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BR

BRAKES

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MBR00001-00000

BASIC CHECK

BRAKE PEDAL

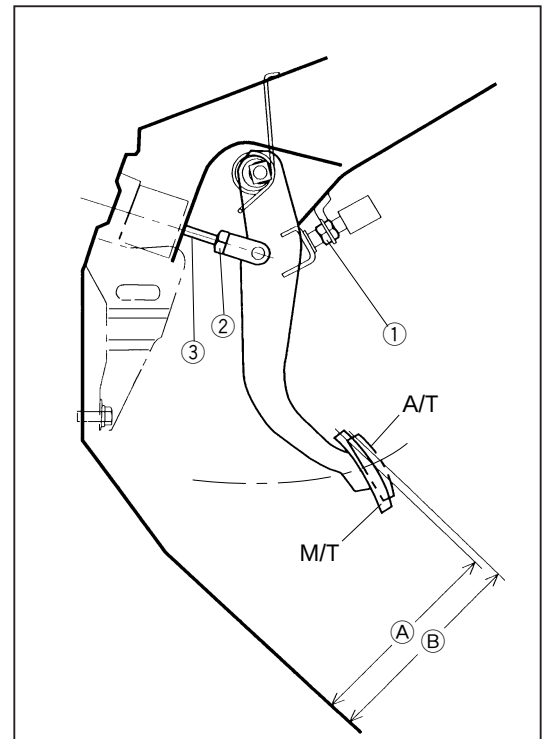
1. Ensure that the brake pedal height is within the specified value by measuring the brake pedal height.

Specified Value	RHD MT:	143.7 ± 5 mm
	AT:	148.4 ± 5 mm
	LHD MT:	109.8 ± 5 mm
	AT:	98.7 ± 5 mm

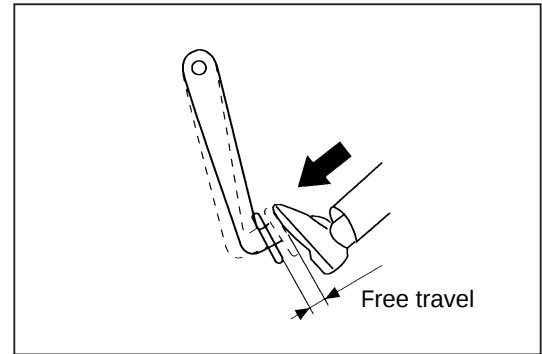
2. Pedal height adjustment

- (1) Disconnect the connector from the stop lamp switch.
- (2) Slacken the nut (①) of the stop lamp switch and screw out the stop lamp switch, until the brake pedal has a free travel.
- (3) Slacken the lock nut (②) of the brake pedal clevis. Turn the push rod (③) so as to adjust the pedal height to the specified value.
- (4) Tighten the lock nut (②) of the brake pedal clevis to the specified tightening torque.
Tightening Torque: 25.5 ± 2.9 N·m

- (5) Screw in the stop lamp switch, until the clearance between the brake pedal cushion and the edge of the threaded portion of the stop lamp switch becomes 1.5 mm.
- (6) Tighten the lock nut (①) of the stop lamp switch to the specified tightening torque.
Tightening Torque: $19.4 - 31.6$ N·m
- (7) Connect the connector of the stop lamp switch. Then, proceed to the brake pedal free travel check.



MBR00002-00001



MBR00003-00002

3. Pedal free travel check

- (1) After turning off the engine, depress the brake pedal several times so that no vacuum may remain in the brake booster.
- (2) Measure the brake pedal free travel by pushing the brake pedal lightly by hand. Here, the brake pedal free travel means the distance from a point where the brake pedal is free to a point where you begin to feel a resistance.
Specified Value: $0.5 - 3$ mm

- (3) Ensure that the free travel is within the specified value.
If the brake pedal free travel fails to meet the specified value, adjust the brake pedal free travel to the specified value.

4. Pedal free travel adjustment

- (1) Slacken the nut (②) of the brake pedal clevis.
- (2) Turn the push rod (③) so as to adjust the pedal free travel to the specified value.
Specified Value: $0.5 - 3$ mm

- (3) Tighten the lock nut of the brake pedal clevis.
Tightening Torque: 25.5 ± 2.9 N·m

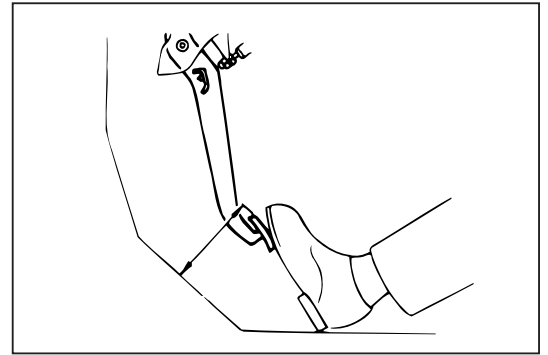
- (4) Ensure that the brake pedal height is within the specified value and the stop lamp functions properly.

MBR00004-00000

5. Pedal reserve travel check

- (1) Start the engine and run the engine at idling.
- (2) Depress the brake pedal with a pedal applying force of 300 N with the parking brake lever returned.
- (3) Measure the distance between the upper surface of brake pedal pad center and the upper surface of protrude section of the floor carpet face.

Specified Value RHD: 62 mm or more
LHD: 66 mm or more

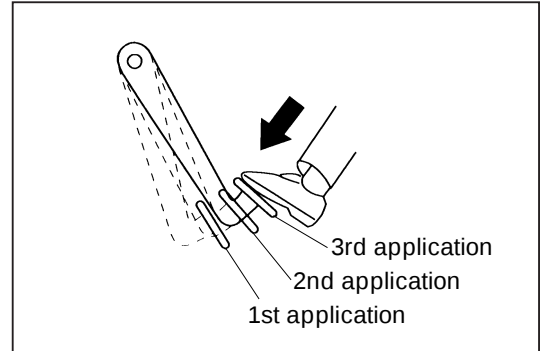


MBR00005-00003

BOOSTER**IN-VEHICLE CHECK**

1. Booster air-tight performance check

- (1) Start the engine.
 - (2) Turn off the engine after a few minutes.
 - (3) Ensure that the position of the brake pedal height progressively rises every time the brake pedal is depressed.
- If the position of the brake pedal rises progressively at the second and third applications, it indicates the brake booster is functioning properly.



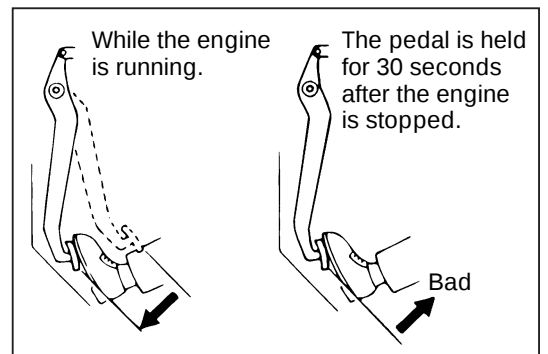
MBR00006-00004

CAUTION:

- Be sure to keep intervals of each application of the brake pedal at least five seconds or more; namely intervals between the first and second applications as well as between the second and third application.

2. Booster air-tight performance check under loaded condition

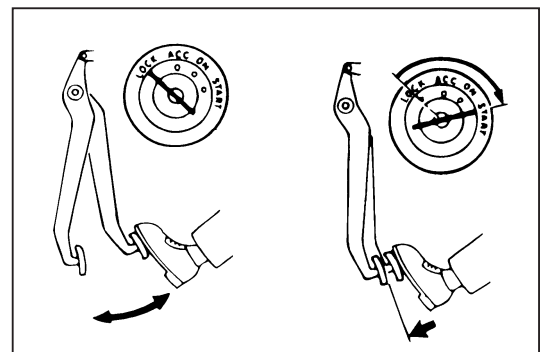
- (1) Start the engine.
- (2) Depress the brake pedal fully.
- (3) Turn off the engine while depressing the brake pedal.
- (4) Ensure that the brake pedal height remains unchanged for more than 30 seconds. It indicates that the booster is functioning properly.



MBR00007-00005

3. Booster operation check

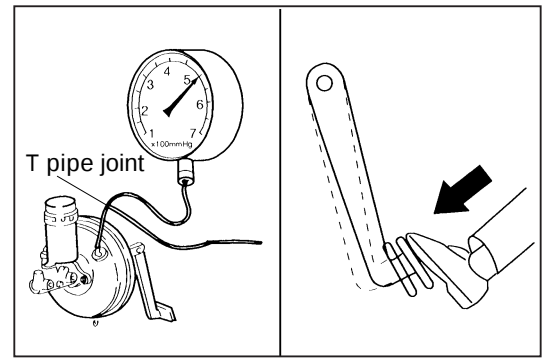
- (1) Depress the brake pedal several times under the engine stopped state, until the brake pedal height will no longer change (to release the vacuum pressure retained in the brake booster).
- (2) Ensure that the height of the brake pedal will go down when the engine is started while keeping the depressing force of the brake pedal unchanged. It indicates that the booster is functioning properly.



MBR00008-00006

4. Booster air-tight performance check under loaded condition
 - (1) Connect a negative pressure gauge to the booster, using a "T or Y" pipe joint.
 - (2) Start the engine with the brake pedal depressed with a force of 200 N.
 - (3) Stop the engine when the negative pressure exceeds 500 mmHg.
 - (4) Ensure that the negative pressure retained in the brake booster will not drop 25 mmHg or more for 15 seconds after the engine is stopped.

It means that the air tightness is proper. If not, check air leakage of the check valve in the brake booster hose.



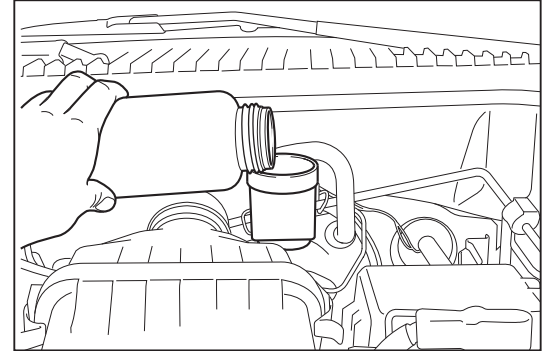
MBR00009-00007

AIR BLEEDING

1. Fill and maintain the brake fluid level in the reservoir tank at the upper level during the operation.

NOTE:

- If the brake fluid is spilled inadvertently over the paint-finish surface of the vehicle or resin-made parts, immediately wipe off the brake fluid and flush with fresh water.
- When draining the brake fluid, do not fill brake fluid into the reservoir tank.

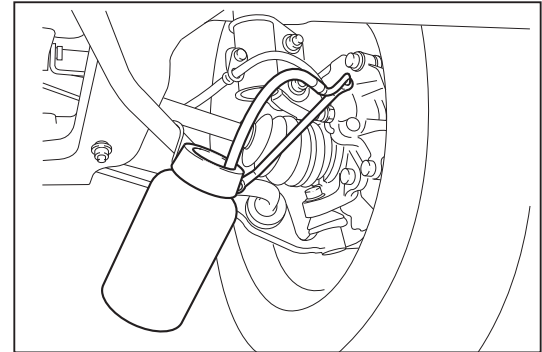


MBR00010-00008

2. Connection of vinyl hose to bleeder plug of wheel cylinder
Connect a suitable vinyl or rubber hose to the bleeder plug of the wheel cylinder and submerge one end of the vinyl or rubber hose in a container filled with the brake fluid. Connect the other end of the vinyl hose to the wheel cylinder bleeder plug of the vehicle.

NOTE:

- Start the air bleeding operation at the wheel cylinder which is located at the furthestmost point from the master cylinder.



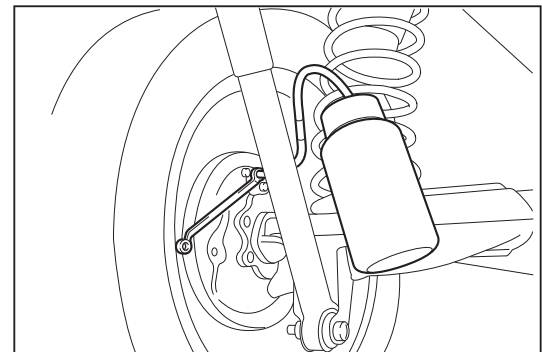
MBR00011-00009

3. Air bleeding

- (1) Perform the operation by two persons. One person should depress the brake pedal slowly and hold it in a depressed state.
- (2) While depressing the brake pedal, the other person slackens the bleeder plug 1/3 through 1/2 turn to drain the brake fluid. Then, tighten the bleeder plug temporarily.
- (3) Repeat the steps (1) and (2) above, until bubbles are no longer observed in the fluid.

NOTE:

- It may require more time than the ordinary brake system if the vehicle is equipped with ABS.



MBR00012-00010

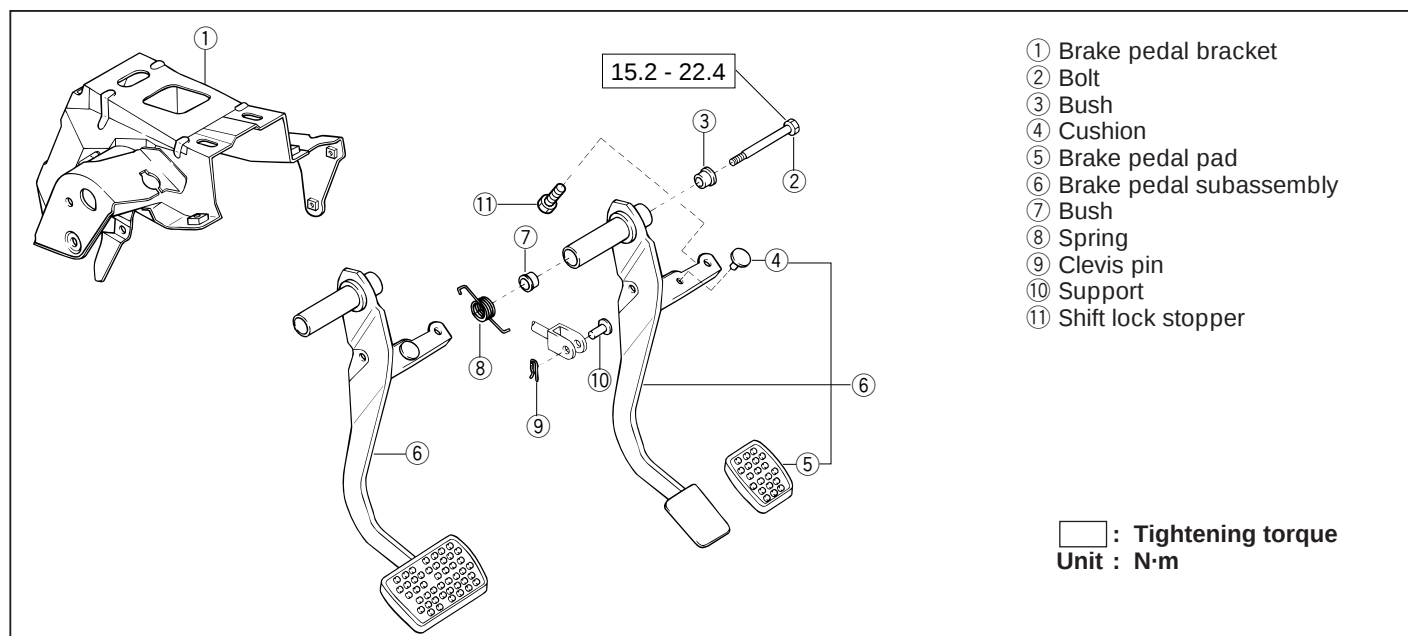
- (4) Tighten the bleeder plug securely to the specified tightening torque.

Tightening Torque: 6.9 - 9.8 N·m

4. Checking of brake fluid leakage

Ensure that no brake fluid leakage exists on the brake line when the brake pedal is depressed fully.

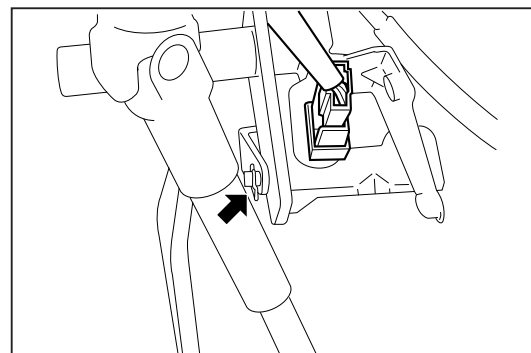
BRAKE PEDAL COMPONENTS



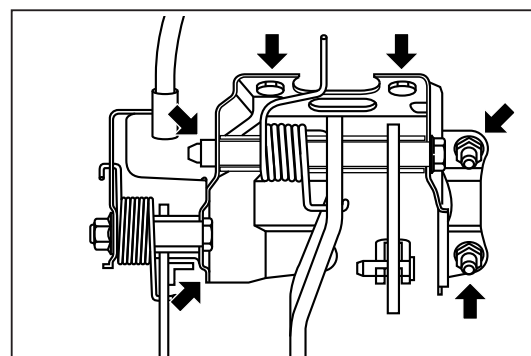
MBR00013-00011

REMOVAL

1. Remove the instrument panel finish lower panel.
(Refer to the BO section.)
2. Disconnect the connector from the stop lamp switch while unlocking its lock.
3. Remove the stop lamp switch by screwing it out.
4. Disengage the clutch cable from the clutch pedal. (Only for models with manual transmission.)
5. Remove the clip and pin from the brake pedal clevis.
6. Remove the brake pedal bracket by removing the attaching two bolts and four nuts.
7. Remove the clutch pedal from the brake pedal bracket.
8. Remove the brake pedal by removing its attaching bolts.
9. Remove the spring from the brake pedal.
10. Remove the bushes from the brake pedal.
11. Remove the brake pedal pad and cushion from the brake pedal.

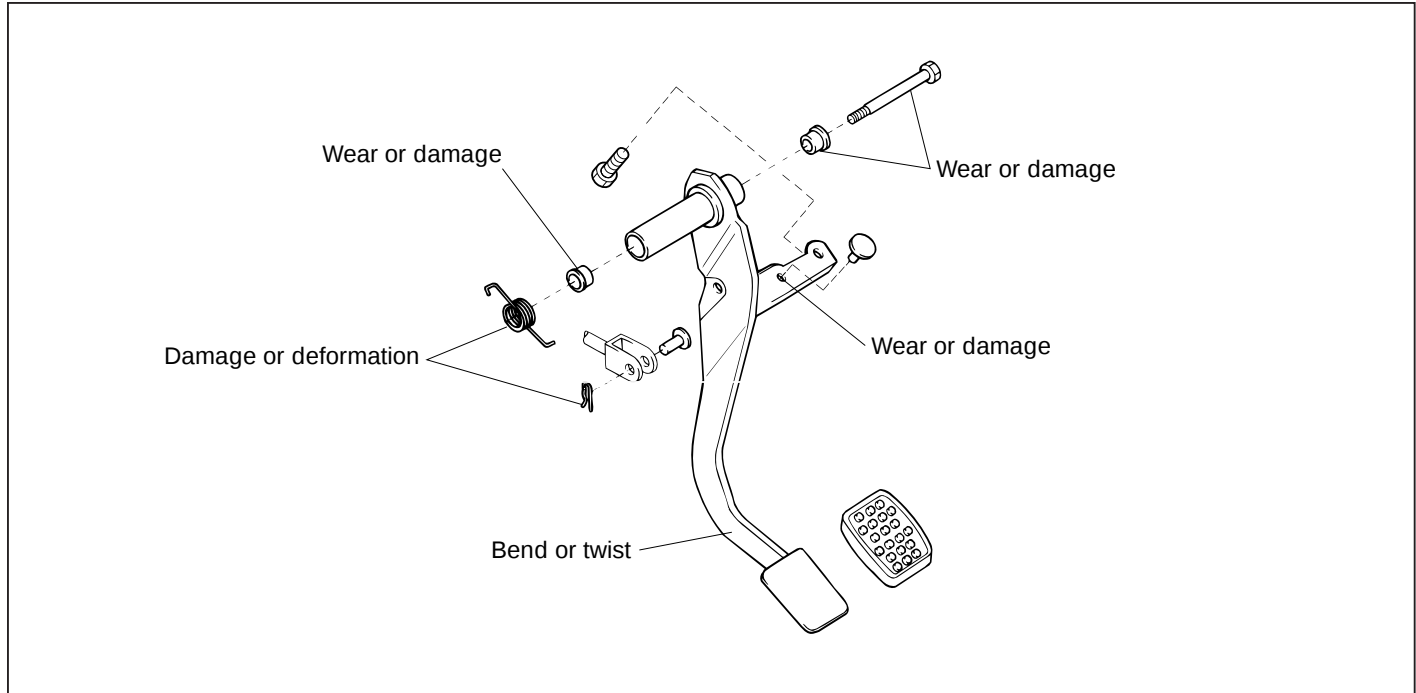


MBR00014-00012



MBR00015-00013

12. Inspect the following parts.



MBR00016-00014

INSTALLATION

1. Apply the specified grease to those points indicated in the right figure.

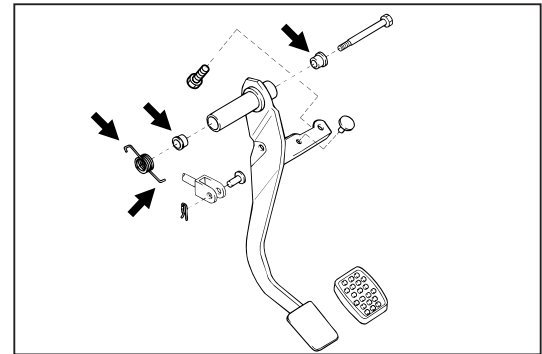
Specified Grease:

Lithium soap base multi-purpose grease

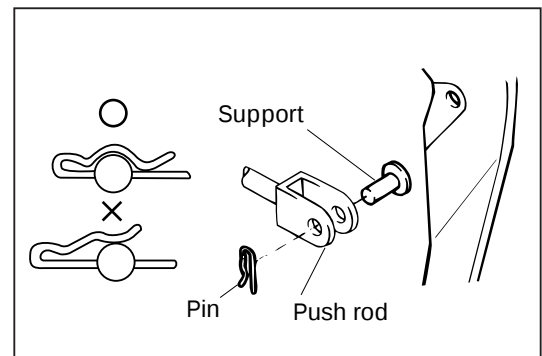
2. Install the cushion, brake pedal pad, bushes and spring to the brake pedal.
3. Install the brake pedal on the brake pedal bracket.
4. Install the brake pedal to the brake pedal bracket while connecting the spring end to the brake pedal bracket with the brake pedal attaching bolt. Then, tighten the bolt to the specified tightening torque.

Tightening Torque: 15.2 - 22.4 N·m

5. Install the clutch pedal to the brake pedal bracket.
6. Apply the lithium soap base multi-purpose grease to the clevis pin contacting surface of the brake pedal.
7. Connect the clevis to the brake pedal with the pin and install the clip to the pin securely.



MBR00017-00015

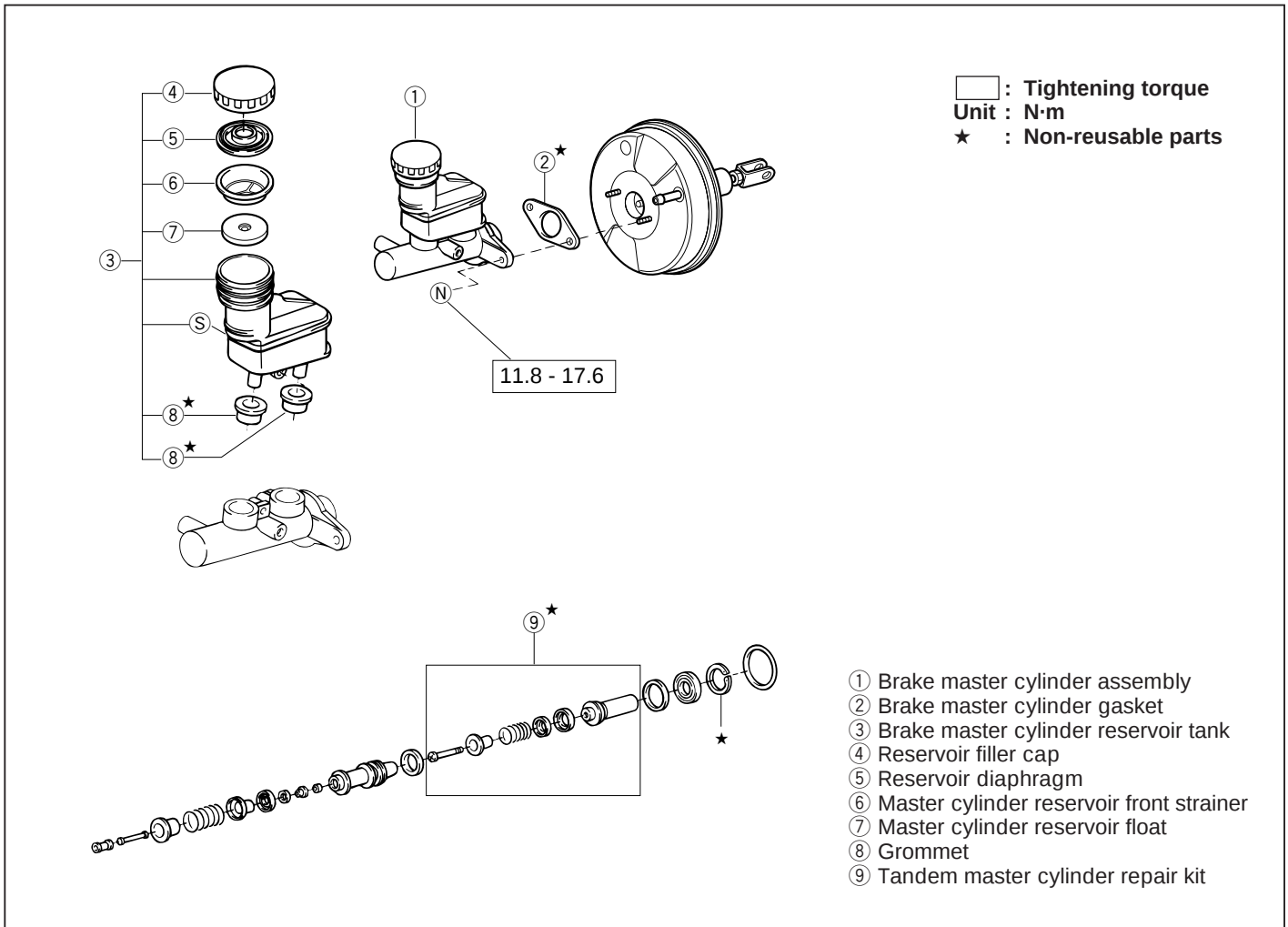


MBR00018-00016

- NOTE:
- When installing the pin, make sure that the clip has settled completely in the protruding portion of the pin.
8. Install the brake pedal bracket to the body with attaching bolts and nuts.
 9. Connect the clutch cable to the clutch pedal. (Only for manual transmission-equipped model.)
 10. Screw in the stop lamp switch to the brake pedal bracket. (Refer to the BR-2.)
 11. Connect the connector to the stop lamp switch while locking its lock.
 12. Perform the check and adjustment of the brake pedal. (Refer to the BR-2.)
 13. Install the instrument finish panel lower panel. (Refer to the BO section.)
 14. Check that no abnormal noise is emitted when the brake pedal is depressed.

MBR00019-00000

BRAKE MASTER CYLINDER COMPONENTS



MBR00020-00017

REMOVAL

1. Remove the air cleaner case cover and air duct from the vehicle. (Refer to the MA section.)
2. Disconnect the connector of the brake fluid level switch.
3. Drain the brake fluid from the master cylinder. (Refer to the "Air bleeding" section for procedure.)
4. Disconnect the brake pipes from the master cylinder.

CAUTION:

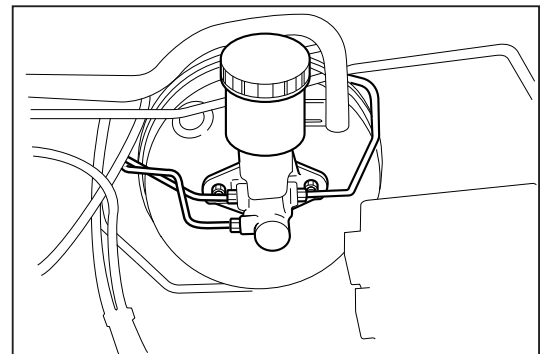
- If the brake fluid is spilled inadvertently over the paint-finish surface of the vehicle or resin-made parts, immediately wipe off the brake fluid and wash with fresh water.

5. Remove the master cylinder and gasket from the brake booster by removing the two attaching nuts.

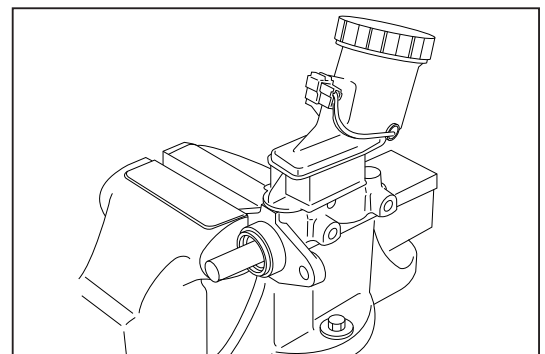
NOTE:

- The O-ring is installed on the master cylinder. It may be hard to remove the master cylinder from the brake booster.

6. Secure the master cylinder to a vise.



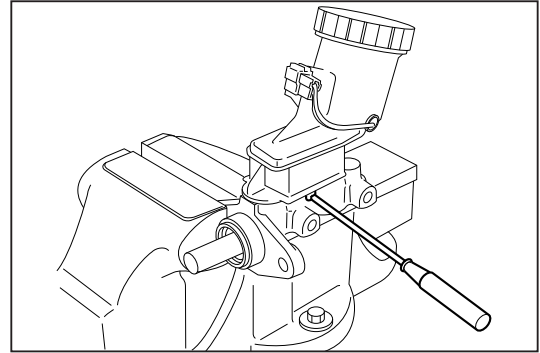
MBR00021-00018



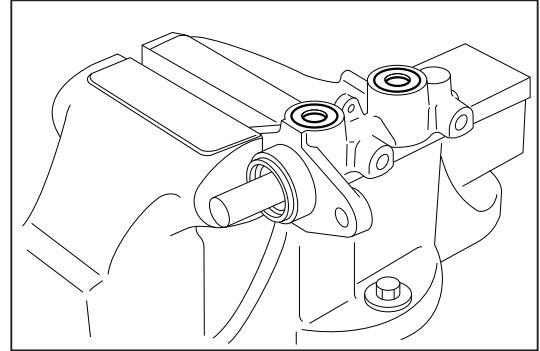
MBR00022-00019

BR-8

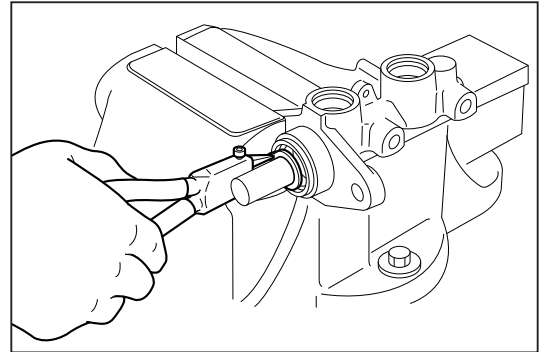
7. Pull out the brake master cylinder reservoir tank from the master cylinder by removing the attaching screw.



8. Remove the grommets from the master cylinder or reservoir tank.



9. Using snap ring pliers, detach the snap ring while the pistons are being pushed by means of a suitable bar.



10. Remove the piston No. 1 from the master cylinder.

CAUTION:

- Remove the piston straight, being very careful not to scratch the cylinder bore.

11. Remove the piston No. 2 by lightly applying compressed air at the brake pipe hole.

WARNING:

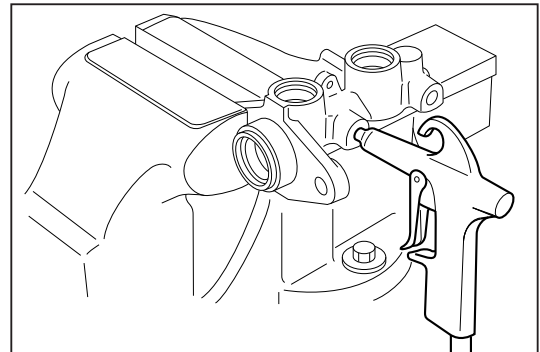
- Be sure to protect your eyes by wearing safety goggles, when using compressed air.

