SECTION BR
BRAKE SYSTEM

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PRECAUTION

PRECAUTIONS

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

INFOID:0000000013568674

Risk of injury

There is a risk of injury caused by parts becoming projectiles if uncontrolled deployment of air bag or seat belt pre-tensioner occurs, or by storing air bag with the deployment side facing downwards. When scrapping air bag or seat belt pre-tensioner by means of controlled deployment, there is also a danger present if a sufficiently safe distance is not maintained, or if opening using cutting torches or other cutting tools, or due to smelting or if parts that are not yet triggered are exposed to a blaze or a smoldering fire at landfills.

Safety instructions/precautions

- Removed air bag must always be stored with deployment side facing up.
- Acquisition, transportation, storage, testing and assembly work should only be performed or supervised by properly trained personnel.
- Install air bag or seat belt pre-tensioner immediately following retrieval from storage.
- Air bag and seat belt pre-tensioner must be protected from flying sparks, open fires and temperature exceeding 100°C (212°F).
- Never transport air bag and seat belt pre-tensioner in the passenger compartment. Store them securely in the luggage room of the vehicle in their original replacement part packaging and secure them so that they cannot slip around.
- Never allow air bag and seat belt pre-tensioner to come into contact with grease, oil, or cleaning agents.
- Perform system tests using approved testing equipment only, and only when the units are properly installed and the vehicle is unoccupied.
- Before the initial hookup of the battery or an external power supply, the ignition must be switched on and the vehicle unoccupied.
- Air bag and seat belt pre-tensioner that fall from a height of more than 0.5 m must be replaced.
- When scrapping by means of controlled deployment of air bag and seat belt pre-tensioner, a safe distance of at least 10 m must be maintained.
- Before starting work on air bag and seat belt pre-tensioner and work on components that are connected to air bag and seat belt pre-tensioner or require and intervention in their electric circuit (e.g. when removing the steering wheel):
  - Disconnect any external power sources (e.g. charger).
  - Disconnect and insulate ground line of battery
- Before starting bodywork in combination with welding or retrofitting, during which work is performed on uninsulated, current-carrying lines or require an intervention in their electric circuit (e.g. when removing the steering wheel):
  - Disconnect any external power sources (e.g. charger).
  - Disconnect and insulate ground line of battery.
  - During welding, disconnect plug connection and from control unit of air bag.

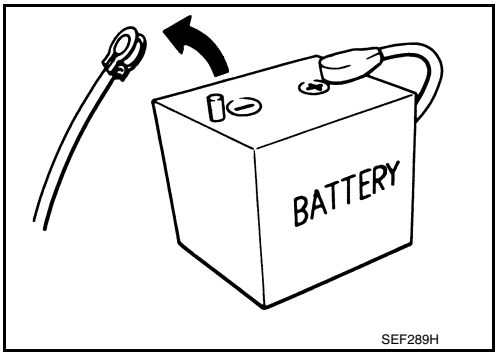
Precautions for Removing Battery Terminal

INFOID:0000000013568675

When disconnecting the battery terminal, pay attention to the following.

- Always use a 12V battery as power source.
- Never disconnect battery terminal while engine is running.
- When removing the 12V battery terminal, turn OFF the ignition switch and wait at least 30 seconds.
- For vehicles with the engine listed below, remove the battery terminal after a lapse of the specified time:

D4D engine	: 20 minutes	YS23DDT	: 4 minutes
HRA2DDT	: 12 minutes	YS23DDTT	: 4 minutes
K9K engine	: 4 minutes	ZD30DDTi	: 60 seconds
M9R engine	: 4 minutes	ZD30DDTT	: 60 seconds
R9M engine	: 4 minutes		



SEF289H

V9X engine : 4 minutes
YD25DDTi : 2 minutes

NOTE:
ECU may be active for several tens of seconds after the ignition switch is turned OFF. If the battery terminal is removed before ECU stops, then a DTC detection error or ECU data corruption may occur.

- After high-load driving, if the vehicle is equipped with the V9X engine, turn the ignition switch OFF and wait for at least 15 minutes to remove the battery terminal.

NOTE:
- Turbocharger cooling pump may operate in a few minutes after the ignition switch is turned OFF.
- Example of high-load driving
  - Driving for 30 minutes or more at 140 km/h (86 MPH) or more.
  - Driving for 30 minutes or more on a steep slope.

- For vehicles with the 2-batteries, be sure to connect the main battery and the sub battery before turning ON the ignition switch.

NOTE:
If the ignition switch is turned ON with any one of the terminals of main battery and sub battery disconnected, then DTC may be detected.

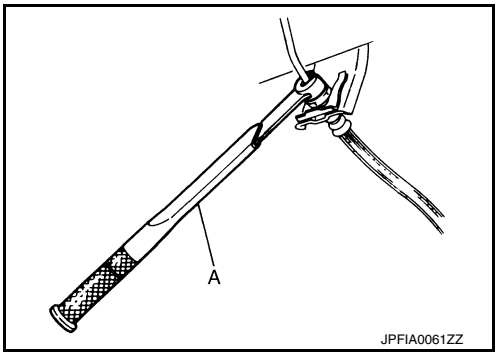
- After installing the 12V battery, always check "Self Diagnosis Result" of all ECUs and erase DTC.

NOTE:
The removal of 12V battery may cause a DTC detection error.

Precaution for Brake System

INFOID:0000000013568676

WARNING:
- **Since dust covering the front and rear brakes has an affect on human body, the dust must be removed with a dust collector. Never splatter the dust with an air blow gun.**
- **Risk of injury. Skin or eye injuries may result when handling hot or glowing objects. Wear protective gloves, protective clothing and safety glasses, if necessary.**
- Brake fluid use refer to MA-12, "FOR NORTH AMERICA : Fluids and Lubricants" (FOR NORTH AMERICA) or MA-13, "FOR MEXICO : Fluids and Lubricants" (FOR MEXICO).
- Never reuse drained brake fluid.
- When performing maintenance and repair work on the brake system, it must be ensured that no mineral oil, lubricating grease or similar substances enter the brake system.
- New brake fluid must be used as a flushing and cleaning agent for the cylinders, the lines and the reservoir tank of the hydraulic braking system.
- Never spill or splash brake fluid on painted surfaces. Brake fluid may seriously damage paint. Wipe it off immediately and wash with water if it gets on a painted surface. For brake component parts, never wash them with water.
- Always confirm the specified tightening torque when installing the brake pipes.
- After pressing the brake pedal more deeply or harder than normal driving, such as air bleeding, check each item of brake pedal.
- Always clean with new brake fluid when cleaning the master cylinder, brake caliper and other components.
- Never use mineral oils such as gasoline or light oil to clean. They may damage rubber parts and cause improper operation.
- Always loosen the brake tube flare nut with a flare nut wrench.
- Tighten the brake tube flare nut to the specified torque with a flare nut torque wrench (A).
- Turn the ignition switch OFF and disconnect the electronic stability program control unit harness connector or the battery negative terminal before performing the work.
- Check that no brake fluid leakage is present after replacing the parts.

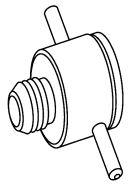


PREPARATION

PREPARATION

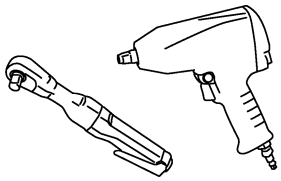
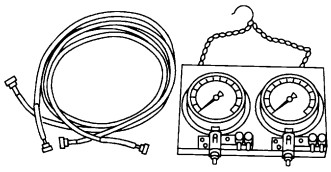
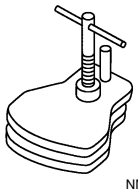
Special Service Tool

INFOID:0000000013568618

Tool number Tool name	Description
KV995H0030 (DAIMLER tool No.168 589 08 63 00) Test connection  JSFIA3390ZZ	• Checking brake booster. • Checking check valve airtightness.

Commercial Service Tool

INFOID:0000000013568619

Tool name	Description
Power tool  PBIC0190E	Loosening bolts and nuts
Handy vacuum pump  ZZC1313D	• Checking brake booster. • Checking check valve airtightness.
Brake pressure gauge  S-NT151	Checking brake booster.
Brake caliper wrench  NNFIA0040ZZ	Return the piston

BASIC INSPECTION

FRONT DISC BRAKE

DISC ROTOR

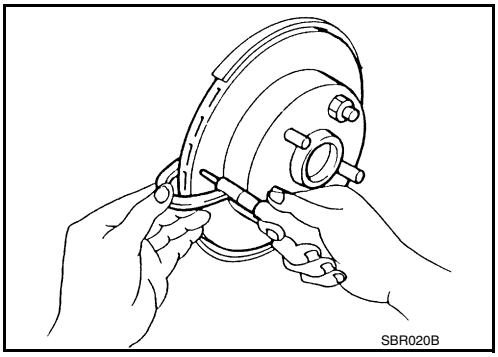
DISC ROTOR : Inspection

INFOID:0000000013568620

INSPECTION

Uneven wear

Check the uneven wear with a micrometer to measure at 10 mm (0.39 in) inside the disc rotor edge. Replace the disc rotor if the thickness is below the wear limit. Refer to FAX-10, "Removal and Installation".



Thickness variation	**: Refer to BR-55, "Front Disc Brake".**

REAR DISC BRAKE
DISC ROTOR

DISC ROTOR : Inspection

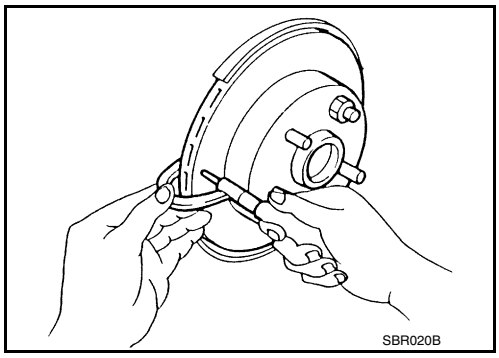
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INSPECTION

Uneven wear

Check the uneven wear with a micrometer to measure at 10 mm (0.39 in) inside the disc rotor edge. Replace the disc rotor if the thickness is below the wear limit.

- 2WD: Refer to RAX-7, "Removal and Installation".
- AWD: Refer to RAX-17, "Removal and Installation".



Thickness variation : **Refer to BR-56, "Rear Disc Brake".**

SYSTEM DESCRIPTION

SYSTEM

WARNING/INDICATOR/CHIME LIST

WARNING/INDICATOR/CHIME LIST : Warning Lamp/Indicator Lamp

INFOID:0000000013568622

Name	Design	Layout/Function
Brake warning lamp		For layout: Refer to MWI-8, "METER SYSTEM : Design". For function: Refer to MWI-20, "WARNING LAMPS/INDICATOR LAMPS : Brake Warning Lamp".

SYMPTOM DIAGNOSIS

NOISE, VIBRATION AND HARSHNESS (NVH) TROUBLESHOOTING

NVH Troubleshooting Chart

INFOID:0000000013568623

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

Reference page			BR-14, BR-15	BR-14, BR-15, BR-6, BR-7	BR-14, BR-15, BR-6, BR-7	BR-14, BR-15	BR-14, BR-15	BR-14, BR-15	BR-14, BR-15	BR-14, BR-15, BR-6, BR-7	NVH in FAX, RAX and FSU, RSU section	NVH in WT section	NVH in WT section	NVH in FAX section	NVH in ST section
Possible cause and SUSPECTED PARTS			Pads wear thickness	Rotor imbalance	Rotor damage	Rotor runout	Rotor deformation	Rotor deflection	Rotor rust	Rotor thickness variation	AXLE AND SUSPENSION	TIRE	ROAD WHEEL	DRIVE SHAFT	STEERING
Symptom	BRAKE	Noise	×	—	—	—	—	—	×	—	×	×	×	×	×
		Shake	—	×	—	—	—	—	—	—	×	×	×	×	×
		Shimmy, Judder	—	×	×	×	×	×	×	×	×	×	×	—	×

×: Applicable, —: Not applicable

PERIODIC MAINTENANCE

BRAKE PEDAL

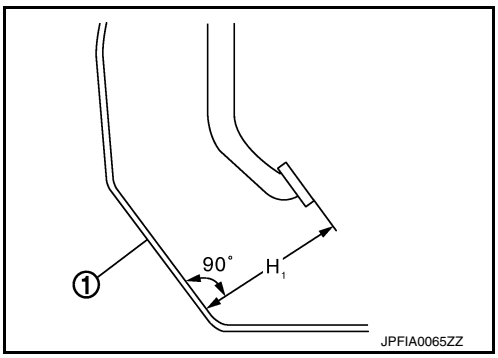
Inspection

INFOID:0000000013568624

INSPECTION

Brake Pedal Height

Check the brake pedal height (H_1) between the dash lower panel ① and the brake pedal upper surface.



Brake pedal height : **Refer to BR-55, "Brake Pedal".**

CAUTION:

Check the height with the floor carpet removed.

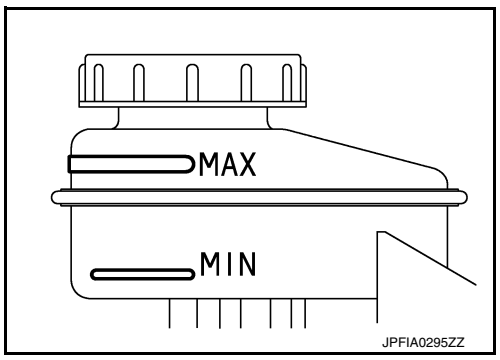
BRAKE FLUID

Inspection

INFOID:0000000013568625

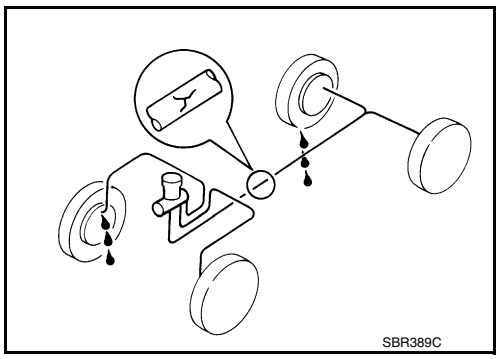
BRAKE FLUID LEVEL

- Check that the brake fluid level in the reservoir tank is within the standard (between MAX – MIN lines).
- Visually check for any brake fluid leakage around the reservoir tank.
- Check the brake system for any leakage if the fluid level is extremely low (lower than MIN).
- Check the reservoir tank for the mixing of foreign matter (e.g. dust) and oils other than brake fluid.



BRAKE LINE

1. Check brake line (tubes and hoses) for cracks, deterioration or other damage. Replace any damaged parts.
2. Depress the brake pedal with a force of 200 – 300 N (21 – 30 kg, 45 – 67 lb) and hold down the pedal with the engine running. Check for any fluid leakage.
   CAUTION:
   Retighten the applicable connection to the specified torque and repair any abnormal (damaged, worn or deformed) part if any brake fluid leakage is present.



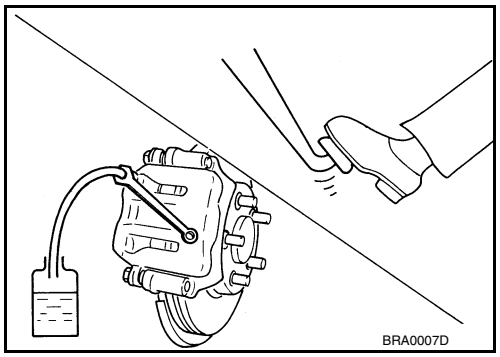
Draining

INFOID:0000000013568626

CAUTION:

- **Never spill or splash brake fluid on painted surfaces. Brake fluid may seriously damage paint. Wipe it off immediately and wash with water if it gets on a painted surface. For brake component parts, never wash them with water.**
- **Turn the ignition switch OFF and disconnect the electronic stability program control unit harness connector or the battery negative terminal before performing work.**

1. Connect a vinyl tube to the bleed valve.
2. Depress the brake pedal and loosen the bleeder valve to gradually discharge brake fluid.



Refilling

INFOID:0000000013568627

CAUTION:

- **Turn the ignition switch OFF and disconnect the electronic stability program control unit harness connector or the battery negative terminal before performing work.**

- **Never spill or splash brake fluid on painted surfaces. Brake fluid may seriously damage paint. Wipe it off immediately and wash with water if it gets on a painted surface. For brake component parts, never wash them with water.**

1. Check that there is no foreign material in the reservoir tank, and refill with new brake fluid.
   CAUTION:
   - **Never reuse drained brake fluid.**
   - **Never allow foreign matter (e.g. dust) and oils other than brake fluid to enter the reservoir tank.**
2. Loosen the bleeder valve, slowly depress the brake pedal to the full stroke, and then release the pedal. Repeat this operation at intervals of 2 or 3 seconds until new brake fluid is discharged. Then close the bleeder valve with the brake pedal depressed. Repeat the same work on each wheel.
3. Perform the air bleeding. Refer to BR-12, "Bleeding Brake System".

Bleeding Brake System

INFOID:0000000013568628

CAUTION:
- **Turn the ignition switch OFF and disconnect the electronic stability program control unit harness connector or the battery negative terminal before performing the work.**
- **Monitor the fluid level in the reservoir tank while performing the air bleeding**
- **Never spill or splash brake fluid on painted surfaces. Brake fluid may seriously damage paint. Wipe it off immediately and wash with water if it gets on a painted surface. For brake component parts, never wash them with water.**

1. Check that there is no foreign material in the reservoir tank, and refill with new brake fluid.
   CAUTION:
   - **Never reuse drained brake fluid.**
   - **Never allow oils other than brake fluid to enter the reservoir tank.**
2. Connect a vinyl tube to the bleeder valve of the rear right brake.
3. Fully depress the brake pedal 4 to 5 times.
4. Loosen the bleeder valve and bleed air with the brake pedal depressed, and then quickly tighten the bleeder valve.
5. Repeat steps 3 and 4 until all of the air is out of the brake line.
6. Tighten the bleeder valve to the specified torque.
   - Front disc brake: Refer to BR-37, "BRAKE CALIPER ASSEMBLY : Exploded View".
   - Rear disc brake: Refer to BR-46, "BRAKE CALIPER ASSEMBLY : Exploded View".
7. Perform steps 2 to 6. Occasionally fill with the brake fluid in order to keep it in the reservoir tank at least half of MAX line. Bleed air in the following order: rear right brake → front left brake → rear left brake → and front right brake in order.
8. Check that the fluid level in the reservoir tank is within the specified range after air bleeding. Refer to BR-11, "Inspection".
9. Check each item of brake pedal. Adjust it if the measurement value is not the standard. Refer to BR-10, "Inspection".

BRAKE BOOSTER

Inspection

INFOID:0000000013568629

CHECKING BRAKE BOOSTER

1. Depress brake pedal several times with engine switched off to reduce the vacuum in the brake booster.
2. Remove engine cover or cylinder head cover trim. Refer to EM-20, "Removal and Installation".
3. Connect handy vacuum pump (commercial service tool) with test connection [SST: KV995H0030 (168 589 08 63 00)] to brake booster.
4. Connect brake pressure gauge (commercial service tool) to brake caliper using connection fitting.
   CAUTION:
   Use correct connection fitting (pitch, cone etc.). Otherwise leaks and measurement errors can occur.
5. Produce a vacuum use a handy vacuum pump (commercial service tool).

