

CHAPTER ELEVEN

REAR SUSPENSION, DIFFERENTIAL, AND DRIVE SHAFT

The RX-2 uses a combined coil spring-shock absorber suspension at the rear. The axle housing is located by 4 trailing links and a lateral rod.

The RX-3 rear suspension is a conventional leaf spring type, supported by staggered shock absorbers.

On all models, power is transmitted from the drive shaft to the differential, then through the axle shafts to the rear wheels.

This chapter includes service procedures for the rear suspension, axle shafts, rear wheel bearings, and drive shaft. Removal, inspection, and installation procedures are provided for the differential. Actual differential repair, however, requires professional skills and many expensive special tools, and is best left to a dealer or other competent repair shop. Inspection procedures in this chapter will tell you if differential repairs are necessary.

Specifications and tightening torques are given in **Tables 1 and 2** at the end of this chapter.

DRIVE SHAFT

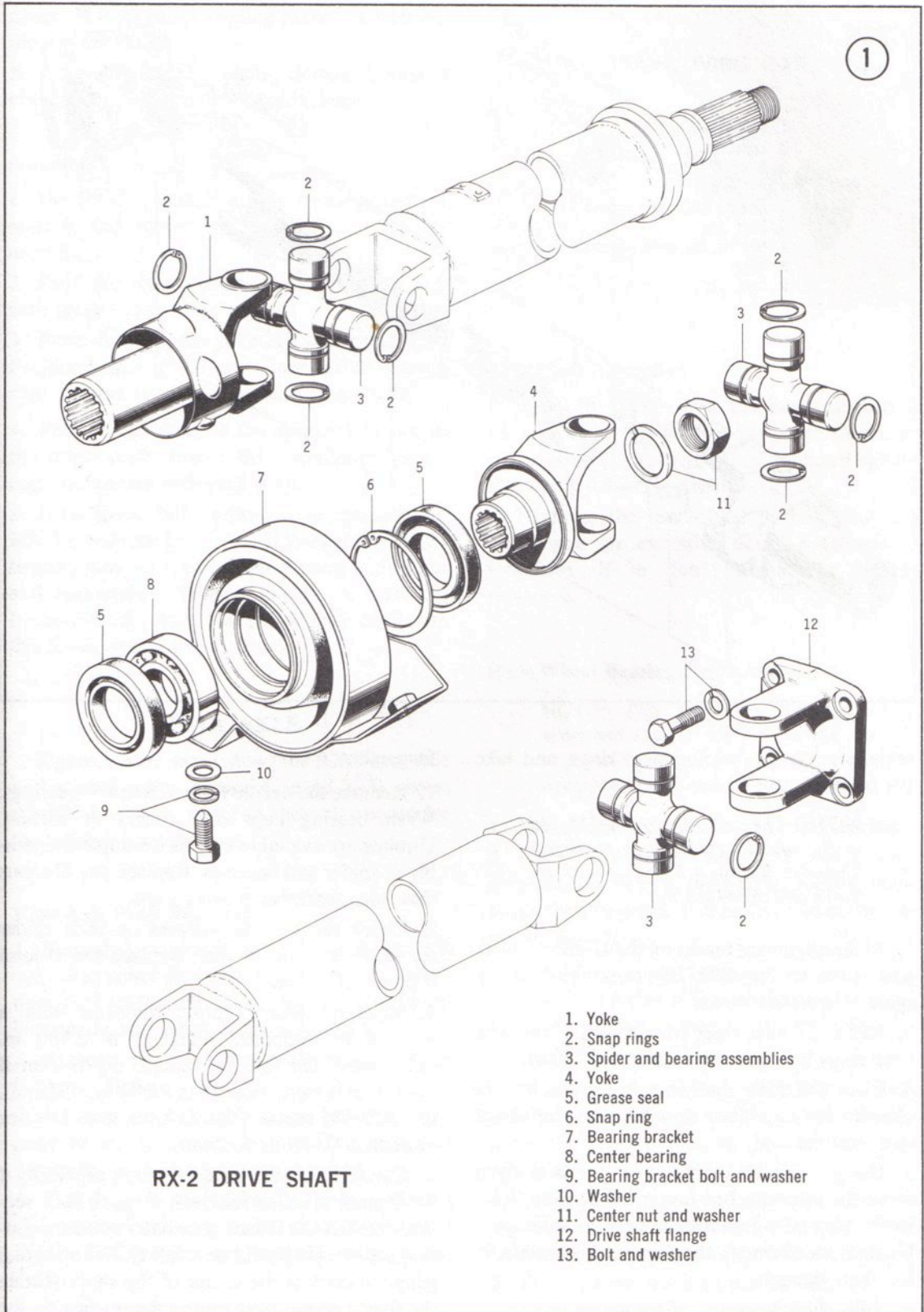
RX-2's use a 2-section drive shaft, supported at the center by a ball bearing. Three universal joints are used. RX-3's use a conventional one-piece shaft with a universal joint at each end. **Figure 1** shows the RX-2 drive shaft and related parts. **Figure 2** shows the RX-3 version.

