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SECTION PS

POWER STEERING SYSTEM

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PRECAUTIONS

PRECAUTIONS

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

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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

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- Before disassembly, thoroughly clean the outside of 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 cloth 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

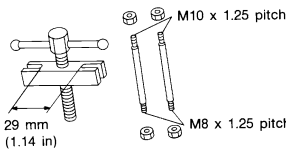
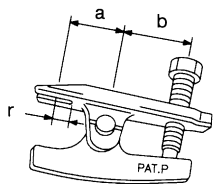
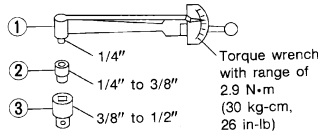
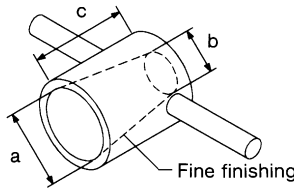
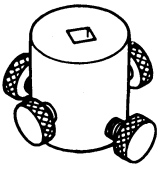
PREPARATION

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Special Service Tools (SST)

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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
ST27180001 (J25726 -A) Steering wheel puller	 <p style="text-align: center;">S-NT544</p>
HT72520000 (J25730-A) Ball joint remover a: 33 mm (1.30 in) b: 50 mm (1.97 in) c: 11.5 mm (0.453 in)	 <p style="text-align: center;">NT546</p>
ST3127S000 (See J25765 - A) Preload gauge 1.GG9103000. (J25765 - A) Torque wrench 2.HT62940000 (-) Socket adapter 3.HT62900000 (-) Socket adapter	 <p style="text-align: center;">S-NT541</p>
KV48104400 (-) Teflon ring correcting tool	 <p style="text-align: center;">S-NT550</p>
KV48103404 (-) Torque adapter	 <p style="text-align: center;">ZZA0824D</p>

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PREPARATION

Tool number (Kent - Moore No.) Tool name	Description
<p>KV48103500 (J26357 and J26357-10) Pressure gauge</p> <div style="text-align: center; margin-top: 10px;"> <p style="font-size: small;">S-NT547</p> </div>	<p>Measurement oil pump relief pressure</p>
<p>KV4802500 (J33914) Pressure gauge adapter</p> <div style="text-align: center; margin-top: 10px;"> <p style="font-size: small;">S-NT542</p> </div>	<p>Measurement oil pump relief pressure</p>

NOISE, VIBRATION AND HARSHNESS (NVH) TROUBLESHOOTING

NOISE, VIBRATION AND HARSHNESS (NVH) TROUBLESHOOTING

PPF:00003

NVH Troubleshooting Chart

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

Symptom		STEERING	Possible cause and SUSPECTED PARTS																Reference page							
			Fluid level	Air in hydraulic system	Outer socket ball joint swinging force	Outer socket ball joint rotating torque	Outer socket 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	PROPELLER SHAFT		DIFFERENTIAL	AXLE AND SUSPENSION	TIRES	ROAD WHEEL	DRIVE SHAFT	BRAKES	
Noise	STEERING	Noise	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	PS-6	
		Shake																								PS-6
		Vibration																								PS-20
		Shimmy																								PS-20
		Judder																								PS-6
																									PS-7	
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																									PS-11	
																									PS-15	
																									NVH in PR section	
																									NVH in RFD section	
																									NVH in FAX, RAX, FSU and RSU section	
																									NVH in WT section	
																									NVH in WT section	
																									NVH in RAX section	
																									NVH in BR section	

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POWER STEERING FLUID

POWER STEERING FLUID

PFP:KLF20

Checking Fluid Level

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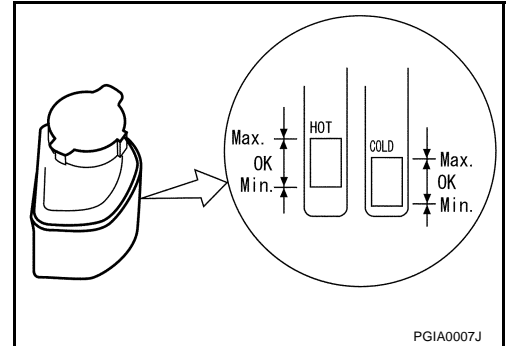
- Stop engine before performing a fluid level check.
- Ensure that fluid level is between the MAX range and MIN level.
- Because fluid level differs within the HOT range and the COLD range, check it carefully.

HOT : Fluid temperatures from 50 to 80°C (122 to 176°F)

COLD : Fluid temperatures from 0 to 30°C (32 to 86°F)

CAUTION:

- Do not overfill the Max level.
- Do not reuse any used power steering fluid.
- Recommended fluid is Genuine NISSAN PSF or equivalent.



Checking Fluid Leakage

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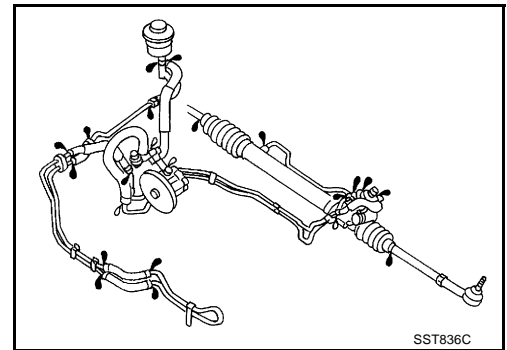
Check the hydraulic piping lines for improper attachment and for leaks, cracks, damage, loose connections, chafing or deterioration.

1. Run engine until fluid temperatures reaches 50 to 80°C (122 to 176°F) in reservoir tank. Keep engine speed idle.
2. Turn steering wheel right-to-left several times.
3. Hold steering wheel at each "lock" position for five seconds to check fluid leakage.

CAUTION:

Do not hold steering wheel in a locked position for more than 10 seconds. (There is the possibility that oil pump may be damaged.)

4. If fluid leakage at connections is noticed, then loosen flare nut and then retighten. Do not over tighten connector as this can damage O-ring, washer and connector.
5. If fluid leakage from oil pump is noticed, check oil pump. Refer to [PS-26. "POWER STEERING OIL PUMP"](#).
6. Check steering gear boots for accumulation of fluid indicating a from steering gear.



Air Bleeding Hydraulic System

EGS0006Y

Incomplete air bleeding causes the following. When this happens, bleed air again.

- Generation of air bubbles in reservoir tank.
- Generation of clicking noise in oil pump.
- Excessive buzzing in oil pump.

NOTE:

When vehicle is stationary or while steering wheel is being turned slowly, some noise may be heard from oil pump or gear. This noise is normal and does not affect any system.

1. Stop engine, and then turn steering wheel fully to right and left several times.

CAUTION:

Do not allow steering fluid reservoir tank to go below the low-level line. Check tank frequently and add fluid as needed.

2. Run engine at idle speed. Turn steering wheel fully to the right and then fully to the left, and keep for about three seconds. Then check whether a fluid leakage has occurred.
3. Repeat the 2nd procedure several times at about three seconds intervals.

CAUTION:

Do not hold steering wheel in the locked position more than 10 seconds. (There is the possibility that oil pump may be damaged.)

4. Check generation of air bubbles and cloud in fluid.

STEERING WHEEL

STEERING WHEEL

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On-Vehicle Inspection and Service

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CHECKING CONDITION OF INSTALLATION

- Check installation condition of steering gear assembly, front suspension, axle and steering column.
- Check if movement exists when steering wheel is moved up and down, to the left and right and to the axial direction.

End play of the axle direction for steering wheel : 0 mm (0 in)

- Check if the mounting bolts for steering gear assembly are loose or not. Refer to [PS-15, "POWER STEERING GEAR AND LINKAGE"](#) .

CHECKING STEERING WHEEL PLAY

1. Set tires to the straight ahead, start engine, then turn steering wheel to the left and right lightly, and measure steering wheel movement on the outer circumference when steering wheel is turned up to the point where tires start moving.

Steering wheel play on the outer circumference : 0 – 35 mm (0 – 1.38 in)

CHECKING NEUTRAL POSITION ON STEERING WHEEL

Check neutral position on steering wheel after confirming that front wheel alignment is correct. Refer to [FSU-5, "Wheel Alignment Inspection"](#) .

1. Set vehicle to the straight direction, check if steering wheel is in the neutral position.
2. If it is not in the neutral position, remove steering wheel and reinstall it correctly.
3. If the neutral position cannot adjust in the two teeth of steering gear assembly, loosen outer socket lock nuts of steering outer sockets, then adjust outer socket by the same amount in the opposite direction.

CHECKING STEERING WHEEL TURNING FORCE

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

Tires need to be inflated normal pressure.

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

Steering wheel turning force : 36 N (3.7kg, 8.2lb) or less

5. If steering wheel turning force is out of specification, check rack sliding force.
 - a. Disconnect steering column lower joint and knuckle arms from gear.
 - b. Start and run engine at idle to make sure steering fluid has reached normal operating temperature.

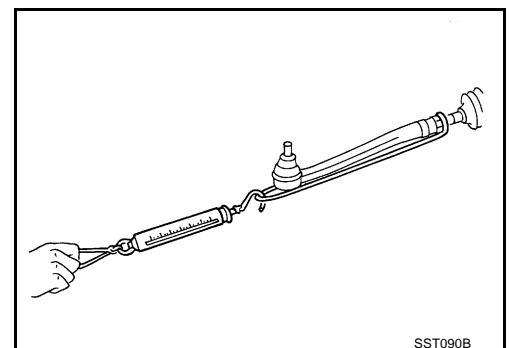
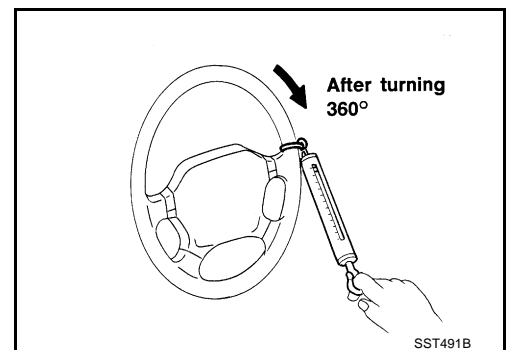
- c. While pulling outer socket slowly in the ± 11.5 mm (± 0.453 in) range from neutral position, make sure rack sliding force is within specification.

Rack sliding force : 255- 294 N (26-30 kg, 57 - 66 lb)

- d. Check sliding force outside above range.

Rack sliding force : Not more than 294 N (30kg, 66lb)

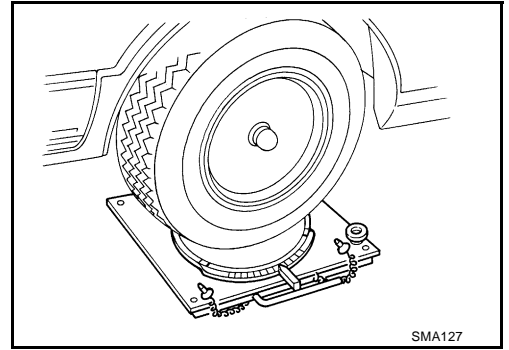
- e. If rack sliding force is not within specification, overhaul steering gear assembly.



