



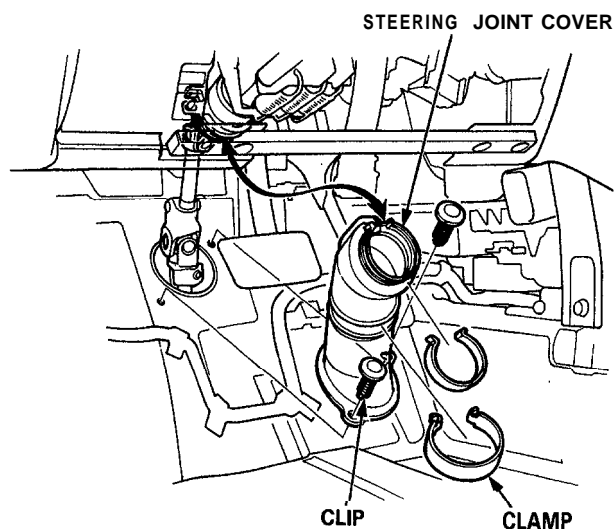
# Manual Steering

## -Gearbox Removal/Installation

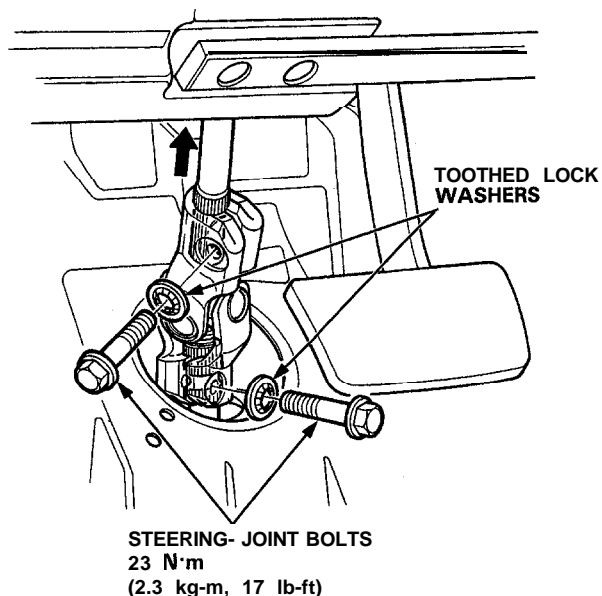
### NOTE:

- Before removing the steering gearbox, align the front wheels straight ahead.
- Disconnect the battery negative terminal and then disconnect the positive terminal.

1. Remove the steering joint cover.



2. Remove the steering joint bolts, and move the joint toward the column.



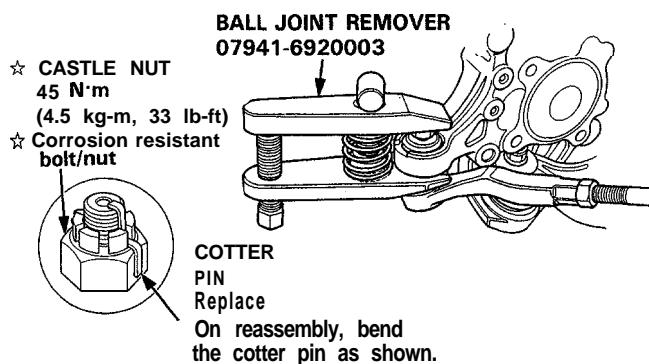
3. Raise the car and place safety stands in the proper locations (see section 1).

4. Remove the front wheels.

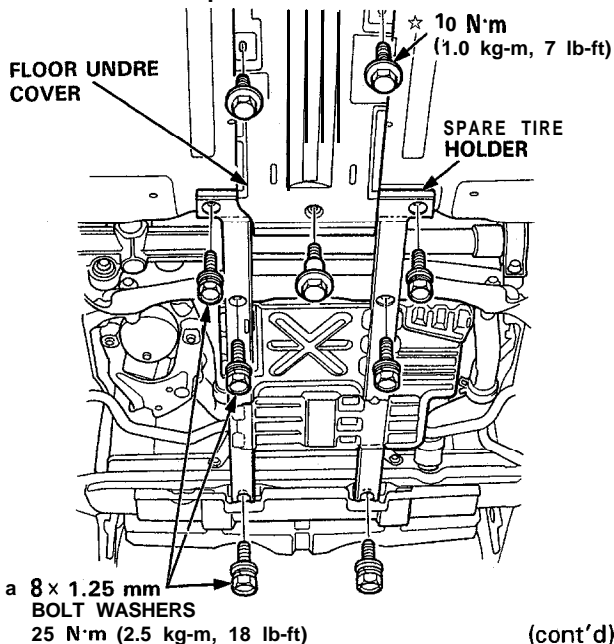
5. Remove the cotter pin from the tie-rod ball joint nut and remove the nut.
6. Install the 12 mm hex nut on the ball joint. Be sure that the 12 mm hex nut is flush with the ball joint pin end, or the threaded section of the ball joint pin might be damaged by the ball joint remover.
7. Separate the tie-rod ball joint and knuckle using the special tool.

**CAUTION:** Avoid damaging the ball joint boot.

**NOTE:** If necessary, apply penetrating type lubricant to loosen the ball joint.



8. Remove the folding spare tire and spare tire holdre plate.
9. Remove the battery.
10. Remove the spare tire holder.



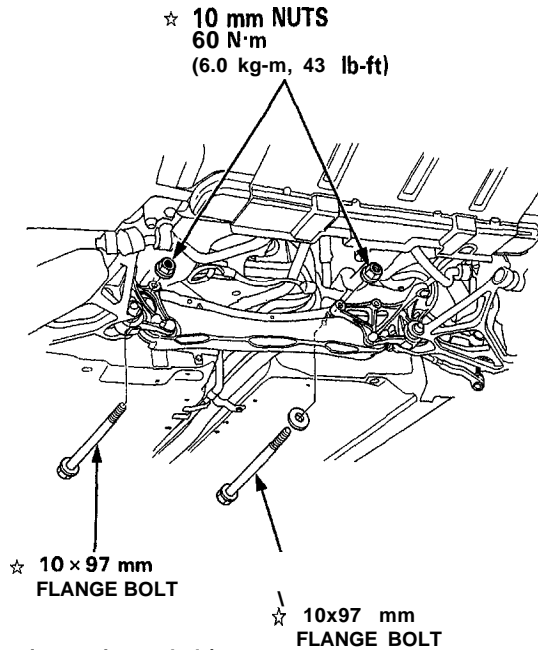
☆ Corrosion resistant bolt/nut

(cont'd)

