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SECTION **ST**

STEERING SYSTEM

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NOISE, VIBRATION AND HARSHNESS (NVH) TROUBLESHOOTING

< SYMPTOM DIAGNOSIS >

SYMPTOM DIAGNOSIS

NOISE, VIBRATION AND HARSHNESS (NVH) TROUBLESHOOTING

NVH Troubleshooting Chart

INFOID:000000009160088

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

Symptom	Steering	Possible cause and SUSPECTED PARTS													Reference									
		Fluid level	Air in hydraulic system	Outer/inner socket ball joint swinging torque	Outer/inner socket ball joint rotating torque	Outer/inner socket ball joint end play	Steering fluid leakage	Steering wheel play	Steering gear rack sliding force	Drive belt looseness	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	PROPELLER SHAFT	DIFFERENTIAL	AXLE and SUSPENSION	TIRE	ROAD WHEEL	DRIVE SHAFT	BRAKE
	Noise	x	x	x	x	x	x	x	x	x				x	x		x	x	x	x	x	x	x	ST-6, "Inspection" ST-6, "Inspection" This work is recommended to be performed by GT-R certified NISSAN dealer. This work is recommended to be performed by GT-R certified NISSAN dealer. This work is recommended to be performed by GT-R certified NISSAN dealer. ST-6, "Inspection" ST-8, "Inspection" This work is recommended to be performed by GT-R certified NISSAN dealer. EM-6, "Checking" ST-8, "Inspection" — ST-13, "Exploded View" This work is recommended to be performed by GT-R certified NISSAN dealer. ST-11, "Exploded View" ST-13, "Exploded View" NVH in DLN section. NVH in DLN section. NVH in FAX, RAX, FSU, RSU section. NVH in WT section. NVH in WT section. NVH in FAX, RAX section. NVH in BR section.
	Shake									x			x											
	Vibration												x	x										
	Shimmy												x	x		x				x	x			x
	Judder													x					x	x				x

x: Applicable

PRECAUTIONS

< PRECAUTION >

PRECAUTION

PRECAUTIONS

Precaution for Working Range at a Regular Dealership

INFOID:000000009180776

CAUTION:

The service items unmentioned on this manual are recommended to be performed by a GT-R certified NISSAN dealer. Because those service items require special equipment and a GT-R certified technical staff who completed special training.

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

INFOID:000000009160089

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 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 ignition ON or engine running, 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 ignition OFF, disconnect the battery, and wait at least 3 minutes before performing any service.

Precautions Necessary for Steering Wheel Rotation After Battery Disconnection

INFOID:000000009160090

CAUTION:

Comply with the following cautions to prevent any error and malfunction.

- Before removing and installing any control units, first turn the ignition switch to the LOCK position, then disconnect both battery cables.
- After finishing work, confirm that all control unit connectors are connected properly, then re-connect both battery cables.
- Always use CONSULT to perform self-diagnosis as a part of each function inspection after finishing work. If a DTC is detected, perform trouble diagnosis according to self-diagnosis results.

For vehicle with steering lock unit, if the battery is disconnected or discharged, the steering wheel will lock and cannot be turned.

If turning the steering wheel is required with the battery disconnected or discharged, follow the operation procedure below before starting the repair operation.

OPERATION PROCEDURE

1. Connect both battery cables.

PRECAUTIONS

< PRECAUTION >

NOTE:

Supply power using jumper cables if battery is discharged.

2. Turn the ignition switch to ACC position.
(At this time, the steering lock will be released.)
3. Disconnect both battery cables. The steering lock will remain released with both battery cables disconnected and the steering wheel can be turned.
4. Perform the necessary repair operation.
5. When the repair work is completed, re-connect both battery cables. With the brake pedal released, turn the ignition switch from ACC position to ON position, then to LOCK position. (The steering wheel will lock when the ignition switch is turned to LOCK position.)
6. Perform self-diagnosis check of all control units using CONSULT.

Precaution for Battery Service

INFOID:000000009160091

Before disconnecting the battery, lower both the driver and passenger windows. This will prevent any interference between the window edge and the vehicle when the door is opened/closed. During normal operation, the window slightly raises and lowers automatically to prevent any window to vehicle interference. The automatic window function will not work with the battery disconnected.

Service Notice or Precautions for Steering System

INFOID:000000009160092

- 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.

General Precautions

INFOID:000000009160093

CAUTION:

After finishing servicing, check that all the tools and waste are stored in a customary place.

PREPARATION

< PREPARATION >

PREPARATION

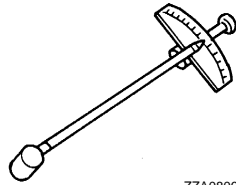
PREPARATION

Special Service Tools

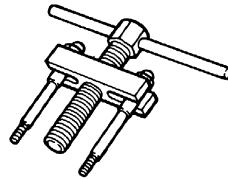
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The actual shapes of Kent-Moore tools may differ from those of special service tools illustrated here.

