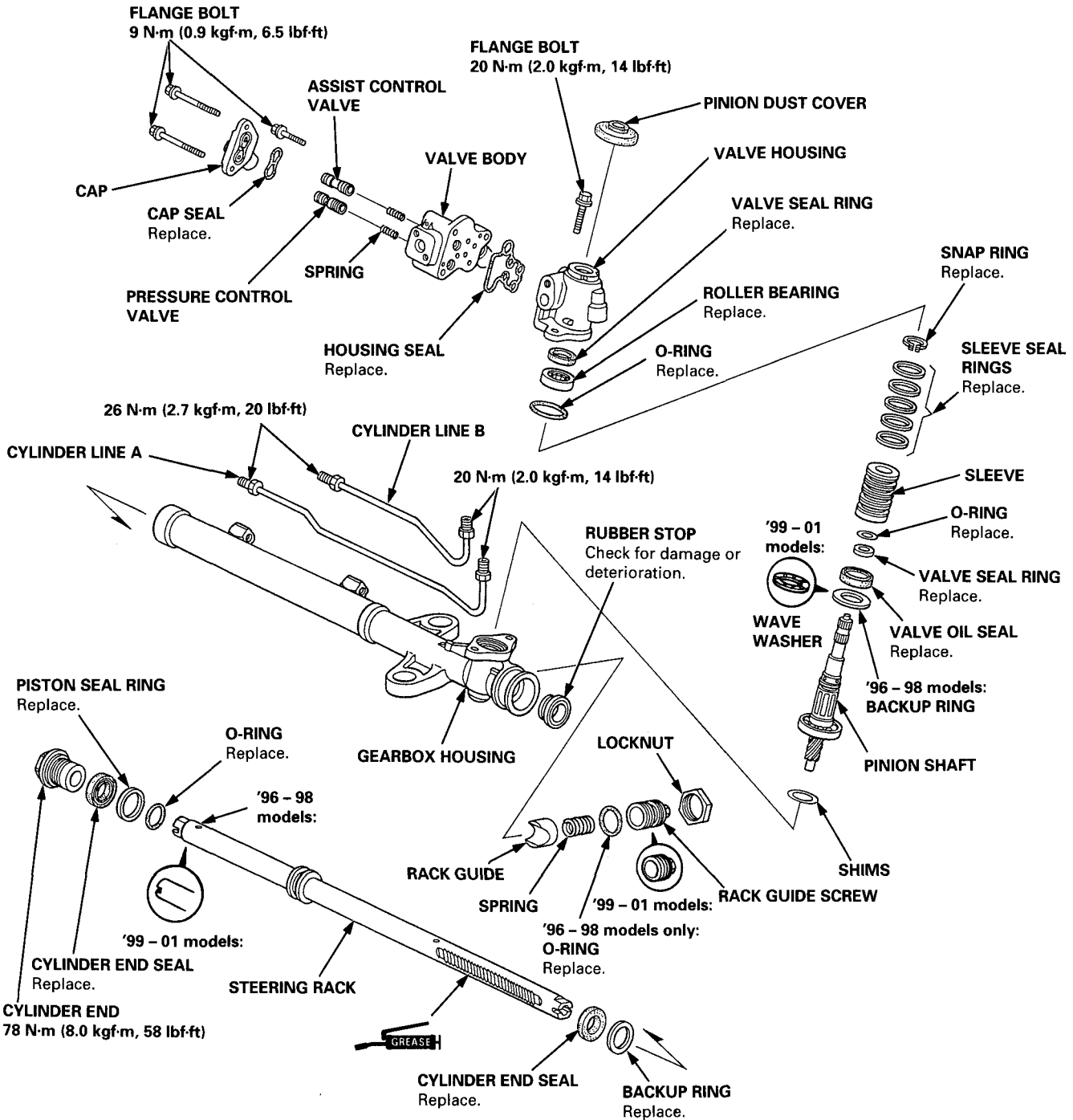


Power Steering Gearbox

Reassembly

NOTE:

- Clean the disassembled parts with a solvent, and dry them with compressed air. Do not dip the rubber parts in a solvent.
- Always replace the O-rings and rubber seals with new ones before assembly.
- Apply the recommended power steering fluid to the parts indicated in the assembly procedures.
- Do not allow dust, dirt, or other foreign materials to enter the power steering system.
- Use the appropriate special tools where necessary.

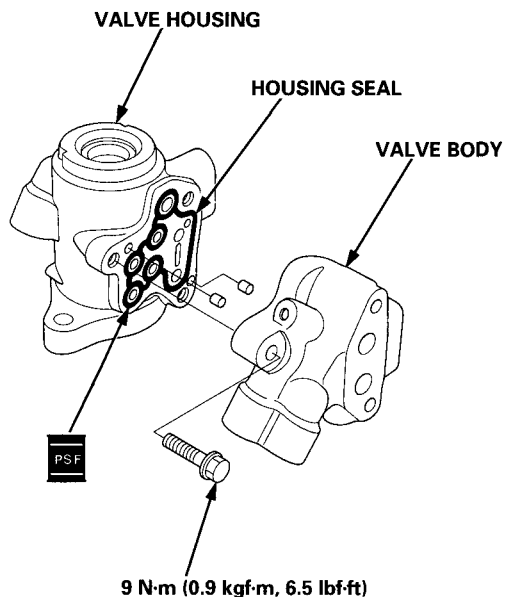




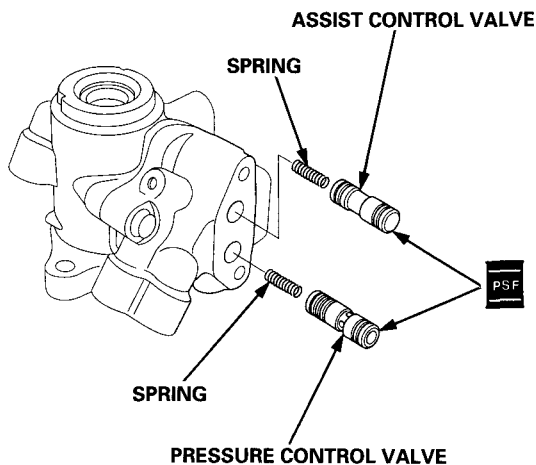
ValveBodyUnitReassembly

Assist control valve unit:

