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# SECTION PS

## POWER STEERING SYSTEM

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# PRECAUTIONS

## PRECAUTIONS

PF0:00001

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

EGS0001S

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

EGS0001T

- 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.
- For easier and proper assembly, place disassembled parts in order on a parts rack.
- 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 or equivalent to hydraulic parts. Petroleum jelly 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

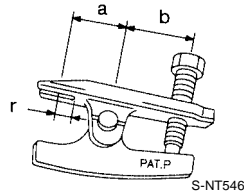
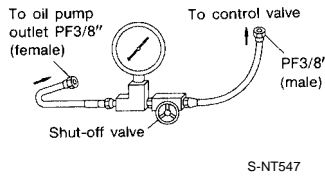
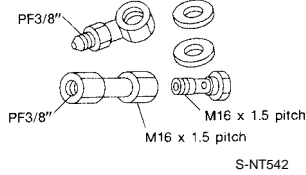
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### Special Service Tools

EGS000KN

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

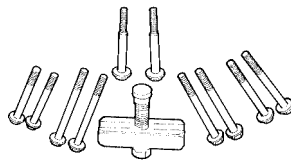
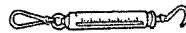
Tool number (Kent-Moore No.) Tool name	Description
KV48102500 (J-33914) Pressure gauge adapter	Measuring oil pressure
KV48103500 (J-26357 and J-26357-10) Pressure gauge	Measuring oil pressure
HT72520000 (J-25730-A) Ball joint remover	Removing ball joint <b>a: 33 mm (1.30 in)</b> <b>b: 50 mm (1.97 in)</b> <b>r: 11.5 mm (0.453 in)</b>



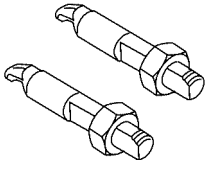
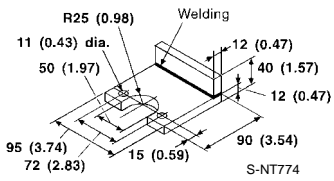
## Commercial Service Tool

EGS000KO

Tool number	Description
Spring gauge	Measuring steering wheel turning force or rack sliding force
(J-1859-A) Steering wheel puller	Removing steering wheel



# PREPARATION

Tool number	Description
<p>(J-42578) Steering wheel puller legs</p>  <p>LHIA0044E</p>	<p>Removing steering wheel</p>
<p>Oil pump attachment</p>  <p>S-NT774</p>	<p>Disassembling and assembling oil pump Unit: mm (in)</p>

# NOISE, VIBRATION, AND HARSHNESS (NVH) TROUBLESHOOTING

## NOISE, VIBRATION, AND HARSHNESS (NVH) TROUBLESHOOTING

PFP:00003

### NVH Troubleshooting Chart

EGS0001W

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

Symptom	Possible cause and SUSPECTED PARTS																Reference page											
	Noise	Shake	Vibration	Shimmy	Shudder	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	
	x					x	x	x	x	x	x	x	x	x														<a href="#">PS-6</a>
	x																										<a href="#">PS-6</a>	
	x																										<a href="#">PS-18</a>	
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	x																										<a href="#">PS-7</a>	
	x																										<a href="#">PS-19</a>	
	x																										<a href="#">MA-12, "CHECKING DRIVE BELTS"</a>	
																											<a href="#">PS-7</a>	
																											<a href="#">PS-13</a>	
																											<a href="#">PS-14</a>	
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																											<a href="#">PS-13</a>	
																											<a href="#">PS-14</a>	
																											<a href="#">FAX-4, "NVH Troubleshooting Chart"</a>	
																											<a href="#">FAX-4, "NVH Troubleshooting Chart"</a>	
																											<a href="#">FSU-5, "NVH Troubleshooting Chart"</a>	
																											<a href="#">WT-3, "NVH Troubleshooting Chart"</a>	
																											<a href="#">WT-3, "NVH Troubleshooting Chart"</a>	
																											<a href="#">BR-5, "NVH Troubleshooting Chart"</a>	

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# POWER STEERING FLUID

PPF:KLF20

## POWER STEERING FLUID

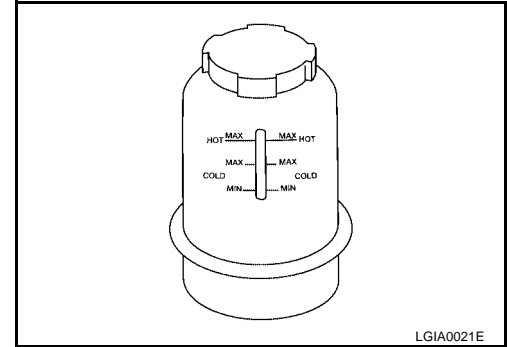
EGS000IX

### Checking Fluid Level

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

#### CAUTION:

- Do not overfill.
- Do not reuse any used power steering fluid.
- Recommended fluid is Genuine NISSAN PSF or equivalent. Refer to [MA-10, "RECOMMENDED FLUIDS AND LUBRICANTS"](#).



### Checking Fluid Leakage

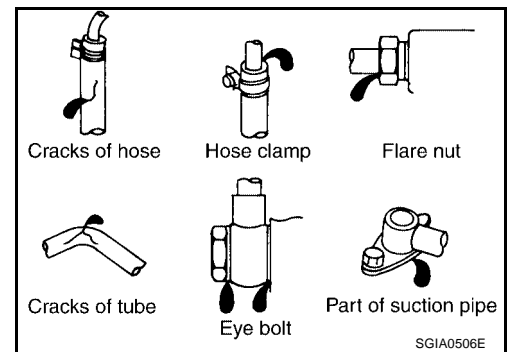
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Check the lines for improper attachment and for leaks, cracks, damage, loose connections, chafing and deterioration.

1. Run engine between idle speed and 1,000 rpm. Make sure temperature of fluid in oil tank rises to 60° – 80°C (140° – 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.**

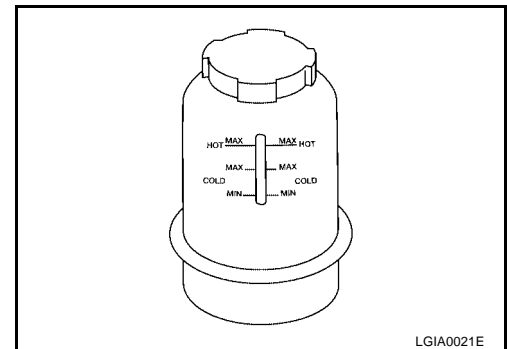


4. If fluid leakage at connectors is noticed, loosen flare nut and then retighten. Do not overtighten connector as this can damage O-ring, washer and connector.
5. If fluid leakage from power steering oil pump is noticed, check the power steering oil pump. Refer to [PS-23, "INSPECTION AFTER DISASSEMBLY"](#).
6. Check steering gear boots for accumulation of power steering fluid, indicating a steering gear leak.

### Bleeding Hydraulic System

EGS000IZ

1. Raise the front end of vehicle until the wheels are clear of the ground.
2. Add Genuine NISSAN PSF or equivalent into the steering fluid reservoir tank to the specified level. Refer to [MA-10, "RECOMMENDED FLUIDS AND LUBRICANTS"](#). Then quickly turn the steering wheel fully to right and left and lightly touch steering stoppers. Repeat steering wheel operation until the fluid level no longer decreases.



3. Start the engine then repeat step 2 above. Incomplete air bleeding will cause the following symptoms:
  - Air bubbles in reservoir tank
  - Clicking noise in oil pump
  - Excessive buzzing in oil pump

If this happens, bleed out the air repeating step 2 above. 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.

# STEERING WHEEL

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## STEERING WHEEL

### On-Vehicle service

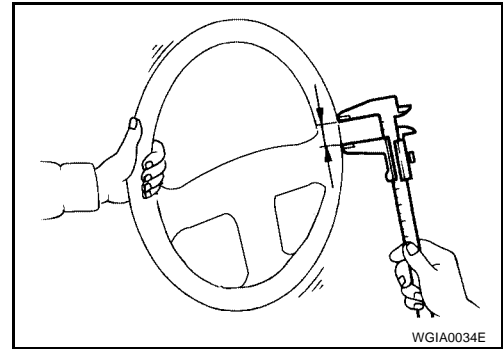
#### CHECKING STEERING WHEEL PLAY

- 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 looseness or worn components:
  - Steering gear assembly
  - Steering column
  - Front suspension and axle
  - Check steering system for looseness while moving the steering wheel in all directions.

**Axial end play : 0 mm (0 in)**



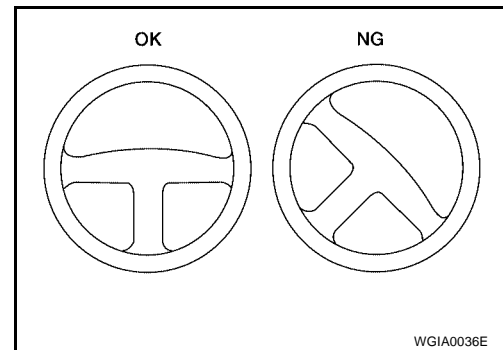
#### CHECKING NEUTRAL POSITION ON STEERING WHEEL

##### Pre-checking

- Make sure that wheel alignment is correct. Refer to [FSU-19, "Front Wheel Alignment \(Unladen\\*1\)"](#).
- Verify that the steering gear is centered before removing the steering wheel.

##### Checking

- Check that the steering wheel is in neutral position when driving straight ahead.
- If it is not in neutral position, remove the steering wheel and reinstall it correctly.
- 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.



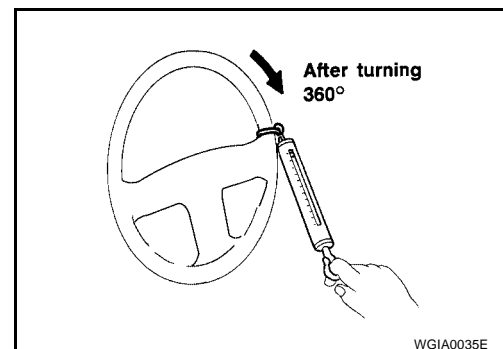
#### CHECKING STEERING WHEEL TURNING FORCE

- Park vehicle on a level, dry surface and set parking brake.
- Start engine.
- Bring power steering fluid up to adequate operating temperature. Make sure the fluid temperature is approximately 60° – 80°C (140° – 176°F). Tires need to be inflated to normal pressure.
- Check steering wheel turning force using Tool when steering wheel has been turned 360° from the neutral position.