   At vacuum of (–75) – (–80) kPa [(–750) – (–800) mbar, (–563) – (–600) mmHg, (–22.15) – (–23.62) inHg]

   NOTE:
   - If this vacuum is not reached or it drops immediately, the seal between the brake booster and master brake cylinder may be damaged or the check valve in the vacuum line may be defective. In this case, check the check valve. Refer to BR-32, "Inspection".
   - If a vacuum of (–75) – (–80) kPa [(–750) – (–800) mbar, (–563) – (–600) mmHg, (–22.15) – (–23.62) inHg] is not reached or drops immediately and the check valve is not defective, replace the O-ring. Refer to BR-26, "Removal and Installation".
6. Apply the specified force to the brake pedal and read off the brake line pressure on the brake pressure gauge (commercial service tool).

Vacuum of brake booster	Force on brake pedal	Brake line pressure
(–75) – (–80) kPa [(–750) – (–800) mbar, (–563) – (–600) mmHg, (–22.15) – (–23.62) inHg]	50 N (5.1 kg, 11 lb)	1800 – 2100 kPa (18 – 21 bar, 18.4 – 21.4 kg/cm^2, 261 – 304 psi)
	100 N (10.2 kg, 23 lb)	4200 – 5200 kPa (42 – 52 bar, 42.9 – 53.0 kg/cm^2, 609 – 754 psi)
	150 N (15.3 kg, 34 lb)	6300 – 7800 kPa (63 – 78 bar, 64.3 – 79.5 kg/cm^2, 914 – 1131 psi)
	200 N (20.4 kg, 45 lb)	9100 kPa (91 bar, 92.8 kg/cm^2, 1319 psi)
	250 N (25.5 kg, 56 lb)	9400 kPa (94 bar, 95.8 kg/cm^2, 1363 psi)

   NOTE:
   - In order to cover measurement errors (incorrect force on the brake pedal, incorrect vacuum) and scatter of the measuring devices, a tolerance of ±1000 kPa (10 bar, 10.2 kg/cm^2, 145 psi) on the specified value is permissible.
   - The measured value must be within the value range.
7. Remove handy vacuum pump (commercial service tool) and test connection [SST: KV995H0030 (168 589 08 63 00)] from brake booster.
8. Remove brake pressure gauge (commercial service tool) from brake caliper.
9. Install engine cover or cylinder head cover trim. Refer to EM-20, "Removal and Installation".
10. Perform the air bleeding. Refer to BR-12, "Bleeding Brake System".

FRONT DISC BRAKE

BRAKE PAD

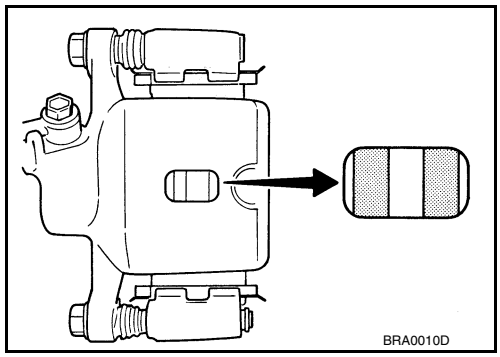
BRAKE PAD : Inspection

INFOID:0000000013568630

INSPECTION

Check brake pad wear thickness from an inspection hole on cylinder body. Check using a scale if necessary.

Wear thickness : Refer to BR-55, "Front Disc Brake".



DISC ROTOR

DISC ROTOR : Inspection

INFOID:0000000013568631

INSPECTION

Appearance

Check surface of disc rotor for score marks and cracks.

NOTE:

Cracks can occur due to high stress.

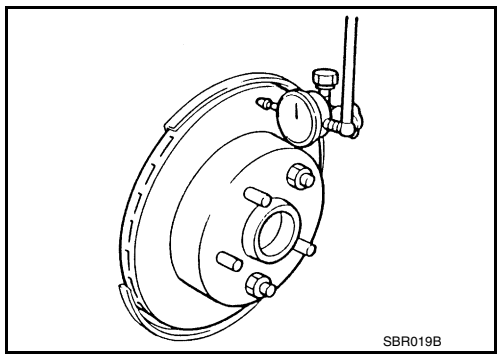
CAUTION:

- **Disc rotor do not have to be replaced when the crack length is a maximum of 25 mm (0.98 in).**
- **With perforated disc rotor or those provided with sunk holes measure the crack length including the bore diameter. For cracks and scores which have split open and are deeper than 0.5 mm (0.020 in). Replace the disc rotor. Refer to FAX-10, "Removal and Installation".**

Runout

1. Check the wheel bearing axial end play before the inspection. Refer to FAX-8, "Inspection".
2. Check the thickness with a dial indicator to measure at 10 mm (0.39 in) inside the disc rotor edge. Replace the disc rotor if the runout is below the wear limit. Refer to FAX-10, "Removal and Installation".

Runout (with it attached to the vehicle) : Refer to BR-55, "Front Disc Brake".



Thickness

Check the thickness with a vernier. Replace the disc rotor if the thickness is below the wear limit. Refer to FAX-10, "Removal and Installation".

Wear thickness : Refer to BR-55, "Front Disc Brake".

REAR DISC BRAKE

BRAKE PAD

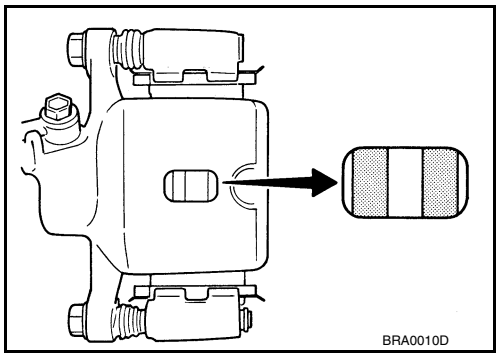
BRAKE PAD : Inspection

INFOID:0000000013568632

INSPECTION

Check brake pad wear thickness from an inspection hole on cylinder body. Check using a scale if necessary.

Wear thickness : Refer to BR-56, "Rear Disc Brake".



DISC ROTOR

DISC ROTOR : Inspection

INFOID:0000000013568633

INSPECTION

Appearance

Check surface of disc rotor for score marks and cracks.

NOTE:

Cracks can occur due to high stress.

CAUTION:

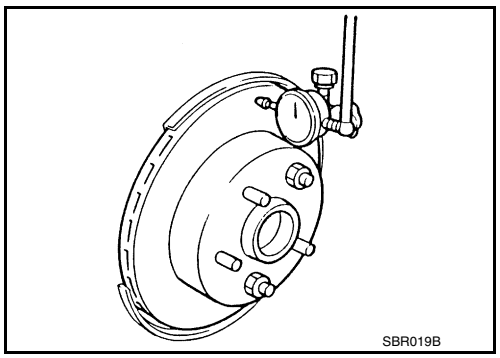
- **Disc rotor do not have to be replaced when the crack length is a maximum of 25 mm (0.98 in).**
- **With perforated disc rotor or those provided with sunk holes measure the crack length including the bore diameter. For cracks and scores which have split open and are deeper than 0.5 mm (0.020 in). Replace the disc rotor.**

- 2WD: Refer to RAX-7, "Removal and Installation".
- AWD: Refer to RAX-17, "Removal and Installation".

Runout

1. Check the wheel bearing axial end play before the inspection.
   - 2WD: Refer to RAX-6, "Inspection".
   - AWD: Refer to RAX-15, "Inspection".
2. Check the runout with a dial indicator to measure at 10 mm (0.39 in) inside the disc rotor edge. Replace the disc rotor if the runout is below the wear limit.
   - 2WD: Refer to RAX-7, "Removal and Installation".
   - AWD: Refer to RAX-17, "Removal and Installation".

Runout (with it attached to the vehicle) : Refer to BR-56, "Rear Disc Brake".



Thickness

Check the thickness with a vernier. Replace the disc rotor if the thickness is below the wear limit.

- 2WD: Refer to RAX-7, "Removal and Installation".
- AWD: Refer to RAX-17, "Removal and Installation".

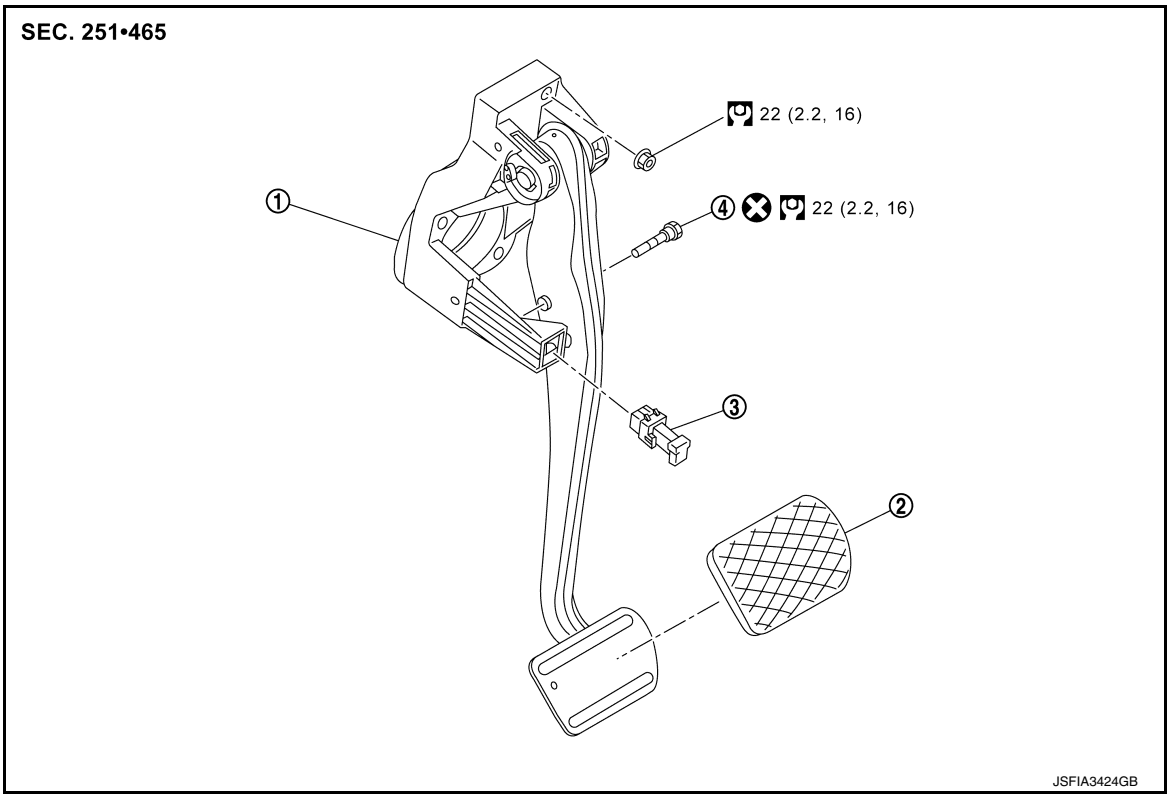
Wear thickness	**: Refer to BR-56, "Rear Disc Brake".**

REMOVAL AND INSTALLATION

BRAKE PEDAL

Exploded View

INFOID:0000000013568634



① Brake pedal assembly ② Brake pedal pad* ③ Brake light switch

④ Security bolt

: Always replace after every disassembly.

: N·m (kg-m, ft-lb)

*: The sport grade is a stainless steel pedal cover.

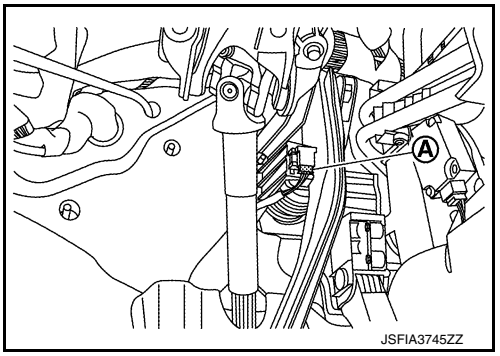
Removal and Installation

INFOID:0000000013568635

REMOVAL

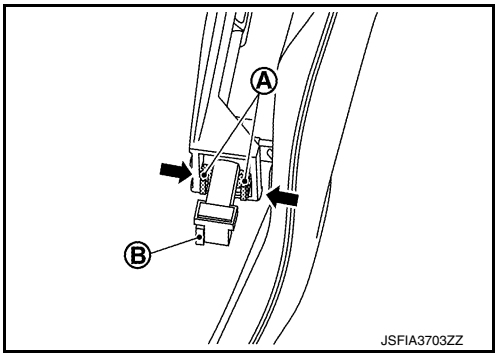
1. Remove stainless steel pedal cover, if necessary. (sport grade)
2. Remove brake pedal pad, if necessary.
3. Remove instrument lower cover LH. Refer to IP-13, "Removal and Installation".
4. Remove front foot duct. Refer to VTL-11, "FRONT FOOT DUCT : Removal and Installation".

5. Disconnect the brake light switch harness connector Ⓐ.



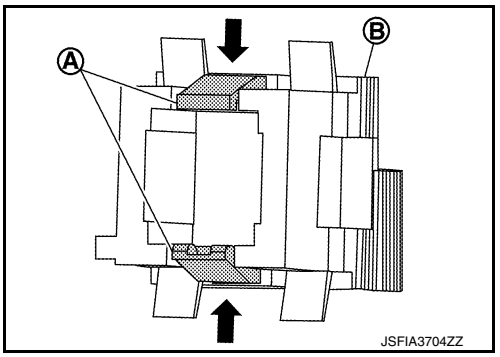
6. Remove brake light switch if necessary, follow the procedure below.

a. Push pawl Ⓐ of brake light switch bracket and remove brake light switch Ⓑ from brake light switch bracket.

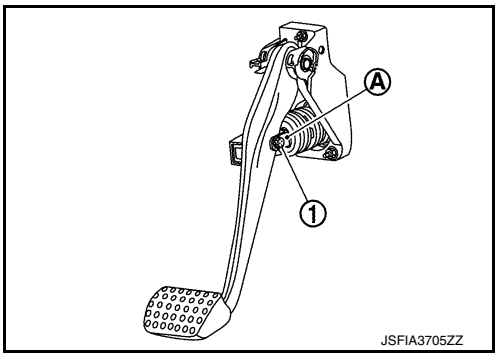


b. Push pawl Ⓐ of brake light switch bracket and remove brake light switch bracket Ⓑ from brake pedal assembly.

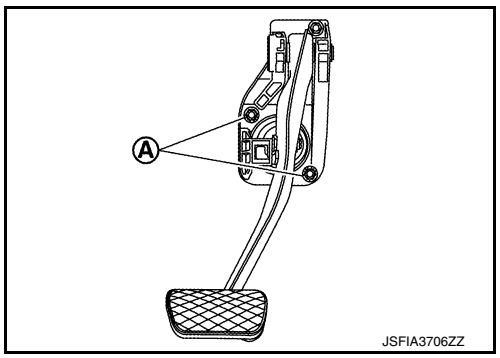
7. Remove accelerator pedal assembly. Refer to ACC-4, "Removal and Installation".



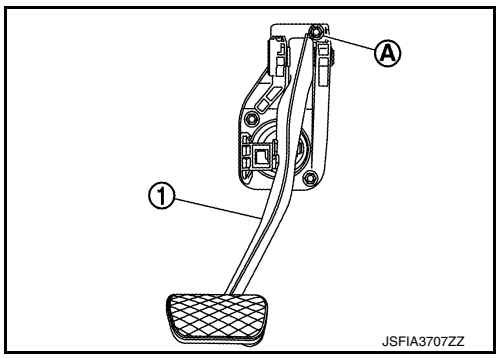
8. Remove security bolt ① from clevis Ⓐ of brake booster.
9. Remove wire harness clips from brake pedal assembly.



10. Remove the brake booster mounting nuts Ⓐ. Refer to BR-29, "Removal and Installation".
CAUTION:
Hold the brake booster and master cylinder assembly so as not to drop out or contact them other parts.



11. Remove the brake pedal assembly mounting nut Ⓐ, and remove the brake pedal assembly ①.



INSTALLATION

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

CAUTION:
Never reuse security bolt.

- Install brake light switch.
  NOTE:
  Depress brake pedal and insert brake light switch. Press brake light switch in fully, release the brake pedal and pull it back with little force.

  Reference value : 20 N (2.0 kg, 4.5 lb)

- Install stainless steel pedal cover to brake pedal assembly. (sport grade)
  CAUTION:
  Never use lubricants when installing. Otherwise the firm seating of the stainless steel pedal cover is not assured.
- Perform inspection after installation. Refer to BR-19, "Inspection".

Inspection

INFOID:0000000013568636

INSPECTION AFTER INSTALLATION

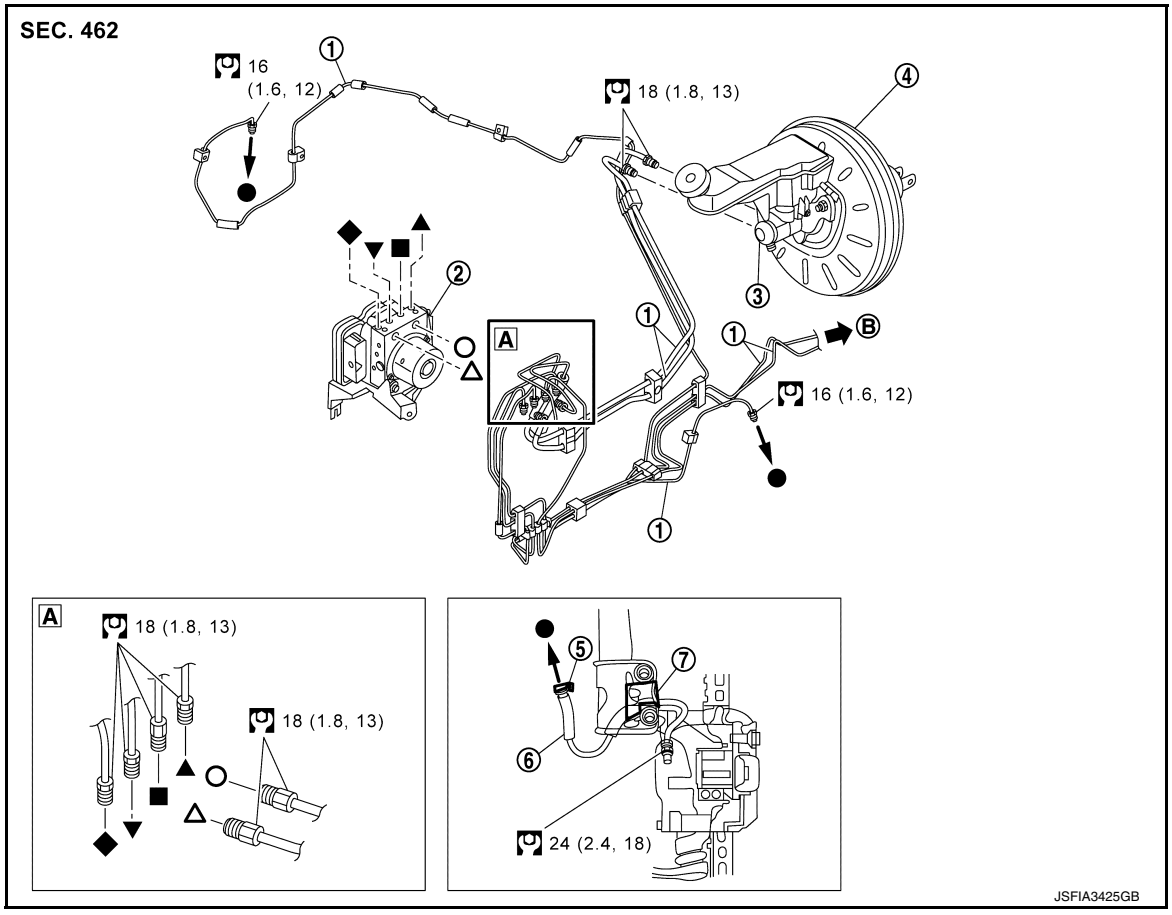
Check each item of brake pedal after installing the brake pedal assembly to the vehicle. Refer to BR-10, "Inspection".