STEERING WHEEL

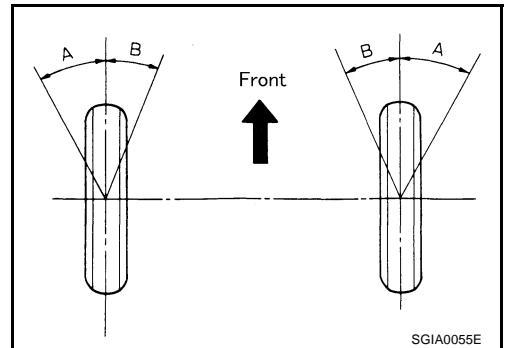
CHECKING FRONT WHEEL TURNING ANGLE

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



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

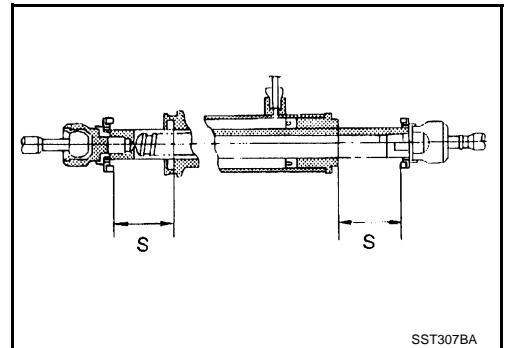
Inner wheel (Angle: A)	Minimum	: 39°45' (39.75°)
	Nominal	: 42°45' (42.75°)
	Maximum	: 43°45' (43.75°)
Outer wheel (Angle: B)	Nominal	: 33°50' (33.83°)



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

Rack stroke : 68.5 mm (2.697 in)

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



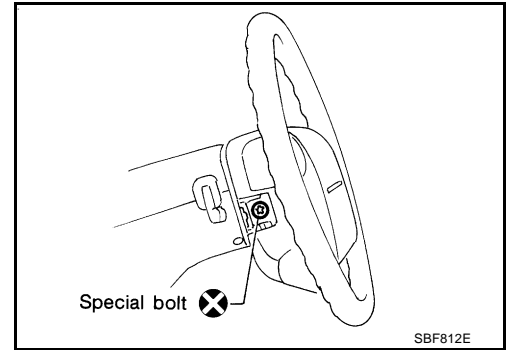
STEERING WHEEL

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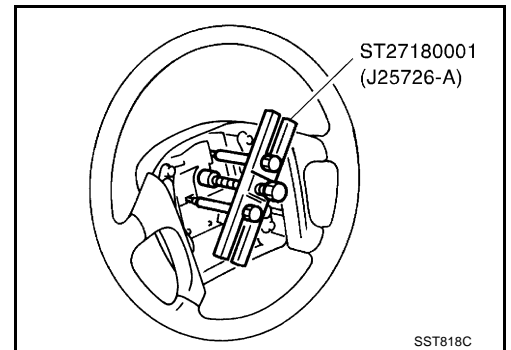
Removal and Installation

REMOVAL

1. Remove driver air bag module. Refer to [SRS-39, "DRIVER AIR BAG MODULE"](#).
2. Remove horn connector.
3. Remove steering wheel mounting nut paint mating marks on the top of column shaft steering wheel.



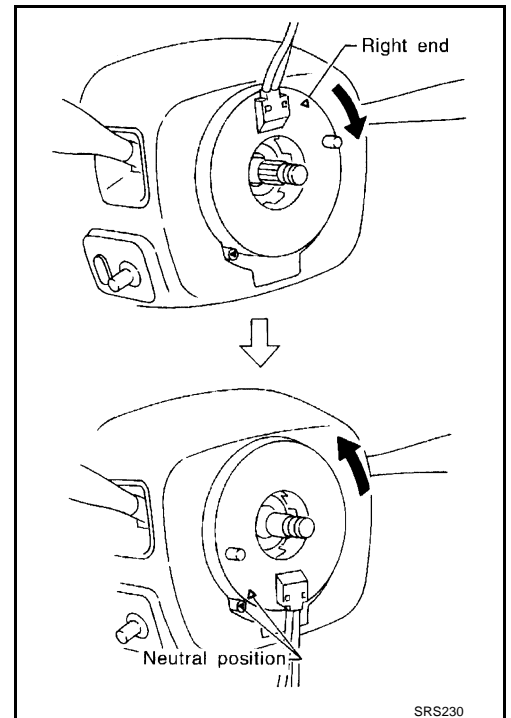
4. Remove steering wheel with steering wheel puller (SST).



INSTALLATION

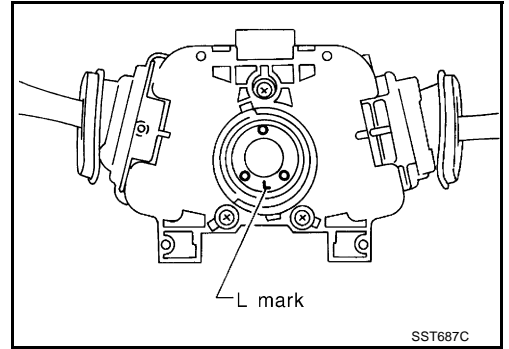
Paying attention to the following items, install in reverse order of removal.

- Align spiral cable correctly when installing steering wheel.
 - a. Set the front wheels in the straight-ahead position.
 - b. Make sure that spiral cable is in neutral position. The neutral position is detected by turning left about 2.5 or 3.5 revolutions from right end position. Align the two marks (▲▽). (The spiral cable can be turned up to about 2.5 or 3.5 turns from neutral position to both right and left. The number of turns depends on spiral cable type. Always confirm the number indicated on the caution label attached to spiral cable before starting work.)
- Always work from side of air bag module.

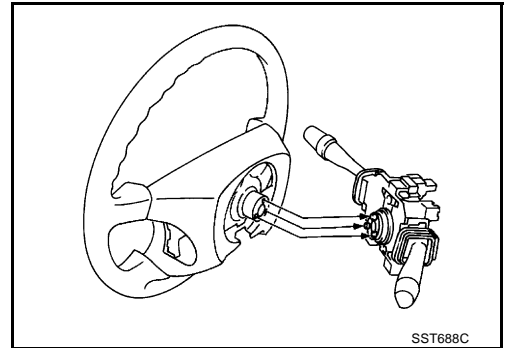


STEERING WHEEL

Place combination switch assembly with the L-mark side facing down.



Align the protruding portions of combination switch assembly with their corresponding holes in steering wheel, then install steering wheel. Refer to figure at right.



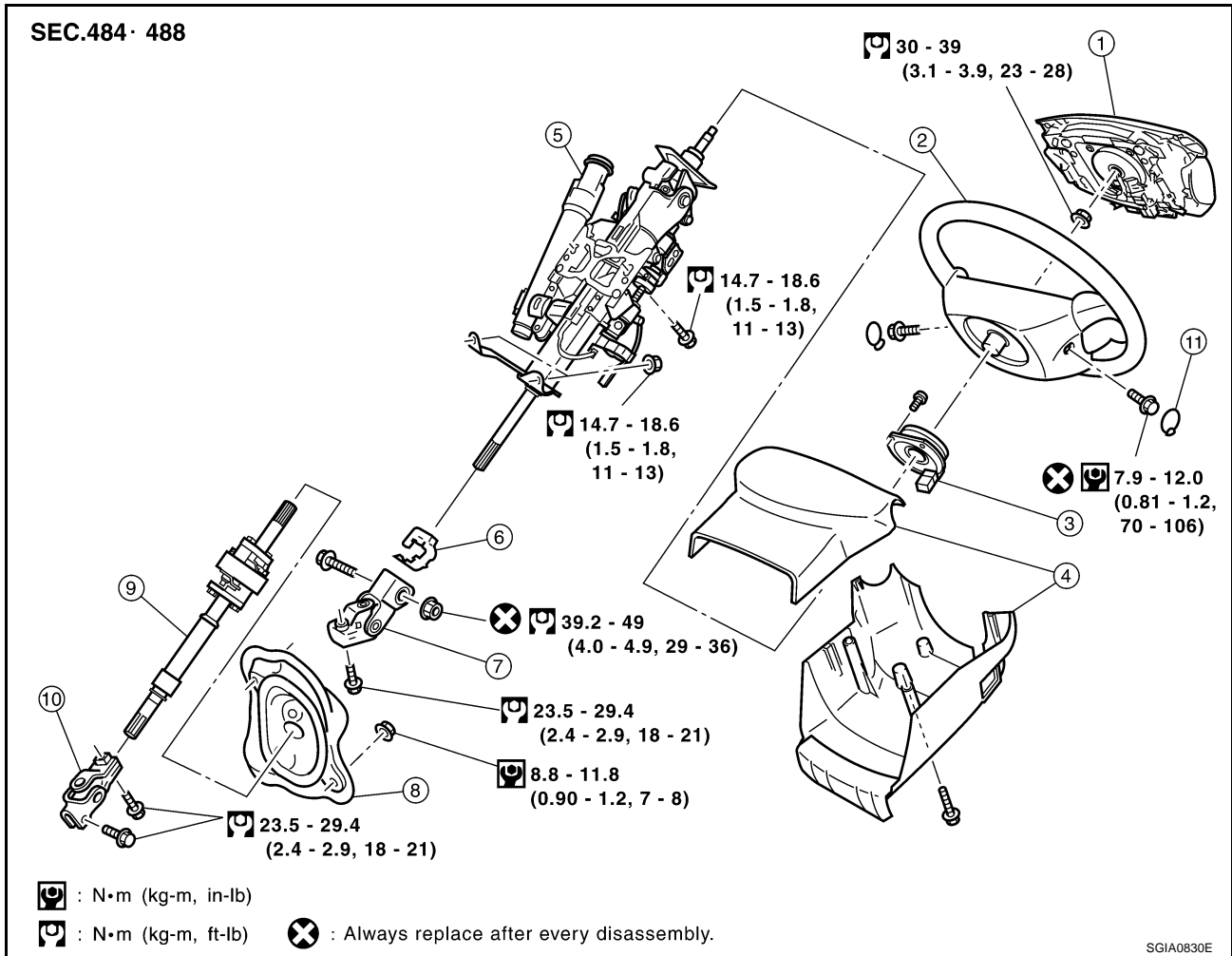
STEERING COLUMN

STEERING COLUMN

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Removal and Installation

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- | | | |
|--------------------------|-----------------------------|-----------------|
| 1. Driver air bag module | 2. Steering wheel | 3. Spiral cable |
| 4. Column cover | 5. Steering column assembly | 6. Collar |
| 7. Upper joint | 8. Hole cover | 9. Lower shaft |
| 10. Lower joint | 11. Rid | 12. |

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.

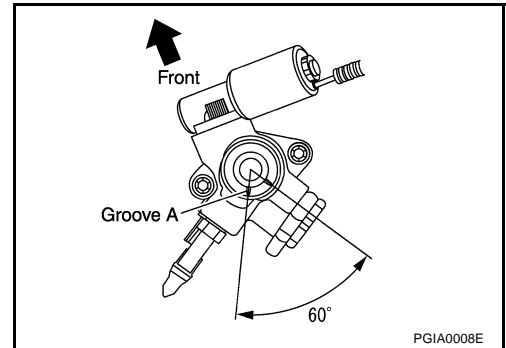
REMOVAL OF LOWER SHAFT AND HALL COVER

1. Set vehicle to the straight ahead-direction.
2. Remove pinch bolt at lower-side of lower joint.
3. Loosen pinch bolt at lower shaft-side of upper joint.
4. Remove cooler, mounting bolt and nut at steering column assembly-side of upper joint.
5. Remove hall cover mounting nuts, and remove upper joint, lower joint, lower shaft and hall cover from vehicle.
6. Remove pinch bolt and remove lower joint from lower shaft.
7. Remove pinch bolt and remove upper joint from lower shaft.
8. Remove lower shaft from hall cover.

STEERING COLUMN

INSTALLATION OF LOWER JOINT AND HALL COVER

- Refer to [PS-11, "Removal and Installation"](#) for tightening torque. Install in the reverse order of removal.
- After removing/installing or replacing steering components, check wheel alignment. Refer to [FSU-5, "Wheel Alignment Inspection"](#).
- After adjusting wheel alignment, adjust neutral position of steering angle sensor. Refer to [BRC-6, "Adjustment of Steering Angle Sensor Neutral Position"](#).
- Install lower joint to power steering gear assembly in the following procedure.
 - Set rear cover cap projection into slot A in the gear sub-assembly.
 - Lock steering wheel by turning steering wheel clockwise by 60° from neutral position.
 - Install lower joint to power steering gear while keeping position shown at steps 1 and 2. Keep slit in lower section of lower joint off rear cover cap projection.
 - Unlock steering and set steering wheel in the neutral position.
 - Check that rear cover cap projection is correctly positioned relative to slot A in the gear sub-assembly as shown in the illustration.



REMOVAL OF STEERING COLUMN

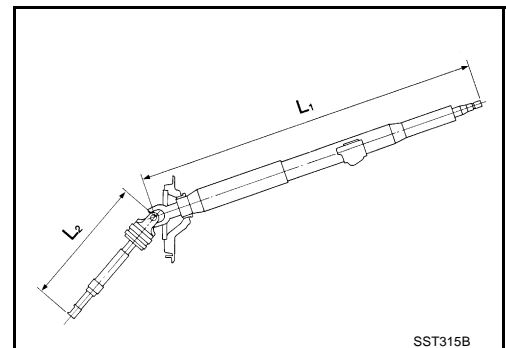
1. Set vehicle to the straight ahead-direction.
2. Remove steering wheel. Refer to [PS-7, "STEERING WHEEL"](#).
3. Remove column cover, steering lock escutcheon, and driver-side instrument lower driver panel. Refer to [IP-10, "INSTRUMENT PANEL ASSEMBLY"](#).
4. Remove combination switch & spiral cable. Refer to [SRS-42, "SPIRAL CABLE"](#).
5. Loosen pinch bolt at lower shaft-side of upper joint.
6. Remove collar, mounting bolt and nut at steering column-side of upper joint. Then remove upper joint from steering column assembly.
7. Disconnect harness connector from each switch on steering column shaft, then separate vehicle side harness from it.
8. Remove steering column assembly from vehicle.