Tool number (Kent-Moore No.) Tool name	Description
ST3127S000 (J-25765-A) Preload gauge	Inspecting steering wheel turning torque, pinion rotating torque, and ball joint rotating torque
ST27180001 (J-25726-A) Steering wheel puller	Removing steering wheel



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POWER STEERING FLUID

< PERIODIC MAINTENANCE >

PERIODIC MAINTENANCE

POWER STEERING FLUID

Inspection

INFOID:000000009160096

FLUID LEVEL

1. Check fluid level with engine stopped.
2. Check that fluid level is between MIN and MAX.

CAUTION:

Adjust the fluid level to the R level (B) rather than the fluid level (A) in sports driving mode or in high road driving mode.

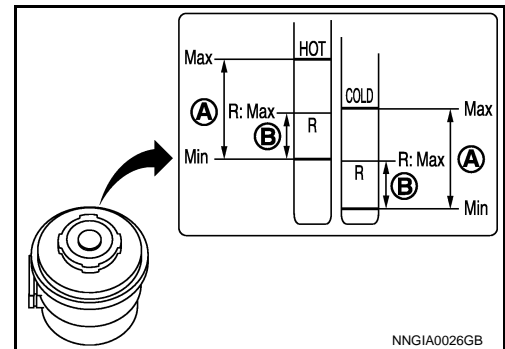
3. Fluid levels at HOT and COLD are different. Do not confuse them.

HOT : Fluid temperature 50 – 80°C (122 – 176°F)

COLD : Fluid temperature 0 – 30°C (32 – 86°F)

Recommended fluid : Refer to [MA-22, "Fluids and Lubricants"](#).

Fluid capacity : Refer to [ST-18, "General Specifications"](#).



CAUTION:

- The fluid level must not exceed the MAX line. Excessive fluid causes fluid leakage from the cap.
- Never reuse drained power steering fluid.

FLUID LEAKAGE

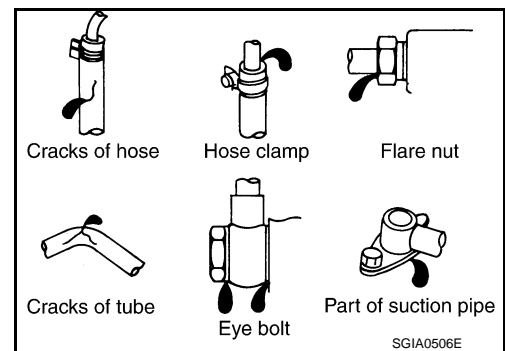
Check hydraulic connections for fluid leakage, cracks, damage, looseness, or wear.

1. Run the engine until the fluid temperature reaches 50 to 80°C (122 to 176°F) in reservoir tank, and keep engine speed idle.
2. Turn steering wheel several times from full left stop to full right stop.
3. Hold steering wheel at each lock position for five seconds and carefully check for fluid leakage.

CAUTION:

Never hold the steering wheel in a locked position for more than 10 seconds. (There is the possibility that power steering oil pump assembly may be damaged.)

4. If fluid leakage at connections occurs, loosen flare nut and then retighten. Do not overtighten connector as this can damage O-ring, washer and connector.
5. If fluid leakage from oil pump occurs, check oil pump. (This work is recommended to be performed by GT-R certified NISSAN dealer.)
6. Check steering gear boots for accumulation of fluid leakage from steering gear.



AIR BLEEDING HYDRAULIC SYSTEM

If air bleeding is not completed, the following symptoms can be observed.

- Bubbles are created in reservoir tank.
- Clicking noise can be heard from oil pump.
- Excessive buzzing in the oil pump.

NOTE:

Fluid noise may occur in the steering gear or oil pump. This does not affect performance or durability of the system.

1. Turn steering wheel several times from full left stop to full right stop with engine off.

CAUTION:

POWER STEERING FLUID

< PERIODIC MAINTENANCE >

Fill reservoir tank with a sufficient amount of fluid so that fluid level is not below the MIN line while turning steering wheel.

2. Start the engine and hold steering wheel at each lock position for 3 seconds at idle to check for fluid leakage.
3. Repeat step 2 above several times at approximately 3 seconds intervals.

CAUTION:

Never hold the steering wheel in a locked position for more than 10 seconds. (There is the possibility that oil pump may be damaged.)

4. Check fluid for bubbles and white contamination.
5. Stop the engine if bubbles or white contamination exist. Perform step 2 and 3 above after waiting until bubbles and white contamination disappear.
6. Stop the engine, and then check fluid level.

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STEERING WHEEL

< PERIODIC MAINTENANCE >

STEERING WHEEL

Inspection

INFOID:000000009160097

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-18, "Steering Wheel Axial End Play and Play"](#).

3. Check the following items if steering wheel axial end play is out of the standard.
 - Check the steering column assembly mounting condition. Refer to [ST-11, "Exploded View"](#).
 - Check steering gear assembly mounting condition for looseness. Refer to [ST-13, "Exploded View"](#).

STEERING WHEEL PLAY

1. Turn steering wheel so that front wheels come to the straight-ahead position.
2. Start the engine 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 : Refer to [ST-18, "Steering Wheel Axial End Play and Play"](#).

