

SECTION **ST**
STEERING SYSTEM

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 B
 C
 D
 E
 F
ST
 H
 I
 J
 K
 L
 M
 N
 O
 P

CONTENTS

PRECAUTION	2	STEERING WHEEL	9
PRECAUTIONS	2	Exploded View	9
Precaution for Technicians Using Medical Electric.....	2	Removal and Installation	9
Point to Be Checked Before Starting Maintenance		STEERING COLUMN	10
Work	2	Exploded View	10
Precaution for Supplemental Restraint System		Removal and Installation	10
(SRS) "AIR BAG" and "SEAT BELT PRE-TEN-		Inspection	11
SIONER"	2	STEERING SHAFT	13
Precaution for Removing 12V Battery	3	Exploded View	13
Service Notice or Precautions for Steering System	3	Removal and Installation	13
		Inspection	14
PREPARATION	4	STEERING GEAR AND LINKAGE	15
PREPARATION	4	Exploded View	15
Special Service Tools	4	Removal and Installation	16
Commercial Service Tools	4	Disassembly and Assembly	18
BASIC INSPECTION	5	Inspection	19
STEERING WHEEL	5	SERVICE DATA AND SPECIFICATIONS	
Inspection	5	(SDS)	21
SYMPTOM DIAGNOSIS	7	SERVICE DATA AND SPECIFICATIONS	
NOISE, VIBRATION AND HARSHNESS		(SDS)	21
(NVH) TROUBLESHOOTING	7	General Specifications	21
NVH Troubleshooting Chart	7	Steering Wheel Axial End Play and Play	21
PERIODIC MAINTENANCE	8	Steering Wheel Turning Force	21
STEERING WHEEL	8	Steering Angle	21
Inspection	8	Steering Column Operating Range	21
REMOVAL AND INSTALLATION	9	Rack Stroke	21
		Ball Joint Swinging Force	21
		Ball Joint Axial End Play	22
		Inner Socket Length	22

PRECAUTIONS

< PRECAUTION >

PRECAUTION

PRECAUTIONS

Precaution for Technicians Using Medical Electric

INFOID:000000007073117

OPERATION PROHIBITION

WARNING:

- Parts with strong magnet is used in this vehicle.
- Technicians using a medical electric device such as pacemaker must never perform operation on the vehicle, as magnetic field can affect the device function by approaching to such parts.

NORMAL CHARGE PRECAUTION

WARNING:

- If a technician uses a medical electric device such as an implantable cardiac pacemaker or an implantable cardioverter defibrillator, the possible effects on the devices must be checked with the device manufacturer before starting the charge operation.
- As radiated electromagnetic wave generated by on board charger at normal charge operation may effect medical electric devices, a technician using a medical electric device such as implantable cardiac pacemaker or an implantable cardioverter defibrillator must not enter the vehicle compartment (including luggage room) during normal charge operation.

Precaution at telematics system operation

WARNING:

- If a technician uses implantable cardiac pacemaker or implantable cardioverter defibrillator (ICD), avoid the device implanted part from approaching within approximately 220 mm (8.66 in) from interior/exterior antenna.
- The electromagnetic wave of TCU might affect the function of the implantable cardiac pacemaker or the implantable cardioverter defibrillator (ICD), when using the service, etc.
- If a technician uses other medical electric devices than implantable cardiac pacemaker or implantable cardioverter defibrillator(ICD), the electromagnetic wave of TCU might affect the function of the device. The possible effects on the devices must be checked with the device manufacturer before TCU use.

Precaution at intelligent key system operation

WARNING:

- If a technician uses implantable cardiac pacemaker or implantable cardioverter defibrillator (ICD), avoid the device implanted part from approaching within approximately 220 mm (8.66 in) from interior/exterior antenna.
- The electromagnetic wave of intelligent key might affect the function of the implantable cardiac pacemaker or the implantable cardioverter defibrillator (ICD), at door operation, at each request switch operation, or at engine starting.
- If a technician uses other medical electric devices than implantable cardiac pacemaker or implantable cardioverter defibrillator (ICD), the electromagnetic wave of intelligent key might affect the function of the device. The possible effects on the devices must be checked with the device manufacturer before intelligent key use.

Point to Be Checked Before Starting Maintenance Work

INFOID:000000007080017

The high voltage system may starts automatically. It is required to check that the timer air conditioner and timer charge (during EVSE connection) are not set before starting maintenance work.

NOTE:

If the timer air conditioner or timer charge (during EVSE connection) is set, the high voltage system starts automatically even when the power switch is in OFF state.

Precaution for Supplemental Restraint System (SRS) "AIR BAG" and "SEAT BELT PRE-TENSIONER"

INFOID:000000007011212

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

PRECAUTIONS

< PRECAUTION >

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 AIR BAG" and "SEAT BELT" of this Service Manual.

WARNING:

Always observe the following items for preventing accidental activation.

- **To avoid rendering the SRS inoperative, which could increase the risk of personal injury or death in the event of a collision that 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 "SRS AIR BAG".**
- **Never 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 WHEN USING POWER TOOLS (AIR OR ELECTRIC) AND HAMMERS

WARNING:

Always observe the following items for preventing accidental activation.

- **When working near the Air Bag Diagnosis Sensor Unit or other Air Bag System sensors with the power switch ON, never use air or electric power tools or strike near the sensor(s) with a hammer. Heavy vibration could activate the sensor(s) and deploy the air bag(s), possibly causing serious injury.**
- **When using air or electric power tools or hammers, always switch the power switch OFF, disconnect the 12V battery, and wait at least 3 minutes before performing any service.**

Precaution for Removing 12V Battery

INFOID:000000007011213

When removing the 12V battery, turn ON/OFF the power switch and check that the charging status indicator does not blink. The 12V battery must be removed within one hour after checking the indicator lamp.

NOTE:

- The automatic 12V battery charge control may start even when the power switch is in OFF state.
- The automatic 12V battery charge control does not start within approximately one hour when the power switch is turned ON/OFF.

Service Notice or Precautions for Steering System

INFOID:000000006827852

- In case of removing steering gear assembly, make the final tightening with grounded and unloaded vehicle condition, and then check wheel alignment.
- Observe the following precautions when disassembling.
 - 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.
 - Never reuse non-reusable parts.
 - Before assembling, apply the specified grease to the directed parts.
- During quick steering, rasping noise may be heard from around the steering wheel. This is not a malfunction. The noise is an operating noise of the EPS system under normal conditions. If the rasping noise occurs during slow steering, this may not be an operating noise of the system. In this case, it is necessary to find out the location of the noise and repair, if necessary.
- Never repeat static steering. (Motor and EPS control unit could be heated.)