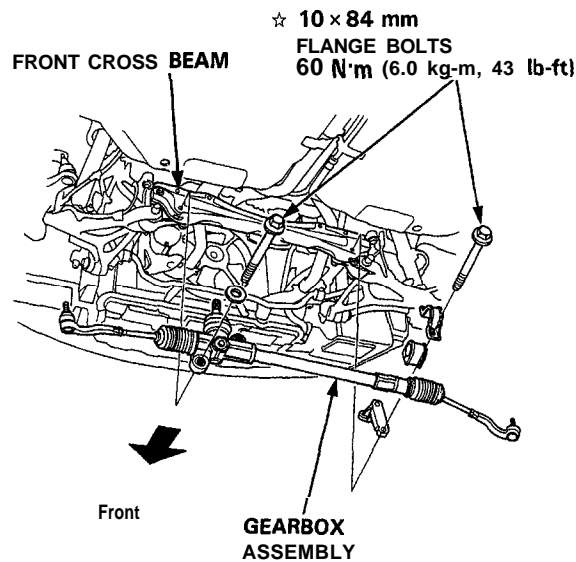
# Manual Steering

## -Gearbox Removal/Installation (Cont'd)

11. Remove the bolts and nuts of the gearbox and cross beam.



12. Remove the steering gearbox from the cross beam by removing the mounting bolts.



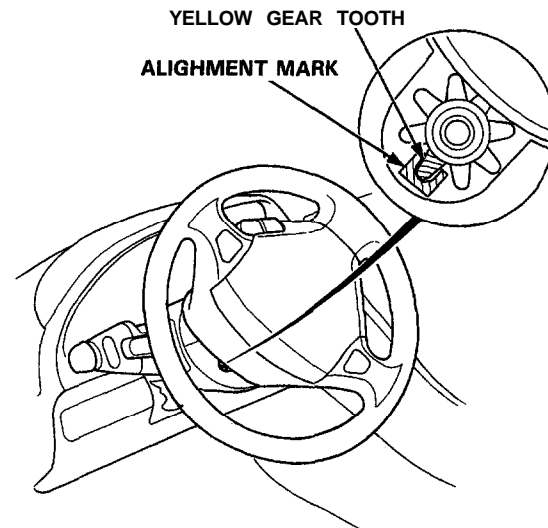
13. Installation is the reverse order of removal.

- Install the gearbox assembly and spare tire holder plate frame.
- Install the battery.
- Install the spare tire holder plate and folding spare tire.
- Install the steering joint.

14. Connect the battery positive terminal and then connect the negative terminal.

15. After confirm proper system operation:

- Turn on the ignition to II: the instrument panel SRS warnig light should go on for about 6 seconds and then go off.
- Confirm operation of horn buttons.
- Confirm operation of cruise control set/resume switch.
- Turn the steering wheel counterclockwise to make sure the yellow gear tooth still lines up with the alignment mark.