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

NEUTRAL POSITION STEERING WHEEL

1. Check 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-7, "Inspection"](#).
3. Set the vehicle to the straight-ahead position and check that the 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 TORQUE

1. Park the vehicle on a level and dry surface, apply parking brake.
2. Tires need to be inflated to the specified pressure. Refer to [WT-13, "Tire"](#).
3. Remove driver air bag module. Refer to [SR-11, "Exploded View"](#).
4. Start the engine.
5. Check that the power steering fluid is at the operating temperature.

Fluid temperature : 50 – 80°C (122 – 176°F)

STEERING WHEEL

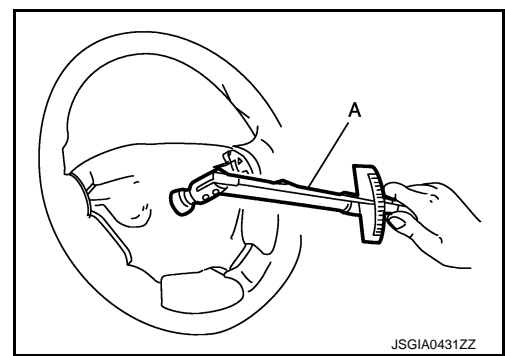
< PERIODIC MAINTENANCE >

6. Make sure that the reading is within the following specified range using preload gauge (A) [SST: ST3127S000 (J-25765-A)].

Steering wheel turning torque

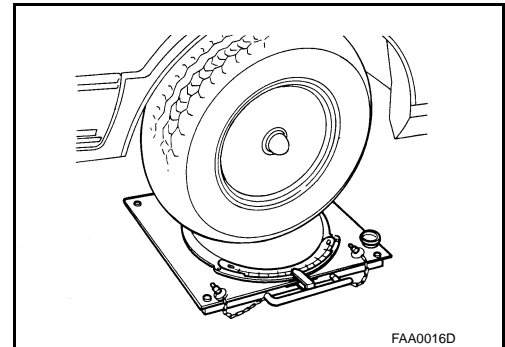
: Refer to [ST-18, "Steering Wheel Turning Torque"](#).

7. If steering wheel turning force is out of the specification, check rack sliding force and relief hydraulic pressure of oil pump. Regarding relief hydraulic pressure of oil pump.



FRONT WHEEL TURNING ANGLE

1. Check front wheel turning angle after toe-in inspection. Refer to [FSU-7, "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.



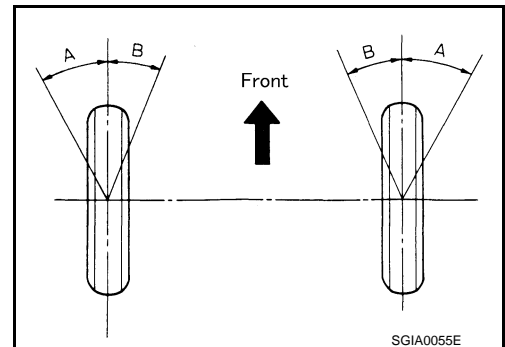
4. With the engine at idle, turn steering wheel from full left stop to full right stop and measure the turning angles.

Inner wheel (Angle: A)

: Refer to [ST-18, "EXCEPT TRACK PACK-SPECIFIC SUSPENSION : Steering Angle"](#) (Except track pack-specific suspension), [ST-18, "TRACK PACK-SPECIFIC SUSPENSION : Steering Angle"](#) (Track pack-specific suspension).

Outer wheel (Angle: B)

: Refer to [ST-18, "EXCEPT TRACK PACK-SPECIFIC SUSPENSION : Steering Angle"](#) (Except track pack-specific suspension), [ST-18, "TRACK PACK-SPECIFIC SUSPENSION : Steering Angle"](#) (Track pack-specific suspension).



STEERING WHEEL

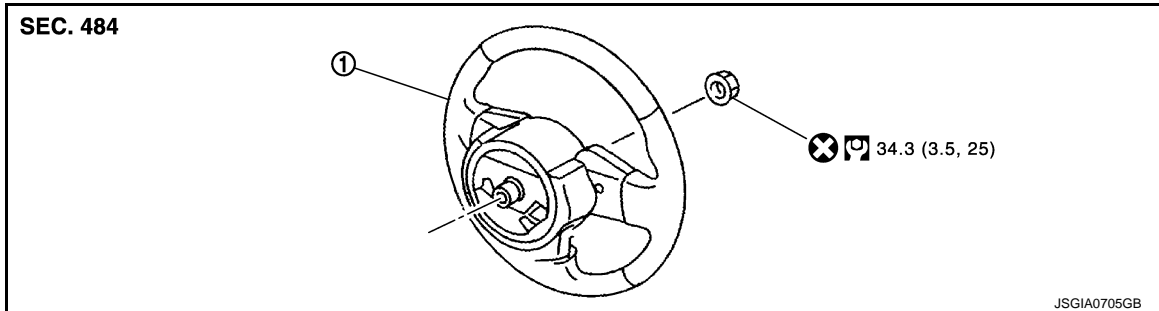
< REMOVAL AND INSTALLATION >

REMOVAL AND INSTALLATION

STEERING WHEEL

Exploded View

INFOID:000000009160098



1. Steering wheel

Refer to [GI-4, "Components"](#) for symbols in the figure.

