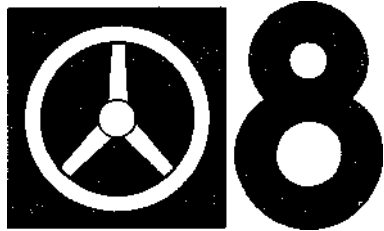


Suspension and Steering

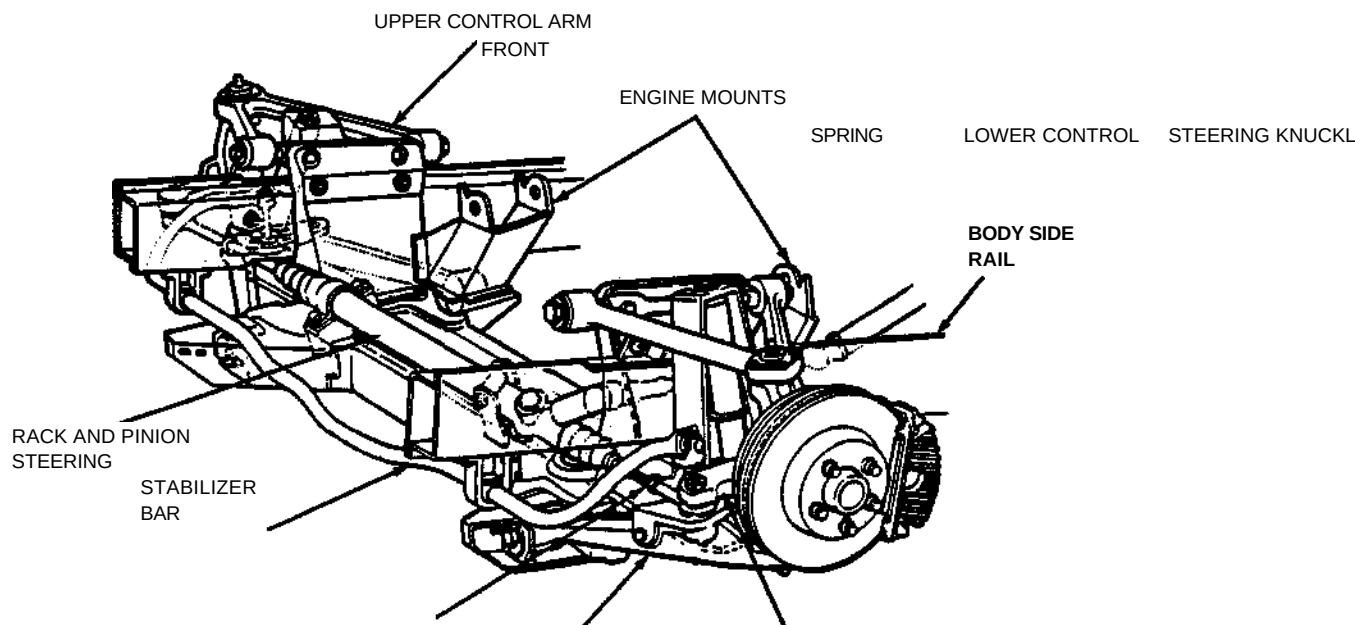


FRONT SUSPENSION

The Corvette Stingray front suspension is an unequal length arm, independent design. Springing action is provided by coil springs. Ball joints connect the steering knuckles to the control arms. The upper and lower control arms have their cross-shafts bolted to fixed frame members. The upper arm cross-shaft has shims to provide the means for setting caster and camber. The front shock absorbers have their bottom ends attached to the lower control arm while the upper end extends through the frame member. The shock absorbers are double action and fit inside the

front coil springs. A stabilizer bar connects the lower control arms to the front frame rails. Tapered roller bearings are used in the front wheels.

On 1984 models, the front suspension uses aluminum for all its major components. These include forged aluminum arms and knuckles and replaces conventional coil springs with a lighter, more durable transverse fiberglass monoleaf spring. Other elements of the front suspension system include long life stabilizer link bushings and the use of spindle offset. Spindle offset is achieved by moving the center of the wheel rearward from the conventional location on line through the ball joints.



ARM Front suspension on 1984
and later models

Rear Axle Identification (cont.)

NOTE: Axle identification is stamped on the differential carrier along with the date of manufacture.

Rear Axle Identification (cont)

NOTE: Axle identification is stamped on the differential carrier along with the date of manufacture.

Type	Plant Identification	Type	Identification
1970		1976-77	
Positraction (3.36 ratio) 4-Speed Automatic.....	CAX CAZ CFA CFB CFC CLR	Positraction (3.55 ratio). Positraction (3.70 ratio).	OBOC
Positraction (3.55 ratio)		1978	OK OM OH OJ
Positraction (3.70 ratio)			
Positraction (4.11 ratio)			
PosRraction (4.5© ratto)....., —			
Pbsitraction (3.36 ratio).....			
1971		1979	
Positraction (3.55 ratio).	AA AB	Positraction (3.36 ratio). Positraction (3.55 ratio). Positraction (3.70 ratio).	OM OH
Positraction (3.70 ratio).	AC AD		
Positraction (4.11 ratto).	AW AX		
Positraction (4.56 ratio).	LR		
Positraction (3.08 ratto).			
Positraction (3.36 ratio).			
Positraction (3.36 ratio).			
1972-75		1980	
		Positraction (3.07 ratio).....	DANA
Positraction (3.36 ratto).	AX LR	1981	
Positraction (3.36 ratio).	AC AB	Positraction (2.87 ratio) w/A.T..... Positraction (2.72 ratio) w/M.T.....	OJ OK
Positraction (4.11 ratio).	AA AW		
Posnraction (3.70 ratio).	AV		
Positraction (3.55 ratio).		1982	
Positraction (3.08 ratio).	OA LR- OD	Positraction (2.87 ratio).....	DANA
PosBractfon (2.73 ratio).			
1976-77		1984	
Positraction (3.08 ratio).		Positraction (3.31 ratio).....	DANA
Positraction (3.36 ratio).			

4. Scribe mark on cam bolt and on mounting bracket so they can be realigned in the same position.

5. Remove cam bolt and • separate the spindle support rod from the mounting bracket at the carrier.

6. Remove axle shaft trunnion straps at the spindle and at the side gear yoke.

7. Push out on the wheel and tire assembly and remove the axle shaft.

8. Replace U-Joints as described under "Propeller Shaft." Install by reversing removal.

9. Realign scribe mark on cam bolt with scribe mark on bracket. Torque bolts to specifications.

10. Check and adjust rear suspension alignment as necessary.

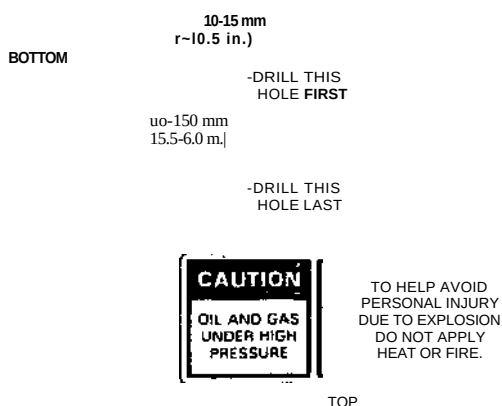
3. Reverse the procedure to install the replacement shock absorbers.

DISPOSAL OF PRESSURIZED SHOCK ABSORBERS

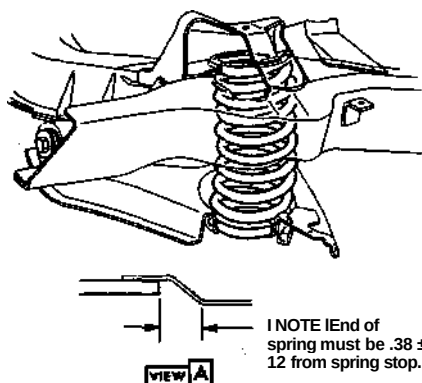
1984 and Later Models

Due to the high pressure of gas it is advised that, upon scrapping or disposal of these shock absorbers, the pressure be released. This is carried out as follows:

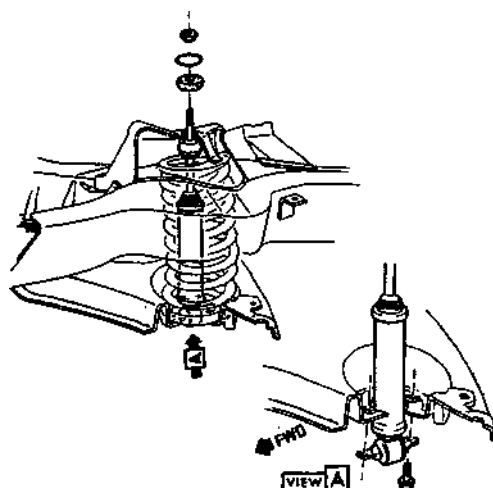
1. Clamp shock in vise with piston rod pointing down.
2. Measure approx. 10—15 mm (0.5 in.) from bottom of shock and drill an approx. 5 mm hole so the gas can escape.
3. Measure approx. 140-150 mm (5.5-6.0 in.) from first hole and drill an approx. 5 mm hole to facilitate drainage of oil. Drain all oil from shock absorber.



Gas-filled shock absorbers should be drilled as shown before disposal. Look for the warning label to identify gas shocks on 1984 and later models



Coil spring positioning

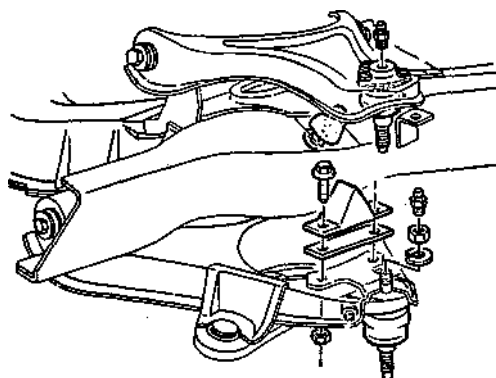


Shock absorber attachments

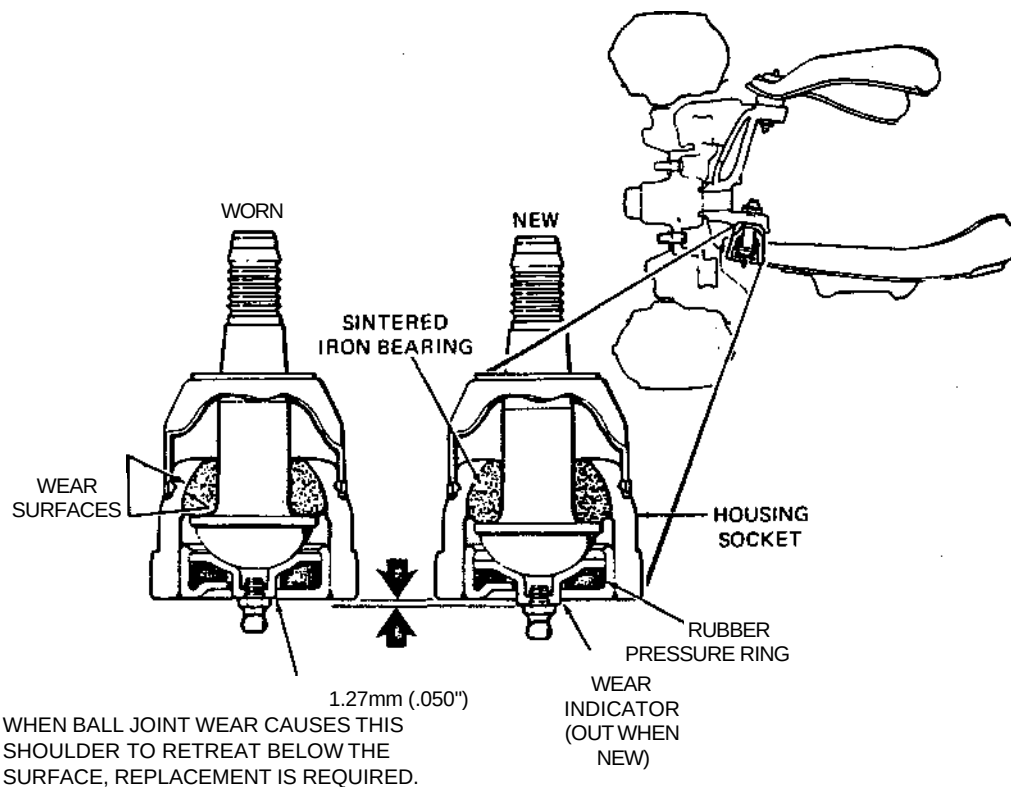
Ball Joints

Erratic front suspension behavior or alignment difficulties suggest possible excessive ball-joint wear. To check, raise the vehicle so that the front suspension hangs freely and remove the wheel and tire assembly. Check the upper ball joint by supporting the lower control arm and by separating the upper ball-joint stud from the steering knuckle. With the steering knuckle and hub hanging freely, install the retaining nut on the ball joint stud and note the torque required to rotate the ball joint with a torque wrench. A ball joint in good condition will require a torque of 2-10 ft. lbs. Less than 2 ft. lbs. torque indicates excessive wear and warrants replacement of the ball joint.

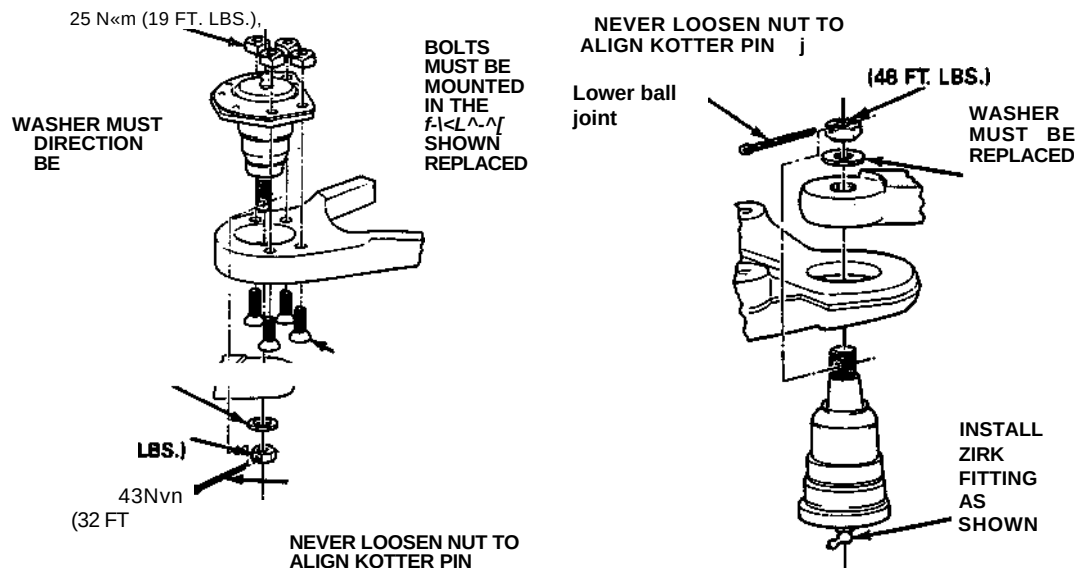
To test the lower control arm ball joint, support the lower control arm so that the wheel hub hangs freely. Measure between the tip of the ball joint stud and the tip of the grease fitting found on the top side of the ball



Upper and lower ball joint assemblies



Typical ball joint inspection, showing how to check wear indicator



Upper ball joint installation. OEM rivets must be drilled and replaced with bolts supplied with replacement part (1984 shown)

installation—typical

joint. Now position the support under the wheel hub and repeat the measurement. A difference in measurement of more than $\frac{1}{16}$ in. dictates replacement of the lower ball joint.

REMOVAL AND INSTALLATION

Replacement of the ball joints may be done without removing the control arms from the vehicle.

