

# STEERING SYSTEM

## SECTION **ST**

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## PRECAUTIONS AND PREPARATION

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### Supplemental Restraint System (SRS) “AIR BAG”

The Supplemental Restraint System “AIR BAG”, used along with a seat belt, helps to reduce the risk or severity of injury to the driver and front passenger in a frontal collision. The Supplemental Restraint System consists of air bag modules (located in the center of the steering wheel and on the instrument panel on the passenger side), a diagnosis sensor unit, a crash zone sensor, warning lamp, wiring harness and spiral cable. The vehicle is equipped with a passenger air bag deactivation switch. Because no rear seat exists where a rear-facing child restraint can be placed, the switch is designed to turn off the passenger air bag so that a rear-facing child restraint can be used in the front passenger seat. The switch is located in the center of the instrument panel, near the ashtray. When the switch is turned to the ON position, the passenger air bag is enabled and could inflate in a frontal collision. When the switch is turned to the OFF position, the passenger air bag is disabled and will not inflate in a frontal collision. A passenger air bag OFF indicator on the instrument panel lights up when the passenger air bag is switched OFF. The driver air bag always remains enabled and is not affected by the passenger air bag deactivation switch.

Information necessary to service the system safely is included in the **RS section** of this Service Manual.

#### **WARNING:**

- To avoid rendering the SRS inoperative, which could increase the risk of personal injury or death in the event of a collision which would result in air bag inflation, all maintenance should be performed by an authorized NISSAN dealer.
- Improper maintenance, including incorrect removal and installation of the SRS, can lead to personal injury caused by unintentional activation of the system.
- Do not use electrical test equipment on any circuit related to the SRS unless instructed to in this Service Manual. SRS wiring harnesses are covered with yellow insulation either just before the harness connectors or on the complete harness, for easy identification.
- The vehicle is equipped with a passenger air bag deactivation switch which can be operated by the customer. When the passenger air bag is switched OFF, the passenger air bag is disabled and will not inflate in a frontal collision. When the passenger air bag is switched ON, the passenger air bag is enabled and could inflate in a frontal collision. After SRS maintenance or repair, make sure the passenger air bag switch is in the same position (ON or OFF) as when the vehicle arrived for service.

### Precautions for Steering System

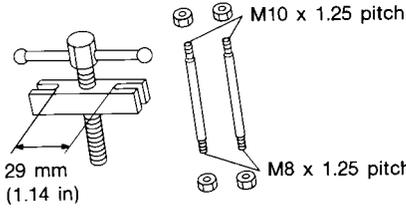
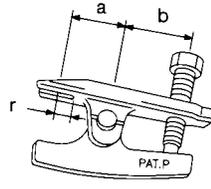
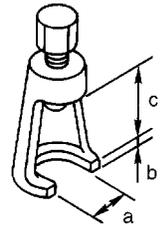
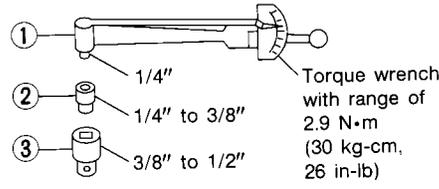
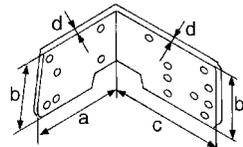
- Before disassembly, thoroughly clean the outside of the unit.
- Disassembly should be done in a clean work area. It is important to prevent the internal parts from becoming contaminated by dirt or other foreign matter.
- For easier and proper assembly, place disassembled parts in order on a parts rack.
- 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 ATF\* 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.

\*: Genuine NISSAN PSFII or equivalent.

# PRECAUTIONS AND PREPARATION

## Special Service Tools

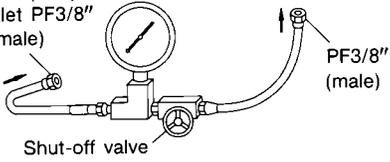
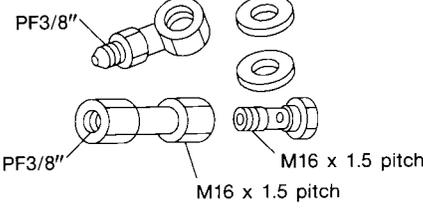
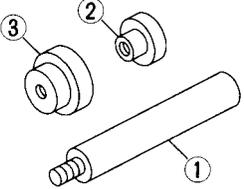
The actual shape of Kent-Moore tools may differ from those of special service tools illustrated here.

Tool number (Kent-Moore No.) Tool name	Description
ST27180001 (J25726-A) Steering wheel puller	 <p>M10 x 1.25 pitch M8 x 1.25 pitch 29 mm (1.14 in)</p> <p>NT544</p>
HT72520000 (J25730-B) Ball joint remover	 <p>a b r PAT. P</p> <p>NT546</p> <p>a: 33 mm (1.30 in) b: 50 mm (1.97 in) r: R11.5 mm (0.453 in)</p>
ST29020001 (J24319-01) Steering gear arm puller	 <p>a b c</p> <p>NT694</p> <p>a: 34 mm (1.34 in) b: 6.5 mm (0.256 in) c: 61.5 mm (2.421 in)</p>
ST3127S000 (see J25765-A) ① GG91030000 (J25765-A) Torque wrench ② HT62940000 ( — ) Socket adapter ③ HT62900000 ( — ) Socket adapter	 <p>① 1/4" ② 1/4" to 3/8" ③ 3/8" to 1/2"</p> <p>Torque wrench with range of 2.9 N·m (30 kg-cm, 26 in-lb)</p> <p>NT541</p>
KV48100301 ( — ) Strut & steering gearbox attachment	 <p>a b c d</p> <p>NT688</p> <p>a: 162 mm (6.38 in) b: 110 mm (4.33 in) c: 190 mm (7.48 in) d: 9 mm (0.35 in)</p>

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# PRECAUTIONS AND PREPARATION

## Special Service Tools (Cont'd)

Tool number (Kent-Moore No.) Tool name	Description	
KV48103500 (J26357 or J26357-10) Pressure gauge	To oil pump outlet PF3/8" (female)  Shut-off valve To control valve PF3/8" (male)	Measuring oil pressure
NT547		
KV48102500 ( — ) Pressure gauge adapter	 PF3/8" PF3/8" M16 x 1.5 pitch M16 x 1.5 pitch	Measuring oil pressure (Use with KV48103500)
NT542		
KV481009S0 ( — ) Oil seal drift set ① KV48100910 ( — ) Drift ② KV48100920 (J26367) Adapter ③ KV48100930 (J26367) Adapter	 ③ ② ①	Installing oil seal
NT174		
KV48100700 (J26364) Torque adapter		Adjusting worm bearing preload
NT169		

# NOISE, VIBRATION AND HARSHNESS (NVH) TROUBLESHOOTING

## NVH Troubleshooting Chart

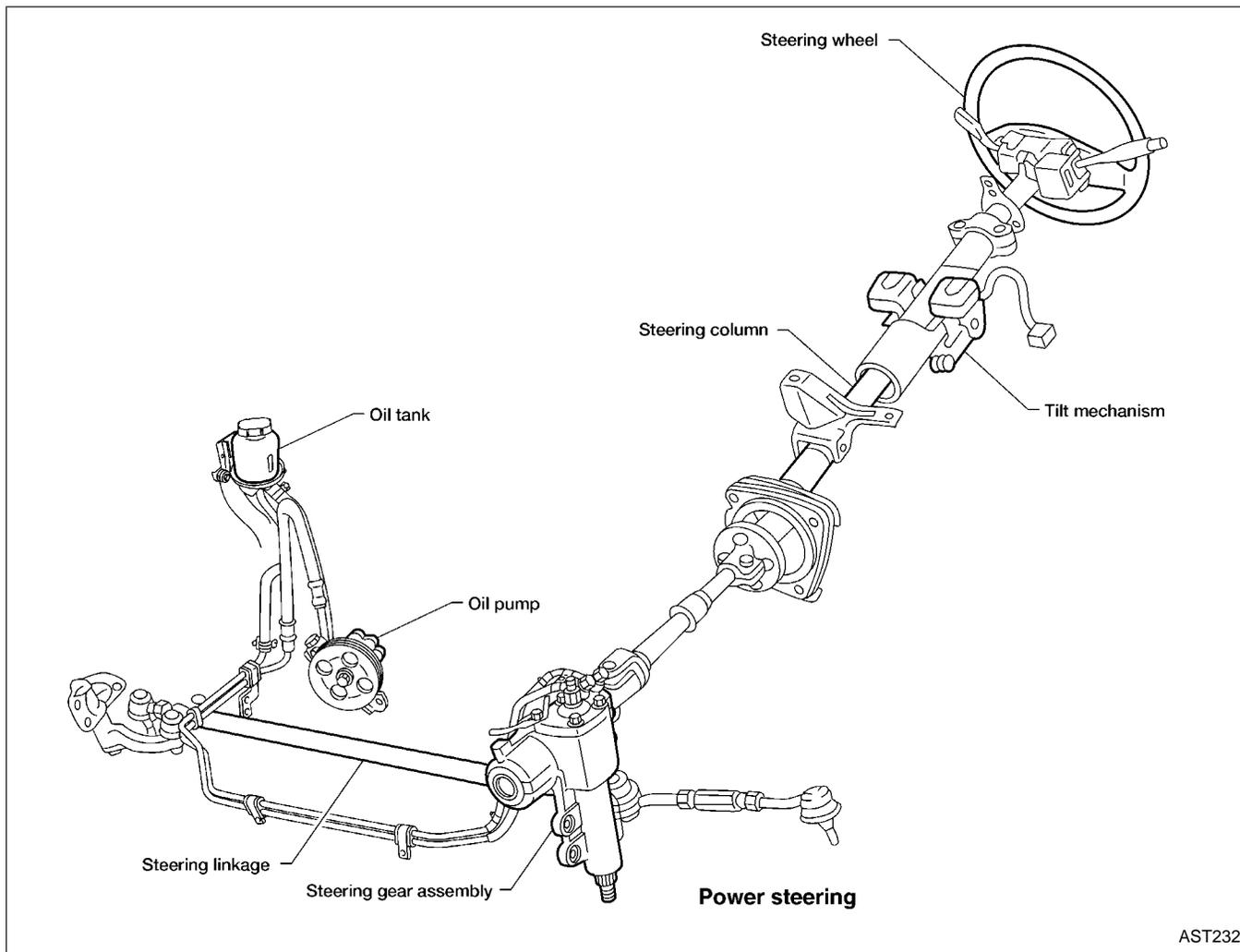
Use the chart below to help you find the cause of the symptom. If necessary, repair or replace these parts.

