

A  
B  
C  
D  
E  
F  
PS  
H  
I  
J  
K  
L  
M

# SECTION PS

## POWER STEERING SYSTEM

### CONTENTS

<b>PRECAUTIONS</b> .....	<b>2</b>	<b>POWER STEERING GEAR AND LINKAGE</b> .....	<b>13</b>
Precautions for Supplemental Restraint System (SRS) "AIR BAG" and "SEAT BELT PRE-TENSIONER" .....	2	Removal and Installation .....	13
Precautions for Steering System .....	2	REMOVAL .....	13
<b>PREPARATION</b> .....	<b>3</b>	INSTALLATION .....	14
Special Service Tools .....	3	<b>POWER STEERING GEAR</b> .....	<b>15</b>
Commercial Service Tools .....	4	Component .....	15
<b>NOISE, VIBRATION AND HARSHNESS (NVH)</b>		Disassembly and Assembly .....	16
<b>TROUBLESHOOTING</b> .....	<b>5</b>	DISASSEMBLY .....	16
NVH Troubleshooting Chart .....	5	INSPECTION .....	17
<b>POWER STEERING FLUID</b> .....	<b>6</b>	ASSEMBLY .....	18
Checking Fluid Level .....	6	<b>POWER STEERING OIL PUMP</b> .....	<b>24</b>
Checking Fluid Leakage .....	6	On-Vehicle Service .....	24
Air Bleeding from Hydraulic System .....	6	CHECKING RELIEF OIL PRESSURE .....	24
<b>STEERING WHEEL</b> .....	<b>7</b>	CHECKING AND ADJUSTING DRIVE BELTS (FOR POWER STEERING) .....	24
On-Vehicle Service .....	7	Removal and Installation .....	24
CHECKING STEERING WHEEL PLAY .....	7	REMOVAL .....	24
CHECKING NEUTRAL POSITION ON STEERING WHEEL .....	7	INSTALLATION .....	24
CHECKING STEERING WHEEL TURNING FORCE .....	7	Disassembly and Assembly .....	25
FRONT WHEEL TURNING ANGLE .....	7	PRE-DISASSEMBLY INSPECTION .....	25
Removal and Installation .....	8	DISASSEMBLY .....	25
<b>STEERING COLUMN</b> .....	<b>9</b>	INSPECTION AFTER DISASSEMBLY .....	26
Removal and Installation .....	9	ASSEMBLY .....	26
REMOVAL OF LOWER JOINT AND HOLE COVER .....	9	<b>HYDRAULIC LINE</b> .....	<b>28</b>
INSTALLATION OF LOWER JOINT AND HOLE COVER .....	10	Removal and Installation .....	28
REMOVAL OF STEERING COLUMN ASSEMBLY .....	10	<b>SERVICE DATA AND SPECIFICATIONS (SDS)</b> .....	<b>29</b>
INSTALLATION OF STEERING COLUMN ASSEMBLY .....	10	Steering Wheel .....	29
Disassembly and Assembly .....	11	Steering Angle .....	29
DISASSEMBLY .....	11	Steering Column .....	29
INSPECTION AFTER DISASSEMBLY .....	11	Steering Linkage .....	29
ASSEMBLY .....	12	Steering Gear .....	30
INSPECTION AFTER INSTALLATION .....	12	Oil Pump .....	30
		Steering Fluid .....	30

# PRECAUTIONS

## PRECAUTIONS

PFP:00001

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

AGS0001P

The Supplemental Restraint System such as “AIR BAG” and “SEAT BELT PRE-TENSIONER”, used along with a front seat belt, helps to reduce the risk or severity of injury to the driver and front passenger for certain types of collision. This system includes seat belt switch inputs and dual stage front air bag modules. The SRS system uses the seat belt switches to determine the front air bag deployment, and may only deploy one front air bag, depending on the severity of a collision and whether the front occupants are belted or unbelted. Information necessary to service the system safely is included in the SRS and SB 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 must be performed by an authorized NISSAN/INFINITI 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 SRS 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 by yellow and/or orange harnesses or harness connectors.**

### Precautions for Steering System

AGS0001M

- 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 Genuine Nissan PSF II or equivalent 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.

# PREPARATION

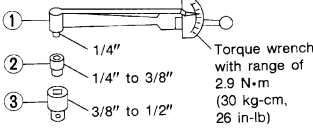
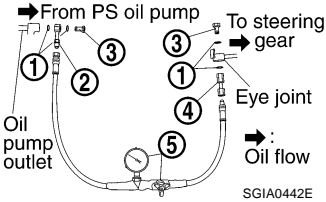
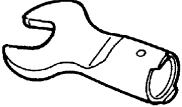
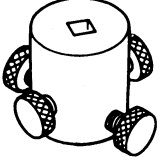
## PREPARATION

PFP:00002

### Special Service Tools

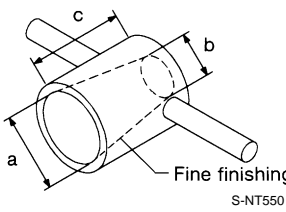
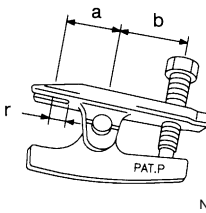
AGS00003

The actual shapes of Kent-Moore tools may differ from those of special service tools illustrated here.

Tool number (Kent - Moore No.) Tool name	Description
ST3127S000 (J25765 - A) Preload gauge 1. GG9103000 (J25765 - A) Torque wrench 2. HT62940000 ( - ) Socket adapter 3. HT62900000 ( - ) Socket adapter	 <p style="text-align: center;">S-NT541</p> Inspecting swinging torque and rotating torque for ball joint
KV48102500 (J33914) Pressure gauge adapter 1. KV48102500-04 ( - ) Copper washer 2. KV48102500-01 ( - ) Eye joint 3. KV48102500-03 ( - ) Bolt 4. KV48102500-02 ( - ) Flare joint 5. KV48103500 (J26357&J26357-10) Pressure gauge & shut-off valve	 <p style="text-align: center;">SGIA0442E</p> Measuring oil pump relief pressure
KV48104300 Open head	 <p style="text-align: center;">SGIA0126J</p> Removing and installing end cover of cylinder
KV48103400 ( - ) Steering gear preload adapter	 <p style="text-align: center;">ZZA0824D</p> In case of inspecting rotational torque etc. for the steering gear, use this adapter together with wrench.

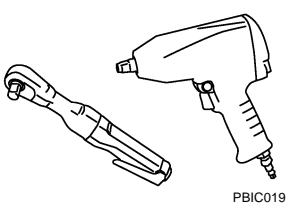
A  
B  
C  
D  
E  
F  
PS  
H  
I  
J  
K  
L  
M

# PREPARATION

Tool number (Kent - Moore No.) Tool name		Description
KV48104400 (      -      ) Teflon ring correcting tool a: 50 mm (1.97 in) dia. b: 36 mm (1.42 in) dia. c: 100 mm (3.94 in)		Installing of rack Teflon ring
HT2520000 (J25730-A) Ball joint remover a: 33 mm (1.30 in) b: 50 mm (1.97 in) r: 11.5 mm (0.453 in)		Removing ball joint of outer socket

## Commercial Service Tools

AGS0001Q

Tool name		Description
Power tool		Removing steering gear assembly and wheel nuts

# NOISE, VIBRATION AND HARSHNESS (NVH) TROUBLESHOOTING

## NOISE, VIBRATION AND HARSHNESS (NVH) TROUBLESHOOTING

PPF:00003

### NVH Troubleshooting Chart

AGS00005

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

Symptom	STEERING	Possible cause and SUSPECTED PARTS													Reference page										
		Fluid level	Air bleeding from hydraulic system	Tie-rod ball joint swing torque	Tie-rod ball joint rotating torque	Tie-rod ball joint end play	Steering fluid leakage	Steering wheel play	Drive belt looseness	Improper steering wheel	Improper installation or looseness of tilt lock lever	Mounting rubber deterioration	Steering column deformation or damage	Improper installation or looseness of steering column		Steering linkage looseness	PROPELLER SHAFT	DIFFERENTIAL	AXLE AND SUSPENSION	TIRES	ROAD WHEEL	DRIVE SHAFT	BRAKES		
Noise	STEERING	x	x	x	x	x	x	x	x															PS-6	
																									PS-6
																									PS-17
																									PS-17
																									PS-17
Shake	STEERING																							PS-6	
																								PS-7	
																								EM-13	
																								—	
																									PS-11
Vibration	STEERING																							PS-13	
																								PS-12	
																								PS-9	
																								PS-13	
																									NVH in PR section
Shimmy	STEERING																							NVH in RFD section	
																								NVH in FAX, RAX, FSU, RSU section	
																								NVH in WT section	
																								NVH in WT section	
																									NVH in RAX section
Judder	STEERING																							NVH in BR section	

x: Applicable

A  
B  
C  
D  
E  
F  
PS  
H  
I  
J  
K  
L  
M

# POWER STEERING FLUID

## POWER STEERING FLUID

PFP:KLF20

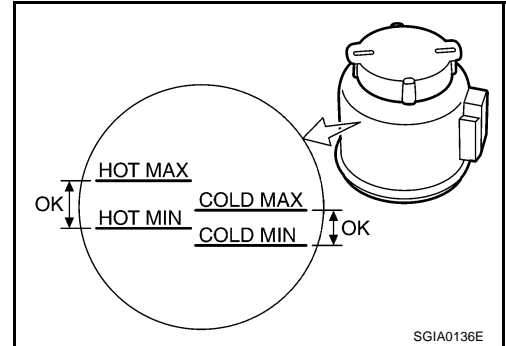
### Checking Fluid Level

AGS00006

- Check fluid level with indicated gauge on reservoir tank. Use "HOT" range at fluid temperatures from 50 to 80°C (122 to 176°F). Use "COLD" range at fluid temperatures from 0 to 30°C (32 to 86°F).

#### CAUTION:

- Do not overfill.
- Recommended fluid is Genuine Nissan PSF or equivalent.



### Checking Fluid Leakage

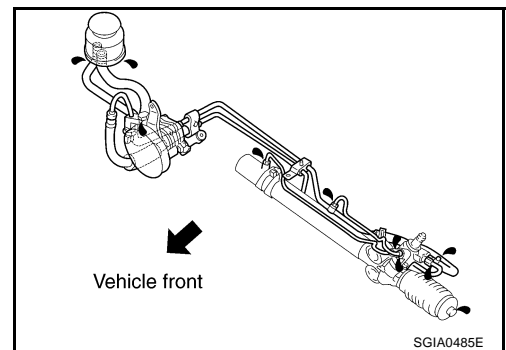
Check the lines for improper attachment and for leaks, cracks, damage, loose connections, chafing or deterioration.

1. Run engine at idle speed or 1,000 rpm.  
**Make sure temperature of fluid in reservoir 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 [PS-24](#), "[CHECKING RELIEF OIL PRESSURE](#)".
6. Check rack boots for accumulation of power steering fluid.



### Air Bleeding from Hydraulic System

AGS00008

1. Raise front end of vehicle until wheels clear ground.  
Add fluid into reservoir tank to specified level. Meanwhile, quickly turn steering wheel fully to right and left and lightly touch steering stoppers.  
Repeat steering wheel operation until fluid level no longer decreases.
2. Start engine and run at idling.  
Repeat step 2 above.
  - Incomplete air bleeding will cause the following to occur. When this happens, bleed air again.
    - a. Generation of air bubbles in reservoir tank
    - b. Generation of 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 performance or durability of the system.

# STEERING WHEEL

PPF:48430

AGS00009

## STEERING WHEEL

### On-Vehicle Service

#### CHECKING STEERING WHEEL PLAY

- 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.

