
SECTION 6C

POWER STEERING GEAR

CAUTION: *Disconnect the negative battery cable before removing or installing any electrical unit or when a tool or equipment could easily come in contact with exposed electrical terminals. Disconnecting this cable will help prevent personal injury and damage to the vehicle. The ignition must also be in B unless otherwise noted.*

TABLE OF CONTENTS

Description and Operation	6C-2	Unit Repair	6C-8
Power Rack and Pinion	6C-2	Tie Rod End Boot	6C-8
Diagnostic Information and Procedures	6C-3	Hydraulic Cylinder Lines	6C-8
Power Rack and Pinion Steering Gear	6C-3	Rack and Pinion Steering Gear	6C-9
Adjust the Free Load of the Steering Gear ...	6C-5	Assembly	
Repair Instructions	6C-6	Specifications	6C-13
On-Vehicle Service	6C-6	General Specifications	6C-13
Rack and Pinion Assembly	6C-6	Fastener Tightening Specifications	6C-13
Power Steering Gear Rack and Pinion Boot ...	6C-7		

DESCRIPTION AND OPERATION

POWER RACK AND PINION

The power rack and pinion steering system has a rotary control valve which directs the hydraulic fluid coming from the hydraulic pump to one side or the other side of the rack piston. The integral rack piston is attached to the rack. The rack piston converts hydraulic pressure to a linear force which moves the rack left or right. The force is then transmitted through the tie rods and the tie

rod ends to the steering knuckles, which turn the wheels.

If hydraulic assist is not available, manual control is maintained. However, under these conditions, more steering effort is required. The movement of the steering wheel is transferred to the pinion. The movement of the pinion is then transferred through the pinion teeth, which meshes with the teeth on the rack, causing the rack to move.

DIAGNOSTIC INFORMATION AND PROCEDURES

POWER RACK AND PINION STERING GEAR

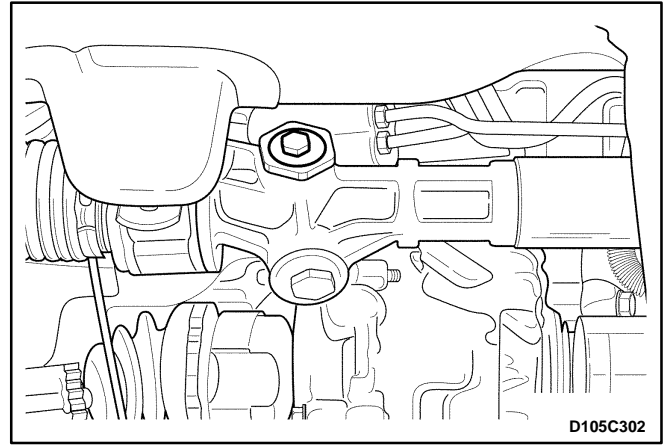
Condition	Probable Cause	Correction
Hissing Noise	<ul style="list-style-type: none"> Loose steering coupling joints. 	<ul style="list-style-type: none"> Tighten the steering coupling joints.
	<ul style="list-style-type: none"> Improperly contacted the power steering hose with other components. 	<ul style="list-style-type: none"> Fit the power steering hose into the hose clips correctly.
Rattling Noise in Steering Gear	<ul style="list-style-type: none"> Improperly contacted the power steering line with the body. 	<ul style="list-style-type: none"> Fix the steering line correctly.
	<ul style="list-style-type: none"> Insufficient lubricant. 	<ul style="list-style-type: none"> Lubricate the steering gear.
	<ul style="list-style-type: none"> Loose steering gear mounting. 	<ul style="list-style-type: none"> Tighten the steering gear mounting bracket bolts.
	<ul style="list-style-type: none"> Improperly installed tie rod ends. 	<ul style="list-style-type: none"> Tighten the tie rod joints and replace the tie rod end as needed.
Poor Return of Steering Wheel to Center	<ul style="list-style-type: none"> Improperly contacted the steering wheel with the turn signal housing. 	<ul style="list-style-type: none"> Adjust the turn signal housing.
	<ul style="list-style-type: none"> Improper binding or looseness of steering coupling. 	<ul style="list-style-type: none"> Replace the intermediate shaft.
	<ul style="list-style-type: none"> Stuck and improperly aligned power steering pump flow control valve. 	<ul style="list-style-type: none"> Replace the power steering pump.
	<ul style="list-style-type: none"> Improper binding or looseness of tie rods and ball joints. 	<ul style="list-style-type: none"> Tighten the tie rods and the ball joints. Replace the tie rods and the ball joints as needed.
	<ul style="list-style-type: none"> Poor adjustments of the steering gear. 	<ul style="list-style-type: none"> Perform a straight-ahead check.
Momentary Increase in Effect When Turning the Wheel Quickly	<ul style="list-style-type: none"> Internal leaks of the power steering pump. 	<ul style="list-style-type: none"> Replace the power steering pump.
	<ul style="list-style-type: none"> The damage or restricted flow of the hoses. 	<ul style="list-style-type: none"> Replace the power steering hoses and pipes.
	<ul style="list-style-type: none"> Insufficient power steering fluid. 	<ul style="list-style-type: none"> Fill the power steering fluid reservoir.
	<ul style="list-style-type: none"> Stuck and improperly operated power steering pump flow control valve. 	<ul style="list-style-type: none"> Replace the power steering pump.
Steering Surges or Jerks When Turning with Engine Running	<ul style="list-style-type: none"> Insufficient pressure of the power steering pump. 	<ul style="list-style-type: none"> Replace the power steering pump.
	<ul style="list-style-type: none"> Stuck and improperly operated power steering pump flow control valve. 	<ul style="list-style-type: none"> Replace the power steering pump.
	<ul style="list-style-type: none"> The slippage of the pump drive belt. 	<ul style="list-style-type: none"> Tighten the pump drive belt.
	<ul style="list-style-type: none"> Contaminated air in the power steering system. 	<ul style="list-style-type: none"> Bleed the power steering system.

