STEERING SYSTEM

SECTION ST

CONTENTS

Supplemental Restraint System (SRS) “AIR BAG”

NMST0038

The Supplemental Restraint System such as “AIR BAG” used along with a seat belt, helps to reduce the risk or severity of injury to the driver and front passenger for certain types of collision. The SRS system composition which is available to NISSAN MODEL S15 is as follows:
The Supplemental Restraint System consists of driver air bag module (located in the center of the steering wheel), front passenger air bag module (located on the instrument panel on passenger side), a diagnosis sensor unit, warning lamp, wiring harness and spiral cable.
Information necessary to service the system safely is included in the **RS section** of this Service Manual.

WARNING:

- **To avoid rendering the SRS inoperative, which could increase the risk of personal injury or death in the event of a collision which would result in air bag inflation, all maintenance should be performed by an authorized NISSAN dealer.**
- **Improper maintenance, including incorrect removal and installation of the SRS, can lead to personal injury caused by unintentional activation of the system. For removal of Spiral Cable and Air Bag Module, see the RS section.**
- **Do not use electrical test equipment on any circuit related to the SRS unless instructed to in this Service Manual. SRS wiring harnesses can be identified with yellow harness connector.**

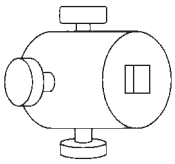
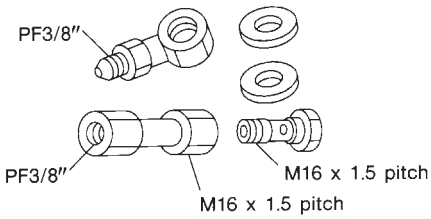
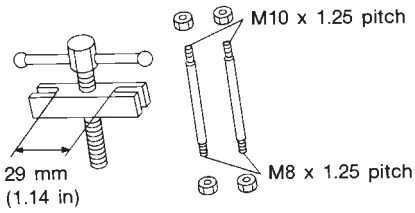
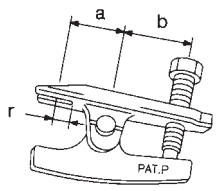
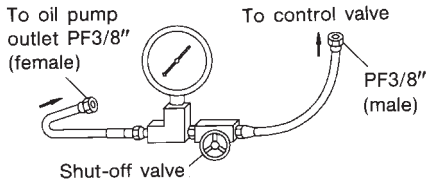
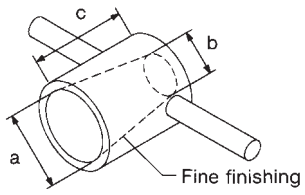
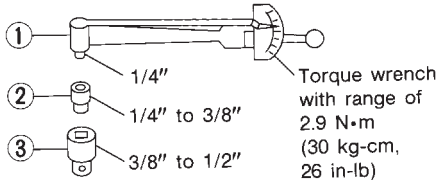
Precautions for Steering System

NMST0003

- **Before disassembly, thoroughly clean the outside of the unit.**
- **Disassembly should be done in a clean work area. It is important to prevent the internal parts from becoming contaminated by dirt or other foreign matter.**
- **Place disassembled parts in order, on a parts rack, for easier and proper assembly.**
- **Use nylon cloths or paper towels to clean the parts; common shop rags can leave lint that might interfere with their operation.**
- **Before inspection or reassembly, carefully clean all parts with a general purpose, non-flammable solvent.**
- **Before assembly, apply a coat of recommended power steering fluid* to hydraulic parts. Vaseline may be applied to O-rings and seals. Do not use any grease.**
- **Replace all gaskets, seals and O-rings. Avoid damaging O-rings, seals and gaskets during installation. Perform functional tests whenever designated.**
  ***: Type Dexron™ III or equivalent. Refer to MA-8, “Fluids and Lubricants”.**

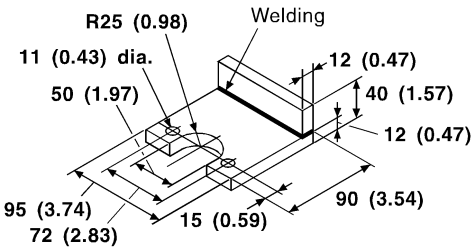
Special Service Tools

NMST0004

Tool number Tool name	Description	
KV48103400 Torque adapter	 NT236	Measuring steering transfer gear rotating torque
KV48102500 Pressure gauge adapter	 NT542	Measuring oil pressure
ST27180001 Steering wheel puller	 NT544	Removing steering wheel
HT72520000 Ball joint remover	 NT546	Removing ball joint **a: 33 mm (1.30 in)** **b: 50 mm (1.97 in)** **r: R11.5 mm (0.453 in)**
KV48103500 Pressure gauge	 NT547	Measuring oil pressure
KV48104400 Rack seal ring reformer	 NT550	Reforming teflon ring **a: 50 mm (1.97 in) dia.** **b: 36 mm (1.42 in) dia.** **c: 100 mm (3.94 in)**
ST3127S000 1 GG91030000 Torque wrench 2 HT62940000 Socket adapter 3 HT62900000 Socket adapter	 NT541	Measuring turning torque

Commercial Service Tool

NMST0005

Tool number	Description	
Oil pump attachment	 NT774	Disassembling and assembling oil pump Unit: mm (in)

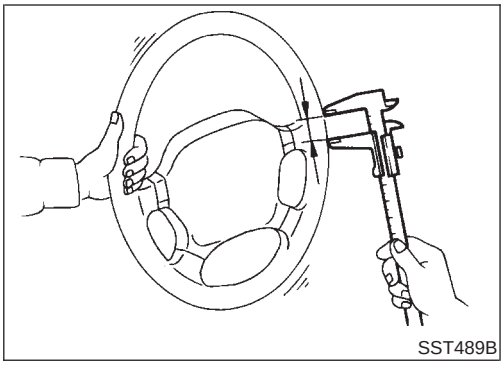
NVH Troubleshooting Chart

NMST0006S01

Use the chart below to help you find the cause of the symptom. If necessary, repair or replace these parts.

Reference page			ST-7	ST-8	ST-19	ST-19	ST-19	ST-7	ST-6	ST-8	EM-16	—	ST-11	ST-6	ST-14	ST-13	ST-15	AX-3	AX-3	SU-4	SU-4	SU-4	BR-5
Possible cause and SUSPECTED PARTS			Fluid level	Air in hydraulic system	Tie-rod ball joint swinging force	Tie-rod ball joint rotating torque	Tie-rod ball joint end play	Steering gear fluid leakage	Steering wheel play	Steering gear rack sliding force	Drive belt looseness	Improper steering wheel	Improper installation or looseness or tilt lock lever	Mounting rubber deterioration	Steering column deformation or damage	Improper installation or looseness of steering column	Steering linkage looseness	DRIVE SHAFT	AXLE	SUSPENSION	TIRES	ROAD WHEEL	BRAKES
Symptom	STEERING	Noise	×	×	×	×	×	×	×	×	×							×	×	×	×	×	×
		Shake										×	×	×				×	×	×	×	×	×
		Vibration										×	×	×	×	×		×	×	×	×		
		Shimmy										×	×	×			×		×	×	×	×	×
		Judder												×			×		×	×	×	×	×

×: Applicable


SST489B

Checking Steering Wheel Play

NMST0007

- With wheels in a straight-ahead position, check steering wheel play.

  Steering wheel play:

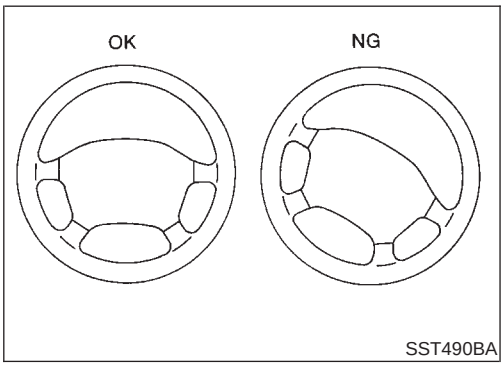
  35 mm (1.38 in) or less

- If it is not within specification, check the following for loose or worn components.

  Steering gear assembly

  Steering column

  Front suspension and axle



SST490BA

Checking Neutral Position on Steering Wheel

NMST0008

PRE-CHECKING

NMST0008S01

- Make sure that wheel alignment is correct.

  Wheel alignment:

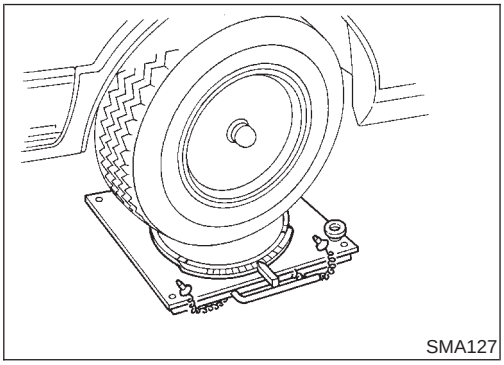
  Refer to SU-13, SDS.

- Verify that the steering gear is centered before removing the steering wheel.

CHECKING

NMST0008S02

1. Check that the steering wheel is in the neutral position when driving straight ahead.
2. If it is not in the neutral position, remove the steering wheel and reinstall it correctly.
3. If the neutral position is between two teeth, loosen tie-rod lock nuts. Turn the tie-rods by the same amount in opposite directions on both left and right sides.


SMA127

Front Wheel Turning Angle

NMST0009

1. Rotate steering wheel all the way right and left; measure turning angle.

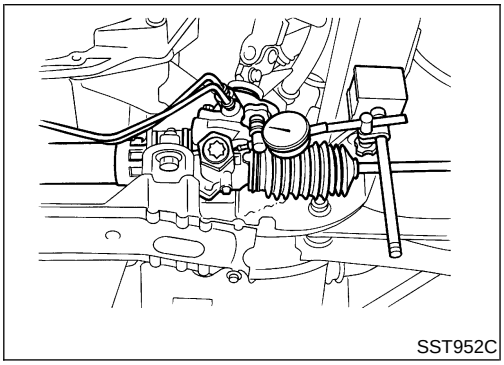
   Turning angle of full turns:

   Refer to SU-13, SDS.

2. If it is not within specification, check rack stroke.

   Rack stroke “S”:

   Refer to SDS, ST-30.


SST952C

Checking Gear Housing Movement

NMST0010

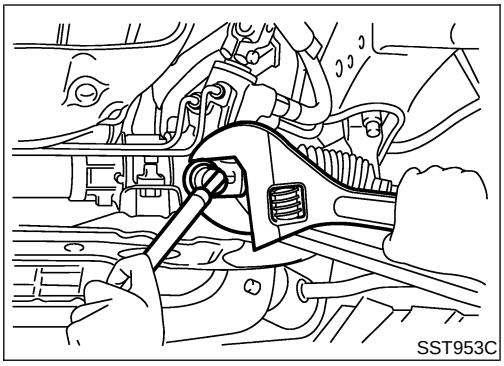
1. Check the movement of steering gear housing during stationary steering on a dry paved surface.

- Apply a force of 49 N (5 kg, 11 lb) to steering wheel to check the gear housing movement.
  Turn off ignition key while checking.

  Movement of gear housing:

  ±2 mm (±0.08 in) or less

2. If movement exceeds the limit, replace mount insulator after confirming proper installation of gear housing clamps.


SST953C

Adjusting Rack Retainer

NMST0039

- Perform this driving test on a flat road.

