Brakes

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12-2 BRAKES

Exploded View



Exploded View

Na	Frateria	Torque				
NO.	Fastener	N∙m	kgf∙m	ft·lb	Remarks	
1	Front Master Cylinder Reservoir Cap	3.4	0.35	30 in·lb		
2	Reservoir Clamp Bolt	6.2	0.63	55 in·lb		
3	Piston Stop Bolt	8.8	0.90	78 in·lb		
4	Brake Pipe Nipples	17.5	1.8	13		
5	Brake Hose Banjo Bolts	25	2.5	18		
6	Front Master Cylinder Mounting Bolts	25	2.5	18		
7	Master Cylinder Bolt	25	2.5	18		
8	Push Rod Locknut	18	1.8	13		
9	Parking Brake Pedal Assy Mounting Bolts	42	4.3	31		
10	Front Brake Pad Mounting Bolts	17	1.7	13		
11	Caliper Bleed Valves	5.4	0.55	48 in·lb		
12	Brake Hose Clamp Bolts	8.8	0.90	78 in·lb		
13	Caliper Holder Shaft	17	1.7	12		
14	Brake Caliper Mounting Bolts	33	3.5	25		
15	Front Brake Disc Mounting Bolts	42	4.3	31	L	
16	Parking Brake Indicator Light Switch Screws	0.4	0.04	35 in·lb		

17. Apply sealing material to the hatched area.

G: Apply grease.

L: Apply a non-permanent locking agent.

MF: Apply gear oil (MOBIL FLUID 424 or equivalent oil).

Si: Apply silicone grease.

R: Replacement Parts

12-4 BRAKES

Exploded View



Exploded View

No	Fastener	Torque			Bomorko
INO.		N∙m	kgf∙m	ft·lb	Remarks
1	Brake Hose Banjo Bolts	25	2.5	18	
2	Brake Pipe Nipples	17.5	1.8	13	
3	Rear Master Cylinder Bleed Valve	5.4	0.55	48 in·lb	
4	Rear Master Cylinder Mounting Bolts	27	2.8	20	L
5	5 Rear Final Gear Case Front Cover Bolts		2.4	18	
6	Spring Bracket Bolt	8.8	0.90	78 in·lb	L
7	Rear Final Gear Case Gasket Screws	1.3	0.13	12 in·lb	

G: Apply grease.

L: Apply a non-permanent locking agent. MF: Apply gear oil (MOBIL FLUID 424 or equivalent oil).

R: Replacement Parts

Si: Apply silicone grease.

12-6 BRAKES

Specifications

Item	Standard	Service Limit	
Brake Fluid			
Туре	DOT 3		
Fluid Level	Between upper and lower level lines		
Brake Pedal			
Brake Pedal Play	2 ~ 10 mm (0.08 ~ 0.39 in.)		
Front Disc Brake			
Pad Lining Thickness	3.9 mm (0.15 in.)	1 mm (0.04 in.)	
Disc Thickness	4.6 ~ 5.0 mm (0.181 ~ 0.197 in.)	4.3 mm (0.17 in.)	
Disc Runout	TIR 0.25 mm (0.010 in.) or less	TIR 0.3 mm (0.012 in.)	

Brake Fluid

A WARNING

When working with the disc brake, observe the precautions listed below.

- 1. Never reuse old brake fluid.
- 2. Do not use fluid from a container that has been left unsealed or that has been open for a long time.
- 3. Do not mix two types and brands of fluid for use in the brake. This lowers the brake fluid boiling point and could cause the brake to be ineffective. It may also cause the rubber brake parts to deteriorate.
- 4. Don't leave the reservoir cap off for any length of time to avoid moisture contamination of the fluid.
- 5. Don't add or change the fluid in the rain or when a strong wind is blowing.
- 6. Except for the disc pads and disc, use only disc brake fluid, isopropyl alcohol, or ethyl alcohol for cleaning brake parts. Do not use any other fluid for cleaning these parts. Gasoline, engine oil, or any other petroleum distillate will cause deterioration of the rubber parts. Oil spilled on any part will be difficult to wash off completely and will eventually deteriorate the rubber used in the disc brake.
- 7. When handling the disc pads or disc, be careful that no disc brake fluid or any oil gets on them. Clean off any fluid or oil that inadvertently gets on the pads or disc with a high-flash point solvent. Do not use one which will leave an oily residue. Replace the pads with new ones if they cannot be cleaned satisfactorily.
- 8. Brake fluid quickly ruins painted surfaces; any spilled fluid should be completely washed away immediately.
- 9. If any of the brake line fittings or the bleed valve is opened at any time, the **AIR MUST BE BLED FROM THE BRAKE LINE.**

Front Brake Fluid Recommendation

Use extra heavy-duty brake fluid only from a container marked DOT3.

