STEERING

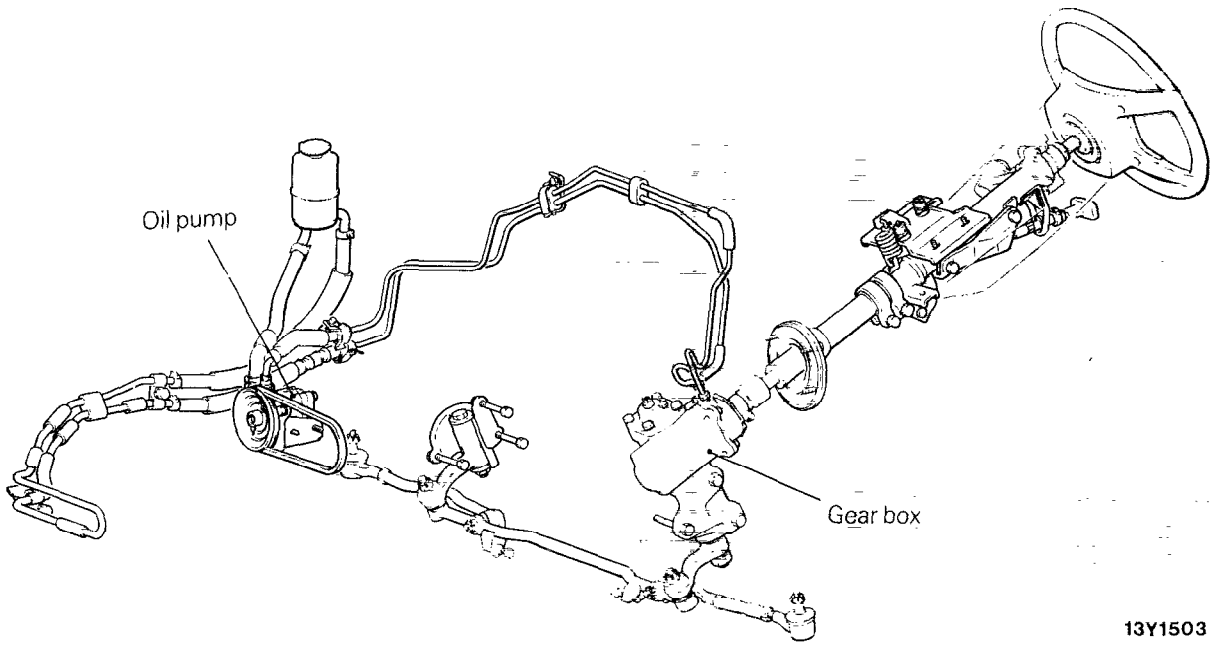
POWER

CONTENTS

GENERAL INFORMATION

N19BABC

The steering column uses the tilt steering system to provide optimum driving position.
The power steering system uses an integral gear box (ball nut type) and a vane type oil pump.
This power steering system is characterized by steering effort that changes with the engine speed. Namely, only a slight steering effort is required when the engine speed is low and it increases with increasing engine speed, thus offering outstanding steering stability.



SPECIFICATIONS

N19CA--

GENERAL SPECIFICATIONS

Items	Specifications
Steering wheel diameter mm (in.)	380 (15.0)
Steering column and shaft type	Collapsible steering column and tilt-adjustable steering wheel
Gear box	
Steering gear type	Ball and nut, torsion bar type
Steering gear ratio	14.25
Oil pump	
Oil pump type	Vane type
Displacement	9.6 cm^3/rev. (.59 $in.^3$/rev.)

SERVICE SPECIFICATIONS

N19CB--

Items	Specifications
Standard value	
Steering angle	
Inner wheel	$39°^{\ 0}_{-3°}$
Outer wheel	$32°^{\ 0}_{-2°}$
Steering wheel free play mm (in.)	25 (1.0) or less
Stationary steering effort N (lbs.)	30 (6.6) or less
V-belt tension mm (in.)	9 – 12 (.35 – .47)
Mainshaft starting torque Ncm (in.lbs.)	25 – 65 (2 – 6)
Mainshaft total starting torque Ncm (in.lbs.)	50 – 90 (4 – 8)
Oil pump pressure kPa (psi)	
Gauge hose valve closed	7,500 – 8,200 (1,067 – 1,166)
Gauge hose valve opened	980 (142) or less
Ball joint starting torque Ncm (in.lbs.)	
Tie rod and relay rod (for pitman arm)	50 – 250 (4 – 22)
Relay rod (for idler arm)	50 – 150 (4 – 13)
Idler arm starting torque Ncm (in.lbs.), Spring scale reading N (lbs.)	300 – 900 (26 – 78), 26 – 78 (6 – 18)
Limit	
Steering wheel free play mm (in.)	50 (2.0)
Steering gear backlash mm (in.)	0.5 (.02)
Oil pump pressure kPa (psi)	
Gauge hose valve closed	1,500 (218)

TORQUE SPECIFICATIONS

N19CC--

Items	Nm	ft.lbs.
Steering column and shaft		
Steering wheel lock nut	35 – 45	25 – 33
Column tube clamp	5 – 8	3.6 – 6.0
Steering column support plate	9 – 14	6.5 – 10
Steering shaft to gear box bolt	20 – 25	14 – 18
Tilt link cover	9 – 14	6.5 – 10
Power steering gear box		
Side cover	45 – 55	33 – 40
Adjusting bolt lock nut	30 – 45	22 – 33
Breather plug	3 – 4	2 – 3
Pitman arm installation	130 – 150	94 – 108
Gear box installation	35 – 40	25 – 29
Circulators installation	3.5 – 4.5	2.5 – 3.3
Valve housing	45 – 55	33 – 40
Lock nut*	180 – 230*	130 – 166*
Oil pump		
Suction connector	6 – 10	4 – 7
Connector	50 – 70	36 – 51
Reservoir	8 – 12	6 – 9
Oil pump bracket	14 – 21	10 – 15
	27 – 41	20 – 30
Oil pump brace bolt	14 – 21	10 – 15
Oil pump cover	18 – 22	13 – 16
Steering hoses		
Pressure hose	30 – 40	22 – 29
Return hose	40 – 50	29 – 36
Clamp A	3.2 – 4.8	2.3 – 3.5
Steering linkage		
Tie rod end	35 – 45	25 – 33
Tie rod socket and relay rod	35 – 45	25 – 33
Relay rod to pitman arm	35 – 45	25 – 33
Relay rod to idler arm	35 – 45	25 – 33
Idler arm attaching nut	40 – 60	29 – 43
Tie rod end stud	50 – 55	36 – 40
Idler arm support and frame	35 – 40	25 – 29
Stopper bolt lock nut for adjustment of steering angle	20	14

NOTE

* If the special tool is used to measure the tightening torque, the measurement is 135 – 175 Nm (98 – 127 ft.lbs.).

LUBRICANTS

N19CD- -

Items	Specified lubricants	Quantity
Power steering fluid	Automatic transmission fluid DEXRON or DEXRON II type	900 cm^3 (54.9 $in.^3$)
Steering shaft bearing	MOPAR Multi-mileage Lubricant Part No. 2525035 or equivalent	As required
Joint bearing	MOPAR Multi-mileage Lubricant Part No. 2525035 or equivalent	As required
Inside of joint socket and spring	MOPAR Multi-mileage Lubricant Part No. 2525035 or equivalent	As required
Joint pin A	MOPAR Multi-mileage Lubricant Part No. 2525035 or equivalent	As required
Inside of joint pin retainer	MOPAR Multi-mileage Lubricant Part No. 2525035 or equivalent	As required
Oil seal lip of cross-shaft	MOPAR Multi-mileage Lubricant Part No. 2525035 or equivalent	As required
Needle bearing of side cover	MOPAR Multi-mileage Lubricant Part No. 2525035 or equivalent	As required
U-packing of side cover	MOPAR Multi-mileage Lubricant Part No. 2525035 or equivalent	As required
Oil seal lip of dust cover	MOPAR Multi-mileage Lubricant Part No. 2525035 or equivalent	As required
Idler arm support, bearing and oil seal	MOPAR Multi-mileage Lubricant Part No. 2525035 or equivalent	As required

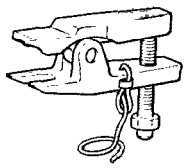
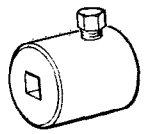
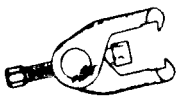
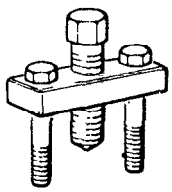
SEALANT AND ADHESIVE

N19CE- -

Items	Specified sealants	Quantity
Inner bore of dash panel cover bolt holes	MOPAR Lock N'Seal Adhesive Part No. 4057989 or equivalent	As required

SPECIAL TOOLS

N19DA--

Tool (Number and name)	Use	Tool (Number and name)	Use
MB991113 Steering linkage puller 	Disconnection of the relay rod	CT-1108 Preload socket 	Measurement of the mainshaft starting torque
C3894-A Pitman arm puller 	Removal of the pitman arm	MB990852 Housing locking nut special spanner 	Removal and installation of the housing locking nut
C-3309-E Oil pressure gauge 	Measurement of the oil pump pressure	MB990853 Top cover remover 	Removal and installation of the top cover
DT-1001-A Steering wheel puller 	Removal of steering wheel	C-4535 Hose set - Pump pressure checking 	Measurement of the oil pump pressure

TROUBLESHOOTING

N19EABA

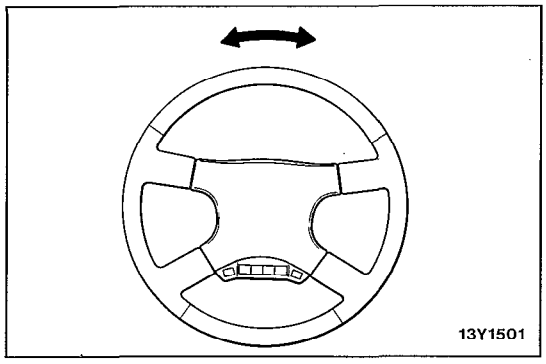
Symptom	Probable cause	Remedy
Excessive play of steering wheel	Excessive play in steering gear box	Repair
	Loose steering gear mounting bolts	Retighten
	Loose or worn stud of tie rod end	Retighten or replace as necessary
Steering wheel operation is heavy (Low power assist)	Loose belt	Adjust the belt tension
	Damaged belt	Replace the belt
	Low fluid level	Refill with fluid
	Air in fluid line	Bleed the system
	Twisted or damaged hoses	Correct the hose routing or replace the hoses
	Fluid leakage	Check the fluid leakage
	Malfunction of gear box	Check and replace the gear box if necessary
	Malfunction of oil pump	Check the oil pump pressure and repair oil pump
Rattling noise	Loose installation of oil pump or gear box	Retighten the oil pump or gear box
	Interference around column or between pressure hose and other parts	Correct or replace the pressure hose and the parts around the column
	Abnormal noise inside of gear box and oil pump	Replace the gear box or oil pump
Shrill noise	Air sucked into oil pump	Check the oil level and hose clips, bleed the system or replace the oil pump
	Oil pump seizure	Replace the oil pump
Squealing noise	Loose belt	Adjust the belt tension
	Oil pump seizure	Replace the oil pump
Hissing noise	Air sucked into oil pump	Check the oil level and hose clips; bleed the system
	Damage to the olive of the gear box port section	Replace the gear box
	Malfunction of return hose	Replace the hose
Whistling noise	Malfunction of gear box port section	Replace the gear box

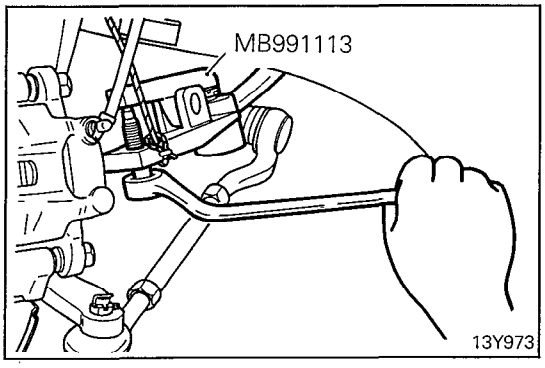
Symptom	Probable cause	Remedy
Droning noise	Loose mounting bolt on oil pump or oil pump bracket	Retighten the pump bracket or pump mounting bolt
	Poor condition of oil pump body*	Replace the oil pump
Squeaking noise	Malfunction of steering stopper contact	Check and adjust the steering stopper
	Interference of wheel with vehicle body	Adjust the steering angle
	Malfunction of gear box	Replace the gear box
Vibration**	Air suction	Bleed the system
	Malfunction of gear box	Replace the gear box
Oil leakage from hose connection	Improperly tightened flare nut Incorrectly installed hose Improperly clamped hose	Check and repair or replace
Oil leakage from hose assembly	Damaged or clogged hose Hose connector malfunction	Replace
Oil leakage from oil reservoir	Improperly welded pipe	Weld the pipes or replace
	Overflow	Bleed the system or adjust the oil level
Oil leakage from oil pump	Malfunction of oil pump housing	Replace the oil pump
	Malfunction of O-ring and/or oil seal	Replace the O-ring and oil seal
Oil leakage from gear box	Malfunction of gear box housing (including leakage from air hole)	Replace the gear box
	Malfunction of O-ring and/or oil seal	Replace the O-ring and oil seal

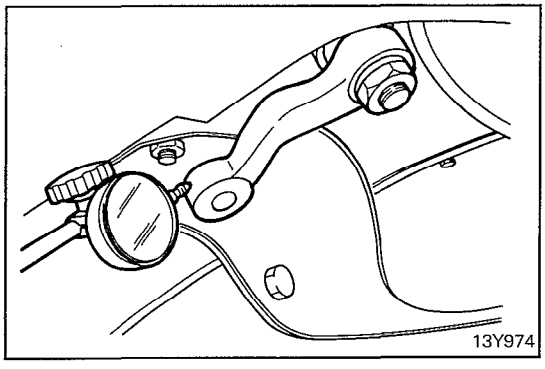
NOTE

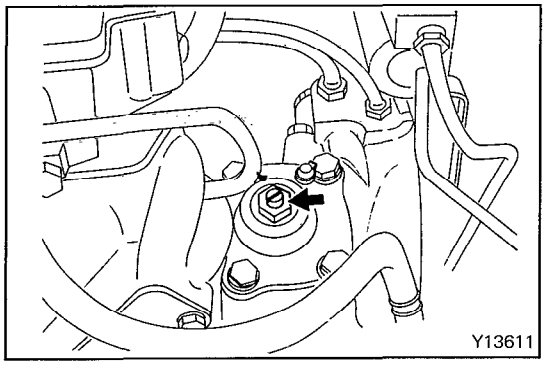
* A slight "beat noise" is produced by the oil pump; this is not a malfunction. (This noise occurs particularly when a stationary steering effort is made.)

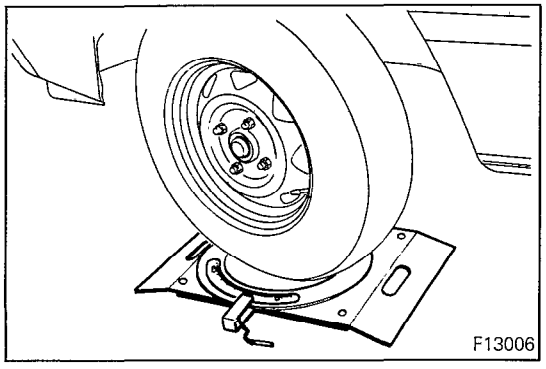
** A slight vibration may be felt when the stationary steering effort is made due to the condition of the road surface. To check whether the vibration actually exists or not, test-drive the vehicle on a dry concrete or asphalt surface. Moreover, a very slight amount of vibration is not a malfunction.











