

**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:000000004204006

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 in hydraulic system	Outer socket ball joint swinging force	Outer socket ball joint rotating torque	Outer socket ball joint end play	Steering fluid leakage	Steering wheel play	Steering gear rack sliding force	Drive belt looseness	Improper steering wheel		Mounting rubber deterioration	Steering column deformation or damage	Improper installation or looseness of steering column	Steering linkage looseness	WHEEL HUB	AXLE and SUSPENSION	TIRES	ROAD WHEEL	DRIVE SHAFT	BRAKES
	Noise	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	ST-8
	Shake																					—
	Vibration																					ST-28
	Shimmy																					ST-28
	Shudder																					ST-8
																						ST-10
																						ST-28
																						EM-16, "Checking Drive Belts" (QR25DE), EM-121, "Checking Drive Belts" (VQ35DE)
																						—
																						ST-17
																						ST-27
																						ST-14, "Removal and Installation"
																						ST-17
																						Refer to FAX-2, "NVH Troubleshooting Chart"
																						Refer to FSU-2, "NVH Troubleshooting Chart"
																						Refer to WT-61, "NVH Troubleshooting Chart"
																						Refer to WT-61, "NVH Troubleshooting Chart"
																						Refer to FAX-2, "NVH Troubleshooting Chart"
																						Refer to BR-6, "NVH Troubleshooting Chart"

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# PRECAUTIONS

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## PRECAUTION

### PRECAUTIONS

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

INFOID:000000004204007

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 SR 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 SR 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.

#### Necessary for Steering Wheel Rotation after Battery Disconnect

INFOID:000000004204008

#### **NOTE:**

- Before removing and installing any control units, first turn the push-button 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-III 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.

This vehicle is equipped with a push-button ignition switch and a 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 procedure below before starting the repair operation.

#### OPERATION PROCEDURE

1. Connect both battery cables.

#### **NOTE:**

Supply power using jumper cables if battery is discharged.

2. Carry the Intelligent Key or insert it to the key slot and turn the push-button 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 push-button ignition switch from ACC position to ON position, then to LOCK position. (The steering wheel will lock when the push-button ignition switch is turned to LOCK position.)
6. Perform self-diagnosis check of all control units using CONSULT-III.

#### General Precautions

INFOID:000000004204009

#### Service Notice or Precautions

INFOID:000000004204010

- In case of removing steering gear assembly, make the final tightening with grounded and unloaded vehicle condition, and then check wheel alignment.

# PRECAUTIONS

## < PRECAUTION >

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- Observe the following precautions when disassembling.
- Before disassembly, thoroughly clean the outside of the unit. A
- 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. B
- Use nylon cloth or paper towels to clean the parts; common shop rags can leave lint that might interfere with their operation.
- Do not reuse non-reusable parts.
- Before assembling, apply the specified grease to the directed parts. C

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# PREPARATION

< PREPARATION >

## PREPARATION

### PREPARATION

#### Special Service Tool

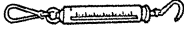
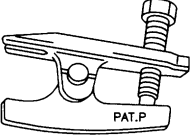
INFOID:000000004204011

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

Tool number (Kent-Moore No.) Tool name	Description
ST27180001 (J-25726-A) Steering wheel puller <div style="text-align: center;"> </div>	Removing steering wheel
ST3127S000 (See J-25765-A) Preload gauge 1. GG9103000 (J-25765-A) Torque wrench 2. HT62940000 ( - ) Socket adapter 3. HT62900000 ( - ) Socket adapter <div style="text-align: center;"> </div>	Inspecting of rotating torque for ball joint
KV48103500 (J-26357) Pressure gauge <div style="text-align: center;"> </div>	Measuring oil pump relief pressure
KV48102500 (J-33914) Pressure gauge adapter <div style="text-align: center;"> </div>	Measuring oil pump relief pressure

# PREPARATION

## < PREPARATION >

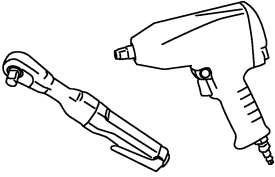
Tool number (Kent-Moore No.) Tool name	Description
— (J-44372) Spring gauge   LST024	Measuring steering wheel turning force or rack sliding force
HT72520000 (J-25730-A) Ball joint remover   PAT.P  NT146	Removing ball joint

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## Commercial Service Tool

INFOID:000000004204012

**ST**

Tool number Tool name	Description
Power tool   PBIC0190E	<ul style="list-style-type: none"> <li>• Removing wheel nuts</li> <li>• Removing undercover</li> </ul>

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# POWER STEERING FLUID

< ON-VEHICLE MAINTENANCE >

## ON-VEHICLE MAINTENANCE

### POWER STEERING FLUID

#### Inspection

INFOID:000000004204013

#### FLUID LEVEL

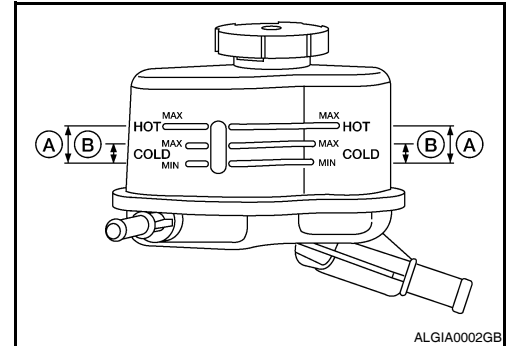
- Check fluid level with engine stopped.
- Make sure that fluid level is between MIN and MAX.
- Fluid levels at HOT (A) and COLD (B) are different. Do not confuse them.

**HOT (A) : Fluid temperature 50 - 80 °C (122 - 176°F)**

**COLD (B) : Fluid temperature 0 - 30°C (32 - 86°F)**

#### CAUTION:

- The fluid level should not exceed the MAX line. Excessive fluid will cause fluid leakage from the cap.
- Do not reuse drained power steering fluid.
- Recommended fluid is Genuine Nissan PSF or equivalent.



#### FLUID LEAKAGE

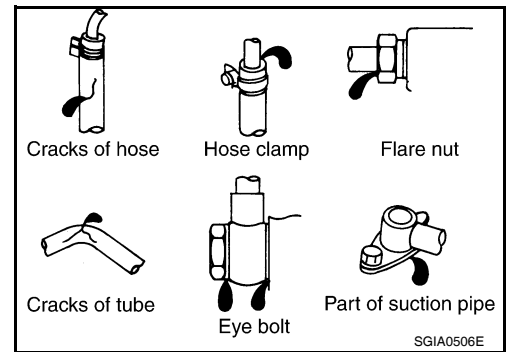
Check hydraulic connections for fluid leakage, cracks, damage, looseness, or wear.

1. Run 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:

**Do not hold the 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 overtighten connector as this can damage O-ring, washer and connector.
5. If fluid leakage from oil pump is noticed, check oil pump. Refer to [ST-31](#) (QR25DE), [ST-31](#) (VQ35DE).
6. Check steering gear boots for accumulation of fluid indicating from steering gear.



#### Draining

INFOID:000000004204014

1. Disconnect both high and low pressure lines from power steering gear.
2. Drain into a suitable container.

#### Refilling

INFOID:000000004204015

#### FILLING HYDRAULIC SYSTEM

1. Fill power steering reservoir while checking fluid level.
2. Bleed air from hydraulic system.
3. Check for fluid leaks.

#### AIR BLEEDING HYDRAULIC SYSTEM

If air bleeding is not complete, 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:



## POWER STEERING FLUID

### < ON-VEHICLE MAINTENANCE >

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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:**

**Turn steering wheel while filling reservoir tank with fluid so as not to lower fluid level below the MIN line.**

2. Start 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 second intervals.

**CAUTION:**

**Do not 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 engine if bubbles and white contamination do not drain out. Perform step 2 and 3 above after waiting until bubbles and white contamination drain out.
6. Stop the engine, and then check fluid level.

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# STEERING WHEEL

< ON-VEHICLE MAINTENANCE >

## STEERING WHEEL

### Inspection

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#### INSTALLATION CONDITION

- Check installation conditions of steering gear assembly, front suspension assembly, axle and steering column assembly.
- 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 : 0 mm (0 in)**

- Check steering gear assembly bolts and nut for looseness. Refer to [ST-17, "Exploded View"](#).

#### STEERING WHEEL PLAY

- Turn steering wheel so that front wheels come to the straight-ahead position. Start engine and lightly turn steering wheel to the left and right until front wheels start to move. Measure steering wheel movement on the outer circumference.

**Steering wheel play : 0 - 35 mm (0 - 1.38 in)**

- When the measurement value is outside the standard value, check backlash for each joint of steering column assembly and installation condition of steering gear assembly.

#### NEUTRAL POSITION OF STEERING WHEEL

- Make sure that steering gear assembly, steering column assembly and steering wheel are installed in the correct position.
- Perform neutral position inspection after wheel alignment. Refer to [FSU-7, "Inspection and Adjustment"](#).
- Set vehicle to the straight-ahead position and confirm steering wheel is in the neutral position.
- 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.

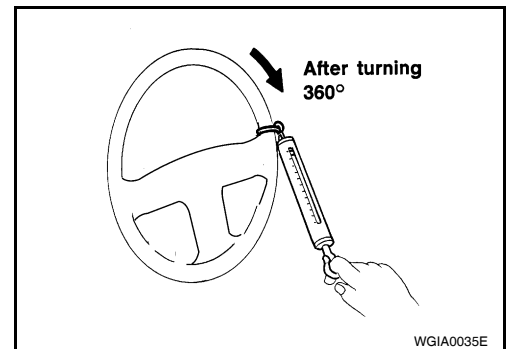
#### STEERING WHEEL TURNING FORCE

1. Park vehicle on a level, dry surface and set parking brake.
2. Start engine.
3. Bring power steering fluid up to adequate operating temperature. Make sure the fluid temperature is approximately 60° to 80°C (140° to 176°F).  
Tires need to be inflated to normal pressure.
4. Check steering wheel turning force using tool when steering wheel has been turned 360° from the neutral position.