Removal and Installation

INFOID:000000009160099

REMOVAL

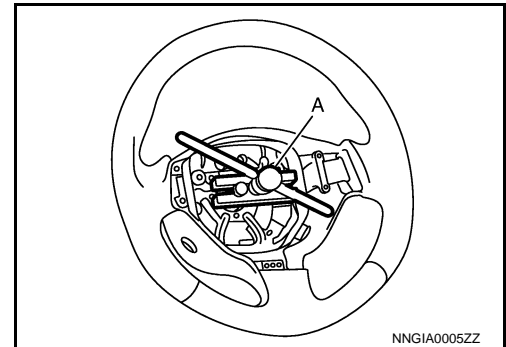
NOTE:

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

1. Set the vehicle to the straight-ahead position.
2. Remove driver air bag module. Refer to [SR-11, "Exploded View"](#).
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)].

NOTE:

Put paint marks on the steering wheel and the column shaft head for supporting accurate positioning during the installation procedure.



INSTALLATION

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

CAUTION:

Never twist spiral cable freely on excessively after it becomes tight (doing so may cause the cable to tear off).

NOTE:

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

- Never reuse steering wheel lock nut.

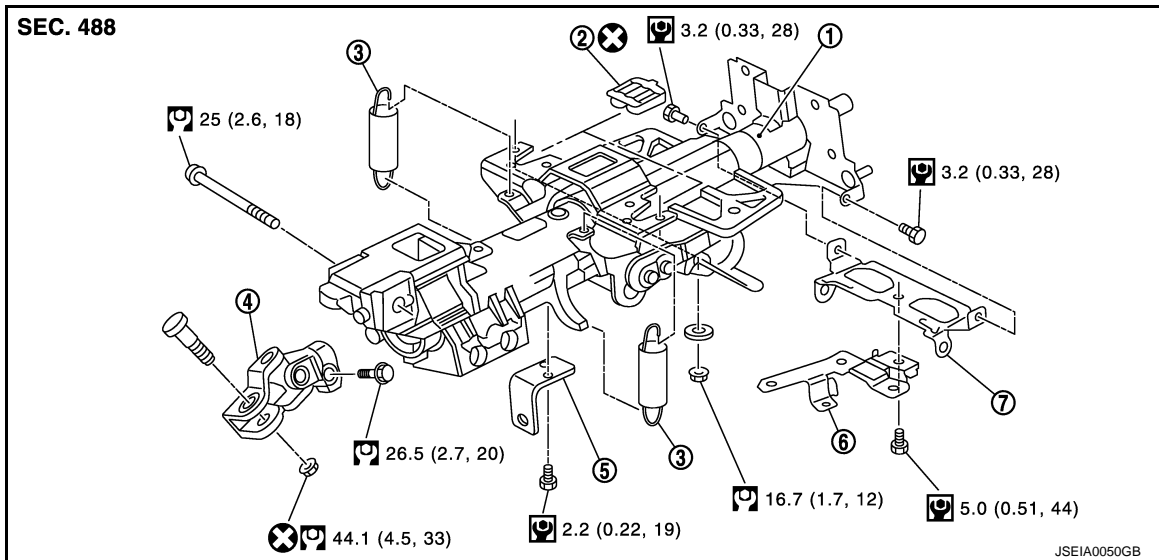
STEERING COLUMN

< REMOVAL AND INSTALLATION >

STEERING COLUMN

Exploded View

INFOID:000000009160100



- | | | |
|-----------------------------|----------------|------------|
| 1. Steering column assembly | 2. Slide plate | 3. Spring |
| 4. Upper joint | 5. Bracket | 6. Bracket |
| 7. Bracket | | |

Refer to [GI-4, "Components"](#) for symbols in the figure.