INSPECTION AFTER REMOVAL

- Check if there is something wrong with jacket tube of steering column assembly and collar etc. And then if they are damaged, replace with new one.
- If vehicle has a collision light shocked, check column length "L¹", "L²" as shown in the figure. Then if it is out of the specified value, replace with new one.

Steering column length "L¹" : 643 mm (25.31 in)

Steering column lower shaft length "L²" : 379.8 mm (14.95 in)



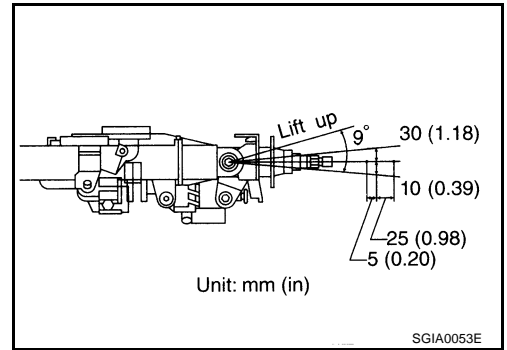
INSTALLATION OF STEERING COLUMN

- Refer to [PS-11, "Removal and Installation"](#) for tightening torque. Install in the reverse order of removal.
- NOTE:**
Refer to component parts location and do not reuse non-reusable parts.
- After removing/installing or replacing steering components, check wheel alignment. Refer to [FSU-5, "Wheel Alignment Inspection"](#).
 - After adjusting wheel alignment, adjust neutral position of steering angle sensor. Refer to [BRC-6, "Adjustment of Steering Angle Sensor Neutral Position"](#).

STEERING COLUMN

INSPECTION AFTER INSTALLATION

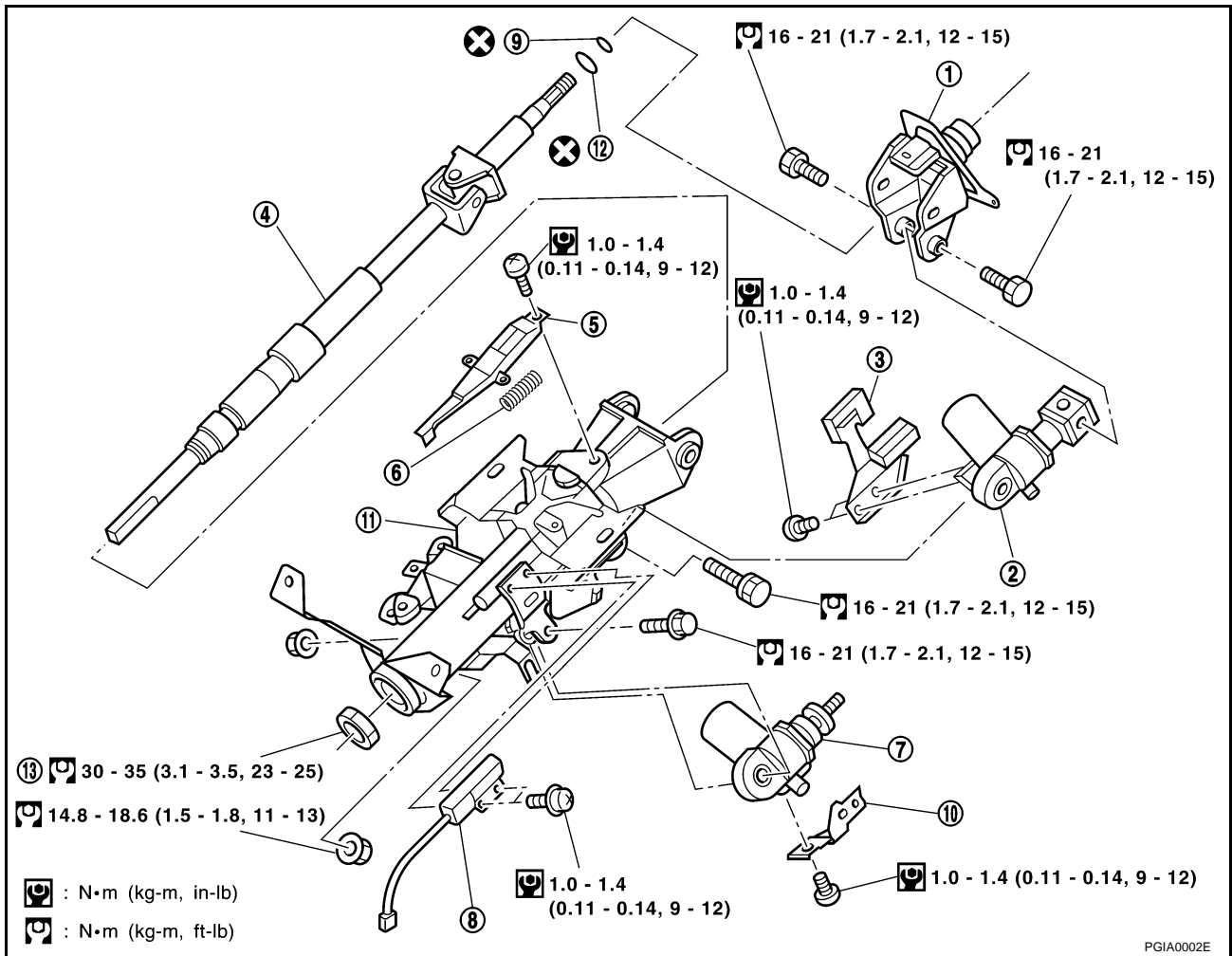
- After installing steering column to vehicle, check tilt device and its operation range. Ranges of operation are shown in the figure.
- Check if steering wheel operation can turn to the end of the left and right smoothly.



Disassembly and Assembly

DISASSEMBLY

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- | | | |
|--------------------------------|----------------------|----------------|
| 1. Upper jacket tube | 2. Tilt motor | 3. Tilt sensor |
| 4. Steering column upper shaft | 5. Tilt lever | 6. Spring |
| 7. Telescopic motor | 8. Telescopic sensor | 9. Snap ring |
| 10. Bracket | 11. Jacket tube | 12. O-ring |
| 13. Mounting nut | | |

Steering Column

1. Remove tilt motor and sensor from jacket tube.
2. Remove telescopic motor and sensor from jacket tube.
3. Remove snap ring from steering column upper shaft.

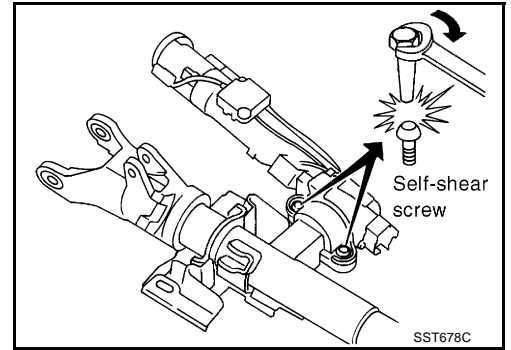
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STEERING COLUMN

4. Remove upper jacket tube.
5. Remove mounting nuts, and remove steering column upper shaft from jacket tube.

Steering Lock

1. Break self-shear type screws with a drill or other appropriate tool.
2. Install new self-shear type screws and then cut off self-shear type screw heads.



ASSEMBLY

Refer to [PS-13, "Disassembly and Assembly"](#) for tightening torque. Install in the reverse order of disassembly.

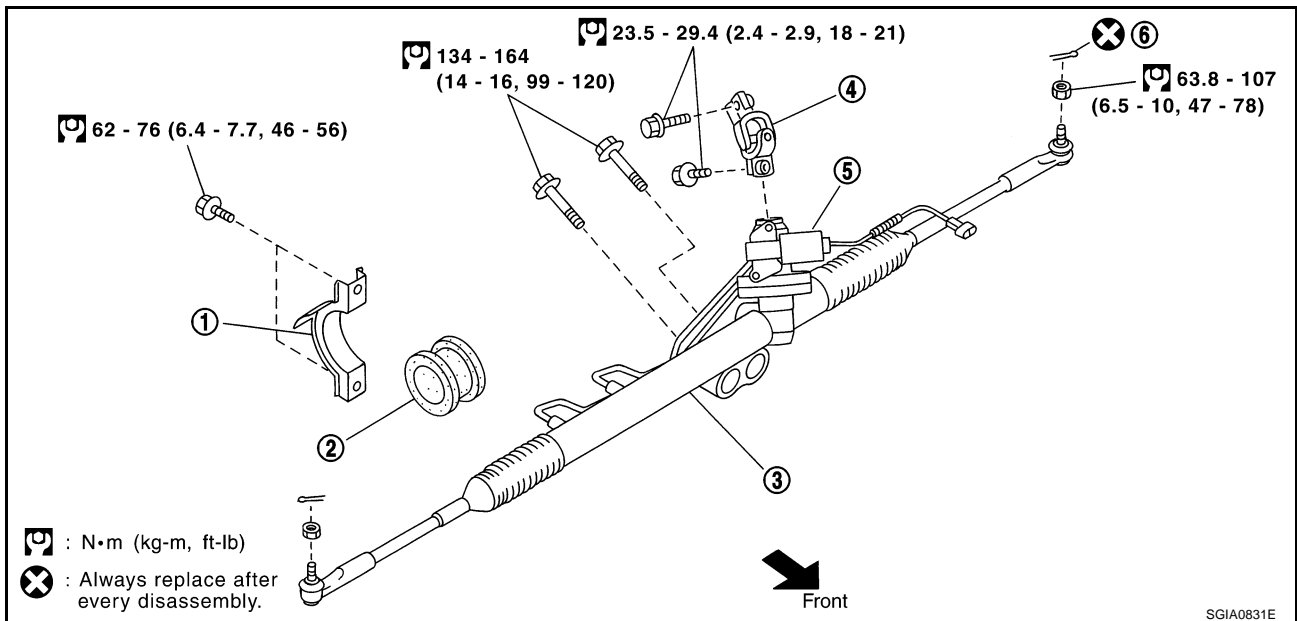
POWER STEERING GEAR AND LINKAGE

POWER STEERING GEAR AND LINKAGE

PFP:49001

Removal and Installation

EGS00073



- | | | |
|--------------------------|----------------------------|---------------------------|
| 1. Rack mounting bracket | 2. Rack mounting insulator | 3. Steering gear assembly |
| 4. Lower joint | 5. EPS solenoid valve | 6. Cotter pin |

CAUTION:

Spiral cable may snap due to steering operation if steering column is separated from steering gear assembly. Therefore fix steering wheel with a string to avoid turns.

REMOVAL

1. Set wheels in the straight-ahead position.
2. Remove tires from vehicle with power tool.
3. Remove undercover with power tool.
4. Remove cotter pin at steering outer socket, then loosen mounting nut.
5. Use a ball joint remover (SST: HT72520000 {J25730-A}) to remove steering outer socket from steering knuckle. Be careful not to damage ball joint boot.

CAUTION:

Tighten temporarily mounting nut to prevent damage to threads and to prevent ball joint remover (SST) from coming off.

6. Remove oil pipings (high pressure side and low pressure side) from steering gear assembly, then drain fluid from pipings.
7. Remove pinch bolt on lower side of lower joint.
8. Loosen pinch bolt on upper side of lower joint.
9. Remove mounting bolts of steering gear assembly with power tool, and then remove rack mounting bracket, rack mounting insulator.
10. Disconnect EPS solenoid valve connector.
11. Remove steering gear assembly from vehicle.

INSTALLATION

- Refer to [PS-15, "Removal and Installation"](#) for tightening torque. Install in the reverse order of removal.

