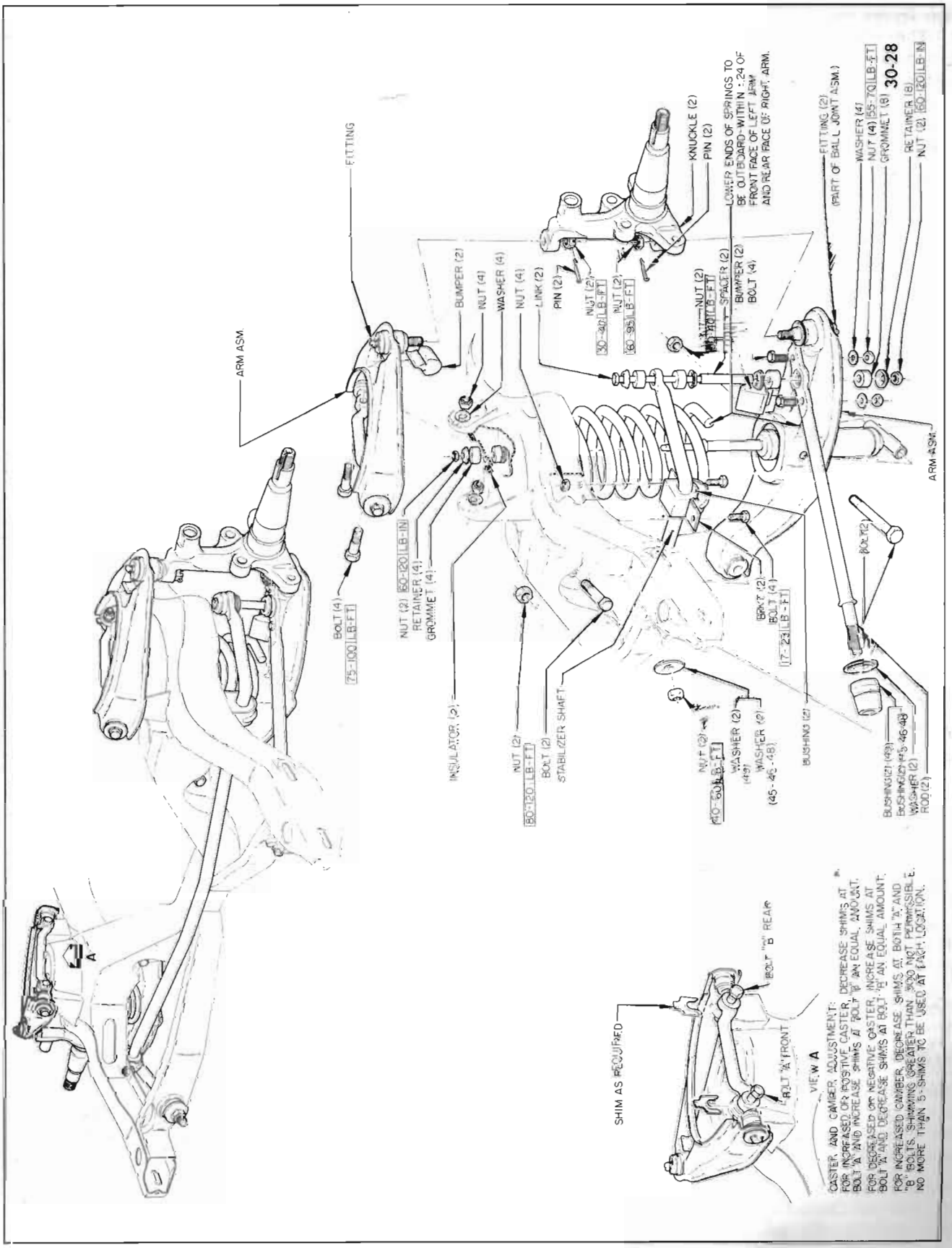


Figure 30-28—Front Suspension Details

30-28

to the frame side rails by brackets. The ends of the stabilizer are connected to the front side of the lower control arms. Rubber grommets at these connections provide flexibility and prevent rattles.

A ball joint is pressed into the outer end of the upper arm. It is spring loaded to insure proper alignment of the ball in the socket.

The inner ends of the lower control arms are bolted to the frame front cross member through rubber bushings. The outer end of each arm is connected to the steering knuckle with a ball socket assembly pressed in the lower control arm and bolted to the steering knuckle. Fore-aft alignment of the control arm is maintained by a brake reaction rod.

Shock absorbers are Delco direct double-acting type. Details on the operation of this type of shock absorber can be found under paragraph 30-4.

DIVISION III

SERVICE PROCEDURES

31-4 REMOVAL AND INSTALLATION OF BALL JOINTS AND STEERING KNUCKLE

a. Removal and Installation of Upper Control Arm Ball Joint Assembly

The upper control arm and ball joint assembly is serviced as a complete unit. See paragraph 31-5 for upper control arm removal and installation.

b. Lower Ball Joint Removal

1. Raise front of car and place jack stands under frame side rails. Remove wheel with hub and drum assembly.

2. Remove the brake backing plate. If the backing plate is wired carefully out of the way, there will be no need to disconnect the brake hose.

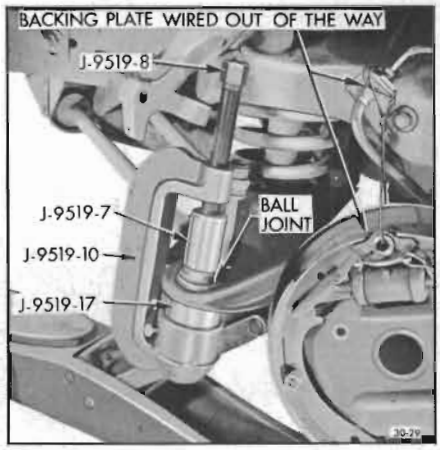


Figure 30-29—Lower Ball Joint Remover in Place

3. For safety's sake, place a floor jack under the lower control arm as far outboard on the arm as possible to gain maximum leverage advantage. Do not place the jack against the arm but about 1/2" below. Now remove cotter pin and loosen (do not remove) nut on lower ball joint tapered stud. Nut should be loosened not more than 1/8".