POWER RACK AND PINION STERING GEAR (Cont'd)

Condition	Probable Cause	Correction
Excessive Wheel Kickback or Loose Steering	<ul style="list-style-type: none"> ● Contaminated air in the power steering system. 	<ul style="list-style-type: none"> ● Bleed the power steering system.
	<ul style="list-style-type: none"> ● Worn or damaged wheel bearings. 	<ul style="list-style-type: none"> ● Replace the wheel bearings.
	<ul style="list-style-type: none"> ● Loose steering gear mounting. 	<ul style="list-style-type: none"> ● Tighten the steering gear mounting bracket bolts.
	<ul style="list-style-type: none"> ● Improperly installed steering gear-to-intermediate shaft joints. 	<ul style="list-style-type: none"> ● Tighten the joint bolt.
	<ul style="list-style-type: none"> ● Loose tie rods and ball joints. 	<ul style="list-style-type: none"> ● Tighten the tie rods and the ball joints. ● Replace the tie rods and the ball joints as needed.
Hard Steering or Lack of Assist (Especially During Parking)	<ul style="list-style-type: none"> ● Stuck and improperly installed power steering pump flow control valve. 	<ul style="list-style-type: none"> ● Replace the power steering pump.
	<ul style="list-style-type: none"> ● Insufficient pressure of the power steering pump. 	<ul style="list-style-type: none"> ● Replace the power steering pump.
	<ul style="list-style-type: none"> ● Internal leaks of power steering pump. 	<ul style="list-style-type: none"> ● Replace the power steering pump.
	<ul style="list-style-type: none"> ● Improper tension of the pump drive belt. 	<ul style="list-style-type: none"> ● Adjust the pump drive belt tension.

ADJUST THE FREE LOAD OF THE STEERING GEAR

1. Place the steering wheel in the straight-ahead position.
2. Raise and suitably support the vehicle.
3. Remove the adjust plug locknut.
4. Check the torque of the adjuster plug.
5. Check the torque is below the specification value or the measured torque is over the specification value, adjust the tightening torque.
 - Place the rack gear in the straight-ahead position.
 - Tighten the adjust plug to 10 N•m (89 lb-in).
 - Turn the steering wheel all the way to the right and the left about 5 times repeatedly.
 - Place the rack gear in the straight-ahead position.
 - Loosen the adjust plug.



- Tighten the adjust plug to 4.5–5.5 N•m (40–49 lb-in).
 - Loosen the adjust plug to 67.5°.
6. Tighten the adjust plug locknut.