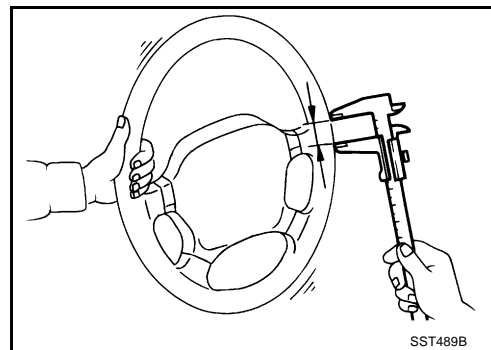
**Steering gear assembly**

**Steering column**

**Front suspension and axle**

- Check the steering wheel for vertical, horizontal, or axial play

**Steering wheel axial end play : 0 mm (0 in)**



#### CHECKING NEUTRAL POSITION ON STEERING WHEEL

##### Pre-Checking

- Make sure that wheel alignment is correct.

**Wheel alignment : Refer to FSU-17, "Wheel Alignment (Unladen)"**

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

##### Checking

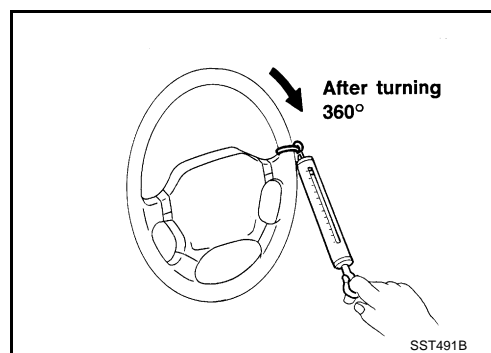
1. Check that the steering wheel is in the neutral position when front tires are set in the straight-ahead direction.
2. If it is not in the neutral position, remove the steering wheel and reinstall it correctly.
3. If the neutral position is between two teeth, loosen lock nuts of tie rods. Turn the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

#### CHECKING STEERING WHEEL TURNING FORCE

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

**Steering wheel turning force:**

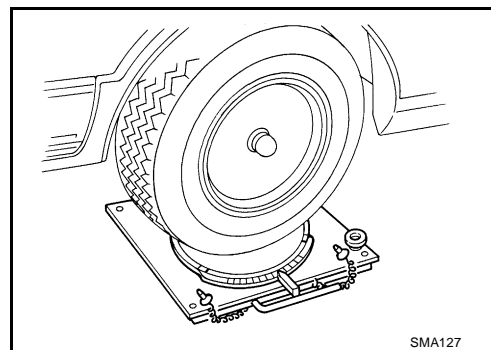
**36 N (3.7 kg, 8.2 lb) or less**



5. If steering wheel turning force is out of specification, check relief oil pressure of oil pump. Refer to [PS-24, "POWER STEERING OIL PUMP"](#).

#### FRONT WHEEL TURNING ANGLE

Check front wheel turning angle after toe-in inspection, Place the front wheels on turning radius gauges and the rear wheels on stands so that the vehicle can be level. Check the maximum inner and outer wheel turning angles for LH and RH road wheels.

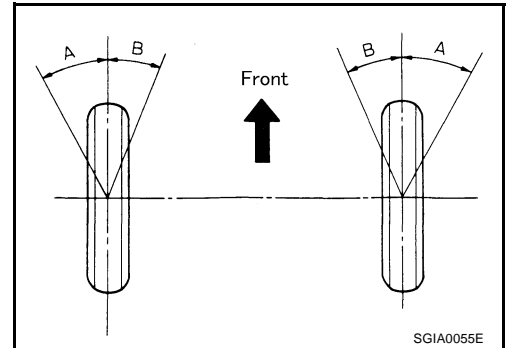


# STEERING WHEEL

- Start the engine. With the engine at idle, rotate steering wheel all the way right and left, measure turning angle.

## Turning angle of full turns:

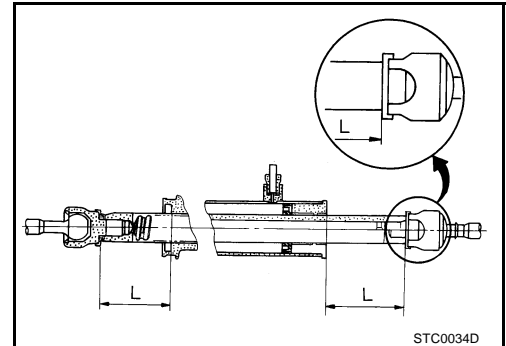
<b>Inner wheel (Angle: A)</b>	<b>Minimum</b>	<b>: 37°30' (37.5°)</b>
	<b>Nominal</b>	<b>: 40°30' (40.5°)</b>
	<b>Maximum</b>	<b>: 41°30' (41.5°)</b>
<b>Outer wheel (Angle: B)</b>	<b>Nominal</b>	<b>: 32°30' (32.5°)</b>



- If it is not within specification, measure the rack strokes.

**Rack stroke "L" : 66.6 mm (2.622 in)**

- If the rack stroke is outside of the specification, disassemble the steering gear to check the rack stroke.
- Turning angles are not adjustable. If any of the steering angles is not within specification, check following components for wear or damage.
  - Steering gear
  - Steering column
  - Front suspension components



## Removal and Installation

Refer to [PS-9. "STEERING COLUMN"](#) .

AGS0000A



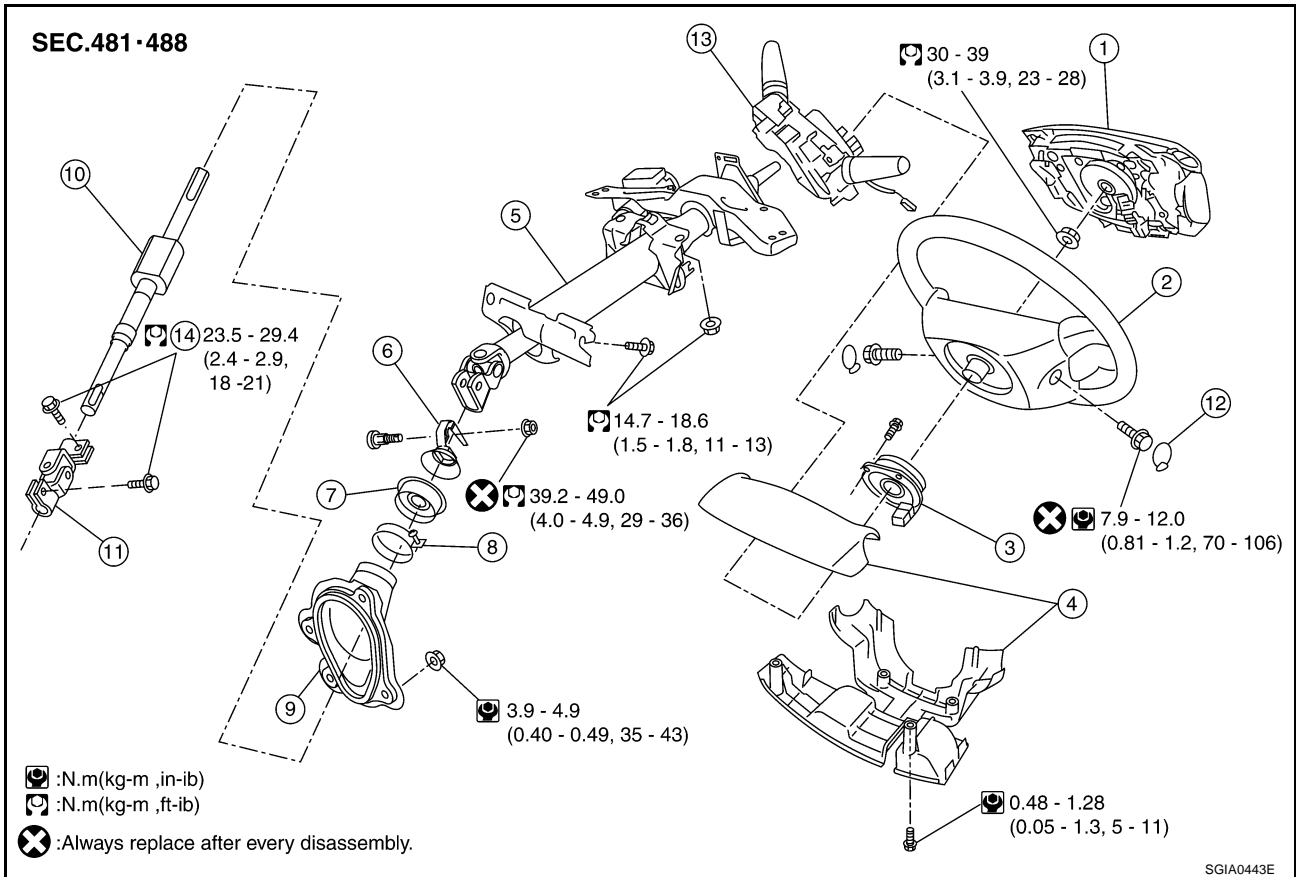
# STEERING COLUMN

## STEERING COLUMN

PF48810

### Removal and Installation

AGS0000B



- |                        |                             |                 |
|------------------------|-----------------------------|-----------------|
| 1. Air bag module      | 2. Steering wheel           | 3. Spiral cable |
| 4. Column cover        | 5. Steering column assembly | 6. Collar       |
| 7. Hole cover seal     | 8. Clamp                    | 9. Hole cover   |
| 10. Lower shaft        | 11. Lower joint             | 12. Side lid    |
| 13. Combination switch | 14. Pinch bolt              |                 |

#### CAUTION:

Care must be taken not to give axial impact to the steering column assembly during removal and installation.

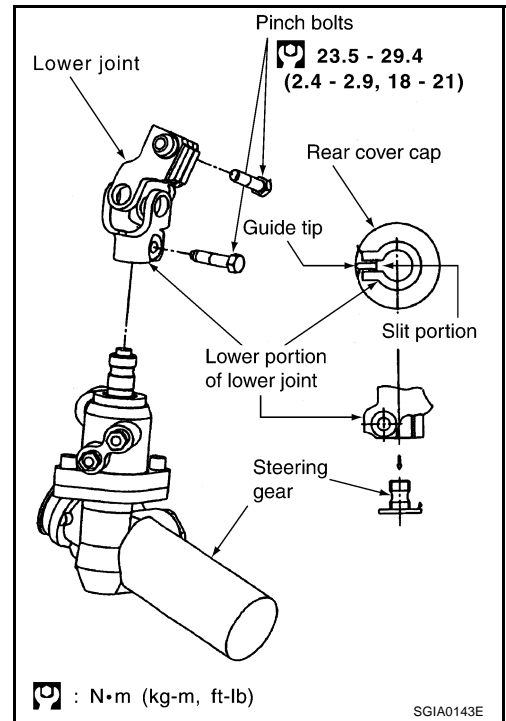
#### REMOVAL OF LOWER JOINT AND HOLE COVER

1. Raise the vehicle with the front wheels in the straight-ahead position.
2. Mark lower joint and steering gear with paint for easy installation. Remove pinch bolt from lower side of lower joint.
3. Remove mounting bolt and nut from upper side of lower joint.
4. Remove hole cover and lower joint from vehicle.
5. Remove clamp and hole cover seal from hole cover.

# STEERING COLUMN

## INSTALLATION OF LOWER JOINT AND HOLE COVER

- Install in the reverse order of removal.
- Install lower joint to steering gear, slot on lower portion of lower joint engaged with guide tip projection.



## REMOVAL OF STEERING COLUMN ASSEMBLY

### CAUTION:

When removing and installing the steering column assembly, avoid impact to the axial direction.