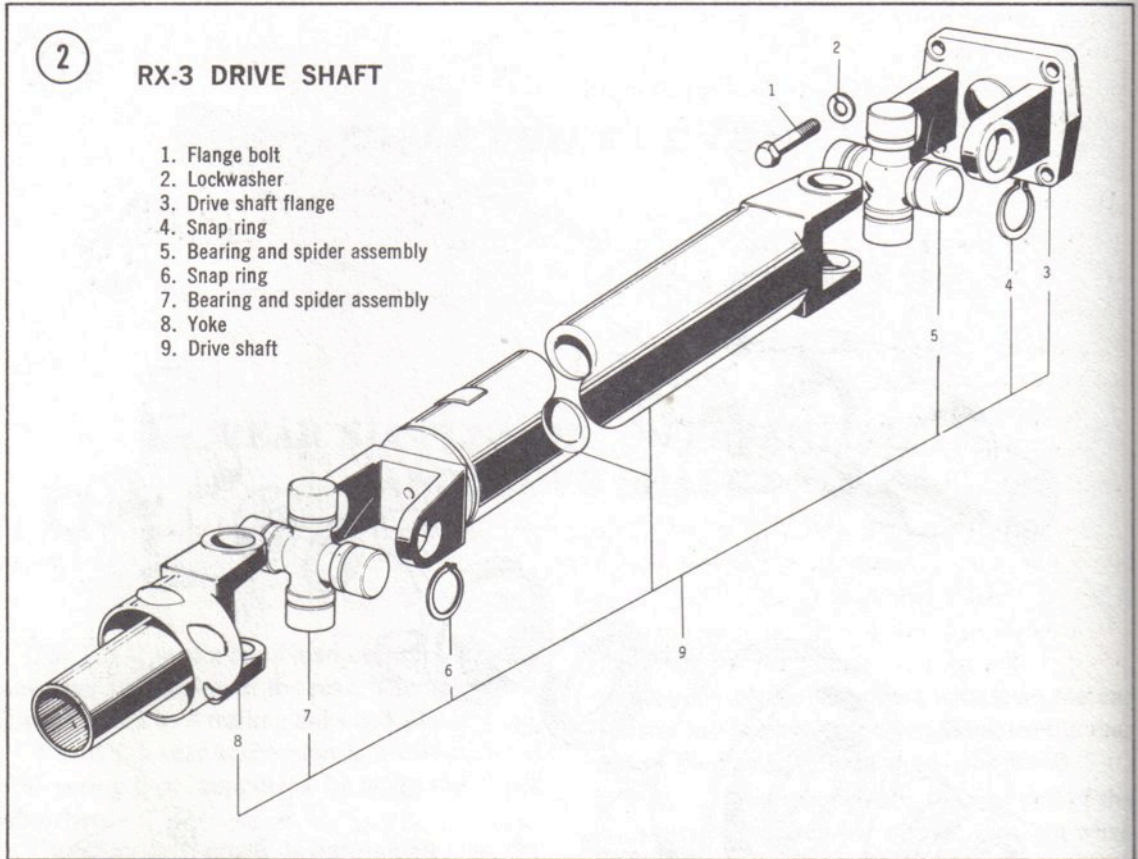
Removal/Installation

1. Securely block both front wheels so the car will not roll in either direction. Jack up the rear end of the car and place it on jackstands.
2. Place a drain pan beneath the rear end of the transmission to catch any oil that runs out when the drive shaft is removed.
3. Make alignment marks on the drive shaft and differential flanges so they can be reassembled in the same relative positions. Remove 4 bolts attaching the rear end of the drive shaft to the differential.
4. On RX-2's, detach the center bearing bracket from the underbody.
5. Slide the drive shaft rearward out of the transmission. Take it out from under the car.
6. Installation is the reverse of these steps. Tighten bolts and nuts to specifications at the end of the chapter. Since some oil may have drained from the transmission after drive shaft removal, check the level and top up if necessary.

Disassembly

1. On RX-2's, check the center bearing for roughness or looseness, and its grease seals for leaks. Leave the bearing and seals in place if serviceable. To remove, undo the nut holding the drive shaft sections together. Pry out the oil





seals, remove the bearing snap rings, and take the bearing out.

NOTE: The nut is torqued to 116-130 ft.-lb., and access to it is restricted. Consider having a Mazda dealer remove and install the nut.

2. Make alignment marks on the U-joint spiders and yokes so they can be reassembled in the same relative positions.
3. Remove 4 snap rings from each U-joint. The snap rings hold the bearings in the yokes.
4. Place the drive shaft in a soft-jawed vise as close to the U-joint as possible. Be careful not to distort the shaft.
5. Using a suitable drift, tap on one bearing to drive the opposite bearing out. Turn the drive shaft over and tap on the spider to drive the first bearing out. Remove the remaining bearings in the same manner.
6. Take the spiders out of the yokes.

Inspection

1. Remove the needle rollers from the bearings. Wash bearing cups and rollers in solvent. U-joints are available only as a complete assembly of spider and bearings. Replace any U-joints that have defective bearing parts.
2. Check the bearing surfaces on each spider for wear, scoring, or pits. Replace the U-joint if these are visible.
3. Measure spider journal diameter with a micrometer. Standard diameter is 0.580 in. (14.72mm). On RX-2's, replace the U-joint if the spider is worn more than 0.004 in. (0.1mm). On RX-3's, replace the U-joint if it is worn more than 0.008 in. (0.2mm).
4. Carefully inspect the drive shaft, especially if it vibrated prior to removal. Inspect both sections on RX-2's. Place the shaft between accurate centers (V-blocks or a lathe). Set up a dial gauge to contact the center of the shaft. Rotate the shaft one full turn, noting the reading on the

gauge. If total gauge reading exceeds 0.016 in., replace the shaft.

5. If the drive shaft is visibly damaged, have it checked for balance by a Mazda dealer.

Assembly

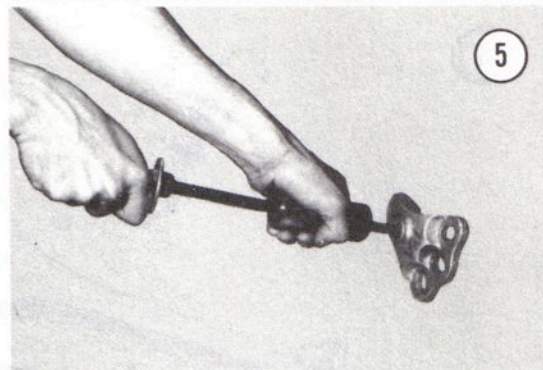
1. On RX-2's, install a new bearing and oil seals in the center bracket (if they were removed).
2. Pack the roller recess in each bearing cup with grease. Install the rollers.
3. Place each U-joint yoke in a soft-jawed vise. Position spider in the yoke, then install bearing cups. Secure bearing cups with snap rings.
4. Position the yoke at the appropriate end of the drive shaft. Install the remaining bearing cups and secure with snap rings.
5. If the drive shaft sections were separated on RX-2's, slide the front section through the center bearing into the rear section. Secure with a nut and lockwasher. Tighten the nut to 116-130 ft.-lb. (16-18 mkg). Have a Mazda dealer do this if you don't have the tools.

REAR AXLE

Figure 3 (next page) shows the RX-2 rear axle and related parts. **Figure 4** (page 195) shows the RX-3 version. Refer to them as needed for the following procedures.

Rear Axle Shaft Removal

1. Securely lock both front wheels so the car will not roll in either direction. Loosen the rear wheel nuts, jack up the rear end of the car, place it on jackstands, and remove the rear wheels.
2. Remove the rear brake drum and shoes (Chapter Ten).
3. Remove 4 nuts attaching the brake backing plate to the rear axle housing. The nuts also secure the rear wheel bearing retainer.
4. Pull the axle shaft from the housing with a slide hammer and adapter like the ones shown in **Figure 5**. The tools are available from rental dealers.
5. Pry the oil seal out of the axle housing.



Axle Shaft Inspection

1. Carefully examine the machined surfaces of the axle shaft and housing for wear. Check the shaft for bending, twisting, or damaged splines. Replace if defects are visible.
2. Examine the rear wheel bearing. Rotate it and check for excessive noise, roughness, or looseness. If in doubt about the bearing, replace it.