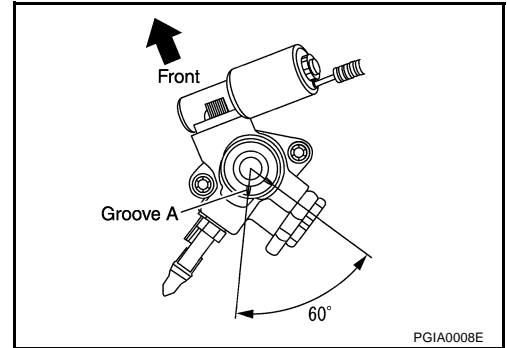
NOTE:

Refer to component parts location and do not reuse non-reusable parts.

- After removing/installing or replacing steering components, check wheel alignment. Refer to [FSU-5, "Wheel Alignment Inspection"](#).
- After adjusting wheel alignment, adjust neutral position of steering angle sensor. Refer to [BRC-6, "Adjustment of Steering Angle Sensor Neutral Position"](#).

POWER STEERING GEAR AND LINKAGE

- After installation, bleed air from piping. Refer to [PS-6, "Air Bleeding Hydraulic System"](#).
- Follow the procedure below to install lower joint to power steering gear:
 1. Set rear cover cap projection into slot A in the gear sub-assembly.
 2. Lock steering wheel by turning steering wheel clockwise by 60° from neutral position.
 3. Install lower joint to power steering gear while keeping position shown at steps 1 and 2. Keep slit in lower section of lower joint off rear cover cap projection.
 4. Unlock steering and set steering wheel in the neutral position.
 5. Check that rear cover cap projection is correctly positioned relative to slot A in the gear sub-assembly as shown in the illustration.



INSPECTION AFTER INSTALLATION

Check if steering wheel turns smoothly when it is turned several times fully to the end of the left and right.

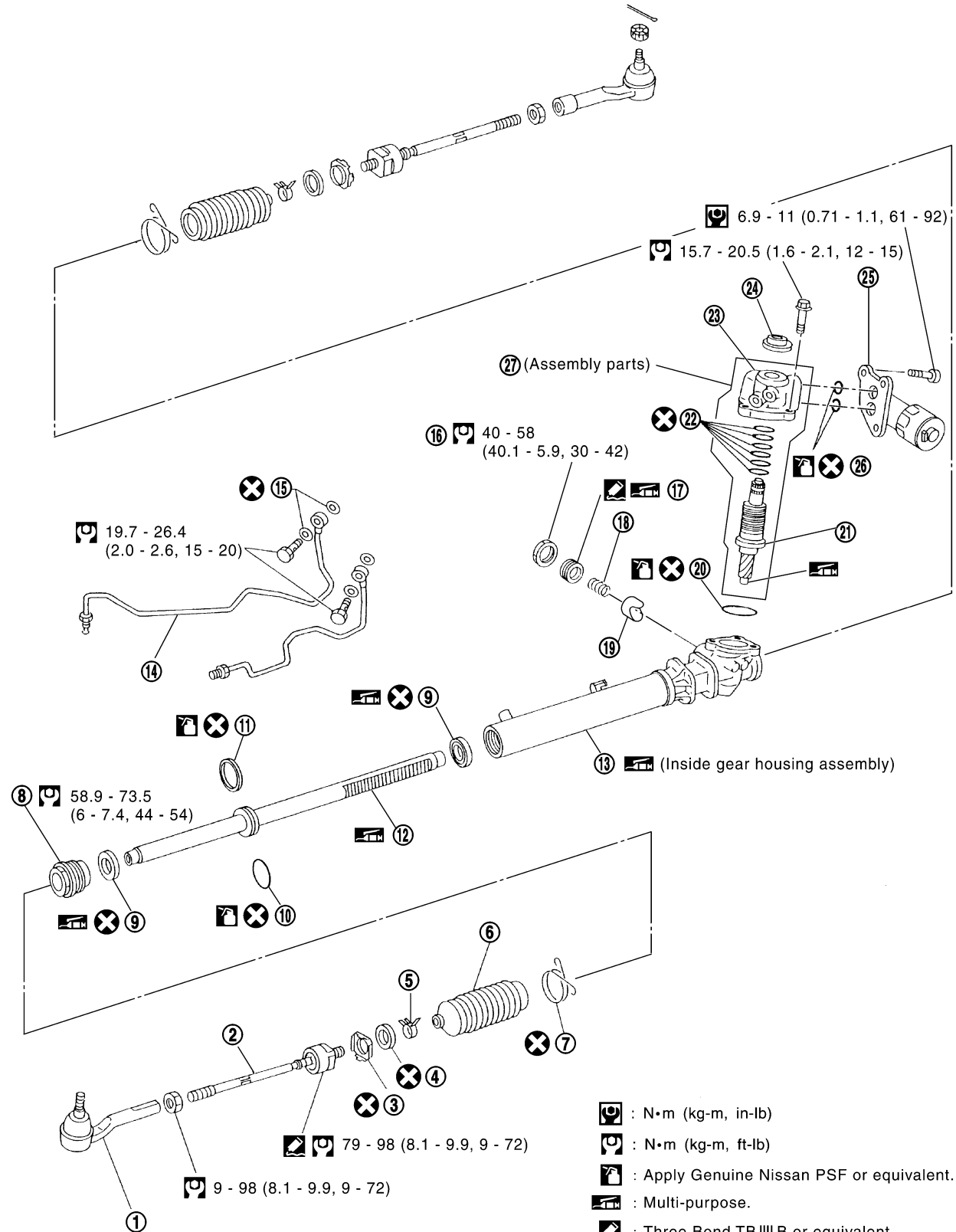
POWER STEERING GEAR AND LINKAGE

Component

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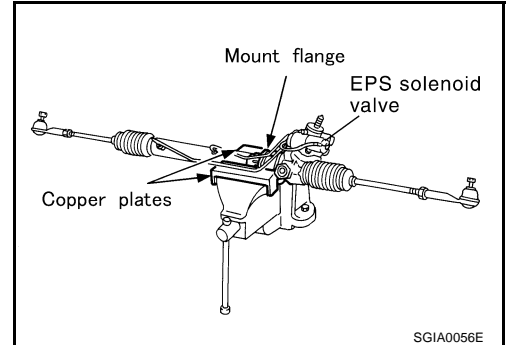
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POWER STEERING GEAR AND LINKAGE

- | | | |
|---------------------------|---------------------------|-----------------------|
| 1. Outer socket | 2. Inner socket | 3. Lock plate |
| 4. Spacer ring | 5. Boot clamp | 6. Boot |
| 7. Boot clamp | 8. End cover assembly | 9. Rack oil seal |
| 10. O-ring | 11. Rack Teflon ring | 12. Rack assembly |
| 13. Gear housing assembly | 14. Cylinder tube | 15. Washer |
| 16. Lock nut | 17. Adjusting screw | 18. Spring |
| 19. Retainer | 20. O-ring | 21. Pinion |
| 22. Pinion Teflon ring | 23. Rear housing assembly | 24. Rear cover cap |
| 25. EPS solenoid valve | 26. O-ring | 27. Gear sub assembly |

CAUTION:

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



EGS00075

Disassembly and Assembly

DISASSEMBLY

1. Remove EPS solenoid valve.

CAUTION:

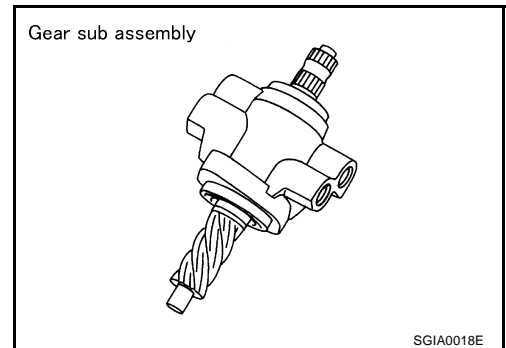
Do not attempt to disassemble EPS solenoid valve.

2. Remove cylinder tubes from gear housing assembly.
3. Remove rear cover cap from gear sub assembly.
4. Measure adjusting screw height from gear housing assembly, then loosen lock nut.
5. Remove adjust screw, spring and retainer from gear housing assembly.
6. Remove mounting bolts of gear sub assembly, then remove gear sub assembly from gear housing assembly.

CAUTION:

Do not overhaul gear sub assembly because it is non overhaul part. If there is something wrong with gear sub-assembly, change it to new one.

7. Remove O-ring from gear housing assembly.
8. Loosen lock nut of outer socket, and remove outer socket.



9. Remove boot clamps of the small side and the large side, then remove boots.

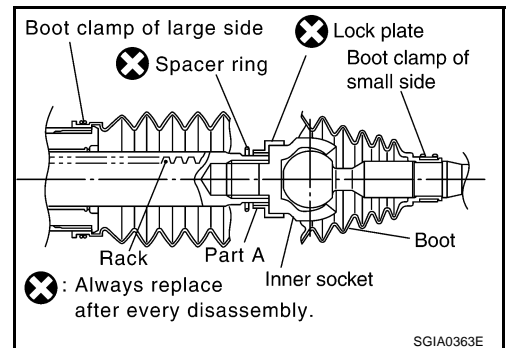
CAUTION:

When removing boots, be careful not to damage inner socket and gear housing assembly. If they are damaged, change them to avoid oil leaks.

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

CAUTION:

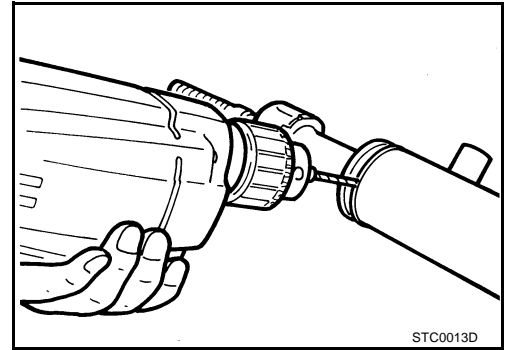
When removing lock plate, be careful not to damage the surface of rack assembly. If damaged rack assembly sur-



POWER STEERING GEAR AND LINKAGE

face will cause an oil leak. Therefore, if the rack assembly surface is damaged, replace rack assembly.

11. Drill out the clinching part of cylinder outer rim with a 3 mm (0.12 in) drill in 1.5 mm (0.059 in) depth.

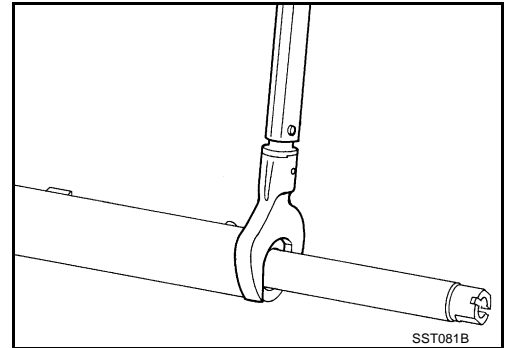


12. Remove end cover assembly with a open head (suitable tool).

CAUTION:
Be careful not to damage rack assembly. If it is damaged, replace rack assembly. Otherwise, oil leaks may result.

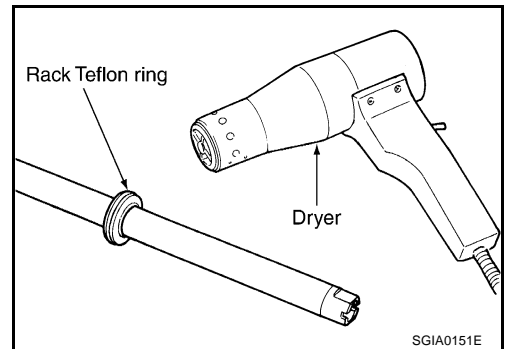
13. Pull rack assembly with rack oil seal out of gear housing assembly.

CAUTION:
Be careful not to damage cylinder. If it is damaged, replace gear housing assembly. Otherwise, oil leaks may result.



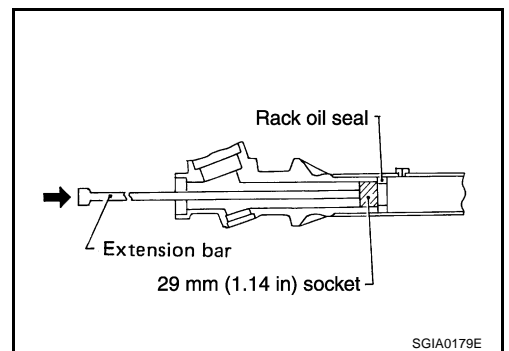
14. Heat rack Teflon ring to approximately 40°C (104°F) with a dryer, then remove it and O-ring from rack.