1. Remove steering wheel. Refer to [PS-9, "Removal and Installation"](#).
2. Remove the instrument of the driver-side lower panel. Refer to [IP-10, "INSTRUMENT PANEL ASSEMBLY"](#).
3. Remove spiral cable. Refer to [SRS-39, "SPIRAL CABLE"](#).
4. Remove the key interlock cable from the steering column assembly. Refer to [AT-311, "KEY INTERLOCK CABLE"](#).
5. Remove clamp and connector from steering column assembly.
6. Remove the meter control unit assembly and cluster lid from steering column assembly. Refer to [IP-10, "INSTRUMENT PANEL ASSEMBLY"](#).
7. Remove steering column assembly mounting nut and remove steering column assembly from vehicle.

### CAUTION:

Do not deform lower side column cover on steering column assembly during removal or installation.

## INSTALLATION OF STEERING COLUMN ASSEMBLY

- Installation procedure should be used with the steering lock unlocked.
1. Tack upper portion of the lower joint on the steering column assembly, and install steering column assembly to vehicle with mounting nuts.
  2. Install pinch bolt on upper portion of lower joint.
  3. Install clamp and connector.
  4. Install the meter control unit to the steering column assembly. Refer to [IP-10, "INSTRUMENT PANEL ASSEMBLY"](#).
  5. Install key interlock cable to steering column assembly. Refer to [AT-311, "KEY INTERLOCK CABLE"](#).
  6. Install spiral cable. Refer to [SRS-39, "SPIRAL CABLE"](#).
  7. Install instrument lower driver panel. Refer to [IP-10, "INSTRUMENT PANEL ASSEMBLY"](#).
  8. Install steering wheel and column cover. Refer to [PS-9, "Removal and Installation"](#).

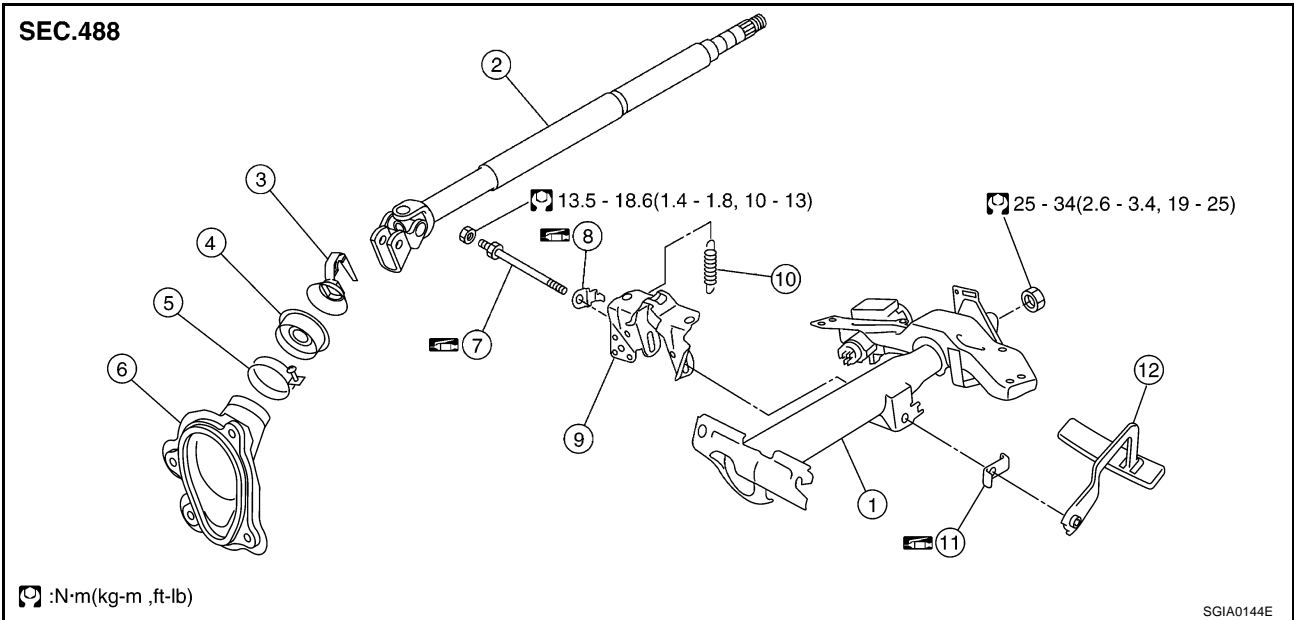
# STEERING COLUMN

## CAUTION:

After installation, turn steering wheel. Be sure with check if besides steering wheel turns smoothly, following items are caused, prying, scratch, noise, excessive steering force.

## Disassembly and Assembly

AGS0000C



- |                    |                        |                         |
|--------------------|------------------------|-------------------------|
| 1. Jacket tube     | 2. Column shaft        | 3. Collar               |
| 4. Hole cover seal | 5. Clamp               | 6. Hole cover           |
| 7. Adjusting bolt  | 8. Adjusting stopper   | 9. Column mount bracket |
| 10. Spring         | 11. Tilt lever stopper | 12. Tilt lever          |

## DISASSEMBLY

### NOTE:

Disassembly and assembly procedures should be done with steering lock unlocked.

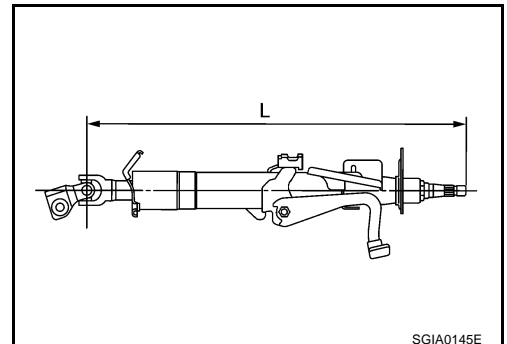
1. Remove combination switch from jacket tube.
2. Remove jacket tube-to-column shaft mounting nut and remove column shaft from jacket tube.
3. Remove spring from mount assembly.
4. Remove mounting lock nut and adjusting stopper.
5. Remove adjusting bolt and remove tilt lever stopper and tilt lever.

## INSPECTION AFTER DISASSEMBLY

- If steering wheel does not turn smoothly, check according to the following procedures and replace malfunctioning part.
  1. Check column shaft bearing for damage and other malfunctions. Lubricate with grease or replace column shaft if necessary.
  2. Check jacket tube for deformation and cracks, and replace if necessary.
- If vehicle has slightly crashed, column length "L" as shown in the figure. If outside standard, replace steering column assembly.

**Steering column length "L":**

**547 - 549 mm (21.54 - 21.61 in)**



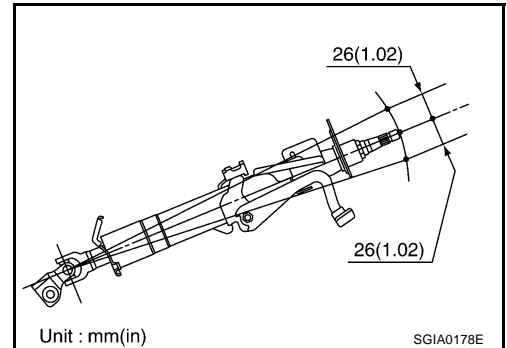
# STEERING COLUMN

## ASSEMBLY

- Refer to the component parts drawing for tightening torque and assemble with the reverse order of removal.
- After assembling steering column, check tilt mechanism.

## INSPECTION AFTER INSTALLATION

- After installing steering column in the vehicle, check tilt mechanism operation and tilt range is as shown in the figure.
  - When steering wheel does not turn smoothly, check the steering column as follows and replace damaged parts.
1. Check column bearings for damage or unevenness. Lubricate with recommended multi-purpose grease or replace steering column as an assembly, if necessary.



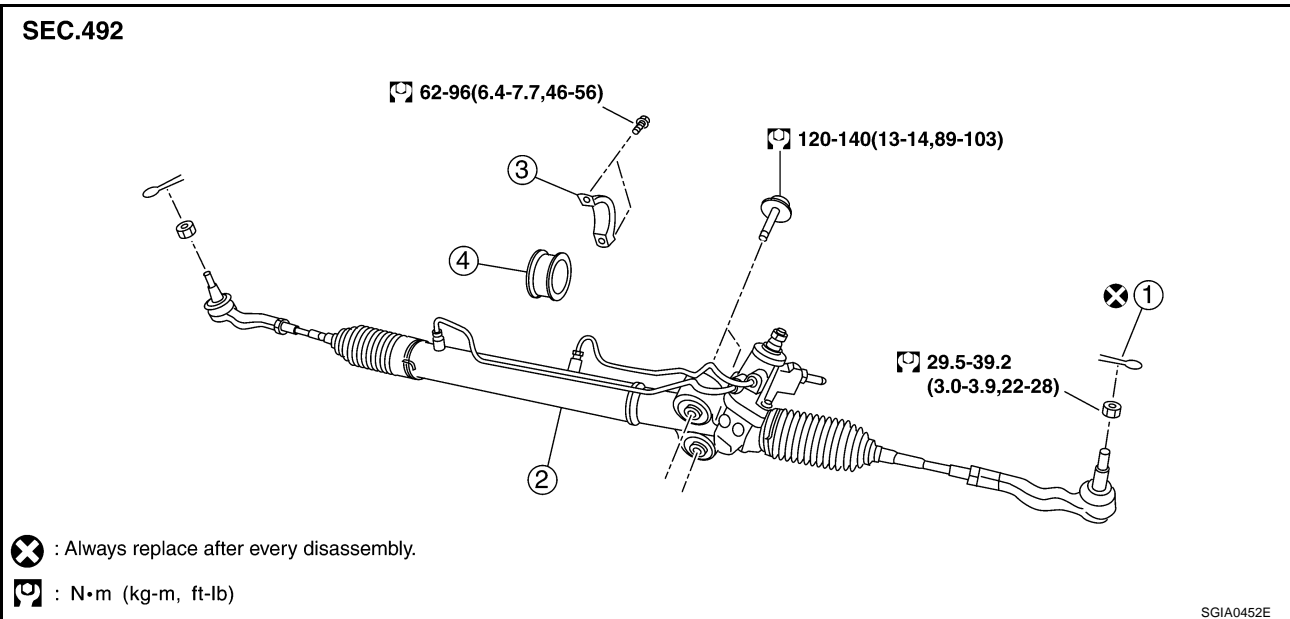
# POWER STEERING GEAR AND LINKAGE

## POWER STEERING GEAR AND LINKAGE

PF0:49001

### Removal and Installation

AGS0000E



1. Cotter pin
2. Steering gear assembly
3. Rack mounting bracket
4. Rack mounting insulator

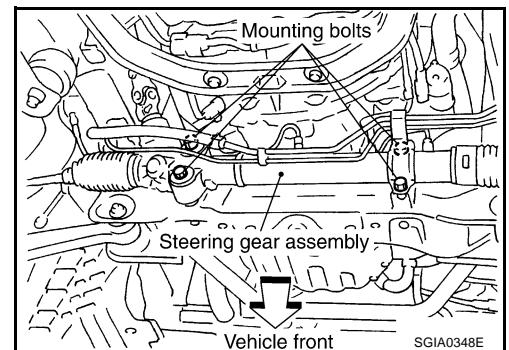
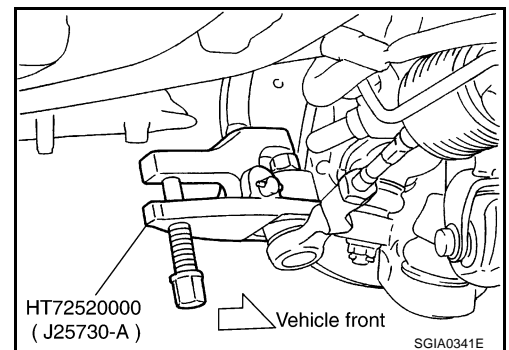
### REMOVAL

1. Remove tires using power tool, and then remove undercover.
2. Remove cotter pin, and loosen the nut for the outer socket, then remove outer socket from steering knuckle.