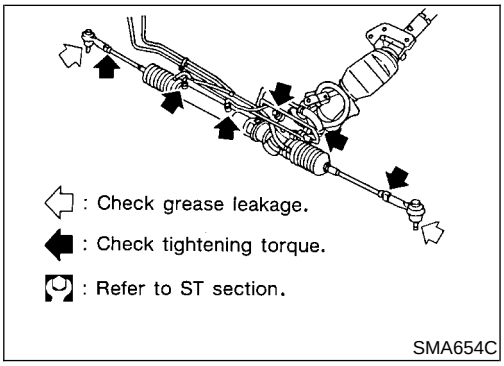
1. Check whether vehicle moves in a straight line when steering wheel is released.
2. Check whether steering wheel returns to neutral position when steering wheel is released from a slightly turned (approx. 20°) position.

- If any abnormality is found, correct it by resetting adjusting screw.

Checking and Adjusting Drive Belts

NMST0011

Refer to EM-16, “Checking Drive Belts”.



SMA654C

Checking Steering Gear and Linkage

NMST0040

STEERING GEAR

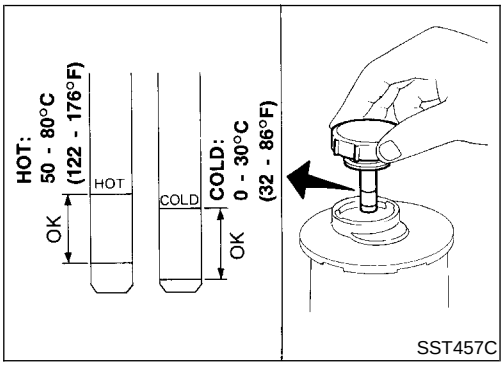
NMST0040S01

- Check gear housing and boots for looseness, damage or grease leakage.
- Check connection with steering column for looseness.

STEERING LINKAGE

NMST0040S02

- Check ball joint, dust cover and other component parts for looseness, wear, damage or grease leakage.



SST457C

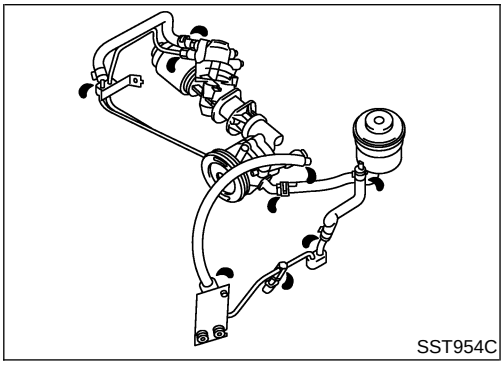
Checking Fluid Level

NMST0012

Check fluid level, referring to the scale on reservoir tank.
Use “HOT” range for fluid temperatures of 50 to 80°C (122 to 176°F).
Use “COLD” range for fluid temperatures of 0 to 30°C (32 to 86°F).

CAUTION:

- **Do not overfill.**
- **Recommended fluid is Type Dexron™ III or equivalent. Refer to MA-8, “Fluids and Lubricants”.**


SST954C

Checking Fluid Leakage

NMST0013

Check the lines for improper attachment and for leaks, cracks, damage, loose connections, chafing and deterioration.

1. Run engine between idle speed and 1,000 rpm.

Make sure temperature of fluid in oil tank rises to 50 to 80°C (122 to 176°F).

2. Turn steering wheel right-to-left several times.
3. Hold steering wheel at each “lock” position for five seconds and carefully check for fluid leakage.

CAUTION:

Do not hold the steering wheel in a locked position for more than 15 seconds.

4. If fluid leakage at connectors is noticed, loosen flare nut and then retighten.

Do not overtighten connector as this can damage O-ring, washer and connector.

5. If fluid leakage from power steering pump is noticed, check power steering pump. Refer to ST-25.
6. Check rack boots for accumulation of power steering fluid.

Bleeding Hydraulic System

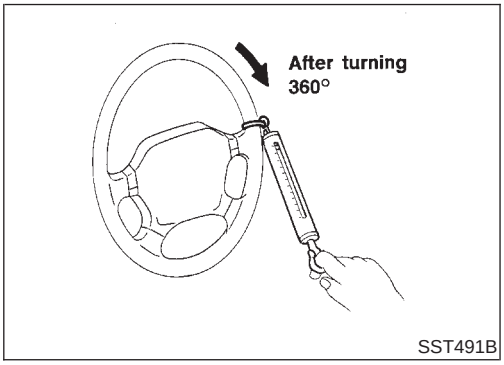
NMST0014

1. Raise front end of vehicle until wheels are clear of the ground.
2. Add fluid into oil tank to specified level. Then quickly turn steering wheel fully to right and left and lightly touch steering stoppers.
   Repeat steering wheel operation until fluid level no longer decreases.
3. Start engine.
   Repeat step 2. above.

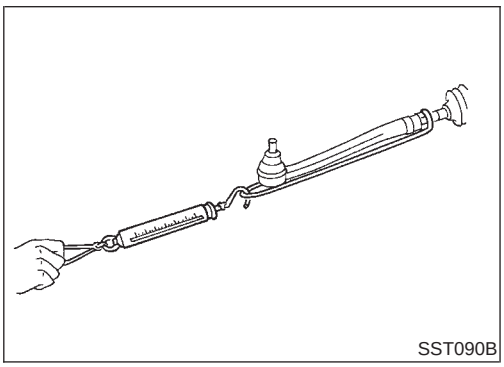
- Incomplete air bleeding will cause the following to occur. When this happens, bleed air again.

a) Air bubbles in reservoir tank
b) Clicking noise in oil pump
c) Excessive buzzing in oil pump

Fluid noise may occur in the valve or oil pump. This is common when the vehicle is stationary or while turning the steering wheel slowly. This does not affect the performance or durability of the system.



SST491B


SST090B

Checking Steering Wheel Turning Force

NMST0015

1. Park vehicle on a level, dry surface and set parking brake.
2. Start engine.
3. Bring power steering fluid up to adequate operating temperature. [Make sure temperature of fluid is approximately 50 to 80°C (122 to 176°F).]

Tires need to be inflated to normal pressure.

4. Check steering wheel turning force when steering wheel has been turned 360° from the neutral position.

   Steering wheel turning force:

   39 N (4 kg, 9 lb) or less

5. If steering wheel turning force is out of specification, check rack sliding force.

a. Disconnect steering column lower joint and knuckle arms from the gear.
b. Start and run engine at idle to make sure steering fluid has reached normal operating temperature.
c. Pull tie-rod slowly to move it from neutral position to ±11.5 mm (±0.453 in) at speed of 3.5 mm (0.138 in)/s. Check that rack sliding force is within specification.

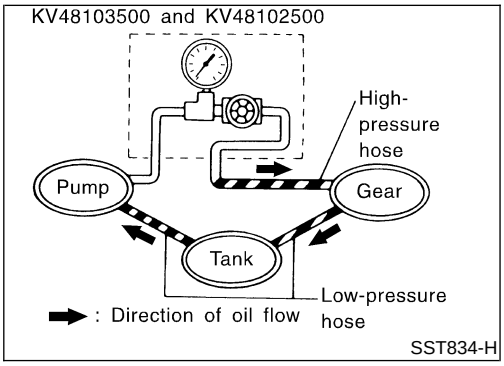
   Average rack sliding force:

   186 - 245 N (19 - 25 kg, 42 - 55 lb)

Maximum force deviation:
98 N (10 kg, 22 lb)

d. Check sliding force outside the above range at rack speed of 40 mm (1.75 in)/s.
Rack sliding force:
Not more than 294 N (30 kg, 66 lb)
Maximum force deviation:
147 N (15 kg, 33 lb)

6. If rack sliding force is not within specification, overhaul steering gear assembly.
7. If rack sliding force is OK, inspect steering column. Refer to ST-13.



Checking Hydraulic System

NMST0016

Before starting, check belt tension, driving pulley and tire pressure.

1. Set Tool. Open shut-off valve. Then bleed air. Refer to "Bleeding Hydraulic System", ST-8.
2. Run engine at idle speed or 1,000 rpm.

Make sure temperature of fluid in tank rises to 50 to 80°C (122 to 176°F).

WARNING:
Warm up engine with shut-off valve fully opened. If engine is started with shut-off valve closed, fluid pressure in oil pump increases to maximum. This will raise oil temperature abnormally.

3. Check pressure with steering wheel fully turned to left and right positions with engine idling at 1,000 rpm.

CAUTION:
Do not hold the steering wheel in a locked position for more than 15 seconds.

Oil pump maximum standard pressure:
8,630 - 9,219 kPa (88 - 94 kg/cm^2, 1,251 - 1,337 psi)

- If pressure reaches maximum operating pressure, system is OK.
- If pressure increases above maximum operating pressure, check power steering pump flow control valve. Refer to ST-25.

4. If power steering pressure is below the maximum operating pressure, slowly close shut-off valve and check pressure again.

CAUTION:
Do not close shut-off valve for more than 15 seconds.

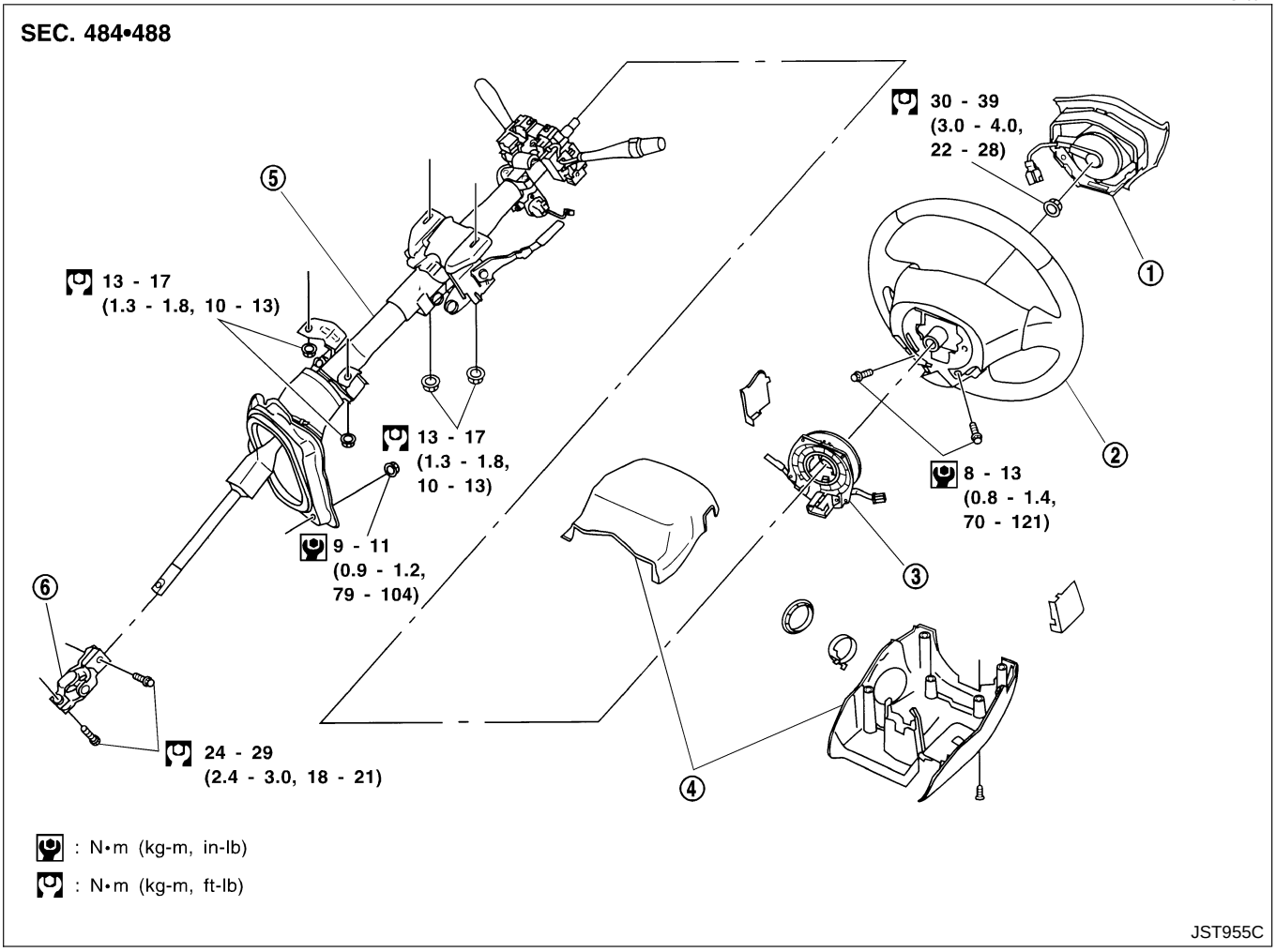
- If pressure increases to maximum operating pressure, gear is damaged. Refer to "Removal and Installation", ST-16.
- If pressure remains below maximum operating pressure, pump is damaged. Refer to "Disassembly", ST-26.