PREPARATION

< PREPARATION >

PREPARATION

PREPARATION

Special Service Tools

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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
ST3127S000 (J-25765-A) Preload gauge	Inspecting steering column assembly rotating torque
ST27180001 (J-25726-A) Steering wheel puller	Removing steering wheel
KV40107300 (—) Boot band crimping tool	Installing boot clamp (large diameter)

Commercial Service Tools

INFOID:000000006827854

Tool name	Description
Ball joint remover	Remove steering outer socket
Power tool	Loosening bolts and nuts

STEERING WHEEL

< BASIC INSPECTION >

BASIC INSPECTION

STEERING WHEEL

Inspection

INFOID:000000006827855

NEUTRAL POSITION STEERING WHEEL

1. Make sure that steering gear assembly, steering column assembly and steering wheel are installed in the correct position.
2. Perform neutral position inspection after wheel alignment. Refer to [FSU-11, "Inspection"](#).
3. Set vehicle to the straight-ahead position and confirm steering wheel is in the neutral position.
4. Loosen outer socket lock nut and turn inner socket to left and right equally to make fine adjustments if steering wheel is not in the neutral position.

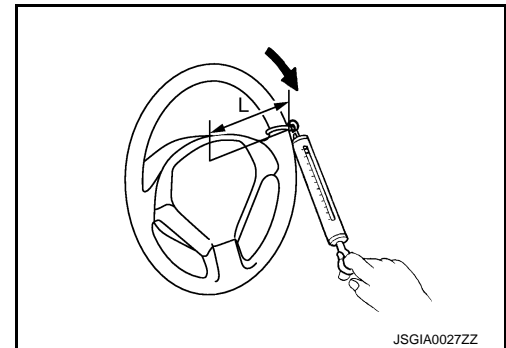
STEERING WHEEL TURNING FORCE

1. Park vehicle on a level and dry surface, set parking brake.
2. Tires need to be inflated normal pressure. Refer to [WT-50, "Tire Air Pressure"](#).
3. Set the vehicle to READY.
4. Check steering wheel turning force when steering wheel has been turned 360° from neutral position.

Steering wheel turning force

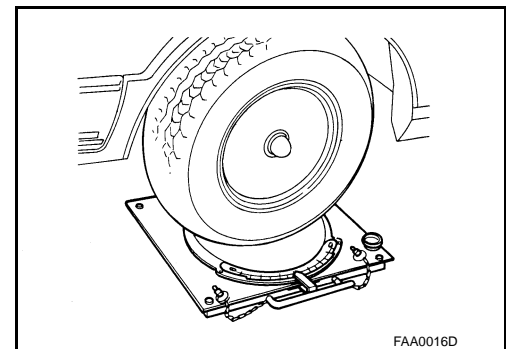
: Refer to [ST-21, "Steering Wheel Turning Force"](#).

L : 185 mm (7.28 in)



FRONT WHEEL TURNING ANGLE

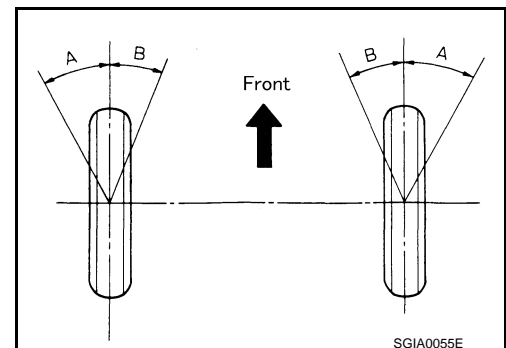
1. Check front wheel turning angle after toe-in inspection. Refer to [FSU-11, "Inspection"](#).
2. Place front wheels on turning radius gauges and rear wheels on stands, so that vehicle can be level.
3. Check the maximum inner and outer wheel turning angles for LH and RH road wheels.



4. Set the vehicle to READY and fully steer right and left to check the steering angle (maximum inner race steering angle and maximum outer race steering angle).

Inner wheel (Angle: A) : Refer to [ST-21, "Steering Angle"](#).

Outer wheel (Angle: B) : Refer to [ST-21, "Steering Angle"](#).

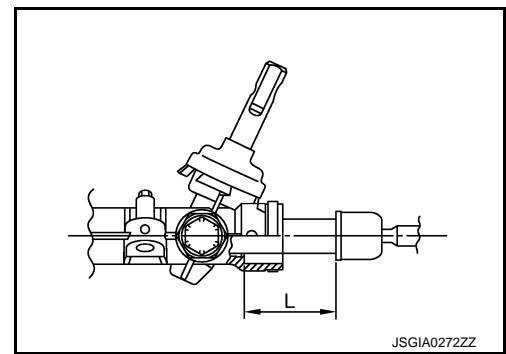


STEERING WHEEL

< BASIC INSPECTION >

5. Check the following items when turning angle is out of the standard.
 - a. Check rack stroke (L).

L : Refer to [ST-21, "Rack Stroke"](#).
 - b. If rack stroke is out of specification, replace steering gear assembly.
 - Steering angles are not adjustable. Check steering gear assembly, steering column assembly, and front suspension components for wear or damage if any of the turning angles are different from the specified value. Replace any of them, if any non-standard condition exists.



NOISE, VIBRATION AND HARSHNESS (NVH) TROUBLESHOOTING

< SYMPTOM DIAGNOSIS >

SYMPTOM DIAGNOSIS

NOISE, VIBRATION AND HARSHNESS (NVH) TROUBLESHOOTING

NVH Troubleshooting Chart

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

Symptom		Possible cause and SUSPECTED PARTS															
		Outer/inner socket ball joint swinging torque	Outer/inner socket ball joint rotating torque	Outer/inner socket ball joint end play	Steering wheel play	Improper steering wheel	Improper installation or looseness of tilt lock lever	Mounting looseness	Steering column deformation or damage	Improper installation or looseness of steering column	Steering linkage looseness	AXLE and SUSPENSION	TIRE	ROAD WHEEL	DRIVE SHAFT	BRAKE	
Steering	Noise	x	x	x	x			x	x			x	x	x	x	x	x
	Shake					x	x	x				x	x	x	x	x	x
	Vibration					x	x	x	x			x	x		x		
	Shimmy					x		x			x	x	x	x			x
	Judder						x	x			x	x	x	x			x
Reference																	

x: Applicable

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STEERING WHEEL

< PERIODIC MAINTENANCE >

PERIODIC MAINTENANCE

STEERING WHEEL

Inspection

INFOID:000000006827857

STEERING WHEEL AXIAL END PLAY

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

Steering wheel axial end play : Refer to [ST-21, "Steering Wheel Axial End Play and Play"](#).

3. Check the following items when steering wheel axial end play is out of the standard.
 - Check the steering column assembly mounting condition. Refer to [ST-10, "Exploded View"](#).
 - Check steering gear assembly mounting condition for looseness. Refer to [ST-15, "Exploded View"](#).

STEERING WHEEL PLAY

1. Turn steering wheel so that front wheels come to the straight-ahead position.
2. Set the vehicle to READY and lightly turn steering wheel to the left and right until front wheels start to move.
3. Measure steering wheel movement on the outer circumference.

Steering wheel play on the outer circumference : Refer to [ST-21, "Steering Wheel Axial End Play and Play"](#).

4. Check the following items when steering wheel play is out of the standard.
 - Check backlash for each joint of steering column assembly.
 - Check installation condition of steering gear assembly.