BRAKE PIPING

FRONT

FRONT : Exploded View

INFOID:0000000013568637



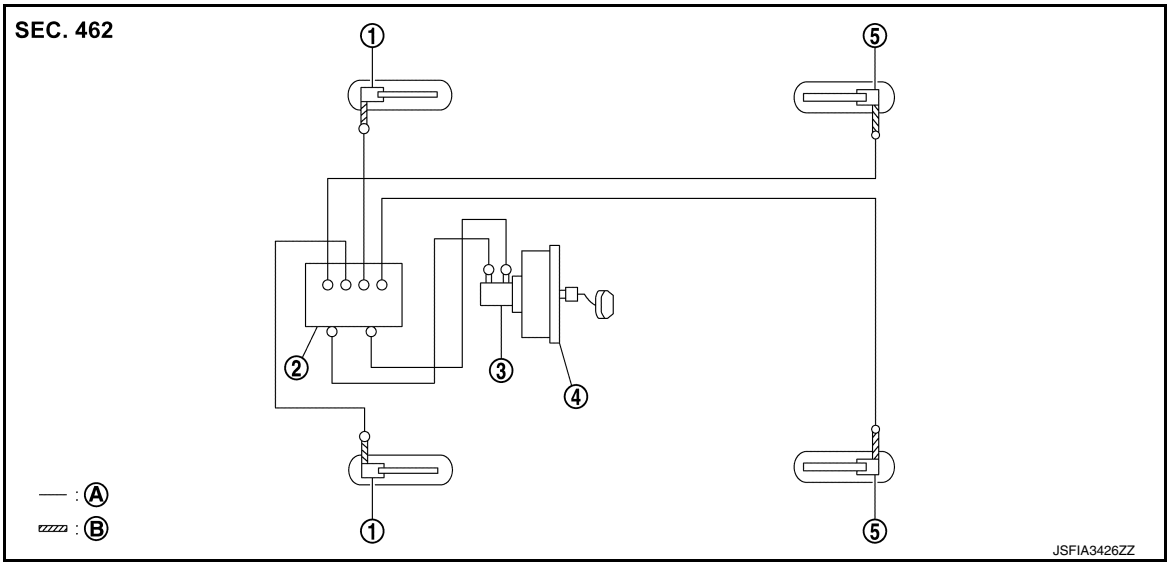
① Brake tube
② Traction system hydraulic unit
③ Master cylinder assembly
④ Brake booster
⑤ Lock spring
⑥ Brake hose
⑦ Bracket
Ⓑ To rear brake

: N·m (kg-m, ft-lb)

●, ▲, ■, ▼, ◆, ○, △: Indicates that the part is connected at points with same symbol in actual vehicle.

FRONT : Hydraulic Piping

INFOID:0000000013568638



① Front disc brake	② Traction system hydraulic unit	③ Master cylinder assembly
④ Brake booster	⑤ Rear disc brake	
Ⓐ Brake tube	Ⓑ Brake hose	

◯: Flare nut

FRONT : Removal and Installation

INFOID:0000000013568639

REMOVAL

CAUTION:

- **Never spill or splash brake fluid on painted surfaces. Brake fluid may seriously damage paint. Wipe it off immediately and wash with water if it gets on a painted surface. For brake component parts, never wash them with water.**
- **Never depress the brake pedal while removing the brake hose or brake tube. If this is not complied with, brake fluid may splash.**

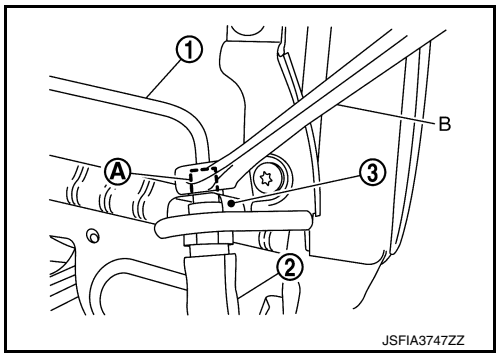
1. Remove tires with power tool (commercial service tool). Refer to WT-70, "Exploded View".
2. Drain brake fluid. Refer to BR-11, "Draining".
3. Loosen the flare nut Ⓐ with a flare nut wrench (B) and separate the brake tube ① from the brake hose ②.

   CAUTION:

   - **Never scratch the flare nut and the brake tube.**
   - **Never bend sharply, twist or strongly pull out the brake hoses and tube.**
   - **Cover open end of brake tubes and hoses when disconnecting to prevent entrance of dirt.**

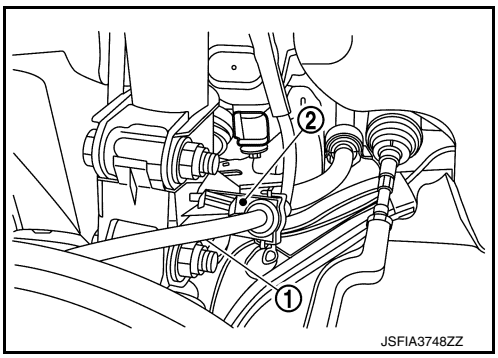
   NOTE:

   Put paint marks on the brake hose and the bracket for supporting accurate positioning during the installation procedure.

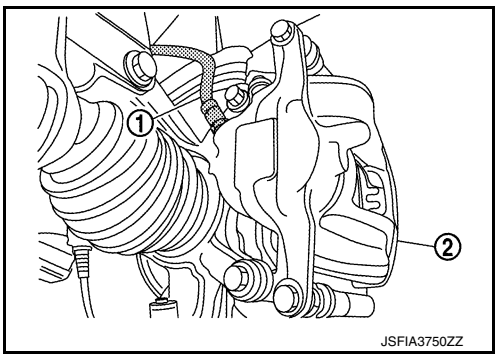


4. Remove lock spring ③.

5. Remove brake hose ① from bracket ②.



6. Remove brake hose ① from brake caliper assembly ②.



INSTALLATION

CAUTION:

- **Never spill or splash brake fluid on painted surfaces. Brake fluid may seriously damage paint. Wipe it off immediately and wash with water if it gets on a painted surface. For brake component parts, never wash them with water.**
- **Never depress the brake pedal while removing the brake hose or brake tube. If this is not complied with, brake fluid may splash.**
- **Never allow foreign matter (e.g. dust) and oils other than brake fluid to enter the reservoir tank.**
- **Install brake hose without any chafing and free of torsion. The brake hose will otherwise be damaged.**
- Install brake hose.

  CAUTION:

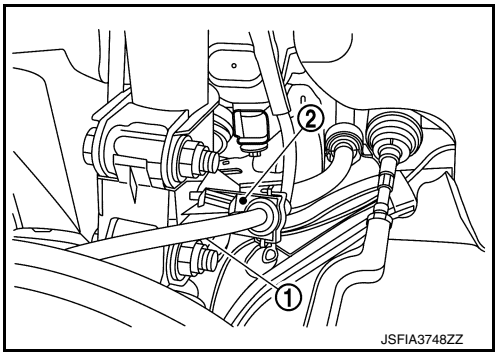
  - **Check that all brake hoses are not twisted and bent.**
  - **An adequate distance from other axle components must be guaranteed in all driving situations.**
  - **On the brake hose connector, there are two elevated sections which lock the brake hose in the multi-point profile of the bracket.**
- Install brake hose ① from bracket ②.

  CAUTION:

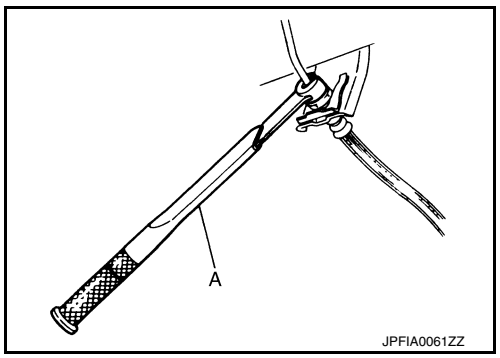
  Ensure that clamp of bracket is correctly seated.
- Install lock spring.

  CAUTION:

  Ensure that lock spring is correctly seated.



- Tighten the flare nut to the specified torque with a flare nut torque wrench (A). Refer to BR-20, "FRONT : Exploded View".
  CAUTION:
  Never scratch the flare nut and the brake tube.
- Perform the air bleeding. Refer to BR-12, "Bleeding Brake System".
  CAUTION:
  Never reuse drained brake fluid.
- Perform inspection after installation. Refer to BR-23, "FRONT : Inspection".



FRONT : Inspection

INFOID:0000000013568640

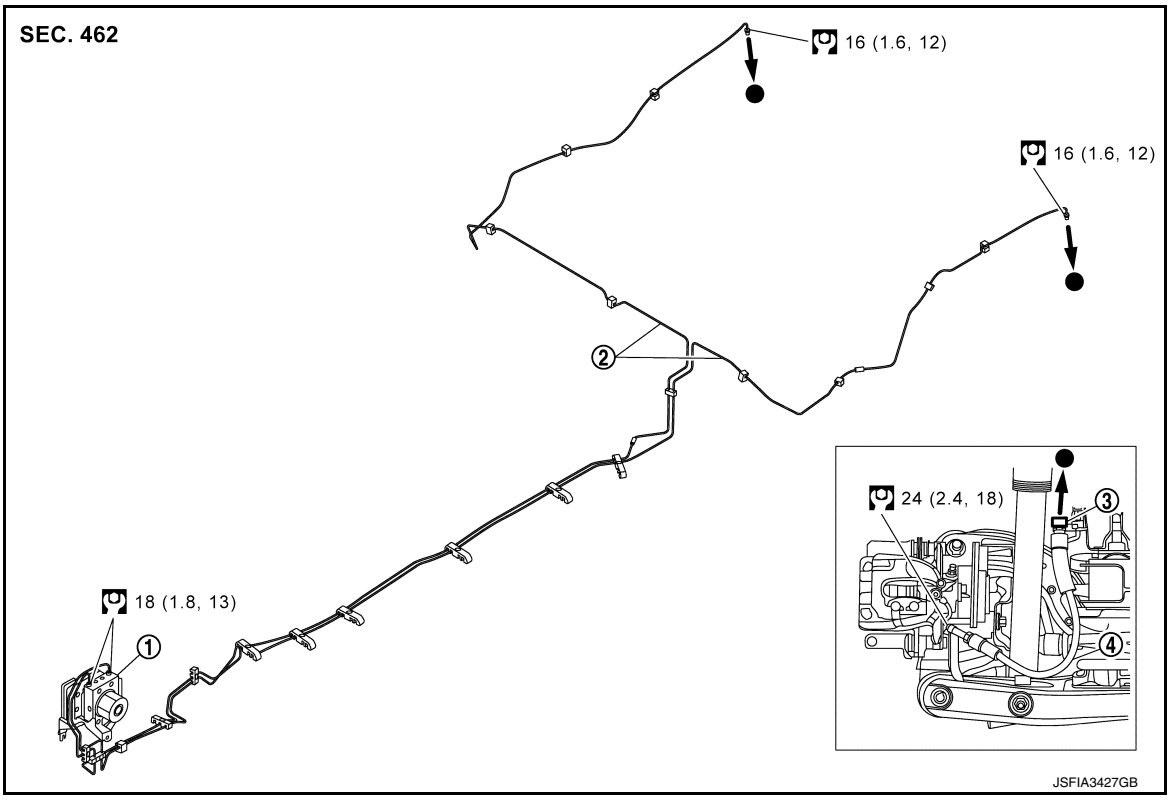
INSPECTION AFTER INSTALLATION

- Check the brake hoses and tubes for the following: no scratches; no twist and deformation; no looseness at connections.
- Check the brake system for leaks. Refer to BR-11, "Inspection".
- Check that the brake fluid level in the reservoir tank. Refer to BR-11, "Inspection".

REAR

REAR : Exploded View

INFOID:0000000013568641



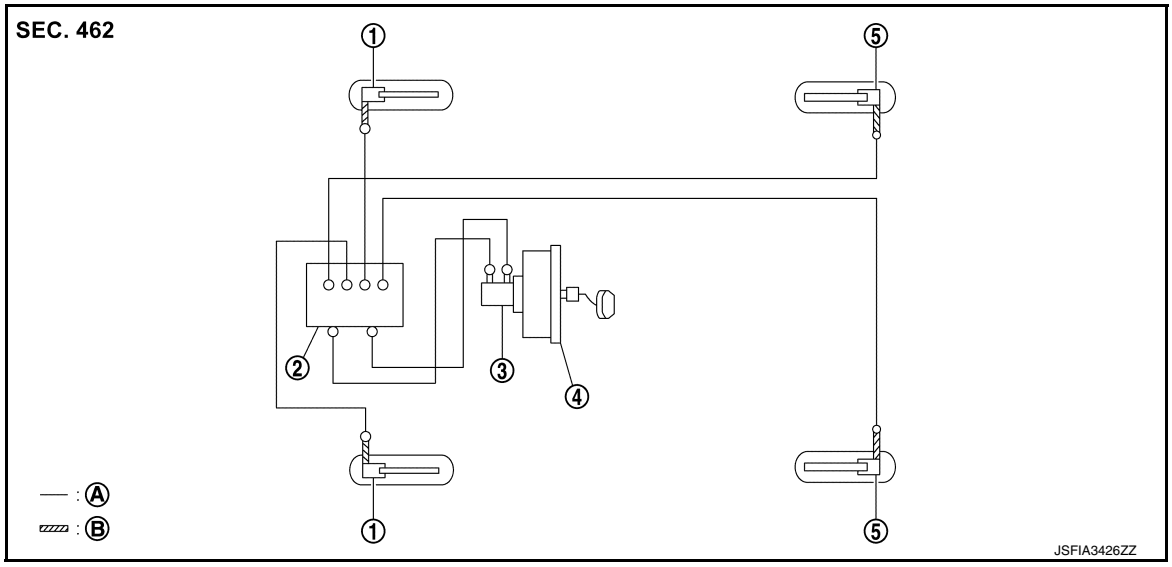
① Traction system hydraulic unit ② Brake tube ③ Lock spring
④ Brake hose

: N·m (kg-m, ft-lb)

●: Indicates that the part is connected at points with same symbol in actual vehicle.

REAR : Hydraulic Piping

INFOID:0000000013568642



① Front disc brake
② Traction system hydraulic unit
③ Master cylinder assembly
④ Brake booster
⑤ Rear disc brake
Ⓐ Brake tube
Ⓑ Brake hose
◯: Flare nut

REAR : Removal and Installation

INFOID:0000000013568643

REMOVAL

CAUTION:

- **Never spill or splash brake fluid on painted surfaces. Brake fluid may seriously damage paint. Wipe it off immediately and wash with water if it gets on a painted surface. For brake component parts, never wash them with water.**
- **Never depress the brake pedal while removing the brake hose or brake tube. If this is not complied with, brake fluid may splash.**

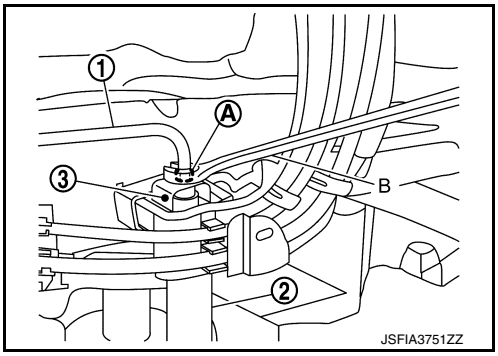
1. Remove tires with power tool (commercial service tool). Refer to WT-70, "Exploded View".
2. Drain brake fluid. Refer to BR-11, "Draining".
3. Loosen the flare nut Ⓐ with a flare nut wrench (B) and separate the brake tube ① from the brake hose ②.

   CAUTION:

   - **Never scratch the flare nut and the brake tube.**
   - **Never bend sharply, twist or strongly pull out the brake hoses and tube.**
   - **Cover the connections immediately to avoid damage being caused by brake fluid running out. The brake caliper assembly must not run empty. The brake caliper assembly must otherwise be replaced.**

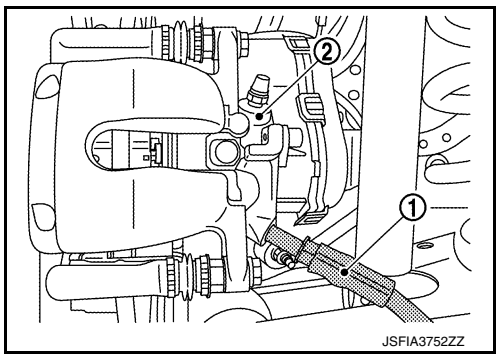
   NOTE:

   Put paint marks on the brake hose and the bracket for supporting accurate positioning during the installation procedure.



4. Remove lock spring ③.

5. Remove brake hose ① from brake caliper assembly ②.



INSTALLATION

CAUTION:

- **Never spill or splash brake fluid on painted surfaces. Brake fluid may seriously damage paint. Wipe it off immediately and wash with water if it gets on a painted surface. For brake component parts, never wash them with water.**
- **Never depress the brake pedal while removing the brake hose or brake tube. If this is not complied with, brake fluid may splash.**
- **Never allow foreign matter (e.g. dust) and oils other than brake fluid to enter the reservoir tank.**
- **Install brake hose without any chafing and free of torsion. The brake hose will otherwise be damaged.**
- Install brake hose.

  CAUTION:

  - **Check that all brake hoses are not twisted and bent.**
  - **An adequate distance from other axle components must be guaranteed in all driving situations.**
  - **On the brake hose connector, there are two elevated sections which lock the brake hose in the multi-point profile of the bracket.**
- Install lock spring.

  CAUTION:

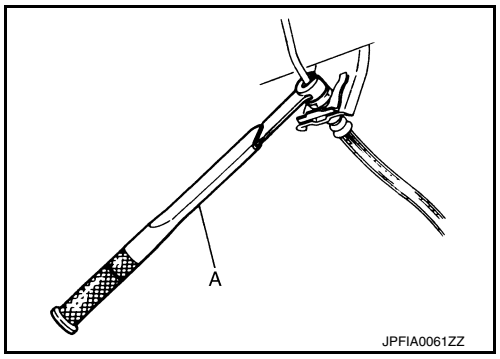
  Ensure that lock spring is correctly seated.
- Tighten the flare nut to the specified torque with a flare nut torque wrench (A). Refer to BR-23, "REAR : Exploded View".

