GROUP

SUSPENSION 04

(3000 & 5000)

SECTION 04-00 Suspension—Service

VEHICLE APPLICATION

Capri.

DIAGNOSIS AND TESTING

The suspension system, independently sprung front and rear, is designed for minimum maintenance. Other than incorrect front toe, front camber and rear toe, suspension misalignment can only result from wear or damage to suspension components, or distortion of body structure due to collision damage. Symptoms of suspension trouble include ride and handling concerns such as wander or pull to one side, erratic or hard steering, braking pull, dog tracking and excessive or uneven tire wear. Most of these symptoms can also be caused by factors outside the suspension such as steering gear conditions, brake drag, worn wheel bearings, mismatched tires, or abnormal vehicle load distribution. It is important to learn as much as possible about a complaint. For example, when the condition was first noticed, whether it appeared suddenly or gradually, and if any impacts with curbs, potholes, or other obstacles. can be associated with it.

SUSPENSION DIAGNOSIS

CONDITION	POSSIBLE SOURCE	ACTION
• Wander / Pull	• Excessive side-to-side difference in caster or camber.	• Check alignment and if incorrect, adjust camber if needed. Inspect related components for wear or damage.
	• Vehicle attitude incorrect (front or rear, high or low).	• Check for abnormal loading, spring sag, or non-standard springs.
	• Steering gear or linkage worn or damaged.	• Check steering system. Refer to Section 11-00.
• Hard Steering	• Excessive positive caster.	• Check caster and if incorrect, inspect related components for wear or damage. Inflate tires to correct and uniform pressure. Refer to Section 04-04.
	• Vehicle attitude incorrect (front high or rear low).	• Check for abnormal loading, spring sag, or non-standard springs.
	• Steering gear or linkage worn, damaged or improperly adjusted.	• Check steering system. Refer to Section 11-00.
• Brake Pull	• Excessive negative caster.	• Check caster and if incorrect, inspect related components for wear or damage. Adjust camber if needed.
	• Unequal tire pressure.	• Inflate tires to correct and uniform pressure. Refer to Section 04-04.
	• Brake drag.	• Check brakes. Refer to Section 06-00.
• Shimmy	• Excessive positive caster or side-to-side caster difference.	• Check caster and if incorrect, inspect related components for wear or damage.
	• Wheel / tire imbalance or runout.	• Check wheels and tires as outlined.
	• Driveline vibration.	• Check driveline for imbalance or misalignment. Refer to Section 00-04. Check for worn rack mounting bushings and worn rack mounting brackets.
• Dog-Tracking	• Excessive side-to-side caster difference.	• Check caster and if incorrect, inspect related components for wear or damage.
	• Rear suspension damage.	• If caster is uniform, check and compare wheelbase at right and left sides. If different, inspect suspension components and rear crossmember for wear or damage.

DIAGNOSIS AND TESTING (Continued)

SUSPENSION DIAGNOSIS (Continued)

CONDITION	POSSIBLE SOURCE	ACTION
• Bump Steer	• Worn steering gear mounting bushings. • Bent steering gear mounting brackets. • Steering gear not level.	• Replace steering gear mounting bushings. • Replace steering gear mounting brackets. • Adjust steering gear mounting.
• Uneven Tire Wear: Outer or Inner Shoulder	• Excessive positive or negative camber. • Excessive toe on radial tires.	• Check camber and if incorrect, inspect related components for wear or damage. Adjust camber if needed. • Check toe and adjust if needed.
• Sawtooth Pattern or Excessive Tire Wear	• Excessive toe-in (high edges inboard) or toe-out (high edges outboard).	• Check and adjust toe-in to specification.
• Cupping or Dishing or Excessive Tire Wear	• Wheel / tire imbalance or runout. • Suspension struts. • Rear toe. • Lack of proper tire rotation.	• Check wheels and tires as outlined. • Replace suspension struts if needed. • Adjust rear toe. • Rotate tires every 7,500 miles. Refer to Section 04-04.

Inspection

Diagnosis of possible suspension concerns must start with a thorough inspection of the vehicle, including all suspension components and mounting points to identify any that are worn, damaged, or not securely installed.

Suspension Height

Examine the vehicle for indications of abnormal attitude, such as front or rear end higher or lower than normal, or not level side-to-side. Check for extra heavy items in luggage or passenger compartments such as tool boxes, sample cases, etc. If present, they should be removed before checking wheel alignment.

If vehicle attitude is not normal and no unusual load is present, check for signs of spring sag or damage, or non-standard replacement springs.

Suspension Struts

Bounce the vehicle at all four corners to check shock absorber function of the struts. Damping action should be pronounced and uniform. Inspect the shock absorbers for signs of leakage. A thin, oily film is normal, but if a strut tube is conspicuously wet, or if oil is evident, the unit should be replaced. Also, check for looseness in the strut mounting bushings in the underbody or lower control arms. If any play is apparent, the bushings involved should be replaced.

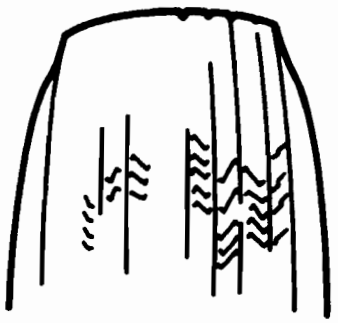
Tires

Verify that tires are matched from side-to-side, equally inflated and uniformly worn. Also, look for abnormal tread wear patterns caused by wheel / tire imbalance or suspension misalignment. If cupping or flat spots are present, wheels and tires should be checked for runout and balance as outlined.

If tread wear is not uniform across the face of the tire, but greater toward the inboard or outboard edges, improper camber is indicated, which will be verified by an alignment check.

DIAGNOSIS AND TESTING (Continued)

Tread wear in a sawtooth pattern, which can be felt even if not visible, results from improper toe adjustment. If the high edges of the tread ribs are toward the vehicle center, excessive toe-in is indicated. If away from the vehicle center, toe-out is excessive.



ABNORMAL WEAR DUE TO EXCESSIVE POSITIVE CAMBER

SAWTOOTH WEAR PATTERN DUE TO EXCESSIVE TOE-IN

F5278-A

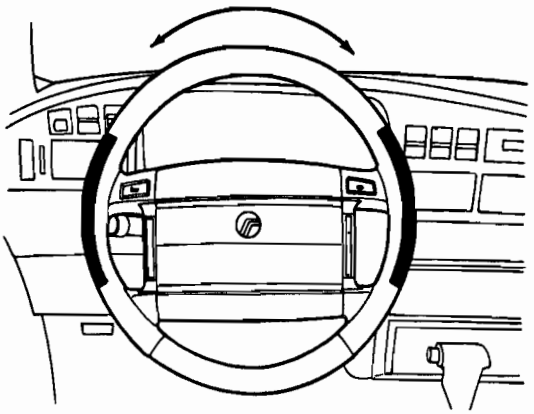
Steering Wheel Play

With steering in the straight-ahead position, check for freeplay at the steering wheel rim. If in excess of 30mm (1.18 inch) look for the cause in the steering system. Refer to Section 11-00.

Also check for looseness or play in the steering wheel. Move the column in all directions to check for:

- Column bearing wear
- Steering shaft U-joint play
- Steering wheel looseness
- Column looseness

Refer to Section 11-04.



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Ball Joints

Lift the vehicle on a suitable hoist until the front wheel is clear of the floor, and try to rock the wheel in a vertical plane. If any play is felt, have an assistant rock the wheel while observing the ball joint in the lower control arm at the bottom of the steering knuckle. If any movement is detectable between steering knuckle and control arm, the ball joint assembly should be replaced. If not, any play in the wheel may be caused by wheel bearing wear. Refer to Section 04-01 for wheel bearing service procedures.

Tie Rods

With one front wheel raised, try to rock it in the horizontal plane with the opposite wheel grounded or blocked. If any play is felt, check the tie rod end ball joint for relative motion. If any is present, replace the tie rod end. Hold the opposite wheel tie rod while rocking the wheel horizontally, to detect any end play present in the steering rack ball joints. Refer to Section 11-02 for steering gear service.

Control Arms and Stabilizers

Inspect control arms of both front and rear suspensions for signs of damage due to curb impacts, improper hoist positioning or other causes. If present, check for bending by carefully measuring and comparing critical dimensions of right and left arms.

Test all rubber-bushed suspension mounting and connecting points for freeplay in the unloaded condition. Use a jack or similar lifting device to raise the vehicle or suspension component to unload the bushing for shake testing. Some restrained relative motion is permissible as the bushing is stressed in testing, but if freeplay is evident at any point, the bushing should be replaced.

DIAGNOSIS AND TESTING (Continued)

Vibration and Roughness

Vibration, roughness, tramp, shimmy and thump may be caused by excessive tire or wheel runout, worn or cupped tires, or wheel and tire unbalance.

These conditions may also be caused by rough or undulating road surfaces. Driving the vehicle on different types of road surfaces will indicate if the road surfaces are actually causing the condition.

Do not immediately suspect the tires when attempting to diagnose a vibration concern. Other sources of vibration include:

- Loose or worn wheel bearings
- Loose or worn suspension or steering components
- Worn upper strut bearings
- Worn or damaged CV joints
- Brake rotor runout
- Loose engine or transmission supports
- Engine driven accessories

This Section covers those vibrations related to the tires and wheels.

For diagnostic procedures and service for non-tire related vibrations, refer to Section 00-04.

Road Test

A tire vibration diagnostic procedure always begins with a road test. The road test and customer interview (if available) will provide much of the information needed to find the source of a vibration.

During the road test, drive the vehicle on a road that is smooth and free of undulations. If vibration is apparent, note and record the following:

- The speed at which the vibration occurs.
- What type of vibration occurs in each speed range—mechanical or audible.
- How the vibration is affected by changes in vehicle speed, engine speed, and engine torque.
- Type of vibration sensitivity—torque sensitive, vehicle speed sensitive, or engine speed sensitive.

Use the following explanation of terms to help isolate the source of the vibration.

Torque Sensitive

This means that the condition can be improved or worsened by accelerating, decelerating, coasting, maintaining a steady vehicle speed and application of engine torque.

Vehicle Speed Sensitive

This means that the vibration always occurs at the same vehicle speed and is not affected by engine torque, engine speed, or transaxle gear selection.

Engine Speed Sensitive

This means that the vibration occurs at varying vehicle speeds when a different transaxle gear is selected. It can sometimes be isolated by increasing or decreasing engine speed with the transaxle in NEUTRAL, or by stall testing with the transaxle in gear. If the condition is engine-speed sensitive, the condition is not related to tires.

If the road test indicates the vibration is related to the tires or wheels, use the Tire Wear Diagnosis Chart to help pinpoint the cause of the concern. If the road test indicates that there is tire whine, but no shake or vibration, the noise originates with the contact between the tire and the road surface.

- A thumping noise usually means that the tire has flat or soft spots making a noise as they slap the roadway. Tire whine can be distinguished from axle noise because axle noise diminishes or changes according to load or speed. Tire noise remains the same over a range of speeds.
- To verify that tire noise is not associated with shake or vibration, inflate the tires one at a time to 345 kPa (50 psi) and check for a change in the sound. The pitch or whine will change as the increased pressure changes the tire frequency.

CAUTION: Be sure to deflate tires to their proper pressures after this check is completed.

NOTE: A complete road test procedure is provided in Section 00-04.

Wheel/Tire Runout

Check wheel and tire runout with the tires inflated to the normal load inflation pressure. To ensure accurate results, make the checks with a dial indicator, or Rotunda Radial Runout Gauge 007-00014 or equivalent, immediately after the road test. If time is allowed to pass between the road test and the runout checks, the tires may develop slight flat spots, which can affect the accuracy of the tire runout checks.

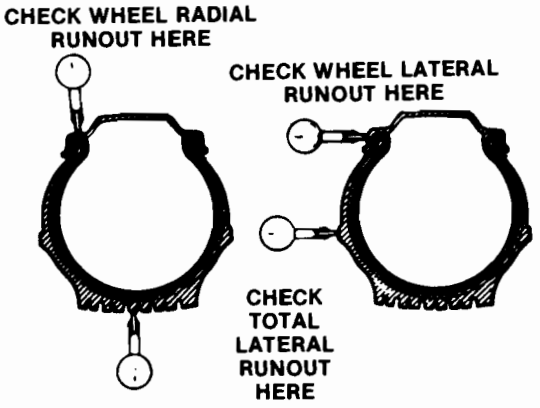
Measure tire radial runout at the center and outside ribs of the tread face. It may be necessary to put tape on the tire tread to keep the dial indicator roller from falling into tread block grooves in the tread. Measure the lateral runout just above the letters identifying the tire size.

Measure wheel radial runout at the wheel rim along the inside edge of the flange.

Use the Wheel/Tire Runout Diagnosis Chart to determine if wheel or tire runout is the source of a vibration condition.

DIAGNOSIS AND TESTING (Continued)

Checking Wheel/Tire Runout



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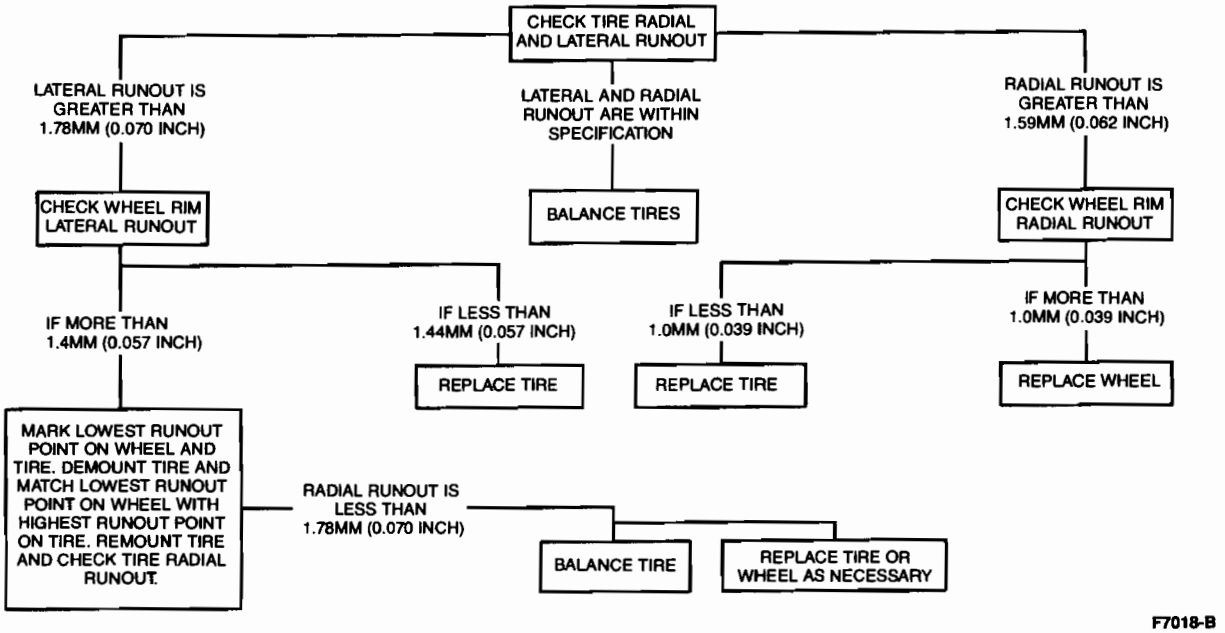
WHEEL/TIRE RUNOUT DIAGNOSIS CHART



F7018-B

Tire Lead

"Lead" is the movement or wander of the vehicle from a straight path on a level road with no pressure on the steering wheel.

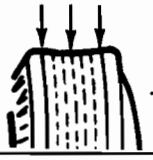
Lead is usually caused by:

- Incorrect wheel alignment.
- Uneven brake adjustment.
- Uneven or incorrect tire inflation pressures.
- Damaged or worn tire construction.

The way in which a tire is constructed can produce lead. An example of this is placement of the radial belts. Off-center belts on a radial tire can cause the tire to develop a side force while rolling straight down the road. If one side of the tire is a little larger diameter than the other, the tire will tend to roll to one side. This will develop a side force which can produce lead.

DIAGNOSIS AND TESTING (Continued)

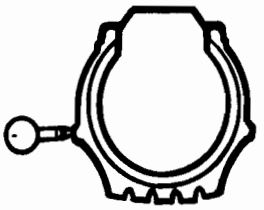
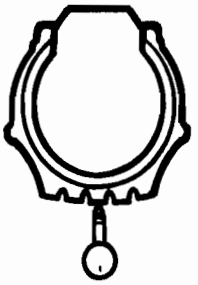
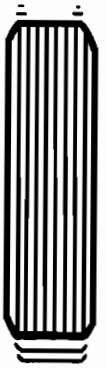
TIRE WEAR DIAGNOSIS CHART

CONDITION	POSSIBLE SOURCE	ACTION
• Rapid Wear At The Shoulders 	• Tires underinflated.	• Inflate tires to recommend pressure—rotate tires.
	• Worn suspension components. i.e., ball joints, upper strut mounts, lower control arm bushings.	• Replace worn components.
	• Excessive cornering speeds.	• Rotate tires.
• Rapid Wear At Center Of Tread 	• Tires overinflated.	• Inflate tires to recommend pressure—rotate tires.
• Wear At One Shoulder 	• Toe out of adjustment.	• Adjust toe to specifications.
	• Camber out of specification.	• Check for worn or damaged suspension components.
	• Bent lower control arms.	• Replace lower control arms.
	• Bent MacPherson struts.	• Replace strut.
	• Bent lower control arm.	• Replace lower control arm.
	• Bent strut tower.	• Replace strut tower.
• Feather Edge 	• Toe out of adjustment.	• Adjust toe to specifications.
	• Bent or worn tie rods.	• Replace tie rods.
	• Damaged spindle carrier.	• Replace spindle carrier.
• Bald Spots or Tire Cupping 	• Unbalanced wheel.	• Balance tire and wheel.
	• Excessive radial runout.	• Check runout and replace tire if necessary.
	• Shock absorber in strut worn.	• Replace strut.
• Tire Scalloped 	• Toe out of adjustment.	• Adjust toe to specifications.
	• Camber out of specification.	• Check for worn or damaged suspension components.
	• Worn suspension components. i.e., ball joints. weak struts.	• Replace worn suspension components.

CF7015-A

DIAGNOSIS AND TESTING (Continued)

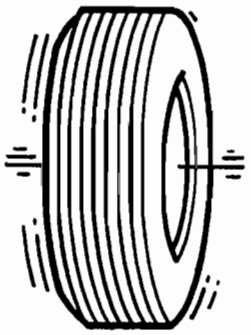
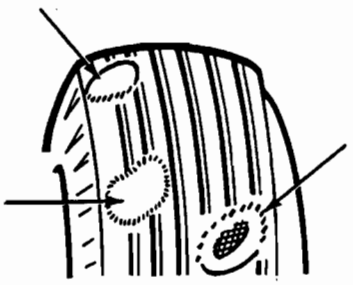
TIRE WEAR DIAGNOSIS CHART

CONDITION	POSSIBLE SOURCE	ACTION
• Vehicle Speed Sensitive Vibration. Vibration at Speeds Above 88 km/h (55 mph).	• Tire and wheel lateral runout. 	• Replace tire(s). Road test vehicle.
• Speed Required to Cause Vibration Increases as Runout Decreases. Vehicle Speed Sensitive Vibration. Vibration at Speeds Above 32 km/h (20 mph).	• Tire and wheel radial runout. 	• Replace tire(s). Road test vehicle.
• Up-down Movement in Steering Wheel and Instrument Panel Along With Mechanical Vibration. Most Noticeable Between 32-64 km/h (20-40 mph). Vehicle speed sensitive vibration.	• Wheel hop. Caused by tires having radial runout of more than 1.14mm (0.045 inch). Do not attempt to correct by balancing. 	• Replace tire(s). Road test vehicle.

CF7016-A

DIAGNOSIS AND TESTING (Continued)

TIRE WEAR DIAGNOSIS CHART

CONDITION	POSSIBLE SOURCE	ACTION
• Steering Vibration Vehicle Speed Sensitive 	• Tire balance. Static unbalance not a cause of vibration below 48 km/h (30 mph). Dynamic unbalance not a cause under 64 km/h (40 mph).	• Balance tires. Road test vehicle.
• Tire Wear Can cause vibration in 48 to 88 km/h (30 to 55 mph) range and may also generate whine at high speed changing to growl at low speed. Vehicle speed sensitive vibration. 	• Worn/damaged suspension components or tires. Vehicle out of alignment. Tires out of balance.	• Balance tires. Service tires and vehicle as required. Road test vehicle.
• Waddle Side to side (waddle) movement at the front and/or rear of the vehicle. Most noticeable at low speed 8 to 48 km/h (5 to 30 mph). It may also appear as a ride roughness at 80 to 112 km/h (50 to 70 mph).	• Steel belt in tire not straight within tire. It is possible to road test a vehicle and tell on which end of the vehicle the worn or damaged tire is located. If the waddle tire is on the rear, the rear end of the vehicle will shake from side to side or "waddle." From the drivers seat it will feel as though someone is pushing on the side of the vehicle. If the worn or damaged tire is on the front, the waddle is more visual. The front sheet metal will appear to be moving back and forth and the driver will feel as though they are at a pivot point in the vehicle.	• Replace tires(s). Road test vehicle.

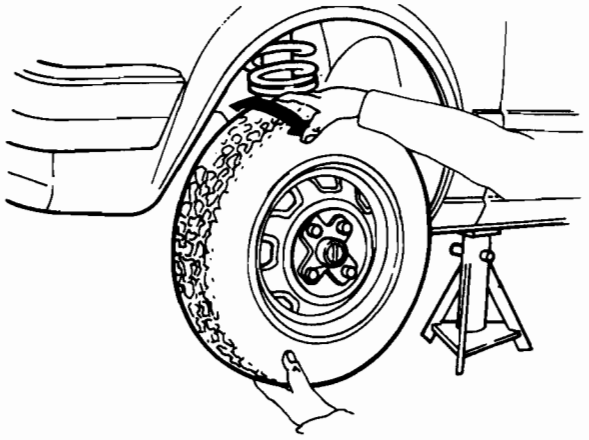
CF7017-B

DIAGNOSIS AND TESTING (Continued)

Bearing, Front Wheel

The most obvious clue to bearings that need replacing is the presence of noise that occurs only when making a turn. To diagnose the bearings:

1. Road test the vehicle on a smooth road. Make sharp turns to the right and left.
   a. If the vehicle makes noises on right turns, the left bearing most likely needs replacement.
   b. If the vehicle makes noises on left turns, the right bearing most likely needs replacement.
   c. If bearing noise is heard on either right or left turns, the hub and bearing assembly on the suspected side should be disassembled and inspected.
2. Raise the front of the vehicle and check for loose front bearings by rocking the tires at the top and bottom.



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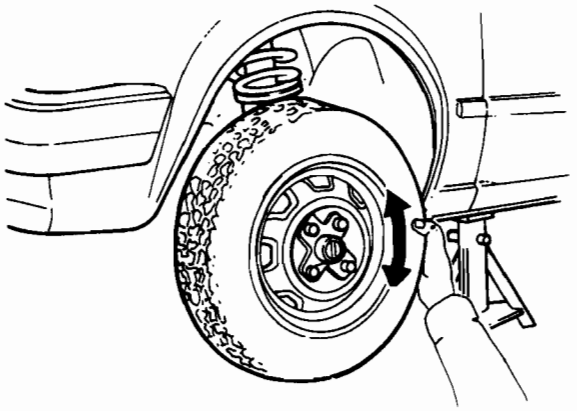
3. Spin the tire quickly by hand and make sure the tire turns smoothly with no abnormal noises from the bearings.

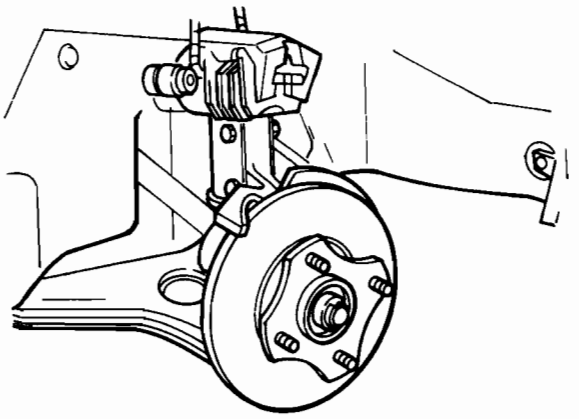


F5088-A

NOTE: Be careful not to confuse ball joint looseness with bearing looseness.

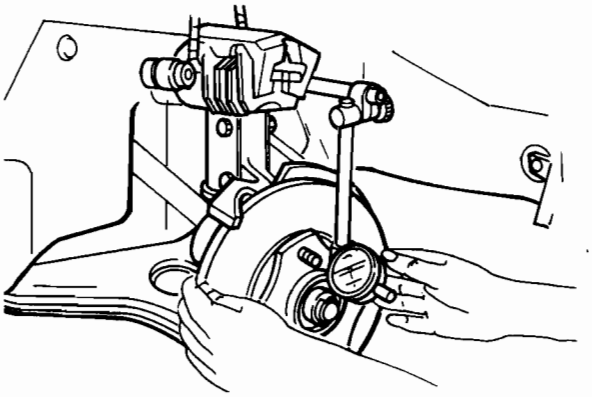
If abnormal looseness or noise is found, disassemble the hub and knuckle, inspect the bearings, and adjust the bearing preload.

4. Remove the wheel and disc brake caliper. Hang the caliper from the coil spring using a cord or piece of wire.



F5089-A

5. Position Dial Indicator with Bracketry TOOL-4201-C or equivalent against the wheel hub, then push and pull the wheel hub. Measure the end play of the wheel hub and bearing assembly. If the end play exceeds the specified limit, adjust the bearing preload or replace the bearings as outlined.