#### CAUTION:

- Be careful not to damage tie rod ball joint dust boot.
- Tack the lock nut to the outer socket bolt because the ball joint remover (SST) might be dangerous in removal from the knuckle arm suddenly, and it's to avoid getting damage to the bolt thread of outer socket.

3. Remove pinch bolt of lower-side for lower joint.
4. Loosen pinch bolt of upper-side for lower joint.
5. Drain power steering fluid from reservoir tank.
6. Remove high pressure-side tube and low pressure-side hose of hydraulic piping from steering gear.
7. Remove bolt from insulator of rack mounting bracket.
8. Remove rack mounting bracket and rack mounting insulator.
9. Remove the fixing bolts and rack mounting bracket, then power steering gear from vehicle.

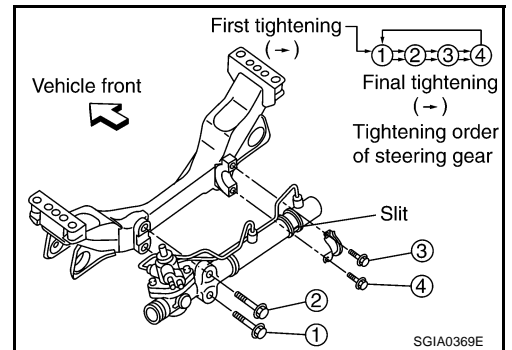


# POWER STEERING GEAR AND LINKAGE

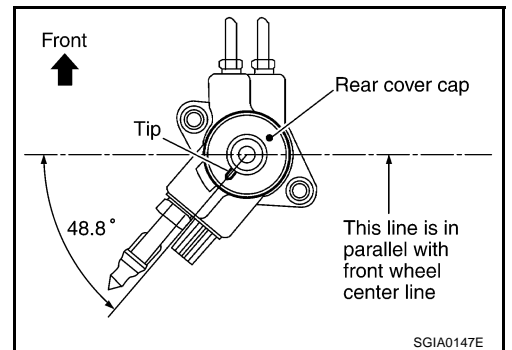
## INSTALLATION

Paying attention to following items, install in the reverse of removal.

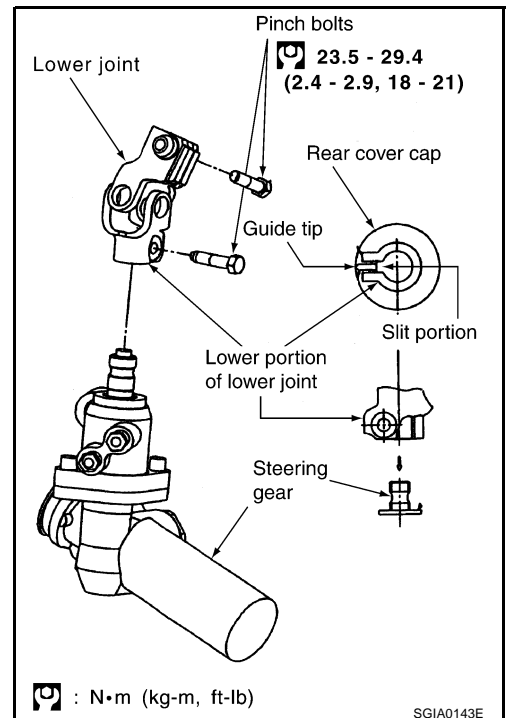
- Install the steering gear to the vehicle, refer to the tightening order shown in the figure.



- Confirm if the rear cover cap on the steering gear consists with the steering gear when the front wheels are set in the straight-ahead direction as shown in the figure.



- Install the lower joint to the steering gear, engage the guide tip on the rear cover cap with slit portion in the lower portion of the lower joint.
- Bleed air. Refer to [PS-6. "Air Bleeding from Hydraulic System"](#) . then check if steering wheel turns smoothly when it is turned several times fully to end of left and right.



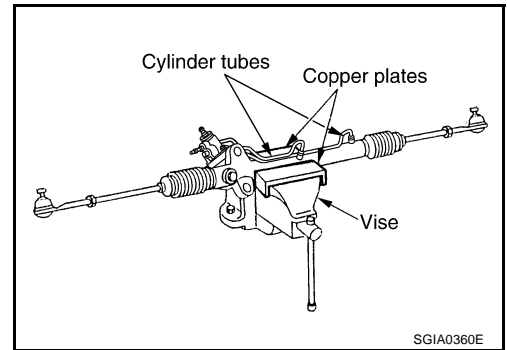


# POWER STEERING GEAR

AGS0001S

## Disassembly and Assembly DISASSEMBLY

- Secure power steering gear in a vise, using copper plates or something similar to prevent it from being damaged. Do not grip cylinder in a vise.
- Before disassembly, clean the power steering gear with kerosene. Be careful not to bring any kerosene into contact with the discharge and return port connectors.



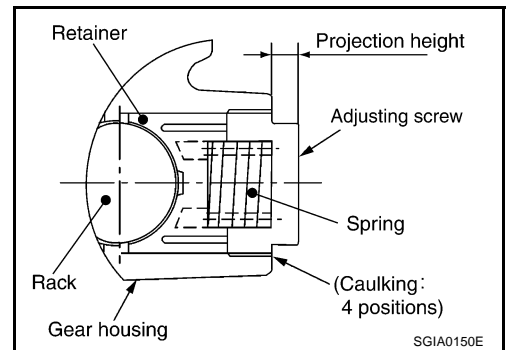
1. Remove cylinder tubes from gear housing assembly.
2. Remove rear cover cap from sub-gear assembly.
3. Measure projection height with adjusting screw from gear housing, then loosen adjusting screw.

### CAUTION:

- Do not remove adjusting screw from gear housing.
  - Change gear housing when adjusting screw is removed or it is turned more than two times.
4. Remove bolt of sub-gear assembly and remove sub-gear assembly from gear housing assembly, holding rack against retainer side.

### CAUTION:

Do not overhaul sub-gear assembly. Or something is wrong with sub-gear assembly, change it with new one.



5. Loosen nut for outer socket tube fixed, remove outer socket and boot.

### CAUTION:

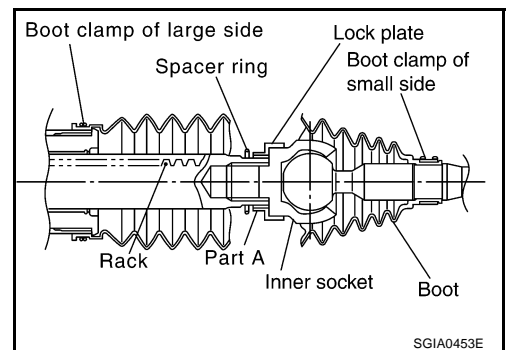
In the removing boot, take care not to damage with inner socket and gear housing. If it is damaged them, change them because it may cause oil leak.

6. Move spacer ring to rack side, raise caulking part (at two points of part A) of lock plate and loosen inner socket, then remove inner socket from rack.

### CAUTION:

When removing lock plate from rack, avoid damaging surface of rack. If damaged, rack assembly must be replaced. Otherwise, oil leaks will result.

7. Remove lock plate and spacer ring from rack.



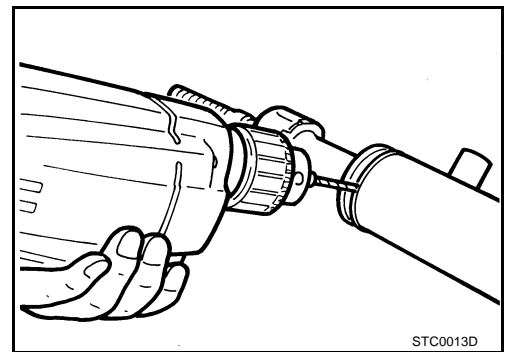


# POWER STEERING GEAR

8. Drill out punch caulking area on cylinder outer rim with a 3 mm (0.12 in) drill bit. [Drill for approx. 1.5 mm (0.059 in) in depth.]
9. Remove end cover with a 42 mm (1.65 in) open head.
10. Pull rack assembly with rack oil seal out of gear housing assembly.

**CAUTION:**

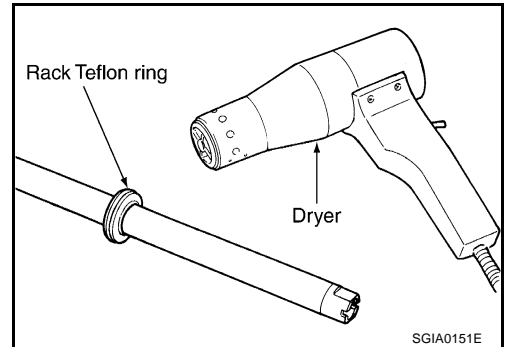
**Be careful not to damage the inside of the gear housing assembly and the rack. If it is damaged, replace the gear housing assembly and the rack. Otherwise, oil leaks may result.**



11. Heat rack Teflon ring to approx. 40°C (104°F) with a dryer, remove it and O-ring from rack.

**CAUTION:**

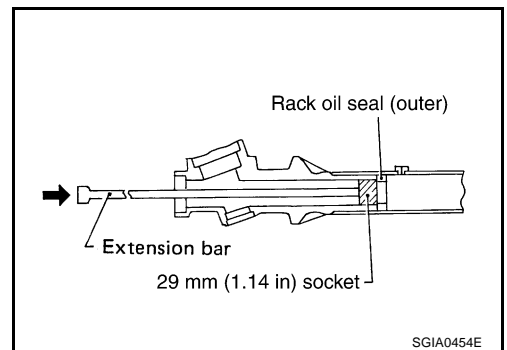
**Be careful not to damage rack. If it damaged, change with new one because it may cause oil leak.**



12. Use a taped 29 mm (1.14 in) socket and an extension bar, push out and remove rack oil seal (outer) from end cover side of gear housing assembly.

**CAUTION:**

- Be careful not to damage inner wall of gear housing assembly.
- If damaged, gear housing assembly must be replaced. Otherwise, oil leaks will result.



## INSPECTION

### Rack

Check rack gear for damage and wear. Replace it, if necessary.

### Sub-Gear Assembly

- Check pinion gear for damage and wear, if damage is found, replace with a new sub-gear assembly.
- Check bearing while at rotating with noise, and then check bearing ball race with dent, worn or other damages. If any damage is found, replace with a new sub-gear assembly.

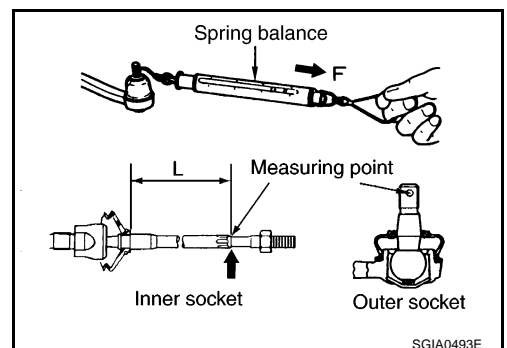
### Gear Housing Assembly

Check gear housing assembly for damage and scratch (inner wall). Replace it, if necessary.

### Tie Rod Ball Joint

1. Swing Torque

- Hook a spring balance at the point shown in the figure. Confirm that the reading observed when the ball stud and the inner socket start moving is within the specification. If the reading is outside the specification, replace the socket.



