

SECTION **ST**  
STEERING SYSTEM

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CONTENTS

<b>PRECAUTION</b> .....	3	HEATED STEERING WHEEL SYSTEM : System Description .....	8
<b>PRECAUTIONS</b> .....	3	<b>ECU DIAGNOSIS INFORMATION</b> .....	9
Precaution for Supplemental Restraint System (SRS) "AIR BAG" and "SEAT BELT PRE-TENSIONER" .....	3	<b>AUTOMATIC DRIVE POSITIONER CONTROL UNIT</b> .....	9
Service Notice or Precautions for Steering System .....	3	List of ECU Reference .....	9
<b>PREPARATION</b> .....	4	<b>WIRING DIAGRAM</b> .....	10
<b>PREPARATION</b> .....	4	<b>STEERING COLUMN</b> .....	10
Special Service Tool .....	4	Wiring Diagram .....	10
Commercial Service Tool .....	5	<b>HEATED STEERING WHEEL</b> .....	13
<b>SYSTEM DESCRIPTION</b> .....	6	Wiring Diagram .....	13
<b>COMPONENT PARTS</b> .....	6	<b>BASIC INSPECTION</b> .....	16
<b>STEERING TILT &amp; STEERING TELESCOPIC</b> .....	6	<b>DIAGNOSIS AND REPAIR WORK FLOW</b> .....	16
STEERING TILT & STEERING TELESCOPIC : Component Parts Location .....	6	Work Flow .....	16
STEERING TILT & STEERING TELESCOPIC : Component Description .....	6	<b>POWER STEERING FLUID</b> .....	18
<b>HEATED STEERING WHEEL SYSTEM</b> .....	6	Inspection .....	18
HEATED STEERING WHEEL SYSTEM : Component Parts Location .....	7	<b>STEERING WHEEL</b> .....	19
HEATED STEERING WHEEL SYSTEM : Component Description .....	7	Inspection .....	19
<b>SYSTEM</b> .....	8	<b>STEERING COLUMN</b> .....	21
<b>STEERING TILT &amp; STEERING TELESCOPIC</b> .....	8	Inspection .....	21
STEERING TILT & STEERING TELESCOPIC : System Diagram .....	8	<b>POWER STEERING OIL PUMP</b> .....	22
STEERING TILT & STEERING TELESCOPIC : System Description .....	8	Inspection .....	22
<b>HEATED STEERING WHEEL SYSTEM</b> .....	8	<b>STEERING GEAR AND LINKAGE</b> .....	23
HEATED STEERING WHEEL SYSTEM : System Diagram .....	8	Inspection .....	23
		<b>DTC/CIRCUIT DIAGNOSIS</b> .....	24
		<b>POWER SUPPLY AND GROUND CIRCUIT</b> ....	24
		<b>AUTOMATIC DRIVE POSITIONER CONTROL UNIT</b> .....	24

AUTOMATIC DRIVE POSITIONER CONTROL UNIT : Diagnosis Procedure .....	24	Draining and Refilling .....	43
		Air Bleeding Hydraulic System .....	43
<b>TILT SWITCH .....</b>	<b>25</b>	<b>REMOVAL AND INSTALLATION .....</b>	<b>45</b>
Description .....	25	<b>STEERING WHEEL .....</b>	<b>45</b>
Component Function Check .....	25	Exploded View .....	45
Diagnosis Procedure .....	25	Removal and Installation .....	45
Component Inspection .....	26	<b>STEERING COLUMN .....</b>	<b>47</b>
<b>TELESCOPIC SWITCH .....</b>	<b>27</b>	Exploded View .....	47
Description .....	27	Removal and Installation .....	47
Component Function Check .....	27	<b>STEERING GEAR AND LINKAGE .....</b>	<b>49</b>
Diagnosis Procedure .....	27	Exploded View .....	49
Component Inspection .....	28	Removal and Installation - Outer socket .....	49
<b>TILT &amp; TELESCOPIC SWITCH GROUND CIRCUIT .....</b>	<b>29</b>	Removal and Installation - Boot .....	50
Diagnosis Procedure .....	29	Removal and Installation - Inner socket .....	51
<b>TILT MOTOR .....</b>	<b>30</b>	<b>POWER STEERING OIL PUMP .....</b>	<b>53</b>
Description .....	30	Exploded View .....	53
Component Function Check .....	30	Removal and Installation .....	53
Diagnosis Procedure .....	30	<b>HYDRAULIC LINE .....</b>	<b>55</b>
<b>TELESCOPIC MOTOR .....</b>	<b>32</b>	Exploded View .....	55
Description .....	32	Removal and Installation .....	56
Component Function Check .....	32	<b>UNIT REMOVAL AND INSTALLATION ....</b>	<b>58</b>
Diagnosis Procedure .....	32	<b>STEERING GEAR AND LINKAGE .....</b>	<b>58</b>
<b>HEATED STEERING WHEEL SYSTEM .....</b>	<b>34</b>	Exploded View .....	58
Component Function Check .....	34	Removal and Installation - 2WD .....	58
Diagnosis Procedure .....	34	Removal and Installation - 4WD .....	60
Component Inspection (Heated Steering Wheel Switch) .....	36	<b>UNIT DISASSEMBLY AND ASSEMBLY ...</b>	<b>62</b>
Component Inspection (Heated Steering Relay) ...	36	<b>STEERING GEAR AND LINKAGE .....</b>	<b>62</b>
Component Inspection (Heated Steering Wheel) ...	37	Exploded View .....	62
<b>HEATED STEERING WHEEL SWITCH INDICATOR LAMP .....</b>	<b>38</b>	Disassembly and Assembly .....	62
Component Function Check .....	38	<b>POWER STEERING OIL PUMP .....</b>	<b>65</b>
Diagnosis Procedure .....	38	Disassembly and Assembly .....	65
<b>SYMPTOM DIAGNOSIS .....</b>	<b>41</b>	<b>SERVICE DATA AND SPECIFICATIONS (SDS) .....</b>	<b>66</b>
<b>STEERING COLUMN .....</b>	<b>41</b>	<b>SERVICE DATA AND SPECIFICATIONS (SDS) .....</b>	<b>66</b>
Symptom Table .....	41	Steering Wheel .....	66
<b>NOISE, VIBRATION AND HARSHNESS (NVH) TROUBLESHOOTING .....</b>	<b>42</b>	Steering Angle .....	66
NVH Troubleshooting Chart .....	42	Steering Column .....	66
<b>PERIODIC MAINTENANCE .....</b>	<b>43</b>	Power Steering Gear .....	67
<b>POWER STEERING FLUID .....</b>	<b>43</b>	Power Steering Oil Pump .....	68
		Power Steering Fluid .....	68

# PRECAUTIONS

< PRECAUTION >

## PRECAUTION

### PRECAUTIONS

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

INFOID:000000012551614

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. 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, it is recommended that all maintenance and repair be performed by an authorized NISSAN/INFINITI dealer.
- Improper repair, 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.

#### PRECAUTIONS WHEN USING POWER TOOLS (AIR OR ELECTRIC) AND HAMMERS

#### **WARNING:**

- When working near the Air Bag Diagnosis Sensor Unit or other Air Bag System sensors with the Ignition ON or engine running, DO NOT 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 or batteries, and wait at least three minutes before performing any service.

#### Service Notice or Precautions for Steering System

INFOID:000000012551615

- In case of removing steering gear, 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.

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# PREPARATION

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## PREPARATION

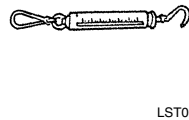
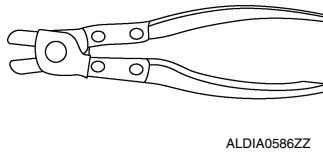
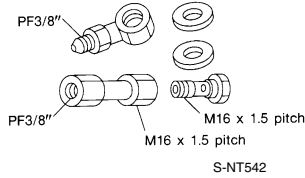
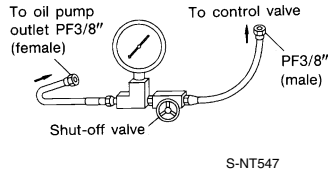
### PREPARATION

#### Special Service Tool

INFOID:0000000012551616

The actual shape of the tools may differ from those illustrated here.

Tool number (TechMate No.) Tool name	Description
KV48103500 (J-26357) Pressure gauge	Measuring oil pump relief pressure
KV48102500 (J-33914) Pressure gauge adapter	Measuring oil pump relief pressure
KV40107300 (J-51751) Boot clamp crimping tool	Installing boot clamps
— (J-44372) Pull gauge	Measuring steering wheel turning force, rack sliding force and ball joint swinging force

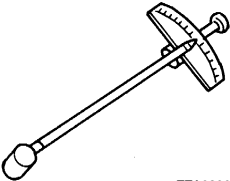
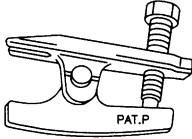
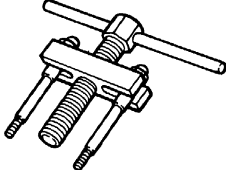



# PREPARATION

< PREPARATION >

## Commercial Service Tool

INFOID:000000012551617

Tool name	Description
Preload gauge  ZZA0806D	Inspecting steering column rotating torque, pinion rotating torque and ball joint rotating torque
Ball joint remover  S-NT146	Remove steering outer socket
Steering wheel puller  ZZA0819D	Removing steering wheel
Power tool  PIIB1407E	Loosening nuts, screws and bolts

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# COMPONENT PARTS

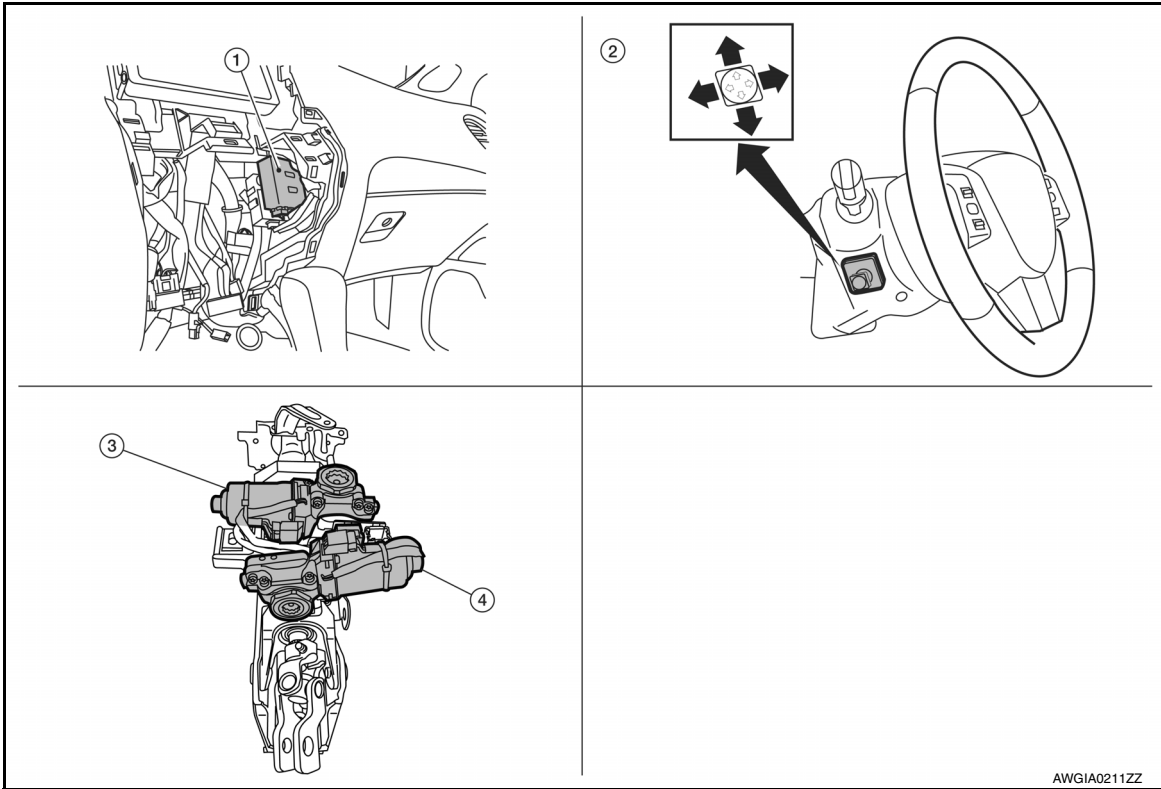
< SYSTEM DESCRIPTION >

## SYSTEM DESCRIPTION

### COMPONENT PARTS

#### STEERING TILT & STEERING TELESCOPIC

#### STEERING TILT & STEERING TELESCOPIC : Component Parts Location INFOID:0000000012551618



- |   |                               |   |
|---|-------------------------------|---|
| <p>1. Automatic drive positioner control unit<br/>(view with cluster lid C removed)</p> <p>4. Telescopic motor<br/>(view with steering column assembly removed)</p> | <p>2. ADP steering switch</p> | <p>3. Tilt motor<br/>(view with steering column assembly removed)</p> |
|---|-------------------------------|---|

#### STEERING TILT & STEERING TELESCOPIC : Component Description INFOID:0000000012551619

Component parts		Description
Automatic drive positioner control unit		<ul style="list-style-type: none"> <li>Supplies power and ground for tilt and telescopic motors.</li> <li>Receives signals from the ADP steering switch.</li> </ul>
ADP steering switch	Tilt switch	<ul style="list-style-type: none"> <li>Controls movement of steering column up and down.</li> <li>Sends tilt up and down signals to automatic drive positioner control unit.</li> </ul>
	Telescopic switch	<ul style="list-style-type: none"> <li>Controls movement of steering column forward and backward.</li> <li>Sends forward and backward signals to automatic drive positioner control unit.</li> </ul>
Tilt motor		<ul style="list-style-type: none"> <li>Tilts steering column upward and downward by changing the polarity of the tilt motor.</li> </ul>
Telescopic motor		<ul style="list-style-type: none"> <li>Telescopes steering column forward and backward by changing the polarity of the telescopic motor.</li> </ul>

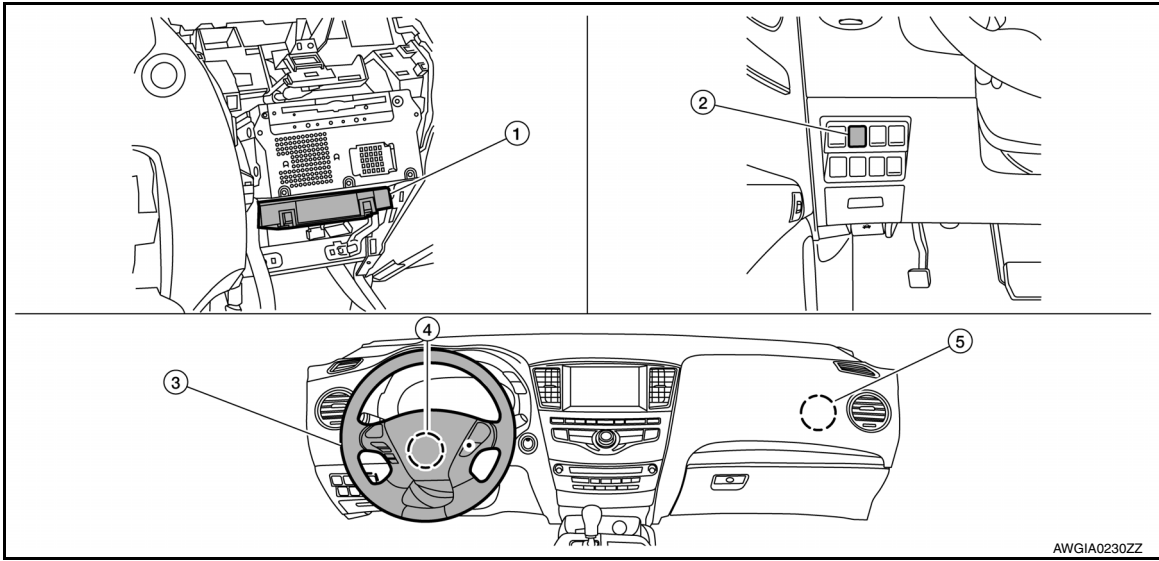
### HEATED STEERING WHEEL SYSTEM

# COMPONENT PARTS

< SYSTEM DESCRIPTION >

## HEATED STEERING WHEEL SYSTEM : Component Parts Location

INFOID:000000012551620



- |  |                                 |                          |
|--|---------------------------------|--------------------------|
| 1. A/C Auto amp<br>(view with cluster lid C removed) | 2. Heated steering wheel switch | 3. Heated steering wheel |
| 4. Spiral cable                                      | 5. Heated steering relay        |                          |

## HEATED STEERING WHEEL SYSTEM : Component Description

INFOID:000000012551621

Components	Description
A/C Auto amp	Controls the heated steering relay by providing a ground signal to the coil.
Heated steering wheel switch	<ul style="list-style-type: none"> <li>Controls the heated steering relay by providing a ground signal to A/C Auto amp.</li> <li>Provides switch indicator for system.</li> </ul>
Heated steering relay	Provides battery power supply to heated steering wheel and switch indicator.
Heated steering wheel	Contains heating element and over-heat protection.
Spiral cable	Provides rotating electrical connection for heated steering wheel.

# SYSTEM

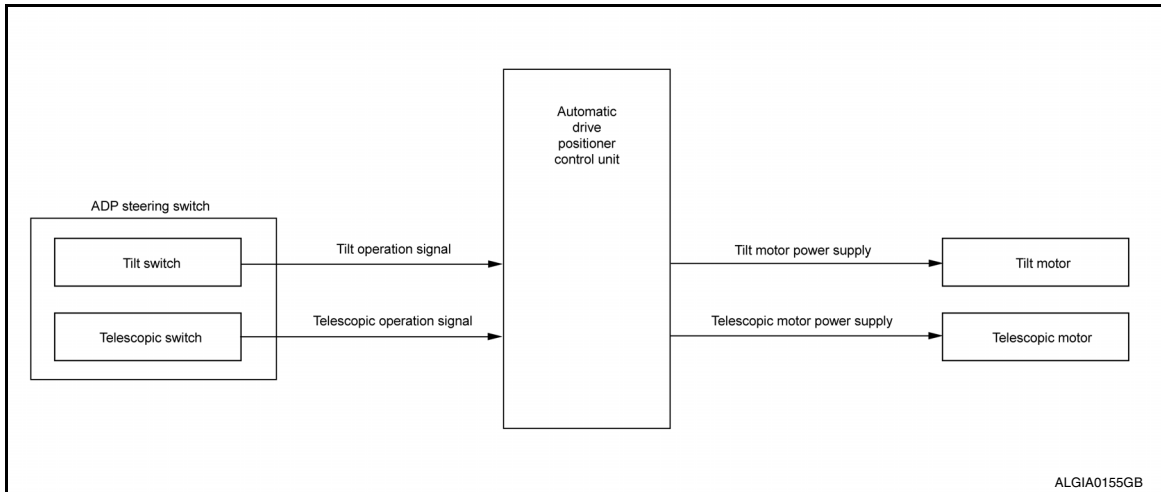
< SYSTEM DESCRIPTION >

## SYSTEM

### STEERING TILT & STEERING TELESCOPIC

#### STEERING TILT & STEERING TELESCOPIC : System Diagram

INFOID:000000012551622



#### STEERING TILT & STEERING TELESCOPIC : System Description

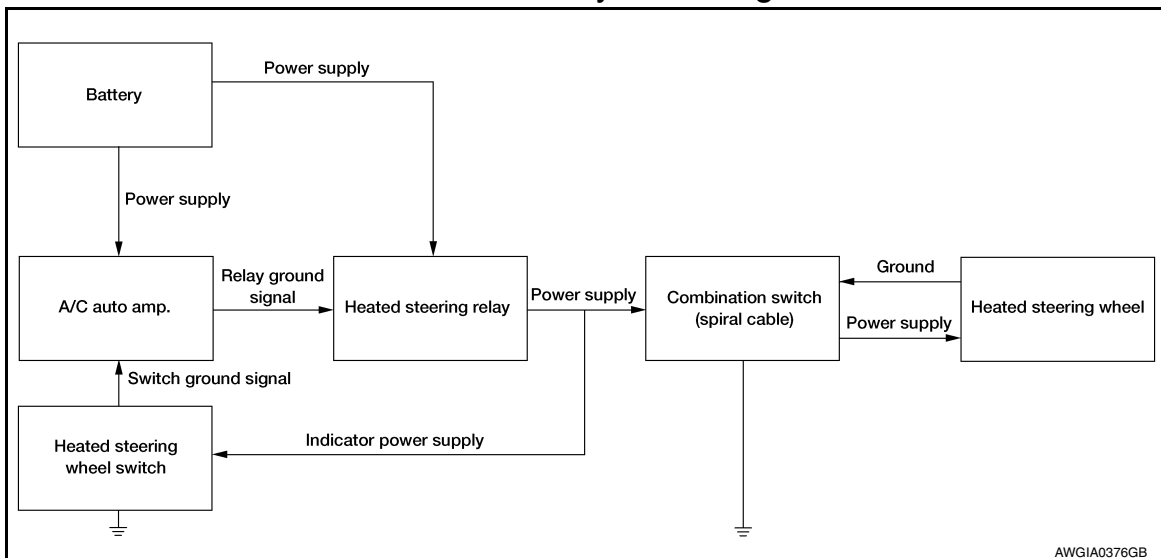
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When the operator adjusts the steering column position using the ADP steering switch (tilt/telescopic), the switch provides a ground signal to the ADP control unit. Power and ground is supplied to the tilt or telescopic motors to move the column in the desired direction.