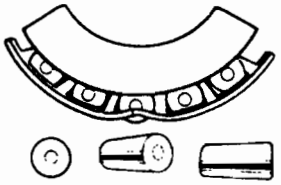
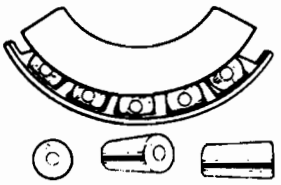
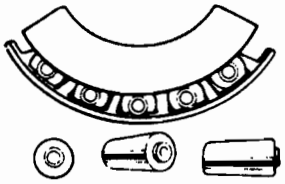
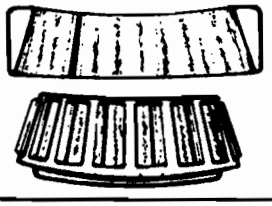


F5090-A

DIAGNOSIS AND TESTING (Continued)

Bearings, Rear Wheel

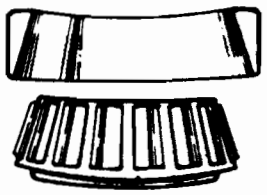
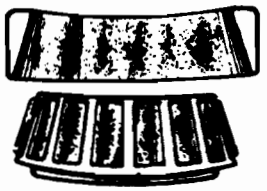
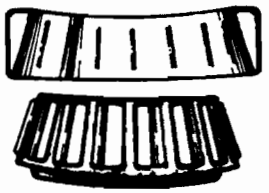
REAR WHEEL BEARINGS AND HUBS COMPONENT INSPECTION CHART —BEARINGS—

CONDITION	CAUSE	CORRECTION
BENT CAGE 	• Improper handling or tool usage	• Replace bearings
GALLING (Metal Smears on roller ends) 	• Overheating • Lubricant failure • Incorrect lubricant • Lubricant failure	• Replace bearings • Use only specified lubricant
ABRASIVE STEP WEAR 	• Fine abrasives mixed with lubricant	• Replace bearings
ETCHING (Bearing surfaces appear gray or grayish black in color. Etching of bearing material may occur between the rollers) 	• Incorrect lubricant • Lubricant failure	• Replace bearings • Use only specified lubricant

F5093-A

DIAGNOSIS AND TESTING (Continued)

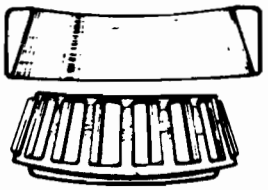
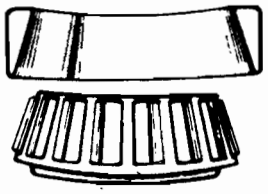
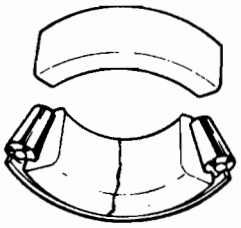
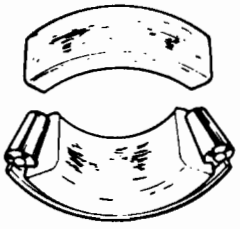
REAR WHEEL BEARINGS AND HUBS
COMPONENT INSPECTION CHART (Continued)
—BEARINGS—

CONDITIONS	CAUSE	CORRECTION
MISALIGNMENT 	• Bearing cup misaligned in spindle bore due to burr, nick or dirt on cup seat	• Replace bearings • Inspect bearing cup seats for damage or dirt
INDENTATIONS 	• Contaminated lubricant	• Replace bearings
FATIGUE SPALLING (Flaking or surface metal) 	• Excessive preload • Insufficient lubricant • Incorrect lubricant	• Replace bearings • Use only specified lubricant
BRINELLING (Surface indentations in raceway) 	• Impact loading or vibration while the bearings is not rotating • Insufficient lubricant	• Replace bearings if rough or noisy

F5091-A

DIAGNOSIS AND TESTING (Continued)

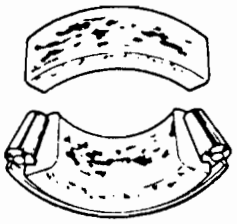
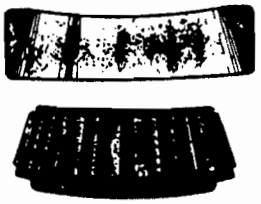
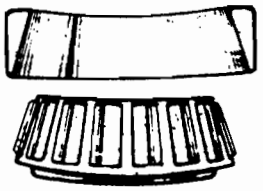
REAR WHEEL BEARINGS AND HUBS
COMPONENT INSPECTION CHART (Continued)
—BEARINGS—

CONDITIONS	CAUSE	CORRECTION
CAGE WEAR 	• Fine abrasives mixed with lubricant • Insufficient lubricant	• Replace bearings • Use only specified lubricant
ABRASIVE ROLLER WEAR 	• Fine abrasives mixed with lubricant	• Replace bearings if rough or noisy
CRACKED INNER RACE 	• Improper fit • Misaligned bearing cup • Metal chips	• Replace bearings • Use correct bearing • Inspect bearing cup seats for damage or dirt
SMEARS (Smearing of metal due to slippage) 	• Improper fit • Incorrect lubricant • Overheating • Excessive loading	• Replace bearings • Use correct bearings • Use only specified lubricant

F5092-A

DIAGNOSIS AND TESTING (Continued)

REAR WHEEL BEARINGS AND HUBS COMPONENT INSPECTION CHART (Continued) —BEARINGS—

CONDITION	CAUSE	CORRECTION
FRETTAGE 	• Corrosion set up by small relative movement between bearing rollers, races and cups without adequate lubrication	• Replace bearings • Use only specified lubricant.
HEAT DISCOLORATION (Color can range from faint yellow to dark blue) 	• Excessive loading • Incorrect lubricant • Insufficient lubricant • Improper fit • Excessive preload	• Replace bearings • Use only specified lubricant • Use correct bearings
STAIN DISCOLORATION (Color can range from light brown to black) 	• Incorrect lubricant • Moisture contamination	• Reuse bearings if stains can be removed by light polishing or if no evidence of overheating is observed • Use only specified lubricant

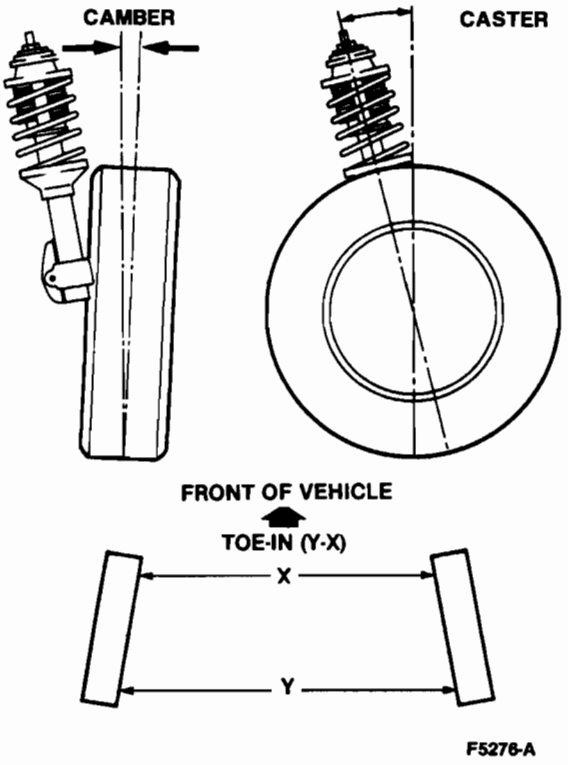
F7049-A

DIAGNOSIS AND TESTING (Continued)

Wheel Alignment

Caster

While caster is preset at the factory and not adjustable, it should be checked as a possible cause of suspension concerns. Be sure the tires are correctly and uniformly inflated, and any abnormal loads are removed from the vehicle. If caster is not within limits (refer to Specifications), and control arms, stabilizers and bushings are in good condition, check the vehicle body for distortion at suspension mounting points due to collision damage, curb or pothole impacts, improper hoisting etc. Refer to Section 01-00. Generally, front-wheel drive vehicles are not sensitive to caster differences from side-to-side that are under one degree.



F5276-A

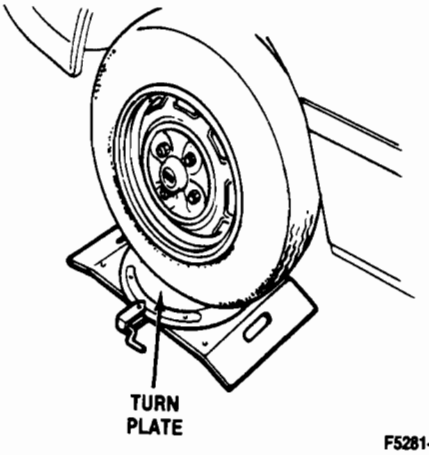
Camber

Camber is always set before all other adjustments. Camber can cause both pull and tire wear if it is set incorrectly.

Wheel Alignment Procedure

To be able to measure and set front wheel alignment, the front wheels must be resting on turn plates.

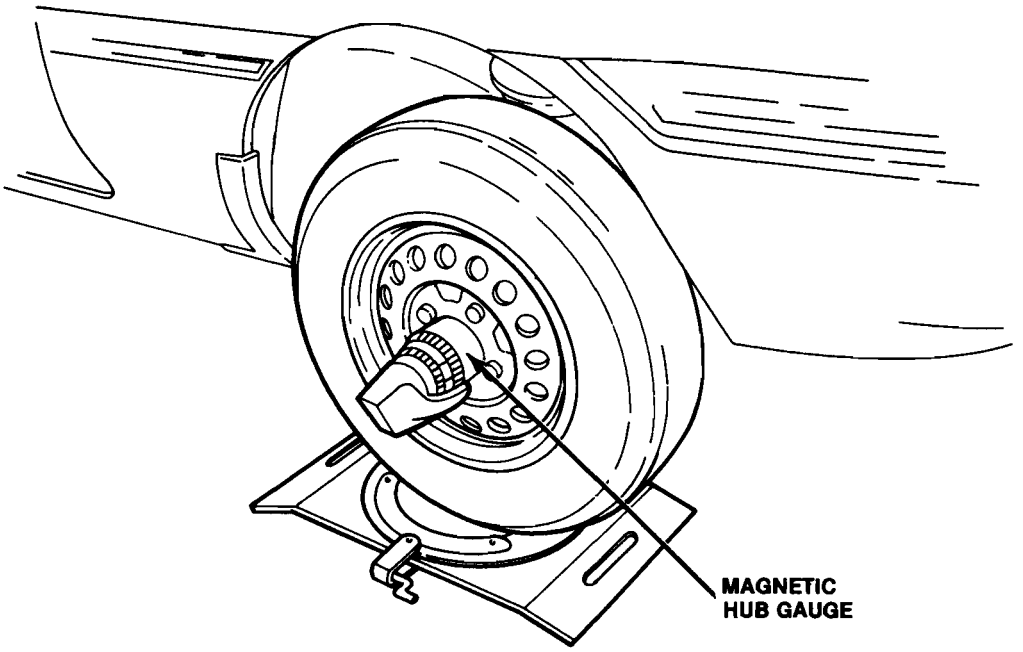
To be able to set rear toe, the back wheels must be resting on slider plates or turn plates. Before setting any alignment angle, the vehicle must be bounced three times at each end. This establishes the actual standing curb height (trim height).



F5281-A

DIAGNOSIS AND TESTING (Continued)

Special adapters are available so that a magnetic hub gauge can be used at the rear wheels. Depending on the equipment being used this may not be necessary. After the hub cap and bearing cap are removed, the hub gauge will snap in place onto the brake rotor. Magnetic mounting toe gauges may also be installed in the same manner.



F5292-A

Wheel alignment should always be done on a perfectly level alignment rack. Before doing an alignment, always check the following:

- Worn suspension parts
- Standing curb height (trim height)
- Heavy weights in the luggage compartment, such as golf clubs or heavy tool boxes
- Tire pressure
- Wheel bearings
- Full tank of gas
- The seat should be in the full rear position
- Rear toe adjustment

Always road test vehicle after an alignment. If the vehicle still pulls, try switching the front tires. This will usually cure any pull concern. If the vehicle still pulls in the same direction, double check the alignment and rear tracking. If the vehicle pulls in the opposite direction, rotate the tires and road test again. For proper rotation procedure, refer to Section 04-04.

ADJUSTMENTS

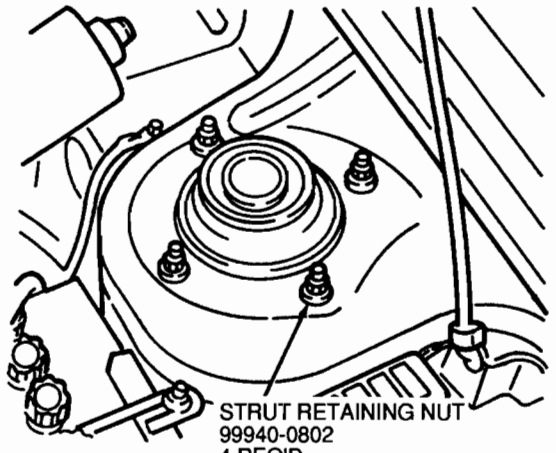
Camber

The top mounting studs on the front struts are offset. Camber is adjusted by rotating the strut bearing one half turn. This will change camber 28-30 minutes. To set camber:

1. Raise the vehicle by the body so that the front suspension is unloaded. Refer to Section 00-02.
2. Remove the wheel.

ADJUSTMENTS (Continued)

3. Loosen and remove four top strut retaining nuts from the mounting studs.



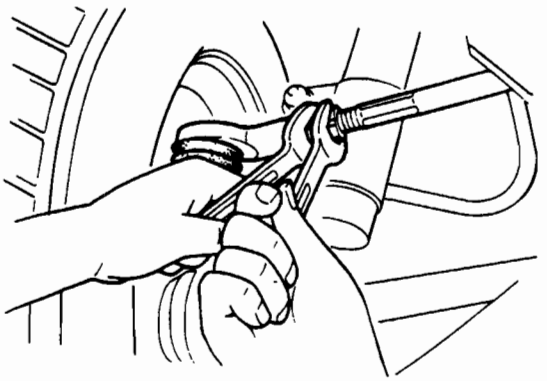
F5877-B

4. Lower the strut, and rotate the strut bearing 180 degrees.
5. Re-install the strut in the strut tower.
6. Install and tighten four retaining nuts to 23-29 N·m (17-21 lb-ft).
7. Double check that camber is set correctly.

Toe-In, Front

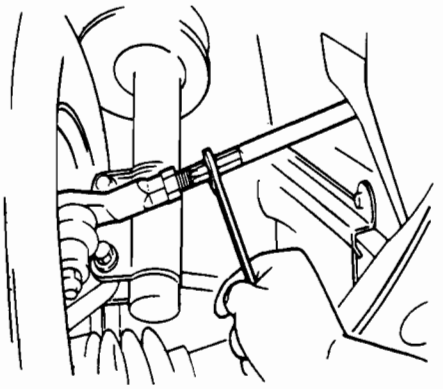
Check toe-in against specifications. If necessary, adjust toe-in as follows:

1. Loosen the locknuts at the tie rod ends and release the clips at the small ends of the steering gear boots. Be sure the boots are free on the tie rods so that they will not be twisted when tie rods are turned.



F5287A

2. Turn the tie rods into or out of the tie rod ends an equal amount on each side, to keep the steering wheel centered.

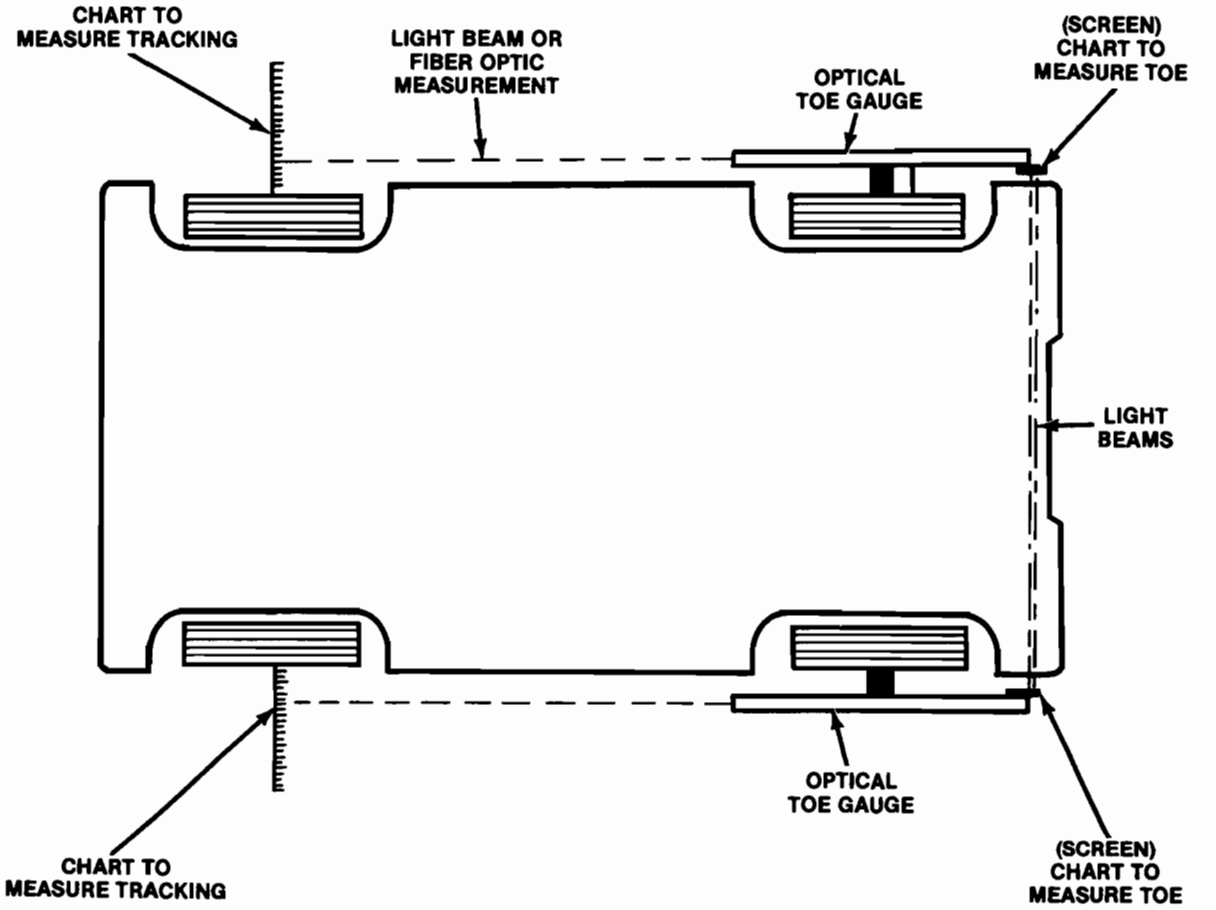


F5288-A

NOTE: Tracking must always be set directly after setting toe.

ADJUSTMENTS (Continued)

3. Check front tracking. Tracking is set by using the rear wheels as a reference point. Follow your equipment manufacturer's instructions to check tracking. The angle of each front wheel in relationship to the rear wheels must be the same. This ensures a straight steering wheel while driving.



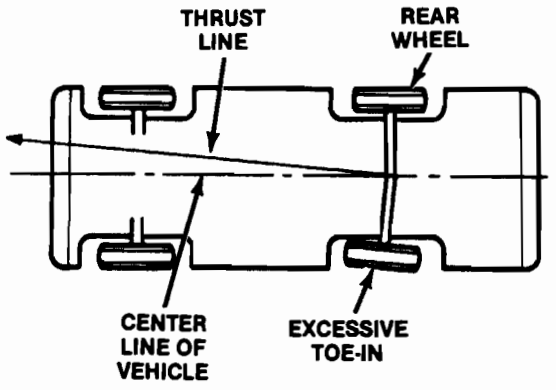
4. Always double check the toe setting after setting tracking.
5. When toe-in is correct, tighten the tie rod end locknuts to 35-40 N·m (26-29 lb-ft). Verify that the steering gear boot ends are positioned in the reduced-diameter sections of the tie rods and install the boot clips.

Toe, Rear

NOTE: If rear toe and tracking are not set correctly, it may cause excessive tire wear. It may also affect the thrust line of the rear wheels, known as "dog tracking". The thrust line is the path the rear wheels take as they roll down the road. Ideally, the thrust line should align perfectly with the centerline of the vehicle. If the thrust line is not correct, it will cause the vehicle to slightly understeer in one direction and oversteer in the other direction. It will also affect the wheel centering.

ADJUSTMENTS (Continued)

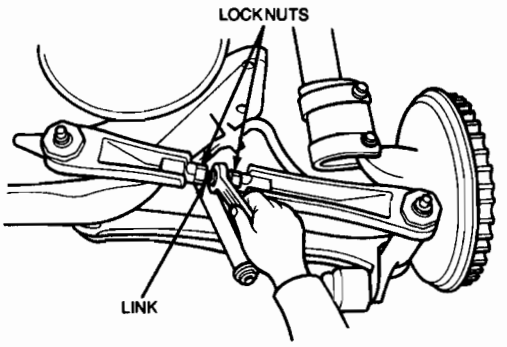
This is why both front and rear alignment angles should be checked at the same time.



NOTE: THE THRUST LINE IS THE PATH BOTH REAR WHEELS TAKE AS THEY ROLL DOWN THE ROAD.

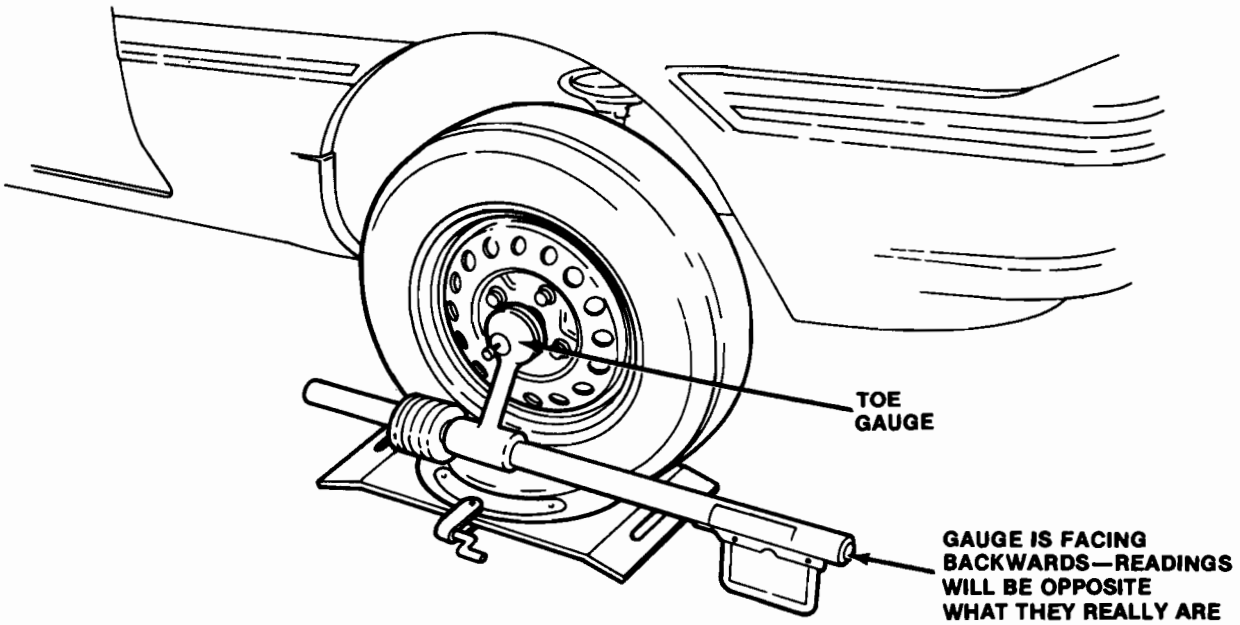
F5290-A

Rear toe should always be checked whenever an alignment on the front wheels is required. Rear toe should be adjusted prior to setting the front alignment angles. Rear toe is adjusted by loosening the locknuts and rotating the adjustment link on the rear control arms.



F7008-A

NOTE: One turn of the link changes toe 5.6mm (0.22 inch).



F5294-A

NOTE: With many toe gauges, rear wheel readings will be opposite of what they really are. Follow your equipment manufacturer's instructions for proper usage.

Rear tracking is adjusted by setting the steering wheel straight ahead and using the front wheels as a reference point for the back wheels.

ADJUSTMENTS (Continued)

After setting rear tracking, always double check the rear toe settings. After checking the toe, tighten the locknuts to 55-64 N·m (41-47 lb-ft).

Centering Steering Wheel

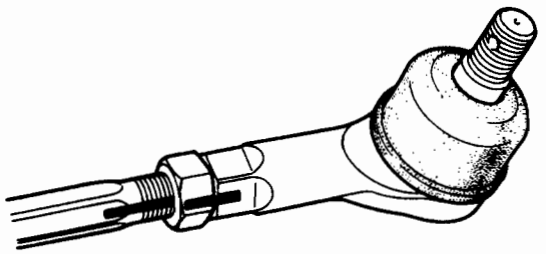
If the steering wheel is not properly centered when the vehicle is driven straight ahead, mark its position with a piece of tape across the gap between steering wheel hub and steering column shroud. Mark and cut the tape at the gap to permit steering wheel operation.

If the steering gear has been serviced, a lock-to-lock centering is advisable to be sure the gear is correctly assembled. Refer to Section 11-02.

In most cases, once front toe and tracking are correctly set, the steering wheel will be centered. If not, further adjustment will be required.

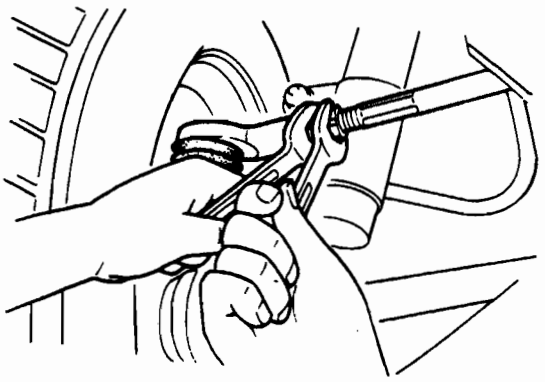
To center the steering wheel, the tie rods must be turned into one tie rod end and out of the other, in equal amounts to avoid changing the toe setting. This shifts the steering rack right or left, turning the pinion, steering column and wheel to the desired position.

1. Mark the tie rods and tie rod ends with paint or grease pencil to indicate their original relative positions.



F5286-A

2. Loosen and back off the tie rod end locknuts and release the steering gear boot clips. Be sure the boots are free on the tie rods to avoid twisting.



F5287A

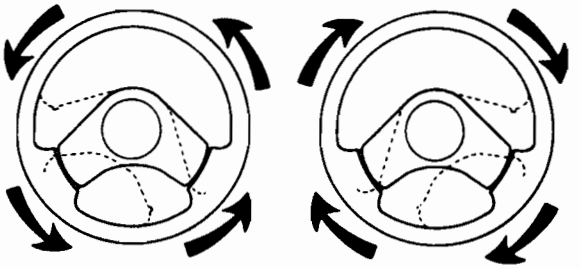
3. Screw the tie rods into one tie rod end and out of the other, depending on which way the steering wheel is to be moved and how much. For example, if the left tie rod is screwed in and the right tie rod out, the steering rack moves to the left and the steering wheel movement is counterclockwise as seen from the driver's seat. For clockwise correction, the rack must be moved to the right.

   Check the marks on tie rod ends to be sure the tie rods are turned equal amounts.

4. If toe-in is to be adjusted, turn BOTH tie rods in or out BY EQUAL AMOUNTS before locking the locknuts. This ensures that the steering wheel will remain centered. Tighten locknuts to 35-40 N·m (26-29 lb-ft). Position the boot ends in the reduced-diameter sections of the tie rod ends, and install the boot clips.