WARNING: If jack is not used and nut is removed, injury could result since heavily compressed chassis spring will be completely released.

4. Rap the steering knuckle sharply in the area of the ball stud to allow the force of the chassis spring to disengage the tapered ball stud from the knuckle.

NOTE: It is sometimes helpful to wedge a block of wood under the upper control arm to provide a solid stop so the lower ball stud can be loosened with a more solid hammer rap.

5. Place the jack under the lower control arm at the spring seat. Raise the jack until compression is relieved on the upper control arm rubber rebound bumper. Remove the lower ball joint stud nut. Move the steering knuckle out of the way.

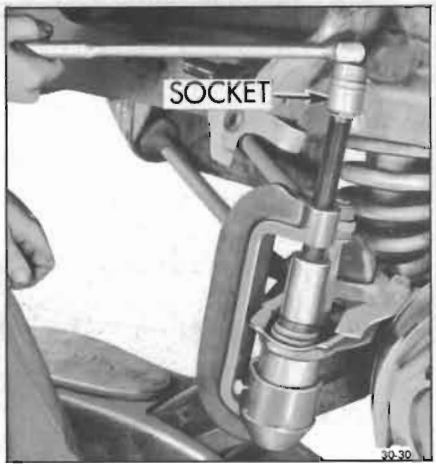


Figure 30-30—Removing Lower Ball Joint

6. Install lower ball joint remover and installer as shown in Figure 30-29.

7. Tighten Detail J-9519-8 with a socket and handle as shown in Figure 30-30 until ball joint is forced out of the lower control arm.

CAUTION: Ball joint may pop out suddenly.

c. Lower Ball Joint Installation

1. Position ball joint in lower control arm and install Tool J-9519 as shown in Figure 30-31.

2. With a suitable socket and handle, force the ball joint into

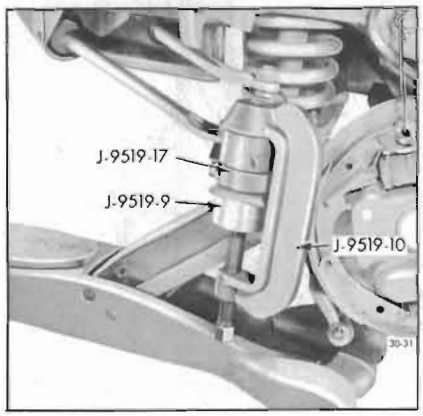


Figure 30-31—Lower Ball Joint Installer in Place

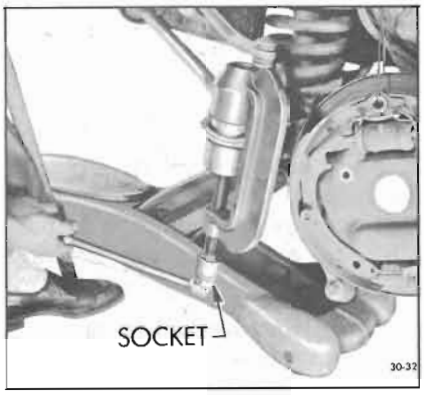


Figure 30-32—Installing Lower Ball Joint

the lower control arm until it is fully seated.

3. Turn the stud so the cotter key hole is fore and aft.

4. Position the tapered stud in the knuckle and install nut. Tighten the nut to 65 lb. ft. and install cotter key. Do not loosen nut to align cotter pin holes. Tighten nut to next slot that lines up with hole.

5. Install wheel with hub and drum assembly. Adjust wheel bearing (Group 100). Remove car stand and lower car.

d. Removal and Installation of Steering Knuckle

1. Follow Steps 1 through 4 of subparagraph b., Removal of the Lower Ball Joint. Be certain to merely loosen the nut.

2. Remove cotter pin and loosen (Do Not Remove) nut on upper ball joint tapered stud. Nut should be loosened not more than 1/8".

3. Rap steering knuckle in area of stud on both upper and lower ball joints to separate studs from knuckle. Nuts that were previously loosened still hold upper and lower control arms to knuckle.

4. Make certain that the lower control arm is adequately supported by a jack on its outer extremities to prevent any downward travel of the lower control arm when removing ball joint nut (it may be necessary to actually raise the lower control arm slightly to remove force of the knuckle against the nut). Remove the nut and raise knuckle off tapered stud.

5. The upper ball joint is already loosened from the knuckle, and with no spring force to interfere, it is now possible to remove the nut from the tapered stud and thus remove the knuckle.

6. To replace knuckle, wipe stud of upper ball joint and tapered hole in knuckle clean. Assemble to knuckle with cotter pin hole fore and aft, torque nut to 35 lb. ft. and install cotter pin. Do not loosen nut to align cotter pin holes. Tighten nut to next slot that lines up with hole.

7. Wipe lower ball joint stud and tapered hole in knuckle clean and assemble to knuckle as outlined in installation Steps 3 through 5 subparagraph c, preceding.

31-5 REMOVAL AND INSTALLATION OF UPPER CONTROL ARM ASSEMBLY

a. Removal

1. Raise car with jack under frame. Remove wheel and tire.

2. Remove cotter pin from castellated nut on upper ball joint tapered stud.

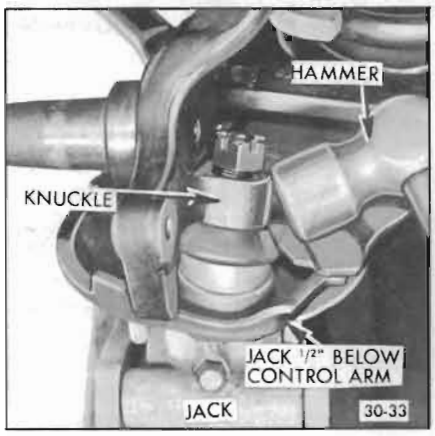


Figure 30-33—Separating Steering Knuckle From Ball Joint

3. Loosen, but do not remove nut. Force of chassis spring will be tending to disengage ball joint tapered stud from steering knuckle. Rap knuckle sharply in area of tapered stud to disengage stud from knuckle. See Figure 30-33.

WARNING: If ball stud nut is removed, injury could result since heavily compressed chassis spring will be completely released.

