STEERING

CONTENTS

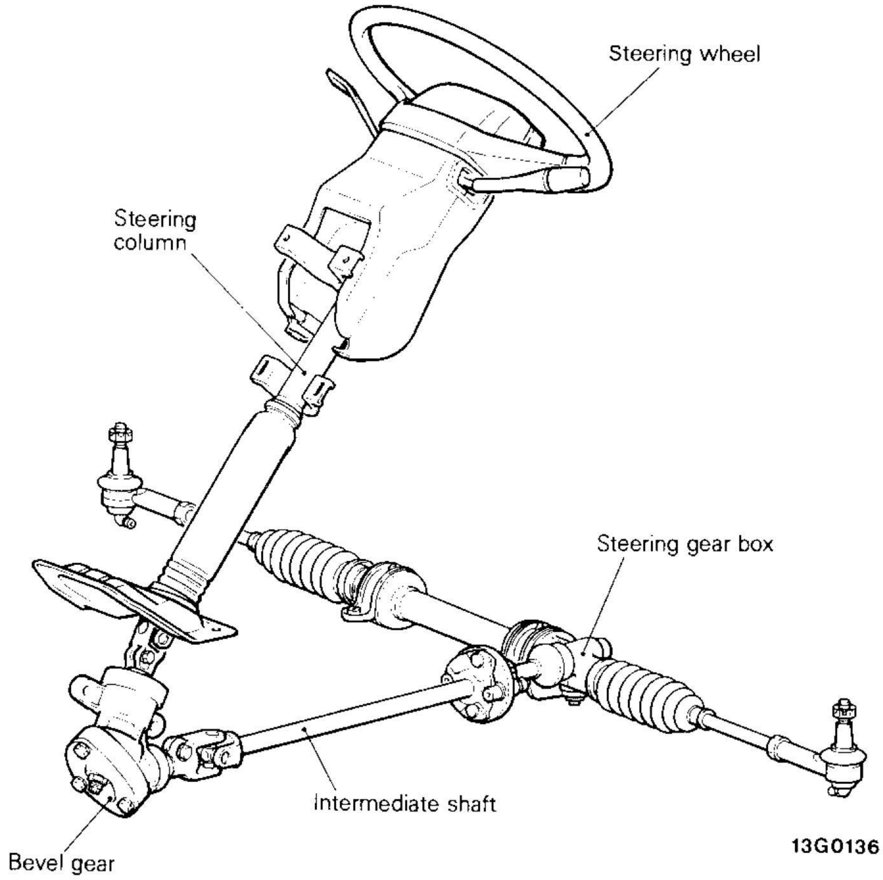
E37AA--

GENERAL INFORMATION

E37BAAE

MANUAL STEERING

The manual steering system consists of the steering wheel, steering column, a bevel gear, an intermediate shaft and the steering gear box.
The bevel gear changes the steering direction from the steering wheel, transmitting to the gear box pinion through an intermediate shaft.
The steering gear box assembly consists of the toothed rack, pinion support, and the rack support spring.
The steering gear rack-and-pinion assembly converts rotational movement of the pinion to transverse movement of the rack. The tie rods and tie rod ends transmit this movement to the knuckle arms and road wheels.



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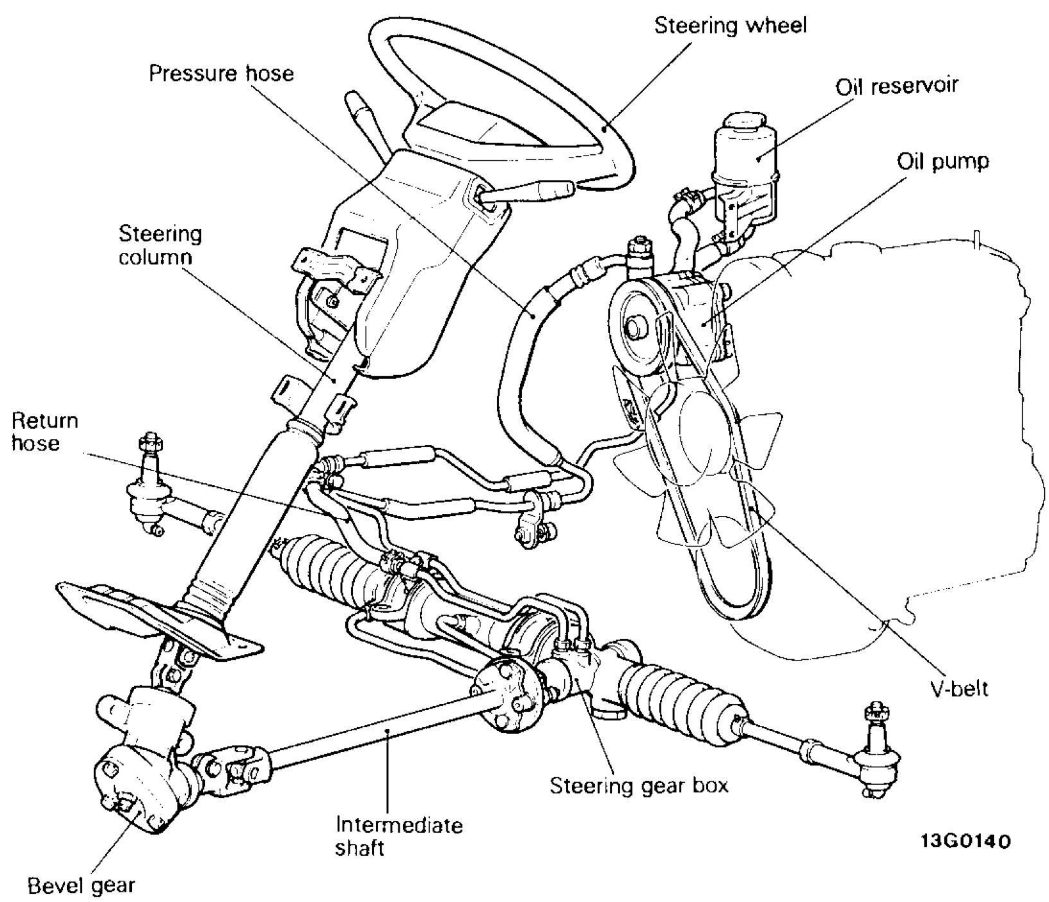
POWER STEERING

The power steering system consists of four major components: the power steering gear box, the power steering pump, the pressure hose and the return hose. The power steering gear resembles the manual steering gear in appearance except for the rotary valve and the oil lines.
Road feel is controlled by the diameter of a torsion bar which initially steers the vehicle. As required steering effort increases, as in turn, the torsion bar twists, causing relative rotary motion between the rotary valve body and the input shaft. This movement directs oil behind the integral rack piston, which, in turn, builds up hydraulic pressure and assists in the turning effort.
Even if the drive belt of power steering pump is cut, manual control is maintained, although steering effort is increased.



SPECIFICATIONS

GENERAL SPECIFICATIONS

E37CA--

Items		Specifications
Manual steering		
Steering wheel diameter O.D.	mm (in.)	390 (15.4)
Steering gear type		Rack and pinion
Power steering		
Gear box		
Steering gear type		Rack and pinion
Oil pump		
Oil pump type		Vane type
Displacement	cm^3/rev. (cu.in./rev.)	9.6 (0.59)
Relief set pressure	MPa (kg/cm^2, psi)	8 (80, 1,138)

SERVICE SPECIFICATIONS

E37CB--

Manual Steering

Items		Specifications
Standard value		
Steering angle		
2WD Inner wheel		$37°00'^{+0°}_{-3°}$
Outer wheel		34°00'
4WD Inner wheel		$30°40'^{+0°}_{-3°}$
Outer wheel		30°20'
Tie rod end ball joint starting torque	Nm (kgcm, in.lbs.)	1–3 (10–30, 9–26)
Bevel gear (output side) torque	Nm (kgcm, in.lbs.)	0.05–0.10 (0.5–1.0, 0.4–0.9)
Bevel gear (input side) torque	Nm (kgcm, in.lbs.)	0.25–0.45 (2.5–4.5, 2.2–3.9)
Total bevel gear torque	Nm (kgcm, in.lbs.)	0.30–0.55 (3.0–5.5, 2.6–4.8)
Total pinion torque	Nm (kgcm, in.lbs.)	0.6–1.2 (6–12, 5–10)
Tie rod joint swing resistance	N (kg, lbs.)	
2WD		4–21 (0.4–2.1, 0.9–4.6)
4WD		5–23 (0.5–2.3, 1.0–5.0)
Tie rod joint swing torque	Nm (kgcm, in.lbs.)	1–5 (10–50, 9–43)
Limit		
Steering wheel free play	mm (in.)	40 (1.57)
Variation of tie rod end ball joint shaft direction	mm (in.)	1.5 (0.059)

Power Steering

Items		Specifications
Standard value		
Steering wheel free play (with engine stopped)	mm (in.)	11 (0.43)
Steering angle		
2WD Inner wheel		$37°00'^{+0}_{-3}$
Outer wheel		34°00'
4WD Inner wheel		$30°40'^{+0}_{-3}$
Outer wheel		30°20'
Tie rod end ball joint starting torque	Nm (kgcm, in.lbs.)	1–3 (10–30, 9–26)
Stationary steering effort	N (kg, lbs.)	37 (3.7, 8)
V-belt deflection	mm (in.)	
Petrol-powered vehicles		6–9 (0.24–0.35)
Diesel-powered vehicles		8–11 (0.31–0.43)
Oil pump pressure	MPa (kg/cm², psi)	
Pressure gauge valve closed		7.5–8.2 (75–82, 1,067–1,166)
Pressure gauge valve opened		0.8–1.0 (8–10, 114–142)
Bevel gear (output side) torque	Nm (kgcm, in.lbs.)	0.05–0.10 (0.5–1.0, 0.4–0.9)
Bevel gear (input side) torque	Nm (kgcm, in.lbs.)	0.25–0.45 (2.5–4.5, 2.2–3.9)
Total bevel gear torque	Nm (kgcm, in.lbs.)	0.30–0.55 (3.0–5.5, 2.6–4.8)
Total pinion torque	Nm (kgcm, in.lbs.)	0.7–1.4 (7–14, 6–12)
Tie rod joint swing resistance	N (kg, lbs.)	
2WD		8–21 (0.8–2.1, 1.8–4.6)
4WD		9–23 (0.9–2.3, 2.0–5.1)
Tie rod joint swing torque	Nm (kgcm, in.lbs.)	2–5 (20–50, 17–43)
Limit		
Steering wheel free play (when hydraulic operation)	mm (in.)	40 (1.57)
Variation of tie rod end ball joint shaft direction	mm (in.)	1.5 (0.059)
Oil pump pressure		
Pressure gauge valve opened	MPa (kg/cm², psi)	1.5 (15, 213)
Space between vane and rotor	mm (in.)	0.06 (0.0024)
Shaft backlash of pump body bushing and pulley assembly	mm (in.)	0.1 (0.004)

TORQUE SPECIFICATIONS

E37CC--

Items	Nm	kgm	ft.lbs.
Steering wheel and shaft			
Steering wheel lock nut	34–50	3.4–5.0	25–36
Steering column			
Standard bolt	14–20	1.4–2.0	10–14
Special bolt (vehicles for Europe)	9–14	0.9–1.4	7–10
Steering shaft to bevel gear	17–26	1.7–2.6	12–19
Upper steering column to lower steering column	15–20	1.5–2.0	11–14
Upper steering shaft to lower steering shaft	30–35	3.0–3.5	22–25
One-way bracket	9–14	0.9–1.4	7–10
Bevel gear intermediate shaft			
Bevel gear	35–55	3.5–5.5	25–40
Bevel gear and intermediate shaft	35–55	3.5–5.5	25–40
Intermediate shaft and yoke	17–26	1.7–2.6	12–19
Yoke and steering gear box	30–40	3.0–4.0	22–29
Adjust bolt locknut	17–26	1.7–2.6	12–19
Front cover attaching bolt	17–26	1.7–2.6	12–19
Gear (output side) locknut	35–54	3.5–5.4	25–39
Rear cover locknut	80–120	8.0–12.0	58–87
[Rear cover locknut (using special tool)]	65–95	6.5–9.5	47–69
Manual steering gear box			
Tie-rod end to knuckle	35–45	3.5–4.5	25–33
Pinion housing clamp	70–90	7.0–9.0	51–65
Tie-rod end locknut	65–80	6.5–8.0	47–58
Tie-rod to rack	80–100	8.0–10.0	58–72
Adjust cover locknut	40–60	4.0–6.0	29–43
Power steering gear box			
Tie-rod end to knuckle	35–45	3.5–4.5	25–33
Pinion housing clamp	70–90	7.0–9.0	51–65
Tie-rod end locknut	65–80	6.5–8.0	47–58
Tie-rod to rack	80–100	8.0–10.0	58–72
Feed tube flare nut	12–18	1.2–1.8	9–13
Pinion and valve assembly locknut	20–30	2.0–3.0	14–22
End plug	50–70	5.0–7.0	36–51
Rack support cover locknut	50–70	5.0–7.0	36–51
Oil pump			
Oil pump to oil pump bracket			
Upper bolt			
4G32, 4G92, 4G63 – 16 Valve, 4G64 –16 Valve	35–45	3.5–4.5	25–33
Except 4G32, 4G92, 4G63 – 16 Valve, 4G64 – 16 Valve	25–33	2.5–3.3	18–24
Lower bolt			
Petrol-powered vehicles	20–27	2.0–2.7	14–20
Diesel-powered vehicles	14–21	1.4–2.1	10–15
Oil pump bracket			
4G92	35–45	3.5–4.5	25–33
4G63 – 16 Valve, 4G64 – 16 Valve	25–33	2.5–3.3	18–24
4D56	14–21	1.4–2.1	10–15
Except 4G92, 4G63 – 16 Valve, 4G64 – 16 Valve, 4D56	17–26	1.7–2.6	12–19
Oil pump bracket lower bolt	45–55	4.5–5.5	33–40

Items	Nm	kgm	ft.lbs.
Stay	14–21	1.4–2.1	10–15
Connector			
4G92, 4G63 – 16 Valve, 4G64 – 16 Valve	50–70	5.0–7.0	36–51
Except 4G92, 4G63 – 16 Valve, 4G64 – 16 Valve	40–60	4.0–6.0	29–43
Suction connector	6–10	0.6–1.0	4–7
Pump cover	18–22	1.8–2.2	13–16
Power steering line			
Oil reservoir	9–14	0.9–1.4	7–10
Pressure hose to oil pump			
4G92, 4G63 – 16 Valve, 4G64 – 16 Valve	14–21	1.4–2.1	10–15
Except 4G92, 4G63 – 16 Valve, 4G64 – 16 Valve	16–24	1.6–2.4	12–17
Return hose clip	4–6	0.4–0.6	3–4
Tube clamp	9–14	0.9–1.4	7–10
Pressure hose flare nut	12–18	1.2–1.8	9–13
Return and pressure tube flare nut	12–18	1.2–1.8	9–13

LUBRICANTS

E37CD--

Items	Specified lubricant	Quantity
Steering wheel and shaft		
Bearing	Multipurpose grease SAE J310, NLGI No.2	As required
Plate and lever (tilt steering type)	Multipurpose grease SAE J310, NLGI No.2	As required
Bushing (tilt steering type)	Multipurpose grease SAE J310, NLGI No.2	As required
Bevel gear		
Bearing in housing	Multipurpose grease SAE J310, NLGI No.2	As required
Oil seal	Multipurpose grease SAE J310, NLGI No.2	As required
Roller and guide	Multipurpose grease SAE J310, NLGI No.2	As required
Dust cover inside	Multipurpose grease SAE J310, NLGI No.2	As required
Housing inside	Multipurpose grease SAE J310, NLGI No.2	More than 50 g (1.76 oz.)
Manual steering gear box		
Needle roller bearing in housing	Multipurpose grease SAE J310, NLGI No.2	As required
Rack bushing and rack serration	Multipurpose grease SAE J310, NLGI No.2	As required
Pinion gear serration, bearing, oil seal and dust cover	Multipurpose grease SAE J310, NLGI No.2	As required
Rack support	Multipurpose grease SAE J310, NLGI No.2	As required

Items	Specified lubricant	Quantity
Bellows	Multipurpose grease SAE J310, NLGI No.2	As required
Tie rod end dust cover	Wheel bearing grease SAE J310, NLGI No.2	As required
Power steering gear box		
Oil seal	Automatic transmission fluid "DEXRON" or "DEXRON II"	As required
Rack serration	Multipurpose grease SAE J310, NLGI No.2	As required
Seal ring	Automatic transmission fluid "DEXRON" and "DEXRON II"	As required
Rack support	Multipurpose grease SAE J310, NLGI No.2	As required
Pinion gear and bearing in housing	Multipurpose grease SAE J310, NLGI No.2	As required
Bellows	Silicone grease	As required
Tie rod end dust cover	Wheel bearing grease SAE J310, NLGI No.2	As required
Oil pump		
Pulley assembly shaft	Automatic transmission fluid "DEXRON" or "DEXRON II"	As required
Friction surface of rotor, vane, cam ring and pump cover	Automatic transmission fluid "DEXRON" or "DEXRON II"	As required
O-ring	Automatic transmission fluid "DEXRON" or "DEXRON II"	As required
Flow control valve	Automatic transmission fluid "DEXRON" or "DEXRON II"	As required

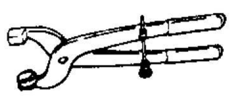
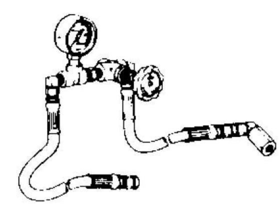
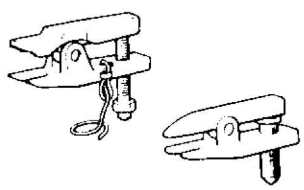
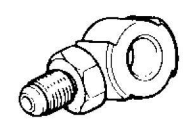
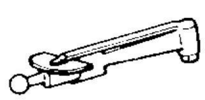
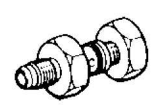
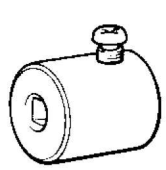
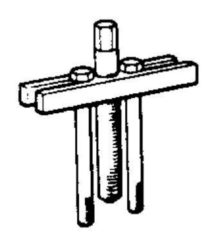
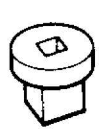
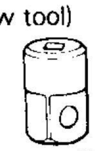
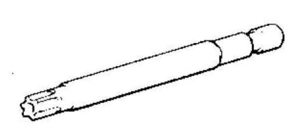
SEALANT AND ADHESIVES

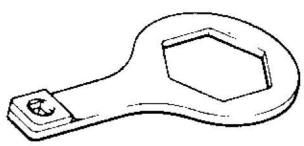
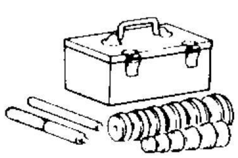
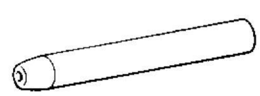
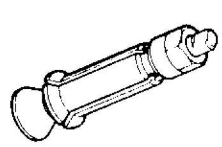
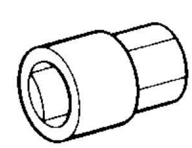
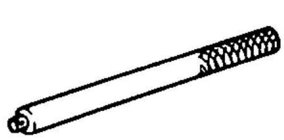
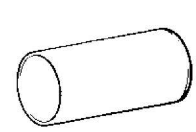
E37CE – –

Items	Specified sealant and adhesive	Remarks
Upper and lower steering column connecting bolt	3M Stud Locking Part No. 4170 or equivalent	Anaerobic adhesive
Bevel gear front cover installed surface Bevel gear adjust bolt screw Manual steering gear box adjust cover screw Tie-rod end dust cover installed surface Power steering rack support cover screw End plug screw	3M ATD Part No. 8661, 8663 or equivalent	Semi-drying sealant

SPECIAL TOOLS

E37DA--

Tool (Number and name)	Use	Tool (Number and name)	Use
MB990948 Linkage joint gauge 	Ball joint variation check for shaft direction	MB990662 Oil presusre gauge assembly 	Meaurement of oil pressure (Power steering)
MB991113 or MB990635 Steering linkage puller 	Disconnection of tie-rod end	MB990993 or MB991217 Power steering oil pressure gauge adapter (pump side) 	
MB990685 MB991151 Torque wrench 	Measurement of the pinion shaft preload Measurement of the ball joint starting toque	MB990994 Power steering oil pressure gauge adapter (hose side) 	
MB991006 Preload socket 		MB990803 Steering wheel puller 	Disconnection of the steering wheei
MB990326 Preload socket  MB990326 (New tool) Preload socket 		MB990826 Torx wrench 	Removal and installation of steering column (Vehicles for Europe)

Tool (Number and name)	Use	Tool (Number and name)	Use
MB990914 Side cover plug special spanner 	Bevel gear torque adjustment	MB991202 Oil seal & bearing installer 	Press fitting of valve housing oil seal and bearing (Power steering)
MB991157 Locknut wrench 	Removal and installation of bevel gear rear cover locknut	MB991201 Oil seal installer 	Press fitting of power cylinder oil seal, back up washer (Power steering)
MB990925 Bearing and oil seal installer set 	Installation of the oil seal MB990927 MB990938 MB990939 (Power steering)	MB991214 Rack installer 	Rack installation (Power steering)
MB991120 Needle bearing puller 	Removal of valve housing needle bearing (Power steering)	MB991204 Torque wrench socket 	Removal and installation of bearing and oil seal (Power steering)
MB991197 Bar (long type) 	Press fitting of power cylinder oil seal, back up washer (Power steering)	MB991317 Seal ring installer 	Installation of pinion seal ring

TROUBLESHOOTING

E37EAAD

MANUAL STEERING

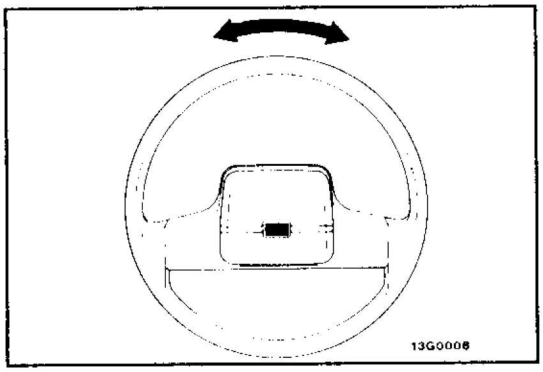
Symptom	Probable cause	Remedy	Reference page
Stiff steering wheel	Broken boots	Replace	37-38
	Insufficient grease	Apply grease	37-38
	Excessive pinion gear starting torque	Adjust	37-40
	Excessive bevel gear starting torque	Adjust	37-34, 35
	Seized or broken ball joint	Grease or replace	37-38
	Deformed tie rod	Replace	37-38
	Worn or broken lower arm bush	Replace	–
	Incorrect gear box installation, insternal defect	Correct or replace	37-36
	Defective steering shaft	Replace	37-25, 27
	Seized steering shaft and column bearing	Replace	37-25, 27
Vehicle pulls to one side	Excessive steering wheel play (inadequate total pinion torque, worn rack support spring)	Adjust or replace	37-38
	Incorrect tire pressure	Adjust	–
	Uneven tire wear, deform	Rotate tires or replace	–
	Brake drag	Correct	–
	Worn or broken front spring	Replace	–
	Defective knuckle	Replace	–
	Incorrect wheel alignment	Adjust	–
	Defective wheel bearing	Replace	–
	Defective or loose lower arm	Tighten or replace	–
	Loose tie rod connection	Tighten	37-38
	Worn or defective ball joints	Replace	37-38
	Worn or defective lower arm bushing	Replace	–
	Incorrect gear box installation, internal defect	Correct or replace	37-36
	Shock absorber malfunction	Replace	–
	Uneven wheel base (right & left)	Adjust	–
Steering shimmy or vibration	Incorrect tire pressure	Adjust	–
	Uneven tire wear, deformed	Rotate or replace	–
	Loose hub nut	Tighten	–
	Tire wheel runout, excessive imbalance	Balance wheel or repalce	–
	Incorrect wheel alignment	Align	–
	Defective wheel bearing damage	Replace	–
	Defective or loose lower arm	Tighten or replace	–
	Bent tie rod	Correct or replace	37-38
	Loose tie rod	Tighten	37-38
	Worn or defective ball joints	Replace	37-38
	Front suspension malfunction	Check, adjust or replace	–
	Incorrect gear box installation, internal defect	Correct or replace	37-36
	Shock absorber malfunction	Replace	–

Symptom	Probable cause	Remedy	Reference page
Feel backlash in steering wheel	Incorrect steering wheel play	Adjust	37–15
	Incorrect bevel gear torque	Adjust	–
	Incorrect tire pressure	Adjust	–
	Uneven tire wear, deformation	Rotate or replace	–
	Shock absorber malfunction	Replace	–
Poor steering wheel return	Incorrect tire pressure	Adjust	–
	Incorrect gear box installation	Tighten	37–36
	Excessive total pinion torque	Adjust	37–40
	Excessive bevel gear torque	Adjust	37–34, 35
	Seized or defective ball joint	Replace	37–36
	Incorrect wheel alignment	Adjust	–

POWER STEERING

Symptom	Probable cause	Check Method	Remedy	Reference page
Stiff steering wheel (low speed and constantly) or uneven torque when turning steering wheel	Loose V-belt	Check V-belt deflection when pressing its center with specified force	Adjust V-belt tension	37–19
	Defective V-belt	Visually check for stretch, wear or separation	Replace	37–54
	Insufficient fluid (Note 1)	Visually check oil reservoir fluid level	Supply fluid	37–20, 21
	Fluid leak	Leak from hose connection, oil pump, gear box seal area (Note 2)	Tighten or replace	37–60
	Crushed or distorted hoses	Check visually	Correct or replace	37–60
	Oil pump pressure does not increase	Assure hydraulic (gauge, valve; open) and maximum hydraulic generation (gauge, valve; closed) with steering wheel centrally aligned	Replace oil pump [Replace steering gear box when if problem is not corrected after replacing pump]	37–54
	Incorrect steering gear installation to crossmember Seized steering shaft and toeboard cover	Loosen bolt and retighten	Correct	37–42
	Bevel gear rear cover and adjusting bolt too tight	Measure bevel gear torque	Adjust	37–34, 35
	Rotary valve malfunction (defective seal) Defective rack piston seal	Assure hydraulic (gauge, valve: open) and maximum hydraulic generation (gauge, valve: closed) with steering wheel in neutral central position	Replace steering gear box	37–42
	Incorrect front wheel alignment	–	–	–
	Rack support too tight	Measure total pinion torque	Replace support spring, rack support	37–46
	Excessive friction around steering linkage	Check ball joint starting torque	Replace tie rod or tie rod end	37–46
Poor steering wheel return	Incorrect front wheel alignment	–	–	–
	Friction at steering shaft joint area and body grommet area	Disconnect from gear box and turn steering wheel to check ratcheting or for seizure	Correct installation or replace	37–42
	Tie rod end, ball joint irregular	Check for loose ball joint or grease	Grease or replace tie rod end	37–46
	Rack support too tight	Measure total pinion torque	Adjust or replace gear box	37–52
	Bevel gear rear cover and adjust bolt too tight	Measure bevel gear torque	Adjust	37–34, 35
	Excessive tie rod ball joint rotational resistance	Check oscillating torque	Replace tie rod	37–46
	Defect in gear friction area or rotating area Bent rack	Measure total pinion torque (No remarkable change while full turning)	Replace gear box	37–42
	Incorrect gear box and crossmember installation	Check gear box, mount rubber seizure	Loosen bolt once Reinstall or replace gear box, mount rubber	37–42

NOTE
1. Check for fluid leak-especially into gear bellows.
2. Check for damaged O-ring before tightening as it seals the gear box pipe connection area.



SERVICE ADJUSTMENT PROCEDURES

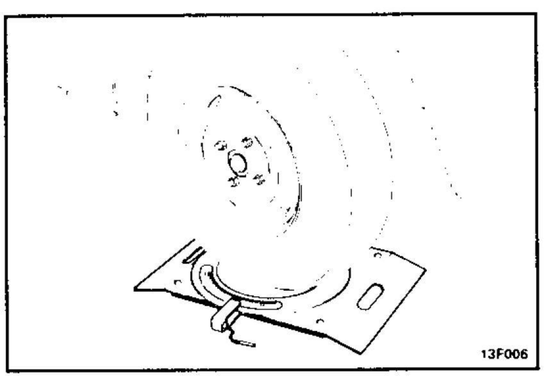
MANUAL STEERING

CHECKING OF THE STEERING WHEEL FREE PLAY E37FAAD

1. Set front wheels straight ahead.
2. Measure the play on steering wheel circumference before wheels move when slightly moving steering wheel in both directions.

   Limit: 40 mm (1.57 in.)

3. When the play exceeds the limit, check play in steering shaft connection and steering linkage. Correct or replace.
4. When (3) check provides good results, check the following to adjust:
   (1) Remove the steering gear box, check and adjust total pinion starting torque.
   (2) Remove bevel gear assembly, check and adjust staring torque.



