

2007 Honda Element EX

2007-2008 STEERING Steering - Element

2007-2008 STEERING

Steering - Element

SPECIAL TOOLS

Ref. No.	Tool Number	Description	Qty
①	07AAF-SDAA100	Ball Joint Thread Protector, 12 mm	1
②	07GAF-PH70100	Pilot Collar	1
③	07MAA-SL00100 or 07916-SA50001	Locknut Wrench, 40 mm	1
④	07MAC-SL0A202	Ball Joint Remover, 28 mm	1
⑤	07NAD-SR30101	Driver Handle	1
⑥	07NAD-SR30200 or 07NAD-SR3020A	Cylinder End Seal Remover Attachment	1
⑦	07NAG-SR30900 or 07NAG-SR3090A	Valve Seal Ring Sizing Tool	1
⑧	07QAD-P0A0100	Attachment, 42 mm	1
⑨	07YAG-S2X0100	Sleeve Seal Ring Guide	1
⑩	07ZAA-S5A0100	Locknut Wrench	1
⑪	07ZAB-S5A0100	Pulley Holder	1
⑫	07ZAF-S5A0100	Driver, 27 mm	1
⑬	07ZAG-S5A0100	Sleeve Seal Ring Sizing Tool, 36 mm	1
⑭	07ZAG-S5A0200	Valve Seal Ring Guide	1
⑮	07VAK-P8A011A	P/S Joint Adapter (Pump)	1
⑯	07ZAG-S7A0100	Piston Seal Ring Guide, 42 mm	1
⑰	07ZAG-S7A0200	Piston Seal Ring Sizing Tool, 42 mm	1
⑱	07ZAK-S7CA100	P/S Joint Adapter Plate (Pump)	1
⑲	07ZAK-S7CA200	P/S Joint Adapter (Hose)	1
⑳	07406-0010001 or 07406-001000A or 07406-001A101	P/S Pressure Gauge	1
㉑	07746-0010100	Attachment, 32 x 35 mm	1
㉒	07749-0010000	Driver	1
㉓	07974-6890801 or 07974-689080A	Cylinder End Seal Slider, 23 mm	1

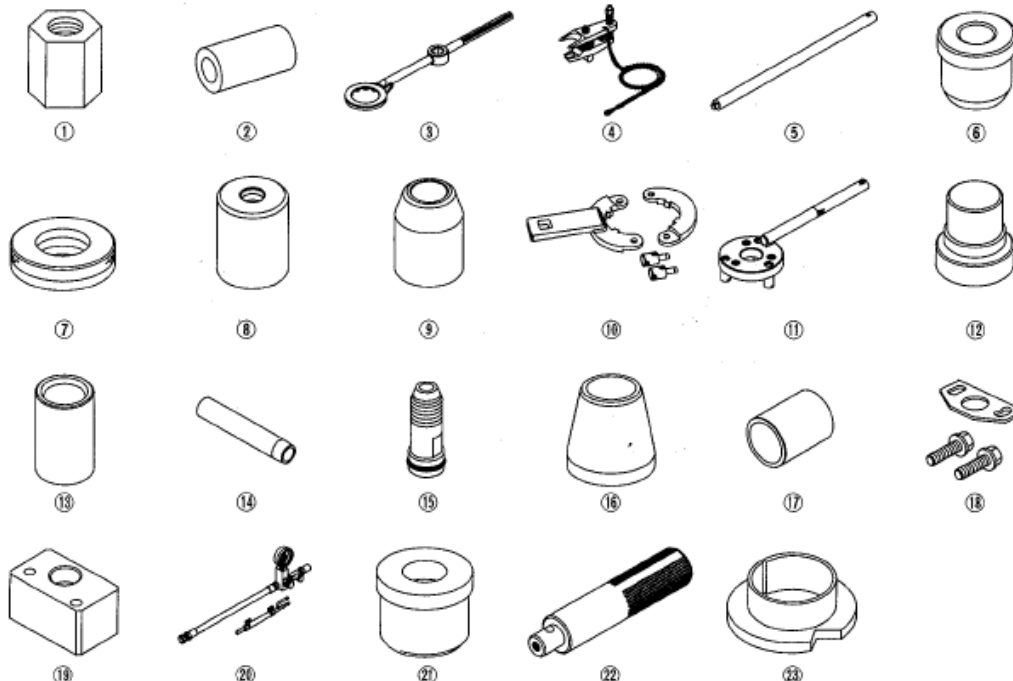


Fig. 1: Identifying Special Tools

Courtesy of AMERICAN HONDA MOTOR CO., INC.

COMPONENT LOCATION INDEX

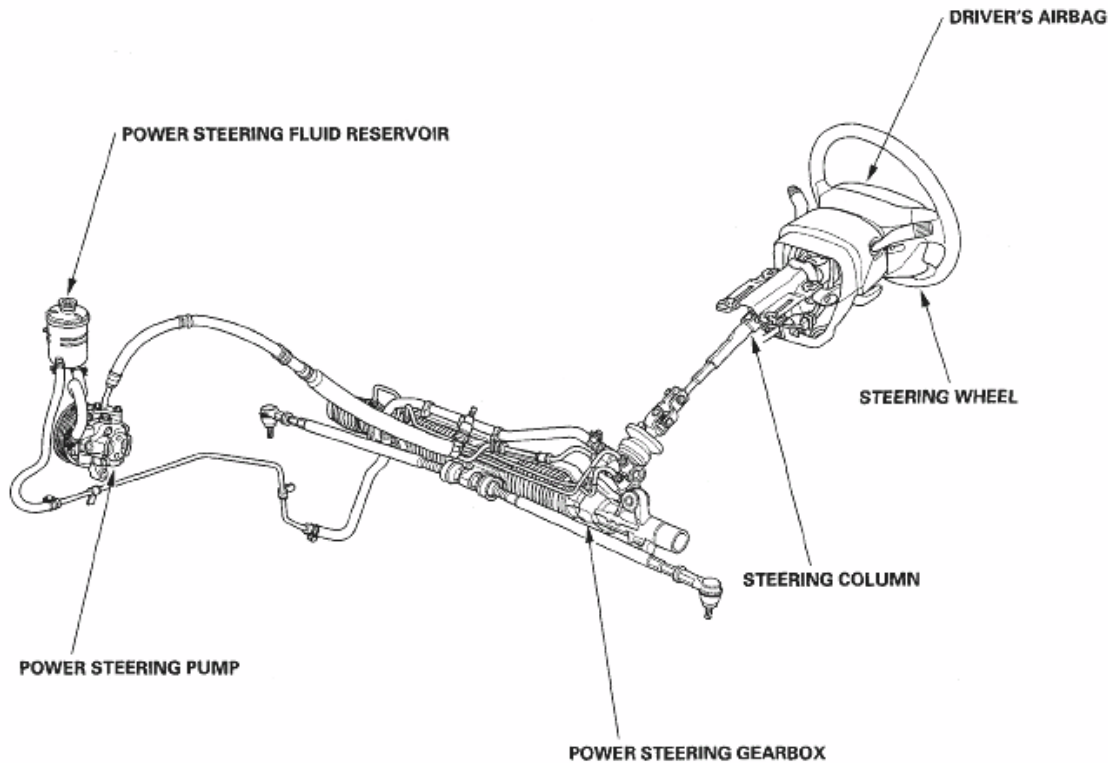


Fig. 2: Identifying Power Steering Component Location
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

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 TROUBLESHOOTING INDEX

Symptom	Procedure(s)	Also check for
Hard steering	Troubleshoot the system (see HARD STEERING).	<ul style="list-style-type: none"> • Modified suspension • Damaged suspension • Tire sizes, tire varieties, and air pressure
Assist (excessively light steering at high	Check the rack guide adjustment (see RACK GUIDE	Front wheel alignment (see

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speed)	<u>ADJUSTMENT</u>).	<u>WHEEL ALIGNMENT</u>)
Shock or vibration when the steering wheel is turned to full lock	<ol style="list-style-type: none"> 1. Check the rack guide adjustment (see <u>RACK GUIDE ADJUSTMENT</u>). 2. Check the drive belt for slippage (see <u>DRIVE BELT INSPECTION</u>). 3. Check the power steering pump fluid pressure with T/N 07406-0010001 (see <u>PUMP PRESSURE TEST WITH T/N 07406-0010001</u>), T/N 07406-001000A or T/N 07406-001A101 (see <u>PUMP PRESSURE TEST WITH T/N 07406-001000A OR T/N 07406-001A101</u>). 4. Overhaul the steering gearbox (see step 2). 	
Steering wheel will not return smoothly	<ol style="list-style-type: none"> 1. Check cylinder lines for deformation. 2. Check the ball joints for binding. 3. Check wheel alignment (see <u>WHEEL ALIGNMENT</u>). 4. Overhaul the steering gearbox (see step 2). 	
Uneven or rough steering	<ol style="list-style-type: none"> 1. Check the rack guide adjustment (see <u>RACK GUIDE ADJUSTMENT</u>). 2. Check the drive belt (see <u>DRIVE BELT INSPECTION</u>). 3. Check for low or erratic engine idle speed (see <u>IDLE SPEED INSPECTION</u>). 4. Check for air in the power steering system due to air entering inlet side of pump. 5. Check for low fluid level in the power steering reservoir due to possible leaks in system (see <u>POWER STEERING HOSE, LINE, AND PRESSURE SWITCH REPLACEMENT</u>). 6. Overhaul the steering gearbox (see step 2). 	
Steering wheel kicks back during wide turns	<ol style="list-style-type: none"> 1. Check the drive belt (see <u>DRIVE BELT INSPECTION</u>). 2. Check the power steering pump fluid pressure with T/N 07406-0010001 (see <u>PUMP PRESSURE TEST WITH T/N 07406-0010001</u>), T/N 07406-001000A or T/N 07406-001A101 (see <u>PUMP PRESSURE TEST WITH T/N 07406-001000A OR T/N 07406-001A101</u>). 	
	<ol style="list-style-type: none"> 1. Check when the noise occurs: <ul style="list-style-type: none"> • If the noise is heard 2-3 minutes after starting 	

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Humming noise from the power steering system	<p style="text-align: center;">the engine in cold weather, this is normal.</p> <ul style="list-style-type: none"> • If the noise is heard when the wheel is turned with the vehicle stopped, this is normal due to the fluid pulsation. <ol style="list-style-type: none"> 2. Check for the high-pressure hose touching the subframe or body. 3. Check for automatic transmission converter noise. 4. Check for air bubbles in the power steering fluid, leak on inlet side of pump. 5. Check for particle contamination of fluid and restricted filter in the reservoir. 	Pump pressure
Power steering rack rattle or chattering	<ol style="list-style-type: none"> 1. Check for loose steering components (tie-rod and ball joints). Tighten or replace as necessary. 2. Check the steering column shaft for wobbling. If the steering column wobbles, replace the steering column assembly (see <u>STEERING COLUMN REMOVAL AND INSTALLATION</u>). 3. Check the rack guide adjustment (see <u>RACK GUIDE ADJUSTMENT</u>). 4. Check the power steering pump pulley: <ul style="list-style-type: none"> • If the pulley is loose, tighten it (see step 46). • If the pump shaft is loose, replace the pump (see <u>PUMP REPLACEMENT</u>). 	
Hissing from the power steering system/foaming fluid	<ul style="list-style-type: none"> • Check the fluid level. If low, fill the reservoir to the proper level and check for leaks (see <u>FLUID LEAKAGE INSPECTION</u>). • Check the reservoir for leaks. • Check for crushed inlet hose or loose hose clamp allowing air into the suction side of the system (see <u>FLUID LEAKAGE INSPECTION</u>). • Check the power steering pump shaft oil seal for leaks. 	Air in the P/S fluid
Noise from the power steering pump	<ul style="list-style-type: none"> • Compare the pump noise at normal operating temperature to another like vehicle (pump noise for 2-3 minutes after starting the engine in cold weather is normal). • Remove and inspect the pump for wear and damage (see <u>PUMP OVERHAUL</u>). 	<ul style="list-style-type: none"> • P/S pump pressure • Air in the P/S fluid
Squeaking from the power steering pump	Check the drive belt (see <u>DRIVE BELT INSPECTION</u>).	
	<ul style="list-style-type: none"> • Fluid leaks from the top of the valve body unit. Overhaul the valve body unit (see <u>STEERING</u> 	

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Fluid leaks from the steering gearbox	<p><u>GEARBOX OVERHAUL</u>).</p> <ul style="list-style-type: none"> • 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. • Fluid leaks from the passenger's side boot. Replace the cylinder end seal on the cylinder side. • Fluid leaks from pinion shaft near the lower steering joint bolt. Overhaul the valve body unit. • Fluid leaks from the steering damping valve covers on the valve body unit. Replace the valve housing. 	
Fluid leaks from the power steering line	<ul style="list-style-type: none"> • Fluid leaks from the cylinder line connections (flare nuts). Tighten the connection and retest. • Fluid leaks from damaged cylinder lines. Replace the cylinder line (see <u>POWER STEERING HOSE, LINE, AND PRESSURE SWITCH REPLACEMENT</u>). • 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, or valve body unit as necessary. 	
Fluid leaks from the power steering pump	<ul style="list-style-type: none"> • Fluid leaks from the front oil seal. Replace the front oil seal. • Fluid leaks from the power steering pump housing. Replace the leaking O-rings or seals (see <u>PUMP OVERHAUL</u>), and if necessary replace the power steering pump (see <u>PUMP REPLACEMENT</u>). 	
Fluid leaks from the power steering reservoir	<ul style="list-style-type: none"> • Fluid leaks from around the reservoir cap because the fluid level is too high. Drain the reservoir to the proper level. If the fluid is aerated, check for an air leak on the inlet side of pump. • Fluid leaks from reservoir. Check reservoir for cracks and replace as necessary. 	
Fluid leaks from the power steering pump outlet hose (high-pressure)	<ul style="list-style-type: none"> • Check the fitting for loose bolts. If the bolts are tight, replace the fitting O-ring. • Fluid leaks at the swagged joint: Replace the outlet hose. 	
Fluid leaks from the power steering pump inlet hose (low-pressure)	Check the hose for damage, deterioration, or improper assembly. Replace or repair as necessary.	

SYMPTOM TROUBLESHOOTING

HARD STEERING

1. Check the power assist (see **POWER ASSIST CHECK**).

Is the initial turning load more than 29 N (3.0 kgf, 6.6 lbf)?

YES -Go to step 2.

NO -Power assist is OK.

2. Connect the P/S joint adapter (pump), P/S joint adapter (hose), and P/S pressure gauge T/N 07406-0010001 (see **PUMP PRESSURE TEST WITH T/N 07406-0010001**), T/N 07406-001000A or T/N 07406-001A101 (see **PUMP PRESSURE TEST WITH T/N 07406-001000A OR T/N 07406-001A101**) to the pump.

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

Is the pressure 1,470 kPa (15.0 kgf/cm² , 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 7,460-8,140 kPa (76-83 kgf/cm² , 1,080-1,180 psi) or less?

YES -Go to step 5.

NO -Go to step 9.

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

Are the two measurements within 2.9 N (0.3 kgf, 0.66 lbf) of each other?

YES -Go to step 6.

NO -Go to step 11.

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 7,460-8,140 kPa (76-83 kgf/cm² , 1,080-1,180 psi) or more?

YES -Go to step 7.

NO -Faulty gearbox.

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7. Adjust the rack guide (see **RACK GUIDE ADJUSTMENT**), and retest.

Is the steering OK?

YES -Repair is completed.

NO -Faulty gearbox.

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

Are the lines clogged or deformed?

YES -Repair or replace the lines.

NO -Faulty valve body unit.

9. Disassemble the pump (see **PUMP OVERHAUL**).
10. Check the pressure control valve for smooth movement and leaks (see step 16).

Is the pressure control valve OK?

YES -Faulty pump assembly.

NO -Faulty pressure control valve.

11. Check the cylinder lines for deformation (see **FLUID LEAKAGE INSPECTION**).

Are any of the lines deformed?

YES -Replace the deformed line.

NO -Go to step 12.

12. 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.

NO -Faulty valve body unit.

STEERING WHEEL ROTATIONAL PLAY CHECK

1. Turn the front wheels to 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 gearbox and linkages are OK.
 - If the play exceeds the limit, adjust the rack guide (see **RACK GUIDE ADJUSTMENT**). If the play is still excessive after rack guide adjustment, inspect the steering linkage and gearbox (see **STEERING LINKAGE AND GEARBOX INSPECTION**).

Rotational play: 0-10 mm (0-0.39 in.)

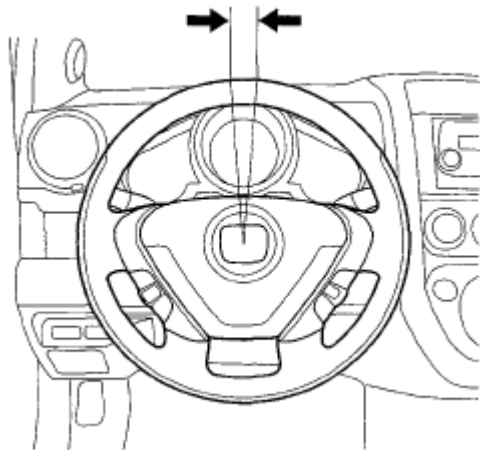


Fig. 3: Identifying Steering Wheel Play
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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 **FLUID REPLACEMENT**).
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 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 gearbox and pump are OK.
 - If the scale reads more than the specification, troubleshoot the steering system (see **SYMPTOM TROUBLESHOOTING**).

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

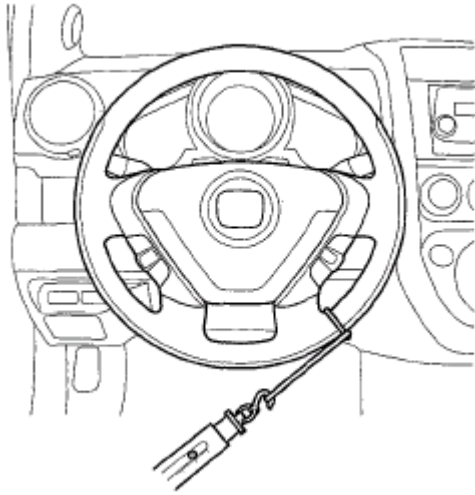


Fig. 4: Attaching Commercially Available Spring Scale To Steering Wheel
Courtesy of AMERICAN HONDA MOTOR CO., INC.

STEERING LINKAGE AND GEARBOX INSPECTION

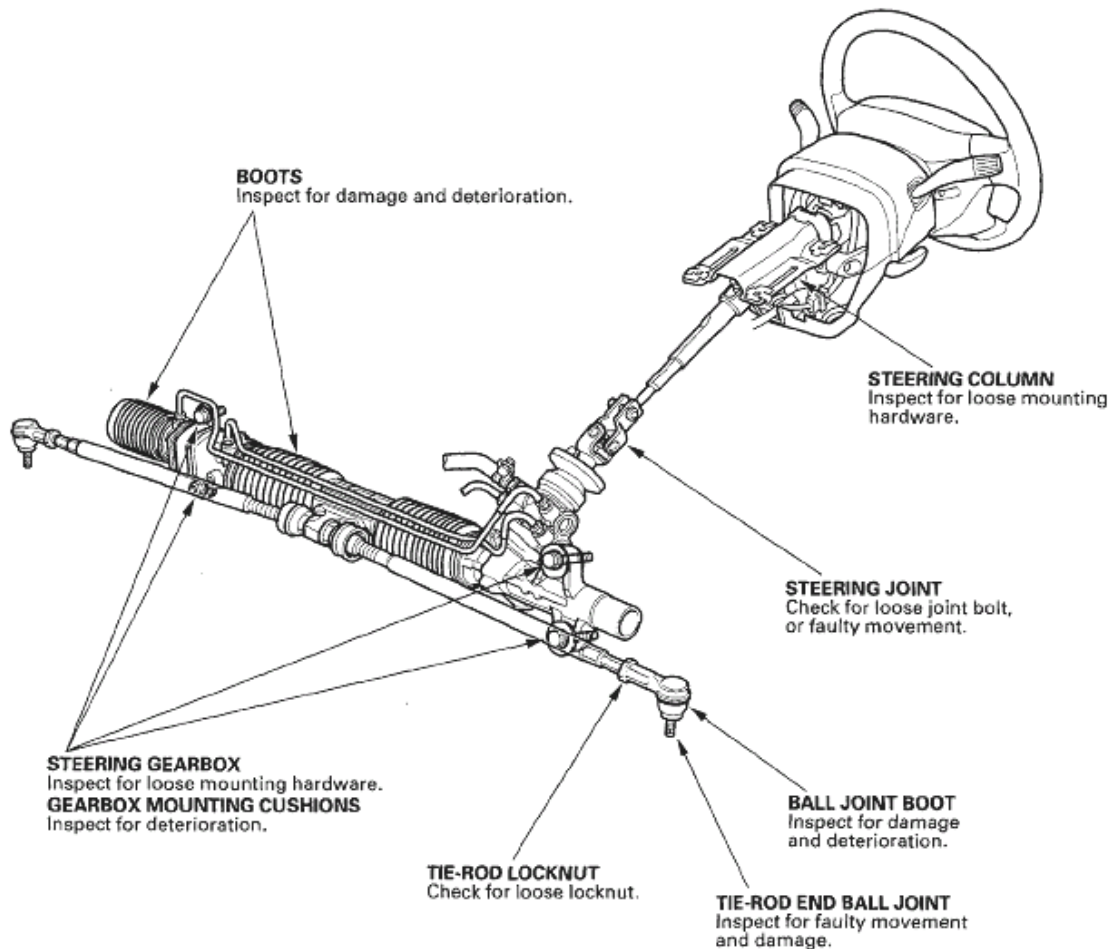


Fig. 5: Identifying Steering Linkage And Gearbox Components

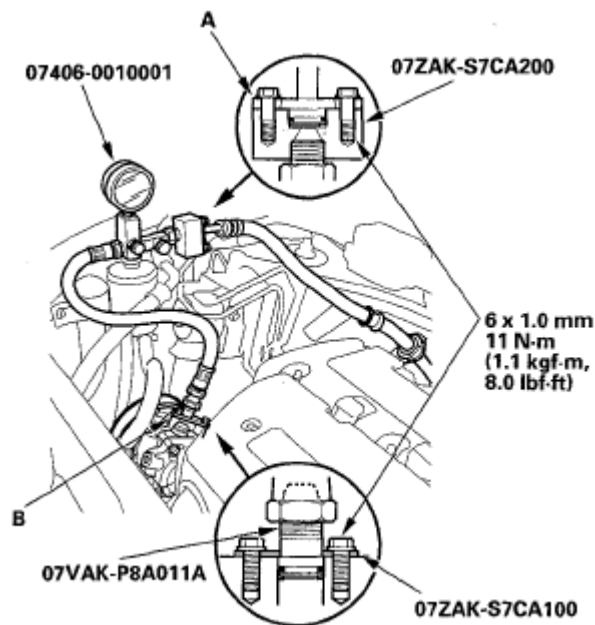
Courtesy of AMERICAN HONDA MOTOR CO., INC.

PUMP PRESSURE TEST WITH T/N 07406-0010001**Special Tools Required**

- P/S joint adapter (pump) 07VAK-P8A011A
- P/S joint adapter plate (pump) 07ZAK-S7CA100
- P/S joint adapter (hose) 07ZAK-S7CA200
- P/S pressure gauge 07406-0010001

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

1. Check the power steering fluid level (see **FLUID REPLACEMENT**).
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 P/S joint adapter (pump) on the pump outlet (B).

**Fig. 6: Identifying Pump Outlet Hose And Pump Outlet With Torque Specification**

Courtesy of AMERICAN HONDA MOTOR CO., INC.

3. Connect the P/S joint adapter (hose) to the P/S pressure gauge, then connect the pump outlet hose to the P/S joint adapter (hose).
4. Install the P/S pressure gauge to the P/S joint adapter (pump).
5. Fully open the shut-off valve (A).

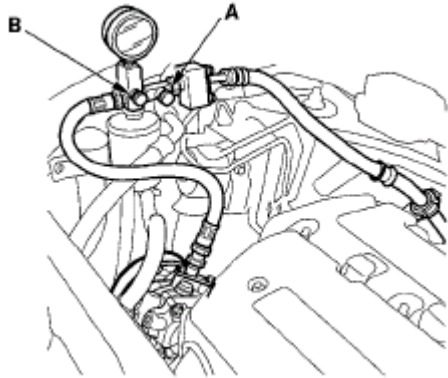


Fig. 7: Identifying Shut-Off Valve And Pressure Control Valve
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

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 pressure should be no more than 1,470 kPa (15.0 kgf/cm², 213 psi). If the pressure is too high, check the outlet hose or valve body unit (see Steering System Troubleshooting).
10. Raise the engine speed to 3,000 rpm, and measure the fluid pressure. If the pump is in good condition, the pressure should be at least 1,470 kPa (15.0 kgf/cm², 213 psi). If the pressure is too high, repair or replace the pump.
11. Lower the engine speed, and let it idle. Close the shut-off valve, then close the pressure control valve gradually until the pressure gauge needle is stable. Read the pressure.