STEERING WHEEL

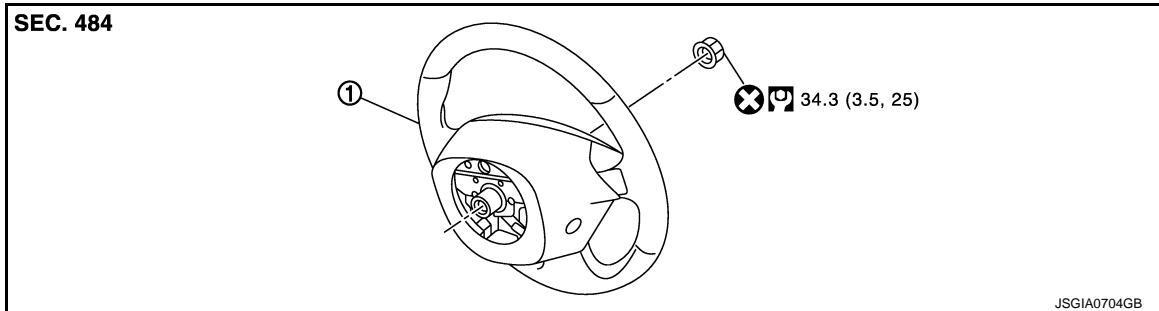
< REMOVAL AND INSTALLATION >

REMOVAL AND INSTALLATION

STEERING WHEEL

Exploded View

INFOID:000000006827858



1. Steering wheel

⊗: Always replace after every disassembly.

Ⓜ: N·m (kg-m, ft-lb)

Removal and Installation

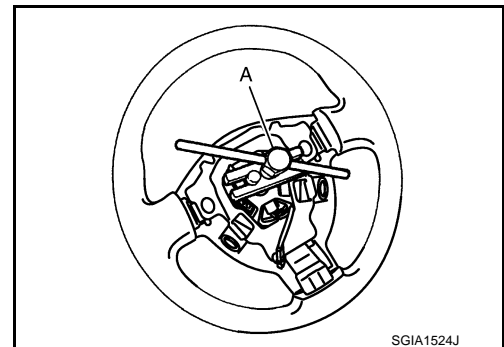
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REMOVAL

NOTE:

When reconnecting spiral cable, fix cable with a tape so that fixing case and rotating part keep aligned. This will omit neutral position alignment procedure during spiral cable installation.

1. Set vehicle to the straight-ahead position.
2. Remove driver air bag module. Refer to [SR-11, "Removal and Installation"](#).
3. Remove steering wheel lock nut after steering is locked.
4. Remove steering wheel with the steering wheel puller (A) [SST: ST27180001 (J-25726-A)].



INSTALLATION

Note the following, and install in the reverse order of removal.

- Check the spiral cable neutral position after replacing or rotating spiral cable. Refer to [SR-14, "Removal and Installation"](#).

CAUTION:

- **Never twist spiral cable excessively after it becomes tight. (Twisting may cause the cable to be torn off.)**
- Never reuse steering wheel lock nut.

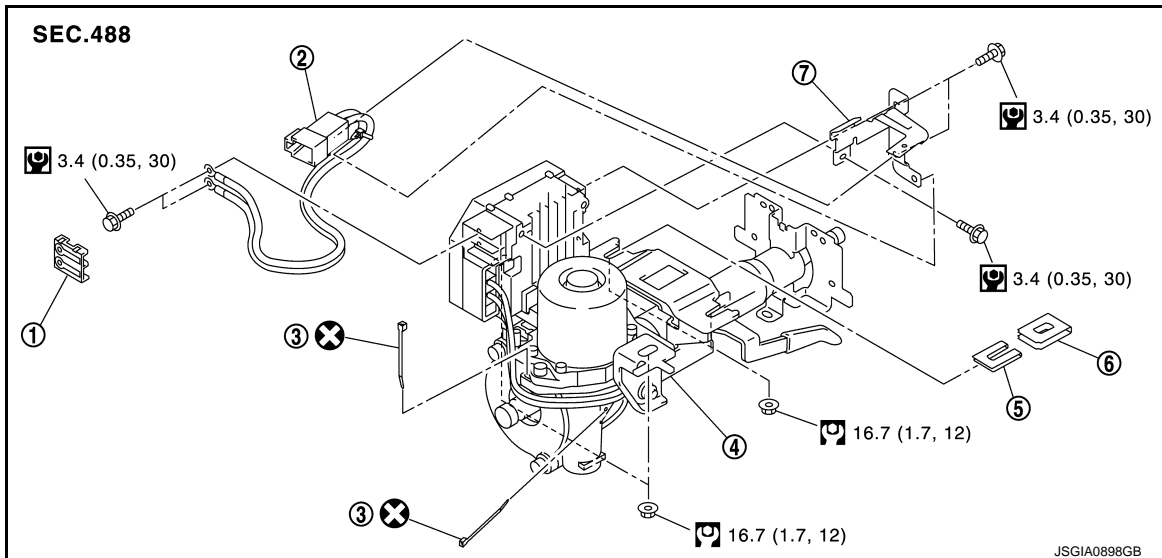
STEERING COLUMN

< REMOVAL AND INSTALLATION >

STEERING COLUMN

Exploded View

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- | | | |
|-----------------------------|------------------------|------------------------|
| 1. Cover | 2. Sub-harness | 3. Band |
| 4. Steering column assembly | 5. Slide plate (inner) | 6. Slide plate (outer) |
| 7. Bracket | | |

⊗: Always replace after every disassembly.

🔧: N-m (kg-m, in-lb)

🔧: N-m (kg-m, ft-lb)

Removal and Installation

INFOID:000000006827861

REMOVAL

CAUTION:

- While removing the steering column assembly, never unlock the tilt lever.
- Never impact on the axis when removing steering column assembly.
- Be careful when removing steering column assembly from the vehicle because it is heavy.
- Keep steering column assembly away from magnetic sources.
- Never disassemble steering column assembly. It is not separable.
- While removing the steering column assembly, never move the steering gear.
- When removing the steering column assembly, be careful not to allow the intermediate shaft to turn.

1. Set vehicle to the straight-ahead position.
2. Place the tilt to the lowest level.

CAUTION:

Securely lock the tilt lever.

3. Remove instrument lower panel. Refer to [IP-13, "Removal and Installation"](#).
4. Remove driver air bag module. Refer to [SR-11, "Removal and Installation"](#).
5. Remove steering wheel. Refer to [ST-9, "Removal and Installation"](#).
6. Remove steering column cover. Refer to [IP-13, "Removal and Installation"](#).
7. Remove spiral cable. Refer to [SR-14, "Removal and Installation"](#).
8. Remove combination switch. Refer to [BCS-77, "Removal and Installation"](#).
9. Remove knee protector.
10. Disconnect each switch harness connectors installed to steering column assembly.

STEERING COLUMN

< REMOVAL AND INSTALLATION >

11. Remove intermediate shaft mounting bolt (steering column side), and separate intermediate shaft from steering column assembly. Refer to [ST-13, "Removal and Installation"](#).

CAUTION:

- Place a matching mark on both intermediate shaft and steering column assembly before removing intermediate shaft.
- When removing intermediate shaft, never insert a tool, such as a screwdriver, into the yoke groove to pull out the intermediate shaft. In case of the violation of the above, replace intermediate shaft with a new one.