1. Raise the vehicle and remove the

wheel and tire. Be sure that the lift is positioned so that the front suspension will hang freely.

2. Remove the stabilizer link from the lower control arm, then disconnect the top ball joint from the steering knuckle and let the knuckle and the wheel hub hang unsupported.

3. The ball joint assembly is riveted to the control arm. Use a suitable cold chisel and knock the heads off the rivets and remove the ball joint.

4. Clean the mounting surface on the control arm and check for signs of cracks or other damage.

5. Measure the thread diameter of the kit-supplied mounting bolts and drill out the control arm rivet holes to the appropriate size.

6. Install the replacement ball joint assembly and torque the new securing bolts to 15-25 ft. lbs. (1963-67), 50 ft. lbs. (1968-82).

7. Lift the lower control arm so that the upper ball joint stud can be rejoined to the steering knuckle. Torque the retaining nut to 42-47 ft. lbs. (1963-67); 80 ft. lbs. (1968-82) and install a new cotter pin.

8. To replace the lower ball joint, support the lower control arm, disconnect the lower ball joint from the steering knuckle and lift the knuckle and wheel hub out of the way.

NOTE: Removal of the spring is not necessary so long as the lower control arm is adequately supported. 9. The lower ball joint assembly is also riveted to the control arm surface. Chisel it free as with the upper ball joint.

10. Replace the joint as previously described, then reconnect the lower ball joint stud to the steering knuckle. **NOTE:** It may be necessary to install grease fittings on the replacement ball joints if none are provided.

Steering Knuckle

REMOVAL AND INSTALLATION

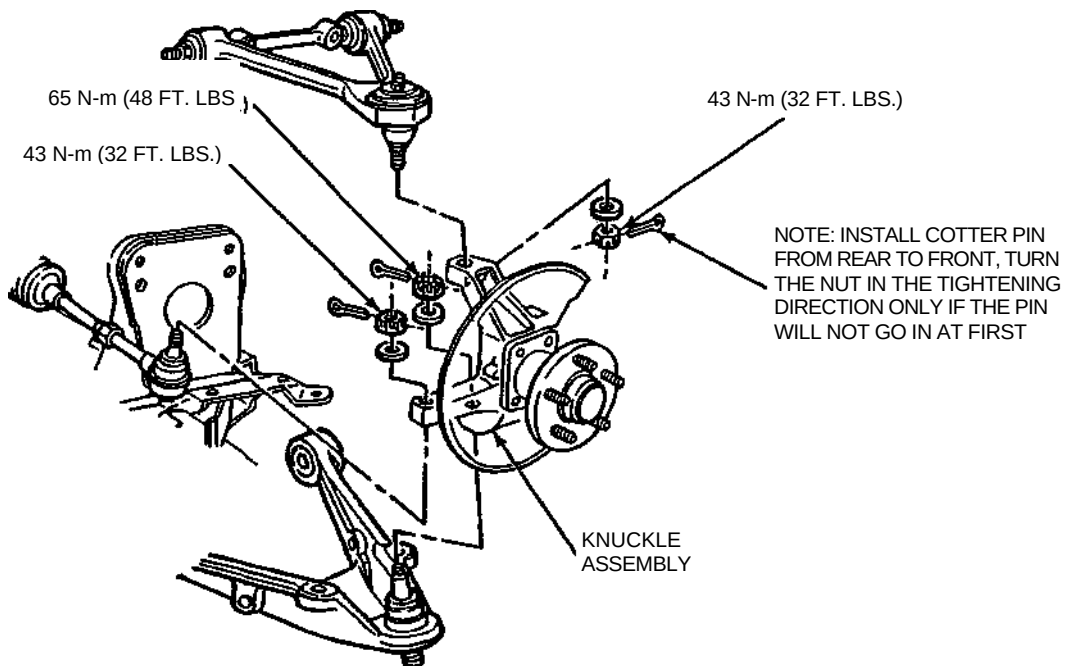
1. Raise the support the vehicle on the lower control arm.

2. Remove the wheel and tire, brake drum or disc caliper, and hub and bearing assembly.

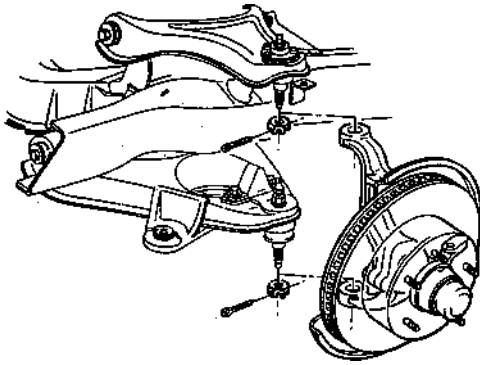
3. On drum brakes, remove the backing plate from the steering knuckle and wire it to the frame. Do not disconnect the brake hose.

4. Remove the upper and lower ball joint stud-retaining nuts and rap the steering knuckle free of the upper and lower control arms.

5. Reverse the procedure to replace the steering knuckle.



Steering knuckle on 1984 and later models



Steering Knuckle

6. Torque the upper stud nut to 50 ft. lbs., and the lower stud nut to 90 ft. lbs.

Upper and Lower Control Arms

SHAFT REMOVAL AND INSTALLATION

1. To remove the lower, control arm shaft, remove the front coil or leaf spring as previously described.

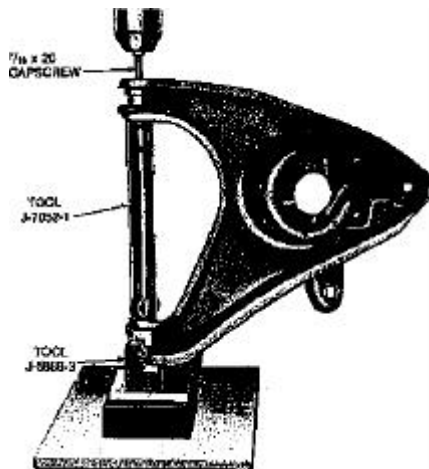
2. Count the shims at each end of the cross-shaft, then unbolt it from the frame and remove the control arm.

3. Remove the bolts, washers, and collars from both ends of the shaft, then screw in a $\frac{7}{16}$ in. x 20 capscrew into one end of the shaft.

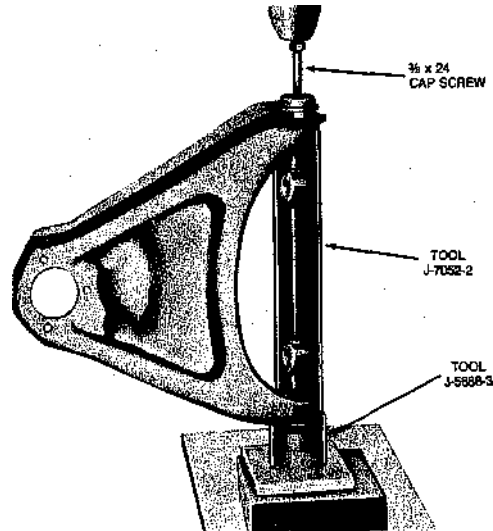
4. Support the control arm in a press and press on the capscrew until the bushing is forced from the arm.

5. Unscrew the capscrew and repeat the procedure on the other end on the cross-shaft.

6. Position the replacement cross-shaft and/or bushings in the control arm and start the bushings into the arm.



Removing the lower control arm shaft



Removing the upper control arm shaft

7. Place the assembly in a press, put a spacer over the bushing, and press into place.

8. Repeat the procedure for the other end, then install the collar and lockwasher but loosely thread in the bolts.

9. Reverse the removal procedure to install the spring and lower control arm. After the arm is installed, lower the vehicle to the floor and tighten the cross-shaft bushing bolts to 45-55 ft. lbs.

10. The procedure for replacing the upper, control arm shaft is the same as for the lower control arm shaft, except a $\frac{3}{8}$ in.—24 capscrew is used to remove the bushings. Torque the bushing bolts to 35-40 ft. lbs.

CONTROL ARM REMOVAL AND INSTALLATION

The upper and lower control arms are removed by combining the operations for replacing the upper and lower cross-shafts and the operations for replacing the steering knuckle.

Stabilizer Bar

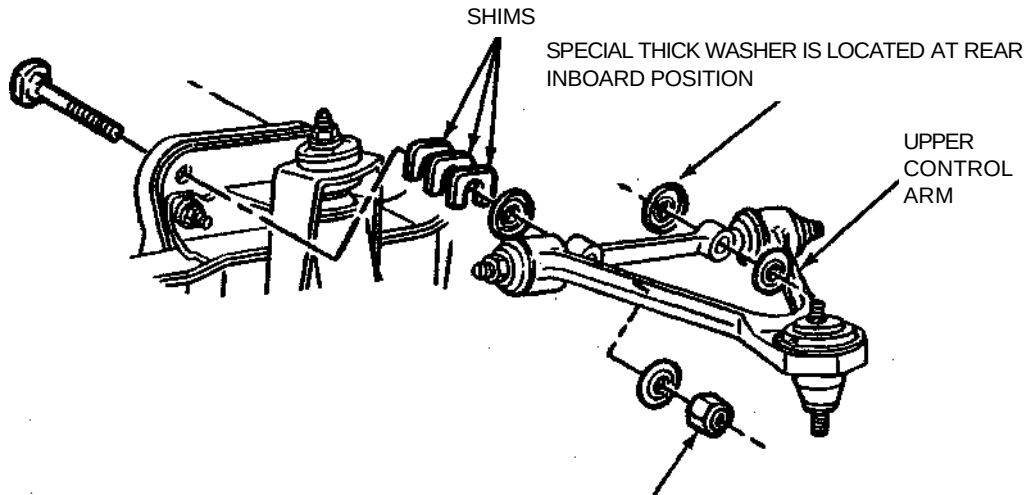
REMOVAL AND INSTALLATION

The stabilizer bar is rubber-mounted to the frame in two locations and attaches to the lower control arms through two links.

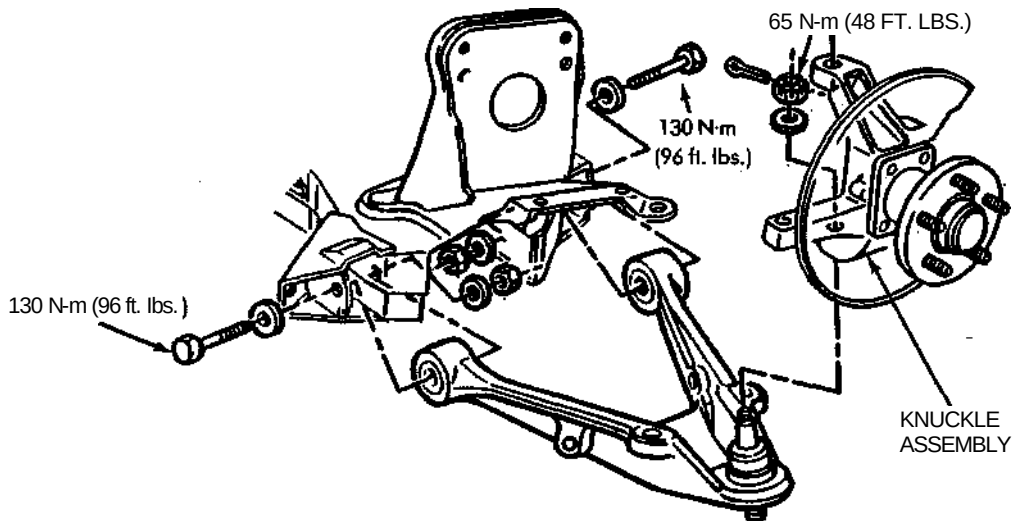
1. Raise the vehicle and disconnect the links from the stabilizer bar.

2. Unbolt the rubber frame attachments and remove the bar from the car.

3. Reverse the procedure to install the stabilizer.



85 N-m (63 FT. LBS.) Upper control arm chassis mounting on 1984 and later models



Lower control arm assembly on 1984 and later

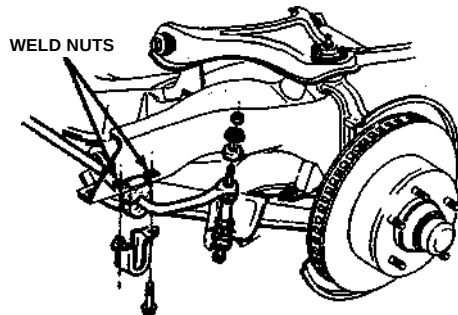
4. Hand-tighten all connections until the bar and links are fully assembled.
5. Tighten all connections, lower the vehicle, and bounce it a few times.

6. Raise the car and tighten all connections with a wrench.

Wheel Hub

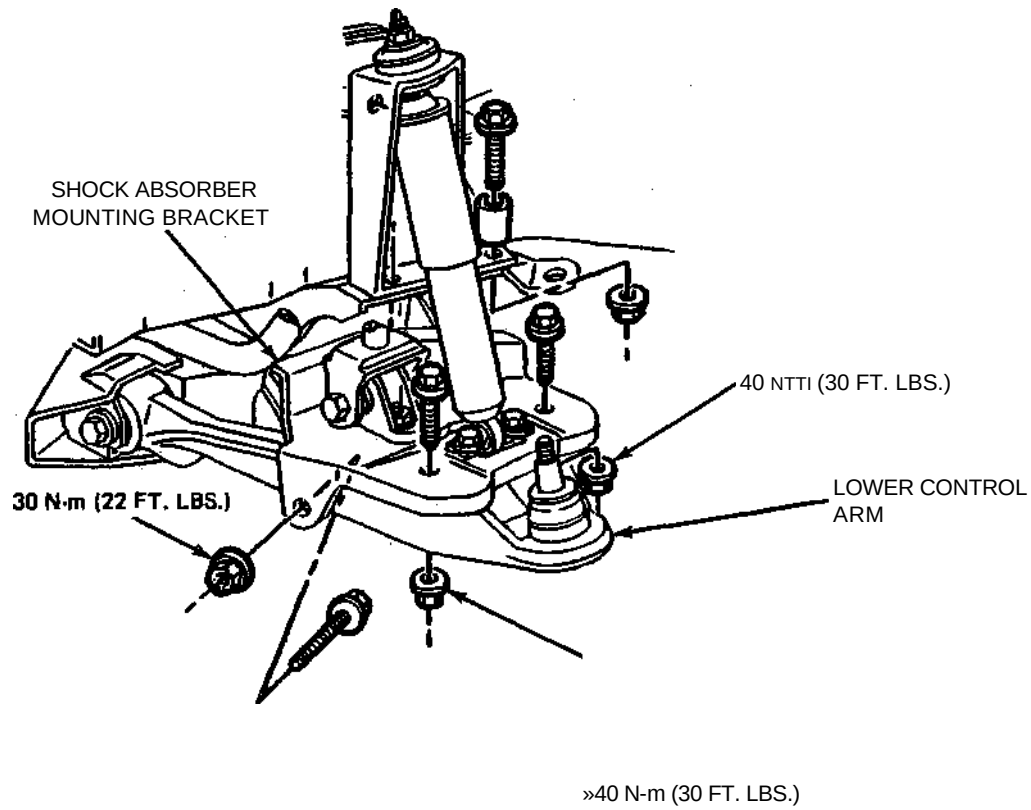
REMOVAL AND INSTALLATION

1. To remove the wheel hub, snap off the wheel covers and loosen the lug nuts, then raise and secure the vehicle.
2. Remove the lug nuts, wheel and tire, and brake drum or disc brake caliper.
3. Insert a wood spacer between the brake calipers, on disc brake vehicles, and secure the assembly out of the way.
4. Pry off the grease cap and extract the cotter pin from the spindle nut. Back off the spindle nut and washer, and remove the hub