CAUTION:

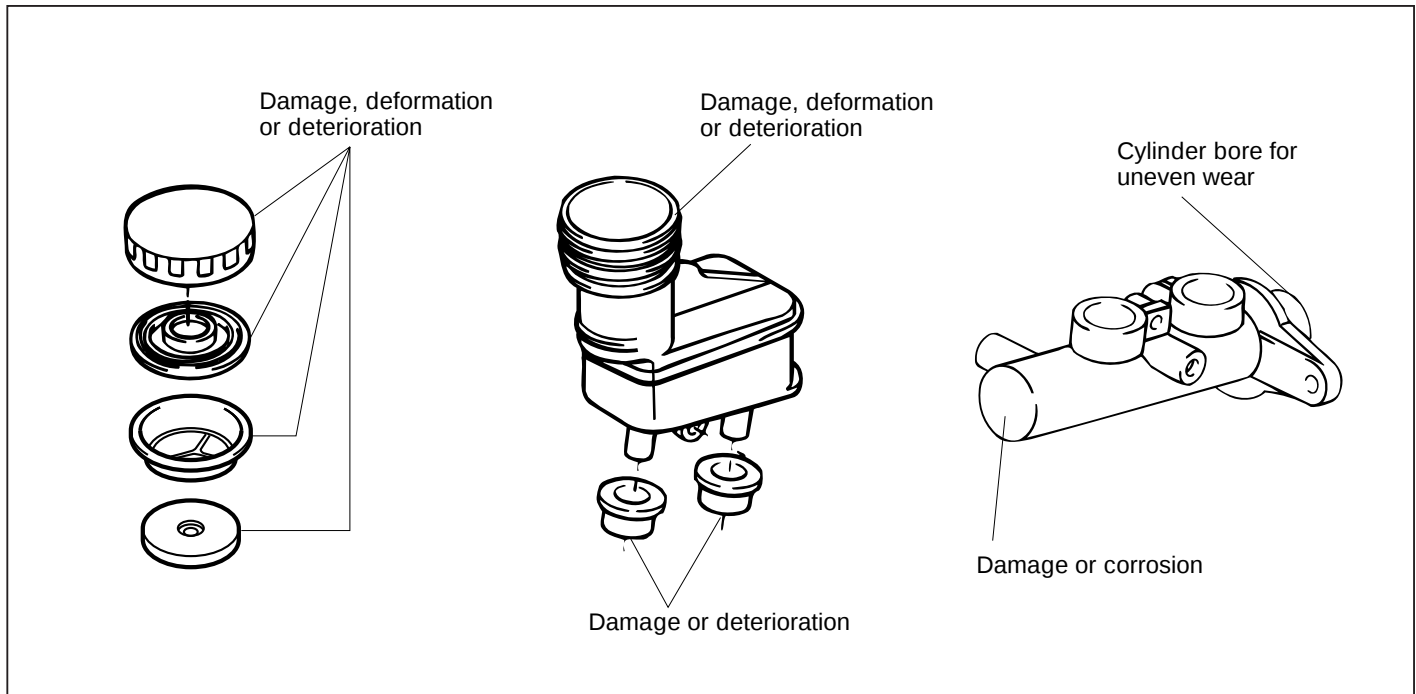
- Never score the cylinder bore during the removal of the piston No. 2.
Remove the piston in a straight direction.

NOTE:

- Be sure to prevent the brake fluid from splashing, using a piece of cloth or the like.



12. Inspect the following parts. If any problem is found, repair them, as required.



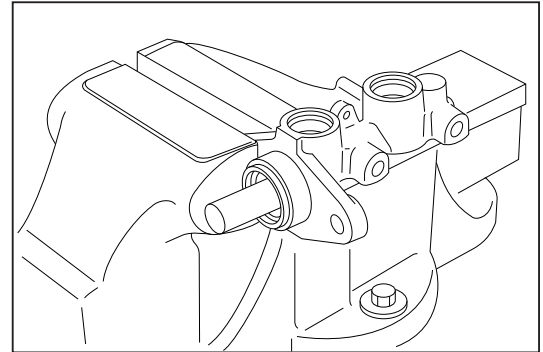
MBR00027-00024

ASSEMBLY

1. Wash the master cylinder and components with washing solvent and dry them with compressed air.

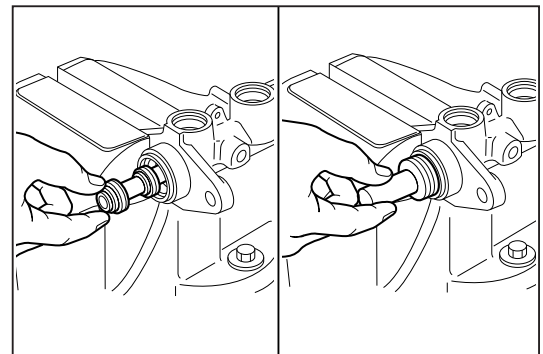
WARNING:

- Be sure to protect your eyes by wearing safety goggles, when using compressed air.



MBR00028-00025

2. Thinly apply brake rubber grease to the lip section of the cups of the piston No. 2 assembly.
3. Install the piston No. 2 into the master cylinder.
4. Thinly apply brake rubber grease to the lip section of the cups and O-ring on the piston No. 1 assembly.

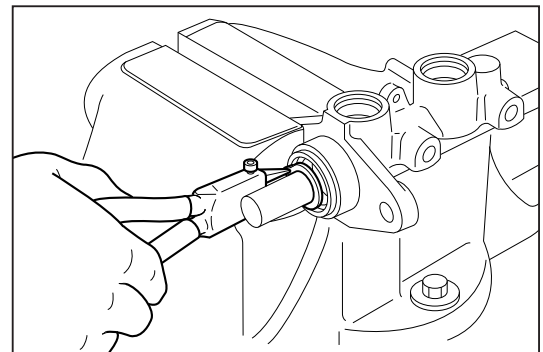


MBR00029-00026

5. Install the piston No. 1 assembly into the master cylinder.
6. Install a new snap ring while pushing the piston No. 1 into the master cylinder, using snap ring pliers.

WARNING:

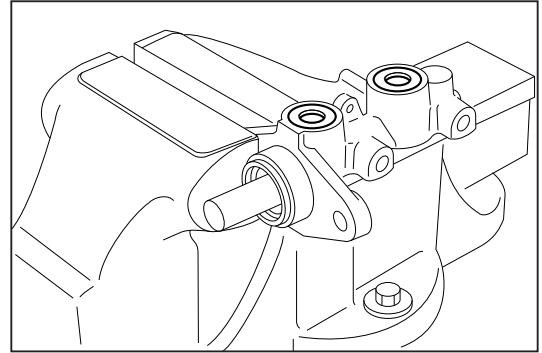
- Never reuse the removed snap ring.



MBR00030-00027

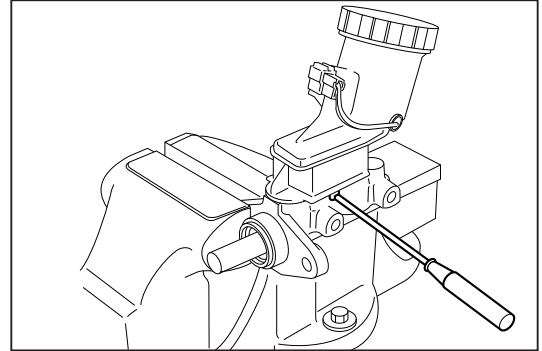
BR-10

7. Thinly apply brake rubber grease to the grommets.
8. Install the grommets to the master cylinder.



MBR00031-00028

9. Install the brake master cylinder reservoir tank to the master cylinder.
10. Secure the master cylinder reservoir tank to the master cylinder by installing a screw.



MBR00032-00029

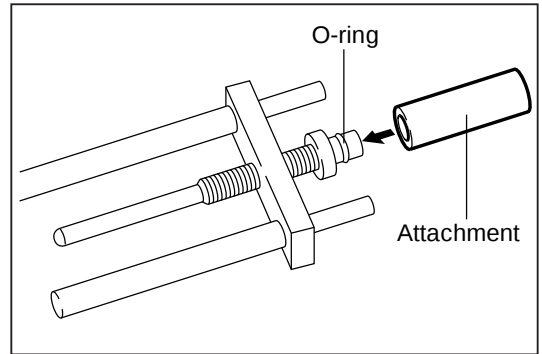
INSTALLATION

1. Check the clearance between the master cylinder and the brake booster push rod.

NOTE:

- Prepare the following SSTs.
SST: 09737-87002-000 (Part number of set)
09737-87003-000
09733-87401-000
09731-87401-000

- (1) Attach the SST on the master cylinder and perform the adjustment so that the clearance between the SST and the piston rod end may become zero by turning the adjusting nut of the SST.



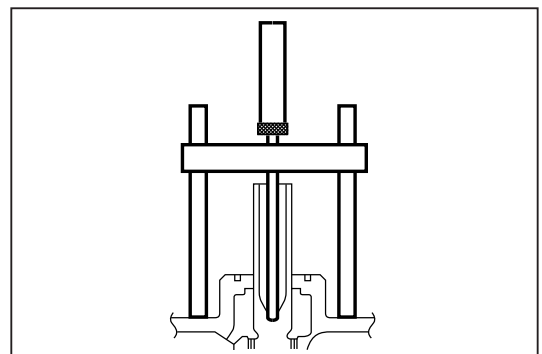
MBR00127-00108

- (2) Set the SST on the brake booster with a new gasket interposed.

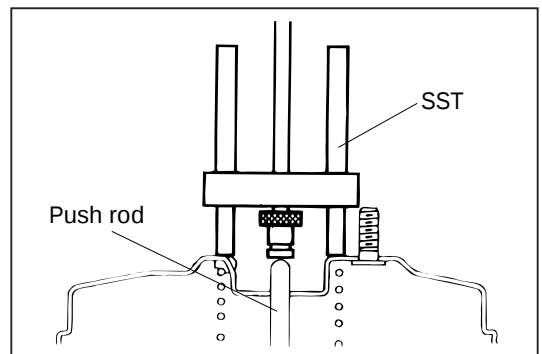
NOTE:

- Apply brake rubber grease to the shaft section of the SST.

- (3) Ensure that the clearance between the SST and the piston rod is zero.



MBR00000-00109



MBR00128-00110

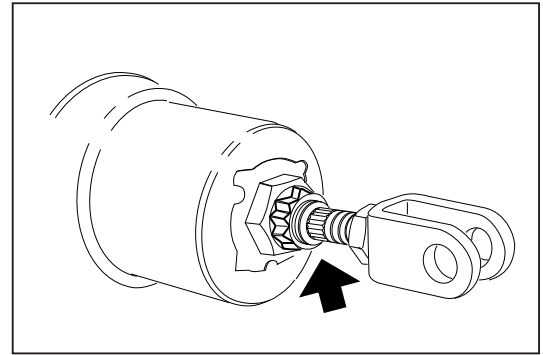
WARNING:

- Be sure to adjust the clearance properly. Failure to observe this caution may lead to brake system problem.

NOTE:

- If not, adjust the clearance between the SST and the piston rod to zero, by turning the adjusting nut and rod.

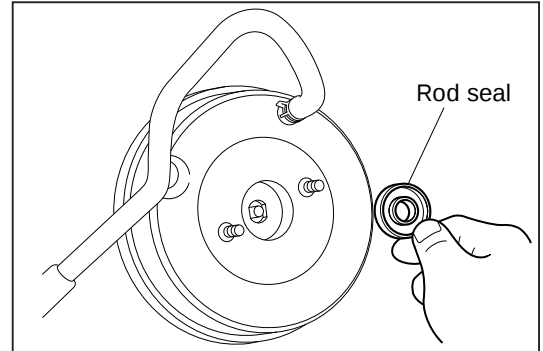
Tightening Torque: 17.6 - 24.5 N·m



MBR00129-00111

2. Thinly apply brake rubber grease to the oil seal on the master cylinder piston shaft.
3. Install the rod seal to the brake booster.
4. Install the master cylinder to the brake booster with attaching nuts. Tighten the attaching nuts evenly to the specified tightening torque.

Tightening Torque: 11.8 - 17.6 N·m



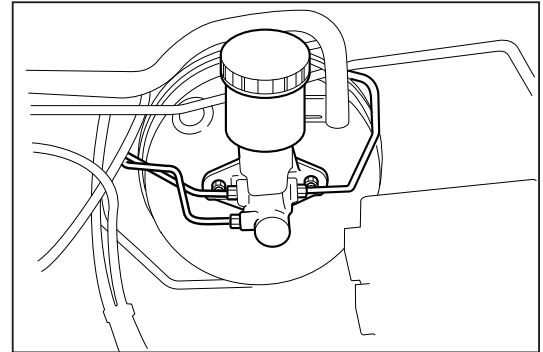
MBR00040-00035

WARNING:

- Be sure to perform the adjustment of the brake booster push rod height, if any inner part of the master cylinder has been replaced.
- Failure to observe this warning may lead to damage or malfunction of the brake system.

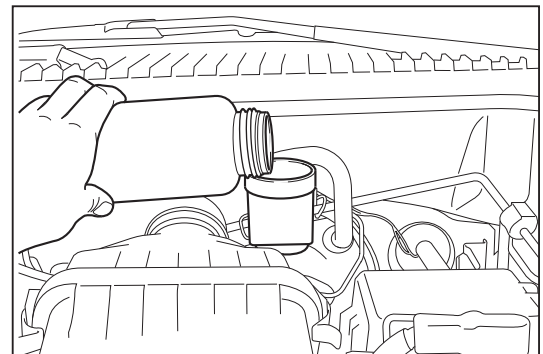
5. Temporarily connect the brake pipes to the master cylinder and tighten the flare nuts to the specified tightening torque.

Tightening Torque: 12.7 - 17.7 N·m



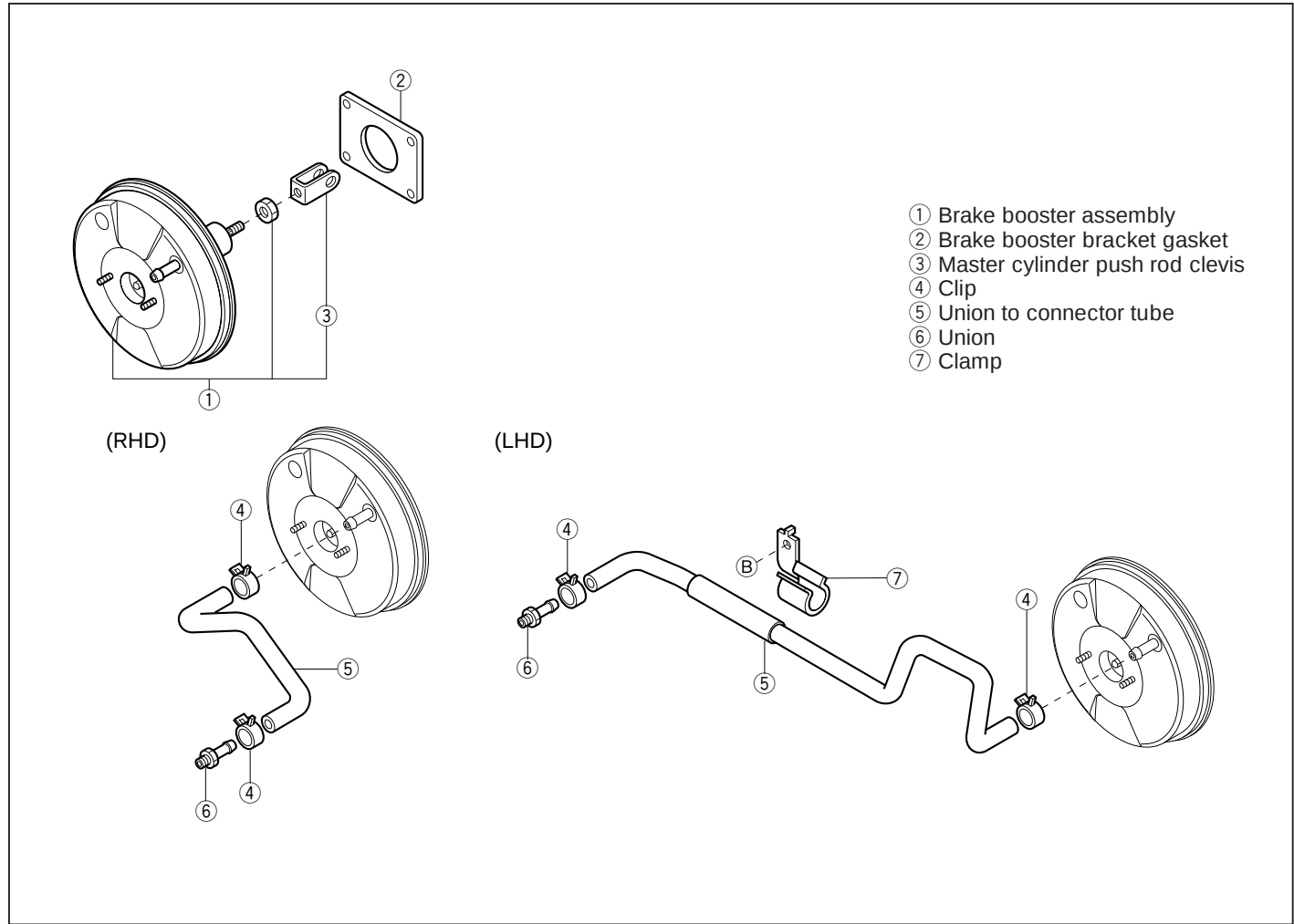
MBR00041-00036

6. Install the air cleaner case cover and air duct. (Refer to the MA section.)
7. Connect the brake fluid level switch connector.
8. Fill the brake fluid.
9. Perform air bleeding for the brake system. (Refer to the BR-4.)
10. Ensure that no fluid leakage exists on the brake system.
11. Perform the checks and adjustments of the brake pedal height. (Refer to the BR-2.)
12. Check the brake fluid leakage on the brake system.



MBR00042-00037

BRAKE BOOSTER COMPONENTS



MBR00043-00038

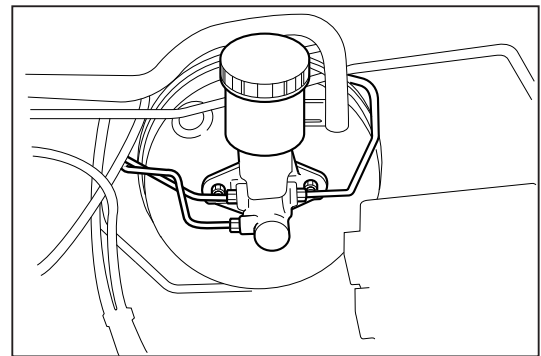
REMOVAL

1. Remove the air cleaner case cover and air duct.
(Refer to the MA section.)
2. Remove the vacuum hose from the brake booster.
3. Remove the brake master cylinder.
(Refer to the "Brake master cylinder" section for removal.)

CAUTION:

- If the brake fluid is spilled inadvertently over the paint finish surface of the vehicle or resin part, immediately wipe off the brake fluid and wash with fresh water.

4. Remove the brake pedal bracket.
(Refer to the "Brake pedal" section.)



MBR00044-00039

5. Loosen the brake booster attaching nuts evenly.
6. Remove the brake booster attaching nuts.
7. Remove the brake booster from the dash panel.

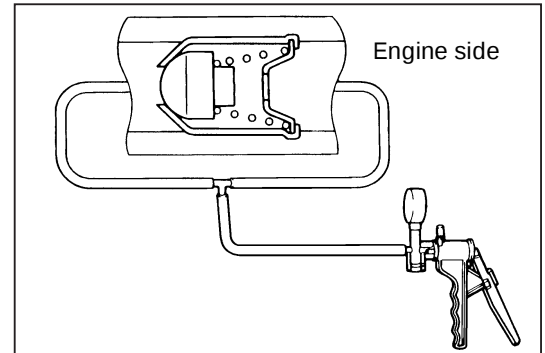
CAUTION:

- Be very careful not to deform the brake tubes during the removal of the brake booster.

MBR00045-00000

INSPECTION

1. Inspection of check valve (vacuum hose)
Check that continuity exists from the booster side to the engine side. Also, check that no continuity exists from the engine side to the booster side.
If the inspection results are not satisfactory, replace the vacuum hose.
2. Inspection of booster push rod-to-master cylinder clearance
Check the clearance of the brake booster push rod.
(Refer to the "Brake master cylinder" section.)



MBR00046-00041

INSTALLATION

1. Install the brake booster to the dash panel with a new brake booster bracket gasket interposed.
2. Install the attaching nuts and tighten them to the specified tightening torque.
Tightening Torque: 9.8 - 15.7 N·m

CAUTION:

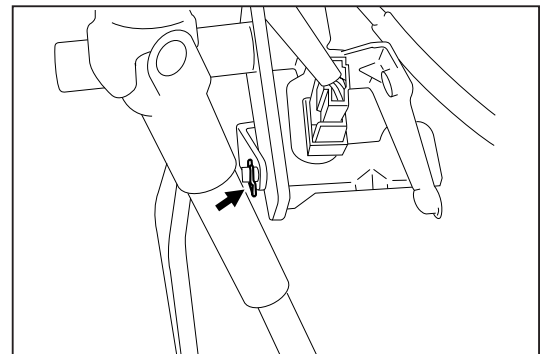
- Care must be exercised so that the brake tubes may not be interfered with the brake pedal during the installation.

MBR00047-00000

3. Connect the clevis and brake pedal with the clevis pin.
If any difficulty is encountered in installing the clevis pin, loosen the lock nut of the clevis and adjust the length of the push rod of the brake booster by turning the brake booster push rod or clevis.
4. Apply chassis grease to the sliding surface of the components.
5. Install a new clip to the clevis pin.
6. Perform the check and adjustment of the brake pedal.
(Refer to the "Brake pedal" section.)
7. Install the instrument finish lower panel and install two attaching screws.
8. Install the brake master cylinder.
(Refer to the "Brake master cylinder" section for installation.)

CAUTION:

- Be sure to follow the installation procedure for the brake master cylinder described in the above mentioned section. Failure to observe this caution may lead to serious accidents or problems.



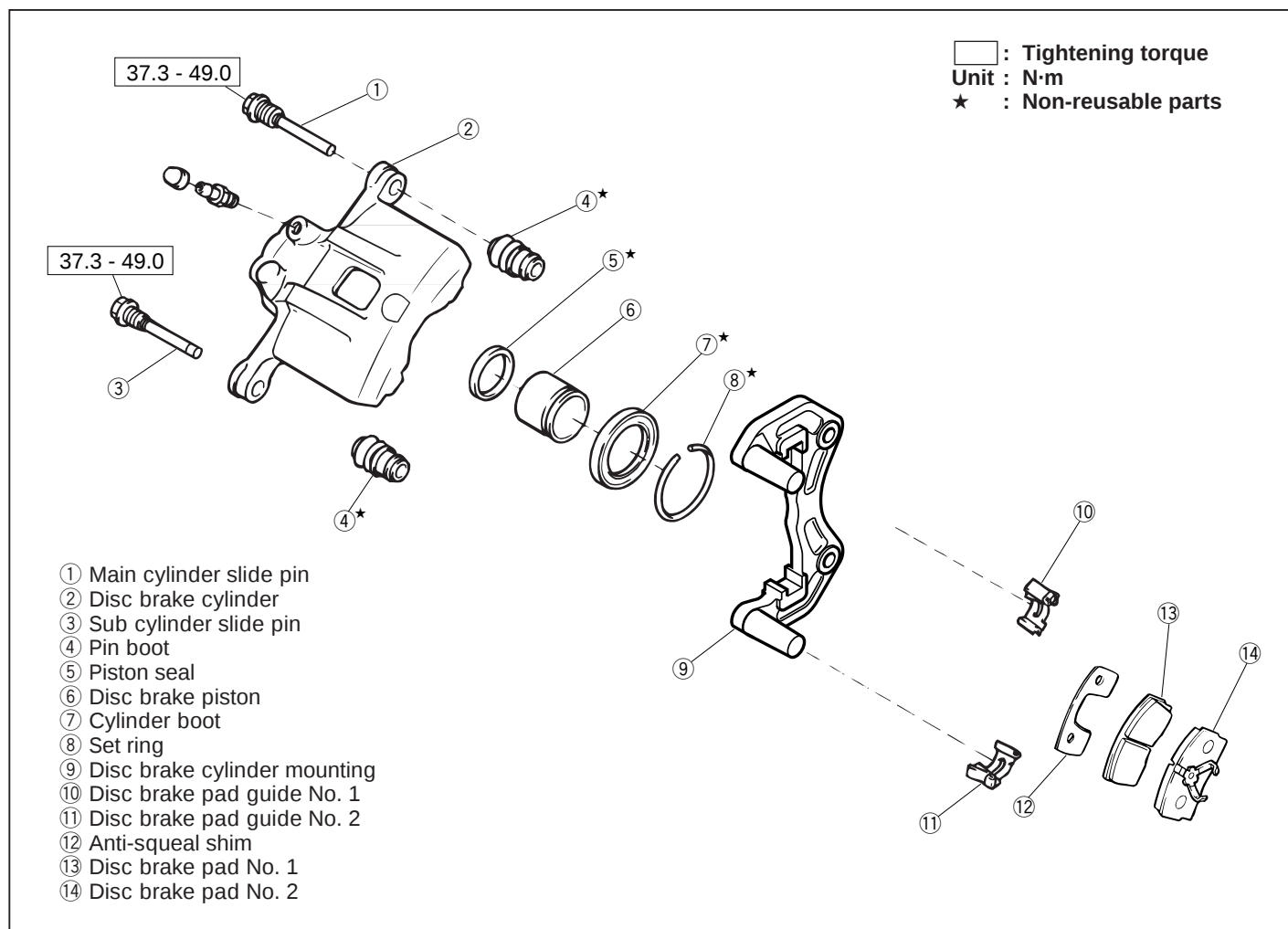
MBR00048-00042

BR-14

9. Install the air cleaner case and air duct.
(Refer to the MA section.)
10. Fill the brake fluid.
11. Perform the air bleeding. (Refer to the BR-4.)
12. Check the brake performance with a four-wheel brake tester.

MBR00049-00000

FRONT BRAKE COMPONENTS



MBR00050-00043

INSPECTION

1. Jack up the vehicle and support the vehicle with safety stands. (Refer to the GI section.)
2. Remove the front wheels.
3. Check the pad thickness through the inspection hole provided at the disc brake caliper as shown.

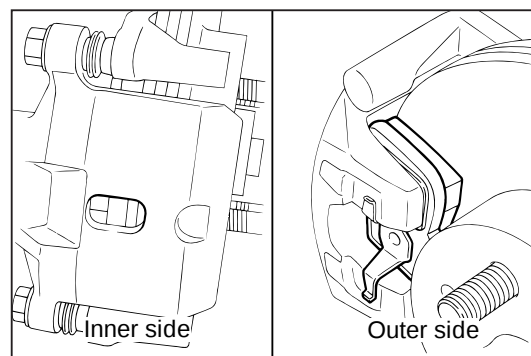
Specified Thickness: 10 mm
 Minimum Thickness: 1 mm

If the brake pad thickness is less than the specified value or the wear indicator emits a warning sound, replace the brake pad with a new one.

CAUTION:

- Be sure to replace the right and left side brake pads as a set. Failure to observe this caution may lead to side pull of the brake function.

4. Install the front wheels.



MBR00051-00044

REMOVAL

NOTE:

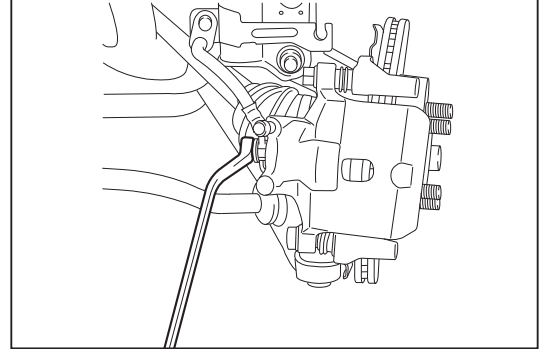
- The replacement procedure of the brake pads is not mentioned in this service manual. Refer to the procedure which is necessary to replace the brake pads.

1. Jack up the vehicle and support the vehicle with safety stands. (Refer to the GI section.)
2. Remove the front wheels.
3. Drain the brake fluid from the front brake line. (When only necessary. Refer to the BR-4.)
4. Disconnect the brake hose from the disc brake cylinder by removing the union bolt and gasket. (When necessary)

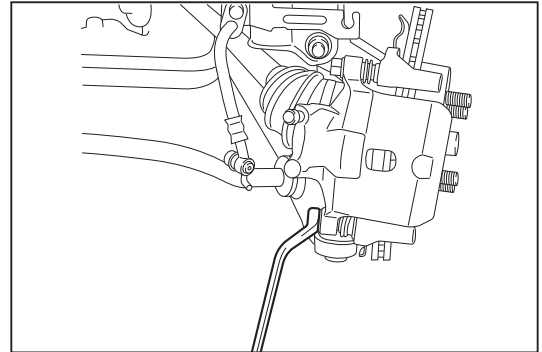
CAUTION:

- Never reuse the used gasket.

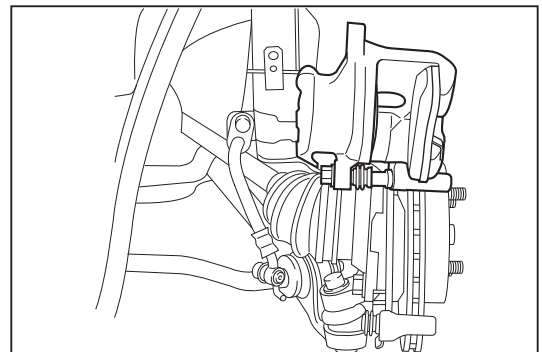
5. Loosen the main and sub cylinder slide pins.
6. Remove the cylinder slide sub pin.
7. Remove the disc brake cylinder assembly from the disc brake cylinder mounting.
8. Remove the cylinder slide main pin from the disc brake cylinder assembly.



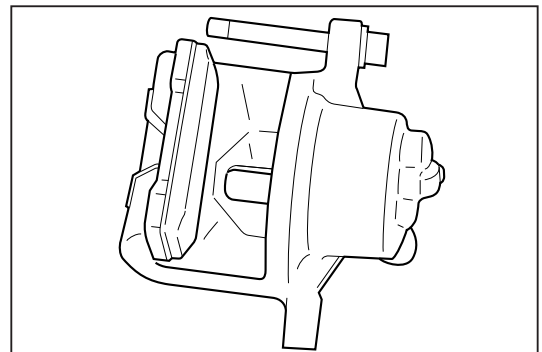
MBR00052-00045



MBR00053-00046



MBR00054-00047



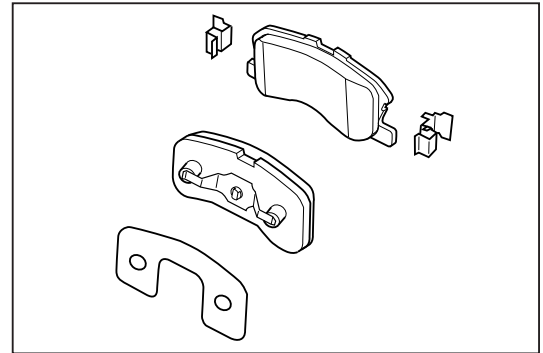
MBR00055-00048

9. Detach the following parts from the disc brake cylinder assembly and disc brake cylinder mounting.
 - (1) Disc brake pads
 - (2) Anti-squeal shim
 - (3) Brake pad guide plates No. 1 and No. 2

10. Inspection of brake pad-related parts
Ensure that the disc brake pad-related parts are free from damage, deformation, deterioration or corrosion.
If any damage is found, replace the damaged part with a new one.

CAUTION:

- Replace the brake pad when damage or uneven wear exists.
- Replace the right and left side brake pads as a set when replacing the brake pads. Failure to observe this caution may lead to side pull of the brake function.
- Be sure to perform the brake pad replacement one side by one side. Failure to observe this caution may cause the piston to jump out.



MBR00056-00049

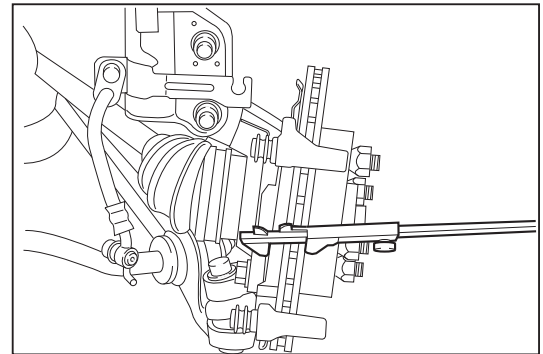
11. Inspection of disc rotor thickness
 - (1) Secure the disc rotor with hub nuts properly.
 - (2) Ensure that the disc rotor thickness is more than the specified value by means of vernier calipers.

Inspect the disc rotor thickness

Specified Thickness: 16 mm

Minimum Thickness: 15 mm

If the measured thickness is less than the minimum thickness, replace the disc rotor.



MBR00057-00050

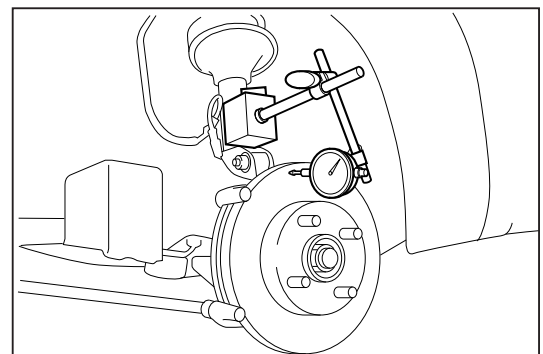
12. Inspection of disc rotor runout
 - (1) Secure the disc rotor with hub nuts properly.
 - (2) Ensure that the wheel bearings exhibit no looseness.
If an excessive play is found, replace the wheel bearings.
 - (3) Ensure that the disc rotor runout is within the specified value, using a dial gauge.

Maximum disc runout: 0.1 mm

CAUTION:

- Be sure to check the runout at a point 10 mm inward from the outer edge of the disc rotor.

If the measured runout exceeds the allowable limit, replace the disc with a new one.



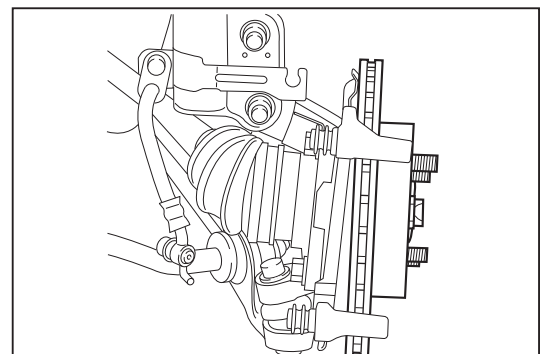
MBR00058-00051

13. Remove the disc rotor.
14. Remove the pin boot from the disc brake cylinder mounting.

NOTE:

- Never reuse the used pin boot.