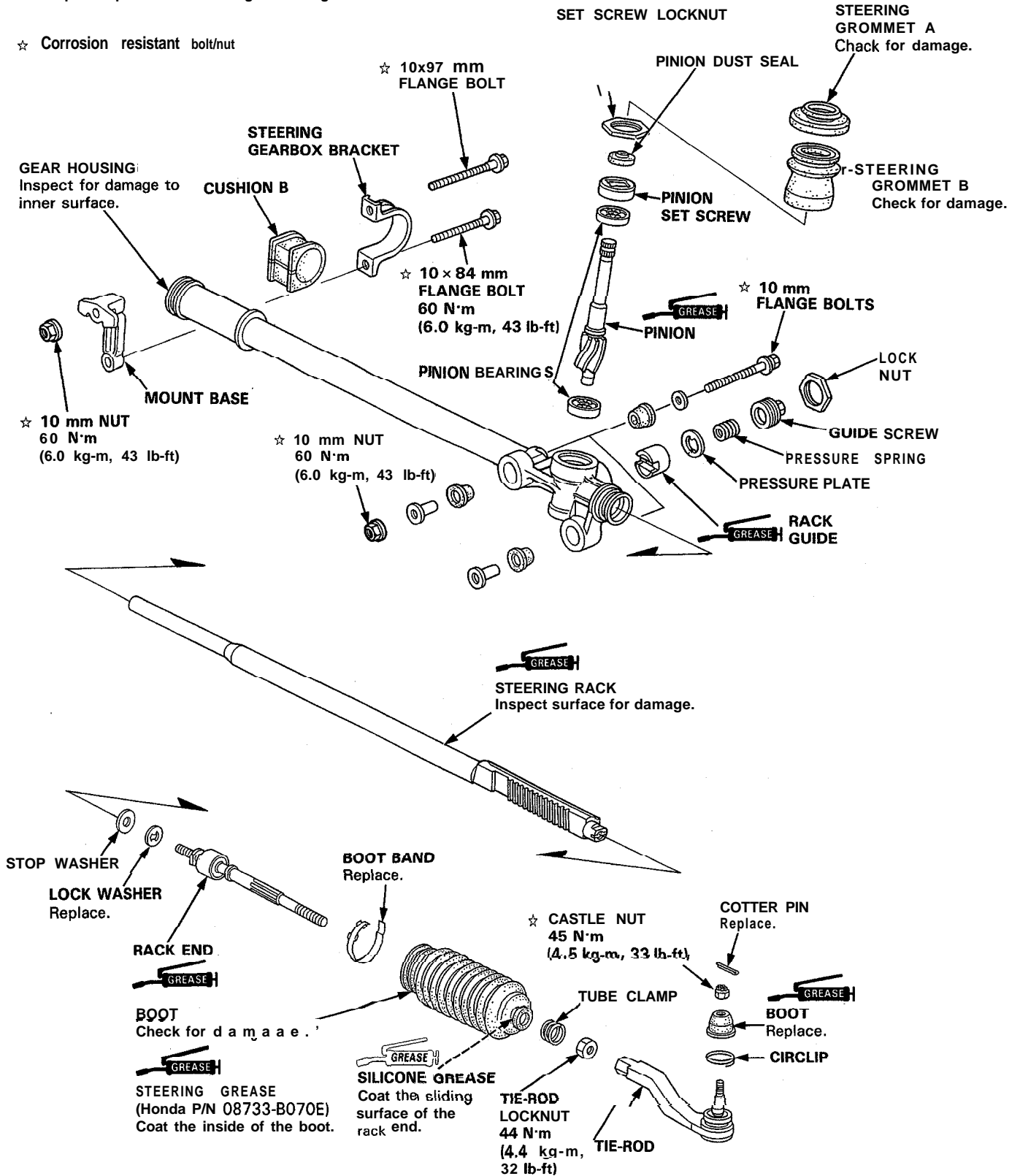


# Illustrated Index

### CAUTION:

- Before disassembling the gearbox, wash it off with solvent and a brush.
- Thoroughly clean all disassembled parts.
- Replace parts with damaged sliding surfaces.

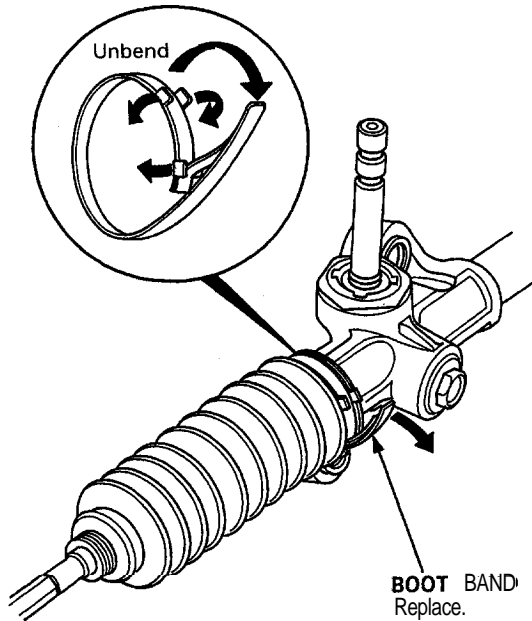
☆ Corrosion resistant bolt/nut



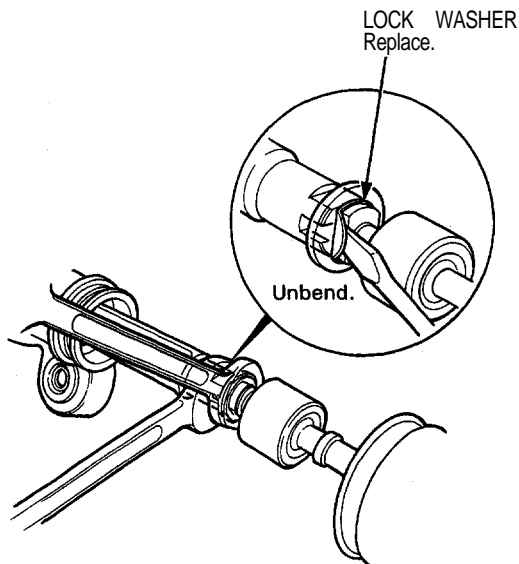
# Manual Steering

## Overhaul

1. Carefully clamp the gearbox in a vise with soft jaws.
2. Remove the boot band.



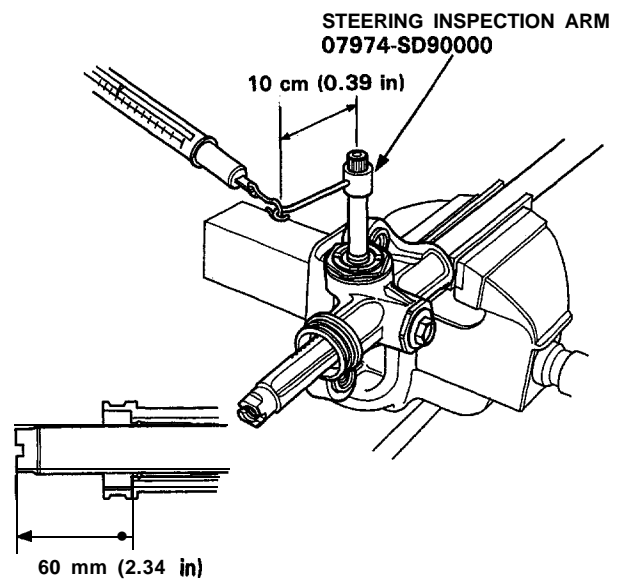
3. Pull the boots away from the ends of the gearbox, and unbend the tie-rod lock washers.
4. Hold the rack with a wrench, and unscrew the tie-rods with another wrench.



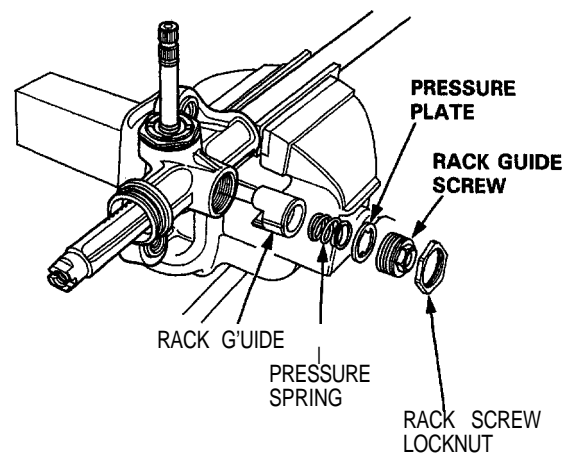
4. Before disassembly, install the special tool on the pinion shaft and check the preload.  
If the preload is out of the specification, adjust the rack guide (page 17-27).  
If the preload is still out of the specification, disassemble the gearbox and check each part.

NOTE: Slide the steering rack in the cylinder until the end of the projects rack 60 mm (2.34 in.) from the cylinder end. Inspection is made near this rack position.