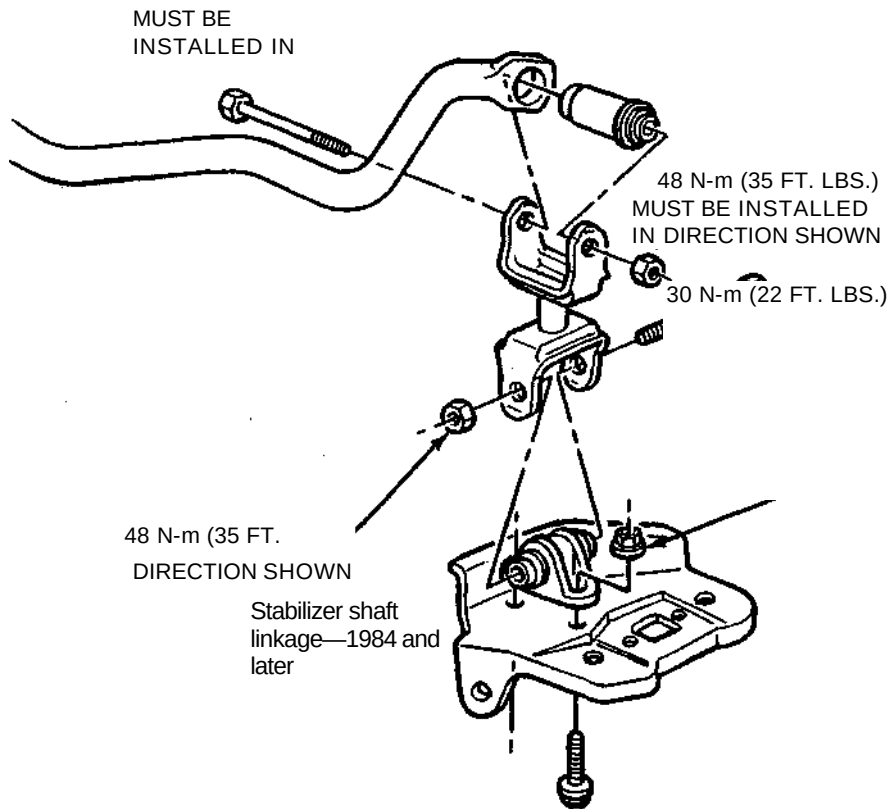


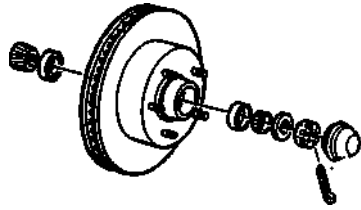
Stabilizer bar mounting

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Shock absorber mounting bracket—1984 and later





Front wheel hub assembly

and disc. Be careful not to drop the outer bearing as the hub comes off.

BEARING REPLACEMENT AND ADJUSTMENT

1. Disassembly of the hub removed the outer roller bearing assembly. The inner roller bearing remains in the hub, held in place by the inner bearing lip seal.

2. Pry out this seal, discard it, and remove the inner roller bearing assembly.

NOTE: // the bearings are going to be reused, it is not necessary to remove the races. If this is the case, disregard steps 3, 4, 5 and 9.

3. Select a suitable brass drift punch and insert it through the inner opening of the hub so that it catches the outer bearing race. Notches are provided in the hub for this purpose.

4. Tap the outer bearing race out. DO NOT attempt to tap the race out from the same spot—move the punch from side-to-side to drive the race out evenly.

5. Repeat steps 3 and 4 for the inner race, but insert the race through the outer opening of the hub to catch the inner race.

NOTE: Never match a new bearing to an old race (or vice-versa) during assembly—excessive bearing wear will result.

6. Inspect the races. The bearing surfaces must be perfectly smooth with no signs of discoloration.

7. Thoroughly clean the bearings and the inside of the hub. Blow the bearings dry with compressed air and wipe out the hub.

CAUTION: DO NOT "spin" the bearings with the compressed air; the bearing rollers could shatter. Be sure that all traces of cleaning solvent are removed after cleaning.

8. Inspect the bearings. The rollers should be perfectly smooth; the bearing cage should not be deformed. To inspect the inner race of either bearing: Turn the cage and rollers around the race while holding the rollers inward and the race stationary. If any grind-

ing or chattering is felt while turning, the bearing assembly should be replaced with a new unit.

9. Pack each bearing by packing a "ball" of grease on your palm and pushing the larger side of the bearing into the grease with your other hand, forcing the grease into the cage and rollers and out of the narrow side of the bearing. The object of this is to pack the grease between the rollers—smearing grease on the outside of the bearing will do no good whatsoever. Set the packed bearings aside, on a clean surface.

10. If the races were removed, drive the new races evenly and firmly into place and lightly coat the races with grease.

11. Install the inner bearing and evenly tap the new inner seal into place. Clean the bearing and seal areas of the spindle. Lubricate both the spindle and the inner seal lip with a light coat of grease.

12. Carefully install the hub or hub and disc assembly. Install the outer bearing, washer, and spindle nut.

13. On 1963-64 models, assemble the backing plate and drum assembly. On later models, remove the spacer block from the caliper and position the caliper on the caliper bracket, over the disc. Install and torque the caliper mounting bolts to 70 ft. lbs.

14. Install the wheel and tire assembly and torque the lug nuts to 75 ft. lbs.

15. Adjust the bearings and complete the operation as follows:

a. Hand-spin the wheel and tire and torque the spindle nut to 12 ft. lbs.

b. Loosen the spindle nut then tighten it snug, by hand.

c. Loosen the nut just until the cotter pin holes align.

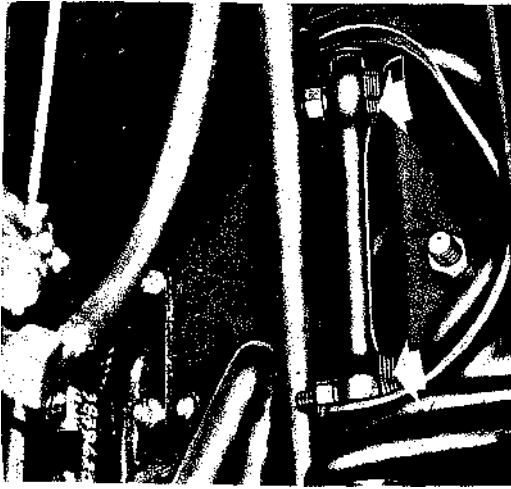
d. Install the cotter pin. Bend the ends of the cotter pin against the nut then cut off the extra length to prevent interference with the dust cap. Install the dust cap.

e. Spin the wheel—it should rotate smoothly and without any signs of grinding. If a dial indicator is available, set it up against the outer surface of the wheel, parallel to the spindle centerline. Rock the tire in and out; total end play should be 0.001—0.005 in.

Front End Alignment

CASTER ADJUSTMENT

Caster is the measured angle between a true vertical line passing through the center of the



Caster and camber shim location

wheel and a line drawn through the center of the upper and lower ball joints. Adjustments to the caster angle are made by the insertion of shims between the upper control arm pivot shaft and the frame bracket. Moving shims front to rear will decrease positive caster. Insertion and removal of a $\frac{1}{32}$ in. shim will effect a $\frac{1}{2}^\circ$ caster change. Adjust caster to specifications.

CAMBER ADJUSTMENT

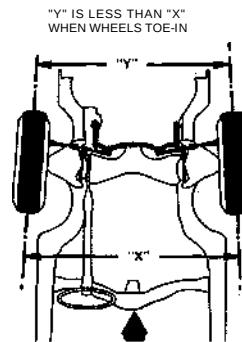
Camber is the measurement in degrees of the outward or inward tilt of the top of the wheel and tire in relation to the true vertical. Tilting of the top of the tire away from the centerline of the vehicle is called positive camber. Tilting toward the vehicle centerline is negative camber. Camber adjustment is made by adding or removing shims equally at both

bolts. Camber and caster adjustment may be made at the same time. A $\frac{1}{32}$ in. shim will effect a $\frac{1}{2}^\circ$ change in camber. Adjust to specifications.

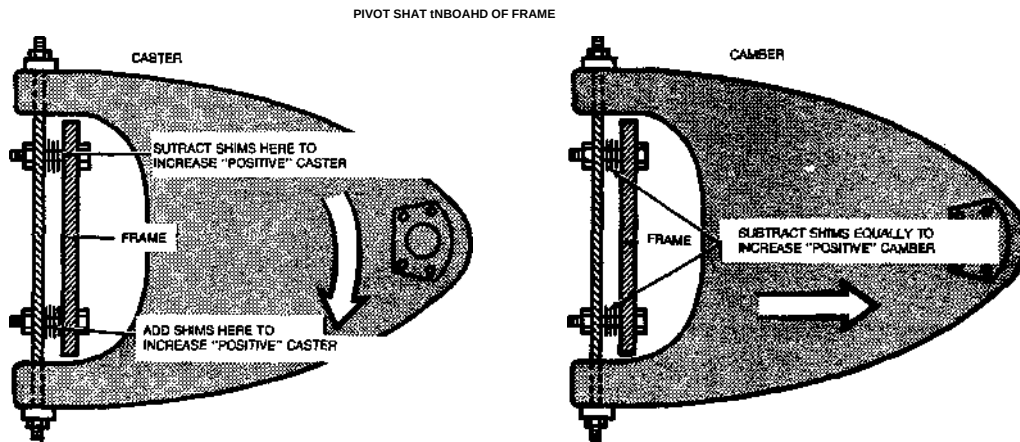
TOE-IN ADJUSTMENT

Toe-in is the measurement in inches of the inward departure of the front of the wheels from a line drawn through the horizontal center of the wheel, parallel to the centerline of the vehicle. Toe-in is expressed as the difference in measurement between the extreme front of the wheel pair and the extreme rear of the wheel pair.

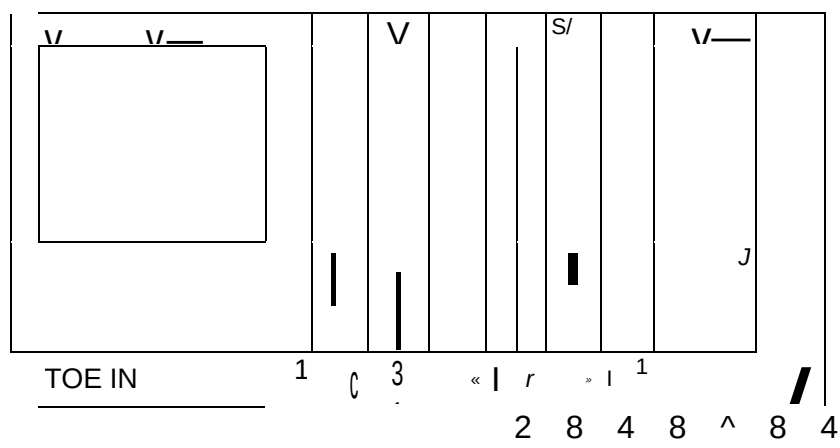
Two methods of setting toe-in may be employed. In the first, position the steering gear on high point and mark the 12 o'clock position on the steering shaft, with the wheel in the straight-ahead position. Loosen both tie rod clamp bolts and adjust each evenly to obtain the total toe-in specified. Secure the inner tie-rod clamp protrusions forward to 90° down to prevent interference with the stabilizer link bolt.



Toe-in adjustment



Caster and camber adjustment



STANDARD SCREEN
INDICATES TOE PER
WHEEL IN INCHES.

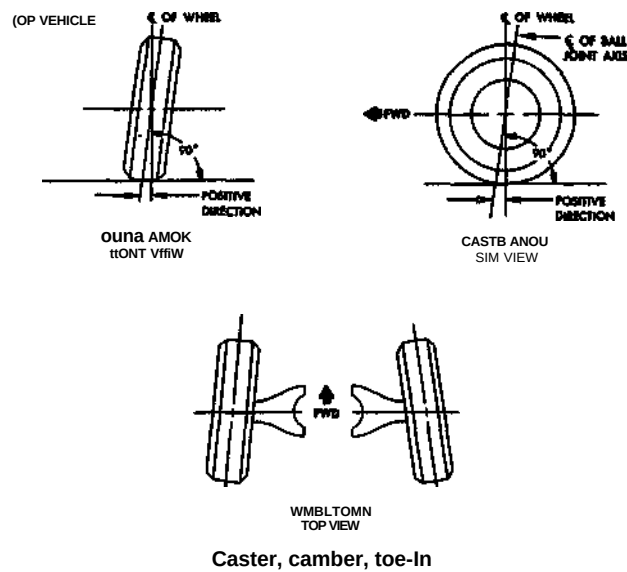
INDICATES TOE PER
WHEEL IN DEGREES
& TENTHS.

INDICATES TOE PER
WHEEL IN DEGREES
& TWELFTHS.

INDICATES TOE PER
WHEEL IN DEGREES &
MINUTES. (60 MIN. =

Conversion chart for alignment specifications

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If a tram gauge is available, position the front wheels straight-ahead. Loosen the tie-rod clamp on one end and adjust the one rod to the total specified toe-in. Loosen the other tie-rod damp and rotate both rods the same amount in the same direction to put the steering gear on high point and the wheel positioned straight-ahead. Secure the inner tie-rod clamps with the bolts down and horizontal. Secure the outer bolts vertical and to the rear.

REAR SUSPENSION

The Stingray rear suspension is a three-link independent system. Longitudinal location is provided by control arms which pivot at the front on bolts through the frame step-up. The lower link is a strut rod which also serves as a camber rod with adjustment permitted by an eccentric cam on the inner end. The universal-jointed axle driveshafts double as the upper locating links. Shock absorbers attach

Wheel Alignment Specifications

All measurements stated in degrees, unless noted

Year	Front Wheel Caster		Front Wheel Camber		Rear Wheel	Toe-In (In.)		
	Range	Preferred	Range	Preferred		Preferred	Wheel	Wheel
1963-66	1P-2P®	1VaP	¹ / ₄ P-1 ¹ / ₄ P	%P	VaN + Va	VaP	%2- ¹ / ₃ a	Vi8-y,6
1967	y ₂ P-1V ₂ P	1P	V ₄ P-1V ₄ P	UP	VaN± ¹ / ₄ a	VaP	yi6-yie	Vinyls
1968-70	¹ / ₂ P-1VaP®	1P	VZP-VAP	y*p	%N-VaN	—	yi8- ⁵ / ₁₈	Vaa-yaa
1971-73	0-2P®	1P	0-1 VaP	3/ ₄ p	%N-VaN	—	yi8-yie	Vaa-yaa
1974	VaP-1VaP®	1P	V ₄ P-1V ₄ P	³ / ₄ P	%N-VaN	—	%ST- ⁵ / ₃₂	0±V ₃₂
1975-76	VaP-IVaP©	1P	¹ / ₄ P-1 ¹ / ₄ P	y ₄ p	¹ / ₂ V ₁₆ -V ₄ ®	—	Va ₂ -y ₃₂	0±Va ₂ ®
1977-78	2P-2V ₂ P	2V ₄ p	V.P-1V ₄ P	y ₄ p	⁷ / ₈ ± ¹ / ₄	—	yi6-yie	Vi8- ¹ / ₄ ^
1979-80	2P-2V ₂ P	2 ¹ / ₄ P	¹ / ₄ P-1P	%P	VaN±Va	—	%2- ⁵ / ₃₂	%2 ¹ / ₄ 3Z
1981-82	iy ₄ P-2y ₄ P	2V ₄ P	V ₄ P-1V ₄ P	UP	0±Va	—	V ₄ ± ¹ / ₁₆	Vie ± Vie
1984	⁵ / ₁₆ P-1%P	1VaP	¹ / ₄ aP- ³ / ₄ aP	³ / ₄ aP	VaP-yaP	³ / ₄ aP	0- ¹ / ₄	0- ¹ / ₄

® 1966 models— VaP-1 VaP ® With power steering— 1 %P-2%P ® With power steering— 1 ¹/₄P-3%P ® 1976 models— %N ± V₄

® 1976 models— Vie±¹/₄ /aain.
N — Negative P — Positive

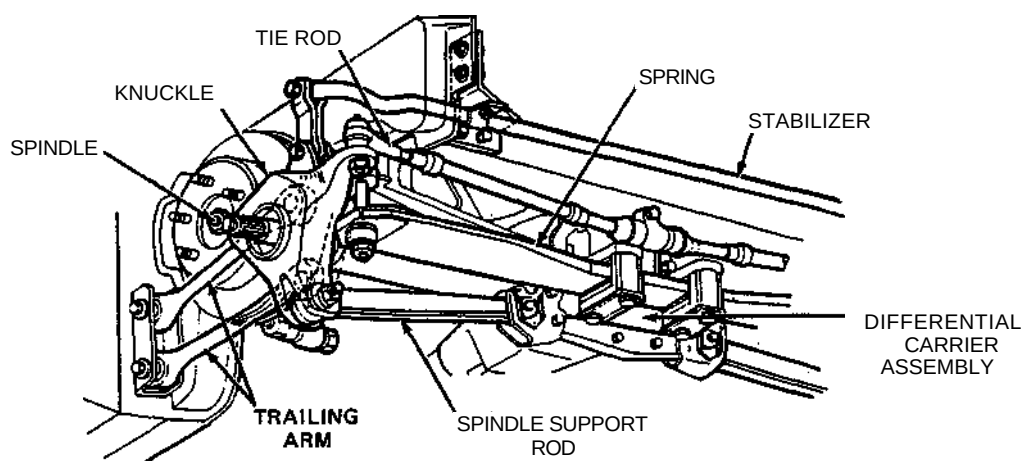
to the frame at the top and attach to the spindle/camber rod strut at the bottom. Springing is provided by a multi-leaf transverse spring bolted to the rear cover of the differential carrier. 1980-82 models without the optional, H.D. suspension use a mono-leaf fiberglass reinforced plastic (FRP) spring. 6% in. rubber-cushioned link bolts locate the spring ends to the control arms.

