SECTION BR
BRAKE SYSTEM

CONTENTS

LHD

SYMPTOM DIAGNOSIS

NOISE, VIBRATION AND HARSHNESS (NVH) TROUBLESHOOTING

NVH Troubleshooting Chart

INFOID:0000000001116104

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

Reference page			BR-15, BR-16	BR-15, BR-16	BR-41, BR-47	BR-15, BR-16	BR-15, BR-16	BR-15, BR-16	BR-15, BR-16	BR-15, BR-16	BR-15, BR-16	BR-15, BR-16	NVH in DLN section	NHV in DLN section	NVH in FAX, RAX, FSU and RSU section	NVH in WT section	NVH in WT section	NVH in FAX and/or RAX section	NVH in ST section
Possible cause and SUSPECTED PARTS			Pads - damaged	Pads - uneven wear	Shims damaged	Rotor imbalance	Rotor damage	Rotor runout	Rotor deformation	Rotor deflection	Rotor rust	Rotor thickness variation	PROPELLER SHAFT	DIFFERENTIAL	AXLE AND SUSPENSION	TIRE	ROAD WHEEL	DRIVE SHAFT	STEERING
Symptom	BRAKE	Noise	×	×	×								×	×	×	×	×	×	×
		Shake				×							×		×	×	×	×	×
		Shimmy, Judder				×	×	×	×	×	×	×			×	×	×		×

×: Applicable

PRECAUTION

PRECAUTIONS

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

INFOID:0000000001148906

The Supplemental Restraint System such as “AIR BAG” and “SEAT BELT PRE-TENSIONER”, used along with a front seat belt, helps to reduce the risk or severity of injury to the driver and front passenger for certain types of collision. Information necessary to service the system safely is included in the “SRS AIRBAG” and “SEAT BELT” of this Service Manual.

WARNING:

- **To avoid rendering the SRS inoperative, which could increase the risk of personal injury or death in the event of a collision which would result in air bag inflation, all maintenance must be performed by an authorized NISSAN/INFINITI dealer.**
- **Improper maintenance, including incorrect removal and installation of the SRS, can lead to personal injury caused by unintentional activation of the system. For removal of Spiral Cable and Air Bag Module, see the “SRS AIRBAG”.**
- **Do not use electrical test equipment on any circuit related to the SRS unless instructed to in this Service Manual. SRS wiring harnesses can be identified by yellow and/or orange harnesses or harness connectors.**

Precaution Necessary for Steering Wheel Rotation After Battery Disconnect

INFOID:0000000001148907

NOTE:

- This Procedure is applied only to models with Intelligent Key system and NATS (NISSAN ANTI-THEFT SYSTEM).
- Remove and install all control units after disconnecting both battery cables with the ignition knob in the ″LOCK″ position.
- Always use CONSULT-III to perform self-diagnosis as a part of each function inspection after finishing work. If DTC is detected, perform trouble diagnosis according to self-diagnostic results.

For models equipped with the Intelligent Key system and NATS, an electrically controlled steering lock mechanism is adopted on the key cylinder.

For this reason, if the battery is disconnected or if the battery is discharged, the steering wheel will lock and steering wheel rotation will become impossible.

If steering wheel rotation is required when battery power is interrupted, follow the procedure below before starting the repair operation.

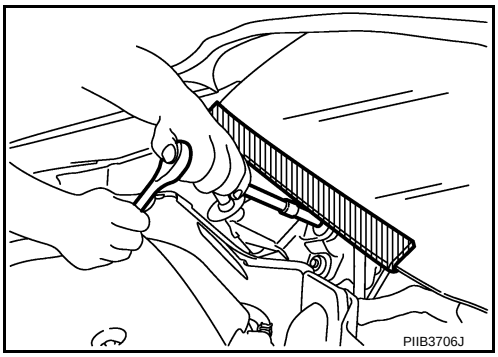
OPERATION PROCEDURE

1. Connect both battery cables.
   NOTE:
   Supply power using jumper cables if battery is discharged.
2. Use the Intelligent Key or mechanical key to turn the ignition switch to the ″ACC″ position. At this time, the steering lock will be released.
3. Disconnect both battery cables. The steering lock will remain released and the steering wheel can be rotated.
4. Perform the necessary repair operation.
5. When the repair work is completed, return the ignition switch to the ″LOCK″ position before connecting the battery cables. (At this time, the steering lock mechanism will engage.)
6. Perform a self-diagnosis check of all control units using CONSULT-III.

Precaution for Procedure without Cowl Top Cover

INFOID:0000000001148908

When performing the procedure after removing cowl top cover, cover the lower end of windshield with urethane, etc.



Precaution for Brake System

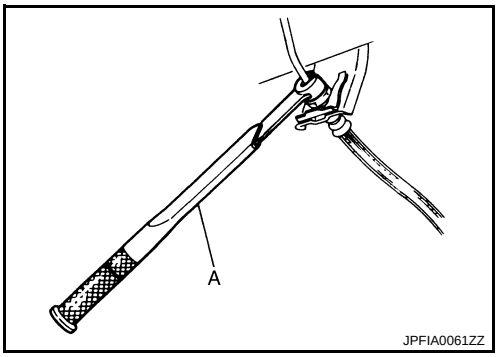
INFOID:0000000001116107

WARNING:

Clean any dust from the front brake and rear brake with a vacuum dust collector. Never blow with compressed air.

CAUTION:

- **Only use “DOT 3” brake fluid. Refer to MA-22, "Fluids and Lubricants".**
- **Never reuse drained brake fluid.**
- **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.**
- **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 flare nut torque wrench (A).**
- **Always confirm the specified tightening torque when installing the brake pipes.**
- **Turn the ignition switch OFF and disconnect the ABS actuator and electric unit (control unit) connector or the battery negative terminal before performing the work.**
- **Check that no brake fluid leakage is present after replacing the parts.**
- **Burnish the brake contact surfaces after refinishing or replacing rotors, after replacing pads, or if a soft pedal occurs at very low mileage. Refer to BR-41, "BRAKE PAD : Inspection and Adjustment" (front brake pad), BR-44, "BRAKE CALIPER ASSEMBLY : Inspection and Adjustment" (front disc rotor), BR-47, "BRAKE PAD : Inspection and Adjustment" (rear brake pad), BR-50, "BRAKE CALIPER ASSEMBLY : Inspection and Adjustment" (rear disc rotor).**

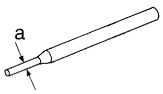


PREPARATION

PREPARATION

Commercial Service Tool

INFOID:0000000001116108

Tool name	Description
Pin punch a: 4 mm (0.16 in) dia.  NT410	Removing and installing reservoir tank pin

ON-VEHICLE MAINTENANCE

BRAKE PEDAL

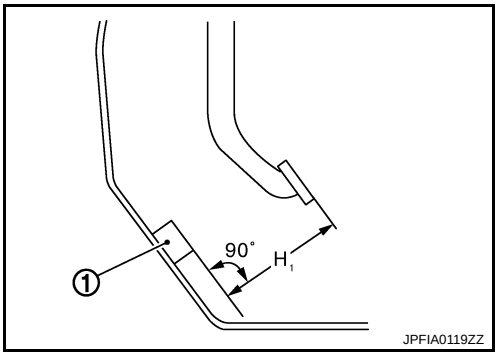
Inspection and Adjustment

INFOID:0000000001116110

INSPECTION

Brake Pedal Height

Check the height (H_1) between the accelerator pedal stopper (1) and the brake pedal upper surface.



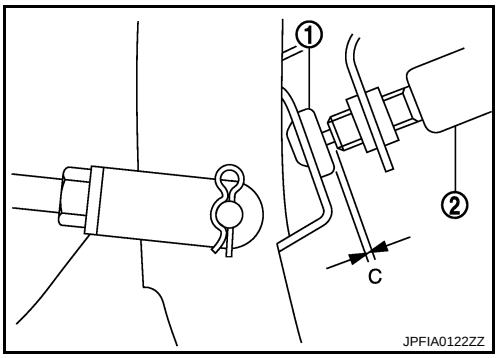
Standard

Brake pedal height (H_1)	**: Refer to BR-52, "Brake Pedal".**

CAUTION:
Remove the floor trim.

Stop Lamp Switch and/or ASCD Brake Switch (Except For M9R) or Brake Pedal Position Switch (For M9R)

Check the clearance (C) among stopper rubber (1) and stop lamp switch and/or ASCD brake switch (except for M9R) or brake pedal position switch (for M9R) (2) threaded end.



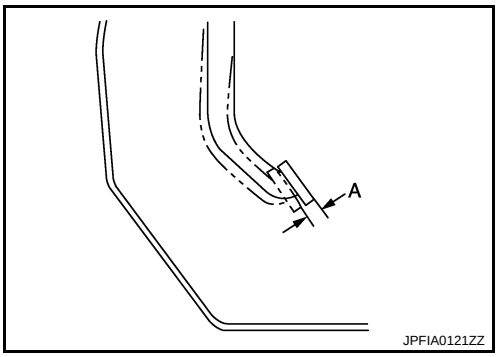
Standard

Clearance (C) between stopper rubber and stop lamp switch and/or ASCD brake switch (except for M9R) or brake pedal position switch (for M9R) threaded end	**: Refer to BR-52, "Brake Pedal".**

CAUTION:
The stop lamp must be turned off when the brake pedal is released.
NOTE:
Pull the brake pedal pad to make the clearance between stopper rubber and stop lamp switch and/or ASCD brake switch (except for M9R) or brake pedal position switch (for M9R) threaded end.

Brake Pedal Play

Press the brake pedal. Check the brake pedal play (A).

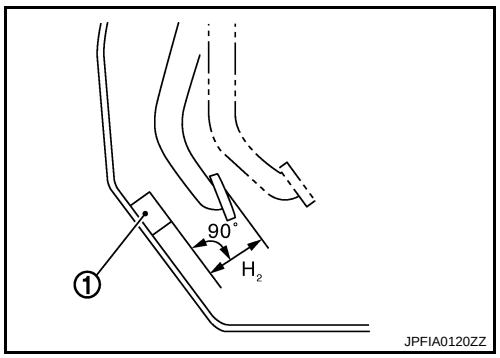


Standard

Pedal play (A)	**: Refer to BR-52, "Brake Pedal".**

Depressed Brake Pedal Height

Check the height between the accelerator pedal stopper (1) and the brake pedal upper surface (H_2) when depressing the brake pedal at 490 N (50 kg, 110 lb) while turning engine ON.



Standard

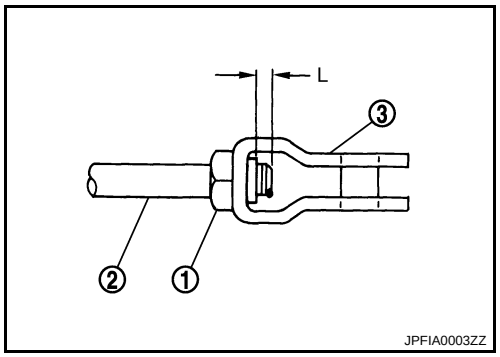
Depressed brake pedal height (H_2)	**: Refer to BR-52, "Brake Pedal".**

CAUTION:
Remove the floor trim.

ADJUSTMENT

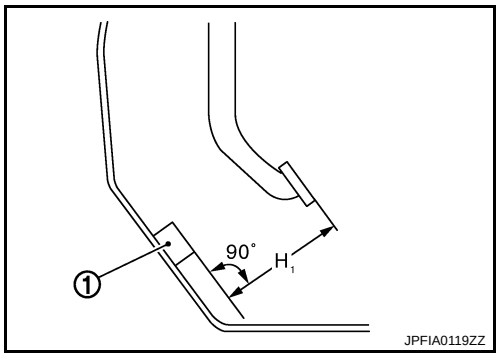
Brake Pedal Height

1. Disconnect the stop lamp switch and/or ASCD brake switch (except for M9R) or brake pedal position switch (for M9R) harness connector.
2. Turn the stop lamp switch and/or ASCD brake switch (except for M9R) or brake pedal position switch (for M9R) 45° counterclockwise.
3. Loosen the input rod lock nut (1). Adjust the brake pedal to the specification. Tighten the input rod lock nut to the specification. Refer to BR-32, "Exploded View".
   CAUTION:
   The threaded end of the input rod (2) must project to the inner side (L) of the clevis (3).



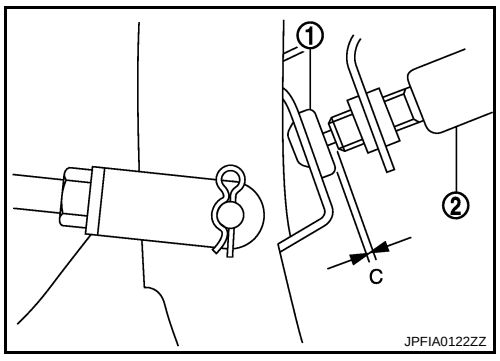
Standard

Brake pedal height (H_1)	**: Refer to BR-52, "Brake Pedal".**



Stop Lamp Switch and/or ASCD Brake Switch (Except For M9R) or Brake Pedal Position Switch (For M9R)

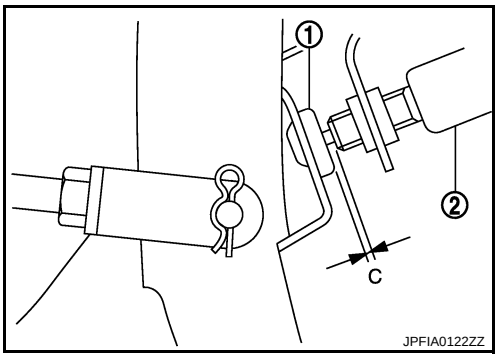
1. Disconnect the stop lamp switch and/or ASCD brake switch (except for M9R) or brake pedal position switch (for M9R) harness connector.
2. Turn the stop lamp switch and/or ASCD brake switch (except for M9R) or brake pedal position switch (for M9R) 45° counterclockwise.
3. Press-fit stop lamp switch and/or ASCD brake switch (except for M9R) or brake pedal position switch (for M9R) (2) until stop lamp switch and/or ASCD brake switch (except for M9R) or brake pedal position switch (for M9R) hits the stopper rubber (1) 45° clockwise.
   CAUTION:
   - **The clearance (C) between the stopper rubber and stop lamp switch and/or ASCD brake switch (except for M9R) or brake pedal position switch (for M9R) threaded end must be the specified value. Refer to BR-52, "Brake Pedal".**



- **The stop lamp must be turned off when the brake pedal is released.**

Brake Pedal Play

1. Disconnect the stop lamp switch and/or ASCD brake switch (except for M9R) or brake pedal position switch (for M9R) harness connector.
2. Turn the stop lamp switch and/or ASCD brake switch (except for M9R) or brake pedal position switch (for M9R) 45° counterclockwise.
3. Press-fit stop lamp switch and/or ASCD brake switch (except for M9R) or brake pedal position switch (for M9R) (2) until stop lamp switch and/or ASCD brake switch (except for M9R) or brake pedal position switch (for M9R) hits the stopper rubber (1) 45° clockwise.



CAUTION:

- **The clearance (C) between the stopper rubber and stop lamp switch and/or ASCD brake switch (except for M9R) or brake pedal position switch (for M9R) threaded end must be the specified value. Refer to BR-52, "Brake Pedal".**
- **The stop lamp must be turned off when the brake pedal is released.**

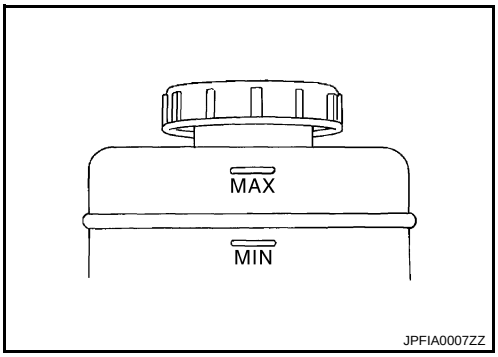
BRAKE FLUID

Inspection

INFOID:0000000001116111

BRAKE FLUID LEVEL

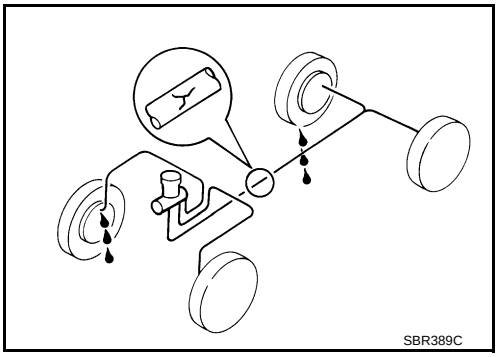
- Check that the fluid level in the reservoir tank is within the specified range (MAX – MIN lines).
- Visually check for any brake fluid leakage around the reservoir tank.
- Check the brake system for any leakage if the fluid level is extremely low (lower than MIN).
- Check the brake system for fluid leakage if the warning lamp remains illuminated even after the parking brake is released.



JPFIA0007ZZ

BRAKE LINE

1. Check brake line (tubes and hoses) for cracks, deterioration or other damage. Replace any damaged parts.
2. Check for fluid leakage by fully depressing brake pedal while engine is running.
   CAUTION:
   If leakage occurs around joints, retighten or, if necessary, replace damaged parts.

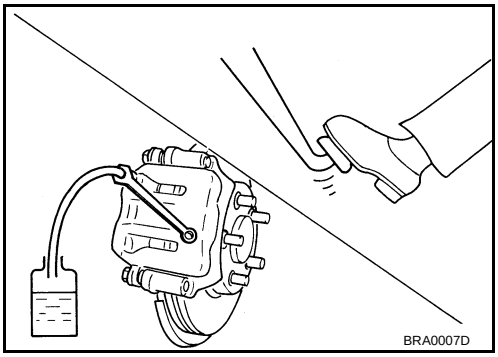

SBR389C

Draining

INFOID:0000000001116112

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.**
- **Turn the ignition switch OFF and disconnect the ABS actuator and electric unit (control unit) connector or the battery negative terminal before draining.**

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

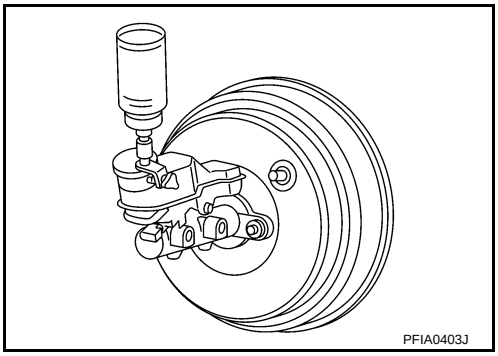

BRA0007D

Refilling

INFOID:0000000001116113

CAUTION:
Turn the ignition switch OFF and disconnect the ABS actuator and electric unit (control unit) connector or the battery negative terminal before refilling.

1. Check that there is no foreign material in the reservoir tank, and refill with new brake fluid.
   CAUTION:
   Never reuse drained brake fluid.
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 all 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:0000000001116114

CAUTION:
- **Turn the ignition switch OFF and disconnect the ABS actuator and electric unit (control unit) connector or the battery negative terminal before performing the work.**
- **Monitor the fluid level in the reservoir tank during the air bleeding.**
- **Always use new brake fluid for refilling. Never reuse the drained brake fluid.**

1. Connect a vinyl tube to the bleeder valve of the rear right brake.
2. Fully depress the brake pedal 4 to 5 times.
3. Loosen the bleeder valve and bleed air with the brake pedal depressed, and then quickly tighten the bleeder valve.
4. Repeat steps 2 and 3 until all of the air is out of the brake line.
5. Tighten the bleeder valve to the specified torque. Refer to BR-42, "BRAKE CALIPER ASSEMBLY : Exploded View" (front disc brake), BR-48, "BRAKE CALIPER ASSEMBLY : Exploded View" (rear disc brake).
6. Perform steps 1 to 5 for the rear right brake → front left brake → rear left brake → and front right brake in order.
7. Check that the fluid level in the reservoir tank is within the specified range after air bleeding. Refer to BR-11, "Inspection".

BRAKE MASTER CYLINDER

Inspection

INFOID:0000000001116116

FLUID LEAK

Check for brake fluid leakage from the master cylinder mounting face, reservoir tank mounting face and brake tube connections.

BRAKE BOOSTER

Inspection

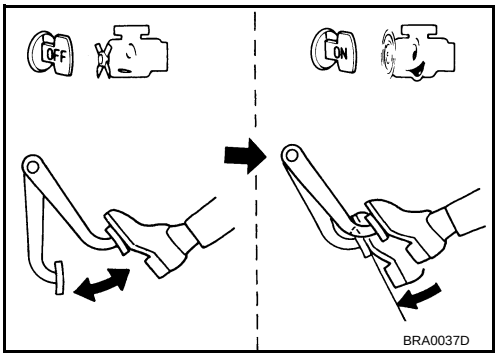
INFOID:0000000001116118

OPERATION

Depress the brake pedal several times at 5-second intervals with the engine stopped. Start the engine with the brake pedal fully depressed. Check that the clearance between brake pedal and dash lower panel decreases.

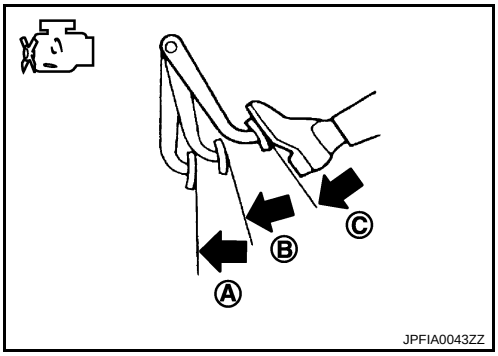
NOTE:

A slight impact with a small click may be felt on the pedal when the brake pedal is fully depressed. This is a normal phenomenon due to the brake system operation.



AIR TIGHT

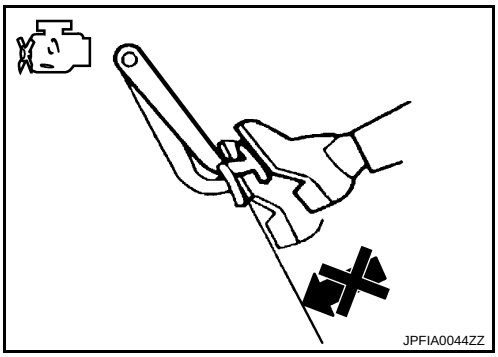
- Idle the engine for 1 minute to apply vacuum to the brake booster, and stop the engine. Then depress the brake pedal several times at 5-second intervals until the accumulated vacuum is released to atmospheric pressure. Check that the clearance between brake pedal and dash lower panel gradually increases (A → B → C) each time the brake pedal is depressed during this operation.



- Depress the brake pedal with the engine running. Then stop the engine while holding down the brake pedal. Check that the brake pedal stroke does not change after holding down the brake pedal for 30 seconds or more.

  NOTE:

  A slight impact with a small click may be felt on the pedal when the brake pedal is fully depressed. This is a normal phenomenon due to the brake system operation.



FRONT DISC BRAKE

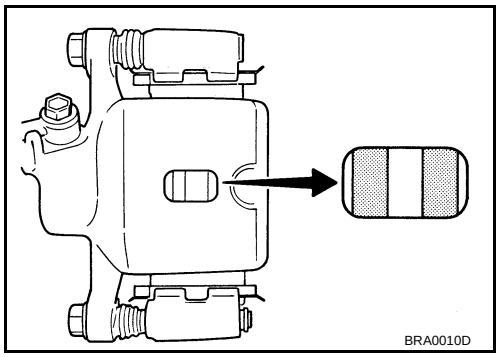
BRAKE PAD

BRAKE PAD : Inspection

INFOID:0000000001116120

PAD WEAR

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



Standard thickness : Refer to BR-52, "Front Disc Brake".

Wear limit thickness : Refer to BR-52, "Front Disc Brake".

DISC ROTOR

DISC ROTOR : Inspection

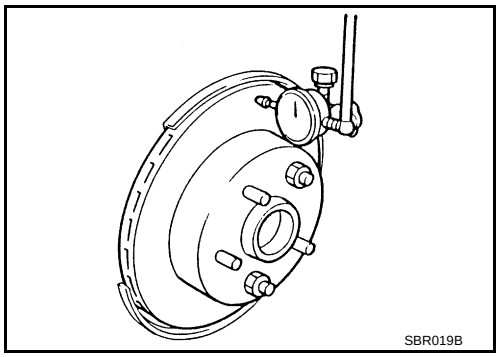
INFOID:0000000001116121

APPEARANCE

Check surface of disc rotor for uneven wear, cracks, and serious damage. Replace if there are.

RUNOUT

1. Fix the disc rotor to the wheel hub and bearing assembly with wheel nuts (2 points at least).
2. Inspect the runout with a dial gauge. [Measured at 10 mm (0.39 in) inside the disc edge.]



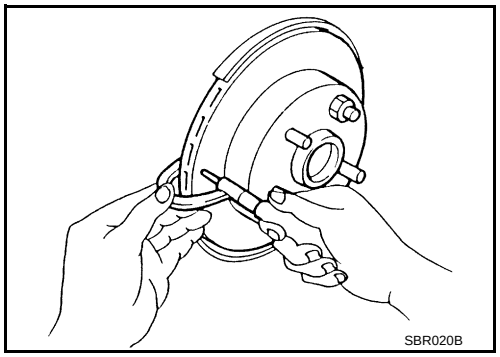
Runout limit : Refer to BR-52, "Front Disc Brake".

NOTE:
Check the wheel bearing axial end play before the inspection. Refer to FAX-7, "Inspection" (2WD), FAX-40, "Inspection" (4WD).

3. Find the installation position with a minimum runout by shifting the disc rotor-to-wheel hub and bearing assembly installation position by one hole at a time if the runout exceeds the limit value.
4. Replace or lathe the disc rotor if the runout exceeds the limit even after the above operation.

THICKNESS

Check the thickness of the disc rotor using a micrometer. Replace the disc rotor if the thickness is below the wear limit.



Wear limit thickness : Refer to BR-52, "Front Disc Brake".

REAR DISC BRAKE

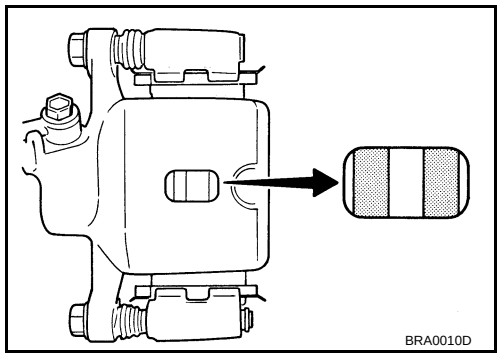
BRAKE PAD

BRAKE PAD : Inspection

INFOID:0000000001116123

PAD WEAR

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



Standard thickness : Refer to BR-52, "Rear Disc Brake".

Wear limit thickness : Refer to BR-52, "Rear Disc Brake".

DISC ROTOR

DISC ROTOR : Inspection

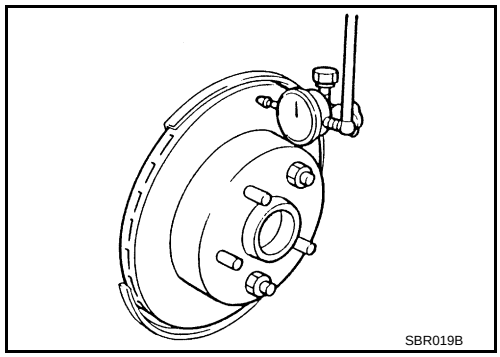
INFOID:0000000001116124

APPEARANCE

Check surface of disc rotor for uneven wear, cracks, and serious damage. Replace if there are.

RUNOUT

1. Fix the disc rotor to the wheel hub and bearing assembly with wheel nuts (2 points at least).
2. Inspect the runout with a dial gauge. [Measured at 10 mm (0.39 in) inside disc edge.]



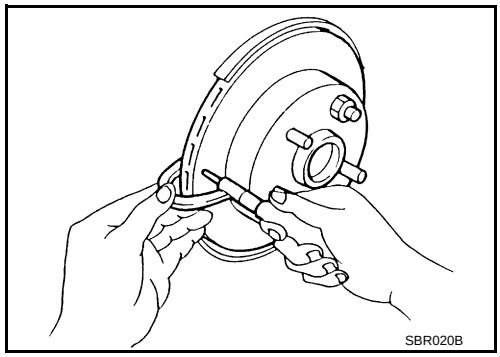
Runout limit : Refer to BR-52, "Rear Disc Brake".

NOTE:
Check the wheel bearing axial end play before the inspection. Refer to FAX-7, "Inspection" (2WD), FAX-40, "Inspection" (4WD).

3. Find the installation position with a minimum runout by shifting the disc rotor-to-wheel hub and bearing assembly installation position by one hole at a time if the runout exceeds the limit value.
4. Replace or lathe the disc rotor if the runout exceeds the limit even after the above operation.

THICKNESS

Check the thickness of the disc rotor using a micrometer. Replace the disc rotor if the thickness is below the wear limit.



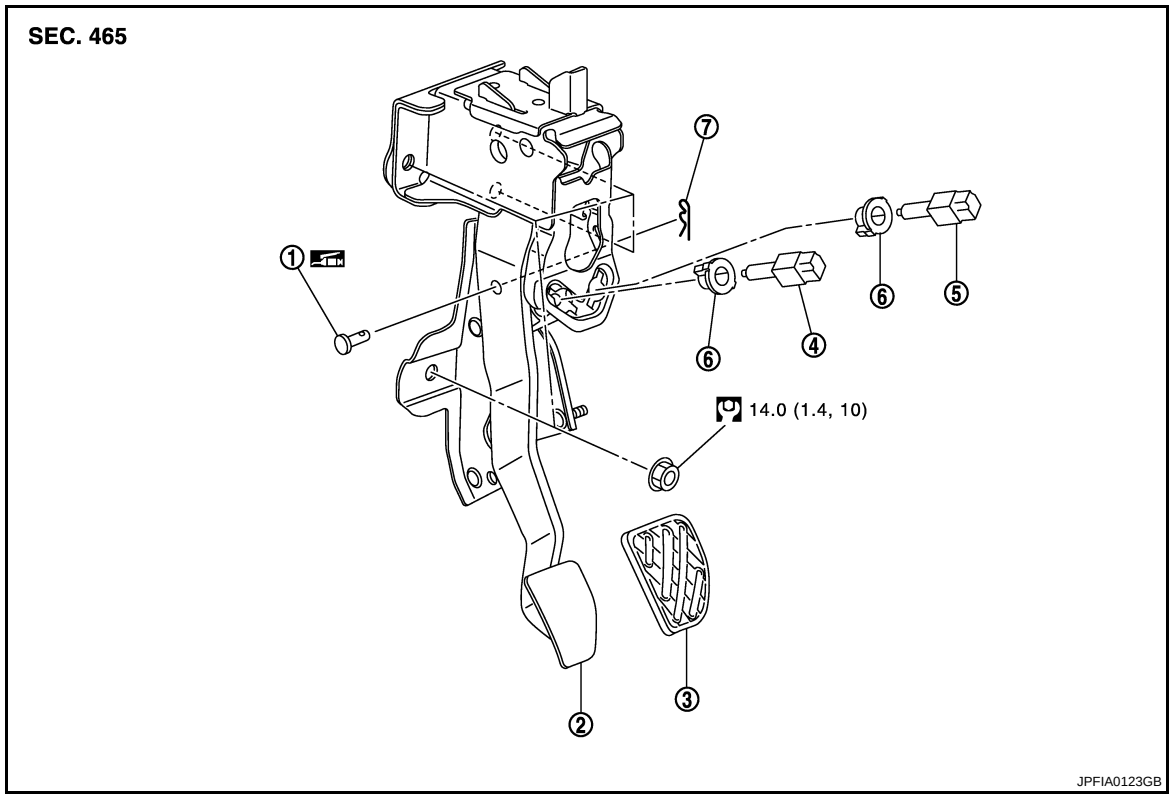
Wear limit thickness : Refer to BR-52, "Rear Disc Brake".

ON-VEHICLE REPAIR

BRAKE PEDAL

Exploded View

INFOID:0000000001116125



1. Clevis pin
2. Brake pedal assembly
3. Brake pedal pad
4. Brake switch (with ESP)*1 *2
5. Stop lamp switch
6. Clip
7. Snap pin

*1: ASCD brake switch (except for M9R)

*2: Brake pedal position switch (for M9R)

: Apply multi-purpose grease.

Refer to GI-4, "Components" for symbols not described on the above.

Removal and Installation

INFOID:0000000001116126

REMOVAL

1. Remove instrument driver lower panel. Refer to IP-11, "Exploded View".
2. Remove foot duct. Refer to VTL-43, "FOOT DUCTS : Exploded View".
3. Remove mode door motor. Refer to VTL-25, "Exploded View".
4. Disconnect the stop lamp switch and/or ASCD brake switch (except for M9R) or brake pedal position switch (for M9R) harness connectors.
5. Disconnect accelerator pedal position sensor harness connector.
6. Remove steering member stay.
7. Remove snap pin and clevis pin from clevis of brake booster.
8. Remove the brake pedal assembly and the accelerator pedal.
9. Remove the accelerator pedal from brake pedal assembly. Refer to ACC-3, "Exploded View".

INSTALLATION

Note the following, and installation is the reverse order of removal.

- Apply the multi-purpose grease to the clevis pin and the mating faces. (Not necessary if grease has been already applied.)

NOTE:
The clevis pin may be inserted in either direction.

Inspection and Adjustment

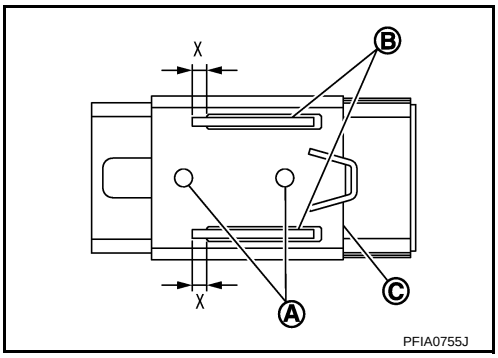
INFOID:0000000001116127

INSPECTION AFTER REMOVAL

- Check the following items and replace the brake pedal assembly if necessary.
- Check the brake pedal upper rivet (A) for deformation.
- Check the brake pedal for bend, damage, and cracks on the welded parts.
- Check the lapping length (X) of sub-bracket (B) and slide plate (C).

