

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

SECTION PS

POWER STEERING SYSTEM

CONTENTS

PRECAUTIONS	3	INSPECTION AFTER INSTALLATION OF STEERING COLUMN ASSEMBLY	13
Precautions for Supplemental Restraint System (SRS) "AIR BAG" and "SEAT BELT PRE-TENSIONER"	3	Disassembly and Assembly	13
Precautions for Steering System	3	COMPONENT (WITHOUT AUTOMATIC DRIVE POSITIONER)	13
PREPARATION	4	DISASSEMBLY	14
Special Service Tools (SST)	4	INSPECTION AFTER DISASSEMBLY	14
Commercial Service Tools	5	ASSEMBLY	14
NOISE, VIBRATION AND HARSHNESS (NVH)		INSPECTION AFTER ASSEMBLY	14
TROUBLESHOOTING	6	COMPONENT (WITH AUTOMATIC DRIVE POSITIONER)	15
NVH Troubleshooting Chart	6	DISASSEMBLY	16
POWER STEERING FLUID	7	INSPECTION AFTER DISASSEMBLY	16
Checking Fluid Level	7	ASSEMBLY	16
Checking Fluid Leakage	7	INSPECTION AFTER ASSEMBLY	16
Air Bleeding Hydraulic System	7	POWER STEERING GEAR AND LINKAGE	17
STEERING WHEEL	9	Removal and Installation	17
On-Vehicle Inspection and Service	9	REMOVAL	17
CHECKING CONDITION OF INSTALLATION	9	INSTALLATION	18
CHECKING STEERING WHEEL PLAY	9	INSPECTION AFTER INSTALLATION	18
CHECKING NEUTRAL POSITION ON STEERING WHEEL	9	POWER STEERING GEAR	19
CHECKING STEERING WHEEL TURNING FORCE	9	Component	19
CHECKING FRONT WHEEL TURNING ANGLE	10	Disassembly and Assembly	20
Removal and Installation	10	DISASSEMBLY	20
STEERING COLUMN	11	INSPECTION AFTER DISASSEMBLY	21
Removal and Installation	11	ASSEMBLY	22
COMPONENT	11	POWER STEERING OIL PUMP	27
REMOVAL OF LOWER JOINT, LOWER SHAFT, HOLE COVER, CLAMP, HOLE COVER SEAL, COLLAR AND UPPER JOINT	11	On-Vehicle Inspection and Service	27
INSTALLATION OF LOWER JOINT, LOWER SHAFT, HOLE COVER, CLAMP, HOLE COVER SEAL, COLLAR AND UPPER JOINT	12	CHECKING RELIEF OIL PRESSURE	27
REMOVAL OF STEERING COLUMN ASSEMBLY	12	Removal and Installation	27
INSPECTION AFTER REMOVAL OF STEERING COLUMN ASSEMBLY	12	REMOVAL	27
INSTALLATION OF STEERING COLUMN ASSEMBLY	13	INSTALLATION	28
		Disassembly and Assembly	28
		INSPECTION BEFORE DISASSEMBLY	28
		DISASSEMBLY	28
		INSPECTION AFTER DISASSEMBLY	29
		ASSEMBLY	29
		HYDRAULIC LINE	32
		Removal and Installation (For A/T Models)	32

Removal and Installation (For M/T Models)	33	Steering Column	35
Removal and Installation (For AWD Models)	34	Steering Outer Socket and Inner Socket	35
SERVICE DATA AND SPECIFICATIONS (SDS)	35	Steering Gear	36
Steering Wheel	35	Oil Pump	36
Steering Angle	35	Steering Fluid	36

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

AGS0001M

- Before disassembly, thoroughly clean the outside of the unit.
- Disassembly should be done in a clean work area. It is important to prevent the internal parts from becoming contaminated by dirt or other foreign matter.
- 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 in order on a parts.
- 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

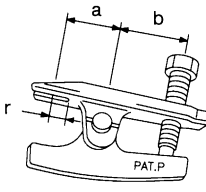
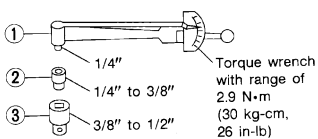
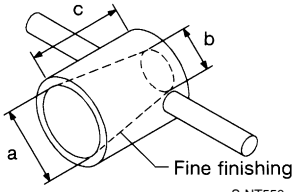
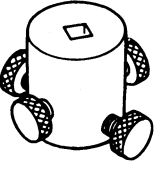
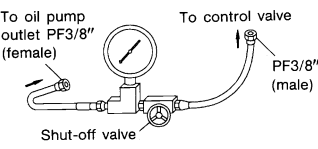
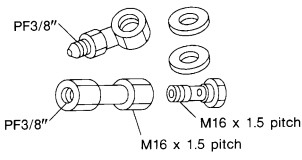
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PREPARATION

Special Service Tools (SST)

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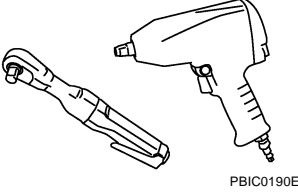
The actual shapes of Kent-Moore tools may differ from those of special service tools illustrated here.

Tool number (Kent - Moore No.) Tool name	Description
HT2520000 (J25730-A) Ball joint remover a: 33 mm (1.30 in) b: 50 mm (1.97 in) r: 11.5 mm (0.453 in)	 <p style="text-align: right;">NT546</p>
ST3127S000 (J25765 - A) Preload gauge 1. GG9103000 (J25765 - A) Torque wrench 2. HT629400000 (-) Socket adapter 3. HT629000000 (-) Socket adapter	 <p style="text-align: right;">S-NT541</p>
KV48104400 (-) Teflon ring installation tool a: 50 mm (1.97 in) dia. b: 36 mm (1.42 in) dia. c: 100 mm (3.94 in)	 <p style="text-align: right;">S-NT550</p>
KV48103400 (-) Torque adapter	 <p style="text-align: right;">ZZA0824D</p>
KV48103500 (J26357) Pressure gauge	 <p style="text-align: right;">NT547</p>
KV48102500 (J33914) Pressure gauge adapter	 <p style="text-align: right;">NT542</p>

PREPARATION

Commercial Service Tools

AGS0001Q

Tool name	Description
<p data-bbox="177 357 288 385">Power tool</p>  <p data-bbox="839 463 911 485">PBIC0190E</p>	<p data-bbox="995 357 1350 385">Removing oil pump and wheel nuts</p>

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

PS

NOISE, VIBRATION AND HARSHNESS (NVH) TROUBLESHOOTING

NOISE, VIBRATION AND HARSHNESS (NVH) TROUBLESHOOTING

PFP:00003

NVH Troubleshooting Chart

AGS00005

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

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

x: Applicable

POWER STEERING FLUID

POWER STEERING FLUID

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Checking Fluid Level

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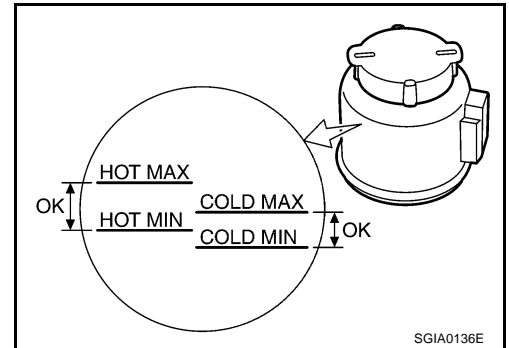
- Stop engine before performing a fluid level check.
- Ensure that fluid level is between the MAX range and MIN level.
- Because fluid level differs within the HOT range and the COLD range, check it carefully.

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

AGS00007

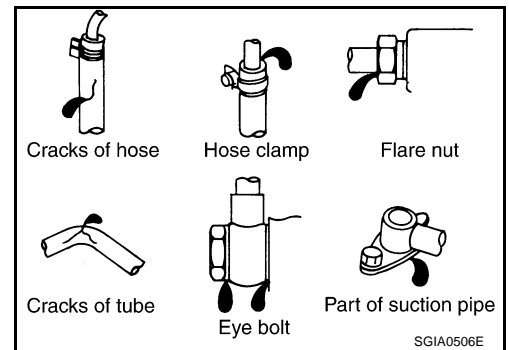
Check the hydraulic piping lines for improper attachment and for leaks, cracks, damage, loose connections, chafing or deterioration.

1. Run engine until fluid temperature 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-27, "On-Vehicle Inspection and Service"](#).
6. Check steering gear boots for accumulation of fluid indicating a from steering gear.



Air Bleeding Hydraulic System

AGS00008

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.

POWER STEERING FLUID

5. If air bubbles and the cloud don't fade, stop engine, hold air bleeding until air bubbles and the cloud fade. Perform the 2nd and the 3rd procedures again.
6. Stop engine, check fluid level.

STEERING WHEEL

STEERING WHEEL

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On-Vehicle Inspection and Service

AGS00009

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 looser not. Refer to [PS-17, "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-7, "Wheel Alignment Inspection"](#) (2WD models), [FSU-24, "Wheel Alignment Inspection"](#) (AWD) models.
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 tie-rod lock nuts of steering outer sockets, then adjust tie-rods 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 the neutral position.

Steering wheel turning force:

36 N (3.7 kg, 8.2 lb) or less

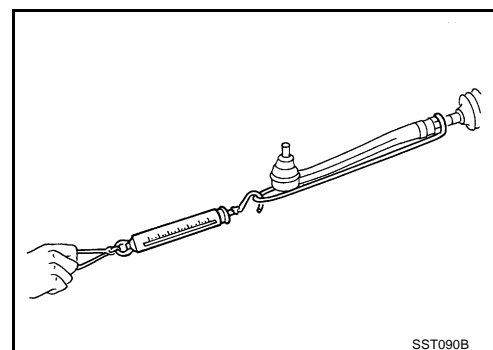
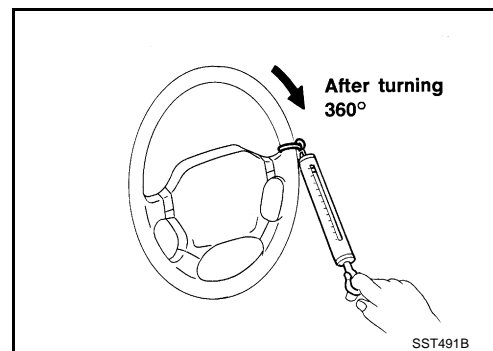
5. If steering wheel turning force is out of specification, check rack sliding force.
 - a. Disconnect lower shaft and steering knuckle from steering gear assembly.
 - b. Start and run engine at idle to make sure steering fluid has reached normal operating temperature.
 - c. While pulling outer socket slowly in ± 11.5 mm (± 0.453 in) range from neutral position, make sure rack sliding force is within specification.

Rack sliding force:

2WD: 171 – 234 N (17.5 – 23.8kg, 38.6 – 52.4 lb)

AWD: 167 – 230 N (17.0 – 23.4kg, 37.5 – 51.5 lb)

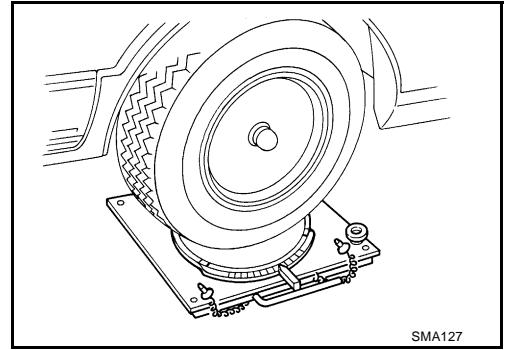
- d. If rack sliding force is not within specification, overhaul steering gear assembly.