# POWER STEERING GEAR

## Specified value

Item	Outer socket	Inner socket
Measuring point	Cotter-pin hole of stud	Shown as L: 48.5 mm (1.91 in)
Swing torque	0.30 - 2.90 N·m (0.03 - 0.29 kg-m, 3 - 25 in-lb)	1.0 - 7.8 N·m (0.10 - 0.80 kg-m, 9 - 69 in-lb)
Measuring value	4.42 - 42.7 N (0.45 - 4.3 kg, 1.0 - 9.6 lb)	10 - 78 N (1.1 - 7.9 kg, 2.25 - 17.5 lb)

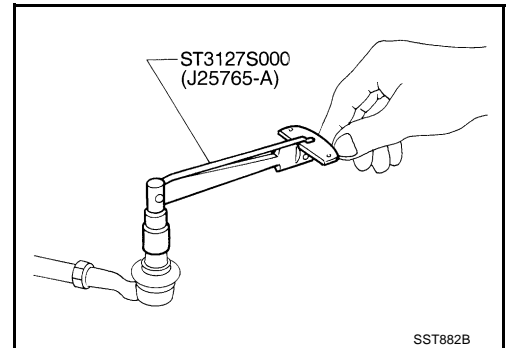
### 2. Rotating Torque (outer socket only)

- Using a preload gauge (SST), check reading is within range specified below. If the value is outside the standard, replace outer and inner sockets.

#### Outer socket

#### Rotating torque:

**0.30 - 2.90 N·m (0.03 - 0.29 kg-m, 3 - 25 in-lb)**

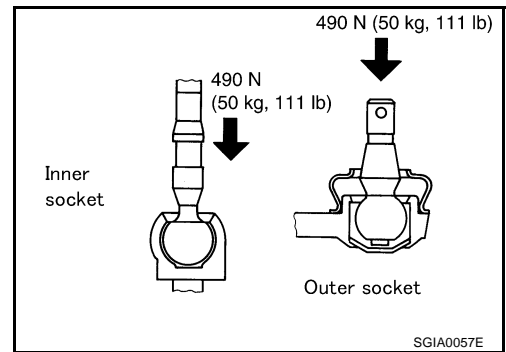


### 3. Axial End Play

- Apply load of 490 N (50 kg, 110 lb) to the ball stud axially. Measure amount of movement that stud makes by using a dial gauge. Check reading is within range specified below. If not, replace outer and inner sockets.

<b>Outer socket</b>	<b>0.5 mm (0.020 in) or less</b>
---------------------	----------------------------------

<b>Inner socket</b>	<b>0.2 mm (0.008 in) or less</b>
---------------------	----------------------------------



## ASSEMBLY

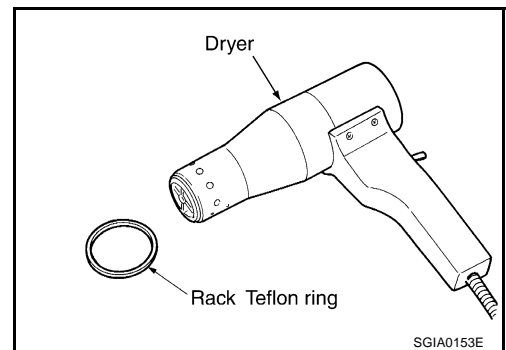
- Always replace O-ring and oil seal with new one.

### 1. Put an O-ring into the rack.

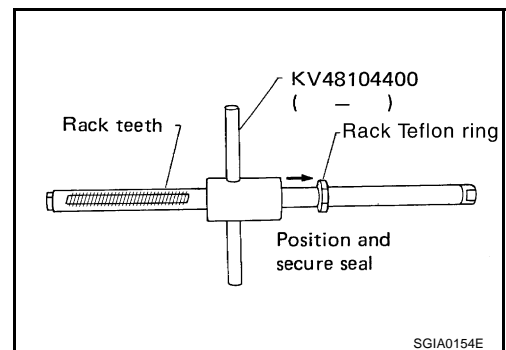
#### CAUTION:

**Do not reuse rack Teflon ring and O-ring.**

### 2. Heat rack Teflon ring to approximately 40°C (104°F) with a dryer. Assemble it to rack.



### 3. To fit Teflon ring on rack, use Teflon ring installation tool from tooth side. Compress the rim of ring with the tool. Then, put the O-ring on Teflon ring.



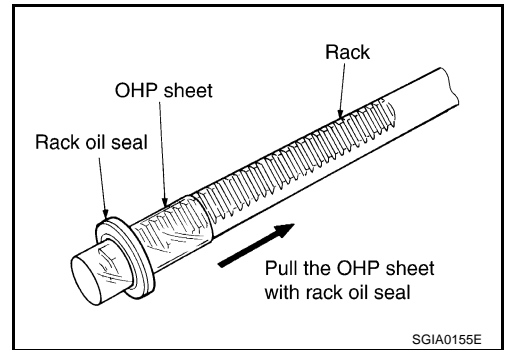
# POWER STEERING GEAR

4. Insert new rack oil seal.

**CAUTION:**

**Do not reuse rack oil seal.**

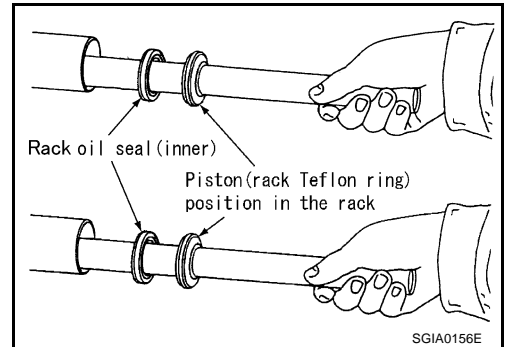
a. To avoid damaging inner rack oil seal, wrap an OHP sheet [approx. 70 mm (2.76 in) × 100 mm (3.94 in)] around rack tooth. Place oil seal over sheet. Then, pull oil seal along with OHP sheet until they pass toothed section of rack.



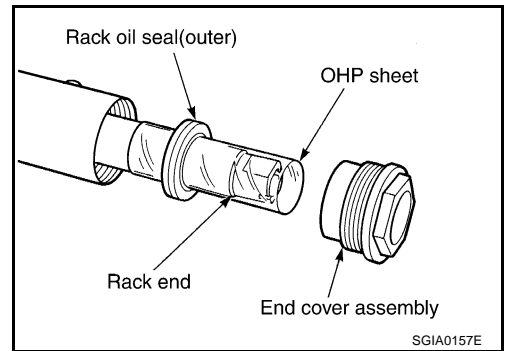
b. Insert rack oil seal (inner) to the piston (rack Teflon ring) and push retainer to adjusting screw side with finger lightly, and then make rack move in gear housing assembly, install rack oil seal (inner) fit in with gear housing.

**CAUTION:**

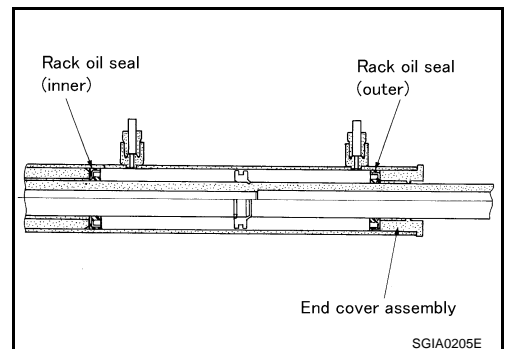
**When inserting rack assembly, do not damage cylinder inner wall. If it damaged, it may cause oil leak. Replace gear housing assembly.**



c. When installing outer rack oil seal, cover end of rack with an OHP sheet [70 mm (2.76 in) × 100 mm (3.94 in)]. It will avoid damaging rack oil seal. Then place oil seal over sheet. Pull rack oil seal along with OHP sheet until they pass rack end. Install rack oil seal in place using end cover assembly.



d. Attach rack oil seal. Both inner lip and outer lip should face each other.



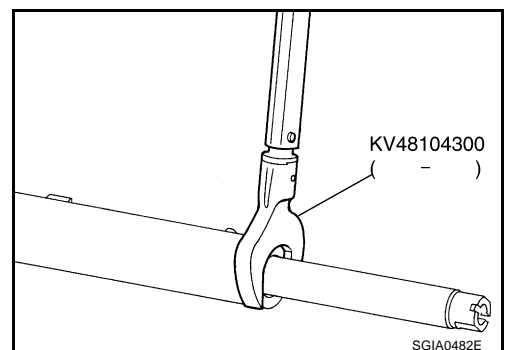
5. Using a 42 mm (1.65 in) open head, tighten end cover assembly at specified torque.

**Tightening torque:**

**59 - 74 N·m (6.1 - 7.5 kg·m, 44 - 54 ft·lb)**

**CAUTION:**

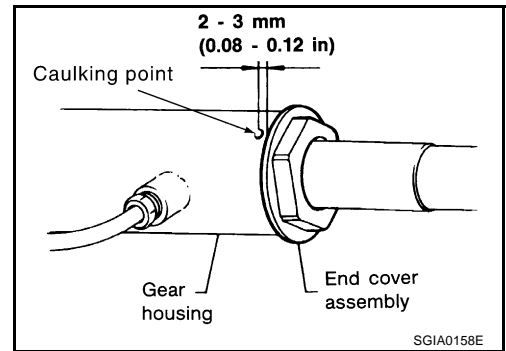
**Do not damage rack surface. If it damaged, it may cause oil leak. Replace rack assembly.**



A  
B  
C  
D  
E  
F  
PS  
H  
I  
J  
K  
L  
M

# POWER STEERING GEAR

6. After tightening end cover, caulk cylinder at one point as shown in figure using a punch. This will prevent end cover from getting loose.



7. Install an O-ring to the gear housing assembly.

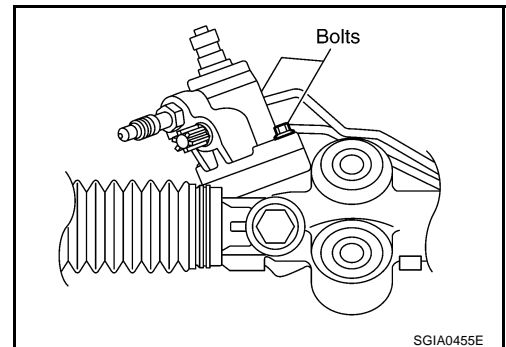
**CAUTION:**

**Do not reuse O-ring.**

8. Install sub-gear assembly to gear housing assembly.  
9. Install mounting bolts to rear housing. Tighten them at specified torque.

**Tightening torque:**

**16 - 20 N-m (1.7 - 2.0 kg-m, 12 - 14 ft-lb)**



10. Attach lock plate in the rack.

**CAUTION:**

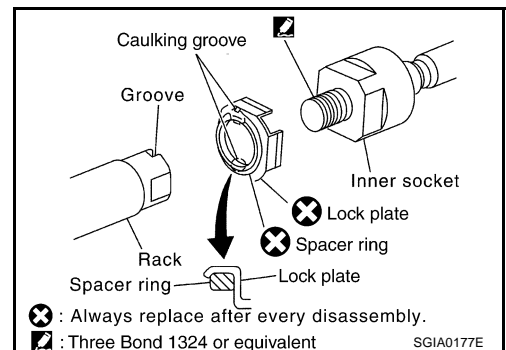
**Do not reuse lock plate.**

- a. Position spacer ring to rack.

**CAUTION:**

**Do not reuse spacer ring.**

- b. Install lock plate in the inner socket.  
c. Apply thread lock adhesive (Three Bond 1324 or equivalent. Refer to [GI-45, "RECOMMENDED CHEMICAL PRODUCTS AND SEALANTS"](#)) to thread of inner socket. Screw inner socket into rack and tighten at specified torque.