5. After checking hydraulic system, remove Tool and add fluid as

necessary. Then completely bleed air out of system. Refer to ST-8.

Components

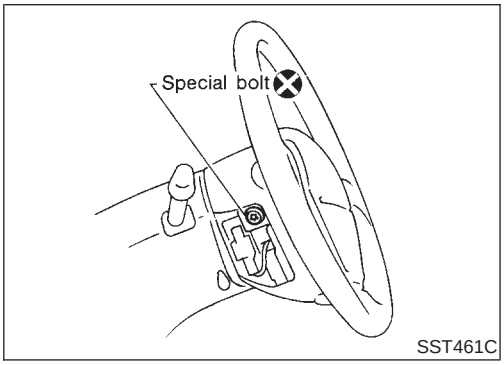
NMST0017



1. Air bag module
2. Steering wheel
3. Spiral cable
4. Column cover
5. Steering column assembly
6. Lower joint

CAUTION:

- **The rotation of the spiral cable (SRS "Air bag" component part) is limited. If the steering gear must be removed, set the front wheels in the straight-ahead direction. Do not rotate the steering column while the steering gear is removed.**
- **Remove the steering wheel before removing the steering lower joint to avoid damaging the SRS spiral cable.**



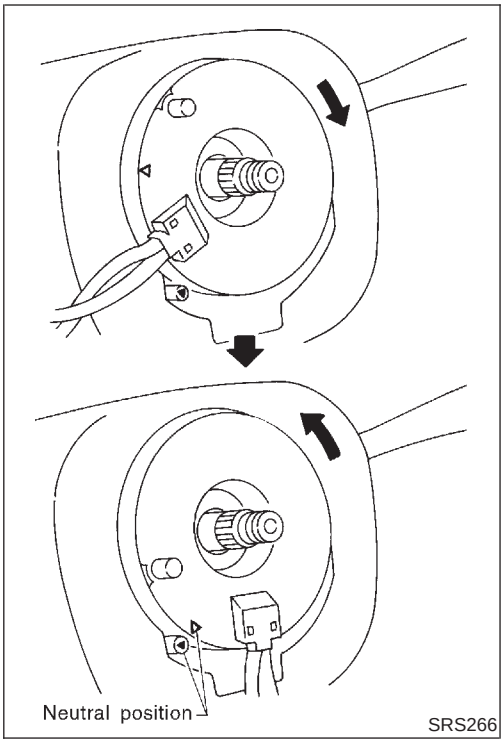
Removal and Installation

NMST0018

STEERING WHEEL

NMST0018S01

- Remove air bag module and spiral cable.
  Refer to RS-12, "Removal — Driver Air Bag Module and Spiral Cable".



- Align spiral cable correctly when installing steering wheel.

a) Set the front wheels in the straight-ahead position.

b) Make sure that the spiral cable is in the neutral position. The neutral position is detected by turning left 2.5 revolutions from the right end position. Align the two marks (⧗).

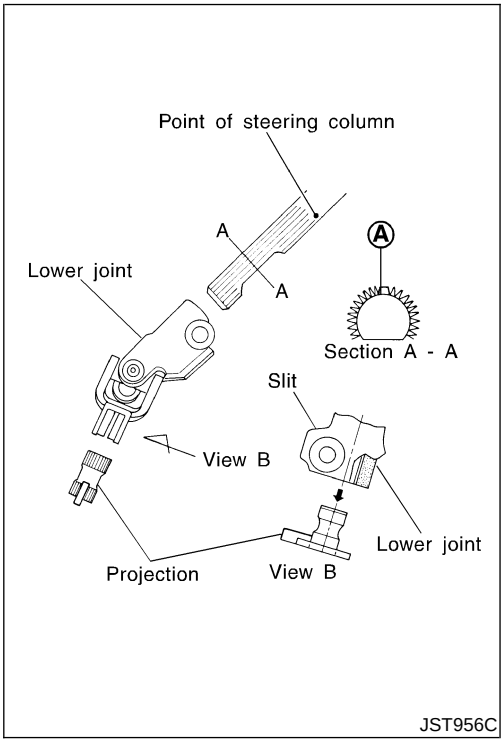
CAUTION:

The spiral cable may snap due to steering operation if the cable is installed in an improper position.
Also, with the steering linkage disconnected, the cable may snap by turning the steering wheel beyond the limited number of turns. (The spiral cable can be turned up to 2.5 turns from the neutral position to both the right and left.)

STEERING COLUMN

NMST0018S02

- Remove key interlock cable (A/T models).
  Refer to AT-203, "Removal", "Key Interlock Cable".



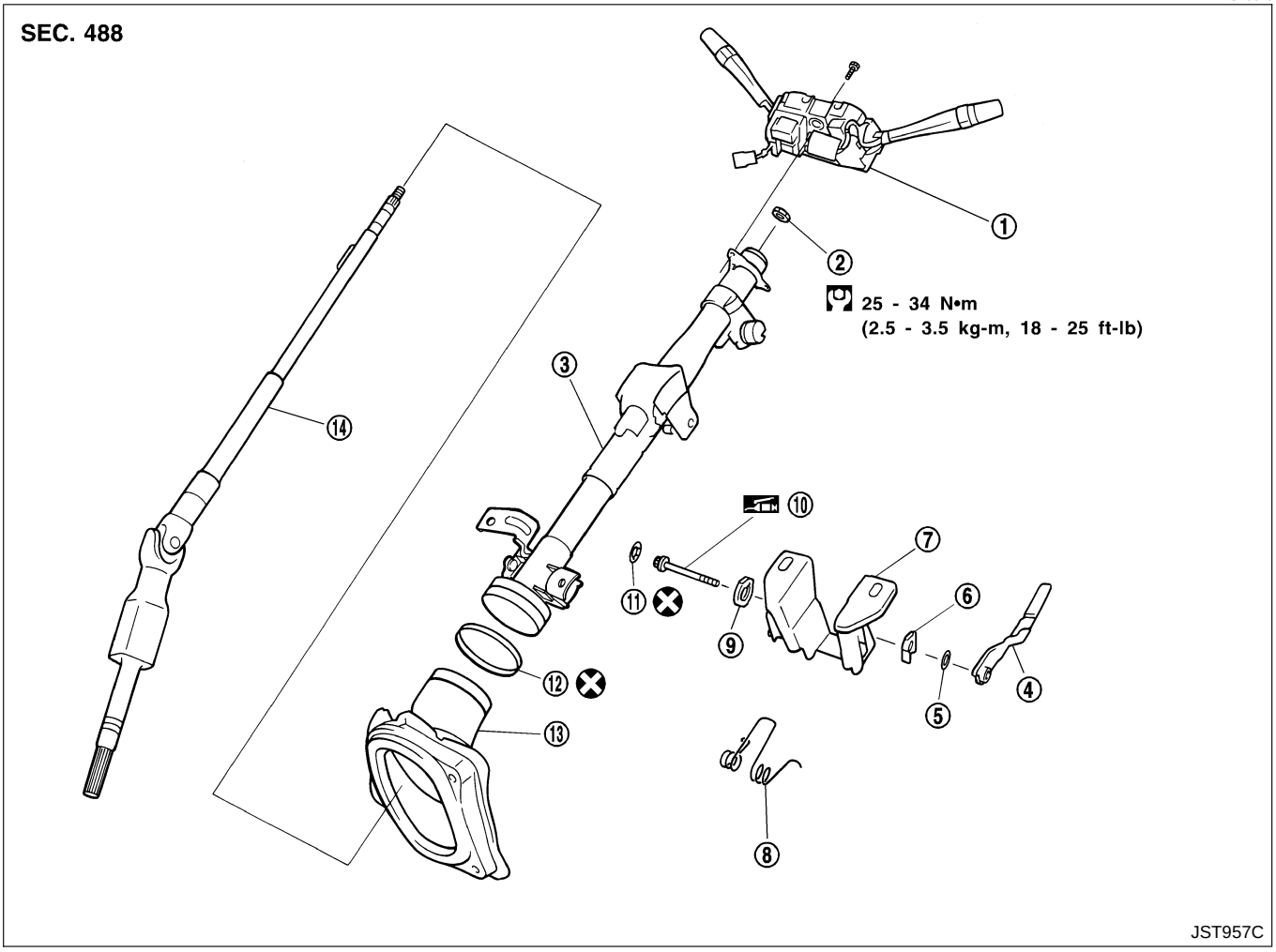
- When installing steering column, fingertighten all lower bracket and clamp retaining bolts; then tighten them securely. Do not apply undue stress to steering column.
- When attaching coupling joint, align A with lower joint side groove.
- Align slit of lower joint with projection on dust cover. Insert joint until surface A contacts surface B.

CAUTION:

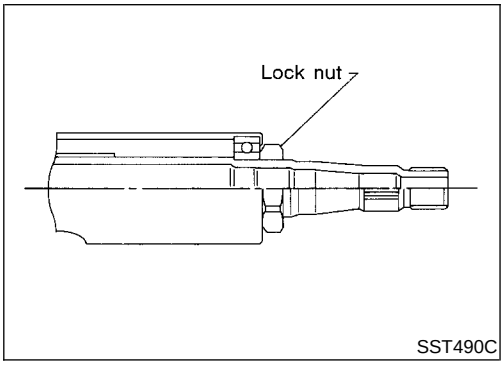
After installation, turn steering wheel to make sure it moves smoothly. Ensure the number of turns are the same from the straight forward position to left and right locks. Be sure that the steering wheel is in a neutral position when driving straight ahead.

Disassembly and Assembly

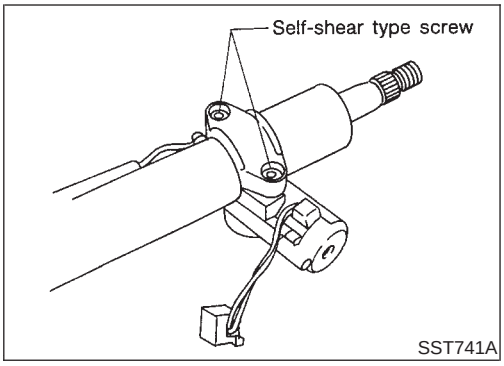
=NMST0019



1. Combination switch
2. Lock nut
3. Jacket tube assembly
4. Tilt lever
5. Washer
6. Tilt lever stopper
7. Steering column mounting bracket
8. Spring
9. Adjust bolt stopper
10. Adjust bolt
11. Steering adjusting nut
12. Band
13. Steering column lower cover
14. Column shaft assembly



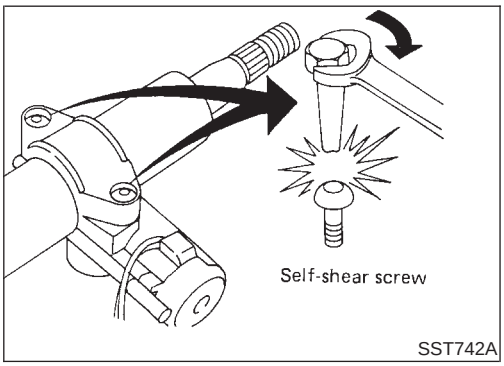
- When disassembling and assembling, unlock steering lock with key.
- Remove combination switch.
- Install lock nut on steering column shaft and tighten the nut.