15. Remove the disc brake cylinder mounting by removing the attaching bolts.

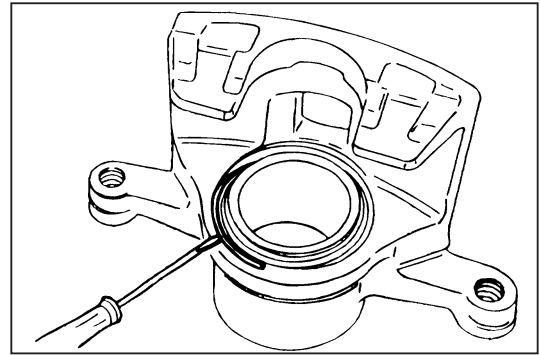


MBR00059-00052

BR-18

Disassembly of front disc brake cylinder assembly

1. Detach the cylinder boot set ring and cylinder boot, using a screwdriver or the like.



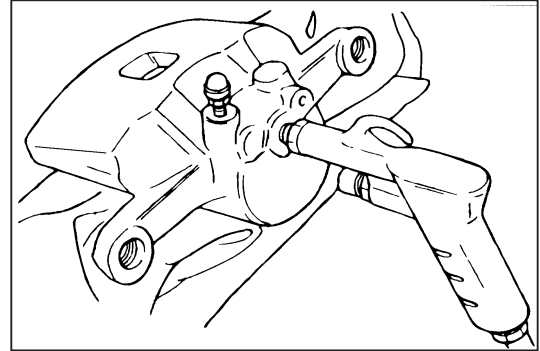
MBR00060-00053

2. Removal of brake piston

Apply compressed air gradually to the brake hose connecting hole of the disc brake cylinder assembly with a piece of cloth placed at the piston end side, in order to prevent the piston from getting damaged and to prevent the brake fluid from splashing.

WARNING:

- Utmost care must be exercised so that your fingers or hands may not be pinched by the piston end.
- Be sure to protect your eyes by wearing safety goggles when using compressed air.

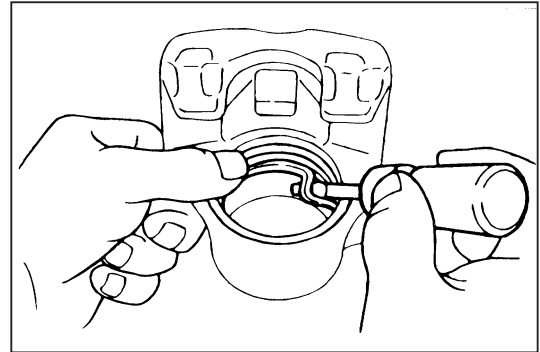


MBR00061-00054

3. Detach the piston seal from the cylinder, using a suitable screwdriver or the like.

CAUTION:

- Be very careful not to score the cylinder bore wall, etc. during the removal.



MBR00062-00055

Assembly of front disc brake cylinder assembly

1. Wash the disc brake cylinder and related parts, except rubber parts, with washing solvent and dry them with compressed air.

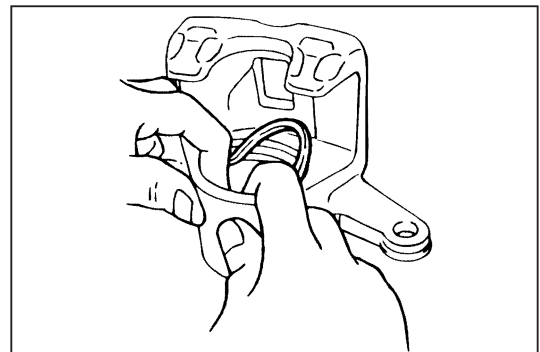
WARNING:

- Be sure to protect your eyes by wearing safety goggles when using compressed air.
- If any damage, deformation, deterioration or wear exists on the components, replace the parts with new ones.

2. Assemble the piston seal in the disc brake cylinder.

NOTE:

- Thinly apply brake rubber grease to the cylinder wall and the piston seal.



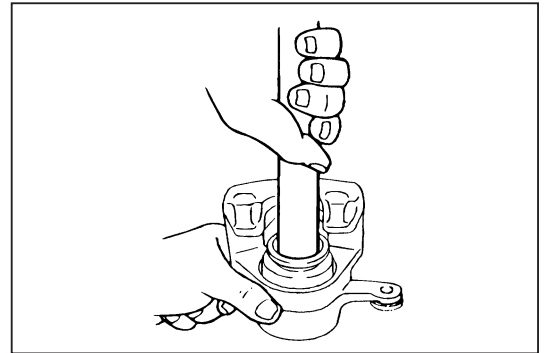
MBR00063-00000

MBR00064-00056

3. Insert the piston into the disc brake cylinder, making sure that the piston is not tilted during the installation.

NOTE:

- Thinly apply brake rubber grease to the piston outer wall.



MBR00065-00057

4. Assemble the cylinder boot in the disc brake cylinder.

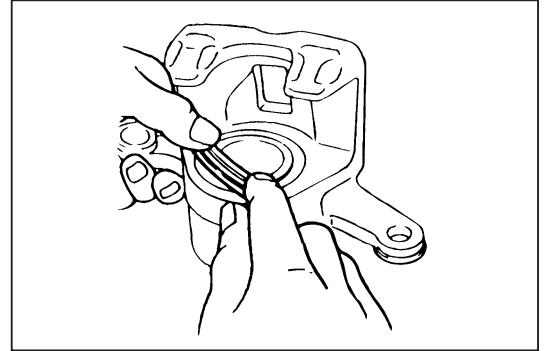
NOTE:

- Thinly apply brake rubber grease to the boot.
- Make sure that the boot is fitted securely in the groove.

5. Assemble the cylinder boot set ring in the cylinder boot.

NOTE:

- Make sure not to scratch and damage the boot.



MBR00066-00058

INSTALLATION

NOTE:

- The installation procedure is basically reverse to the removal procedure. Therefore, some illustrations are not given in this installation procedure.
- Please refer to the illustration given in the disassembly procedure if any difficulty is encountered.

1. Install the disc brake cylinder mounting to the steering nuckle with the attaching bolts and tighten the attaching bolts to the specified tightening torque.

Tightening Torque: 90.2 - 135.3 N·m

2. Thinly apply the brake rubber grease to the pin boots.
3. Install the new pin boots to the disc brake cylinder mounting.
4. Install the disc rotor.

NOTE:

- Be sure to clean the disc rotor attaching surface.

5. Install the brake pad guide plates on the disc brake cylinder mounting.

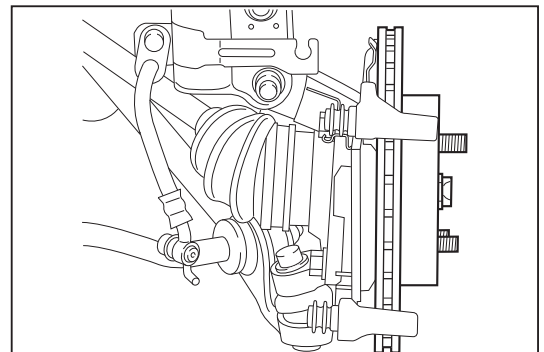
NOTE:

- The pad guide differs in shape between the rotor inlet side and the rotor outlet side. Be sure to assemble the pad guide in the correct direction.

6. Install the brake pad No. 1 to the disc brake cylinder mounting.

NOTE:

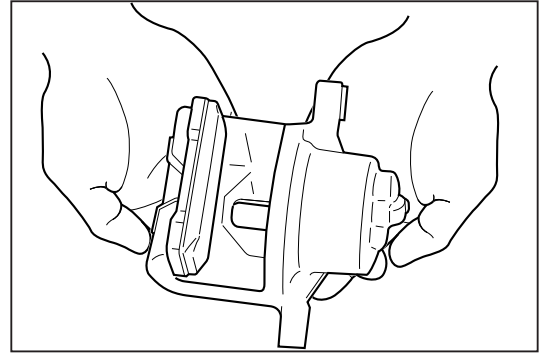
- Be sure to assemble the pad No. 1 in such a way that the wear indicator comes at the upper side of the vehicle.



MBR00068-00059

BR-20

7. Install the brake pad No. 2 and anti-squeal shim to the brake cylinder assembly.

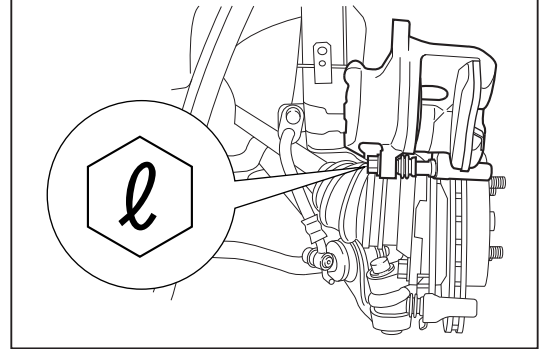


MBR00069-00060

8. Thinly apply the brake rubber grease to the sliding surface of the cylinder slide pins.
9. Install the main cylinder slide pin of the disc brake cylinder assembly to the disc brake mounting.

CAUTION:

- Be sure to install the brake cylinder in such a way that the bolt with a "ℓ" mark faces upward.
- Be very careful not to damage the pin boot during the assembly.

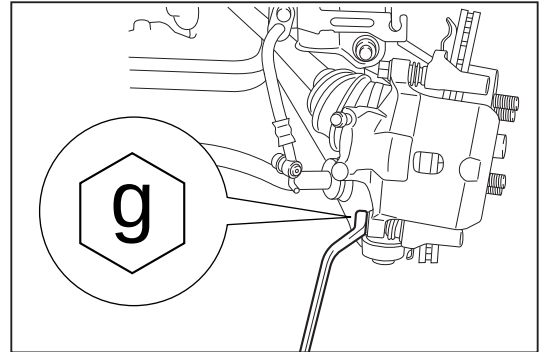


MBR00070-00061

10. Place the disc brake cylinder assembly on the disc brake pad.

CAUTION:

- Care must be exercised so that the brake cylinder may not be interfered with the disc brake pad during the installation.



MBR00071-00062

11. Install the cylinder slide sub pin.

CAUTION:

- Be very careful not to damage the pin boot during the installation.
- Be sure to install the bolt bearing a "g" mark.

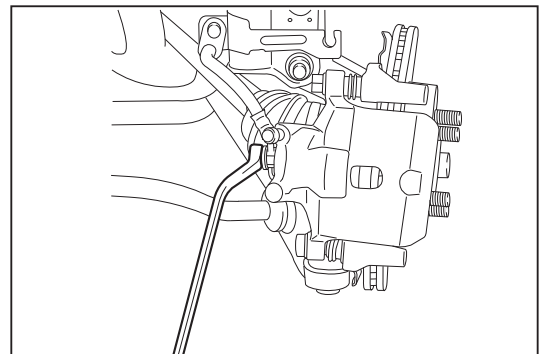
12. Tighten the main and sub cylinder slide pins to the specified tightening torque.

Tightening Torque: 37.3 - 49.0 N·m

13. Connect the brake hose to the disc brake cylinder assembly by the union bolt with a new gasket interposed.

14. Tighten the union bolt to the specified tightening torque.

Tightening Torque: 26.5 - 34.3 N·m



MBR00072-00063

CAUTION:

- Make sure that the brake hose is not twisted or stretched.
- After completion of the installation, turn the steering wheel from lock to lock position. Make sure that the brake hose is not interfered with other parts.

15. Perform the air bleeding for the brake line.

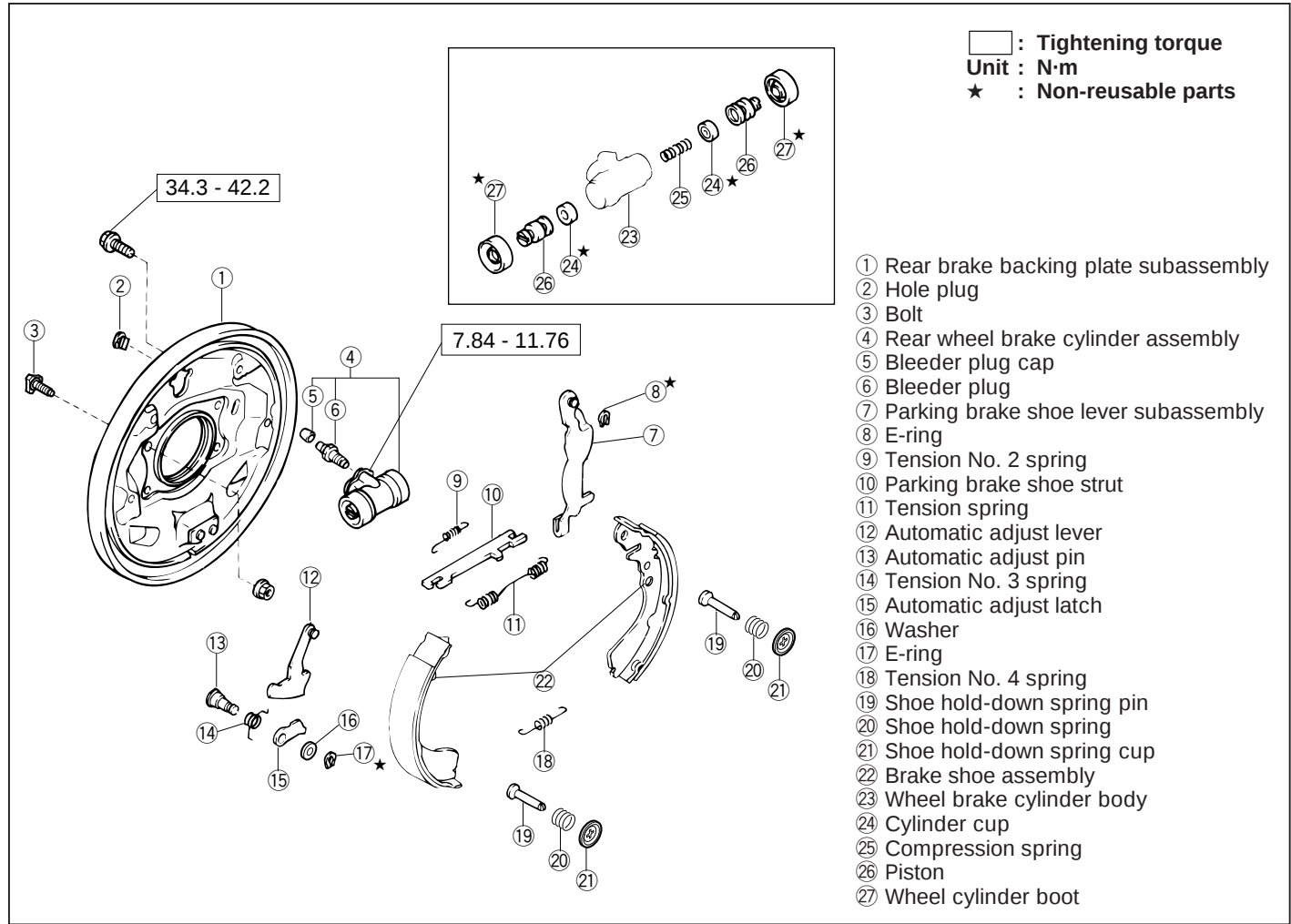
(Refer to the BR-4.)

16. Ensure that no fluid leakage is present on the brake hose connected section and parts between the disc brake cylinder and the disc brake piston.

17. Install the front wheels.

18. Depress the brake pedal more than 10 times.
19. Check to see if the brake disc can rotate smoothly.
20. Ensure that no abnormal sound is emitted or no drag exists when the wheel is rotated.
21. Check the brake performance with a brake tester.

REAR BRAKE COMPONENTS



MBR00074-00064

INSPECTION

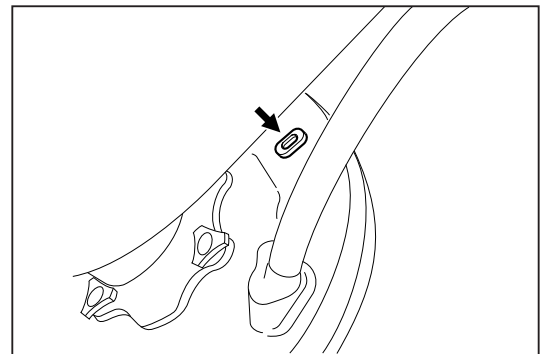
1. Jack up the vehicle and support it with safety stands.
(Refer to the GI section.)
2. Remove the hole plug at the inspection hole provided on the backing plate.
3. Inspect the thickness of the brake shoe lining is more than the specified value, through the inspection hole.
 Standard thickness: 4.0 mm
 Minimum thickness: 1.0 mm

If the lining thickness is less than the specified value, replace the brake shoe.

4. Install the hole plug.

CAUTION:

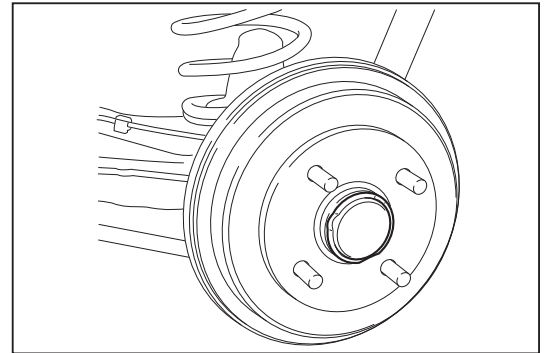
- Be sure to install the hole plug securely. Failure to observe this caution may lead to a rear brake problem owing to admission of dust, mud, water, etc.



MBR00075-00065

REMOVAL

1. Jack up the vehicle and support it with safety stands.
(Refer to the GI section.)
2. Drain the brake fluid from the rear brake line.
(Refer to the BR-4.)
3. Remove the rear wheels.
4. Release the parking brake fully.
5. Remove the grease retainer cap, using a cap remover.

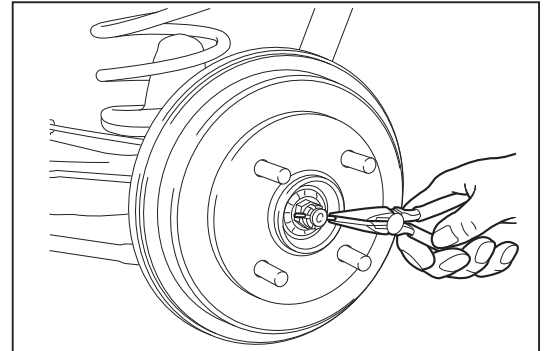


MBR00076-00066

6. Remove the cotter pin after straightening it properly.

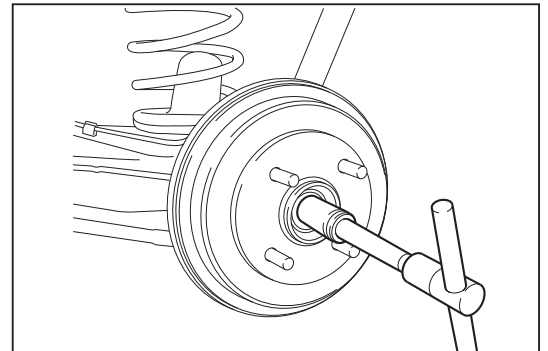
CAUTION:

- Never reuse the removed cotter pin.



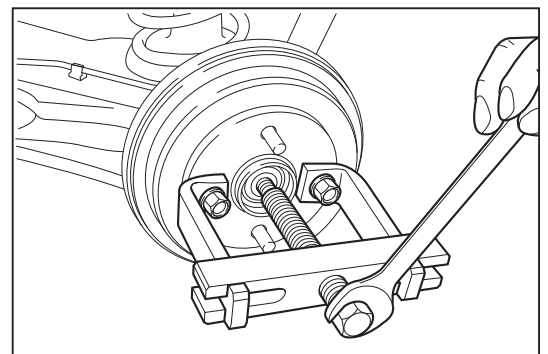
MBR00077-00067

7. Remove the castle nut and plate washer.



MBR00078-00068

8. Remove the brake drum, using the following SST.
SST: 09510-87301-000



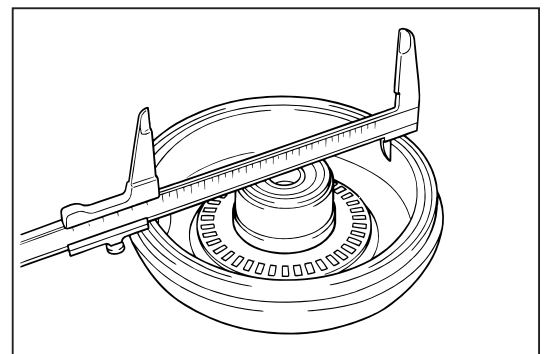
MBR00079-00069

9. Check the brake drum inner diameter, using suitable vernier calipers.
Specified diameter: 180 mm
Allowable limit: 181 mm

If the diameter exceeds the specified value, replace the brake drum with a new one.

NOTE:

- On ABS-equipped vehicles, the ABS sensor rotor has been pressed-fit into the drum (incorporated in the drum). Therefore, perform the check, referring to the ABS section.



MBR00080-00070

BR-24

10. Check the brake shoe thickness, using suitable vernier calipers or ruler.

Standard thickness: 4.0 mm

Allowable limit: 1.0 mm

If the brake shoe lining is less than the specified value, replace the brake shoe lining with a new one.

WARNING:

- Be sure to replace the right and left side brake shoe lining as a set. Failure to observe this warning may lead to side pull of the brake function.

11. Check the brake shoe for seizure or abnormal wear, etc.
If any damage exists, replace the brake shoe with a new one.

12. Remove the wheel speed sensor. (Only when equipped)

13. Remove the tension spring.

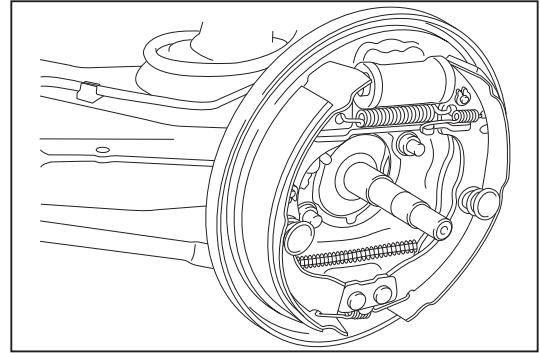
SST: 09703-30010-000

14. Remove the shoe hold-down springs and shoe hold-down spring pins.

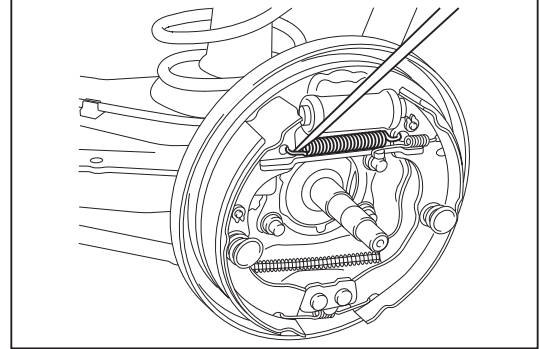
15. Remove the tension No. 4 spring, using the following SST.

SST: 09703-30010-000

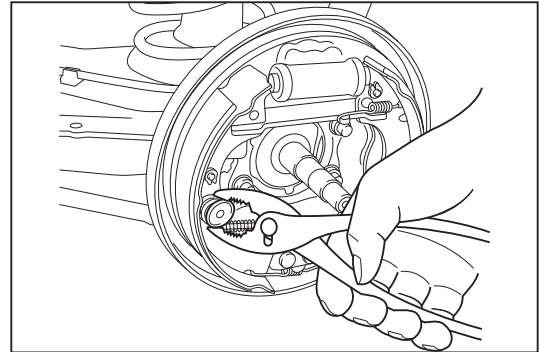
16. Detach the front side brake shoe from the wheel cylinder.
17. Remove the rear side brake shoe from the wheel cylinder.
18. Remove the parking brake cable from the parking brake lever.



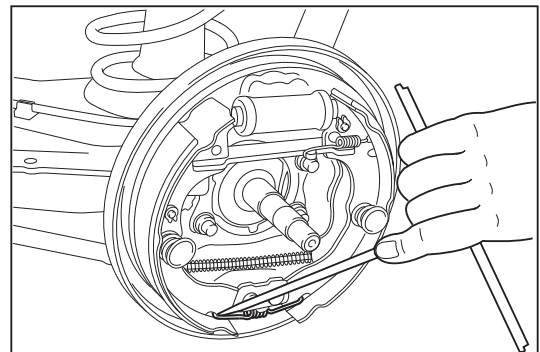
MBR00081-00071



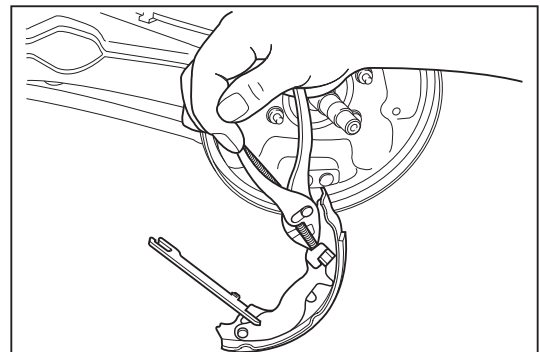
MBR00082-00072



MBR00083-00073



MBR00084-00074

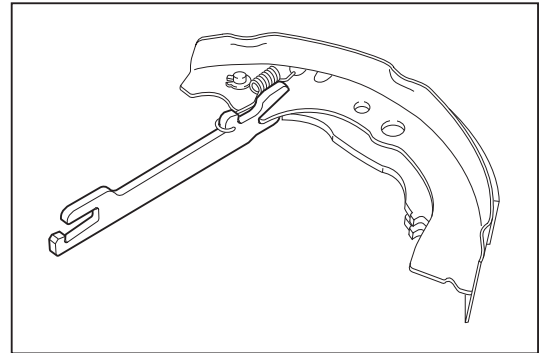


MBR00085-00075

19. Remove the tension No. 2 spring from the brake shoe.
20. Remove the parking brake shoe strut from the brake shoe.
21. Remove the parking brake lever from the brake shoe by extracting the E-ring.

CAUTION:

- Never reuse the removed E-ring.

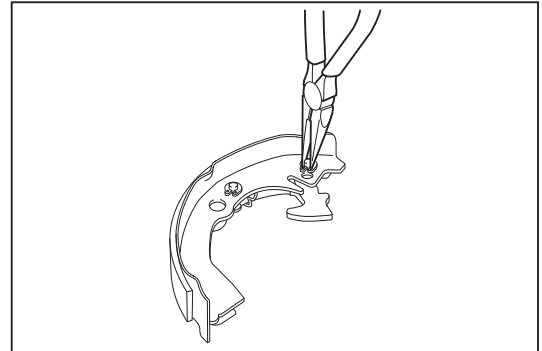


MBR00086-00076

22. Remove the automatic adjust latch from the brake shoe by extracting the C-ring.

CAUTION:

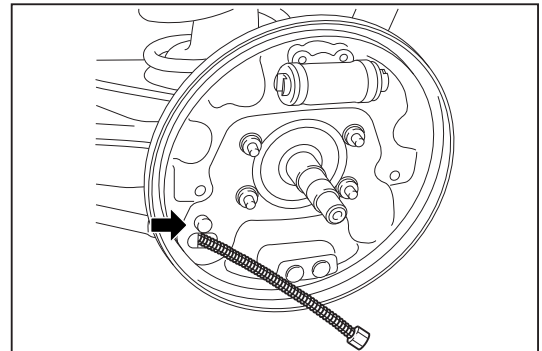
- Never reuse the removed C-ring.



MBR00087-00077

23. Remove the automatic adjust lever, automatic adjust pin and tension No. 3 spring from the brake shoe.

24. Disconnect the parking brake cable from the backing plate by removing the attaching bolt.

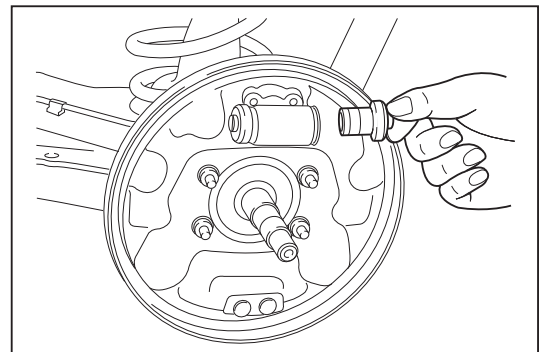


MBR00088-00078

25. Remove the wheel cylinder boot, wheel cylinder pistons with the cup and compression spring from the wheel cylinder.

NOTE:

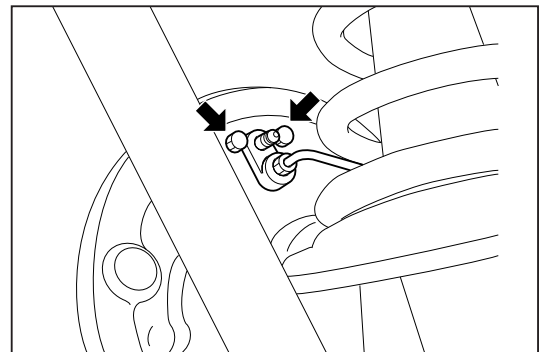
- Never reuse the used cup and boots.



MBR00089-00079

26. Remove the piston cup and boot from the wheel cylinder pistons.

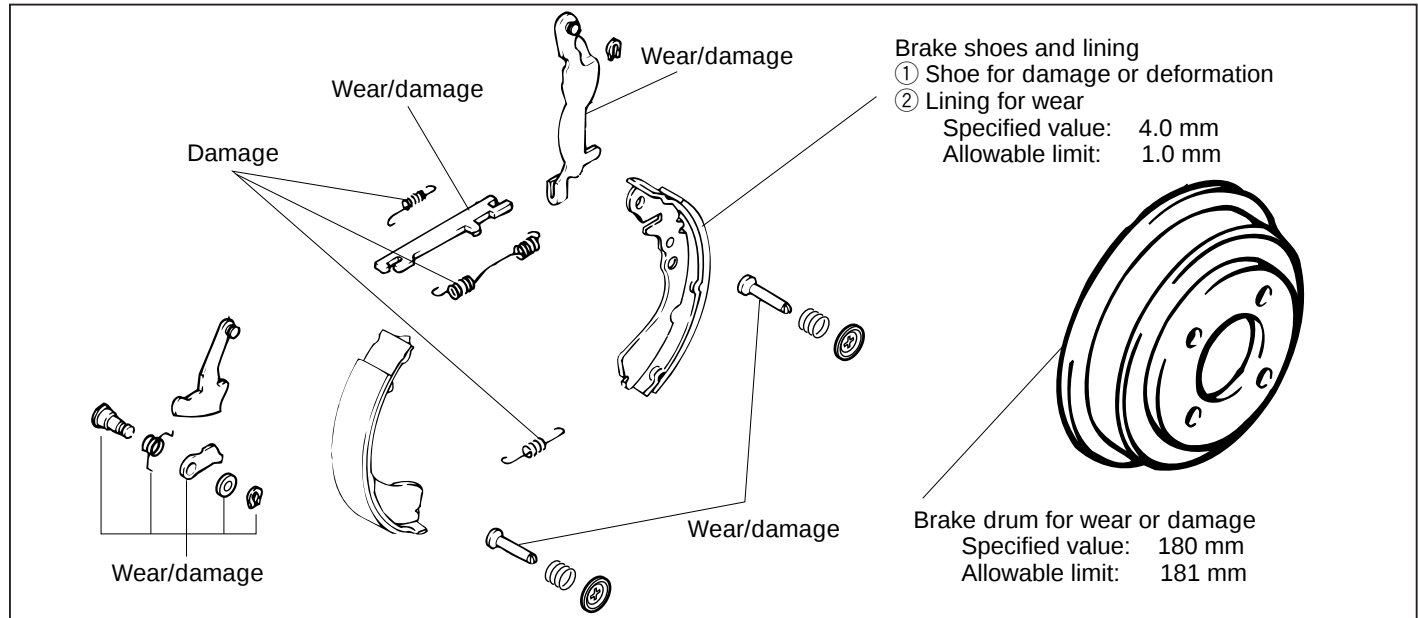
27. Disconnect the brake pipe from the wheel cylinder by disconnecting the flare nut, using a flare nut wrench.
28. Remove the wheel cylinder by removing the two attaching bolts.
29. Remove the brake backing plate by removing the four attaching bolts.



MBR00090-00080

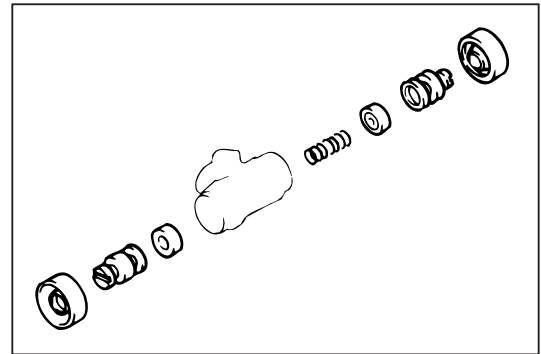
INSPECTION

1. Inspect the components for the points mentioned in the figure.
If any damage is found, replace the damaged parts with new ones.



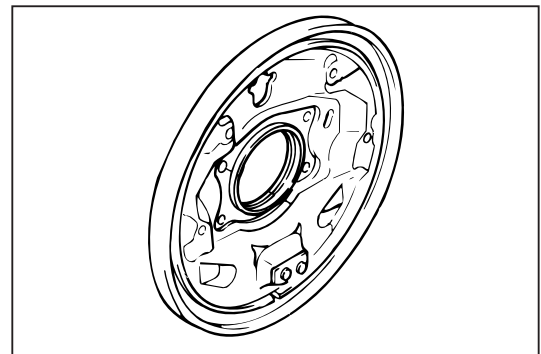
MBR00091-00081

2. Inspection of components of wheel cylinder
Inspect the components for the points as shown in the right figure.



MBR00092-00082

3. Inspection of backing plate
Inspect that no wear, deformation or damage exists on the backing plate.
If any damage exists, replace the backing plate, as required.

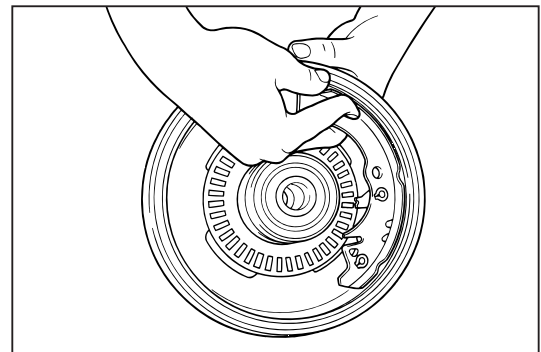


MBR00093-00083

4. Inspection of working face of the brake lining with the brake drum

(1) Apply powder of chalk to the brake drum. Then, check the brake lining surface contacting condition with the brake drum by rubbing the brake lining in the brake drum.

If the contacting condition of the brake lining with brake drum is poor, grind the brake lining surface with abrasive paper or the like.



MBR00094-00084

CAUTION:

- Replace the brake lining with a new one if an excessive uneven contact exists.
- Ensure that the brake lining thickness is within the specified value after grinding.