**Tool number : — (J-44372)**

**Steering wheel turning force : 39 N (4 kg-f, 9 lb-f) or less**

5. If steering wheel turning force is out of specification, check rack sliding force. Refer to [ST-28, "Inspection"](#).
6. If rack sliding force is not within specifications, adjust rack sliding force. Refer to [ST-28, "Inspection"](#).
7. If rack sliding force is OK, inspect steering column. Refer to [ST-14, "Removal and Installation"](#).

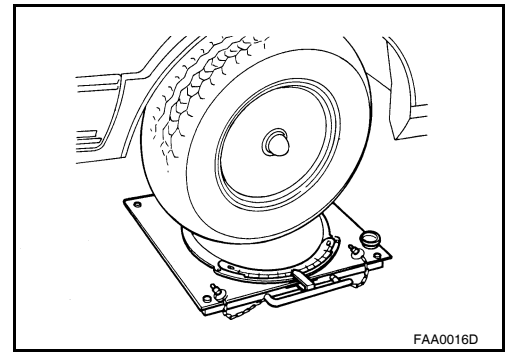


#### FRONT WHEEL TURNING ANGLE

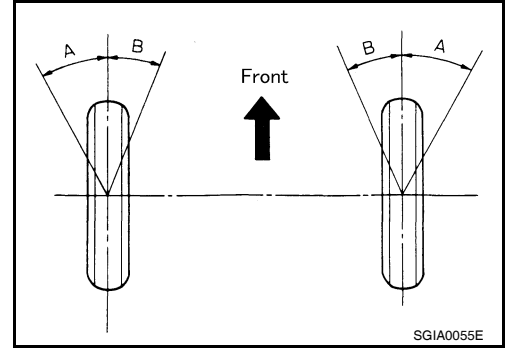
# STEERING WHEEL

## < ON-VEHICLE MAINTENANCE >

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



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

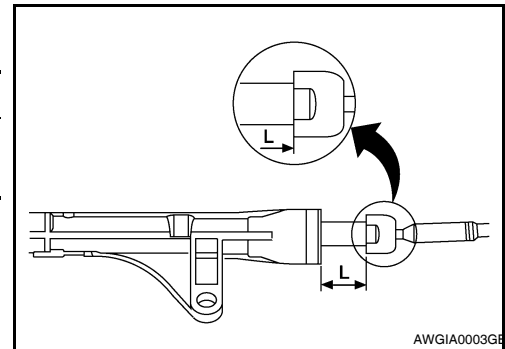


Unit: Degree minute (Decimal Degree)

Tire size		P215/60R16	P215/55R17	P235/45R18
Inner wheel (Angle: A)	Minimum	35° 30' (35.5°)	33° 30' (33.5°)	32° (32.0°)
	Nominal	38° 30' (38.5°)	36° 30' (36.5°)	35° (35.0°)
	Maximum	39° 30' (39.5°)	37° 30' (37.5°)	36° (36.0°)
Outer wheel (Angle: B)	Nominal	31° 30' (31.5°)	30° 30' (30.5°)	29° 30' (29.5°)

- Measure rack stroke if angles are outside the specified value.

Tire	P215/60R16	P215/55R17	P235/45R18
Rack stroke "L"	71.5 mm (2.815 in)	69.0 mm (2.717 in)	66.5 mm (2.618 in)



# POWER STEERING OIL PUMP

< ON-VEHICLE MAINTENANCE >

## POWER STEERING OIL PUMP

### Inspection

INFOID:000000004204017

#### RELIEF OIL PRESSURE

##### CAUTION:

Make sure that belt tension is normal before starting the following procedure.

1. Connect the Tool between oil pump discharge connector and high-pressure hose. Bleed air from the hydraulic circuit while opening valve fully. Refer to [ST-8, "Inspection"](#).

**Tool numbers** : KV48103500 (J-26357),  
KV48102500 (J-33914)

2. Start engine. Run engine until oil temperature reaches 50° to 80°C (122° to 176°F).

##### CAUTION:

- Leave the valve of the hydraulic pressure gauge [SST] fully open while starting and running engine. If engine is started with the valve closed, the hydraulic pressure in oil pump goes up to the relief pressure along with unusual increase of oil temperature.
- Be sure to keep hose clear of belts and other parts when engine is started.

3. Fully close the Tool valve with engine at idle and measure the relief oil pressure.

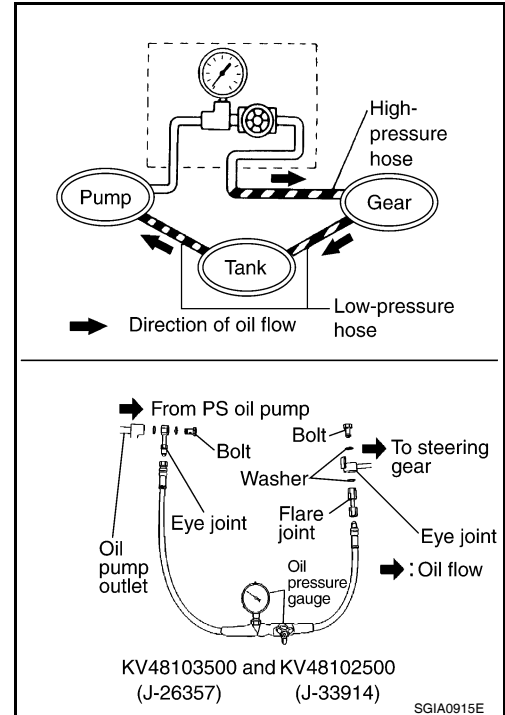
**Relief oil pressure:**

**8,520 - 9,320 kpa (86.9 - 95.1 kg/cm<sup>2</sup>, 1,235 - 1,351 psi)**

##### CAUTION:

Never keep valve closed for 10 seconds or longer.

4. Open the valve slowly after measuring. Replace oil pump is the relief oil pressure is outside the standard.
5. After inspection, disconnect the Tool from hydraulic circuit, then add fluid and bleed air. Refer to [ST-8, "Inspection"](#).



# STEERING WHEEL

< ON-VEHICLE REPAIR >

## ON-VEHICLE REPAIR

### STEERING WHEEL

#### Removal and Installation

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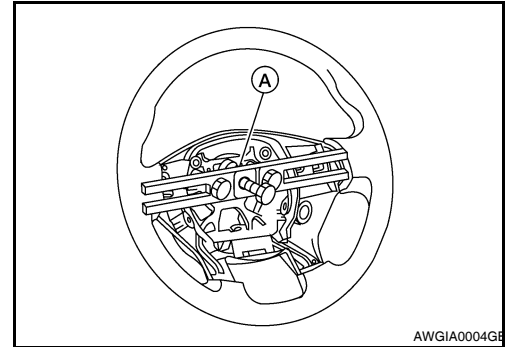
#### REMOVAL

##### 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-5, "Removal and Installation"](#).
3. Remove steering wheel lock nut after steering is locked.
4. Remove steering wheel using Tool (A).

Tool number A: [ST27180001 \(J-25726-A\)](#)



#### INSTALLATION

Installation is in the reverse order of removal.

##### NOTE:

Align the spiral cable. Refer to [SR-8, "Removal and Installation"](#).

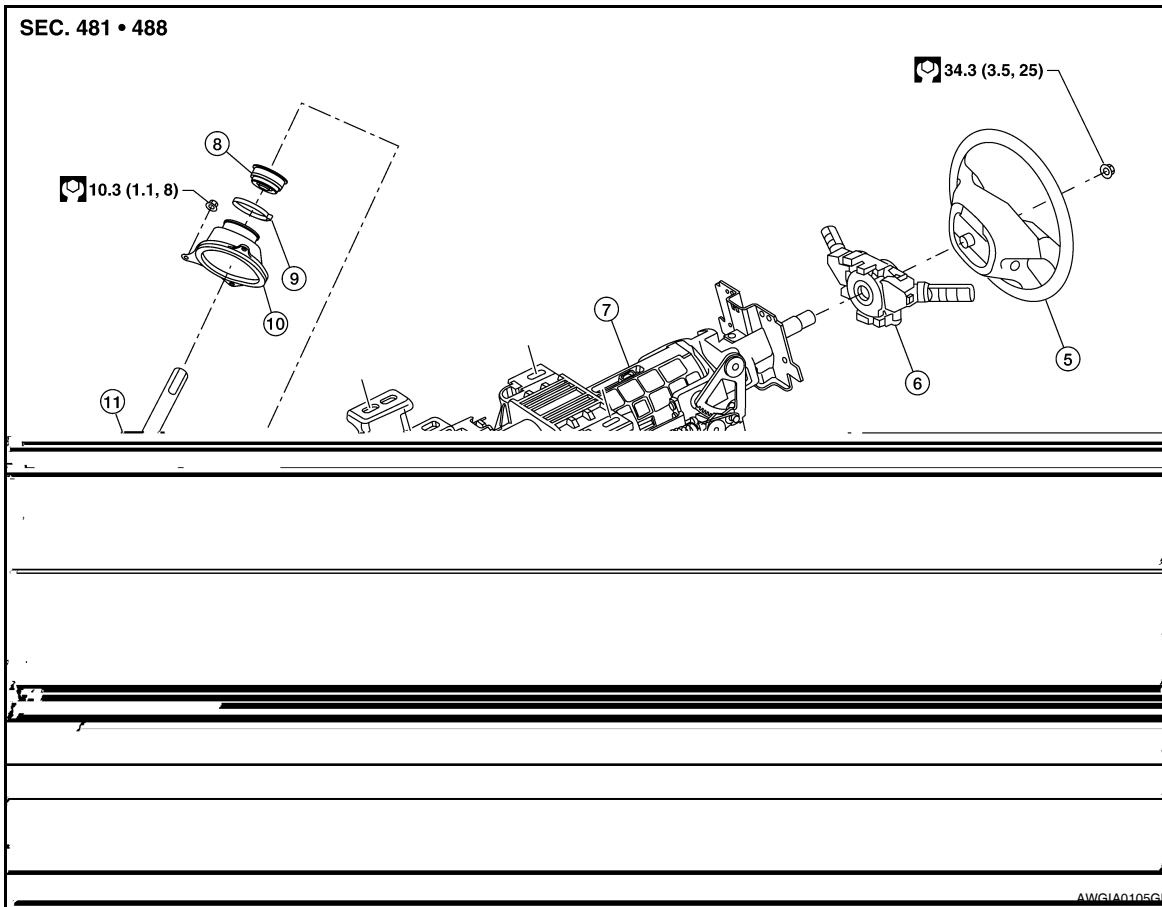
# STEERING COLUMN

< ON-VEHICLE REPAIR >

## STEERING COLUMN

### Exploded View

INFOID:000000004513205



- |  |                          |  |
|--|--------------------------|--|
| 1-4. Steering column assembly nut tightening order | 5. Steering wheel        | 6. Combination switch and spiral cable |
| 7. Steering column assembly                        | 8. Hole cover seal       | 9. Herbie clip                         |
| 10. Hole cover                                     | 11. Lower shaft assembly |  |