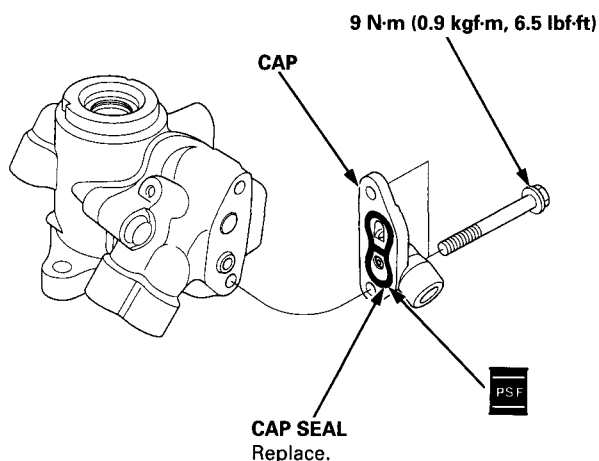
1. Coat the housing seal with power steering fluid, and install it in the groove of the valve housing. Then install the valve body.



2. Install the valve springs.
3. Coat the pressure control valve and assist control valve with power steering fluid, then install them into the valve body.



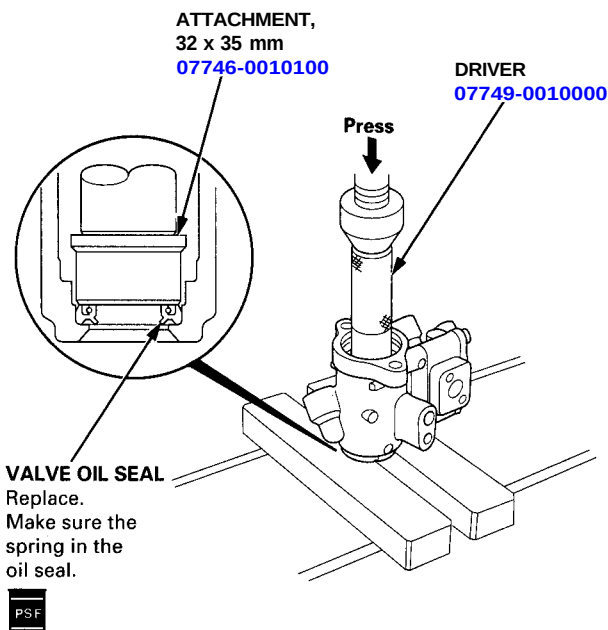
4. Coat the cap seal with power steering fluid, and install it in the groove of the cap.
5. Install the cap on the valve body.



Valve body unit:

6. Apply power steering fluid to the seal ring lip of the valve oil seal, then install the seal in the valve housing using a hydraulic press and the special tools as shown.

CAUTION: Install the valve oil seal with its grooved side facing the tool.



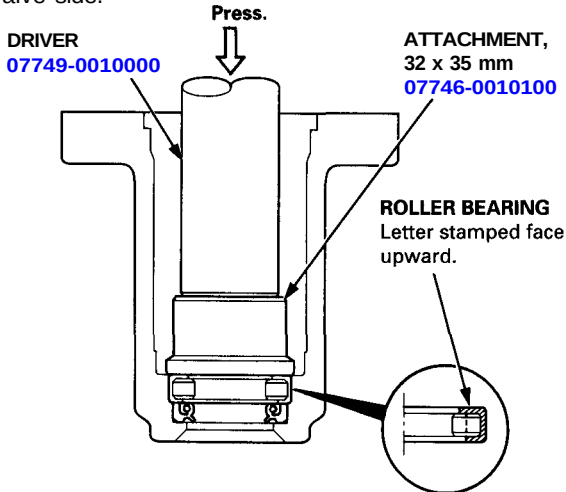
(cont'd)

Power Steering Gearbox

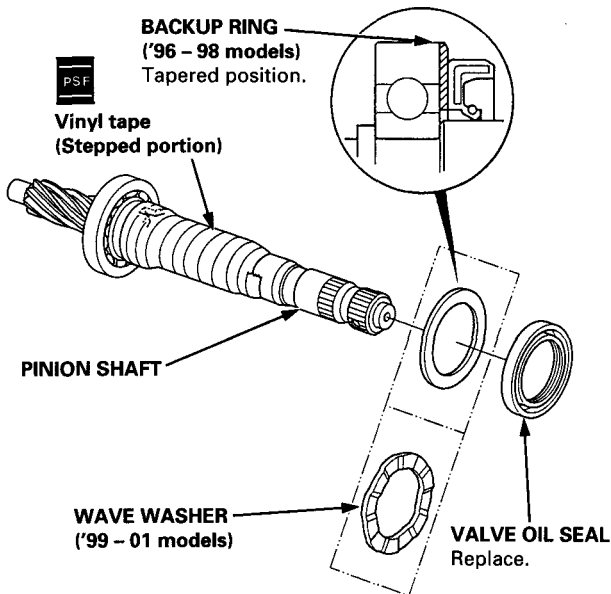
Reassembly (cont'd)

7. Press the new roller bearing into the valve housing using a hydraulic press and the special tools as shown.

NOTE: Place the roller bearing on the valve housing with the stamped letter facing up towards the valve side.



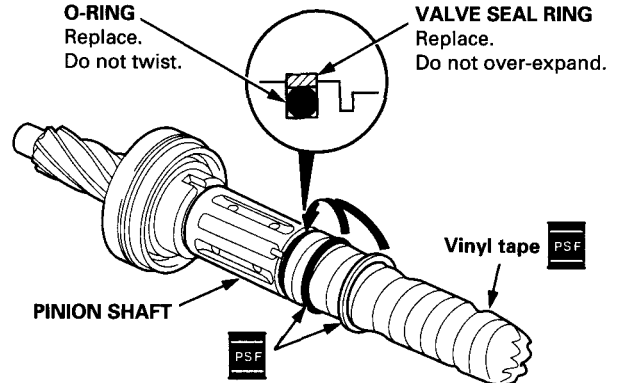
8. Apply vinyl tape to the stepped portion of the pinion shaft, and coat the surface of the vinyl tape with the power steering fluid.