CLOCKWISE ANGULAR ERROR TURN BOTH TIE-RODS AN EQUAL AMOUNT COUNTERCLOCKWISE TO CORRECT	COUNTER-CLOCKWISE ANGULAR ERROR TURN BOTH TIE-RODS AN EQUAL AMOUNT CLOCKWISE TO CORRECT

CLOCKWISE AND COUNTERCLOCKWISE ARE AS VIEWED FROM THE LEFT SIDE OF THE VEHICLE



F5291-A

SPECIFICATIONS

FRONT AND REAR SUSPENSION

Description		mm	Inch
Front Spring Dimensions	Wire Diameter	13.4	0.53
	Coil Diameter	145.0	5.70
	Free Length	283	11.1
	Stabilizer Bar Diameter	29.2	1.14
Rear Spring Dimensions	Wire Diameter	11.4	0.45
	Coil Diameter	123	4.84
	Free Length	309	12.2
	Stabilizer Bar Diameter Naturally Aspirated Vehicles	14	0.55
	Turbocharged Vehicles	17.3	0.69

CF7060-A

WHEELBASE AND TREAD WIDTH

		Tread Width			
Wheelbase		Front		Rear	
mm	Inches	mm	Inches	mm	Inches
2405.3	94.7	1389.3	54.7	1414.8	55.7

CF7059-A

FRONT WHEEL ALIGNMENT

Alignment Factor	Degrees-Minutes	Decimal-Degrees
Caster	+1°35' ± 0°45'	+1.6° ± 0.75°
Caster-Side-to-Side VAR.	less than 0°40'	less than 0.65°
Camber	+0°48' ± 0°45'	+0.8° ± 0.75°
Camber-Side-to-Side VAR.	less than 0°30'	less than 0.5°
Toe-In	+0°18' ± 0°18'	+0.3° ± 0.3°
King Pin Inclination	+12°22'	+12.3°

CF5886-B

REAR WHEEL ALIGNMENT

Alignment Factor	Degrees-Minutes	Decimal-Degrees
Camber	-0°2' ± 0°45'	-0.03° ± 0.75°
Toe-in	+0°18' ± 0°18'	+0.3° ± 0.3°

CF7058-B

TORQUE SPECIFICATIONS

Description	N·m	Lb-Ft
Front Axle		
Knuckle to Strut (P/T Nut)	93-117	69-86
Knuckle to Lower Arm Ball Joint	43-54	32-40
Lower Arm to Lower Arm Ball Joint	93-117	69-86
Knuckle to Brake Assembly	39-49	29-36
Knuckle to Tie Rod End	29-44	22-35
Disc Plate to Wheel Hub	44-54	33-40
Strut-to-Strut Tower Nuts	23-29	17-21
Tie Rod End Lock Nuts	35-40	26-29
Rear Strut Link Nuts	55-64	41-47
Rear Axle		
Hub Spindle to Strut (P/T Nut)	93-117	69-86
Lateral Link Through Bolt	93-117	69-86
Hub Spindle to Back Plate	45-67	33-49

SPECIAL SERVICE TOOLS

Tool Number	Description
TOOL-4201-C	Dial Indicator with Bracketry

ROTUNDA EQUIPMENT

Model	Description
007-00014	Radial Runout Gauge

SECTION 04-01 Suspension and Wheel Ends—Front

VEHICLE APPLICATION

Capri.

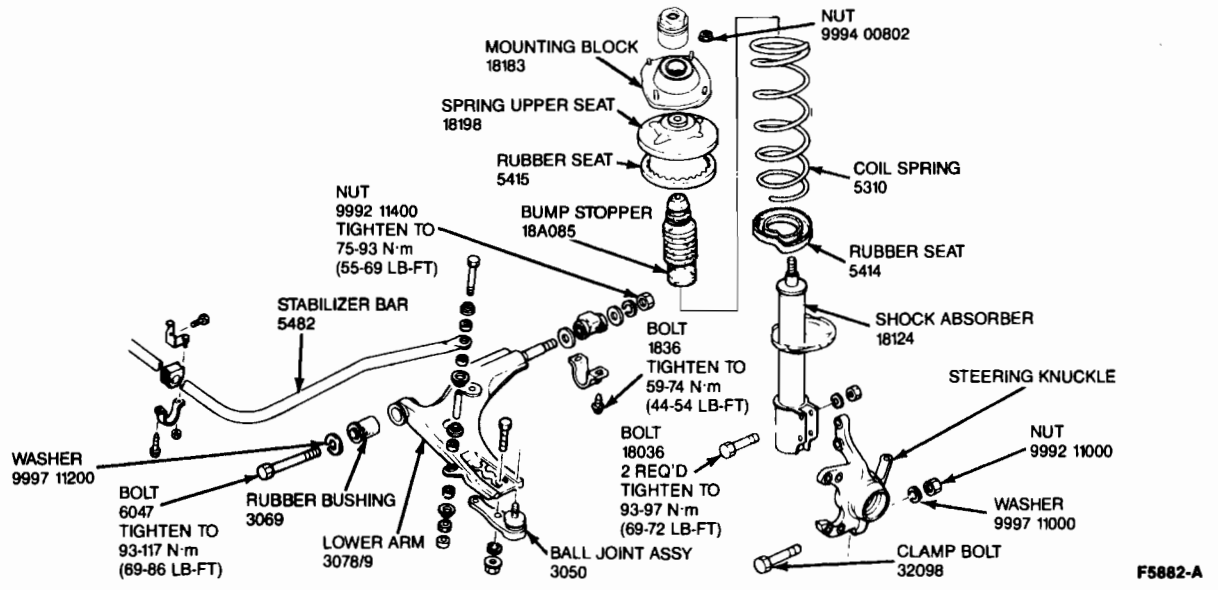
DESCRIPTION

The front suspension consists of MacPherson struts, coil springs and single control arms. Strut towers located in the wheel wells locate the upper ends of the MacPherson struts. The strut mounting blocks house rubber mounted strut bearings. Both the upper and lower end of the coil springs ride in heavy rubber spring seats. A forged steering knuckle bolts to each strut assembly.

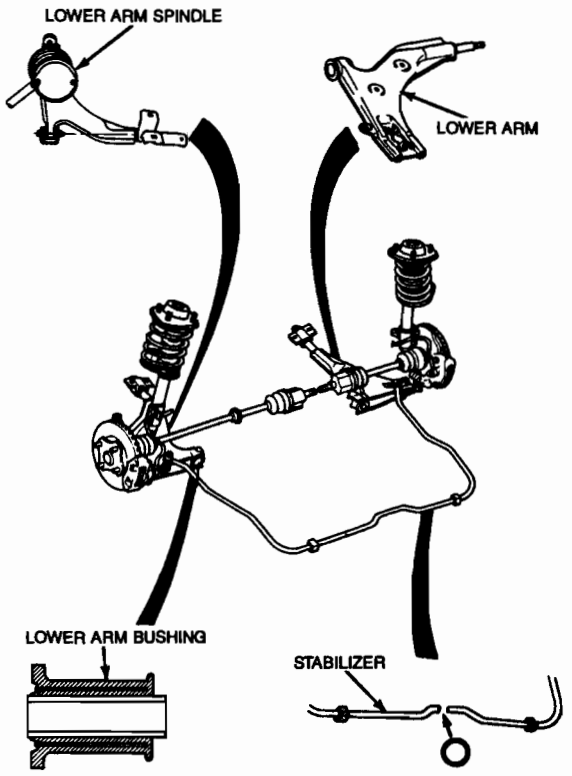
Ball joints connect the control arms to the steering knuckles. The wide stance control arms are supported by rubber bushings at each end. Body lean on turns is controlled by a hollow stabilizer bar that connects to both lower control arms.

The front wheels are attached to the front hub and rotor assemblies. The assembly is supported by roller bearings mounted in the steering knuckle. The outer races are pressed into the steering knuckle. The hub and rotor assemblies are pressed into the inner wheel bearing races during assembly. Inner and outer grease seals retain grease in the bearings and steering knuckle. Pressure from the torqued halfshaft nut and the halfshaft holds the bearings and hub in place.

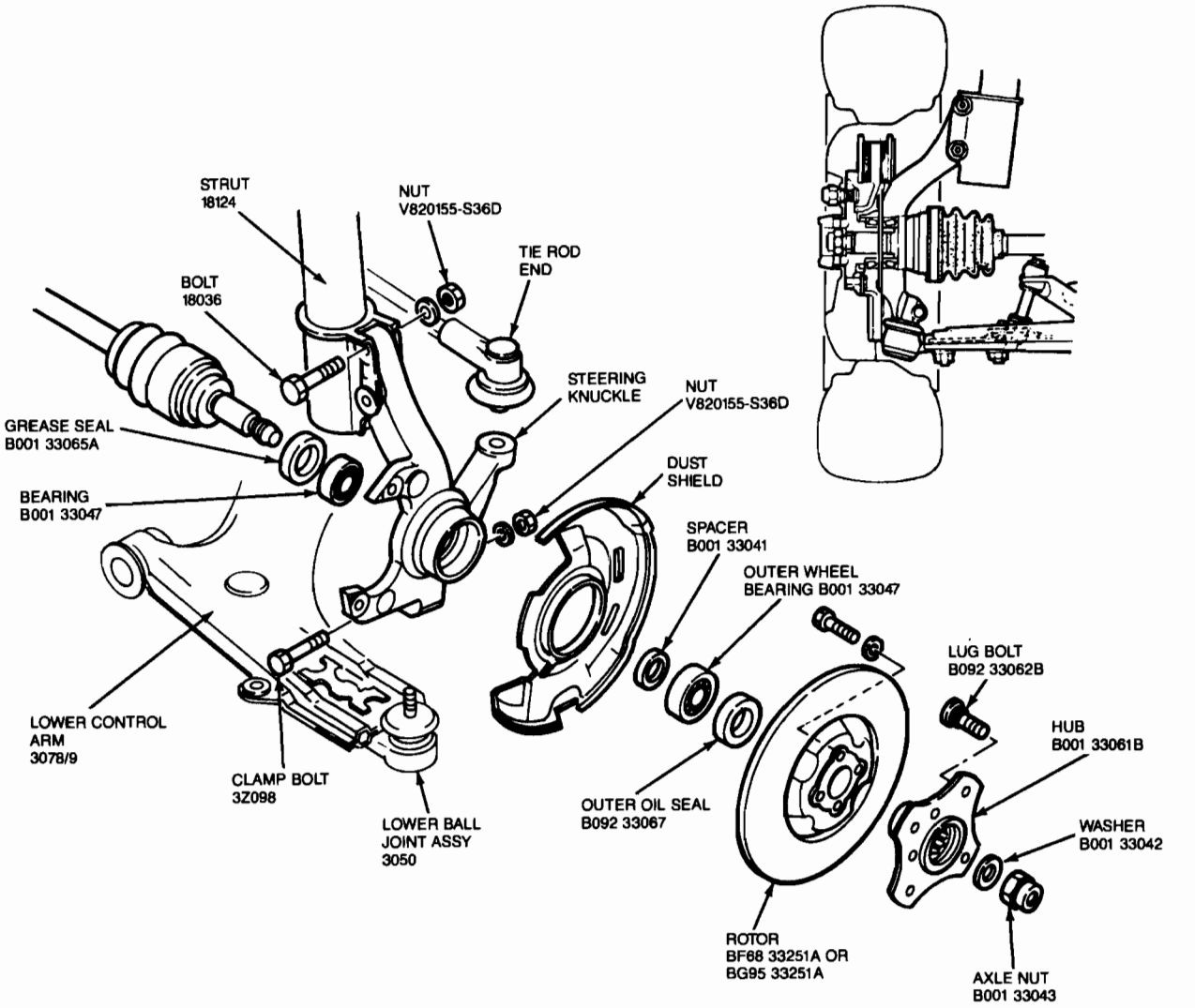
For easier service, the rotor unbolts from the hub, and the steering knuckle can be easily removed from the strut.



DESCRIPTION (Continued)



DESCRIPTION (Continued)



DIAGNOSIS AND TESTING

Refer to Section 04-00.

REMOVAL AND INSTALLATION

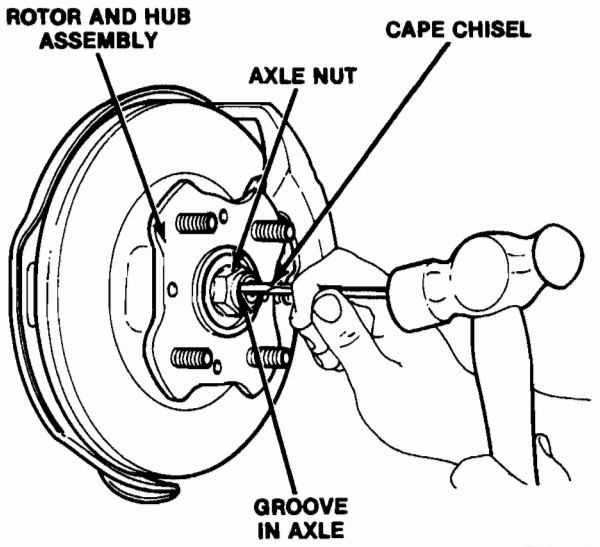
Wheel Hub / Steering Knuckle Assembly

Removal

1. Raise vehicle. Refer to Section 00-02.
2. Remove the tire and wheel assembly.

REMOVAL AND INSTALLATION (Continued)

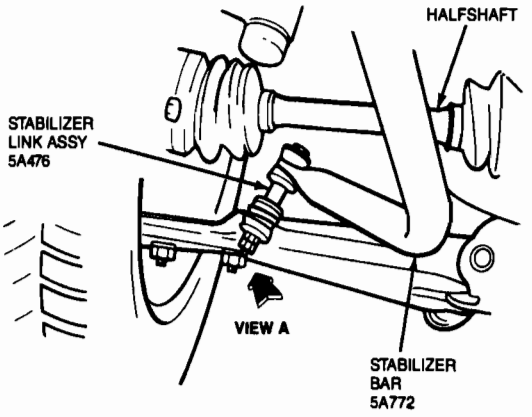
3. Carefully raise the staked portion of the halfshaft attaching nut using a small cape chisel.

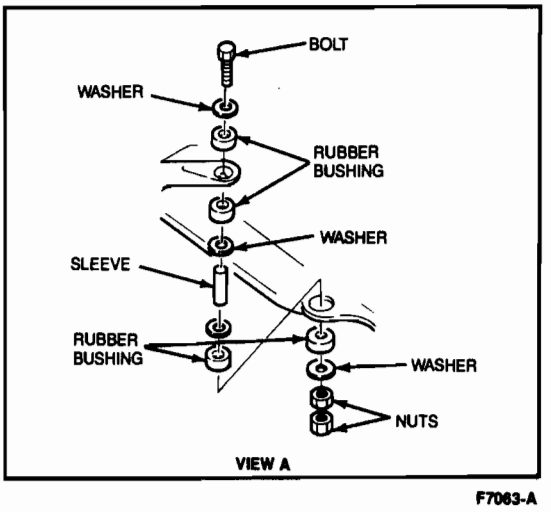


4. Remove halfshaft retaining nut and washer. Discard the nut. Do not reuse.

   NOTE: When loosening the nut, lock the hub by applying the brakes.

5. Remove the stabilizer bar to control arm attaching bolt, nut, washers and bushings.

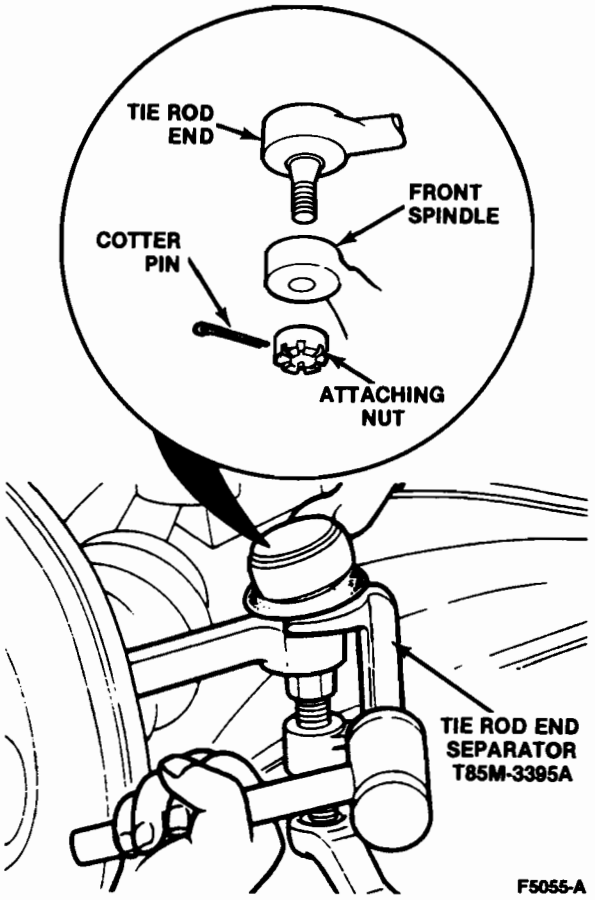




6. Remove cotter pin and tie rod end retaining nut.

REMOVAL AND INSTALLATION (Continued)

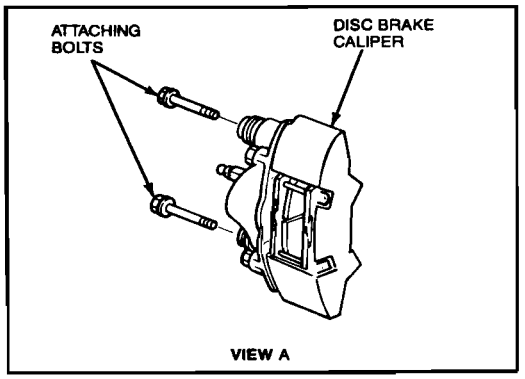
7. Separate the tie rod end from the steering knuckle arm using Tie Rod End Separator T85M-3395-A or equivalent. If tie rod end does not separate easily, give the steering knuckle a sharp blow with a soft faced hammer to shock the taper.

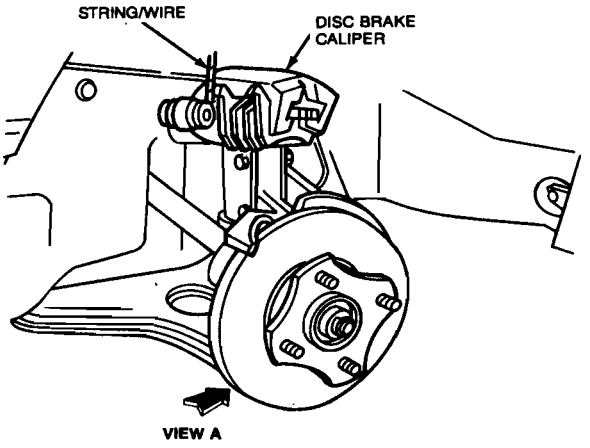


8. Remove U-shaped retaining clip from the center section of the caliper flex hose.
9. Remove the disc brake pads. Refer to Section 06-03.

REMOVAL AND INSTALLATION (Continued)

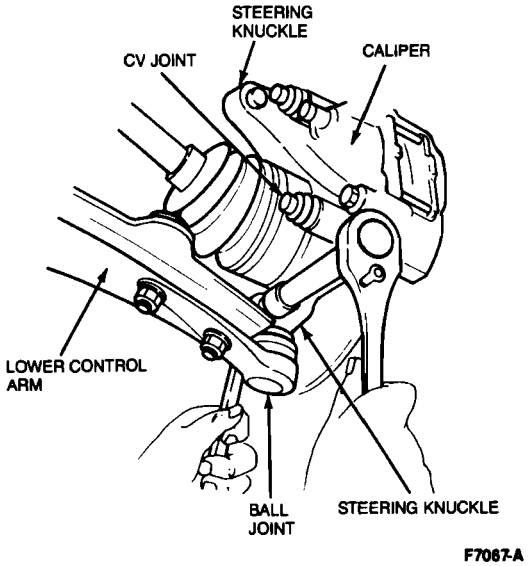
10. Remove the brake caliper retaining bolts. Lift caliper off the rotor and suspend it from the suspension coil spring.





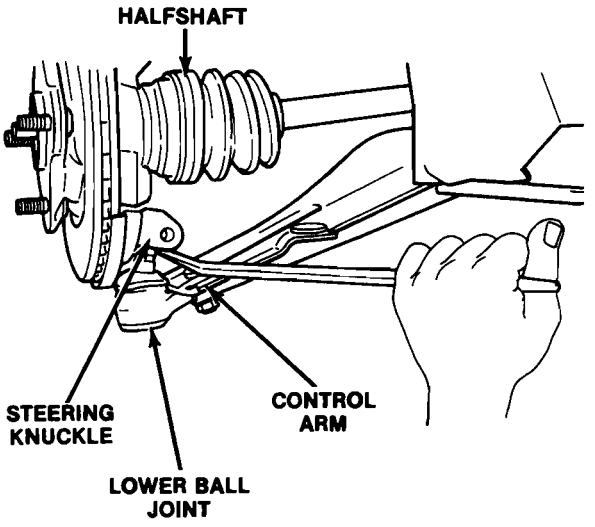
F7068-A

11. Remove the lower control arm ball joint clamp bolt and nut.



F7067-A

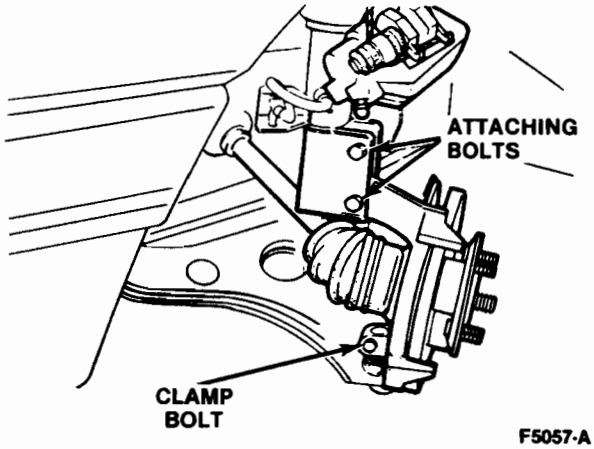
12. Pry downward on the lower control arm to separate the ball joint from the steering knuckle.



F5086-A

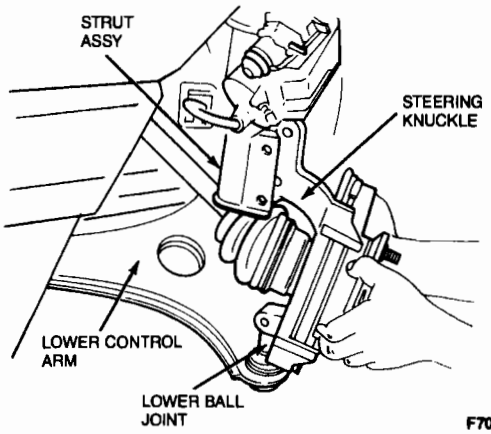
REMOVAL AND INSTALLATION (Continued)

13. Remove the steering knuckle to strut retaining bolts.



F5057-A

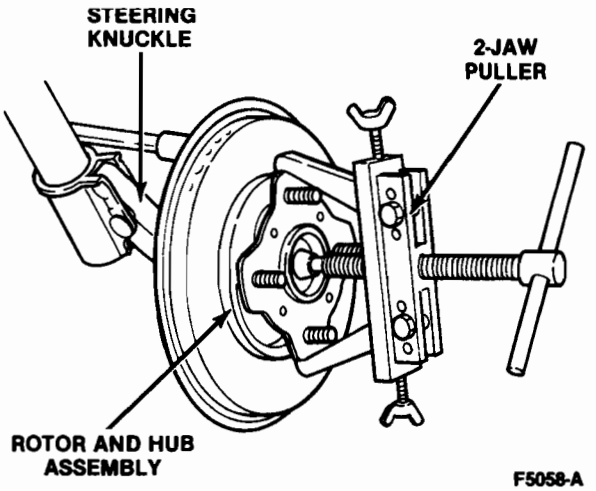
14. Slide the front hub / steering knuckle assembly out of its bracket in the strut and off the end of the halfshaft. Use care to prevent damage to the grease seals.



F7066-A

NOTE: If the hub binds on the halfshaft splines, it can be loosened by lightly tapping with a plastic faced hammer on the end of the halfshaft.

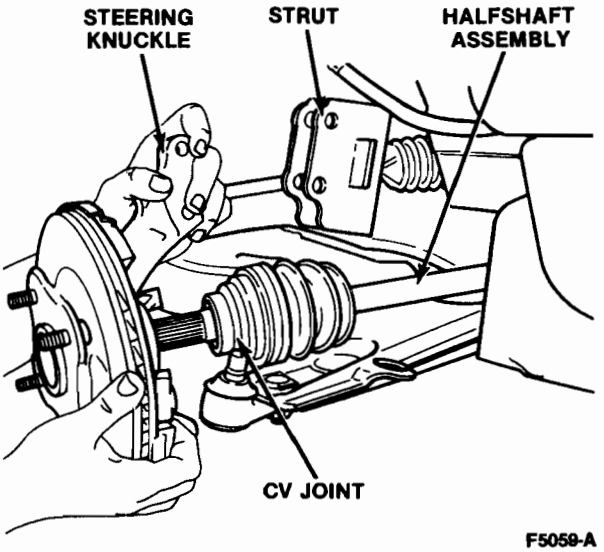
CAUTION: Never use any type of metal faced hammer to separate the halfshaft from the hub. Damage to the CV joint internal components will result. If the halfshaft splines become rusted to the hub, a two jaw puller or hub puller must be used to separate them.



F5058-A

Installation

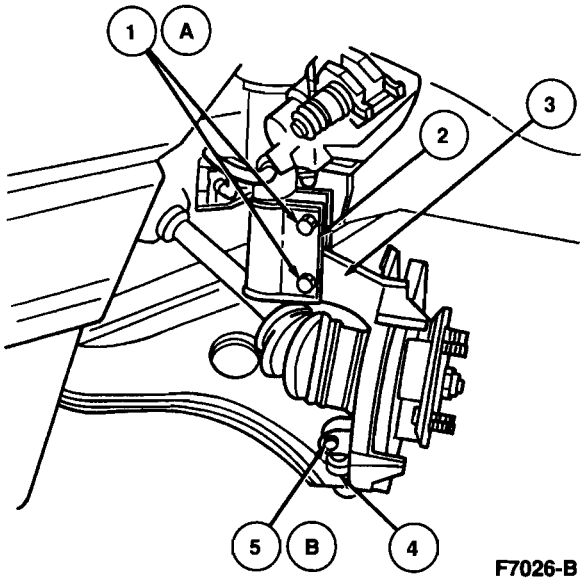
1. Position the front hub / steering knuckle assembly over the halfshaft and into the strut.



F5059-A

2. Install the steering knuckle to strut retaining bolts and nuts. Tighten the retaining nuts to 93-117 N·m (69-86 lb-ft).
3. Position the lower control arm ball joint through the steering knuckle and install the clamp bolt and nut. Tighten the clamp bolt to 43-54 N·m (32-40 lb-ft).

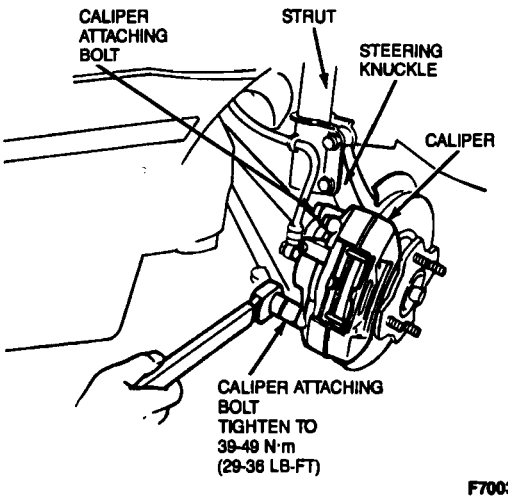
REMOVAL AND INSTALLATION (Continued)



F7026-B

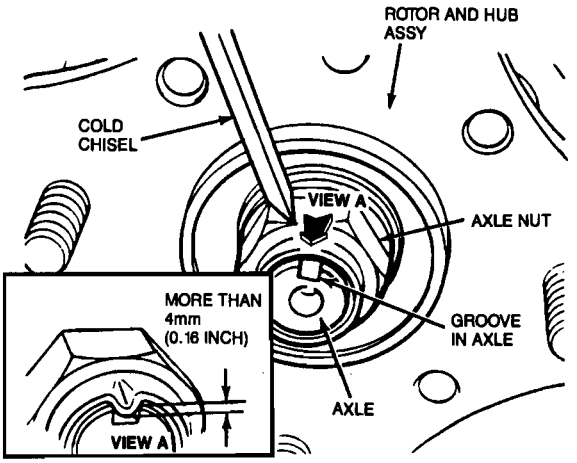
Item	Part Number	Description
1A	—	Bolts
2	—	Strut
3	—	Steering Knuckle
4	—	Lower Ball Joint
5B	—	Clamp Bolt
A		Tighten to 93-97 N·m (69-72 lb-ft)
B		Tighten to 43-54 N·m (32-40 lb-ft)

4. Position the brake caliper over the rotor and install the retaining bolts. Tighten to 39-49 N·m (29-36 lb-ft).



F7003-A

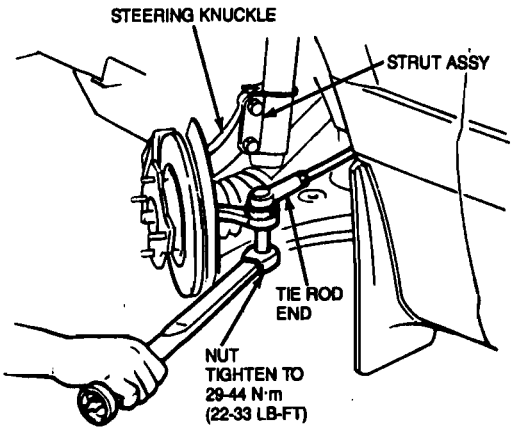
5. Install the U-clip on the caliper flex line.
6. Install a new halfshaft retaining nut. Tighten to 157-235 N·m (116-174 lb-ft).
7. Stake the halfshaft attaching nut using a cold chisel with the cutting edge rounded.