  CAUTION:

  Never scratch the flare nut and the brake tube.
- Perform the air bleeding. Refer to BR-12, "Bleeding Brake System".

  CAUTION:

  Never reuse drained brake fluid.
- Perform inspection after installation. Refer to BR-25, "REAR : Inspection".



REAR : Inspection

INFOID:0000000013568644

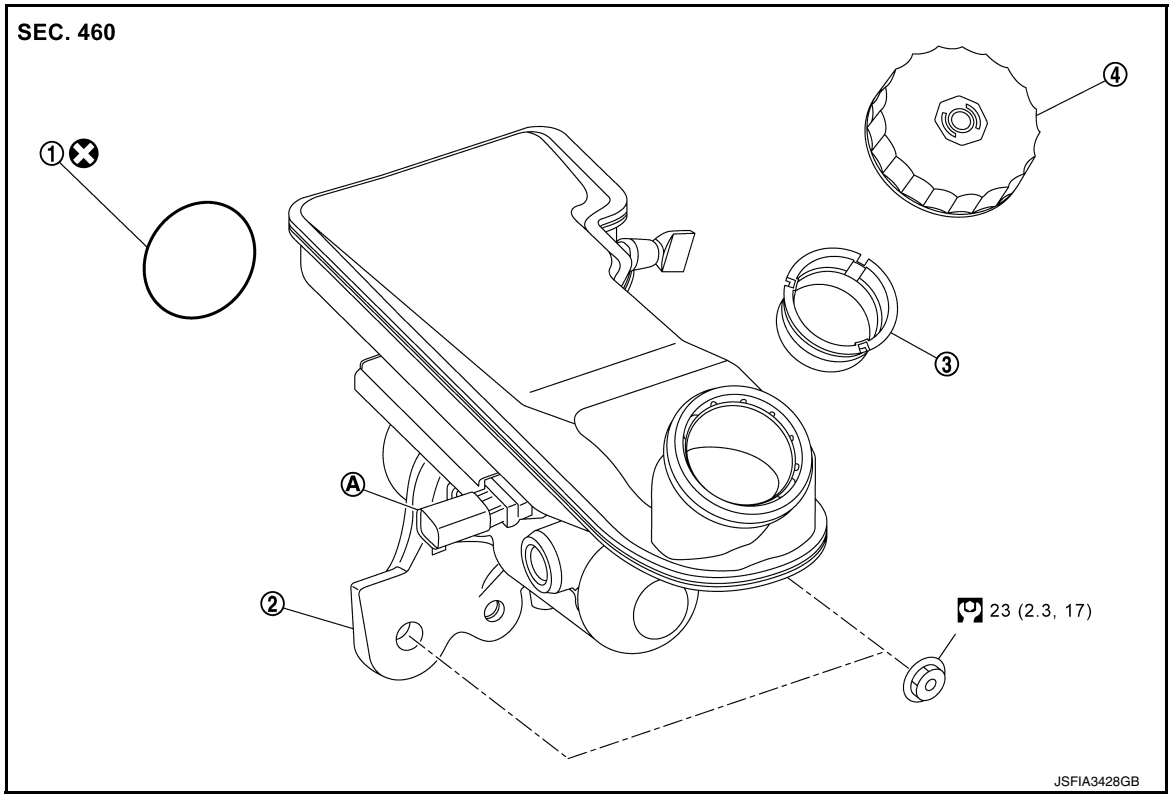
INSPECTION AFTER INSTALLATION

- Check the brake hoses and tubes for the following: no scratches; no twist and deformation; no looseness at connections.
- Check the brake system for leaks. Refer to BR-11, "Inspection".
- Check that the brake fluid level in the reservoir tank. Refer to BR-11, "Inspection".

BRAKE MASTER CYLINDER

Exploded View

INFOID:0000000013568645



1. O-ring
2. Master cylinder assembly
3. Oil strainer
4. Reservoir tank cap

A. Brake fluid level switch

: Always replace after every disassembly.

: N·m (kg-m, ft-lb)

Removal and Installation

INFOID:0000000013568646

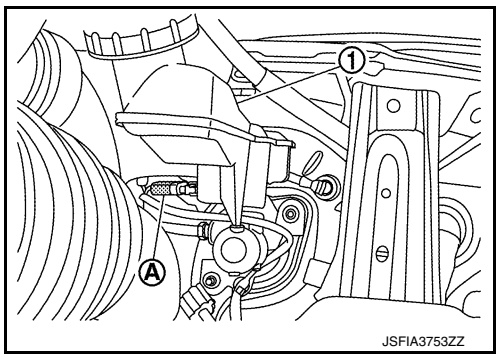
REMOVAL

CAUTION:

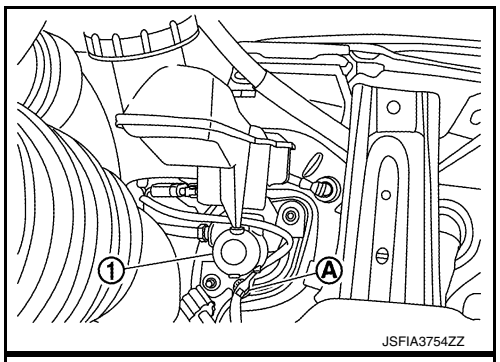
- **Never spill or splash brake fluid on painted surfaces. Brake fluid may seriously damage paint. Wipe it off immediately and wash with water if it gets on a painted surface. For brake component parts, never wash them with water.**
- **Depress the brake pedal several times to release the vacuum pressure from the brake booster. Then remove the master cylinder assembly.**
- **Never depress the brake pedal while removing the brake tube. If this is not complied with, brake fluid may splash.**

1. Drain brake fluid. Refer to BR-11, "Draining".
2. Remove air cleaner assembly. Refer to EM-23, "Removal and Installation".
3. Remove battery. Refer to PG-117, "MAIN BATTERY : Removal and Installation".

4. Disconnect the brake fluid level switch harness connector Ⓐ from master cylinder assembly ①.



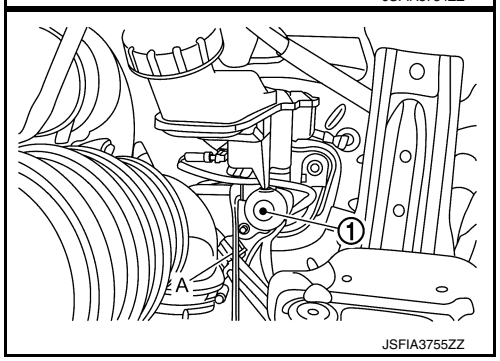
5. Remove wire harness clip Ⓐ from master cylinder assembly ①.



6. Separate brake tubes from master cylinder assembly ① with a flare nut wrench (A).

CAUTION:

- **Put matching marks on brake tubes and master cylinder assembly.**
- **Never scratch flare nut and brake tube.**
- **Cover open end of brake tubes when disconnecting to prevent entrance of dirt.**

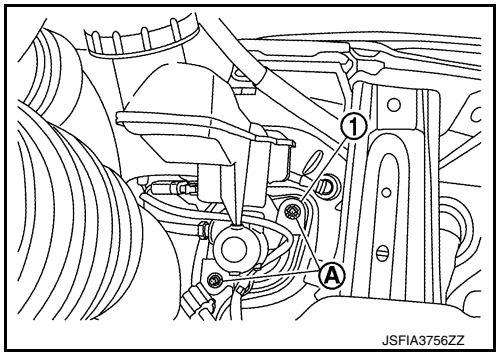


7. Remove master cylinder assembly mounting nuts Ⓐ, and remove master cylinder assembly ①.

CAUTION:

- **Never tilt master brake cylinder assembly. Pull out master brake cylinder assembly directly forwards from the brake booster. Otherwise the push rod will be pressed out of its axial position.**
- **Collect brake fluid which runs out with an absorbent rag. Otherwise damage can occur to the painted surfaces.**

8. Remove O-ring.



INSTALLATION

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

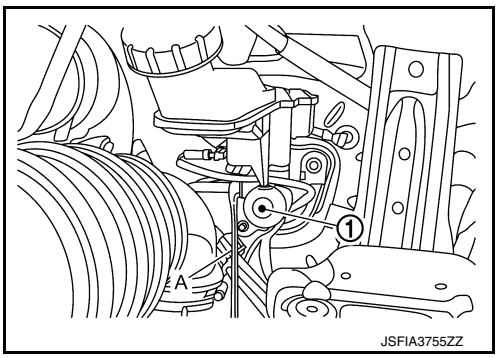
CAUTION:

- **Never spill or splash brake fluid on painted surfaces. Brake fluid may seriously damage paint. Wipe it off immediately and wash with water if it gets on a painted surface. For brake component parts, never wash them with water.**
- **Never reuse O-ring.**
- Install wire harness clip to master cylinder assembly.

CAUTION:

Never reuse clip

- Temporarily tighten brake tube flare nuts to master cylinder assembly ① by hand. Then tighten it to the specified torque with a flare nut torque wrench (A). Refer to BR-20, "FRONT : Exploded View".
  CAUTION:
  Never deform or bend brake tube.
- Perform the air bleeding. Refer to BR-12, "Bleeding Brake System"
- Perform inspection after installation. Refer to BR-28, "Inspection".



Inspection

INFOID:0000000013568647

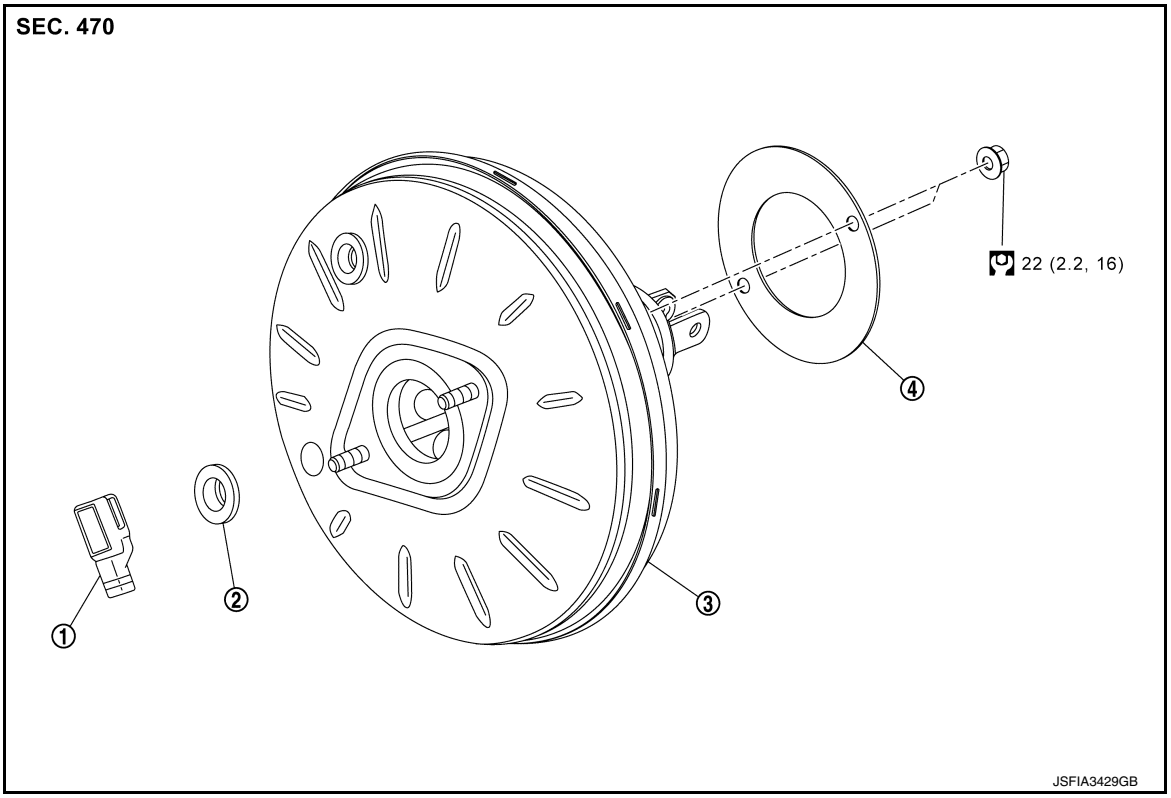
INSPECTION AFTER INSTALLATION

- Check the master cylinder for deformation, twist, contact with other parts or looseness of connection.
- Check the brake system for leaks. Refer to BR-11, "Inspection".
- Check that the brake fluid level in the reservoir tank. Refer to BR-11, "Inspection".

BRAKE BOOSTER

Exploded View

INFOID:0000000013568648



① Brake vacuum sensor ② Grommet ③ Brake booster

④ Gasket

: N·m (kg-m, ft-lb)

Removal and Installation

INFOID:0000000013568649

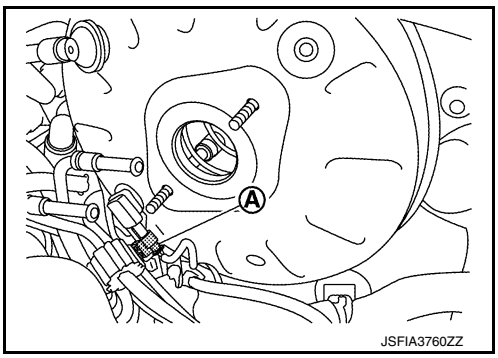
REMOVAL

CAUTION:

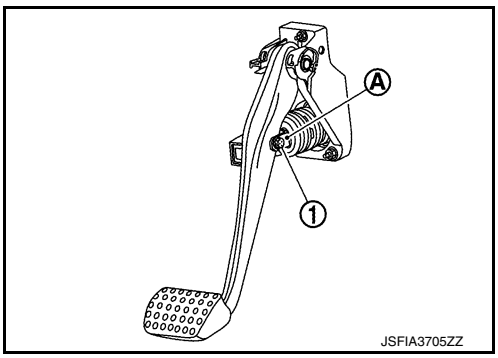
- **Never spill or splash brake fluid on painted surfaces. Brake fluid may seriously damage paint. Wipe it off immediately and wash with water if it gets on a painted surface.**
- **Be careful not to deform or bend brake tube while removing and installing the brake booster.**
- **Be careful not to damage brake booster stud bolt threads. If brake booster is tilted or inclined during installation, the dash panel may damage the threads.**
- **Depress the brake pedal several times to release the vacuum pressure from the brake booster. Then remove the brake booster.**

1. Remove master cylinder assembly. Refer to BR-26, "Removal and Installation".
2. Remove battery tray. Refer to PG-117, "MAIN BATTERY : Removal and Installation".
3. Remove vacuum hose from brake booster. Refer to BR-32, "Removal and Installation".

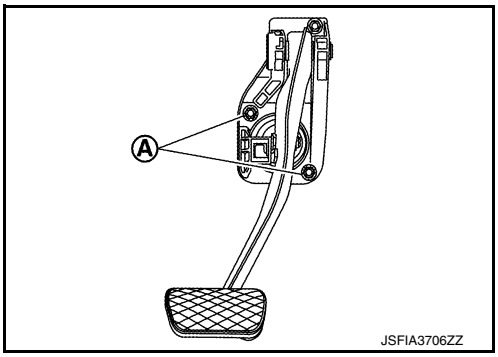
4. Disconnect brake vacuum sensor harness connector Ⓐ.
5. Remove brake vacuum sensor and grommet from brake booster if necessary.
6. Remove instrument lower cover LH. Refer to IP-13, "Removal and Installation".



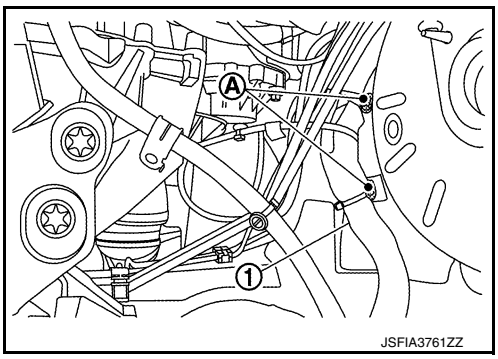
7. Remove security bolt ① from clevis Ⓐ of brake booster. Refer to BR-17, "Removal and Installation".



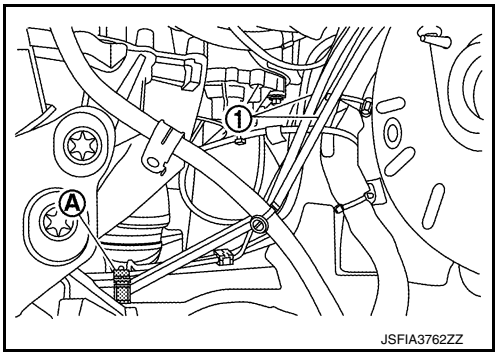
8. Remove brake booster mounting nuts Ⓐ from brake pedal assembly.
CAUTION:
Hold the brake booster so as to avoid dropping out.



9. Remove wire harness clips Ⓐ, and move wire harness ① aside.

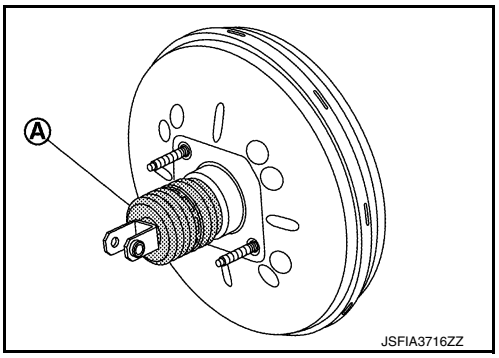


10. Separate brake tubes from clamp Ⓐ, and move brake tubes ① aside.
CAUTION:
Never deform or bend the brake tube.



11. Remove brake booster.
CAUTION:
- **Never damage the boot Ⓐ of brake booster when removing and installing brake booster. Otherwise the brake booster must be replaced.**
- **Never deform or bend the brake tube.**

12. Remove gasket.
13. Perform inspection after removal. Refer to BR-31, "Inspection".



INSTALLATION

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

CAUTION:
- **Never spill or splash brake fluid on painted surfaces. Brake fluid may seriously damage paint. Wipe it off immediately and wash with water if it gets on a painted surface.**
- **Never deform or bend the brake tubes when installing brake booster.**
- Always use a gasket between the brake booster and the dash panel.
- The grommet can be replaced, if it is damaged.
- Perform the air bleeding. Refer to BR-12, "Bleeding Brake System".
- Perform inspection after installation. Refer to BR-31, "Inspection".

Inspection

INFOID:0000000013568650

INSPECTION AFTER REMOVAL

Check the following items and replace, if necessary.

Grommet

Check grommet cracks, and replace it if a malfunction is detected.

Brake booster

Check brake booster for damage and scratches. Replace if there are any abnormal conditions.