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

12. Immediately open the shut-off valve fully. If the pump is in good condition, the gauge should read at least 7,460-8,140 kPa (76-83 kgf/cm², 1,080-1,180 psi). A low reading means pump output is too low for full assist. Repair or replace the pump.

PUMP PRESSURE TEST WITH T/N 07406-001000A OR T/N 07406-001A101

Special Tools Required

- P/S joint adapter (pump) 07VAK-P8A011A
- P/S joint adapter plate (pump) 07ZAK-S7CA100
- P/S joint adapter (hose) 07ZAK-S7CA200
- 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 gearbox.

1. Check the power steering fluid level (see **FLUID REPLACEMENT**).
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 P/S joint adapter (pump) on the pump outlet (B) with the P/S joint outlet plate.

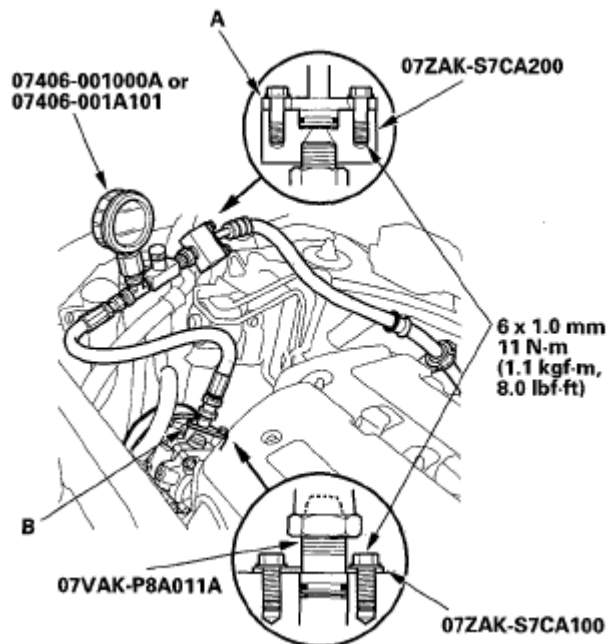


Fig. 8: Identifying Pump Outlet Hose And Pump Outlet With Torque Specification
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

3. Connect the P/S joint adapter (hose) to the P/S pressure gauge, then connect the pump outlet hose to the P/S joint adapter (hose).
4. Install the P/S pressure gauge to the P/S joint adapter (pump).
5. Open the pressure control valve (A) fully.



Fig. 9: Identifying Pressure Control Valve

Courtesy of AMERICAN HONDA MOTOR CO., INC.

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 pressure should be no more than 1,470 kPa (15.0 kgf/cm², 213 psi). If the pressure is too high, check the outlet hose or valve body unit (see Steering System Troubleshooting).
9. Raise the engine speed to 3,000 rpm, and measure the fluid pressure. If the pump is in good condition, the pressure should be at least 1,470 kPa (15.0 kgf/cm², 213 psi). If the pressure is too high, repair or replace the pump.
10. Lower the engine speed, and let it idle. Close the shut-off valve gradually until the pressure gauge needle is stable. Read the pressure.

NOTE: **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 7,460-8,140 kPa (76-83 kgf/cm², 1,080-1,180 psi). A low reading means pump output is too low for full assist. Repair or replace the pump.

FLUID LEAKAGE INSPECTION

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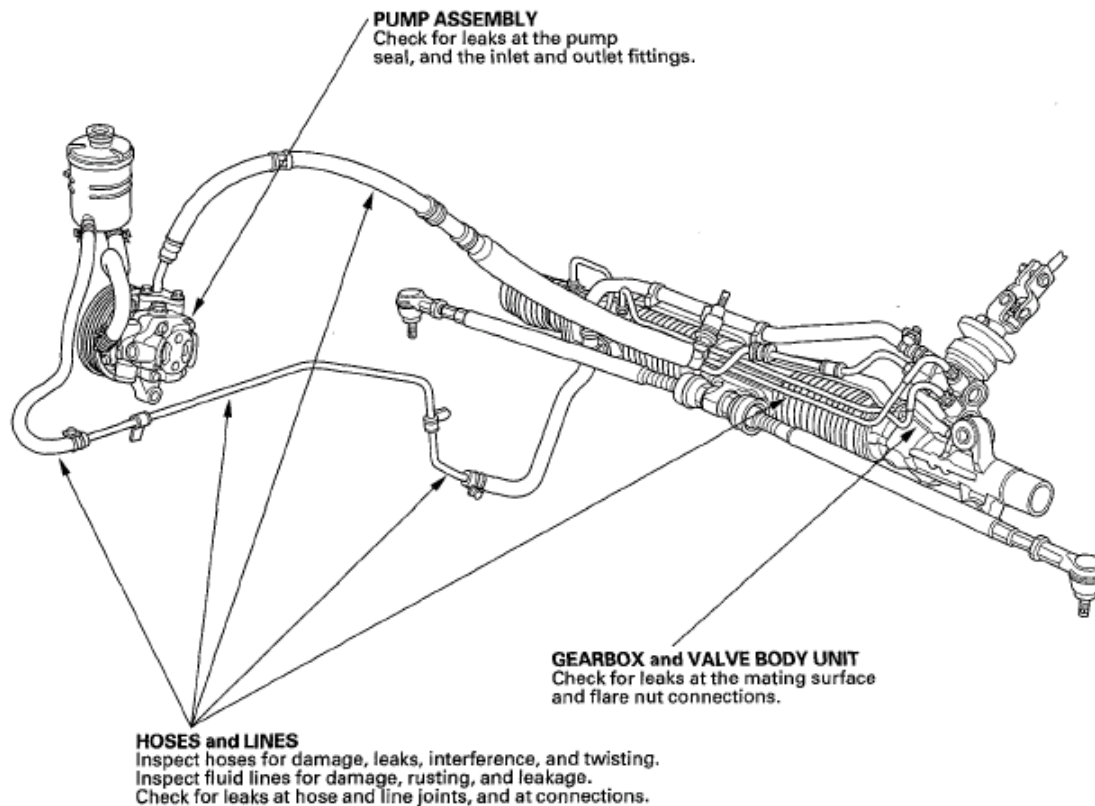


Fig. 10: Identifying Power Steering Fluid Leakage Parts Location
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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 and poor steering in cold weather.

NOTE: If the fluid is contaminated, the screen in the reservoir may be partially blocked. Replace the reservoir if necessary.

System capacity: 0.83 L (0.87 US. qt) at disassembly

Reservoir capacity: 0.27 L (0.28 US. qt)

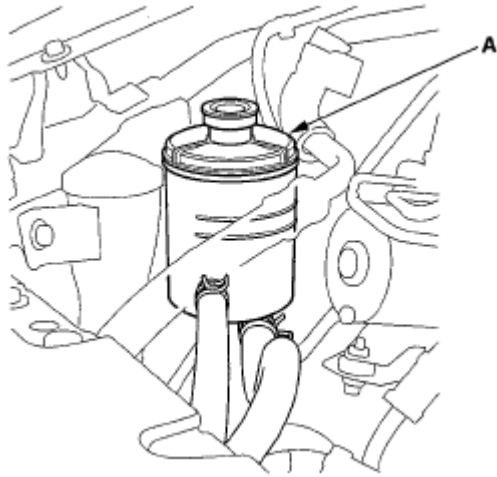


Fig. 11: Identifying Reservoir

Courtesy of AMERICAN HONDA MOTOR CO., INC.

1. Raise the reservoir, then disconnect the return hose (A) to drain the reservoir. Take care not to spill the fluid on the body and parts. Wipe off any spilled fluid at once.

NOTE: **Inspect the reservoir screen for any debris. If the reservoir screen is clogged, replace the reservoir.**

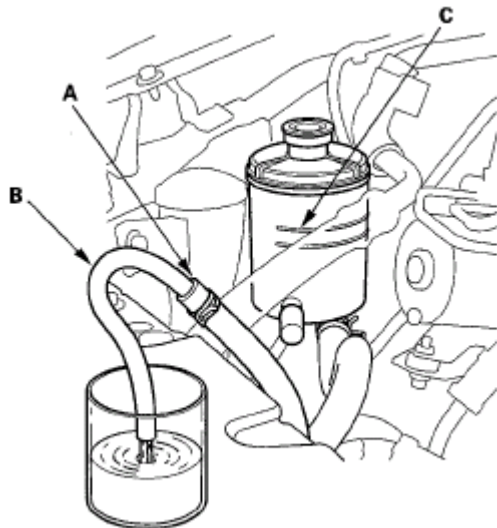


Fig. 12: Draining Fluid

Courtesy of AMERICAN HONDA MOTOR CO., INC.

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.

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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, then 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.

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.

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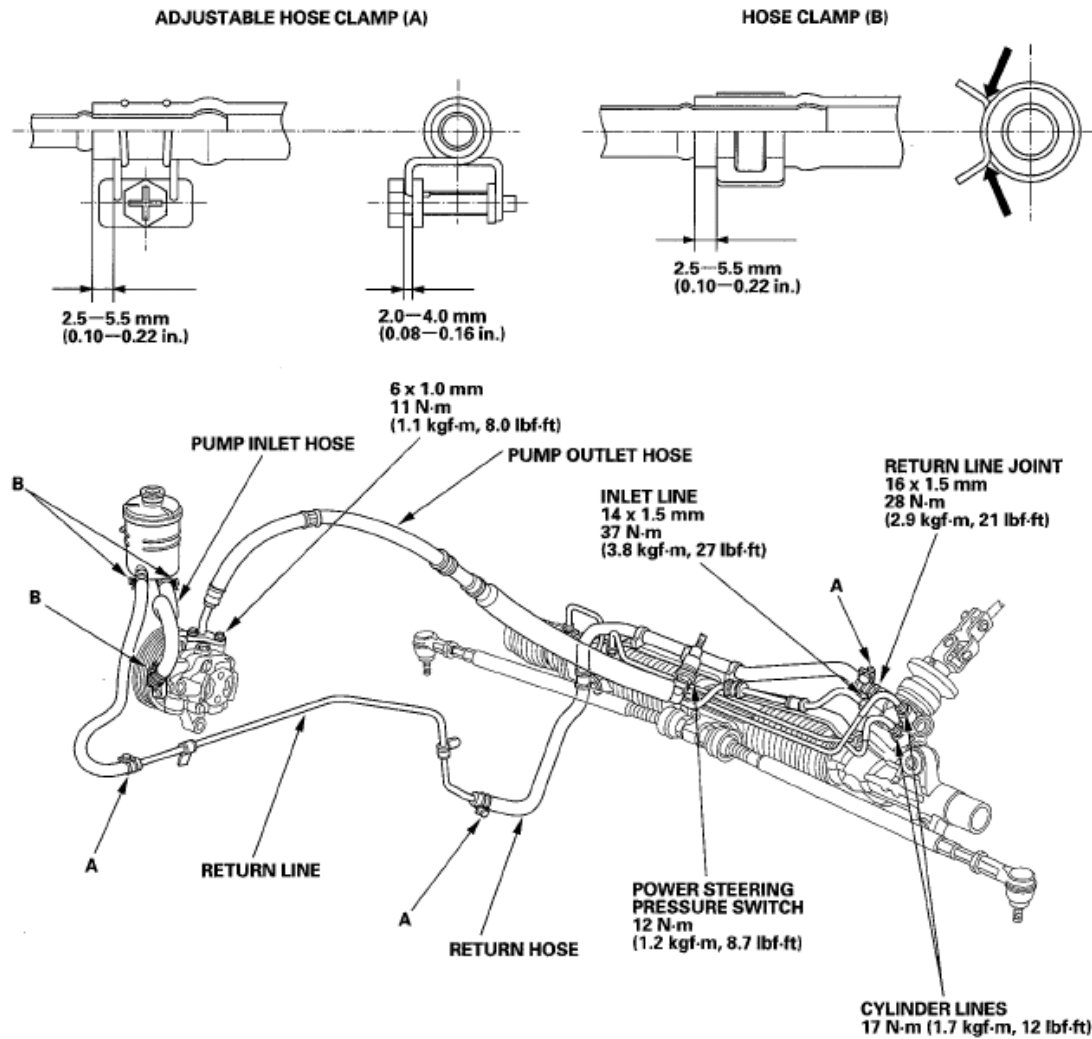


Fig. 13: Identifying Distance Between Adjustable Clamp And Hose End With Torque Specifications
Courtesy of AMERICAN HONDA MOTOR CO., INC.

PUMP REPLACEMENT

1. Place a suitable container under the vehicle.
2. Drain the power steering fluid from the reservoir (see **FLUID REPLACEMENT**).
3. Remove the drive belt (A) from the pump pulley (see **DRIVE BELT INSPECTION**).

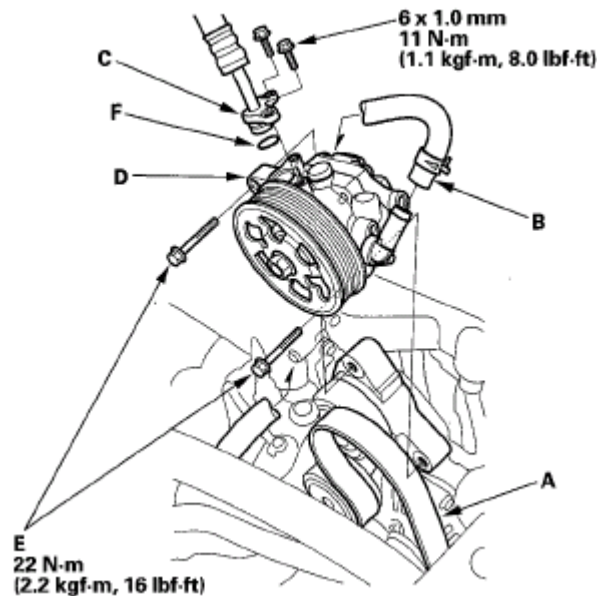


Fig. 14: Identifying Drive Belt, Pump Inlet Hose, Pump Outlet Hose And Pump With Torque Specifications

Courtesy of AMERICAN HONDA MOTOR CO., INC.

4. Cover the auto-tensioner, alternator, and 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 body or parts. Wipe off any spilled fluid at once. Do not turn the steering wheel with the pump removed.
5. Remove the pump mounting bolts (E).
6. Cover the opening of the pump with a piece of tape to prevent foreign material from entering the pump.
7. Connect the pump inlet hose and the pump outlet hose 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 securely.
9. Tighten the pump mounting bolts to the specified torque.
10. Install the drive belt (A).

Note these items during belt installation:

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

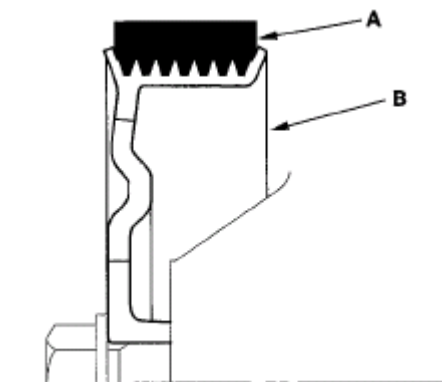


Fig. 15: Identifying Drive Belt And Pulley
Courtesy of AMERICAN HONDA MOTOR CO., INC.

11. Fill the reservoir to the upper level line (see **FLUID REPLACEMENT**).

PUMP OVERHAUL

EXPLODED VIEW

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

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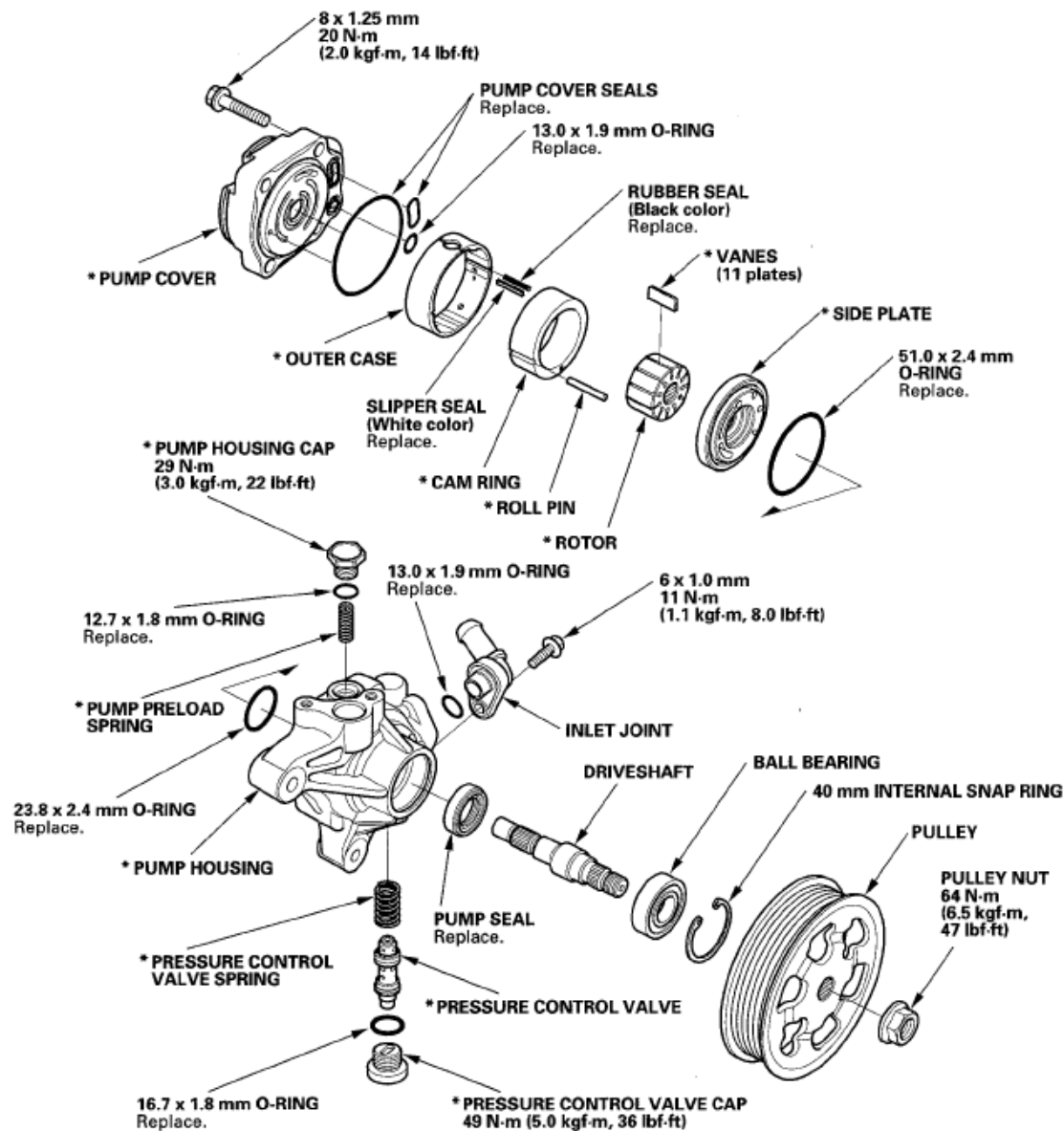


Fig. 16: Exploded View Of Pump With Torque Specifications
Courtesy of AMERICAN HONDA MOTOR CO., INC.

Special Tools Required

- Pulley holder 07ZAB-S5A0100
- Attachment, 32 x 35 mm 07746-0010100
- Driver 07749-0010000

Disassembly

NOTE: Refer to the EXPLODED VIEW as needed during the following procedure.

1. Drain the fluid from the power steering pump (see **FLUID REPLACEMENT**).
2. Remove the power steering pump (see **PUMP REPLACEMENT**).
3. Hold the power steering pump (A) in a vise with soft jaws (B), hold the pulley (C) with the pulley holder (D), and remove the pulley nut (E) and pulley. Be careful not to damage the pump housing with the jaws of the vise.

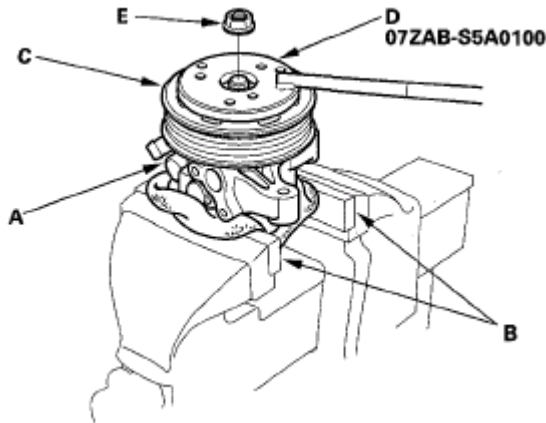


Fig. 17: Holding Power Steering Pump In Vise With Soft Jaws
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

4. Remove the inlet joint and O-ring.
5. Remove the pressure control valve cap, O-ring, pressure control valve, and valve spring.
6. Remove the pump housing cap, O-ring, and pump preload spring.
7. Remove the pump cover, O-ring, and pump cover seals.
8. Pull out the roll pin.
9. Remove the outer case, cam ring, rotor, vanes, and side plate.
10. Remove the rubber seal and slipper seal from the outer case.
11. Remove the O-rings from the bottom of the housing.
12. Remove the 40 mm internal snap ring, then remove the driveshaft by tapping the shaft end with a plastic hammer.
13. Remove the pump seal from the pump housing.

Inspection

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

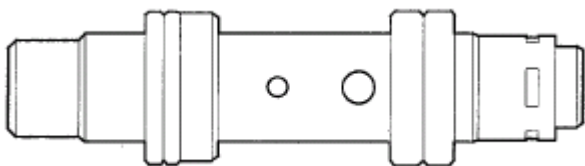
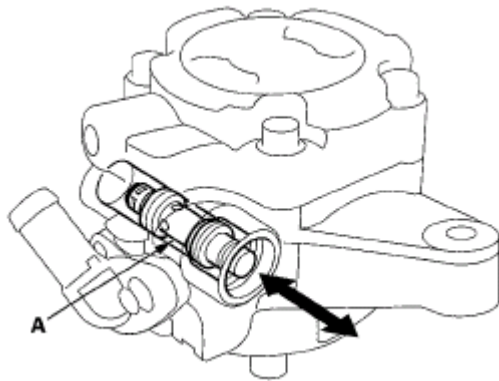


Fig. 18: Identifying Pressure Control Valve

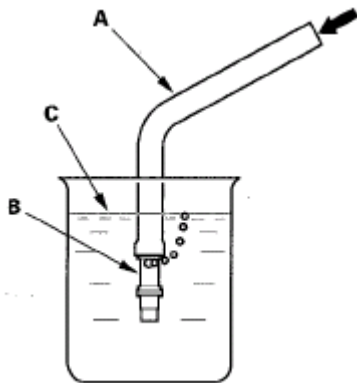
Courtesy of AMERICAN HONDA MOTOR CO., INC.

15. Inspect the bore of the pressure control valve on the pump housing for scratches and wear.
16. Slip the pressure control valve (A) back in the pump housing, and check that it moves in and out smoothly. If OK, go to step 17; if not, replace the pump as an assembly. The pressure control valve is not available separately.

**Fig. 19: Checking Pressure Control Valve**

Courtesy of AMERICAN HONDA MOTOR CO., INC.

17. 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 or solvent (C), and blow in the hose.
 - If air bubbles leak through the valve at less than 98 kPa (1.0 kgf/cm², 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.

**Fig. 20: Attaching Hose To End Of Pressure Control Valve**

Courtesy of AMERICAN HONDA MOTOR CO., INC.

18. 18. Inspect the ball bearing by rotating the outer race slowly. If you feel any play (axial or radial) or roughness, remove the faulty ball bearing (A), and install a new one (B).

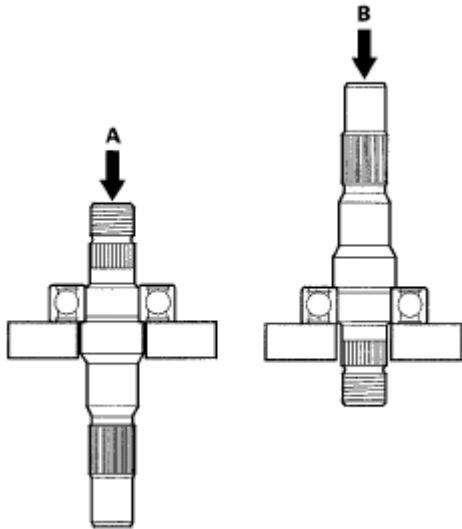


Fig. 21: Installing Ball Bearing

Courtesy of AMERICAN HONDA MOTOR CO., INC.

19. 19. Inspect each part shown with an asterisk in the Exploded View. If any of them are worn or damaged, replace the pump as an assembly.