4. With another jack, support car weight under outer edge of lower control arm. Raise jack until compression is relieved on upper control arm bumper and remove from ball joint tapered stud.

5. Wire brake and knuckle assembly in place to prevent damage to the brake hose, and lift upper control arm from knuckle.

6. Remove the upper control arm shaft to bracket nuts and lock washers, carefully noting the number, location, and thickness of adjusting shims between the shaft and frame bracket. Remove the control arm assembly.

7. The upper control arm is serviced only as an assembly. Therefore, if arm is bent or distorted, bushings worn, or control arm shaft is damaged in any way, the entire assembly must be replaced.

b. Installation

1. Assemble upper control arm and shaft assembly to bracket, making certain the number, thickness and location of adjusting shims between shaft and bracket are correct. Torque shaft to bracket bolts to 85 lb. ft. Those bolts may be torqued from within the engine compartment through the use of a standard 11/16"-1/2" drive socket and J-1313 Torque Wrench or its equivalent.

2. Assemble tapered stud to knuckle with cotter pin holes fore

and aft. Install castellated nut. Torque to 35 lb. ft. and install cotter pin. Do not loosen nut to align cotter pin holes. Tighten nut to next slot that lines up with hole.

3. Install wheel. Check and adjust front end alignment if necessary. When working in the area of the front upper control arm, make certain that the rubber water deflectors on fender skirt are securely attached in their original positions when the work is completed. If reasonable care is exercised in removing the fasteners for these rubber deflectors, they may be satisfactorily reused.

4. Lubricate the ball joint with a long-effectiveness grease equivalent to Buick Specification No. 742.

31-6 REMOVAL AND INSTALLATION OF LOWER CONTROL ARM ASSEMBLY

a. Removal

1. Remove coil spring reaction rod, and stabilizer link according to outline in paragraph 33-2.

2. Remove the lock nut attaching the control arm to the frame.

b. Installation

1. Install arm with the bolt head to the front of car.

2. Reinstall coil spring, reaction rod, and stabilizer link to paragraph 33-2.

3. Tighten control arm attaching bolt nut to 80-120 lb. ft.

33-2 REMOVAL AND INSTALLATION OF FRONT SPRINGS

a. Removal

1. Raise front of car and support solidly with a car stand under the frame side rail on the side where the spring removal is to be performed.

2. Remove wheel, and hub and drum assembly.

Figure 30-34—Wiring Brake Backing Plate Out of Way

3. Remove brake backing plate but do not disconnect the brake hose. Support the brake backing plate by wiring it to the frame or sheet metal out of way of work area. See Figure 30-34.

4. Remove shock absorber according to outline in paragraph 36-2.

5. Remove the front stabilizer rod link from lower control arm.

6. Disconnect brake reaction rod from lower control arm but leave attached to front frame cross member.

7. Remove control arm bumper.

8. As a safety precaution place a floor jack under the lower control arm as far outboard as possible to gain maximum leverage advantage.

Do not place the jack against the arm, but about 1/2 inch below. Now remove the cotter pin and LOOSEN, DO NOT REMOVE the nut on the lower ball joint tapered stud. The nut should be loosened not more than 1/8".

9. Rap the steering knuckle in the area of the stud to separate the stud from the knuckle. See Figure 30-33.

Raise the jack against the control arm to relieve pressure on the nut, remove the nut and separate the steering knuckle from the tapered stud.

10. Carefully lower the jack supporting the lower control arm to release the spring. With the jack all the way down to the floor

