SECTION 04-01 Suspension and Wheel Ends—Front

VEHICLE APPLICATION

Capri.

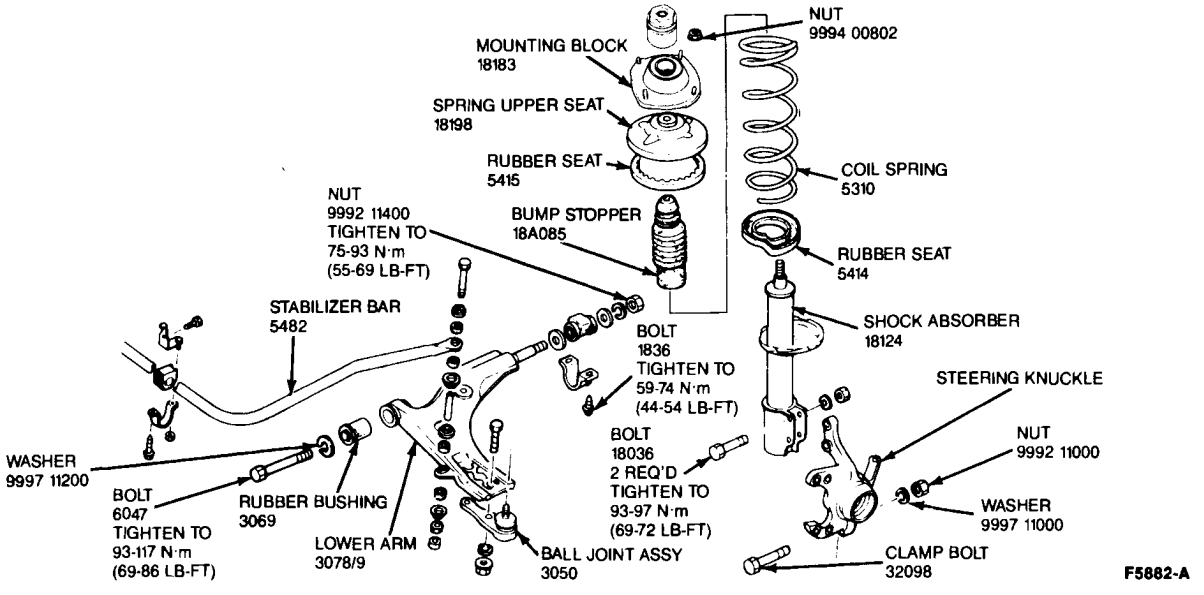
DESCRIPTION

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.

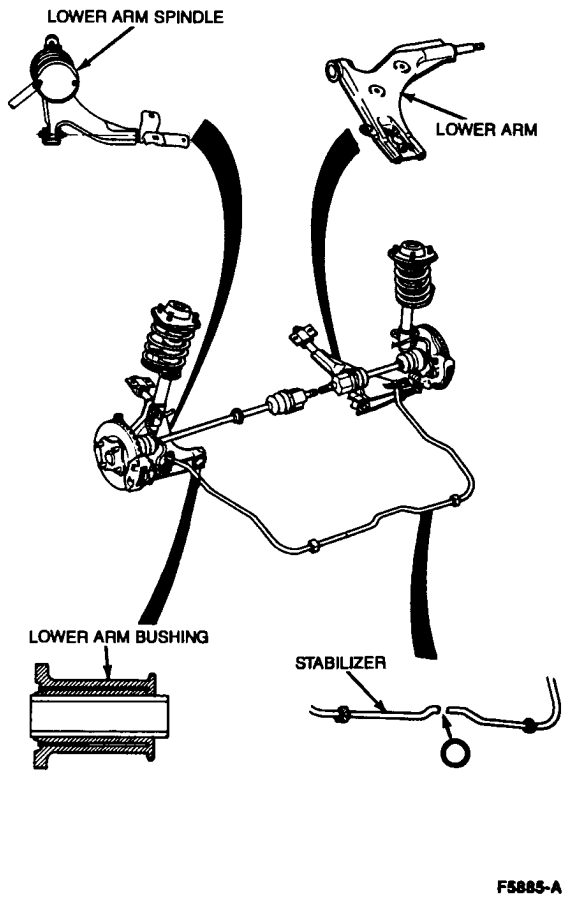
Ball joints connect the control arms to the steering knuckles. The wide stance control arms are supported by rubber bushings at each end. Body lean on turns is controlled by a hollow stabilizer bar that connects to both lower control arms.

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.

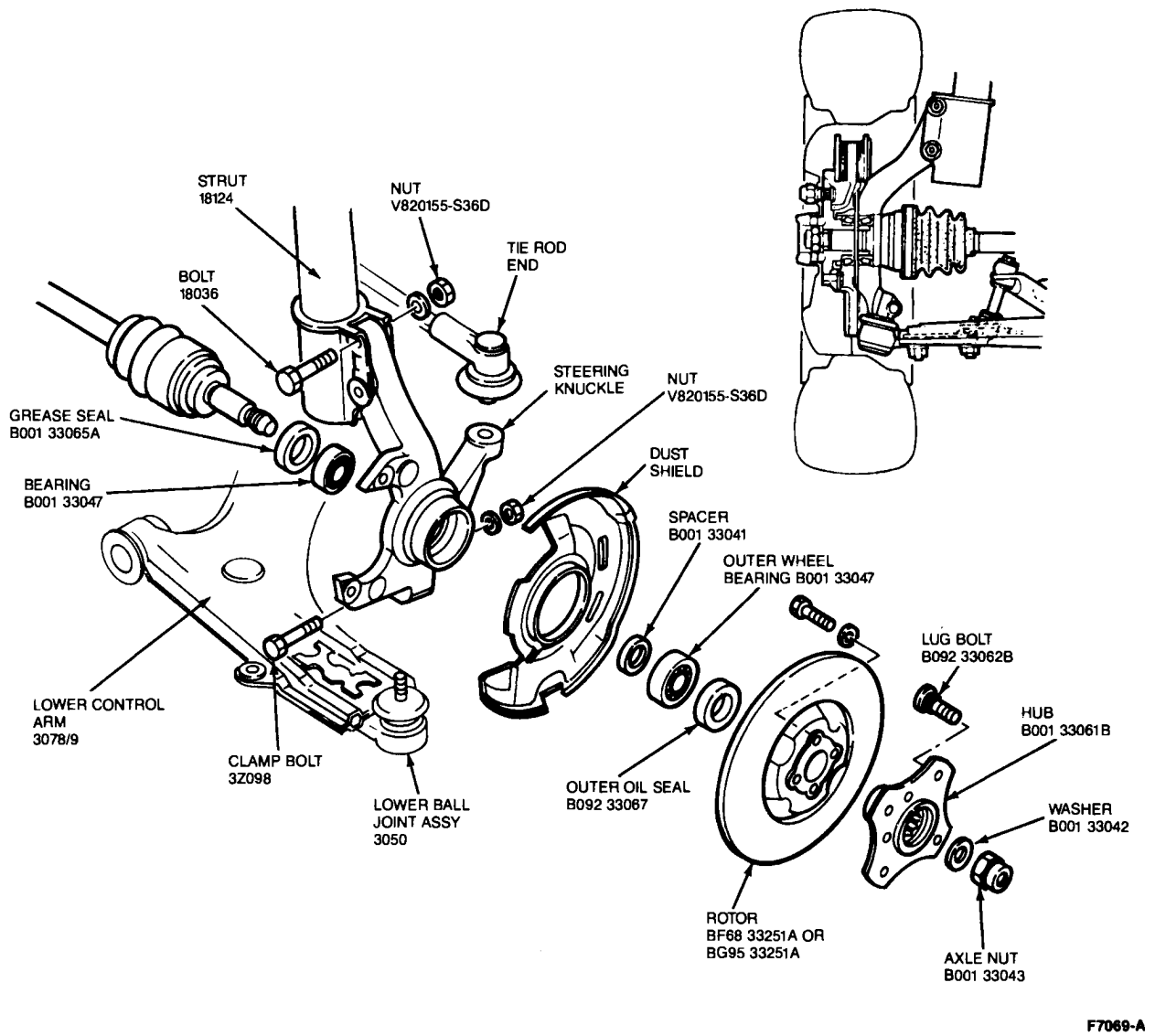
For easier service, the rotor unbolts from the hub, and the steering knuckle can be easily removed from the strut.