Reassembly

20. 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 and the attachment until the seal is fully seated in the pump housing. Do not apply more than 1,370 N (140 kgf, 308 lbf) of pressure.

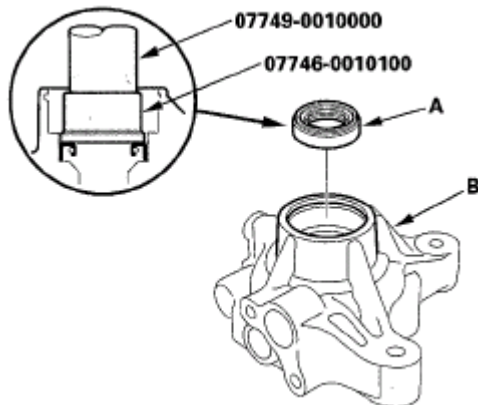


Fig. 22: Identifying Pump Seal And Pump Housing

Courtesy of AMERICAN HONDA MOTOR CO., INC.

21. Position the driveshaft (A) in the pump housing, then press it in with the appropriate size socket wrench (B) as shown.

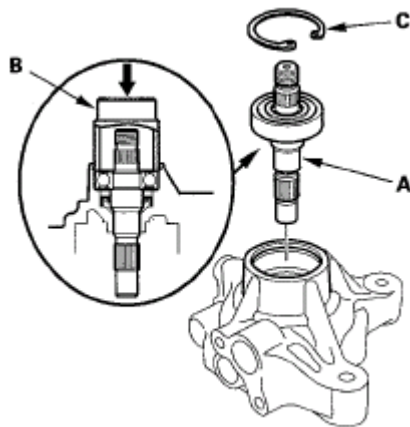


Fig. 23: Pressing Driveshaft With Size Socket Wrench
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

22. Install the 40 mm internal snap ring (C) with its radiused edge facing out.
23. Coat the new 23.8 mm O-ring (A) with power steering fluid, then position it on the bottom (B) of the pump housing.

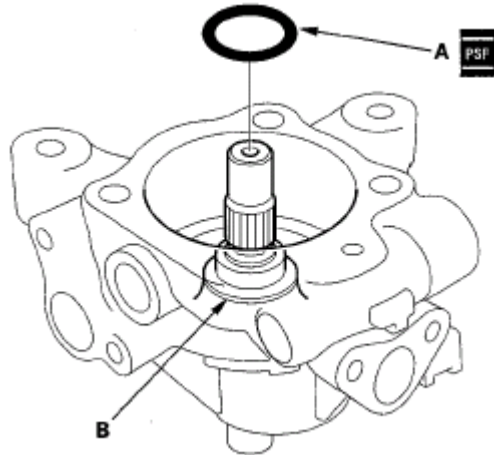


Fig. 24: Identifying O-Ring
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

24. Coat the new pump cover seals (A) and new 13.0 mm O-ring (B) with power steering fluid, then position them into the grooves on the pump cover (C).

NOTE: Be careful not to install the inlet joint O-ring because they are the same sizes.

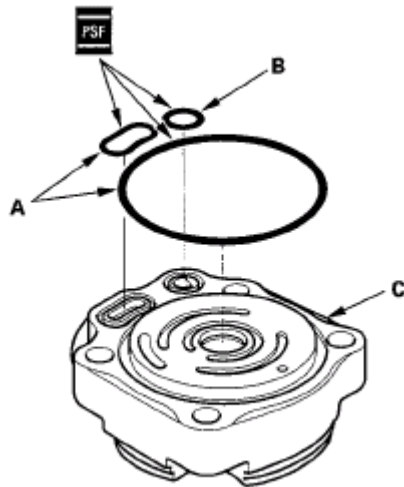


Fig. 25: Identifying Pump Cover Seals, O-Ring And Pump Cover
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

25. Install the outer case (A) by aligning the slot (B) inside the outer case with the pump cover roll pin hole (C). Be sure that the slit (D) on the outer case is in the direction shown.

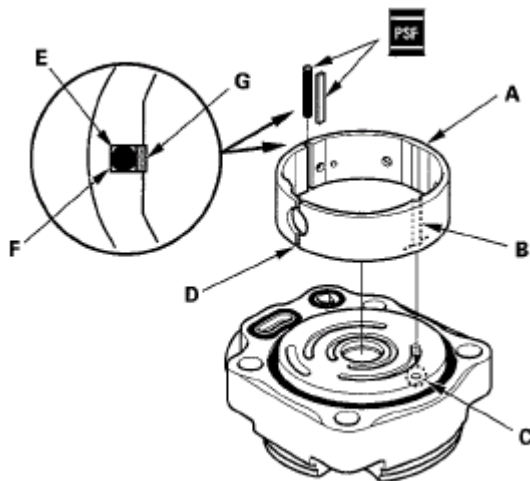


Fig. 26: Aligning Slot Inside Outer Case With Pump Cover Roll Pin Hole
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

26. Apply power steering fluid to the rubber seal (E) (black), and install it in the slot (F) of the outer case.
27. Apply power steering fluid to the slipper seal (G) (white), and install it on top of the rubber seal you just installed.
28. Install the cam ring (A) by aligning the slot (B) with the slot (C) in the outer case.

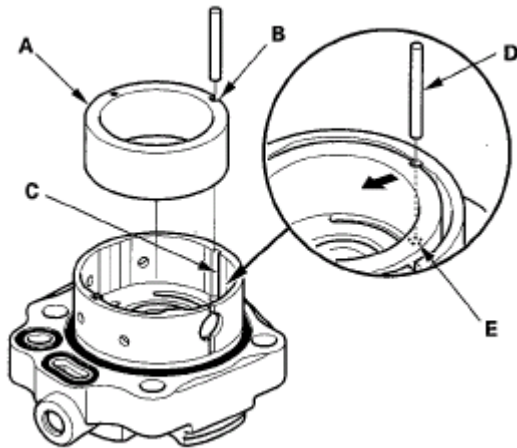


Fig. 27: Installing Cam Ring

Courtesy of AMERICAN HONDA MOTOR CO., INC.

29. Insert the roll pin (D) into the slots between the cam ring and outer case, then push the roll pin into the set hole (E).
30. Install the rotor (A) into the cam ring (B).

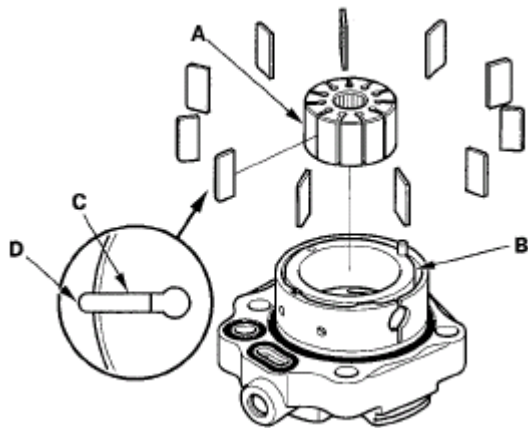


Fig. 28: Identifying Roll Pin, Rotor And Cam Ring

Courtesy of AMERICAN HONDA MOTOR CO., INC.

31. Set the 11 vanes (C) in the grooves in the rotor. Make sure that the round ends (D) of the vanes are in contact with the sliding surface of the cam ring.
32. Place the side plate (A) on the cam ring, and align the roll pin set hole (B) with the roll pin (C).

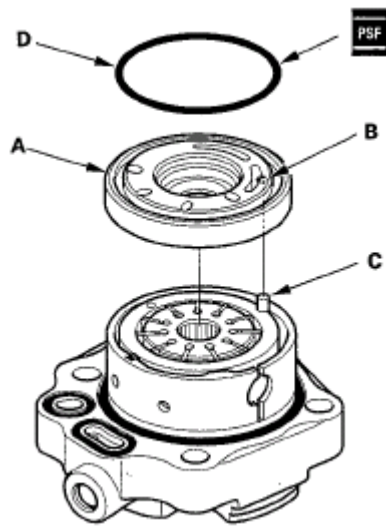


Fig. 29: Identifying Side Plate, Roll Pin Set Hole, Roll Pin And O-Ring
Courtesy of AMERICAN HONDA MOTOR CO., INC.

33. Coat the new O-ring (D) with power steering fluid, then position it into the groove on the side plate.
34. Install the pump housing (A) over the pump cover assembly (B).

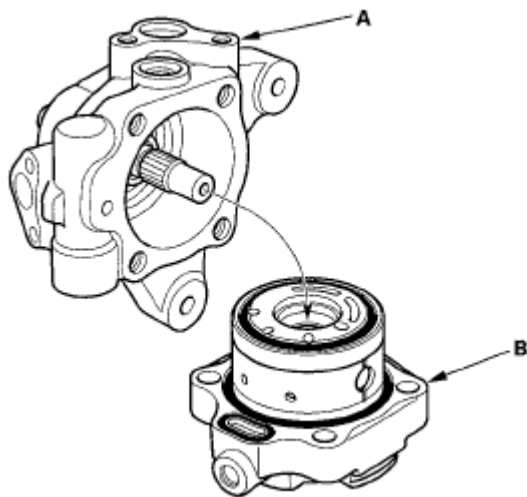


Fig. 30: Installing Pump Housing Over Pump Cover Assembly
Courtesy of AMERICAN HONDA MOTOR CO., INC.

35. Align the bolt holes in the pump cover (A) with the threaded holes in the pump housing. Install the flange bolts loosely first, then torque the flange bolts in a criss-cross pattern in two or more steps.

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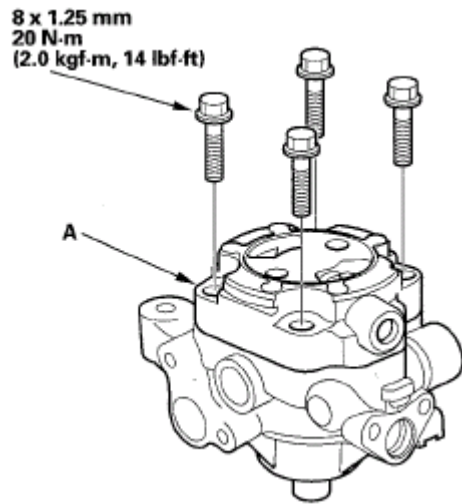


Fig. 31: Identifying Pump Cover Bolts With Torque Specification
Courtesy of AMERICAN HONDA MOTOR CO., INC.

36. 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.

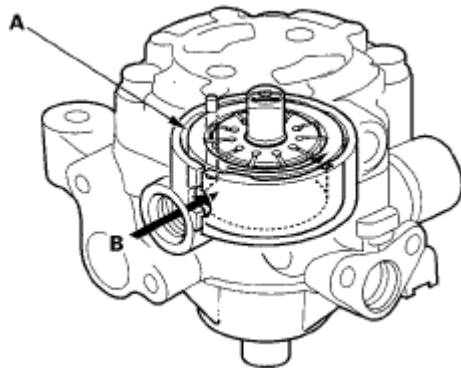


Fig. 32: Pushing In Cam Ring From Pump Housing Cap Hole
Courtesy of AMERICAN HONDA MOTOR CO., INC.

37. Install the pump preload spring (A) in the pump housing.

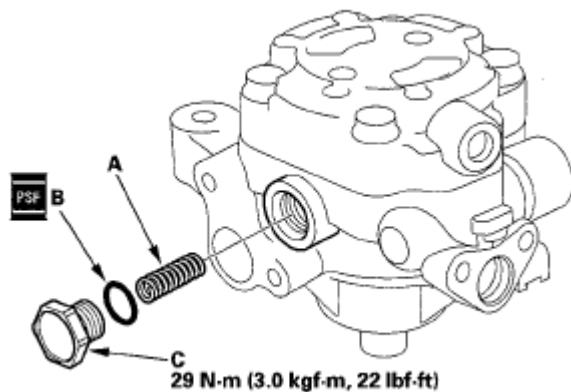


Fig. 33: Identifying Pump Preload Spring And Pump Housing Cap With Torque Specification
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

38. Coat the new 12.7 mm O-ring (B) with power steering fluid, and install it on the pump housing cap(C).
39. Install the pump housing cap on the pump housing, and tighten it to the specified torque.
40. Install the pressure control valve spring (A) in the pump housing.

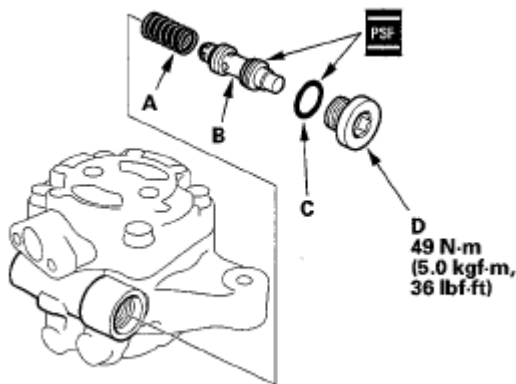


Fig. 34: Identifying Pressure Control Valve Spring, Pressure Control Valve And Pressure Control Valve Cap With Torque Specification
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

41. Coat the pressure control valve (B) with power steering fluid, and install it in the pump housing.
42. Coat the new 16.7 mm O-ring (C) with power steering fluid, and install it on the pressure control valve cap (D).
43. Install the pressure control valve cap on the pump housing. Tighten it to the specified torque.
44. Coat the new O-ring (A) with power steering fluid, and install it on the inlet joint (B).

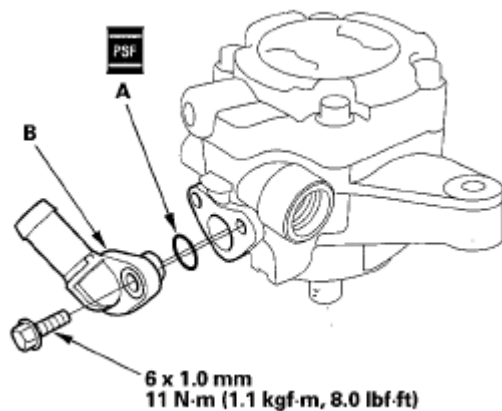


Fig. 35: Identifying O-Ring And Inlet Joint With Torque Specification
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

45. Install the inlet joint on the pump housing.
46. Install the pulley (A), then loosely install the pulley nut (B). Hold the power steering pump in a vise with soft jaws (C). Be careful not to damage the pump housing with the jaws of the vise.

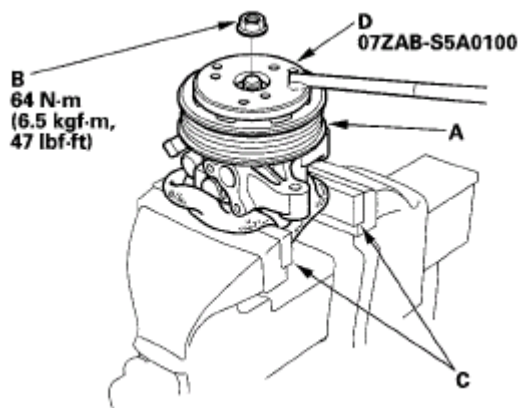


Fig. 36: Holding Pulley With Pulley Holder With Torque Specification
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

47. Hold the pulley with the pulley holder (D), and tighten the pulley nut to the specified torque.
48. Check that the 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 35. Turn the pump again by hand.

STEERING WHEEL REMOVAL

SRS components are located in this area. Review the SRS component locations (see **COMPONENT LOCATION INDEX**), and the precautions and procedures (see **PRECAUTIONS AND PROCEDURES**) before doing repairs or service.

1. Make sure you have the anti-theft code for the audio system.

2. Make sure the ignition switch is OFF, then disconnect the negative cable from the battery.
3. Align the front wheels straight ahead, then remove the driver's airbag from the steering wheel (see **DRIVER'S AIRBAG REPLACEMENT**).
4. Disconnect the horn switch connector (A), audio remote switch connector (B), and the cruise control set/decel, Resume/accel, Cancel switch connector (C).

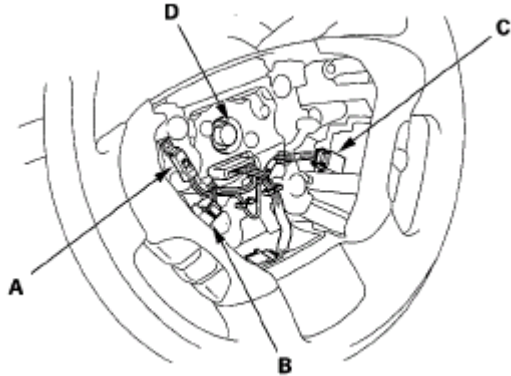


Fig. 37: Identifying Horn Switch Connector And Audio Remote Switch Connector
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

5. Loosen the steering wheel bolt (D).
6. 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.

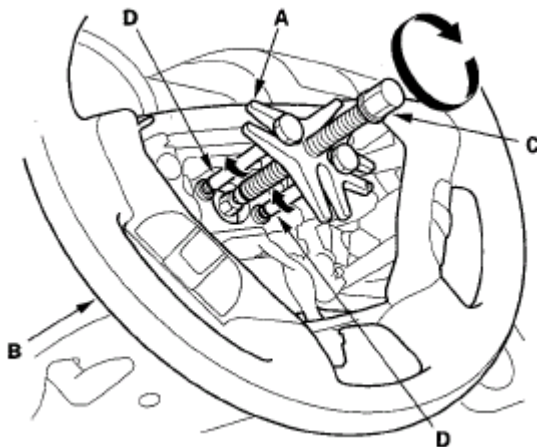


Fig. 38: Turning Pressure Bolt Of Steering Wheel Puller

Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

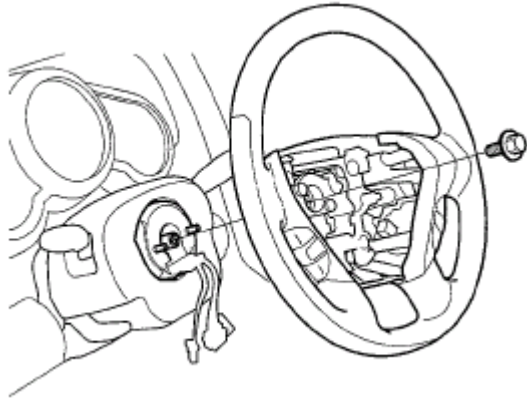


Fig. 39: Identifying Steering Wheel Bolt

Courtesy of AMERICAN HONDA MOTOR CO., INC.

STEERING WHEEL DISASSEMBLY/REASSEMBLY

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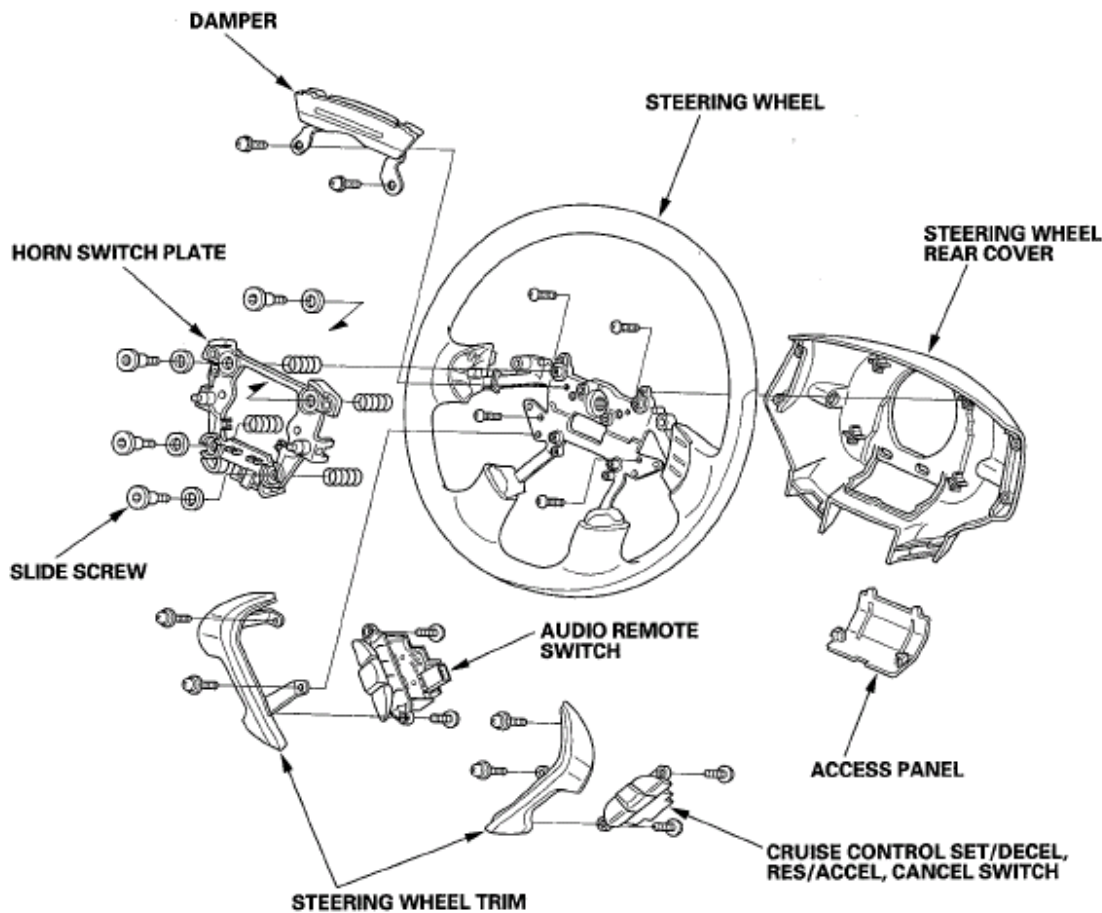


Fig. 40: Exploded View Of Steering Wheel
Courtesy of AMERICAN HONDA MOTOR CO., INC.

STEERING WHEEL INSTALLATION

1. Before installing the steering wheel, make sure the front wheels are aligned 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 two and a half turns. The arrow mark (B) on the cable reel label should point straight up.

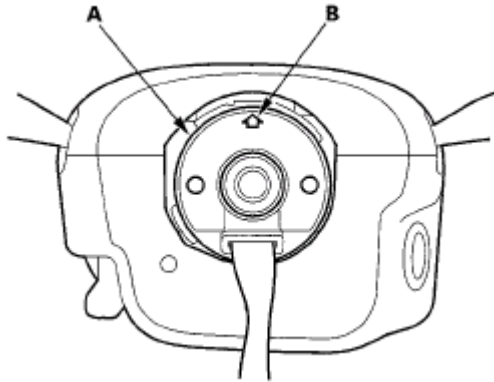


Fig. 41: Identifying Arrow Mark On Cable Reel Label
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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 cancelling sleeve. Do not tap on the steering wheel or steering column shaft when installing the steering wheel.

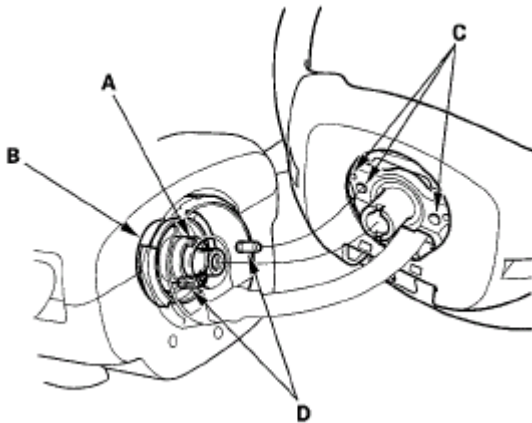


Fig. 42: Engaging Pins Of Cable Reel And Tabs Of Turn Signal Cancelling Sleeve
Courtesy of AMERICAN HONDA MOTOR CO., INC.

3. Install the steering wheel bolt (A), and tighten it to the specified torque. Connect the horn switch connector (B), audio remote switch connector (C), and Set/decel, Resume/accel, Cancel switch connector (D). Make sure the wire harness is routed and fastened properly.

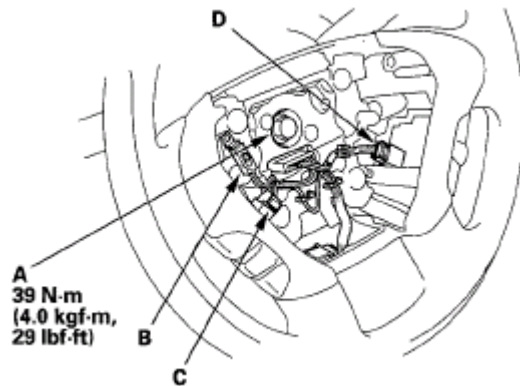


Fig. 43: Identifying Steering Wheel Bolt, Horn Switch Connector And Audio Remote Switch Connector With Torque Specification

Courtesy of AMERICAN HONDA MOTOR CO., INC.