12. Disconnect EPS control unit connectors.

13. Remove steering column assembly.

CAUTION:

When removing the mounting, be careful not to drop the steering column assembly.

14. Remove slide plate (outer and inner) from steering column assembly.

15. Remove cover, sub-harness, band, and bracket from steering column assembly.

CAUTION:

Remove cover, sub-harness, band, and bracket only when necessary.

16. Perform inspection after removal. Refer to [ST-11, "Inspection"](#).

INSTALLATION

CAUTION:

- Never impact on the axis when removing steering column assembly.
- When installing the steering column cover, check that the vehicle harness is not stuck in the cover.

Note the following, and install in the reverse order of removal.

- After tightening mounting nut (A) of the steering column assembly, press in slide plate (outer and inner) (1) to tighten mounting nut (B).

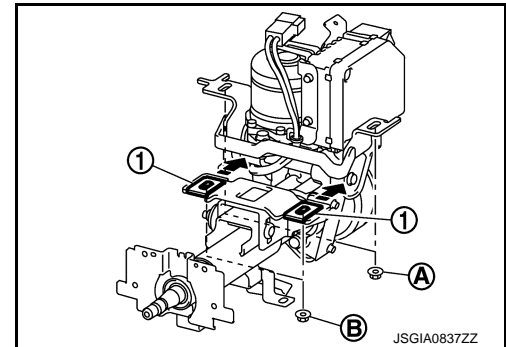
CAUTION:

The slide plate must be securely pressed in before tightening the nut of slide plate (outer and inner).

- For intermediate shaft mounting bolt direction, refer to [ST-13, "Exploded View"](#). (Do not insert it from the other side.)

CAUTION:

Never reuse intermediate mounting bolt.

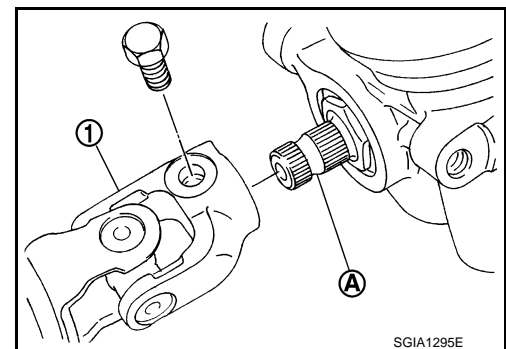


- When connecting intermediate shaft upper side (1) and column shaft, make sure the bolt is securely seated in groove (A) of column shaft (A) before final tightening.

- After installing steering column assembly, perform self-diagnosis with CONSULT to ensure correct operation. Refer to [STC-10, "CONSULT Function"](#).

- Never reuse band.

- Perform inspection after installation. Refer to [ST-11, "Inspection"](#).



Inspection

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INSPECTION AFTER REMOVAL

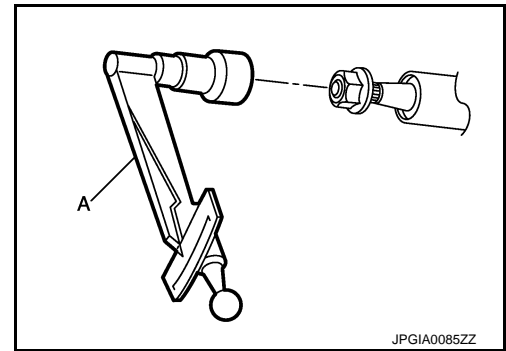
- Check each part of steering column assembly for damage or other malfunctions. Replace if there are any abnormal conditions.

STEERING COLUMN

< REMOVAL AND INSTALLATION >

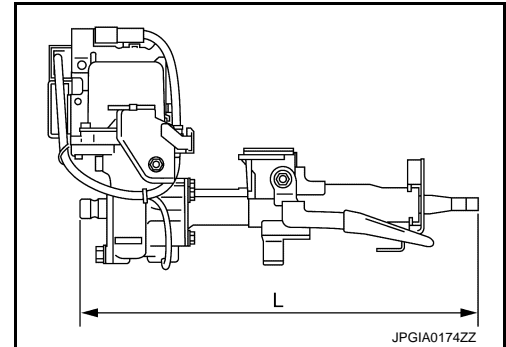
- Measure steering column assembly rotating torque using a preload gauge (A) [SST: ST3127S000 (J-25765-A)]. Replace steering column assembly if the rotating torque is outside the standard.

Rotating torque : Refer to [ST-21, "Steering Column Operating Range"](#).



- Measure the length "L" shown in the figure, if vehicle has been involved in a minor collision. Replace steering column assembly (with motor, reduction gear, sensor) if "L" is outside the standard.

L : Refer to [ST-21, "Steering Column Operating Range"](#).

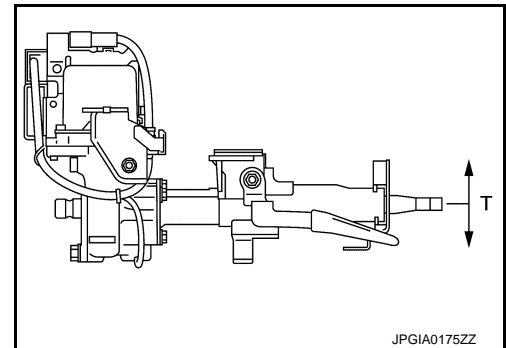


INSPECTION AFTER INSTALLATION

- Check each part of steering column assembly for damage or other malfunctions. Replace if there are any abnormal conditions.
- Check the steering wheel play, neutral position steering wheel, steering wheel turning force, and front wheel turning angle.
 - Steering wheel play: Refer to [ST-8, "Inspection"](#).
 - Neutral position steering wheel, steering wheel turning force, and front wheel turning angle: Refer to [ST-5, "Inspection"](#).
- Check tilt mechanism operating range "T" shown in the figure.

T : Refer to [ST-21, "Steering Column Operating Range"](#).

- Adjust neutral position of steering angle sensor. Refer to [BRC-59, "Work Procedure"](#).