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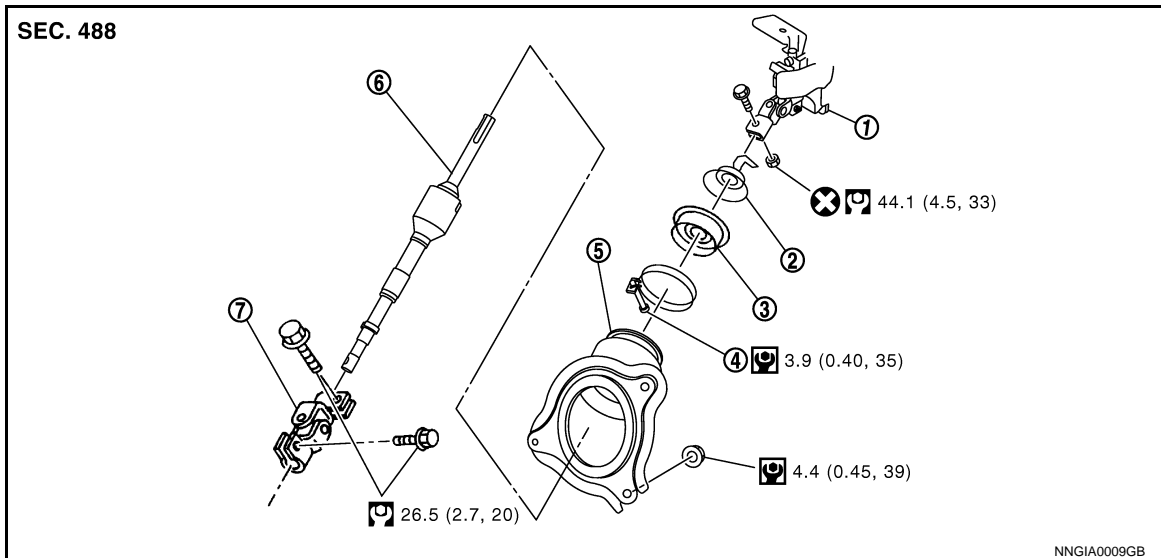
LOWER SHAFT

< REMOVAL AND INSTALLATION >

LOWER SHAFT

Exploded View

INFOID:000000009160103



- | | | |
|-----------------------------|---------------|--------------------|
| 1. Steering column assembly | 2. Collar | 3. Hole cover seal |
| 4. Clamp | 5. Hole cover | 6. Lower shaft |
| 7. Lower joint | | |

Refer to [GI-4, "Components"](#) for symbols in the figure.