F7023-A

CAUTION: If the nut splits or cracks after staking, it must be replaced with a new nut.

8. Connect the tie rod to the steering knuckle arm and install the retaining nut. Tighten to 29-44 N·m (22-33 lb-ft) and install a new cotter pin.

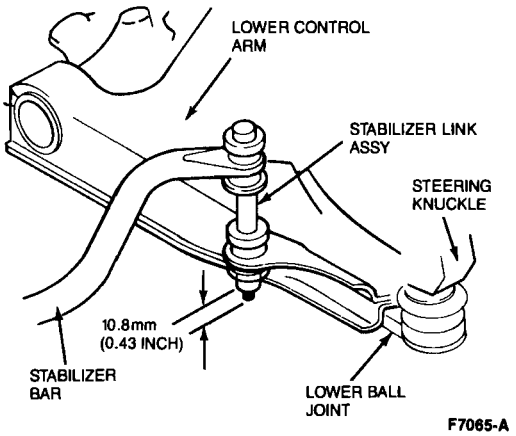


F7004-A

NOTE: If the slots in the nut do not align with the cotter pin hole in the ball joint stud, tighten the nut for proper alignment. Never loosen the nut.

REMOVAL AND INSTALLATION (Continued)

9. Position the stabilizer bar and install the stabilizer link assembly including the retaining bolt, nut, washers, sleeve and rubber bushings. Tighten the attaching nut until 10.8mm (0.43 inch) of the bolt threads extend beyond the nut.

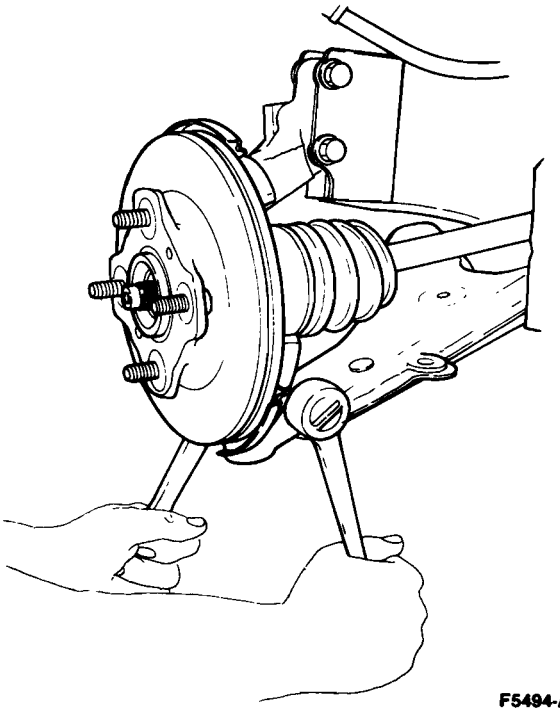


10. Install the wheel and the tire assembly.
11. Tighten wheel lug nuts to 90-120 N·m (65-88 lb-ft).
12. Lower vehicle.

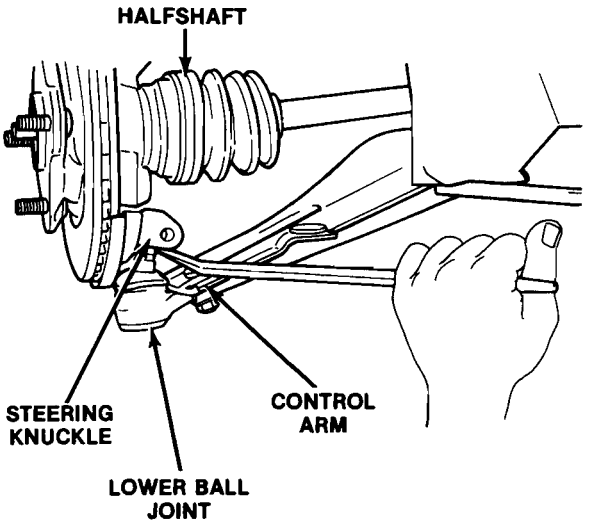
Ball Joint

Removal

1. Raise vehicle on a hoist. Refer to Section 00-02.
2. Remove the tire and wheel assembly.
3. Remove ball joint clamp bolt from steering knuckle.

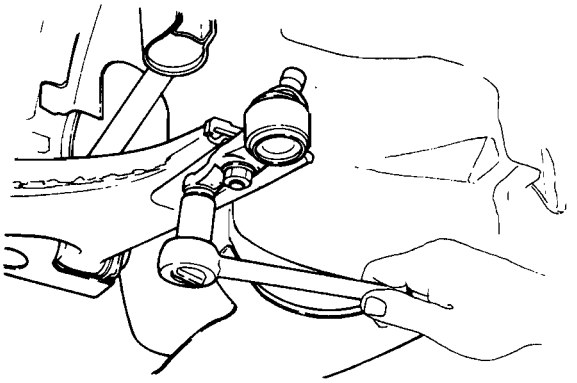


4. Using a small pry bar, pull down on lower control arm to separate it from steering knuckle.



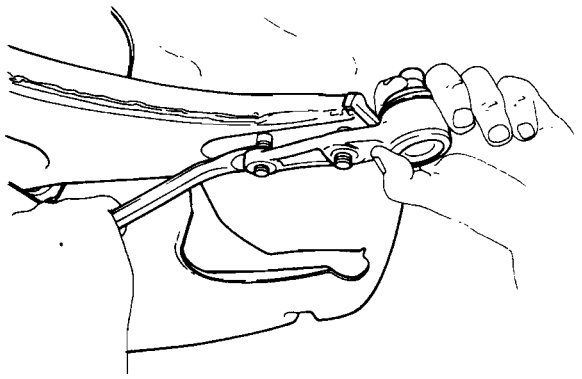
REMOVAL AND INSTALLATION (Continued)

5. Remove two ball joint retaining bolts from control arm.



F5495-A

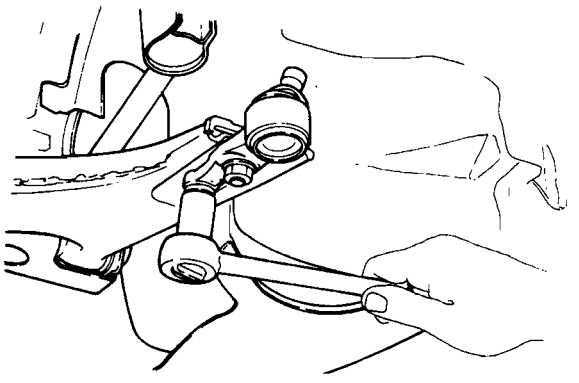
6. Using a small pry bar, pry ball joint off control arm.



F5496-A

Installation

1. Install ball joint to control arm. Tighten bolts to 93-117 N·m (69-86 lb-ft).



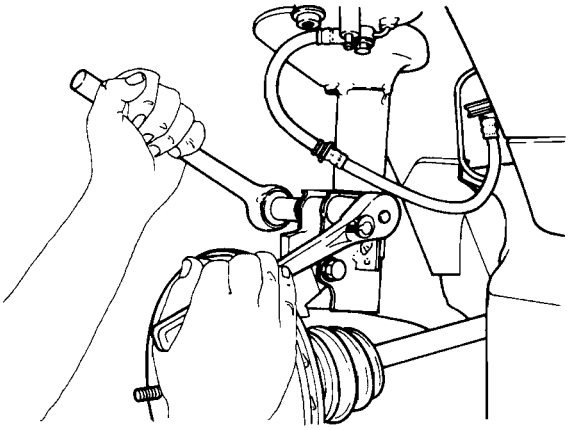
F5495-A

2. Raise lower control arm and install ball joint stud in spindle.
3. Install ball joint clamp bolt in spindle. Tighten the ball joint clamp bolt to 43-54 N·m (32-40 lb-ft).
4. Install the tire and wheel assembly. Tighten wheel lug nuts to 90-120 N·m (65-88 lb-ft).
5. Lower vehicle.

Strut and Spring

Removal

1. Raise vehicle on a hoist. Refer to Section 00-02.
2. Remove the tire and wheel assembly.
3. Remove the brake caliper and support it from the coil spring. Refer to Section 06-03.
4. Paint a white aligning mark on the inside of the strut mounting block.
5. Loosen and remove the steering knuckle to strut retaining bolts and nuts.



F5497-A

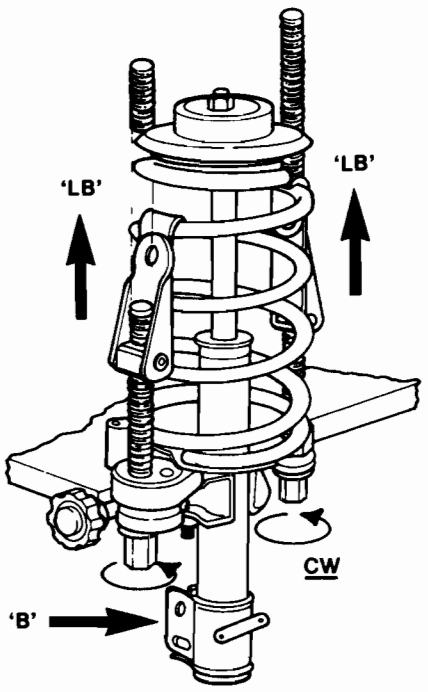
6. Remove the U-clip from the brake line hose and slide it out of its bracket on the strut.
7. Remove the strut mount nuts from the strut tower.
8. Remove the spring and shock absorber assembly from the vehicle.
9. Compress the spring with Rotunda Spring Compressor 086-00029 or equivalent.
10. Remove the strut rod nut.
11. Gradually release the spring compressor.
12. Remove the mounting block, upper spring seat, bump stopper, coil spring and lower spring seat from strut.

Installation

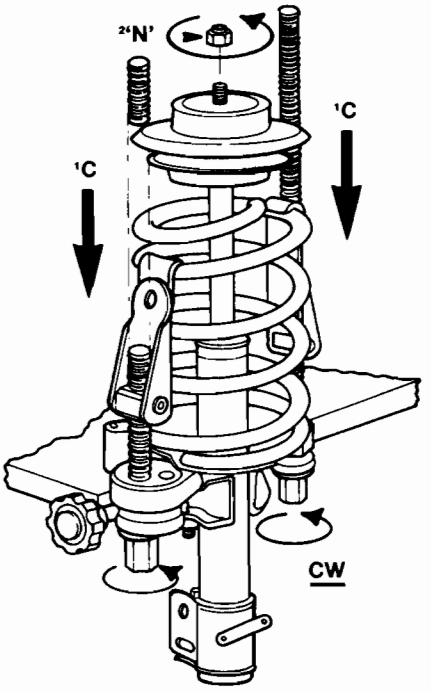
1. Install the lower spring seat, coil spring, bump stopper, upper spring seat and mounting block on the strut.

REMOVAL AND INSTALLATION (Continued)

2. Compress the spring with Rotunda Spring Compressor 086-00029 or equivalent.



1. REMOVE STRUT FROM CAR
2. CLAMP STRUT IN VISE WITH LOWER BRACKET (B) FACING THE BENCH
3. SET CAMS
4. USE 4° HOLE AND INSTALL LONG BOLTS (LB) AND HOOKS

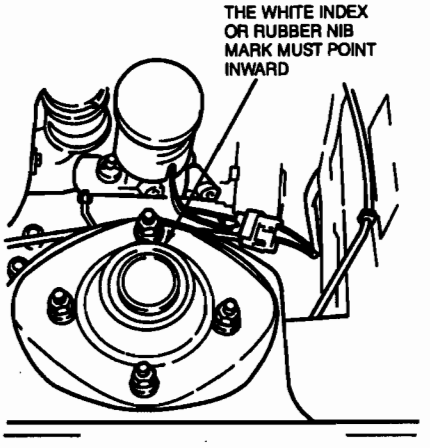


1. FIND CENTER OF FREEPLAY AND LOCK CAMS
2. COMPRESS SPRING (¹C) MOVING SIDE TO SIDE
3. WHEN TOP MOUNT IS UNLOADED, REMOVE ROD NUT (²N)
4. SET MOUNT ON BENCH

F5855-A

3. Install the strut rod nut. Tighten to 29-36 N·m (22-27 lb-ft).
4. Gradually release the spring compressor.
5. Install the strut and spring assembly in strut tower.
6. Install the four strut retaining nuts. Tighten to 23-29 N·m (17-22 lb-ft).

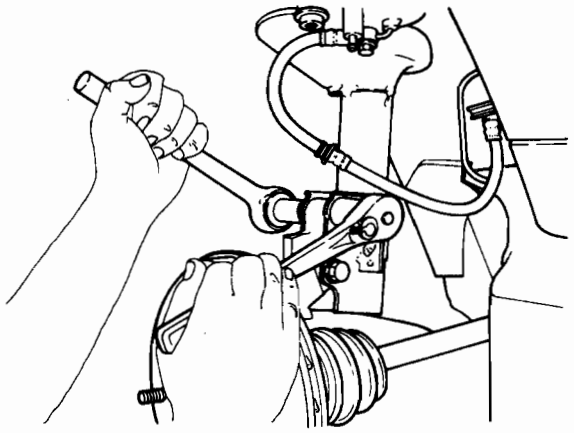
   NOTE: Be sure that the white aligning mark faces the center of the vehicle.



F5891-A

REMOVAL AND INSTALLATION (Continued)

7. Install the steering knuckle to strut, install retaining bolts and nuts. Tighten the steering knuckle to strut retaining bolt to 93-117 N·m (69-86 lb-ft).



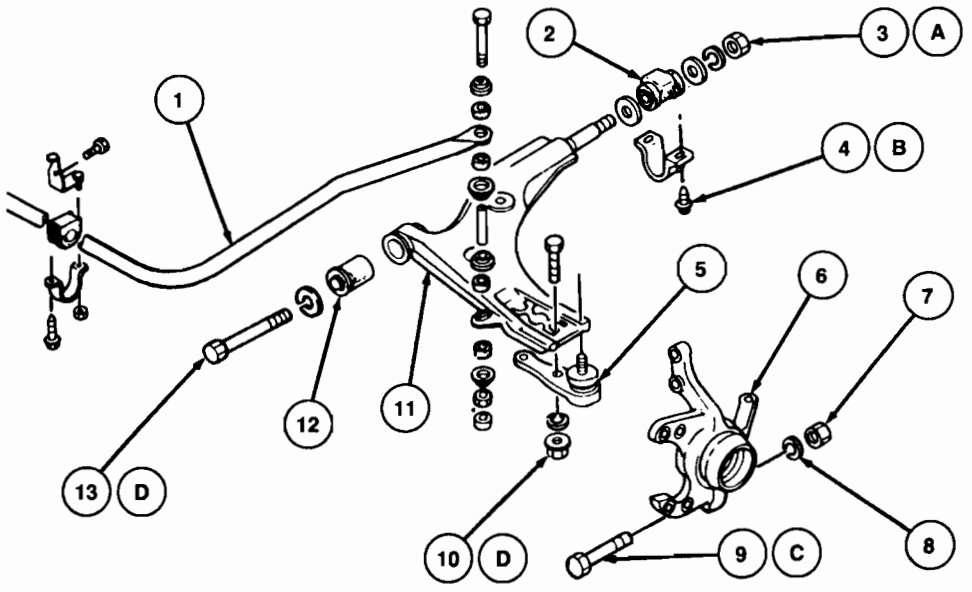
F5497-A

8. Install the brake caliper and brake hose in bracket. Refer to Section 06-03.
9. Install the tire and wheel assembly. Tighten wheel lug nuts to 90-120 N·m (65-88 lb-ft).
10. Lower vehicle. Refer to Section 00-02.

Control Arm

Removal

1. Raise vehicle on a hoist. Refer to Section 00-02.
2. Remove tire and wheel assembly.
3. Disconnect stabilizer bar from control arm, if equipped.
4. Remove ball joint clamp bolt.
5. Remove control arm front retaining bolt.
6. Remove control arm rear bracket and retaining bolts.
7. Remove control arm.



F7006-B

Item	Part Number	Description	Item	Part Number	Description
1	5482	Stabilizer Bar	10D	—	Nut (2 Req'd)
2	3069	Bushing	11	—	Control Arm

(Continued)

REMOVAL AND INSTALLATION (Continued)

Item	Part Number	Description	Item	Part Number	Description
3A	9992 11400	Nut	12	3069	Bushing
4B	18036	Bolt	13D	6047	Bolt
5	3050	Ball Joint Assy	A		Tighten to 75-93 N·m (55-69 lb-ft)
6	—	Steering Knuckle	B		Tighten to 59-74 N·m (44-54 lb-ft)
7	9992 11000	Nut	C		Tighten to 43-54 N·m (32-40 lb-ft)
8	9997 11000	Washer	D		Tighten to 93-117 N·m (69-86 lb-ft)
9C	32098	Clamp Boot			

Installation

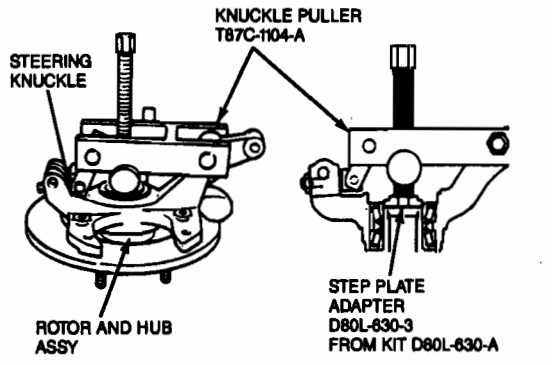
1. Position control arm. Loosely install front retaining bolt.
2. Install control arm rear retaining bracket and bolts. Tighten retaining bolts to 59-74 N·m (44-54 lb-ft).
3. Tighten front retaining bolt to 93-117 N·m (69-86 lb-ft).
4. Install ball joint to steering knuckle. Tighten clamp bolt to 43-54 N·m (32-40 lb-ft).
5. Install tire and wheel assembly. Tighten wheel lug nuts to 90-120 N·m (65-88 lb-ft).
6. Lower vehicle.

DISASSEMBLY AND ASSEMBLY

Brake Rotor/Wheel Hub

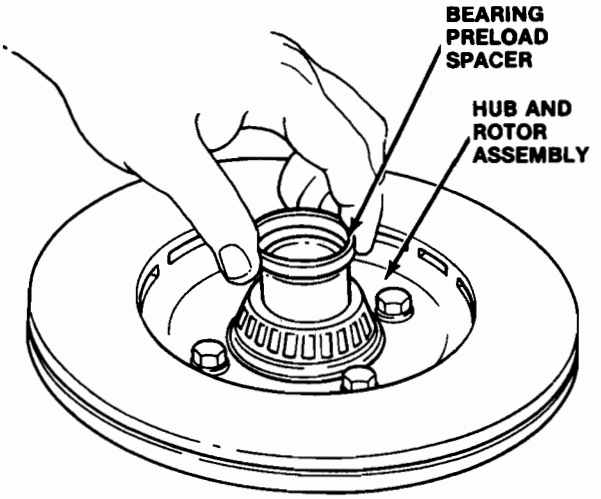
Disassembly

1. Remove the hub and rotor assembly from the steering knuckle using Knuckle Puller T87C-1104-A or equivalent.



F6990-A

2. Remove the bearing preload spacer from the hub and rotor assembly.

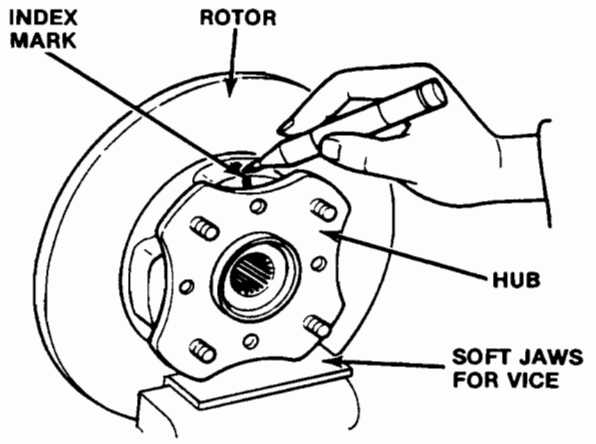


F5067-A

NOTE: The spacer located between the bearings determines bearing preload. It must not be discarded.

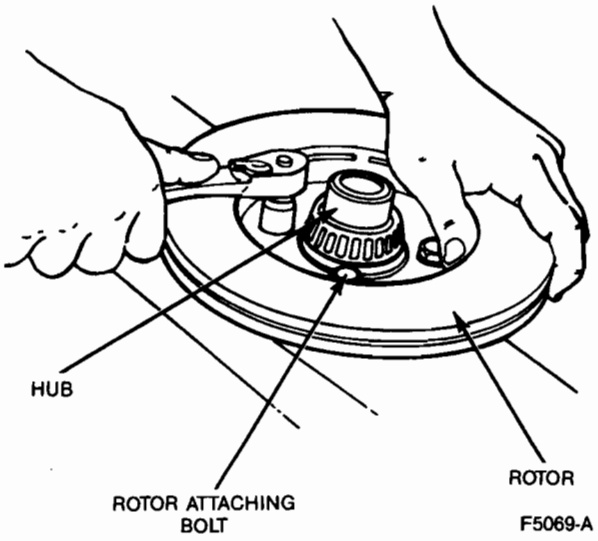
DISASSEMBLY AND ASSEMBLY (Continued)

3. Mark or paint aligning marks on the hub and rotor assembly so they can be assembled in the same position.



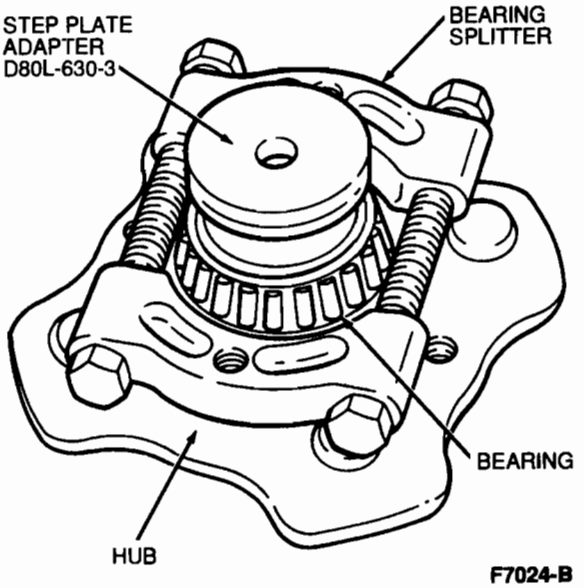
F5068-A

4. Remove the attaching bolts and separate the rotor from the hub. It may be helpful to mount the rotor in a soft-jawed vise.



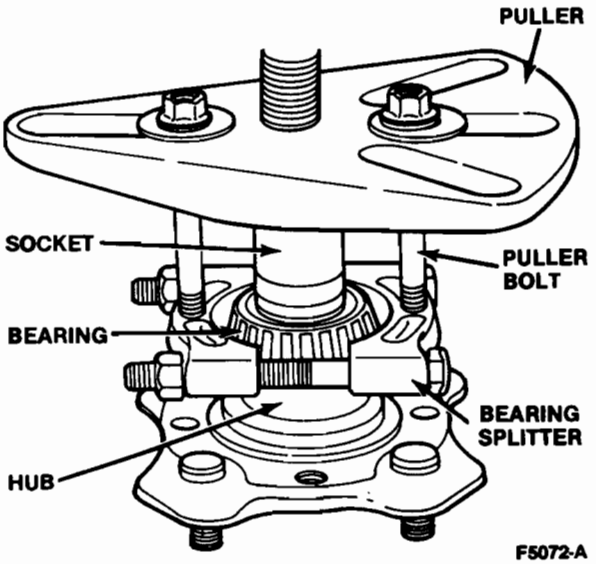
F5069-A

5. Remove the bearing from the wheel hub using Bearing Puller Attachment D84L-1123-A and Puller D80L-927-A or equivalent.
6. A bearing splitter and a large vibration damper puller can also be used. A spacer block will have to be used over the hub.



F7024-B

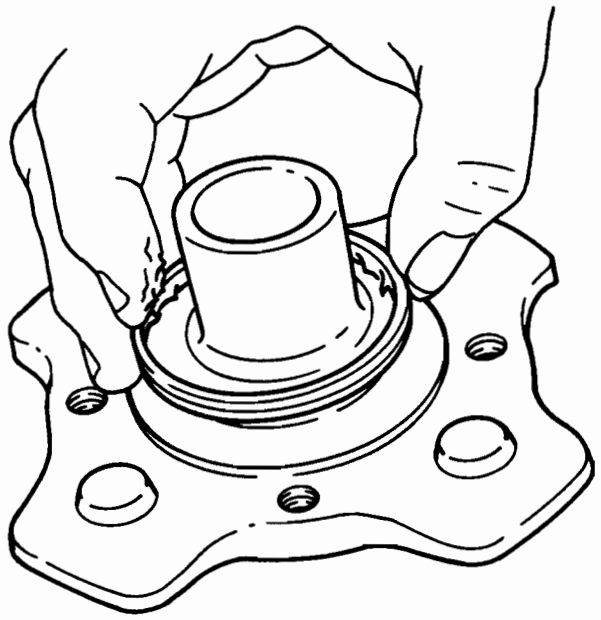
7. A socket may also have to be used to finish pulling the bearing off the hub.



F5072-A

DISASSEMBLY AND ASSEMBLY (Continued)

8. Remove the outer grease seal from the hub.



F5075-A

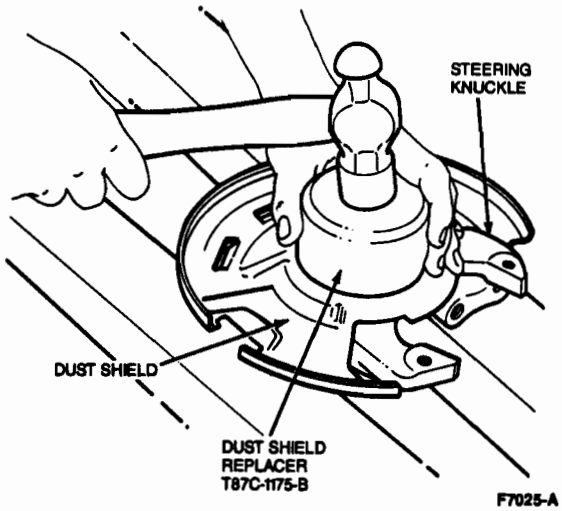
9. Remove the inner grease seal from the steering knuckle using a large screwdriver.

