

Brakes

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Conventional Brakes

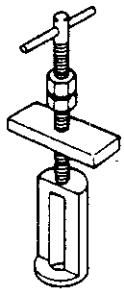
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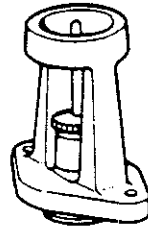
Special Tools

* Cars with ABS

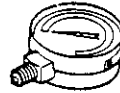
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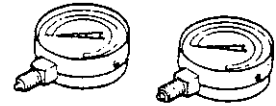
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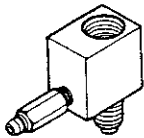
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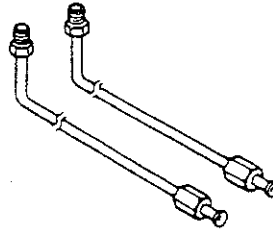
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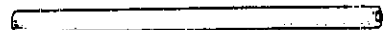
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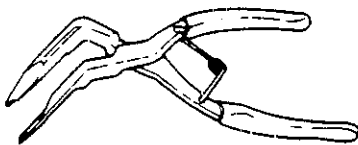
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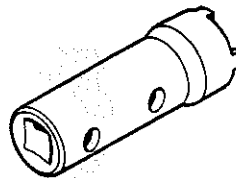
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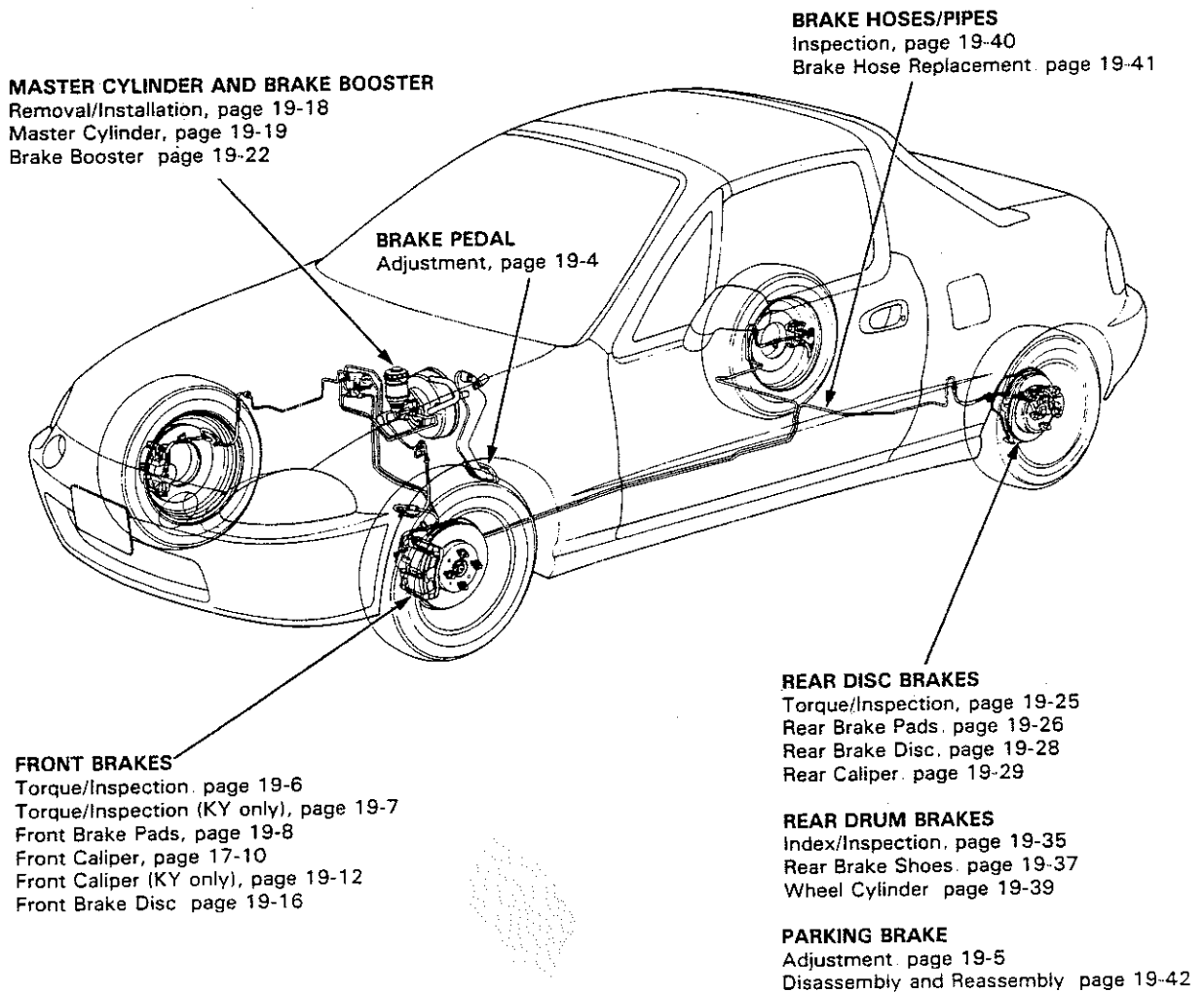
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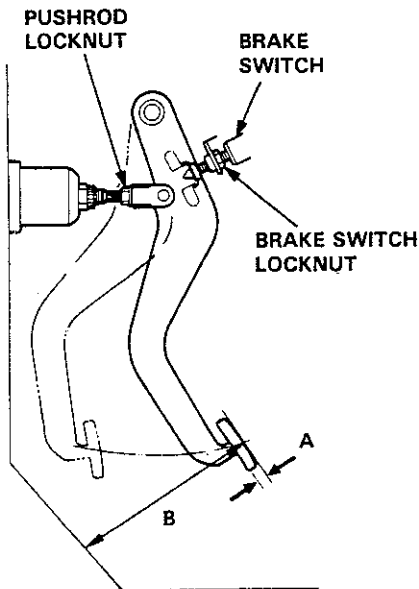


Pedal Height

Adjustment

1. Disconnect the brake switch connector, loosen the brake switch locknut and back off the brake switch until it is no longer touching the brake pedal

NOTE: Measure the pedal height from the left side center of the pedal surface.



A: Pedal Play

1–5 mm (1/16–13/64 in)

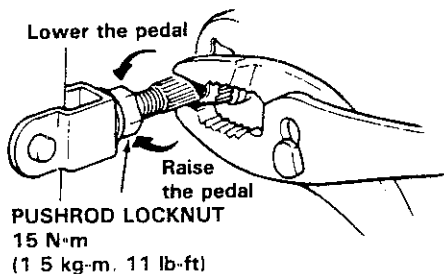
B: Standard Pedal Height

MT: 160 mm (6.3 in)

AT: 165 mm (6.5 in)

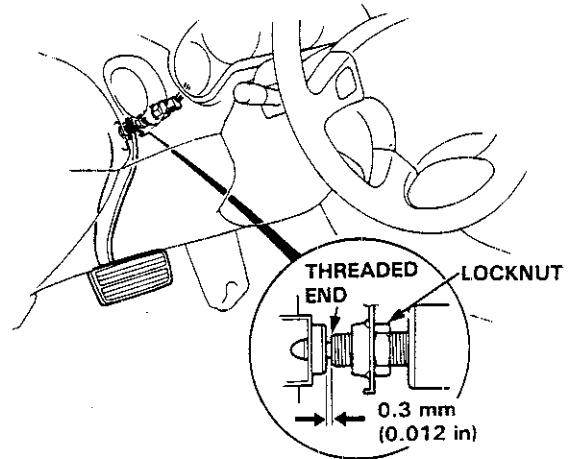
(with floor mat removed)

2. Loosen the pushrod locknut and screw the pushrod in or out with pliers until the standard pedal height from the floor is reached. After adjustment, tighten the locknut firmly.



3. Screw in the brake switch until its plunger is fully depressed (threaded end touching the pad on the pedal arm). Then back off the switch 1/4 turn to make 0.3 mm (0.012 in) of clearance between the threaded end and pad. Tighten the locknut firmly. Connect the brake switch connector

CAUTION: Check that the brake lights go off when the pedal is released.



Brake Pedal Play Inspection:

Stop the engine and inspect the play by pushing the pedal by hand.

Brake Pedal Play: 1–5 mm (1/16–13/64 in)

NOTE: Do not adjust the pedal height with the pushrod depressed.

CAUTION: If the pedal free play is out of specification, brake drag may occur.



Parking Brake

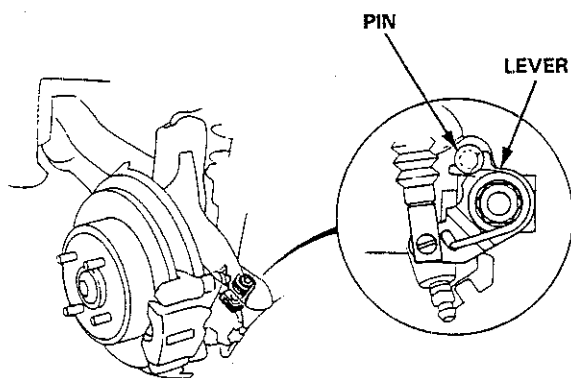
Adjustment

NOTE: After rear brake caliper or shoe servicing, loosen the parking brake adjusting nut, start the engine and depress the brake pedal several times to set the self-adjusting brake before adjusting the parking brake

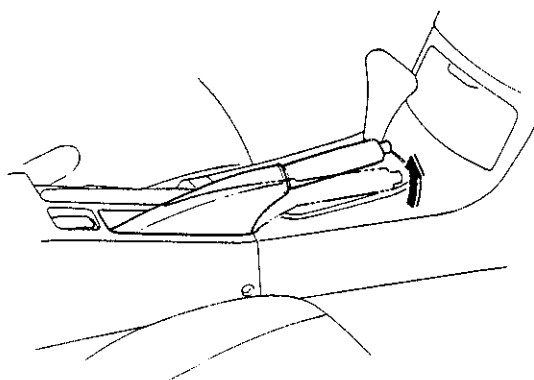
WARNING Block the front wheels before jacking up the rear of the car.

NOTE: Do not open or close the power roof when the car is raised by using the safety stands.

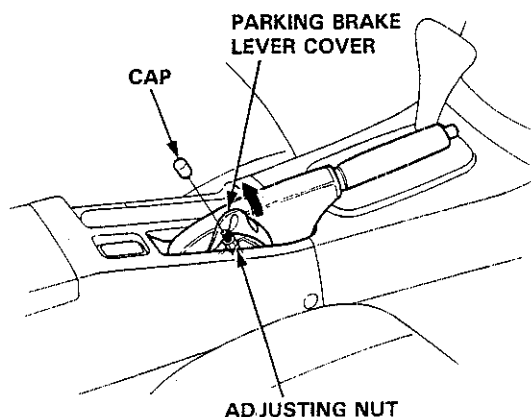
1. Raise the rear wheels off the ground.
2. On cars with rear disc brakes, make sure the lever of the rear brake caliper contacts the brake caliper pin.



3. Pull the parking brake lever up one notch



4. Turn up the parking brake lever cover and remove the cap from the parking brake cable end
5. Tighten the adjusting nut until the rear wheels drag slightly when turned



6. Release the parking brake lever and check that the rear wheels do not drag when turned. Readjust if necessary
7. With the equalizer properly adjusted, the rear brakes should be fully applied when the parking brake lever is pulled up 6 to 10 clicks
8. Install the cap onto the parking brake cable end and return the parking brake lever cover.

Front Brakes

Torque/Inspection

⚠ WARNING



- Never use an air hose or dry brush to clean brake assemblies.
- Use a vacuum cleaner, to avoid breathing brake dust.
- Contaminated brake discs or pads reduce stopping ability

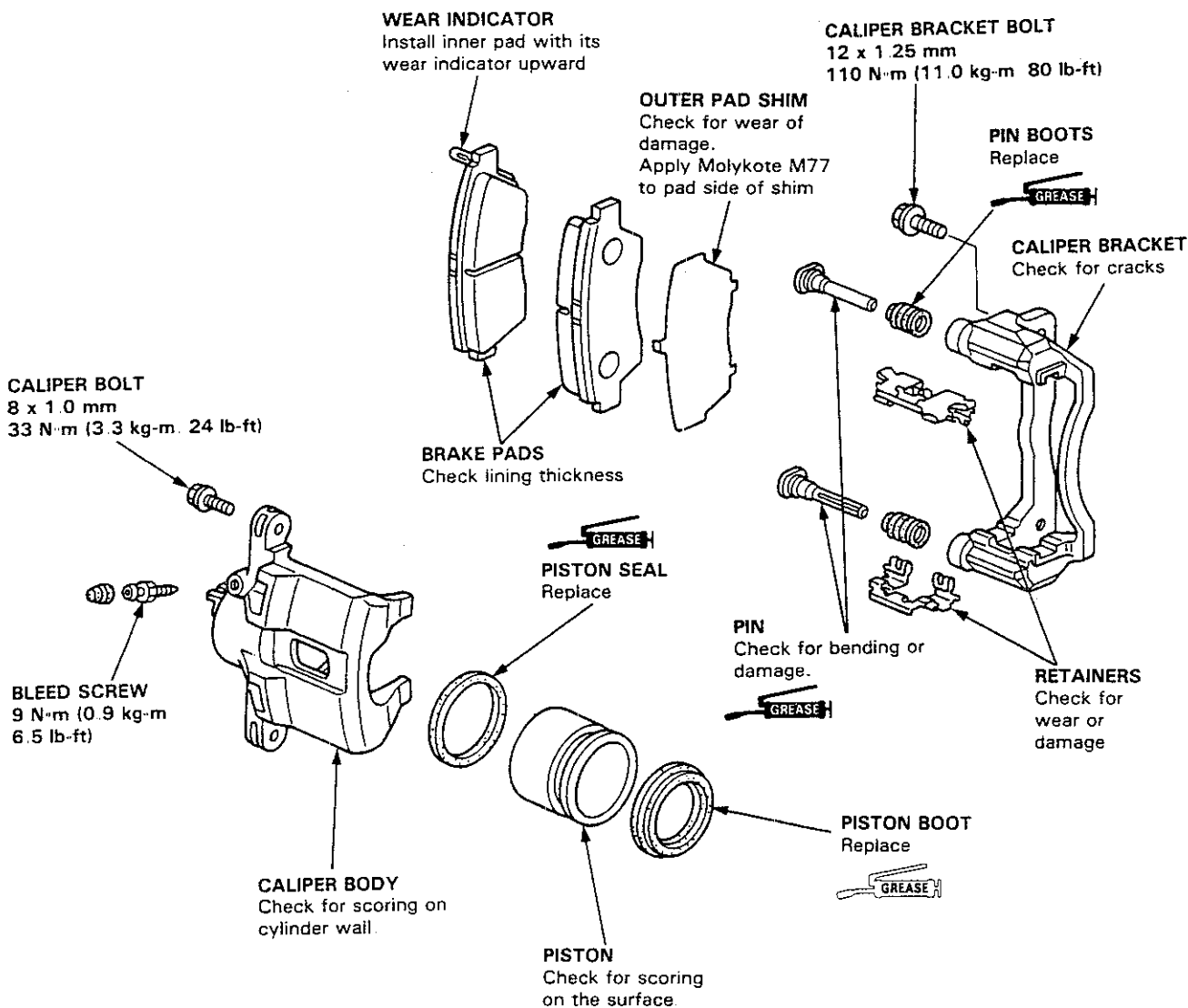
CAUTION:

- Do not spill brake fluid on the car; it may damage the paint; if brake fluid does contact the paint, wash it off immediately with water.
- To prevent spills, cover the hose joints with rags or shop towels.
- Clean all parts in brake fluid and air dry; blow out all passages with compressed air.
- Before reassembling, check that all parts are free of dust and other foreign particles.
- Replace parts with new ones whenever specified to do so.
- Make sure no dirt or other foreign matter is allowed to contaminate the brake fluid.
- Do not mix different brands of brake fluid as they may not be compatible.
- Do not reuse the drained fluid. Use only clean DOT 3 or 4 brake fluid.

NOTE:

- Coat piston, piston seal, and caliper bore with clean brake fluid
- Replace all rubber parts with new ones whenever disassembled.

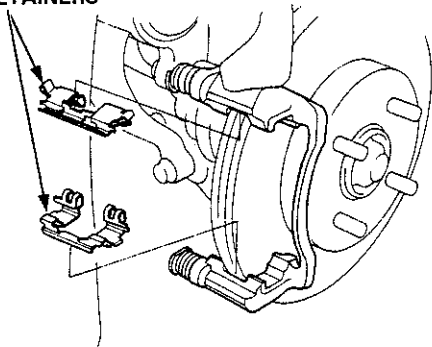
 : Brake cylinder grease (P/N: 08733-B020E) or equivalent rubber grease  : Silicone grease



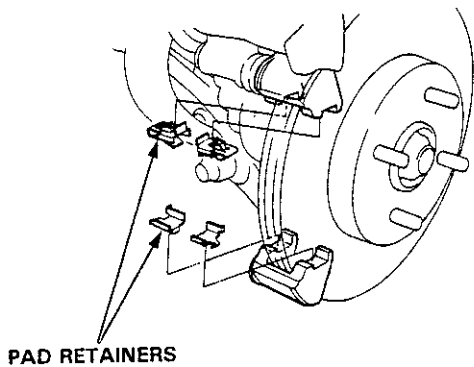


6. Clean the caliper thoroughly; remove any rust, and check for grooves or cracks.
7. Install the pad retainers

PAD RETAINERS



KY only:

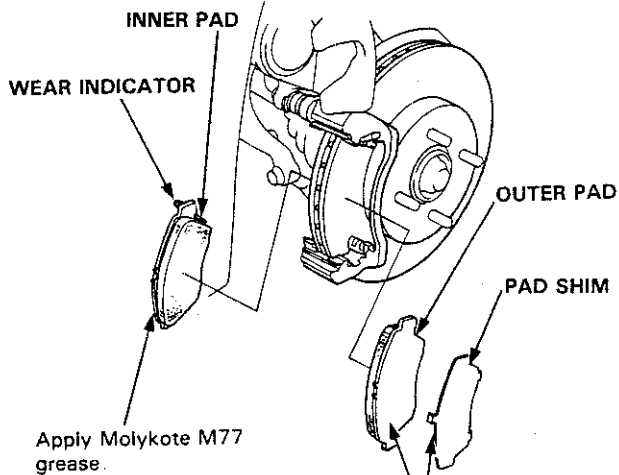


8. Apply Molykote M77 to the pad shims and the back of the pads. Wipe off excess.
9. Install the brake pads and pad shims correctly.

▲ WARNING

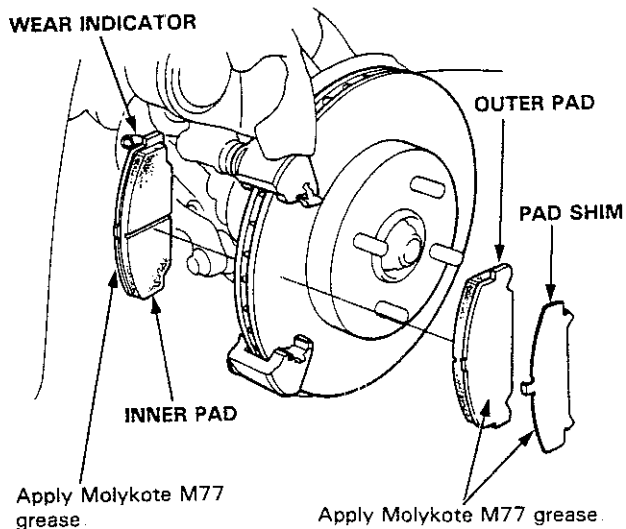
- When reusing the pads, always reinstall the brake pads in their original positions to prevent loss of braking efficiency
- Contaminated brake discs or pads reduce stopping ability. Keep grease off the discs and pads.

NOTE: Install the pad with the wear indicator on the inside.



Apply Molykote M77 grease.

KY only:



Apply Molykote M77 grease.

Apply Molykote M77 grease.

