STEERING SYSTEM

SECTION **ST**

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Supplemental Restraint System (SRS) “AIR BAG” and “SEAT BELT PRE-TENSIONER”

NJST0044

The Supplemental Restraint System such as “AIR BAG” and “SEAT BELT PRE-TENSIONER” 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 N16 is as follows (The composition varies according to the destination and optional equipment.):

- For a frontal collision
  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), front seat belt pre-tensioners, a diagnosis sensor unit, warning lamp, wiring harness and spiral cable.
- For a side collision
  The Supplemental Restraint System consists of front side air bag module (located in the outer side of front seat), side air bag (satellite) sensor, diagnosis sensor unit (one of components of air bags for a frontal collision), wiring harness, warning lamp (one of components of air bags for a frontal collision).

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 (except “SEAT BELT PRE-TENSIONER” connector) can be identified by yellow harness connector.**

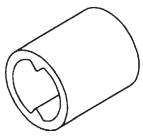
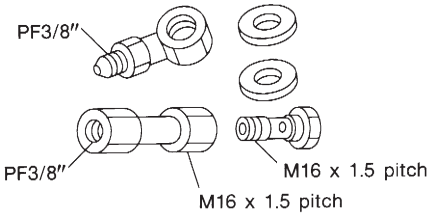
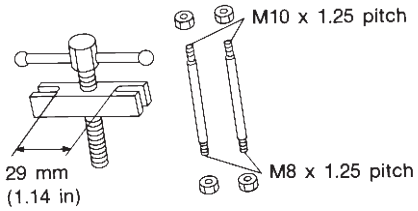
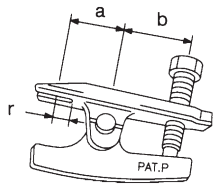
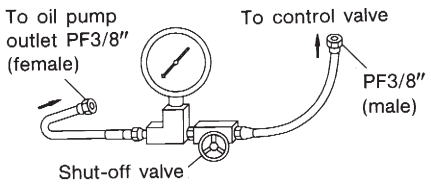
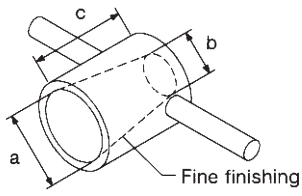
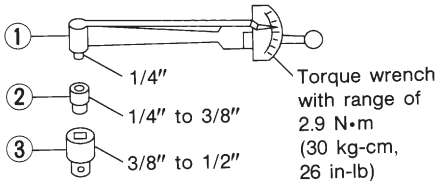
Precautions for Steering System

NJST0003

- **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.**
  ***: DEXRON™III or equivalent. Refer to MA-20, “Fluids and Lubricants”.**

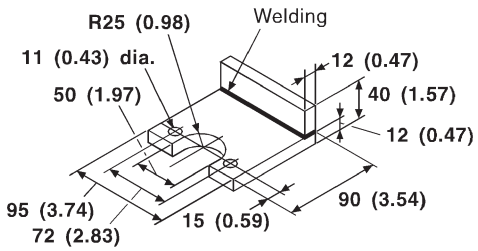
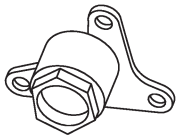
Special Service Tools

NJST0004

Tool number Tool name	Description	
KV48100700 Torque adapter	 NT169	Measuring pinion 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

NJST0005

Tool number	Description	
Oil pump attachment	 NT774	Disassembling and assembling oil pump Unit: mm (in)
KV48105210 Sprocket holder	 NT809	Removing and Installing power steering oil pump

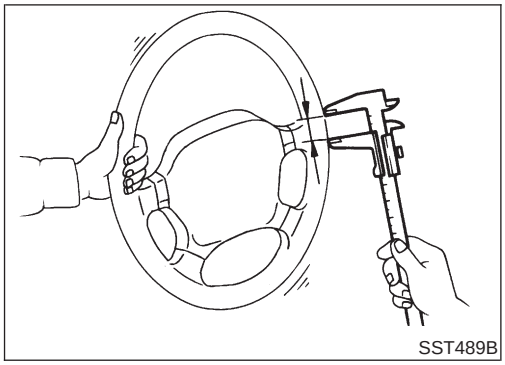
NVH Troubleshooting Chart

NJST0006S01

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	Refer to EM-15.	—	ST-10	ST-6	ST-14	ST-13	ST-15	AX-3	AX-3	SU-4	SU-4	SU-4	BR-6
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

NJST0007

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

  Steering wheel play:

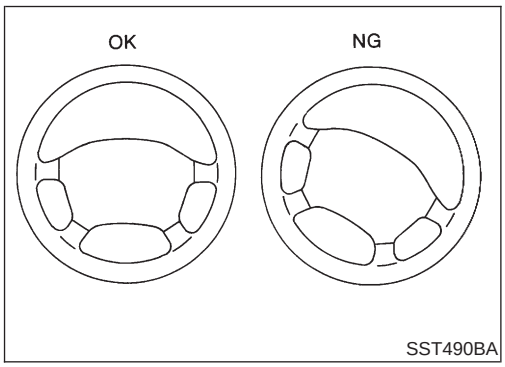
  35 mm (1.38 in) or less

- 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

NJST0008

PRE-CHECKING

NJST0008S01

- Make sure that wheel alignment is correct.

  Wheel alignment:

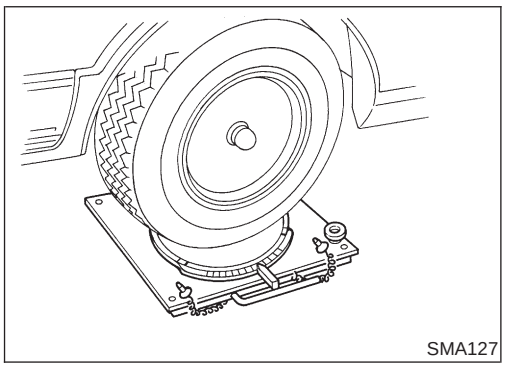
  Refer to SU-14, SDS.

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

CHECKING

NJST0008S02

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

NJST0009

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

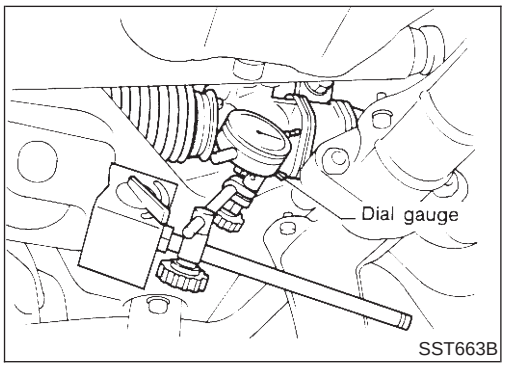
   Turning angle of full turns:

   Refer to SU-14, SDS.

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

   Rack stroke “S”:

   Refer to SDS, ST-30.



SST663B

Checking Gear Housing Movement

NJST0010

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:

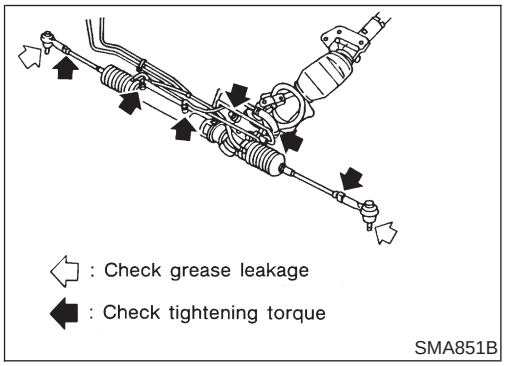
  ±2 mm (±0.08 in) or less

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

Checking and Adjusting Drive Belts

NJST0011

Refer to EM-15, “Checking Drive Belts”.



Checking Steering Gear and Linkage

NJST0037

STEERING GEAR

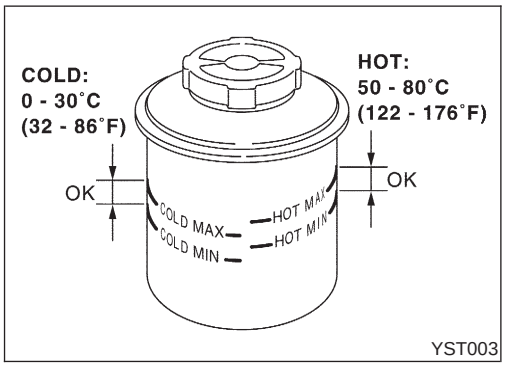
NJST0037S01

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

STEERING LINKAGE

NJST0037S02

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



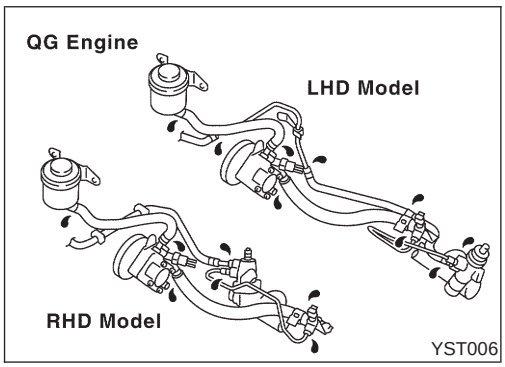
Checking Fluid Level

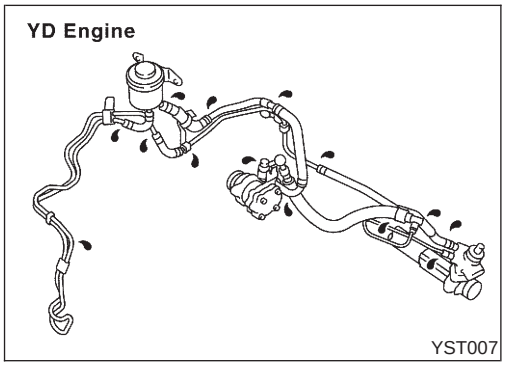
NJST0012

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 DEXRON™III or equivalent. Refer to MA-20, “Fluids and Lubricants”.**





Checking Fluid Leakage

NJST0013

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 60 to 80°C (140 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

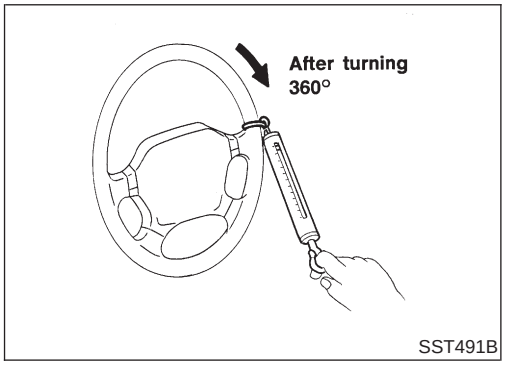
NJST0014

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.