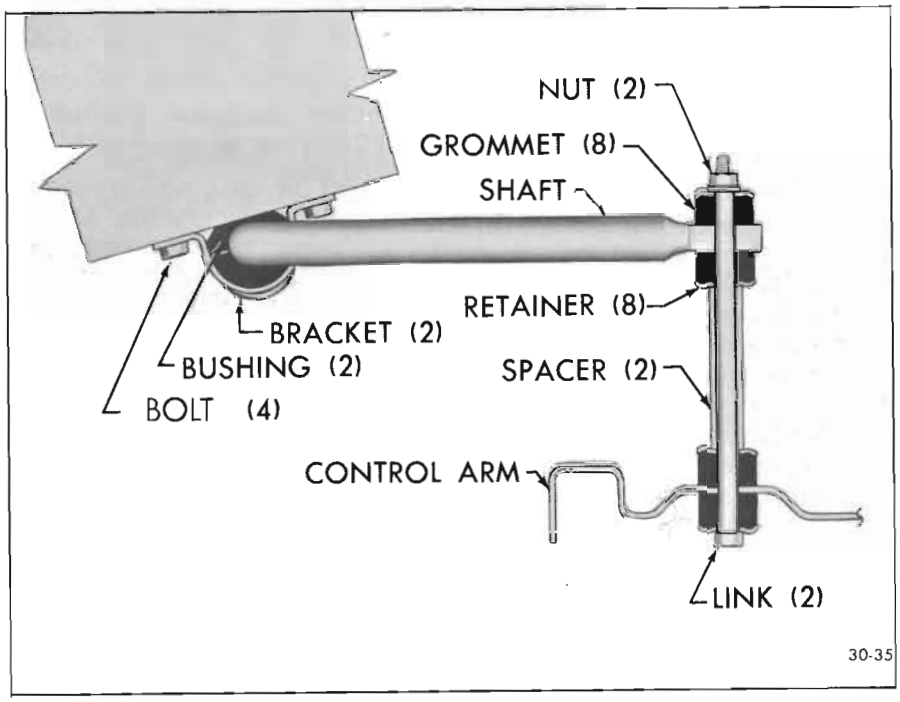


Figure 30-35—Stabilizer Link Installation

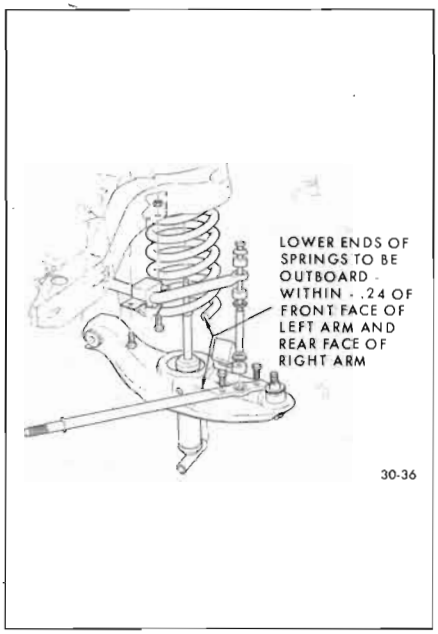


Figure 30-36—Front Coil Spring Orientation

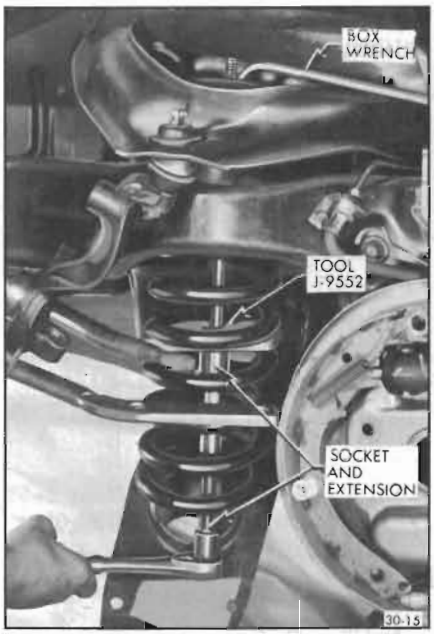


Figure 30-38—Compressing Front Spring With Tool J-9552

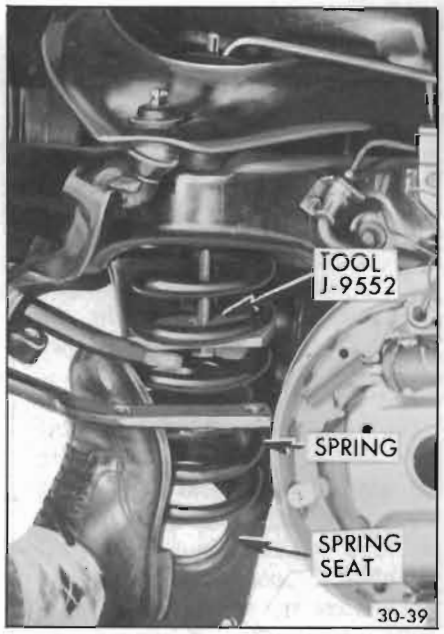


Figure 30-39—Pushing Spring onto Lower Control Arm Seat

it still may be necessary to pry the spring off its seat on the lower control arm with a long pry bar. Caution should be exercised in handling this loaded spring while still attached.

b. Installation

1. Position spring in frame upper spring seat. When assembled, the end of the lower coil must be within 1/4" of the front face of the lower control arm.

2. Place plate of J-7592-7 of spring installing Tool J-9552 between the 4th and 5th coil of the spring from the bottom. Slip in plate will fit contour of the coil. Install bolt to plate and place threaded end of the bolt through the shock absorber hole in the frame spring seat.

Figure 30-37—Tool J-9552

3. Install special Nut J-9552-2 on the upper end of the bolts so that the shoulder of the nut protrudes through the hole in the upper spring seat to protect the threads of the bolt at this point.

4. Place a box wrench on the upper nut of the tool to keep it from turning. Now tighten the bolt with a 7/8" socket and extension. See Figure 30-38.

5. Tighten the bolt, compressing the spring, until at least 1-3/4" to 2" of the rod protrudes through the upper nut of the tool. At this point the spring is usually compressed sufficiently.

6. Force the spring on its seat in the lower control arm as shown in Figure 30-39. Remove tool.

7. With the spring in position raise the lower control arm with the jack and attach the lower ball joint tapered stud to the knuckle. Make certain that the rubber dust cover is in place on the ball joint. Torque the nut to 60-95 lb. ft. and install the cotter pin. Do not loosen nut to align cotter pin holes. Tighten nut to next slot that lines up with hole.

8. Install shock absorber. Torque upper nut to 10 lb. ft., and lower bolt nut, to 30-40 lb. ft.

9. Attach brake reaction rod and compression bumper to the lower control arm. Torque the nuts to 50-70 lb. ft.

NOTE: Never use standard bolts, nuts or washers at this location. If replacement parts are needed a package, (Group 6.171), contains the two special nuts and two special washers necessary for this installation.

10. Reinstall stabilizer link and grommets. See Figure 30-35.

11. Replace wheel hub and drum assembly.

12. Remove the car stand and recheck and adjust toe-in as necessary.

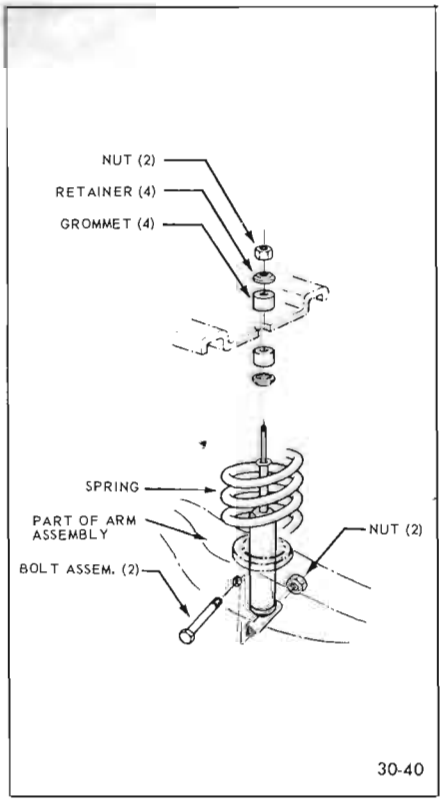


Figure 30-40—Shock Absorber Mounting Details

36-2 SHOCK ABSORBER SERVICE

a. Removal

1. Remove upper shock absorber attaching nut, grommet retainer and grommet.

2. Remove the lower retaining bolt, stop and nut. Lower shock through lower control arm.

b. Inspection

Check shock absorber for visible damage and oil leaks. Place shock absorber in upright position. Push and pull shock absorber noting resistance. If smooth hydraulic resistance is not present in both directions, replace absorber.

c. Installation

1. Select the correct shock absorber for particular car model. Refer to Master Chassis Parts Catalog for correct absorber. Substitution of an incorrectly calibrated shock absorber will adversely effect car handling performance.