4. Install the driver's airbag, and confirm that the system is operating properly (see **DRIVER'S AIRBAG REPLACEMENT**).
5. Reconnect the negative battery cable to the battery, and do these tasks:
 - Turn the ignition switch ON (II); the SRS indicator should come on for about 6 seconds and then go off.
 - Do the power window control unit reset procedure (see **RESETTING THE POWER WINDOW CONTROL UNIT**).
 - Enter the anti-theft code for the audio system.
 - Set the clock.
 - Make sure the horn and turn signal switches work properly.
 - Make sure the steering wheel switches work properly.
 - Make sure the steering wheel is centered.

STEERING COLUMN REMOVAL AND INSTALLATION

SRS components are located in this area. Review the SRS component locations (see **COMPONENT LOCATION INDEX**), and the precautions and procedures (see **PRECAUTIONS AND PROCEDURES**) before doing repairs or service.

REMOVAL

1. Make sure you have the anti-theft code for the audio system.
2. Make sure the ignition switch is OFF, then disconnect the negative cable from the battery.
3. Remove the driver's airbag assembly and the steering wheel (see **STEERING WHEEL REMOVAL**).
4. Remove the driver's dashboard lower cover (see **DRIVER'S DASHBOARD LOWER COVER REMOVAL/INSTALLATION**).
5. Remove the column covers (A).

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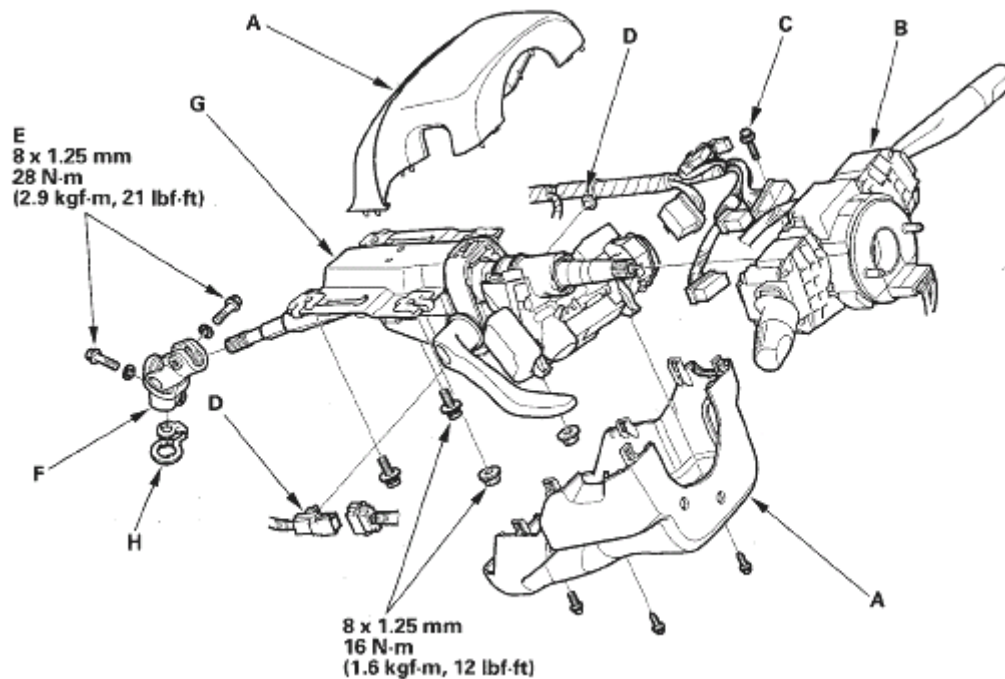


Fig. 44: Exploded View Of Steering Column With Torque Specifications
Courtesy of AMERICAN HONDA MOTOR CO., INC.

6. Disconnect the wire harness connectors from the combination switch assembly and cable reel (B).
7. Remove the combination switch assembly from the steering column shaft by removing the screw (C) on the top of the combination switch.
8. Disconnect the connectors from the ignition switch, and release the wire harness clips (D) from the steering column.
9. Remove the steering joint bolts (E), then disconnect the steering joint (F) from the pinion shaft and the steering column shaft.
10. Remove the steering column (G) by removing the attaching nuts and bolts.
11. Remove the center guide (H) (if equipped), and discard it. The center guide is for factory assembly only.

INSTALLATION

1. Install the steering column in the reverse order of removal, and note these items:
 - Take care not to let the sliding capsules fall out of position during column installation.
 - Make sure the wires are not caught or pinched by any parts.
2. Insert the upper end of the steering joint (A) onto the steering shaft (B) (line up the bolt hole (C) with the flat portion (D) on the shaft).

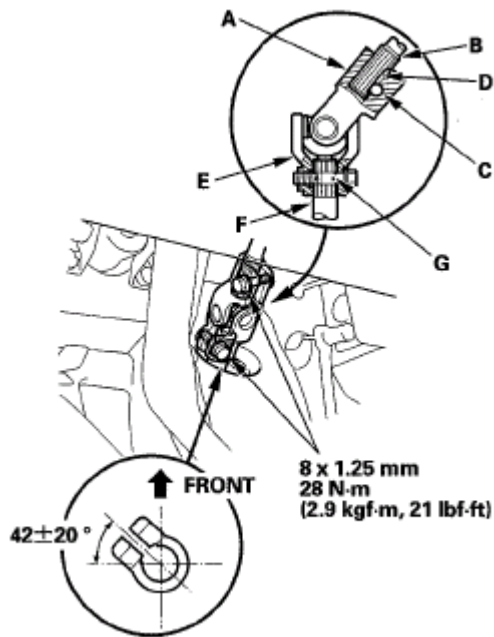


Fig. 45: Inserting Upper End Of Steering Joint Onto Steering Shaft With Torque Specification
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

3. Slip the lower end of the steering joint (E) onto the pinion shaft (F) (line up the bolt hole with the groove (G) around the shaft), and loosely install the lower joint bolt. Be sure that the lower joint bolt is securely in the groove of the pinion shaft.
4. Pull on the steering joint to make sure that the steering joint is fully seated, then install the upper joint bolt and tighten it to the specified torque.
5. Tighten the lower joint bolt to the specified torque.
6. Install the steering wheel (see **STEERING WHEEL INSTALLATION**).
7. Reconnect the battery negative cable to the battery, and do these tasks:
 - Turn the ignition switch ON (II); the SRS indicator should come on for about 6 seconds and then go off.
 - Do the power window control unit reset procedure (see **RESETTING THE POWER WINDOW CONTROL UNIT**).
 - Enter the anti-theft code for the audio system.
 - Set the clock.
 - Make sure the horn and turn signal switch work properly.
 - Make sure the steering wheel switches work properly.
 - Make sure the steering wheel is centered.

STEERING COLUMN INSPECTION

INSPECTION

2007 Honda Element EX

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- Check the steering column ball bearing (A) and the steering joint bearings (B) 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 (C) for distortion and breakage. If there is distortion or breakage, replace the steering column as an assembly.

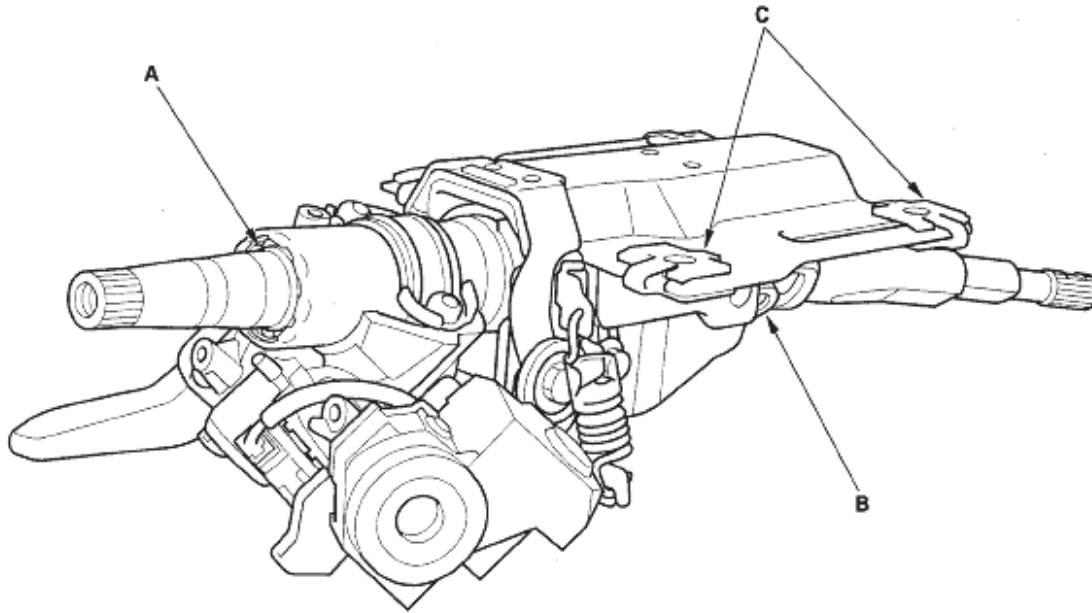


Fig. 46: Identifying Steering Column Ball Bearing, Sliding Capsules And Steering Joint Bearings
Courtesy of AMERICAN HONDA MOTOR CO., INC.

CHECK OF TILTING LOAD

1. Set the steering wheel in the straight-ahead driving position, and loosen the lock lever fully.
2. Attach the spring scale to the highest point of the steering wheel, and set the tilting position at the lowest.
3. Pull the spring scale straight up, and read the operation load during tilting.
4. Attach the spring scale to the lowest point of the steering wheel.
5. Pull the spring scale straight down, and read the operation load during tilting.

Tilting load (upward/downward):
Standard: 68 N (7.0 kgf, 15 lbf) or below

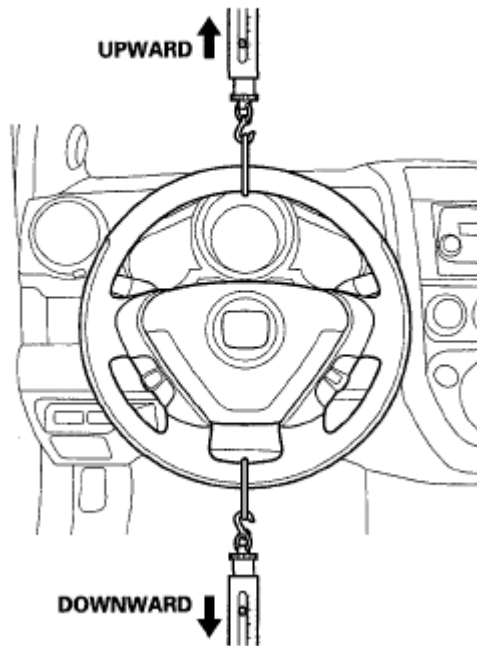


Fig. 47: Checking Tilting Load With Torque Specification
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

- If the measurement is more than the specification, adjust the lock lever preload if necessary.

LOCK LEVER PRELOAD INSPECTION/ADJUSTMENT

- Move the lock lever (A) from the loosened position to the locked position three to five times; then measure the lock lever preload 10 mm (0.39 in.) from the end of the lock lever.

Preload: 70–90 N (7–9 kgf, 15–20 lbf)

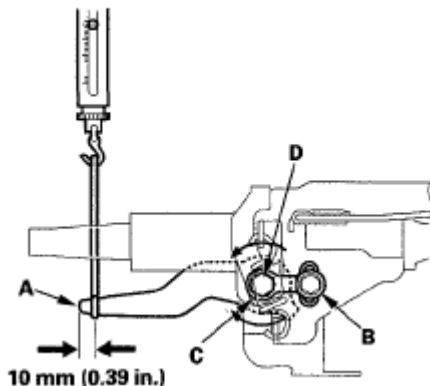


Fig. 48: Checking Lock Lever Preload With Torque Specification
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

2. If the measurement is out of the specification, adjust the preload using the following procedures.
 - Loosen the lock lever, and set the steering column to the neutral position.
 - Remove the 6 mm lock bolt (B), and remove the stop (C). Be careful not to loosen the lock lever when installing the stop or tightening the 6 mm lock bolt.
 - Adjust the preload by turning the tilt lock bolt (D) left or right.
 - Pull up the lock lever to the uppermost position, and install the stop. Check the preload again. If the measurement is still out of specification, repeat the above procedures to adjust.

STEERING LOCK REPLACEMENT

1. Remove the steering column (see **STEERING COLUMN REMOVAL AND INSTALLATION**).
2. Center-punch each of the two shear bolts, and drill their heads off with a 5 mm (3/16 in.) drill bit. Be careful not to damage the switch body and steering column when removing the shear bolts.

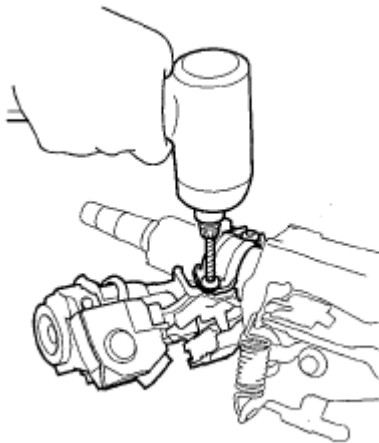


Fig. 49: Drilling Shear Bolts

Courtesy of AMERICAN HONDA MOTOR CO., INC.

3. Remove the shear bolts from the switch body.
4. Install the switch body without the key inserted.
5. Loosely tighten the new shear bolts.
6. Insert the ignition key, and check for proper operation of the steering wheel lock and that the ignition key turns freely.
7. Tighten the shear bolts (A) until the hex heads (B) twist off.

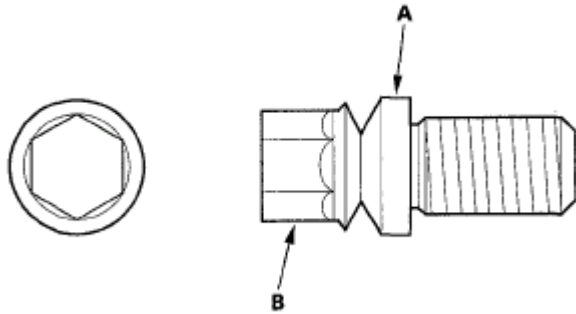


Fig. 50: Identifying Shear Bolt

Courtesy of AMERICAN HONDA MOTOR CO., INC.

8. Register the immobilizer control unit-receiver (see **IMMOBILIZER CONTROL UNIT-RECEIVER REPLACEMENT**), and make sure the immobilizer system works properly.

RACK GUIDE ADJUSTMENT

Special Tools Required

Locknut wrench, 40 mm 07MAA-SL00100 or 07916-SA50001

1. Set the 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).

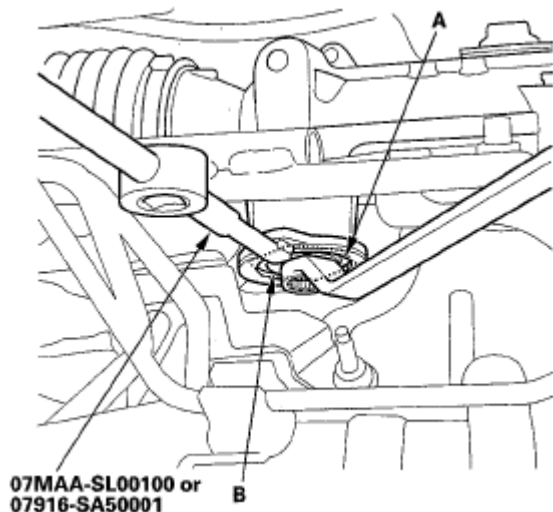


Fig. 51: Identifying Rack Guide Screw Locknut And Rack Guide Screw

Courtesy of AMERICAN HONDA MOTOR CO., INC.

3. Remove the old sealant from 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 in the steering gearbox.

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

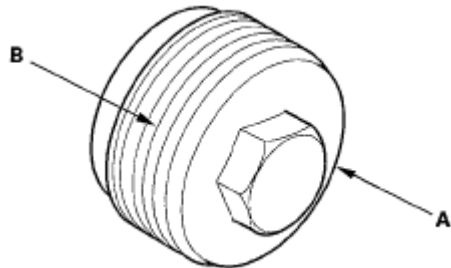


Fig. 52: Identifying Rack Guide Screw And Threads
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

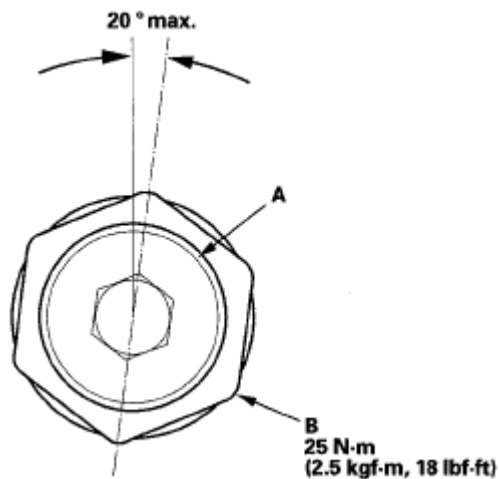


Fig. 53: Identifying Rack Guide Screw Tightening Angle With Torque Specification
Courtesy of AMERICAN HONDA MOTOR CO., INC.

5. Retighten the rack guide screw to 6 N.m (0.6 kgf.m, 4 lbf.ft), then back it off to the specified angle.

Specified return angle: 20 ° max.

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), continue to hold the rack guide screw stationary and tighten the locknut an additional 30° with the locknut wrench.
8. Check for unusual steering effort through the complete turning range.
9. Check the steering wheel rotational play and the power assist (see **POWER ASSIST CHECK**).

STEERING GEARBOX REMOVAL

Special Tools Required

- Ball joint thread protector, 12 mm 07AAF-SDAA100
- Ball joint remover, 28 mm 07MAC-SL0A202

Note these items during removal:

- Using solvent and a brush, wash any oil and dirt off the valve body unit, its lines, and the end of the gearbox. Blow dry with compressed air.
 - Be sure to remove the steering wheel before disconnecting the steering joint. Damage to the cable reel can occur.
1. Drain the power steering fluid (see **FLUID REPLACEMENT**).
 2. Make sure you have the anti-theft code for the audio system.
 3. Make sure the ignition switch is OFF, then disconnect the negative cable from the battery.
 4. Raise the front of vehicle, and support it with safety stands in the proper locations (see **LIFT AND SUPPORT POINTS**).
 5. Remove the front wheels.
 6. Remove the steering wheel (see **STEERING WHEEL REMOVAL**).
 7. Remove the driver's dashboard lower cover (see **DRIVER'S DASHBOARD LOWER COVER REMOVAL/INSTALLATION**).
 8. Remove the steering joint bolts, and disconnect the steering joint by moving the steering joint (A) toward the column.

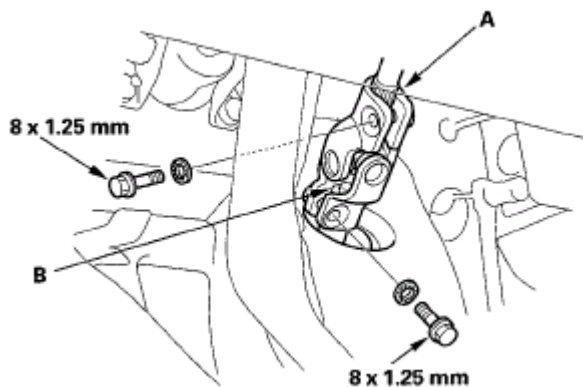


Fig. 54: Identifying Steering Joint

Courtesy of AMERICAN HONDA MOTOR CO., INC.

9. Remove the center guide from the top of the pinion shaft (B) (if equipped), and discard it.
10. Remove the cotter pin (A) from the tie-rod ball joint nut (B), and loosen the nut.

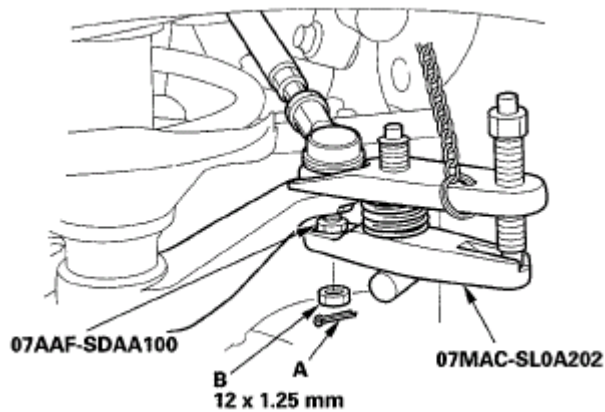


Fig. 55: Removing Cotter Pin From Tie-Rod Ball Joint Nut
Courtesy of AMERICAN HONDA MOTOR CO., INC.

11. Separate the tie-rod ball joint and damper steering arm using the ball joint thread protector and ball joint remover (see **BALL JOINT REMOVAL**).
12. Remove the P/S heat shield (A).

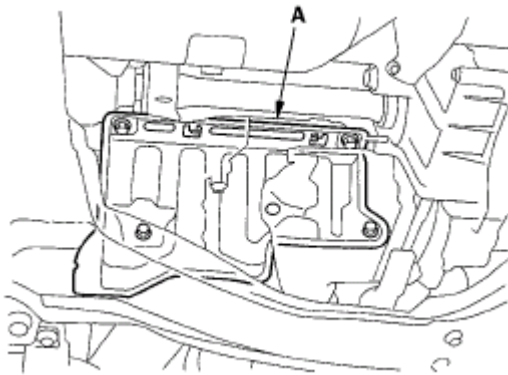


Fig. 56: Removing P/S Heat Shield
Courtesy of AMERICAN HONDA MOTOR CO., INC.

13. Remove the engine wire harness clamp and clip (A) from the two mounting brackets.

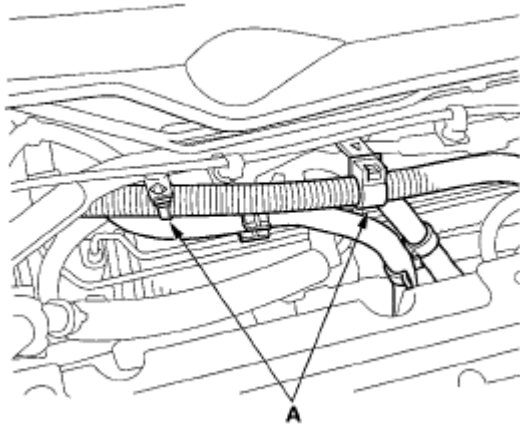


Fig. 57: Removing Engine Wire Harness Clamp And Clip From Two Mounting Brackets
Courtesy of AMERICAN HONDA MOTOR CO., INC.

14. Loosen the adjustable hose clamp (A) and disconnect the return hose (B).

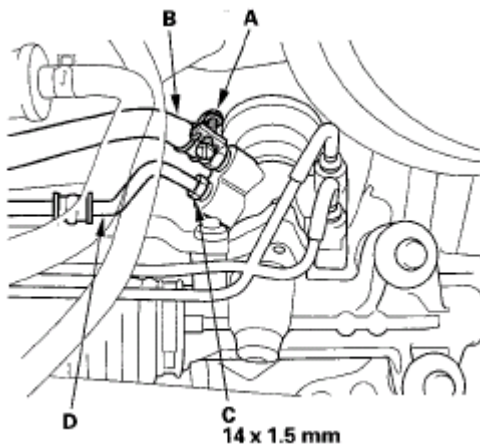


Fig. 58: Disconnecting Return Hose
Courtesy of AMERICAN HONDA MOTOR CO., INC.

15. Loosen the 14 mm flare nut (C), and disconnect the inlet line (D).
16. Open the hose holders (A) on the return hose, and remove the return hose clamp bolt (B).

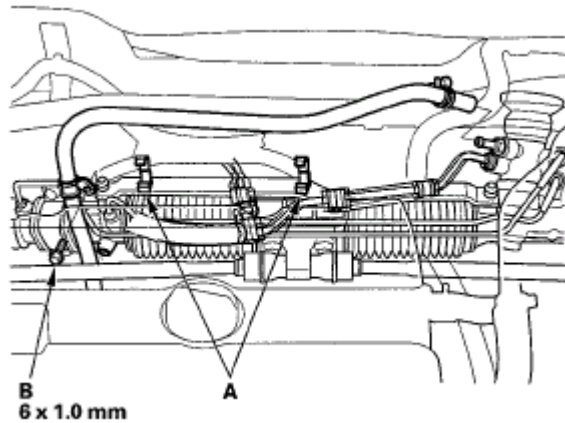


Fig. 59: Removing Return Hose Clamp Bolt
Courtesy of AMERICAN HONDA MOTOR CO., INC.