DESCRIPTION (Continued)



DESCRIPTION (Continued)



DIAGNOSIS AND TESTING

Refer to Section 04-00.

REMOVAL AND INSTALLATION

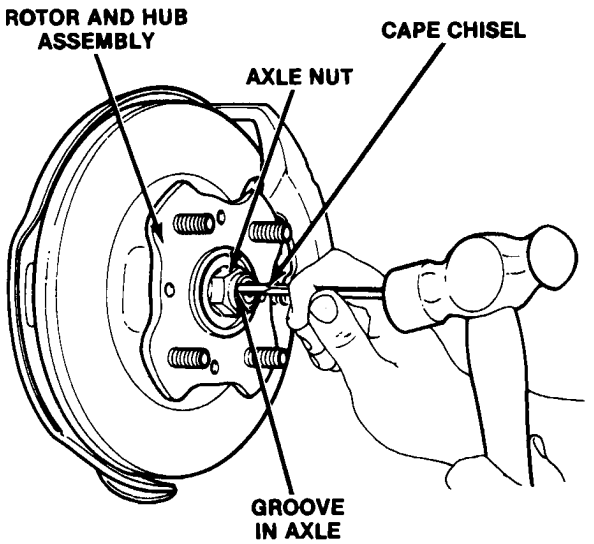
Wheel Hub/Steering Knuckle Assembly

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.

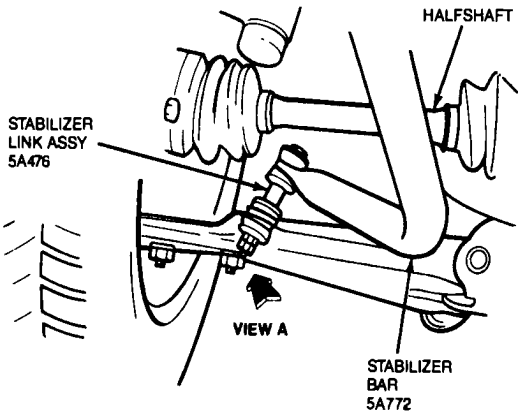


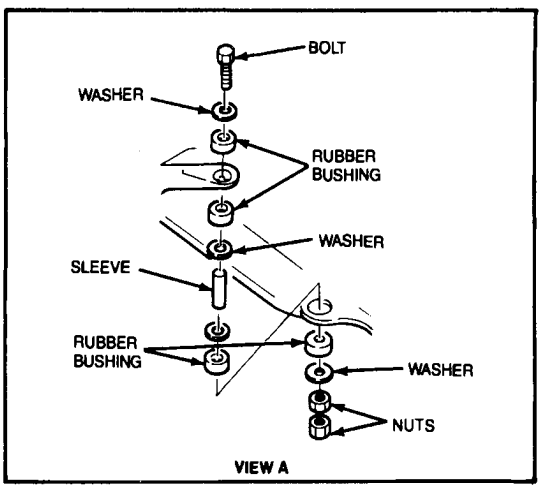
F5052-A

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.



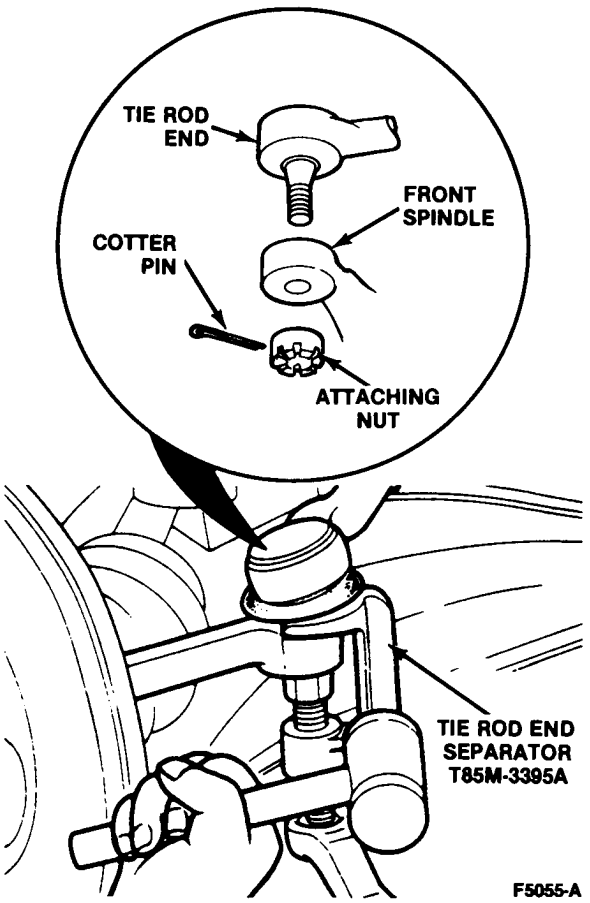


F7063-A

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

REMOVAL AND INSTALLATION (Continued)

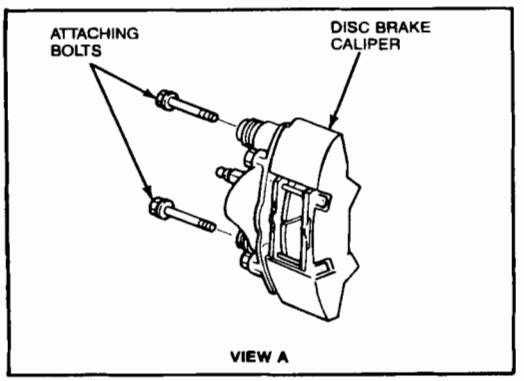
7. Separate the tie rod end from the steering knuckle arm using Tie Rod End Separator T85M-3395-A or equivalent. If tie rod end does not separate easily, give the steering knuckle a sharp blow with a soft faced hammer to shock the taper.

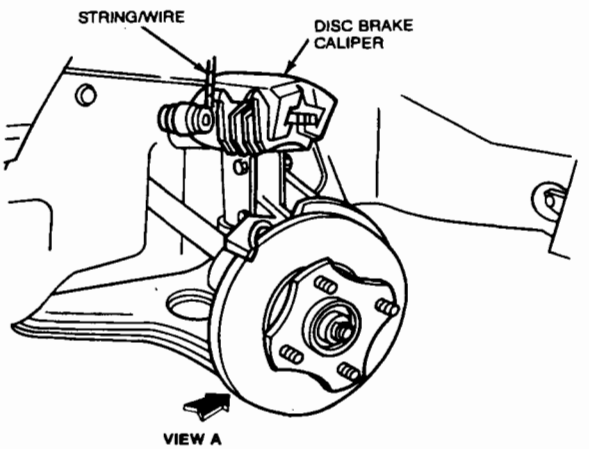


8. Remove U-shaped retaining clip from the center section of the caliper flex hose.
9. Remove the disc brake pads. Refer to Section 06-03.

