# SECTION REAR SUSPENSION

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# < PRECAUTION > PRECAUTION PRECAUTIONS

Precautions for Suspension

- When installing rubber bushings, the final tightening must be carried out under unladen conditions with tires on ground. Spilled oil might shorten the life of rubber bushings. Be sure to wipe off any spilled oil.
- Unladen conditions mean that fuel, engine coolant and lubricant are full. Spare tire, jack, hand tools and mats are in designated positions.
- After servicing suspension parts, be sure to check wheel alignment.
- Self-lock nuts are not reusable. Always use new ones when installing. Since new self-lock nuts are pre-oiled, tighten as they are.

#### PREPARATION

< PREPARATION >	
PREPARATION	
PREPARATION	
Special Service Tools	INFOID:00000007377139
The actual shapes of Kent-Moore tools may differ from those of	special service tools illustrated here.
Tool number (Kent-Moore No.) Tool name	Description
KV10109300 ( – ) Holder	Removing and installing bracket
Commercial Service Tools	ZZA1010D
	INFOID.00000001517140
Tool name	Description
Power tool	Loosening bolts and nuts
Spring compressor	PBIC0190E Removing and installing coil spring
Socket a: 80 mm (3.15 in)	S-NT717  Removing and installing bumper rubber
	JPEIB0233ZZ

# NOISE, VIBRATION AND HARSHNESS (NVH) TROUBLESHOOTING < SYMPTOM DIAGNOSIS >

# SYMPTOM DIAGNOSIS

### NOISE, VIBRATION AND HARSHNESS (NVH) TROUBLESHOOTING

#### NVH Troubleshooting Chart

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

Reference		<u>RSU-8, RSU-10, RSU-13, RSU-15, RSU-18</u>	<u>RSU-11</u>	1	1		<u>RSU-8, RSU-10, RSU-13, RSU-15, RSU-18</u>	RSU-6	<u>RSU-17</u>	NVH in DLN section.	NVH in DLN section.	NVH in RAX and RSU sections.	NVH in WT section.	NVH in WT section.	NVH in RAX section.	NVH in BR section.	NVH in ST section.	
Possible cause and SUSPECTED PARTS		Improper installation, looseness	Shock absorber deformation, damage or deflection	Bushing or mounting deterioration	Parts interference	Spring fatigue	Suspension looseness	Incorrect wheel alignment	Stabilizer bar fatigue	PROPELLER SHAFT	DIFFERENTIAL	REAR AXLE AND REAR SUSPENSION	TIRE	ROAD WHEEL	DRIVE SHAFT	BRAKE	STEERING	
		Noise	×	×	×	×	×	×			×	×	×	×	×	×	×	×
		Shake	×	×	×	×		×			×		×	×	×	×	×	×
		Vibration	×	×	×	×	×				×		×	×		×		×
Symptom	REAR SUSPENSION	Shimmy	×	×	×	×			×				×	×	×		×	×
		Judder	×	×	×								×	×	×		×	×
		Poor quality ride or handling	×	×	×	×	×		×	×			×	×	×			

×: Applicable

# < PERIODIC MAINTENANCE > PERIODIC MAINTENANCE REAR SUSPENSION ASSEMBLY

# Inspection

#### COMPONENT PART

Check the mounting conditions (looseness, backlash) of each component and component conditions (wear, c damage) are normal.

Ball Joint Axial End Play

Move axle side of suspension arm and front lower link in the axial direction by hand. Check there is no end play.

#### Axial end play : Refer to <u>RSU-20, "Ball Joint"</u>.

#### **CAUTION:**

- Never depress brake pedal when measuring.
- Never perform with tires on level ground.
- Be careful not to damage ball joint boot. Never damage the installation position by applying excessive force.

#### SHOCK ABSORBER

Check for oil leakage and damage. Replace it if necessary.



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#### < PERIODIC MAINTENANCE >

#### WHEEL ALIGNMENT

#### Inspection

DESCRIPTION

Measure wheel alignment under unladen conditions.

#### NOTE:

"Unladen conditions" means that fuel, engine coolant, and lubricant are full. Spare tire, jack, hand tools and mats are in designated positions.

#### PRELIMINARY CHECK

Check the following:

- Tires for improper air pressure and wear. Refer to WT-63, "Tire Air Pressure".
- Road wheels for runout.
- Wheel bearing axial end play. Refer to <u>RAX-5, "Inspection"</u>.
- Ball joint axial end play of suspension arm and front lower link. Refer to RSU-5. "Inspection".
- Shock absorber operation.
- Each mounting point of axle and suspension for looseness and deformation.
- Each of front lower link, rear lower link, rear suspension member, suspension arm and shock absorber for cracks, deformation, and other damage.
- Vehicle height (posture).