- (2) Make sure that the contacting condition of the brake lining is sufficient after grinding the brake lining.
- (3) Clean the brake lining and brake drum after performing the checking of the brake lining contacting condition.

MBR00095-00000

INSTALLATION**CAUTION:**

- Be sure to apply brake grease to the metal and metal sliding surfaces, unless otherwise specified.

NOTE:

- The installation procedure is basically reverse to the removal procedure. Therefore, some illustrations are not given in this installation procedure.
- Please refer to the illustration given in the removal procedure if any difficulty is encountered.

1. Install the backing plate to the rear axle carrier with the four attaching bolts

Tightening Torque: 34.3 - 42.2 N·m

NOTE:

- Be sure to apply liquid gasket (Three Bond® 1104) to the mating surface between the rear backing plate and the trailing arm.

2. Install the wheel cylinder to the backing plate with the two attaching bolts and tighten the attaching bolts to the specified tightening torque.

Tightening Torque: 7.84 - 11.76 N·m

3. Connect the flare nut of the brake pipe connected to the wheel cylinder by hand and tighten it to the specified tightening torque.

Tightening Torque: 12.7 - 17.7 N·m

4. Install the new piston cups and rubber boot to the pistons.
5. Thinly apply brake rubber grease to the lip section of the piston cup.

WARNING:

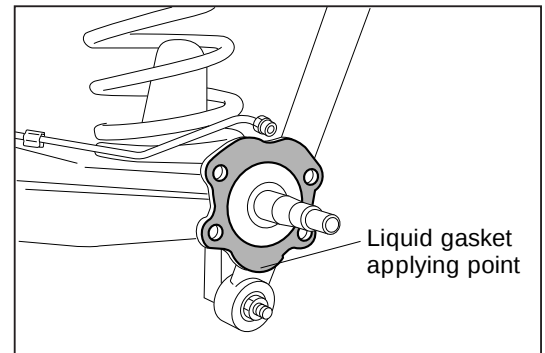
- Never install the piston cups in a wrong direction. Failure to observe this warning may lead to brake fluid leakage or serious brake malfunction.

6. Install the compression spring and wheel cylinder pistons with the wheel cylinder boot assembled to the wheel cylinder.

NOTE:

- Loosen the bleeder plug fully before installing the wheel pistons.

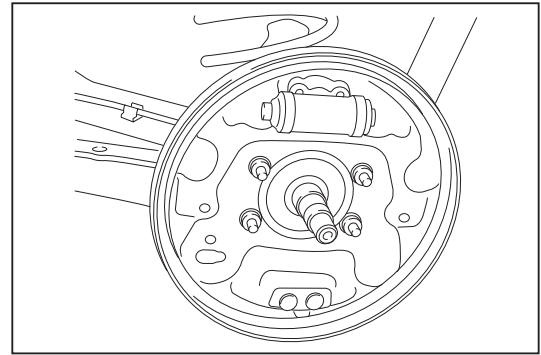
MBR00096-00000



MBR00097-00085

BR-28

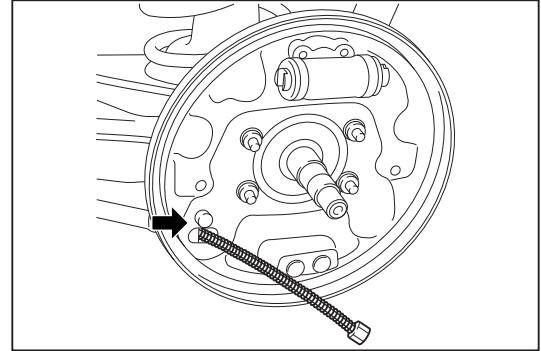
7. Clean the backing plate thoroughly.
8. Apply brake grease to the brake shoe contacting points on the backing plate.



MBR00098-00086

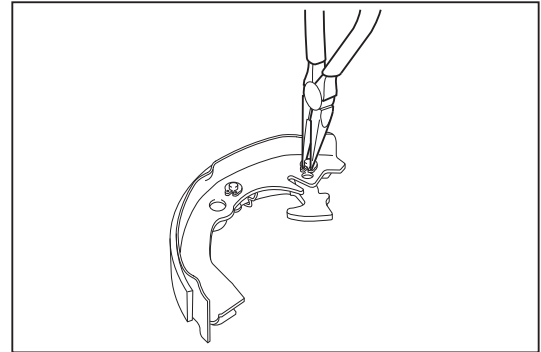
9. Connect the parking brake cable to the rear brake backing plate.

Tightening Torque: 6.2 - 9.2 N·m



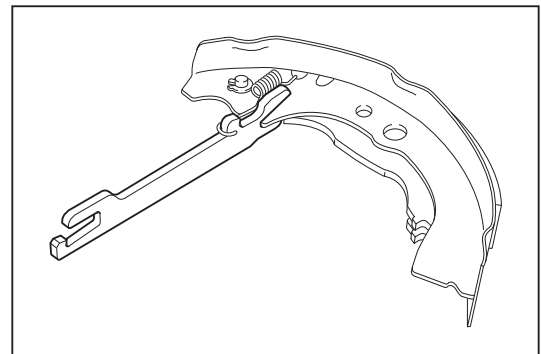
MBR00099-00087

10. Install the automatic adjust lever, automatic adjust pin and tension No. 3 spring to the brake shoe.
11. Install the automatic adjust latch to the brake shoe. Then, install the new C-ring.



MBR00100-00088

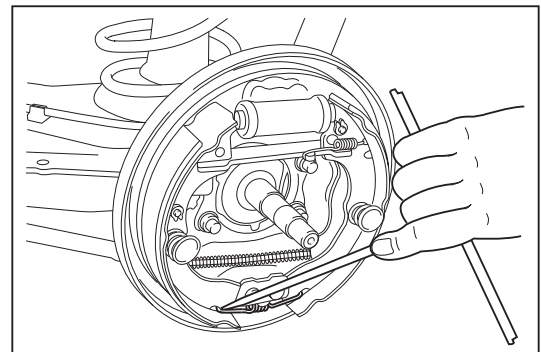
12. Install the parking brake shoe strut to the brake shoe.
13. Install the tension No. 2 spring to the brake shoe.
14. Install the parking brake lever to the brake shoe. Then, install the new C-ring.



MBR00101-00089

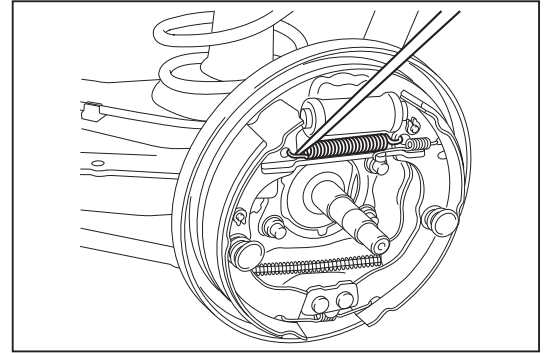
15. Connect the parking brake cable to the parking brake shoe lever.
16. Install the rear side brake shoe with the parking brake shoe lever by installing the shoe hold-down pin and spring.
17. Install the front side brake shoe and parking brake shoe strut by installing the shoe hold-down pin and spring.
18. Install the tension No. 4 spring, using the following SST.

SST: 09703-30010-000



MBR00102-00090

19. Install the tension spring, using the following SST.
SST: 09703-30010-000



MBR00103-00091

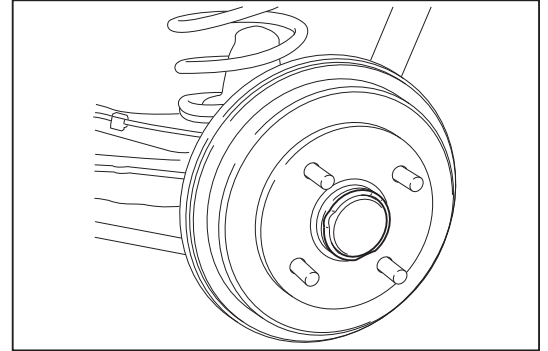
20. Install the wheel speed sensor with the attaching bolt.
(Only when equipped)
Tightening Torque: 6.4 - 9.3 N·m

21. Clean the brake drum contacting surface of the rear axle hub and hub contacting surface of the brake drum properly.

22. Install the brake drum to the rear axle hub.

CAUTION:

- Never allow the brake drum to interfere with the brake shoe during the installation.
- Make sure that the parking brake lever strut is retracted fully before the installation.

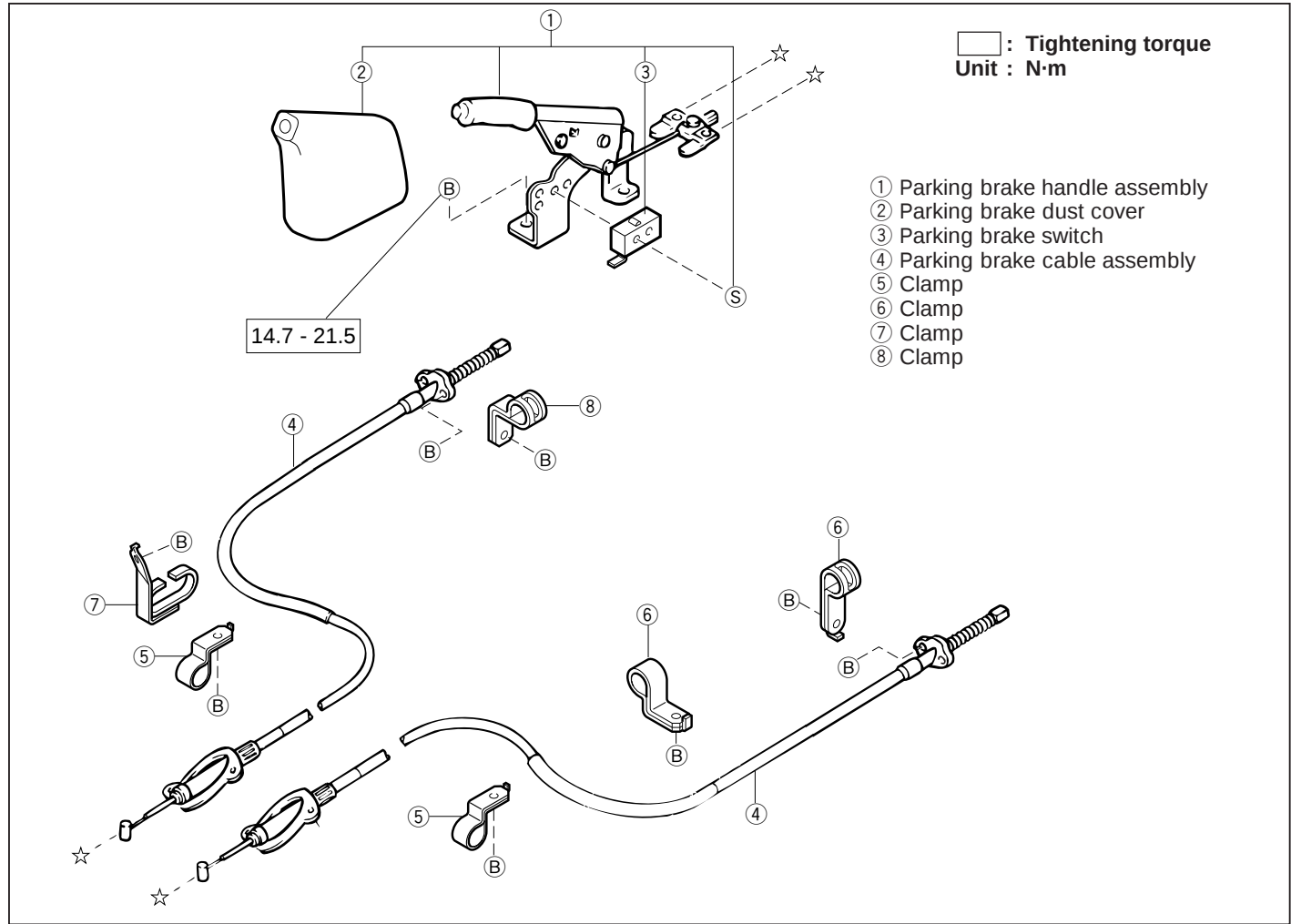


MBR00104-00092

23. Install the plate washer and castle nut to the axle hub and tighten it to the specified tightening torque.
Tightening Torque: 58.8 - 78.5 N·m

24. Install the cotter pin.
25. Install the grease retainer cap.
26. Install the rear wheels.
27. Perform the air bleeding for the brakes.
(Refer to the BR-4.)
28. Depress the brake pedal. Ensure that the automatic adjusting mechanism emits operating sounds. Continue this operation, until you no longer hear any operating sound.
29. Ensure that the rear wheels turn without pulling.
30. Check the reserve working travel of the parking brake.
(Refer to the BR-30.)
31. Jack down the vehicle.
32. Perform the brake performance test with a brake tester.

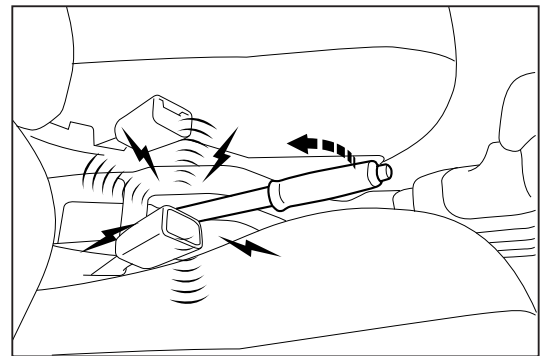
PARKING BRAKE COMPONENTS



MBR00105-00093

INSPECTION

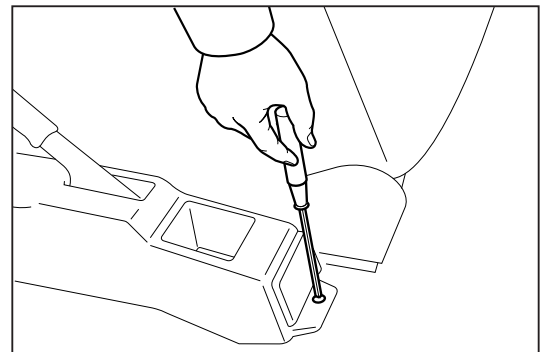
1. Pull up the parking brake control handle several times and place it to the fully-returned position.
2. Ensure that the parking brake control handle travel is 4 to 7 notches when the parking brake control handle is pulled up with a force of 196 N.
If the number of the notches fails to meet the specified value, adjust the parking brake control handle travel to the specified value.



MBR00106-00094

ADJUSTMENT

1. Depress the brake pedal fully several times and ensure that the parking brake control lever travel fails to meet the specified notches.
2. Remove the console box by removing the attaching screw. (Refer to the BO section.)

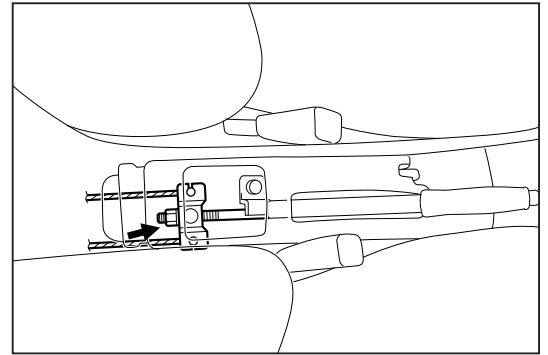


MBR00107-00095

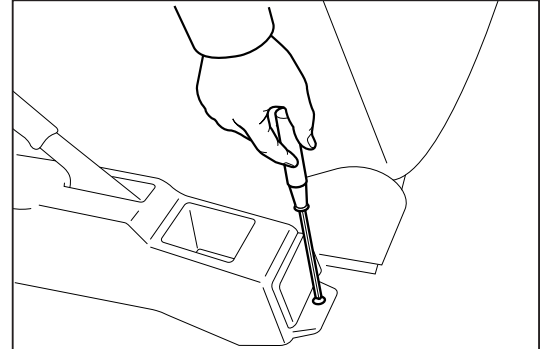
3. Adjust the parking brake control handle travel to the specified number of notches by turning the adjusting nut.
Specified Value: 4 - 7 notches
4. Ensure that the parking brake lamp goes on within one notch.
CAUTION:
 - Be sure to use a hexagon socket (box) wrench for adjustment to prevent the adjusting nut from being damaged.
5. Install the rear console box with the attaching screw.

REMOVAL

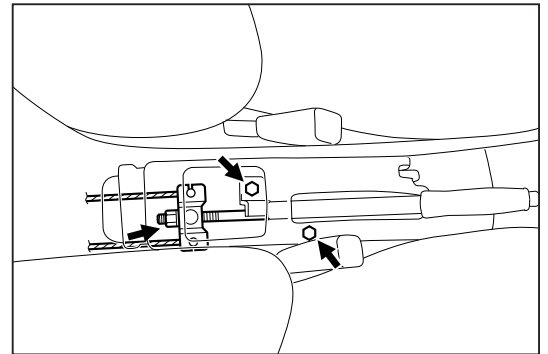
1. Remove the console box by removing the attaching screw.
(Refer to the BO section.)
2. Disconnect the connector from the parking brake switch.
3. Remove the parking brake control handle by removing the two attaching bolts.
4. Remove the parking brake pull rod by disconnecting the parking brake cables from the parking brake pull rod.
5. Lift up the vehicle and support the vehicle with safety stands. (Refer to the GI section.)
6. Disconnect the parking brake cable assembly from the brake backing plate. (Refer to the "Rear brake" section.)
7. Remove the parking brake cable by removing the attaching bolts of the parking brake cable and its clamps.
8. Remove the clamps from the parking brake assembly.



MBR00108-00096



MBR00109-00097

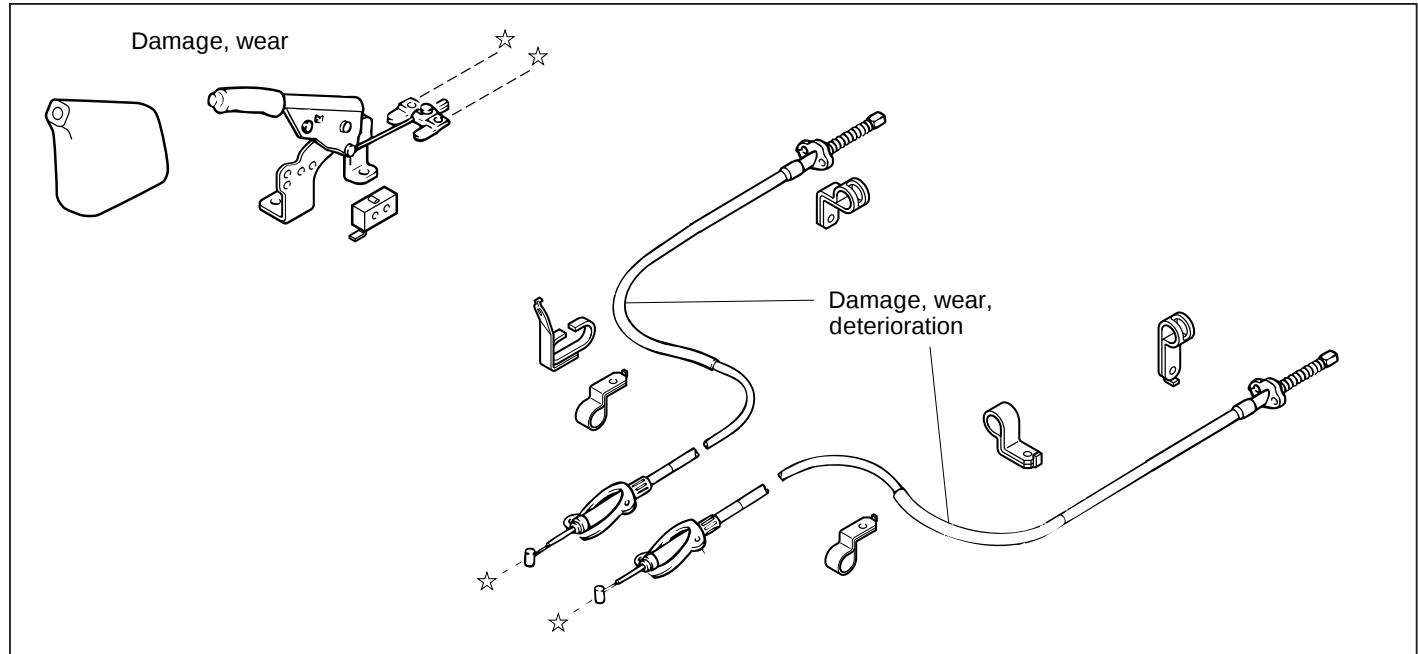


MBR00110-00098

MBR00111-00000

INSPECTION

Inspect the components for the following points. Replace any damaged parts.



MBR00112-00099

INSTALLATION

NOTE:

- The installation procedure is basically reverse to the removal procedure. Therefore, some illustrations are not given in this installation procedure.
- Please refer to the illustration given in the removal procedure, if any difficulty is encountered.

1. Install the parking brake cable to the vehicle with the attaching bolts of the parking brake cable and its clamps.

Tightening Torque: 5.9 - 8.8 N·m

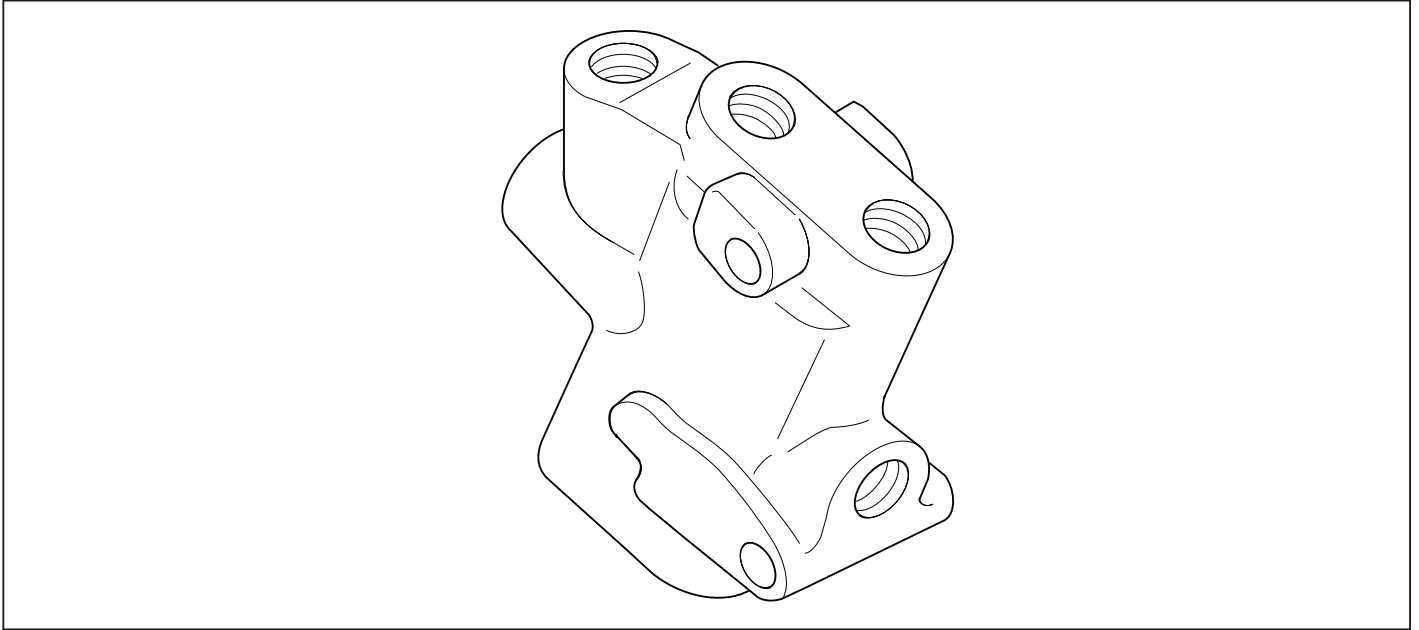
2. Connect the parking brake cable assembly to the brake backing plate. (Refer to the "Rear brake" section.)
3. Lift down the vehicle.
4. Connect the parking brake cables to the parking brake pull rod.
5. Install the parking brake handle assembly to the floor panel while connecting the parking brake pull rod to the parking brake handle assembly and tighten the attaching bolts to the specified tightening torque.

Tightening Torque: 14.7 - 21.5 N·m

6. Install the adjusting nut.
7. Connect the connector of the parking brake switch.
8. Perform the adjustment of the parking brake lever. (Refer to the BR-30.)
9. Install the console box with the attaching screw. (Refer to the BO section.)

MBR00113-00000

PROPORTIONING VALVE COMPONENTS



MBR00114-00100

INSPECTION

Inspect the proportioning valve function with a four-wheel brake tester.

1. Place the vehicle on the four-wheel brake tester.
2. Ensure that the rear wheels will not be locked before the front wheels are locked.
If the rear wheel are locked simultaneously or before the front wheels are locked, replace the proportioning valve with a new one.

MBR00115-00000

REPLACEMENT

1. Open the engine hood.
2. Drain the brake fluid from the brake line. (Refer to the BR-4.)
3. Remove the air cleaner case cover and air duct. (Refer to the MA section.)
4. Disconnect the brake tubes from the proportioning valve.
5. Remove the proportioning valve by removing the attaching bolts.

MBR00116-00000

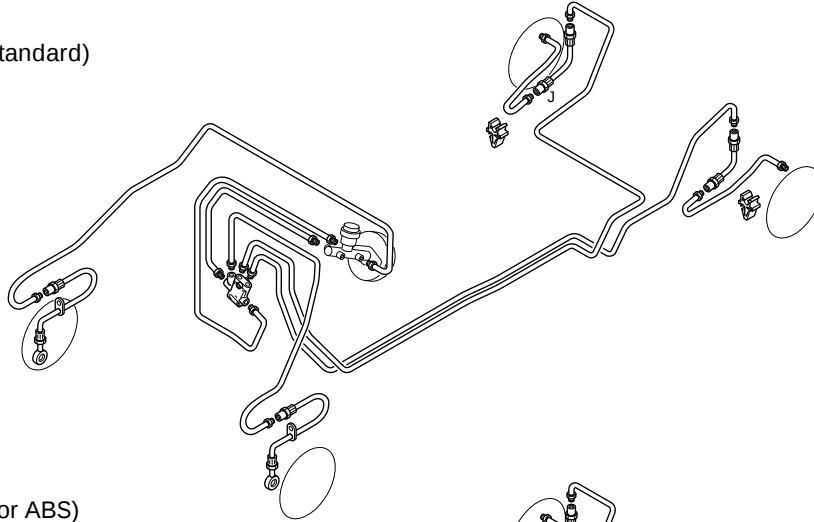
INSTALLATION

1. Install the new proportioning valve with the bolts and tighten them to the specified tightening torque.
Tightening Torque: 5.9 - 8.8 N·m
2. Connect the brake tubes to the proportioning valve fully by hand.
3. Tighten the flare nut to the specified tightening torque.
Tightening Torque: 12.7 - 17.7 N·m
4. Perform the air bleeding for the brake system. (Refer to the BR-4.)
5. Perform the brake performance test with a four-wheel brake tester.

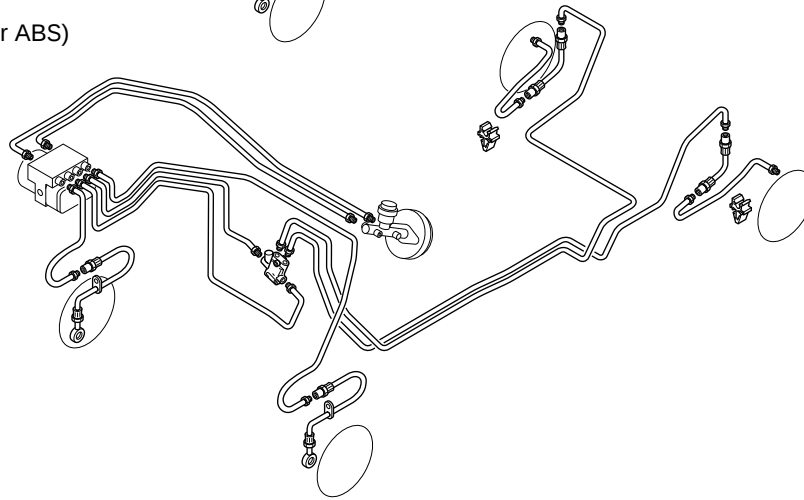
MBR00117-00000

BRAKE HOSE COMPONENTS

(Standard)



(For ABS)

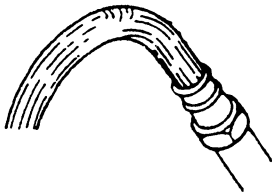


MBR00118-00101

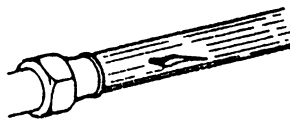
INSPECTION

Inspect the brake hose for following points and replace it with a new one if any damage exists.

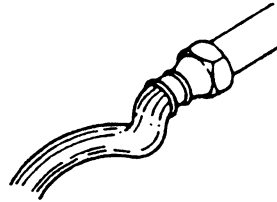
Crack



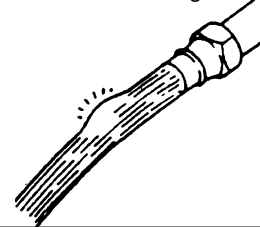
Scratch/Cut



Twist



Swelling

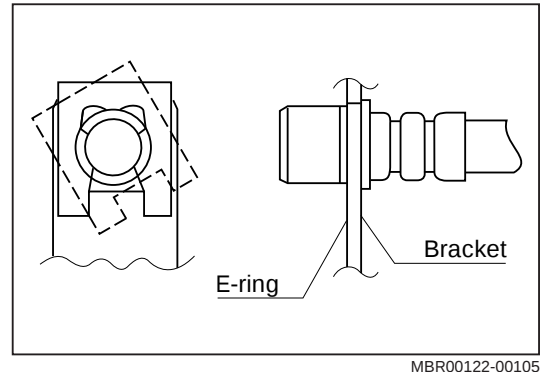
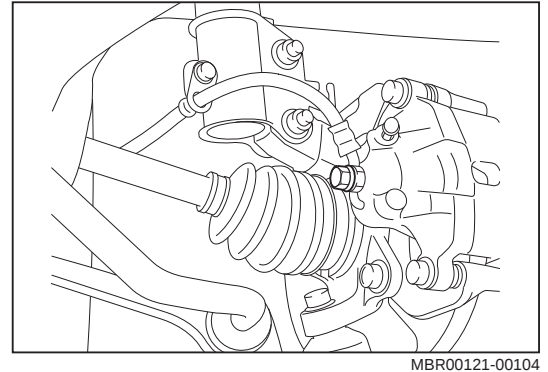
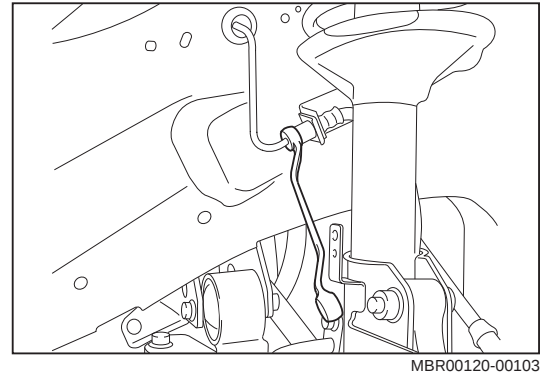


MBR00119-00102

REPLACEMENT

Front brake hose

1. Jack up the vehicle and support the vehicle with safety stands. (Refer to the GI section.)
2. Remove the front wheels.
3. Drain the brake fluid from the brake system.
(Refer to the BR-4.)
4. Disconnect the flare nut of the brake pipe from the brake hose, using a flare nut wrench.
5. Disconnect the brake hose from the clamp by removing the E-ring.
CAUTION:
 - Never reuse the used E-ring.
6. Disconnect the brake hose from the disc brake cylinder assembly by removing the union bolts and washers.
CAUTION:
 - Never reuse the used washers.
7. Remove the brake hose by removing the clamp bolts.
8. Install the brake hose with the clamp bolt and tighten the clamp bolt to the specified tightening torque.
Tightening Torque: 16.7 - 24.5 N·m
9. Connect the brake hose to the disc brake cylinder assembly with the union bolt with a new gasket interposed.
10. Tighten the union bolt to the specified tightening torque.
Tightening Torque: 26.5 - 34.3 N·m
11. Connect the brake hose to the bracket and secure it by installing a new E-ring.
CAUTION:
 - Be sure to connect the E-ring in such a manner that the E-ring is securely inserted in the groove provided on the brake hose end properly.
12. Connect the flare nut of the brake pipe to the brake hose fully by hand.
13. Tighten the flare nut to the specified tightening torque.
Tightening Torque: 12.7 - 17.7 N·m
14. Perform the air bleeding. (Refer to the BR-4.)
15. Ensure that no brake fluid leakage exists.



BR-36

Rear brake hose

1. Jack up the vehicle and support the vehicle with safety stands. (Refer to the GI section.)
2. Remove the rear wheels.
3. Drain the brake fluid from the brake system. (Refer to the BR-4.)
4. Disconnect the flare nut of the brake pipes from the brake hose, using a flare nut wrench.
5. Disconnect the brake hose from the clamps by removing the E-rings.

CAUTION:

- Never reuse the used E-ring.

6. Connect the brake hose to the brackets and secure it by installing new E-rings.

WARNING:

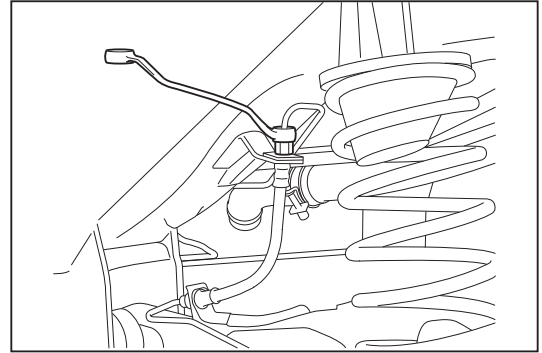
- Be sure to connect the E-ring in such a manner that the E-ring is securely inserted in the groove provided on the brake hose end properly.

7. Connect the flare nut of the brake pipes to the brake hose fully by hand.
8. Tighten the flare nuts to the specified tightening torque.