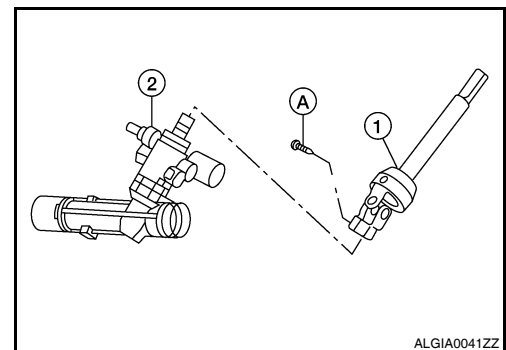
## Removal and Installation

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### REMOVAL

Hole Cover Seal, Hole Cover and Lower Shaft Assembly

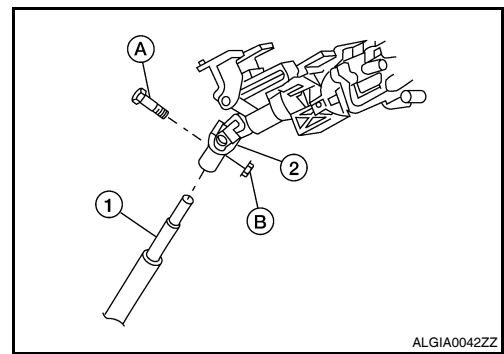
1. Set wheels to the straight-ahead position.
  - Steering gear (2)
2. Remove lower side bolt (A) of lower shaft assembly (1).



# STEERING COLUMN

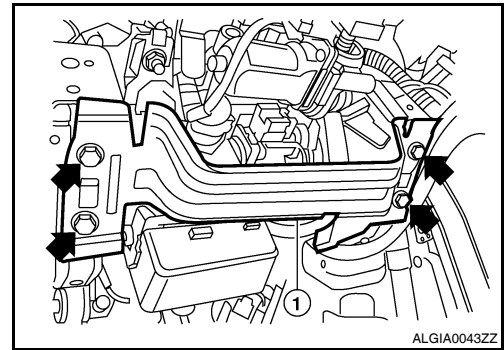
## < ON-VEHICLE REPAIR >

3. Remove bolt (A) and nut (B) of column upper joint (2), then remove lower shaft assembly (1).
4. Loosen herbie clip, then remove hole cover seal from hole cover.
5. Remove nuts of hole cover, and then remove clamp and hole cover from dash panel.

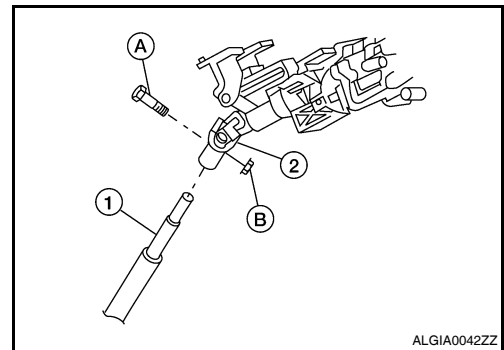


### Steering Column Assembly

1. Set wheels to the straight-ahead position.
2. Remove driver air bag module. Refer to [SR-5. "Removal and Installation"](#).
3. Remove steering wheel. Refer to [ST-13. "Removal and Installation"](#).
4. Remove instrument lower cover (LH). Refer to [IP-11. "Exploded View"](#).
5. Remove knee protector bolts, then remove knee protector (1). Refer to [IP-11. "Exploded View"](#).
6. Remove steering column cover (upper and lower). Refer to [IP-11. "Exploded View"](#).
7. Remove combination switch and spiral cable. Refer to [SR-8. "Removal and Installation"](#).
8. Disconnect each switch connector installed to steering column assembly, and then disconnect harness from steering column assembly.



- Lower shaft assembly (1)
9. Remove bolt (A) and nut (B) of column upper joint (2).
  10. Remove steering column assembly and nuts, then remove steering column assembly.



## INSPECTION AFTER REMOVAL

### Hole Cover Seal, Hole Cover and Lower Shaft Assembly

Check each part of hole cover seal, hole cover and steering column and lower shaft assembly for damage or other malfunctions. Replace if necessary.

### Steering Column Assembly

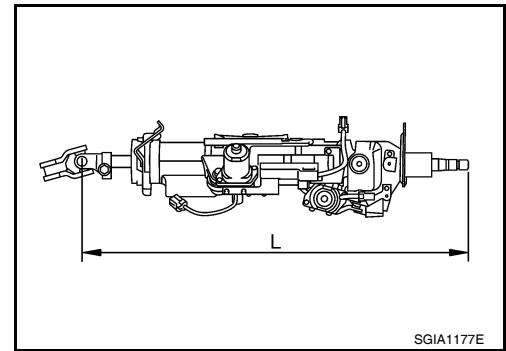
- Check each part of steering column assembly for damage or other malfunctions. Replace entire steering column assembly if any parts are damaged.

# STEERING COLUMN

## < ON-VEHICLE REPAIR >

- Measure the length (L) as shown if vehicle has been involved in a minor collision. Replace steering column assembly if outside the specifications.

**Steering column length (L)** : Refer to [ST-32, "Steering Column"](#)



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

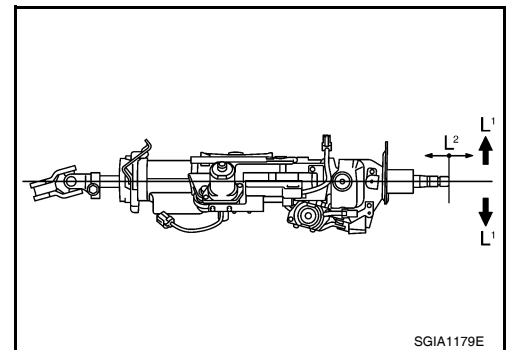
**Tool number** : [ST3127S000 \(J-25765-A\)](#)

**Rotating torque** : Refer to [ST-32, "Steering Column"](#)

- Check tilt and telescopic mechanism operating range ( $L^1$ ), ( $L^2$ ) as shown.

**Tilt operating range ( $L^1$ )** : Refer to [ST-32, "Steering Column"](#)

**Telescopic operating range ( $L^2$ )** : Refer to [ST-32, "Steering Column"](#)



## INSTALLATION

### Steering Column Assembly

Installation is in the reverse order of removal.

### Hole Cover Seal, Hole Cover and Lower Shaft Assembly

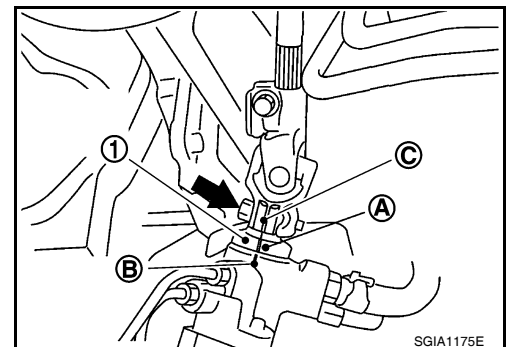
Installation is in the reverse order of removal.

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

#### NOTE:

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

- Align rear cover cap projection (A) with the marking position (B) of gear housing assembly.
- Install slit part of lower shaft assembly (C) aligning with the projection (A) of rear cover cap (1). Make sure that the slit part of lower shaft assembly (C) is aligned with both the projection (A) of rear cover cap (1) and the marking position (B) of gear housing assembly.
- 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-16, "Wheel Alignment \(Unladen\\*\)"](#).