   NOTE: The seal should be discarded.

10. Remove the bearing from the steering knuckle.
11. Unless it has been damaged, the disc brake dust shield should be left on the steering knuckle.

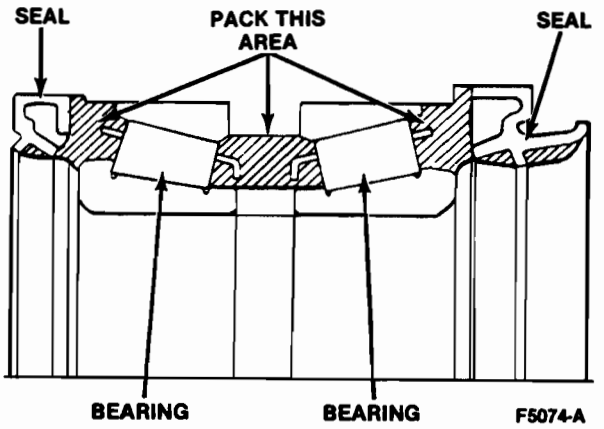
Assembly

1. Inspect the hub and steering knuckle for cracks, wear, and scoring.
2. If removed, install the dust shield on the steering knuckle using Dust Shield Replacer T87C-1175-B or equivalent.



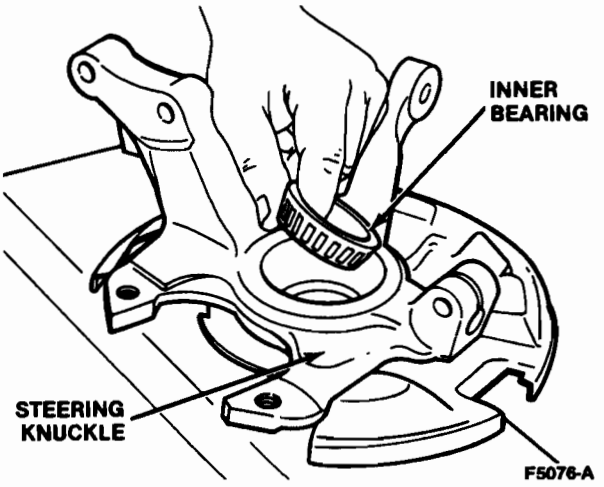
F7025-A

3. Pack the bearings and the hub area shown with Premium Long-Life Grease C1AZ-19590-E (ESA-M1C75-B) or equivalent.



F5074-A

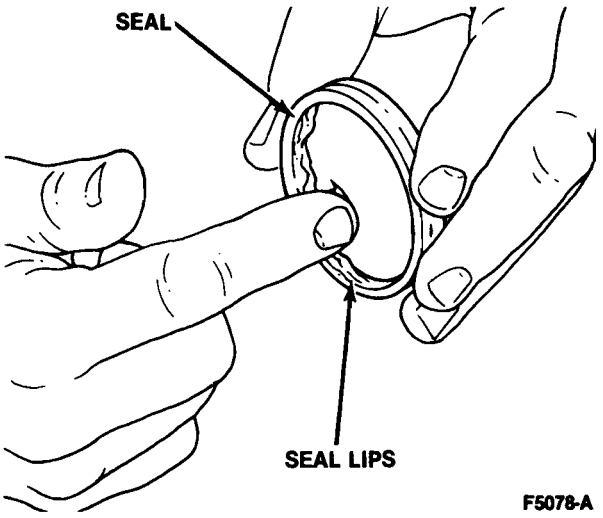
4. Position the inner bearing in the steering knuckle.



F5076-A

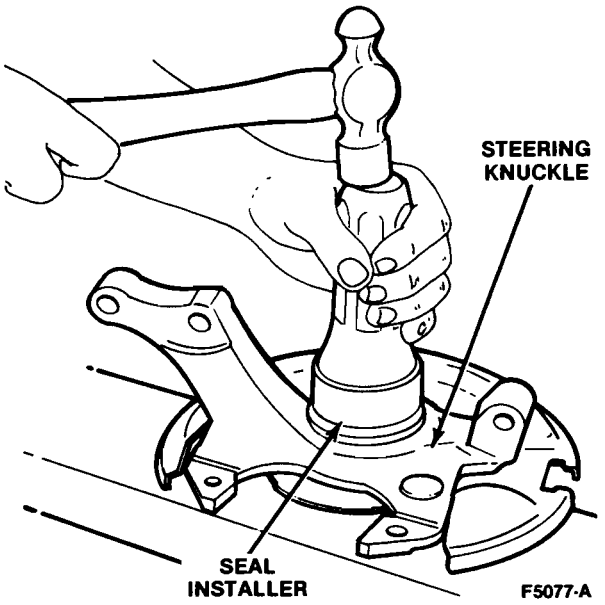
DISASSEMBLY AND ASSEMBLY (Continued)

5. Lubricate the grease seal lip with Premium Long-Life Grease C1AZ-19590-E (ESA-M1C75-B) or equivalent before installing the seal. Form the lubricant into a fillet along the seal lip edges.



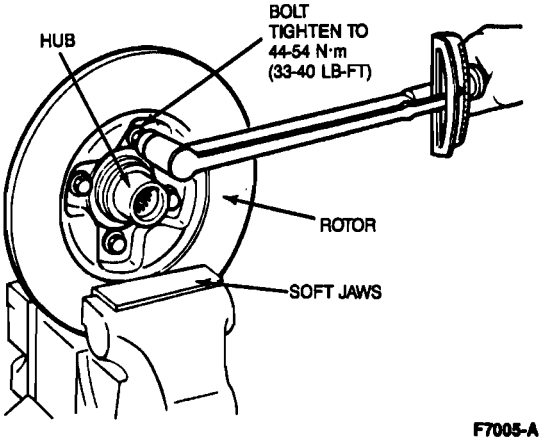
F5078-A

Be sure the bearing is in position and install a new inner grease seal using Seal Installer T87C-1175-A or equivalent.



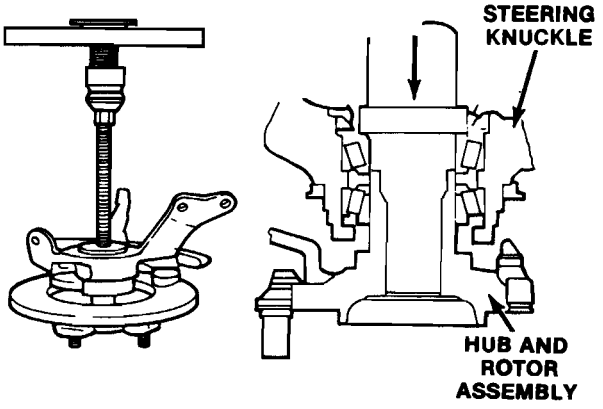
F5077-A

6. Install the bearing preload spacer in the steering knuckle.
7. Position the bearing in the steering knuckle.
8. Lubricate the grease seal lip with Premium Long-Life Grease C1AZ-19590-E (ESA-M1C75-B) or equivalent before installing the seal. Form the lubricant into a fillet along the seal lip edges.
9. Install a new outer grease seal in the steering knuckle using Seal Installer T87C-1175-A or equivalent.
10. Position the hub on the rotor and install the attaching bolts. Be sure the index marks on the hub and rotor align with each other. Tighten the attaching bolts to 44-54 N·m (33-40 lb-ft).



F7005-A

11. Install the hub and rotor assembly in the steering knuckle using a hydraulic press and suitable fixtures.



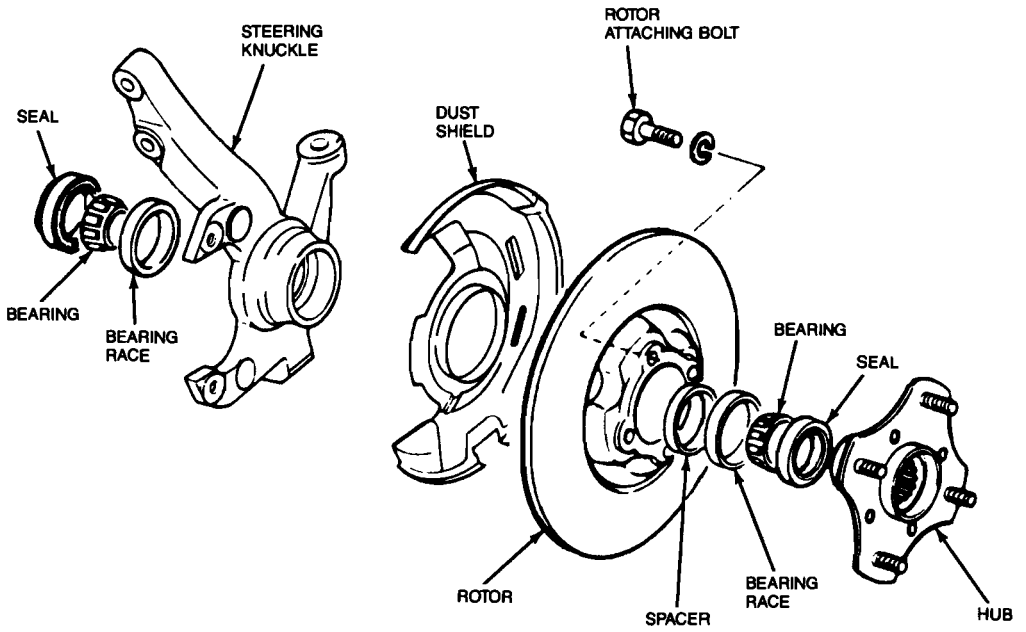
F5080A

DISASSEMBLY AND ASSEMBLY (Continued)

Steering Knuckle/Bearings

Disassembly

Steering Knuckle — Disassembled View

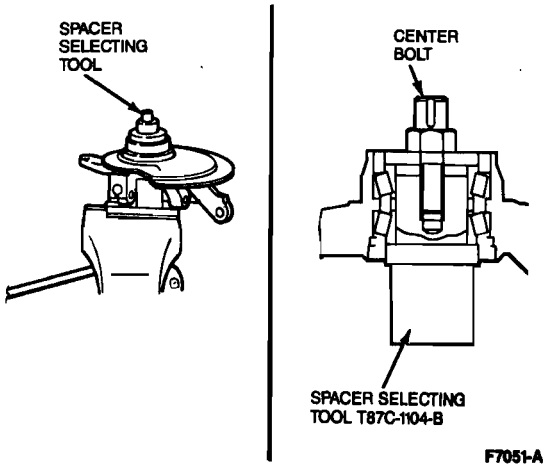


NOTE: If the bearings and races are to be reused they must be identified so that they can be installed in their original positions.

1. Remove the wheel hub/brake rotor assembly as outlined.
2. Remove the inner bearing from the steering knuckle.
3. Remove the bearing races from the steering knuckle using a brass drift.

Assembly

1. Install the bearing races in the steering knuckle using Bearing Cup Replacer D79P-1202-A or equivalent.
2. Install the bearing and preload spacer in the steering knuckle.
3. Install Spacer Selection Tool T87C-1104-B or equivalent in the steering knuckle and clamp the tool in a vise.



4. Tighten the center bolt in increments to 49, 98, 147 and 196 N·m (36, 72, 108 and 145 lb-ft). After tightening seat the bearings by rotating the steering knuckle. Verify torque of center bolt is 196 N·m (145 lb-ft).
5. Remove the tool/steering knuckle from the vise.

DISASSEMBLY AND ASSEMBLY (Continued)

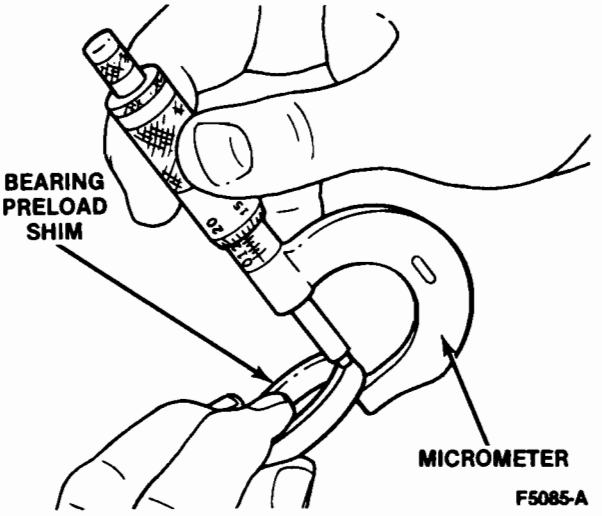
6. Mount the steering knuckle in a vise, clamping it where the shock absorber mounts.
7. Install a socket and N·m (lb-in) torque wrench on the space selector tool.
8. Measure the amount of torque required to rotate the Spacer Selection Tool T87C-1104-B or equivalent using a torque wrench. The torque wrench reading must be taken just as the tool starts to rotate.
   - If reading indicates 0.25-1.8 N·m (2.21-10.44 lb-in) the spacer is the correct thickness.
   - If reading indicates less than 0.25 N·m (2.21 lb-in) a thinner spacer must be installed.
   - If the torque wrench indicates more than 1.8 N·m (10.44 lb-in) a thicker spacer must be installed.

   Each bearing spacer has been assigned a numerical code that identifies its thickness. The code is stamped into the outer diameter of the spacer. The numbers range from 1 to 21 with 1 being the thinnest spacer.

Stamped mark	Thickness
1	6.285 mm (0.2474 in)
2	6.325 mm (0.2490 in)
3	6.365 mm (0.2506 in)
4	6.405 mm (0.2522 in)
5	6.445 mm (0.2538 in)
6	6.485 mm (0.2554 in)
7	6.525 mm (0.2570 in)
8	6.565 mm (0.2586 in)
9	6.605 mm (0.2602 in)
10	6.645 mm (0.2618 in)
11	6.685 mm (0.2634 in)
12	6.725 mm (0.2650 in)
13	6.765 mm (0.2666 in)
14	6.805 mm (0.2682 in)
15	6.845 mm (0.2698 in)
16	6.885 mm (0.2714 in)
17	6.925 mm (0.2730 in)
18	6.965 mm (0.2746 in)
19	7.005 mm (0.2762 in)
20	7.045 mm (0.2778 in)
21	7.085 mm (0.2794 in)

F5084-A

If the number is not legible, measure the spacer with a micrometer and compare it to the chart to determine which number it is.



F5085-A

Changing the spacer thickness by one number, either higher or lower, will change bearing preload by 0.2-0.4 N·m (1.7-3.5 lb-in).

EXAMPLE: Bearing preload too low—thinner spacer required.

- Measured Preload: 0.15 N·m (1.32 lb-in)
- Spacer Thickness: 11
- Required Spacer: 9

A change of two will change bearing preload by 0.4-0.8 N·m (3.4-7.0 lb-in).

2 x 0.2 to 0.4 = 0.4 to 0.8

(2 x 1.7 to 3.5 = 3.4 to 7.0)

When added to the existing preload, the measured preload will now be 0.55 to 0.95 N·m (4.72 to 8.32 lb-in).

N·m	Lb-in
0.40 0.80 +0.15 +0.15	3.40 7.00 +1.32 +1.32
=0.55 to 0.95 N·m	=4.72 to 8.32 Lb-in

CF7027-A

- EXAMPLE: Bearing preload too high—thicker spacer required.
- Measured Preload: 1.9 — (16.82 lb-in)
- Spacer Thickness: 7
- Required Spacer: 11

A change of four will change bearing preload by 0.8-1.6 N·m (6.8-14.0 lb-in).

4 x 0.2 to 0.4 = 0.8 to 1.6

(4 x 1.7 to 3.5 = 6.8 to 14.0 lb-in)

DISASSEMBLY AND ASSEMBLY (Continued)

When subtracted from the existing preload, the measured preload will now be 0.30-1.10 N·m (2.82-10.02 lb-in).

N·m	Lb-In
1.90 1.90 -1.60 -0.80	16.82 16.82 -14.00 -6.80
= 0.30 to 1.10 N·m	= 2.82 to 10.02 Lb-In

CF7028-A

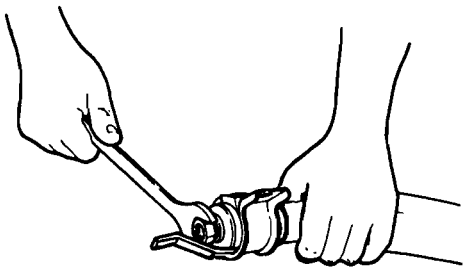
After selecting a spacer, verify the bearing preload using Spacer Selection Tool T87C-1104-B or equivalent.

9. Install the brake rotor / wheel hub assembly as outlined.

Control Arm

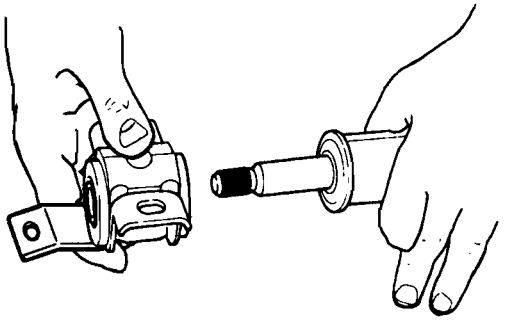
Disassembly

1. Remove bolt retaining ball joint to control arm.
2. Remove the rear bushing retaining nut and washer.



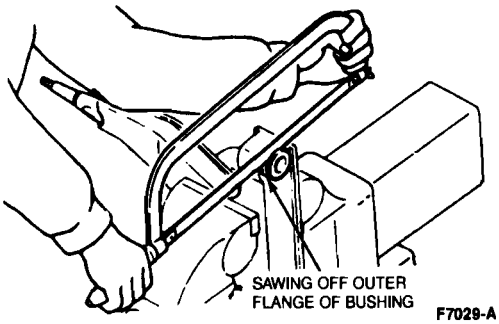
F6305-A

3. Remove the rear bushing.



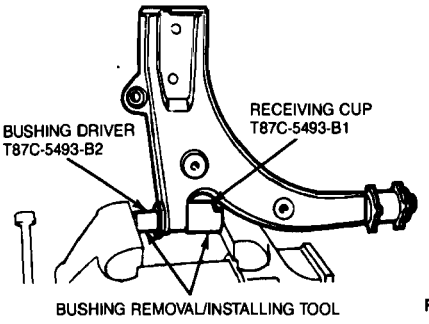
F6306-A

4. Using a hacksaw, saw off the rear flange of the front control arm bushing.



F7029-A

5. Use a vise and Bushing Driver T87C-5493-B2 and Receiving Cup T87C-5493-B1 or equivalent to press out the front control arm bushing.



F7030-A

Assembly

1. Use a vise and Bushing Driver T87C-5493-B2 and Receiving Cup T87C-5493-B1 or equivalent to press the front bushing into the control arm.
2. Install rear bushing to control arm.
3. Install washer and retaining nut. Tighten nut to 75-93 N·m (55-69 lb-ft).
4. Install ball joint to control arm. Tighten retaining bolt to 93-117 N·m (69-86 lb-ft).

ADJUSTMENTS

Refer to Section 04-00.

SPECIFICATIONS

TORQUE SPECIFICATIONS

Description	N·m	Lb-Ft
Control Arm Front Bolt	93-117	69-86
Control Arm Rear Nut	75-93	55-69
Control Arm Bracket Bolt	59-74	44-54
Shock Absorber Bolt	93-97	69-72

(Continued)

SPECIFICATIONS (Continued)

TORQUE SPECIFICATIONS (Cont'd)

Description	N·m	Lb-Ft
Control Arm Bracket Bolt	39-74	44-54
Ball Joint to Control Arm Bolt	93-117	69-86
Ball Joint Clamp Bolt	43-54	32-40
Steering Knuckle to Strut Bolt	93-117	69-86
Strut Rod Nut	29-36	22-27
Strut Assembly to Body Nut	23-29	17-22
Wheel Lug Nut	90-120	65-88
Brake Caliper Retaining Bolts	39-49	29-36
Halfshaft Retaining Nuts	157-235	116-174
Tie Rod to Steering Knuckle Retaining Nuts [1]	29-44	22-33
Stabilizer Link Retaining Bolts[2]	—	—
Hub to Rotor Retaining Bolts	44-54	33-40

SPECIAL SERVICE TOOLS

Tool Number	Description
T85M-3395-A	Tie Rod End Separator
T87C-5493-B1	Receiving Cup
T87C-5493-B2	Bushing Driver
TOOL-4201-C	Dial Indicator
T87C-1104-B	Spacer Selection Tool
D80L-927-A	Puller
D84L-1123-A	Bearing Puller Attachment
D80L-630-3	Step Plate Adapter
T87C-1175-B	Seal Replacer
T87C-1175-B	Dust Shield Replacer
D79P-1202-A	Bearing Cup Replacer
T87C-1104-A	Knuckle Puller

(Continued)

ROTUNDA EQUIPMENT

Model	Description
086-00029	Spring Compressor

1 Tighten to Torque Specification, then continue to tighten to nearest cotter pin slot.
2 Tighten nut until 10.8 mm (0.43 inch) for the bolt threads extend beyond the nut.

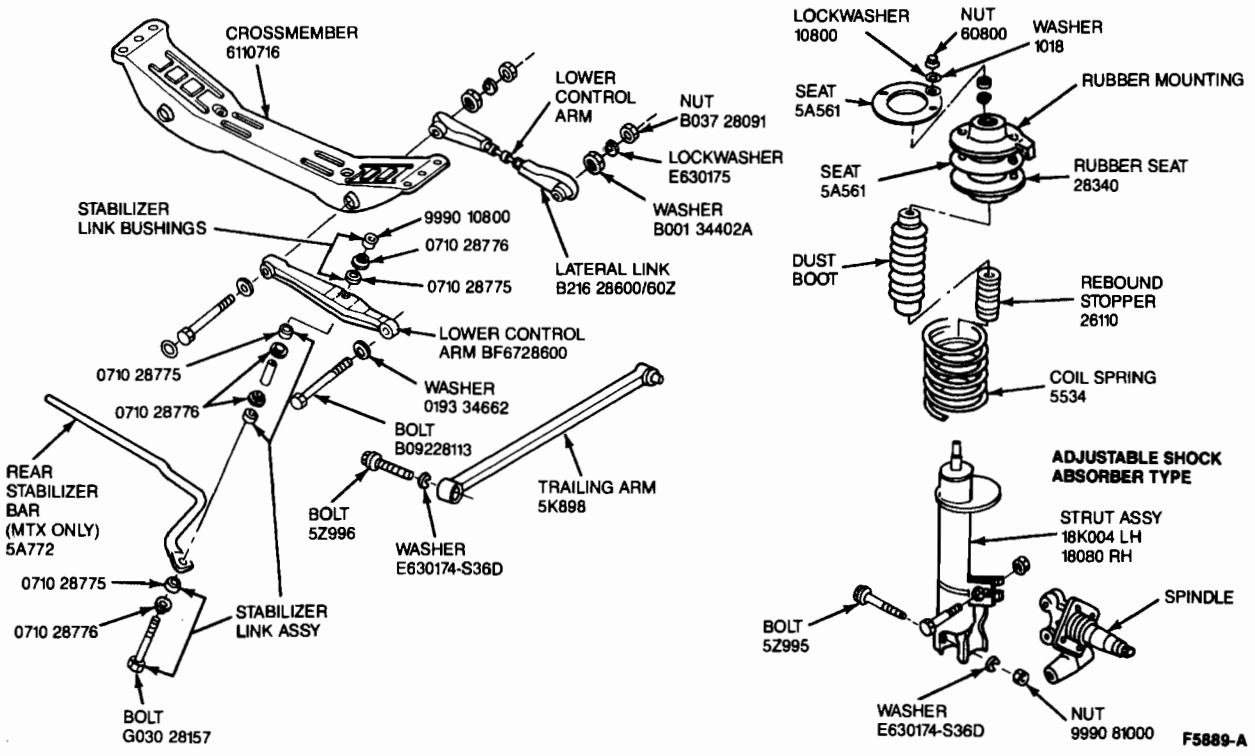
SECTION 04-02 Suspension and Wheel Ends—Rear

VEHICLE APPLICATION

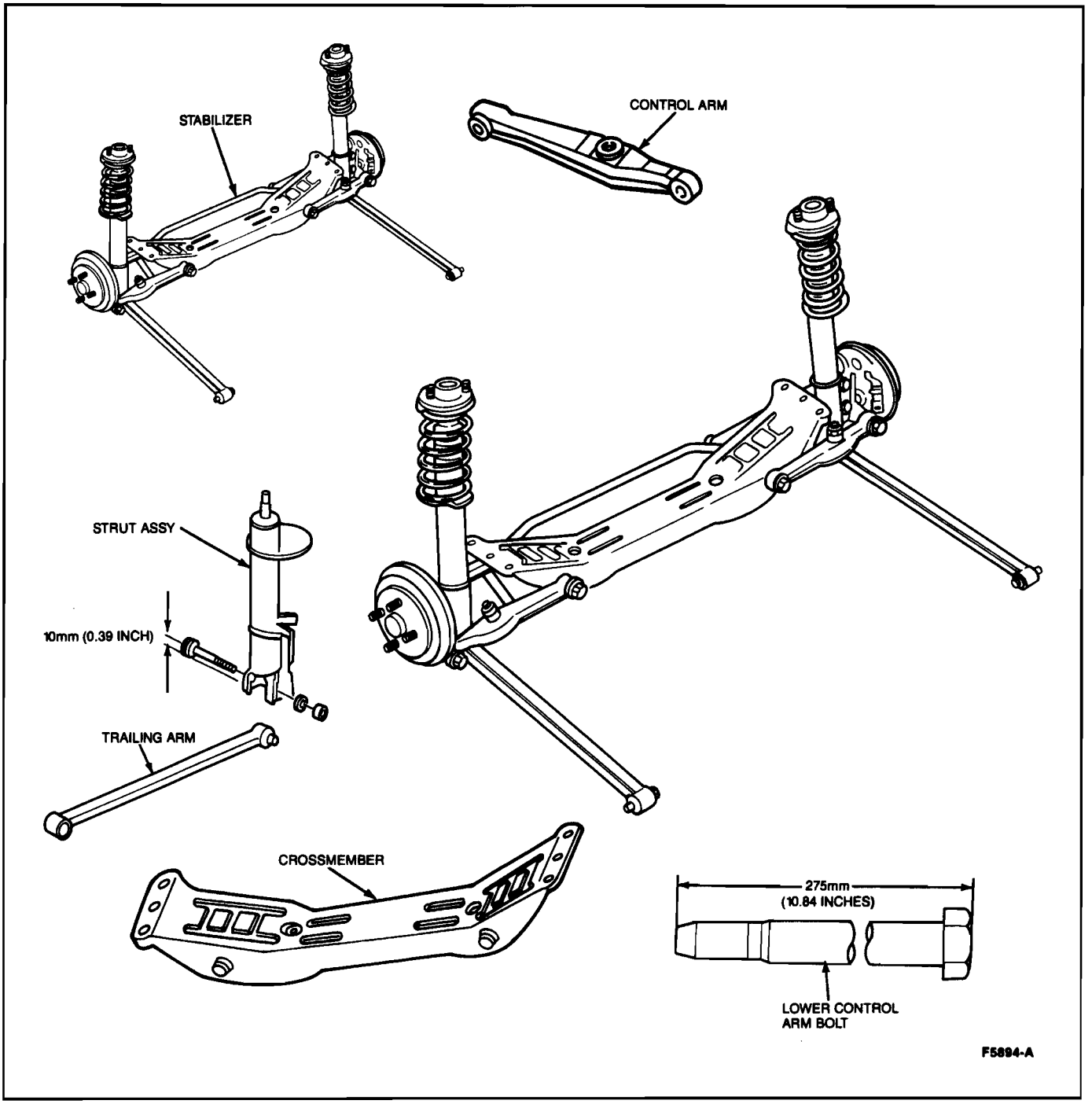
Capri.