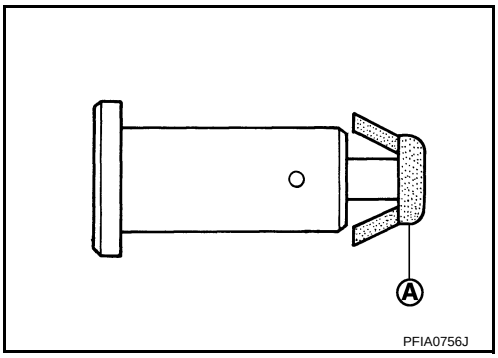
Standard

Lapping length : 5.0 – 6.0 mm (0.197 – 0.236 in)



PFIA0755J

- Check clevis pin and plastic stopper (A) for damage and deformation. If any is found, replace clevis pin.



PFIA0756J

ADJUSTMENT AFTER INSTALLATION

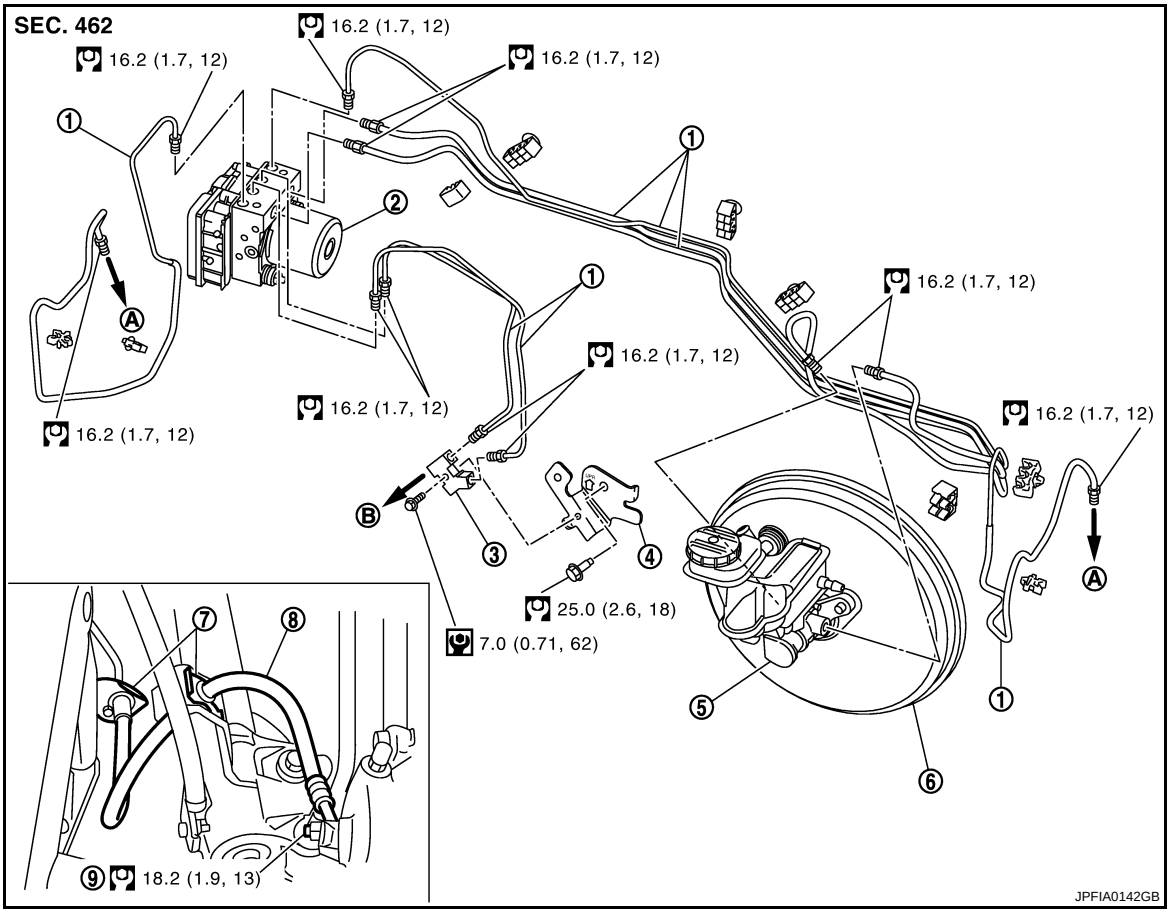
- Perform the brake pedal adjustment after installing the brake pedal assembly. Refer to BR-8, "Inspection and Adjustment".
- Perform the accelerator pedal check after installing the accelerator pedal. Refer to ACC-4, "Inspection".

BRAKE PIPING

FRONT (WITHOUT ESP)

FRONT (WITHOUT ESP) : Exploded View

INFOID:0000000001116128

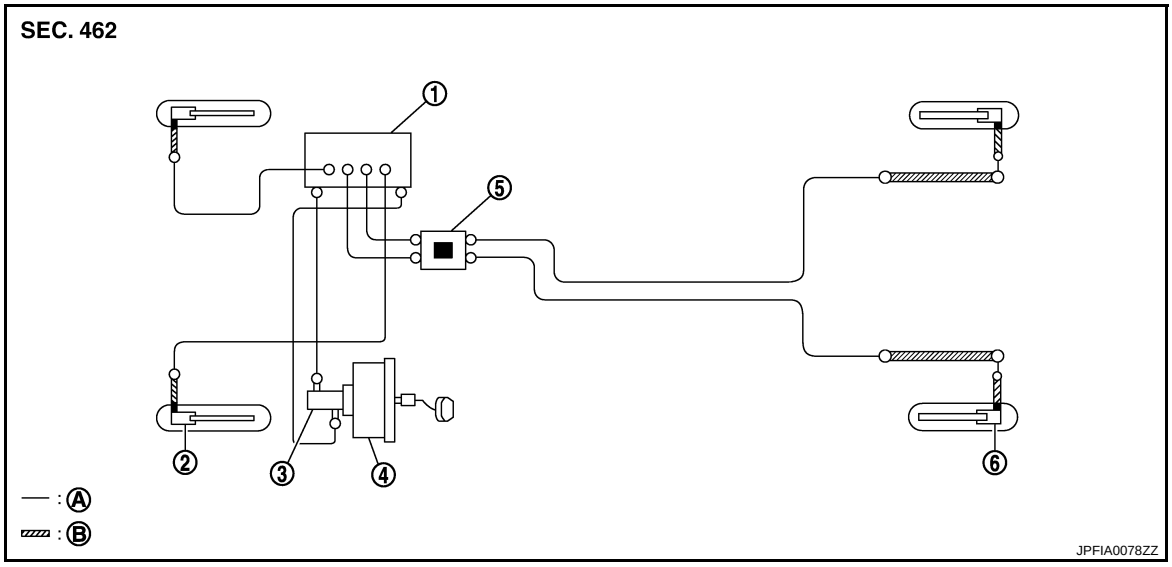


1.	Brake tube	2.	ABS actuator and electric unit (control unit)	3.	Connector
4.	Connector bracket	5.	Master cylinder assembly	6.	Brake booster
7.	Lock plate	8.	Brake hose	9.	Union bolt
A.	To front brake hose	B.	To rear brake tube		

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

FRONT (WITHOUT ESP) : Hydraulic Piping

INFOID:0000000001116129



1. ABS actuator and electric unit (control unit)
2. Front disc brake
3. Master cylinder assembly
4. Brake booster
5. Connector
6. Rear disc brake

A. Brake tube
B. Brake hose

: Flare nut

: Union bolt

: Connector

FRONT (WITHOUT ESP) : Removal and Installation

INFOID:0000000001116130

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.

1. Remove tires.
2. Drain brake fluid. Refer to BR-11, "Draining".
3. Loosen the flare nut with a flare nut wrench and separate the brake tube from the hose.
   CAUTION:
   - **Never scratch the flare nut and the brake tube.**
   - **Never bend sharply, twist or strongly pull out the brake hoses and tubes.**
   - **Cover open end of brake tubes and hoses when disconnecting to prevent entrance of dirt.**
4. Remove the union bolt and remove the brake hose from the brake caliper assembly.
5. Remove the lock plate and remove the brake hose.

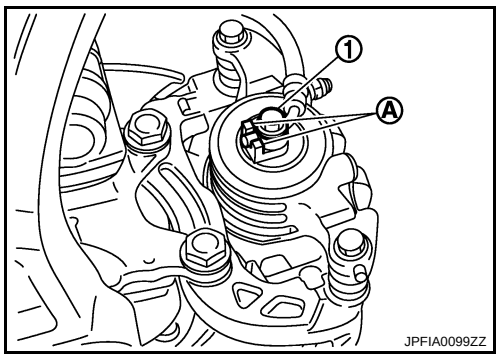
INSTALLATION

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.

1. Assemble the union bolt and the copper washer to the brake hose.
   CAUTION:
   Never reuse the copper washer.

2. Align the brake hose pin to the projection (A) of the brake caliper assembly and tighten the union bolt (1) to the specified torque.
3. Install the brake tube to the brake hose, temporarily tighten the flare nut by hand until it does not rotate further, and fix the brake hose to the bracket with the lock plate.
   CAUTION:
   Check that all brake hoses and tubes are not twisted and bent.
4. Tighten the flare nut to the specified torque with a flare nut torque wrench.
   CAUTION:
   Never scratch the flare nut and the brake tube.



5. Refill with new brake fluid and perform the air bleeding. Refer to BR-12, "Bleeding Brake System".
   CAUTION:
   Never reuse drained brake fluid.
6. Install tires.

FRONT (WITHOUT ESP) : Inspection

INFOID:0000000001116131

INSPECTION AFTER INSTALLATOIN

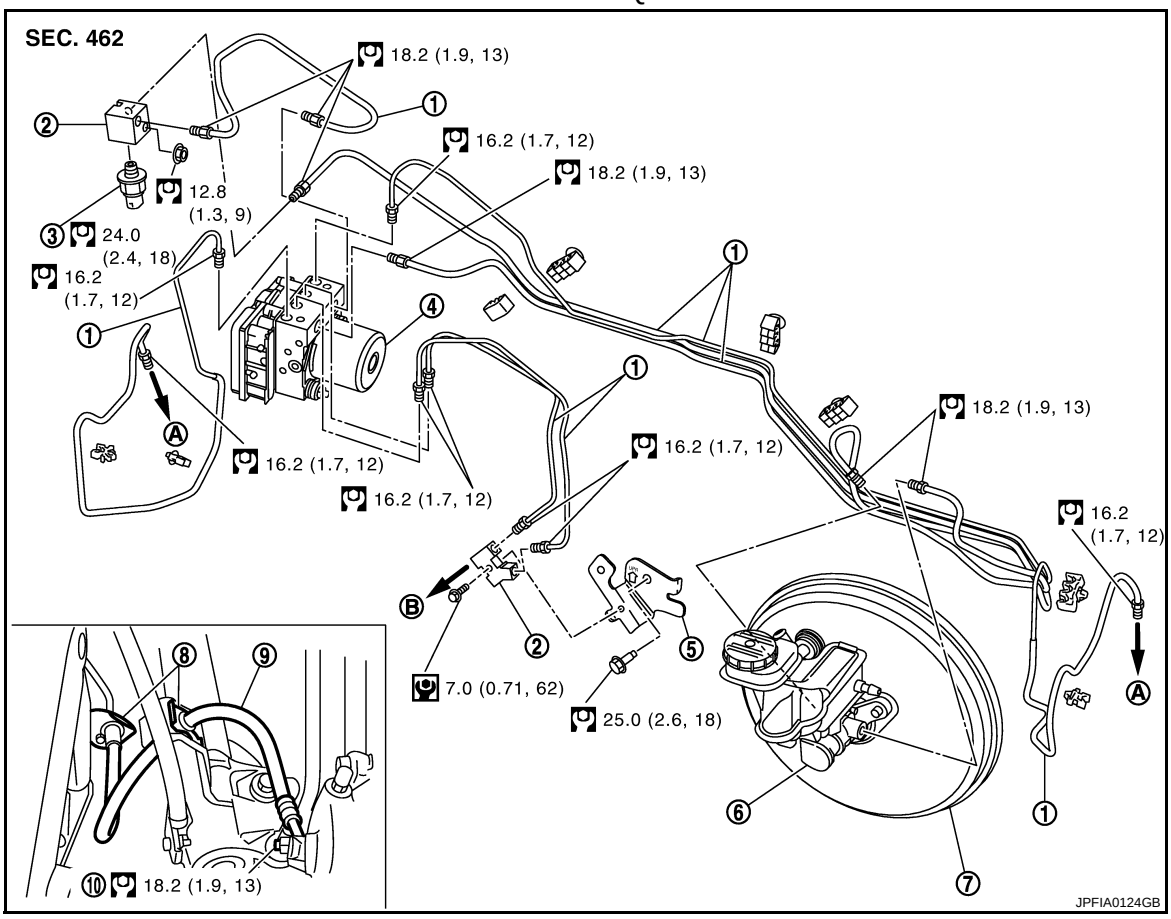
1. Check the brake hoses and tubes for the following: no scratches; no twist and deformation; no interference with other components when steering the steering wheel; no looseness at connections.
2. Depress the brake pedal with a force of 785 N (80 kg, 176 lb) and hold down the pedal for approximately 5 seconds 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.

FRONT (WITH ESP)

FRONT (WITH ESP) : Exploded View

INFOID:0000000001116132

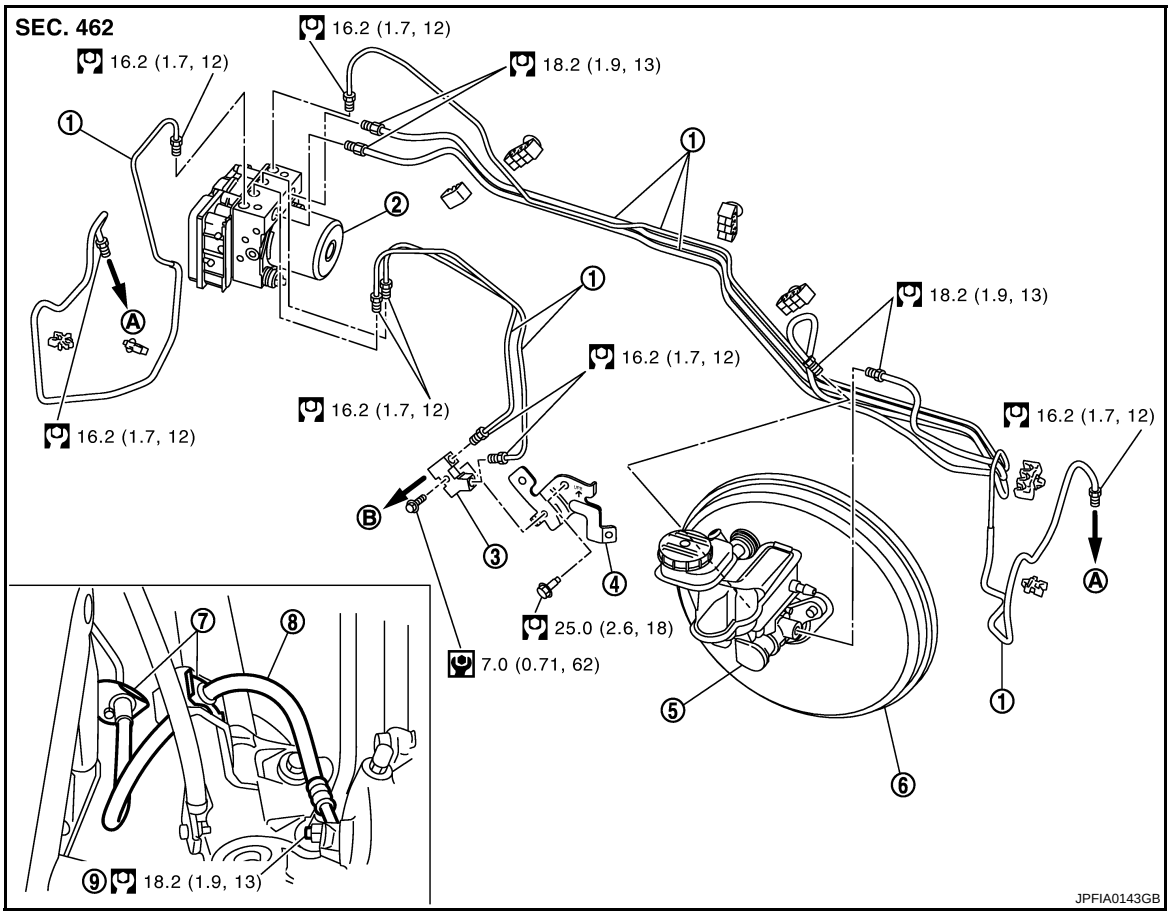
MR20DE AND QR25DE



1.	Brake tube	2.	Connector	3.	Pressure sensor
4.	ABS actuator and electric unit (control unit)	5.	Connector bracket	6.	Master cylinder assembly
7.	Brake booster	8.	Lock plate	9.	Brake hose
10.	Union bolt				
A.	To front brake hose	B.	To rear brake tube		

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

M9R



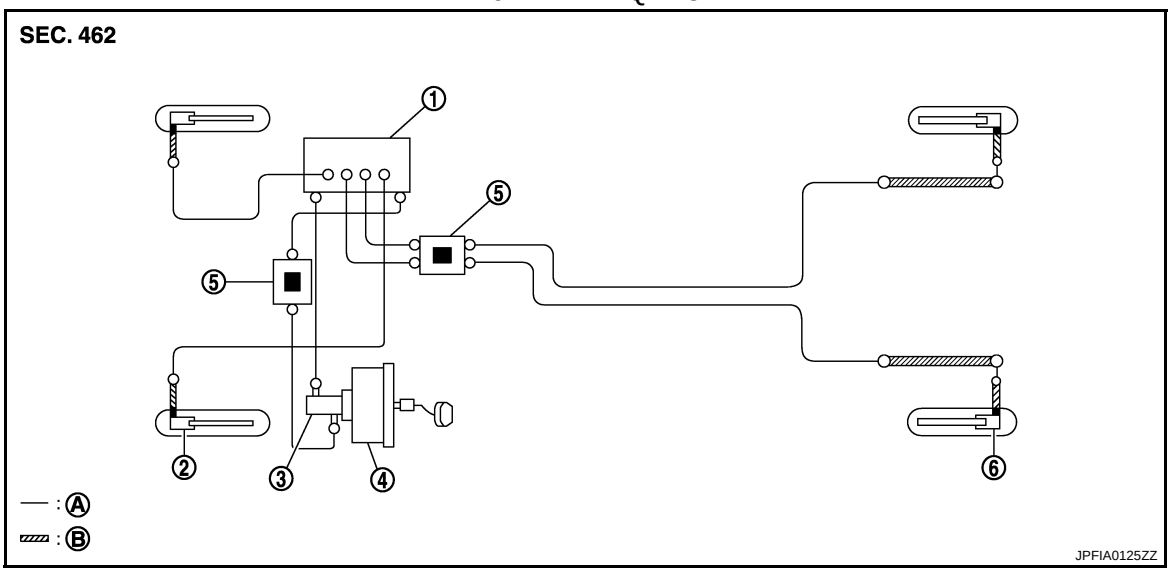
1.	Brake tube	2.	ABS actuator and electric unit (control unit)	3.	Connector
4.	Connector bracket	5.	Master cylinder assembly	6.	Brake booster
7.	Lock plate	8.	Brake hose	9.	Union bolt
A.	To front brake hose	B.	To rear brake tube		

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

FRONT (WITH ESP) : Hydraulic Piping

INFOID:0000000001125471

MR20DE AND QR25DE



1. ABS actuator and electric unit (control unit)
2. Front disc brake
3. Master cylinder assembly
4. Brake booster
5. Connector
6. Rear disc brake

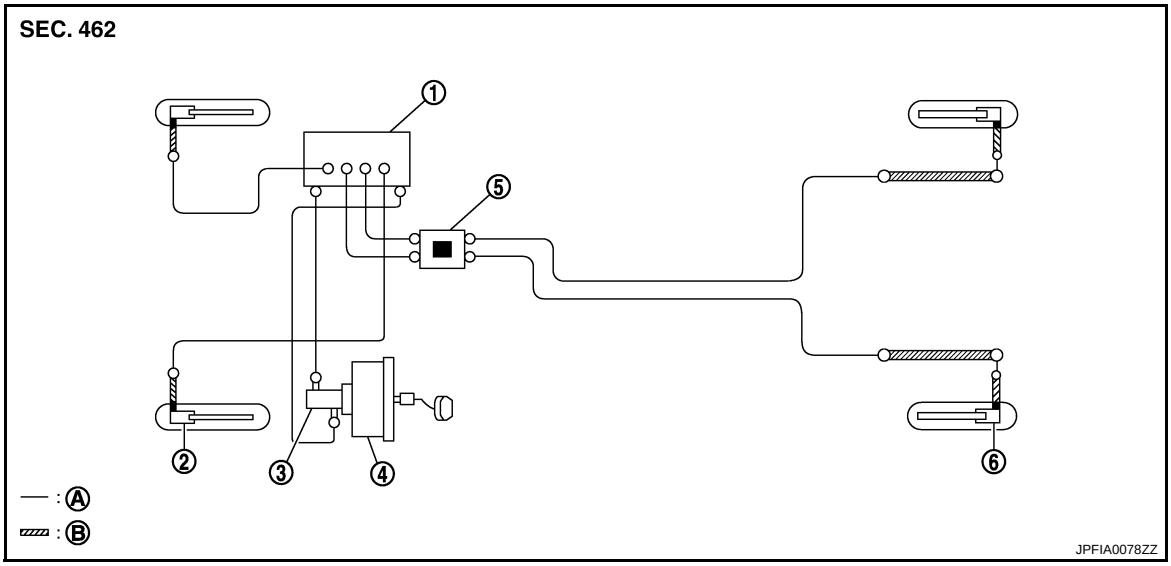
A. Brake tube
B. Brake hose

◯ : Flare nut

■ : Union bolt

▣ : Connector

M9R



1. ABS actuator and electric unit (control unit)
2. Front disc brake
3. Master cylinder assembly
4. Brake booster
5. Connector
6. Rear disc brake

A. Brake tube
B. Brake hose

◯ : Flare nut

■ : Union bolt

▣ : Connector

FRONT (WITH ESP) : Removal and Installation

INFOID:0000000001125472

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.

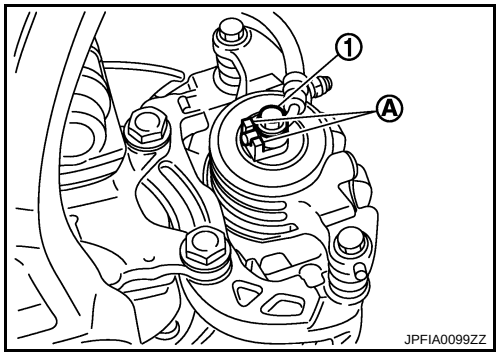
1. Remove tires.
2. Drain brake fluid. Refer to BR-11, "Draining".
3. Loosen the flare nut with a flare nut wrench and separate the brake tube from the hose.
   CAUTION:
   - **Never scratch the flare nut and the brake tube.**
   - **Never bend sharply, twist or strongly pull out the brake hoses and tubes.**
   - **Cover open end of brake tubes and hoses when disconnecting to prevent entrance of dirt.**
4. Remove the union bolt and remove the brake hose from the brake caliper assembly.
5. Remove the lock plate and remove the brake hose.

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.

1. Assemble the union bolt and the copper washer to the brake hose.
   CAUTION:
   Never reuse the copper washer.
2. Align the brake hose pin to the projection (A) of the brake caliper assembly and tighten the union bolt (1) to the specified torque.
3. Install the brake tube to the brake hose, temporarily tighten the flare nut by hand until it does not rotate further, and fix the brake hose to the bracket with the lock plate.
   CAUTION:
   Check that all brake hoses and tubes are not twisted and bent.
4. Tighten the flare nut to the specified torque with a flare nut torque wrench.
   CAUTION:
   Never scratch the flare nut and the brake tube.



5. Refill with new brake fluid and perform the air bleeding. Refer to BR-12, "Bleeding Brake System".
   CAUTION:
   Never reuse drained brake fluid.
6. Install tires.

FRONT (WITH ESP) : Inspection

INFOID:0000000001125778

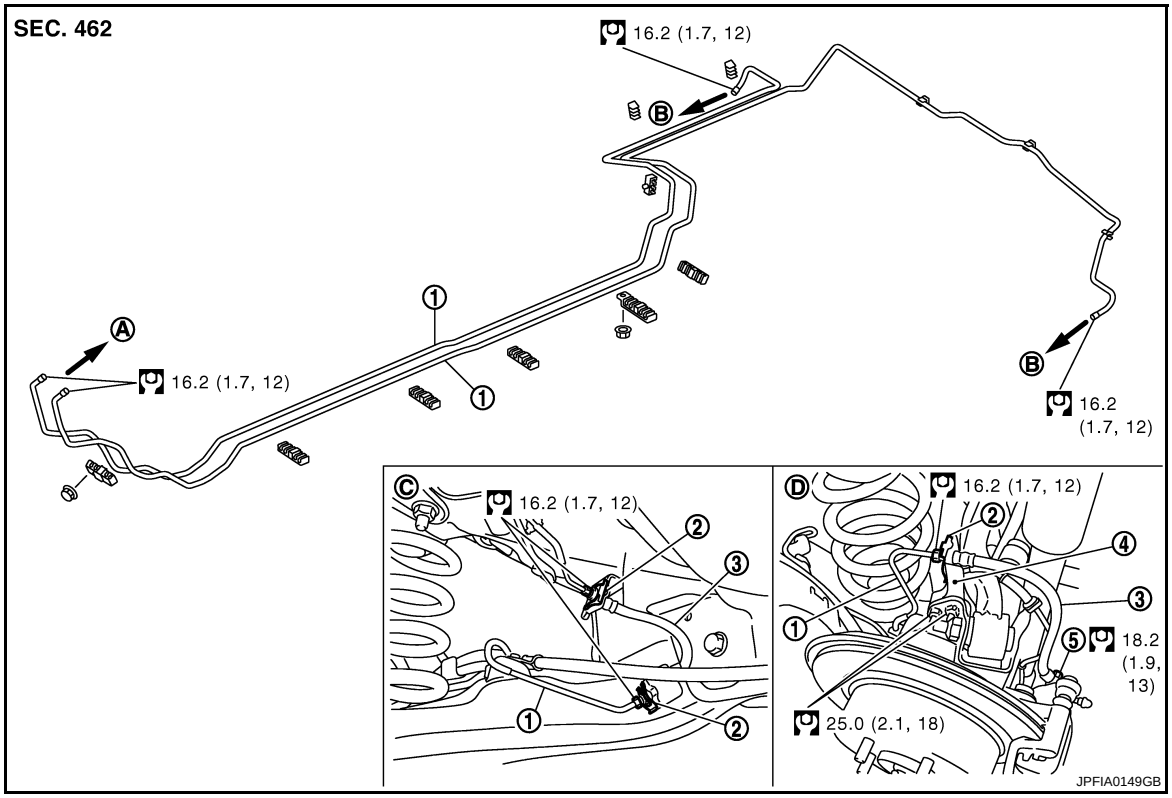
INSPECTION AFTER INSTALLATOIN

1. Check the brake hoses and tubes for the following: no scratches; no twist and deformation; no interference with other components when steering the steering wheel; no looseness at connections.
2. Depress the brake pedal with a force of 785 N (80 kg, 176 lb) and hold down the pedal for approximately 5 seconds 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.

REAR

REAR : Exploded View

INFOID:0000000001116136



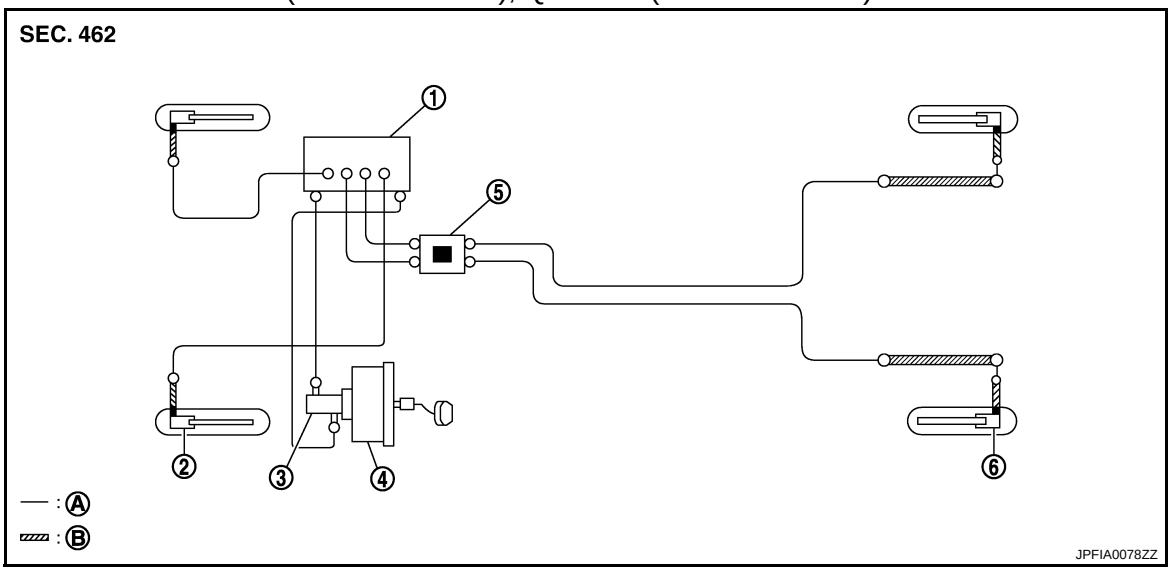
1. Brake tube
2. Lock plate
3. Brake hose
4. Brake hose bracket
5. Union bolt
A. To front brake tube
B. To rear brake hose
C. Floor side
D. Caliper side

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

REAR : Hydraulic Piping

INFOID:0000000001116137

MR20DE (WITHOUT ESP), QR25DE (WITHOUT ESP) AND M9R

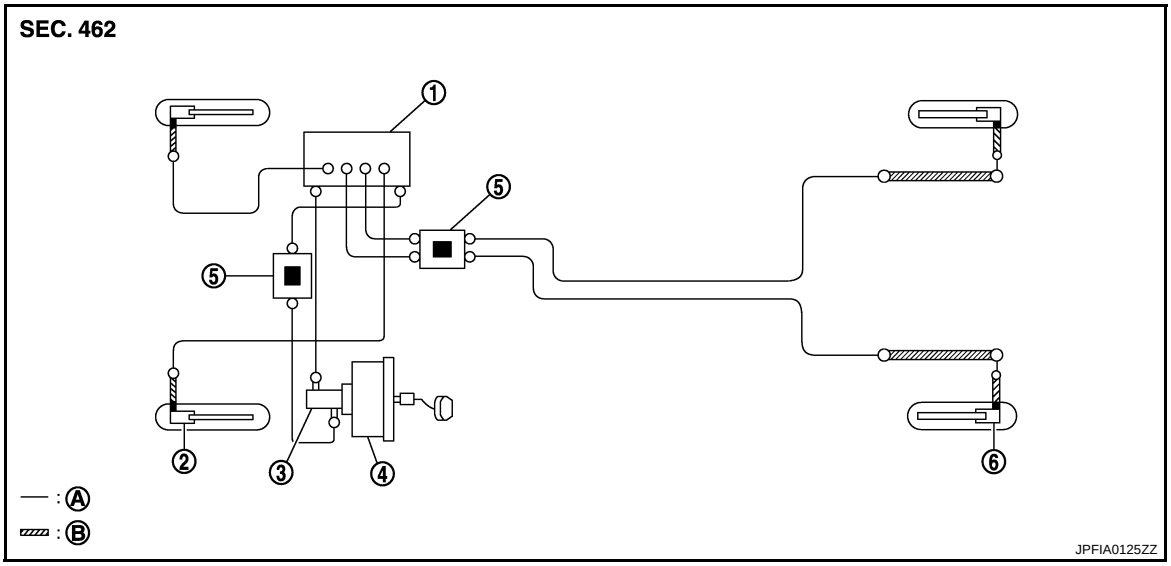


1. ABS actuator and electric unit (control unit)
2. Front disc brake
3. Master cylinder assembly
4. Brake booster
5. Connector
6. Rear disc brake

A. Brake tube
B. Brake hose

◯ : Flare nut
■ : Union bolt
▣ : Connector

MR20DE (WITH ESP) AND QR25DE (WITH ESP)



1. ABS actuator and electric unit (control unit)
2. Front disc brake
3. Master cylinder assembly
4. Brake booster
5. Connector
6. Rear disc brake

A. Brake tube
B. Brake hose

◯ : Flare nut
■ : Union bolt
▣ : Connector

REAR : Removal and Installation

INFOID:0000000001116138

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.

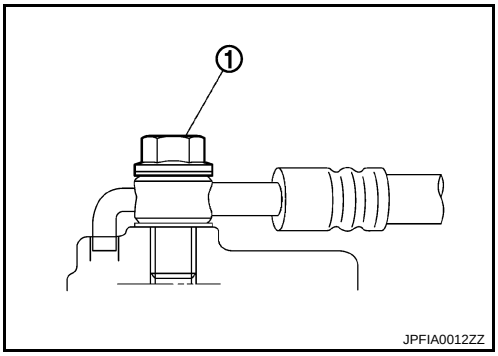
1. Remove tires.
2. Drain brake fluid. Refer to BR-11, "Draining".
3. Loosen the flare nut with a flare nut wrench and separate the brake tube from the hose.
   CAUTION:
   - **Never scratch the flare nut and the brake tube.**
   - **Never sharply bend, twist or strongly pull the brake hoses and tubes.**
   - **Cover the open end of brake tubes and hoses when disconnecting to prevent entrance of dirt.**
4. Remove the union bolt and remove the brake hose from the brake caliper assembly.
5. Remove the lock plate and remove the brake hose from the vehicle.

