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## Steering

### Steering

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### Hydraulic Power Steering Components

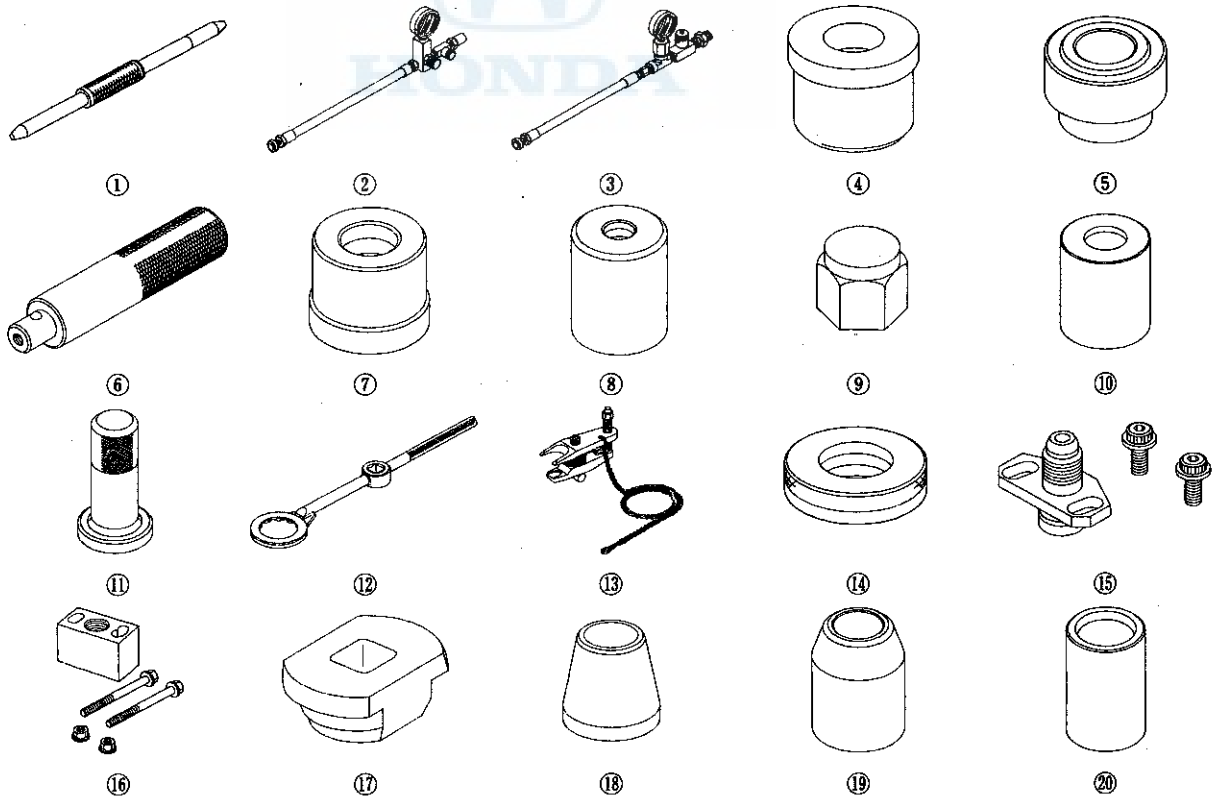
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# Steering

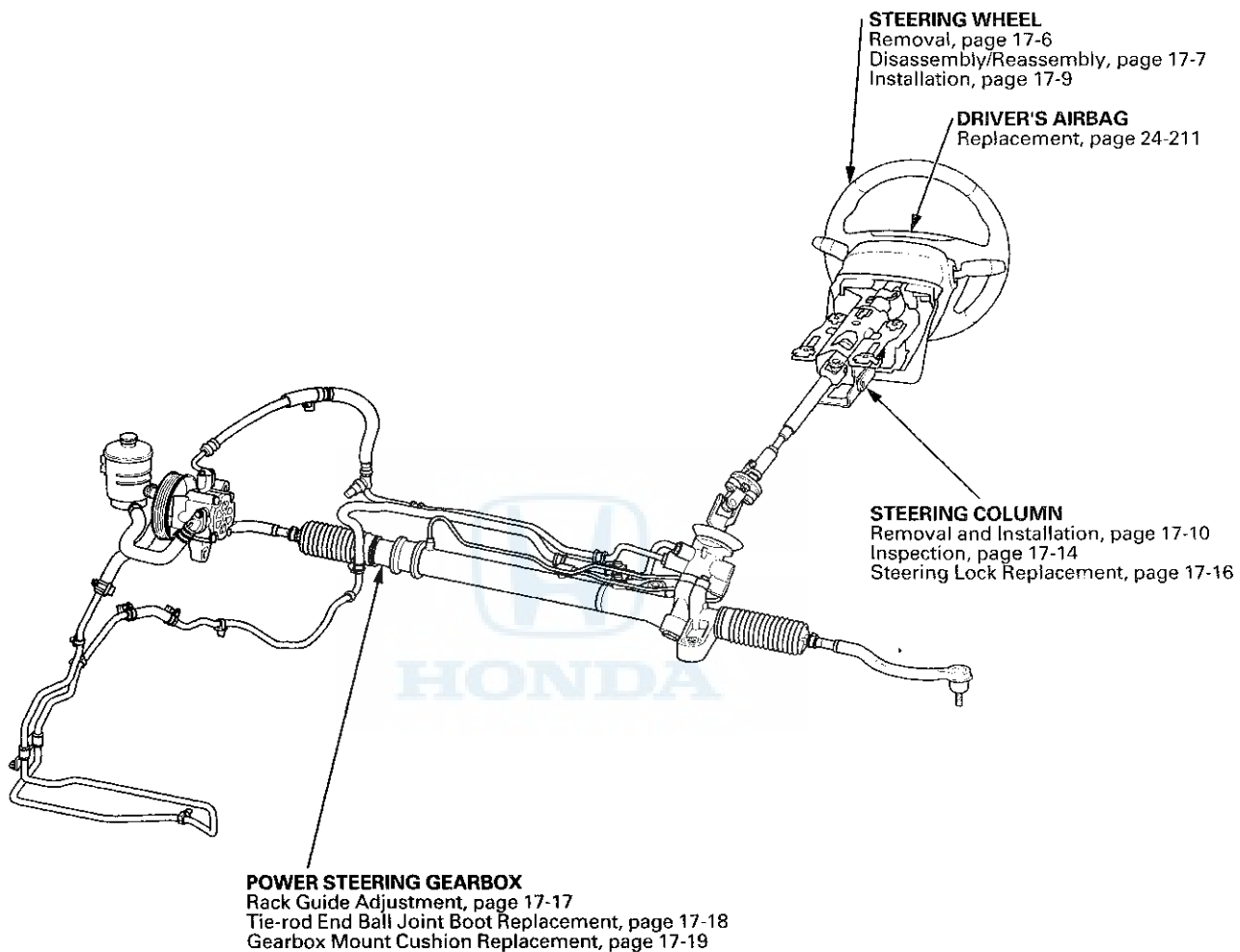
## Special Tools

Ref.No.	Tool Number	Description	Qty
①	070AG-SJAA10S	Subframe Alignment Pin	1
②	07406-0010001	P/S Pressure Gauge	1
③	07406-001000A or 07406-001A101	P/S Pressure Gauge	1
④	07746-0010100	Attachment, 32 x 35 mm	1
⑤	07746-0030300	Bearing Driver Attachment, 30 mm	1
⑥	07749-0010000	Driver Handle, 15 x 135L	1
⑦	07946-1870100	Bearing Driver Attachment, 28 x 30	1
⑧	07965-SA50500	Bearing Driver Attachment, 36	1
⑨	07AAF-SDAA100	Ball Joint Thread Protector, 12 mm	1
⑩	07HAG-SF1020A or 07HAG-SF10200	Sizing Tool, 42	1
⑪	07JAD-PL9A100	Oil Seal Driver, 65	1
⑫	07MAA-SL00100 or 07916-SA50001	Locknut Wrench, 40 mm	1
⑬	07MAC-SL0A202	Ball Joint Remover, 28 mm	1
⑭	07NAG-SR3090A	Valve Seal Ring Sizing Tool	1
⑮	07RAK-S040111 or 07RAK-S040110	Pump Joint Adapter	1
⑯	07RAK-S040122	Hose Joint Adapter	1
⑰	07TAF-SZ50100	Cylinder End Seal Remover Attachment	1
⑱	07XAG-S0KA200	Piston Seal Ring Guide	1
⑲	07YAG-S2X0100	Sleeve Seal Guide, 35.9 x 37	1
⑳	07ZAG-S5A0100	Sizing Tool, 36	1





## Component Location Index

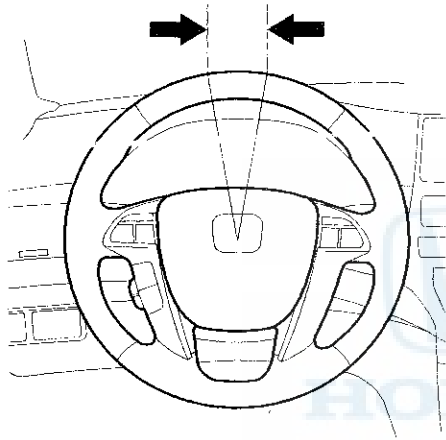


# Steering

## Steering Wheel Rotational Play Check

1. Set the front wheels in the straight ahead position.
2. Measure how far you can turn the steering wheel left and right without moving the front wheels.
  - If the play is within the limit, the steering gearbox and the steering linkages are OK.
  - If the play exceeds the limit, adjust the rack guide (see page 17-17). If the play is still excessive after rack guide adjustment, inspect the steering linkage and steering gearbox (see page 17-5).

**Rotational play: 0–10 mm (0–0.39 in)**

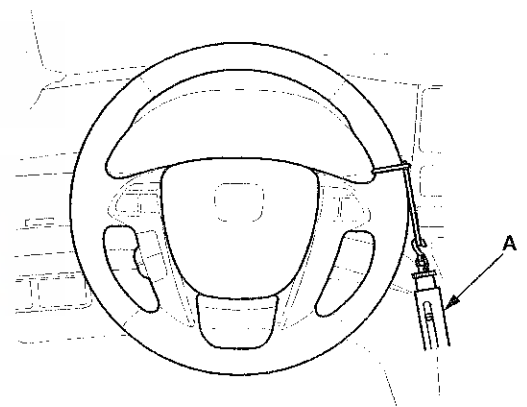


## Power Assist Check

**NOTE:** This test should be done with original equipment tires and wheels at the correct tire pressure.

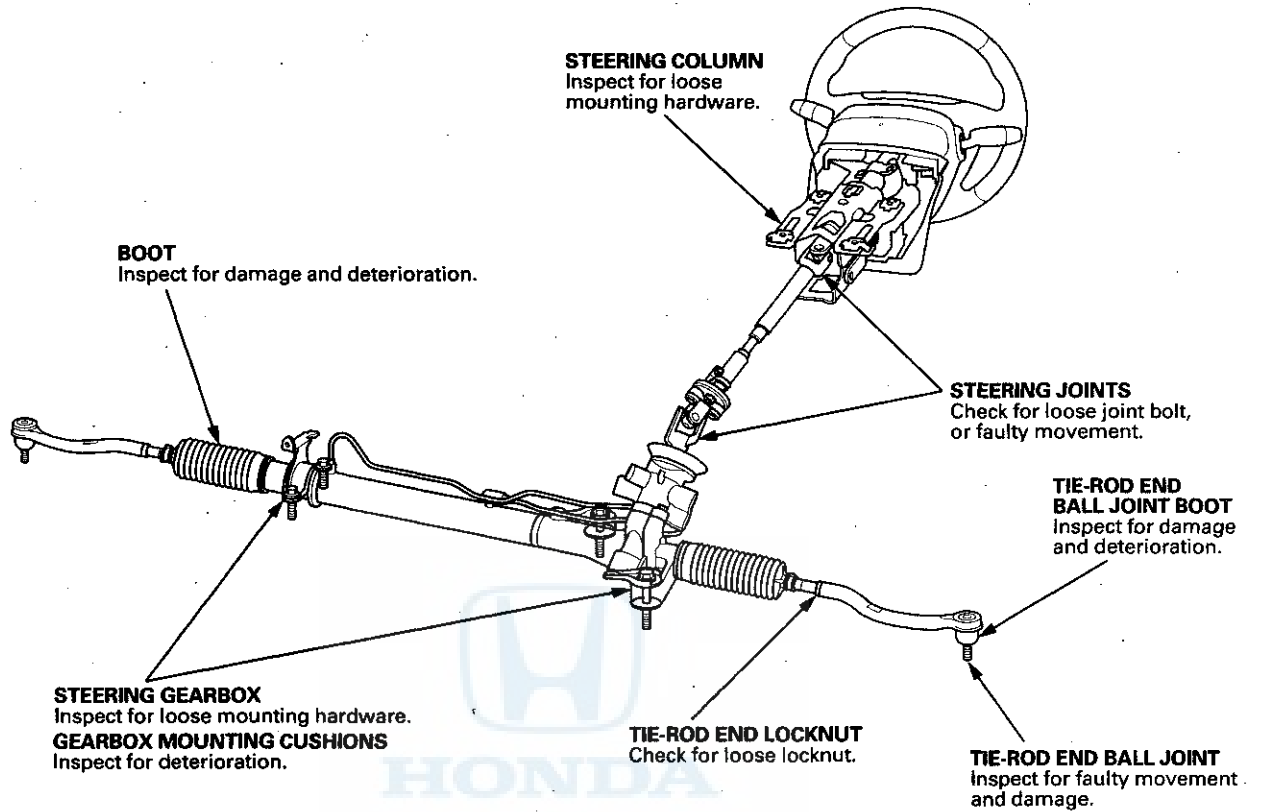
1. Check the power steering fluid level (see page 17-28).
2. Start the engine, let it idle, and turn the steering wheel from lock to lock several times to warm up the fluid.
3. Attach a commercially available spring scale (A) to the steering wheel. With the engine idling and the vehicle on a clean, dry floor, pull the scale as shown and read it as soon as the tires begin to turn.
  - If the scale reads no more than the specification, the steering gearbox and pump are OK.
  - If the scale reads more than the specification, troubleshoot the steering system (see page 17-24).

**Initial turning load: 29 N (3.0 kgf, 6.6 lbf)**





## Steering Linkage and Gearbox Inspection

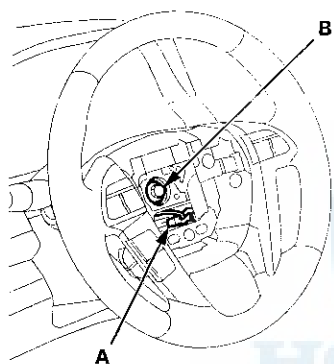


# Steering

## Steering Wheel Removal

SRS components are located in this area. Review the SRS component locations: 4-door (see page 24-21), 2-door (see page 24-23) and the precautions and procedures (see page 24-25) before doing repairs or service.

1. Do the battery terminal disconnection procedure (see page 22-91).
2. Set the front wheels in the straight ahead position, then remove the driver's airbag from the steering wheel (see page 24-211).
3. Disconnect the cable reel subharness connector (A).

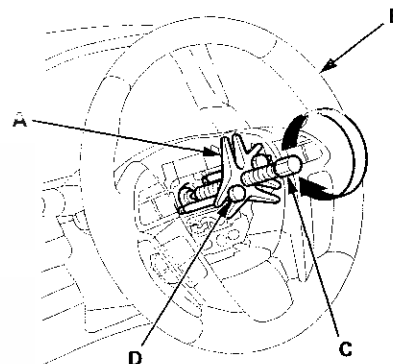


4. Loosen the steering wheel bolt (B) three turns.

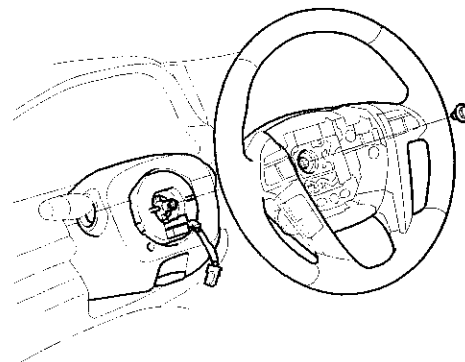
5. Install a commercially available steering wheel puller (A) on the steering wheel (B). Free the steering wheel from the steering column shaft by turning the pressure bolt (C) of the puller.

Note these items when removing the steering wheel:

- Do not tap on the steering wheel or the steering column shaft when removing the steering wheel.
- If you thread the puller bolts (D) into the wheel hub more than five threads, the bolts will hit the cable reel and damage it. To prevent this, install a pair of jam nuts five threads up on each puller bolt.



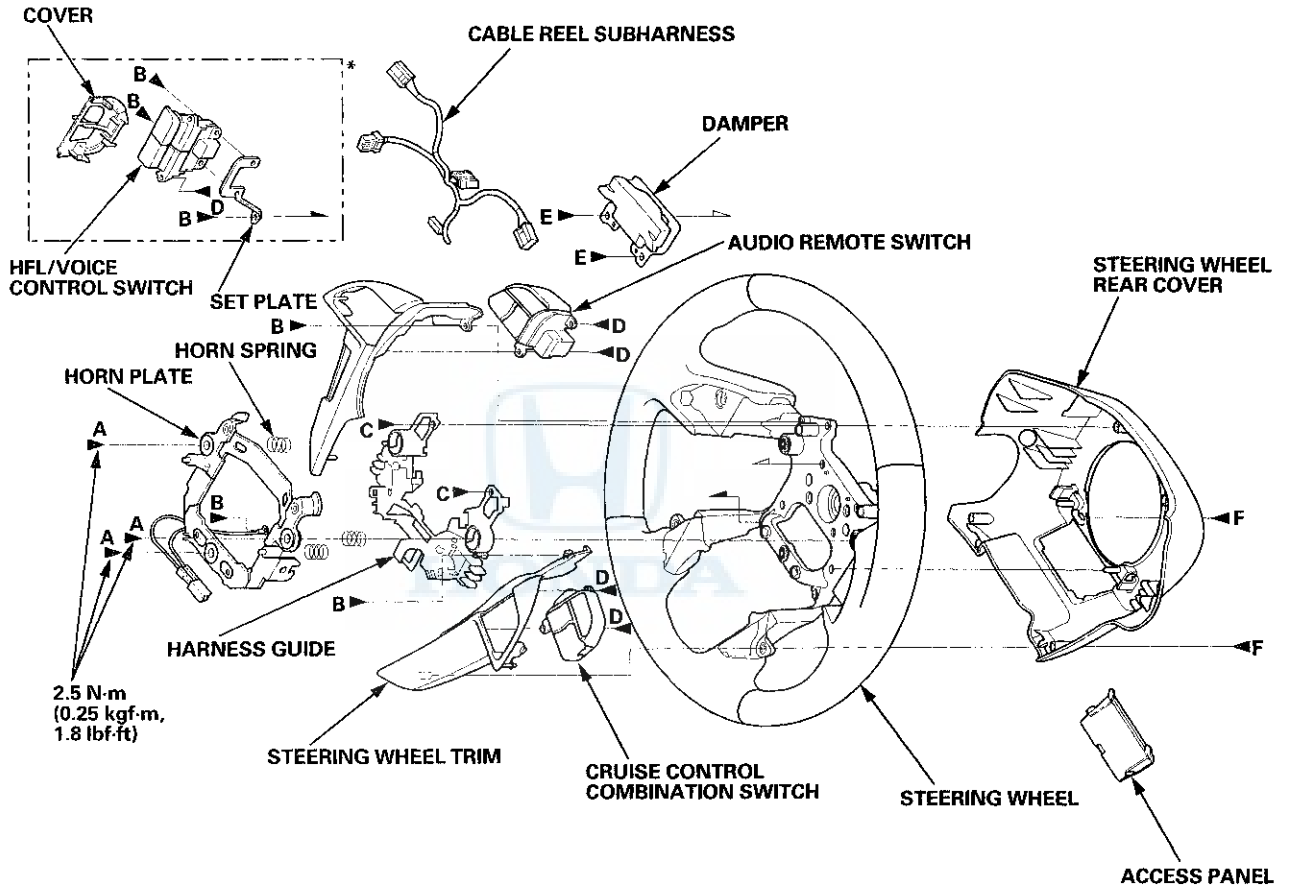
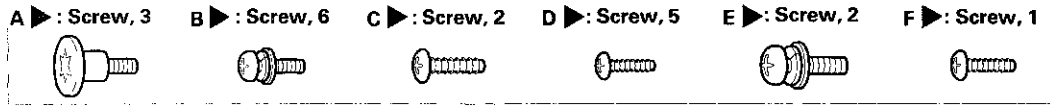
6. Remove the steering wheel puller, then remove the steering wheel bolt and steering wheel from the steering column.





# Steering Wheel Disassembly/Reassembly

4-door



\*: With Navigation

(cont'd)



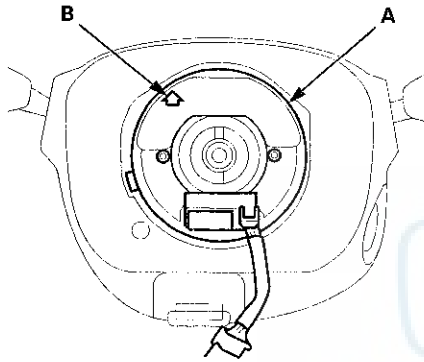




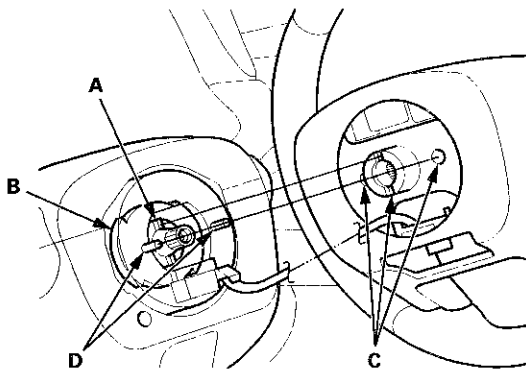
## Steering Wheel Installation

SRS components are located in this area. Review the SRS component locations: 4-door (see page 24-21), 2-door (see page 24-23) and the precautions and procedures (see page 24-25) before doing repairs or service.

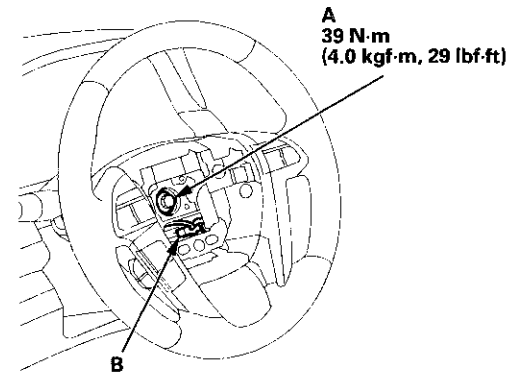
1. Before installing the steering wheel, make sure the front wheels are pointing straight ahead, then center the cable reel (A). Do this by first rotating the cable reel clockwise until it stops. Then rotate it counterclockwise about three full turns. The arrow mark (B) on the cable reel label should point straight up.



2. Position the two tabs (A) of the turn signal canceling sleeve (B) as shown. Install the steering wheel on to the steering column shaft, making sure the steering wheel hub (C) engages the pins (D) of the cable reel and tabs of the turn signal canceling sleeve. Do not tap on the steering wheel or steering column shaft when installing the steering wheel.



3. Install the steering wheel bolt (A), and tighten it to the specified torque. Connect the cable reel subharness connector (B). Make sure the wire harness is routed and fastened properly.



4. Install the driver's airbag (see page 24-211).
5. Do the battery terminal reconnection procedure (see page 22-91), and check these items:
  - Turn the ignition switch to ON (II) and check that the SRS indicator comes on for about 6 seconds, and then goes off.
  - Make sure the horn and turn signal switches work properly.
  - Make sure the steering wheel switches work properly.
6. After installation, check the steering wheel spoke angle. If the steering spoke angles to the right and left are not equal (steering wheel is not centered), correct the engagement of the wheel/column shaft splines.

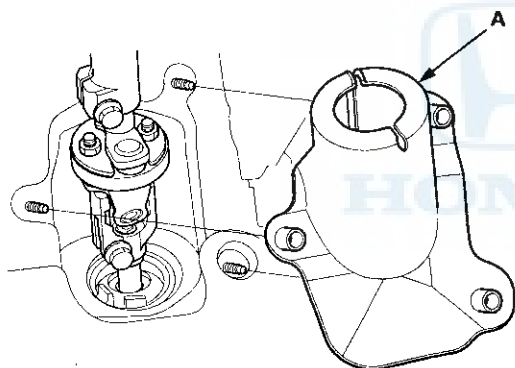
# Steering

## Steering Column Removal and Installation

SRS components are located in this area. Review the SRS component locations: 4-door (see page 24-21), 2-door (see page 24-23) and the precautions and procedures (see page 24-25) before doing repairs or service.

