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This file was not scanned to deprive Mazda of any money - it was scanned due to the rareness of the original manuals and the overwhelming need of the RX-7 owner to have this information so that they can accurately troubleshoot problems. Perhaps if Mazda’s dealerships could support the Rotary Engine it wouldn’t be so necessary for the owners to do so.

Many thanks to Lenny Terris for scanning this.
Before beginning any service procedure, refer to the 1994 RX-7 Body Electrical Troubleshooting Manual; see section S for air bag system service warnings and section J1 for audio anti-theft system alarm conditions.

BRAKING SYSTEM

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FMVSS 116 DOT-3

LEVER STROKE
7-10 NOTCHES

WHEN PULLED UP WITH A
FORCE OF 98 N
(10 kgf, 22 lbf)

FREE PLAY
3-8 mm (0.12-0.31 in)
<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
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</thead>
<tbody>
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<tr>
<td>Replacement</td>
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<td>page P-8</td>
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<td></td>
</tr>
<tr>
<td>3. Vacuum line</td>
<td>10. Disc plate (front)</td>
<td>20. ABS control unit</td>
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<td>Disassembly / Inspection /</td>
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<td>Removal / Installation</td>
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<td>Installation ... page P-10</td>
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<td>12. Rear brake (disc)</td>
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<td></td>
</tr>
<tr>
<td>5. Master cylinder</td>
<td>Inspection (on-vehicle)</td>
<td>22. Wheel-speed sensor (front)</td>
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<tr>
<td>Removal / Installation</td>
<td>Removal / Inspection /</td>
<td>Removal / Installation</td>
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<tr>
<td>Inspection (on-vehicle)</td>
<td>Disassembly / Inspection /</td>
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<td>Removal /</td>
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<td>Installation ... page P-16</td>
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<td></td>
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<td>15. Caliper (rear)</td>
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</tr>
<tr>
<td>Inspection</td>
<td>Inspection</td>
<td>Removal / Installation</td>
</tr>
<tr>
<td>Replacement</td>
<td>Adjustment</td>
<td></td>
</tr>
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<td>page P-33</td>
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<td></td>
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<td></td>
</tr>
<tr>
<td>17. Parking cable (lever type)</td>
<td></td>
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## OUTLINE SPECIFICATIONS

<table>
<thead>
<tr>
<th>Item</th>
<th>Specifications</th>
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<tr>
<td><strong>Brake pedal</strong></td>
<td></td>
</tr>
<tr>
<td>Type</td>
<td>Suspended</td>
</tr>
<tr>
<td>Lever ratio</td>
<td>4.1 : 1</td>
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<tr>
<td>Maximum stroke</td>
<td>mm (in)</td>
</tr>
<tr>
<td></td>
<td>135 (5.31)</td>
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<tr>
<td><strong>Master cylinder</strong></td>
<td></td>
</tr>
<tr>
<td>Type</td>
<td>Tandem (with level sensor)</td>
</tr>
<tr>
<td></td>
<td>Portless, reessed type</td>
</tr>
<tr>
<td>Bore</td>
<td>mm (in)</td>
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<tr>
<td></td>
<td>23.8 (0.94)</td>
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<tr>
<td><strong>Front brake</strong></td>
<td></td>
</tr>
<tr>
<td>Type</td>
<td>Disc (ventilated)</td>
</tr>
<tr>
<td>Cylinder bore</td>
<td>mm (in)</td>
</tr>
<tr>
<td></td>
<td>35.1 (1.42)</td>
</tr>
<tr>
<td>Pad dimension</td>
<td>mm² x mm</td>
</tr>
<tr>
<td>(area x thickness)</td>
<td>mm² x mm</td>
</tr>
<tr>
<td>Outer</td>
<td>4,500 x 10.3 (6.97 x 0.41)</td>
</tr>
<tr>
<td>Inner</td>
<td>4,500 x 9.3 (6.97 x 0.37)</td>
</tr>
<tr>
<td>Disc plate dimension</td>
<td>mm x mm</td>
</tr>
<tr>
<td>(outer diameter x thickness)</td>
<td>(in x in)</td>
</tr>
<tr>
<td></td>
<td>294.0 x 22.0 (11.57 x 0.87)</td>
</tr>
<tr>
<td><strong>Rear brake</strong></td>
<td></td>
</tr>
<tr>
<td>Type</td>
<td>Disc (ventilated)</td>
</tr>
<tr>
<td>Cylinder bore</td>
<td>mm (in)</td>
</tr>
<tr>
<td></td>
<td>34.9 (1.37)</td>
</tr>
<tr>
<td>Pad dimension</td>
<td>mm² x mm</td>
</tr>
<tr>
<td>(area x thickness)</td>
<td>mm² x mm</td>
</tr>
<tr>
<td></td>
<td>3,210 x 8.0 (4.98 x 0.31)</td>
</tr>
<tr>
<td>Disc plate dimension</td>
<td>mm x mm</td>
</tr>
<tr>
<td>(outer diameter x thickness)</td>
<td>(in x in)</td>
</tr>
<tr>
<td></td>
<td>294.0 x 20.0 (11.57 x 0.79)</td>
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<tr>
<td><strong>Power brake unit</strong></td>
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</tr>
<tr>
<td>Type</td>
<td>Vacuum multiplier</td>
</tr>
<tr>
<td>Size</td>
<td>mm (in)</td>
</tr>
<tr>
<td></td>
<td>209.5 + 215.2 (8 + 8)</td>
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<tr>
<td><strong>Rear wheel hydraulic control system</strong></td>
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<tr>
<td>Type</td>
<td>Proportioning bypass valve</td>
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<tr>
<td>Switching point</td>
<td>kPa (kgf/cm², psi)</td>
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<tr>
<td>(master cylinder pressure)</td>
<td>3,920 (40.0, 570)</td>
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<td><strong>Parking brake</strong></td>
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<tr>
<td>Type</td>
<td>Mechanical two-rear-wheel control</td>
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<tr>
<td><strong>Operation system</strong></td>
<td></td>
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<tr>
<td>Hand lever</td>
<td></td>
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<tr>
<td><strong>Brake fluid</strong></td>
<td></td>
</tr>
<tr>
<td>Type</td>
<td>FMVSS 116 DOT-3</td>
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</table>
## CONVENTIONAL BRAKE SYSTEM

### PREPARATION

<table>
<thead>
<tr>
<th>SST</th>
<th>Description</th>
<th>Part No</th>
<th>Description</th>
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</thead>
<tbody>
<tr>
<td>49 0259 770B</td>
<td>Wrench, flare nut</td>
<td>49 B043 001</td>
<td>Gauge, adjustment</td>
</tr>
<tr>
<td></td>
<td>For removal / installation of brake pipe</td>
<td></td>
<td>For adjustment of push rod clearance</td>
</tr>
<tr>
<td>49 B043 003</td>
<td>Lock tool, turning</td>
<td>49 B043 004</td>
<td>Wrench, socket</td>
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<tr>
<td></td>
<td>For adjustment of push rod clearance</td>
<td></td>
<td>For adjustment of push rod clearance</td>
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<tr>
<td>49 0208 701A</td>
<td>Air-out tool, boot</td>
<td>49 0221 600C</td>
<td>Expansion tool, disc brake</td>
</tr>
<tr>
<td></td>
<td>For removal of piston seal</td>
<td></td>
<td>For installation of disc pads</td>
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<tr>
<td>49 F033 001</td>
<td>Stopper, disc brake piston</td>
<td>49 FA18 602</td>
<td>Wrench, disc brake piston</td>
</tr>
<tr>
<td></td>
<td>For removal of disc brake piston</td>
<td></td>
<td>For removal of disc brake piston</td>
</tr>
<tr>
<td>49 1285 071</td>
<td>Puller, bearing</td>
<td>49 B043 002</td>
<td>Installer, bearing</td>
</tr>
<tr>
<td></td>
<td>For removal of bearing</td>
<td></td>
<td>For installation of bearing</td>
</tr>
<tr>
<td>49 U043 0A0</td>
<td>Gauge set, oil pressure</td>
<td>49 U043 004</td>
<td>Gauge, oil pressure (Part of 49 U043 0A0)</td>
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<td></td>
<td>For measurement of fluid pressure</td>
<td></td>
<td>For measurement of fluid pressure</td>
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<tr>
<td>49 U043 005</td>
<td>Joint (Part of 49 U043 0A0)</td>
<td>49 U043 006</td>
<td>Hose (Part of 49 U043 0A0)</td>
</tr>
<tr>
<td></td>
<td>For measurement of fluid pressure</td>
<td></td>
<td>For measurement of fluid pressure</td>
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</table>
# TROUBLESHOOTING GUIDE