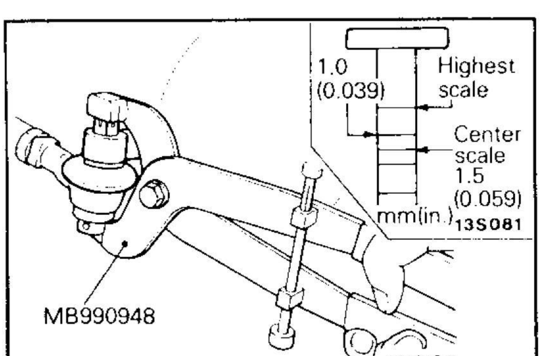
CHECKING OF THE STEERING ANGLE E37FDAD 0

1. Locate front wheels on turning radius gauge and measure steering angle.

   Standard value:

2WD	**Inside wheel**	**37°00′ $^{+0°}_{-3°}$**
	Outside wheel	**34°00′**
4WD	**Inside wheel**	**30°40′ $^{+0°}_{-3°}$**
	Outside wheel	**30°20′**

2. When the angle is not within the standard value, the toe is probably incorrect. Adjust toe (Refer to GROUP 33 FRONT SUSPENSION–Service Adjustment Procedures) and recheck steering angle.



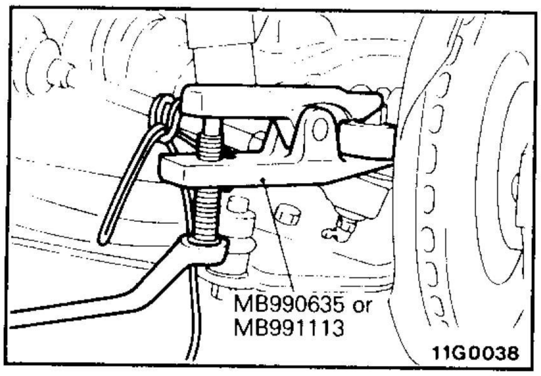
VARIATION CHECK OF TIE ROD END BALL JOINT FOR SHAFT DIRECTION E37FCAB0

1. For 4WD vehicles, remove tie rod end grease fitting.
2. Hold ball joint with the special tool.
3. Set special tool scale at its highest and measure variation with ball stud compressed. The variation should locate between the highest and centre scales.

   Limit: 1.5 mm (0.059 in.)

4. When the variation exceeds the centre scale, replace the tie rod end.

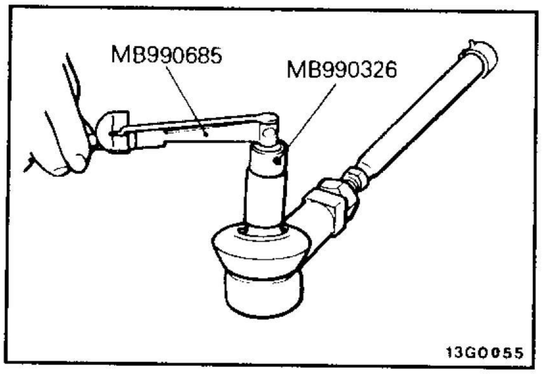
   Caution
   Even if the variation is within the limit, check ball joint starting torque.



STARTING TORQUE CHECK OF TIE ROD END BALL JOINT

E37FMAA0

1. Disconnect tie rod and knuckle with special tool.



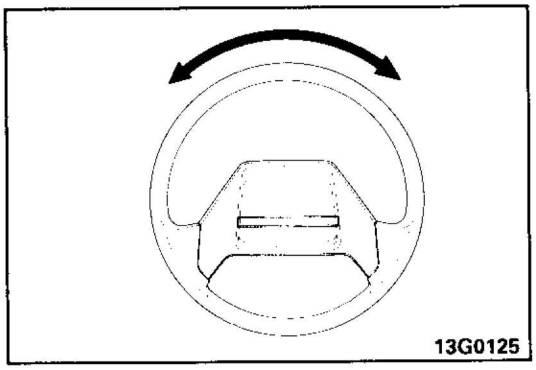
2. Move ball joint stud several times and install nut on stud. Measure ball joint starting torque with special tool.

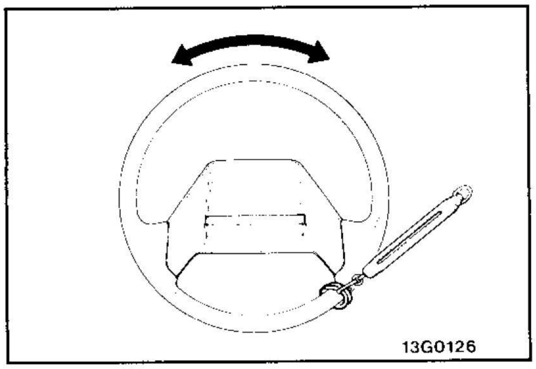
   Standard value: 1–3 Nm (10–30 kgcm, 9–26 in.lbs.)

3. When the starting torque exceeds the standard value, replace tie rod end.
4. When the starting torque is under the standard value, check ball joint for end play or ratcheting. If none these, the joint is still serviceable.

SERVICE ADJUSTMENT PROCEDURES (POWER STEERING)

STEERING WHEEL FREE PLAY CHECK E37FABA





1. With engine running (hydraulic operation), set front wheels straight ahead.
2. Measure the play on steering wheel circumference before wheels start to move when slightly moving steering wheel in both directions.

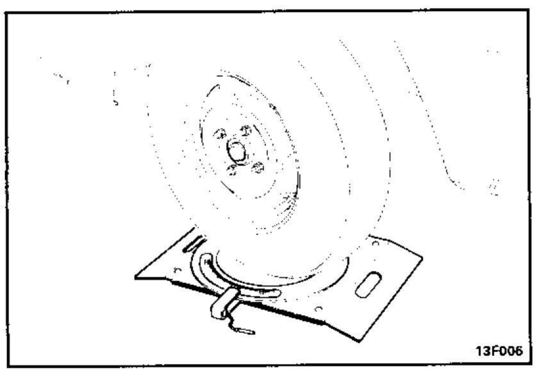
   Limit: 40 mm (1.57 in.)

3. When play exceeds the limit, check for play on steering shaft connection and steering linkage. Correct or replace.
4. If the free play still exceeds the standard value after check (3), set steering wheel straight ahead with engine stopped. Load 5 N (0.5 kg, 1 lb.) towards steering wheel circumference and check play.

   Standard value (steering wheel play with engine stopped): 11 mm (0.43 in.)

   If the play exceeds the standard value, remove steering gear box and check total pinion torque or remove bevel gear and check starting torque.

STEERING ANGLE CHECK E37FDAD1



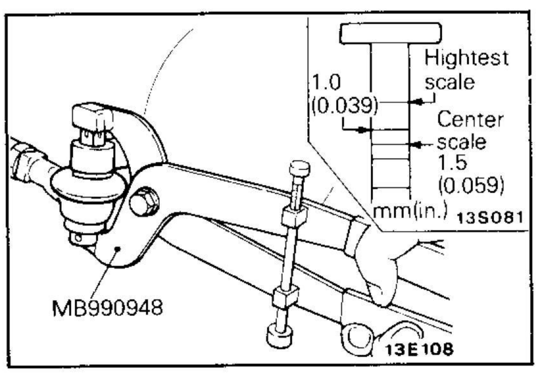
1. Set front wheels on turning radius gauge and measure steering angle.

   Standard value:

2WD	**Inner wheel**	**37°0′ $^{+0°}_{-3°}$**
	Outer wheel	**34°00′**
4WD	**Inner wheel**	**30°40′ $^{+0°}_{-3°}$**
	Outer wheel	**30°20′**

2. When not within the standard value, it is probably a toe problem. Adjust toe (Refer to GROUP 33 – Service Adjustment Procedures) and recheck.

TIE ROD END BALL JOINT VARIATION CHECK E37FCAB1



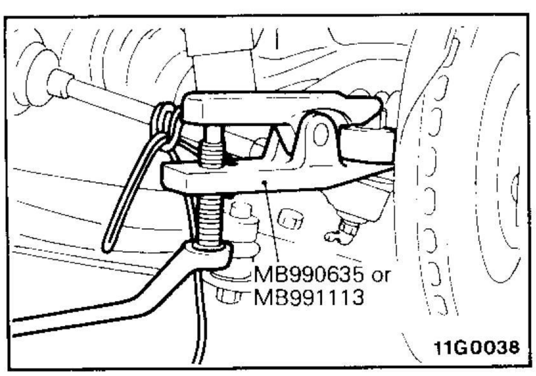
1. For 4WD vehicles, remove grease fitting from tie rod end.
2. Hold ball joint with special tool.
3. Set special tool at highest scale. Compress the ball stud and measure the variation. Variation should be between the highest and center scale.

   Limit: 1.5 mm (0.059 in.)

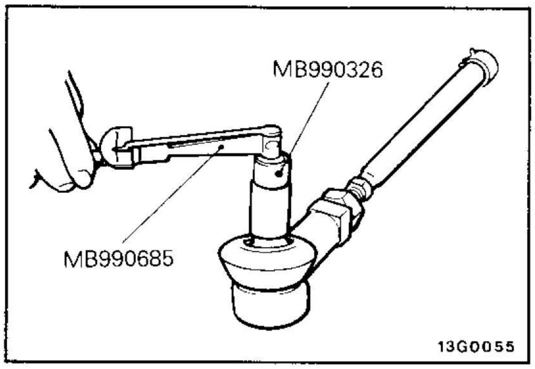
4. If variation exceeds the center scale, replace the tie rod end.

   Caution
   Even with the variation within the limit value, check ball joint starting torque.

TIE ROD END BALL JOINT STARTING TORQUE CHECK E37FMAA1



1. Connect tie rod and knuckle with special tool.



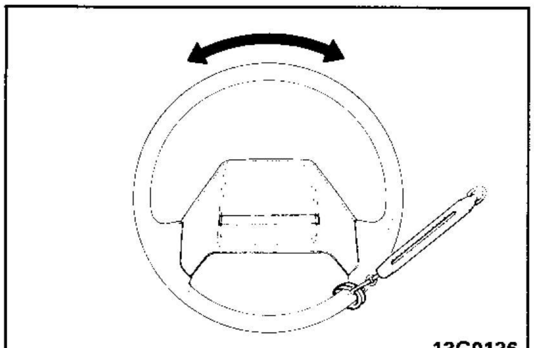
13G0055

2. Move ball joint stud several times and install nut on stud. Measure ball joint starting torque with special tool.

   Standard value: 1 – 3 Nm (10 – 30 kgcm, 9 – 26 in.lbs.)

3. When starting torque exceeds the standard value, replace tie rod end.
4. When the starting torque is under the standard value, check for play or ratcheting in ball joint. If none of these, it is still serviceable.

STATIONARY STEERING EFFORT CHECK E37FFAC

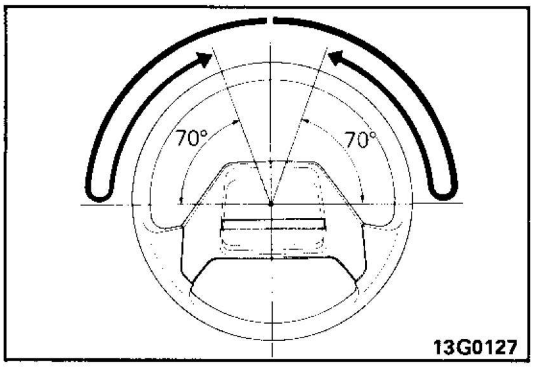

13G0126

1. With the vehicle stopped on a flat, paved surface, turn the steering wheel to the straight ahead position.
2. Start the engine and set it to 1,000±100 r/min.
3. Attach a spring scale to the outer circumference of the steering wheel and measure the steering force required to turn the steering wheel from the straight ahead position to the left and right (within a range of 1.5 turns).
   Also check to be sure that there is no significant fluctuation of the required steering force.

   Standard value: 37 N (3.7 kg, 8 lbs.) or less [fluctuation allowance 6 N (0.6 kg, 1.3 lbs.) or less]

4. If the measured force exceeds the standard value, refer to the troubleshooting guide and make the checks and adjustments described there.

STEERING WHEEL RETURN TO CENTRE CHECK E37FGAA

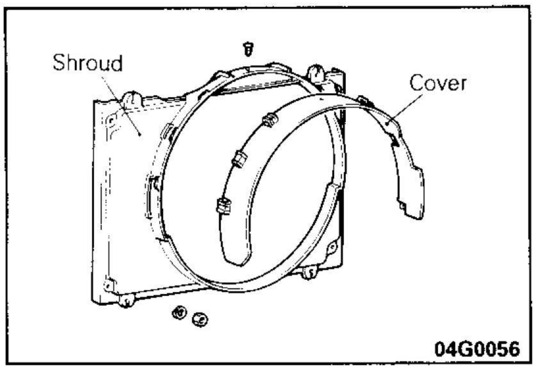


13G0127

To make this test, conduct a road test and check as follows.

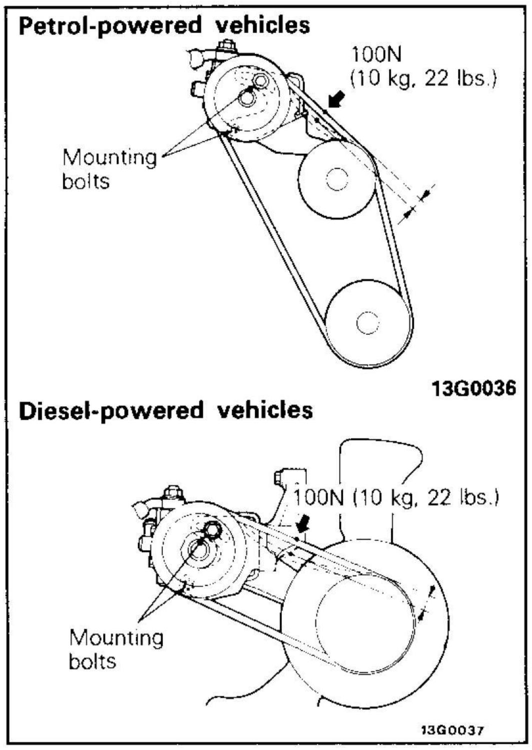
1. Make both gradual and sudden turns and check the steering "feeling" to be sure that there is no difference in the steering force required and the wheel return between left and right turns.
2. At a speed of 35 km/h (22 mph), turn the steering wheel 90°, and release the steering wheel after 1 or 2 seconds. If the steering wheel then returns 70° or more, the return can be judged to the satisfactory.

   NOTE
   There will be a momentary feeling or "heaviness" when the wheel is turned quickly, but this is not abnormal.
   (This is because the oil pump discharge amount is especially apt to be insufficient during idling.)



DRIVE BELT TENSION CHECK
E37FHAB

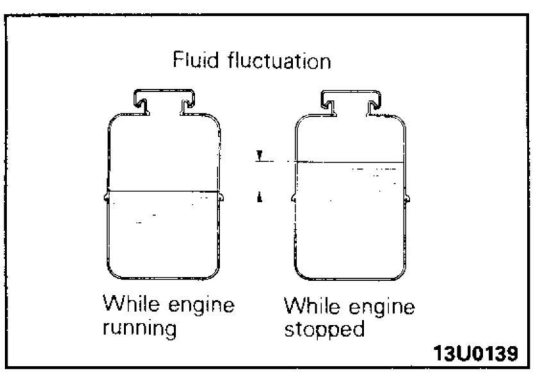
1. Remove radiator shroud. (2000 2WD and 2500 vehicles) (Refer to GROUP 14 – radiator.)



2. Press in drive belt at the illustrated position with about 100 N (10 kg, 22 lbs.) and measure deflection.

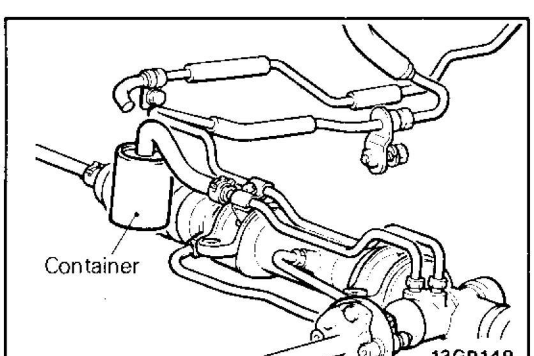
   Standard value:
   Petrol-powered vehicles: 6 – 9 mm (0.24 – 0.35 in.)
   Diesel-powered vehicles: 8 – 11 mm (0.31 – 0.43 in.)

3. When not within the standard value, loosen oil pump bolt and move oil pump to obtain the standard value.



FLUID LEVEL CHECK
E37FIAD

1. Park the vehicle on a flat, level surface, start the engine, and then turn the steering wheel several times to raise the temperature of the fluid to approximately 50 – 60°C (122 – 140°F).
2. With the engine running, turn the wheel all the way to the left and right several times.
3. Check the fluid in the oil reservoir for foaming or milkiness. Check the difference of the fluid level when the engine is stopped, and while it is running. If the fluid level changes considerably, air bleeding should be done.



FLUID REPLACEMENT
E37FJAD

1. Raise the front wheels on a jack, and then support them with floor stands.
2. Disconnect the return hose connection, and drain the oil into a container.
3. Disconnect the high-tension cable (petrol-powered vehicles) or the connector of the fuel-cut solenoid valve (diesel-powered vehicles), and then while operating the starting motor intermittently, turn the steering wheel all the way to the left and right several times to drain all of the fluid.

Caution
Be careful not to position the high-tension cable near the carburetor or the injection mixer.

4. Connect the return hoses securely, and then secure it with the clip.
5. Fill the oil reservoir with the specified fluid up to the lower position of the filter, and then bleed the air.

Specified fluid: Automatic transmission fluid DEXRON or DEXRON II

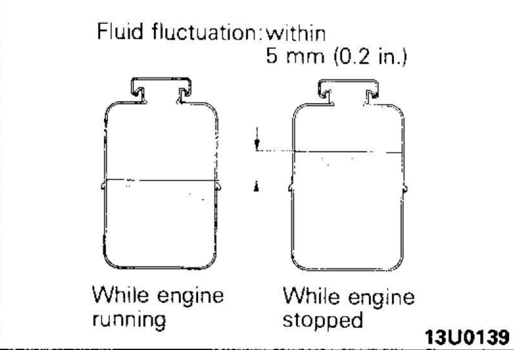
BLEEDING

E37FKAD

1. Jack up the front wheels and support them by using a rigid rack.
2. Manually turn the oil pump pulley a few times.
3. Turn the steering wheel all the way to the left and to the right five or six times.
4. Disconnect the high-tension cable (petrol-powered vehicles) or the connector of the fuel-cut solenoid valve (diesel-powered vehicles), and then, while operating the starting motor intermittently, turn the steering wheel all the way to the left and right five or six times (for 15 to 20 seconds).

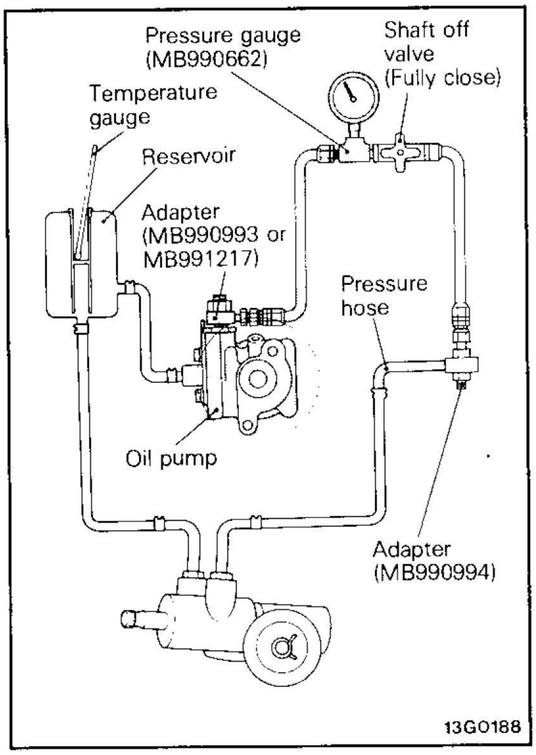
Caution
1. **During air bleeding, replenish the fluid supply so that the level never falls below the lower position of the filter.**
2. **If air bleeding is done while engine is running, the air will be broken up and absorbed into the fluid; be sure to do the bleeding only while cranking.**

5. Connect the ignition cable, and then start the engine (idling).
6. Turn the steering wheel to the left and right until there are no air bubbles in the oil reservoir.
7. Confirm that the fluid is not milky, and that the level is up to the specified position on the level gauge.
8. Confirm that there is very little change in the fluid level when the steering wheel is turned left and right.
9. Check whether or not the change in the fluid level is within 5 mm (0.2 in.) when the engine is stopped and when it is running.



13U0139

Caution
1. **If the change of the fluid level is 5 mm (0.2 in.) or more, the air has not been completely bled from the system, and thus must be bled completely.**
2. **If the fluid level rises suddenly after the engine is stopped, the air has not been completely bled.**
3. **If air bleeding is not complete, there will be abnormal noises from the pump and the flow-control valve, and this condition could cause a lessening of the life of the pump, etc.**



OIL PUMP PRESSURE TEST

E37FLAD

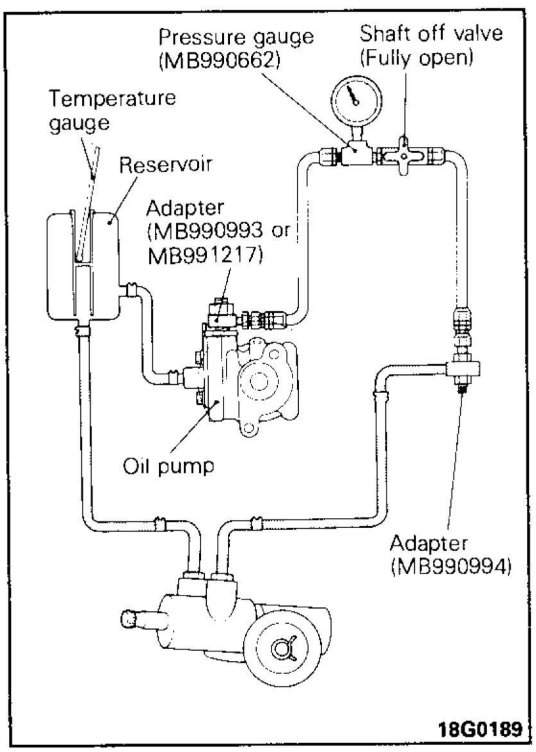
OIL PUMP RELIEF PRESSURE CHECK

1. Disconnect the pressure hose from the oil pump, and then connect the special tools.
2. Bleed the air, and then turn the steering wheel several times while the vehicle is not moving so that the temperature of the fluid rises to approximately 50 – 60°C (122 – 140°F).
3. Start the engine and idle it at 1,000±100 r/min.
4. Fully close the shut-off valve of the pressure gauge and measure the oil pump relief pressure to confirm that it is within the standard value range.

Standard value: 7.5 – 8.2 MPa (75 – 82 kg/cm^2, 1,067 – 1,166 psi.)

Caution
Pressure gauge shut off valve must not remain closed for more than 10 seconds.

5. If it is not within the standard value, overhaul the oil pump.
6. Remove the special tools, and then tighten the pressure hose to the specified torque.
7. Bleed the system. (Refer to P. 37-20.)



PRESSURE UNDER NO-LOAD CONDITIONS CHECK

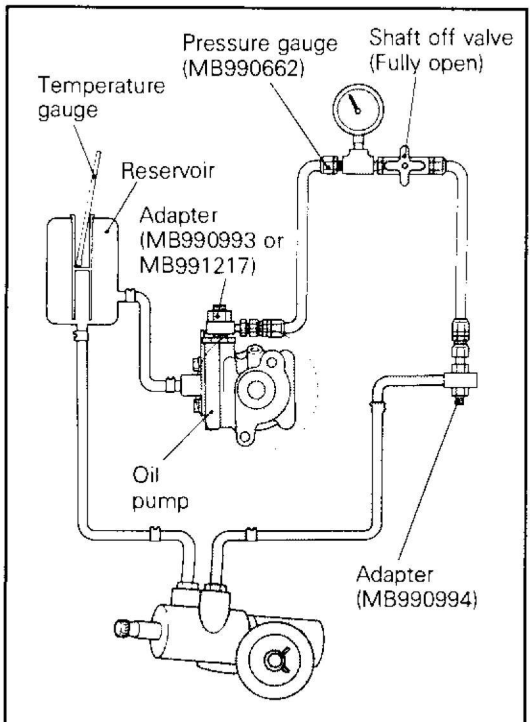
1. Disconnect the pressure hose from the oil pump, and then connect the special tools.
2. Bleed the air, and then turn the steering wheel several times while the vehicle is not moving so that the temperature of the fluid rises to approximately 50 – 60°C (122 – 140°F).
3. Start the engine and idle it at 1,000 ± 100 r/min.
4. Check whether or not the hydraulic pressure is the standard value when no-load conditions are created by fully opening the shut-off valve of the pressure gauge.

Standard value: 0.8 – 1.0 MPa (8 – 10 kg/cm^2, 114 – 142 psi.)
Limit: 1.5 MPa (15 kg/cm^2, 213 psi.)

5. If it is not within the standard value, the probable cause is a malfunction of the oil line or steering gear box, so check these parts and repair as necessary.
6. Remove the special tools, and then tighten the pressure hose to the specified torque.
7. Bleed the system.

STEERING GEAR RETENTION HYDRAULIC PRESSURE CHECK

1. Disconnect the pressure hose from the oil pump, and then connect the special tools.
2. Bleed the air, and then turn the steering wheel several times while the vehicle is not moving so that the temperature of the fluid rises to approximately 50 – 60°C (122 – 140°F).
3. Start the engine and idle it at 1,000 ± 100 r/min.
4. Fully open the shut-off valve of the pressure gauge.



13G0190

5. Turn the steering wheel all the way to the left or right; then check whether or not the retention hydraulic pressure is the standard value.

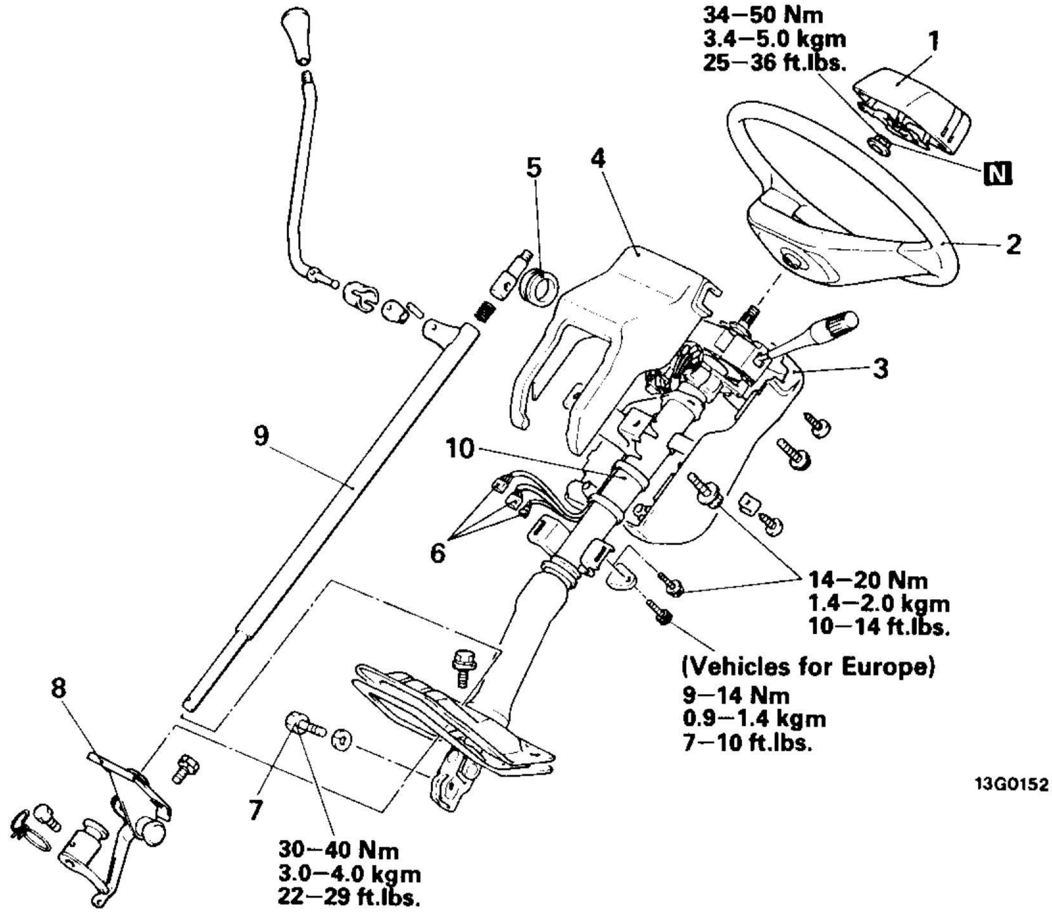
   Standard value: 7.5 – 8.2 MPa (75 — kg/cm^2, 1,067 – 1,166 psi.)

6. When not within the standard value, overhaul the steering gear box.
   Remeasure fluid pressure.
7. Remove the special tools, and then tighten the pressure hose to the specified torque.
8. Bleed the system.