2. Assemble lower grommet retainer and grommet on shock stem. Extend shock and install through lower control arm.

3. Install stop, bolt and nut. Torque to 12-24 lb. ft.

4. Assemble top grommet, grommet retainer, and nut on stem. Torque to 5-10 lb. ft.

37-3 REMOVAL AND INSTALLATION OF STABILIZER BAR

a. Stabilizer Shaft, Removal and Replacement

Disconnect stabilizer links (subpar. c. following) and disconnect the two underbody-to-shaft insulator mounts and brackets.

To install, position insulator mounts and brackets over shaft and connect bracket to underbody. Torque bracket bolts to 13 lb. ft. Connect stabilizer links, subparagraph c below. Do not lubricate insulator mounts.

b. Stabilizer Bracket and Insulator, Removal and Replacement

Stabilizer brackets should be replaced if damaged, and rubber insulator mounts replaced if deteriorated.

Replace by supporting stabilizer shaft in position and replacing brackets and mounts one at a time. Torque bracket bolts 17-23 lb. ft.

c. Stabilizer Link Removal and Replacement

1. Remove nut from upper end of link. Remove link, spacer, retainers and grommets. See Figure 30-41.

2. Inspect link and grommets.

3. Install grommets dry and use care to center the grommets in

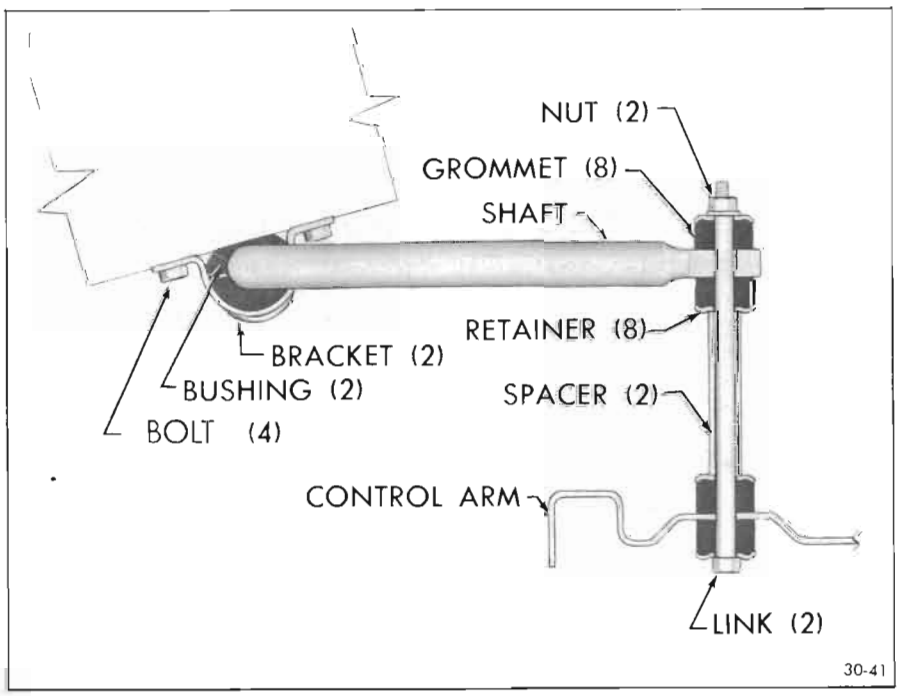


Figure 30-41—Stabilizer Link Assembly

the seats on stabilizer shaft and bracket on lower control arm. Also, center the retainers on grommets before tightening rod nut.

4. Tighten rod nut to 7 lb. ft.

37-4 REMOVAL AND INSTALLATION OF BRAKE REACTION RODS

a. Removal

1. Raise front of car.

2. Remove nut and washer at frame attachment.

3. Remove 2 bolts, nuts and washers at lower control arm, remove nut at bottom of stabilizer link and raise link upward and slide reaction rod out of bushing in frame.

b. Installation

1. Remove and replace old rubber bushing if worn.

2. Install washer with largest hole on brake reaction rod first, with concave side toward nut. Install rod through bushing in frame bracket. Install washer with smaller hole and with concave side toward bushings. Start nut, but do not tighten.

3. Install two attaching nuts and bolts and washers to lower control arm. Torque 45-60 lb. ft.

4. Reposition stabilizer link; install lower grommet, retainer and nut and torque to 5-10 lb. ft.

5. Torque nut at frame end of brake reaction rod to 40-60 lb. ft.

NOTE: CASTER AND CAMBER MUST BE CHECKED AFTER REPLACEMENT OF BRAKE REACTION ROD.

NOTE: If there is any question concerning the serviceability of the brake reaction rod to lower control arm bolts, nuts or washers, install Group 6.171, which includes two special bolts, two special nuts and four special washers. Never use standard bolts, nuts or washers at this location.

DIVISION IV TROUBLE DIAGNOSIS

37-5 FAULTY SPRINGS, SHOCK ABSORBERS, AND BALL JOINTS

a. Trim Height Checking Considerations

Optional equipment, undercoating, accumulated dirt, etc., change the car weight and must be considered when checking spring trim dimensions. Because of the many possible variations in loading due to optional equipment, it is not possible to give dimensions for all conditions; therefore, the spring trim dimensions following are for the standard car only, without optional equipment or undercoating and with car at curb weight. Curb weight includes gas, oil, water, and spare tire but no passengers.

Before measuring spring trim dimensions, bounce both ends of car up and down several times to make sure there is no bind in suspension members, and to let springs take a natural position.

b. Measuring Trim Height

1. On a new car, the front spring trim dimension "Y" should be as shown in Figure 30-42.

NOTE: On a car having service miles the trim height may be 1/4" less due to normal setting of bushings, dirt accumulation, etc.

2. On a new car, the rear spring trim dimension "Z" should be as shown in Figure 30-42.

NOTE: On a car having service miles the trim height may be 3/8" less due to normal setting of bushings, dirt accumulation, etc.

3. When checking side to side differences in trim height at the front, take measurements at the front wheel house openings as shown in Figure 30-43.