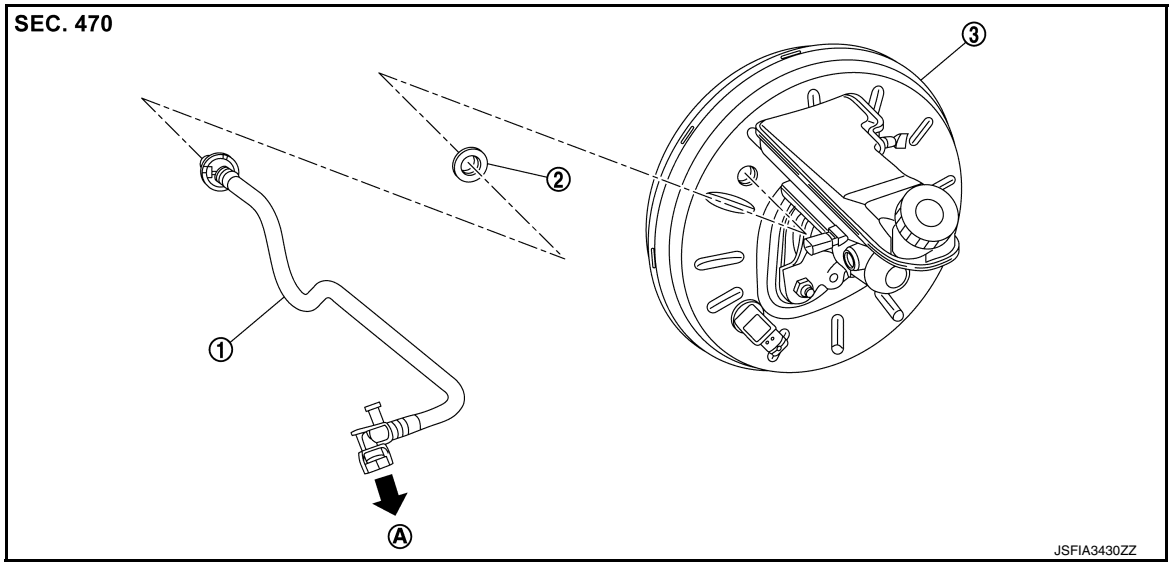
INSPECTION AFTER INSTALLATION

- Check the checking brake booster. Refer to BR-13, "Inspection".
- Check each item of brake pedal. Refer to BR-10, "Inspection".

VACUUM LINES

Exploded View

INFOID:0000000013568651



① Vacuum hose ② Grommet ③ Brake booster

Ⓐ To vacuum pump

Removal and Installation

INFOID:0000000013568652

REMOVAL

CAUTION:

Depress the brake pedal several times to release the vacuum pressure from the brake booster. Then remove the vacuum hose.

1. Remove engine cover or cylinder head cover trim. Refer to EM-20, "Removal and Installation".
2. Remove vacuum hose from brake booster.
3. Remove vacuum hoses from vacuum pump.
4. Remove grommet from brake booster.
5. Perform inspection after removal. Refer to BR-32, "Inspection".

INSTALLATION

Note the following, install the vacuum hose.

- Install grommet to brake booster.
  NOTE:
  The grommet can be replaced, if it is damaged.
- Perform inspection after installation. Refer to BR-32, "Inspection".

Inspection

INFOID:0000000013568653

INSPECTION AFTER REMOVAL

Appearance

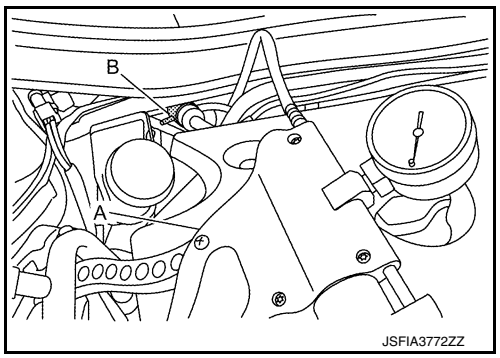
Check for correct assembly, damage and deterioration.

INSPECTION AFTER INSTALLATION

Checking Check Valve Airtightness

1. Depress brake pedal several times with engine switched off to reduce the vacuum in the brake booster.
2. Remove engine cover or cylinder head cover trim. Refer to EM-20, "Removal and Installation".

3. Connect handy vacuum pump (commercial service tool) (A) with test connection [SST: KV995H0030 (168 589 08 63 00)] (B) to brake booster.
4. Check the air tight use a handy vacuum pump (commercial service tool).



At vacuum of (−75) – (−80) kPa [(−750) – (−800) mbar, (−563) – (−600) mmHg, (−22.15) – (−23.62) inHg] **: Vacuum should decrease within 20 kPa (200 mbar, 150 mmHg, 5.90 inHg) for 30 seconds.**

5. If the air tight condition cannot be maintained, perform the following operation.

a. Check the no dirt and dust are present on the brake booster and brake master cylinder mating faces. Clean it if necessary.

b. Check the O-ring on the master cylinder. If anything is found, replace the O-ring. Refer to BR-26, "Removal and Installation".

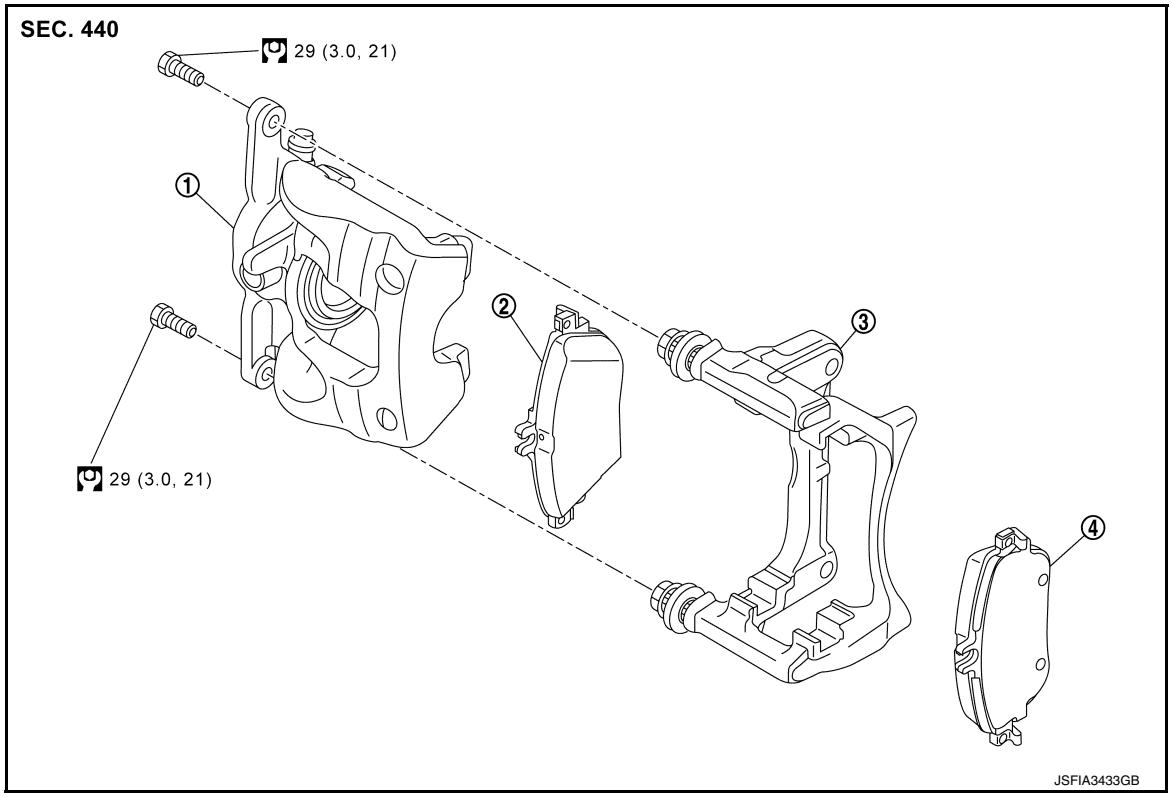
c. Check the air tight condition again. If the condition still cannot be maintained, replace the brake booster.

FRONT DISC BRAKE

BRAKE PAD

BRAKE PAD : Exploded View

INFOID:0000000013568654

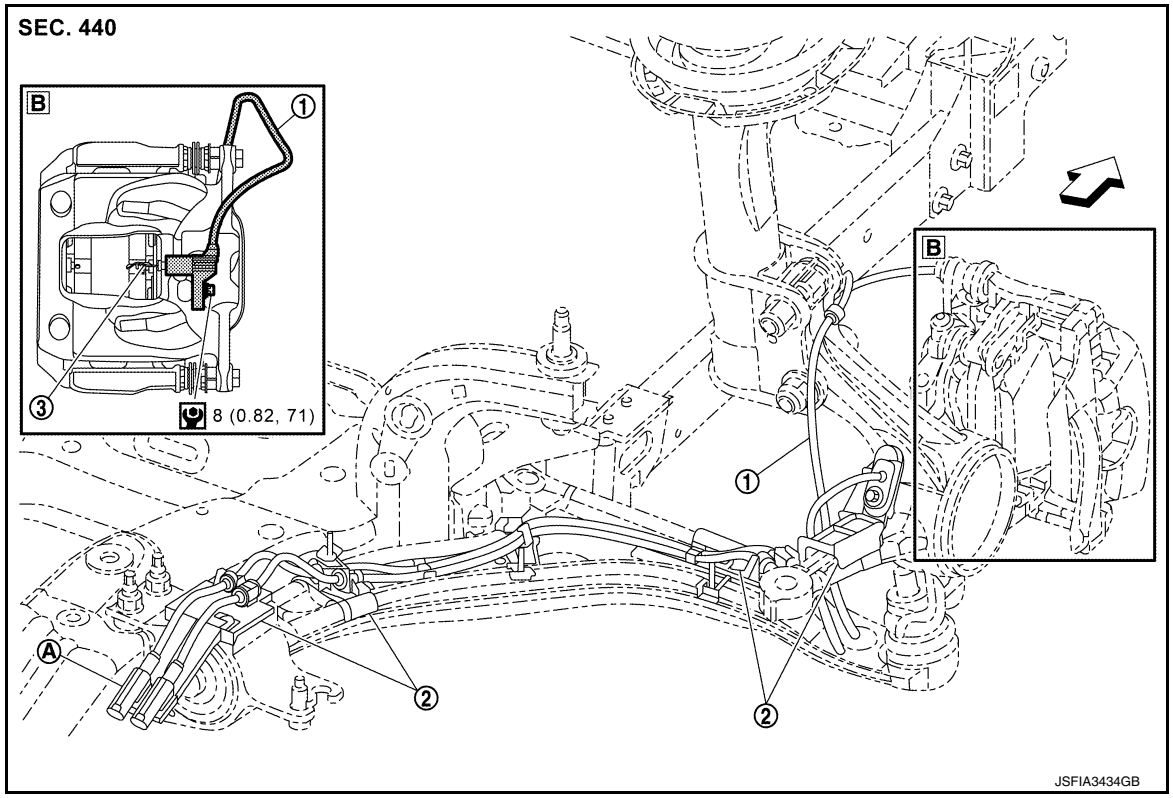


① Brake caliper
② Inner brake pad
③ Torque member
④ Outer brake pad

: N·m (kg-m, ft-lb)

BRAKE PAD : Brake Wear Sensor Layout

INFOID:0000000013568655



① Right front brake wear sensor harness	② Harness bracket	③ Right front brake wear sensor
Ⓐ Right front brake wear sensor harness connector		

⇦: Vehicle front

: N·m (kg-m, in-lb)

BRAKE PAD : Removal and Installation

INFOID:0000000013568656

REMOVAL

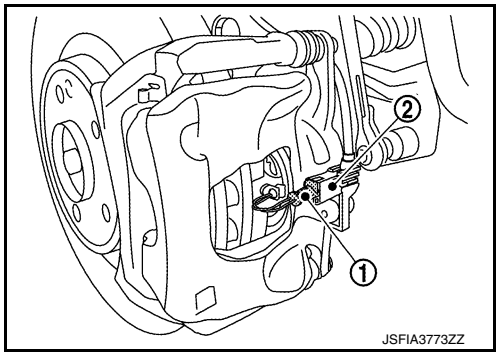
WARNING:

Since dust covering the front brake has an affect on human body, the dust must be removed with a dust collector. Never splatter the dust with an air blow gun.

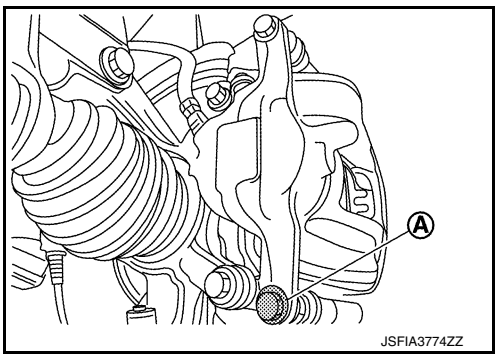
CAUTION:

- **Never depress the brake pedal while removing the brake pads because the piston may pop out.**
- **If the brake fluid or grease adheres to the brake caliper assembly and disc rotor, quickly wipe it off.**

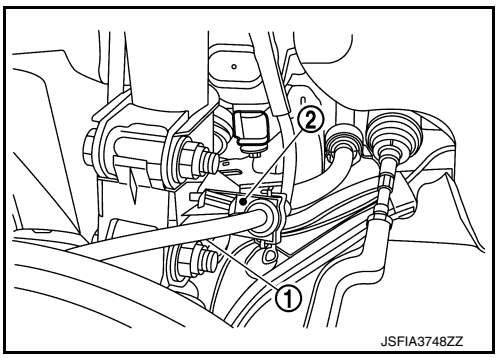
1. Remove tires with power tool (commercial service tool). Refer to WT-70, "Exploded View".
2. Disconnect right front brake wear sensor ① from right front brake wear sensor harness ②.



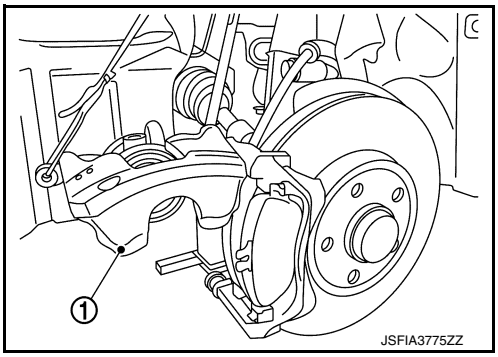
3. Remove lower sliding pin bolt Ⓐ.



4. Remove brake hose ① from bracket ②.



5. Fold brake caliper ① upwards.
   CAUTION:
   Never tension or kink brake hose. The brake hose will otherwise be damaged.
   NOTE:
   Secure brake caliper against falling down. Do not detach brake hose.
6. Remove brake pads from torque member.
7. Remove right front brake wear sensor from right brake pad if necessary.
8. Remove right front brake wear sensor harness and harness bracket if necessary.



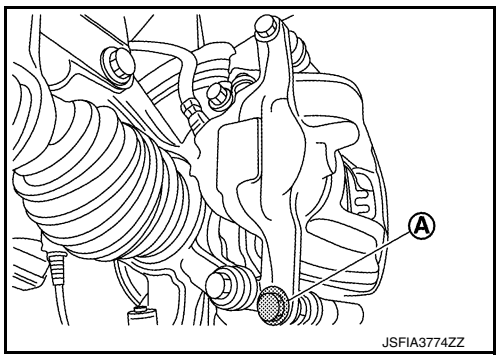
9. Perform inspection after removal. Refer to BR-37, "BRAKE PAD : Inspection".

INSTALLATION

WARNING:
- **Risk of accident when commissioning the vehicle due to a lack of braking effect when the service brake is operated for the first time after repair work.**
- **Since dust covering the front brake has an affect on human body, the dust must be removed with a dust collector. Never splatter the dust with an air blow gun.**

CAUTION:
- **Never depress the brake pedal while removing the brake pads or the brake caliper because the piston may pop out.**
- **If the brake fluid or grease adheres to the disc rotor, quickly wipe it off.**
- Press the piston of brake caliper using brake caliper wrench (commercial service tool).
  CAUTION:
  If the piston is difficult move. Replace brake caliper.
- Clean contact surfaces of brake pad on brake caliper and torque member using rags.
  CAUTION:
  In the process do not damage the piston boot of brake caliper. Never use sharp-edged or pointed objects. Otherwise the brake caliper or torque member can be damaged.
- Install right front brake wear sensor. Refer to BR-35, "BRAKE PAD : Brake Wear Sensor Layout".
  NOTE:
  Guide the right front brake wear sensor through the opening of the right brake caliper.

- Install right front brake wear sensor harness and harness bracket. Refer to BR-35, "BRAKE PAD : Brake Wear Sensor Layout".
- Install lower sliding pin bolt Ⓐ and tighten it to specified torque. Refer to BR-34, "BRAKE PAD : Exploded View".
- Depress brake pedal several times until brake pad rest against brake disks the brake pedal.
  NOTE:
  - Before starting the engine, actuate brake pedal several times until pressure is built up and maintained in the brake system.
  - Firm resistance should be noticeable at the brake pedal.
- Perform inspection after installation. Refer to BR-37, "BRAKE PAD : Inspection".



BRAKE PAD : Inspection

INFOID:0000000013568657

INSPECTION AFTER REMOVAL

- Check the brake pad wear thickness. Refer to BR-55, "Front Disc Brake".
- Check surface of disc rotor. Refer to BR-14, "DISC ROTOR : Inspection".
- Check piston boot of brake caliper for damage. If damage is present replace brake caliper.
- Check sliding pin boot of torque member for damage. If damage is present replace torque member.

INSPECTION AFTER INSTALLATION

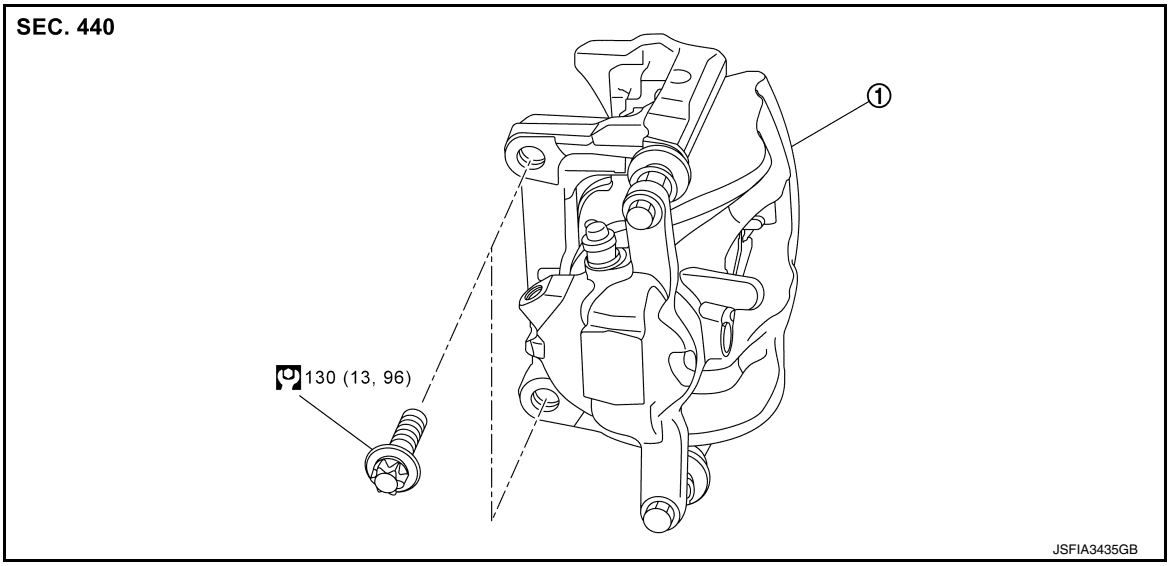
- Check that the brake fluid level in the reservoir tank. Refer to BR-11, "Inspection".
  NOTE:
  Correct brake fluid level in the reservoir tank if necessary.