REMOVAL AND INSTALLATION (Continued)

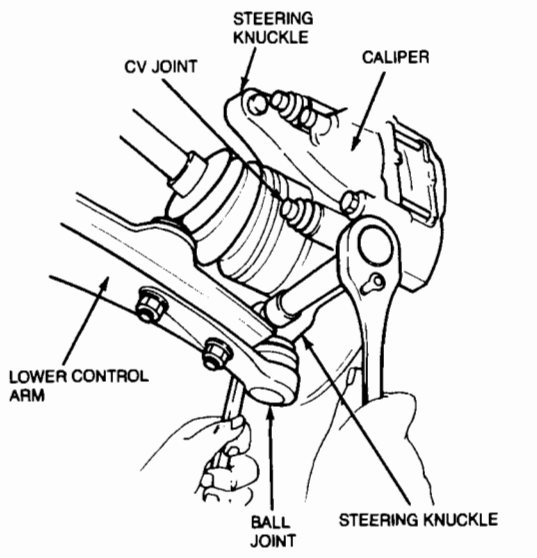
10. Remove the brake caliper retaining bolts. Lift caliper off the rotor and suspend it from the suspension coil spring.





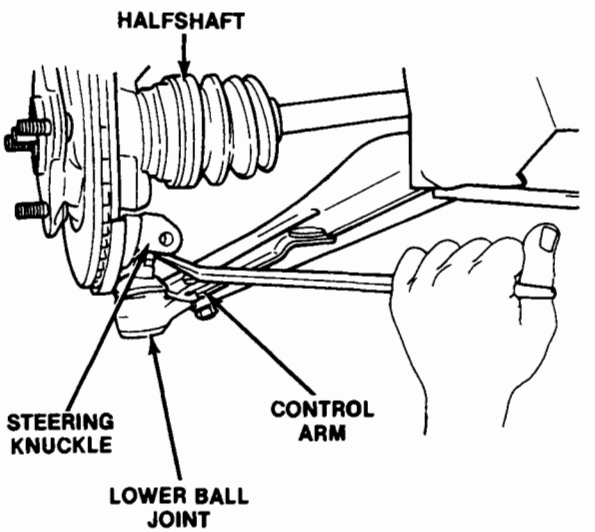
F7068-A

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



F7067-A

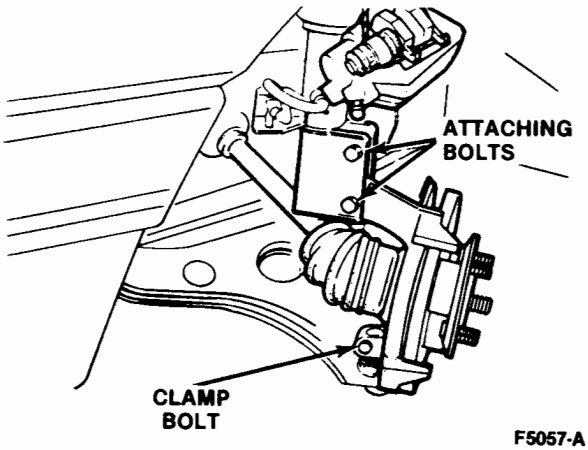
12. Pry downward on the lower control arm to separate the ball joint from the steering knuckle.



F5086-A

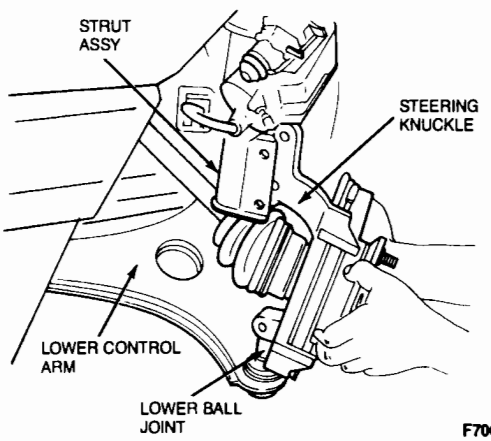
REMOVAL AND INSTALLATION (Continued)

13. Remove the steering knuckle to strut retaining bolts.



F5057-A

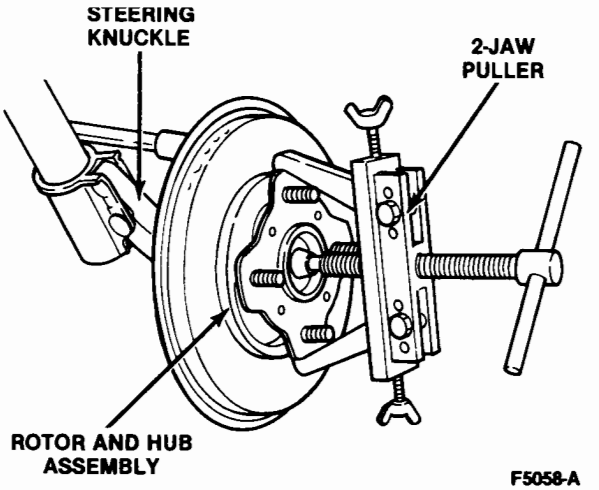
14. Slide the front hub / steering knuckle assembly out of its bracket in the strut and off the end of the halfshaft. Use care to prevent damage to the grease seals.



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.

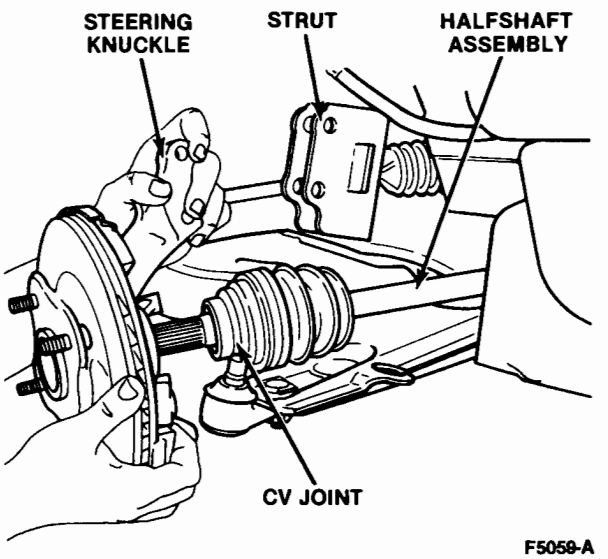
CAUTION: Never use any type of metal faced hammer to separate the halfshaft from the hub. Damage to the CV joint internal components will result. If the halfshaft splines become rusted to the hub, a two jaw puller or hub puller must be used to separate them.



F5058-A

Installation

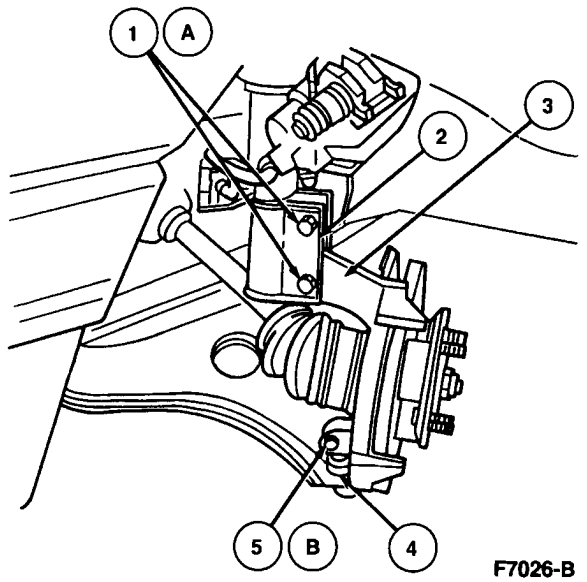
1. Position the front hub / steering knuckle assembly over the halfshaft and into the strut.