Rear Wheel Bearing Replacement

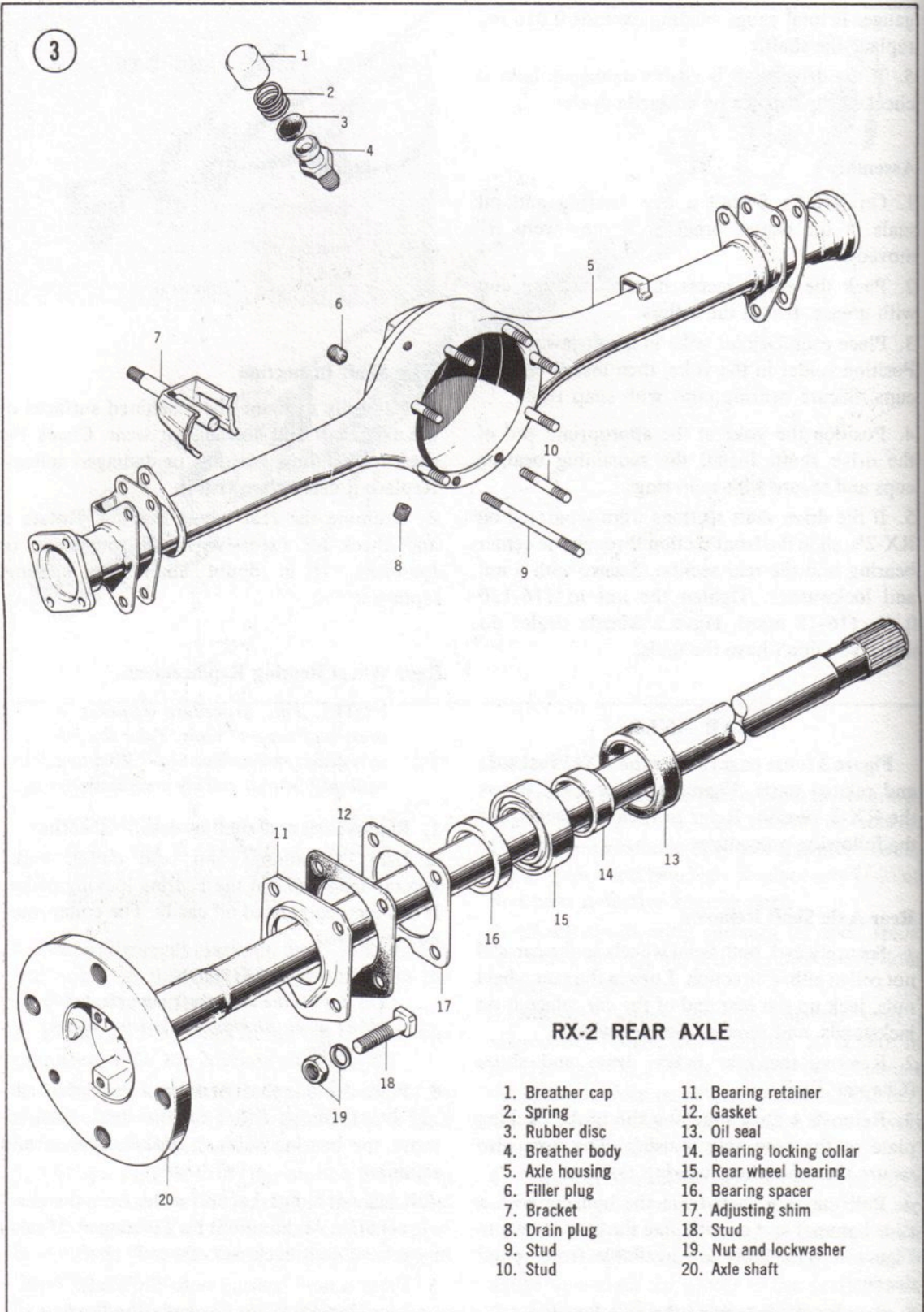
NOTE: This procedure requires a press and support tools. Take the job to a dealer or machine shop. They are equipped to do it quickly and safely.

1. Remove the axle shaft as described earlier.
2. Using a hammer and cold chisel, make several deep nicks in the bearing locking collar. It can then be pressed off easily. The collar must not be reused.

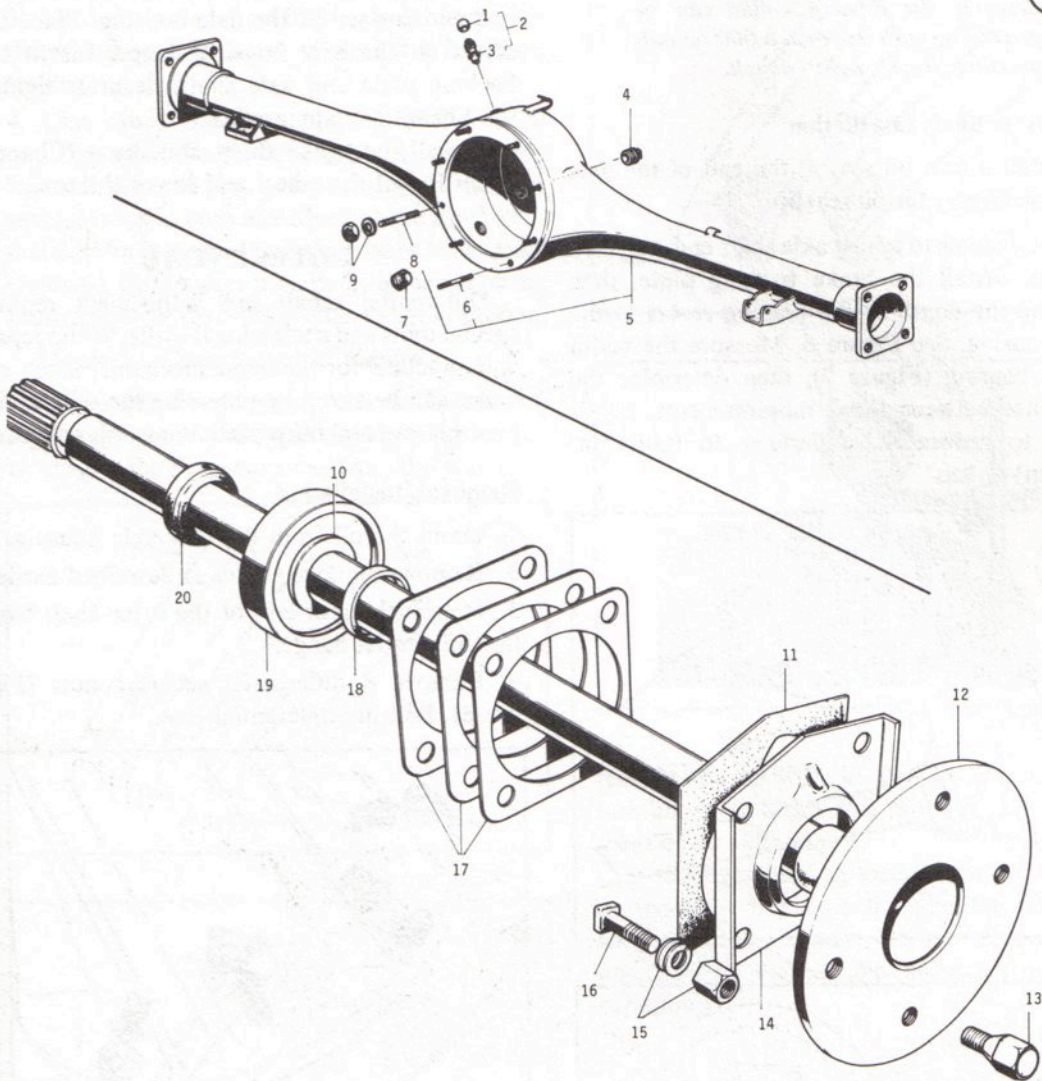
CAUTION

Do not hit the axle shaft with the cold chisel when nicking the bearing locking collar.

3. Place the axle shaft in a press. Press the bearing and retaining collar off the shaft, then remove the bearing shim(s), gasket, spacer, and retainer.
4. Clean all old gasket and sealer from the bearing retainer. Make sure it isn't damaged. If serviceable, slide it back onto the axle shaft.
5. Press a new bearing onto the shaft. Press a new locking collar on to secure the bearing.