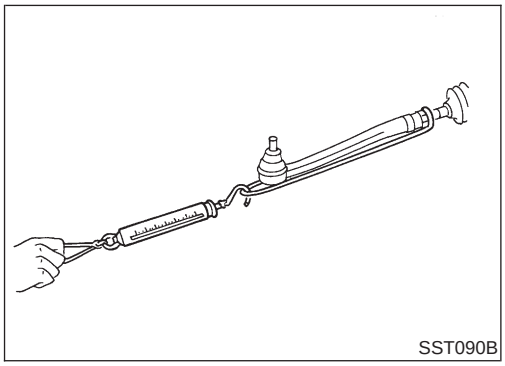
- Incomplete air bleeding will cause the following to occur. When this happens, bleed air again.

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

NJST0015

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 60 to 80°C (140 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.

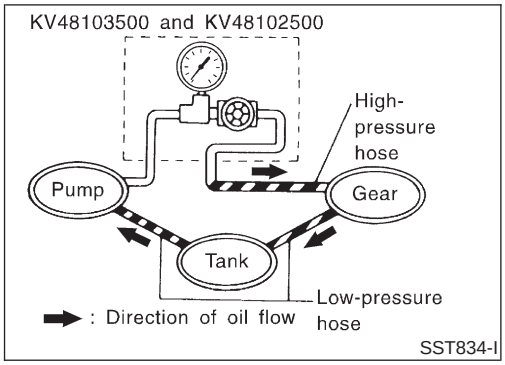
   Steering wheel turning force:
   39 N (4 kg, 9 lb) or less

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:
   132 - 308 N (13.5 - 31.4 kg, 30 - 69 lb)
   Maximum force deviation:
   176 N (17.9 kg, 39 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

NJST0016

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 60 to 80°C (140 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:

QG15, 18 engine

8,600 - 9,200 kPa (86.0 - 92.0 bar, 88.7 - 93.8 kg/cm^2, 1,247 - 1,334 psi)

YD22 engine

8,800 - 9,400 kPa (88.0 - 94.0 bar, 88.7 - 95.8 kg/cm^2, 1,261 - 1,362 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:

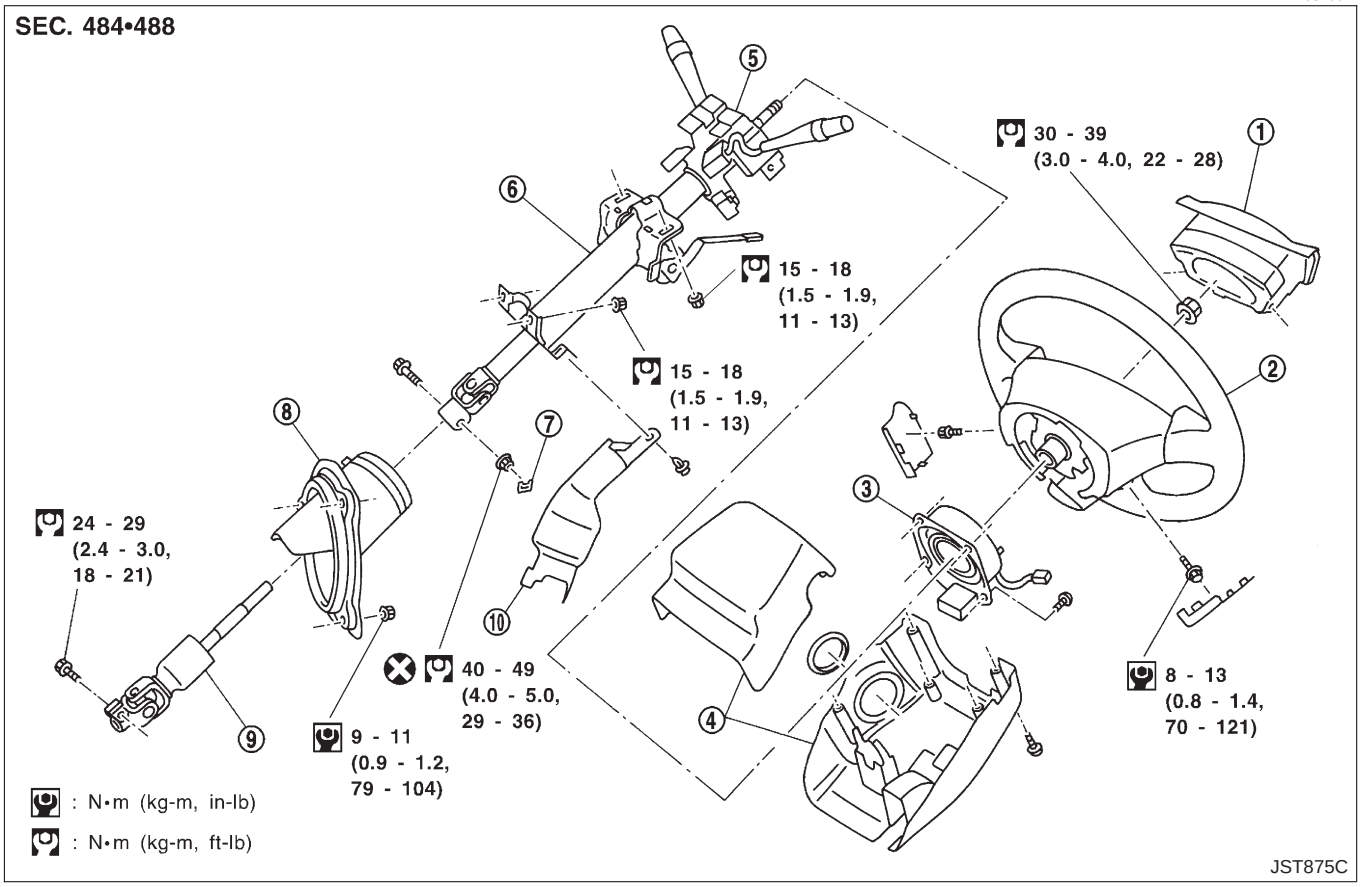
Do not close shut-off valve for more than 15 seconds.

- 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

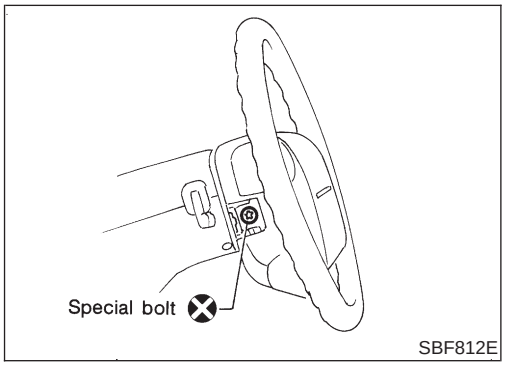
NJST0017



1. Air bag module
2. Steering wheel
3. Spiral cable
4. Column cover
5. Combination switch
6. Steering column assembly
7. Clip
8. Hole cover
9. Lower joint
10. Lower cover

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.**



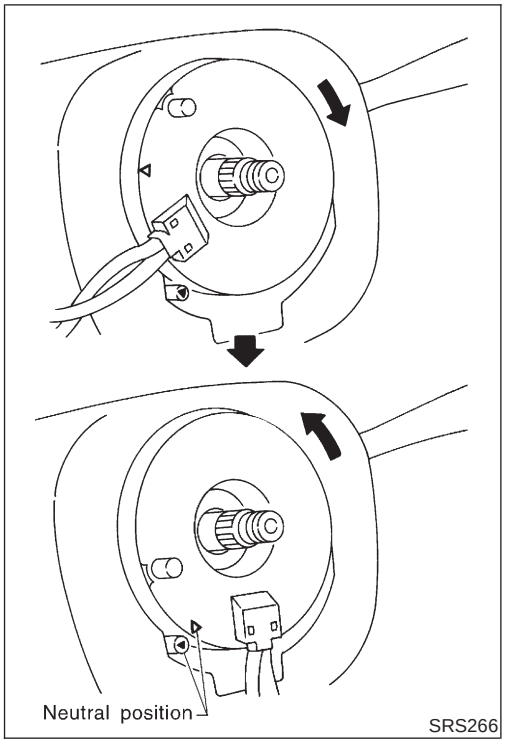
Removal and Installation

NJST0018

STEERING WHEEL

NJST0018S01

- Remove air bag module and spiral cable.
  Refer to RS-29, "Removal — Air Bag Module and Spiral Cable".