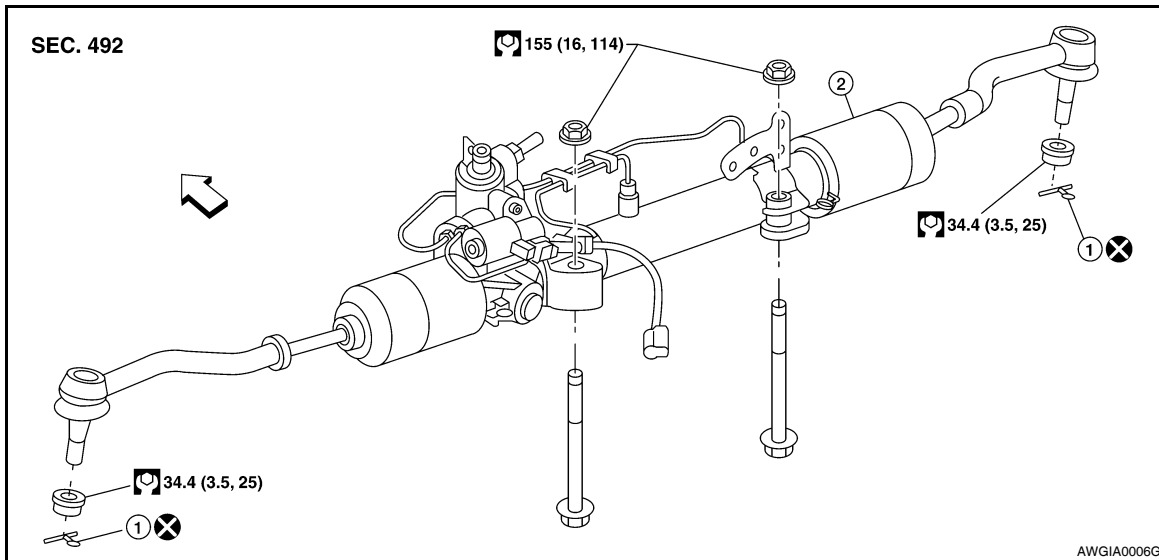
# STEERING GEAR AND LINKAGE

< ON-VEHICLE REPAIR >

## STEERING GEAR AND LINKAGE

### Exploded View

INFOID:000000004204021



1. Cotter pin

2. Steering gear assembly

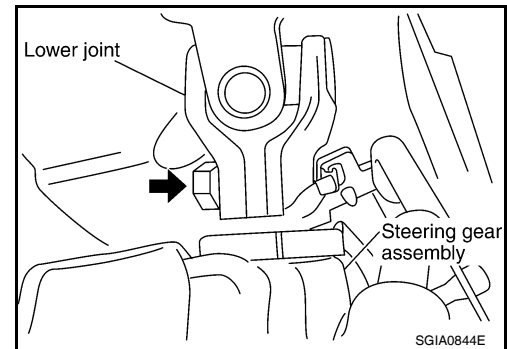
← Front

### Removal and Installation

INFOID:000000004204022

#### REMOVAL

1. Remove the front tires.
2. Remove undercover using power tool.
3. Remove lower side bolt of lower joint.



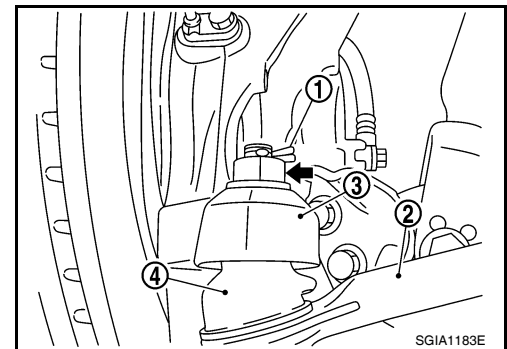
4. Remove cotter pin (1), and then loosen the nut.
5. Remove steering outer socket (2) from steering knuckle (3) so as not to damage ball joint boot (4) using the Tool.

#### CAUTION:

Temporarily tighten the nut to prevent damage to threads and to prevent the Tool from suddenly coming off.

**Tool number** : HT72520000 (J-25730-A)

6. Remove high and low pressure piping of hydraulic piping, and then drain power steering fluid. Refer to [ST-8, "Draining"](#).
7. Remove steering hydraulic piping bracket from front suspension member.
8. Remove SSPS valve harness connector. Refer to [ST-28, "Exploded View"](#).
9. Remove bolts and nuts of steering gear assembly, and then remove steering gear assembly from vehicle.



## STEERING GEAR AND LINKAGE

< ON-VEHICLE REPAIR >

### INSPECTION AFTER REMOVAL

Check for fluid leaks or damage to steering gear. If any exist, replace steering gear as an assembly.

### INSTALLATION

Installation is in the reverse order of removal. For tightening specifications, refer to [ST-17, "Exploded View"](#).

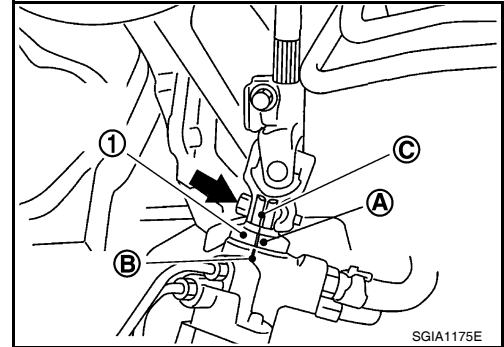
- When installing lower joint to steering gear assembly, follow the procedure listed below.

- Set rack of steering gear in the neutral position.

#### NOTE:

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

- Align rear cover cap projection (A) with the marking position (B) of gear housing assembly.
- Install slit part of lower joint (C) aligning with the projection (A) of rear cover cap (1). Make sure that the slit part of lower joint (C) is aligned with both the projection (A) of rear cover cap (1) and the marking position (B) of gear housing assembly.
- After installation, bleed air from the steering hydraulic system. Refer to [ST-8, "Inspection"](#).
- 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-7, "Inspection and Adjustment"](#).



### INSPECTION AFTER INSTALLATION

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

# POWER STEERING OIL PUMP

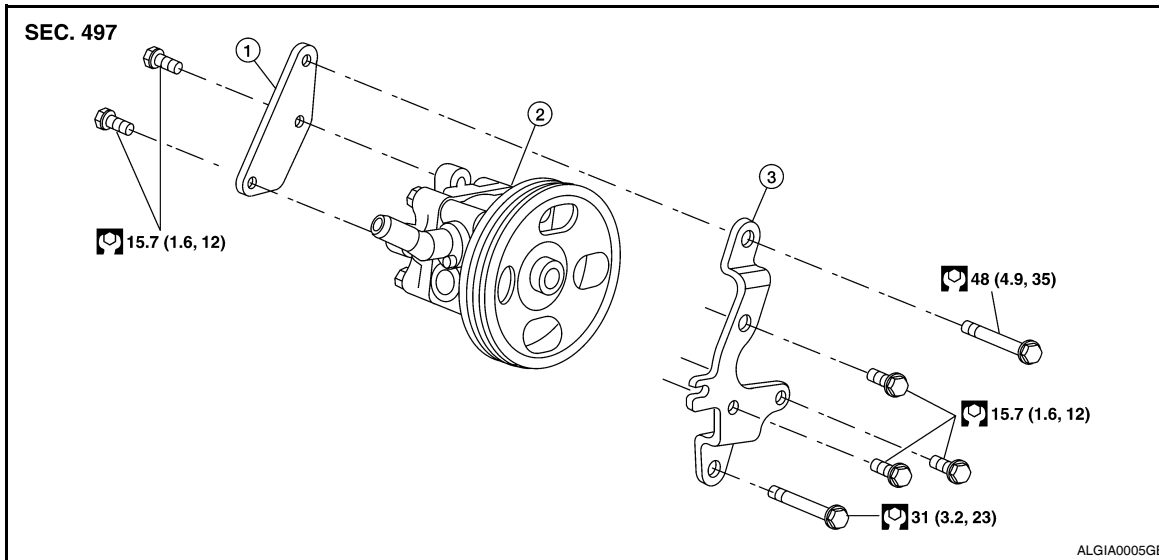
< ON-VEHICLE REPAIR >

## POWER STEERING OIL PUMP

QR25DE

QR25DE : Exploded View

INFOID:000000004204023



1. Rear bracket

2. Pump assembly

3. Front bracket

## QR25DE : Removal and Installation

INFOID:000000004204024

### REMOVAL

1. Drain power steering fluid from reservoir tank.
2. Remove undercover using power tool.
3. Loosen drive belt. Refer to [EM-16, "Removal and Installation"](#).
4. Remove drive belt from oil pump pulley.
5. Remove piping of high pressure and low pressure (drain fluid from pipings). Refer to [ST-21, "QR25DE : Exploded View"](#).
6. Remove oil pump bolts, and then remove power steering oil pump. Refer to [ST-19, "QR25DE : Exploded View"](#).

### INSPECTION AFTER REMOVAL

### INSTALLATION

Installation is in the reverse order of removal. For tightening specifications, refer to [ST-19, "QR25DE : Exploded View"](#).

- Perform the following procedure after installing.
  - For the installation of drive belt, refer to [EM-16, "Tension Adjustment"](#).
  - Bleed air. Refer to [ST-8, "Inspection"](#).

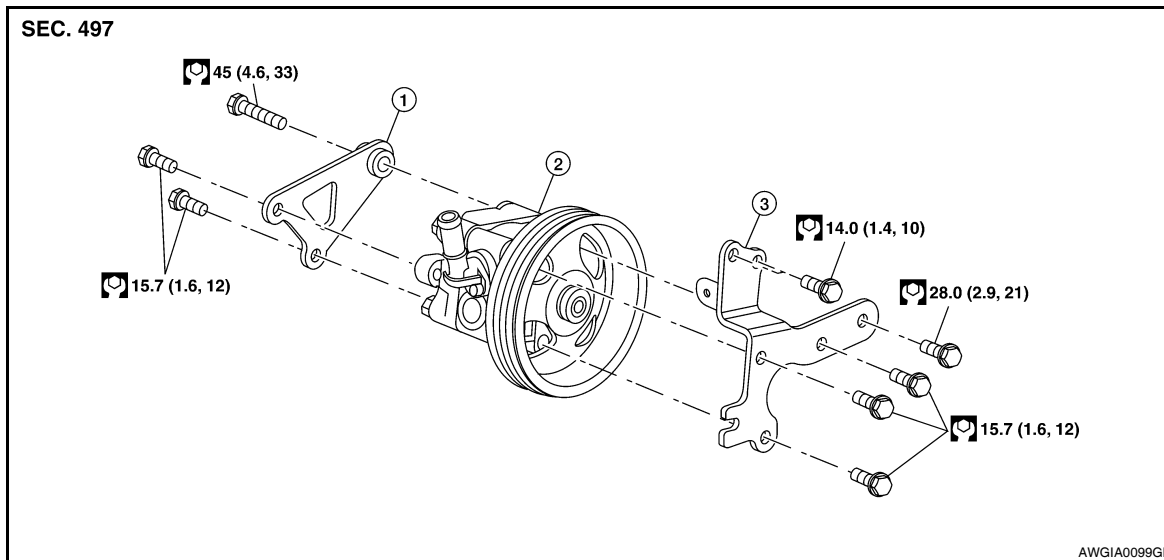
VQ35DE

# POWER STEERING OIL PUMP

< ON-VEHICLE REPAIR >

## VQ35DE : Exploded View

INFOID:000000004204025



1. Rear bracket

2. Pump assembly

3. Front bracket

## VQ35DE : Removal and Installation

INFOID:000000004204026

### REMOVAL

1. Drain power steering fluid from reservoir tank.
2. Remove undercover using power tool.
3. Loosen drive belt. Refer to [EM-121, "Removal and Installation"](#).
4. Remove drive belt from oil pump pulley.
5. Remove piping of high pressure and low pressure (drain fluid from pipings). Refer to [ST-22, "VQ35DE : With 17 Inch Tire"](#) or [ST-24, "VQ35DE : With 18 Inch Tire"](#).
6. Remove oil pump bolts, and then remove power steering oil pump. Refer to [ST-20, "VQ35DE : Exploded View"](#).