Symptom	STEERING	SUSPECTED PARTS (Possible cause)																		Reference page						
		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 turning force	Drive belt looseness	Improper steering wheel	Improper installation or looseness of tilt lock lever	Steering column deformation or damage	Improper installation or looseness of steering column	Steering linkage looseness	PROPELLER SHAFT	DIFFERENTIAL	DRIVE SHAFT	FRONT AXLE AND FRONT SUSPENSION		REAR AXLE AND REAR SUSPENSION	TIRES	ROAD WHEEL	BRAKES		
Noise	STEERING	X	X	X	X	X	X	X	X	X						X	X	X	X	X	X	X	X	X	ST-6	
											X	X				X		X	X	X	X	X	X	X	ST-7	
												X	X	X	X			X	X	X	X	X			ST-27	
																X				X	X	X	X	X	X	ST-27
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X : Applicable

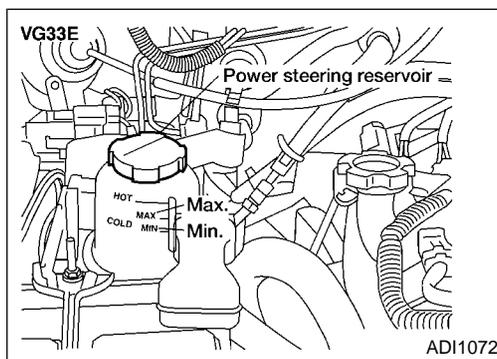
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## Steering System



### Checking and Adjusting Drive Belts

Refer to MA section (“Checking Drive Belts”, “ENGINE MAINTENANCE”).

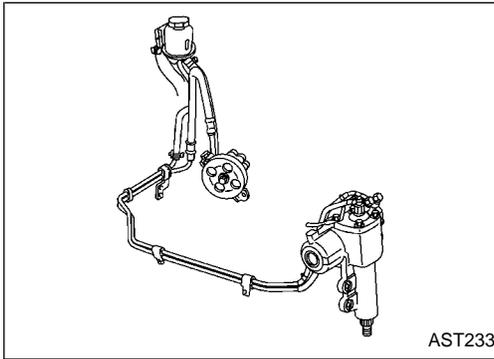


### Checking Fluid Level

- Check fluid level with engine off.
- Check fluid level on reservoir. Use “HOT” range at fluid temperatures of 50 to 80°C (122 to 176°F). Use “COLD” range at fluid temperatures of 0 to 30°C (32 to 86°F).

**CAUTION:**

- Do not overfill.
- Recommended fluid is Genuine NISSAN PSFII or equivalent.



## Checking Fluid Leakage

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

1. Run engine between idle speed and 1,000 rpm.
  - **Make sure temperature of fluid in reservoir tank rises to 60 to 80°C (140 to 176°F).**
2. Turn steering wheel right-to-left several times.
3. Hold steering wheel at each "lock" position for 5 seconds and carefully check for fluid leakage.

### CAUTION:

**Do not hold steering wheel at lock position for more than 15 seconds.**

4. If fluid leakage from any line is noticed, loosen flare nut and then retighten.

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

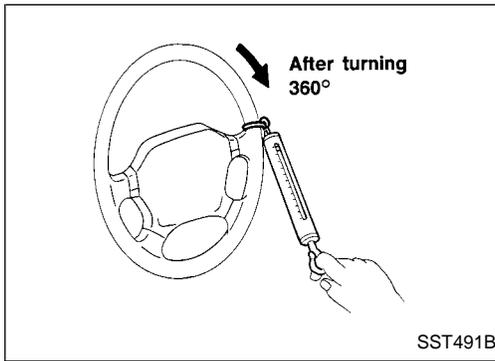
5. If fluid leakage from power steering pump is noticed, check power steering pump. Refer to ST-22.
6. If fluid leakage from power steering gear is noticed, check power steering gear. Refer to or ST-15.

## Bleeding Hydraulic System

1. Raise front end of vehicle until wheels are clear of the ground.
2. Add fluid to reservoir tank to specified level. Quickly turn steering wheel fully to right and left and lightly touch steering stoppers. Repeat steering wheel operation until fluid level no longer decreases.
3. Start engine. Repeat step 2 above.
  - Incomplete air bleeding will cause the following to occur:
    - a. Air bubbles in reservoir tank
    - b. Clicking noise in power steering pump
    - c. Excessive buzzing in power steering pump
 When this happens, bleed air again.

Fluid noise may occur in the valve or power steering 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.

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### Checking Steering Wheel Turning Force

1. Park vehicle on a level, dry surface and set parking brake.
2. Start engine and run at idle speed or 1,000 rpm.
3. Bring power steering fluid up to adequate operating temperature. [Make sure temperature of fluid is approximately 60 to 80°C (140 to 176°F).]

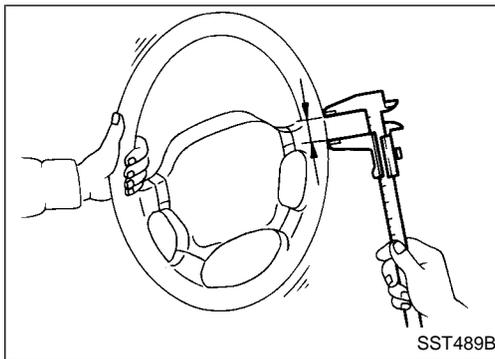
#### Tires need to be inflated to normal pressure.

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

#### Steering wheel turning force:

**39 N (4 kg, 9 lb) or less**

5. If steering wheel turning force is out of specification, check the following:
  - a. Hydraulic system. Refer to "Checking Hydraulic System", ST-10.
  - b. Steering Column. Refer to ST-12.
  - c. Front suspension and axle. Refer to FA section ("Front Axle and Front Suspension Parts", "ON-VEHICLE SERVICE").
  - d. Steering gear turning torque. Refer to "TURNING TORQUE MEASUREMENT", ST-17.



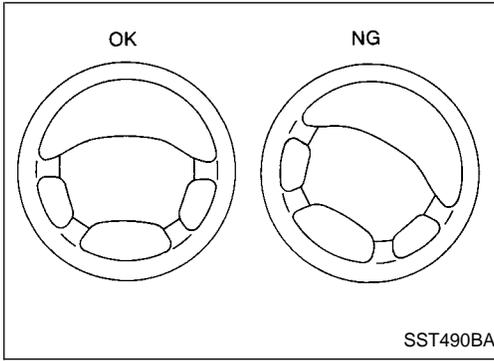
### Checking Steering Wheel Play

- Place wheels in straight ahead position and check steering wheel play.

#### Steering wheel play:

**35 mm (1.38 in) or less**

- If steering wheel play is not within specification, check the following for loose or worn components.
  - a. Steering column. Refer to ST-12.
  - b. Front suspension and axle. Refer to FA section ("Front Axle and Front Suspension Parts", "ON-VEHICLE SERVICE").
  - c. Steering gear. Refer to ST-15.

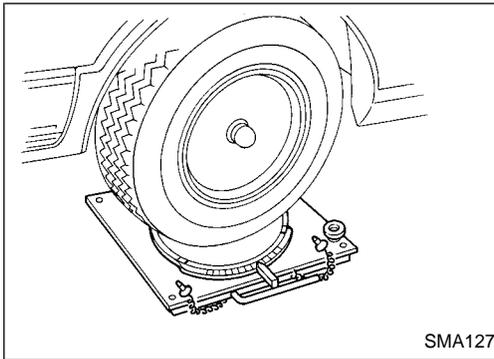


## Checking Neutral Position on Steering Wheel

- Make sure that wheel alignment is correct.  
**Wheel alignment:**  
Refer to FA section (“Inspection and Adjustment”, “SERVICE DATA AND SPECIFICATIONS”).
- Verify that the steering gear is centered before removing the steering wheel.

### Checking

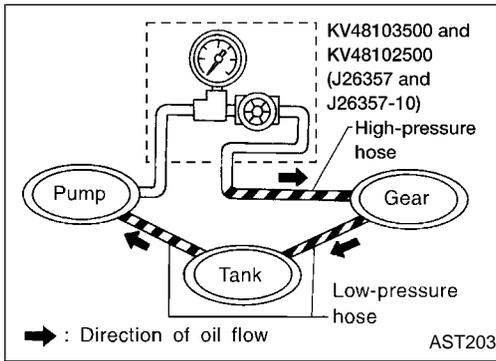
1. Check that the steering wheel is in the neutral position when driving straight ahead.
2. If it is not in the neutral position, remove the steering wheel and reinstall it correctly.
3. If the neutral position is still not correct:
  - a. Loosen tie-rod lock nuts.
  - b. Move tie-rods, in opposite direction, the same amount on both left and right sides.  
This will compensate for error in the neutral position.



## Checking Front Wheel Turning Angle

1. Rotate steering wheel fully right, then left; measure turning angle.  
**Turning angle of full turns:**  
Refer to FA section (“Inspection and Adjustment”, “SERVICE DATA AND SPECIFICATIONS”).
2. If it is not within specification, check stopper bolt adjustment. Refer to FA section (“FRONT WHEEL TURNING ANGLE”, “Front Wheel Alignment”).

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## 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 "Bleeding Hydraulic System", ST-7.
2. Run engine at idle speed or 1,000 rpm.
  - **Make sure fluid temperature in reservoir tank rises to 60 to 80°C (140 to 176°F).**

### WARNING:

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

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

### CAUTION:

**Do not hold the steering wheel at full lock position for more than 15 seconds.**

**Power steering pump maximum operating pressure:  
7,649 - 8,238 kPa (78 - 84 kg/cm<sup>2</sup>, 1,109 - 1,194 psi) at idling**

- If pressure reaches maximum operating pressure, system is OK.
  - If pressure increases above maximum operating pressure, check power steering pump flow control valve. Refer to ST-22.
4. If power steering pressure is below the maximum operating pressure, slowly close shut-off valve and check pressure again.