**Tool number : J-44372**

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

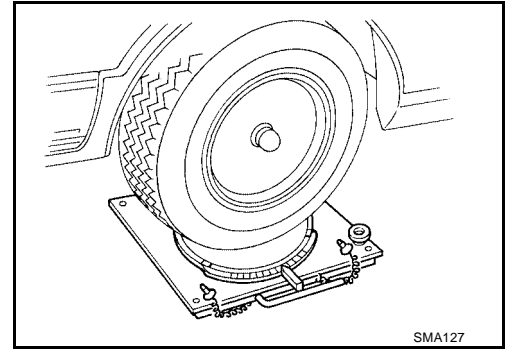
- If steering wheel turning force is out of specification, check rack sliding force. Refer to [PS-14, "CHECKING RACK SLIDING FORCE"](#).
- If rack sliding force is not within specifications, adjust rack sliding force. Refer to [PS-19, "Adjustment for Rack Sliding Force"](#).
- If rack sliding force is OK, inspect steering column. Refer to [PS-13, "Inspection"](#).
- If the steering column is OK, check the fluid pressure. Refer to [PS-21, "CHECKING HYDRAULIC SYSTEM"](#).



# STEERING WHEEL

## FRONT WHEEL TURNING ANGLE

1. Rotate steering wheel all the way right and left; measure turning angle. Refer to [FSU-19, "General Specifications \(Front\)"](#) .
2. If it is not within specifications, check rack stroke. Refer to [PS-29, "Steering Gear and Linkage"](#) .



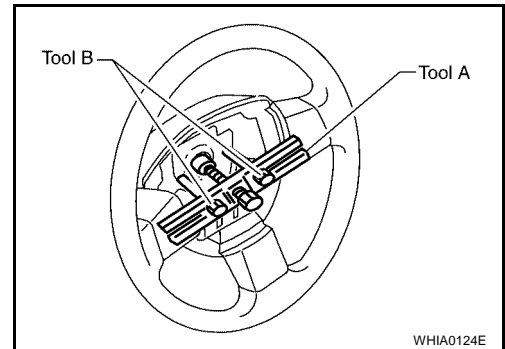
## Removal and Installation

### REMOVAL

1. Set the front wheels in the straight-ahead position.
2. Remove the driver air bag module. Refer to [SRS-44, "Removal and Installation"](#) .
3. Remove the steering wheel center nut.
4. Remove the steering wheel using Tools.

**Tool number**    **A: J-1859-A**  
                             **B: J-42578**

5. Place a piece of tape across the spiral cable so it will not be rotated out of position.
6. Inspect the steering wheel near the puller holes for damage. If damaged, replace the steering wheel.



## INSTALLATION

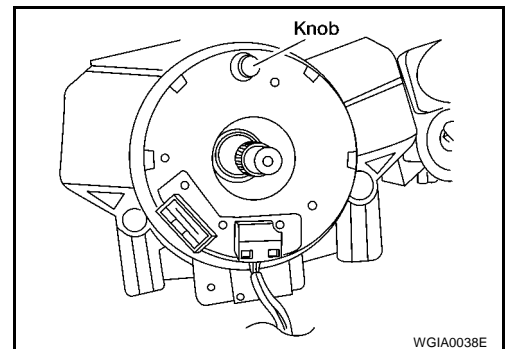
Installation is in the reverse order of removal.

**Steering wheel center nut**    **: 34.3 N·m (3.5 kg·m,  
25 ft·lb)**

- Align spiral cable correctly when installing steering wheel. Make sure that the spiral cable is in the neutral position. The neutral position is detected by turning left 2.6 revolutions from the right end position and ending with the knob at the top.

### 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 2.6 turns from the neutral position to both the right and left.)





# STEERING COLUMN

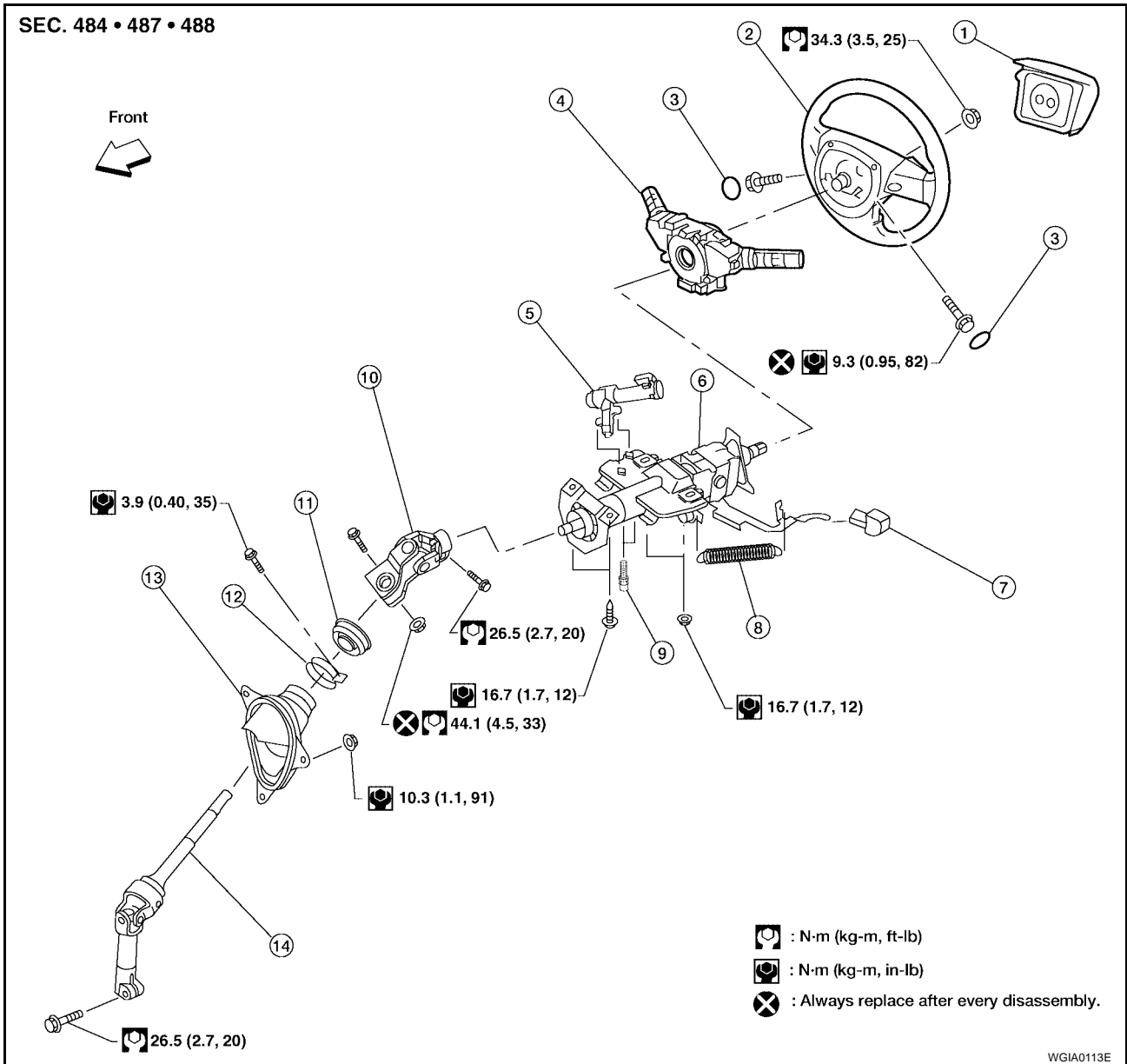
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## STEERING COLUMN

### Removal and Installation

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- |  |                     |                              |
|--|---------------------|------------------------------|
| 1. Driver air bag module               | 2. Steering wheel   | 3. Steering wheel side cover |
| 4. Combination switch and spiral cable | 5. Ignition switch  | 6. Steering column assembly  |
| 7. Tilt lever knob                     | 8. Spring           | 9. Self-shear bolt           |
| 10. Upper joint                        | 11. Hole cover seal | 12. Clamp                    |
| 13. Hole cover                         | 14. Lower joint     |                              |

#### CAUTION:

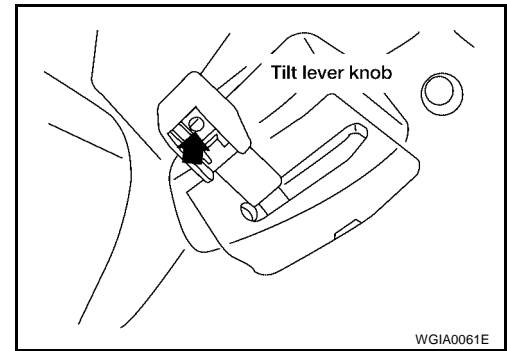
- Care must be taken not to give axial impact to steering column assembly during removal and installation.
- Care must be taken not to move steering gear during removal of steering column assembly.

#### REMOVAL

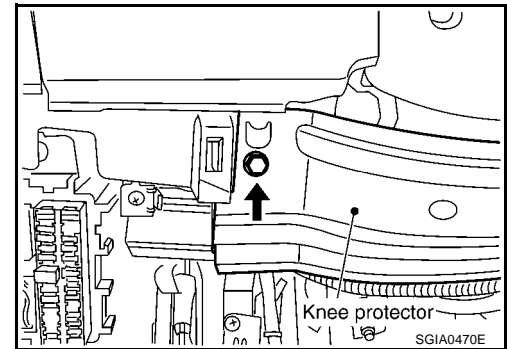
1. Remove spiral cable from steering column assembly with combination switches attached. Refer to [SRS-46, "Removal and Installation"](#).

## STEERING COLUMN

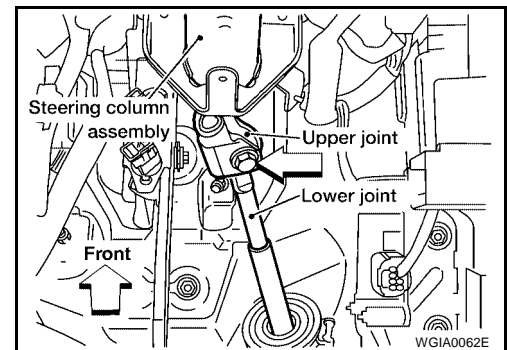
2. Remove tilt lever knob from tilt lever by inserting a suitable tool into slot of tilt knob, then depress tab and withdraw tilt lever knob.