17. Disconnect the power steering pressure switch connector (A).

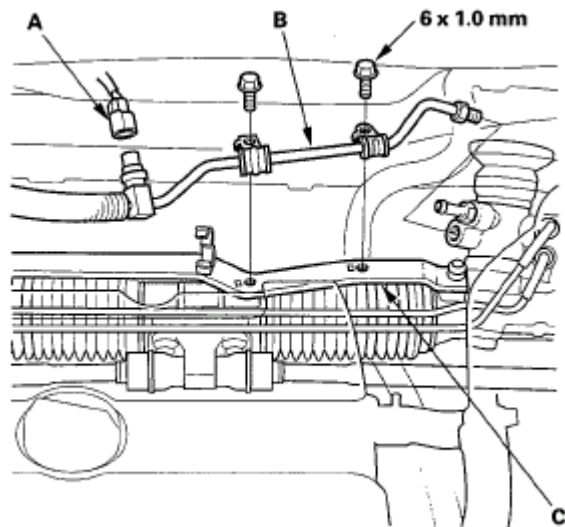


Fig. 60: Disconnecting Power Steering Pressure Switch Connector
Courtesy of AMERICAN HONDA MOTOR CO., INC.

18. Remove the inlet line (B) on the P/S line mounting bracket (C), and move it aside.
19. Remove the body stiffener (A).

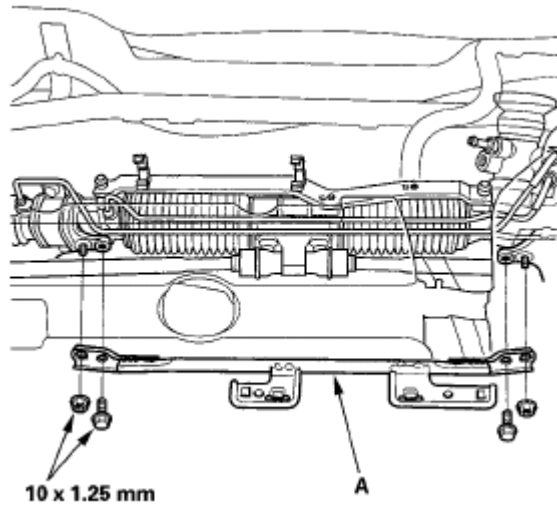


Fig. 61: Removing Body Stiffener

Courtesy of AMERICAN HONDA MOTOR CO., INC.

20. Remove the two 10 mm flange bolts (A) and washers (B) from the left side of gearbox.

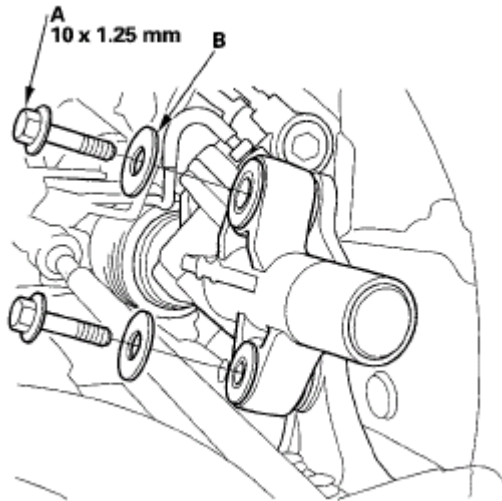


Fig. 62: Removing Flange Bolts And Washers From Left Side Of Gearbox

Courtesy of AMERICAN HONDA MOTOR CO., INC.

21. Remove the 10 mm flange bolt (A) and nut (B) from the right side of gearbox, and remove the mounting bracket (C).

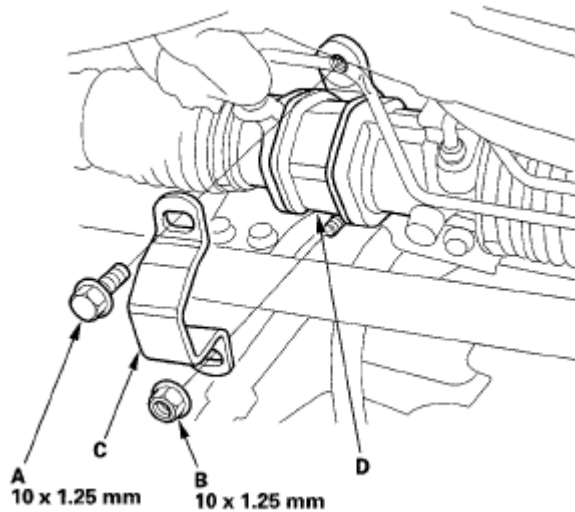


Fig. 63: Removing 10 Mm Flange Bolt And Nut From Right Side Of Gearbox
Courtesy of AMERICAN HONDA MOTOR CO., INC.

22. Lower the steering gearbox, and rotate it so the pinion shaft points upward, and remove the mounting cushion (D).
23. Remove the pinion shaft grommet (A) from the top of the valve body unit.

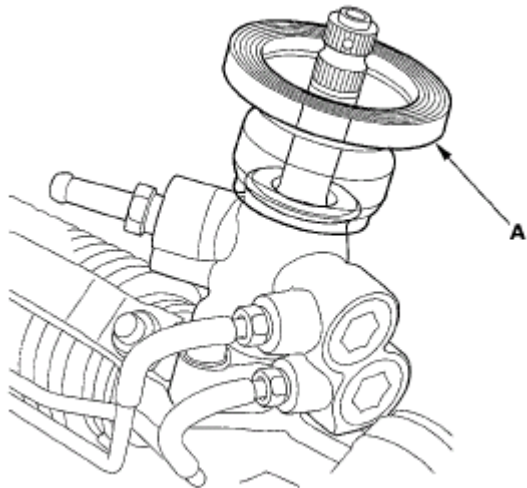


Fig. 64: Removing Pinion Shaft Grommet From Top Of Valve Body Unit
Courtesy of AMERICAN HONDA MOTOR CO., INC.

24. Carefully move the steering gearbox and tie-rod as an assembly toward the driver's side until the pinion shaft (A) clears the wheel well opening (B) on the frame.

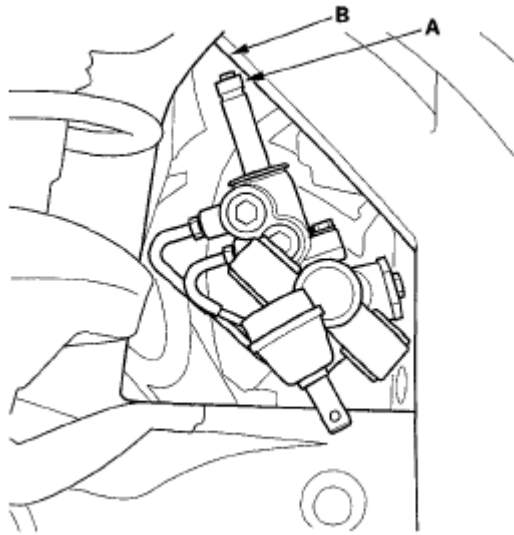


Fig. 65: Identifying Pinion Shaft And Wheel Well Opening On Frame
Courtesy of AMERICAN HONDA MOTOR CO., INC.

25. Remove the steering gearbox (A) through the wheel well opening on the driver's side. Be careful not to damage the hoses, lines, and wire harnesses.

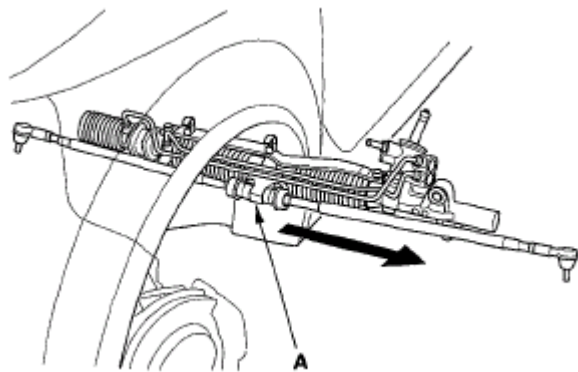


Fig. 66: Removing Steering Gearbox Through Wheel Well Opening On Driver's Side
Courtesy of AMERICAN HONDA MOTOR CO., INC.

26. Remove the P/S line mounting bracket (A).

2007 Honda Element EX

2007-2008 STEERING Steering - Element

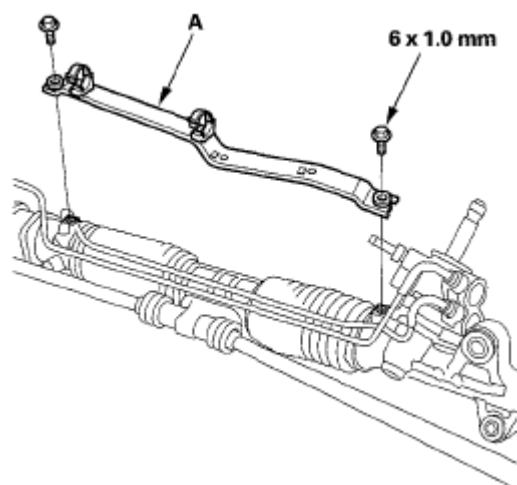


Fig. 67: Removing P/S Line Mounting Bracket
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

STEERING GEARBOX OVERHAUL

EXPLODED VIEW

2007 Honda Element EX

2007-2008 STEERING Steering - Element

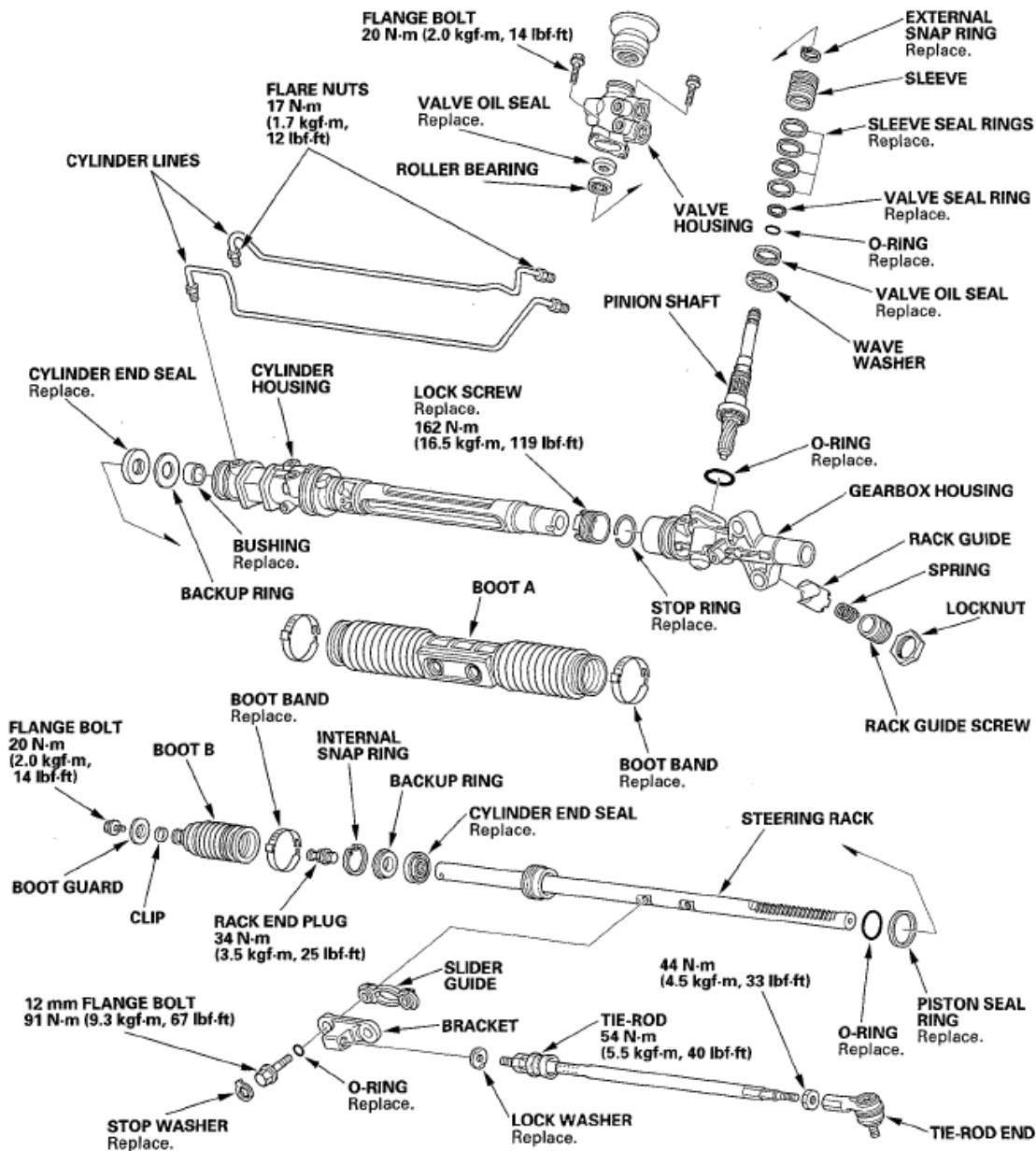


Fig. 68: Exploded View Of Steering Gearbox Overhaul With Torque Specifications
Courtesy of AMERICAN HONDA MOTOR CO., INC.

Special Tools Required

- Pilot collar 07GAF-PH70100
- Driver handle 07NAD-SR30101
- Cylinder end seal remover attachment 07NAD-SR30200 or 07NAD-SR3020A
- Valve seal ring sizing tool 07NAG-SR30900 or 07NAG-SR3090A
- Sleeve seal ring guide 07YAG-S2X0100
- Locknut wrench 07ZAA-S5A0100

- Driver, 27 mm 07ZAF-S5A0100
- Sleeve seal ring sizing tool, 36 mm 07ZAG-S5A0100
- Valve seal ring guide 07ZAG-S5A0200
- Piston seal ring guide, 42 mm 07ZAG-S7A0100
- Piston seal ring sizing tool, 42 mm 07ZAG-S7A0200
- Attachment, 32 x 35 mm 07746-0010100
- Driver 07749-0010000
- Cylinder end seal slider, 23 mm 07974-6890801 or 07974-689080A
- Pincers, Oetiker 1098, or equivalent, commercially available

NOTE: Refer to the **EXPLODED VIEW** as needed during this procedure.

Removal

1. Remove the steering gearbox (see **STEERING GEARBOX REMOVAL**).

Disassembly

2. Remove cylinder lines (A) and return line joint (B) from the gearbox.

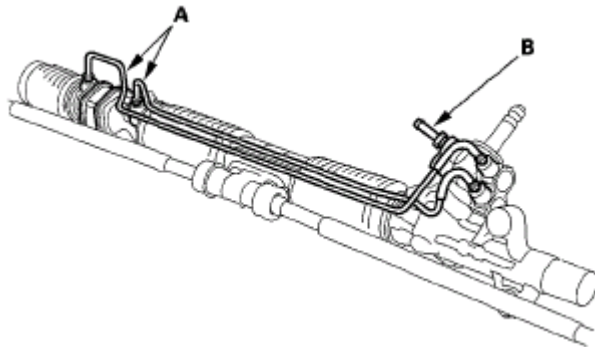


Fig. 69: Removing Cylinder Lines And Return Line Joint From Gearbox
Courtesy of AMERICAN HONDA MOTOR CO., INC.

3. Drain the fluid from the cylinder fittings by slowly moving the steering rack back and forth.
4. Unbend the lock washers (A).

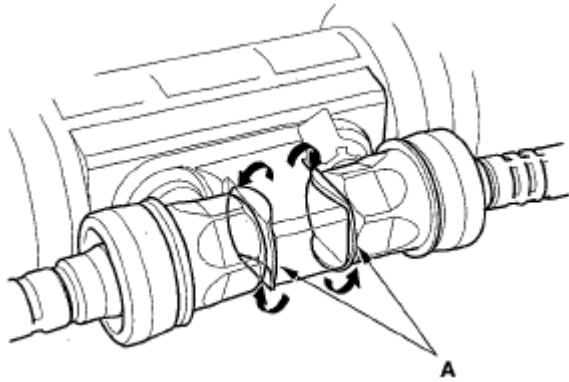


Fig. 70: Identifying Lock Washers
Courtesy of AMERICAN HONDA MOTOR CO., INC.

5. Hold the bracket (A) with a wrench, and unscrew both tie-rods (B) with a wrench. Remove the lock washers.

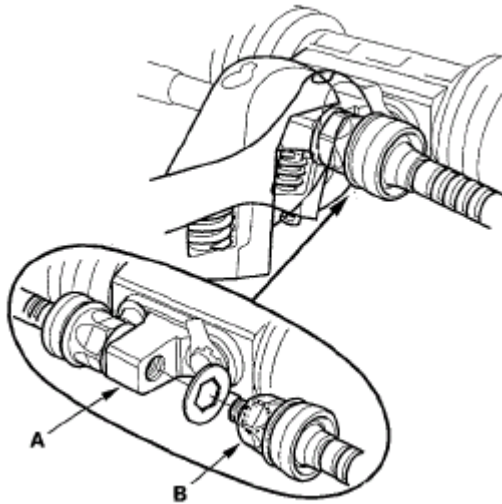


Fig. 71: Identifying Bracket And Tie-Rods
Courtesy of AMERICAN HONDA MOTOR CO., INC.

6. Remove the stop washer (A), the 12 mm flange bolts (B), O-rings (C), and bracket (D) from the steering gearbox.

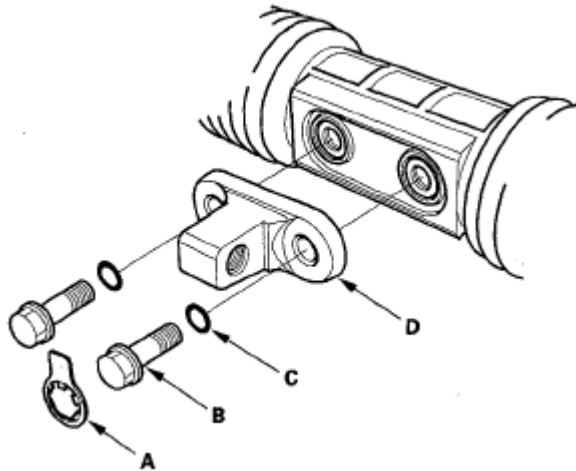


Fig. 72: Removing Stop Washer Flange Bolts, O-Rings And Bracket From Steering Gearbox
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

7. Remove the boot guard (A) by removing the 8 mm flange bolt (C) on the rack end.

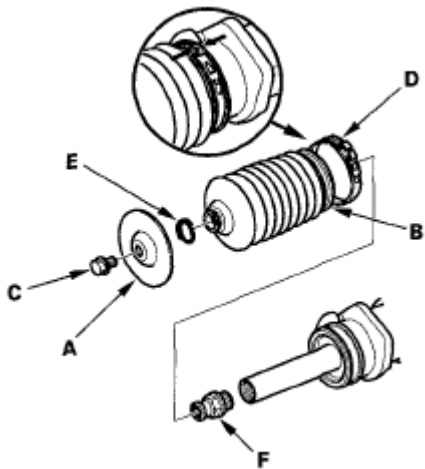


Fig. 73: Removing 8 Mm Flange Bolt On Rack End
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

8. Remove the boot band (D) and clip (E). Pull the boot B away from the end of the steering gearbox. Remove the rack end plug (F).
9. Loosen the locknut (A), then remove the rack guide screw (B), spring (C), and rack guide (D) from the steering gearbox.

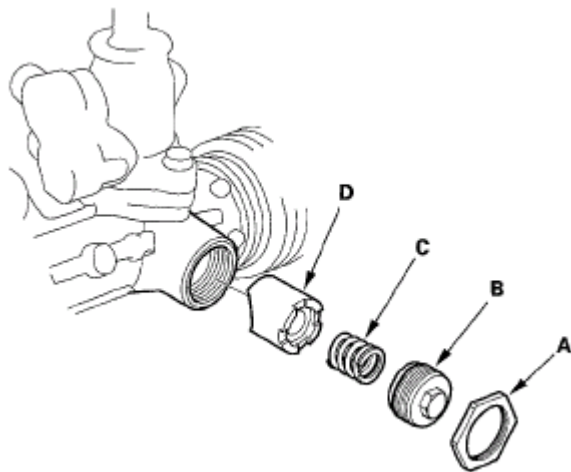


Fig. 74: Removing Rack Guide Screw, Spring, And Rack Guide From Steering Gearbox
Courtesy of AMERICAN HONDA MOTOR CO., INC.

10. Remove the internal snap ring (A) and backup ring (B) from the cylinder housing.

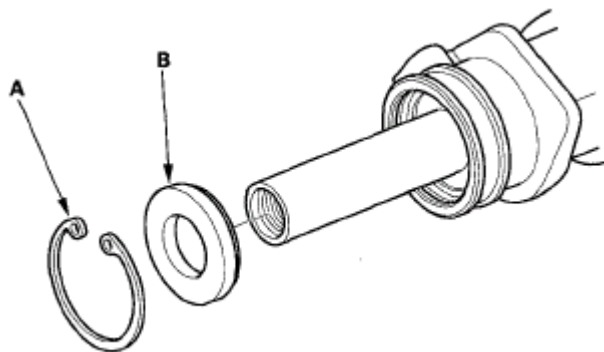


Fig. 75: Removing Internal Snap Ring And Backup Ring From Cylinder Housing
Courtesy of AMERICAN HONDA MOTOR CO., INC.

11. Remove the two flange bolts, then remove the valve body unit (A) from the gearbox housing (B). Remove the O-ring (C).

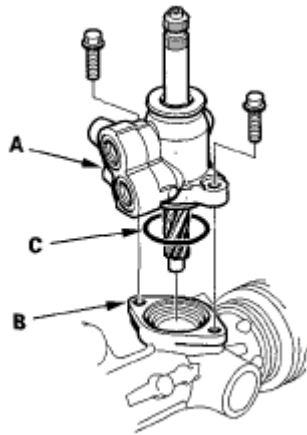


Fig. 76: Removing Valve Body Unit From Gearbox Housing
Courtesy of AMERICAN HONDA MOTOR CO., INC.

12. Remove the two boot bands (B) from boot A. Compress boot A by hand, and apply vinyl tape (C) so the boots stay collapsed and pulled back.

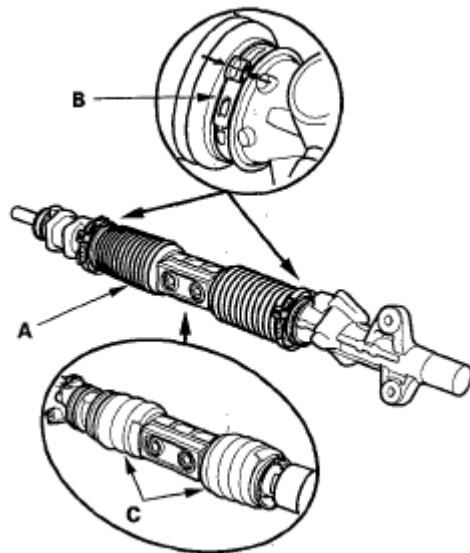


Fig. 77: Removing Boot Bands From Boot
Courtesy of AMERICAN HONDA MOTOR CO., INC.

13. Hold the gearbox housing using a C-clamp (commercially available) (A) and the wooden blocks (B) as shown. Do not clamp the cylinder part of the housing or gearbox housing in the vise.

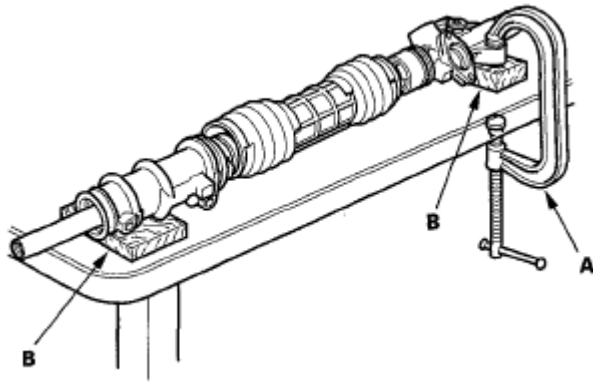


Fig. 78: Holding Gearbox Housing Using C-Clamp
Courtesy of AMERICAN HONDA MOTOR CO., INC.

14. Install the locknut wrench (A) on the lock screw (B), then loosen and remove the lock screw from inside of the gearbox housing (C).

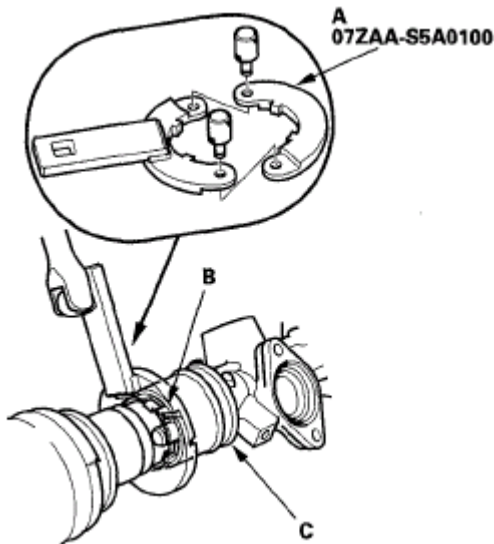


Fig. 79: Installing Locknut Wrench On Lock Screw
Courtesy of AMERICAN HONDA MOTOR CO., INC.