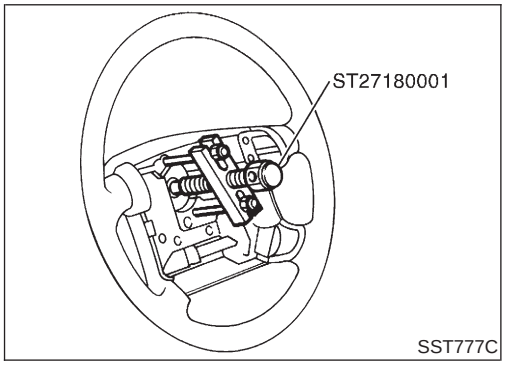
- Align spiral cable correctly when installing steering wheel.

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:

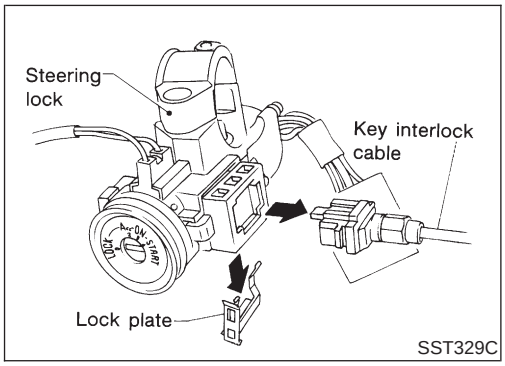
The spiral cable may snap due to steering operation if the cable is installed in an improper position.
Also, with the steering linkage disconnected, the cable may snap by turning the steering wheel beyond the limited number of turns. (The spiral cable can be turned up to 2.5 turns from the neutral position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



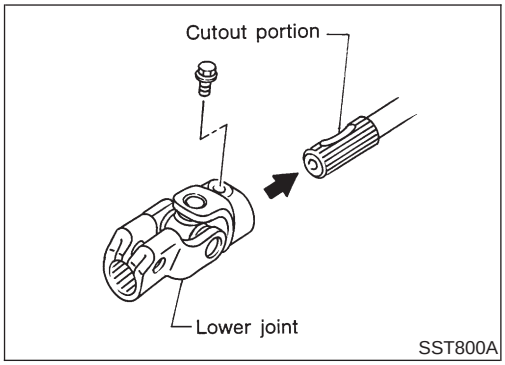
- Remove steering wheel with Tool.

STEERING COLUMN

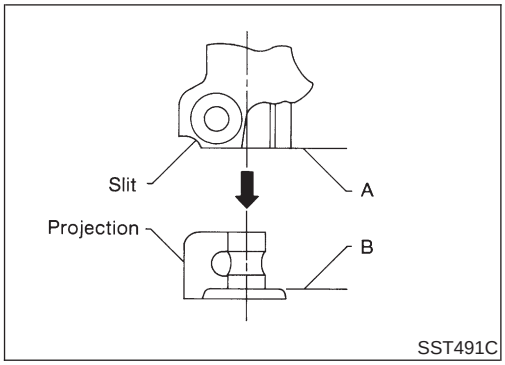
NJST0018S02



- Remove key interlock cable (A/T models).



- 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, be sure tightening bolt faces cutout portion.



- Align slit of lower joint with projection on dust cover. Insert joint until surface A contacts surface B.

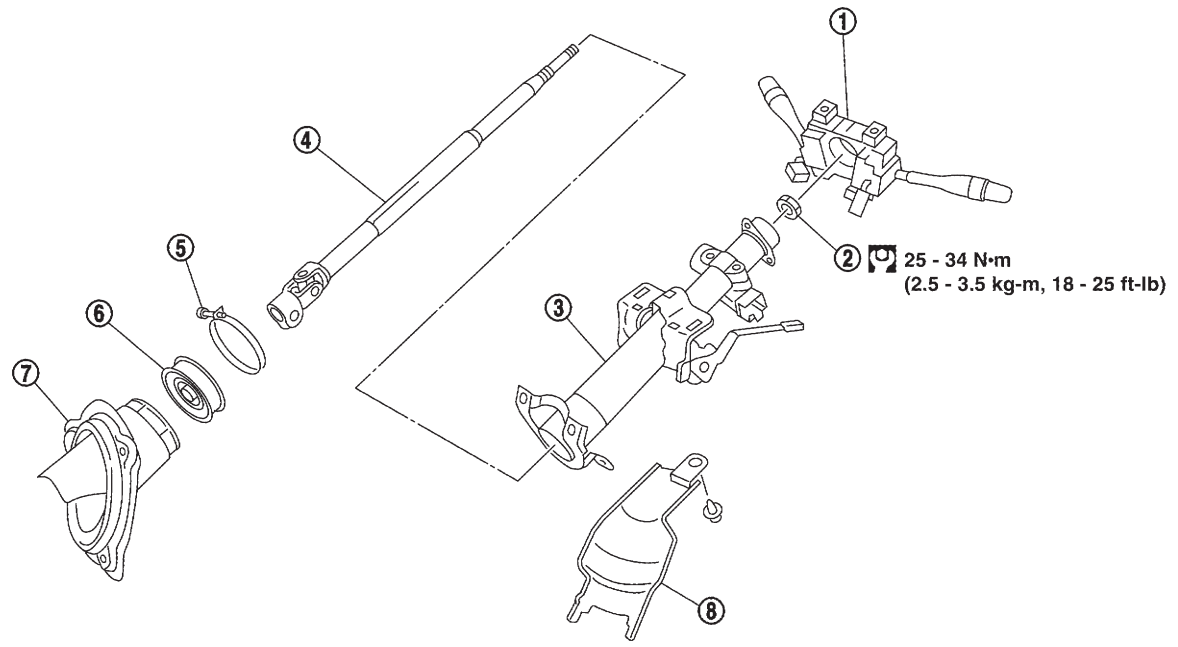
CAUTION:

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.

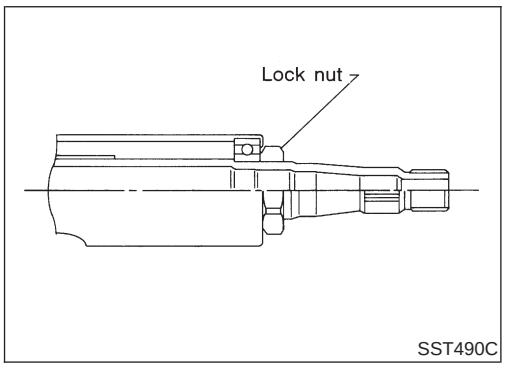
Disassembly and Assembly

=NJST0019

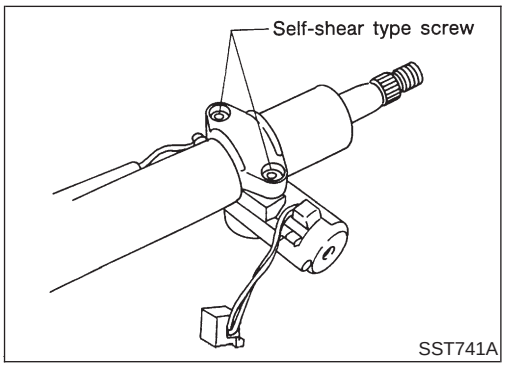
SEC. 488



1. Combination switch
2. Lock nut
3. Jacket tube assembly
4. Column shaft assembly
5. Clip
6. Lower seal cover
7. Hole cover
8. Steering column lower cover

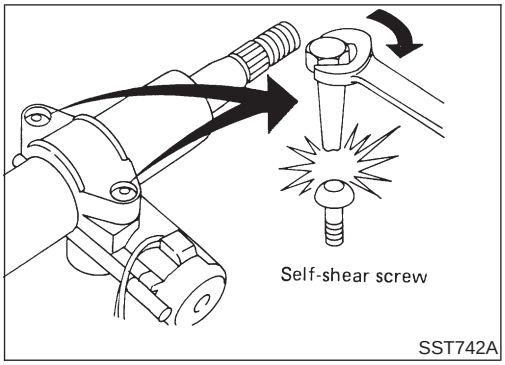


- When disassembling and assembling, unlock steering lock with key.
- Remove combination switch.
- Install lock nut on steering column shaft and tighten the nut.

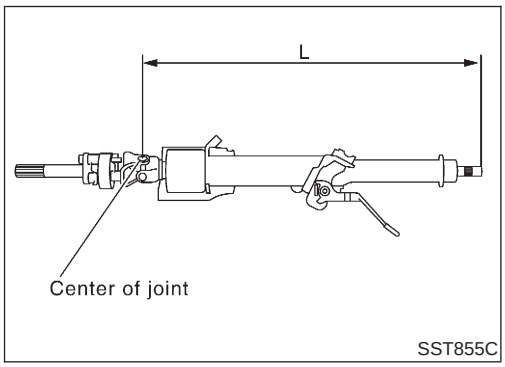


- Steering lock

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



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



Inspection

NJST0020

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

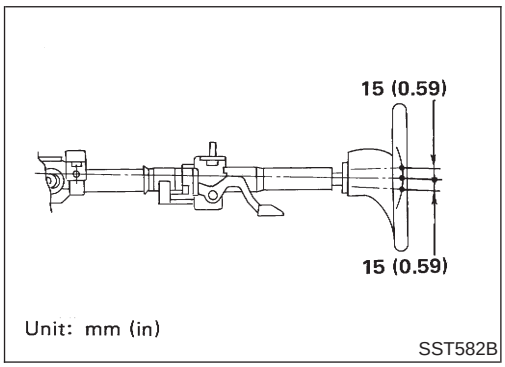
a) Check column bearings for damage or unevenness. Lubricate with recommended multi-purpose grease or replace steering column as an assembly, if necessary.

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

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

Steering column length "L":
Refer to SDS, ST-29.