NOTE: If a variation exists in trim height from side to side at front, installation of one shim will increase height of low side by approximately 1/4". Only two shims can be used at each front location. If side to side variation is in excess of one inch, check suspension components for damage, excessive wear, or incorrect spring installation. See subparagraph c following for front shim installation.

4. When checking side to side differences in trim height at rear, take measurements at rear wheel house openings as shown in Figure 30-43. If shimming is required, see subparagraph c following.

c. Installation of Front Spring Shim

To correct variations in trim height, front spring shims may be ordered from the Parts Department under Group 7.425.

1. Remove front spring from car as described in paragraph 33-2.

2. Place shim at top of spring as shown in Figure 30-44.

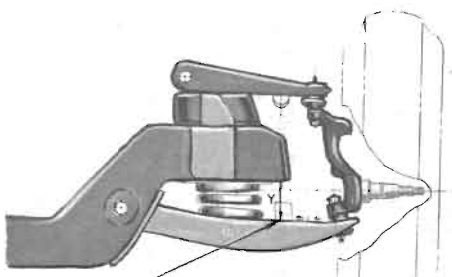
3. Install spring in car.

d. Weak and Non-Operative Shock Absorbers

Many shock absorbers have been replaced and returned to the factory with the report that they were weak. When tested with special factory equipment very

CHASSIS TRIM DIMENSION 1966

MODEL	FRONT COIL Y ± .18 CURB WEIGHT	REAR COIL Z ± .24 CURB WEIGHT
45237	4.42	6.14
45239	4.42	6.14
45269	4.42	6.14
45437	4.42	6.14
45439	4.42	6.14
45467	4.42	6.14
45469	4.42	6.14
46237	4.24	5.56
46239	4.24	5.56
46269	4.24	5.56
46437	4.24	5.56
46439	4.24	5.56
46467	4.24	5.56
46469	4.24	5.56
46637	4.24	5.56
46639	4.24	5.56
46667	4.24	5.56
48237	4.24	5.56
48239	4.24	5.56
48269	4.24	5.56
48437	4.24	5.56
48439	4.24	5.56
48467	4.24	5.56
48469	4.24	5.56
49487	4.01	5.88

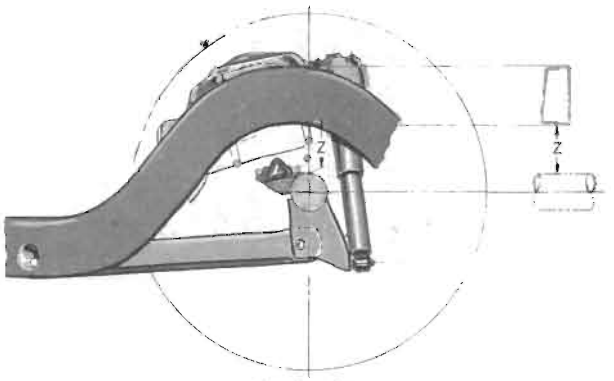


MEASUREMENT TAKEN FROM TOP SURFACE OF LOWER CONTROL ARM AT ℄ OF REAR FACE OF BUMPER, TO BOTTOM OF RAIL.

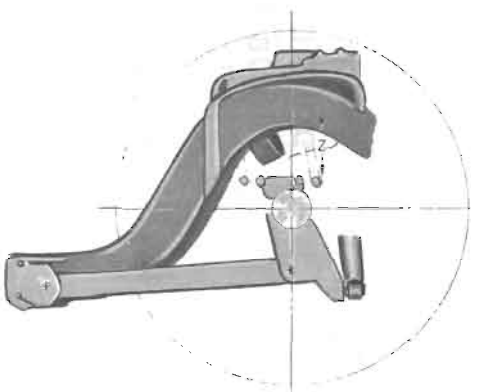
45-46-48-49
FRONT COIL SPRING

THESE DIMENSIONS DO NOT APPLY TO OPTIONAL SPRINGS.

CURB WEIGHT TRIM ON AIR CONDITIONED CARS SUBTRACT 1/8" FROM FRONT TRIM DIMENSIONS.



45 - 46 - 48
REAR COIL SPRING



49
REAR COIL SPRING

30-42

Figure 30-42—Trim Height Dimension Chart 45, 46, 48, 49000 Series

few of these replaced units have been found weak or otherwise below standard in operation. This indicates that these shock absorbers were needlessly replaced in an attempt to improve riding conditions that were actually standard, or that erroneous methods were used in judging the operating condition of the units.

Before attempting to test shock absorbers make sure that all attaching bolts and nuts are tight. Tires should be uniformly inflated to specified pressure (Group 100). The chassis should be well lubricated to make sure that suspension parts are free moving.

Test each front and rear shock absorber in turn by quickly pushing down and then lifting up on the end of the car bumper closest to the unit being checked. Use the same amount of force on each test, and note the amount of resistance provided by the shock absorber on compression and rebound. A little practice on another car of the same model which has satisfactory ride control will aid in judging the amount of resistance that should exist. Both front shock absorbers should provide the same feeling of resistance as should both rear shock absorbers. Any noticeable variation between right and left shock absorbers indicates that one unit is not operating normally. Little or no resistance on compression or rebound indicates air in shock absorbers, internal leakage due to wear, or that the valve is held open by dirt. Excessive resistance indicates that bleeder hole in valve is plugged with dirt.

If there is any doubt about the action of a shock absorber after testing as described above, remove the unit from car. Mount it vertically in vise with safe jaws gripping the mounting firmly, then move the piston rod up and down by hand. There should be no free movement in this test. Lack of resistance to movement indicates air in the shock absorber, internal leakage due to wear, or that the valve is held open by dirt. A faulty shock absorber must be replaced as it cannot be disassembled for repairs. In the test given above, the amount of force that can be applied is not sufficient to open a valve against its spring pressure; therefore, this test only checks the flow of fluid through the valve bleeder hole as well as any leakage due to a valve being held open, or due to internal wear of piston and cylinder. Since it is unlikely that the valve springs will weaken in service, it may be assumed that the shock absorber action is normal, if it operates satisfactorily in the test given above.

e. Loose Ball Joints

The upper ball stud is spring-equipped and thus preloaded in its socket at all times. This minimizes looseness at this point and compensates for normal wear. If the upper stud has any perceptible lateral shake, or if it can be twisted in its socket with the fingers, the upper ball joint should be replaced.