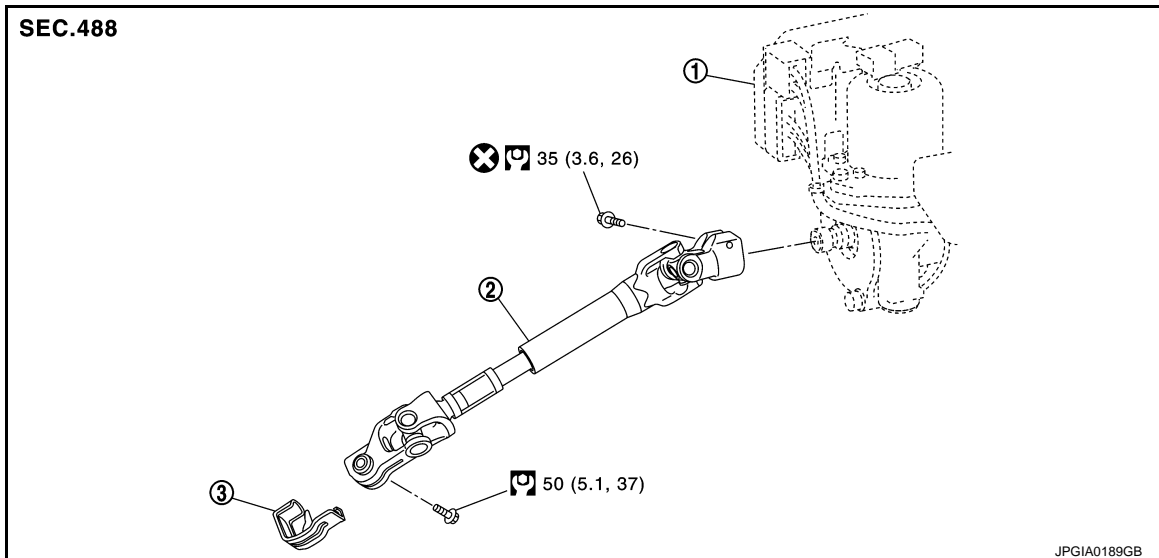
STEERING SHAFT

< REMOVAL AND INSTALLATION >

STEERING SHAFT

Exploded View

INFOID:000000006827863



1. Steering column assembly 2. Intermediate shaft 3. Guide*

: Always replace after every disassembly.

: N·m (kg-m, ft-lb)

*: If reinstalling, this part is not required.

Removal and Installation

INFOID:000000006827864

REMOVAL

CAUTION:

Spiral cable may be cut if steering wheel turns while separating steering column assembly and steering gear assembly. Be sure to secure steering wheel using string to avoid turning.

1. Set vehicle to the straight-ahead position.
2. Place the tilt to the lowest level.
CAUTION:
Securely lock the tilt lever.
3. Remove instrument lower panel. Refer to [IP-13. "Removal and Installation"](#).
4. Remove intermediate shaft mounting bolt (steering gear side), and separate intermediate shaft from steering gear assembly.
CAUTION:
 - Place a matching mark on both intermediate shaft and steering gear assembly before removing intermediate shaft.
 - When removing intermediate shaft, never insert a tool, such as a screwdriver, into the yoke groove to pull out the intermediate shaft. In case of the violation of the above, replace intermediate shaft with a new one.
5. Remove intermediate shaft mounting bolt (steering column side), and remove intermediate shaft from steering column assembly.
CAUTION:
 - Place a matching mark on both intermediate shaft and steering column assembly before removing intermediate shaft.
 - When removing intermediate shaft, never insert a tool, such as a screwdriver, into the yoke groove to pull out the intermediate shaft. In case of the violation of the above, replace intermediate shaft with a new one.
6. Remove guide from intermediate shaft.

STEERING SHAFT

< REMOVAL AND INSTALLATION >

CAUTION:

Remove guide only when necessary.

7. Perform inspection after removal. Refer to [ST-14, "Inspection"](#).

INSTALLATION

Note the following, and install in the reverse order of removal.

CAUTION:

Spiral cable may be cut if steering wheel turns while separating steering column assembly and steering gear assembly. Be sure to secure steering wheel using string to avoid turning.

- Follow the instructions below to install intermediate shaft to steering gear assembly.
- Insert intermediate shaft into steering gear assembly. Align groove of the steering gear assembly with the bolt hole of the intermediate shaft.

CAUTION:

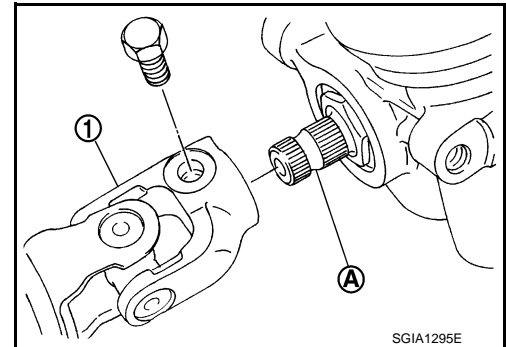
The guide protrusion is not required to be reinstalled.

- Check for galling while hand-tightening the mounting bolt of intermediate shaft (steering gear assembly side). After checking that the bolt is inserted in the groove of steering gear assembly, tighten the bolt to the specified torque.
- For intermediate shaft mounting bolt direction, refer to [ST-13, "Exploded View"](#). (Do not insert it from the other side.)

CAUTION:

Never reuse intermediate mounting bolt.

- When connecting intermediate shaft upper side (1) and column shaft, make sure the bolt is securely seated in groove (A) of column shaft (A) before final tightening.
- Perform inspection after installation. Refer to [ST-14, "Inspection"](#).



SGIA1295E

INFOID:000000006827865

Inspection

INSPECTION AFTER REMOVAL

- Check each part of intermediate shaft for damage or other malfunctions. Replace if there are any abnormal conditions.

INSPECTION AFTER INSTALLATION

- Check each part of intermediate shaft for damage or other malfunctions. Replace if there are any abnormal conditions.
- Rotate steering wheel to check for decentered condition, binding, noise, or excessive steering effort.
- Check the steering wheel play, neutral position steering wheel, steering wheel turning force, and front wheel turning angle.
- Steering wheel play: Refer to [ST-8, "Inspection"](#).
- Neutral position steering wheel, steering wheel turning force, and front wheel turning angle: Refer to [ST-5, "Inspection"](#).
- Adjust neutral position of steering angle sensor. Refer to [BRC-59, "Work Procedure"](#).