### CAUTION:

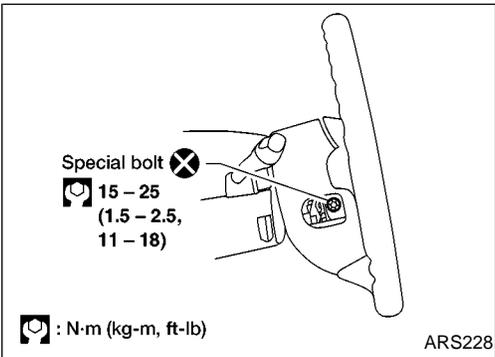
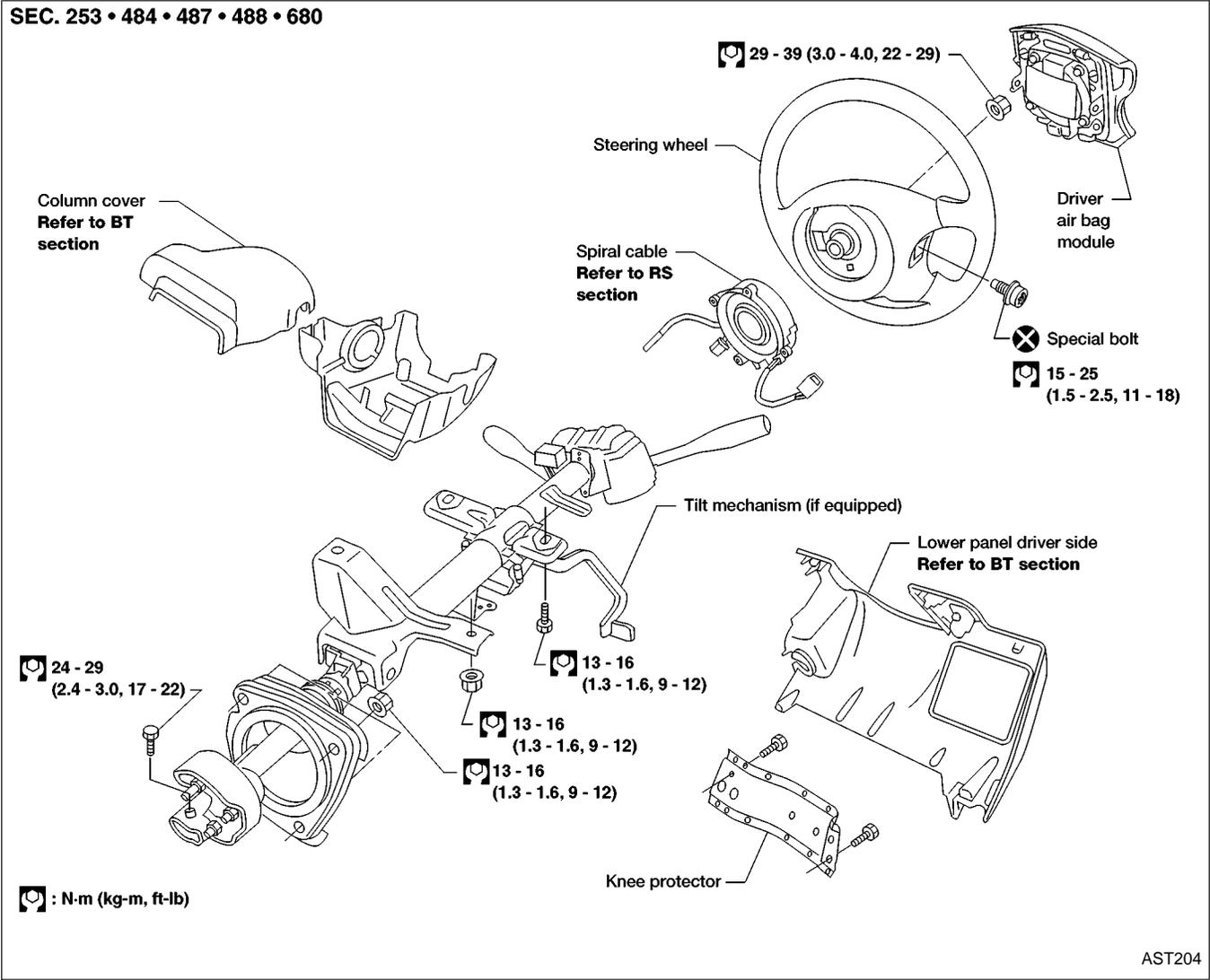
**Do not close shut-off valve for more than 15 seconds.**

- If pressure increases to maximum operating pressure, gear is damaged. Refer to "Removal and Installation", ST-16.
  - If pressure remains below maximum operating pressure, pump is damaged. Refer to "Disassembly and Assembly", ST-22.
5. After checking hydraulic system, remove Tool and add fluid as necessary. Completely bleed air out of system. Refer to ST-7.

# STEERING WHEEL AND STEERING COLUMN

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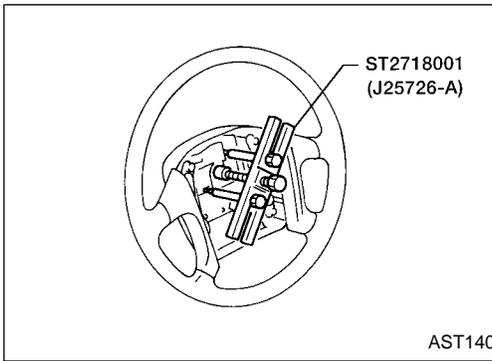
## Steering Wheel

### REMOVAL AND INSTALLATION

1. Remove air bag module and spiral cable. Refer to RS section ["Air Bag Module and Spiral Cable", "SUPPLEMENTAL RESTRAINT SYSTEM (SRS)"].
2. Disconnect horn connector and remove steering wheel nut.

# STEERING WHEEL AND STEERING COLUMN

## Steering Wheel (Cont'd)



3. Remove steering wheel using Tool.

- For installation, refer to RS section [“Air Bag Module and Spiral Cable”, “SUPPLEMENTAL RESTRAINT SYSTEM (SRS)”].

## Steering Column

### REMOVAL

#### CAUTION:

- The rotation of the spiral cable (SRS “AIR BAG” component part) is limited. If the steering gear must be removed, set the front wheels in the straight-ahead direction. Do not rotate the steering column while the steering gear is removed.
- Remove the steering wheel before removing the steering lower joint to avoid damaging the SRS spiral cable. Refer to ST-11.

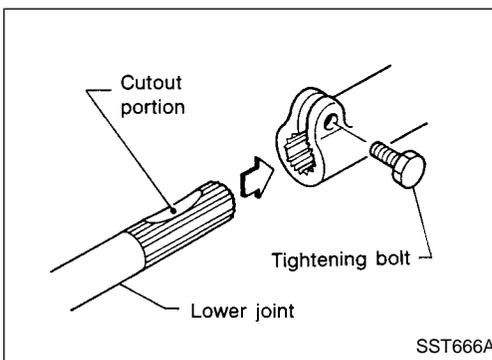
1. Remove steering wheel, refer to ST-11.
2. Remove steering column covers.
3. Remove instrument lower panel. Disconnect security lamp indicator.
4. Disconnect combination switch electrical connectors and air bag harness connector.
5. Remove knee protector.
6. Disconnect ignition switch and shift lock solenoid connectors.
7. Disconnect shift cable.
8. Remove bolt from lower joint.
9. Remove two steering column bolts and remove steering column.

### INSTALLATION

- When installing steering column, finger-tighten all lower bracket and clamp retaining bolts; then tighten them securely. Make sure that undue stress is not applied to steering column.
- When fitting steering lower joint, be sure tightening bolt faces cutout portion.
- Align spiral cable correctly when installing steering wheel. Refer to RS section [“Air Bag Module and Spiral Cable”, “SUPPLEMENTAL RESTRAINT SYSTEM (SRS)”].

#### CAUTION:

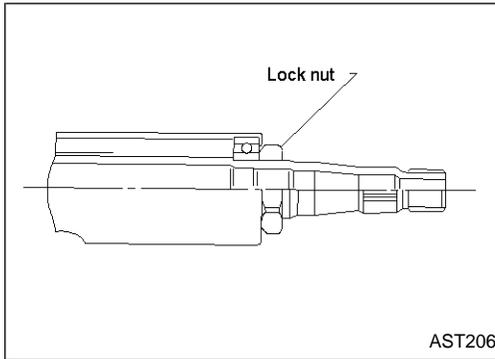
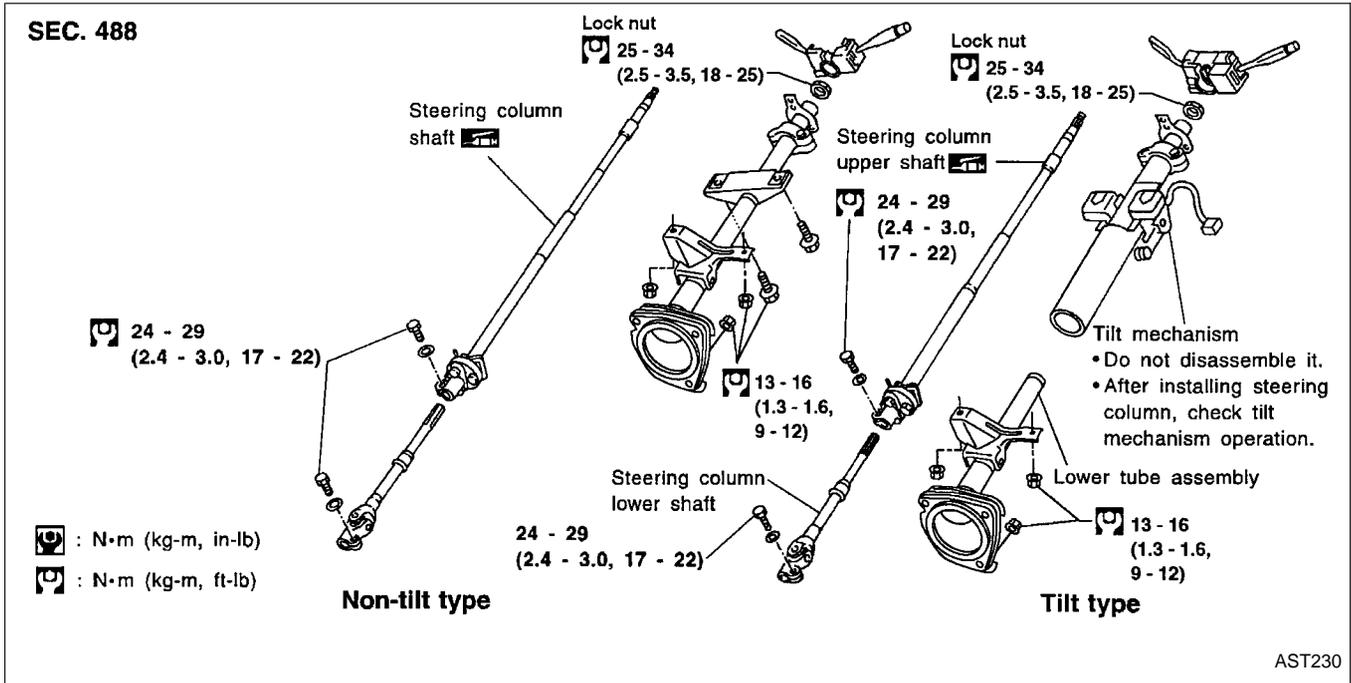
After installation, turn steering wheel to make sure it moves smoothly. Ensure the number of turns from the straight forward position to left and right locks are the same. Be sure that the steering wheel is in a neutral position when driving straight ahead.