SERVICE ADJUSTMENT PROCEDURES

N19FABD

CHECKING STEERING WHEEL FREE PLAY

1. With the engine stationary and the steering wheel in the straight-ahead position, apply a force of 5 N (1.1 lbs.) to the steering wheel in the peripheral direction. Measure the play of the circumference of the steering wheel.

   Standard value: 25 mm (1.0 in.) or less
   Limit: 50 mm (2.0 in.)

2. If the measured value exceeds the limit, check the steering gear backlash, and linkage ball joint end play.

CHECKING STEERING GEAR BACKLASH N19FOAC

1. Jack up the vehicle front and hold the steering wheel in the straight-ahead position.
2. Disconnect the relay rod and pitman arm using the special tool.

   Caution
   1. Tie the string to a nearby part so that the special tool will not come loose.
   2. Do not remove the ball joint nut but simply loosen.

3. Measure the steering gear backlash at the pitman arm top end with dial indicator.

   Limit: 0.5 mm (.02 in.)

4. If the measured value exceeds the limit, screw in the steering gear box adjusting bolt until the steering wheel free play is within the range of standard value.

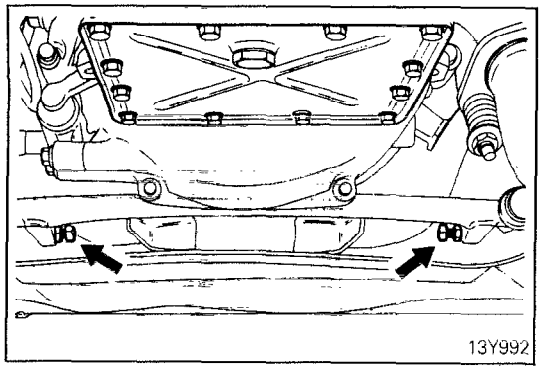
   Caution
   1. Be sure to make the adjustment with the steering wheel in the straight-ahead position.
   2. If the adjusting bolt is overtightened, more steering effort will be required, and return of the wheel will be adversely affected.

CHECKING STEERING ANGLE N19FDBC

1. Place the front wheel on a turning radius gauge and measure the steering angle.

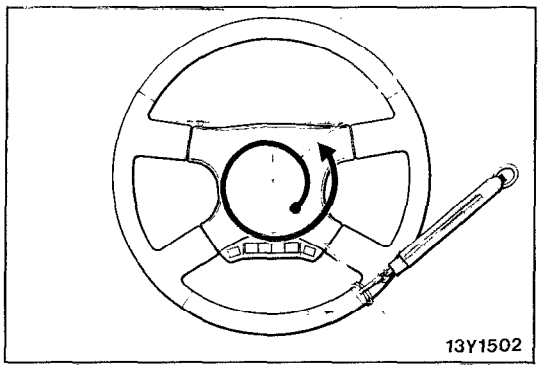
   Standard value:

Inner wheel	**$39^{\circ}{}_{-3^{\circ}}^{0^{\circ}}$**
Outer wheel	**$32^{\circ}{}_{-2^{\circ}}^{0^{\circ}}$**


13Y992

2. Adjust the steering angle of each wheel by turning the stop bolt of the relay rod.

Caution
Be sure that the toe-in is properly adjusted before adjusting the steering angle.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CHECKING STATIONARY STEERING EFFORT N19FFAE

1. Place the vehicle on a level surface and place the steering wheel in the neutral position.
2. Set the engine speed to 1,000 rpm.

Caution
The engine speed should be lowered to the standard (idling) speed after inspection.

3. Measure the tangential force with a spring balance by turning the steering wheel clockwise and counterclockwise one and a half turns.

Standard value: 30 N (6.6 lbs.)

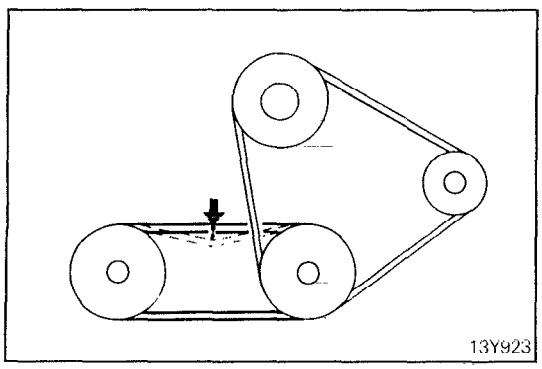
4. If the stationary steering effort exceeds the standard value, check for belt slackness, damage, insufficient oil, air mixed into oil, collapsed or twisted hoses, etc., and repair if found.

CHECKING STEERING WHEEL RETURN TO CENTER N19FGAD

To check for the return of steering wheel to center, carry out drive test and check the following points.

1. Make gentle and sharp turns and check to get a feel for that there is no appreciable difference in steering effort and return to center between right and left turns.
2. Drive at a speed of about 35 km/h (22 mph), turn the steering wheel 90° clockwise or counterclockwise, and release the wheel one or two seconds later. If the wheel returns more than 70°, the return of steering wheel may be considered good.

NOTE
When the steering wheel is turned abruptly, momentary hard steering might result, but this does not mean any problem. It is caused by low oil pump delivery during idling.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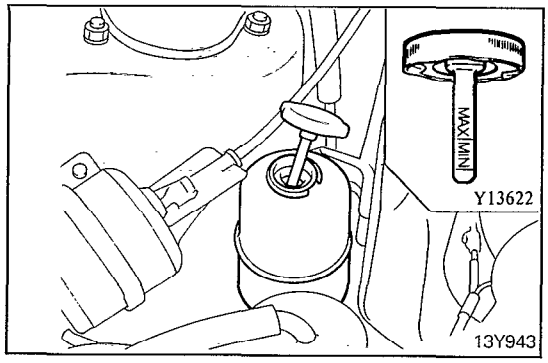
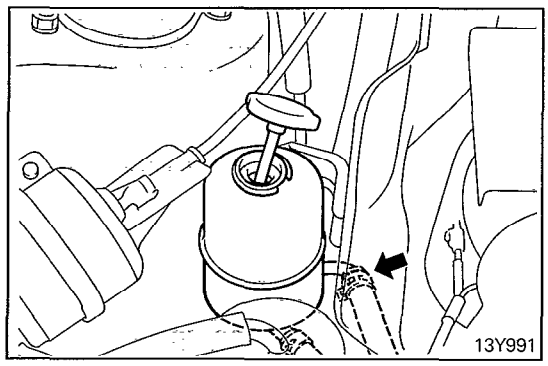
CHECKING DRIVE BELT TENSION N19FHAE

1. Check the belt for slackness by applying pressure of 100 N (22 lbs.) to the center of the belt.

Standard value: 9 – 12 mm (.35 – .47 in.)

2. If the measured value does not agree with the standard value, adjust the drive belt tension.





CHECKING FLUID LEVEL N19FIAG

1. Start the engine on a level surface, and turn the steering wheel several times fully to the right and left while the engine is idling.
2. Check the reservoir for contamination.
3. Replace the fluid if it has bubbles or has become white.
4. Fill the reservoir with specified automatic transmission fluid to the MAX level.

Specified fluid: MOPAR DEXRON or DEXRON II Automatic Transmission Fluid Part No. 3549660 or 4131509, or equivalent

REPLACEMENT OF FLUID N19FKAG

Check for contamination in the fluid reservoir. Foamy or cloudy fluid should be replaced.

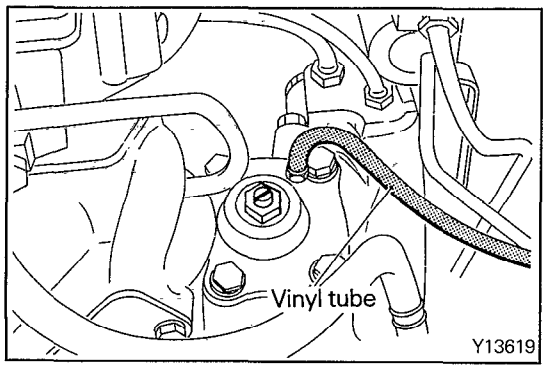
1. Remove the reservoir cap.
2. Disconnect the return hose from the reservoir tank and remove the fluid.
3. Disconnect the high tension cable. Run the engine intermittently several times with the starter motor, and remove the fluid from the gear box.
4. Attach the return hose and supply the specified fluid.
5. Bleed the system and check the fluid pressure.

Specified fluid: MOPAR DEXRON or DEXRON II Automatic Transmission Fluid Part No. 3549660 or 4131509, or equivalent

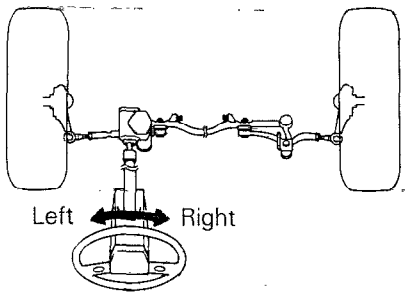
AIR BLEEDING N19FKAE

Check the stationary steering effort. If it is not within the range of the standard value, it is possible that air has been mixed into the system. Bleed the air from the system.

1. Make certain the reservoir is filled up.
2. Jack up the front wheels.
3. Disconnect the high tension cable.
4. While turning the steering wheel completely to the right and to the left, turn the engine over by using the starter motor. Repeat this several times.
5. Lower the front wheels.



6. Connect one end of a vinyl tube of suitable length to the breather plug of the gear box, and place its other end in a container.
7. Start the engine and idle it.



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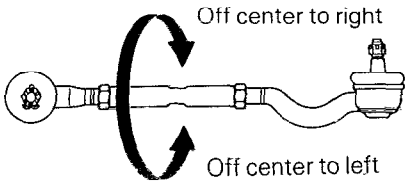


Tie rod viewed from above

1/5 turn of the tie rod
= 2 mm (.08 in.) toe change
= 2 degrees or 1/4 in. at the steering wheel

13Y972

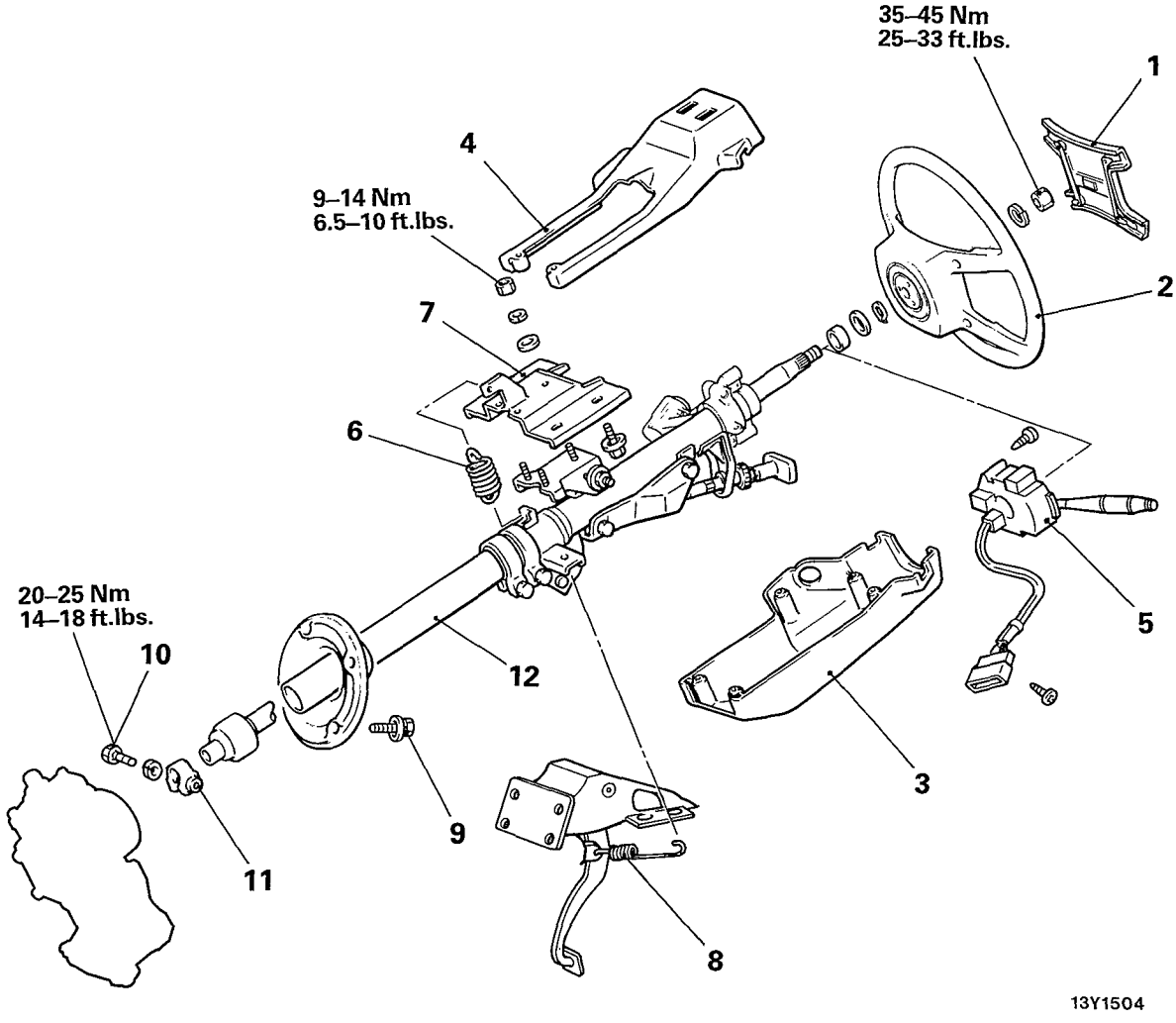
1. Measure the toe-in.
2. The steering wheel is off center to the left, subtract one millimeter from the measured value down to the specification limit.
   The steering wheel is off center to the right, add one millimeter to the measured value up to the specification limit, as shown in the sample calculation.
   Then adjust the tie rod to change the toe by that number.
3. Hold the tie rod with a wrench while loosening the lock nuts.
4. Turn the tie rod 1/5 turn for each two degrees the steering wheel is off center.
5. Re-check toe-in to be sure the specification is not exceeded.

Sample calculation:
Steering wheel 5° off center to right.
Measured toe-in = 2 mm (.08 in.)
Maximum toe-in = 5 mm (.20 in.)
5 mm (.20 in.) – 2 mm (.08 in.) = 3 mm (.12 in.) available for correction
3/2 x 1/5 = 3/10 turn to bring the steering wheel to within 2° of being centered.

STEERING COLUMN AND SHAFT

N19GA--

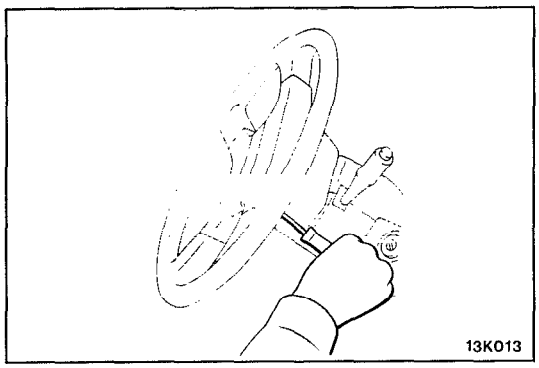
REMOVAL AND INSTALLATION



Removal steps

- ◆◆ 1. Horn pad
- ◆◆ ◆◆ 2. Steering wheel
- 3. Lower column cover
- 4. Upper column cover
- 5. Column switch assembly
- 6. Spring
- 7. Steering column support plate
- 8. Brake pedal return spring
- ◆◆ 9. Dash panel cover to dash panel bolt
- 10. Steering shaft to gear box bolt
- ◆◆ 11. Steering shaft clamp
- 12. Steering column assembly

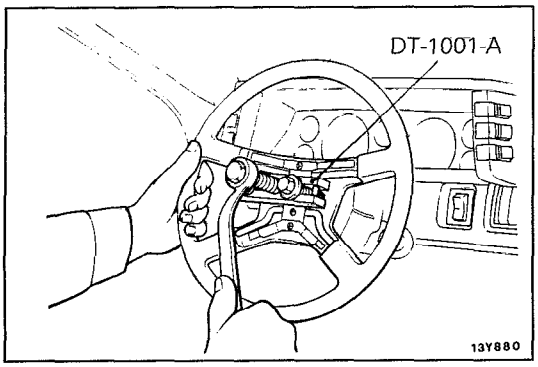
NOTE
(1) Reverse the removal procedures to reinstall.
(2) ◆◆: Refer to "Service Points of Removal".
(3) ◆◆: Refer to "Service Points of Installation".