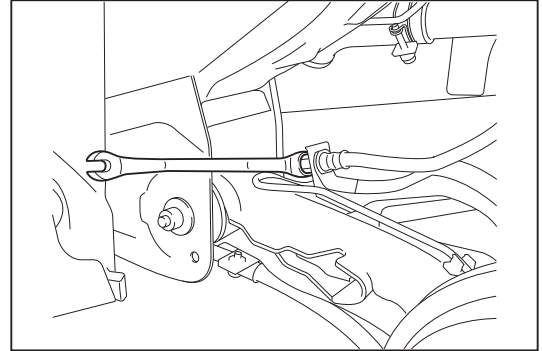
Tightening Torque: 12.7 - 17.7 N·m

9. Perform the air bleeding. (Refer to the BR-4.)

10. Ensure that no brake fluid leakage exists.



MBR00123-00106

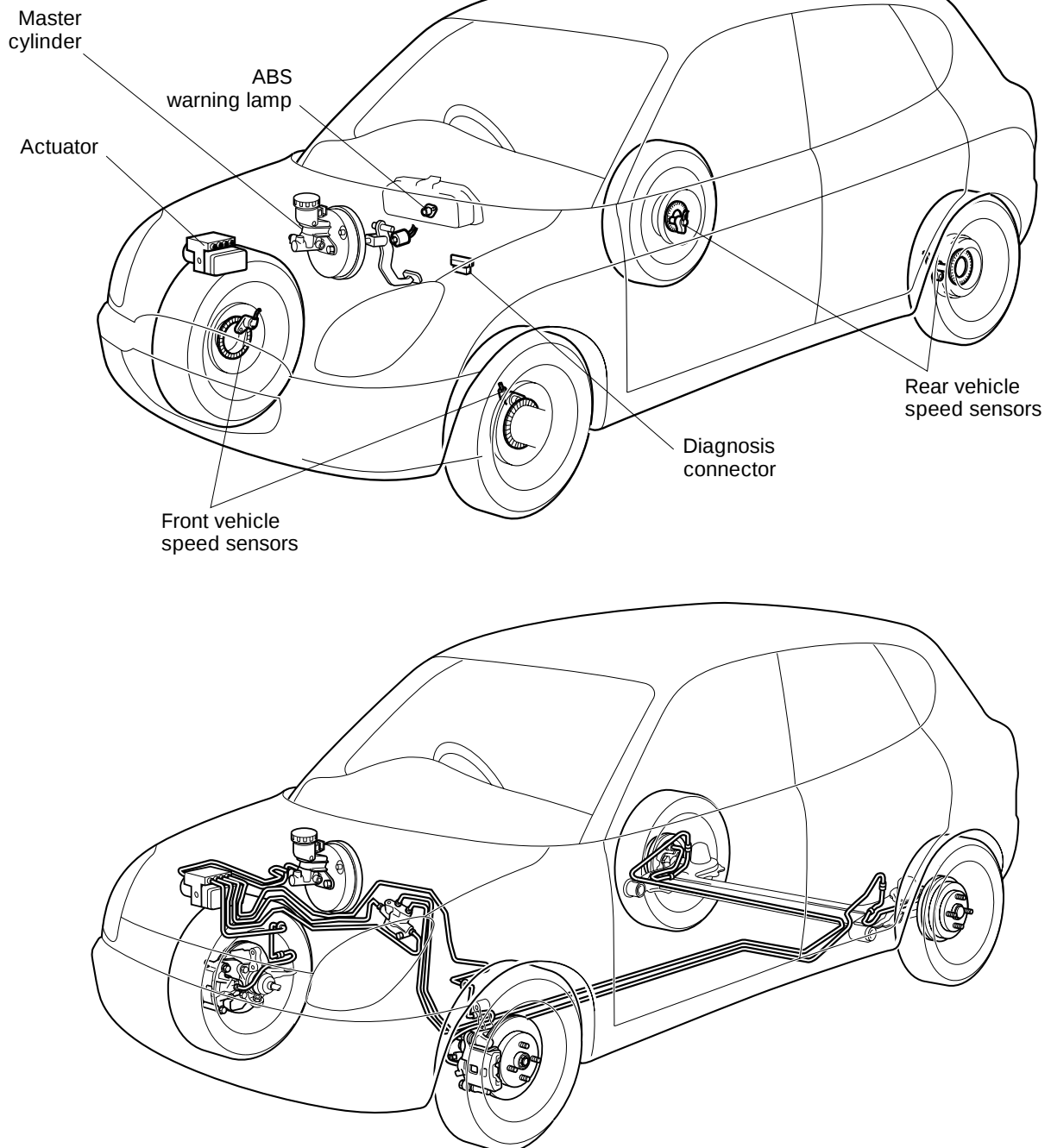


MBR00124-00107

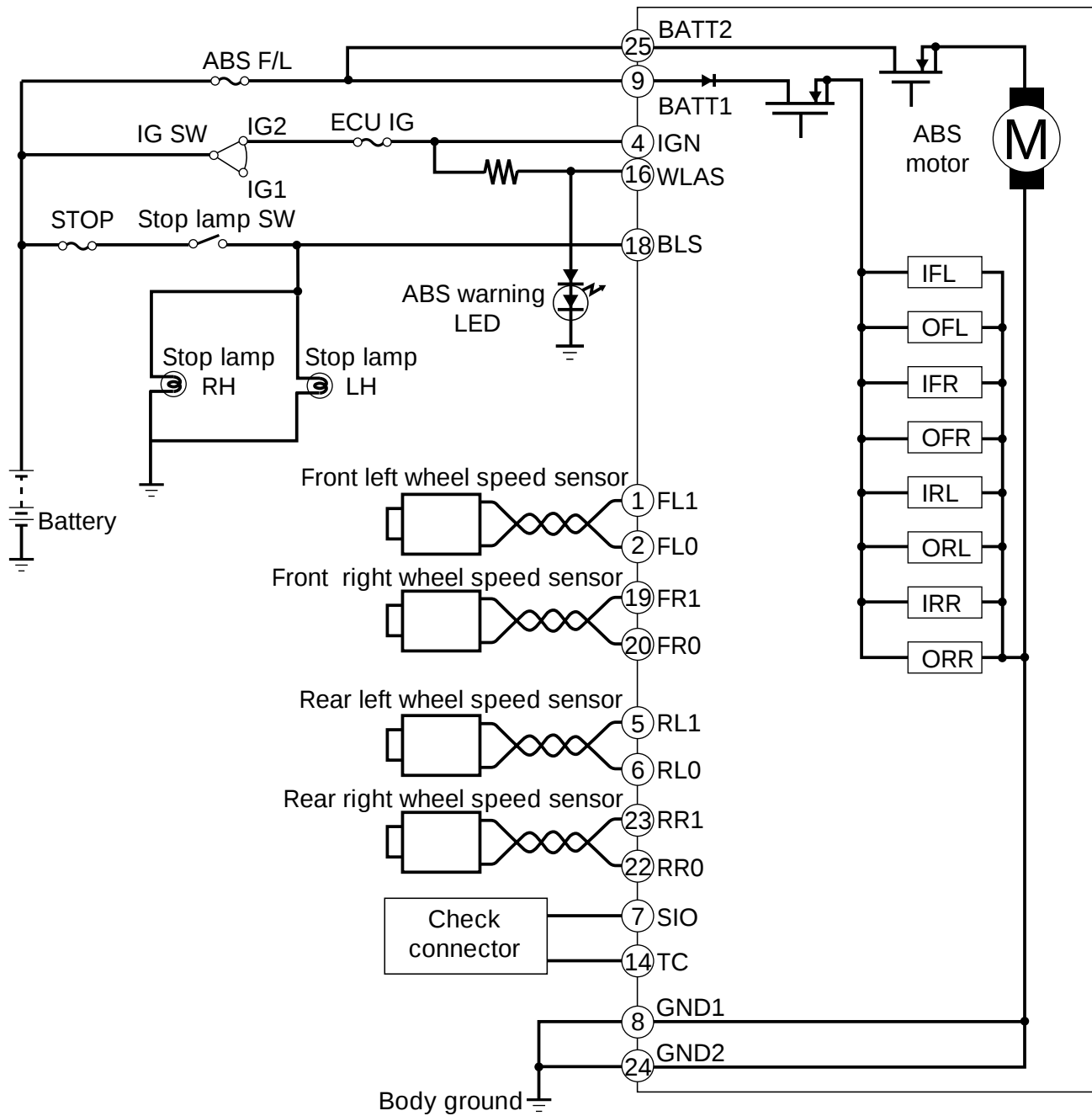
ANTI-LOCK BRAKE SYSTEM

OUTLINE OF SYSTEM

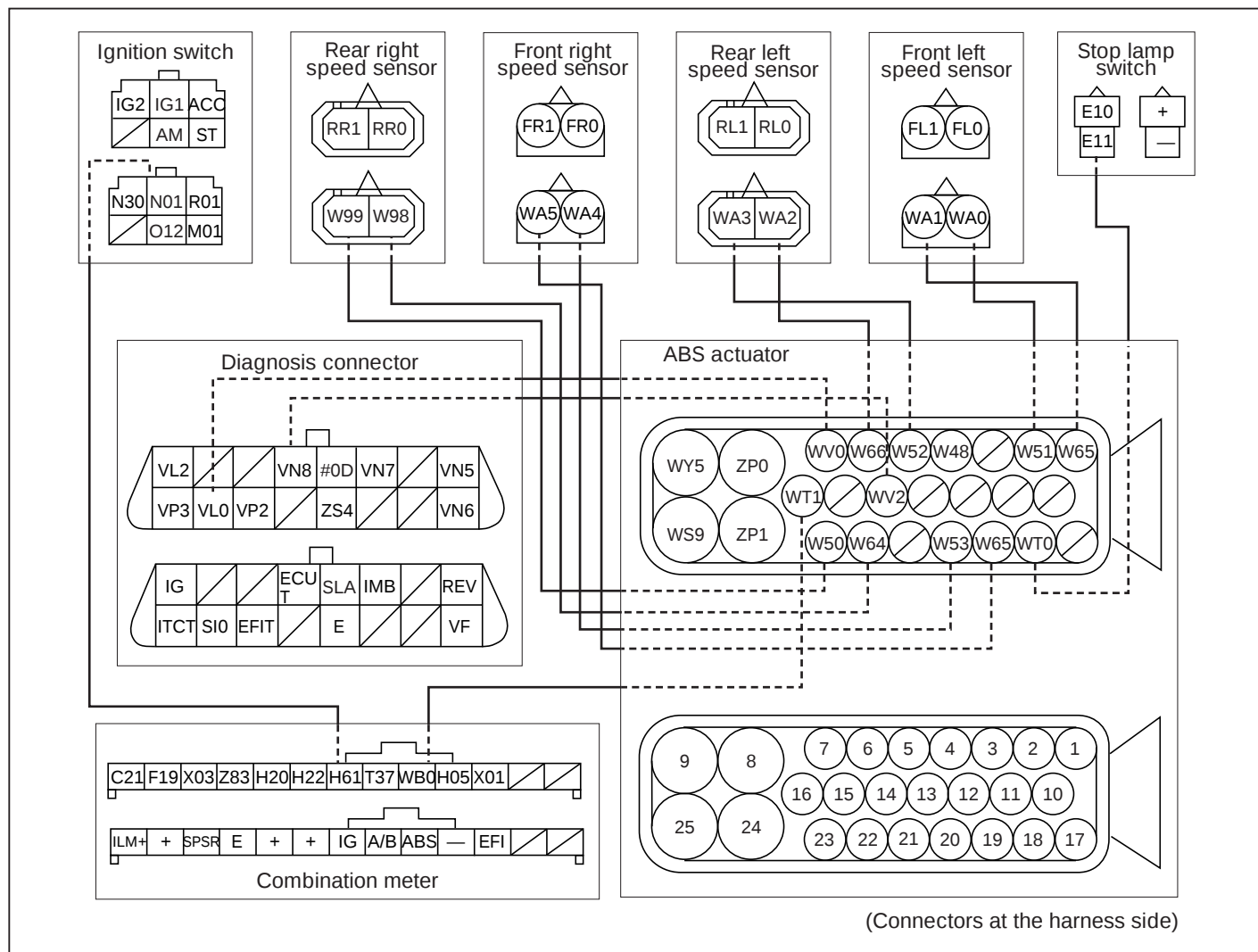
The ABS is a brake system to prevent the wheels from locking which may cause the vehicle to slip. For this purpose, the ABS assures proper braking forces at all times by maintaining the coefficient of friction between the tires and the road surface to an optimum level through controlling the hydraulic pressure of each of the front right, front left and rear wheels. In this way, the controllability or steerability of the steering wheel is assured even under sudden braking/hard braking, except for the case of over-speeding or sharp turning in a corner.



ABS CIRCUIT DIAGRAM

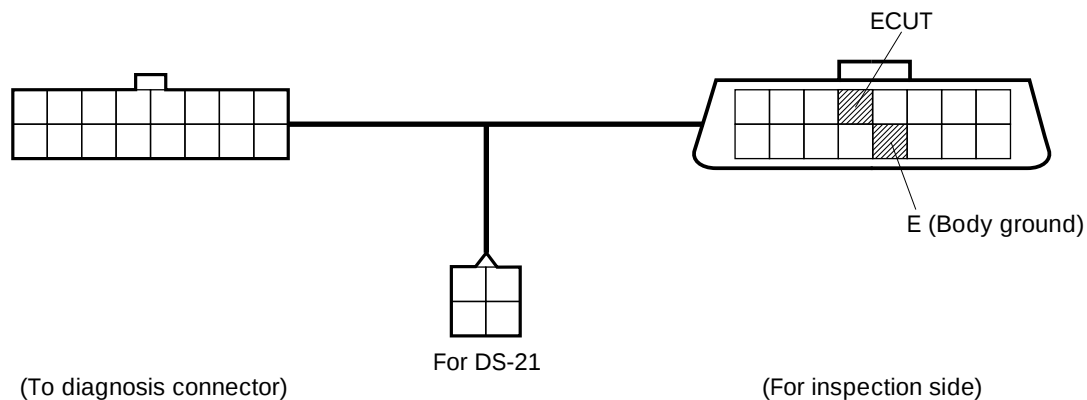


ABS-RELATED CONNECTORS



MABS00003-00003

SST (For diagnosis check connector)



MABS00000-00004

ABS CIRCUIT CONNECTION TABLE

ABS actuator unit				Wheel speed sensor				Stop lamp switch			
No.	Abbreviation code	Terminal of ABS actuator unit to be connected	Front		Rear			Ignition switch			
			Right	Left	Right	Left		ABS fuse			
								Diagnosis check connector	Others		
1	FL1 (W65)	Speed sensor (Front left)	○	○							
2	FL0 (W51)	Speed sensor (Front left)	○	○							
4	IGN (W48)	Ignition switch	○				○				
5	RL1 (W52)	Speed sensor (Rear left)	○			○					
6	RL0 (W66)	Speed sensor (Rear left)	○			○					
7	SIO (WV0)	External communication circuit (Diagnosis check connector)	○						○		
8	GND1 (ZP0)	Ground	○							○ Body ground	
9	BATT1 (WY5)	ABS fuse	○					○			
14	TC (WV2)	Diagnosis check connector	○						○		
16	WLAS (WT1)	ABS warning lamp	○							○ Combination meter	
18	BLS (WT0)	Stop lamp switch	○				○				
19	FR1 (W65)	Speed sensor (Front right)	○	○							
20	FR0 (W53)	Speed sensor (Front right)	○	○							
22	RR0 (W64)	Speed sensor (Rear right)	○			○					
23	RR1 (W50)	Speed sensor (Rear right)	○			○					
24	GND2 (ZP1)	Body ground	○							○ Body ground	
25	BATT2 (WS9)	Battery	○					○			
a	M +	Motor +	○							○ Motor positive	
b	M –	Motor –	○							○ Motor negative	

PRECAUTIONS

1. The ABS system has a self-diagnosis function. The ECU in the ABS actuator unit memorizes abnormality as diagnosis codes which are occurring at present or occurred in the past.
Memorized diagnosis codes are erased when the brake pedal is depressed eight times or more within predetermined form. Therefore, no diagnosis code will be erased even when the battery power supply is shut off.

NOTE:

- Be sure to perform the sensor check by sensor check function after erasing the diagnosis code.

2. The components of the ABS system are precise and delicate. Therefore, never apply any excessive impact during the removal, inspection and installation.

CAUTION:

- Never use components to which an impact has been applied by dropping or hitting with other objects.

3. Never perform the inspection of the ABS system when the vehicle is wet, such as after running in rain or snow and after washing, in order to prevent water or dust, etc. from being admitted into the ABS and related connectors.
4. Never allow water and dust, etc. to enter into the ABS actuator unit and related connectors.
5. Prevent water from coming in contact with the ABS related parts and connectors during washing.
6. Prior to replacing the ABS actuator unit, thoroughly perform the trouble shooting for possible items other than the ABS actuator unit. The ABS actuator unit is a reliable, but an expensive part.
Even when the ABS actuator unit is replaced according to the check results of the trouble shooting and the relevant trouble has been remedied, be sure to reinstall the old ABS actuator unit so as to confirm that the malfunction was obviously caused by the faulty ABS unit.
7. Never try to remove the ABS actuator unit cover and touch the screws on the ABS actuator unit proper.
8. Ensure that the components of the brake system are installed properly and that no brake fluid leakage exists before performing the trouble shooting of the ABS.
9. Ensure that no excessive rattle exists on each of the wheel bearings before performing the trouble shooting of the ABS.
10. When installing a wireless installation (HAM, CB, Telephone, etc.) :
The ABS actuator unit has been so designed that it is resistant to external influence.
However, if a vehicle is equipped with a wireless installation, such as CB, HAM, telephone and so forth, (even if its output is only 10 Ω) it may affect the ABS actuator unit adversely. Therefore, observe the following precautions.
 - Install the antenna at a place as far away as possible from the ABS actuator unit and related harnesses.
 - The antenna cord should be kept at least 30 cm from the ABS actuator unit and its related harnesses.
 - The antenna cord should not be routed in parallel to ABS related harnesses.
 - Adjust the antenna output correctly.
 - Never install a wireless installation with a high output into the vehicle.
 - Never use or place a handy telephone near the components of the ABS and its related harnesses.
11. When disconnecting or connecting connectors:
 - Prevent dust, water and foreign material, etc. from being admitted into the ABS-related connectors when disconnecting or connecting the connectors. Failure to observe this caution may cause serious malfunction, due to lowering the insulation of each terminal.
 - Never damage or lose the gasket or seal of connectors during disconnection or connection.
 - Be sure to confirm the shape of the lock and release the lock properly before disconnecting the connectors.
 - Never make damage to the rubber protector of connectors during disconnection or connection.

12. Circuit tester

- For trouble shooting, use a volt/ohmmeter whose internal resistance is more than 10 k ohm, whose resolution is 0.1 V or more and 0.5 ohm or more, and whose accuracy is $0 \pm 2 \%$ or more. Use of a volt/ohmmeter which has lower specifications than those described above for trouble shooting may lead to wrong diagnosis or mis-judgement.

13. Never deform the terminals of connectors by applying an excessive force when checks are performed by attaching the probe electrodes of the volt/ohmmeter to the terminals.

Prevent such damage by utilizing SSTs effectively.

14. Be sure to disconnect the ground cable from the negative terminal of the battery before disconnecting the connector of the wire harness from the ABS actuator unit. Failure to observe this caution may lead to ABS unit damage.

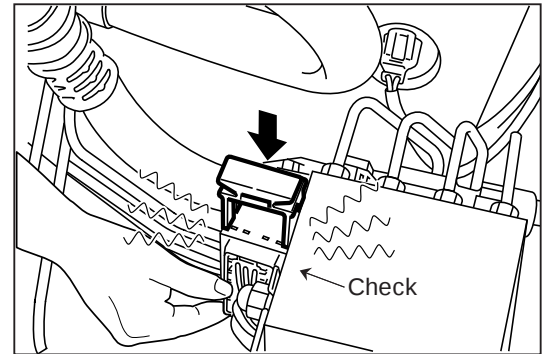
MABS00006-00000

TROUBLE SHOOTING HINTS

Most of troubles related to the electrical system of the ABS are merely caused by poor connections.

Ensure the following points carefully before and during the inspection.

- (1) Visually inspect that the terminals are not damaged or bent.
- (2) Ensure that connectors are securely connected and locked.
- (3) Ensure that the measured continuity or resistance will not be changed when light vibration is applied to the connector or the wire harness connected to the related circuit of presumable parts of trouble.



MABS00007-00005

HOW TO PROCEED TROUBLE SHOOTING

The trouble or malfunction of the brake system mainly originates in the mechanical systems, such as the brake pedal, brake booster, brake master cylinder, P valve, wheel cylinders and brake fluid line, or electrical systems, such as the ABS actuator unit, wheel speed sensors and ABS related wiring harness.

This manual describes mainly trouble shooting of the electrical system of the ABS control systems on the premise that the brake mechanical systems are functioning normally.

Hence, when the brake system is encountered with any trouble, make sure that the trouble does not originate in the mechanical systems of the brake systems.

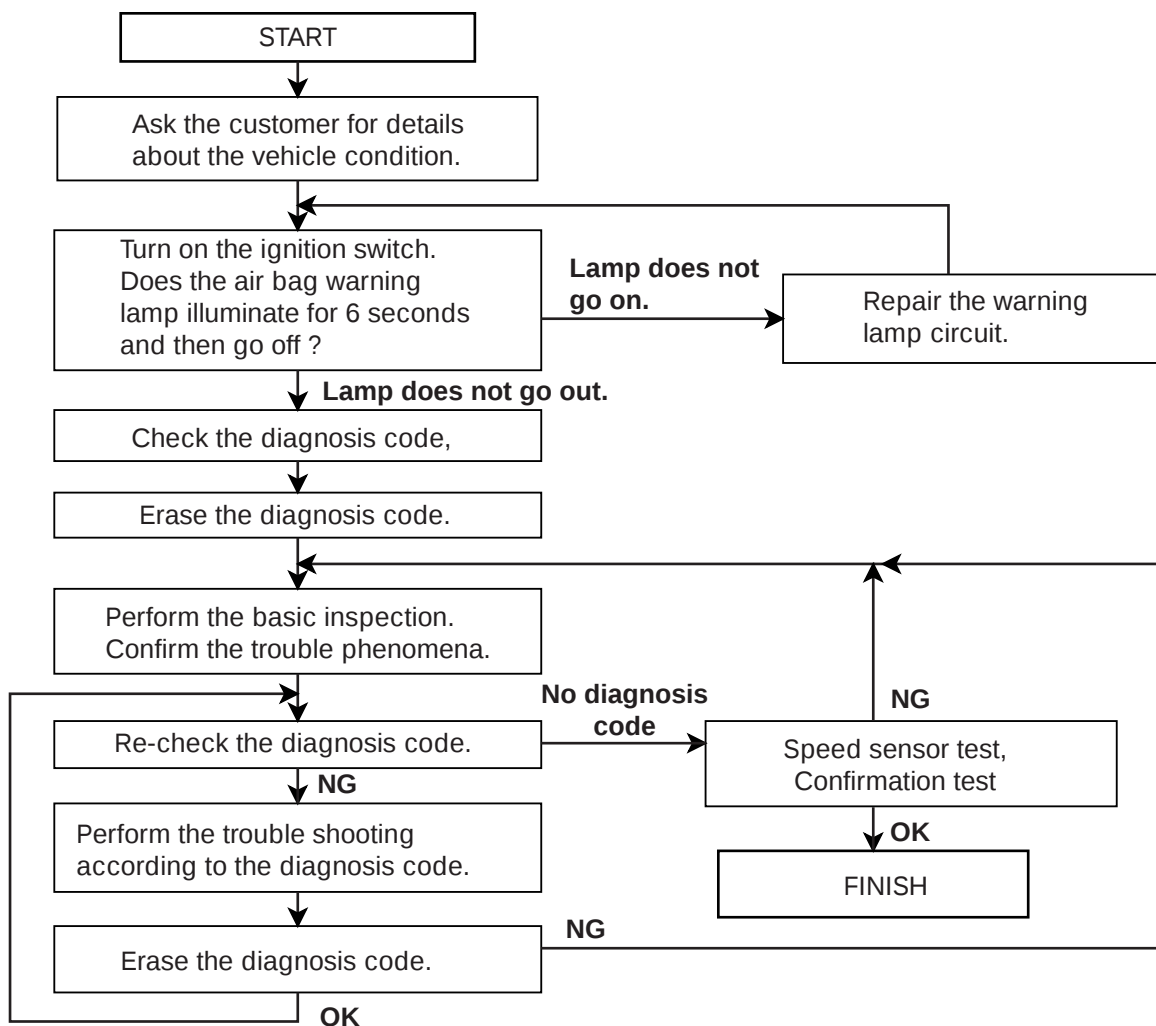
To proceed the trouble shooting, first perform the diagnosis check. Then, if any of the diagnosis codes other than the normal codes is outputted, perform the trouble shooting according to the diagnosis codes.

When no diagnosis code is outputted even if malfunction phenomena exists, perform the trouble shooting according to the malfunction phenomena.

The following diagram shows the basic procedure for the trouble shooting.

Actual approach may differ if you have much experience on this system. However, it is recommended to perform the trouble shooting according to this procedure.

MABS00008-00000



MABS00009-00000

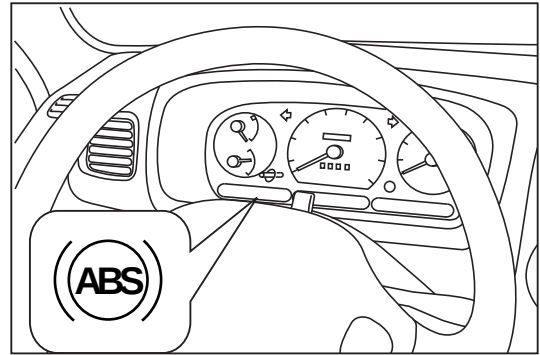
DIAGNOSIS CODE CHECK

1. Checking of ABS warning lamp

- (1) Ensure that the ABS warning lamp will glow for about three seconds after the ignition switch is turned ON, and, then, the warning lamp goes out.

NOTE:

- Proceed to trouble shooting according to the trouble phenomenon if the ABS warning lamp fails to meet the condition above.



MABS00010-00006

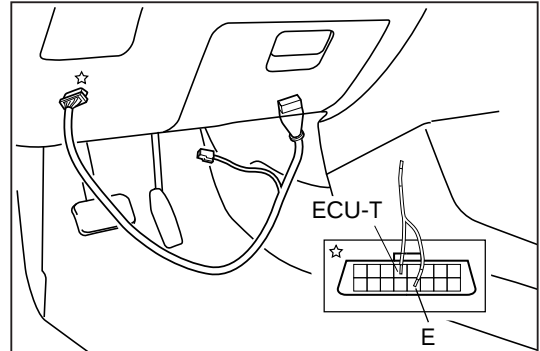
2. Output of diagnosis codes

- (1) Connect the following SST to the diagnosis connector.

SST: 09991-87404-000

- (2) Connect the ECUT and E terminals in the SST with the following SST.

SST: 09991-87403-000



MABS00011-00007

CAUTION:

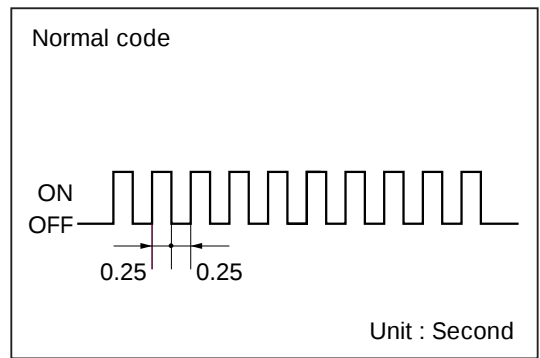
- Never connect the terminals other than those specified. Even slight contact of the other terminals causes serious malfunction.

- (4) Turn ON the ignition switch.

- (5) Read out the diagnosis code(s) by observing the number of blinking of the ABS warning lamp.

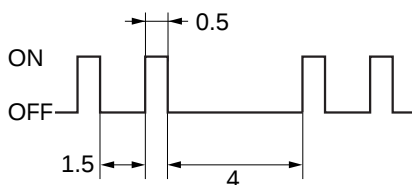
NOTE:

- When plural malfunction codes are memorized, the code will be outputted starting from a smaller code number at intervals of 2.5 seconds.
- After completion of one cycle, the same codes will be outputted again at intervals of 4 seconds.

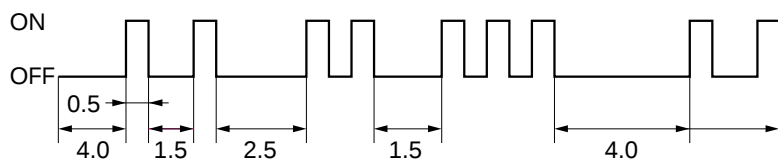


MABS00012-00008

Single code : 11



Plural codes : 11 and 23



unit : Second

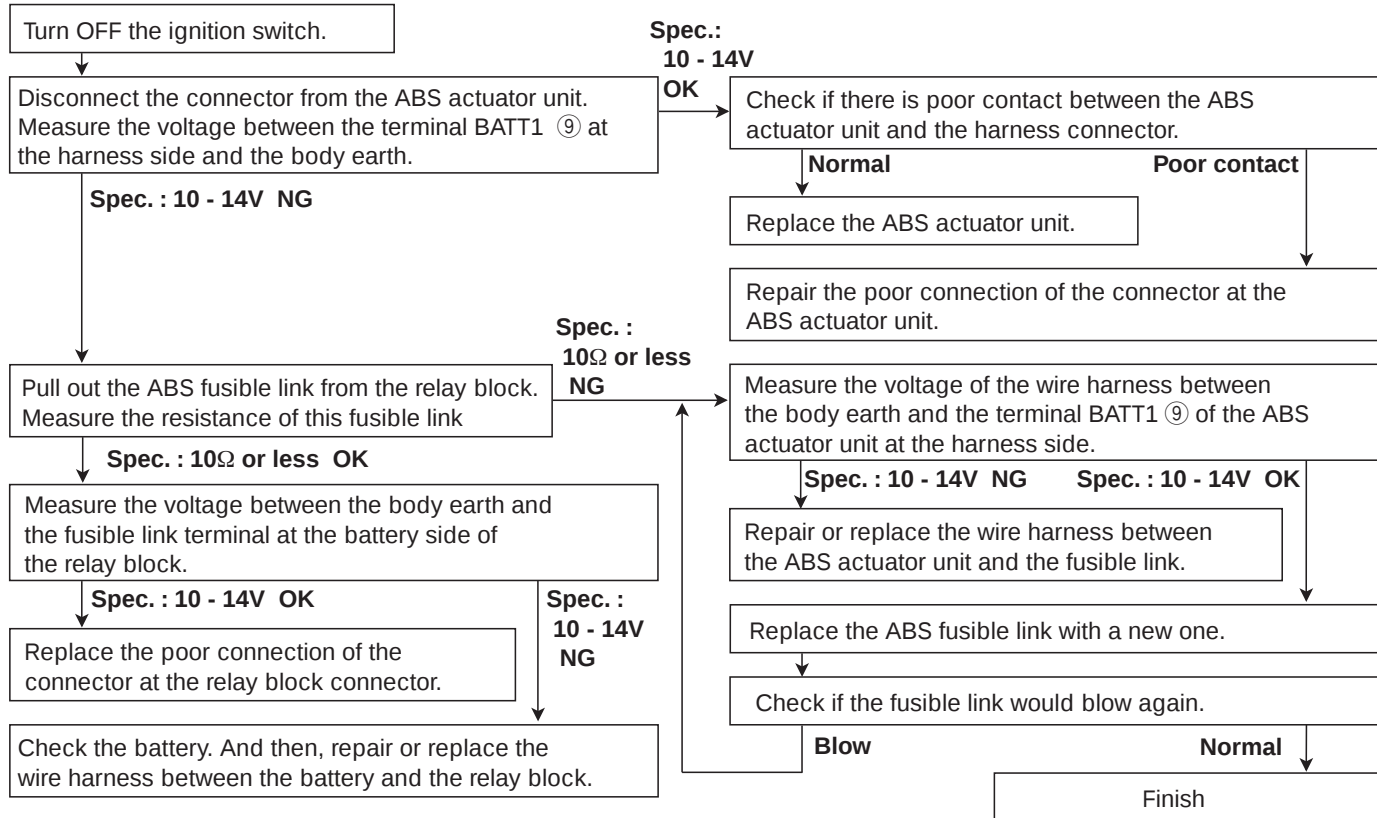
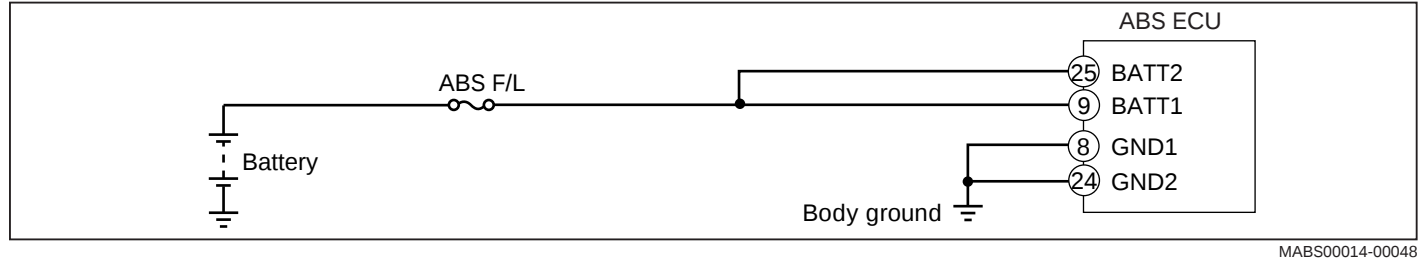
MABS00000-00009

DIAGNOSIS CODE TABLE

Code No.	Warning lamp output	Diagnosis malfunction contents		Refer to page
—		Normal code		
11		Main relay has open wire.		BR-48
12		Main relay is shorted.		Replace the ABS actuator.
13		Motor relay has open wire.		Replace the ABS actuator.
14		Motor relay is shorted.		Replace the ABS actuator.
21		Front right inlet solenoid valve	• Open wire • short circuit	Replace the ABS actuator.
22		Front right outlet solenoid valve		Replace the ABS actuator.
23		Front left inlet solenoid valve		Replace the ABS actuator.
24		Front left outlet solenoid valve		Replace the ABS actuator.
25		Rear right inlet solenoid valve		Replace the ABS actuator.
26		Rear right outlet solenoid valve		Replace the ABS actuator.
27		Rear left inlet solenoid valve		Replace the ABS actuator.
28		Rear left outlet solenoid valve		Replace the ABS actuator.
31		Front right speed sensor	• Open wire • Short circuit • Abnormal speed sensor signal	BR-49
32		Front left speed sensor		BR-49
33		Rear right speed sensor		BR-49
34		Rear left speed sensor		BR-49
35		Front right speed sensor	• Abnormal speed sensor signal or noise	BR-49
36		Front left speed sensor		BR-49
37		Rear right speed sensor		BR-49
38		Rear left speed sensor		BR-49
41		Abnormal power supply voltage (Low voltage)		BR-50
49		ABS ECU malfunctioning		Replace the ABS actuator.
51		ABS pump motor malfunctioning		Replace the ABS actuator.