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.

1. Assemble the union bolt and the copper washer to the brake hose.
   CAUTION:
   Never reuse copper washer.
2. Install the brake hose L-pin by aligning it with the brake caliper assembly positioning hole, and tighten the union bolt (1) to the specified torque.
3. Connect the hose to the brake tube, temporarily tighten the flare nut by hand until it does not rotate further, and fix the brake hose to the bracket with the lock plate.
   CAUTION:
   Check that the brake hoses and tubes are not twisted and bent.
4. Tighten the flare nut to the specified torque with a flare nut torque wrench.
   CAUTION:
   Never scratch the flare nut and the brake tube.



5. Refill with new brake fluid and perform the air bleeding. Refer to BR-12, "Bleeding Brake System".
   CAUTION:
   Never reuse drained brake fluid.
6. Install tires.

REAR : Inspection

INFOID:0000000001125779

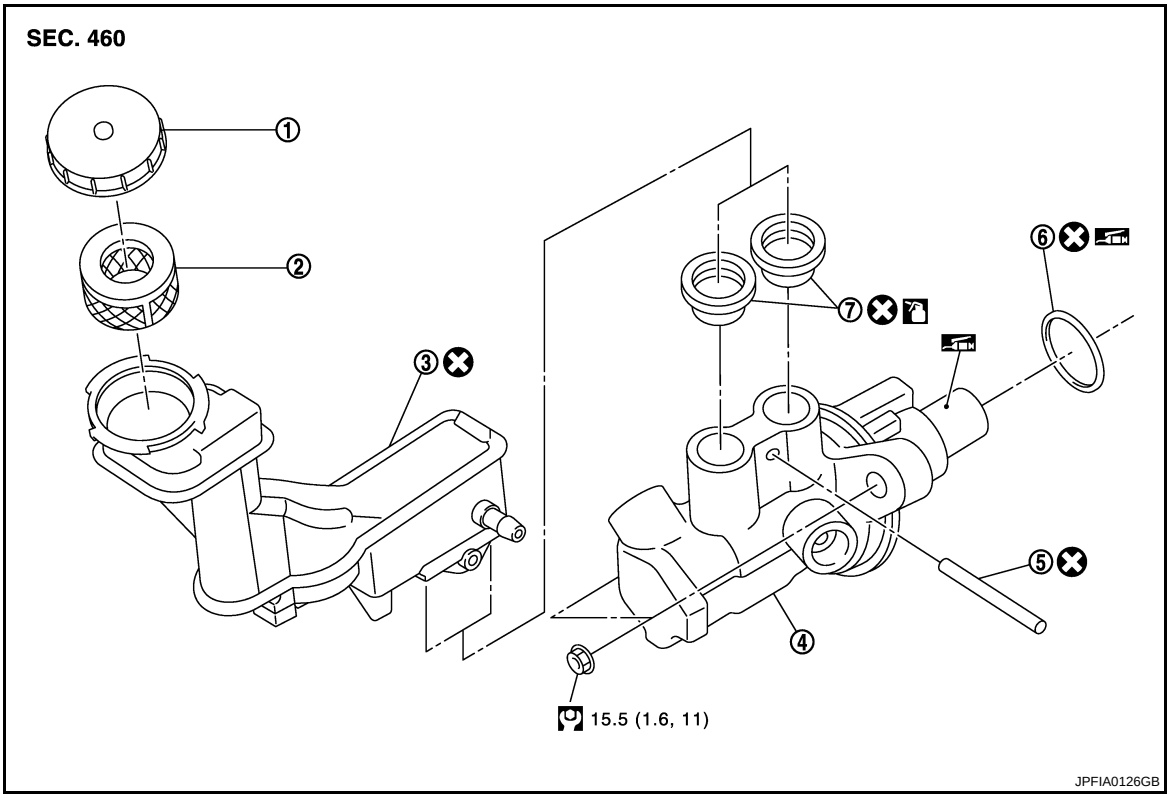
INSPECTION AFTER INSTALLATOIN

1. Check the brake hoses and tubes for the following: no scratches; no twist and deformation; no interference with other components when steering the steering wheel; no looseness at connections.
2. Depress the brake pedal with a force of 785 N (80 kg, 176 lb) and hold down the pedal for approximately 5 seconds 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.

BRAKE MASTER CYLINDER

Exploded View

INFOID:0000000001116140



1. Reservoir cap
2. Oil strainer
3. Reservoir tank
4. Cylinder body
5. Pin
6. O-ring
7. Grommet

: Apply PBC (Poly Butyl Cuprysil) grease or silicone-based grease.

: Apply brake fluid.

Refer to GI-4, "Components" for symbols not described on the above.

Removal and Installation

INFOID:0000000001116141

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.

1. Remove battery and bracket.
2. Remove air duct and air cleaner case. Refer to EM-25, "Exploded View" (MR20DE), EM-150, "Exploded View" (QR25DE), EM-263, "Exploded View" (M9R).
3. Drain brake fluid. Refer to BR-11, "Draining".
4. Separate the brake fluid level switch harness connector.
5. Separate the brake tubes from the master cylinder assembly with a flare nut wrench.
   CAUTION:
   Never scratch the flare nut and the brake tube.
6. Remove the master cylinder assembly.
   CAUTION:
   - **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 after the master cylinder assembly is removed.**

- **The piston of the master cylinder assembly is exposed. Never damage it when removing the master cylinder.**
- **The piston may drop off when pulled out strongly. Never hold the piston. Hold the cylinder body when handling the master cylinder assembly.**

INSTALLATION

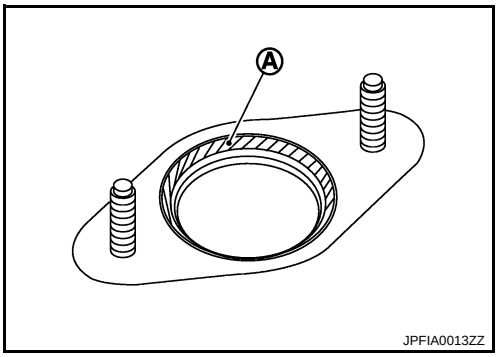
CAUTION:

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.

- Note the following, and installation is the reverse order of removal.

CAUTION:

- **Never depress the brake pedal after the master cylinder assembly is removed.**
- **Apply PBC (Poly Butyl Cuprysil) silicone-based grease to the brake booster [see (A) in the figure] when installing the master cylinder assembly to the brake booster.**
- **The piston of the master cylinder assembly is exposed. Never damage it when handling the master cylinder and check that no dirt and dust are present on the piston before installation. Clean it with new brake fluid if necessary.**
- **The piston may drop off when pulled strongly. Never hold the piston. Hold the cylinder body when handling the master cylinder assembly.**



- Temporarily tighten the brake tube flare nut to the master cylinder assembly by hand. Then tighten it to the specified torque with a flare nut torque wrench. Refer to BR-19, "FRONT (WITHOUT ESP) : Exploded View" (without ESP), BR-22, "FRONT (WITH ESP) : Exploded View" (with ESP).

CAUTION:

Never scratch the flare nut and the brake tube.

- After installation, perform the air bleeding. Refer to BR-12, "Bleeding Brake System".

CAUTION:

Never reuse drained brake fluid.

Disassembly and Assembly

INFOID:0000000001116142

DISASSEMBLY

CAUTION:

- **Never disassemble the cylinder body.**
- **Remove the reservoir tank if necessary.**

1. Fix the master cylinder assembly to a vise.

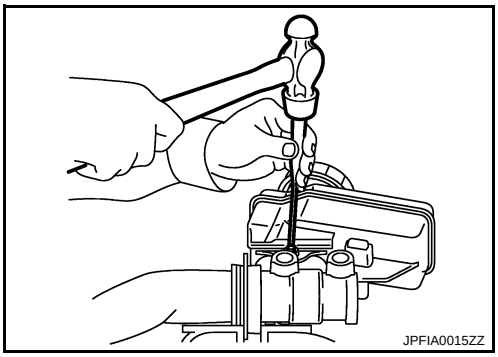
   CAUTION:

   Always set copper plates or cloth between vise when fixing the cylinder body to a vise. Never overtighten the vise.

2. Remove the reservoir tank mounting pin with a pin punch.
3. Remove the reservoir tank and grommet from the cylinder body.

   CAUTION:

   Never drop the removed parts. The parts must not be reused if they are dropped.



ASSEMBLY

1. Apply new brake fluid to the grommet and install it to the cylinder body.

   CAUTION:

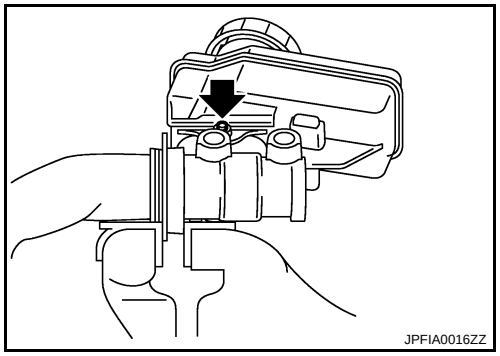
   - **Never use mineral oil such as gasoline or light oil.**
   - **Never reuse the grommets.**

2. Install the reservoir tank to the cylinder body.

CAUTION:
- **Never drop the parts when installing. The parts must not be reused if they are dropped.**
- **Never reuse reservoir tank.**

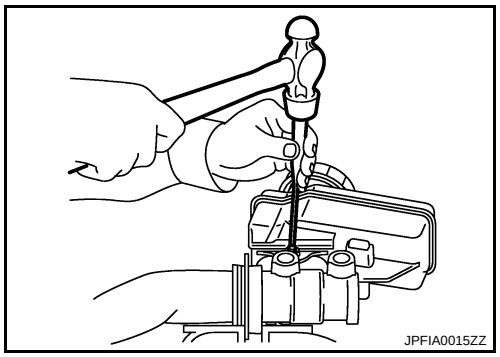
3. Fix the cylinder body to a vise.

CAUTION:
- **Place the reservoir tank with the chamfered pin hole (⬅) facing up.**
- **Always set copper plates or cloth between vise when fixing the cylinder body to a vise. Never overtighten the vise.**


JPFIA0016ZZ

4. Tilt the reservoir tank so that a mounting pin can be inserted. Insert a mounting pin. Return the reservoir tank to the horizontal position. Insert another mounting pin into the pin hole on the opposite side in the same manner after the mounting pin passes through the cylinder body pin hole.

CAUTION:
Never reuse the mounting pin.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Inspection

INFOID:0000000001116143

INSPECTION AFTER INSTALLATION

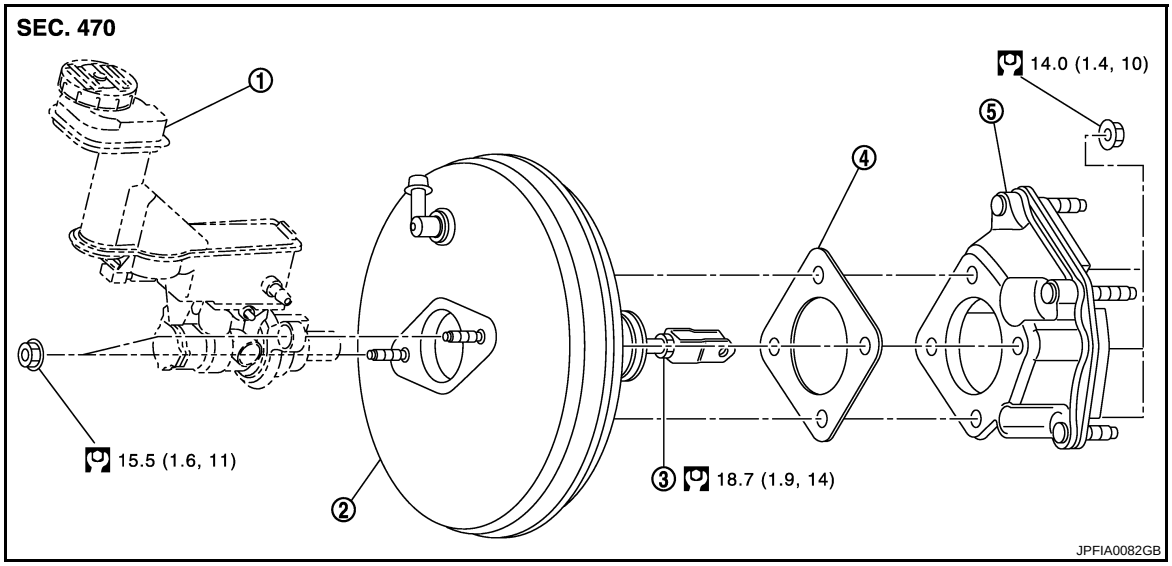
Fluid Leak

Check for brake fluid leakage from the cylinder body-to-brake booster mounting face, reservoir tank mounting face and brake tube connections.

BRAKE BOOSTER

Exploded View

INFOID:0000000001116144



1. Master cylinder assembly
2. Brake booster
3. Lock nut
4. Gasket
5. Spacer

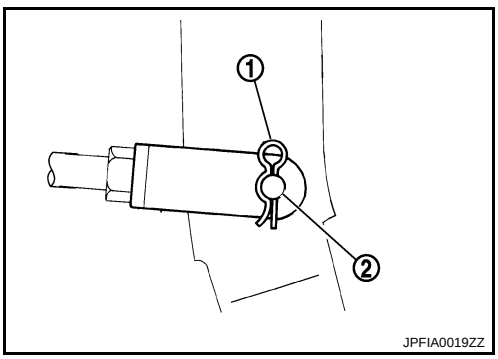
Refer to GI-4, "Components" for symbols in the figure.

Removal and installation

INFOID:0000000001116145

REMOVAL

1. Remove battery and bracket.
2. Remove air duct and air cleaner case. Refer to EM-25, "Exploded View" (MR20DE), EM-150, "Exploded View" (QR25DE), EM-263, "Exploded View" (M9R).
3. Remove brake master cylinder assembly. Refer to BR-29, "Removal and Installation".
   CAUTION:
   - **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 after the master cylinder assembly is removed.**
   - **The piston of the master cylinder assembly is exposed. Never damage it when removing the master cylinder.**
   - **The piston may drop off when pulled out strongly. Never hold the piston. Hold the cylinder body when handling the master cylinder assembly.**
4. Remove vacuum hose from brake booster. Refer to BR-35, "MR20DE : Exploded View" (MR20DE), BR-36, "QR25DE : Exploded View" (QR25DE), BR-38, "M9R : Exploded View" (M9R).
5. Remove snap pin (1) and clevis pin (2) from inside vehicle.
6. Remove nuts on brake booster and brake pedal assembly. Refer to BR-17, "Exploded View".
7. Remove brake booster from dash panel in engine room side.
   CAUTION:
   Never deform or bend the brake tubes.
8. Remove the spacer from brake booster.



INSTALLATION

- Note the following, and installation is the reverse order of removal.

CAUTION:
- **Be careful not to damage brake booster stud bolt threads. If brake booster is tilted during installation, the dash panel may damage the threads.**
- **Never deform or bend the brake tubes when installing the brake booster.**
- **Always use a new gasket between the brake booster and the spacer.**
- **Replace the clevis pin if it is damaged. Refer to BR-18, "Inspection and Adjustment".**
- After installation, perform the air bleeding. Refer to BR-12, "Bleeding Brake System".

CAUTION:
Never reuse drained brake fluid.

Inspection and Adjustment

INFOID:0000000001116146

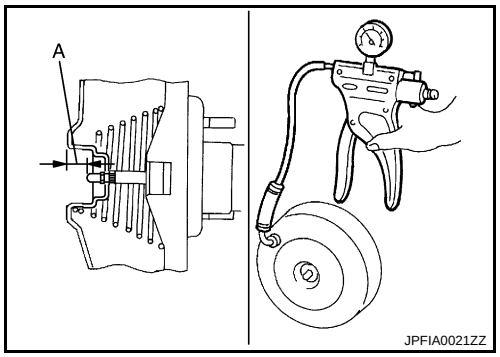
INSPECTION AFTER REMOVAL

Output Rod Length Inspection

1. With a handy vacuum pump, apply vacuum pressure of –66.7 kPa (–500 mmHg, –19.70 inHg, –0.667 bar) to the brake booster.
2. Check the output rod length (A).

Standard

Output rod length (A) **: Refer to BR-52, "Brake Booster".**



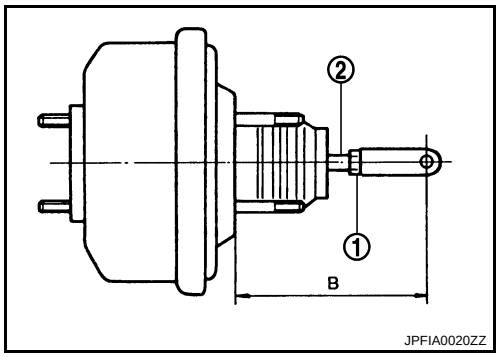
Input Rod Length Inspection

1. Loosen the lock nut (1) and adjust the input rod (2) to the specified length (B).

Standard

Input rod length (B) **: Refer to BR-52, "Brake Booster".**

2. Tighten the lock nut to the specified torque.

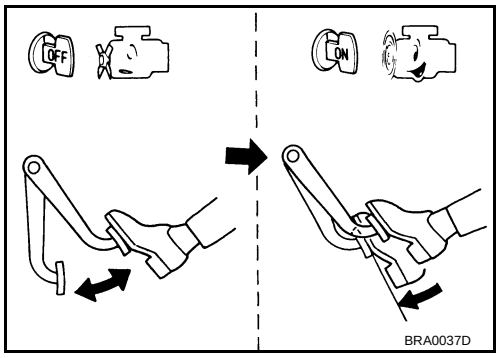


INSPECTION AFTER INSTALLATION

Operation

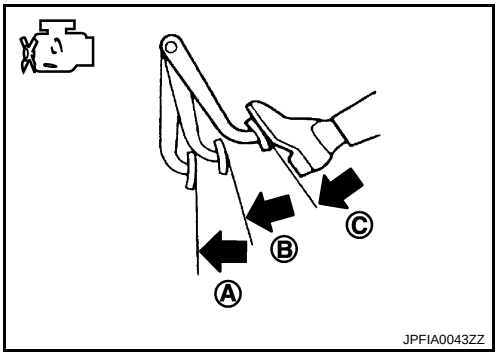
Depress the brake pedal several times at 5-second intervals with the engine stopped. Start the engine with the brake pedal fully depressed. Check that the clearance between brake pedal and dash lower pane decreases.

NOTE:
A slight impact with a small click may be felt on the pedal when the brake pedal is fully depressed. This is a normal phenomenon due to the brake system operation.

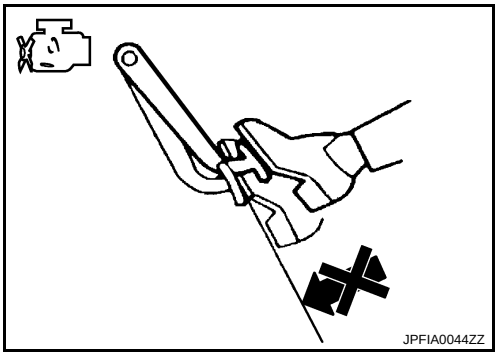


Air Tight

- Idle the engine for 1 minute to apply vacuum to the brake booster, and stop the engine. Then depress the brake pedal several times at 5-second intervals until the accumulated vacuum is released to atmospheric pressure. Check that the clearance between brake pedal and dash lower panel gradually increases (A → B → C) each time the brake pedal is depressed during this operation.



- Depress the brake pedal with the engine running. Then stop the engine while holding down the brake pedal. Check that the brake pedal stroke does not change after holding down the brake pedal for 30 seconds or more.
  NOTE:
  A slight impact with a small click may be felt on the pedal when the brake pedal is fully depressed. This is a normal phenomenon due to the brake system operation.



ADJUSTMENT AFTER INSTALLTION

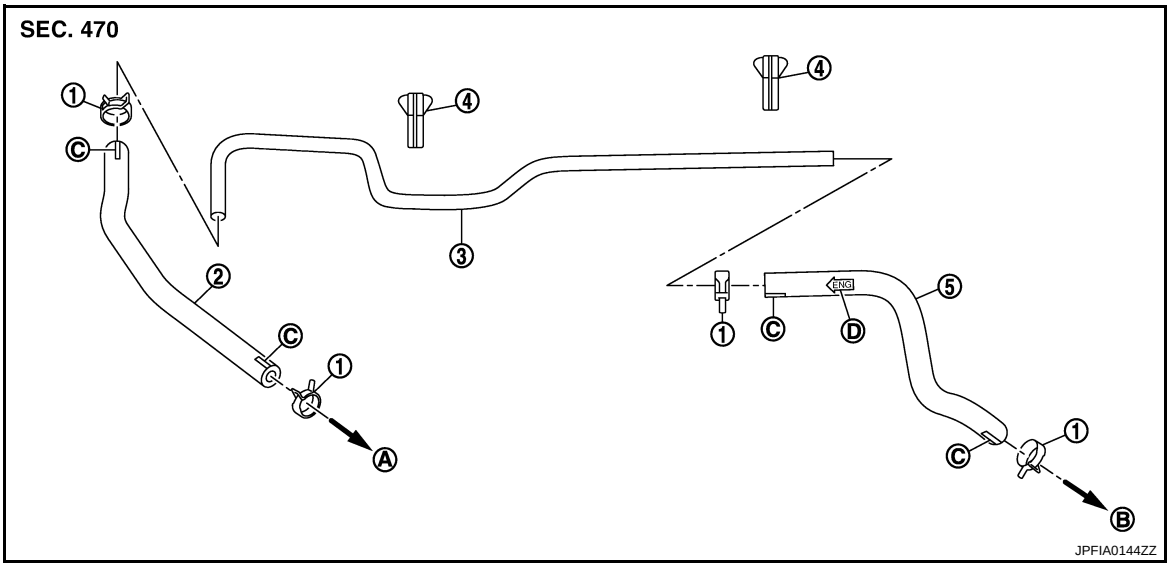
Perform the brake pedal adjustment after installing the brake pedal assembly. Refer to BR-8, "Inspection and Adjustment".

VACUUM LINES

MR20DE

MR20DE : Exploded View

INFOID:0000000001116147



1. Clamp
2. Vacuum hose
3. Vacuum tube
4. Clip
5. Vacuum hose (built in check valve)
A. To intake manifold
B. To brake booster
C. Paint mark
D. Stamp indicating engine direction

MR20DE : Removal and Installation

INFOID:0000000001116148

REMOVAL

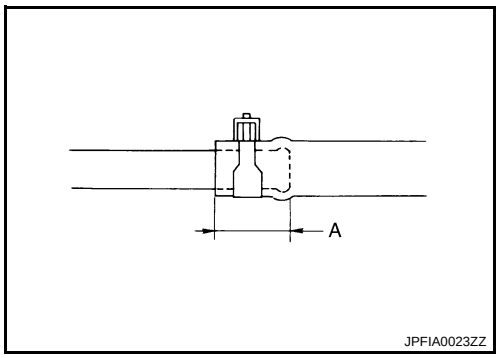
1. Remove engine cover. Refer to EM-27, "Exploded View".
2. Remove the vacuum hose and tube.

INSTALLATION

Note the following, and installation is the reverse order of removal.

CAUTION:

- **Because vacuum hose contains a check valve, it must be installed in the correct position. Refer to the stamp to confirm correct installation. Brake booster will not operate normally if the hose is installed in the wrong direction.**
- **Insert vacuum hose at least 24 mm (0.94 in) (A).**
- **Never use lubricating oil during assembly.**
- **Face the marking side up when assembling of vacuum hose.**
- **Face the marking side vehicle front when assembling of vacuum hose (built in check valve).**



MR20DE : Inspection

INFOID:0000000001116149

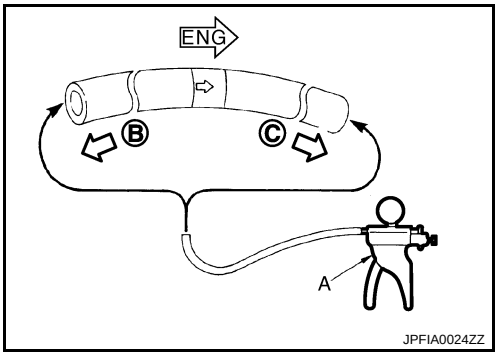
INSPECTION AFTER REMOVAL

Appearance

Check for correct assembly, damage and deterioration.

Check Valve Airtightness

- Use a handy vacuum pump (A) to check.



When connected to the brake booster side (B):

Vacuum should decrease within 1.3 kPa (10 mm-Hg, 0.39 inHg, 0.013 bar) for 15 seconds under a vacuum of −66.7 kPa (−500 mmHg, −19.70 inHg, −0.667 bar).

When connected to the engine side (C):

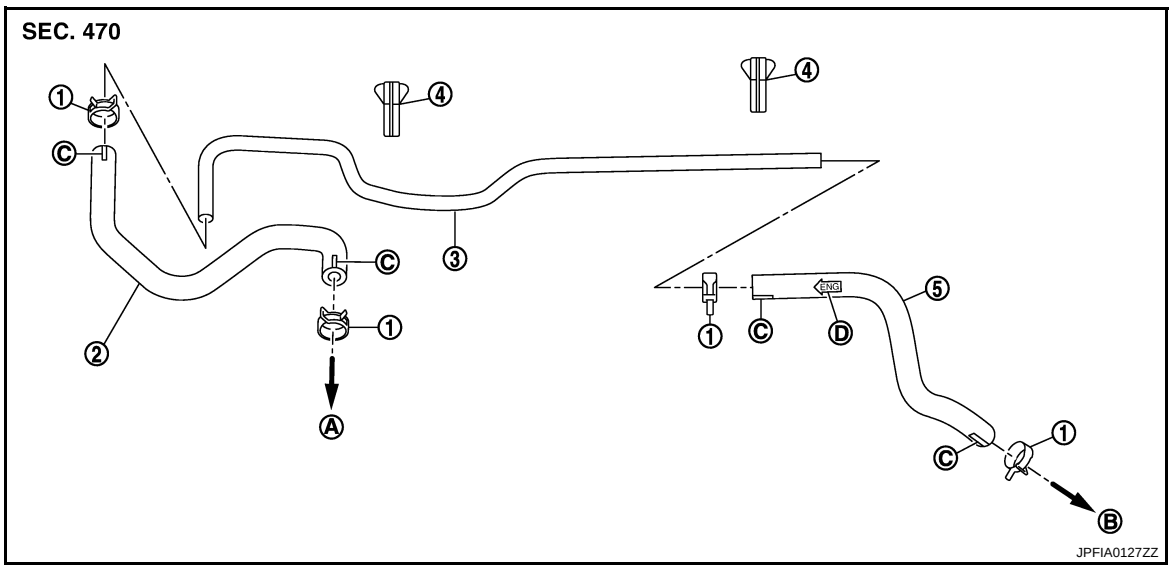
Vacuum should not exist.

- Replace vacuum hose assembly if vacuum hose and check valve are malfunctioning.

QR25DE

QR25DE : Exploded View

INFOID:0000000001116308



1.	Clamp	2.	Vacuum hose	3.	Vacuum tube
4.	Clip	5.	Vacuum hose (built in check valve)		
A.	To intake manifold	B.	To brake booster	C.	Paint mark
D.	Stamp indicating engine direction				

QR25DE : Removal and Installation

INFOID:0000000001116309

REMOVAL

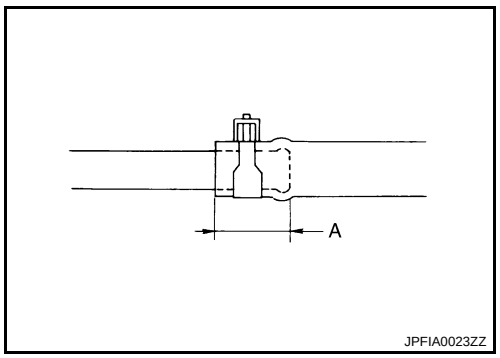
Remove the vacuum hose and tube.

INSTALLATION

Install the vacuum hose and tube.

CAUTION:

- **Because vacuum hose contains a check valve, it must be installed in the correct position. Refer to the stamp to confirm correct installation. Brake booster will not operate normally if the hose is installed in the wrong direction.**
- **Insert vacuum hose at least 24 mm (0.94 in) (A).**
- **Never use lubricating oil during assembly.**
- **Face the marking side up when assembling of vacuum hose.**
- **Face the marking side vehicle front when assembling of vacuum hose (built in check valve).**



QR25DE : Inspection

INFOID:0000000001125780

INSPECTION AFTER REMOVAL

Appearance

Check for correct assembly, damage and deterioration.

Check Valve Airtightness

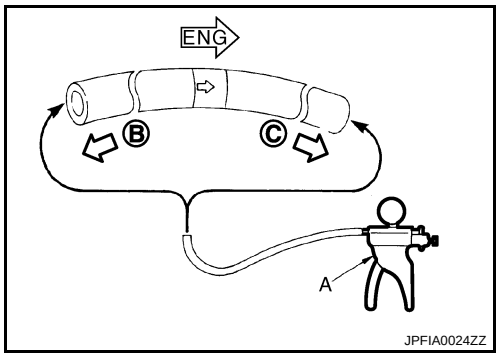
- Use a handy vacuum pump (A) to check.

When connected to the brake booster side (B):

Vacuum should decrease within 1.3 kPa (10 mmHg, 0.39 inHg, 0.013 bar) for 15 seconds under a vacuum of –66.7 kPa (–500 mmHg, –19.70 inHg, –0.667 bar).

When connected to the engine side (C):

Vacuum should not exist.

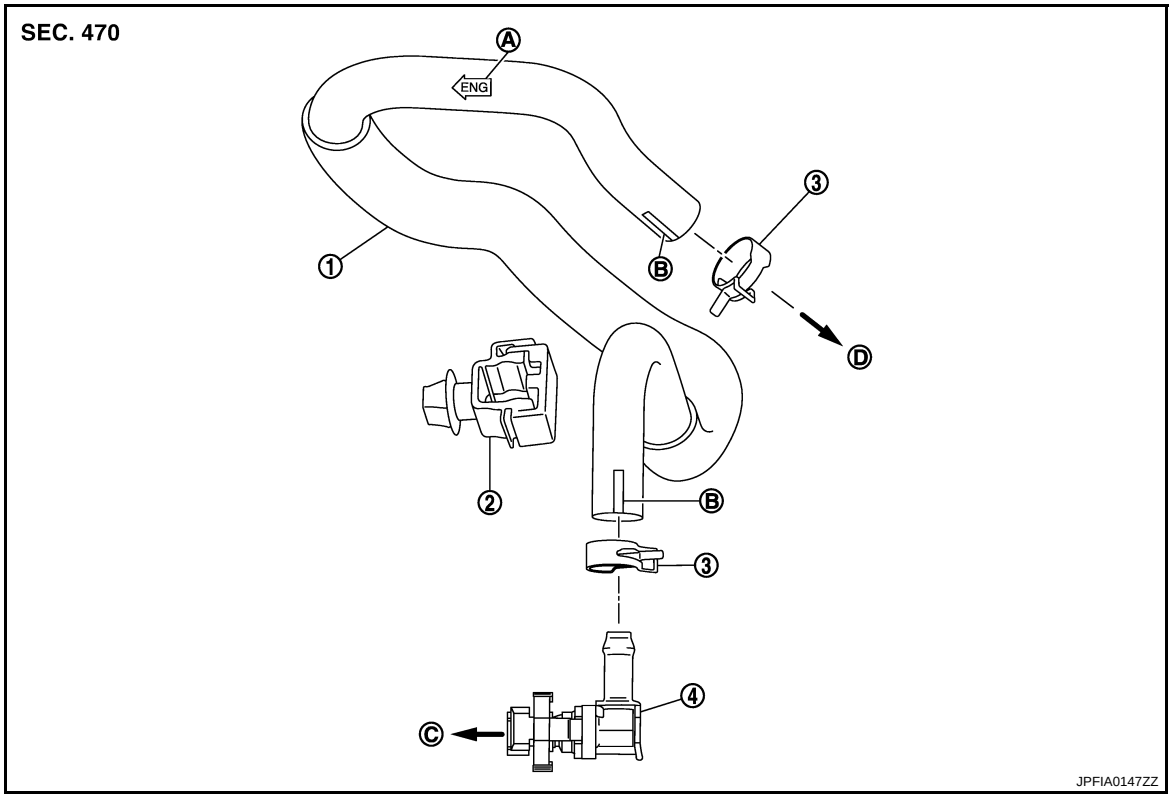


- Replace vacuum hose assembly if vacuum hose and check valve are malfunctioning.

M9R

M9R : Exploded View

INFOID:0000000001116150



1. Vacuum hose (built in check valve)
2. Clip
3. Clamp
4. Vacuum hose connector
A. Stamp indicating engine direction
B. Paint mark
C. To vacuum pump
D. To brake booster

M9R : Removal and Installation

INFOID:0000000001116151

REMOVAL

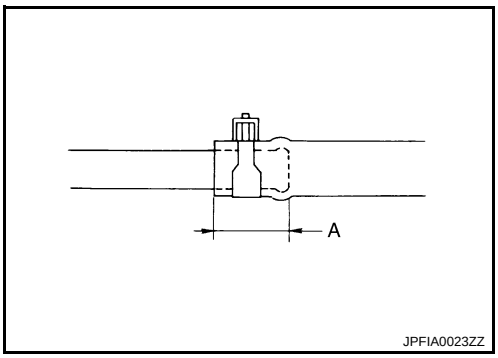
1. Remove engine cover. Refer to EM-265, "Exploded View".
2. Remove the vacuum hose.

INSTALLATION

Note the following, and installation is the reverse order of removal.