5. Check the pinion preload with a spring scale.  
Preload 7-17 N (0.7-1.7 kg, 1.5-3.8 lb)



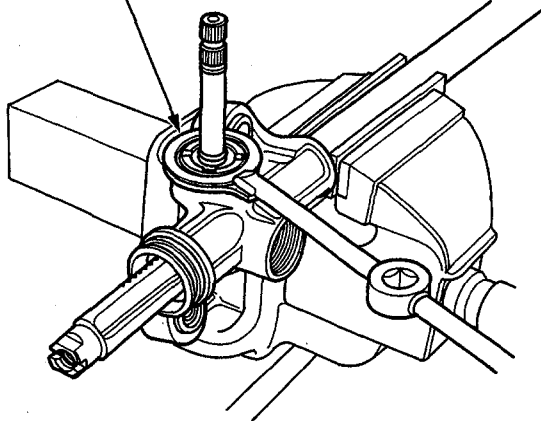
6. Loosen the rack screw locknut, and remove the rack guide screw.





7. Remove the set screw locknut using the special tool.

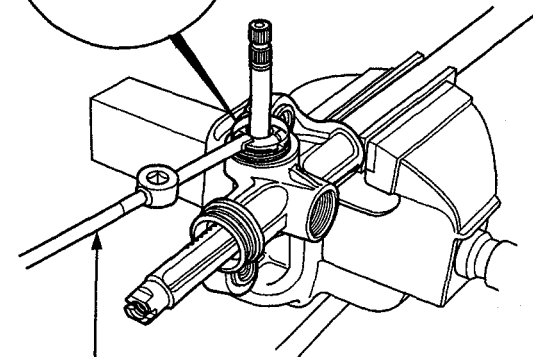
50 mm, LOCKNUT WRENCH  
07MAA-SL0030A



8. Remove the set screw using the special tool.

- Check the dust seal for damage and remove it if it must be replaced. Refer to page 17-25 for installation.

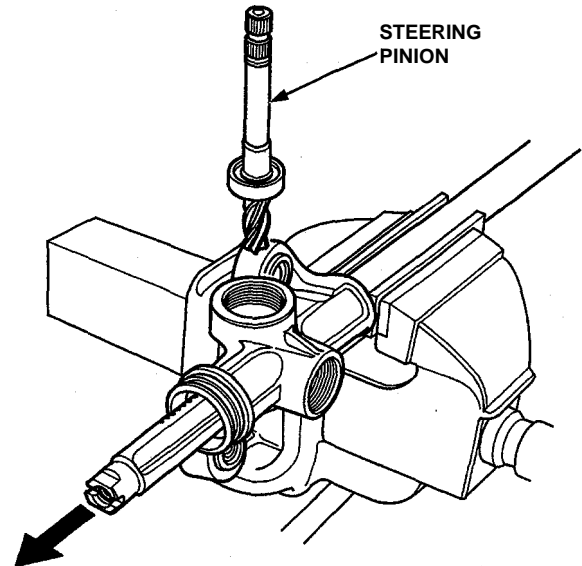
SET SCREW      DUST SEAL



PINION SCREW WRENCH  
07MAA-SL0040A

9. Move the rack toward the gearbox side (i.e. in the direction of the arrow) as far as it goes, and out the pinion assembly pull when the pinion gear contacts the cutout in the rack.

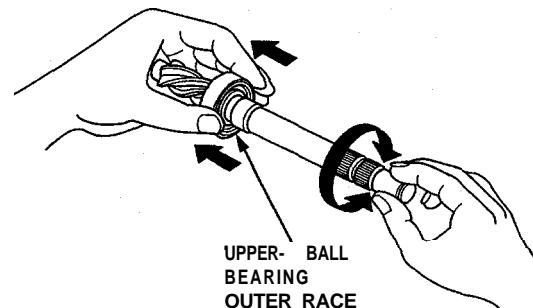
NOTE: The rack cannot be removed from the rack-end side.



Arrow direction.

- Check the bearing movement while pulling the bearing outer race as shown.

NOTE: This type of the bearing has play. The play should not be excessive.



UPPER- BALL  
BEARING  
OUTER RACE

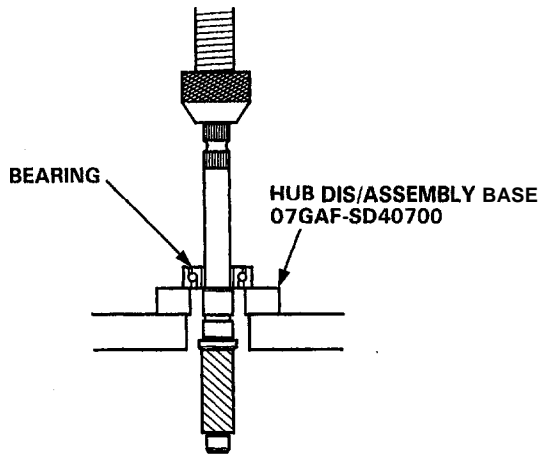
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# Manual Steering

## -Overhaul (Cont'd)

- If the bearing is noisy or has excessive play, replace the bearing using the special tools.

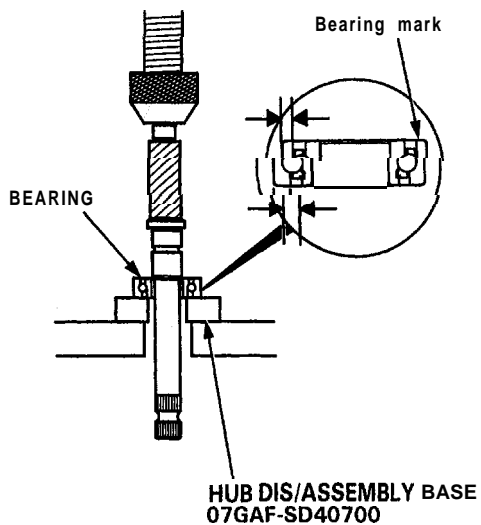
NOTE: Hold the outer race with the tool securely.