REPAIR INSTRUCTIONS

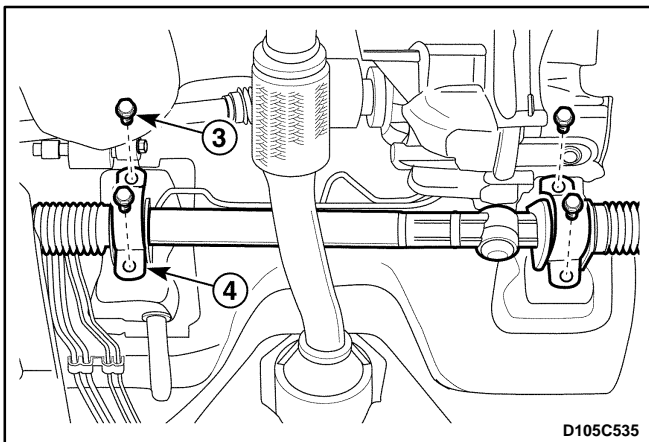
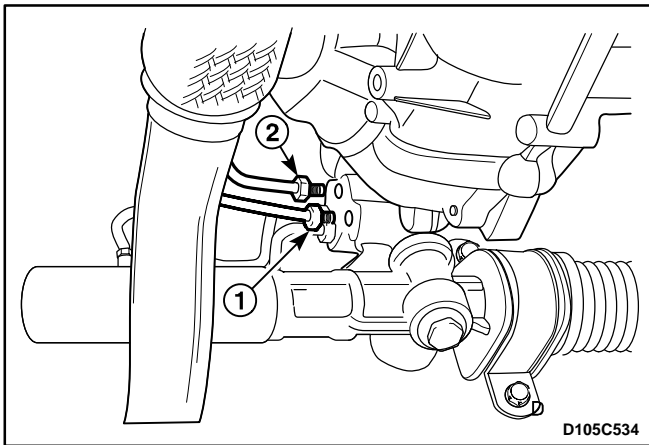
ON-VEHICLE SERVICE

RACK AND PINION ASSEMBLY

(Left-Hand Drive Shown, Right-Hand Drive Similar)

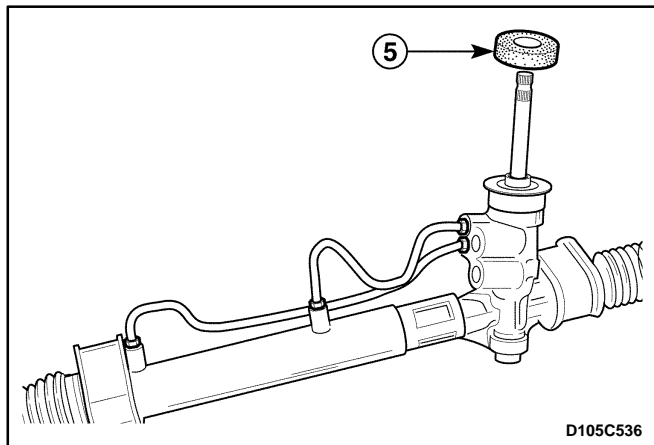
Removal Procedure

1. Remove the intermediate shaft lower pinch bolt. Refer to *Section 6E, Steering Wheel and Column*.
2. Remove the wheel. Refer to *Section 2E, Tires and Wheels*.
3. Remove the tie rod ends. Refer to *Section 6D, Manual Steering Gear*.
4. Remove the front exhaust pipe nuts. Refer to *Section 1G, Engine Exhaust*.
5. Remove the rack and pinion assembly.
 - Disconnect the return line pipe from the steering gear (1).
 - Disconnect the pressure inlet line pipe from the steering gear (2).
 - Plug the opening in the power steering pipe line to prevent fluid loss and contamination.

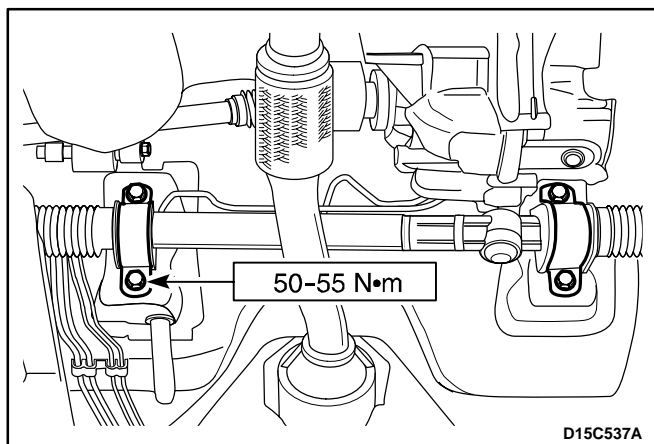


- Remove the power steering gear retaining bracket tighten bolts (3).
- Remove the power steering gear retaining bracket (4).