STEERING WHEEL

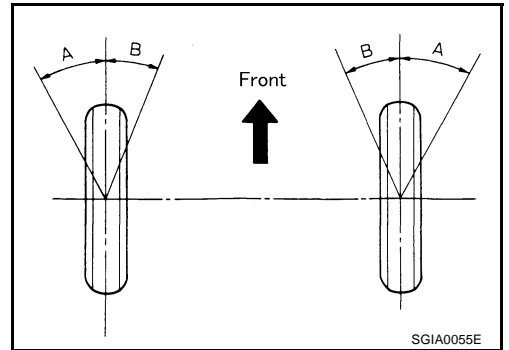
CHECKING FRONT WHEEL TURNING ANGLE

- 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.

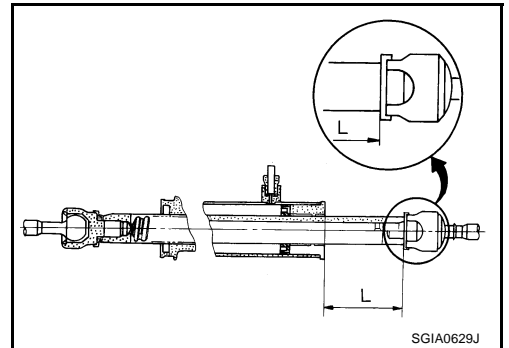
Inner wheel (Angle: A)	Minimum	: 37°30' (37.5°) (2WD models)
		: 38°00' (38.0°) (AWD models)
	Nominal	: 40°30' (40.5°) (2WD models)
		: 41°00' (41.0°) (AWD models)
Outer wheel (Angle: B)	Minimum	: 41°30' (41.5°) (2WD models)
		: 42°00' (42.0°) (AWD models)
	Nominal	: 32°30' (32.5°) (2WD models)
		: 31°40' (31.7°) (AWD models)



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

Rack stroke "L"	: 66.6 mm (2.622 in) (2WD models)
	: 66.0 mm (2.598 in) (AWD models)

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



Removal and Installation

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Refer to [PS-11, "STEERING COLUMN"](#) .

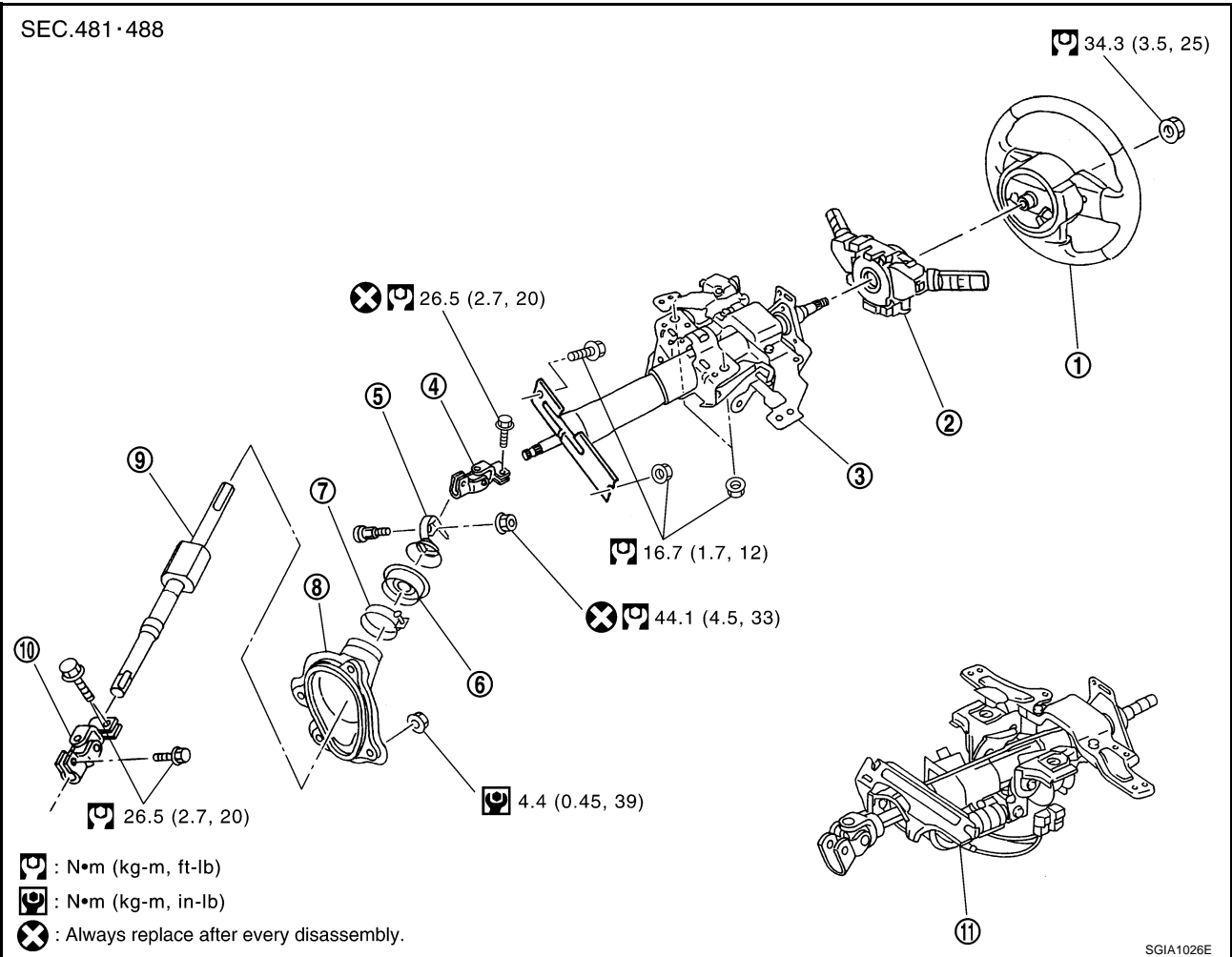
STEERING COLUMN

STEERING COLUMN

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Removal and Installation COMPONENT

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- | | | |
|-------------------|--|-----------------------------|
| 1. Steering wheel | 2. Combination switch & spiral cable | 3. Steering column assembly |
| 4. Upper joint | 5. Collar | 6. Hole cover seal |
| 7. Clamp | 8. Hole cover | 9. Lower shaft |
| 10. Lower joint | 11. Steering column assembly (with Automatic Drive Positioner) | |

CAUTION:

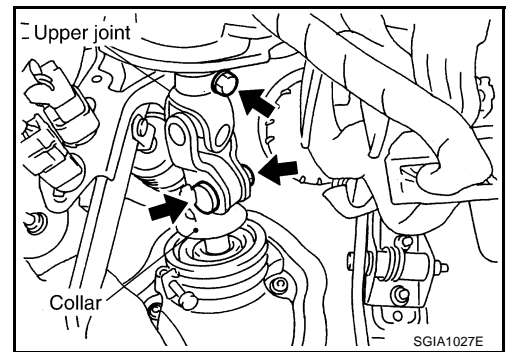
- Do not give axial impact to steering column assembly during removal and installation.
- Do not move steering gear assembly when removing steering column assembly.
- When removing steering column assembly, remove it at the minimum of telescopic.

REMOVAL OF LOWER JOINT, LOWER SHAFT, HOLE COVER, CLAMP, HOLE COVER SEAL, COLLAR AND UPPER JOINT

1. Set vehicle to the straight-ahead position.

STEERING COLUMN

2. Remove fixing bolt and nut of upper joint, then remove upper joint, collar from steering column assembly and lower shaft.
3. Raise vehicle.
4. Remove fixing bolts of lower joint, then remove lower joint from steering gear assembly and lower shaft.
5. Remove lower shaft from vehicle.
6. Lowering vehicle.
7. Loosen clamp, then remove hole cover seal from hole cover.
8. Remove mounting bolts of hole cover, then remove clamp and hole cover from dash panel.



INSTALLATION OF LOWER JOINT, LOWER SHAFT, HOLE COVER, CLAMP, HOLE COVER SEAL, COLLAR AND UPPER JOINT

- Installation is the reverse order of the removal. For tightening torque, refer to [PS-11, "COMPONENT"](#) .

NOTE:

Do not reuse non-reusable parts.

- When installing lower joint to steering gear assembly, follow the procedure listed below.
 - Set rack of steering gear assembly in the neutral position.

NOTE:

To get the neutral position of rack, turn sub-gear assembly and measure the distance of inner socket, and then measure the intermediate position of the distance.

- Install slit part of lower joint aligning with the projection of rear cover cap. Make sure that the slit part of lower joint is aligned with both the projection of rear cover cap and the marking position of sub-gear assembly.

REMOVAL OF STEERING COLUMN ASSEMBLY

1. Set vehicle to the straight-ahead position.
2. Remove driver air bag module. Refer to [SRS-42, "DRIVER AIR BAG MODULE"](#) .
3. Remove steering wheel and steering column cover (upper and lower). Refer to [IP-10, "INSTRUMENT PANEL ASSEMBLY"](#) .
4. Remove steering column cover front lower and steering lock escutcheon. Refer to [IP-10, "INSTRUMENT PANEL ASSEMBLY"](#) .
5. Remove instrument driver lower panel. Refer to [IP-10, "INSTRUMENT PANEL ASSEMBLY"](#) .
6. Remove combination switch & spiral cable from steering column assembly. Refer to [SRS-44, "SPIRAL CABLE"](#) .
7. Remove knee protector lower. Refer to [IP-10, "INSTRUMENT PANEL ASSEMBLY"](#) .
8. Remove cluster lid A. Refer to [IP-10, "INSTRUMENT PANEL ASSEMBLY"](#) .
9. Remove key interlock cable. Refer to [AT-246, "KEY INTERLOCK CABLE"](#) .
10. Disconnect each switch connectors installed to steering column assembly, and then disconnect harness from steering column assembly.
11. Remove fixing bolt and nut of upper joint (upper side).
12. Remove mounting bolts and nut of steering column assembly, then remove steering column assembly from vehicle.

INSPECTION AFTER REMOVAL OF STEERING COLUMN ASSEMBLY

- Check steering column assembly for damage or other malfunctions. Replace if there are.

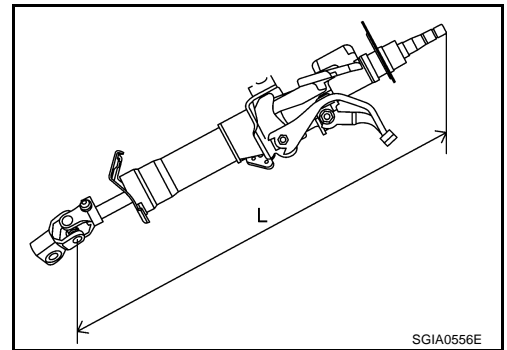
STEERING COLUMN

- Measure the length "L" as shown in the figure if vehicle has been involved in a minor collision. Replace steering column assembly if outside the standard. (Listen to design for electrical)

Steering column length "L" : 548 mm (21.57 in)

- Measure steering column rotating torque using preload gauge. Replace steering column assembly if outside the standard.

Rotating torque : 0.49 N·m (0.05 kg·m, 4 in·lb)



SGIA0556E

INSTALLATION OF STEERING COLUMN ASSEMBLY

Installation is the reverse order of removal. For tightening torque, refer to [PS-11, "COMPONENT"](#).

NOTE:

Do not reuse non-reusable parts.