CAUTION:
Be careful not to damage rack. If it is damaged, change to a new one to avoid oil leaks.



15. Use a taped 29 mm (1.14 in) socket and an extension bar. Remove rack oil seal from gear housing assembly.

CAUTION:
Be careful not to damage gear housing assembly and cylinder inner wall. If it is damaged, gear housing assembly must be replaced. Otherwise, oil leaks will result.



INSPECTION AFTER DISASSEMBLY

Boot

Check boot for cracks and deformation. Replace it, if necessary.

Rack

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

Gear Sub-Assembly

- Check pinion gear for damage and wear. Replace gear sub-assembly, if necessary.

POWER STEERING GEAR AND LINKAGE

- Check bearing while rotating it. Replace gear sub assembly if bearing ball race was dented, worn, or damaged.

Gear Housing Assembly

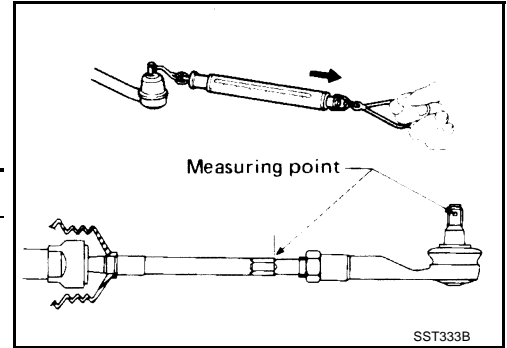
Check gear housing assembly for damage and scratches (inner wall). Replace it, if necessary.

Outer Socket and Inner Socket

Swing Torque

- Hook a spring balance at the point shown in the figure. Confirm if the reading is within the specification. When ball stud and inner socket moving the measured value must be within the specification. If the reading is outside the specification, replace socket.

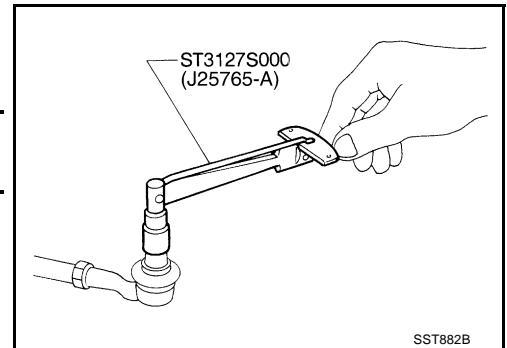
Item	Outer socket	Inner socket
Swinging torque	4.81 – 45.7 N (0.49 – 4.67 kg, 1.08 – 10.32 lb)	8.9 – 64 N·m (0.91 – 6.5 kg·m, 79 – 566 in·lb) (point indicated by arrow)



Rotating torque

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

Rotating torque : 0.3 – 2.9 N·m (0.03 – 0.29 kg·m, 3 – 25 in·lb)

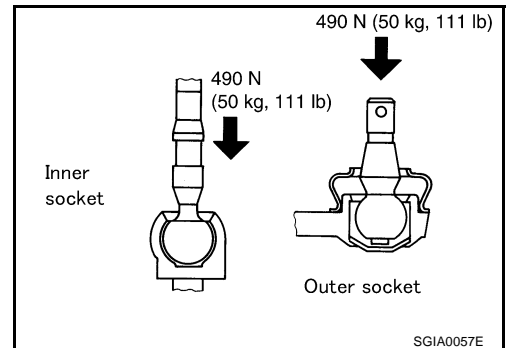


Axial End Play

- Apply load of 490 N (50 kg, 111 lb) to ball stud axially. Use a dial gauge to measure the amount of the movement that the stud makes. Check if the reading is within the specified below. If the value is out side the standard, replace outer and inner sockets.

Outer socket : 0.5 mm (0.02 in) or less

Inner socket : 0.2 mm (0.008 in) or less



POWER STEERING GEAR AND LINKAGE

ASSEMBLY

1. Apply Genuine Nissan PSF or equivalent to O-ring. Put an O-ring into rack Teflon ring.

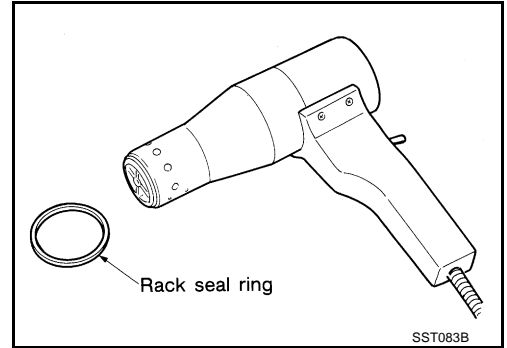
NOTE:

Do not reuse O-ring.

2. Apply Genuine Nissan PSF or equivalent to rack Teflon ring, then heat rack Teflon ring to approximately 40°C (104°F) with a dryer. Assemble it to mounting groove of rack.

NOTE:

Do not reuse rack Teflon ring.



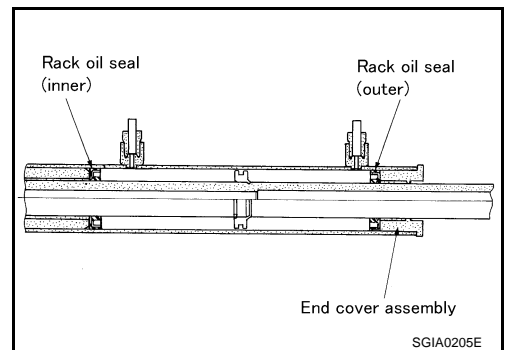
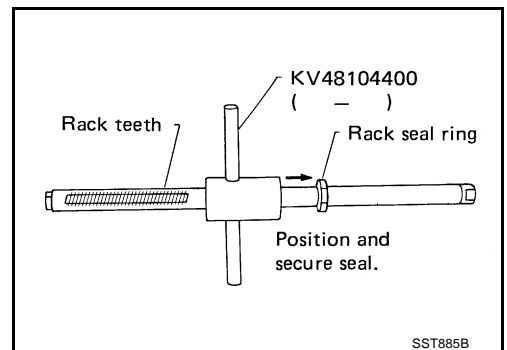
3. To fit rack Teflon ring on rack assembly, use rack Teflon ring correcting tool (SST) from tooth side. Compress rim of ring with the tool.
4. Apply Multi-purpose grease to rack oil seal. Insert rack oil seal, then insert rack assembly to gear housing assembly.

NOTE:

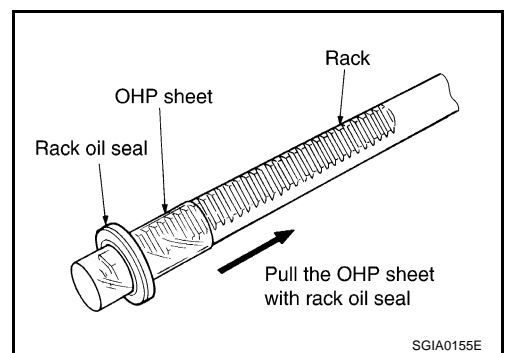
Do not reuse rack oil seal.

CAUTION:

- When inserting rack assembly, do not damage retainer sliding part. If it is damaged, replace gear housing assembly.
- When inserting rack assembly, do not damage cylinder inner wall. If it is damaged, it may cause oil leaks. Replace gear housing assembly.
- Attach rack oil seal. Both inner lip and outer lip should face each other.

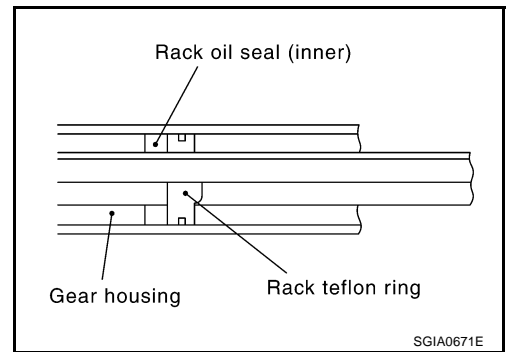


- a. To avoid damaging inner rack oil seal, wrap an OHP sheet [approximately. 70 mm (2.76 in) × 100 mm (3.94 in)]. It will avoid damaging rack oil seal. Then place oil seal on sheet. Pull rack oil seal along with OHP sheet until they pass rack end. Then remove OHP sheet.

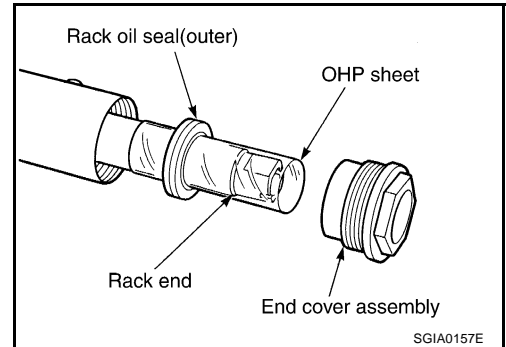


POWER STEERING GEAR AND LINKAGE

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



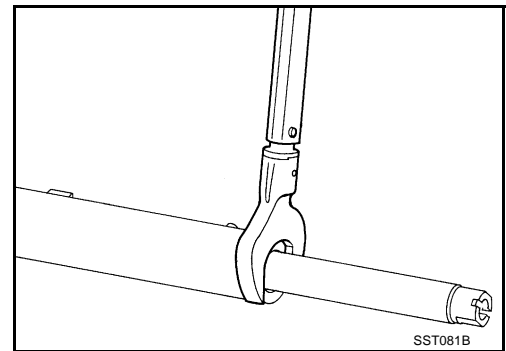
- c. When installing outer rack oil seal, cover the end of rack with an OHP sheet [70 mm (2.76 in) × 100 mm (3.94 in)]. It will avoid damaging rack oil seal. Then place oil seal on sheet. Pull rack oil seal along with OHP sheet until they pass rack end. Then remove OHP sheet.
- d. Install end cover assembly to rack assembly, move it to gear housing assembly.



5. Using a 36 mm (1.42 in) open head (suitable tool), tighten end cover assembly at the specified torque.

CAUTION:

Do not damage rack surface. If it is damaged, it may cause oil leaks. Replace rack assembly.

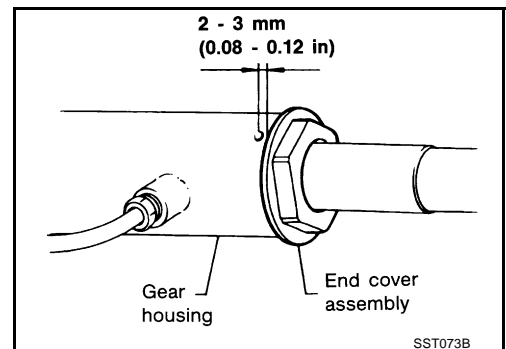


6. After tightening end cover assembly, caulk cylinder at one point as shown in the figure using a punch. This will prevent end cover assembly from getting loose.
7. Apply Genuine Nissan PSF or equivalent to O-ring, then install O-ring to gear housing assembly.

NOTE:

Do not reuse O-ring.

8. Install gear sub assembly to gear housing assembly.



9. Attach lock plate to rack assembly.

NOTE:

Do not reuse lock plate.

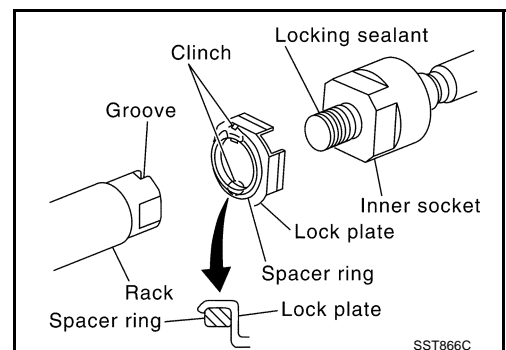
- a. Tack spacer ring to rack assembly.

NOTE:

Do not reuse spacer ring.

- b. Install inner socket to lock plate.

- c. Apply locking sealant (Three Bound IIIIB or equivalent) to the thread of inner socket. Screw inner socket into rack assembly and tighten at the specified torque.