<table>
<thead>
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<th>Problem</th>
<th>Possible cause</th>
<th>Action</th>
<th>Page</th>
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<tbody>
<tr>
<td>Poor braking</td>
<td>Leakage of brake fluid</td>
<td>Repair</td>
<td>—</td>
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<tr>
<td></td>
<td>Air in system</td>
<td>Bleed air</td>
<td>P-7</td>
</tr>
<tr>
<td></td>
<td>Worn disc pad</td>
<td>Replace</td>
<td>P-24, 29</td>
</tr>
<tr>
<td></td>
<td>Brake fluid, grease, oil, or water on disc pad</td>
<td>Clean or replace</td>
<td>P-24, 29</td>
</tr>
<tr>
<td></td>
<td>Hardening of disc pad surface, or poor contact</td>
<td>Grind or replace</td>
<td>P-24, 29</td>
</tr>
<tr>
<td></td>
<td>Malfunction of caliper piston</td>
<td>Replace</td>
<td>P-26, 31</td>
</tr>
<tr>
<td></td>
<td>Malfunction of master cylinder</td>
<td>Repair or replace</td>
<td>P-11, 15</td>
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<td></td>
<td>Malfunction of power brake unit</td>
<td>Replace</td>
<td>P-16</td>
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<tr>
<td></td>
<td>Malfunction of check valve (vacuum hose)</td>
<td>Replace</td>
<td>P-8</td>
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<tr>
<td></td>
<td>Damaged vacuum hose</td>
<td>Replace</td>
<td>P-7</td>
</tr>
<tr>
<td></td>
<td>Deterioration of flexible hose</td>
<td>Replace</td>
<td>P-20</td>
</tr>
<tr>
<td></td>
<td>Malfunction of proportioning bypass valve (PBV)</td>
<td>Replace</td>
<td>—</td>
</tr>
<tr>
<td>Brakes pull to one side</td>
<td>Worn disc pad</td>
<td>Replace</td>
<td>P-24, 29</td>
</tr>
<tr>
<td></td>
<td>Brake fluid, grease, oil, or water on disc pad</td>
<td>Clean or replace</td>
<td>P-24, 29</td>
</tr>
<tr>
<td></td>
<td>Hardening of disc pad surface, or poor contact</td>
<td>Grind or replace</td>
<td>P-24, 29</td>
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<td></td>
<td>Abnormal wear, distortion, or runout of disc plate</td>
<td>Repair or replace</td>
<td>P-24, 30</td>
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<td>Malfunction of automatic adjuster</td>
<td>Repair or replace</td>
<td>P-26, 31</td>
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<tr>
<td></td>
<td>Loose or damaged dust cover mounting bolt</td>
<td>Tighten or replace</td>
<td>Section M</td>
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<tr>
<td></td>
<td>Malfunction of caliper piston</td>
<td>Replace</td>
<td>P-26, 31</td>
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<tr>
<td></td>
<td>Worn or improperly adjusted wheel bearing preload</td>
<td>Adjust or replace</td>
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<td></td>
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<td>Adjust</td>
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<td>Adjust</td>
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<td>No brake pedal play</td>
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<td></td>
<td>Improper adjustment of push rod clearance</td>
<td>Adjust</td>
<td>P-11</td>
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<td></td>
<td>Clogged master cylinder return port</td>
<td>Clean</td>
<td>—</td>
</tr>
<tr>
<td></td>
<td>Brake pad not returning properly</td>
<td>Repair</td>
<td>—</td>
</tr>
<tr>
<td></td>
<td>Improper return or malfunction of caliper piston</td>
<td>Repair or Replace</td>
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<td>Excessive runout of disc plate</td>
<td>Replace</td>
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<td>Improper adjustment of wheel bearing preload</td>
<td>Adjust or replace</td>
<td>Section M</td>
</tr>
<tr>
<td>Pedal goes too far (excessive pedal stroke)</td>
<td>Air in system, insufficient brake fluid</td>
<td>Add fluid and bleed air</td>
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<td></td>
<td>Improper adjustment of pedal play</td>
<td>Adjust</td>
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<tr>
<td></td>
<td>Worn disc pad</td>
<td>Replace</td>
<td>P-24, 29</td>
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<tr>
<td>Abnormal noise or vibration during braking</td>
<td>Worn disc pad</td>
<td>Replace</td>
<td>P-24, 29</td>
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<tr>
<td></td>
<td>Damaged pad</td>
<td>Grind or replace</td>
<td>P-24, 29</td>
</tr>
<tr>
<td></td>
<td>Brakes do not release</td>
<td>Repair</td>
<td>—</td>
</tr>
<tr>
<td></td>
<td>Foreign material or scratches on disc plate contact surface</td>
<td>Clean</td>
<td>—</td>
</tr>
<tr>
<td></td>
<td>Loose caliper mounting bolt</td>
<td>Tighten</td>
<td>P-22, 28</td>
</tr>
<tr>
<td></td>
<td>Damaged disc plate contact surface</td>
<td>Replace</td>
<td>P-22, 28</td>
</tr>
<tr>
<td></td>
<td>Poor contact of pad</td>
<td>Repair or replace</td>
<td>P-24, 29</td>
</tr>
<tr>
<td></td>
<td>Insufficient grease on sliding parts</td>
<td>Apply grease</td>
<td>—</td>
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</tbody>
</table>
CONVENTIONAL BRAKE SYSTEM

AIR BLEEDING
The brakes should be bled whenever a brake line is disconnected. If a hydraulic line is disconnected at the master cylinder, start at the slave cylinder farthest from the brake master cylinder, and move to the next closest slave cylinder until all four cylinders have been bled. If the disconnection point is anywhere except the master cylinder, start at the point closest to the disconnection, and move to the next farthest slave cylinder until all four cylinders have been bled.

1. On level ground, jack up the vehicle and support it evenly on safety stands.

Caution
• Brake fluid will damage painted surfaces. If brake fluid does get on a painted surface, wipe it off immediately.

2. Remove the bleeder cap and attach a vinyl tube to the bleeder screw.
3. Place the other end of the vinyl tube in a clear, fluid-filled container.
4. Have a helper depress the brake pedal several times, and then hold it in the depressed position.
5. Loosen the bleeder screw, drain out the fluid, and close the screw by using the SST.
6. Repeat steps 4 and 5 until no air bubbles are seen.
7. Modify the bleeder screw tightening torque to allow for use of a torque wrench-SST combination. (Refer to section G1 "Torque Formulas").
8. Tighten the bleeder screw by using the SST.

Tightening torque:
5.9–6.8 N·m (60–90 kgf·cm, 53–78 in·lbf)
9. Perform the above steps for the remaining wheels.
10. Check for correct brake operation.
11. Check that there is no fluid leakage. Wipe off any spilled fluid immediately.
12. After bleeding the brakes, add brake fluid to MAX.

BRAKE LINE
Inspection
Check for the following and repair or replace parts as necessary:
1. Cracks, damage, and corrosion of brake lines
2. Damage to brake hose threads
3. Scars, cracks, and swelling of flexible hoses
4. Fluid leakage from brake lines

Removal / Installation
1. When disconnecting the flexible hose and brake line, loosen the nut by using the SST, then remove the holding clip.
2. When connecting the flexible hose, do not overtighten or twist it.
3. Install the holding clip and tighten the brake pipe nut by using the SST.
4. Verify that the hose does not contact other parts when the vehicle bounces or when the steering wheel is turned all the way to the left or right.
5. Bleed the air from the brake system. (Refer to above.)
CONVENTIONAL BRAKE SYSTEM

BRAKE FLUID
Inspection
1. Depress the brake pedal several times, and check the brake system for leaks.

2. Verify that the fluid level in the reservoir is between MAX and MIN.
3. If the fluid level is extremely low, check the brake system for leaks.

Fluid specification: FMVSS 116 DOT-3

Replacement
Caution
• Brake fluid will damage painted surfaces. If brake fluid does get on a painted surface, wipe it off immediately.

1. Remove the brake fluid from the reservoir by using a suction pump.
2. Fill the reservoir with clean brake fluid.
3. Attach a vinyl tube to the farthest bleeder screw and place the other end of the tube in a clear container.
4. Remove all old brake fluid from the brake lines by loosening the bleeder screw and pumping the brake pedal until only clean fluid is seen. The reservoir should be kept about 3/4 full during this procedure to prevent air from reentering the lines.
5. Modify the bleeder screw tightening torque to allow for use of a torque wrench-SST combination. (Refer to section GI "Torque Formulas").
6. Tighten the bleeder screw.