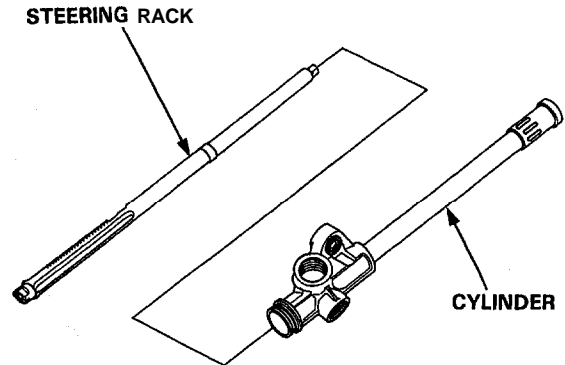
- Press the steering pinion into the new bearing.

NOTE:

- Install the bearing with the wider side of the inner race toward the gear.
- Hold the inner race with the tool securely.



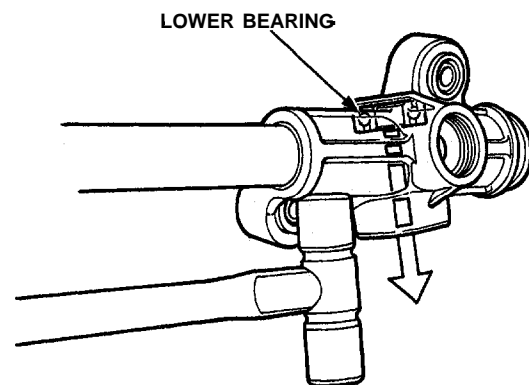
10. Remove the steering rack from the cylinder.



- Check the gearbox lower bearing and replace it if it is damaged.

Remove the bearing by lightly tapping with a plastic hammer as shown. If the bearing is hard to remove by tapping, heat the gearbox by soaking it in 100°C (212°F) water.

CAUTION: To avoid burns, use heavy gloves when handling the heated gearbox.



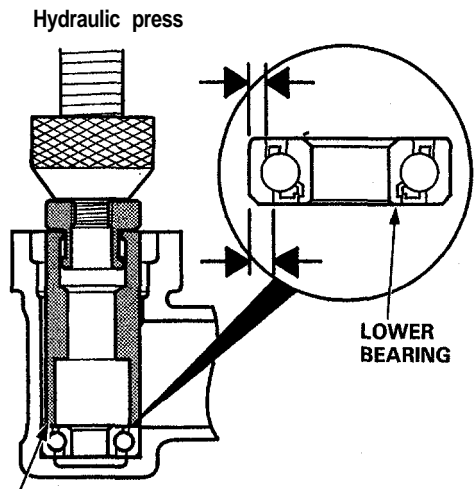
Tap with a plastic hammer to remove the bearing.



- Press the new bearing into the gearbox housing until it seats using the hydraulic press and special tool.

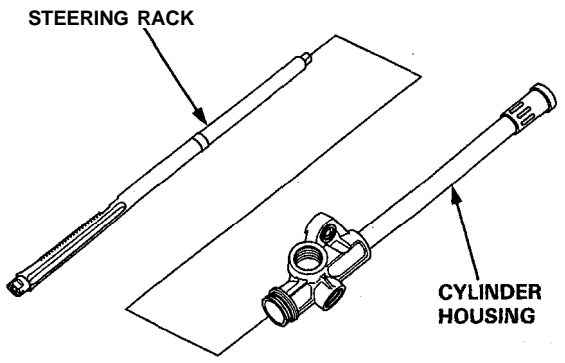
**NOTE:**

- Install the bearing with the wider side of the outer race toward the bottom of the gearbox.
- Hold the outer race with the tool securely.
- Do not allow dust and other foreign materials to enter the bearing.



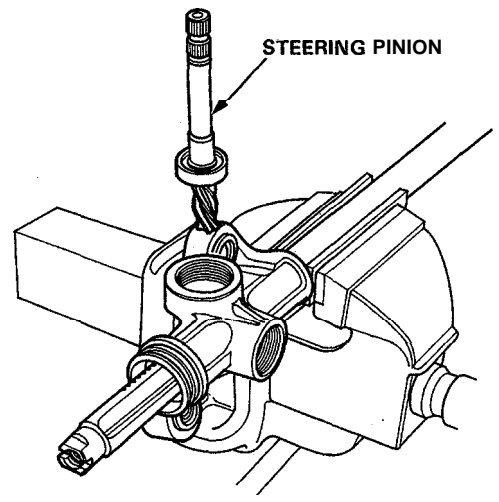
**P/S ADJUSTMENT GUIDE**  
07973-6920001

1. Insert the steering rack into the cylinder housing, being careful not to damage the steering rack sliding surface.



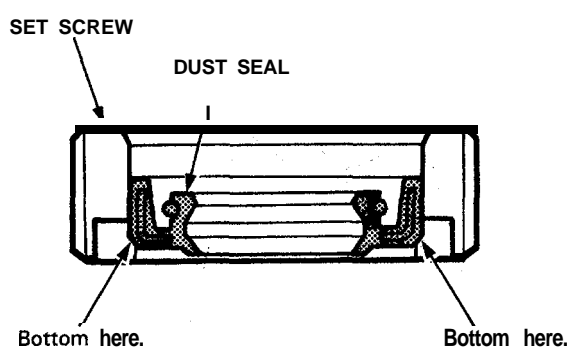
12. Install the steering pinion into the gearbox.

**NOTE:** Do not engage the steering pinion with the steering rack this time.



13. If the dust seal was removed, drive in the new dust seal until it bottoms on the step on the rack screw.

14. Grease the sealing lip of the dust seal.

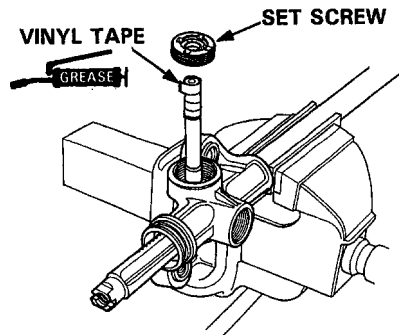


(cont'd)

# Manual Steering

## -Overhaul (Cont'd)

15. Wrap the splined area of the steering pinion with vinyl tape and grease the surface of the tape.
16. Slide the set screw over the steering pinion, being careful not to damage the sealing lip of the dust seal, then remove the vinyl tape.



