

GROUP 7

CHASSIS SUSPENSION

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SECTION 7-A

SPECIFICATIONS AND DESCRIPTION OF CHASSIS SUSPENSION

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NOTES

7-1 CHASSIS SUSPENSION SPECIFICATIONS

a. Tightening 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.

Part	Location	Thread Size	Torque Ft.Lbs.
Nut	Lower Control Arm Shaft Bolt	$\frac{7}{16}$ -20	45-50
Nut	Steering Knuckle Support Lower Pivot Pin	$\frac{1}{8}$ -11	65 Min
Bushing	Steering Knuckle Support		200 Min
Bolt	Steering Knuckle Support Clamp	$\frac{3}{8}$ -24	30-35
Bushing	Knuckle Support Upper Pivot Pin		75-80
Nut	Upper Pivot Pin Bushing Clamp Bolt	$\frac{3}{8}$ -24	25-30
Nut	Front Stabilizer Bracket Bolt	$\frac{3}{8}$ -24	30-35
Bolt	Wheel to Front Hub and Rear Axle Shaft	$\frac{9}{16}$ -18	70-75
Nut	Rear Brake Assembly to Axle Housing	$\frac{7}{16}$ -20	35-40
Nut	Brake Assembly and Steering Arm to Steering Knuckle Bolt	$\frac{7}{16}$ -20	45-50
Nut	Knuckle Support Upper Arm Shaft Bolt	$\frac{9}{16}$ -18	70-75
Bolt	Shock Absorber Lower Bracket	$\frac{3}{8}$ -16	25-30
Nut	Shock Absorber Pivot Bolt	$\frac{7}{16}$ -20	45-50
Nut	Shock Absorber Link Rod	$\frac{3}{8}$ -24	25-30
Pal Nut	Shock Absorber Link Rod	$\frac{3}{8}$ -24	2-4
Nut	Radius Rod Frame End Bracket	$\frac{7}{16}$ -20	60-70
Bolt	Radius Rod Frame End Bracket	$\frac{7}{16}$ -14	60-70

7-2 DESCRIPTION**CHASSIS SUSPENSION (240)****b. Wheels and Tires**

Item	Series 40	Series 60-50	Series 70
Wheel Type	Demountable Steel Disk		
Rim Type	Drop Center		
Rim Size	15" x 5.50 K	15" x 6.00 L	15" x 6.00 L
Tire Type	Tubeless		
Tire Size	7.10"—15" 7.60"—15" Optional	7.60"—15"	8.00"—15"
Tire Inflation Pressures	See paragraph 1-1		

c. Springs and Shock Absorbers

Item	Series 40, 60 (Except 49, 69)	Series 50, 70 (And 49, 69)
Spring Type—Front and Rear	Coil	
Spring Trim Dimensions	See Paragraph 7-13	
Shock Absorber		
Make and Type—Front	Delco, Double Direct-Acting	
Make and Type—Rear	Delco, Double Direct-Acting	
Model—Front	812H	
Model—Rear	870U	
Shock Absorber Color Code		
Front	Plain	Blue
Rear	Plain	Grey

d. Dimensional Specifications

NOTE: Dimensions and limits given in these specifications apply to new parts only. Where

limits are given, "T" means tight and "L" means loose.

Item	All Series
Caster, Camber, Toe-in, King Pin Inclination, and Steering Geometry	See figure 7-16
Steering Knuckle Spindle	
Large End, Diameter	1.3735"—1.3740"
Small End, Diameter	.8426"—.8431"
Wheel Bearing Cone on Spindle	
Outer	.0004" L—.0014" L
Inner	.0005" L—.0015" L
Wheel Bearing Cup in Hub	
Outer	.0005" T—.0025" T
Inner	.0005" T—.0025" T
Wheel Bearing Adjustment	See paragraph 7-10
King Pin Diameter	.861"—.862"
Knuckle Bushings, Bore	.8625"—.8635"
King Pin to Knuckle Bushings, Clearance	.0005" L—.0025" L
Knuckle End Clearance	Shim to .003"
Knuckle Support Pivot Pins in Bushings, Upper and Lower	.011" L—.020" L

7-2 DESCRIPTION OF WHEEL SUSPENSION**a. Front Wheel Suspension**

The front wheel suspension allows each front wheel to rise and fall, due to change in road surface level, without appreciably affecting the opposite wheel.