Tightening torque:
5.9–9.8 N·m {60–100 kgf·cm, 53–86 in·lb}

7. Perform the above steps for the remaining wheels.
8. Fill the reservoir to MAX.

VACUUM LINE
Inspection
1. Remove the clamps and the hose.
2. Apply both suction and pressure to the engine side of the hose, and verify that air flows only toward that side. If air flows in both directions or not at all, replace the vacuum hose.
**CONVENTIONAL BRAKE SYSTEM**

**BRAKE PEDAL**

**Inspection (on-vehicle)**

**Pedal height inspection**
Verify that the distance from the center of the upper surface of the pedal pad to the carpet is as specified.

**Pedal height:** 164.5–176.0 mm (6.48–6.92 in)  
(with carpet)

**Pedal height adjustment**
1. Disconnect the stoplight switch connector.
2. Loosen locknut B and turn switch A until it does not contact the pedal arm.
3. Loosen locknut D and turn rod C to adjust the height.
4. Adjust the pedal free play and tighten locknut D. (Refer to below.)
5. Turn switch A until it contacts the pedal arm; then turn the switch a half-turn more.
6. Tighten locknut B.

**Tightening torque:**
13.8–17.6 N·m (140–180 kgf·cm, 122–156 in·lbf)
7. Connect the stoplight switch connector.

**Pedal play inspection**
1. Depress the pedal a few times to eliminate the vacuum in the system.
2. Lightly depress the pedal by hand until resistance is felt, and check the free play.

**Free play:** 3–8 mm (0.12–0.31 in)

**Pedal play adjustment**
1. Loosen locknut D and turn rod C to adjust the free play.

**Free play:** 3–8 mm (0.12–0.31 in)

2. Tighten locknut D.

**Tightening torque:**
24–34 N·m (2.4–3.5 kgf·m, 17–25 ft·lbf)

**Pedal-to-floor clearance**
1. Check if the distance from the floor panel to the center of the upper surface of the pedal pad is as specified when the pedal is depressed with a force of 589 N (60 kgf, 132 lbf).

**Pedal-to-floor clearance:** 100 mm (3.94 in) min.  
(without carpet)
2. If the distance is less than specified, inspect for air in the brake system.
Removal / Inspection / Installation
1. Remove the side wall. (Refer to section S.)
2. Remove the lower panel. (Refer to section S.)
3. Remove the column cover.
4. Remove in the order shown in the figure.
5. Inspect all parts and repair or replace as necessary.
6. Install in the reverse order of removal.
7. After installation, check and adjust the pedal height and free play.

1. Stoplight switch connector
2. Spring clip
3. Clevis pin
4. Steering shaft bracket mounting nut
   Service .......................... Section N
5. Nut

6. Stoplight switch
   Inspection ........................ below
7. Pedal pad
   Inspect for wear and damage
8. Brake pedal
   Inspect for bending and damage

Inspection
Stoplight switch
1. Disconnect the stoplight switch connector.
2. Connect an ohmmeter to the terminals of the stop-light switch.
3. Verify continuity between the terminals when the brake pedal is depressed.
MASTER CYLINDER
Removal / Installation
1. Remove in the order shown in the figure, referring to Removal Note.
2. Install in the reverse order of removal, referring to Installation Note.
3. After installation, perform the following.
   (1) Add fluid and bleed the brakes. (Refer to page P-7.)
   (2) Check for fluid leakage. (Refer to page P-8.)

---

1. Hose (MT)
2. Brake fluid level sensor connector
3. Brake pipe
   - Removal Note ............... below
   - Installation Note ............ page P-14
4. Pipe joint and bracket
5. Nut
6. Bracket
7. O-ring
8. Master cylinder
   - Disassembly / Inspection / Assembly
   - Installation Note ............ page P-15
   - Installation Note ............ page P-12

---

Removal note
Brake pipe
Loosen the brake pipe at the master cylinder by using the SST.

Caution
- Brake fluid will damage painted surfaces. If brake fluid does get on a painted surface, wipe it off immediately.
Installation note
Master cylinder
Piston to push rod clearance
1. Turn the nut of the SST clockwise to fully retract the gauge rod. Attach the SST to the power brake unit.

Tightening torque:
9.9-15.6 N·m [100-160 kgf·cm, 87-138 in·lbf]

2. Apply 66.7 kPa [500 mmHg, 19.7 inHg] vacuum by using a vacuum pump.

3. Turn the adjusting nut of the SST counterclockwise until the gauge rod just contacts the end of the master cylinder push rod.
Push lightly on the end of the gauge rod to be sure it is seated. Verify that there is no gap between the adjusting nut and the SST body.

4. Remove the SST from the power brake unit without disturbing the adjusting nut. Set the SST onto the master cylinder as shown in the figure.

5. Push lightly on the end of the SST gauge rod to be sure it is bottomed in the master cylinder piston, but do not push so hard that the piston moves. Note any clearance between the SST body and the adjusting nut (clearance B) or between the body and the master cylinder (clearance C). Adjust the push rod as necessary, as outlined in “Adjustment” on the next page.

<table>
<thead>
<tr>
<th>Measurement</th>
<th>Push rod</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clearance at (B)</td>
<td>Too short</td>
</tr>
<tr>
<td>Clearance at (C)</td>
<td>Too long</td>
</tr>
<tr>
<td>No clearance at (B) or (C)</td>
<td>OK</td>
</tr>
</tbody>
</table>
CONVENTIONAL BRAKE SYSTEM

Adjustment
The threads of the push rod are specially designed so that the bolt becomes harder to turn past a certain point. This is to prevent the bolt from coming loose. Turn the bolt only within this range when adjusting.

Clearance at B
1. Push lightly on the end of the SST gauge rod, and measure the clearance between the adjusting nut and the SST body.

2. Using the SSTs, turn the nut to lengthen the master cylinder push rod an amount equal to the clearance measured at B.

Clearance at C
1. Measure and record height D1 of the gauge rod.

2. Turn the adjusting nut until the SST body sets squarely on the master cylinder. (Turn only enough for the body to touch.)
3. Measure and record height D2 of the gauge rod.

4. Subtract D1 from D2. Using the SSTs, turn the nut to shorten the master cylinder push rod an amount equal to the difference.
CONVENTIONAL BRAKE SYSTEM

Note
- The previous adjustment produces the following clearance.

<table>
<thead>
<tr>
<th>Vacuum applied to unit</th>
<th>Push rod-to-piston clearance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Approx 66.7 kPa (500 mmHg, 19.7 inHg)</td>
<td>0.1–0.4 mm (0.004–0.016 in)</td>
</tr>
</tbody>
</table>

Brake pipe
1. Modify the brake pipe flare nut tightening torque to allow for use of a torque wrench-SST combination.
   (Refer to section GI “Torque Formulas”.)
2. Tighten the brake pipe flare nut by using the SST.

Tightening torque:
12.8–21.5 N·m (130–220 kgf·cm, 113–190 in·lbf)
Disassembly / Inspection / Assembly

Caution
- The brake master cylinder is made of aluminum, and can be easily damaged by tightening in a vise. When securing the master cylinder in a vise, tighten only the master cylinder flange.

1. Disassemble in the order shown in the figure.
2. Inspect all parts and repair or replace as necessary.
3. Assemble in the reverse order of disassembly, referring to Assembly Note.

---

1. Brake fluid level sensor
   Inspection .................. page P-16
2. Screw
3. Reservoir assembly
   Inspect for damage and deformation
4. Bushings
5. Snap ring and spacer
6. Primary piston assembly
   Inspect for abnormal wear, rust, and damage
7. Stop pin and O-ring
   Assembly Note ................ page P-16
8. Secondary piston assembly
   Inspect for abnormal wear, rust, and damage
9. Master cylinder body
   Inspect for damage and wear
   Inspect inside of body for corrosion
CONVENTIONAL BRAKE SYSTEM

Inspection
Brake fluid level sensor
1. Disconnect the brake fluid level sensor connector.
2. Check continuity of the brake fluid level sensor.

<table>
<thead>
<tr>
<th>Fluid level</th>
<th>Continuity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Below MIN</td>
<td>Yes</td>
</tr>
<tr>
<td>Above MIN</td>
<td>No</td>
</tr>
</tbody>
</table>

3. If not as specified, replace the brake fluid level sensor.

Assembly note
Stop pin and O-ring
1. Install a new O-ring onto the stop pin.
2. Install the secondary piston assembly with the hole in the piston facing the stop pin.
3. Install and tighten the stop pin.
4. Push and release the piston to verify that it is held by the stop pin.

POWER BRAKE UNIT
Inspection (on-vehicle)
Power brake unit function check
(Simple method)
Step 1
1. With the engine stopped, depress the brake pedal a few times.
2. With the pedal depressed, start the engine.
3. If immediately after the engine starts the pedal moves down slightly, the unit is operating.