CAUTION:

- **Because vacuum hose contains a check valve, it must be installed in the correct position. Refer to the stamp to confirm correct installation. Brake booster will not operate normally if the hose is installed in the wrong direction.**
- **Insert vacuum hose at least 24 mm (0.94 in) (A).**
- **Never use lubricating oil during assembly.**
- **Face the marking side up when assembling (vacuum pump side).**
- **Face the marking side vehicle front when assembling (brake booster side).**



M9R : Inspection

INFOID:0000000001125781

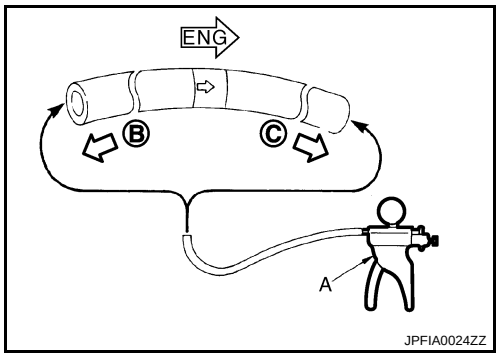
INSPECTION AFTER REMOVAL

Appearance

Check for correct assembly, damage and deterioration.

Check Valve Airtightness

- Use a handy vacuum pump (A) to check.



When connected to the brake booster side (B):

Vacuum should decrease within 1.3 kPa (10 mmHg, 0.39 inHg, 0.013 bar) for 15 seconds under a vacuum of −66.7 kPa (−500 mmHg, −19.70 inHg, −0.667 bar).

When connected to the engine side (C):

Vacuum should not exist.

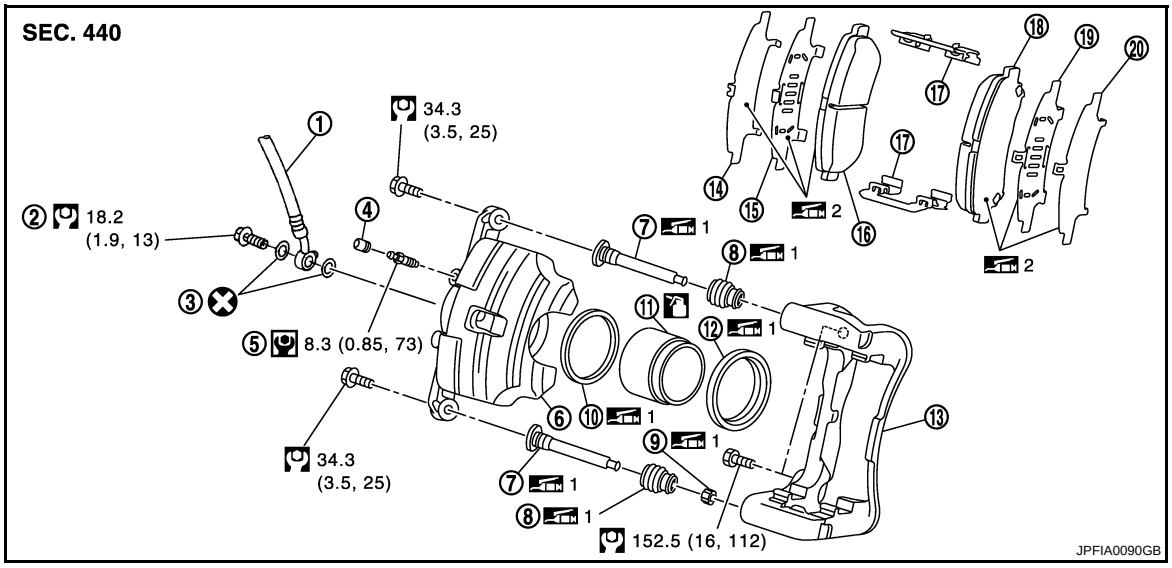
- Replace vacuum hose assembly if vacuum hose and check valve are malfunctioning.

FRONT DISC BRAKE

BRAKE PAD

BRAKE PAD : Exploded View

INFOID:0000000001127959



1. Brake hose	2. Union bolt	3. Copper washer
4. Cap	5. Bleeder valve	6. Cylinder body
7. Sliding pin	8. Sliding pin boot	9. Bushing
10. Piston seal	11. Piston	12. Piston boot
13. Torque member	14. Inner shim cover	15. Inner shim
16. Inner pad	17. Pad retainer	18. Outer pad
19. Outer shim	20. Outer shim cover	

: 1: Apply rubber grease.

: 2: Apply copper based brake grease.

: Apply brake fluid.

Refer to GI-4, "Components" for symbols not described on the above.

BRAKE PAD : Removal and Installation

INFOID:0000000001116154

REMOVAL

WARNING:

Clean any dust from the brake caliper and brake pads with a vacuum dust collector. Never blow with compressed air.

CAUTION:

- **Never depress the brake pedal while removing the brake pads because the piston may pop out.**
- **Never spill or splash brake fluid on the disc rotor.**

1. Remove tires.
2. Remove lower sliding pin bolt.
3. Suspend the cylinder body with suitable wire so that the brake hose will not stretch. Then remove the brake pad from the torque member.

   CAUTION:

   - **Never deform the pad retainer when removing the pad retainer from the torque member.**
   - **Never damage the piston boot.**
   - **Never drop the brake pads, shims, and the shim covers.**

INSTALLATION

WARNING:
Clean any dust from the brake caliper and brake pads with a vacuum dust collector. Never blow with compressed air.
CAUTION:
- **Never depress the brake pedal while removing the brake pads or the cylinder body because the piston may pop out.**
- **Never spill or splash brake fluid on the disc rotor.**

1. Install the pad retainer to the torque member if the pad retainers has been removed.
   CAUTION:
   - **Securely assemble the pad retainers so that it will not be lifted up from the torque member.**
   - **Never deform the pad retainers.**
2. Apply copper based brake grease to the mating faces between the pads, shims and shim covers, and install them to the brake pad.
   CAUTION:
   Always replace the shims together with the shim covers when replacing the brake pad.
3. Install the cylinder body and brake pads to the torque member.
   CAUTION:
   - **Never damage the piston boot.**
   - **When replacing a pad with new one, check a brake fluid level in the reservoir tank because brake fluid returns to master cylinder reservoir tank when pressing piston in.**

   NOTE:
   Use a disc brake piston tool to easily press piston.
4. Install the lower sliding pin bolt and tighten it to the specified torque.
5. Depress the brake pedal several times to check that no drag feel is present for the front disc brake.
6. Install tires.

BRAKE PAD : Inspection and Adjustment

INFOID:0000000001116155

INSPECTION AFTER REMOVAL

Replace the shims and the shim covers if rust is excessively attached.

ADJUSTMENT AFTER INSTALLATION

Brake Burnishing Procedure

Burnish contact surfaces between pads according to following procedure after refinishing or replacing pads, or if a soft pedal occurs at very low mileage.

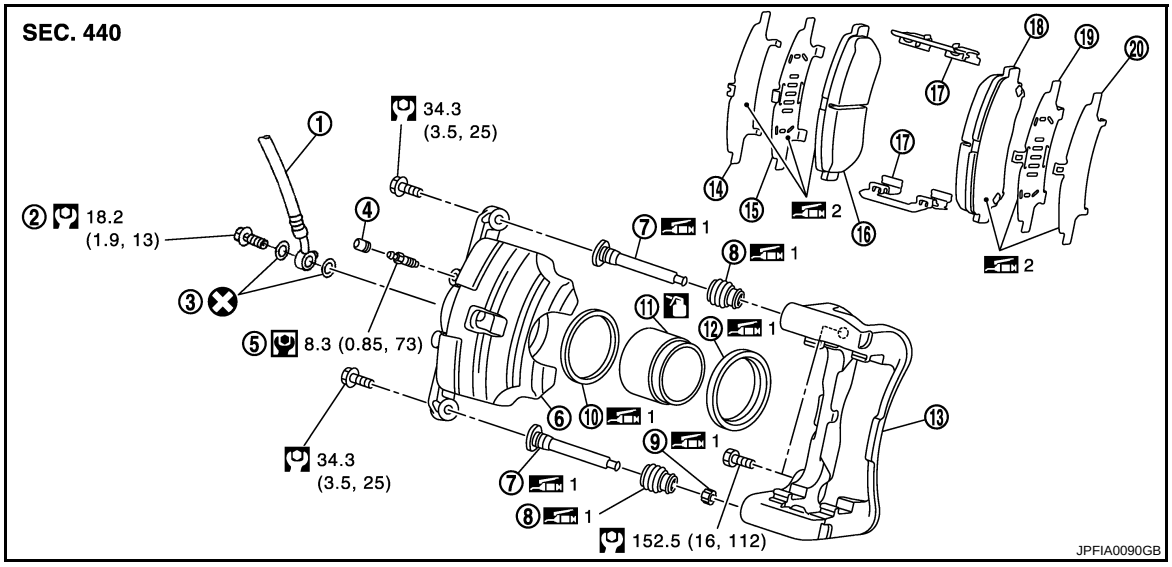
CAUTION:
- **Be careful of vehicle speed because the brake does not operate easily until pads and disc rotor are securely fitted.**
- **Only perform this procedure under safe road and traffic conditions. Use extreme caution.**

1. Drive vehicle on straight, flat road.
2. Depress brake pedal with the power to stop vehicle within 3 to 5 seconds until the vehicle stops.
3. Drive without depressing brake for a few minutes to cool the brake.
4. Repeat steps 1 to 3 until pad and disc rotor are securely fitted.

BRAKE CALIPER ASSEMBLY

BRAKE CALIPER ASSEMBLY : Exploded View

INFOID:0000000001116156



1.	Brake hose	2.	Union bolt	3.	Copper washer
4.	Cap	5.	Bleeder valve	6.	Cylinder body
7.	Sliding pin	8.	Sliding pin boot	9.	Bushing
10.	Piston seal	11.	Piston	12.	Piston boot
13.	Torque member	14.	Inner shim cover	15.	Inner shim
16.	Inner pad	17.	Pad retainer	18.	Outer pad
19.	Outer shim	20.	Outer shim cover		

1: Apply rubber grease.

2: Apply copper based brake grease.

: Apply brake fluid.

Refer to GI-4, "Components" for symbols not described on the above.

BRAKE CALIPER ASSEMBLY : Removal and Installation

INFOID:0000000001116157

REMOVAL

WARNING:

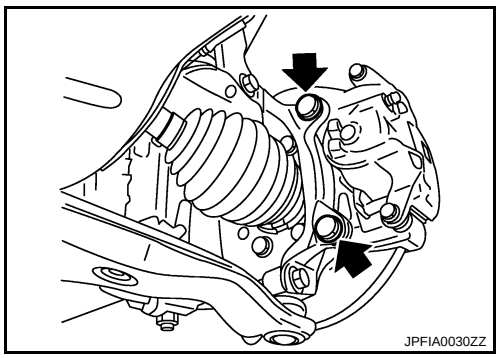
Clean any dust from the brake caliper and brake pads with a vacuum dust collector. Never blow with compressed air.

CAUTION:

Never depress the brake pedal. Brake fluid may splash while removing the brake hose.

1. Remove tires.
2. Fix the disc rotor using wheel nuts.
3. Drain brake fluid. Refer to BR-11, "Draining".
   CAUTION:
   Never spill or splash brake fluid on the disc rotor.
4. Remove union bolt, and then disconnect brake hose from caliper assembly.

5. Remove torque member mounting bolts, and remove brake caliper assembly.
   CAUTION:
   Never drop brake pads and caliper assembly.
6. Remove disc rotor.
   CAUTION:
   - **Put matching marks on the wheel hub and bearing assembly and the disc rotor before removing the disc rotor.**
   - **Never drop disc rotor.**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INSTALLATION

WARNING:
Clean any dust from the brake caliper and brake pads with a vacuum dust collector. Never blow with compressed air.
CAUTION:
Never depress the brake pedal. Brake fluid may splash while removing the brake hose.

1. Install disc rotor.
   CAUTION:
   Align the matching marks made during removal when reusing the disc rotor.
2. Install the brake caliper assembly to the vehicle 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 bolts and washers. Wipe out any grease and moisture.
3. Install brake hose to brake caliper assembly, and tighten union bolts to the specified torque.
4. Refill with new brake fluid and 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.**
5. Check that no drag feel is present for the front disc brake.
6. Install tires.

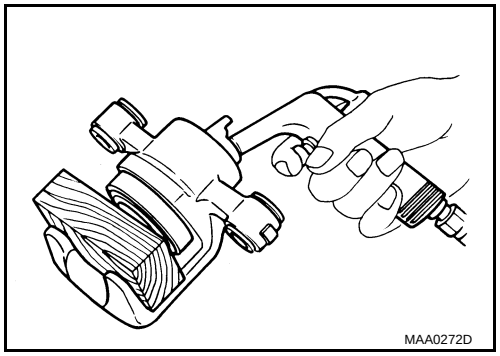
BRAKE CALIPER ASSEMBLY : Disassembly and Assembly

INFOID:0000000001116158

DISASSEMBLY

NOTE:
Never remove the torque member, brake pads, shims, shim covers and pad retainers when disassembling and assembling the cylinder body.

1. Remove the sliding pin bolts, and remove the cylinder body from the torque member.
   CAUTION:
   Never drop pads, shims, shim covers and pad retainers from torque member.
2. Remove sliding pins and sliding pin boots from torque member.
3. Remove bushing from sliding pin.
4. Place a wooden block as shown in the figure, and blow air from union bolt mounting hole to remove piston and piston boot.
   CAUTION:
   Never get fingers caught in the piston.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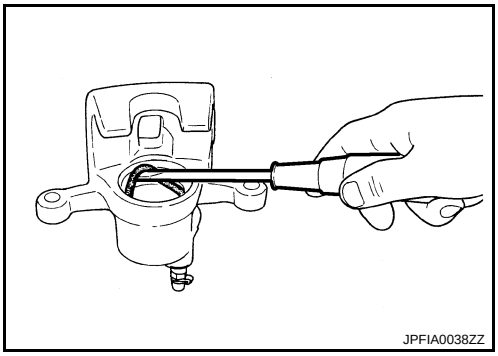
5. Remove piston seal from cylinder body using suitable tool.
CAUTION:
Be careful not to damage a cylinder inner wall.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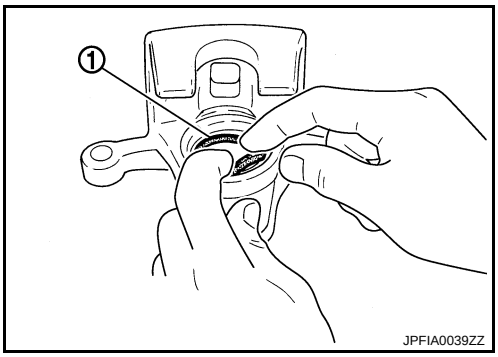
ASSEMBLY

1. Apply rubber grease to piston seal (1), and install to cylinder body.
CAUTION:
Never reuse piston seal.



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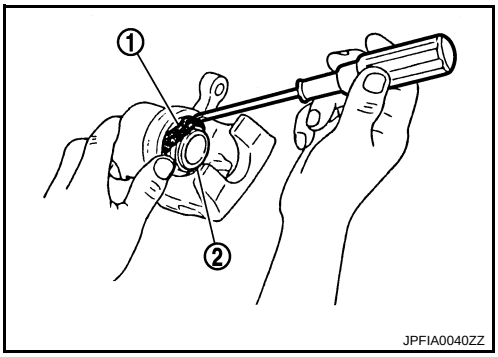
2. Apply rubber grease to piston boot (1). Cover the piston (2) end with piston boot, and then install cylinder side lip on piston boot securely into a groove on cylinder body.
CAUTION:
Never reuse piston boot.



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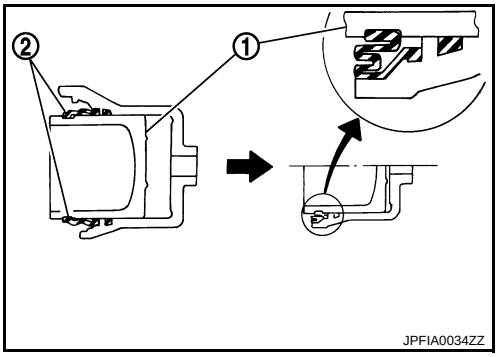
3. Apply brake fluid to piston (1). Push piston into cylinder body by hand and push piston boot (2) piston-side lip into the piston groove.
CAUTION:
Press the piston evenly and vary the pressing point to prevent cylinder inner wall from being rubbed.
4. Apply rubber grease to bushing, install bushing to sliding pin.
5. Apply rubber grease to sliding pins and sliding pin boots, install sliding pins and sliding pin boots to torque member.
6. Install the cylinder body to the torque member and tighten the sliding pin bolts to the specified torque.



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BRAKE CALIPER ASSEMBLY : Inspection and Adjustment

INFOID:0000000001116159

INSPECTION AFTER DISASSEMBLY

Cylinder Body

Check the inner wall of the cylinder for rust, wear, cracks or damage. Replace the cylinder if any abnormal condition is detected.

CAUTION:
Always clean with new brake fluid. Never clean with mineral oil such as gasoline and light oil.

Torque Member

Check the torque member for rust, wear, cracks or damage. Replace the member if any abnormal condition is detected.

Piston

Check the surface of the piston for rust, wear, cracks or damage. Replace the piston if any abnormal condition is detected.

CAUTION:

A piston sliding surface is plated. Never polish with sandpaper.

Sliding Pin and Sliding Pin Boot

Check the sliding pins and sliding boots for rust, wear, cracks or damage. Replace the parts if any abnormal condition is detected.

ADJUSTMENT AFTER INSTALLATION

Brake Burnishing Procedure

Burnish contact surfaces between disc rotors and pads according to following procedure after refinishing or replacing disc rotor, or if a soft pedal occurs at very low mileage.

CAUTION:

- **Be careful of vehicle speed because the brake does not operate easily until pad and disc rotor are securely fitted.**
- **Only perform this procedure under safe road and traffic conditions. Use extreme caution.**

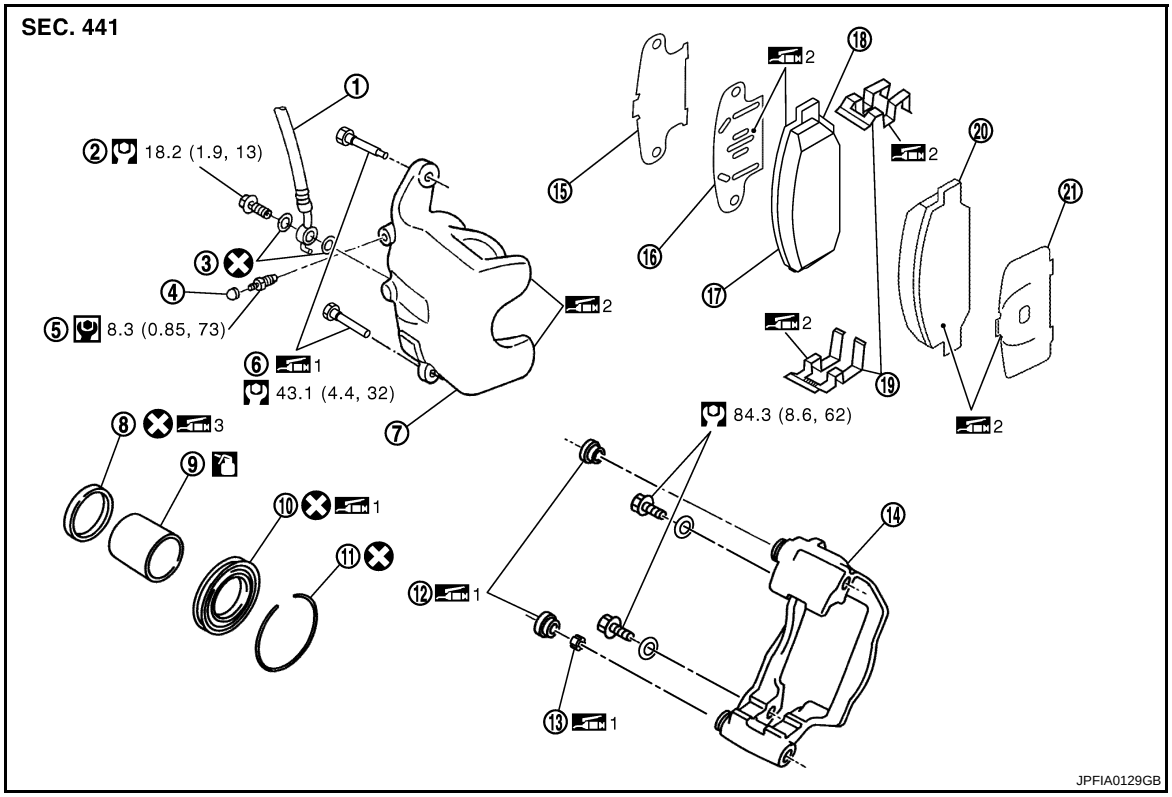
1. Drive vehicle on straight, flat road.
2. Depress brake pedal with the power to stop vehicle within 3 to 5 seconds until the vehicle stops.
3. Drive without depressing brake for a few minutes to cool the brake.
4. Repeat steps 1 to 3 until pad and disc rotor are securely fitted.

REAR DISC BRAKE

BRAKE PAD

BRAKE PAD : Exploded View

INFOID:0000000001127960



1. Brake hose	2. Union bolt	3. Copper washer
4. Cap	5. Bleeder valve	6. Sliding pin bolt
7. Cylinder body	8. Piston seal	9. Piston
10. Piston boot	11. Retaining ring	12. Sliding pin boot
13. Bushing	14. Torque member	15. Inner shim cover
16. Inner shim	17. Inner pad	18. Pad wear sensor (RH inner pad only)
19. Pad retainer	20. Outer pad	21. Outer shim

1: Apply rubber grease.

2: Apply copper based brake grease.

3: Apply polyglycol ether based lubricant.

: Apply brake fluid.

Refer to GI-4, "Components" for symbols not described on the above.

BRAKE PAD : Removal and Installation

INFOID:0000000001116161

REMOVAL

WARNING:

Clean any dust from the brake caliper and brake pads with a vacuum dust collector. Never blow with compressed air.

CAUTION:

- **Never depress the brake pedal while removing the brake pads or the cylinder body because the piston may pop out.**
- **Never spill or splash brake fluid on the disc rotor.**

1. Remove tires.
2. Remove the lower sliding pin bolt.
3. Suspend the cylinder body with suitable wire so that the brake hose will not stretch. Remove the brake pads from the torque member.
   CAUTION:
   - **Never deform the pad retainers if removing the pad retainers.**
   - **Never damage the piston boot.**
   - **Never drop the brake pad, shims, and the shim covers.**

INSTALLATION

WARNING:
Clean any dust from the brake caliper and brake pads with a vacuum dust collector. Never blow with compressed air.
CAUTION:
- **Never depress the brake pedal while removing the brake pads or the cylinder body because the piston may pop out.**
- **Never spill or splash brake fluid on the disc rotor.**

1. Install the pad retainers to the torque member if the pad retainers has been removed.
   CAUTION:
   - **Securely assemble the pad retainers not to be lifted up from the torque member.**
   - **Never deform the pad retainers.**
2. Apply copper based brake grease to the mating faces between the brake pads, the shims and pawls part of cylinder body, and install them to the brake pad.
   CAUTION:
   Always replace the shims together with the shim covers when replacing the brake pad.
3. Install cylinder body and brake pads to torque member.
   CAUTION:
   - **Never damage the piston boot.**
   - **When replacing a pads with new one, check a brake fluid level in the reservoir tank because brake fluid returns to master cylinder reservoir tank when pressing piston in.**

   NOTE:
   Use a disc brake piston tool to easily press piston.
4. Install the lower sliding pin bolt and tighten it to the specified torque.
5. Depress the brake pedal several times to check that no drag feel is present for the rear disc brake.
6. Install tires.

BRAKE PAD : Inspection and Adjustment

INFOID:0000000001116162

INSPECTION AFTER REMOVAL

Replace the shims and the shim covers if rust is excessively attached.

ADJUSTMENT AFTER INSTALLATION

Brake Burnishing Procedure

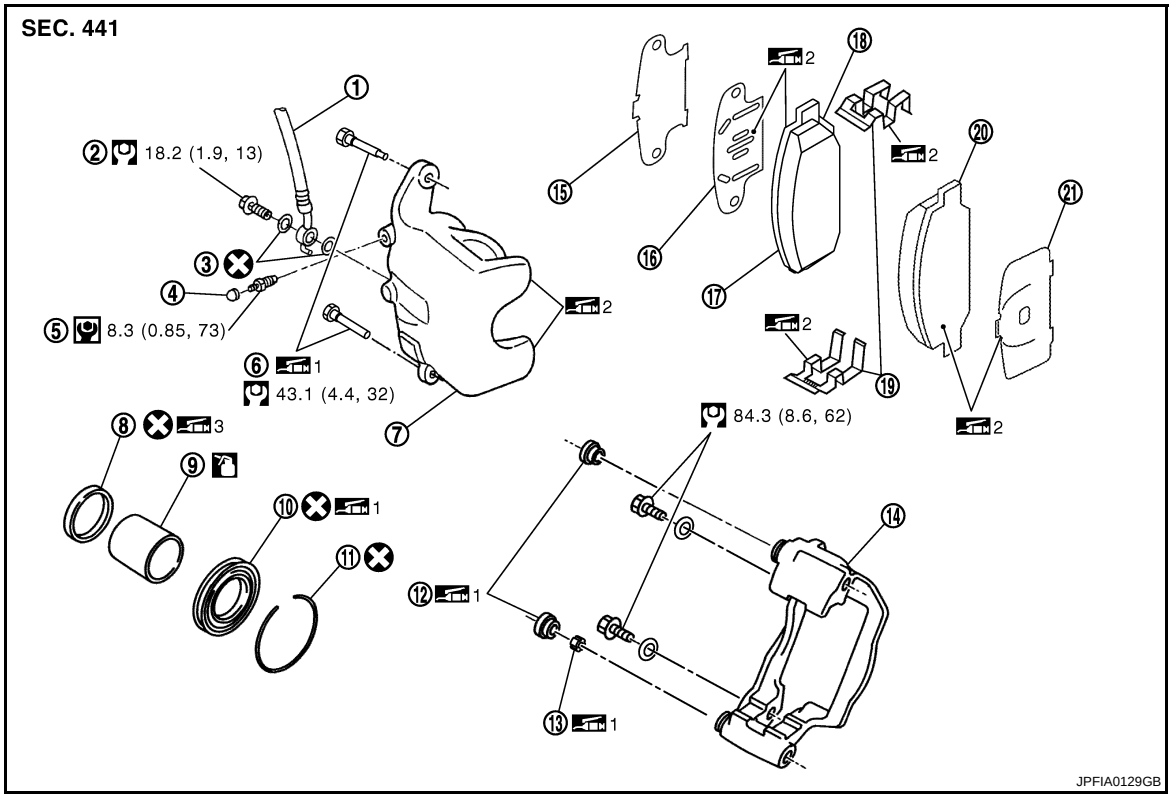
Burnish contact surfaces between pads according to following procedure after refinishing or replacing pads, or if a soft pedal occurs at very low mileage.
CAUTION:
- **Be careful of vehicle speed because the brake does not operate easily until pad and disc rotor are securely fitted.**
- **Only perform this procedure under safe road and traffic conditions. Use extreme caution.**

1. Drive vehicle on straight, flat road.
2. Depress brake pedal with the power to stop vehicle within 3 to 5 seconds until the vehicle stops.
3. Drive without depressing brake for a few minutes to cool the brake.
4. Repeat steps 1 to 3 until pad and disc rotor are securely fitted.

BRAKE CALIPER ASSEMBLY

BRAKE CALIPER ASSEMBLY : Exploded View

INFOID:0000000001116163



1. Brake hose	2. Union bolt	3. Copper washer
4. Cap	5. Bleeder valve	6. Sliding pin bolt
7. Cylinder body	8. Piston seal	9. Piston
10. Piston boot	11. Retaining ring	12. Sliding pin boot
13. Bushing	14. Torque member	15. Inner shim cover
16. Inner shim	17. Inner pad	18. Pad wear sensor (RH inner pad only)
19. Pad retainer	20. Outer pad	21. Outer shim

1: Apply rubber grease.

2: Apply copper based brake grease.

3: Apply polyglycol ether based lubricant.

: Apply brake fluid.

Refer to GI-4, "Components" for symbols not described on the above.

BRAKE CALIPER ASSEMBLY : Removal and Installation

INFOID:0000000001116164

REMOVAL

WARNING:

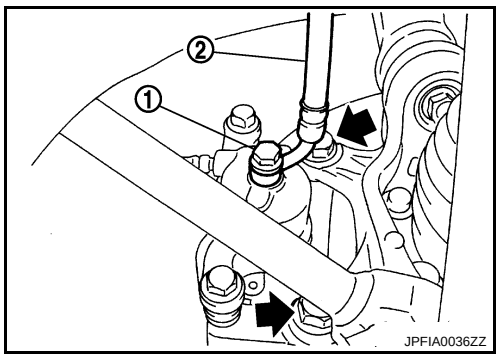
Clean any dust from the brake caliper and brake pads with a vacuum dust collector. Never blow with compressed air.

CAUTION:

Never depress the brake pedal. Brake fluid may splash while removing the brake hose.

1. Remove tires.
2. Fix the disc rotor using wheel nuts.
3. Drain brake fluid. Refer to BR-11, "Draining".
   CAUTION:
   Never spill or splash brake fluid on the disc rotor.

4. Remove union bolt (1) and then disconnect brake hose (2) from caliper assembly.
5. Remove torque member mounting bolts, and remove brake caliper assembly.
   CAUTION:
   Never drop brake pads and caliper assembly.
6. Remove disc rotor.
   CAUTION:
   - **Put matching marks on the wheel hub and bearing assembly and the disc rotor before removing the disc rotor.**
   - **Never drop disc rotor.**



INSTALLATION

WARNING:
Clean any dust from the brake caliper and brake pads with a vacuum dust collector. Never blow with compressed air.
CAUTION:
Never depress the brake pedal. Brake fluid may splash while removing the brake hose.

1. Install disc rotor.
   CAUTION:
   Align the matching marks made during removal when reusing the disc rotor.
2. Install the brake caliper assembly to the vehicle 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 bolts, and washers. Wipe out any grease and moisture.
3. Install brake hose to brake caliper assembly, and tighten union bolts to the specified torque.
4. Refill with new brake fluid and 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.**
5. Check that no drag feel is present for the rear disc brake.
6. Install tires.

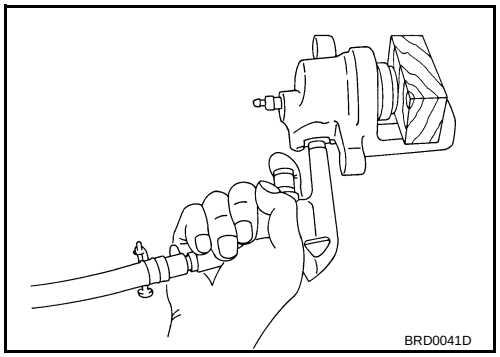
BRAKE CALIPER ASSEMBLY : Disassembly and Assembly

INFOID:0000000001116165

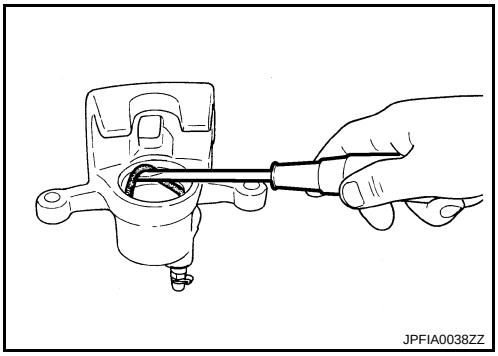
DISASSEMBLY

NOTE:
Never remove the torque member, brake pads, shims, shim covers and pad retainers disassembling and assembling the cylinder body.

1. Remove the sliding pin bolts and remove the cylinder body from the torque member.
   CAUTION:
   Never drop pads, shims, shim covers and pad retainers from torque member.
2. Remove sliding pin boots from torque member.
3. Remove bushing from sliding pin bolt.
4. Place a wooden block as shown in the figure, and blow air from union bolt mounting hole to remove piston and piston boot.
   CAUTION:
   Never get fingers caught in the piston.

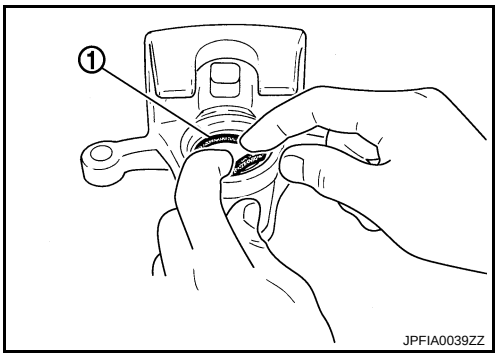


5. Remove piston seal from cylinder body using suitable tool.
CAUTION:
Be careful not to damage a cylinder inner wall.


JPFIA0038ZZ

ASSEMBLY

1. Apply polyglycol ether based lubricant to piston seal (1), and install to cylinder body.
CAUTION:
Never reuse piston seal.



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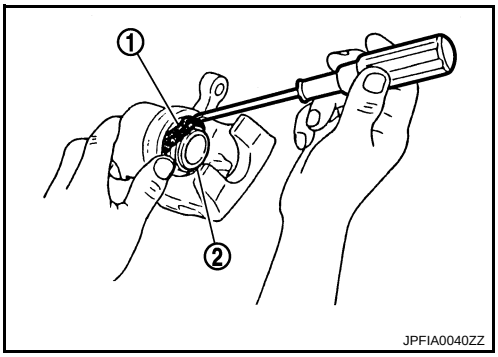
2. Apply rubber grease to piston boot (1). Cover the piston (2) end with the piston boot, and then install cylinder side lip on the piston boot securely into the groove on cylinder body.
CAUTION:
Never reuse piston boot.