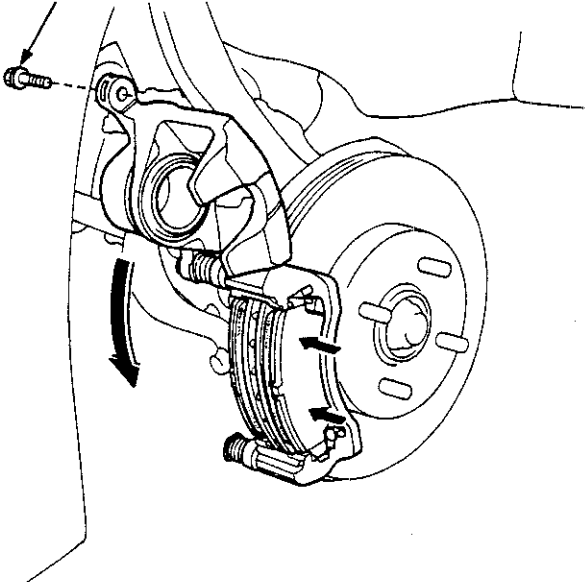
Front Brake Pads

Inspection/Replacement (cont'd)

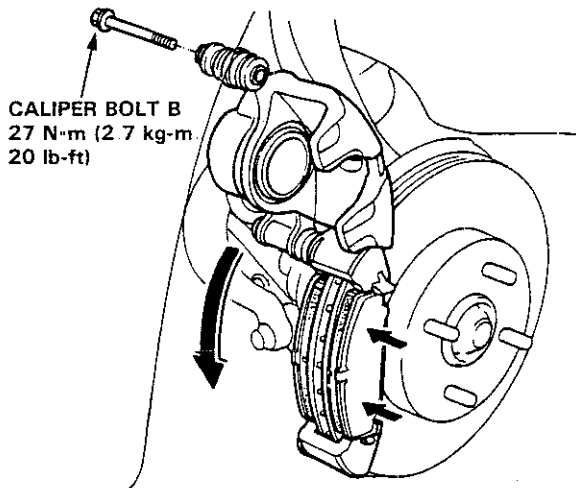
10. Push in the piston so that the caliper will fit over the pads. Keep the boot in position to prevent damaging the boot when pivoting the caliper down.

11. Pivot the caliper down into position, then install the caliper bolt (caliper bolt B) and the brake hose bracket bolts. Tighten the bolts.

CALIPER BOLT
33 N·m
(3.3 kg·m, 24 lb-ft)



KY only:



CALIPER BOLT B
27 N·m (2.7 kg·m,
20 lb-ft)

12. Depress the brake pedal several times to make sure the brakes work, then road-test.

NOTE: Engagement of the brake may require a greater pedal stroke immediately after the brake pads have been replaced as a set. Several applications of the brake pedal will restore the normal pedal stroke.

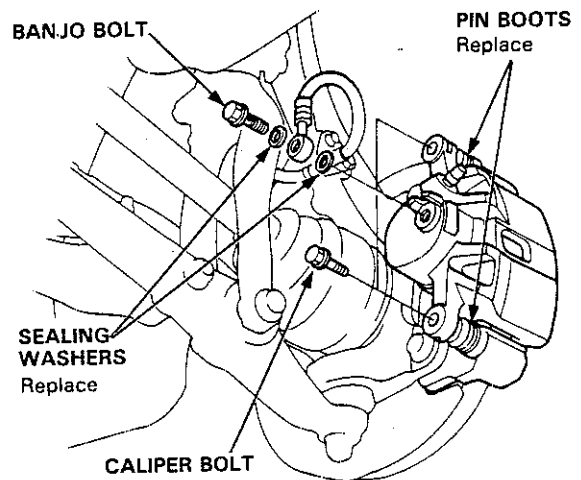
Front Caliper

Disassembly

CAUTION:

- Do not spill brake fluid on the car; it may damage the paint; if brake fluid does contact the paint, wash it off immediately with water.
- To prevent spills, cover the hose joints with rags or shop towels.
- Clean all parts in brake fluid and air dry; blow out all passages with compressed air.

1. Remove the banjo bolt and disconnect the brake hose from the caliper.
2. Remove the caliper bolts; then remove the caliper.

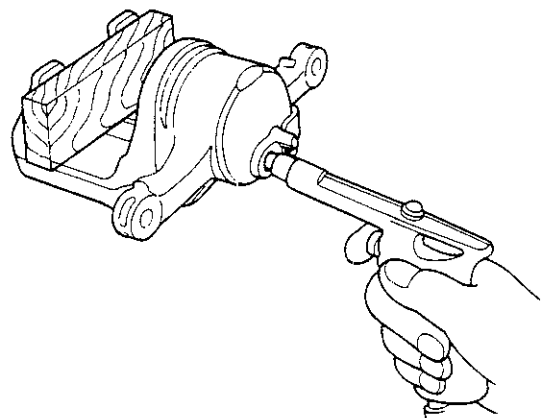


3. If necessary, apply compressed air to the caliper fluid inlet to get the piston out. Place shop rag or wooden block as shown to cushion the piston when it is expelled.

WARNING

- Do not place your fingers in front of the piston.
- Do not use high air pressure.

NOTE: Use low pressure air in short spurts.

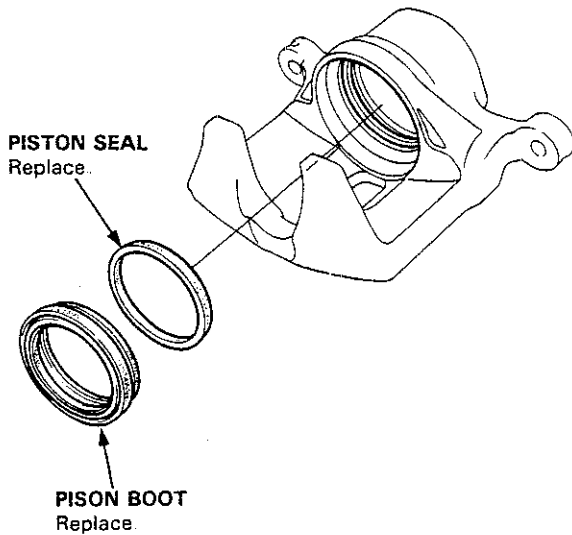


4. Remove the piston from the caliper.



5. Remove the piston boot and piston seal.

CAUTION: Be careful not to damage the caliper cylinder wall.



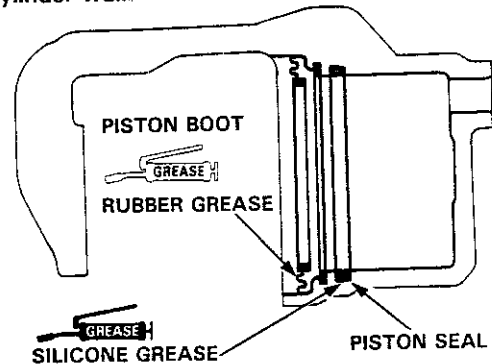
Reassembly

CAUTION:

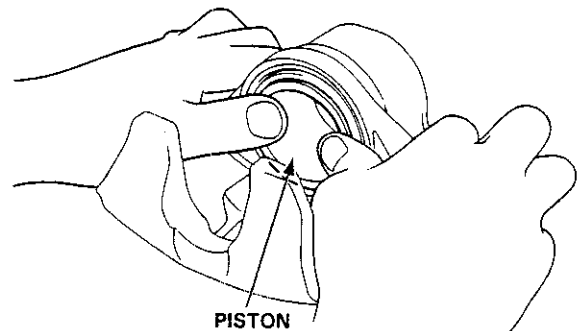
- Do not spill brake fluid on the car; it may damage the paint; if brake fluid does contact the paint, wash it off immediately with water.
- Before reassembling, check that all parts are free of dust and other foreign particles.
- Replace parts with new ones whenever specified to do so.
- Make sure no dirt or other foreign matter is allowed to contaminate the brake fluid.
- Do not mix different brands of brake fluid as they may not be compatible.
- Do not reuse the drained fluid. Use only clean DOT 3 or 4 brake fluid.

1. Clean the piston and caliper bore with brake fluid and inspect for wear or damage.
2. Coat a new piston seal with silicone grease and install it in the cylinder groove.
3. Apply brake cylinder grease (P/N: 08733-B020E) or equivalent rubber grease to the sealing lips and inside of a new piston boot, and install the boot in the cylinder groove.

CAUTION: Be careful not to damage the caliper cylinder wall.



4. Lubricate the caliper cylinder and piston with brake fluid then install the piston in the cylinder with the dished end facing in.



(cont'd)

Front Caliper

Reassembly (cont'd)

5 Apply silicone grease to the sliding surface of the pin and inside of the new pin boot.

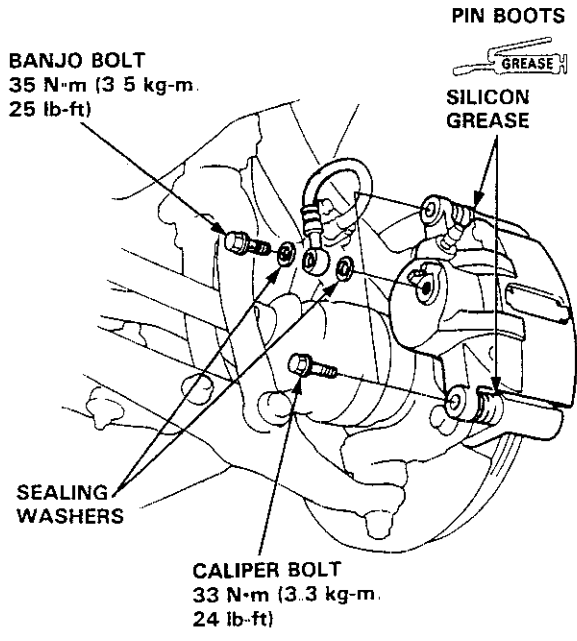
6. Install the pin boot into the groove in the caliper bracket, then install the pin into the caliper bracket.

NOTE: Install the pin boot into the groove in the pin properly.

7. Install the brake pad retainers and brake pads in their original positions.

8 Install the caliper on the caliper bracket and tighten the caliper bolts

9. Connect the brake hose to the caliper with new sealing washers and tighten the banjo bolt



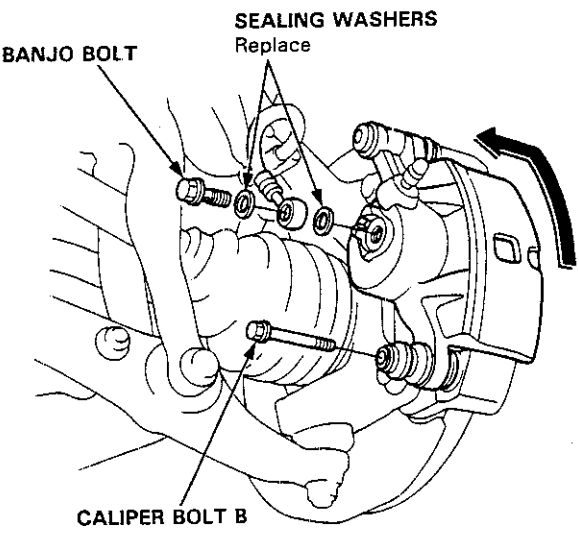
10. Fill the brake reservoir up and bleed the brake system (page 19-17).

Front Caliper (KY only)

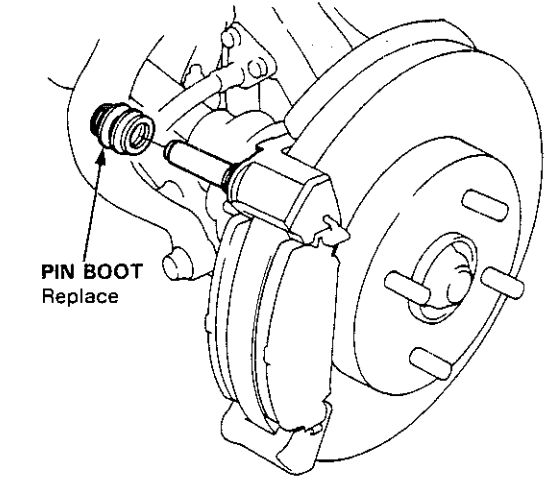
Disassembly

- CAUTION:**
- Do not spill brake fluid on the car; it may damage the paint; if brake fluid does contact the paint, wash it off immediately with water.
 - To prevent spills, cover the hose joints with rags or shop towels.
 - Clean all parts in brake fluid and air dry; blow out all passages with compressed air.

- 1 Remove the banjo bolt and disconnect the brake hose from the caliper.
2. Remove caliper bolt B and pivot the caliper up out of the way then remove the caliper from bracket.

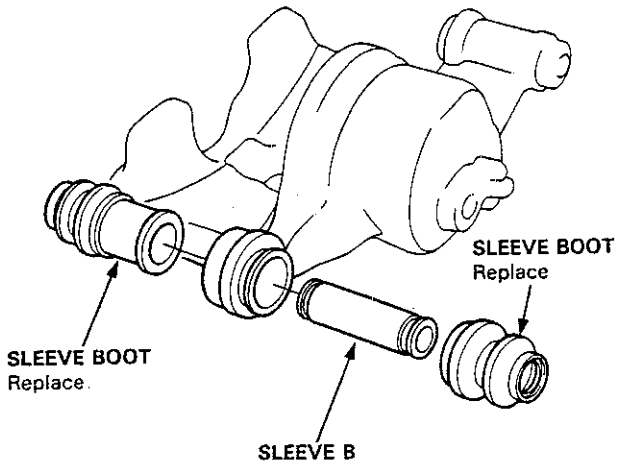


3. Remove the pin boot from the caliper bracket.





4. Remove the sleeve B and sleeve boots from the caliper

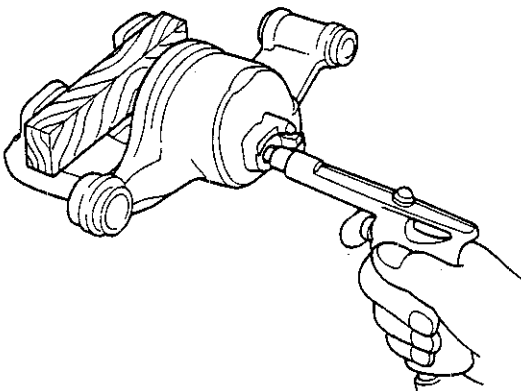


5. If necessary, apply compressed air to the caliper fluid inlet to get the piston out. Place a shop rag or wooden block as shown to cushion the piston when it is expelled.

⚠ WARNING

- Do not place your fingers in front of the piston
- Do not use high air pressure.

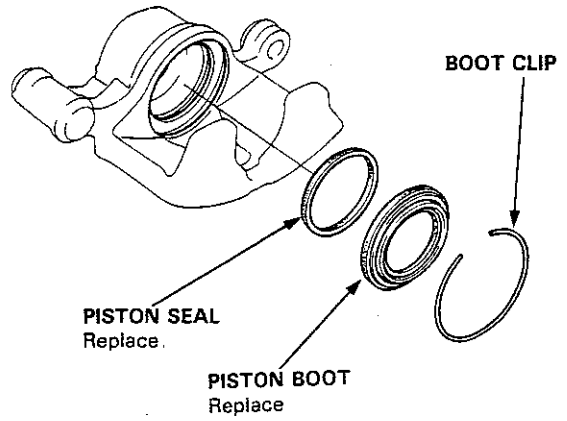
NOTE: Use low pressure air in short spurts.



6. Remove the piston from the caliper.

7. Remove the boot clip, piston boot and piston seal.

CAUTION: Be careful not to damage the caliper cylinder wall.



Front Caliper (KY only)

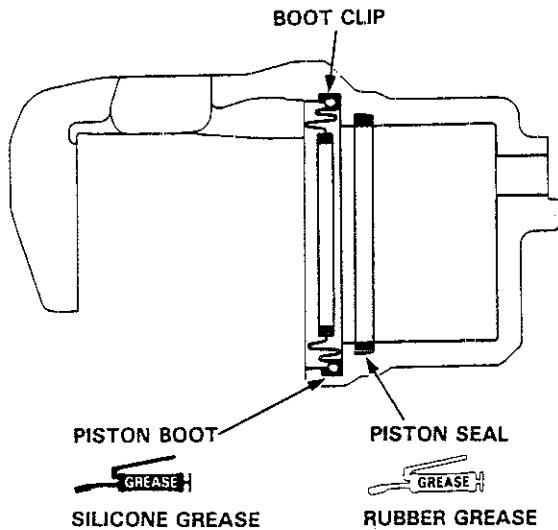
Reassembly

CAUTION:

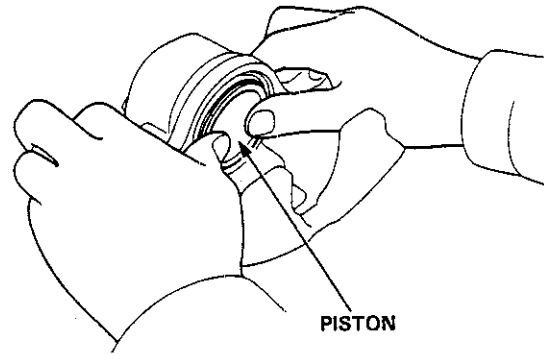
- Do not spill brake fluid on the car; it may damage the paint; if brake fluid does contact the paint, wash it off immediately with water.
- Before reassembling, check that all parts are free of dust and other foreign particles.
- Replace parts with new ones whenever specified to do so.
- Make sure no dirt or other foreign matter is allowed to contaminate the brake fluid.
- Do not mix different brands of brake fluid as they may not be compatible.
- Do not reuse the drained fluid. Use only clean DOT 3 or 4 brake fluid.

1. Clean the piston and caliper bore with brake fluid and inspect for wear or damage.
2. Coat a new piston seal with brake cylinder grease (P/N: 08733-B020E) or equivalent rubber grease and install it in the cylinder groove.
3. Apply silicone grease to the sealing lips and inside of a new piston boot, install the boot in the cylinder groove and secure it with the boot clip

CAUTION: Be careful not to damage the caliper cylinder wall.

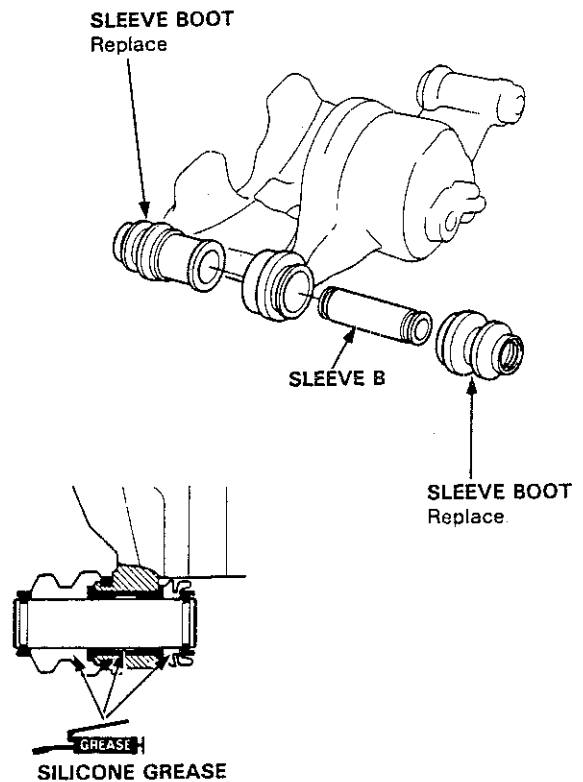


4. Lubricate the caliper cylinder and piston with brake fluid, then install the piston in the cylinder with the dished end facing in.