Step 2
1. Start the engine.
2. Stop the engine after it has run for 1 or 2 minutes.
3. Depress the pedal with the usual force.
4. If the first pedal stroke is long and becomes shorter with subsequent strokes, the unit is operating.
5. If a problem is found, inspect for damage of the check valve or vacuum hose and examine the installation. Repair if necessary, and inspect it once again.

Step 3
1. Start the engine.
2. Depress the pedal with the usual force.
3. Stop the engine with the pedal held depressed.
4. Hold the pedal down for about 30 seconds.
5. If the pedal height does not change, the unit is operating.
6. If there is a problem, inspect for damage to the check valve or vacuum hose, and inspect the hose connections. Repair if necessary, and inspect once again.

If the nature of the problem is still not clear after the three steps above, follow the more detailed check described in "Using the testers". (Refer to page P-17).
CONVENTIONAL BRAKE SYSTEM

(Using the testers)
1. Connect the SST or equivalent, vacuum gauge, and pedal depression force gauge as shown in the figure.
2. After bleeding the air from the SST, conduct the test as described in the steps below.

a) Checking for vacuum loss

Unloaded condition
1. Start the engine.
2. Stop the engine when the vacuum gauge reading reaches 66.7 kPa (500 mmHg, 19.7 inHg).
3. Observe the vacuum gauge for 15 seconds. If the gauge shows 63.4–66.7 kPa (475–500 mmHg, 18.7–19.7 inHg), the unit is operating.

Loaded condition
1. Start the engine.
2. Depress the brake pedal with a force of 196 N (20 kgf, 44 lbf).
3. With the brake pedal depressed, stop the engine when the vacuum gauge reading reaches 66.7 kPa (500 mmHg, 19.7 inHg).
4. Observe the vacuum gauge for 15 seconds. If the gauge shows 63.4–66.7 kPa (475–500 mmHg, 18.7–19.7 inHg), the unit operating.

b) Checking for hydraulic pressure
1. If, with the engine stopped (vacuum 0 kPa [0 mmHg, 0 inHg]), the fluid pressure is within specification, the unit is operating.

<table>
<thead>
<tr>
<th>Pedal force</th>
<th>Fluid pressure kPa (kgf/cm², psi)</th>
</tr>
</thead>
<tbody>
<tr>
<td>196 N (20 kgf, 44 lbf)</td>
<td>590 (86, 85) min.</td>
</tr>
</tbody>
</table>

2. Start the engine. Depress the brake pedal when the vacuum reaches 66.7 kPa (500 mmHg, 19.7 inHg). If the fluid pressure is within specification, the unit is operating.

<table>
<thead>
<tr>
<th>Pedal force</th>
<th>Fluid pressure kPa (kgf/cm², psi)</th>
</tr>
</thead>
<tbody>
<tr>
<td>196 N (20 kgf, 44 lbf)</td>
<td>7750 (79, 1120) min.</td>
</tr>
</tbody>
</table>
CONVENTIONAL BRAKE SYSTEM

Removal / Installation
1. Remove in the order shown in the figure, referring to Removal Note.
2. Install in the reverse order of removal, referring to Installation Note.
3. Add fluid and bleed the brakes. (Refer to page P-7.)
4. Check and adjust the brake pedal height. (Refer to page P-9.)
5. Check for fluid leakage. (Refer to page P-8.)

1. Hose (MT)
2. Brake fluid level sensor connector
3. Brake pipe
   - Removal Note ....................... page P-11
   - Installation Note ............... page P-14
4. Pipe joint and bracket
5. Nut
6. Bracket
7. O-ring
8. Master cylinder
   - Removal / Installation ............ page P-11
   - Disassembly / Inspection / Assembly ................ page P-15
9. Vacuum hose inspection ........ page P-8
10. Spring clip
11. Clevis pin
12. Nut
13. Power brake unit
   - Inspection ....................... page P-16
14. Spacer
15. Gasket
CONVENTIONAL BRAKE SYSTEM

PROPORTIONING BYPASS VALVE

Inspection
1. Connect the SST or equivalent to the inlet and outlet pipes to the rear brake system.
2. After bleeding the air from the SST, measure the fluid pressure from the master cylinder and to the rear brakes.

Specification:

<table>
<thead>
<tr>
<th>MASTER CYLINDER PRESSURE</th>
<th>REAR BRAKE PRESSURE</th>
</tr>
</thead>
<tbody>
<tr>
<td>3,920 (40,570)</td>
<td>3,630–4,210</td>
</tr>
<tr>
<td>5,880 (60,860)</td>
<td>4,320–5,090</td>
</tr>
</tbody>
</table>

3. If not as specified, replace the proportioning bypass valve assembly.
4. Add fluid and bleed the air. (Refer to page P–7.)
5. Check for fluid leakage. (Refer to page P–8.)
CONVENTIONAL BRAKE SYSTEM

Replacement
1. Remove in the order shown in the figure, referring to Removal Note.
2. Install in the reverse order of removal, referring to Installation Note.
3. Add fluid and bleed the brakes. (Refer to page P-7.)
4. Check for fluid leakage. (Refer to page P-8.)

1. Brake pipe
   Removal Note ................................ below
   Installation Note .......................... below

2. Bolt
   3. Proportioning bypass valve
      Inspection ............................ page P-19

Removal note
Brake pipe
Loosen the brake pipes by using the SST.

Caution
- Brake fluid will damage painted surfaces. If brake fluid does get on a painted surface, wipe it off immediately.

Installation note
Brake pipe

1. Modify the brake pipe flare nut tightening torque to allow for use of a torque wrench-SST combination.
   (Refer to section GI "Torque Formulas");
2. Tighten the brake pipes by using the SST.

Tightening torque:
12.8-21.5 N·m (130-220 kgf·cm, 113-190 in·lbf)
FRONT BRAKE (DISC)

Inspection (on-vehicle)
Disc pad
1. On level ground, jack up the front of the vehicle and support it on safety stands.
2. Remove the wheels.
3. Look through the caliper inspection hole and inspect the remaining thickness of the pads.

Thickness: 1.0 mm (0.04 in) min.

4. Replace the pads as a set (right and left wheels) if either is at or less than the minimum thickness.
Removal / Inspection / Installation
1. Remove in the order shown in the figure, referring to Removal Note.
2. Inspect all parts and repair or replace as necessary
3. Install in the reverse order of removal, referring to Installation Note.
4. Add fluid and bleed the air. (Refer to page P-7.)
5. Check for fluid leakage. (Refer to page P-8.)
6. Depress the pedal a few times, then verify that the brakes do not drag while the wheels are being rotated by hand.

1. Brake hose
   Inspect for damage and cracks
2. Brake pipe
   Removal Note
   ................. page P-23
   Installation Note
   ................. page P-23
3. Bolt, spacer
4. Bolt, brake pipe bracket
5. Guard plate
6. Caliper
   Removal Note
   ................. page P-23
   Disassembly / Inspection / Assembly .... page P-26
7. M-spring
8. Pad pin
9. M-clip
10. Disc pad
    Inspection .... page P-21
    Installation Note
    ................. page P-23
11. Outer shim
    Installation Note
    ................. page P-23
12. Inner shim
    Installation Note
    ................. page P-23
13. Screw
14. Disc plate
    Inspection .... page P-24
Removal note
Brake pipe
Remove the brake pipe by using the SST.

Caliper

Caution
• Loosening the caliper bridge bolts will damage the brake caliper. Do not loosen or remove the caliper bridge bolts.

Installation note
Outer shim, inner shim
Align the arrow with the disc plate rotation and install the shims.

Disc pad
1. Clean the piston.
2. Push the piston Inward by using the SST.
3. Install the disc pads.

Brake pipe
1. Modify the brake pipe tightening torque to allow for a torque wrench-SST combination. (Refer to section G1 "Torque Formulas").
2. Tighten the brake pipe by using the SST.

Tightening torque:
12.8–21.5 N·m{130–220 kgf·cm, 113–190 in·lbf}
CONVENTIONAL BRAKE SYSTEM

DISC PAD (FRONT)
Replacement
1. Remove in the order shown in the figure.
2. Install in the reverse order of removal, referring to Installation Note.

1. M-clip
2. Pad pin
3. M-spring

4. Disc pad
   Installation Note
   .................... Page P-23

5. Outer shim
   Installation Note
   .................... page P-23

6. Inner shim
   Installation Note
   .................... page P-23

DISC PLATE (FRONT)
Inspection
Disc plate thickness
1. Measure the thickness of the disc plate.

   Standard: 22.0 mm {0.87 in}
   Minimum: 20.0 mm {0.79 in}

2. If the thickness is less than minimum, replace the disc plate.
Disc plate runout
1. Verify that there is no looseness in the wheel bearing.
2. Measure the runout at the outer edge of the contact surface.

Runout: 0.1mm (0.004 in) max.