SST741A

- Steering lock

a) Break self-shear type screws with a drill or other appropriate tool.



SST742A

b) Install new self-shear type screws and then cut off self-shear type screw heads.

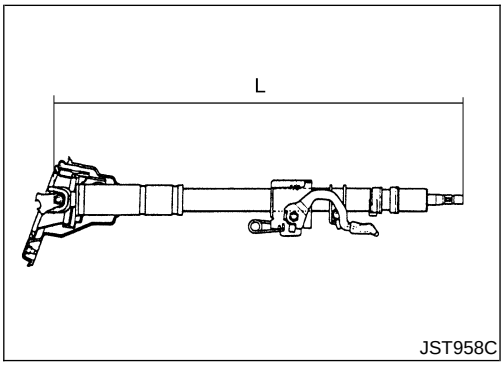
Inspection

NMST0020

- When steering wheel does not turn smoothly, check the steering column as follows and replace damaged parts.

a) Check column bearings for damage or unevenness. Lubricate with recommended multi-purpose grease or replace steering column as an assembly, if necessary.

b) Check jacket tube for deformation or breakage. Replace if necessary.



JST958C

- When the vehicle comes into a light collision, check length "L".

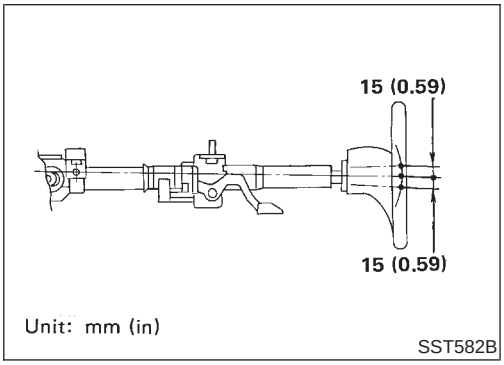
Steering column length "L":
610 mm (24.02 in)

If out of the specifications, replace steering column as an assembly.

TILT MECHANISM

NMST0020S01

- After installing steering column, check tilt mechanism operation.

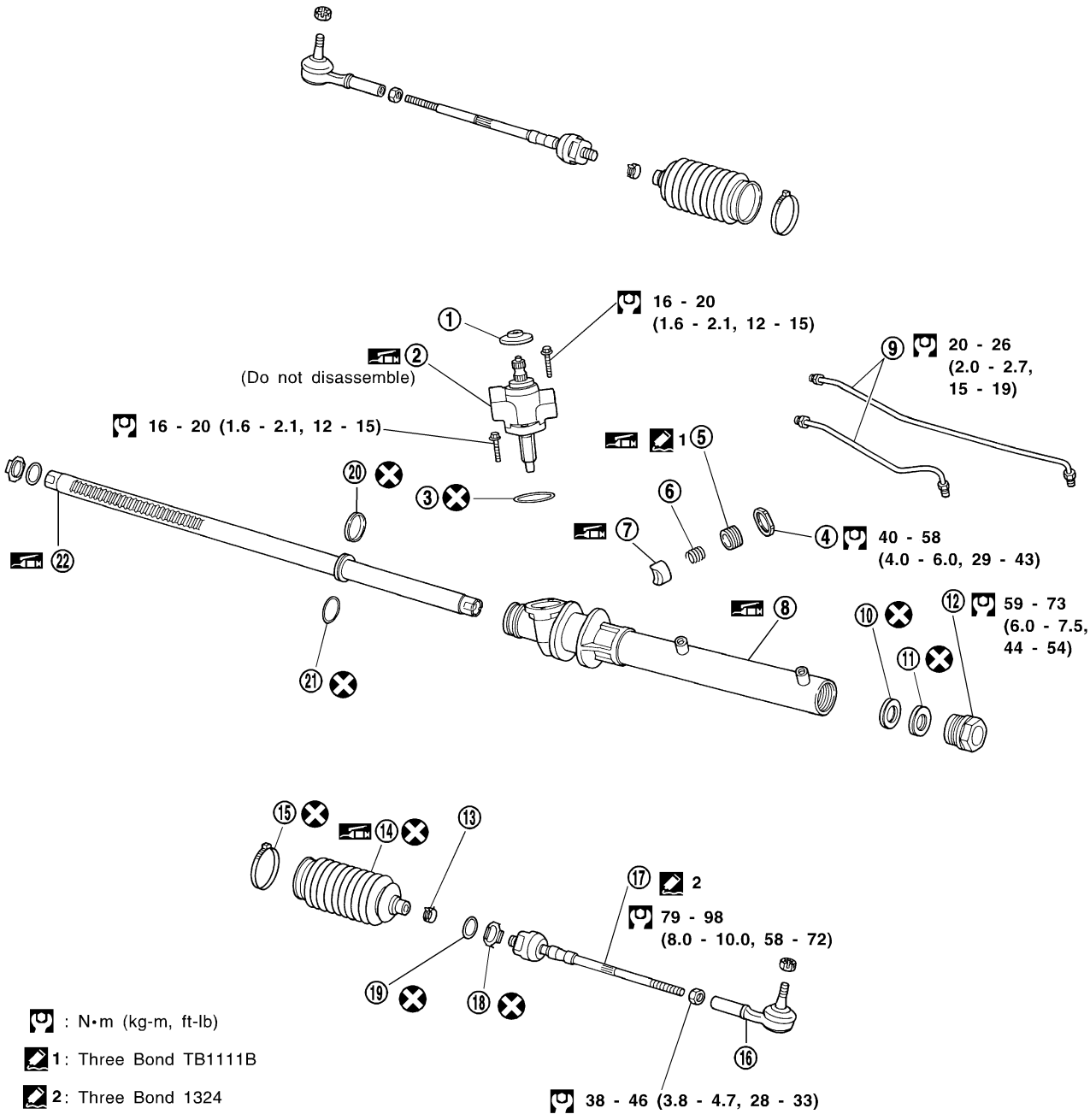


SST582B

Components

NMST0021

SEC. 492

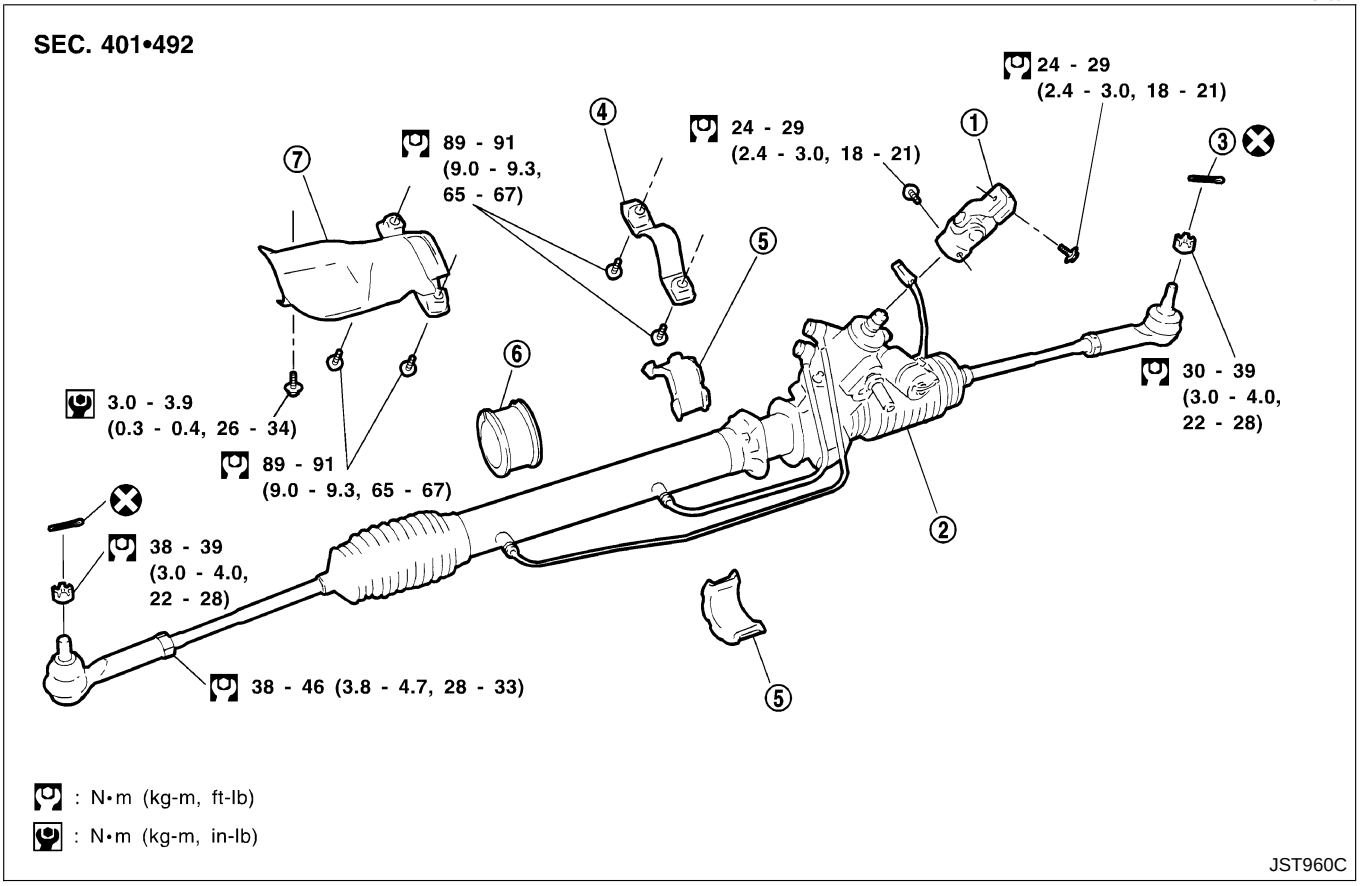


JST959C

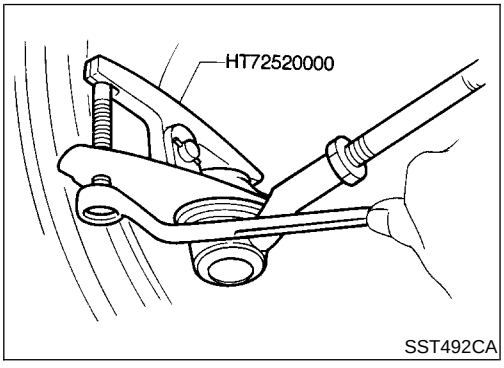
1. Rear cover cap
2. Gear sub-assembly
3. O-ring
4. Lock nut
5. Adjusting screw
6. Spring
7. Retainer
8. Gear housing
9. Gear housing tube
10. Rack oil seal (Inner)
11. Rack oil seal (Outer)
12. End cover assembly
13. Boot bond
14. Dust boot
15. Boot band
16. Tie-rod outer socket
17. Tie-rod inner socket
18. Lock plate
19. Spacer ring
20. Rack seal ring
21. O-ring
22. Rack assembly

Removal and Installation

NMST0022



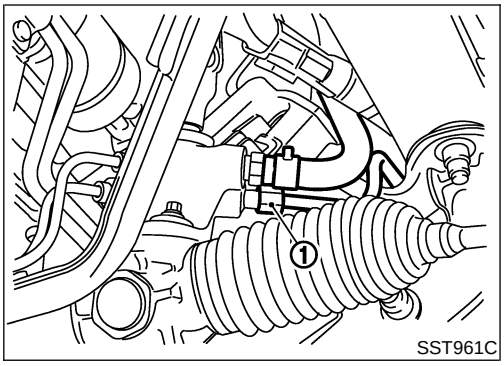
1. Lower joint
2. Gear and linkage assembly
3. Cotter pin
4. Gear housing mounting bracket
5. Rack mounting insulator
6. Rack mount insulator
7. Gear housing mounting bracket



CAUTION:

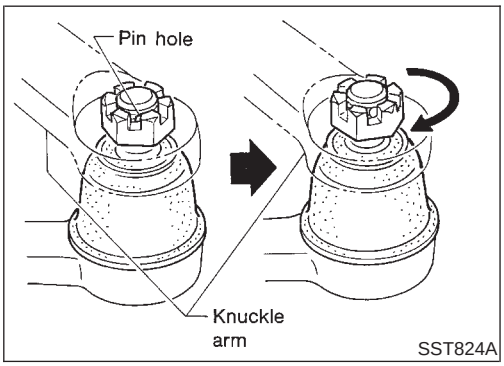
- **The rotation of the spiral cable (SRS “Air bag” component part) is limited. If the steering gear must be removed, set the front wheels in the straight-ahead direction. Do not rotate the steering column while the steering gear is removed.**
- **Remove the steering wheel before removing the steering lower joint to avoid damaging the SRS spiral cable.**
- **Detach tie-rod outer sockets from knuckle arms with Tool.**

1. Remove lower joint fixing bolt (Lower side).
2. Loosen lower joint fixing bolt (Upper side).
3. Remove front cross bar. Refer to “Components”, SU-9.
4. Remove steering gear assembly.