On 1984 models, the rear suspension features a light weight fiberglass transverse spring mounted to the fixed differential carrier cover beam. Light weight aluminum components such as the knuckles, upper and lower control arms, camber control support rods, differential carrier cover beam and the drive line support beam are used throughout the rear suspension. Each wheel is mounted by a five link independent suspension. The five links are identified as the wheel drive shaft, camber control support rod, upper and lower control arms and tie rod. The axle drive shafts and the camber control support rods act together in maintaining an almost constant camber change throughout the entire arc of wheel travel. Fore-aft motion of the wheel is controlled by the upper and lower control arms. Each rear wheel has a short spindle, hub and bearing assembly and knuckle contained at the rear of the upper and lower control arms. The knuckle also acts as a mount for the brake caliper mounting and parking brake backing plate assembly.

Aside from controlling wheel location, each portion of the suspension has additional functions. The control arms and knuckle carries the brake caliper, thus, all brake torque and

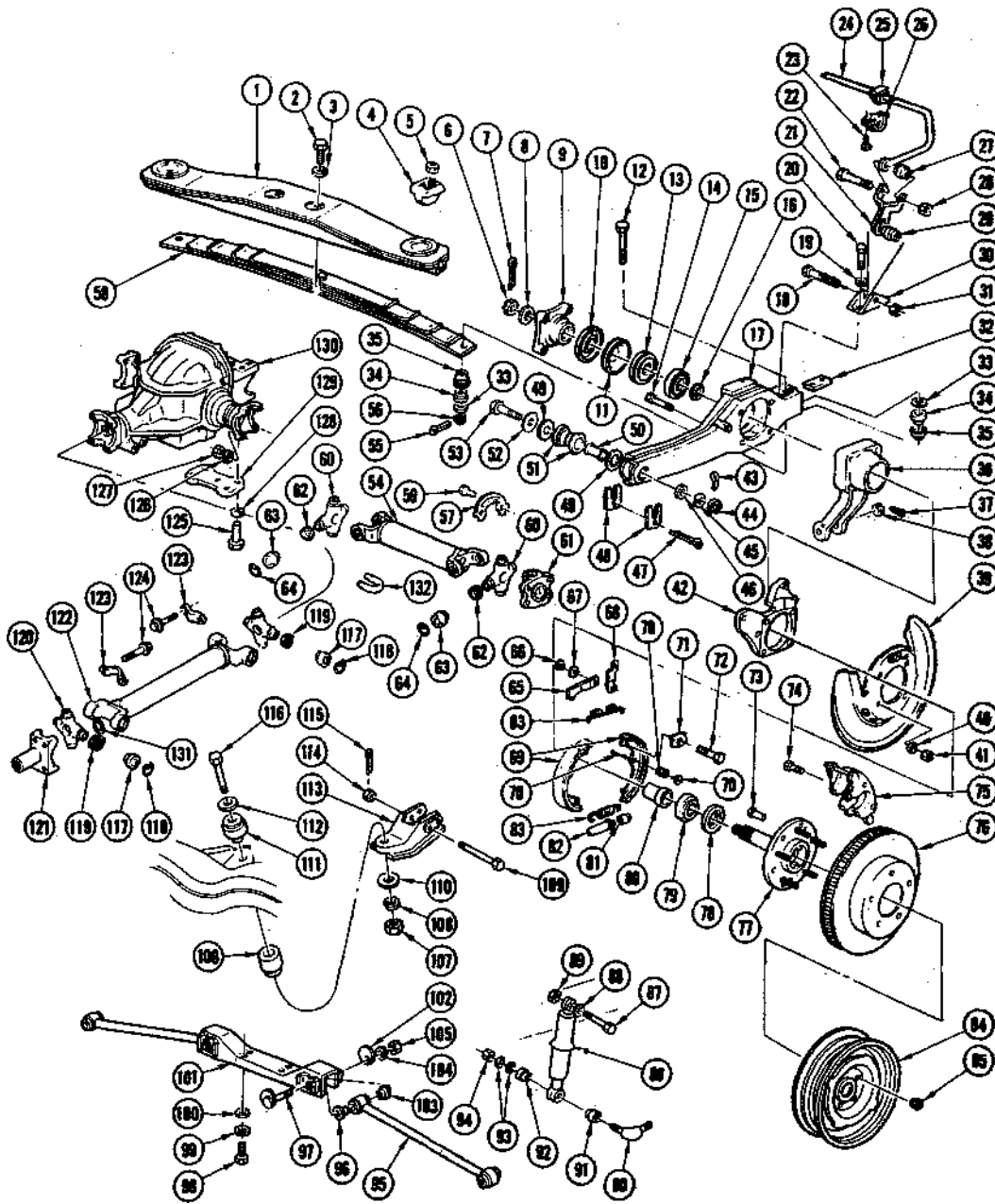
braking tractive forces are transmitted through the arms. The lateral links transmit side forces to the fixed differential, and through the rubber bushings in the cover beam to the frame. The upper link, or wheel drive shaft, transmits acceleration torque through the differential to the frame. The final duty of the lateral links is to maintain the camber angle of the wheel throughout its travel. Since the camber control support rod and the wheel drive shaft are of different lengths, a certain amount of camber change occurs through jounce and rebound. The overall result of the camber control support rod and wheel drive shaft geometry holds the wheel in a near vertical position at all times.

Direct double-acting shock absorbers are attached at the upper eye to a frame bracket and at the lower eye to the knuckle which has a threaded stud for the shock absorber lower eye. The transversely mounted spring is clamp bolted at the center section to a lower mounting surface on the differential carrier cover beam. The outer ends of the spring are provided with a hole through which the spring is link bolted to the rear of the knuckle. A stabilizer shaft is used which attaches to the section of the knuckle, and extends rearward where it is connected to the frame by two rubber bushings and mounting brackets. A single unit hub and bearing assembly is bolted to each knuckle. The hub and bearing assembly supports the drive axle shaft and spindle allowing torque to be transferred from the differential carrier to the wheel and tire. This hub and bearing assembly is a sealed unit and no maintenance is required.



Rear suspension on 1984 and later models

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1. MEMBER, Rr. Susp. Mtg. Cross
2. BOLT ($\frac{7}{16}$ "-14 x 1W)
3. WASHER ($\frac{7}{16}$ "W)
4. BUMPER, Rr. Spring
5. NUT ($\frac{5}{8}$ "-16)
6. NUT ($\frac{5}{8}$ "-20)
7. PIN, Rr. Whi. Spindle
8. WASHER ($\frac{7}{32}$ "
9. FLANGE, Rr. Whi. Spindle
10. DEFLECTOR, Rr. Whi. Spindle
11. SHIELD, Rr. Whi. Inr. Brg
12. BOLT, Rr. Spring
13. SEAL, Rr. Inr. Brg.
14. BOLT ($\frac{5}{8}$ "-24x2 $\frac{1}{2}$ "

15. BEARING, Rr. WhL Inr
16. SHIM, Rr. Whi
17. ARM, Torque Control
18. BOLT ($\frac{5}{8}$ "-16x1 $\frac{1}{2}$ "
19. WASHER ($\frac{5}{16}$ "x $\frac{19}{32}$ "
20. BOLT ($\frac{5}{16}$ "-18x $\frac{9}{16}$ "
21. LINK, Rr. Stab. Shaft
22. BOLT ($\frac{5}{8}$ "-16x1 $\frac{1}{2}$ "
23. BOLT ($\frac{5}{16}$ "-18x1 $\frac{7}{16}$ "
24. SHAFT, Rr. Stab
25. BUSHING, Rr. Stab. Shaft
26. BRACKET, Stab. Shaft
27. BUSHING, Rr. Stab
28. NUT ($\frac{5}{8}$ "-16)

1963-79 rear suspension and related components

Spring

REMOVAL AND INSTALLATION

1. Jack the rear of the car up high enough to provide working clearance and support with jacks tands.

2. Position a floor jack under the link bolt on one side. Raise the jack until the spring is compressed tightly, and install a $\frac{1}{4}$ in., or larger, chain around the suspension cross-member and the spring. Use a C-clamp to hold the chain to the spring.

3. Lower the jack to permit access to the

link bolt, and then remove the link bolt nut, cushions, and retainers.

4. Raise the spring again and remove the chain and C-clamp.

5. Slowly lower the spring until all tension is released.

6. Perform the same steps on the other side.

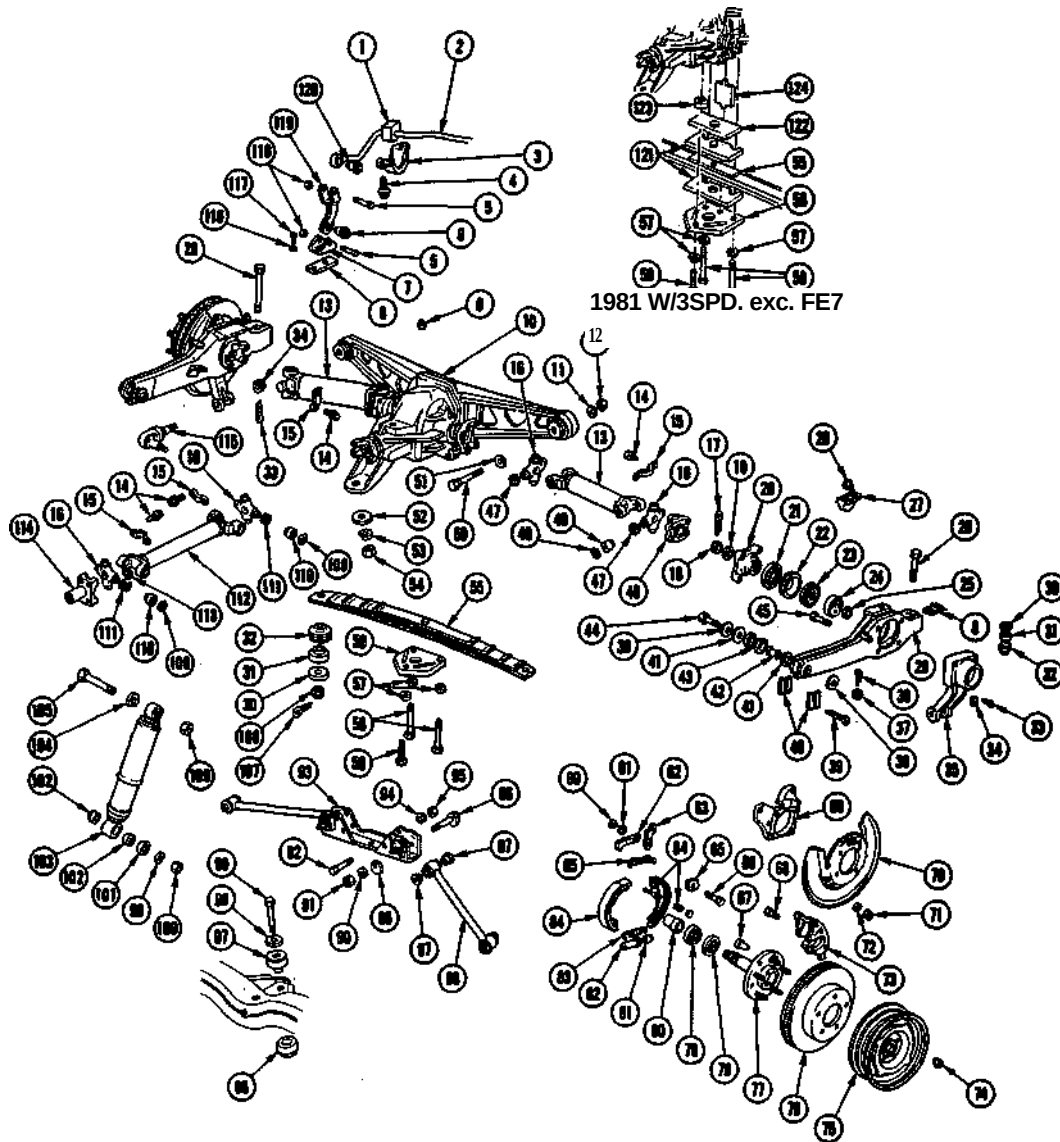
7. Remove the four, spring pad bolts and plate.