POWER STEERING GEAR AND LINKAGE

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

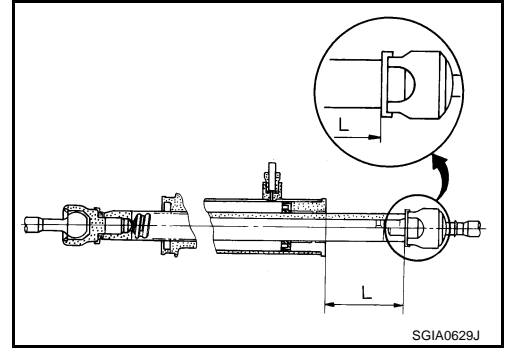
CAUTION:

When installing spacer ring, avoid damaging it.

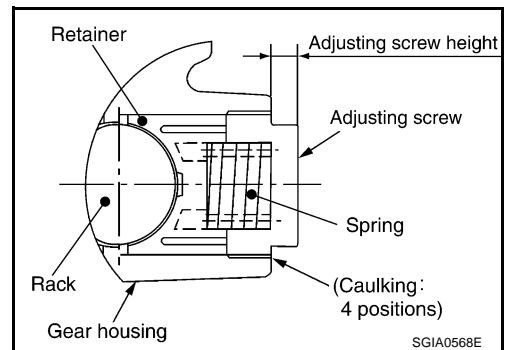
10. Decide neutral position of rack assembly.

Rack stroke (L) : 68.5 mm (2.697 in)

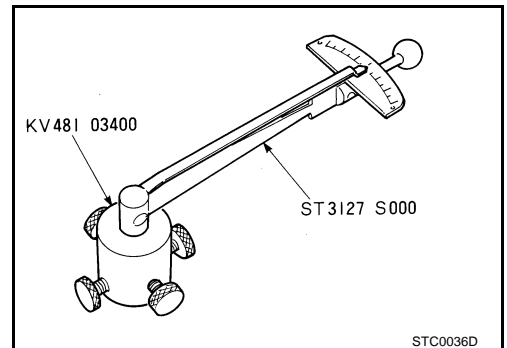
11. Install rear cover cap to gear sub assembly.
12. Apply multi-purpose grease to retainer, then install retainer, spring and adjust screw to gear housing assembly.



13. Apply thread locking adhesive (Three Bound TB IIIIB or equivalent) to the thread of adjusting screw to the adjusting screw height from gear housing assembly. The adjusting screw height is the same as it was measured in the overhaul in advance.
14. With adjusting screw held in place, tighten lock nut to specified torque.
15. Rotate pinion ten times whole range of rack assembly so that parts get to fit each other.



16. Measure pinion rotating torque within from -180° to $+180^\circ$, make preload gauge (SST) and torque adapter (SST) in rack neutral position, then hold preload gauge (SST) at maximum torque.
17. After loosening adjusting screw once, tighten it again with torque of $4.9 - 5.9 \text{ N}\cdot\text{m}$ ($0.5 - 0.6 \text{ kg}\cdot\text{m}$, $44 - 52 \text{ in}\cdot\text{lb}$). After that loosen it within 20° to 40° .
18. With adjusting screw held in place, tighten lock nut to specified torque.



19. Measure pinion rotating torque with torque adapter (SST) and preload gauge (SST), then confirm whether it's reading is within the specified value. If the reading is not within the specified value, readjust screw angle with adjusting screw. Change gear assembly to new one, if the reading is still not within the specified value or the rotating torque of adjusting screw is less than $5 \text{ N}\cdot\text{m}$ ($0.51 \text{ kg}\cdot\text{m}$, $44 \text{ in}\cdot\text{lb}$).

Pinion rotating torque:

Around neutral position [within $\pm 11.5 \text{ mm}$ (0.453 in)]

Average "A"

$0.79 - 1.27 \text{ N}\cdot\text{m}$ ($0.08 - 0.12 \text{ kg}\cdot\text{m}$, $7 - 11 \text{ in}\cdot\text{lb}$)

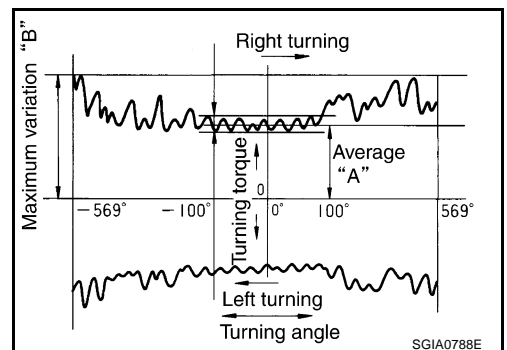
Maximum variation "B":

$0.39 \text{ N}\cdot\text{m}$ ($0.04 \text{ kg}\cdot\text{m}$, $3 \text{ in}\cdot\text{lb}$)

Other than above

Average "A"

$0.58 \text{ N}\cdot\text{m}$ ($0.06 \text{ kg}\cdot\text{m}$, $5 \text{ in}\cdot\text{lb}$)



POWER STEERING GEAR AND LINKAGE

Maximum variation "B"

1.86 N·m (0.19 kg-m, 16 in-lb)

20. Turn pinion fully to the end of the left with inner socket to gear housing assembly.

21. Set dial gauge to rack as shown in the figure. Measure vertical movement of rack assembly when pinion is turned counterclockwise with torque of 4.9 N·m (0.5 kg-m, 43 in-lb). Check reading is within the specified value. If reading is outside of the specification, readjust screw angle with adjusting screw. If reading is still out side of specification, or if the rotating torque of adjusting screw is less than 5 N·m (0.51 kg-m, 44 in-lb), replace steering gear assembly.

22. Install large side of boot to gear housing assembly.

23. Install small side of boot to the mounting groove of inner socket boot.

24. Install boot clamp to the small side of boot.

25. Install boot clamp to the large side of boot.

NOTE:

Do not reuse boot clamp.

a. Tighten large side of RH/LH boot with boot clamp (stainless steel wire).

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

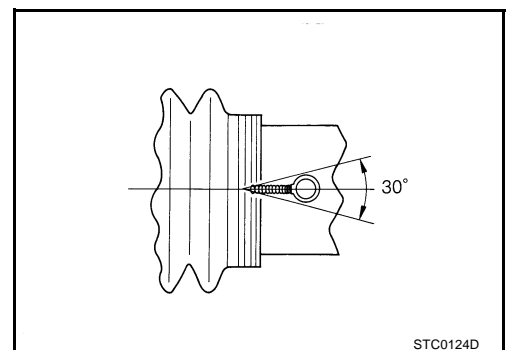
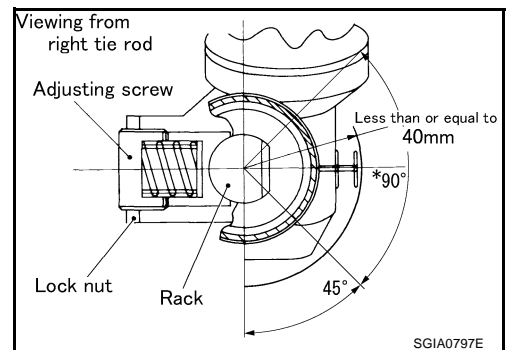
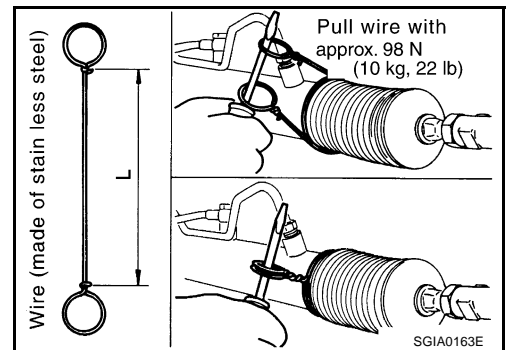
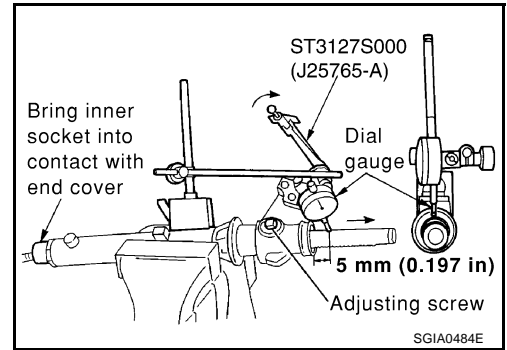
b. After wrapping clamp around boot groove for two turns, insert screwdriver in loop on both ends of wire. Twist 4 to 4.5 turns while pulling with a force of approx. 98 N (10 kg, 22.1 lb).

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

d. Twisted point should face front of vehicle (* marked portion) with steering gear assembly installed on vehicle (to prevent interference with other parts).

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

26. Install cylinder tubes to gear housing assembly.



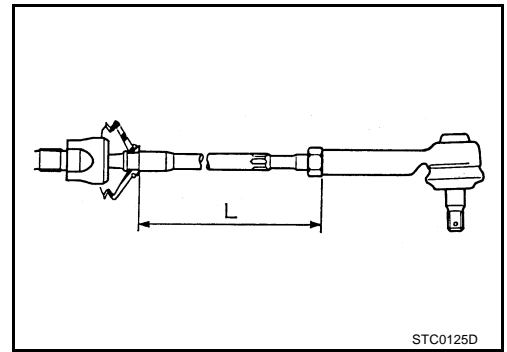
POWER STEERING GEAR AND LINKAGE

27. Tighten lightly tie-rod in specified length "L", then tighten lock nut at specified torque. Refer to [PS-18, "Disassembly and Assembly"](#). Reconfirm if tie-rod length is within limit of specified length "L".

Inner socket length (L) : 160 mm (6.30 in)

CAUTION:

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



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POWER STEERING OIL PUMP

POWER STEERING OIL PUMP

PFP:49110

On-Vehicle Inspection and Service CHECKING RELIEF OIL PRESSURE

EGS00076

CAUTION:

Before starting work, confirm belt tension is proper.

1. Connect oil pressure gauge (SST) and oil pressure gauge adapter (SST) between oil pump discharge connector and high pressure hose and then bleed air from the hydraulic circuit.
2. Start engine. Allow engine to run until tank temperature reaches 50 to 80°C (122 to 176°F).

CAUTION:

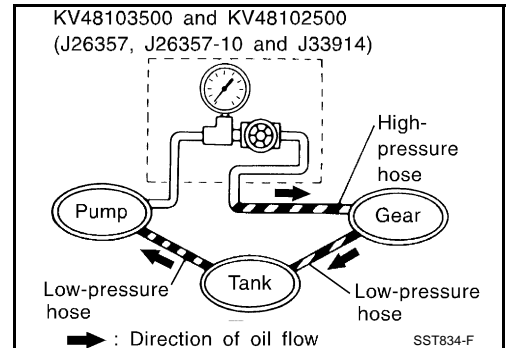
- Warm up engine with shut-off valve fully opened. If engine is started with shut-off valve closed, fluid pressure in power steering pump increases to maximum. This will raise fluid temperature excessively.
 - Be careful not to contact hose with belt when engine is started.
3. With engine at idle, close shut-off valve and read the relief oil pressure.

Relief oil pressure: : 8,500 - 9,300 kPa (88 - 94 kg/cm² , 1,251 - 1,337 psi)

CAUTION:

Do not close shut-off valve of pressure gauge for more than 10 seconds.

4. After measurement, open shut-off valve slowly.
If relief oil pressure is outside the specification, disassemble and repair oil pump. Refer to [PS-27, "Disassembly and Assembly"](#) .
5. After inspection, disconnect oil pressure gauge (SST) and oil pressure gauge adapter (SST) from hydraulic circuit, connect oil pump discharge connector and high pressure hose. Add fluid and bleed air from hydraulic circuit thoroughly.
Refer to [PS-6, "Air Bleeding Hydraulic System"](#) .



Removal and Installation

REMOVAL

1. Remove battery and radiator reservoir tank from vehicle.
2. Drain power steering fluid from reservoir tank.
3. Loosen adjusting screw and bolts for oil pump attaching bracket and remove belt.
4. Remove oil pump union bolt and hose.
5. Remove oil pump bolts and oil pump attaching bracket.
6. Remove oil pump from vehicle.

INSTALLATION

Refer to [PS-31, "HYDRAULIC LINE"](#) for tightening torque. Install in the reverse order of removal.

- After installation, adjust belt tension. Refer to [EM-12, "DRIVE BELTS"](#) .
- After installation, bleed air. Refer to [PS-6, "Air Bleeding Hydraulic System"](#) .