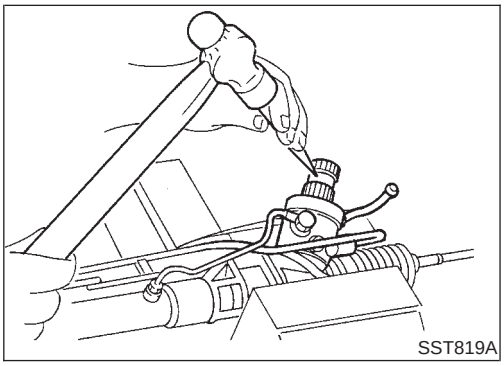
- Install pipe connector.
- Observe specified tightening torque when tightening high-pressure pipe connectors. Excessive tightening will damage threads of connector or O-ring.

Connector tightening torque:
1 High-pressure side
15 - 25 N·m (1.5 - 2.5 kg-m, 11 - 18 ft-lb)

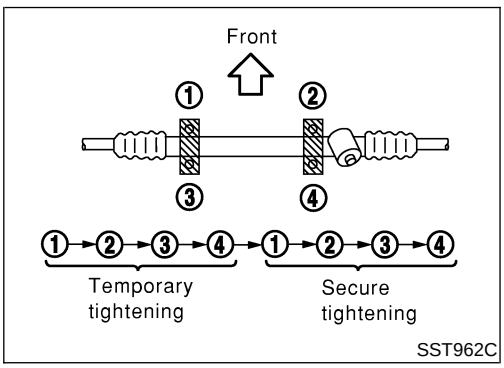


- Initially, tighten nut on tie-rod outer socket and knuckle arm to 29 to 39 N·m (3 to 4 kg-m, 22 to 29 ft-lb). Then tighten further to align nut groove with first pin hole so that cotter pin can be installed.

CAUTION:
Tightening torque must not exceed 49 N·m (5 kg-m, 36 ft-lb).

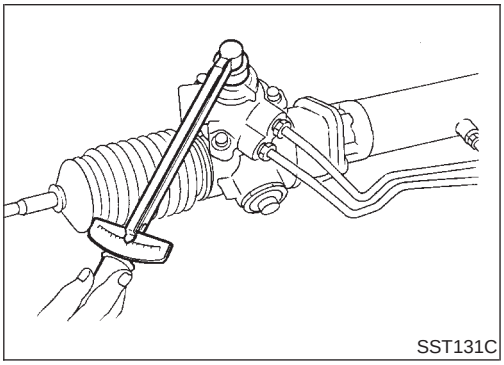


- Before removing lower joint from gear, set gear in neutral (wheels in straight-ahead position). After removing lower joint, put matching mark on pinion shaft and pinion housing to record neutral position.
- To install, set left and right dust boots to equal deflection. Attach lower joint by aligning matching marks of pinion shaft and pinion housing.



- Tighten gear housing mounting bracket bolts in the order shown.

Temporary tightening torque:
78 N·m (8.0 kg-m, 58 ft-lb)
Secure tightening torque:
88 - 108 N·m (9.0 - 11.0 kg-m, 65 - 80 ft-lb)



Disassembly

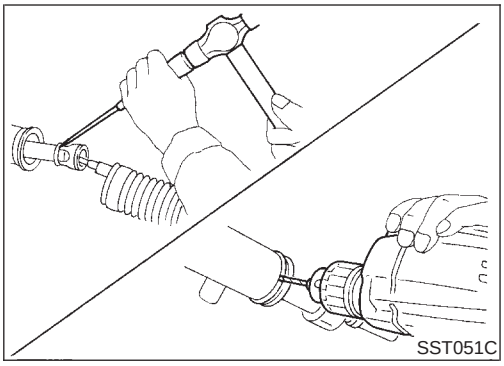
NMST0023

1. Prior to disassembling, measure pinion rotating torque. Record the pinion rotating torque as a reference.

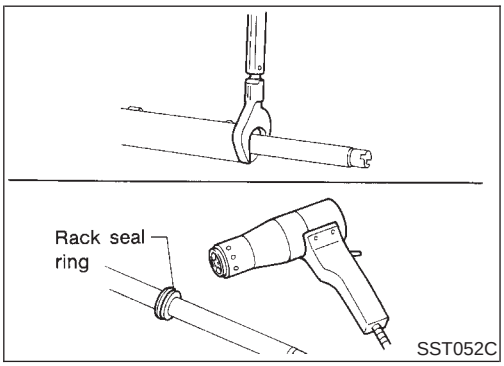
- **Before measuring, disconnect gear housing tube and drain fluid.**
- **Use soft jaws when holding steering gear housing. Handle gear housing carefully, as it is made of aluminum. Do not grip cylinder in a vise.**

2. Remove gear sub-assembly, O-ring.

Gear sub-assembly cannot be disassembled. If it is faulty, replace with a new one.


SST051C

3. Remove tie-rod outer sockets and boots.
4. Loosen tie-rod inner socket by prying up staked portion, and remove socket and spacer ring.
5. Remove retainer.
6. Use a 2 to 2.5 mm (0.079 to 0.098 in) diameter drill to completely remove staked portion of gear housing end.

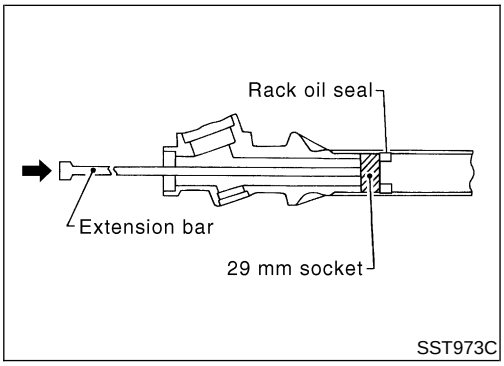


SST052C

7. Remove end cover assembly with a suitable tool.
8. Draw out rack assembly.
9. Remove rack oil seal (outer).

- Using a heat gun, heat rack seal ring to approximately 40°C (104°F).
- Remove rack seal ring and O-ring.

Be careful not to damage rack.



SST973C

10. Remove rack oil seal (inner) using tape wrapped socket and extension bar.

Do not scratch inner surfaces of pinion housing.

Inspection

NMST0024

Thoroughly clean all parts in cleaning solvent or Type Dexron™ III or equivalent. Blow dry with compressed air, if available.

BOOT

NMST0024S01

- Check condition of boot. If cracked excessively, replace it.
- Check boots for accumulation of power steering fluid.

RACK

NMST0024S02

Thoroughly examine rack gear. If damaged, cracked or worn, replace it.

GEAR SUB-ASSEMBLY

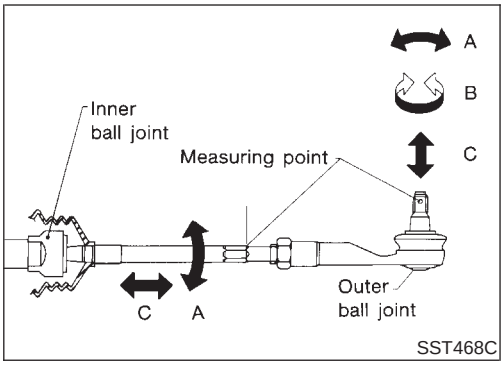
NMST0024S03

- Check pinion gear. If it is worn or damaged, replace as a gear sub-assembly.
- Manually spin bearing. If torque variations or free play are noted, replace as a gear sub-assembly.

GEAR HOUSING CYLINDER

NMST0024S04

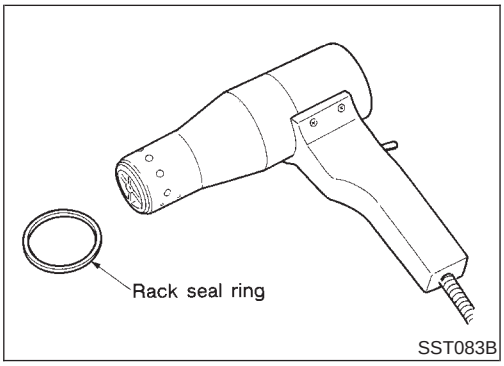
Check gear housing cylinder bore for scratches or other damage. Replace if necessary.



TIE-ROD OUTER AND INNER SOCKETS

NMST0024S05

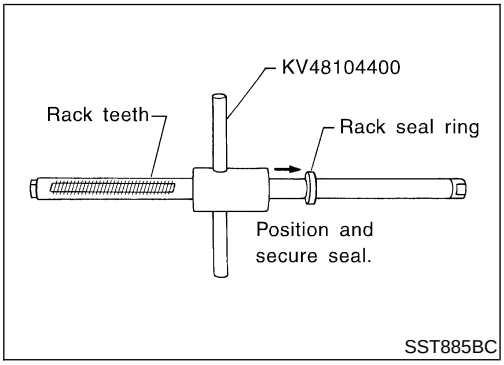
- Check ball joints for swinging force.
  Tie-rod outer and inner ball joints swinging force "A":
  Refer to SDS, ST-30.
- Check ball joint for rotating torque.
  Tie-rod outer ball joint rotating torque "B":
  Refer to SDS, ST-30.
- Check ball joints for axial end play.
  Tie-rod outer and inner ball joints axial end play "C":
  Refer to SDS, ST-30.
- Check condition of dust cover. If cracked excessively, replace outer tie-rod.



Assembly

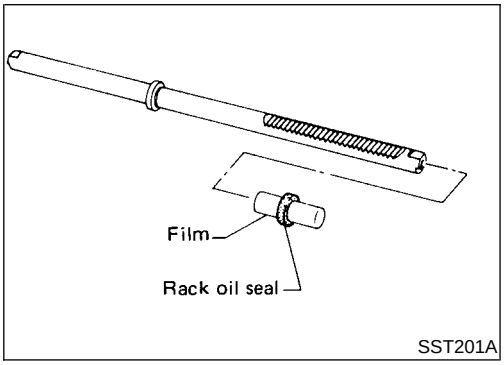
NMST0025

1. Install O-ring.
2. Using a heat gun, heat new teflon rack seal ring to approximately 40°C (104°F). Then place it onto rack.