### HEATED STEERING WHEEL SYSTEM

#### HEATED STEERING WHEEL SYSTEM : System Diagram

INFOID:000000012551624



#### HEATED STEERING WHEEL SYSTEM : System Description

INFOID:000000012551625

The heated steering wheel switch controls the heated steering relay through the A/C Auto amp. When the switch is turned on, the relay is energized and the heated steering system will operate. The heated steering system will turn off when the steering wheel temperature reaches approximately 86° F (30° C). Heated steering system operation can also be canceled by pressing the heated steering wheel switch again. If the surface temperature of the steering wheel is below 68° F (20° C), the system will heat the steering wheel and cycle off and on to maintain a temperature above 68° F (20° C). The indicator light will remain on as long as the system is on.



# AUTOMATIC DRIVE POSITIONER CONTROL UNIT

< ECU DIAGNOSIS INFORMATION >

## ECU DIAGNOSIS INFORMATION

### AUTOMATIC DRIVE POSITIONER CONTROL UNIT

#### List of ECU Reference

INFOID:0000000012551626

ECU	Reference
ADP Control Unit	<a href="#">ADP-36, "Reference Value"</a>

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# STEERING COLUMN

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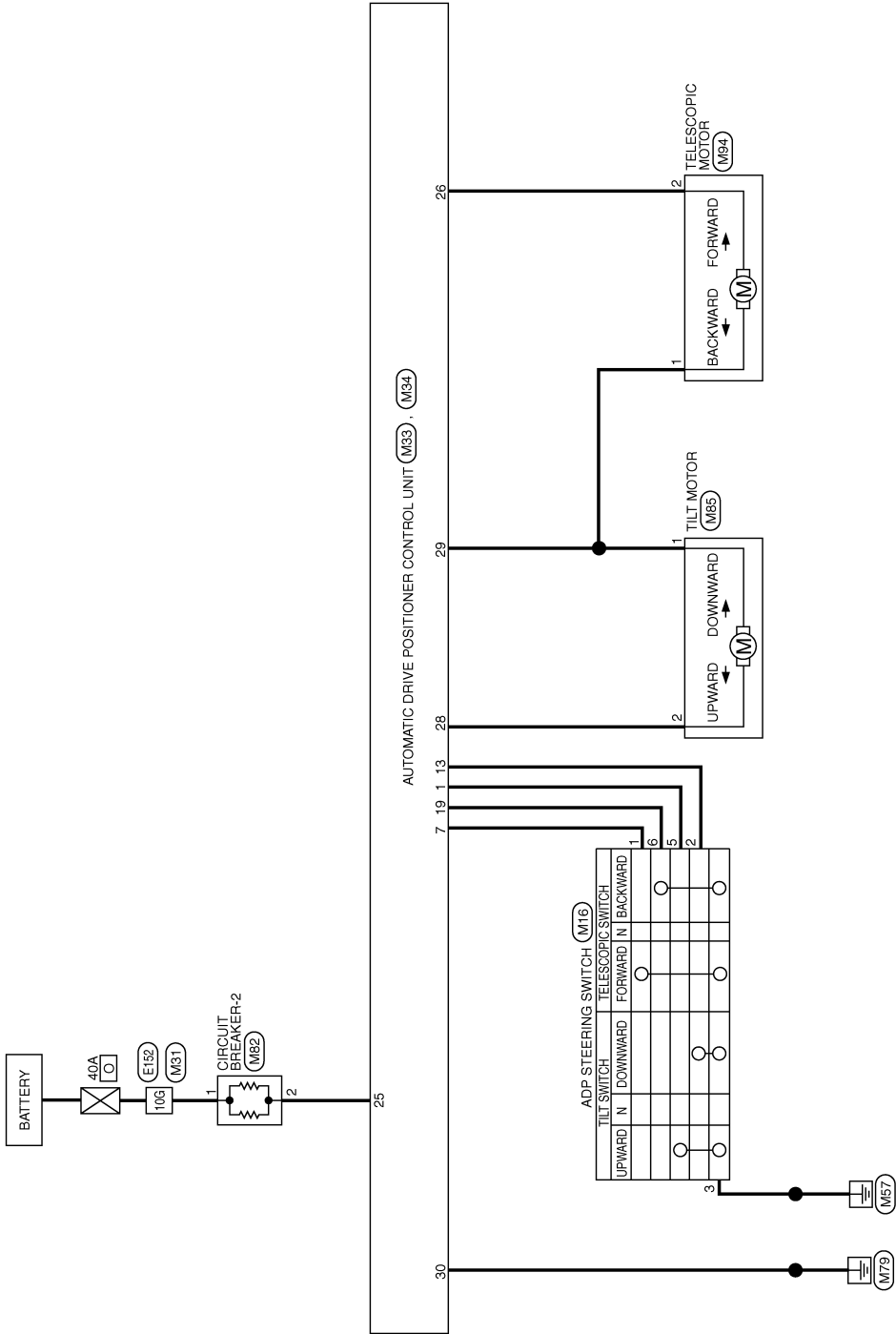
## WIRING DIAGRAM

### STEERING COLUMN

Wiring Diagram

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#### TILT & TELESCOPIC STEERING COLUMN



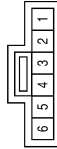
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# STEERING COLUMN

< WIRING DIAGRAM >

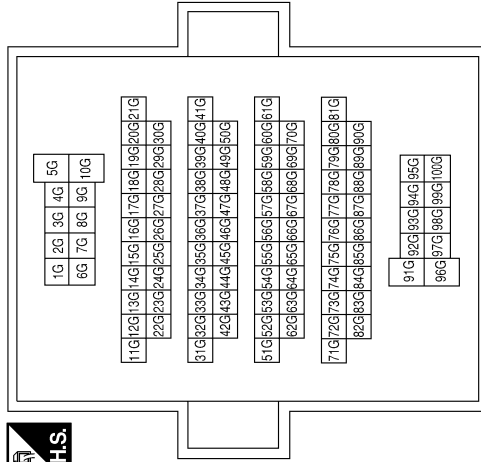
## TILT & TELESCOPIC STEERING COLUMN CONNECTORS

Connector No.	M16
Connector Name	ADP STEERING SWITCH
Connector Color	GRAY



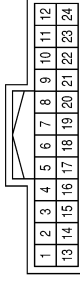
Terminal No.	Color of Wire	Signal Name
1	BR	-
2	Y	-
3	B	-
5	LG	-
6	L	-

Connector No.	M31
Connector Name	WIRE TO WIRE
Connector Color	WHITE



Terminal No.	Color of Wire	Signal Name
10G	W	-

Connector No.	M33
Connector Name	AUTOMATIC DRIVE POSITIONER CONTROL UNIT
Connector Color	WHITE



Terminal No.	Color of Wire	Signal Name
1	LG	TILT SW (UPWARD)
7	BR	TELESCOPIC SW (FRONTWARD)
13	Y	TILT SW (DOWNWARD)
19	L	TELESCOPIC SW (BACKWARD)

Connector No.	M34
Connector Name	AUTOMATIC DRIVE POSITIONER CONTROL UNIT
Connector Color	WHITE



Terminal No.	Color of Wire	Signal Name
25	L	BAT (PTC)
26	V	TELESCOPIC MOTOR (BACKWARD)
28	SB	TILT MOTOR (DOWNWARD)
29	BR	STG MOTOR COMMON (UPWARD/FORWARD)
30	B	GND (POWER)

Connector No.	M82
Connector Name	CIRCUIT BREAKER-2
Connector Color	WHITE



Terminal No.	Color of Wire	Signal Name
1	W	-
2	L	-

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# STEERING COLUMN

< WIRING DIAGRAM >

Connector No.	M94
Connector Name	TELESCOPIC MOTOR
Connector Color	BROWN



Terminal No.	Color of Wire	Signal Name
1	BR	-
2	V	-

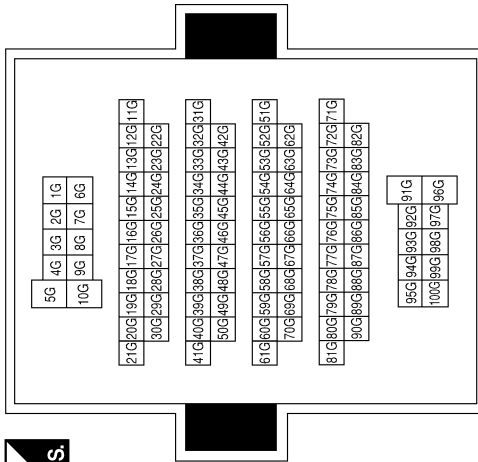
Connector No.	M85
Connector Name	TILT MOTOR
Connector Color	WHITE



Terminal No.	Color of Wire	Signal Name
1	BR	-
2	SB	-

Terminal No.	10G
Color of Wire	P
Signal Name	-

Connector No.	E152
Connector Name	WIRE TO WIRE
Connector Color	WHITE



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# HEATED STEERING WHEEL

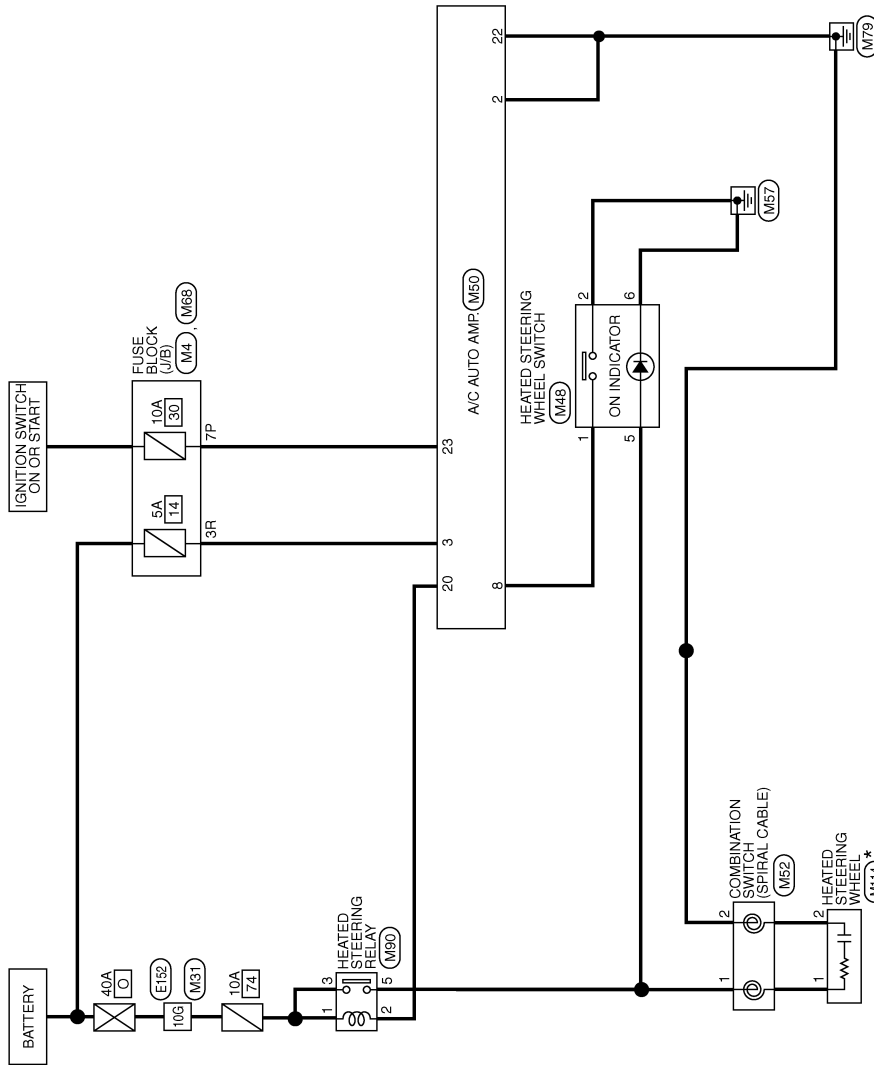
< WIRING DIAGRAM >

## HEATED STEERING WHEEL

Wiring Diagram

INFOID:000000012551628

### HEATED STEERING WHEEL



\*: THIS CONNECTOR IS NOT SHOWN IN "HARNES LAYOUT" OF PG SECTION.

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# HEATED STEERING WHEEL

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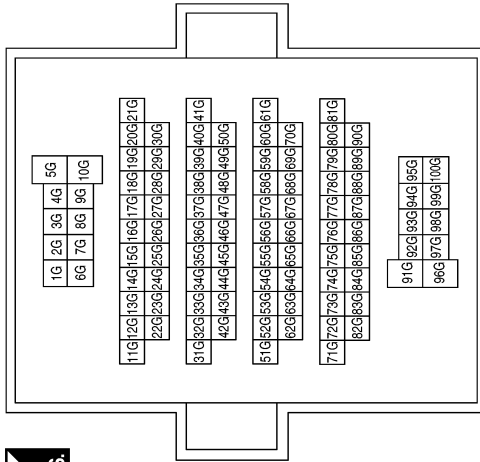
## HEATED STEERING WHEEL CONNECTORS

Connector No.	M4
Connector Name	FUSE BLOCK (J/B)
Connector Color	WHITE



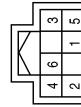
Terminal No.	Color of Wire	Signal Name
7P	LG	-

Connector No.	M31
Connector Name	WIRE TO WIRE
Connector Color	WHITE



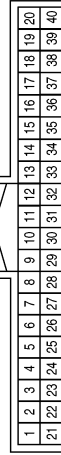
Terminal No.	Color of Wire	Signal Name
10G	W	-

Connector No.	M48
Connector Name	HEATED STEERING WHEEL SWITCH
Connector Color	BLUE



Terminal No.	Color of Wire	Signal Name
1	G	-
2	GR	-
5	Y	-
6	B	-

Connector No.	M50
Connector Name	A/C AUTO AMP.
Connector Color	WHITE



Terminal No.	Color of Wire	Signal Name
20	BR	STRG HTR RLY
22	GR	GND (POWER)
23	LG	IGN

Terminal No.	Color of Wire	Signal Name
2	GR	GND
3	G	BATT
8	G	STRG HTR SW

# HEATED STEERING WHEEL

< WIRING DIAGRAM >

Connector No.	M52
Connector Name	COMBINATION SWITCH (SPIRAL CABLE)
Connector Color	WHITE



Terminal No.	Color of Wire	Signal Name
1	Y	-
2	B	-

Connector No.	M68
Connector Name	FUSE BLOCK (J/B)
Connector Color	BROWN



Terminal No.	Color of Wire	Signal Name
3R	G	-

Connector No.	M90
Connector Name	HEATED STEERING RELAY
Connector Color	BLUE



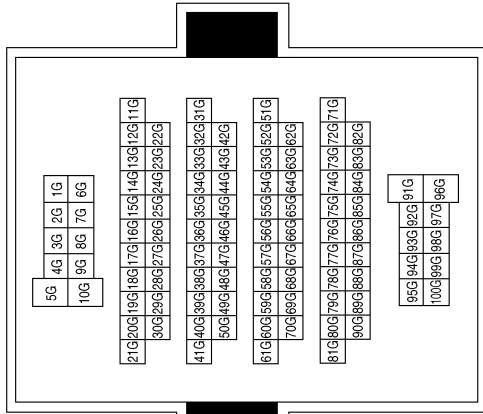
Terminal No.	Color of Wire	Signal Name
1	LG	-
2	BR	-
3	LG	-
5	Y	-

Connector No.	M114
Connector Name	HEATED STEERING WHEEL
Connector Color	WHITE



Terminal No.	Color of Wire	Signal Name
1	Y	-
2	L	-

Connector No.	E152
Connector Name	WIRE TO WIRE
Connector Color	WHITE



Terminal No.	Color of Wire	Signal Name
10G	P	-

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# DIAGNOSIS AND REPAIR WORK FLOW

< BASIC INSPECTION >

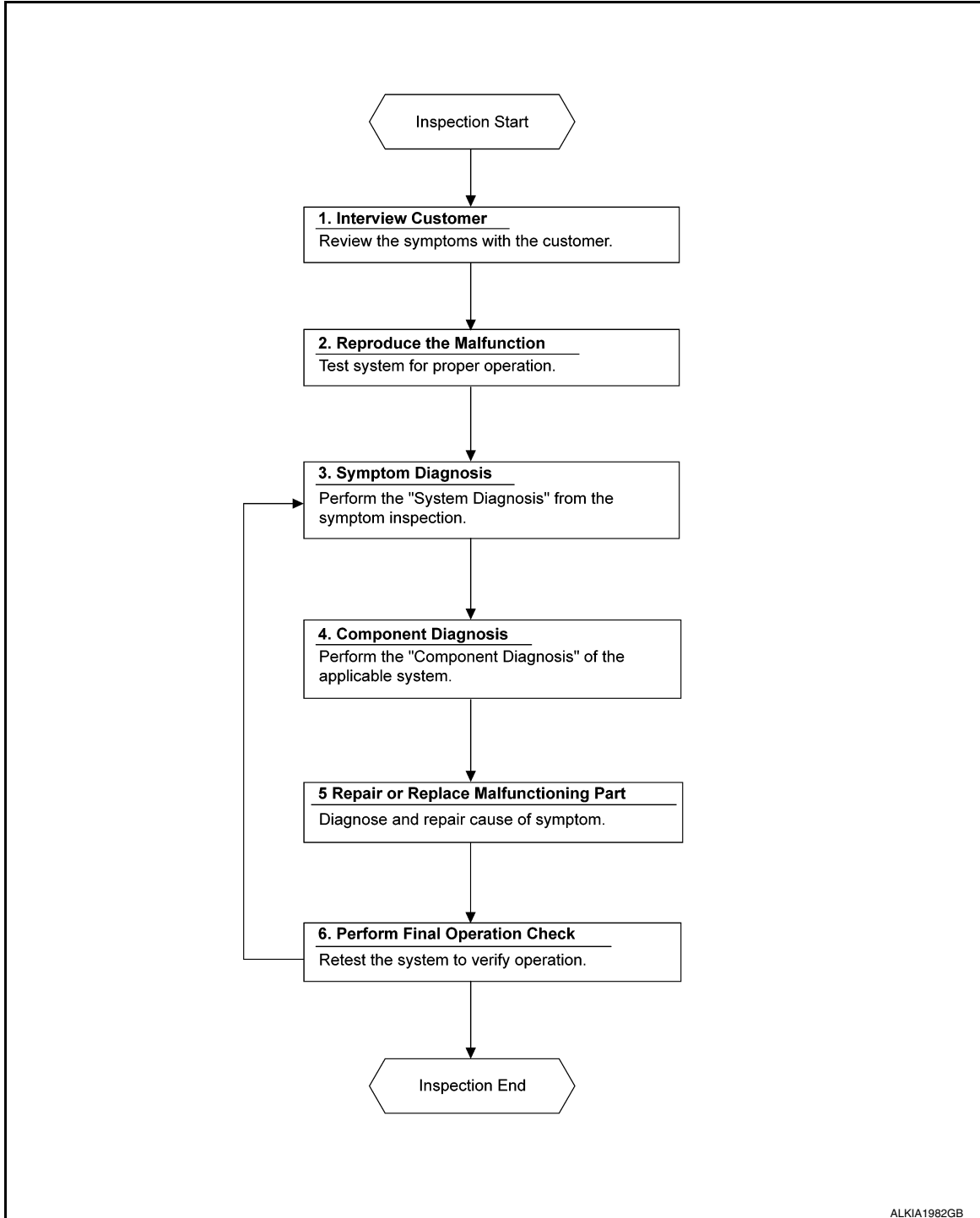
## BASIC INSPECTION

### DIAGNOSIS AND REPAIR WORK FLOW

Work Flow

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#### OVERALL SEQUENCE



#### DETAILED FLOW

##### 1. OBTAIN INFORMATION ABOUT SYMPTOM

Interview the customer to obtain as much information as possible about the conditions and environment under which the malfunction occurred.