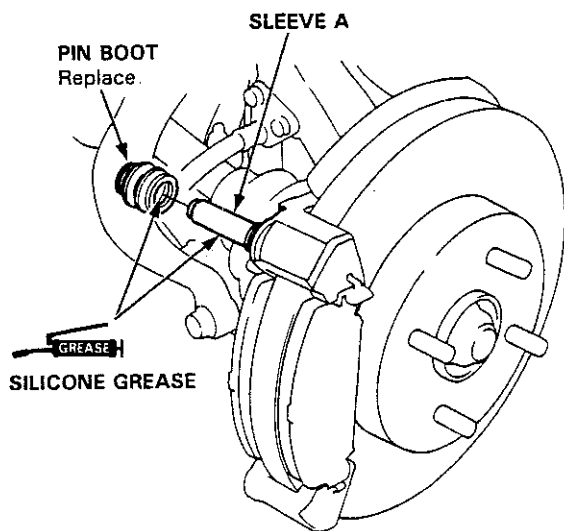
5. Apply silicone grease to the sliding surface of sleeve B and the inside of new pin and sleeve boots
6. Install the sleeve boot and sleeve B on the caliper

NOTE: Be sure to install the boots into the grooves in the caliper and sleeve B properly



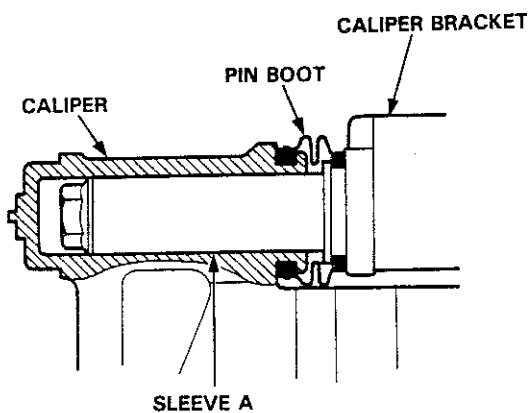


7. Apply silicone grease to the sliding surface of sleeve A and the inside of a new pin boot
8. Install the pin boot into the groove in the caliper bracket.
9. Install the brake pad retainers and brake pads in their original positions.

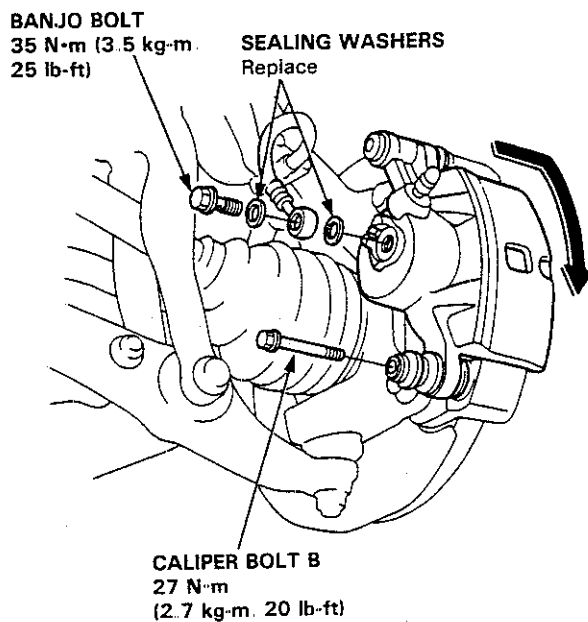


10. Install the caliper onto sleeve A, pivot it down into position.

NOTE: Install the pin boot into the groove in the caliper properly.



11. Connect the brake hose to the caliper with new sealing washers and tighten the banjo bolt.
12. Tighten the caliper bolt B.



13. Fill the brake reservoir up and bleed the brake system (page 19-17).

Front Brake Disc

Runout Inspection

1. Loosen the front wheel lug nuts slightly, then raise the car and support on safety stands. Remove the front wheels

NOTE: Do not open or close the power roof when the car is raised by using the safety stands.

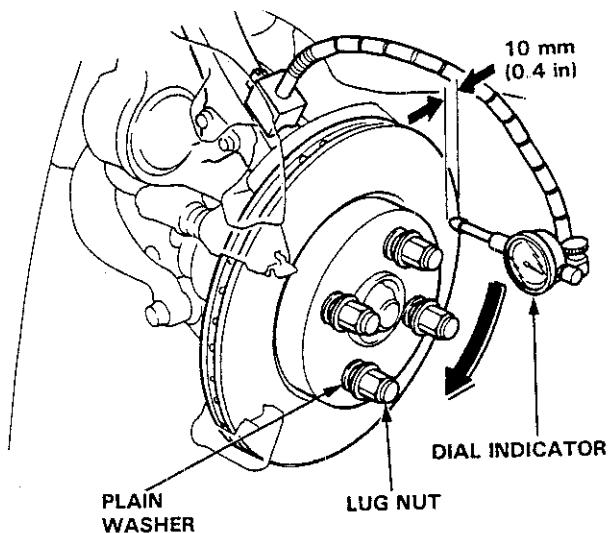
2. Remove the brake pads (page 19-8).
3. Inspect the disc surface for cracks, and rust. Clean the disc thoroughly and remove all rust
4. Use lug nuts and suitable plain washers to hold the disc securely against the hub, then mount a dial indicator as shown and measure the runout at 10 mm (0.4 in) from the outer edge of the disc.

Brake Disc Runout:

Service Limit: 0.10 mm (0.004 in)

Max. Refinishing Limit: 19.0 mm (0.75 in)

5. If the disc is beyond the service limit, refinish the rotor with an on-car brake lathe. The Kwik-Lathe produced by Kwik-Way Manufacturing Co. and the "Front Brake Disc Lathe" offered by Snap-on Tools Co. are approved for this operation



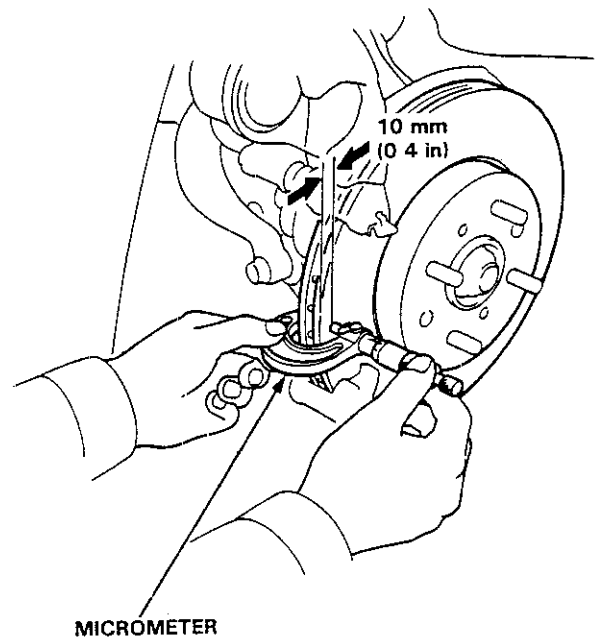
NOTE: A new disc should be refinished if its runout is greater than 0.10 mm (0.004 in).

Thickness and Parallelism Inspection

1. Loosen the front wheel lug nuts slightly, then raise the car and support on safety stands. Remove the front wheels

NOTE: Do not open or close the power roof when the car is raised by using the safety stands.

2. Remove the brake pads (page 19-8).
3. Using a micrometer, measure disc thickness at eight points, approximately 45° apart and 10 mm (0.4 in) in from the outer edge of the disc.



Brake disc thickness:

Standard: 21.0 mm (0.83 in)

Max. Refinishing Limit: 19.0 mm (0.75 in)

Brake Disc Parallelism:

The difference between any thickness measurements should not be more than 0.015 mm (0.0006 in).

4. If the disc is beyond the service limit for parallelism, refinish the rotor with an on-car brake lathe. The Kwik-Lathe produced by Kwik-Way Manufacturing Co. and the "Front Brake Disc Lathe" offered by Snap-on Tools Co. are approved for this operation



Bleeding

CAUTION:

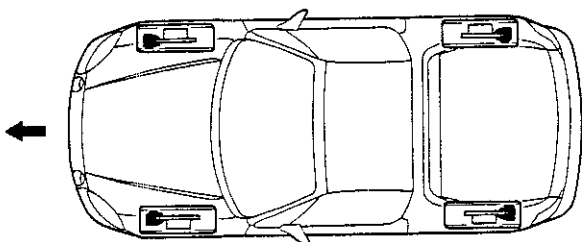
- Use only clean DOT 3 or 4 brake fluid.
- Make sure no dirt or other foreign matter is allowed to contaminate the brake fluid.
- Do not mix different brands of brake fluid as they may not be compatible.
- Do not spill brake fluid on the car, it may damage the paint; if brake fluid does contact the paint, wash it off immediately with water.

NOTE: The reservoir on the master cylinder must be full at the start of bleeding procedure, and checked after bleeding each brake caliper. Add fluid as required. Use only clean DOT 3 or 4 brake fluid.

BLEEDING SEQUENCE:

④ Front Right

① Rear Right

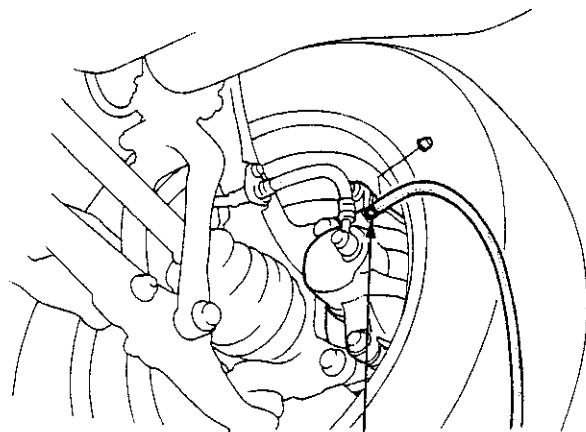


② Front Left

③ Rear Left

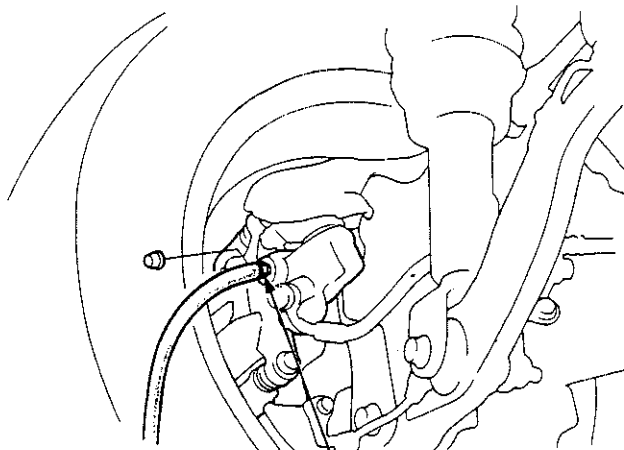
1. Have someone slowly pump the brake pedal several times, then apply steady pressure.
2. Loosen the brake bleed screw to allow air to escape from the system. Then tighten the bleed screw securely.
3. Repeat the procedure for each wheel in the sequence shown above, until air bubbles no longer appear in the fluid.

FRONT:



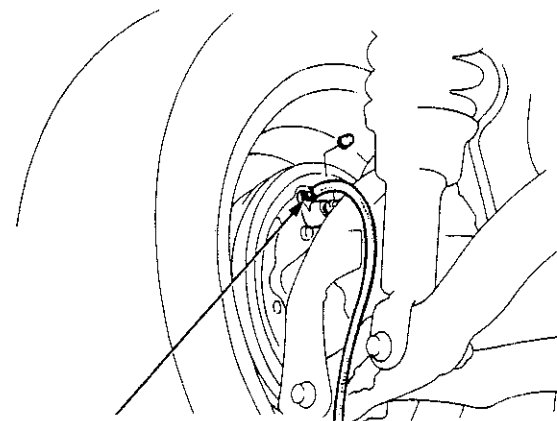
BLEED SCREW
9 N·m (0.9 kg-m, 6.5 lb-ft)

REAR: (Disc Brake)



BLEED SCREW
9 N·m (0.9 kg-m, 6.5 lb-ft)

REAR: (Drum Brake)



BLEED SCREW
7 N·m (0.7 kg-m, 5.1 lb-ft)

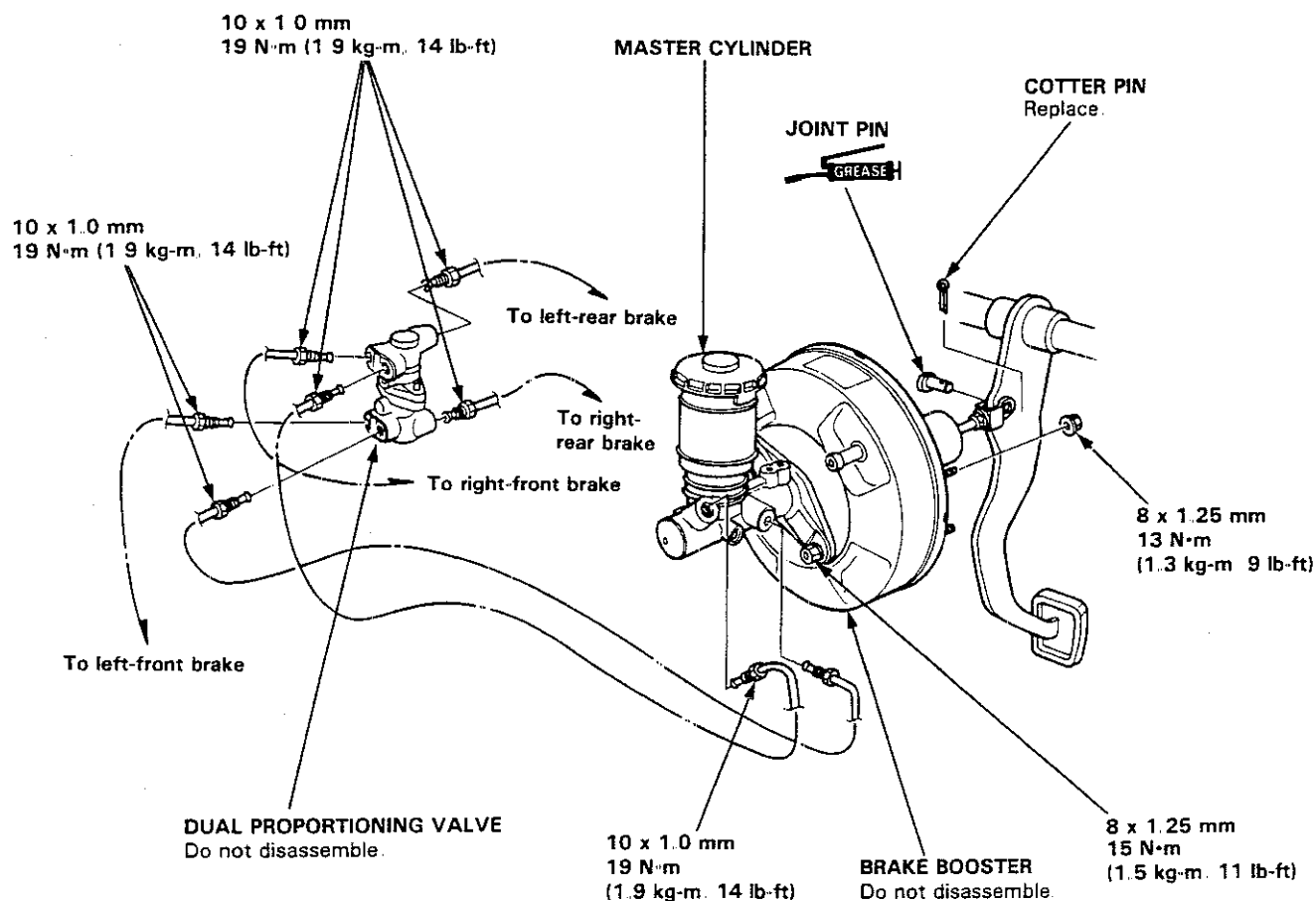
Master Cylinder and Brake Booster

Removal/Installation

CAUTION:

- Be careful not to bend or damage the brake pipes when removing the master cylinder.
- Do not spill brake fluid on the car; it may damage the paint; if brake fluid does contact the paint, wash it off immediately with water.
- To prevent spills, cover the hose joints with rags or shop towels.
- Before reassembling, check that all parts are free of dust and other foreign particles.
- Make sure no dirt or other foreign matter is allowed to contaminate the brake fluid.
- Do not mix different brands of brake fluid as they may not be compatible.
- Do not reuse the drained fluid. Use only clean DOT 3 or 4 brake fluid.
- When connecting the brake pipes, make sure that there is no interference between the brake pipes and other parts.
- Do not disassemble the booster. Replace it as complete assembly.

1. Drain the brake fluid from the master cylinder.
2. Disconnect the brake fluid level switch connectors.
3. Disconnect the brake pipes from the master cylinder.
4. Remove the master cylinder mounting nuts and the master cylinder.
5. Disconnect the vacuum hose from the brake booster and remove the check valve bracket.
6. Remove the cotter pin and joint pin.
7. Remove the booster mounting nuts and the brake booster.



8. Install the brake booster and master cylinder in the reverse order of removal.

NOTE: Before installing the master cylinder, check and adjust the pushrod clearance (page 19-24).

9. After installation, check and adjust the brake pedal height (page 19-4)
10. Fill and bleed the brake system (page 19-17)



Master Cylinder



Index/Inspection

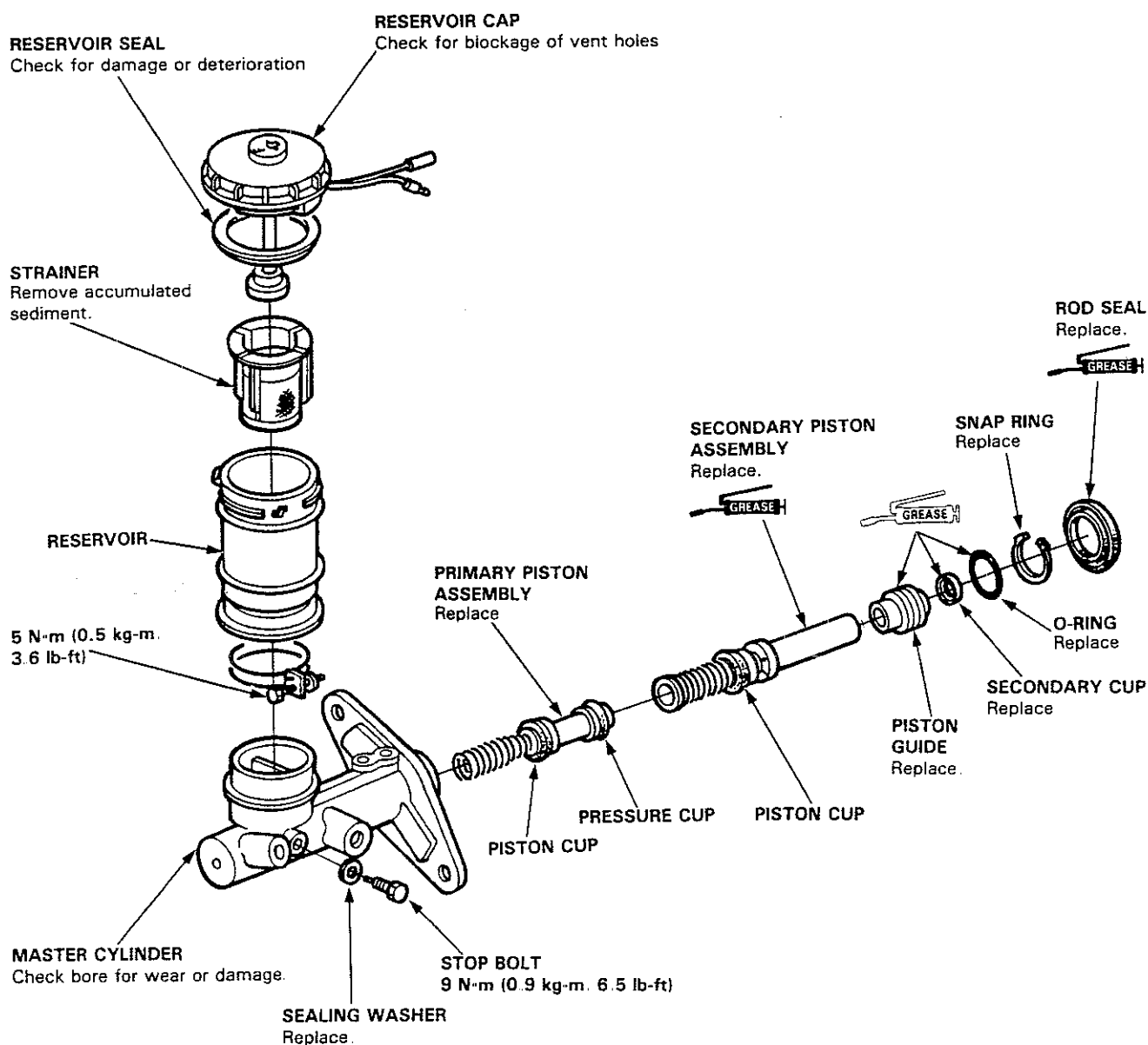
CAUTION:

- Do not spill brake fluid on the car. It may damage the paint; if brake fluid does contact the paint, wash it off immediately with water.
- Clean all parts in brake fluid and air dry; blow out all passages with compressed air.
- Before reassembling, check that all parts are free of dust and other foreign particles.
- Replace parts with new ones whenever specified to do so.
- Make sure no dirt or other foreign matter is allowed to contaminate the brake fluid.
- Do not mix different brands of brake fluid as they may not be compatible.
- Do not reuse the drained fluid. Use only clean DOT 3 or 4 brake fluid.
- Replace the master cylinder if the bore is damaged or worn. Do not hone or attempt to refinish the bore.