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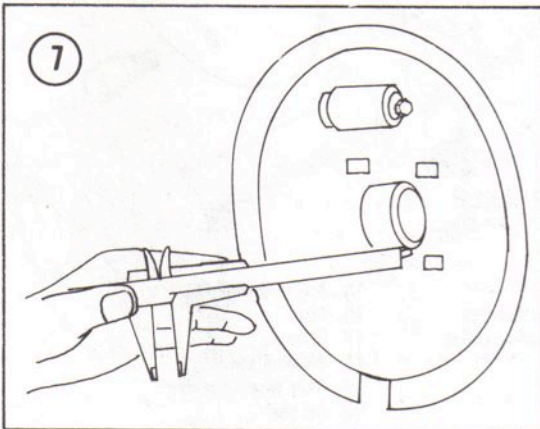
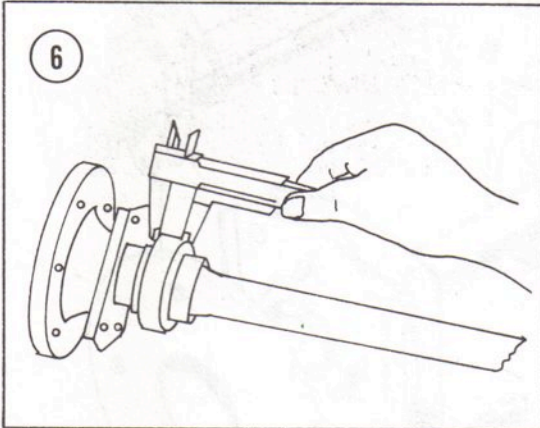
RX-3 REAR AXLE

- | | | |
|----------------------|----------------------------|------------------------|
| 1. Breather cap | 8. Stud | 15. Nut and washers |
| 2. Breather assembly | 9. Nut and lockwasher | 16. Stud |
| 3. Breather body | 10. Bearing locking collar | 17. Shims |
| 4. Filler plug | 11. Gasket | 18. Bearing spacer |
| 5. Axle housing | 12. Axle shaft | 19. Rear wheel bearing |
| 6. Stud | 13. Wheel bolt | 20. Oil seal |
| 7. Drain plug | 14. Bearing retainer | |

NOTE: Do not try to press the bearing and locking collar on at the same time. If the locking collar can be pressed on with less than 6,000 pounds pressure, it isn't tight enough.

Rear Axle Shaft Installation

1. Install a new oil seal in the end of the axle housing. Grease the oil seal lip.
2. Select shims to adjust axle shaft end-play. To do this, install the brake backing plate, then measure the depth of the bearing recess in the axle housing. See **Figure 6**. Measure the width of the bearing (**Figure 7**), then determine the difference between the 2 measurements. Select shims to reduce the difference to 0.004 in. (0.1mm) or less.



3. On RX-2's, install the rear axle shaft and selected shims in the axle housing. Securely tighten the 4 bearing retainer nuts.

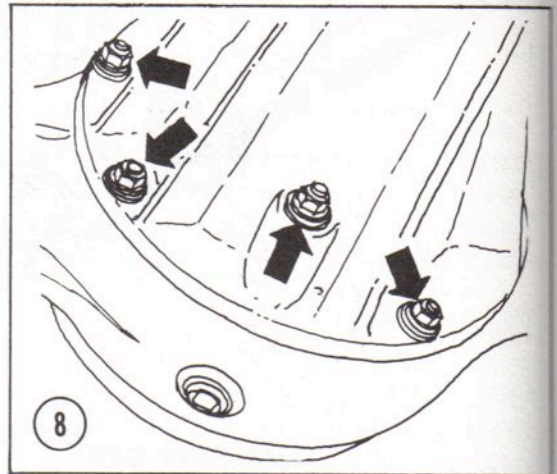
4. On RX-3's, remove the brake backing plate. Apply a light coat of gasket sealer to the shims and end surface of the axle housing. Place the shims on the axle housing flange. Install the backing plate and axle shaft. Securely tighten the 4 bearing retainer nuts.
5. Install the brake shoes and drum (Chapter Ten). Install the wheel and lower the car.

DIFFERENTIAL

Differential repair and adjustment require special tools and professional skills. While repair is impractical for the home mechanic, much expense can be saved by removing the differential yourself and making a preliminary examination.

Removal/Installation

1. Drain the oil from the rear axle housing.
2. Remove the axle shafts as described earlier.
3. Detach the rear end of the drive shaft from the differential flange.
4. Remove 8 differential securing nuts (**Figure 8**). Pull the differential free.



5. Installation is the reverse of these steps. Tighten differential nuts to 14.5 ft.-lb. (2 mkg). Fill the rear axle housing with a lubricant specified at the end of the chapter.

Inspection

1. Look for visible wear or signs of damage, such as chipped or missing teeth. Have worn or damaged parts replaced.

2. Check the bearings for wear or damage. Have them replaced as needed.
3. Look for signs of oil leaking past the pinion (front) oil seal. Have it replaced if it has been leaking.
4. Check the tooth contact pattern of the pinion and ring gear. To do this, apply a coat of red lead oxide to the ring gear teeth. Turn the gear several turns in both directions so the tooth contact pattern is pressed into the coat of lead oxide. Compare the contact pattern with the following illustrations to determine differential condition.

Figure 9—Correct contact pattern.

Figure 10—Heel contact. Correct by increasing the thickness of the pinion adjusting washer or moving the ring gear away from the pinion.

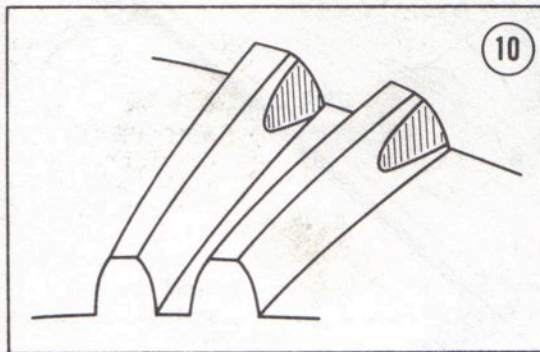
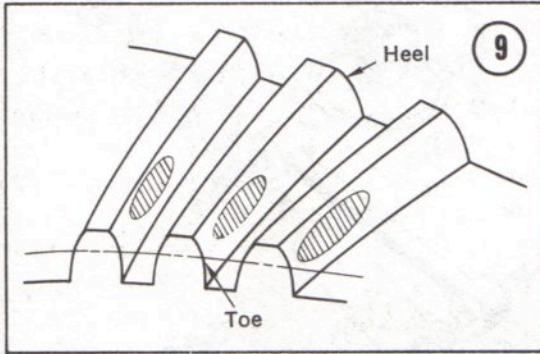
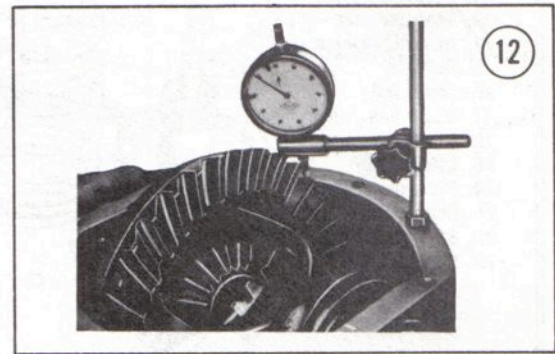
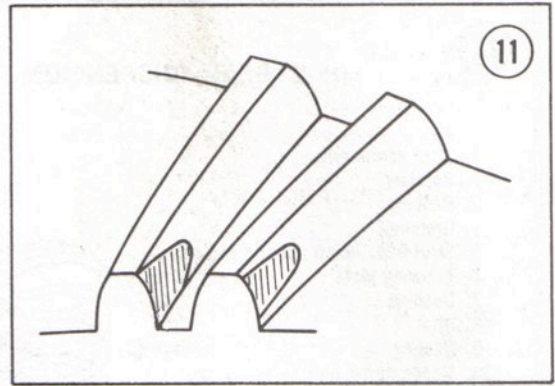


Figure 11—Toe contact. Correct by decreasing the thickness of the pinion adjusting washer, or moving the ring gear toward the pinion.