Important: After moving the gear toward the passenger side and pulling the gear of the driver side into the underbody hole, remove the steering gear.



- Remove the packing (5).

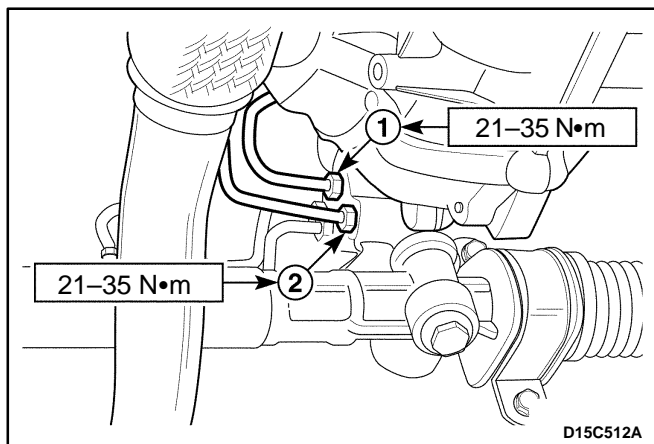


Installation Procedure

- Install in the reverse order of removal.
- Install the power steering gear bracket with the bolt.

Tighten

Tighten the bracket bolts to 50–55 N•m (36–41 lb-ft).



- Connect the steering pipe. Refer to *Section 6A, Power Steering System*.

Tighten

Tighten the power steering pressure line fitting (1) to 21–35 N•m (16–25 lb-ft) (1).

Tighten the return line fitting to 21–35 N•m (16–25 lb-ft) (2).

Important: When adding fluid or making a complete fluid change, always use DEXRON® II or III power steering fluid. Failure to use the proper fluid will cause hose and seal change and fluid leaks.

- Fill the fluid reservoir with power steering fluid.
- Inspect for leaks. If there are leaks, correct the cause of the leaks and bleed the system. Refer to *Section 6A, Power Steering System*.

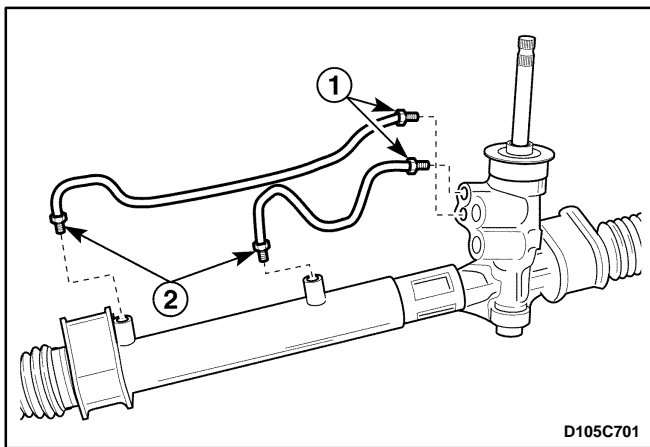
POWER STEERING GEAR RACK AND PINION BOOT

Refer to *Section 6D, Manual Steering Gear*.

UNIT REPAIR

TIE ROD END BOOT

Refer to *Section 6D, Manual Steering Gear*.

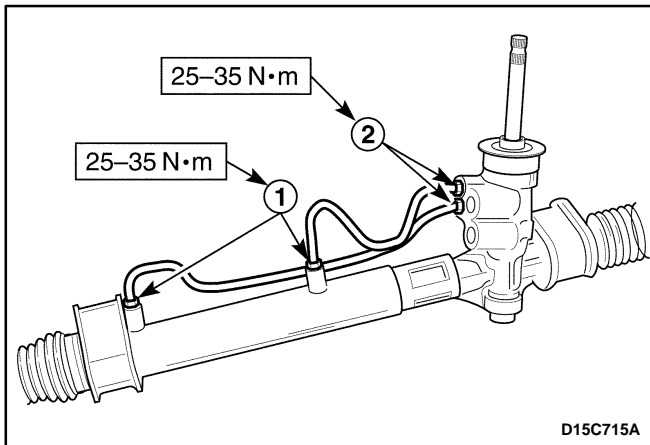


HYDRAULIC CYLINDER LINES

(Left-Hand Drive Shown, Right-Hand Drive Similar)

Disassembly Procedure

1. Remove the rack and pinion steering assembly from the vehicle. Refer to "Rack and Pinion Assembly" in this section.
2. Disconnect the cylinder lines from the rack and pinion housing.
 - Remove the fitting (1).
 - Remove the fitting (2).