15. Remove the locknut wrench.
16. Pull on the cylinder to remove it from the gearbox housing. Remove boot A and the slider guide (B) from the cylinder.

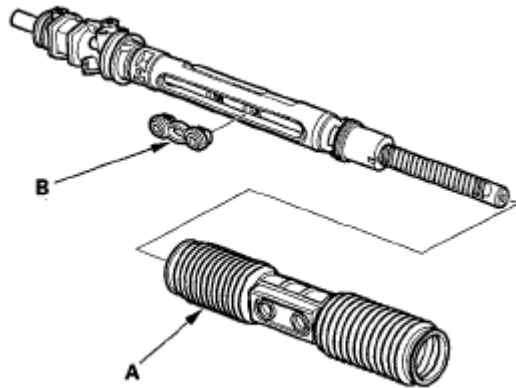


Fig. 80: Removing Boot And Slider Guide From Cylinder
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

17. Check the slider guide for damage and cracks. Use vernier calipers to measure the thickness of the slider guide. If the thickness is less than the service limit (A), replace the slider guide.

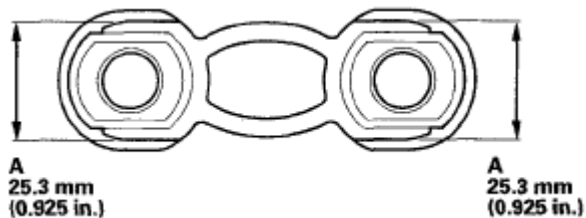


Fig. 81: Identifying Slider Guide Thickness
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

18. Remove and discard the stop ring (A) on the cylinder by expanding it with snap ring pliers. Remove and discard the lock screw (B).

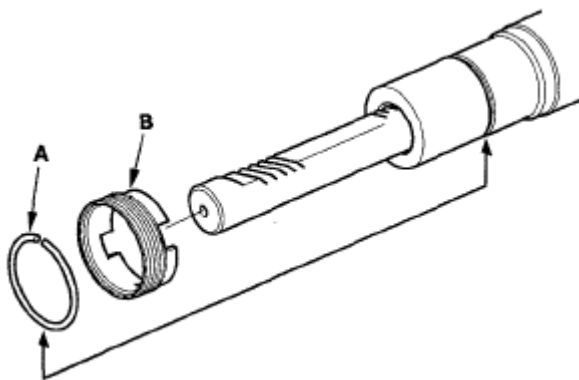


Fig. 82: Removing Stop Ring On Cylinder
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

19. Set the cylinder housing (A) in a press so the cylinder side points downward, then press the cylinder end seal (B) and steering rack (C) out of the cylinder. Hold the rack to keep it from falling when pressed clear.

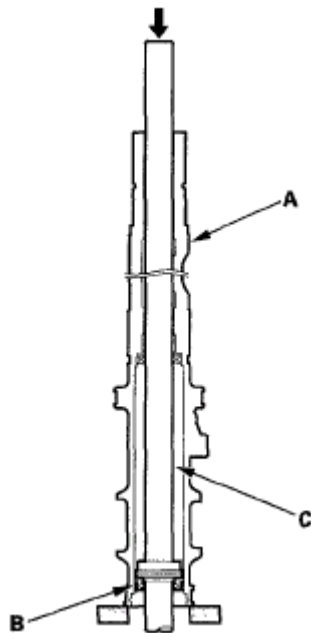


Fig. 83: Setting Cylinder Housing In Press

Courtesy of AMERICAN HONDA MOTOR CO., INC.

20. Remove the cylinder end seal from the steering rack.
21. Insert a driver handle (A), on the cylinder end seal remover attachment (B) into the cylinder. Make sure the cylinder end seal remover attachment is securely positioned on the bushing edges (C).

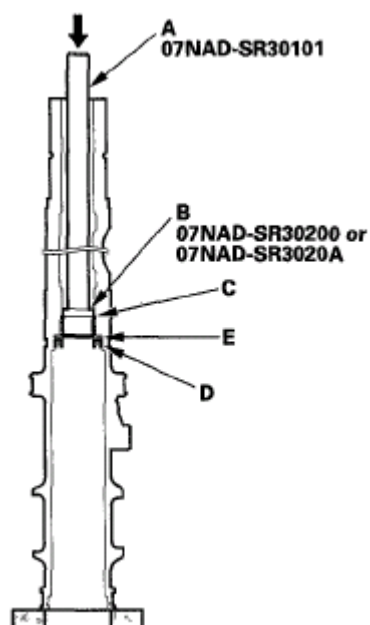


Fig. 84: Inserting Driver Handle On Cylinder End Seal Remover Attachment Into Cylinder

Courtesy of AMERICAN HONDA MOTOR CO., INC.

22. Place the cylinder in a press, then remove the cylinder end seal (D), backup ring (E), and bushing from the cylinder by pressing on the cylinder end seal remover attachment.

Note the items when pressing the 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 cylinder end seal.
 - Use a press to remove the cylinder end seal. Do not try to remove the seal by striking the tool; striking the tool would break the cylinder end seal, and the seal would remain in the cylinder.
23. 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.

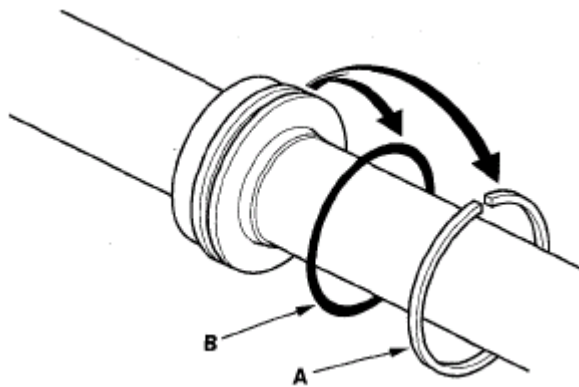


Fig. 85: Identifying Piston Seal Ring And O-Ring
Courtesy of AMERICAN HONDA MOTOR CO., INC.

24. Before removing the valve housing (A), apply vinyl tape (B) to the splines on the pinion shaft.

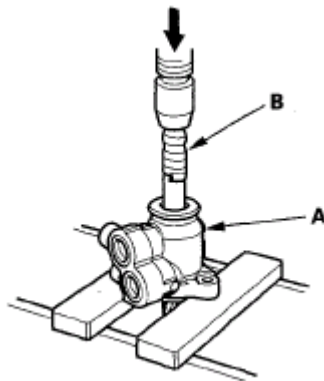


Fig. 86: Applying Vinyl Tape To Splines On Pinion Shaft
Courtesy of AMERICAN HONDA MOTOR CO., INC.

25. Separate the valve housing from the pinion shaft/valve using a press.
26. 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.

NOTE: There may be sliding marks from the seal ring on the wall of the valve housing. Replace the valve housing only if the wall is stepped.



Fig. 87: Checking Inner Wall Of Valve Housing Where Seal Ring Slides
Courtesy of AMERICAN HONDA MOTOR CO., INC.

27. 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.

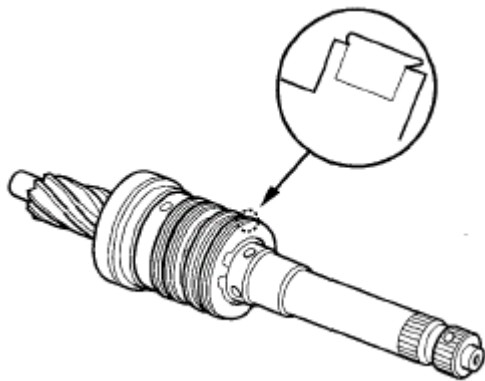


Fig. 88: Checking Wear, Burrs, And Other Damage
Courtesy of AMERICAN HONDA MOTOR CO., INC.

28. Remove the external snap ring (A) and sleeve (B) from the pinion shaft.

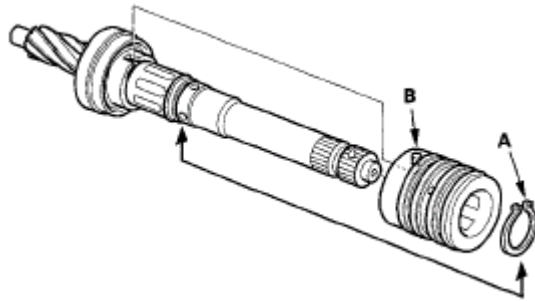


Fig. 89: Removing External Snap Ring And Sleeve From Pinion Shaft
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

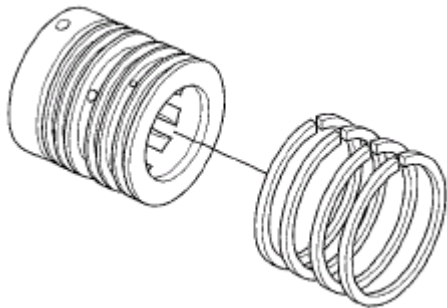


Fig. 90: Removing Seal Rings From Sleeve
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

30. 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.

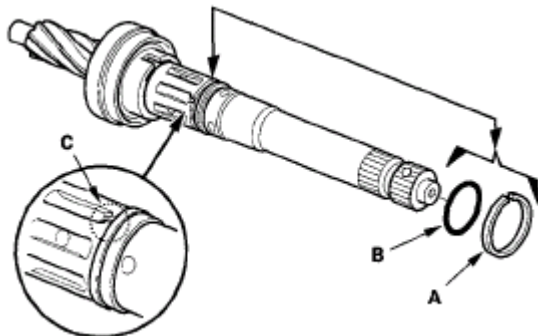


Fig. 91: Identifying Valve Seal Ring And O-Ring
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

31. Remove the valve oil seal (A) and wave washer (B) from the pinion shaft.

Note these items during disassembly:

- Inspect the ball bearing (C) by rotating the outer race slowly. If there is any excessive play or wear, replace the pinion shaft and sleeve as an assembly.
- The pinion shaft and sleeve are a precise fit; do not intermix old and new pinion shafts and sleeves.

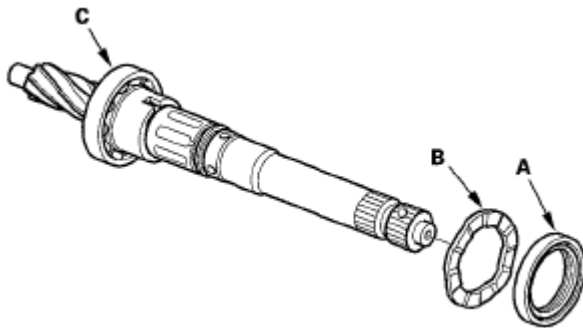


Fig. 92: Removing Valve Oil Seal And Wave Washer From Pinion Shaft
Courtesy of AMERICAN HONDA MOTOR CO., INC.

32. Remove the valve oil seal (A) and roller bearing (B) out of the valve housing using a hydraulic press and a pilot collar.

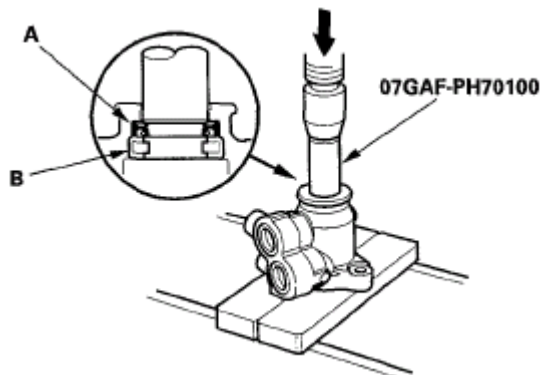


Fig. 93: Removing Valve Oil Seal And Roller Bearing Out Of Valve Housing Using Hydraulic Press
Courtesy of AMERICAN HONDA MOTOR CO., INC.

Reassembly

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

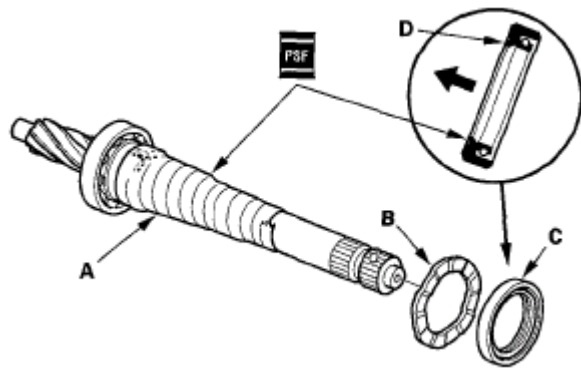


Fig. 94: Applying Vinyl Tape To Stepped Portion Of Pinion Shaft
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

34. Install the wave washer (B). Coat the inside surface of the new valve oil seal (C) with power steering fluid, and install the seal with its grooved side facing opposite the bearing, then slide it over the pinion shaft, being careful not to damage its sealing lip (D). Remove the vinyl tape.
35. Install the valve seal ring guide over the pinion, and coat the surface of the tool with power steering fluid. Slip the new O-ring (A) and new valve seal ring (B) over the valve seal ring guide, and expand them.

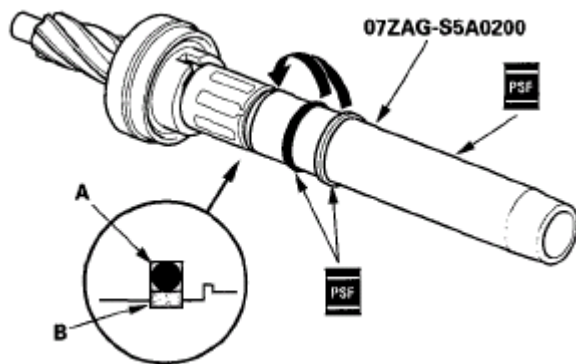


Fig. 95: Identifying Wave Washer And Inside Surface Of New Valve Oil Seal
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

36. Fit the O-ring in the groove of the pinion shaft. Then slide the valve seal ring over the shaft and in the groove on the pinion shaft.
37. Remove the valve seal ring guide, and apply power steering fluid to the surface of the valve seal ring (A).

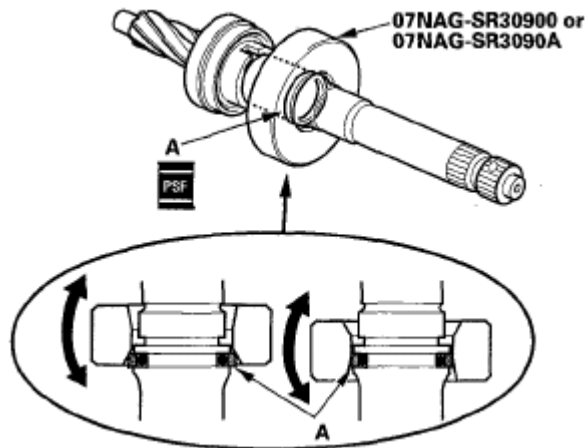


Fig. 96: Applying Power Steering Fluid To Surface Of Valve Seal Ring
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

38. Apply power steering fluid to the inside of the valve seal ring sizing tool. Set the larger diameter end of the valve seal ring sizing tool over the valve seal ring, and move the valve seal ring sizing tool up and down several times to make the valve seal ring fit in the pinion shaft groove.
39. Remove the valve seal ring sizing tool, turn it over, and slide the smaller diameter end over the valve seal ring. Move it up and down several times to make sure the valve seal ring fits snugly in the pinion shaft groove.
40. Apply power steering fluid to the surface of the sleeve seal ring guide. Slip two new seal rings (A) over the sleeve seal 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 rings:

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

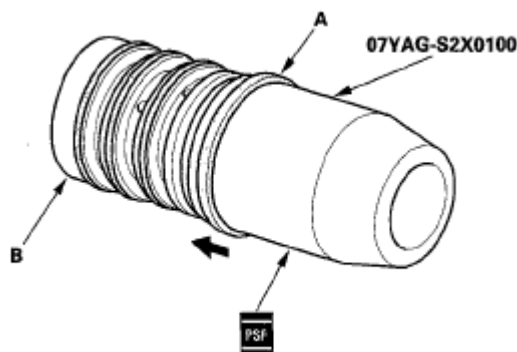


Fig. 97: Applying Power Steering Fluid To Surface Of Sleeve Seal Ring Guide
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

41. Align the sleeve seal 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.
42. 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 sleeve seal ring sizing tool.

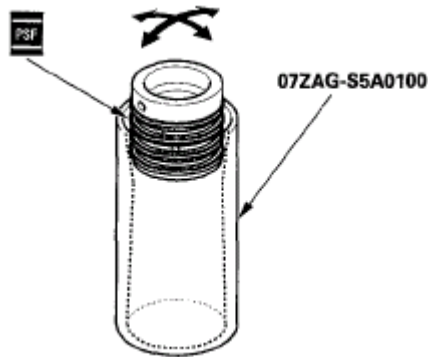


Fig. 98: Applying Power Steering Fluid To Seal Rings On Sleeve
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

43. Move the sleeve back and forth several times to make the seal rings fit snugly in the sleeve. Make sure the seal rings are not twisted.
44. 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 inside of the sleeve with the cutout (D) in the shaft. Then install the new external snap ring (E) securely in the pinion shaft groove. Be careful not to damage the valve seal ring when inserting the sleeve.

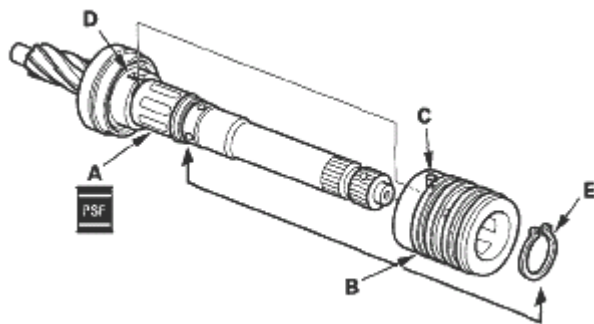


Fig. 99: Applying Power Steering Fluid To Surface Of Pinion Shaft
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

45. 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, driver, and attachment. Install the seal with its grooved side facing the tool.

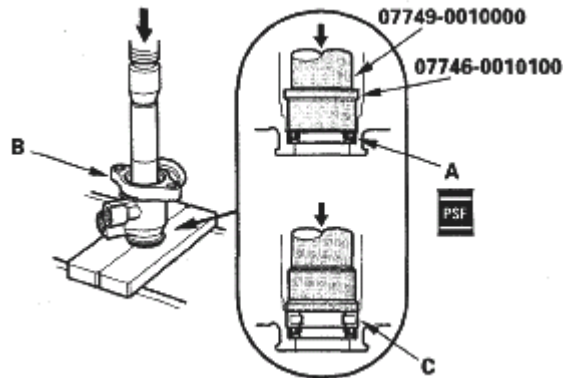


Fig. 100: Applying Power Steering Fluid To Seal Ring Lip Of New Valve Oil Seal
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

46. Press the roller bearing (C) into the valve housing with a hydraulic press, driver, and attachment.
47. Apply vinyl tape (A) to the pinion shaft, then coat the vinyl tape with power steering fluid.

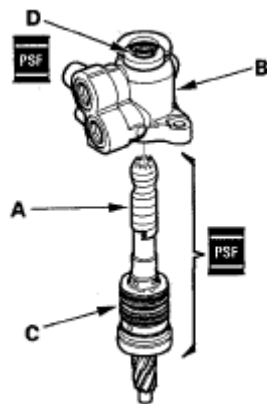


Fig. 101: Applying Vinyl Tape To Pinion Shaft
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

48. Insert the pinion shaft into the valve housing (B). Be careful not to damage the valve seal rings (C) and valve oil seal sealing lip (D).
49. Remove the vinyl tape from the pinion shaft, then remove any residue of the tape adhesive.
50. Press the pinion shaft/sleeve into the valve housing with a hydraulic press. Check that the pinion shaft/sleeve turns smoothly by hand after installing it.

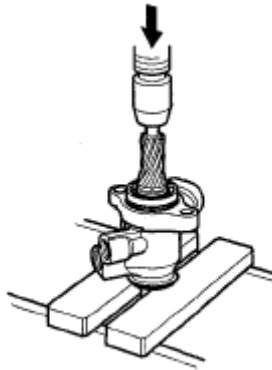


Fig. 102: Inserting Pinion Shaft Into Valve Housing
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

51. Coat the piston seal ring guide with power steering fluid, then slide it onto the rack, big end first.
52. 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 ring. Install the resin seal ring with care so as not to damage it. After installation, make sure you contract the seal ring using the piston seal ring sizing tool.
- Replace piston's O-ring and seal ring as a set.

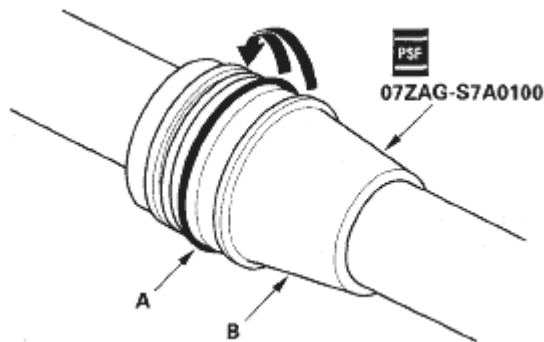


Fig. 103: Positioning O-Ring And New Piston Seal Ring On Piston Seal Ring Guide
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

53. 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.
54. 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.

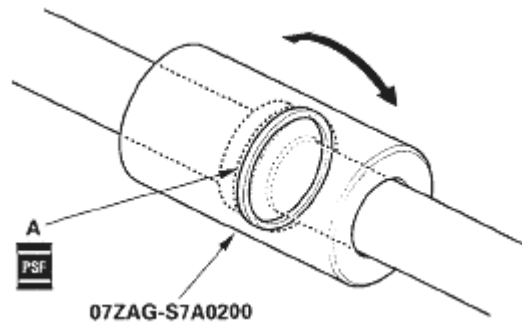


Fig. 104: Identifying Piston Seal Ring

Courtesy of AMERICAN HONDA MOTOR CO., INC.

55. Move the piston seal ring sizing tool back and forth several times to make the piston seal ring fit snugly in the piston.
56. Set the new bushing (A) on the driver, and insert the driver and driver handle into the cylinder housing (B).

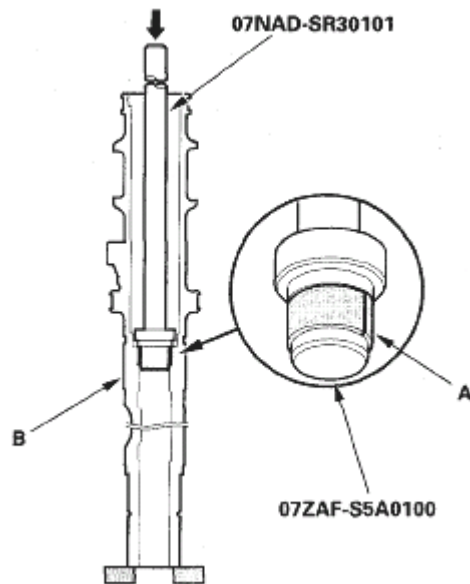


Fig. 105: Inserting Driver And Driver Handle Into Cylinder Housing

Courtesy of AMERICAN HONDA MOTOR CO., INC.

57. Set the cylinder in a press, and install the bushing 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 new bushing.
58. Coat the sliding surface of the cylinder end seal slider (A) and new cylinder end seal (B) with power steering fluid. Place the seal on the cylinder end seal slider with its grooved side (C) facing opposite the cylinder end seal slider.

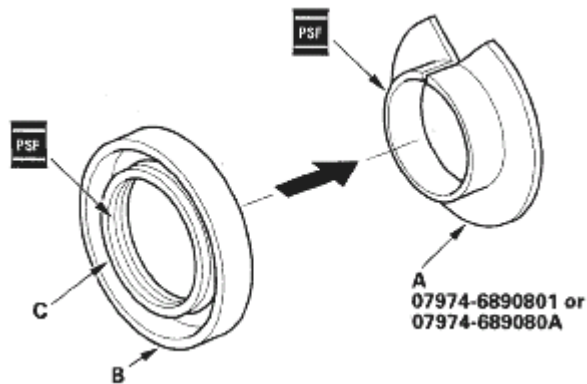


Fig. 106: Placing Seal On Cylinder End Seal Slider With Grooved Side
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

59. Apply a thin coat of power steering grease to the inside of the cylinder end seal slider.
60. Install the cylinder end seal (A) onto the steering rack (B) with its grooved side (C) toward the piston (D). Make sure the gap in the cylinder end seal slider is opposite of rack teeth.