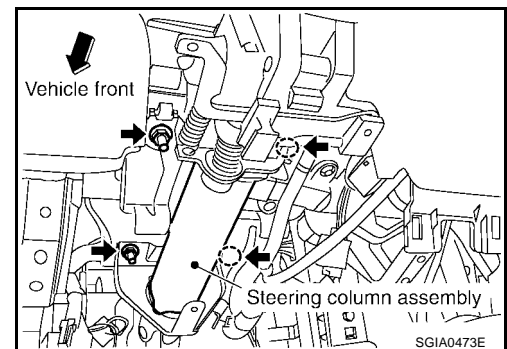
3. Remove instrument driver lower panel. Refer to [IP-10, "Removal and Installation"](#).
4. Remove steering column cover and ignition key finisher. Refer to [IP-10, "Removal and Installation"](#).
5. Remove mounting screws of knee protector, then remove knee protector from vehicle.



6. Remove lock nut and bolt, then separate lower joint from upper joint.



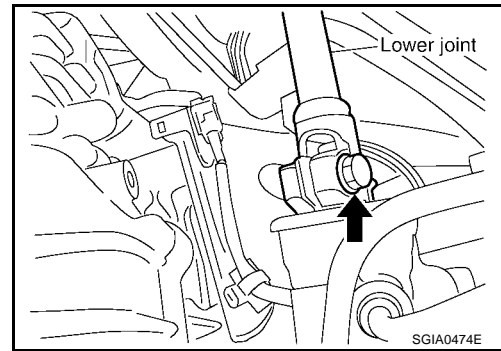
7. Remove mounting nuts from steering member, remove steering column assembly from steering member.



8. Remove hole cover seal and clamp.
9. Remove mounting nuts, then remove hole cover from dash panel.

# STEERING COLUMN

10. Raise vehicle, then remove mounting bolt (lower side) of lower joint and remove lower joint from vehicle.

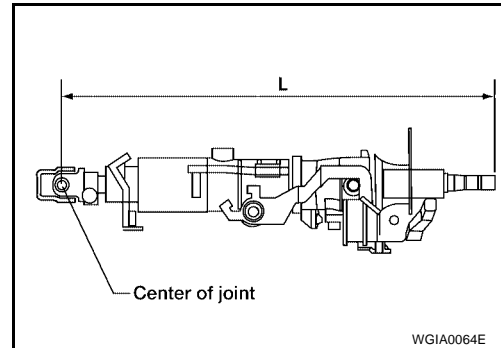


## INSPECTION AFTER REMOVAL

- Check for damage to steering column jacket tube, if damage is found, replace steering column with new one.
- If vehicle has been in a collision, or if noise and rattles are heard during a turn, check the column length "L" as shown. If out of specification, replace the steering column as an assembly.

**Steering column length "L" : 428 mm (16.85 in)**

- Check for proper lubrication, apply grease as necessary.



## INSTALLATION

Installation is in the reverse order of removal.

- Tighten the nuts and bolts to the specified torque. Refer to [PS-9, "Removal and Installation"](#).

### NOTE:

Do not reuse non-reusable parts.

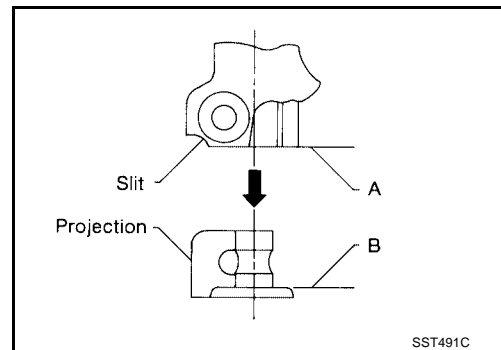
- When installing steering column to steering member, install mounting nut from front side of vehicle.

### CAUTION:

**When installing the steering column, finger-tighten all of the lower bracket and joint retaining bolts; then tighten them to specification. Do not apply undue stress to the steering column.**

### NOTE:

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

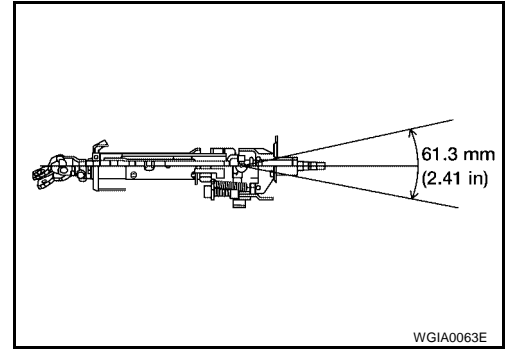


- After installation, turn steering wheel to make sure it moves smoothly. Ensure the number of turns are the same from the straight-forward position to left and right locks. Be sure that the steering wheel is in a neutral position when driving straight ahead.

# STEERING COLUMN

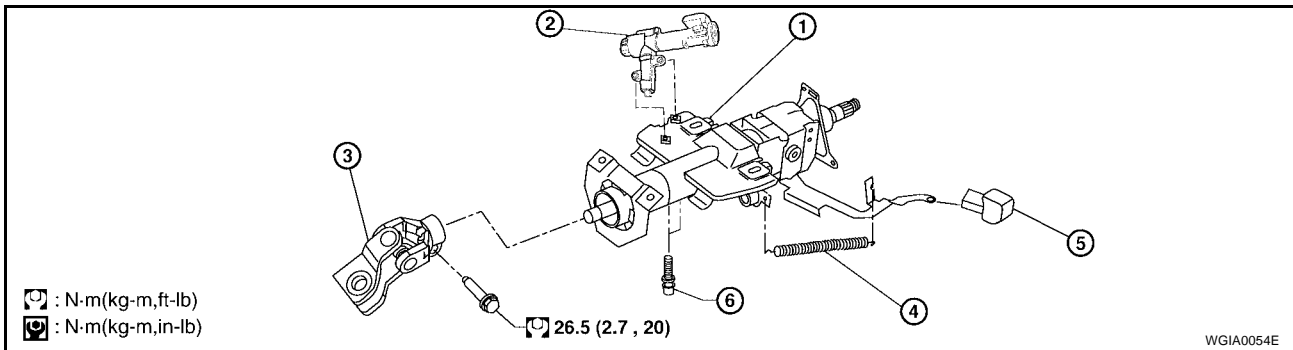
## INSPECTION AFTER INSTALLATION

- After installing steering column to vehicle, check tilt device and its operation range. Ranges of operation are shown in the figure.
- Check if steering wheel operation can turn to the end of the left and right stops smoothly.



## Disassembly and Assembly

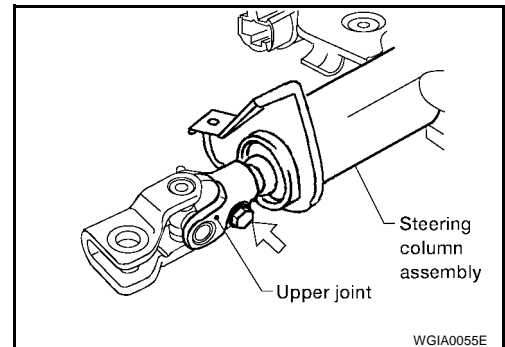
EGS000JM



- |                             |                    |                    |
|-----------------------------|--------------------|--------------------|
| 1. Steering column assembly | 2. Ignition switch | 3. Upper joint     |
| 4. Spring                   | 5. Tilt lever knob | 6. Self-shear bolt |

## DISASSEMBLY

1. Remove spring from steering column assembly and tilt lever.
2. Remove mounting bolt from upper joint, then remove upper joint from steering column assembly.

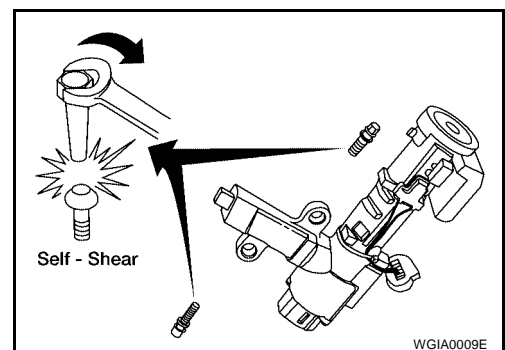


3. Remove ignition switch tamper resistant self-shear type screws with a drill or other suitable tool.

## ASSEMBLY

Assembly is in the reverse order of disassembly.

- Tighten the nuts and bolts to the specified torque. Refer to [PS-12, "Disassembly and Assembly"](#) .
- Install new tamper resistant self-shear type screws as shown.



# STEERING COLUMN

EGS000J6

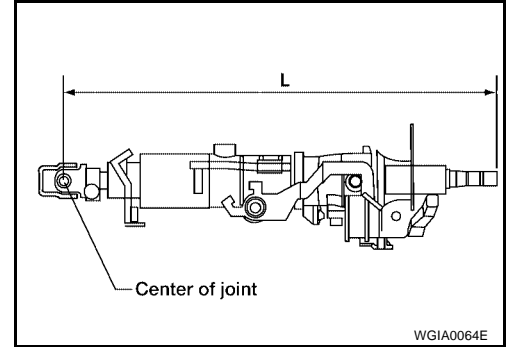
## Inspection

- When the steering wheel does not turn smoothly, check the steering column as follows:
  1. Check the column bearings for damage or unevenness. Lubricate with recommended multi-purpose grease. Replace the steering column as an assembly, if necessary.
  2. Check the column tube for deformation or breakage. Replace the steering column as an assembly, if necessary.

- If the vehicle has been involved in a collision, or if noise and rattles are heard during a turn, check the length “L” of the column. If out of specification, replace the steering column as an assembly.

**Steering column length “L” : 428 mm (16.85 in)**

- Check for proper lubrication, apply grease as necessary.
- Check for wear around the seal edges, replace as necessary.
- Check for corrosion or pitting around the seal sliding area.
- Replace the seal and shaft in case of seal edge wear or damage.



- After installing the steering column, check the tilt mechanism for proper operation.