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).

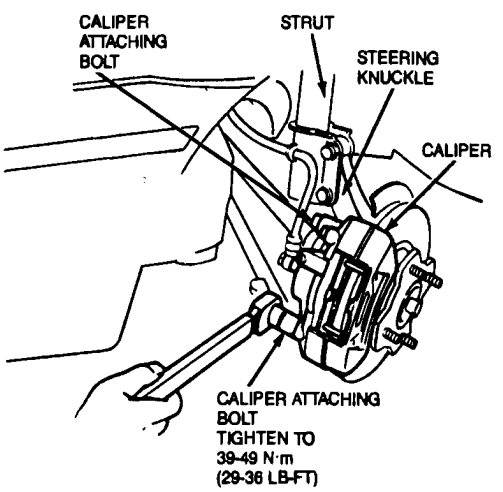
REMOVAL AND INSTALLATION (Continued)



F7026-B

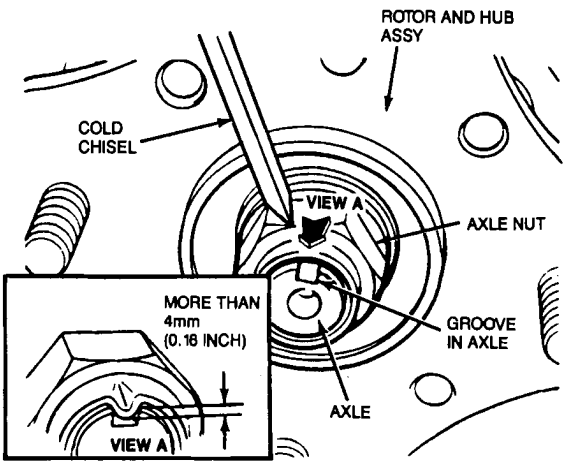
Item	Part Number	Description
1A	—	Bolts
2	—	Strut
3	—	Steering Knuckle
4	—	Lower Ball Joint
5B	—	Clamp Bolt
A		Tighten to 93-97 N·m (69-72 lb-ft)
B		Tighten to 43-54 N·m (32-40 lb-ft)

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

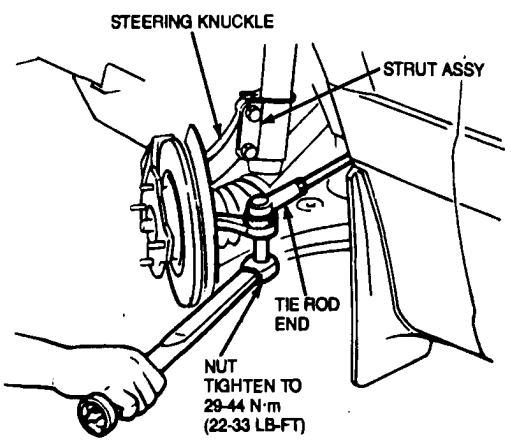
5. Install the U-clip on the caliper flex line.
6. Install a new halfshaft retaining nut. Tighten to 157-235 N·m (116-174 lb-ft).
7. Stake the halfshaft attaching nut using a cold chisel with the cutting edge rounded.



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.

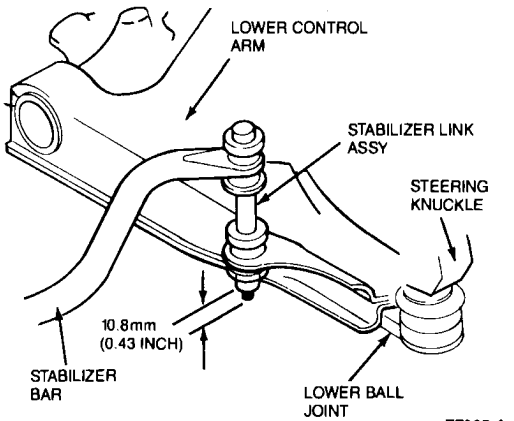


F7004-A

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.

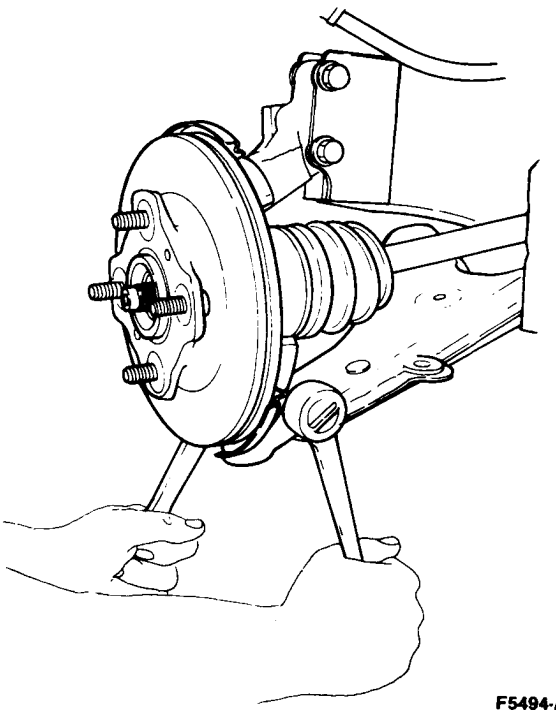


10. Install the wheel and the tire assembly.
11. Tighten wheel lug nuts to 90-120 N·m (65-88 lb-ft).
12. Lower vehicle.

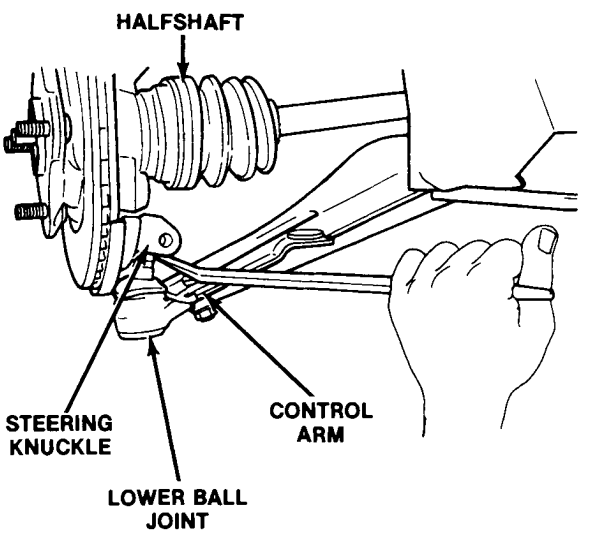
Ball Joint

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.