Each wheel is independently connected to the frame front cross member by a steering knuckle, steering knuckle support, lower control arm assembly, and a knuckle support upper arm. See figure 7-1. The upper and lower arms are so placed and proportioned in length that they allow each knuckle support, spindle, and wheel to move through a vertical plane only. The front wheels are held in proper relation to each other

for steering by means of two tie rods which connect to steering arms on the steering knuckles and to the intermediate rod shown in figure 8-6.

A coil type chassis spring is mounted between the frame front cross member and a spring seat in each lower control arm assembly. A large rubber bumper is mounted on the outer end of each lower control arm to limit travel of the arm during compression of chassis spring. A similar rubber bumper is mounted on the frame under each upper control arm to limit travel of arm during rebound of chassis spring.

Side roll of the front end of chassis is controlled by a spring steel stabilizer shaft. The shaft is mounted in rubber bushings supported in brackets attached to lower flange of each

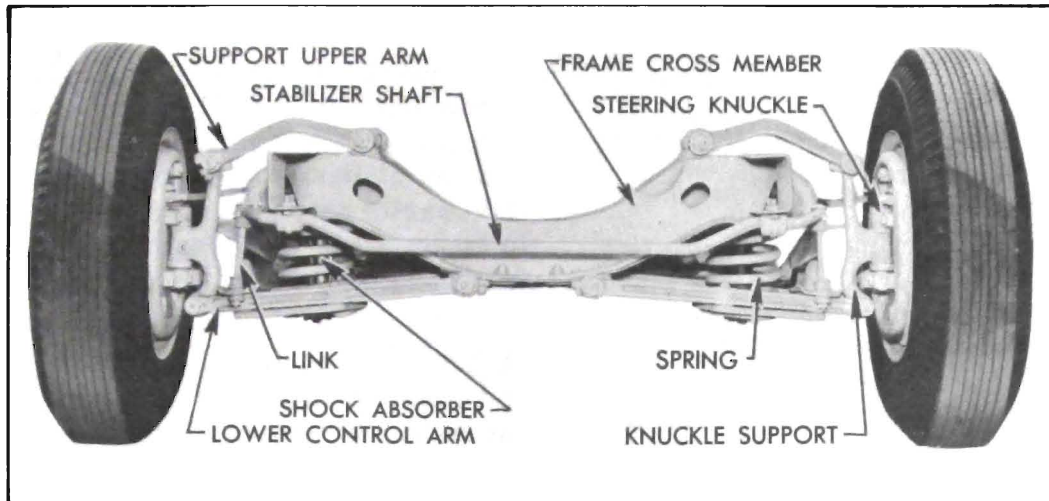


Figure 7-1—Front Wheel Suspension

frame side rail. The ends of stabilizer shaft are connected to the front sides of lower control arms by links which have rubber grommets at both ends to provide flexibility at the connections and prevent rattle. See figures 7-1 and 7-8.

The lower control arm assembly consists of two drop forged steel arms solidly riveted to a stamped steel spring seat to form a rigid V-shaped unit. A small plate riveted above the spring seat serves as a mounting for a rubber

bumper and a point of connection for the stabilizer link. Hardened steel threaded bushings are screwed solidly into the inner ends of the forged arms to provide thread-type bearings on the ends of the control arm shaft which is attached to the frame front cross member. A large threaded pivot pin held by a lock washer and nut connects the steering knuckle support to the lower control arm. See figure 7-2.

A large threaded hardened steel bushing is screwed solidly into the lower end of each steering knuckle support to provide a thread-type bearing on the pivot pin in outer end of lower control arm. The upper end of knuckle support provides for a threaded, clamp type pivot pin which connects upper end of support to outer end of the knuckle support upper arm. The threaded ends of the upper pivot pin seat in internally threaded hardened steel bushings mounted in outer end of the upper arm. See figure 7-2.