5. Connect a dial gauge as shown in **Figure 12** and measure backlash of the pinion and ring gear. To measure, hold the pinion from turning and turn the ring gear as much as possible. The reading on the dial gauge should range



from 0.0067-0.0076 in. (0.17-0.19mm). Backlash above or below this range requires adjustment of the differential.

If the inspection procedures indicate defects or incorrect adjustments, take the differential to a dealer for repair. Do not disassemble it any further without the necessary tools and experience.

REAR SUSPENSION

Figure 13 shows the RX-2 rear suspension. The RX-3 sedan and coupe suspension (**Figure 14**) is similar to that used on the RX-3 station wagon (**Figure 15**). The main difference is in the shock absorber mounts.

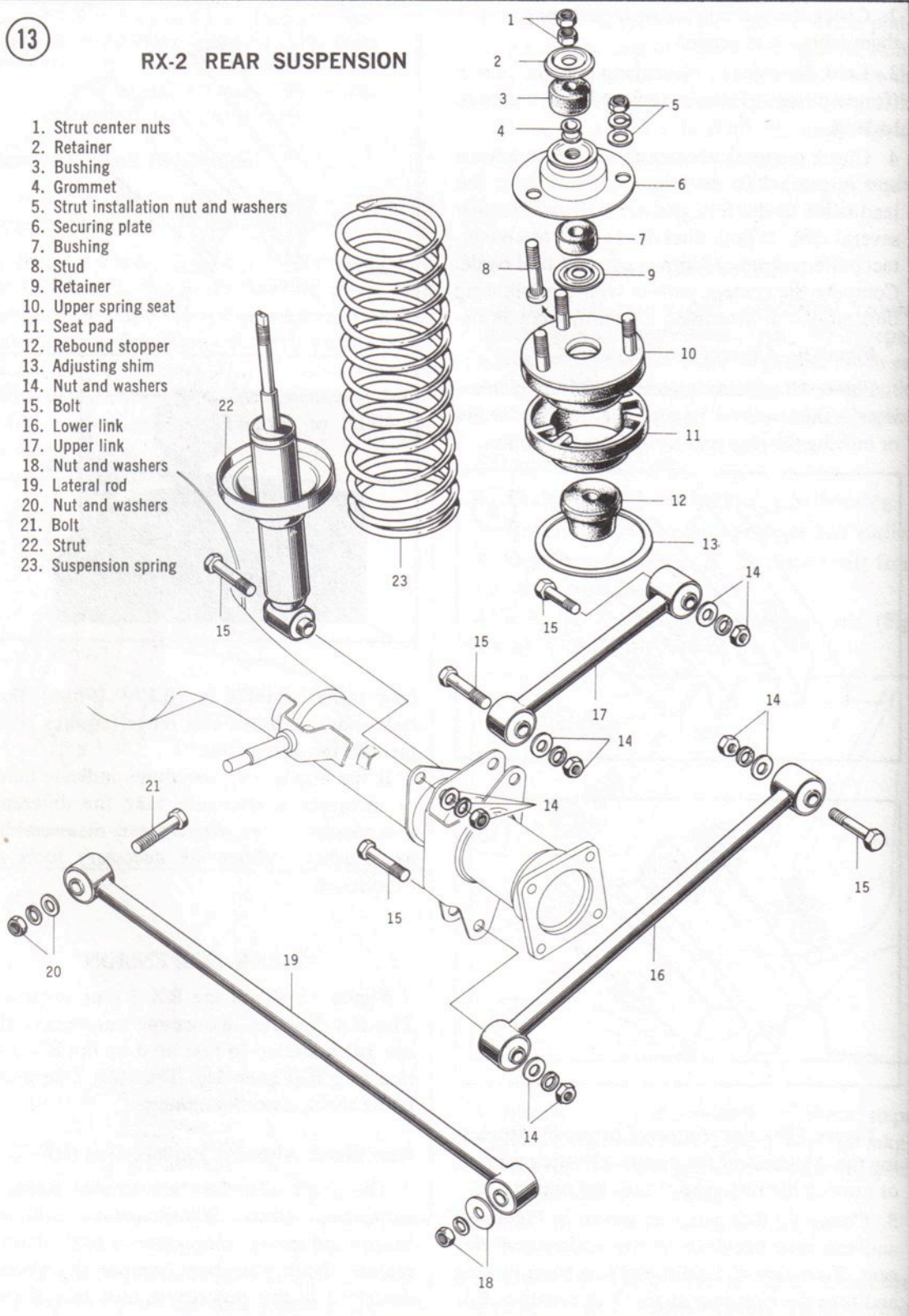
Rear Shock Absorber Replacement (RX-2)

The shock absorbers are located inside the suspension struts. Replacement requires a Mazda coil spring compressor or equivalent. To replace shock absorbers, remove the struts as described in this procedure, then take them to a Mazda dealer for shock absorber replacement.

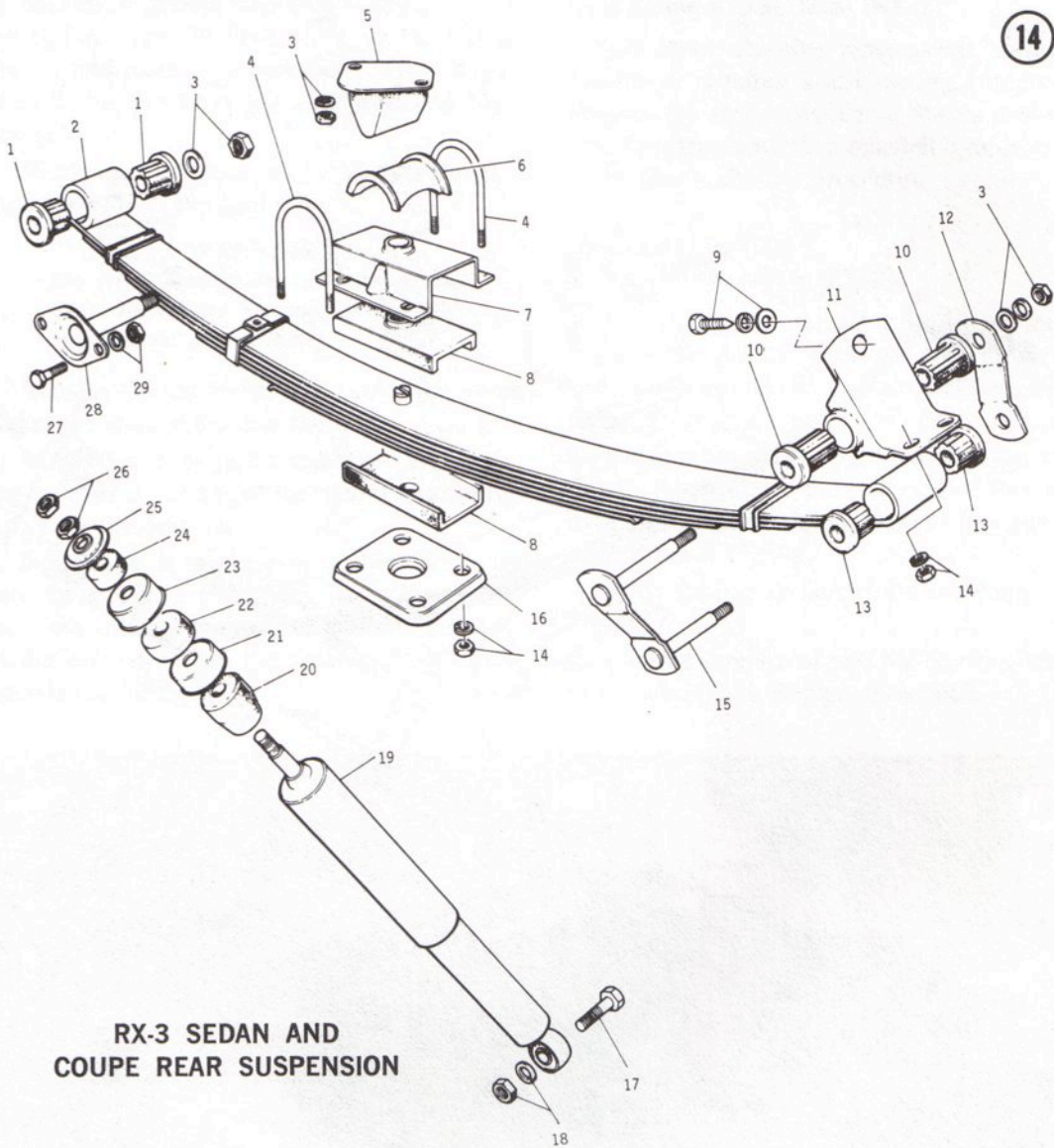
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RX-2 REAR SUSPENSION