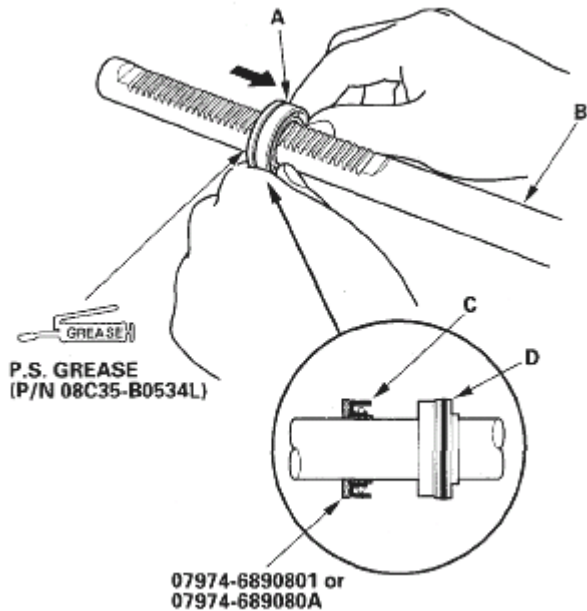


Fig. 107: Installing Cylinder End Seal Onto Steering Rack
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

61. Separate the cylinder end seal from the cylinder end seal slider, then remove the cylinder end seal slider.

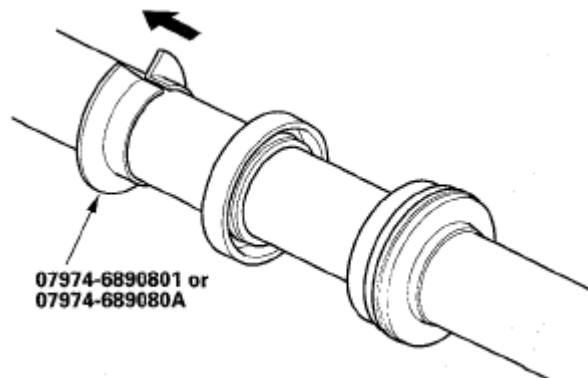


Fig. 108: Separating Cylinder End Seal From Cylinder End Seal Slider
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

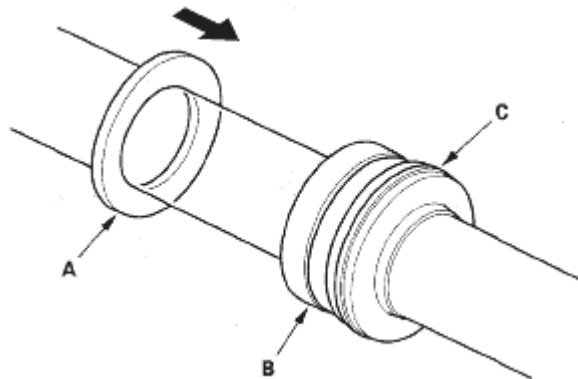


Fig. 109: Installing New Backup Ring On Steering Rack
Courtesy of AMERICAN HONDA MOTOR CO., INC.

63. Mark (A) a position on the steering rack surface with a felt-tip marker, 7.7 mm (0.3 in.) from the rack end.

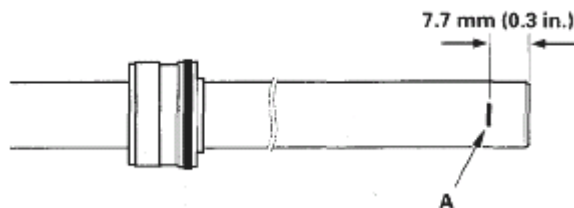


Fig. 110: Marking Position On Steering Rack Surface
Courtesy of AMERICAN HONDA MOTOR CO., INC.

64. Apply power steering grease to the steering rack teeth, then insert the steering rack (A) into the cylinder (B). Be careful not to damage the inner surface of the cylinder wall and bushing with the rack edges.

2007 Honda Element EX

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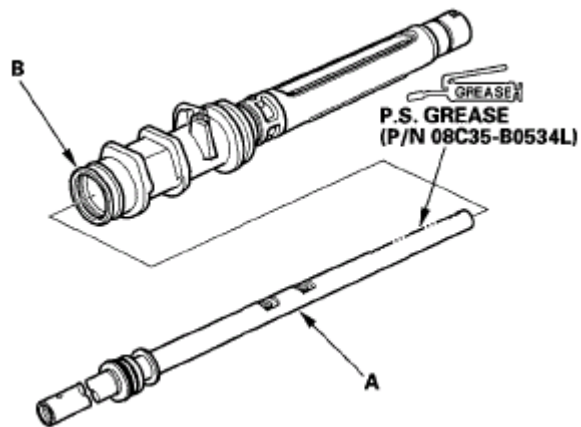


Fig. 111: Inserting Steering Rack Into Cylinder

Courtesy of AMERICAN HONDA MOTOR CO., INC.

65. Set the cylinder (A) in a press, then press the cylinder end seal (B) into the bottom of the cylinder until the mark (C) on the rack meets the edges (D) of the cylinder.

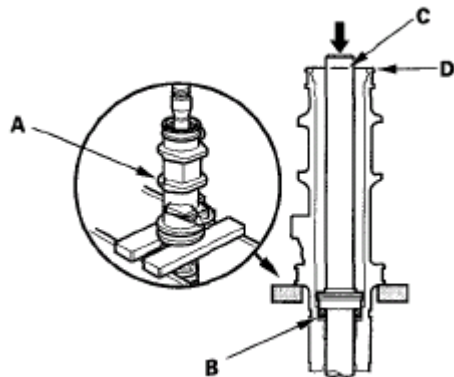


Fig. 112: Pressing Cylinder End Seal Into Bottom Of Cylinder

Courtesy of AMERICAN HONDA MOTOR CO., INC.

66. Coat the inside and outside surfaces of the new cylinder end seal (A) with power steering fluid.

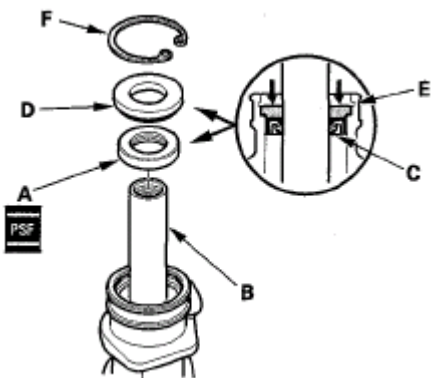


Fig. 113: Coating Inside And Outside Surfaces Of New Cylinder End Seal With Power Steering Fluid

Courtesy of AMERICAN HONDA MOTOR CO., INC.

67. Install the cylinder end seal onto the steering rack (B) with its grooved side (C) toward the piston. Push in the cylinder end seal with your finger.
68. Place the backup ring (D) on the cylinder end seal with its flat side facing upward. Then drive the backup ring in with the appropriate size socket wrench until the its surface is below the internal snap ring groove (E). Install the snap ring (F) in the groove.
69. Install the new lock screw (A) on the cylinder.

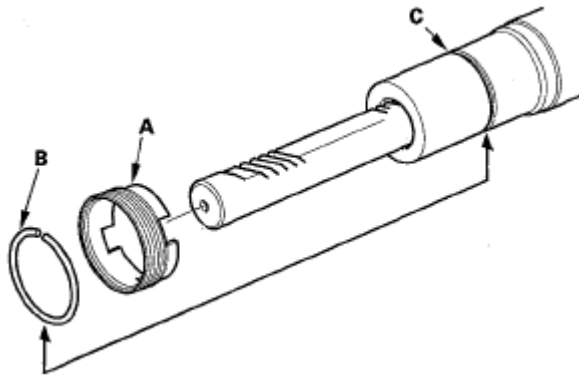


Fig. 114: Installing Lock Screw On Cylinder

Courtesy of AMERICAN HONDA MOTOR CO., INC.

70. Install the new stop ring (B) in the groove (C) on the cylinder by expanding it with snap ring pliers. Be careful not to scratch or damage the cylinder surface with the stop ring edges.
71. Coat the housing surface with multipurpose grease as shown.

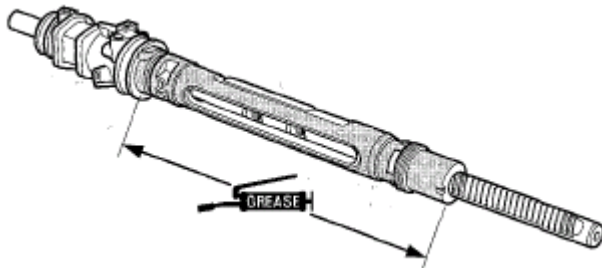


Fig. 115: Coating Housing Surface With Multipurpose Grease

Courtesy of AMERICAN HONDA MOTOR CO., INC.

72. Set the new boot bands (B) on the band installation grooves of boot A by aligning the tabs (C) with the holes (D) of the band. Do not close the ear portion of the boot band yet.

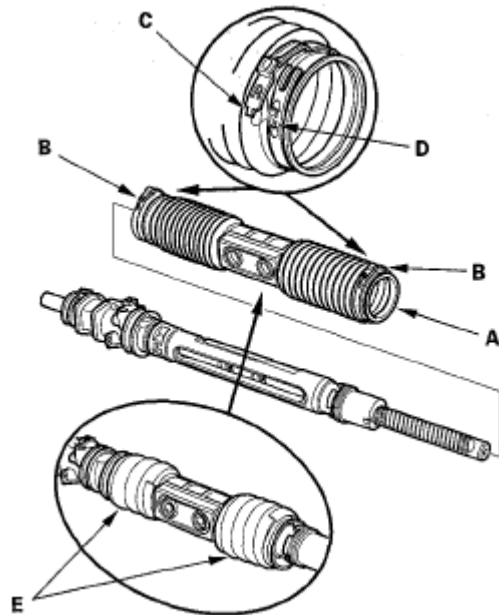


Fig. 116: Setting Boot Bands On Band Installation Grooves Of Boot
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

73. Compress boot A by hand, and apply vinyl tape (E) to the bellows so the boots stay collapsed and pulled back. Slide boot A over the cylinder so the smaller diameter end of the boot faces the gearbox housing.
74. Apply power steering grease to the sliding surface of the slider guide (A). Keep grease off of the rack-to-slider guide matching surfaces and the boot-to-slider guide matching surfaces. Slide the steering rack all the way to left, and place the slider guide on the steering rack by aligning the bolt holes (B).

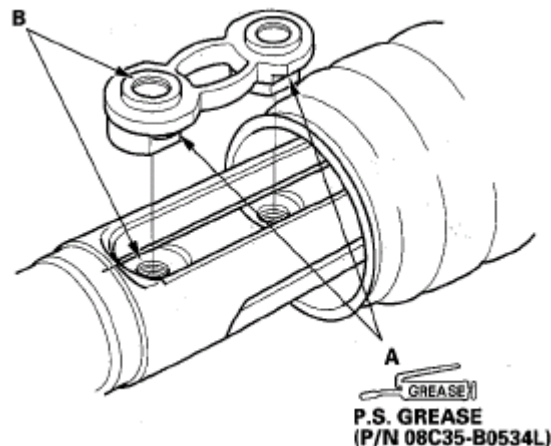


Fig. 117: Applying Power Steering Grease To Sliding Surface Of Slider Guide
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

75. Hold the gearbox housing using a C-clamp (commercially available) (A) and the wooden block (B) as shown. Do not clamp the gearbox housing in the vice.

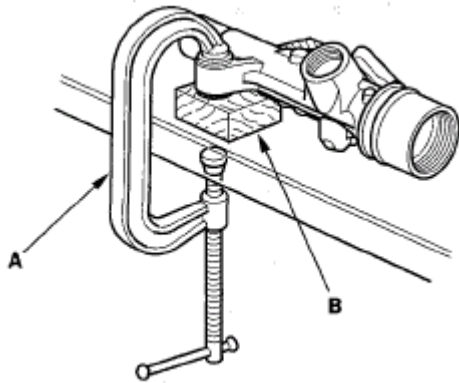


Fig. 118: Holding Gearbox Housing Using C-Clamp And Wooden Block
Courtesy of AMERICAN HONDA MOTOR CO., INC.

76. Push the cylinder (A) into the gearbox housing (B) so the notch (C) is aligned with the pin (D) inside of the gearbox housing.

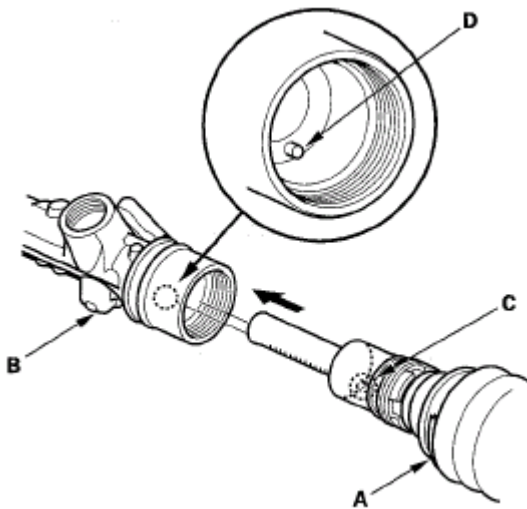


Fig. 119: Pushing Cylinder Into Gearbox Housing
Courtesy of AMERICAN HONDA MOTOR CO., INC.

77. Tighten the lock screw (A) by hand first, then install the locknut wrench (B) on the lock screw. Lightly tighten the lock screw. Do not tighten the lock screw to the specified torque yet.

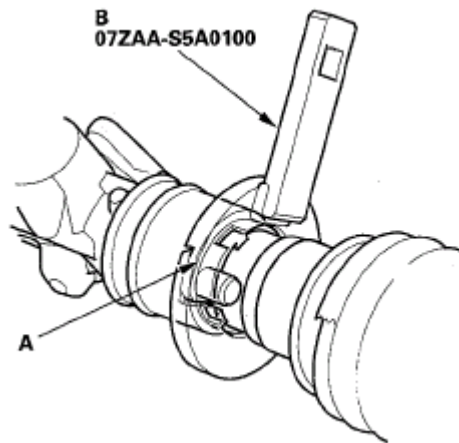


Fig. 120: Installing Locknut Wrench On Lock Screw
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

78. Remove the locknut wrench.
79. Coat the new O-ring (A) with power steering grease, and carefully fit it on the valve housing.

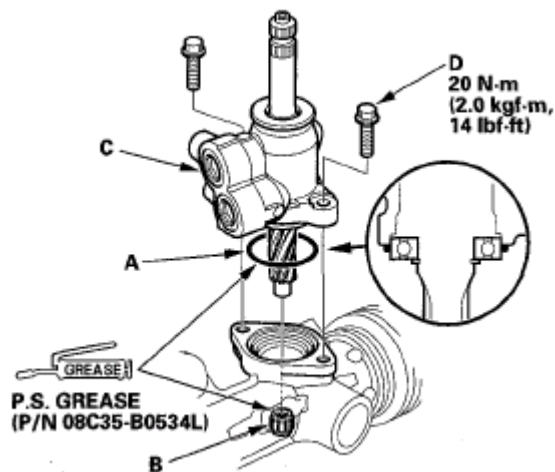


Fig. 121: Coating New O-Ring With Power Steering Grease With Torque Specification
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

80. Apply power steering grease to the needle 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). Tighten the flange bolts (D) to the specified torque.
81. Apply power steering grease to the sliding surface and circumference of the rack guide (A), and install it into the gearbox housing. Wipe the grease off the threaded section of the housing.

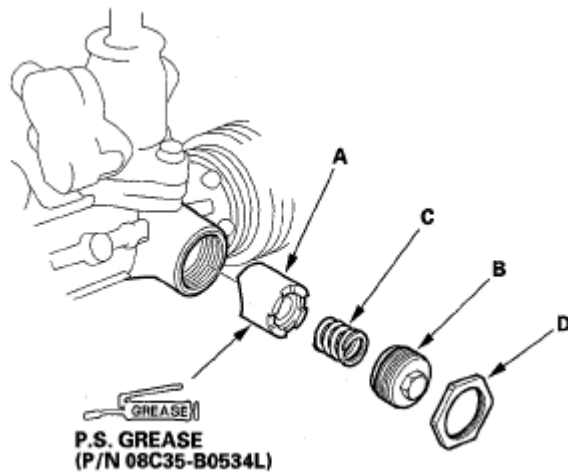


Fig. 122: Applying Power Steering Grease To Sliding Surface And Circumference Of Rack Guide
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

82. 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).
83. Adjust the rack guide screw (see **RACK GUIDE ADJUSTMENT**). After adjusting, check that the rack moves smoothly by sliding it right and left.

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

84. Center the steering rack within its stroke, and align the slider guide (B) with the holes (C) in the boot A. Fit the slider guide to boot A by pressing around the edges of the holes securely.

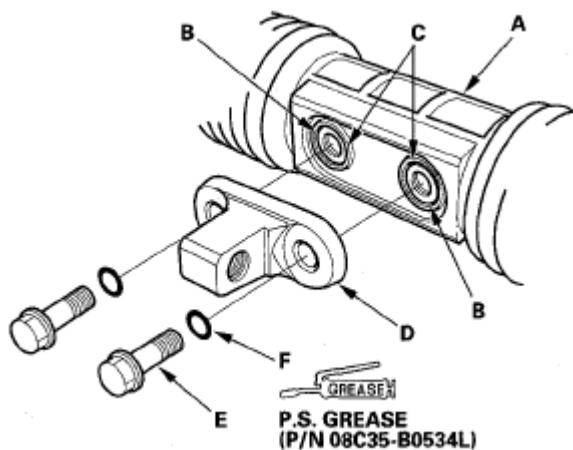


Fig. 123: Aligning Slider Guide With Holes In Boot
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

85. Before installing the bracket (D), clean the mating surface of the 12 mm flange bolts (E) and bracket. Coat the new O-rings (F) with power steering grease, and install them on the 12 mm flange bolts.

86. Loosely install the bracket on the steering rack by tightening the 12 mm flange bolts to 25 N.m (2.5 kgf.m, 18 lbf.ft).
87. Hold the gearbox housing using a C-clamp, then install the locknut wrench on the lock screw (A). Retighten the lock screw to the specified torque value. Remove the locknut wrench.

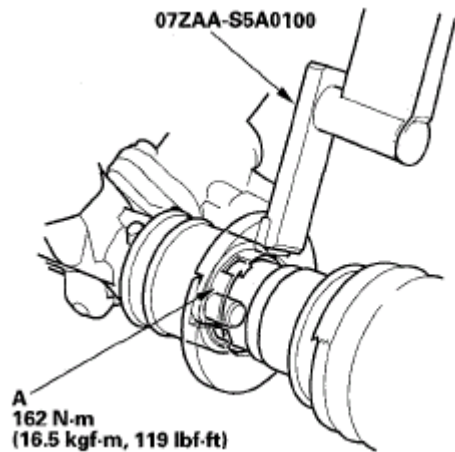


Fig. 124: Installing Locknut Wrench On Lock Screw With Torque Specification
Courtesy of AMERICAN HONDA MOTOR CO., INC.

88. Retighten the 12 mm flange bolts (A) to the specified torque value.

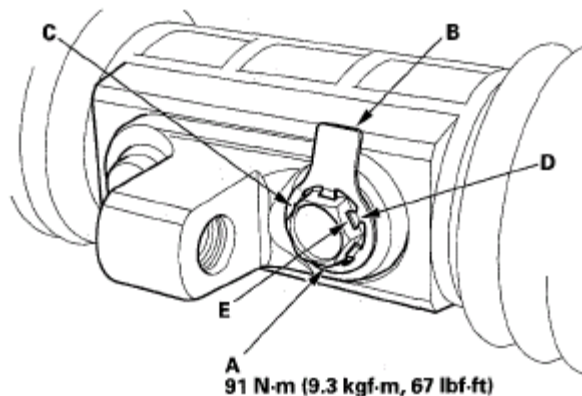


Fig. 125: Tightening Flange Bolts With Torque Specification
Courtesy of AMERICAN HONDA MOTOR CO., INC.

89. After tightening the 12 mm flange bolts, install a new stop washer (B) over one of the bolt heads (C). Be sure the tabs (D) of the stop washer are aligned with the flat surfaces (E) of the bolt head.
90. Clean off any grease or contamination from the boot installation grooves around the housing.
91. Expand boot A by removing the vinyl tape, and fit the boot ends (B) in the installation grooves on the cylinder housing.

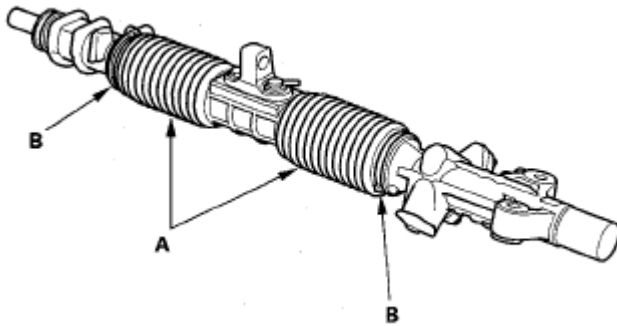


Fig. 126: Installing Stop Washer Over One Of Bolt Heads
Courtesy of AMERICAN HONDA MOTOR CO., INC.

92. Close the ear portion (A) of the bands with a commercially available pincers, Oetiker 1098 or equivalent (B).

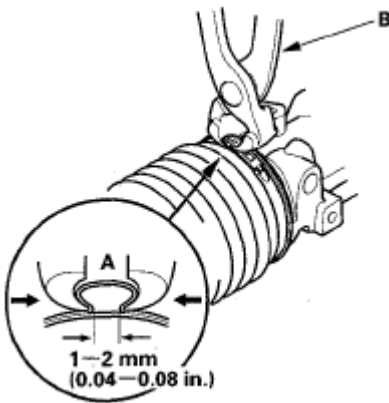


Fig. 127: Identifying Portion Of Bands
Courtesy of AMERICAN HONDA MOTOR CO., INC.

93. Install the rack end plug (A). Clean off any grease or contamination from the boot installation grooves (C) around the housing and the rack end plug.

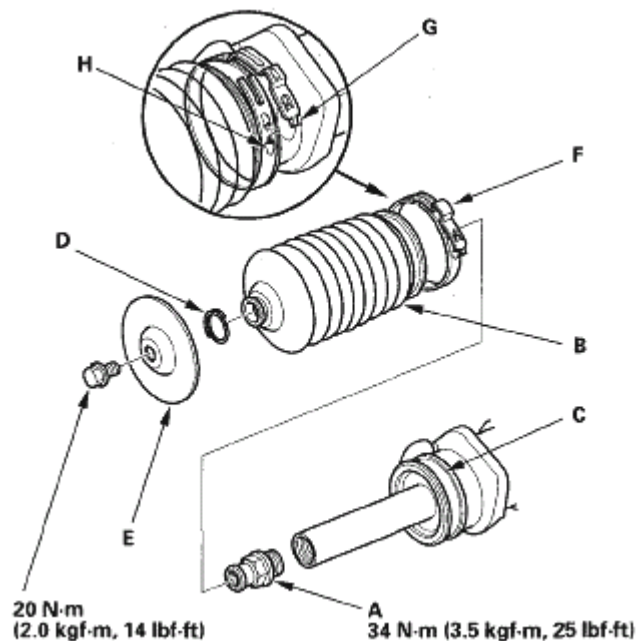


Fig. 128: Installing Rack End Plug With Torque Specifications

Courtesy of AMERICAN HONDA MOTOR CO., INC.

94. Slide the steering rack, and adjust the distance between the cylinder housing end and the end of the rack end plug to 70.5 mm (2.8 in.). Install the boot B, and set the boot end in the installation grooves in the cylinder housing and the rack end plug properly. Install the clip (D) and boot guard (E). Install the new boot band (F) in the band grooves of boot B by aligning the tabs (G) with the holes (H) in the band.
95. Close the ear portion (A) of the band with a commercially available pincers, Oetiker 1098 or equivalent (B). Slide the rack right and left to be certain that the boots are not deformed or twisted.

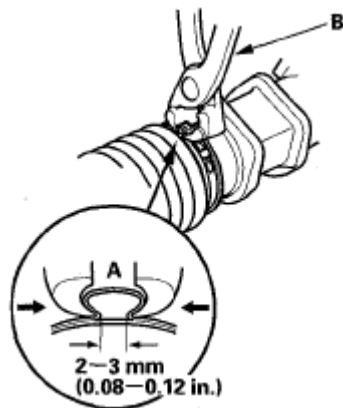


Fig. 129: Identifying Ear Portion Of Band

Courtesy of AMERICAN HONDA MOTOR CO., INC.

96. Install a new lock washer (A) on the tie-rod (B) with the radiused side of the washer toward the tie-rod, and screw the tie-rod into the bracket (C). Repeat this step for the other tie-rod. Hold the bracket with one wrench, and tighten both tie-roads to the specified torque with another wrench.