STEERING GEAR AND LINKAGE

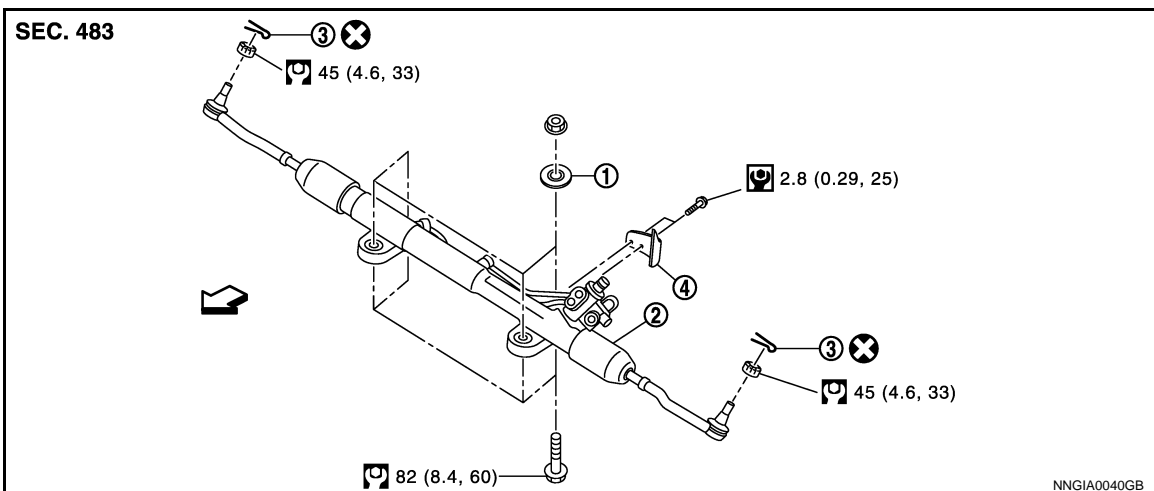
< REMOVAL AND INSTALLATION >

STEERING GEAR AND LINKAGE

Exploded View

INFOID:000000009160106

REMOVAL

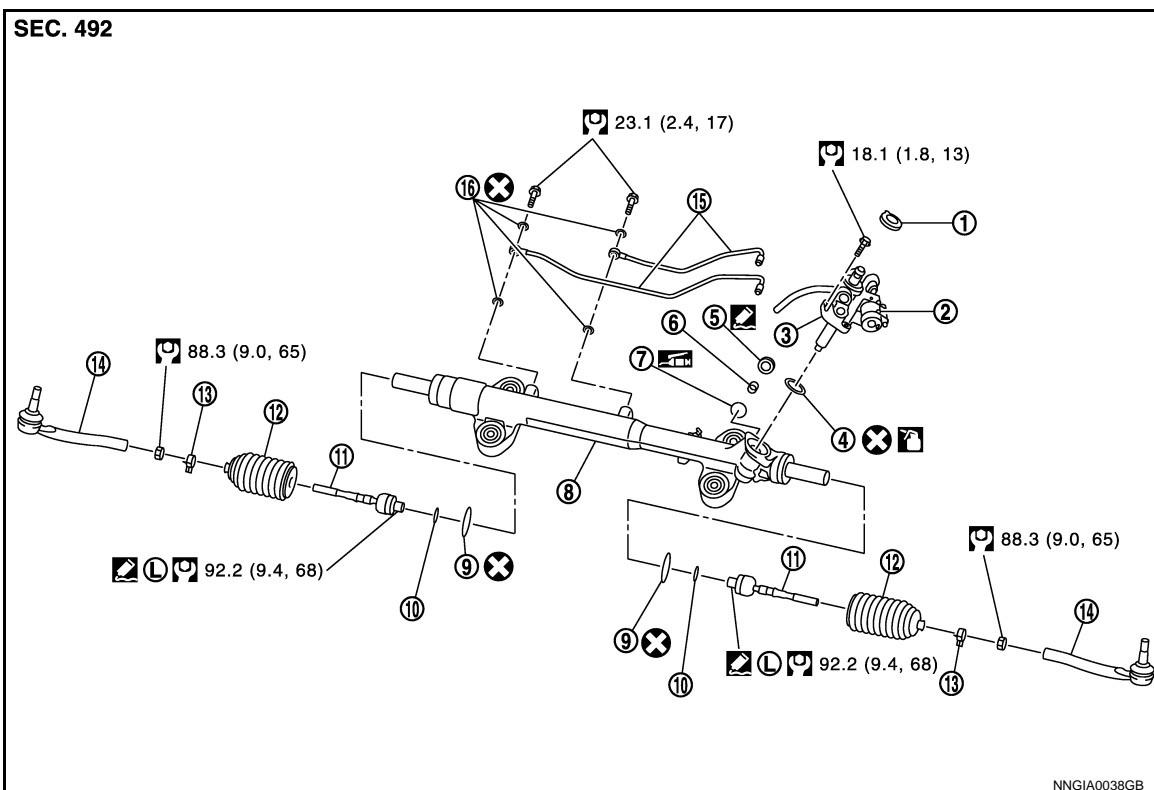


- 1. Spacer
- 2. Steering gear assembly
- 3. Cotter pin
- 4. Heat insulator

← Vehicle front

Refer to [GI-4. "Components"](#) for symbols in the figure.

DISASSEMBLY





- 1. Rear cover cap
- 2. Power steering solenoid valve
- 3. Gear-sub assembly
- 4. O-ring
- 5. Adjusting screw
- 6. Spring


STEERING GEAR AND LINKAGE


< REMOVAL AND INSTALLATION >

- | | | |
|-------------------|--------------------------|--------------------------------|
| 7. Retainer | 8. Gear housing assembly | 9. Boot clamp (stainless wire) |
| 10. Spacer | 11. Inner socket | 12. Boot |
| 13. Boot clamp | 14. Outer socket | 15. Cylinder tubes |
| 16. Copper washer | | |

: Apply power steering fluid.

: Apply Genuine High Performance Thread Sealant or equivalent. Refer to [GI-18, "Recommended Chemical Products and Sealants"](#).

 (L): Apply Genuine Medium Strength Thread Locking Sealant or equivalent. Refer to [GI-18, "Recommended Chemical Products and Sealants"](#).

: Apply multi-purpose grease.

Refer to [GI-4, "Components"](#) for symbols not described on the above.