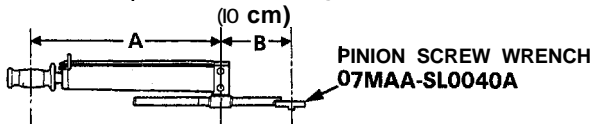
17. Tighten the pinion set screw to a torque wrench reading (indicated) of 5.7 ~ 7.1 N·m (57 ~ 71 kg-cm, 49 ~ 62 in-lb).

NOTE: The above specification is the torque wrench reading (indicated) when the set screw is tightened using a torque wrench 25 cm (10 inches) long. If you tighten the set screw using a torque wrench of the different length, obtain the torque value using the following formulas.

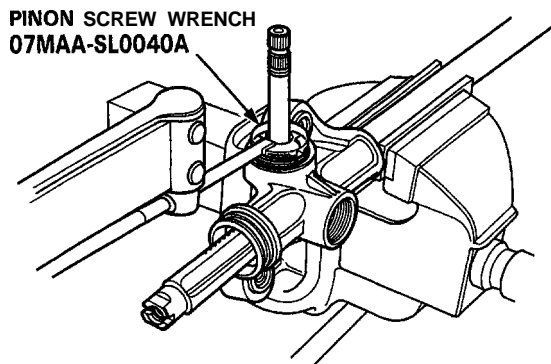
$$A/(A+B) = Y$$

$$Y \times \text{Actual torque} = X$$

$$X = \text{Torque wrench reading.}$$

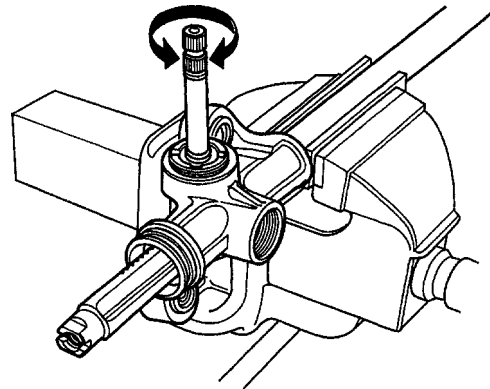


Indicated: 5.7-7.1 N·m (57-71 kg-cm, 49-62 in-lb)  
Actual: 8.0-10 N·m (80-100 kg-cm, 82-87 in-lb)

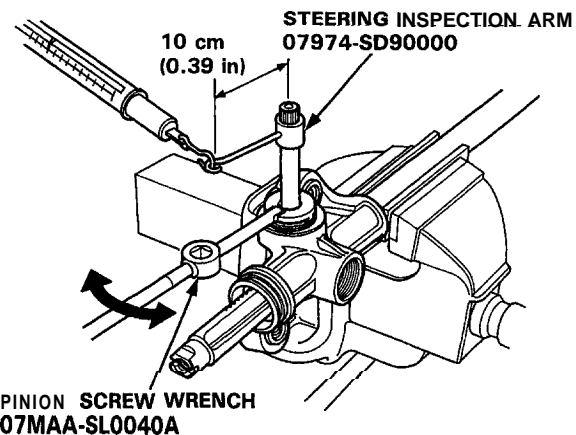


18. Turn the pinion right and left several times to make set it, then loosen the pinion set screw.

NOTE: Be sure that the pinion gear and rack gear are not engaged.



19. Install the special tool onto the pinion shaft. Attach a spring scale to the tool and pull the scale adjust the pinion set screw until the gauge reads 1.5 ~ 2.5 N (0.15-0.25 kg, 0.33-0.55 lb).







20. Install the pinion set screw locknut, then hold the pinion set screw and tighten the locknut to a torque wrench reading (indicated) of 54 ~ 69 N·m (5.4 ~ 6.9 kg-m, 39 ~ 50 lb-ft).

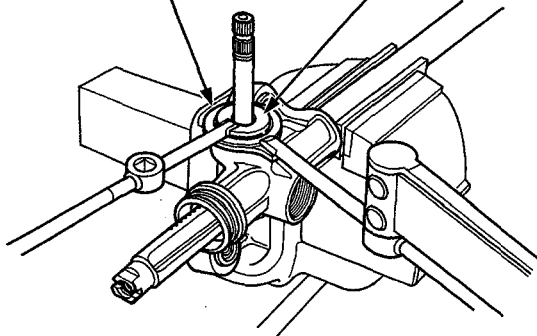
NOTE: The above specification is the torque wrench reading (indicated) when the set screw is tightened using a torque wrench 50 cm (20 inches) long. If you tighten the set screw using a torque wrench of the different length, obtain the indicated torque value (torque wrench reading) using the formulas shown in the step 17.

Actual: 70-90 N·m (7-9 kg-m, 50-65 lb-ft)  
indicated: 54-69 N·m (5.4-6.9 kg-m, 39-50 lb-ft)

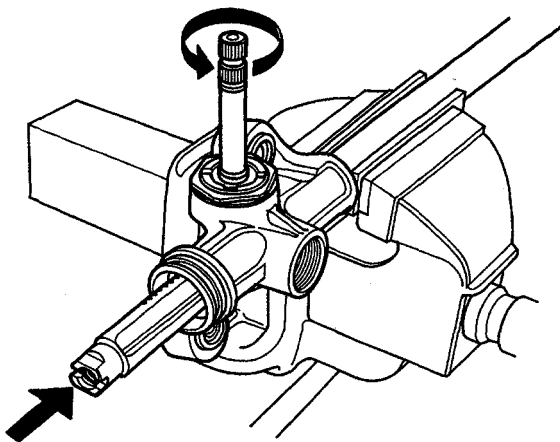
Tool length (B): 15 cm (6 in)