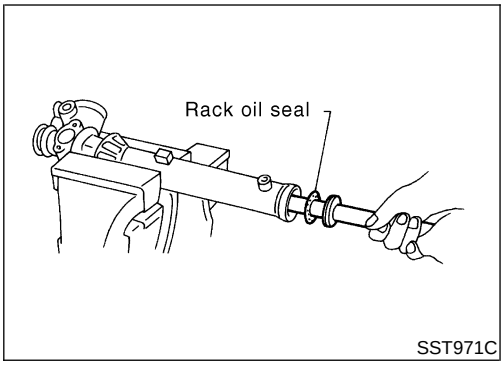
3. Using Tool, compress rack seal ring securely onto rack.

Always insert Tool from the rack gear side.

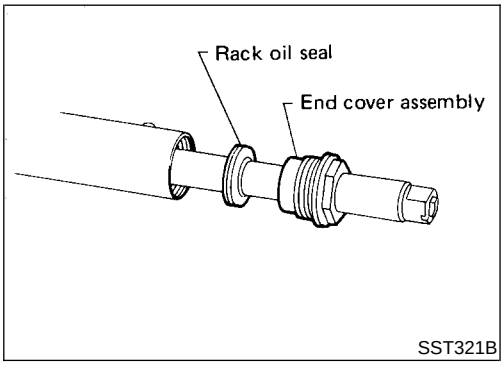


4. Insert new rack oil seal.

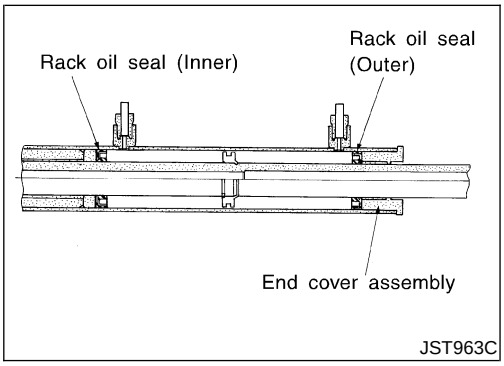
- **Place plastic film into rack oil seal to prevent damage by rack teeth.**
- **Do not forget to remove plastic film after rack oil seal is positioned properly.**
- **Make sure lips of rack oil seal face each other.**



5. Install rack oil seal (Inner) with rack assembly.

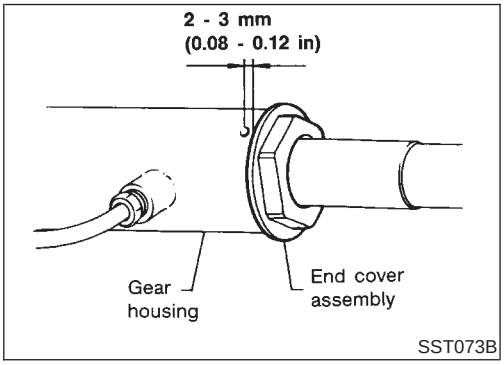


6. Insert rack oil seal (Outer) and end cover assembly to rack. Then install end cover assembly.

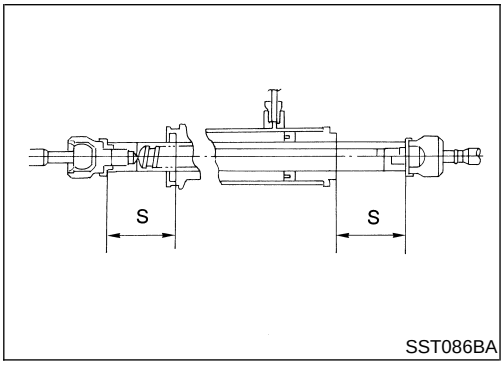


7. Install the inner and outer rack oil seal with both lips facing each other.
8. Tighten the end cover assembly with the specified torque.
   Tightening torque: Refer to "Components", ST-15.

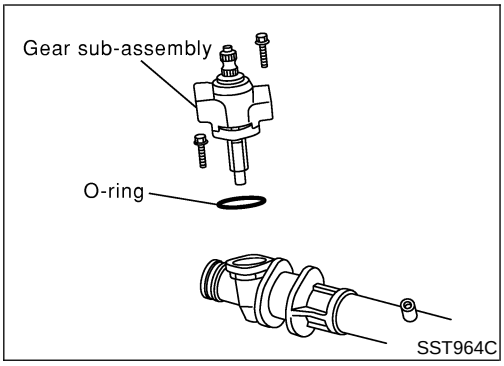
CAUTION:
Do not damage the rack surface. If the surface is damaged, replace rack to avoid oil leakage.



9. Fasten end cover assembly to gear housing by staking.

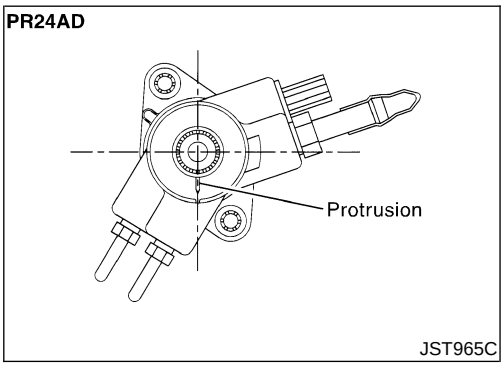


10. Set rack gear in neutral position.
    Rack stroke "S":
    Refer to SDS, ST-30.

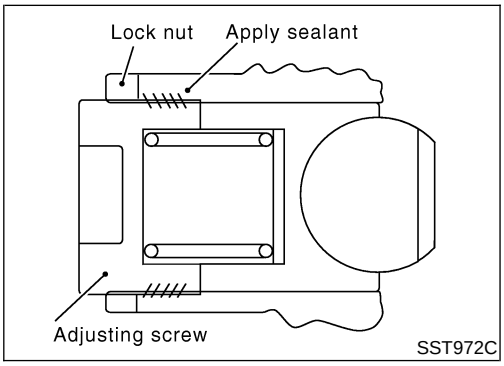


11. Install O-rings to gear sub-assembly.
- Discard old O-rings; replace with new ones.

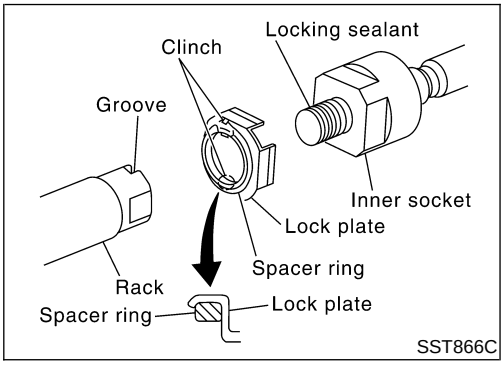
12. Tighten gear sub-assembly securing bolts to specified tightening torque.



13. Ensure that the rack is centered. Install rear cover cap so that its protrusion is positioned as shown in figure.



14. Install adjusting screw temporarily.



15. Install lock plate to rack.

a. Temporarily install spacer ring to rack.

Discard old spacer ring; replace with a new one.

b. Install lock plate to inner socket.

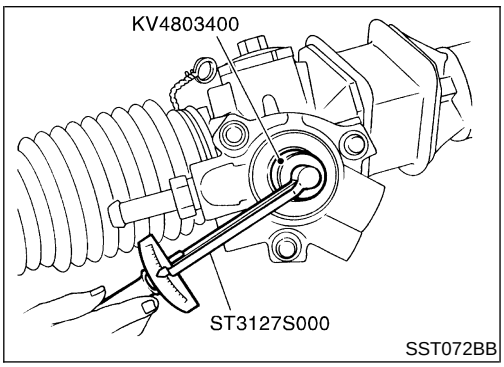
Discard old lock plate; replace with a new one.

c. Apply a coat of locking sealant to inner socket threads. Screw inner socket into rack and tighten to specified torque.

d. Clinch lock plate at rack groove location (at two points).

e. Install spacer ring to lock plate as shown in the Figure at left.

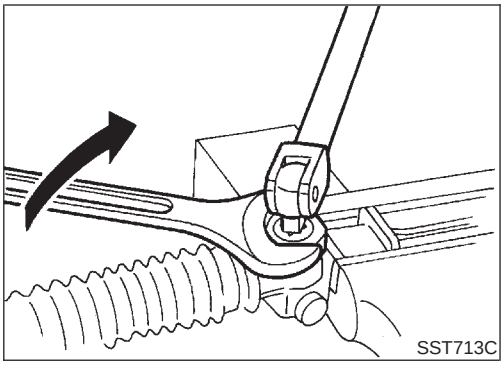
Be careful not to damage spacer ring during installation



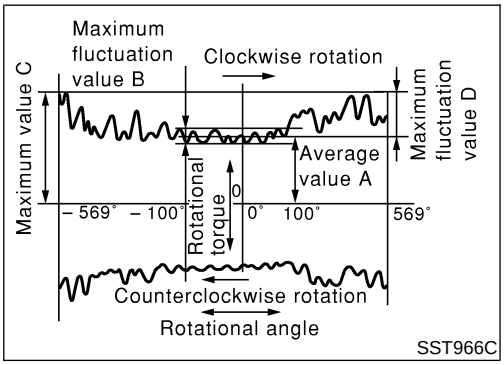
16. Measure pinion rotating torque within the range of 180° from neutral position.
Stop the gear at the point of maximum torque.

17. Loosen adjusting screw, then retighten it to 4.9 to 5.9 N·m (50 to 60 kg-cm, 43 to 52 in-lb).

18. Loosen adjusting screw by 60° to 80°.


SST713C

19. Prevent adjusting screw from turning, and tighten lock nut to specified torque.



SST966C

20. Measure the rotational torque of the pinion gear to confirm that it is within the specified torque range. If it is out of the specified range, readjust it. If it is still out of specifications after readjustment, replace the power steering gear.

Pinion rotational torque: Near neutral position (within ±100°)

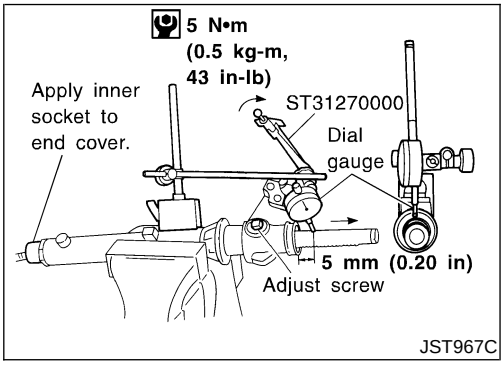
Average value A: 0.8 - 1.2 N·m (0.08 - 0.13 kg-m, 7 - 11 in-lb)

Maximum fluctuation value B: Less than 0.4 N·m (0.04 kg-m, 3 in-lb)

Other than the above

Maximum value C: Less than 1.9 N·m (0.19 kg-m, 16 in-lb)

Maximum fluctuation value D: Less than 0.6 N·m (0.06 kg-m, 5 in-lb)



JST967C

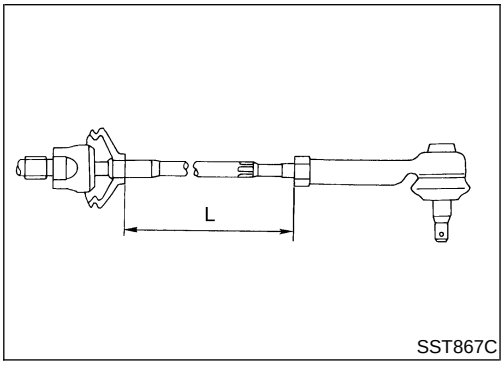
21. Rotate the pinion counterclockwise as far as it will go.
22. Set the dial gauge as shown in the figure at left. Rotate the pinion to 5 N·m (0.5 kg-m, 43 in-lb), then measure the amount of rack vertical movement using the dial gauge. Make sure that the measured value is within the specifications. If it is out of specifications, readjust it. If it is still out of specifications after readjustment, replace the power steering gear.