**Tilt mechanism range (manual tilt) : 3° per notch at 6 steps**

### CAUTION:

- Do not exert any load or impact in the axial direction immediately before or after column removal.
- After installation, check for smooth steering wheel rotation, without any catches or noise.
- Replace the column if it is depleted of grease, worn, damaged, or if any scratches or coating separation is present on the shaft seal area.
- The nut on the upper joint may not be reused.
- During lower joint detachment, insert a tool into the yoke groove to prevent gouging damage.

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# POWER STEERING GEAR AND LINKAGE

PF:49001

EGS000J7

## POWER STEERING GEAR AND LINKAGE

### On-Vehicle Service

#### CHECKING STEERING GEAR

- Check gear housing and boots for looseness and damage.
- Check gear housing and boots for fluid leakage. Refer to [PS-6, "Checking Fluid Leakage"](#) .
- Check connection with steering column for looseness.
- Prior to removing the steering gear from the vehicle, check rack sliding force. Refer to [PS-14, "CHECKING RACK SLIDING FORCE"](#) .
- If rack sliding force is not within specification, adjust rack sliding force. Refer to [PS-19, "Adjustment for Rack Sliding Force"](#) .

#### CHECKING STEERING LINKAGE

- Check ball joint, and other component parts for looseness, wear, and damage.

#### CHECKING GEAR HOUSING MOVEMENT

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.

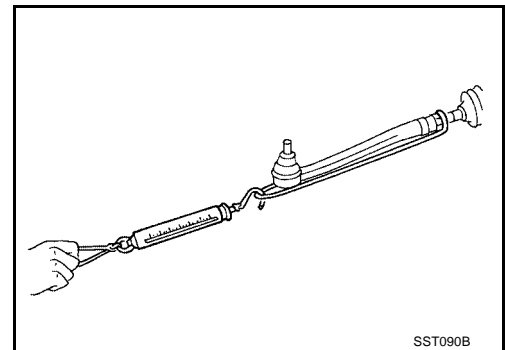
**Movement of gear housing :  $\pm 2$  mm ( $\pm 0.08$  in) or less**

2. If movement exceeds the limit, replace or repair as necessary.

#### CHECKING RACK SLIDING FORCE

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

**Tool number : J-44183-A**



**Average rack sliding force : 279.5 +34.3/-44.1 N (28.51 +3.50/-4.50 kg, 62.83 +7.71/-9.91 lb)**

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

4. Check sliding force outside the above range at rack speed 40 mm (1.57 in)/s.

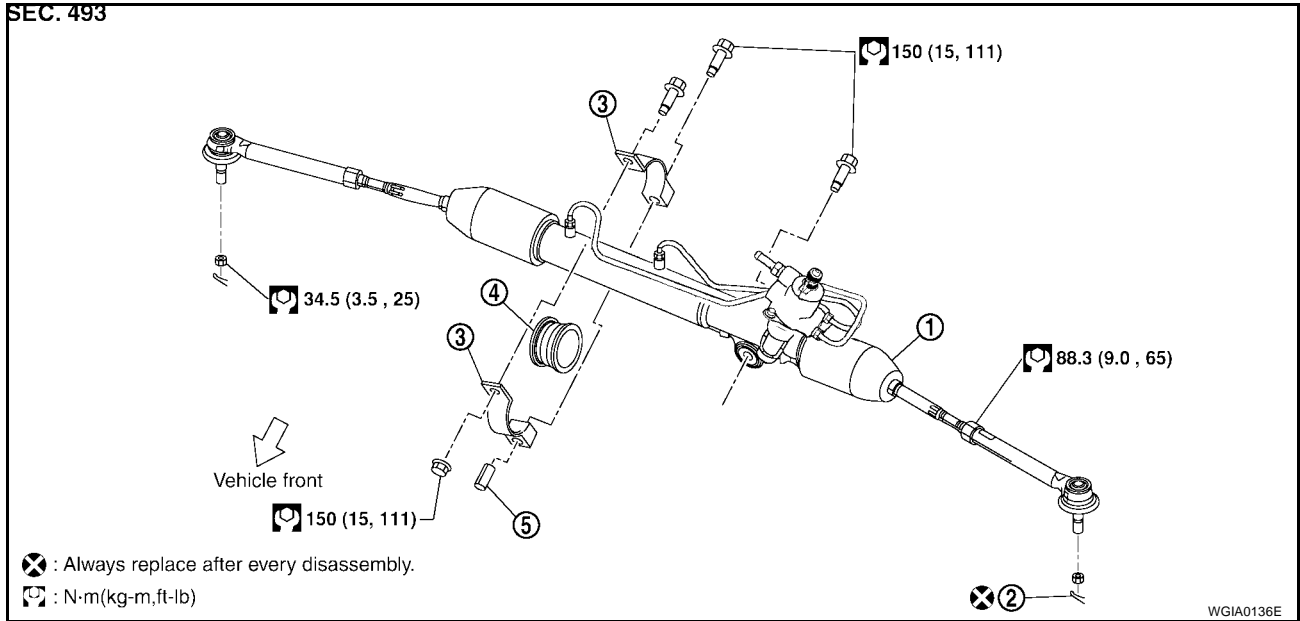
**Maximum rack sliding force : Not more than 299 N (30.5 kg-f, 67.2 lb-f)**

**Maximum force deviation : 147 N (15 kg-f, 33 lb-f)**

# POWER STEERING GEAR AND LINKAGE

EGS000JB

## Removal and Installation



- |                           |               |                                  |
|---------------------------|---------------|----------------------------------|
| 1. Steering gear assembly | 2. Cotter pin | 3. Gear housing mounting bracket |
| 4. Gear housing insulator | 5. Sleeve     |                                  |

### REMOVAL

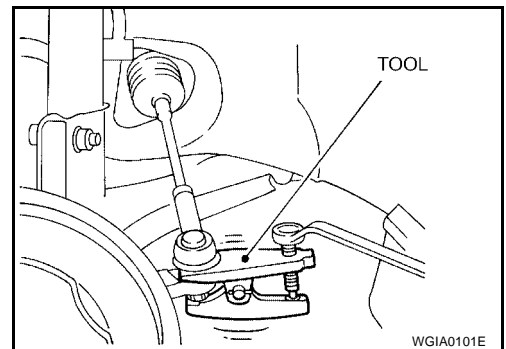
#### CAUTION:

- The rotation of the driver air bag spiral cable 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 and spiral cable before removing the steering lower joint to avoid damaging the SRS spiral cable.

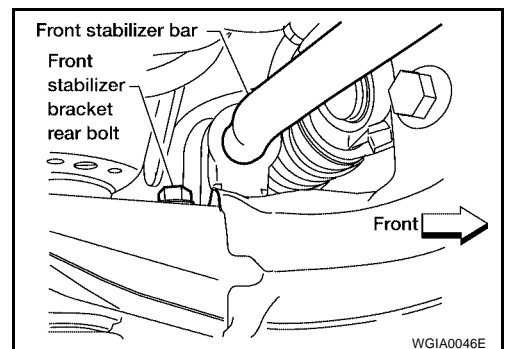
1. Remove the two front tires using power tool.
2. Remove cotter pins and nuts, then disconnect the outer tie-rods using Tool.

**Tool number : HT72520000 (J-25730-A)**

3. Disconnect the outer stabilizer bar ends from connecting rods using power tool. Refer to [FSU-12, "Removal and Installation"](#).

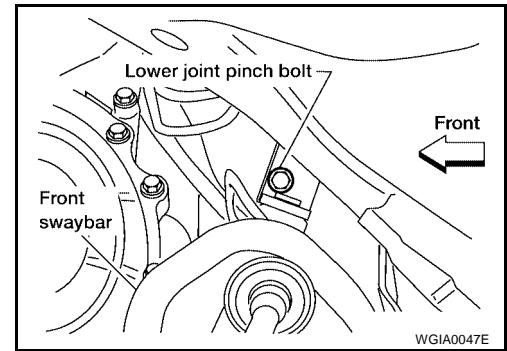


4. Remove the front stabilizer bar bracket rear bolts and loosen the front bolts. Refer to [FSU-12, "Removal and Installation"](#).

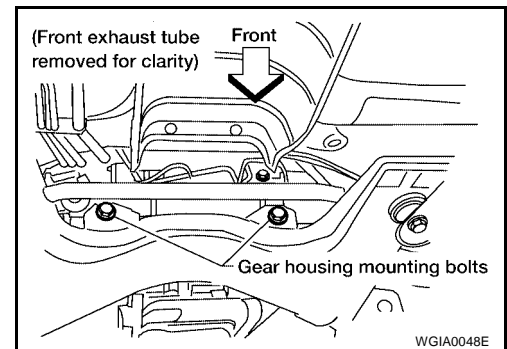


# POWER STEERING GEAR AND LINKAGE

- Remove the lower joint pinch bolt. Refer to [PS-9, "Removal and Installation"](#).



- Drain the power steering fluid.
- Disconnect the power steering high and low pressure lines from the steering gear.
- Reposition the stabilizer bar up and out of the way.
- Remove the two gear housing mounting bolts. Refer to [PS-15, "Removal and Installation"](#).
  - Do not remove the gear housing mounting bracket from the gear housing.
- Remove the power steering gear and linkage assembly.



## INSTALLATION

Installation is in the reverse order of removal.

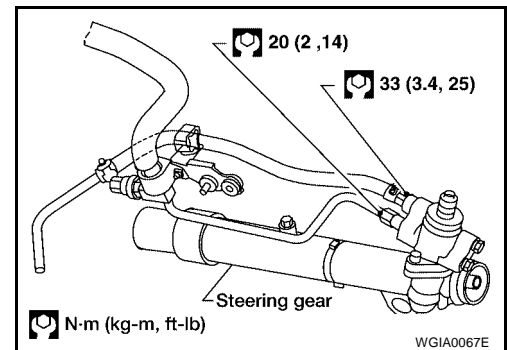
### NOTE:

Do not reuse non-reusable parts.

- Use the specified tightening torque when installing the high-pressure tube and low-pressure hose connections.

### CAUTION:

**Excessive tightening will damage threads of connection or O-ring.**



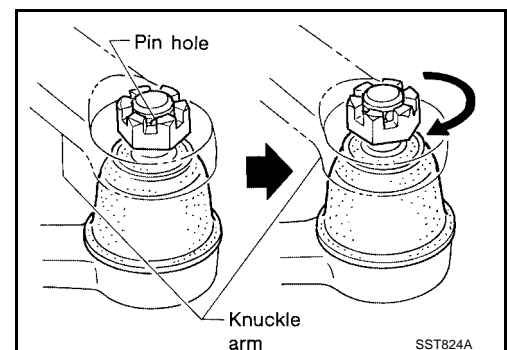
- The O-ring in low-pressure hose connector is larger than that in high-pressure connector. Take care to install the proper O-ring.
- Initially, tighten nut on outer tie-rod socket and knuckle arm to specification. Then tighten further to align nut groove with first pin hole so that the cotter pin can be installed.