- 1. Strut center nuts
- 2. Retainer
- 3. Bushing
- 4. Grommet
- 5. Strut installation nut and washers
- 6. Securing plate
- 7. Bushing
- 8. Stud
- 9. Retainer
- 10. Upper spring seat
- 11. Seat pad
- 12. Rebound stopper
- 13. Adjusting shim
- 14. Nut and washers
- 15. Bolt
- 16. Lower link
- 17. Upper link
- 18. Nut and washers
- 19. Lateral rod
- 20. Nut and washers
- 21. Bolt
- 22. Strut
- 23. Suspension spring



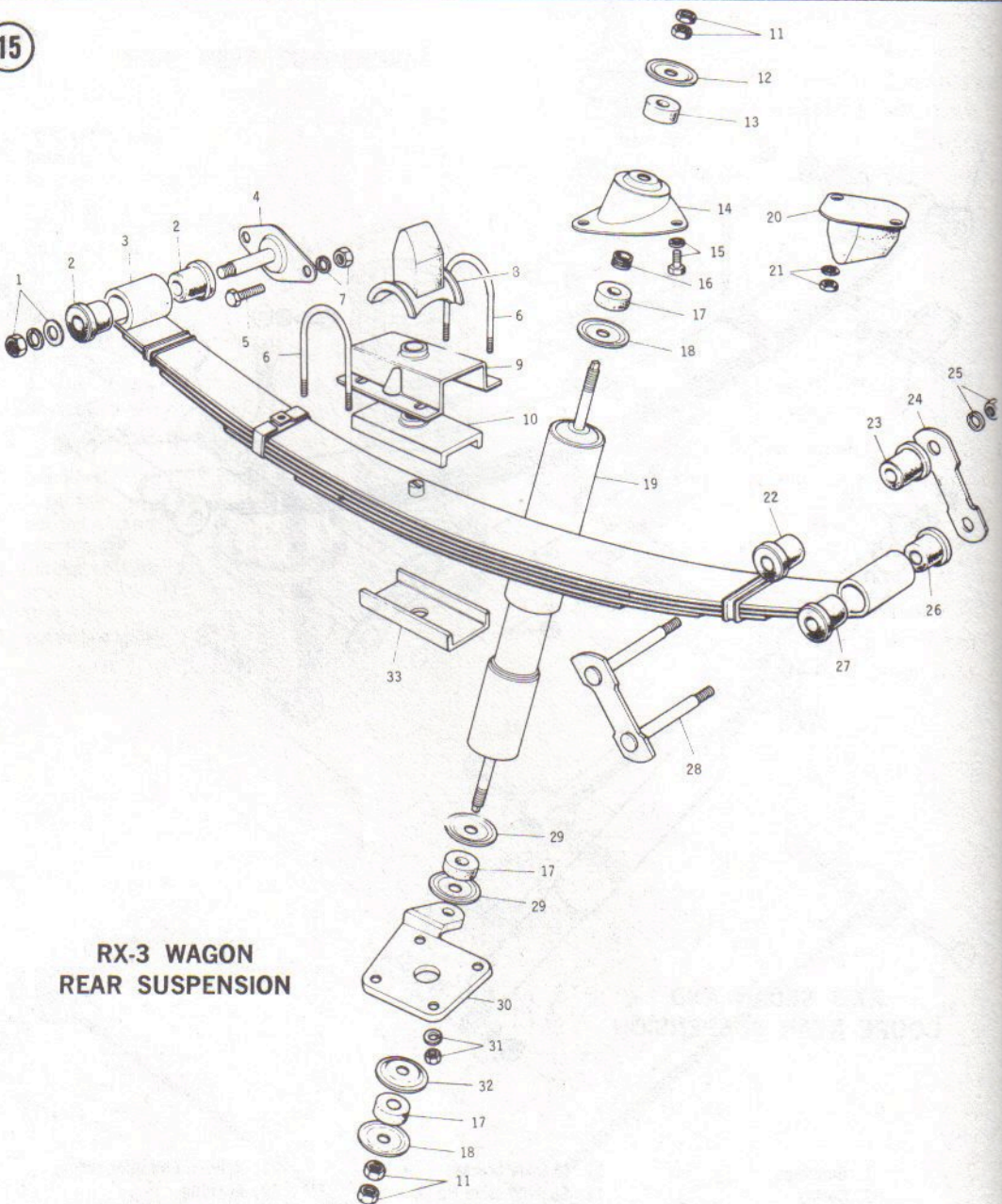
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**RX-3 SEDAN AND
COUPE REAR SUSPENSION**

- | | | |
|---------------------|-------------------------|-------------------------------|
| 1. Bushings | 11. Shackle bracket | 21. Rebound bumper casing |
| 2. Spring | 12. Shackle plate No. 2 | 22. Bushing |
| 3. Nut and washer | 13. Bushings | 23. Bushing holder |
| 4. U-bolt | 14. Nut and washers | 24. Bushing |
| 5. Rebound bumper | 15. Shackle plate No. 1 | 25. Bushing retainer |
| 6. U-bolt seat | 16. Metal plate | 26. Shock absorber upper nuts |
| 7. Pad holder | 17. Bolt | 27. Bolt |
| 8. Pads | 18. Nut and washer | 28. Spring front pin |
| 9. Bolt and washers | 19. Shock absorber | 29. Nut and washer |
| 10. Bushings | 20. Rebound bumper | |

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**RX-3 WAGON
REAR SUSPENSION**

- 1. Nut and washers
- 2. Bushings
- 3. Spring
- 4. Spring pin
- 5. Bolt
- 6. U-bolts
- 7. Nut and washers
- 8. Rebound bumper
- 9. Pad holder
- 10. Pad
- 11. Shock absorber nuts

- 12. Retainer
- 13. Bushing
- 14. Shock absorber bracket
- 15. Bolt and washer
- 16. Grommet
- 17. Bushings
- 18. Retainer
- 19. Shock absorber
- 20. Rebound bumper
- 21. Nut and washer
- 22. Bushing

- 23. Bushing
- 24. Shackle plate No. 2
- 25. Nut and washer
- 26. Bushing
- 27. Bushing
- 28. Shackle plate No. 1
- 29. Retainers
- 30. Metal plate
- 31. Nut and washer
- 32. Retainer
- 33. Pad

1. Securely lock both front wheels so the car will not roll in either direction. Jack up the rear of the car and place it on jackstands. Place a jack beneath the center of the rear axle and raise it slightly.
2. Working in the trunk, remove 3 nuts securing the upper end of the strut.