3. If the runout exceeds specification, repair or replace the disc plate.
CALIPER (FRONT)
Disassembly / Inspection / Assembly
1. Disassemble in the order shown in the figure, referring to Disassembly Note.

Caution
• Loosening the caliper bridge bolts will damage the brake caliper. Do not loosen or remove the caliper bridge bolts.

2. Inspect all parts and repair or replace as necessary.
3. Assemble in the reverse order of disassembly, referring to Assembly Note.

1. Piston ring
2. Dust boot
   Inspect for wear and cracks
3. Piston
   Disassembly Note
   Inspect for wear and cracks
   page P-27
4. Piston seal
   Disassembly Note
   page P-27
5. Bleeder cap
6. Bleeder screw
   Disassembly Note
   page P-27
   Assembly Note
   page P-27
7. Caliper body
   Inspect for damage and wear
Disassembly note
Piston
1. Place the SST in the caliper.
2. Blow compressed air through the pipe hole to force the pistons out of the caliper.

Piston seal
Remove the piston seal from the caliper by using the SST.

Bleeder screw
Loosen the bleeder screw by using the SST.

Assembly note
Bleeder screw
1. Modify the bleeder screw tightening torque to allow for use of a torque wrench-SST combination.
   (Refer to section GI "Torque Formulas").
2. Tighten the bleeder screw by using the SST.

   Tightening torque:
   5.9–9.8 N·m (60–100 kgf·cm, 53–86 in·lbf)

REAR BRAKE (DISC)
Inspection (on-vehicle)
Disc pad
1. On level ground, jack up the rear of the vehicle and support it on safety stands.
2. Remove the wheel.
3. Look through the caliper inspection hole and inspect the remaining thickness of the pads.
   Thickness: 1.0 mm (0.04 in) min.
4. Replace the pads as a set (right and left wheels) if either is at or less than the minimum thickness.
Removal / Inspection / Installation
1. Remove in the order shown in the figure.
2. Inspect all parts and repair or replace as necessary.
3. Install in the reverse order of removal, referring to Installation Note.
4. Add fluid and bleed the air. (Refer to page P-7.)
5. Check for fluid leakage. (Refer to page P-8.)
6. Depress the pedal a few times, then verify that the brakes do not drag while the wheels are rotated by hand.

1. Clip and rear parking cable
2. Flexible brake hose
   Inspect for damage and cracks
3. Lock pin
4. Guide pin
5. Caliper
   Disassembly / Inspection / Assembly .... page P-31
6. V-spring
7. Disc pad
   Inspection .... page P-27
   Installation Note ......... page P-29
8. Outer shim
9. Inner shim
10. Pad clip
11. Bolt, washer
12. Protector
13. Mounting support
14. Disc plate
   Inspection ....... page P-30

Nm (kgf-m, ft-lbf)
CONVENTIONAL BRAKE SYSTEM

Installation note
Disc pad
1. Clean up the piston with clean brake fluid.
2. Rotate the piston clockwise by using the SST.
3. Align the piston grooves as shown in the illustration, and install the disc pads.

DISC PAD (REAR)
Replacement
1. Disconnect the rear parking cable from the caliper.
2. Remove in the order shown in the figure.
3. Install in the reverse order of removal, referring to Installation Note.

1. Lock pin
2. Caliper
3. V-spring
4. Disc pad

Installation Note ................. above

5. Outer shim
6. Inner shim
7. Pad clip

N·m (kgf·m, ft·lb)
CONVENTIONAL BRAKE SYSTEM

DISC PLATE (REAR)
Inspection
Disc plate thickness
1. Measure the thickness of the disc plate.

   Standard: 20.0 mm {0.79 in}
   Minimum: 18.0 mm {0.71 in}

2. If the thickness is less than minimum, replace the disc plate.

Disc plate runout
1. Verify that there is no looseness in the wheel bearing.
2. Measure the runout at the outer edge of the contact surface of the disc pad.

   Runout: 0.1mm {0.004 in} max.

3. If the runout exceeds specification, repair or replace the disc plate.
CALIPER (REAR)
Disassembly / Inspection / Assembly
1. Disassembly in the order shown in the figure, referring to Disassembly Note.
2. Inspect all parts and repair or replace as necessary.
3. Assemble in the reverse order of disassembly, referring to Assembly Note.

1. Cable bracket
2. Retaining ring
3. Dust boot
4. Piston
   Disassembly Note ........................ page P-32
   Inspect for wear and damage
   Assembly Note ............................ page P-33
5. Piston seal
   Disassembly Note ........................ page P-32
6. Snap ring
7. Case cover
8. Spring
9. Spring washer
10. Stopper
11. Adjuster spindle
   Inspect for wear and damage
12. O-ring
13. Connecting link
   Inspect for wear and damage
14. Lever spring
15. Operating lever
16. Lever boot
17. Bearing
   Disassembly Note ......................... page P-32
   Assembly Note ............................ page P-33
18. Bleeder cap
19. Bleeder screw
   Disassembly Note ........................ page P-32
   Assembly Note ............................ page P-32
20. Caliper body
   Inspect for wear and damage
Disassembly note
Piston
Remove the piston by turning the SST counterclockwise.

Piston seal
Remove the piston seal by using the SST.

Bearing
1. Secure the caliper in a vise.
2. Remove the bearing from the caliper by using the SST.

Bleeder screw
Loosen the bleeder screw by using the SST.

Assembly note
Bleeder screw
1. Modify the bleeder screw tightening torque to allow for use of a torque wrench-SST combination. (Refer to section GI "Torque Formulas".)
2. Tighten the bleeder screw by using the SST.

Tightening torque:
5.9-9.8 N·m (60-100 kgf·cm, 53-86 in·lbf)
CONVENTIONAL BRAKE SYSTEM, PARKING BRAKE SYSTEM

Bearing
Press the new bearing into the caliper with the SST until the SST bottoms against the caliper.

Piston
1. Clean the piston with clean brake fluid.
2. Install the new dust boot in the piston groove.
3. Install the piston into the caliper body by turning the SST clockwise, and align the piston grooves, as shown in the illustration.
4. Fit the dust boot into the caliper body.

PARKING BRAKE SYSTEM
TROUBLESHOOTING GUIDE

<table>
<thead>
<tr>
<th>Problem</th>
<th>Possible cause</th>
<th>Action</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Brakes do not release</td>
<td>Improper return of parking cable or improper adjustment</td>
<td>Repair or adjust</td>
<td>P-34</td>
</tr>
<tr>
<td>Parking brake does not hold well</td>
<td>Excessive parking brake lever stroke</td>
<td>Adjust</td>
<td>P-33</td>
</tr>
<tr>
<td></td>
<td>Parking cable stuck or damaged</td>
<td>Repair or replace</td>
<td>P-34</td>
</tr>
<tr>
<td></td>
<td>Brake fluid or oil on pads</td>
<td>Clean or replace</td>
<td>P-29</td>
</tr>
<tr>
<td></td>
<td>Hardening of pad surfaces, or poor contact</td>
<td>Grind or replace</td>
<td>P-29</td>
</tr>
</tbody>
</table>

PARKING BRAKE (LEVER TYPE)
Inspection
Parking brake lever stroke
1. Depress the brake pedal several times.
2. Pull and release the parking brake lever several times.
3. Verify that the stroke is within specification when the parking brake lever is pulled up with a force of 98 N (10 kgf, 22 lbf).

Stroke: 7–10 notches
4. If not within specification, adjust the parking brake lever stroke. (Refer to below.)

Adjustment
Parking brake lever stroke
1. Depress the brake pedal several times.
2. Pull and release the parking brake lever several times.
3. Remove the console panel. (Refer to section S.)
4. Adjust the parking brake lever stroke by turning the adjusting nut.

Stroke: 7–10 notches
5. Pull the parking brake lever up one notch, and verify that the parking brake warning light comes on. Release the parking brake.
6. Turn the wheels by hand, and verify that the brakes do not drag.
PARKING BRAKE SYSTEM

PARKING CABLE (LEVER TYPE)

Removal/Inspection / Installation
1. Remove in the order shown in the figure.
2. Inspect all parts and repair or replace as necessary.
3. Install in the reverse order of removal.
4. After installation, check the parking brake lever stroke. (Refer to page P-33.)

1. Adjusting nut
2. Front parking cable
   Inspect for damage and wear
3. Clip
4. Bolt
5. Clip
6. Rear parking cable
   Inspect for damage and wear

N·m (kgf·m, ft·lb)
PARKING BRAKE LEVER
Removal / Inspection / Installation
1. Remove the console panel. (Refer to section S.)
2. Remove the rear console. (Refer to section S.)
3. Remove in the order shown in the figure.
4. Inspect all parts and repair or replace as necessary.
5. Install in the reverse order of removal, referring to Installation Note.
6. After installation, check the parking brake lever stroke. (Refer to page P-33.)
PARKING BRAKE SYSTEM

Inspection
Parking brake switch
1. Remove the console panel. (Refer to section S.)
2. Disconnect the connector from the parking brake switch.
3. Pull the parking brake lever and check continuity between
   the terminal of the switch and a ground.