### Removal

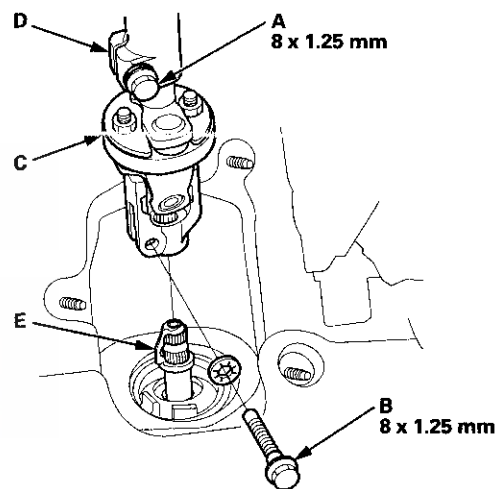
1. Adjust the steering column to the full tilt down position, and to the full telescopic out position.
2. Do the battery terminal disconnection procedure (see page 22-91).
3. Remove the driver's airbag (see page 24-211), and the steering wheel (see page 17-6).
4. Remove the steering column covers (see page 20-181).
5. Remove the steering joint cover (A).



6. Loosen the upper steering joint bolt (A), and remove the lower steering joint bolt (B). Disconnect the steering joint (C) by sliding the steering joint into the column shaft (D). Tighten the upper steering joint bolt to hold the steering joint in place.

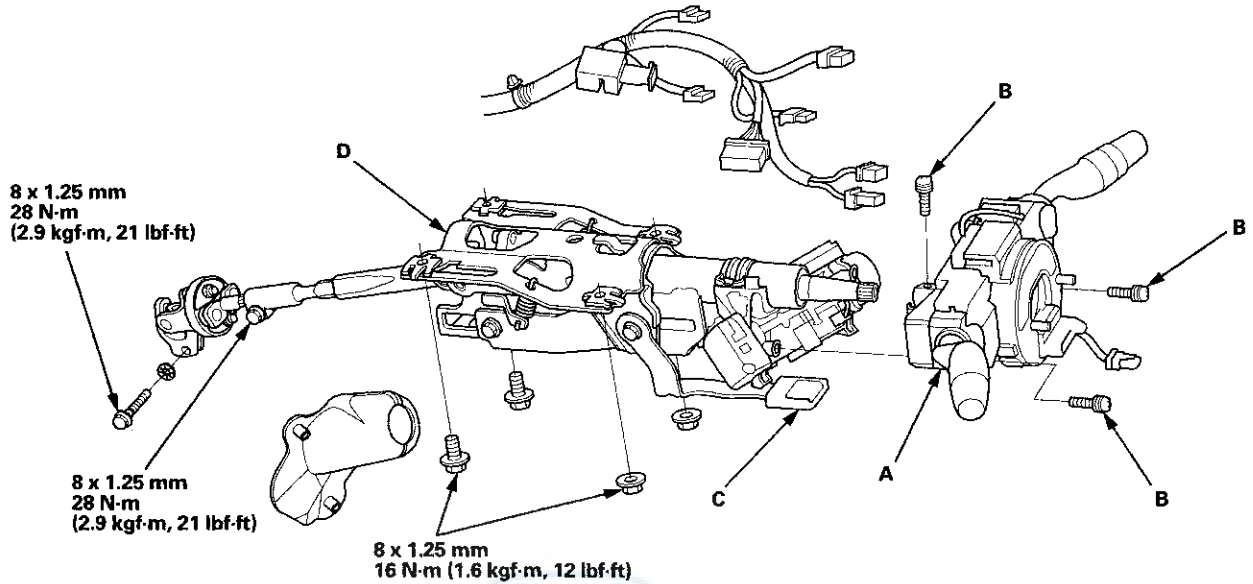
### NOTE:

- Do not disconnect the steering joint from the column shaft.
- If the center guide (E) is in place and has not moved, leave it in place.
- If the center guide has come off, discard it.





7. Disconnect the wire harness connectors from the combination switch assembly/cable reel (A).



8. Remove the combination switch assembly/cable reel from the steering column shaft by removing the three screws (B).

9. Disconnect the connectors from the ignition switch, and release the wire harness clips from the steering column.

10. Make sure that the lock lever (C) is in the locked position. Remove the steering column (D) by removing the attaching nuts and bolts, and carefully guide it out of the dashboard.

**NOTE:** Do not release the lock lever until the steering column is installed. If the lock lever is released before installation, adjust the steering column (see page 17-15) after installation.

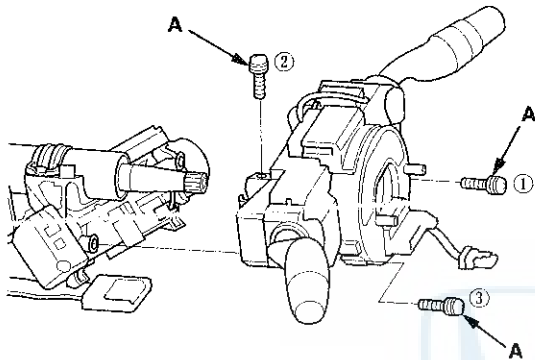
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# Steering

## Steering Column Removal and Installation (cont'd)

### Installation

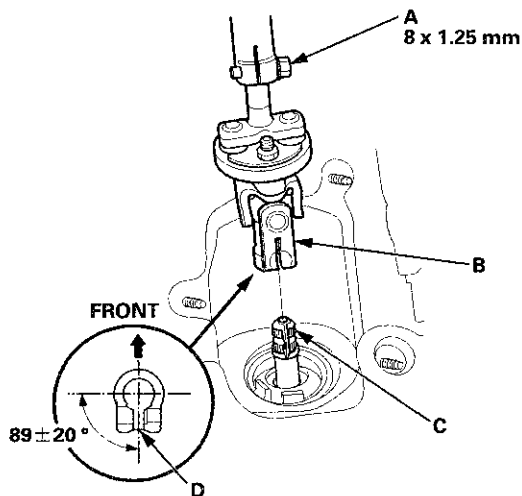
1. Install the steering column in the reverse order of removal, and note these items:
  - Make sure the wires are not caught or pinched by any parts.
  - Tighten the three screws (A) in the sequence shown.



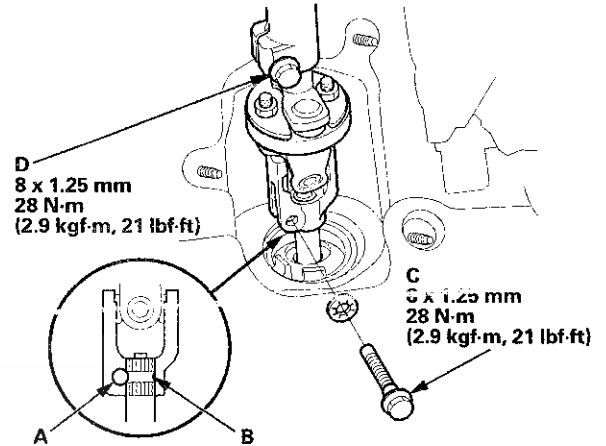
2. Center the steering rack within its stroke.
3. Loosen the upper steering joint bolt (A), and slip the lower end of the steering joint (B) on to the pinion shaft (C).

#### NOTE:

- Pinion shaft with center guide: Install the steering joint by aligning the center guide.
- Pinion shaft without center guide: Position the steering column by aligning the gap (D) within the angle.

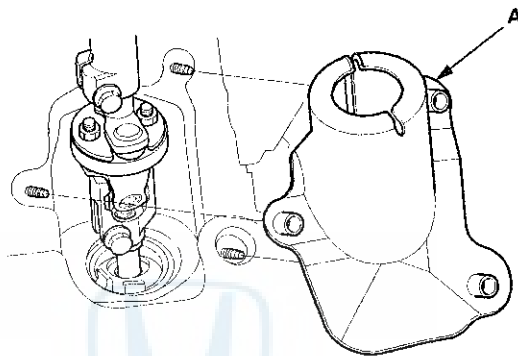


4. Align the bolt hole (A) on the steering joint with the groove (B) around the pinion shaft, then loosely install the lower steering joint bolt (C). Be sure that the joint bolt is securely in the groove in the pinion shaft.



5. Pull on the steering joint to make sure that the steering joint is fully seated, then tighten the lower joint bolt to the specified torque.
6. Tighten the upper steering joint bolt (D) to the specified torque.

7. Install the steering joint cover (A).



8. Install the steering column covers (see page 20-181).

9. Install the steering wheel (see page 17-9), and the driver's airbag (see page 24-211).

10. Do the battery terminal reconnection procedure (see page 22-91), and check these items:

- Turn the ignition switch to ON (II), and check that the SRS indicator comes on for about 6 seconds, and then goes off.
- Make sure the horn and turn signal switches work properly.
- Make sure the steering wheel switches work properly.

11. After installation, check these items:

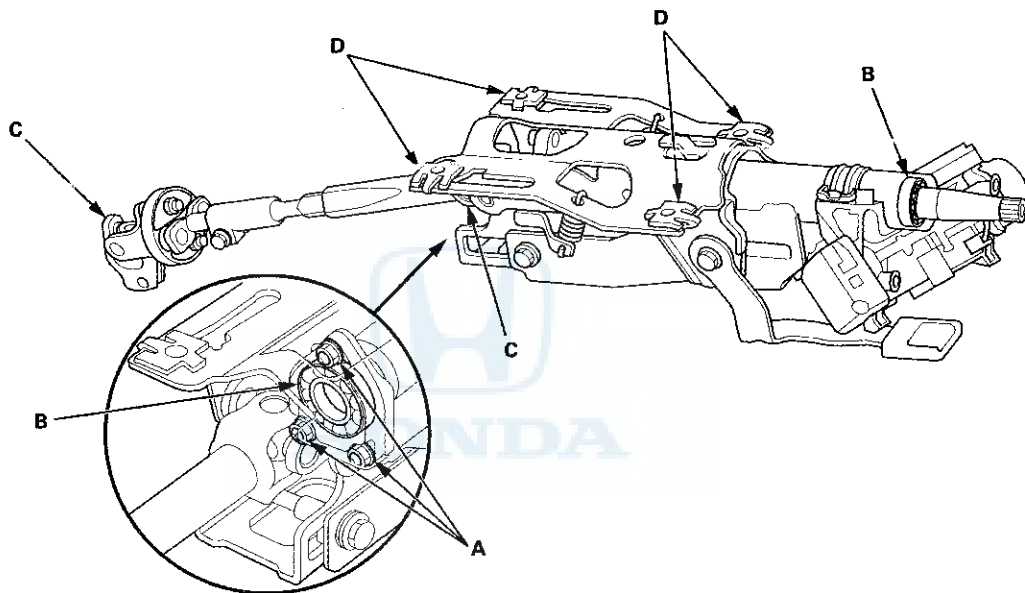
- Check the steering wheel spoke angle. If the steering spoke angles to the right and left are not equal (steering wheel and rack are not centered), correct the engagement of the joint/pinion shaft splines.
- Set the steering column to the center tilt position, and to the center telescopic position, then do the front toe inspection (see page 18-5).

# Steering

## Steering Column Inspection

### Inspection

1. Remove the steering column (see page 17-10).
2. Check these items:
  - Check for loose bearing mounting nuts (A). If they are loose, replace the column as an assembly.
  - Check the steering column ball bearings (B) and the steering joints (C) for play and proper movement. If any bearing is noisy or has excessive play, replace the steering column as an assembly.
  - Check the sliding capsules (D) for distortion or breakage. If there is distortion or breakage, replace the steering column as an assembly.
  - Check the tilt mechanism and telescopic mechanism for movement and damage.

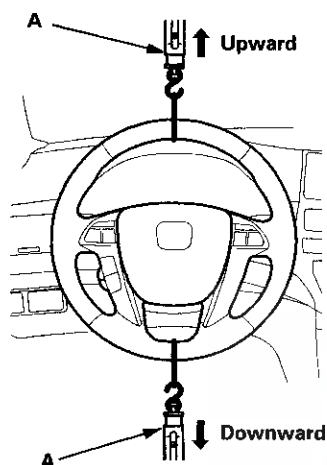


3. Install the steering column (see page 17-12).



### Check of Tilting Force

1. Set the steering wheel in the straight ahead driving position, and loosen the lock lever fully.
2. Attach a commercially available spring scale (A) to the highest point of the steering wheel, and tilt the steering column to the lowest position.



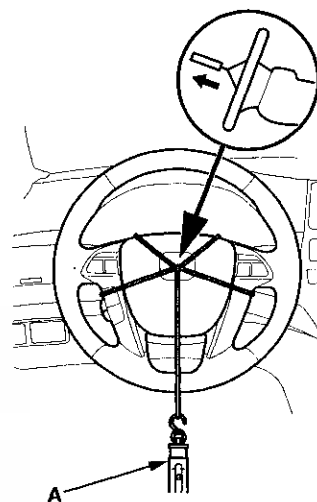
3. Pull the spring scale straight up, and read the force required to move the steering column.
4. Attach the spring scale to the lowest point of the steering wheel.
5. Pull the spring scale straight down, and read the force required to move the steering column.

**Tilting force (upward/downward):**  
**Standard: 70 N (7.1 kgf, 15 lbf) max.**

6. If the measurement is higher than specified, or if the tilt function feels rough, do the following.
  - Loosen the attaching nuts so they are finger-tight.
  - Release the lock lever, and tilt and telescope the steering column several times.
  - Tilt the column down, then tighten the lock lever.
  - Torque the upper nuts, then torque the lower bolts.
7. Test the tilting force again. If the force is still higher than the specification, replace the steering column as an assembly (see page 17-10).

### Check of Telescoping Force

1. Set the steering wheel in the straight ahead driving position, and loosen the lock lever fully, and push in the steering wheel to the fully telescoped in position.
2. Attach a commercially available spring scale (A) to the center point of the steering wheel as shown.



3. Pull the spring scale, and read the force required to move the steering column during telescoping out.

**Telescoping force:**  
**Standard: 135 N (13.8 kgf, 30.3 lbf) max.**

4. If the measurement is higher than specified, replace the steering column as an assembly (see page 17-10).

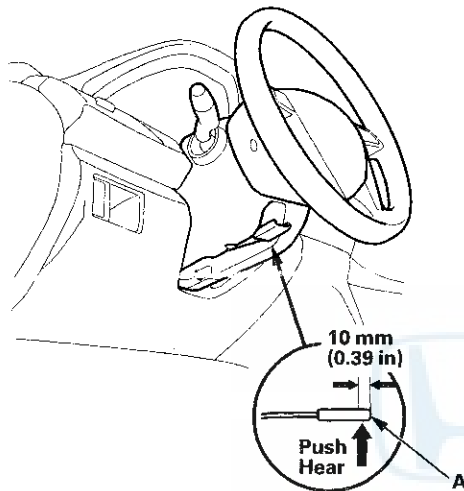
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# Steering

## Steering Column Inspection (cont'd)

### Check of Lock Lever Force

1. Move the lock lever (A) from the loosened position to the locked position three to five times, then release the lock lever. Adjust the steering column to the center tilt position and also to the full telescopic out position, and hold the steering wheel.



2. Using a commercially available push-pull gauge, push up the lock lever 10 mm (0.39 in) in from its end, and measure the force required to move the lock lever.

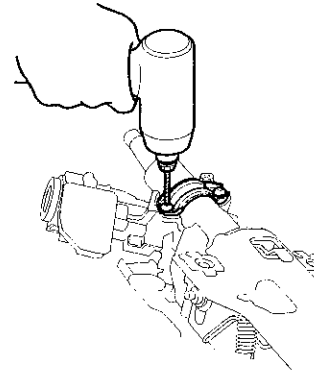
#### Lock lever force:

50–85 N (5.1–8.7 kgf, 11–19 lbf) min.

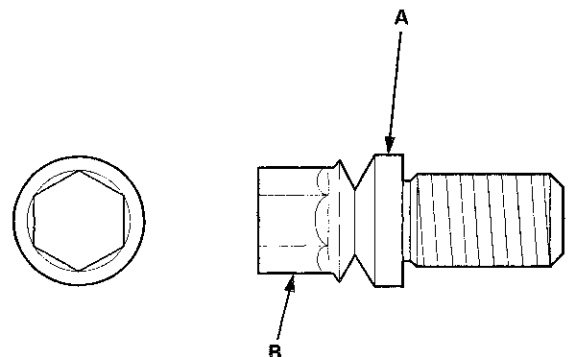
3. If the measurement is higher than specified, replace the steering column as an assembly (see page 17-10).

## Steering Lock Replacement

1. Remove the steering column (see page 17-10).
2. Center-punch both of the two shear bolts, and drill their heads off with a 5 mm (0.20 in) drill bit. Be careful not to damage the steering lock when removing the shear bolts.



3. Remove the shear bolts from the steering lock, then remove the steering lock.
4. Remove the immobilizer-keyless control unit from the steering lock, then install it on the new steering lock (see page 22-440).
5. Install the steering lock without the key inserted.
6. Loosely tighten the new shear bolts.
7. Insert the ignition key, and check for proper operation of the steering wheel lock and that the ignition key turns freely.
8. Tighten the shear bolts (A) until the hex heads (B) twist off.



9. Install the steering column (see page 17-12).
10. Rewrite all new keys to the immobilizer-keyless control unit (see page 22-439), and make sure the immobilizer system works properly.



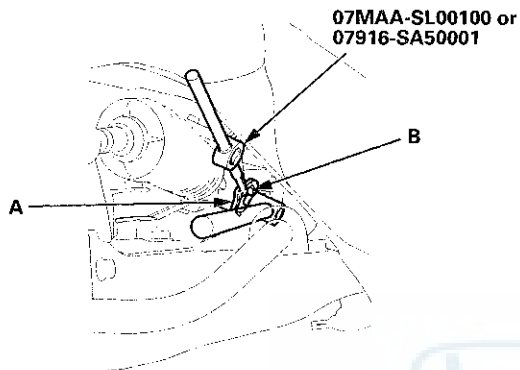


## Rack Guide Adjustment

### Special Tools Required

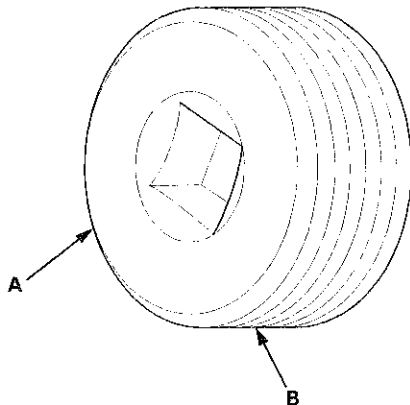
Locknut Wrench, 40 mm 07MAA-SL00100 or Locknut Wrench, 41 mm 07916-SA50001

1. Set the front wheels in the straight ahead position.
2. Loosen the rack guide screw locknut (A) with the locknut wrench, then remove the rack guide screw (B).

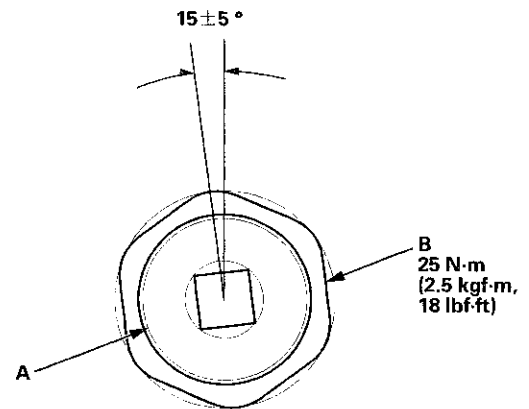


3. Remove the old sealant from the rack guide screw (A), and apply new sealant (Three Bond 1215 or Loctite 5699) to the middle of the threads (B). Loosely install the rack guide screw on the steering gearbox.

**NOTE:** If more than 5 minutes have passed after applying the sealant, remove the old sealant and residue, and reapply new sealant.



4. Tighten the rack guide screw (A) to 25 N·m (2.5 kgf·m, 18 lbf·ft), then loosen it.



5. Retighten the rack guide screw to 3.9 N·m (0.4 kgf·m, 2.9 lbf·ft), then back it off to the specified angle.

**Specified return angle:  $15 \pm 5^\circ$**

6. Hold the rack guide screw stationary with a wrench, and tighten the locknut by hand until it's fully seated.
7. Install the locknut wrench on the locknut (B), and hold the rack guide screw stationary with a wrench. Tighten the locknut to the specified torque.
8. Check for unusual steering effort through the complete turning range.
9. Check the steering wheel rotation play (see page 17-4) and the power assist (see page 17-4).

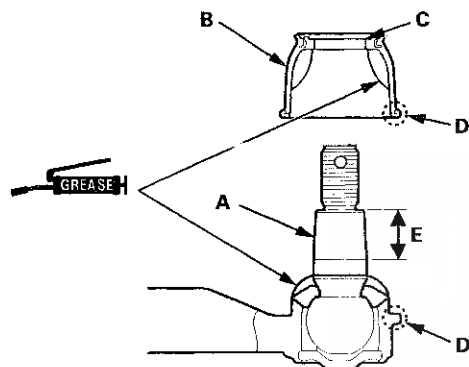
# Steering

## Tie-rod End Ball Joint Boot Replacement

### Special Tools Required

Bearing Driver Attachment, 36 07965-SA50500

1. Disconnect the tie-rod end ball joint from the knuckle (see step 26 on page 17-41).
2. Remove the tie-rod end from the rack end.
3. Remove the ball joint boot from the tie-rod end, and wipe the old grease off the ball pin.
4. Pack the lower area of the ball pin (A) with fresh multipurpose grease.

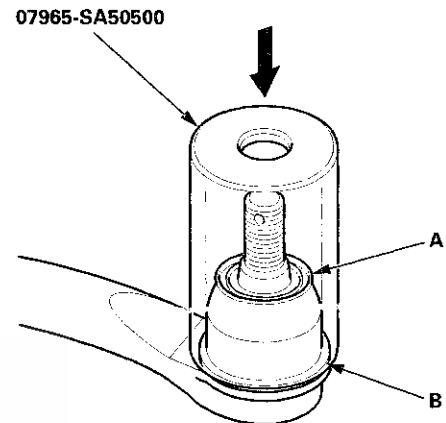


5. Pack the interior of the new ball joint boot (B) and lip (C) with fresh multipurpose grease.

Note these items when installing new grease:

- Keep grease off the boot mounting area (D) and the tapered section (E) of the ball pin.
- Do not allow dust, dirt, or other foreign materials to enter the boot.

6. Install the ball joint boot (A) using the bearing driver attachment. The boot must not have a gap at the boot installation sections (B). After installing the boot, check the ball pin tapered section for grease contamination, and wipe it if necessary.

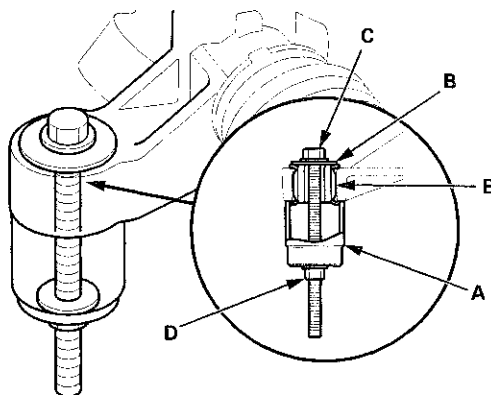


7. Install the tie-rod end to the rack end.
8. Connect the tie-rod end ball joint to the knuckle (see step 32 on page 17-64).
9. Check the wheel alignment, and adjust it if necessary (see page 18-5).

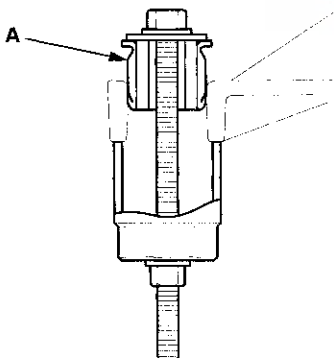


## Gearbox Mount Cushion Replacement

1. Remove the steering gearbox (see page 17-37).
2. Position a 40 mm socket (A) on the flange part of the gearbox housing with a washer (B), a 10 x 150 mm flange bolt (C), and a 10 mm nut (D) as shown.

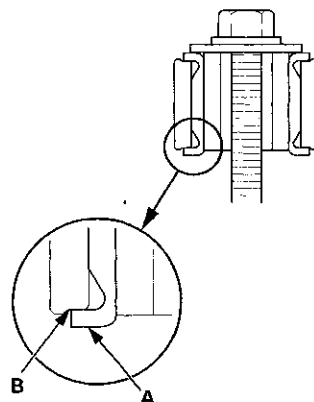


3. Hold the flange bolt with a wrench, and tighten the nut with a wrench. Remove the gearbox mount cushion (E).
4. Apply a mild soap and water solution to the new gearbox mount cushion surface (A), then place the mount cushion on the gearbox mounting cushion hole.