#### GENERAL INFORMATION AND RECOMMENDATIONS

- A four-wheel thrust alignment should be performed.
- This type of alignment is recommended for any NISSAN/INFINITI vehicle.
- The four-wheel "thrust" process helps ensure that the vehicle is properly aligned and the steering wheel is centered.
- The alignment rack itself should be capable of accepting any NISSAN/INFINITI vehicle.
- The rack should be checked to ensure that it is level.
- Make sure the machine is properly calibrated.
- Your alignment equipment should be regularly calibrated in order to give correct information.
- Check with the manufacturer of your specific equipment for their recommended Service/Calibration Schedule.

#### ALIGNMENT PROCESS

#### **IMPORTANT:**

Use only the alignment specifications listed in this Service Manual.

- When displaying the alignment settings, many alignment machines use "indicators": (Green/red, plus or minus, Go/No Go). Never use these indicators.
- The alignment specifications programmed into your machine that operate these indicators may not be correct.
- This may result in an ERROR.
- Most camera-type alignment machines are equipped with both "Rolling Compensation" method and optional "Jacking Compensation" method to "compensate" the alignment targets or head units. "Rolling Compensation" is the preferred method.
- If using the "Rolling Compensation" method, after installing the alignment targets or head units, push or pull on the rear wheel to move the vehicle. **Do not push or pull on the vehicle body.**
- If using the "Jacking Compensation" method, after installing the alignment targets or head units, raise the vehicle and rotate the wheels 1/2 turn both ways.

NOTE:

Do not use the "Rolling Compensation" method if you are using sensor-type alignment equipment.

- Follow all instructions for the alignment machine you're using for more information.

#### Adjustment

#### CAMBER

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#### WHEEL ALIGNMENT

#### < PERIODIC MAINTENANCE >

Adjust with adjusting bolt (1) in front lower link (2).

#### Camber : Refer to RSU-20, "Wheel Alignment".

#### **CAUTION:**

- When tightening the nut firmly and checking the torque, use a wrench to prevent the turning of bolt.
- After adjusting camber, be sure to check toe-in.
- If camber is not still within the specification, inspect and replace any damaged or worn suspension parts.

#### TOE-IN

Adjust with adjusting bolt (1) in rear lower link (2).

#### Toe-In : Refer to RSU-20, "Wheel Alignment".

#### **CAUTION:**

- Be sure to adjust equally on right and left side with adjusting bolt.
- When tightening the nut firmly and checking the torque, use a wrench to prevent the turning of bolt.
- If toe-in is not still within the specification, inspect and replace any damaged or worn suspension parts.
- After toe-in adjustment, adjust neutral position of steering angle sensor. Refer to <u>BRC-58</u>, "Work Procedure".





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#### < REMOVAL AND INSTALLATION >

# REMOVAL AND INSTALLATION REAR LOWER LINK & COIL SPRING

#### **Exploded View**

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- Rear suspension member
   Eccentric disc
- Upper seat

Refer to <u>GI-4, "Components"</u> for symbols in the figure.

#### Removal and Installation

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#### REMOVAL

1. Remove tires with power tool. Refer to WT-58, "Removal and Installation".

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Rubber seat

2. Remove wheel sensor harness. Refer to BRC-140, "REAR WHEEL SENSOR : Removal and Installation".

6.

Coil spring

- 3. Remove height sensor from rear lower link (right side). Refer to EXL-120, "Removal and Installation".
- 4. Remove vehicle height sensor from rear lower link (left side). Refer to <u>SCS-94. "Removal and Installa-</u> tion".
- 5. Set suitable jack under rear lower link.
- Using a spring compressor (commercial service tool), compress coil spring between rubber seat and upper seat until coil spring with a spring compressor is free.
   CAUTION:

#### Be sure a spring compressor is securely attached coil spring. Compress coil spring.

- 7. Remove rear lower link mounting bolt (axle housing side).
- 8. Slowly lower jack, then remove upper seat, coil spring and rubber seat from rear lower link.
- 9. Remove rear lower link mounting nut, eccentric disc, and adjusting bolt and then remove rear lower link.
- 10. Perform inspection after removal. Refer to RSU-9, "Inspection".

#### INSTALLATION

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

#### **REAR LOWER LINK & COIL SPRING**

#### < REMOVAL AND INSTALLATION >

- Make sure that upper seat and rubber seat are attached as shown in the figure.