**Tightening torque : 79 - 98 N-m (8.1 - 9.9 kg-m, 59 - 72 ft-lb)**

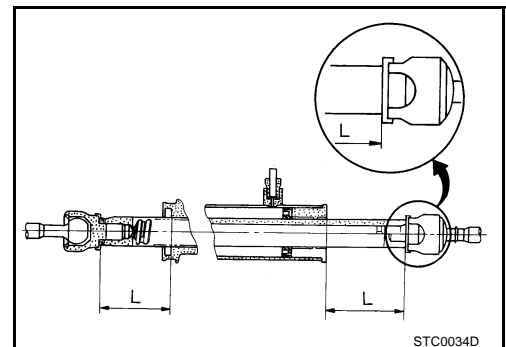
- d. Caulk lock plate at two points on rack slit.  
e. Install spacer ring to lock plate as shown in the figure.

**CAUTION:**

**When installing spacer ring, avoid damaging it.**

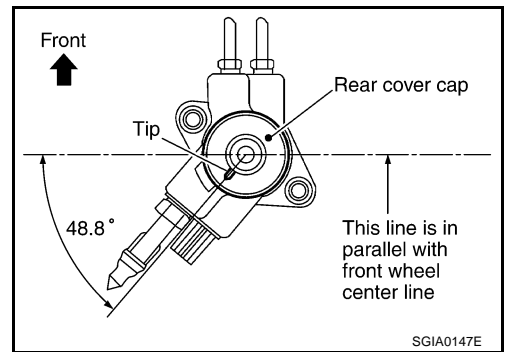
11. Decide neutral position of rack gear.

**Rack stroke "L" : 66.6 mm (2.622 in)**

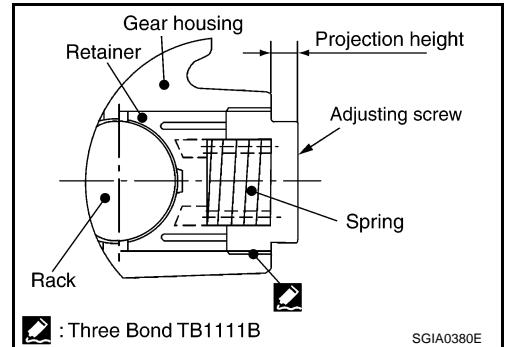


# POWER STEERING GEAR

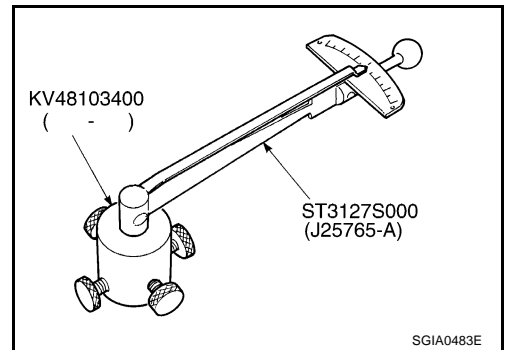
12. Install rear cover cap to the sub-gear assembly, holding relation between projection part (Tip) of rear cover on the sub-gear assembly and the line that is in parallel with front wheel center line as shown in the figure.



13. Apply thread locking adhesive (Three Bond TB1111B or equivalent. Refer to [GI-45, "RECOMMENDED CHEMICAL PRODUCTS AND SEALANTS"](#) ) to the thread of adjusting screw, and screw it to the projection height from the gear housing. The projection height is the same as it is measured in the overhaul in advance.
14. Rotate ten times throughout whole range of pinion so that parts fit with each other.



15. Measure pinion rotation torque with preload gauge (SST), then confirm whether its reading is within the specific range. If the reading is not within the specific range, readjust screw angle with adjusting screw. Change gear assembly with new one, if the reading is still not within the specific range or the rotation torque of adjusting screw is less than 5 N·m (0.51 kg·m, 44 in-lb)



## Pinion rotation torque:

Around neutral position (within  $\pm 100^\circ$ )

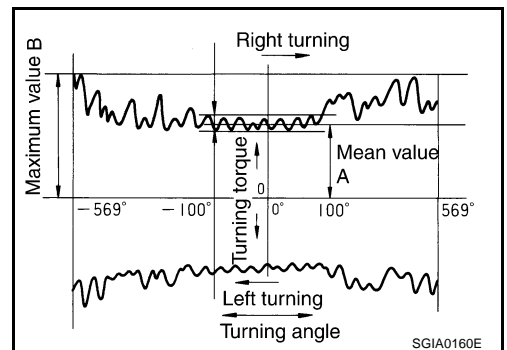
Average "A":

0.8 - 2.0 N·m (0.09 - 0.20 kg·m, 7 - 17 in-lb)

Other than above (more than  $\pm 100^\circ$ )

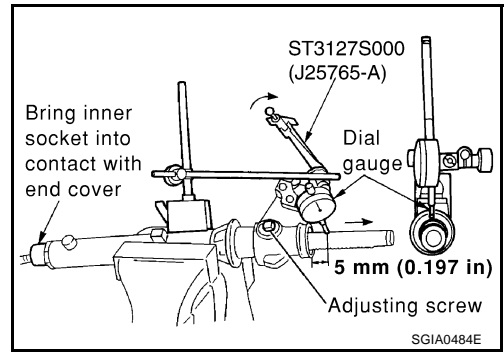
Maximum variation "B":

2.3 N·m (0.23 kg·m, 20 in-lb)



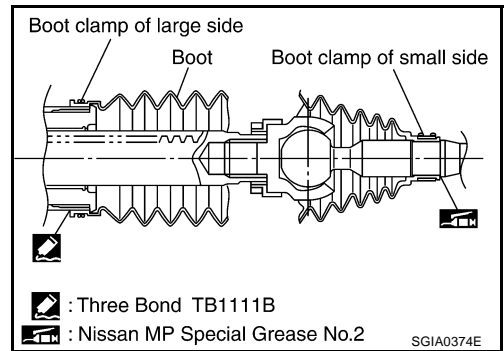
# POWER STEERING GEAR

16. Turn sub-gear assembly fully to the end of the left.
17. Set dial gauge as shown in figure. Measure vertical movement of rack when pinion is turned counterclockwise with torque of 19.6 N·m (2.0 kg-m, 14 ft-lb). Check reading is within range specified. If reading is outside of specification, readjust screw angle with the adjusting screw. If reading is still outside of specification, or if the rotation torque of adjusting screw is less than 5 N·m (0.51kg-m, 44 in-lb), replace power steering gear.



Specified amount of vertical movement with rack	Less than 0.265 mm (0.010 in)	
Measuring point	Shaft direction of rack	5 mm (0.197 in) away from end of gear hosing assembly
	Radius direction of rack	Shaft direction of adjusting screw

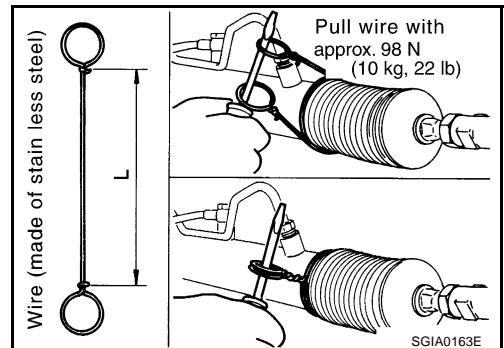
18. Install large-diameter side of boot to the gear hosing assembly.
19. Install small-diameter side of boot to inner socket boot mounting groove.
20. Install boot clamp to small-diameter side of boot.



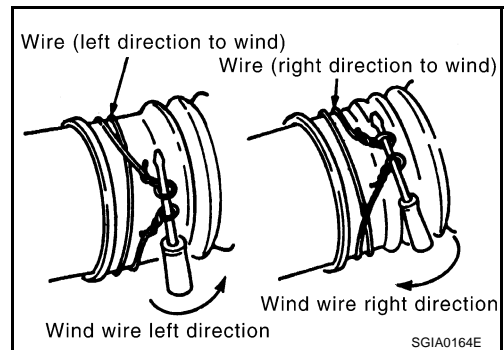
21. Tighten boot clamp.
  - a. Tighten large-diameter sides of RH/LH boot with boot clamp (stainless wire).

**Wire length "L" : 370 mm (14.57 in)**

- b. After wrapping clamp around boot groove for two turns, insert screwdriver in loop on both ends of wire. Twist 4 to 4.5 turns while pulling with a force of approx. 98 N (10 kg, 22.1 lb).

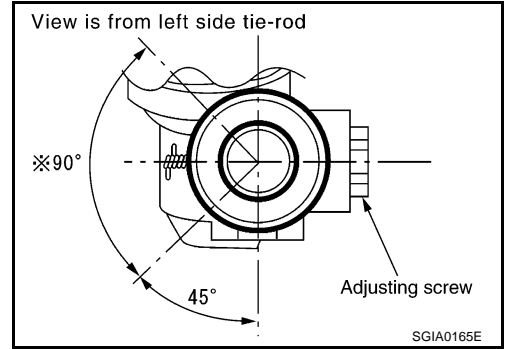


- c. Twist boot clamp as shown in the figure, pay attention to relationship between winding and twisting directions.

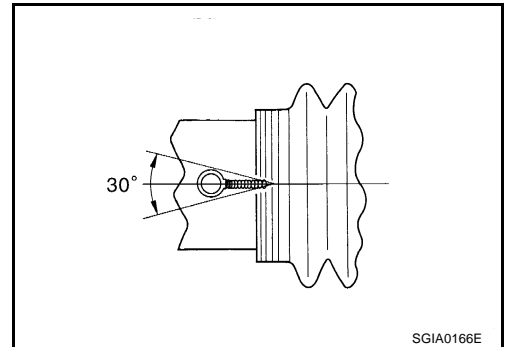


# POWER STEERING GEAR

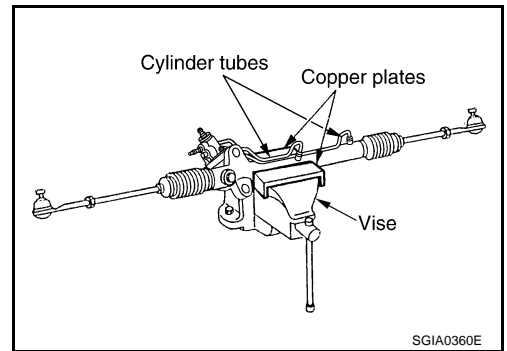
- d. Confirm the twisted point with clamp opposite to the adjusting screw within 90° as shown in the figure.



- e. After twisting wire 4 to 4.5 turns, bend cut end of wire. Cut end of wire should not touch boot. Be sure wire end is at least 5 mm (0.20 in) away from clearance for tube.



22. Install cylinder-tubes to the gear housing assembly.

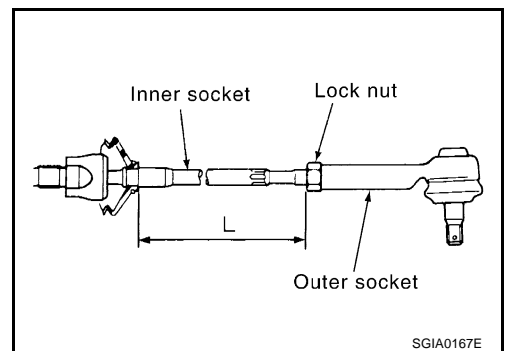


23. Install lock nut and outer socket to inner socket, then tighten temporarily lock nut until length of tie rod is specification. Specified tightening torque with lock nut, refer to [PS-15, "Component"](#)

**Tie rod length "L" : 106.3 mm (4.185 in)**

**CAUTION:**

Perform toe-in adjustment after this procedure. Length achieved after toe-in adjustment is not necessarily value given here.



A  
B  
C  
D  
E  
F  
PS  
H  
I  
J  
K  
L  
M

# POWER STEERING OIL PUMP

PFP:49110

## POWER STEERING OIL PUMP

### On-Vehicle Service

#### CHECKING RELIEF OIL PRESSURE

AGS0000H

Before starting work, confirm belt tension is proper.