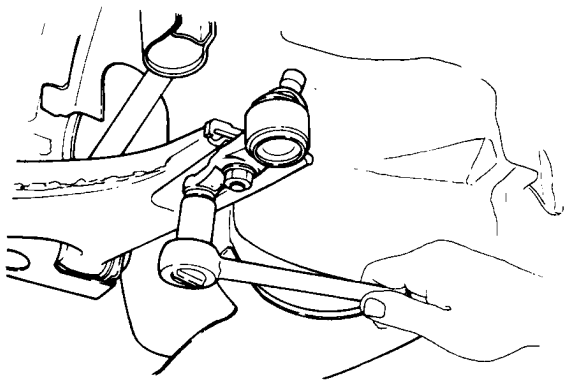


4. Using a small pry bar, pull down on lower control arm to separate it from steering knuckle.



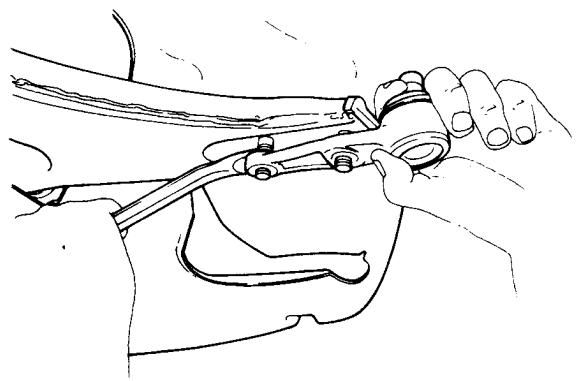
REMOVAL AND INSTALLATION (Continued)

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



F5495-A

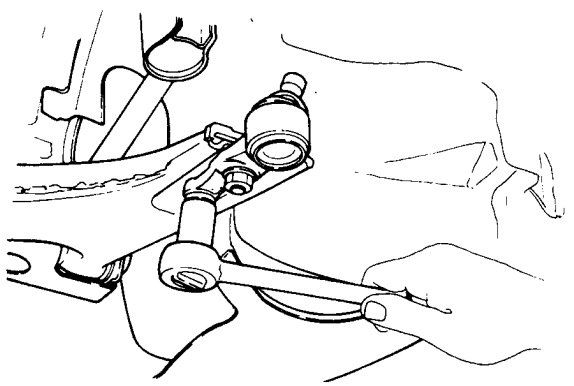
6. Using a small pry bar, pry ball joint off control arm.



F5496-A

Installation

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



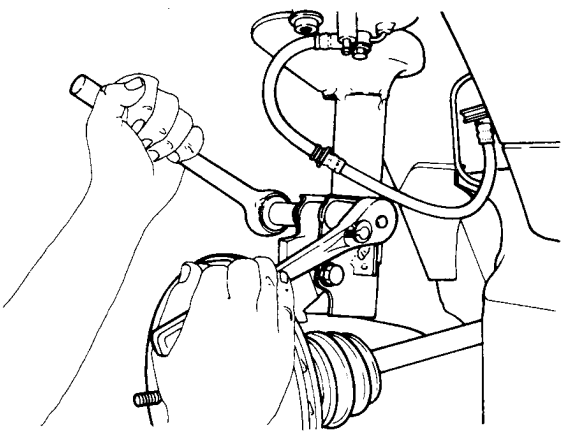
F5495-A

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

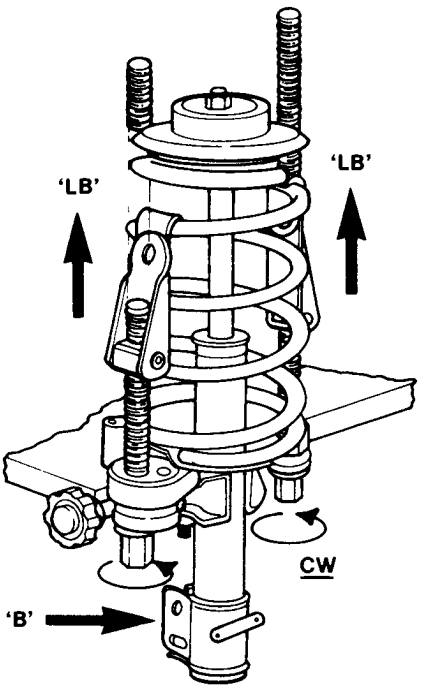
6. Remove the U-clip from the brake line hose and slide it out of its bracket on the strut.
7. Remove the strut mount nuts from the strut tower.
8. Remove the spring and shock absorber assembly from the vehicle.
9. Compress the spring with Rotunda Spring Compressor 086-00029 or equivalent.
10. Remove 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

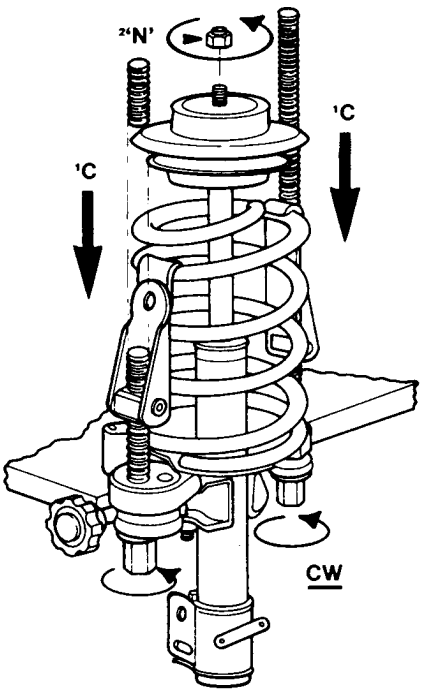
1. Install the lower spring seat, coil spring, bump stopper, upper spring seat and mounting block on the strut.

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

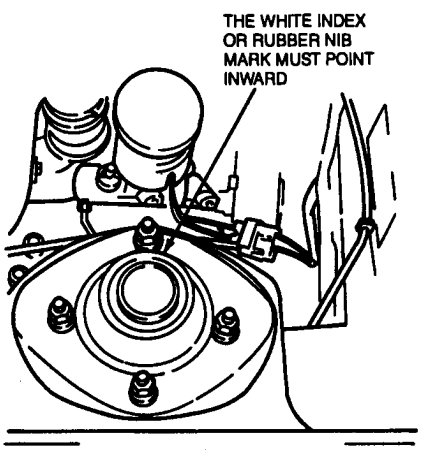


1. FIND CENTER OF FREEPLAY AND LOCK CAMS
2. COMPRESS SPRING (¹C) MOVING SIDE TO SIDE
3. WHEN TOP MOUNT IS UNLOADED, REMOVE ROD NUT (²N)
4. SET MOUNT ON BENCH

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).

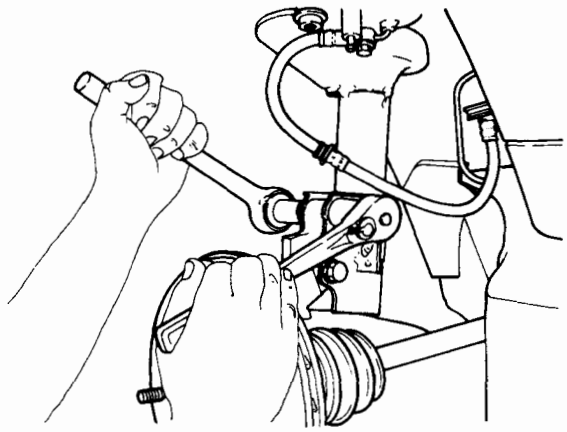
   NOTE: Be sure that the white aligning mark faces the center of the vehicle.



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).