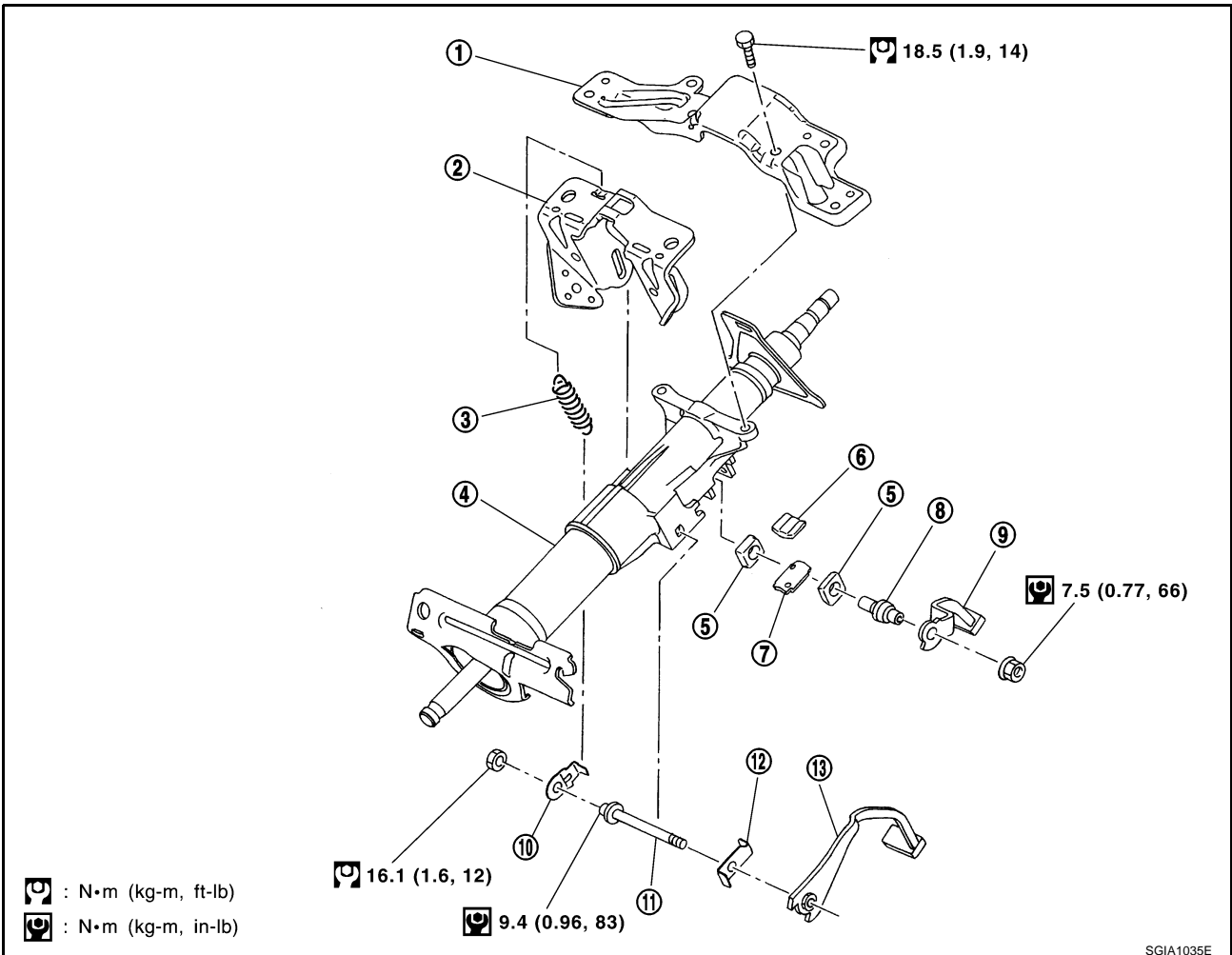
INSPECTION AFTER INSTALLATION OF STEERING COLUMN ASSEMBLY

Make sure that steering wheel operates smoothly by turning several times from full left stop to full right stop.

Disassembly and Assembly

COMPONENT (WITHOUT AUTOMATIC DRIVE POSITIONER)

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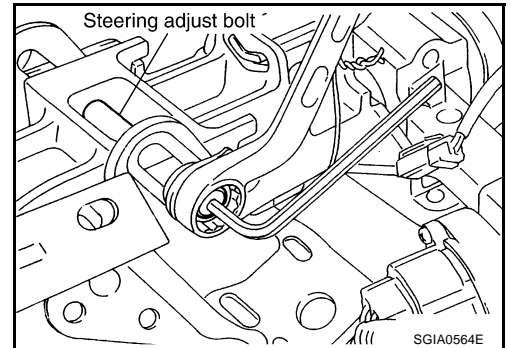
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|--------------------------|-----------------------------------|--------------------------|
| 1. Meter bracket | 2. Steering column mounting clamp | 3. Spring |
| 4. Jacket tube assembly | 5. Lock nut | 6. Telescopic lock block |
| 7. Telescopic lock guide | 8. Telescopic lock bolt | 9. Telescopic lever |
| 10. Adjust stopper | 11. Steering adjust bolt | 12. Tilt lever stopper |
| 13. Tilt lever | | |

STEERING COLUMN

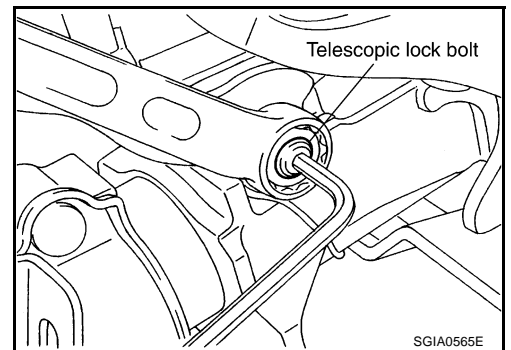
DISASSEMBLY

Remove all parts from jacket tube assembly.

- When remove tilt lever, perform as shown in the figure.



- When remove telescopic lever, perform as shown in the figure.



INSPECTION AFTER DISASSEMBLY

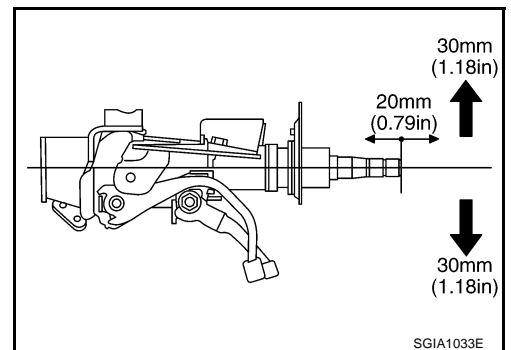
Check tilt and telescopic mechanism components for malfunction. Replace if there are.

ASSEMBLY

Assemble is the reverse order of the disassembly. For tightening torque, refer to [PS-13, "COMPONENT \(WITHOUT AUTOMATIC DRIVE POSITIONER\)"](#).

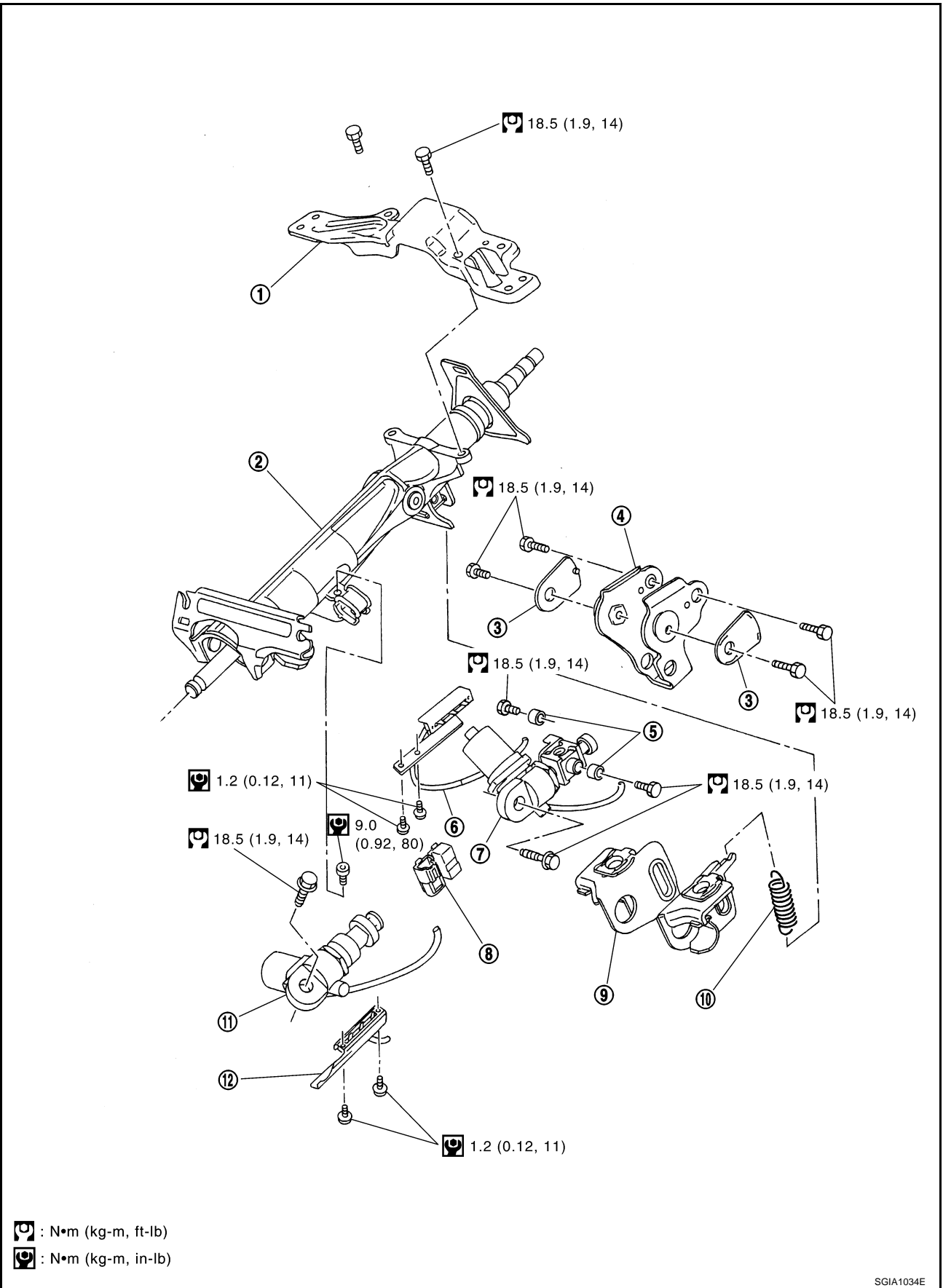
INSPECTION AFTER ASSEMBLY

Check tilt and telescopic mechanism operating range.



STEERING COLUMN

COMPONENT (WITH AUTOMATIC DRIVE POSITIONER)



- Meter bracket
- Jacket tube assembly
- Bush spacer
- Tilt link assembly

- Collar
- Tilt sensor assembly

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- Collar
- Collar
- Collar
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STEERING COLUMN

- 7. Tilt unit assembly
- 10. Spring

- 8. Connector assembly
- 11. Telescopic unit assembly

- 9. Clamp
- 12. Telescopic sensor assembly

DISASSEMBLY

Remove parts from jacket tube assembly. Refer to [PS-15. "COMPONENT \(WITH AUTOMATIC DRIVE POSITIONER\)"](#) .