5. Position a 40 mm socket on the flange part of the gearbox housing with a washer, a flange bolt, and a nut as shown.

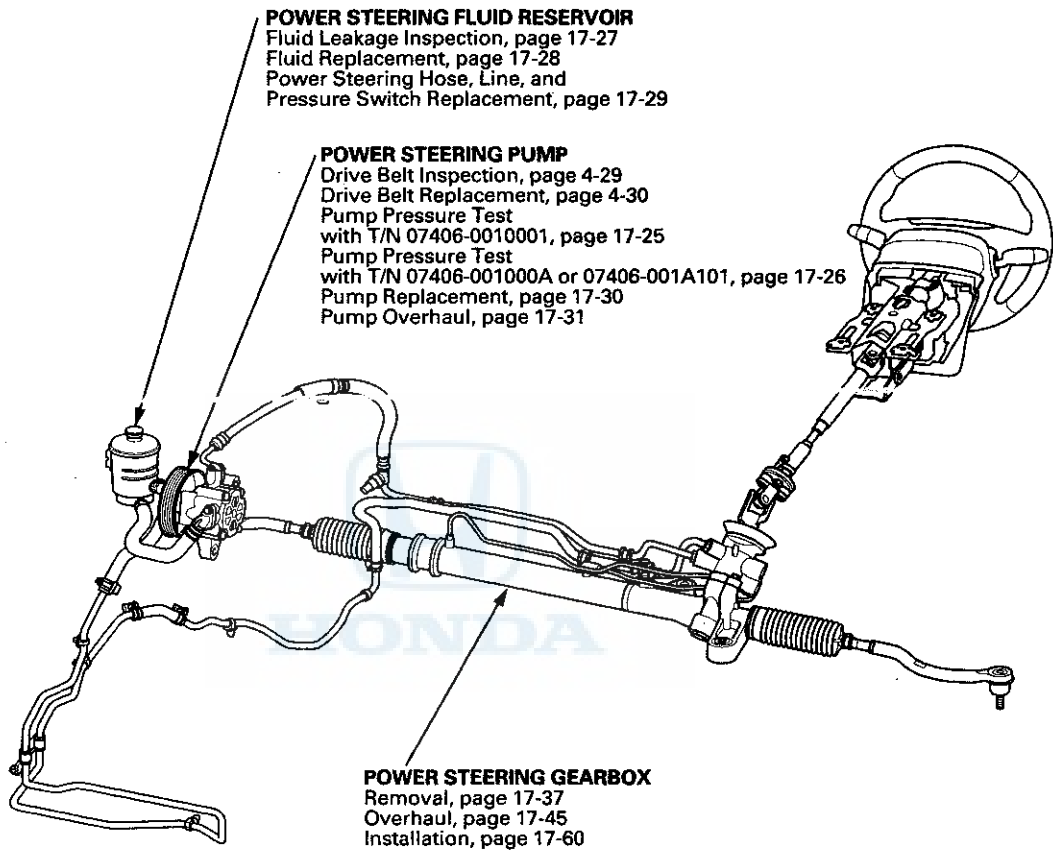
6. Install the gearbox mount cushion by tightening the nut until the mount cushion edge (A) properly fits on the gearbox flange surface (B).



7. Install the steering gearbox (see page 17-60).

# Hydraulic Power Steering Components

## Component Location Index





## Symptom Troubleshooting Index

Find the symptom in the chart below, and do the related procedures in the order listed until you find the cause.

Symptom	Procedure(s)	Also check for
Hard steering	Troubleshoot the system (see page 17-24).	<ul style="list-style-type: none"> <li>Modified suspension</li> <li>Damaged suspension</li> <li>Incorrect tire sizes, tire varieties, and air pressure</li> </ul>
Assist (excessively light steering at high speed)	Check the rack guide adjustment (see page 17-17).	Front wheel alignment (see page 18-5)
Shock or vibration when the steering wheel is turned to full lock	<ol style="list-style-type: none"> <li>1. Check the drive belt for slippage (see page 4-29).</li> <li>2. Check the power steering pump fluid pressure with T/N 07406-0010001 (see page 17-25), T/N 07406-001000A or T/N 07406-001A101 (see page 17-26).</li> <li>3. Check the rack guide adjustment (see page 17-17).</li> <li>4. Overhaul the steering gearbox (see page 17-45).</li> </ol>	
Steering wheel will not return smoothly	<ol style="list-style-type: none"> <li>1. Check cylinder lines for deformation (see page 17-29).</li> <li>2. Check the ball joints for binding.</li> <li>3. Check wheel alignment (see page 18-5).</li> <li>4. Overhaul the steering gearbox (see page 17-45).</li> </ol>	Damaged suspension
Uneven or rough steering	<ol style="list-style-type: none"> <li>1. Check for low fluid level in the power steering reservoir due to possible leaks in system (see page 17-28).</li> <li>2. Check the drive belt (see page 4-29).</li> <li>3. Check for low or erratic engine idle speed (see page 11-292).</li> <li>4. Check for air in the power steering system due to air entering the inlet side of the pump.</li> <li>5. Check the rack guide adjustment (see page 17-17).</li> <li>6. Overhaul the steering gearbox (see page 17-45).</li> </ol>	
Steering wheel kicks back during wide turns	<ol style="list-style-type: none"> <li>1. Check for low fluid level in the power steering reservoir due to possible leaks in the system (see page 17-28).</li> <li>2. Check the drive belt (see page 4-29).</li> <li>3. Check the power steering pump fluid pressure with T/N 07406-0010001 (see page 17-25), T/N 07406-001000A or T/N 07406-001A101 (see page 17-26).</li> </ol>	

(cont'd)

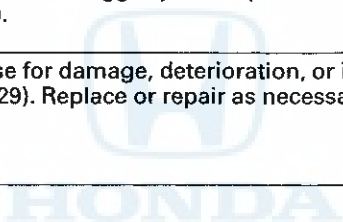
# Hydraulic Power Steering Components

## Symptom Troubleshooting Index (cont'd)

Symptom	Procedure(s)	Also check for
Humming noise from the power steering system	<ol style="list-style-type: none"> <li>Check when the noise occurs: <ul style="list-style-type: none"> <li>If the noise is heard during the first 2–3 minutes after starting the engine in cold weather, this is normal.</li> <li>If the noise is heard when the wheel is turned with the vehicle stopped, this is normal due to the fluid pulsation.</li> </ul> </li> <li>Check for air bubbles in the power steering fluid, leak on the inlet side of the pump.</li> <li>Check for particle contamination of fluid and a restricted filter in the reservoir.</li> <li>Check for the high-pressure hose touching the subframe or body.</li> <li>Check for automatic transmission torque converter noise.</li> </ol>	<ul style="list-style-type: none"> <li>Pump pressure</li> <li>Fluid contamination <ul style="list-style-type: none"> <li>– Restriction in the high-pressure line</li> <li>– Restriction in the low-pressure line</li> </ul> </li> </ul>
Power steering rack rattle or chattering	<ol style="list-style-type: none"> <li>Check for loose steering components (tie-rod and ball joints). Tighten or replace as necessary.</li> <li>Check the steering column shaft for wobbling. If the steering column wobbles, replace the steering column assembly (see page 17-10).</li> <li>Check the power steering pump pulley on the shaft comp, for damage and deterioration. replace the shaft comp, if necessary (see page 17-30).</li> <li>Check the rack guide adjustment (see page 17-17).</li> </ol>	
Hissing from the power steering system/foaming fluid	<ul style="list-style-type: none"> <li>Check the fluid level. If low, fill the reservoir to the proper level, and check for leaks (see page 17-27).</li> <li>Check the reservoir for leaks.</li> <li>Check for crushed inlet hose or loose hose clamp allowing air into the suction side of the system (see page 17-29).</li> <li>Check the power steering pump shaft oil seal for leaks.</li> </ul>	<ul style="list-style-type: none"> <li>Air in the P/S fluid</li> <li>Fluid contamination</li> </ul>
Noise from the power steering pump	<ul style="list-style-type: none"> <li>Compare the pump noise at normal operating temperature to another like vehicle (pump noise during the first 2–3 minutes after starting the engine in cold weather is normal).</li> <li>Remove and inspect the pump for wear and damage (see page 17-31).</li> </ul>	<ul style="list-style-type: none"> <li>P/S pump pressure</li> <li>Air in the P/S fluid</li> </ul>
Squeaking from the power steering pump	Check the drive belt (see page 4-29).	
Fluid leaks from the steering gearbox	<ul style="list-style-type: none"> <li>Fluid leaks from the top of the valve body unit. Overhaul the valve body unit (see page 17-45).</li> <li>Fluid leaks from the driver's side boot. Replace the valve oil seal on the pinion shaft. Replace the cylinder end seal on the gearbox side (see page 17-45).</li> <li>Fluid leaks from the passenger's side boot. Replace the cylinder end seal on the cylinder side (see page 17-45).</li> <li>Fluid leaks from pinion shaft near the lower steering joint bolt. Overhaul the valve body unit (see page 17-45).</li> <li>Fluid leaks from the steering damping valve covers on the valve body unit. Replace the valve housing (see page 17-45).</li> </ul>	Fluid contamination



<b>Symptom</b>	<b>Procedure(s)</b>	<b>Also check for</b>
Fluid leaks from the power steering line	<ul style="list-style-type: none"><li>• Fluid leaks from the cylinder line connections (flare nuts). Tighten the connection (see page 17-29), and retest.</li><li>• Fluid leaks from a damaged cylinder line(s). Replace the cylinder line(s) (see page 17-29).</li><li>• Fluid leaks from the pump outlet hose or return line fitting on the valve body unit (flare nuts). Tighten the fitting and retest. If it still leaks, replace the hose, the line (see page 17-29), or valve body unit as necessary.</li></ul>	Fluid contamination
Fluid leaks from the power steering pump	<ul style="list-style-type: none"><li>• Fluid leaks from the pump seal. Replace the pump seal (see page 17-31).</li><li>• Fluid leaks from the power steering pump housing. Replace the leaking O-rings or seals (see page 17-31), and if necessary replace the power steering pump (see page 17-30).</li></ul>	Fluid contamination
Fluid leaks from the power steering reservoir	<ul style="list-style-type: none"><li>• Fluid leaks from around the reservoir cap because fluid level is too high. Drain the reservoir to the proper level (see page 17-28). If the fluid is foaming check for an air leak on the inlet side of the pump.</li><li>• Fluid leaks from the reservoir. Check the reservoir for cracks, and replace as necessary.</li></ul>	Fluid contamination
Fluid leaks from the power steering pump outlet hose (high-pressure)	<ul style="list-style-type: none"><li>• Check the fitting for loose bolts. If the bolts are tight, replace the fitting O-ring (see page 17-31).</li><li>• Fluid leaks at the swagged joint. Replace the pump outlet hose (see page 17-31).</li></ul>	Fluid contamination
Fluid leaks from the power steering pump inlet hose (low-pressure)	Check the hose for damage, deterioration, or improper assembly (see page 17-29). Replace or repair as necessary.	Fluid contamination



# Hydraulic Power Steering Components

## Symptom Troubleshooting

### Hard Steering

#### NOTE:

- Compare to a known-good vehicle that is the same trim level.
- Check for suspension damage.
- Check the steering alignment.
- Check the tire condition and pressure.

1. Check the power assist (see page 17-4).

*Is the initial turning load more than 29.4 N (3.0 kgf, 6.6 lbf)?*

**YES**—Go to step 2.

**NO**—Power assist is OK at this time. Compare to a known-good vehicle.■

2. Connect the pump joint adapter or P/S joint adapter (pump), hose joint adapter, and P/S pressure gauge T/N 07406-0010001 (see page 17-25), T/N 07406-001000A or T/N 07406-001A101 (see page 17-26) to the pump.

3. Measure steady-state fluid pressure from the pump at idle.

*Is the pressure 1,470 kPa (15 kgf/cm<sup>2</sup>, 213 psi) or less?*

**YES**—Go to step 4.

**NO**—Go to step 8.

4. Measure the pump relief pressure at idle.

*Is the pressure 8,140–8,830 kPa (83–90 kgf/cm<sup>2</sup>, 1,180–1,280 psi) or more?*

**YES**—Go to step 5.

**NO**—Replace the pump assembly (see page 17-30).■

5. Using a spring scale, measure the power assist in both directions, to the left and to the right.

*Are the two measurements within 5.0 N (0.51 kgf, 1.12 lbf) of each other?*

**YES**—Go to step 6.

**NO**—Go to step 9.

6. Measure the fluid pressure with both pressure gauge valves open (if so equipped), while turning the steering wheel fully to the left and fully to the right.

*Is the pressure 8,140–8,830 kPa (83–90 kgf/cm<sup>2</sup>, 1,180–1,280 psi) or more in both directions?*

**YES**—Go to step 7.

**NO**—Faulty steering gearbox. Overhaul the steering gearbox (see page 17-45).■

7. Adjust the rack guide (see page 17-17), and retest.

*Is the steering OK?*

**YES**—Repair is completed.■

**NO**—Faulty steering gearbox. Overhaul the steering gearbox (see page 17-45).■

8. Check the outlet and return hoses and the lines between the pump and the steering gearbox for clogging and deformation.

*Are the lines clogged or deformed?*

**YES**—Replace the lines.■

**NO**—Faulty valve body unit. Overhaul the valve body unit (see page 17-45).■

9. Check the cylinder lines for deformation (see page 17-29).

*Are any of the line(s) deformed?*

**YES**—Replace the deformed line(s).■

**NO**—Go to step 10.

10. Check for a bent rack shaft or misadjusted rack guide (too tight).

*Is the rack shaft bent or the rack guide adjusted too tight?*

**YES**—Replace the rack shaft, or readjust the rack guide preload.■

**NO**—Faulty valve body unit. Overhaul the valve body unit (see page 17-45).■





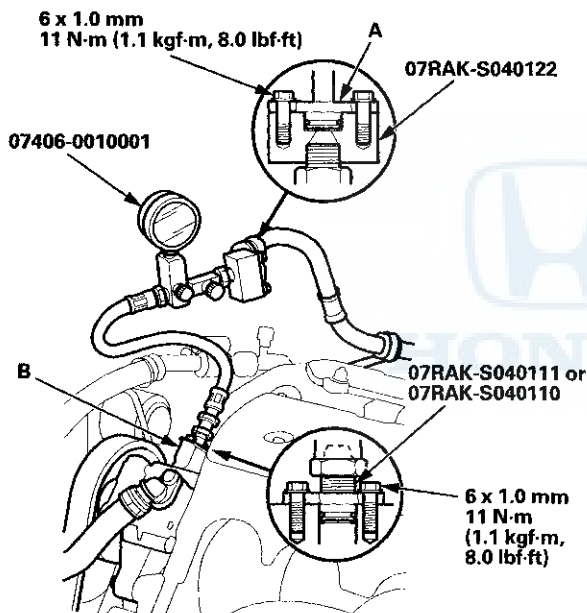
## Pump Pressure Test with T/N 07406-0010001

### Special Tools Required

- Pump Joint Adapter 07RAK-S040111 or P/S Joint Adapter (pump) 07RAK-S040110
- Hose Joint Adapter 07RAK-S040122
- P/S Pressure Gauge 07406-0010001

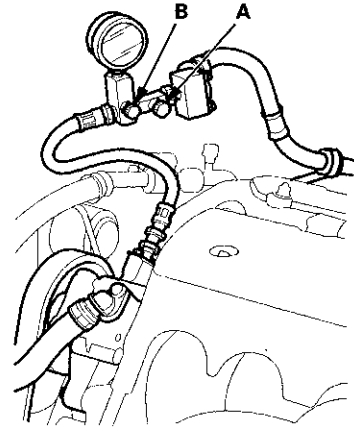
Check the fluid pressure as follows to determine whether the trouble is in the pump or steering gearbox.

1. Check the power steering fluid level (see page 17-28).
2. Disconnect the pump outlet hose (A) from the pump outlet with care so as not to spill the power steering fluid on the frame and other parts, then install the pump joint adapter or P/S joint adapter (pump) on the pump outlet (B).



3. Connect the hose joint adapter to the P/S pressure gauge, then connect the pump outlet hose to the hose joint adapter.
4. Install the P/S pressure gauge to the pump joint adapter or P/S joint adapter (pump).

5. Fully open the shut-off valve (A).



6. Fully open the pressure control valve (B).
7. Start the engine, and let it idle.
8. Turn the steering wheel from lock to lock several times to warm the fluid to operating temperature at 158 °F (70 °C).
9. Measure steady-state fluid pressure while the engine is idling. If the pump is in good condition, the gauge should read no more than 1,470 kPa (15 kgf/cm<sup>2</sup>, 213 psi).

If the reading is high, check for:

- Clogged or deformed inlet or return line between the pump and the steering gearbox.
- Clogged valve body unit.

10. Close the shut-off valve, then close the pressure control valve gradually until the pressure gauge needle is stable. Read the pressure.

### NOTICE

Do not keep the shut-off valve closed more than 5 seconds or the pump could be damaged by over-heating.

11. Immediately open the shut-off valve fully.

If the pump is in good condition, the gauge should read at least 8,140–8,830 kPa (83–90 kgf/cm<sup>2</sup>, 1,180–1,280 psi). A low reading means the pump output is too low for full assist. Repair or replace the pump.

# Hydraulic Power Steering Components

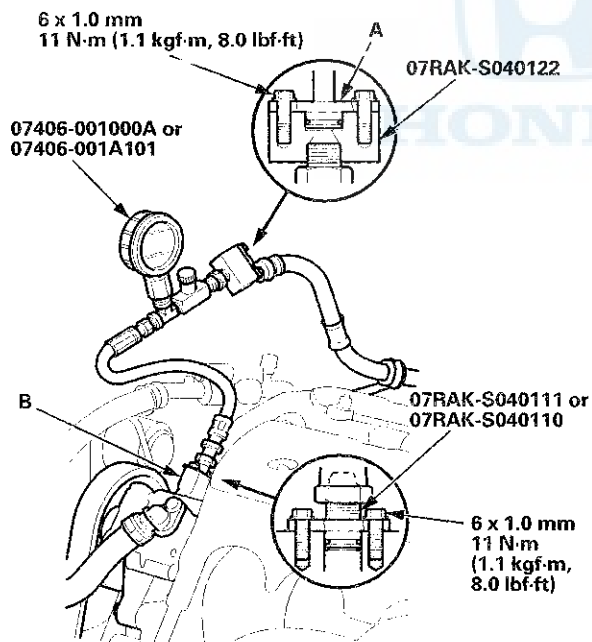
## Pump Pressure Test with T/N 07406-001000A or T/N 07406-001A101

### Special Tools Required

- Pump Joint Adapter 07RAK-S040111 or P/S Joint Adapter (pump) 07RAK-S040110
- Hose Joint Adapter 07RAK-S040122
- P/S Pressure Gauge 07406-001000A or 07406-001A101

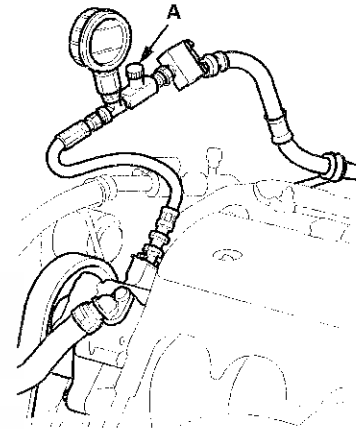
Check the fluid pressure as follows to determine whether the trouble is in the pump or steering gearbox.

1. Check the power steering fluid level (see page 17-28).
2. Disconnect the pump outlet hose (A) from the pump outlet with care so as not to spill the power steering fluid on the frame and other parts, then install the pump joint adapter or P/S joint adapter (pump) on the pump outlet (B).



3. Connect the hose joint adapter to the P/S pressure gauge, then connect the pump outlet hose to the hose joint adapter.
4. Install the P/S pressure gauge to the pump joint adapter or P/S joint adapter (pump).

5. Fully open the shut-off valve (A).



6. Start the engine, and let it idle.
7. Turn the steering wheel from lock to lock several times to warm the fluid to operating temperature at 158 °F (70 °C).
8. Measure steady-state fluid pressure while the engine is idling. If the pump is in good condition, the gauge should read no more than 1,470 kPa (15 kgf/cm<sup>2</sup>, 213 psi).

If the reading is high, check for:

- Clogged or deformed inlet or return line between the pump and the steering gearbox.
- Clogged valve body unit.

9. Let the engine idle, and gradually close the shut-off valve and immediately read the pressure.

### **NOTICE**

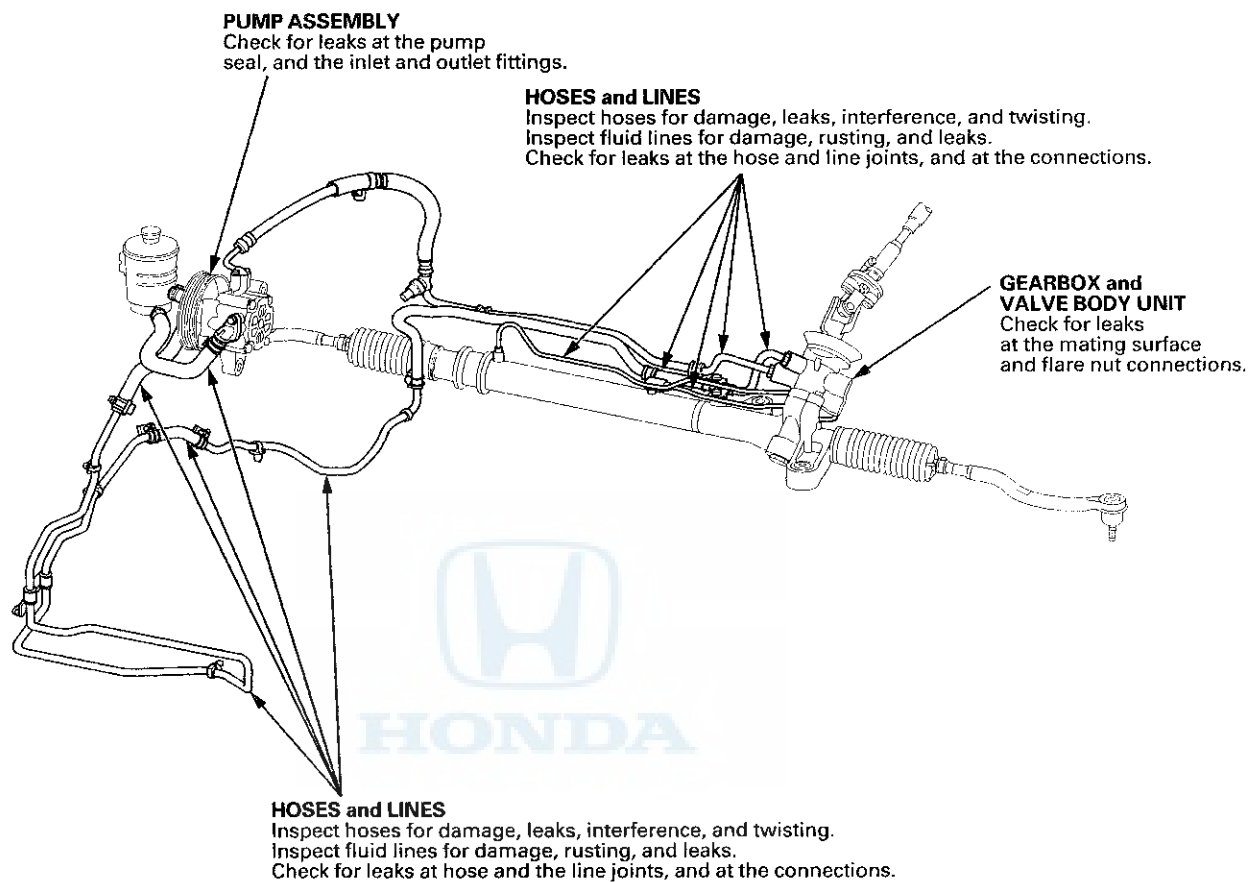
Do not keep the shut-off valve closed more than 5 seconds or the pump could be damaged by over-heating.

10. Immediately open the shut-off valve fully.

If the pump is in good condition, the gauge should read at least 8,140–8,830 kPa (83–90 kgf/cm<sup>2</sup>, 1,180–1,280 psi). A low reading means the pump output is too low for full assist. Repair or replace the pump.



## Fluid Leakage Inspection



# Hydraulic Power Steering Components

## Fluid Replacement

Check the reservoir (A) at regular intervals, and add the recommended fluid as necessary. Always use Honda Power Steering Fluid. Using any other type of power steering fluid or automatic transmission fluid can cause increased wear, fluid leaks, and poor steering in cold weather.

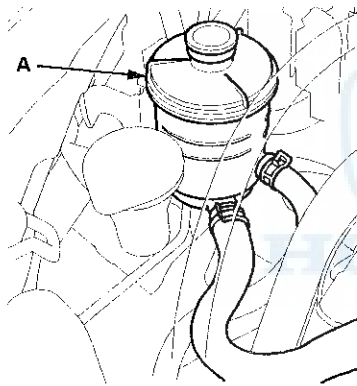
NOTE: If the fluid is contaminated, the screen in the reservoir may be partially blocked. Inspect the reservoir screen for any debris. If the reservoir screen is clogged, replace the reservoir, and check for the source of the contamination.

**System capacity:**

1.05 L (1.11 US qt) at disassembly

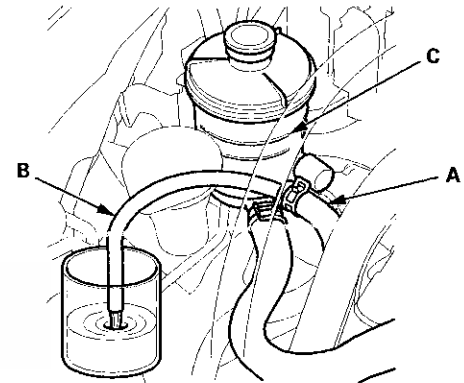
**Reservoir capacity:**

0.32 L (0.34 US qt)



1. Remove the reservoir from its holder. Raise the reservoir, then disconnect the return hose (A) to drain the reservoir. Take care not to spill the fluid on the vehicle. Wipe off any spilled fluid at once.

NOTE: Inspect the reservoir screen for any debris. If the reservoir screen is clogged, replace the reservoir, and check for the source of the contamination.



2. Connect a hose (B) of suitable diameter to the disconnected return hose, and put the hose end in a suitable container.
3. Start the engine, let it run at idle, and turn the steering wheel from lock to lock several times. When fluid stops running out of the hose, shut off the engine. Discard the fluid.

NOTE: Stop the engine immediately once the fluid stops running out of the hose to prevent pump damage.