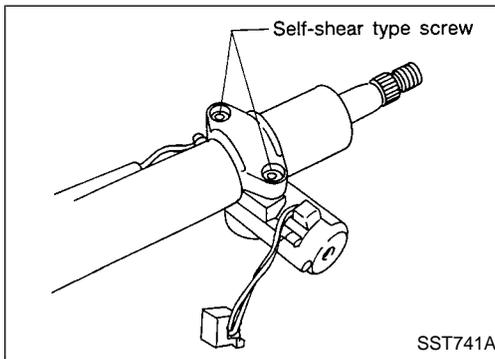
# STEERING WHEEL AND STEERING COLUMN

## Disassembly and Assembly

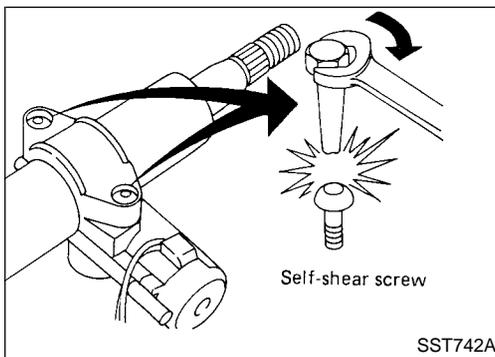
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- When disassembling and assembling, unlock steering lock with key.
- Install lock nut on steering column shaft and tighten the nut to specification.  
⊕: 25 - 34 N·m (2.5 - 3.5 kg-m, 18 - 25 ft. lb)



- Steering lock
  - Break self-shear type screws using a drill or other appropriate tool.



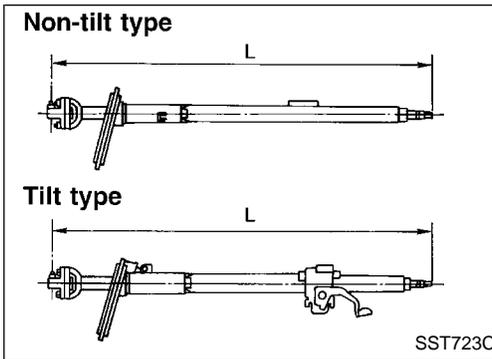
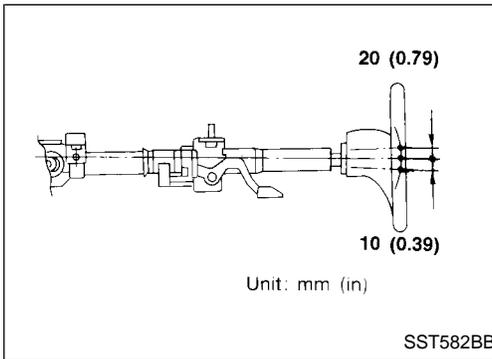
- Install self-shear type screws, then tighten until heads break off.

# STEERING WHEEL AND STEERING COLUMN

## Disassembly and Assembly (Cont'd)

### Tilt mechanism

After installing steering column, check tilt mechanism operation.



### Inspection

- If steering wheel does not turn smoothly, check the steering column as follows and replace damaged parts.
  - a. Check column bearings for damage and unevenness. Lubricate with recommended multi-purpose grease or replace steering column as an assembly, if necessary.
  - b. Check jacket tube for deformation and breakage. Replace if necessary.
- If the vehicle is involved in a light collision, check dimension "L". If it is not within specification, replace steering column as an assembly.

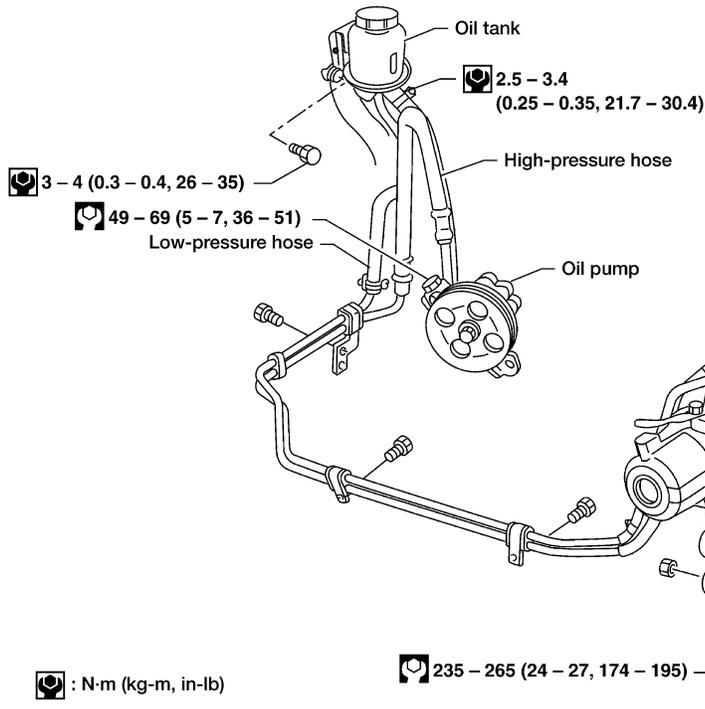
**Column length "L":**

**863.1 - 866.7 mm (33.98 - 34.12 in)**

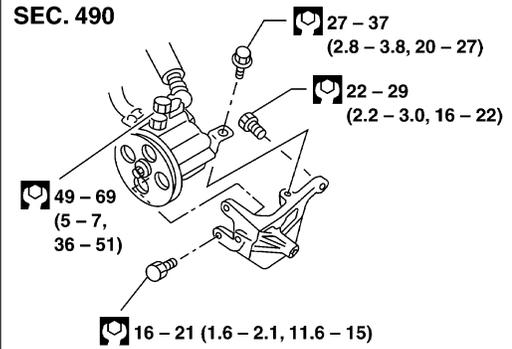
# POWER STEERING SYSTEM (Model: PB59K)

## Description

SEC. 492 • 497



SEC. 490



WST058

### CAUTION:

- Parts which can be disassembled are strictly limited. Never disassemble parts other than those specified.
- Disassemble in as clean a place as possible.
- Clean your hands before disassembly.
- Do not use rags; use nylon cloths or paper towels.
- Follow the procedures and cautions indicated in the Service Manual.

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# POWER STEERING GEAR (Model: PB59K)

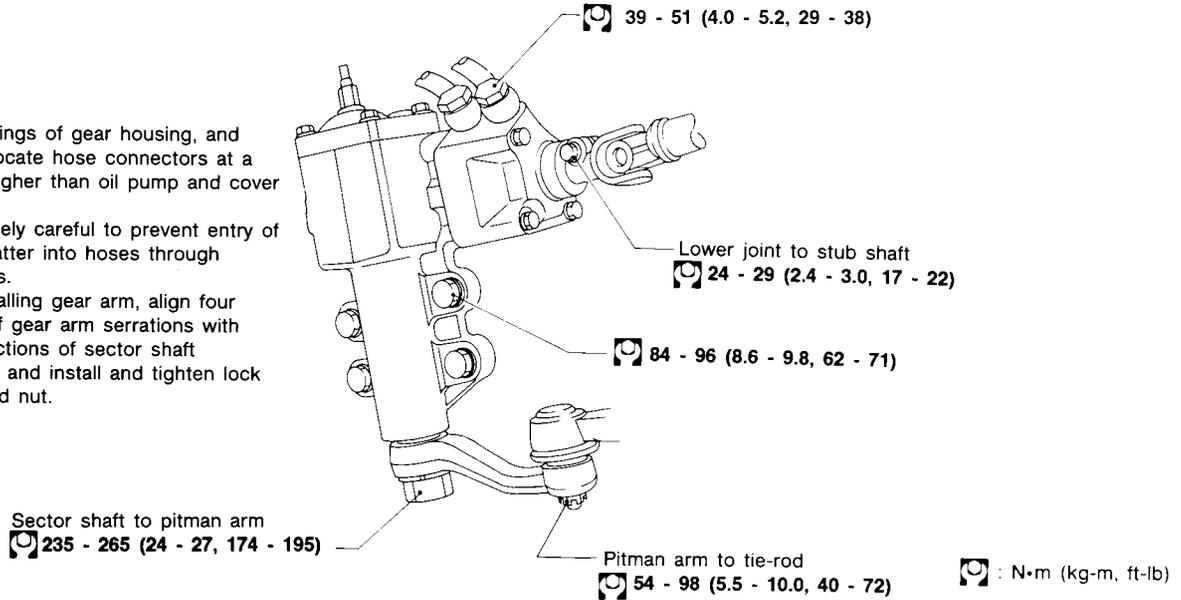
## Removal and Installation

Before removal, clean gear housing and oil pump exteriors using a steam cleaner, then dry with compressed air.