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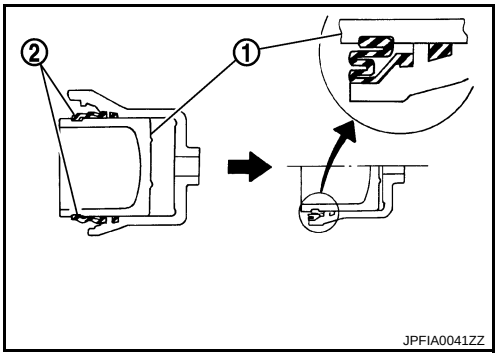
3. Apply brake fluid to piston (1). Push piston into cylinder body by hand and push piston boot (2) piston side lip into the piston groove.
CAUTION:
Press the piston evenly and vary the pressing point to prevent cylinder inner wall from being rubbed.
4. Apply polyglycol ether based lubricant to bushing, install bushing to sliding pin bolt.
5. Apply rubber grease to the sliding pin bolts and the sliding pin boots, install sliding pin boot to torque member.
6. Install the cylinder body to the torque member and tighten the sliding pin bolts to the specified torque.



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BRAKE CALIPER ASSEMBLY : Inspection and Adjustment

INFOID:0000000001116166

INSPECTION AFTER DISASSEMBLY

Cylinder Body

Check the inner wall of the cylinder for rust, wear, cracks or damage. Replace the cylinder if any abnormal condition is detected.

CAUTION:
Always clean with new brake fluid. Never clean with mineral oil such as gasoline and light oil.

Torque Member

Check the torque member for rust, wear, cracks or damage. Replace the member if any abnormal condition is detected.

Piston

Check the piston for rust, wear, cracks or damage. Replace the piston if any abnormal condition is detected.

CAUTION:

A piston sliding surface is plated. Never polish with sandpaper.

Sliding Pin Bolt and Sliding Pin Boot

Check the sliding pin bolts and sliding pin boots for rust, wear, cracks or damage. Replace the parts if any abnormal condition is detected.

ADJUSTMENT AFTER INSTALLATION

Brake Burnishing Procedure

Burnish contact surfaces between disc rotors and pads according to the following procedure after refinishing or replacing disc rotor, or if a soft pedal occurs at very low mileage.

CAUTION:

- **Be careful of vehicle speed because the brake does not operate easily until pad and disc rotor are securely fitted.**
- **Only perform this procedure under safe road and traffic conditions. Use extreme caution.**

1. Drive vehicle on straight, flat road.
2. Depress brake pedal with the power to stop vehicle within 3 to 5 seconds until the vehicle stops.
3. Drive without depressing brake for a few minutes to cool the brake.
4. Repeat steps 1 to 3 until pad and disc rotor are securely fitted.

SERVICE DATA AND SPECIFICATIONS (SDS)

SERVICE DATA AND SPECIFICATIONS (SDS)

General Specifications

INFOID:0000000001116167

Unit: mm (in.)

Front brake	Cylinder bore diameter	60.33 (2.375)
	Pad length × width × thickness	123.6 × 47.5 × 11.0 (4.87 × 1.870 × 0.433)
	Rotor outer diameter × thickness	296 × 26.0 (11.65 × 1.024)
Rear brake	Cylinder bore diameter	34.93 (1.375)
	Pad length × width × thickness	83.0 × 31.9 × 8.5 (3.268 × 1.256 × 0.335)
	Rotor outer diameter × thickness	292 × 16.0 (11.50 × 0.630)
Master cylinder	Cylinder bore diameter	23.8 (15/16)
Control valve	Valve type	Electric brake force distribution
Brake booster	Diaphragm diameter	178 (7.01)
Recommended brake fluid		DOT 3 or DOT 4

Brake Pedal

INFOID:0000000001116168

Unit: mm (in.)

Brake pedal height (H_1)		183.7 – 193.7 (7.23 – 7.63)
Clearance (C) between stopper rubber and stop lamp switch and/or ASCD brake switch (except for M9R) or brake pedal position switch (for M9R) threaded end		0.74 – 1.96 (0.0291 – 0.0772)
Brake pedal play (A)		3.0 – 11.0 (0.12 –0.43)
Depressed brake pedal height (H_2) [Depressing 490 N (50 kg, 110 lb) while turning the engine ON]	MR20DE and QR25DE	65 (2.56) or more
	M9R	60 (2.36) or more

Brake Booster

INFOID:0000000001116169

Vacuum type

Unit: mm (in.)

Output rod length (A)	30.5 (1.201)
Input rod length (B)	153.2 – 154.2 (6.03 – 6.07)

Front Disc Brake

INFOID:0000000001116170

Unit: mm (in.)

Brake pad	Standard thickness	11.0 (0.433)
	Wear limit thickness	2.0 (0.079)
Disc rotor	Standard thickness	26.0 (1.024)
	Wear limit thickness	24.0 (0.945)
	Thickness variation (measured at 8 positions)	0.020 (0.0008)
	Runout limit (with it attached to the vehicle)	0.035 (0.0014)

Rear Disc Brake

INFOID:0000000001116171

Unit: mm (in.)

Brake pad	Standard thickness	8.5 (0.335)
	Wear limit thickness	1.5 (0.059)

Disc rotor	Standard thickness	16.0 (0.630)
	Wear limit thickness	14.0 (0.551)
	Thickness variation (measured at 8 positions)	0.020 (0.0008)
	Runout limit (with it attached to the vehicle)	0.070 (0.0028)

SYMPTOM DIAGNOSIS

NOISE, VIBRATION AND HARSHNESS (NVH) TROUBLESHOOTING

NVH Troubleshooting Chart

INFOID:0000000001125782

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

Reference page			BR-65, BR-66	BR-65, BR-66	BR-88, BR-94	BR-65, BR-66	BR-65, BR-66	BR-65, BR-66	BR-65, BR-66	BR-65, BR-66	BR-65, BR-66	BR-65, BR-66	NVH in DLN section	NHV in DLN section	NVH in FAX, RAX, FSU and RSU section	NVH in WT section	NVH in WT section	NVH in FAX and/or RAX section	NVH in ST section
Possible cause and SUSPECTED PARTS			Pads - damaged	Pads - uneven wear	Shims damaged	Rotor imbalance	Rotor damage	Rotor runout	Rotor deformation	Rotor deflection	Rotor rust	Rotor thickness variation	PROPELLER SHAFT	DIFFERENTIAL	AXLE AND SUSPENSION	TIRE	ROAD WHEEL	DRIVE SHAFT	STEERING
Symptom	BRAKE	Noise	×	×	×								×	×	×	×	×	×	×
		Shake				×							×		×	×	×	×	×
		Shimmy, Judder				×	×	×	×	×	×	×			×	×	×		×

×: Applicable

PRECAUTION

PRECAUTIONS

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

INFOID:0000000001148909

The Supplemental Restraint System such as “AIR BAG” and “SEAT BELT PRE-TENSIONER”, used along with a front seat belt, helps to reduce the risk or severity of injury to the driver and front passenger for certain types of collision. Information necessary to service the system safely is included in the “SRS AIRBAG” and “SEAT BELT” of this Service Manual.

WARNING:

- **To avoid rendering the SRS inoperative, which could increase the risk of personal injury or death in the event of a collision which would result in air bag inflation, all maintenance must be performed by an authorized NISSAN/INFINITI dealer.**
- **Improper maintenance, including incorrect removal and installation of the SRS, can lead to personal injury caused by unintentional activation of the system. For removal of Spiral Cable and Air Bag Module, see the “SRS AIRBAG”.**
- **Do not use electrical test equipment on any circuit related to the SRS unless instructed to in this Service Manual. SRS wiring harnesses can be identified by yellow and/or orange harnesses or harness connectors.**

Precaution Necessary for Steering Wheel Rotation After Battery Disconnect

INFOID:0000000001148910

NOTE:

- This Procedure is applied only to models with Intelligent Key system and NATS (NISSAN ANTI-THEFT SYSTEM).
- Remove and install all control units after disconnecting both battery cables with the ignition knob in the ″LOCK″ position.
- Always use CONSULT-III to perform self-diagnosis as a part of each function inspection after finishing work. If DTC is detected, perform trouble diagnosis according to self-diagnostic results.

For models equipped with the Intelligent Key system and NATS, an electrically controlled steering lock mechanism is adopted on the key cylinder.

For this reason, if the battery is disconnected or if the battery is discharged, the steering wheel will lock and steering wheel rotation will become impossible.

If steering wheel rotation is required when battery power is interrupted, follow the procedure below before starting the repair operation.

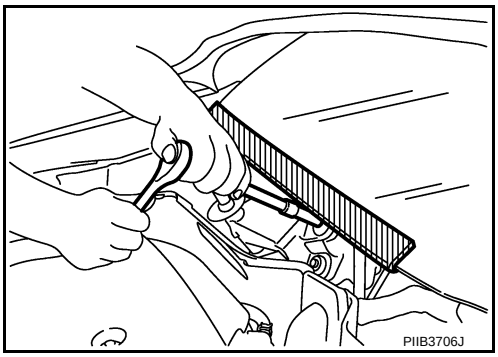
OPERATION PROCEDURE

1. Connect both battery cables.
   NOTE:
   Supply power using jumper cables if battery is discharged.
2. Use the Intelligent Key or mechanical key to turn the ignition switch to the ″ACC″ position. At this time, the steering lock will be released.
3. Disconnect both battery cables. The steering lock will remain released and the steering wheel can be rotated.
4. Perform the necessary repair operation.
5. When the repair work is completed, return the ignition switch to the ″LOCK″ position before connecting the battery cables. (At this time, the steering lock mechanism will engage.)
6. Perform a self-diagnosis check of all control units using CONSULT-III.

Precaution for Procedure without Cowl Top Cover

INFOID:0000000001148911

When performing the procedure after removing cowl top cover, cover the lower end of windshield with urethane, etc.



Precaution for Brake System

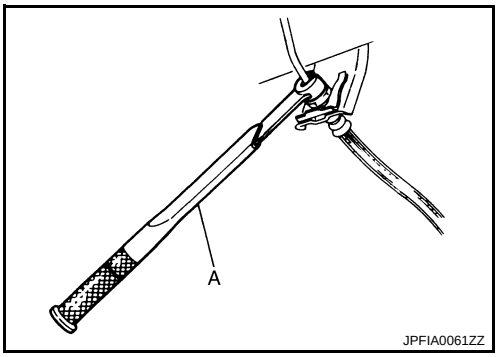
INFOID:0000000001125783

WARNING:

Clean any dust from the front brake and rear brake with a vacuum dust collector. Never blow with compressed air.

CAUTION:

- **Only use “DOT 3” brake fluid. Refer to MA-22, "Fluids and Lubricants".**
- **Never reuse drained brake fluid.**
- **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.**
- **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 flare nut torque wrench (A).**
- **Always confirm the specified tightening torque when installing the brake pipes.**
- **Turn the ignition switch OFF and disconnect the ABS actuator and electric unit (control unit) connector or the battery negative terminal before performing the work.**
- **Check that no brake fluid leakage is present after replacing the parts.**
- **Burnish the brake contact surfaces after refinishing or replacing rotors, after replacing pads, or if a soft pedal occurs at very low mileage. Refer to BR-88, "BRAKE PAD : Inspection and Adjustment" (front brake pad), BR-91, "BRAKE CALIPER ASSEMBLY : Inspection and Adjustment" (front disc rotor), BR-94, "BRAKE PAD : Inspection and Adjustment" (rear brake pad), BR-97, "BRAKE CALIPER ASSEMBLY : Inspection and Adjustment" (rear disc rotor).**

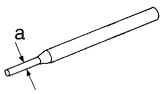


PREPARATION

PREPARATION

Commercial Service Tool

INFOID:0000000001125784

Tool name	Description
Pin punch a: 4 mm (0.16 in) dia.  NT410	Removing and installing reservoir tank pin

ON-VEHICLE MAINTENANCE

BRAKE PEDAL

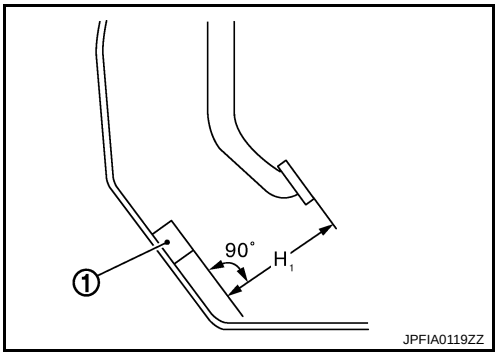
Inspection and Adjustment

INFOID:0000000001125785

INSPECTION

Brake Pedal Height

Check the height (H_1) between the accelerator pedal stopper (1) and the brake pedal upper surface.



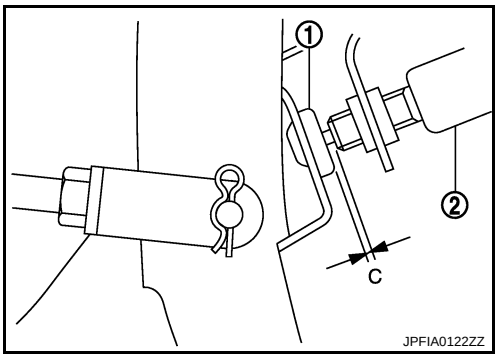
Standard

Brake pedal height (H_1)	**: Refer to BR-99, "Brake Pedal".**

CAUTION:
Remove the floor trim.

Stop Lamp Switch and/or ASCD Brake Switch (Except For M9R) or Brake Pedal Position Switch (For M9R)

Check the clearance (C) among stopper rubber (1) and stop lamp switch and/or ASCD brake switch (except for M9R) or brake pedal position switch (for M9R) (2) threaded end.



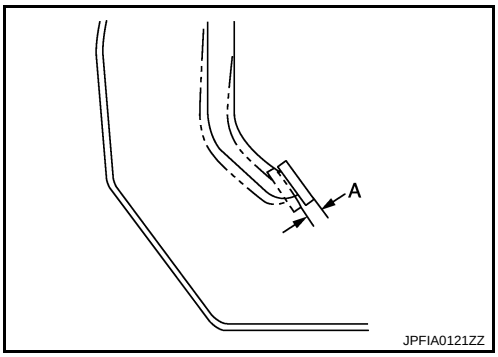
Standard

Clearance (C) between stopper rubber and stop lamp switch and/or ASCD brake switch (except for M9R) or brake pedal position switch (for M9R) threaded end	**: Refer to BR-99, "Brake Pedal".**

CAUTION:
The stop lamp must be turned off when the brake pedal is released.
NOTE:
Pull the brake pedal pad to make the clearance between stopper rubber and stop lamp switch and/or ASCD brake switch (except for M9R) or brake pedal position switch (for M9R) threaded end.

Brake Pedal Play

Press the brake pedal. Check the brake pedal play (A).

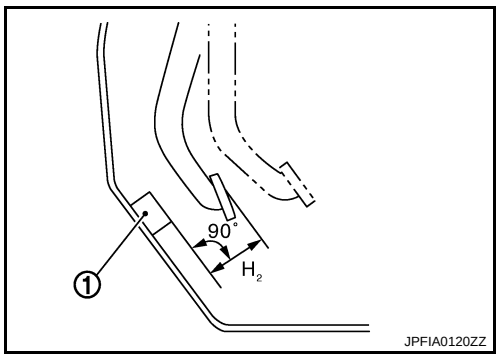


Standard

Pedal play (A)	**: Refer to BR-99, "Brake Pedal".**

Depressed Brake Pedal Height

Check the height between the accelerator pedal stopper (1) and the brake pedal upper surface (H_2) when depressing the brake pedal at 490 N (50 kg, 110 lb) while turning engine ON.



Standard

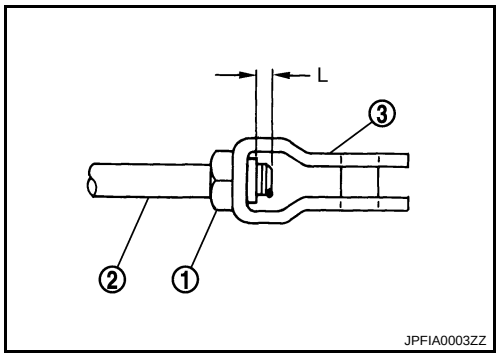
Depressed brake pedal height (H_2)	**: Refer to BR-99, "Brake Pedal".**

CAUTION:
Remove the floor trim.

ADJUSTMENT

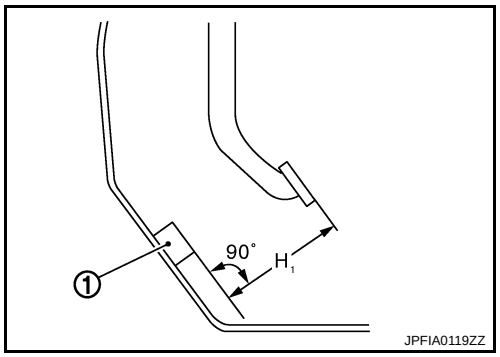
Brake Pedal Height

1. Disconnect the stop lamp switch and/or ASCD brake switch (except for M9R) or brake pedal position switch (for M9R) harness connector.
2. Turn the stop lamp switch and/or ASCD brake switch (except for M9R) or brake pedal position switch (for M9R) 45° counterclockwise.
3. Loosen the input rod lock nut (1). Adjust the brake pedal to the specification. Tighten the input rod lock nut to the specification. Refer to BR-80, "Exploded View".
   CAUTION:
   The threaded end of the input rod (2) must project to the inner side (L) of the clevis (3).



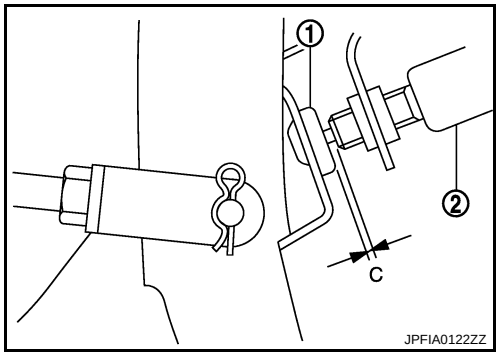
Standard

Brake pedal height (H_1)	**: Refer to BR-99, "Brake Pedal".**



Stop Lamp Switch and/or ASCD Brake Switch (Except For M9R) or Brake Pedal Position Switch (For M9R)

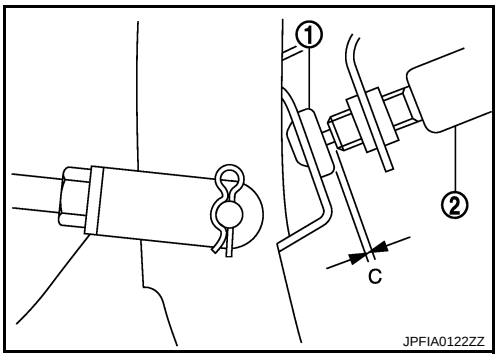
1. Disconnect the stop lamp switch and/or ASCD brake switch (except for M9R) or brake pedal position switch (for M9R) harness connector.
2. Turn the stop lamp switch and/or ASCD brake switch (except for M9R) or brake pedal position switch (for M9R) 45° counterclockwise.
3. Press-fit stop lamp switch and/or ASCD brake switch (except for M9R) or brake pedal position switch (for M9R) (2) until stop lamp switch and/or ASCD brake switch (except for M9R) or brake pedal position switch (for M9R) hits the stopper rubber (1) 45° clockwise.
   CAUTION:
   - **The clearance (C) between the stopper rubber and stop lamp switch and/or ASCD brake switch (except for M9R) or brake pedal position switch (for M9R) threaded end must be the specified value. Refer to BR-99, "Brake Pedal".**



- **The stop lamp must be turned off when the brake pedal is released.**

Brake Pedal Play

1. Disconnect the stop lamp switch and/or ASCD brake switch (except for M9R) or brake pedal position switch (for M9R) harness connector.
2. Turn the stop lamp switch and/or ASCD brake switch (except for M9R) or brake pedal position switch (for M9R) 45° counterclockwise.
3. Press-fit stop lamp switch and/or ASCD brake switch (except for M9R) or brake pedal position switch (for M9R) (2) until stop lamp switch and/or ASCD brake switch (except for M9R) or brake pedal position switch (for M9R) hits the stopper rubber (1) 45° clockwise.



CAUTION:

- **The clearance (C) between the stopper rubber and stop lamp switch and/or ASCD brake switch (except for M9R) or brake pedal position switch (for M9R) threaded end must be the specified value. Refer to BR-99, "Brake Pedal".**
- **The stop lamp must be turned off when the brake pedal is released.**

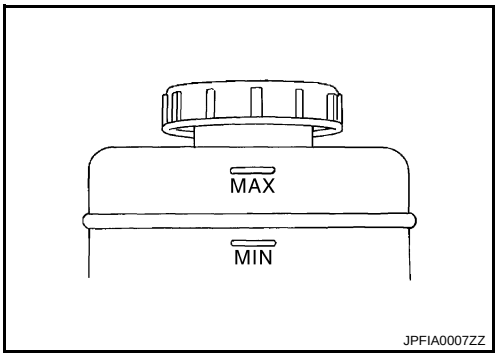
BRAKE FLUID

Inspection

INFOID:0000000001125786

BRAKE FLUID LEVEL

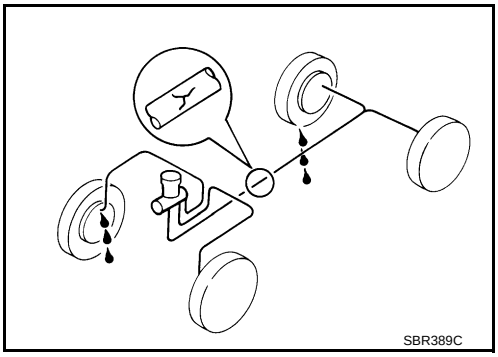
- Check that the fluid level in the reservoir tank is within the specified range (MAX – MIN lines).
- Visually check for any brake fluid leakage around the reservoir tank.
- Check the brake system for any leakage if the fluid level is extremely low (lower than MIN).
- Check the brake system for fluid leakage if the warning lamp remains illuminated even after the parking brake is released.



JPFIA0007ZZ

BRAKE LINE

1. Check brake line (tubes and hoses) for cracks, deterioration or other damage. Replace any damaged parts.
2. Check for fluid leakage by fully depressing brake pedal while engine is running.
   CAUTION:
   If leakage occurs around joints, retighten or, if necessary, replace damaged parts.

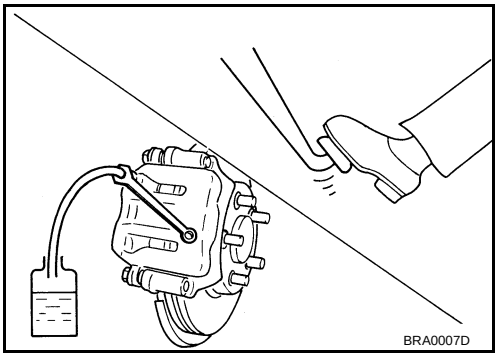

SBR389C

Draining

INFOID:0000000001125787

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.**
- **Turn the ignition switch OFF and disconnect the ABS actuator and electric unit (control unit) connector or the battery negative terminal before draining.**

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

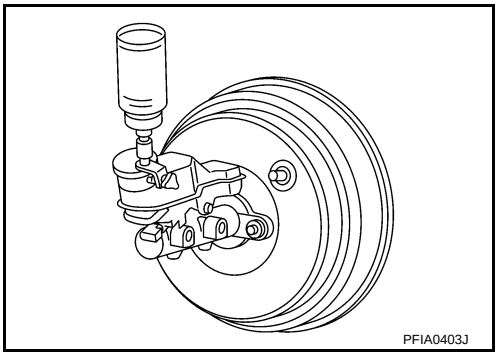

BRA0007D

Refilling

INFOID:0000000001125788

CAUTION:
Turn the ignition switch OFF and disconnect the ABS actuator and electric unit (control unit) connector or the battery negative terminal before refilling.

1. Check that there is no foreign material in the reservoir tank, and refill with new brake fluid.
   CAUTION:
   Never reuse drained brake fluid.
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 all 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-62, "Bleeding Brake System".



Bleeding Brake System

INFOID:0000000001116184

CAUTION:
- **Turn the ignition switch OFF and disconnect the ABS actuator and electric unit (control unit) connector or the battery negative terminal before performing the work.**
- **Monitor the fluid level in the reservoir tank during the air bleeding.**
- **Always use new brake fluid for refilling. Never reuse the drained brake fluid.**

1. Connect a vinyl tube to the bleeder valve of the rear left brake.
2. Fully depress the brake pedal 4 to 5 times.
3. Loosen the bleeder valve and bleed air with the brake pedal depressed, and then quickly tighten the bleeder valve.
4. Repeat steps 2 and 3 until all of the air is out of the brake line.
5. Tighten the bleeder valve to the specified torque. Refer to BR-89, "BRAKE CALIPER ASSEMBLY : Exploded View" (front disc brake), BR-95, "BRAKE CALIPER ASSEMBLY : Exploded View" (rear disc brake).
6. Perform steps 1 to 5 for the rear left brake →front right brake → rear right brake → and front left brake in order.
7. Check that the fluid level in the reservoir tank is within the specified range after air bleeding. Refer to BR-61, "Inspection".

BRAKE MASTER CYLINDER

Inspection

INFOID:0000000001125789

FLUID LEAK

Check for brake fluid leakage from the master cylinder mounting face, reservoir tank mounting face and brake tube connections.

BRAKE BOOSTER

Inspection

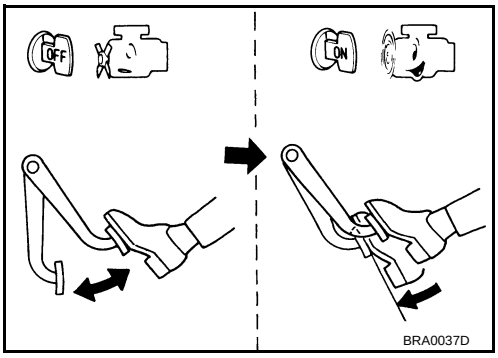
INFOID:0000000001125790

OPERATION

Depress the brake pedal several times at 5-second intervals with the engine stopped. Start the engine with the brake pedal fully depressed. Check that the clearance between brake pedal and dash lower panel decreases.

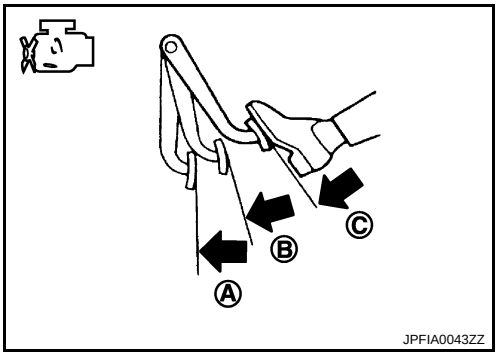
NOTE:

A slight impact with a small click may be felt on the pedal when the brake pedal is fully depressed. This is a normal phenomenon due to the brake system operation.



AIR TIGHT

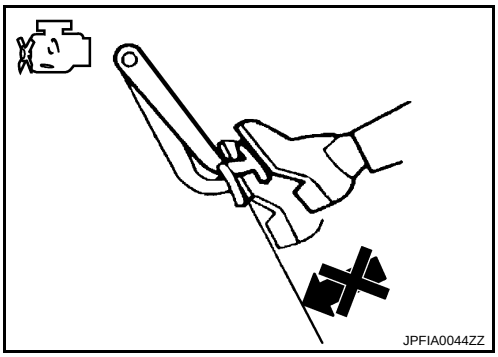
- Idle the engine for 1 minute to apply vacuum to the brake booster, and stop the engine. Then depress the brake pedal several times at 5-second intervals until the accumulated vacuum is released to atmospheric pressure. Check that the clearance between brake pedal and dash lower panel gradually increases (A → B → C) each time the brake pedal is depressed during this operation.



- Depress the brake pedal with the engine running. Then stop the engine while holding down the brake pedal. Check that the brake pedal stroke does not change after holding down the brake pedal for 30 seconds or more.

  NOTE:

  A slight impact with a small click may be felt on the pedal when the brake pedal is fully depressed. This is a normal phenomenon due to the brake system operation.



FRONT DISC BRAKE

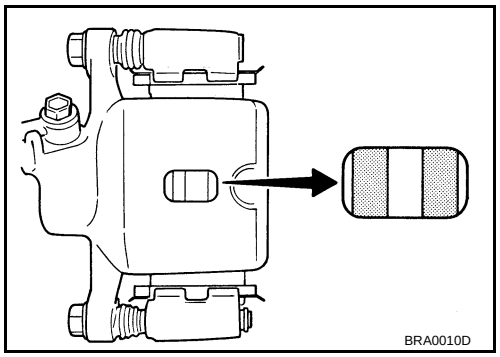
BRAKE PAD

BRAKE PAD : Inspection

INFOID:0000000001125791

PAD WEAR

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



Standard thickness : Refer to BR-99, "Front Disc Brake".

Wear limit thickness : Refer to BR-99, "Front Disc Brake".

DISC ROTOR

DISC ROTOR : Inspection

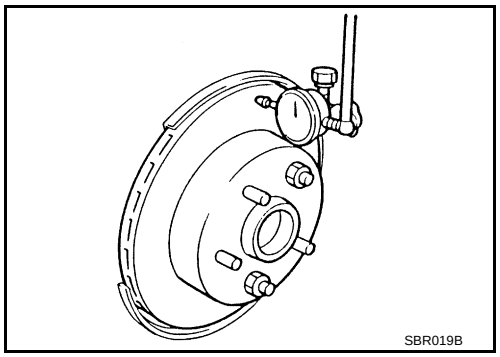
INFOID:0000000001125792

APPEARANCE

Check surface of disc rotor for uneven wear, cracks, and serious damage. Replace if there are.

RUNOUT

1. Fix the disc rotor to the wheel hub and bearing assembly with wheel nuts (2 points at least).
2. Inspect the runout with a dial gauge. [Measured at 10 mm (0.39 in) inside the disc edge.]



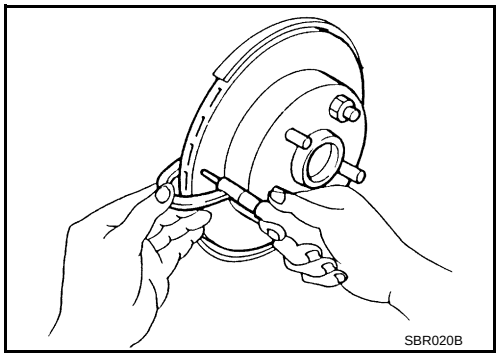
Runout limit : Refer to BR-99, "Front Disc Brake".

NOTE:
Check the wheel bearing axial end play before the inspection. Refer to FAX-7, "Inspection" (2WD), FAX-40, "Inspection" (4WD).

3. Find the installation position with a minimum runout by shifting the disc rotor-to-wheel hub and bearing assembly installation position by one hole at a time if the runout exceeds the limit value.
4. Replace or lathe the disc rotor if the runout exceeds the limit even after the above operation.

THICKNESS

Check the thickness of the disc rotor using a micrometer. Replace the disc rotor if the thickness is below the wear limit.



Wear limit thickness : Refer to BR-99, "Front Disc Brake".

REAR DISC BRAKE

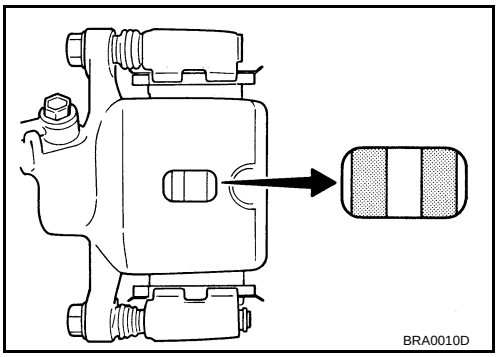
BRAKE PAD

BRAKE PAD : Inspection

INFOID:0000000001125793

PAD WEAR

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



Standard thickness : Refer to BR-99, "Rear Disc Brake".

Wear limit thickness : Refer to BR-99, "Rear Disc Brake".

DISC ROTOR

DISC ROTOR : Inspection

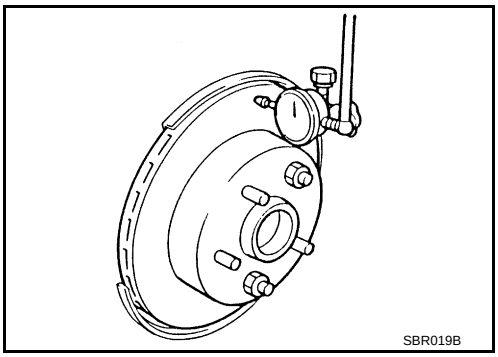
INFOID:0000000001125794

APPEARANCE

Check surface of disc rotor for uneven wear, cracks, and serious damage. Replace if there are.

RUNOUT

1. Fix the disc rotor to the wheel hub and bearing assembly with wheel nuts (2 points at least).
2. Inspect the runout with a dial gauge. [Measured at 10 mm (0.39 in) inside disc edge.]



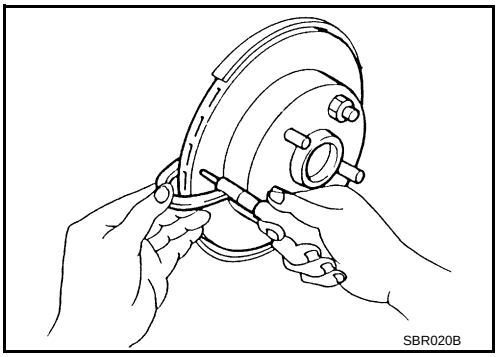
Runout limit : Refer to BR-99, "Rear Disc Brake".

NOTE:
Check the wheel bearing axial end play before the inspection. Refer to RAX-3, "Inspection" (2WD), RAX-9, "Inspection" (4WD).

3. Find the installation position with a minimum runout by shifting the disc rotor-to-wheel hub and bearing assembly installation position by one hole at a time if the runout exceeds the limit value.
4. Replace or lathe the disc rotor if the runout exceeds the limit even after the above operation.

THICKNESS

Check the thickness of the disc rotor using a micrometer. Replace the disc rotor if the thickness is below the wear limit.