<table>
<thead>
<tr>
<th>Parking brake lever</th>
<th>continuity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Released</td>
<td>No</td>
</tr>
<tr>
<td>Pulled</td>
<td>Yes</td>
</tr>
</tbody>
</table>

4. If not as specified, replace the parking brake switch.

Installation note
Parking brake switch
1. Install the parking brake switch so that it contacts the
   parking brake lever when the lever is fully released.
2. Turn the ignition switch ON, and check that the parking
   brake warning lamp illuminates with the lever is pulled up
   one notch.
<table>
<thead>
<tr>
<th>SST</th>
<th>Description</th>
<th>49 H028 2A0</th>
<th>49 F026 104</th>
<th>49 0259 770B</th>
</tr>
</thead>
<tbody>
<tr>
<td>49 H066 003</td>
<td>Harness, adapter</td>
<td>For connecting ABS tester</td>
<td>For installation of sensor rotor (front)</td>
<td>Wrench, flare nut</td>
</tr>
<tr>
<td>49 H028 2A0</td>
<td>Set, rubber bushing replacer</td>
<td>For installation of sensor rotor (front)</td>
<td>For installation of sensor rotor (rear)</td>
<td></td>
</tr>
<tr>
<td>49 F026 104</td>
<td>Installer, sensor rotor</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

For removal/ installation of brake pipe
TROUBLESHOOTING GUIDE

Outline

The ABS tester is used to locate the cause of a problem within the antilock brake system by retaining and reducing the hydraulic fluid pressure in the hydraulic unit. Because there is no way to check the ABS control unit itself, replace the control unit assembly only after first confirming that the other electrical parts are not malfunctioning.

ABS tester

Connecting the ABS tester

1. Turn the ignition switch OFF.
2. Connect the SST between the hydraulic unit wiring harness connectors, and to the positive battery terminal.
3. Remove the trunk side trim.
4. Remove the ABS control unit.
5. Disconnect the control unit connector and connect the ABS tester to the control unit connector at the harness side.
EXPLANATION OF INSTRUCTION PROCEDURE

Example:
5B "Brake light switch test"

PRESS BRK - - - - HOLD
PRESS BRAKE PEDAL FIRMLY AND HOLD PRESSURE
THEN
YES PRESSED? NO

THEN INDICATES TESTER CHANGES TO NEXT DISPLAY

TESTER GIVES INSTRUCTIONS/INFORMATION

"THEN" INDICATES TESTER ASKS A "QUESTION" WHICH MUST BE ANSWERED BY PRESSING SWITCH UNDER DESIRED ANSWER
NOTE: IN THIS CASE PRESS YES - TEST CONTINUES PRESS NO - TESTER DISPLAYS:

PRESS BRK - - - - HOLD

IF NO FAULTS ARE DETECTED TESTER DISPLAYS:

IF FAULT IS DETECTED TESTER DISPLAYS:

CHK BRK LIGHT SW
(Check Brake Light Switch)

THEN
YES CONTINUE? NO

TESTER INDICATES FAULT MESSAGE

RELEASE BRAKE

TESTER GIVES NEW INSTRUCTIONS/INFORMATION AND CONTINUES
# Troubleshooting Procedure

<table>
<thead>
<tr>
<th>ITEM</th>
<th>Description</th>
</tr>
</thead>
</table>
| **1. CONNECTION / POWER ON** | 1. Locate ABS control unit.  
2. Disconnect control unit harness connector from control unit.  
3. Connect ABS tester harness to control unit harness connector  
4. Turn ignition key to ON position |

**2. ALTERNATOR TEST**  
* Start engine  
Tester rapidly displays several messages during initial segment check.

```
THEN

MAZDA ABS 2 TEST

YES ENG RUN? NO

MAZDA ALT TEST

CHK ALTERNATOR

YES CONTINUE? NO

TURN OFF ENGINE

No fault detected
```

**3. ABS SYSTEM TEST**  
* Turn ignition key ON  
(Do not run engine)  
Tester rapidly displays several messages during initial segment check.

```
THEN

YES ENG RUN? NO

MAZDA ABS 2 TEST

(Cont.)
```
4. SYSTEM VOLTAGE CHECKS

- If tester displays a fault message, check and repair or replace parts as necessary.

Tester automatically performs multiple system voltage tests

If no faults are detected, tester advances to next test

If faults are detected, tester displays corresponding fault message(s)

- LF VALVE OPEN
  (Left front valve open)
- RF VALVE OPEN
  (Right front valve open)
- REAR VALVE OPEN
- CHK ABS DIODE
  (Check ABS diode)
- CHK CONT MOD GND
  (Check control module ground)
- CHK SYSTEM GND
  (Check system ground)
- CHK LF SPD SENS
  (Check left front speed sensor)
- CHK RF SPD SENS
  (Check right front speed sensor)
- CHK LR SPD SENS
  (Check left rear speed sensor)
- CHK RR SPD SENS
  (Check right rear speed sensor)

Tester alternately displays above messages with:

YES CONTINUE? NO

PRESS: \(-\text{ OR } -\)

Tester displays same fault message

If no additional faults are detected, tester advances to next test

If additional faults are detected, tester displays next fault message

(Cont.)
5. STATIC TESTS
5A ABS WARNING LIGHT TEST

(Cont)

ANTILock LT ON?

THEN

YES LIGHT? NO

(Press light on?)

PRESS: - OR -

CHK ANTILock LT

(Check ABS warning light)

THEN

YES CONTINUE? NO

PRESS: - OR -

5B. BRAKE LIGHT SWITCH TEST

PRESS BRK ------- HOLD

Press and hold brake pedal firmly

THEN

YES PRESSED? NO

PRESS: - OR -

If no faults are detected, tester displays:

CHK BRK LIGHT SW

(Check brake light switch)

THEN

YES CONTINUE? NO

PRESS: - OR -

RELEASE BRAKE
5C PUMP TEST

(Cont.)

PUSH <LISTEN>
Press either switch, and listen for pump motor operation (Note: pump runs for 5 seconds max)

If fault is detected tester displays:

CHK MOTOR RELAY
(Check motor relay)

THEN

YES CONTINUE? NO

PRESS:
- OR -

If no faults are detected, tester displays:

YES PUMPING? NO
Respond within 5 seconds or pump will shut off and tester returns to start of pump test

PRESS:
- OR -

PUMP MOTOR OK

CHK PUMP MOTOR
(Check pump motor)

THEN

YES CONTINUE? NO

PRESS:
- OR -

STAT TEST DYNAM
(Static test) (Dynamic test)

PRESS:
- OR -

Tester returns to 5A "ABS warning light test"

Tester advances to next test

(Cont.)
6. DYNAMIC TESTS
6A WHEEL SELECTION OR EXIT

Each messages will displayed 3-1/2 seconds Select one wheel to begin dynamic test sequence

OR

Press either switch under "PUSH TO EXIT" to return to "STAT TEST DYNAM" selection

IMPORTANT:
After completing testing of selected wheel return to 6A "WHEEL SELECTION," to select another wheel
Complete test procedures for all four wheels

On level ground, jack up the vehicle and support it evenly on safety stands. An extra person will be needed to spin wheels during the test.

6B WHEEL SENSOR TEST

SPIN TIRE
Display shows wheel selected in 6A
Spin wheel
If speed is incorrect tester displays:

SPIN FASTER OR
SPIN SLOWER

(Cont.)
6B WHEEL SENSOR TEST

(Cont.)

If no faults are detected tester displays:

<table>
<thead>
<tr>
<th>SPD SENS OK</th>
<th>YES</th>
<th>TEST</th>
<th>SPUN7 NO</th>
<th>OR</th>
<th>CHK TOOTHED IM</th>
<th>OR</th>
<th>CHK SPD SENS OK</th>
</tr>
</thead>
<tbody>
<tr>
<td>(Speed sensor OK)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Tester returns to 6A "Wheel selection"

Messages alternate with:

<table>
<thead>
<tr>
<th>YES CONTINUE</th>
<th>NO</th>
</tr>
</thead>
</table>

Press:

- ON 

Tester returns to 6A "Wheel selection"

6C SOLENOID TEST

Each solenoid test can be conducted for 15 seconds maximum. The tester will display the following message if the time limit is exceeded.