NOTE:

- Coat piston cup, pressure cup and master cylinder bore with clean brake fluid.
- Replace all rubber parts with new ones whenever disassembled.

 : Brake cylinder grease (P/N: 08733--B020E) or equivalent rubber grease.  : Silicone grease



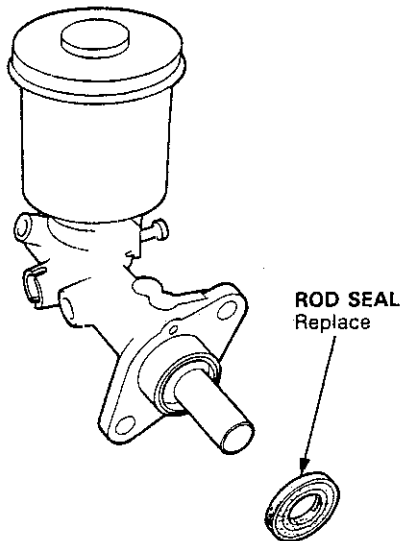
Master Cylinder

Disassembly

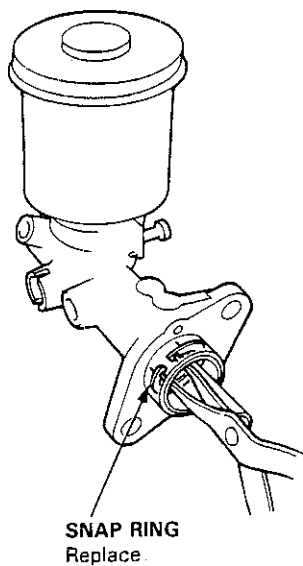
CAUTION:

- Do not spill brake fluid on the car; it may damage the paint; if brake fluid does contact the paint, wash it off immediately with water.
- Clean all parts in brake fluid and air dry; blow out all passages with compressed air

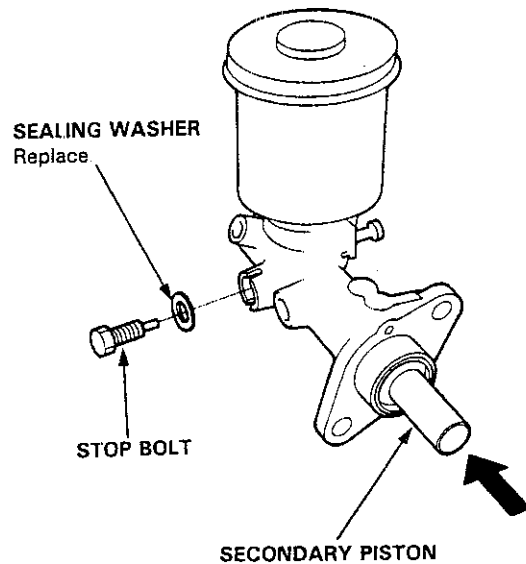
1. Remove the rod seal



2. Push the secondary piston assembly, then remove the snap ring.



3. Remove the stop bolt while pushing in the secondary piston assembly.



4. Remove the piston guide, secondary piston assembly and primary piston assembly.

NOTE: If the primary piston assembly is difficult to remove, apply compressed air from the primary piston side port

CAUTION:

- Do not use high pressure air or bring the nozzle too close to the port.
- Place a shop rag over the master cylinder to prevent the primary piston from becoming a projectile.

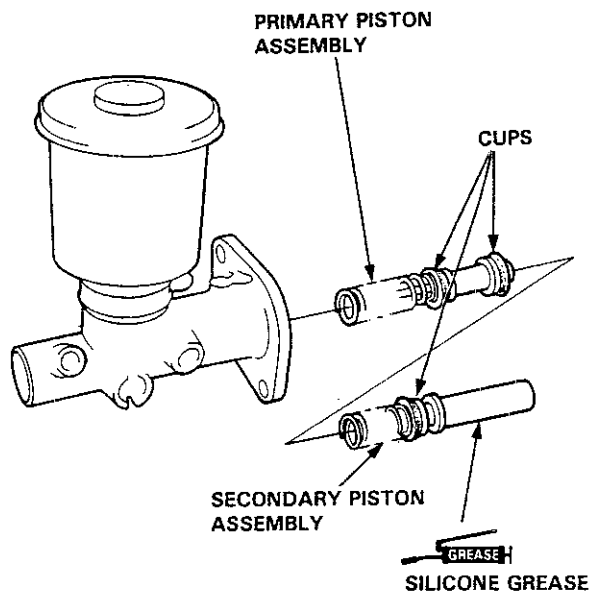


Reassembly

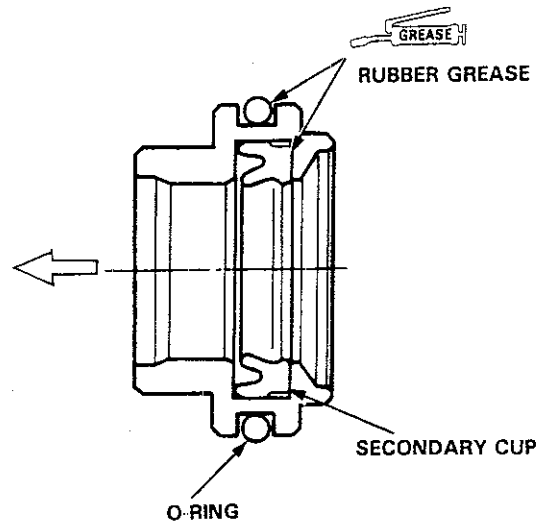
CAUTION:

- Do not spill brake fluid on the car; it may damage the paint; if brake fluid does contact the paint, wash it off immediately with water.
- Before reassembling, check that all parts are free of dust and other foreign particles.
- Replace parts with new ones whenever specified to do so.
- Make sure no dirt or other foreign matter is allowed to contaminate the brake fluid.
- Do not mix different brands of brake fluid as they may not be compatible.
- Do not reuse the drained fluid. Use only clean DOT 3 or 4 brake fluid.

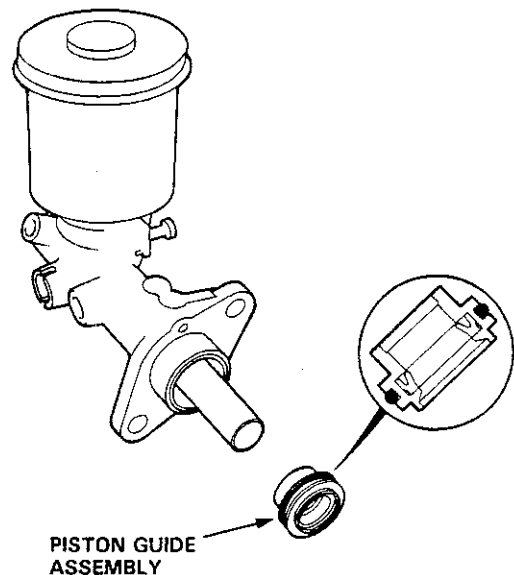
1. Apply silicone grease to a new secondary piston
2. Lubricate the cups of new primary and secondary piston assemblies with brake fluid, and install them into the master cylinder.



3. Apply brake cylinder grease (P/N: 08733--B020E) or equivalent rubber grease to new O-ring and secondary cup and install them onto the piston guide.



4. Install the piston guide assembly into the master cylinder.

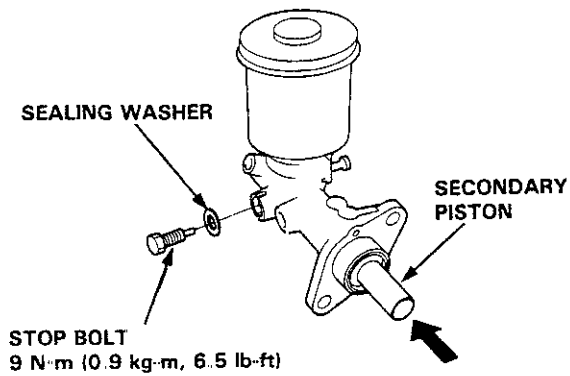


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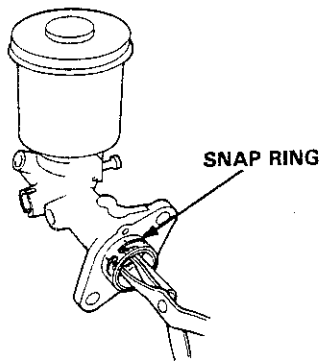
Master Cylinder

Reassembly (cont'd)

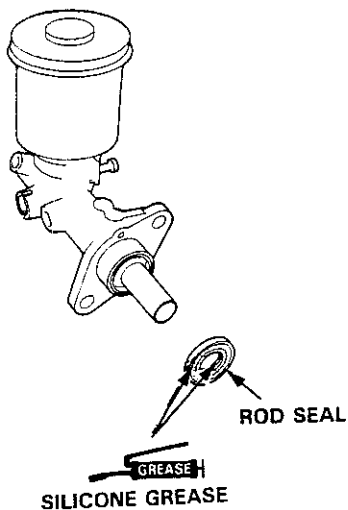
5. Install the stop bolt with a new sealing washer while pushing in the secondary piston, and tighten the stop bolt



6. Install a new snap ring while pushing in the secondary piston.



7. Apply silicone grease to a new rod seal and install the seal onto the master cylinder.

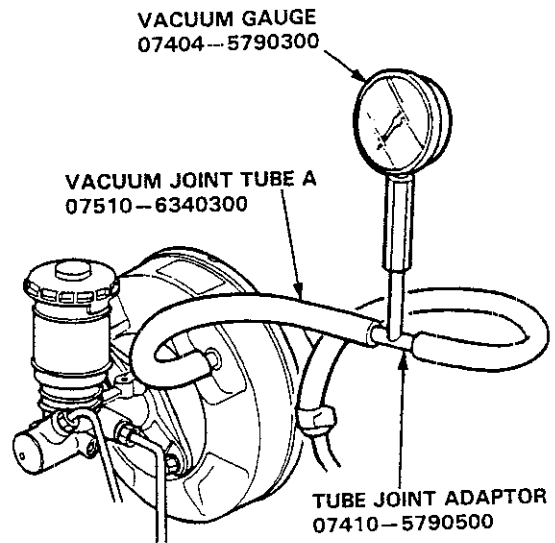


Brake Booster

Tests

LEAK TEST

1. Install the brake power kit (07504-6340100) as shown.



2. Start the engine, adjust the engine speed with the accelerator pedal so that the vacuum gauge readings show 300-500 mmHg (11.8-19.7 inHg), then stop the engine
3. Read the vacuum gauge.

If the vacuum readings decrease 20 mmHg (0.8 inHg) or more after 30 seconds, check following parts for leaks

- Check valve
- Vacuum hose pipe
- Seals
- Diaphragm
- Master cylinder rod seal and cup

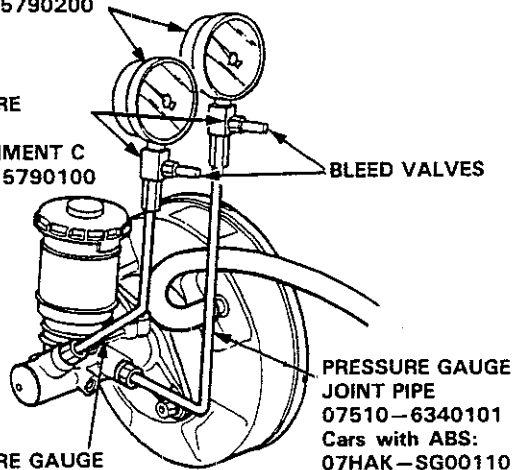


FUNCTION TEST

1. Install the vacuum gauge as same the leak test.
2. Connect the oil pressure gauges to the master cylinder using the attachments as shown.
3. Bleed air through the valves.

PRESSURE GAUGES
07406-5790200

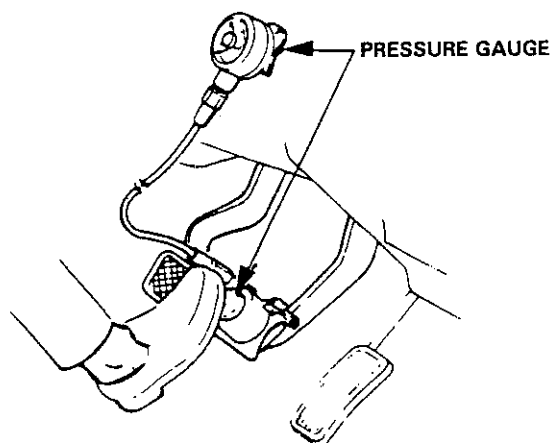
PRESSURE GAUGE ATTACHMENT C
07410-5790100



PRESSURE GAUGE JOINT PIPE
07510-6340101

PRESSURE GAUGE JOINT PIPE
07510-6340101
Cars with ABS:
07HAK-SG00110

4. Start the engine
5. Depress the brake pedal with a 200 N (20 kg, 44 lbs) of pressure. The following pressures should be observed at the pressure gauges in each vacuum.



Cars without ABS (KY only)

Vacuum mm (in) Hg	Mim. Line Pressure kPa (kg/cm ² , psi)
0 (0)	140 (14.0, 199)
300 (11.8)	621 (62.1, 883)
500 (19.7)	836 (83.6, 1,189)

Cars without ABS (Others)

Vacuum mm (in) Hg	Mim. Line Pressure kPa (kg/cm ² , psi)
0 (0)	121 (12.1, 172)
300 (11.8)	536 (53.6, 762)
500 (19.7)	786 (78.6, 1,118)

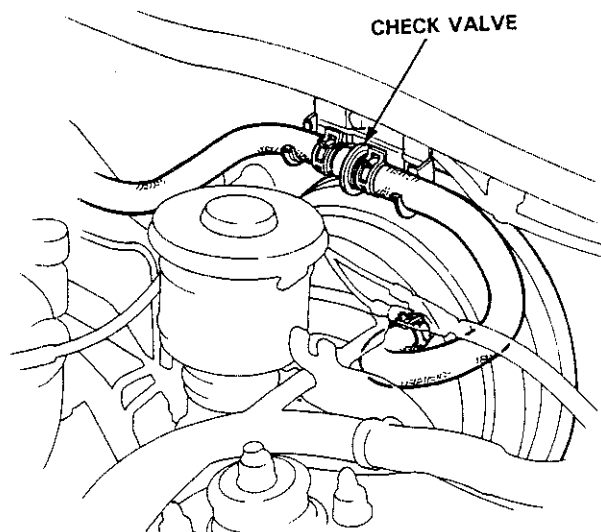
Cars with ABS

Vacuum mm (in) Hg	Mim. Line Pressure kPa (kg/cm ² , psi)
0 (0)	83 (8.3, 118)
300 (11.8)	548 (54.8, 779)
500 (19.7)	825 (82.5, 1,173)

6. Inspect the master cylinder pistons and cups if the readings do not fall within the limits shown above.

CHECK VALVE TEST

1. Disconnect the brake booster vacuum hose at the booster.
2. Start the engine and let it idle. There should be vacuum available. If no vacuum is available, the check valve is not working correctly. Replace the check valve and retest.

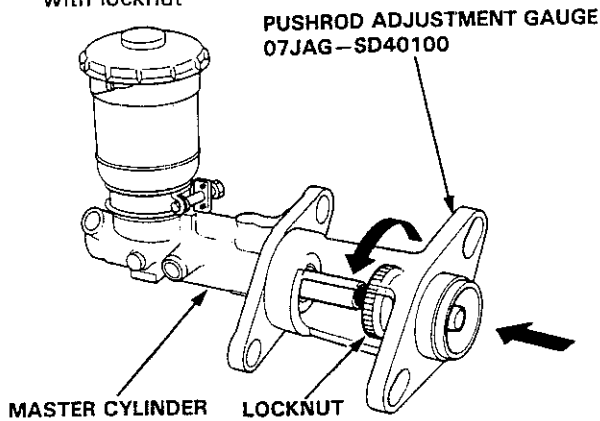


Brake Booster

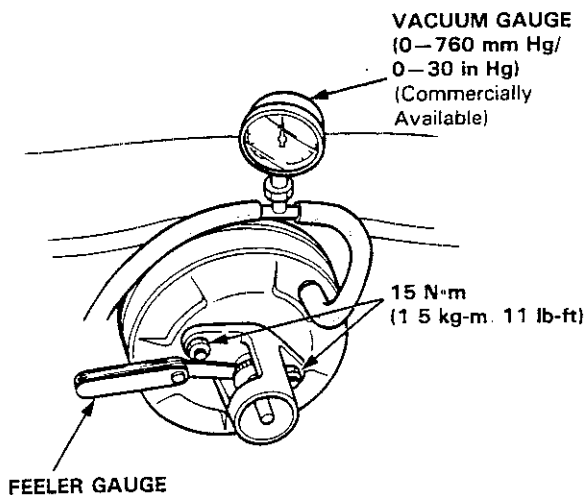
Pushrod Clearance Adjustment

NOTE: Master cylinder pushrod-to-piston clearance must be checked and adjustments made, if necessary, before installing master cylinder.

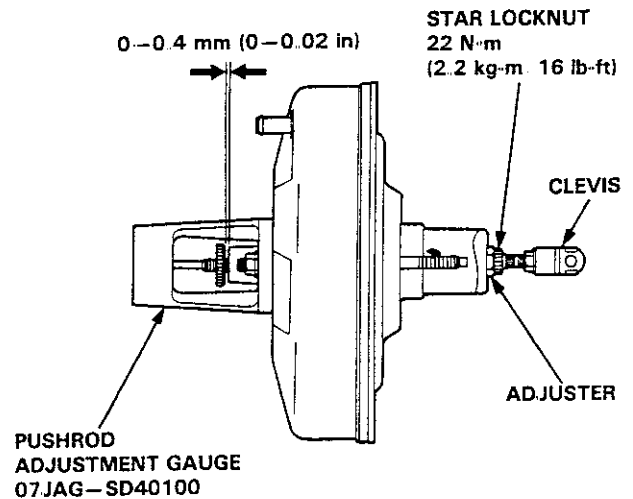
1. Set the special tool on the master cylinder body; push in the center shaft until the top of it contacts with the end of the secondary piston and lock it with locknut



2. Without disturbing the adjusting bolt's position, install the special tool upside down on the booster
3. Install the master cylinder nuts and tighten to the specified torque.
4. Connect the booster in-line with a vacuum gauge (0-760 mm Hg/0-30 in Hg) to the booster's engine vacuum supply, and maintain a engine speed that will deliver 500 mm Hg (20 in Hg) vacuum
5. With a feeler gauge, measure the clearance between the gauge body and the adjusting nut as shown
Clearance: 0-0.4 mm (0-0.02 in)

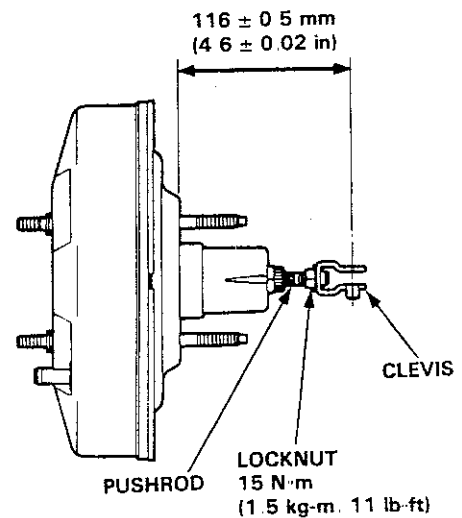


6. If clearance is incorrect, loosen the star locknut and turn the adjuster in or out to adjust. Hold the clevis while adjusting.
7. Tighten the star locknut securely. Remove the special tool and install a new master cylinder rod seal in the booster.



NOTE: If the clearance between the gauge body and adjusting nut is 0.4 mm (0.02 in), the pushrod-to-piston clearance is 0 mm. If the clearance between the gauge body and adjusting nut is 0 mm, the pushrod-to-piston clearance is 0.4 mm (0.02 in), or more. Therefore, it must be adjusted and rechecked.