STEERING GEAR AND LINKAGE

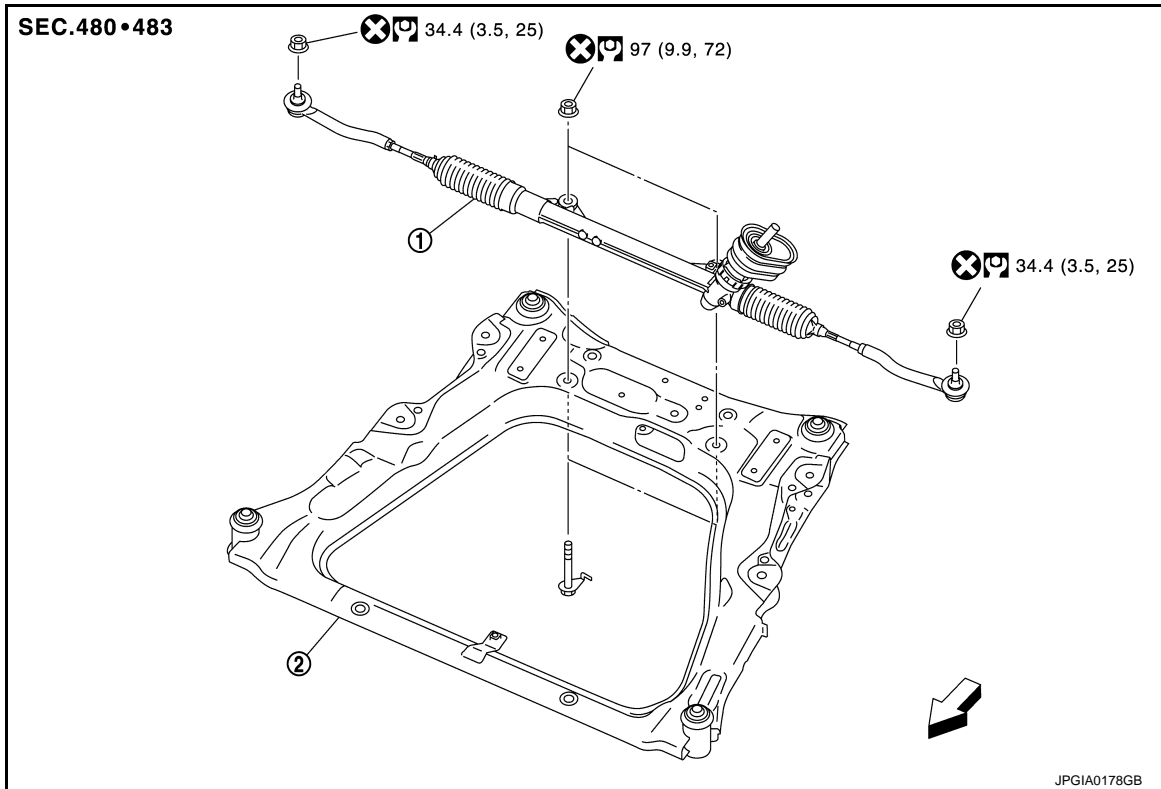
< REMOVAL AND INSTALLATION >

STEERING GEAR AND LINKAGE

Exploded View

INFOID:000000006827866

REMOVAL



1. Steering gear assembly

2. Front suspension member

⇐: Vehicle front

⊗: Always replace after every disassembly.

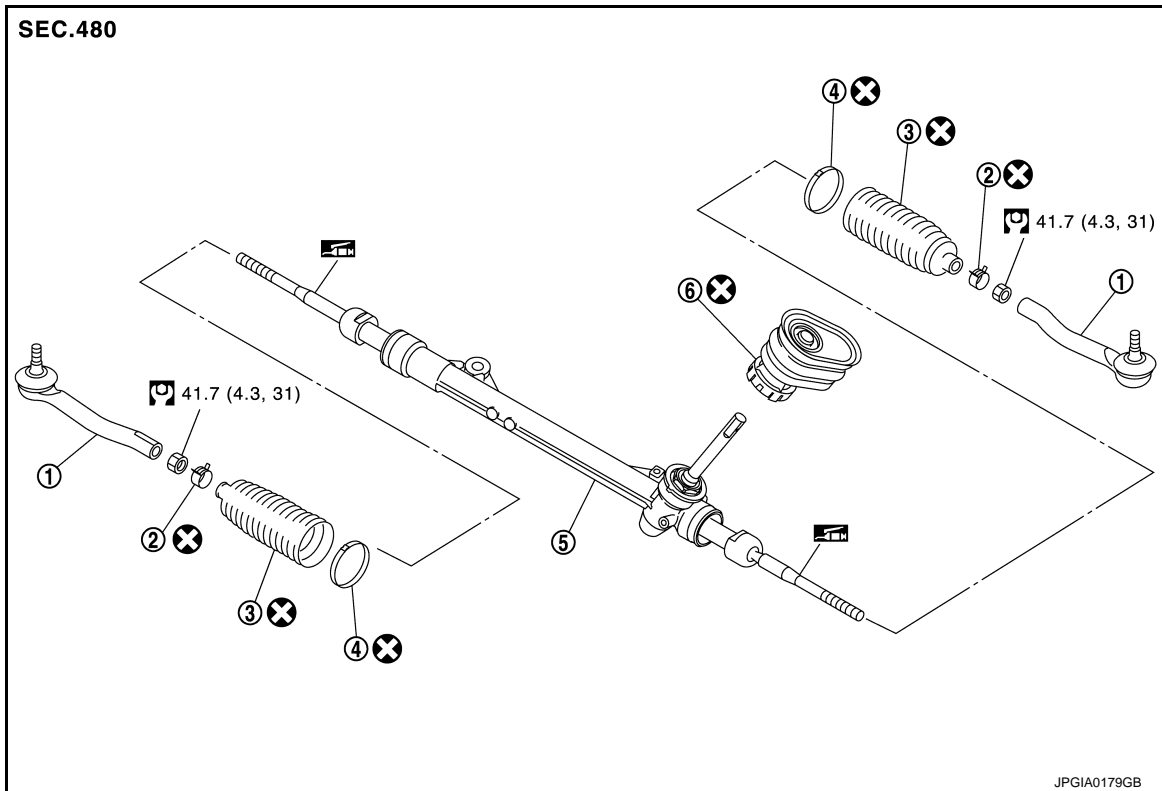
□: N·m (kg-m, ft-lb)

DISASSEMBLY

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STEERING GEAR AND LINKAGE

< REMOVAL AND INSTALLATION >



- | | | |
|--------------------------------|--------------------------------|-------------------|
| 1. Outer socket | 2. Boot clamp (small diameter) | 3. Boot |
| 4. Boot clamp (large diameter) | 5. Gear housing assembly | 6. Fire wall seal |

⊗: Always replace after every disassembly.

Ⓜ: N·m (kg·m, ft·lb)

🛢: Apply Genuine Lithium Soap, Autorex A (manufactured by Kyodo yushi) or equivalent.

Removal and Installation

INFOID:000000006827867

REMOVAL

1. Set vehicle to the straight-ahead position.
2. Remove intermediate shaft mounting bolt (steering gear assembly side). Refer to [ST-13. "Removal and Installation"](#).
CAUTION:
 - Spiral cable may be cut if steering wheel turns while separating steering column assembly and steering gear assembly. Always fix the steering wheel using string to avoid turning.
 - Place a matching mark on both intermediate shaft and steering gear assembly before removing intermediate shaft.
 - When removing intermediate shaft, never insert a tool, such as a screwdriver, into the yoke groove to pull out the intermediate shaft. In case of the violation of the above, replace intermediate shaft with a new one.
3. Remove tires with power tool. Refer to [WT-45. "Exploded View"](#).
4. Remove front under cover. Refer to [EXT-21. "FRONT UNDER COVER : Exploded View"](#).
5. Remove battery under cover (front). Refer to [EVB-136. "Removal and Installation"](#).
6. Remove fender protector. Refer to [EXT-19. "FENDER PROTECTOR : Exploded View"](#).
7. Remove stabilizer connecting rod. Refer to [FSU-18. "Exploded View"](#).

STEERING GEAR AND LINKAGE

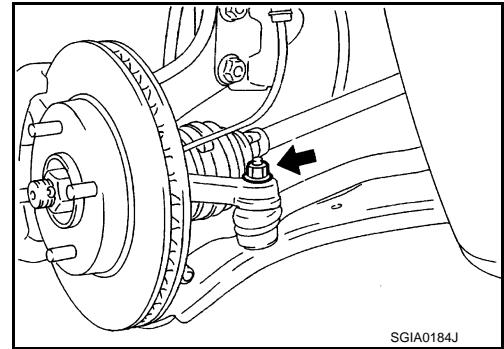
< REMOVAL AND INSTALLATION >

8. Remove steering outer socket from steering knuckle so as not to damage ball joint boot using suitable ball joint remover (commercial service tool).

CAUTION:

Temporarily tighten the nut to prevent damage to threads and to prevent the ball joint remover from sudden drop turning.