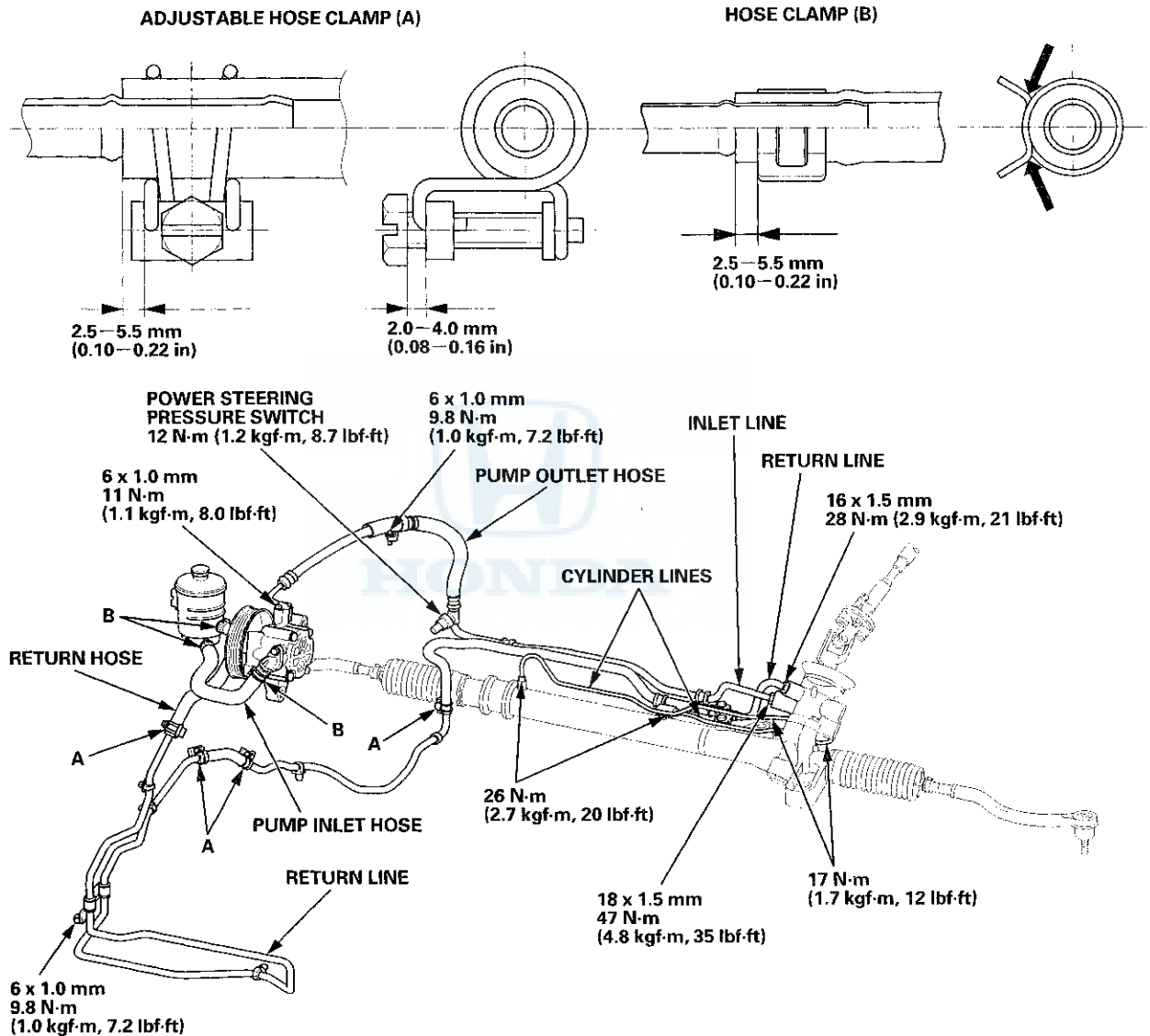
4. Reinstall the return hose on the reservoir.
5. Fill the reservoir to the upper level line (C).
6. Start the engine, and run it at idle. Turn the steering from lock to lock several times to bleed air from the system.
7. Recheck the fluid level and, add some if necessary. Do not fill the reservoir beyond the upper level line.
8. If the fluid is contaminated, dark, or discolored, repeat the procedure as necessary until the system is clean.



## Power Steering Hose, Line, and Pressure Switch Replacement

Note these items during installation:

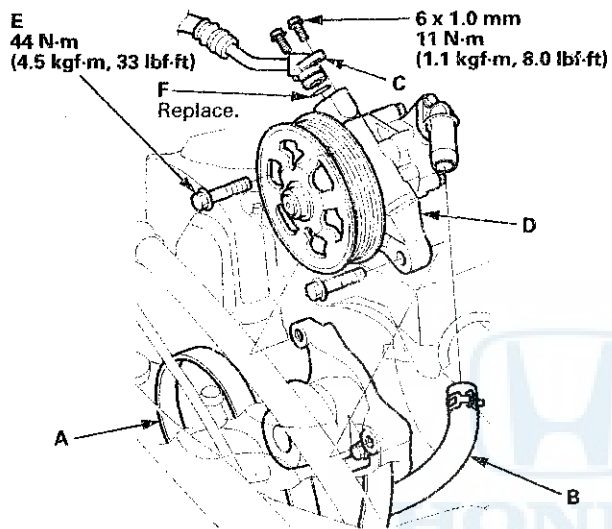
- Connect each hose to the corresponding line securely until it contacts the stop on the line. Install the clamp or adjustable clamp at the specified distance from the hose end as shown.
- Check all clamps for deterioration or deformation; replace the clamps with new ones if necessary.
- Add the recommended power steering fluid to the specified level on the reservoir, and check for leaks.



# Hydraulic Power Steering Components

## Pump Replacement

1. Place a suitable container under the vehicle to catch any spilled fluid.
2. Drain the power steering fluid from the reservoir (see page 17-28).
3. Remove the drive belt (A) from the pump pulley (see page 4-30).

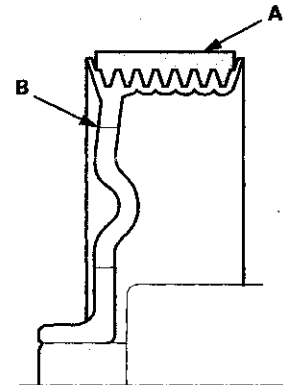


4. Cover the auto-tensioner, the alternator, and the A/C compressor with several shop towels to protect them from spilled power steering fluid. Disconnect the pump inlet hose (B) and the pump outlet hose (C) from the pump (D), and plug them. Take care not to spill the fluid on the vehicle. Wipe off any spilled fluid at once. Do not turn the steering wheel with the pump removed.
5. Remove the pump mounting bolts (E), then remove the pump.
6. Cover the opening of the pump with a piece of tape to prevent foreign material from entering the pump.
7. Transfer the pump inlet hose and the pump outlet hose from the original pump onto the new pump with a new O-ring (F).
8. Loosely install the pump in the pump bracket with the mounting bolts, then tighten the pump fittings to the specified torque.
9. Tighten the pump mounting bolts to the specified torque.

10. Install the drive belt (A) (see page 4-30).

Note these items during drive belt installation:

- Inspect the belt for wear and cracks. Replace the belt if necessary.
- Make sure that the belt is properly positioned on the pulleys (B).
- Do not get power steering fluid or grease on the auto-tensioner, the alternator, the A/C compressor, and the drive belt, or the pulley faces. Clean off any fluid or grease before installation.



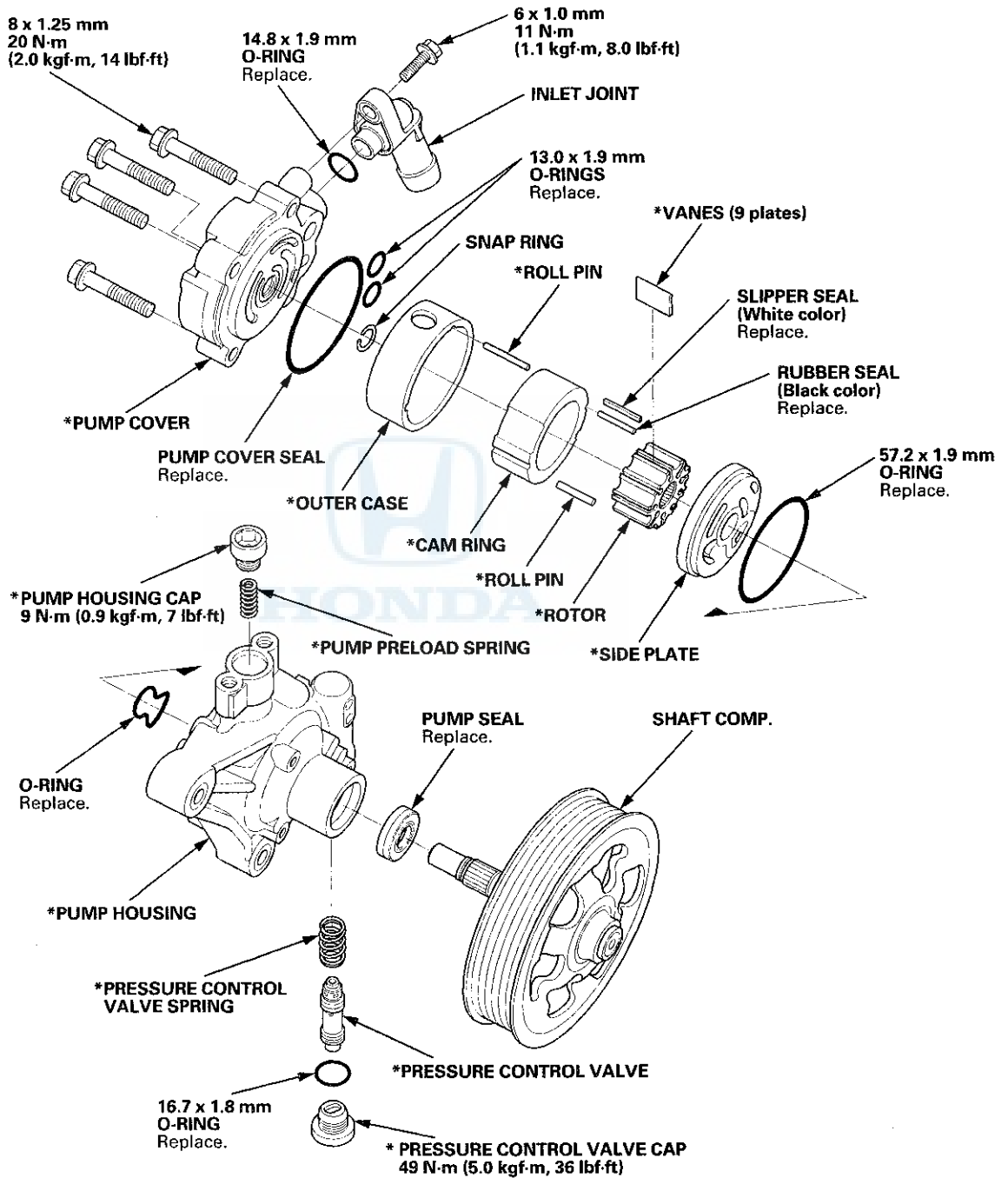
11. Fill the reservoir to the upper level line (see page 17-28).
12. Start the engine, and check for leaks.



# Pump Overhaul

## Exploded View

Replace the pump as an assembly if any of the parts indicated with an asterisk (\*) are worn or damaged.



(cont'd)

# Hydraulic Power Steering Components

## Pump Overhaul (cont'd)

### Special Tools Required

- Attachment, 32 x 35 mm 07746-0010100
- Driver Handle, 15 x 135L 07749-0010000

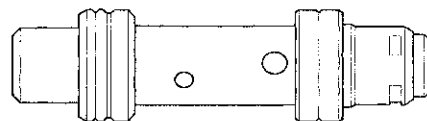
### Disassembly

NOTE: Refer to the Exploded View as needed during the following procedure.

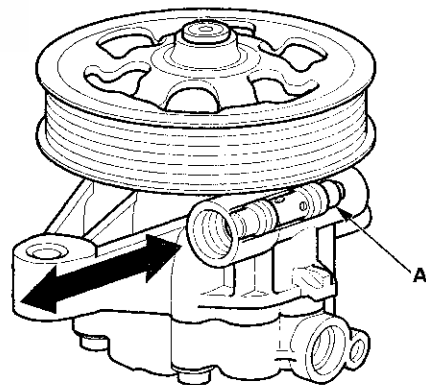
1. Remove the power steering pump (see page 17-30).
2. Drain the remaining fluid from the power steering pump.
3. Remove the inlet joint and the O-ring.
4. Remove the pressure control valve cap, the O-ring, the pressure control valve, and the spring.
5. Remove the pump housing cap and the pump preload spring.
6. Remove the pump cover, the pump cover seal, and the O-rings.
7. Remove the snap ring, then remove the rotor, the vanes, the cam ring, the outer case, the side plate, and the O-rings.
8. Remove the shaft comp. by tapping the shaft end with a soft face hammer.
9. Remove the pump seal from the pump housing.

### Inspection

10. Check the pressure control valve for wear, burrs, and other damage to the edges of the grooves in the valve.



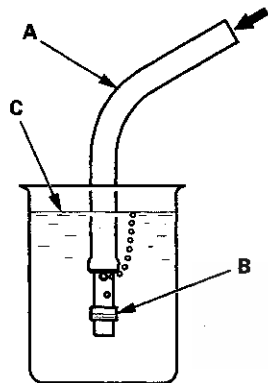
11. Inspect the bore of the pressure control valve on the pump housing for scratches and wear.
12. Slip the pressure control valve back in the pump housing, and check that it moves in and out smoothly. If OK, go to step 13; if not, replace the pump as an assembly. The pressure control valve (A) is not available separately.





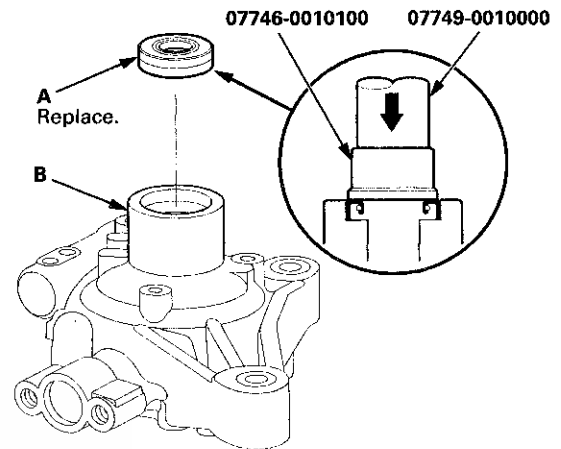


13. Attach a hose (A) to the end of the pressure control valve (B) as shown. Then submerge the pressure control valve in a container of power steering fluid (C), and apply compressed air in the hose.
- If air bubbles leak through the valve at less than 98 kPa (1.0 kgf/cm<sup>2</sup>, 14.2 psi), replace the pump as an assembly. The pressure control valve is not available separately.
  - If the pressure control valve is OK, set it aside for reassembly later.



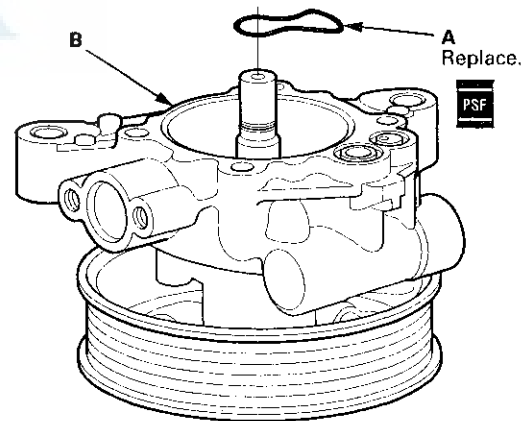
### Reassembly

14. Install the new pump seal (A) (with its grooved side facing in) into the pump housing (B) by hand first, then drive it in using the driver handle and attachment until the pump seal is flush with the pump housing, and the seal is fully seated in the pump housing.



15. Install the shaft comp. into the pump housing.

16. Coat the new O-ring (A) with power steering fluid, and install it into the groove in the pump housing (B).

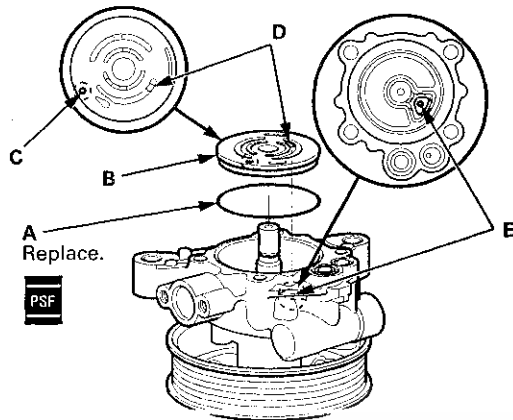


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# Hydraulic Power Steering Components

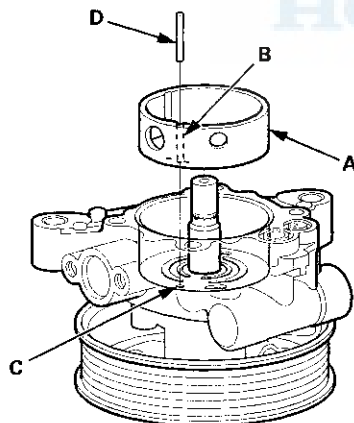
## Pump Overhaul (cont'd)

17. Coat the new 57.2 mm O-ring (A) with power steering fluid, and install it into the groove in the side plate (B).



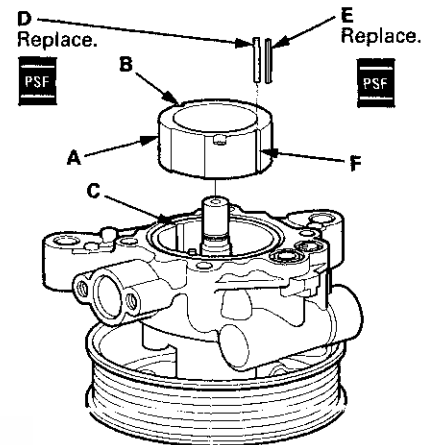
18. Set the side plate with the slot (C) facing up, and align the hole (D) in the side plate and the slot (E) in the pump housing.

19. Install the outer case (A) by aligning the slot (B) inside the pump housing with the roll pin hole (C) on the side plate.



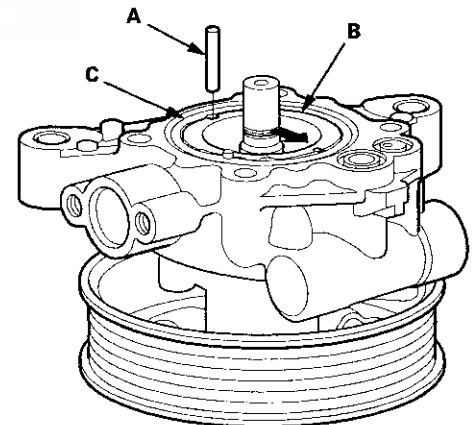
20. Install the roll pin (D) into the set hole.

21. Install the cam ring (A) by aligning the slot (B) outside of the cam ring with the slot (C) in the outer case.



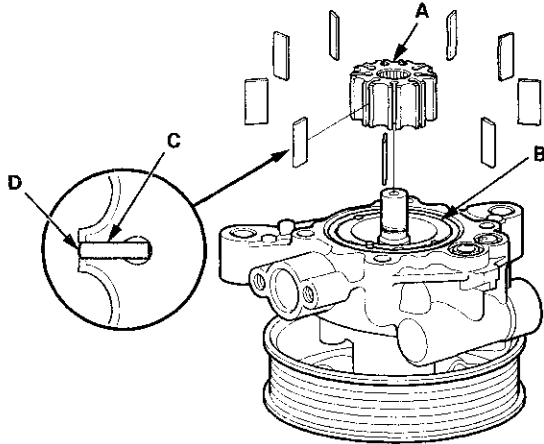
22. Apply power steering fluid to the rubber seal (D) (black) and slipper seal (E) (white), and install them in the slot (F) of the cam ring.

23. Install the roll pin (A) into the slots between the cam ring (B) and outer case (C), then push the roll pin into the set hole.



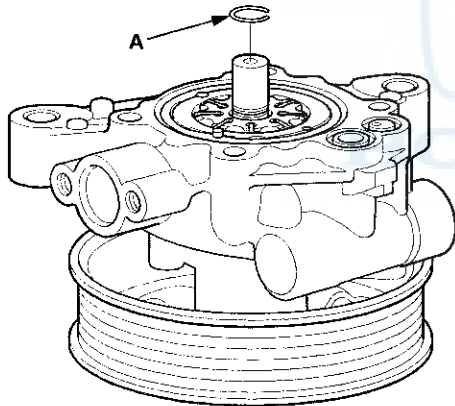


24. Install the rotor (A) in the cam ring (B).

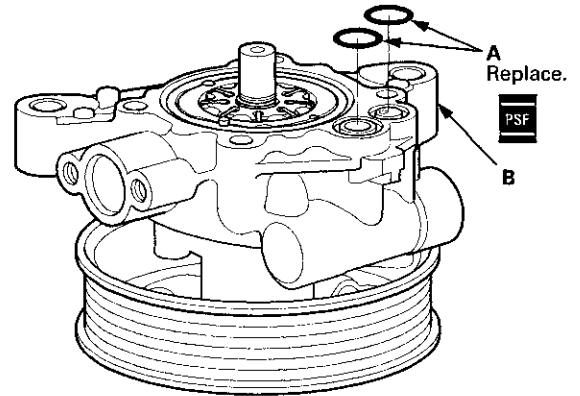


25. Set the 9 vanes (C) into the grooves in the rotor. Make sure that the gold-colored ends (D) of the vanes are in contact with the sliding surface of the cam ring.

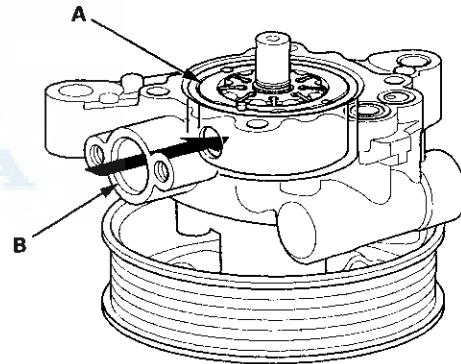
26. Install the snap ring (A).



27. Coat the new 13.0 mm O-rings (A) with power steering fluid, and install them into the grooves in the pump housing (B).



28. Push in the cam ring (A) from the pump housing cap hole (B) with a flat-tip screwdriver to make sure the cam ring is fully seated against the outer case.

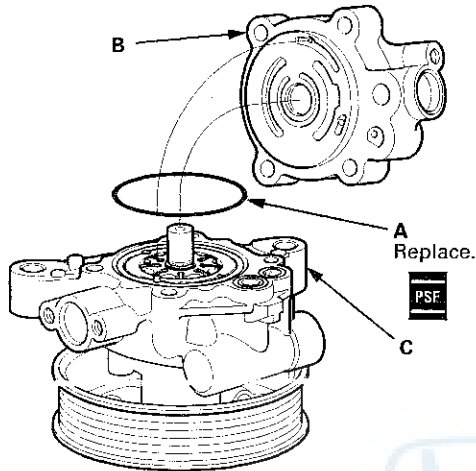


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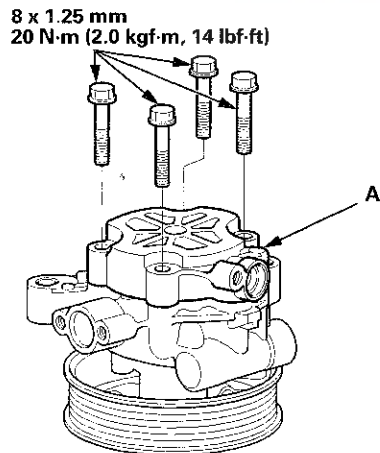
# Hydraulic Power Steering Components

## Pump Overhaul (cont'd)

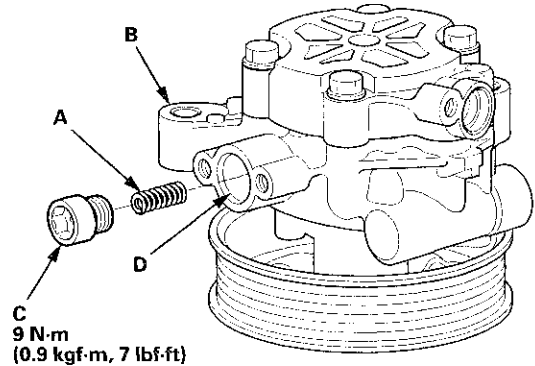
29. Coat the new pump cover seal (A) with power steering fluid, and install it into the groove in the pump cover (B).



30. Install the pump cover assembly over the pump housing (C).
31. Align the bolt holes in the cover (A) with the threaded holes in the pump housing. Install the flange bolts loosely first, then tighten the flange bolts to the specified torque alternately in two or more steps.



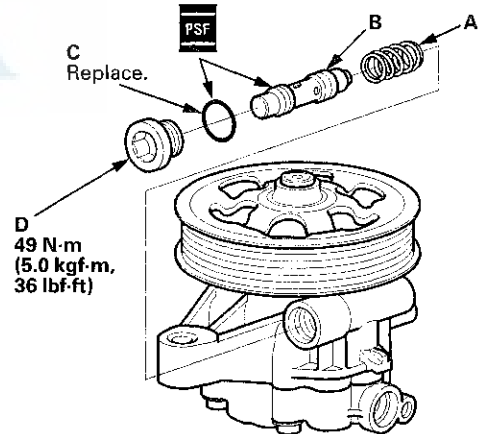
32. Install the pump preload spring (A) in the pump housing (B).