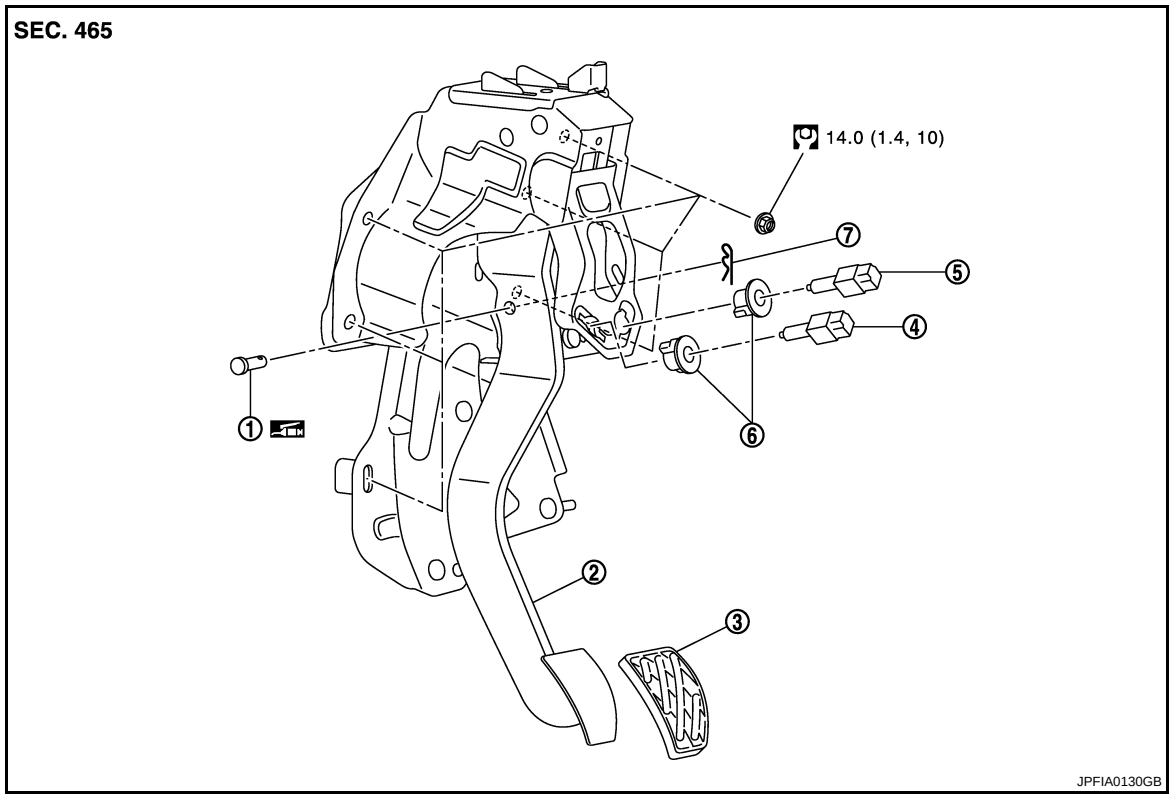
Wear limit thickness : Refer to BR-99, "Rear Disc Brake".

ON-VEHICLE REPAIR

BRAKE PEDAL

Exploded View

INFOID:0000000001116195



1. Clevis pin
2. Brake pedal assembly
3. Brake pedal pad
4. Brake switch (with ESP)*1*2
5. Stop lamp switch
6. Clip
7. Snap pin

*1: ASCD brake switch (except for M9R)

*2: Brake pedal position switch (for M9R)

: Apply multi-purpose grease.

Refer to GI-4, "Components" for symbols not described on the above.

Removal and Installation

INFOID:0000000001116196

REMOVAL

1. Remove instrument driver lower panel. Refer to IP-11, "Exploded View".
2. Disconnect stop lamp switch and/or ASCD brake switch (except for M9R) or brake pedal position switch (for M9R) harness connectors.
3. Disconnect accelerator pedal position sensor harness connector.
4. Remove steering member stay.
5. Remove snap pin and clevis pin from clevis of brake booster.
6. Remove the brake pedal assembly and the accelerator pedal.
7. Remove the accelerator pedal from brake pedal assembly. Refer to ACC-3, "Exploded View".

INSTALLATION

Note the following, and installation is the reverse order of removal.

- Apply the multi-purpose grease to the clevis pin and the mating faces. (Not necessary if grease has been already applied.)

NOTE:
The clevis pin may be inserted in either direction.

Inspection and Adjustment

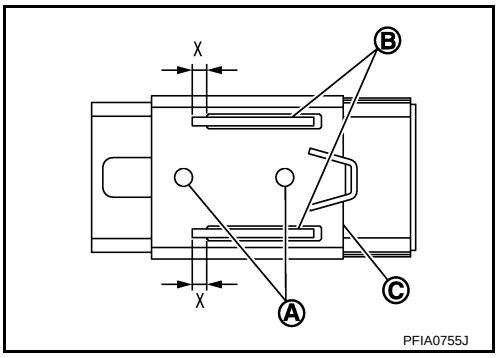
INFOID:0000000001125796

INSPECTION AFTER REMOVAL

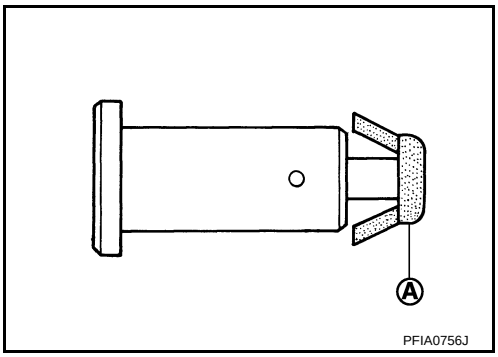
- Check the following items and replace the brake pedal assembly if necessary.
- Check the brake pedal upper rivet (A) for deformation.
- Check the brake pedal for bend, damage, and cracks on the welded parts.
- Check the lapping length (X) of sub-bracket (B) and slide plate (C).

Standard

Lapping length : 5.0 – 6.0 mm (0.197 – 0.236 in)



- Check clevis pin and plastic stopper (A) for damage and deformation. If any is found, replace clevis pin.



ADJUSTMENT AFTER INSTALLATION

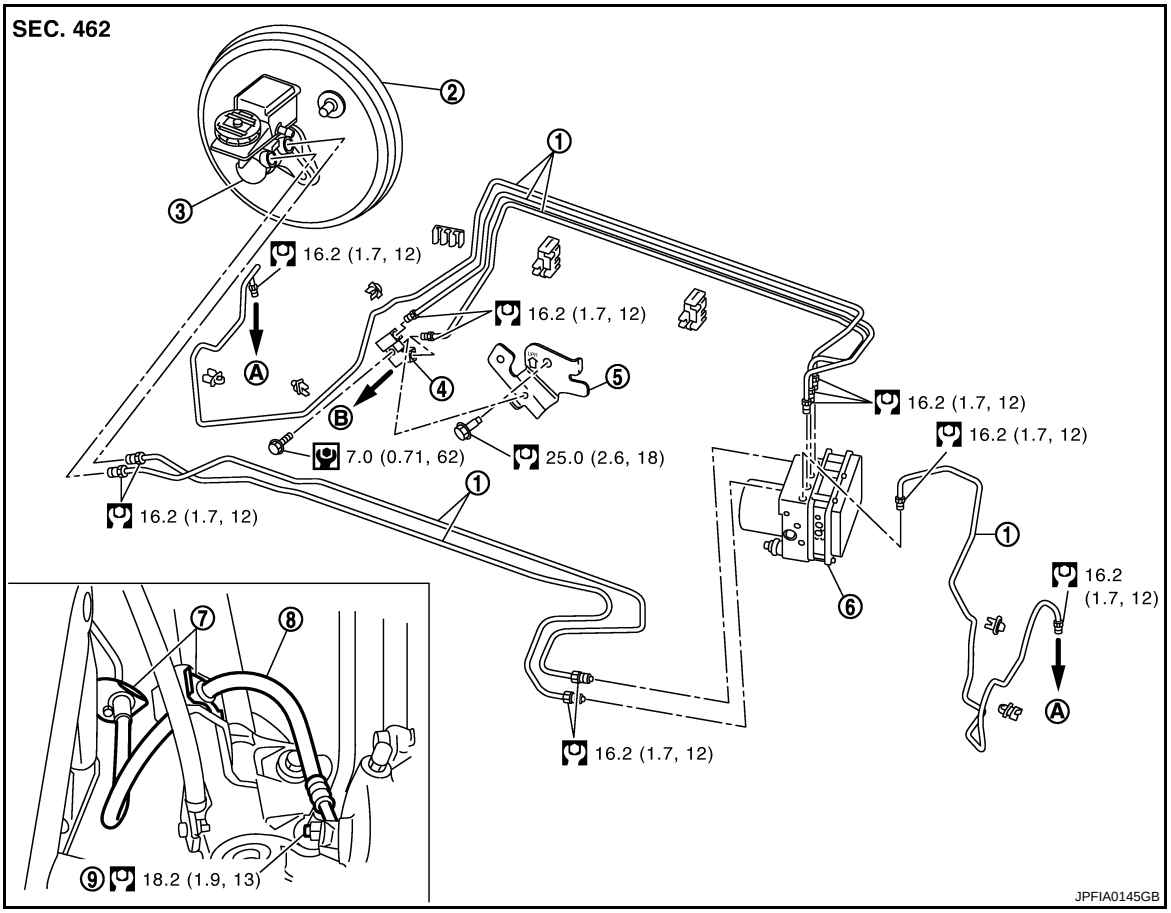
- Perform the brake pedal adjustment after installing the brake pedal assembly. Refer to BR-58, "Inspection and Adjustment".
- Perform the accelerator pedal check after installing the accelerator pedal. Refer to ACC-4, "Inspection".

BRAKE PIPING

FRONT (WITHOUT ESP)

FRONT (WITHOUT ESP) : Exploded View

INFOID:0000000001116198

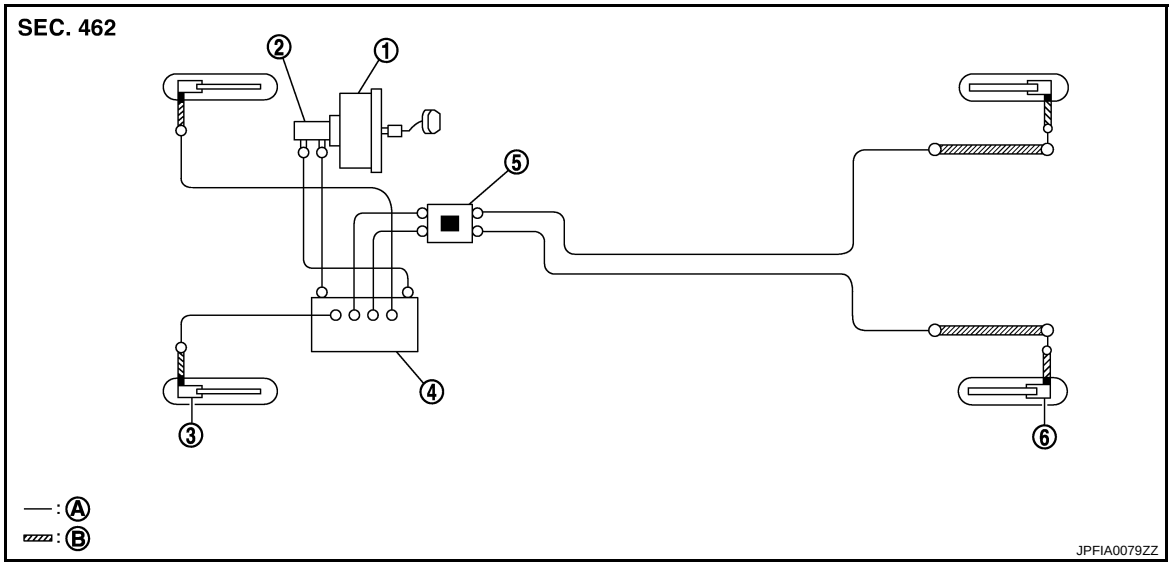


1. Brake tube	2. Brake booster	3. Master cylinder assembly
4. Connector	5. Connector bracket	6. ABS actuator and electric unit (control unit)
7. Lock plate	8. Brake hose	9. Union bolt
A. To front brake hose	B. To rear brake tube	

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

FRONT (WITHOUT ESP) : Hydraulic Piping

INFOID:0000000001116199



1. Brake booster
2. Master cylinder assembly
3. Front disc brake
4. ABS actuator and electric unit (control unit)
5. Connector
6. Rear disc brake

A. Brake tube
B. Brake hose

◯ : Flare nut

■ : Union bolt

▣ : Connector

FRONT (WITHOUT ESP) : Removal and Installation

INFOID:0000000001125797

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.

1. Remove tires.
2. Drain brake fluid. Refer to BR-61, "Draining".
3. Loosen the flare nut with a flare nut wrench and separate the brake tube from the hose.
   CAUTION:
   - **Never scratch the flare nut and the brake tube.**
   - **Never bend sharply, twist or strongly pull out the brake hoses and tubes.**
   - **Cover open end of brake tubes and hoses when disconnecting to prevent entrance of dirt.**
4. Remove the union bolt and remove the brake hose from the brake caliper assembly.
5. Remove the lock plate and remove the brake hose.

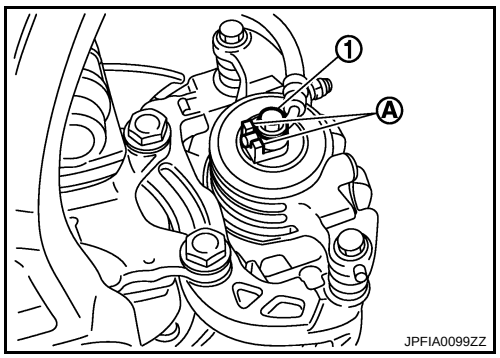
INSTALLATION

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.

1. Assemble the union bolt and the copper washer to the brake hose.
   CAUTION:
   Never reuse the copper washer.

2. Align the brake hose pin to the projection (A) of the brake caliper assembly and tighten the union bolt (1) to the specified torque.
3. Install the brake tube to the brake hose, temporarily tighten the flare nut by hand until it does not rotate further, and fix the brake hose to the bracket with the lock plate.
   CAUTION:
   Check that all brake hoses and tubes are not twisted and bent.
4. Tighten the flare nut to the specified torque with a flare nut torque wrench.
   CAUTION:
   Never scratch the flare nut and the brake tube.



5. Refill with new brake fluid and perform the air bleeding. Refer to BR-62, "Bleeding Brake System".
   CAUTION:
   Never reuse drained brake fluid.
6. Install tires.

FRONT (WITHOUT ESP) : Inspection

INFOID:0000000001125798

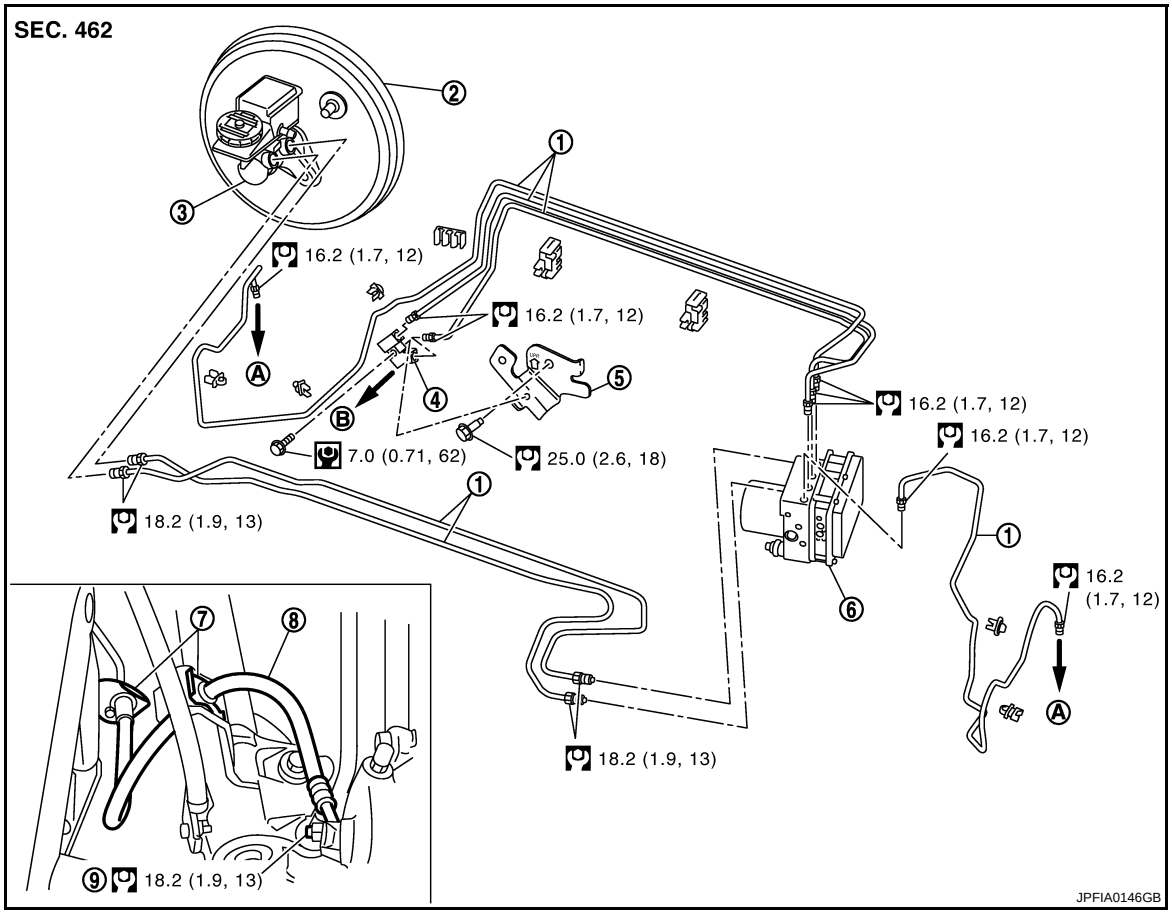
INSPECTION AFTER INSTALLATOIN

1. Check the brake hoses and tubes for the following: no scratches; no twist and deformation; no interference with other components when steering the steering wheel; no looseness at connections.
2. Depress the brake pedal with a force of 785 N (80 kg, 176 lb) and hold down the pedal for approximately 5 seconds 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.

FRONT (WITH ESP)

FRONT (WITH ESP) : Exploded View

INFOID:0000000001116202

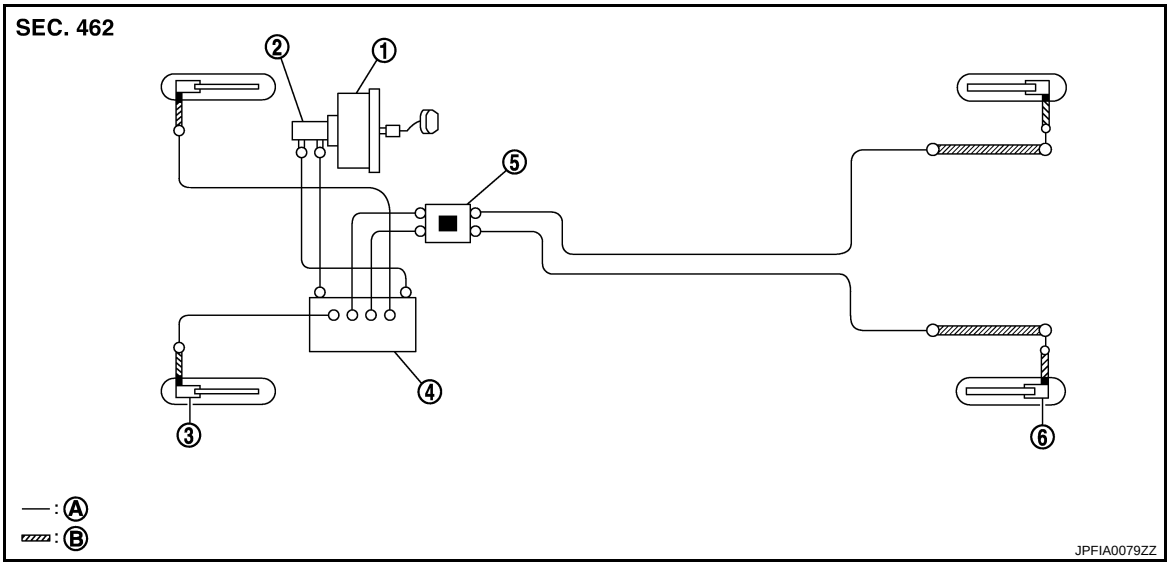


1. Brake tube	2. Brake booster	3. Master cylinder assembly
4. Connector	5. Connector bracket	6. ABS actuator and electric unit (control unit)
7. Lock plate	8. Brake hose	9. Union bolt
A. To front brake hose	B. To rear brake tube	

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

FRONT (WITH ESP) : Hydraulic Piping

INFOID:0000000001116203



1. Brake booster
2. Master cylinder assembly
3. Front disc brake
4. ABS actuator and electric unit (control unit)
5. Connector
6. Rear disc brake

A. Brake tube
B. Brake hose

: Flare nut

: Union bolt

: Connector

FRONT (WITH ESP) : Removal and Installation

INFOID:0000000001125799

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.

1. Remove tires.
2. Drain brake fluid. Refer to BR-61, "Draining".
3. Loosen the flare nut with a flare nut wrench and separate the brake tube from the hose.
   CAUTION:
   - **Never scratch the flare nut and the brake tube.**
   - **Never bend sharply, twist or strongly pull out the brake hoses and tubes.**
   - **Cover open end of brake tubes and hoses when disconnecting to prevent entrance of dirt.**
4. Remove the union bolt and remove the brake hose from the brake caliper assembly.
5. Remove the lock plate and remove the brake hose.

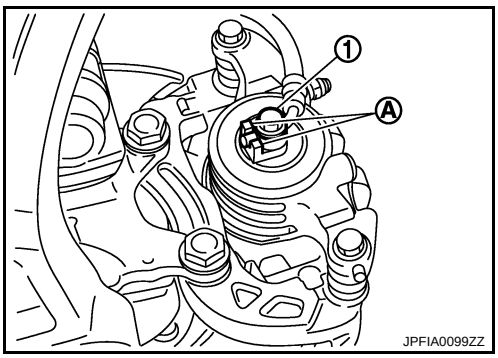
INSTALLATION

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.

1. Assemble the union bolt and the copper washer to the brake hose.
   CAUTION:
   Never reuse the copper washer.

2. Align the brake hose pin to the projection (A) of the brake caliper assembly and tighten the union bolt (1) to the specified torque.
3. Install the brake tube to the brake hose, temporarily tighten the flare nut by hand until it does not rotate further, and fix the brake hose to the bracket with the lock plate.
   CAUTION:
   Check that all brake hoses and tubes are not twisted and bent.
4. Tighten the flare nut to the specified torque with a flare nut torque wrench.
   CAUTION:
   Never scratch the flare nut and the brake tube.



5. Refill with new brake fluid and perform the air bleeding. Refer to BR-62, "Bleeding Brake System".
   CAUTION:
   Never reuse drained brake fluid.
6. Install tires.

FRONT (WITH ESP) : Inspection

INFOID:0000000001125800

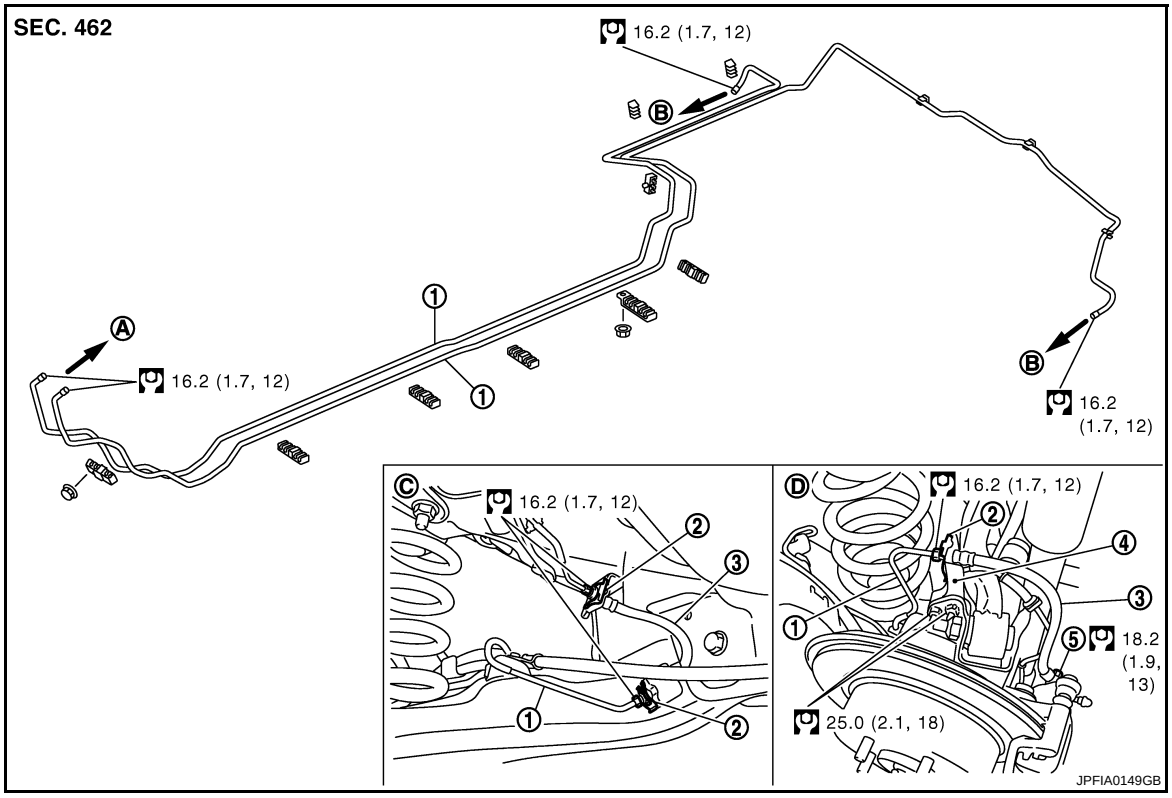
INSPECTION AFTER INSTALLATOIN

1. Check the brake hoses and tubes for the following: no scratches; no twist and deformation; no interference with other components when steering the steering wheel; no looseness at connections.
2. Depress the brake pedal with a force of 785 N (80 kg, 176 lb) and hold down the pedal for approximately 5 seconds 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.

REAR

REAR : Exploded View

INFOID:0000000001125801

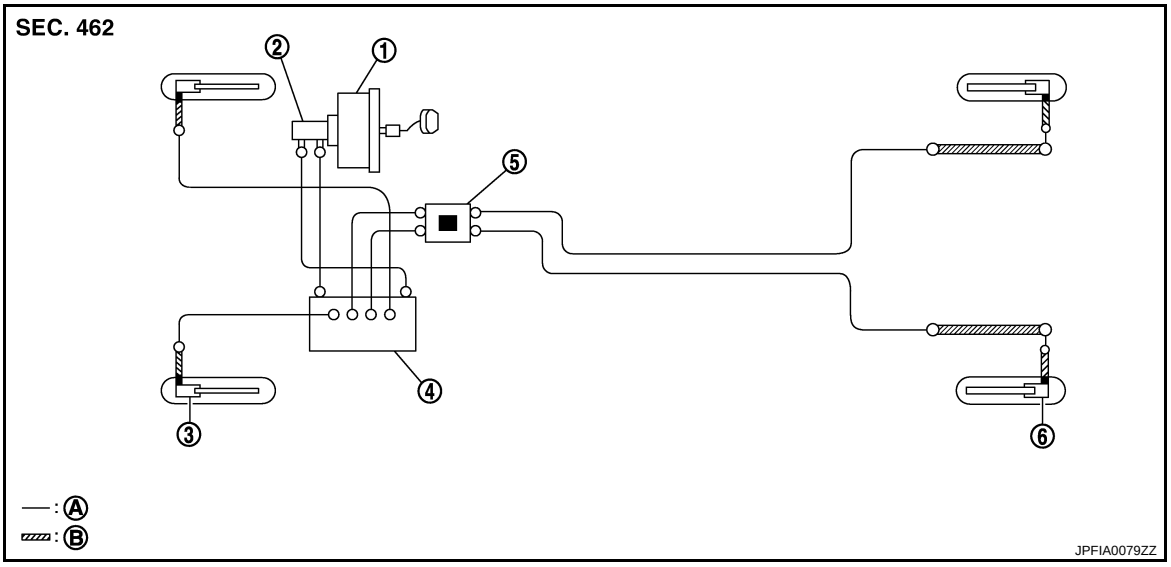


1. Brake tube
2. Lock plate
3. Brake hose
4. Brake hose bracket
5. Union bolt
A. To front brake tube
B. To rear brake hose
C. Floor side
D. Caliper side

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

REAR : Hydraulic Piping

INFOID:0000000001125802



1. Brake booster
2. Master cylinder assembly
3. Front disc brake
4. ABS actuator and electric unit (control unit)
5. Connector
6. Rear disc brake

A. Brake tube
B. Brake hose

◯ : Flare nut
■ : Union bolt
▣ : Connector

REAR : Removal and Installation

INFOID:0000000001125803

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.

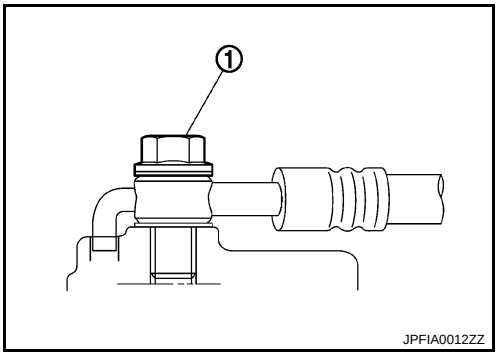
1. Remove tires.
2. Drain brake fluid. Refer to BR-61, "Draining".
3. Loosen the flare nut with a flare nut wrench and separate the brake tube from the hose.
   CAUTION:
   - **Never scratch the flare nut and the brake tube.**
   - **Never sharply bend, twist or strongly pull the brake hoses and tubes.**
   - **Cover the open end of brake tubes and hoses when disconnecting to prevent entrance of dirt.**
4. Remove the union bolt and remove the brake hose from the brake caliper assembly.
5. Remove the lock plate and remove the brake hose from the vehicle.

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.

1. Assemble the union bolt and the copper washer to the brake hose.
   CAUTION:
   Never reuse copper washer.
2. Install the brake hose L-pin by aligning it with the brake caliper assembly positioning hole, and tighten the union bolt (1) to the specified torque.
3. Connect the hose to the brake tube, temporarily tighten the flare nut by hand until it does not rotate further, and fix the brake hose to the bracket with the lock plate.
   CAUTION:
   Check that the brake hoses and tubes are not twisted and bent.
4. Tighten the flare nut to the specified torque with a flare nut torque wrench.
   CAUTION:
   Never scratch the flare nut and the brake tube.



5. Refill with new brake fluid and perform the air bleeding. Refer to BR-62, "Bleeding Brake System".
   CAUTION:
   Never reuse drained brake fluid.
6. Install tires.

REAR : Inspection

INFOID:0000000001125804

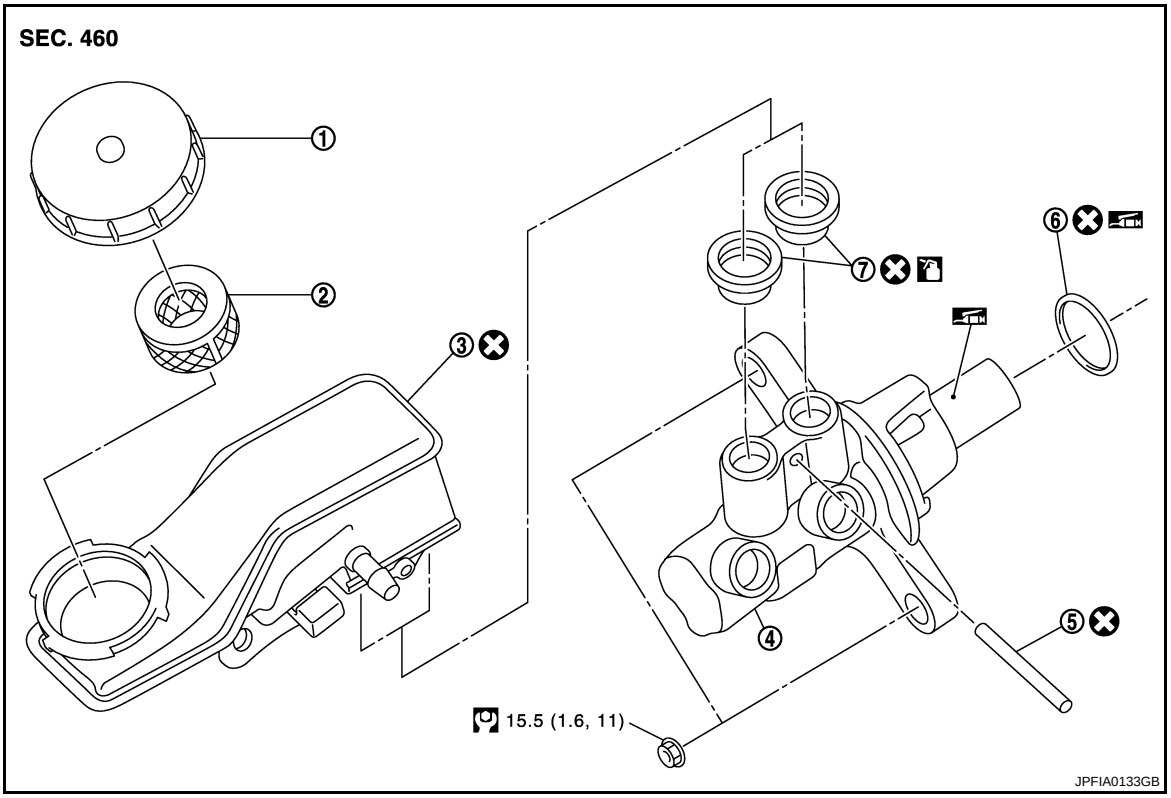
INSPECTION AFTER INSTALLATOIN

1. Check the brake hoses and tubes for the following: no scratches; no twist and deformation; no interference with other components when steering the steering wheel; no looseness at connections.
2. Depress the brake pedal with a force of 785 N (80 kg, 176 lb) and hold down the pedal for approximately 5 seconds 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.