DESCRIPTION

The rear suspension is fully independent utilizing rear MacPherson struts at each wheel. Rear strut towers locate the springs and strut. A forged rear spindle bolts to the strut double lower control arms and a single trailing arm locate the rear suspension.



DESCRIPTION (Continued)



Both the control arm and the trailing arm have rubber bushings at each end. The control arms are attached to the rear crossmember and also to the spindle with a common bolt at each end. The trailing arm bolts to the strut and a bracket on the floorpan.

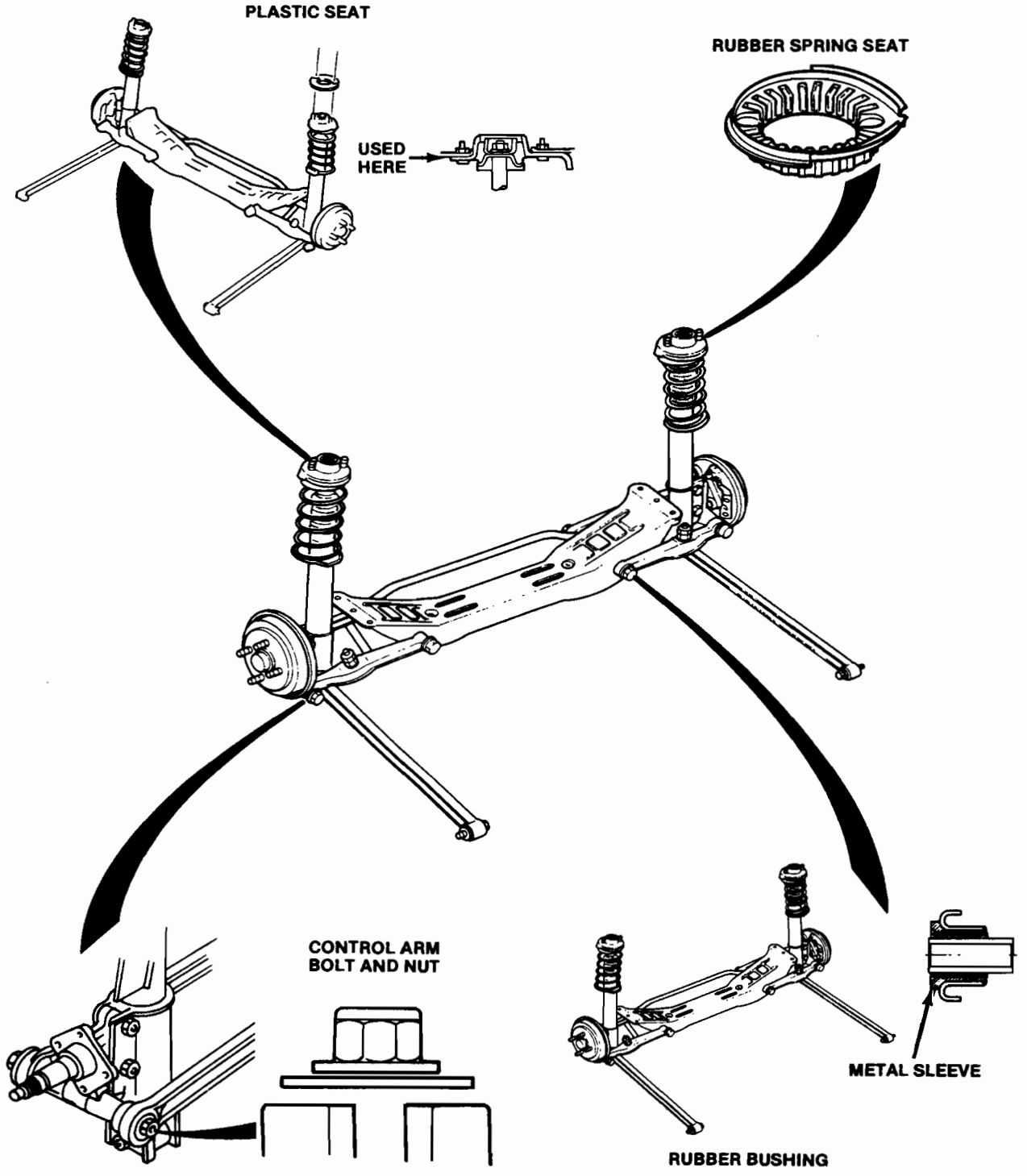
NOTE: Never attempt to heat, quench, or straighten any rear suspension part. Replace with a new part.

The rear wheels and brake rotors are supported on opposed tapered roller bearings. The bearing inner race rides on a spindle bolted to the rear strut and suspension control arms. The outer bearing races are press-fit into the hub. A staked nut and washer are installed to hold the bearings and hub in position on the spindle.

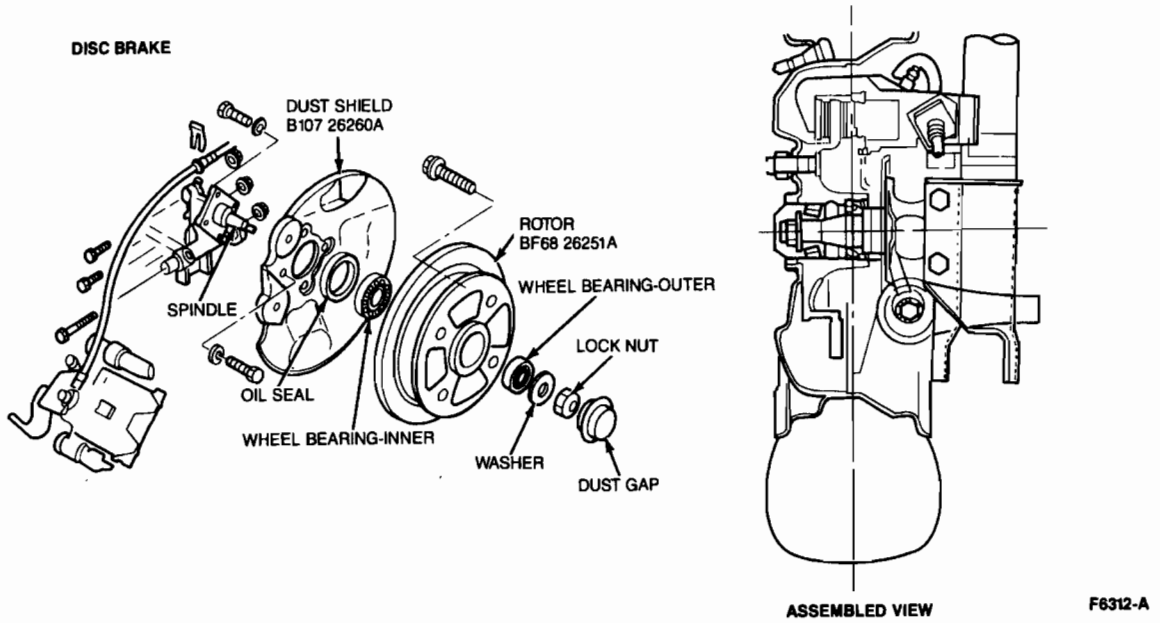
The attaching nut is also used to set bearing preload. If the nut is loosened to adjust preload or to remove the brake rotor it must be replaced with a new nut.

DESCRIPTION (Continued)

The bearings and bearing races are serviceable separate from the rotor / hub assembly. The bearing hub is available only as part of the brake rotor.



DESCRIPTION (Continued)



DIAGNOSIS AND TESTING

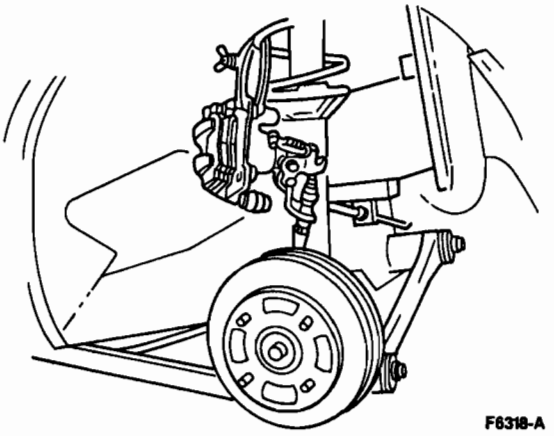
Refer to Section 04-00.

REMOVAL AND INSTALLATION

Brake Rotor/Bearing Hub Assembly

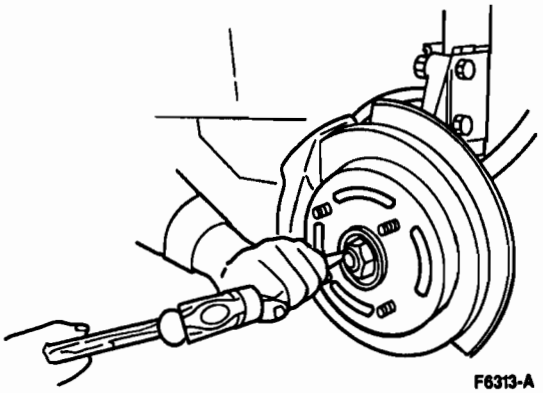
Removal

1. Make sure parking brake is fully released.
2. Raise vehicle and install safety stands. Refer to Section 00-02.
3. Remove the wheel and tire assembly.
4. Remove two guide pin bolts from caliper and lift caliper clear of disc with inner cable and flexible hose attached. Tie caliper to strut spring.
5. Remove the grease cap.



REMOVAL AND INSTALLATION (Continued)

6. Carefully raise the staked portion of the locknut using a small cape chisel.



F6313-A

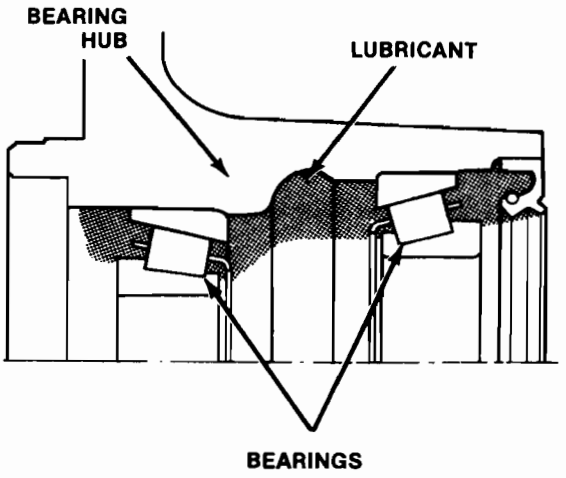
7. Remove and discard the locknut.

   NOTE: The locknuts are threaded left and right. The LH threaded locknut is located on the RH side of the vehicle. Turn this locknut clockwise to loosen. The RH threaded locknut is turned counterclockwise to loosen.

8. Remove washer and outer bearing from the bearing hub.
9. Remove the brake rotor / bearing hub assembly.

Installation

1. Make sure the bearings and hub area contain adequate lubricant. If necessary, add Premium Long Life Grease C1AZ-19590-E (ESA-M1C75-B) or equivalent.



F4813-A

2. Position the brake rotor / bearing hub assembly on the spindle.

   CAUTION: Keep the hub centered on the spindle to prevent damage to the grease seal and spindle threads.

3. Install the outer bearing, washer and a new locknut.
4. Adjust the bearing preload as outlined.
5. Install the grease cap.
6. Install the wheel and tire assembly.
7. Remove safety stands and lower vehicle.
8. Tighten wheel lug nuts to 90-120 N·m (67-88 lb-ft)

Grease Seal / Bearings

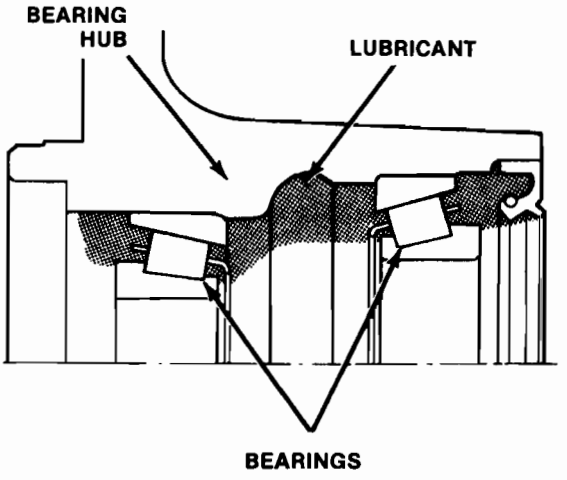
Removal

1. Remove the brake rotor / bearing hub assembly as outlined.
2. Remove the bearing grease seal using a large screwdriver. Discard the seal.
3. Remove the inner bearing from the bearing hub.

   NOTE: If the bearings are to be re-used, they should be tagged so that they can be installed in their original positions.

Installation

1. Pack the bearings and the hub area shown in the illustration with Premium Long Life Grease C1AZ-19590-E (ESA-M1C75-B) or equivalent.

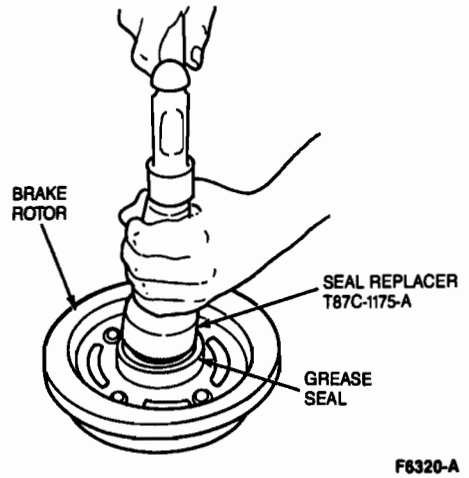


F4813-A

2. Position the inner bearing in the bearing hub.
3. Lubricate the grease seal lip with Premium Long Life Grease C1AZ-19590-E (ESA-M1C75-B) or equivalent. Form the lubricant into a fillet along the seal lip edges.

REMOVAL AND INSTALLATION (Continued)

4. Install a new grease seal using Seal Replacer T87C-1175-A or equivalent.

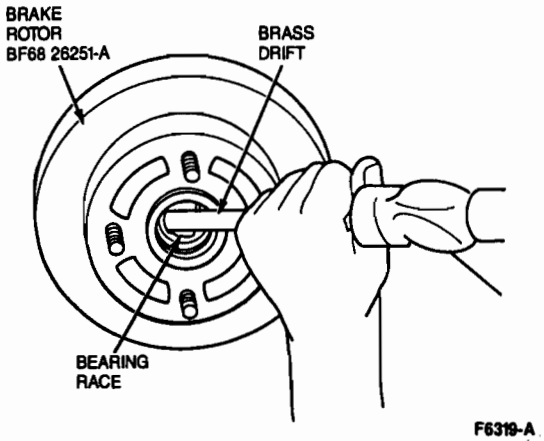


5. Install the rotor / bearing hub assembly as outlined.

Bearing Races

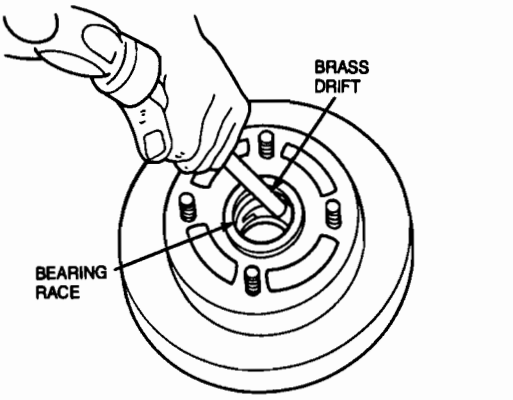
Removal

1. Remove the brake rotor / bearing hub assembly, grease seal and bearings as outlined.
2. Remove the inner and outer bearing races using a brass drift.



Installation

1. Install the inner and outer bearing races using a brass drift.

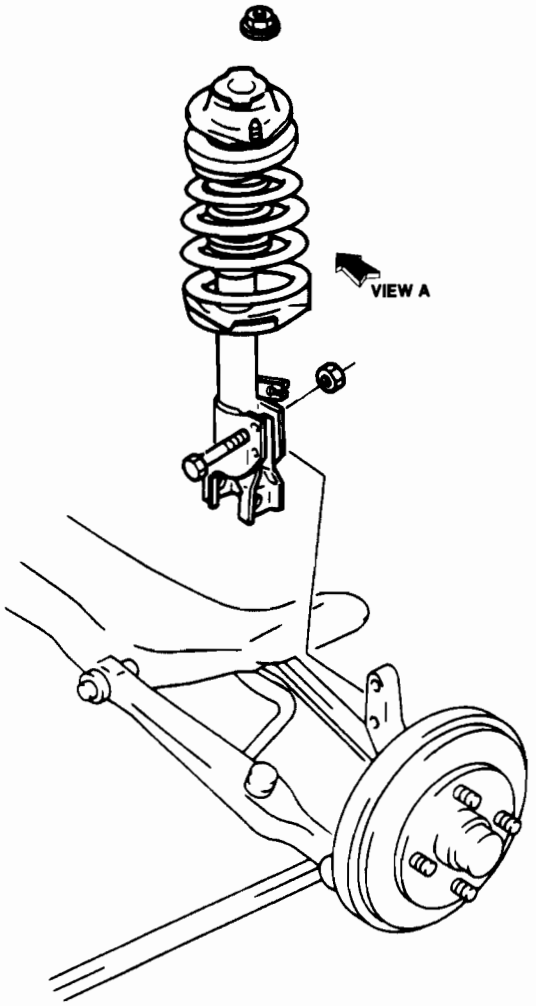


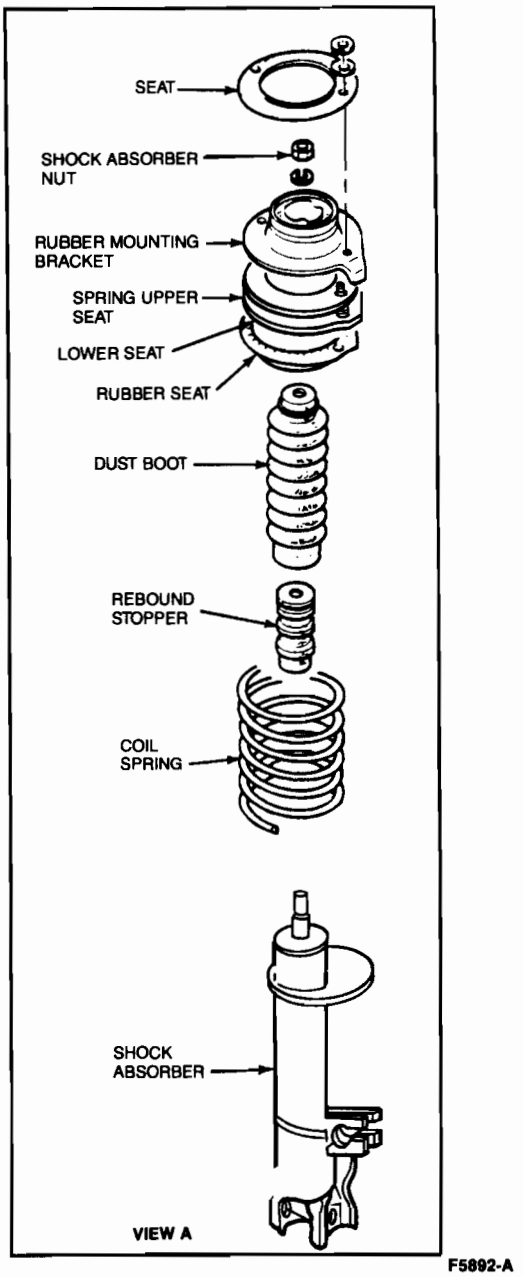
2. Install the inner bearing. Install grease seal using Seal Replacer T87C-1175-A or equivalent.
3. Install brake rotor / bearing hub assembly as outlined.

REMOVAL AND INSTALLATION (Continued)

Strut and Spring, Rear

Rear suspension parts such as control arms, trailing arms and spindles are normally only replaced when the part has been damaged or when the vehicle has been in an accident. If a suspension part has been damaged, be sure to check the underbody dimensions of the vehicle. If the underbody dimensions are not in alignment, the vehicle must be straightened before the suspension components are re-installed.

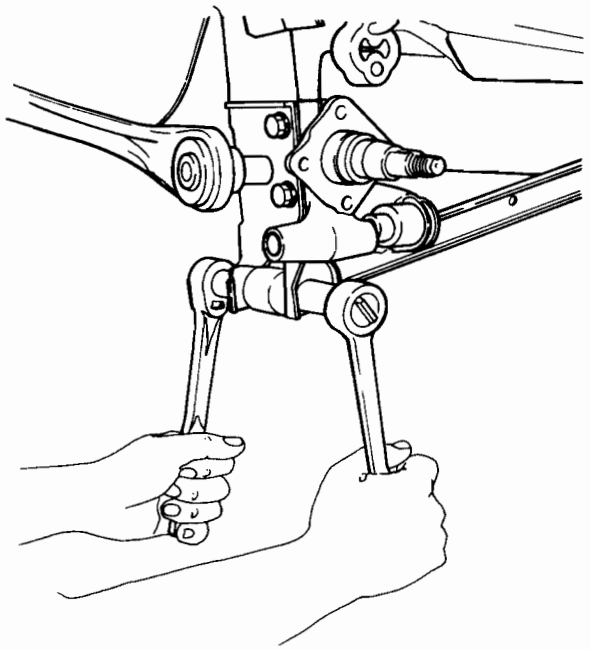




REMOVAL AND INSTALLATION (Continued)

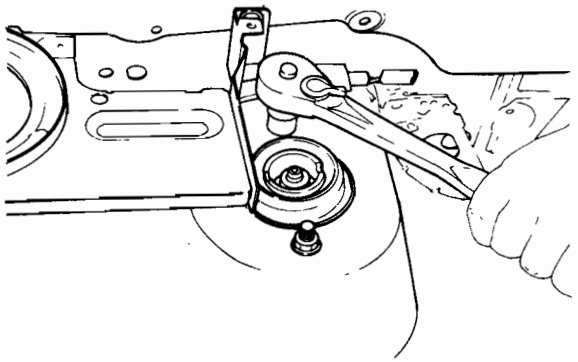
Removal

1. Remove the tire and wheel assembly.
2. Remove the rear disc brake caliper and rotor assembly as outlined.
3. Loosen the trailing arm bolt and the spindle to shock absorber retaining bolts.



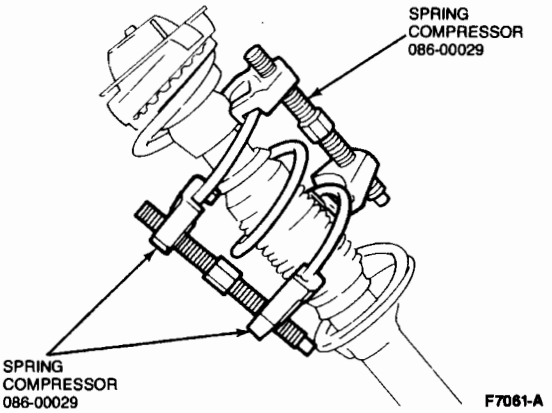
F5490-A

4. Remove the trailing arm retaining bolts and spindle retaining bolts.
5. Paint a white index mark on the strut rubber mounting bracket.
6. Remove the strut retaining nuts from inside the vehicle.



F5472-A

7. Compress the coil spring using Spring Compressor T81P-5310-A, Rotunda Spring Compressor 086-00029 or equivalent.

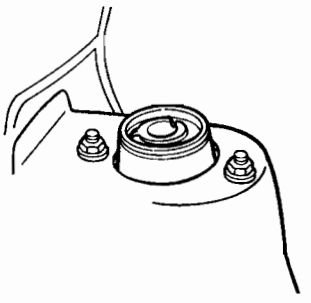


F7061-A

8. Remove the strut rod nut while the spring is compressed and remove the rubber mounting bracket, spring upper seat, lower seat and the rubber spring seat.
9. Slowly release the coil spring and remove the spring compressor.
10. Remove the coil spring, dust boot and rebound bumpers.

Installation

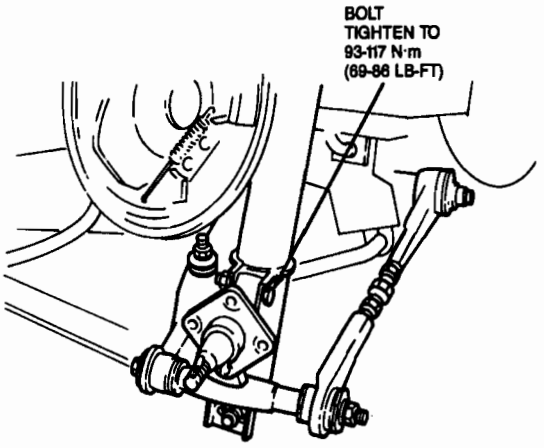
1. Install the rebound bumpers and dust boot on the strut.
2. Compress and install the coil spring on the strut. Lubricate strut rod with Premium Long-Life Grease C1AZ-19590-E (ESA-M1C75-B) or equivalent.
3. Install the rubber seat, spring upper seat with rubber mounting bracket, and strut rod nut on the strut. Tighten to 55-68 N·m (40-50 lb-ft).
4. Release the Spring Compressors, T81P-5310-A, Rotunda 086-00029 or equivalent.
5. Install the strut in the strut tower.



F5893-A

REMOVAL AND INSTALLATION (Continued)

6. Install the spindle to strut mounting bolts. Tighten the bolts to 93-117 N·m (69-86 lb-ft). Final tightening must be done with suspension loaded.



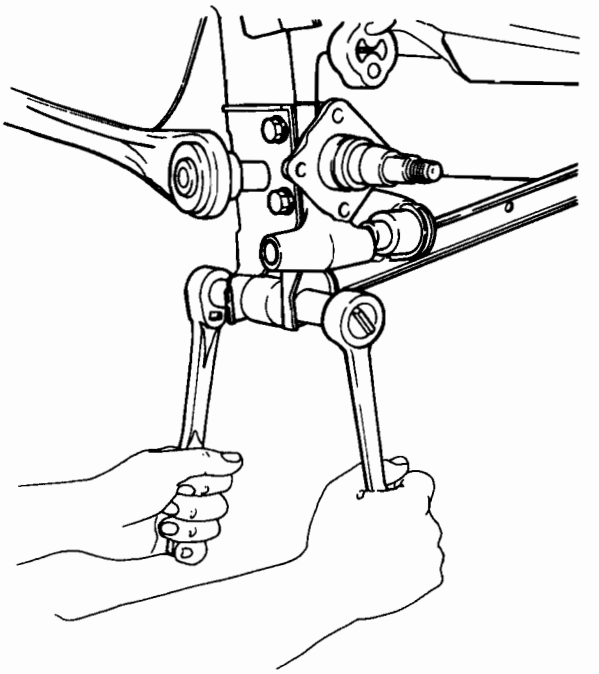
F7009-A

7. Install the rear brake assembly as outlined.
8. Install the tire and wheel assembly.

Spindle

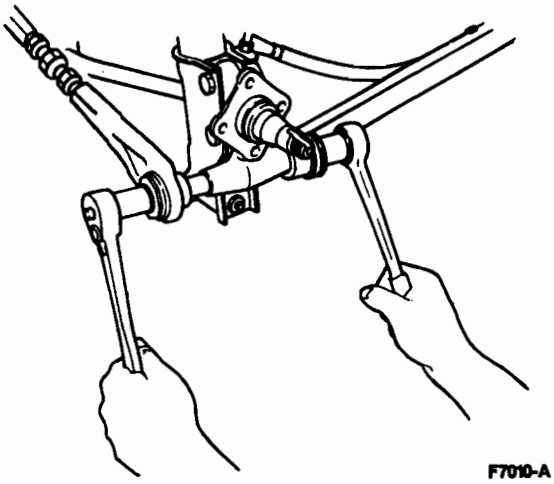
Removal

1. Remove the tire and wheel assembly.
2. Remove the rear disc brake caliper and rotor assembly as outlined.
3. Loosen the spindle to strut retaining bolts.