# DIAGNOSIS AND REPAIR WORK FLOW

## < BASIC INSPECTION >

---

>> GO TO 2.

### 2. CONFIRM THE SYMPTOM

---

Check the malfunction on the vehicle that the customer describes.  
Inspect the relation of the symptoms and the condition when the symptoms occur.

>> GO TO 3.

### 3. IDENTIFY THE MALFUNCTIONING SYSTEM WITH SYMPTOM DIAGNOSIS

---

Use Symptom diagnosis from the symptom inspection result in step 2 and then identify where to start performing the diagnosis based on possible causes and symptoms. Refer to [ST-41, "Symptom Table"](#).

>> GO TO 4.

### 4. PERFORM THE COMPONENT DIAGNOSIS OF THE OF THE APPLICABLE SYSTEM

---

Perform the diagnosis with Component diagnosis of the applicable system.

>> GO TO 5.

### 5. REPAIR OR REPLACE THE MALFUNCTIONING PARTS

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Repair or replace the specified malfunctioning parts.

>> GO TO 6.

### 6. FINAL CHECK

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Check that malfunctions are not reproduced when obtaining the malfunction information from the customer, referring to the symptom inspection result in step 2.

Are the malfunctions corrected?

YES >> Inspection End.

NO >> GO TO 3.

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# POWER STEERING FLUID

< BASIC INSPECTION >

## POWER STEERING FLUID

### Inspection

INFOID:000000012551630

#### FLUID LEVEL

Check power steering fluid level at the scale on the power steering reservoir cap indicator.

- Check power steering fluid level with engine stopped and the fluid temp between 0 – 30° C (32 – 86° F).
- Power steering fluid level should be between the hatching area on the power steering reservoir cap indicator.

#### CAUTION:

- Do not overfill.
- Do not reuse used power steering fluid.
- Recommended power steering fluid is Genuine NISSAN E-PSF or equivalent. Refer to [MA-17, "FOR USA AND CANADA : Fluids and Lubricants"](#) (United States and Canada) or [MA-19, "FOR MEXICO : Fluids and Lubricants"](#) (Mexico).

#### NOTE:

Power steering fluid level marks are on the reservoir and also on the power steering reservoir cap indicator.

#### FLUID LEAKAGE

Check the power steering hydraulic system for leaks, cracks, damage, loose connections, chafing or deterioration. Repair or replace as necessary.

1. Start engine and allow engine to idle.
2. Turn steering wheel right-to-left several times.
3. Hold steering wheel at each "lock" position for five seconds to check fluid leakage.

#### CAUTION:

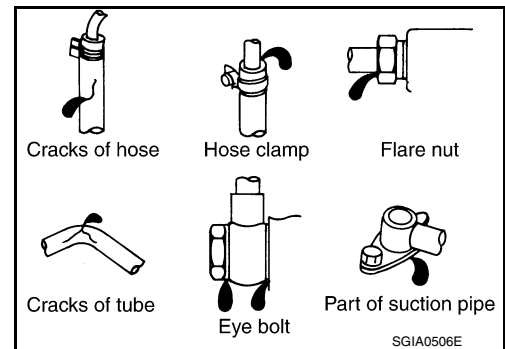
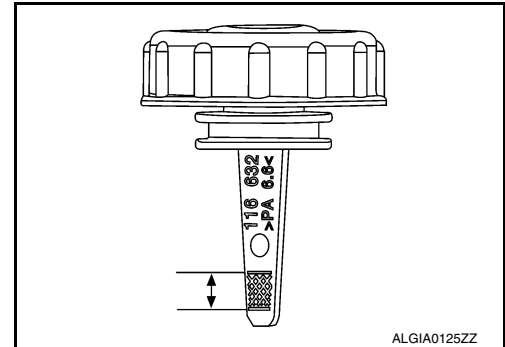
**Do not hold steering wheel in a locked position for more than 10 seconds. Damage to power steering oil pump may occur.**

4. If power steering fluid leakage at connections is noticed, loosen flare nut and retighten.

#### CAUTION:

**Do not over tighten flare nut as damage to O-ring and connection can occur.**

5. If power steering fluid leakage from the power steering oil pump is noticed, repair connection or replace power steering oil pump. Refer to [ST-53, "Removal and Installation"](#).
6. Check steering gear boots for accumulation of power steering fluid. Power steering fluid indicates a leak from the power steering gear, replace as necessary. Refer to [ST-58, "Removal and Installation - 2WD"](#) (2WD) or [ST-60, "Removal and Installation - 4WD"](#) (4WD).



# STEERING WHEEL

< BASIC INSPECTION >

## STEERING WHEEL

### Inspection

INFOID:000000012551631

#### CONDITION OF INSTALLATION

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

**Steering wheel axial end play**

**: Refer to [ST-66, "Steering Wheel"](#).**

- Verify that the power steering gear nuts are tightened to specification. Refer to [ST-58, "Exploded View"](#).

#### STEERING WHEEL PLAY

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

**Steering wheel play**

**: Refer to [ST-66, "Steering Wheel"](#).**

#### NEUTRAL POSITION ON STEERING WHEEL

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

1. Turn tires straight ahead, check if steering wheel is in the neutral position.
2. If it is not in the neutral position, remove steering wheel and reinstall it correctly.
3. If the neutral position cannot be attained by repositioning the steering wheel two teeth or less on steering stem, loosen tie-rod lock nuts of power steering gear outer sockets, then adjust tie-rods by the same amount in the opposite direction.

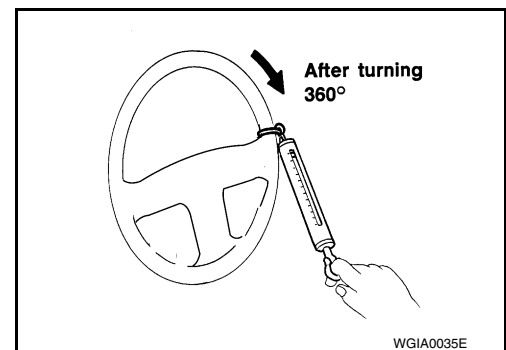
#### STEERING WHEEL TURNING FORCE

1. Park vehicle on a level, dry surface and set parking brake.
2. Start engine.
3. Bring power steering fluid up to operating temperature.
4. Verify that the tires are inflated to the specified pressure. Refer to [WT-67, "Tire Air Pressure"](#).
5. 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** : Refer to [ST-66, "Steering Wheel"](#).

6. If steering wheel turning force is out of specification, inspect steering column. Refer to [ST-21, "Inspection"](#).
7. If steering column meets specification, inspect steering gear. Refer to [ST-23, "Inspection"](#).

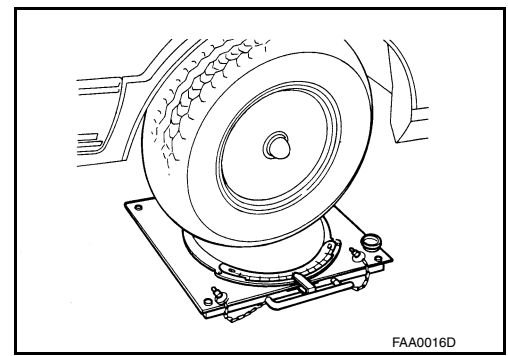


#### CHECKING FRONT WHEEL TURNING ANGLE

# STEERING WHEEL

## < BASIC INSPECTION >

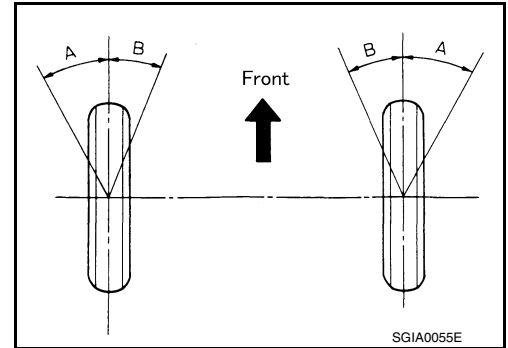
- Check front wheel turning angle after toe-in inspection. Place front wheels on turning radius gauges and rear wheels on stands. Check the maximum inner and outer wheel turning angles for LH and RH road wheels.



- Measure the turning angles with the engine at idle, then turn the steering wheel from full left stop to full right stop and measure the turning angle. Refer to [ST-66, "Steering Angle"](#).

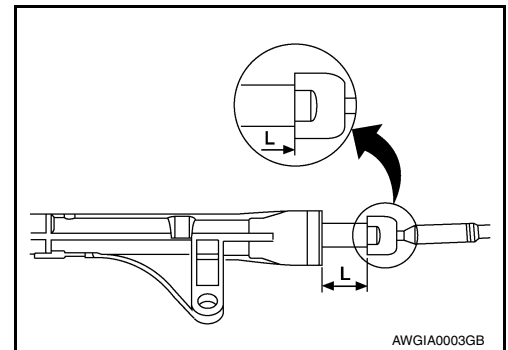
**Inner wheel angle (A)** : Refer to [ST-66, "Steering Angle"](#).

**Outer wheel angle (B)** : Refer to [ST-66, "Steering Angle"](#).



- Measure the rack stroke specification with vehicle in neutral position. Refer to [ST-67, "Power Steering Gear"](#).

**Rack stroke in neutral position (L)** : Refer to [ST-67, "Power Steering Gear"](#).



# STEERING COLUMN

< BASIC INSPECTION >

## STEERING COLUMN

### Inspection

INFOID:000000012551632

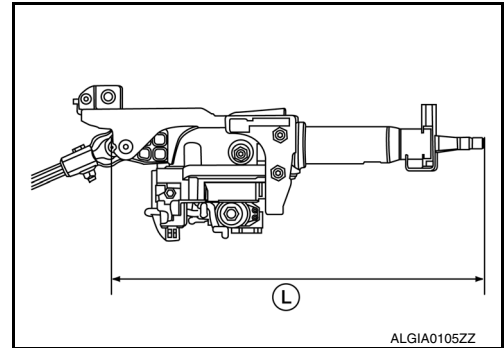
#### HOLE COVER SEAL, HOLE COVER AND LOWER SHAFT

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

#### STEERING COLUMN

- Check each part of steering column for damage or other malfunctions. Replace entire steering column if any parts are damaged.
- Measure the length (L) as shown if vehicle has been involved in a minor collision. Replace steering column if outside the specifications.

**Steering column length (L)** : Refer to [ST-66, "Steering Column"](#).



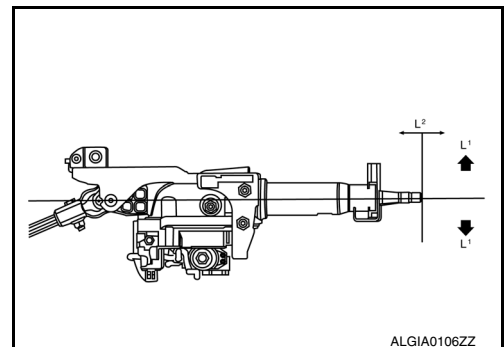
- Measure steering column rotating torque using suitable tool. Replace steering column if outside the standard.

**Rotating torque** : Refer to [ST-66, "Steering Column"](#).

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

**Tilt operating range ( $L^1$ )** : Refer to [ST-66, "Steering Column"](#).

**Telescopic operating range ( $L^2$ )** : Refer to [ST-66, "Steering Column"](#).



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# POWER STEERING OIL PUMP

< BASIC INSPECTION >

## POWER STEERING OIL PUMP

### Inspection

INFOID:000000012551633

#### RELIEF OIL PRESSURE

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-43, "Air Bleeding Hydraulic System"](#).

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

2. Start engine. Run engine until power steering fluid temperature reaches 50° - 80°C (122° - 176°F).

**CAUTION:**

- Leave the valve of the hydraulic pressure gauge 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 fluid temperature.
- Be sure to keep hose clear of belts and other parts when engine is started.

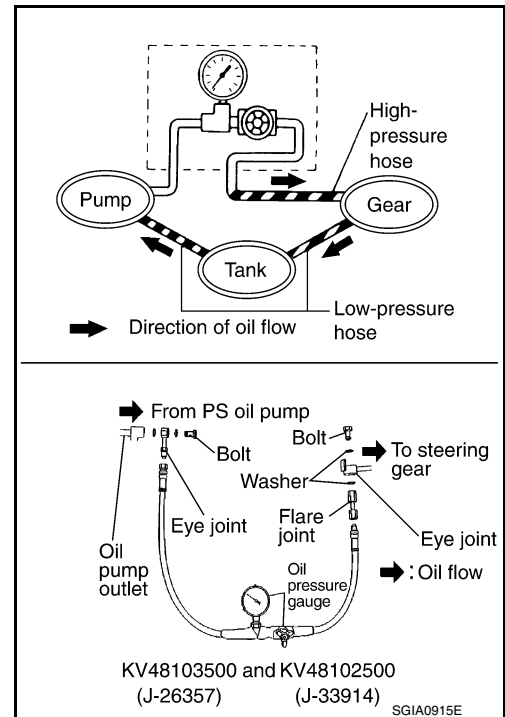
3. Fully close the Tool valve with engine at idle and measure the relief oil pressure.

**Relief oil pressure** : Refer to [ST-68, "Power Steering Oil Pump"](#)

**CAUTION:**

**Do not keep valve closed for 10 seconds or longer.**

4. Open the valve slowly after measuring. Replace oil pump if 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-43, "Air Bleeding Hydraulic System"](#).



# STEERING GEAR AND LINKAGE

< BASIC INSPECTION >

## STEERING GEAR AND LINKAGE

### Inspection

INFOID:000000012551634

#### BOOT

Check boot for cracks. Replace if any damage is found.

#### OUTER SOCKET AND INNER SOCKET

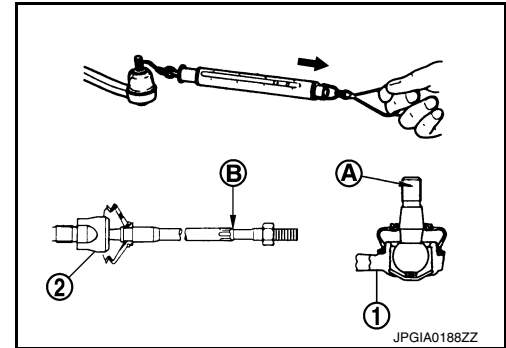
- Ball joint swinging torque
- Hook the Tool at the measuring point and pull the Tool. Make sure that the Tool reads the specified value when ball stud and inner socket start to move. Replace outer socket or inner socket if the measured values are outside the standard.

Measuring point of outer socket (1) : Ball stud upper side (A)

Measuring point of inner socket (2) : Point (B) as shown

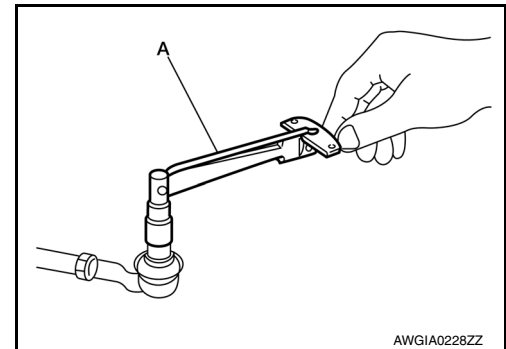
**Tool number** : — (J-44372)

**Swinging torque** : Refer to [ST-67, "Power Steering Gear"](#).



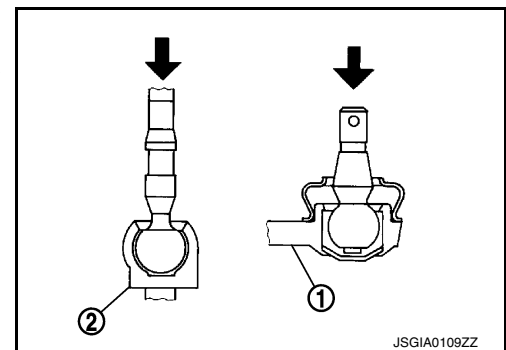
- Ball joint rotating torque
- Make sure that the reading is within the following specified range using suitable tool (A). Replace outer socket if the reading is outside the specification.

**Rotating torque** : Refer to [ST-67, "Power Steering Gear"](#).



- Ball joint axial end play
- Apply an axial load of 490 N (50 kg, 111 lb) to ball stud. Measuring the amount of stud movement using a suitable tool, make sure that the value is within specification. Replace outer socket (1) and inner socket (2) if the measured value is outside specification.

**Axial end play** : Refer to [ST-67, "Power Steering Gear"](#).



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# POWER SUPPLY AND GROUND CIRCUIT

< DTC/CIRCUIT DIAGNOSIS >

## DTC/CIRCUIT DIAGNOSIS

### POWER SUPPLY AND GROUND CIRCUIT

#### AUTOMATIC DRIVE POSITIONER CONTROL UNIT

#### AUTOMATIC DRIVE POSITIONER CONTROL UNIT : Diagnosis Procedure

INFOID:000000012551635

#### NOTE:

Do not disconnect the battery negative terminal and the driver seat control unit connector until DTC is confirmed with CONSULT.

Regarding Wiring Diagram information, refer to [ST-10. "Wiring Diagram"](#).

### 1. CHECK POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect automatic drive positioner control unit.
3. Check voltage between automatic drive positioner control unit harness connector and ground.

(+)		(-)	Voltage (V) (Approx.)
Automatic drive positioner control unit			
Connector	Terminal		
M34	25	Ground	Battery voltage

#### Is the inspection result normal?

YES >> GO TO 2.

- NO >> Check the following.
- Repair or replace harness.
  - Circuit breaker-2.

### 2. CHECK GROUND CIRCUIT

Check continuity between the automatic drive positioner control unit harness connector and ground.

Automatic drive positioner control unit		Ground	Continuity
Connector	Terminal		
M34	30		Yes

#### Is the inspection result normal?

YES >> Inspection End.

NO >> Repair or replace harness.



# TILT SWITCH

< DTC/CIRCUIT DIAGNOSIS >

## TILT SWITCH

### Description

INFOID:000000012551636

ADP steering switch (tilt switch) is equipped to the steering column. The operation signal is input to the automatic drive positioner control unit when the ADP steering switch is operated.