BRAKE MASTER CYLINDER

Exploded View

INFOID:0000000001116210



1. Reservoir cap
2. Oil strainer
3. Reservoir tank
4. Cylinder body
5. Pin
6. O-ring
7. Grommet

: Apply PBC (Poly Butyl Cuprysil) grease or silicone-based grease.

: Apply brake fluid.

Refer to GI-4, "Components" for symbols not described on the above.

Removal and Installation

INFOID:0000000001116211

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.

1. Remove cowl top cover. Refer to EXT-19, "Exploded View".
2. Remove engine room insulator.
3. Remove engine cover. Refer to EM-27, "Exploded View" (MR20DE), EM-265, "Exploded View" (M9R).
4. Drain brake fluid. Refer to BR-61, "Draining".
5. Separate the brake fluid level switch harness connector.
6. Separate the brake tubes from the master cylinder assembly with a flare nut wrench.
   CAUTION:
   Never scratch the flare nut and the brake tube.
7. Remove the master cylinder assembly.
   CAUTION:
   - **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 after the master cylinder assembly is removed.**
- **The piston of the master cylinder assembly is exposed. Never damage it when removing the master cylinder.**
- **The piston may drop off when pulled out strongly. Never hold the piston. Hold the cylinder body when handling the master cylinder assembly.**

INSTALLATION

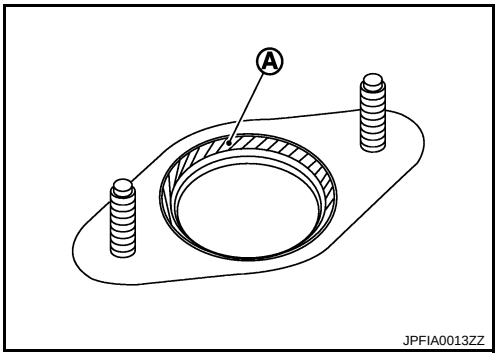
CAUTION:

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.

- Note the following, and installation is the reverse order of removal.

CAUTION:

- **Never depress the brake pedal after the master cylinder assembly is removed.**
- **Apply PBC (Poly Butyl Cuprysil) silicone-based grease to the brake booster [see (A) in the figure] when installing the master cylinder assembly to the brake booster.**
- **The piston of the master cylinder assembly is exposed. Never damage it when handling the master cylinder and check that no dirt and dust are present on the piston before installation. Clean it with new brake fluid if necessary.**
- **The piston may drop off when pulled strongly. Never hold the piston. Hold the cylinder body when handling the master cylinder assembly.**



- Temporarily tighten the brake tube flare nut to the master cylinder assembly by hand. Then tighten it to the specified torque with a flare nut torque wrench. Refer to BR-69, "FRONT (WITHOUT ESP) : Exploded View" (without ESP), BR-72, "FRONT (WITH ESP) : Exploded View" (with ESP).

CAUTION:

Never scratch the flare nut and the brake tube.

- After installation, perform the air bleeding. Refer to BR-62, "Bleeding Brake System".

CAUTION:

Never reuse drained brake fluid.

Disassembly and Assembly

INFOID:0000000001125805

DISASSEMBLY

CAUTION:

- **Never disassemble the cylinder body.**
- **Remove the reservoir tank if necessary.**

1. Fix the master cylinder assembly to a vise.

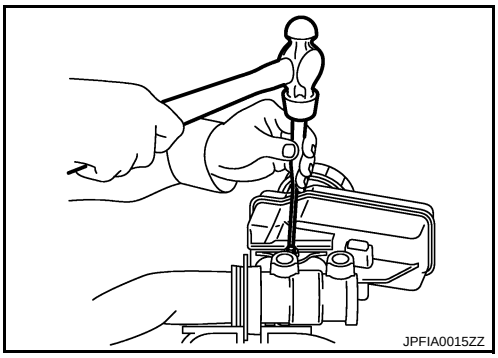
   CAUTION:

   Always set copper plates or cloth between vise when fixing the cylinder body to a vise. Never overtighten the vise.

2. Remove the reservoir tank mounting pin with a pin punch.
3. Remove the reservoir tank and grommet from the cylinder body.

   CAUTION:

   Never drop the removed parts. The parts must not be reused if they are dropped.



ASSEMBLY

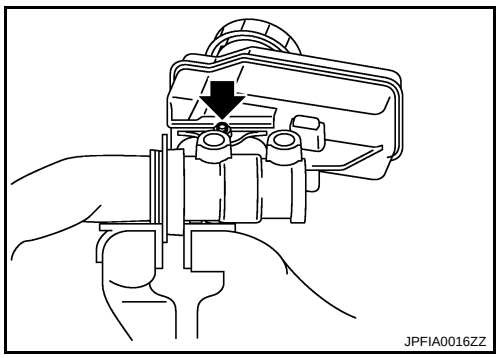
1. Apply new brake fluid to the grommet and install it to the cylinder body.

   CAUTION:

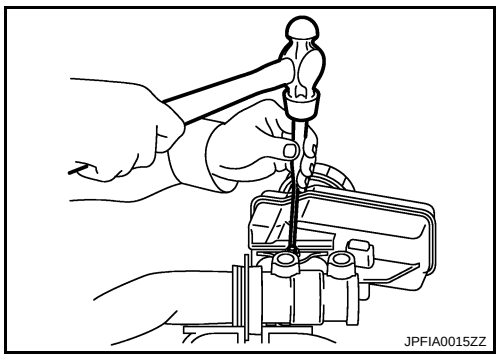
   - **Never use mineral oil such as gasoline or light oil.**
   - **Never reuse the grommets.**

2. Install the reservoir tank to the cylinder body.
CAUTION:
- **Never drop the parts when installing. The parts must not be reused if they are dropped.**
- **Never reuse reservoir tank.**

3. Fix the cylinder body to a vise.
CAUTION:
- **Place the reservoir tank with the chamfered pin hole (⬅) facing up.**
- **Always set copper plates or cloth between vise when fixing the cylinder body to a vise. Never overtighten the vise.**


JPFIA0016ZZ

4. Tilt the reservoir tank so that a mounting pin can be inserted. Insert a mounting pin. Return the reservoir tank to the horizontal position. Insert another mounting pin into the pin hole on the opposite side in the same manner after the mounting pin passes through the cylinder body pin hole.
CAUTION:
Never reuse the mounting pin.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Inspection

INFOID:0000000001125806

INSPECTION AFTER INSTALLATION

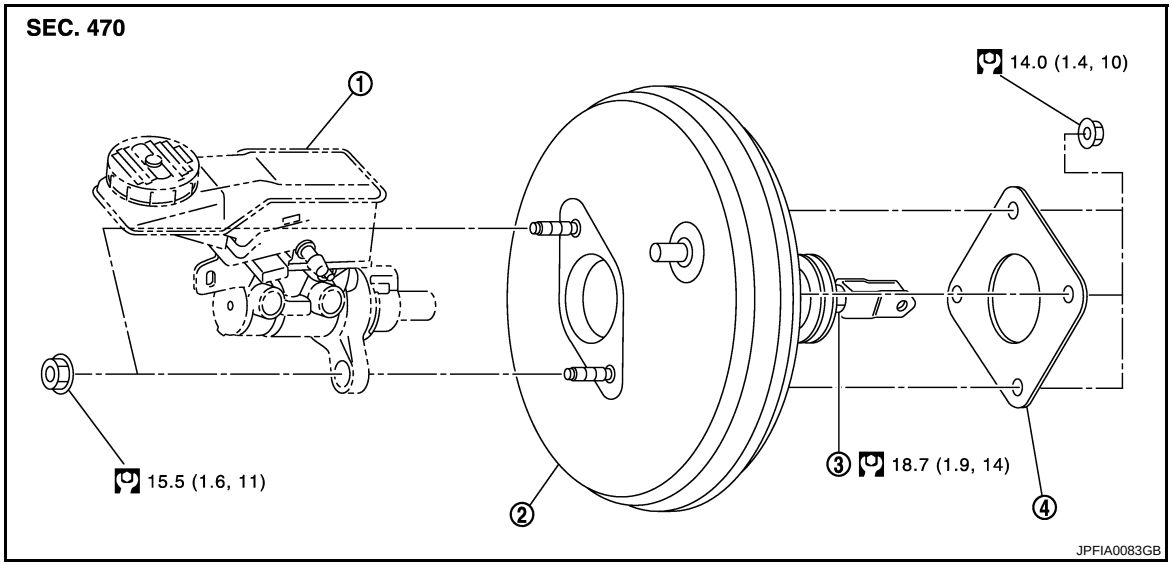
Fluid Leak

Check for brake fluid leakage from the cylinder body-to-brake booster mounting face, reservoir tank mounting face and brake tube connections.

BRAKE BOOSTER

Exploded View

INFOID:0000000001116214



1. Master cylinder assembly
2. Brake booster
3. Lock nut
4. Gasket

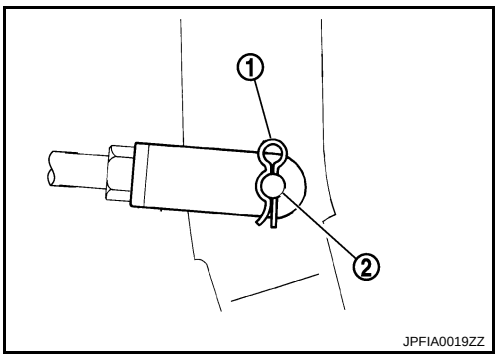
Refer to GI-4, "Components" for symbols in the figure.

Removal and installation

INFOID:0000000001116215

REMOVAL

1. Remove cowl top cover. Refer to EXT-19, "Exploded View".
2. Remove engine room insulator.
3. Remove engine cover. Refer to EM-27, "Exploded View" (MR20DE), EM-265, "Exploded View" (M9R).
4. Remove brake master cylinder assembly. Refer to BR-77, "Removal and Installation".
   CAUTION:
   - **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 after the master cylinder assembly is removed.**
   - **The piston of the master cylinder assembly is exposed. Never damage it when removing the master cylinder.**
   - **The piston may drop off when pulled out strongly. Never hold the piston. Hold the cylinder body when handling the master cylinder assembly.**
5. Remove vacuum hose from brake booster. Refer to BR-83, "MR20DE : Exploded View" (MR20DE), BR-84, "QR25DE : Exploded View" (QR25DE), BR-85, "M9R : Exploded View" (M9R).
6. Remove snap pin (1) and clevis pin (2) from inside vehicle.
7. Remove nuts on brake booster and brake pedal assembly. Refer to BR-80, "Exploded View".
8. Remove brake booster from dash panel in engine room side.
   CAUTION:
   Never deform or bend the brake tubes.
9. Remove the spacer from brake booster.



INSTALLATION

- Note the following, and installation is the reverse order of removal.

CAUTION:

- **Be careful not to damage brake booster stud bolt threads. If brake booster is tilted during installation, the dash panel may damage the threads.**
- **Never deform or bend the brake tubes when installing the brake booster.**
- **Always use a new gasket between the brake booster and the spacer.**
- **Replace the clevis pin if it is damaged. Refer to BR-68, "Inspection and Adjustment".**

- After installation, perform the air bleeding. Refer to BR-62, "Bleeding Brake System".

CAUTION:

Never reuse drained brake fluid.

Inspection and Adjustment

INFOID:0000000001125807

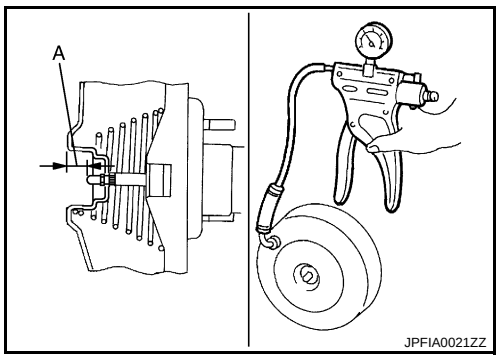
INSPECTION AFTER REMOVAL

Output Rod Length Inspection

1. With a handy vacuum pump, apply vacuum pressure of –66.7 kPa (–500 mmHg, –19.70 inHg, –0.667 bar) to the brake booster.
2. Check the output rod length (A).

Standard

Output rod length (A) **: Refer to BR-99, "Brake Booster".**



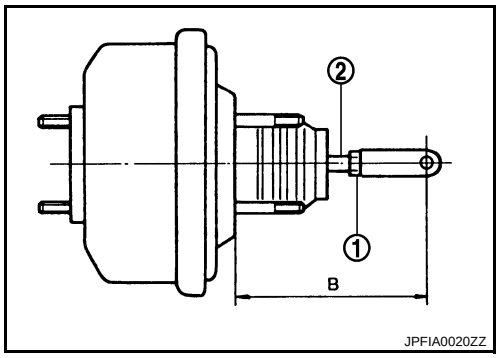
Input Rod Length Inspection

1. Loosen the lock nut (1) and adjust the input rod (2) to the specified length (B).

Standard

Input rod length (B) **: Refer to BR-99, "Brake Booster".**

2. Tighten the lock nut to the specified torque.



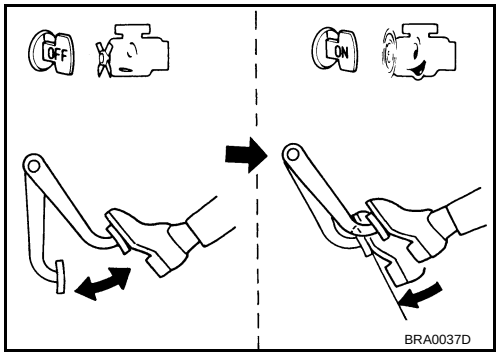
INSPECTION AFTER INSTALLATION

Operation

Depress the brake pedal several times at 5-second intervals with the engine stopped. Start the engine with the brake pedal fully depressed. Check that the clearance between brake pedal and dash lower pane decreases.

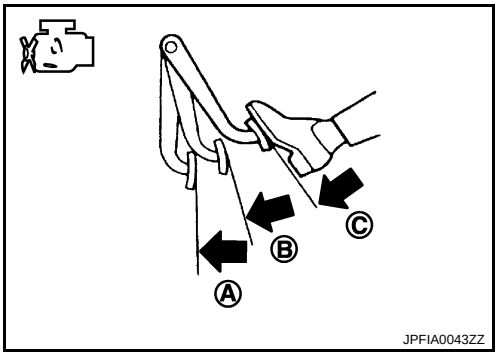
NOTE:

A slight impact with a small click may be felt on the pedal when the brake pedal is fully depressed. This is a normal phenomenon due to the brake system operation.

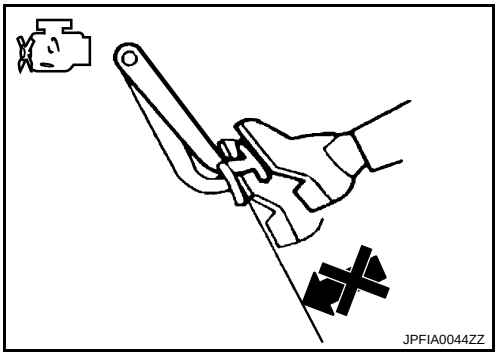


Air Tight

- Idle the engine for 1 minute to apply vacuum to the brake booster, and stop the engine. Then depress the brake pedal several times at 5-second intervals until the accumulated vacuum is released to atmospheric pressure. Check that the clearance between brake pedal and dash lower panel gradually increases (A → B → C) each time the brake pedal is depressed during this operation.



- Depress the brake pedal with the engine running. Then stop the engine while holding down the brake pedal. Check that the brake pedal stroke does not change after holding down the brake pedal for 30 seconds or more.
  NOTE:
  A slight impact with a small click may be felt on the pedal when the brake pedal is fully depressed. This is a normal phenomenon due to the brake system operation.



ADJUSTMENT AFTER INSTALLTION

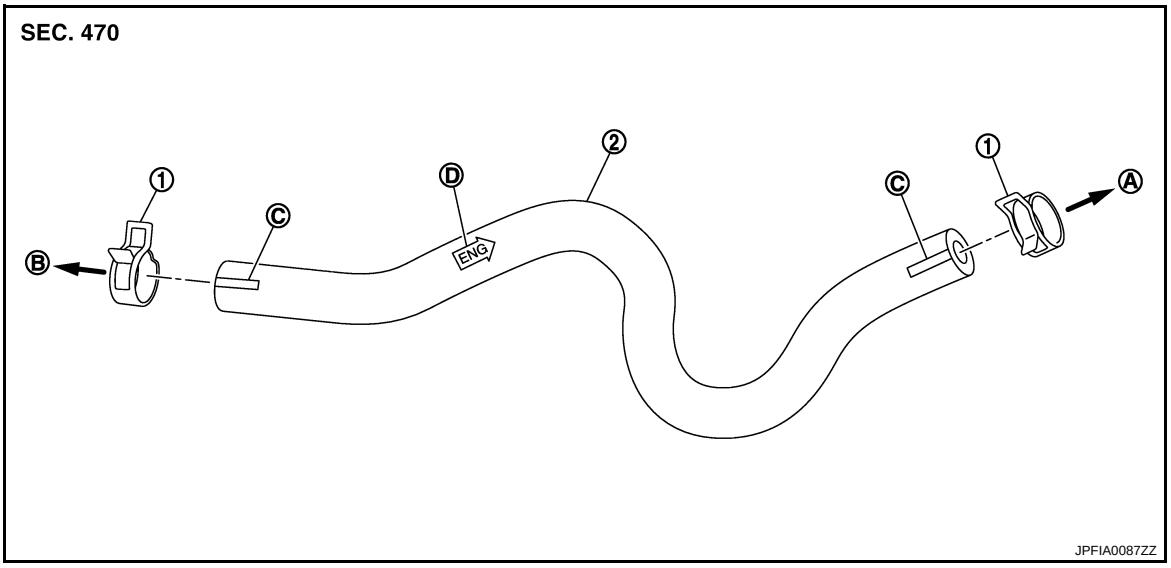
Perform the brake pedal adjustment after installing the brake pedal assembly. Refer to BR-58, "Inspection and Adjustment".

VACUUM LINES

MR20DE

MR20DE : Exploded View

INFOID:0000000001116217



1. Clamp
2. Vacuum hose (built in check valve)
A. To intake manifold
B. To brake booster
C. Paint mark
D. Stamp indicating engine direction

MR20DE : Removal and Installation

INFOID:0000000001116218

REMOVAL

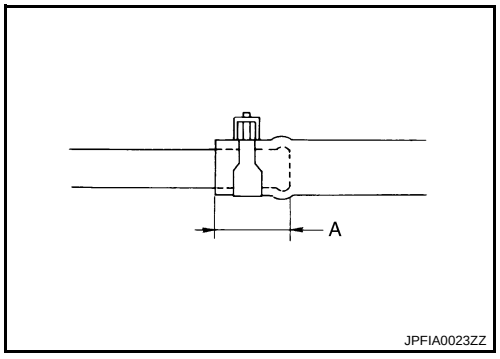
1. Remove engine cover. Refer to EM-27, "Exploded View".
2. Remove the vacuum hose.

INSTALLATION

Note the following, and installation is the reverse order of removal.

CAUTION:

- **Because vacuum hose contains a check valve, it must be installed in the correct position. Refer to the stamp to confirm correct installation. Brake booster will not operate normally if the hose is installed in the wrong direction.**
- **Insert vacuum hose at least 24 mm (0.94 in) (A).**
- **Never use lubricating oil during assembly.**
- **Face the marking side up when assembling of vacuum hose.**



MR20DE : Inspection

INFOID:0000000001125808

INSPECTION AFTER REMOVAL

Appearance

Check for correct assembly, damage and deterioration.

Check Valve Airtightness

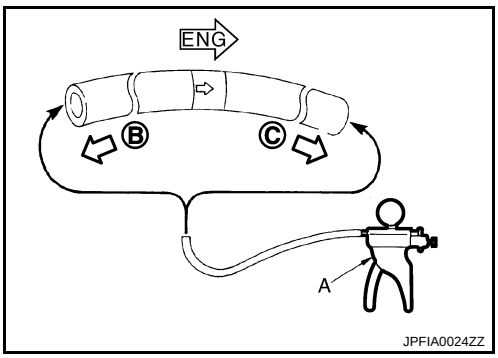
- Use a handy vacuum pump (A) to check.

When connected to the brake booster side (B):

Vacuum should decrease within 1.3 kPa (10 mmHg, 0.39 inHg, 0.013 bar) for 15 seconds under a vacuum of −66.7 kPa (−500 mmHg, −19.70 inHg, −0.667 bar).

When connected to the engine side (C):

Vacuum should not exist.

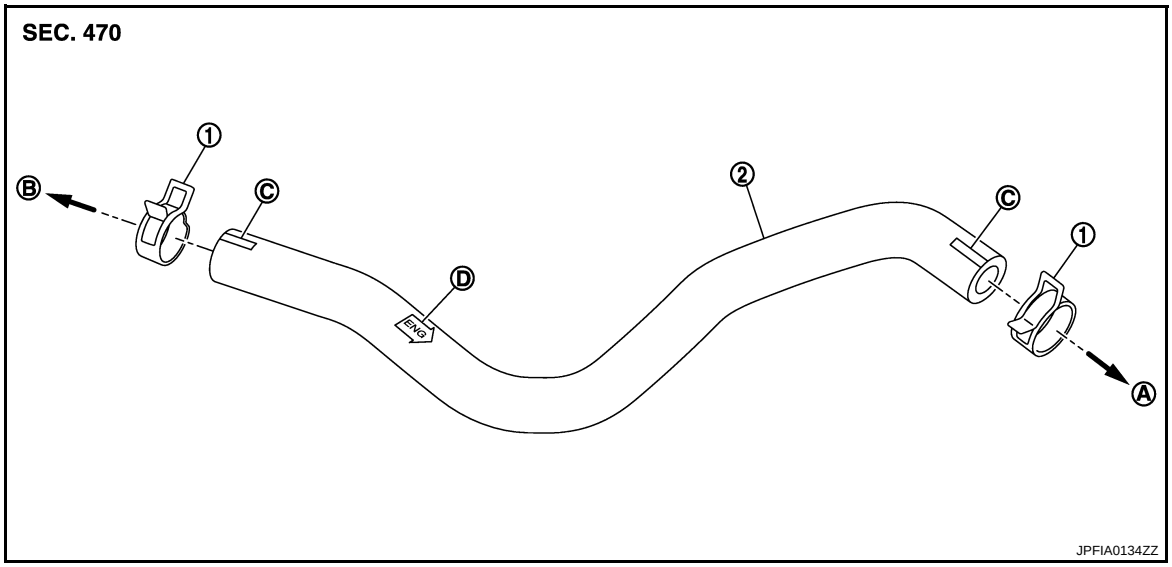


- Replace vacuum hose assembly if vacuum hose and check valve are malfunctioning.

QR25DE

QR25DE : Exploded View

INFOID:0000000001116311



1. Clamp
2. Vacuum hose (built in check valve)
A. To intake manifold
B. To brake booster
C. Paint mark
D. Stamp indicating engine direction

QR25DE : Removal and Installation

INFOID:0000000001116312

REMOVAL

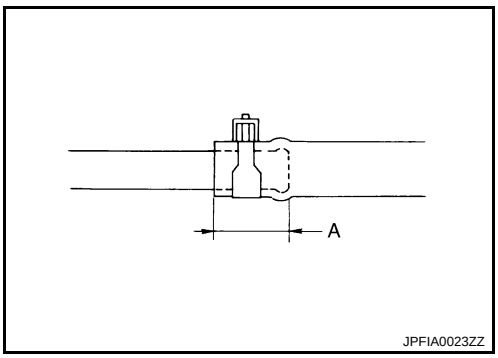
Remove the vacuum hose.

INSTALLATION

Install the vacuum hose.

CAUTION:

- **Because vacuum hose contains a check valve, it must be installed in the correct position. Refer to the stamp to confirm correct installation. Brake booster will not operate normally if the hose is installed in the wrong direction.**
- **Insert vacuum hose at least 24 mm (0.94 in) (A).**
- **Never use lubricating oil during assembly.**
- **Face the marking side up when assembling of vacuum hose.**



QR25DE : Inspection

INFOID:0000000001125809

INSPECTION AFTER REMOVAL

Appearance
Check for correct assembly, damage and deterioration.

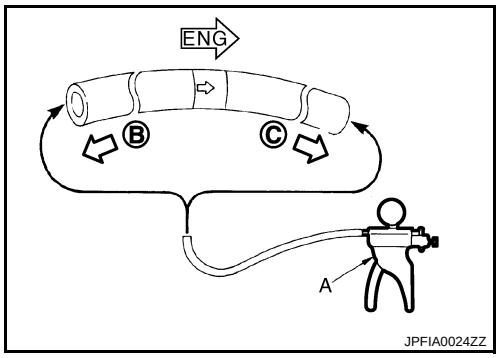
Check Valve Airtightness
- Use a handy vacuum pump (A) to check.

When connected to the brake booster side (B):

Vacuum should decrease within 1.3 kPa (10 mmHg, 0.39 inHg, 0.013 bar) for 15 seconds under a vacuum of –66.7 kPa (–500 mmHg, –19.70 inHg, –0.667 bar).

When connected to the engine side (C):

Vacuum should not exist.

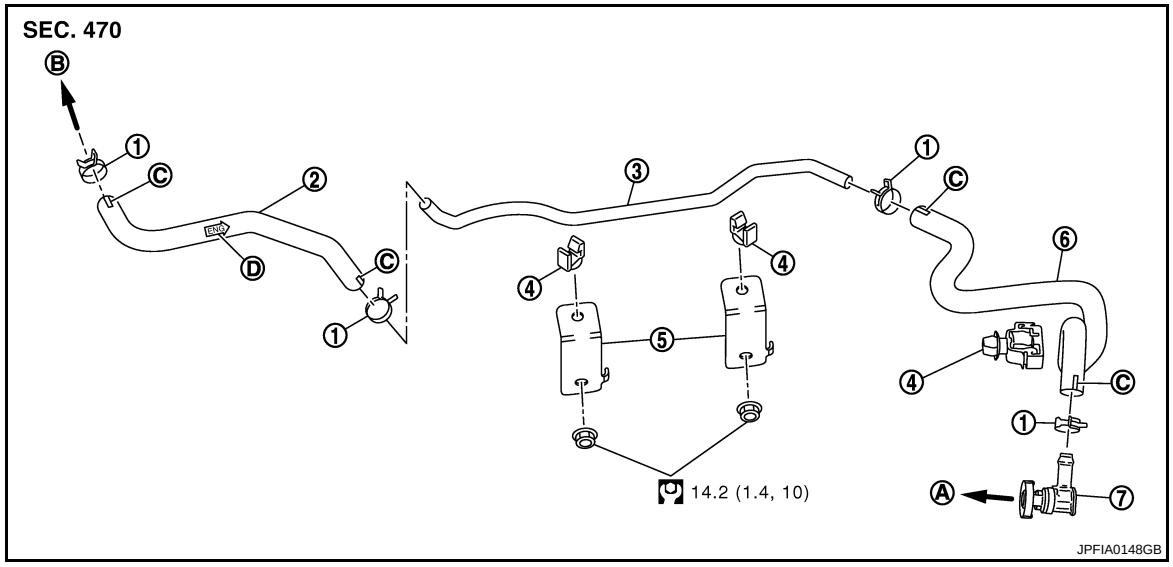


- Replace vacuum hose assembly if vacuum hose and check valve are malfunctioning.

M9R

M9R : Exploded View

INFOID:0000000001116220



1.	Clamp	2.	Vacuum hose (built in check valve)	3.	vacuum tube
4.	Clip	5.	Bracket	6.	Vacuum hose
7.	Vacuum hose connector				
A.	To vacuum pump	B.	To brake booster	C.	Paint mark
D.	Stamp indicating engine direction				

M9R : Removal and Installation

INFOID:0000000001116221

REMOVAL

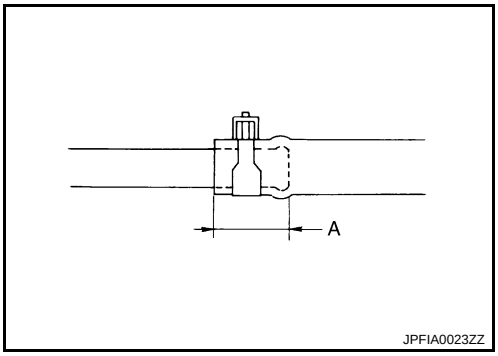
1. Remove engine cover. Refer to EM-265, "Exploded View".
2. Remove the vacuum hose and tube.

INSTALLATION

Note the following, and installation is the reverse order of removal.

CAUTION:

- **Because vacuum hose contains a check valve, it must be installed the correct position. Refer to the stamp to confirm correct installation. Brake booster will not operate normally if the hose is installed in the wrong direction.**
- **Insert vacuum hose at least 24 mm (0.94 in) (A).**
- **Never use lubricating oil during assembly.**
- **Face the marking side up when assembling of vacuum hose.**
- **Face the marking side vehicle front when assembling of vacuum hose (vacuum pump side of a built in check valve).**



M9R : Inspection

INFOID:0000000001125810

INSPECTION AFTER REMOVAL

Appearance

Check for correct assembly, damage and deterioration.

Check Valve Airtightness

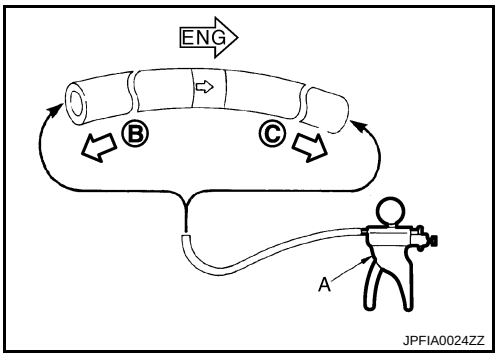
- Use a handy vacuum pump (A) to check.

When connected to the brake booster side (B):

Vacuum should decrease within 1.3 kPa (10 mmHg, 0.39 inHg, 0.013 bar) for 15 seconds under a vacuum of –66.7 kPa (–500 mmHg, –19.70 inHg, –0.667 bar).

When connected to the engine side (C):

Vacuum should not exist.



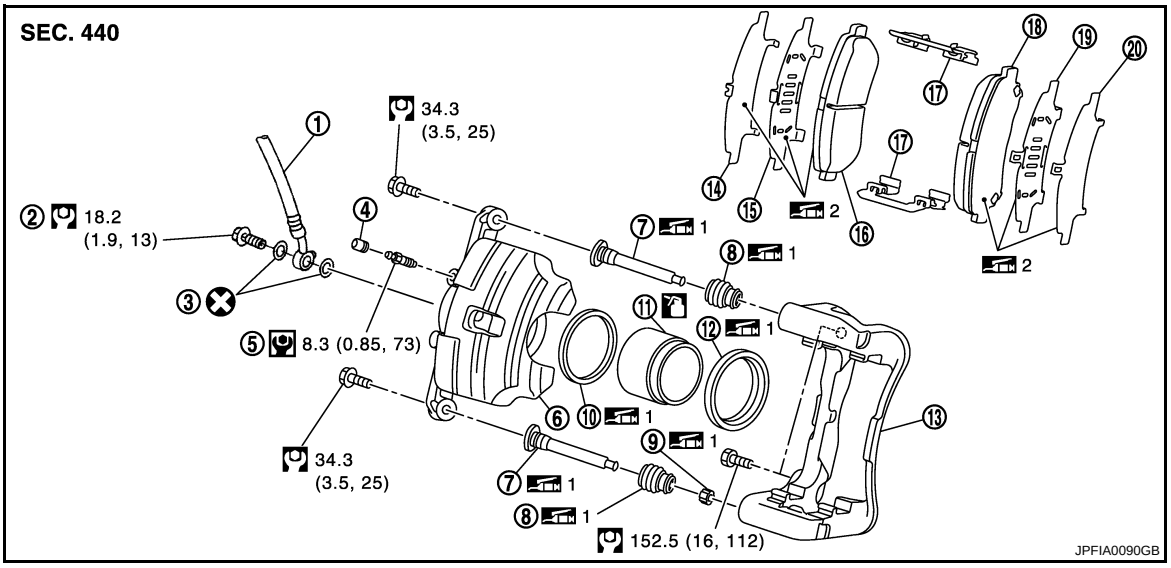
- Replace vacuum hose assembly if vacuum hose and check valve are malfunctioning.

FRONT DISC BRAKE

BRAKE PAD

BRAKE PAD : Exploded View

INFOID:0000000001127958



1. Brake hose	2. Union bolt	3. Copper washer
4. Cap	5. Bleeder valve	6. Cylinder body
7. Sliding pin	8. Sliding pin boot	9. Bushing
10. Piston seal	11. Piston	12. Piston boot
13. Torque member	14. Inner shim cover	15. Inner shim
16. Inner pad	17. Pad retainer	18. Outer pad
19. Outer shim	20. Outer shim cover	

1: Apply rubber grease.

2: Apply copper based brake grease.

: Apply brake fluid.

Refer to GI-4, "Components" for symbols not described on the above.

BRAKE PAD : Removal and Installation

INFOID:0000000001125812

REMOVAL

WARNING:

Clean any dust from the brake caliper and brake pads with a vacuum dust collector. Never blow with compressed air.

CAUTION:

- **Never depress the brake pedal while removing the brake pads because the piston may pop out.**
- **Never spill or splash brake fluid on the disc rotor.**

1. Remove tires.
2. Remove lower sliding pin bolt.
3. Suspend the cylinder body with suitable wire so that the brake hose will not stretch. Then remove the brake pad from the torque member.