BRAKE CALIPER ASSEMBLY

BRAKE CALIPER ASSEMBLY : Exploded View

INFOID:0000000013568658

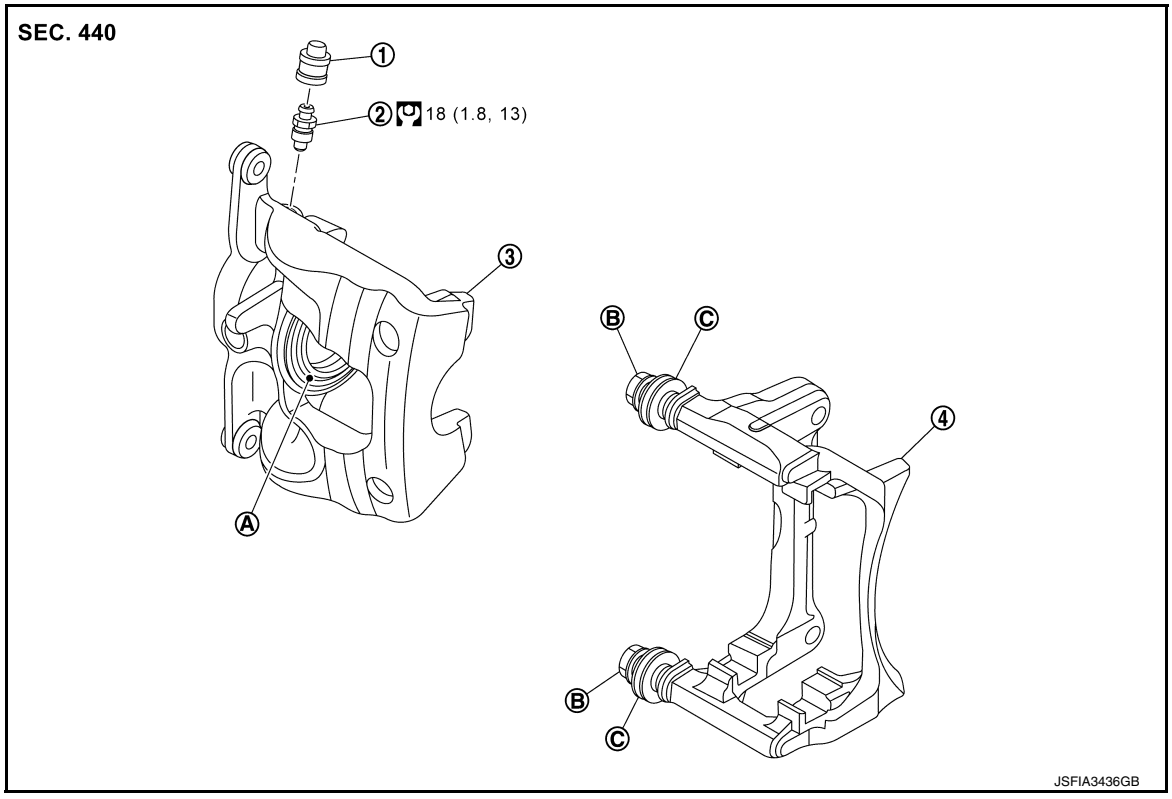
REMOVAL



① Brake caliper assembly

: N·m (kg-m, ft-lb)

DISASSEMBLY



① Cap	② Bleeder valve	③ Brake caliper
④ Torque member		
Ⓐ Piston boot	Ⓑ Sliding pin	Ⓒ Sliding pin boot

: N·m (kg-m, ft-lb)

BRAKE CALIPER ASSEMBLY : Removal and Installation

INFOID:0000000013568659

REMOVAL

WARNING:

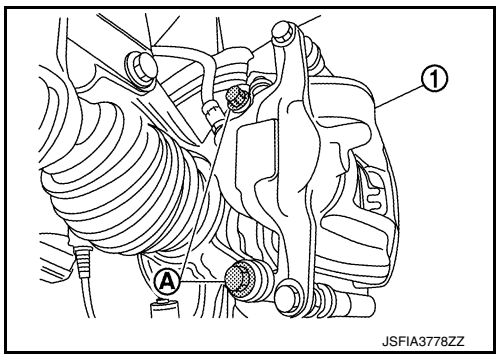
Since dust covering the front brake has an affect on human body, the dust must be removed with a dust collector. Never splatter the dust with an air blow gun.

CAUTION:

- **Never spill or splash brake fluid on painted surfaces. Brake fluid may seriously damage paint. Wipe it out immediately and wash with water if it gets on a protect surface. For brake component parts, never wash them with water.**
- **Never depress the brake pedal while removing the brake hose. If this is not complied with, brake fluid may splash.**
- **If the brake fluid or grease adheres to the disc rotor, quickly wipe it off.**

1. Remove tires with power tool (commercial service tool). Refer to WT-70, "Exploded View".
2. Drain brake fluid. Refer to BR-11, "Draining".
   CAUTION:
   Never spill or splash brake fluid on the disc rotor.
3. Remove brake hose from brake caliper assembly. Refer to BR-21, "FRONT : Removal and Installation".
   CAUTION:
   Never depress the brake pedal while removing the brake hose. If this is not complied with, brake fluid may splash.

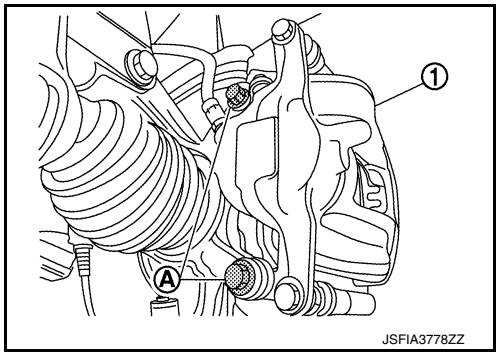
4. Remove torque member mounting bolts Ⓐ, and remove brake caliper assembly ①.
CAUTION:
Never drop brake pad and brake caliper assembly.



INSTALLATION

WARNING:
- **Risk of accident when commissioning the vehicle due to a lack of braking effect when the service brake is operated for the first time after repair work.**
- **Since dust covering the front brake has an affect on human body, the dust must be removed with a dust collector. Never splatter the dust with an air blow gun.**

CAUTION:
- **Never spill or splash brake fluid on painted surfaces. Brake fluid may seriously damage paint. Wipe it out immediately and wash with water if it gets on a protect surface. For brake component parts, never wash them with water.**
- **Never depress the brake pedal while removing the brake hose. If this is not complied with, brake fluid may splash.**
- **If the brake fluid or grease adheres to the disc rotor, quickly wipe it off.**
- **Never allow foreign matter (e.g. dust) and oils other than brake fluid to enter the reservoir tank.**
- Install the brake caliper assembly ① to the steering knuckle and tighten the torque member mounting bolts Ⓐ to the specified torque. Refer to BR-37, "BRAKE CALIPER ASSEMBLY : Exploded View".
- Perform the air bleeding. Refer to BR-12, "Bleeding Brake System".
- Perform inspection after installation. Refer to BR-39, "BRAKE CALIPER ASSEMBLY : Inspection".



BRAKE CALIPER ASSEMBLY : Disassembly and Assembly

INFOID:0000000013568660

DISASSEMBLY

NOTE:
Never remove the torque member and brake pad when disassembling and assembling the brake caliper.

1. Remove the sliding pin bolts, and remove the brake caliper from the torque member. Refer to BR-35, "BRAKE PAD : Removal and Installation".
CAUTION:
Fix the brake pad at suitable tape so that the brake pad will not drop.
2. Remove bleeder valve and cap from brake caliper.
3. Perform inspection after disassembly. Refer to BR-39, "BRAKE CALIPER ASSEMBLY : Inspection".

ASSEMBLY

1. Install bleeder valve and cap to brake caliper.
2. Install brake caliper to torque member.
3. Install sliding pin bolts to the specified torque. Refer to BR-34, "BRAKE PAD : Exploded View".

BRAKE CALIPER ASSEMBLY : Inspection

INFOID:0000000013568661

INSPECTION AFTER DISASSEMBLY

Check the following items and replace if necessary.

Brake Caliper
- Check the brake caliper for rust, wear, cracks or damage.
- Check piston boot of brake caliper for damage.

Torque Member
- Check the torque member for rust, wear, cracks or damage.
- Check sliding pin boot of torque member for damage.

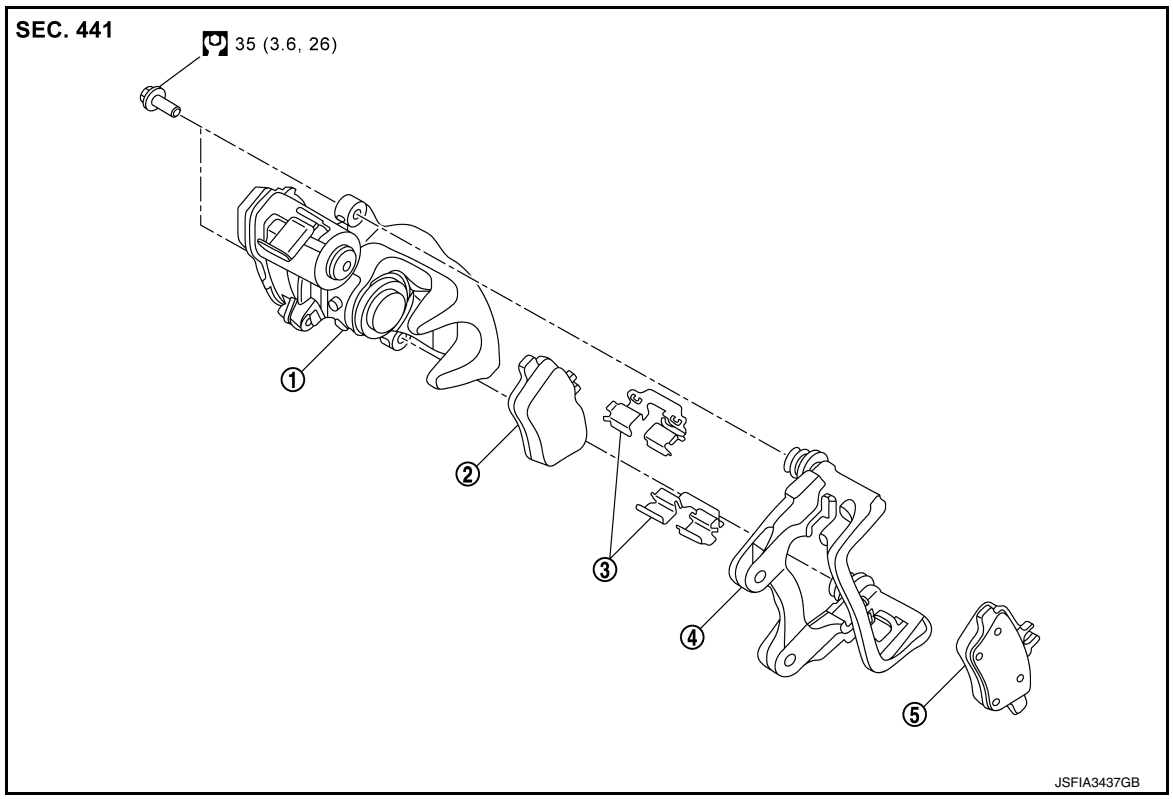
INSPECTION AFTER INSTALLATION
- Check that the brake fluid level in the reservoir tank. Refer to BR-11, "Inspection".
  NOTE:
  Correct brake fluid level in the reservoir tank if necessary.

REAR DISC BRAKE

BRAKE PAD

BRAKE PAD : Exploded View

INFOID:0000000013568662



① Brake caliper ② Inner brake pad ③ Pad retainer
④ Torque member ⑤ Outer brake pad

: N·m (kg-m, ft-lb)

BRAKE PAD : Removal and Installation

INFOID:0000000013568663

REMOVAL

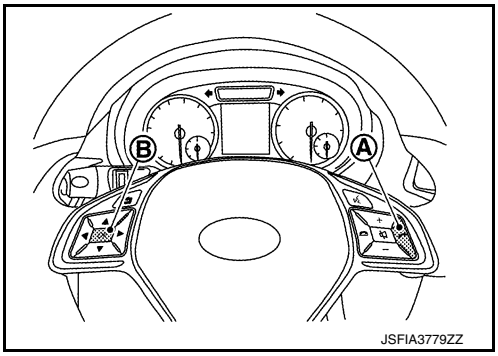
WARNING:
Since dust covering the rear brake has an affect on human body, the dust must be removed with a dust collector. Never splatter the dust with an air blow gun.
CAUTION:
- **Never depress the brake pedal while removing the brake pads because the piston may pop out.**
- **If the brake fluid or grease adheres to the disc rotor, quickly wipe it off.**

1. Move rear brake pad to fitting position, follow the procedure described below.

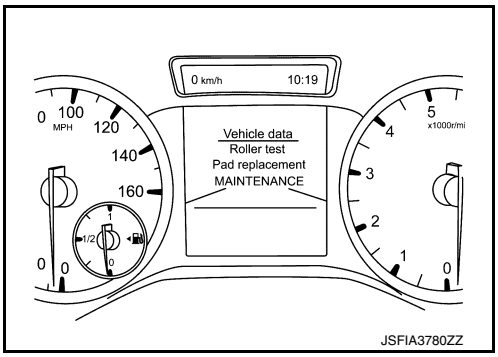
a. Turn ignition switch to ACC position.
NOTE:
The “Trip” menu item must show the trip and kilometer reading.

b. If the information display shows the “Engine hood open” fault message. Close hood.

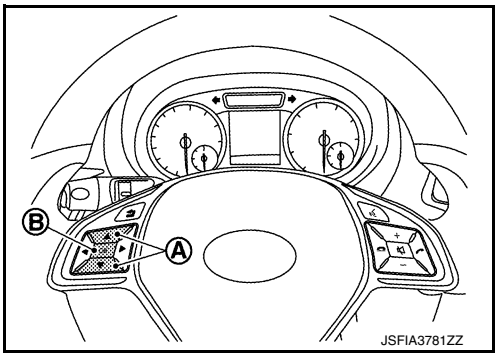
c. First press and hold down accept TEL switch Ⓐ, then within 1 second additionally press and hold down OK switch Ⓑ.



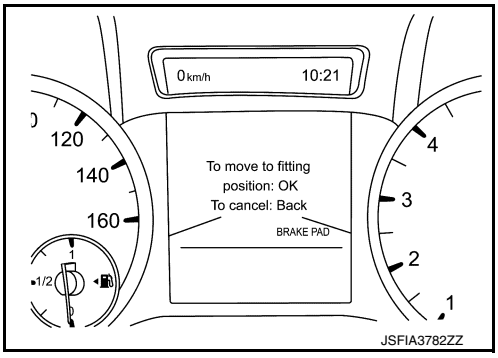
NOTE:
After approx. 5 seconds, the information display shows the workshop menu with the “Vehicle data”, “Roller test”, “Pad replacement”, and “MAINTENANCE” tabs.



d. Press scroll up/down switch Ⓐ repeatedly until “Pad replacement” is highlighted and confirm selection by pressing OK switch Ⓑ.



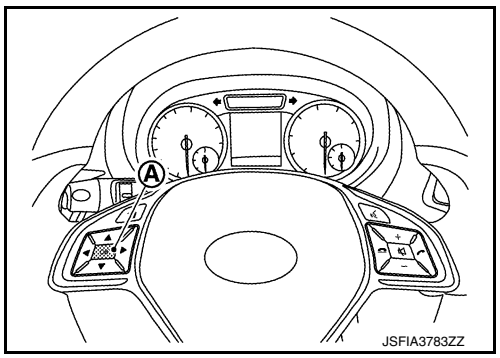
NOTE:
The information display then shows “To move to fitting position: OK / To cancel: Back”.



e. Confirm with OK switch Ⓐ.

CAUTION:

Never depress the service brake during “Move to fitting position”. Otherwise, the spindle in the brake caliper can be damaged.



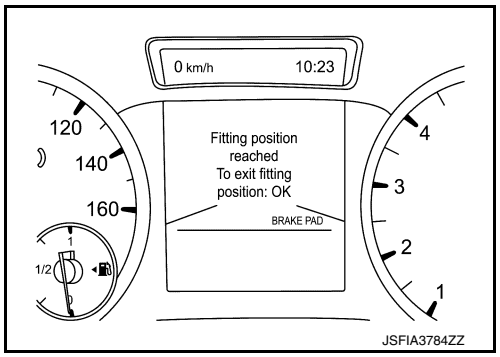
NOTE:

The information display then shows “Fitting position reached / To exit fitting position: OK”.

f. Turn ignition switch to OFF position.

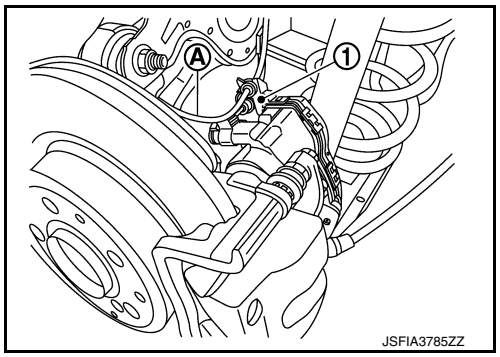
NOTE:

In order to prevent unintended movement away from the assembly position.

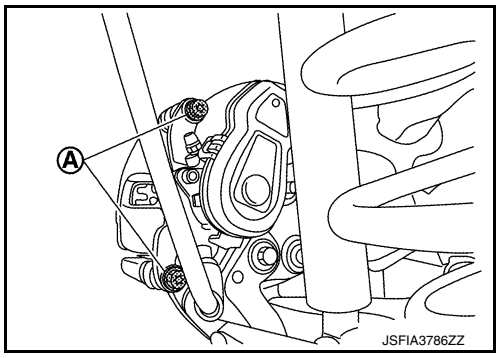


2. Remove tires with power tool (commercial service tool). Refer to WT-70, "Removal and Installation".

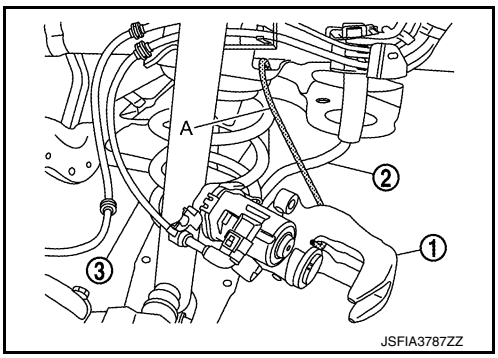
3. Remove rear axle rpm sensor harness Ⓐ from retaining frame ①.