<DIAGNOSIS CODE 11>

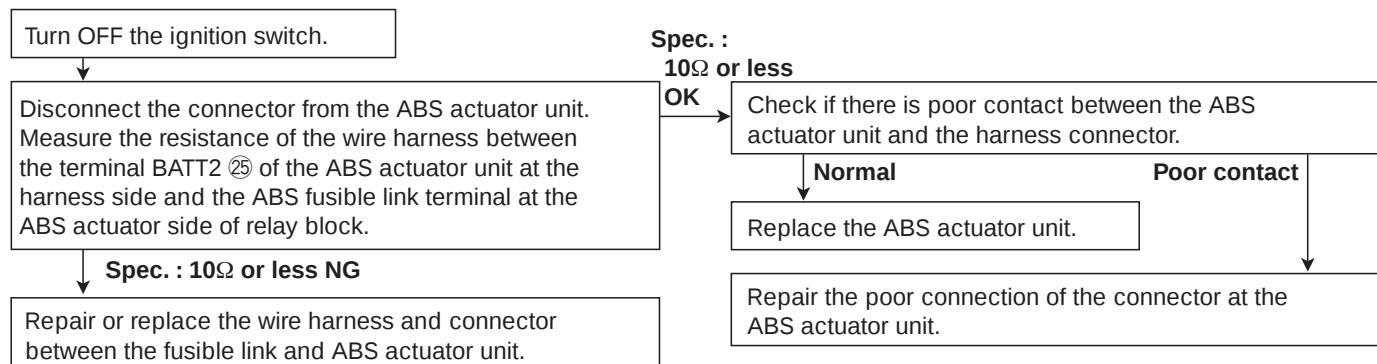
- Monitoring circuit voltage at time when test pulse is sent to main relay.
- Monitoring the voltage being applied to BATT1 ⑨ and BATT2 ⑫ terminal.



<DIAGNOSIS CODE 13>

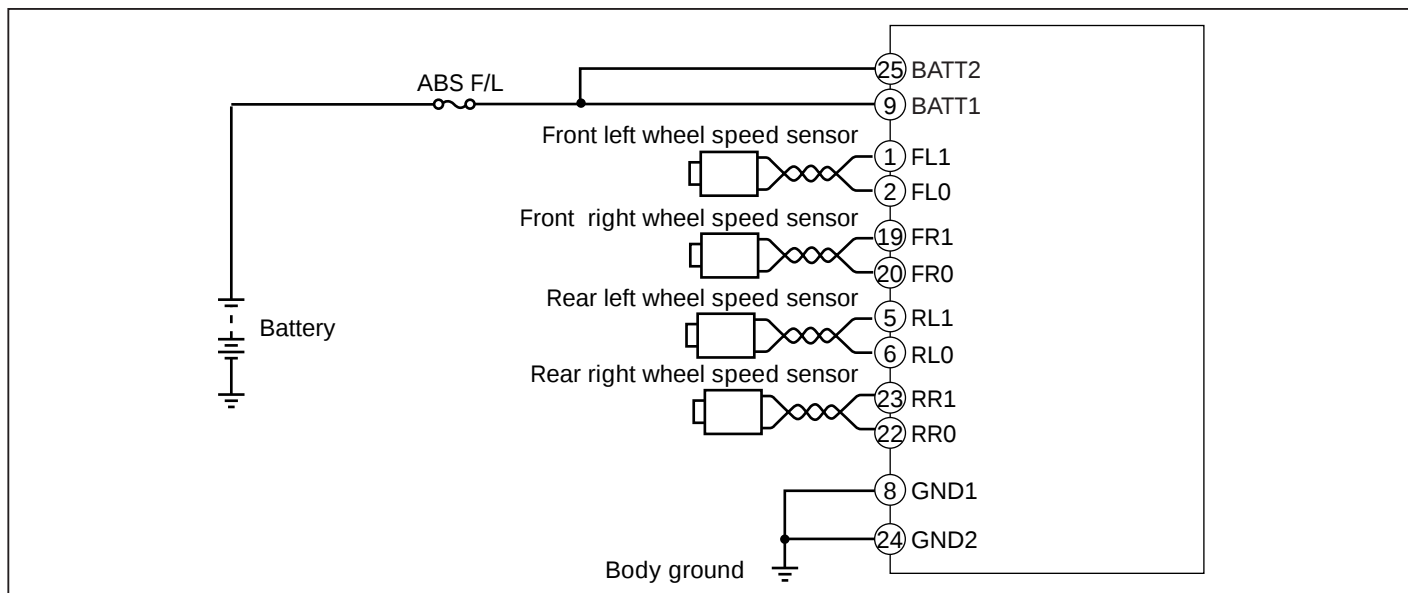
- Monitoring circuit voltage while ABS motor is driving and stopped.

MABS00016-00000



<DIAGNOSIS CODE 31,32,33,34,35,36,37,38,61,62,63,64>

- Circuit voltage at time when vehicle stops.
- Output voltage of speed sensor at time of moving-off of vehicle.
- Pressure reduction during ABS control / Length of retention signal. (Solenoid valve operation faulty.)
- Difference in output of speed sensor of each wheel.



MABS00018-00037

Diagnosis code 31,35,61 : Front right speed sensor
 32,36,62 : Front left speed sensor
 33,37,63 : Rear right speed sensor
 34,38,64 : Rear left speed sensor

Turn OFF the ignition switch.

Spec. : 1.0 - 1.8kΩ OK

Disconnect the connector from the ABS actuator unit.
 Measure the resistance of the wire harness.

Code No. 31,35,61 :

- Between the terminal FR0 ⑳ and FR1 ⑑ of the ABS actuator unit at the harness side.

Code No. 32,36,62 :

- Between the terminal FL0 ② and FL1 ① of the ABS actuator unit at the harness side.

Code No. 33,37,63 :

- Between the terminal RR0 ㉒ and RR1 ㉓ of the ABS actuator unit at the harness side.

Code No. 34,38,64 :

- Between the terminal RL0 ⑥ and RL1 ⑤ of the ABS actuator unit at the harness side.

Spec. : 1.0 - 1.8kΩ NG

Check the resistance between the terminal of the speed sensor.

Spec. : 1.0 - 1.8kΩ NG

Replace the speed sensor.

Spec. :
1.0 - 1.8kΩ
OK

Repair or replace the wire harness and connector
 between the speed sensor and the ABS actuator unit.

Has any foreign matter stuck to the speed sensor?
 Or is there any external damage?

YES

NO

Remove the foreign matter from
 the speed sensor.

Check the tightening torque of speed sensor.

Spec. : FR 15.2 - 23.0 N·m
 RR 6.9 - 9.8 N·m NG

Spec. :
FR 15.2 - 23.0 N·m
 RR 6.9 - 9.8 N·m OK

Tighten the attaching bolts to the
 specified torque.

Is there damage in speed sensor rotor?

YES

NO

Replace the speed sensor rotor.

Is the air gap between the sensor tip and the sensor
 rotor within the spec.?

Spec. : FR 0.7 - 1.7 mm , RR 0.9 - 1.5 mm

Spec. : OK

Spec. : NG

Replace the ABS actuator unit.

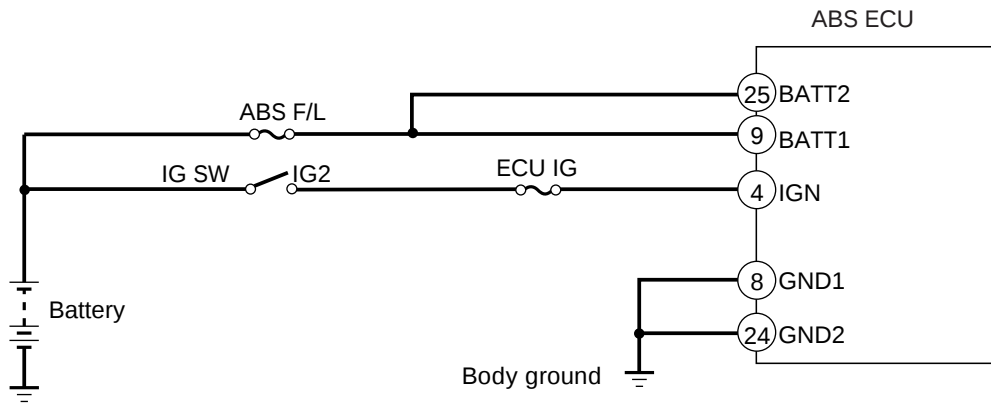
Adjust the air gap between the speed sensor and
 the sensor rotor to the specified value.

Spec. : FR 0.7 - 1.7 mm , RR 0.9 - 1.5 mm

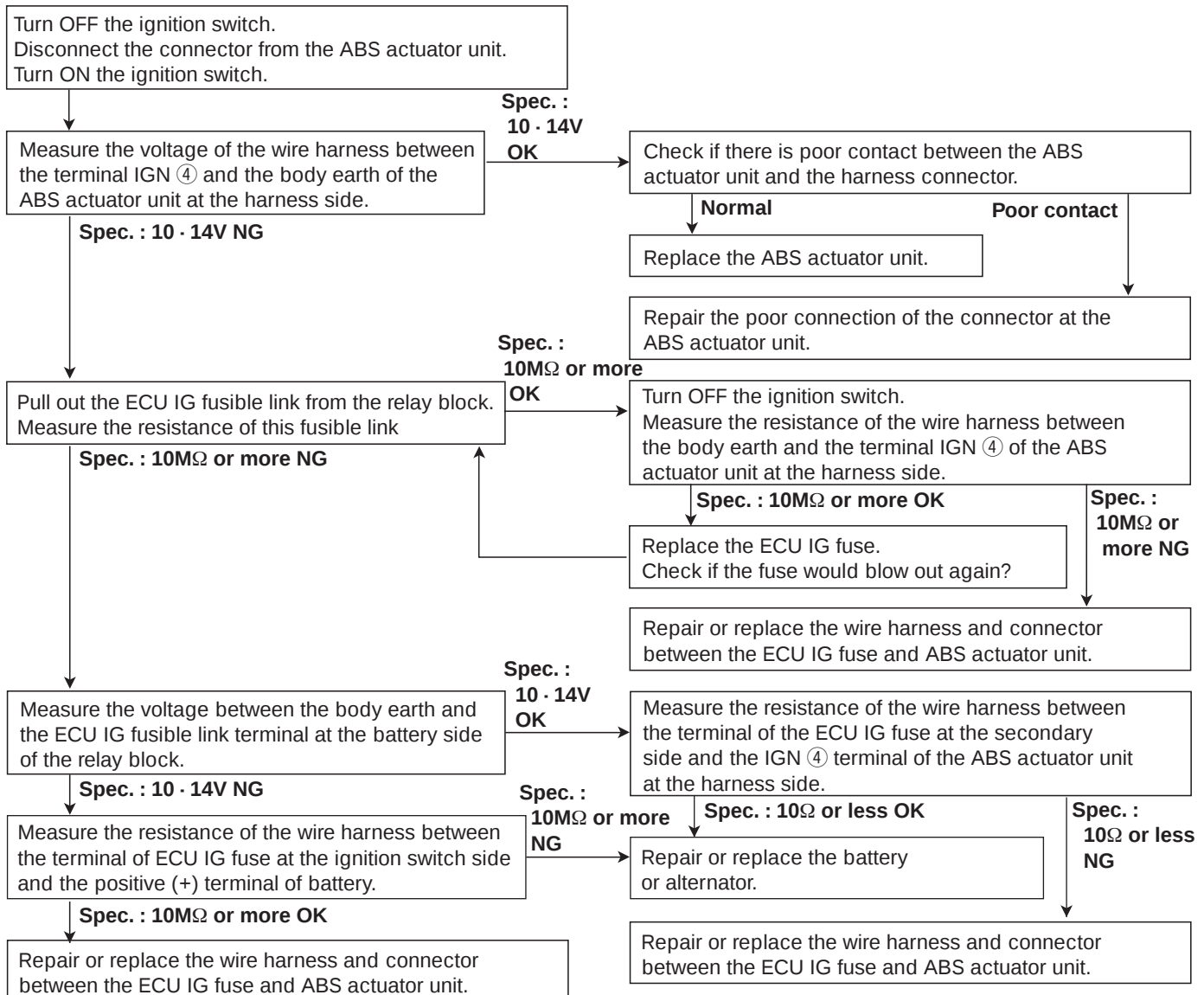
MABS00019-00000

<DIAGNOSIS CODE 41>

- Monitoring input voltage of IGN ④ terminal.



MABS00020-00038

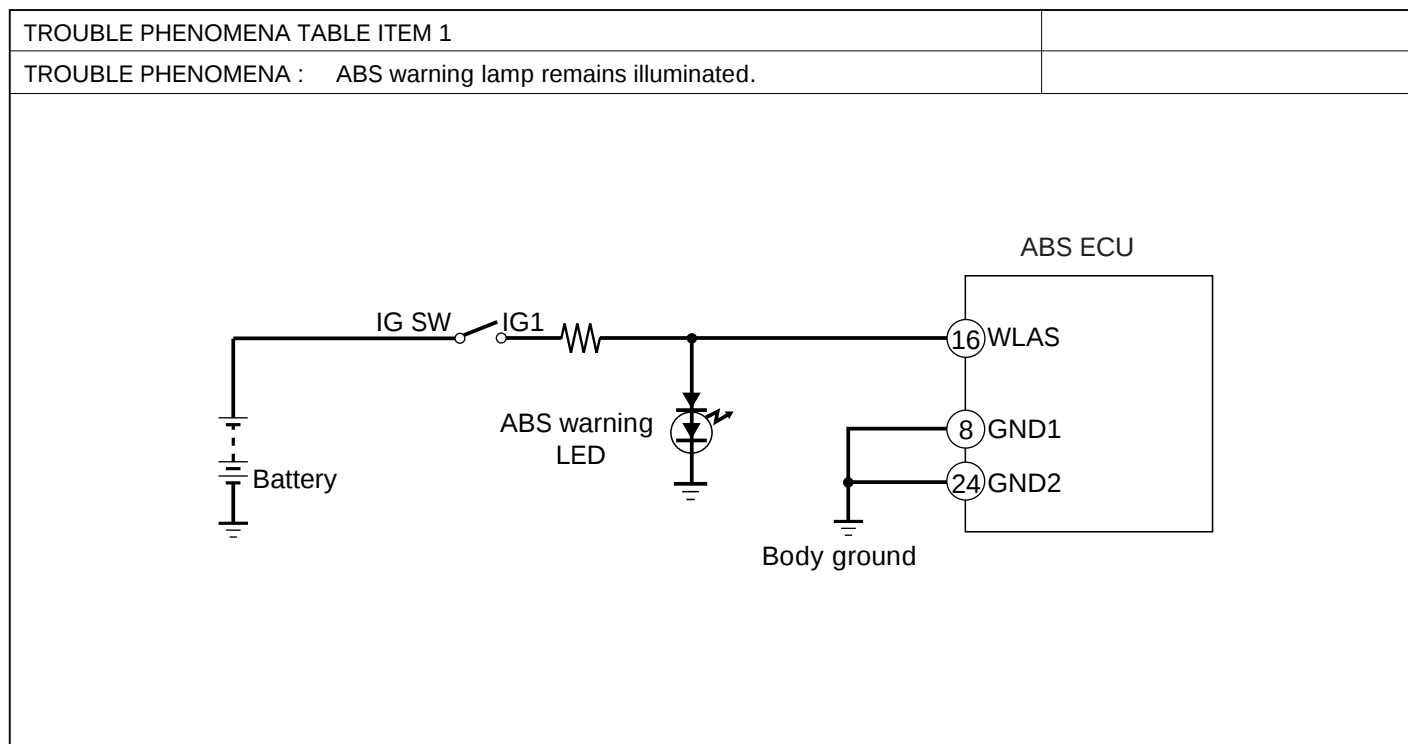


MABS00021-00000

TROUBLE SHOOTING ACCORDING TO TROUBLE PHENOMENA TABLE

TROUBLE PHENOMENA	Refer to page
1. ABS warning lamp remains illuminated immediately after ignition switch is turned on.	BR-49
2. ABS warning lamp will not glow immediately after ignition switch is turned on.	BR-51
3. ABS warning lamp is illuminated while driving.	BR-52
4. Poor effectiveness	BR-52
5. ABS operates under normal braking.	BR-52
6. ABS operates just before vehicle stops under the normal driving.	BR-52
7. Brake pedal vibrates excessively.	BR-52
8. Wheel locks frequently during ABS operation.	BR-52
9. Brake pedal working travel is too small.	BR-53
10. Brake pedal working travel is too large. (Reserve travel is too small.)	BR-54
11. Diagnosis code will not be erased.	BR-54
12. Unable to communicate with DS-21	BR-55

MABS00022-00000

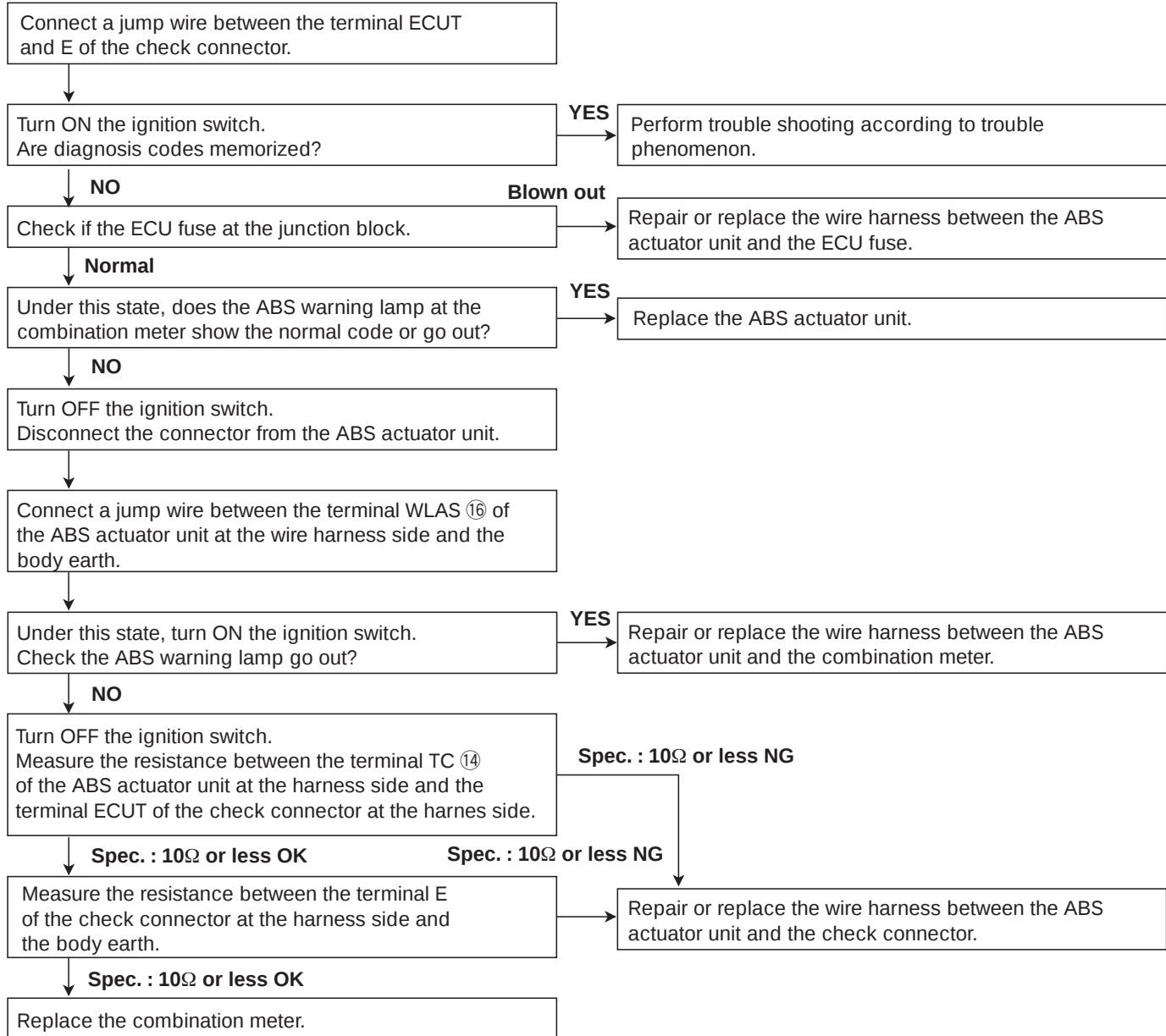


MABS00023-00000

Checking point:

1. Wire harness between terminal WLAS ⑩ or ABS actuator unit and combination meter (ABS warning lamp) for open circuit.
2. ABS warning lamp circuit in the combination lamp
3. ABS actuator unit

MABS00024-00000



MABS00025-00000

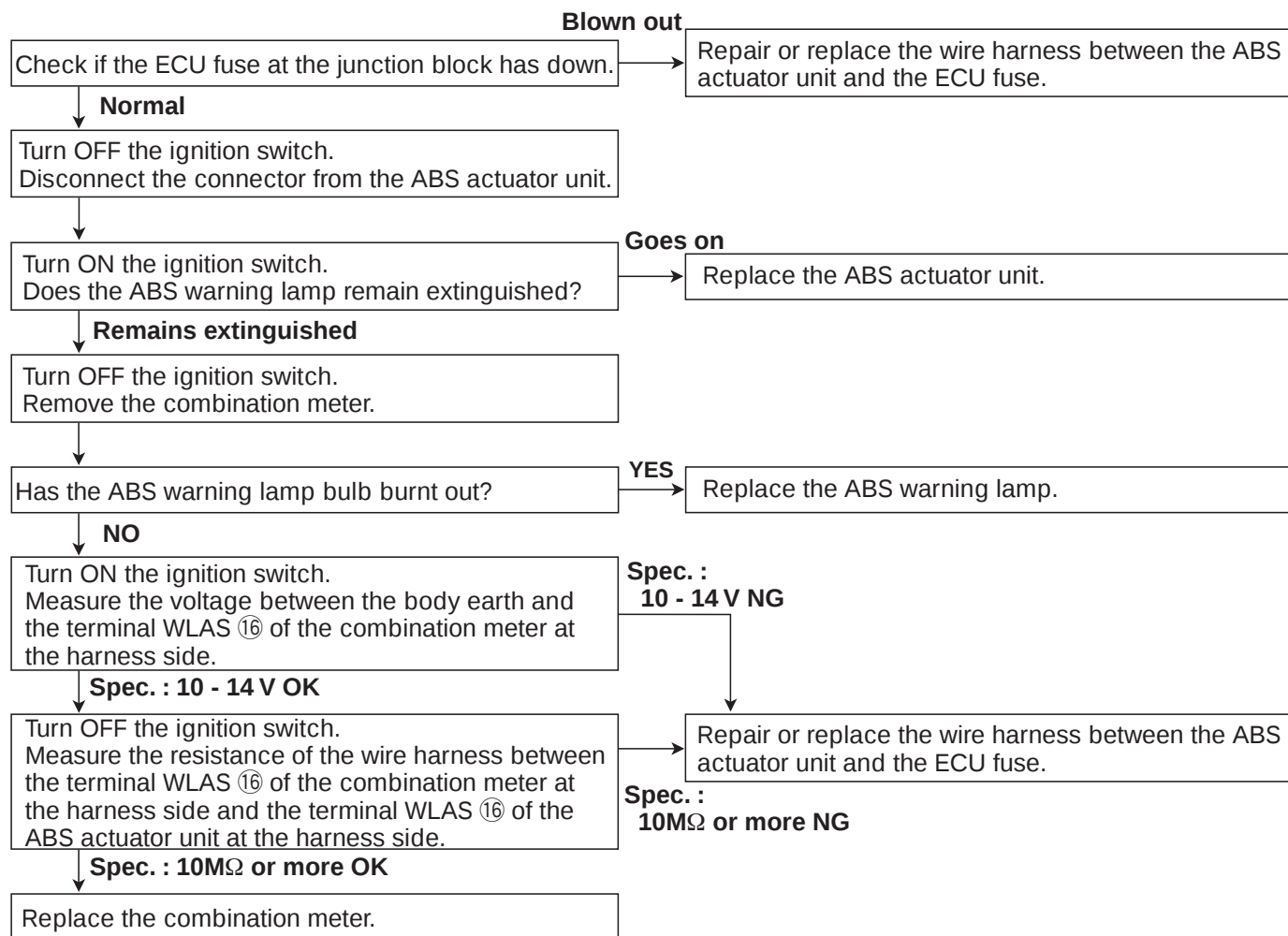
TROUBLE PHENOMENA TABLE ITEM 2

TROUBLE PHENOMENA : ABS warning lamp will not glow after ignition switch is turned on.

MABS00026-00000

Checking point:

1. ABS warning lamp for burnout.
2. Circuit between battery and combination meter for short circuit or open wire.
3. Circuit between WLAS ⑯ terminal or ABS actuator and combination meter for short circuit with positive circuit.
4. ABS warning lamp circuit in the combination meter.
5. ABS actuator unit

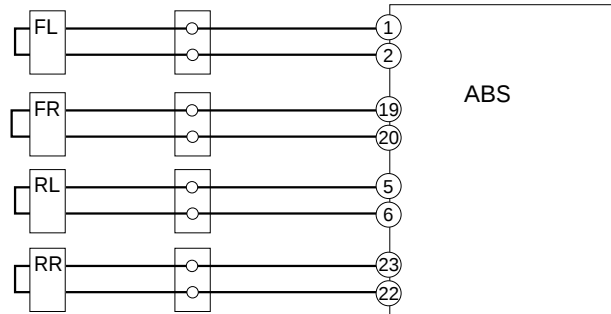


MABS00027-00000

TROUBLE PHENOMENA TABLE ITEM 3, 4, 5, 6, 7, 8

TROUBLE PHENOMENA :

- ABS warning lamp is illuminated while driving.
- Poor effectiveness
- ABS operates under normal braking.
- ABS operates just before vehicle stops under the normal driving.
- Brake pedal vibrates excessively.
- Wheel locks frequently during ABS operation.



MABS00028-00000

Checking point:

1. Wheel speed sensor and related wire harness.
2. ABS actuator unit

Connect a jump wire between the terminal ECUT and E of the check connector.

Turn ON the ignition switch.
Are diagnosis codes memorized?

YES

Perform trouble shooting according to trouble phenomenon.

NO

Turn OFF the ignition switch.
Is there damage in each speed sensor?

YES

Replace the speed sensor.

NO

Has any foreign matter stuck to the speed sensor?
Or is there any external damage?

YES

Remove the foreign matter from the speed sensor.

NO

Spec. : OK

Check the tightening torque of speed sensor.
Spec. : FR 7.8 - 9.8 N·m, RR 6.9 - 9.8 N·m

Tighten the attaching bolts to the specified torque.

Spec. : NG

Is there damage in speed sensor rotor?

YES

Replace the speed sensor rotor.

NO

Spec. : OK

Is the air gap between the sensor tip and the sensor rotor within the spec.?
Spec. : FR 0.7 - 1.7 mm RR 0.9 - 1.5 mm

Adjust the air gap between the speed sensor and the sensor rotor to the specified value.
Spec. : 0.7 - 1.7 mm

Spec. : NG

Disconnect the connector from the ABS actuator unit.
Measure the resistance between each terminal of the ABS actuator unit at the harness side and the each speed sensor at the harness side.

Spec. :
10Ω or less NG

Spec. : 10Ω or less OK

Measure the resistance, while moving the wire harness between the actuator unit and the each speed sensor by hand.

Repair or replace the wire harness between the ABS actuator unit and the each speed sensor.

Spec. : 1.0 - 1.8kΩ OK

Spec. :
1.0 - 1.8kΩ NG

Replace the ABS actuator unit.

MABS00029-00000

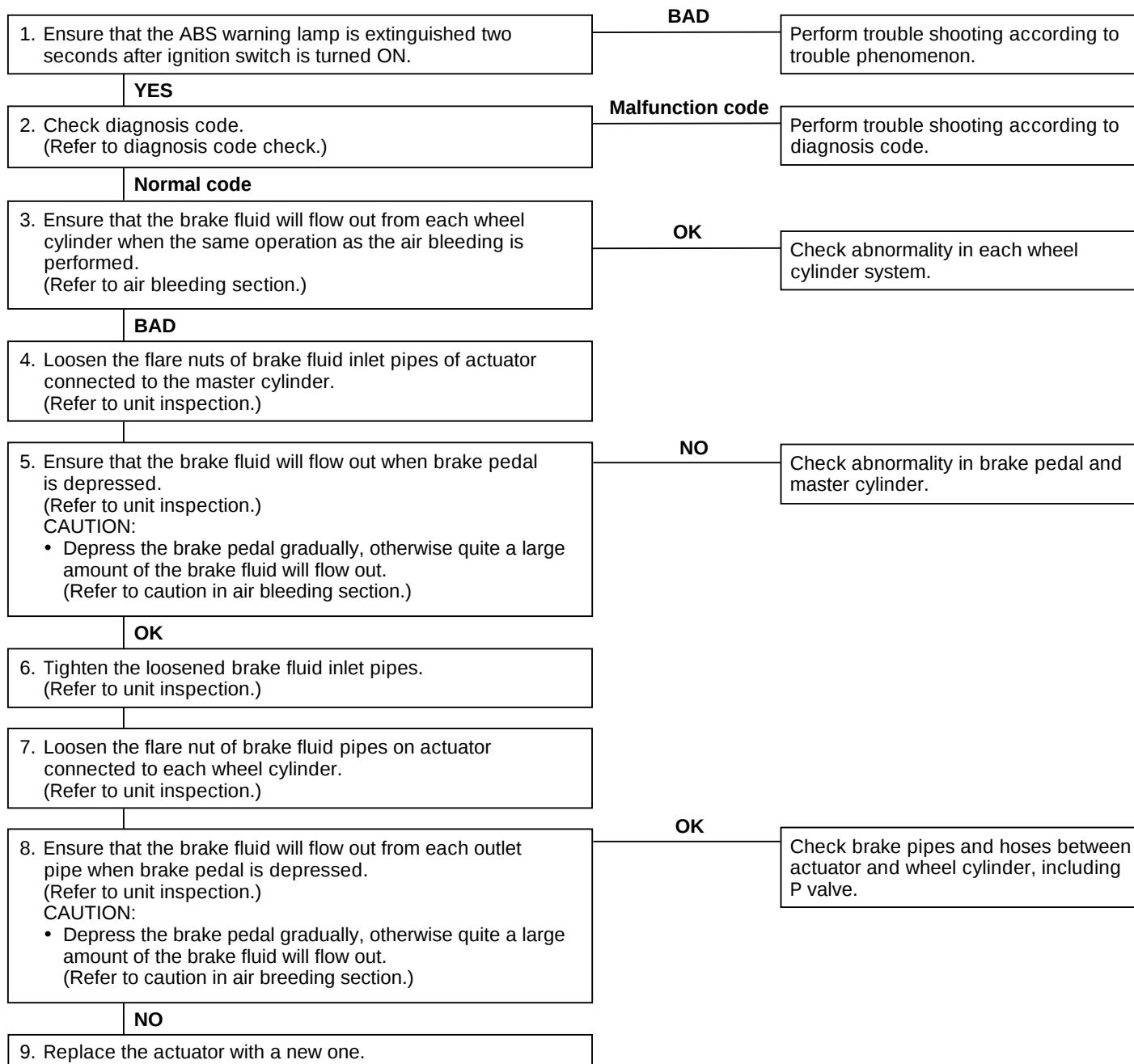
TROUBLE PHENOMENA TABLE ITEM 9

TROUBLE PHENOMENA : Brake pedal working travel is too small.

MABS00030-00000

NOTE:

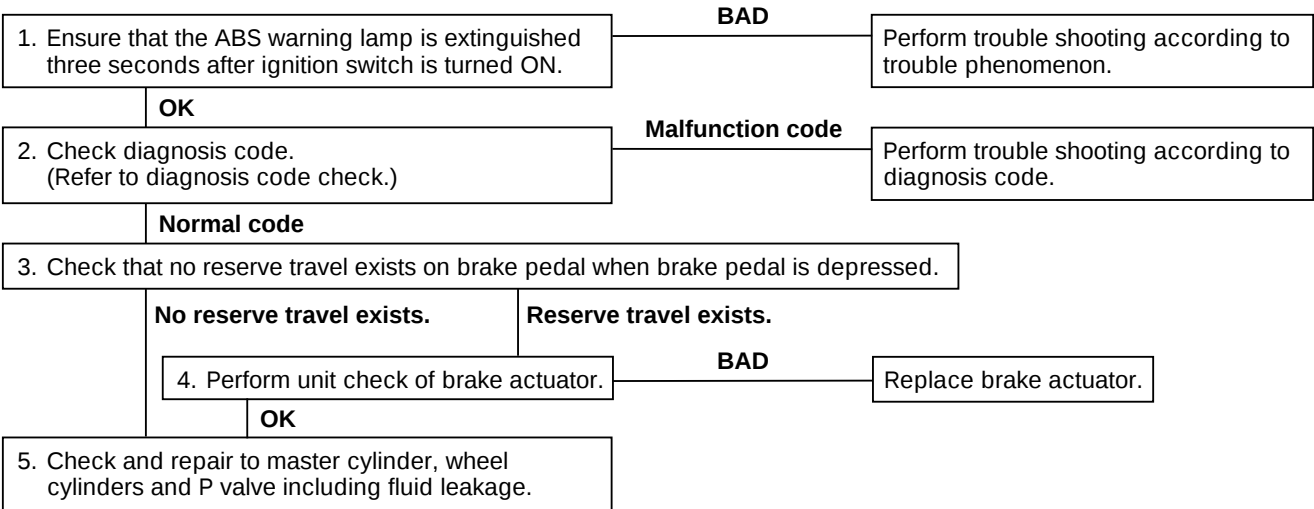
- No consideration has been taken for function of each wheel cylinder in this procedure.