Assembly Procedure

1. Connect the cylinder lines to the rack and pinion housing.
2. Install the power steering line fittings at the pinion valve end.

Tighten

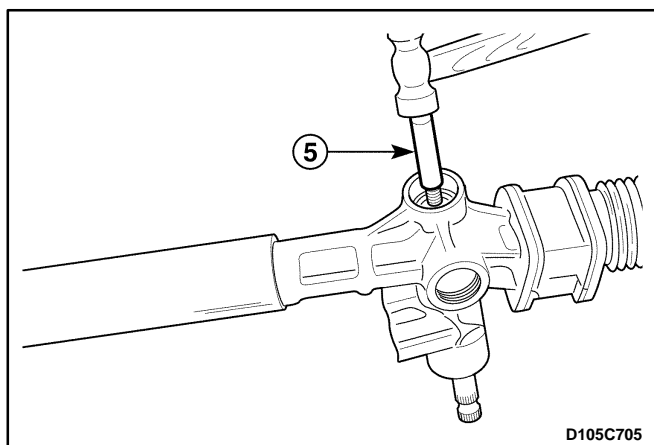
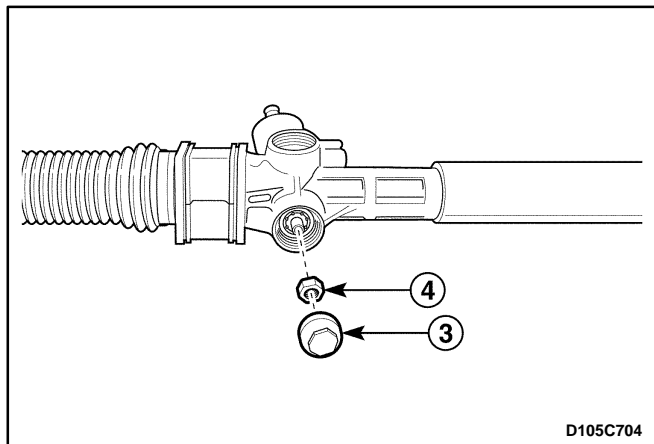
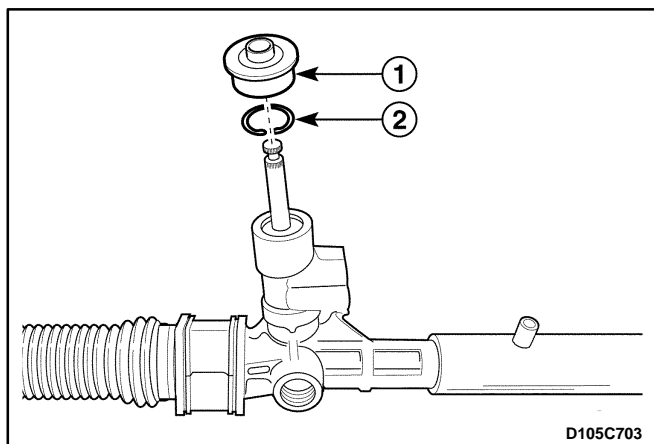
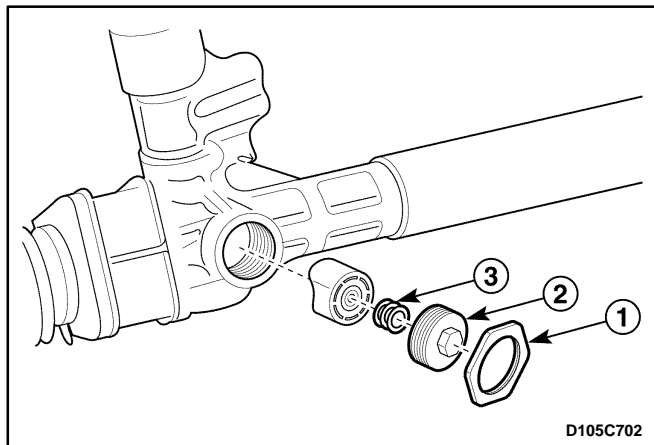
Tighten the power steering line fittings to 25–35 N·m (18–25 lb-ft) (1).