4. Remove sliding pin bolts Ⓐ.



5. Remove brake caliper ①, and suspend the brake caliper with suitable wire (A) so that the brake hose ② and electric parking brake actuator motor harness ③ will not stretch.
CAUTION:
Never damage the brake hose and electric parking brake actuator motor harness.



6. Remove brake pads and pad retainers from torque member.
CAUTION:
- **Never deform the pad retainer when removing the pad retainer from the torque member.**
- **Never damage the piston boot.**
- **Remember each position of the removed brake pad.**

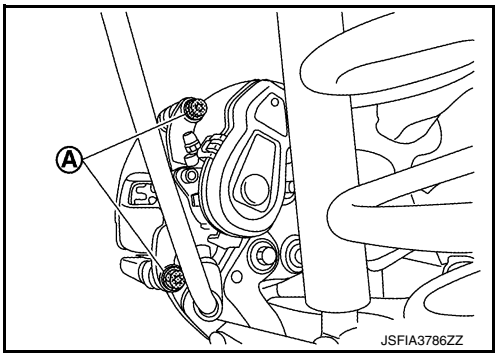
7. Perform inspection after removal. Refer to BR-46, "BRAKE PAD : Inspection".

INSTALLATION

WARNING:
- **Risk of accident when commissioning the vehicle due to a lack of braking effect when the service brake is operated for the first time after repair work.**
- **Since dust covering the front brake has an affect on human body, the dust must be removed with a dust collector. Never splatter the dust with an air blow gun.**

CAUTION:
- **Never depress the brake pedal while removing the brake pads or the brake caliper because the piston may pop out.**
- **If the brake fluid or grease adheres to the disc rotor, quickly wipe it off.**

1. Clean contact surfaces of brake pad on brake caliper and torque member using rags.
CAUTION:
In the process do not damage the piston boot of brake caliper. Never use sharp-edged or pointed objects. Otherwise the brake caliper or torque member can be damaged.
2. Install brake pads and pad retainers to the torque member.
CAUTION:
Never apply brake pastes or lubricants to the brake pads and brake calipers.
3. Press the piston of brake caliper using brake caliper wrench (commercial service tool), and install brake caliper to torque member.
CAUTION:
If the piston is difficult move. Replace brake caliper.

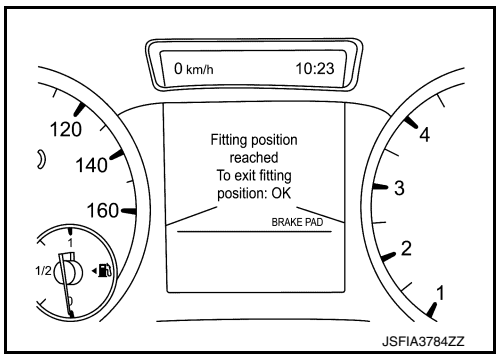


4. Install sliding pin bolts Ⓐ and tighten it to the specified torque. Refer to BR-41, "BRAKE PAD : Exploded View".
5. Depress brake pedal several times until brake pad rest against brake disks the brake pedal.
NOTE:
- Before starting the engine, actuate brake pedal several times until pressure is built up and maintained in the brake system.
- Firm resistance should be noticeable at the brake pedal.

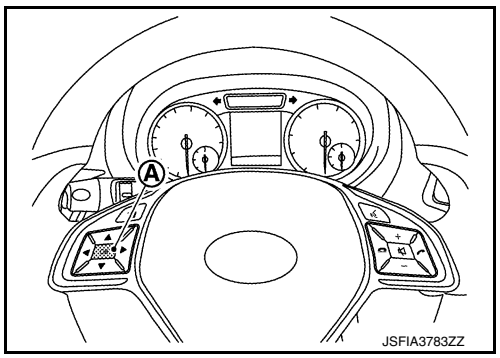
6. Install tires with power tool. Refer to WT-70, "Exploded View".
7. Exit rear brake pad to fitting position, follow the procedure described below.
CAUTION:
Exit the fitting position only with the brake linings fitted and brake caliper mounted. Otherwise the brake piston will be pushed out of the brake caliper.

a. Turn ignition switch to OFF position.
NOTE:

The information display then shows “Fitting position reached / To exit fitting position: OK”.

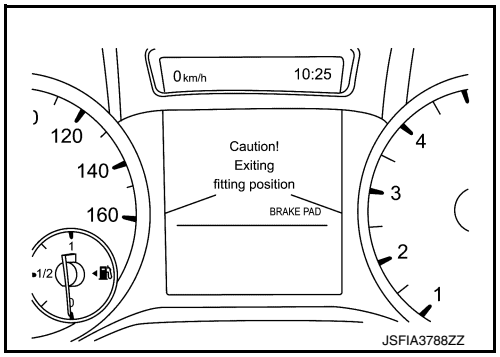


b. Confirm with OK switch Ⓐ.

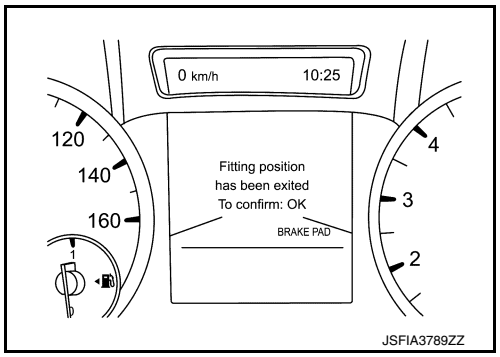


NOTE:

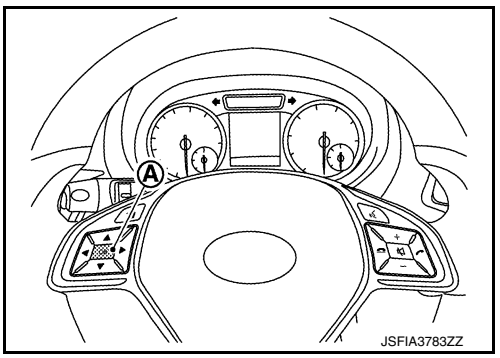
- “Caution Exiting fitting position” is shown in the information display for the duration of the fitting position exit.



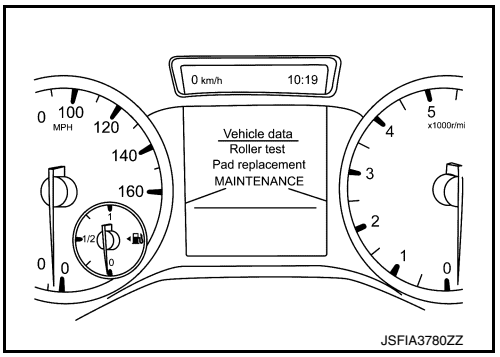
- When the process has finished, the “Fitting position has been exited To confirm: OK” indicator appears in the information display.



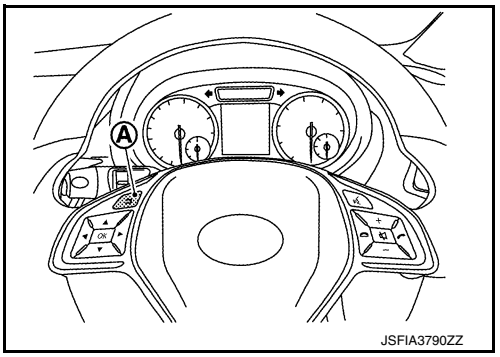
c. Confirm with OK switch Ⓐ.



NOTE:
The information display shows the workshop menu with the "Vehicle data", "Roller test", "Pad replacement", and "MAINTENANCE" tabs.



d. Exit workshop menu with back switch Ⓐ.
e. Turn ignition switch to OFF position.



8. Perform inspection after installation. Refer to BR-46, "BRAKE PAD : Inspection".

BRAKE PAD : Inspection

INFOID:0000000013568664

INSPECTION AFTER REMOVAL

- Check the brake pad wear thickness. Refer to BR-56, "Rear Disc Brake".
- Check surface of disc rotor. Refer to BR-15, "DISC ROTOR : Inspection".
- Check piston boot of brake caliper for damage. If damage is present replace brake caliper.
- Check sliding pin boot of torque member for damage. If damage is present replace torque member.

INSPECTION AFTER INSTALLATION

- Check that the brake fluid level in the reservoir tank. Refer to BR-11, "Inspection".

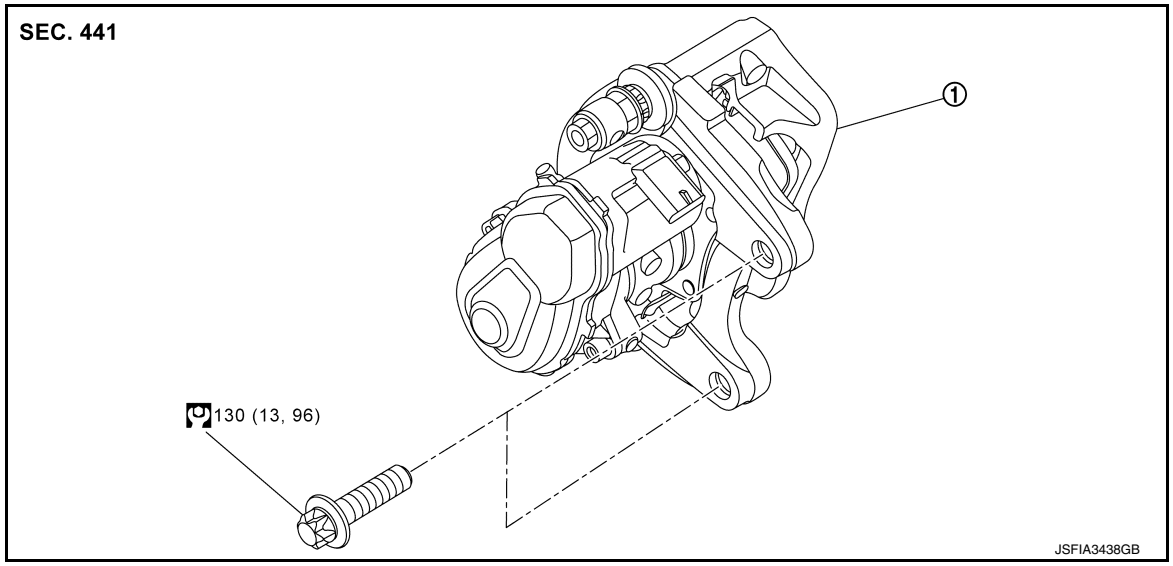
NOTE:
Correct brake fluid level in the reservoir tank if necessary.

BRAKE CALIPER ASSEMBLY

BRAKE CALIPER ASSEMBLY : Exploded View

INFOID:0000000013568665

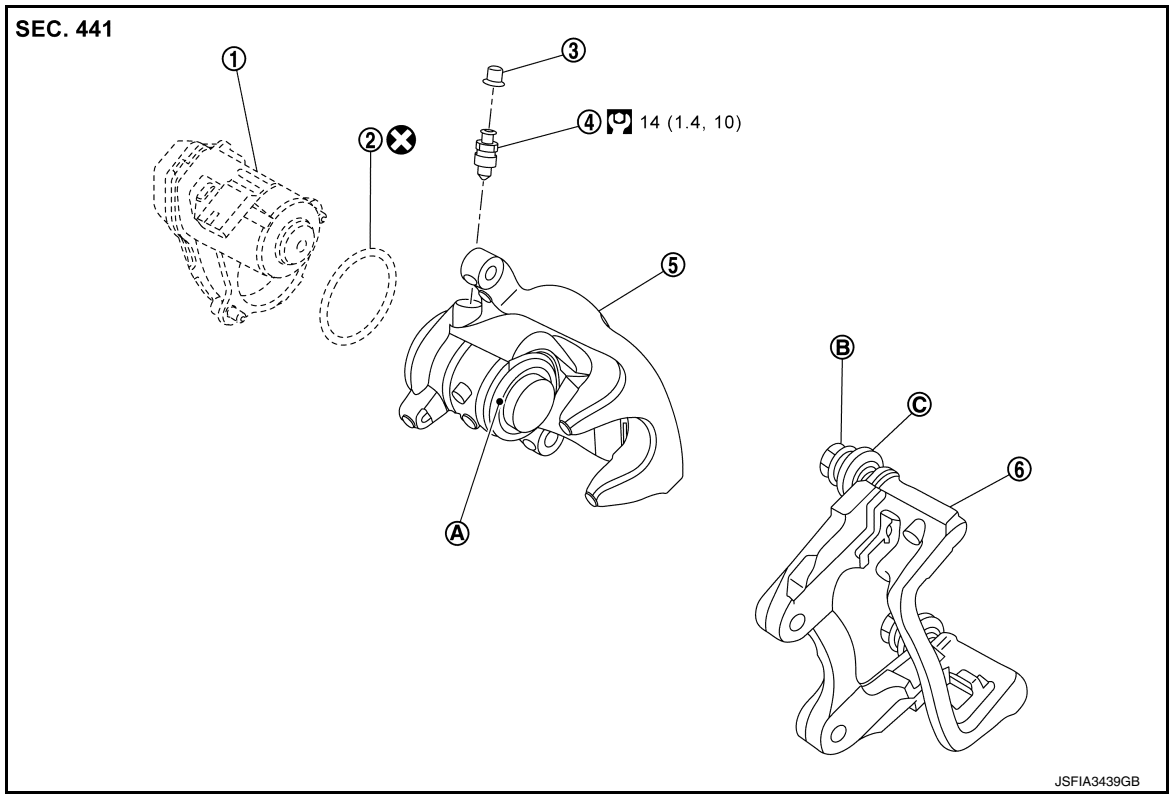
REMOVAL



① Brake caliper assembly

: N·m (kg-m, ft-lb)

DISASSEMBLY



① Electric parking brake actuator motor	② O-ring	③ Cap
④ Bleeder valve	⑤ Brake caliper	⑥ Torque member
Ⓐ Piston boot	Ⓑ Sliding pin	Ⓒ Sliding pin boot

: Always replace after every disassembly.

: N·m (kg-m, ft-lb)

BRAKE CALIPER ASSEMBLY : Removal and Installation

INFOID:0000000013568666

REMOVAL

WARNING:

Since dust covering the front brake has an affect on human body, the dust must be removed with a dust collector. Never splatter the dust with an air blow gun.

CAUTION:

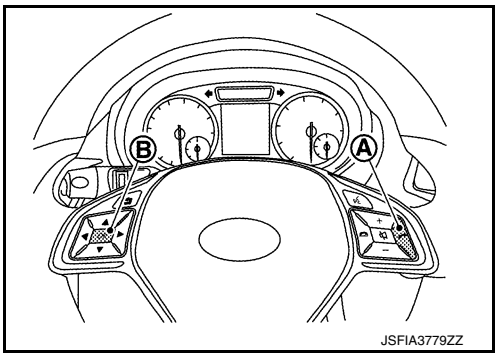
- **Never spill or splash brake fluid on painted surfaces. Brake fluid may seriously damage paint. Wipe it out immediately and wash with water if it gets on a protect surface. For brake component parts, never wash them with water.**
- **Never depress the brake pedal while removing the brake hose. If this is not complied with, brake fluid may splash.**
- **If the brake fluid or grease adheres to the disc rotor, quickly wipe it off.**

1. Move rear brake pad to fitting position, follow the procedure described below.

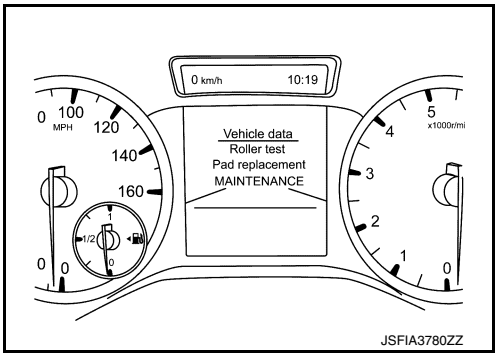
a. Turn ignition switch to ACC position.
NOTE:
The “Trip” menu item must show the trip and kilometer reading.

b. If the information display shows the “Engine hood open” fault message. Close hood.

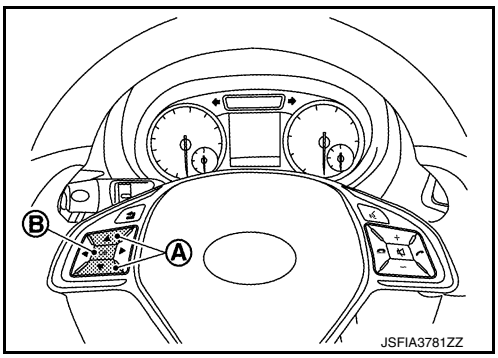
c. First press and hold down accept TEL switch Ⓐ, then within 1 second additionally press and hold down OK switch Ⓑ.



NOTE:
After approx. 5 seconds, the information display shows the workshop menu with the “Vehicle data”, “Roller test”, “Pad replacement”, and “MAINTENANCE” tabs.

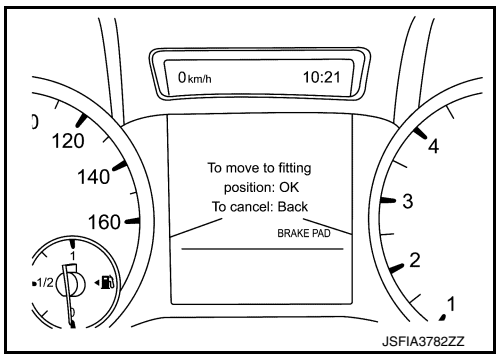


d. Press scroll up/down switch Ⓐ repeatedly until “Pad replacement” is highlighted and confirm selection by pressing OK switch Ⓑ.



NOTE:

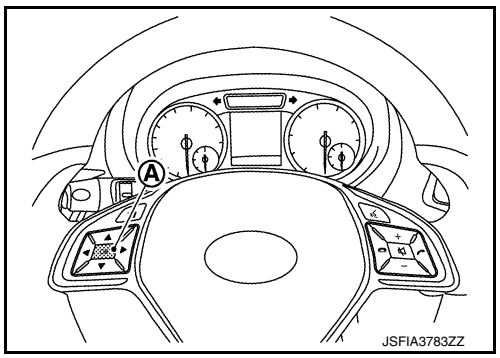
The information display then shows “To move to fitting position: OK / To cancel: Back”.



e. Confirm with OK switch Ⓐ.

CAUTION:

Never depress the service brake during “Move to fitting position”. Otherwise, the spindle in the brake caliper can be damaged.



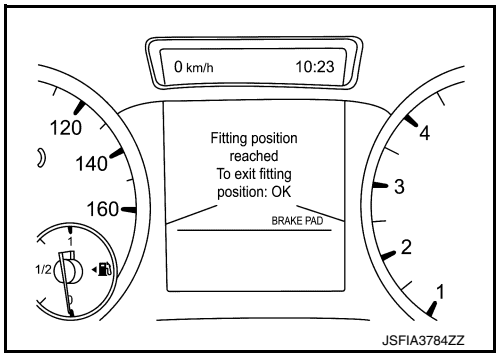
NOTE:

The information display then shows “Fitting position reached / To exit fitting position: OK”.

f. Turn ignition switch to OFF position.