- A : Vehicle upper side
- B : Two paint marks
- C : One paint mark
- D : Vehicle inside
- Perform the final tightening of rear suspension member and axle housing rubber bushing position under unladen condition with tires on level ground.
- Perform inspection after installation. Refer to <u>RSU-9, "Inspection"</u>.

#### Inspection

#### INSPECTION AFTER REMOVAL

Check rear lower link, bushing and coil spring for deformation, crack, and damage. Replace it if necessary.

INSPECTION AFTER INSTALLATION Check wheel alignment. Refer to <u>RSU-6, "Inspection"</u>.



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#### < REMOVAL AND INSTALLATION >

#### REAR SHOCK ABSORBER

#### **Exploded View**

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#### WITHOUT HBMC



Shock absorber Front lower link 4. 5.

Refer to GI-4, "Components" for symbols in the figure.

#### WITH HBMC

1.



- 1.
- 2. 5.

Front lower link

Bushing 3.

4. Shock absorber

Refer to GI-4, "Components" for symbols in the figure.

#### **Removal and Installation**

#### REMOVAL

Reduce system pressure. (With HBMC) Refer to SCS-18, "Work Procedure". 1. **CAUTION:** 

#### **RSU-10**

#### **REAR SHOCK ABSORBER**

#### < REMOVAL AND INSTALLATION >

#### Inadvertent piping removal causes fluid to splatter.

- 2. Remove tires with power tool. Refer to WT-58, "Removal and Installation".
- 3. Remove height sensor from rear lower link (right side). Refer to EXL-120, "Removal and Installation".
- Remove vehicle height sensor from rear lower link (left side). Refer to <u>SCS-94, "Removal and Installa-</u> tion".
- 5. Remove air tube from shock absorber assembly. Refer to SCS-91, "Removal and Installation".
- Remove middle tube assembly from shock absorber assembly. (With HBMC) Refer to <u>SCS-44, "REAR</u> <u>TUBE ASSEMBLY : Removal and Installation"</u>.
- 7. Remove shock absorber mounting bolt (lower side).
- 8. Remove piston rod lock nut.
- 9. Remove bracket, bushings, and shock absorber. (With HBMC)
- 10. Remove washers, bushings, and shock absorber. (Without HBMC)
- 11. Perform inspection after removal. Refer to <u>RSU-11, "Inspection and Adjustment"</u>.

#### INSTALLATION

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

- When installing the bracket (1), check that bracket is attached as shown in the figure. (With HBMC)

  - A : Frame edge line
  - B : Almost parallel



- Use the holder (A) [SST: KV10109300 ( )] and a suitable tool (B) to tighten piston rod lock nut so that the bracket does not become misaligned. (With HBMC)
- Install air tube to shock absorber assembly. Refer to <u>SCS-91,</u> <u>"Removal and Installation"</u>.
- Perform final tightening of bolts and nuts at the shock absorber lower side (rubber bushing), under unladen conditions with tires on level ground.
- Perform inspection after installation. Refer to <u>RSU-11, "Inspection</u> and Adjustment".
- After replacing the shock absorber, always follow the disposal procedure to discard the shock absorber. Refer to <u>RSU-11, "Disposal"</u>.

#### Inspection and Adjustment

#### **INSPECTION AFTER REMOVAL**

Check the following items, and replace the parts if necessary.

- Shock absorber assembly for deformation, cracks, damage.
- Piston rod on shock absorber assembly for damage, uneven wear, and distortion.
- Welded and sealed areas for oil leakage.

#### INSPECTION AFTER INSTALLATION

Check wheel alignment. Refer to RSU-6, "Inspection".

ADJUSTMENT AFTER INSTALLATION (WITH HBMC) Bleed air from the HBMC. Refer to <u>SCS-18, "Work Procedure"</u>.

#### Disposal

WITHOUT HBMC



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#### **REAR SHOCK ABSORBER**

#### < REMOVAL AND INSTALLATION >

- 1. Set shock absorber horizontally with the piston rod fully extended.
- Drill 2 3 mm (0.08 0.12 in) hole at the position (●) from top as shown in the figure to release gas gradually.
   CAUTION:
  - Wear eye protection (safety glasses).
  - Wear gloves.
  - Be careful with metal chips or oil blown out by the compressed gas.

NOTE:

- Drill vertically in this direction (**(**).
- Directly to the outer tube avoiding brackets.
- The gas is clear, colorless, odorless, and harmless.



#### A : 20 – 30 mm (0.79 – 1.18 in)

3. Position the drilled hole downward and drain oil by moving the piston rod several times. CAUTION:

#### Dispose of drained oil according to the law and local regulations.

#### WITH HBMC

#### NOTE:

Releasing gas is not required.