F5490-A

4. Loosen the outer rear control arm common bolt and nut.

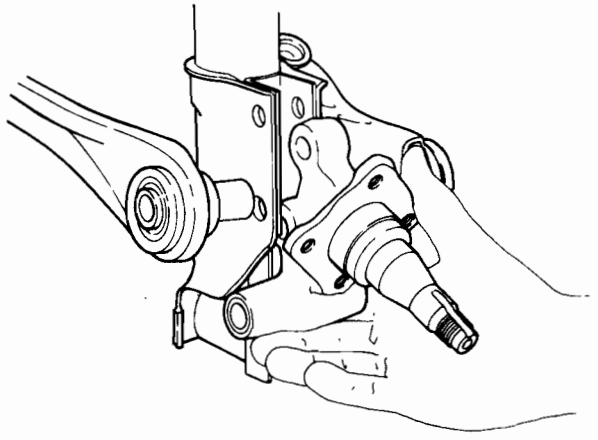


F7010-A

5. Remove the spindle to strut mounting bolts and the common control arm bolt.

REMOVAL AND INSTALLATION (Continued)

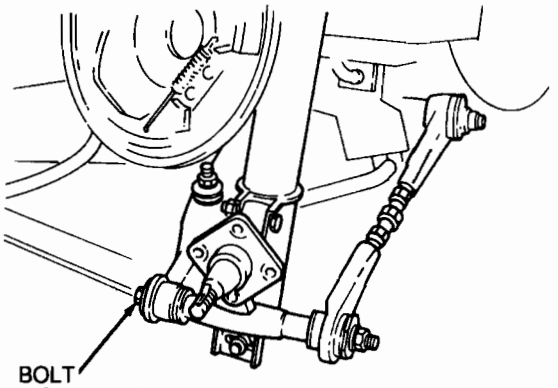
6. Remove the spindle from the strut.



F5480-A

Installation

1. Install the spindle in the strut.
2. Install the strut to spindle retaining bolts.
3. Install the common control arm bolt. Tighten to 60-75 N·m (45-55 lb-ft).



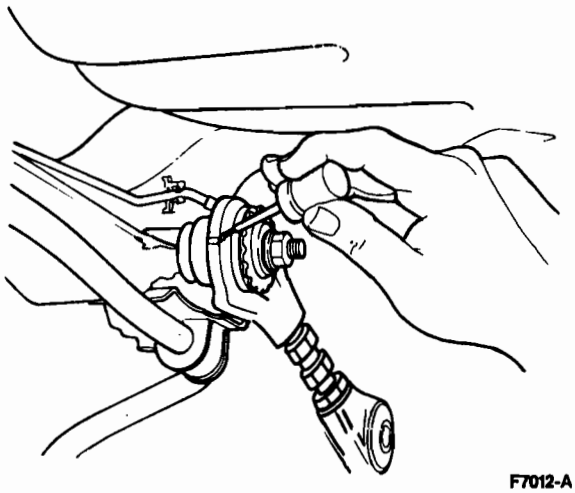
F7011-B

4. Tighten the spindle to strut bolts to 93-117 N·m (69-86 lb-ft). Final tightening must be done with suspension loaded.
5. Install the rear brake assembly as outlined.
6. Install the wheel and tire assembly.

Control Arms and Trailing Arm

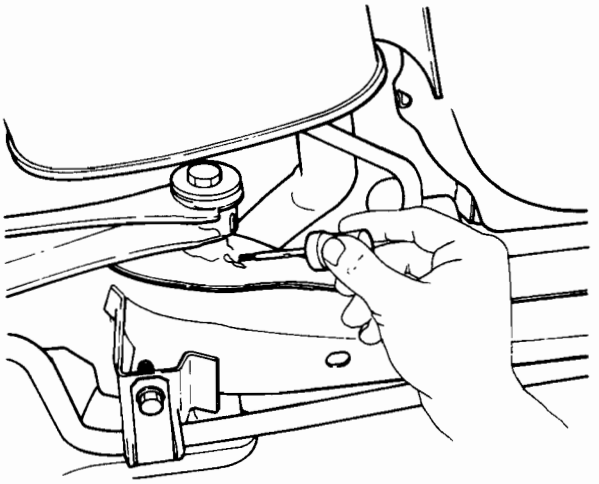
Removal

1. Remove the wheel and tire assembly.
2. Remove rear disc brake caliper and rotor assembly as outlined.
3. Paint an aligning mark on each control arm and control arm bushing.



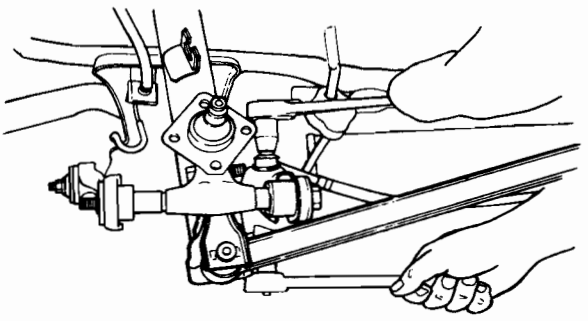
F7012-A

4. Paint an aligning mark on each side of trailing arm and crossmember.



F5483-A

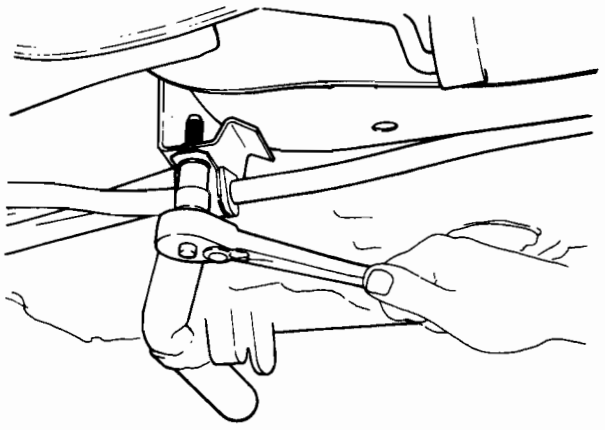
5. Remove the stabilizer link assembly.



F5484-A

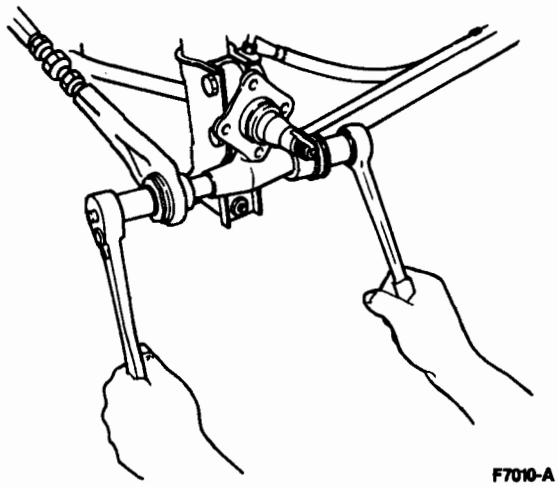
REMOVAL AND INSTALLATION (Continued)

6. Loosen and remove the stabilizer bar, bushings and the stabilizer.

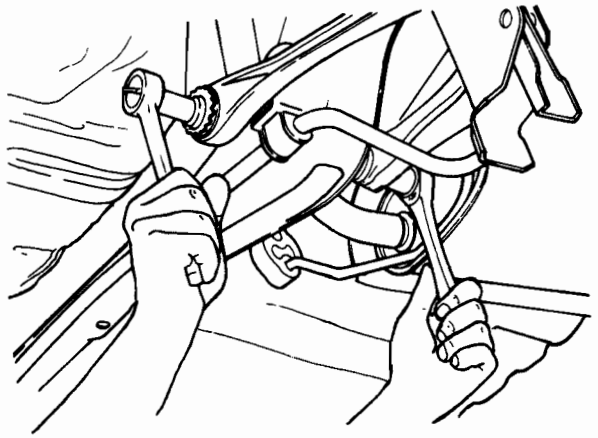


F5485-A

7. Loosen both inner and outer lower control arm bolts.

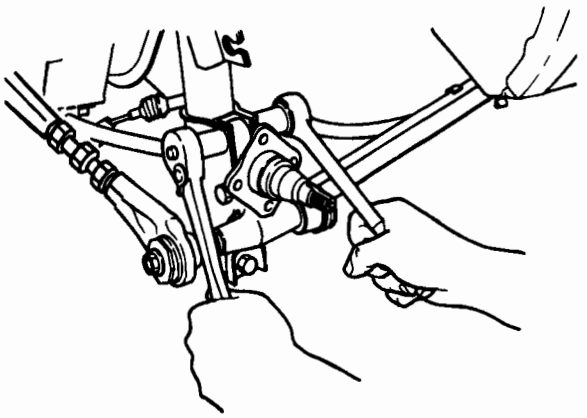


F7010-A



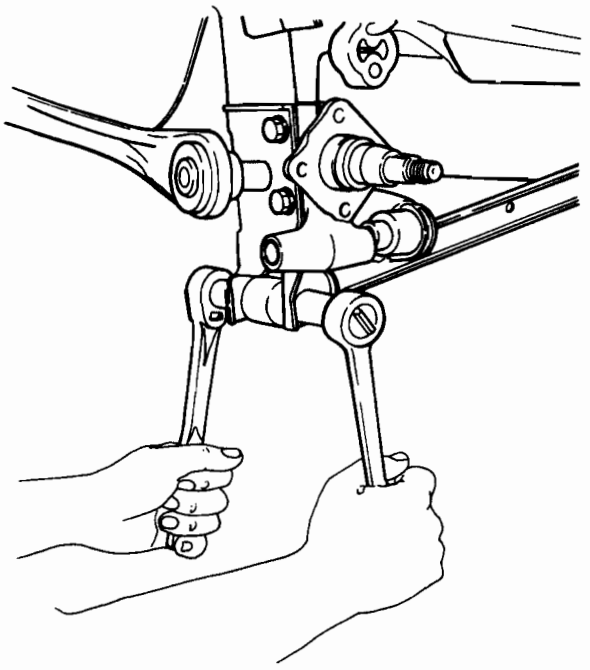
F5487-A

8. Loosen the spindle to strut retaining bolts.



F7013-A

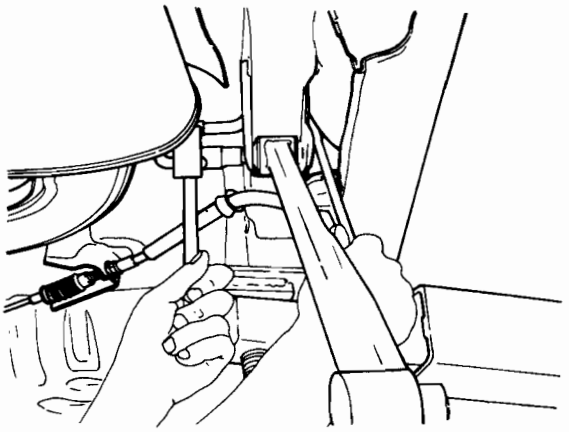
9. Remove the parking brake retaining bolt from the rear trailing assembly.
10. Loosen the trailing arm to strut retaining bolts.



F5490-A

REMOVAL AND INSTALLATION (Continued)

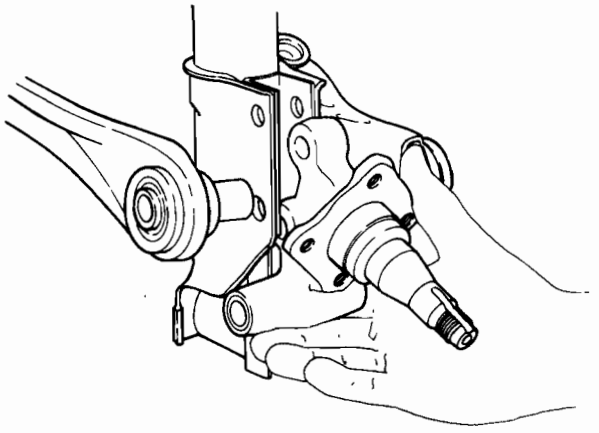
11. When all control arm and trailing arm bolts are loosened, remove all bolts and remove both the control arms and the trailing arm.



F5491-A

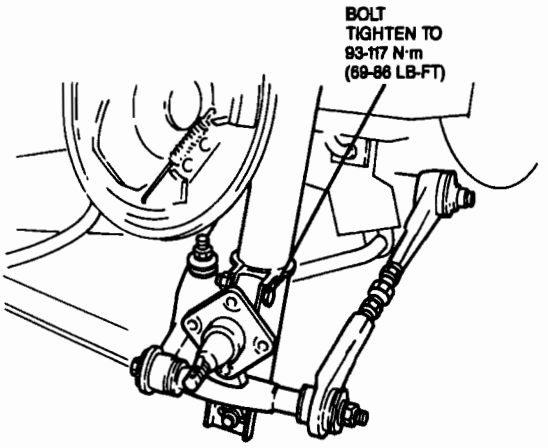
Installation

1. Mount control arm and trailing arm on the rear crossmember and hand tighten the bolts. Ensure LH and RH arms are in correct position.
2. Connect both control arms with the outer control arm bolt but do not install the spindle yet. Raise both control arms so the painted aligning stripes line up and tighten the rear control arm bolts.
3. Install the spindle in the strut.



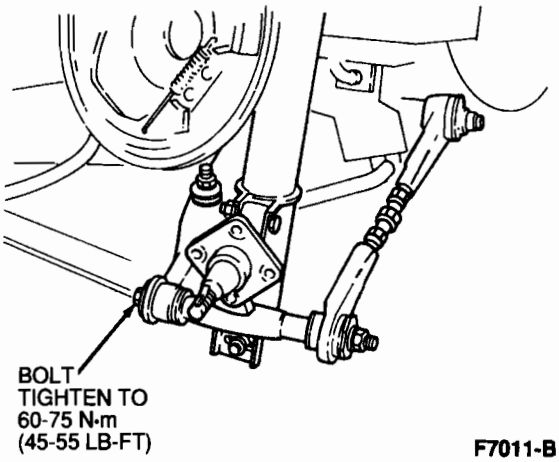
F5480-A

4. Tighten the spindle to strut retaining bolts to 93-117 N·m (69-86 lb-ft).



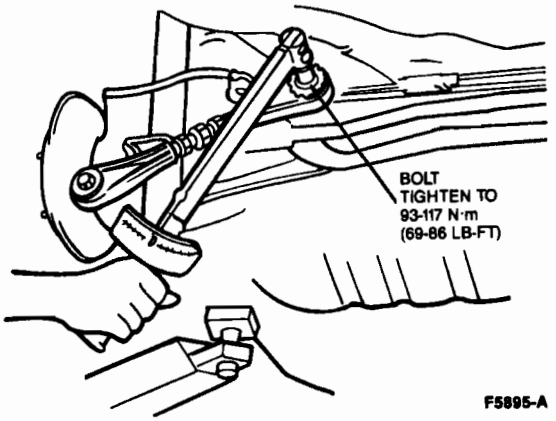
F7009-A

5. Install and tighten the control arm to spindle retaining bolt to 60-75 N·m (45-55 lb-ft).



F7011-B

6. Tighten the inner control arm bolt to 93-117 N·m (69-86 lb-ft).



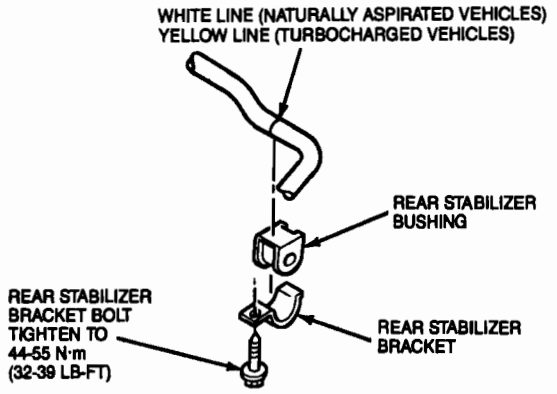
F5895-A

REMOVAL AND INSTALLATION (Continued)

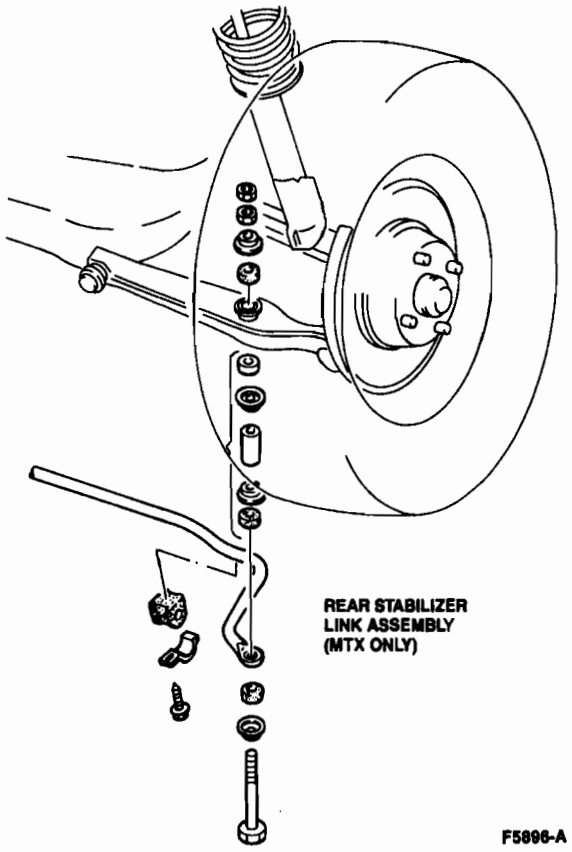
7. Loosely install the rear stabilizer bar in the stabilizer bushing.

   NOTE: Be sure the alignment stripe painted on the stabilizer bar aligns with the bushings.

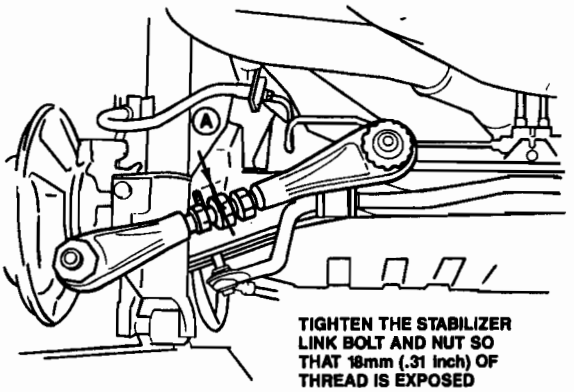
8. Do not fully tighten the bracket bolts yet.



9. Install the stabilizer link assembly.



10. Tighten the stabilizer bushing bracket bolts to 44-55 N·m (32-39 lb-ft).
11. Tighten the stabilizer link bolt until 18mm of thread extends beyond the nut. Final tightening must be done with suspension loaded.



12. Install the rear brake caliper and rotor assembly as outlined.
13. Install the wheel and tire assembly.

ADJUSTMENTS

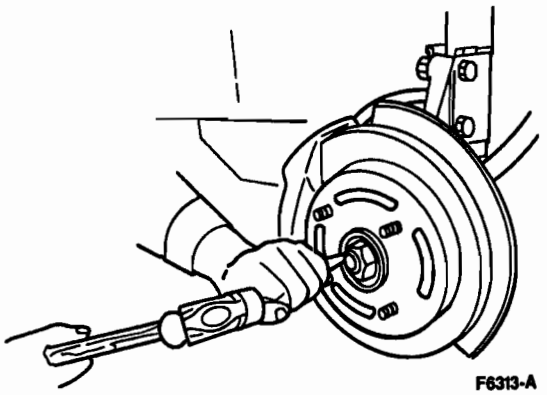
For suspension alignment procedures, refer to Section 04-00.

Bearing Preload

1. Make sure the parking brake is fully released.
2. Raise vehicle and install safety stands. Refer to Section 00-02.
3. Remove wheel and tire assembly.
4. Rotate the brake rotor to make sure there is no brake drag. If the brakes drag, press on inner brake pad to push caliper piston back slightly.
5. Remove the grease cap.

ADJUSTMENTS (Continued)

6. Carefully raise the staked portion of the locknut using a small cape chisel.

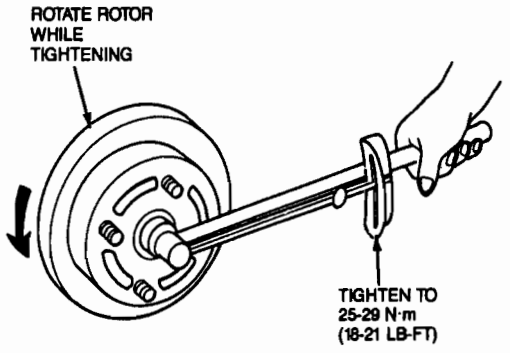


F6313-A

7. Remove and discard the locknut.

   NOTE: The locknuts are threaded left and right. The LH threaded locknut is located on the RH side of the vehicle. Turn this locknut clockwise to loosen. The RH threaded locknut is turned counterclockwise to loosen.

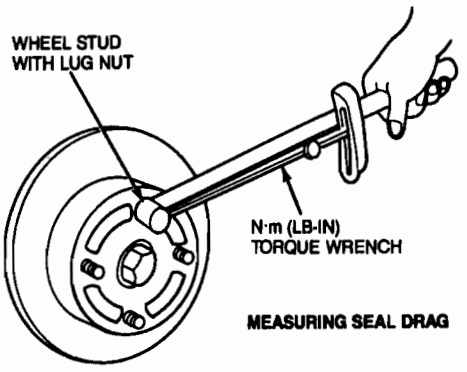
8. Install a new locknut.
9. Seat the bearings by tightening the locknut to 25-29 N·m (18-21 lb-ft). While tightening the locknut rotate the brake rotor.



F6314-A

10. Loosen the locknut slightly until it can be turned by hand.
11. Before bearing preload can be set, the amount of seal drag must be measured and added to the required preload.

    To measure seal drag, place a N·m (lb-in) torque wrench onto a lug nut positioned at 12 o'clock and measure the amount of force required to rotate the brake rotor.



MEASURING SEAL DRAG

F6315-A

    Pull the torque wrench and note the reading when rotation starts.

12. To determine the specified preload, add the amount of seal drag to the required preload which is 0.15 to 0.49 N·m (1.3 to 4.3 lb-in).

    For example:

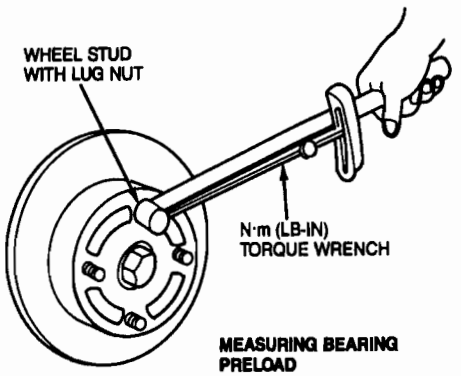
    If seal drag measures 0.25 N·m (2.2 lb-in), this amount must be added to the required preload:

    - 0.15 N·m + 0.25 N·m = 0.40 N·m Minimum
    - (1.3 lb-in + 2.2 lb-in = 3.5 lb-in Minimum)
    - 0.49 N·m + 0.25 N·m = 0.74 N·m Maximum
    - (4.3 lb-in + 2.2 lb-in = 6.5 lb-in Maximum)

    In the above example, when the seal drag is added the specified amount of preload becomes 0.40 to 0.74 N·m (3.5 to 6.5 lb-in).

13. Tighten the wheel bearing locknut a slight amount.
14. Place the N·m (lb-in) torque wrench onto a lug nut positioned at 12 o'clock and measure the amount of pull required to rotate the brake rotor.

    Continue tightening the attaching nut until the specified amount of preload is measured with the torque wrench.

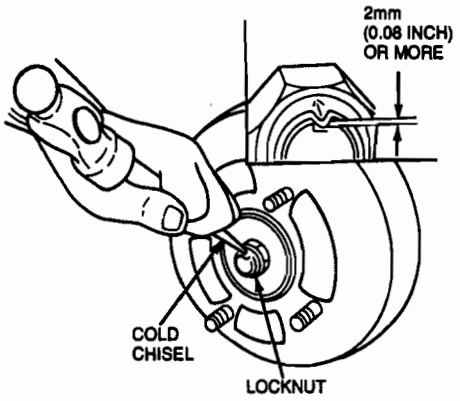


MEASURING BEARING PRELOAD

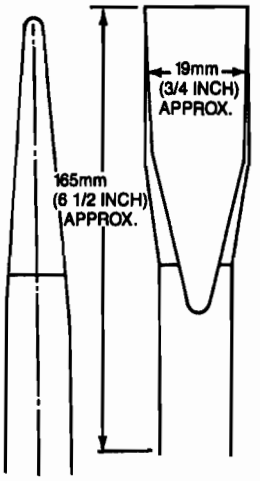
F6316-A

ADJUSTMENTS (Continued)

15. Stake new locknut using a cold chisel with the cutting edge rounded as shown.



NOTE: INSTALL A NEW LOCKNUT



THE STAKING TOOL CAN BE FABRICATED FROM AN EXISTING HARDENED CHISEL. THE CORRECT RADIUS ON THE CHISEL TIP WILL PREVENT IMPROPER STAKING. DO NOT ATTEMPT TO STAKE WITH A SHARP EDGED TOOL.

F6317-A

CAUTION: If the nut splits or cracks after staking, it must be replaced with a new nut.

16. Install the grease cap.
17. Install the wheel and tire assembly.
18. Remove safety stands and lower vehicle.
19. Tighten the wheel lug nuts to 90-120 N·m (67-88 lb-ft).

SPECIFICATIONS

TORQUE SPECIFICATIONS

Description	N·m	Lb-Ft
Spindle to Strut Bolts	93-117	69-86
Control Arm to Spindle	60-75	45-55
Inner Control Arm Bolts	93-117	69-86
Rear Stabilizer Bracket	44-55	32-39

(Continued)

TORQUE SPECIFICATIONS (Cont'd)

Description	N·m	Lb-Ft
Wheel Bearing Locknut	25-29	18-21
Wheel Lug Nuts	90-120	67-88
Strut Rod Nut	55-68	40-50

SPECIAL SERVICE TOOLS

Tool Number	Description
T81P-5310-A	Spring Compressor
T87C-1175-A	Seal Replacer

ROTUNDA EQUIPMENT

Model	Description
086-00029	Spring Compressor

SECTION 04-04 Wheels and Tires

VEHICLE APPLICATION

Capri.