**Outer tie-rod grooved nut : 34 N-m (3.5 kg-m, 25 ft-lb)**

### CAUTION:

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

- Refill power steering system and bleed air after installation. Refer to [PS-6, "POWER STEERING FLUID"](#).

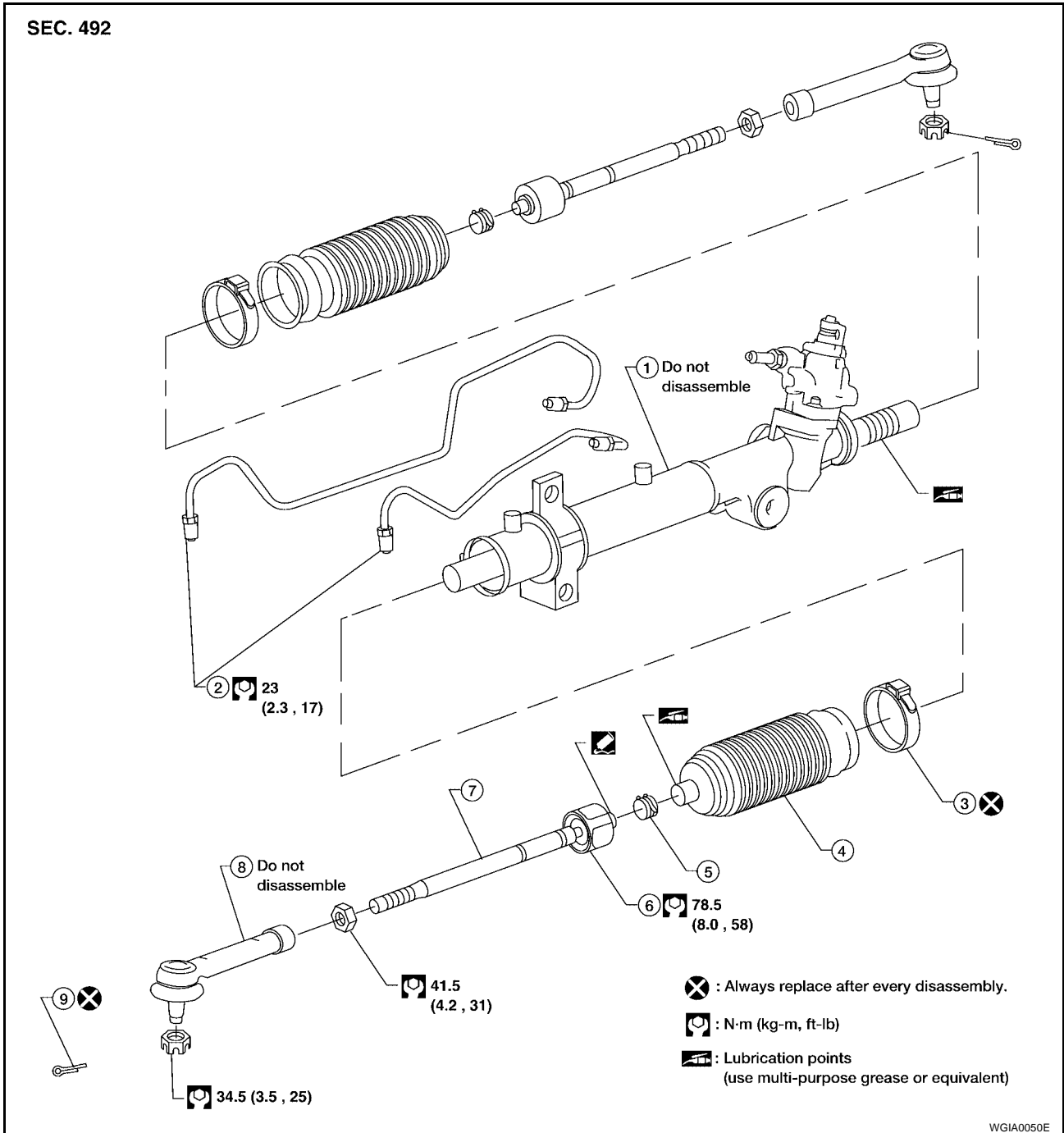




# POWER STEERING GEAR AND LINKAGE

## Disassembly and Assembly

EGS000J9



- |                  |                             |                         |
|------------------|-----------------------------|-------------------------|
| 1. Steering gear | 2. Gear housing fluid tubes | 3. Boot clamp           |
| 4. Dust boot     | 5. Boot band                | 6. Tie-rod inner socket |
| 7. Inner tie-rod | 8. Outer tie-rod            | 9. Cotter pin           |

### DISASSEMBLY

#### CAUTION:

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.

1. Remove the outer tie-rods.
2. Remove the boot clamps and boot bands
3. Remove the inner tie-rods and dust boots.

# POWER STEERING GEAR AND LINKAGE

## INSPECTION AFTER DISASSEMBLY

Thoroughly clean all parts in cleaning solvent or Genuine NISSAN PSF or equivalent. Refer to [MA-10, "RECOMMENDED FLUIDS AND LUBRICANTS"](#) . Blow dry the parts with compressed air.

### Boot

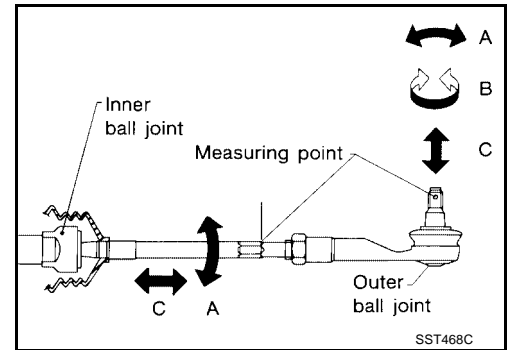
- Check condition of boot. If cracked, replace it.
- Check boots for accumulation of power steering fluid indicating steering gear leak. If found, replace the gear.

### Gear

- Thoroughly examine steering gear. If damaged, cracked, leaking, or worn, replace it.

### Inner and Outer Tie-rods

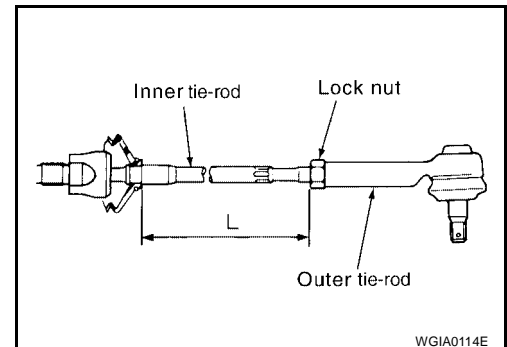
- Check ball joints for swinging force:  
Outer tie-rod outer and inner ball joints swinging force "A". Refer to [PS-29, "Steering Gear and Linkage"](#) .
- Check ball joint for rotating torque:  
Outer tie-rod outer ball joint rotating torque "B". Refer to [PS-29, "Steering Gear and Linkage"](#) .
- Check ball joints for axial end play:  
Outer tie-rod outer and inner ball joints axial end play "C". Refer to [PS-29, "Steering Gear and Linkage"](#) .
- Check condition of dust cover. If cracked, replace outer tie-rod.



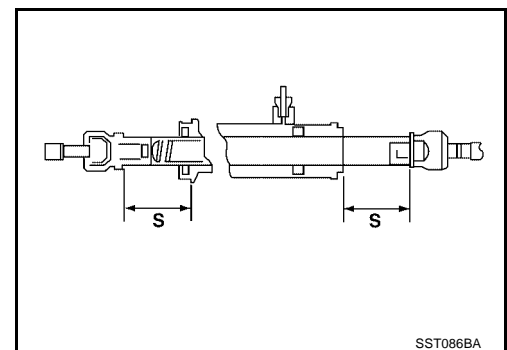
## ASSEMBLY

1. Install the inner tie-rods.
2. Install the outer tie-rods to the specified length and tighten the outer tie-rod lock nut. Refer to [PS-29, "Steering Gear and Linkage"](#) .  
Use Genuine High Temperature, High Strength Thread Locking Sealant (Red) or equivalent. Refer to [GI-43, "RECOMMENDED CHEMICAL PRODUCTS AND SEALANTS"](#) .

**Outer tie-rod lock nut : 41.5 N·m (4.2 kg·m, 31 ft·lb)**

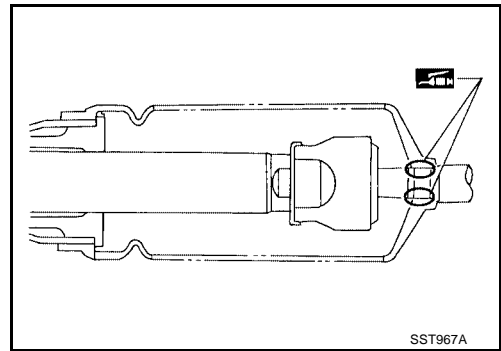


3. Measure rack stroke. Refer to [PS-29, "Steering Gear and Linkage"](#) .

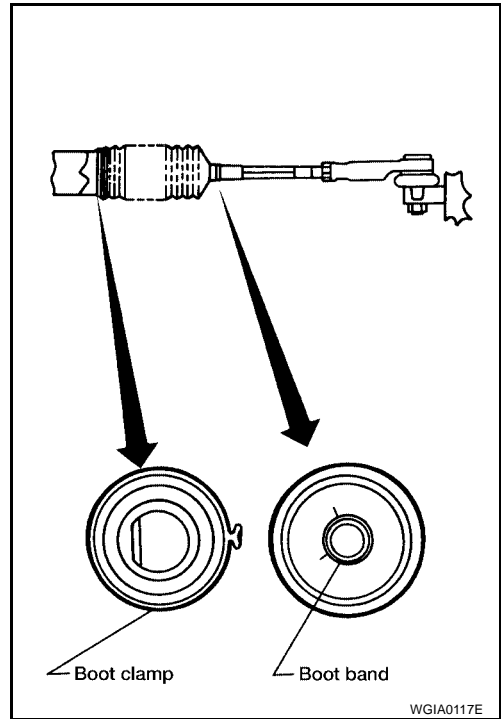


# POWER STEERING GEAR AND LINKAGE

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



- Install the boot clamps and boot bands securely.