### INSPECTION AFTER REMOVAL

### INSTALLATION

Installation is in the reverse order of removal.

- When installing power steering oil pump, install all bolts by hand initially, then tighten bolts to specification.
- Perform the following procedure after installing.
  - Adjust belt tension. Refer to [EM-121, "Tension Adjustment"](#).
  - Bleed air. Refer to [ST-8, "Inspection"](#).

# HYDRAULIC LINE

< ON-VEHICLE REPAIR >

## HYDRAULIC LINE

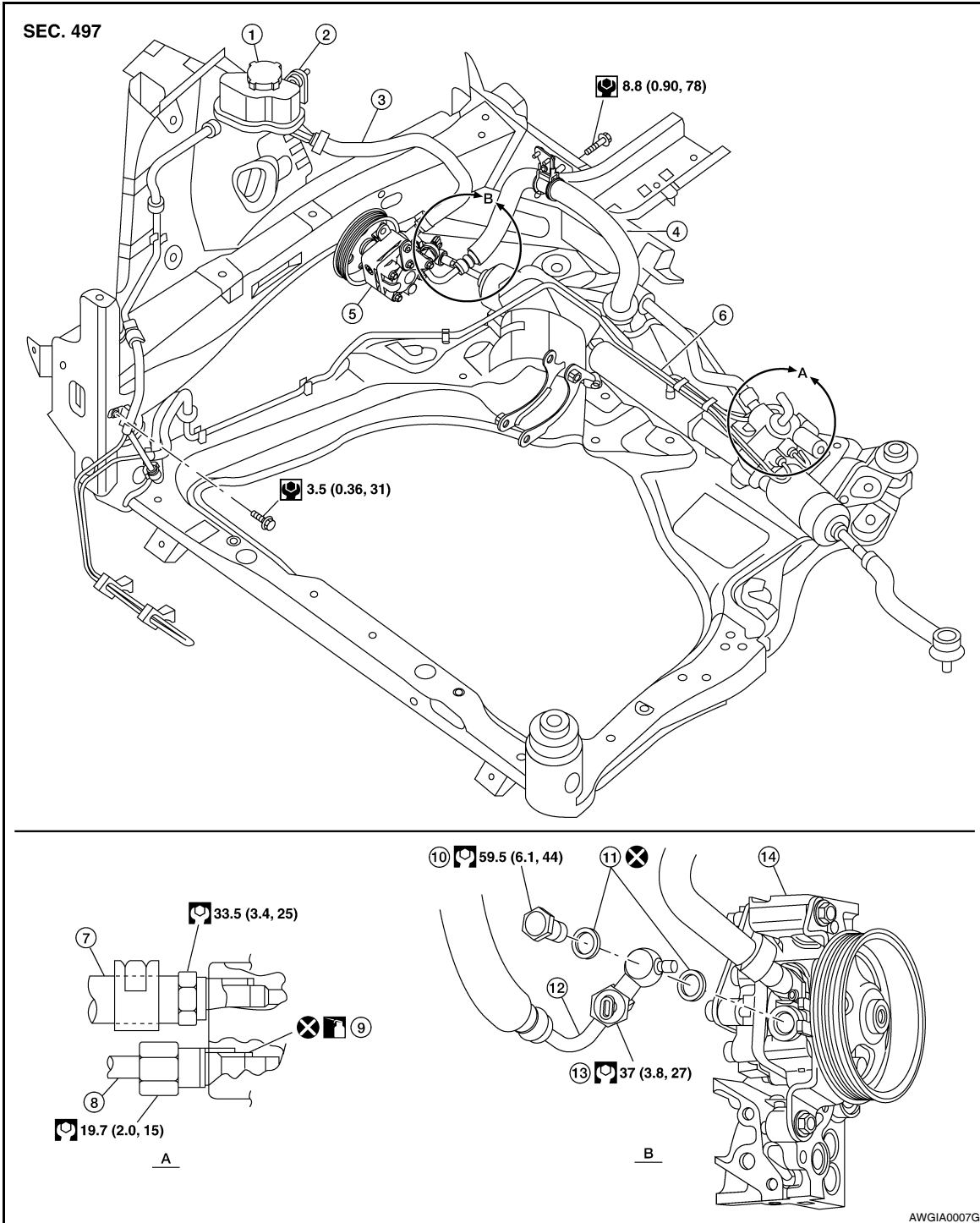
QR25DE

QR25DE : Exploded View

INFOID:000000004204027

**CAUTION:**


Securely insert harness connector to pressure sensor.



- |                        |                           |                           |
|------------------------|---------------------------|---------------------------|
| 1. Reservoir tank      | 2. Reservoir tank bracket | 3. Suction hose           |
| 4. High-pressure hose  | 5. Oil pump assembly      | 6. Steering gear assembly |
| 7. Low pressure piping | 8. High pressure piping   | 9. O-ring                 |

# HYDRAULIC LINE

## < ON-VEHICLE REPAIR >

- |                     |   |  |
|---------------------|---|--|
| 10. Eye-bolt        | 11. Copper washer                                   | 12. Eye-joint (assembled to high-pressure side hose)   |
| 13. Pressure sensor | 14. Oil pump bracket to engine block mounting point |  Apply Genuine Nissan PSF or equivalent |

## QR25DE : Removal and Installation

INFOID:000000004204028

### REMOVAL

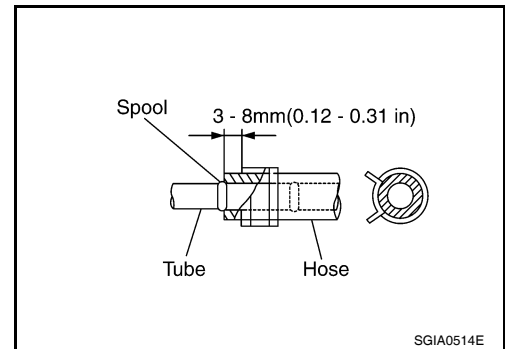
Refer to [ST-21. "QR25DE : Exploded View"](#) for removal procedure.

### INSTALLATION

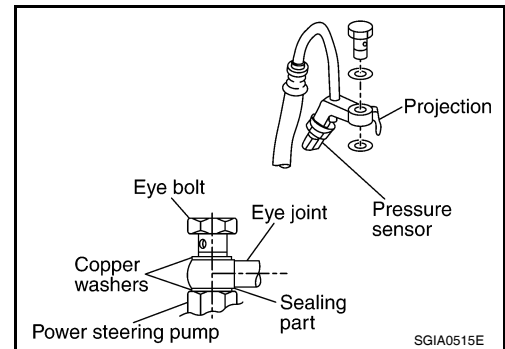
- Insert hose securely until it contacts tube spool.

**CAUTION:**

**Do not apply fluid.**



- Install eye-bolt with eye-joint (assembled to high-pressure hose) protrusion facing with pump side cutout, and then tighten it to the specified torque after tightening by hand.