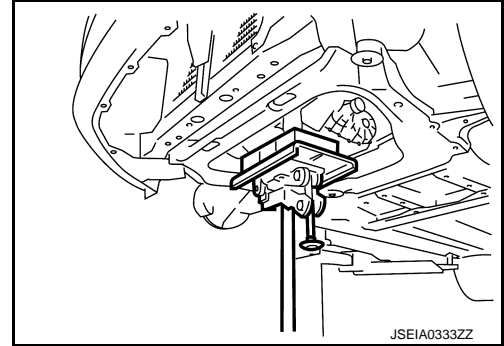
9. Separate transverse link from steering knuckle with power tool. Refer to [FAX-9, "Exploded View"](#).



10. Set suitable jack under reduction gear and traction motor.

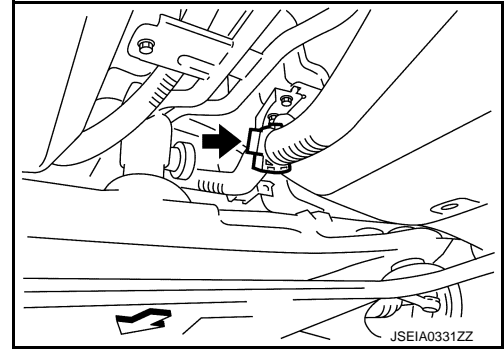
CAUTION:

- Never damage the reduction gear and traction motor with a jack.
- Check the stable condition when using a jack.



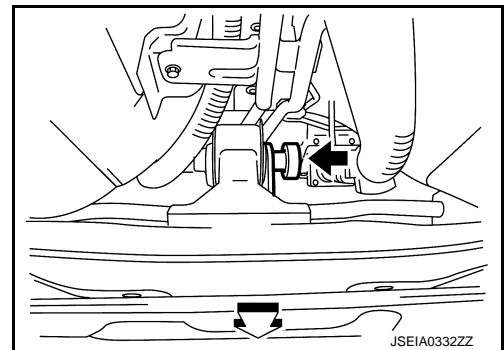
11. Separate high voltage harness clip from bracket.

← : Vehicle front



12. Remove motor mounting rear mounting bolt. Refer to [TMS-123, "Removal and Installation"](#).

← : Vehicle front



13. Remove motor mounting (LH and RH) mounting bolts from front suspension member. Refer to [TMS-123, "Removal and Installation"](#).

14. Remove member stay and rebound stopper with power tool. Refer to [FSU-21, "Exploded View"](#).

15. Remove suspension member mounting bolts, washer, and rebound stopper rubber with power tool. Refer to [FSU-21, "Exploded View"](#).

16. Remove front suspension member from vehicle body.

CAUTION:

Check the stable condition when using a jack.

17. Remove steering gear assembly with power tool.

18. Perform inspection after removal. Refer to [ST-19, "Inspection"](#).

INSTALLATION

Note the following, and install in the reverse order of removal.

CAUTION:

A
B
C
D
E
F
ST
H
I
J
K
L
M
N
O
P

STEERING GEAR AND LINKAGE

< REMOVAL AND INSTALLATION >

Spiral cable may be cut if steering wheel turns while separating steering column assembly and steering gear assembly. Always fix the steering wheel using string to avoid turning.

- Perform final tightening of nuts and bolts on each part under unladen conditions with tires on level ground when removing steering gear assembly. Check wheel alignment. Refer to [FSU-11, "Inspection"](#).
- Rotate steering wheel to check for decentered condition, binding, noise or excessive steering effort.
- Never reuse steering outer socket fixing nut and steering gear assembly mounting nut.
- Perform inspection after installation. Refer to [ST-19, "Inspection"](#).

Disassembly and Assembly

INFOID:000000006827868

DISASSEMBLY

1. Loosen outer socket lock nut, and remove outer socket.

CAUTION:

When loosening lock nut, be sure to fix outer socket with a wrench or an equivalent.

2. Remove boot clamps, and then remove boot from inner socket.

CAUTION:

Never damage inner socket part of gear housing assembly when removing boot. Steering gear assembly must be replaced if gear housing assembly are damaged because it may cause foreign material interfusion.

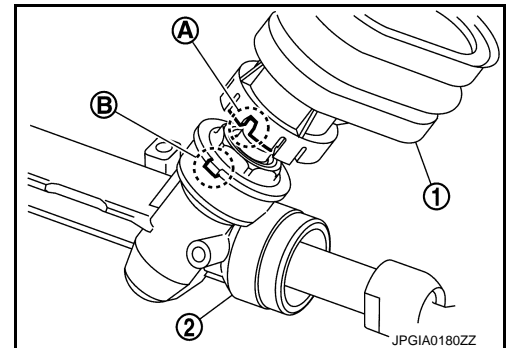
3. Remove fire wall seal.
4. Perform inspection after disassembly. Refer to [ST-19, "Inspection"](#).

ASSEMBLY

1. Install fire wall seal to gear housing assembly.

CAUTION:

Install fire wall seal (1) so that the groove (A) for locating is securely set to gear housing assembly (2) protrusion (B).



2. Apply recommended grease to inner socket part (A) of gear housing assembly, and install boot to gear housing assembly.

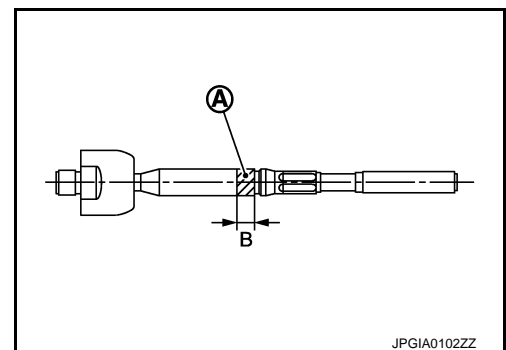
Use Genuine Lithium Soap, Autorex A (manufactured by Kyodo yushi) or equivalent.

CAUTION:

Never reuse boot.

Grease application position (Reference)

B : 10 mm (0.39 in)



STEERING GEAR AND LINKAGE

< REMOVAL AND INSTALLATION >

3. Install boot clamp (large diameter) (1) to boot using boot band crimping tool (A) [SST: KV40107300 (—)].

CAUTION:

- Never reuse boot clamp (large diameter).
- Install boot clamp (large diameter) (1) securely to boot groove, and crimp it so as to have clearance (B) of 3 mm (0.12 in) or less as shown.

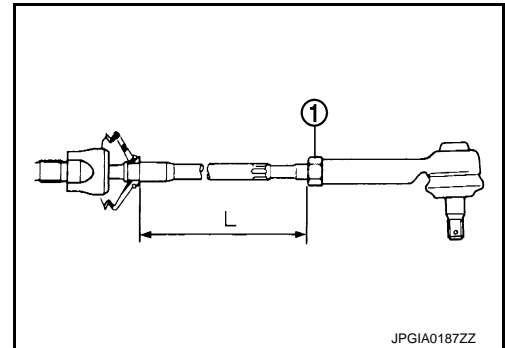
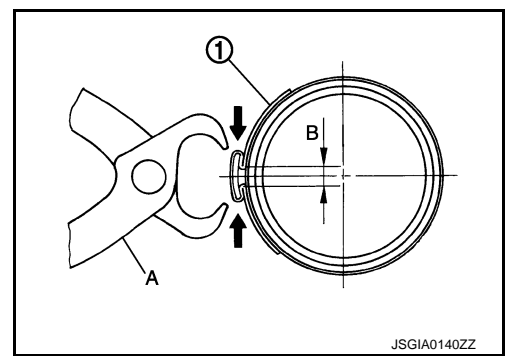
4. Install boot clamp (small diameter) to boot.