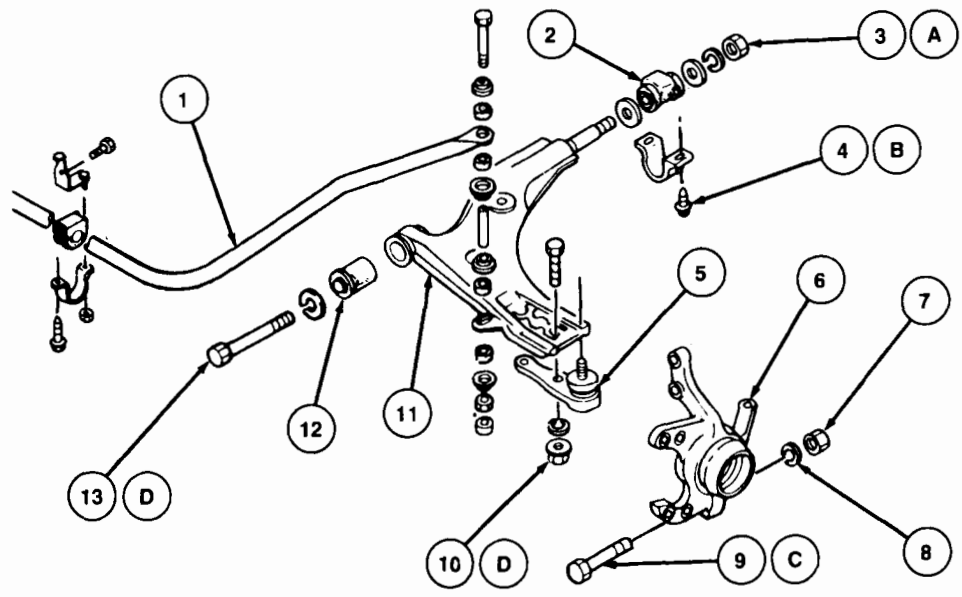
F5497-A

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

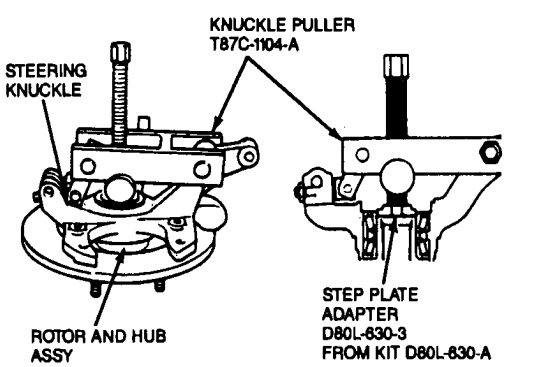
1. Position control arm. Loosely install front retaining bolt.
2. Install control arm rear retaining bracket and bolts. Tighten retaining bolts to 59-74 N·m (44-54 lb-ft).
3. Tighten front retaining bolt to 93-117 N·m (69-86 lb-ft).
4. Install ball joint to steering knuckle. Tighten clamp bolt to 43-54 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

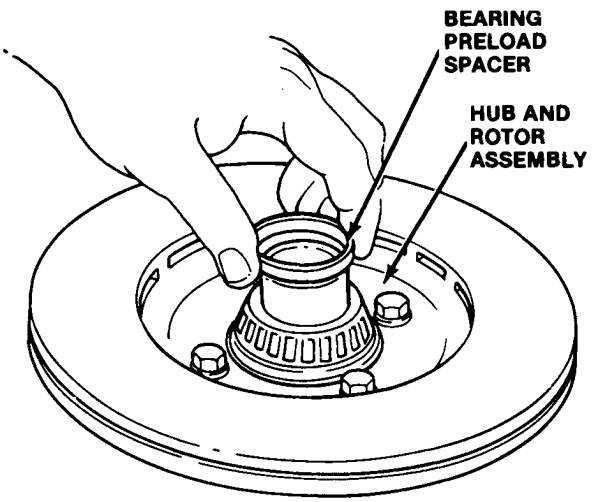
Disassembly

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.

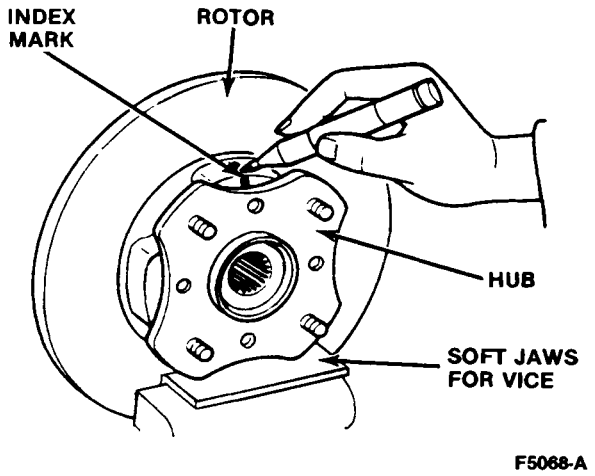


F5067-A

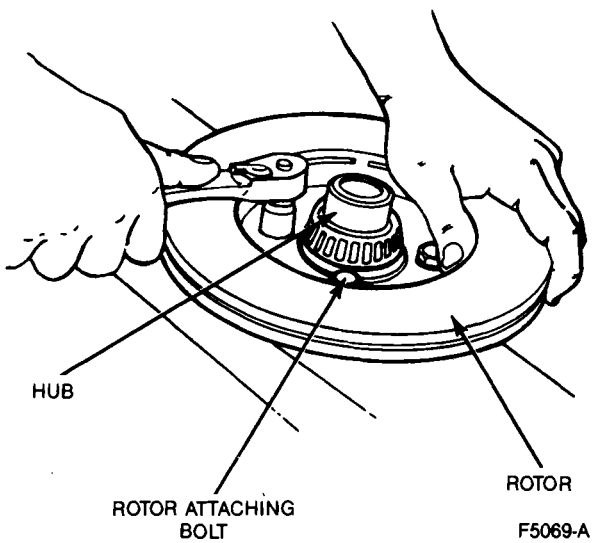
NOTE: The spacer located between the bearings determines bearing preload. It must not be discarded.

DISASSEMBLY AND ASSEMBLY (Continued)

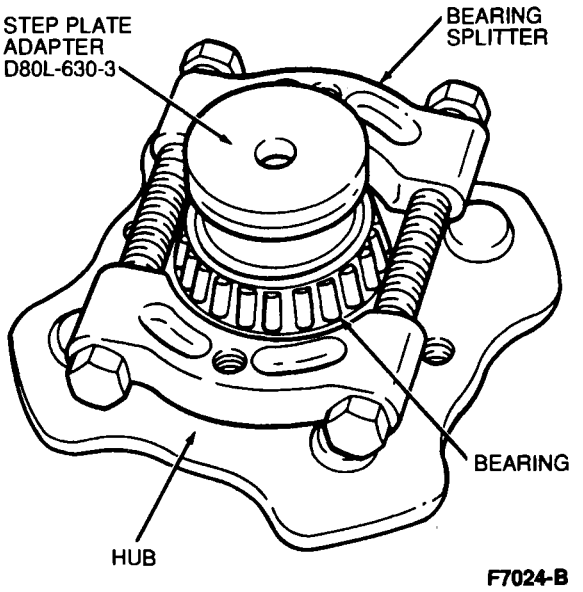
3. Mark or paint aligning marks on the hub and rotor assembly so they can be assembled in the same position.



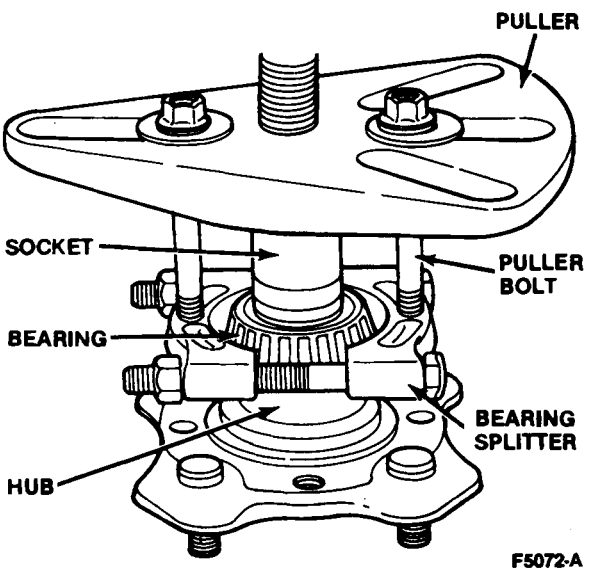
4. Remove the attaching bolts and separate the rotor from the hub. It may be helpful to mount the rotor in a soft-jawed vise.