STEERING WHEEL AND SHAFT

E37HA--

REMOVAL AND INSTALLATION



Pre-removal Operation
- Removal of undercover

Post-installation Operation
- Checking of steering wheel position with wheels straight ahead
- Installation of undercover

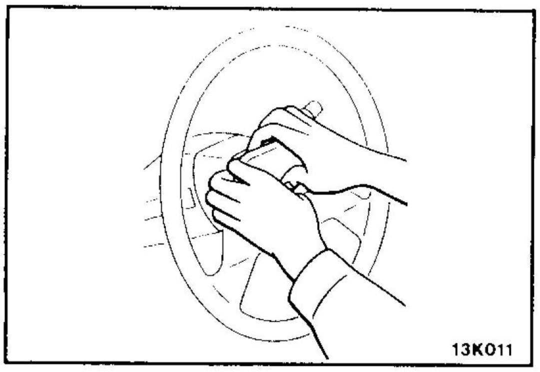
Removal steps

◆◆ 1. Horn pad
◆◆ 2. Steering wheel
3. Lower column cover
4. Upper column cover
5. Grommet
6. Connector (column switch, ignition switch) connection
7. Bolt
◆◆ 8. Selector lever bracket assembly (vehicles with column shift)
◆◆ 9. Control rod (vehicles with column shift)
◆◆ 10. Steering column

NOTE
(1) Reverse the removal procedures to reinstall.
(2) ◆◆ : Refer to "Service Points of Removal".
(3) N : Non-reusable parts
(4) The illustration shows steering shaft for vehicles without tilt steering. However, steering shaft removal and installation are the same for vehicles with tilt steering.

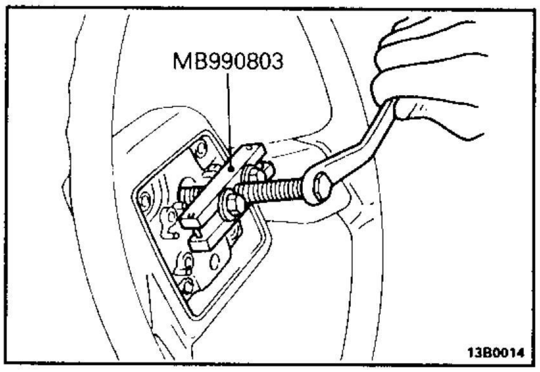
SERVICE POINTS OF REMOVAL

E37HBAH


13K011

1. REMOVAL OF HORN PAD

Refer to GROUP 54 CHASSIS ELECTRICAL–Horn.



13B0014

2. REMOVAL OF STEERING WHEEL

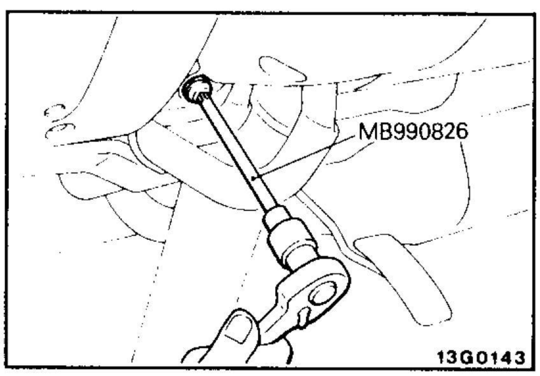
Remove the steering wheel by using the special tool.

Caution

Do not hammer on the steering wheel to remove it, doing so may damage the collapsible mechanism.

8. REMOVAL OF SELECTOR LEVER BRACKET ASSEMBLY/9. CONTROL ROD

Refer to GROUP 22 MANUAL TRANSMISSION–Transmission Control (vehicles with column shift).



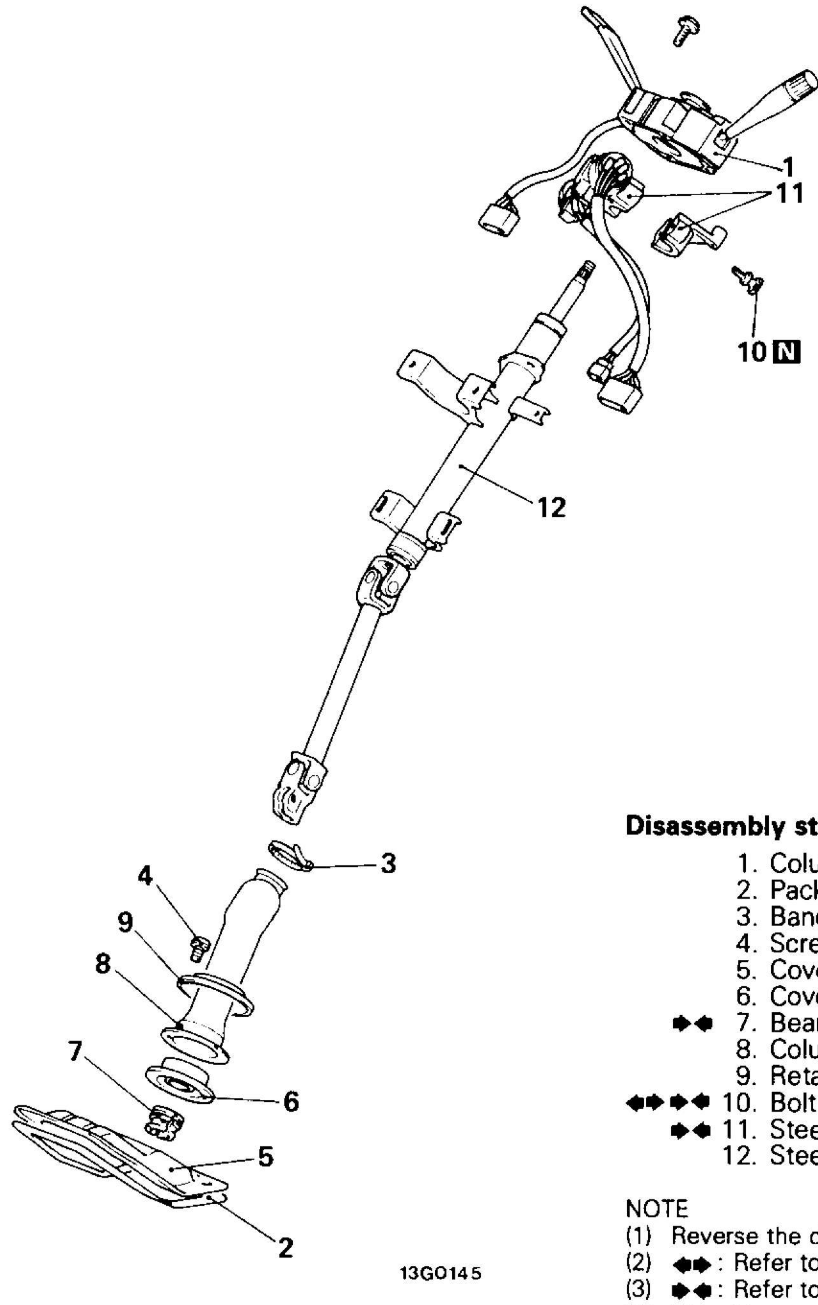
13G0143

10. REMOVAL OF STEERING COLUMN

For vehicles for Europe, one of the 4 steering column bolt is a special screw. Remove this screw with special tool.

DISASSEMBLY AND REASSEMBLY (Vehicles without tilt-steering)

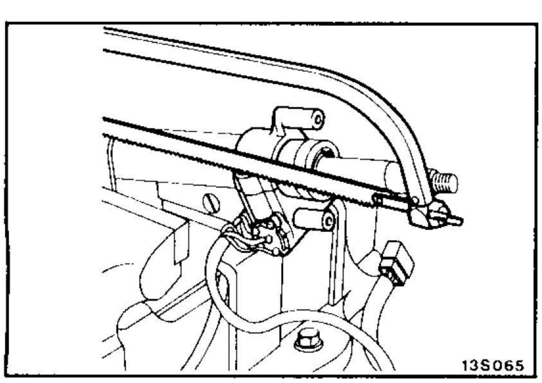
E37HE–A



Disassembly steps

1. Column switch
2. Packing
3. Band
4. Screw
5. Cover plate
6. Cover
7. ➡⬅ Bearing
8. Column shift cover
9. Retainer
10. ⬅➡ ➡⬅ Bolt
11. ➡⬅ Steering lock
12. Steering column

NOTE
(1) Reverse the disassembly procedures to reassemble.
(2) ⬅➡ : Refer to "Service Points of Disassembly".
(3) ➡⬅ : Refer to "Service Points of Reassembly".
(4) N : Non-reusable parts



SERVICE POINTS OF DISASSEMBLY

E37HFAF

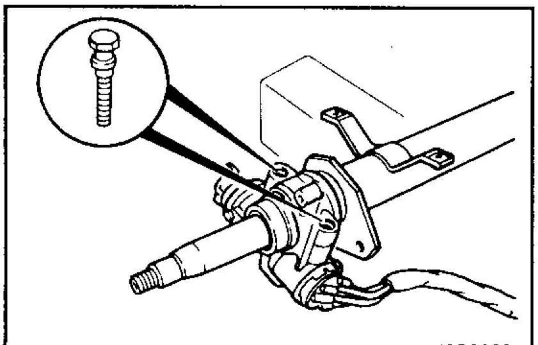
10. REMOVAL OF BOLT

If it is necessary to remove the steering lock, use a hack-saw to cut a groove on the head of the special bolt, and then use a screwdriver to remove the steering lock.

INSPECTION

E37HGAF

- Check the steering shaft universal joint for end play.
- Check for bent steering shaft.
- Check for damaged or defective steering column.
- Check for damaged column shift cover to boots.



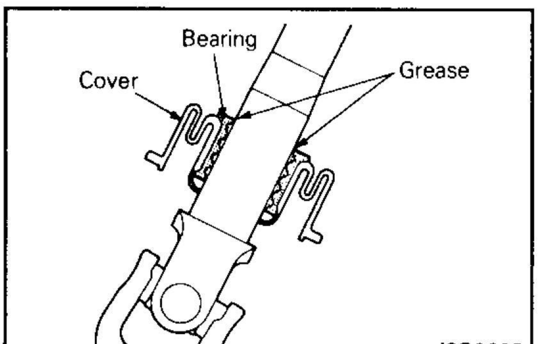
13G0098

SERVICE POINTS OF REASSEMBLY

E37HHAF

11. INSTALLATION OF STEERING LOCK/10. BOLT

(1) Match steering lock retainer in shaft groove through steering column aperture and temporarily install. Check steering lock operation.
(2) Tighten bolt until the head tears off.



13G0035

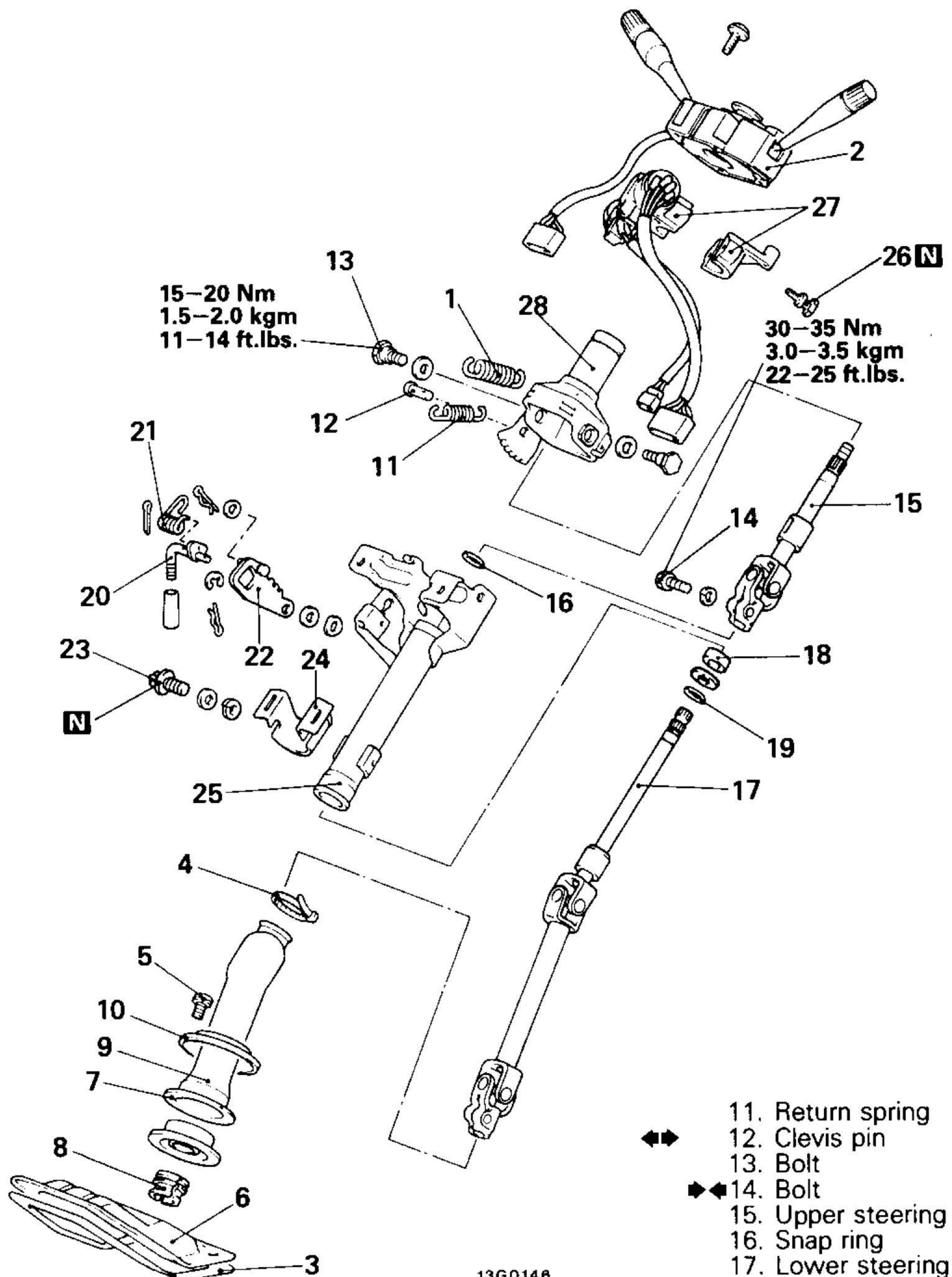
7. APPLICATION OF GREASE TO BEARING

Pack bearing inner groove with specified grease. Press the bearing into cover.

Specified grease: Multipurpose grease, SAE J310, NLGI No.2

DISASSEMBLY AND REASSEMBLY (Vehicles with tilt-steering)

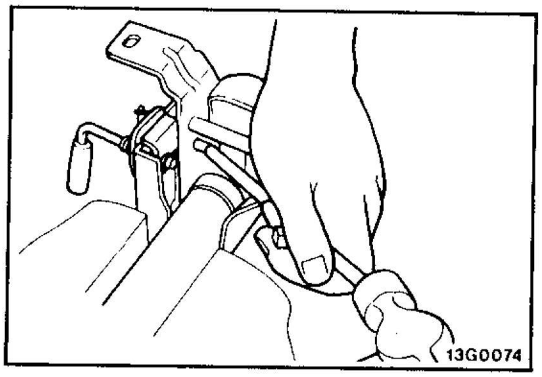
E37HE-B



Disassembly steps

1. Return spring
2. Column switch
3. Packing
4. Band
5. Screw
6. Cover plate
7. Cover
8. ▶◀ Bearing
9. Column shift cover
10. Retainer
11. Return spring
12. ◀▶ Clevis pin
13. Bolt
14. ▶◀ Bolt
15. Upper steering shaft
16. Snap ring
17. Lower steering shaft
18. Bearing spacer
19. Snap ring
20. ▶◀ Lever
21. Return spring
22. ▶◀ Plate
23. ◀▶ ▶◀ Bolt
24. One-way braket
25. Lower steering column
26. ◀▶ ▶◀ Bolt
27. ▶◀ Steering lock
28. Upper steering column

NOTE
(1) Reverse the disassembly procedures to reassemble.
(2) ◀▶ : Refer to "Service Points of Disassembly".
(3) ▶◀ : Refer to "Service Points of Reassembly".
(4) N : Non-reusable parts

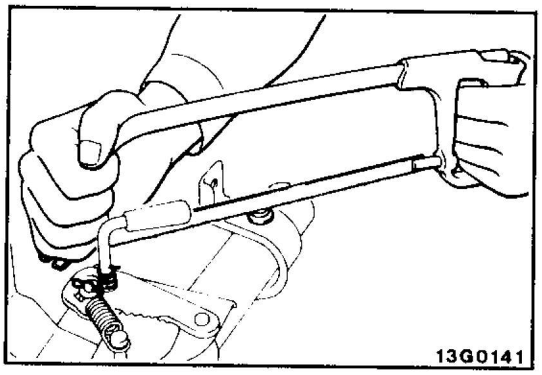


SERVICE POINTS OF DISASSEMBLY

E37HFAG

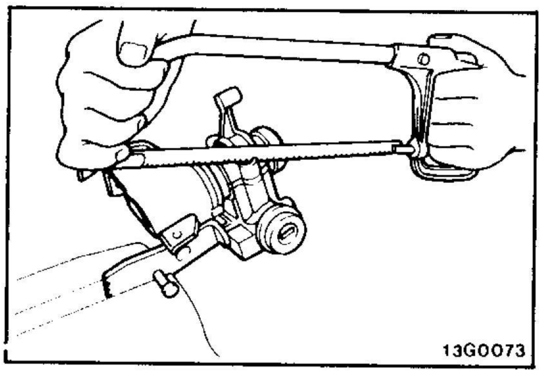
12. REMOVAL OF CLEVIS PIN

Hammer out clevis pin from inside steering column.



23. REMOVAL OF BOLT

If it is necessary to remove the one-way bracket of the lower steering column, use a hacksaw to cut a groove on a head of the special bolt, and then use a screwdriver to remove it.



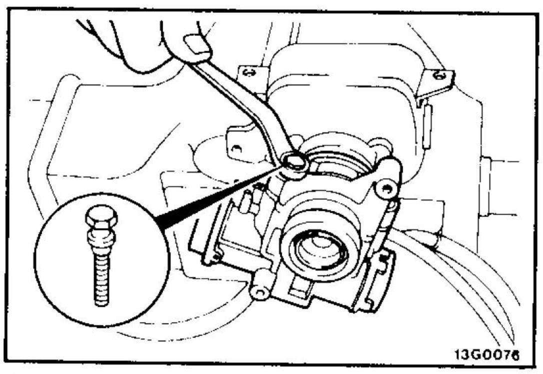
26. REMOVAL OF BOLT

If it is necessary to remove the steering lock, cut a groove in bolt head with a hacksaw, and then remove steering lock with a screwdriver.

INSPECTION

E37HGAG

- Check for damaged or defective plate.
- Check for worn plate serration.
- Check play or irregular steering shaft joint rotation.
- Check for bent steering shaft.
- Check for damaged or defective steering column.

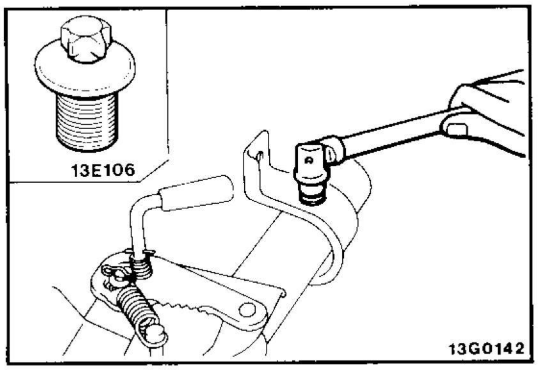


SERVICE POINTS OF REASSEMBLY

E37HHAG

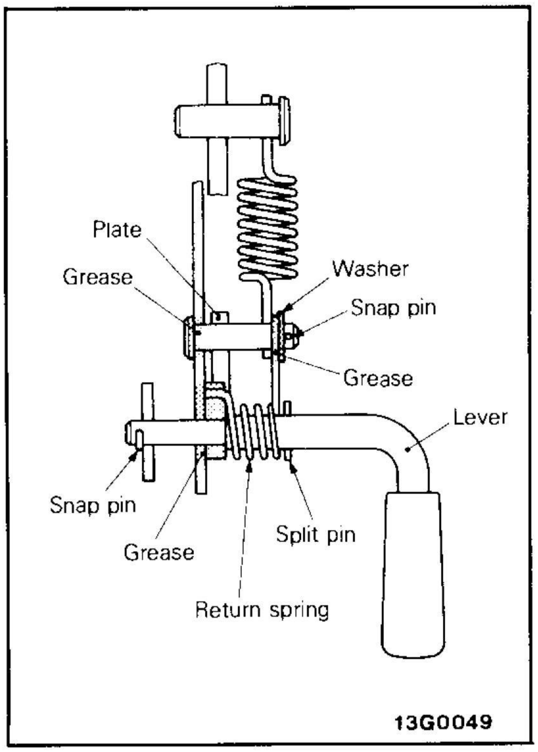
27. INSTALLATION OF STEERING LOCK/26. BOLT

(1) Match steering lock retainer in shaft groove through steering column aperture and temporarily tighten the bolt. Check steering lock operation.
(2) Tighten bolt until the head tears off.



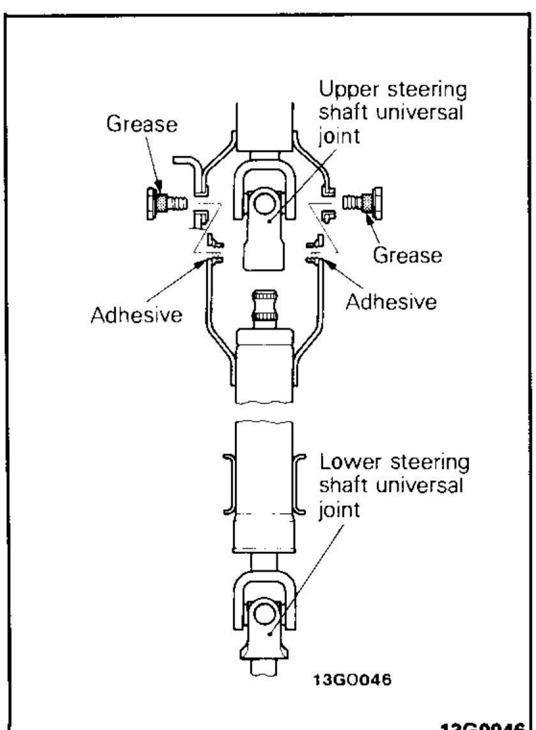
23. INSTALLATION OF BOLT

When installing the one-way bracket of column, tighten the special bolt until the head twists off.



22. APPLICATION OF GREASE TO PLATE/20. LEVER

Apply multipurpose grease at illustrated locations.



14. INSTALLATION OF BOLT

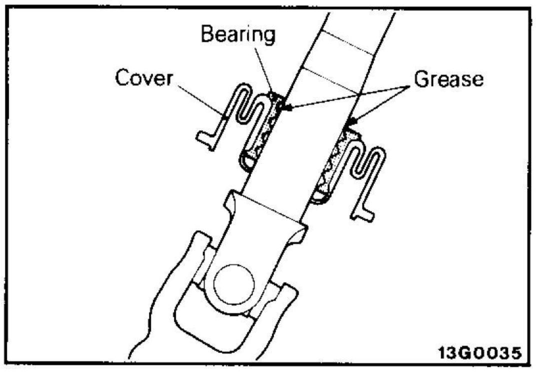
(1) Coat the multipurpose grease to the bolt stem.

(2) Apply specified adhesive to lower steering column nut.

Specified adhesive: 3M Stud Locking Part No. 4170 or equivalent

Caution
If there is any adhesive hardened inside the nut, use a tap to remove it before applying the adhesive.

(3) Install to locate upper steering shaft and lower steering shaft universal joints at the illustrated positions.



8. APPLICATION OF GREASE TO BEARING

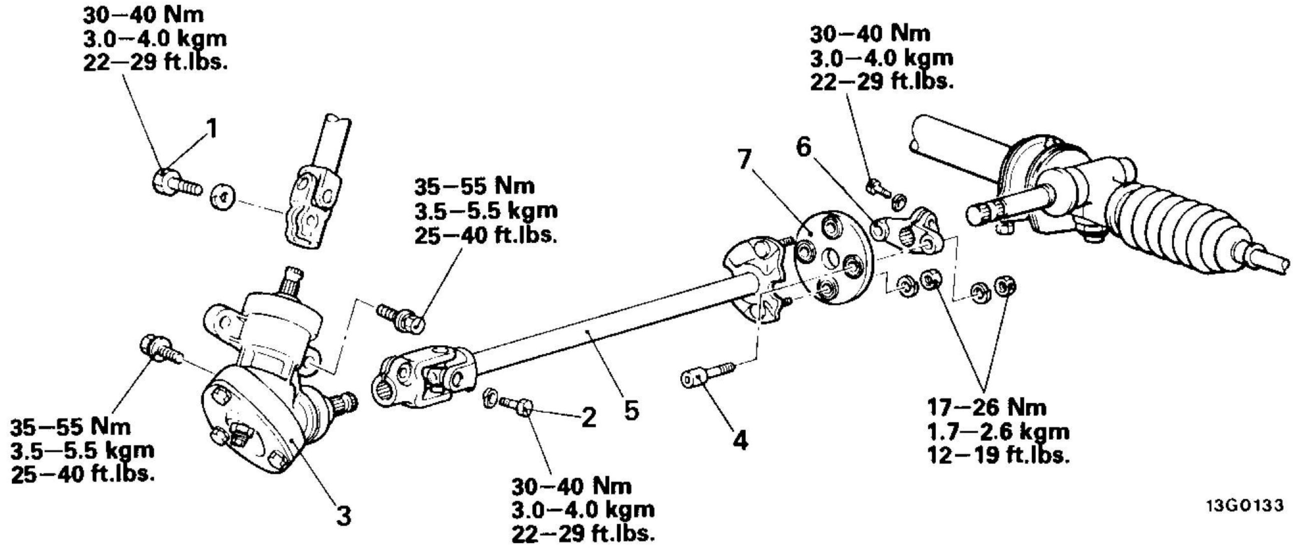
Pack bearing inner groove with specified grease and press into cover.

Specified grease: Multipurpose grease, SAE J310, NLGI No.2

BEVEL GEAR AND INTERMEDIATE SHAFT ASSEMBLY

E37IA--

REMOVAL AND INSTALLATION



Pre-removal Operation
- Removal of air guide panel and under skid panel (4WD) (Refer to GROUP 42 BODY–Under cover.)

Bevel gear removal steps

1. Bolt
2. Bolt
3. Bevel gear assembly

Post-installation Operation
- Installation of air guide panel and under skid panel (4WD) (Refer to GROUP 42 BODY–Under cover).

Intermediate shaft assembly removal steps

2. Bolt
4. Bolt
5. Intermediate shaft
6. Yoke
7. Rubber coupling

NOTE
Reverse the removal procedures to reinstall.

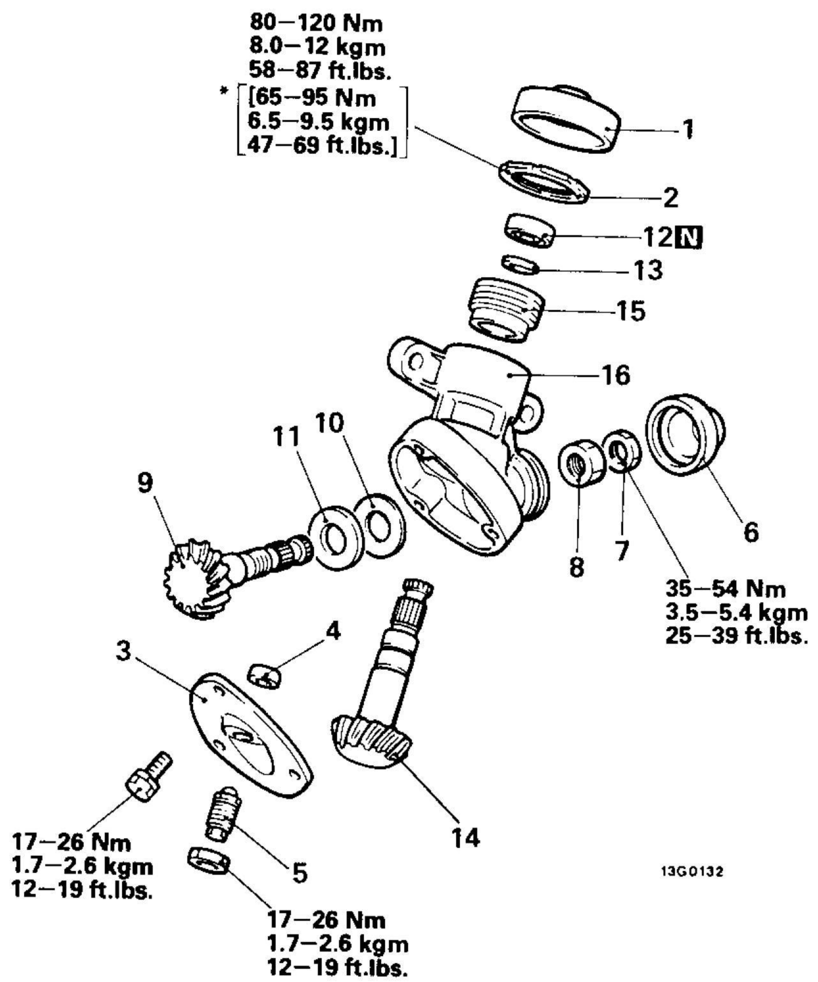
INSPECTION

E37ICAA

- Check for cracked or damaged rubber coupling.
- Check for bent intermediate shaft.
- Check the intermediate shaft universal joint for play.
- Check for cracked or damaged bevel gear assembly.