Measurement position (Rack radial direction):

Adjusting screw axial direction

Specified value (Rack radial direction):

Max. 0.13 mm (0.0051 in)

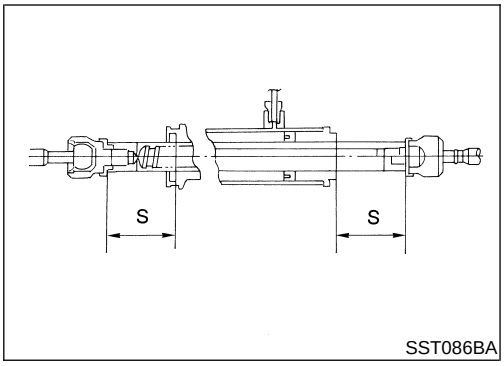


SST867C

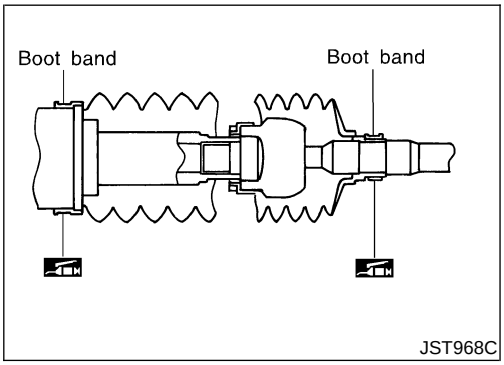
23. Tighten outer socket lock nut.

Tie-rod length "L":

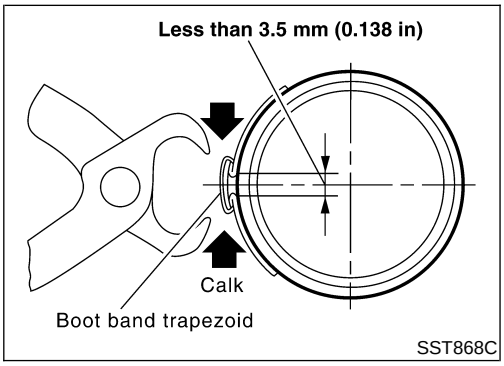
Refer to SDS, ST-30.



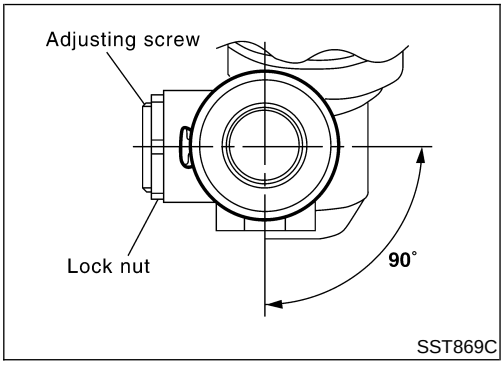
24. Measure rack stroke.
    Rack stroke "S":
    Refer to SDS, ST-30.



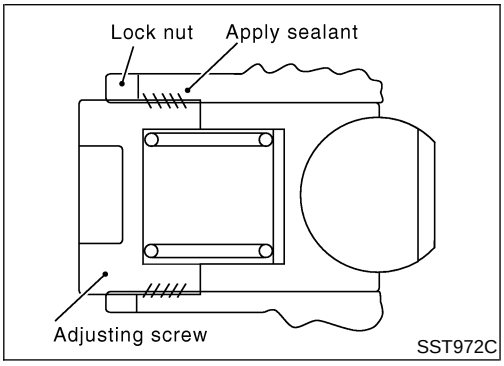
25. Before assembling the boot, temporarily install the boot band to the larger-diameter side.
26. Apply grease to the larger- and smaller- diameter sides.
27. Fit the boot smaller-diameter side into the boot-installation groove on the inner socket. Then use a boot clamp to attach the smaller-diameter side to the inner socket.
28. Install the boot band to the larger-diameter side.



29. Install boot bands.
- Securely install boot band to boot groove and clinch the root section of the trapezoidal area.
- Make sure that there is a clearance of 3.5 mm (0.138 in) or less at the clinched section of the boot band. Refer to the Figure at left.



- After installing gear in vehicle, make sure that the clinched section of boot band is positioned toward the rear of vehicle (to prevent interference with adjacent parts).



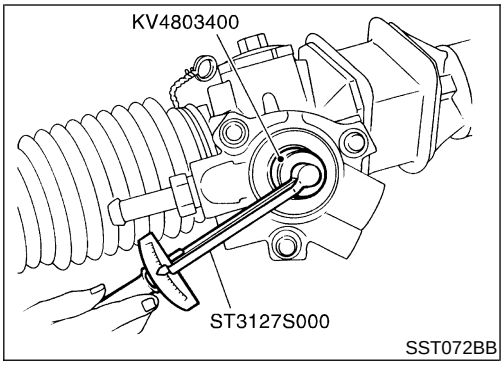
Adjustment

NMST0026

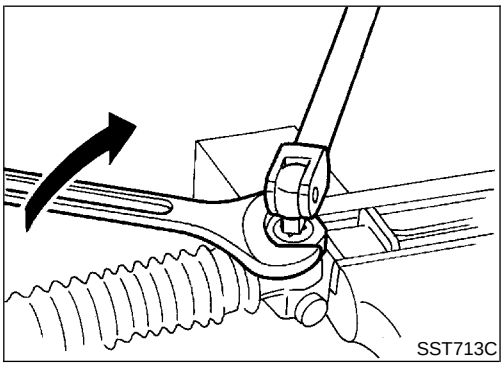
Adjust pinion rotating torque as follows:

1. Set rack to the neutral position without fluid in the gear.
2. Coat the adjusting screw with locking sealant and screw it in.
3. Lightly tighten lock nut.
4. Tighten adjusting screw to a torque of 4.9 to 5.9 N·m (50 to 60 kg-cm, 43 to 52 in-lb).
5. Loosen adjusting screw, then retighten it to 0.2 N·m (2 kg-cm, 1.7 in-lb).

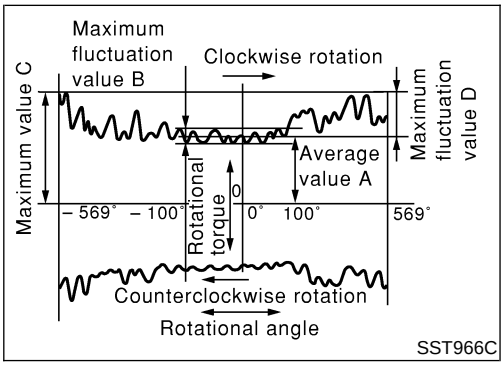
Adjustment (Cont'd)



6. Move rack over its entire stroke several times.
7. Measure pinion rotating torque within the range of 180° from neutral position.
   Stop the gear at the point of maximum torque.
8. Loosen adjusting screw, then retighten it to 4.9 N·m (50 kg-cm, 43 in-lb).
9. Loosen adjusting screw by 60° to 80°.



10. Prevent adjusting screw from turning, and tighten lock nut to specified torque.



11. Measure the rotational torque of the pinion gear to confirm that it is within the specified torque range.

Pinion rotational torque: Near neutral position (within ±100°)

Average value A: 0.8 - 1.2 N·m (0.08 - 0.13 kg-m, 7 - 11 in-lb)

Maximum fluctuation value B: Less than 0.4 N·m (0.04 kg-m, 3 in-lb)

Other than the above

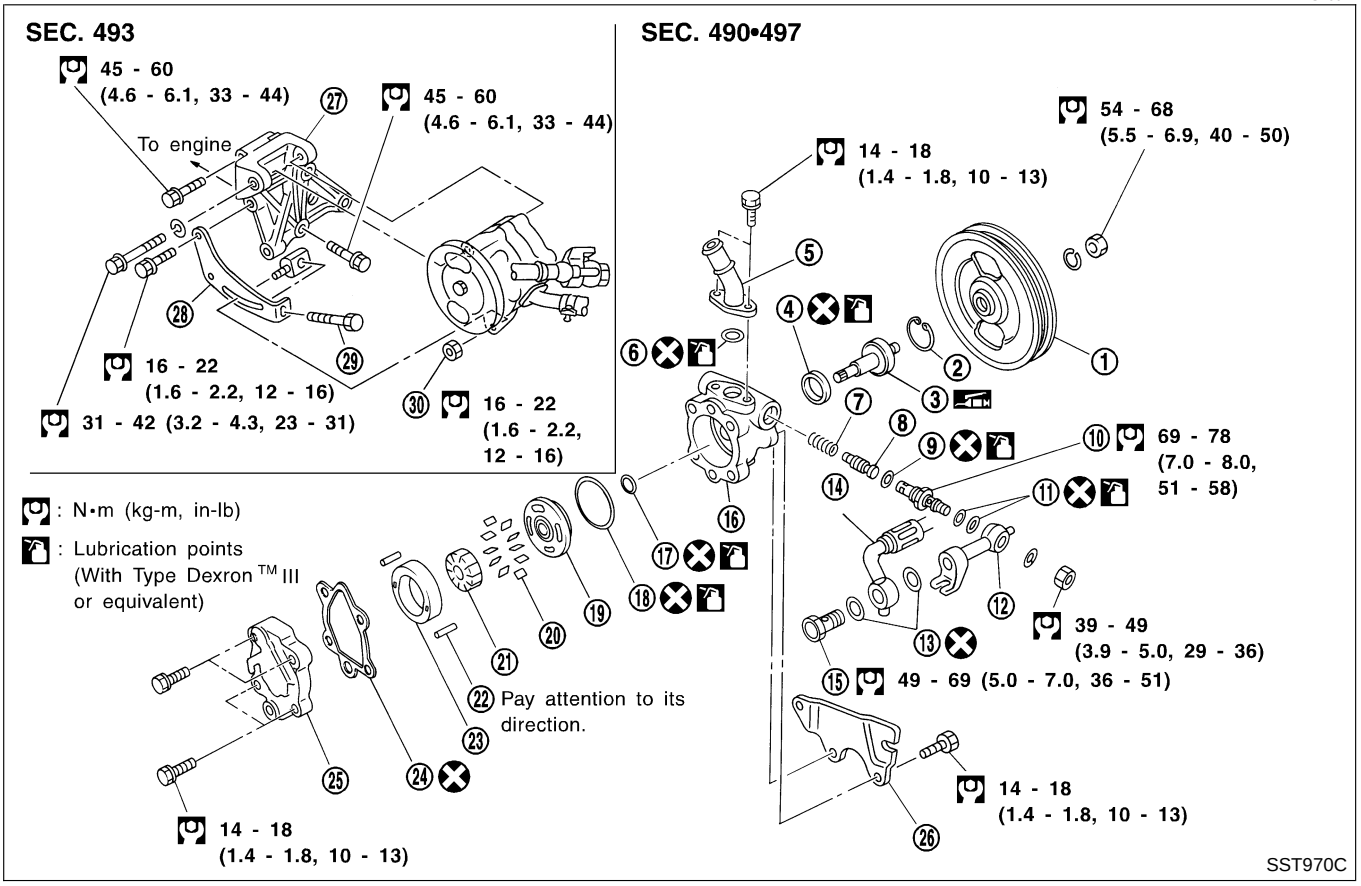
Maximum value C: Less than 1.9 N·m (0.19 kg-m, 16 in-lb)

Maximum fluctuation value D: Less than 0.6 N·m (0.06 kg-m, 5 in-lb)

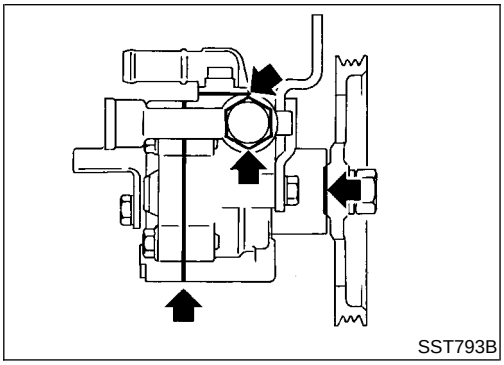
- If rack sliding force is not within specification, readjust by repeating adjustment procedure from the beginning.
- If rack sliding force is still out of specification after readjustment, gear assembly needs to be replaced.