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



TILT MECHANISM

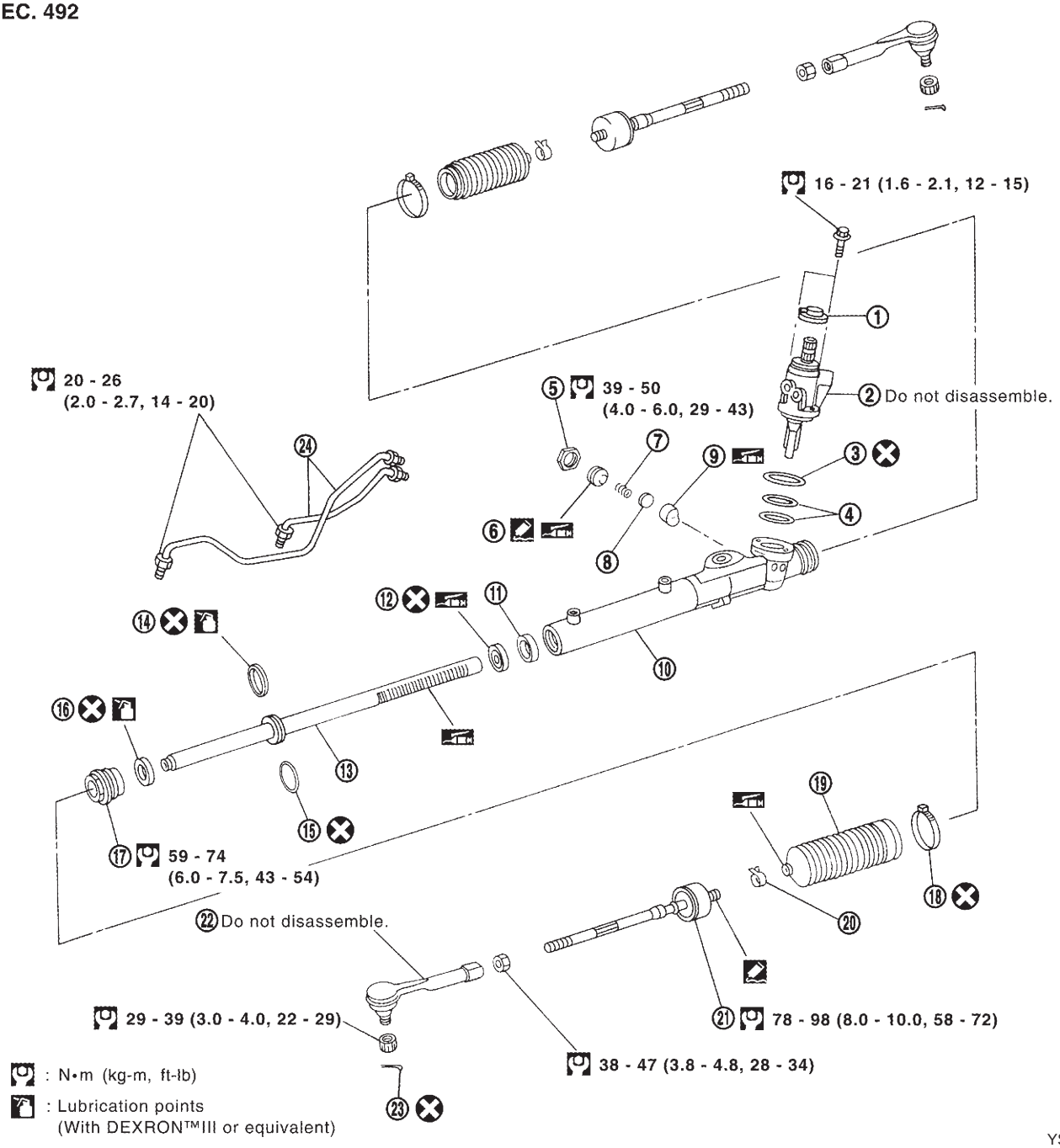
NJST0020S01

- After installing steering column, check tilt mechanism operation.

Components

NJST0021

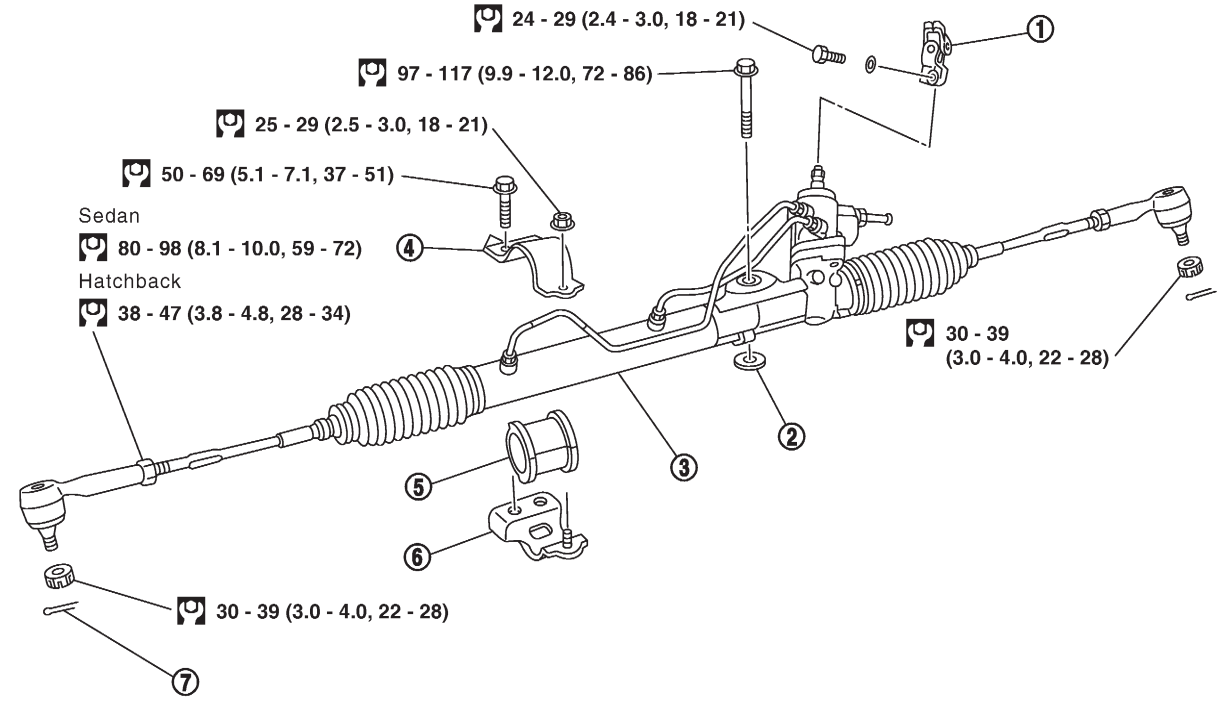
SEC. 492



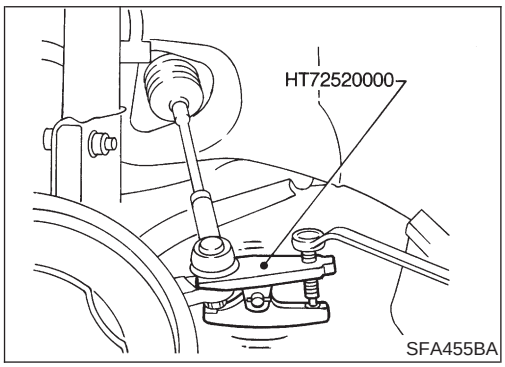
1. Rear cover cap
2. Gear sub-assembly
3. O-ring
4. Shim
5. Lock nut
6. Adjusting screw
7. Spring
8. Spring seat
9. Retainer
10. Gear housing
11. Center bushing
12. Rack oil seal
13. Rack assembly
14. Rack seal ring
15. O-ring
16. Rack oil seal
17. End cover assembly
18. Boot band
19. Dust boot
20. Boot band
21. Tie-rod inner socket
22. Tie-rod outer socket
23. Cotter pin
24. Gear cylinder tube

Removal and Installation

NJST0022



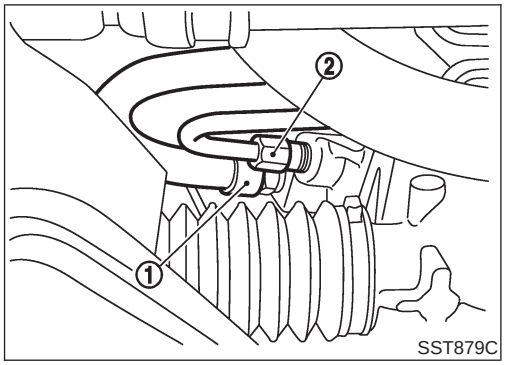
1. Lower joint
2. Washer
3. Gear and linkage assembly
4. Upper gear housing mounting bracket
5. Rack mounting insulator
6. Lower gear housing mounting bracket
7. Cotter pin



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 stabilizer fixing bolts. Refer to SU-11, “Removal and Installation”.
2. Disconnect lower joint.
3. Remove gear housing mounting bracket fixing bolts.
4. Remove steering gear assembly.



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

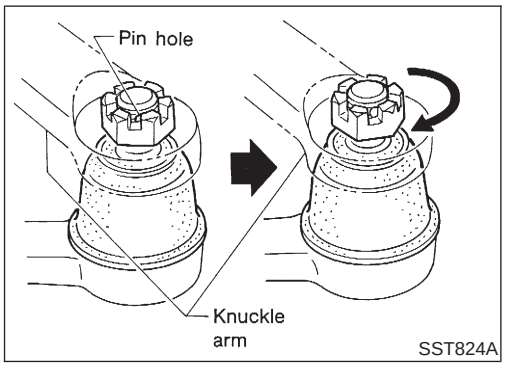
  Connector tightening torque:

  1 Low-pressure side

  27 - 39 N·m (2.8 - 4.0 kg-m, 20 - 29 ft-lb)

  2 High-pressure side

  15 - 25 N·m (1.5 - 2.5 kg-m, 11 - 18 ft-lb)
- The O-ring in low-pressure pipe connector is larger than that in high-pressure connector. Take care to install the proper O-ring.