## VQ35DE

### VQ35DE : With 17 Inch Tire

INFOID:000000004476244

### EXPLODED VIEW

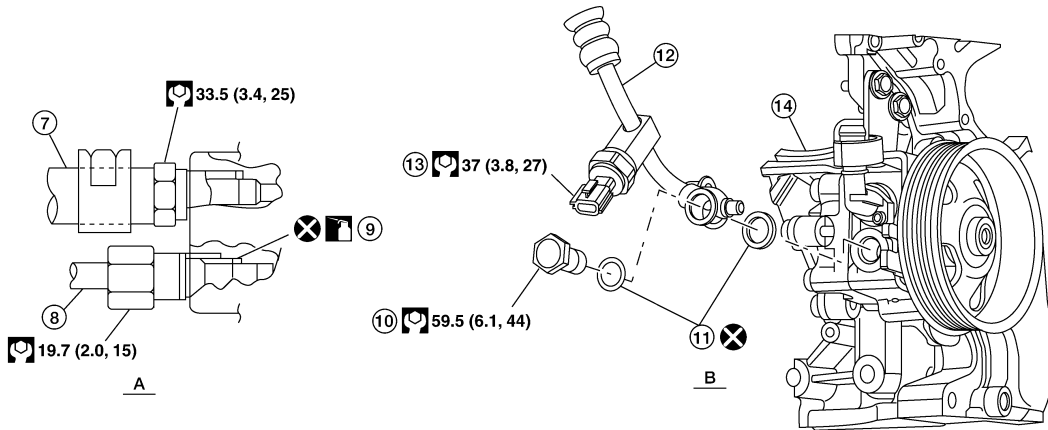
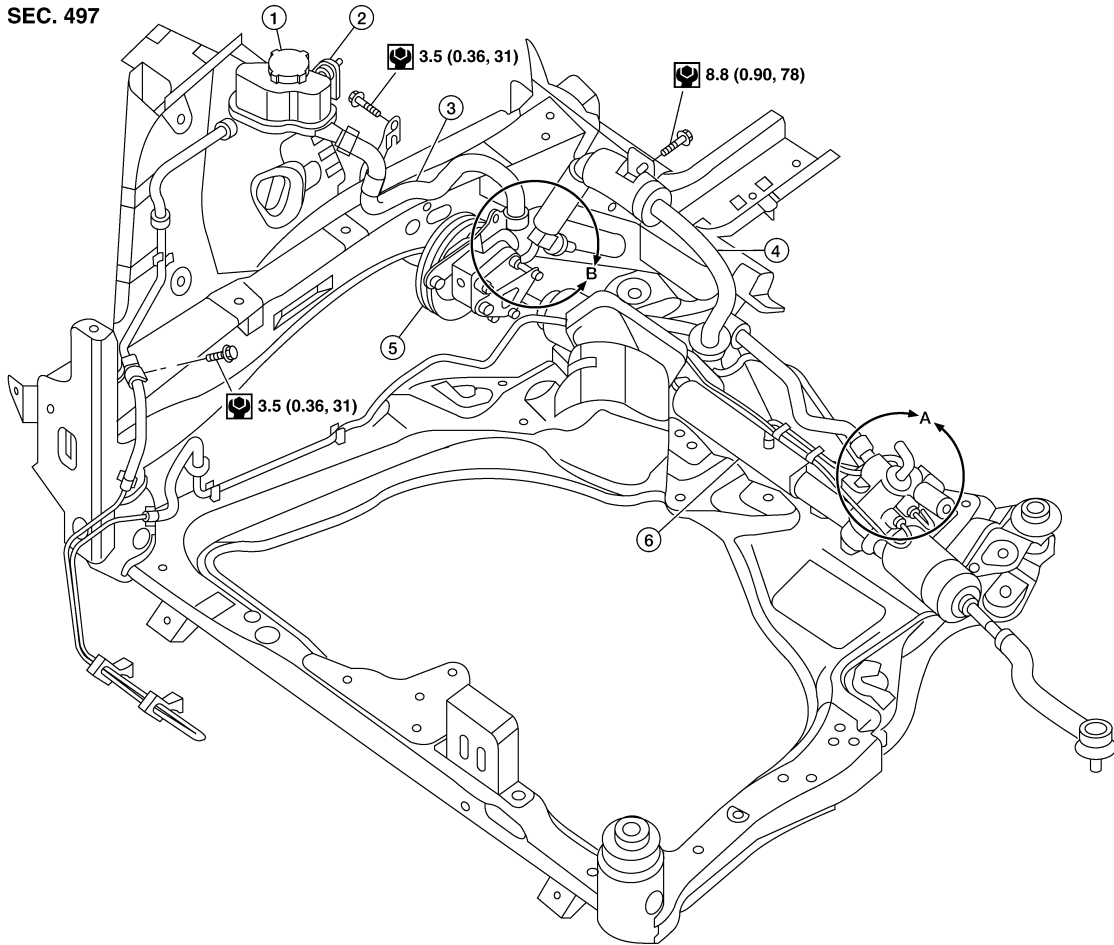
**CAUTION:**

**Securely insert harness connector to pressure sensor.**

# HYDRAULIC LINE

< ON-VEHICLE REPAIR >

SEC. 497



AWGIA0008GB

- |                        |   |  |
|------------------------|---|--|
| 1. Reservoir tank      | 2. Reservoir tank bracket                     | 3. Suction hose                                      |
| 4. High pressure hose  | 5. Oil pump assembly                          | 6. Steering gear assembly                            |
| 7. Low pressure piping | 8. High pressure piping                       | 9. O-ring  |
| 10. Eye-bolt           | 11. Copper washer                             | 12. Eye-joint (assembled to high-pressure side hose) |
| 13. Pressure sensor    | 14. Oil pump bracket to engine mounting point | Genuine Nissan PSF or equivalent                     |

## REMOVAL AND INSTALLATION

### Removal

Refer to [ST-22, "VQ35DE : With 17 Inch Tire"](#) for removal procedure.

# HYDRAULIC LINE

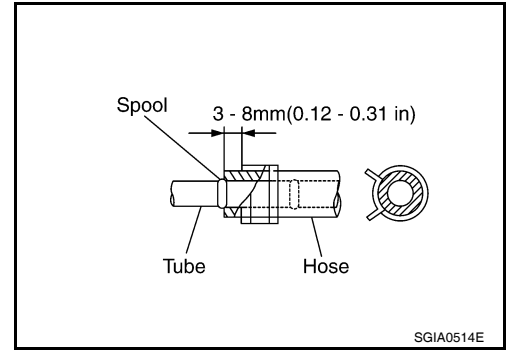
## < ON-VEHICLE REPAIR >

### Installation

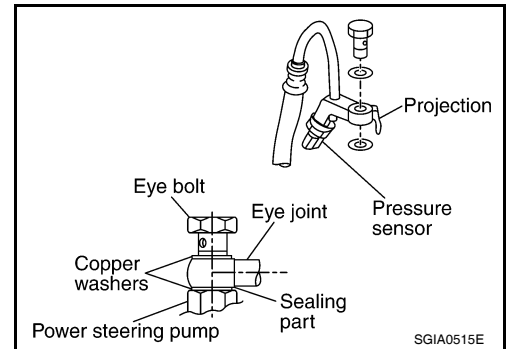
- Insert hose securely until it contacts tube spool.

**CAUTION:**

**Do not apply fluid.**



- Install eye-bolt with eye-joint (assembled to high-pressure hose) protrusion facing with pump side cutout, and then tighten it to the specified torque after tightening by hand.



VQ35DE : With 18 Inch Tire

INFOID:000000004476245

### EXPLODED VIEW

**CAUTION:**

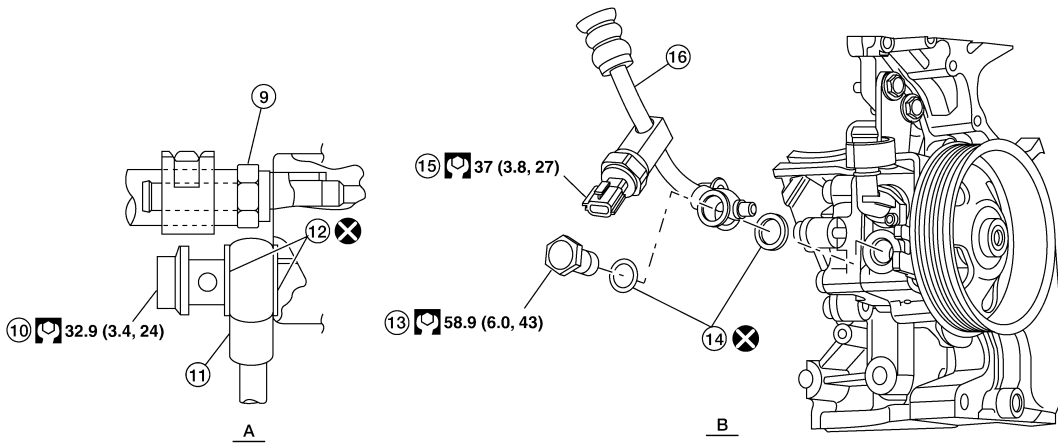
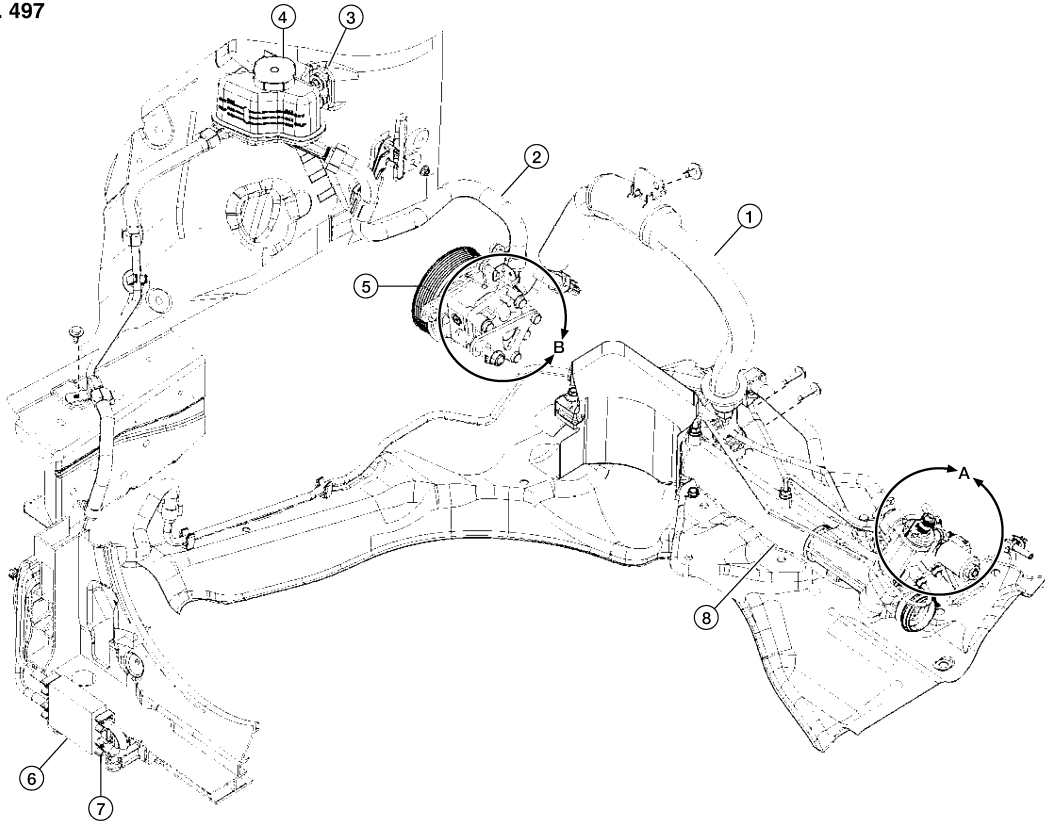
**Securely insert harness connector to pressure sensor.**



# HYDRAULIC LINE

< ON-VEHICLE REPAIR >

SEC. 497



ALGIA0046GB

- |  |                           |                                |
|--|---------------------------|--------------------------------|
| 1. High pressure hose                                | 2. Suction hose           | 3. Reservoir tank bracket      |
| 4. Reservoir tank                                    | 5. Oil pump assembly      | 6. Power steering fluid cooler |
| 7. Power steering fluid cooler brackets              | 8. Steering gear assembly | 9. Low pressure piping         |
| 10. Eye-bolt   | 11. High pressure piping  | 12. Copper washer              |
| 13. eye bolt   | 14. Copper washer         | 15. Pressure sensor            |
| 16. Eye-joint (assembled to high-pressure side hose) |                           |                                |

## REMOVAL AND INSTALLATION

Removal

Refer to [ST-24, "VQ35DE : With 18 Inch Tire"](#) for removal procedure.