The lower ball joint is not spring loaded but is held seated by the weight of the car. With the chassis spring load removed from the ball joint, this ball joint may show looseness. Such looseness is probably due to normal operating clearance.

1. Place jack under lower control arm as far outboard as possible

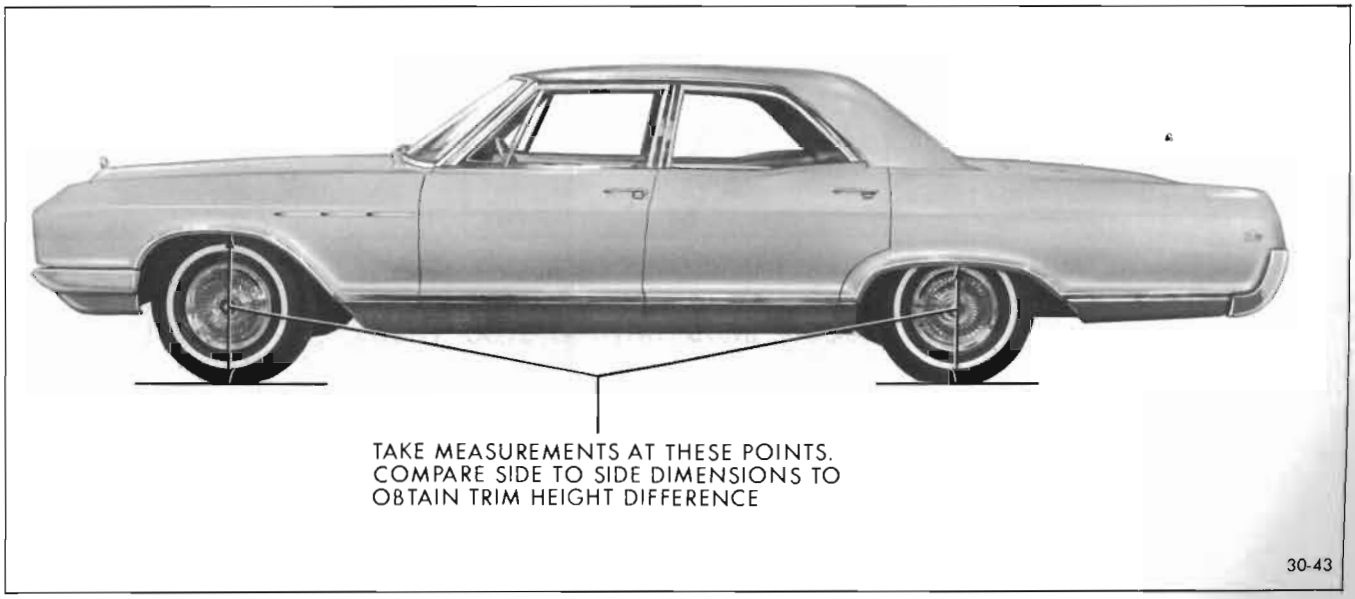


Figure 30-43—Trim Height Side - To - Side Checking Locations

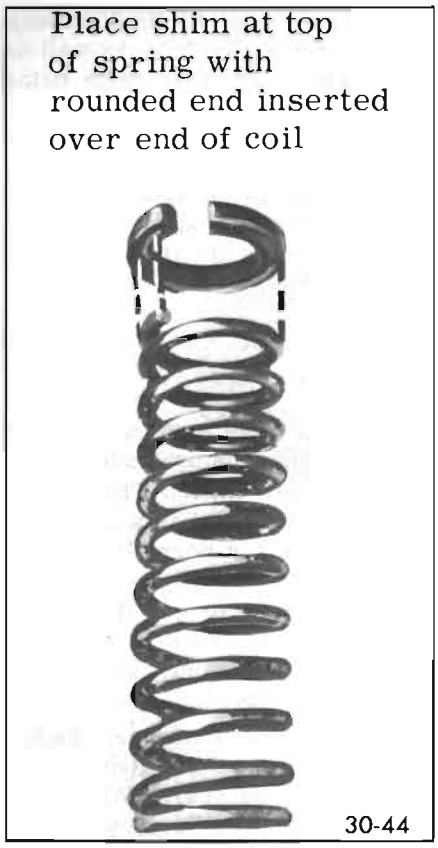


Figure 30-44—Installing Shim on Spring

and still have access to the lower ball joint grease fitting. Be sure the upper control arm does not contact the rebound bumper when the car is raised. Raise car until front wheel clears the floor.