50 mm, LOCKNUT WRENCH  
07HAA-SL0030A

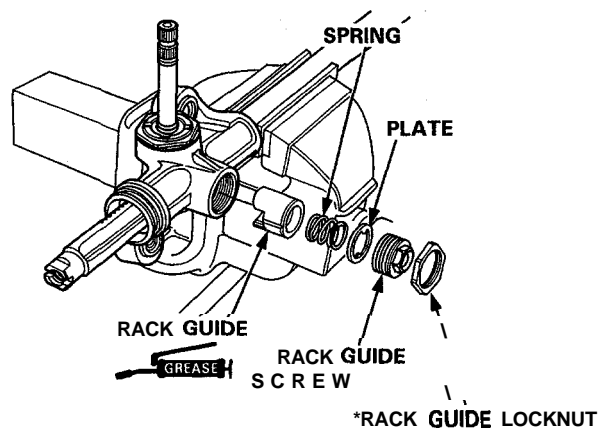
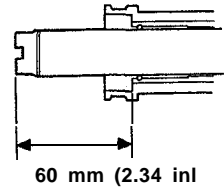
PINION SCREW WRENCH  
07MAA-SL0040A



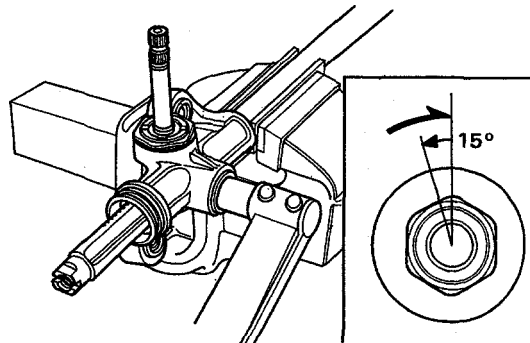
21. Turn the pinion shaft slowly, then insert the rack and engage the rack and pinion gears.



22. The system is in neutral when the rack end projects 60 mm (2.34 in) from the cylinder end.
23. Install the rack guide, pressure plate, pressure spring and rack screw guide.



24. Tighten, loosen and retighten the rack guide screw two times to 5 N·m 10.5 kg-m, 3.6 lb-ft), then back it off 15°.



(cont'd)

# Manual Steering

## -Overhaul (Cont'd)

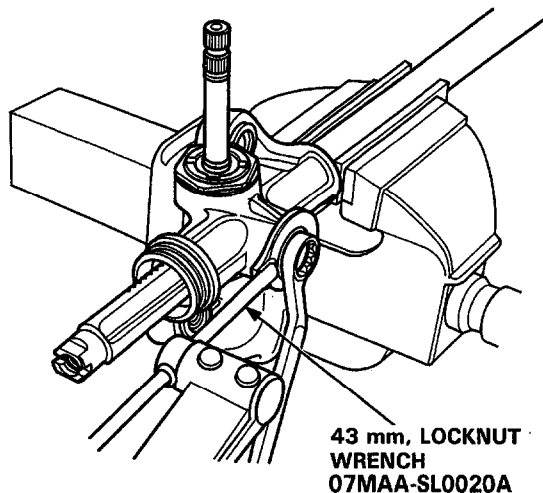
25. Install the locknut on the rack guide screw, and tighten the locknut to a torque wrench reading (indicated) of 52 N·m (5.2 kg-m, 38 lb-ft) while holding the rack guide screw with a wrench.

**NOTE:** The above specification is the torque wrench reading (indicated) when the locknut is tightened using a torque wrench 50 cm (20 in) long. If you tighten the locknut using a torque wrench of the different length, obtain the indicated torque value (torque wrench reading) using the formulas shown in the step 17.

Actual: 68 N·m (6.8 kg-m, 49 lb-ft)

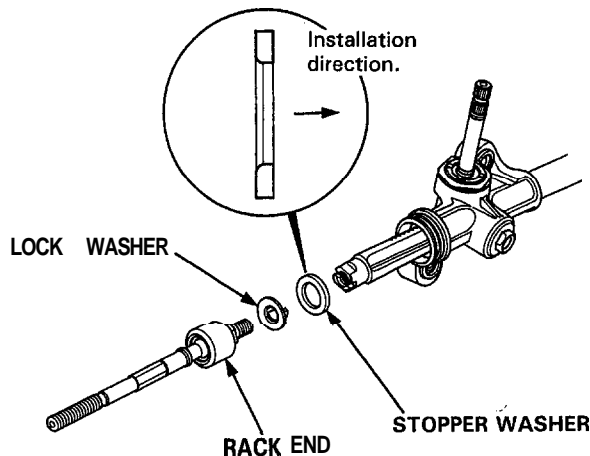
Indicated: 52 N·m (5.2 kg-m, 38 lb-ft)

Tool length (B): 150 mm (6 in)