MABS00031-00000

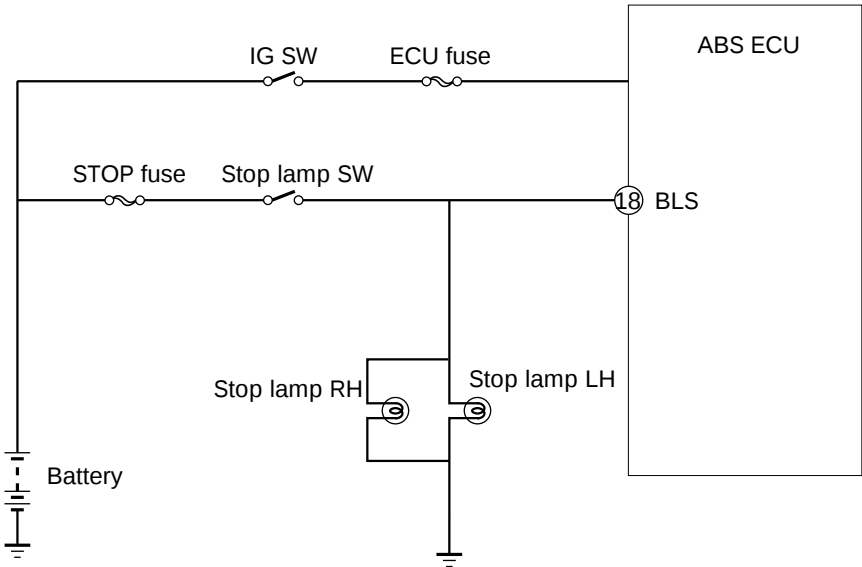
TRouble PHENOMENA TABLE ITEM 10
TRouble PHENOMENA : Brake pedal working travel is too large. (Reserve travel is too small.)

MABS00032-00000



MABS00033-00000

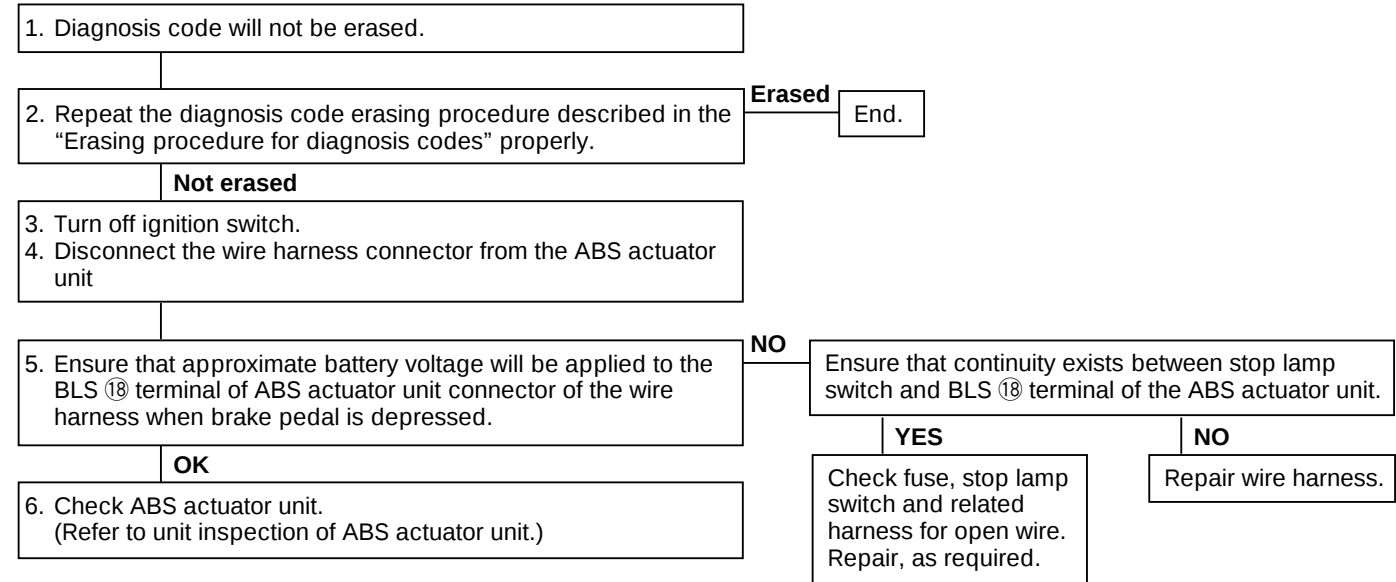
TRouble PHENOMENA TABLE ITEM 11
TRouble PHENOMENA : Diagnosis code will not be erased.



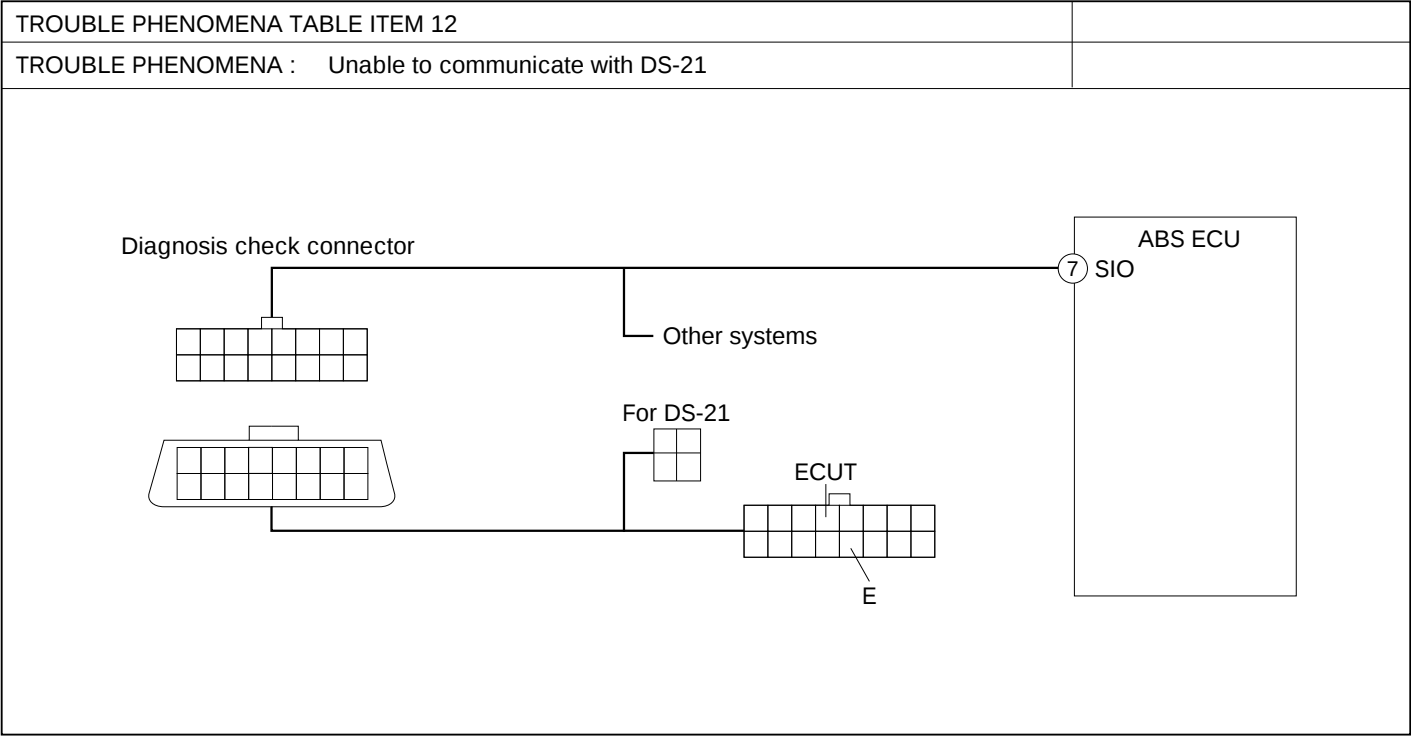
MABS00034-00000

Checking point:

- 1. Stop lamp switch signal
- 2. ABS actuator unit



MABS00035-00000

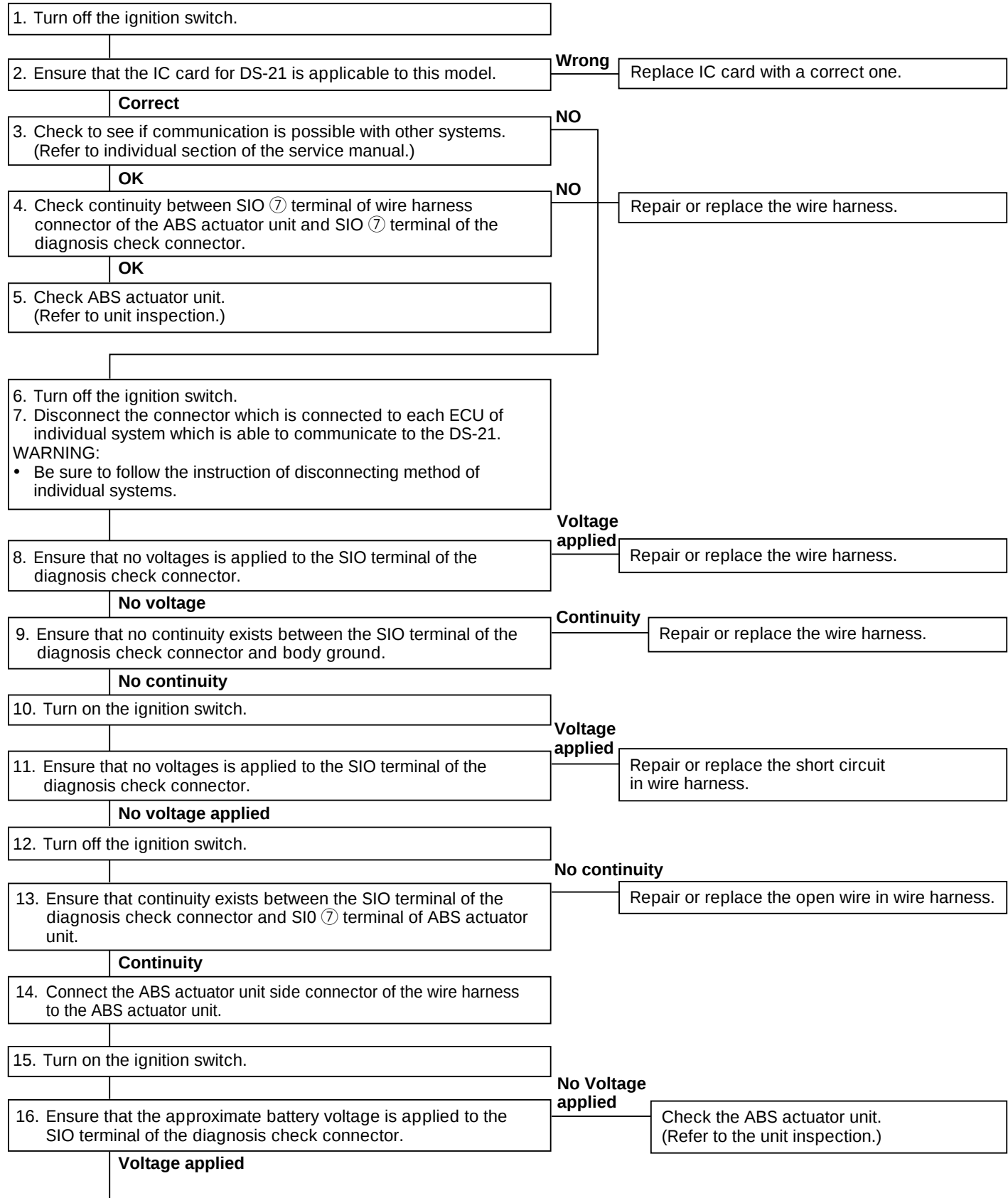


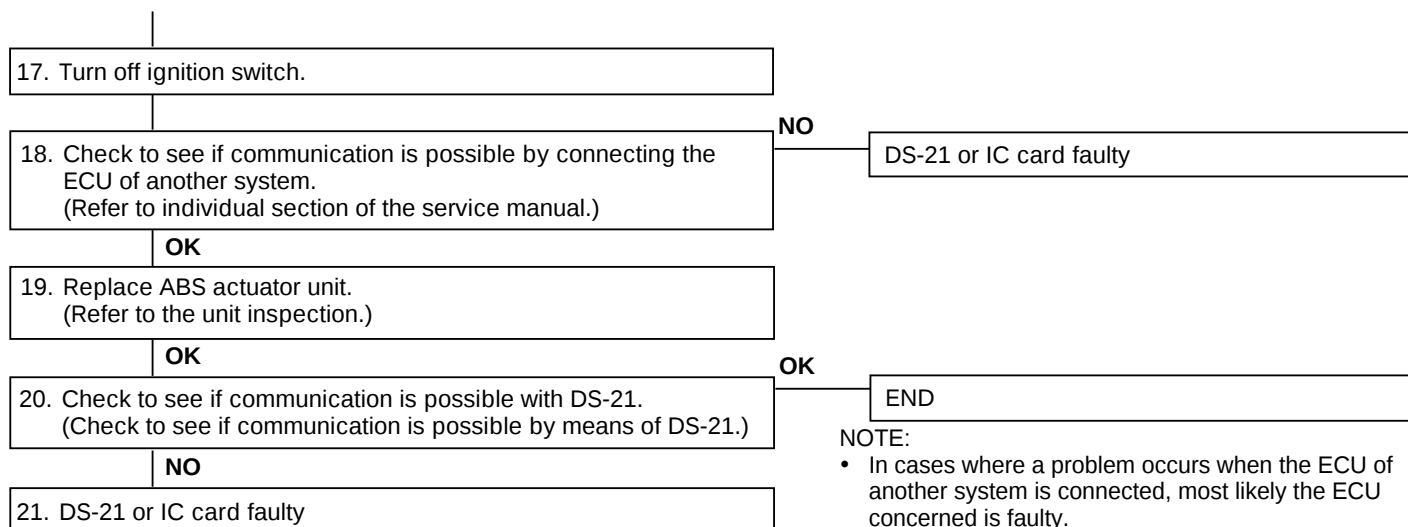
MABS00036-00000

BR-56

Checking point:

1. Wire harness between terminal SIO ⑦ of ABS actuator unit and diagnosis check connector for open wire or short circuit.
2. Failure of other system.
3. ABS actuator unit.





NOTE:

- In cases where a problem occurs when the ECU of another system is connected, most likely the ECU concerned is faulty. Therefore, refer to the repair section of each system.

MABS00038-00000

Erasing procedure for diagnosis codes

NOTE:

- The diagnosis codes will not be erased even if the battery power supply is shut off.

1. Erasing procedure by brake pedal

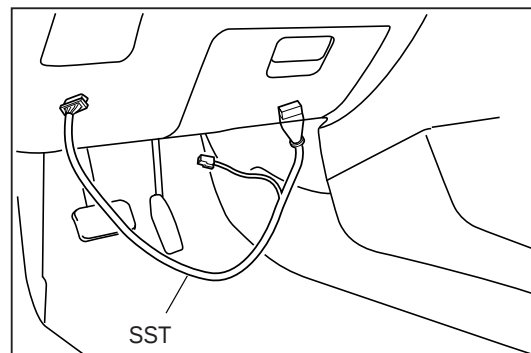
- Connect the following SST to the diagnosis connector.
SST: 09991-87404-000

- Connect the ECUT and E terminals in the SST terminal with the following SST.

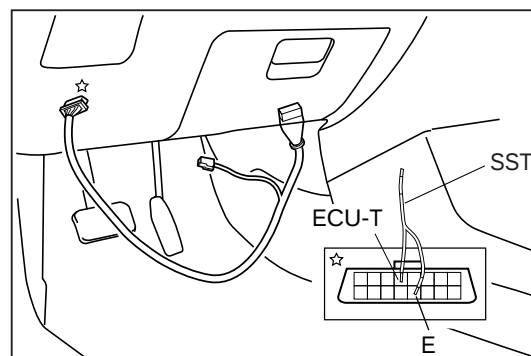
SST: 09991-87403-000

CAUTION:

- Never connect the terminals other than those specified, for even slight contact of other terminals may lead to serious malfunction or damage.



MABS00039-00010

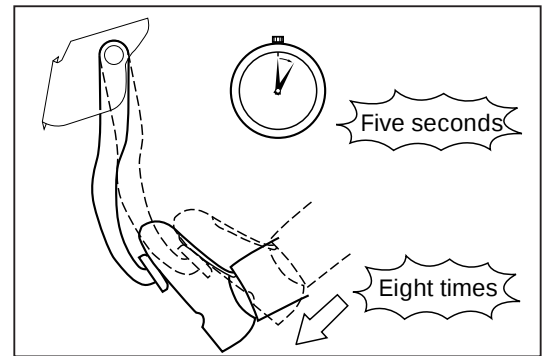


MABS00040-00039

- (3) Turn ON the ignition switch.(Never start the engine.)
- (4) Depress the brake pedal more than 8 times within five seconds in order to repeat the ON/OFF operation of the stop lamp switch immediately after the ignition switch is turned ON.

NOTE:

- When no change in ON/OFF state of the stop lamp switch is inputted within three seconds after the ignition switch has been turned ON, or when no change in ON/OFF state of the stop lamp of the second time onward is inputted within one second, the diagnosis code remains indicated and no diagnosis code will be erased.
- If any malfunction persists even after the diagnosis code has been erased, the warning lamp will not go out.
- After the diagnosis code is erased, the mode will automatically move on to the sensor check mode.
(Refer to the section under "Wheel speed sensor check by sensor check function.")

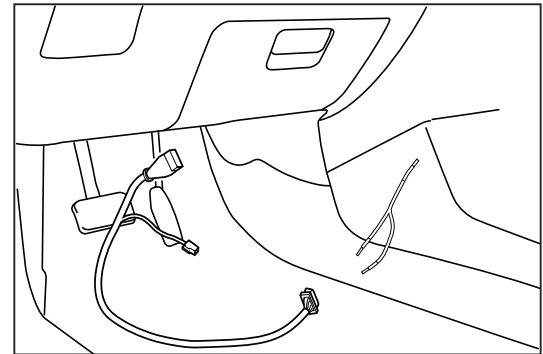


MABS00041-00011

- (5) Turn off the ignition switch.
- (6) Remove the SST (jump wire) from the SST (sub harness).
- (7) Remove the SST from the diagnosis connector.
- (8) Proceed to check the wheel speed sensor by the sensor check function.
(Refer to page BR-59.)

NOTE:

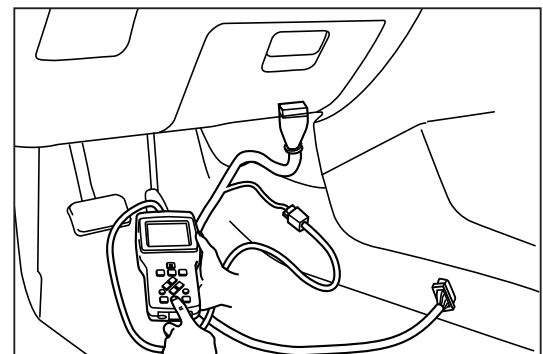
- The wheel speed sensor check function will take place when erasing the diagnosis code or replacing the ABS actuator unit with a new one.



MABS00042-00049

2. Erasing procedure by means of trouble shooting device (DS-21)

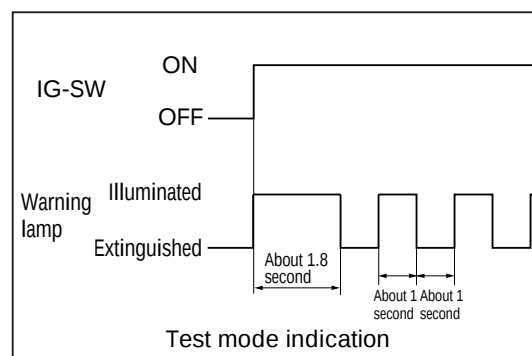
Connect the DS-21 to the check connector. Erase diagnosis codes, using the erasing function.



MABS00043-00012

Wheel speed sensor check by sensor check function

- (1) Turn on the ignition switch.
- (2) Ensure that the ABS warning lamp starts to blink at intervals of one second after the ABS warning lamp illuminates for 1.8 second.



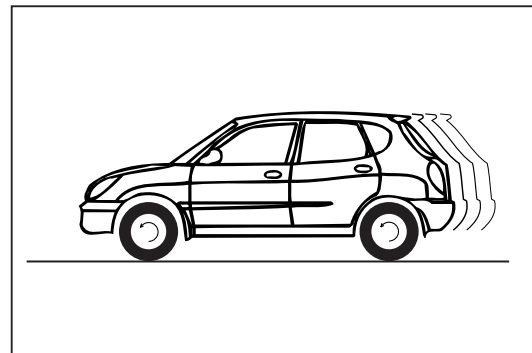
MABS00044-00013

- (3) Perform the test driving at speed of more than 7 km/h.
- (4) Ensure that the ABS warning lamp is turned off.

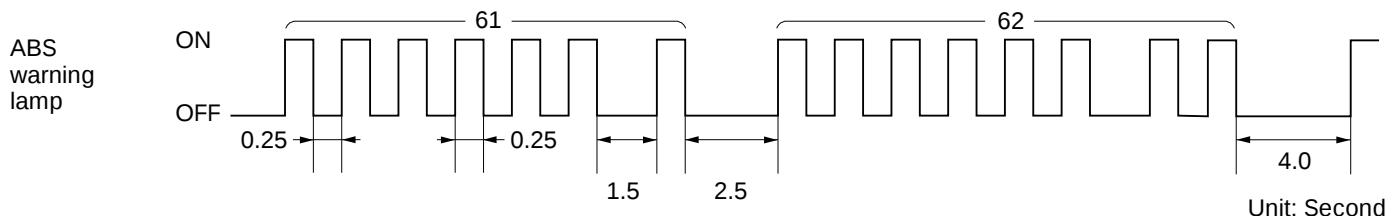
NOTE:

- The ABS warning lamp starts to blink to indicate the malfunction codes by form mentioned below, if any malfunction is found in this check.
- Perform the trouble shooting according to the diagnosis code, if the trouble code is indicates.
- Perform the test driving by speed of 10 km/h in straight direction, if ABS warning lamp is remain illuminated after test driving by speed of 7 km/h.

Perform the trouble shooting, if ABS warning lamp is remain illuminated.



MABS00045-00047

<Example of blinking form of the ABS warning lamp>

Diagnosis item	Front right speed sensor	Front left speed sensor	Rear right speed sensor	Rear left speed sensor
Diagnosis code	61	62	63	64
Refer to page	BR-47	BR-47	BR-47	BR-47

- (5) Turn off the ignition switch.
- (6) Connect the following SST to the diagnosis connector.
SST: 09991-87404-000

Connect the ECU and GND terminals in the SST with the following SST.
SST: 09991-87403-000

- (7) Turn on the ignition switch.
- (8) Read out the diagnosis codes by observing the number of blinking of the ABS warning lamp.

MABS00046-00014

UNIT INSPECTION & REPLACEMENT

CAUTION:

- Be very careful not to deform the terminal in the related connector during the inspection. Failure to observe this caution may lead to system malfunction.

NOTE:

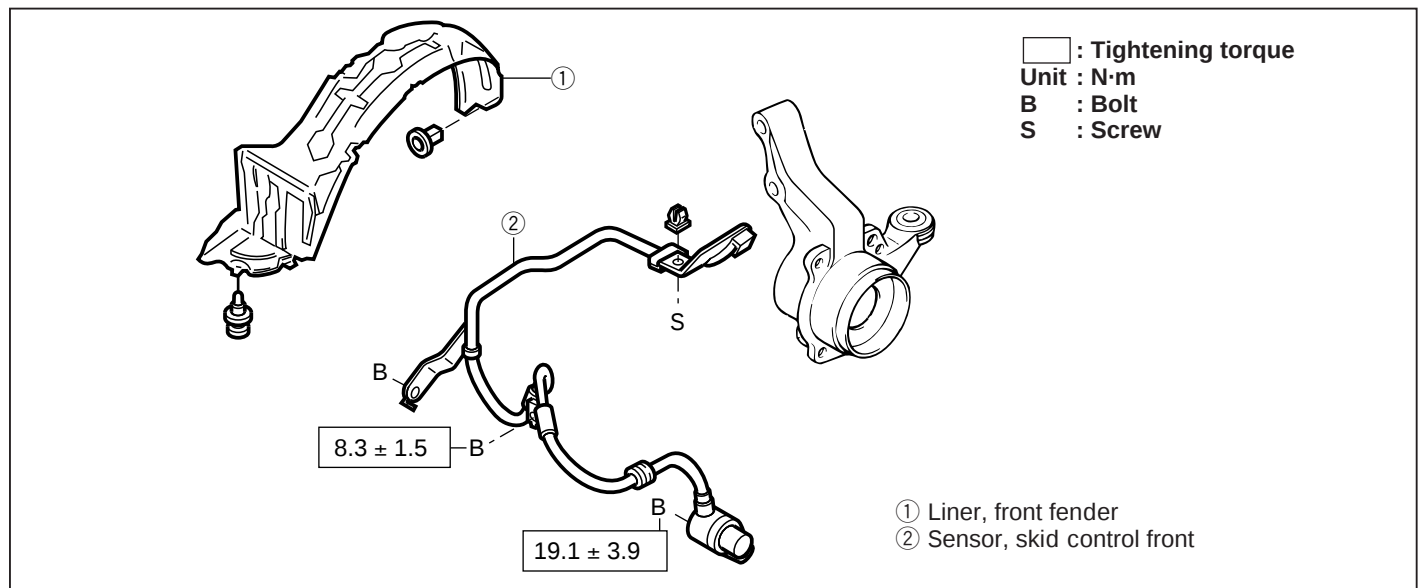
- The inspection of each sensor circuit should be performed by referring to the ABS RELATED CONNECTORS and ABS CIRCUIT CONNECTION TABLE.

MABS00047-00000

FRONT SPEED SENSOR

NOTE:

- The check of the speed sensor is basically carried out by the sensor check function.



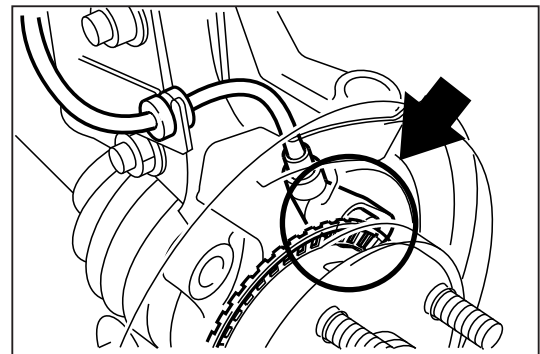
MABS00048-00015

1. Checking of air gap

Ensure that the air gap between the sensor tip and the sensor rotor is within the specified value.

Air Gap: 1.2 ± 0.5 mm

If the air gap fails to meet the specified air gap, adjust the clearance by adjusting the sensor attaching condition or replace the speed sensor, knuckle or sensor rotor (drive shaft), as required. (Refer to FS section.)



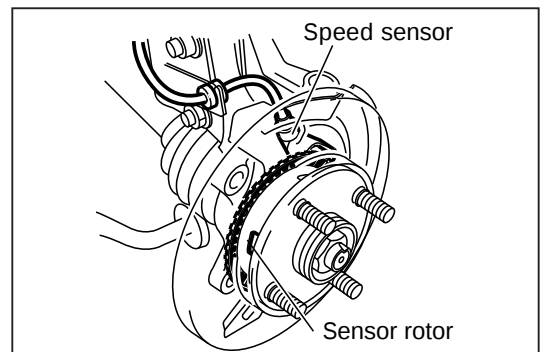
MABS00049-00016

2. Checking of sensor rotor

Inspect the sensor rotor for the following points.

- Ensure that the sensor rotor is pressed in to the drive shaft properly, is free from damage and is not contaminated by foreign materials.
- Ensure that the wheel bearing has no excessive play.

If any trouble exists, clean, repair or replace the sensor rotor (drive shaft) or wheel bearing, as required. (Refer to FS section.)



MABS00050-00017

3. Inspection of speed sensor

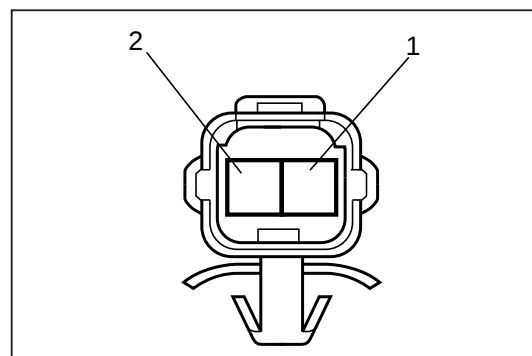
- (1) Ensure that the front speed sensor resistance is within the specified value, using an ohmmeter.
Specified Resistance: $1.4 \pm 0.4 \text{ k}\Omega$ (at 20°C)

NOTE:

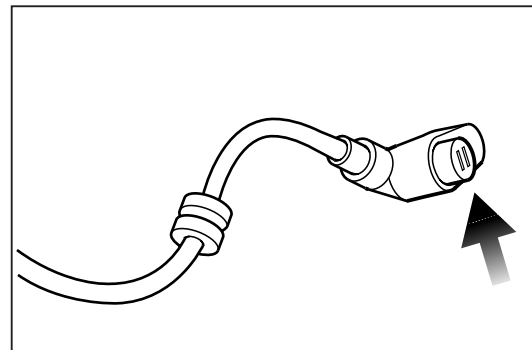
- Prior to the inspection, disconnect the harness connectors which are located at the rear side of the headlamp inside the engine compartment, and at the vehicle side and at the sensor side, respectively. Then, the inspection should be conducted under this condition by means of the harness connector at the sensor side.

If the measured resistance fails to meet the specified value above, replace the speed sensor with a new one.

- (2) Ensure that the tips of the speed sensors are free from damage or contamination with foreign materials.
Clean the tips of the speed sensors, if they are contaminated.



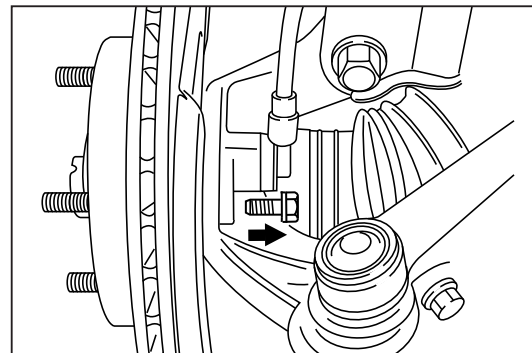
MABS00051-00018



MABS00000-00040

4. Removal of front speed sensor

- (1) Remove the fender liner. (Refer to the BO section.)
- (2) Disconnect the wire harness side connector from the sensor connector.
- (3) Remove the wire clamps of the front speed sensor.
- (4) Remove the front speed sensor by removing the attaching bolts.



MABS00052-00019

5. Installation of front speed sensor

CAUTION:

- Be sure to clean the contacting surfaces of the speed sensors and speed sensor before the installation.
- Never twist the speed sensor harness during the installation.

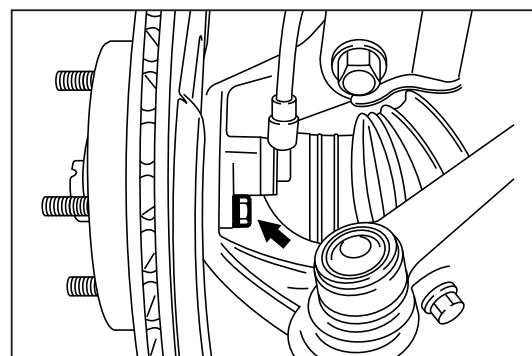
- (1) Install the speed sensor to the vehicle with the attaching bolts and tighten them to the specified tightening torque.

Tightening Torque:

Speed sensor harness clamp to inner fender:

6.9 - 9.8 N·m

Speed sensor to knuckle: 15.2 - 23.0 N·m



MABS00053-00020

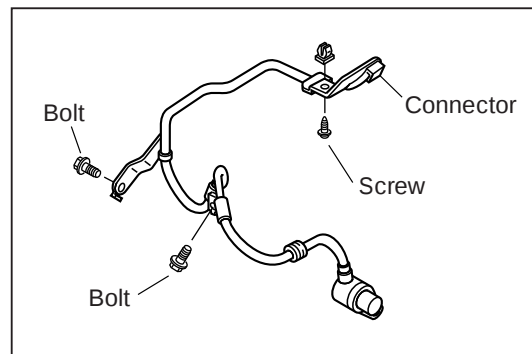
- (2) Secure the speed sensor harness by harness clamps.
- (3) Connect the wire harness connector to the connector of the speed sensor.