SERVICE POINTS OF REMOVAL N19GBAI

1. REMOVAL OF HORN PAD

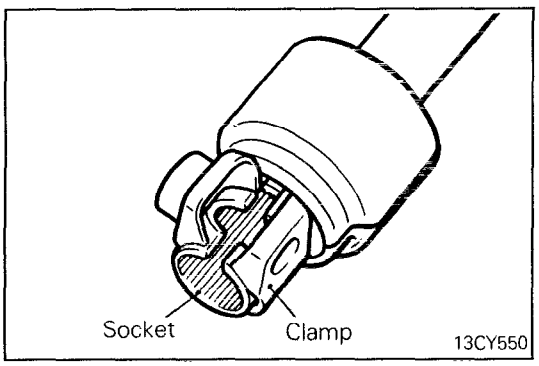
Remove the horn pad and disconnect the horn cable connector.



2. REMOVAL OF STEERING WHEEL

Remove the steering wheel by using the special tool.

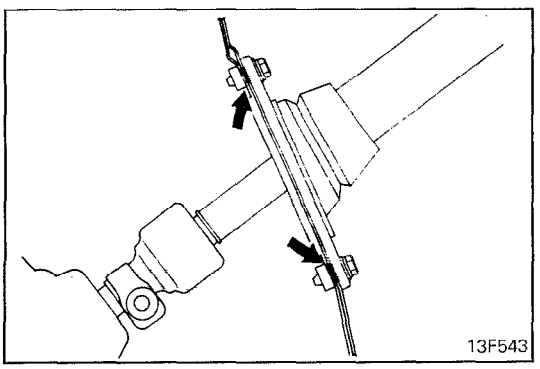
Caution
Do not hammer on the steering wheel to remove it, or else the collapsible mechanism may be damaged.



SERVICE POINTS OF INSTALLATION N19GDAF

11. INSTALLATION OF STEERING SHAFT CLAMP

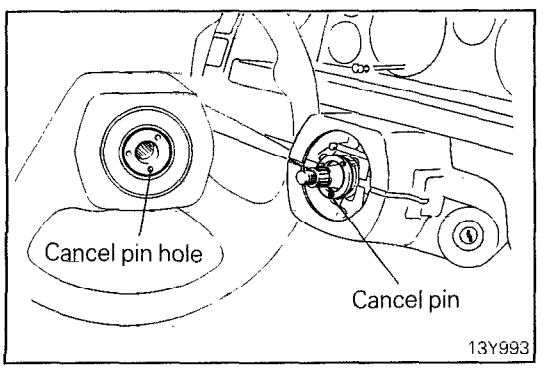
Align the cut of the joint socket with the bolt hole of the clamp.



9. INSTALLATION OF DASH PANEL COVER TO DASH PANEL BOLTS

When attaching the dash panel cover, apply specified sealant around the bolt holes.

Specified sealant: MOPAR Lock N'Seal Adhesive Part No. 4057989 or equivalent



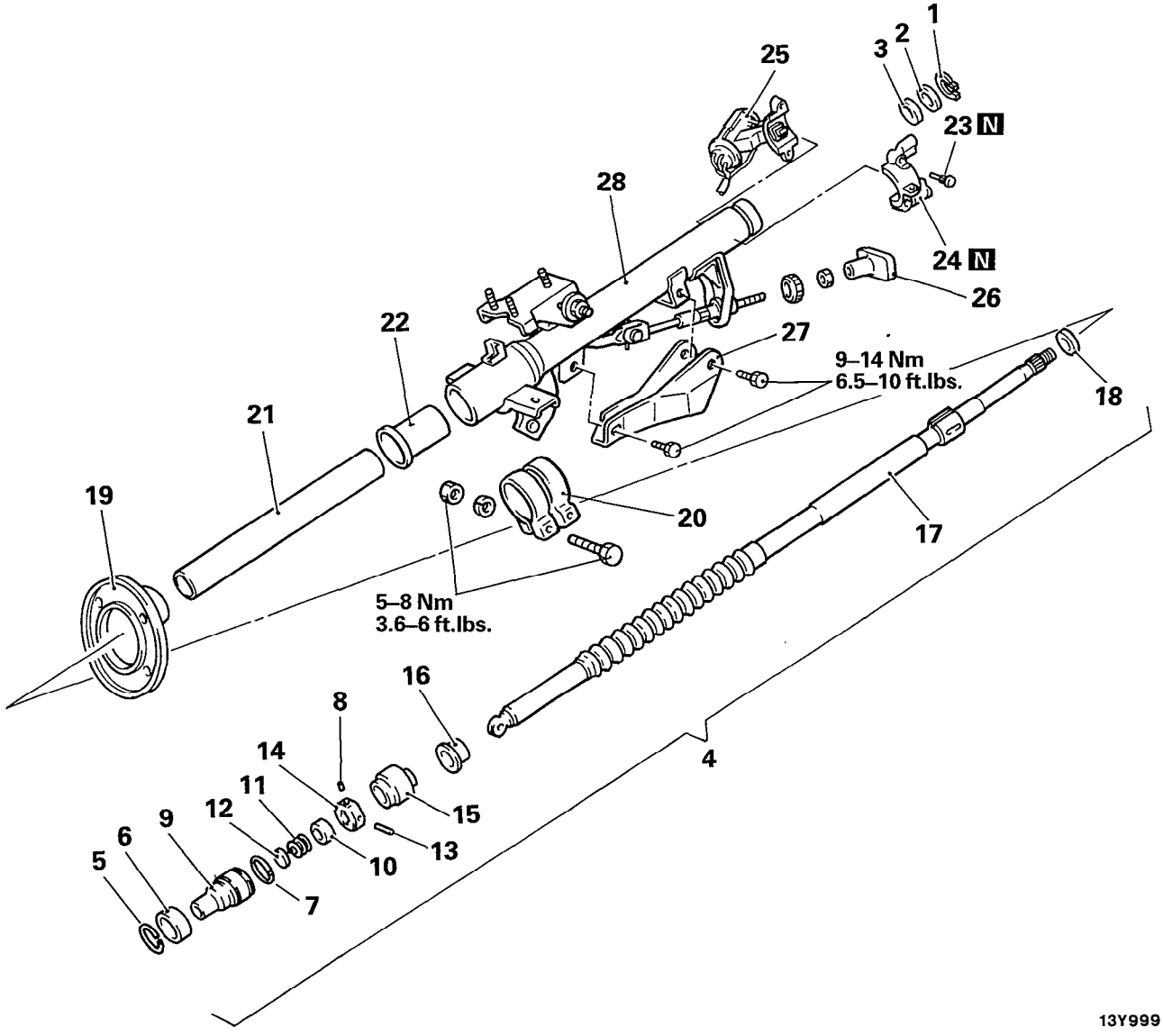
2. INSTALLATION OF STEERING WHEEL

To install the steering wheel, hold the front wheels in the straight-ahead position, fit the three cancel pins into the bottom holes in the steering wheel, and tighten the steering wheel lock nut to the specified torque.

STEERING COLUMN AND SHAFT

N19GE--

DISASSEMBLY AND REASSEMBLY



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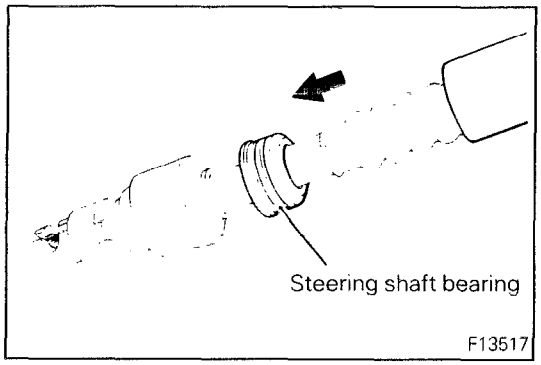
Disassembly steps

1. Snap ring
2. Stopper
3. Spacer
4. ◆◆ Steering shaft assembly
5. Stopper
6. ◆◆ ▶◀ Joint pin retainer
7. Stopper
8. ◆◆ ▶◀ Joint pin A
9. ▶◀ Joint socket
10. Spring seat
11. Spring
12. Seat
13. ◆◆ Joint pin B
14. ▶◀ Joint bearing
15. Joint cover
16. ▶◀ Steering shaft bearing
17. Steering shaft
18. Spacer
19. Dash panel cover
20. ▶◀ Column tube clamp
21. Lower column tube
22. Column bushing
23. Special bolt
24. Steering lock bracket
25. ◆◆ ▶◀ Steering lock
26. Tilt knob
27. Tilt link cover
28. Upper column tube

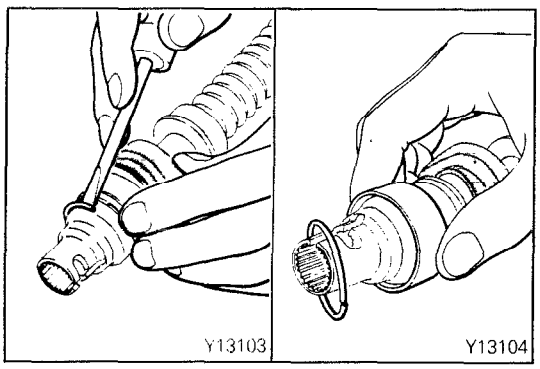
NOTE
(1) Reverse the disassembly procedures to reassemble.
(2) ◆◆: Refer to "Service Points of Disassembly"
(3) ▶◀: Refer to "Service Points of Reassembly"
(4) N: Non-reusable parts



SERVICE POINTS OF DISASSEMBLY N19GFAG

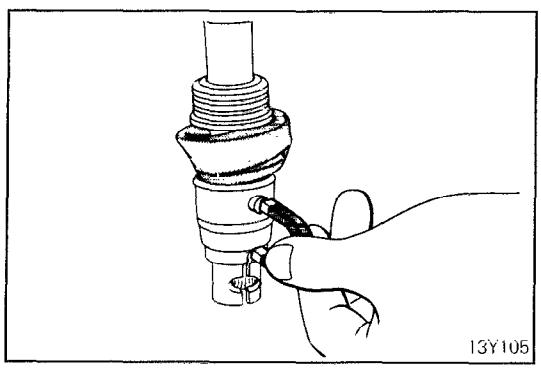
4. REMOVAL OF STEERING SHAFT ASSEMBLY

(1) Take out the steering shaft bearing from the lower column tube.
(2) Remove the snap ring of the upper column shaft with snap ring pliers.
(3) Take out the steering shaft from the column tube.



6. REMOVAL OF JOINT PIN RETAINER

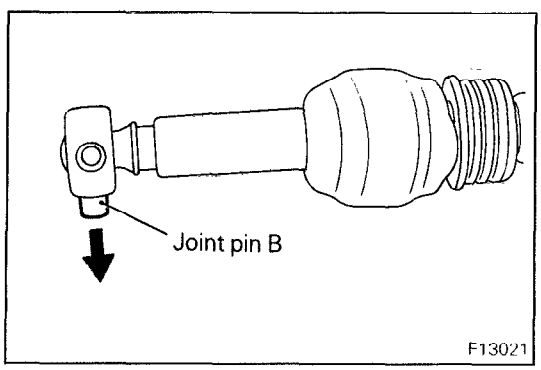
(1) Slide off the joint cover from the socket assembly.
(2) Remove the stoppers, and pull out the joint pin retainer.



8. REMOVAL OF JOINT PIN A

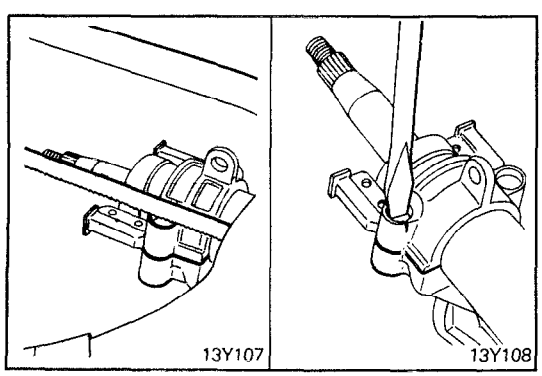
(1) With the steering shaft set upright, pull out joint pin A on both sides of the socket, by utilizing a magnet, while holding the shaft downward.
(2) Remove the joint socket.

Caution
Be sure to use a magnet to remove joint pin A. Striking the pin with a hammer will make it unremovable.



13. REMOVAL OF JOINT PIN B

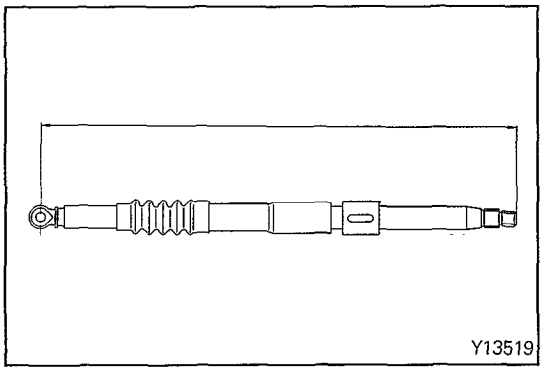
(1) If necessary, press out joint pin B from the steering shaft and take out the joint bearing.
(2) Take out the joint cover and steering shaft bearing.



25. REMOVAL OF STEERING LOCK

If it is necessary to remove the steering lock, cut a groove on the head of the special bolt with a metal saw, and remove the steering lock with a screwdriver.

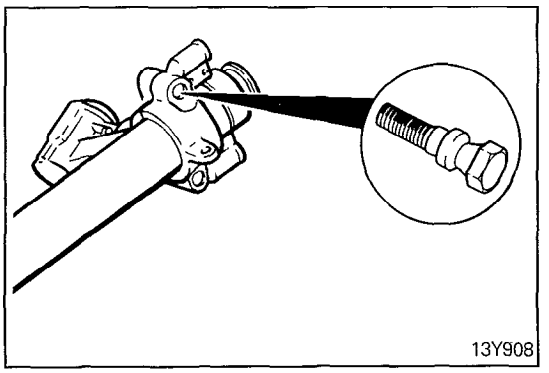
Caution
The steering lock bracket (upper) and bolts should be replaced with new ones without fail when installing the steering lock.



INSPECTION N19GGAG

- Check tilt bracket for cracks and damage.
- Check column bushing for damage.
- Check steering shaft bearing for wear.
- Check steering shaft for damage and deformation.
- Check joint cover for wear.
- Check joint bearing for wear and damage.

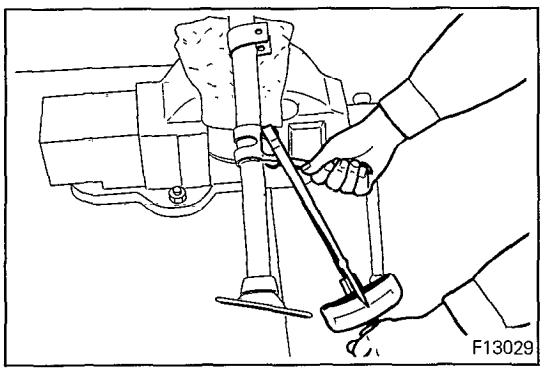
Steering shaft length: 727 mm (28.62 in.)