Components

NMST0027



1. Pulley
2. Snap ring
3. Drive shaft assembly
4. Oil seal
5. Suction pipe
6. O-ring
7. Spring
8. Flow control valve
9. O-ring
10. Connector bolt
11. O-ring
12. Joint
13. Washer
14. Hose
15. Eye bolt
16. Casing
17. O-ring
18. O-ring
19. Front side plate
20. Vane
21. Rotor
22. Pin
23. Cam ring
24. Gasket
25. Rear cover
26. Front bracket
27. Power steering pump bracket
28. Adjusting bar
29. Adjusting bolt
30. Adjusting bolt lock nut



Pre-disassembly Inspection

NMST0028

Disassemble the power steering oil pump only if the following items are found.

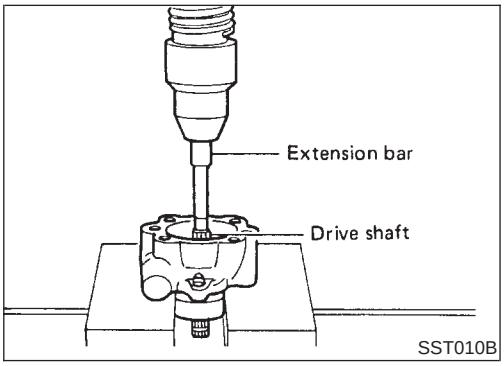
- Oil leak from any point shown in the figure
- Deformed or damaged pulley
- Poor performance

Disassembly

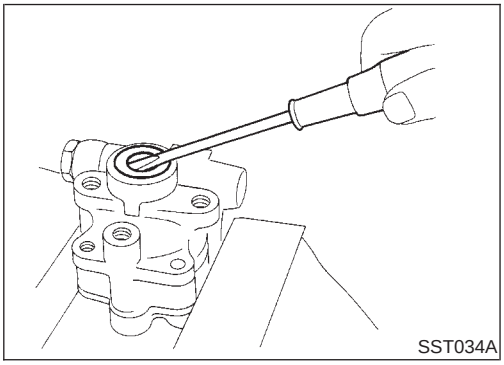
NMST0029

CAUTION:

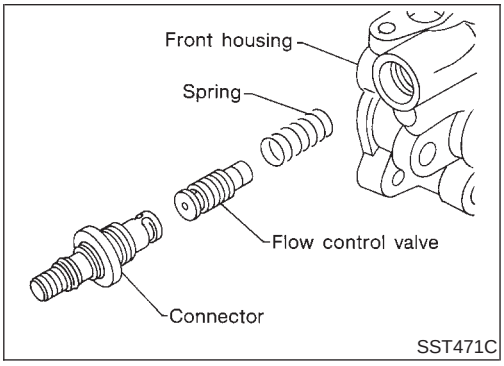
- **Parts which can be disassembled are strictly limited. Never disassemble parts other than those specified.**
- **Disassemble in as clean a place as possible.**
- **Clean your hands before disassembly.**
- **Do not use rags; use nylon cloths or paper towels.**
- **Follow the procedures and cautions in the Service Manual.**
- **When disassembling and reassembling, do not let foreign matter enter or contact the parts.**



- Remove snap ring, then draw drive shaft out.
  Be careful not to drop drive shaft.



- Remove oil seal.
  Be careful not to damage front housing.

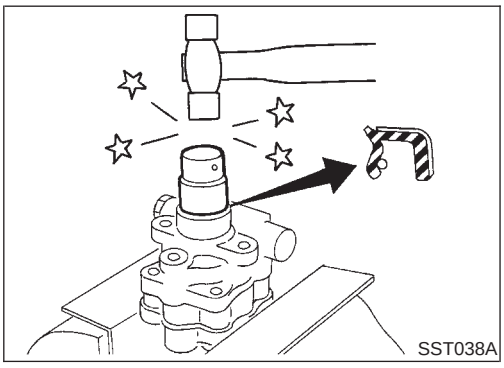


- Remove connector and flow control valve with spring.
  Be careful not to drop flow control valve.
  Do not disassemble flow control valve.

Inspection

NMST0030

- If pulley is cracked or deformed, replace it.
- If an oil leak is found around pulley shaft oil seal, replace the seal.
- If serration on pulley or pulley shaft is deformed or worn, replace it.

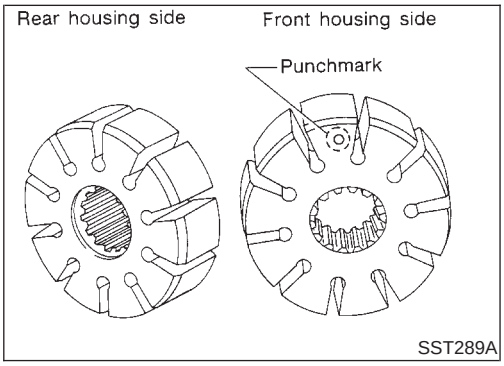

SST038A

Assembly

NMST0031

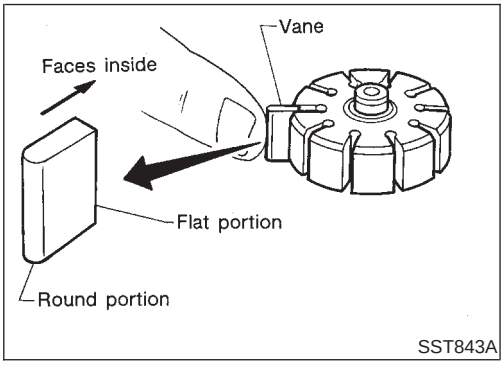
Assemble oil pump, noting the following instructions.

- Make sure O-rings and oil seal are properly installed.
- Always install new O-rings and oil seal.
- Be careful of oil seal direction.
- Cam ring, rotor and vanes must be replaced as a set if necessary.
- Coat each part with Type Dexron™ III or equivalent when assembling.



SST289A

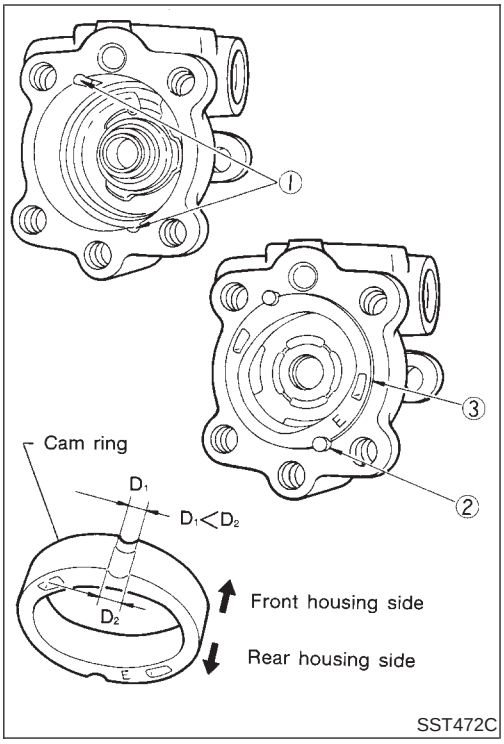
- Pay attention to the direction of rotor.



SST843A

- When assembling vanes to rotor, rounded surfaces of vanes must face cam ring side.

Assembly (Cont'd)



- Insert pin 2 into pin groove 1 of front housing and front side plate. Then install cam ring 3 as shown at left.

  Cam ring:

  D_1 is less than D_2.

General Specifications

NMST0032

Steering model	Power steering
Steering gear type	PR24AD
Steering overall gear ratio	17.2
Turns of steering wheel (Lock to lock)	3.1
Steering column type	Collapsible, tilt

Steering Wheel

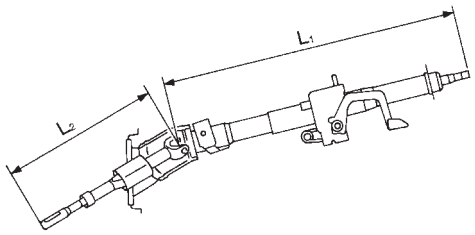
NMST0033

Steering wheel axial play mm (in)	0 (0)
Steering wheel play mm (in)	35 (1.38) or less
Movement of gear housing mm (in)	±2 (±0.08) or less

Steering Column

NMST0034

Applied model	All
Steering column length "L_1" mm (in)	610 (24.02)
Steering column length "L_2" mm (in)	341.0 (13.39)



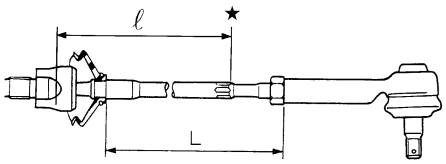
SST493C

Steering Gear and Linkage

NMST0035

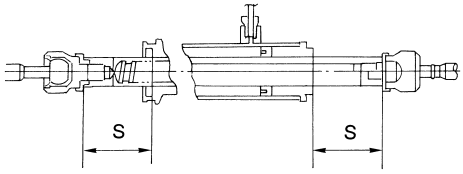
Applied model		All
Steering gear type		PR24AD
Tie-rod outer ball joint	Swinging force at cotter pin hole: “A” N (kg, lb)	6.47 - 363 (0.66 - 37, 1.46 - 82)
	Rotating torque: “B” N·m (kg-cm, in-lb)	0.29 - 2.94 (3.0 - 30.0, 2.6 - 26.0)
	Axial end play: “C” mm (in)	0.2 (0.008) or less
Tie-rod inner ball joint	Swinging force*: “A” N (kg, lb)	7.16 - 57.17 (0.73 - 5.83, 1.61 - 12.86)
	Axial end play: “C” mm (in)	0.2 (0.004) or less
Tie-rod standard length “L” mm (in)		154.2 (6.07)

*: Measuring point [ℓ: 137 mm (6.77 in)]



SST974C

Retainer adjustment Adjusting screw	Initial tightening torque N·m (kg-cm, in-lb)	4.9 - 5.9 (50 - 60, 43 - 52)
	Retightening torque after loosening N·m (kg-cm, in-lb)	0.2 (2, 1.7)
	Tightening torque after gear has settled N·m (kg-cm, in-lb)	4.9 - 5.9 (50 - 60, 43 - 52)
	Returning angle degree	60° - 80°
Steering gear type		PR24AD
Rack stroke “S” mm (in)		67 (2.64)



SST086BA

Power Steering

NMST0036

Applied model			All
Steering gear type			PR24AD
Rack sliding force N (kg, lb) Under normal operating oil pressure	Range within ±11.5 mm (±0.453 in) from the neutral position at rack speed of 3.5 mm (0.138 in)/s	Average force	186 - 245 (19 - 25, 42 - 55)
		Maximum force deviation	98 (10, 22)
	Except for the above range	Maximum sliding force	294 (30, 66)
		Maximum force deviation	147 (15, 33)
Steering wheel turning force (Measured at one full turn from the neutral position) N (kg, lb)			39 (4, 9) or less
Fluid capacity (Approximate) ℓ (US qt, Imp qt)			1.0 (1-1/8, 7/8)
Oil pump maximum pressure kPa (kg/cm^2, psi)			8,630 - 9,219 (88 - 94, 1,251 - 1,337)

NOTES