### STEERING GEAR

#### SEC. 492

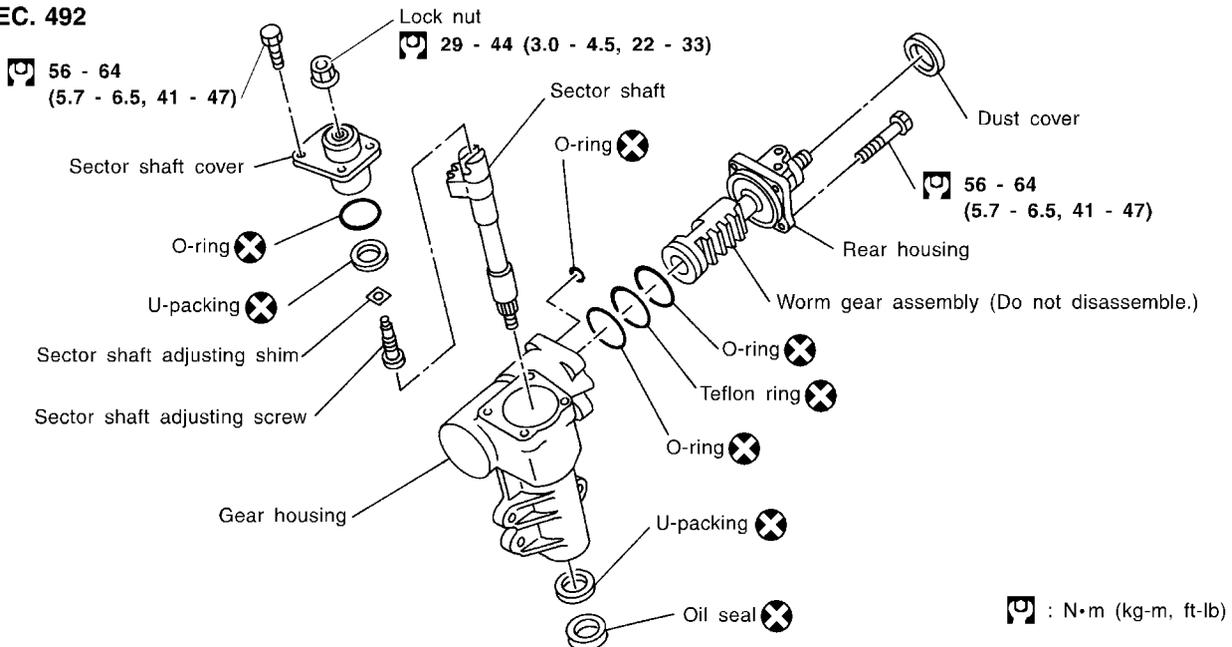
- Plug openings of gear housing, and securely locate hose connectors at a position higher than oil pump and cover with rag.
- Be extremely careful to prevent entry of foreign matter into hoses through connectors.
- When installing gear arm, align four grooves of gear arm serrations with four projections of sector shaft serrations, and install and tighten lock washer and nut.



SST123CB

## Power Steering Gear Component

#### SEC. 492



SST733C

# POWER STEERING GEAR (Model: PB59K)

## Pre-disassembly Inspection and Adjustment

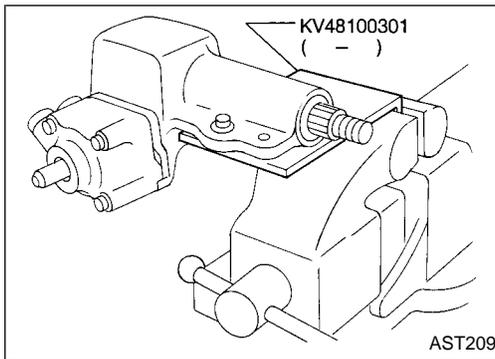
Before disassembling power steering gear component parts, make sure there is no oil leakage around sealing portion and check steering turning torque as follows:

Check sealing portion.

- Sector shaft cover O-ring
- Sector shaft U-packing
- Sector shaft oil seal
- Rear housing O-ring
- Gear housing O-ring

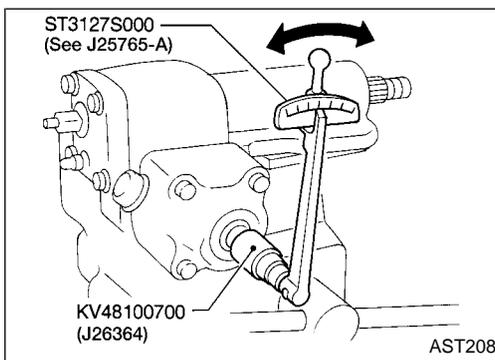
Discard any oil seals, and O-rings, which have been removed. Replace oil seals, and O-rings, if sealing surface is deformed or cracked.

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## TURNING TORQUE MEASUREMENT

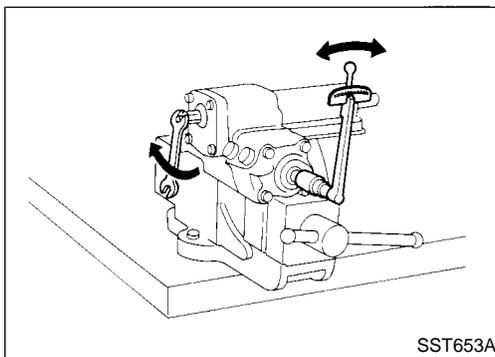
1. Measure turning torque at 360° position.
  - a. Install steering gear on Tool.



- b. Turn stub shaft all the way to the right and left several times.
- c. Measure turning torque at 360° position from straight-ahead position with Tools.

**Turning torque at 360°:**

**0.15 - 0.78 N·m (1.5 - 8.0 kg-cm, 1.3 - 6.9 in-lb)**



- d. Measure turning torque at straight-ahead position.

**Straight-ahead position is a position where stub shaft is turned 2.14 turns (two full turns and 50°) from lock position.**

**Turning torque at straight-ahead position:**

**.25 - 1.32 N·m (2.5 - 13.5 kg-cm, 2.3 - 11.6 in-lb)**

**higher than turning torque at 360°**

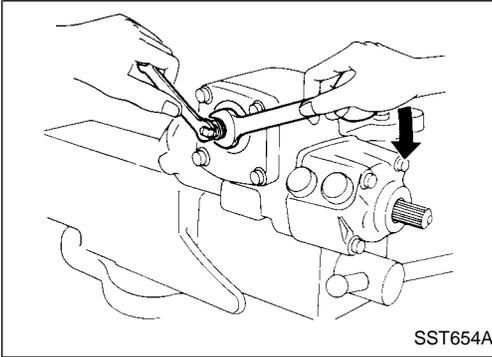
**Maximum turning torque:**

**1.03 - 1.47 N·m (10.5 - 15 kg-cm, 9.2 - 13.0 in-lb)**

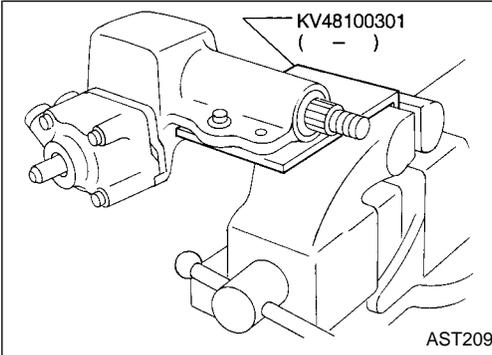
**If turning torque is not within specifications, adjust by turning sector shaft adjusting screw.**

# POWER STEERING GEAR (Model: PB59K)

## Pre-disassembly Inspection and Adjustment (Cont'd)



2. Tighten adjusting screw lock nut with Tools.



## Disassembly

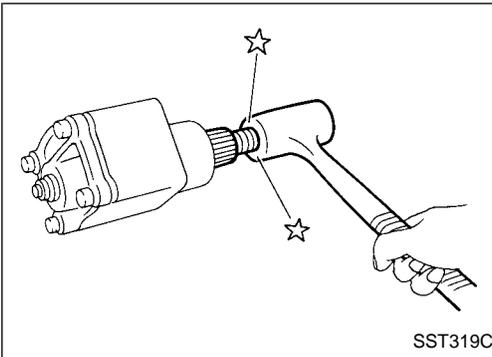
Before disassembly, measure turning torque.

**If not within specification, replace steering gear assembly.**

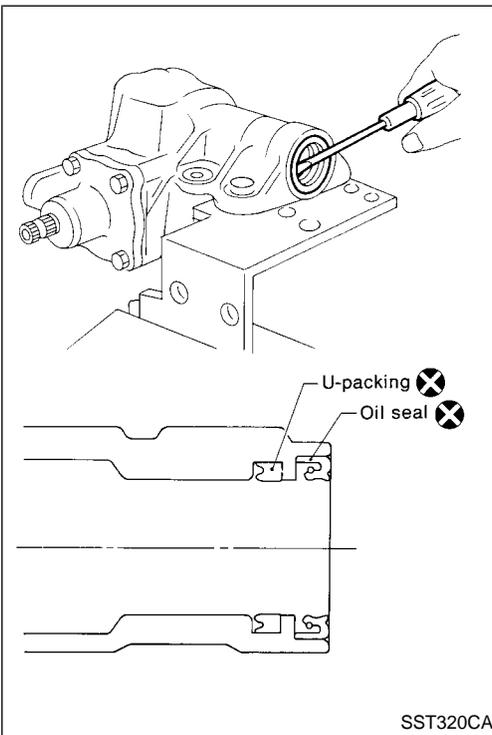
### CAUTION:

**Oil sealing parts and snap ring must not be used again after removal.**

1. Place steering gear in a vise with Tool.
2. Set worm gear in straight-ahead position.



3. Loosen (do not remove) sector shaft cover bolt.
4. Knock out end of sector shaft with a plastic hammer.
5. Remove sector shaft by hand.