WARNING

Do NOT remove the 2 center nuts. This will release the coil spring, and could cause serious injury.

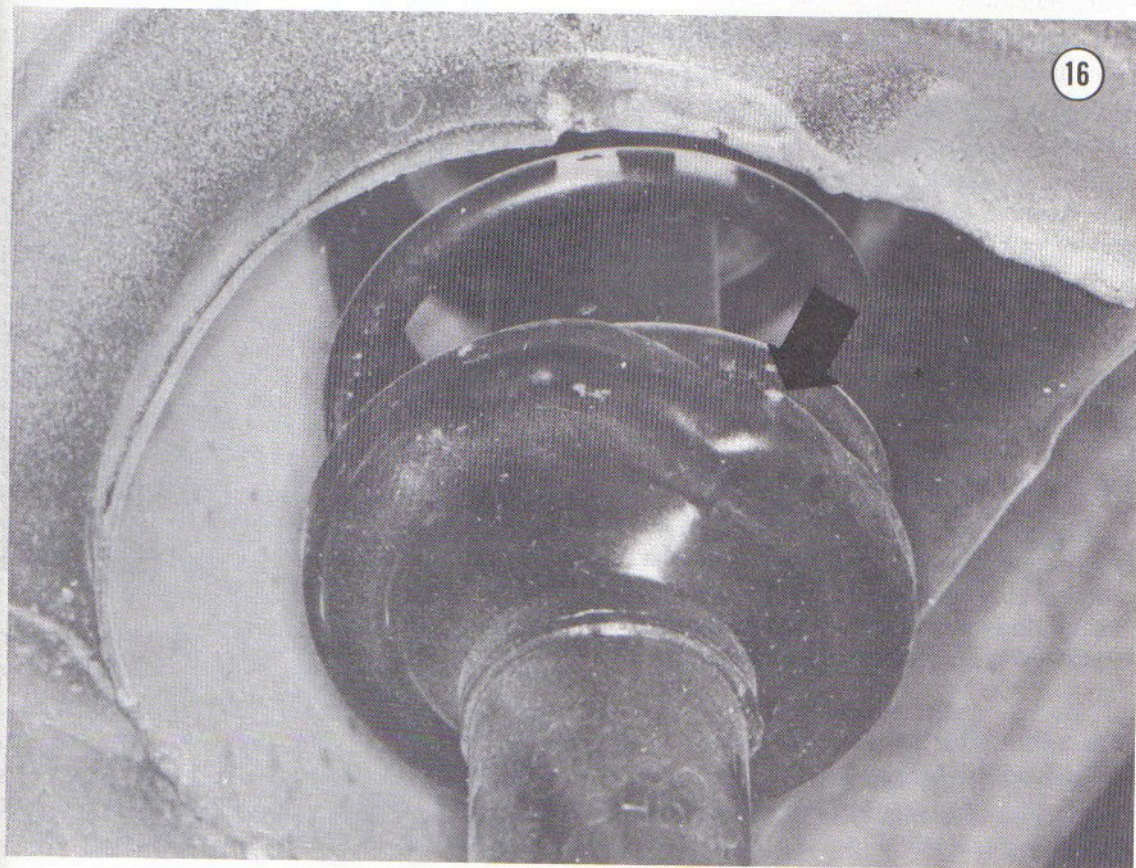
3. Remove the nut and bolt attaching the lower end of the strut to the axle housing.
4. Slowly lower the jack beneath the axle housing until the upper end of the strut is clear of the car. Take the strut out.
5. Installation is the reverse of these steps. Be sure the point on the spring base (**Figure 16**) faces the front of the car. Tighten nut and bolt at the bottom end of the strut to 72-87 foot-pounds (10-12 mkg).

Rear Spring Replacement (RX-2)

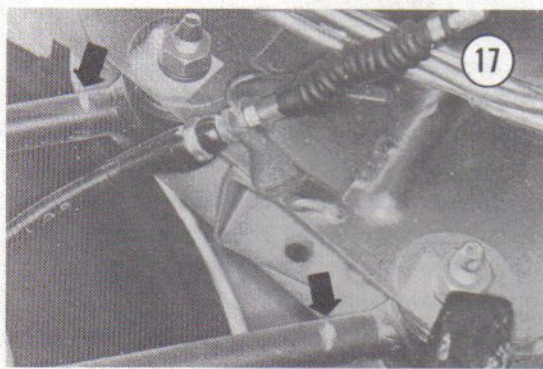
Like shock absorber replacement, spring replacement requires a coil spring compressor. Remove the strut, take it to a Mazda dealer for spring replacement, then reinstall it as described in the shock absorber procedure.

Link and Lateral Rod Removal/Installation (RX-2)

1. Securely block both front wheels so the car will not roll in either direction. Jack up the rear end of the car and place jackstands beneath the frame. Place a jack beneath the center of axle.
2. Remove the nut and bolt from each end of the link or lateral rod being removed. If the bolt is difficult to remove, it may help to jack the axle up and down slightly.
3. Take the link or lateral rod out from under the car.
4. Check the removed part for bending, cracks, or worn bushings. Replace as needed.



5. Install by reversing Steps 1-3. If a link has been removed, be sure the white paint mark is toward the body when installed. See **Figure 17**. Tighten the attaching nuts and bolts to 72-87 ft.-lb. (10-12 mkg) with the car on the ground and unloaded. Tightening while the car is jacked up will cause excessive vehicle height and premature bushing wear.



2. Remove the nuts, washers, and bushing from the lower end of the shock absorber.
3. Compress the shock absorber and separate it from its lower bracket.
4. Remove 3 bolts attaching the shock absorber bracket to the body.
5. Take the shock absorber out from under the car. Remove the nuts, lockwashers, bushings, and upper bracket from the shock absorber.
6. Installation is the reverse of these steps. Tighten the upper and lower shock absorber nuts until the stud protrudes approximately $\frac{1}{4}$ inch past the nuts. Tighten the bracket-to-body bolts to 15 ft.-lb. (2 mkg).

Rear Spring Removal/Installation (RX-3)

1. Securely block both front wheels so the car will not roll in either direction. Loosen the rear wheel nuts, jack up the rear end of the car, and remove the rear wheels. Place jackstands beneath the frame and rear axle housing.

Rear Shock Absorber Replacement (RX-3 Sedan and Coupe)

1. Remove the front trim panel from inside the trunk.

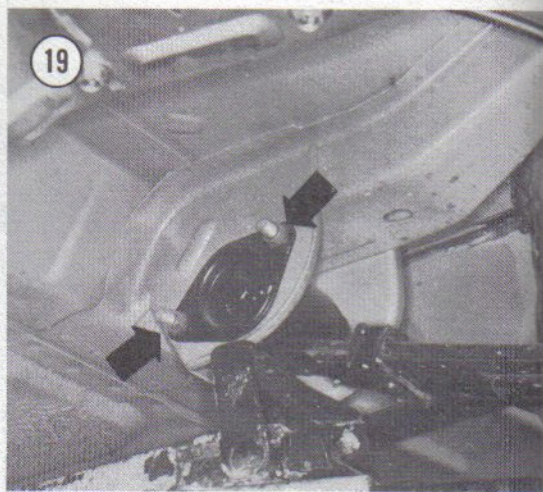
2. Remove the nuts, washers, and bushings from the upper end of the shock absorber.
3. Remove the nut and bolt from the lower end of the shock absorber. Take the shock out from under the car.
4. Installation is the reverse of these steps.