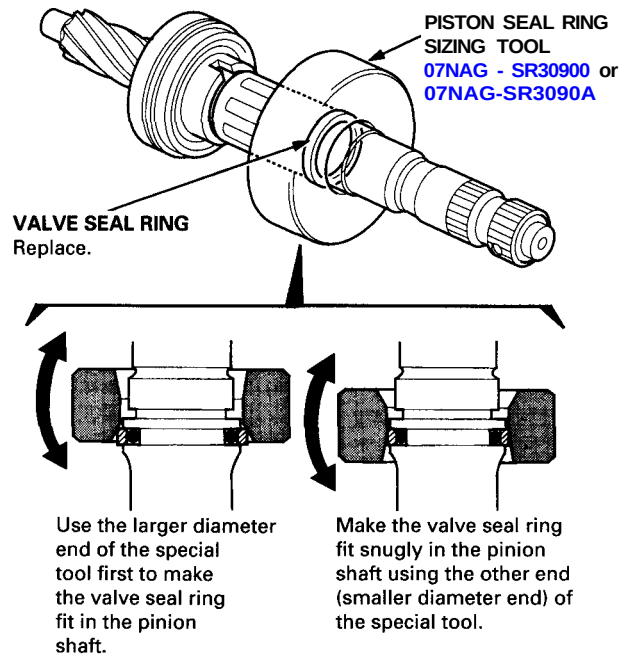
9. Install the backup ring ('96 - 98 models) or wave washer ('99 - 01 models).
 10. Coat the inside surface of the new valve oil seal with power steering fluid.
 11. Slide the valve oil seal over the pinion shaft, being careful not to damage the sealing lip.

CAUTION: Install the valve oil seal with its grooved side facing opposite the bearing.

12. Apply vinyl tape to the splines and stepped portion of the shaft, and coat the surface of the vinyl tape with the power steering fluid.



13. Fit the new O-ring in the groove of the pinion shaft. Then slide the new valve seal ring over the shaft and the groove in on the pinion shaft.
 14. Remove the vinyl tape from the pinion shaft.
 15. Apply power steering fluid to the surface of the valve seal ring that was installed on the pinion shaft.



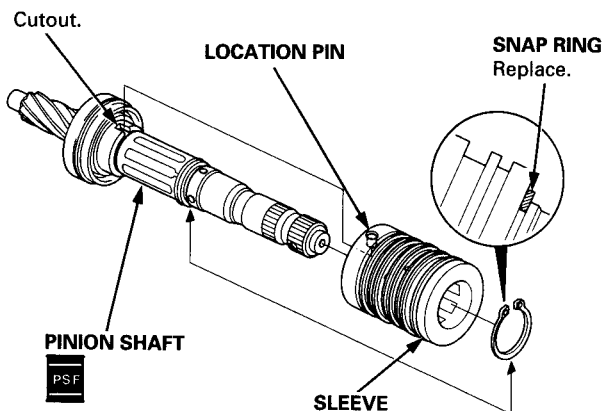
16. Apply power steering fluid to the inside of the special tool. Set the larger diameter end of the special tool over the valve seal ring.
 17. Move the special tool up and down several times to make the valve seal ring fit in the pinion shaft.
 18. Remove the special tool.
 19. Turn the special tool over, and set the smaller diameter end of the special tool over the valve seal ring. Move the special tool up and down several times to make the valve seal ring fit snugly in the pinion shaft.



20. Apply power steering fluid to the surface of the pinion shaft. Assemble the sleeve over the pinion shaft by aligning the locating pin on the inside of the sleeve with the cutout in the shaft. Then install the new snap ring securely in the pinion shaft groove.

NOTE:

- Be careful not to damage the valve seal ring when inserting the sleeve.
- Install the snap ring with its radiused side facing in.



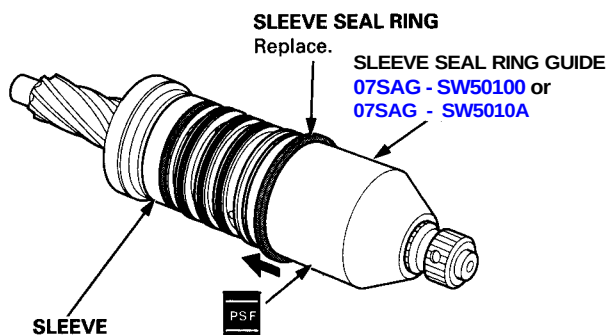
21. Apply power steering fluid to the surface of the special tool. Set the new seal rings over the special tool from the smaller diameter end of the tool, and expand the seal rings.

NOTE:

- Do not over-expand the seal ring. Install the resin seal rings with care so as not to damage them. After installation, be sure to contract the seal rings using the special tool (sizing tool).
- There are two types of sleeve seal rings: black and brown. Do not mix the different types of sleeve seal rings as they are not compatible.

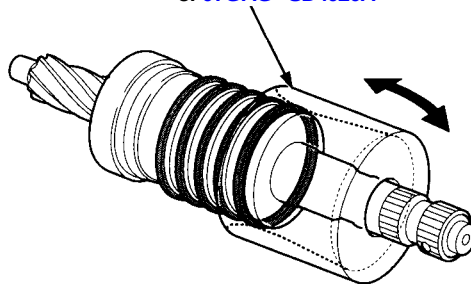
22. Set the special tool in the grooves in the sleeve, and set each ring in each groove securely.

NOTE: After installation, compress the seal rings with your fingers temporarily.



23. Apply power steering fluid to the seal rings on the sleeve, and to the entire inside surface of the special tool.

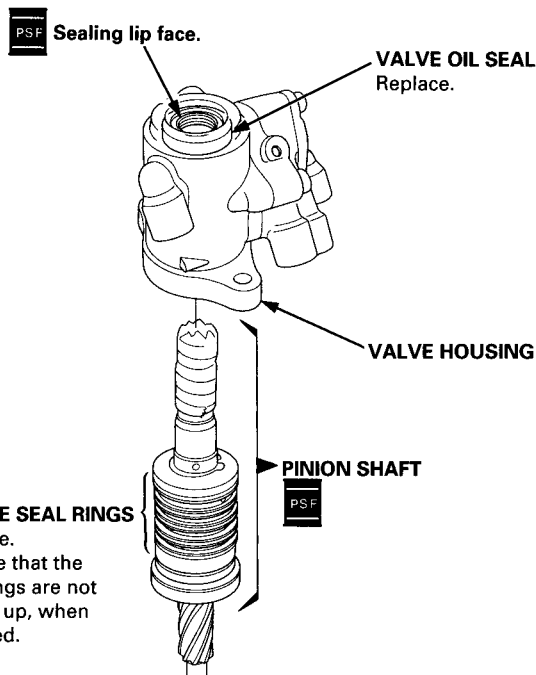
PISTON SEAL RING
SIZING TOOL
07GAG - SD40200
or 07GAG - SD4020A



24. Insert the sleeve into the special tool slowly.
25. Move the sleeve each direction several times to make the seal rings snugly fit in the sleeve.