2. Remove lower ball joint grease fitting and install Gauge J-21240.

3. Place a pry bar between floor and tire and raise tire. This puts a load on the ball joint.

4. Repeat procedure several times and take maximum and minimum gauge readings under load and no load conditions.

5. Subtract minimum reading from maximum reading. If difference is more than .100", replace ball joint.

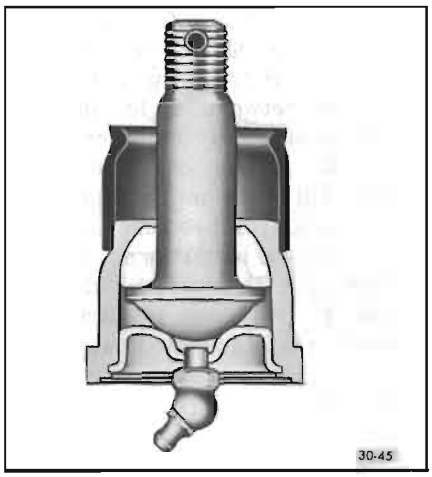


Figure 30-45—Upper Ball Joint Construction

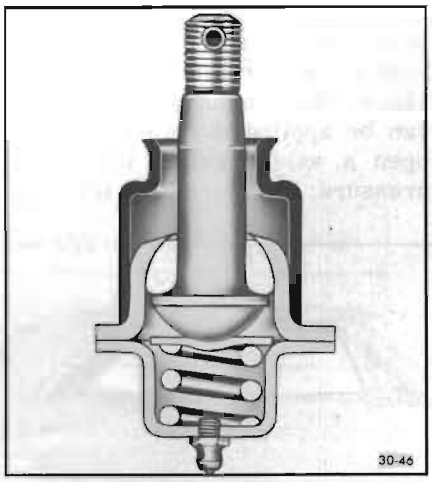


Figure 30-46—Lower Ball Joint Construction

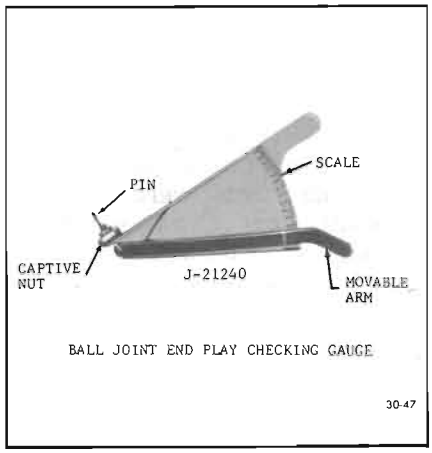


Figure 30-47—Ball Joint Checking Gage J-21240

f. Loose Upper Control Arm Bushing Retaining Bolts

If loose upper control arm bushing retaining bolts are encountered, it is necessary to torque bolts to 55 lb. ft. On some cars equipped with air conditioning, power brackes, etc. it will be necessary to remove the upper control arm per paragraph 31-5 to torque the bolts.

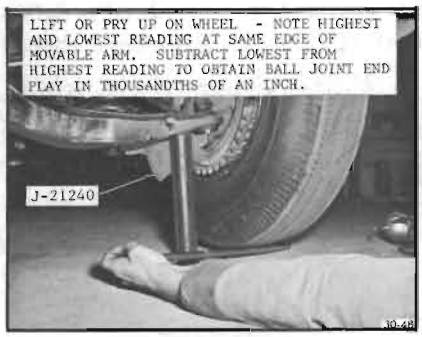
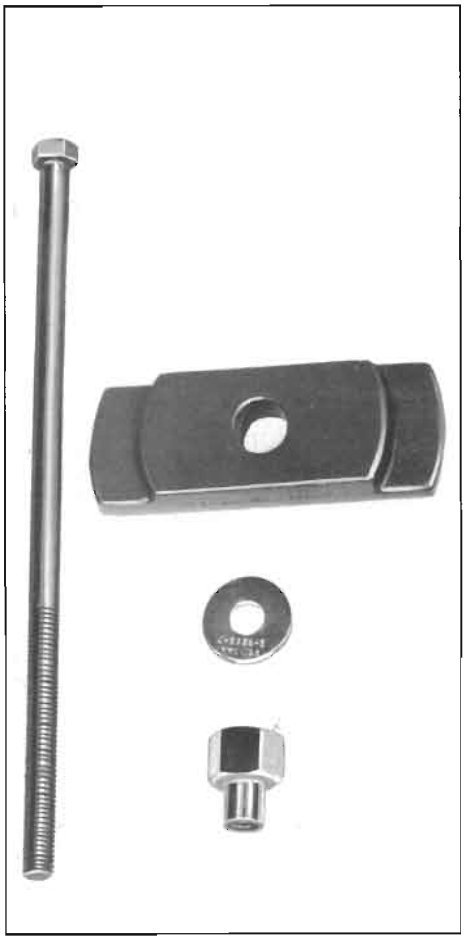
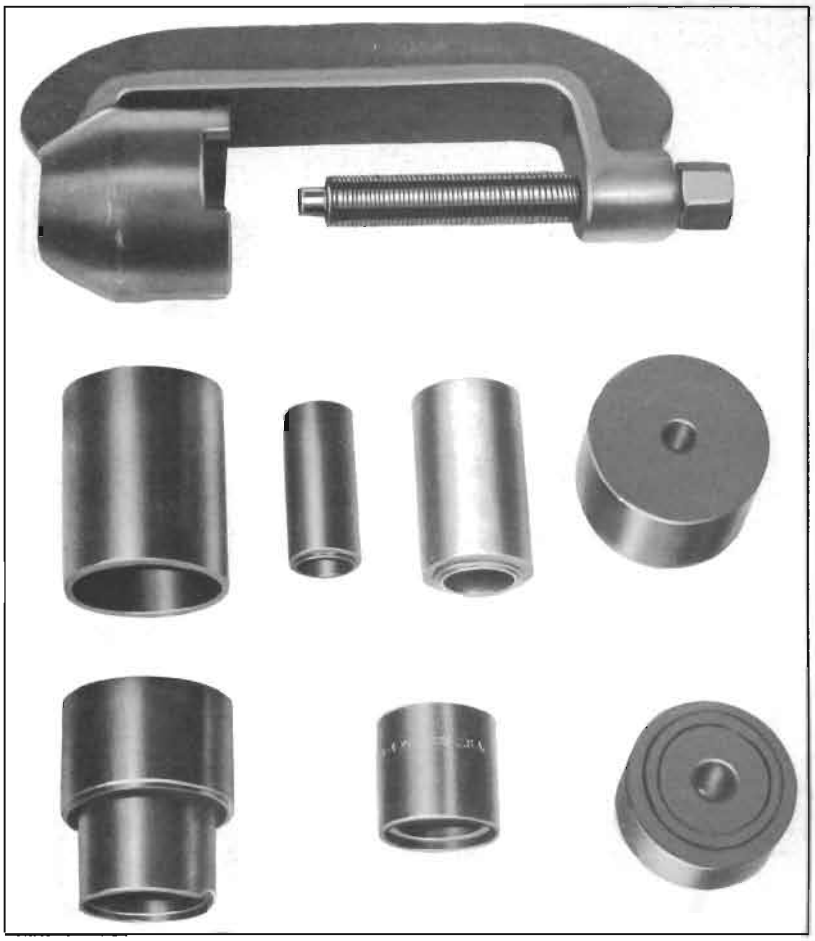


Figure 30-48—Ball Joint Checking Gage Installed



J-9552



J-9519-01

J 9519-01	LOWER CONTROL BALL JOINT REMOVER AND REPLACER SET
J 9552	FRONT COIL SPRING COMPRESSOR

Figure 30-49—Special Tools - Group 30