Recommended Disc Brake Fluid Type DOT 3

Front Brake Fluid Level Inspection

• Refer to the Brake Fluid Level Inspection in the Periodic Maintenance chapter.

Front Brake Fluid Change

 Refer to the Brake Fluid Change in the Periodic Maintenance chapter.

Brake Fluid

Brake Line Air Bleeding

The brake fluid has a very low compression coefficient so that almost all the movement of the brake pedal is transmitted directly to the caliper for braking action. Air, however, is easily compressed. When air enters the brake lines, brake pedal movement will be partially used in compressing the air. This will make the lever or pedal feel spongy, and there will be a loss in braking power.

WARNING

Be sure to bleed the air from the brake line whenever brake pedal action feels soft or spongy after the brake fluid is changed, or whenever a brake line fitting has been loosened for any reason.

NOTE

OThe procedure to bleed the brake line is as follows.

• Remove the reservoir cap [A] and fill the reservoir with new brake fluid.



- Slowly pump the brake pedal several times until no air bubbles can be seen rising up through the fluid from the holes at the bottom of the reservoir.
- OBleed the air completely from the front master cylinder by this operation.

NOTE

OStart with the rear master cylinder and finish with the front left or right caliper.

- Remove the rubber cap from the bleed valve on the rear master cylinder.
- Connect a clear plastic hose [A] to the bleed valve on the rear master cylinder, and run the other end of the hose into a container.



Brake Fluid

- Bleed the brake line and the rear master cylinder as follows:
- ORepeat this operation until no more air can be seen coming out into the plastic hose.
- 1. Pump the brake pedal until it becomes hard, and apply the brake pedal and hold it [A].
- 2. Quickly open and close [B] the bleed valve while holding the brake pedal applied.
- 3. Release the brake pedal [C].

NOTE

O The fluid level must be checked several times during the bleeding operation and replenished as necessary. If the fluid in the reservoir runs completely out any time during bleeding, the bleeding operation must be done over again from the beginning since air will have entered the line.





- Remove the clear plastic hose.
- Tighten:

Torque - Rear Master Cylinder Bleed Valve: 5.4 N·m (0.55 kgf·m, 48 in·lb)

- Install the rubber cap.
- Repeat the previous step for front calipers [A].
- After the air bleeding, tighten the caliper bleed valves.

Torque - Caliper Bleed Valves: 5.4 N·m (0.55 kgf·m, 48 in·lb)



- When air bleeding is finished, add fluid up to the upper level in the reservoir.
- Tighten:
 - Torque Front Master Cylinder Reservoir Cap: 3.4 N·m (0.35 kgf·m, 30 in·lb)
- Apply the brake forcefully for a few seconds, and check for fluid leakage around the fittings.

12-10 BRAKES

Brake Pedal and Master Cylinder

Brake Pedal Play Inspection

 Refer to the Brake Pedal Play Inspection in the Periodic Maintenance chapter.

Brake Pedal Removal

- Lift and hold the front fender (see Front Fender Removal in the Frame chapter).
- Remove:
 - Brake Light Switch Spring [A]
- Remove: Cotter Pin and Pin [A] Cotter Pin and Brake Shaft [B] Spring [C] Brake Pedal [D]

Brake Pedal Installation

- Apply grease to the brake shaft [A].
- Install:
 - Brake Pedal [B] Spring [C] Brake Shaft New Cotter Pin [D] Push Rod [E] and Pin [F] New Cotter Pin [G]
- Bend the cotter pins over the shaft and pin ends.

• Install:

- Brake Light Switch Spring
- After the spring is installed, bend the spring ends to prevent it from coming off.