3. Install the power steering line fittings at the cylinder end.

Tighten

Tighten the power steering line fittings to 25–35 N·m (18–25 lb-ft) (2).

4. Install the rack and pinion steering assembly to the vehicle. Refer to "Rack and Pinion Assembly" in this section.



RACK AND PINION STEERING GEAR ASSEMBLY

(Left-Hand Drive Shown, Right-Hand Drive Similar)

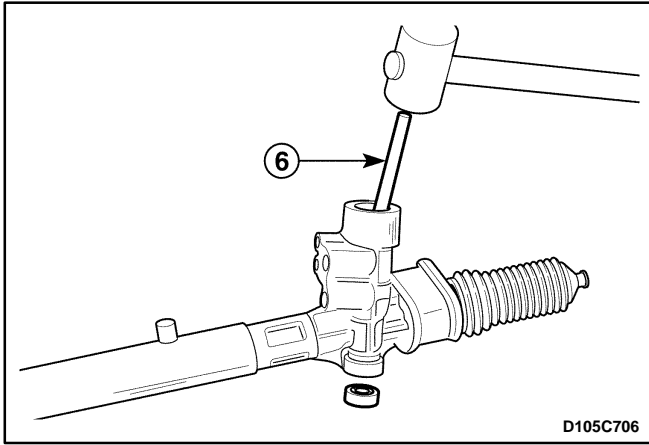
Disassembly Procedure

1. Remove the rack and pinion steering assembly from the vehicle. Refer to "Rack and Pinion Assembly" in this section.
2. Remove the rack bearing.
 - Remove the adjuster plug locknut (1).
 - Remove the adjuster plug (2).
 - Remove the adjuster spring (3).
3. Remove the steering pinion.
 - Remove the dust cap (1).
 - Remove the retaining ring (2).

- Remove the steering pinion dust cap (3).
- Remove the steering pinion locknut (4).

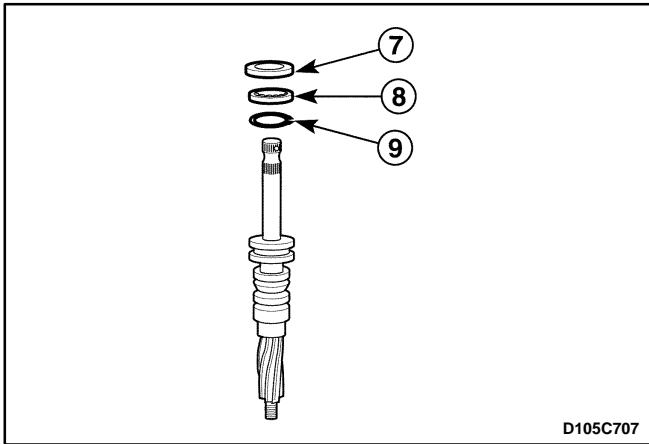
Notice: If the stub shaft is not held, damage to the pinion teeth will occur. While holding the stub shaft, remove the locknut from the pinion.

- Remove the steering pinion from the pinion bearing by hitting the pinion with the fluted drift and hammer (5).



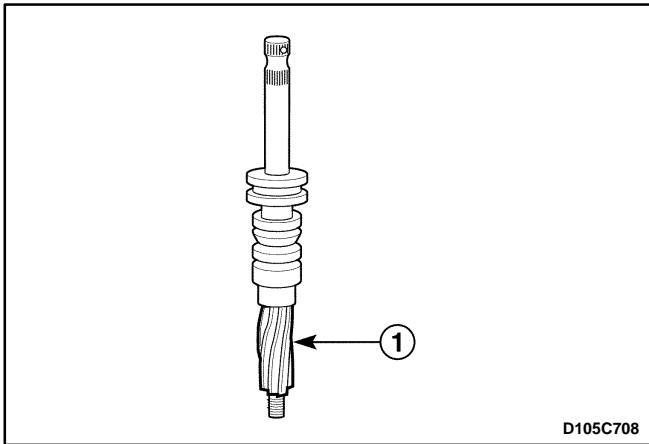
Important: Hit the drift using a hammer when the lower pinion is vertical with the drift.

- Remove the bearing by hitting the bearing with the fluted drift and rubber hammer (6).