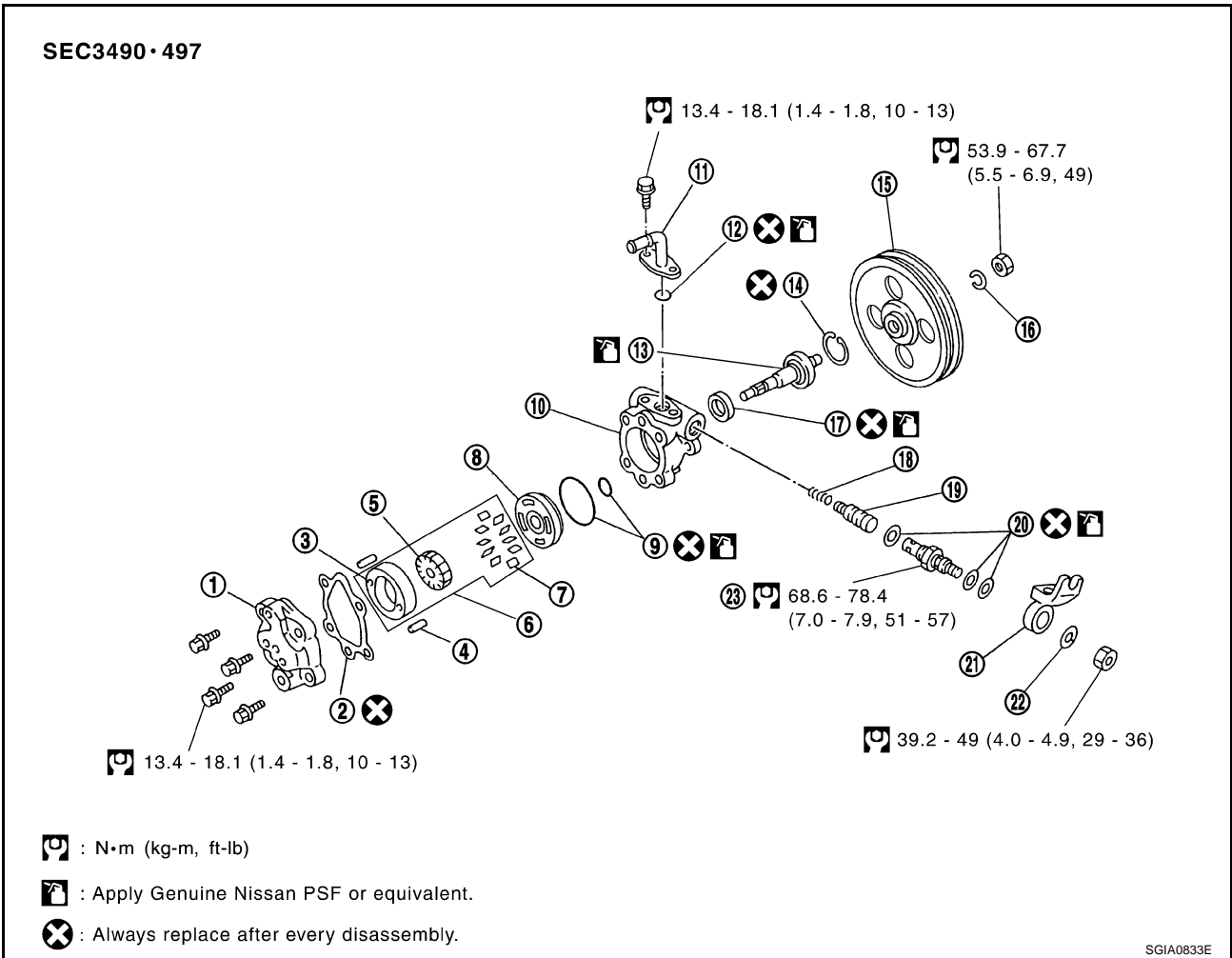
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POWER STEERING OIL PUMP

Disassembly and Assembly

EGS00078

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|--------------------------|--------------------|--------------|
| 1. Rear cover | 2. Gasket | 3. Cam ring |
| 4. Lock pin | 5. Rotor | 6. Cartridge |
| 7. Vane | 8. Side plate | 9. O-ring |
| 10. Body assembly | 11. Suction pipe | 12. O-ring |
| 13. Drive shaft assembly | 14. Snap ring | 15. Pulley |
| 16. Spring washer | 17. Oil seal | 18. Spring |
| 19. Flow control valve | 20. O-ring | 21. Joint |
| 22. Washer | 23. Connector bolt | |

INSPECTION BEFORE DISASSEMBLY

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

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

DISASSEMBLY

NOTE:

Fix oil pump in vise as the occasion demands.

CAUTION:

When retaining drive shaft in a vice, always use copper or aluminum plates between vise and shaft.

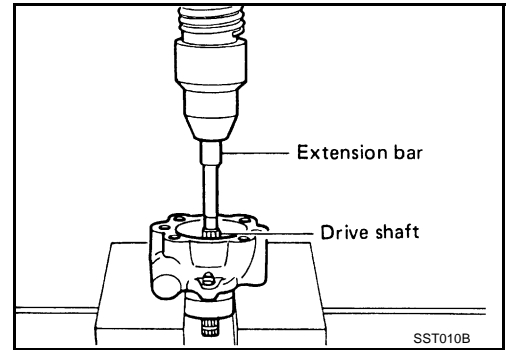
1. Unscrew four rear cover bolts and remove rear cover from body assembly.
2. Remove gasket from body assembly.
3. Remove lock pin, cartridge and side plate from body assembly.

POWER STEERING OIL PUMP

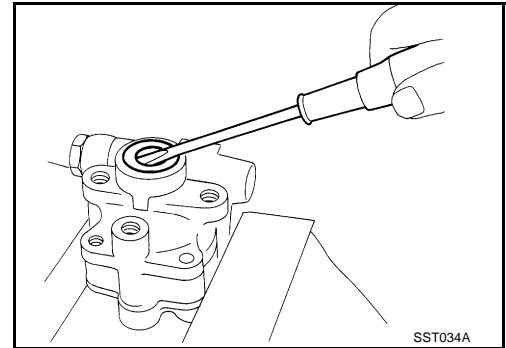
4. Remove pulley from drive shaft assembly.
5. Remove snap ring from drive shaft assembly and press out it.

CAUTION:

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



6. Using a screwdriver, remove oil seal for body assembly.
7. Remove O-ring from body assembly.

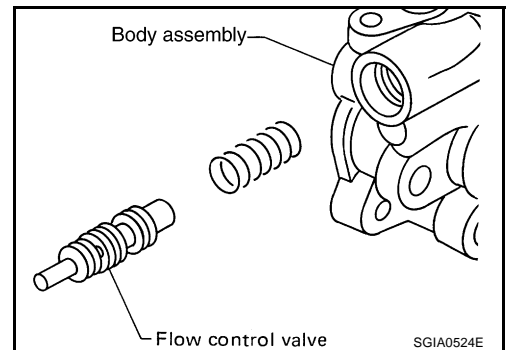


8. Loosen lock nut and remove washer, O-ring, joint then remove connector bolt, O-ring and pull out flow control valve and spring from body assembly.

CAUTION:

Be careful not to drop and deform the flow control valve.

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



INSPECTION AFTER DISASSEMBLY

Body Assembly and Rear Cover Inspection

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

Cartridge Assembly Inspection

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

POWER STEERING OIL PUMP

ASSEMBLY

NOTE:

Fix oil pump in vise as vice occasion demands.

CAUTION:

When retaining drive shaft assembly in a vise, always use copper or aluminum plates between vise and shaft.

1. Apply a coat of Genuine Nissan PSF or equivalent 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 Genuine Nissan PSF or equivalent to drive shaft assembly and press drive shaft assembly into body assembly with suitable tool, then install snap ring.

NOTE:

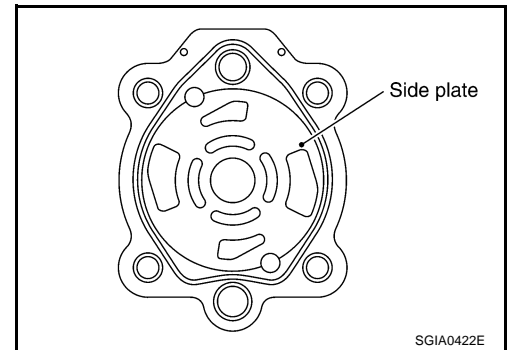
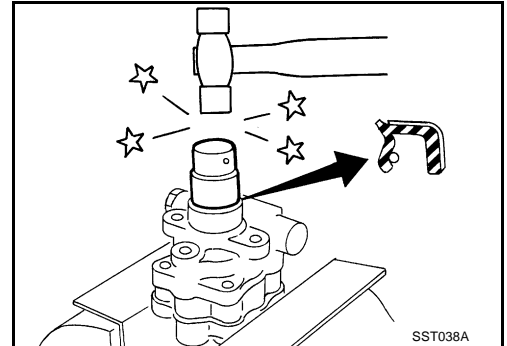
Do not reuse snap ring.

3. Apply a coat of Genuine 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.

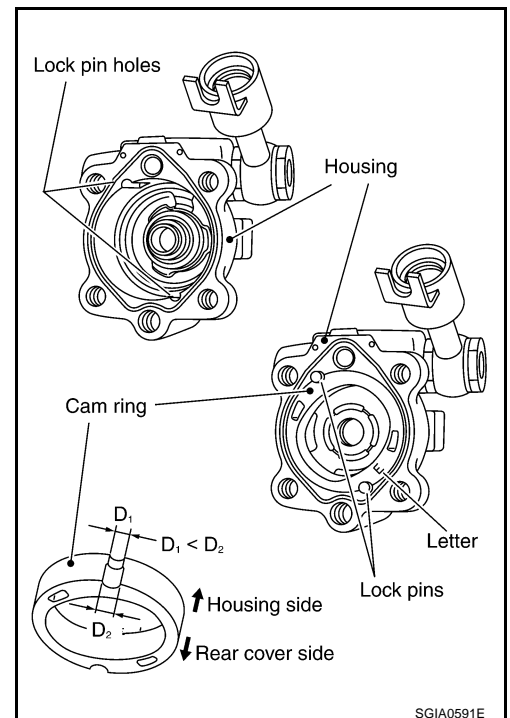


5. Install lock pin into lock pin hole, and install cam-ring as shown in the figure.

- When installing cam-ring, turn carved face with a letter (E) of it to rear cover.

CAUTION:

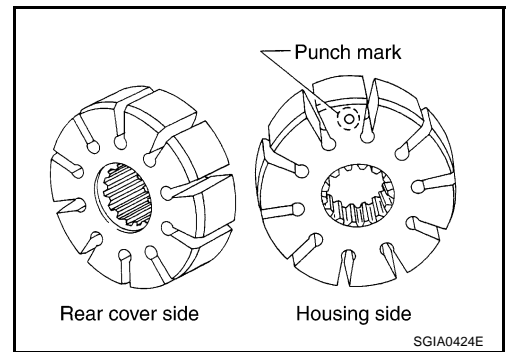
Do not confuse the assembling direction of cam ring. If cam-ring is installed facing the incorrect direction, it may cause pump operation malfunction.



6. Install rotor to body assembly.

POWER STEERING OIL PUMP

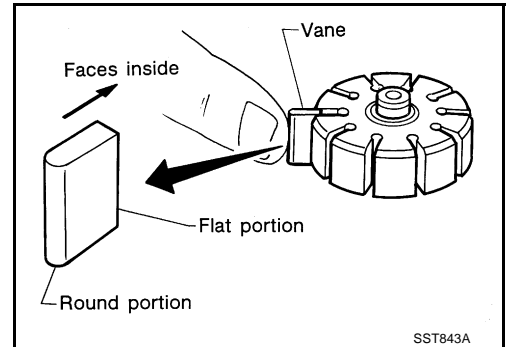
- When installing rotor, turn punch mark face on rotor to body assembly.



7. Install vane to rotor with facing the round portion outside.
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 at the specified torque.
11. Install pulley to drive shaft assembly then tighten lock nut at the specified torque.
12. Install spring, flow control valve, O-ring, connector bolt, joint, washer to body assembly. Then tighten lock nut at the specified torque.