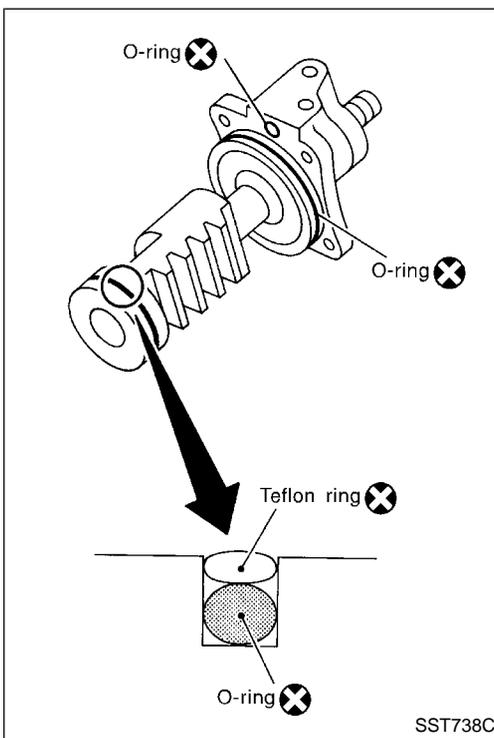
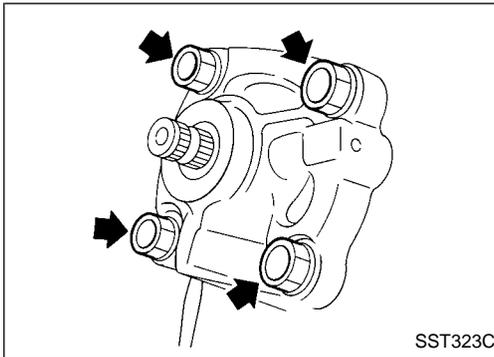
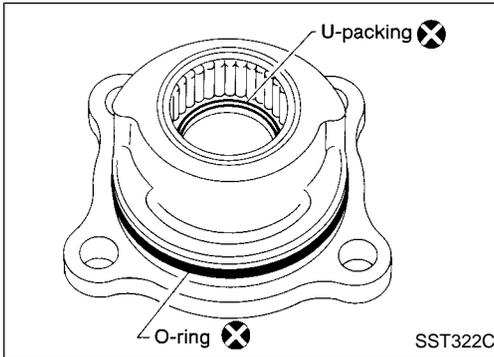
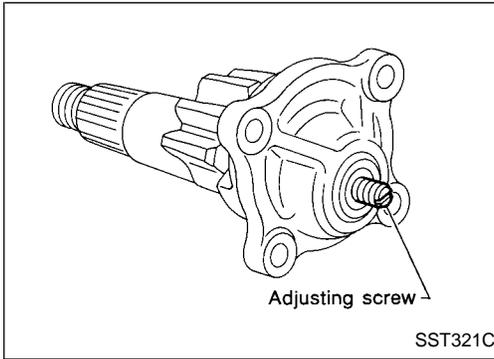
6. Remove oil seal.
7. Remove U-packing.

### CAUTION:

**When removing oil seal and U-packing, be careful not to scratch gear housing.**

# POWER STEERING GEAR (Model: PB59K)

## Disassembly (Cont'd)



8. Remove lock nut, then loosen adjusting screw using a screwdriver. Separate sector cover and sector shaft.

9. Remove O-ring.  
10. Remove U-packing.

### CAUTION:

- When removing U-packing, be careful not to scratch sector cover, needle bearing, etc.
- Needle bearing cannot be disassembled. If it is damaged, remove sector cover assembly.

11. Remove dust seal.  
12. Remove rear housing bolts.  
13. Remove rear housing together with worm gear assembly.

### CAUTION:

Worm gear assembly cannot be disassembled. When it is removed, be careful not to disengage worm gear from shaft or allow it to drop.

14. Remove teflon ring and O-ring of worm gear assembly.

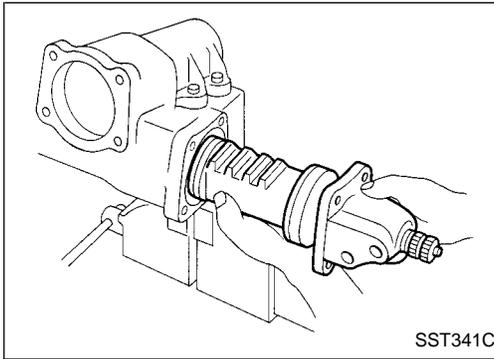
## Assembly

1. Install new O-ring on worm gear assembly.
  - Apply a thin coat of ATF to new O-ring.
2. Install new teflon ring on worm gear assembly.
  - Make sure that teflon ring is seated in correct position.
3. Install new O-rings into rear housing.

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## POWER STEERING GEAR (Model: PB59K)

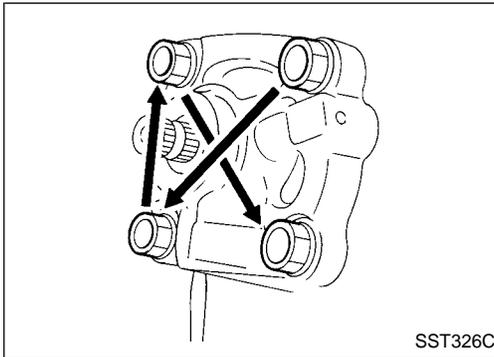
### Assembly (Cont'd)



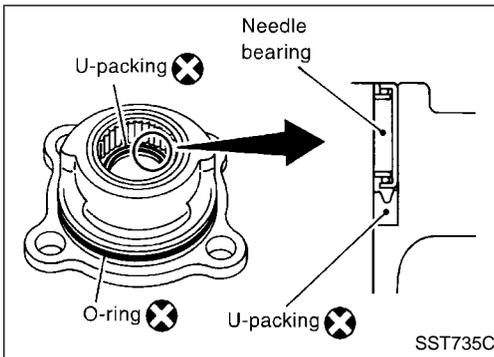
4. Install worm gear assembly with rear housing into the gear housing.

#### CAUTION:

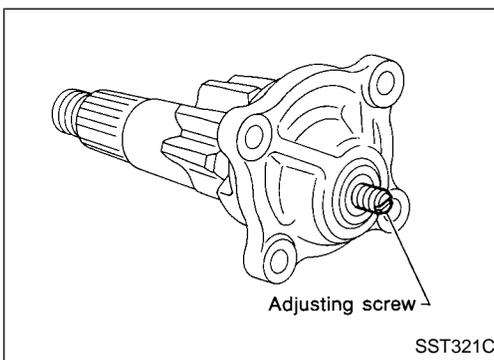
- Apply a thin coat of ATF inside gear housing and piston before insertion.
- Be careful not to damage teflon ring at piston end when inserting worm gear assembly into gear housing.



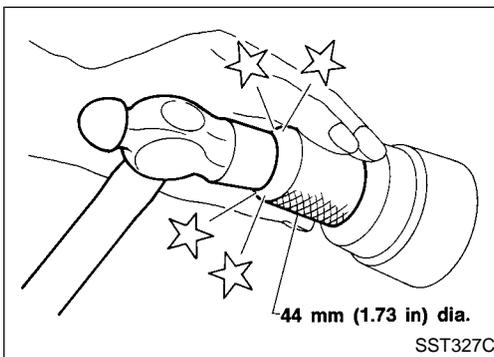
5. Gradually tighten rear housing bolts in a criss-cross fashion.



6. Install new O-ring into sector shaft cover.
  - Before installing, apply a thin coat of ATF to O-ring.
7. Install new U-packing into sector shaft cover.
  - Before installing, apply a thin coat of ATF to U-packing.
  - Direct grooved side of U-packing to needle bearing.



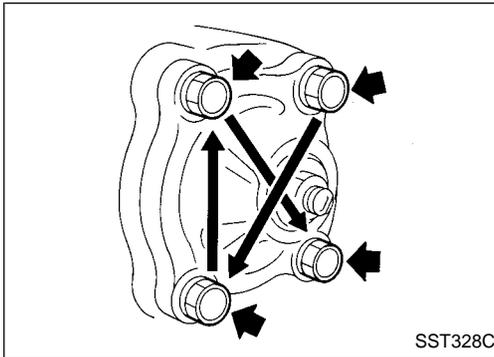
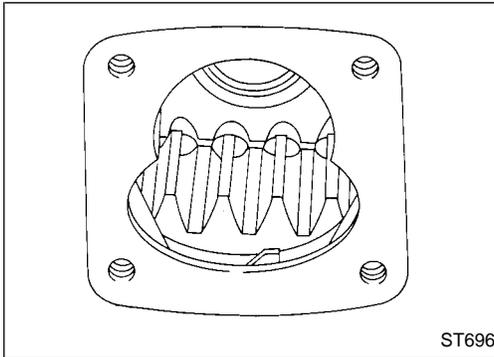
8. Install sector shaft into sector shaft cover.  
Set adjusting screw to its outermost position.
  - Before installing sector shaft, apply multi-purpose grease to adjusting screw and adjusting screw shim.



9. Install new oil seal into gear housing with suitable tool.
  - Before installing oil seal, apply multi-purpose grease to oil seal lips.

## POWER STEERING GEAR (Model: PB59K)

### Assembly (Cont'd)



10. Set piston rack at straight-ahead position.

Turn piston rack about 10° to 15° toward yourself with your finger.

This enables smooth insertion of sector gear.

11. Gradually insert sector shaft into gear housing.

12. Tighten sector shaft cover bolts.

13. Set worm gear turning torque by turning sector shaft adjusting screw and locking with lock nut.

Refer to “TURNING TORQUE MEASUREMENT”, “Pre-disassembly and Adjustment”, ST-17.

- If set and adjusting turning torque is considerably different from the value before disassembly, replace the entire assembly.

14. Check sector shaft end play in neutral position.

**End play:**

**Less than 0.1 mm (0.004 in)**

If not within specification, adjust it with adjusting screw.