8. Withdraw the spring over the exhaust pipes and down from the car.

9. To install, position the spring on the

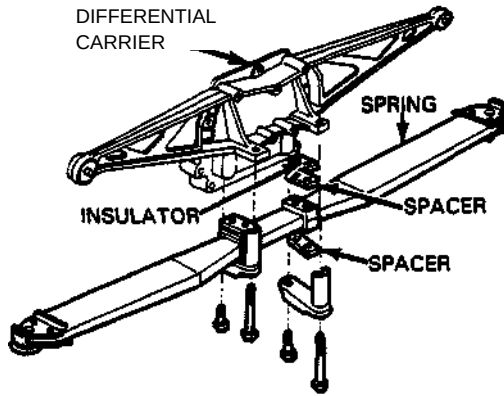
29. BUSHING, Rr. Stab
30. BRACKET, Rr. Stab. Shaft
31. NUT($\frac{1}{2}$ "-16)
32. PLATE (3 xyV/w/2 Holes)
33. RETAINER, Otr. Rr. Spring
34. CUSHION, Rr. Spring
35. RETAINER, Inner
36. SUPPORT, Cont. Arm to Spindle
37. PIN($\frac{5}{16}$ "-1 $\frac{1}{4}$ ")
38. NUT($\frac{1}{2}$ "-18)
39. PLATE, Parking Brake
40. WASHER($\frac{1}{2}$ "-16)
41. NUT($\frac{1}{2}$ "-24)
42. BRACKET, Brake Flange Rr
43. PIN($\frac{3}{16}$ "x1")
44. NUT($\frac{1}{2}$ "-16)
45. WASHER CM x $\frac{5}{16}$ " x $\frac{5}{32}$ "
46. WASHER($\frac{1}{2}$ "-16)
47. PIN (Wx 41/2?)
48. SHIM, Rr. Susp. Torque
49. PLATE, Rr. Susp. Torque
50. RETAINER, Torque Arm Bshg
51. BUSHING, Upr. Rr
52. WASHER (W)
53. BOLT($\frac{7}{16}$ "-20x $\frac{9}{16}$ "
54. SHAFT, Axle
55. PIN($\frac{1}{2}$ "x1 $\frac{1}{2}$ ")
56. NUT($\frac{9}{16}$ "-18)
57. LOCK, Rr. Axle U-Joint
58. SPRING, Leaf Type Rr
59. BOLT C/16"-20 x 1 $\frac{1}{2}$ "
60. REPAIR KIT, Rr. Whl. Dr. Shaft U-Joint
61. FLANGE, Rr. Whl. U-Joint
62. SEAL, Yoke Brg. (IVsa" x $\frac{21}{32}$ ") (Also Part of #60)
63. BEARING, U-Joint (Also Part of #60)
64. LOCK RING, U-Joint (Also Part of #60)
65. LEVER ASM., Parking Brake
66. CLIP, Parking Lvr
67. WASHER, Pivot Pin
68. STRUT, Parking Brake
69. SHOE UNIT, Parking Brake
70. PIN, Brake Shoe
71. PLATE, Brake Shoe Guide
72. BOLT(V2"-20x2")
73. RIVET, Spindle
74. BOLT($\frac{1}{2}$ "-20x1W)
75. HOUSING ASM., Brake Caliper
76. DISC, Rr. Whl. Brake
77. SPINDLE, Rr. Whl
78. SEAL, Rr. Whl. Otr. Brg
79. BEARING ASM., Rr. Whl. Otr
80. SPACER, Brg

81. SOCKET, Adj. Screw
82. SCREW, W/Nut Parking Brake
83. SPRING, Parking Brake
84. WHEEL ASM., Rr
85. NUT($\frac{7}{16}$ "-20)
86. ABSORBER UNIT, Rr. Shock
87. BOLT ($\frac{1}{2}$ "-20x 23/16")
88. WASHER ($\frac{1}{2}$ "-16)
89. NUT ($\frac{7}{16}$ "-20)
90. SHAFT, Rr. Whl. Spindle
91. GROMMET, Shk. Abs. Link Rr. Lwr
92. GROMMET, Shk. Abs. Link Rr.
93. WASHER($\frac{1}{2}$ "x $\frac{1}{2}$ "
94. NUT(V2"-20)
95. STRUT, Rr. Whl. Spindle Supt
96. CAP, Bushing
97. CAM, Spindle Supt. Strut
98. BOLT($\frac{1}{2}$ "-16x $\frac{1}{2}$ "
99. WASHER ($\frac{1}{2}$ "-16)
100. WASHER p/32")
101. BRACKET, Rr. Whl. Spindle
102. CAM, Rr. Whl. Spindle
103. CAP, Bushing
104. WASHER C/20
105. NUT(V2"-20)
106. CUSHION, Diff. Carrier Mtg
107. NUT($\frac{7}{16}$ "-18)
108. WASHER ($\frac{7}{16}$ "-18)
109. BOLT($\frac{7}{16}$ "-20x4i3/16")
110. PLATE, Body Mtg. Cushion
111. CUSHION, Diff. Carrier Mtg
112. WASHER CM $\frac{1}{2}$ "
113. BRACKET, Diff. Carrier Mtg
114. NUT ($\frac{7}{16}$ "-20)
115. PIN (3/32" x 1")
116. BOLT ?M'-W x 2 $\frac{1}{2}$ "
117. BEARING ASM. (Part of #120)
118. RING, U-Joint (Also Part #120)
119. SEAL, U-Joint (Also Part #120)
120. REPAIR KIT, U-Joint
121. YOKE, U-Joint Sleeve Fit
122. SHAFT, Rr. Propeller
123. STRAP, Propeller Shaft
124. BOLT ($\frac{5}{16}$ "-24 x 1 $\frac{1}{2}$ "
125. BOLT ($\frac{3}{16}$ "-12x331/64")
126. WASHER (Wx $\frac{1}{2}$ "x $\frac{1}{2}$ "
127. NUT($\frac{1}{2}$ "-24)
128. WASHER (9/16")
129. PLATE, Rr. Spring Anchor
130. CARRIER ASM., Diff
131. SPACER, Trunnion Brg
132. "U" BOLT (Trunnion Finger Dia. $\frac{1}{2}$ "

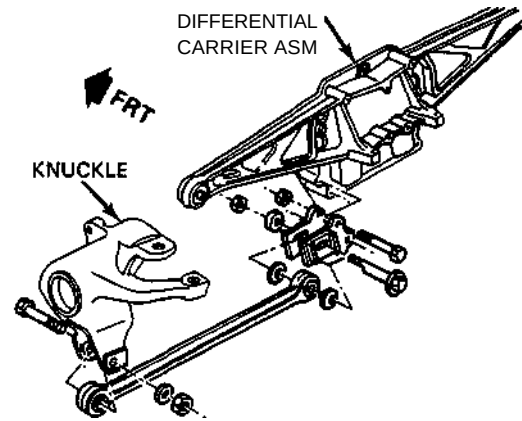


- | | |
|---|---|
| 1. BUSHING, Rr Stab Shaft | 21. DEFLECTOR, RrWhl Spindle |
| 2. SHAFT, Rr Stab | 22. SHIELD, Rr Whl Inr Bearing |
| 3. BRACKET, Rr Stab Shaft | 23. SEAL, Rr Inr Bearing |
| 4. SCREW, Rr Stab Shaft Brkt | 24. BEARING, RrWhl Inr |
| 5. BOLT (W-16 x 1 $\frac{1}{2}$ ") | 25. SHIM, Rr Wheel |
| 6. BUSHING, Rr Stab Shaft Link | 26. NUT, Hex ($\frac{7}{16}$ "-16) |
| 7. BRACKET, Rr Stab Shaft Link | 27. BUMPER, Rr Spring |
| 8. PLATE, Rr Stab Shaft Link | 28. BOLT, Rr Spring |
| 9. PLUG, W/Instruction Tag (1 $\frac{7}{64}$ "OL) | 29. ARM, Torque Control |
| 10. CARRIER, DiffW/Cap | 30. RETAINER, Spring Otr |
| 11. WASHER, Lock | 31. CUSHION, Rr Spring |
| 12. NUT, Hex | 32. RETAINER, Spring Inr |
| 13. SHAFT, Axle | 33. PIN, Cotter |
| 14. BOLT, Hex $\frac{7}{16}$ "-20 x $\frac{1}{2}$ " | 34. NUT, Hex Slot ($\frac{7}{16}$ "-18) |
| 15. RETAINER, Prop & Axle Shaft U-Joint (5.428) | 35. SUPPORT, Control Arm to Spindle |
| 16. REPAIR KIT, U-Joint | 36. PIN, Cotter |
| 17. PIN, RrWhl Spindle | 37. NUT, Diff Carrier Mount (Hex Slot; $\frac{7}{16}$ "-20) |
| 18. NUT, Hex Slot ($\frac{7}{16}$ "-20) | 38. WASHER, Torque Control Arm |
| 19. WASHER ($\frac{1}{32}$ ") | 39. PIN, Cotter |
| 20. FLANGE, Rr Whl Spindle | 40. SHIM, Rr Axle Torque Arm |

1980-82 rear suspension and related components



Rear leaf spring mounting assembly—1984 and later



Spindle support rod assembly—1984 and later

bottom carrier mounting pad with the center bolt aligned with the hole in the mounting pad.

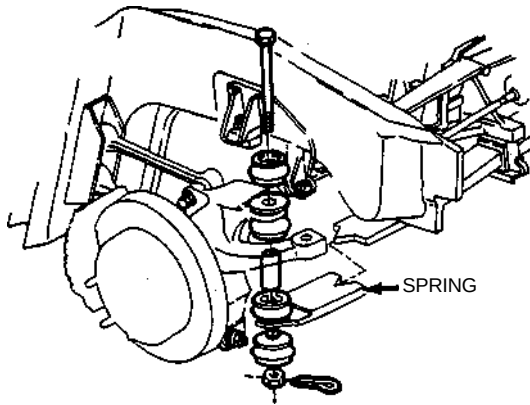
10. Install the center clamp and the four

mounting bolts. Tighten the bolts to 55-75 ft. lbs.

11. Jack one end of the spring and secure with chain as in the removal procedure.

41. PLATE, Rr Susp Torque
42. RETAINER, Torque Arm Bushing
43. BUSHING, Upr Rr
44. BOLT, Torque Control Arm
45. BOLT, Hex ($\frac{5}{16}$ "-24 x 2 $\frac{1}{2}$ ")
46. FLANGE, Rr Whl U-Joint
47. SEAL, Yoke Bearing (Also Part of #16)
48. LOCK RING, U-Joint (Also Part of #16)
49. BEARING, U-Joint (Also Part of #16)
50. BOLT, Hex
51. WASHER
52. PLATE, Body Mtg Cushion
53. WASHER, Lock ($\frac{7}{16}$ "-14)
54. NUT, Hex ($\frac{7}{16}$ "-14)
55. SPRING, Rear
56. PLATE, Rr Spring
57. WASHER, Lock ($\frac{7}{16}$ "-14)
58. BOLT, Hex (M12x1.75x90)(10.9 PC)
59. BOLT, Hex (M12 x 1.75 x 30)
60. CLIP, Parking Lever
61. WASHER, Pivot Pin
62. STRUT, Parking Brake Shoe Lever
63. LEVER, Parking Brake Shoe
64. PIN KIT, Brake Shoe
65. PLATE, Brake Shoe Guide
66. BOLT, Hex ($\frac{7}{16}$ "-20x1 $\frac{1}{2}$ "-18)
67. RIVET, Spindle
68. BOLT, Hex ($\frac{7}{16}$ "-20 x We")
69. BRACKET, Brake Flange Rr
70. PLATE, Parking Brake
71. NUT, Hex ($\frac{5}{16}$ "-24)
72. WASHER($\frac{5}{16}$ "-24)
73. HOUSING ASM, Brake Caliper
74. NUT, Whl ($\frac{7}{16}$ "-20)
75. WHEEL ASM
76. DISC, Rr Whl Brake
77. SPINDLE, Rr Whl
78. SEAL, Rr Whl Otr Brg
79. BEARING ASM, Rr Whl Otr
80. SPACER, Bearing
81. SOCKET, Adj Screw
82. SCREW, W/Nut, Parking Brake Adj

83. SPRING, Parking Brake
84. SHOE KIT, Parking Brake
85. SPRING, Parking Brake
86. CAM, Spindle Support Strut
87. BUSHING, Rr Whl Spindle Rod
88. ROD, Rr Whl Spindle
89. CAM, Rr Whl Spindle
90. WASHER, Lock ($\frac{5}{16}$ "-20)
91. NUT, Hex ($\frac{7}{16}$ "-20)
92. BOLT, Hex (M10 x 1.5 x 70)
93. BRACKET, Rr Whl Spindle
94. WASHER, Lock
95. NUT, Hex (M10x 1.5x70)
96. INSULATOR, Diff Carrier Mt Lwr
97. INSULATOR, Diff Carrier Mt Upr
98. WASHER (Waz x 1 $\frac{1}{2}$ x Va)
99. BOLT, Hex ($\frac{7}{16}$ "-14 x 3W)
100. NUT, Shock Abs Lwr ($\frac{1}{2}$ "-20)
101. RETAINER, Lwr Grommet Otr
102. GROMMET, Shock Abs Lwr
103. ABSORBER, Rr Shock
104. WASHER, Lock
105. BOLT, Shock Abs Upr
106. NUT($\frac{7}{16}$ "-20)
107. PIN, Cotter
108. NUT, Hex Slot ($\frac{3}{16}$ "-18)
109. LOCK RING, U-Joint (Also Part of #16)
110. BEARING, U-Joint (Part of #16)
- 1-11. SEAL, U-Joint (Also Part of #16)
112. SHAFT, Propeller
113. SPACER, Trunnion Bearing
114. YOKE, U-Joint Sleeve Frt
115. SHAFT, Rr Whl Spindle Rod
116. WASHER, Lock
117. BOLT ($\frac{5}{16}$ "-18 x $\frac{1}{2}$ ")
118. NUT, Hex ($\frac{5}{16}$ "-16)
119. LINK, Rr Stab Shaft
120. BUSHING, Rr Stab Shaft Link
121. SPACER, RrSpr
122. INSULATOR, RrSpr
123. SPACER, Rr Spr ($\frac{1}{2}$ " ID $\frac{11}{16}$ " OD $\frac{3}{16}$ " Thk)
124. SPACER, Rr Spr, Plate to Diff



Rear leaf spring to knuckle attachment—1984 and later

12. Lower the jack and position the control arm for the link bolt installation. Install the link bolt, rubber cushions, and retainers. Install the castellated nut on the link bolt and secure with a cotter pin.

13. Raise the spring and remove the C-clamp and chain.

14. Repeat the above operation on the other side.

15. Lower the car.

Shock Absorbers

BOUNCE TEST

Each shock absorber can be tested by bouncing the corner of the vehicle until maximum up and down movement is obtained. Release the car. It should stop bouncing in one or two bounces. Compare both front corners or both rear corners but do not compare the front to the rear. If one corner bounces longer than the other it should be inspected for damage and possibly be replaced.

REMOVAL AND INSTALLATION

1. Remove the upper shock absorber bolt and nut.

2. Remove the lower mounting nut and lockwasher.

3. Slide the upper eye of the shock absorber out of the frame bracket.

4. Pull the lower eye off the strut rod shaft and remove the rubber grommets.

5. To install, position the upper shock absorber eye in the frame mounting bracket and install the bolt, lockwasher, and nut.

6. Install the inner rubber grommet and then the shock absorber eye on the strut rod shaft. Install the outer grommet, washer, lockwasher, and nut.

7. Torque the upper nut to 40-60 ft. lbs. and the lower nut to 50-60 ft. lbs.

DISPOSAL OF PRESSURIZED SHOCK ABSORBERS

1984 and Later

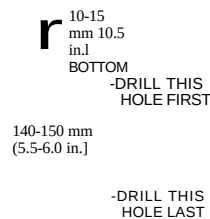
Due to the high pressure of gas it is advised that, upon scrapping or disposal of these shock absorbers, the pressure be released. This is carried out as follows:

1. Clamp shock in vise with piston rod pointing down.

2. Measure approx. 10-15 mm (0.5 in.) from bottom of shock and drill an approx. 5 mm hole so the gas can escape.

3. Measure approx. 140-150 mm (5.5-6.0 in.) from first hole and drill an approx. 5 mm hole to facilitate drainage of oil. Drain shock completely, then dispose of in the normal manner.

NOTE: All models equipped with the Z-51 suspension use pressurized gas shock absorbers.



OIL AND GAS
UNDER HIGH
PRESSURE

TO HELP AVOID
PERSONAL INJURY
DUE TO EXPLOSION
DO NOT APPLY
HEAT OR FIRE.