INSPECTION AFTER DISASSEMBLY

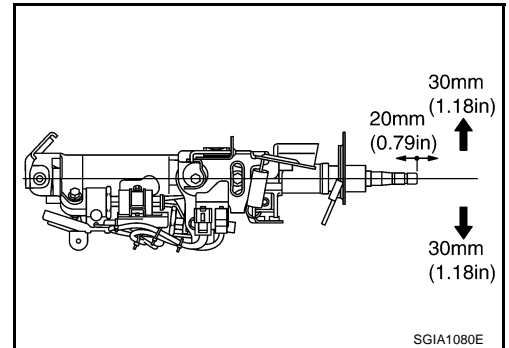
Check tilt and telescopic mechanism components for malfunction. Replace if there are.

ASSEMBLY

Assemble is the reverse order of the disassembly. For tightening torque, refer to [PS-15. "COMPONENT \(WITH AUTOMATIC DRIVE POSITIONER\)"](#) .

INSPECTION AFTER ASSEMBLY

Check tilt and telescopic mechanism operating range.



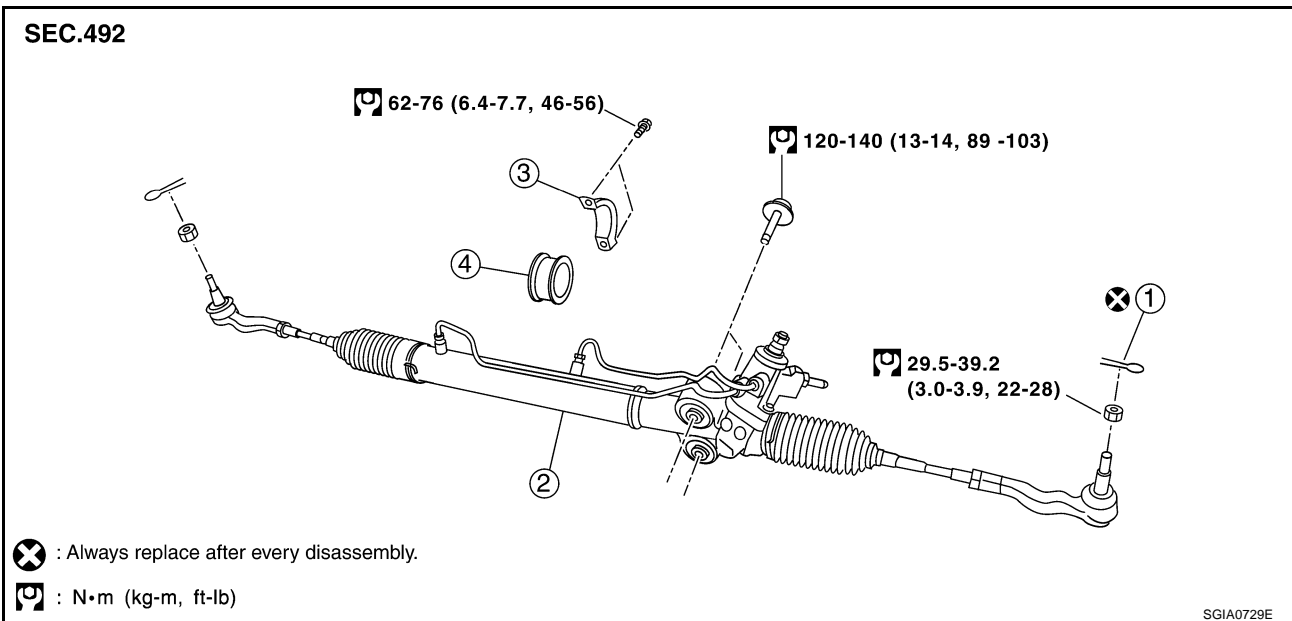
POWER STEERING GEAR AND LINKAGE

POWER STEERING GEAR AND LINKAGE

PPF:49001

Removal and Installation

AGS0000E



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

REMOVAL

CAUTION:

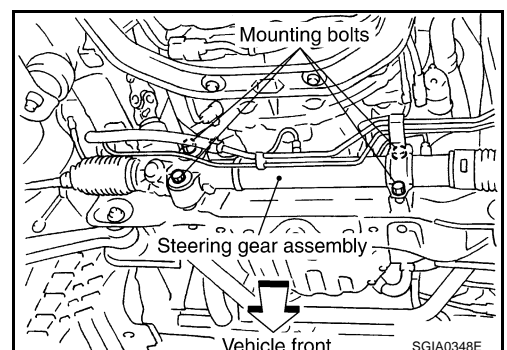
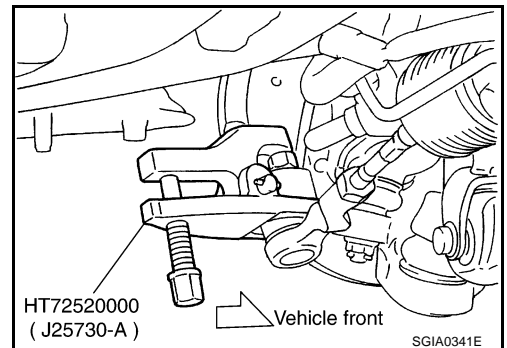
Spiral cable may snap due to steering operation if steering column is separated from steering gear assembly. Therefore fix steering wheel with a string to avoid turns.

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) 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 pinch bolt of lower-side for lower joint.
7. Loosen pinch bolt of upper-side for lower joint.
8. Remove oil pipings (high pressure side and low pressure side) from steering gear assembly, then drain fluid from pipings.
9. Remove mounting bolts of steering gear assembly with power tool, and then remove rack mounting bracket, rack mounting insulator and steering gear assembly from vehicle.



POWER STEERING GEAR AND LINKAGE

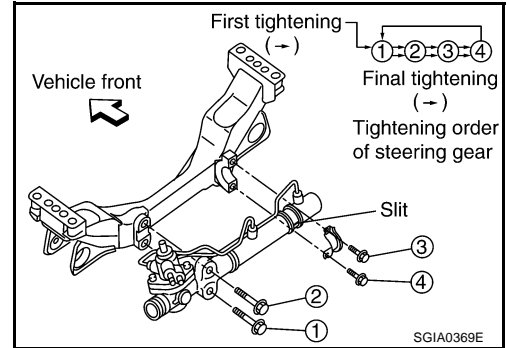
INSTALLATION

- Refer to [PS-17, "Removal and Installation"](#) for tightening torque. Install in the reverse order of removal.

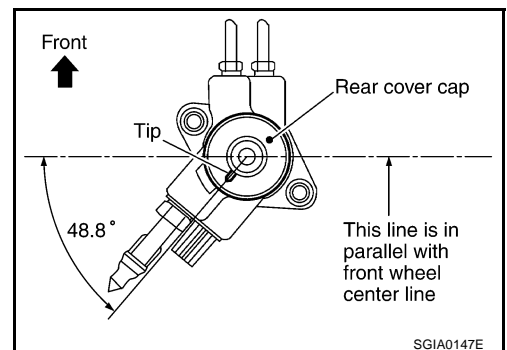
NOTE:

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

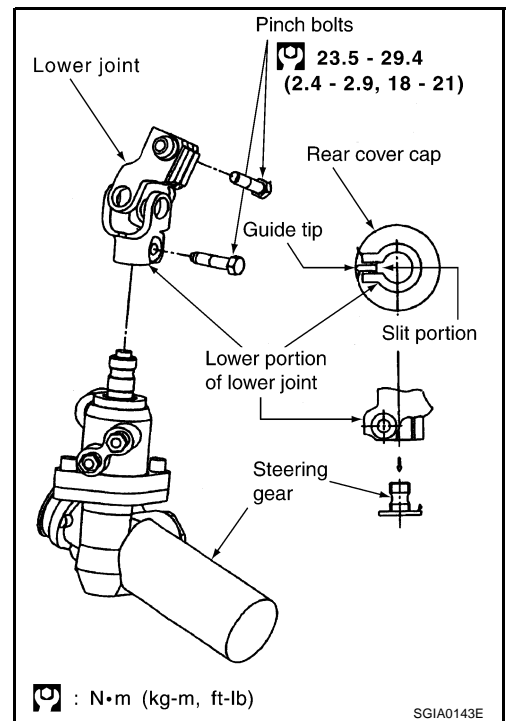
- Install the steering gear to the vehicle, refer to the tightening order shown in the figure.



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



- Install lower joint to steering gear, engage the guide tip on rear cover cap with slit portion in the lower portion of lower joint.
- After installation, bleed air from piping. Refer to [PS-7, "Air Bleeding Hydraulic System"](#).



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

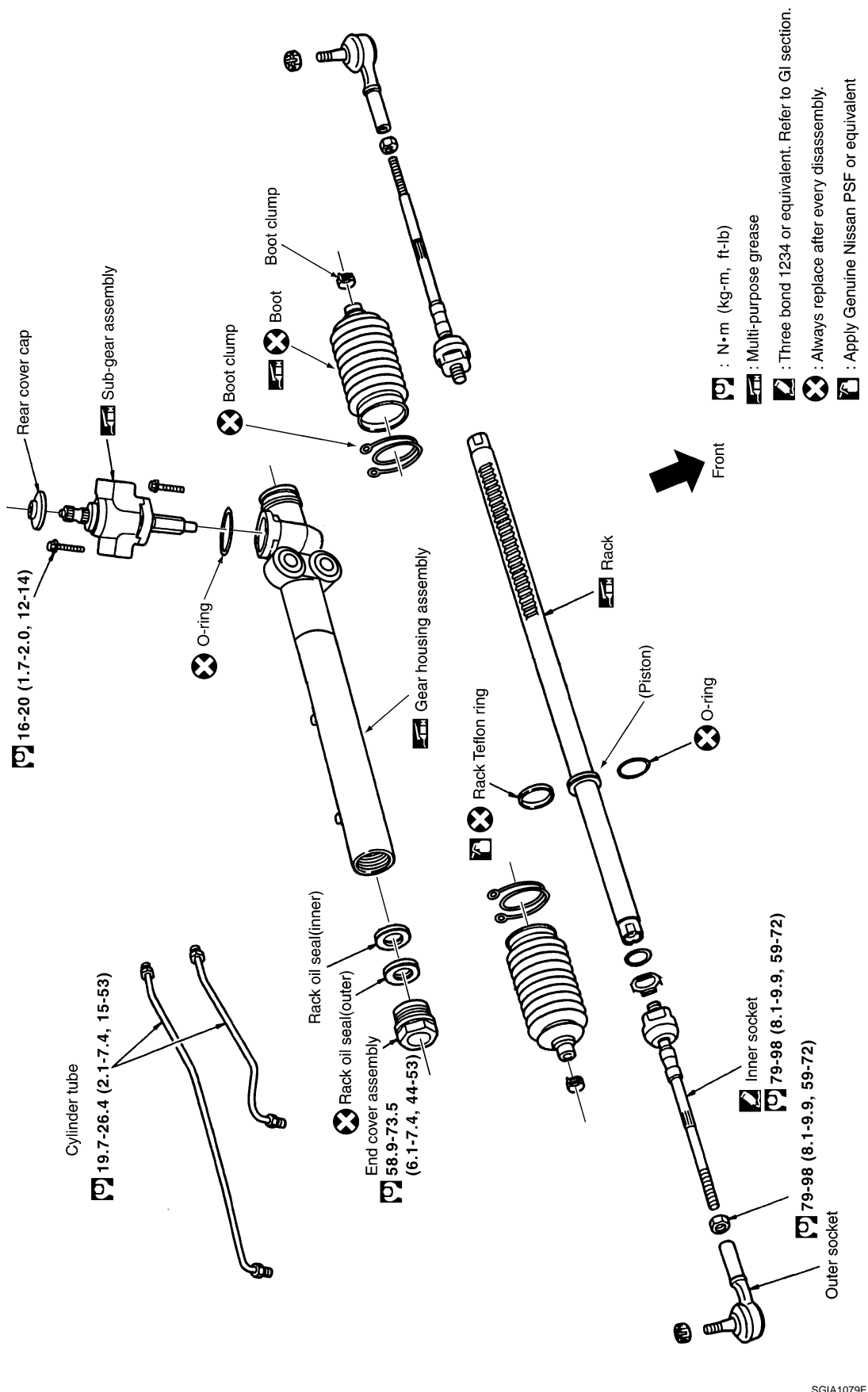
POWER STEERING GEAR

PF0:49001

Component

AGS0001R

SEC.492



SGIA1079E

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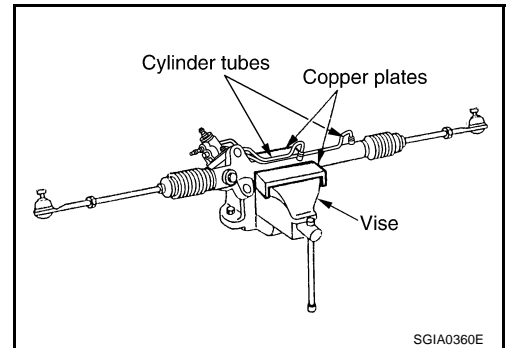
POWER STEERING GEAR

AGS0001S

Disassembly and 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 in 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.