15. Check worm gear preload. If not within specification, readjust it.

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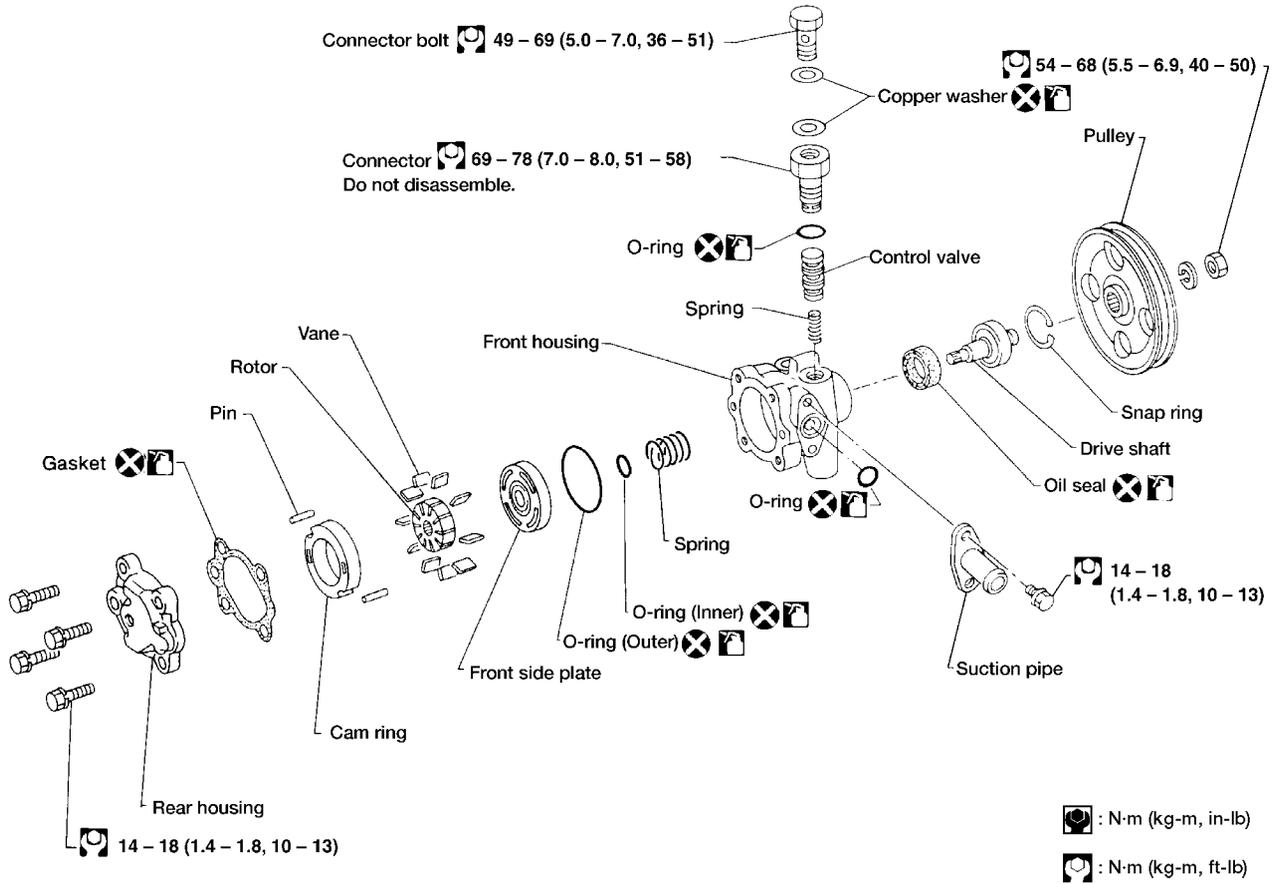
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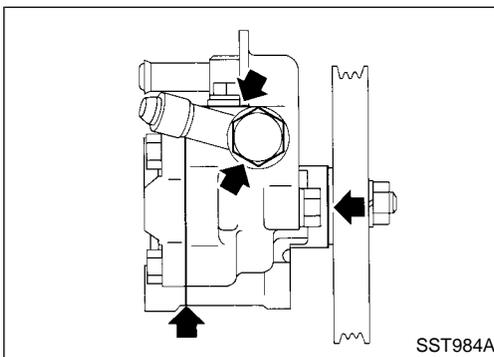
# POWER STEERING OIL PUMP

## Disassembly and Assembly

SEC.490



AST234



### Pre-disassembly Inspection

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

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

# POWER STEERING OIL PUMP

## Inspection

### PULLEY AND PULLEY SHAFT

- If pulley is cracked or deformed, replace it.
- If fluid leak is found around the pulley shaft, replace the oil seal.

## Disassembly

### CAUTION:

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

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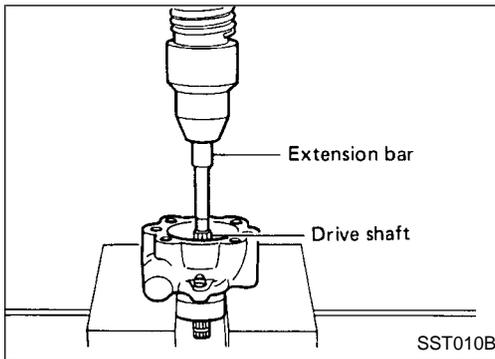
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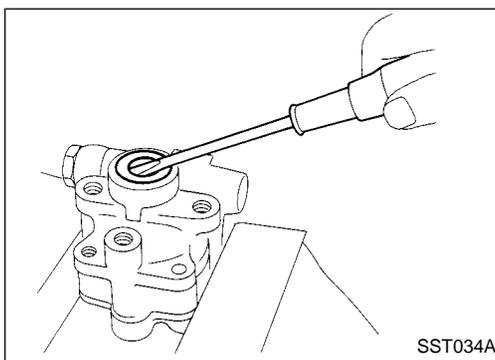
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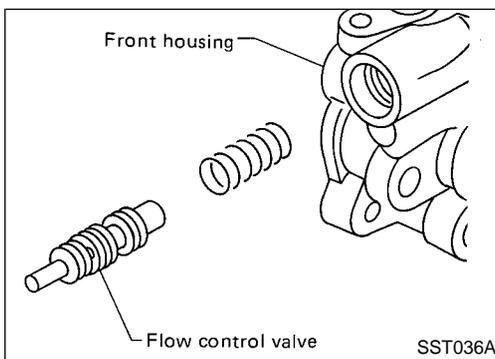
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- Remove snap ring, then draw drive shaft out.
- **Be careful not to drop drive shaft.**

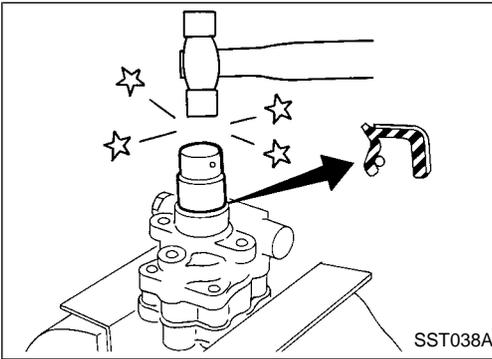


- Remove oil seal.
- **Be careful not to damage front housing.**



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

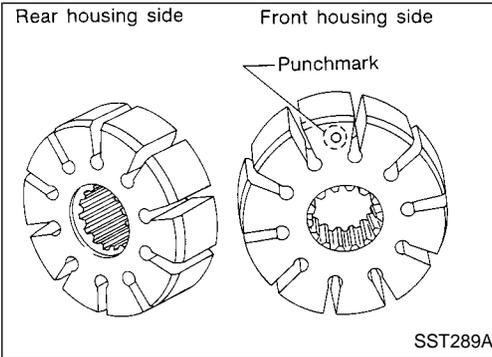
# POWER STEERING OIL PUMP



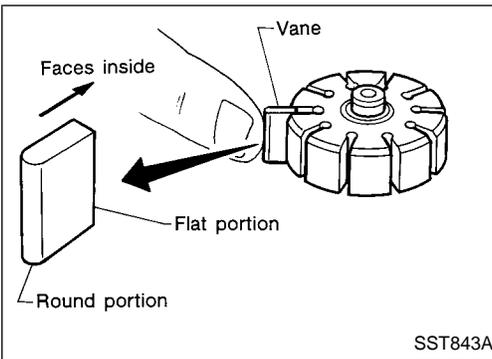
## Assembly

Assemble oil pump, noting the following instructions.

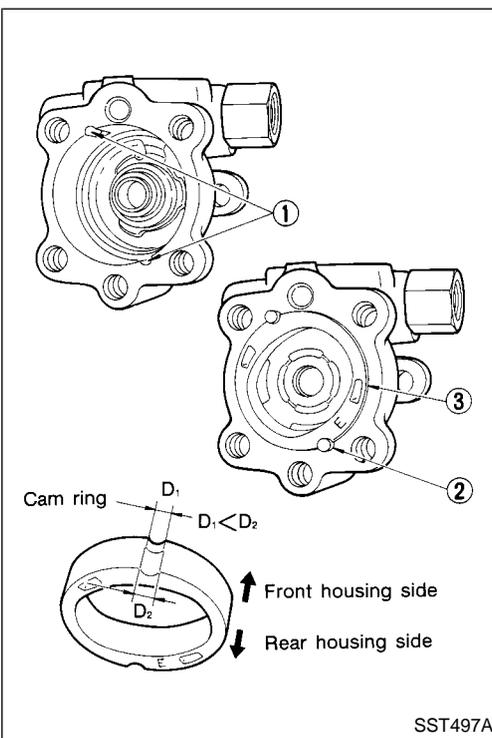
- Make sure O-rings and oil seal are properly installed.
- Always install new O-rings and oil seal.
- Be careful of oil seal direction.
- Cam ring, rotor and vanes must be replaced as a set if necessary.
- When assembling, coat each part with ATF.



- Pay attention to the direction of rotor.



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



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

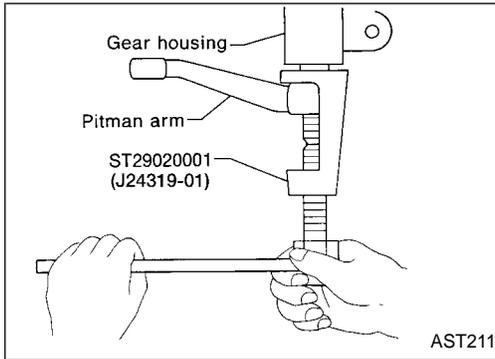
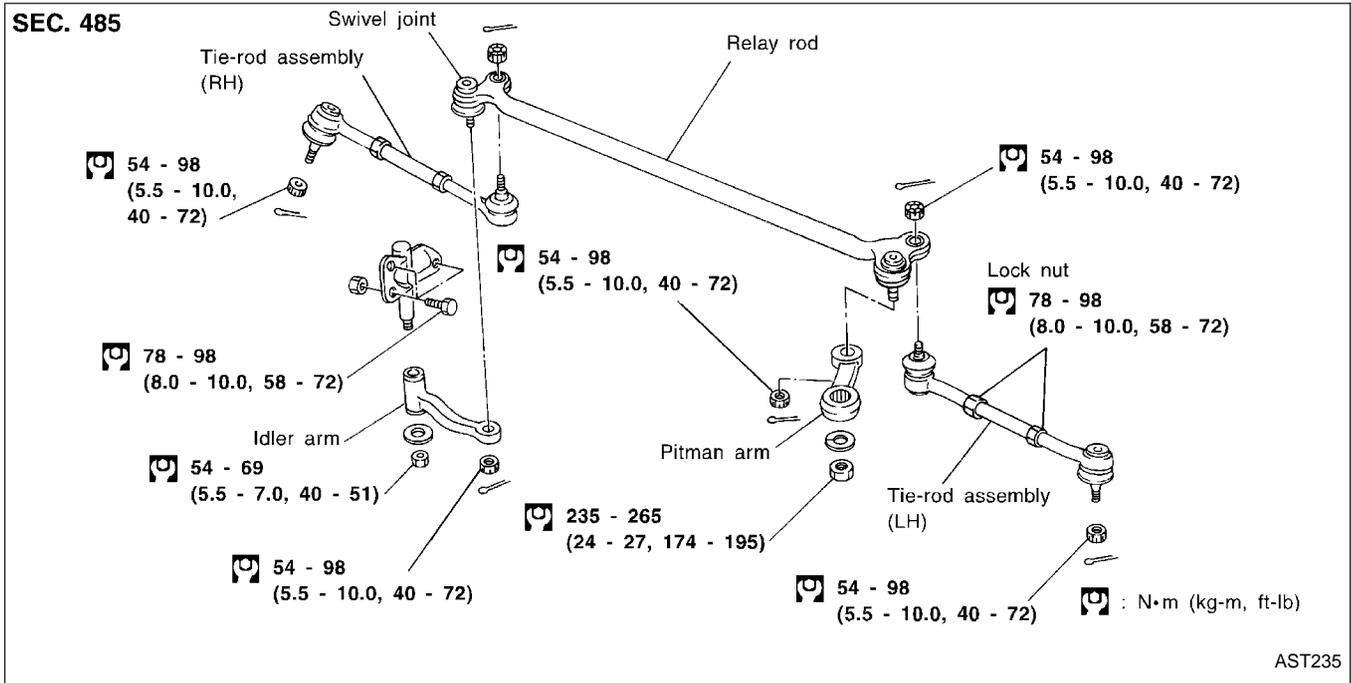
**Cam ring:**