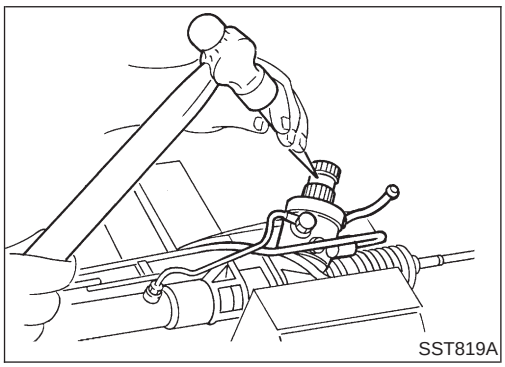
- Initially, tighten nut on tie-rod outer socket and knuckle arm to 29 to 39 N·m (3 to 4 kg-m, 22 to 29 ft-lb). Then tighten further to align nut groove with first pin hole so that cotter pin can be installed.

CAUTION:

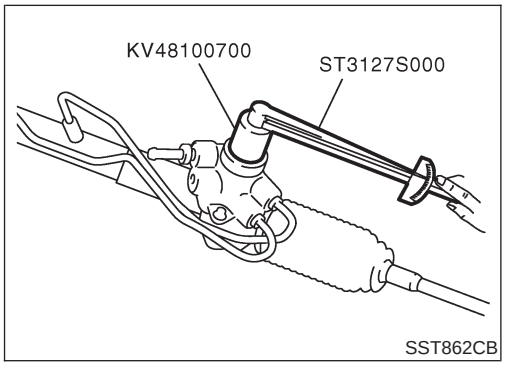
Tightening torque must not exceed 49 N·m (5 kg-m, 36 ft-lb).

NOTE:

Only the dust boot, tie-rod inner socket and tie-rod outer socket can be disassembled on models for Europe.



- 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.



Disassembly

NJST0023

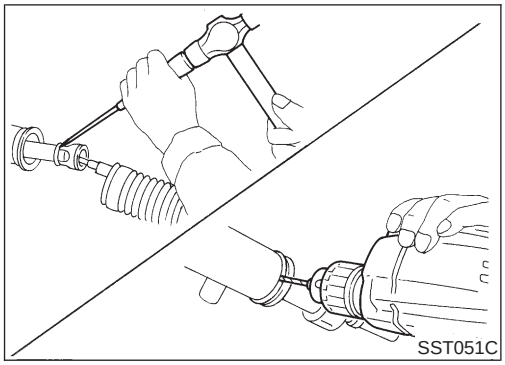
1. Prior to disassembling, measure pinion rotating torque. Record the pinion rotating torque as a reference.

- **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.**

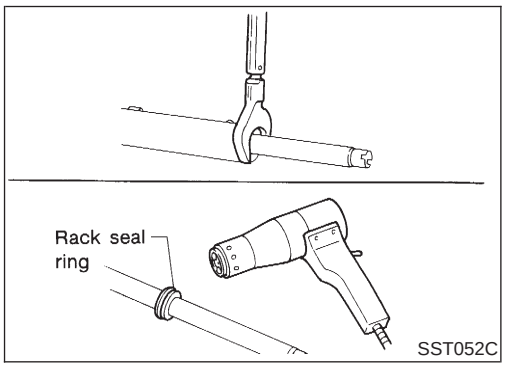
2. Remove gear sub-assembly, O-ring and shim.

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

Disassembly (Cont'd)



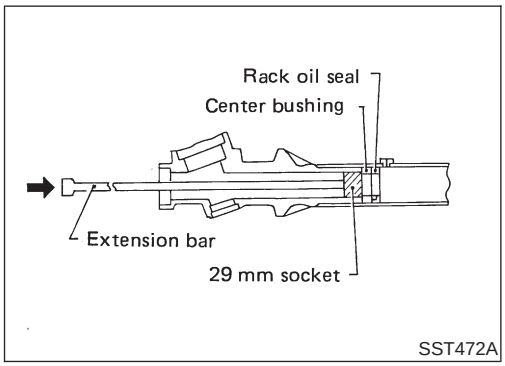
3. Remove tie-rod outer sockets and boots.
4. Loosen tie-rod inner socket by prying up staked portion, and remove socket and spacer.
5. Remove retainer.
6. Use a 2 to 2.5 mm (0.079 to 0.098 in) diameter drill to completely remove staked portion of gear housing end.



7. Remove end cover assembly with a suitable tool.
8. Draw out rack assembly.
9. Remove rack seal ring.

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

Be careful not to damage rack.



10. Remove center bushing and rack oil seal using tape wrapped socket and extension bar.

Do not scratch inner surfaces of pinion housing.

Inspection

NJST0024

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

BOOT

NJST0024S01

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

RACK

NJST0024S02

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

GEAR SUB-ASSEMBLY

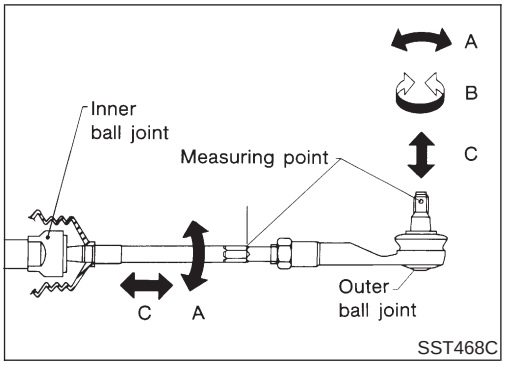
NJST0024S03

- 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

NJST0024S04

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



TIE-ROD OUTER AND INNER SOCKETS

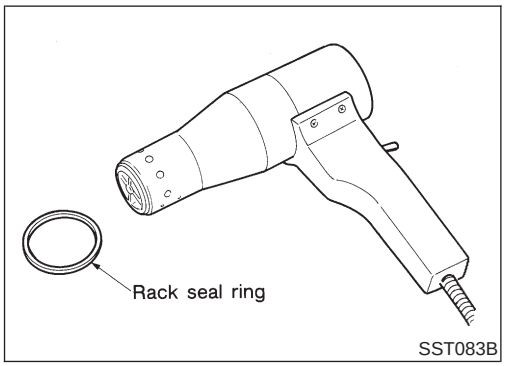
NJST0024S05

- 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.

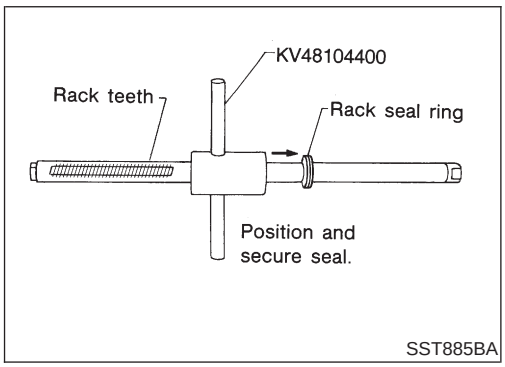
  Tie-rod outer and inner ball joints axial end play "C":
  Refer to SDS, ST-30.
- Check condition of dust cover. If cracked excessively, replace outer tie-rod.



Assembly

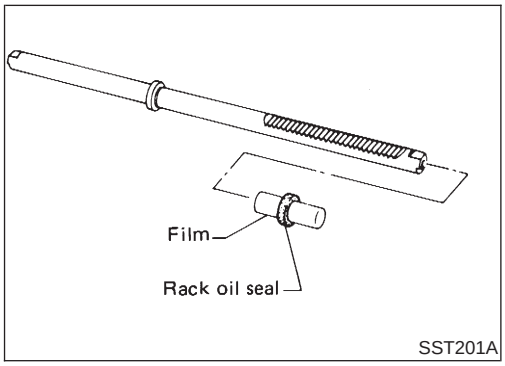
NJST0025

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



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

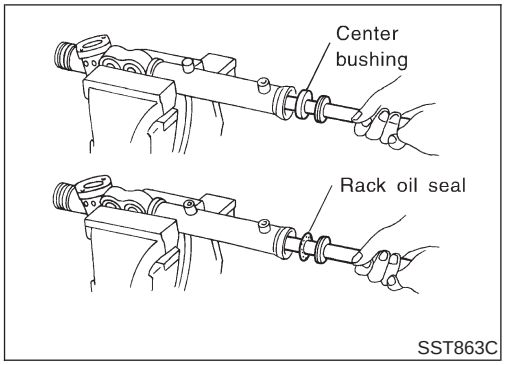
Always insert Tool from the rack gear side.



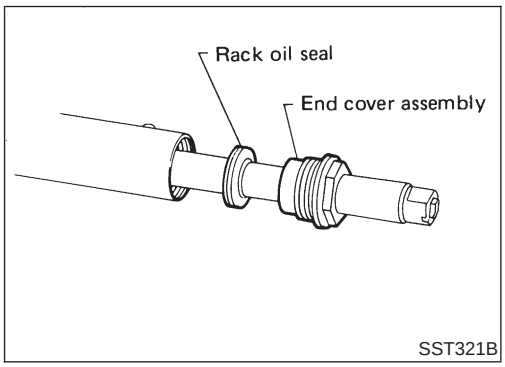
3. Insert new rack oil seal.