   CAUTION:

   - **Never deform the pad retainer when removing the pad retainer from the torque member.**
   - **Never damage the piston boot.**
   - **Never drop the brake pads, shims, and the shim covers.**

INSTALLATION

WARNING:
Clean any dust from the brake caliper and brake pads with a vacuum dust collector. Never blow with compressed air.
CAUTION:
- **Never depress the brake pedal while removing the brake pads or the cylinder body because the piston may pop out.**
- **Never spill or splash brake fluid on the disc rotor.**

1. Install the pad retainer to the torque member if the pad retainers has been removed.
   CAUTION:
   - **Securely assemble the pad retainers so that it will not be lifted up from the torque member.**
   - **Never deform the pad retainers.**
2. Apply copper based brake grease to the mating faces between the pads, shims and shim covers, and install them to the brake pad.
   CAUTION:
   Always replace the shims together with the shim covers when replacing the brake pad.
3. Install the cylinder body and brake pads to the torque member.
   CAUTION:
   - **Never damage the piston boot.**
   - **When replacing a pad with new one, check a brake fluid level in the reservoir tank because brake fluid returns to master cylinder reservoir tank when pressing piston in.**

   NOTE:
   Use a disc brake piston tool to easily press piston.
4. Install the lower sliding pin bolt and tighten it to the specified torque.
5. Depress the brake pedal several times to check that no drag feel is present for the front disc brake.
6. Install tires.

BRAKE PAD : Inspection and Adjustment

INFOID:0000000001125813

INSPECTION AFTER REMOVAL

Replace the shims and the shim covers if rust is excessively attached.

ADJUSTMENT AFTER INSTALLATION

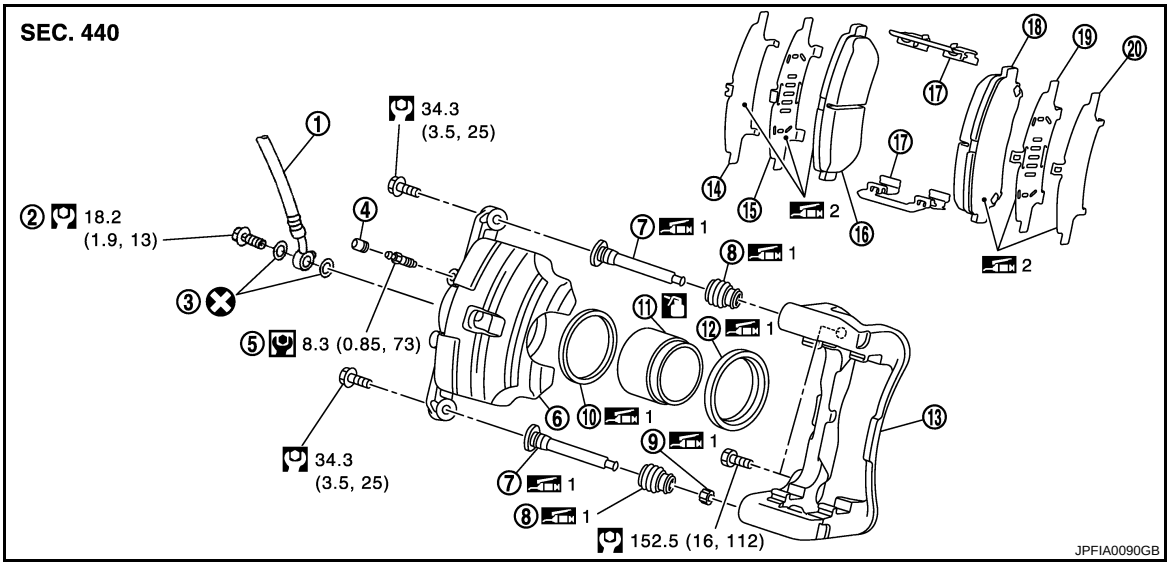
Brake Burnishing Procedure
Burnish contact surfaces between pads according to following procedure after refinishing or replacing pads, or if a soft pedal occurs at very low mileage.
CAUTION:
- **Be careful of vehicle speed because the brake does not operate easily until pads and disc rotor are securely fitted.**
- **Only perform this procedure under safe road and traffic conditions. Use extreme caution.**

1. Drive vehicle on straight, flat road.
2. Depress brake pedal with the power to stop vehicle within 3 to 5 seconds until the vehicle stops.
3. Drive without depressing brake for a few minutes to cool the brake.
4. Repeat steps 1 to 3 until pad and disc rotor are securely fitted.

BRAKE CALIPER ASSEMBLY

BRAKE CALIPER ASSEMBLY : Exploded View

INFOID:0000000001125814



1.	Brake hose	2.	Union bolt	3.	Copper washer
4.	Cap	5.	Bleeder valve	6.	Cylinder body
7.	Sliding pin	8.	Sliding pin boot	9.	Bushing
10.	Piston seal	11.	Piston	12.	Piston boot
13.	Torque member	14.	Inner shim cover	15.	Inner shim
16.	Inner pad	17.	Pad retainer	18.	Outer pad
19.	Outer shim	20.	Outer shim cover		

1: Apply rubber grease.

2: Apply copper based brake grease.

: Apply brake fluid.

Refer to GI-4, "Components" for symbols not described on the above.

BRAKE CALIPER ASSEMBLY : Removal and Installation

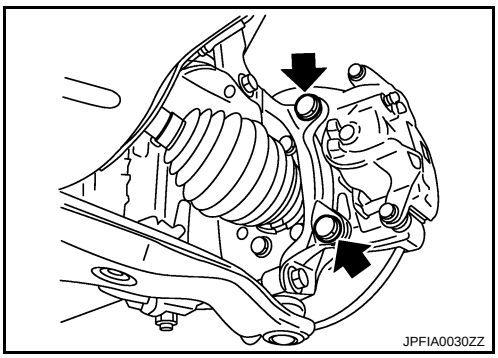
INFOID:0000000001125815

REMOVAL

WARNING:
Clean any dust from the brake caliper and brake pads with a vacuum dust collector. Never blow with compressed air.
CAUTION:
Never depress the brake pedal. Brake fluid may splash while removing the brake hose.

1. Remove tires.
2. Fix the disc rotor using wheel nuts.
3. Drain brake fluid. Refer to BR-61, "Draining".
   CAUTION:
   Never spill or splash brake fluid on the disc rotor.
4. Remove union bolt, and then disconnect brake hose from caliper assembly.

5. Remove torque member mounting bolts, and remove brake caliper assembly.
   CAUTION:
   Never drop brake pads and caliper assembly.
6. Remove disc rotor.
   CAUTION:
   - **Put matching marks on the wheel hub and bearing assembly and the disc rotor before removing the disc rotor.**
   - **Never drop disc rotor.**


JPFIA0030ZZ

INSTALLATION

WARNING:
Clean any dust from the brake caliper and brake pads with a vacuum dust collector. Never blow with compressed air.
CAUTION:
Never depress the brake pedal. Brake fluid may splash while removing the brake hose.

1. Install disc rotor.
   CAUTION:
   Align the matching marks made during removal when reusing the disc rotor.
2. Install the brake caliper assembly to the vehicle 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 bolts and washers. Wipe out any grease and moisture.
3. Install brake hose to brake caliper assembly, and tighten union bolts to the specified torque.
4. Refill with new brake fluid and perform the air bleeding. Refer to BR-62, "Bleeding Brake System".
   CAUTION:
   - **Never reuse drained brake fluid.**
   - **Never spill or splash brake fluid on the disc rotor.**
5. Check that no drag feel is present for the front disc brake.
6. Install tires.

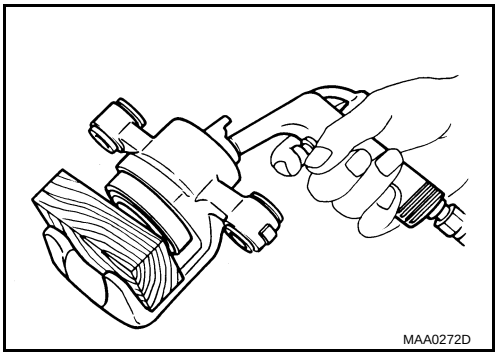
BRAKE CALIPER ASSEMBLY : Disassembly and Assembly

INFOID:0000000001125816

DISASSEMBLY

NOTE:
Never remove the torque member, brake pads, shims, shim covers and pad retainers when disassembling and assembling the cylinder body.

1. Remove the sliding pin bolts, and remove the cylinder body from the torque member.
   CAUTION:
   Never drop pads, shims, shim covers and pad retainers from torque member.
2. Remove sliding pins and sliding pin boots from torque member.
3. Remove bushing from sliding pin.
4. Place a wooden block as shown in the figure, and blow air from union bolt mounting hole to remove piston and piston boot.
   CAUTION:
   Never get fingers caught in the piston.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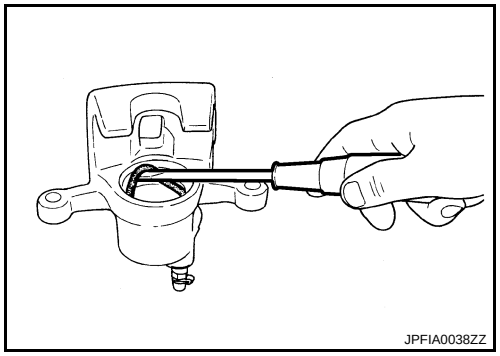
5. Remove piston seal from cylinder body using suitable tool.
CAUTION:
Be careful not to damage a cylinder inner wall.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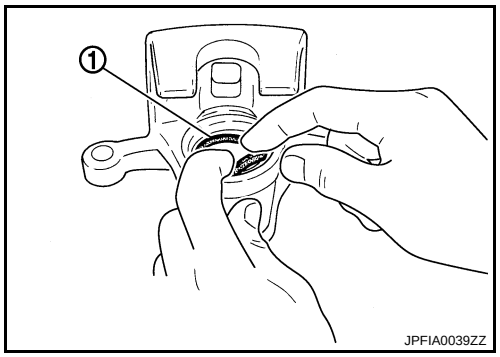
ASSEMBLY

1. Apply rubber grease to piston seal (1), and install to cylinder body.
CAUTION:
Never reuse piston seal.



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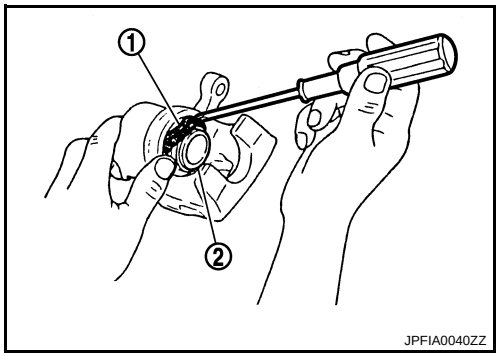
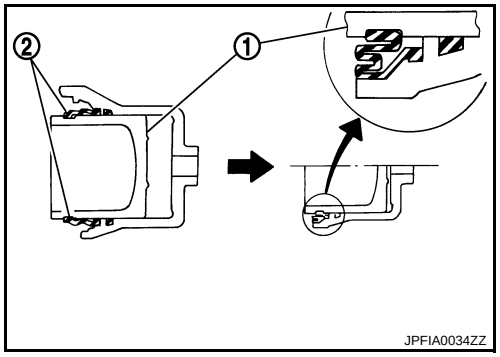
2. Apply rubber grease to piston boot (1). Cover the piston (2) end with piston boot, and then install cylinder side lip on piston boot securely into a groove on cylinder body.
CAUTION:
Never reuse piston boot.



JPFIA0040ZZ

3. Apply brake fluid to piston (1). Push piston into cylinder body by hand and push piston boot (2) piston-side lip into the piston groove.
CAUTION:
Press the piston evenly and vary the pressing point to prevent cylinder inner wall from being rubbed.
4. Apply rubber grease to bushing, install bushing to sliding pin.
5. Apply rubber grease to sliding pins and sliding pin boots, install sliding pins and sliding pin boots to torque member.
6. Install the cylinder body to the torque member and tighten the sliding pin bolts to the specified torque.



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BRAKE CALIPER ASSEMBLY : Inspection and Adjustment

INFOID:0000000001125817

INSPECTION AFTER DISASSEMBLY

Cylinder Body

Check the inner wall of the cylinder for rust, wear, cracks or damage. Replace the cylinder if any abnormal condition is detected.

CAUTION:
Always clean with new brake fluid. Never clean with mineral oil such as gasoline and light oil.

Torque Member

Check the torque member for rust, wear, cracks or damage. Replace the member if any abnormal condition is detected.

Piston

Check the surface of the piston for rust, wear, cracks or damage. Replace the piston if any abnormal condition is detected.

CAUTION:

A piston sliding surface is plated. Never polish with sandpaper.

Sliding Pin and Sliding Pin Boot

Check the sliding pins and sliding boots for rust, wear, cracks or damage. Replace the parts if any abnormal condition is detected.

ADJUSTMENT AFTER INSTALLATION

Brake Burnishing Procedure

Burnish contact surfaces between disc rotors and pads according to following procedure after refinishing or replacing disc rotor, or if a soft pedal occurs at very low mileage.

CAUTION:

- **Be careful of vehicle speed because the brake does not operate easily until pad and disc rotor are securely fitted.**
- **Only perform this procedure under safe road and traffic conditions. Use extreme caution.**

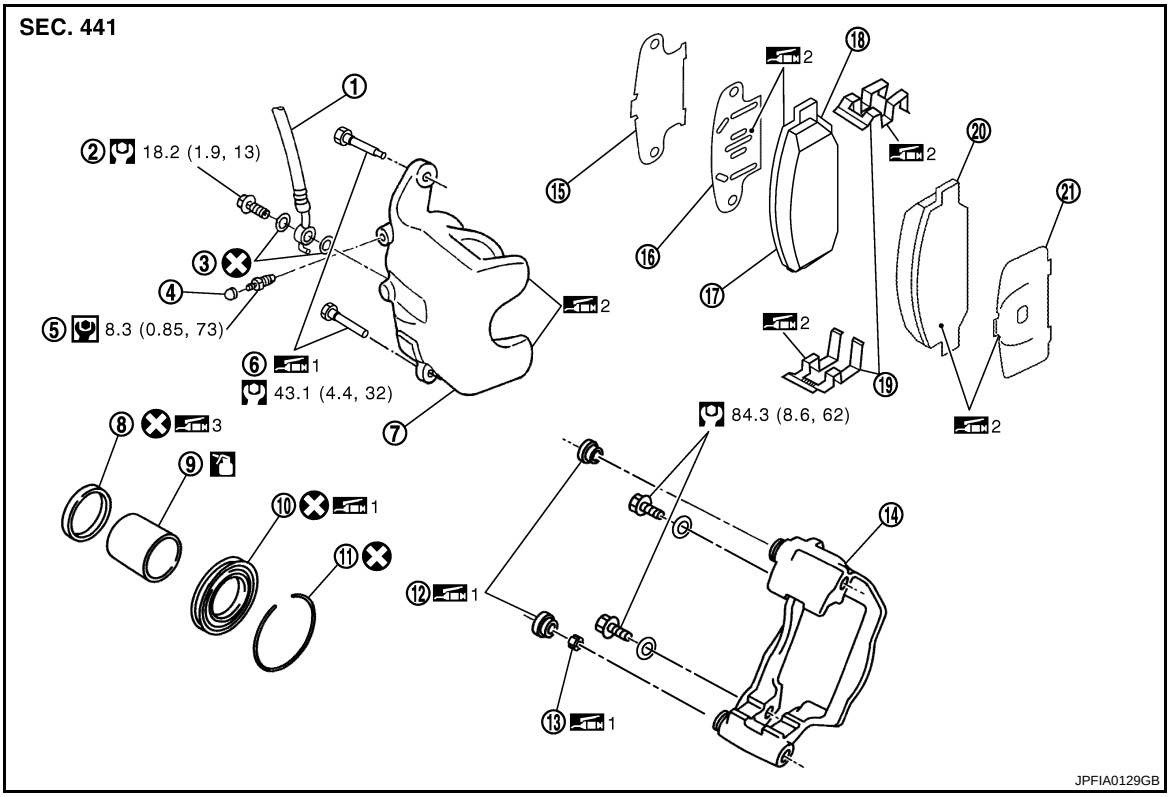
1. Drive vehicle on straight, flat road.
2. Depress brake pedal with the power to stop vehicle within 3 to 5 seconds until the vehicle stops.
3. Drive without depressing brake for a few minutes to cool the brake.
4. Repeat steps 1 to 3 until pad and disc rotor are securely fitted.

REAR DISC BRAKE

BRAKE PAD

BRAKE PAD : Exploded View

INFOID:0000000001126558



1. Brake hose	2. Union bolt	3. Copper washer
4. Cap	5. Bleeder valve	6. Sliding pin bolt
7. Cylinder body	8. Piston seal	9. Piston
10. Piston boot	11. Retaining ring	12. Sliding pin boot
13. Bushing	14. Torque member	15. Inner shim cover
16. Inner shim	17. Inner pad	18. Pad wear sensor (RH inner pad only)
19. Pad retainer	20. Outer pad	21. Outer shim

1: Apply rubber grease.

2: Apply copper based brake grease.

3: Apply polyglycol ether based lubricant.

: Apply brake fluid.

Refer to GI-4, "Components" for symbols not described on the above.

BRAKE PAD : Removal and Installation

INFOID:0000000001125819

REMOVAL

WARNING:

Clean any dust from the brake caliper and brake pads with a vacuum dust collector. Never blow with compressed air.

CAUTION:

- **Never depress the brake pedal while removing the brake pads or the cylinder body because the piston may pop out.**
- **Never spill or splash brake fluid on the disc rotor.**

1. Remove tires.
2. Remove the lower sliding pin bolt.
3. Suspend the cylinder body with suitable wire so that the brake hose will not stretch. Remove the brake pads from the torque member.
   CAUTION:
   - **Never deform the pad retainers if removing the pad retainers.**
   - **Never damage the piston boot.**
   - **Never drop the brake pad, shims, and the shim covers.**

INSTALLATION

WARNING:
Clean any dust from the brake caliper and brake pads with a vacuum dust collector. Never blow with compressed air.
CAUTION:
- **Never depress the brake pedal while removing the brake pads or the cylinder body because the piston may pop out.**
- **Never spill or splash brake fluid on the disc rotor.**

1. Install the pad retainers to the torque member if the pad retainers has been removed.
   CAUTION:
   - **Securely assemble the pad retainers not to be lifted up from the torque member.**
   - **Never deform the pad retainers.**
2. Apply copper based brake grease to the mating faces between the brake pads, the shims and pawls part of cylinder body, and install them to the brake pad.
   CAUTION:
   Always replace the shims together with the shim covers when replacing the brake pad.
3. Install cylinder body and brake pads to torque member.
   CAUTION:
   - **Never damage the piston boot.**
   - **When replacing a pads with new one, check a brake fluid level in the reservoir tank because brake fluid returns to master cylinder reservoir tank when pressing piston in.**

   NOTE:
   Use a disc brake piston tool to easily press piston.
4. Install the lower sliding pin bolt and tighten it to the specified torque.
5. Depress the brake pedal several times to check that no drag feel is present for the rear disc brake.
6. Install tires.

BRAKE PAD : Inspection and Adjustment

INFOID:0000000001125820

INSPECTION AFTER REMOVAL

Replace the shims and the shim covers if rust is excessively attached.

ADJUSTMENT AFTER INSTALLATION

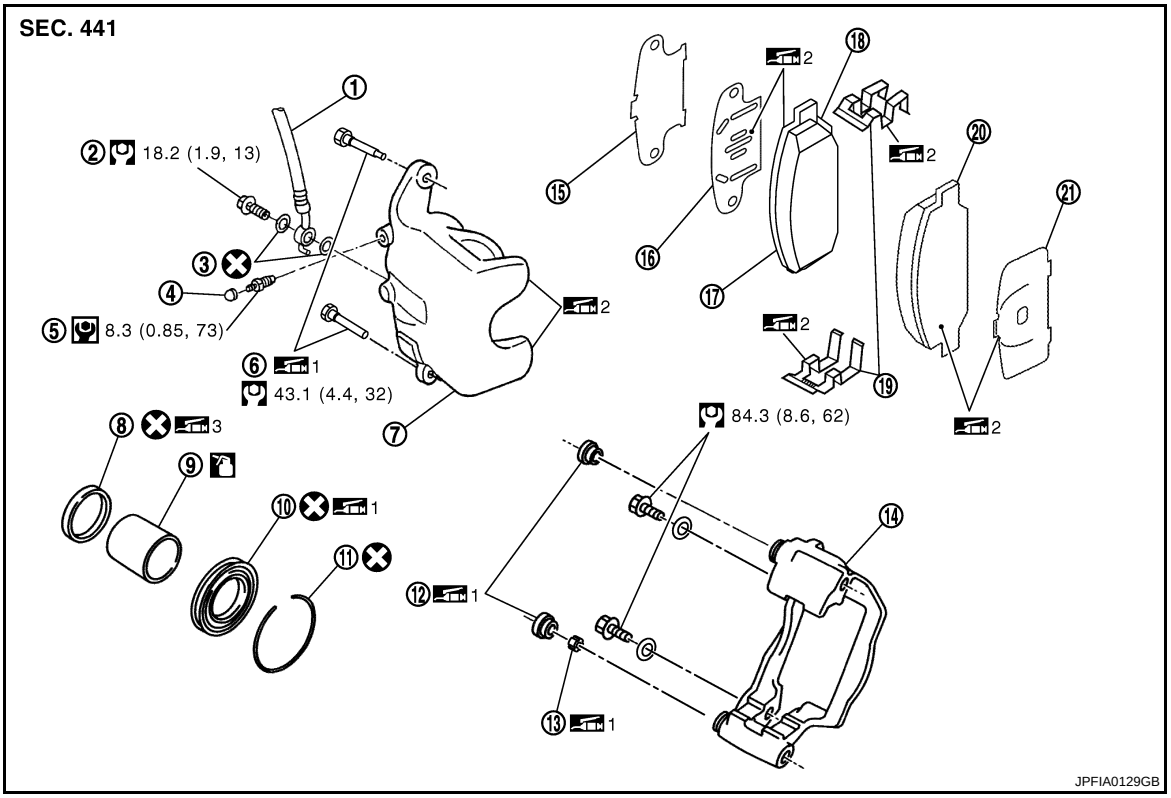
Brake Burnishing Procedure
Burnish contact surfaces between pads according to following procedure after refinishing or replacing pads, or if a soft pedal occurs at very low mileage.
CAUTION:
- **Be careful of vehicle speed because the brake does not operate easily until pad and disc rotor are securely fitted.**
- **Only perform this procedure under safe road and traffic conditions. Use extreme caution.**

1. Drive vehicle on straight, flat road.
2. Depress brake pedal with the power to stop vehicle within 3 to 5 seconds until the vehicle stops.
3. Drive without depressing brake for a few minutes to cool the brake.
4. Repeat steps 1 to 3 until pad and disc rotor are securely fitted.

BRAKE CALIPER ASSEMBLY

BRAKE CALIPER ASSEMBLY : Exploded View

INFOID:0000000001125821



1. Brake hose	2. Union bolt	3. Copper washer
4. Cap	5. Bleeder valve	6. Sliding pin bolt
7. Cylinder body	8. Piston seal	9. Piston
10. Piston boot	11. Retaining ring	12. Sliding pin boot
13. Bushing	14. Torque member	15. Inner shim cover
16. Inner shim	17. Inner pad	18. Pad wear sensor (RH inner pad only)
19. Pad retainer	20. Outer pad	21. Outer shim

1: Apply rubber grease.

2: Apply copper based brake grease.

3: Apply polyglycol ether based lubricant.

: Apply brake fluid.

Refer to GI-4, "Components" for symbols not described on the above.

BRAKE CALIPER ASSEMBLY : Removal and Installation

INFOID:0000000001125822

REMOVAL

WARNING:

Clean any dust from the brake caliper and brake pads with a vacuum dust collector. Never blow with compressed air.

CAUTION:

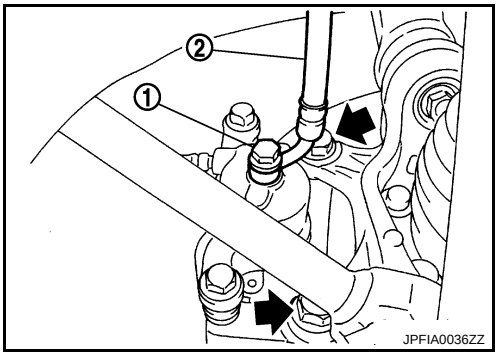
Never depress the brake pedal. Brake fluid may splash while removing the brake hose.

1. Remove tires.
2. Fix the disc rotor using wheel nuts.
3. Drain brake fluid. Refer to BR-61, "Draining".

   CAUTION:

   Never spill or splash brake fluid on the disc rotor.

4. Remove union bolt (1) and then disconnect brake hose (2) from caliper assembly.
5. Remove torque member mounting bolts, and remove brake caliper assembly.
   CAUTION:
   Never drop brake pads and caliper assembly.
6. Remove disc rotor.
   CAUTION:
   - **Put matching marks on the wheel hub and bearing assembly and the disc rotor before removing the disc rotor.**
   - **Never drop disc rotor.**



INSTALLATION

WARNING:
Clean any dust from the brake caliper and brake pads with a vacuum dust collector. Never blow with compressed air.
CAUTION:
Never depress the brake pedal. Brake fluid may splash while removing the brake hose.

1. Install disc rotor.
   CAUTION:
   Align the matching marks made during removal when reusing the disc rotor.
2. Install the brake caliper assembly to the vehicle 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 bolts, and washers. Wipe out any grease and moisture.
3. Install brake hose to brake caliper assembly, and tighten union bolts to the specified torque.
4. Refill with new brake fluid and perform the air bleeding. Refer to BR-62, "Bleeding Brake System".
   CAUTION:
   - **Never reuse drained brake fluid.**
   - **Never spill or splash brake fluid on the disc rotor.**
5. Check that no drag feel is present for the rear disc brake.
6. Install tires.

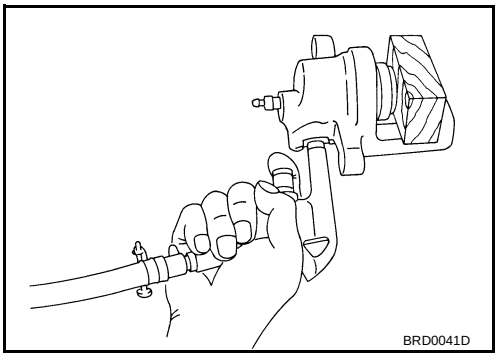
BRAKE CALIPER ASSEMBLY : Disassembly and Assembly

INFOID:0000000001125823

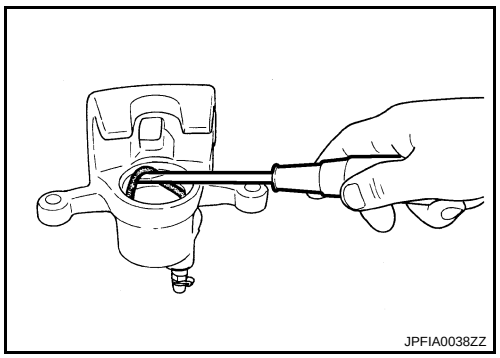
DISASSEMBLY

NOTE:
Never remove the torque member, brake pads, shims, shim covers and pad retainers disassembling and assembling the cylinder body.

1. Remove the sliding pin bolts and remove the cylinder body from the torque member.
   CAUTION:
   Never drop pads, shims, shim covers and pad retainers from torque member.
2. Remove sliding pin boots from torque member.
3. Remove bushing from sliding pin bolt.
4. Place a wooden block as shown in the figure, and blow air from union bolt mounting hole to remove piston and piston boot.
   CAUTION:
   Never get fingers caught in the piston.



5. Remove piston seal from cylinder body using suitable tool.
CAUTION:
Be careful not to damage a cylinder inner wall.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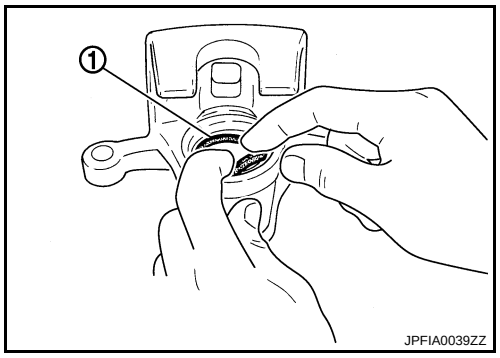
ASSEMBLY

1. Apply polyglycol ether based lubricant to piston seal (1), and install to cylinder body.
CAUTION:
Never reuse piston seal.



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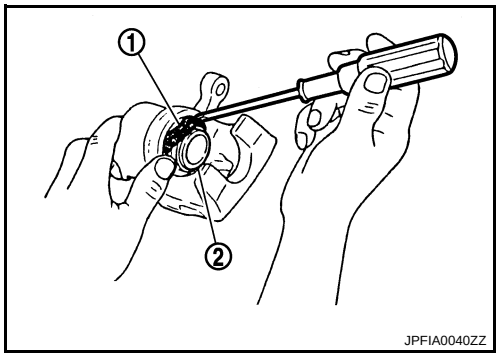
2. Apply rubber grease to piston boot (1). Cover the piston (2) end with the piston boot, and then install cylinder side lip on the piston boot securely into the groove on cylinder body.
CAUTION:
Never reuse piston boot.



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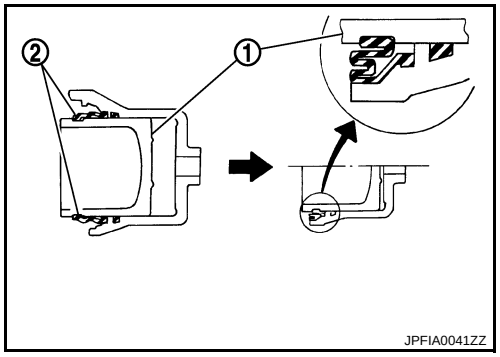
3. Apply brake fluid to piston (1). Push piston into cylinder body by hand and push piston boot (2) piston side lip into the piston groove.
CAUTION:
Press the piston evenly and vary the pressing point to prevent cylinder inner wall from being rubbed.
4. Apply polyglycol ether based lubricant to bushing, install bushing to sliding pin bolt.
5. Apply rubber grease to the sliding pin bolts and the sliding pin boots, install sliding pin boot to torque member.
6. Install the cylinder body to the torque member and tighten the sliding pin bolts to the specified torque.



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BRAKE CALIPER ASSEMBLY : Inspection and Adjustment

INFOID:0000000001125824

INSPECTION AFTER DISASSEMBLY

Cylinder Body

Check the inner wall of the cylinder for rust, wear, cracks or damage. Replace the cylinder if any abnormal condition is detected.

CAUTION:
Always clean with new brake fluid. Never clean with mineral oil such as gasoline and light oil.

Torque Member

Check the torque member for rust, wear, cracks or damage. Replace the member if any abnormal condition is detected.

Piston

Check the piston for rust, wear, cracks or damage. Replace the piston if any abnormal condition is detected.

CAUTION:

A piston sliding surface is plated. Never polish with sandpaper.

Sliding Pin Bolt and Sliding Pin Boot

Check the sliding pin bolts and sliding pin boots for rust, wear, cracks or damage. Replace the parts if any abnormal condition is detected.

ADJUSTMENT AFTER INSTALLATION

Brake Burnishing Procedure

Burnish contact surfaces between disc rotors and pads according to the following procedure after refinishing or replacing disc rotor, or if a soft pedal occurs at very low mileage.

CAUTION:

- **Be careful of vehicle speed because the brake does not operate easily until pad and disc rotor are securely fitted.**
- **Only perform this procedure under safe road and traffic conditions. Use extreme caution.**

1. Drive vehicle on straight, flat road.
2. Depress brake pedal with the power to stop vehicle within 3 to 5 seconds until the vehicle stops.
3. Drive without depressing brake for a few minutes to cool the brake.
4. Repeat steps 1 to 3 until pad and disc rotor are securely fitted.

SERVICE DATA AND SPECIFICATIONS (SDS)

SERVICE DATA AND SPECIFICATIONS (SDS)

General Specifications

INFOID:0000000001116237

Unit: mm (in.)

Front brake	Cylinder bore diameter	60.33 (2.375)
	Pad length × width × thickness	123.6 × 47.5× 11.0 (4.87 × 1.870× 0.433)
	Rotor outer diameter × thickness	296 × 26.0 (11.65 × 1.024)
Rear brake	Cylinder bore diameter	34.93 (1.375)
	Pad length × width × thickness	83.0 × 31.9 × 8.5 (3.268 × 1.256 × 0.335)
	Rotor outer diameter × thickness	292 × 16.0 (11.50 × 0.630)
Master cylinder	Cylinder bore diameter	23.8 (15/16)
Control valve	Valve type	Electric brake force distribution
Brake booster	Diaphragm diameter	255 (10.4)
Recommended brake fluid		DOT 3 or DOT 4

Brake Pedal

INFOID:0000000001116238

Unit: mm (in.)

Brake pedal height (H_1)		130.2 – 140.2 (5.13 – 5.52)
Clearance (C) between stopper rubber and stop lamp switch and/or ASCD brake switch (except for M9R) or brake pedal position switch (for M9R) threaded end		0.74 – 1.96 (0.0291 – 0.0772)
Brake pedal play (A)		3.0 – 11.0 (0.12 – 0.43)
Depressed brake pedal height (H_2) [Depressing 490 N (50 kg, 110 lb) while turning the engine ON]	MR20DE and QR25DE	15 (0.59) or more
	M9R	10 (0.39) or more

Brake Booster

INFOID:0000000001125825

Vacuum type

Unit: mm (in.)

Output rod length (A)	30.5 (1.201)
Input rod length (B)	124.5 – 125.5 (4.90 – 4.94)

Front Disc Brake

INFOID:0000000001125826

Unit: mm (in.)

Brake pad	Standard thickness	11.0 (0.433)
	Wear limit thickness	2.0 (0.079)
Disc rotor	Standard thickness	26.0 (1.024)
	Wear limit thickness	24.0 (0.945)
	Thickness variation (measured at 8 positions)	0.020 (0.0008)
	Runout limit (with it attached to the vehicle)	0.035 (0.0014)

Rear Disc Brake

INFOID:0000000001125827

Unit: mm (in.)

Brake pad	Standard thickness	8.5 (0.335)
	Wear limit thickness	1.5 (0.059)

Disc rotor	Standard thickness	16.0 (0.630)
	Wear limit thickness	14.0 (0.551)
	Thickness variation (measured at 8 positions)	0.020 (0.0008)
	Runout limit (with it attached to the vehicle)	0.070 (0.0028)