1. Connect oil pressure gauge (special service tool) and oil pressure gauge adapter (special service tool) between the oil pump outlet connector and high pressure hose, then bleed air from the hydraulic circuit.
2. Start engine. Allow engine to run until reservoir tank temperature reaches 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 the power steering pump increases to maximum. This will raise fluid temperature abnormally.
  - Be careful not to contact hose with belt when engine is started.
3. With engine at idle, close oil pressure gauge valve (Special Service Tool) and read the relief oil pressure.

#### Relief oil pressure specification:

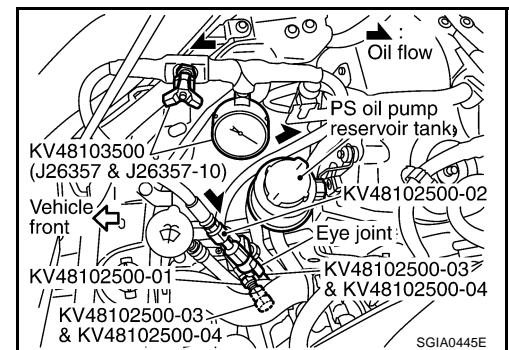
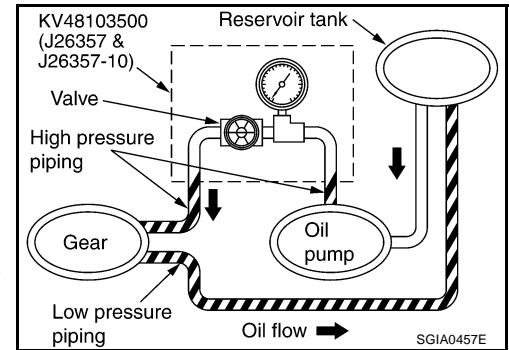
9,600 - 10,200 kPa (98 - 104 kg/cm<sup>2</sup> , 1,390 - 1,480 psi)

4. After measurement, open the valve slowly.

#### CAUTION:

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

- If relief oil pressure is outside the specification, disassemble and service the oil pump. Refer to [PS-25, "Disassembly and Assembly"](#).
5. After inspection, remove oil pressure gauge (special service tool) and oil pressure gauge adapter (special service tool) from the hydraulic circuit, add fluid and bleed air from the hydraulic circuit thoroughly. Refer to [PS-6, "Air Bleeding from Hydraulic System"](#).



## CHECKING AND ADJUSTING DRIVE BELTS (FOR POWER STEERING)

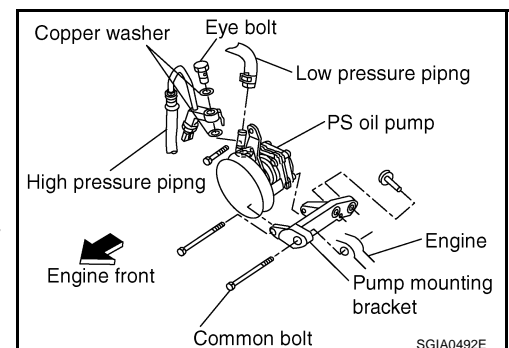
Refer to MA section, [MA-13, "Checking Drive Belts"](#).

## Removal and Installation

### REMOVAL

AGS0000I

1. Remove engine cover.
2. Remove air cleaner box.
3. Drain water from radiator, then remove radiator upper hose.
4. Remove radiator fan shroud. Refer to [CO-14, "Removal and Installation"](#).
5. Loosen idler pulley, then remove belt.
6. Drain power steering fluid from reservoir tank.
7. Remove piping of high pressure and low pressure (drain fluid from their pipings)
8. Remove bolt common to water pump and power steering pump using power tool.
9. Remove bolt then remove power steering pump using power tool.



### INSTALLATION

Install the components in the reverse order of removal. Refer to [PS-28, "HYDRAULIC LINE"](#).

- After installation, adjust belt tension. Refer to [EM-13, "DRIVE BELTS"](#).

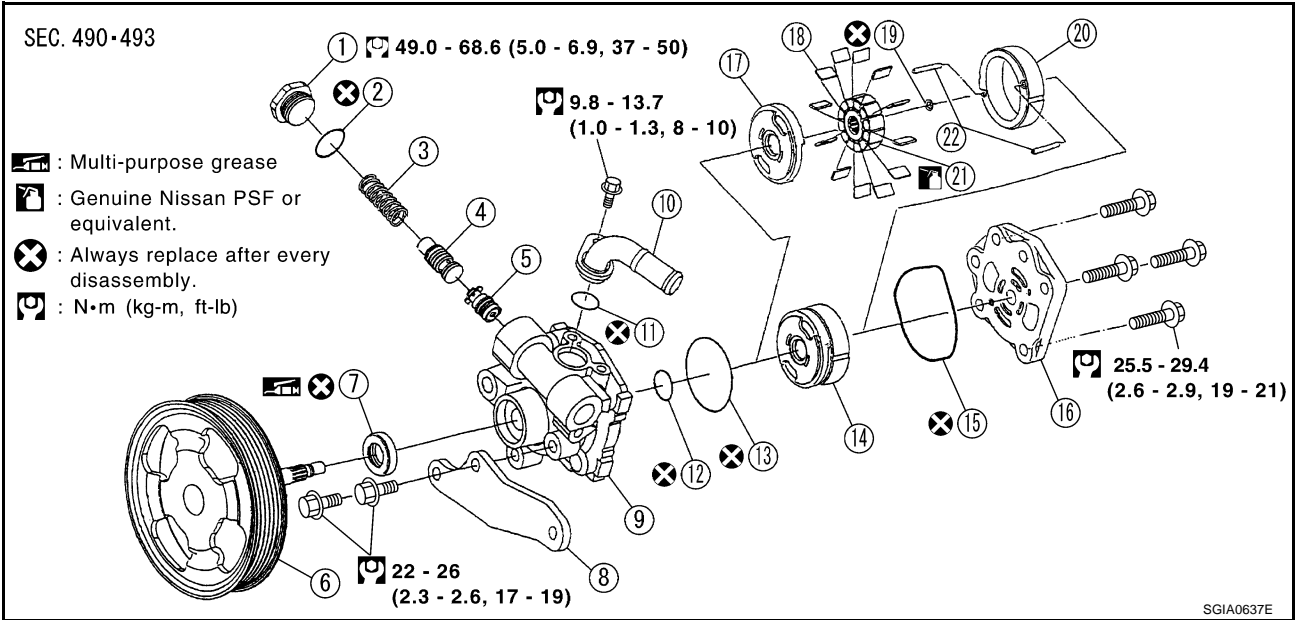


# POWER STEERING OIL PUMP

- After installation, bleed air from engine coolant.
- After installation, bleed air. Refer to [PS-6, "Air Bleeding from Hydraulic System"](#).

## Disassembly and Assembly

AGS0000J

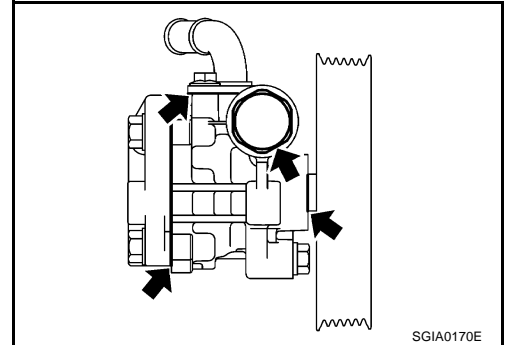


- |                                |                                |                              |
|--------------------------------|--------------------------------|------------------------------|
| 1. Plug                        | 2. O-ring D                    | 3. Flow control valve spring |
| 4. Relief valve assembly       | 5. Flow control valve assembly | 6. Shaft kit                 |
| 7. Oil seal                    | 8. Bracket                     | 9. Body assembly             |
| 10. Suction connector assembly | 11. O-ring E                   | 12. O-ring C                 |
| 13. O-ring B                   | 14. Cartridge assembly         | 15. O-ring A                 |
| 16. Cover assembly             | 17. Side plate                 | 18. Vane                     |
| 19. Rotor snap ring            | 20. Cam ring                   | 21. Rotor                    |
| 22. Dowel pin                  |                                |                              |

## PRE-DISASSEMBLY INSPECTION

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

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



## DISASSEMBLY

1. Secure power steering pump in a vise.

### CAUTION:

**Be sure to place aluminum plates or something similar between surface of the steering pump and the vise to prevent scratches or damage to the pump surface.**

2. Remove bracket from body assembly.
3. Remove cover assembly from body assembly.
4. Remove O-ring A from body assembly.

# POWER STEERING OIL PUMP

5. Remove rotor snap ring and remove shaft kit from the body assembly.

**CAUTION:**

**When removing rotor snap ring, be careful not to damage the pulley shaft of the shaft kit.**

6. Remove cam ring, rotor, vane, side plate, O-ring B and O-ring C from body assembly.

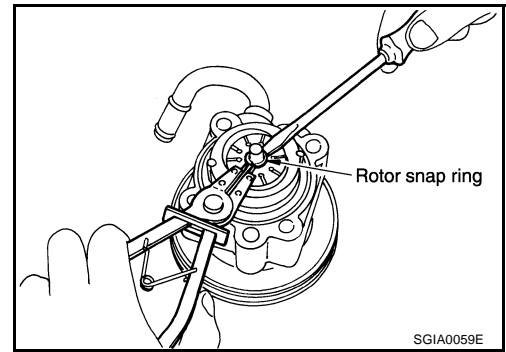
7. Remove plug, then remove flow control valve spring, relief valve assembly and flow control valve assembly from body assembly.

**CAUTION:**

**Be careful not to drop and deform either the relief valve assembly or the flow control valve assembly.**

8. Remove oil seal from body assembly using the flat-bladed screwdriver.

9. Remove one bolt of the suction connector assembly, then remove suction connector assembly and O-ring E.



## INSPECTION AFTER DISASSEMBLY

### Body Assembly and Cover Assembly Inspection

- Check body assembly and cover assembly for damage. If any damage is found, replace with new part for cover assembly, and replace with new power steering pump assembly for body assembly.

### Cartridge Assembly Inspection

- Check cam ring, side plate, rotor and vanes for damage. If any damage is found, replace cartridge assembly with new one.

### Relief Valve Assembly Inspection

- Check relief valve assembly for damage. If any damage is found, replace it with new one.

## ASSEMBLY

Before assembling, clean part and protect the pump from contamination.

1. Apply a coat of multi-purpose grease to the oil seal lip. Using a taped 22mm (0.87in) socket, install it to the end of body assembly.