- **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.**

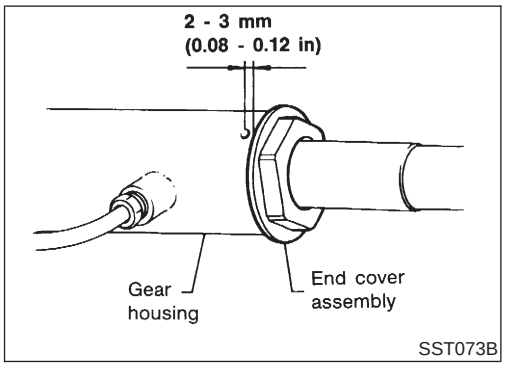
Assembly (Cont'd)



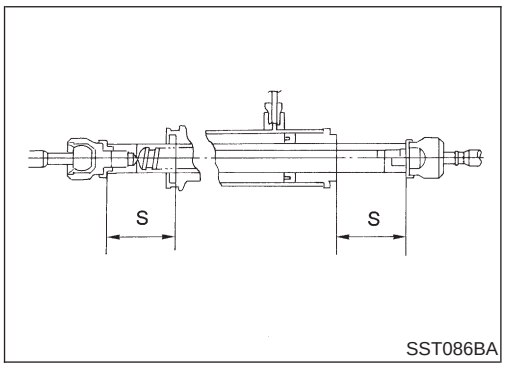
4. Install center bushing and rack oil seal with rack assembly.



5. Insert rack oil seal and end cover assembly to rack. Then tighten end cover assembly.

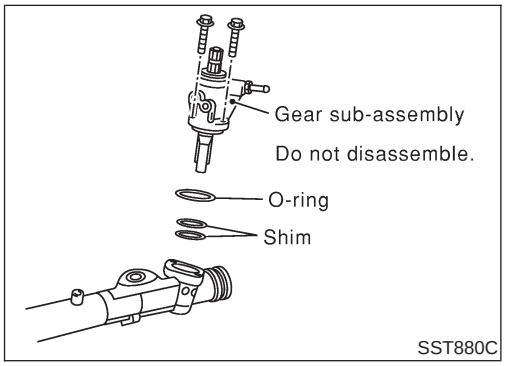


6. Fasten end cover assembly to gear housing by staking.



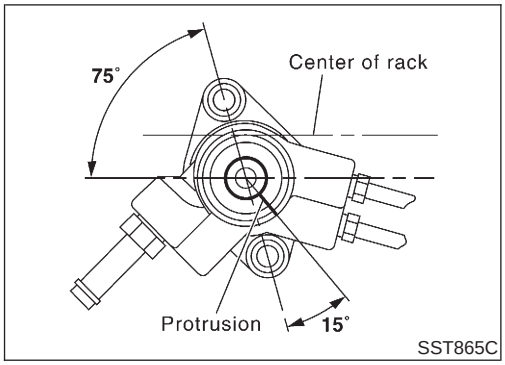
7. Set rack gear in neutral position.

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

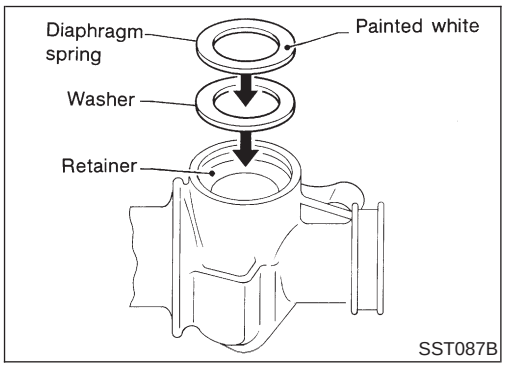


8. Install adjustment shims and O-rings to gear sub-assembly.
- Install the same number of adjustment shims as before, regardless of whether or not gear sub-assembly is replaced.
- Discard old O-rings; replace with new ones.

9. Tighten gear subassembly securing bolts to specified tightening torque.

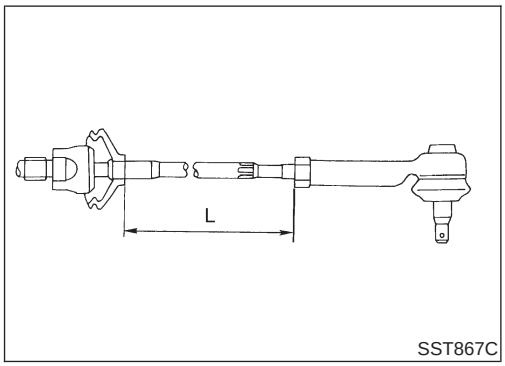


10. Ensure that the rack is centered. Install rear cover cap so that its protrusion is positioned as shown in figure.



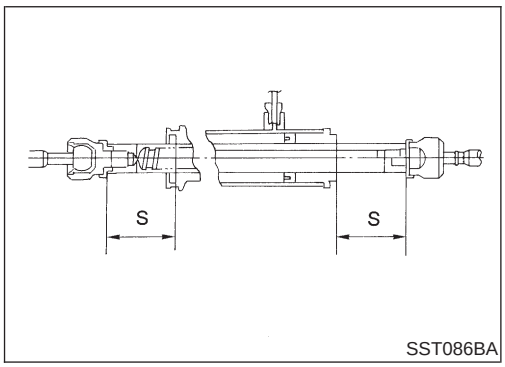
11. Install diaphragm spring into gear housing.
- Always install retainer, spring washer and diaphragm spring in that order.
- Make sure convex end (painted white) of diaphragm spring faces outward when installing.

12. Install spring seat retainer spring and adjusting screw temporarily.



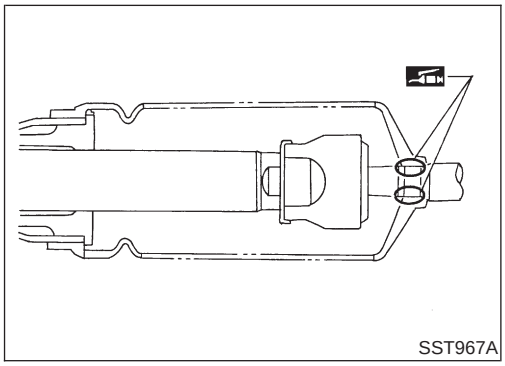
13. Tighten outer socket lock nut.

Tie-rod length "L":
Refer to SDS, ST-30.

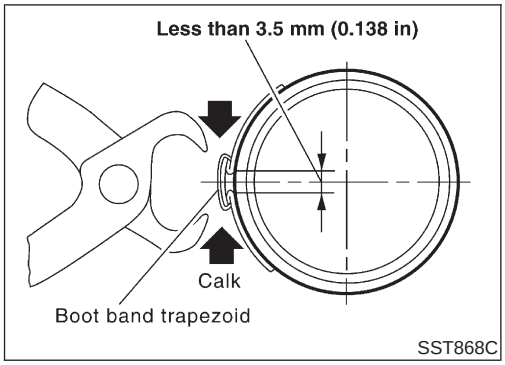


14. Measure rack stroke.

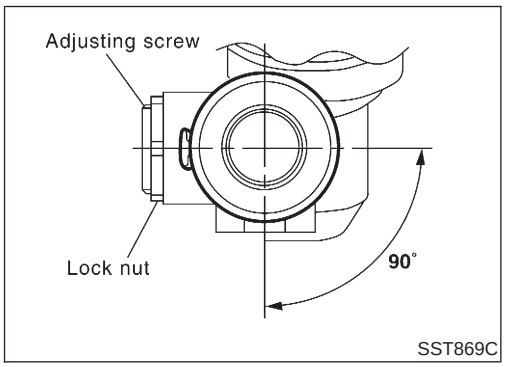
Rack stroke "S":
Refer to SDS, ST-30.



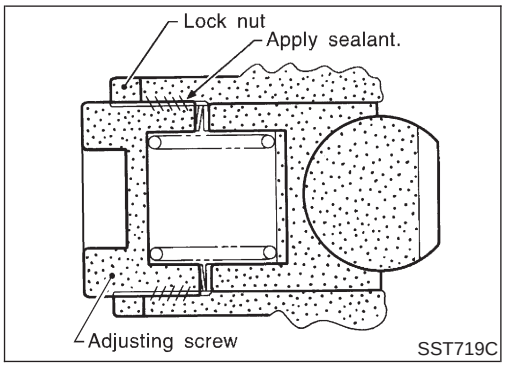
15. Before installing boot, coat the contact surfaces between boot and tie-rod with grease.



16. 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).

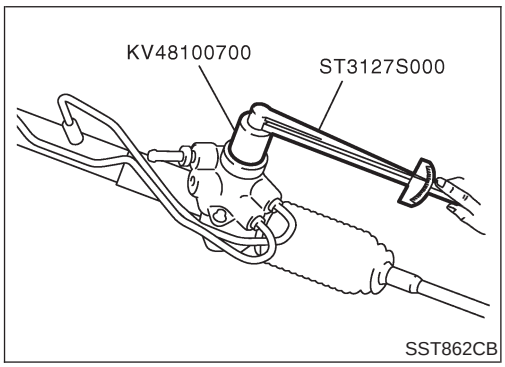


Adjustment

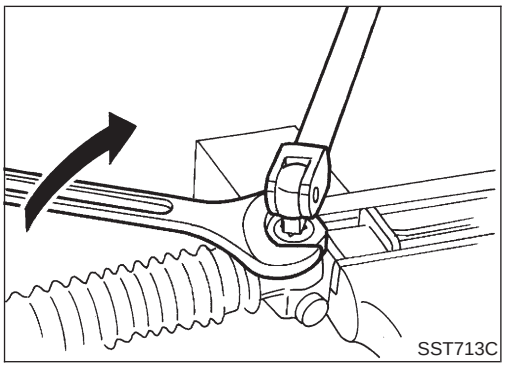
NJST0026

Adjust pinion rotating torque as follows:

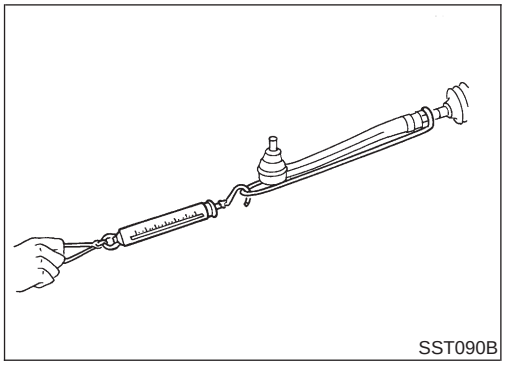
1. Set rack to the neutral position without fluid in the gear.
2. Coat the adjusting screw with locking sealant and screw it in.
3. Lightly tighten lock nut.
4. Tighten adjusting screw to a torque of 4.9 to 5.9 N·m (50 to 60 kg-cm, 43 to 52 in-lb).
5. Loosen adjusting screw, then retighten it to 0.2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



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 50° to 70°.