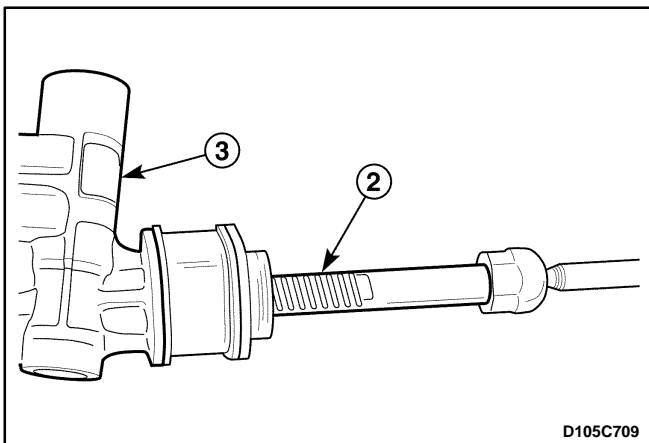
- Remove the pinion shaft seal (7).
- Remove the needle bearing (8).
- Remove the retaining ring (9).

Important: The power steering gear housing and the rack gear in this vehicle is not serviceable as unit. The faulty parts must be replaced as whole units.

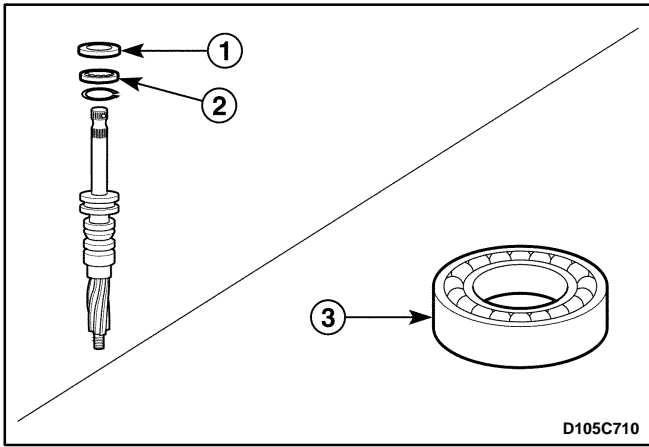


Inspection Procedure

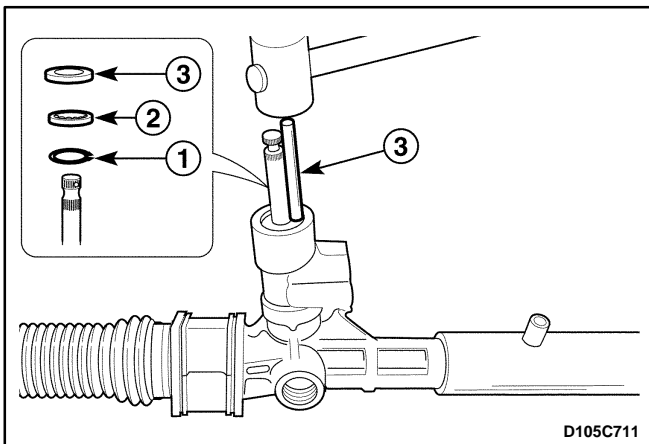
1. Inspect the tie rod ends and the ball joints for damage. Refer to *Section 6D, Manual Steering Gear*.
2. Inspect the tie rod ends and the rack/pinion boot for cracks or abnormal wear. Refer to *Section 6D, Manual Steering Gear*.
3. Inspect the metal part for damage.
 - Inspect the pinion gear for damage or wear (1).



- Inspect the rack gear for damage or wear (2).
- Inspect the steering gear housing for damage or wear(3).

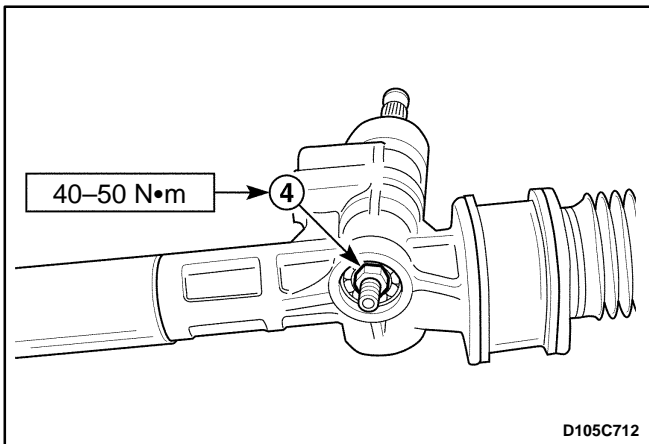


4. Inspect the bearings and the seal for damage.
 - Inspect the pinion shaft seal for leaks and wear (1).
 - Inspect the needle bearing for wear (2).
 - Inspect the pinion bearing for wear (3).
5. The faulty parts must be replaced.