The eccentric type steering knuckle support upper pivot pins provide adjustment for both caster and camber. The threaded pin and bushings permit adjustment of caster by turning the pin, which moves the upper end of knuckle support fore or aft, depending on rotation. The large diameter threaded middle section of pin is eccentric to the ends so that camber is also changed by turning the pin. A hex recess is broached in one end of pin for insertion of the adjusting wrench after removal of the lubrication fitting from the clamped type pivot pin bushing. See figure 7-2.

Rubber seals are installed on upper and lower arm shafts and on lower and upper pivot pins

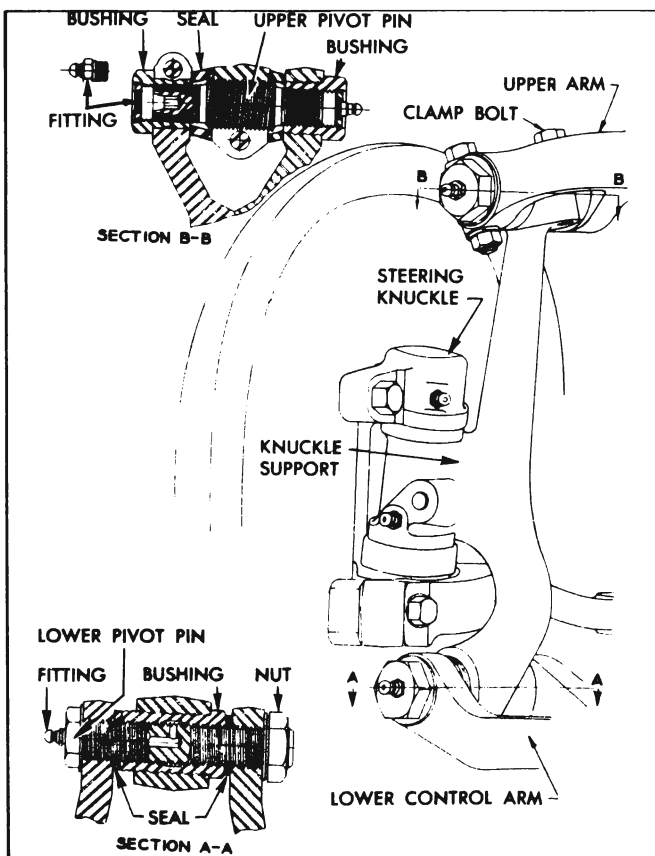


Figure 7-2—Steering Knuckle Support and Pivot Pins

to exclude dirt and water from the threaded bearing surfaces. Lubrication fittings are provided at all bearing locations.

The steering knuckle is attached to knuckle support by a hardened steel king pin which is locked in knuckle support by a tapered pin. Bronze bushings in steering knuckle provide bearings for king pin. Vertical thrust is taken by a ball bearing between the steering knuckle and knuckle support. The steering knuckle spindle supports the wheel hub with two New Departure adjustable cup and cone ball bearings. The outer end of hub is closed by a cap and inner end is sealed with a packing to exclude dirt and water from bearings. See figure 7-9.

b. Rear Wheel Suspension

Rear wheels are not independently sprung since they are mounted on axle shafts incorporated in the rear axle assembly. The rear wheels are held in proper alignment with each other by the rigid construction of the rear axle housing. They are held in alignment with the rest of the chassis by the torque tube and radius rod between car frame and the rear axle assembly.

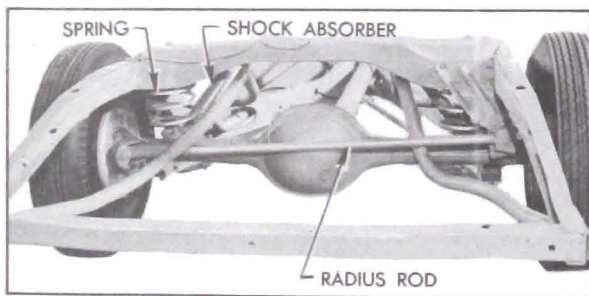


Figure 7-3—Rear Wheel Suspension

Two coil type chassis springs are mounted between the frame cross member at top of kick-up, and spring seats welded to the axle housing near each end. Ride control is provided by two identical double direct-acting shock absorbers angle mounted between brackets welded to the front of the rear axle housing and brackets bolted to the front of the rear spring cross member. Side sway of the chassis springs and rear end of frame is prevented by the transverse radius rod. Large rubber bumper and rubber rear axle stops are bolted to lower flange of frame side rails over axle housing to limit travel of axle housing during compression of the chassis springs. See figure 7-3.