NOTE: Be sure that the seal rings are not turned up.

26. Apply vinyl tape to the pinion shaft, then coat the vinyl tape with power steering fluid.



SLEEVE SEAL RINGS
Replace.
Be sure that the seal rings are not turned up, when installed.

27. Insert the pinion shaft into the valve housing.

CAUTION: Be careful not to damage the valve seal rings.

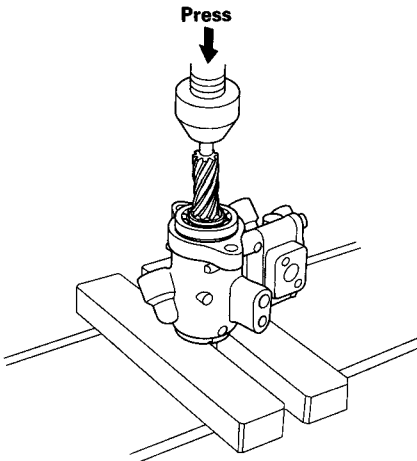
28. Remove the vinyl tape from the pinion shaft.

(cont'd)

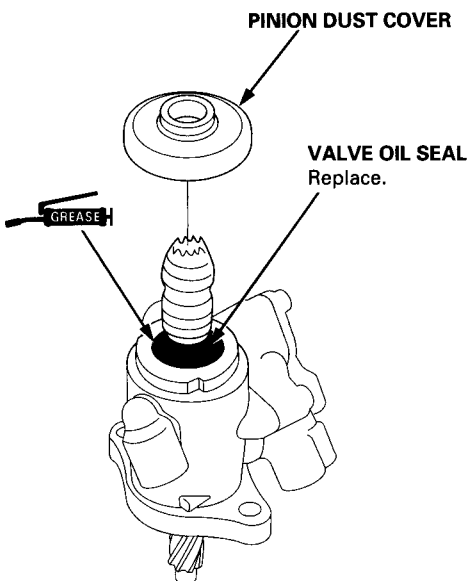
Power Steering Gearbox

Reassembly (cont'd)

29. Press the pinion shaft/sleeve into the valve housing using a hydraulic press as shown.



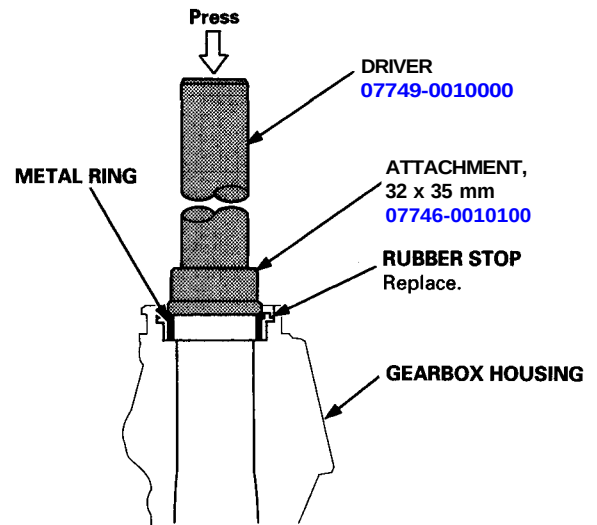
30. Apply steering grease on the valve oil seal, and install the pinion dust cover on the valve body unit.



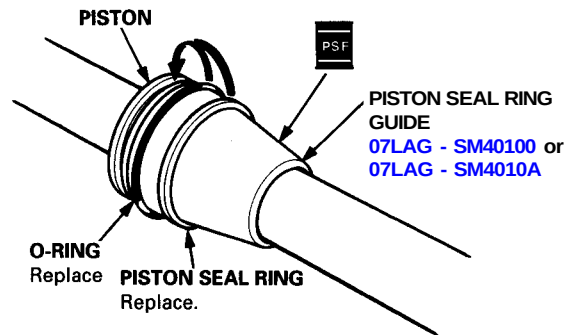
Steering Rack Installation

31. If the rubber stop was removed, position the new rubber stop in the gearbox housing, then press it in using a hydraulic press and the special tools as shown.

NOTE: Make sure that the special tool presses against the metal portion of the rubber stop.



32. Coat the piston seal ring guide with power steering fluid, and slide it onto the rack, big end first.



33. Position the new O-ring and new piston seal ring on the special tool, then slide them down toward the big end of the tool.

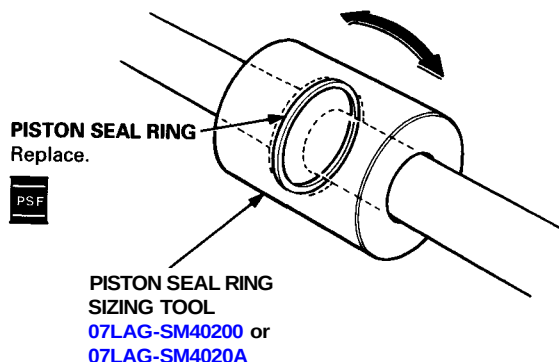
NOTE:

- Do not over expand the resin seal rings. Install the resin seal rings with care so as not to damage them. After installation, be sure to contract the seal ring using the special tool (sizing tool).
- Replace piston's O-ring and seal ring as a set.

34. Pull the O-ring off into the piston groove, then pull the piston seal ring off into the piston groove on top of the O-ring.