**ST-25**

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

# HYDRAULIC LINE

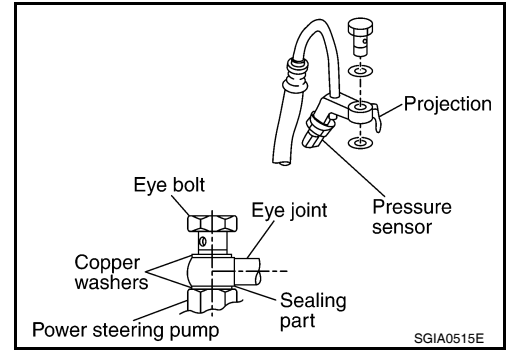
## < ON-VEHICLE REPAIR >

### Installation

#### **CAUTION:**

#### **Do not apply fluid.**

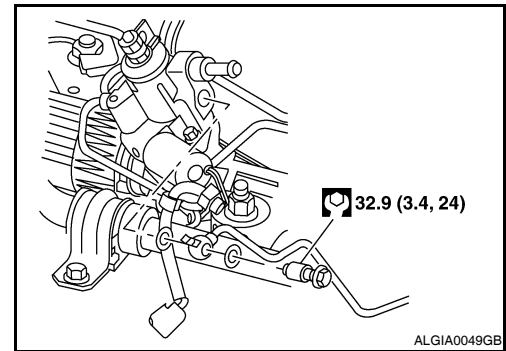
- Install eye-bolt with eye-joint (assembled to high-pressure hose) protrusion facing with pump side cutout, and then tighten it to the specified torque after tightening by hand.



- Install check valve with eye-joint (assembled to high pressure tube) protrusion facing gear side and tighten it to the specified torque after tightening by hand.

#### **CAUTION:**

#### **Do not reuse copper washers.**



# STEERING COLUMN

< DISASSEMBLY AND ASSEMBLY >

## DISASSEMBLY AND ASSEMBLY

### STEERING COLUMN

#### Disassembly and Assembly

INFOID:000000004204031

**CAUTION:**

- Any time the ignition switch has been disconnected, removed or installed, the keys must be re-registered in the BCM. Refer to Consult-III operations IVIS/NVIS.

The steering column assembly is not serviceable and must be replaced as an assembly.

A

B

C

D

E

F

ST

H

I

J

K

L

M

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O

P

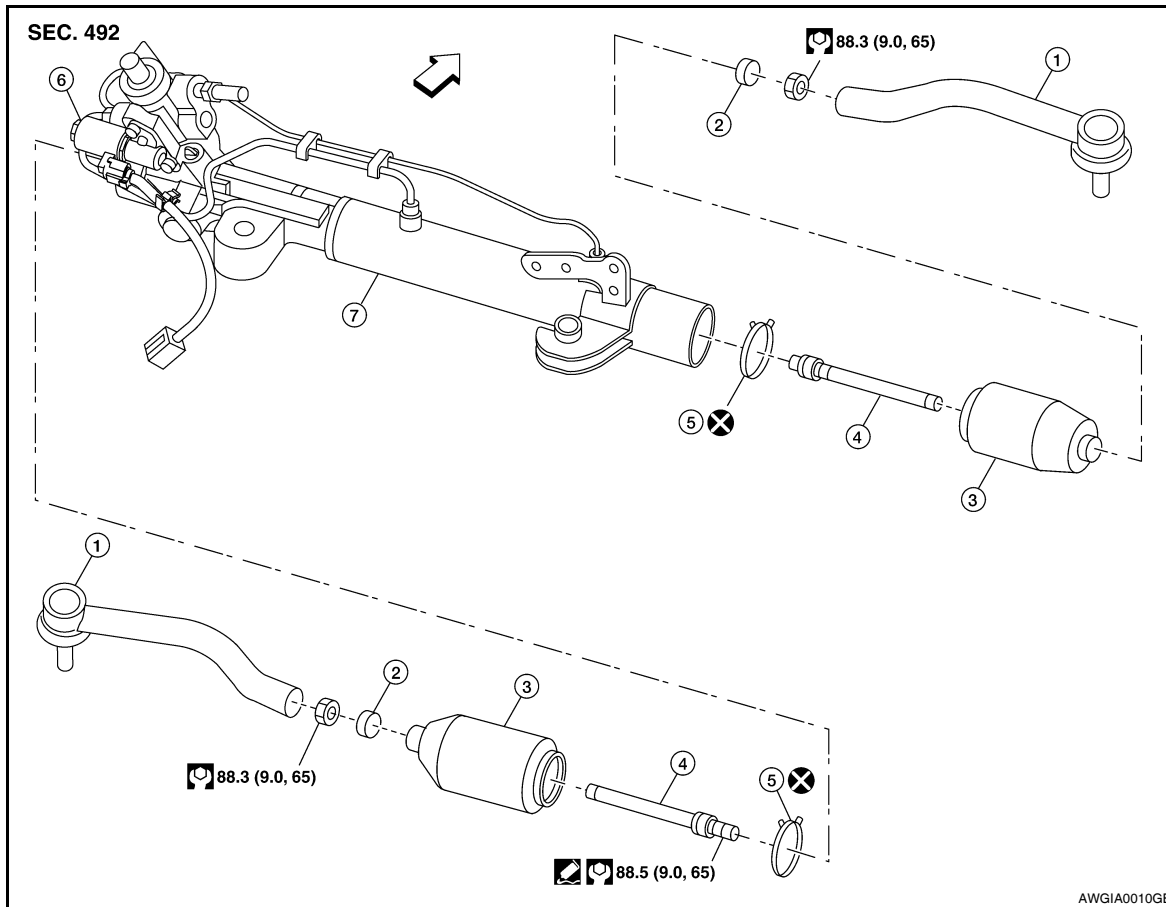
# STEERING GEAR AND LINKAGE

< DISASSEMBLY AND ASSEMBLY >

## STEERING GEAR AND LINKAGE

Exploded View

INFOID:000000004204032



- |                  |               |                                       |
|------------------|---------------|---------------------------------------|
| 1. Outer socket  | 2. Boot clamp | 3. Boot                               |
| 4. Inner socket  | 5. Boot clamp | 6. SSPS valve (part of gear assembly) |
| 7. Gear assembly | ← Front       | Three Bound TB1111 or equivalent      |

### Disassembly

INFOID:000000004204033

1. Remove outer socket locknut and outer socket
2. Remove boot clamps and boot.
3. Remove inner socket.

### Inspection

INFOID:000000004204034

#### INSPECTION AFTER DISASSEMBLY

##### Boot

Check boot for cracks. Replace if there are.

##### Outer Socket and Inner Socket

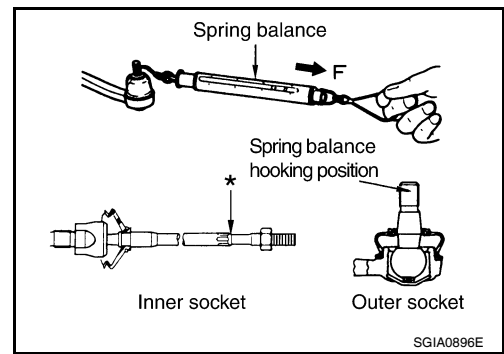
1. Ball joint swinging torque

# STEERING GEAR AND LINKAGE

## < DISASSEMBLY AND ASSEMBLY >

- Hook a tool at the point shown in the figure 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 and steering gear assembly if they are outside the standard.

**Tool number** : — (J-44372)

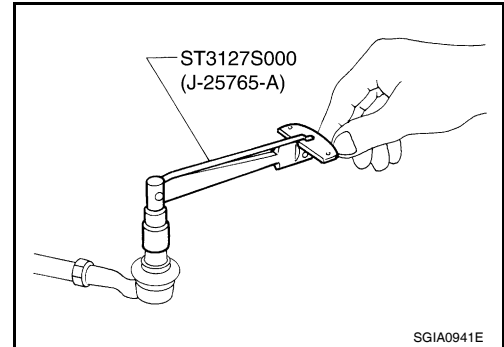


Items	Outer socket	Inner socket
Measuring point of spring balance	Stud cotter pin mounting hole	Measuring point at * mark shown in the figure
Swinging torque	0.1 - 2.9 N·m (0.01 - 0.29 kg-m, 1.0 - 25 in-lb)	0.1 - 7.8 N·m (0.01 - 0.79 kg-m, 1.0 - 69 in-lb)
Spring balance measurement	1.4 - 42.7 N (0.14 - 4.4 kg, 12 - 31 lb)	0.8 - 64 N (0.082 - 6.5 kg, 0.18 - 14.4 lb)

- Ball joint rotating torque
  - Make sure that the reading is within the following specified range using Tool. Replace outer socket if the reading is outside the specified value.

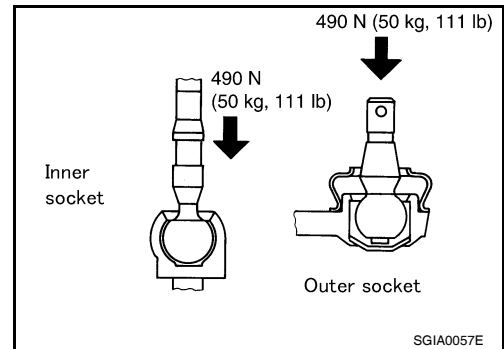
**Tool number** : ST31227S000 (J-25765-A)

<b>Outer socket rotating torque</b>	<b>0.3 - 2.9 N·m (0.03 - 0.29 kg-m, 3.0 - 25 in-lb)</b>
-------------------------------------	---



- Ball joint axial end play
  - Apply an axial load of 490 N (50 kg-f, 111 lb-f) 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 and inner socket if the measured value is outside the standard.