Drill holes as shown to relieve pressure in gas-filled shock absorbers before disposal on 1984 and later models. Gas shocks can be recognized by the warning label attached

Strut Rod and Bracket

REMOVAL AND INSTALLATION

1. Jack the rear of the car high enough to allow working clearance.

2. Disconnect the lower shock absorber eye from the strut rod shaft.

3. Remove the strut rod shaft cotter pin and nut. Drive the shaft out of the spindle support.

CAUTION: *The strut rod shaft is often very hard to remove; take care not to distort either the shaft or the spindle support in the removal process.*

4. Scribe the camber adjusting cam-to-bracket relationship for correct relocation.
 5. Loosen the cam adjusting bolt and nut.
 6. Remove the four bracket-to-carrier bolts, and lower the bracket.
 7. Remove the cam, bolt, and nut. Remove the strut from the bracket and remove the bushing caps.
 8. Inspect the strut rod bushings and replace if necessary.
 9. Install the inside bushing caps and slip the strut rod into the bracket.
 10. Install the cam and bolt assemblies, and align the previously scribed marks. Hand-tighten the adjustment nut.
 11. Raise the bracket assembly and install the four bracket-to-carrier bolts. Torque the bolts to 15-22 ft. lbs.
 12. Raise the outer end of the strut rod into the spindle support. Install the strut rod shaft through the spindle support and strut rod.
- NOTE:** *The strut rod shaft has a flat side which should line up with the matching flat in the spindle support.*
13. Replace the shock absorber lower eye on the strut rod shaft. Torque the nut to 50-60 ft. lbs.
 14. Lower the car and then tighten the camber cam nut to 55-77 ft. lbs. Tighten the strut rod shaft nut to 80 ft. lbs. and install a new cotter pin.

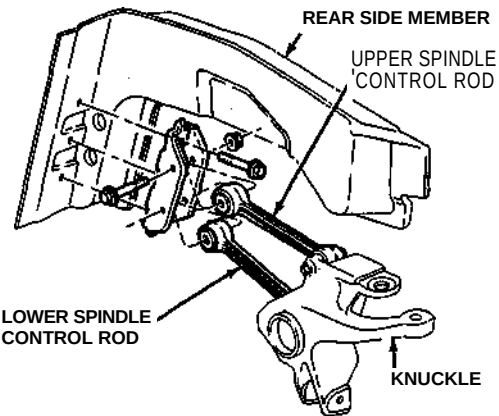
Control Arms, Hub and Knuckle

DISASSEMBLY

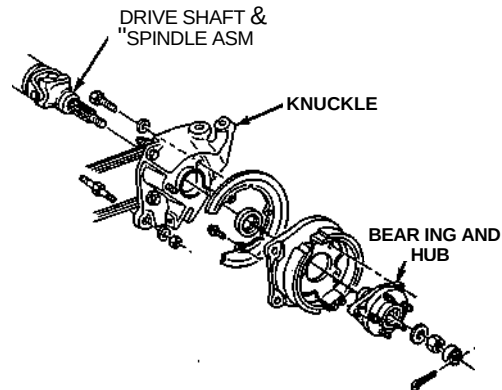
1984 and Later Models

NOTE: *The following procedure outlines the general disassembly of the rear 5-link suspension components.*

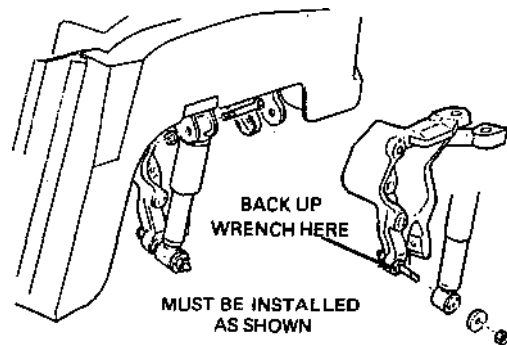
1. Remove center cap from wheel. Break lugnut torque.
2. Remove cotter pin, spindle nut and washer.
3. Raise the vehicle and support it safely.
4. Remove wheel and tire.
5. Remove brake caliper. Do not allow caliper to hang by the brake hose.
6. Remove brake rotor.
7. Disconnect tie rod end from the knuckle.
8. Disconnect transverse spring from the knuckle.



Control arms on 5-link rear suspension—1984 and later



Rear hub and bearing assembly—1984 and later



Rear shock absorber mounting—1984 and later

9. Disconnect parking brake cable from the backing plate.
10. Disconnect shock absorber from the knuckle. Use a backup wrench on the mounting stud to loosen fasteners.
11. Scribe mark on cam bolt and mounting bracket so they can be realigned in the same position.

250 SUSPENSION AND STEERING

12. Remove cam bolt and separate spindle support rod from the mounting bracket,

13. Remove the trunnion straps at the side gear yoke shaft.

14. Push out on the knuckle and separate axle shaft from the side gear yoke shaft. Remove the axle shaft from the vehicle.

15. Lower the knuckle assembly and slide spindle out from the hub and bearing.

16. Using tool J-34161 (Torx® #T55), or equivalent, remove the hub and bearing bolts. Remove hub and bearing with parking brake backing plate from the knuckle.

17. Remove splash shield from the knuckle.

18. Disconnect spindle support rod from the knuckle.

19. Disconnect upper and lower control arms from the knuckle, then remove the knuckle assembly.

20. Remove control arm bolt at the body bracket and remove the arm, if not already done.

21. Installation is the reverse of removal. Inspect the spindle seal and replace if necessary. Torque all bolts to specification.

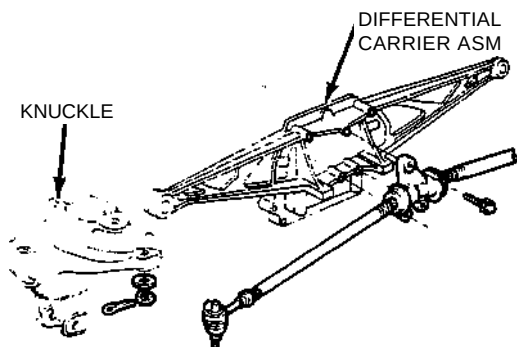
22. Check and adjust rear suspension alignment as necessary.

Rear Axle Tie Rod and/or Adjuster Sleeve

REMOVAL AND INSTALLATION

1984 and Later

1. Raise the vehicle and support it safely.
2. Remove cotter pin and retaining nut from tie rod end at knuckle. Discard the cotter pin.
3. Loosen jam nut on tie rod end.
4. Using tool J-24319-01, or equivalent, press tie rod end out of the knuckle.
5. Remove tie rod end from the adjusting



Rear suspension tie rod assembly—1984 and later

sleeve. Note the number of turns during removal and install the same number during reassembly.

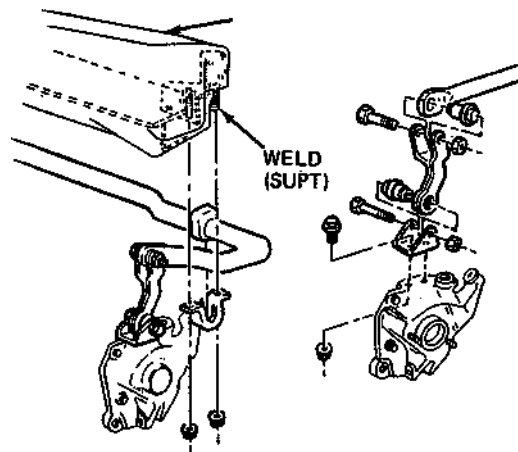
6. To install, reverse the removal procedures and tighten all bolts to specification.

7. Check and adjust the rear suspension alignment as necessary.

Stabilizer Bar

REMOVAL AND INSTALLATION

1. Raise the vehicle and support it safely.
2. Remove spare tire and tire carrier.
3. Disconnect stabilizer bar from knuckles.
4. Remove stabilizer bar bushing retainers, bushings and bar from the vehicle.
5. To install, reverse the removal procedures and torque all bolts to specifications.



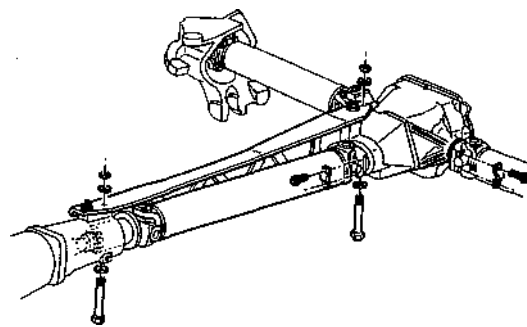
Rear stabilizer bar linkage—1984 and later

Driveline Beam

REMOVAL 1984

and Later

1. Raise the vehicle and support it safely.
2. Remove the complete exhaust system as an assembly as follows:
 - a. Disconnect A.I.R. pipe at the converter.
 - b. Disconnect A.I.R. pipe clamps at exhaust pipe.
 - c. Disconnect oxygen sensor electrical lead.
 - d. Remove the bolts attaching the mufflers to the hangers
 - e. Remove hanger bracket at the converter.



CARRIER TO SUPPORT BEAM

Driveline beam attachments—1984 and later

Torque Sp

Bolt Location

Cover beam to body Supp
earner Support beam to tr
Truunion straps at side ge
straps at spindle yoke Spi
bearing Hub and bearing
shield to backing plate Sh
to knuckle Shock absorbe
absorber to knuckle Contr
Control arms to knuckle J
body Transverse spring to
bolt to support rod

- f. Disconnect the exhaust from the ex-
haust manifold and remove the exhaust
system.
 3. Support the transmission with a suit-
able jack or stand.
 4. Remove driveline beam attaching bolts
at the differential carrier and transmission ex-
tension housing.
 5. Remove the propeller shaft.
 6. Remove the driveline beam by prying
transmission to the driver side of vehicle. Re-
move support beam from the vehicle.
- NOTE: Do not use excessive force when
prying transmission housing.

INSTALLATION

Installation is the reverse of removal. Align driveline components. To insure proper alignment of the driveline, a clearance of $45\text{mm} \pm 6$ ($1.77 \pm .250$ in.) must be maintained between the top of the beam to the underbody and a clearance of $28\text{mm} \pm 6$ ($1.1 \pm .250$ in.) from the right side (passenger side of vehicle) of the beam to the side wall. Take these measurements directly above and to the right of the propeller shaft dampener. Torque all fasteners to specification.

NOTE: Do not over torque the bolts attaching the driveline beam to the transmission. Over torquing can damage the transmission extension housing, bushing and seal and result in fluid leakage. Inadequate fluid level can damage the transmission. Apply sealant to the mating surfaces of the transmission extension housing, differential carrier and beam.

Adjustments

CAMBER

The rear wheel camber adjustment is made by rotating the eccentric cam and bolt assembly that connects the strut rod to the differential carrier bracket, or at the inboard mounting of the support rods on 1984 and later models. Loosen the locknut and turn the eccentric cam bolt until the correct wheel camber angle is obtained. Secure the locknut and torque to 55-77 ft. lbs. (158-213 ft. lbs. on 1984 and later).

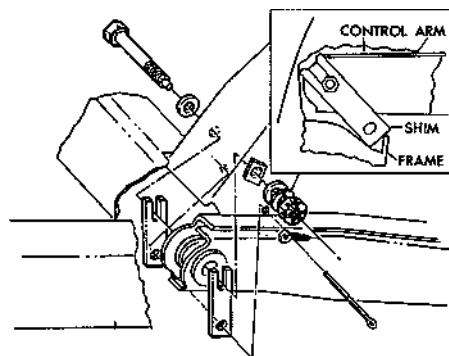
TOE-IN

Rear wheel toe-in is adjusted by the placement of shims of different thickness on both sides of the control arm pivot bushings. These shims are available in $\frac{1}{4}$ in., $\frac{3}{32}$ in., $\frac{1}{8}$ in.,



2
5
2

S U S P E N S I O N A N D S T E E R I N G



Toe-in adjustment shim location

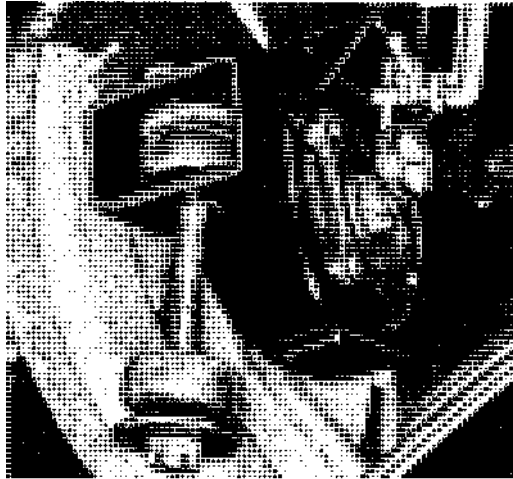
and $\frac{1}{16}$ in. sizes. To make this adjustment, remove the pivot bolt and position the torque arm so that the correct toe-in specifications are achieved. Insert shims in the gap nearest the car centerline between the bushing and the frame inner wall. Use shims of only the thickness required to bridge the gap. Do not overshim or force the shims during the adjusting. Insert shims in the outside gap until solidarity is reached between the pivot bushing and the frame walls. Insert the bolt, torque the nut to 50 ft. lbs., and install a cotter pin.

On 1984 and later models, rear toe-in is adjusted by loosening lock nuts on the tie rod ends and turning the adjusting sleeves.

Wheel Bearings

ADJUSTMENT

The spindle bearings are of the tapered roller design and require an end play of 0.004 in. to 0.008 in. To measure end play, raise the wheels clear of the ground and turn the axle driveshaft from the front. There must be sufficient clearance to turn the axle driveshaft when the rear suspension is in the fully adjusted position. The rear suspension must be loosened and rotated so the tie rod forces the trailing arm back to the vehicle centerline and perpendicular to the ground. The vehicle must be lowered.



Checking spindle bearing play

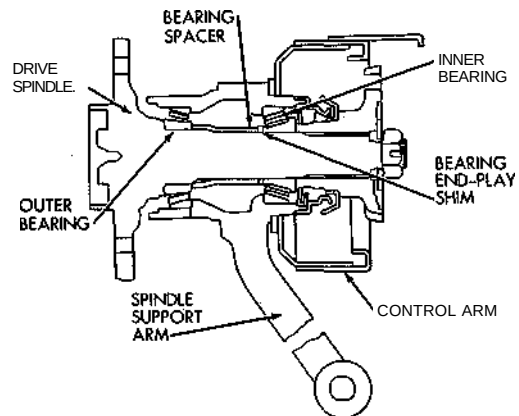
ceeds the 0.001 in. to 0.008 in. tolerances, the bearings must be adjusted.

4. Set the handbrake and remove the drive spindle nut.

5. Release the brake and remove the brake drum or caliper and disc as described in Chapter 9.

6. Remove the spindle flange then reinstall the nut until it is flush with the end of the spindle. Use a puller to withdraw the spindle from its support.

7. Remove the spindle-support dust deflector and pry out the inner seal. Remove



the inner bearing race, roller assembly, shim, and bearing spacer from the spindle support.

8. Check the size of the old shim and, if the dial indicator reading exceeded 0.008 in., replace it with one that is thinner by the required amount to bring end-play within allowable tolerances. A dial indicator reading of less than 0.001 in. requires a shim thick enough to move the end-play beyond the 0.001 in. minimum.

NOTE: Shims are available in 0.003 in. increments and range in thickness from 0.097 in. to 0.145 in.

9. Insert the spindle bearing and seal in the spindle support and install the bearing spacer and shim.

10. Place the inner race and roller assembly on the spindle and a suitable spacer to aid in pressing the bearing into position.

11. Start the nut onto the spindle and against the press spacer. Tighten the nut and press the bearing in a sufficient amount to permit the installation of the spindle drive flange.

12. Remove the spindle nut and washer and discard the nut. Use a new replacement for assembly.

13. Tap the replacement inner seal in place, install the dust deflector, drive flange, spindle washer, and nut. Torque the nut to 100 ft. lbs. and install a new cotter pin.

REPLACEMENT

Outer Bearing

1. With the wheel spindle removed, attach a bearing puller around the bearing and secure the tool and spindle in a press, and remove the bearing from the spindle.

2. Remove the outer seal and replace if necessary.

3. Position the replacement seal on the spindle before installing the bearing assembly.

4. Pack the replacement bearing with a high melting point grease and place it on the spindle, large end facing the spindle shoulder.