8. Adjust the pushrod length as shown if necessary





Rear Disc Brakes

Torque/Inspection

WARNING

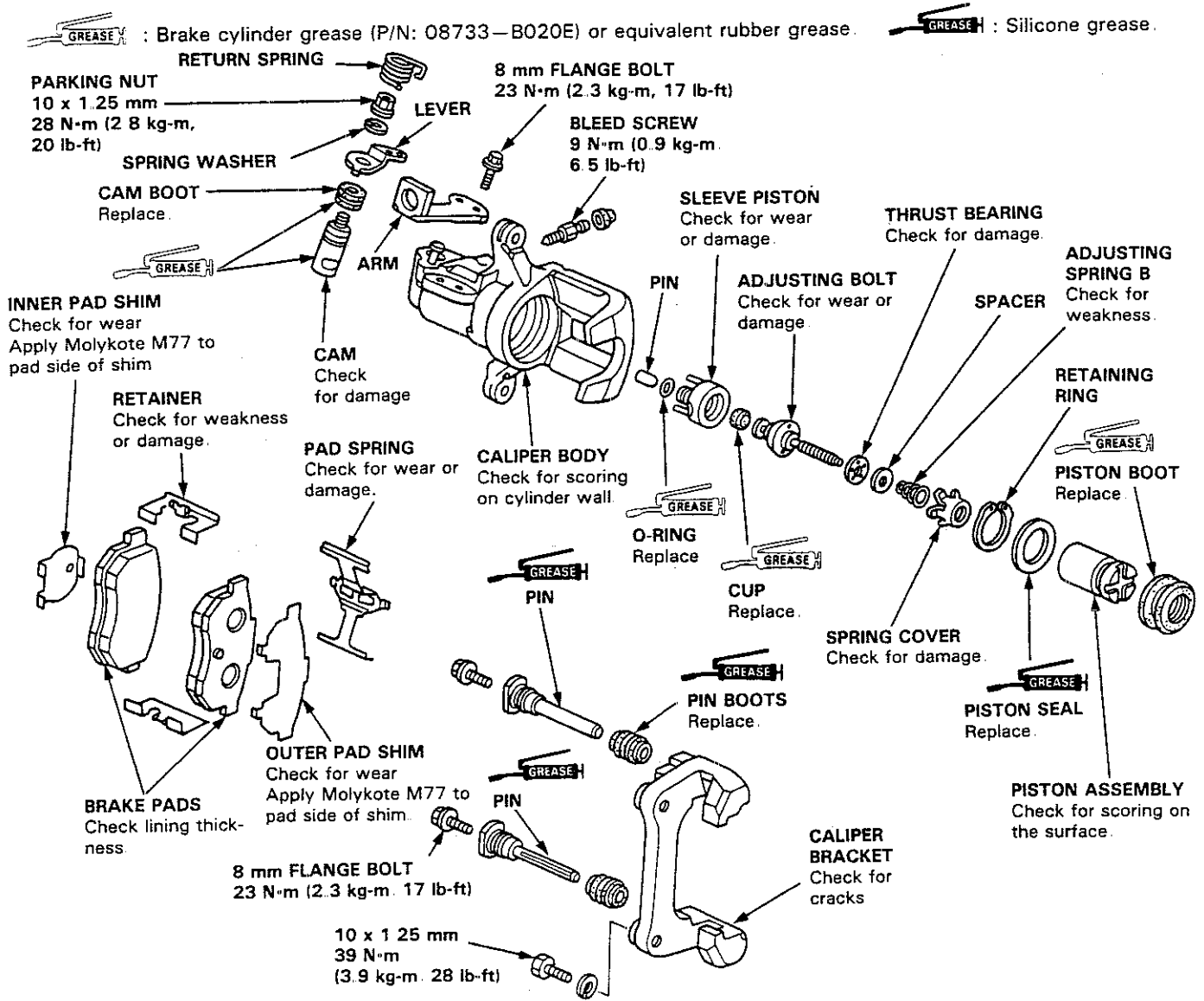
- Never use an air hose or dry brush to clean brake assemblies.
- Use a vacuum cleaner to avoid breathing brake dust
- Contaminated brake discs or pads reduce stopping ability.

CAUTION:

- Do not spill brake fluid on the car; it may damage the paint; if brake fluid does contact the paint, wash it off immediately with water.
- To prevent spills, cover the hose joints with rags or shop towels
- Clean all parts in brake fluid and air dry; blow out all passage with compressed air.
- Before reassembling, check that all parts are free of dust and other foreign particles.
- Replace parts with new ones whenever specified to do so.
- Make sure no dirt or other foreign matter is allowed to contaminate the brake fluid.
- Do not mix different brands of brake fluid as they may not be compatible.
- Do not reuse the drained fluid. Use only clean DOT 3 or 4 brake fluid

NOTE:

- Coat piston, piston seal, and caliper bore with clean brake fluid.
- Replace all rubber parts with new ones whenever disassembled.



Rear Brake pads

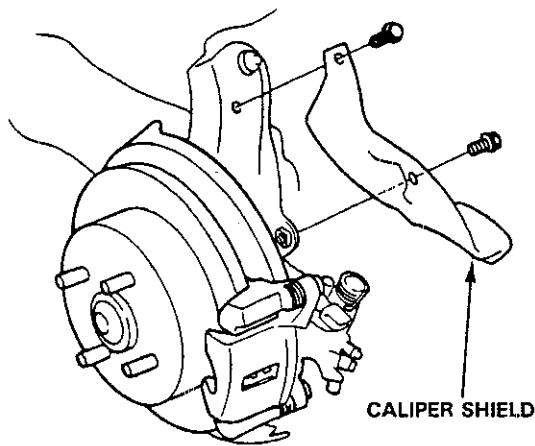
Inspection/Replacement

⚠ WARNING

- Never use an air hose or dry brush to clean brake assemblies.
- Use a vacuum cleaner, to avoid breathing brake dust.

NOTE: Do not open or close the power roof when the car is raised by using the safety stands.

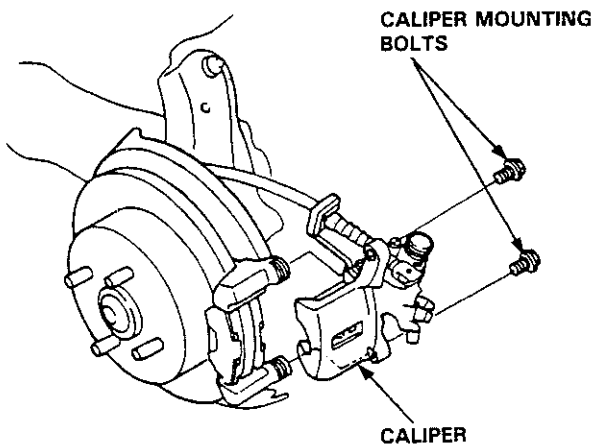
1. Block the front wheels, loosen the rear wheel lug nuts slightly, support the rear of car on safety stands, then remove the rear wheels.
2. Release the parking brake and remove the caliper shield.



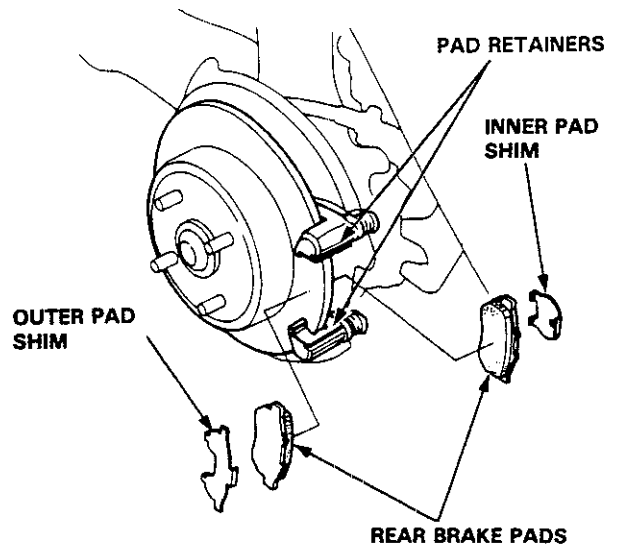
3. Remove the two caliper mounting bolts and the caliper from the bracket.

CAUTION:

- Thoroughly clean the outside of the caliper to prevent dust and dirt from entering inside.
- Support the caliper with a piece of wire so that it does not hang from the brake hose.



4. Remove the pad shims, pads and pad retainers.

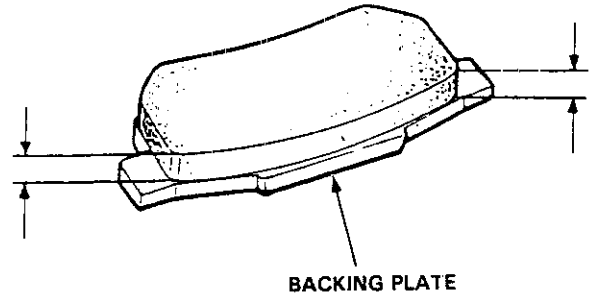


5. Using vernier calipers, measure the thickness of each brake pad lining.

Brake Pad Thickness:

Standard: 7.5 mm (0.30 in)

Service Limit: 1.6 mm (0.06 in)

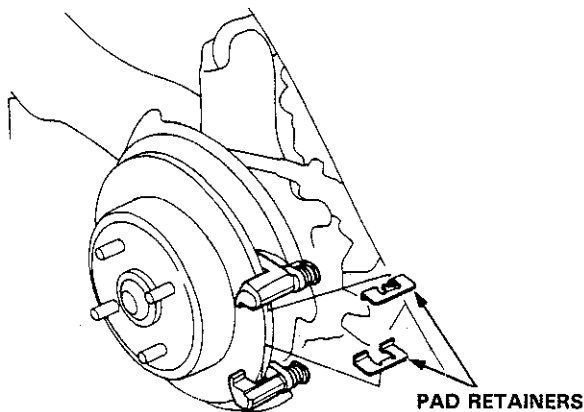


NOTE: Measurement does not include pad backing plate thickness.

6. If lining thickness is less than service limit, replace the rear pads as a set.



- 7 Clean the caliper thoroughly; remove any rust, and check for grooves or cracks.
8. Make sure that the pad retainers are installed in the correct positions.



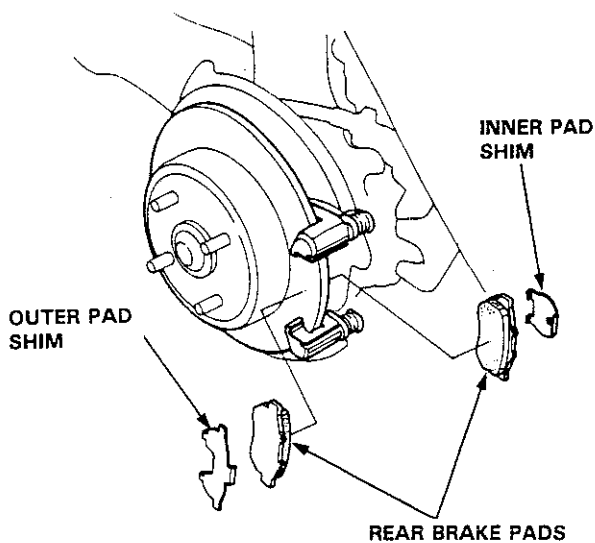
9. Install the brake pads and pad shims on caliper bracket.

▲ WARNING

- When reusing the pads, always reinstall the brake pads in their original positions to prevent loss of braking efficiency.
- Contaminated brake discs or pads reduce stopping ability. Keep grease off the discs and pads

NOTE:

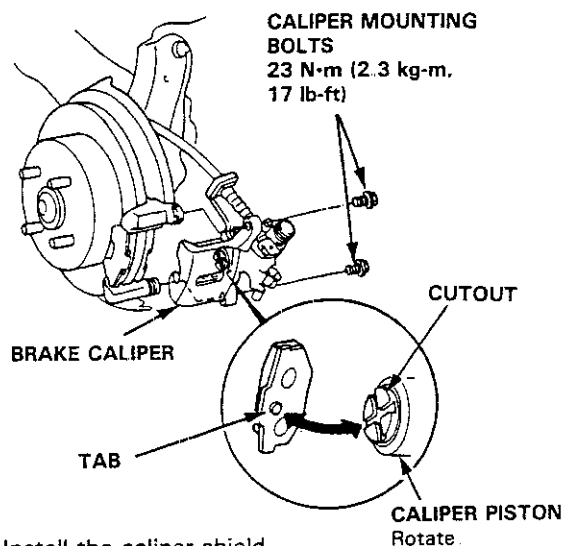
- Apply Molykote M77 to the pad side of the shims. Wipe excess grease off the shims
- Install the inner pad with its wear indicator facing downward



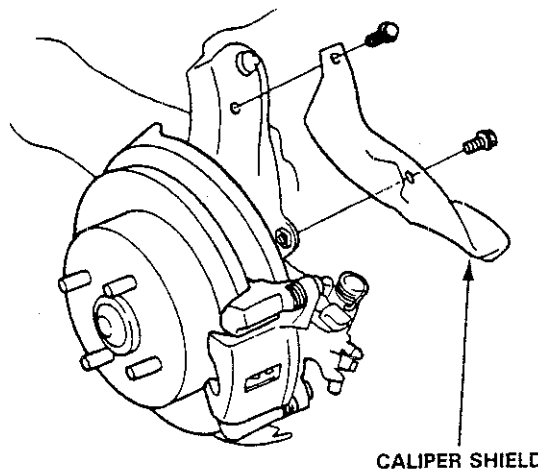
- 10 Rotate the caliper piston clockwise into place in the cylinder, then align the cutout in the piston with the tab on the inner pad by turning the piston back

CAUTION: Lubricate the boot with silicone grease to avoid twisting the piston boot. If piston boot is twisted, back it out so it sits properly.

11. Install the brake caliper and tighten the caliper mounting bolts.



- 12 Install the caliper shield.



13. Depress the brake pedal several times to make sure the brakes work, then road-test

NOTE: Engagement of the brake may require a greater pedal stroke immediately after the brake pads have been replaced as a set. Several application of the brake pedal will restore the normal pedal stroke.

Rear Brake Disc

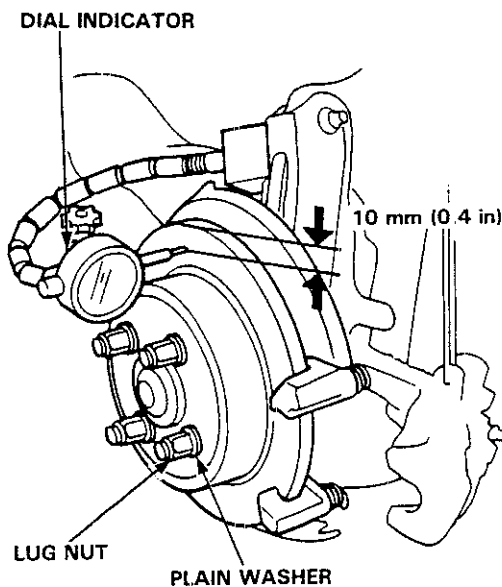
Runout Inspection

1. Loosen the rear wheel lug nuts slightly, then raise the car and support on safety stands.

NOTE: Do not open or close the power roof when the car is raised by using the safety stands

2. Remove the rear wheels then remove the brake pads (page 19-26)
3. Inspect the disc surface for grooves, cracks, and rust. Clean the disc thoroughly and remove all rust.
4. Use lug nuts and suitable plain washers to hold the disc securely against the hub, then mount a dial indicator as shown and measure the runout at 10 mm (0.4 in) from the outer edge of the disc.

Brake Disc Runout:
Service Limit: 0.15 mm (0.006 in)



5. If the disc is beyond the service limit, refinish the rotor.

Max. Refinishing Limit: 8.0 mm (0.31 in)

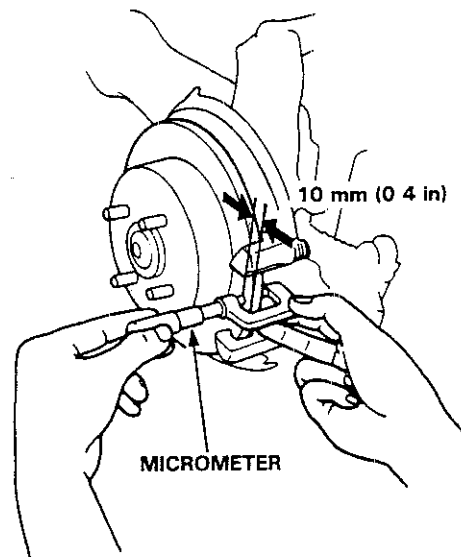
NOTE: A new disc should be refinished if its runout is greater than 0.1 mm (0.004 in).

Thickness and Parallelism Inspection

1. Loosen the rear wheel lug nuts slightly, then raise the car and support on safety stands.

NOTE: Do not open or close the power roof when the car is raised by using the safety stands

2. Remove the rear wheels then remove the brake pads (page 19-26).
3. Using a micrometer, measure disc thickness at eight points, approximately 45° apart and 10 mm (0.4 in) in from the outer edge of the disc.



Brake Disc Thickness:
Standard: 9.0 mm (0.35 in)
Max. Refinishing Limit: 8.0 mm (0.31 in)

Brake Disc Parallelism:
The difference between any thickness measurements should not be more than 0.015 mm (0.0006 in).

4. If the disc is beyond the service limit, for thickness or parallelism, refinish the rotor.



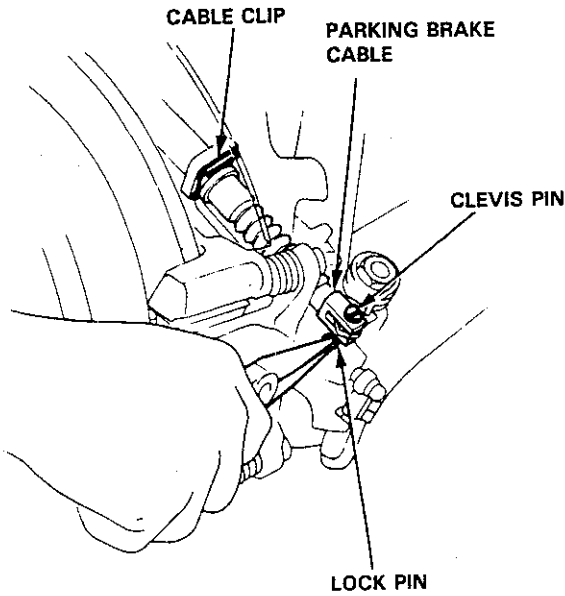
Rear Caliper

Disassembly

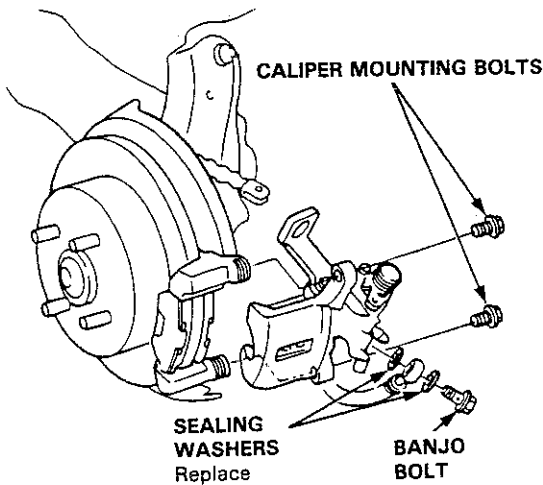
CAUTION:

- Do not spill brake fluid on the car; it may damage the paint; if brake fluid does contact the paint, wash it off immediately with water.
- To prevent spills, cover the hose joints with rags or shop towels.
- Clean all parts in brake fluid and air dry; blow out all passages with compressed air.