SERVICE POINTS OF REASSEMBLY N19GHAL

25. INSTALLATION OF STEERING LOCK

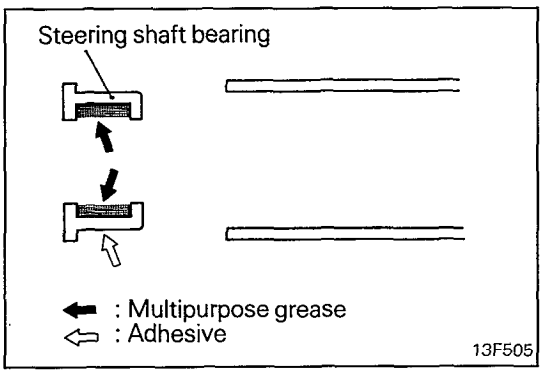
When the steering lock is to be installed to the column, temporarily install the steering lock in alignment with the column boss, and, after checking that the lock works properly, tighten the special bolts until the heads twist off.



20. INSTALLATION OF COLUMN TUBE CLAMP

Attach the column bushing to the upper and lower column tubes, and secure the upper tube with the clamp.

NOTE
Install the clamp so that the bolt tightening part of the clamp is at the bottom.



16. INSTALLATION OF STEERING SHAFT BEARING

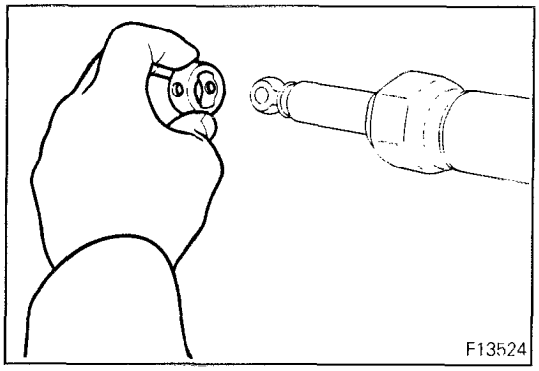
(1) Apply the specified grease to the inside of the steering shaft bearing, and then insert the steering shaft into the bearing.

Specified grease: MOPAR Multi-mileage Lubricant Part No. 2525035 or equivalent

(2) Apply specified adhesive to the surface where the steering shaft bearing and the column tube contact.
(3) Apply the specified grease to the inside of the upper bearing.

Specified grease: MOPAR Multi-mileage Lubricant Part No. 2525035 or equivalent

(4) Install the steering shaft with the steering shaft bearing in the column tube.

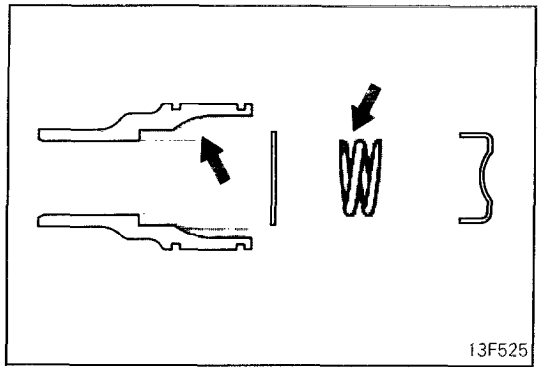


14. INSTALLATION OF JOINT BEARING

(1) Install the joint bearing (with the flanged surface facing upward) on the steering shaft lower end.
(2) Align the joint bearing hole with steering shaft hole.
(3) Apply specified grease to joint pin B and insert in the joint bearing.

Specified grease: MOPAR Multi-mileage Lubricant Part No. 2525035 or equivalent

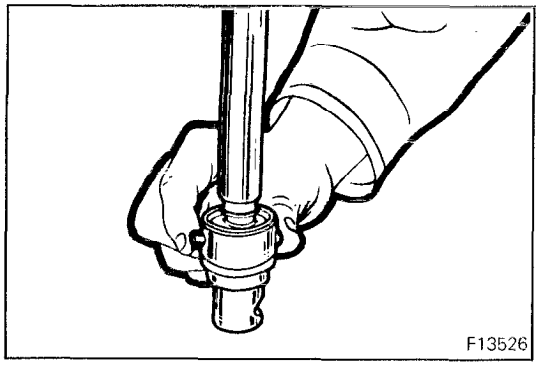
Caution
Be careful that the pin does not project over the bearing surface.



9. INSTALLATION OF JOINT SOCKET

Fill the socket with the specified grease, and then insert the seat, spring and spring seat into it.

Specified grease: MOPAR Multi-mileage Lubricant Part No. 2525035 or equivalent

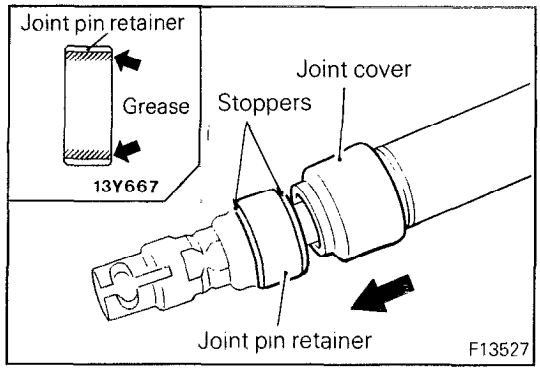


8. INSTALLATION OF JOINT PIN A

(1) Apply specified grease to joint pin A.

Specified grease: MOPAR Multi-mileage Lubricant Part No. 2525035 or equivalent

(2) Insert the steering shaft lower end into the socket, and, while holding the shaft downward, insert joint pin A by hand.



6. INSTALLATION OF JOINT PIN RETAINER

(1) Apply the specified grease to the inside of the joint pin retainer.

Specified grease: MOPAR Multi-mileage Lubricant Part No. 2525035 or equivalent

(2) Attach the joint pin retainer, and secure it with the stoppers.
Cover with the joint cover.

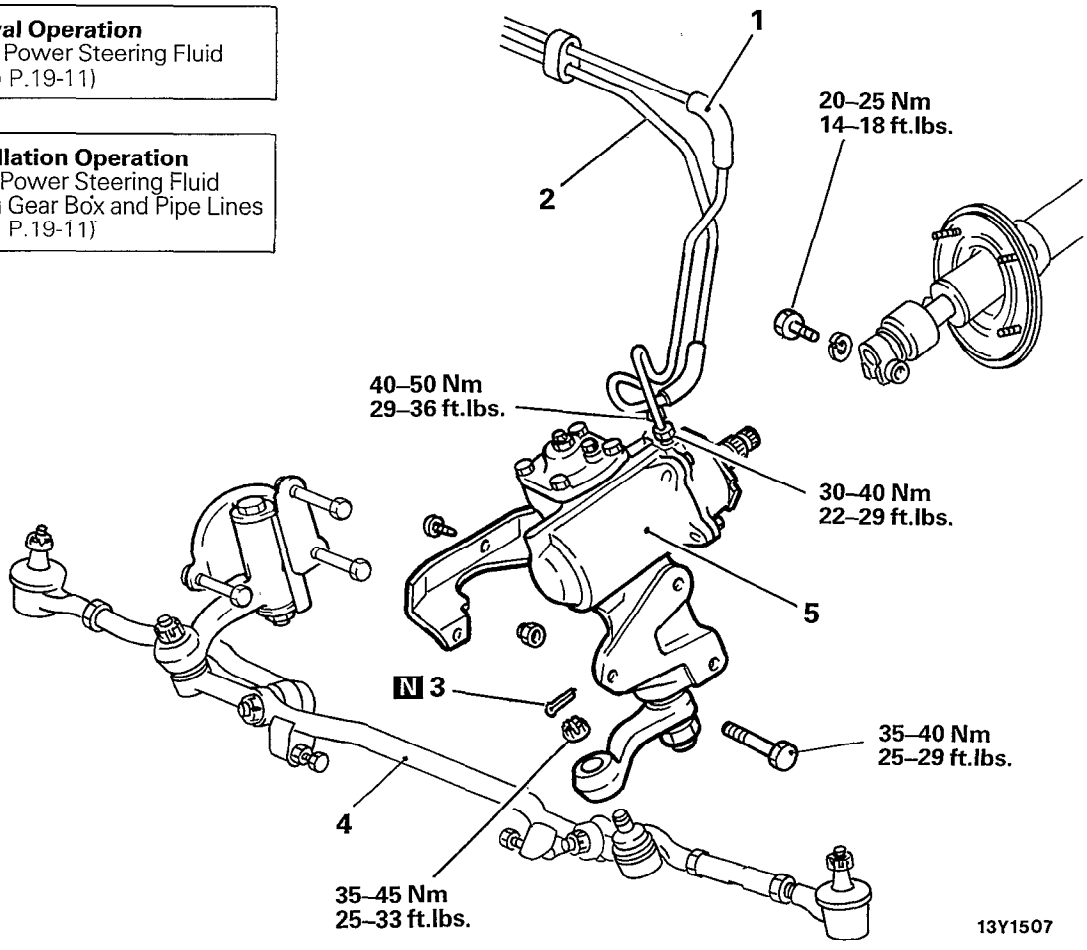
POWER STEERING GEAR BOX

N19NA--

REMOVAL AND INSTALLATION

Pre-removal Operation
- Draining Power Steering Fluid (Refer to P.19-11)

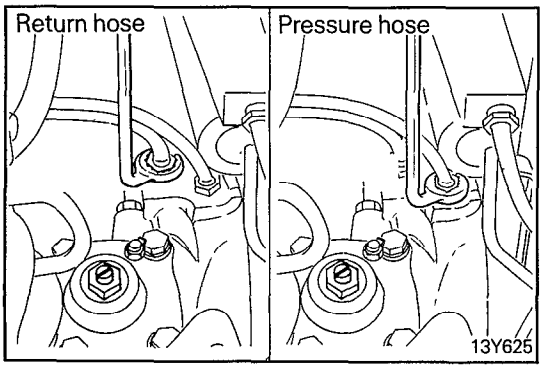
Post-installation Operation
- Refilling Power Steering Fluid
- Bleeding Gear Box and Pipe Lines (Refer to P.19-11)



Removal steps

◆◆ 1. Pressure hose connection
◆◆ 2. Return hose connection
3. Cotter pin
◆◆ 4. Relay rod connection
5. Gear box assembly

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



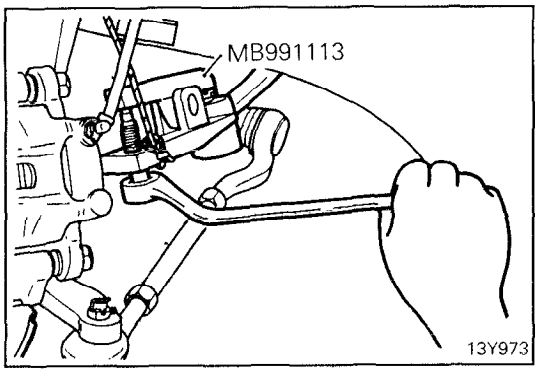
SERVICE POINTS OF REMOVAL

N19NBAD

1. DISCONNECTION OF PRESSURE HOSE / 2. RETURN HOSE

Disconnect the pressure hose and return hose from the gear box.

Caution
Use pieces of cloth to close the end of each hose in order to prevent escape of fluid and entrance of dirt and other foreign material.



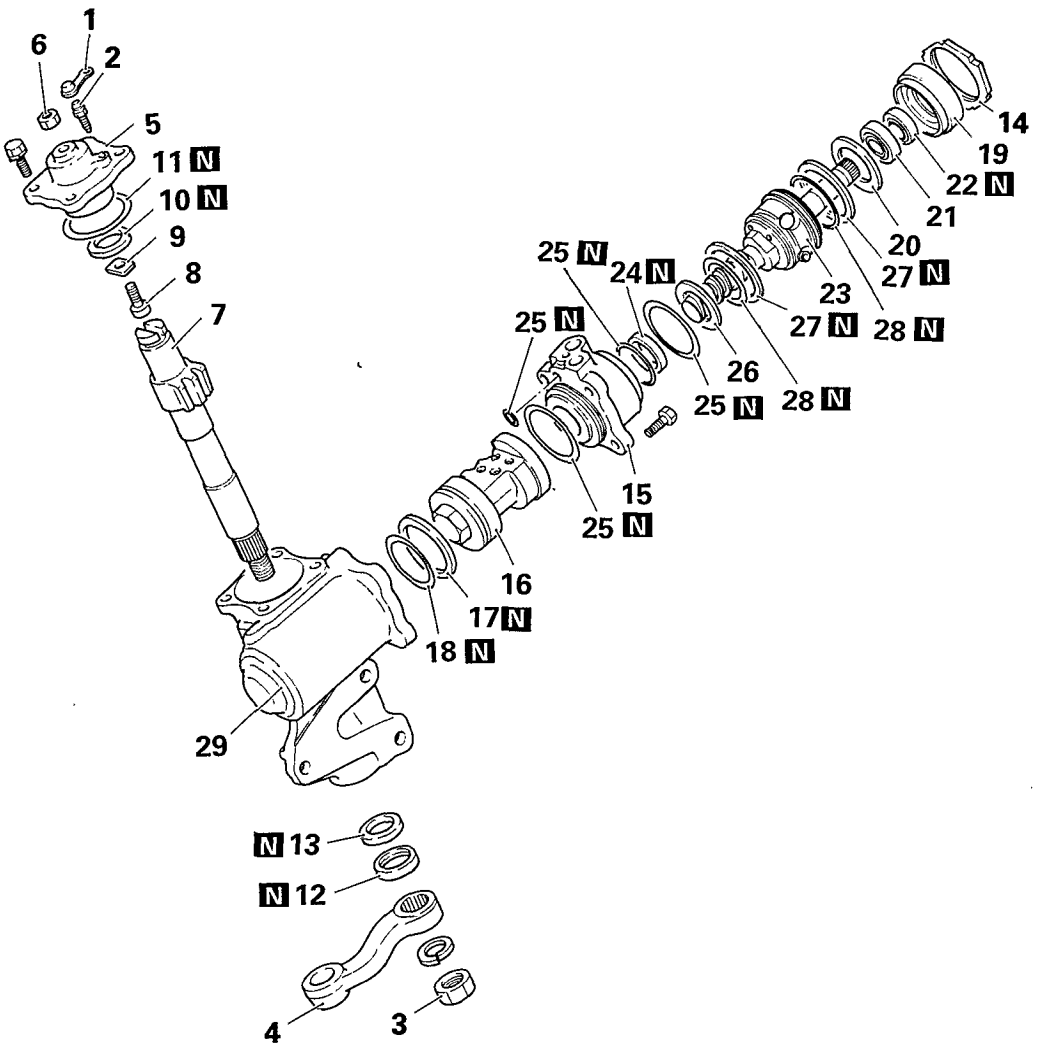
4. DISCONNECTION OF RELAY ROD

Disconnect the pitman arm from the relay rod by using the special tool.