## Adjustment for Rack Sliding Force DECREASE

Decrease rack sliding force as follows:

- Loosen adjusting screw two rotations counterclockwise.

### CAUTION:

- Do not remove adjusting screw.
- Steering gear must be replaced if adjusting screw is removed or loosened more than two rotations.

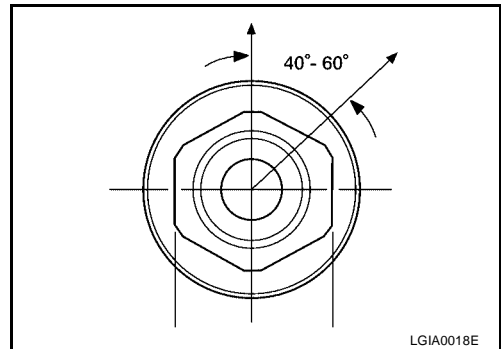
- Tighten adjusting screw in 40° - 60° increments until rack sliding force is within specification.

**Average rack sliding force** : 279.5 +34.3/-44.1 N (28.51 +3.50/-4.50 kg, 62.83 +7.71/-9.91 lb)

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

### NOTE:

Steering gear must be replaced if adjusting screw rotation torque is less than 5.0 N·m (0.9 kg·m, 44 in·lb).



- Verify rack sliding force. Refer to [PS-14, "CHECKING RACK SLIDING FORCE"](#).
- If rack sliding force is out of specification adjust rack sliding force again.
- If rack sliding force cannot be adjusted within specification replace steering gear.

# POWER STEERING GEAR AND LINKAGE

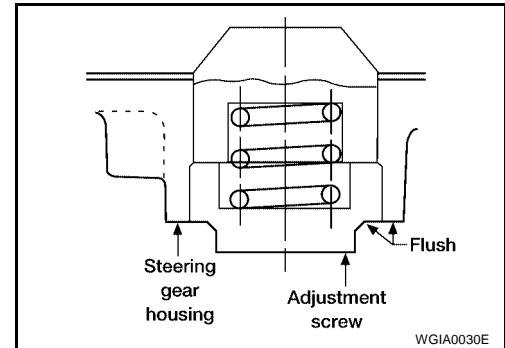
## INCREASE

Increase rack sliding force as follows:

1. Tighten adjusting screw until it is flush with housing surface.

### CAUTION:

- Do not remove adjusting screw.
- Steering gear must be replaced if adjusting screw is removed or loosened more than two rotations.



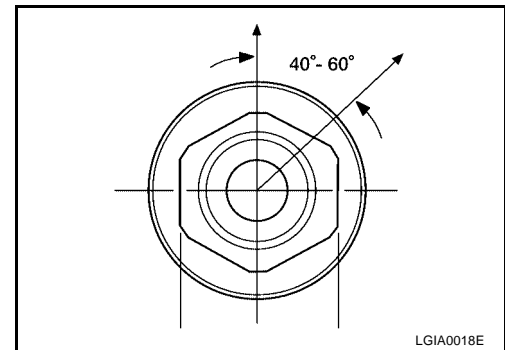
2. Loosen adjusting screw in 40° - 60° increments until rack sliding force is within specification.

**Average rack sliding force** : 279.5 +34.3/-44.1 N (28.51 +3.50/-4.50 kg, 62.83 +7.71/-9.91 lb)

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

### NOTE:

Steering gear must be replaced if adjusting screw rotation torque is less than 5.0 N·m (0.9 kg-m, 44 in-lb).



3. Verify rack sliding force. Refer to [PS-14, "CHECKING RACK SLIDING FORCE"](#).
4. If rack sliding force is out of specification adjust rack sliding force again.
5. If rack sliding force cannot be adjusted within specification replace steering gear.

# POWER STEERING OIL PUMP

PFP:49110

EGS000JB

## POWER STEERING OIL PUMP

### On-Vehicle Service CHECKING HYDRAULIC SYSTEM

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

1. Set Tool. Open shut-off valve. Then bleed air. Refer to [PS-6, "Bleeding Hydraulic System"](#).

**Tool numbers** : KV48103500 (J-26357 and J-26357-10),  
KV48102500 (J-33914)

2. Run engine at idle speed or 1,000 rpm.  
Make sure temperature of fluid in tank rises to 60° – 80°C (140° – 176°F).

**WARNING:**

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

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

**CAUTION:**

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

**Oil pump maximum standard pressure** : 8,800 kPa (89.76 kg/cm<sup>2</sup> , 1,276 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 [PS-28, "Power Steering"](#).
4. If power steering pressure is below the maximum operating pressure, slowly close shut-off valve and check pressure again.

**CAUTION:**

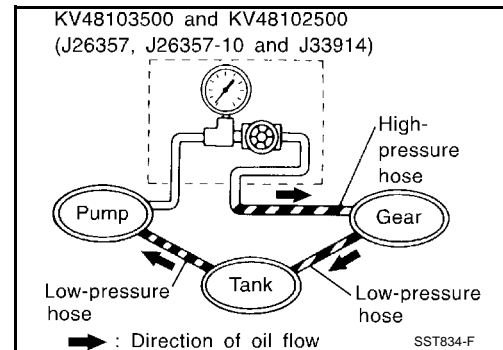
**Do not close shut-off valve for more than 15 seconds.**

- If pressure increases to maximum operating pressure, gear is damaged. Refer to [PS-15, "Removal and Installation"](#).
  - If pressure remains below maximum operating pressure, pump is damaged. Refer to [PS-21, "Removal and Installation"](#).
5. After checking hydraulic system, remove Tool and add fluid as necessary. Then completely bleed air out of system. Refer to [PS-6, "Bleeding Hydraulic System"](#).

### Removal and Installation

#### REMOVAL

1. Remove wheel and tire using power tool.
2. Remove side splash guard.
3. Remove heat insulator.
4. Loosen adjustment screw and oil pump mounting bolt, then remove belt.
5. Drain power steering fluid.
6. Remove oil pump union bolts and hose.
7. Remove oil pump bracket mounting bolts.
8. Remove power steering oil pump.



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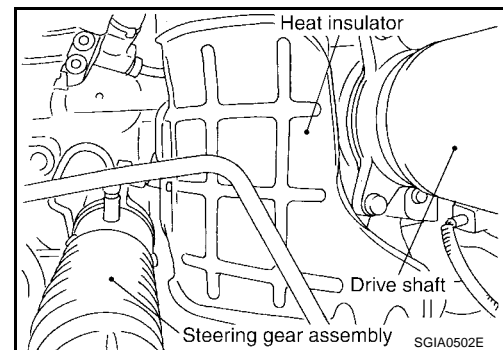
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#### INSTALLATION

Installation is in the reverse order of removal.

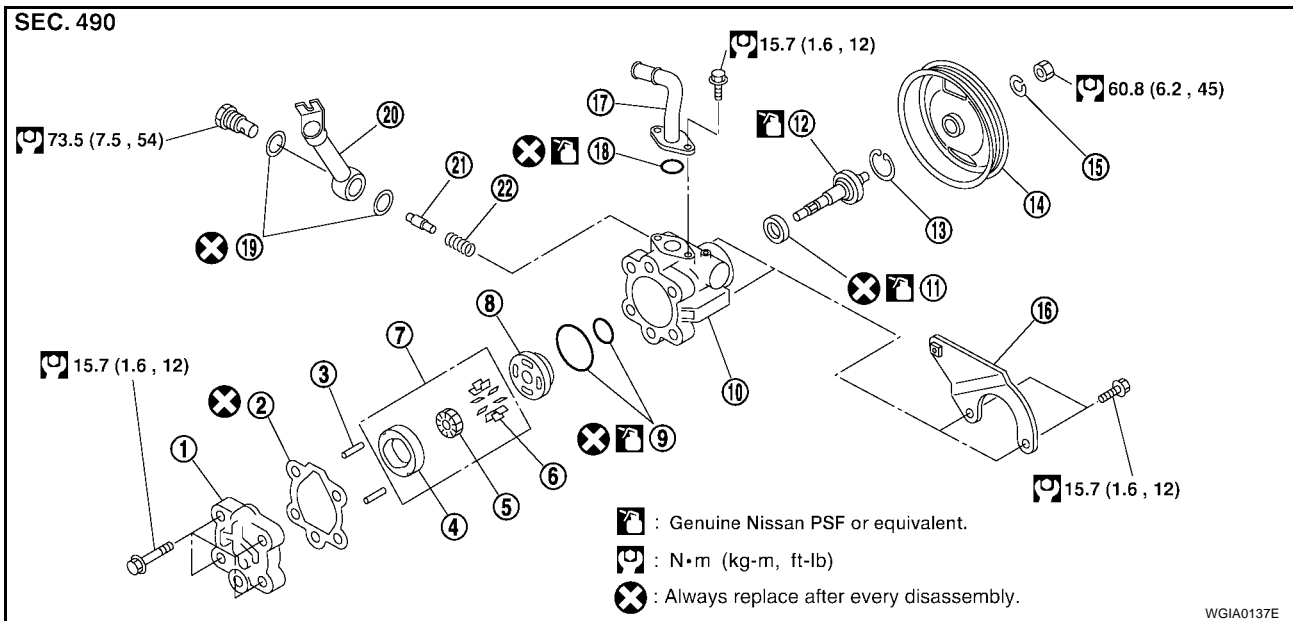
- Tighten component connections to specification. Refer to [PS-22, "Disassembly and Assembly"](#).
- Adjust belt tension. Refer to [MA-12, "CHECKING DRIVE BELTS"](#).

# POWER STEERING OIL PUMP

- Refill power steering system and bleed air after installation. Refer to [PS-6, "POWER STEERING FLUID"](#).