33. Install the pump housing cap (C) on the pump housing, and tighten it to the specified torque.

NOTE: Be careful not to damage the pump outlet hose connecting surface (D) pump housing when installing the housing cap.

34. Install the spring (A) in the pump housing.



35. Coat the pressure control valve (B) with power steering fluid, and install it in the pump housing.

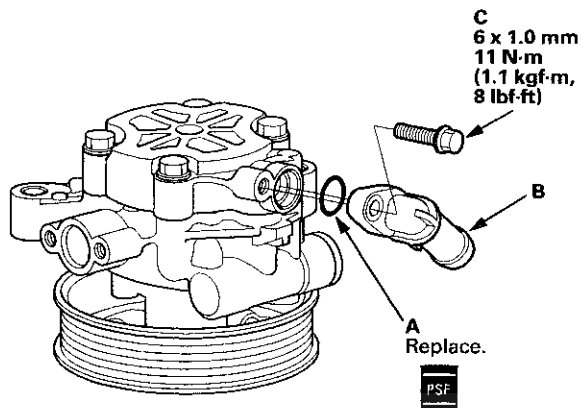
36. Coat the new 16.7 mm O-ring (C) with power steering fluid, and install it on the pressure control valve cap (D).

37. Install the pressure control valve cap on the pump housing, and tighten it to the specified torque.



## Steering Gearbox Removal

38. Coat the new 14.8 mm O-ring (A) with power steering fluid, and install it on the inlet joint (B). Install the inlet joint with a flange bolt (C) on the pump housing, and tighten to the specified torque.



39. Check that the power steering pump turns smoothly by turning the pulley by hand. If it turns hard, loosen the four flange bolts on the pump cover, then retighten them in the same manner as in step 31. Retest. If the power steering pump is still hard to turn, replace the power steering pump.
40. Reinstall the power steering pump (see page 17-30).

### Special Tools Required

- Engine Hanger Adapter VSB02C000015\*
- Engine Support Hanger, A and Reds AAR-T1256\*
- Ball Joint Remover, 28 mm 07MAC-SL0A202
- Ball Joint Thread Protector, 12 mm 07AAF-SDAA100
- Subframe Adapter VSB02C000016\*

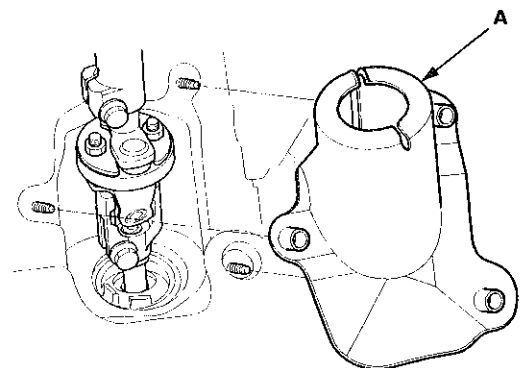
\*: Available through the Honda Tool and Equipment Program, 888-424-6857.

SRS components are located in this area. Review the SRS component locations: 4-door (see page 24-21), 2-door (see page 24-23) and the precautions (see page 24-25) and procedures before doing repairs or service.

Note these items during removal:

- Using clean solvent and a brush, wash any oil and dirt off the valve body unit, it's lines, and the end of the steering gearbox. Blow dry with compressed air.
- Be sure to remove the steering wheel before disconnecting the steering joint, or damage to the cable reel can occur.
- Lower the front subframe from the body, and remove the steering gearbox through the gap produced by lowering the front subframe.

1. Drain the power steering fluid (see page 17-28).
2. Do the battery terminal disconnection procedure (see page 22-91).
3. Raise and support the vehicle (see page 1-13).
4. Remove the front wheels.
5. Remove the driver's airbag (see page 24-211), and the steering wheel (see page 17-6).
6. Remove steering joint cover (A).



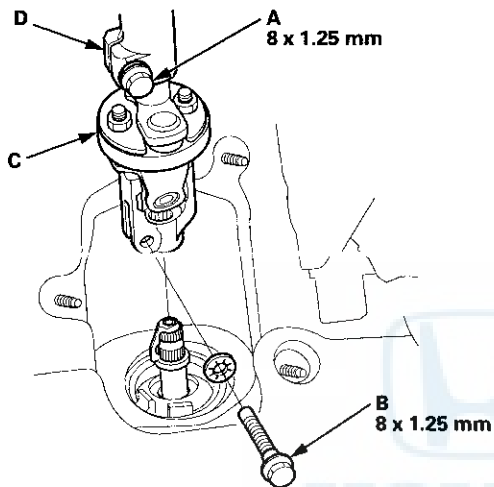
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# Hydraulic Power Steering Components

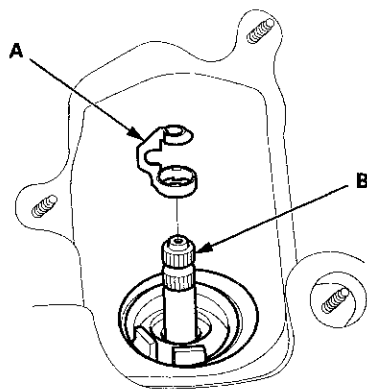
## Steering Gearbox Removal (cont'd)

7. Loosen the upper steering joint bolt (A), and remove the lower steering joint bolt (B). Disconnect the steering joint (C) by sliding the steering joint into the column shaft (D). Tighten the upper steering joint bolt to hold the steering joint in place.

NOTE: Do not disconnect the steering joint from the column shaft.

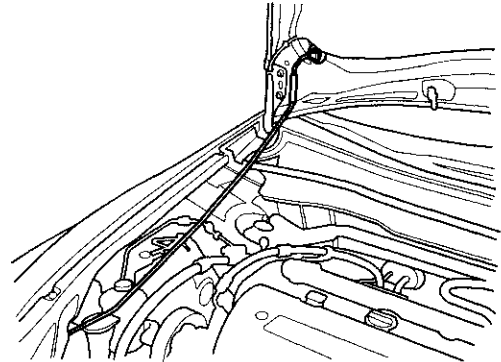


8. Remove the center guide (A) (if equipped) from the top of the pinion shaft (B), and discard it.



9. Apply vinyl tape to the splines on the pinion shaft.

10. Remove the hood support rod, then use it as shown to prop the hood in the wide-open position.

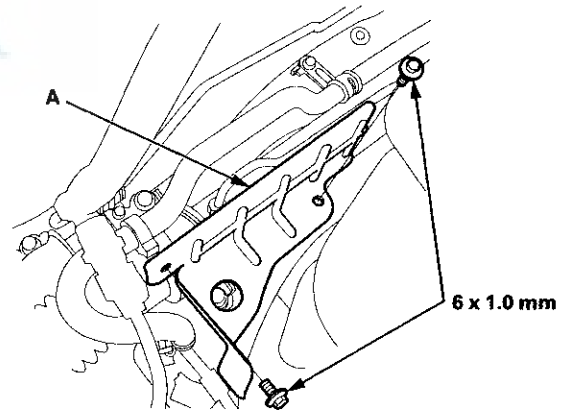


11. Remove the front grille cover:

- 4-door (see page 20-274)
- 2-door (see page 20-274)

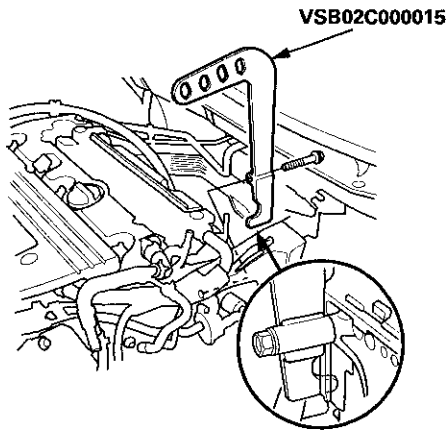
12. Remove the strut brace (if equipped) (see page 20-306).

13. Remove the P/S heat shield (A).



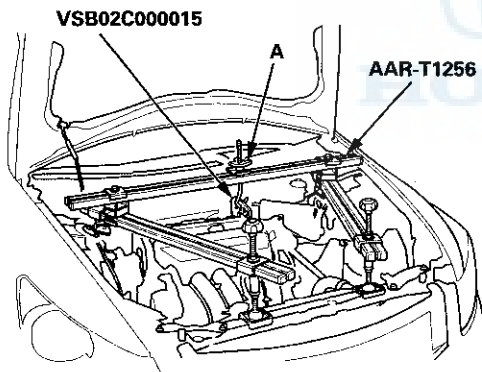


14. Attach the engine hanger adapter (VSB02C000015) to the threaded hole in the cylinder head.



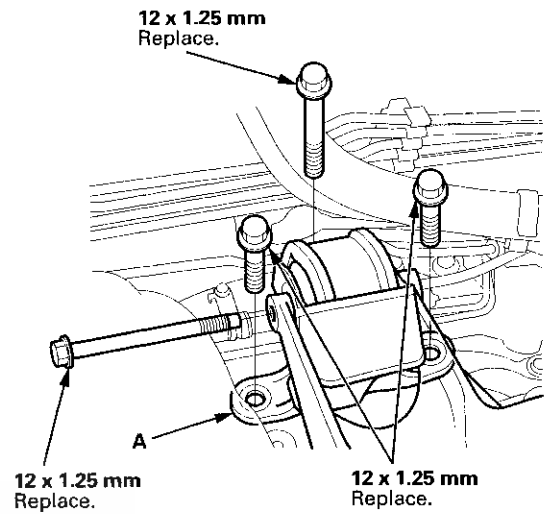
15. Install the engine support hanger (AAR-T1256), then attach the hook to the slotted hole in the hanger adapter. Tighten the wing nut (A) by hand to lift and support the engine/transmission.

NOTE: Be careful when working around the windshield.

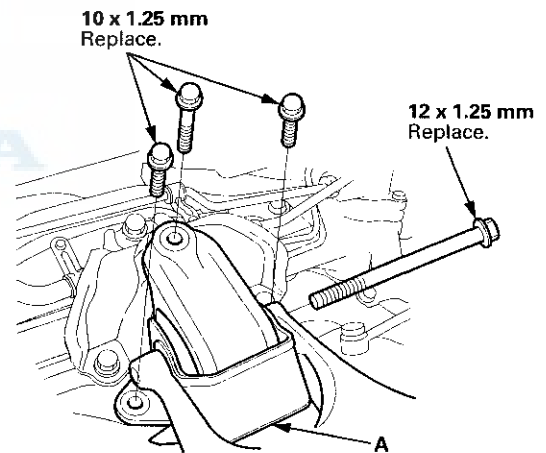


16. Remove the rear engine mount (A).

M/T



A/T

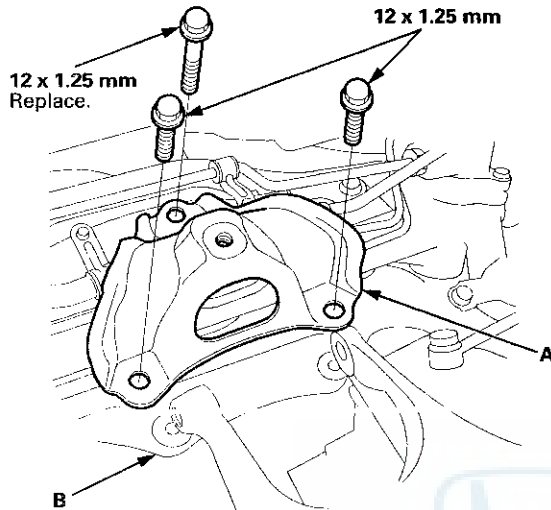


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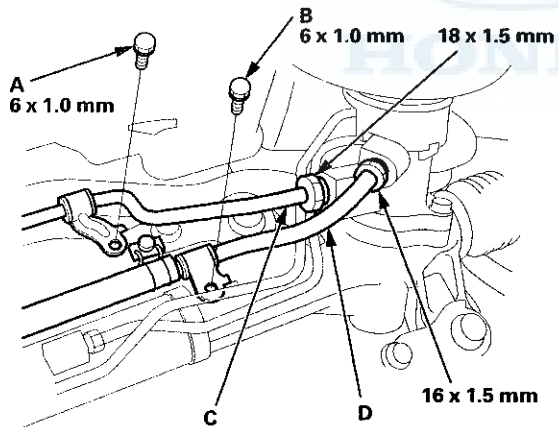
# Hydraulic Power Steering Components

## Steering Gearbox Removal (cont'd)

17. A/T: Remove the rear engine mount upper bracket (A) from the base bracket (B).

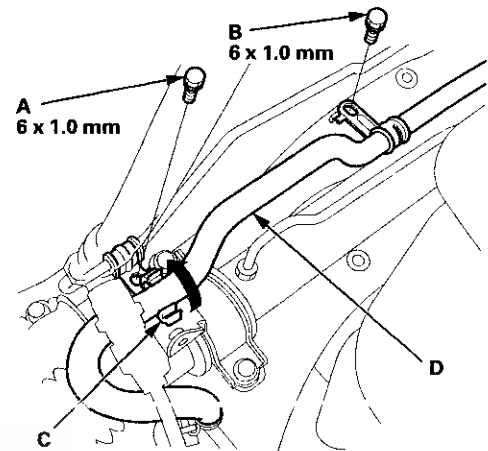


18. Remove the inlet line clamp bolt (A) and the return line clamp bolt (B).



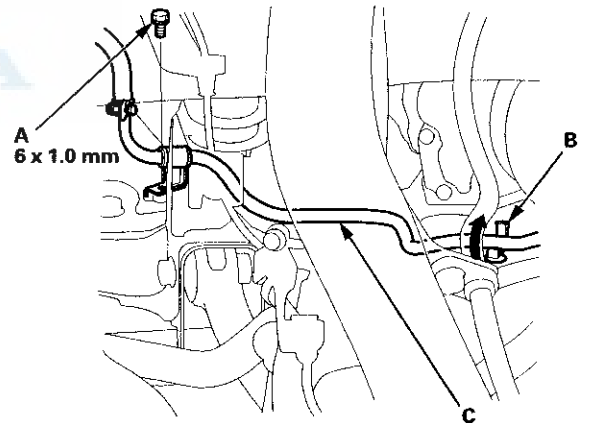
19. Loosen the flare nuts, and disconnect the inlet line (C) and the return line (D).

20. Remove the inlet line clamp bolt (A) and the return hose clamp bolt (B).



21. Release the return hose clamp (C), and remove the return hose (D).

22. Remove the return line clamp bolt (A).

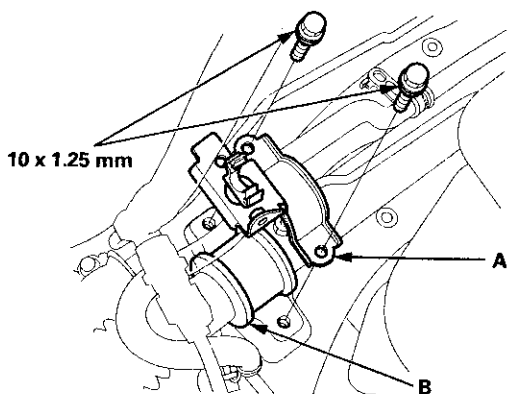


23. Release the return line clamp (B), and remove the return line (C).

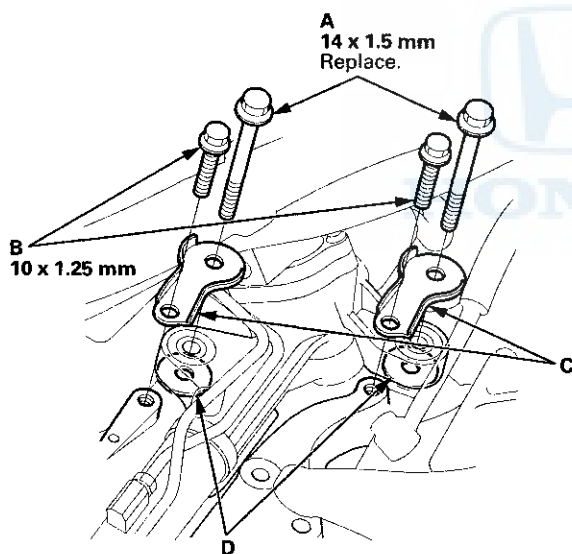




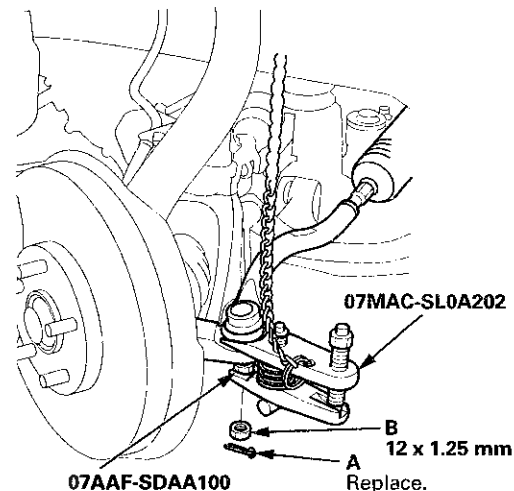
24. Remove the flange bolts from the passenger's side of the steering gearbox, then remove the gearbox mounting bracket (A) and mounting cushion (B).



25. Remove the mounting bolts (A) and the flange bolts (B) from the driver's side of the steering gearbox, and remove the stiffener plates (C) and the washers (D).



26. Remove cotter pin (A) from the tie-rod end ball joint, then remove the nut (B) on both sides.



27. Disconnect the tie-rod end ball joint from the knuckle using the ball joint thread protector and the ball joint remover on both side (see page 18-10).

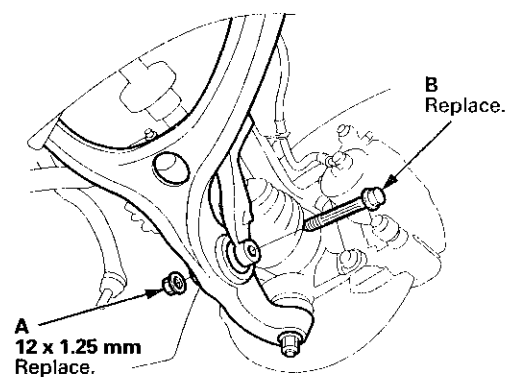
NOTE: Be careful not to damage the ball joint boot when installing the remover.

28. Raise the vehicle.

29. Remove the front splash shield (see page 20-291).

30. Remove exhaust pipe A (see page 9-9).

31. Remove the damper fork mounting nut (A) and the mounting bolt (B).

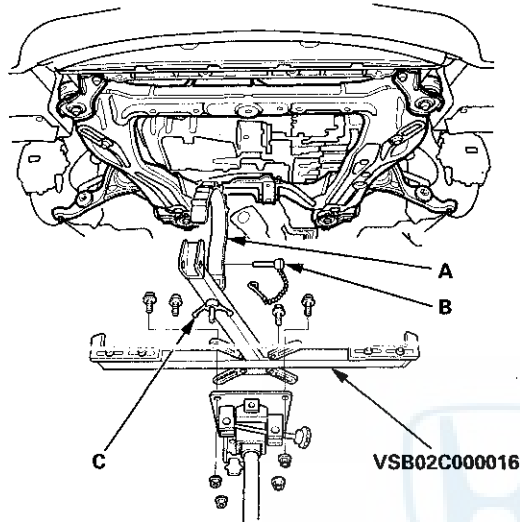


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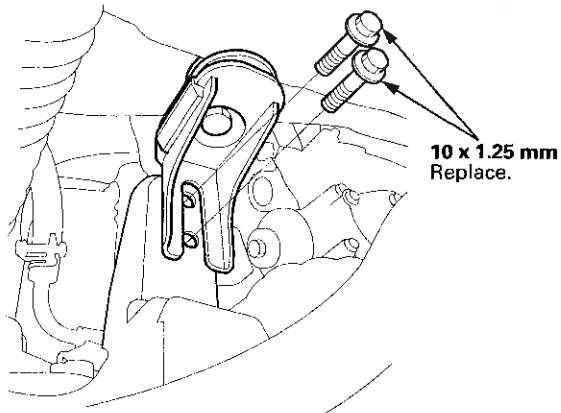
# Hydraulic Power Steering Components

## Steering Gearbox Removal (cont'd)

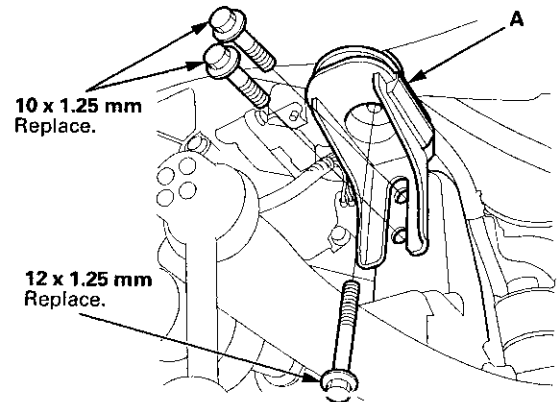
32. Attach the front subframe adapter (VSB02C000016) to the subframe by looping the strap (A) over the front of the subframe, then secure the strap with the stop (B), then tighten the wing nut (C).



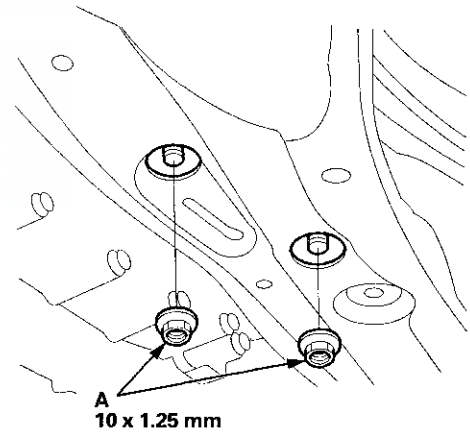
33. Remove the front subframe middle mounting bolts on the passenger's side.



34. Remove the front subframe middle mount (A) on the driver's side.

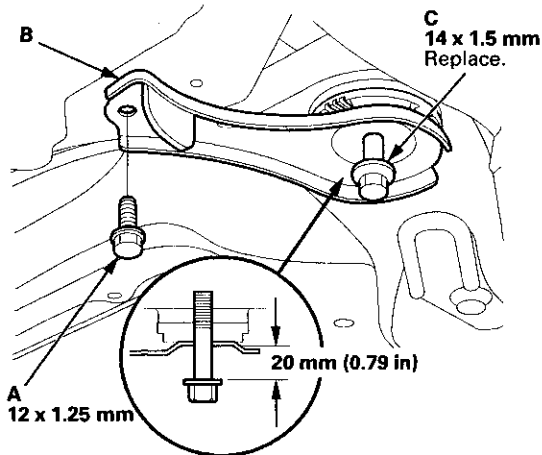


35. Remove the flange nuts (A) from the lower transmission mount.



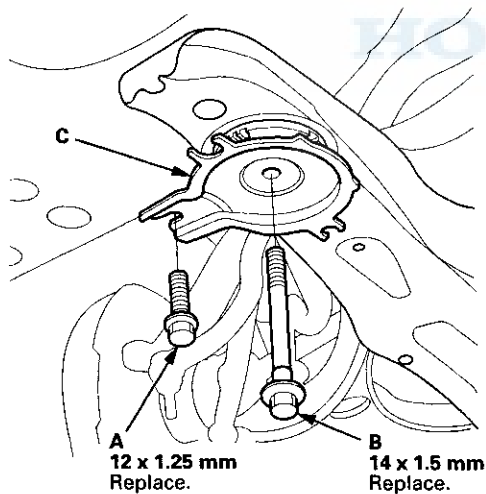


36. Remove the flange bolts (A) from the front subframe front stiffeners (B).

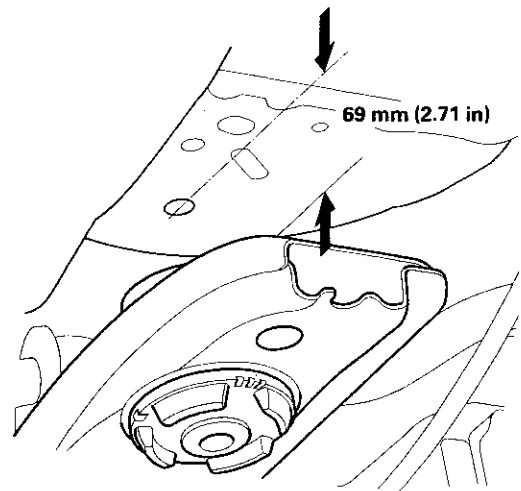


37. Loosen the front subframe mounting bolts (C) so they are about 20 mm (0.79 in) from the mounting surface. Do not loosen the front subframe mounting bolts more than necessary.

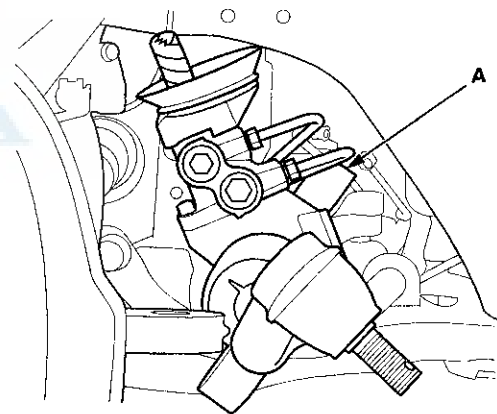
38. Remove the flange bolts (A) and front subframe mounting bolts (B) from the front subframe rear stiffeners (C).