### Component Function Check

INFOID:000000012551637

#### 1. CHECK FUNCTION

1. Select "TILT SW-UP", "TILT SW-DOWN" in "DATA MONITOR" mode with CONSULT.
2. Check tilt switch signal under the following conditions.

Monitor item	Condition		Status
TILT SW-UP	Tilt switch (up)	Operate	ON
		Release	OFF
TILT SW-DOWN	Tilt switch (down)	Operate	ON
		Release	OFF

Is the inspection result normal?

- YES >> Inspection End.  
 NO >> Perform diagnosis procedure. Refer to [ST-25, "Diagnosis Procedure"](#).

### Diagnosis Procedure

INFOID:000000012551638

Regarding Wiring Diagram information, refer to [ST-10, "Wiring Diagram"](#).

#### 1. CHECK TILT SWITCH SIGNAL

1. Disconnect ADP steering switch (tilt switch).
2. Check voltage between ADP steering switch harness connector and ground.

(+)		(-)	Voltage (V) (Approx.)
Connector	Terminals		
M16	5	Ground	5
	2		

Is the inspection result normal?

- YES >> GO TO 3.  
 NO >> GO TO 2.

#### 2. CHECK TILT SWITCH CIRCUIT

1. Disconnect automatic drive positioner control unit.
2. Check continuity between automatic drive positioner control unit harness connector and ADP steering switch harness connector.

Automatic drive positioner control unit		ADP steering switch (tilt switch)		Continuity
Connector	Terminal	Connector	Terminal	
M33	1	M16	5	Yes
	13		2	

3. Check continuity between automatic drive positioner control unit harness connector and ground.

# TILT SWITCH

## < DTC/CIRCUIT DIAGNOSIS >

Automatic drive positioner control unit		Ground	Continuity
Connector	Terminal		
M33	1		
	13		

### Is the inspection result normal?

- YES >> Replace automatic drive positioner unit. Refer to [ADP-164, "Removal and Installation"](#).  
 NO >> Repair or replace harness.

## 3. CHECK TILT SWITCH

Refer to [ST-26, "Component Inspection"](#).

### Is the inspection result normal?

- YES >> GO TO 4.  
 NO >> Replace ADP steering switch (tilt switch). Refer to [ADP-167, "Removal and Installation"](#).

## 4. CHECK INTERMITTENT INCIDENT

Refer to [GI-47, "Intermittent Incident"](#).

>> Inspection End.

## Component Inspection

INFOID:000000012551639

## 1. CHECK TILT SWITCH

- Turn ignition switch OFF.
- Disconnect ADP steering switch (tilt switch).
- Check continuity between ADP steering switch terminals.

ADP steering switch (tilt switch)		Condition	Continuity	
Terminal				
3	5	Tilt switch (up)	Operate	Yes
			Release	No
	2	Tilt switch (down)	Operate	Yes
			Release	No

### Is the inspection result normal?

- YES >> Inspection End.  
 NO >> Replace ADP steering switch (tilt switch). Refer to [ADP-167, "Removal and Installation"](#).

# TELESCOPIC SWITCH

< DTC/CIRCUIT DIAGNOSIS >

## TELESCOPIC SWITCH

### Description

INFOID:000000012551640

ADP steering switch (telescopic switch) is equipped to the steering column. The operation signal is input to the automatic drive positioner control unit when the telescopic switch is operated.

### Component Function Check

INFOID:000000012551641

#### 1. CHECK FUNCTION

1. Select "TELESCO SW-FR", "TELESCO SW-RR" in "DATA MONITOR" mode with CONSULT.
2. Check telescopic switch signal under the following conditions.

Monitor item	Condition		Status
TELESCO SW-FR	Telescopic switch (forward)	Operate	ON
		Release	OFF
TELESCO SW-RR	Telescopic switch (backward)	Operate	ON
		Release	OFF

Is the inspection result normal?

YES >> Inspection End.

NO >> Perform diagnosis procedure. Refer to [ST-27, "Diagnosis Procedure"](#).

### Diagnosis Procedure

INFOID:000000012551642

Regarding Wiring Diagram information, refer to [ST-10, "Wiring Diagram"](#).

#### 1. CHECK TELESCOPIC SWITCH SIGNAL

1. Disconnect ADP steering switch (telescopic switch).
2. Check voltage between ADP steering switch harness connector and ground.

(+)		(-)	Voltage (V) (Approx.)
ADP steering switch (telescopic switch)			
Connector	Terminals	Ground	5
M16	1		
	6		

Is the inspection result normal?

YES >> GO TO 3.

NO >> GO TO 2.

#### 2. CHECK TELESCOPIC SWITCH CIRCUIT

1. Disconnect automatic drive positioner control unit.
2. Check continuity between automatic drive positioner control unit harness connector and ADP steering switch harness connector.

Automatic drive positioner control unit		ADP steering switch (telescopic switch)		Continuity
Connector	Terminal	Connector	Terminal	
M33	7	M16	1	Yes
	19		6	

3. Check continuity between automatic drive positioner control unit harness connector and ground.

# TELESCOPIC SWITCH

## < DTC/CIRCUIT DIAGNOSIS >

Automatic drive positioner control unit		Ground	Continuity
Connector	Terminal		
M33	7		No
	19		

### Is the inspection result normal?

- YES >> Replace automatic drive positioner unit. Refer to [ADP-164, "Removal and Installation"](#).  
 NO >> Repair or replace harness.

## 3. CHECK TELESCOPIC SWITCH

Refer to [ST-28, "Component Inspection"](#).

### Is the inspection result normal?

- YES >> GO TO 4.  
 NO >> Replace ADP steering switch (telescopic switch). Refer to [ADP-167, "Removal and Installation"](#).

## 4. CHECK INTERMITTENT INCIDENT

Refer to [GI-47, "Intermittent Incident"](#).

>> Inspection End.

## Component Inspection

INFOID:000000012551643

## 1. CHECK TELESCOPIC SWITCH

1. Turn ignition switch OFF.
2. Disconnect ADP steering switch (telescopic switch).
3. Check continuity between ADP steering switch terminals.

ADP steering switch (telescopic switch)		Condition		Continuity
Terminal				
3	1	Telescopic switch (forward)	Operate	Yes
			Release	No
	6	Telescopic switch (backward)	Operate	Yes
			Release	No

### Is the inspection result normal?

- YES >> Inspection End.  
 NO >> Replace ADP steering switch (telescopic switch). Refer to [ADP-167, "Removal and Installation"](#).

# TILT & TELESCOPIC SWITCH GROUND CIRCUIT

< DTC/CIRCUIT DIAGNOSIS >

## TILT & TELESCOPIC SWITCH GROUND CIRCUIT

### Diagnosis Procedure

INFOID:000000012551644

Regarding Wiring Diagram information, refer to [ST-10, "Wiring Diagram"](#).

### 1. CHECK ADP STEERING SWITCH (TILT & TELESCOPIC SWITCH) GROUND CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect ADP steering switch (tilt & telescopic switch).
3. Check continuity between ADP steering switch (tilt & telescopic switch) and ground.

ADP steering switch (tilt & telescopic switch)		Ground	Continuity
Connector	Terminal		
M16	3		Yes

Is the inspection result normal?

- YES >> Check intermittent incident. Refer to [GI-47, "Intermittent Incident"](#).  
NO >> Repair or replace harness.

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# TILT MOTOR

< DTC/CIRCUIT DIAGNOSIS >

## TILT MOTOR

### Description

INFOID:000000012551645

- The tilt motor is installed to the steering column assembly.
- The tilt motor is activated with the automatic drive positioner control unit.
- The steering column is tilted upward/downward by changing the rotation direction of tilt motor.

### Component Function Check

INFOID:000000012551646

#### 1. CHECK FUNCTION

1. Select "TILT MOTOR" in "ACTIVE TEST" mode with CONSULT.
2. Check the tilt motor operation.

Test item		Description	
TILT MOTOR	OFF	Steering tilt	Stop
	UP		Upward
	DWN		Downward

Is the operation of relevant parts normal?

YES >> Inspection End.

NO >> Perform diagnosis procedure. Refer to [ST-30, "Diagnosis Procedure"](#).

### Diagnosis Procedure

INFOID:000000012551647

Regarding Wiring Diagram information, refer to [ST-10, "Wiring Diagram"](#).

#### 1. CHECK TILT MOTOR POWER SUPPLY

1. Turn ignition switch OFF.
2. Disconnect tilt motor.
3. Turn the ignition switch ON.
4. Perform "ACTIVE TEST" ("TILT MOTOR") with CONSULT.
5. Check voltage between tilt motor harness connector and ground.

(+)		(-)	Condition	Voltage (V) (Approx.)	
Tilt motor					
Connector	Terminals				
M85	2	Ground	TILT MOTOR	OFF	0
				UP	0
				DWN (down)	Battery voltage
	1			OFF	0
				UP	Battery voltage
				DWN (down)	0

Is the inspection result normal?

YES >> Replace tilt motor. Refer to [ST-47, "Removal and Installation"](#).

NO >> GO TO 2.

#### 2. CHECK TILT MOTOR CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect automatic drive positioner control unit.
3. Check continuity between automatic drive positioner control unit harness connector and tilt motor harness connector.

# TILT MOTOR

## < DTC/CIRCUIT DIAGNOSIS >

Automatic drive positioner control unit		Tilt motor		Continuity
Connector	Terminal	Connector	Terminal	
M34	28	M85	2	Yes
	29		1	

4. Check continuity between automatic drive positioner control unit harness connector and ground.

Automatic drive positioner control unit		Ground	Continuity
Connector	Terminal		
M34	28		No
	29		

Is the inspection result normal?

- YES >> Replace automatic drive positioner control unit. Refer to [ADP-164, "Removal and Installation"](#).  
 NO >> Repair or replace harness.

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# TELESCOPIC MOTOR

< DTC/CIRCUIT DIAGNOSIS >

## TELESCOPIC MOTOR

### Description

INFOID:000000012551648

- The telescopic motor is installed to the steering column assembly.
- The telescopic motor is activated with the automatic drive positioner control unit.
- Compresses the steering column by changing the rotation direction of telescopic motor.

### Component Function Check

INFOID:000000012551649

#### 1. CHECK FUNCTION

1. Select "TELESCO MOTOR" in "ACTIVE TEST" mode with CONSULT.
2. Check the telescopic motor operation.

Test item		Description	
TELESCO MOTOR	OFF	Steering telescopic	Stop
	FR		Forward
	RR		Backward

Is the operation of relevant parts normal?

YES >> Inspection End.

NO >> Perform diagnosis procedure. Refer to [ST-32, "Diagnosis Procedure"](#).

### Diagnosis Procedure

INFOID:000000012551650

Regarding Wiring Diagram information, refer to [ST-10, "Wiring Diagram"](#).

#### 1. CHECK TELESCOPIC MOTOR POWER SUPPLY

1. Turn ignition switch OFF.
2. Disconnect telescopic motor.
3. Turn the ignition switch ON.
4. Perform "ACTIVE TEST" ("TELESCO MOTOR") with CONSULT.
5. Check voltage between telescopic motor harness connector and ground.

(+)		(-)	Condition	Voltage (V) (Approx.)	
Connector	Terminals				
M94	2	Ground	TELE- SCOPIC MOTOR	OFF	0
			FR (forward)	0	
			RR (backward)	Battery voltage	
	1		OFF	0	
			FR (forward)	Battery voltage	
			RR (backward)	0	

Is the inspection result normal?

YES >> Replace telescopic motor. Refer to [ST-47, "Removal and Installation"](#).

NO >> GO TO 2.

#### 2. CHECK TELESCOPIC MOTOR CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect automatic drive positioner control unit.
3. Check continuity between automatic drive positioner control unit harness connector and telescopic motor harness connector.



# TELESCOPIC MOTOR

## < DTC/CIRCUIT DIAGNOSIS >

Automatic drive positioner control unit		Telescopic motor		Continuity
Connector	Terminal	Connector	Terminal	
M34	29	M94	1	Yes
	26		2	

4. Check continuity between automatic drive positioner control unit harness connector and ground.

Automatic drive positioner control unit		Ground	Continuity
Connector	Terminal		
M34	29		No
	26		

Is the inspection result normal?

- YES >> Replace automatic drive positioner control unit. Refer to [ADP-164, "Removal and Installation"](#).  
 NO >> Repair or replace harness.

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# HEATED STEERING WHEEL SYSTEM

< DTC/CIRCUIT DIAGNOSIS >

## HEATED STEERING WHEEL SYSTEM

### Component Function Check

INFOID:0000000012551651

#### 1. CHECK HEATED STEERING WHEEL SYSTEM

Check operation of heated steering wheel system. Refer to [ST-8, "HEATED STEERING WHEEL SYSTEM : System Description"](#).

Is the inspection result normal?

YES >> Inspection End.

NO >> Go to [ST-34, "Diagnosis Procedure"](#).

### Diagnosis Procedure

INFOID:0000000012551652

Regarding Wiring Diagram information, refer to [ST-13, "Wiring Diagram"](#).

#### 1. CHECK POWER CIRCUIT

1. Turn ignition switch OFF.
2. Remove the steering wheel. Refer to [ST-45, "Removal and Installation"](#).
3. Turn ignition switch ON.
4. Turn heated steering wheel switch ON.
5. Check voltage between heated steering wheel harness connector terminals.

Connector	Terminal		Voltage (Approx.)
	+	-	
M114	1	2	Battery voltage

Is the inspection result normal?

YES >> GO TO 2.

NO >> GO TO 3.

#### 2. CHECK HEATED STEERING WHEEL

Check heated steering wheel. Refer to [ST-37, "Component Inspection \(Heated Steering Wheel\)"](#).

Is the inspection result normal?

YES >> Inspection End.

NO >> Replace heated steering wheel. Refer to [ST-45, "Removal and Installation"](#).

#### 3. CHECK GROUND CIRCUIT

Check continuity between heated steering wheel harness connector terminal and ground.

Connector	Terminal	Ground	Continuity
M114	2	Ground	Yes

Is the inspection result normal?

YES >> GO TO 4.

NO >> Repair or replace harness or connector.

#### 4. CHECK HARNESS BETWEEN HEATED STEERING WHEEL RELAY AND HEATED STEERING WHEEL

1. Turn ignition switch OFF.
2. Disconnect heated steering wheel relay connector.
3. Check continuity between heated steering wheel relay harness connector terminal and heated steering wheel harness connector terminal.

Heated steering wheel relay		Heated steering wheel		Continuity
Connector	Terminal	Connector	Terminal	
M90	5	M114	1	Yes

# HEATED STEERING WHEEL SYSTEM

## < DTC/CIRCUIT DIAGNOSIS >

4. Check continuity between heated steering wheel relay harness connector terminal and ground.

Heated steering wheel relay		Ground	Continuity
Connector	Terminal		
M90	5		No

Is the inspection result normal?

YES >> GO TO 5.

NO >> Repair or replace harness or connector.

### 5. CHECK HEATED STEERING RELAY

Check heated steering relay. Refer to [ST-36, "Component Inspection \(Heated Steering Relay\)"](#).

Is the inspection result normal?

YES >> GO TO 6.

NO >> Replace heated steering relay.

### 6. CHECK POWER TO HEATED STEERING RELAY

Check the following.

- Battery
- Harness for open or short between battery and 10A fuse (No. 74)
- 10A fuse (No. 74)
- Harness for open or short between 10A fuse (No. 74) and heated steering relay

Is the inspection result normal?

YES >> GO TO 7.

NO >> Repair or replace damaged parts.

### 7. CHECK GROUND CIRCUIT

1. Disconnect heated steering wheel switch.
2. Check continuity between heated steering wheel switch harness connector terminal and ground.

Connector	Terminal	Ground	Continuity
M48	2		

Is the inspection result normal?

YES >> GO TO 8.

NO >> Repair or replace harness or connector.

### 8. CHECK HARNESS BETWEEN HEATED STEERING RELAY AND A/C AUTO AMP.

1. Disconnect A/C auto amp.
2. Check continuity between heated steering wheel relay harness connector terminal and A/C auto amp. harness connector terminal.

Heated steering relay		A/C Auto amp.		Continuity
Connector	Terminal	Connector	Terminal	
M90	2	M50	20	Yes

3. Check continuity between heated steering relay harness connector terminal and ground.

Heated steering relay		Ground	Continuity
Connector	Terminal		
M90	2		No

Is the inspection result normal?

YES >> GO TO 9.

NO >> Repair or replace harness or connector.

### 9. CHECK HARNESS BETWEEN A/C AUTO AMP. AND HEATED STEERING WHEEL SWITCH

1. Check continuity between A/C auto amp. harness connector terminal and heated steering wheel switch harness connector terminal.

# HEATED STEERING WHEEL SYSTEM

## < DTC/CIRCUIT DIAGNOSIS >

A/C Auto amp.		Heated steering wheel switch		Continuity
Connector	Terminal	Connector	Terminal	
M50	8	M48	1	Yes

2. Check continuity between A/C auto amp. harness connector terminal and ground.

A/C Auto amp.		Ground	Continuity
Connector	Terminal		
M50	8		No

Is the inspection result normal?

YES >> GO TO 10.

NO >> Repair or replace harness or connector.

### 10. CHECK HEATED STEERING WHEEL SWITCH

Check heated steering wheel switch. Refer to [ST-36, "Component Inspection \(Heated Steering Wheel Switch\)"](#).

Is the inspection result normal?

YES >> Replace A/C Auto amp. Refer to [HAC-156, "Removal and Installation"](#).

NO >> Replace heated steering wheel switch. Refer to [IP-25, "Removal and Installation"](#).

### Component Inspection (Heated Steering Wheel Switch)

INFOID:0000000012551653

#### 1. CHECK HEATED STEERING WHEEL SWITCH

1. Turn ignition switch OFF.
2. Remove the heated steering wheel switch. Refer to [IP-25, "Removal and Installation"](#).
3. Check continuity between heated steering wheel switch terminals.

Terminal		Condition	Continuity
1	2	switch pressed	Yes
		switch released	No

Is the inspection result normal?

YES >> GO TO 2.

NO >> Replace heated steering wheel switch.

#### 2. CHECK HEATED STEERING WHEEL SWITCH INDICATOR LAMP

Apply 12V direct current between heated steering wheel switch terminals and check that the indicator lamp turns ON.

Terminals		Condition	Indicator lamp status
+	-		
5	6	Apply 12V direct current between terminals	ON

Is the inspection result normal?

YES >> Inspection End.

NO >> Replace heated steering wheel switch.

### Component Inspection (Heated Steering Relay)

INFOID:0000000012551654

#### 1. CHECK HEATED STEERING RELAY CONTINUITY

1. Turn ignition switch OFF.
2. Remove heated steering relay. Refer to [ST-7, "HEATED STEERING WHEEL SYSTEM : Component Parts Location"](#).
3. Apply 12V direct current between heated steering relay terminals and check continuity.

# HEATED STEERING WHEEL SYSTEM

## < DTC/CIRCUIT DIAGNOSIS >

Terminal	Condition	Continuity
3 – 5	12V direct current applied between terminals 1 and 2.	Yes
	No current applied.	No

Is the inspection result normal?

- YES >> Inspection End.  
 NO >> Replace heated steering wheel relay.

### Component Inspection (Heated Steering Wheel)

INFOID:0000000012551655

#### 1. CHECK HEATED STEERING WHEEL CONTINUITY

1. Turn ignition switch OFF.
2. Remove the steering wheel. Refer to [ST-45. "Removal and Installation"](#).
3. Check continuity between steering wheel connector terminals.

Terminals	Condition	Continuity
1 – 2	Surface temperature of less than 30°C (86°F)	Yes
	Surface temperature of 30°C (86°F) or more	No

Is the inspection result normal?

- YES >> GO TO 2.  
 NO >> Replace heated steering wheel.

#### 2. CHECK HEATED STEERING WHEEL RESISTANCE

Check resistance between heated steering wheel connector terminals.