6. Install the fender liner. (Refer to the BO section.)

NOTE:

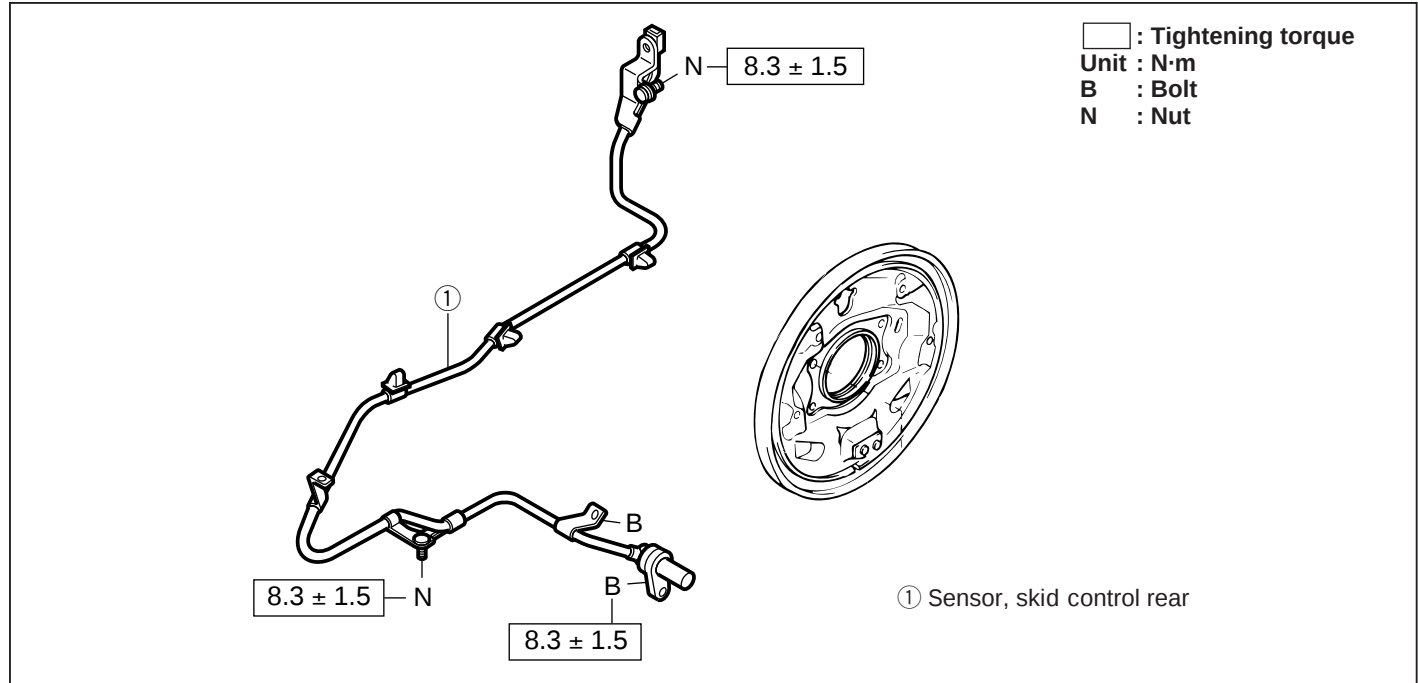
- The check of the speed sensor is basically carried out by the sensor check function.

7. Check the speed sensor by performing the sensor check function of the ABS.



MABS00000-00041

REAR SPEED SENSOR



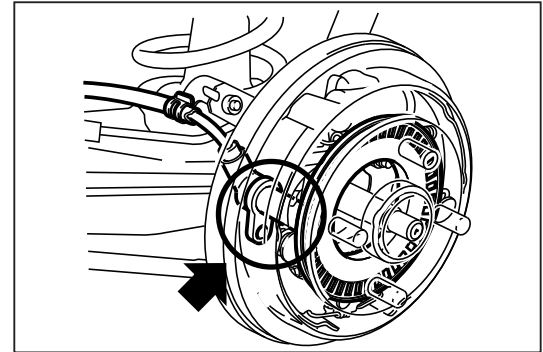
MABS00054-00021

1. Checking of air gap.

- (1) Remove the rear wheel and brake drum. (Refer to the rear brake section.)
- (2) Ensure that the air gap between the sensor tip and the sensor rotor (rear axle hub) is within the specified value.

Air Gap: 1.2 ± 0.3 mm

If the air gap fails to meet the specified air gap, adjust the air gap by adjusting the attaching condition of the speed sensor or replace the speed sensor, brake backing plate (refer to the BR section.) or sensor rotor (rear axle hub), as required.



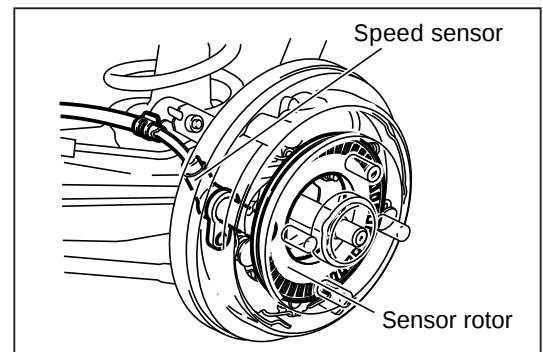
MABS00055-00022

- (3) Install the rear wheel and brake drum. (Refer to the rear brake section.)

2. Checking of sensor rotor (rear axle hub.)

- (1) Remove the rear wheel and brake drum. (Refer to the rear brake section.)
- (2) Ensure that the sensor rotor is free from damage and contamination with foreign materials. Also, check that no excessive free play exists on the wheel bearings. (Refer to the RS section)

If any trouble exists, clean, repair or replace the sensor rotor (rear axle hub) or wheel bearing, as required.



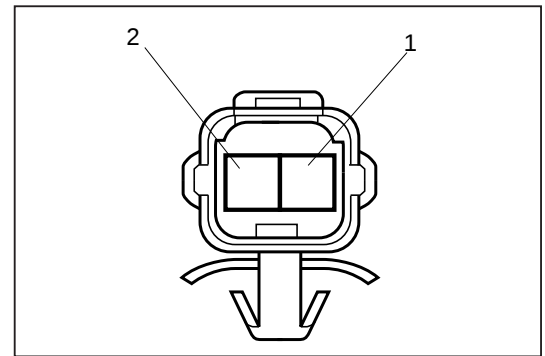
MABS00056-00023

- (3) Install the rear wheel and brake drum. (Refer to rear brake section.)
3. Inspection of speed sensor
- (1) Ensure that the rear speed sensor resistance is within the specified value, using an ohmmeter.
- Specified Resistance: $1.4 \pm 0.4 \text{ k}\Omega$ (at 20°C)

NOTE:

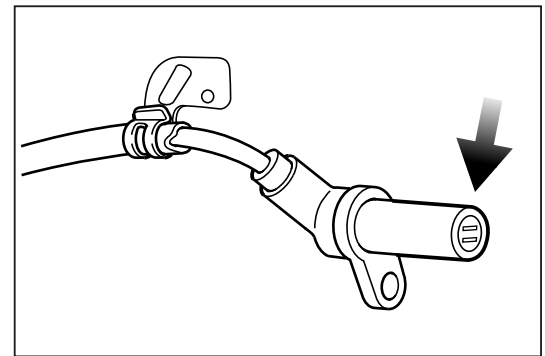
- Prior to the inspection, remove the deck side trim. (Refer to the BO section.) Then, disconnect the harness connectors which are located at the inside of the body lower back panel, and at the vehicle side and at the sensor side, respectively. The inspection should be conducted under this condition by means of the connector at the sensor side.

If the measured resistance fails to meet the specified value above, replace the speed sensor with a new one.



MABS00057-00024

- (2) Ensure that the tips of the speed sensors are free from damage or contamination with foreign materials. Clean the tips of the speed sensors, if they are contaminated.



MABS00058-00042

4. Removal of speed sensor

NOTE:

- Refer to the illustration shown in page BR-62.

- (1) Remove the hatch back door scuff plate by removing the attaching bolts. (Refer to the BO section.)
- (2) Remove the clips of the deck side trim. (Refer to the BO section.)

NOTE:

- Press the central portion of the clip to release the locking. Then, remove the clip.

MABS00059-00000

- (3) Turn over the deck side trim. (Refer to the BO section.)
- (4) Disconnect the connector of the speed sensor from the connector of the wire harness.
- (5) Remove the speed sensor by removing the attaching bolt.
- (6) Remove the attaching bolt of the speed sensor harness clamps.
- (7) Remove the speed sensor harness grommet from the bracket.

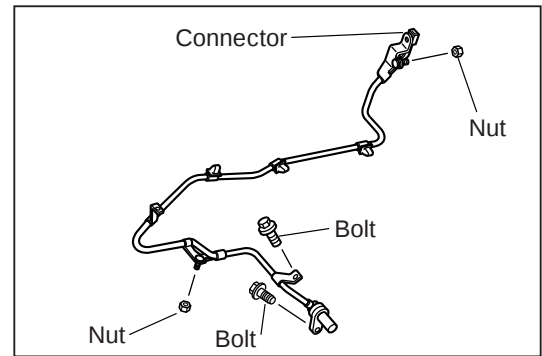
MABS00060-00000

5. Installation of speed sensor

- (1) Clean the attaching surface of the speed sensor and backing plate.
- (2) Install the speed sensor with the attaching bolt and tightening it to the specified tightening torque.
Tightening Torque: 6.9 - 9.8 N·m

CAUTION:

- After the installation, be sure to check that the clearance between the speed sensor and the speed sensor rotor is within the specified value.



MABS00061-00026

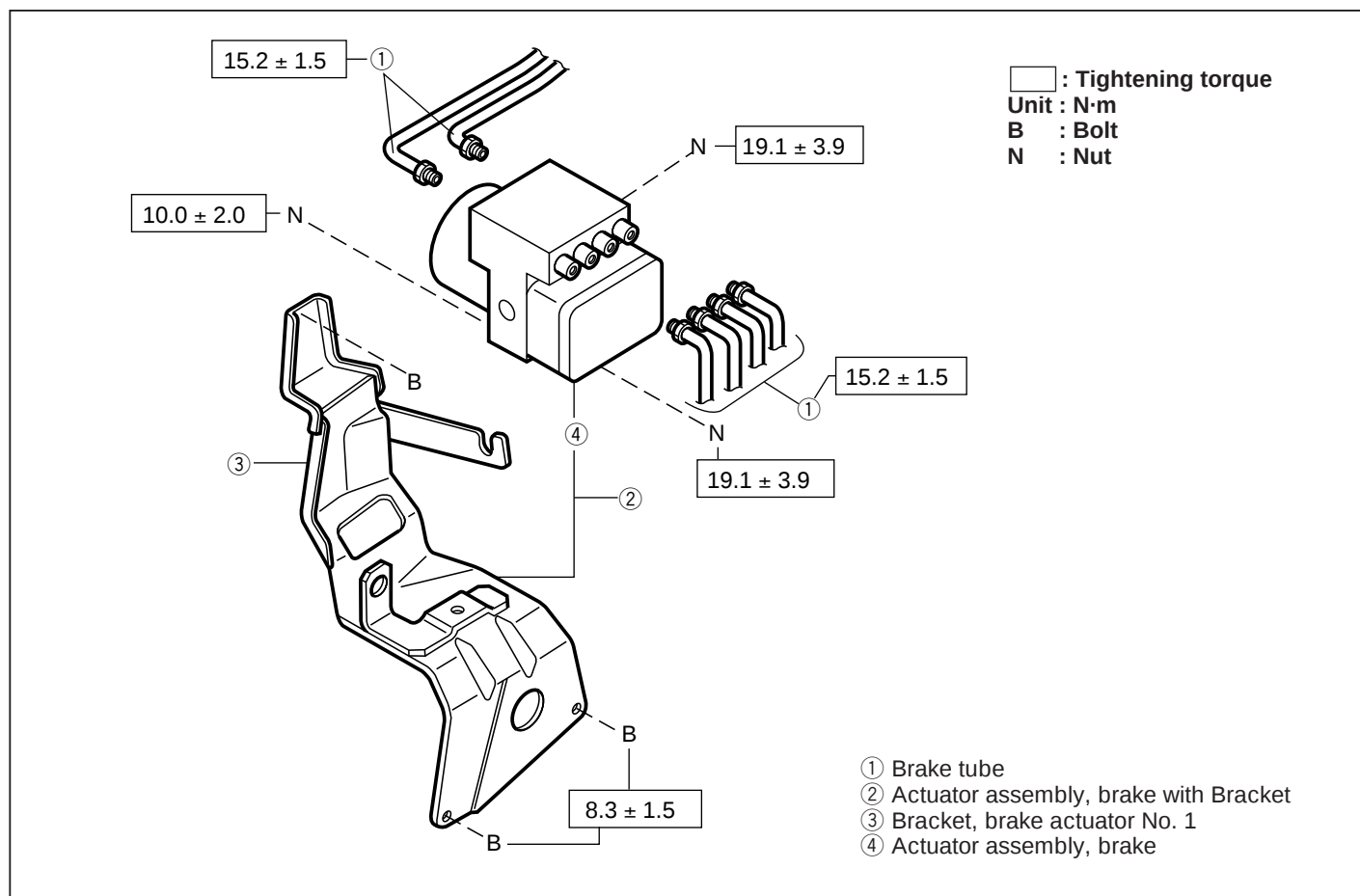
- (3) Connect the sensor harness to the clamp and install them to the floor panel with attaching bolts and ensure that they are installed properly.
Tightening Torque: 6.9 - 9.8 N·m
- (4) Connect the connector of the speed sensor to the connector of the wire harness.
- (5) Install the deck side trim by installing the attaching clips. (Refer to the BO section.)
- (6) Install the hatch back door scuff plate with the attaching screws. (Refer to the BO section.)
- (7) Check the speed sensor by performing the sensor check function of the ABS.

MABS00062-00000

ABS ACTUATOR UNIT

WARNING:

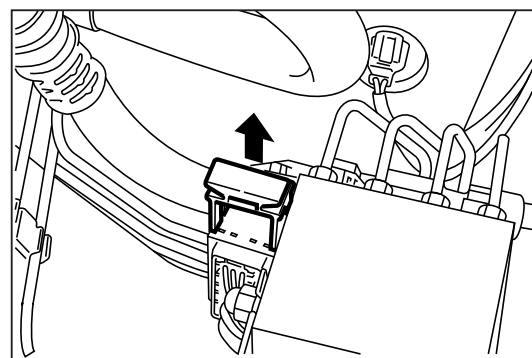
- Be sure to prevent foreign substances from being admitted into the brake actuator. Failure to observe this warning may lead to serious brake malfunction.



MABS00063-00027

1. Check of terminal voltage and resistance of ABS actuator unit connector.

- Turn off the ignition switch.
- Pull up the lock of the connector lock lever to unlock the connector from the ABS actuator unit.
- Disconnect the connector of the wire harness from the ABS actuator unit.
- Ensure that the voltage or resistance between respective terminals mentioned below within the specified value by measuring with a circuit tester.



MABS00064-00028

CAUTION:

- Be very careful not to connect the tester probe to terminals other than those specified.

NOTE:

- Refer to page BR-39 under "ABS-RELATED CONNECTOR."

- Connect the connector of the wire harness to the ABS actuator unit and lock the lock lever of connector securely.

MABS00065-00000

2. Check of fluid lines in actuator

CAUTION:

- Be sure to prevent the brake fluid from coming in contact with the painted surface and resin parts, using a piece of cloth or the like. If the brake fluid comes in contact with the painted surface and resin parts, immediately wipe off the brake fluid and wash with fresh water.

- (1) Loosen the brake pipes connected to the actuator from the master cylinder.
- (2) Ensure that the brake fluid will flow out without resistance when the brake pedal is depressed.

CAUTION:

- Be sure to depress the brake pedal gradually, otherwise a quite large amount of brake fluid will splash out.
- If no brake fluid flows out, check the fluid leakage or internal leakage in the brake master cylinder.

- (3) Tighten the flare nuts to the specified tightening torque.

Tightening Torque: 15.2 ± 2.5 N·m

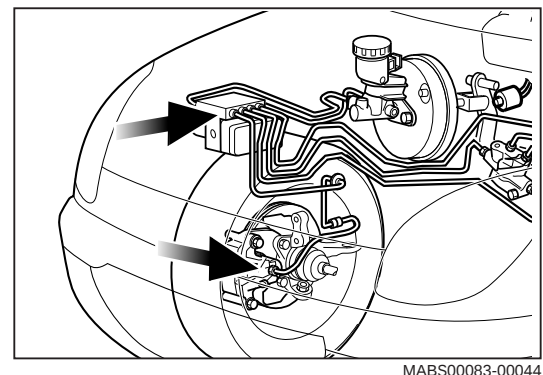
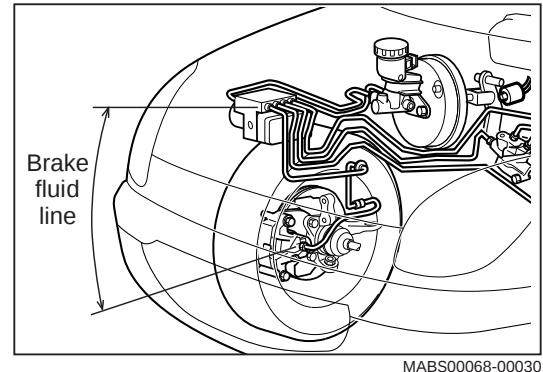
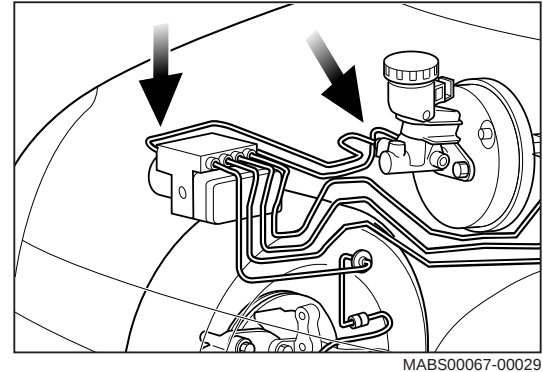
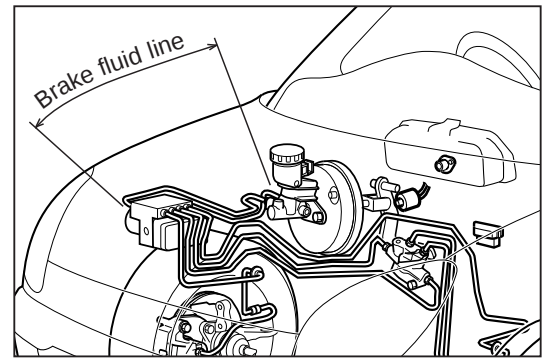
- (4) Loosen the brake pipes connected to the actuator from the wheel cylinders.
- (5) Ensure that the brake fluid will flow out without resistance when the brake pedal is depressed.

CAUTION:

- Be sure to depress the brake pedal gradually, otherwise a quite large amount of brake fluid will splash out.
- If no brake fluid flows out, replace the actuator with a new one, after inspecting the P valve for fluid continuity.

- (6) Tighten the flare nuts to the specified tightening torque.

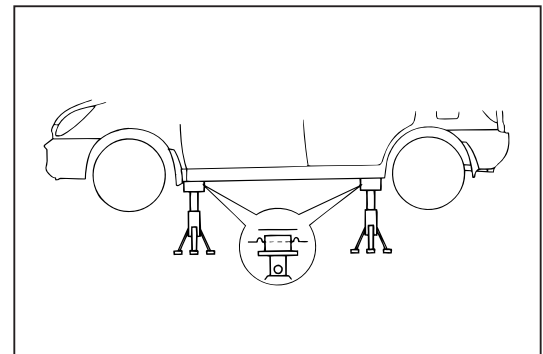
Tightening Torque: 15.2 ± 2.5 N·m



3. Function check of actuator using DS-21

(1) Preparation before inspection

- ① Check the brake system, using a brake tester.
- ② Jack up the vehicle and support it with safety stands.
(Refer to the GI section for supporting position of the safety stand.)
- ③ Release the parking brake.
- ④ Place the shift lever to the neutral position.
- ⑤ Ensure that the wheels turn properly.



(2) Inspection

- ① Turn off the ignition switch.
- ② Connect the following SST to the diagnosis check connector.

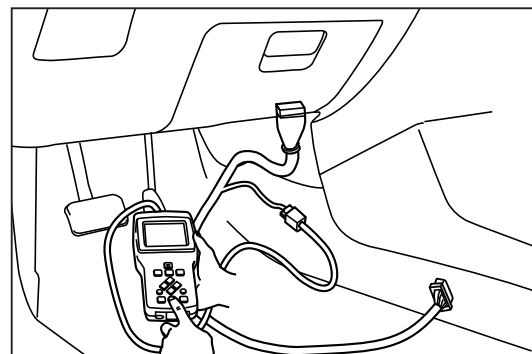
SST: 09991-87404-000

- ③ Connect the DS-21 to the SST connector.
- ④ Select the function of the actuator drive in DS-21.

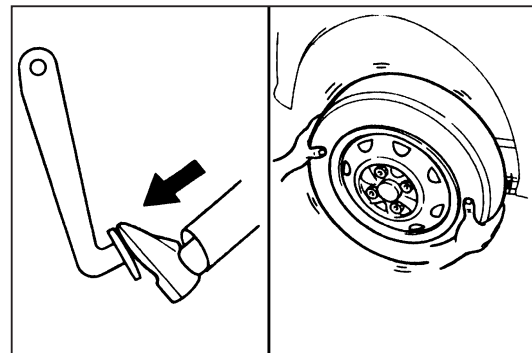
NOTE:

- When selecting the actuator drive, release the security function of DS-21.

- ⑤ Ensure that the wheels turn properly.
- ⑥ Ensure that the wheels will be locked when the brake pedal is depressed.



MABS00070-00032



MABS00071-00033

- ⑦ Ensure that the locked state of the “front side left wheel will be released” and the wheel turns freely. Also ensure that the brake pedal will rise up slightly when the function of “actuating the front side left wheel brake solenoid valve in the actuator” is performed by DS-21.
- ⑧ Perform the remaining inspection of the front side right wheel brake solenoid valve in the actuator and rear wheel brake solenoid valve in the actuator one by one, following the steps ① to ⑦ mentioned above.

4. Removal of ABS actuator

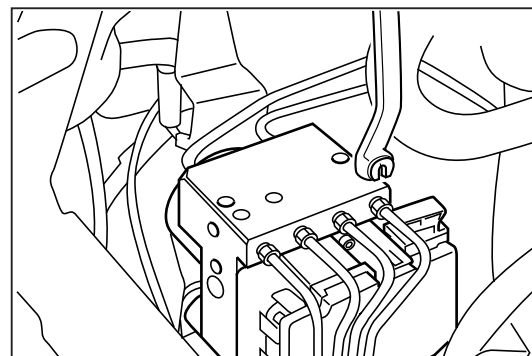
NOTE:

- Refer to the illustration in page BR-65.

- (1) Drain the brake fluid from the brake system.
- (2) Remove the brake tube clamp.
- (3) Disconnect the brake pipes from the actuator.

CAUTION:

- Prevent dust or other foreign substances from being admitted into the actuator and brake line.
- Failure to observe this caution may lead to serious brake problem.



MABS00073-00034

(4) Remove the actuator by removing the attaching nuts.

CAUTION:

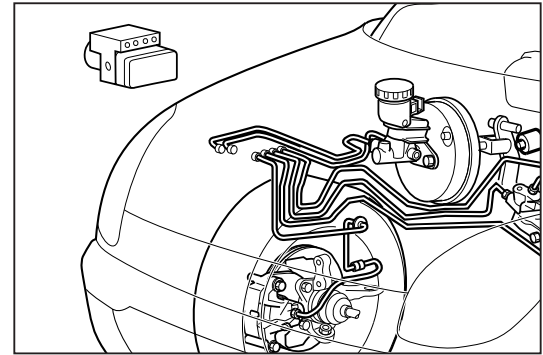
- Never deform the brake pipes during the removal of the actuator.

(5) Removal of ABS actuator bracket

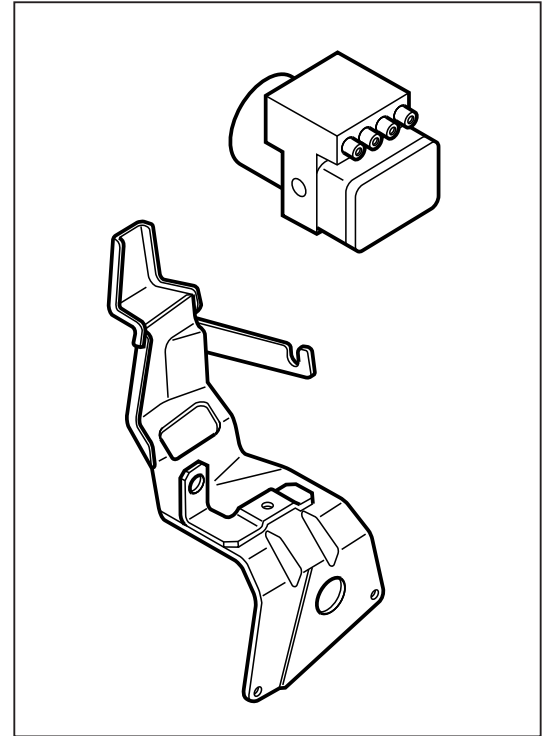
- ① Disconnect the brake pipe from the brake pipe clamp.
- ② Disconnect the brake pipe (connected from the front inlet P valve to the actuator) from the P valve.

CAUTION:

- Prevent dust or other foreign substances from being admitted into the brake line.
 - Failure to observe this caution may lead to serious brake problem.
- ③ Remove the ABS actuator bracket with the brake pipe by removing the attaching bolts.



MABS00074-00035



MABS00075-00045

5. Installation of ABS actuator

WARNING:

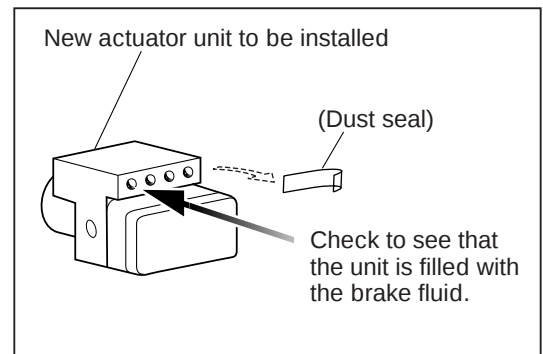
- Before replacing the ABS actuator, be sure to confirm that the actuator in the unit state is filled with the brake fluid.

NOTE:

- The installation procedure is basically the reverse order of the removal procedure. Therefore, some illustrations are omitted from the installation procedure. Refer to the illustration in the removal procedure if any difficulty is encountered.

(1) Installation of ABS actuator bracket

- ① Insert the brake pipe (connected from the P valve to the front inlet of the actuator) in the brake actuator bracket as shown.
- ② Install the ABS actuator bracket by installing the attaching bolts and tighten the attaching bolts to the specified tightening torque evenly.



MABS00076-00046

- ③ Connect the brake pipe to the P valve temporarily by your hand.
- ④ Install the actuator with the attaching nuts and tighten them to the specified tightening torque.

CAUTION:

- Never deform the brake pipes during the installation of the actuator.

MABS00077-00000

- (2) Connect the brake pipes to the actuator and tighten the flare nuts of the brake pipes which are connected to the actuator and P valve to the specified tightening torque.

CAUTION:

- Prevent dust or other foreign substances from being admitted into the actuator and brake line.
- Failure to observe this caution may lead to serious brake problem.

- (3) Fill brake fluid to the brake system and perform the air bleeding.
- (4) Ensure that no brake fluid leakage exists.
- (5) Connect the connector of the wire harness to the ABS actuator unit.
- (6) Perform the speed sensor check by the sensor check function.
(Refer to the "sensor check function" section.)

MABS00078-00000

NOTE:

- Resistance values in the following table given below denote values at an ambient temperature of 20°C.
- If any one of resistance or voltage fails to meet the specification in the following table, repair or replace the checking circuit and other related parts properly. Then, recheck the resistance or voltage.
- Replace the ABS actuator unit with a new one. if diagnosis codes will be memorized (except wheel speed sensors) even when the input voltage and resistance meet following specified value.

MABS00079-00000

Input voltage and resistance of ABS actuator unit.

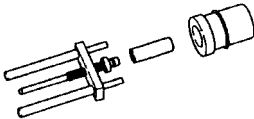
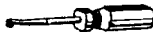
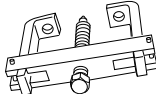
Terminals	Standard voltage or resistance	Condition	Remedies
① ~ ②	0 volt	Ignition switch turned ON and OFF.	• Front left speed sensor
	$1.4 \pm 0.4 \text{ k}\Omega$	Ignition switch turned OFF.	
④ ~ ⑧ or ②④	0 volt	Ignition switch turned OFF.	• Battery • ECU fuse 10 A • Ignition switch • Related circuit
	Approx. battery voltage	Ignition switch turned ON.	
⑤ ~ ⑥	0 volt	Ignition switch turned ON and OFF.	• Rear left speed sensor
	$1.4 \pm 0.4 \text{ k}\Omega$	Ignition switch turned OFF.	
⑦ ~ ⑧ or ②④	0 volt	Ignition switch turned OFF.	• Open wire or short circuit
		Ignition switch turned ON.	
⑧ ~ Body ground	0 volt	Ignition switch turned OFF.	• Ground circuit
		Ignition switch turned ON.	
⑨ ~ ⑧ or ②④	Approx. battery voltage	At all time	• Battery • ABS F/L 50 A • Related circuit
⑭ ~ ⑧ or ②④	0 volt	Ignition switch turned OFF.	• Open wire or short circuit
		Ignition switch turned ON.	
⑯ ~ ⑧ or ②④	0 volt	Ignition switch turned OFF.	
	Approx. battery voltage	Ignition switch turned ON.	
⑱ ~ ⑧ or ②④	0 volt	The brake pedal is not depressed.	
	Approx. battery voltage	The brake pedal is depressed.	
⑲ ~ ⑳	0 volt	Ignition switch turned ON and OFF.	• Front right speed sensor
	$1.4 \pm 0.4 \text{ k}\Omega$	Ignition switch turned OFF.	
㉒ ~ ㉓	0 volt	Ignition switch turned ON and OFF.	• Rear right speed sensor
	$1.4 \pm 0.4 \text{ k}\Omega$	Ignition switch turned OFF.	
㉔ ~ Body ground	0 volt	At all time	• Open wire or short circuit
㉕ ~ ⑧ or ②④	Approx. battery voltage	At all time	• Battery • ABS F/L 50 A • Related circuit

SERVICE SPECIFICATIONS

Brake pedal	Pedal height	RHD	MT:	143.7 ± 5 mm	
			AT:	148.4 ± 5 mm	
		LHD	MT:	109.8 ± 5 mm	
			AT:	98.7 ± 5 mm	
	Free travel			0.5 - 3 mm	
	Reserve travel	RHD		64 mm or more	
LHD		68 mm or more			
Disc brake pad	Thickness	STD		10 mm	
		Minimum		1 mm	
Disc rotor	Thickness	STD		16 mm	
		Minimum		15 mm	
	Runout			0.1 mm	
Brake lining	Thickness	STD		4.0 mm	
		Minimum		1.0 mm	
Brake drum	Inner diameter	STD		180 mm	
		Minimum		181 mm	
Parking brake	Specified number of notches			4 - 7 notches	

MABS00081-00000

SSTs

Shape	Part name	Part name	Remarks
	09730-87401-000	Brake booster gauge set	
	09737-87003-000	(Gauge)	
	09733-87401-000	(O-ring)	
	09731-87401-000	(Attachment)	
	09703-30010-000	Brake shoe return spring tool	
	09921-00010-000	Spring tension tool	
	09510-87301-000	Front hub & drum puller	
	09991-87403-000	Diagnosis check wire	
	09991-87404-000	Engine control system inspection wire	

MABS00082-00036

TIGHTENING TORQUE

Tightening components	N·m	kgf·m
Brake pedal clevis	25.5 ± 2.9	2.6 ± 0.3
Stop lamp switch	19.4 - 31.6	2.0 - 3.2
Bleeder plug	6.9 - 9.8	0.7 - 1.0
Brake pedal × brake pedal bracket	15.2 - 22.4	1.5 - 2.3
Brake master cylinder × brake booster	11.8 - 17.6	1.2 - 1.8
Brake pipe × brake master cylinder	12.7 - 17.7	1.3 - 1.8
Brake booster × dash panel	9.8 - 15.7	1.0 - 1.6
Disc brake cylinder mounting × steering nuckle	90.2 - 135.3	9.2 - 13.8
Main and sub cylinder slide pins	37.3 - 49.0	3.8 - 5.0
Brake hose × disc brake cylinder assembly	26.5 - 34.3	2.7 - 3.5
Brake backing plate × rear axle carrier	34.3 - 42.2	3.5 - 4.3
Wheel speed sensor × brake backing plate	6.4 - 9.3	0.65 - 0.95
Wheel cylinder × brake backing plate	7.84 - 11.76	0.8 - 1.2
Brake pipe × wheel cylinder	12.7 - 17.7	1.3 - 1.8
Parking brake cable × brake backing plate	6.3 - 9.2	0.64 - 0.96
Rear axle hub castle nut	58.8 - 78.5	6.0 - 8.0
Parking brake cable attaching bolts	5.9 - 8.8	0.6 - 0.9
Parking brake handle assembly × floor panel	14.7 - 21.5	1.5 - 2.2
Proportioning valve × body	5.9 - 8.8	0.6 - 0.9
Proportioning valve × brake tube	12.7 - 17.7	1.3 - 1.8
Brake hose clamp bolt	16.7 - 24.5	1.7 - 2.5
Push rod adjusting nut	17.6 - 24.5	1.8 - 2.5
Speed sensor harness clamp × inner fender	6.9 - 9.8	0.7 - 1.0
Speed sensor harness clamp × floor panel	6.9 - 9.8	0.7 - 1.0
Front speed sensor clamp × fender	6.9 - 9.8	0.7 - 1.0
Front speed sensor × knuckle	15.2 - 23.0	1.55 - 2.35
Rear speed sensor clamp × floor panel	6.9 - 9.8	0.7 - 1.0
Rear speed sensor × rear brake	6.9 - 9.8	0.7 - 1.0
ABS actuator × ABS actuator bracket	10.0 - 2.0	1.02 ± 0.2
Brake pipe × ABS actuator	15.2 ± 2.5	1.55 ± 0.25
ABS actuator bracket × fender apron	6.8 - 9.8	0.7 - 1.0
Flare nut	15.2 ± 2.5	1.55 ± 0.25
Stop lamp switch	19.6 ± 7.8	2.0 ± 0.8
Brake pedal × brake pedal bracket	14.7 - 21.6	1.5 - 2.2
Front disc brake assembly × steering knuckle	31.4 - 41.2	3.2 - 4.2

MABS00083-00000