<b>Outer socket</b>	<b>0.5 mm (0.020 in) or less</b>
<b>Inner socket</b>	<b>0.2 mm (0.008 in) or less</b>



## Assembly

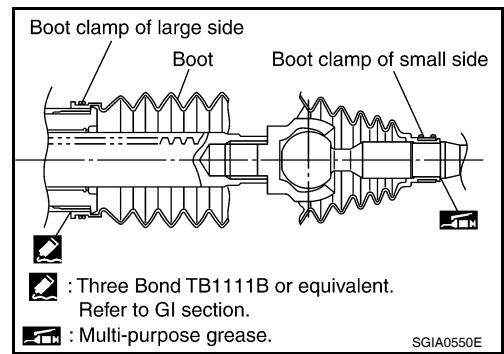
INFOID:000000004204035

- Apply Three Bound TB1111 or equivalent to inner socket and turn pinion fully to left with inner socket installed to gear housing assembly.

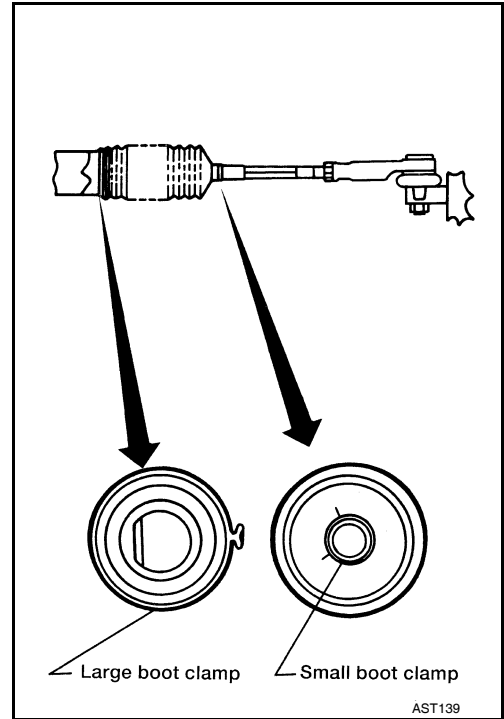
## STEERING GEAR AND LINKAGE

### < DISASSEMBLY AND ASSEMBLY >

2. Install large end of boot to gear housing assembly.
3. Install small end of boot to inner socket boot mounting groove.



4. Install boot clamp to boot small end.
5. Install boot clamp to boot large end.

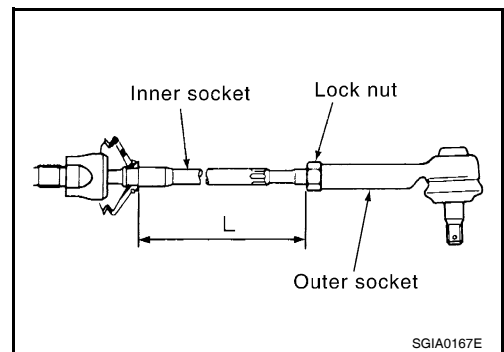


6. Adjust inner socket to standard length "L", and then tighten lock nut to the specified torque. Refer to [ST-28, "Exploded View"](#). Check length of inner socket "L" again after tightening lock nut. Make sure that the length is the standard.

<b>Inner socket length "L"</b>	<b>93.3 mm (3.673 in)</b>
--------------------------------	---------------------------

**CAUTION:**

**Adjust toe-in after this procedure. Length achieved after toe-in adjustment should not be more than 98.3 mm max.**



# POWER STEERING OIL PUMP

< DISASSEMBLY AND ASSEMBLY >

## POWER STEERING OIL PUMP

QR25DE

A

QR25DE : Disassembly and Assembly

INFOID:000000004204036

B

The power steering oil pump and pulley is not serviceable and should be replaced as an assembly. For front and rear bracket removal, refer to [ST-19, "QR25DE : Removal and Installation"](#).

VQ35DE

C

VQ35DE : Disassembly and Assembly

INFOID:000000004204037

D

The power steering oil pump and pulley is not serviceable and should be replaced as an assembly. For front and rear bracket removal, refer to [ST-20, "VQ35DE : Removal and Installation"](#).

E

F

ST

H

I

J

K

L

M

N

O

P

# SERVICE DATA AND SPECIFICATIONS (SDS)

< SERVICE DATA AND SPECIFICATIONS (SDS)

## SERVICE DATA AND SPECIFICATIONS (SDS)

### SERVICE DATA AND SPECIFICATIONS (SDS)

#### Steering Wheel

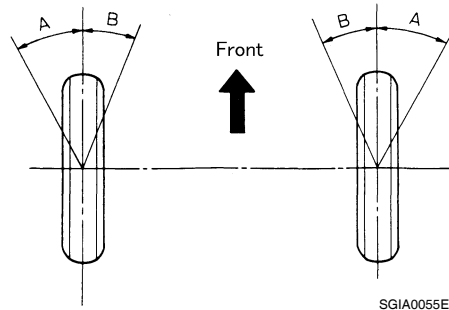
INFOID:000000004204038

Steering wheel axial end play	0 mm (0 in)
Steering wheel play	0 - 35 mm (0 - 1.38 in)

#### Steering Angle

INFOID:000000004204039

Unit: Degree minute (Decimal Degree)



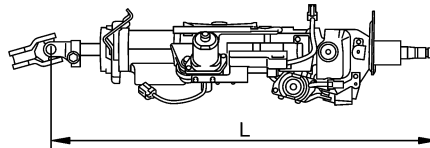
SGIA0055E

Tire size		P215/60R16	P215/55R17	P235/45R18
Inner wheel (Angle: A)	Minimum	35° 30' (35.5°)	33° 30' (33.5°)	32° (32.0°)
	Nominal	38° 30' (38.5°)	36° 30' (36.5°)	35° (35.0°)
	Maximum	39° 30' (39.5°)	37° 30' (37.5°)	36° (36.0°)
Outer wheel (Angle: B)	Nominal	31° (31.5°)	30° 30' (30.5°)	29° 30' (29.5°)

#### Steering Column

INFOID:000000004204040

#### STEERING COLUMN LENGTH



SGIA1177E

Steering column length "L"	Telescopic maximum	513 - 543 mm (20.20 - 21.38 in)
	Telescopic minimum	503 - 513 mm (19.80 - 20.20 in)

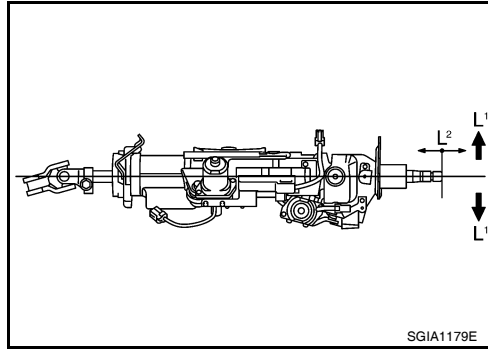
#### TILT MECHANISM OPERATING RANGE



# SERVICE DATA AND SPECIFICATIONS (SDS)

## < SERVICE DATA AND SPECIFICATIONS (SDS)

Unit: mm (in)



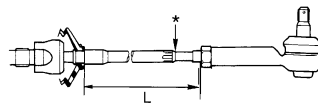
Tilt operating range "L <sup>1</sup> "	41 (1.61)
Telescopic operating range "L <sup>2</sup> "	40 (1.57)

### Steering Gear

INFOID:000000004204041

### STEERING OUTER SOCKET AND INNER SOCKET

Steering gear type		PR26AF
Outer socket	Swinging torque	0.1 - 2.9 N·m (0.01 - 0.29 kg-m, 1.0 - 25 in-lb)
	Measurement on spring balance Measuring point: cotter pin hole of stud	1.4 - 42.7 N (0.14 - 4.4 kg, 12 - 31 lb)
	Rotating torque	0.3 - 2.9 N·m (0.03 - 0.29 kg-m, 3.0 - 25 in-lb)
	Axial end play	0.5 mm (0.020 in) or less
Inner socket	Swinging torque	0.1 - 7.8 N·m (0.01 - 0.79 kg-m, 1.0 - 69 in-lb)
	• Measurement on spring balance • Measuring point at* mark shown	0.8 - 64 N (0.082 - 6.5 kg, 0.18 - 14.4 lb)
	Axial end play	0.2 mm (0.008 in) or less
Inner socket length "L"	Nominal	93.3 mm (3.673 in)
	Maximum	98.3 mm (3.870 in)



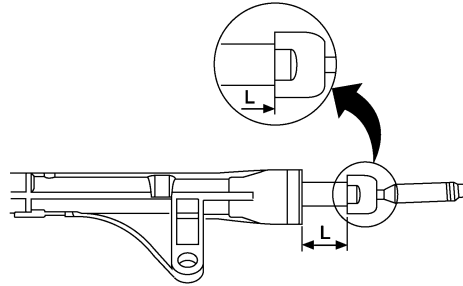
SGIA0950E

### RACK STROKE

# SERVICE DATA AND SPECIFICATIONS (SDS)

## < SERVICE DATA AND SPECIFICATIONS (SDS)

Steering gear model	PR26AF		
Tire size	P215/60R16	P215/55R17	P235/45R18
Rack neutral position, dimension "L" (rack stroke)	71.5 mm (2.815 in)	69.0 mm (2.717 in)	66.5 mm (2.167 in)



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## Oil Pump

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Oil pump relief hydraulic pressure	8,520 - 9,320 kPa (86.9 - 95.1 kg/cm <sup>2</sup> , 1,235 - 1,351 psi)
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## Steering Fluid

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Fluid type and capacity	Refer to <a href="#">MA-12, "Fluids and Lubricants"</a> .
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