DISASSEMBLY AND REASSEMBLY

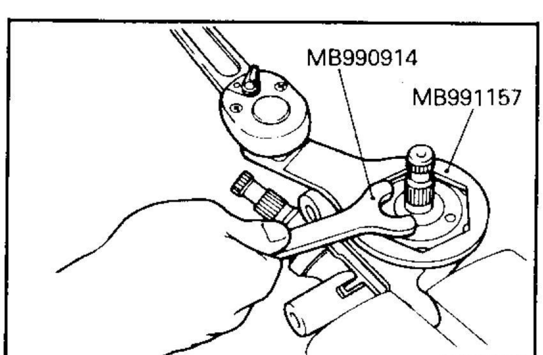
E37IE--



Disassembly steps

1. Dust cover
◆▶ ▶◆ 2. Locknut
▶◆ Adjustment of total bevel gear torque
▶◆ 3. Front cover
4. Block
5. Adjust bolt
▶◆ 6. Dust cover
7. Locknut
▶◆ Adjustment of gear (output side) torque
8. Nut
◆▶ 9. Gear (output side)
▶◆ 10. Guide
▶◆ 11. Roller
▶◆ 12. Oil seal
13. Snap ring
14. Gear (input side)
▶◆ 15. Rear cover
▶◆ 16. Housing

NOTE
(1) Reverse the disassembly procedures to reassemble.
(2) ◆▶: Refer to "Service Points of Disassembly".
(3) ▶◆: Refer to "Service Points of Reassembly".
(4) N : Non-reusable parts
(5) Tightening torque [*] indicates when a special tool is required.

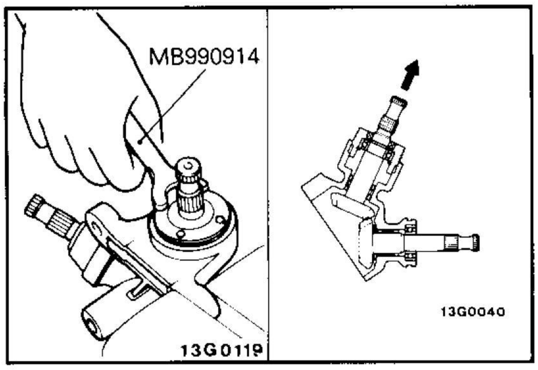


SERVICE POINTS OF DISASSEMBLY

E37IFAA

2. REMOVAL OF LOCKNUT

Remove locknut with special tool.



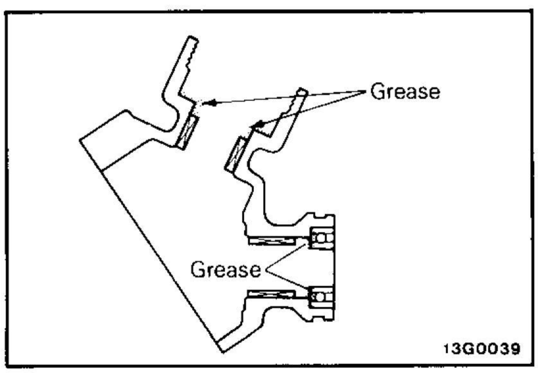
9. REMOVAL OF GEAR

(1) Use special tool to loosen rear cover until input side gear is disconnected from output side gear.
(2) Remove output side gear
(3) Remove input side gear.

INSPECTION

E37IGAA

- Check for irregular rotation or defective ball bearing or needle bearing in housing
- Check the gear serration for wear or damage
- Check for cracked or damaged dust cover.

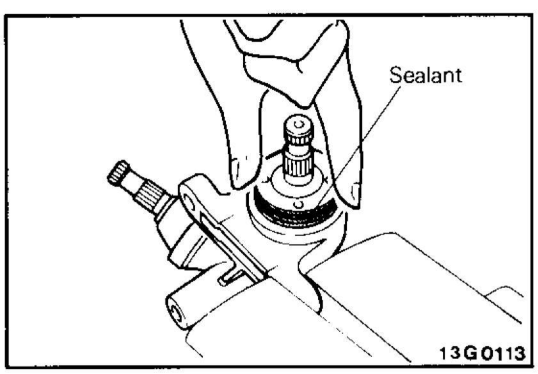


SERVICE POINTS OF REASSEMBLY

E37IHAA

16. APPLICATION OF GREASE TO HOUSING

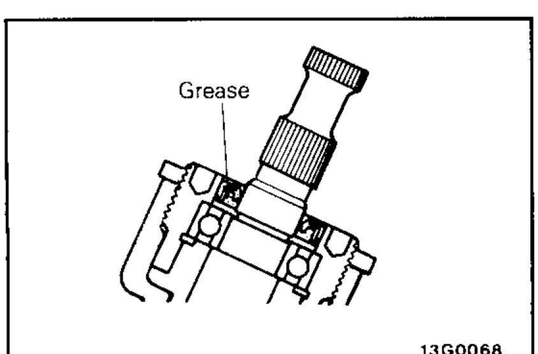
Pack housing as illustrated with multipurpose grease.



15. APPLICATION OF LIQUID GASKET TO REAR COVER

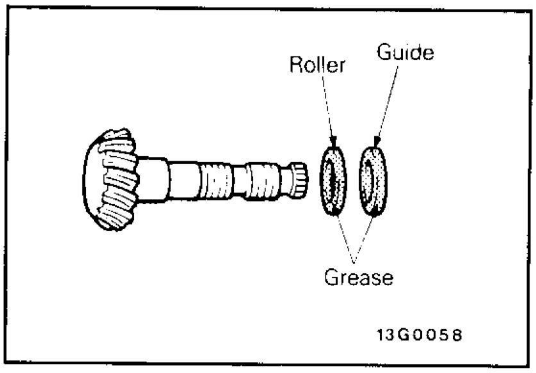
Apply specified sealant to rear cover screw to slightly insert into housing.

Specified sealant: 3M ATD Part No. 8661, 8663 or equivalent



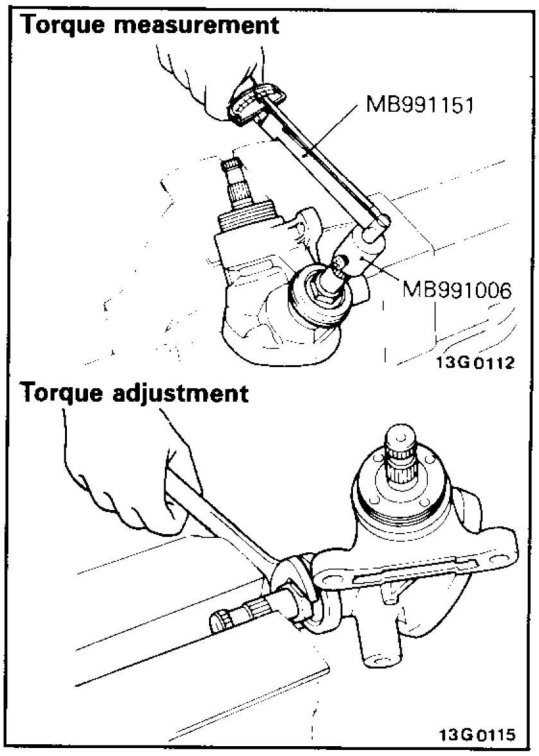
12. APPLICATION OF GREASE TO OIL SEAL

Pack oil seal with multipurpose grease.



11. APPLICATION OF GREASE TO ROLLER/10. GUIDE

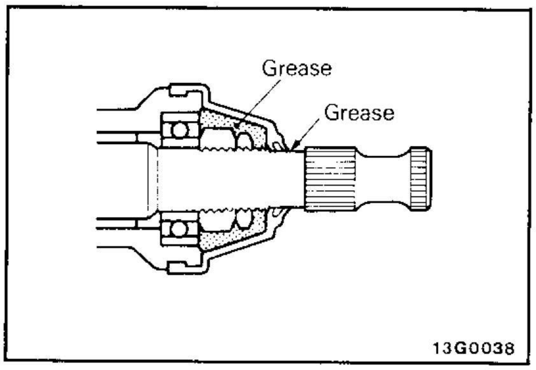
Apply multipurpose grease on roller and guide. Install roller and guide in this order to gear (output side).



• ADJUSTMENT OF GEAR (OUTPUT SIDE) TORQUE

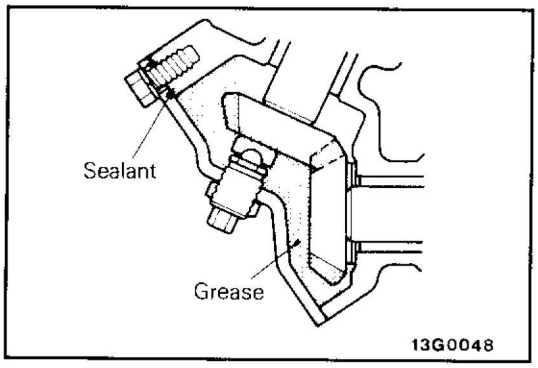
(1) Use special tool and rotate output side gear at one turn/4–6 seconds and measure torque.
(2) Adjust torque with nut to the standard value.

Standard value: 0.05–0.10 Nm
(0.5–1.0 kgcm, 0.4–0.9 in.lbs.)



6. APPLICATION OF GREASE TO DUST COVER

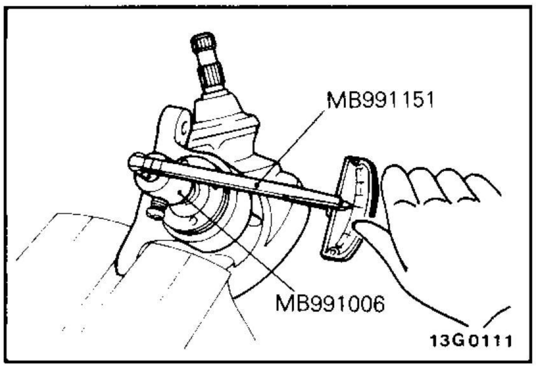
(1) Apply specified grease to dust cover lip.
(2) Pack dust cover with multipurpose grease.



3. INSTALLATION OF FRONT COVER

(1) Pack housing with multipurpose grease.
(2) Apply specified sealant to front cover and housing contact surfaces.

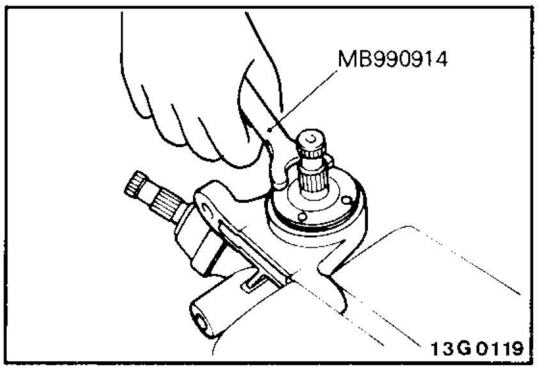
Specified sealant: 3M ATD Part No. 8661,
8663 or equivalent



- **ADJUSTMENT OF TOTAL BEVEL GEAR TORQUE**

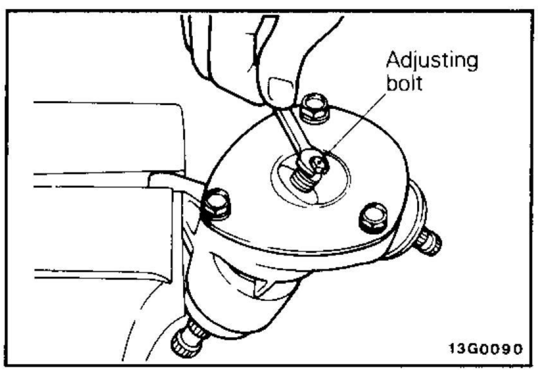
(1) Use special tool and rotate input side gear at one turn/4–6 seconds. Measure torque.

NOTE
Return adjust bolt to ensure block does not touch the input side gear.



(2) Use special tool and tighten rear cover assembly to set input side gear torque at the standard value.

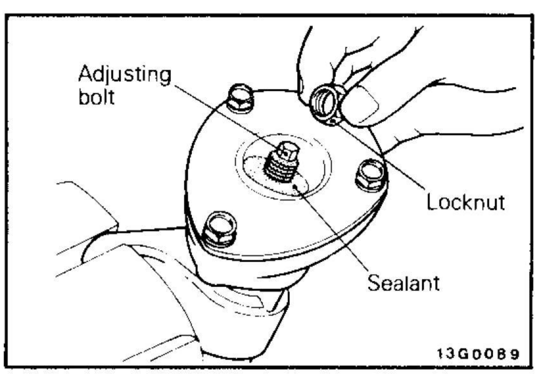
Standard value: 0.25–0.45 Nm (2.5–4.5 kgcm, 2.2–3.9 in.lbs.)



(3) Tighten adjust bolt to set total bevel gear torque to standard value.

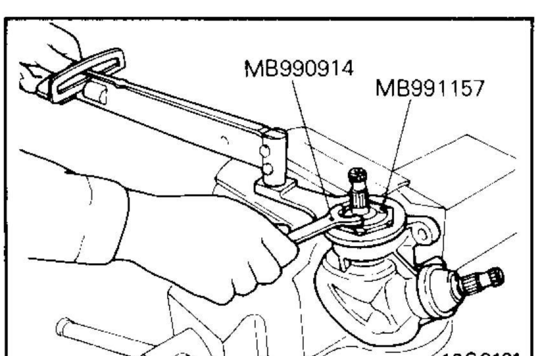
Standard value: 0.30–0.55 Nm (3.0–5.5 kgcm, 2.6–4.8 in.lbs.)

(4) Turn input side gear to both left and right 10 times. Check torque. If not within the standard value [30–55 Ncm (3.0–5.5 kgcm, 2.6–4.8 in.lbs.)], adjust rear cover assembly.



(5) Apply specified sealant to the illustrated locations. Lock adjust bolt with locknut.

Specified sealant: 3M ATD Part No. 8661, 8663 or equivalent



2. INSTALLATION OF LOCKNUT

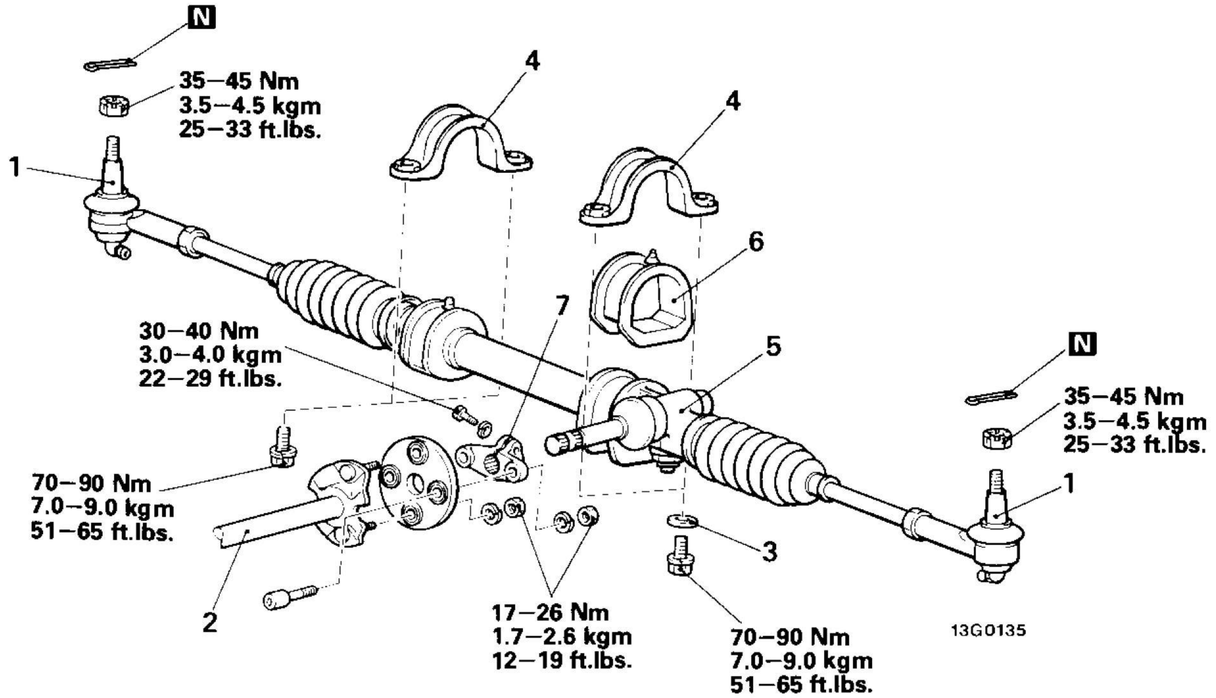
Use special tool and lock rear cover with locknut.

NOTE
Locknut tightening torque when using special tool and torque wrench [effective length 425 mm (16.7 in.)] is 65–95 Nm (6.5–9.5 kgm, 47–69 ft.lbs.)

MANUAL STEERING GEAR BOX

REMOVAL AND INSTALLATION

E37LA – –



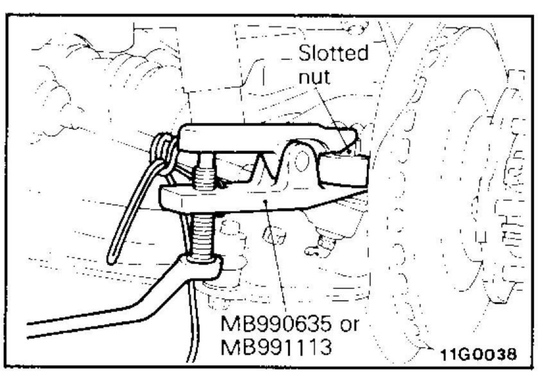
Removal steps

◀▶ 1. Tie rod end connection
2. Intermediate shaft connection
3. Washer <4WD>
4. Pinion housing clamp
5. Steering gear and linkage assembly
▶◀ 6. Gear housing mounting rubber
7. Yoke

NOTE
(1) Reverse the removal procedures to reinstall.
(2) ◀▶: Refer to "Service Points of Removal".
(3) ▶◀: Refer to "Service Points of Installation".
(4) [N] : Non-reusable parts

Pre-removal Operation
- Removal of snow guard plate <2WD> and under skid plate <4WD> (Refer to GROUP 42 – Under cover.)

Post-installation Operation
- Installation of snow guard plate <2WD> and under skid plate <4WD> (Refer to GROUP 42 – Under cover.)
- Adjustment of toe-in (Refer to GROUP 33 – Service Adjustment Procedures.)
- Checking of steering wheel in straight ahead position
- Checking of steering wheel play (Refer to P. 37-15.)



SERVICE POINTS OF REMOVAL

E37LBAB

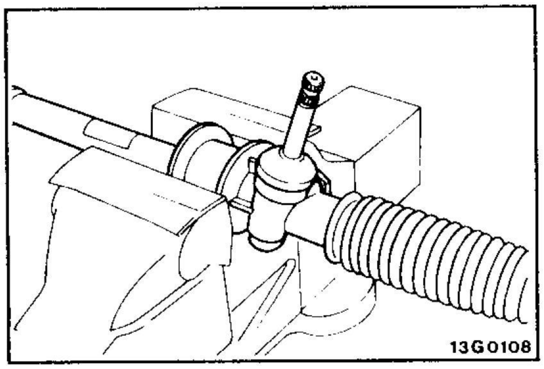
1. DISCONNECTION OF TIE ROD END

(1) Remove split pin.
(2) Loosen slotted nut.

Caution

1. Use cord to bind the special tool closely so it will not become separated.
2. Loosen slotted nut but do not remove.

(3) Use special tool to disconnect the tie-rod end from the knuckle.



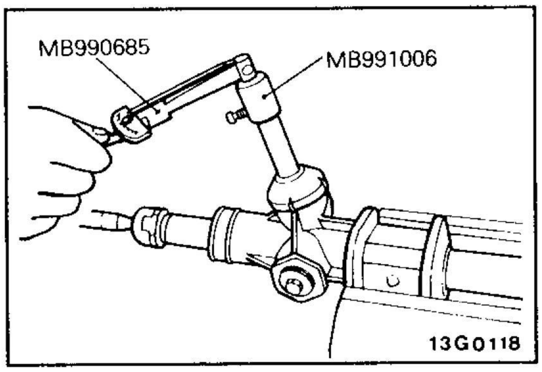
INSPECTION

E37LCAB

Secure the gear box in a vice, using protective metal plates (copper or aluminum).

Caution

When securing the gear box in a vice, it should be secured only at the gear box mounting positions as shown in the illustration. If secured at other positions, it may be damaged or deformed.



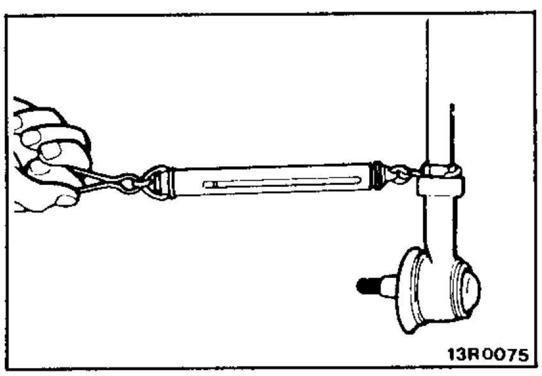
- **CHECKING OF TOTAL PINION TORQUE**

(1) Use special tool and rotate pinion at one turn/4–6 seconds. Measure total pinion torque.

Standard value: 0.6–1.2 Nm
(6–12 kgcm, 5–10 in.lbs.)

NOTE
1. When measuring, remove boots from gear housing.
2. Turn pinion 180° to left and right from the neutral position to measure.

(2) When not within the standard value, adjust torque. (Refer to P. 37–40.) If adjustment to the standard value cannot be achieved, check parts or replace.

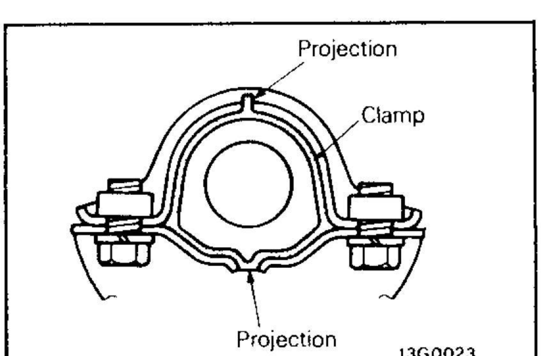


- **CHECKING OF TIE ROD OSCILLATION TORQUE**

(1) Oscillate tie rod 10 times vigorously.
(2) Arrange tie rod end downward and measure oscillation resistance [oscillation torque] with spring scale as illustrated.

Standard velue:
2WD 4–21 N (0.4–2.1 kg, 0.9–4.6 lbs.)
[1–5 Nm (10–50 kgcm, 9–43 in.lbs.)]
4WD 5–23 N (0.5–2.3 kg, 1.0–5.0 lbs.)
[1–5 Nm (10–50 kgcm, 9–43 in.lbs.)]

(3) When oscillation resistance exceeds the standard value, replace tie rod.
(4) When the oscillation resistance is under the standard value, and no ball joint backlash or irregular oscillation, it is still serviceable.



SERVICE POINTS OF INSTALLATION

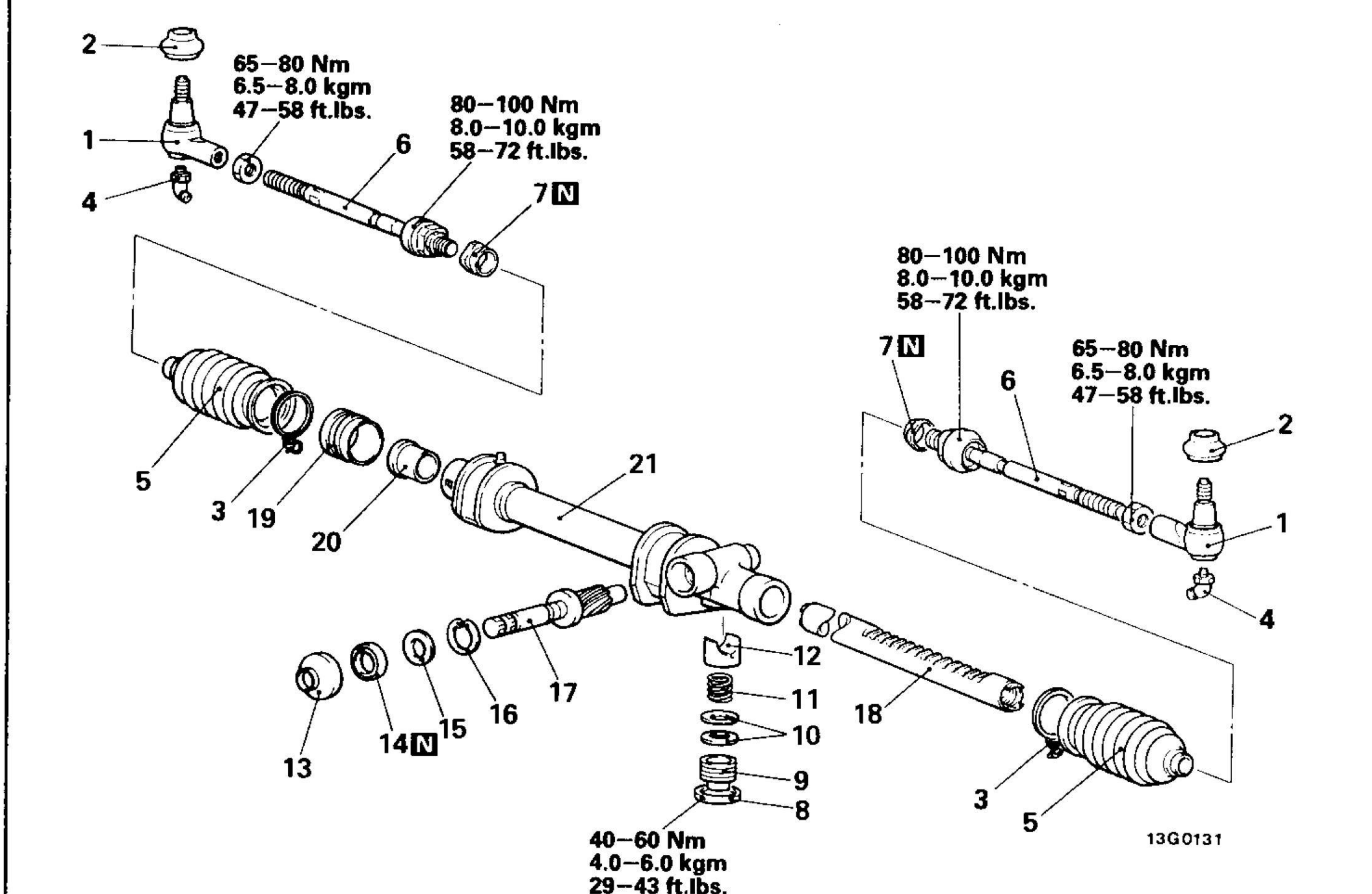
E37LDAB0

6. INSTALLATION OF GEAR HOUSING MOUNTING RUBBER

Match peak on lower part of gear housing mounting rubber to crossmember hole, and upper peak to clamp hole. Install gear box.

DISASSEMBLY AND REASSEMBLY

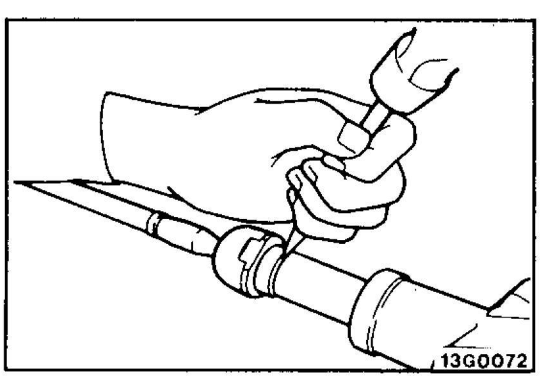
E37LE--



Disassembly steps

- ▶◀ 1. Tie-rod end
- ▶◀ 2. Dust cover
- ▶◀ 3. Wire clamp
- 4. Grease nipple (4WD)
- ▶◀ 5. Boots
- ◀▶▶◀ 6. Tie-rod
- ▶◀ 7. Tab washer
- 8. Lock nut
- ▶◀ Adjustment of total pinion torque
- ▶◀ 9. Adjusting cover
- 10. Convex spring
- 11. Spring
- ▶◀ 12. Rack support
- ▶◀ 13. Dust cover
- ▶◀ 14. Oil seal
- 15. Support ring
- 16. Snap ring
- ▶◀ 17. Pinion (with bearing)
- ◀▶▶◀ 18. Rack
- ▶◀ 19. Stopper ring
- ◀▶▶◀ 20. Rack bushing
- ▶◀ 21. Housing

NOTE
(1) Reverse the disassembly procedures to reassemble.
(2) ◀▶ : Refer to "Service Points of Disassembly".
(3) ▶◀ : Refer to "Service Points of Reassembly".
(4) N : Non-reusable parts

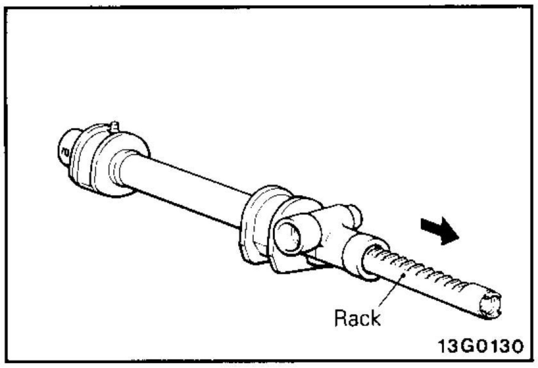


SERVICE POINTS OF DISASSEMBLY

E37LFAB

6. REMOVAL OF TIE ROD

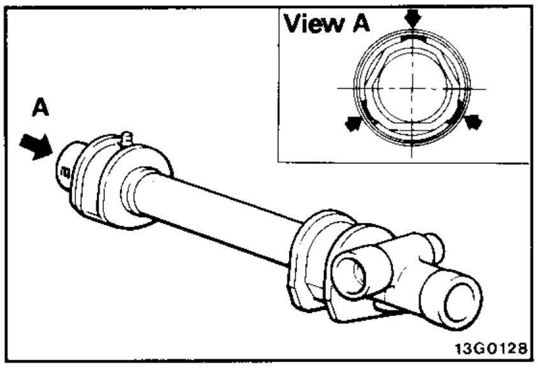
Lift tab washer caulking with a chisel to remove tie rod from rack.