NOTE:

In order to prevent unintended movement away from the assembly position.

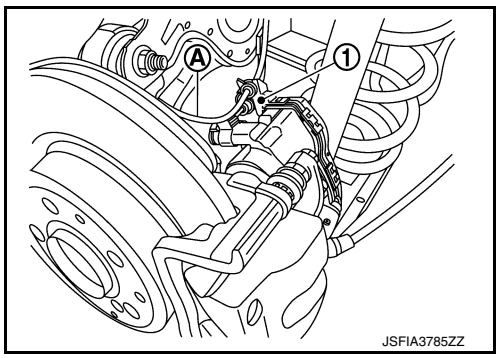


2. Remove tires with power tool (commercial service tool). Refer to WT-70, "Removal and Installation".
3. Drain brake fluid. Refer to BR-11, "Draining".

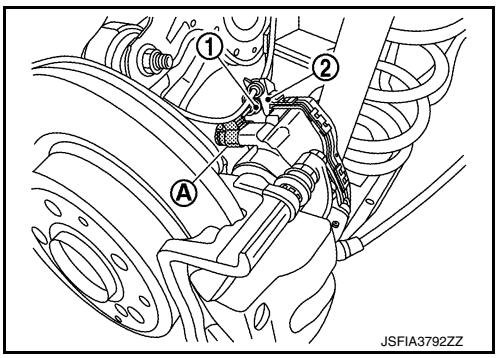
CAUTION:

Never spill or splash brake fluid on the disc rotor.

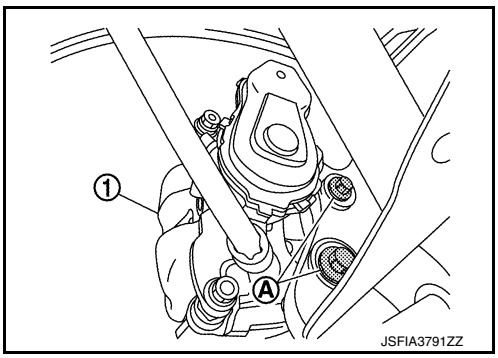
4. Remove rear axle rpm sensor harness Ⓐ from retaining frame ①



5. Disconnect electric parking brake actuator motor harness connector Ⓐ, and remove electric parking brake actuator motor harness ① from retaining frame ②.
6. Remove brake hose from brake caliper assembly. Refer to BR-24, "REAR : Removal and Installation".
   CAUTION:
   Never depress the brake pedal while removing the brake hose. If this is not complied with, brake fluid may splash.



7. Remove torque member mounting bolts Ⓐ, and remove brake caliper assembly ①.
   CAUTION:
   Never drop brake pad and brake caliper assembly.

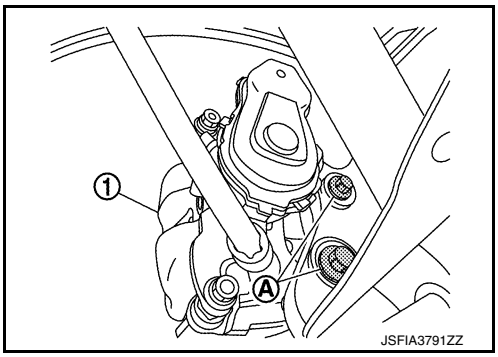


INSTALLATION

WARNING:
- **Risk of accident when commissioning the vehicle due to a lack of braking effect when the service brake is operated for the first time after repair work.**
- **Since dust covering the front brake has an affect on human body, the dust must be removed with a dust collector. Never splatter the dust with an air blow gun.**

CAUTION:
- **Never spill or splash brake fluid on painted surfaces. Brake fluid may seriously damage paint. Wipe it out immediately and wash with water if it gets on a protect surface. For brake component parts, never wash them with water.**
- **Never depress the brake pedal while removing the brake hose. If this is not complied with, brake fluid may splash.**
- **If the brake fluid or grease adheres to the disc rotor, quickly wipe it off.**
- **Never allow foreign matter (e.g. dust) and oils other than brake fluid to enter the reservoir tank.**

1. Install the brake caliper assembly ① to the axle housing and tighten the torque member mounting bolts Ⓐ to the specified torque.
   CAUTION:
   Never spill or splash any grease and moisture on the brake caliper assembly mounting face, threads, mounting bolt and washer. Wipe out any grease and moisture.



2. Install brake hose to brake caliper assembly, and tighten to the specified torque. Refer to BR-23, "REAR : Exploded View".
   CAUTION:
   Never reuse copper washer.
3. Perform the air bleeding. Refer to BR-12, "Bleeding Brake System".
   CAUTION:
   - **Never reuse drained brake fluid.**
   - **Never spill or splash brake fluid on the disc rotor.**
4. Depress brake pedal several times until brake pad rest against brake disks the brake pedal.
   NOTE:
   - Before starting the engine, actuate brake pedal several times until pressure is built up and maintained in the brake system.
   - Firm resistance should be noticeable at the brake pedal.

5. Install tires with power tool. Refer to WT-70, "Exploded View".
6. Exit rear brake pad to fitting position, follow the procedure described below.

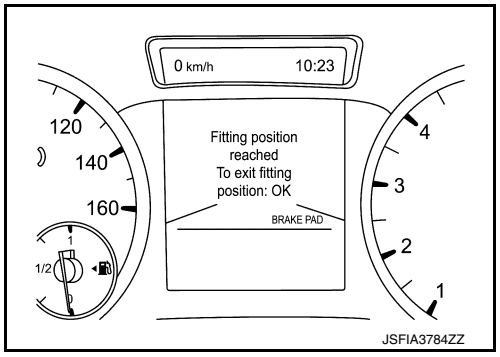
CAUTION:

Exit the fitting position only with the brake linings fitted and brake caliper mounted. Otherwise the brake piston will be pushed out of the brake caliper.

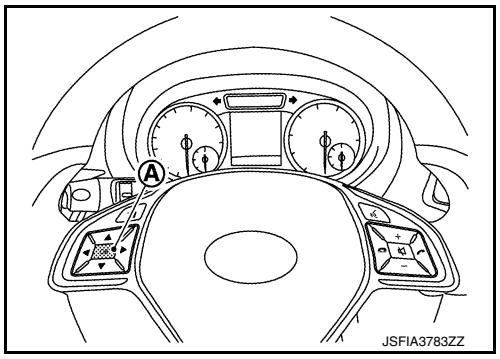
a. Turn ignition switch to OFF position.

NOTE:

The information display then shows “Fitting position reached / To exit fitting position: OK”.

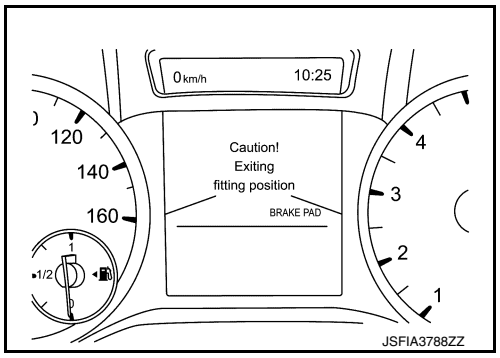


b. Confirm with OK switch Ⓐ.

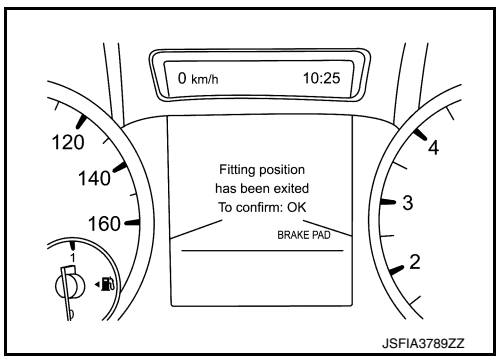


NOTE:

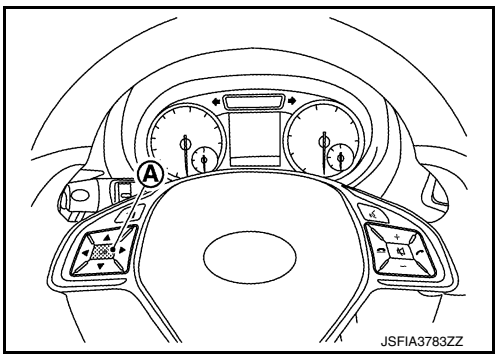
- “Caution Exiting fitting position” is shown in the information display for the duration of the fitting position exit.



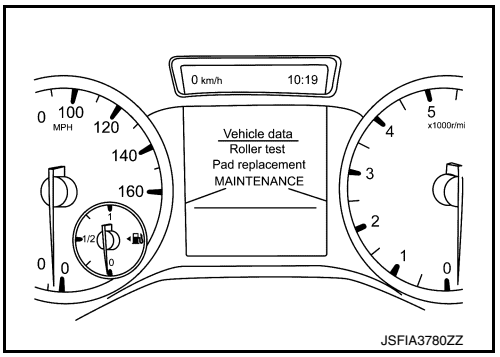
- When the process has finished, the “Fitting position has been exited To confirm: OK” indicator appears in the information display.



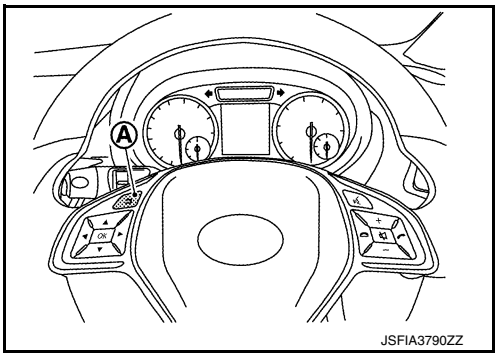
c. Confirm with OK switch Ⓐ.



NOTE:
The information display shows the workshop menu with the "Vehicle data", "Roller test", "Pad replacement", and "MAINTENANCE" tabs.



d. Exit workshop menu with back switch Ⓐ.
e. Turn ignition switch to OFF position.



7. Perform inspection after installation. Refer to BR-53, "BRAKE CALIPER ASSEMBLY : Inspection".

BRAKE CALIPER ASSEMBLY : Disassembly and Assembly

INFOID:0000000013568667

DISASSEMBLY

NOTE:
Never remove the torque member and brake pad when disassembling and assembling the brake caliper.

1. Remove the sliding pin bolts, and remove the brake caliper from the torque member. Refer to BR-41, "BRAKE PAD : Exploded View".
   CAUTION:
   Fix the brake pad at suitable tape so that the brake pad will not drop.
2. Remove electric parking brake actuator motor. Refer to PB-131, "Removal and Installation".
3. Remove bleeder valve and cap from brake caliper.
4. Perform inspection after disassembly. Refer to BR-53, "BRAKE CALIPER ASSEMBLY : Inspection".

ASSEMBLY

1. Install electric parking brake actuator motor. Refer to PB-131, "Removal and Installation".
2. Install bleeder valve and cap to brake caliper.
3. Install brake caliper to torque member.
4. Install sliding pin bolts to the specified torque. Refer to BR-41, "BRAKE PAD : Exploded View".

BRAKE CALIPER ASSEMBLY : Inspection

INFOID:0000000013568668

INSPECTION AFTER DISASSEMBLY

Check the following items and replace if necessary.

Brake Caliper

- Check the brake caliper for rust, wear, cracks or damage.
- Check piston boot of brake caliper for damage.

Torque Member

- Check the torque member for rust, wear, cracks or damage.
- Check sliding pin boot of torque member for damage.

INSPECTION AFTER INSTALLATION

- Check that the brake fluid level in the reservoir tank. Refer to BR-11, "Inspection".
  NOTE:
  Correct brake fluid level in the reservoir tank if necessary.

SERVICE DATA AND SPECIFICATIONS (SDS)

SERVICE DATA AND SPECIFICATIONS (SDS)

General Specifications

INFOID:0000000013568669

1.6L TURBO ENGINE

Unit: mm (in)

Front brake	Cylinder bore diameter	60 (2.36)
	Pad length × width × thickness	122 × 57.6 × 12.9 (4.80 × 2.268 × 0.508)
	Disc rotor outer diameter × thickness	295 × 28 (11.61 × 1.10)
Rear brake	Cylinder bore diameter	34 (1.34)
	Pad length × width × thickness	85.5 × 45 × 12 (3.366 × 1.77 × 0.47)
	Disc rotor outer diameter × thickness	295 × 10 (11.61 × 0.39)
Master cylinder	Cylinder bore diameter	23.81 (0.9374)
Control valve	Valve type	Electric brake force distribution
Brake booster	Diaphragm diameter	274.3 (10.80)
Recommended brake fluid		For Noth America: Refer to MA-12, "FOR NORTH AMERICA : Fluids and Lubricants". For Mexico: Refer to MA-13, "FOR MEXICO : Fluids and Lubricants".

2.0L TURBO ENGINE

Except CANADA

Unit: mm (in)

Front brake	Cylinder bore diameter	60 (2.36)
	Pad length × width × thickness	122 × 57.6 × 12.9 (4.80 × 2.268 × 0.508)
	Disc rotor outer diameter × thickness	320 × 30 (12.60 × 1.18)
Rear brake	Cylinder bore diameter	34 (1.34)
	Pad length × width × thickness	85.5 × 45 × 12 (3.366 × 1.77 × 0.47)
	Disc rotor outer diameter × thickness	295 × 10 (11.61 × 0.39)
Master cylinder	Cylinder bore diameter	23.81 (0.9374)
Control valve	Valve type	Electric brake force distribution
Brake booster	Diaphragm diameter	274.3 (10.80)
Recommended brake fluid		For Noth America: Refer to MA-12, "FOR NORTH AMERICA : Fluids and Lubricants". For Mexico: Refer to MA-13, "FOR MEXICO : Fluids and Lubricants".

CANADA

Unit: mm (in)

Front brake		Cylinder bore diameter	60 (2.36)
		Pad length × width × thickness	122 × 57.6 × 12.9 (4.80 × 2.268 × 0.508)
		Disc rotor outer diameter × thickness	320 × 30 (12.60 × 1.18)
Rear brake	2WD	Cylinder bore diameter	34 (1.34)
		Pad length × width × thickness	85.5 × 45 × 12 (3.366 × 1.77 × 0.47)
		Disc rotor outer diameter × thickness	295 × 10 (11.61 × 0.39)
	AWD	Cylinder bore diameter	38 (1.50)
		Pad length × width × thickness	85.5 × 45 × 12 (3.366 × 1.77 × 0.47)
		Disc rotor outer diameter × thickness	295 × 22 (11.61 × 0.87)

Master cylinder	Cylinder bore diameter	23.81 (0.9374)
Control valve	Valve type	Electric brake force distribution
Brake booster	Diaphragm diameter	274.3 (10.80)
Recommended brake fluid		Refer to MA-12, "FOR NORTH AMERICA : Fluids and Lubricants".

Brake Pedal

INFOID:0000000013568670

EXCEPT SPORT GRADE

Unit: mm (in)

Item	Transaxle	Standard
Brake pedal height	7DCT	152.8 – 162.8 (6.02 – 6.41)

SPORT GRADE

Unit: mm (in)

Item	Transaxle	Standard
Brake pedal height	7DCT	152.7 – 162.7 (6.01 – 6.41)

Front Disc Brake

INFOID:0000000013568671

1.6L TURBO ENGINE

Unit: mm (in)

Item			Limit
Brake pad	Wear thickness		2.0 (0.079)
Disc rotor	Wear thickness		25.4 (0.1000)
	Thickness variation*	uneven at 1 position	0.008 (0.0003)
		uneven at 2 positions	0.005 (0.0002)
		uneven at 3 positions	0.004 (0.0002)
		uneven at 4 positions or more	Not allowed
	Runout (with it attached to the vehicle)		0.05 (0.0020)

*To check if rotor imbalance, rotor runout deformation is occured.

2.0L TURBO ENGINE

Except Sport grade

Unit: mm (in)

Item			Limit
Brake pad	Wear thickness		2.0 (0.079)
Disc rotor	Wear thickness		27.4 (1.079)
	Thickness variation*	uneven at 1 position	0.008 (0.0003)
		uneven at 2 positions	0.005 (0.0002)
		uneven at 3 positions	0.004 (0.0002)
		uneven at 4 positions or more	Not allowed
	Runout (with it attached to the vehicle)		0.05 (0.0020)

*To check if rotor imbalance, rotor runout deformation is occured.

Sport grade

Unit: mm (in)

Item		Limit
Brake pad	Wear thickness	2.0 (0.079)

Item			Limit
Disc rotor	Wear thickness		28 (1.10)
	Thickness variation*	uneven at 1 position	0.008 (0.0003)
		uneven at 2 positions	0.005 (0.0002)
		uneven at 3 positions	0.004 (0.0002)
		uneven at 4 positions or more	Not allowed
	Runout (with it attached to the vehicle)		0.05 (0.0020)

*To check if rotor imbalance, rotor runout deformation is occured.

Rear Disc Brake

INFOID:0000000013568672

1.6L TURBO ENGINE

Unit: mm (in)

Item			Limit
Brake pad	Wear thickness		2.0 (0.079)
Disc rotor	Wear thickness		8.3 (0.327)
	Thickness variation*	uneven at 1 position	0.008 (0.0003)
		uneven at 2 positions	0.005 (0.0002)
		uneven at 3 positions	0.004 (0.0002)
		uneven at 4 positions or more	Not allowed
	Runout (with it attached to the vehicle)		0.05 (0.0020)

*To check if rotor imbalance, rotor runout deformation is occured.

2.0L TURBO ENGINE

Except CANADA

Unit: mm (in)

Item			Limit
Brake pad	Wear thickness		2.0 (0.079)
Disc rotor	Wear thickness		8.3 (0.327)
	Thickness variation*	uneven at 1 position	0.008 (0.0003)
		uneven at 2 positions	0.005 (0.0002)
		uneven at 3 positions	0.004 (0.0002)
		uneven at 4 positions or more	Not allowed
	Runout (with it attached to the vehicle)		0.05 (0.0020)

*To check if rotor imbalance, rotor runout deformation is occured.

CANADA

Unit: mm (in)

Item		Limit
Brake pad	Wear thickness	2.0 (0.079)

Item				Limit
Disc rotor	2WD	Wear thickness		8.3 (0.327)
		Thickness variation*	uneven at 1 position	0.008 (0.0003)
			uneven at 2 positions	0.005 (0.0002)
			uneven at 3 positions	0.004 (0.0002)
			uneven at 4 positions or more	Not allowed
		Runout (with it attached to the vehicle)		0.05 (0.0020)
	AWD	Wear thickness		19.4 (0.764)
		Thickness variation*	uneven at 1 position	0.008 (0.0003)
			uneven at 2 positions	0.005 (0.0002)
			uneven at 3 positions	0.004 (0.0002)
			uneven at 4 positions or more	Not allowed
		Runout (with it attached to the vehicle)		0.05 (0.0020)

*To check if rotor imbalance, rotor runout deformation is occured.