## Disassembly and Assembly

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- |                   |                  |                          |
|-------------------|------------------|--------------------------|
| 1. Rear cover     | 2. Gasket        | 3. Lock pin              |
| 4. Cam ring       | 5. Rotor         | 6. Vane                  |
| 7. Cartridge      | 8. Side plate    | 9. O-ring                |
| 10. Body assembly | 11. Oil seal     | 12. Drive shaft assembly |
| 13. Snap ring     | 14. Pulley       | 15. Spring washer        |
| 16. Bracket       | 17. Suction pipe | 18. O-ring               |
| 19. Washers       | 20. Joint        | 21. Flow control valve   |
| 22. Spring        |                  |                          |

## INSPECTION BEFORE DISASSEMBLY

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

- Oil leakage from oil pump
- Deformed or damaged pulley
- Poor performance

## DISASSEMBLY

### CAUTION:

When holding the drive shaft in a vise, always use copper or aluminum plates between vise and drive shaft to prevent damage.

### NOTE:

Mount the oil pump in a soft jawed vise as necessary.

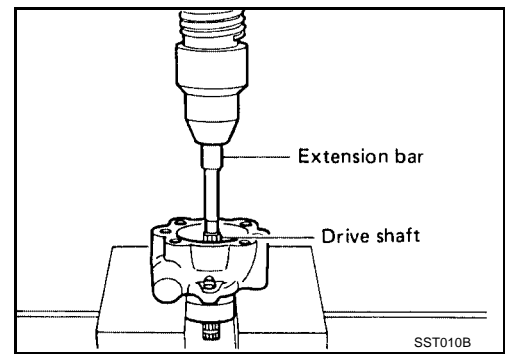
1. Unscrew four rear cover bolts and remove rear cover from body assembly.
2. Remove gasket from body assembly.
3. Remove lock pin, cartridge and side plate from body assembly.
4. Remove pulley from drive shaft.
5. Unscrew mounting bolts of bracket and remove bracket from body assembly.

# POWER STEERING OIL PUMP

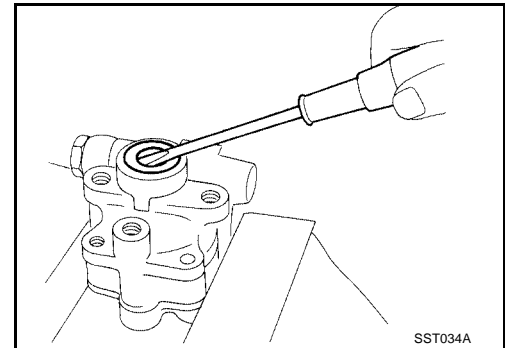
6. Remove snap ring from drive shaft assembly and press it out.

**CAUTION:**

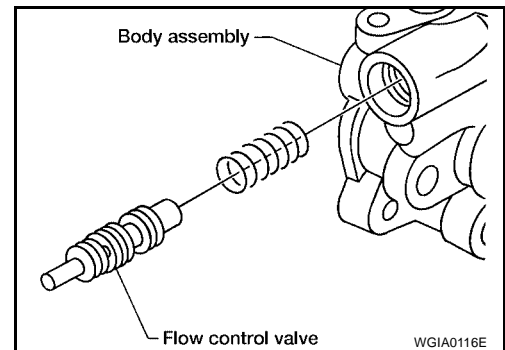
When removing snap ring, be careful not to damage drive shaft assembly.



7. Using a screwdriver, remove oil seal for body assembly.



8. Remove O-ring from body assembly.  
9. Loosen union bolt and remove joint and washers, then pull out flow control valve and spring from body assembly.



10. Remove suction pipe from body assembly.  
11. Remove O-ring for suction pipe.

## INSPECTION AFTER DISASSEMBLY

### Body Assembly and Rear Cover Inspection

- Check the body assembly and the inside of rear cover for damage. If any damage is found, replace the rear cover with a new rear cover, and replace the power steering pump assembly with a new one for a damaged body assembly.

### Cartridge Assembly Inspection

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

### Relief Valve Assembly Inspection

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

## ASSEMBLY

**CAUTION:**

When holding the drive shaft in a vise, always use copper or aluminum plates between vise and drive shaft to prevent damage.

**NOTE:**

Mount oil pump in soft jawed vise as required.

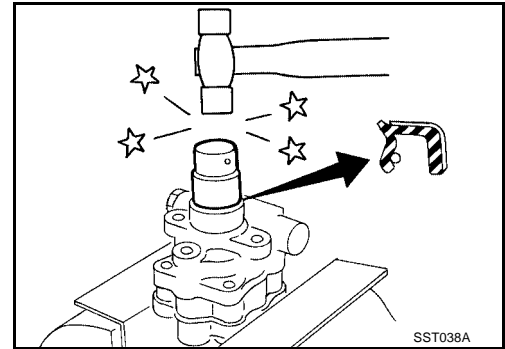
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## POWER STEERING OIL PUMP

1. Apply a coat of NISSAN PSF or equivalent, refer to [MA-10. "RECOMMENDED FLUIDS AND LUBRICANTS"](#) , to oil seal lip and to the circumference of oil seal. Using proper tool, such as hand press machine, install it to body assembly.

**NOTE:**

Do not reuse oil seal.

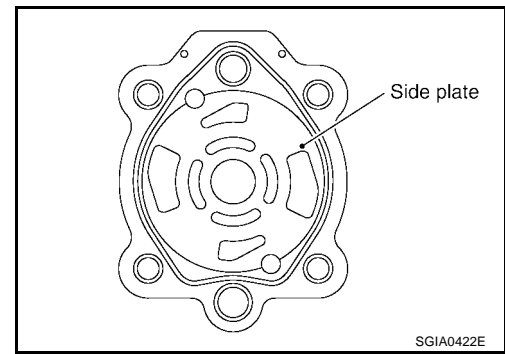


2. Apply a coat of NISSAN PSF or equivalent to drive shaft, and press drive shaft assembly into body assembly with suitable tool, then install snap ring.
3. Apply a coat of NISSAN PSF or equivalent to O-ring and install O-ring into body assembly.

**NOTE:**

Do not reuse O-ring.

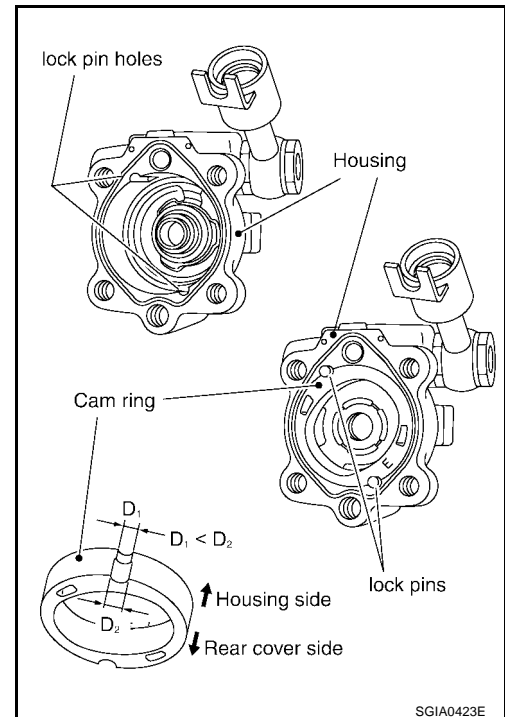
4. Install side plate to body assembly.



5. Install lock pin into lock pin hole, and install cam ring as shown.
  - When installing cam ring, turn carved face with a letter on it to rear cover.

**CAUTION:**

**Do not confuse the assembling direction of cam ring. If cam ring is installed facing the incorrect direction, it may cause pump operation malfunction.**

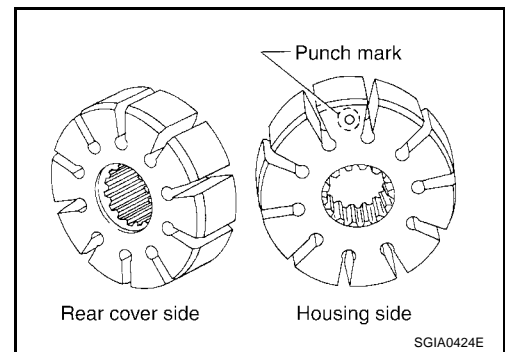




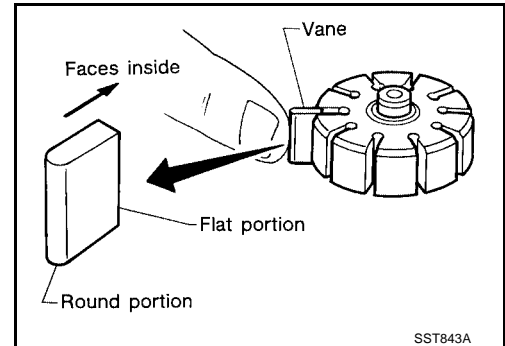
# POWER STEERING OIL PUMP

6. Install rotor to body assembly.

- When installing rotor, turn punch mark face on rotor to body assembly.



7. Install vane to rotor with arc of vane in contact with cam ring.



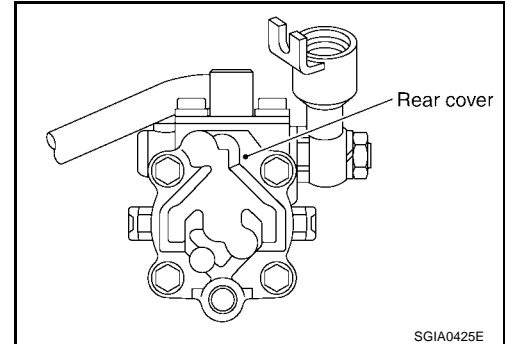
8. Check if drive shaft assembly turns smoothly.

9. Install gasket to body assembly.

**NOTE:**

Do not reuse gasket.

10. Install rear cover to body assembly and tighten bolts to the specified torque.



11. Install bracket to body assembly, and tighten the two bracket bolts to the specified torque.

12. Install pulley to drive shaft assembly, then tighten lock nut to the specified torque.

13. Install spring, flow control valve, washer, and joint to body assembly. Then tighten union bolt to the specified torque.

**NOTE:**

Do not reuse washer.

14. Apply a coat of NISSAN PSF or equivalent to O-ring and Install O-ring to suction pipe. Refer to [MA-10, "RECOMMENDED FLUIDS AND LUBRICANTS"](#).