POWER STEERING GEAR BOX

N19NE--

DISASSEMBLY

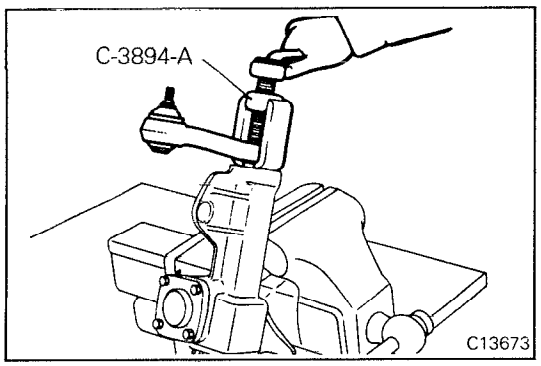


Disassembly steps

1. Breather plug cap
2. Breather plug
3. Jam nut
4. ◆◆ Pitman arm
5. ◆◆ Side cover
6. Lock nut
7. ◆◆ Cross-shaft
8. ◆◆ Adjusting bolt
9. Adjusting plate
10. ◆◆ U-packing (side cover side)
11. O-ring
12. Oil seal
13. U-packing (pitman arm side)
14. ◆◆ Valve housing lock nut
15. ◆◆ Valve housing
16. ◆◆ Rack piston
17. Seal ring
18. O-ring
19. ◆◆ Top cover
20. Thrust needle bearing
21. ◆◆ Ball bearing
22. ◆◆ Oil seal
23. Mainshaft
24. Seal ring
25. O-ring
26. Thrust needle bearing
27. Seal ring
28. O-ring
29. Gear box housing

NOTE
(1) ◆◆: Refer to "Service Points of Disassembly"
(2) N: Non-reusable parts

13Y980



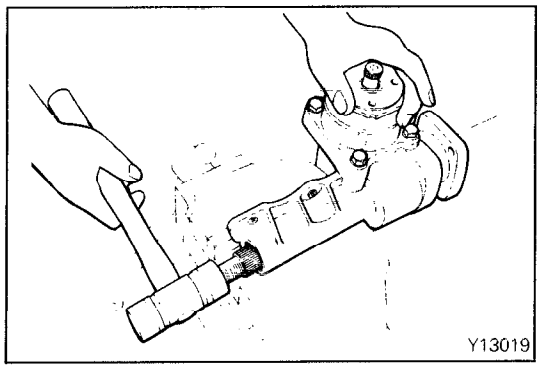
SERVICE POINTS OF DISASSEMBLY N19NFAD

4. REMOVAL OF PITMAN ARM

Remove the pitman arm from the gear box assembly by using the special tool.

5. REMOVAL OF SIDE COVER

Loosen the lock nut of the adjusting bolt and screw in the adjusting bolt so that the side cover may be raised slightly.

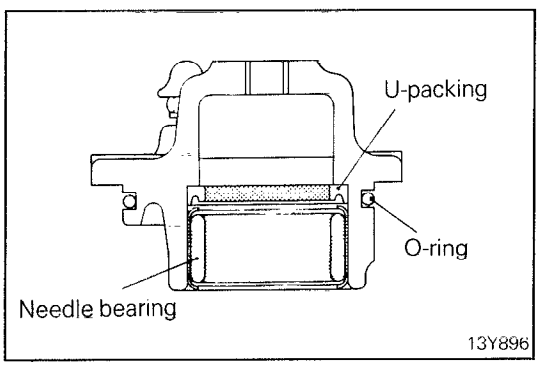


7. REMOVAL OF CROSS-SHAFT

With the mainshaft and cross-shaft placed in the neutral position, tap the bottom of the cross-shaft with a plastic hammer to take out the cross-shaft together with the side cover.

8. REMOVAL OF ADJUSTING BOLT

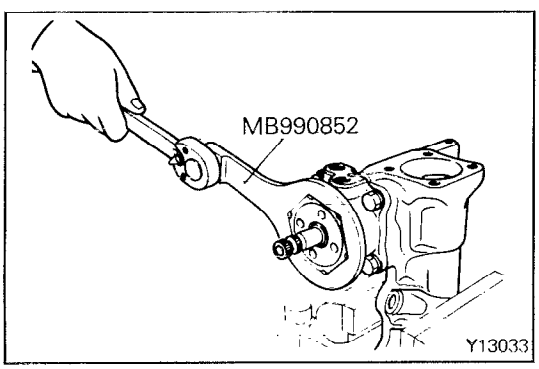
Remove the side cover by turning the adjusting bolt.



10. REMOVAL OF U-PACKING (SIDE COVER SIDE)

(1) Remove the needle bearing rollers manually from the side cover.
(2) Remove the O-ring and U-packing.

NOTE
Unless there are fluid leaks from the adjusting bolt threads, do not remove the U-packing. If removed, be sure to use new U-packing.



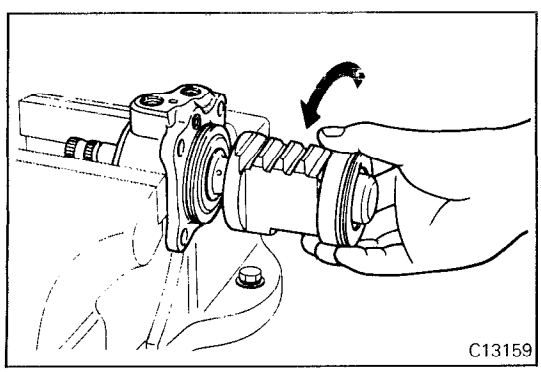
14. REMOVAL OF VALVE HOUSING LOCK NUT

Remove the valve housing lock nut by using the special tool.

15. REMOVAL OF VALVE HOUSING

Remove the valve housing together with the rack piston.

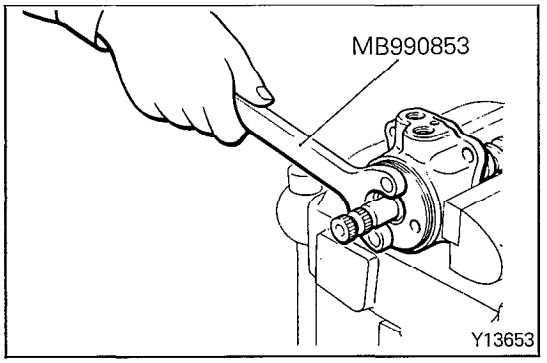
Caution
Use care not to drop the rack piston.



16. REMOVAL OF RACK PISTON

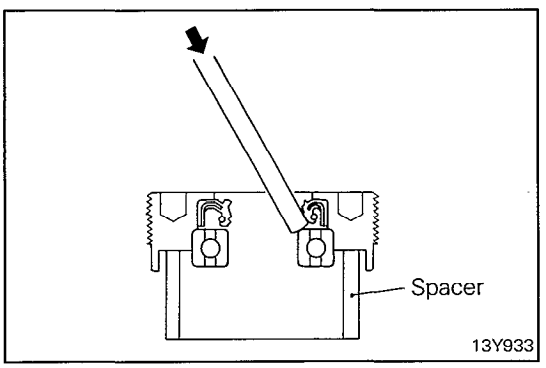
Remove the rack piston from the mainshaft by turning it counterclockwise.

Caution
Be careful not to lose the 26 balls inside the rack piston.



19. REMOVAL OF TOP COVER

Remove the top cover by using the special tool, and take out the mainshaft, together with the top cover, from the valve housing.



21. REMOVAL OF BALL BEARING / 22. OIL SEAL

Remove the ball bearing and the oil seal with a punch.

INSPECTION

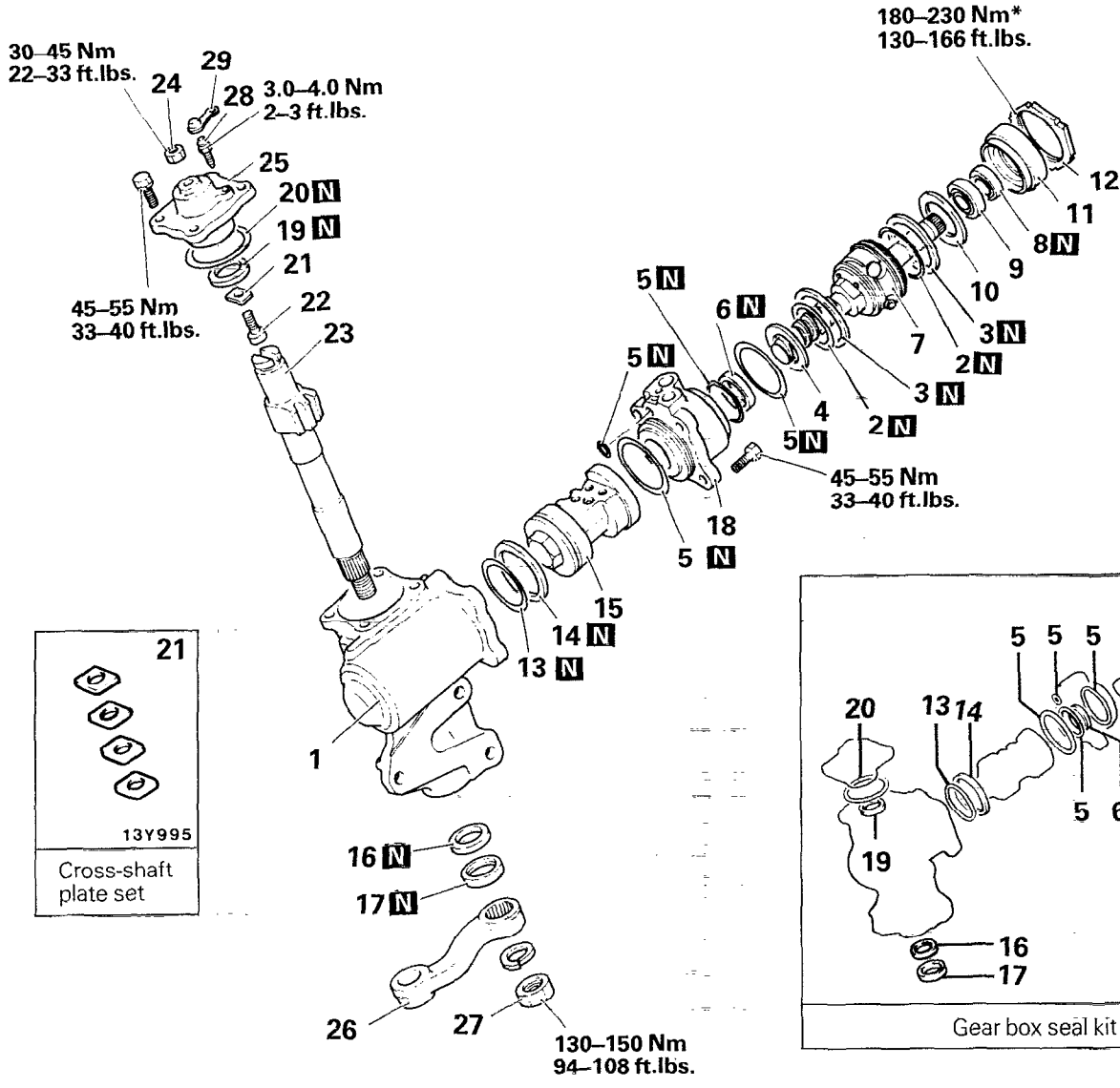
N19NGAB

- Check the mainshaft for wear and damage.
- Check the cross-shaft and rack piston for wear and damage of tooth surface.
- Check the adjusting bolt for uneven wear of contact part.
- Check the dust seal and oil seal for wear and damage.
- Check the O-rings for damage.

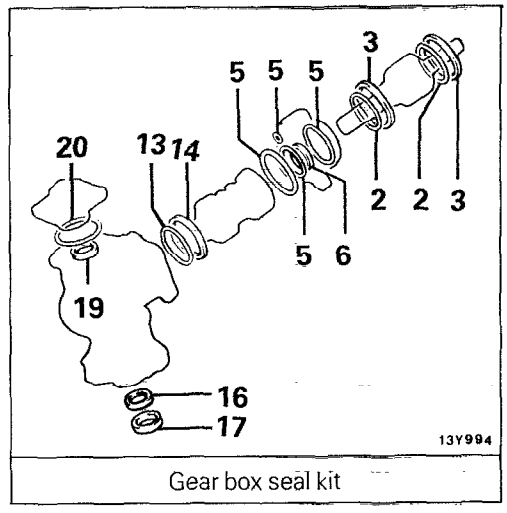
POWER STEERING GEAR BOX

N19NE--

REASSEMBLY



Cross-shaft plate set



Gear box seal kit

Reassembly steps

1. Gear box housing
- ◆◆ 2. O-ring
- ◆◆ 3. Seal ring
- ◆◆ 4. Thrust needle bearing
5. O-ring
6. Seal ring
7. Mainshaft
- ◆◆ 8. Oil seal
- ◆◆ 9. Ball bearing
- ◆◆ 10. Thrust needle bearing
- ◆◆ Adjustment of mainshaft starting torque
11. Top cover
12. Valve housing lock nut
13. O-ring
14. Seal ring
- ◆◆ 15. Rack piston
- ◆◆ 16. U-packing (pitman arm)
- ◆◆ 17. Oil seal
- ◆◆ 18. Valve housing
- ◆◆ 19. U-packing (side cover side)
- ◆◆ 20. O-ring
21. Adjusting plate
22. Adjusting bolt
23. Cross-shaft
24. Lock nut
- ◆◆ 25. Side cover
- ◆◆ Adjustment of mainshaft total starting torque
- ◆◆ 26. Pitman arm
27. Jam nut
28. Breather plug
29. Breather plug cap

NOTE
(1) ◆◆: Refer to "Service Points of Reassembly"
(2) N: Non-reusable parts
(3) *: If the special tool is used to measure the tightening torque, the measurement is 135 – 175 Nm (98 – 127 ft.lbs.).

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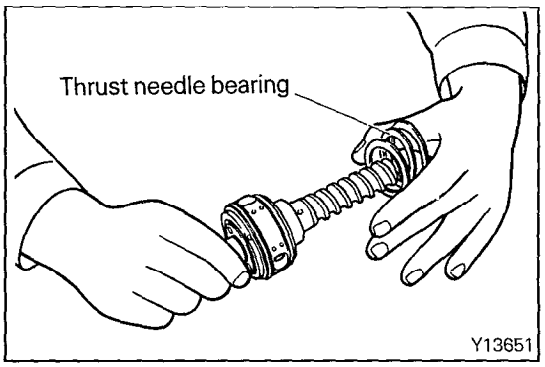
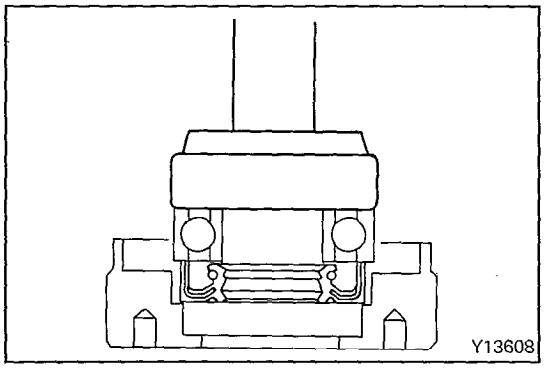
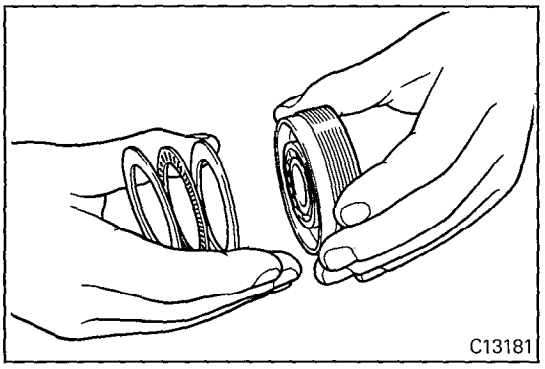
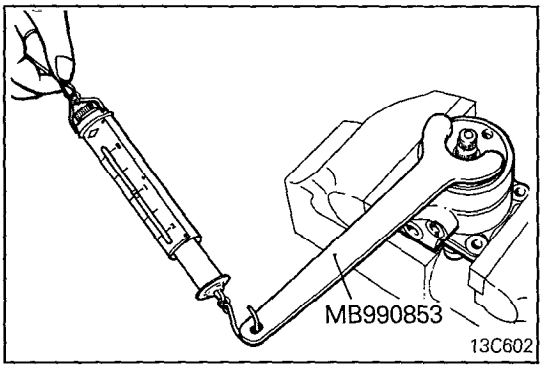
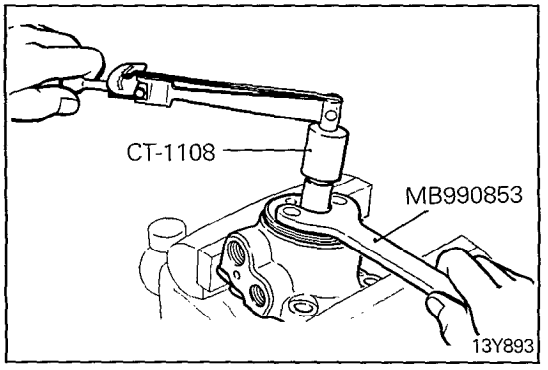










SERVICE POINTS OF REASSEMBLY N19NHAG

2. APPLICATION OF AUTOMATIC TRANSMISSION FLUID TO O-RING / 3. SEAL RING

Apply specified fluid to the O-ring and seal ring of the mainshaft.