Terminals	Condition	Resistance
1 – 2	Surface temperature of 20°C (68°F)	1.7 – 2.17 Ω

Is the inspection result normal?

- YES >> Inspection End.  
 NO >> Replace heated steering wheel.

# HEATED STEERING WHEEL SWITCH INDICATOR LAMP

< DTC/CIRCUIT DIAGNOSIS >

## HEATED STEERING WHEEL SWITCH INDICATOR LAMP

### Component Function Check

INFOID:000000012551656

#### 1. CHECK HEATED STEERING WHEEL SWITCH INDICATOR LAMP

1. Turn ignition switch ON.
2. Turn heated steering wheel switch ON. Observe indicator.
3. Turn heated steering wheel switch OFF. Observe indicator.

Does heated steering wheel switch indicator lamp turn ON and then OFF?

- YES >> Inspection End.  
NO >> Go to [ST-38, "Diagnosis Procedure"](#).

### Diagnosis Procedure

INFOID:000000012551657

Regarding Wiring Diagram information, refer to [ST-13, "Wiring Diagram"](#).

#### 1. CHECK POWER CIRCUIT

1. Turn ignition switch OFF.
2. Remove the heated steering wheel switch. Refer to [IP-25, "Removal and Installation"](#).
3. Turn ignition switch ON.
4. Check voltage between heated steering wheel switch harness connector terminals.

Connector	Terminal		Voltage (Approx.)
	+	-	
M48	1	2	Battery voltage

Is the inspection result normal?

- YES >> GO TO 2.  
NO >> GO TO 7.

#### 2. CHECK GROUND CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect heated steering wheel switch connector.
3. Check continuity between heated steering wheel switch harness connector terminal and ground.

Connector	Terminal	Ground	Continuity
M48	6		Yes

Is the inspection result normal?

- YES >> GO TO 3.  
NO >> Repair harness or connector.

#### 3. CHECK HARNESS BETWEEN HEATED STEERING RELAY AND HEATED STEERING WHEEL SWITCH

1. Disconnect heated steering relay connector.
2. Check continuity between heated steering relay harness connector terminal and heated steering wheel switch harness connector terminal.

Heated steering relay		Heated steering wheel switch		Continuity
Connector	Terminal	Connector	Terminal	
M90	5	M48	5	Yes

3. Check continuity between heated steering relay harness connector terminal and ground.

Connector	Terminal	Ground	Continuity
M90	5		No

# HEATED STEERING WHEEL SWITCH INDICATOR LAMP

## < DTC/CIRCUIT DIAGNOSIS >

### Is the inspection result normal?

- YES >> GO TO 4.
- NO >> Repair harness or connector.

### 4.CHECK HEATED STEERING RELAY

Check heated steering relay. Refer to [ST-36, "Component Inspection \(Heated Steering Relay\)"](#).

### Is the inspection result normal?

- YES >> GO TO 5.
- NO >> Replace heated steering relay.

### 5.CHECK BATTERY POWER

Check the following:

- Battery
- Harness for open or short between battery and 10A fuse (No. 74)
- 10A fuse (No. 74)
- Harness for open or short between 10A fuse (No. 74) and heated steering wheel relay

### Is the inspection result normal?

- YES >> GO TO 6.
- NO >> Repair harness or connector.

### 6.CHECK HARNESS BETWEEN A/C AUTO AMP. AND HEATED STEERING WHEEL RELAY

1. Check continuity between A/C Auto amp. harness connector terminal and heated steering wheel relay harness connector terminal.

A/C Auto amp.		Heated steering wheel relay		Continuity
Connector	Terminal	Connector	Terminal	
M50	20	M90	2	Yes

2. Check continuity between A/C Auto amp. harness connector terminal and ground.

A/C auto amp.		Ground	Continuity
Connector	Terminal		
M50	20		No

### Is the inspection result normal?

- YES >> GO TO 9.
- NO >> Repair harness or connector.

### 7.CHECK HARNESS BETWEEN A/C AUTO AMP. AND HEATED STEERING WHEEL SWITCH

1. Check continuity between A/C auto amp. harness connector terminal and heated steering wheel switch harness connector terminal.

A/C Auto amp.		Heated steering wheel switch		Continuity
Connector	Terminal	Connector	Terminal	
M50	8	M48	1	Yes

2. Check continuity between A/C auto amp. harness connector terminal and ground.

A/C Auto amp.		Ground	Continuity
Connector	Terminal		
M50	8		No

### Is the inspection result normal?

- YES >> GO TO 8.
- NO >> Repair or replace harness or connector.

### 8.CHECK GROUND CIRCUIT

1. Disconnect heated steering wheel switch.

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

## HEATED STEERING WHEEL SWITCH INDICATOR LAMP

### < DTC/CIRCUIT DIAGNOSIS >

2. Check continuity between heated steering wheel switch harness connector terminal and ground.

Connector	Terminal	Ground	Continuity
M48	2		Yes

Is the inspection result normal?

YES >> GO TO 9.

NO >> Repair or replace harness or connector.

### 9.CHECK HEATED STEERING WHEEL SWITCH

Check heated steering wheel switch. Refer to [ST-36, "Component Inspection \(Heated Steering Wheel Switch\)"](#).

Is the inspection result normal?

YES >> Replace A/C Auto amp. Refer to [HAC-156, "Removal and Installation"](#).

NO >> Replace heated steering wheel switch. Refer to [IP-25, "Removal and Installation"](#).



# STEERING COLUMN

< SYMPTOM DIAGNOSIS >

## SYMPTOM DIAGNOSIS

### STEERING COLUMN

#### Symptom Table

INFOID:0000000012551658

#### STEERING COLUMN

Symptom	Inspection item
Tilt and telescopic functions are inoperative	Refer to <a href="#">ST-24, "AUTOMATIC DRIVE POSITIONER CONTROL UNIT : Diagnosis Procedure"</a> (power supply and ground circuit). Refer to <a href="#">ST-29, "Diagnosis Procedure"</a> (tilt and telescopic switch ground circuit).
Tilt function only is inoperative	Refer to <a href="#">ST-25, "Diagnosis Procedure"</a> (tilt switch). Refer to <a href="#">ST-30, "Diagnosis Procedure"</a> (tilt motor).
Telescopic function only is inoperative	Refer to <a href="#">ST-27, "Diagnosis Procedure"</a> (telescopic switch). Refer to <a href="#">ST-32, "Diagnosis Procedure"</a> (telescopic motor).

#### HEATED STEERING WHEEL

Symptom	Inspection item
Heated steering wheel system inoperative	Refer to <a href="#">ST-34, "Diagnosis Procedure"</a> .
Heated steering wheel switch indicator lamp inoperative	Refer to <a href="#">ST-38, "Diagnosis Procedure"</a> .

# NOISE, VIBRATION AND HARSHNESS (NVH) TROUBLESHOOTING

< SYMPTOM DIAGNOSIS >

## NOISE, VIBRATION AND HARSHNESS (NVH) TROUBLESHOOTING

### NVH Troubleshooting Chart

INFOID:000000012551659

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

Symptom	Steering	Reference page		Possible cause and SUSPECTED PARTS
		Reference page	Possible cause and SUSPECTED PARTS	
				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
				Improper steering wheel
				Improper installation or looseness of tilt lock lever
				Mounting rubber deterioration
				Steering column deformation or damage
				Improper installation or looseness of steering column
				Steering linkage looseness
				WHEEL HUB
				AXLE and SUSPENSION
				TIRES
				ROAD WHEEL
				DRIVE SHAFT
				BRAKES

x: Applicable

# POWER STEERING FLUID

< PERIODIC MAINTENANCE >

## PERIODIC MAINTENANCE

### POWER STEERING FLUID

#### Draining and Refilling

INFOID:000000012551660

#### DRAINING

1. Disconnect the high and low pressure piping from the power steering gear. Refer to [ST-55, "Exploded View"](#).
2. Drain power steering fluid into a suitable container.

#### REFILLING

1. Connect the high and low pressure piping to the power steering gear. Refer to [ST-55, "Exploded View"](#).
2. Fill power steering reservoir while checking power steering fluid level.
3. Bleed air from power steering hydraulic system. Refer to [ST-43, "Air Bleeding Hydraulic System"](#).
4. Check for power steering fluid leaks.

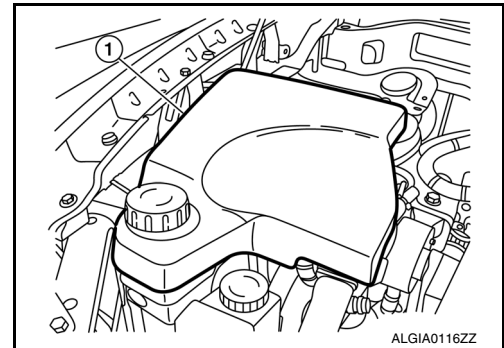
#### Air Bleeding Hydraulic System

INFOID:000000012551661

#### AIR BLEEDING HYDRAULIC SYSTEM

If air bleeding is not complete, excessive noise in the power steering oil pump will be present.

1. Make sure engine is off.
2. Remove power steering oil pump cover (1).



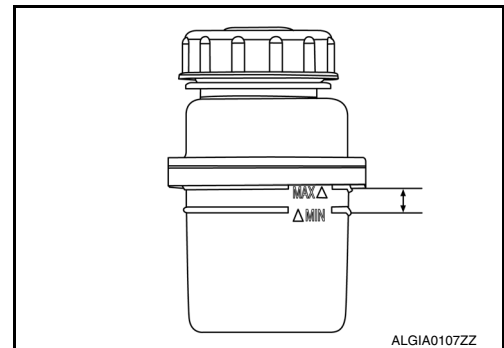
3. Turn the steering wheel from the full right stop position and then to full left stop position several times. Repeat until bubbles are no longer being generated in the reservoir.
4. When the power steering fluid level lowers, refill the reservoir.

**CAUTION:**

**Do not allow the power steering fluid level to drop below the MIN line.**

**NOTE:**

Power steering fluid level marks are on the outside of the power steering reservoir and also on the power steering reservoir cap indicator.

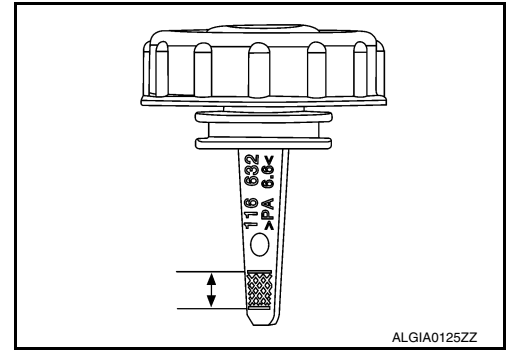


5. Repeat steps one and two until the power steering fluid level stabilizes.
6. Start the engine and run at idle.
7. Turn the steering wheel from the full right stop position and then to full left stop position several times. Repeat until bubbles or fluid discoloration are no longer being generated in the reservoir.
8. When the power steering fluid level lowers, refill the reservoir.
9. Stop the engine.

## POWER STEERING FLUID

### < PERIODIC MAINTENANCE >

10. Verify proper power steering fluid level. Power steering fluid level should be between the hatching area on the power steering reservoir cap indicator.



# STEERING WHEEL

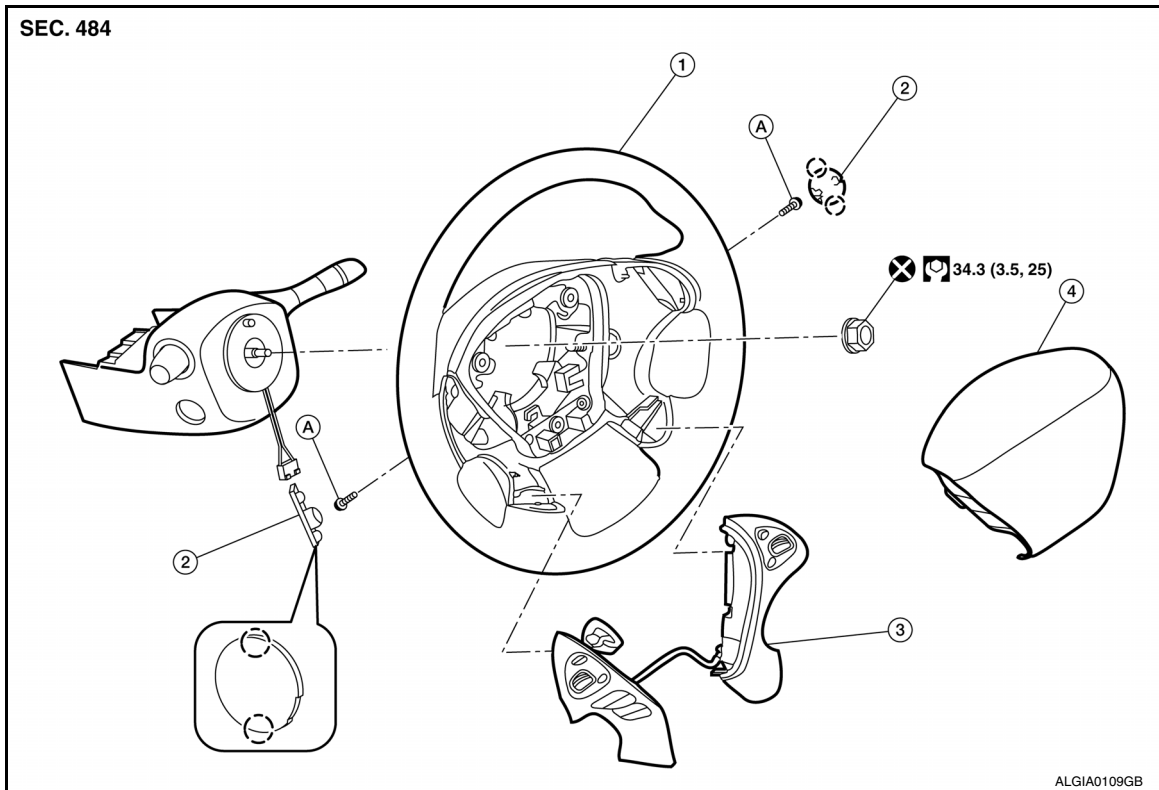
< REMOVAL AND INSTALLATION >

## REMOVAL AND INSTALLATION

### STEERING WHEEL

Exploded View

INFOID:000000012551662



- |                          |  |                      |
|--------------------------|--|----------------------|
| 1. Steering wheel        | 2. Cover   | 3. Steering switches |
| 4. Driver air bag module | A. Refer to <a href="#">SR-12, "Exploded View"</a> . | ⊗ Pawl               |

### Removal and Installation

INFOID:000000012551663

#### REMOVAL

1. Set the front wheels and tires in the straight-ahead position.
2. Remove driver air bag module. Refer to [SR-12, "Removal and Installation"](#).
3. Remove steering wheel lock nut.
4. Remove steering switches. Refer to [AV-45, "Removal and Installation"](#) (BASE AUDIO), [AV-191, "Removal and Installation"](#) (MID AUDIO), [AV-433, "Removal and Installation"](#) (PREMIUM AUDIO WITH NAVIGATION).
5. Remove steering wheel using suitable tool.  
**CAUTION:**  
Place a piece of tape across the spiral cable so it will not be rotated out of position.
6. Inspect steering wheel near the puller holes for damage. Replace as necessary.

#### INSTALLATION

Installation is in the reverse order of removal.

- Align spiral cable correctly before installing steering wheel. Make sure that the spiral cable is in the neutral position. Refer to [SR-15, "Removal and Installation"](#).

**CAUTION:**

- The spiral cable may snap due to steering operation if the cable is not installed in the correct position.

## STEERING WHEEL

### < REMOVAL AND INSTALLATION >

---

- **With the steering linkage disconnected, the cable may snap by turning the steering wheel beyond the limited number of turns.**
- Adjust the neutral position of the steering angle sensor. Refer to [BRC-221. "Description"](#).
- Tighten steering wheel lock nut to specification. Refer to [ST-45. "Exploded View"](#).

**CAUTION:**

**Do not reuse steering wheel lock nut.**

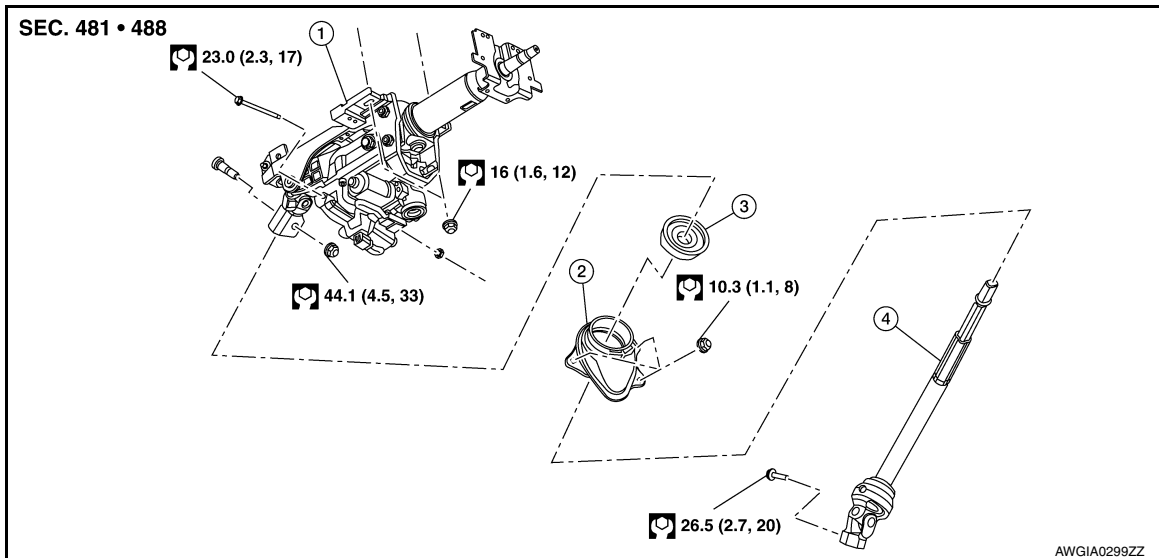
# STEERING COLUMN

< REMOVAL AND INSTALLATION >

## STEERING COLUMN

### Exploded View

INFOID:000000012551664



1. Steering column
2. Hole cover
3. Lower boot
4. Steering intermediate shaft

### Removal and Installation

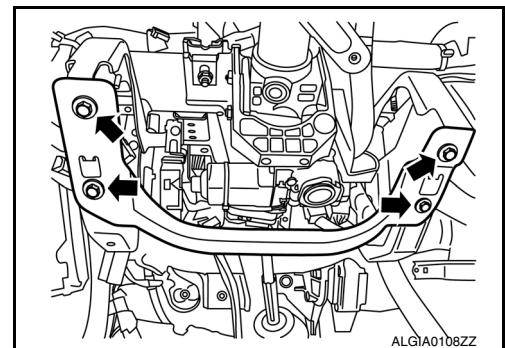
INFOID:000000012551665

#### CAUTION:

- Care must be taken not to give axial impact to steering column during removal and installation.
- Care must be taken not to move steering gear during removal of steering column.

#### REMOVAL

1. Remove the steering angle sensor from the steering column. Refer to [BRC-325, "Removal and Installation"](#).
2. Remove the combination switch. Refer to [BCS-82, "Removal and Installation"](#).
3. Remove the instrument lower panel LH. Refer to [IP-25, "Removal and Installation"](#).
4. Remove the instrument panel brace bolts and the instrument panel brace.