CAUTION:

- Never reuse boot clamp (small diameter).

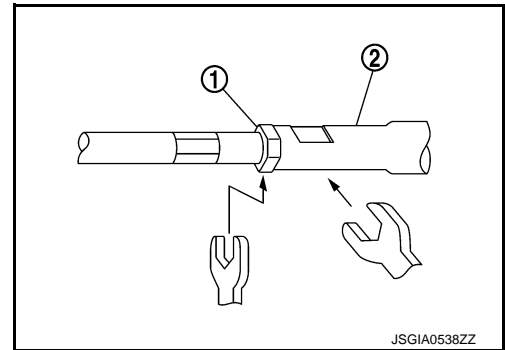
5. Adjust inner socket to standard length (L), and then tighten lock nut (1) to the specified torque. Check length again after tightening lock nut.

L : Refer to [ST-22, "Inner Socket Length"](#).



CAUTION:

- When tightening the lock nut (1), be sure to fix outer socket (2) with a wrench or an equivalent to prevent the ball joint from getting contact with the knuckle.
- Adjust toe-in. Refer to [FSU-11, "Inspection"](#). Length achieved after toe-in adjustment is not necessarily the above value.



Inspection

INFOID:000000006827869

INSPECTION AFTER DISASSEMBLY

Boot

- Check boot for cracks, and replace it if a malfunction is detected.

Gear housing Assembly

- Check gear housing assembly for damage and scratches. Replace if there are any abnormal conditions.

Outer Socket and Inner Socket

- Check the following items and replace the component if it does not meet the standard.

BALL JOINT SWINGING FORCE

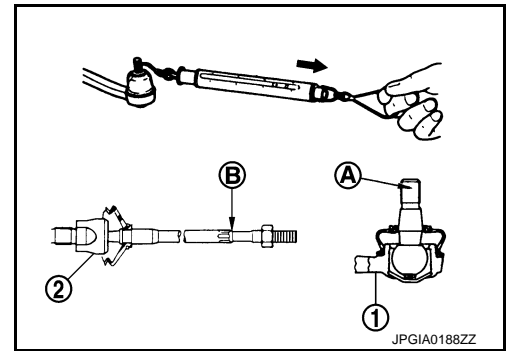
STEERING GEAR AND LINKAGE

< REMOVAL AND INSTALLATION >

- Hook a spring balance at the point and pull the spring balance. Make sure that the spring balance reads the specified value when ball stud and inner socket start to move. Replace outer socket or steering gear assembly (inner socket) if they are outside the standard.

Measuring point of outer socket (1) : Ball stud upper side (A)
Measuring point of inner socket (2) : Point (B) shown in the figure

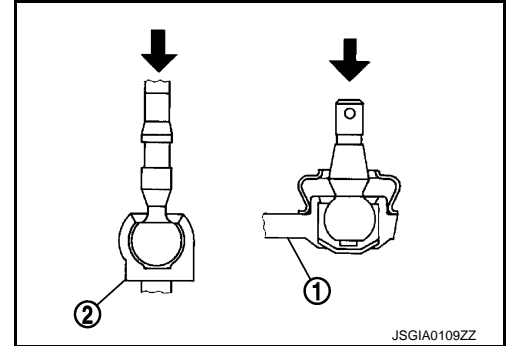
Swinging force : Refer to [ST-21, "Ball Joint Swinging Force"](#).



BALL JOINT AXIAL END PLAY

- Apply an axial load of 490 N (50 kg, 110 lb) to ball stud. Using a dial gauge, measure amount of stud movement, and then make sure that the value is within the following specified range. Replace outer socket (1) or steering gear assembly (inner socket) (2) if the measured value is outside the standard.

Axial end play : Refer to [ST-22, "Ball Joint Axial End Play"](#).



INSPECTION AFTER INSTALLATION

- Check if steering wheel turns smoothly when it is turned several times fully to the end of the left and right.
- Check the steering wheel play, neutral position steering wheel, steering wheel turning force, and front wheel turning angle.
 - Steering wheel play: Refer to [ST-8, "Inspection"](#).
 - Neutral position steering wheel, steering wheel turning force, and front wheel turning angle: Refer to [ST-5, "Inspection"](#).
- Adjust neutral position of steering angle sensor. Refer to [BRC-59, "Work Procedure"](#).

SERVICE DATA AND SPECIFICATIONS (SDS)

< SERVICE DATA AND SPECIFICATIONS (SDS)

SERVICE DATA AND SPECIFICATIONS (SDS)

SERVICE DATA AND SPECIFICATIONS (SDS)

General Specifications

INFOID:0000000006827870

Steering gear model	R25N
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Steering Wheel Axial End Play and Play

INFOID:0000000006827871

Unit: mm (in)

Item	Standard
Steering wheel axial end play	0 (0)
Steering wheel play on the outer circumference	0 - 35 (0 - 1.38)

Steering Wheel Turning Force

INFOID:0000000006827872

Unit: N (kg-f, lb-f)

Item	Standard
Steering wheel turning force	36 (3.7, 8.09) or less

Steering Angle

INFOID:0000000006827873

Unit: Degree minute (Decimal degree)

Item	Standard	
Inner wheel	Minimum	37° 00' (37.0°)
	Nominal	40° 00' (40.0°)
	Maximum	41° 00' (41.0°)
Outer wheel	Nominal	33° 00' (33.0°)

Steering Column Operating Range

INFOID:0000000006827874

Tilt operating range*	40.0 mm (1.575 in)
Rotating torque	0 – 2.1 N·m (0 – 0.21 kg-m, 0 – 2 in-lb)
Steering column length*	438.5 – 440.5 mm (17.26 – 17.34 in)

*: For measuring position, refer to [ST-11, "Inspection"](#).

Rack Stroke

INFOID:0000000006827875

Unit: mm (in)

Item	Standard
Rack stroke neutral position	73 (2.87)

Ball Joint Swinging Force

INFOID:0000000006827876

Item	Standard	
Outer socket	Spring balance measurement*	6.0 – 58 N (0.61 – 5.9 kg-f, 1.35 – 13.03 lb-f)
Inner socket	Spring balance measurement*	4.3 – 43.1 N (0.44 – 4.39 kg-f, 0.97 – 9.68 lb-f)

*: For measuring position, refer to [ST-19, "Inspection"](#).

SERVICE DATA AND SPECIFICATIONS (SDS)

< SERVICE DATA AND SPECIFICATIONS (SDS)

Ball Joint Axial End Play

INFOID:000000006827877

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

Inner Socket Length

INFOID:000000006827878

Unit: mm (in)

Item	Standard
Rack neutral position, dimension	82.4 (3.244)