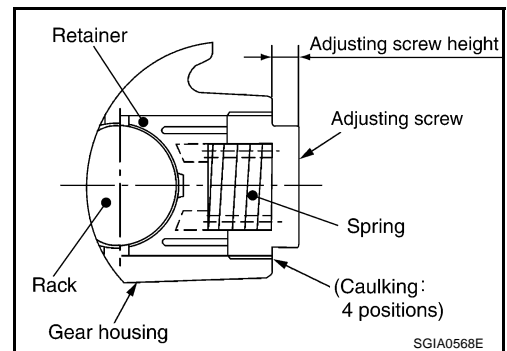


DISASSEMBLY

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

CAUTION:

- Do not turn adjusting screw more than twice.
 - Replace steering gear assembly when adjusting screw is removed or more than twice.
4. Remove fixing bolts of sub-gear assembly and remove sub-gear assembly and O-ring from gear housing assembly.
 5. Loosen nut of outer socket, and remove outer socket.
 6. Remove boot clamps of the small diameter side and the large diameter side, then remove boot.



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.

7. 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.
8. Remove end cover assembly with a 42 mm (1.65 in) open head (suitable tool).

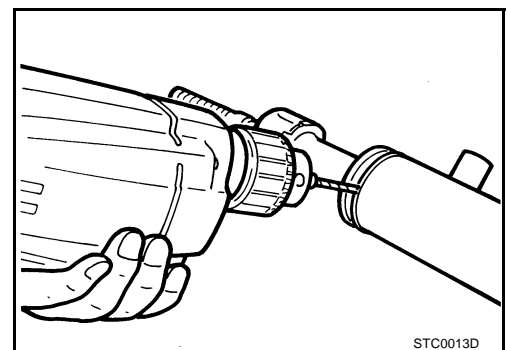
CAUTION:

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

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

CAUTION:

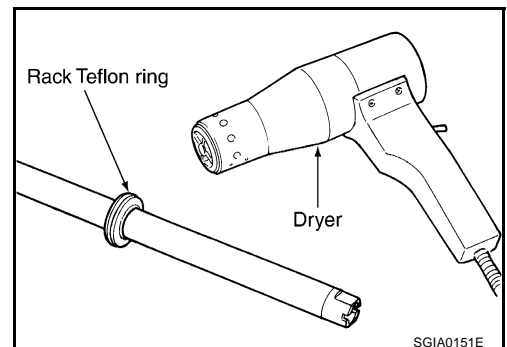
Be careful not to damage cylinder. If it is damaged, replace gear housing assembly. Otherwise, oil leaks may result.



10. 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.

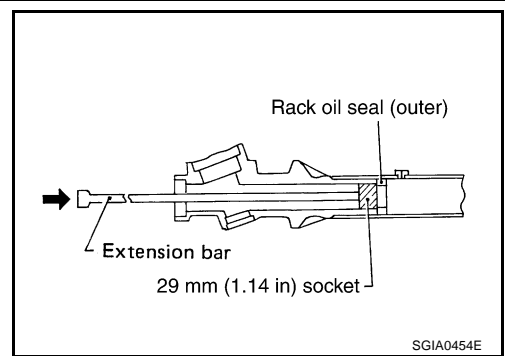


POWER STEERING GEAR

11. 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.



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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.

Sub-Gear Assembly

- Check pinion gear for damage and wear. Replace it, if necessary.
- Check bearing while rotating it. Replace bearing if bearing ball race was dented, worn, or damaged.

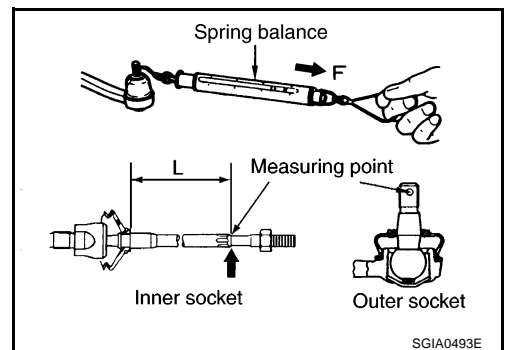
Gear Housing Assembly

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 start moving the measured value must be within the specification. If the reading is outside the specification, replace socket.



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Specified value

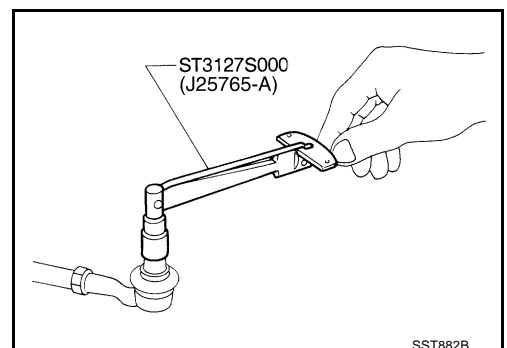
Item	Outer socket	Inner socket
Measuring point	Cotter pin hole of stud	Shown as L: 48.5 mm (1.91 in)
Swing torque	0.3 - 2.9 N·m (0.03 - 0.29 kg·m, 3 - 25 in-lb)	1.0 - 7.8 N·m (0.11 - 0.79 kg·m, 9 - 69 in-lb)
Measuring value	4.42 - 42.7 N (0.45 - 4.3 kg, 1.0 - 9.6 lb)	10 - 78 N (1.1 - 7.9 kg, 2.25 - 17.5 lb)

M

Rotating torque

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

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

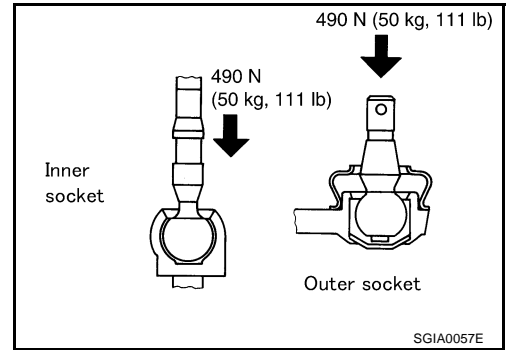


POWER STEERING GEAR

Axial End Play

- Apply load of 490 N (50 kg, 110 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 outside the standard, replace outer and inner sockets.

Outer socket	0.5 mm (0.020 in) or less
Inner socket	0.2 mm (0.008 in) or less



ASSEMBLY

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

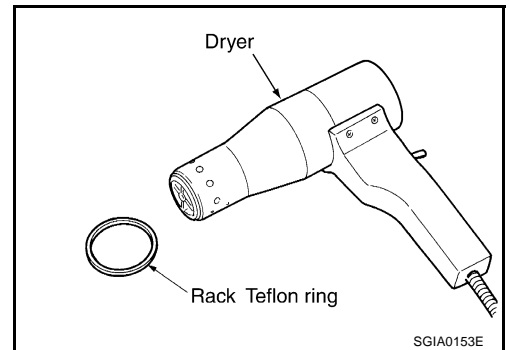
NOTE:

Do not reuse O-ring.

- 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.



- To fit rack Teflon ring on rack, use rack Teflon ring installation tool (SST) from tooth side. Compress rim of ring with the tool.

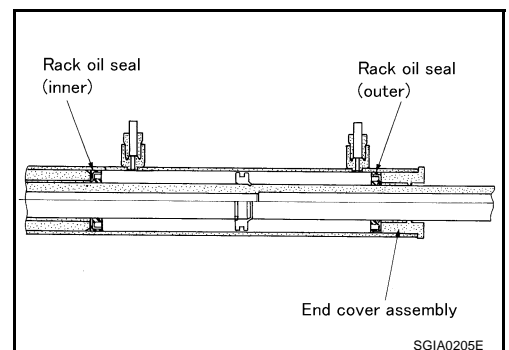
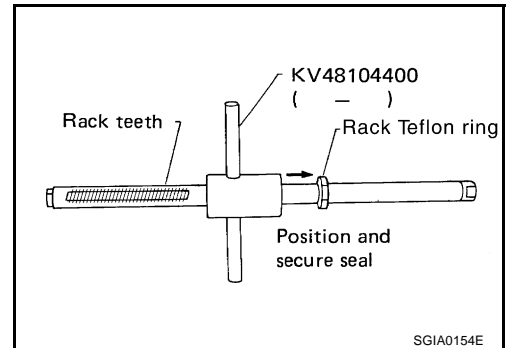
- Apply Multi-purpose grease or equivalent to rack oil seal. Insert rack oil seal, then insert rack to gear housing assembly.

NOTE:

Do not reuse rack oil seal.

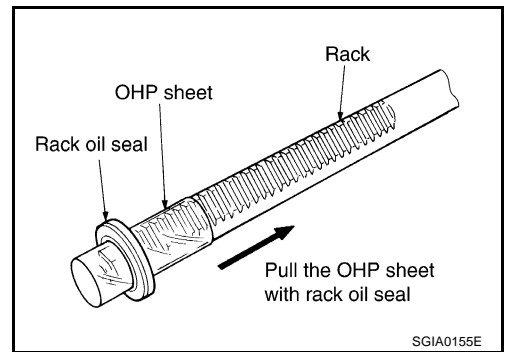
CAUTION:

- When inserting rack, do not damage retainer sliding part. If it is damaged, replace gear housing assembly.
- When unstringing rack, 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.