39. Lower the jack slowly until the front subframe has dropped about 69 mm (2.71 in).



40. Carefully move the steering gearbox (A) toward the driver's side until the pinion shaft clears the fenderwell opening on the body.

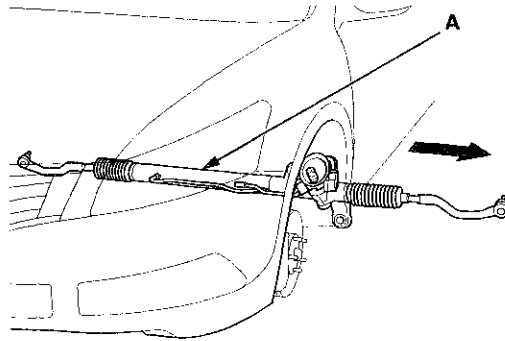


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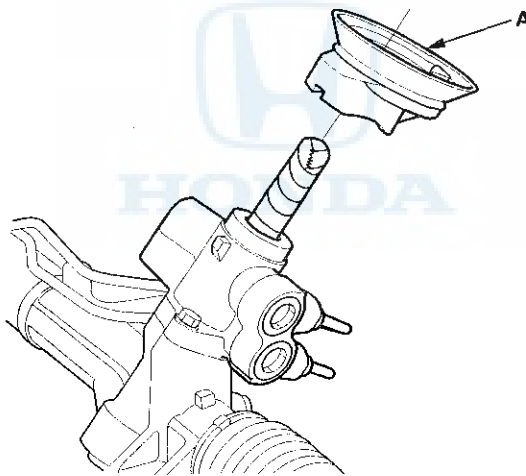
# Hydraulic Power Steering Components

## Steering Gearbox Removal (cont'd)

41. Remove the steering gearbox (A) through the fenderwell opening on the driver's side.



42. Remove the pinion shaft grommet (A) from the top of the valve housing.



43. After removing the steering gearbox, make sure that no power steering fluid gets on the gearbox mount cushions, the gearbox housing, the surface of the front subframe, and stiffener. Wipe off any spilled fluid at once.



# Hydraulic Power Steering Components

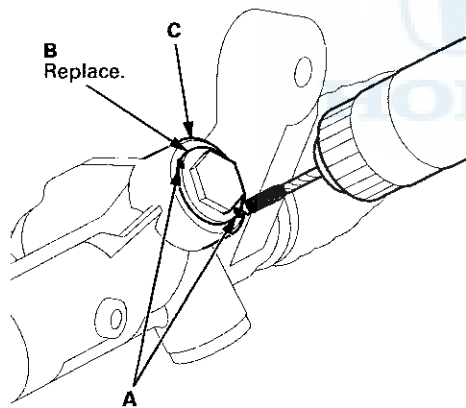
## Steering Gearbox Overhaul (cont'd)

### Special Tools Required

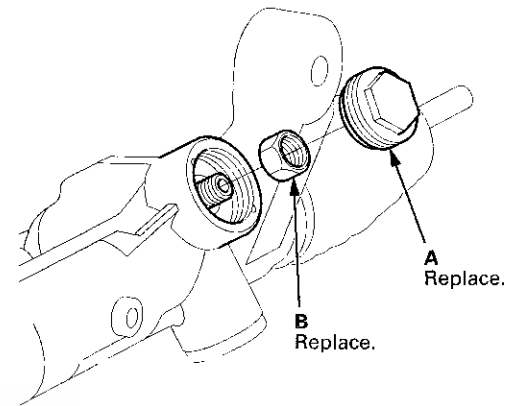
- Cylinder End Seal Remover Attachment 07TAF-SZ50100
- Valve Seal Ring Sizing Tool 07NAG-SR3090A
- Sleeve Seal Guide, 35.9 x 37 07YAG-S2X0100
- Sizing Tool, 36 07ZAG-S5A0100
- Bearing Driver Attachment, 28 x 30 07946-1870100
- Driver Handle, 15 x 135L 07749-0010000
- Oil Seal Driver, 65 07JAD-PL9A100
- Bearing Driver Attachment, 30 mm 07746-0030300
- Piston Seal Ring Guide 07XAG-S0KA200
- Sizing Tool, 42 07HAG-SF1020A or 07HAG-SF10200
- Pincers Oetiker 1098, commercially available

### Disassembly

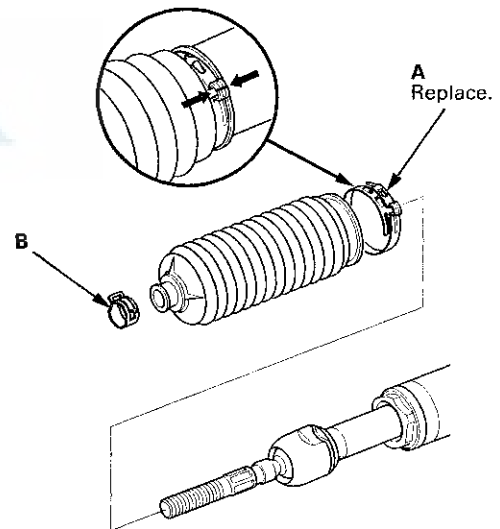
1. Remove the steering gearbox (see page 17-37).
2. Remove the tie-rod end from the rack end.
3. Drill a 4.0 mm (0.16 in) diameter hole about 2.5—3.0 mm (0.10—0.12 in) in depth in the staked points (A) on the end plug (B) and the gearbox housing (C).



4. Remove the end plug (A) from the gearbox housing, then remove the self-locking nut (B) from the pinion shaft end.

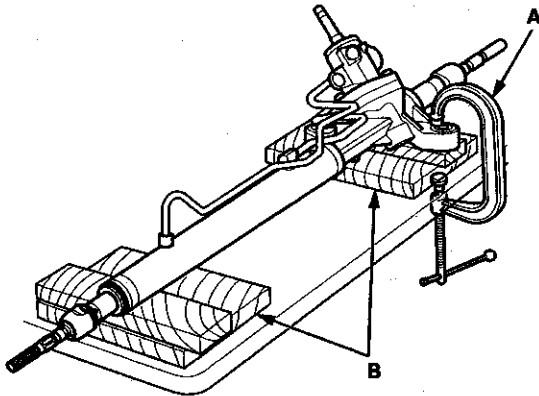


5. Remove the boot bands (A) and tie-rod clips (B). Pull the boot away from the ends of the steering gearbox.

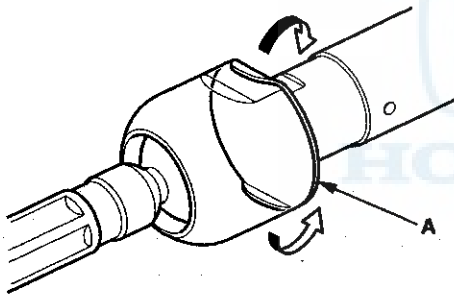




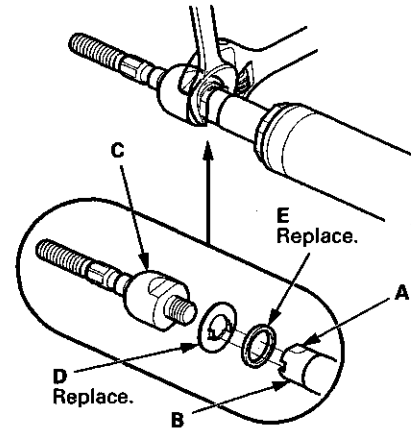
6. Hold the gearbox housing using a C-clamp (A) and wooden blocks (B) to a work bench as shown. Do not clamp the cylinder part of the gearbox housing in a vise.



7. Unbend the lock washers (A).

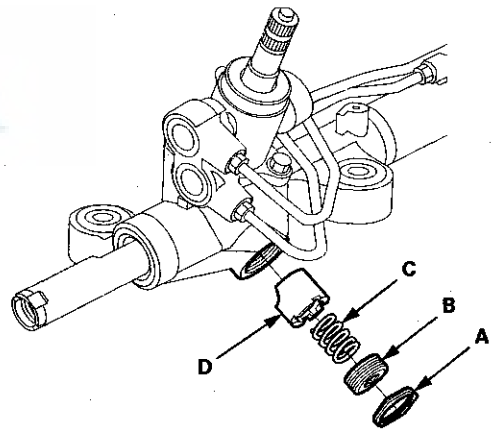


8. Hold the flat surface sections (A) of the steering rack (B) with one wrench, and unscrew both rack ends (C) with another wrench. Be careful not to damage the rack surface with the wrench.



9. Remove the lock washer (D) and rubber stop (E).

10. Loosen the locknut (A), then remove the rack guide screw (B).



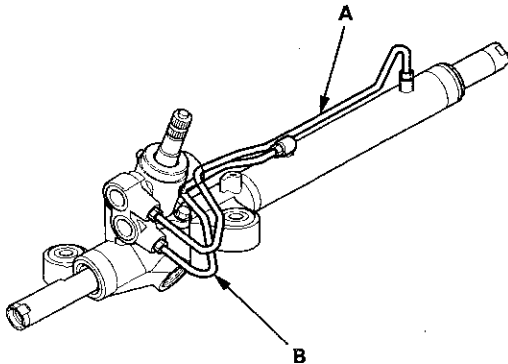
11. Remove the spring (C), and the rack guide (D) from the gearbox housing.

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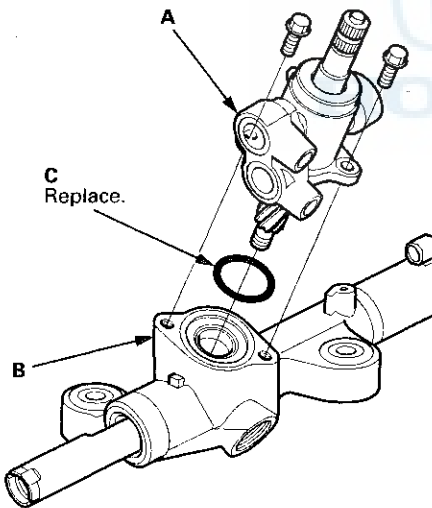
# Hydraulic Power Steering Components

## Steering Gearbox Overhaul (cont'd)

12. Remove cylinder line A and B from the steering gearbox.

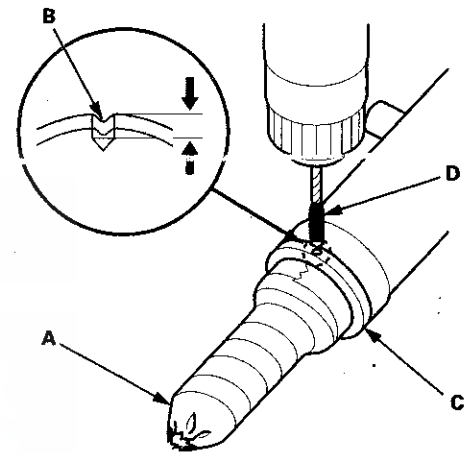


13. Drain the fluid from the cylinder fittings by slowly moving the steering rack back and forth.
14. Remove the two flange bolts, then remove the valve body unit (A) from the gearbox housing (B). Remove the O-ring (C).

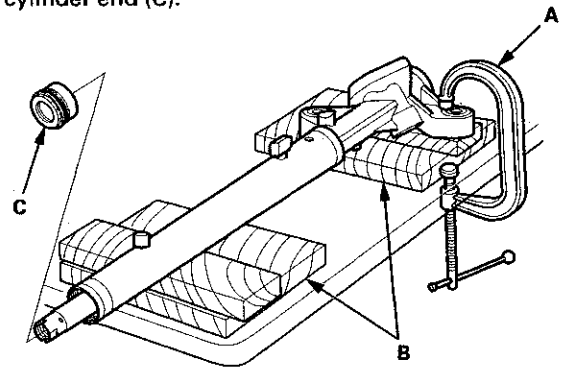


15. Apply vinyl tape (A) to the end of the steering rack and the gearbox housing. Drill a 3.0–4.0 mm (0.12–0.16 in) diameter hole about 2.5–3.0 mm (0.10–0.12 in) in depth in the staked point (B) on the cylinder. Do not allow metal shavings to enter the cylinder side on the gearbox housing. After removing the cylinder end (C), remove any burrs at the staked point.

NOTE: Apply vinyl tape (D) to the drill, and do not drill the depth more than necessary.



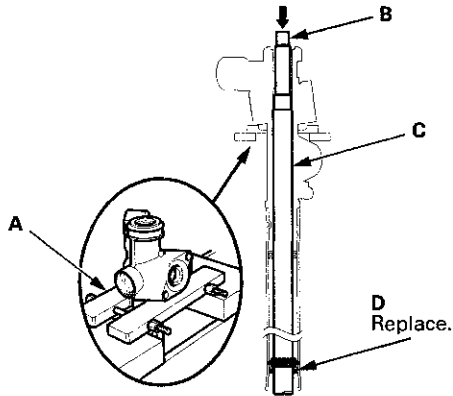
16. Hold the gearbox housing using a C-clamp (A) and wooden blocks (B) to a work bench as shown. Do not clamp the cylinder part of the gearbox housing in a vise. Remove the vinyl tape. Then remove the cylinder end (C).







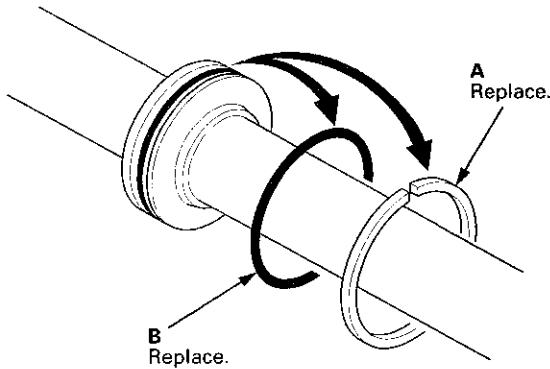
17. Install a commercially available bearing separator (A) on the gearbox housing as shown.



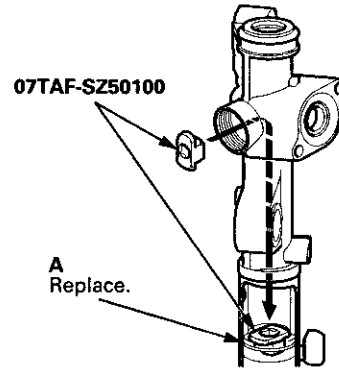
18. Place an appropriate size deep socket (B) on the steering rack (C).

19. Set the steering gearbox in a press so the gearbox housing side points upward, then press the cylinder end seal (D) and steering rack out of the steering gearbox. Hold the steering rack to keep it from falling when pressed clear. Be careful not to damage the inner surface of the cylinder side on the gearbox housing with the tool.

20. Carefully pry the piston seal ring (A) and O-ring (B) off the rack piston. Be careful not to damage the inside of the seal ring groove and piston edges when removing the seal ring.



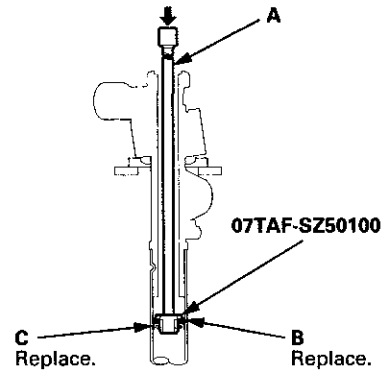
21. Turn the cylinder end seal remover attachment so it fits through the rack guide hole of the gearbox housing, then position the seal remover on the backup ring (A). Make sure that the seal remover is securely positioned on the backup ring.



22. Insert a 24" long 3/8" drive extension (A), on the cylinder end seal remover attachment. Place the gearbox housing in a press, then remove the backup ring (B) and cylinder end seal (C) from the gearbox housing by pressing on the 24" long 3/8" drive extension.

Note these items when pressing the backup ring and cylinder end seal:

- Keep the tool straight to avoid damaging the cylinder wall. Check the tool angle, and correct it if necessary, when removing the backup ring and cylinder end seal.
- Use a press to remove the backup ring and cylinder end seal. Do not try to remove the backup ring and cylinder end seal by striking the tool; striking the tool would break the backup ring and cylinder end seal, and the backup ring and cylinder end seal would remain in the gearbox housing.

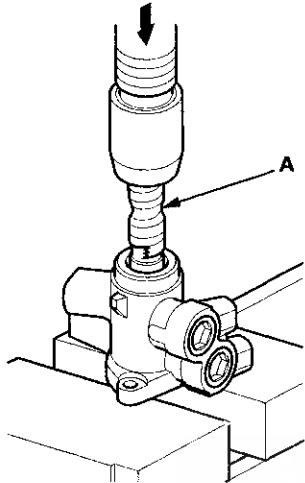


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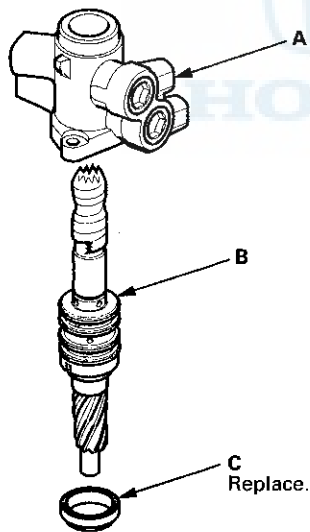
# Hydraulic Power Steering Components

## Steering Gearbox Overhaul (cont'd)

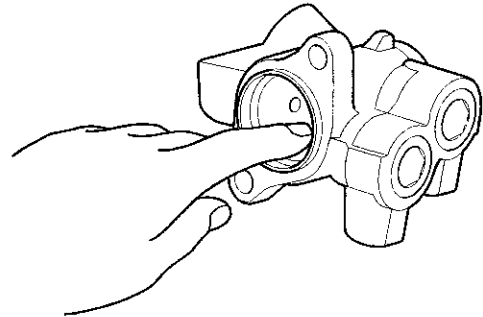
23. Apply vinyl tape (A) to the splines on the pinion shaft.



24. Separate the valve housing (A) from the pinion shaft/sleeve (B) and the valve oil seal (C).

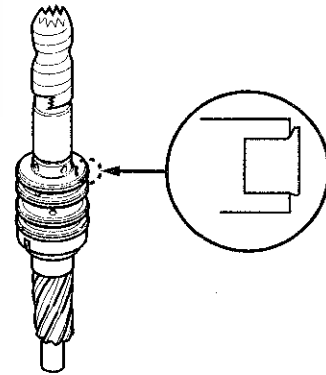


25. With your finger, check the inner wall of the valve housing where the seal ring slides. If there is a step in the wall, the housing is worn, replace it.



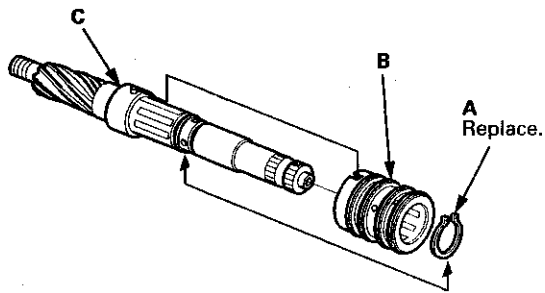
26. Check for wear, burrs, and other damage to the edges of the grooves in the sleeve.

**NOTE:** The pinion shaft and sleeve are a precision matched set. If either the pinion shaft or sleeve must be replaced, replace both parts as a set.

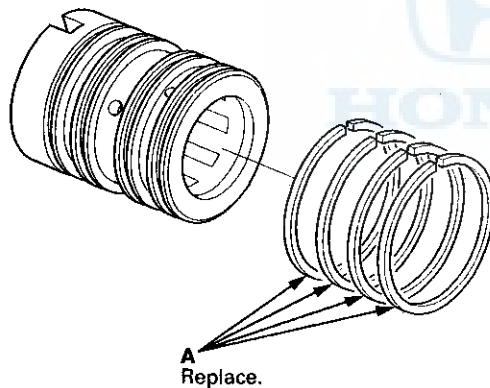




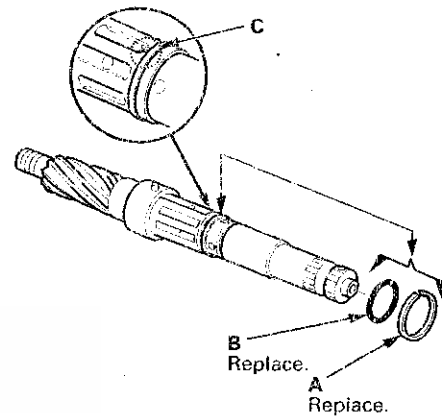
27. Remove the snap ring (A) and the sleeve (B) from the pinion shaft (C).



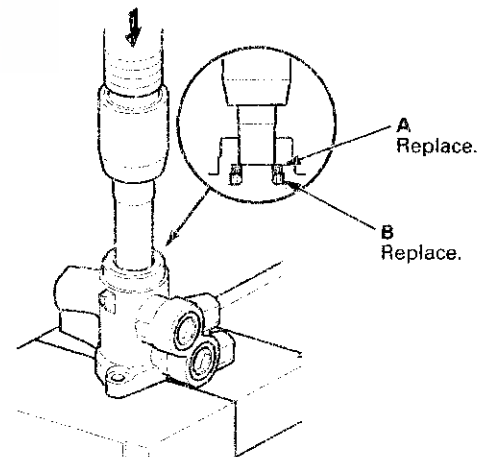
28. Using a cutter or an equivalent tool, cut and remove the four seal rings (A) from the sleeve. Be careful not to damage the edges of the sleeve grooves and outer surface when removing the seal rings.



29. Using a cutter or an equivalent tool, cut the valve seal ring (A) and O-ring (B) at the cutting groove position (C) in the pinion shaft. Remove the valve seal ring and O-ring. Be careful not to damage the edges of the pinion shaft groove and outer surface when removing the valve seal ring and O-ring.



30. Remove the valve oil seal (A) and roller bearing (B) out of the valve housing using a hydraulic press and an appropriate size socket.



31. Clean the disassembled parts with solvent, and dry them with compressed air. Do not dip rubber parts in the solvent.

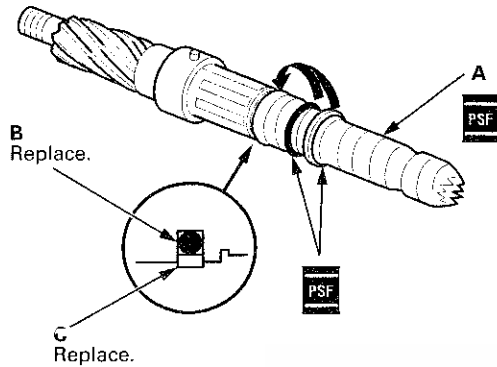
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# Hydraulic Power Steering Components

## Steering Gearbox Overhaul (cont'd)

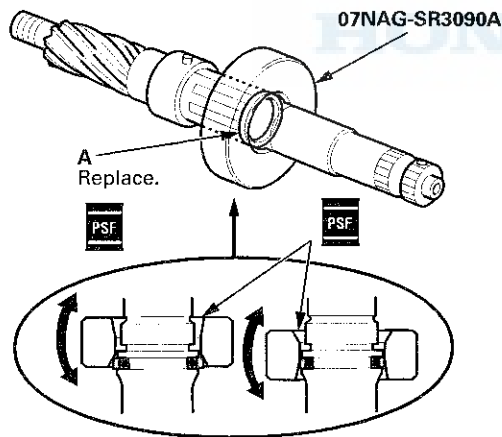
### Reassembly

32. Apply vinyl tape (A) to the splines and stepped portion of the shaft, and coat the surface of the vinyl tape with power steering fluid.



33. Fit the new O-ring (B) in the groove of the pinion shaft. Then slide the new valve seal ring (C) over the shaft and in the groove on the pinion shaft.

34. Remove the vinyl tape, and apply power steering fluid to the surface of the valve seal ring (A).



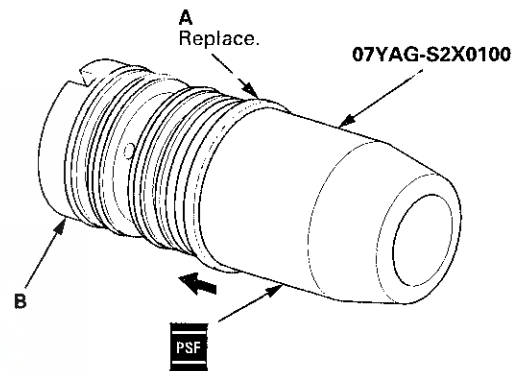
35. Apply power steering fluid to the inside of the valve seal ring sizing tool. Set the larger diameter end of the sizing tool over the valve seal ring, and move the sizing tool up and down several times to make the valve seal ring fit in the pinion shaft groove.

36. Remove the sizing tool, turn it over, slide the smaller diameter end over the valve seal ring. Move it up and down several times to make the valve seal ring fit snugly in the pinion shaft groove.

37. Apply power steering fluid to the surface of the sleeve seal ring guide. Slip two new seal rings (A) over the ring guide from the smaller diameter end, and expand them. Install only two rings at a time from each end of the pinion shaft sleeve (B).

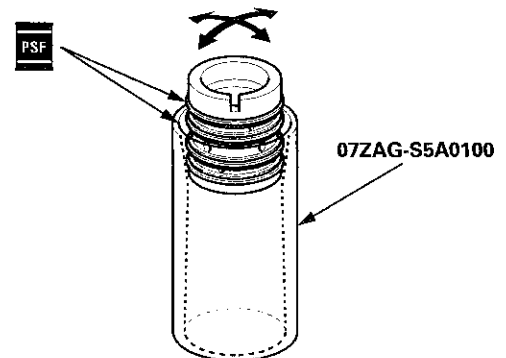
Note these items when installing the seal ring:

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



38. Align the ring guide with each groove in the sleeve, and slide a sleeve seal ring into each groove. After installation, compress the seal rings with your fingers temporarily.