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.

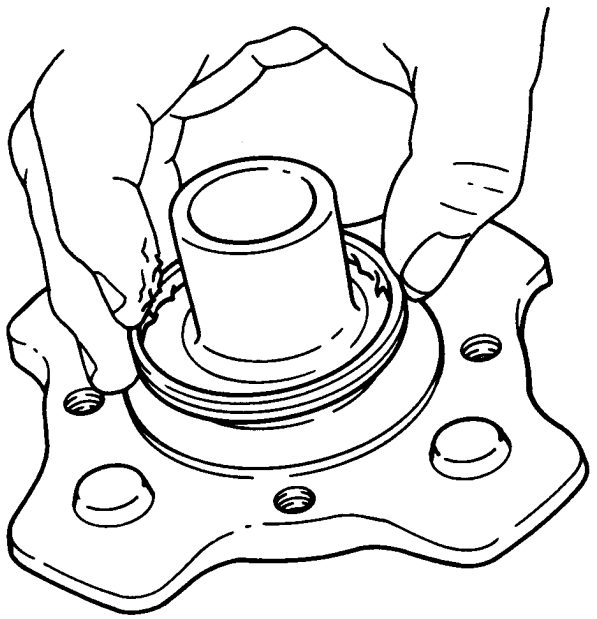


7. A socket may also have to be used to finish pulling the bearing off the hub.



DISASSEMBLY AND ASSEMBLY (Continued)

8. Remove the outer grease seal from the hub.



F5075-A

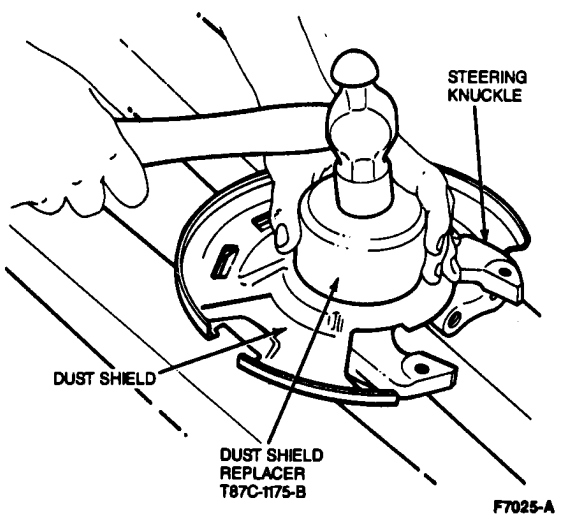
9. Remove the inner grease seal from the steering knuckle using a large screwdriver.

   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.

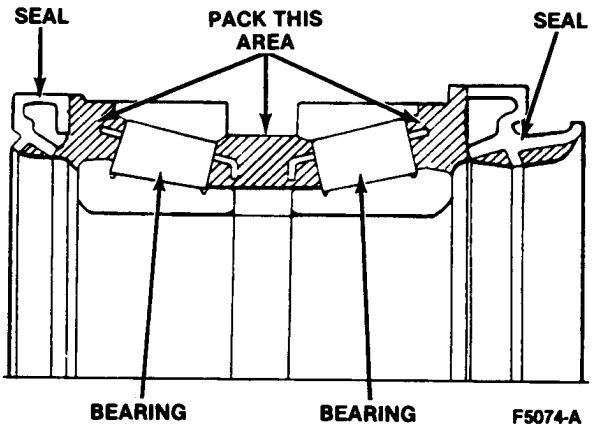
Assembly

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.



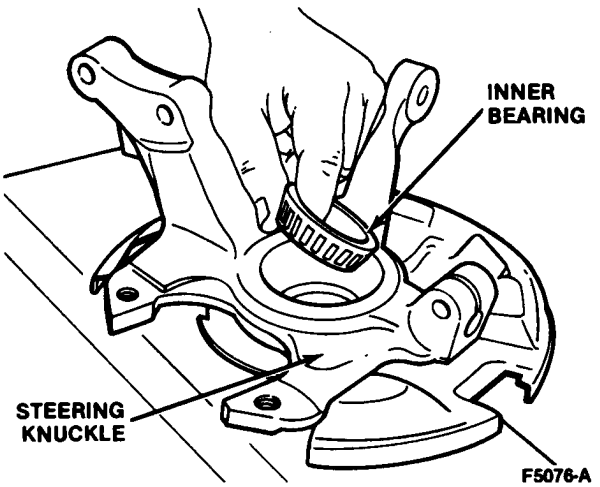
F7025-A

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



F5074-A

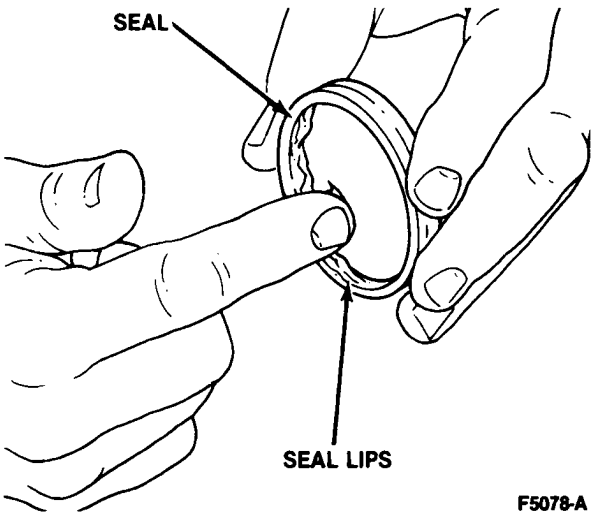
4. Position the inner bearing in the steering knuckle.



F5076-A

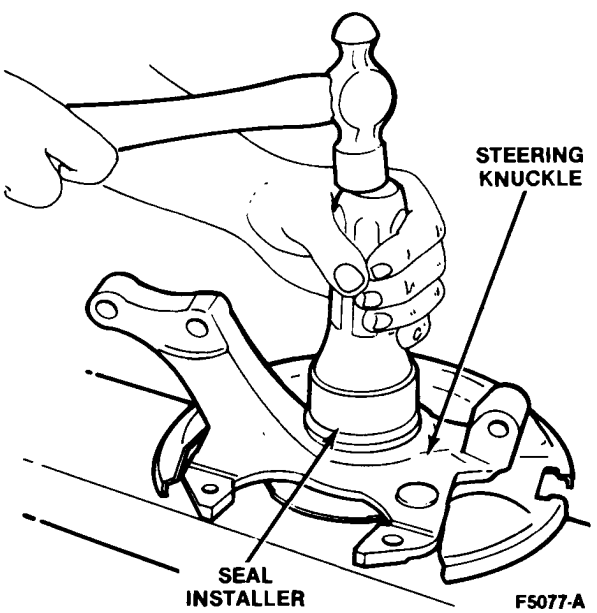
DISASSEMBLY AND ASSEMBLY (Continued)

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.