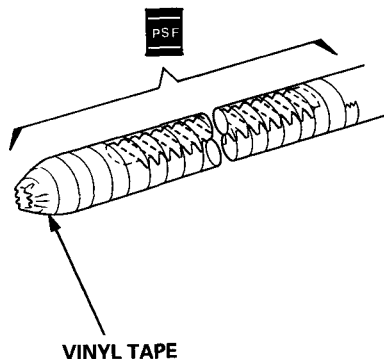


35. Coat the piston seal ring and the inside of the special tool with power steering fluid.

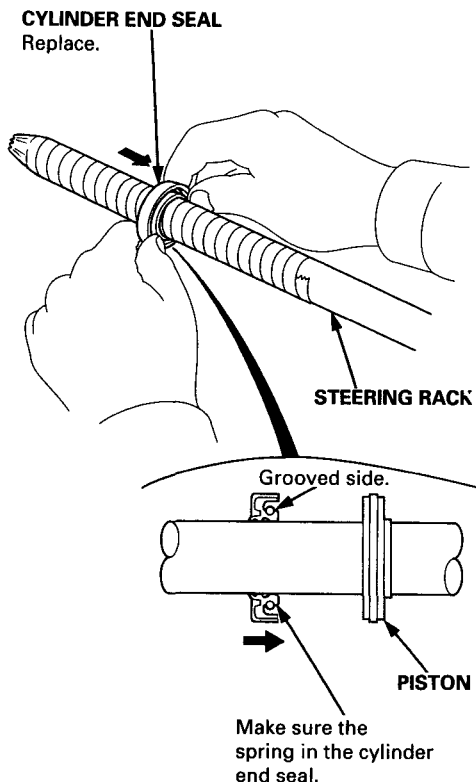


36. Carefully slide the tool onto the rack and over the piston seal ring.
37. Move the special tool back and forth several times to make the piston seal ring fit snugly in the piston.
38. Wrap vinyl tape around the rack teeth and rack end edges, then coat the surface of the tape with the power steering fluid.

NOTE: Make sure that the vinyl tape is wrapped carefully so that there is no stepped portion.



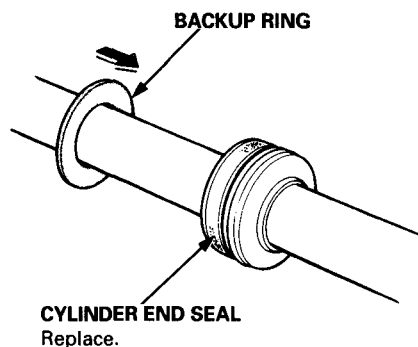
39. Coat the inside surface of the new cylinder end seal with power steering fluid.



40. Install the cylinder end seal onto the steering rack with its grooved side toward the piston.

CAUTION: When installing the cylinder end seal, be careful not to damage the sealing lip face of the seal with the edges or teeth of the steering rack.

41. Remove the vinyl tape from the steering rack. Remove any residue of tape adhesive.
42. Install the new backup ring on the steering rack, then place the cylinder end seal to piston.



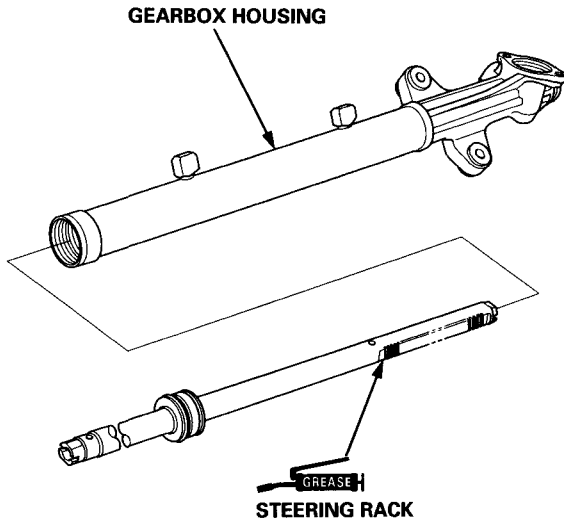
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Power Steering Gearbox

Reassembly (cont'd)

43. Grease the steering rack teeth, then insert the steering rack into the gearbox housing.

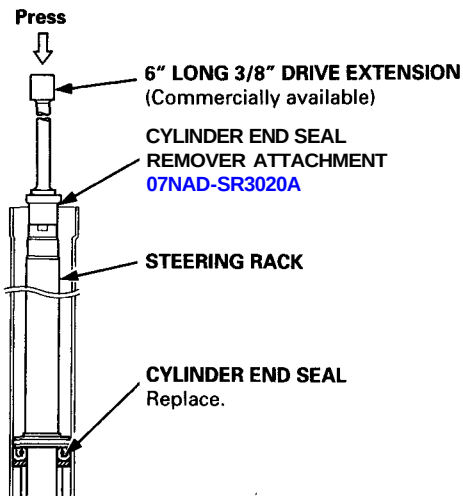
CAUTION: Be careful not to damage to inner surface of the cylinder wall with the rack edges.



44. Insert 6" long 3/8" drive extension and the special tool into the steering rack as shown.

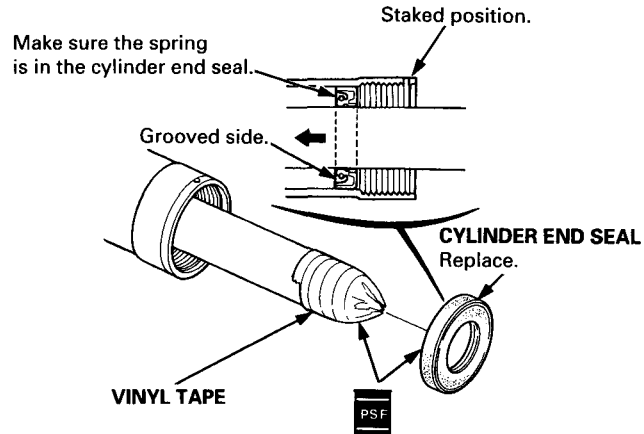
45. Install the cylinder end seal into the bottom of the cylinder by pressing on the tool with a press as shown.

CAUTION: Do not push on the tool with excessive force as it may damage the cylinder end seal.



46. Wrap vinyl tape around the rack end edges, and coat the surface of the tape with the power steering fluid.

NOTE: Make sure that the vinyl tape is wrapped carefully so that there is no stepped portion.



47. Coat the inside surface of the new cylinder end seal with power steering fluid.

48. Install the cylinder end seal onto the steering rack with its grooved side toward the piston.

CAUTION: When installing the cylinder end seal, be careful not to damage the sealing lip face of the seal with the edges of the steering rack.