Rear Shock Absorber Replacement (RX-3 Station Wagon)

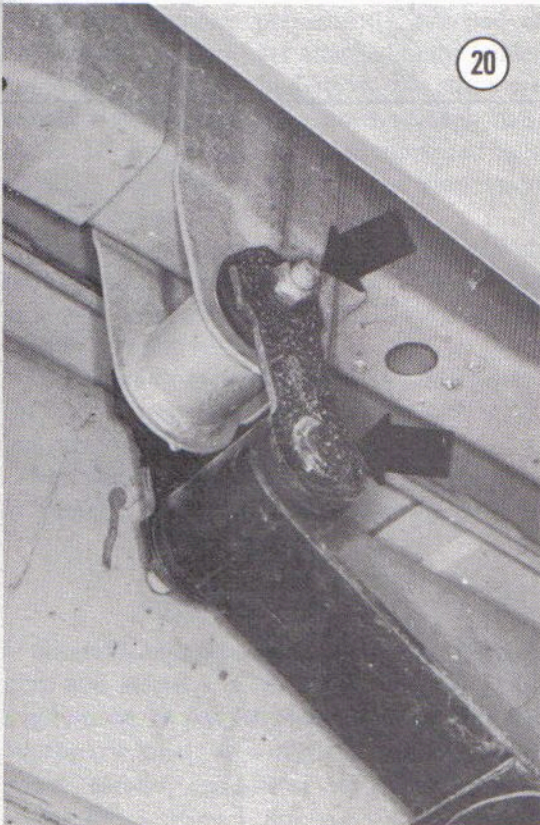
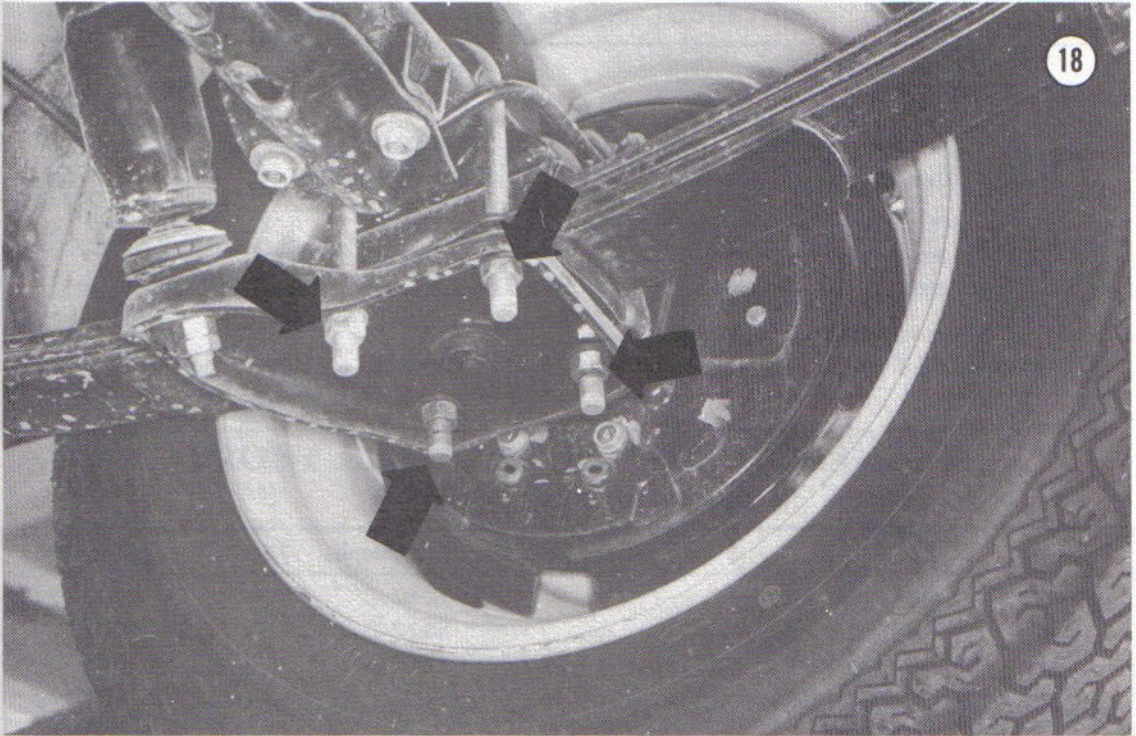
1. Securely block both front wheels so the car will not roll in either direction. Jack up the rear end of the car and place it on jackstands.
2. Remove the U-bolt nuts (**Figure 18**). Separate the metal plate, rubber pad, and U-bolts from the spring.
3. Remove 2 bolts and a nut attaching the spring front pin to its bracket on the body (**Figure 19**). Pry the pin out with a screwdriver.

WARNING

Be sure the jackstands beneath the axle housing are positioned so they exert an upward pressure on the spring. Otherwise, the end of the spring could snap downward, causing serious injury.



4. Remove 2 nuts and a bolt attaching the rear shackle hanger to the body (**Figure 20**). Remove the spring together with the shackle hanger.
5. Installation is the reverse of these steps. Tighten the shackle and spring pin nuts and bolts to 14 ft.-lb. (1.9 mkg). Tighten the U-bolt nuts to 30 ft.-lb. (4 mkg).



Rear Spring Disassembly, Inspection, and Repair (RX-3)

1. Place the spring in a soft-jawed vise. Remove 2 nuts, then the shackle hanger.
2. Pry the clips off the spring with a heavy screwdriver.
3. Remove the nut and bolt from the center of the spring. Separate the spring leaves.
4. Check the rubber bushings and spring pads for wear or deterioration. Replace as needed.
5. Check the spring leaves for breaks, cracks, or obvious weakness. Replace defective springs.

NOTE: Springs differ for coupes, sedans, and wagons. In addition, 3 camber settings are available. Camber settings are indicated by a plus, minus, or zero mark on the main leaf. When installing a new spring, be sure it has the same camber setting as the original.

6. Check the U-bolts and attaching parts for wear or damage. Replace as needed.
7. Assemble by reversing Steps 1-3. After installing center screw and nut, stake the nut with a hammer and punch so it won't come loose.

Table 1 DIFFERENTIAL AND REAR SUSPENSION SPECIFICATIONS

Final gear type	Semi-floating, hypoid
Oil type	
Above 0° F (−18° C)	SAE 90 hypoid
Below 0° F (−18° C)	SAE 80 hypoid
Oil capacity	
RX-2	1.3 quarts (1.2 liters)
RX-3	1.5 quarts (1.4 liters)
Rear suspension type	
RX-2	Combined coil spring-shocks
RX-3	Leaf springs, tube shocks

Table 2 TIGHTENING TORQUES

RX-2	Foot-pounds	Mkg
Upper and lower links	72-87	10-12
Lateral rod to body	58-72	8-10
Lateral rod to axle housing	72-87	10-12
Shock absorber to axle housing	72-87	10-12
RX-3	Foot-pounds	Mkg
Shock absorber bracket to body (wagon)	15	2
Rear spring U-bolt nuts	30	4
Pivot bolts, front and rear ends of spring	14	1.9