Install:

Front Fender (see Front Fender Installation in the Frame chapter)







Brake Pedal and Master Cylinder

Front Master Cylinder Removal

• Remove:

Brake Hose Banjo Bolts [A] Brake Pipe Nipple [B] (unscrew)

• Immediately wipe up any brake fluid that spills.

CAUTION

Brake fluid quickly ruins painted surface; any spilled fluid should be completely washed away immediately.

• Remove:

Front Master Cylinder Mounting Bolts [C] Front Master Cylinder [D]

Front Master Cylinder Installation

• Install:

Front Master Cylinder Front Master Cylinder Mounting Bolts

• Tighten:

Torque - Front Master Cylinder Mounting Bolts: 25 N·m (2.5 kgf·m, 18 ft·lb)

- Use a new flat washer on each side of the brake hose fitting.
- Tighten:

Torque - Brake Hose Banjo Bolts: 25 N·m (2.5 kgf·m, 18 ft·b) Brake Pipe Nipple: 17.5 N· (1.8 kgf·m, 13 ft·lb)

- Bleed the brake line after master cylinder installation.
- Adjust the brake pedal play (see Brake Pedal Play Inspection).
- Check that the brake line has proper fluid pressure and no fluid leakage.

Front Master Cylinder Disassembly/Assembly

• Refer to the Front Brake Master Cylinder Cup and Dust Seal Replacement in the Periodic Maintenance chapter.



12-12 BRAKES

Brake Pedal and Master Cylinder

Front Master Cylinder Inspection

- Disassemble the front master cylinder (see Front Brake Master Cylinder Cup and Dust Seal Replacement in the Periodic Maintenance chapter).
- Check that there are no scratches, rust or pitting on the inside of the cylinder [A] and on the outside of the pistons [B].
- \star If the cylinder or piston shows any damage, replace them.
- Inspect the primary cups [C] and secondary cups [D].
- ★ If a cup is worn, damaged, softened (rotted), or swollen, replace it.
- ★ If fluid leakage is noted at the brake push rod, the secondary cup of the rear piston should be replaced.
- Check the dust cover [E] for damage.
- \star If it is damaged, replace it.
- Check that the relief [F] and supply [G] ports are not plugged.
- ★ If the small relief port becomes plugged, the brake shoes will drag on the drum. Blow the ports clean with compressed air.
- Check the piston return springs [H] for any damage.
- \star If the spring is damaged, replace it.

Rear Master Cylinder Removal

- Remove:
- Brake Pipe Nipple [A] (unscrew)
- Immediately wipe up any brake fluid that spills.

CAUTION

Brake fluid quickly ruins painted surface; any spilled fluid should be completely washed away immediately.

Remove:

Rear Master Cylinder Mounting Bolts [B] Rear Master Cylinder [C] and Shims

Rear Master Cylinder Installation

- Apply specified oil to the rod end [A].
- Apply grease to the O-ring [B].
- Install:
 - Rear Master Cylinder [C] and Shims
- Apply a non-permanent locking agent to the rear master cylinder mounting bolts.
- Tighten:
 - Torque Rear Master Cylinder Mounting Bolts (M8): 27 N·m (2.8 kgf·m, 20 ft·lb)
 - Brake Pipe Nipple: 17.5 N·m (1.8 kgf·m, 13 ft·lb)
- Bleed the brake line after master cylinder installation.
- Check that the brake line has proper fluid pressure and no fluid leakage.

Rear Master Cylinder Disassembly/Assembly

• Refer to the Rear Brake Master Cylinder Cup, O-ring and Boot Replacement in the Periodic Maintenance chapter.







Brake Pedal and Master Cylinder

Rear Master Cylinder Inspection

- Disassemble the rear master cylinder (see Rear Brake Master Cylinder Cup, O-ring and Boot Replacement in the Periodic Maintenance chapter).
- Check that there are no scratches, rust or pitting on the inside of the cylinder [A] and on the outside of the pistons [B].
- \star If the cylinder or piston shows any damage, replace them.
- Inspect the cup [C].
- ★ If a cup is worn, damaged, softened (rotted), or swollen, replace it.
- ★ If fluid leakage is noted at the push rod [D], the cup of the piston should be replaced.
- Check the boot [E] for damage.
- ★ If it is damaged, replace it.
- Check the piston return springs [F] for any damage.
- \star If the spring is damaged, replace it.