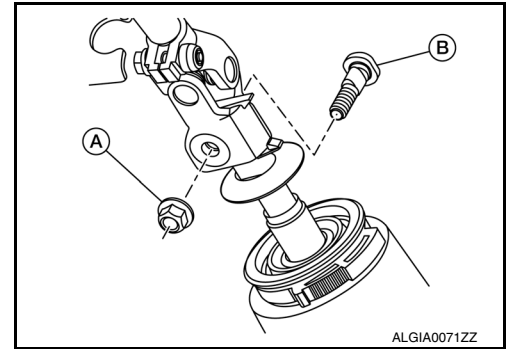


5. Disconnect the tilt motor and telescopic motor harness connectors (if equipped).

## STEERING COLUMN

### < REMOVAL AND INSTALLATION >

6. Remove lock nut (A) and bolt (B), then separate steering column from steering intermediate shaft.



7. Remove the steering column nuts and bolt, then remove steering column.

### INSTALLATION

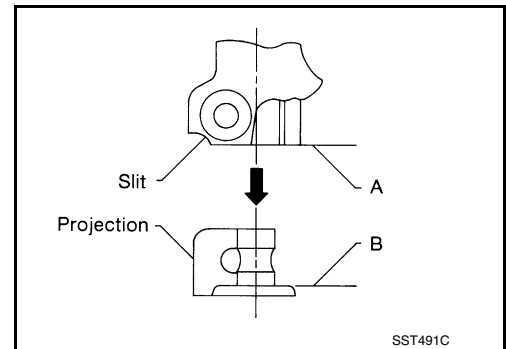
Installation is in the reverse order of removal.

#### **CAUTION:**

**When installing the steering column, finger-tighten all of the lower bracket and joint retaining bolts; then tighten them to specification. Do not apply undue stress to the steering column.**

#### **NOTE:**

Align slit of the coupling joint with projection on dust cover. Insert the joint until surface (A) contacts surface (B).



- After installation, turn steering wheel to make sure it moves smoothly. Make sure the number of turns are the same from the straight-forward position to left and right locks. Make sure that the steering wheel is in a neutral position when driving straight ahead.
- When installing steering column to steering member, install nut from front of vehicle.
- After installing the steering column, check the tilt mechanism for proper operation.
- After installing the steering column, check if steering wheel has smooth operation while turning to the left and right end stops.
- Adjust the neutral position of the steering angle sensor. Refer to [BRC-221, "Description"](#).



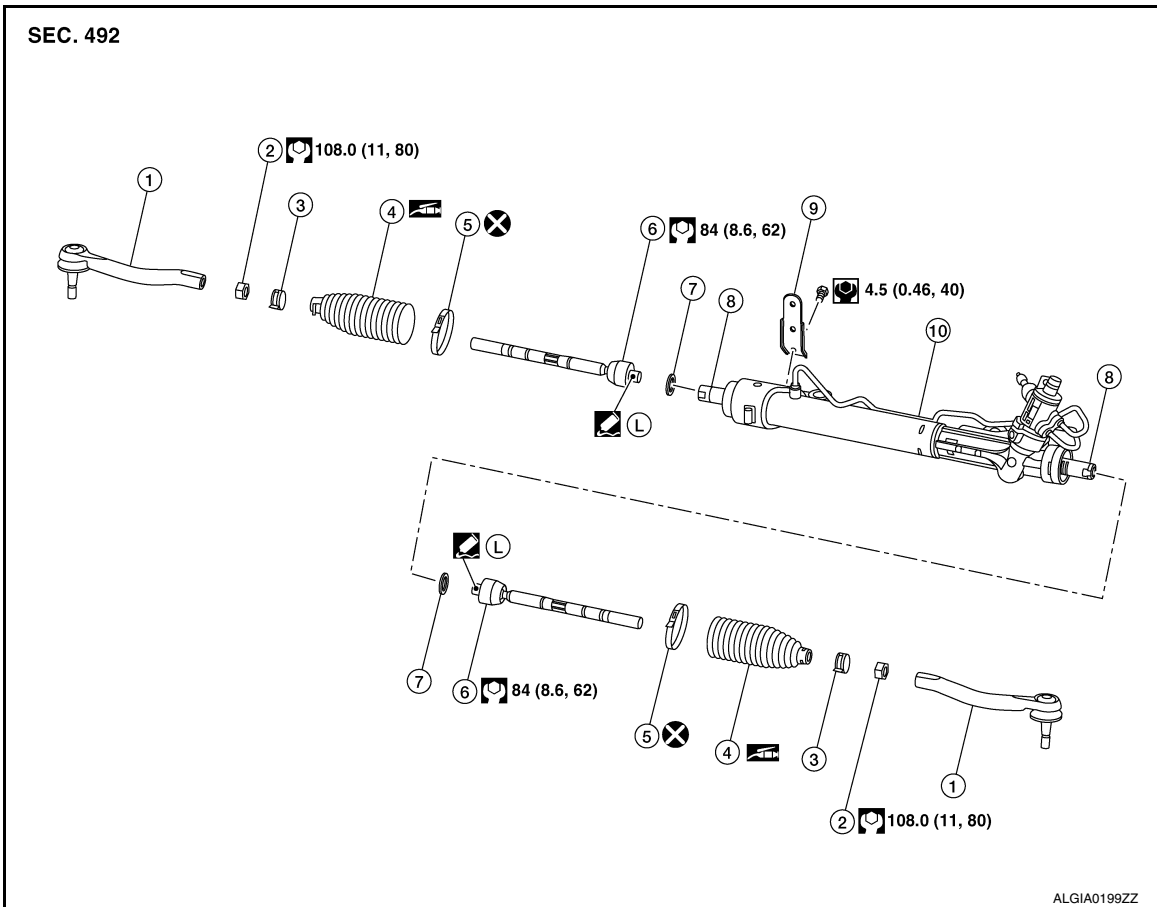
# STEERING GEAR AND LINKAGE

< REMOVAL AND INSTALLATION >

## STEERING GEAR AND LINKAGE

Exploded View

INFOID:000000012551666



- |                   |                               |                     |
|-------------------|-------------------------------|---------------------|
| 1. Outer socket   | 2. Inner socket lock nut      | 3. Small boot clamp |
| 4. Boot           | 5. Large boot clamp           | 6. Inner socket     |
| 7. Spacer         | 8. Rack bar (not serviceable) | 9. Bracket          |
| 10. Steering gear |                               |                     |

### Removal and Installation - Outer socket

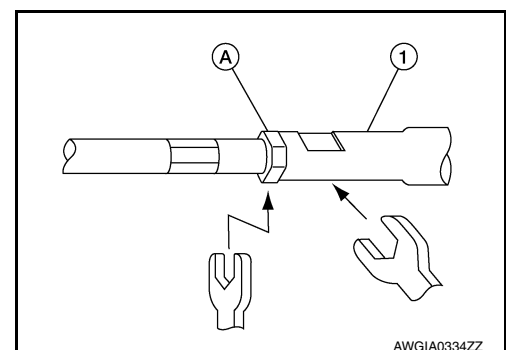
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#### REMOVAL

1. Remove front wheel and tire using power tool.
2. Loosen inner socket locknut (A).

**CAUTION:**

To prevent damage, hold outer socket (1) across flats using suitable tool while loosening inner socket lock nut (A).



3. Remove cotter pin.
4. Loosen outer socket nut and separate outer socket from steering knuckle using suitable tool.

# STEERING GEAR AND LINKAGE

## < REMOVAL AND INSTALLATION >

### CAUTION:

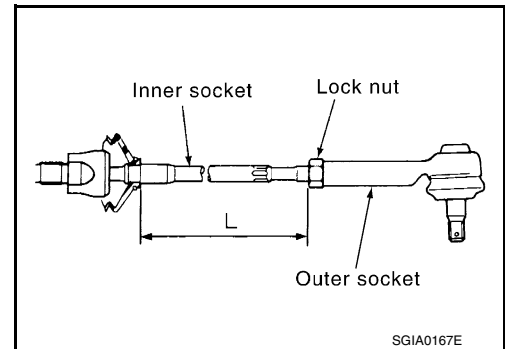
Leave the outer socket nut half threaded on the outer socket to prevent damage to threads and to prevent the suitable tool from coming off suddenly.

5. Remove outer socket nut and outer socket.

### INSTALLATION

1. Install outer socket to inner socket.
2. Adjust inner socket to standard length (L), and then tighten inner socket lock nut to the specified torque. Refer to [ST-49, "Exploded View"](#). Check length of inner socket (L) again after tightening inner socket lock nut. Make sure that the length is the standard.

**Inner socket length (L) : Refer to [ST-67, "Power Steering Gear"](#).**



### CAUTION:

- To prevent damage, hold outer socket across flats using suitable tool while tightening inner socket lock nut.
- Adjust toe-in after this procedure. The length achieved after toe-in adjustment is not necessarily the above value.
- Inspect to make sure no boot deformation has occurred during toe-in adjustment. Adjust boot as necessary.

3. Install outer socket to steering knuckle.
4. Install outer socket nut to outer socket. Refer to [ST-58, "Exploded View"](#).
5. Install cotter pin to outer socket stud hole.

### WARNING:

After torquing the outer socket nuts, be sure to install the cotter pins through the outer socket stud holes and bend the cotter pins around the outer socket studs.

### CAUTION:

Do not reuse cotter pin.

6. Install front wheel and tire. Refer to [WT-59, "Adjustment"](#).
7. Check wheel alignment. Refer to [FSU-5, "Inspection and Adjustment"](#).
8. Adjust the neutral position of the steering angle sensor. Refer to [BRC-61, "Description"](#).

## Removal and Installation - Boot

INFOID:000000012551668

### REMOVAL

1. Remove outer socket. Refer to [ST-49, "Removal and Installation - Outer socket"](#).
2. Remove inner socket lock nut.
3. Remove the nuts and separate the stabilizer connecting rods from the stabilizer bar. Reposition the stabilizer bar. Refer to [FSU-13, "Removal and Installation"](#).
4. Remove small boot clamp and large boot clamp.

### CAUTION:

Do not reuse large boot clamp.

5. Remove boot.

### INSTALLATION

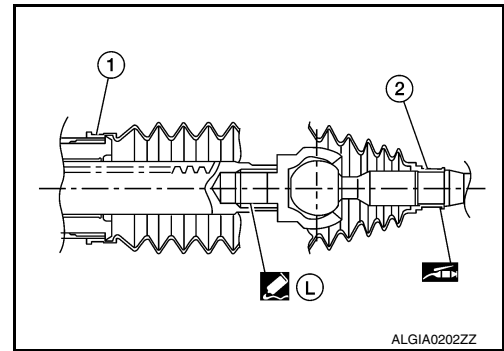
# STEERING GEAR AND LINKAGE

## < REMOVAL AND INSTALLATION >

1. Install large end of boot (1) to gear housing.
2. Apply silicone grease between the inner socket and small end of boot (2). Install small end of boot to inner socket boot mounting groove.

**CAUTION:**

To prevent boot deformation or damage during toe-in adjustment, apply silicone grease between the inner socket and small end of boot.

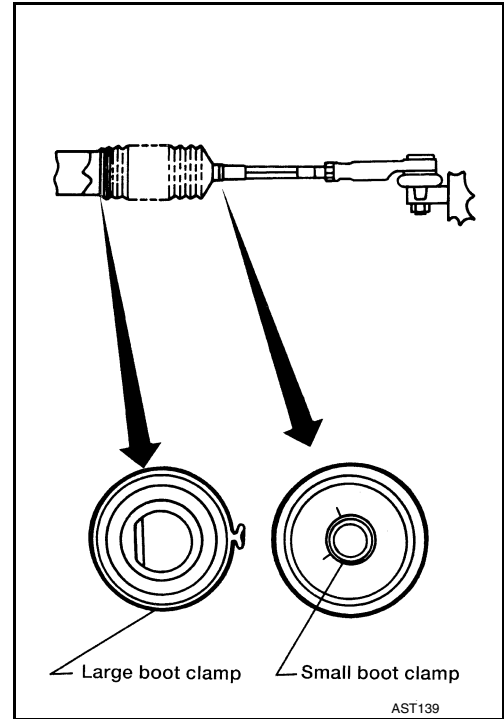


3. Install small boot clamp.
4. Install large boot clamp using Tool.

**CAUTION:**

Do not reuse large boot clamp.

Tool number : KV40107300 (J-51751)



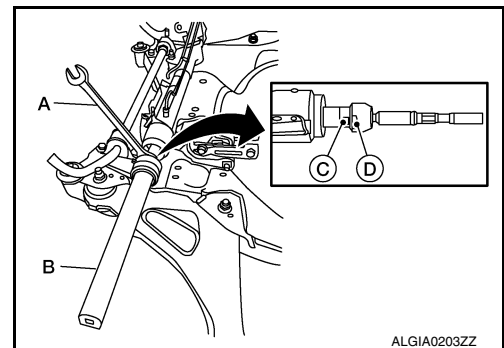
5. Install the nuts and stabilizer connecting rods to the stabilizer bar. Refer to [FSU-13, "Removal and Installation"](#).
6. Partially thread the inner socket lock nut on the inner socket.
7. Install the outer socket. Refer to [ST-49, "Removal and Installation - Outer socket"](#).
8. Check wheel alignment. Refer to [FSU-5, "Inspection and Adjustment"](#).
9. Adjust the neutral position of the steering angle sensor. Refer to [BRC-61, "Description"](#).

## Removal and Installation - Inner socket

INFOID:000000012551669

### REMOVAL

1. Remove boot. Refer to [ST-50, "Removal and Installation - Boot"](#).
2. Remove inner socket.  
**CAUTION:**  
To prevent damage to the rack bar when removing the inner socket, hold suitable tool (A) across rack bar flats (C) while turning suitable tool (B) across inner socket flats (D).
3. Remove spacer.



## STEERING GEAR AND LINKAGE

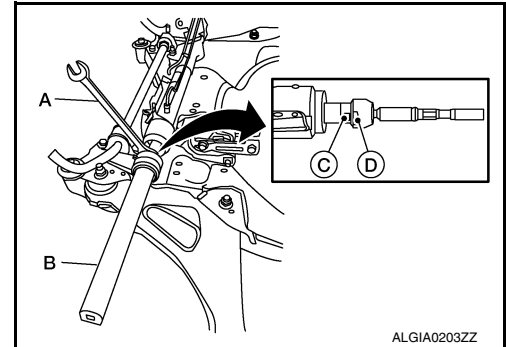
### < REMOVAL AND INSTALLATION >

#### INSTALLATION

1. Place spacer on the end of the rack bar.
2. Apply medium strength thread locker to threads of inner socket. Tighten inner socket to the specified torque. Refer to [ST-49, "Exploded View"](#).

**CAUTION:**

To prevent damage to the rack bar when installing the inner socket, hold suitable tool (A) across rack bar flats (C) while turning suitable tool (B) across inner socket flats (D).



3. Install boot. Refer to [ST-50, "Removal and Installation - Boot"](#).
4. Check wheel alignment. Refer to [FSU-5, "Inspection and Adjustment"](#).
5. Adjust the neutral position of the steering angle sensor. Refer to [BRC-61, "Description"](#).

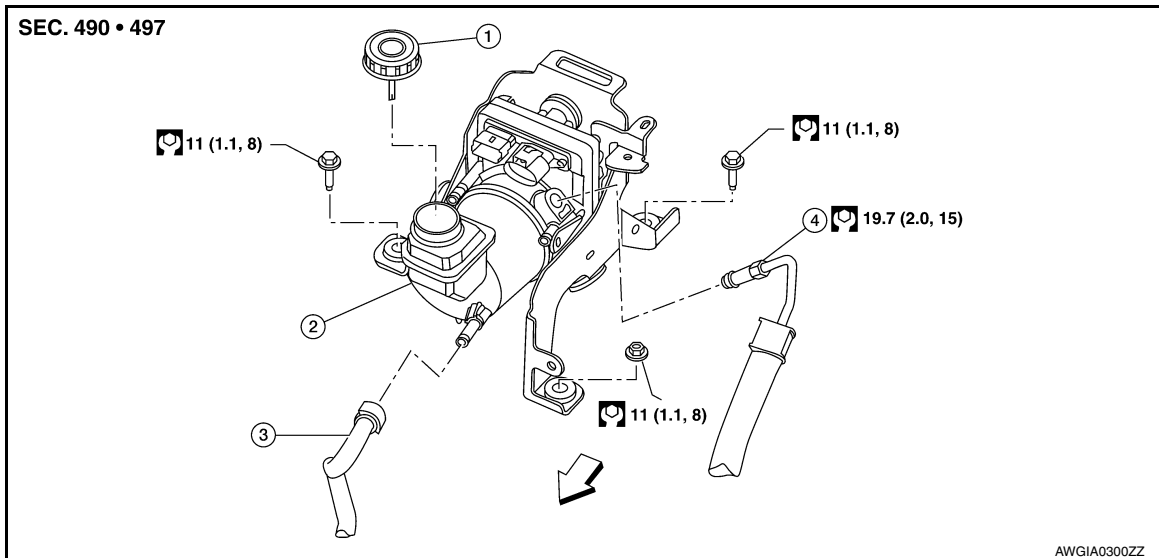
# POWER STEERING OIL PUMP

< REMOVAL AND INSTALLATION >

## POWER STEERING OIL PUMP

Exploded View

INFOID:000000012551670



- 1. Power steering reservoir cap
  - 2. Power steering pump
  - 3. Low pressure piping
  - 4. High pressure piping
- ↔ Front

## Removal and Installation

INFOID:000000012551671

### WARNING:

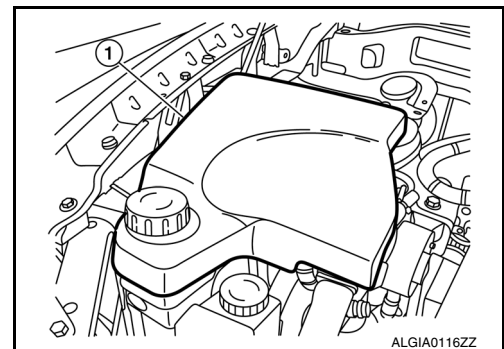
**Power steering pump outer shell will be hot while running and after driving. When working, be sure to wear protective equipment to avoid getting burned.**

### NOTE:

When removing components such as hoses, tubes/lines, etc., cap or plug openings to prevent fluid from spilling.

### REMOVAL

1. Remove the power steering pump cover (1).

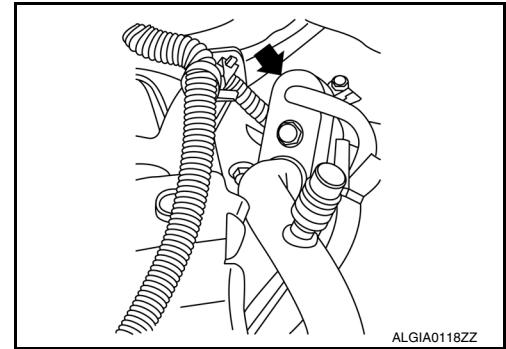


2. Drain power steering fluid. Refer to [ST-43, "Draining and Refilling"](#).
3. Remove the upper torque rod. Refer to [EM-107, "2WD : Exploded View"](#) (2WD) or [EM-111, "4WD : Exploded View"](#) (4WD).
4. Remove the RH upper engine mount insulator nuts. Refer to [EM-107, "2WD : Exploded View"](#) (2WD) or [EM-111, "4WD : Exploded View"](#) (4WD).

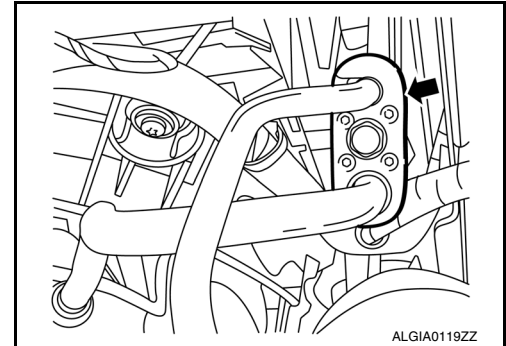
# POWER STEERING OIL PUMP

## < REMOVAL AND INSTALLATION >

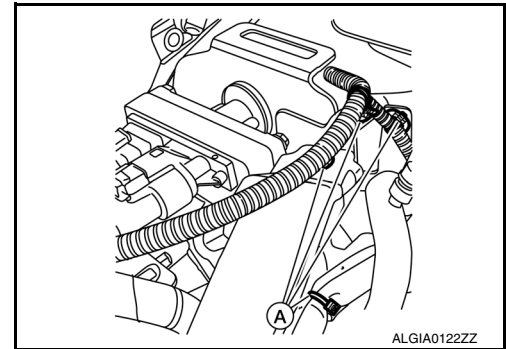
5. Disconnect the A/C rear lines at lower pipes. Refer to [HA-34](#), "[Exploded View](#)".