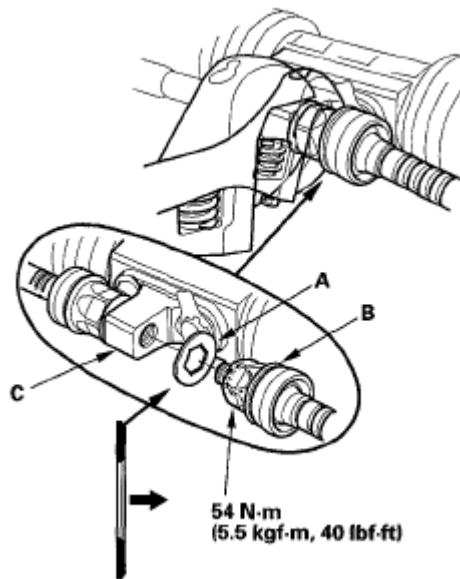


Fig. 130: Installing Lock Washer On Tie-Rod With Torque Specification
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

97. Bend the lock washers (A) against the flat spots on the bracket with a large pair of pliers.

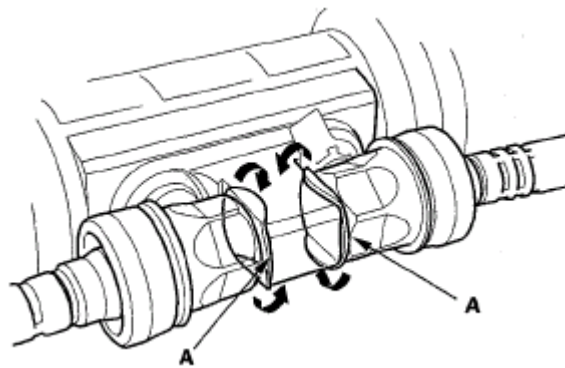


Fig. 131: Bending Lock Washers Against Flat Spots On Bracket With Large Pair Of Pliers
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

98. Install the cylinder lines (A) and return line joint (B).

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.

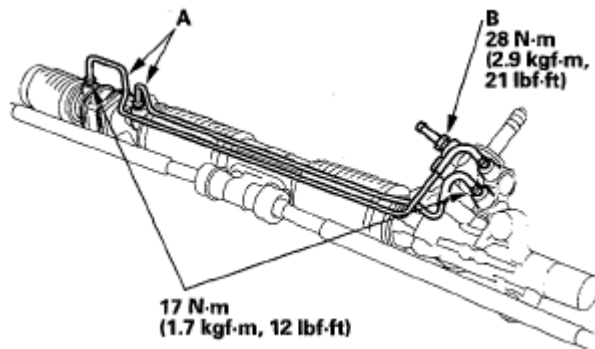


Fig. 132: Installing Cylinder Lines And Return Line Joint With Torque Specifications
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

99. Reinstall the steering gearbox (see **STEERING GEARBOX INSTALLATION**).

STEERING GEARBOX INSTALLATION

1. Before installing the steering gearbox, make sure that no power steering fluid is on the mating surface of the steering gearbox and front subframe. To prevent the gearbox mounting bolts from loosening after the installation, remove any power steering fluid from the mount cushions and bolt holes.
2. Install the P/S line mounting bracket (A).

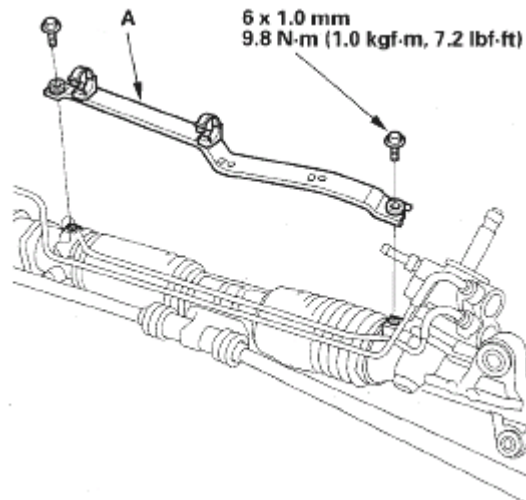


Fig. 133: Installing P/S Line Mounting Bracket With Torque Specification
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

3. Pass the cylinder of the steering gearbox (A) together with the tie-rods (B) through the wheel well opening on the driver's side.

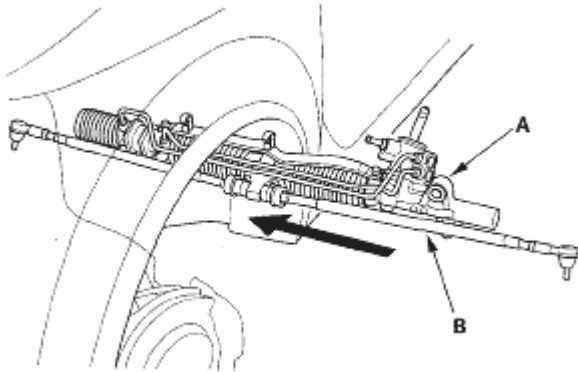


Fig. 134: Passing Cylinder Of Steering Gearbox Together With Tie-Rods
Courtesy of AMERICAN HONDA MOTOR CO., INC.

4. Carefully move the steering gearbox toward the passenger's side until the pinion shaft (A) clears the wheel well opening (B) on the body. Continue moving the gearbox toward the passenger's side until the steering gearbox is in position.

NOTE: Make sure the power steering return hose is routed between the gearbox and right tie-rod.

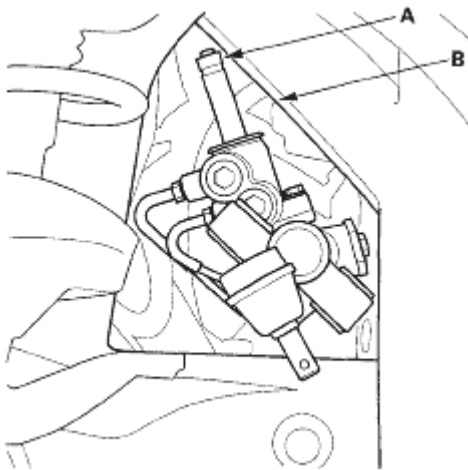


Fig. 135: Identifying Pinion Shaft And Wheel Well Opening On Body
Courtesy of AMERICAN HONDA MOTOR CO., INC.

5. Install the pinion shaft grommet (A). A

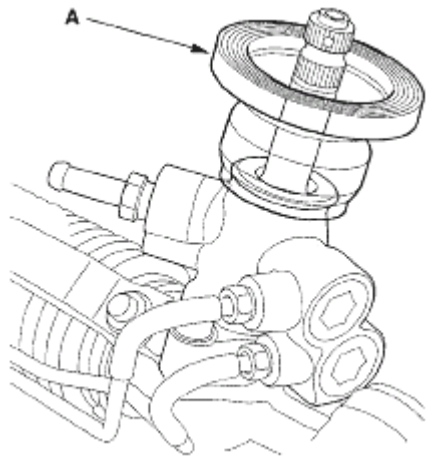


Fig. 136: Installing Pinion Shaft Grommet
Courtesy of AMERICAN HONDA MOTOR CO., INC.

6. Insert the pinion shaft up through the bulkhead, and place the steering gearbox on the mounting brackets. Be sure that the pinion shaft grommet is in place securely.
7. Loosely install the two 10 mm flange bolts (A) and washers (B) on the left side of the gearbox.

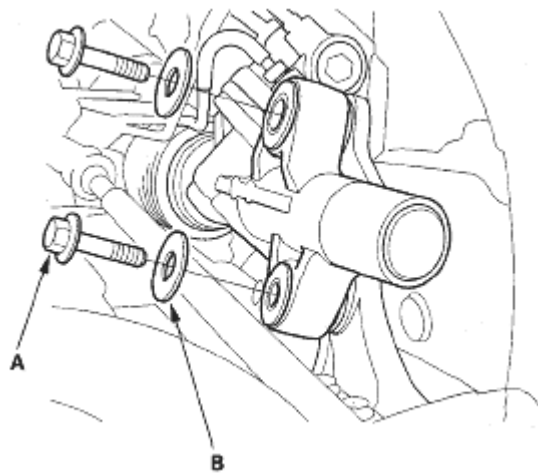


Fig. 137: Installing Flange Bolts And Washers On Left Side Of Gearbox
Courtesy of AMERICAN HONDA MOTOR CO., INC.

8. Install the mounting cushion (A) on the right side of the gearbox. Position the cutout (B) on the mounting cushion as shown.

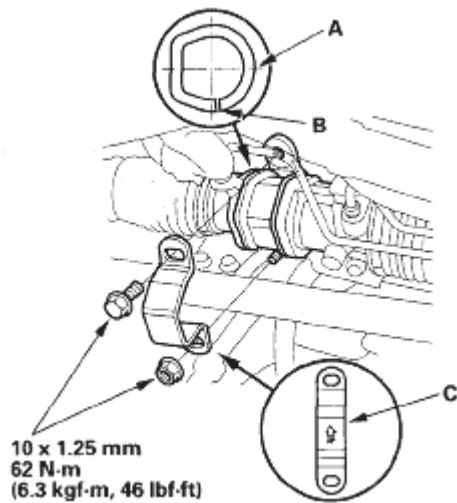


Fig. 138: Installing Mounting Cushion On Right Side Of Gearbox With Torque Specification
Courtesy of AMERICAN HONDA MOTOR CO., INC.

9. Install the mounting bracket (C) over the mounting cushion.
10. Install the 10 mm flange bolt and nut loosely first, then torque the flange bolt and nut alternately in two or more steps.
11. Tighten the left side flange bolts to the specified torque value.

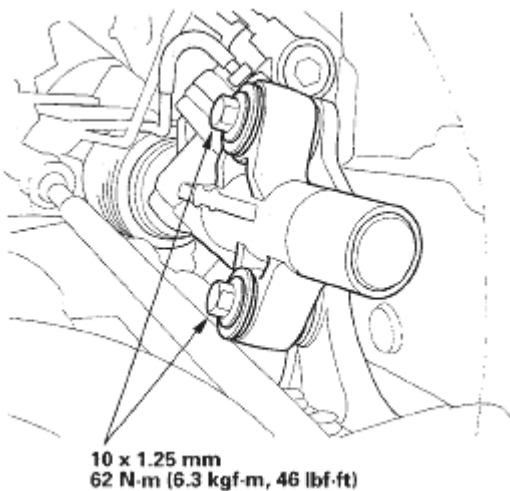


Fig. 139: Installing Mounting Bracket Over Mounting Cushion With Torque Specification
Courtesy of AMERICAN HONDA MOTOR CO., INC.

12. Install the body stiffener (A).

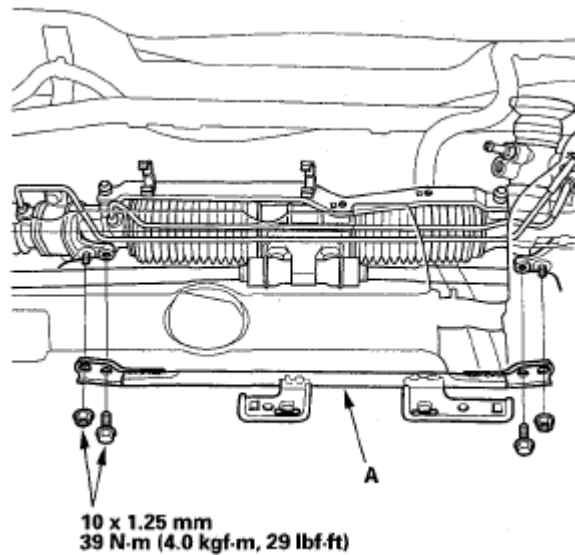


Fig. 140: Installing Body Stiffener With Torque Specification

Courtesy of AMERICAN HONDA MOTOR CO., INC.

13. Loosely connect the 14 mm flare nut (A) to the valve body unit, and install the inlet line (B) on the P/S line mounting bracket (C). Connect the power steering pressure switch connector (D).

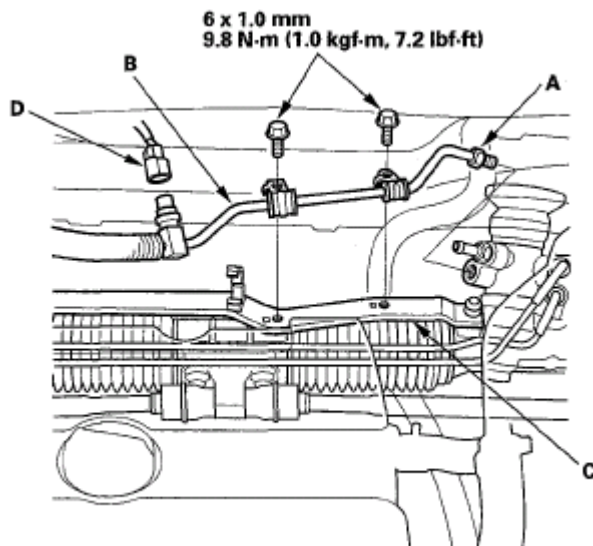


Fig. 141: Installing Inlet Line On P/S Line Mounting Bracket With Torque Specification

Courtesy of AMERICAN HONDA MOTOR CO., INC.

14. Connect the return hose (A) to the return line joint (B) securely. Install the return hose clamp (C) on the steering gearbox.

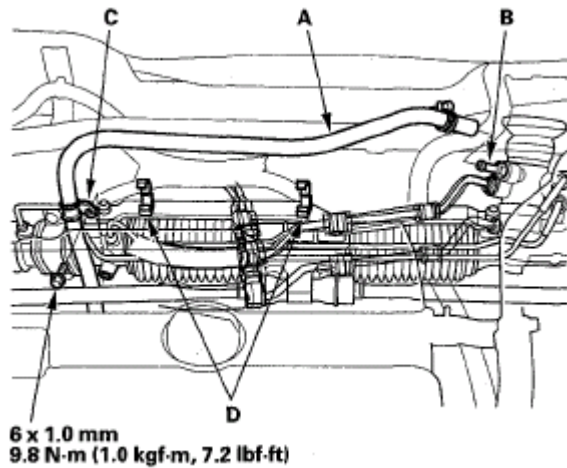


Fig. 142: Installing Return Hose Clamp On Steering Gearbox With Torque Specification
Courtesy of AMERICAN HONDA MOTOR CO., INC.

15. Install the return hose on the hose holders (D) securely.
16. Tighten the 14 mm flare nut (A) to the specified torque value, and tighten the adjustable hose clamp (B) (see **POWER STEERING HOSE, LINE, AND PRESSURE SWITCH REPLACEMENT**).

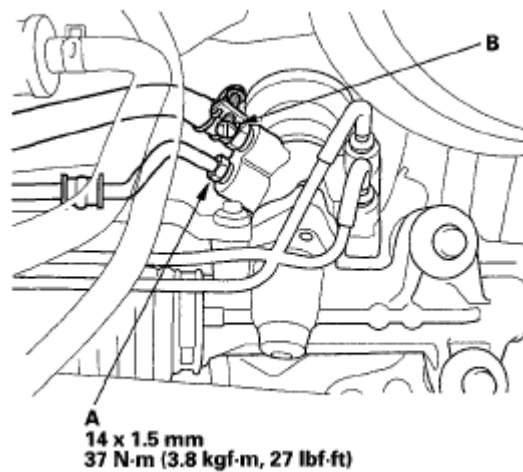


Fig. 143: Installing Return Hose On Hose Holders With Torque Specification
Courtesy of AMERICAN HONDA MOTOR CO., INC.

17. Reinstall the engine wire harness clamp and clip (A) to the mounting brackets.

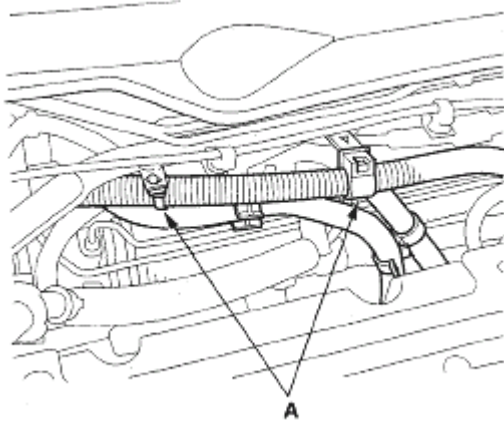


Fig. 144: Installing Engine Wire Harness Clamp And Clip To Mounting Brackets
Courtesy of AMERICAN HONDA MOTOR CO., INC.

18. Install the P/S heat shield (A).

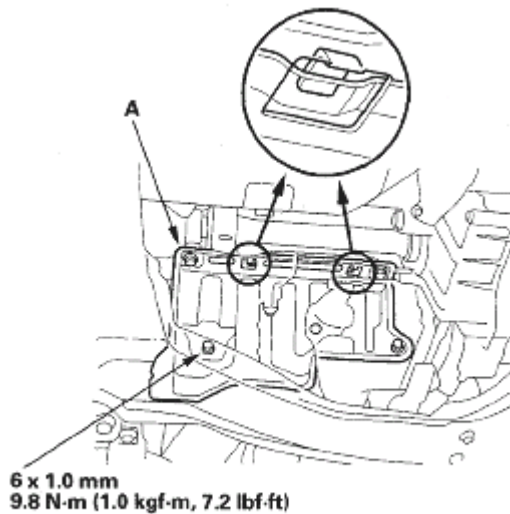


Fig. 145: Installing P/S Heat Shield With Torque Specification
Courtesy of AMERICAN HONDA MOTOR CO., INC.

19. Wipe off any grease or contamination from the ball joint tapered section and threads. Reconnect the tie-rod end (A) to the damper steering arms. Install the 12 mm nut (B), and tighten it to the specified torque value.

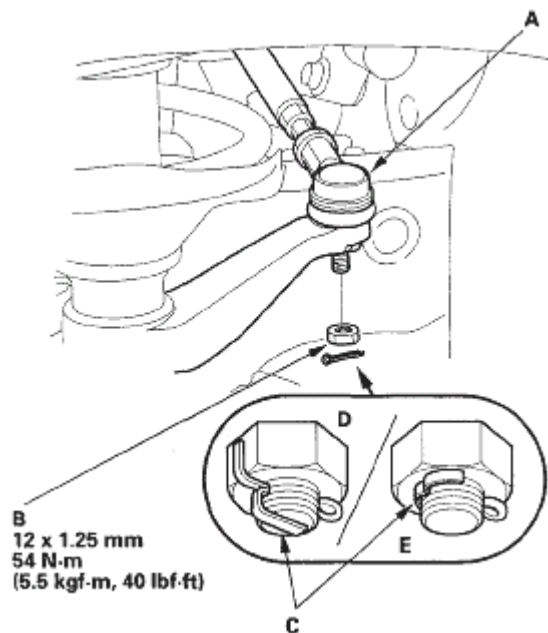


Fig. 146: Connecting Tie-Rod End To Damper Steering Arms With Torque Specification
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

20. Install a new cotter pin (C), and bend it as shown (D) or (E).
21. Insert the upper end of the steering joint (A) onto the steering shaft (B) (line up the bolt hole (C) with the flat portion (D) on the shaft).

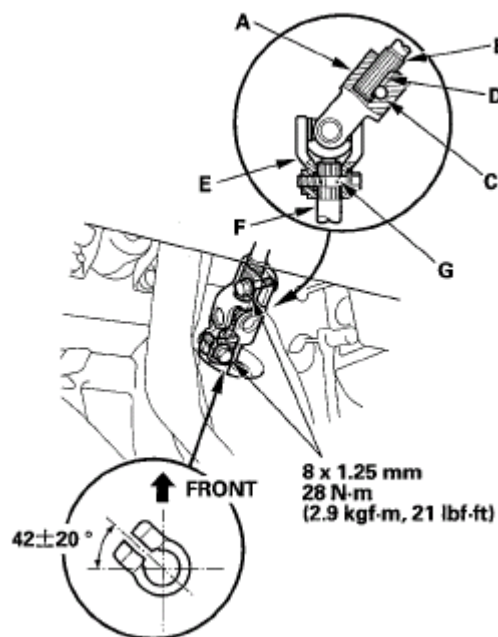


Fig. 147: Inserting Upper End Of Steering Joint Onto Steering Shaft With Torque Specification
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

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22. Slip the lower end of the steering joint (E) onto the pinion shaft (F) (line up the bolt hole with the groove (G) around the shaft), and loosely install the lower joint bolt. Be sure that the lower joint bolt is securely in the groove in the pinion shaft.
23. Pull on the steering joint to make sure that the steering joint is fully seated, then install the upper joint bolt and tighten it to the specified torque.
24. Tighten the lower joint bolt to the specified torque.
25. Install the driver's dashboard lower cover (see **DRIVER'S DASHBOARD LOWER COVER REMOVAL/INSTALLATION**).
26. Install the front wheel, 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.

27. Install the steering wheel (see **STEERING WHEEL INSTALLATION**).
28. Fill the system with power steering fluid, and bleed air from the system (see **FLUID REPLACEMENT**).
29. Reconnect the negative battery cable to the battery, and do these tasks:
 - Turn the ignition switch ON (II); the SRS indicator should come on for about 6 seconds and then go off.
 - Do the power window control unit reset procedure (see **RESETTING THE POWER WINDOW CONTROL UNIT**).
 - Enter the anti-theft code for the audio system.
 - Set the clock.
 - Make sure the horn and turn signal switches work properly.
 - Make sure the steering wheel switches work properly.
 - Make sure the steering wheel is centered.
30. After installation, do these checks:
 - 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 **FLUID LEAKAGE INSPECTION**).
 - Do the front toe inspection (see **WHEEL ALIGNMENT**).
 - 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, then adjust the front toe by turning the tie-rods, if necessary.

TIE-ROD BALL JOINT BOOT REPLACEMENT

Special Tools Required

Attachment, 42 mm 07QAD-P0A0100

1. Disconnect the tie-rod ball joint from the damper (see step 10).
2. Remove the boot from the tie-rod end, and wipe the old grease off the ball pin.
3. Pack the lower area of the ball pin (A) with fresh multipurpose grease.

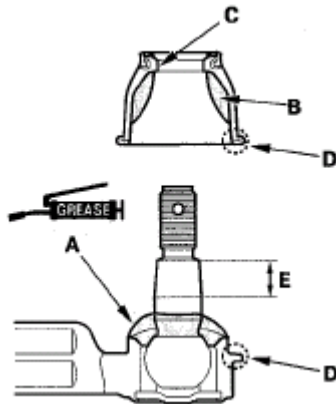


Fig. 148: Identifying Lower Area Of Ball Pin
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

4. Pack the interior of a new 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.
5. Install a new boot (A) using the 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.

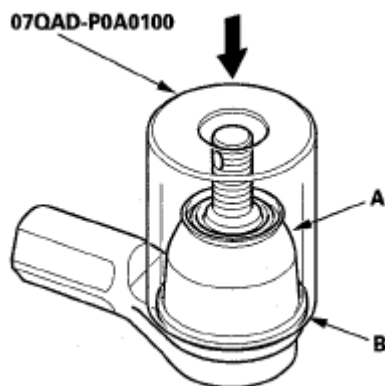


Fig. 149: Installing Boot Using Attachment
 Courtesy of AMERICAN HONDA MOTOR CO., INC.

6. Connect the tie-rod ball joint to the damper (see step 19).

7. Check the wheel alignment, and adjust it if necessary (see WHEEL ALIGNMENT).

GEARBOX MOUNT CUSHION REPLACEMENT

1. Remove the steering gearbox (see STEERING GEARBOX REMOVAL).
2. Position the 34 mm socket wrench (A) on the flange part of the gearbox housing with a washer (B), a 10 x 105 mm flange bolt (C) and a 10 mm nut (D) as shown.

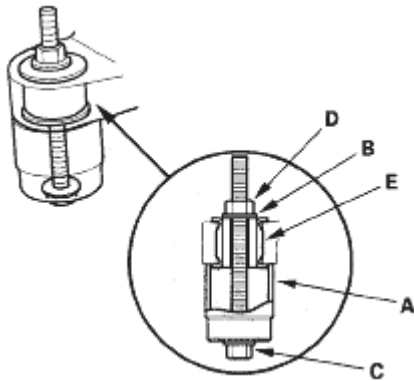


Fig. 150: Positioning Socket Wrench On Flange Part Of Gearbox Housing With A Washer
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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 it on the gearbox mounting cushion hole.

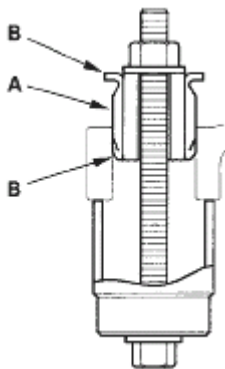


Fig. 151: Applying Mild Soap And Water Solution To Gearbox Mount Cushion Surface
Courtesy of AMERICAN HONDA MOTOR CO., INC.

5. Position the 34 mm socket wrench on the flange part of the gearbox housing with a washer, flange bolt, and the nut as shown.
6. Install the gearbox mount cushion by tightening the nut until the mount cushion edges (B) contact the gearbox flange surface.

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7. Install the steering gearbox (see **STEERING GEARBOX INSTALLATION**).