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


SST090B

11. Check rack sliding force on vehicle as follows:
a. Install steering gear onto vehicle, but do not connect tie-rod to knuckle arm.
b. Connect all piping and fill with steering fluid.
c. Start engine and bleed air completely.
d. Disconnect steering column lower joint from the gear.
e. Keep engine at idle and make sure steering fluid has reached normal operating temperature.
f. 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:

132 - 308 N (13.5 - 31.4 kg, 30 - 69 lb)

Maximum force deviation:

176 N (17.9 kg, 39 lb)

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

Component Description

NJST0045

The power steering pump can not be disassembled on QG engine models.

Tightening torque:

Bracket bolt: 14 - 18 N·m (1.36 - 1.84 kg-m, 10 - 13 ft-lb)

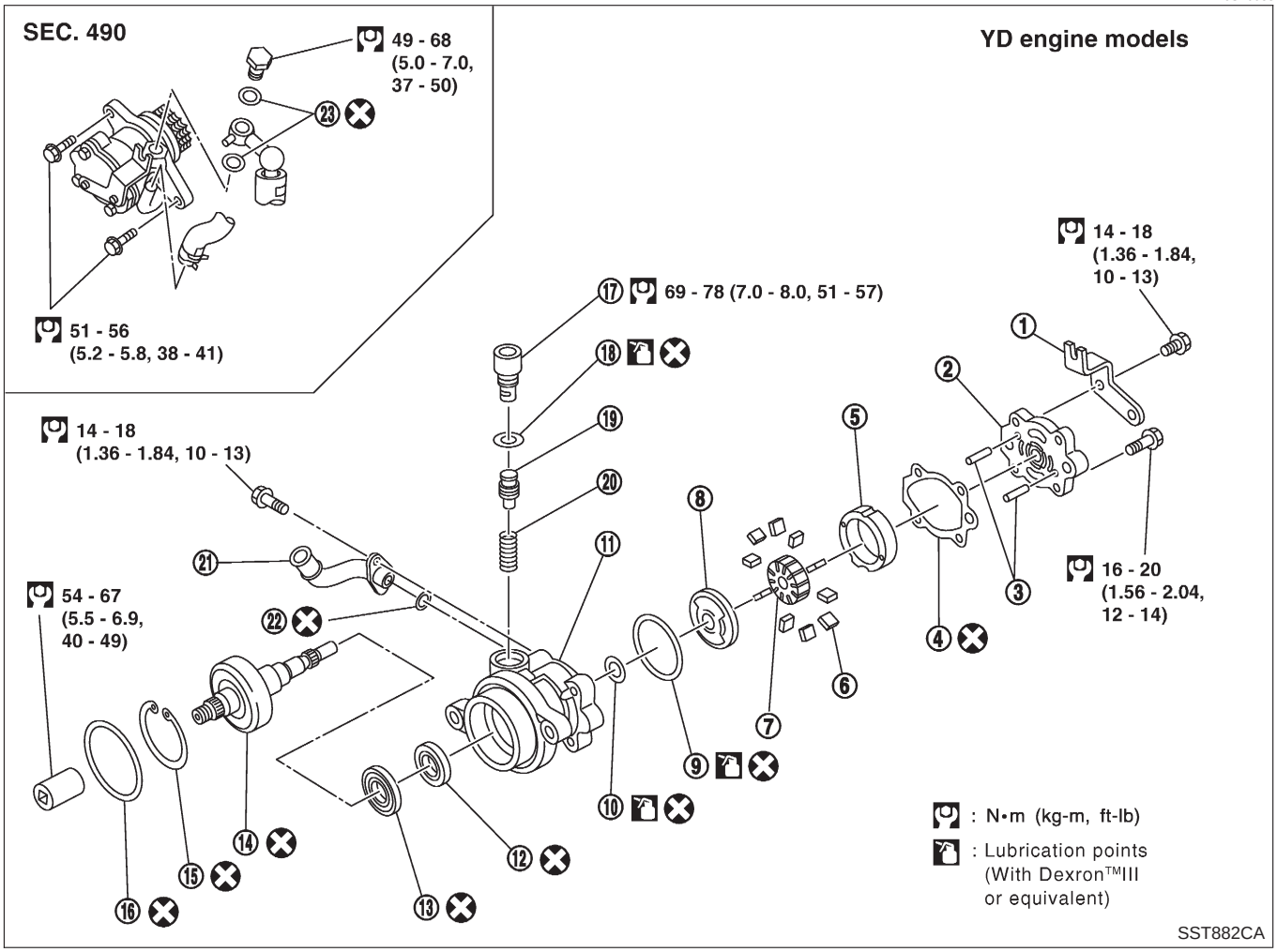
Lower fixing bolt: 32 - 42 N·m (3.2 - 4.2 kg-m, 24 - 31 ft-lb)

Inspection:

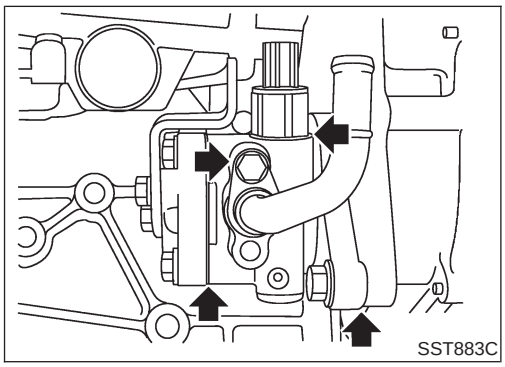
Check oil pump maximum pressure. Refer to "Power Steering" in SDS.

Components

NJST0038



1. Rear bracket
2. Rear body
3. Dowel pin
4. Side plate seal
5. Cam ring
6. Vane
7. Rotor
8. Side plate
9. O-ring (Outer)
10. O-ring (Inner)
11. Front body
12. Drive shaft rear oil seal
13. Drive shaft front oil seal
14. Drive shaft
15. Snap ring
16. O-ring
17. Outlet connector
18. Connector seal
19. Flow control valve
20. Flow control valve spring
21. Inlet connector
22. O-ring
23. Washer

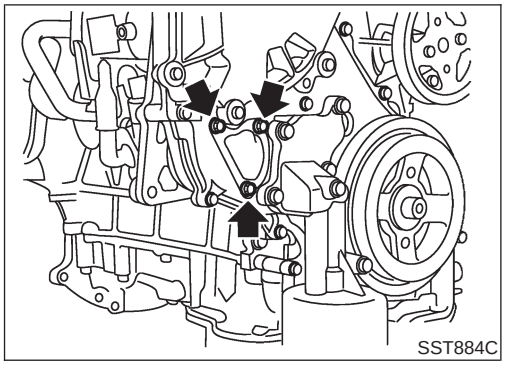


Pre-disassembly Inspection

NJST0039

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

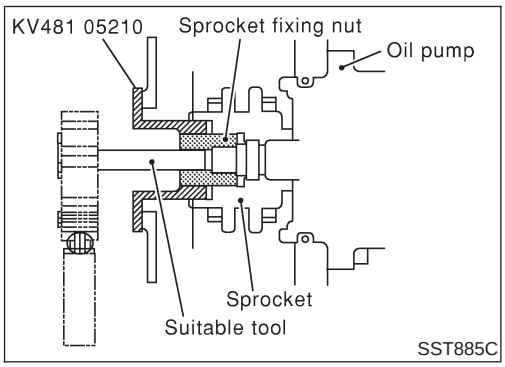
- Oil leak from any point shown in the figure
- Poor performance


SST884C

Removal and Installation

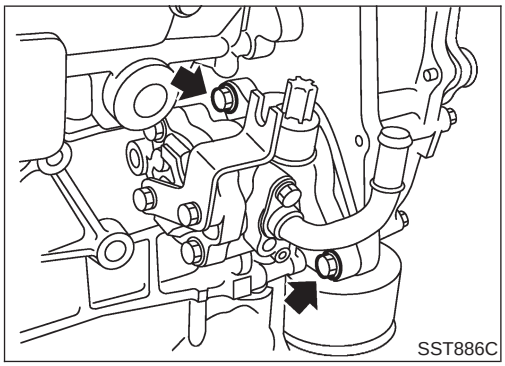
NJST0040

1. Remove chain case cover.

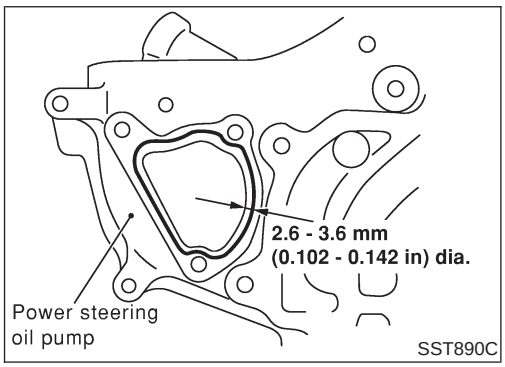


SST885C

2. Revolving crank pulley, set tool.
3. Fix tool with chain cover fixing bolts.
4. Using suitable tool, remove sprocket fixing nut and washer.
   Do not remove Tool while power steering oil pump is removed.