Specified fluid: MOPAR DEXRON or DEXRON II Automatic Transmission Fluid Part No. 3549660 or 4131509, or equivalent

4. INSTALLATION OF THRUST NEEDLE BEARING

Install the thinner thrust plate, thrust needle bearing and thicker thrust plate to the mainshaft in that order as shown in the illustration.

8. PRESS-FIT OF OIL SEAL / 9. BALL BEARING

(1) Press-fit the ball bearing and oil seal into the top cover.
(2) Apply specified grease to the oil seal of the top cover.

Specified grease: MOPAR Multi-mileage Lubricant Part No. 2525035 or equivalent

10. INSTALLATION OF THRUST NEEDLE BEARING

(1) Install the thinner thrust plate, thrust needle bearing and thicker thrust plate to the top cover in that order as shown in the illustration.
(2) Attach the top cover to the valve housing.

Caution
Be careful that the thrust plates and the thrust needle bearing do not come off the top cover.

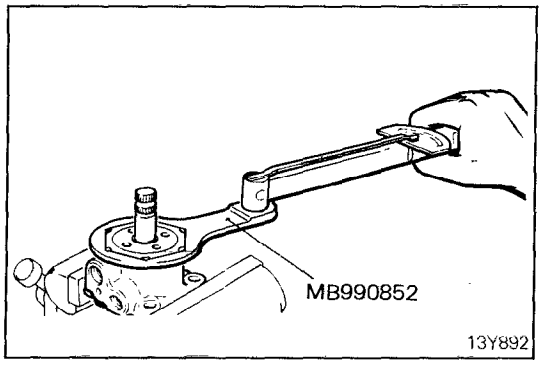
• ADJUSTMENT OF MAINSHAFT STARTING TORQUE

(1) In order to fit in the assembly parts, use the special tool and a spring balance, and tighten the top cover until the tangent force becomes 62 – 83 N (14 – 19 lbs.). Then return the top cover until the tightening torque is 0 N (0 lbs.).

Caution
After tightening the top cover, rotate the mainshaft to confirm that there is no torque fluctuation or abnormal noise.

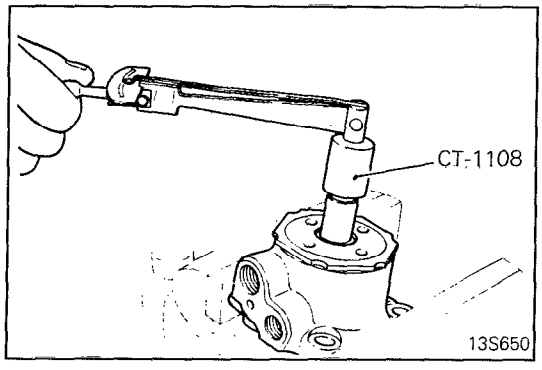
(2) Measure the mainshaft starting torque by using the special tools.
(3) Tighten the top cover until the mainshaft starting torque is 20 – 30 Ncm (1.8 – 2.7 in.lbs.) greater than the previously mentioned measurement value.

NOTE
Tighten the top cover gradually while measuring the starting torque.



(4) Tighten the valve housing lock nut by using the special tool.

Caution
Be sure that the top cover does not turn together with the lock nut at this time.



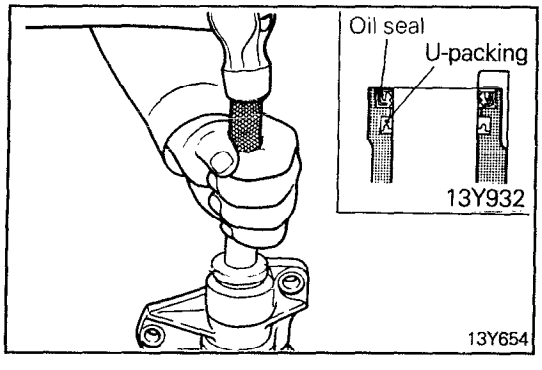
(5) Measure the mainshaft starting torque by using the special tools.

Standard value: 25 – 65 Ncm (2 – 6 in.lbs.)

(6) If the measured mainshaft starting torque does not comply with the standard value, remove the valve housing lock nut and adjust the tightening of the top cover.

15. INSTALLATION OF RACK PISTON

(1) Install the rack piston until it comes in contact with the edge of the mainshaft.
(2) Rotate the mainshaft to align the ball raceway with the ball insertion hole.



16. INSTALLATION OF U-PACKING (PITMAN ARM) / 17. OIL SEAL

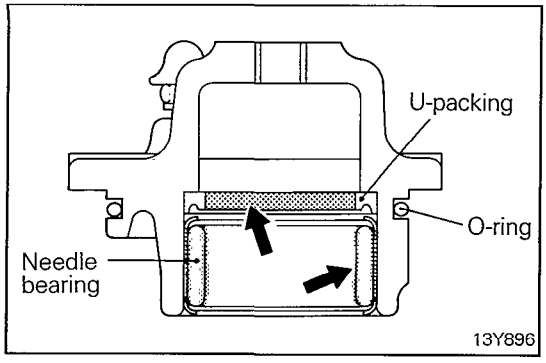
Install the U-packing on the gear box and press-fit the oil seal.

18. INSTALLATION OF VALVE HOUSING

(1) Apply specified automatic transmission fluid to the seal ring of the rack piston.

Specified fluid: MOPAR DEXRON or DEXRON II Automatic Transmission Fluid Part No. 3549660 or 4131509, or equivalent

(2) Install the valve housing.
(3) Rotate the mainshaft until the rack piston moves to the neutral position (center).



19. APPLICATION OF GREASE TO U-PACKING (SIDE COVER SIDE)

(1) Apply specified grease to the seal surface of U-packing.

Specified grease: MOPAR Multi-mileage Lubricant Part No. 2525035 or equivalent

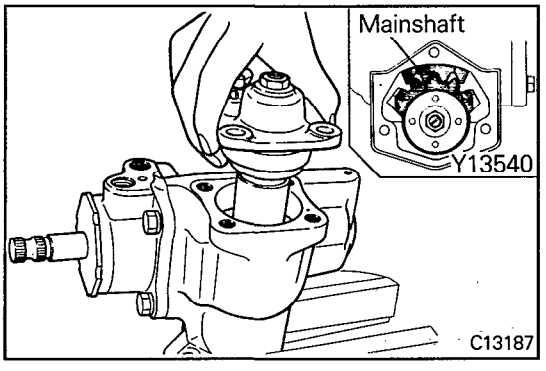
(2) Apply specified grease to the needle bearings.

Specified grease: MOPAR Multi-mileage Lubricant Part No. 2525035 or equivalent

20. APPLICATION OF AUTOMATIC TRANSMISSION FLUID TO O-RING

Apply specified fluid to the O-ring, and attach it to the side cover.

Specified fluid: MOPAR DEXRON or DEXRON II Automatic Transmission Fluid Part No. 3549660 or 4131509, or equivalent



25. INSTALLATION OF SIDE COVER

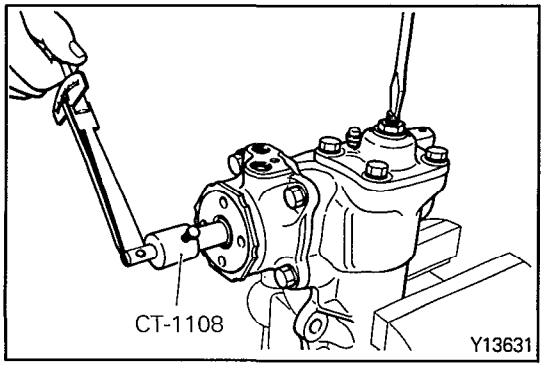
With the mainshaft in the neutral position, install the side cover assembly (with the cross-shaft) to the gear box.

NOTE
Apply specified automatic transmission fluid to the teeth and shaft areas of the rack piston, and apply specified grease to the oil seal lip.

Specified fluid: MOPAR DEXRON or DEXRON II Automatic Transmission Fluid Part No. 3549660 or 4131509, or equivalent

Specified grease: MOPAR Multi-mileage Lubricant Part No. 2525035 or equivalent

Caution
Do not rotate the side cover during installation.
Take care not to damage the cross-shaft oil seal.



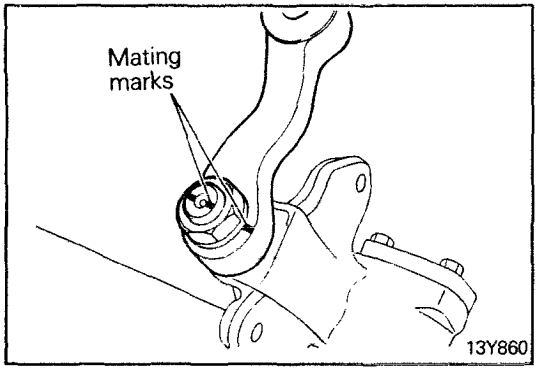
- **ADJUSTMENT OF MAINSHAFT TOTAL STARTING TORQUE**

(1) While turning the adjusting bolt, measure the mainshaft total starting torque by using the special tools.

Standard value: 50 – 90 Ncm (4 – 8 in.lbs.)

NOTE
Position the mainshaft in the neutral position during measurement.

(2) Tighten the adjusting bolt lock nut.



26. INSTALLATION OF PITMAN ARM

Install the pitman arm to the gear box with the mating marks aligned.

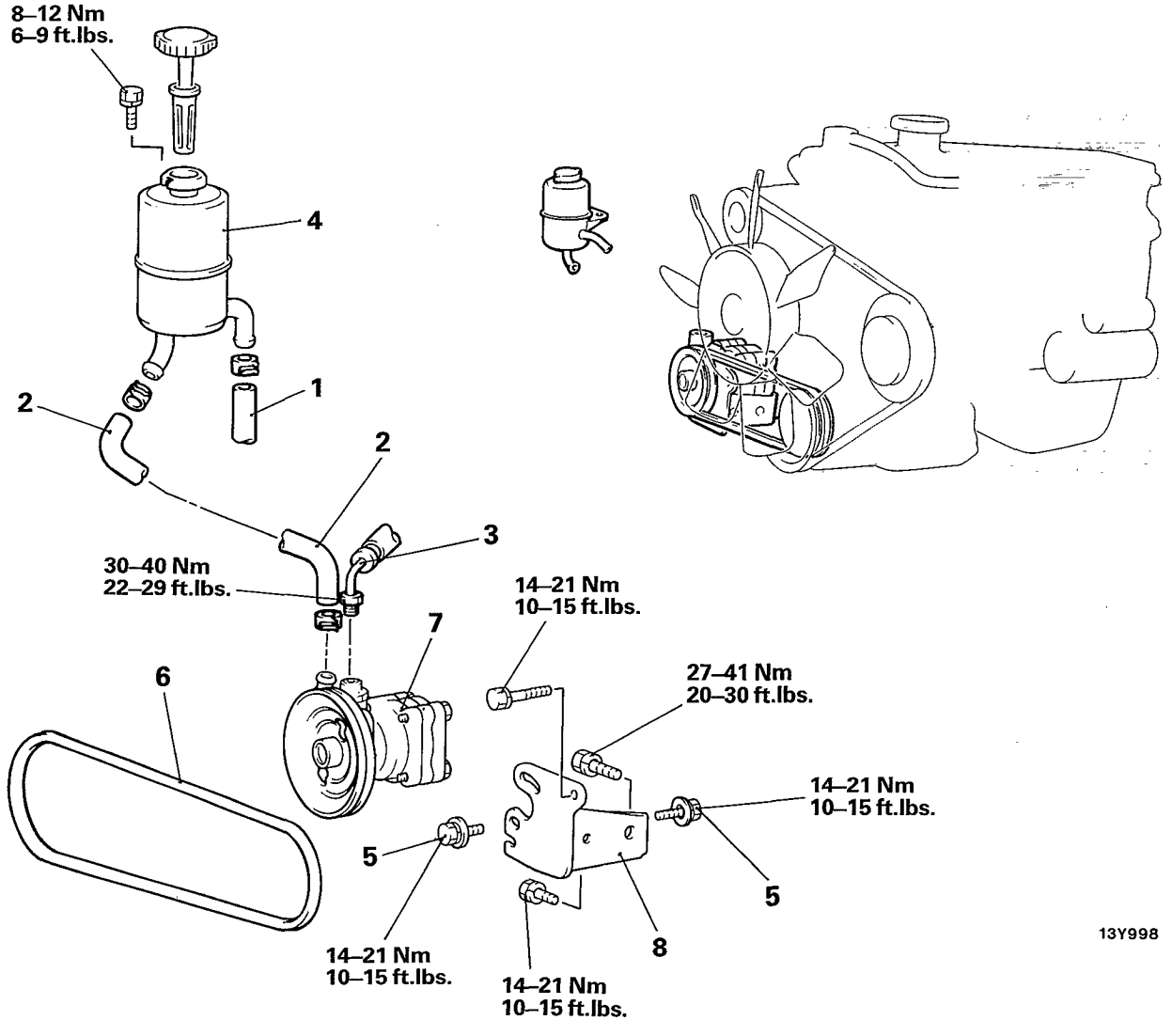
OIL PUMP

N19RA- -

REMOVAL AND INSTALLATION

Pre-removal Operation
- Draining Power Steering Fluid (Refer to P.19-11)

Post-installation Operation
- Refilling Power Steering Fluid
- Bleeding Power Steering Line (Refer to P.19-11.)
- Adjustment of Power Steering Belt Tension (Refer to P.19-10.)