NOTE:

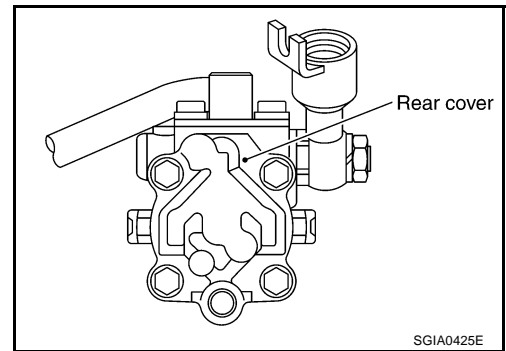
Do not reuse O-ring.

13. Apply a coat of Nissan PSF or equivalent to O-ring and install O-ring to body assembly.

NOTE:

Do not reuse O-ring.

14. Install suction pipe to body assembly.



HYDRAULIC LINE

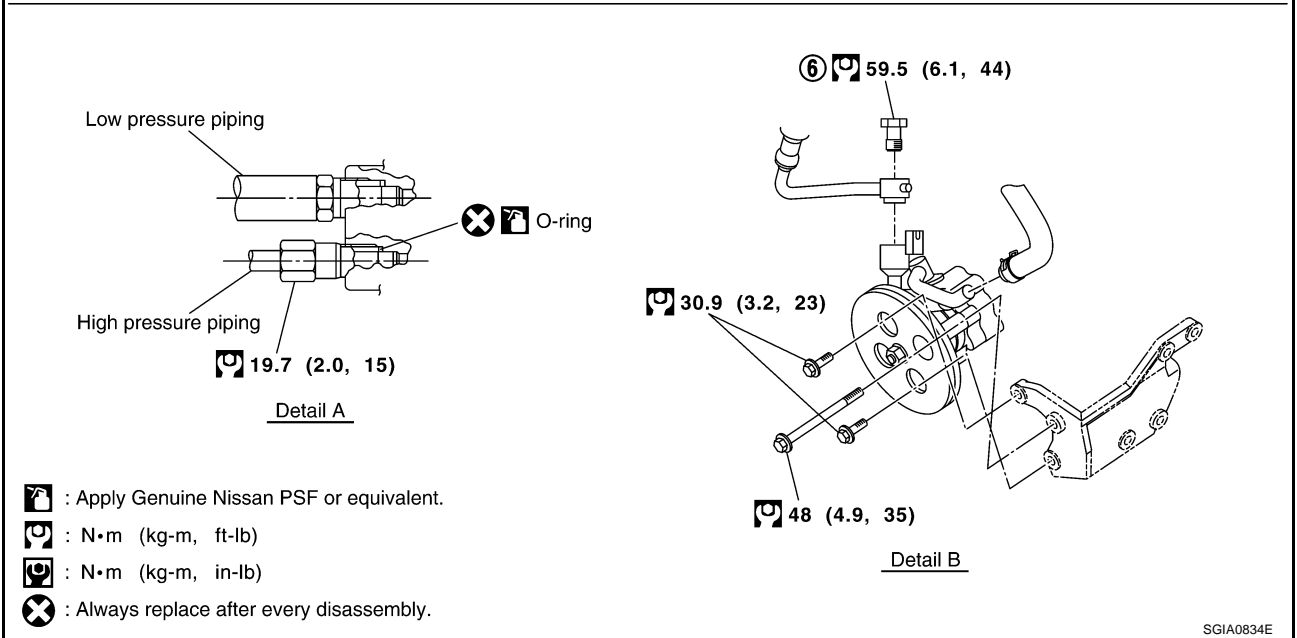
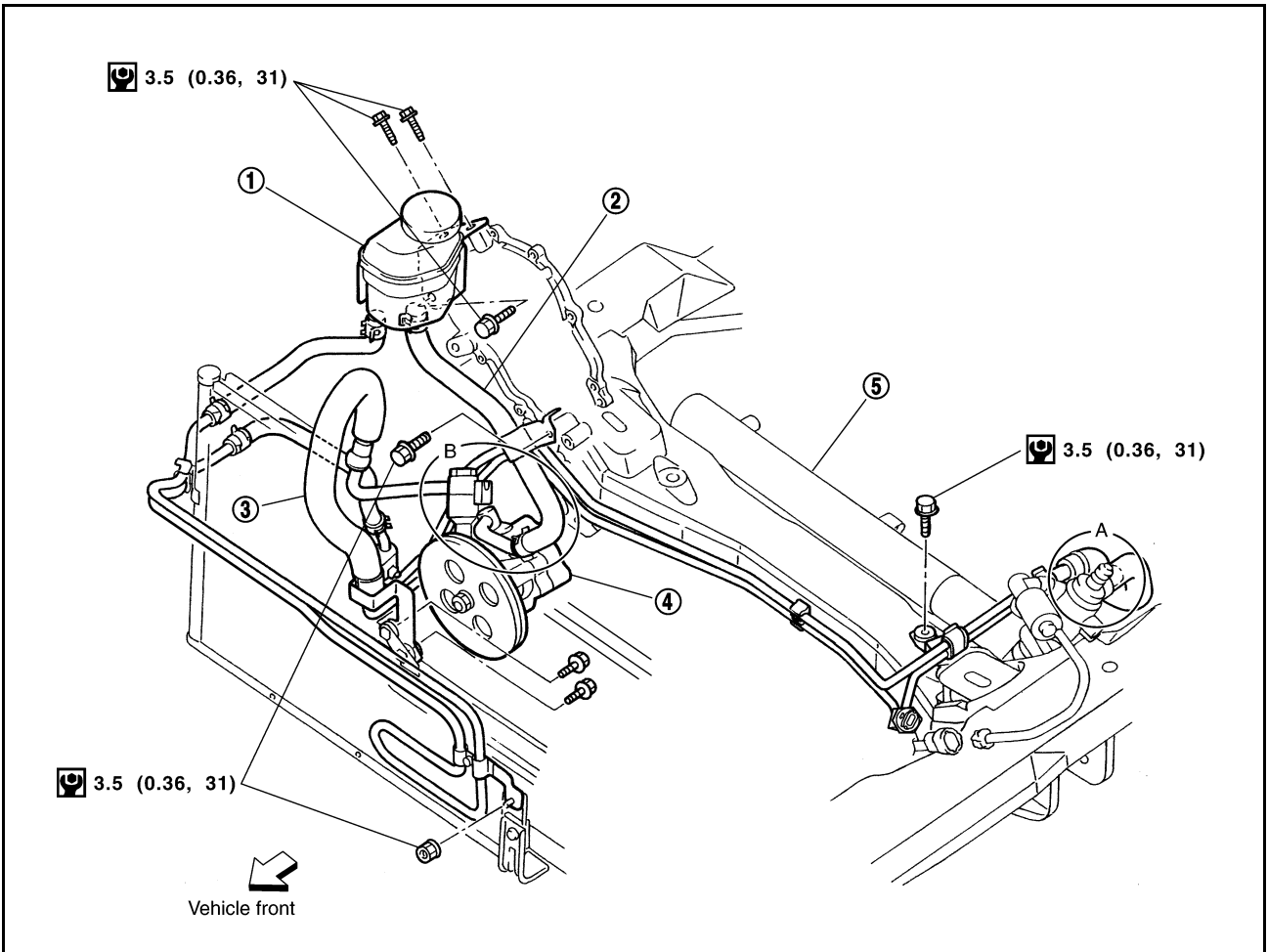
HYDRAULIC LINE

PFP:49721

Components

EGS0013H

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



- : Apply Genuine Nissan PSF or equivalent.
- : N•m (kg-m, ft-lb)
- : N•m (kg-m, in-lb)
- : Always replace after every disassembly.

- | | | |
|-------------------|---------------------------|-----------------------|
| 1. Reservoir tank | 2. Suction hose | 3. High pressure hose |
| 4. Oil pump | 5. Steering gear assembly | 6. Eye bolt |

HYDRAULIC LINE

Removal and Installation

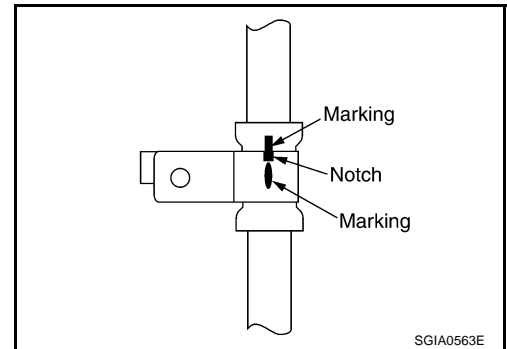
EGS0013I

- Refer to [PS-31, "Components"](#) for tightening torque. Install in the reverse order of removal.

NOTE:

Refer to component parts location and do not reuse non-reusable parts.

- Confirm with mating marking that if it is in phase with hose and clamp, then correct if needs.



SERVICE DATA AND SPECIFICATIONS (SDS)

SERVICE DATA AND SPECIFICATIONS (SDS)

PFP:00030

Steering Wheel

EGS0007A

End play of the axial direction for steering wheel	0 mm (0 in)
Steering wheel play on the outer circumference	0 - 35 mm (0 - 1.38 in)

Steering Angle

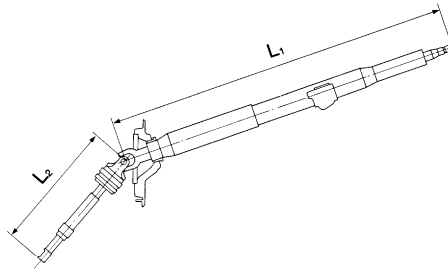
EGS0007B

1 Inner wheel Degree minute (Decimal degree)	Minimum	39°45' (39.75°)
	Nominal	42°45' (42.75°)
	Maximum	43°45' (43.75°)
Outer wheel Degree minute (Decimal degree)	Nominal	33°50' (33.83°)

Steering Column

EGS0007C

Steering column length L1	643 mm (25.31 in)
Steering column length L2	379.8 mm (14.95 in)

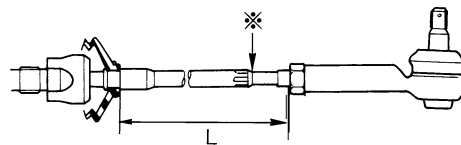


SST315B

Steering Outer Socket and Inner Socket

EGS0007D

Steering gear type		PR26AF
Outer socket ball joint	Swinging torque	0.3 - 2.9 N·m (0.03 - 0.29 kg-m, 3 - 25 in-lb)
	Spring balance reading (Measuring point: stud bolt hole)	4.81 - 45.7 N (0.49 - 4.67 kg, 1.08 - 10.32 lb)
	Rotating torque	0.3 - 2.9 N·m (0.03 - 0.29 kg-m, 3 - 25 in-lb)
	Axial end play	0.5 mm (0.02 in) or less
Inner socket ball joint	Swinging torque	1.0 - 7.8 N·m (0.1 - 0.8 kg-m, 9 - 69 in-lb)
	Measured value of spring scale (measuring point: mark)	8.9 - 64 N (0.91 - 6.5 kg, 79 - 566 in)
	Axial end play	0.2 mm (0.008 in) or less
Inner socket length "L"		160 mm (6.30 in)



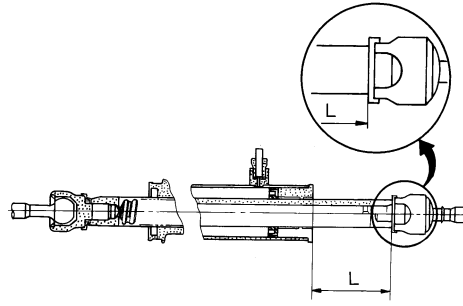
STC1006D

SERVICE DATA AND SPECIFICATIONS (SDS)

Steering Gear

EGS0007E

Steering gear model	PR26AF
Rack neutral position, dimension "L" (Rack stroke)	68.5 mm (2.697 in)



SGIA0629J

Rack sliding torque:	Range within ± 11.5 mm from neutral position ((at power ON)	Area average value	245.2 - 294.2N (25 - 30 kg, 55 -66 lb)
		Allowable variation	58 N (6.0 kg, 13 lb) or less
	Whole area (at power OFF)	Peak value	294 N (30.0 kg, 66 lb) or less
		Allowable variation	147 N (15.0 kg, 33 lb) or less

Oil Pump

EGS0007F

Oil pump relief hydraulic pressure	8,500 - 9,300 kPa (88 -94 kg/cm ² , 1,251 - 1,337 psi)
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Steering Fluid

EGS0007G

Fluid capacity	approx. 1.0 ℓ (1-1/8 us qt, 7/8 Imp qt)
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