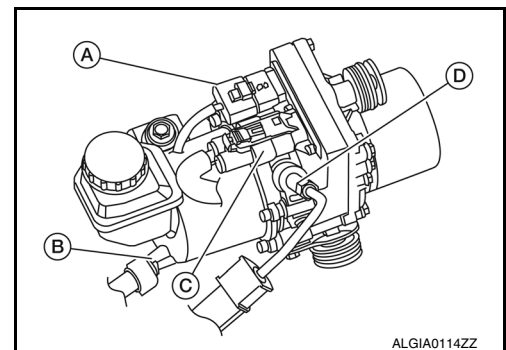
6. Disconnect the A/C front lines at junction. Refer to [HA-34](#), "[Exploded View](#)".



7. Disconnect wiring harness clips from bracket (A).



8. Disconnect the following components from the power steering pump:
- LH power steering pump harness connector (A).
  - Reservoir hose (B).
  - RH power steering pump harness connector (C).
  - High pressure piping (D).
9. Remove power steering pump bolts, and then remove power steering pump.



## INSTALLATION

Installation is in the reverse order of removal.

- Bleed air from power steering system. Refer to [ST-43](#), "[Air Bleeding Hydraulic System](#)".

### **CAUTION:**

**Do not reuse O-rings.**

# HYDRAULIC LINE

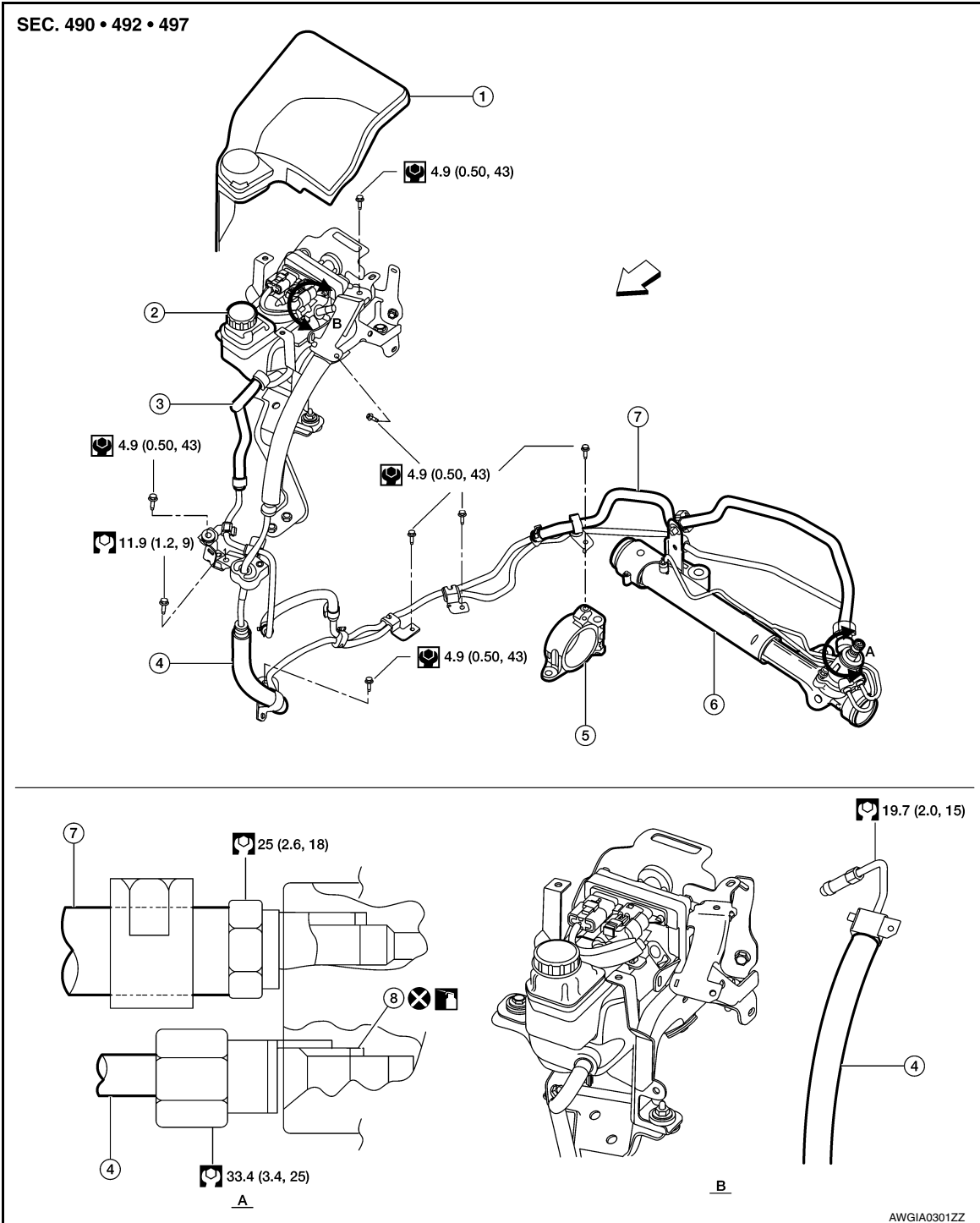
< REMOVAL AND INSTALLATION >

## HYDRAULIC LINE

Exploded View

INFOID:000000012551672

2WD



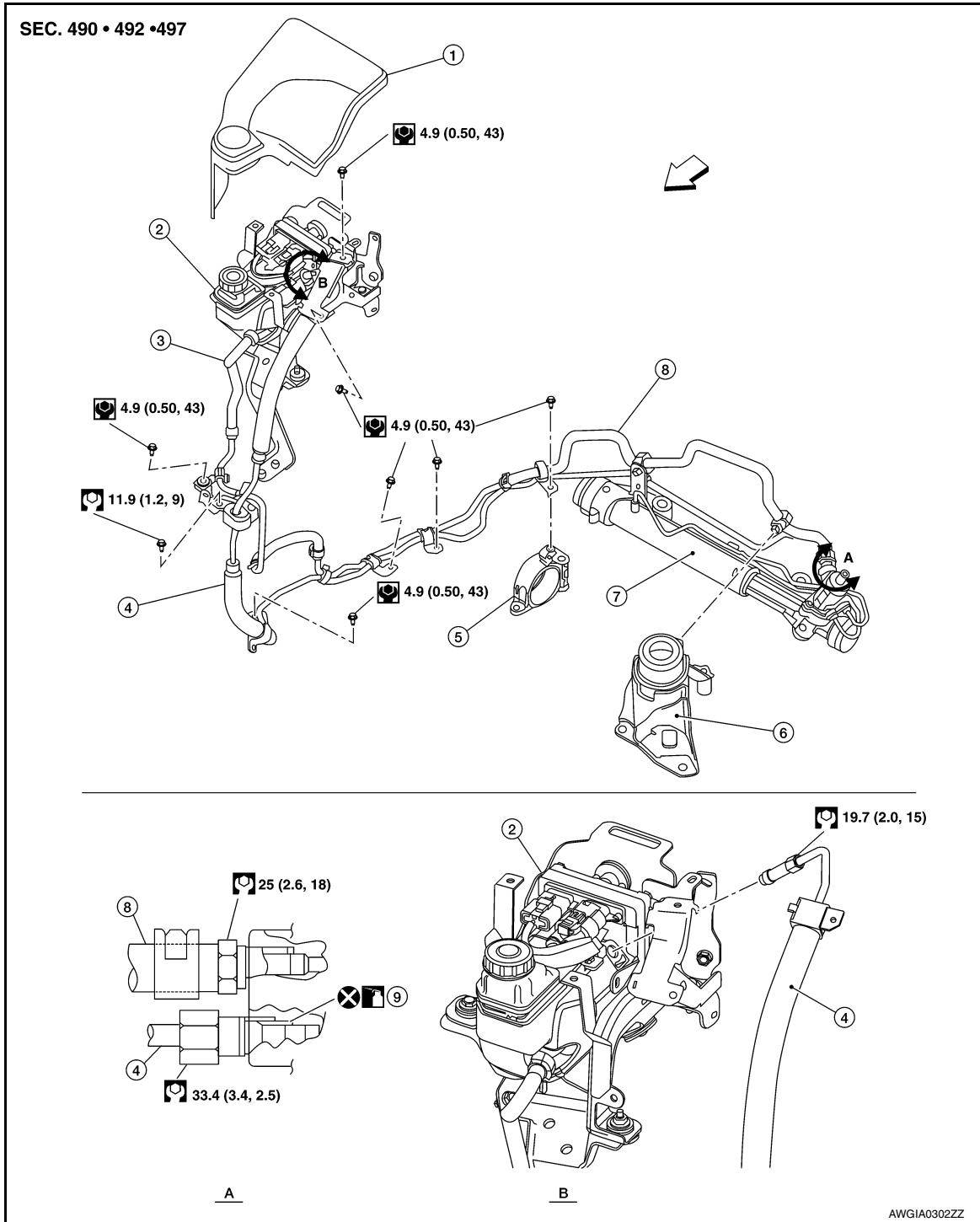
- |  |                        |                                    |
|--|------------------------|------------------------------------|
| 1. Cover                                 | 2. Power steering pump | 3. Low pressure piping (upper)     |
| 4. High pressure piping                  | 5. Engine mount        | 6. Power steering gear             |
| 7. Low pressure piping (lower)           | 8. O-ring              | A. Steering gear connection detail |
| B. Power steering pump connection detail | ← Front                |                                    |

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# HYDRAULIC LINE

< REMOVAL AND INSTALLATION >

4WD



- |                                    |  |                                |
|------------------------------------|--|--------------------------------|
| 1. Cover                           | 2. Power steering pump                   | 3. Low pressure piping (upper) |
| 4. High pressure piping            | 5. Engine mount                          | 6. Engine mount bracket        |
| 7. Power steering gear             | 8. High pressure piping (lower)          | 9. O-ring                      |
| A. Steering gear connection detail | B. Power steering pump connection detail | ← Front                        |

## Removal and Installation

INFOID:000000012551673

### NOTE:

When removing components such as hoses, tubes/lines, etc., cap or plug openings to prevent fluid from spilling.



# HYDRAULIC LINE

## < REMOVAL AND INSTALLATION >

---

### REMOVAL

Refer to the component parts location illustration for hydraulic line removal. Refer to [ST-55, "Exploded View"](#).

**CAUTION:**

- Do not reuse O-rings.

### INSTALLATION

Installation is in the reverse order of removal.

- Bleed air from power steering system. Refer to [ST-43, "Air Bleeding Hydraulic System"](#).

- Check for fluid leaks. Repair as necessary.

**CAUTION:**

- Do not reuse O-rings.

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# STEERING GEAR AND LINKAGE

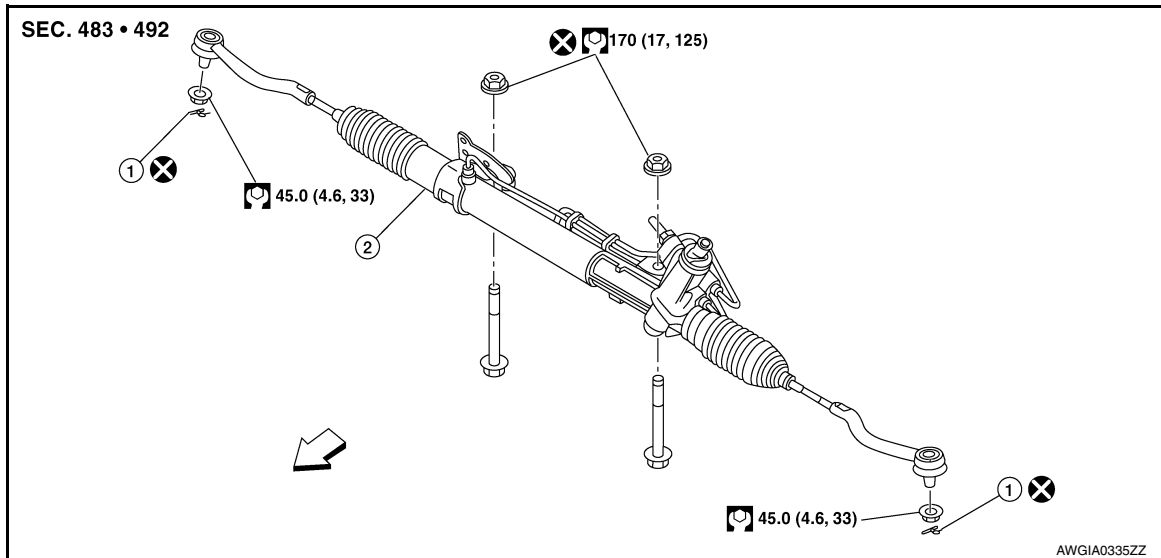
< UNIT REMOVAL AND INSTALLATION >

## UNIT REMOVAL AND INSTALLATION

### STEERING GEAR AND LINKAGE

Exploded View

INFOID:000000012551674



1. Cotter pin

2. Steering gear

← Front

### Removal and Installation - 2WD

INFOID:000000012551675

#### NOTE:

When removing components such as hoses, tubes/lines, etc., cap or plug openings to prevent fluid from spilling.

#### REMOVAL

1. Set the front wheels and tires to the straight-ahead position.
2. Remove the front wheels and tires using power tool. Refer to [WT-59, "Adjustment"](#).
3. Drain the power steering fluid. Refer to [ST-43, "Draining and Refilling"](#).
4. Remove the cotter pins.
5. Loosen the outer socket nuts and separate outer sockets from the steering knuckles using suitable tool.

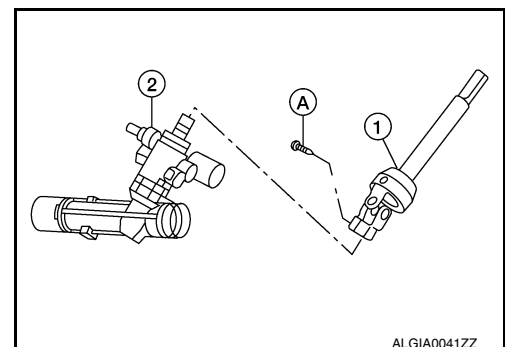
#### CAUTION:

**Leave the outer socket nuts half threaded on the outer socket to prevent damage to threads and to prevent the suitable tool from coming off suddenly.**

6. Remove outer socket nuts and separate the outer sockets from the steering knuckles.
7. Remove the rear engine bracket. Refer to [EM-111, "4WD : Exploded View"](#).
8. Remove the front exhaust tube. Refer to [EX-5, "Removal and Installation"](#).
9. Remove bolt (A) and separate the steering intermediate shaft (1) from the steering gear (2).

#### CAUTION:

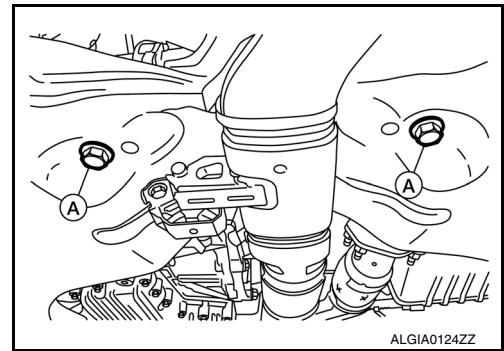
**With the steering linkage disconnected, the spiral cable may snap by turning the steering wheel beyond the limited number of turns. Secure the steering wheel during removal of the steering gear.**



# STEERING GEAR AND LINKAGE

## < UNIT REMOVAL AND INSTALLATION >

10. Remove the steering gear nuts and bolts. Position the steering gear forward.



11. Remove the stabilizer bar. Refer to [FSU-13, "Removal and Installation"](#).
12. Separate the high pressure piping and low pressure piping (lower) with clips from the bracket on the power steering gear. Refer to [ST-55, "Exploded View"](#).
13. Separate the high pressure piping and low pressure piping (lower) from the steering gear. Refer to [ST-55, "Exploded View"](#).
14. Remove the steering gear.

## INSTALLATION

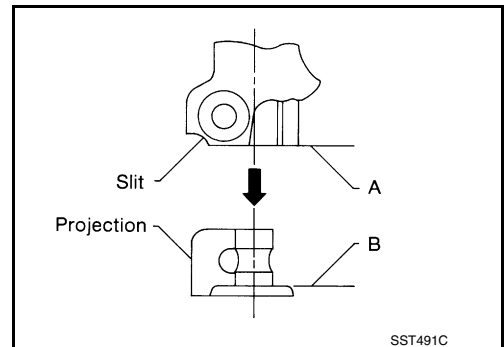
Installation is in the reverse order of removal.

### CAUTION:

**With the steering linkage disconnected, the spiral cable may snap by turning the steering wheel beyond the limited number of turns. Secure the steering wheel during installation of the steering gear.**

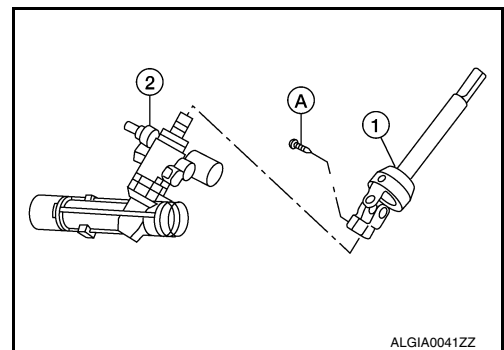
### NOTE:

Align slit of the steering intermediate shaft with the projection on the steering gear. Insert the joint until surface (A) contacts surface (B).



### CAUTION:

**When connecting the steering intermediate shaft (1) to the steering gear (2), first finger-tighten the joint retaining bolt (A); then tighten to specification. The joint retaining bolt is directional. Refer to [ST-47, "Exploded View"](#).**



### WARNING:

**After torquing the outer socket nuts, be sure to install the cotter pins through the outer socket stud holes and bend the cotter pin around the outer socket studs.**

### CAUTION:

- Do not reuse O-rings.
- Do not reuse steering gear nuts.
- Do not reuse cotter pins.
- Bleed the air from hydraulic system. Refer to [ST-43, "Air Bleeding Hydraulic System"](#).
- Check wheel alignment. Refer to [FSU-5, "Inspection and Adjustment"](#).

# STEERING GEAR AND LINKAGE

## < UNIT REMOVAL AND INSTALLATION >

- Adjust the neutral position of the steering angle sensor. Refer to [BRC-221, "Description"](#).

### Removal and Installation - 4WD

INFOID:000000012551676

#### NOTE:

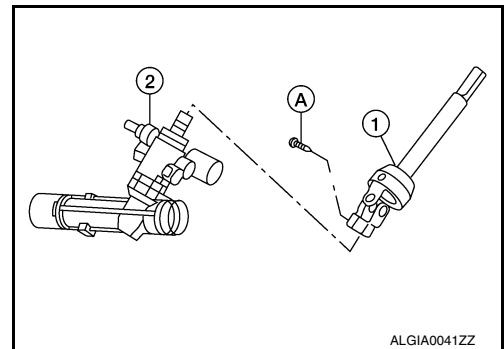
When removing components such as hoses, tubes/lines, etc., cap or plug openings to prevent fluid from spilling.