12-14 BRAKES

Calipers

Front Brake Caliper Removal

- Remove the front wheel (see Wheel Removal in the Wheels/Tires chapter).
- Loosen the banjo bolt [A] at the brake hose lower end, and tighten it loosely.
- Unscrew the caliper mounting bolts [B], and detach the caliper [C] from the disc.
- Unscrew the banjo bolt and remove the brake hose [D] from the caliper.

CAUTION

Immediately wash away any brake fluid that spills.

NOTE

Olf the caliper is to be disassembled after removal and if compressed air is not available, disassemble the caliper before the brake hose is removed (see Front Brake Caliper Piston Seal and Dust Seal Replacement).

Front Brake Caliper Installation

• Install the caliper and brake hose lower end.

- OReplace the washers that are on each side of hose fitting with new ones.
- Touch the stopper of the brake hose to the stopper on the caliper.
- Tighten:
 - Torque Brake Caliper Mounting Bolts: 33 N·m (3.5 kgf·m, 25 ft·lb)

Brake Hose Banjo Bolt: 25 N·m (2.5 kgf·m, 18 ft·lb)

- Check the fluid level in the brake reservoir.
- Bleed the brake line (see Brake Line Air Bleeding).
- Check the brake for good braking power, no brake drag, and no fluid leakage.

A WARNING

Do not attempt to drive the vehicle until a firm brake pedal can be obtained by pumping the brake pedal until the pads are against each disc. The brakes will not function on the first application of the pedal if this is not done.

Front Brake Caliper Disassembly

• Refer to the Front Brake Caliper Piston Seal and Dust Seal Replacement in the Periodic Maintenance chapter.

Front Brake Caliper Assembly

• Refer to the Front Brake Caliper Piston Seal and Dust Seal Replacement in the Periodic Maintenance chapter.



Calipers

Front Brake Caliper Piston and Cylinder Damage Inspection

- Visually inspect the piston [A] and cylinder surfaces [B].
- ★ Replace the caliper if the cylinder and piston are badly scored or rusty.



Front Brake Caliper Holder Shaft Wear Inspection

The caliper body must slide smoothly on the caliper holder shafts [A]. If the body does not slide smoothly, one pad will wear more than the other, pad wear will increase, and constant drag on the disc will raise brake and brake fluid temperature.

- Check to see that the caliper holder shafts are not badly worn or stepped, and that the rubber boots [B] are not damaged.
- \star If the rubber boot is damaged, replace the rubber boot.
- ★If caliper holder shaft is damaged, replace the caliper holder shaft and rubber boot as a unit.



12-16 BRAKES

Brake Pads

Front Brake Pad Removal

- Detach the caliper from the disc (see Front Brake Caliper Removal).
- Remove: Pad Mounting Bolts [A]







Front Brake Pad Installation

- Push the caliper piston in by hand as far as it will go.
- Be sure that the anti-rattle spring is in place.
- Install:
 - Brake Pads
 - Pad Mounting Bolts
- Tighten:
 - Torque Front Brake Pad Mounting Bolts: 17 N·m (1.7 kgf·m, 13 ft·lb)

WARNING

Do not attempt to drive the vehicle until a firm brake lever can be obtained by pumping the brake lever until the pads are against each disc. The brake will not function on the first application if this is not done.

Front Brake Pad Wear Inspection

• Refer to the Front Brake Pad Wear Inspection in the Periodic Maintenance chapter.

Brake Discs

Front Brake Disc Cleaning

Poor braking can be caused by oil on a disc. Oil on a disc must be cleaned off with an oilless cleaning fluid such as trichloroethylene or acetone.

A WARNING

These cleaning fluids are usually highly flammable and harmful if breathed for prolonged periods. Be sure to heed the fluid manufacturer's warnings.