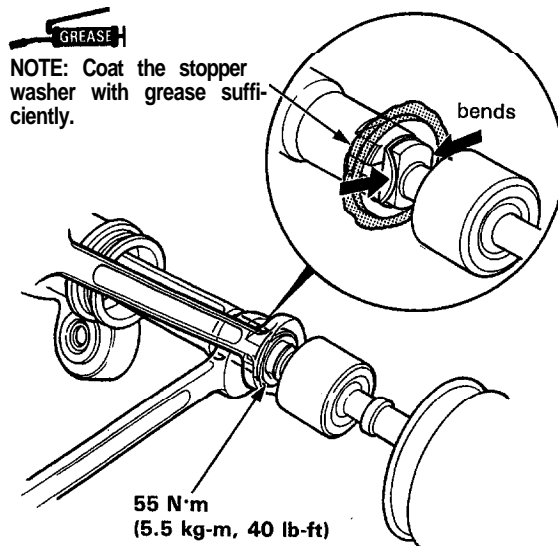


26. Screw each rack end into the rack while holding the lock washer so its tabs are in the slots in the rack end.

**NOTE:** Install the stopper washer with the chamfered side facing out.



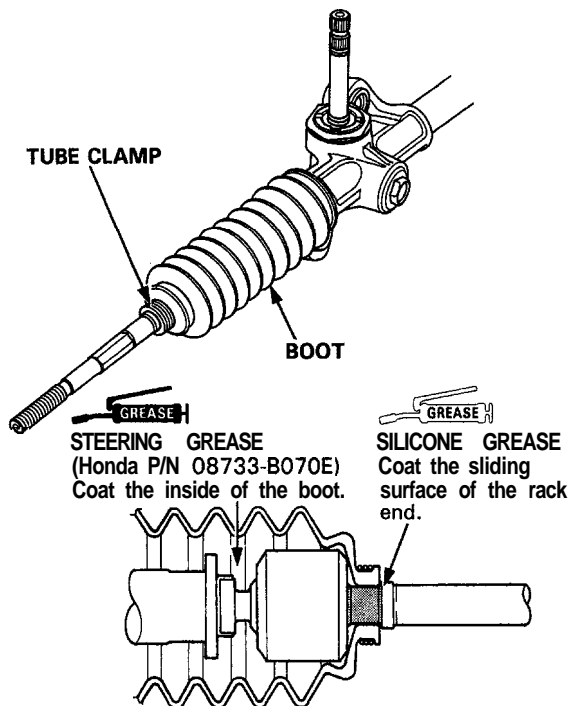
27. Tighten the rack end securely, then bend the lock washer back against the flat on the flange as shown.



28. Install the boots on the rack end with the tube clamps.

**NOTE:**

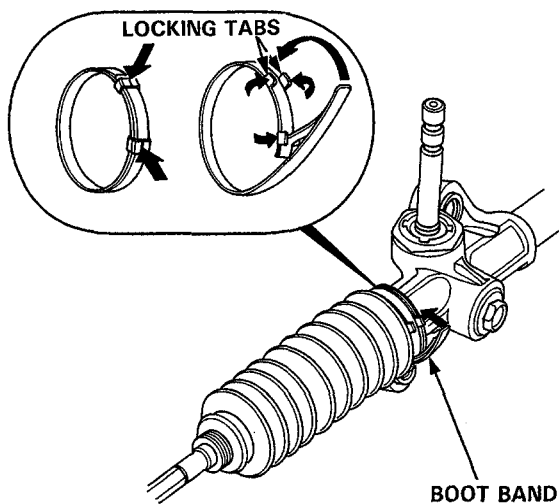
- Coat the rack end and inside of the boot with the grease.
- Before installing the boot, be sure that the pressure inside of the boot is the atmospheric pressure.
- Install the boot band with the rack in the straight ahead condition (i.e. right and left tie-rods are equal in length).



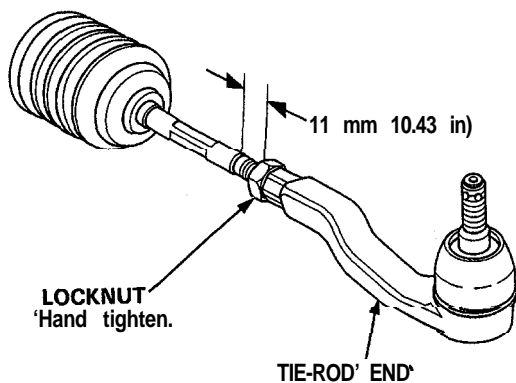


29. Install the new boot bands on the boot and bend both sets of locking tabs.
30. Lightly tap on the doubled portions to reduce their height.

**NOTE:** After assembling, slide the rack right and left to be certain that the boots are not deformed or twisted.



31. If the tie-rod ends were removed, install the tie-rods on the right and left rack ends and screw them in until the threaded section is 11 mm (0.43 in) in length.



32. Install the gearbox on the cross-beam (page 17-20).
33. Check the wheel alignment and adjust if necessary (Section 18).

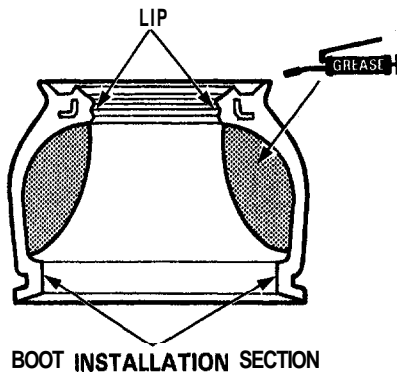
# Manual Steering

## -Ball Joint Boot Replacement

1. Remove the circlip and the boot.

**CAUTION:** Do not contaminate the boot installation section with grease.

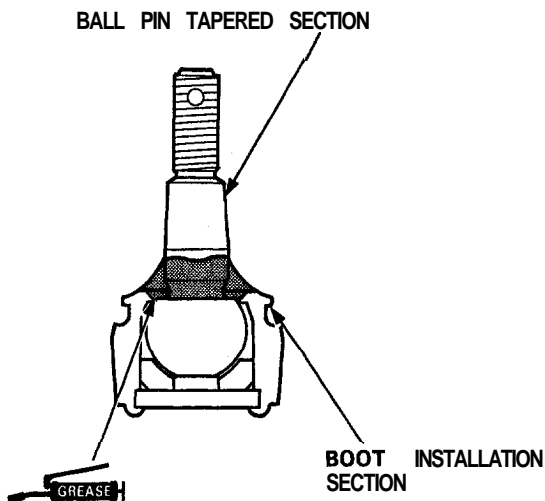
2. Pack the interior of the boot and lip with grease.



3. Wipe the grease off the sliding surface of the ball pin, then pack the lower area with fresh grease.

**CAUTION:**

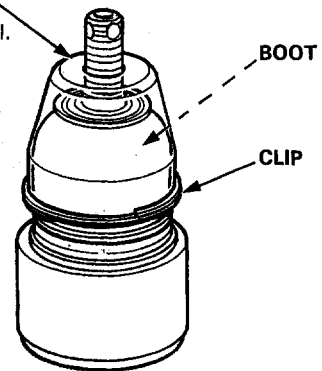
- Keep grease off the boot installation section and the tapered section of the ball pin.
- Do not allow dust, dirt, or other foreign materials to enter the boot.



4. Install the boot in the groove of the boot installation section securely, then bleed air.

5. Insert the special tool into the threads in the ball pin and align the end of the tool with the groove in the boot. Slide the clip over the tool and into position.

BALL JOINT  
BOOT CLIP  
GUIDE  
07MAG-SL00100  
Adjust the depth  
by turning the tool.



**CAUTION:** After installing the boot, check the ball pin tapered section for grease contamination and wipe it if necessary.