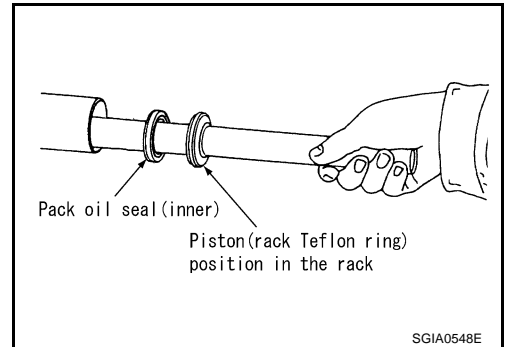


POWER STEERING GEAR

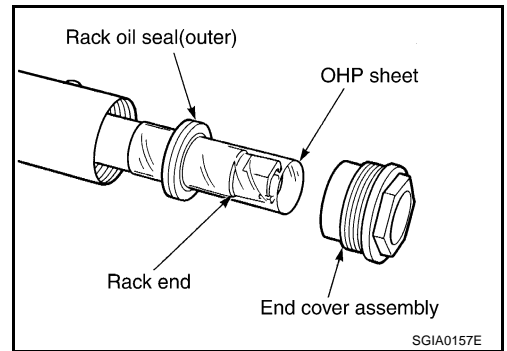
- a. To avoid damaging inner rack oil seal, wrap an OHP sheet [approximately. 70 mm (2.76 in) × 100 mm (3.94 in)] around rack tooth. Place oil seal on sheet. Then, pull oil seal along with OHP sheet until they pass the toothed section of rack, then remove it.



- 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 in 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.

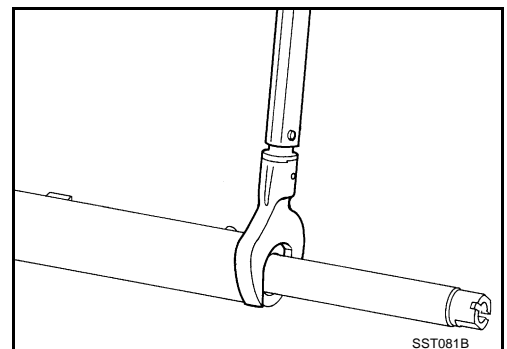


- d. Install end cover assembly to rack, move it to gear housing assembly.

5. Using a 42 mm (1.65 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.

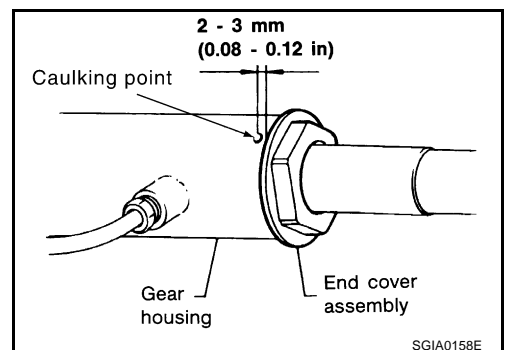


6. After tightening end cover assembly, caulk cylinder at one point as shown in the figure using a punch. This will prevent end cover from getting loose.

7. Apply Genuine NISSAN PSF or equivalent to O-ring. Install O-ring to gear housing assembly.

NOTE:

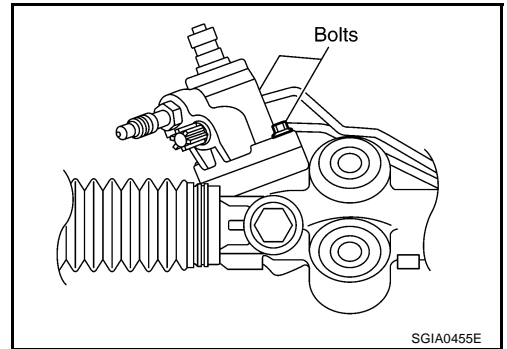
Do not reuse O-ring.



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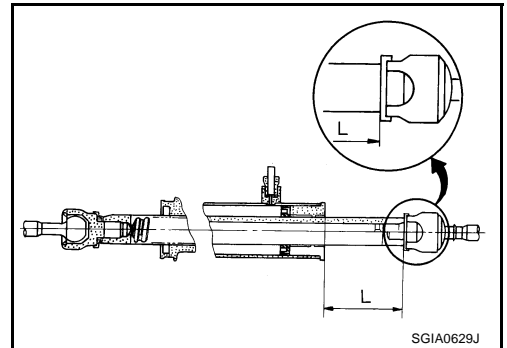
POWER STEERING GEAR

8. Install gear sub-assembly to gear housing assembly.

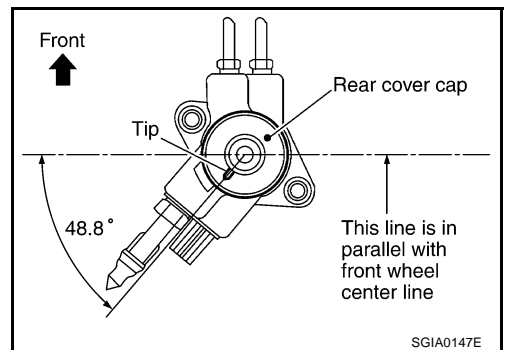


9. Decide neutral position of rack gear.

Rack stroke "L" : 66.6 mm (2.622 in) (2WD models)
 : 66.0 mm (2.598 in) (AWD models)

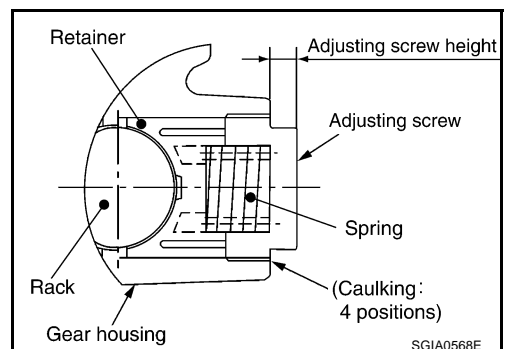


10. Install rear cover cap to the sub-gear assembly, holding relation between projection part (Tip) of rear cover on the sub-gear assembly and the line that is in parallel with front wheel center line as shown in the figure.



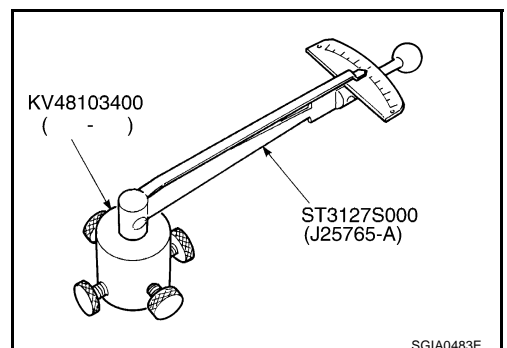
11. Apply thread locking adhesive (Three Bound TB1111B or equivalent) to the thread of adjusting screw to the adjusting screw height from gear housing assembly. The adjusting screw height is the same as it was measured in the overhaul in advance.

12. Rotate pinion ten times whole range of rack so that parts get to fit with each other.



13. 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.

14. After loosening adjusting screw once, tighten it again with torque of 4.9 – 5.9 N·m (0.50 – 0.60 kg·m, 44 – 52 in·lb). After that loosen it within from 20° to 40° .



POWER STEERING GEAR

15. Measure pinion rotating torque with torque adapter (SST) and preload gauge (SST), then confirm whether its 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 N·m (0.51 kg·m, 44 in·lb)

Pinion rotation torque:

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

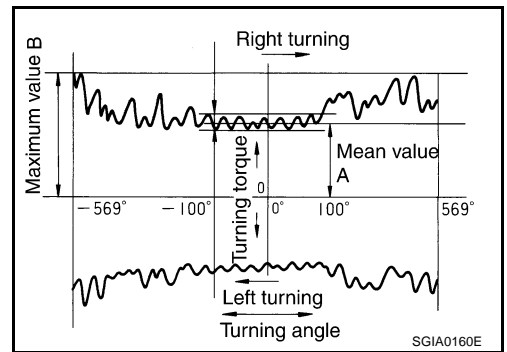
Average "A":

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

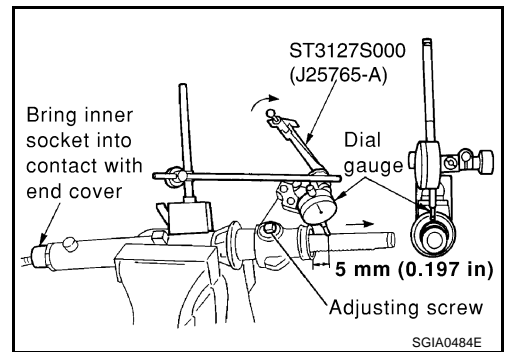
Other than above (more than $\pm 100^\circ$)

Maximum variation "B":

2.3 N·m (0.23 kg·m, 20 in·lb)



16. Turn pinion fully to the end of the left with outer socket to rack.
 17. Set dial gauge to rack as shown in the figure. Measure vertical movement of rack when pinion is turned counterclockwise with torque of 19.6 N·m (2.0 kg·m, 14 ft·lb). Check reading is within the specified value. If reading is outside of the specification, readjust screw angle with adjusting screw. If reading is till 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.

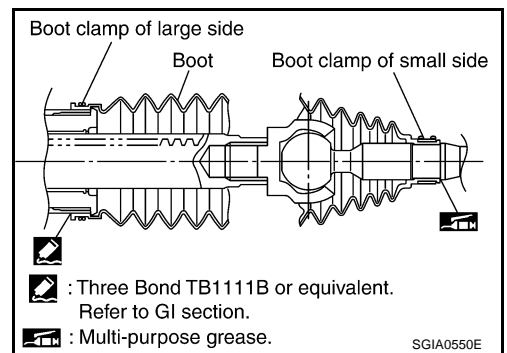


Amount of vertical movement with rack	Less than 0.265 mm (0.010 in)	
Measuring point	Axial direction	5 mm (0.197 in) away from end of gear hosing assembly
	Radius direction of rack	Shaft direction of adjusting screw

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

NOTE:

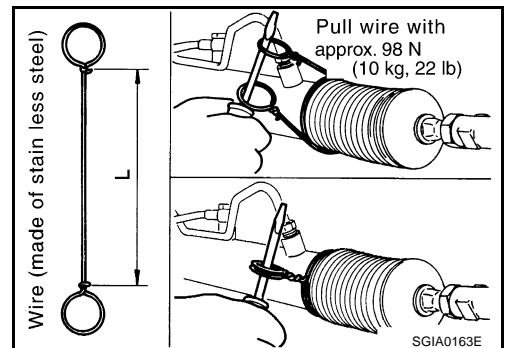
Do not reuse boot clamp.



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

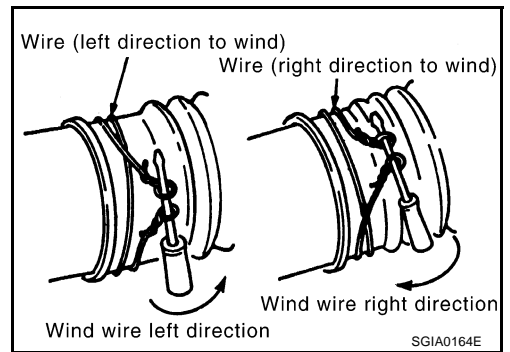
Wire length "L" : 370 mm (14.57 in)

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

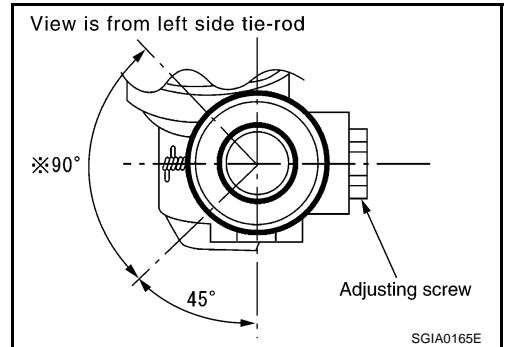


POWER STEERING GEAR

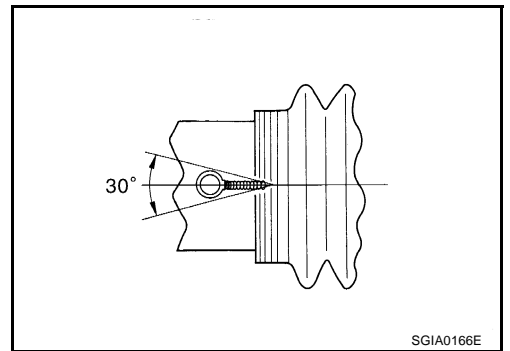
- c. Twist boot clamp as shown in the figure, pay attention to relationship between winding and twisting directions.