DESCRIPTION

Factory installed tires and wheels are designed to operate satisfactorily with loads up to the full-rated load capacity when inflated to recommended pressures.

Correct tire pressures and driving techniques have an important influence on tire life. Heavy cornering, excessively rapid acceleration and unnecessary sharp braking increase tire wear.

Tires

When replacing tires, only the size, load range and construction type (radial) originally installed on the vehicle are recommended. Use of any other tire size or type may seriously affect ride, handling, speedometer / odometer calibration, vehicle ground clearance, and tire clearance to the body and chassis.

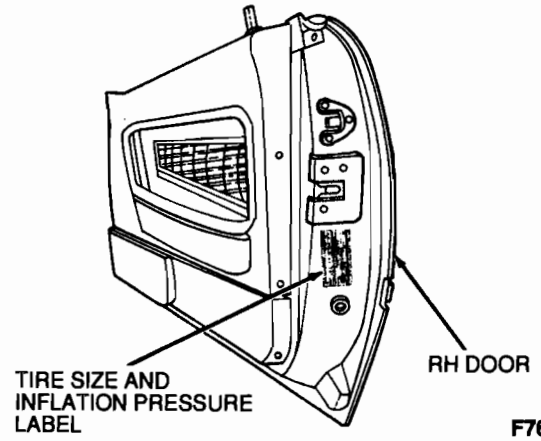
WARNING: DO NOT MIX DIFFERENT TYPES OF TIRES ON THE SAME VEHICLE SUCH AS RADIAL, BIAS OR BIAS-BELTED TIRES EXCEPT IN EMERGENCIES (TEMPORAL SPARE USAGE), BECAUSE VEHICLE HANDLING MAY BE SERIOUSLY AFFECTED AND MAY RESULT IN LOSS OF CONTROL.

A tire size and inflation pressure decal, located at the rear of the RH door, lists the recommended tire sizes, inflation pressure and load ratings.

Consider the following when replacing tires:

- It is recommended that new tires be installed in pairs.
- When replacing only one tire, it should be paired with the tire having the most tread, to equalize braking traction.

Tire Size and Inflation Pressure Label—Typical



F7659-A

Spare Tire

Refer to Section 00-02 for information on the spare tire.

DESCRIPTION (Continued)

Wheels

Wheels must be replaced when they are bent, dented or heavily rusted, have air leaks (aluminum wheels can, in most cases, be serviced using the procedure outlined in Maintenance), or elongated bolt holes, and have excessive lateral or radial runout. Wheels with lateral or radial runout greater than the recommended specification may cause an objectionable, high-speed vehicle vibration.

Replacement wheels must be equal to the original equipment wheels in load capacity, diameter, width, offset and mounting configuration. An improper wheel may affect bearing life, ground and tire clearance, or speedometer and odometer calibrations.

Corrosion build-up can result in wheels sticking to the axle or rotor flange after extensive service. To prevent this from recurring once the wheels are removed, use the following procedure:

1. Clean axle / rotor flange and wheel bore of corrosion with wire brush, steel wool or suitable material.
2. Coat wheel bore with Disc Brake Caliper Slide Grease D7AZ-19590-A (ESA-M1C172-A) or equivalent. Do not apply grease to wheel lug nut seats or wheel studs.
3. Install wheel on vehicle.

Wheel Lug Nuts

Replacement of wheel lug nuts must be of the same type and thread size.

NOTE: Aluminum wheels and several steel wheels must use a special type metric wheel lug nut with enlarged chamfers, or distortion of the aluminum wheel lug nut seat will result.

DIAGNOSIS

Refer to Section 04-00.

MAINTENANCE

Steel Wheels

Wheel services that use welding, heating or peening are not approved. An inner tube is not acceptable service for leaky wheels or tires.

Aluminum Wheels

Appearance

To clean wheels, use a mild soap and water solution and rinse thoroughly with clean water.

CAUTION: Do not use steel wool, abrasive type cleaner or strong detergents containing high alkaline or caustic agents. Damage may occur to the protective coating and cause discoloration.

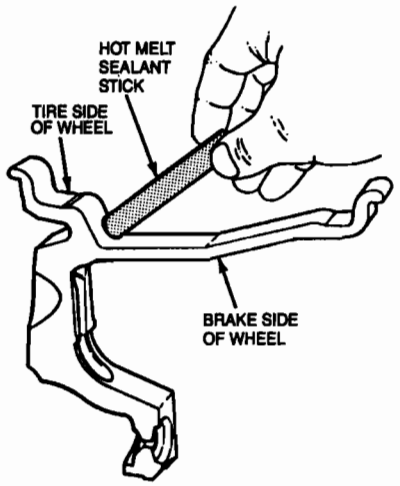
Air Leaks

If air pressure in a tire mounted on an aluminum wheel is found to be low, the following procedure should be performed prior to wheel replacement.

1. Raise vehicle on a hoist. Refer to Section 00-02. Remove tire and wheel assembly, and inspect wheel for structural damage. If none exists, go to Step 2. If the wheel is damaged, replace wheel.
2. With tire mounted on wheel, locate air leak using a water bath or equivalent method, and mark location. Check complete wheel for possible additional leaks.
3. On tire side of leak, use sandpaper of about 80-grit to thoroughly remove all contamination and score surface of wheel to improve sealer adhesion. An adequately sized area around the leak should be prepared to ensure covering the leak. Remove the valve stem if it is close to the area being serviced.
4. Use a clean cloth to remove all sanding dust.
5. Heat and seal the leak using Rotunda 750°-1000°F Master Heat Gun 107-00301 and Aluminum Wheel Repair Compound E7AZ-19554-A (ESA-M4G280-A) or equivalent as follows:
   a. Heat repair area being serviced so that sealing compound flows when applied.
   b. Apply a liberal amount of sealer using a wiping action to ensure complete coverage.
   c. Apply only enough heat to melt sealer and then remove heat source.

MAINTENANCE (Continued)

d. Allow wheel to cool. Re-assemble wheel and tire and test for leaks.



NOTE: Caution must be exercised when mounting the tire so as not to damage the sealer.

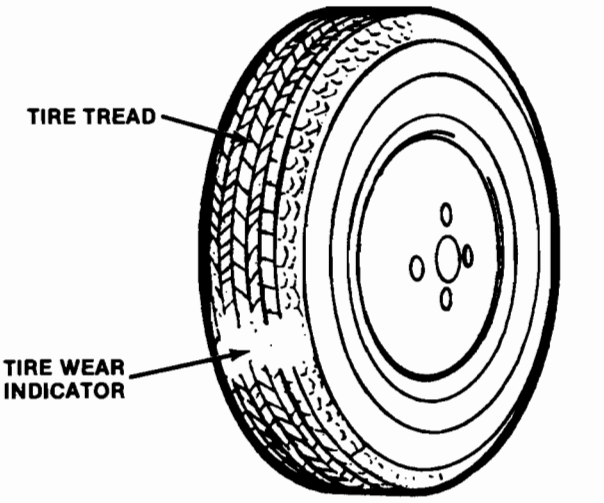
6. Inflate tire to recommended pressure and install on vehicle.
7. Lower vehicle.

Tire Maintenance

To maximize tire performance, inspect tires for signs of improper inflation and uneven wear which may indicate a need for balancing, rotation or suspension alignment. If the tires have uneven or abnormal wear patterns, refer Section 04-00.

Check tires frequently for cuts, stone bruises, abrasions, blisters and for objects that may have become imbedded in the tread. More frequent inspections are recommended when rapid or extreme temperature changes occur, or where road surfaces are rough or littered with debris.

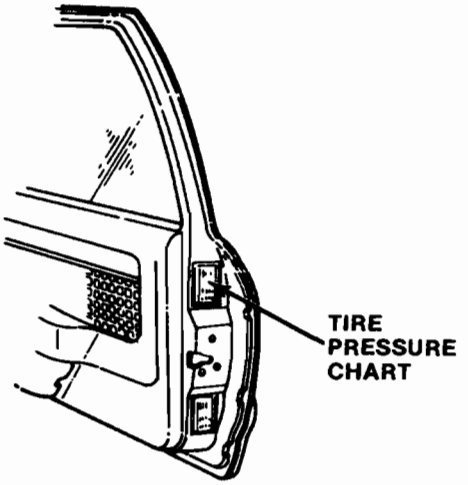
As a further visible check of tire condition, tread wear indicators are moulded into the bottom of the tread grooves. These indicators will appear as 12.7mm (1/2 inch) wide bands when the tire tread depth becomes 1.6mm (1/16 inch). When the indicators appear in two or more adjacent grooves, at three locations around the tire or when cord or fabric is exposed, tire replacement due to tread wear is recommended.



Tire Inflation

Always check tire inflation pressure using an accurate gauge and inflate the tires to recommended levels only.

The tire inflation pressure is carefully calculated to give the vehicle satisfactory ride and steering characteristics while not compromising long tire tread life. The recommended vehicle load capacities and tire inflation pressures for full or reduced load operation are listed in the Tire Inflation Pressure Chart. This information is also provided in the Owner Guide and on a label attached to the inside edge of the passenger door.



MAINTENANCE (Continued)

Tire Inflation Pressure Chart

kPa	psi	kPa	psi
140	20	215	31
145	21	220	32
155	22	230	33
160	23	235	34
165	24	240	35
170	25	250	36
180	26	275	40
185	27	310	45
190	28	345	50
200	29	380	55
205	30	415	60

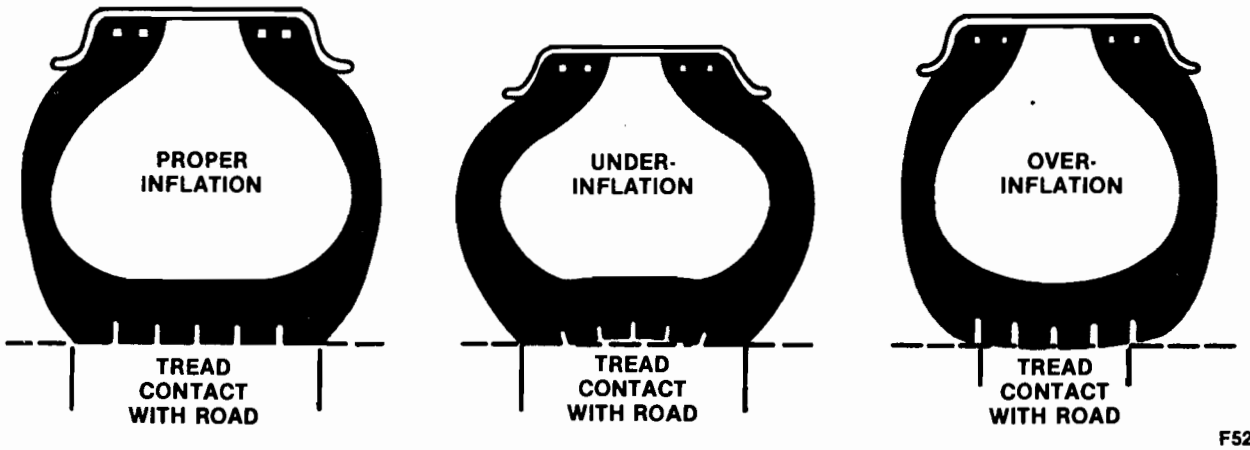
CONVERSION: 6.9 kPa = 1 psi

F5298-A

Check and adjust tire inflation pressures only when the tires are cold (vehicle has been parked for three hours or more) or driven less than 3.2 km (2 miles) at speeds below 64 km/h (40 mph).

Do not reduce inflation pressures if the tires are hot, or driven over 3.2 km (2 miles) at speeds above 62 km/h (40 mph) as pressures can increase as much as 41 kPa (6 psi) over cold inflation pressures.

Be sure to re-install the valve cap. It prevents air leaks and keeps dust and dirt out of the valve stems.



F5299-A

CAUTION: Radial-ply tires have a highly flexible sidewall, which produces a characteristic sidewall bulge, making the tire appear underinflated. This is a normal condition for radial-ply tires. Do not attempt to reduce this bulge by over-inflating the tire.

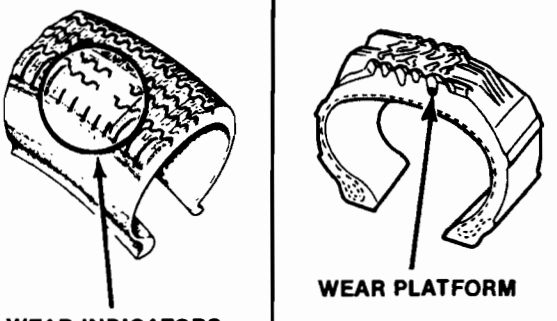
Check the condition of the wheels. Replace any wheel that is bent, cracked, severely dented, or has excessive runout. Also, check the condition of the valve stem. Replace the valve stem if worn, cracked, loose or leaking air.

It is mandatory that only the tire size recommended on the tire chart attached to the vehicle be used. Larger or smaller tires can damage the vehicle and affect durability, and may cause the speedometer to read incorrectly. Be sure wheel sizes and offsets match those recommended for the tire in use.

SERVICE

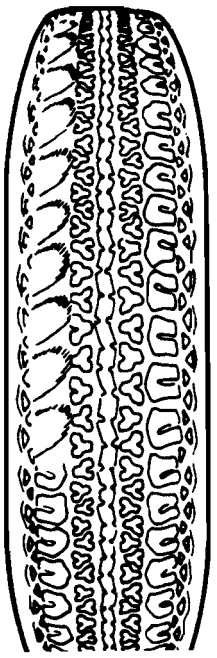
The tires should be replaced if the wear indicators are exposed, or if there is severe shoulder wear. Shoulder wear is usually caused by excessive camber or excessive toe on radial tires.

Incorrect rear toe settings or bad shock absorbers will cause severe "cupping" or "scalloped" tire wear on non-drive wheels.



F5376-A

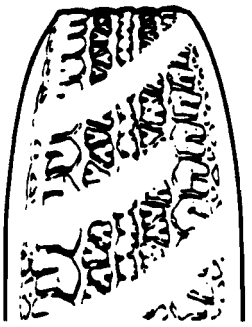
SERVICE (Continued)



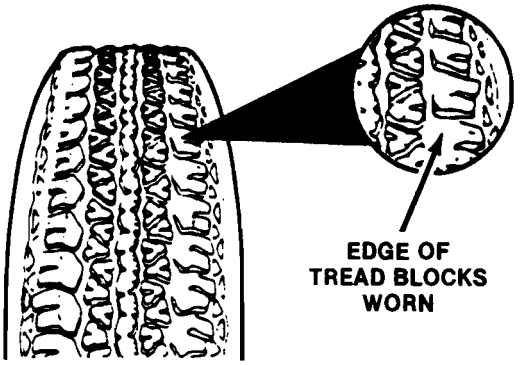
CUPPING OR SCALLOPED TIRE WEAR

F5377-A

Severely misadjusted rear toe will also cause other unusual wear patterns.



- EXCESSIVE TOE ON THE NON-DRIVE WHEELS
- LACK OF ROTATION



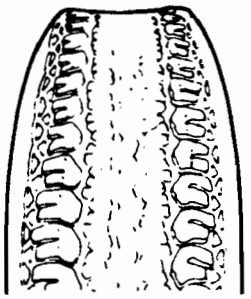
- EXCESSIVE TOE ON THE NON-DRIVE WHEELS
- LACK OF ROTATION

F5378-A

If the cupping or other wear patterns are severe enough to cause noise or vibration, the tire must be replaced. Tire rotation every 6,000 km (3,750 miles) may prevent these tire patterns from developing.

SERVICE (Continued)

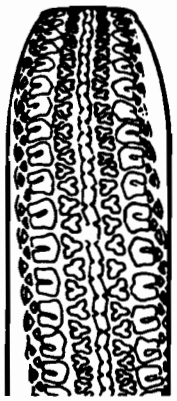
Under-inflation will cause shoulder wear in a radial tire, but because of the strength of the radial belts, overinflation seldom causes center tread wear. Radial tire center tread wear can be caused by heavy acceleration or excessive toe on drive wheels.



- **HEAVY ACCELERATION ON DRIVE WHEELS**
- **EXCESSIVE TOE ON DRIVE WHEELS**

F5379-A

A nail puncture may allow water to seep in and cause rust damage to one of the steel belts in a radial tire. Internal stresses in the tire caused by the loss of one of the steel belts will cause the tread to distort. Tread distortion is often incorrectly referred to as belt shift.

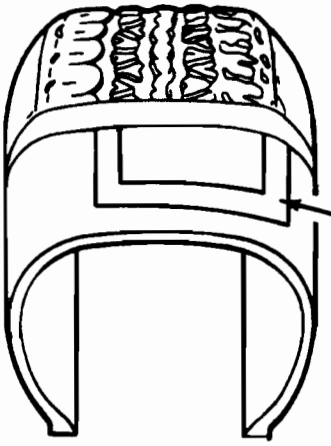


TREAD DISTORTION

F5380-A

This condition will cause low speed "waddle" and vibration similar to a statically imbalanced tire at high speed. A tire with severe tread distortion should be replaced.

A damaged or worn tire built with the radial belts closer to one side of the tire than the other may cause the tire to be slightly cone shaped. This will cause the tire and therefore the vehicle to pull in one direction or the other.



TIRE CONICITY

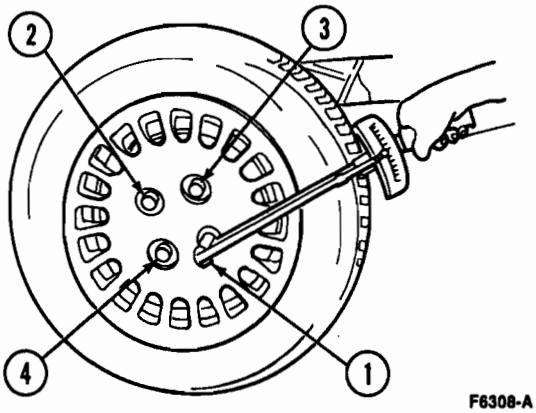
F5385-A

If a vehicle pulls and there is not apparent tread wear, switch the two front tires. If the vehicle now pulls in the opposite direction, rotate all four tires.

Tire Replacement

If a new tire comes with a sticker or dye mark to indicate the high spot, this should always be installed at the valve stem. When replacing tires on wheels with over 48,279 km (30,000 miles), the valve stem should always be replaced.

When installing wheel lug nuts to mount the road wheels, a torque wrench should always be used for final tightening. Tighten wheel lug nuts to 90-120 N·m (67-88 lb-ft) progressively in a diagonal sequence. This will prevent concerns with warped disc brake rotors, and stretched wheel studs.



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Tire and Wheel Balance

Before balancing a tire, clean deposits of dirt, mud and ice from the wheel, both inside and outside the rims, and remove any existing balance weights.

SERVICE (Continued)

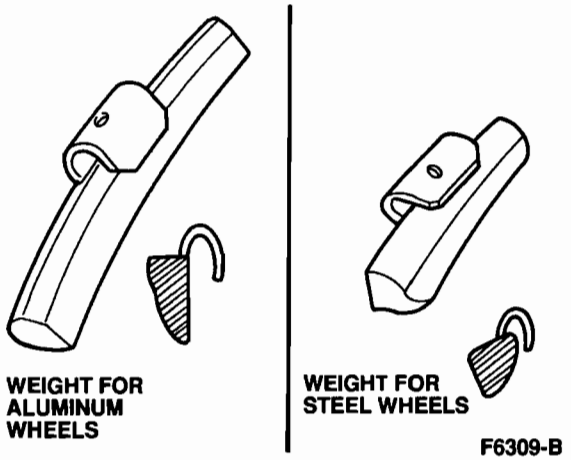
Remove stones from the tire tread in order to avoid operator injury when spin balancing and to obtain a proper balance. Inspect all tires for damage. Check and, if necessary, correct tire pressures, then balance according to equipment manufacturer's instructions.

Never add more than 160 grams (5-1/2 oz) of weight to any one wheel. If using a bubble balancer or an on the vehicle spin balancer, always split the weight so that half of the weight is on the inside wheel rim edge and half of the weight is on the outside wheel rim edge.

NOTE: The shape of the rim on the aluminum alloy wheels requires a unique wheel weight with a matching contour. Do not attempt to use a steel wheel weight on an aluminum wheel.

Balance Weights

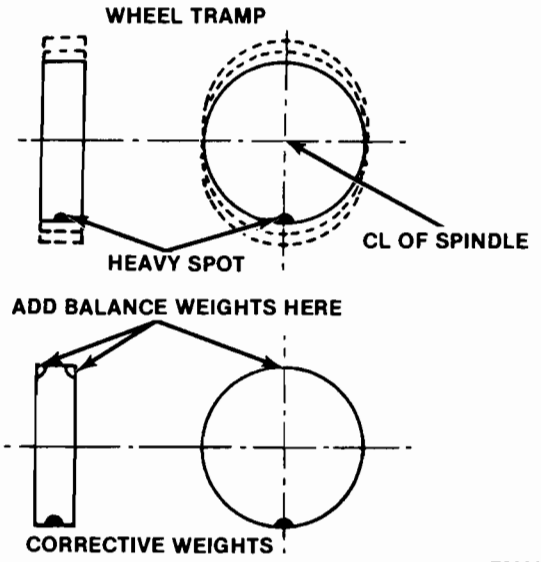
When balancing aluminum wheels, note that the weights have a different profile from those used on steel wheels. **It is important that only the correct balance weights are used.** The following illustration shows the correct type of wheel weights for use with "A" steel wheels and "B" wheels.



Static Tire Balance

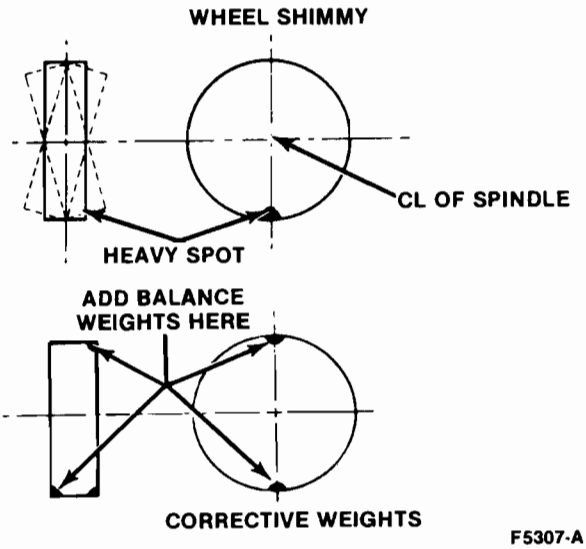
There are two types of wheel and tire balance: single plane STATIC balance and two plane DYNAMIC balance.

A **static** balance is the equal distribution of weight around the wheel. Wheels that are statically unbalanced cause a bouncing action called wheel tramp. This condition will eventually cause uneven tire wear.



Dynamic Tire Balance

A **dynamic** balance is the equal distribution of weight on each side of the wheel centerline, so that when the wheel spins there is no tendency for side-to-side movement. Wheels that are dynamically unbalanced may cause wheel shimmy.



There are two types of wheel balancing procedures: off-vehicle and on-vehicle. A brief description of each is provided as follows.

SERVICE (Continued)

Off-Vehicle Balancing

With off-vehicle balancing, the wheel is removed from the vehicle and put on a special machine which balances it. In most cases (except with bubble balancers), the wheel is spun on a machine and both static and dynamic balance are corrected for. Always place the centering cone on the back side of the wheel. This is especially important with stamped steel wheels. Most steel wheels are stamped from the back side—locating the cone on the front side of the wheel could cause an incorrect balance. When using special adapters, it is imperative that the wheels be located by the center hole and NOT the stud holes.

On-Vehicle Balancing

When balancing the front wheels, use the engine to spin the tires, not the balancing spinner. Place a wooden block under the wheel that is not being balanced. If a vehicle has a limited slip differential, remove the wheel from the side that is not being balanced, and support the lower control arm with a jackstand. Be sure to mark the wheel and one of the studs so the tire can be installed in the same position as it was taken off. Be sure the axle shafts are not hitting any suspension components when performing a front on-vehicle balance.

Always refer to the manufacturer's instructions provided with the dynamic-type wheel balancer when balancing wheels on the vehicle.

Support the front suspension so that the axle shaft angles are at near curb height angles. The wheel being balanced would be 50mm (2 inch) or slightly more off the ground. BE SURE THE PARKING BRAKE IS APPLIED WHEN BALANCING THE FRONT WHEELS. Before spinning the wheels, check for looseness in the suspension joints, worn wheel bearings and brake grab.

Start the engine, select top gear and accelerate slowly. Be sure the speed as indicated on the speedometer does not go over the equivalent road speed of 56 km/h (35 mph). Remember that the wheel speed (when driven by the engine) will be twice speedometer speed.

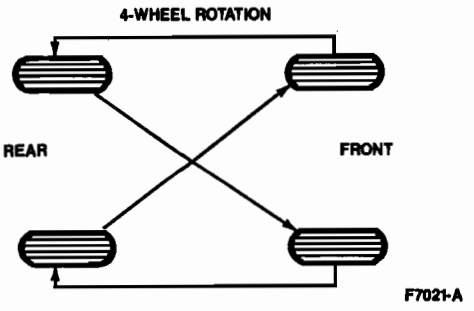
WARNING: WHEN BALANCING FRONT WHEELS ON FRONT WHEEL DRIVE VEHICLES WITH CONVENTIONAL TRANSAXLES, LIMIT THE WHEEL SPEED TO 56 KM/H (35 MPH) AS INDICATED ON THE SPEEDOMETER. IF CARE IS NOT TAKEN DURING THIS PROCEDURE, POSSIBLE TIRE DISINTEGRATION, TRANSAXLE AND/OR HALFSHAFT FAILURE CAN RESULT, WHICH COULD CAUSE PERSONAL INJURY OR EXTENSIVE COMPONENT DAMAGE.

Tire Rotation

Front and rear tires perform different jobs and can wear differently depending on the type of vehicle and driving habits. To equalize wear and optimize tire life, rotate tires every 6,000 km (3,750 miles).

If abnormal wear is detected, find and correct the cause, and rotate the tires, to allow more even wear.

CAUTION: Do not use "Temporary" tire for tire rotation.



Wheel Bearing Adjustment—Rear

Refer to Section 04-02.

SPECIFICATIONS

WHEEL RIM RUNOUT AND BALANCE SPECIFICATIONS

Type Wheel	Max. Radial Runout	Max. Lateral Runout	Max. Balance Weight
Aluminum	2.0mm (0.079 inch)	1.5mm (0.059 inch)	150g (3.5 oz) per wheel
Steel	2.5mm (0.098 inch)		150g (3.5 oz) per wheel

SPECIFICATIONS (Continued)

WHEELS

Size	Offset	Diameter of Pitch Circle	Material	Tire Size
5 1/2—JJ X 14	45mm (1.77 inch)	114.3mm (4.5 inch)	Steel and Aluminum	185/60R14 82H
6-JJ X 15	42mm (1.65 inch)	114.3 (4.5 inch)	Aluminum	195/50R15 82V
4-T X14	50mm (1.97 inch)	114.3mm (4.5 inch)	Steel	T105/70D14

TORQUE SPECIFICATIONS

Description	N·m	Lb-Ft
Wheel Lug Nuts	90-120	67-88

SPECIAL SERVICE TOOLS

ROTUNDA EQUIPMENT

Model	Description
107-00301	750°-1000°F Master Heat Gun