49. Remove the vinyl tape from the steering rack, then push in the cylinder end seal with your finger.

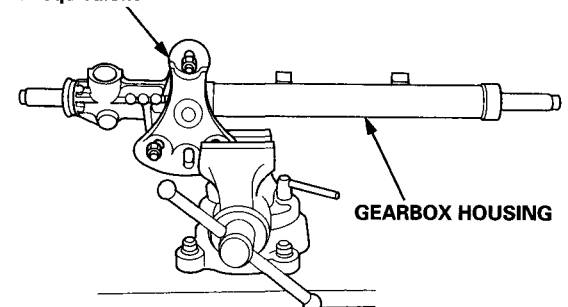
NOTE:

- Remove any residue of tape adhesive.
- Take care not to damage the cylinder end seal with the threads and burrs at the staked position of the gearbox housing.

50. Install the special tool to the gearbox housing, then clamp the tool in a vise with soft jaws as shown.

CAUTION: Do not clamp the cylinder.

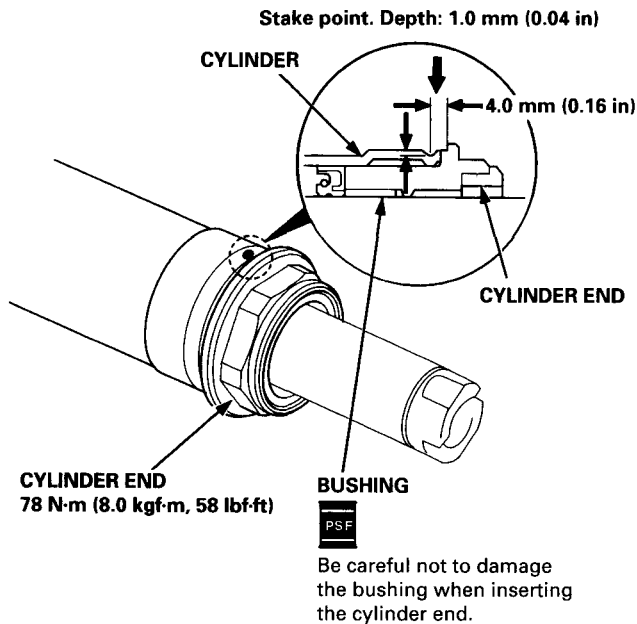
PULLER YOKE:
(Commercially available)
Snap-On® T/N CJ123-1
OTC® T/N 7372
or equivalent





51. Coat the inside surface of the cylinder end with power steering fluid, then install the cylinder end by screwing it into the gearbox housing.
52. Remove the tool from the gearbox housing.
53. After tightening the cylinder end, stake the point of the cylinder shown below. For '99 - 01 models go to step 56.

NOTE: Stake the cylinder in the position opposite from where the stake was removed during disassembly.



54. Select the 44 mm shim(s) ('96 - 98 models only).

NOTE: Only reinstall the original 44 mm shim(s) when the steering gearbox is reassembled without replacing the pinion shaft, valve housing, and gearbox housing with new ones.

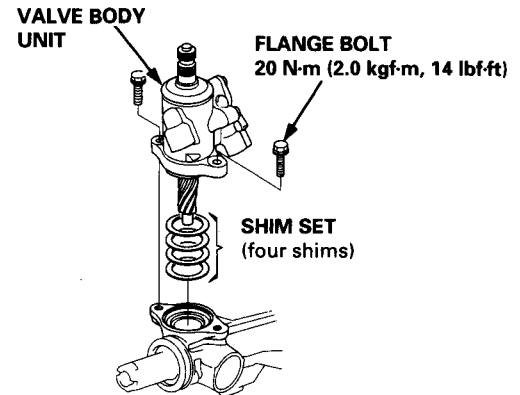
If the pinion shaft, valve housing, and gearbox housing are replaced, select the new shim(s) as follows.

Shim selection:

- a. Set the four 44 mm shims on the bearing surface of the gearbox housing. Total thickness of the four shims should equal no more than 0.70 mm.
Shim set: four 44 mm shims (Thickness: 0.10 mm, 0.15 mm, 0.20 mm, 0.25 mm respectively)

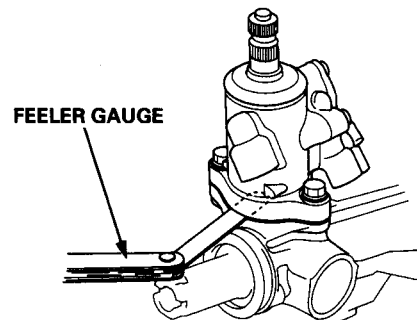
CAUTION: The four 44 mm shims do not have thickness identification marks. Measure the thickness of each shim using a micrometer, and mark the shim for identification.

- b. Install the valve body unit on the gearbox housing, and tighten the flange bolts to the specified torque.



- c. Measure the clearance between the gearbox housing and valve body unit using a feeler gauge as shown.

NOTE: Measure the clearance at the point midway between the two mounting bolts.



(cont'd)

Power Steering Gearbox

Reassembly (cont'd)

- d. Determine the required thickness of the 44 mm shims by subtracting the clearance obtained in the step - "C" from the total thickness of the four shims.
 (Total thickness of the four shims) - (Clearance) =
 Required thickness of the shims

NOTE: Select the shims so that the total thickness is close to, but less than the required thickness.

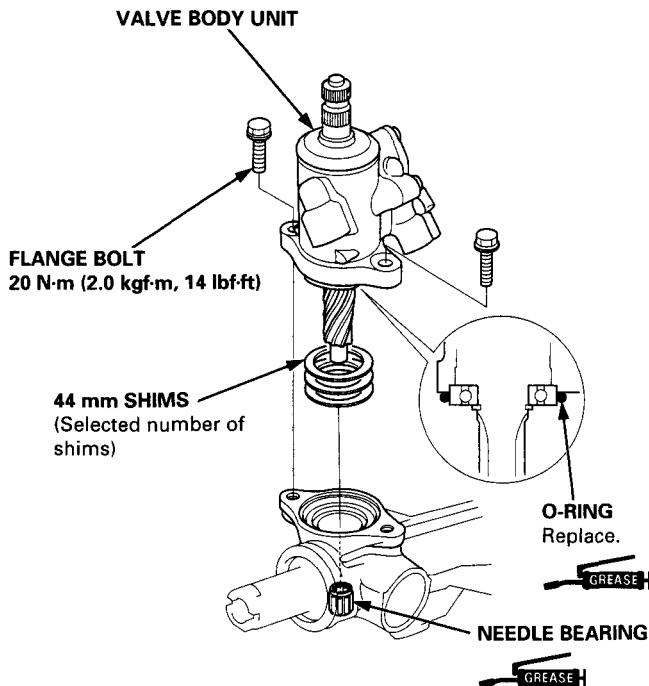
Example:

Measurement is 0.28 mm (0.011 in):
 $0.07 - 0.28 = 0.42 \text{ mm}$ ($0.028 - 0.011 = 0.017 \text{ in}$)

The selected shims should be 0.25 mm (0.010 in) and 0.15 mm (0.006 in) in thickness.