**$D_1$  is less than  $D_2$**

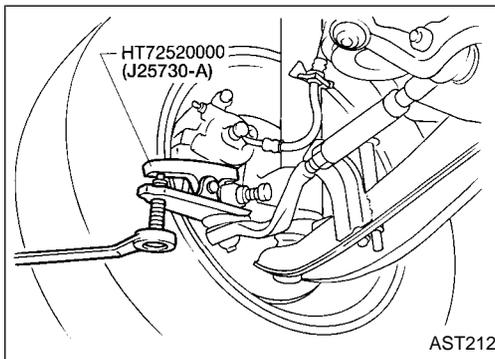
# STEERING LINKAGE

## Removal and Installation

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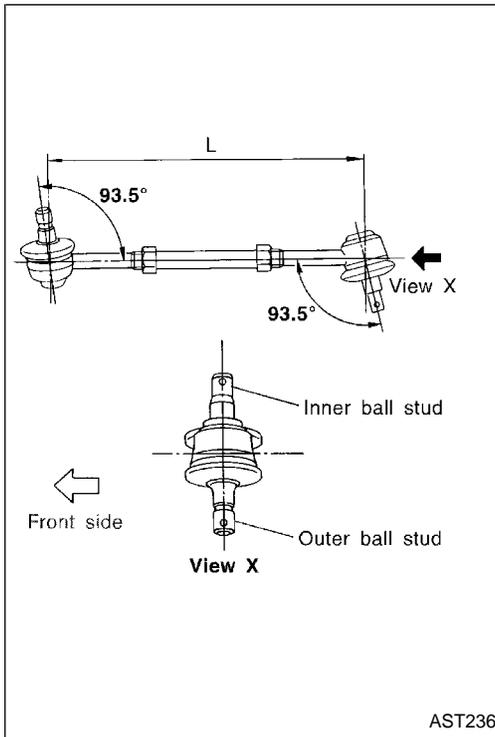


Remove pitman arm with Tool.



Remove tie-rod from knuckle arm with Tool.

# STEERING LINKAGE



## Disassembly

### IDLER ARM ASSEMBLY

- Apply coat of multi-purpose grease to bushing.
- Press bushing into idler body, and insert shaft of idler bracket carefully until bushing protrudes.

### CROSS ROD AND TIE-ROD

1. When tie-rod ball joints and tie-rod bar are separated, adjust tie-rod length correctly. Adjustment should be done between ball stud centers.
2. Lock tie-rod clamp nut so that ball joint on outer ball stud is as follows with respect to that on inner ball stud.

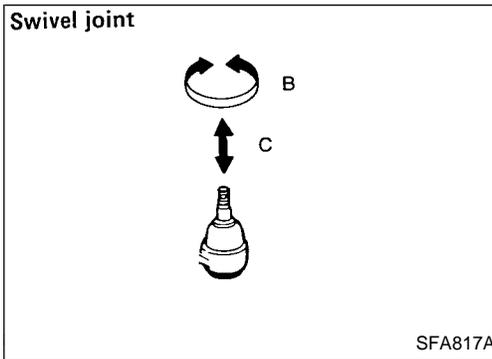
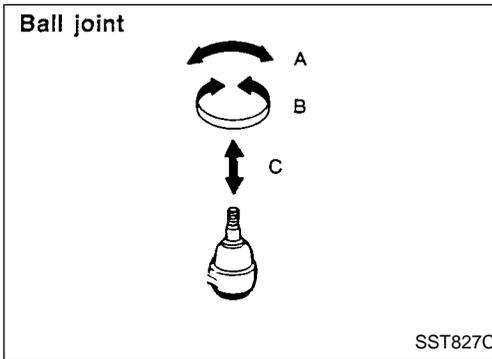
**L: Standard**

**297.6 mm (11.72 in)**

### CAUTION:

**Make sure that tie-rod bars are screwed into tie-rod tube more than 22 mm (.87 in).**

# STEERING LINKAGE



## Inspection

### BALL JOINT AND SWIVEL JOINT

1. Check joints for play. If ball or swivel stud is worn and play in axial direction is excessive or joint is hard to swing, replace as a complete unit.

**Swinging force (Measure point: Cotter pin hole) "A":**

**Ball joint**

15.7 - 147.1 N (1.6 - 15.0 kg, 3.5 - 33.1 lb)

**Rotating torque "B":**

**Ball joint**

0.5 - 4.9 N·m (5 - 50 kg-cm, 4.3 - 43.4 in-lb)

**Swivel joint**

1.0 - 5.9 N·m (10 - 60 kg-cm, 8.7 - 52.1 in-lb)

**Axial end play "C":**

**Ball joint and swivel joint**

0 mm (0 in)

2. Check condition of dust cover. If it is cracked excessively, replace as a complete unit.

### CAUTION:

**Be careful not to apply grease or oil to taper of joint.**

### IDLER ARM ASSEMBLY

- Check rubber bushing of idler arm for breakage, wear or play, and replace if necessary.
- Lubricate idler arm assembly with multi-purpose grease, if necessary.

### CROSS ROD AND TIE-ROD

Check tie-rod and cross rod for breakage, bends and cracks, and replace with a new one if necessary.

### FIXING LOCATION

- Check fixing location (nuts and cotter pins) for looseness, play or breakage.
- When looseness or play is found, check for wear on tapered portion of joints, gear arm or idler arm.
- When reassembling each joint, use new cotter pins.

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# SERVICE DATA AND SPECIFICATIONS (SDS)

## General Specifications

Steering column type (Collapsible)	Power steering
Steering gear type	PB59K
Turns of steering wheel on the vehicle (Lock-to-lock)	3.4
Steering gear ratio	15

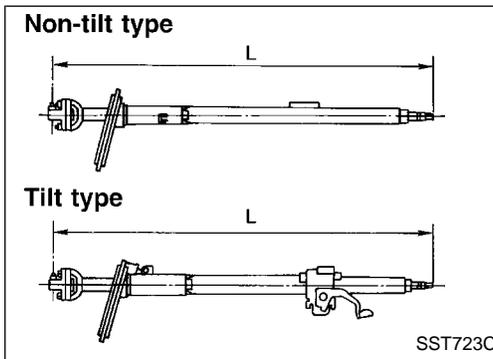
Steering wheel axial play mm (in)	0 (0)
Steering wheel play mm (in)	35 (1.38) or less

## Inspection and Adjustment

### STEERING COLUMN LENGTH

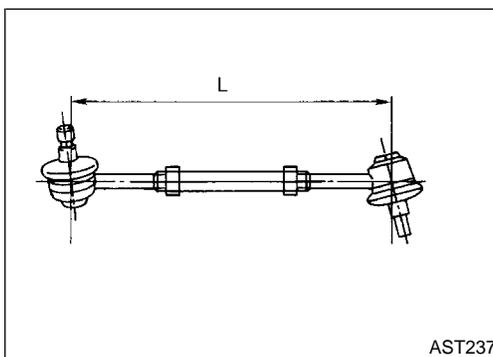
Unit: mm (in)

Dimension "L"	863.1 - 866.7 (33.98 - 34.12)
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### STEERING LINKAGE

Relay-rod swivel joint	
Rotating torque N·m (kg-cm, in-lb)	1.0 - 5.9 (10 - 60, 8.7 - 52.1)
Axial end play mm (in)	0 (0)
Tie-rod & relay-rod ball joint	
Swinging force at cotter pin hole N (kg, lb)	15.7 - 147.1 (1.6 - 15.0, 3.5 - 33.1)
Rotating torque N·m (kg-cm, in-lb)	0.5 - 4.9 (5 - 50, 4.3 - 43.4)
Axial end play mm (in)	0 (0)
Tie-rod standard length (L) mm (in)	297.6 (11.72)



### POWER STEERING SYSTEM (Model: PB59K)

Steering wheel turning force (at 360° from neutral position and circumference of steering wheel) N (kg, lb)	39 (4, 9) or less
Oil pump pressure kPa (kg/cm <sup>2</sup> , psi)	7,649 - 8,238 (78 - 84, 1,109 - 1,194) at idling
Fluid capacity ml (Imp fl oz)	Approximately 1,000 - 1,100 (35.2 - 38.7)
Normal operating temperature °C (°F)	60 - 80 (140 - 176)
Steering gear turning torque N·m (kg-cm, in-lb)	
360° position from straight-ahead position	0.15 - 0.78 (1.5 - 8.0, 1.3 - 6.9)
Straight-ahead position (As compared with steering wheel turned 360°)	0.25 - 1.32 (2.5 - 13.5, 2.2 - 11.7) higher
Maximum turning torque	1.03 - 1.47 (10.5 - 15, 9.1 - 13.0)
Backlash at pitman arm top end (in straight-ahead position) mm (in)	0 - 0.1 (0 - 0.004)
End play (at sector shaft end in neutral position) mm (in)	0.1 (0.004) or less