c. Wheels and Tires

Wheels are demountable steel disk type. The wheels have wide drop center type rims designed to give ample support for the tire sizes used as standard equipment. The rims have tapered tire bead seats which cause tire beads to wedge tightly in place when tires are inflated.

Tires are tubeless low pressure balloon type, of 4-ply construction. U. S. Royal, Firestone, and Goodrich tires are used in production without optional selection of any specified make.

All tires used as standard factory equipment have been worked out with the tire manufacturer for stability. *This does not imply that other makes and types of tires are not suitable for Buick cars, but owing to the large number of tire makes and designs it is impossible for ride and handling calibrations to be worked out for each one.*

Standard production tire sizes are given in paragraph 7-1. Tires other than those used as standard equipment may cause a wander. Larger tires will reduce clearance at fenders and be difficult to mount in spare carriers. Tires with more plies may cause hard riding. Some types of tire and tube combinations are difficult to balance and may cause "tramp."

7-3 SHOCK ABSORBERS

a. Shock Absorber Type and Location

Both front and rear shock absorbers are Delco double direct-acting (telescoping) hydraulic type. All shocks are filled with a calibrated amount of fluid and sealed during production; therefore, no refilling or other service is possible other than replacement of deteriorated rubber bushings.

Each *front* shock absorber is mounted vertically inside a front chassis spring. The upper end is attached to a bracket welded on the frame through rubber grommets by a threaded mounting stem and a nut. The lower end has a bracket which is a part of the shock absorber assembly. This bracket is attached to the lower spring seat by two bolts. See figure 7-4.

Each *rear* shock absorber is mounted on an angle with the upper end in toward the center of the car. The upper end is attached to a bracket bolted on the frame through rubber

bushings. The lower end is attached to a bracket welded on the rear axle housing through rubber bushings. See figure 7-5.

Right and left *front* shock absorbers are identical and interchangeable. Right and left *rear* shock absorbers are also identical and interchangeable. Front and rear shock absorbers are of the same general type, but are *not* interchangeable.

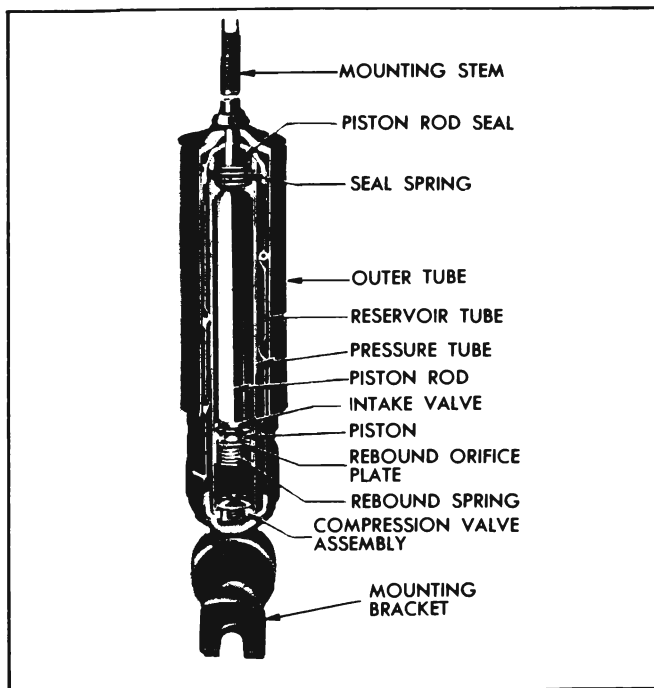


Figure 7-4—Front Shock Absorber—Sectional View

b. Shock Absorber Construction and Operation

The shock absorber consists of three concentric tubes, a piston and rod, and valves for controlling hydraulic resistance. The pressure (inner) tube provides a cylinder in which the piston and rod operate. The upper end is sealed by a piston rod seal, and the lower end is closed by the compression valve assembly. This tube is completely filled with fluid at all times. The reservoir (middle) tube provides space for reserve fluid and for overflow from the pressure tube during operation. The outer tube telescopes over the reservoir tube to provide a dust shield.