#### < REMOVAL AND INSTALLATION >

#### SUSPENSION ARM

#### **Exploded View**

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Swing Torque Inspection

#### SUSPENSION ARM

#### < REMOVAL AND INSTALLATION >

- 1. Move the ball joint at least ten times by hand to check for smooth movement.
- Hook spring balance (A) at groove. Confirm spring balance measurement value is within specifications when ball stud begins moving.

#### Swing torque : Refer to <u>RSU-20, "Ball Joint"</u>.

• If swing torque exceeds the standard range, replace suspension arm assembly.



#### Rotating Torque Inspection

- 1. Move the ball joint at least ten times by hand to check for smooth movement.
- 2. Check that rotating torque is within the specifications.

#### Rotating torque : Refer to <u>RSU-20, "Ball Joint"</u>.

• If rotating torque exceeds the standard range, replace suspension arm assembly.

#### Axial End Play Inspection

- 1. Move the ball joint at least ten times by hand to check for smooth movement.
- 2. Move tip of ball stud in axial direction to check for looseness.

#### Axial end play : Refer to <u>RSU-20, "Ball Joint"</u>.

• If axial end play exceeds the standard range, replace suspension arm assembly.

**INSPECTION AFTER INSTALLATION** 

Check wheel alignment. Refer to RSU-6, "Inspection".

ADJUSTMENT AFTER INSTALLATION (WITH HBMC) Bleed air from the HBMC. Refer to <u>SCS-18, "Work Procedure"</u>.

#### FRONT LOWER LINK

#### < REMOVAL AND INSTALLATION >

#### FRONT LOWER LINK

#### **Exploded View**

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Revision: 2012 September

#### FRONT LOWER LINK

#### < REMOVAL AND INSTALLATION >

2. Hook spring balance (A) at groove. Confirm spring balance measurement value is within specifications when ball stud begins moving.

#### Swing torque : Refer to <u>RSU-20, "Ball Joint"</u>.

• If swing torque exceeds the standard range, replace front lower link.



Rotating Torque Inspection

- 1. Move the ball joint at least ten times by hand to check for smooth movement.
- 2. Check that rotating torque is within the specifications.

#### Rotating torque : Refer to <u>RSU-20, "Ball Joint"</u>.

• If rotating torque exceeds the standard range, replace front lower link.

Axial End Play Inspection

- 1. Move the ball joint at least ten times by hand to check for smooth movement.
- 2. Move tip of ball stud in axial direction to check for looseness.

#### Axial end play : Refer to <u>RSU-20, "Ball Joint"</u>.

• If axial end play exceeds the standard range, replace front lower link.

INSPECTION AFTER INSTALLATION Check wheel alignment. Refer to <u>RSU-6. "Inspection"</u>.

#### **REAR STABILIZER**

#### < REMOVAL AND INSTALLATION >

# REAR STABILIZER

#### Exploded View

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### UNIT REMOVAL AND INSTALLATION REAR SUSPENSION MEMBER

Exploded View

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1. Rear suspension member

Refer to <u>GI-4, "Components"</u> for symbols in the figure.

#### Removal and Installation

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#### REMOVAL

1. Reduce system pressure. (With HBMC) Refer to <u>SCS-18, "Work Procedure"</u>. CAUTION:

#### Inadvertent piping removal causes fluid to splatter.

- 2. Remove tires with power tool. Refer to WT-58. "Removal and Installation".
- 3. Remove emergency tires.
- 4. Remove front tube and main muffler. Refer to EX-5, "Removal and Installation".
- Remove caliper assembly. Hang caliper assembly in a place where it will not interfere with work. Refer to <u>BR-43. "BRAKE CALIPER ASSEMBLY : Removal and Installation"</u>. CAUTION:

#### Avoid depressing brake pedal while brake caliper is removed.

- 6. Remove disc rotor. Refer to RAX-7, "Removal and Installation".
- 7. Remove wheel sensor harness from rear suspension member. Refer to <u>BRC-140, "REAR WHEEL SEN-SOR : Removal and Installation"</u>.
- 8. Remove height sensor from rear lower link (right side). Refer to EXL-120. "Removal and Installation".
- 9. Remove vehicle height sensor from rear lower link (left side). Refer to <u>SCS-94, "Removal and Installa-</u> tion".
- 10. Remove parking brake cable mounting bolt and separate parking brake cable from vehicle and rear suspension member. Refer to <u>PB-5</u>, "Removal and Installation".
- 11. Remove shock absorber mounting bolt (lower side).
- 12. Remove stabilizer bar. (Without HBMC). Refer to RSU-17, "Removal and Installation".
- 13. Remove rear lower link and coil spring. Refer to RSU-8, "Removal and Installation".
- 14. Remove drive shaft. Refer to <u>RAX-11, "Removal and Installation"</u>.
- 15. Remove propeller shaft. Refer to <u>DLN-146, "Removal and Installation"</u> (2WD), <u>DLN-138, "Removal and Installation"</u> (4WD).