- 1 Remove the caliper shield (page 19-26)
- 2 Remove the lock pin and clevis pin. Remove the cable clip and disconnect the cable from the arm

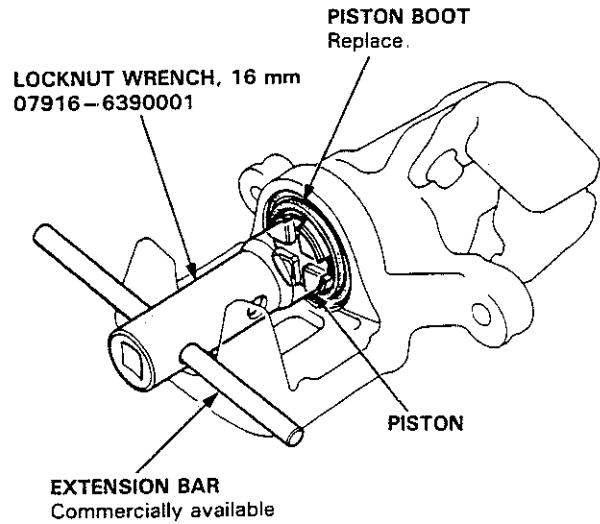


- 3 Remove the banjo bolt and two sealing washers
- 4 Remove the two caliper mounting bolts and caliper body from the bracket



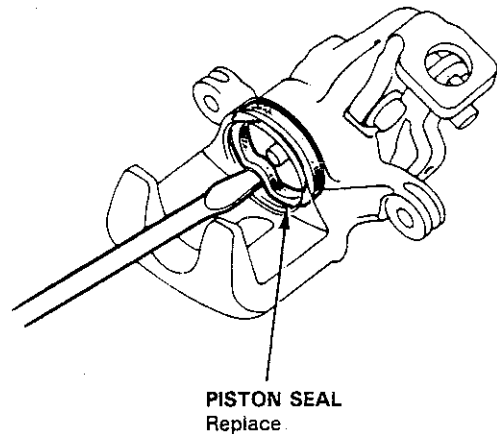
- 5 Remove the pad spring from the caliper body
- 6 Remove the piston by rotating the piston counterclockwise with the special tool and remove the piston boot

CAUTION: Avoid damaging the piston.



- 7 Remove the piston seal

CAUTION: Be careful not to damage the caliper cylinder wall.



(cont'd)

Rear Caliper

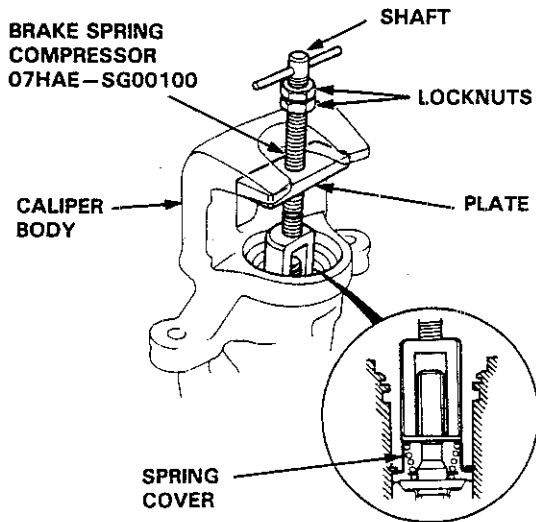
Disassembly (cont'd)

- 8 Install the special tool between the caliper body and spring cover.

CAUTION: Be careful not to damage the inside of the caliper cylinder during caliper disassembly.

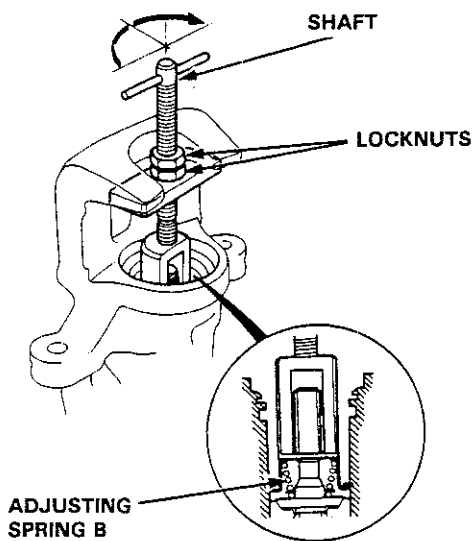
9. Position the locknuts as shown, then turn the shaft until the plate just contacts the caliper body.

NOTE: Do not compress the spring under the spring cover



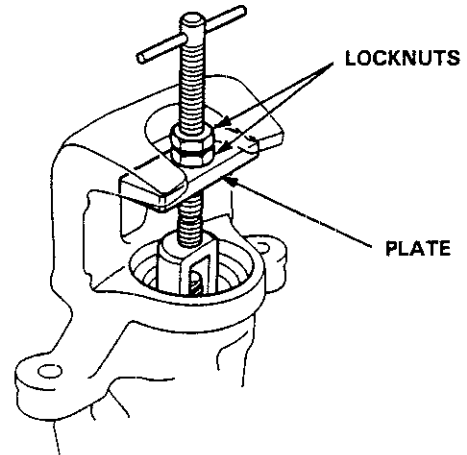
10. Turn the shaft clockwise 1/4–1/2 turn to compress the adjusting spring B in the caliper body.

CAUTION: To prevent damage to the inner components, do not turn the shaft more than 1/2 turn.



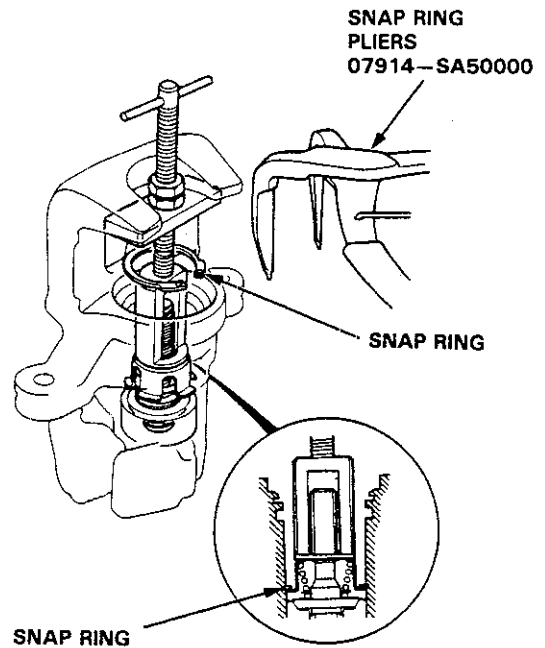
- 11 Lower the locknuts fully and tighten the locknuts securely.

NOTE: Keep the locknuts in this position until you reinstall the retaining ring.



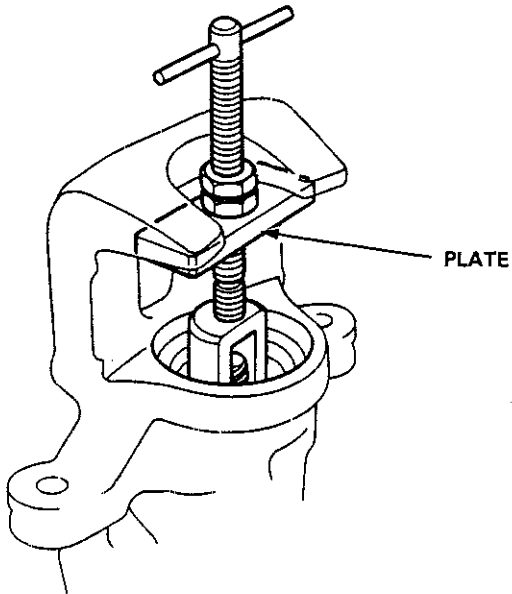
12. Remove the snap ring with special tool.

CAUTION: Be careful not to damage the caliper cylinder wall.

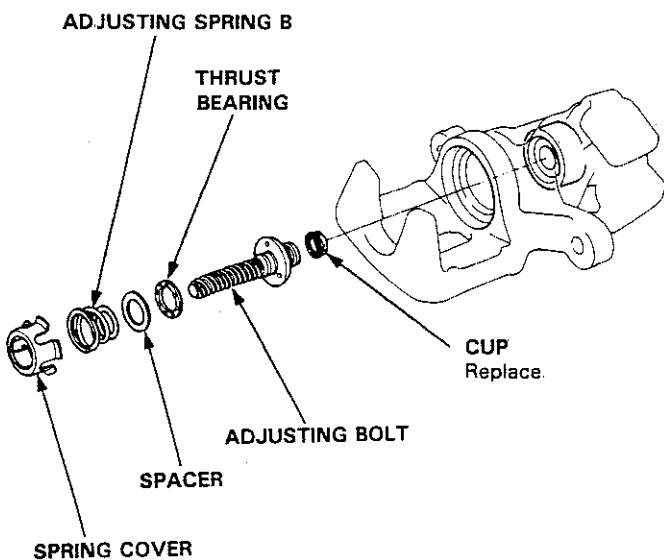




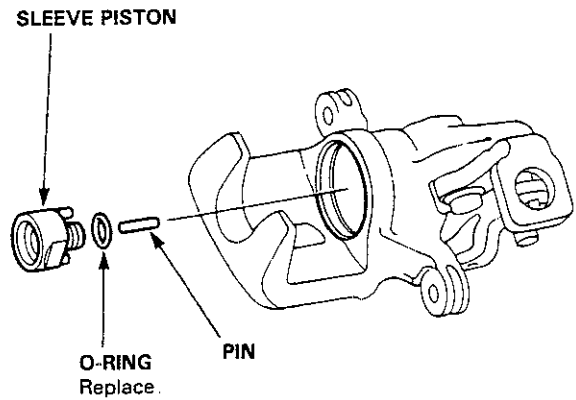
13. Hold the plate with your fingers and turn the shaft counterclockwise. Then, remove the special tool from the caliper.



14. Remove the adjusting bolt.
15. Remove the spring cover, adjusting spring B, spacer, thrust bearing and cup from the adjusting bolt.



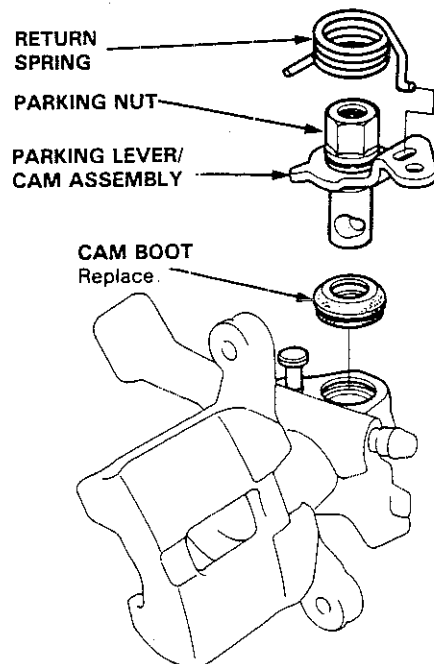
16. Remove the sleeve piston, and remove the pin from the cam



17. Remove the return spring.
18. Remove the parking lever and cam as an assembly from the caliper body.

CAUTION: Do not loosen the parking nut with the cam installed in the caliper body. If the lever and shaft must be separated, hold the lever in a vise and loosen the parking nut.

19. Remove the cam boot.



Rear Caliper

Reassembly

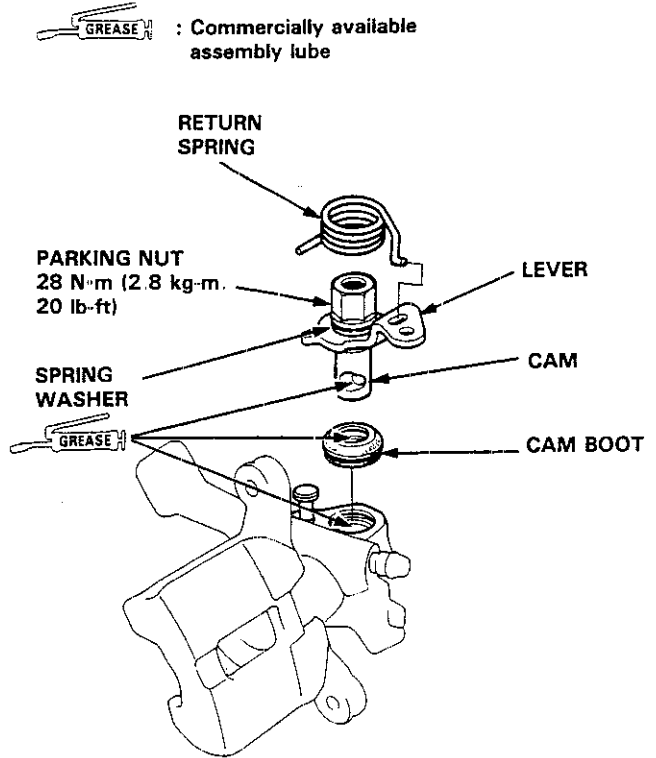
CAUTION:

- Do not spill brake fluid on the car; it may damage the paint; if brake fluid does contact the paint, wash it off immediately with water.
- Before reassembling, check that all parts are free of dust and other foreign particles.
- Replace parts with new ones whenever specified to do so.
- Make sure no dirt or other foreign matter is allowed to contaminate the brake fluid.
- Do not mix different brands of brake fluid as they may not be compatible.
- Do not reuse the drained fluid. Use only clean DOT 3 or 4 brake fluid.

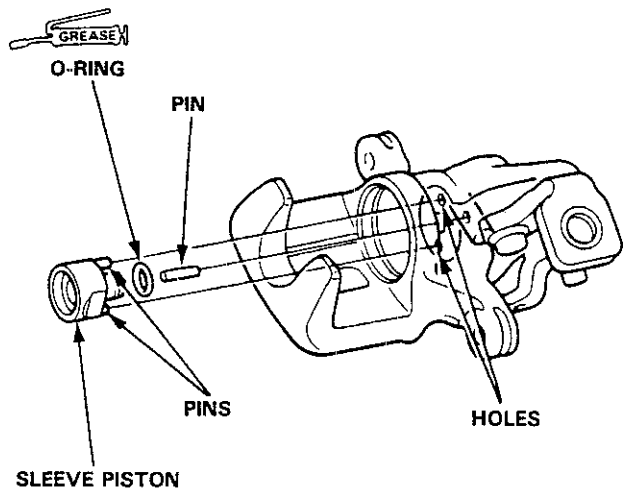
1. Pack all cavities of the needle bearing with commercially available assembly lube
2. Coat the new cam boot with commercially available assembly lube and install it in the caliper body
3. Apply commercially available assembly lube to the pin contacting area of the cam and install the cam and lever assembly into the caliper body.
4. Install the return spring.

CAUTION:

- When the cam and lever were separated, be sure to assemble them before installing the cam in the caliper body. Install the lever and spring washer, apply locking agent to the threads, and tighten the parking nut while holding the lever with a vise.
- Avoid damaging the cam boot since it must be installed before the cam.
- When installing the cam, do not allow the cam boot lips to turn outside in.

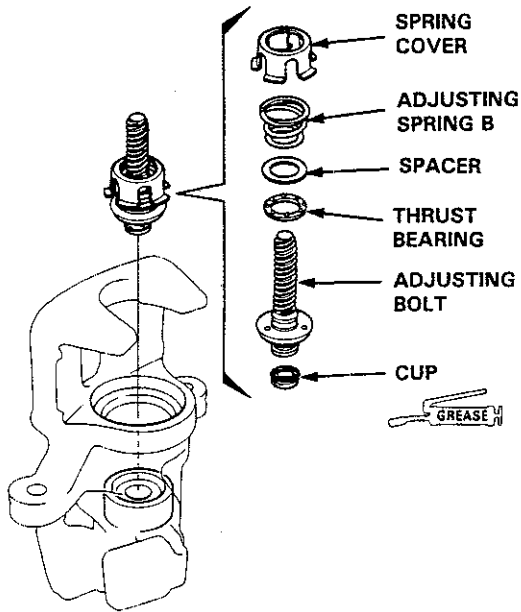


5. Install the pin in the cam.
6. Install a new O-ring on the sleeve piston.
7. Install the sleeve piston so the hole in the bottom of the piston is aligned with the pin in the cam, and two pins on the piston are aligned with the holes in the caliper.

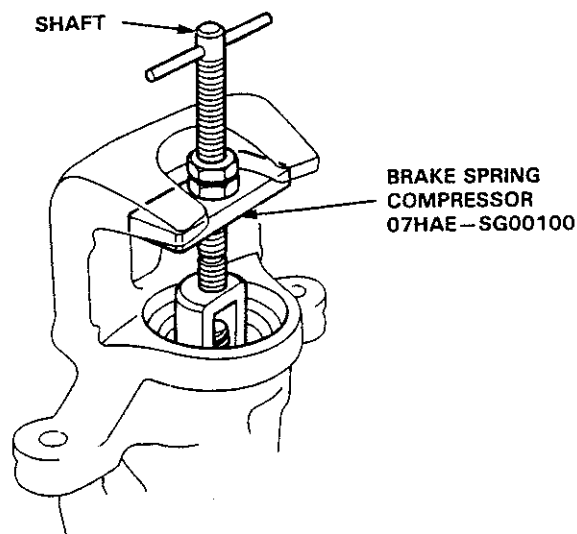




8. Coat a new cup with brake cylinder grease (P/N: 08733-B020E) or equivalent rubber grease, and install it with its groove facing the bearing A side on the adjusting bolt.
9. Fit the thrust bearing, spacer, adjusting spring B and spring cover on the adjusting bolt, and install them in the caliper cylinder.



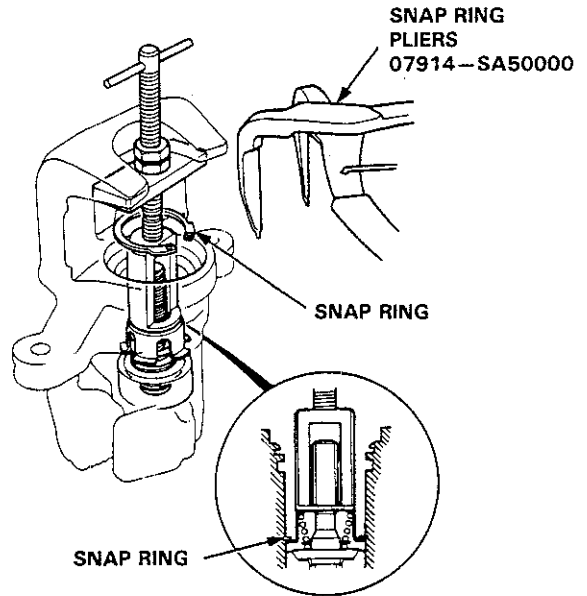
10. Install the special tool on the spring cover and turn the shaft until the locknut contacts the plate



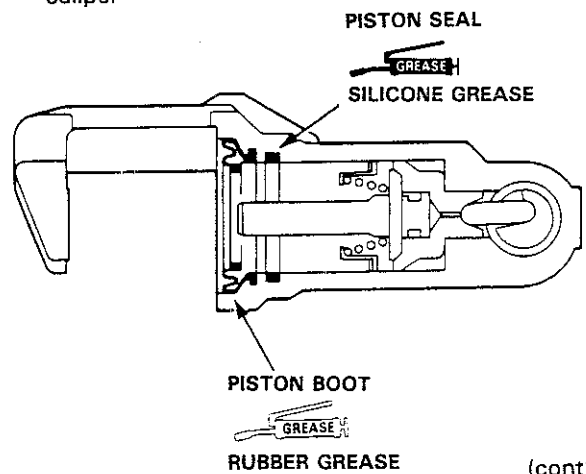
11. Check that the flared end of the spring cover is below the retaining ring groove.
12. Install the snap ring in the groove, then remove the special tool

CAUTION: Be careful not to damage the caliper cylinder wall.

NOTE: Check that the snap ring is seated in the groove properly.



13. Coat a new piston seal with silicone grease and install it in the caliper
14. Apply brake cylinder grease (P/N: 08733-B020E) or equivalent rubber grease to the sealing lips and inside of a new piston boot, and install it in the caliper



(cont'd)

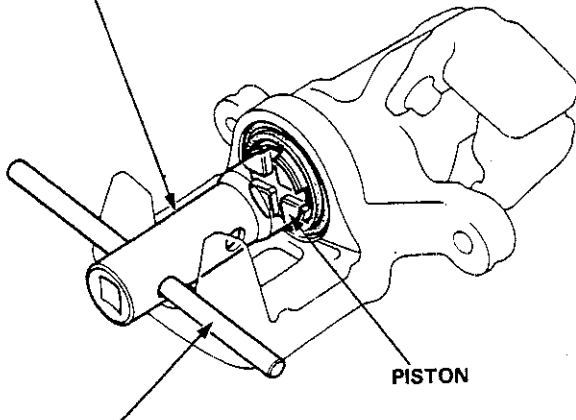
Rear Caliper

Reassembly (cont'd)

15. Coat the outside of the piston with brake fluid and install it on the adjusting bolt while rotating it clockwise with the special tool.