18. REMOVAL OF RACK

Pull out the rack from the gear housing in the direction shown in the illustration.

Caution
If the rack is pulled out in the wrong direction, the bushing in the gear box may be damaged by the rack threads.



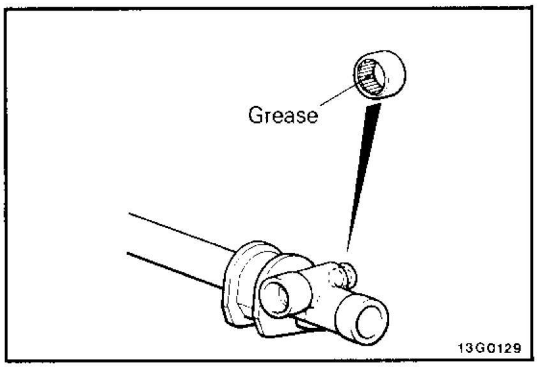
20. REMOVAL OF RACK BUSHING

Press bushing retainer at 3 places and remove bushing from housing.

INSPECTION

E37LGAB

- Check the rack support for uneven wear or damage.
- Check the rack support spring for deterioration.
- Check the oil seal for cracks or damage.
- Check the rack pinion tooth surfaces for wear or damage.
- Check the ball bearings or pinion bushing for noise, uneven rotation, or damage.
- Check the rack bushing for damage.
- Check the dust cover for cracks or damage



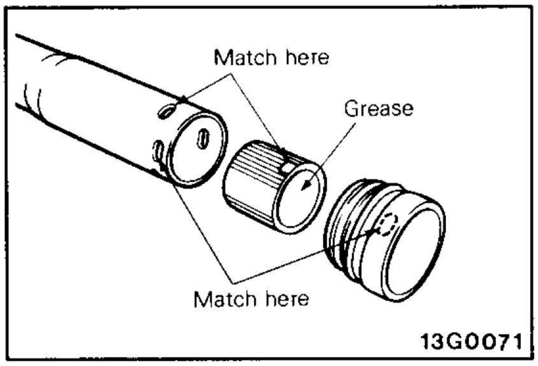
SERVICE POINTS OF REASSEMBLY

E37LHAB

21. APPLICATION OF GREASE TO HOUSING

Apply specified grease to needle roller bearing in housing.

Specified grease: Multipurpose grease, SAE J310, NLGI No.2



20. INSTALLATION OF RACK BUSHING

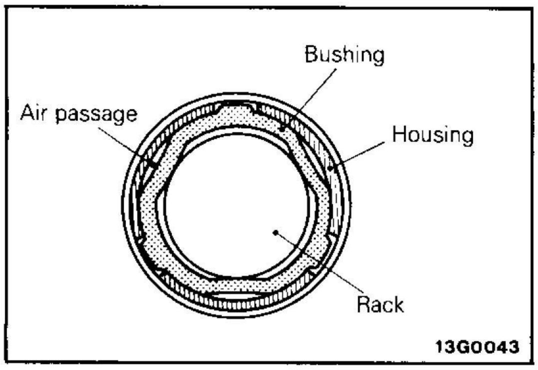
(1) Pack rack bushing with specified grease.

Specified grease: Multipurpose grease, SAE J310, NLGI No.2

(2) Match rack bushing retainer and housing hole to install.

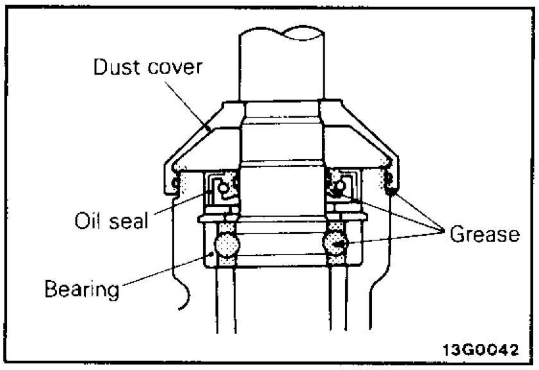
19. INSTALLATION OF STOPPER RING

Match stopper ring peak and housing hole to install.



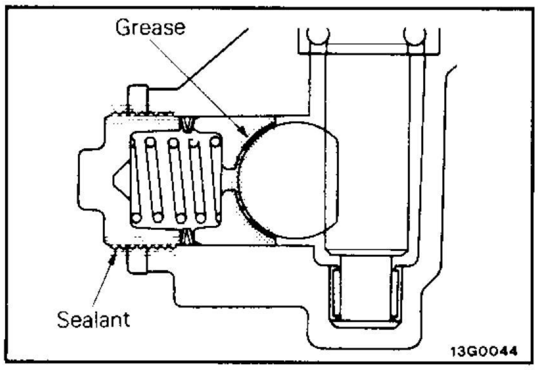
18. APPLICATION OF GREASE TO RACK

(1) Apply multipurpose grease to rack serrations and surfaces contacting rack bushing.
(2) After operating rack several times, check that the air passage between rack bushing and housing is not blocked with multipurpose grease.



17. APPLICATION OF GREASE TO PINION/14. OIL SEAL/13. DUST COVER

Apply multipurpose grease to the following:
(1) Pinion gear serrations
(2) Pinion bearing
(3) Oil seal lip
(4) Dust cover lip



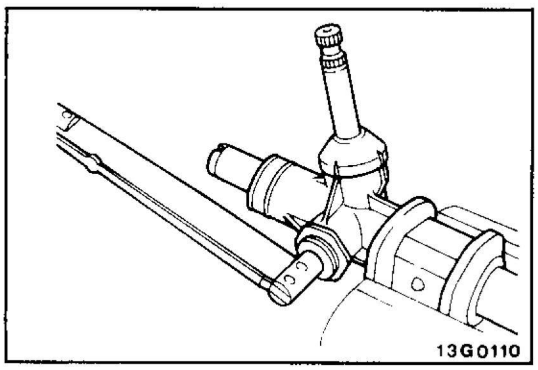
12. APPLICATION OF GREASE TO RACK SUPPORT

Apply multipurpose grease to rack support at surfaces contacting rack.

9. APPLICATION OF SEALANT TO ADJUSTING COVER

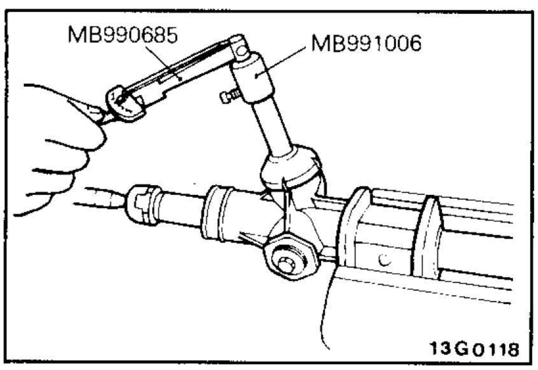
Apply specified sealant to adjusting cover screw.

Specified sealant: 3M ATD Part No. 8661, 8663 or equivalent



• ADJUSTMENT OF TOTAL PINION TORQUE

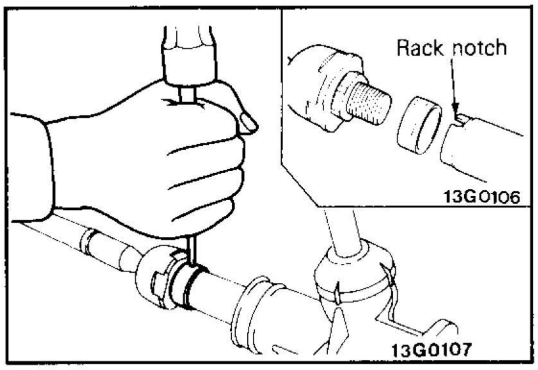
(1) Tighten adjust cover to 10 Nm (1.0 kgm. 7 ft.lbs.)



(2) Rotate pinion at one turn/4–6 seconds with special tool and measure total pinion torque. Return adjust cover until it reaches standard value. Lock with locknut.

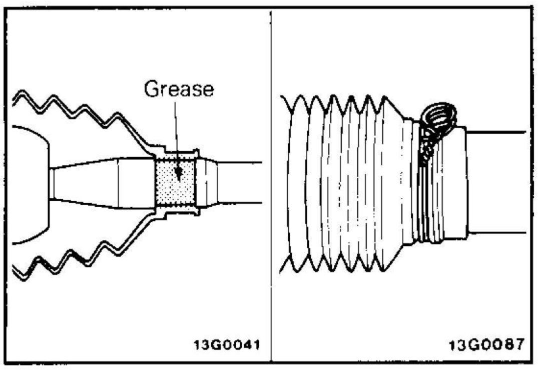
Standard value: 0.6–1.2 Nm (6–12 kgcm, 5–10 in.lbs.)

NOTE
1. Measure total pinion torque rotating 180° to left and right from the neutral position.
2. Adjust total pinion torque to near the highest standard value.
3. When the standard value cannot be obtained after returning over 60°, repeat disassembly and check.



7. **INSTALLATION OF TAB WASHER/6. TIE ROD**

After installing tie rod to rack, caulk 2 positions of tab washer end and rack notch with a punch.

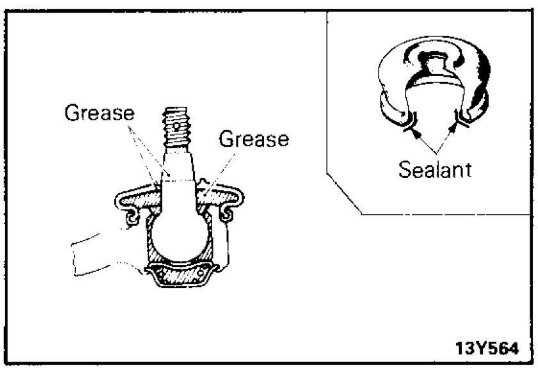


5. **APPLICATION OF GREASE TO BOOTS**

Apply multipurpose grease to tie rod boots locking groove.

3. **INSTALLATION OF WIRE CLAMP**

Wrap boots outer circumference twice and twist 4–4.5 times to lock boots.



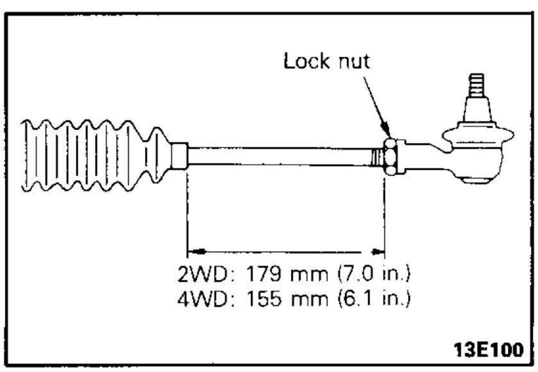
2. **INSTALLATION OF DUST COVER**

(1) Fill the inside and the lip of the dust cover with the specified grease.

Specified grease: Wheel bearing grease, SAE J310, NLGI No.2

(2) Apply specified sealant to dust cover.

Specified sealant: 3M ATD Part No. 8661, 8663 or equivalent



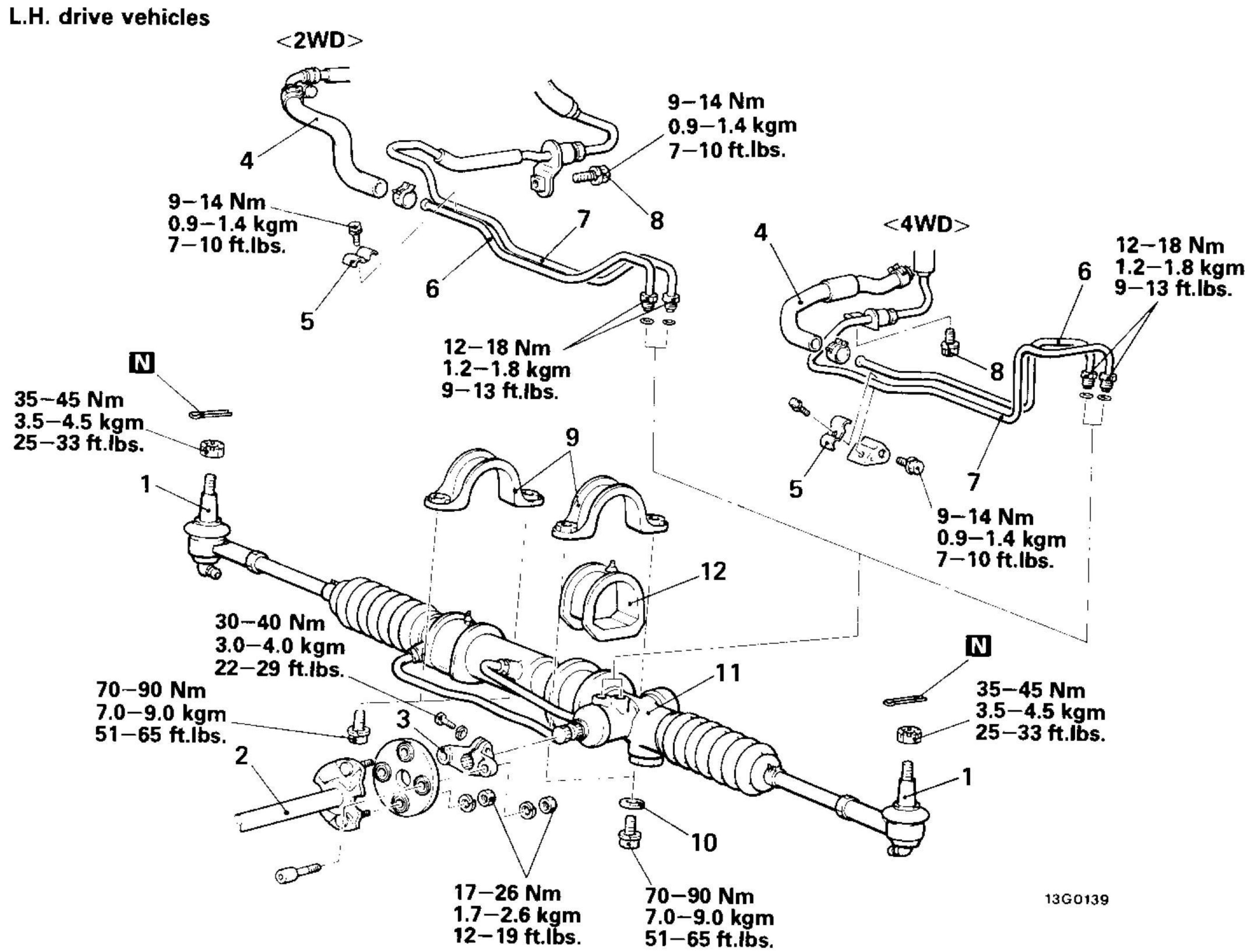
1. **INSTALLATION OF TIE ROD END**

Screw in tie rod end to have the right and left lengths as illustrated and lock with locknut.

POWER STEERING GEAR BOX

REMOVAL AND INSTALLATION

E37PA--



Removal steps

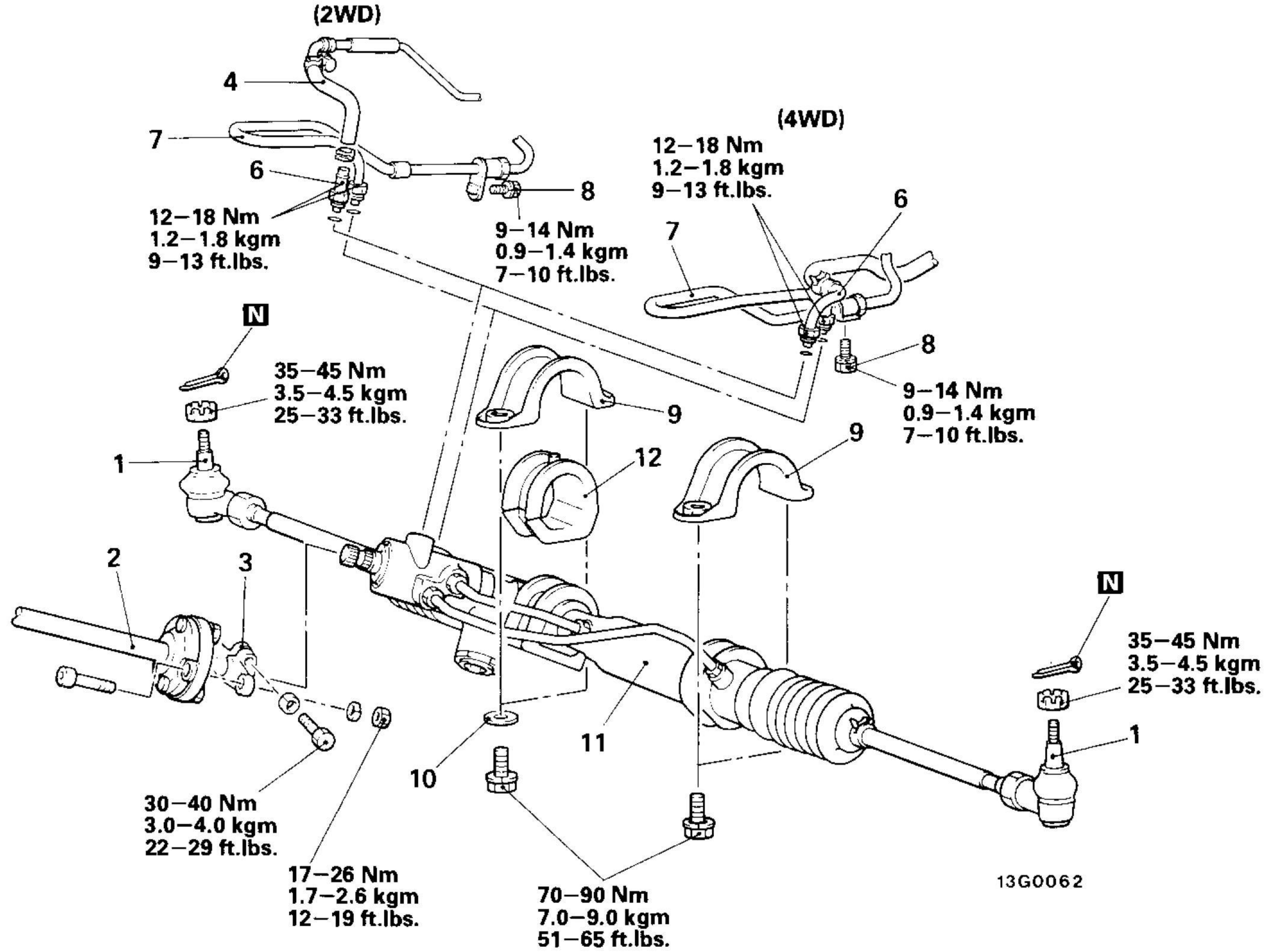
◆◆ 1. Tie rod end connection
2. Intermediate shaft connection
3. Yoke
◆◆ 4. Return hose connection
5. Clamp
6. Return tube
7. Pressure tube connection
8. Bolt
9. Pinion housing clamp
10. Washer <4WD>
11. Gear housing and linkage assembly
◆◆ 12. Gear housing mounting rubber

NOTE
(1) Reverse the removal procedures to reinstall.
(2) ◆◆: Refer to "Service Points of Removal".
(3) ◆◆: Refer to "Service Points of Installation".
(4) N : Non-reusable parts

Pre-removal Operation
- Removal of snow guard plate <2WD>, power steering tube protector <2WD>, under skid plate <4WD> (Refer to GROUP 42 – Under cover.)

Post-installation Operation
- Installation of snow guard plate <2WD>, power steering tube protector <2WD>, under skid plate <4WD> (Refer to GROUP 42 – Under cover.)
- Filling and bleeding of power steering fluid. (Refer to P. 37-21.)
- Adjustment of toe-in. (Refer to GROUP 33 – Service Adjustment Procedures.)
- Checking of steering wheel in straight ahead position.
- Checking of steering wheel play. (Refer to P. 37-17.)

R.H. drive vehicles



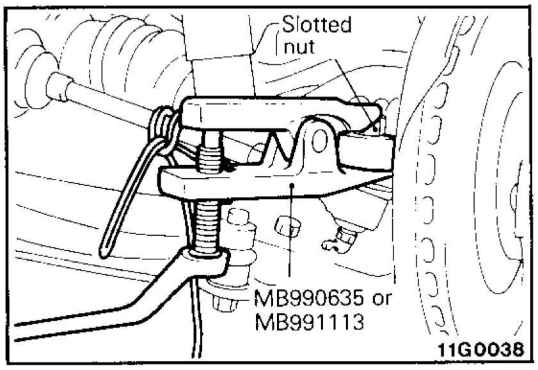
Removal steps

◆◆ 1. Tie rod end connection
2. Intermediate shaft connection
3. Yoke
◆◆ 4. Return hose connection (2WD)
6. Return tube connection
7. Pressure tube connection
8. Bolt
9. Pinion housing clamp
10. Washer (4WD)
11. Gear housing and linkage assembly
◆◆ 12. Gear housing mounting rubber

NOTE
(1) Reverse the removal procedures to reinstall.
(2) ◆◆: Refer to "Service Points of Removal".
(3) ◆◆: Refer to "Service Points of Installation".
(4) N : Non-reusable parts

Pre-removal Operation
- Removal of snow guard plate (2WD), power steering tube protector (2WD), under skid plate (4WD)
(Refer to GROUP 42 BODY–Under cover.)

Post-installation Operation
- Installation of snow guard plate (2WD), power steering tube protector (2WD), under skid plate (4WD)
(Refer to GROUP 42 BODY–Under cover.)
- Filling and bleeding of power steering fluid.
(Refer to P. 37–21.)
- Adjustment of toe-in.
(Refer to GROUP 33 FRONT SUSPENSION–Service Adjustment Procedures.)
- Checking of steering wheel in straight ahead position.
- Checking of steering wheel play.
(Refer to P. 37–17.)



SERVICE POINTS OF REMOVAL

E37PBAB

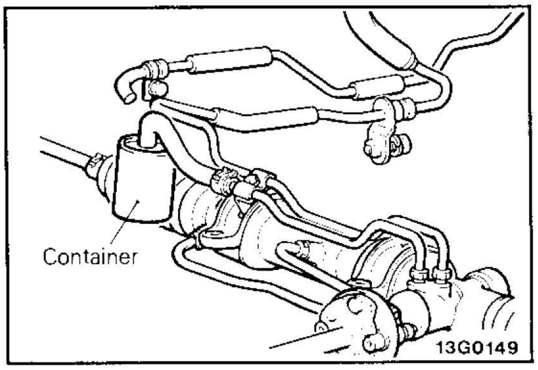
1. DISCONNECTION OF TIE ROD END

(1) Remoive split pin.
(2) Loosen slotted nut.

Caution

1. Use cord to bind the special tool closely so it will not become separated.
2. Loosen slotted nut but do not remove.

(3) Use the special tool to disconnect the tie-rod from the knuckle.

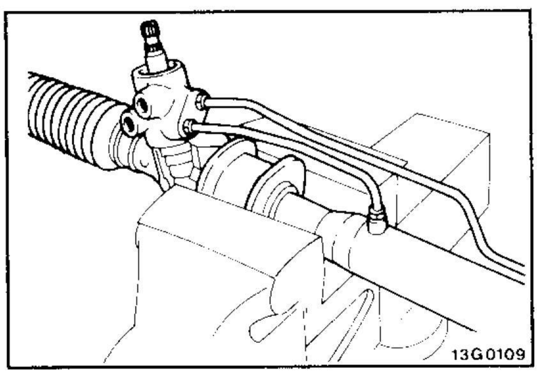


4. DISCONNECTION OF RETURN HOSE

(1) Disconnect return hose and drain fluid into a container.
(2) Disconnect the high-tension cable (petrol-powered vehicles) or the connector of the fuel-cut solenoid valve (diesel-powered vehicles), and then while operating the starting motor intermittently, turn the steering wheel all the way to the left and right several times to drain all of the fluid.

Caution

Be careful not to position the high-tension cable near the carburettor or the injection mixer.



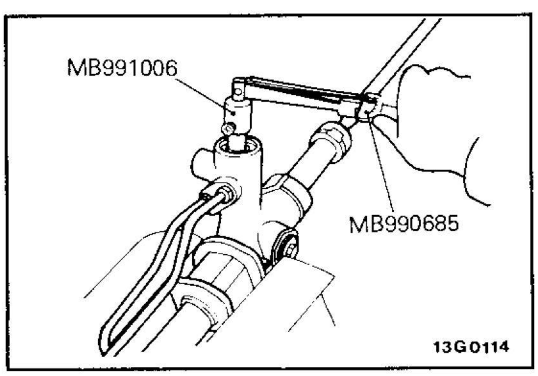
INSPECTION

E37PCAB

Secure the gear box in a vice, using protective metal plates (copper or aluminium).

Caution

When securing the gear box in a vice, it should be secured only at the gear box mounting positions as shown in the illustration. If secured at other positions, it may be damaged or deformed.



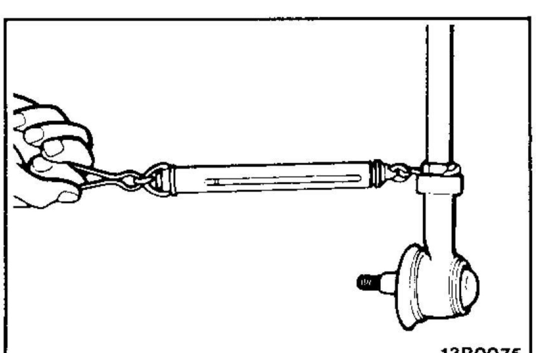
- **CHECKING OF TOTAL PINION TORQUE**

(1) Use special tool and rotate pinion at one turn/4 – 6 seconds. Measure total pinion torque.

Standard value: 0.7 – 1.4 Nm
(7 – 14 kgcm, 6 – 12 in.lbs.)

NOTE
1. When measuring, remove boots from gear housing.
2. Turn pinion 180° to left and right from the neutral position to measure.

(2) When not within the standard value, adjust torque. (Refer to P. 37-52.) If adjustment to the standard value cannot be achieved, check parts or replace.

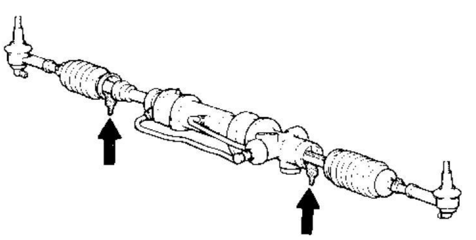


- **CHECKING OF TIE ROD OSCILLATION TORUQE**

(1) Oscillate tie rod 10 times vigorously.
(2) Arrange tie rod end downward and measure oscillation resistance (oscillation torque) with spring scale as illustrated.

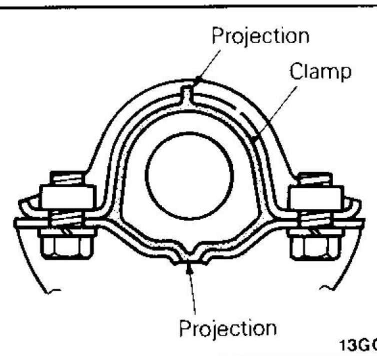
Standard value
2WD 8 – 21 N (0.8 – 2.1 kg, 1.8 – 4.6 lbs.)
[2 – 5 Nm (20 – 50 kgcm, 17 – 43 in.lbs.)]
4WD 9 – 23 N (0.9 – 2.3 kg, 2.0 – 5.1 lbs.)
[2 – 5 Nm (20 – 50 kgcm, 17 – 43 in.lbs.)]

(3) When oscillation resistance exceeds the standard value, replace tie rod.
(4) When the oscillation resistance is under the standard value, and no ball joint backlash or irregular oscillation, it is still serviceable.



13G0150

- **POWER STEERING FLUID LEAK CHECK**
  (1) Remove dust cover. Check pinion oil seal for leak.
  (2) Remove bellows on both sides. Check for leak.
  (3) If fluid leaks, disassemble gear box and replace oil seal and O-ring.