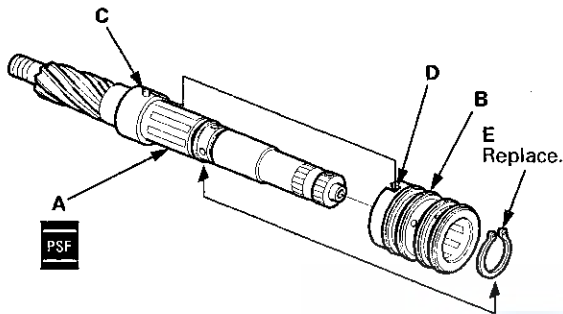
39. Apply power steering fluid to the seal rings on the sleeve, and to the entire inside surface of the sleeve seal ring sizing tool, then slowly insert the sleeve into the sizing tool.



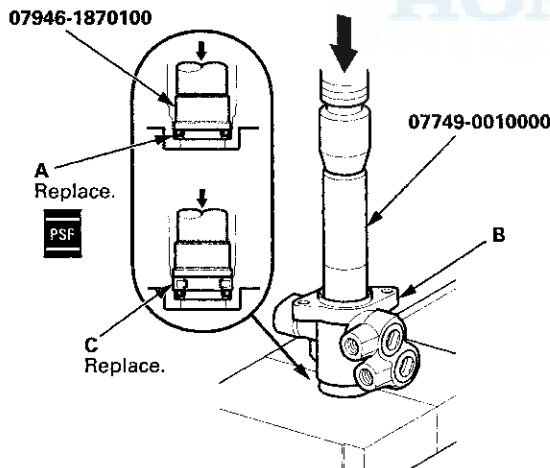
40. Move the sleeve back and forth several times to make sure the seal rings fit snugly in the sleeve. Make sure the seal rings are not twisted.



41. Apply power steering fluid to the surface of the pinion shaft (A). Slide the sleeve (B) onto the pinion shaft by aligning the locating pin (C) on the pinion shaft with the cutout (D) in the sleeve. Then install the new snap ring (E) securely in the pinion shaft groove. Be careful not to damage the valve seal ring when installing the sleeve.

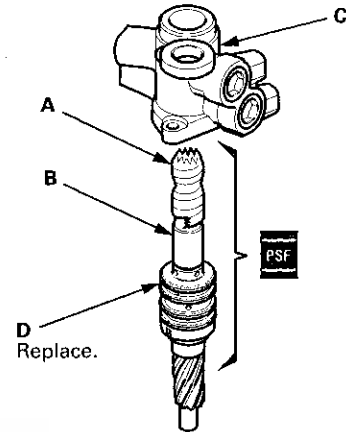


42. Apply power steering fluid to the seal ring lip of the new valve oil seal (A), then install the seal in the valve housing (B) using a hydraulic press and driver handle. Install the seal with its grooved side facing the tool.



43. Press the new roller bearing (C) into the valve housing with a hydraulic press and attachment.

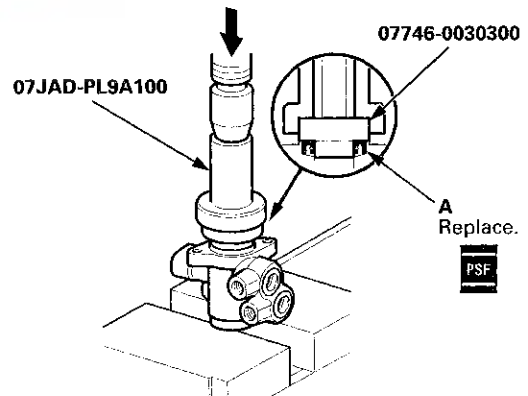
44. Apply vinyl tape (A) to the pinion shaft/sleeve (B), then coat the vinyl tape with power steering fluid.



45. Insert the pinion shaft/sleeve into the valve housing (C). Be careful not to damage the valve seal rings (D).

46. Remove the vinyl tape from the pinion shaft, then remove any residue from the tape adhesive.

47. Press the new valve oil seal (A) into the valve housing with a hydraulic press. Check that the pinion shaft/sleeve turns smoothly by hand after installing it.



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

(cont'd)

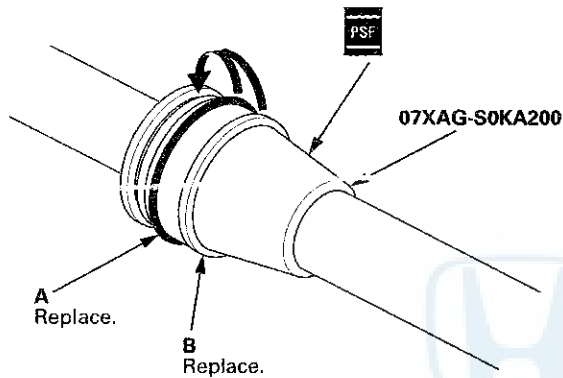
# Hydraulic Power Steering Components

## Steering Gearbox Overhaul (cont'd)

49. Position the new O-ring (A) and new piston seal ring (B) on the piston seal ring guide, then slide them down toward the big end of the tool.

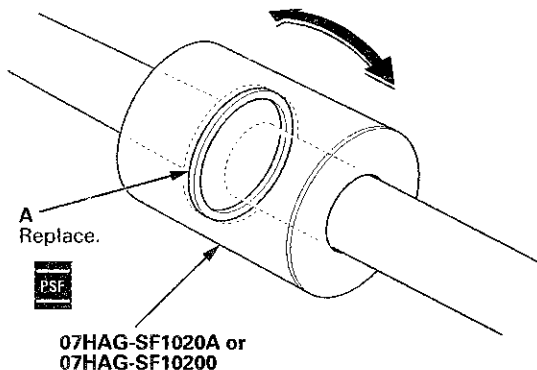
Note these items during reassembly:

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



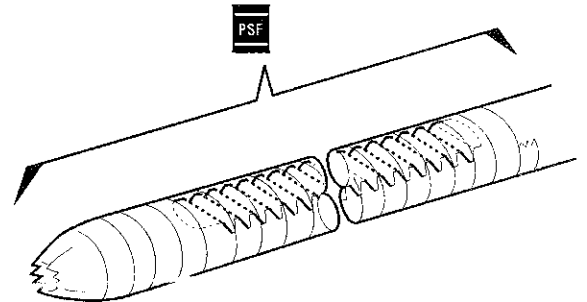
50. Pull the O-ring off into the piston groove, then pull the piston seal ring off into the piston groove on top of the O-ring.

51. Coat the piston seal ring (A) and the inside of the piston seal ring sizing tool with power steering fluid, then carefully slide the tool onto the rack and over the piston seal ring.

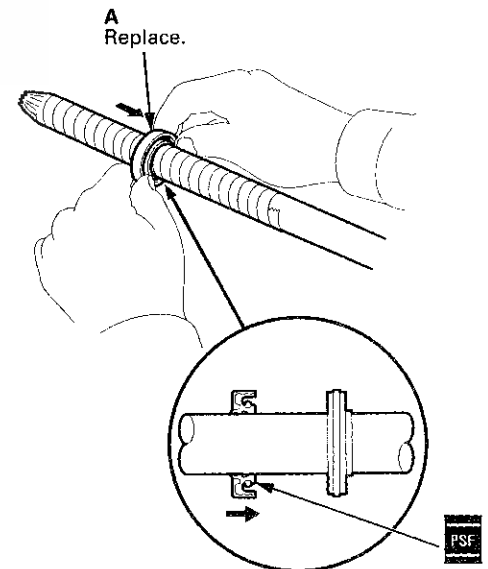


52. Move the sizing tool back and forth several times to make the piston seal ring fit snugly in the piston.

53. Wrap vinyl tape around the rack teeth and rack end edges, then coat the surface of the tape with power steering fluid. Make sure that the vinyl tape is wrapped carefully so that there is no stepped portion.



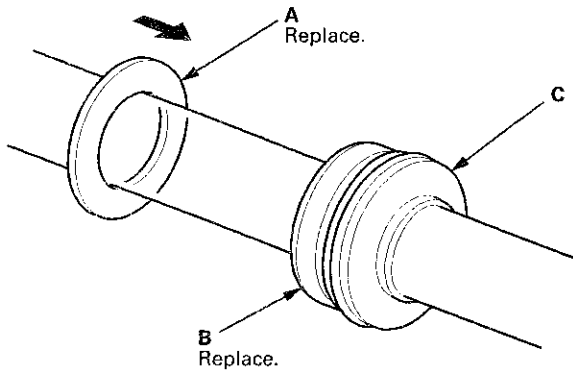
54. Coat the inside surface of the new cylinder end seal (A) with power steering fluid, then install it onto the steering rack with its grooved side toward the piston. When installing the cylinder end seal, be careful not to damage the lip of the seal with the edges or teeth of the steering rack.



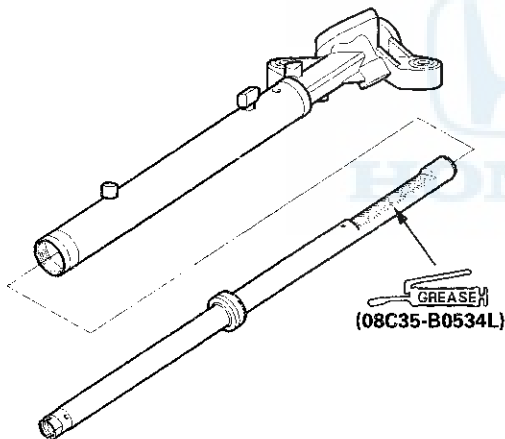
55. Remove the vinyl tape from the steering rack, then remove any adhesive residue.



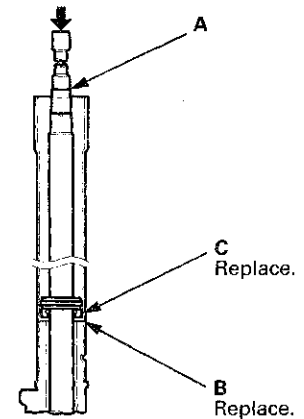
56. Install the new backup ring (A) on the steering rack, then place the backup ring and cylinder end seal (B) against the piston (C).



57. Apply steering grease to the steering rack teeth, then insert the steering rack into the gearbox housing. Be careful not to damage the inner surface of the cylinder wall with the rack edges.



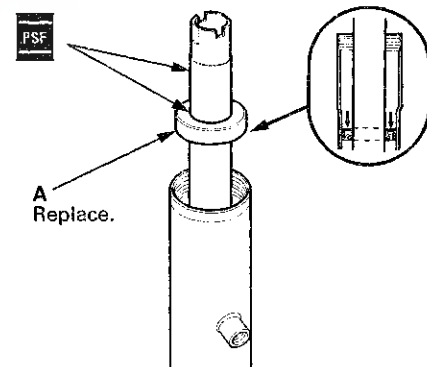
58. Insert an appropriate size socket (A) onto the steering rack as shown.



59. Install the backup ring (B) and cylinder end seal (C) into the bottom of the cylinder by pressing on the tool with a press. Do not push on the tool with excessive force as it may damage the backup ring and cylinder end seal.

60. Remove the tool, and center the steering rack.

61. Coat the inside surface of the new cylinder end seal (A) and steering rack with power steering fluid, then install the cylinder end seal onto the steering rack with its grooved side toward the cylinder.



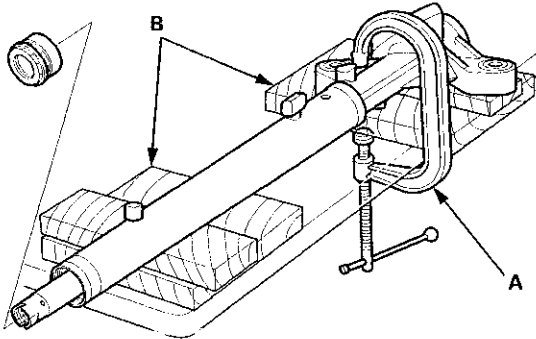
62. Push in the cylinder end seal with your finger. Be careful not to damage the surface of the seal with the threads and burrs at the staked position of the cylinder housing.

(cont'd)

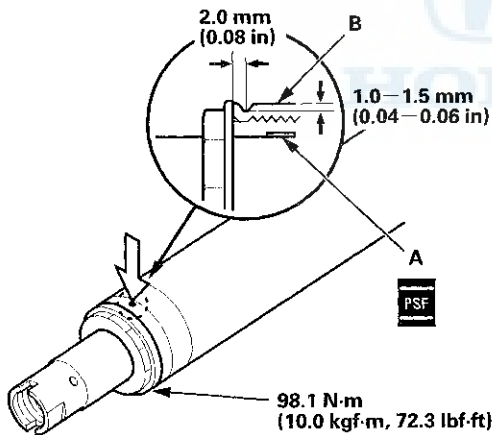
# Hydraulic Power Steering Components

## Steering Gearbox Overhaul (cont'd)

63. Hold the gearbox housing using a C-clamp (A) and wooden blocks (B) to a work bench as shown. Do not clamp the cylinder part of the gearbox housing in a vise.

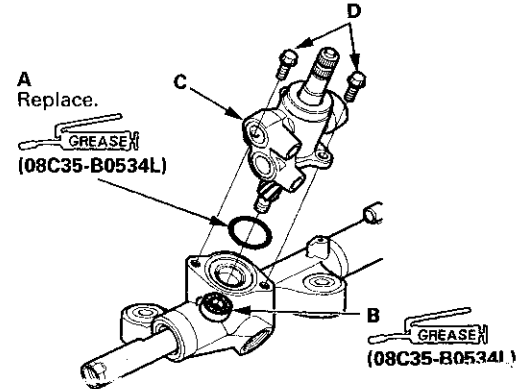


64. Coat the inside surface of the cylinder end (A) with power steering fluid, then install the cylinder end by screwing it into the cylinder (B). Tighten the cylinder end to the specified torque.



65. Stake the point of the cylinder shown (opposite from where the stake was removed during disassembly).

66. Coat the new O-ring (A) with steering grease, and carefully fit it on the valve housing.



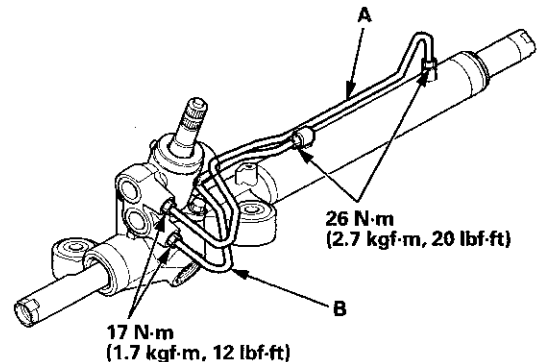
67. Apply steering grease to the ball bearing (B) in the gearbox housing, then install the valve body unit (C) by engaging the gears. Note the valve body unit installation position (direction of the line connections).

68. Loosely install the flange bolts (D).

69. Install cylinder line A and B to the steering gearbox.

Note these items during reassembly:

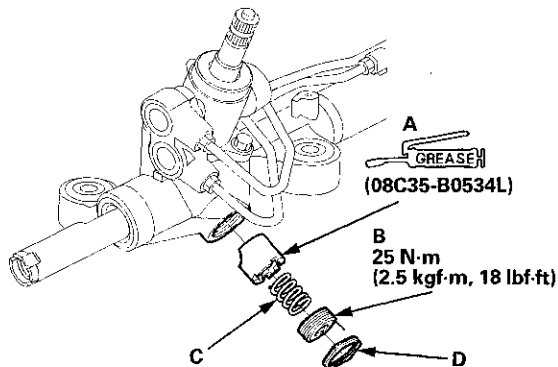
- Thoroughly clean the joints of the cylinder lines. The joints must be free of foreign material.
- Install the cylinder lines by tightening the flare nuts by hand first, then tighten the flare nuts to the specified torque.







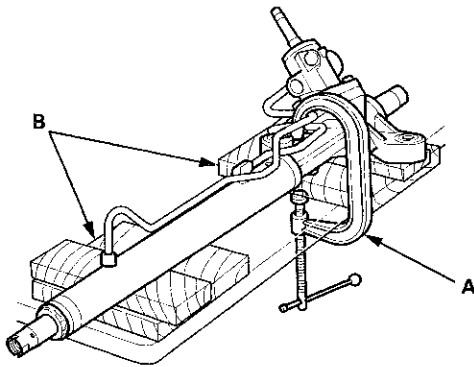
70. Apply steering grease to the sliding surface of the rack guide (A), and install it onto the gearbox housing.



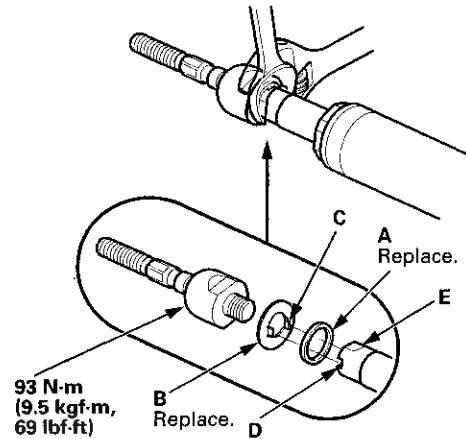
71. Remove the old sealant from the rack guide screw (B), then apply new sealant (Three Bond 1215 or Loctite 5699) to the middle of the threads. Install the spring (C), rack guide screw, and locknut (D).

NOTE: If more than 5 minutes have passed after applying the sealant, remove the old sealant and residue, and reapply new sealant.

72. Adjust the rack guide screw (see page 17-17). After adjusting, check that the rack moves smoothly by sliding it right and left.
73. Hold the gearbox housing using a C-clamp (A) and wooden blocks (B) to a work bench as shown. Do not clamp the cylinder part of the gearbox housing in a vise.

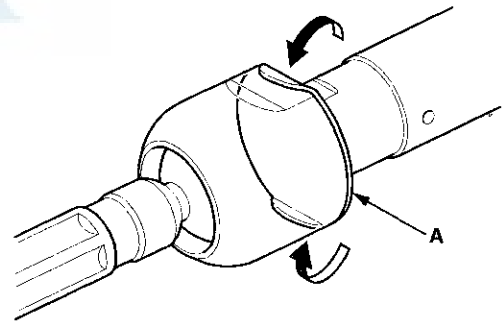


74. Install a new rubber stop (A) and a new lock washer (B). Align the lock washer tabs (C) with the slots (D) on the rack end (E) while holding the lock washer in place. Repeat this step for the other side of the rack.



75. Hold the flat surface sections of the steering rack with one wrench, and tighten both rack ends with another wrench. Be careful not to damage the rack surface with the wrench.

76. Bend the lock washer (A) back against the flat spots on the rack end joint housing.

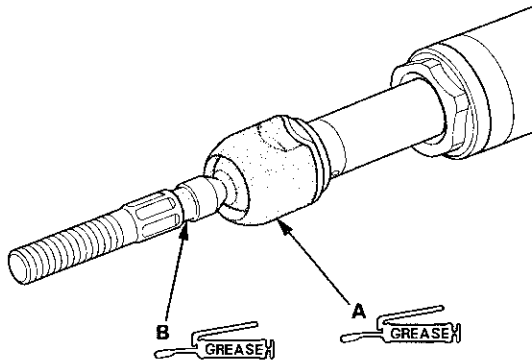


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# Hydraulic Power Steering Components

## Steering Gearbox Overhaul (cont'd)

77. Apply multipurpose grease to the circumference of the rack end joint housing (A).

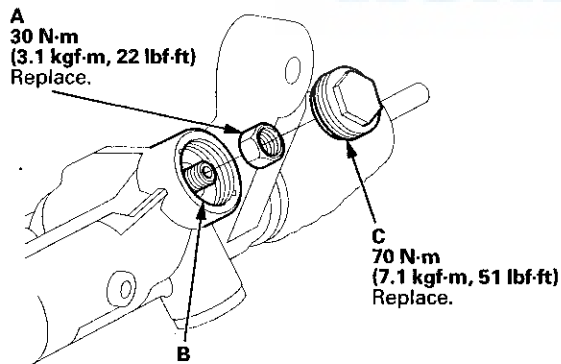


78. Apply a light coat of silicone grease (P/N 08/98-9013) to the boot grooves (B) on the rack end.

**NOTE:** Make sure not to get any silicone grease on the terminal part of the connectors, especially if you have silicone grease on your hands or gloves.

79. Center the steering rack within its stroke.

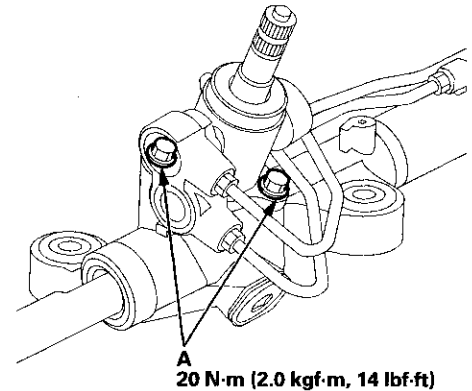
80. Install the new self-locking nut (A) onto the pinion shaft end, and tighten to the specified torque.



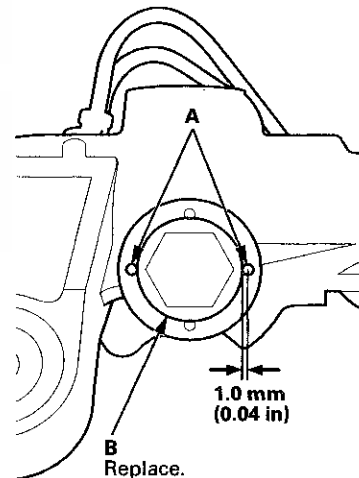
81. Remove the old sealant from the threads on the gearbox housing (B), and apply new sealant (Three Bond 1215 or Loctite 5699) all the way around the threads on the gearbox housing and the new end plug (C). Install the end plug onto the gearbox housing, and tighten it to the specified torque.

**NOTE:** If more than 5 minutes have passed after applying the sealant, remove the old sealant and residue, and reapply new sealant.

82. Tighten the flange bolts (A) to the specified torque.

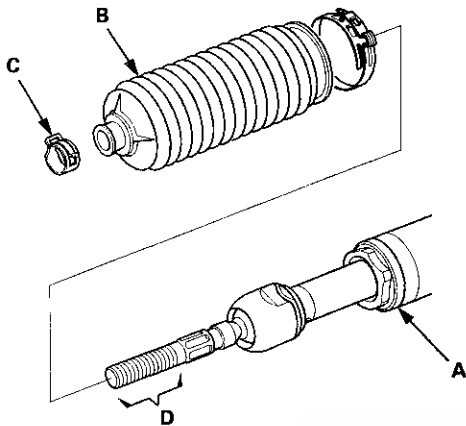


83. After tightening, use a drift to stake (A) the gearbox housing shoulder against the end plug (B).



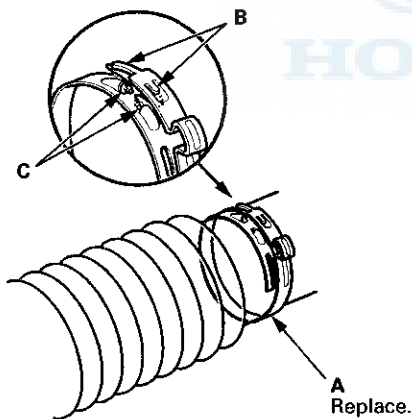


84. Clean off any grease or contamination from the boot installation grooves (A) around the gearbox housing. Install the boots (B) on the rack ends with the tie-rod clips (C), and fit the boot end in the installation grooves in the housing properly.

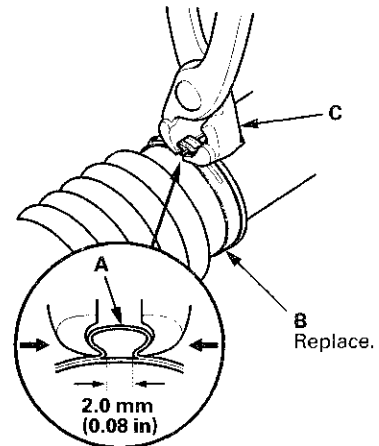


85. After installing the boots, wipe the grease off the threaded section (D) of the rack end.

86. Install the new boot bands (A) by aligning the tabs (B) with the holes (C) on the band.



87. Close the ear portion (A) of the boot band (B) with commercially available pincers, Oetiker 1098 or equivalent (C).



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

89. Install the tie-rod end to the rack end.

90. Install the steering gearbox (see page 17-60).

# Hydraulic Power Steering Components

## Steering Gearbox Installation

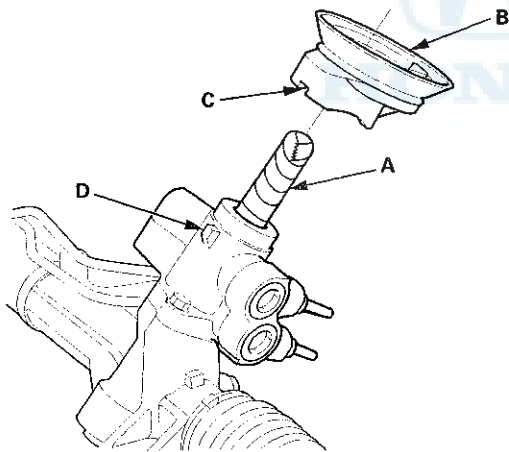
### Special Tools Required

- Subframe Adapter VSB02C000016\*
- Subframe Alignment Pin 070AG-SJAA10S
- Engine Support Hanger, A and Reds AAR-T1256\*
- Engine Hanger Adapter VSB02C000015\*

\*: Available through the Honda Tool and Equipment Program, 888-424-6857.