Removal steps

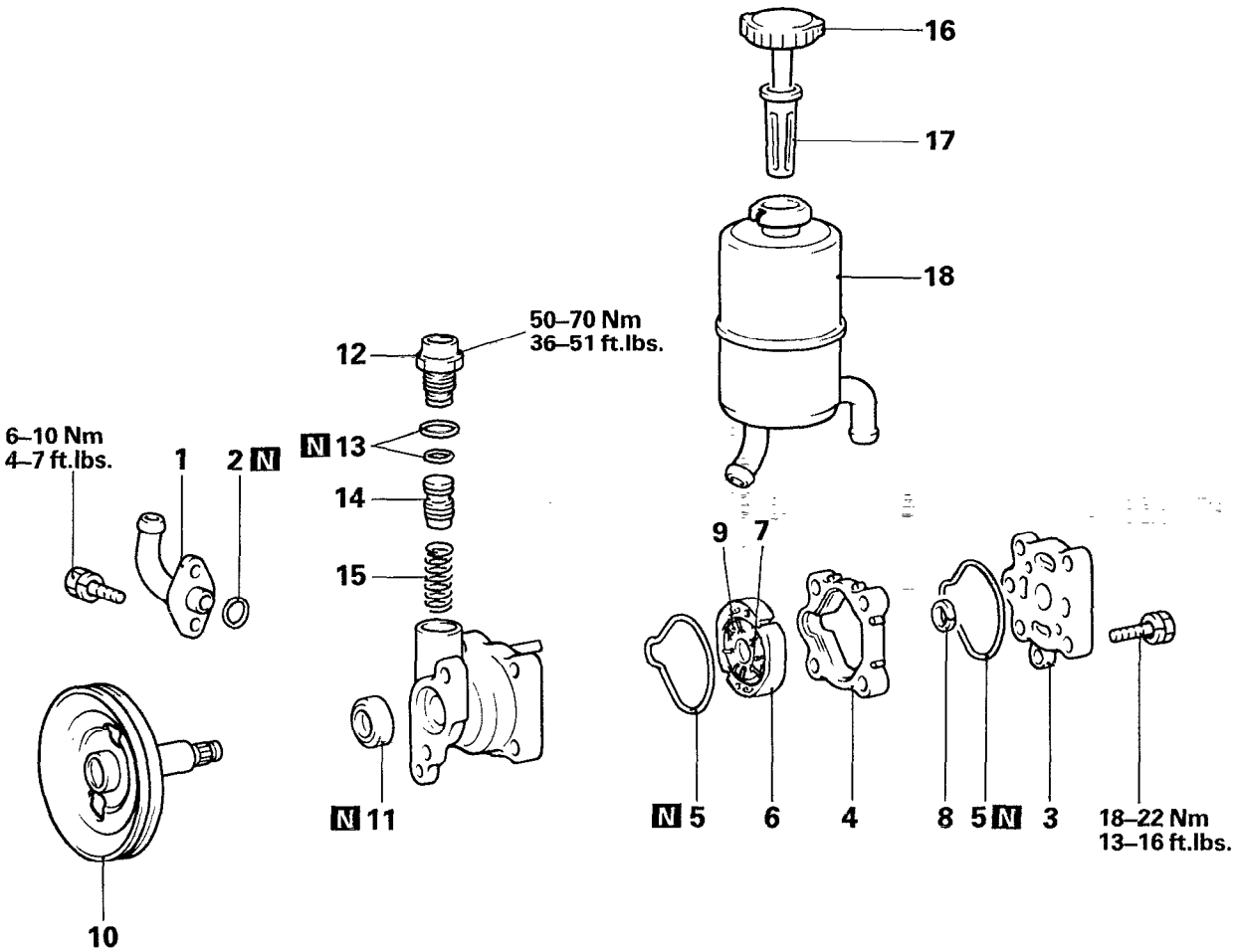
1. Return hose connection
2. Suction hose
3. Pressure hose connection
4. Oil reservoir
5. Bolts
6. V-belt
7. Oil pump
8. Oil pump bracket

NOTE
Reverse the removal procedures to reinstall.

OIL PUMP

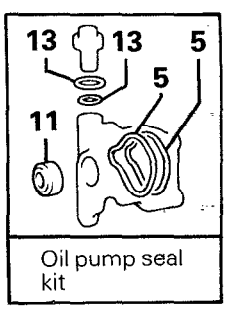
N19RE--

DISASSEMBLY AND REASSEMBLY

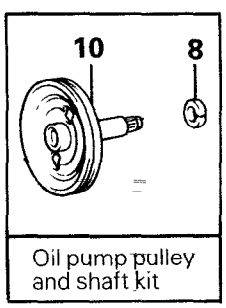


Disassembly steps

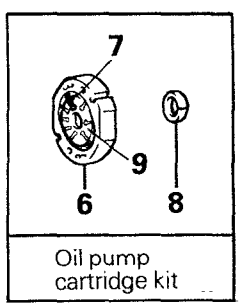
1. Suction connector
2. ◆◆ O-ring
3. Oil pump cover
4. Cam case
5. ◆◆ O-rings
6. ◆◆ Cam ring
7. ◆◆ Vanes
8. ◆◆ ◆◆ Snap ring
9. ◆◆ Rotor
10. ◆◆ Pulley assembly
11. ◆◆ Oil seal
12. Connector
13. O-rings
14. ◆◆ Flow control valve
15. ◆◆ Flow control spring
16. Cap
17. Oil filter
18. Oil reservoir



Oil pump seal kit



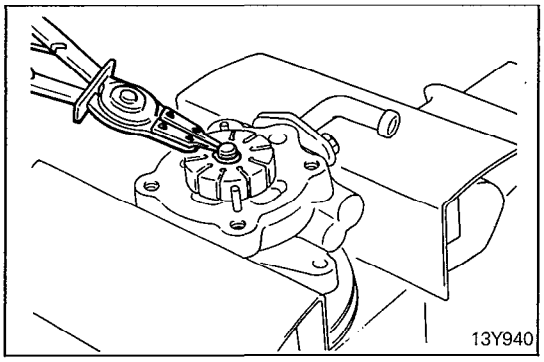
Oil pump pulley and shaft kit



Oil pump cartridge kit

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.

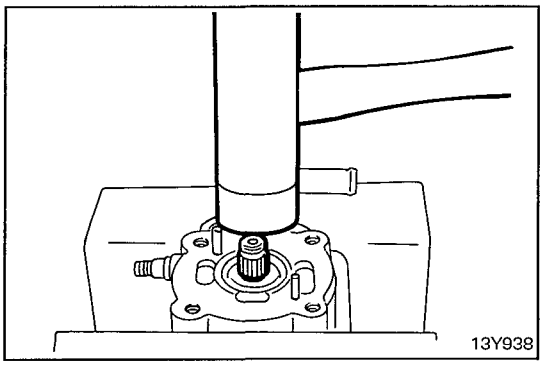
13Y997



SERVICE POINTS OF DISASSEMBLY N19RFAF

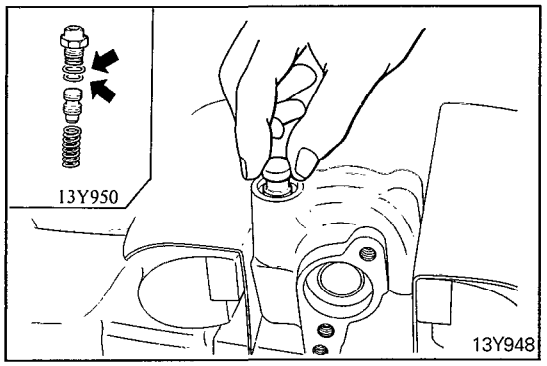
8. REMOVAL OF SNAP RING

Remove the snap ring of the shaft with snap ring pliers, and separate the rotor from the shaft.



10. REMOVAL OF PULLEY ASSEMBLY

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



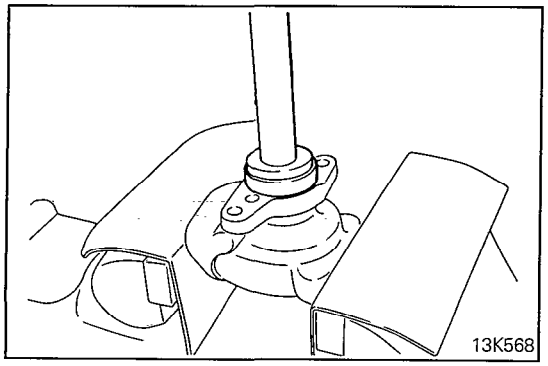
14. REMOVAL OF FLOW CONTROL VALVE / 15. FLOW CONTROL SPRING

(1) Remove the connector from the oil pump body, and take out the flow control valve and flow control spring.
(2) Remove the O-ring from the connector.

Caution
Do not disassemble the flow control valve.

INSPECTION N19RGAE

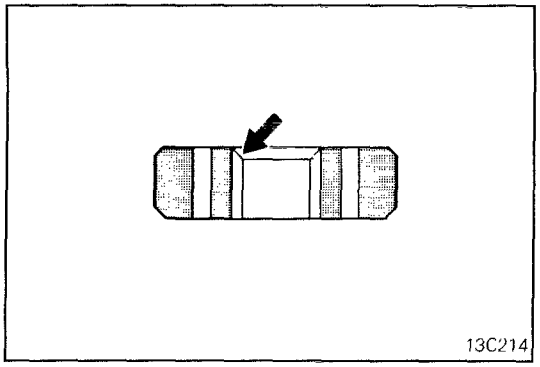
- Check the flow control valve for clogging.
- Check the shaft for wear and damage.
- Check the V-belt for cracks and wear.
- Check the rotor and vane for "stepped" wear of groove.
- Check the cam ring and vanes for "stepped" wear of contact surface.
- Check the vanes for damage.
- Check the pump body and pump cover with rotor for streak-like abrasion of contact surface.



SERVICE POINTS OF REASSEMBLY N19RHAI

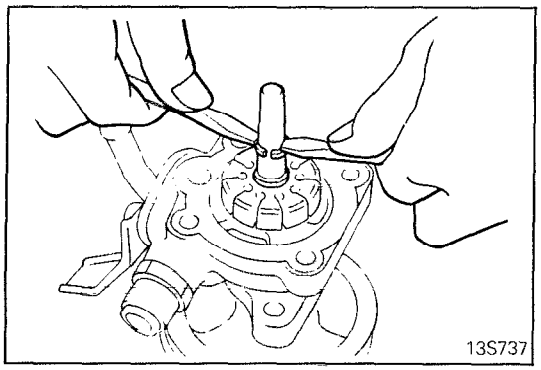
11. INSTALLATION OF OIL SEAL

Drive the oil seal into the pump body.


13C214

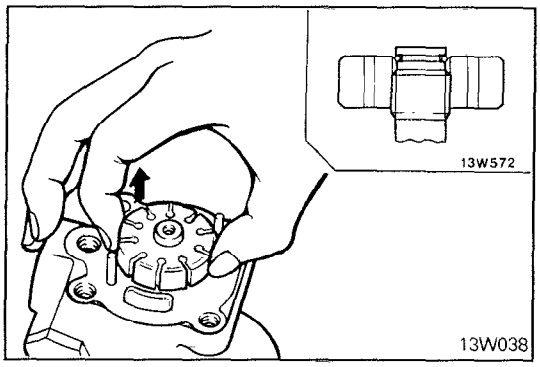
9. INSTALLATION OF ROTOR

(1) Mount the rotor onto the shaft.
(2) When installing the rotor, the countersunk part (shown in the illustration) should face the pump cover side.

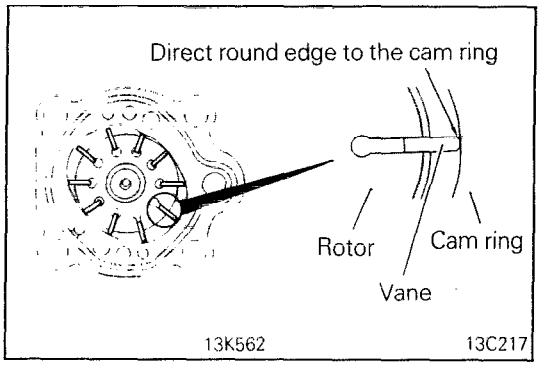

13S737

8. INSTALLATION OF SNAP RING

(1) Install the snap ring.


13W572
13W038

(2) Lift the rotor and check to be sure that the snap ring has entered the countersunk part.



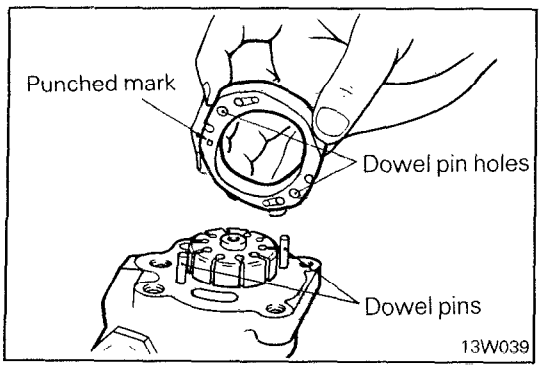
13K562 13C217

7. INSTALLATION OF VANE

(1) Apply the specified automatic transmission fluid to the vanes.

Specified fluid: MOPAR DEXRON or DEXRON II Automatic Transmission Fluid Part No. 3549660 or 4131509, or equivalent

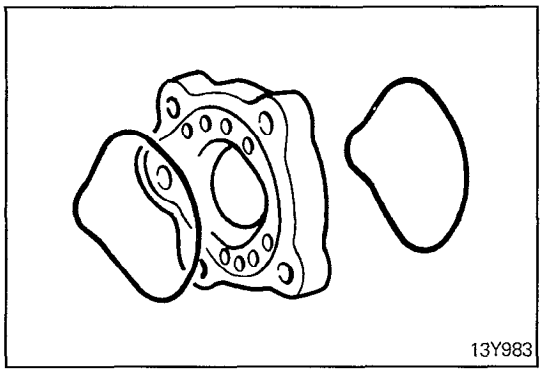
(2) Install the vanes on the rotor paying close attention to the installation direction.



13W039

6. INSTALLATION OF CAM RING

Install the cam ring with its punched mark facing the pump body and its dowel holes aligned with the dowel pins on the pump body.

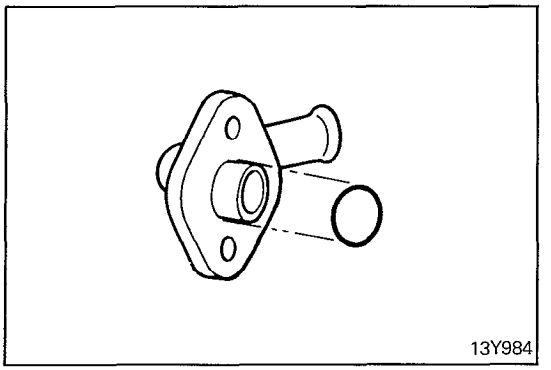

13Y983

5. APPLICATION OF AUTOMATIC TRANSMISSION FLUID TO O-RINGS

(1) Apply the specified automatic transmission fluid to the O-rings.

Specified fluid: MOPAR DEXRON or DEXRON II Automatic Transmission Fluid Part No. 3549660 or 4131509, or equivalent

(2) Install the O-rings to the cam case.


13Y984

2. APPLICATION OF AUTOMATIC TRANSMISSION FLUID TO O-RING

(1) Apply the specified automatic transmission fluid to the O-ring.

Specified fluid: MOPAR DEXRON or DEXRON II Automatic Transmission Fluid Part No. 3549660 or 4131509, or equivalent

(2) Mount the O-ring onto the suction connector.