13G0023

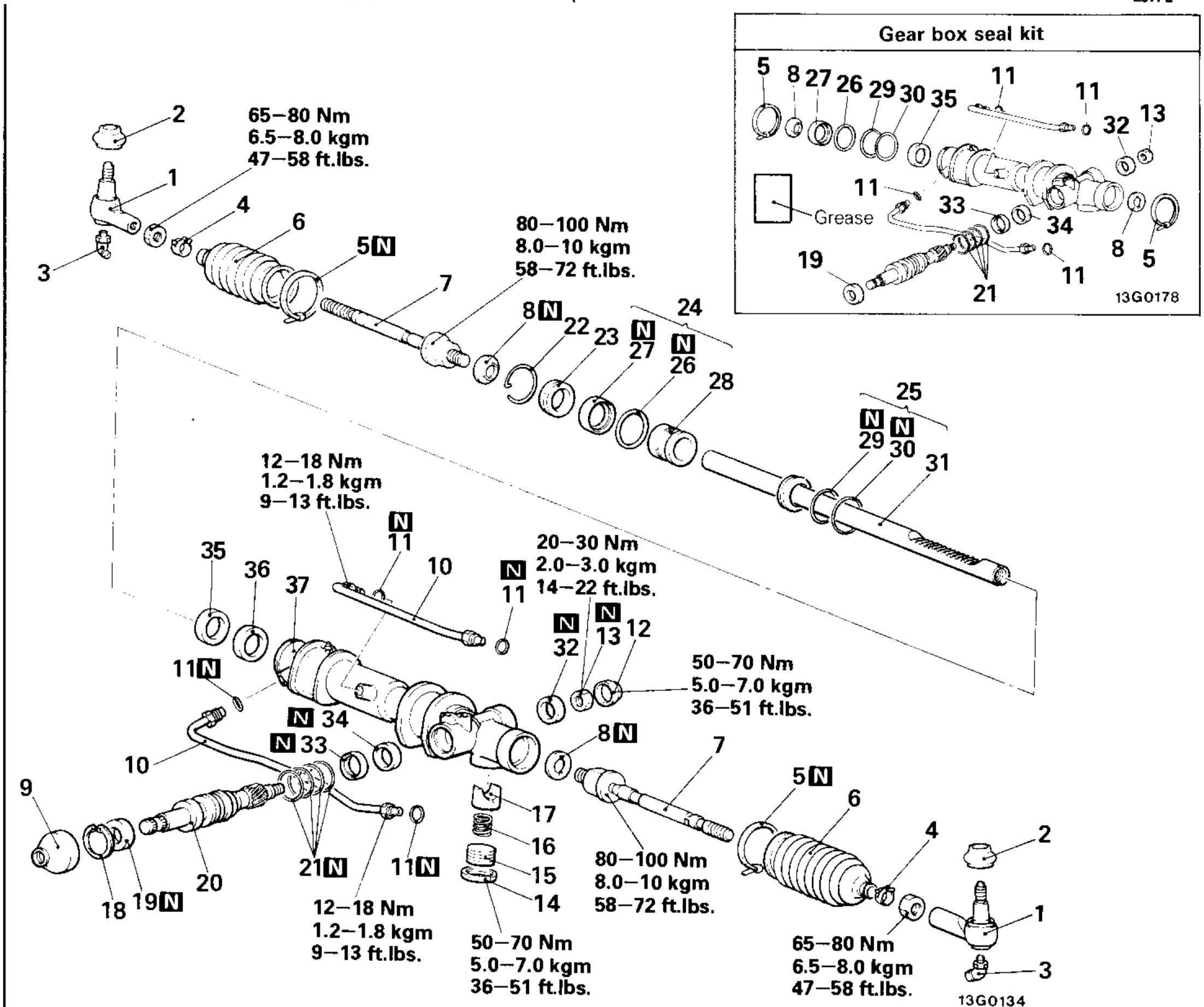
SERVICE POINTS OF INSTALLATION E37LDAB1

12. INSTALLATION OF GEAR HOUSING MOUNTING RUBBER

Match gear housing mounting rubber lower peak to crossmember hole and upper peak to clamp hole. Install gear box.

DISASSEMBLY AND REASSEMBLY

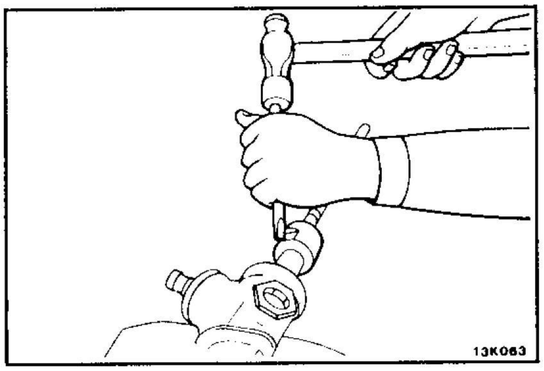
E37PE--



Disassembly steps

- ➡◆ 1. Tie rod ends
- ➡◆ 2. Dust covers
- 3. Grease nipples <4WD>
- 4. Bellows clips
- 5. Bellows bands
- ➡◆ 6. Bellows
- ◆➡ ➡◆ 7. Tie rods
- ➡◆ Adjustment of total pinion torque
- 8. Tab washer
- 9. Dust cover
- 10. Feed tubes
- 11. O-ring
- ◆➡ ➡◆ 12. End plug
- 13. Self-locking nut
- 14. Locking nut
- ◆➡ ➡◆ 15. Rack support cover
- 16. Rack support spring
- ➡◆ 17. Rack support
- 18. Snap ring
- ◆➡ ➡◆ 19. Oil seal
- ◆➡ ➡◆ 20. Pinion and valve assembly
- ➡◆ 21. Seal rings
- ◆➡ ➡◆ 22. Circlip
- ◆➡ ➡◆ 23. Rack stopper
- ◆➡ ➡◆ 24. Rack bushing assembly
- ◆➡ ➡◆ 25. Rack assembly
- 26. O-ring
- ◆➡ ➡◆ 27. Oil seal
- 28. Rack bushing
- 29. Piston ring
- 30. O-ring
- 31. Rack
- ◆➡ ➡◆ 32. Ball bearing
- ◆➡ ➡◆ 33. Oil seal
- ◆➡ ➡◆ 34. Needle roller bearing
- ◆➡ ➡◆ 35. Oil seal
- ◆➡ ➡◆ 36. Back-up washer
- 37. Rack housing

NOTE
(1) Reverse the removal procedures to reassemble.
(2) ◆➡: Refer to "Service Points of Disassembly".
(3) ➡◆: Refer to "Service Points of Reassembly".
(4) N : Non-reusable parts

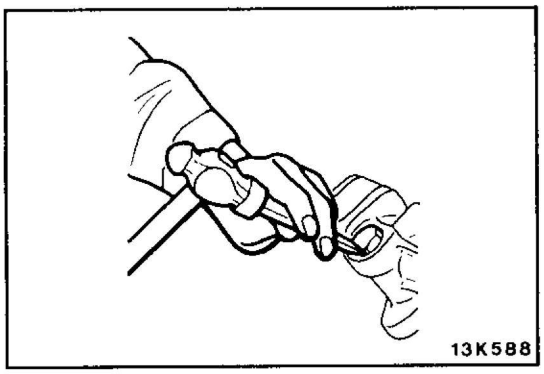


SERVICE POINTS OF DISASSEMBLY

E37PFAC

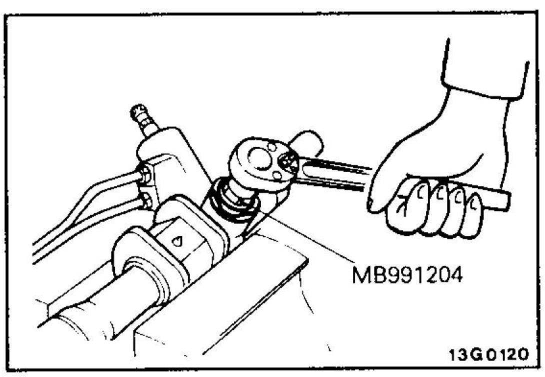
7. REMOVAL OF TIE ROD

Lift tab washer caulking with chisel and remove tie rod from rack.



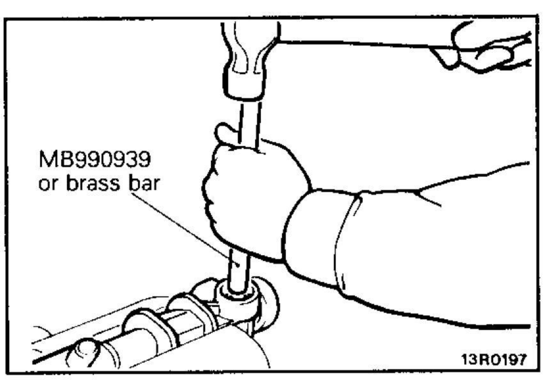
12. REMOVAL OF END PLUG

Disconnect end plug caulking and remove end plug.



15. REMOVAL OF RACK SUPPORT COVER

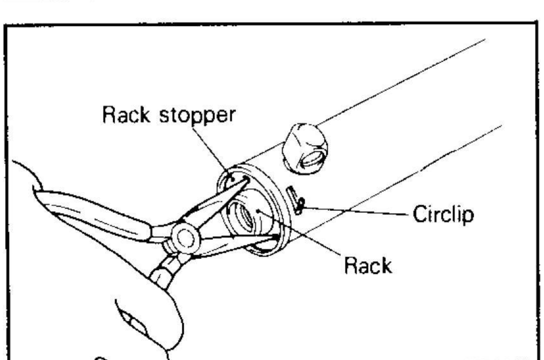
Remove the rack support cover by using the special tool.



19. REMOVAL OF OIL SEAL/20. PINION AND VALVE ASSEMBLY

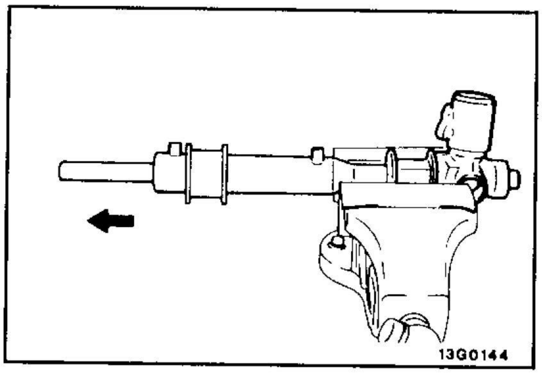
Remove the pinion-and-valve assembly together with the oil seals by using brass bar.

Caution
Be very careful not to drop and damage the pinion-and-valve assembly.



22. REMOVAL OF CIRCLIP

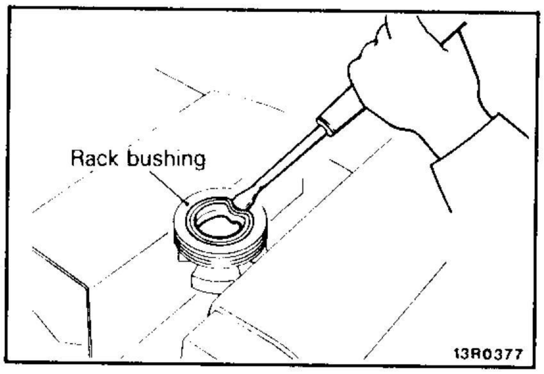
(1) Turn the rack stopper clockwise until the end of the circlip comes out of the slot in the rack housing.



13G0144

23. REMOVAL OF RACK STOPPER/24. RACK BUSHING ASSEMBLY/25. RACK ASSEMBLY

Remove rack in illustrated direction. Remove rack stopper, rack bushing and rack assembly.



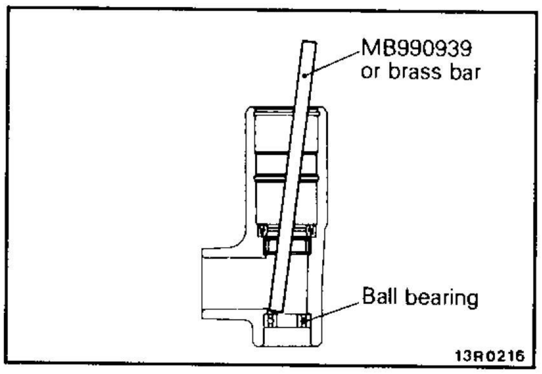
13R0377

27. REMOVAL OF OIL SEAL

Partially bend oil seal and remove from rack bushing.

Caution

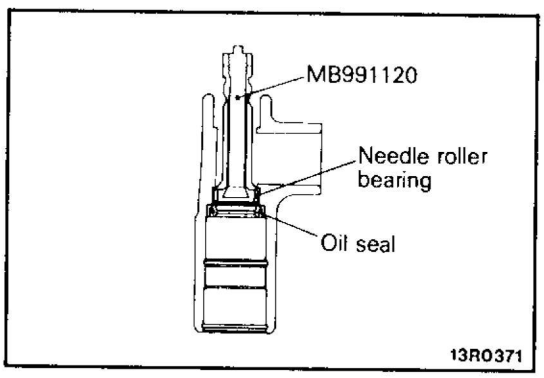
Do not damage oil seal press fitting surface.



13R0216

32. REMOVAL OF BALL BEARING

Use a brass bar or the special tool to remove the ball bearing from the gear housing.



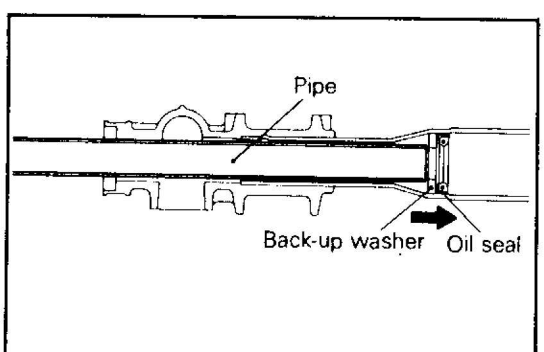
13R0371

33. REMOVAL OF OIL SEAL/34. NEEDLE ROLLER BEARING

Use the special tool to remove the needle roller bearing and the oil seal from the rack housing.

Caution

Do not open special tool excessively to prevent damaging housing interior.



13R0218

35. REMOVAL OF OIL SEAL/36. BACK-UP WASHER

Use a piece of pipe or similar tool to remove the back-up washer and oil seal from the gear housing.

Caution

Be careful not to damage the inner surface of the rack cylinder of the gear housing.

INSPECTION

E37PGAC

RACK

- Check the rack tooth surfaces for damage or wear.
- Check the oil seal contact surfaces for uneven wear.
- Check the rack for bends.

PINION-AND-VALVE ASSEMBLY

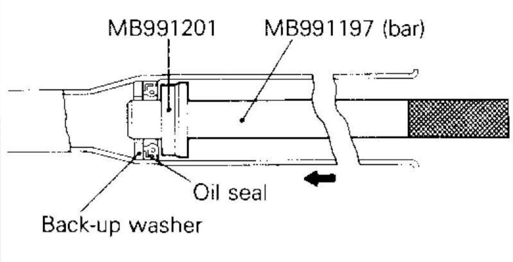
- Check the pinion gear tooth surfaces for damage or wear.
- Check for worn or defective seal ring.

BEARING

- Check for roughness or abnormal noise during bearing operation.
- Check the bearing for play.
- Check the needle roller bearings for roller slip-off.

OTHERS

- Check the cylinder inner surafce of the rack housing for damage.
- Check the bellows for damage, cracking or deterioration.
- Check the rack support for uneven wear or dents.
- Check the rack bushing for uneven wear or damage.



13R0373

SERVICE POINTS OF REASSEMBLY

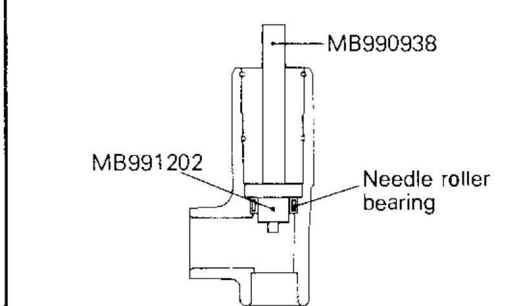
E37PHAC

36. INSTALLATION OF BACK-UP WASHER/35. OIL SEAL

(1) Apply a coating of the specified fluid to the oil seal for the rack.

Specified fluid: Automatic transmission fluid "DEXRON" or "DEXRON II"

(2) Using the special tools, press the back-up washer and the oil seal into the rack housing.



13R0375

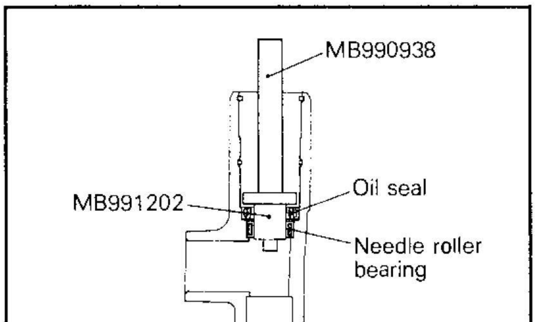
34. INSTALLATION OF NEEDLE ROLLER BEARING

(1) Apply specified fluid to housing bearing and oil seal press fitting surface.

Specified fluid: Automatic transmission fluid "DEXRON" or "DEXRON II"

(2) Press fit needle roller bearing with special tool.

Caution
Press fit straight as valve housing is aluminum.

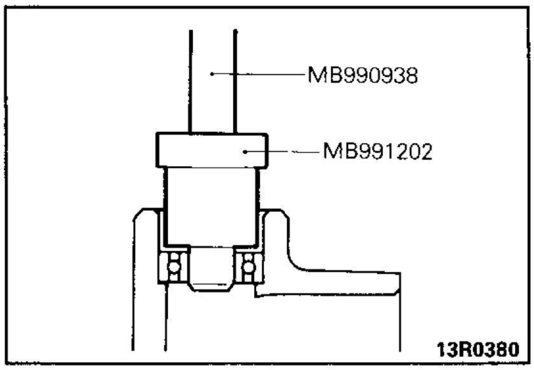


13R0372

33. INSTALLATION OF OIL SEAL

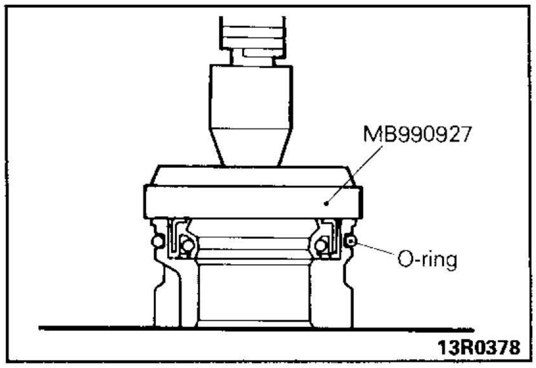
Using the special tool, press the oil seal into the rack housing.

Caution
Be sure the oil seal faces in the correct direction.



32. INSTALLATION OF BALL BEARING

Use special tool to press fit ball bearing.

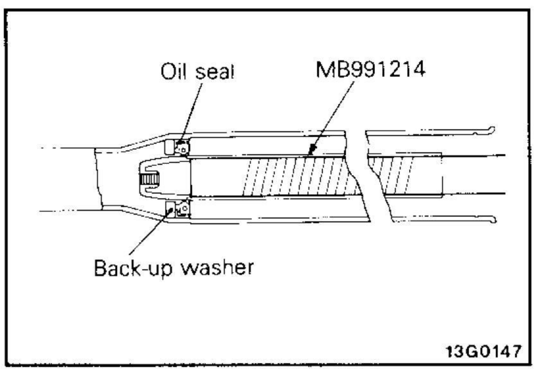


27. INSTALLATION OF OIL SEAL

(1) Apply a coating of the specified fluid all over the oil seal for the rack bushing.

Specified fluid: Automatic transmission fluid "DEXRON" or "DEXRON II"

(2) Use special tool to press fit oil seal until it touches rack bush end.



25. INSTALLATION OF RACK ASSEMBLY

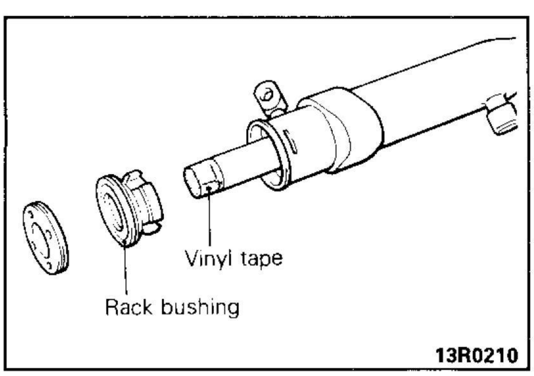
(1) Apply a coating of the specified grease to the rack teeth face.

Specified grease: Multipurpose grease, SAE J310, NLGI No.2

(2) Cover rack serrations with special tool.
(3) Apply specified fluid on special tool.

Specified fluid: Automatic transmission fluid "DEXRON" or "DEXRON II"

(4) Match oil seal center with rack to prevent retainer spring from slipping and slowly insert rack from power cylinder side.

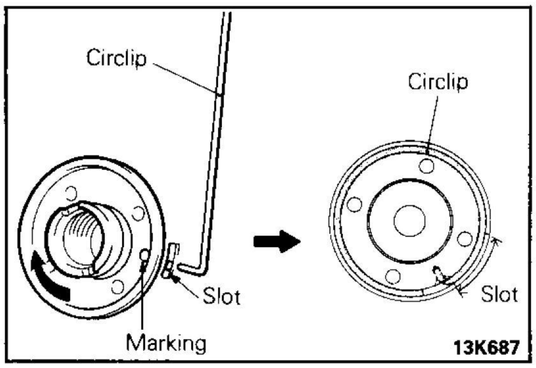


24. INSTALLATION OF RACK BUSHING ASSEMBLY

Wrap the rack end with vinyl tape, apply a coating of the specified fluid, and then install the rack bushing and rack stopper.

Specified fluid: Automatic transmission fluid "DEXRON" or "DEXRON II"

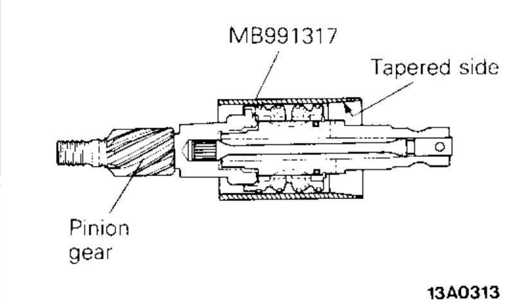
Caution
Do not allow oil seal retainer spring to slip out.

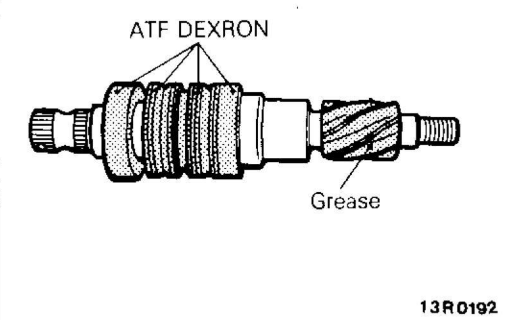


23. INSTALLATION OF RACK STOPPER/22. CIRCLIP

(1) Match rack stopper marking and cylinder hole.
(2) Insert circlip to rack stopper hole through cylinder hole. Turn rack stopper clockwise and insert circlip firmly.

Caution
Insert circlip to rack stopper hole whilst turning rack stopper clockwise.



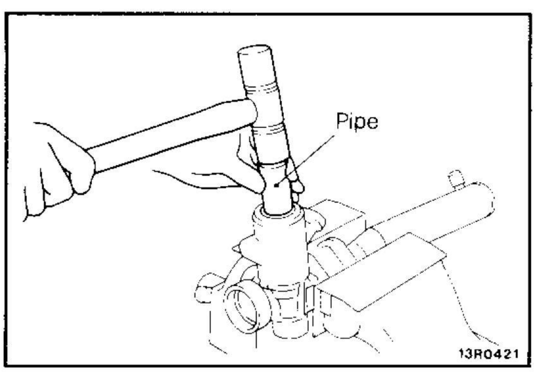


21. INSTALLATION OF SEAL RING/20. PINION AND VALVE ASSEMBLY

(1) Kneed the seal ring to soften it.
(2) Applythe specified fluid to the seal ring, and install to the rack groove.

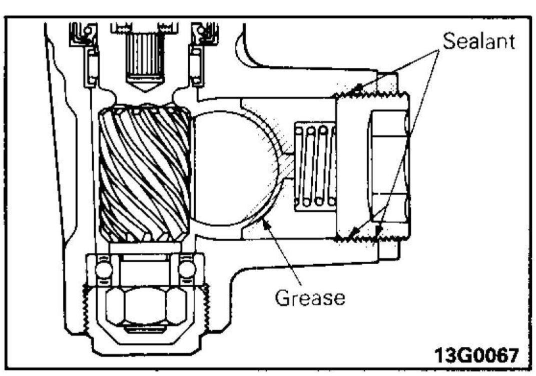
Specified fluid: Automatic transmission fluid "DEXRON" or "DEXRON II"

(3) Insert the tapered side of the special tool from the pinion gear side, and compress the seal ring.
(4) Apply multipurpose grease to pinion gear and housing bearing.



19. INSTALLATION OF OIL SEAL

Press fit oil seal with pipe.



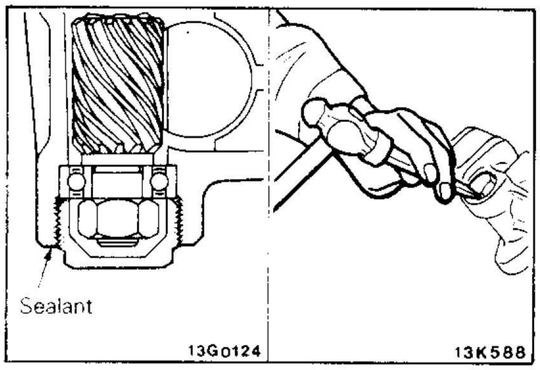
17. INSTALLATION OF RACK SUPPORT

Apply multipurpose grease to the rack support surfaces in contact with the rack bar.

15. INSTALLATION OF RACK SUPPORT COVER

Apply specified sealant to rack support cover screw. Lock temporarily with locknut.

Specified sealant: 3M ATD Part No. 8661, 8663 or equivalent

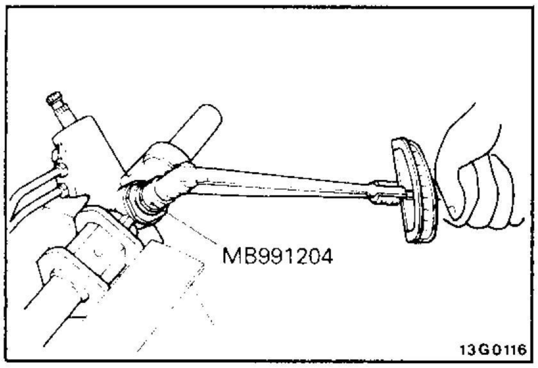


12. INSTALLATION OF END PLUG

(1) Apply the specified sealant to the threaded part of the end plug.

Specified sealant: 3M ATD Part No. 8661, 8663 or equivalent

(2) Secure the threaded portion of the end plug at two places by using a punch.

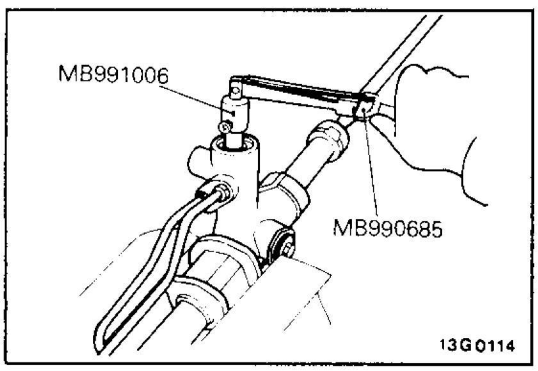


• ADJUSTMENT OF TOTAL PINION TORQUE

(1) Position rack at its center. With special tool, tighten rack support cover to 15 Nm (1.5 kgm, 11 ft.lbs.)

(2) In neutral position, rotate pinion shaft clockwise one turn/4–6 seconds with special tool. Return rack support cover 30°–60° and adjust torque to the standard value.

Standard value: 0.7–1.4 Nm (7–14 kgcm, 6–12 in.lbs.)



Caution

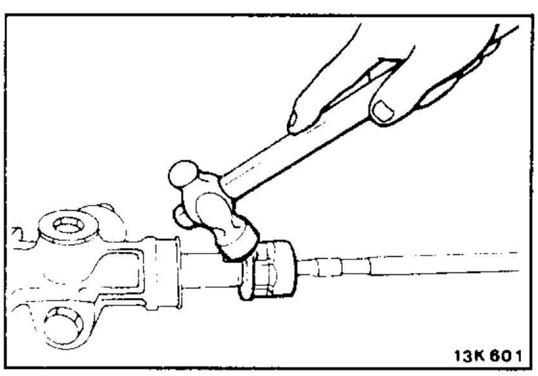
(1) When adjusting, set the standard value at its highest value.

(2) Assure no ratcheting or catching when operating rack towards the shaft direction.

NOTE

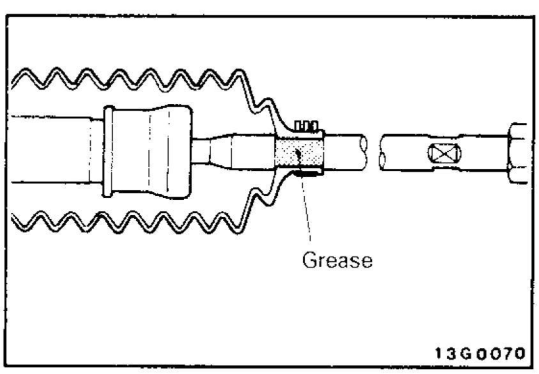
When it cannot be adjusted within the specified return angle, check rack support cover components or repalce.