Assembly Procedure

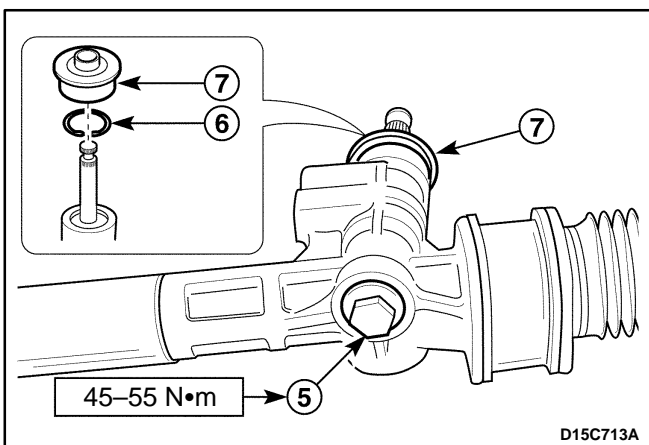
1. Install the steering pinion gear.
 - Install the retaining ring (1).
 - Install the needle bearing (2).
 - Install the pinion shaft seal using a drift (3).



2. Install the steering pinion locknut (4).

Tighten

Tighten the pinion locknut to 40–50 N•m (30–36 lb-ft).

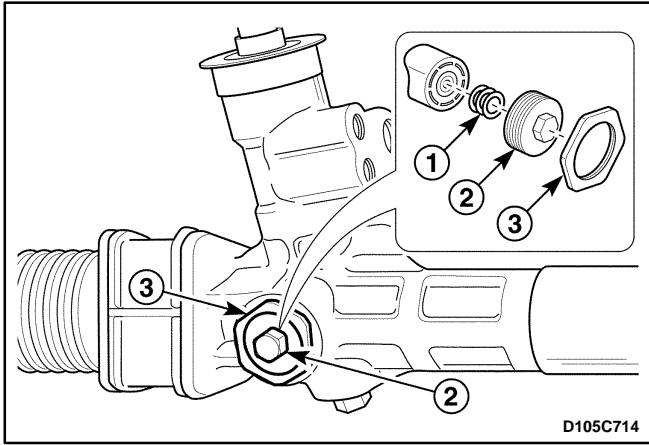


3. Install the dust cap (5).

Tighten

Tighten the dust cap to 45–55 N•m (33–41 lb-ft).

4. Install the retaining ring (6).
5. Install the plastic dust cap (7).



6. Install the rack bearing.
 - Install the adjuster spring (1).
 - Tighten the adjuster plug (2).
 - Tighten the plug locknut (3).
7. Install the rack and pinion steering assembly to the vehicle. Refer to “ Rack and Pinion Assembly ” in this section.

SPECIFICATIONS

GENERAL SPECIFICATIONS

Application			Description
Power Steering Fluid			Power Steering Fluid DEXRON®-II or DEXRON®-III
Capacity			1.0 L (1.056 qt)
Type			Rack and Pinion
Overall Gear Ratio			15.7 : 1
Power Steering Angle	144, 155 Tire	Inside	$39.5^{\circ} \pm 2^{\circ}$
		Outside	$33.5^{\circ} \pm 2^{\circ}$
	175 Tire	Inside	$34.9^{\circ} \pm 2^{\circ}$
		Outside	$30.5^{\circ} \pm 2^{\circ}$
Grease		Rack	POLYUREAS
		Ball Joint	SYNTHETICS OILS & LI SOAPS

FASTENER TIGHTENING SPECIFICATIONS

Application	N•m	Lb-Ft	Lb-In
Power Steering Gear Bracket Bolt	50-55	36-41	-
Power Steering Gear Pinion Nut	40-50	30-36	-
Power Steering Gear Pinion Dust Cover	45-55	33-41	-
Power Steering Gear Pressure Line Fitting	25-35	18-25	-
Power Steering Oil Pressure Pipe Fitting (Gear Side)	21-35	16-25	-
Power Steering Gear Adjuster Plug	Refer to "DIAGNOSIS" in this section.		