POWER STEERING OIL PUMP

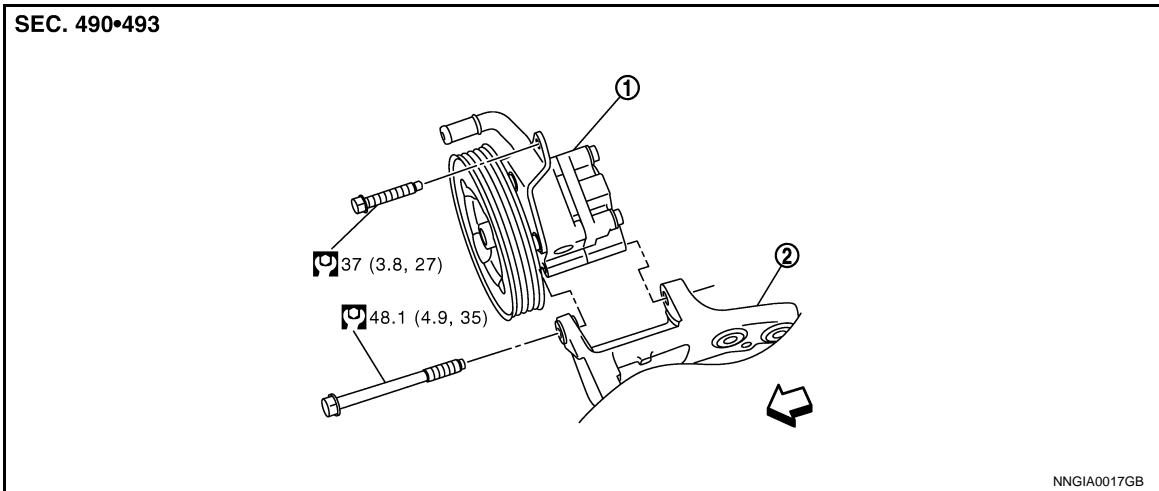
< REMOVAL AND INSTALLATION >

POWER STEERING OIL PUMP

Exploded View

INFOID:000000009160110

REMOVAL

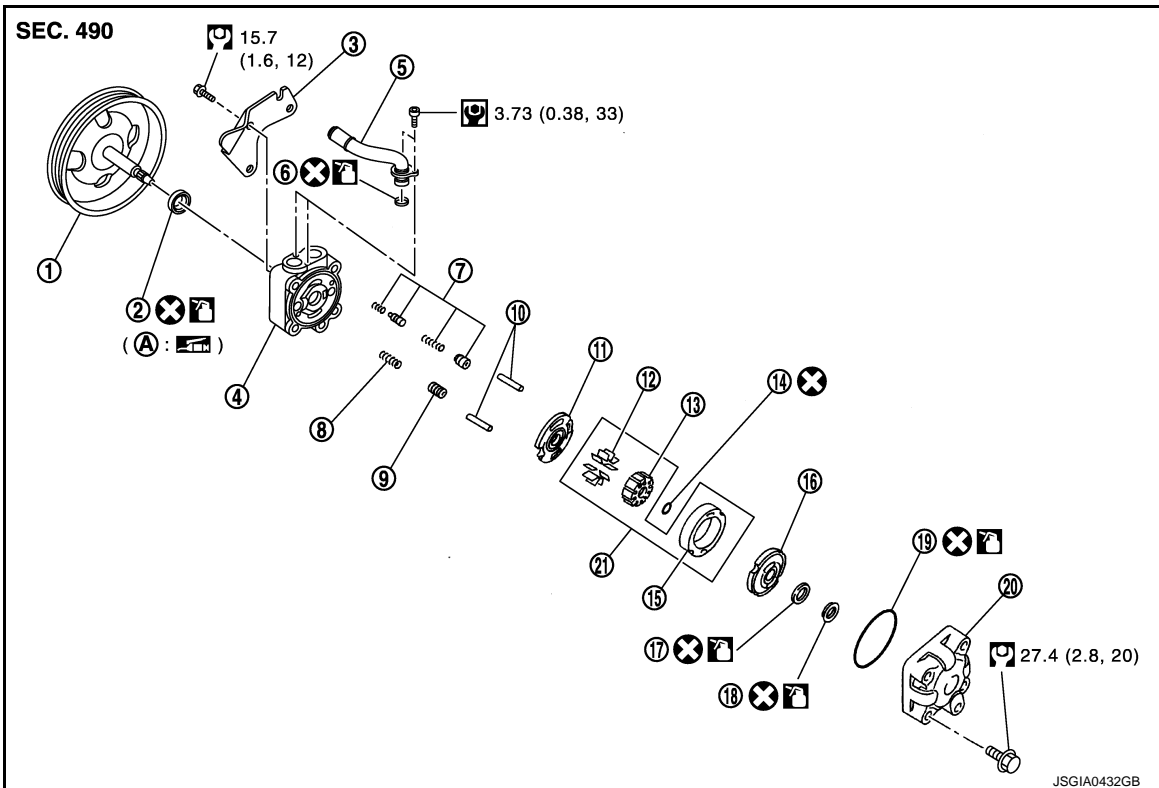


1. Power steering oil pump
2. Bracket

← Vehicle front

Refer to [GI-4. "Components"](#) for symbols in the figure.

DISASSEMBLY



- | | | |
|----------------------------------|------------------------------|-------------------------|
| 1. Pulley | 2. Oil seal | 3. Bracket |
| 4. Body assembly | 5. Suction pipe | 6. O-ring |
| 7. Flow control valve B assembly | 8. Flow control valve spring | 9. Flow control valve A |

POWER STEERING OIL PUMP

< REMOVAL AND INSTALLATION >

- | | | |
|---------------------|----------------------|-----------------|
| 10. Dowel pin | 11. Front side plate | 12. Vane |
| 13. Rotor | 14. Rotor snap ring | 15. Cam ring |
| 16. Rear side plate | 17. O-ring | 18. Teflon ring |
| 19. O-ring | 20. Rear cover | 21. Cartridge |
| A. Oil seal lip | | |



Apply power steering fluid.



Apply multi-purpose grease.

Refer to [GI-4, "Components"](#) for symbols not described on the above.