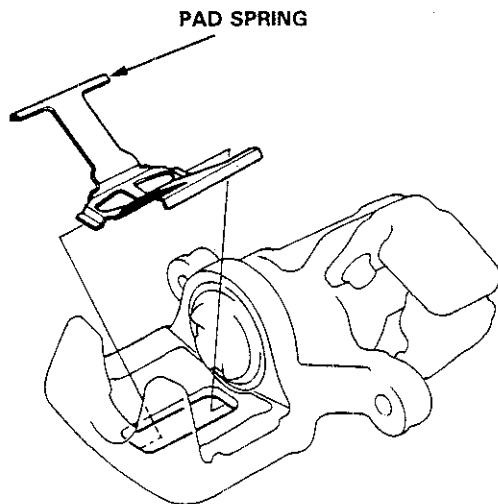
CAUTION: Avoid damaging the piston and piston boot.

LOCKNUT WRENCH, 16 mm
07916-6390001



EXTENSION BAR
Commercially available

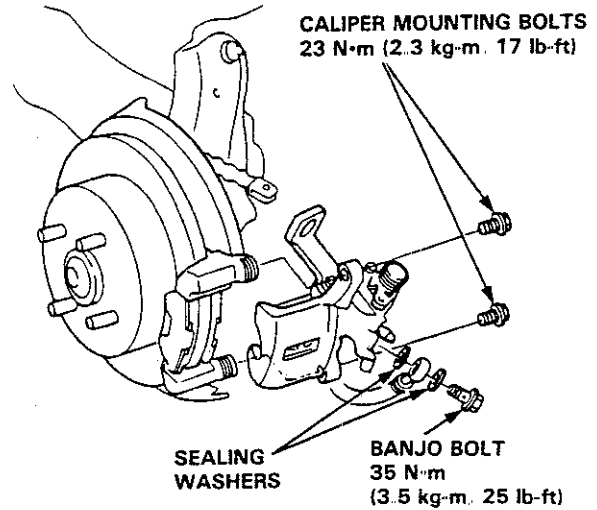
16. Install the pad spring on the caliper.



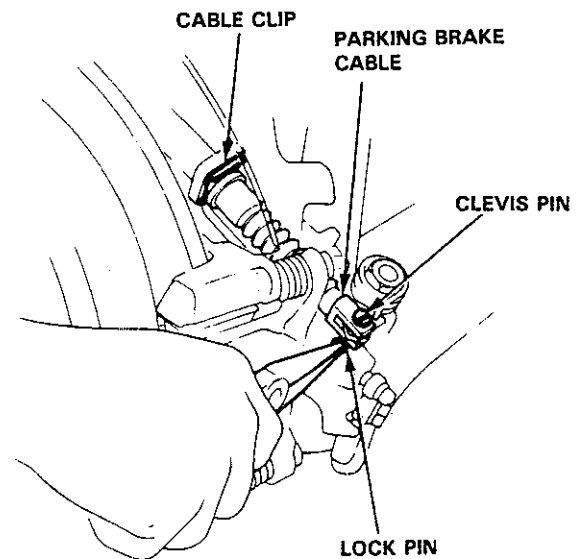
17. Install the brake pad retainers and brake pads.
18. Align the cutout in the piston with the tab on the inner pad (page 19-27).

19. Install the caliper on the caliper bracket and tighten the caliper mounting bolts.

20. Connect the brake hose to the caliper with new sealing washers and tighten the banjo bolt.



21. Insert the cable through the arm and connect the cable to the lever with the clevis pin and lock pin. Install the cable clip securely.



22. Install the caliper shield (page 19-27).

23. Fill the brake reservoir up and bleed the brake system (page 19-17).

24. Operate the brake pedal several times, then adjust the parking brake (page 19-5).



Rear Drum Brakes

Index/Inspection

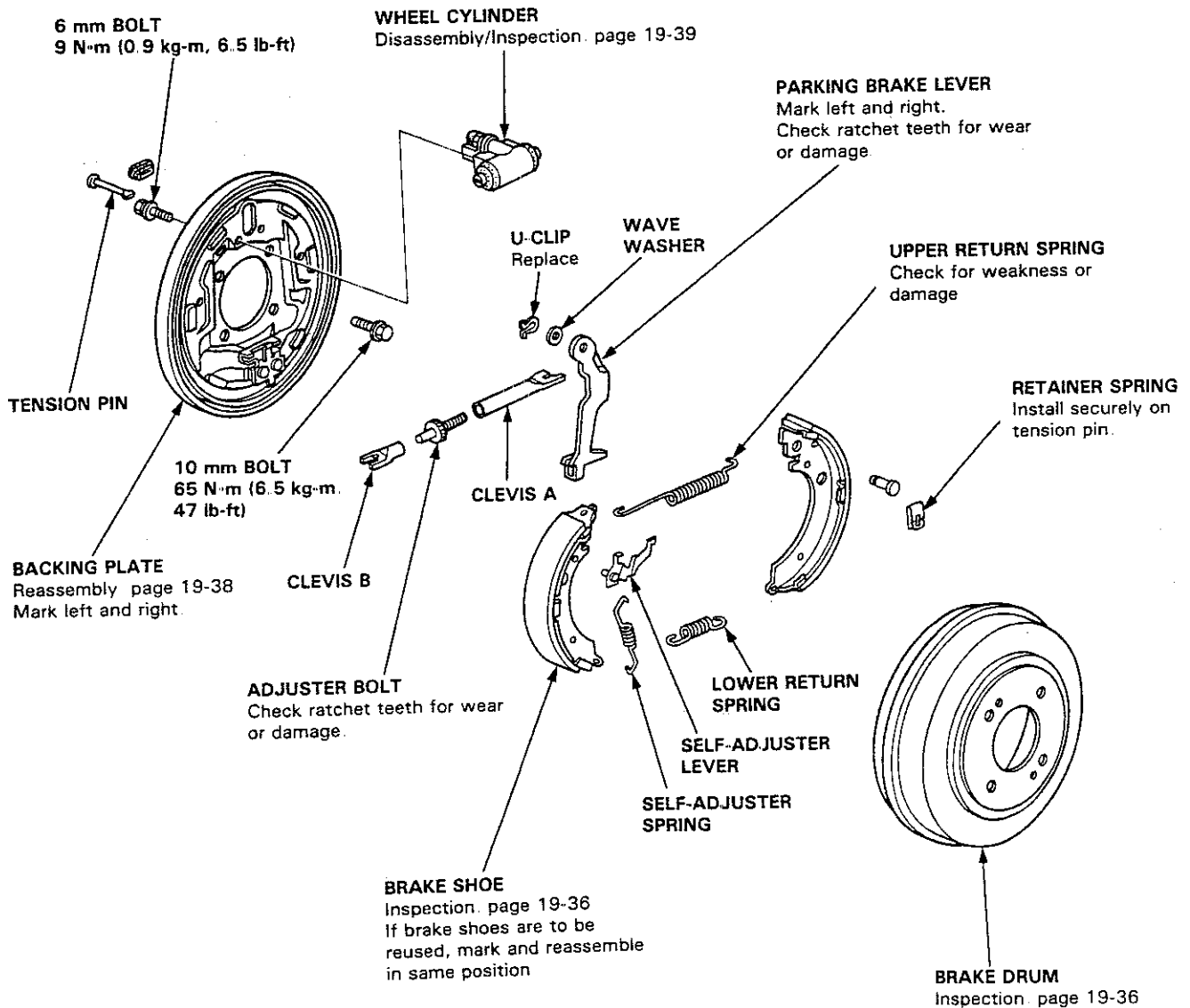
⚠ WARNING

- Never use an air hose or dry brush to clean brake assemblies
- Use a vacuum cleaner to avoid breathing brake dust.
- Contaminated brake linings or drum reduce stopping ability.

- 1 Block the front wheels, loosen the rear wheel lug nuts slightly, support the rear of car on safety stands, then remove the rear wheels

NOTE: Do not open or close the power roof when the car is raised by using the safety stands

2. Loosen the parking brake and remove the rear brake drum.



Rear Drum Brake

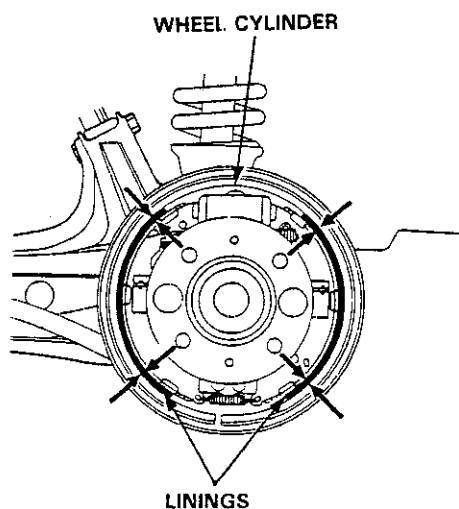
Inspection

1. Check the wheel cylinder for leakage.
2. Check the brake linings for cracking, glazing, wear or contamination.
3. Measure the brake lining thickness.

Brake Lining Thickness:

Standard: 4.5 mm (0.18 in)

Service Limit: 2.0 mm (0.08 in)



NOTE: Measurement does not include brake shoe thickness.

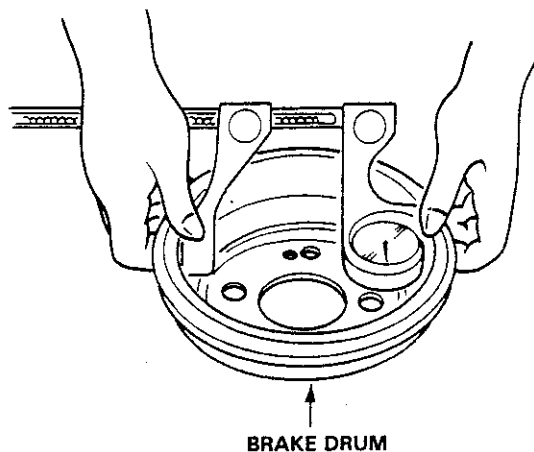
4. Check the bearings in the hub unit for smooth operation. If defective, refer to section 18.

5. Measure the inside diameter of the brake drum.

Drum Inside Diameter:

Standard: 180 mm (7.09 in)

Service Limit: 181 mm (7.13 in)



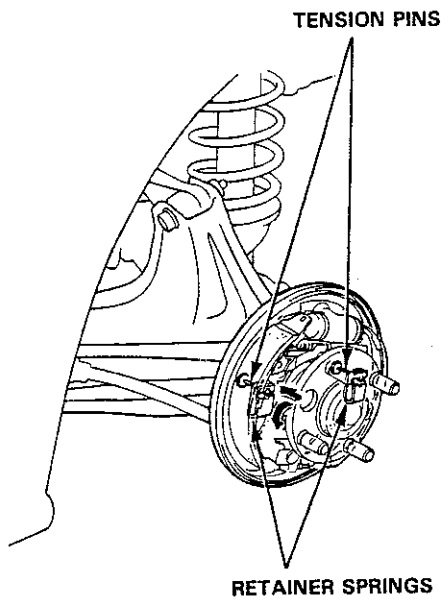
6. Check the brake drum for scoring, grooving and cracks.



Rear Brake Shoes

Disassembly

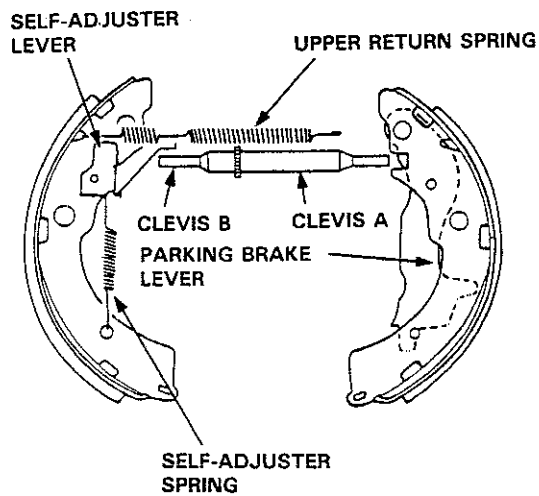
1. Remove the tension pins by pushing the retainer springs and turning them.



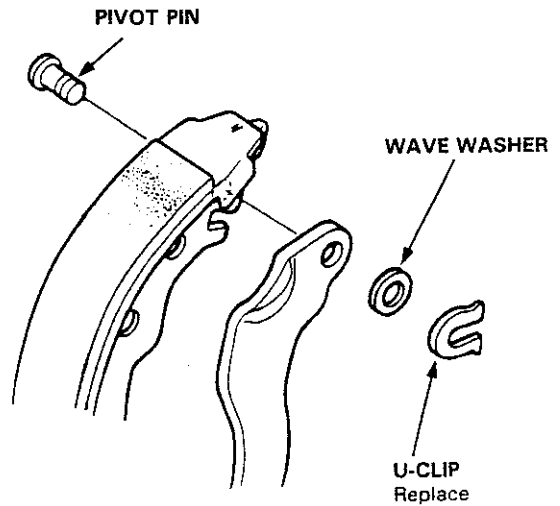
2. Lower the brake shoe assembly and remove the lower return spring.

NOTE: Be careful not to damage the dust cover on the wheel cylinder.

3. Remove the brake shoe assembly.
4. Disconnect the parking brake cable from the parking brake lever.
5. Remove the upper return spring, self-adjuster lever and self-adjuster spring, and separate the brake shoes.



6. Remove the wave washer, parking brake lever and pivot pin from the brake shoe by removing the U-clip.

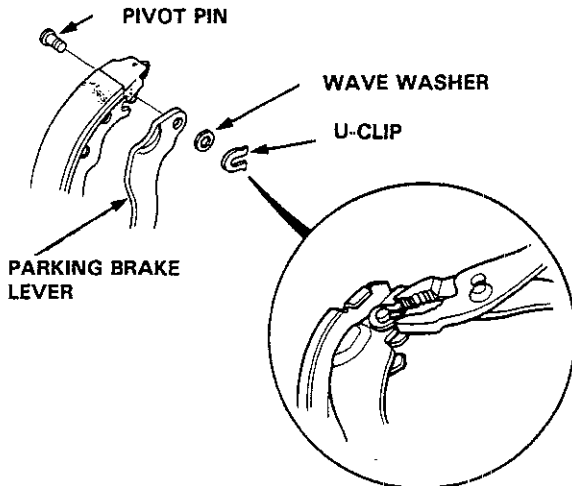


Rear Brake Shoes

Reassembly

- 1 Apply brake cylinder grease (P/N: 08733-B020E) or equivalent rubber grease to the sliding surface of the pivot pin, and insert the pin into the brake shoe
- 2 Install the parking brake lever and wave washer on the pivot pin and secure with U-clip.

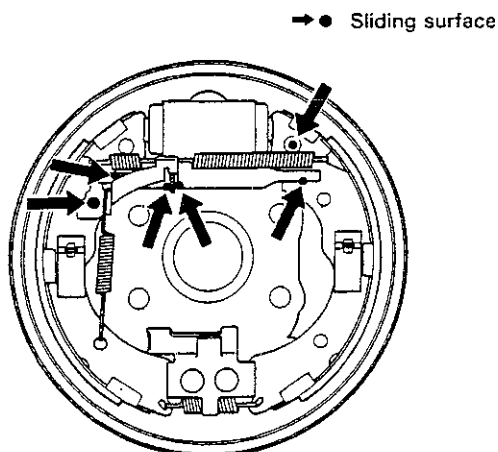
NOTE: Pinch the new U-clip securely to prevent the pivot pin from coming out of the brake shoe.



- 3 Connect the parking brake cable to the parking brake lever
- 4 Apply grease on each sliding surface.

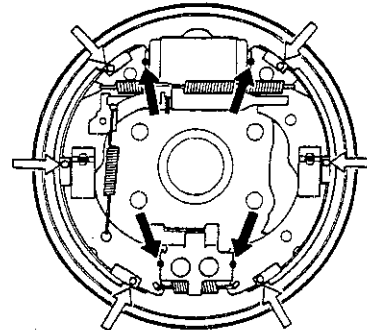
CAUTION: Contaminated brake linings or drum reduce stopping ability. Keep grease or oil off the brake linings. Wipe any excess grease off the parts.

- Apply brake cylinder grease (P/N: 08733-B020E) or equivalent rubber grease to the sliding surfaces as shown.



- Apply Molykote 44MA to the brake shoe ends and opposite edges of the shoes as shown.

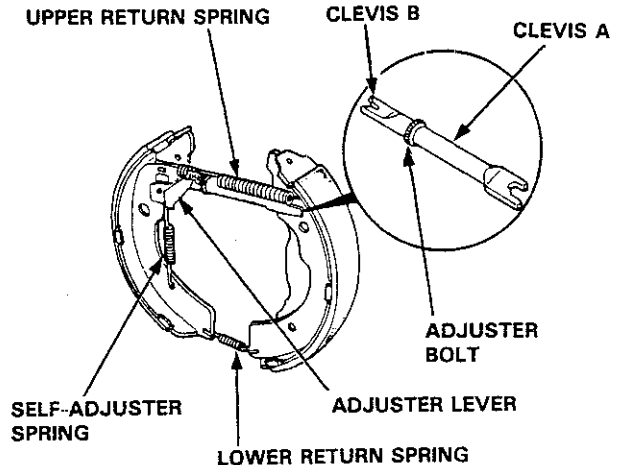
●● Opposite edge of the shoe
 ⇨○ Brake shoe ends



- 5 Clean the threaded portions of clevises A and B. Coat the threads of the clevises with grease. To shorten the clevises, turn the adjuster bolt
- 6 Hook the adjuster spring to the adjuster lever first, then to the brake shoe
- 7 Install the clevises and upper return spring noting the installation direction.

NOTE: Be careful not to damage the wheel cylinder dust covers.

- 8 Install the lower return spring.
- 9 Install the tension pins and retaining springs.



- 10 Install the brake drum.
- 11 If the wheel cylinder has been removed, bleed the brake system (page 19-17).
- 12 Depress the brake pedal several times to set the self-adjusting brake.
- 13 Adjust the parking brake (page 19-5).



Wheel Cylinder

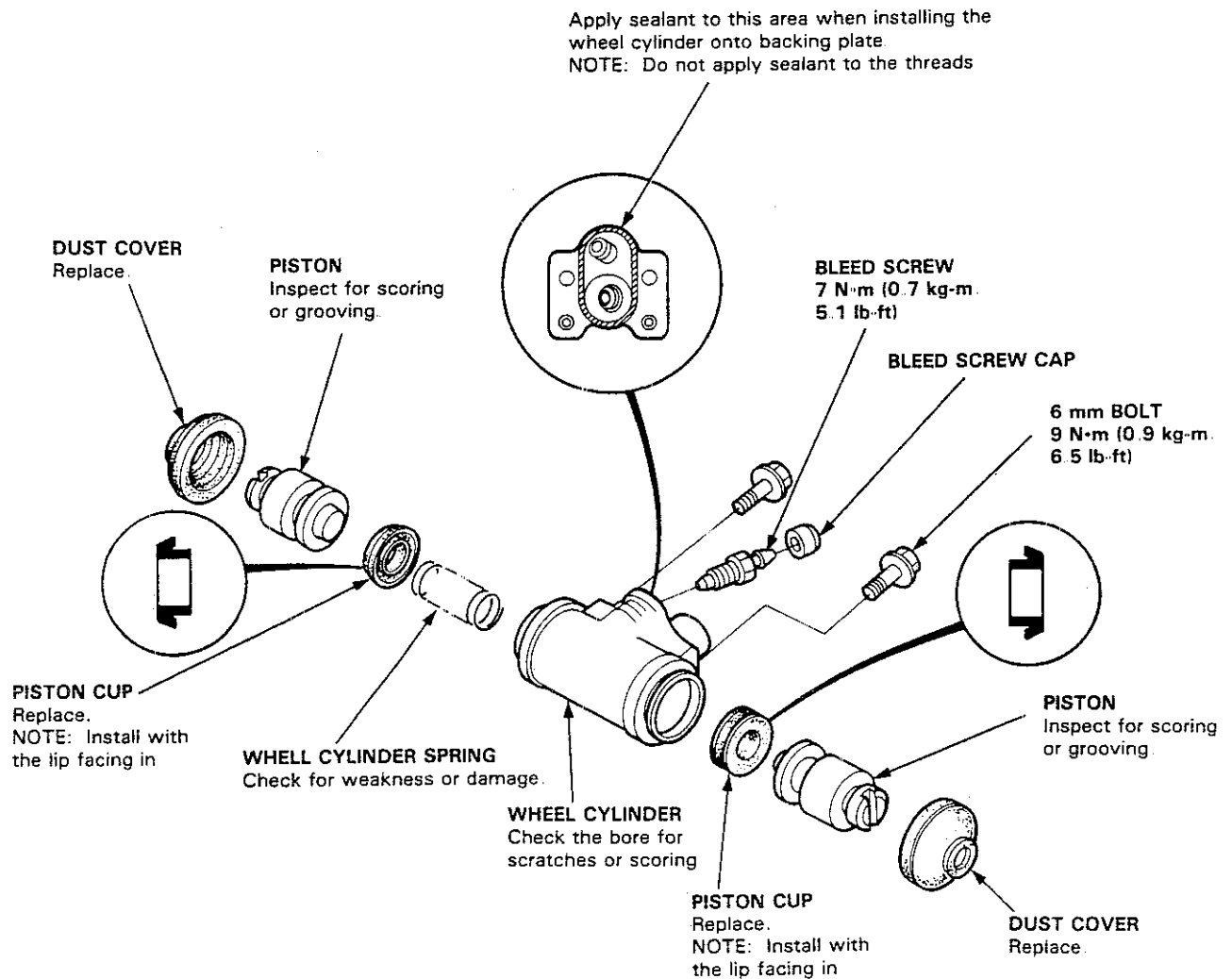
Disassembly/Inspection

CAUTION:

- Do not spill brake fluid on the car; it may damage the paint; if brake fluid does contact the paint, wash it off immediately with water.
- Clean all parts in brake fluid and air dry; blow out all passages with compressed air.
- Before reassembling, check that all parts are free of dust and other foreign particles.
- Replace parts with new ones whenever specified to do so.
- Make sure no dirt or other foreign matter is allowed to contaminate the brake fluid.
- Do not mix different brands of brake fluid as they may not be compatible.
- Do not reuse the drained fluid. Use only clean DOT 3 or 4 brake fluid.