If the required shim thickness is 0.10 mm or less, no shims are necessary.

55. Set the selected 44 mm shims on the bearing surface of the gearbox housing.

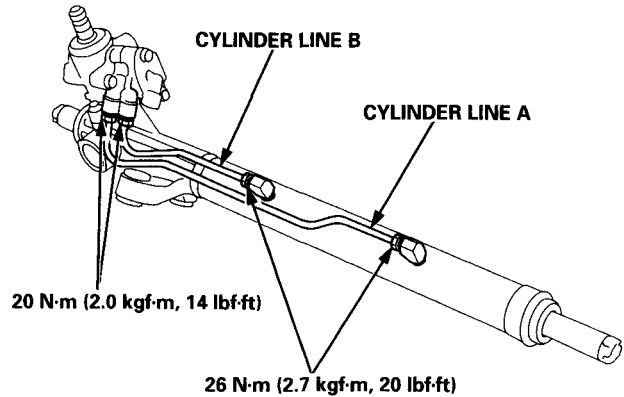


56. Coat the new O-ring with grease, and carefully fit it on the valve housing.
 57. Apply grease to the needle bearing in the gearbox housing.
 58. Install the valve body unit on the gearbox housing by engaging the gears.
 NOTE: Note the valve body unit installation position (direction of line connection).
 59. Tighten the flange bolts to the specified torque.

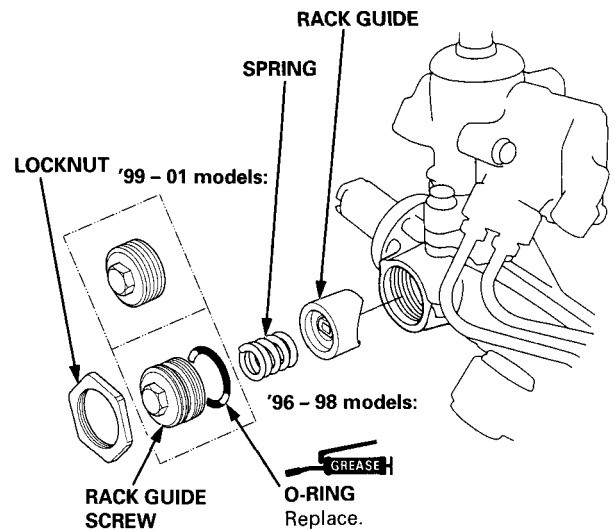
60. Install cylinder lines A and B.

NOTE:

- Clean the joints of cylinder lines A and B thoroughly. The joints must be free of foreign material.
- Install cylinder lines A and B by lighting the flare nuts by hand first, then tighten the flare nuts to the specified torque.



61. Grease the sliding surface of the rack guide, and install it onto the gearbox housing.



62. For '96 - 98 models: Apply a thin coat of grease to the new O-ring, and install it on the rack guide screw. For '99 - 01 models: Apply sealant to the all around threads on the rack guide screw.
 63. Install the spring, rack guide screw and locknut on the gearbox housing.
 64. Adjust the rack guide screw (see page 17-16).

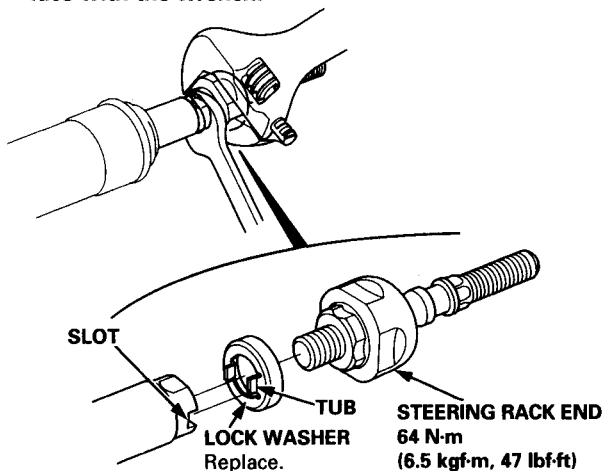
NOTE: After adjusting, check that the rack moves smoothly by sliding the rack right and left.



65. Install the new lock washer in the groove in the steering rack.
66. Install the steering rack ends into the rack.
67. Hold the steering rack with a wrench ('99 - 01 models: left end only), and tighten the rack ends with another wrench.

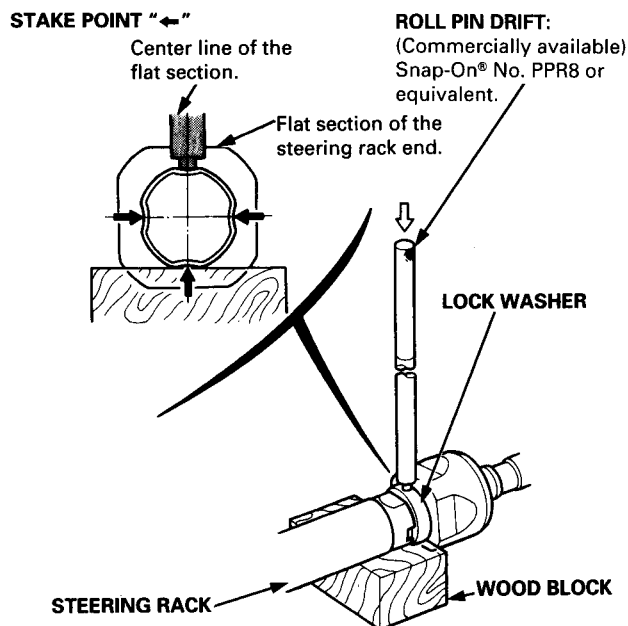
NOTE: '96 - 98 models shown.