#### REMOVAL

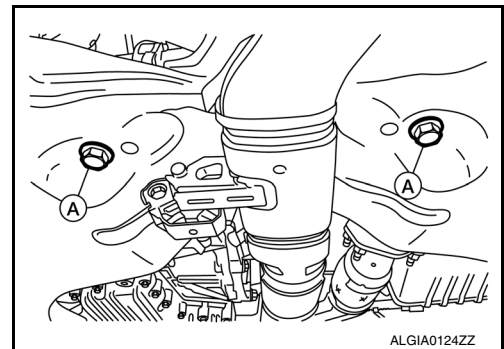
1. Set the front wheels to the straight-ahead position.
2. Remove the front wheels and tires using power tool. Refer to [WT-59, "Adjustment"](#).
3. Drain the power steering fluid. Refer to [ST-43, "Draining and Refilling"](#).
4. Remove the cotter pins.
5. Loosen the outer socket nuts and separate outer sockets from the steering knuckles using suitable tool.  
**CAUTION:**  
**Leave the outer socket nuts half threaded on the outer socket to prevent damage to threads and to prevent the suitable tool from coming off suddenly.**
6. Remove outer socket nuts and separate the outer sockets from the steering knuckles.
7. Remove the rear engine mount. Refer to [EM-111, "4WD : Exploded View"](#).
8. Remove the front exhaust tube. Refer to [EX-5, "Removal and Installation"](#).
9. Remove the propeller shaft. Refer to [DLN-102, "Removal and Installation"](#).
10. Remove bolt (A) and separate the steering intermediate shaft (1) from the steering gear (2).

#### CAUTION:

**With the steering linkage disconnected, the spiral cable may snap by turning the steering wheel beyond the limited number of turns. Secure the steering wheel during removal of the steering gear.**



11. Remove the steering gear nuts and bolts. Position the steering gear forward.



12. Remove the stabilizer bar. Refer to [FSU-13, "Removal and Installation"](#).
13. Separate the high pressure piping and low pressure piping (lower) with clips from the bracket on the power steering gear. Refer to [ST-55, "Exploded View"](#).
14. Separate the high pressure piping and low pressure piping (lower) from the steering gear. Refer to [ST-55, "Exploded View"](#).
15. Remove the steering gear.

#### INSTALLATION

Installation is in the reverse order of removal.

#### CAUTION:

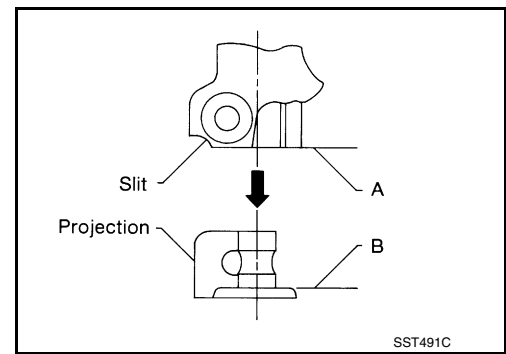
**With the steering linkage disconnected, the spiral cable may snap by turning the steering wheel beyond the limited number of turns. Secure the steering wheel during installation of the steering gear.**

#### NOTE:

# STEERING GEAR AND LINKAGE

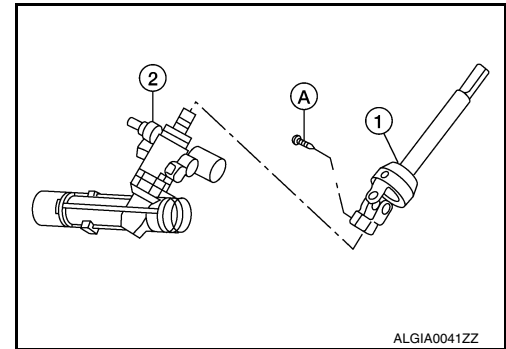
## < UNIT REMOVAL AND INSTALLATION >

Align slit of the steering intermediate shaft with the projection on the steering gear. Insert the joint until surface (A) contacts surface (B).



### CAUTION:

When connecting the steering intermediate shaft (1) to the steering gear (2), first finger-tighten the joint retaining bolt (A); then tighten to specification. The joint retaining bolt is directional. Refer to [ST-55, "Exploded View"](#).



### WARNING:

After torquing the outer socket nuts, be sure to install the cotter pins through the outer socket stud holes and bend the cotter pin around the outer socket studs.

### CAUTION:

- Do not reuse O-rings.
- Do not reuse steering gear nuts.
- Do not reuse cotter pins.
- Bleed the air from power steering system. Refer to [ST-43, "Air Bleeding Hydraulic System"](#).
- Check wheel alignment. Refer to [FSU-5, "Inspection and Adjustment"](#).
- Adjust the neutral position of the steering angle sensor. Refer to [BRC-221, "Description"](#).

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# STEERING GEAR AND LINKAGE

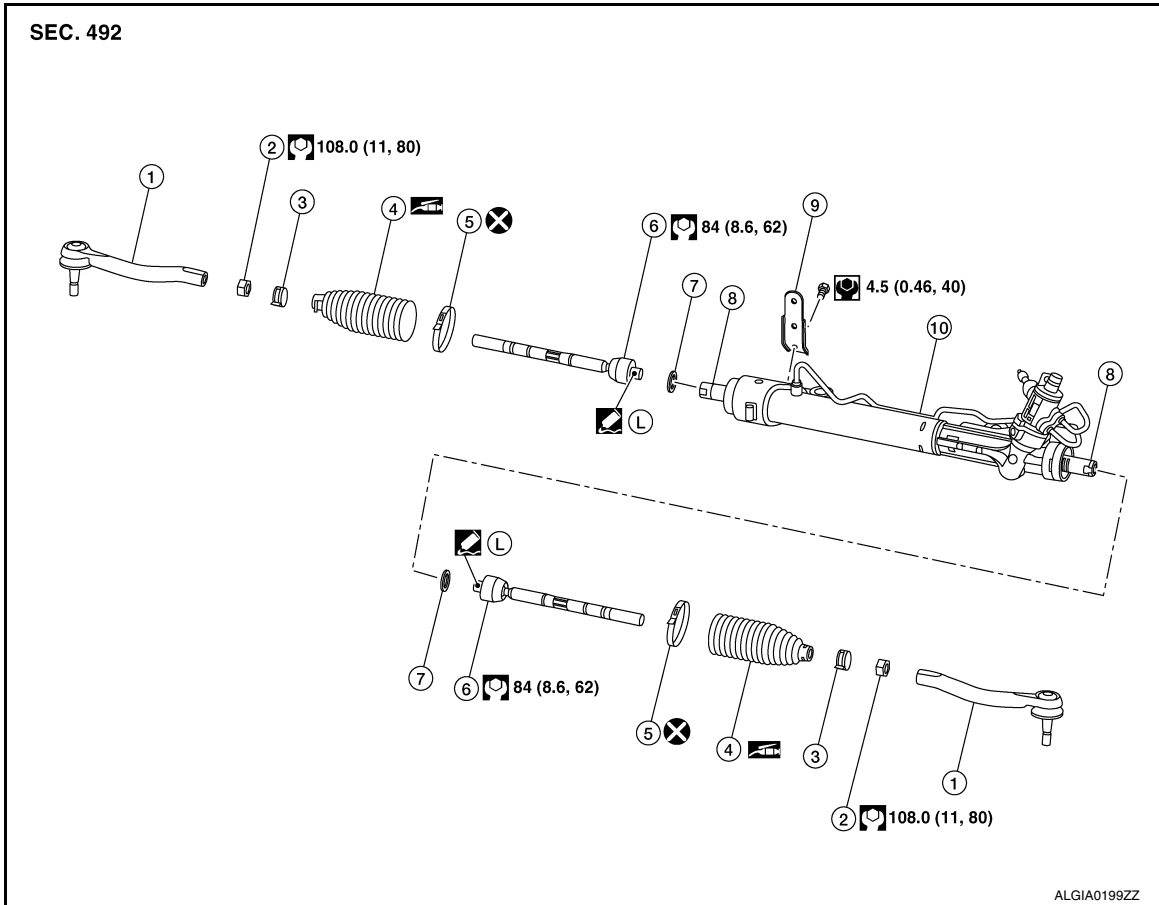
< UNIT DISASSEMBLY AND ASSEMBLY >

## UNIT DISASSEMBLY AND ASSEMBLY

### STEERING GEAR AND LINKAGE

Exploded View

INFOID:000000012551677



- |                   |                               |                     |
|-------------------|-------------------------------|---------------------|
| 1. Outer socket   | 2. Inner socket lock nut      | 3. Small boot clamp |
| 4. Boot           | 5. Large boot clamp           | 6. Inner socket     |
| 7. Spacer         | 8. Rack bar (not serviceable) | 9. Bracket          |
| 10. Steering gear |                               |                     |

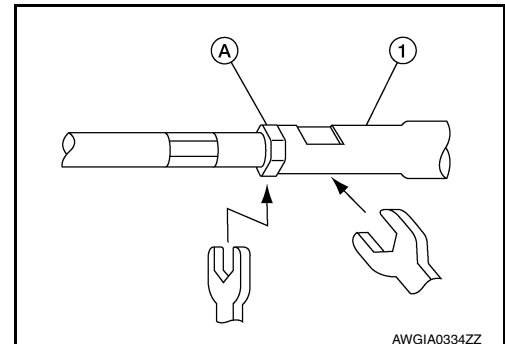
### Disassembly and Assembly

INFOID:000000012551678

#### DISASSEMBLY

1. Remove inner socket lock nut (A) and outer socket (1).

**CAUTION:**  
To prevent damage, hold outer socket (1) across flats using suitable tool while loosening inner socket lock nut (A).



2. Remove boot clamps and boot.

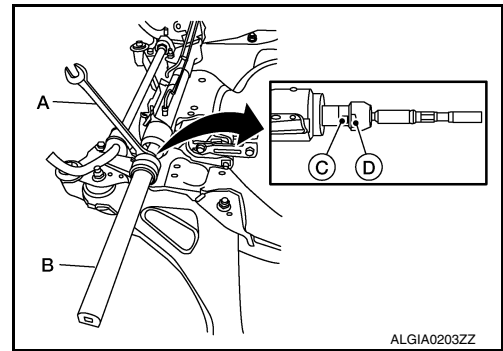
# STEERING GEAR AND LINKAGE

## < UNIT DISASSEMBLY AND ASSEMBLY >

3. Remove inner socket.

**CAUTION:**

To prevent damage to the rack bar when removing the inner socket, hold suitable tool (A) across rack bar flats (C) while turning suitable tool (B) across inner socket flats (D).



4. Remove spacer.
5. Remove bracket bolt and bracket.

## ASSEMBLY

1. Install bracket and bracket bolt to gear housing.
2. Install spacer on the end of the rack bar.
3. Apply medium strength thread locker to threads of inner socket. Tighten inner socket to the specified torque. Refer to [ST-62](#), "[Exploded View](#)".

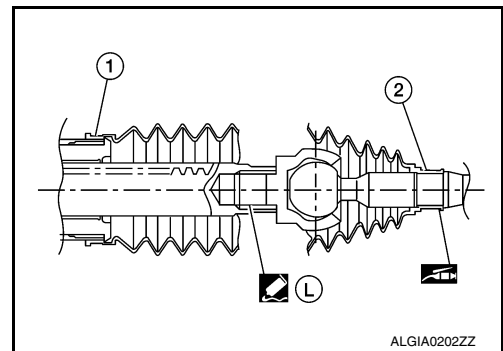
**CAUTION:**

To prevent damage to the rack bar when installing the inner socket, hold suitable tool across rack bar flats while turning suitable tool across inner socket flats.

4. Install large end of boot (1) to gear housing.
5. Apply silicone grease between the inner socket and small end of boot (2). Install small end of boot to inner socket boot mounting groove.

**CAUTION:**

To prevent boot deformation or damage during toe-in adjustment, apply silicone grease between the inner socket and small end of boot.

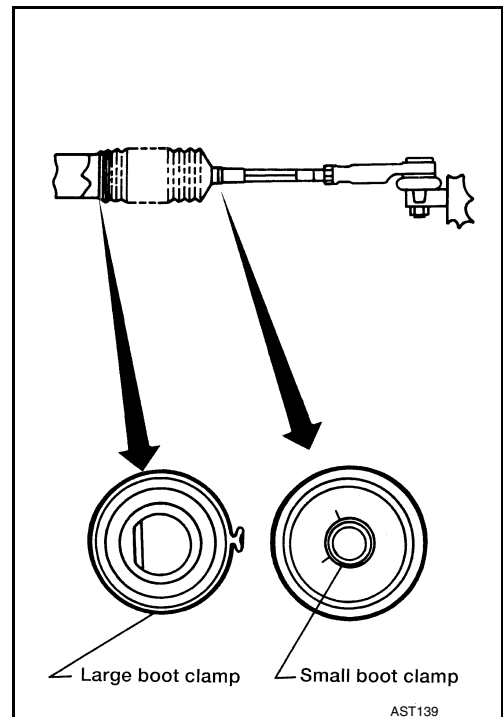


6. Install small boot clamp.
7. Install large boot clamp using Tool.

**CAUTION:**

Do not reuse boot clamp.

Tool number : KV40107300 (J-51751)



## STEERING GEAR AND LINKAGE

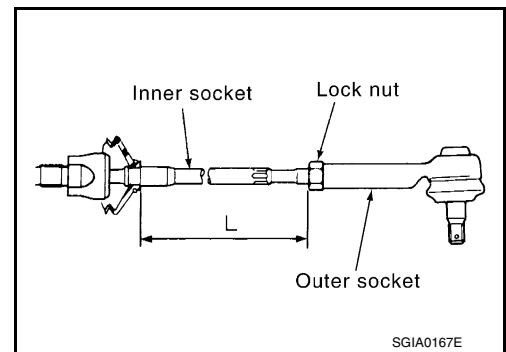
### < UNIT DISASSEMBLY AND ASSEMBLY >

8. Adjust inner socket to standard length (L), and then tighten inner socket lock nut to the specified torque. Refer to [ST-62, "Exploded View"](#). Check length of inner socket (L) again after tightening inner socket lock nut. Make sure that the length is the standard.

**Inner socket length (L) : Refer to [ST-67, "Power Steering Gear"](#).**

#### **CAUTION:**

- Adjust toe-in after this procedure. The length achieved after toe-in adjustment is not necessarily the above value.
- To prevent damage, hold outer socket across flats using suitable tool while tightening inner socket lock nut.
- Inspect to make sure no boot deformation has occurred during toe-in adjustment. Adjust boot as necessary.





# POWER STEERING OIL PUMP

< UNIT DISASSEMBLY AND ASSEMBLY >

## POWER STEERING OIL PUMP

---

### Disassembly and Assembly

INFOID:000000012551679

The power steering oil pump is not serviceable and should be replaced as an assembly. Refer to [ST-53](#), "[Removal and Installation](#)".

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# SERVICE DATA AND SPECIFICATIONS (SDS)

< SERVICE DATA AND SPECIFICATIONS (SDS)

## SERVICE DATA AND SPECIFICATIONS (SDS)

### SERVICE DATA AND SPECIFICATIONS (SDS)

#### Steering Wheel

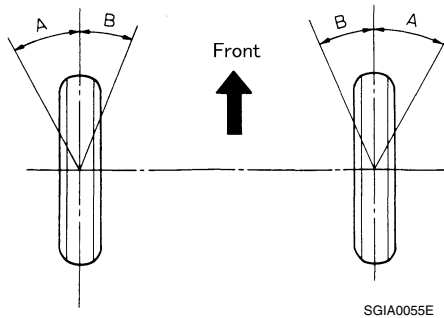
INFOID:0000000012551680

Steering wheel axial end play	0 mm (0 in)
Steering wheel play	0 - 35 mm (0 - 1.38 in)
Steering wheel turning force	39 N (4 kg-f, 9 lb-f) or less

#### Steering Angle

INFOID:0000000012551681

Unit: Degree minute (Decimal Degree)



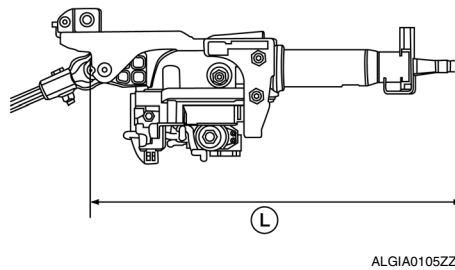
Inner wheel angle (A)	Minimum	35° 00' (35.0°)
	Nominal	38° 00' (38.0°)
	Maximum	39° 00' (39.0°)
Outer wheel angle (B)	Nominal	33° 00' (33.0°)

#### Steering Column

INFOID:0000000012551682

#### STEERING COLUMN LENGTH

Unit: mm (in)



Steering column length	Length (L)	463 (18.2)
	Telescopic maximum	483 (19.0)
	Telescopic minimum	443 (17.4)

#### STEERING COLUMN ROTATING TORQUE

Unit: N·m (kg-m, in-lb)

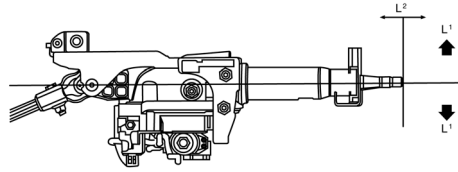
Rotating torque	0.67 (0.07, 6)
-----------------	----------------

#### TILT MECHANISM OPERATING RANGE

# SERVICE DATA AND SPECIFICATIONS (SDS)

## < SERVICE DATA AND SPECIFICATIONS (SDS)

Unit: mm (in)



ALGIA0106ZZ

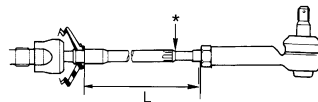
Tilt operating range (L <sup>1</sup> )	50 (2.0)
Telescopic operating range (L <sup>2</sup> )	40 (1.6)

### Power Steering Gear

INFOID:0000000012551683

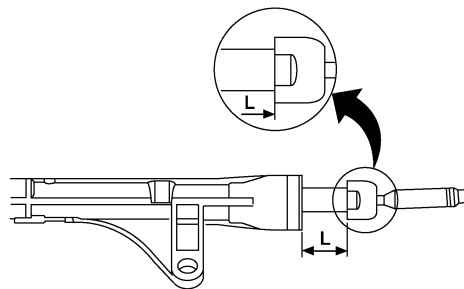
### STEERING OUTER SOCKET AND INNER SOCKET

Outer socket	Rocking torque	0.3 - 2.9 N·m (0.03 - 0.30 kg·m, 3 - 26 in·lb)
	<ul style="list-style-type: none"> <li>• Measurement on spring balance</li> <li>• Measuring point: cotter pin hole of stud</li> </ul>	1.4 - 42.7 N (0.143 - 4.36 kg, 0.31 - 9.60 lb)
	Rotating torque	0.3 - 2.9 N·m (0.03 - 0.30 kg·m, 3 - 26 in·lb)
	Axial end play	0.5 mm (0.020 in) or less
Inner socket	Rocking torque	0.1 - 7.8 N·m (0.01 - 0.80 kg·m, 1 - 69 in·lb)
	<ul style="list-style-type: none"> <li>• Measurement on spring balance</li> <li>• Measuring point at * mark shown</li> </ul>	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)		127.5 mm (5.02 in) or less



SGIA0950E

### RACK STROKE



AWGIA0003GB

Rack stroke in neutral position (L)	73 mm (2.87 in)
-------------------------------------	-----------------

### RACK SLIDING FORCE

## SERVICE DATA AND SPECIFICATIONS (SDS)

### < SERVICE DATA AND SPECIFICATIONS (SDS)

Rack sliding force	270 - 370 N-f (27.5 - 37.7kg-f, 60.7 - 83.2 lb-f)
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### Power Steering Oil Pump

INFOID:0000000012551684

Relief oil pressure	9,900 -10,400 kPa (100.98 -106.08 kg/cm <sup>2</sup> , 1435.5 - 1,508.0 psi)
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### Power Steering Fluid

INFOID:0000000012551685

Fluid type	E-PSF
Fluid capacity	Refer to <a href="#">MA-17. "FOR USA AND CANADA : Fluids and Lubricants"</a> (United States and Canada) or <a href="#">MA-19. "FOR MEXICO : Fluids and Lubricants"</a> (Mexico).