SST886C

5. Remove power steering pump fixing bolts, then remove it.



SST890C

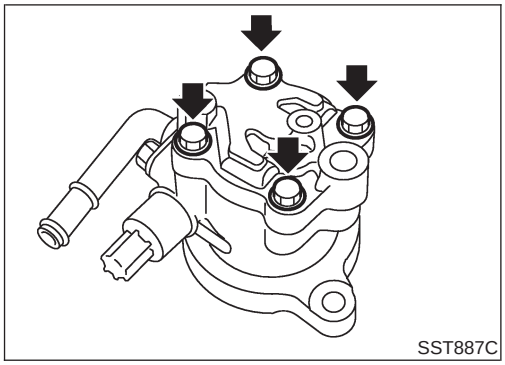
- Apply Gasket to the installation surface of the engine chain case cover as shown in the figure before installing the chain case cover to the engine.
- Bleed air after installation.
  Refer to ST-8.

Disassembly

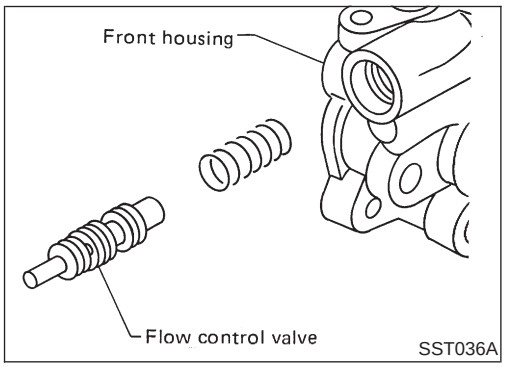
NJST0041

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 procedure and cautions in the Service Manual.**
- **When disassembling and reassembling, do not let foreign matter enter or contact the parts.**

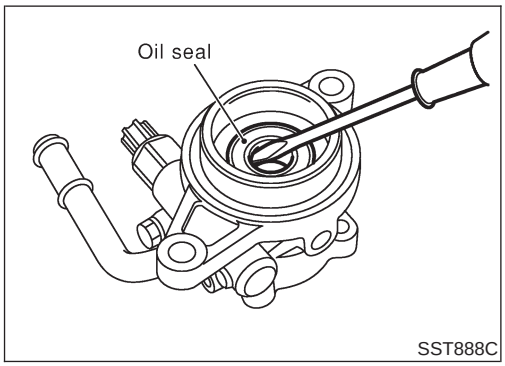

SST887C

- Remove rear bracket and rear body.
- Remove side plate seal, cam ring vane, rotor side and plate.



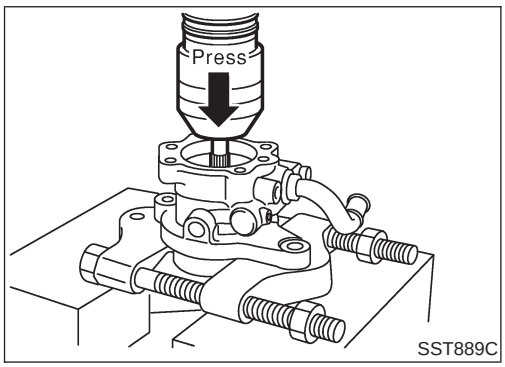
SST036A

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



SST888C

- Remove oil seal



SST889C

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

Inspection

NJST0042

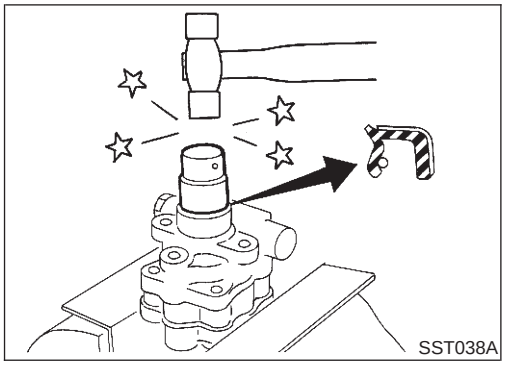
- If pulley is cracked or deformed, replace it.
- If an oil leak is found around pulley shaft oil seal, replace the seal.
- If serration on pulley or pulley shaft is deformed or worn, replace it.

Assembly

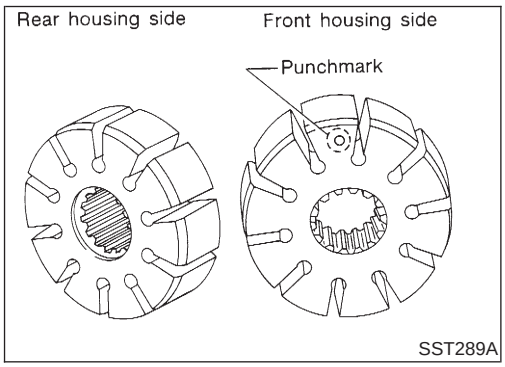
NJST0043

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 DEXRON™III or equivalent when assembling.

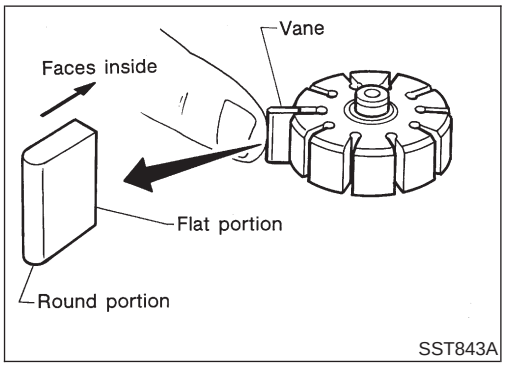

SST038A

- Pay attention to the direction of rotor.



SST289A

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

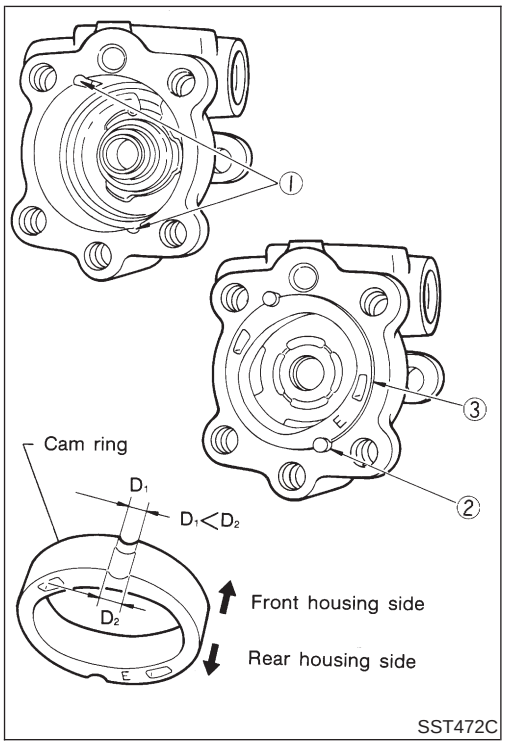


SST843A

- 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.



SST472C

General Specifications

NJST0032

Steering model	Power steering
Steering gear type	PR25T
Steering overall gear ratio	16.8
Turns of steering wheel (Lock to lock)	2.9
Steering column type	Collapsible, tilt

Steering Wheel

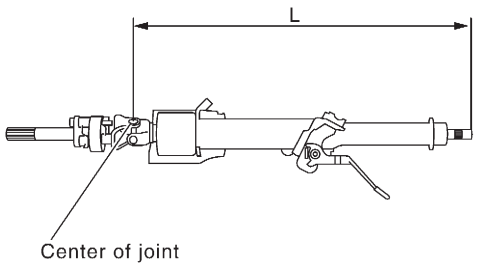
NJST0033

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

NJST0034

Steering column length “L” mm (in)	545 - 547 (21.46 - 21.54)

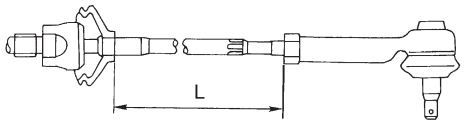


SST855C

Steering Gear and Linkage

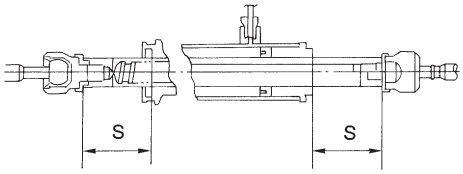
NJST0035

Applied model		QG engine	YD engine
Steering gear type		PR25T	
Tie-rod outer ball joint	Swinging force at cotter pin hole: “A” N (kg, lb)	64.6 - 65.0 (6.59 - 6.63, 14.52 - 14.61)	
	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 (0)	
Tie-rod inner ball joint	Swinging force*: “A” N (kg, lb)	1.61 - 12.9 (0.164 - 1.32, 0.36 - 2.90)	
	Axial end play: “C” mm (in)	0 (0)	
Tie-rod standard length “L” mm (in)		132 (5.20)	136 (5.35)



SST867C

Rack stroke “S” mm (in)	65.0 (2.559)



SST086BA

Power Steering

NJST0036

Steering gear type			PR25T
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	132 - 308 (13.5 - 31.4, 30 - 69)
		Maximum force deviation	176 (17.9, 39)
	Except for the above range	Maximum sliding force	—
		Maximum force deviation	—
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 (Imp qt)			1.0 (7/8)
Oil pump maximum pressure kPa (bar, kg/cm^2, psi)		QG15, 18 engines	8,600 - 9,200 (86.0 - 92.0, 87.72 - 93.84, 1,247 - 1,334)
		YD22 engine	8,800 - 9,400 (88.0 - 94.0, 88.7 - 95.8, 1,261 - 1,362)