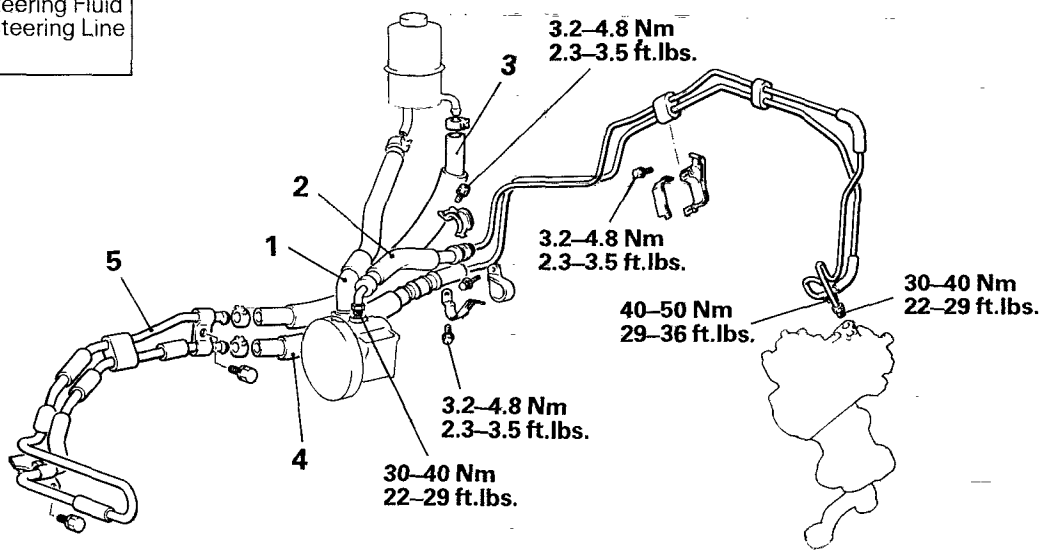
STEERING HOSES

N19TA--

REMOVAL AND INSTALLATION

Pre-removal Operation
- Draining Power Steering Fluid (Refer to P.19-11)

Post-installation Operation
- Refilling Power Steering Fluid
- Bleeding Power Steering Line (Refer to P.19-11)



Removal steps

1. Suction hose
2. Pressure hose
3. Return hose
4. Return hose
5. Cooler tube

NOTE
Reverse the removal procedures to reinstall.

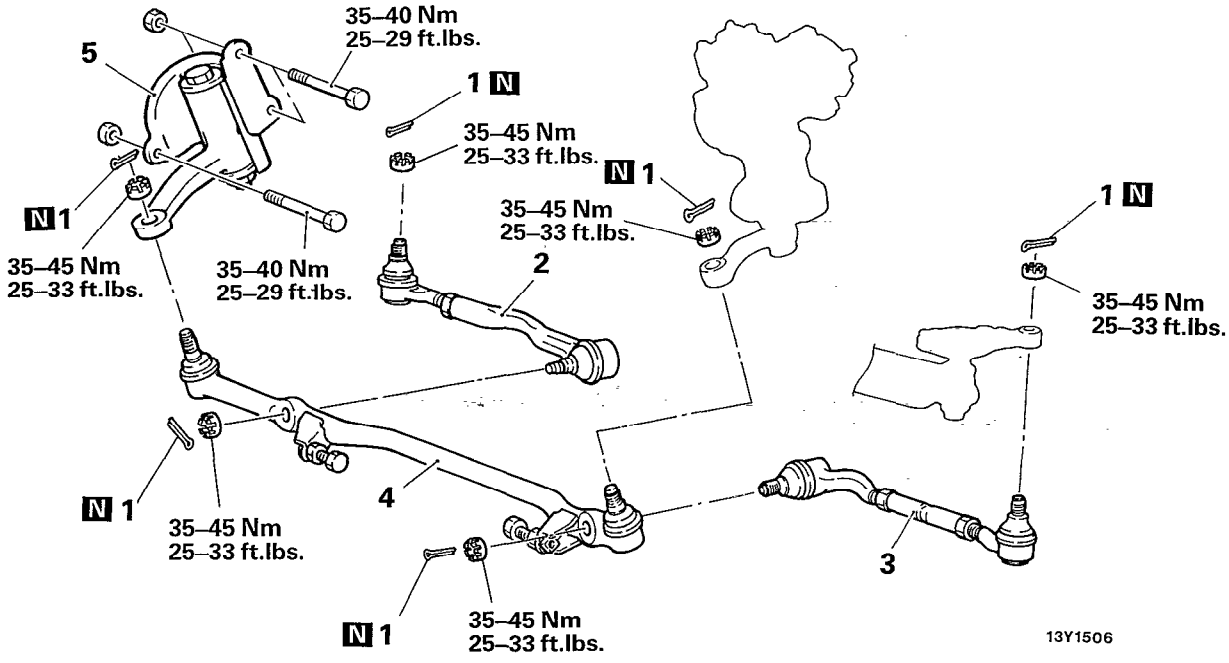
13Y963

STEERING LINKAGE

N19VA--

REMOVAL AND INSTALLATION

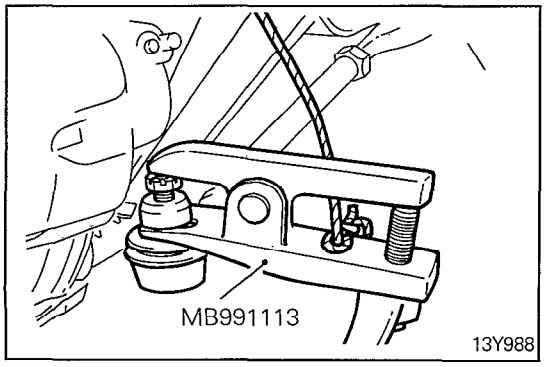
Post-installation Operation
- Adjustment of Toe-in
(Refer to GROUP 2 FRONT SUSPENSION – Service Adjustment Procedures.)



Removal steps

1. Cotter pin
◆◆ 2. Tie rod assembly, right
◆◆ 3. Tie rod assembly, left
◆◆ 4. Relay rod
◆◆ 5. Idler arm assembly

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



SERVICE POINTS OF REMOVAL

N19VBAD

2. DISCONNECTION OF TIE ROD ASSEMBLY, RIGHT / 3. TIE ROD ASSEMBLY, LEFT / 4. RELAY ROD / 5. IDLER ARM ASSEMBLY

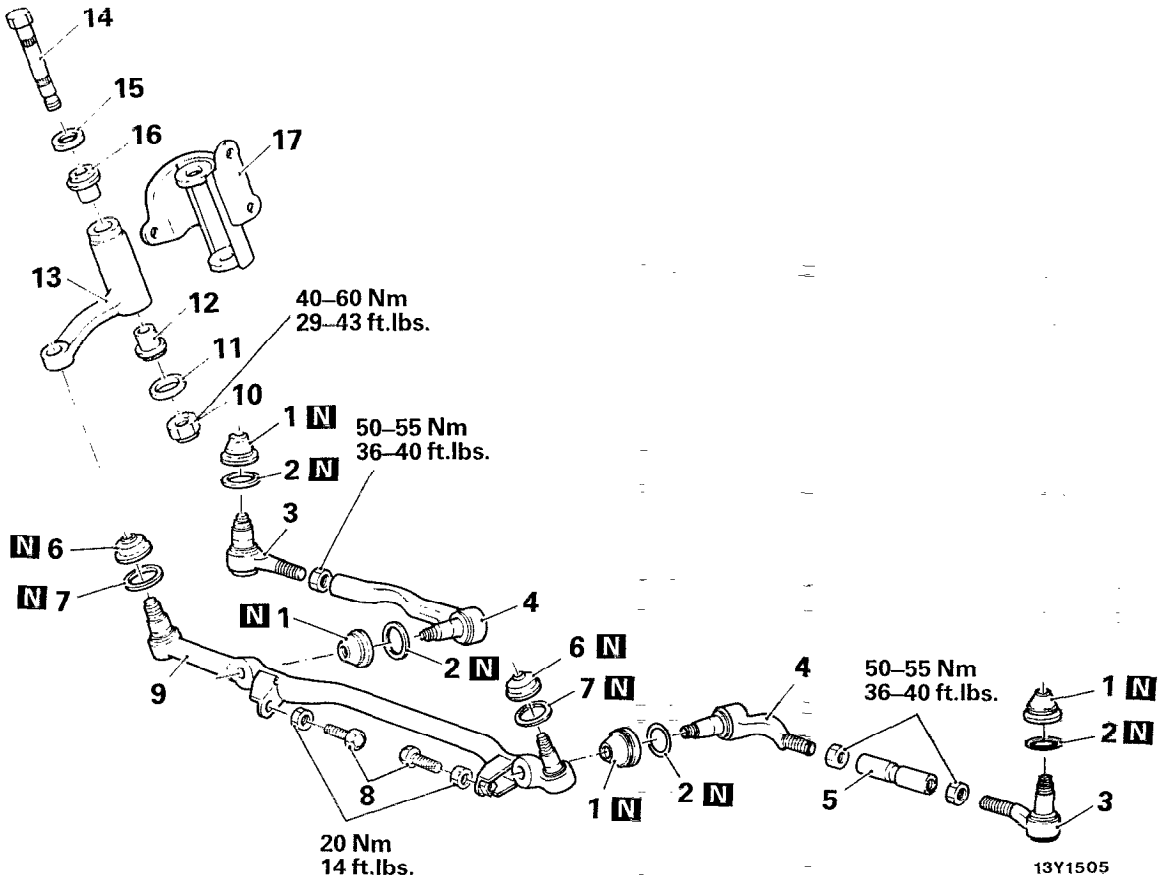
Disconnect each linkage by using the special tool.

Caution
Do not remove the ball joint nut but simply loosen.

STEERING LINKAGE

N19VG-

DISASSEMBLY AND REASSEMBLY



Tie rod assembly disassembly steps

- ➡⬅ Measurement of tie rod end ball joint starting torque
- 1. Dust cover
- 2. O-ring
- ➡⬅ 3. Tie rod outer end
- ➡⬅ 4. Tie rod inner end
- ➡⬅ 5. Tie rod

Relay rod disassembly steps

- 6. Dust cover
- 7. O-ring
- 8. Stopper bolts
- 9. Relay rod

Idler arm disassembly steps

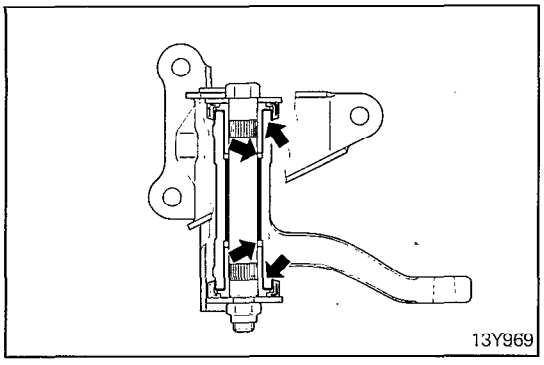
- ➡⬅ Measurement of idler arm starting torque
- 10. Idler arm attaching nut
- 11. Oil seal
- 12. Idler arm bearing
- 13. Idler arm
- 14. Pin
- 15. Oil seal
- 16. Idler arm bearing
- 17. Idler arm support

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

INSPECTION

N19VHAA

- Check the idler arm support for damage and deformation.
- Check the idler arm for damage and deformation.
- Check the idler arm bearings for wear and cracks.
- Check the dust covers and O-rings for damage and cracks.
- Check the tie rods for damage and deformation.
- Check the relay rod for bends and damage.

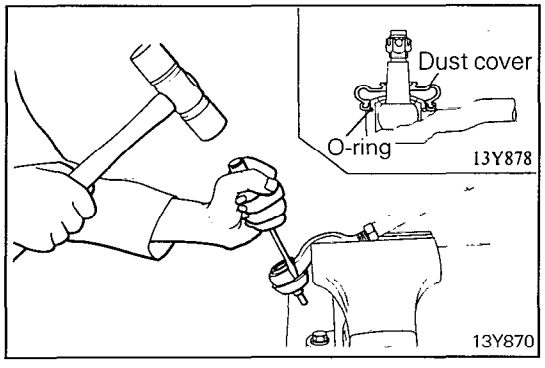


REPLACEMENT OF IDLER ARM BEARING N19VJAA

1. Apply a thin coat of specified grease to the inner surfaces of the idler arm, outer surfaces of the bearings and lips of oil seals.

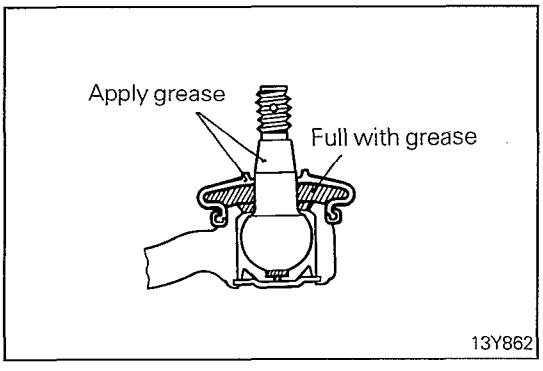
   Specified grease: MOPAR Multi-mileage Lubricant Part No. 2525035 or equivalent

2. Install the bearings and oil seals to the idler arm.
3. Install the idler arm assembly to the idler arm support.



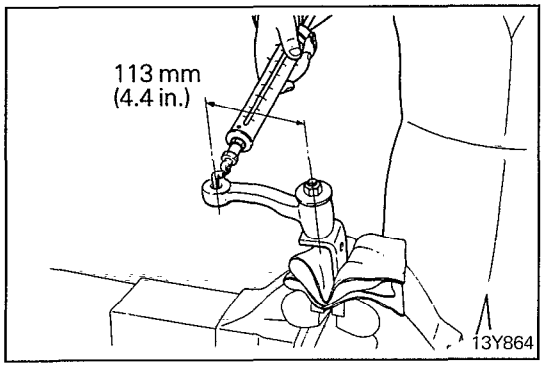
REPLACEMENT OF DUST COVER N19VEAC

1. Remove the dust cover and O-ring from the ball joint.



2. When installing the dust cover, fill the cover lip and the interior with the specified grease.

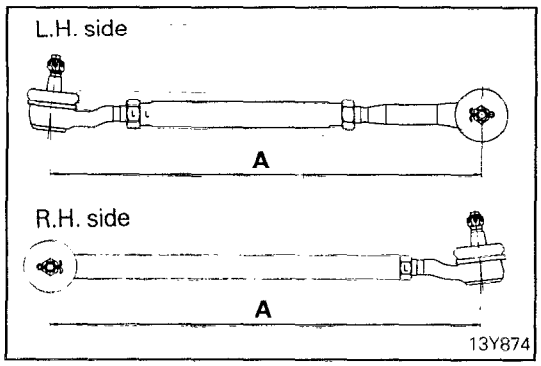
   Specified grease: MOPAR Multi-mileage Lubricant Part No. 2525035 or equivalent



MEASUREMENT OF IDLER ARM STARTING TORQUE

Measure the starting torque of the idler arm with a spring balance.

Standard value: 300 – 900 Ncm (26 – 78 in.lbs.)
Spring scale reading
26 – 78 N (6 – 18 lbs.)



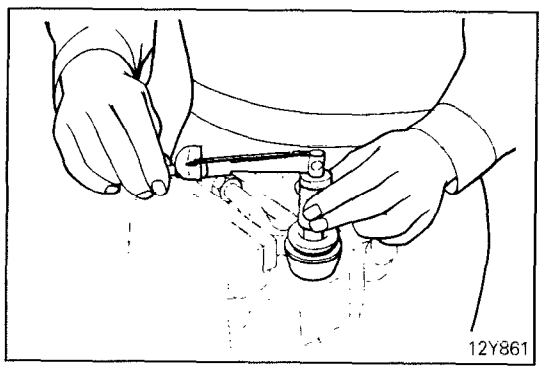
SERVICE POINTS OF REASSEMBLY N19VIAA

5. INSTALLATION OF TIE ROD / 4. TIE ROD INNER END / 3. TIE ROD OUTER END

1. Apply the specified grease to the threaded portion of the tie rod.
2. Temporarily tighten the tie rod so that the distance between the stud bolts of the tie rod is the following dimension.

Tie rod end ball joint center distance A:
372 mm (14.65 in.)

Caution
Tie rod end tightness, left and right, should be uniform.



- **MEASUREMENT OF TIE ROD END BALL JOINT STARTING TORQUE**

Secure the relay rod and the tie rod in a vice.
Mount the nut to the ball joint, and then measure the ball joint starting torque.

Standard value:
Tie rod and relay rod (for gear box)
50 – 250 Ncm (4 – 22 in.lbs.)
Relay rod (for idler arm)
50 – 150 Ncm (4 – 13 in.lbs.)