TIMEOUT EXPIRED

THEN

TRY TEST AGAIN

PUSH TEST 1

Press either switch to start test tester displays:

PRESS BRK... HOLD

Apply firm pressure to brake pedal and hold firmly throughout solenoid tests 1 and 2

(Cont.)
6C SOLENOID TEST

(Cont.)

YES LOCKED? NO

Has wheel stopped spinning and locked in place

PRESS: - OR -

CHECK HYDRAULICS

THEN

YES CONTINUE? NO

PRESS: - OR -

STAT TEST DYNAM

PRESS: - OR -

Tester returns to 5A "ABS warning light test"
Tester returns to 6A "Wheel selection"

PUSH TEST 2

Press either switch to start test
(Continue applying firm pressure to brake pedals)

If no faults are detected tester advances to next step
If fault is detected tester displays either:

CHK VALVE RELAY
(Check valve relay)
THEN

YES CONTINUE? NO

PRESS: - OR -

Spin tire as directed

(Cont.)
**6C SOLENOID TEST**

**Cont.**

**YES SPINNING? NO**

Can assistant spin tire and is it spinning?

PRESS: - OR -

**CHECK HYDRAULICS THEN**

**YES CONTINUE? NO**

PRESS: - OR -

**STAT TEST DYNAM**

**Tester returns to 5A "ABS warning light test"**

**Tester returns to 6A "Wheel selection"**

**YES LOCKED? NO**

Has wheel stopped spinning and locked?

PRESS: - OR -

**CHECK HYDRAULICS THEN**

**YES CONTINUE? NO**

PRESS: - OR -

**RELEASE BRAKE THEN**

**SOLENOID OK THEN**

**STAT TEST DYNAM**

**Tester returns to 5A "ABS warning light test"**

**Tester returns to 6A "Wheel selection"**

**IMPORTANT—Continue returning to 6A until all four wheels have been tested**
ANTILock BRAKE SYSTEM (ABS)

Inspection of ABS system
Check system ground
Check for an open circuit in (B) wire from terminals 1D, 1S, and AF of the ABS control unit O-01 connector and ground.

Caution
- To prevent damage to the terminals, create a probe by wrapping a thin wire around the tester lead before inserting.

Check antilock warning light
1. Remove the switch assembly. (Refer to 1994 RX-7 body electrical troubleshooting manual section Z4.)
2. Remove and check the ABS warning light bulb.
3. If a problem is found, replace the bulb.
4. If OK repair or replace the wiring harness. (Battery–ABS control unit–ABS warning light)

Check ABS diode
1. Check the wiring harness between the warning light and the control unit and hydraulic unit. Repair if necessary.
2. Disconnect the hydraulic unit O-02 connector.
3. Using an ohmmeter, check for continuity between the terminals of the connector (hydraulic unit side).

<table>
<thead>
<tr>
<th>Terminal</th>
<th>(G/O)</th>
<th>(G/Y)</th>
</tr>
</thead>
<tbody>
<tr>
<td>○–○○ Continuity</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

4. If continuity is not specified, replace the hydraulic unit.

Check front and rear valves
1. Disconnect the negative battery cable.
2. Disconnect the hydraulic unit O-02 connector.
3. Check for continuity between terminals of the connector (hydraulic unit side).

<table>
<thead>
<tr>
<th>Wire</th>
<th>Continuity</th>
</tr>
</thead>
<tbody>
<tr>
<td>(G/Y)</td>
<td>Yes</td>
</tr>
<tr>
<td>(BR)</td>
<td>Yes</td>
</tr>
<tr>
<td>(B/W)</td>
<td>Yes</td>
</tr>
</tbody>
</table>

4. If not as specified, replace the hydraulic unit.
Check stoplight switch
1. Disconnect the stoplight switch connector.
2. Connect an ohmmeter between terminals of the switch.
3. Verify that there is continuity between the terminals when the brake pedal is depressed.
4. If there is no continuity, replace or adjust the stoplight switch.

Check motor relay
1. Disconnect the negative battery cable.
2. Remove the motor relay.

3. Using an ohmmeter, check continuity between terminals of the relay.

<table>
<thead>
<tr>
<th>Connect to</th>
<th>a</th>
<th>b</th>
<th>c</th>
<th>d</th>
</tr>
</thead>
<tbody>
<tr>
<td>12V Ground</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>-</td>
<td></td>
<td></td>
<td>O</td>
<td>O</td>
</tr>
<tr>
<td>c</td>
<td>b</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

O--O: Continuity
4. If continuity is not as specified, replace the motor relay.

Check pump motor
1. Disconnect the hydraulic unit O-03 connector.
2. Measure the voltage between wire (B/L) and a ground.

<table>
<thead>
<tr>
<th>Wire</th>
<th>Voltage</th>
</tr>
</thead>
<tbody>
<tr>
<td>B/L</td>
<td>Battery positive voltage</td>
</tr>
</tbody>
</table>

3. If not as specified, check the fuse (MAIN and ABS 60A) and repair or replace the wiring harness (battery-hydraulic unit).

4. If as specified, check for continuity between wire (G) of O-03 connector and a ground (hydraulic unit side).

<table>
<thead>
<tr>
<th>Wire</th>
<th>Continuity</th>
</tr>
</thead>
<tbody>
<tr>
<td>R/Y</td>
<td>Yes</td>
</tr>
</tbody>
</table>

5. If there is no continuity, replace the hydraulic unit.
Check valve relay
1. Disconnect the negative battery cable.
2. Remove the valve relay.
3. Using an ohmmeter, check for continuity between terminals of the relay.

<table>
<thead>
<tr>
<th>Connect to</th>
<th>12V</th>
<th>Ground</th>
<th>a</th>
<th>b</th>
<th>c</th>
<th>d</th>
<th>e</th>
</tr>
</thead>
<tbody>
<tr>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>b</td>
<td>—</td>
<td>d</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
</tbody>
</table>

O—O: Continuity

4. If continuity is not as specified, replace the valve relay.
5. If as specified, connect the negative battery cable.
6. Disconnect the hydraulic unit O-02 connector.
7. Measure voltage between wire (W/R) of O-02 connector and ground.

<table>
<thead>
<tr>
<th>Wire (W/R)</th>
<th>Voltage</th>
<th>Battery positive voltage</th>
</tr>
</thead>
<tbody>
<tr>
<td>(W/R)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

8. If not as specified, check the fuse (MAIN and ABS 15A) and repair or replace the wiring harness (battery-hydraulic unit).

Check rotor
1. Check the rotor for looseness and missing or damaged teeth.
2. Replace if necessary.

Check alternator
Refer to section G.
ANTIOLOCK BRAKE SYSTEM (ABS)

Check wheel-speed sensor
1. Disconnect the O-01 connector.
2. Using an ohmmeter, check for continuity between the ABS control unit O-01 connector terminals.

<table>
<thead>
<tr>
<th>Sensor</th>
<th>Terminal</th>
<th>1K</th>
<th>1G</th>
<th>1O</th>
<th>1Q</th>
<th>1U</th>
<th>1F</th>
<th>1L</th>
<th>1P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Left front</td>
<td></td>
<td>O</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Right front</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>O</td>
</tr>
<tr>
<td>Left rear</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>O</td>
</tr>
<tr>
<td>Right rear</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>O</td>
</tr>
</tbody>
</table>

O—O: Continuity

2. If the continuity is not as specified, repair the wiring harness (wheel-speed sensor—ABS control unit).
3. If continuity is as specified, check voltage between the following terminals while rotating the wheel one rotation per second by hand.

<table>
<thead>
<tr>
<th>Sensor</th>
<th>Terminal</th>
<th>Voltage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Left front</td>
<td>1K and 1G</td>
<td>50–60 mV*</td>
</tr>
<tr>
<td>Right front</td>
<td>1U and 1F</td>
<td>50–60 mV*</td>
</tr>
<tr>
<td>Left rear</td>
<td>1O and 1Q</td>
<td>50–60 mV*</td>
</tr>
<tr>
<td>Right rear</td>
<td>1L and 1P</td>
<td>50–60 mV*</td>
</tr>
</tbody>
</table>

*Alternating current voltage

4. If voltage is not as specified, replace the wheel-speed sensor.
5. If voltage is as specified, replace the ABS control unit.

Check hydraulics
Verify that all brake fluid line connections are tight and that no fluid is leaking.