#### **REAR SUSPENSION MEMBER**

#### < UNIT REMOVAL AND INSTALLATION >

16. Remove final drive. Refer to DLN-205, "Removal and Installation".	
17. Remove rear tube assembly A and rear tube assembly B. (With HBMC) Refer to <u>SCS-44, "REAR TUBE</u> <u>ASSEMBLY : Removal and Installation"</u> .	А
18. Set suitable jack under rear suspension member.	_
19. Slowly lower jack, then remove rear suspension member, suspension arm, front lower link, wheel hub and housing from vehicle as a unit.	В
20. Remove mounting bolts and nuts, then remove suspension arm, front lower link, wheel hub and housing from rear suspension member.	С
21. Perform inspection after removal. Refer to RSU-19, "Inspection and Adjustment".	
INSTALLATION	
<ul> <li>Note the following, and install in the reverse order of the removal.</li> <li>Perform the final tightening of each of parts under unladen conditions, which were removed when removing rear suspension assembly.</li> </ul>	D
<ul> <li>Perform inspection after installation. Refer to <u>RSU-19, "Inspection and Adjustment"</u>.</li> <li>Perform adjustment after installation. (With HBMC) Refer to <u>RSU-19, "Inspection and Adjustment"</u>.</li> </ul>	RSU
Inspection and Adjustment	F
INSPECTION AFTER REMOVAL	
Check rear suspension member for deformation, cracks, or any other damage. Replace if necessary.	
INSPECTION AFTER INSTALLATION	G
1. Adjust parking brake operation (stroke), Refer to PB-3, "Inspection and Adjustment".	
<ol> <li>Check wheel sensor harness for proper connection. Refer to <u>BRC-140</u>, "<u>REAR WHEEL SENSOR</u> : <u>Exploded View</u>"</li> </ol>	Н
3. Check wheel alignment. Refer to <u>RSU-6, "Inspection"</u> .	
ADJUSTMENT AFTER INSTALLATION (WITH HBMC)	
Bleed air from the HBMC. Refer to SCS-18, "Work Procedure".	
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#### SERVICE DATA AND SPECIFICATIONS (SDS)

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# SERVICE DATA AND SPECIFICATIONS (SDS) SERVICE DATA AND SPECIFICATIONS (SDS)

#### Wheel Alignment

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	Item	Standard						
		Minimum	-1° 00′ (-1.00°)					
Camber		Nominal	-0° 30′ (-0.50°)					
Degree minute (Decimal degree)		Maximum	0° 00′ (0.00°)					
		Left and right difference	0° 45′ (0.75°) or less					
Toe-in		Minimum	0 mm (0 in)					
	Total toe-in Distance	Nominal	In 3.4 mm (0.134 in)					
		Maximum	In 6.8 mm (0.268 in)					
		Minimum	0° 00′ (0.00°)					
	Total toe-angle Degree minute (Decimal degree)	Nominal	ln 0° 13′ 48″ (ln 0.23°)					
		Maximum	ln 0° 28′ 12″ (ln 0.47°)					

Measure value under unladen\* conditions.

\*: Fuel, engine coolant and lubricant are full. Spare tire, jack, hand tools and mats are in designated positions.

#### **Ball Joint**

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Item	Standard				
Swing torque		0.5 – 6.4 N·m (0.06 – 0.65 kg-m, 5 – 56 in-lb)			
Macaurament on apring balance (grapus position)	Suspension arm	11.4 – 145.4 N (1.17 – 14.83 kg, 2.57 – 32.68 lb)			
Measurement on spring balance (groove position)	Front lower link	11.0 – 140.6 N (1.13 – 14.34 kg, 2.48 – 31.60 lb)			
Rotating torque	0.5 – 6.4 N·m (0.06 – 0.65 kg-m, 5 – 56 in-lb)				
Axial end play		0 mm (0 in)			

#### Wheel Height

INFOID:000000007377166

Item	Standard
Front (Hf)	903 mm (35.55 in)
Rear (Hr)	890 mm (35.04 in)



SFA746B

Measure value under unladen\* conditions.

\*: Fuel, engine coolant and lubricant are full. Spare tire, jack, hand tools and mats are in designated positions.