5. Support the spindle and press the bearing into position. Install the reassembled spindle to the spindle support.

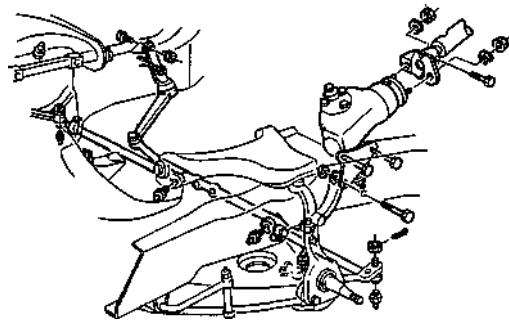
STEERING

The 1963-82 Corvette steering system is a recirculating ball, relay type. A pitman arm

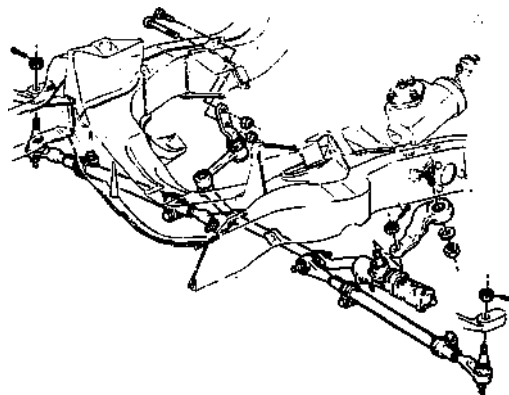
connects the steering gear to the relay rod by way of a pivoted joint. The opposite end of this transverse relay rod attaches to a frame-mounted idler arm by way of another pivoting joint. These joints are the ball and socket type.

Two adjustable tie-rods join each steering arm to the relay rod through self-adjusting ball and socket joints. The steering arms have two tie-rod end holes drilled in them to provide a road steering ratio of: 19.6:1 or 20.2:1 on earlier models; a faster ratio of 17:1 or 17:6.1 on later models. This adjustment is made by disconnecting the tie-rod ends from one steering arm hole and moving to the other. The latest models (1969-1984) have Function Locking Energy Absorbing steering columns. With this design, the mast jacket and steering shaft are designed to collapse during conditions generated by a front end collision.

The collapsible mast jacket has ball bearings embedded in plastic and pressed between the upper and lower jackets. A predetermined load will collapse the assembly. The steering shaft collapses under predetermined loads, shearing the plastic pins. Additionally, these columns contain an anti-theft ignition



Steering linkage—1963-67



Steering linkage—1968-82

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switch and ignition lock system. This system prevents the removal of the ignition key unless the automatic transmission is in Park or the manual transmission is in Reverse, and the key is in the "Lock" position. In this position, a rod and lock plate mechanism lock the steering wheel and shift lever.

The power rack and pinion steering system has a rotary control valve which directs hydraulic fluid, coming from the hydraulic pump, to either side of the rack piston. The integral rack piston is attached to the rack and converts hydraulic pressure to a linear force which moves the rack left or right. The force is then transmitted through the inner and outer tie rods to the steering knuckles which turn the wheels.

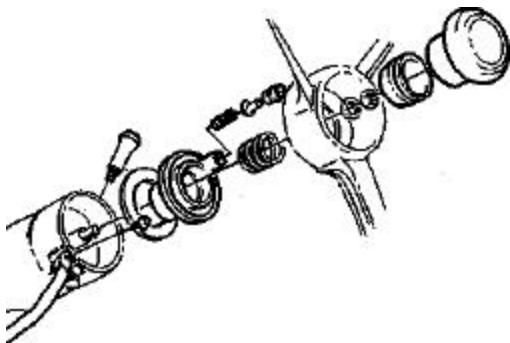
Lip seals, which seal rotating shaft, require special treatment. This type of seal is used on the steering rack and pinion at the rack, at the pinion and valve, and on the drive shaft of the pump. When leakage occurs in one of these areas, always replace the seal(s), after inspecting and thoroughly cleaning the sealing surfaces. Replace the shaft only if very severe pitting is found except for the rack. If the rack shows evidence of corrosion, it should be replaced. If the corrosion in the lip seal contact zone is slight, clean the surface of the shaft with crocus cloth. Replace the shaft only if the leakage cannot be stopped by smoothing with crocus cloth first.

Steering Wheel

REMOVAL AND INSTALLATION

1963-67 Standard Wheel

1. Disconnect the battery ground cable.
2. Pry off the horn cap with a small screw driver.
3. Remove the steering shaft nut and washer.



Standard steering wheel—1963-67

4. Install a wheel puller in the two threaded holes provided. Remove the steering wheel.

5. To install, align the wheel in a straight, up-and-down position.

6. Install the washer and nut on the shaft, and while holding the wheel, tighten the nut to 35-40 ft. lbs.

7. Reinstall the contact assembly and horn cap.

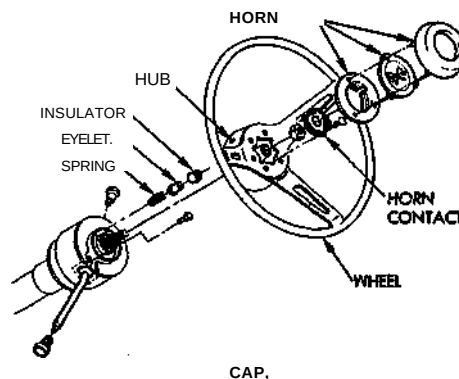
1968-76 Standard Wheel

1. Disconnect the battery ground cable.
2. Pry the horn cap off with a small screw driver and remove the upper horn contact.
3. Remove the six steering wheel retaining screws and remove the wheel.

NOTE: To remove the wheel for turn signal switch service, follow Steps 3-6 of the "1963-67 Standard Wheel" procedure. Tighten the nut to 30 ft. lbs. On 1975-76 models, it is necessary to remove the snap-ring from the steering shaft first. Don't forget to install the snap-ring after tightening the nut.

4. To install, attach the wheel to the hub with the six screws.

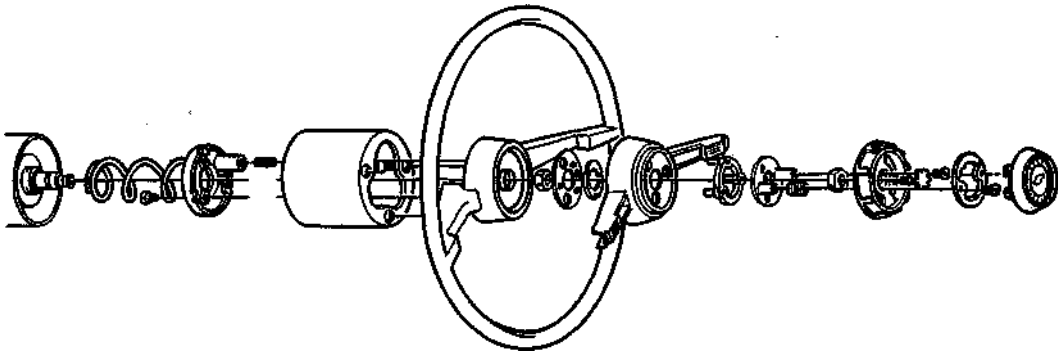
5. Install the upper horn contact and the horn cap.



Standard steering wheel—1968-76

1965-67 Telescoping Wheel

1. Disconnect the battery ground cable.
2. Pry off the horn cap with a small screwdriver and remove the horn contact assembly.
3. Remove the lock screw-to-lock knob retaining screws, and remove the lock screw, lock knob, and the spacer.
4. Remove the six steering wheel-to-hub screws and remove the wheel.
5. Replace the steering wheel on the hub and install the six retaining screws.



Tilt and telescoping wheel—1965-66

6. Install the spacer on the steering wheel and position the lock knob.

7. The lock screw installs through the lock knob, is turned into the shaft, and adjusted to the lock position.

8. Attach the spacer to the steering wheel. Put the lock knob in lock position and attach it to the lock screw with two screws.

9. Remove the three, spacer retaining screws and install the horn contact to the spacer and the steering wheel with three screws.

10. Install the horn cap.

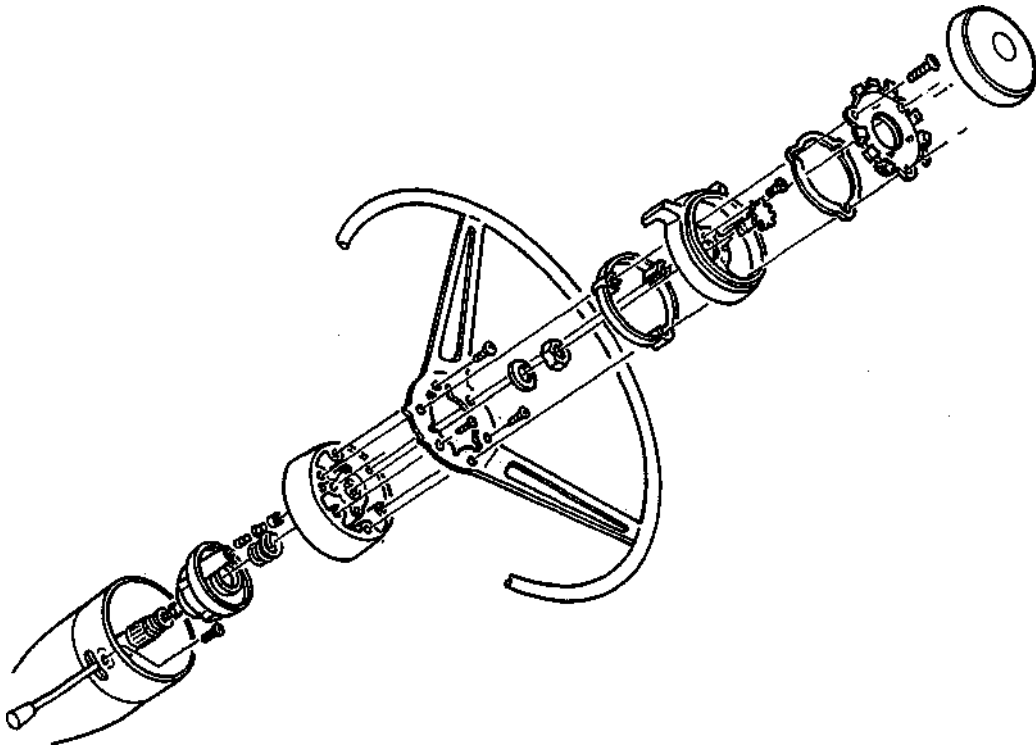
1968-76 Telescoping Wheel

1. Disconnect the battery ground cable.

2. Remove the horn cap and upper horn contact.

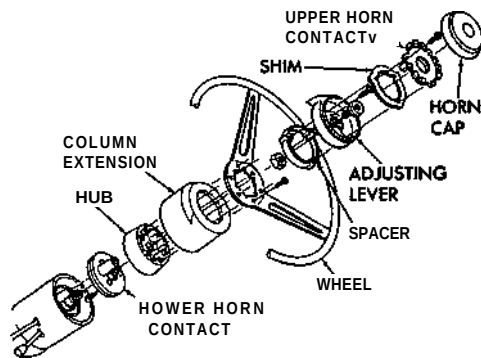
3.. Remove the shim, star screw, lock lever, and spacer.

NOTE: To remove the wheel for turn signal switch service, follow Steps 3-67 Standard Wheel procedure. Tighten the nut to 30ft. lbs. On 1975-76 models, it is necessary to remove the snap-ring from the steering shaft first. Don't forget to install the snap-ring after tightening the nut.



Tilt and telescoping wheel—1967

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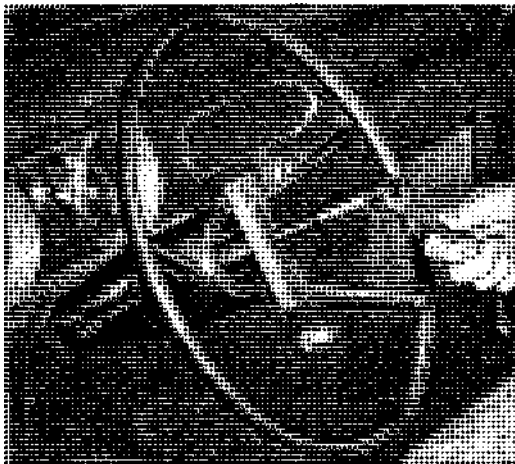


Tilt and telescoping wheel 1968-76

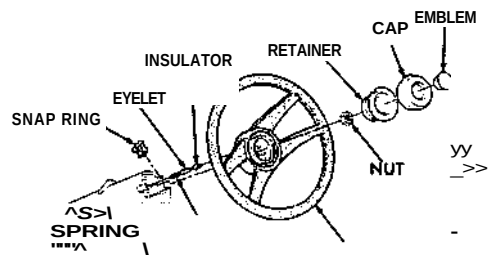
4. Remove the six steering wheel retaining screws and remove the wheel.
5. Replace the steering wheel on the hub and install the six retaining screws.
6. Position the spacer and lock lever on the steering wheel.
7. Install the star screw through the lock lever, turn it into the shaft, and put it into lock position.
8. Install the spacer to the steering wheel with three screws. Position the lock lever in "Lock."
9. Attach the star screw with two screws and remove the three spacer retaining screws.
10. Install the shims and the upper horn contact.
11. Install the horn cap.

1977-79 Standard Wheel

1. Disconnect the battery ground cable.
2. Pry off the horn button cap.
3. Remove the snap ring then the steering wheel nut.



Steering wheel puller—typical



STRG COLUMN ASM

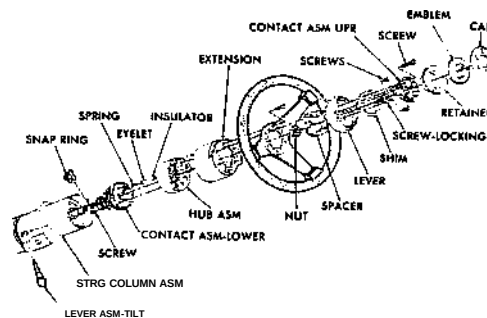
STRG WHEEL ASM

Standard steering wheel—1977-79

4. Install a wheel puller in the threaded holes provided. Butt the center bolt of the tool against the steering shaft and turn clockwise to remove the hub assembly.
5. When installing make sure the turn signal is in the neutral position, then install the hub on the steering shaft and secure it with the nut. Torque the nut to 30 ft. lbs.
6. Install the snap ring.
4. Attach the steering wheel to the hub assembly with the attaching screws.
5. Install the horn contact and attach with the three screws.
6. Snap the horn button in place.
10. Connect the battery ground cable.

1977-84 Tilt Telescoping Wheel

1. Disconnect the battery ground cable.
2. Pry off the horn button cap.
1. Remove the three screws and remove the upper horn contact assembly.
1. If used, remove the shim then remove the screw securing the center star screw. Remove the star screw and lever.
2. Remove the snap ring and nut from the shaft and remove the steering wheel assembly with a wheel puller.
1. If it is necessary to disassemble the steering wheel, remove the three screws securing the steering wheel and separate; then



STRG COLUMN ASM

1977-82 tilt and telescoping steering wheel

remove the four screws securing the extension to the steering wheel then separate.

7. To assemble the steering wheel, position the extension to the steering wheel and install the attaching screws. Torque the screws to 20 in. lbs.

8. Position the spring, eyelet and insulator to the lower contact assembly. Position the assembly to the steering wheel and install the three screws.

9. Position the steering wheel assembly to the steering column and torque the nut to 30ft. lbs.

10. Install the snap ring.

11. Position the lever to the steering column and install the star screw. Install the screws. Remove the switch by pulling it.

12. Position the upper contact assembly and shim if used and install the three retaining screws.

13. Install the retainer and horn button cap.

14. Connect the battery ground cable.

Turn Signal Switch

REPLACEMENT

1963

The 1963 turn signal switch is mounted on the lower part of the steering column. The switch is operated by a cable from the signal housing located under the steering wheel.