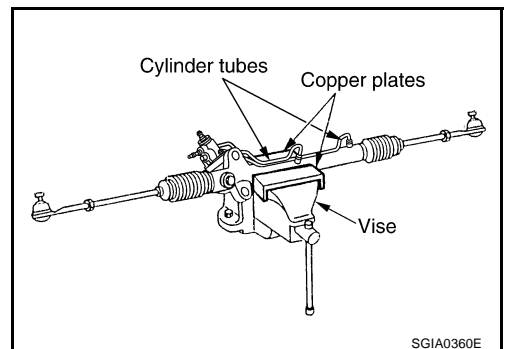
- d. Confirm the twisted point with clamp faces in the opposite direction to adjusting screw within 30° as shown in the figure.



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



22. Install cylinder tubes to gear housing assembly.

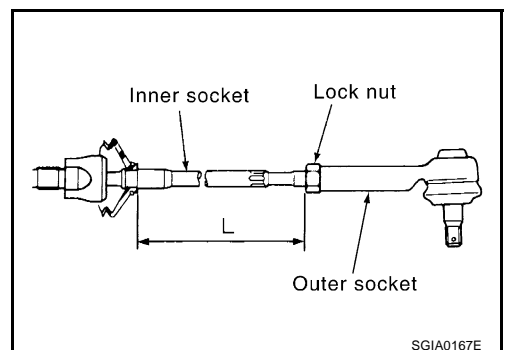


23. Tighten lightly outer socket in specified length "L", then tighten lock nut at specified torque. Refer to [PS-19, "Component"](#). Reconfirm if outer socket length is within limit of specified length "L".

Inner socket length "L" : 106.3 mm (4.185 in)

CAUTION:

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



POWER STEERING OIL PUMP

POWER STEERING OIL PUMP

PFP:49110

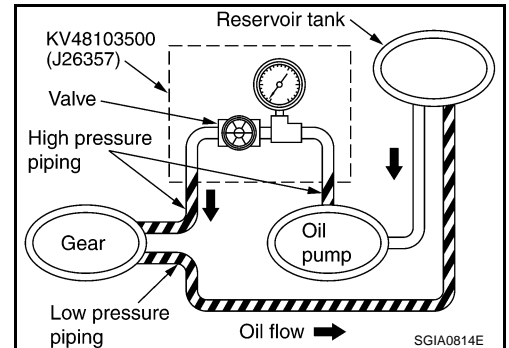
On-Vehicle Inspection and Service CHECKING RELIEF OIL PRESSURE

AGS0000H

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.

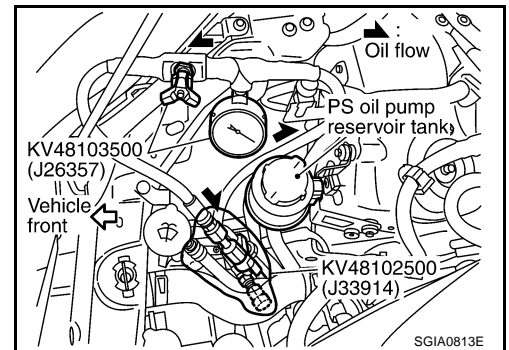


2. Start engine. Allow engine to run until tank temperature reaches 50 to 80°C (122 to 176°F).

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 increase 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 specification:

9,600 - 10,200 kPa (98 - 104 kg/cm² , 1,390 - 1,480 psi)

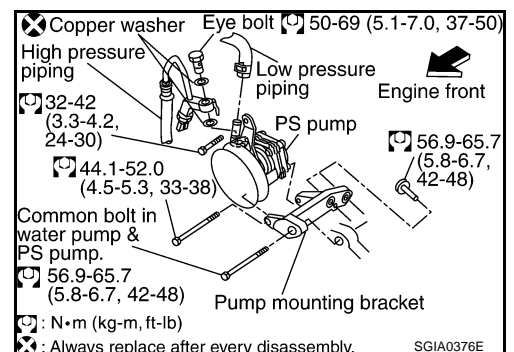
4. After measurement, open shut-off valve slowly.
 - If relief oil pressure is outside the specification, disassemble and repair oil pump. Refer to [PS-28, "Disassembly and Assembly"](#) .
5. After inspection, disconnect oil pressure gauge (SST) and oil pressure gauge adapter (SST) from hydraulic circuit, connect oil pump discharge connector and high pressure hose. Add fluid and bleed air from hydraulic circuit thoroughly. Refer to [PS-7, "Air Bleeding Hydraulic System"](#) .

Removal and Installation

REMOVAL

AGS0000I

1. Remove engine cover.
2. Remove air cleaner box.
3. Drain water from radiator upper tank, then remove radiator upper hose.
4. Remove radiator fan shroud. Refer to [CO-21, "COOLING FAN"](#) .
5. Loosen idler pulley, then remove belt.
6. Drain power steering fluid from reservoir tank.
7. Remove piping of high pressure and low pressure (drain fluid from their pipings)
8. Remove bolt common to water pump and power steering pump.
9. Remove bolt then remove power steering pump.



POWER STEERING OIL PUMP

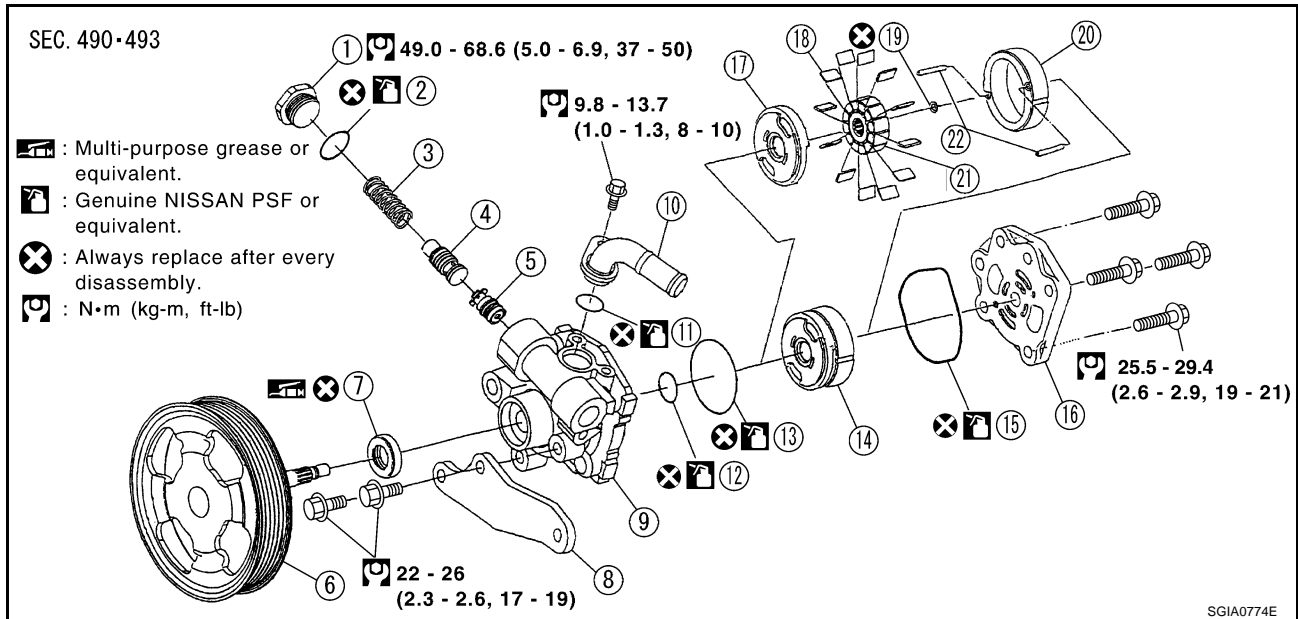
INSTALLATION

Refer to [PS-32, "HYDRAULIC LINE"](#) for tightening torque. Install in the reverse order of removal.

- After installation, adjust belt tension. Refer to [EM-14, "DRIVE BELTS"](#).
- After installation, bleed air. Refer to [PS-7, "Air Bleeding Hydraulic System"](#).

Disassembly and Assembly

AGS0000J

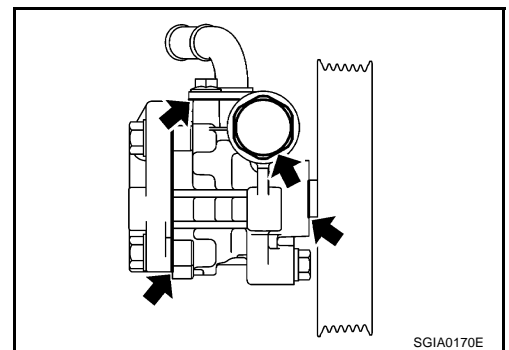


- | | | |
|--------------------------------|--------------------------------|------------------------------|
| 1. Plug | 2. O-ring D | 3. Flow control valve spring |
| 4. Relief valve assembly | 5. Flow control valve assembly | 6. Shaft kit |
| 7. Oil seal | 8. Bracket | 9. Body assembly |
| 10. Suction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

INSPECTION BEFORE DISASSEMBLY

Disassemble the power steering oil pump only if 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 vise, always use copper or aluminium plates between vise and shaft.

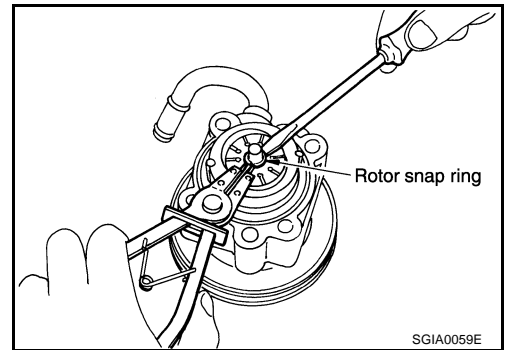
1. Unscrew two front bracket bolts and remove bracket from body assembly.
2. Unscrew four cover assembly bolts and remove cover assembly from body assembly.
3. Remove O-ring A from body assembly.

POWER STEERING OIL PUMP

4. Remove rotor snap ring with snap ring pliers, and remove shaft kit from body assembly.

CAUTION:

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

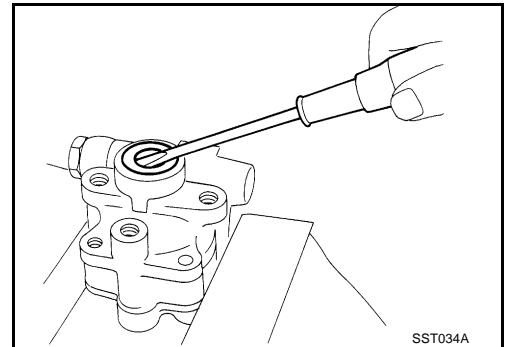


5. Using a screw driver, remove oil seal for body assembly.
6. Remove cam ring, rotor, vane, side plate, O-ring B and O-ring C from body assembly.
7. Remove plug, then remove O-ring D, flow control valve spring, relief valve assembly and flow control valve assembly from body assembly.