Front Brake Disc Removal

 Remove: Front Hub (see Front Hub Removal in the Wheels/Tires

chapter) Brake Disc Mounting Bolts [A] Brake Disc [B]

Front Brake Disc Installation

- The disc must be installed with the marked side [A] facing toward the steering knuckle.
- Apply a non-permanent locking agent to the brake disc mounting bolts.
- Tighten:

Torque - Front Brake Disc Mounting Bolts: 42 N·m (4.3 kgf·m, 31 ft·lb)

• After installing the discs, check the disc runout. Completely clean off any grease that has gotten on either side of the disc with a high-flash point solvent. Do not use one which will leave an oily residue.

Front Brake Disc Wear Inspection

- Measure the thickness of each disc at the point [A] where it has worn the most.
- \star Replace the disc if it has worn past the service limit.

Disc Thickness Standard: 4.6 ~ 5.0 mm (0.181 ~ 0.197 in.) Service Limit: 4.3 mm (0.17 in.)

Front Brake Disc Runout Inspection

- Jack up the vehicle so that the wheels are off the ground.
- Remove the front wheels and turn the handlebar fully to one side.
- Set up a dial gauge against the disc [A], and measure the disc runout.
- \bigstar If the runout exceeds the service limit, replace the disc.

Disc Runout Standard: TIR 0.25 mm (0.010 in.) or less Service Limit: TIR 0.3 mm (0.012 in.)









12-18 BRAKES

Brake Hoses and Pipes

Brake Hose and Pipe InspectionRefer to the Brake Hose and Pipe Connections Inspection in the Periodic Maintenance chapter.

Brake Hose Replacement

• Refer to the Brake Hose Replacement in the Periodic Maintenance chapter.

Parking Brake Pedal and Cables

Parking Brake Pedal Inspection

• Refer to the Parking Brake Pedal Inspection in the Periodic Maintenance chapter.

Parking Brake Pedal Removal

- Remove:
 - Control Panel (see Control Panel Removal in the Frame chapter)
 - Cable Locknuts [A]
- Remove the cable end from the pin [B].
- Remove:
 Spring
 - Spring [C] Circlip [D] Washer [E]
 - Parking Brake Pedal [F]
- When removing the parking release lever [G], remove the following parts. Spring [H]
 - Circlip and Washer [I]

Parking Brake Pedal Installation

- Apply grease: Parking Brake Pedal Pivot [A] Parking Release Lever Pivot [B]
- Install: Parking Brake Pedal [C] New Bushings [D] (press, if installing) Pin [E] Washer [F] New Circlip [G] Spring [H] Parking Release Lever [I] Washer [J] New Circlip [K] Spring [L]
- When installing the parking brake indicator light switch [M], install the washer [N] and tighten the parking brake indicator light switch screws [O].

Torque - Parking Brake Indicator Light Switch Screws: 0.4 N·m (0.04 kgf·m, 3.5 in·lb)

Parking Brake Cable Removal

• Remove:

Control Panel (see Control Panel Removal in the Frame chapter)

Cable Locknuts [A]

• Loosen the cable mounting nuts [B] and remove the cable [C] from the bracket.







12-20 BRAKES

Parking Brake Pedal and Cables

- Remove:
 - Adjuster [A]
 - Pin [B] Washer
 - Spring [C]
- Remove the cable from the bracket and remove it from the frame.

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Parking Brake Cable Installation

- Run the 2WD/4WD shift cable according to the Cable, Wire and Hose Routing section in the Appendix chapter.
- Install the front side of parking brake cable [A] as shown in the figure.
 - Cable Mounting Nut [B]
 - 10 mm (0.39 in.) [C]
- Install the rear side of parking brake cable [D] as follows.
- Install the following parts in the lever [E] temporarily. Rear End of Parking Brake Cable Washer and Pin Adjuster [F]
- Push the lever to right side until the lever is stopped without spring.

Setting Position [G]

- Then tighten the adjuster until the pin touches the lever and return the adjuster 3 ~ 5 rotations.
- Install the spring.
- Check the parking brake for good braking power and when the parking brake released, no brake drag.

Parking Brake Cable Lubrication

Whenever the brake cable is removed, lubricate the cable as follows:

• Lubricate the cable with a penetrating aerosol cable lubricant through the pressure cable luber.

Internal Wet Brake

Internal Wet Brake DisassemblyRefer to Rear Final Gear Case section in the Final Drive chapter.

Internal Wet Brake AssemblyRefer to Rear Final Gear Case section in the Final Drive chapter.

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