The piston, piston rod and outer tube are attached to the car frame, while the pressure and reservoir tubes are attached as a unit to the chassis suspension through the mounting eye. As the wheel moves up and down with respect to the frame the chassis spring com-

presses or expands, and the shock absorber is telescoped or extended. This action forces the fluid to move between the pressure and reservoir tubes through small restricting orifices in the valves. The relative slowness of fluid movement imposes restraint on the telescoping or extension of the shock absorber, thus providing the required dampening effect on spring action.

(1) *Compression Stroke Operation.* When the chassis spring is being compressed the shock absorber is telescoped, causing the piston to move down in the pressure tube, forcing fluid through holes in the piston. The pressure lifts the intake valve plate, allowing fluid in lower chamber to pass into the upper chamber. As the piston rod moves downward into the pressure tube it occupies space previously filled with fluid and this displaced fluid is forced out of the lower chamber into the reservoir through the restricting orifice in the compression valve. On fast or extreme movements when the fluid flow exceeds the capacity of the orifice, the spring loaded relief valve in the compression valve assembly is forced open to permit more rapid escape of fluid. The amount of compression control is governed entirely by the volume of fluid displaced by the piston rod, and the resistance to chassis spring travel is governed by the area of the orifice and the strength of the compression relief valve spring.

(2) *Rebound Stroke Operation.* When the chassis spring expands, or rebounds, the shock absorber is extended and its resistance is

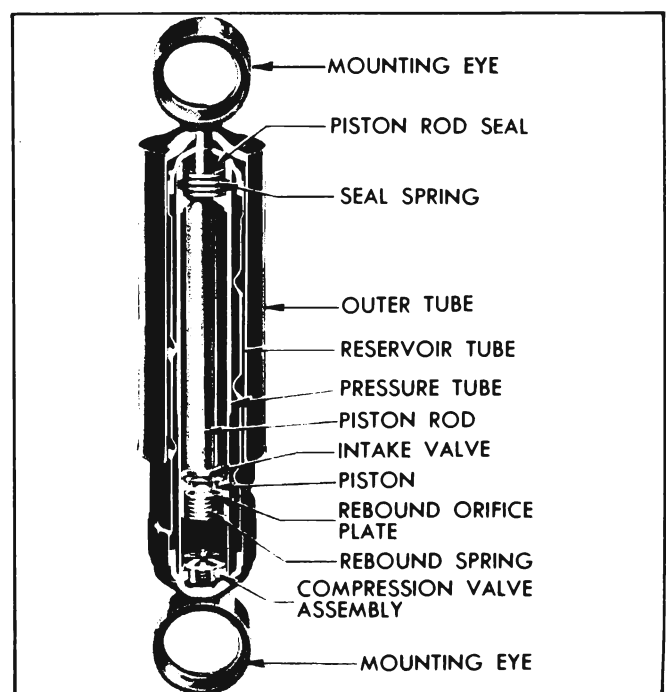


Figure 7-5—Rear Shock Absorber—Sectional View

instantly effective. As the piston is pulled upward the intake valve plate seats and fluid in the upper chamber is forced through slots in the plate and holes in the piston to build up pressure against the rebound orifice plate. As the pressure increases, the rebound spring is compressed and the orifice plate leaves its seat

to permit fluid to pass into the lower chamber. As the piston rod moves upward out of the pressure tube the space previously occupied by the rod is filled with fluid drawn into the lower chamber from the reservoir. A separate intake valve in the compression valve assembly opens to permit return of this fluid.