Check hydraulic unit wiring
1. Verify that the hydraulic unit connectors are properly secured.
2. Verify that the valve relay and motor relay are properly secured.
# ANTILOCK BRAKE SYSTEM (ABS)

## Electrical diagnosis support

### Hydraulic Unit (HU)

<table>
<thead>
<tr>
<th>Circuit</th>
<th>Condition</th>
<th>Open circuit</th>
<th>Short circuit</th>
<th>Poor ground</th>
</tr>
</thead>
<tbody>
<tr>
<td>Valve relay, motor relay and solenoid valve—ABS CU</td>
<td>System shut down ↓ Normal braking</td>
<td>System shut down ↓ Normal braking</td>
<td>NA</td>
<td></td>
</tr>
<tr>
<td>HU–Fuse–Battery</td>
<td>System shut down ↓ Normal braking</td>
<td>System shut down ↓ Normal braking</td>
<td>NA</td>
<td></td>
</tr>
<tr>
<td>Motor–Ground</td>
<td>System shut down ↓ Normal braking</td>
<td>No symptom</td>
<td>System shut down ↓ Normal braking</td>
<td></td>
</tr>
<tr>
<td>O–2 connector (B)–Ground</td>
<td>ABS warning light does not illuminate when ABS CU disconnected</td>
<td>No symptom</td>
<td>ABS warning light does not illuminate when ABS CU disconnected</td>
<td></td>
</tr>
<tr>
<td>HU–ABS warning light</td>
<td>ABS warning light does not illuminate when ABS CU disconnected</td>
<td>ABS warning light illuminates continuously</td>
<td>NA</td>
<td></td>
</tr>
</tbody>
</table>

## Wheel-speed sensor

<table>
<thead>
<tr>
<th>Circuit</th>
<th>Condition</th>
<th>Open circuit</th>
<th>Short circuit</th>
<th>Poor ground</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wheel speed sensor—ABS CU</td>
<td>Partial control</td>
<td>Partial control</td>
<td>NA</td>
<td></td>
</tr>
</tbody>
</table>

Partial control: If failure occurs during ABS operation, system is controlled by remaining sensors until ABS cycle is completed, then system is shut down.

NA: Not applicable
<table>
<thead>
<tr>
<th>Circuit</th>
<th>Open circuit</th>
<th>Short circuit</th>
<th>Poor ground</th>
</tr>
</thead>
<tbody>
<tr>
<td>ABS CU-Ignition switch-Battery</td>
<td>System shut down</td>
<td>System shut down</td>
<td>NA</td>
</tr>
<tr>
<td></td>
<td>↓ Normal braking</td>
<td>Normal braking</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Fuse (AIR CON 15A) burns out</td>
<td></td>
</tr>
<tr>
<td>ABS CU-Stoplight switch-Battery</td>
<td>ABS controllability slightly down</td>
<td>ABS controllability slightly down on low coefficient road, but no other effects</td>
<td>NA</td>
</tr>
<tr>
<td></td>
<td>on low coefficient road, but no other effects</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Fuse (STOP 20A) burns out</td>
<td></td>
</tr>
<tr>
<td>ABS CU-Alternator</td>
<td>ABS warning light remains illuminated after engine started</td>
<td>ABS warning light remains illuminated after engine started</td>
<td>NA</td>
</tr>
<tr>
<td></td>
<td>ABS control normal</td>
<td>ABS control normal</td>
<td></td>
</tr>
<tr>
<td>ABS CU-Ground</td>
<td>If all ground harnesses are open, system shut down</td>
<td>No symptom</td>
<td>If all ground harnesses are open, system shut down</td>
</tr>
<tr>
<td>ABS CU-ABS warning light</td>
<td>ABS warning light does not illuminate when ABS CU disconnected</td>
<td>ABS warning light illuminates continuously</td>
<td>NA</td>
</tr>
<tr>
<td></td>
<td>ABS warning light does not illuminate when ignition switch is ON and system has been shut down</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

NA: Not applicable
HYDRAULIC UNIT
Removal / Installation
1. Disconnect the negative battery cable.
2. Remove in the order shown in the figure, referring to Removal Note.
3. The only serviceable parts of the hydraulic unit are the valve relay and the motor relay, if there is a failure of any other part, replace the hydraulic unit assembly.
4. Install in the reverse order of removal, referring to Installation Note.
5. Add fluid and bleed the air. (Refer to page P-7.)
6. Check for fluid leakage. (Refer to page P-8.)

1. Connector
2. Brake pipe
   Removal Note
   ............... page P-57
   Installation Note
   ............... page P-57
3. Proportioning bypass valve
4. Ground wire
5. Nut
6. Hydraulic unit
   Disassembly / Inspection / Assembly .... page P-58
7. ABS bracket
8. Insulator and bracket
Removal / note
Brake pipe

Caution
• Brake fluid will damage painted surfaces. If brake fluid does get on a painted surface, wipe it off immediately.

Loosen the brake pipe by using the SST.

Installation note
Brake pipe

1. Modify the brake pipe flare nut tightening torque to allow for use of a torque wrench-SST combination. (Refer to section GI "Torque Formulas").
2. Tighten the brake pipes by using the SST.

Tightening torque:
12.8–21.5 N·m {130–220 kgf·cm, 113–190 in·lbf}
Disassembly / Inspection / Assembly
1. Disassemble in the order shown in the figure.
2. Inspect all parts and repair or replace as necessary.
3. Assemble in the reverse order of disassembly.

[Diagram of antilock brake system]

1. Connector bolt
2. Pipe joint
3. Gasket
4. Proportioning bypass valve holder
5. Casing and mount rubber
6. Hex stud
7. Ground wire
8. Cover
9. Motor relay
10. Valve relay
11. Hydraulic unit

Inspection .... page P-64

M-m (kgf·m, ft·lbf)

4.9-6.8 N·m (70-100 kgf·cm, 81-86 in·lbf)
ABS CONTROL UNIT
Removal / Installation
1. Disconnect the negative battery cable.
2. Remove the luggage compartment side trim. (Refer to section S.)
3. Remove in the order shown in the figure.
4. Install in the reverse order of removal.

1. Bolt
2. Connector
3. ABS control unit
WHEEL-SPEED SENSOR (FRONT)

Removal / Installation
1. Remove in the order shown in the figure.
2. Install in the reverse order of removal.

Inspection
Wheel speed sensor (front)
1. Measure resistance between terminals of the wheel-speed sensor.
   Resistance: 0.8–1.2 kΩ
2. If resistance is not as specified, replace the wheel-speed sensor.
SENSOR ROTOR (FRONT)
Removal / Installation
1. Remove the wheel hub assembly from the vehicle. (Refer to section M.)
2. Remove in the order shown in the figure, referring to Removal Note.
3. Install in the reverse order of removal, referring to Installation Note.
4. Install the wheel hub assembly to the vehicle. (Refer to section M.)

1. Sensor rotor (front)
   Removal Note .......... below
   Installation Note ...... below

2. Front wheel hub assembly

Removal note
Sensor rotor (front)

Note
- The sensor rotor does not need to be removed unless you are replacing it.

Remove the sensor rotor by using a brass bar and a hammer.

Installation note
Sensor rotor (front)
Press on the new sensor rotor by using the SST.
WHEEL-SPEED SENSOR (REAR)
Removal / Installation
1. Remove in the order shown in the figure.
2. Install in the reverse order of removal.

3. Wheel-speed sensor (rear)
   Inspection ..................... below

   Inspection
   Wheel-speed sensor (rear)
   1. Measure resistance between terminals of the wheel-speed sensor.

   Resistance: 0.8 ~ 1.2 kΩ

   2. If resistance is not as specified, replace the wheel-speed sensor.
SENSOR ROTOR (REAR)

Removal / Installation
1. Remove the drive shaft from the vehicle. (Refer to section M.)
2. Remove in the order shown in the figure, referring to Removal Note.
3. Install in the reverse order of removal, referring to Installation Note.
4. Install the drive shaft to the vehicle. (Refer to section M.)

1. Boot band and boot
2. Sensor rotor (rear)
   Removal Note .................................... below
   Installation Note ................................. below

3. Drive shaft

Removal note
Sensor rotor (rear)

Note
- The sensor rotor does not need to be removed unless you are replacing it.

Tap the sensor rotor off the drive shaft by using a chisel and a hammer.

Installation note
Sensor rotor (rear)
Set a new sensor rotor on the drive shaft and press it on by using the SST.
ANTILOCK BRAKE SYSTEM (ABS)

RELAY
Removal / Installation
1. Disconnect the negative battery cable.
2. Remove in the order shown in the figure.
3. Install in the reverse order of removal.

1. Cover
2. Motor relay
   Inspection ........................................ below
3. Valve relay
   Inspection ........................................ below

Inspection
Motor relay
1. Using an ohmmeter, check for continuity between the relay terminals.

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<tr>
<th>Connect to</th>
<th>a</th>
<th>b</th>
<th>c</th>
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O—O Continuity
2. If continuity is not as specified, replace the motor relay.

Valve relay
1. Using an ohmmeter, check for continuity between the relay terminals.

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<th>Connect to</th>
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O—O Continuity
2. If continuity is not as specified, replace the valve relay.