CAUTION: Be careful not to damage the rack surface with the wrench.

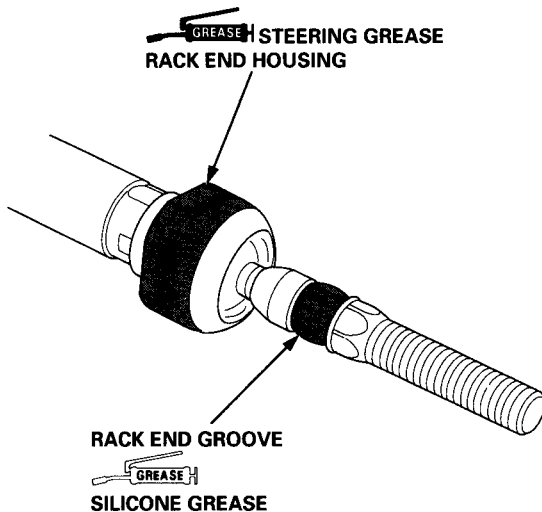


68. After tightening the rack ends, stake the four section of lock washer with a commercially-available roll pin drift and mallet.

- Place the wood block, then set the lock washer section of rack end securely on the wood block.
- Be sure the tool is aligned with the stake point (four dents) of the steering rack end before staking.



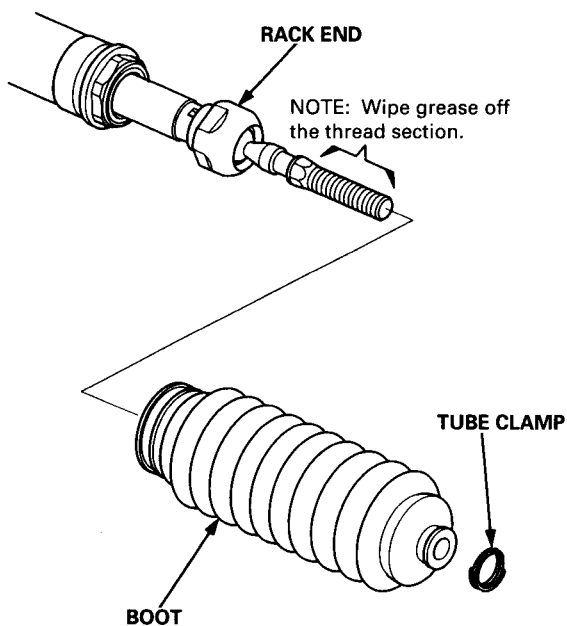
69. Apply steering grease to the circumference of the rack end housing.



70. Apply a light coat of silicone grease to the boot grooves on the rack ends.

71. Install the boots in the rack end with the tube clamps.

NOTE: Install the boots with the rack in the straight ahead position (right and left tie-rods are equal in length).

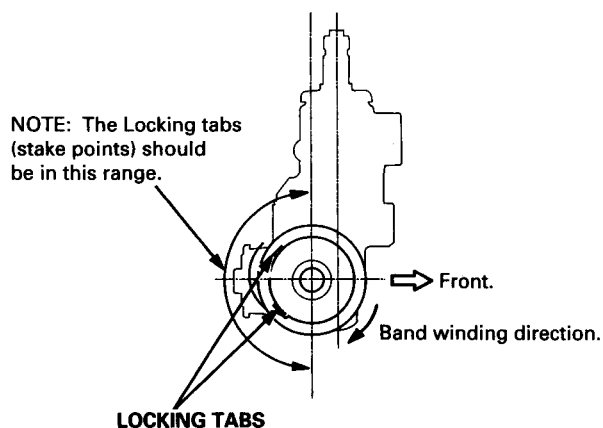


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Power Steering Gearbox

Reassembly (cont'd)

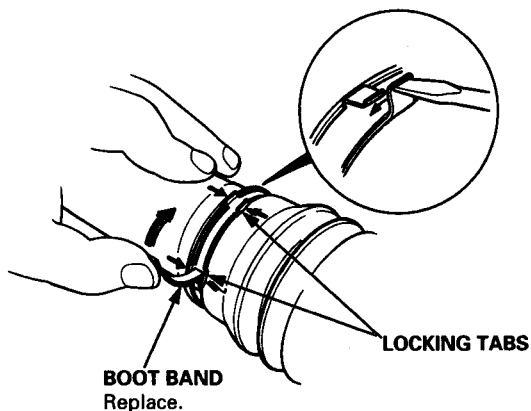
72. Install the new boot bands on the boots as shown.



73. Bend both sets of locking tabs.

74. Lightly tap on the doubled-over portions to reduce their height.

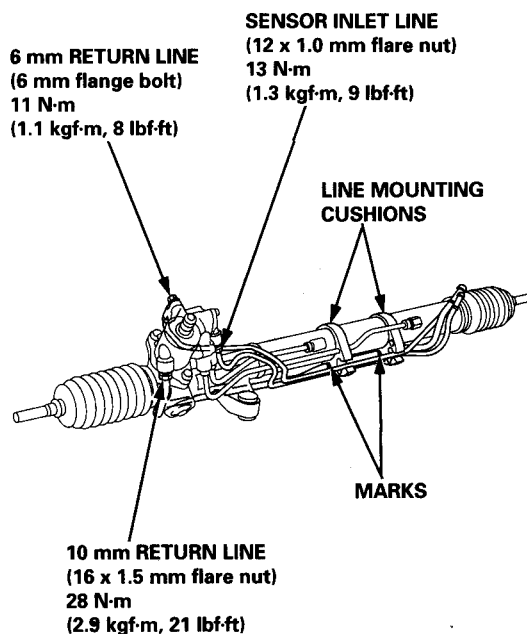
CAUTION: Stake the band locking tabs firmly.



75. Slide the rack right and left to be certain that the boots are not deformed or twisted.

76. Install the three lines (6 mm return line, 10 mm return line and sensor inlet line) to the valve body unit as shown.

77. Install the line mounting cushions by aligning the marks on the 10 mm return line (large diameter line).



78. Loosely install the tie-rod locknuts and tie-rod ends on the rack ends.