1. Remove the screws holding the switch case to the mast jacket.

2. Remove the control cable from the spring clip at the switch.

3. Loosen the cable-to-switch retaining screw.

4. Disconnect the switch wire.

5. Put the column lever in neutral.

6. Move the switch slide so that it is in the center of the slot on the switch.

7. Install the cable into the spring clip without disturbing the switch slide. Fasten the cable with the screw.

8. Install the switch on the column.

1964-66

1. Remove the steering wheel as previously outlined.

2. Remove the terminal wires from the connector and remove the mast jacket harness cover.

3. Remove the turn signal lever and the three switch retaining screws.

4. Remove the retainer plate, switch housing, and the switch from the mast jacket.

Pull each wire separately through the mast jacket slot to prevent damaging the harness.

5. Transfer the wiring harness to the replacement switch and install the components using a reverse of the removal procedure.

1967-68

1. Remove the steering wheel as previously outlined.

2. From under the dash, disconnect the switch harness connector from the chassis harness.

3. Remove the preload spring and the cancelling cam.

4. Remove the turn signal lever. Push the flasher knob in and remove it by unscrewing.

5. Remove the lower trim cover.

6. Remove the retaining ring and the thrust and wave washers from the top of the steering shaft. Cut the wiring above the connector.

7. Unscrew the switch, and slide it, the cover, and the upper bearing housing out of the column. Pull the wire through the column protector and escutcheon.

8. Install the new switch by assembling it and the upper bearing housing into the switch cover, and then working the wire down through the escutcheon and column protector until the switch can be positioned on the mast jacket.

9. Install the switch and remaining components in a reverse order of removal.

Standard Wheel 1969-79

1. Remove the steering wheel as previously outlined.

2. On 1969-75 models loosen the three cover screws and lift the cover off the shaft. On 1976-79 models pry the lock plate cover off with a screwdriver blade.

3. Position the special lockplate compressing tool (J-23131 1969-70 or J-23653 1971-79) on the end of the steering shaft and compress the lockplate by turning the shaft nut clockwise. Pry the wire snap-ring out of the shaft groove.

4. Remove the tool and lift the lockplate off the shaft.

5. Slip the cancelling cam, upper bearing pre-load spring, and thrust washer off the shaft.

6. Remove the turn signal lever. Push the flasher knob in and unscrew it.

7. Pull the switch connector out of the mast jacket and tape the upper part to facilitate switch removal. On tilt wheels, place the

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turn signal and shifter housing in Low position and remove the harness cover.

8. Remove the three switch mounting screws. Remove the switch by pulling it straight up while guiding the wiring harness cover through the column.

9. Install the replacement switch by working the connector and cover down through the housing and under the bracket. On tilt models, the connector is worked down through the housing, under the bracket, and then the cover is installed on the harness.

10. Install the switch mounting screws and the connector on the mast jacket bracket. Install the column-to-dash trim plate.

11. Install the flasher knob and the turn signal lever.

12. With the turn signal lever in neutral and the flasher knob out, slide the thrust washer, upper bearing pre-load spring, and cancelling cam onto the shaft.

13. Position the lockplate on the shaft and press it down until a new snap-ring can be inserted in the shaft groove.

14. Install the cover and the steering wheel.

Tilt-Telescope 1969-84

1. Remove the steering wheel as previously outlined and press off the hub with a puller.

2. Remove the steering column/dash trim cover.

3. Remove the C-ring plastic retainer, if so equipped.

4. Install the special lockplate compressing tool (J23131 1969-70; J23653 1971-81; J23063 1982) over the steering shaft. Position a $\frac{5}{16}$ in. nut under each tool leg and reinstall the star screw to prevent the shaft from moving.

5. Compress the lockplate by turning the shaft nut clockwise until the C-ring can be removed.

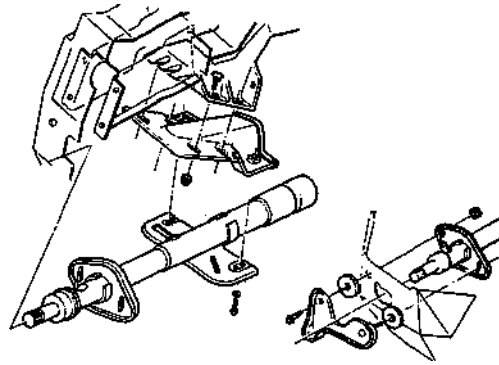
6. Remove the tool and lift out the lockplate, horn contact carrier, and the upper bearing preload spring.

NOTE: 1969 Corvette assembly order is: horn control carrier, lockplate, and upper bearing preload spring.

7. Pull the switch connector out of the mast jacket and tape the upper part to facilitate switch removal.

8. Remove the turn signal lever. Push the flasher in and unscrew it.

9. Position the turn signal and shifter housing in Low position. Remove the switch



Steering column to dash panel

by pulling it straight up while guiding the wiring harness out of the housing.

10. Install the replacement switch by working the harness connector down through the housing and under the mounting bracket.

11. Install the harness cover and clip the connector to the mast jacket.

12. Install the switch mounting screws, signal lever, and the flasher knob.

13. With the turn signal lever in neutral and the flasher knob out, install the upper bearing pre-load spring, horn contact carrier, and lockplate onto the shaft. Horn contact carrier is last on 1969 models.

14. Position the tool as in Step 4 and compress the plate far enough to allow the C-ring to be installed.

15. Remove the tool. Install the plastic C-ring retainer.

16. Install the column/dash trim cover. Install the steering wheel.

Ignition Switch

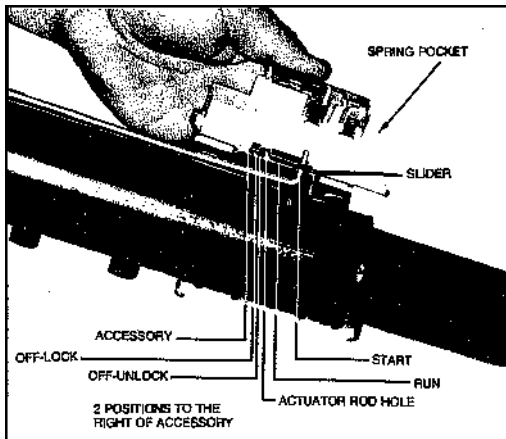
REMOVAL AND INSTALLATION

1969-84

NOTE: See Chapter 5 for "1964-68 Ignition Switch Removal and Installation" The switch is located inside the channel section of the brake pedal support and is completely inaccessible without first lowering the steering column. The switch is actuated by a rod and rack assembly. A gear on the end of the lock cylinder engages the toothed upper end of the rod.

1. Lower the steering column; be sure to properly support it.

2. Put the switch in "Lock" position on models through 1977 and the "Off-Unlocked" position on 1978 and later models. With the cylinder removed, the rod is in "Lock" or



Positioning the ignition switch

"Off-Unlocked" position when it is in the next to the uppermost detent.

3. Remove the two switch screws and remove the switch assembly.

4. Before installing, place the new switch in "Lock" or "Off-Unlocked" position and make sure the lock cylinder and actuating rod are in "Lock" or "Off-Unlocked" position (second detent from the top).

5. Install the activating rod into the switch and assemble the switch on the column. Tighten the mounting screws. Use only the specified screws since overlength screws could impair the collapsibility of the column.

6. Reinstall the steering column.

Steering Linkage

The Corvette has two tie-rods. Each rod is a three-piece assembly made up of the rod itself and two tie-rod ends. The ends screw onto the rod and are clamped in place. Right- and left-hand threads are used to assist toe-in and centering adjustments. The ends are self-adjusting and, with the exception of periodic lubrication, require no servicing.

ADJUSTMENTS—1963-82

Relay Arm Ball Joint

1. Remove the cotter pin and adjust the end plug slot clockwise until the inside springs are bottomed.

2. Turn the plug 90° turn counterclockwise and reinsert the cotter pin.

Steering Ratio

1. Two-position steering arms permit an adjustment for quicker steering. Do not make



Steering ratio adjustment

this adjustment on Corvettes equipped with power steering, as frame interference will result.

2. Disconnect the tie-rod ball joint stud from the steering arm.

3. Insert the stud in the forward hole for a quick steering ratio, or the rear hole for a slower ratio.

4. Install the nut and cotter pin. Repeat this operation on the opposite side.

5. Reset the toe-in after a steering ratio adjustment.

Rack and Pinion Assembly

REMOVAL AND INSTALLATION

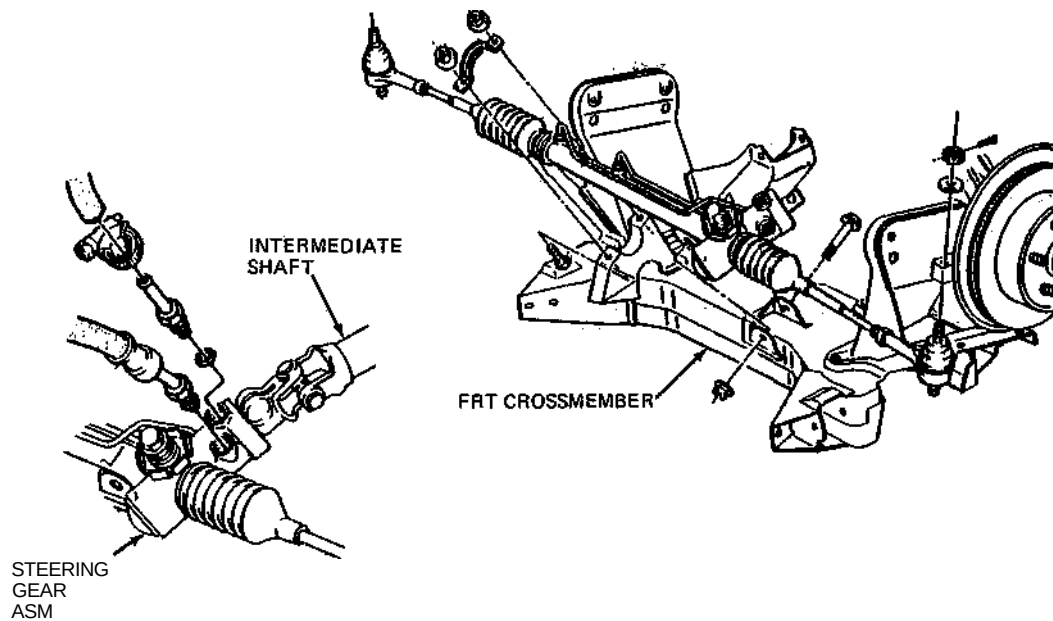
1. Raise the vehicle on a hoist.

2. Remove the driver's side wheel and tire.

3. Disconnect the power steering hoses and cap them off.

4. Disconnect the outer tie rod ends on both sides.

5. Remove the upper and lower mounting bolts, passenger side.



Power rack and pinion assembly on 1984 and later models

6. Remove the mounting bolt, drivers side.
7. Remove the intermediate shaft lower universal joint at the rack and pinion assembly.
8. Remove the stabilizer bar.
9. Remove the electric fan.
10. Remove the rack and pinion assembly from the vehicle.
11. Reverse the removal procedure for installation.
12. Check and refill the power steering fluid if necessary.
13. Bleed the system.
14. Check and adjust toe in if necessary.

BLEEDING POWER STEERING SYSTEM

1. Run engine until power steering fluid reaches normal operating temperature, approximately 170°F (80°C), then shut engine off. Remove reservoir filler cap and check oil level.
2. If oil level is low, add power steering fluid to proper level and replace filler cap. When adding or making a complete fluid change, always use CM #1050017 or equivalent power steering fluid. Do not use transmission fluid.
3. When checking fluid level after the steering system has been serviced, air must be bled from the system. With wheels turned

all the way to the left, add power steering fluid to level indicated on reservoir.

4. Start engine, and running at fast idle, recheck fluid level. Add fluid if necessary.

5. Bleed system by turning wheels from side to side without hitting stops. Maintain fluid level just above internal pump casting. Fluid with air in it will have a light tan or milky appearance. This air must be eliminated from fluid before normal steering action can be obtained.

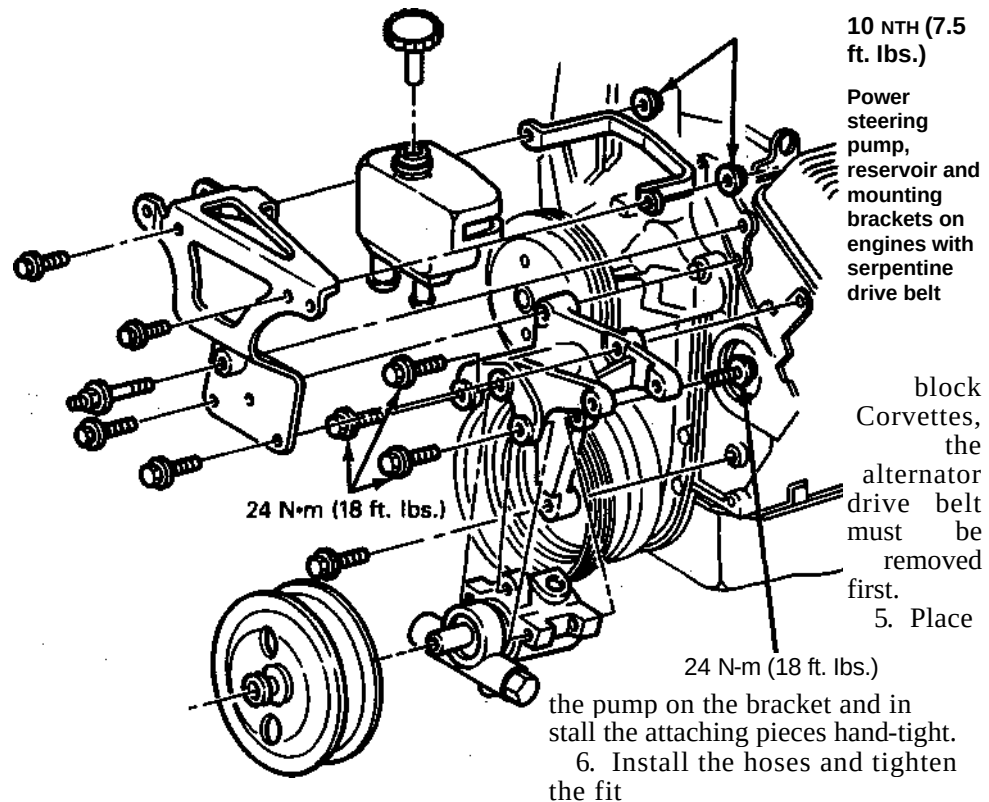
6. Return wheels to center position and continue to run engine for two or three minutes, then shut engine off.

7. Road-test vehicle to make sure steering functions normally and is free from noise.

8. Recheck fluid level as described in steps 1 and 2.

Power Steering Gear

The optional power steering on the Corvette is of the linkage assist type. The steering gear and linkage is identical to that used on manual steering cars. All procedures for the manual gear apply to the power steering gear. A belt-driven pump supplies hydraulic pressure to a sensing valve, and then on demand to a power cylinder on the linkage, which provides the power assist to the linkage. See the "Maintenance" section for adjustment procedure.



Power Steering Pump

REMOVAL AND INSTALLATION

1. Remove the hoses at the pump, and tape the ends to prevent dirt from entering.
2. Plug the pump fittings to keep the fluid in the pump.
3. Loosen the bracket retaining nuts and remove the drive belt.
4. Withdraw the bracket-to-pump bolts and remove the pump from the car. On large

tings.

7. Refill the pump reservoir. Turn the pulley backward to bleed the pump.

8. Install the belt over the pulley and tighten to the correct tension.

9. Bleed the hydraulic system, as previously described.