**CAUTION:**

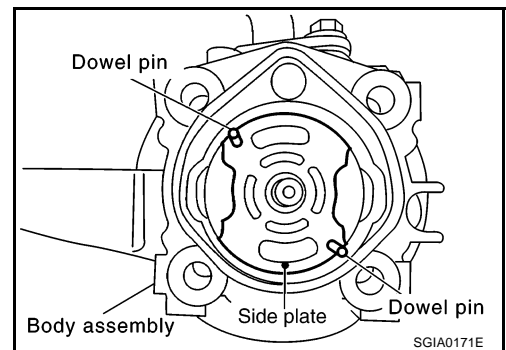
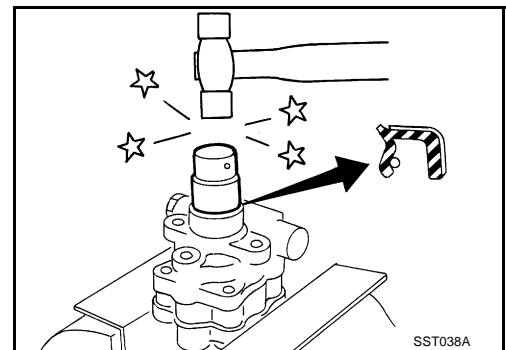
**Do not reuse oil seal.**

2. Install shaft kit in the body assembly.
3. Install O-ring B and O-ring C to the body assembly.

**CAUTION:**

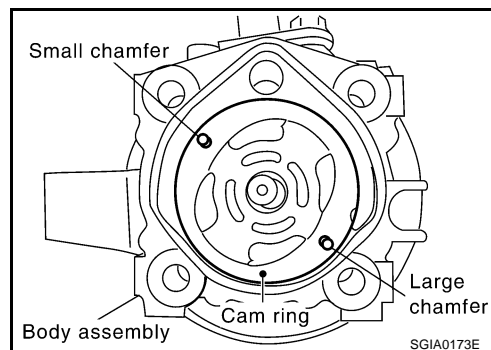
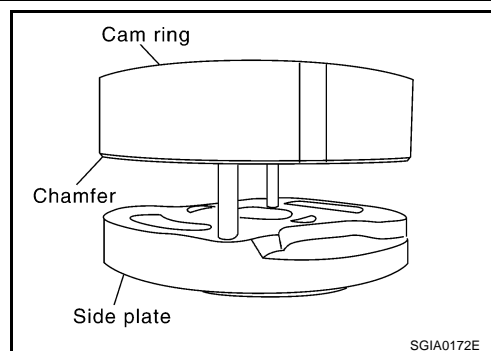
**Do not reuse O-ring.**

4. Set dowel pin at the illustration position (The position is the same regardless of right or left direction), and install side plate to the body assembly.



## POWER STEERING OIL PUMP

5. Turn the chamfered edge side of cam ring to the side plate as shown in the figure and turn the round hole side with large chamfer of cam ring to the direction in the figure, then install it to the body assembly.



6. Install the rotor to shaft of shaft kit (rotor direction is the same regardless of the front and back).
7. Install vanes to rotor (vane direction is the same regardless of inside and outside).
8. Install rotor snap ring to the shaft of shaft kit.

**CAUTION:**

- Do not reuse rotor snap ring.
- Be careful not to damage rotor and shaft of shaft kit.
- If rotor is damaged, cartridge assembly must be replaced with new one.

9. Install O-ring A to the body assembly.

**CAUTION:**

**Do not reuse O-ring A.**

10. Apply Genuine Nissan PSF or equivalent to rotor.
11. Fix power steering pump in a vise.

**CAUTION:**

**When fixing pump in a vise, use aluminum plates to protect steering pump mounting surface.**

12. Attach cover assembly to pump assembly and tighten four mounting bolts diagonally at specified torque.

**CAUTION:**

- Be careful not to damage the thread, do not use the power tool.

13. Install flow control valve assembly, relief valve and flow control valve spring to the body assembly.

14. Install O-ring D to the plug, tighten plug at specified torque.

**CAUTION:**

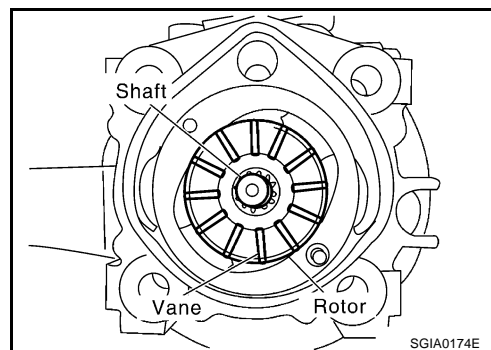
**Do not reuse O-ring D.**

15. Install O-ring E to suction connector assembly, and install suction connector assembly to the body assembly. Tighten one mounting bolt at specified torque.

**CAUTION:**

**Do not reuse O-ring E.**

16. Install bracket to body assembly, and tighten the two mounting bolts at specified torque.



A  
B  
C  
D  
E  
F  
PS  
H  
I  
J  
K  
L  
M

## HYDRAULIC LINE

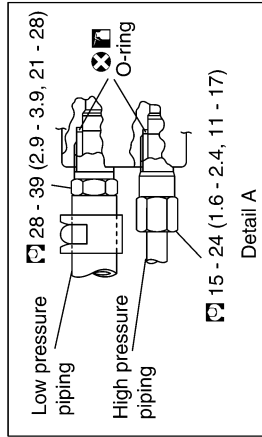
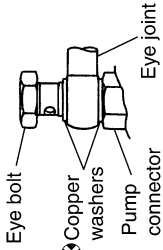
PFP:49721

### Removal and Installation

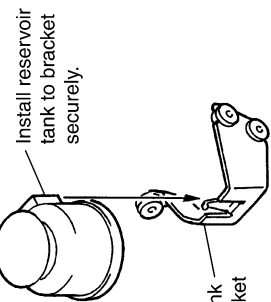
AGS0001N

#### SEC.497

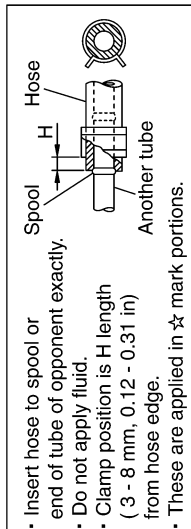
How to install eye joint :  
Bring eye joint contact with installation face of pump connector correctly, tighten eye bolt by hand, then tighten it at specified torque.



3.0 - 3.9 (0.31 - 0.39, 27 - 34)



Reservoir tank installation



- Insert hose to spool or end of tube of opponent exactly.
- Do not apply fluid.
- Clamp position is H length (3 - 8 mm, 0.12 - 0.31 in) from hose edge.
- These are applied in ☆ mark portions.

Install with position mark facing to return port.

Suction hose

Install with position mark facing to out of vehicle.

Return hose

Tube & hose set

Closing plate

Suction hose

Install with AM6 mark facing front of vehicle.

☆ (insert hose into opponent spool.)

Install the projection to cut portion of pump outlet securely.

Engine side bracket

Engine

PS oil pump

Detail B

44.1-52.0 (4.5-5.3, 33-38)

56.9-65.7 (5.8-6.7, 42-48)

56.9-65.7 (5.8-6.7, 42-48)

56.9-65.7 (5.8-6.7, 42-48)

56.9-65.7 (5.8-6.7, 42-48)

56.9-65.7 (5.8-6.7, 42-48)

56.9-65.7 (5.8-6.7, 42-48)

56.9-65.7 (5.8-6.7, 42-48)

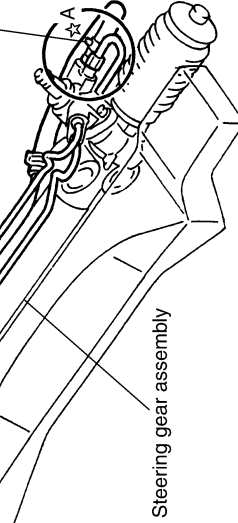
56.9-65.7 (5.8-6.7, 42-48)

56.9-65.7 (5.8-6.7, 42-48)

3.0 - 3.9 (0.31 - 0.39, 27 - 34)

Install on upper bracket of rack mounting.

Install with position mark turning to top of vehicle.



Connect pressure sensor to opponent harness connector securely.

Side member

Engine side bracket

56.9-65.7 (5.8-6.7, 42-48)

56.9-65.7 (5.8-6.7, 42-48)

56.9-65.7 (5.8-6.7, 42-48)

56.9-65.7 (5.8-6.7, 42-48)

56.9-65.7 (5.8-6.7, 42-48)

56.9-65.7 (5.8-6.7, 42-48)

56.9-65.7 (5.8-6.7, 42-48)

56.9-65.7 (5.8-6.7, 42-48)

☆ : N·m (kg·m, in·lb)

⊗ : N·m (kg·m, ft·lb)

⊠ : Apply Genuine Nissan PSF or equivalent.

⊗ : Always replace after every disassembly.



Vehicle front

SGIA0638E

# SERVICE DATA AND SPECIFICATIONS (SDS)

## SERVICE DATA AND SPECIFICATIONS (SDS)

PFP:00030

### Steering Wheel

AGS0000K

Steering wheel free play	35 mm (1.38 in) or less
Steering wheel axial end play	0 mm (0 in)

### Steering Angle

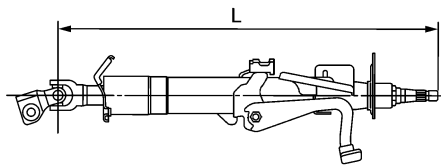
AGS0000L

Drive type	2WD	
Inner wheel Degree minute (Decimal degree)	Minimum	37°30' (37.5°)
	Nominal	40°30' (40.5°)
	Maximum	41°30' (41.5°)
Outer wheel Degree minute (Decimal degree)	Nominal	32°30' (32.5°)

### Steering Column

AGS0000M

Steering column length "L"	547 - 549 mm (21.54 - 21.61 in)
----------------------------	---------------------------------

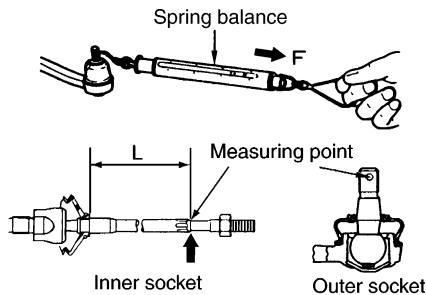


SGIA0145E

### Steering Linkage

AGS0000N

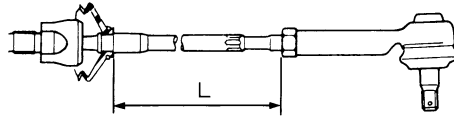
Steering gear type	PR26AD	
Tie rod ball joint outer socket	Swing torque	0.30 - 2.90 N·m (0.03 - 0.29 kg-m, 3-25in-lb)
	Measurement on spring balance (Measuring point: stud bolt hole)	4.42 - 42.7 N (0.45 - 4.3 kg, 1.0 - 9.6 lb)
	Rotating torque (outer socket only)	0.30 - 2.90 N·m (0.03 - 0.29 kg-m, 3 - 25 in-lb)
	Axial end play	0.5 mm (0.02 in) or less
Tie rod ball joint inner socket	Swinging torque	1.0 - 7.8 N·m (0.11 - 0.79 kg-m, 9 - 69 in-lb)
	Measurement on spring balance (measuring point: ↓ mark see below)	10 - 78 N (1.1 -7.9 kg, 2.43 - 17.44 lb)
	Axial end play	0.2 mm (0.08 in) or less



SGIA0493E

# SERVICE DATA AND SPECIFICATIONS (SDS)

Steering gear type	PR26AD
Tire rod length "L"	106.3 mm (4.185 in)

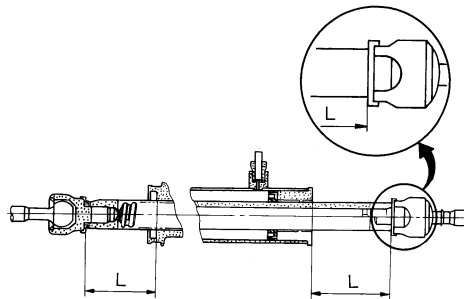


STC1030D

## Steering Gear

AGS00000

Steering gear model	PR26AD
Rack neutral position, dimension "L" (rack stroke)	66.6 mm (2.622 in)



STC0034D

## Oil Pump

AGS0000P

Oil pump relief hydraulic pressure	9,600 - 10,200 kPa (98 - 104 kg/cm <sup>2</sup> , 1,390 - 1,480 psi)
------------------------------------	----------------------------------------------------------------------

## Steering Fluid

AGS0000Q

Fluid capacity	Approx. 1.0 ℓ (1-1/8 US qt, 7/8 Imp qt)
----------------	-----------------------------------------