(3) After adjusting, lock rack support cover with locknut.



7. INSTALLATION OF TIE ROD

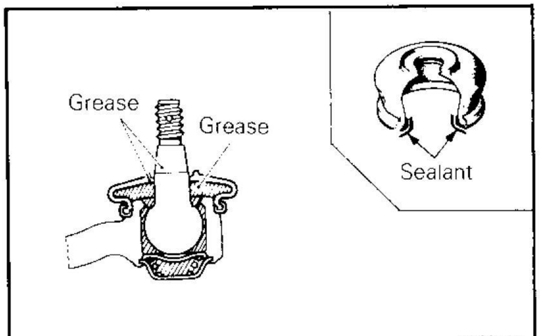
After installing tie rod to rack, fold tab washer end (2 locations) to rie rod notch.



6. APPLICATION OF GREASE TO BELLOWS

Pack tie rod bellows lock groove with specified grease.

Specified grease: Silicone grease



13Y564

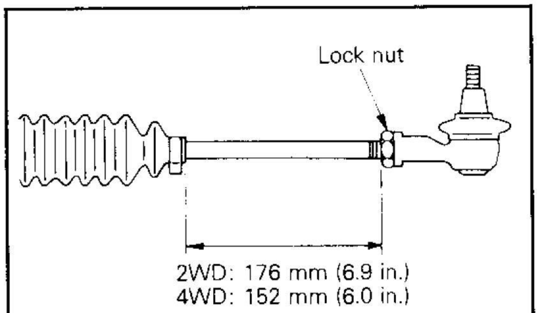
2. INSTALLATION OF DUST COVER

(1) Pack dust cover interior and lip with specified grease.

Specified grease: Wheel bearing grease, SAE J310, NLGI N°2

(2) Apply specified sealant to dust cover.

Specified sealant: 3M ATD Part No. 8661, 8663 or equivalent



13E100

1. INSTALLATION OF TIE ROD END

Screw in tie rod end to have its right and left length as illustrated. Lock with locknut.

OIL PUMP

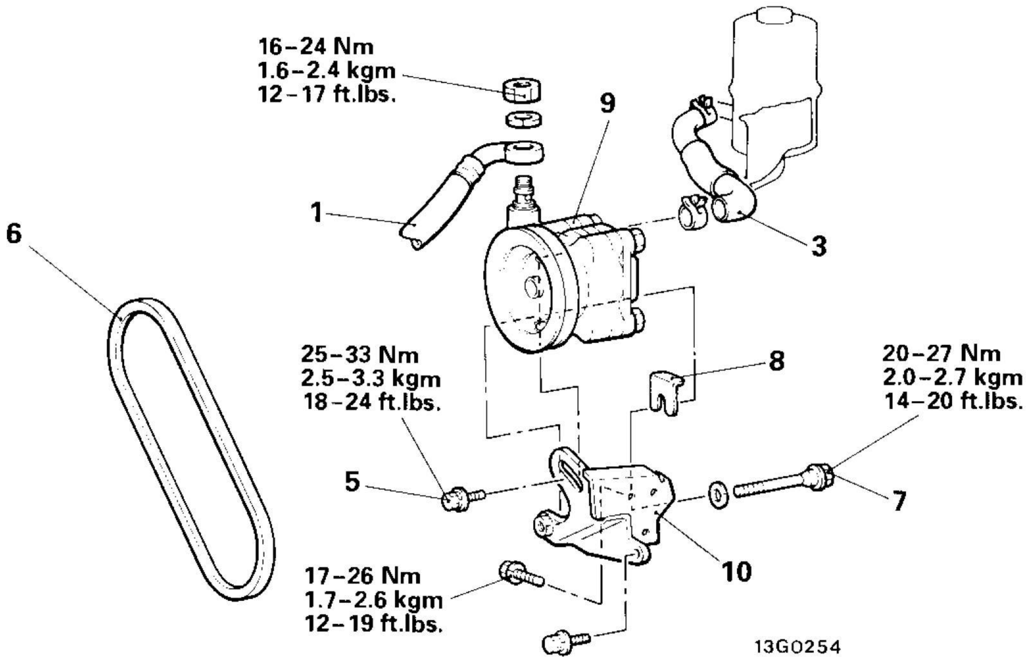
REMOVAL AND INSTALLATION

E37RA--

Pre-removal Operation
- Removal of seat under-frame (R.H. drive vehicles) (Refer to GROUP 42–Seat Under-frame.)
- Drainage of power steering fluid

Post-installation Operation
- Adjustment of V-belt (Refer to P. 37–19.)
- Installation of seat under-frame (R.H. drive vehicles) (Refer to GROUP 42–Seat Under-frame.)
- Filling and bleeding of power steering fluid (Refer to P. 37–21.)
- Checking oil pump pressure generation (Refer to P. 37–22.)

<Except 4G32, 4G92, 4G63 - 16 Valve, 4G64 - 16 Valve, 4D56>



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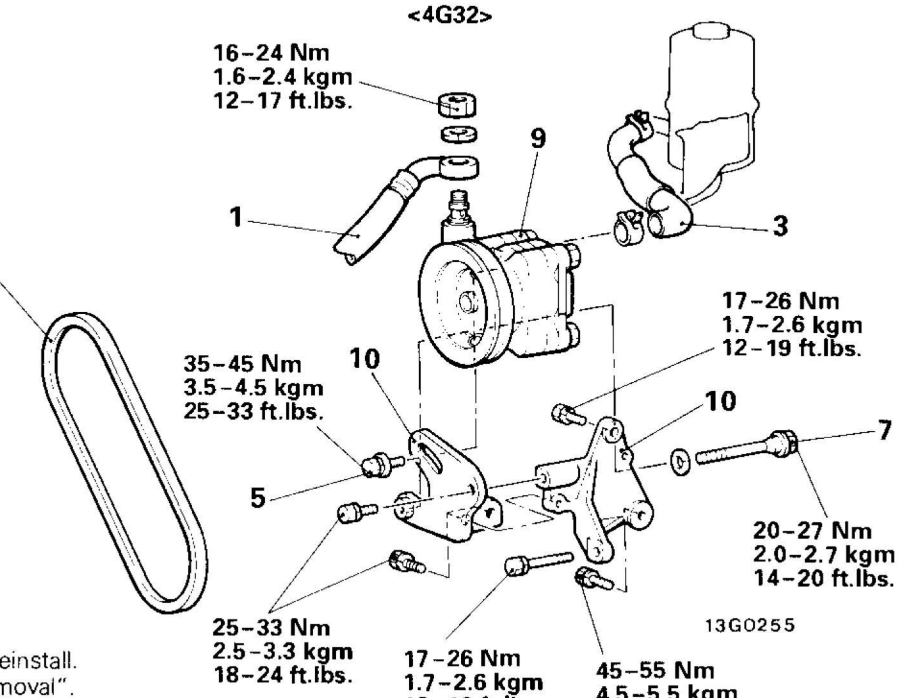
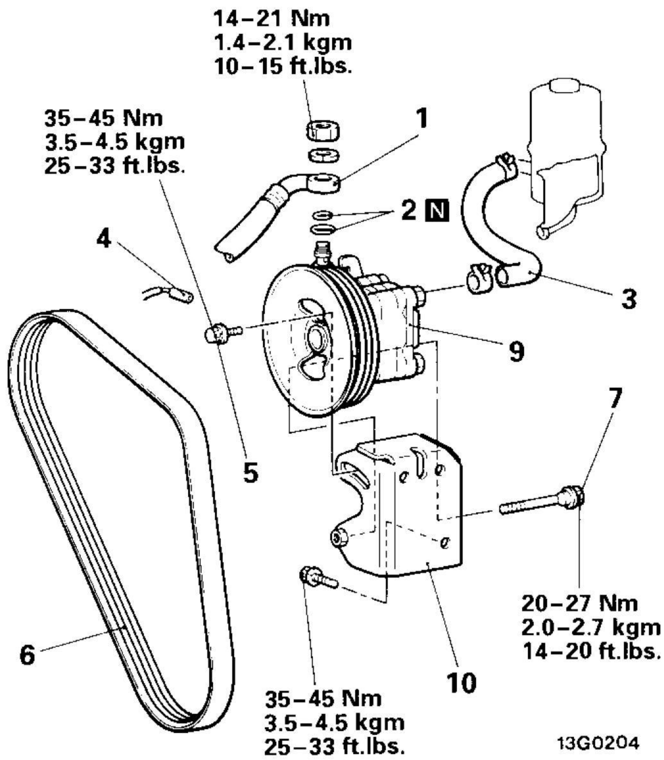


Removal steps

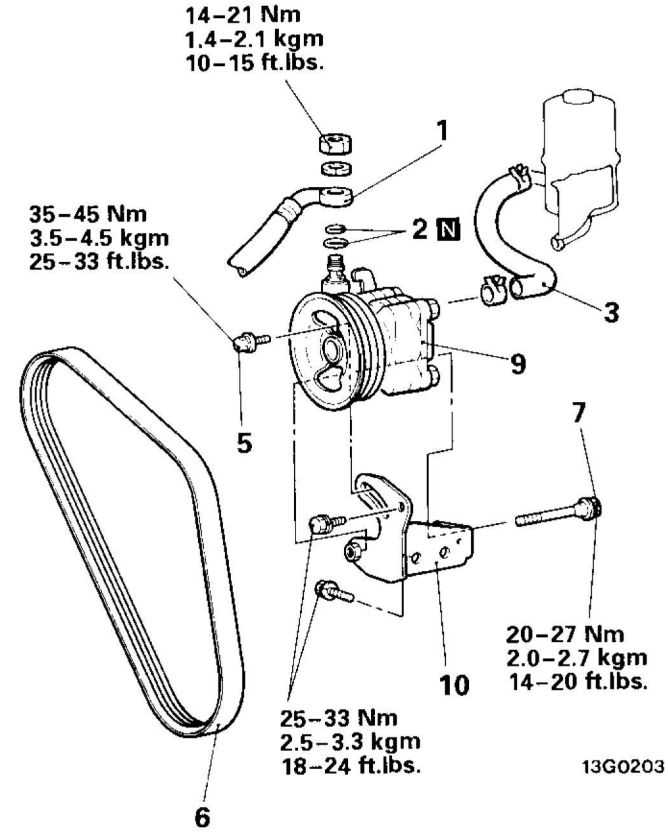
- ➧◆ 1. Pressure hose connection
- 3. Suction hose connection
- ◆➧ 5. Bolt
- 6. V-belt
- 7. Bolt
- 8. Spacer
- 9. Oil pump
- 10. Oil pump bracket

NOTE
(1) Reverse the removal procedures to reinstall.
(2) ◆➧: Refer to "Service Points of Removal".
(3) ➧◆: Refer to "Service Points of Installation".

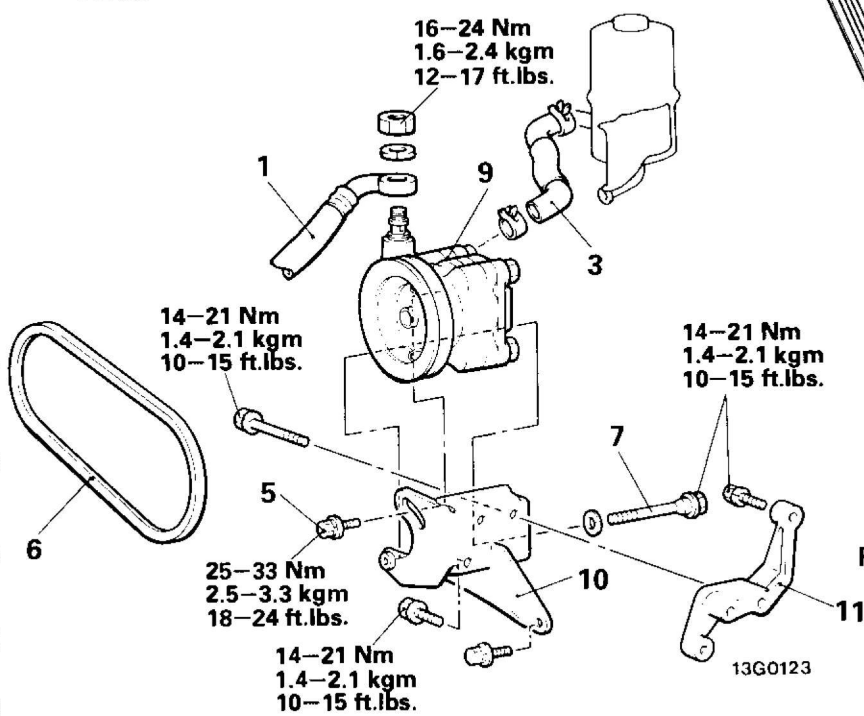
<4G92>



<4G63 – 16 Valve, 4G64 – 16 Valve>



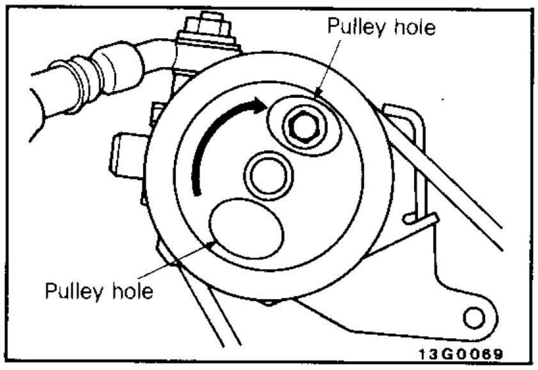
<4D56>



Removal steps

▶◀ 1. Pressure hose connection
2. O-ring
3. Suction hose connection
4. Oil pressure switch connector
◀▶ 5. Bolt
6. V-belt
7. Bolt
9. Oil pump
10. Oil pump bracket
11. Stay

NOTE
(1) Reverse the removal procedures to reinstall.
(2) ◀▶ : Refer to "Service Points of Removal".
(3) ▶◀ : Refer to "Service Points of Installation".
(4) N : Non-reusable parts

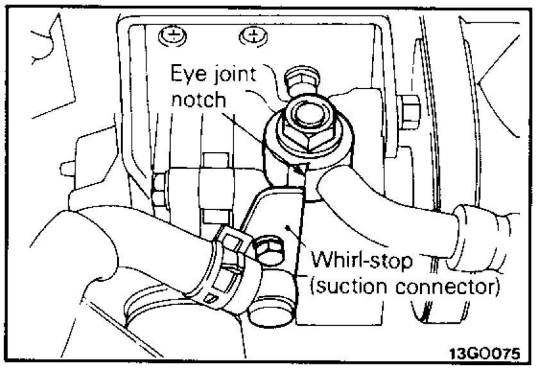


SERVICE POINTS OF REMOVAL

E37RBAC

5. REMOVAL OF BOLT

Turn pulley to match pulley hole with bolt position. Remove bolt.



SERVICE POINTS OF INSTALLATION

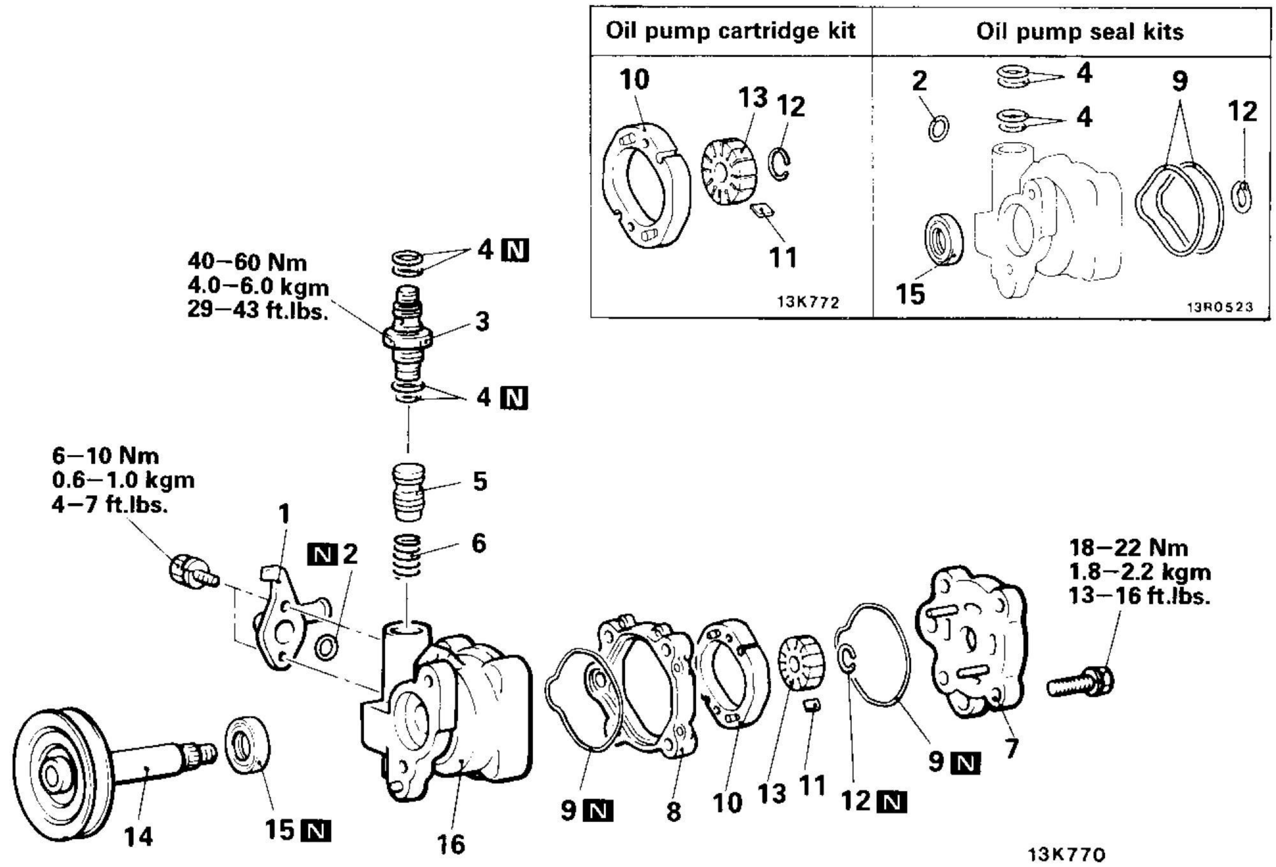
E37RDAB

1. INSTALLATION OF PRESSURE HOSE

Lock when pressure hose eye joint notch touches pump whirl-stop.

NOTES

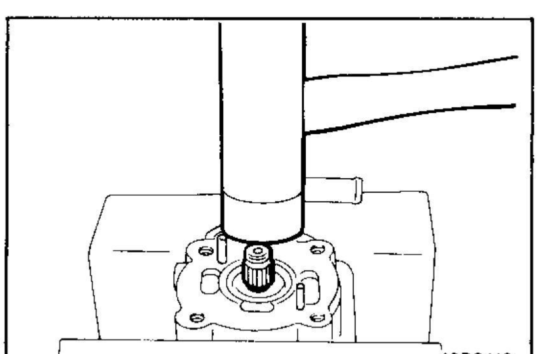
DISASSEMBLY AND REASSEMBLY <Except 4G92, 4G63 – 16 Valve, 4G64 – 16 Valve>



Disassembly steps

1. Suction connector
▶◀ 2. O-ring
3. Connector
▶◀ 4. O-ring
◀▶ ▶◀ 5. Flow control valve
6. Flow control spring
▶◀ 7. Pump cover
8. Cam case
▶◀ 9. O-ring
▶◀ 10. Cam ring
▶◀ 11. Vane
12. Snap ring
▶◀ 13. Rotor
◀▶ ▶◀ 14. Pulley assembly
▶◀ 15. Oil seal
16. Oil pump body

NOTE
(1) Reverse the disassembly procedures to reassemble.
(2) ◀▶ : Refer to "Service Points of Disassembly".
(3) ▶◀ : Refer to "Service Points of Reassembly".
(4) N : Non-reusable parts



SERVICE POINTS OF DISASSEMBLY

E37RFAD

5. REMOVAL OF FLOW CONTROL VALVE

Remove flow control valve only. Do not disassemble control valve further.

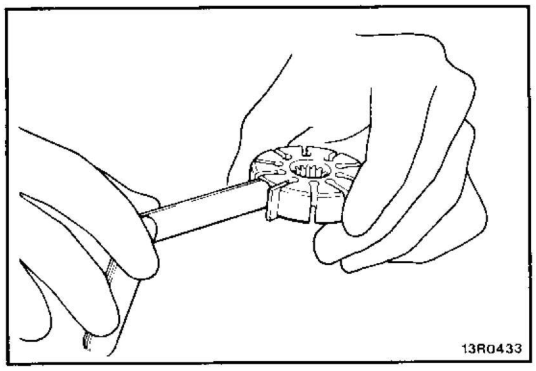
14. REMOVAL OF PULLEY ASSEMBLY

Tap the rotor side of the shaft lightly with a plastic hammer and take out the pulley assembly.

INSPECTION

E37RGAC

- Check the flow control spring for wear.
- Check the shaft of the pulley for wear and bend.
- Check the groove of rotor vane for "stepped" wear.
- Check the contact surface of cam ring and vanes for "stepped" wear.
- Check the vanes for breakage.

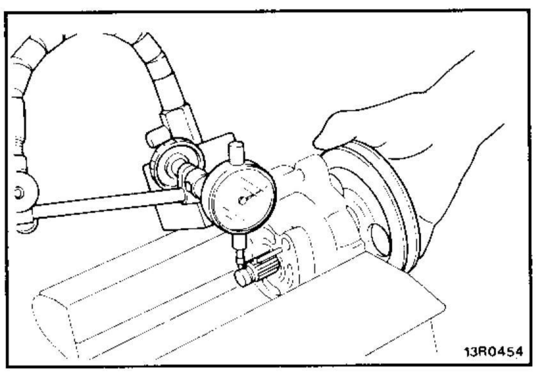


13R0433

CHECK OF GAP BETWEEN VANE AND ROTOR GROOVE

Install vane to rotor groove as illustrated. Measure the gap between vane and rotor groove with feeler gauge.

Limit: 0.06 mm (0.0024 In.)

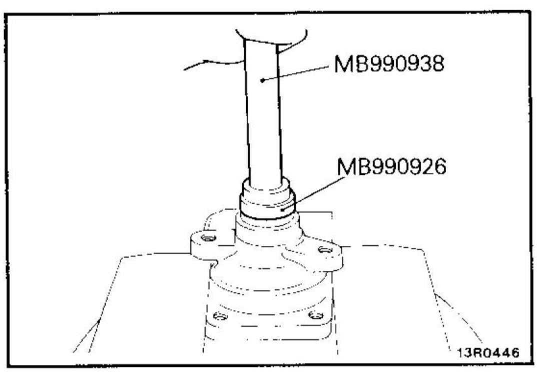


13R0454

CHECK OF SHAFT BACKLASH OF PUMP BODY BUSHING AND PULLEY ASSEMBLY

(1) Place a dial gauge at the end of the shaft of the pulley assembly.
(2) Move the pulley assembly up and down, and measure the play.

Limit: 0.1 mm (0.004 in.)



13R0446

SERVICE POINTS OF REASSEMBLY

E37RHAD

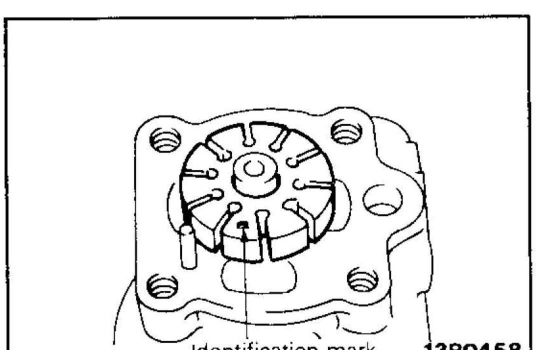
15. INSTALLATION OF OIL SEAL

Drive the oil seal into the pump body with the special tools.

14. INSTALLATION OF PULLEY ASSEMBLY

Apply specified fluid to entire shaft circumference of pulley assembly and install to pump body.

Specified fluid: Automatic transmission fluid "DEXRON" or "DEXRON II"



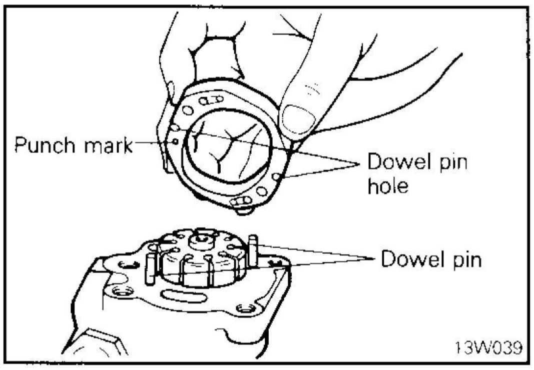
13R0458

13. INSTALLATION OF ROTOR

(1) Apply specified fluid to rotor drive area.

Specified fluid: Automatic transmission fluid "DEXRON" or "DEXRON II"

(2) Install with rotor punch mark side facing pump cover.

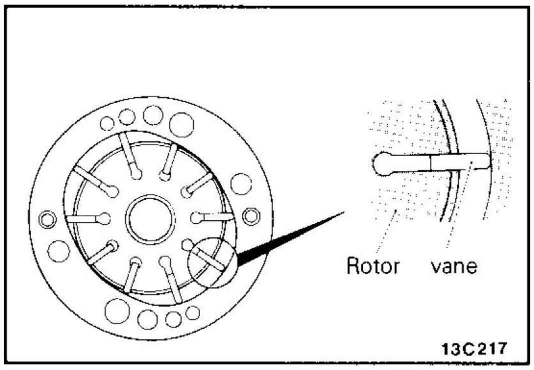


11. INSTALLATION OF VANE/10. CAM RING

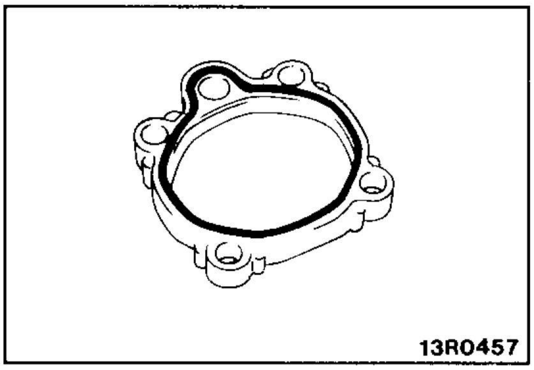
(1) Apply specified fluid to vane and cam ring friction surface.

Specified fluid: Automatic transmission fluid "DEXRON" or "DEXRON II"

(2) Align the dowel pins of the pump body with the dowel holes of the cam ring, and then install so that the cam ring's punch mark is at the pump body side.



(3) Install vane to rotor with its round edge to cam ring.



9. INSTALLATION OF O-RING

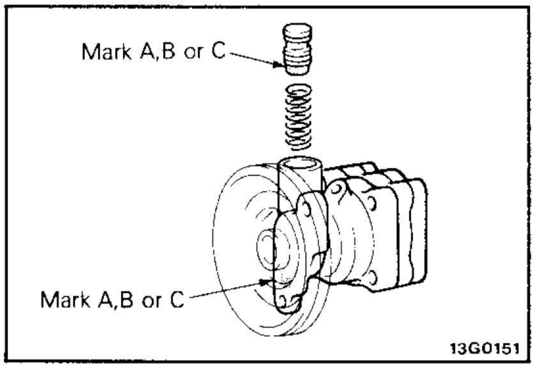
Apply specified fluid to O-ring and install firmly on cam case.

Specified fluid: Automatic transmission fluid "DEXRON" or "DEXRON II"

7. INSTALLATION OF PUMP COVER

Apply specified fluid to rotor friction surface of pump cover.

Specified fluid: Automatic transmission fluid "DEXRON" or "DEXRON II"

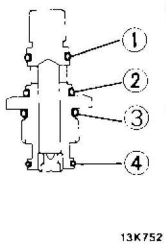
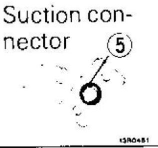


5. INSTALLATION OF FLOW CONTROL VALVE

(1) If the flow control valve is to be replaced, install the flow control valve to the oil pump body corresponding with the body identification mark (A,B,C).

(2) Apply the specified fluid to the outside of the flow control valve.

Specified fluid: Automatic transmission fluid "DEXRON" or "DEXRON II"

Identification of Repair Kit O-rings			
Position		I.D. x Width mm (in.)	Identification color
Connector 	①	11.0 x 1.9 (0.433 x 0.075)	Yellow
	②	13.0 x 1.9 (0.512 x 0.075)	Blue
	③	15.8 x 2.4 (0.622 x 0.094)	–
	④	13.5 x 1.5 (0.531 x 0.059)	Red
Suction connector ⑤ 	⑤	14.8 x 2.4 (0.583 x 0.094)	White
O-ring (not to be used)	–	3.8 x 1.9 (0.150 x 0.075)	–
	–	13.0 x 1.9 (0.512 x 0.075)	Blue

4. INSTALLATION OF O-RING/2. O-RING

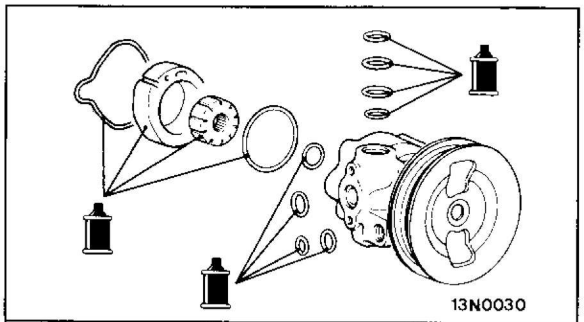
(1) Apply specified fluid on O-rings to install.