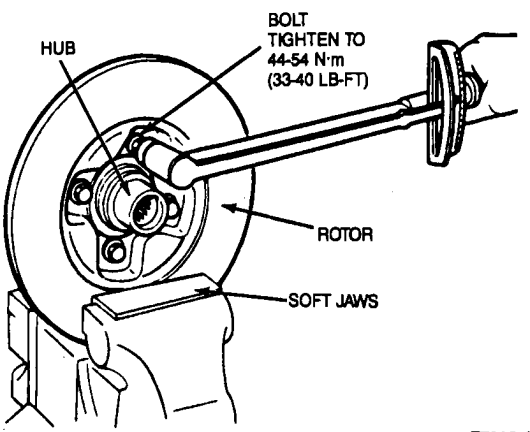
F5078-A

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



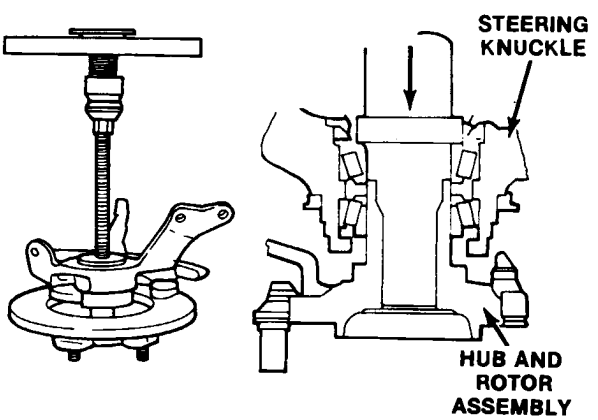
F5077-A

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.



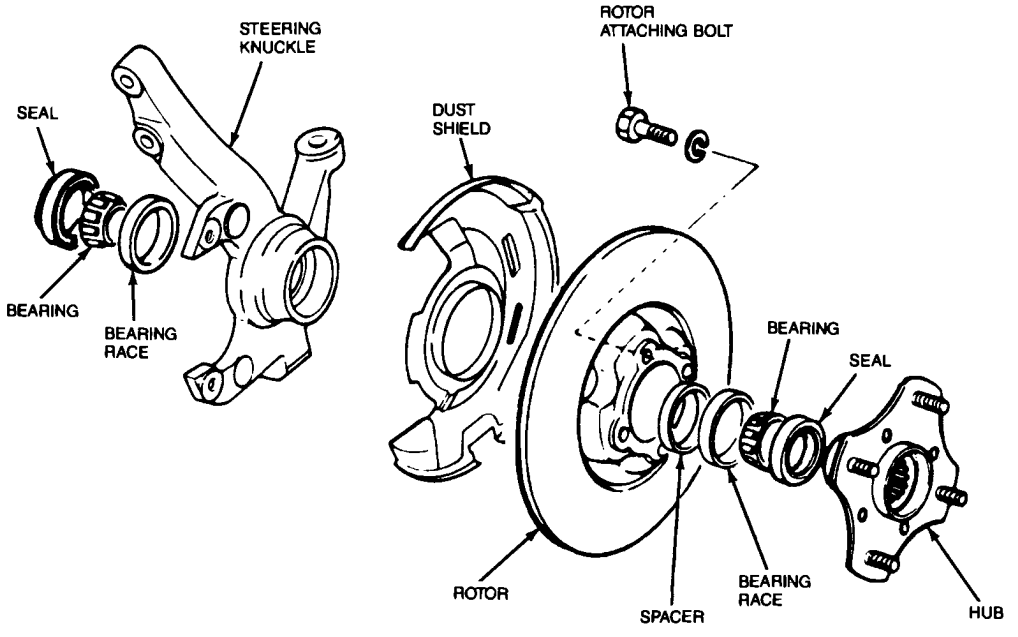
F5080A

DISASSEMBLY AND ASSEMBLY (Continued)

Steering Knuckle/Bearings

Disassembly

Steering Knuckle — Disassembled View



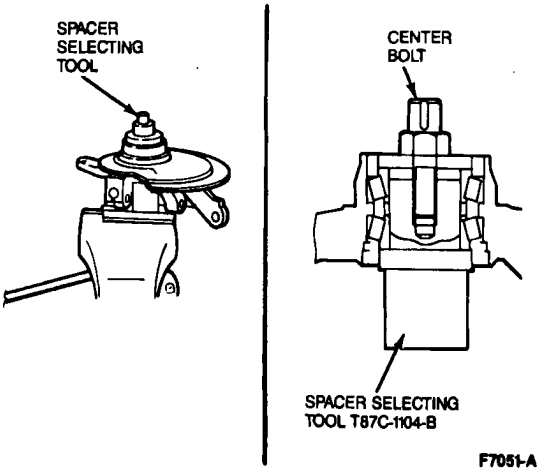
F7064-A

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.



F7051-A

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)

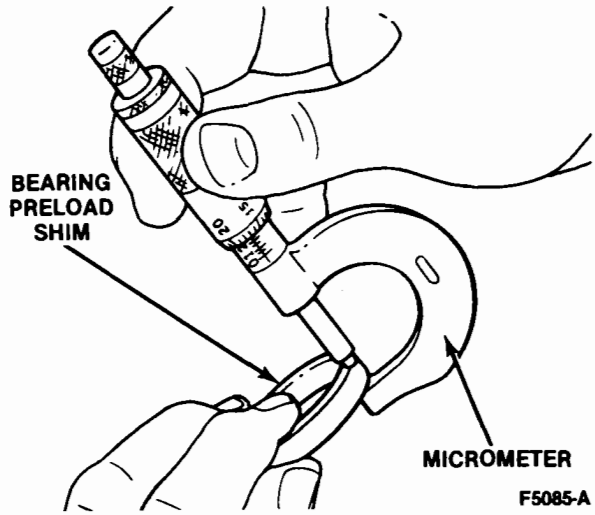
6. Mount the steering knuckle in a vise, clamping it where the shock absorber mounts.
7. Install a socket and N·m (lb-in) torque wrench on the space selector tool.
8. Measure the amount of torque required to rotate the Spacer Selection Tool T87C-1104-B or equivalent using a torque wrench. The torque 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

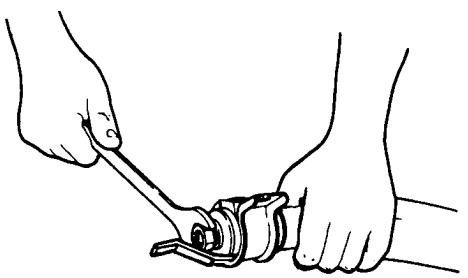
After selecting a spacer, verify the bearing preload using Spacer Selection Tool T87C-1104-B or equivalent.

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

Control Arm

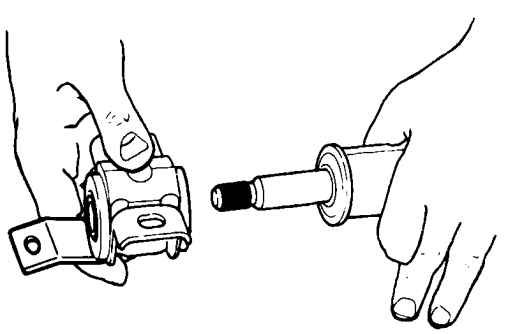
Disassembly

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



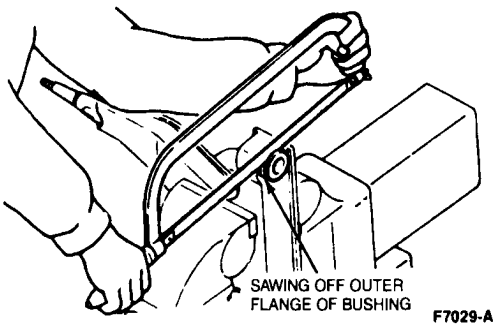
F6305-A

3. Remove the rear bushing.



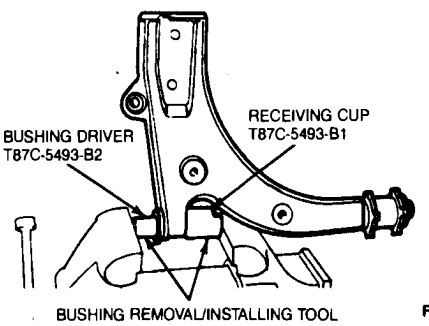
F6306-A

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.