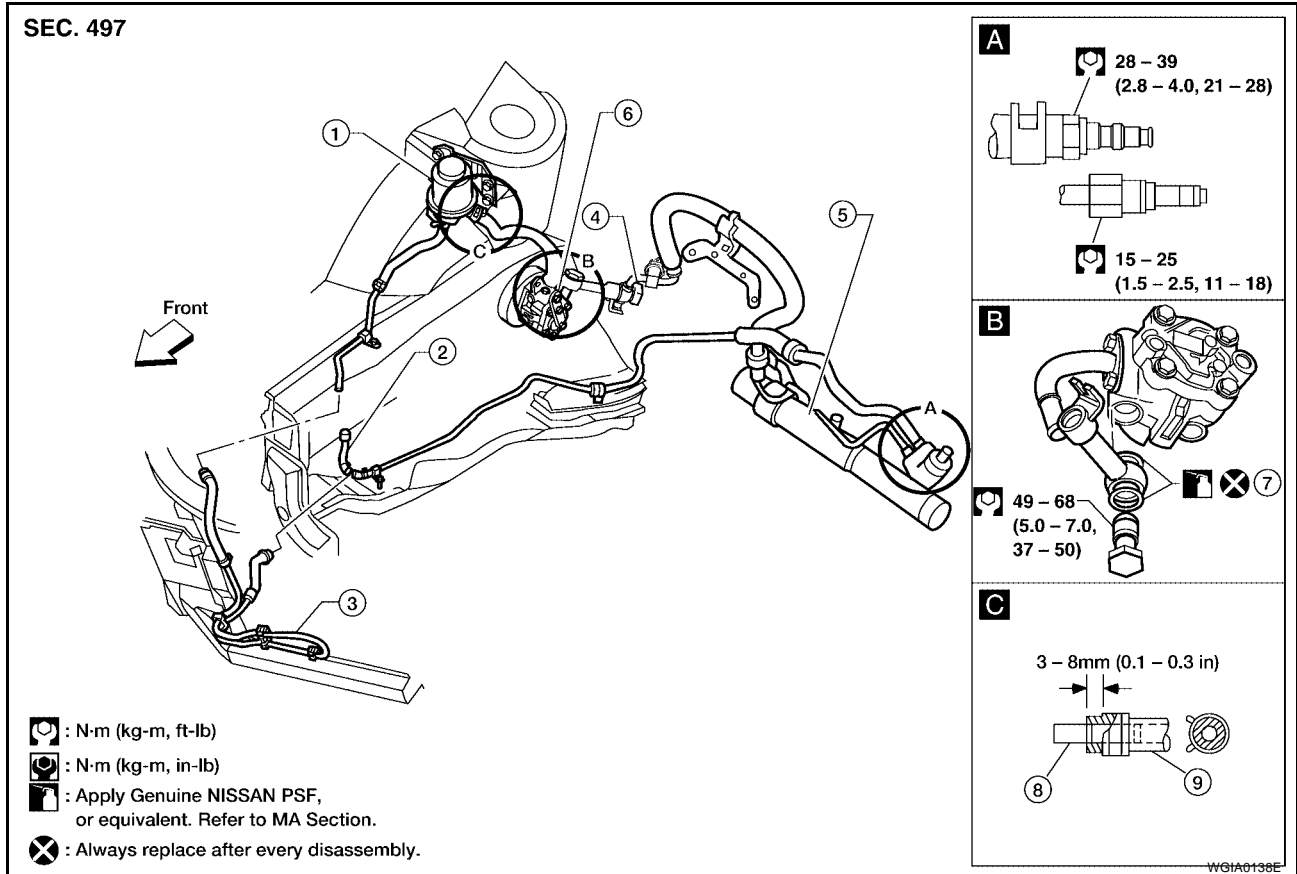
15. Install suction pipe to body assembly and tighten bolts to the specified torque.

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M

## HYDRAULIC LINE

### Removal and Installation



- |                                   |                                   |                        |
|-----------------------------------|-----------------------------------|------------------------|
| 1. Power steering fluid reservoir | 2. Power steering pressure switch | 3. Power steering gear |
| 4. Power steering oil pump        | 5. Washers                        | 6. Tube                |
| 7. Hose                           |                                   |                        |

### REMOVAL

Refer to the illustration for hydraulic tube and hose routing. Remove any components necessary to access the lines.

#### CAUTION:

Be careful not to kink or bend the tubes.

### INSTALLATION

Installation is in the reverse order of removal.

- Refer to [PS-14, "POWER STEERING GEAR AND LINKAGE"](#) and [PS-21, "POWER STEERING OIL PUMP"](#) for tightening torque.

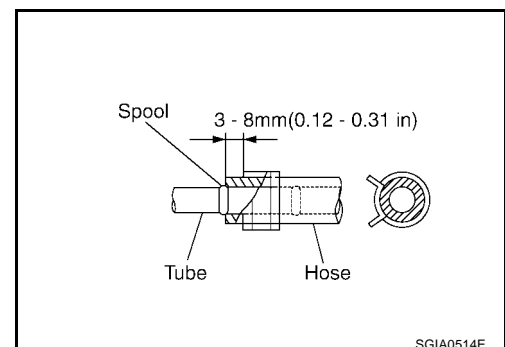
#### NOTE:

Do not reuse non-reusable parts.

- Ensure that hose touches spool of tube when tube is to be inserted to hose.

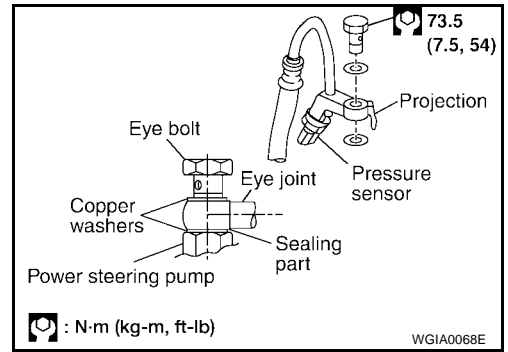
#### CAUTION:

Do not apply power steering fluid to the junction surface between tube and hose.



# HYDRAULIC LINE

- To install the eye joint on the power steering pump, align the projection of the eye joint into the notch of the power steering pump. Make sure the eye joint is properly installed on the power steering pump, then tighten the eye bolt to the specified torque.
- Connect the harness connector into the power steering pressure switch securely.



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# SERVICE DATA AND SPECIFICATIONS (SDS)

## SERVICE DATA AND SPECIFICATIONS (SDS)

PFP:00100

### General Specifications

EGS000JG

Steering model	Power steering
Steering gear type	PR26AD
Steering overall gear ratio	17.1:1
Turns of steering wheel (lock to lock)	3.0
Steering column type	Collapsible, manual tilt

### Steering Wheel

EGS000JH

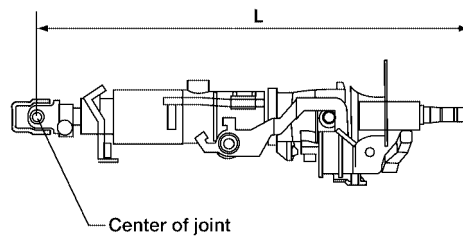
Unit: mm (in)

Steering wheel axial play	0 (0)
Steering wheel play	35 (1.38) or less
Movement of gear housing	$\pm 2$ ( $\pm 0.08$ ) or less

### Steering Column

EGS000JI

Unit: mm (in)



WGIA0064E

Applied model	All
Steering column length "L"	428 (16.85)

### Power Steering

EGS000JK

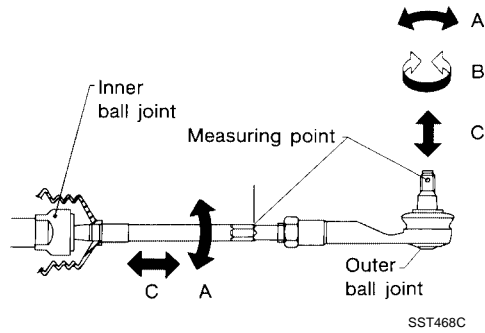
Applied model	All
Steering gear type	PR26AD
Pump type	F40
Steering wheel turning force (Measured at one full turn from the neutral position)	39 N (4 kg-f, 9 lb-f) or less
Fluid capacity (approximate)	1.0 ℓ (2 1/8 US pt, 1 3/4 Imp pt)
Oil pump maximum pressure	8,800 kPa (89.76 kg/cm <sup>2</sup> , 1,276 psi)

# SERVICE DATA AND SPECIFICATIONS (SDS)

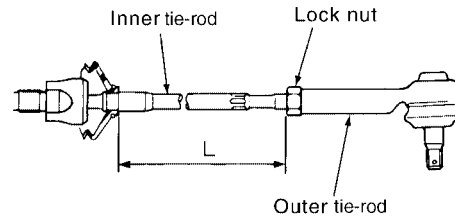
## Steering Gear and Linkage

EGS000JJ

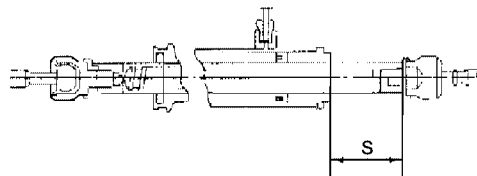
Applied model	All
Steering gear type	PR26AD



Tie-rod outer ball joint	Swinging force at cotter pin hole "A"	6.47 - 64.63 N (0.66 - 6.59 kg-f, 1.46 - 14.53 lb-f)
	Rotating torque "B"	0.29 - 2.94 N·m (3.0 - 30.0 kg-cm, 2.6 - 26.0 in-lb)
	Axial end play "C"	0.4 mm (0.016 in) or less
Tie-rod inner ball joint	Swinging force* "A" * Measuring point: 172 mm (6.77 in)	5.69 - 45.60 N (0.58 - 4.65 kg-f, 1.28 - 10.25 lb-f)
	Axial end play "C"	0.2 mm (0.008 in) or less



Tie-rod standard length "L"		204.7 mm (8.059 in)	
Rack sliding force Under normal operating oil pressure	Range within $\pm 11.5$ mm ( $\pm 0.453$ in) from the neutral position at rack speed of 3.5 mm (0.138 in)/s	Average force	279.5 +34.3/-44.1 N (28.51 +3.50/-4.50 kg, 62.83 +7.71/-9.91 lb)
		Maximum force deviation	98 N (10 kg-f, 22 lb-f)
	Except for the above range	Maximum force	299 N (30.5 kg-f, 67.2 lb-f)
		Maximum force deviation	147 N (15 kg-f, 33 lb-f)



Rack stroke "S"	73.5 mm (2.89 in)
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## SERVICE DATA AND SPECIFICATIONS (SDS)

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