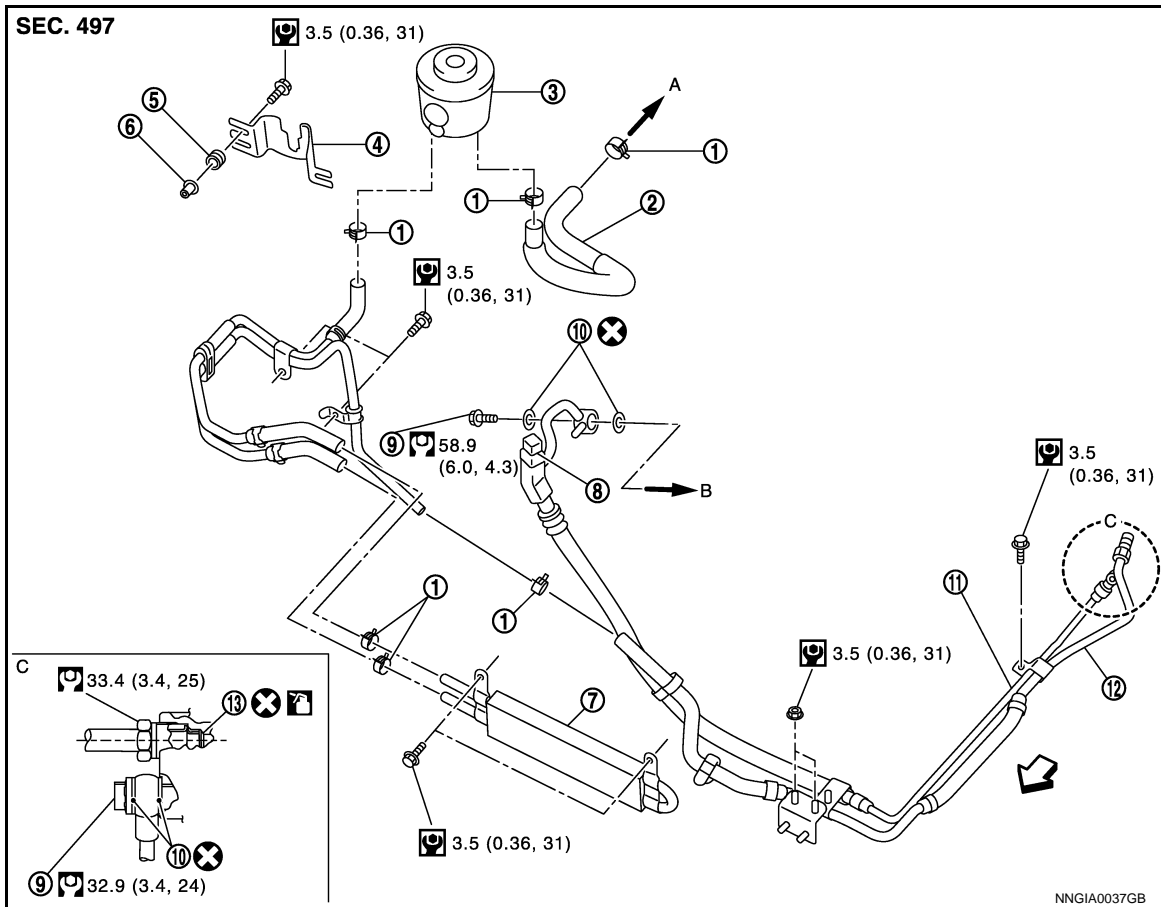
HYDRAULIC LINE

< REMOVAL AND INSTALLATION >

HYDRAULIC LINE

Exploded View

INFOID:000000009160114



- | | | |
|---------------------------|--------------------------|-------------------------|
| 1. Clamp | 2. Suction hose | 3. Reservoir tank |
| 4. Reservoir tank bracket | 5. Bushing | 6. Collar |
| 7. Oil cooler | 8. Pressure sensor | 9. Eye bolt |
| 10. Copper washer | 11. High pressure piping | 12. Low pressure piping |
| 13. O-ring | | |

- A. To power steering oil pump suction B. To power steering oil pump piping.

↔: Vehicle front

Refer to [GI-4. "Components"](#) for symbols in the figure.

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SERVICE DATA AND SPECIFICATIONS (SDS)

< SERVICE DATA AND SPECIFICATIONS (SDS)

SERVICE DATA AND SPECIFICATIONS (SDS)

SERVICE DATA AND SPECIFICATIONS (SDS)

General Specifications

INFOID:000000009160115

Steering gear model	PR26AF
Fluid capacity (Approx.) ℓ (US qt, Imp qt)	1.0 (1-1/8, 7/8)

Steering Wheel Axial End Play and Play

INFOID:000000009160116

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 Torque

INFOID:000000009160117

Unit: N·m (kg·m, in·lb)

Item	Standard
Steering wheel turning force	7.45 (0.76, 66)

EXCEPT TRACK PACK-SPECIFIC SUSPENSION

EXCEPT TRACK PACK-SPECIFIC SUSPENSION : Steering Angle

INFOID:000000009160118

Unit: Degree minute (Decimal degree)

	Item	Standard
Inner wheel	Minimum	34° 15' (34.25°)
	Nominal	36° 45' (36.75°)
	Maximum	39° 15' (39.25°)
Outer wheel	Minimum	28° 25' (28.42°)
	Nominal	30° 55' (30.92°)
	Maximum	33° 25' (33.41°)

TRACK PACK-SPECIFIC SUSPENSION

TRACK PACK-SPECIFIC SUSPENSION : Steering Angle

INFOID:000000009160119

Unit: Degree minute (Decimal degree)

	Item	Standard
Inner wheel	Minimum	34° 10' (34.17°)
	Nominal	36° 40' (36.67°)
	Maximum	39° 10' (39.16°)
Outer wheel	Minimum	28° 25' (28.42°)
	Nominal	30° 55' (30.92°)
	Maximum	33° 25' (33.41°)