Specified fluid: Automatic transmission fluid "DEXRON" or "DEXRON II"

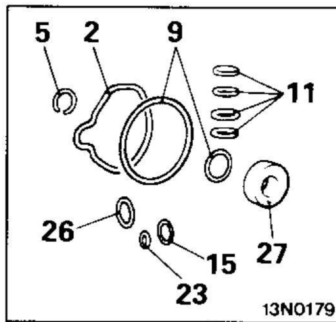
(2) Identify O-rings acording to table at left as they differ in size.

DISASSEMBLY AND REASSEMBLY <4G92, 4G63 – 16 Valve, 4G64 – 16 Valve>

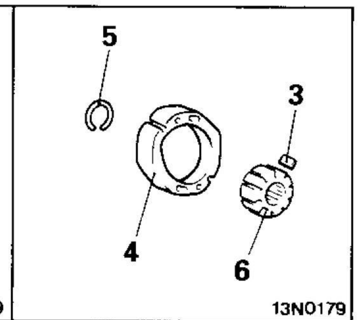
E37RE--



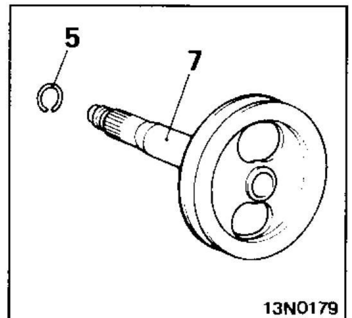
Fluid: Automatic transmission fluid DEXRON or DEXRON II



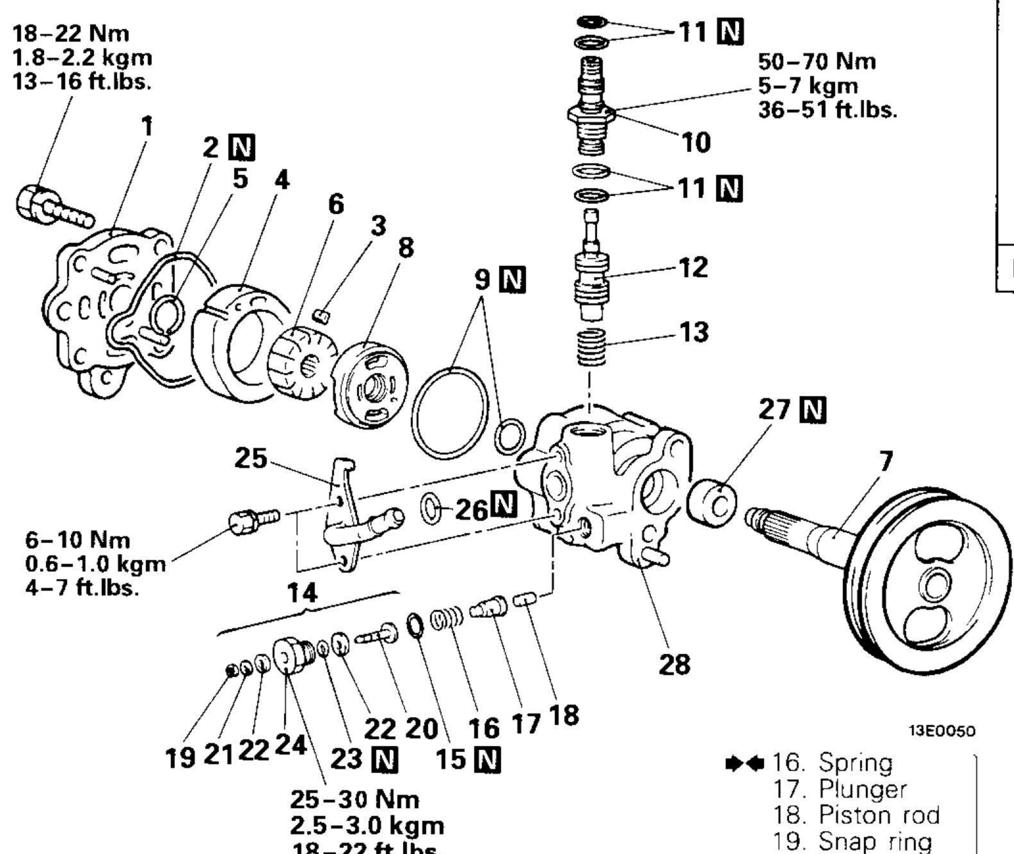
Oil pump seal kit



Oil pump cartridge kit



Pulley and shaft kit

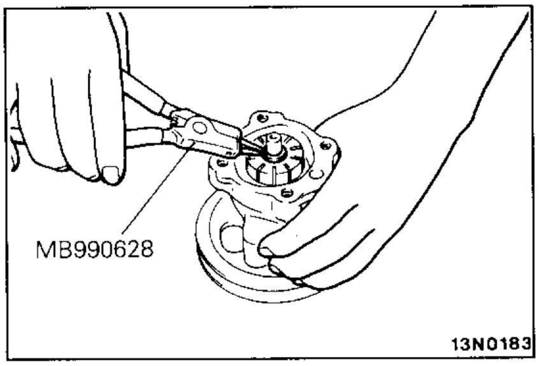


Disassembly steps

1. Pump cover
2. O-ring
3. ▶◀ Vanes
4. ▶◀ Cam ring
5. ◀▶ ▶◀ Snap ring
6. ▶◀ Rotor
7. Pulley assembly
8. ▶◀ Side plate
9. ▶◀ O-ring
10. Connector
11. ▶◀ O-ring
12. Flow control valve
13. Flow control spring
14. Terminal assembly } 4G92
15. ▶◀ O-ring } 4G92
16. ▶◀ Spring } 4G92
17. Plunger } 4G92
18. Piston rod } 4G92
19. Snap ring } 4G92
20. Terminal } 4G92
21. Washer } 4G92
22. Insulator } 4G92
23. ▶◀ O-ring } 4G92
24. Plug } 4G92
25. Suction connector
26. ▶◀ O-ring
27. ▶◀ Oil seal
28. Oil pump body

Caution
Do not disassemble the flow control valve.

NOTE
(1) Reverse the disassembly procedures to reassemble.
(2) ◀▶ : Refer to "Service Points of Disassembly".
(3) ▶◀ : Refer to "Service Points of Reassembly".
(4) N : Non-reusable parts

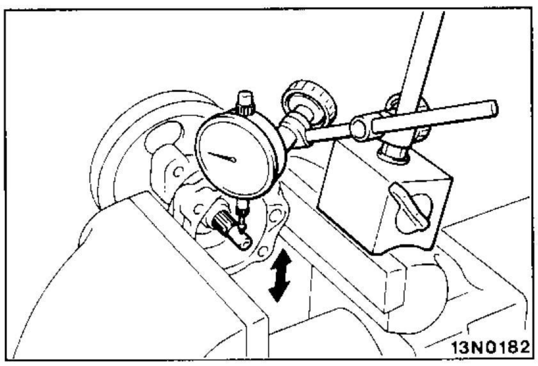


SERVICE POINTS OF DISASSEMBLY E37RFAH

5. REMOVAL OF SNAP RING

INSPECTION E37RGAH

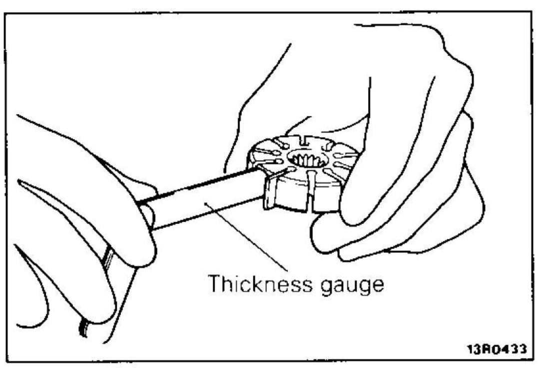
- Check the flow control valve for clogging.
- Check the pulley assembly for wear or damage.
- Check the groove of rotor and vane for "Stepped" wear.
- Check the contact surface of cam ring and vanes for "Stepped" wear.
- Check the vanes for damage.



CLEARANCE BETWEEN SHAFT AND PUMP BODY

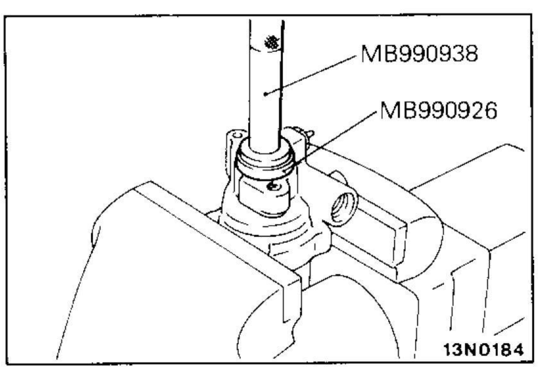
(1) Place the dial gauge against the end of the pulley assembly's shaft.
(2) Move the pulley assembly up and down and measure the play.

Limit: 0.1 mm (0.004 in.)



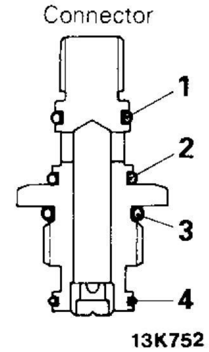
GAP BETWEEN VANE AND ROTOR GROOVE

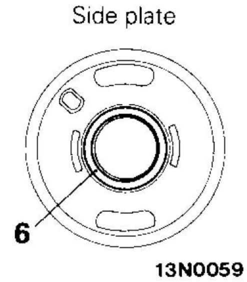
Limit: 0.06 mm (0.0024 in.)

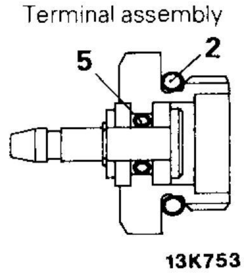


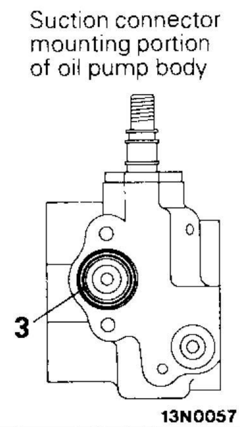
SERVICE POINTS OF REASSEMBLY E37RHAL

27. INSTALLATION OF OIL SEAL





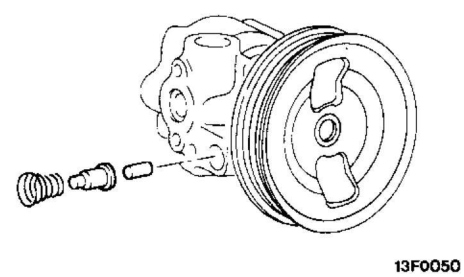




26./23./15./11./9. INSTALLATION OF O-RINGS

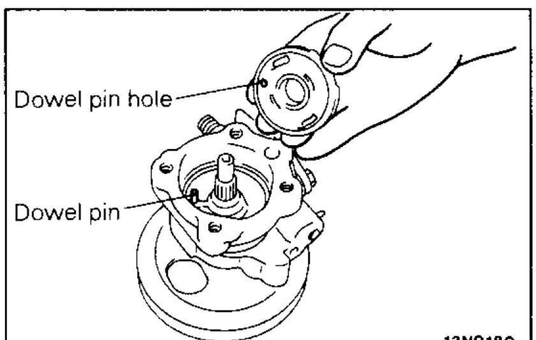
Apply specified fluid on O-rings to install.

No.	I.D.×Width	mm (in.)
1	11×1.9	(0.433×0.075)
2	13×1.9	(0.512×0.075)
3	17.8×2.4	(0.701×0.094)
4	13.5×1.5	(0.531×0.059)
5	3.8×1.9	(0.150×0.075)
6	16.8×2.4	(0.661×0.094)



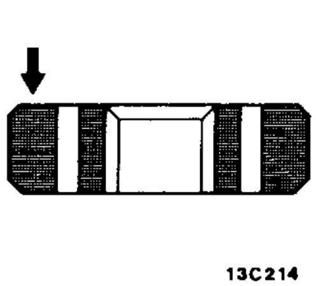
16. INSTALLATION OF SPRING

Fit the spring to the oil pump body with the larger-diameter end at the terminal assembly side.



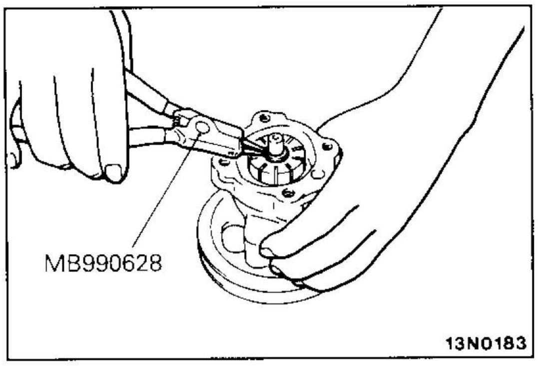
8. INSTALLATION OF SIDE PLATE

Line up the dowel pin hole of the side plate with the dowel pin of the pump body when installing the side plate.

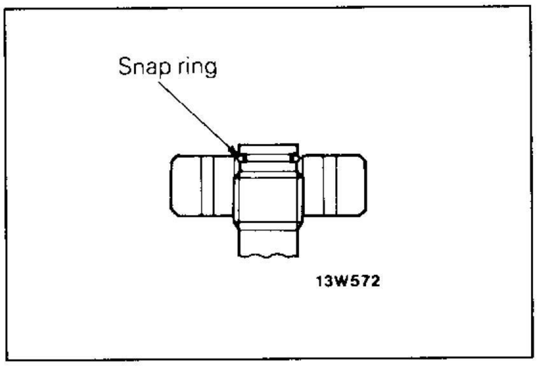


6. INSTALLATION OF ROTOR

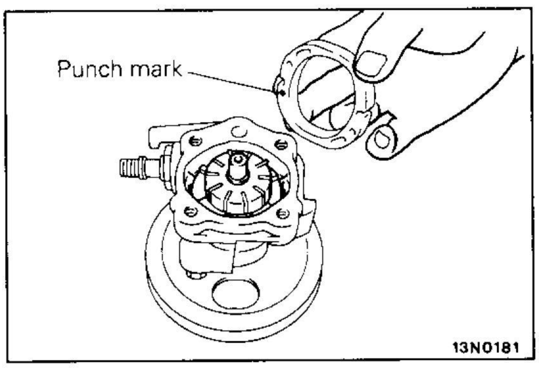
Install the rotor to the pulley assembly so that the rotor's punch mark is at the pump cover side.



5. INSTALLATION OF SNAP RING

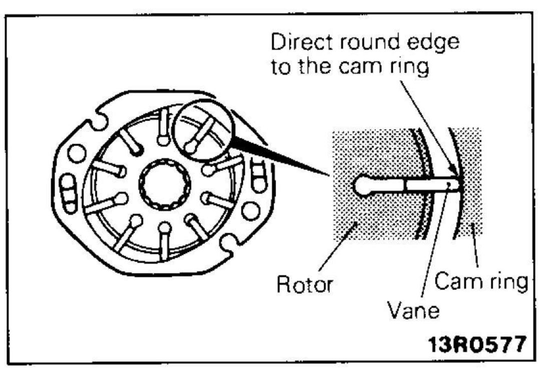


After installation of the snap ring, lift the rotor and check that the snap ring has entered the countersunk part.



4. INSTALLATION OF CAM RING

Install the cam ring with the punch mark facing the side plate.



3. INSTALLATION OF VANES

Install the vanes on the rotor, paying close attention to the installation direction.

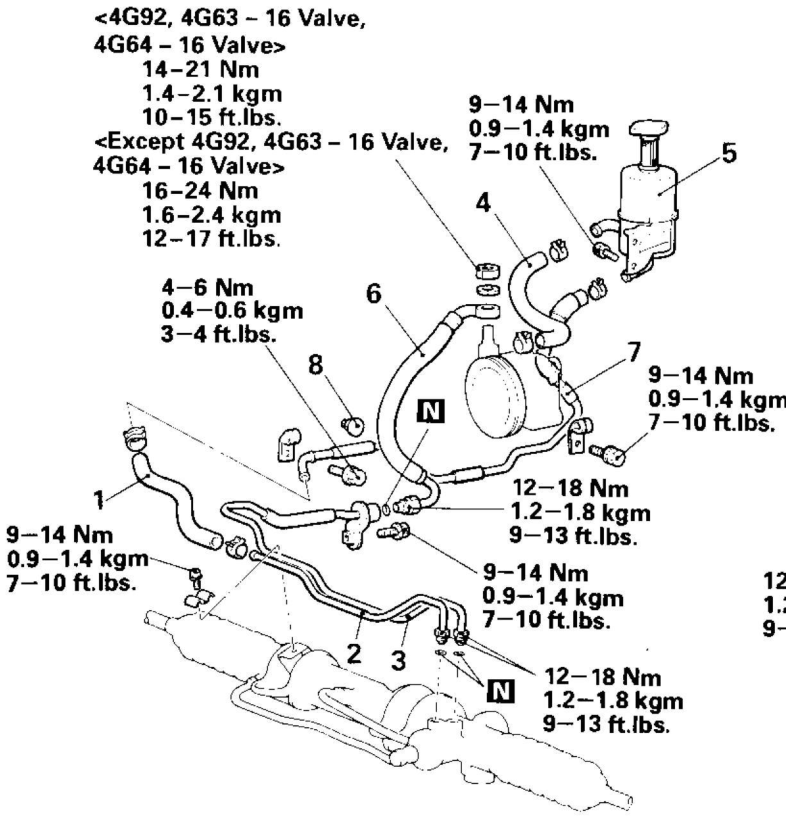
POWER STEERING HOSES

E37TA--

REMOVAL AND INSTALLATION

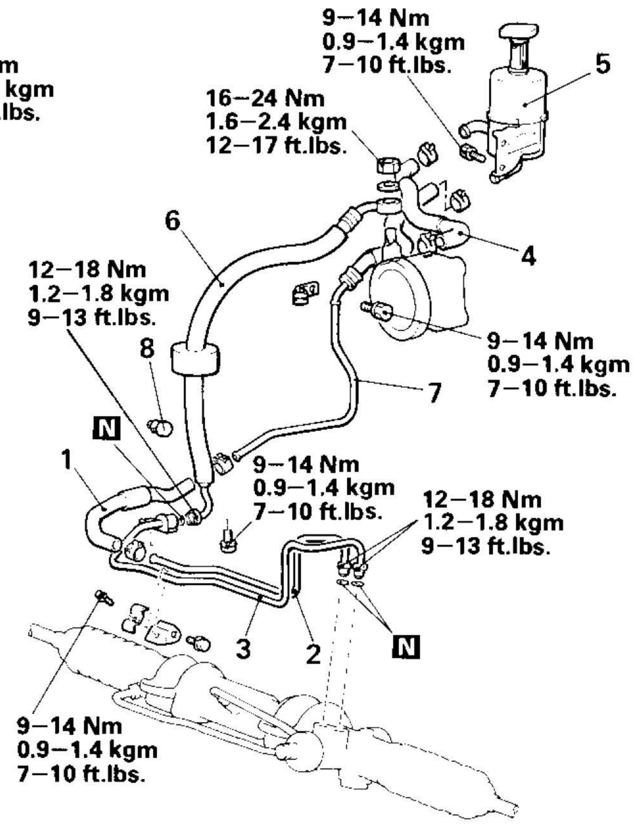
L.H. drive vehicles

(2WD)



13G0137

(4WD)



13G0138

Removal steps

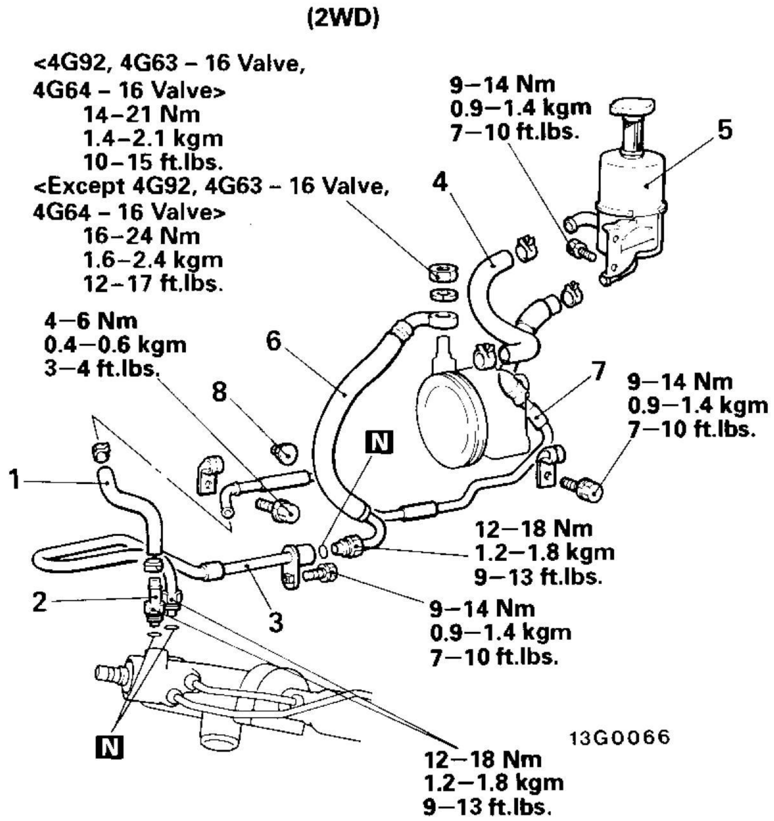
- ◄► 1. Return hose
- 2. Return tube
- 3. Pressure tube
- 4. Suction hose
- 5. Oil reservoir
- ►◄ 6. Pressure hose
- 7. Return hose
- 8. Tube guide

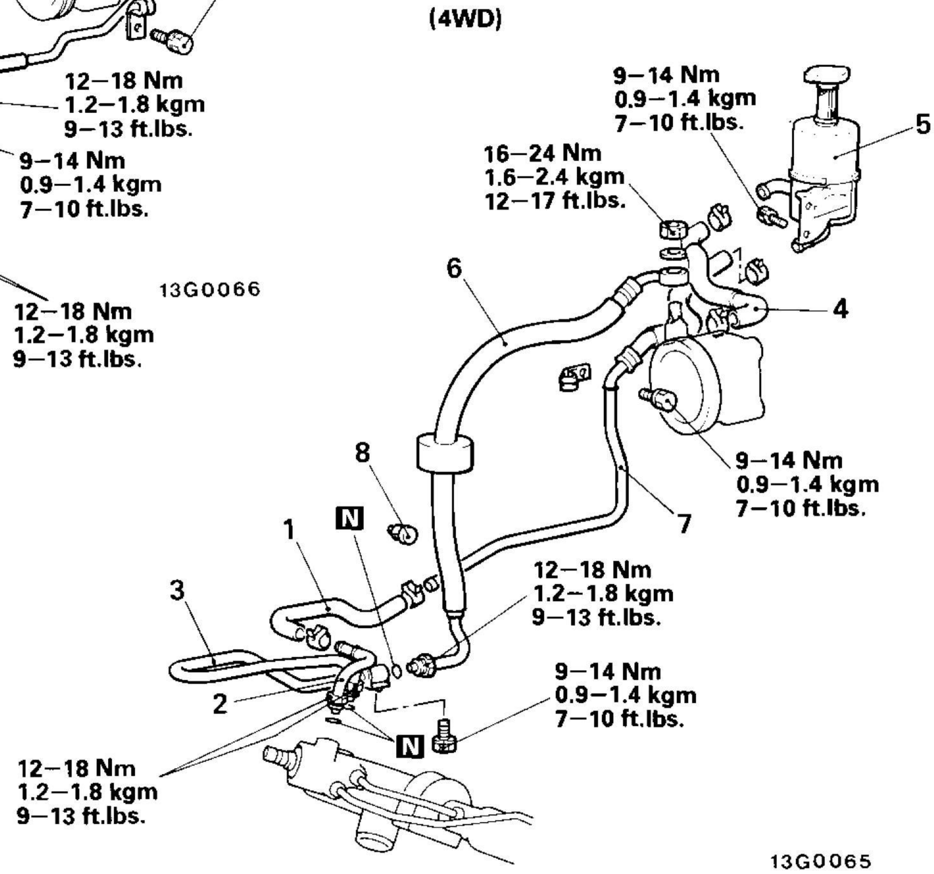
NOTE
(1) Reverse the removal procedures to reinstall.
(2) ◄►: Refer to "Service Points of Removal".
(3) ►◄: Refer to "Service Points of Installation".
(4) N : Non-reusable parts

Pre-removal Operation
- Removal of snow guard plate (2WD), power steering tube protector (2WD), under skid plate (4WD) (Refer to GROUP 42 BODY–Under cover.)

Post-installation Operation
- Filling and bleeding of power steering fluid (Refer to P. 37–21.)
- Installation of snow guard plate (2WD), power steerng tube protector (2WD), under skid plate (4WD) (Refer to GROUP 42 BODY–Under cover.)

R.H. drive vehicles





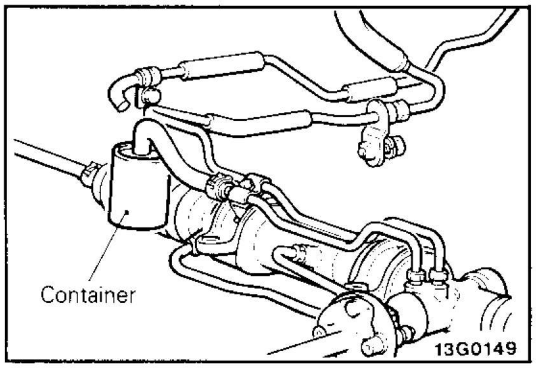
Removal steps

◆◆ 1. Return hose
2. Return tube
3. Pressure tube
4. Suction hose
5. Oil reservoir
◆◆ 6. Pressure hose
7. Return hose
8. Tube guide

NOTE
(1) Reverse the removal procedures to reinstall.
(2) ◆◆: Refer to "Service Points of Removal".
(3) ◆◆: Refer to "Service Points of Installation".
(4) N : Non-reusable parts

Pre-removal Operation
- Removal of snow guard plate (2WD), power steering tube protector (2WD), under skid plate (4WD) (Refer to GROUP 42 BODY–Under cover.)
- Removal of seat under-frame (Refer to GROUP 42 BODY–Under-frame.)

Post-installation Operation
- Filling and bleeding of power steering fluid (Refer to P. 37–21.)
- Installation of seat under-frame (Refer to GROUP 42 BODY–Seat Under-frame.)
- Installation of snow guard plate (2WD), power steering tube protector (2WD), under skid plate (4WD) (Refer to GROUP 42 BODY–Under cover.)



SERVICE POINTS OF REMOVAL E37TBAC

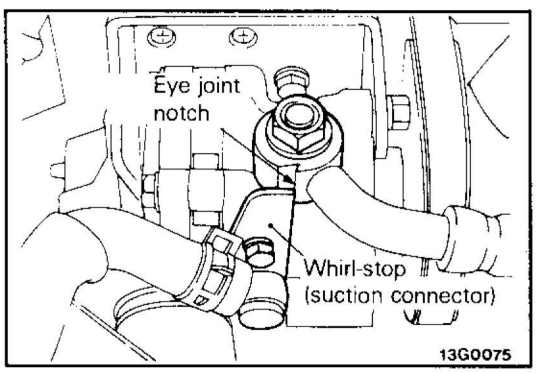
1. REMOVAL OF RETURN HOSE

(1) Disconnect return hose connection and drain fluid into a container.

(2) Disconnect the high-tension cable (petrol-powered vehicles) or the connector of the fuel-cut solenoid valve (diesel-powered vehicles), and then while operating the starting motor intermittently, turn the steering wheel all the way to the left and right several times to drain all of the fluid.

Caution
Be careful not to position the high-tension cable near the carburettor or the injection mixer.

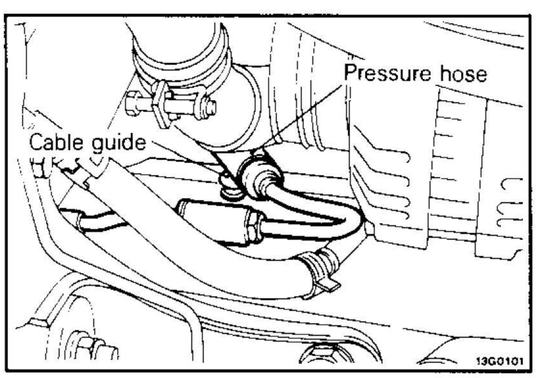
(3) Remove return hose.



SERVICE POINTS OF INSTALLATION E37TDAB

6. INSTALLATION OF PRESSURE HOSE

(1) Lock with pressure hose eye joint notch contacting pump whirl-stop.



(2) Tighten flare nut with pressure hose contacting cable guide.