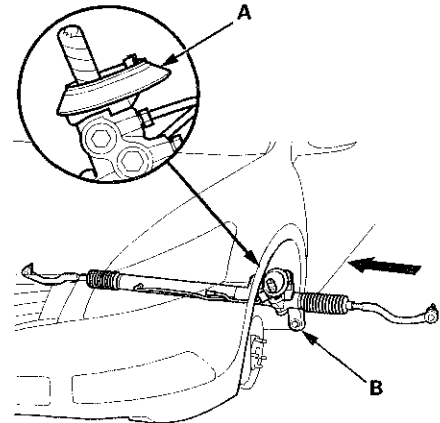
SRS components are located in this area. Review the SRS component locations: 4-door (see page 24-21), 2-door (see page 24-23) and the precautions and procedures (see page 24-25) before doing repairs or service.

1. Before installing the steering gearbox, make sure that no power steering fluid is on the mating surface of the steering gearbox and the front subframe. To prevent the gearbox mounting bolts from loosening after the installation, remove any power steering fluid from the mount cushions and the bolt holes.
2. Wrap vinyl tape over the splines on the pinion shaft (A).

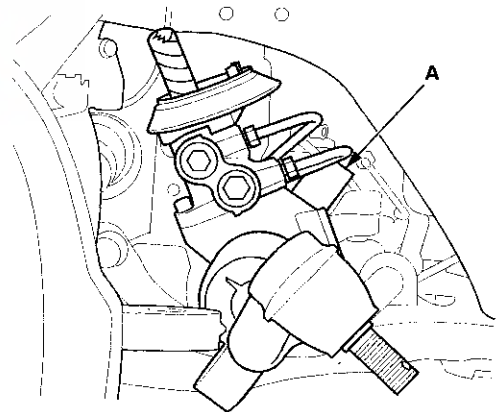


3. Install the pinion shaft grommet (B). Align the slot (C) in the pinion shaft grommet with the lug portion (D) on the valve housing. Make sure there is no gap between the grommet and the valve housing.

4. Turn the lip (A) of the pinion shaft grommet.



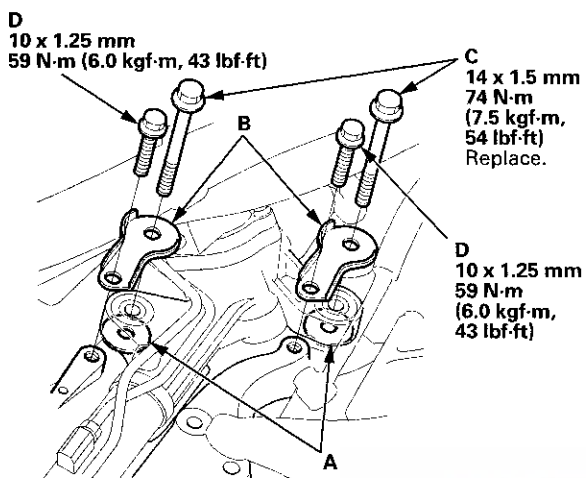
5. Slide the steering gearbox (B) between the front subframe and the body from the driver's side.
6. Carefully move the steering gearbox (A) toward the passenger's side until the pinion shaft clears the fenderwell opening on the body.



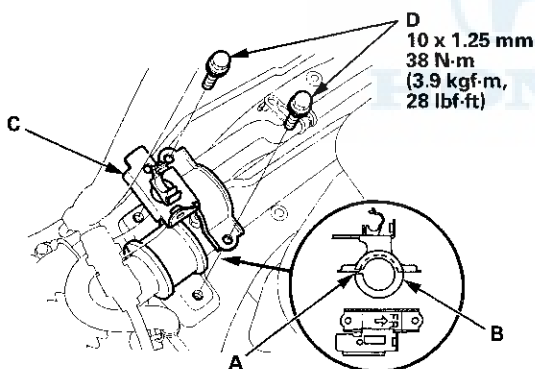
7. Continue moving the gearbox toward the passenger's side until the steering gearbox is in position.



8. Install the washers (A), the stiffener plates (B), the new mounting bolts (C), and the flange bolts (D) on the driver's side of the gearbox. Then loosely install the mounting bolts and the flange bolts.



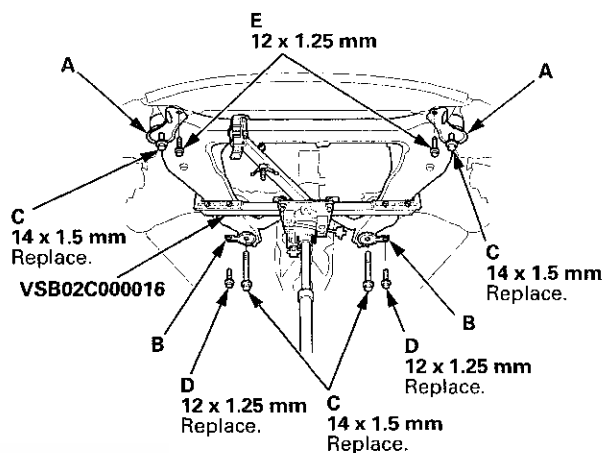
9. Position the cutout (A) on the mounting cushion (B) as shown, and install it on the passenger's side of the steering gearbox.



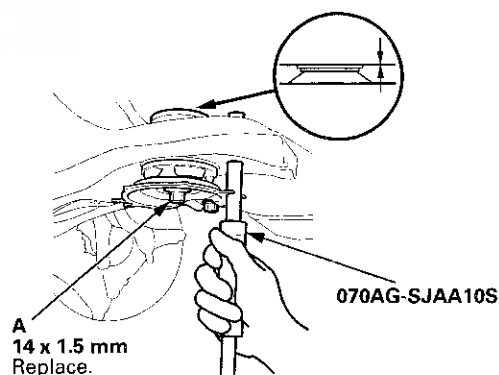
10. Install the gearbox mounting bracket (C) over the mounting cushion, and tighten the flange bolts (D) to the specified torque.

11. Tighten the flange bolts on the driver's side of the steering gearbox to the specified torque alternately in two steps.

12. Install the front subframe front stiffeners (A) and the front subframe rear stiffeners (B), then loosely install the new front subframe mounting bolts (C), the new flange bolts (D), and the flange bolts (E).



13. Align the front subframe using the 15.7 mm end of the subframe alignment pin. Vertically install the subframe alignment pin, and align the right rear corner of the front subframe and the vehicle frame holes, then loosely tighten the subframe mounting bolt (A) until the front subframe contacts the body frame.



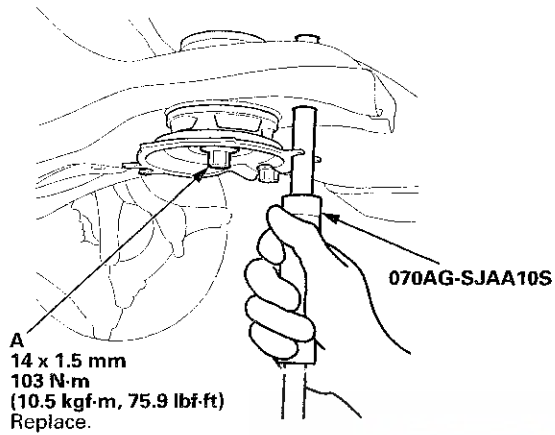
14. Loosely tighten the left rear subframe mounting bolt with the same procedure as the right rear using the subframe alignment pin.

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# Hydraulic Power Steering Components

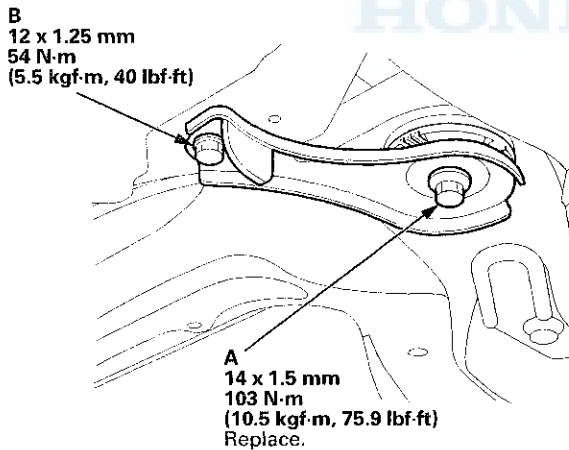
## Steering Gearbox Installation (cont'd)

15. Tighten the right rear subframe mounting bolt (A) to the specified torque with the subframe alignment pin installed.



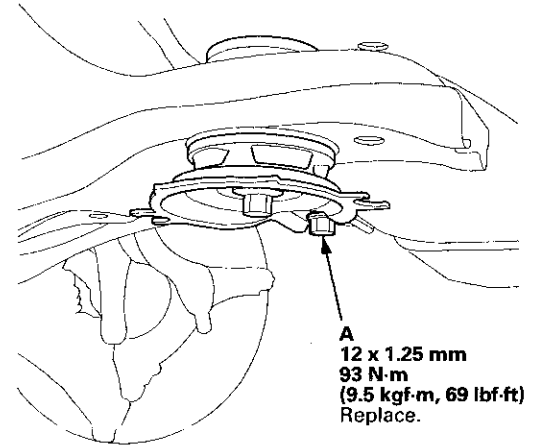
16. Tighten the left rear subframe mounting bolt to the specified torque with the subframe alignment pin installed.

17. Tighten the subframe mounting bolts (A) to the specified torque.

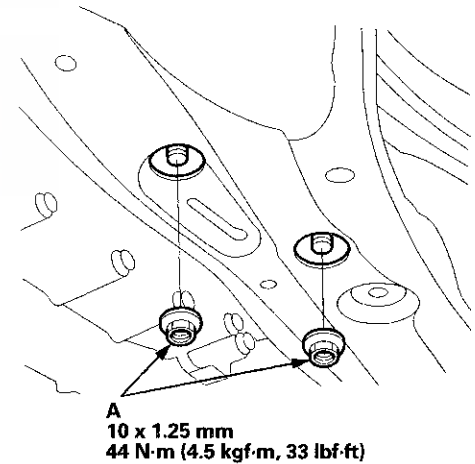


18. Tighten the flange bolts (B) to the specified torque.

19. Tighten the flange bolts (A) to the specified torque.

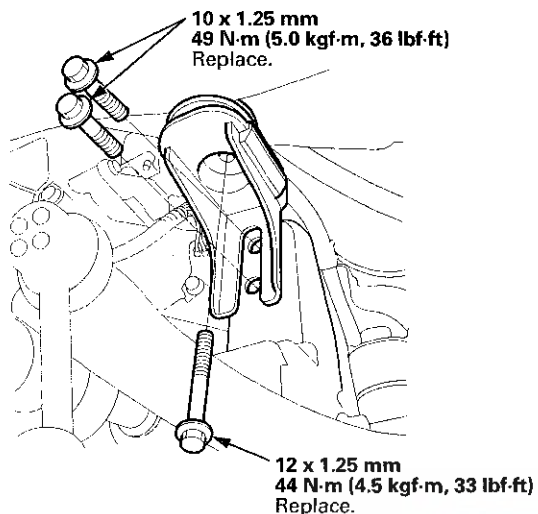


20. Install the flange nuts (A) to the lower transmission mount, and tighten them to the specified torque.

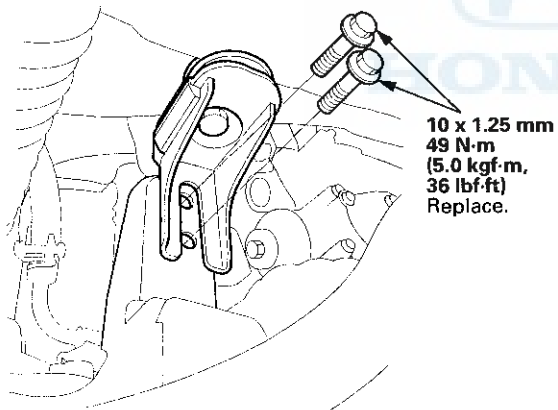




21. Install the new front subframe middle mounting bolts on the driver's side, and tighten them to the specified torque.

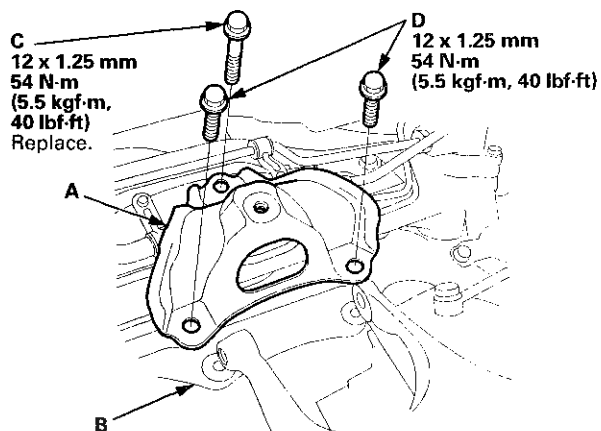


22. Install the new front subframe middle mounting bolts on the passenger's side, and tighten them to the specified torque.



23. Lower the transmission jack supporting the front subframe.

24. A/T: Install the rear engine mount upper bracket (A) to the base bracket (B) with a new mounting bolt (C) and mounting bolts (D), and tighten them to the specified torque.



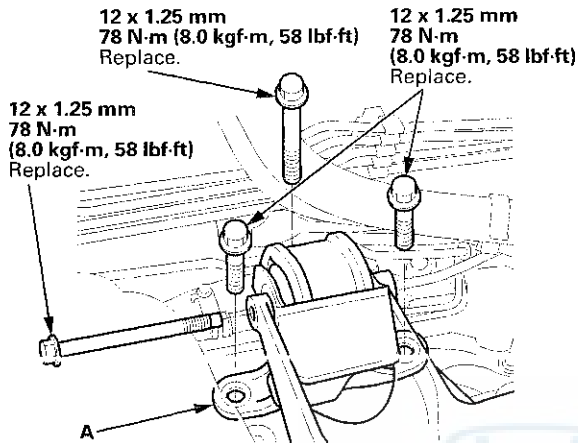
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# Hydraulic Power Steering Components

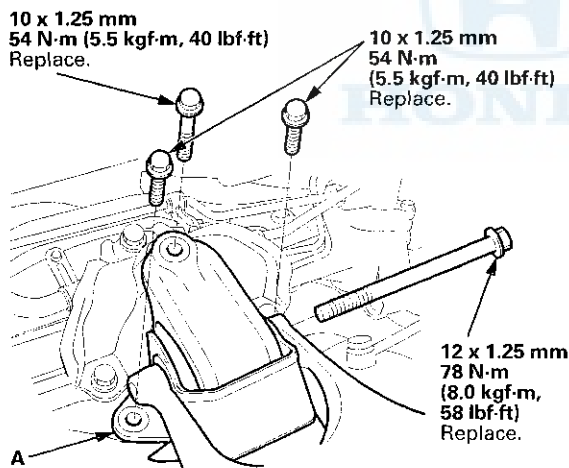
## Steering Gearbox Installation (cont'd)

25. Install the rear engine mount (A) with new mounting bolts, and lightly tighten them.

M/T

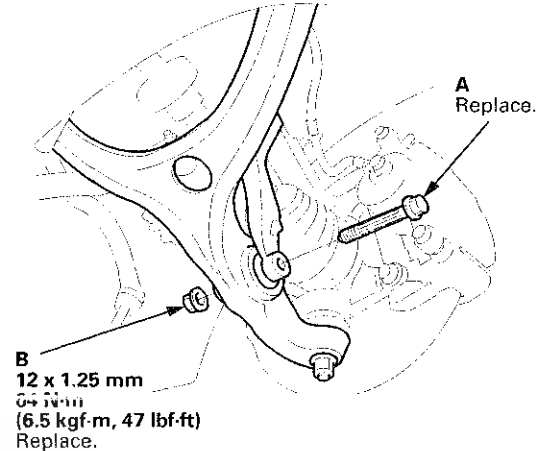


A/T



26. Remove the engine support hanger, the hanger balance bar, and the hanger adapter set.
27. Tighten the rear engine mount mounting bolts to the specified torque.

28. Install the new damper fork mounting bolt (A) and the new mounting nut (B), and loosely tighten the nut.

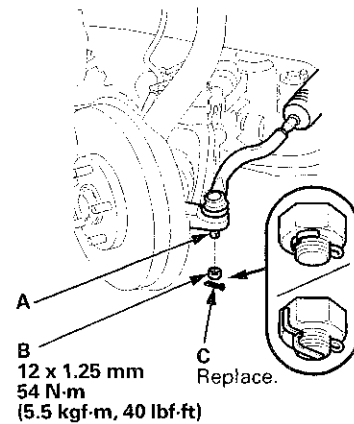


29. Install exhaust pipe A (see page 9-9).

30. Install the front splash shield (see page 20-291).

31. Lower the vehicle.

32. On both sides, wipe off any grease contamination from the ball joint tapered section and threads. Reconnect the tie-rod end ball joint (A) to the knuckle. Install the nut (B), and tighten it to the specified torque.



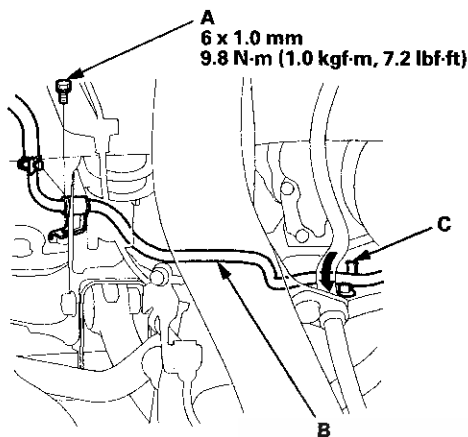
33. Install a new cotter pin (C), and bend it as shown.

34. Loosely connect the return line and inlet line to the valve housing by hand.



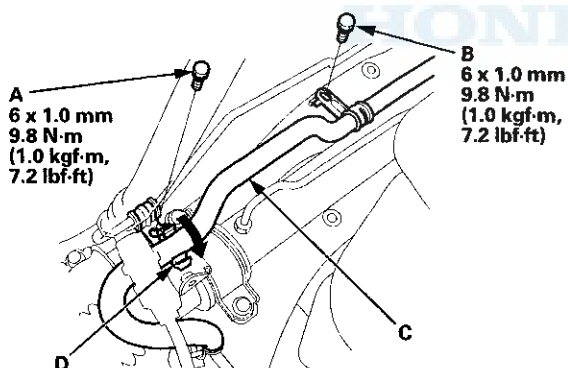


35. Install the return line clamp bolt (A), and tighten it to the specified torque.



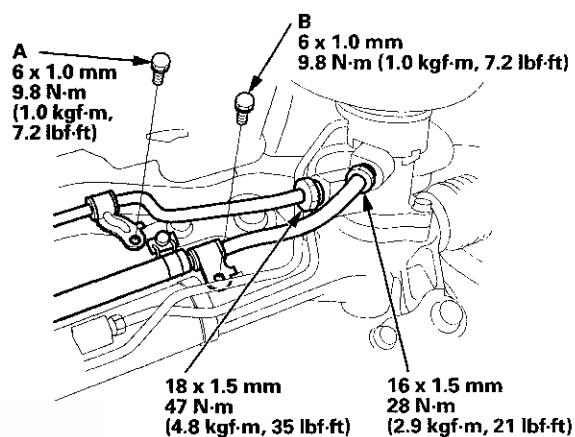
36. Install the return line (B) to the return hose clamp (C), and clamp it.

37. Install the inlet line clamp bracket bolt (A) and the return hose clamp bolt (B), and tighten them to the specified torque.



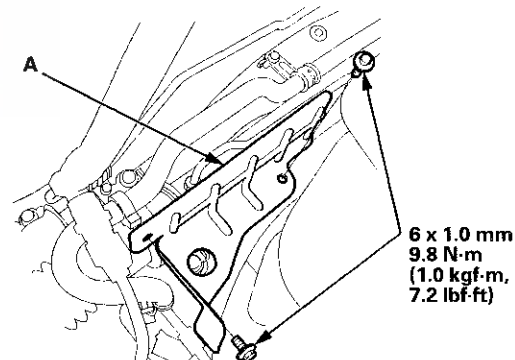
38. Install the return hose (C) to the return hose clamp (D), and clamp it.

39. Install the inlet line clamp bracket bolt (A) and the return line clamp bolt (B), and tighten them to the specified torque.



40. Tighten the flare nuts to the specified torque.

41. Install the P/S heat shield (A) with the flange bolts, and tighten them to the specified torque.



42. Install the strut brace (see page 20-306).

43. Install the front grille cover:

- 4-door (see page 20-274)
- 2-door (see page 20-274)

44. Place a floor jack under the lower arm, and raise the suspension to load it with the vehicle's weight. Do not place the jack against the ball joint pin of the knuckle.

45. Tighten the damper fork mounting nut while holding the mounting bold to the specified torque (see step 28).

(cont'd)

# Hydraulic Power Steering Components

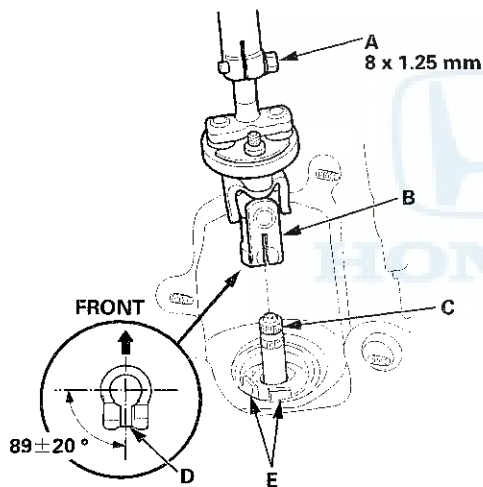
## Steering Gearbox Installation (cont'd)

46. Install the front wheels, then set the wheels in the straight ahead position.

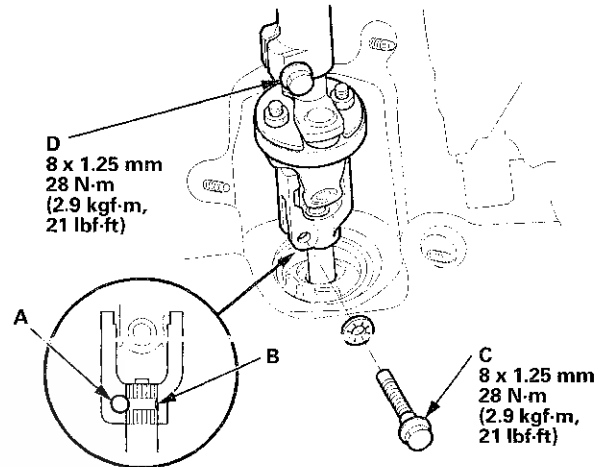
NOTE: Before installing the wheel, clean the mating surfaces of the brake disc and the inside of the wheel.

47. Center the steering rack within its stroke.
48. Loosen the upper steering joint bolt (A), and slip the lower end of the steering joint (B) onto the pinion shaft (C) taking care to align the gap (D) within the angle.

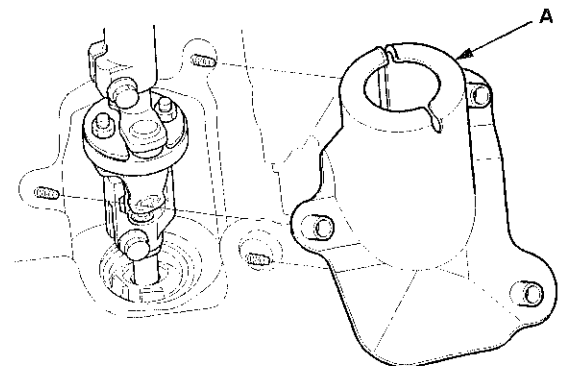
NOTE: Pick up the tabs (E) of the pinion shaft grommet, and turn up the lip of the pinion shaft grommet securely in place. Make sure that light does not enter from the space between the pinion shaft grommet and the body.



49. Align the bolt hole (A) on the steering joint with the groove (B) around the pinion shaft, then loosely install the lower steering joint bolt (C). Be sure that the joint bolt is securely in the groove in the pinion shaft.



50. Pull on the steering joint to make sure that the steering joint is fully seated, then tighten the lower joint bolt to the specified torque.
51. Tighten the upper steering joint bolt (D) to the specified torque.
52. Install the steering joint cover (A).



53. Install the steering wheel (see page 17-9), and the driver's airbag (see page 24-211).

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54. Do the battery terminal reconnection procedure (see page 22-91), and check these items:
- Turn the ignition switch to ON (II) and check that the SRS indicator comes on for about 6 seconds, and then goes off.
  - Make sure the horn and turn signal switches work properly.
  - Make sure the steering wheel switches work properly.
55. Fill the system with power steering fluid, and bleed air from the system (see page 17-28).
56. After installation, check these items.
- Start the engine, allow it to idle, and turn the steering wheel from lock to lock several times to warm up the fluid. Check the gearbox for leaks (see page 17-27).
  - Check the steering wheel spoke angle.
  - If steering spoke angles to the right and left are not equal (steering wheel and rack are not centered), correct the engagement of the joint/pinion shaft serrations.
  - Set the steering column to the center tilt position, and to the center telescopic position, then do the front toe inspection (see page 18-5).