CAUTION:

Be careful not to drop and deform relief valve assembly and flow control valve assembly.

8. Remove fixing bolt of suction connector assembly, then remove suction connector assembly and O-ring E from body assembly.



INSPECTION AFTER DISASSEMBLY

Body Assembly and Cover Assembly Inspection

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

Cartridge Assembly Inspection

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

Relief Valve Assembly Inspection

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

Flow Control Valve Assembly Inspection

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

ASSEMBLY

NOTE:

Fix oil pump in vise as occasion demands.

CAUTION:

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

1. Apply a coat of Multi-purpose grease or equivalent to oil seal lip and to the circumference of oil seal. Using proper tool such as hand press machine, install it to the body assembly.

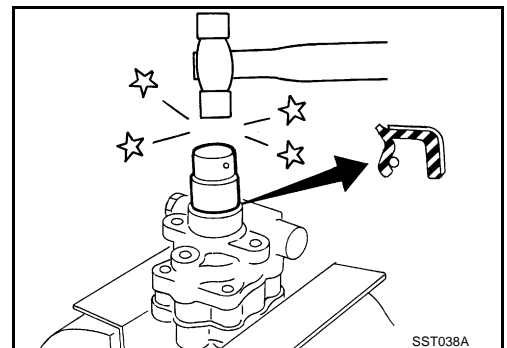
NOTE:

Do not reuse oil seal.

2. Install shaft kit to body assembly.
3. Apply a coat of NISSAN PSF or equivalent to O-ring B and O-ring C, then install O-ring B and O-ring C to body assembly.

NOTE:

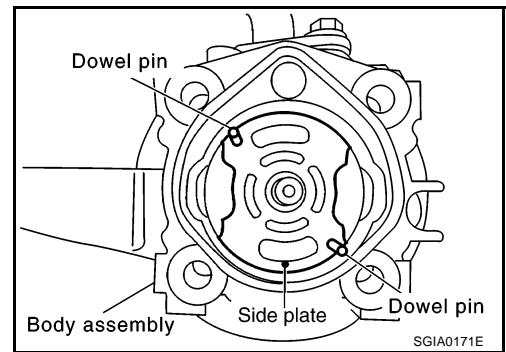
Do not reuse O-ring B and O-ring C.



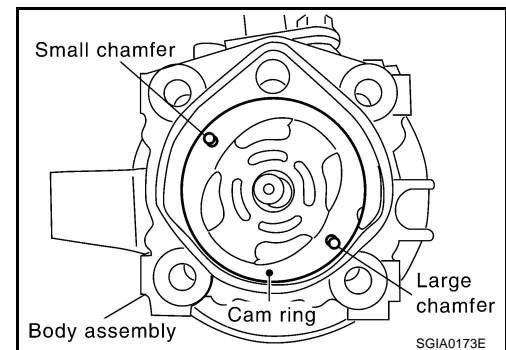
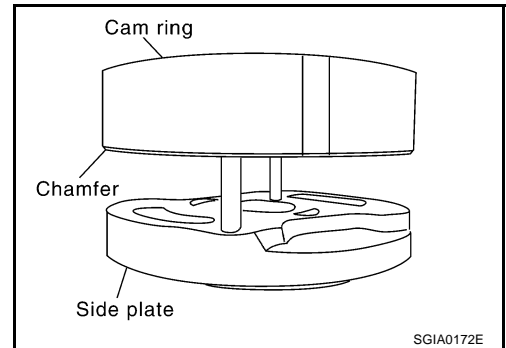
A
B
C
D
E
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PS
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I
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K
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M

POWER STEERING OIL PUMP

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



5. Install cam ring on side plate as follows;
- Turn chamfered edge side of cam ring to side plate as shown in the figure.
 - Position large chamfered side of cam ring as shown in the figure.



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

NOTE:

Do not reuse rotor snap ring.

CAUTION:

Be careful not to damage rotor and pulley shaft.

9. Apply a coat of NISSAN PSF or equivalent to O-ring A, then install O-ring A to body assembly.

NOTE:

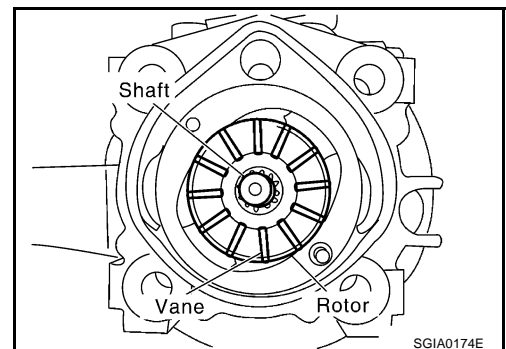
Do not reuse O-ring A.

10. Attach cover assembly to body assembly and tighten fixing bolts diagonally at the specified torque.
11. Install flow control valve assembly, relief valve assembly and flow control valve spring to body assembly.
12. Apply a coat of NISSAN PSF or equivalent to O-ring D and install to plug, then tighten plug at the specified torque.

NOTE:

Do not reuse O-ring D.

13. Apply a coat NISSAN PSF or equivalent to O-ring E and install to suction connector assembly, then install suction connector to body assembly.



POWER STEERING OIL PUMP

NOTE:

Do not reuse O-ring E.

A

B

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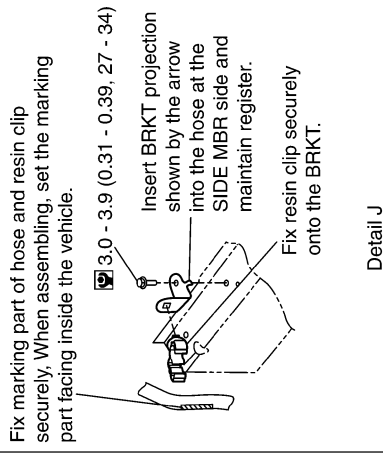
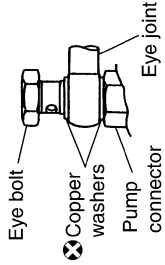
M

Removal and Installation (For AWD Models)

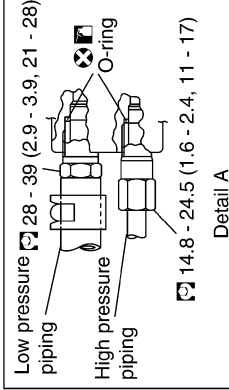
AGS000JA

SEC.497

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

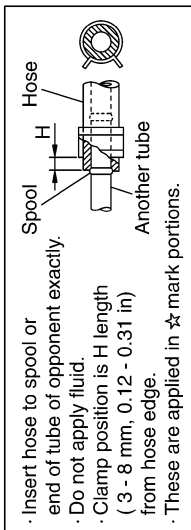


Detail J

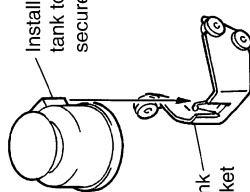


Detail A

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



Install with position mark facing to out of vehicle.
Tube & hose set
Connect pressure sensor to opponent harness connector securely.



Reservoir tank bracket

Reservoir tank installation

Eye bolt

50 - 69 (5.1 - 7.0, 37 - 50)

Copper washers

32 - 42 (3.3 - 4.2, 24 - 30)

Suction hose

Install with AM6 mark facing front of vehicle. ☆ (Insert hose into opponent spool.)

Install the projection to cut portion of pump outlet securely.

Engine side bracket

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

Engine

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

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

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

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

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

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

☆ :N.m (kg-m, in-lb)

☆ :N.m (kg-m, ft-lb)

☆ :Apply Genuine Nissan PSF or equivalent.

☆ :Always replace after every disassembly.

Vehicle front

PS oil pump

Steering gear assembly

Side member

Engine

PS oil pump

Detail B

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

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

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

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

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

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

SERVICE DATA AND SPECIFICATIONS (SDS)

SERVICE DATA AND SPECIFICATIONS (SDS)

PFP:00030

Steering Wheel

AGS0000K

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

Steering Angle

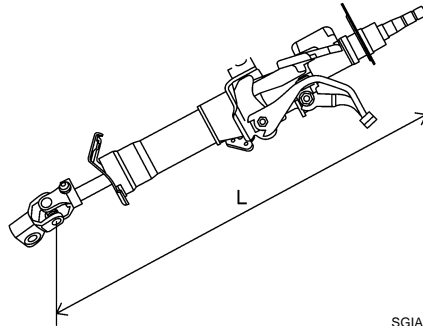
AGS0000L

Inner wheel Degree minute (Decimal degree)	Minimum	37°30' (37.5°) (2WD models) 38°00' (38.0°) (AWD models)
	Nominal	40°30' (40.5°) (2WD models) 41°00' (41.0°) (AWD models)
	Maximum	41°30' (41.5°) (2WD models) 42°00' (42.0°) (AWD models)
Outer wheel Degree minute (Decimal degree)	Nominal	32°30' (32.5°) (2WD models) 31°40' (31.7°) (AWD models)

Steering Column

AGS0000M

Steering column length "L"	548 mm (21.57 in)
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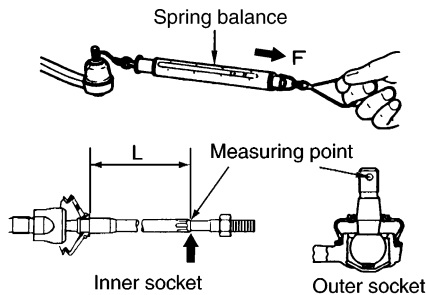


SGIA0556E

Steering Outer Socket and Inner Socket

AGS0000N

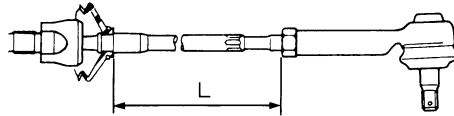
Steering gear type		PR26AD
Outer socket ball joint	Swing torque	0.3 - 2.9 N·m (0.03 - 0.29 kg·m, 3 - 25 in·lb)
	Measurement on spring balance (Measuring point: stud cotter pin hole)	4.42 - 42.7 N (0.45 - 4.4 kg, 1.0 - 9.7 lb)
	Rotating torque	0.3 - 2.9 N·m (0.03 - 0.29 kg·m, 3 - 25 in·lb)
	Axial end play	0.5 mm (0.02 in) or less
Inner socket ball joint	Swinging torque	1.0 - 7.8 N·m (0.11 - 0.79 kg·m, 9 - 69 in·lb)
	Measurement on spring balance (measuring point: ↓ mark see below)	10 - 78 N (1.1 - 7.9 kg, 2.43 - 17.44 lb)
	Axial end play	0.2 mm (0.08 in) or less



SGIA0493E

SERVICE DATA AND SPECIFICATIONS (SDS)

Steering gear type	PR26AD
Inner socket length "L"	106.3 mm (4.185 in)

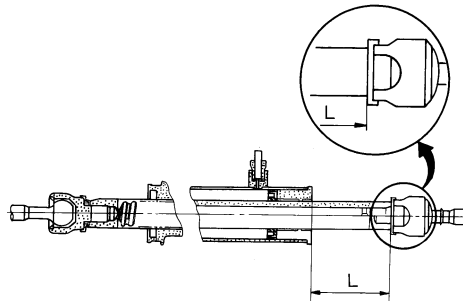


STC1030D

Steering Gear

AGS00000

Steering gear model	PR26AD
Rack neutral position, dimension "L" (rack stroke)	66.6 mm (2.622 in) (2WD models) 66.0 mm (2.598 in) (AWD models)



SGIA0629J

Oil Pump

AGS0000P

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

AGS0000Q

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