NOTE:

- Coat piston, piston cup, and wheel cylinder bore with clean brake fluid
- Replace all rubber parts with new ones whenever disassembled

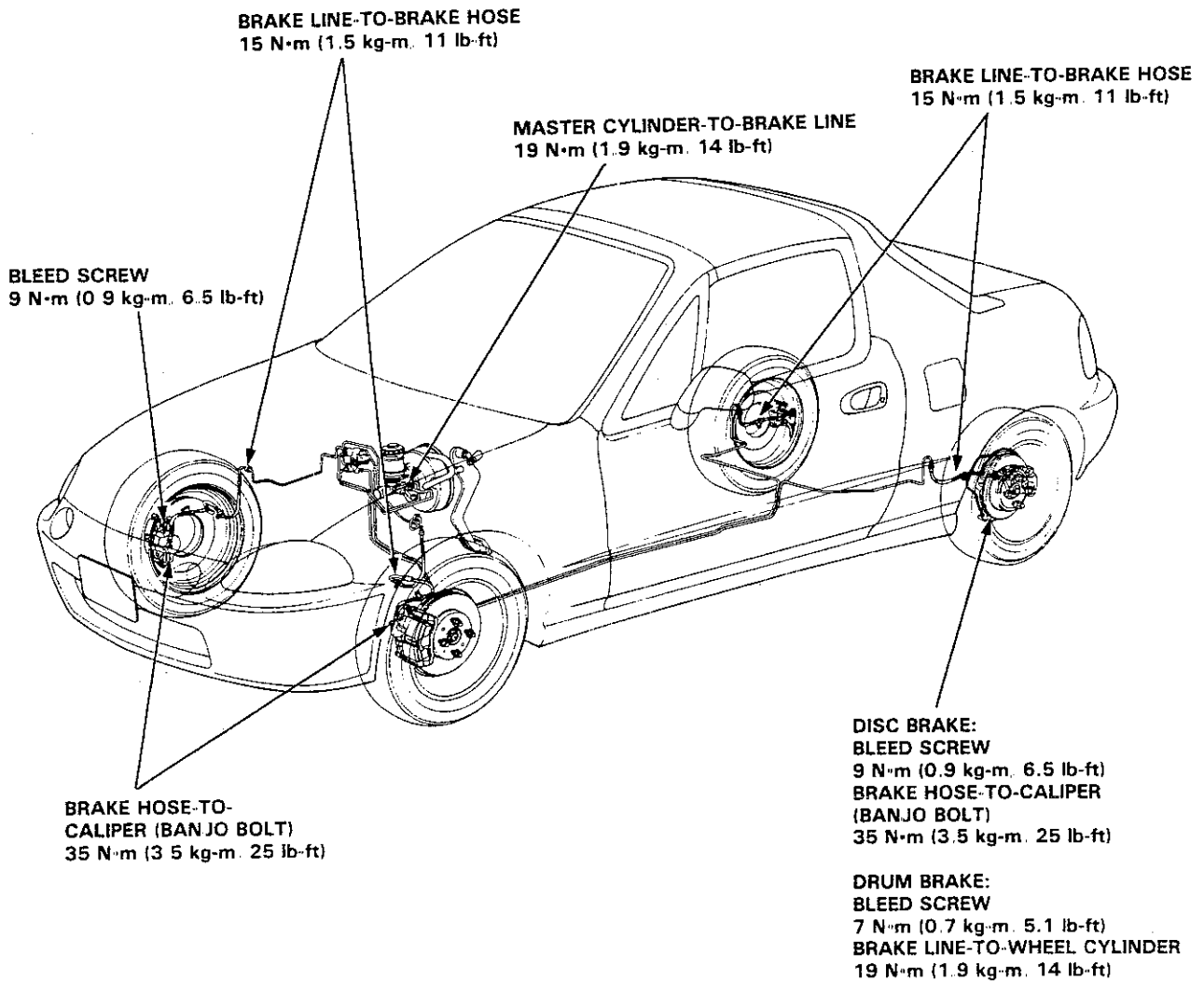


Brake Hoses/Pipes

Inspection

1. Inspect the brake hoses for damage, deterioration, leaks, interference or twisting.
2. Check the brake lines for damage, tipping, rusting or leakage. Also check for bent brake lines.
3. Check for leaks at hose and line joints or connections, and retighten if necessary

CAUTION: Replace the brake hose clip whenever the brake hose is serviced.



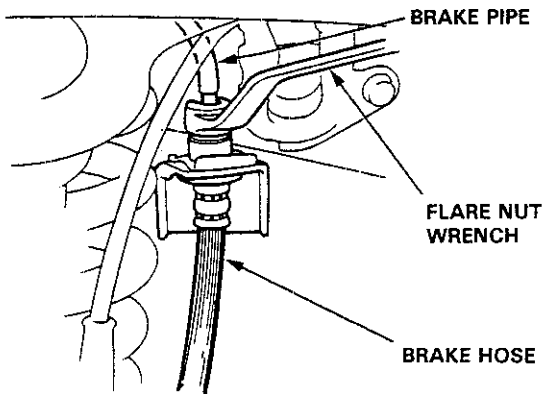


Brake Hose Replacement

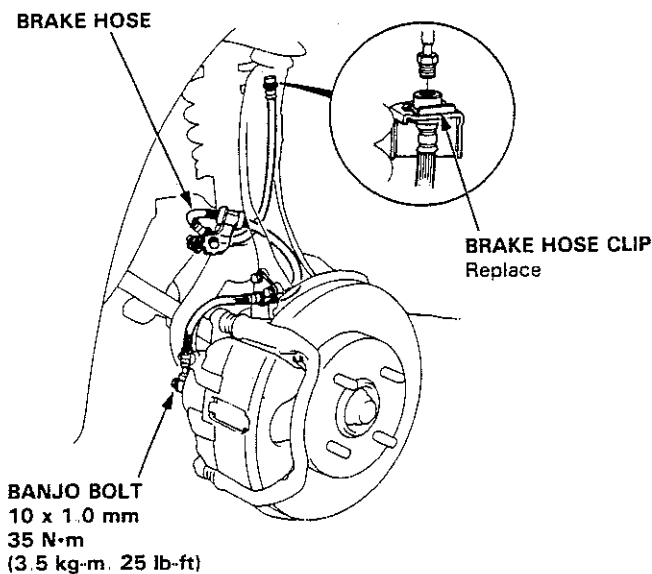
CAUTION:

- Before reassembling, check that all parts are free of dust and other foreign particles.
- Replace parts with new ones whenever specified to do so.
- Use only clean DOT 3 or DOT 4 brake fluid.
- Make sure no dirt or other foreign matter is allowed to contaminate the brake fluid.
- Do not mix different brands of brake fluid as they may not be compatible.
- Do not spill brake fluid on the car; it may damage the paint; if brake fluid does contact the paint, wash it off immediately with water.

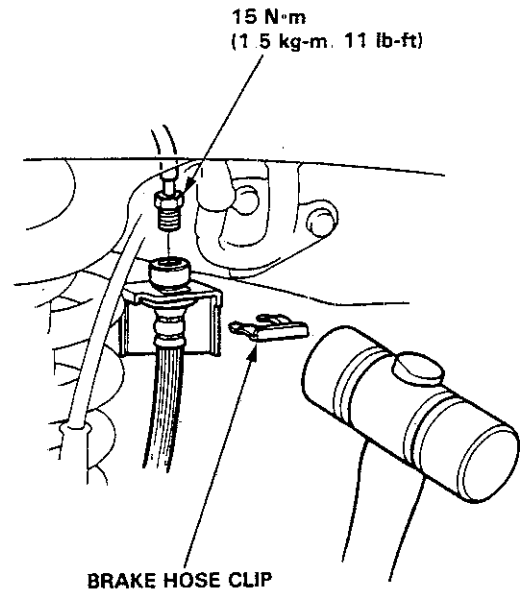
1. Replace the brake hose if the hose is twisted, cracked or if it leaks
2. Disconnect the brake hose from the brake pipe using a 10 mm flare nut wrench



3. Remove and discard the brake hose clip from the brake hose.
4. Remove the banjo bolt and disconnect the brake hose from the caliper



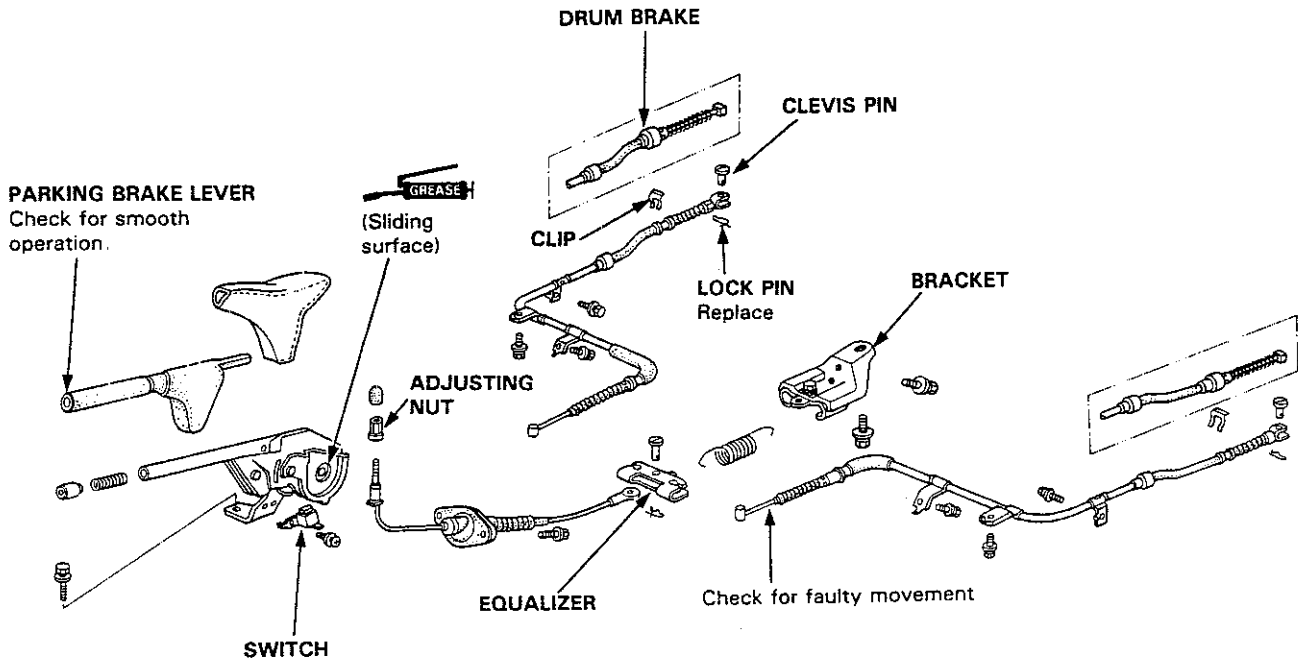
5. Install a new brake hose clip on the brake hose
6. Connect the brake pipe to the brake hose



7. Connect the brake hose to the caliper
8. Install the brake hose on the knuckle and damper mounting clamp.
9. After installing the brake hose, check the hose and line joints for leaks, and tighten if necessary

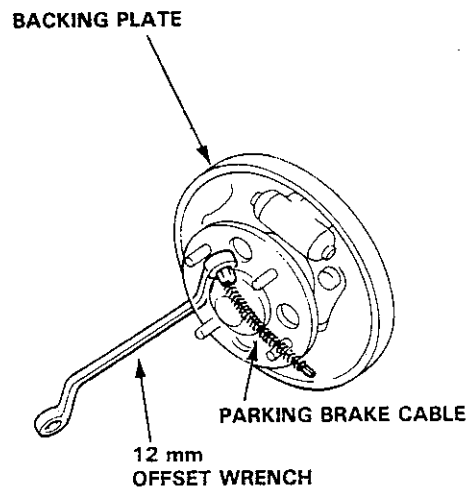
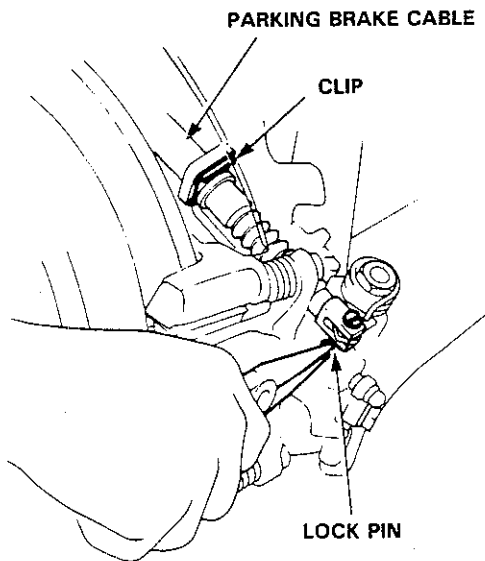
Parking Brake

Disassembly and Reassembly



Disconnect the parking brake cable from the lever on the caliper by removing the lock pin

Remove the parking brake cable from the backing plate using a 12 mm offset wrench as shown



Anti-lock Brake System

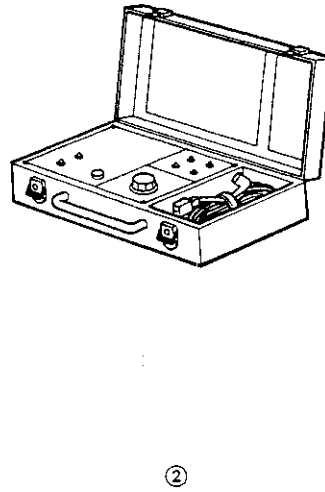
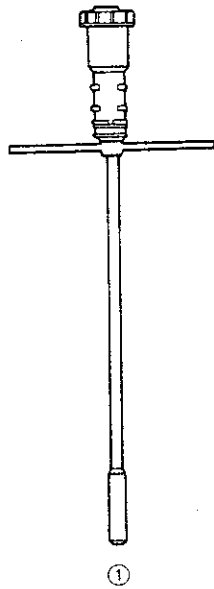
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Special Tools

Ref. No.	Tool Number	Description	Q'ty	Page Reference
①	07HAA-SG00101 or 07HAA-SG00100	Bleeder-T Wrench	1	19-67, 19-74, 19-92, 19-100
②	*07HAJ-SG00602	ALB Checker	1	19-61, 19-63, 19-100

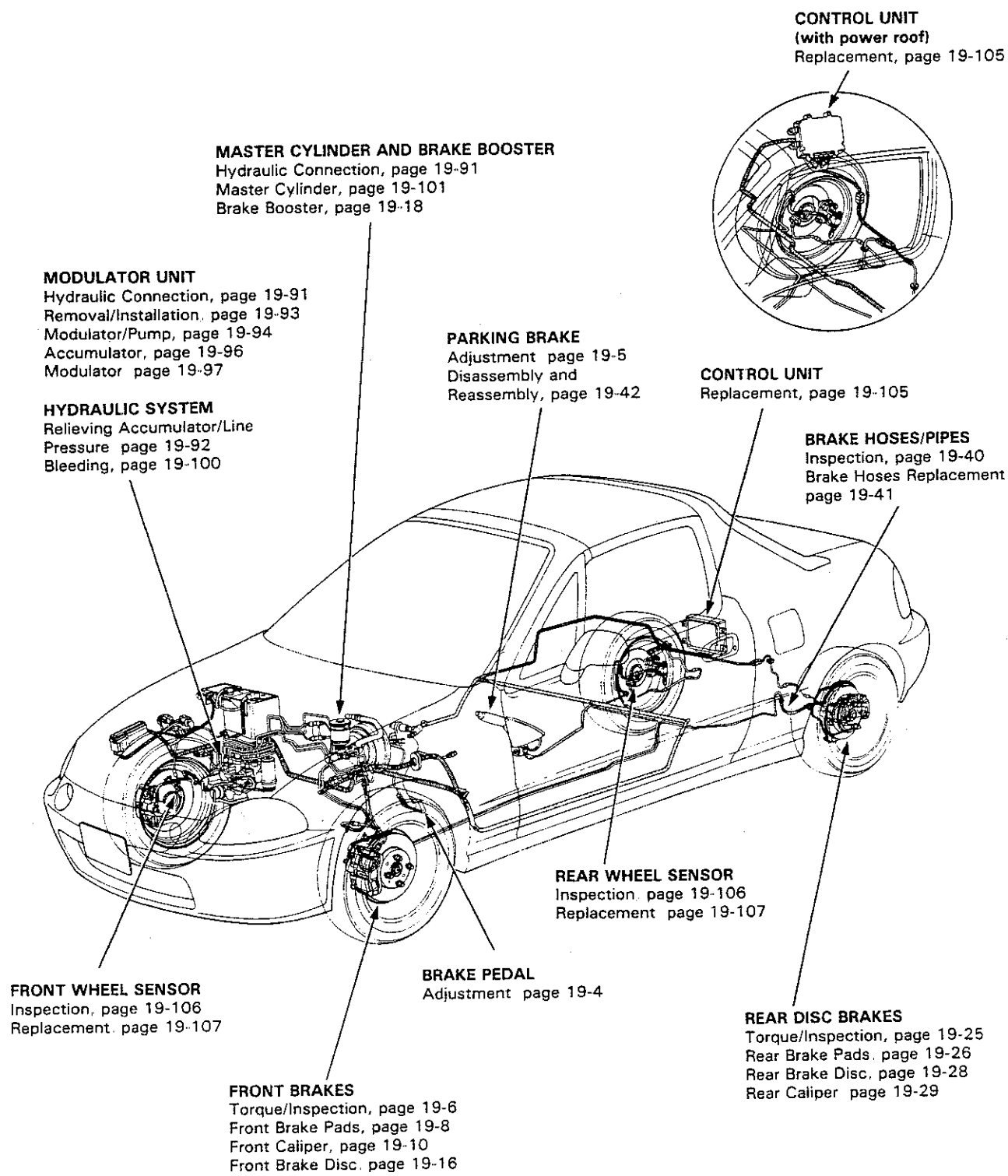
*: The ALB checker 07HAJ-SG00XXX can be used. (XXX: unspecified number) The ALB checker 07508-SB00000 can be used together with ALB checker adaptor 07HAJ-SG00400.





Illustrated Index

▲ WARNING The accumulator contains high-pressure nitrogen gas, do not puncture, expose to flame or attempt to disassemble the accumulator or it may explode; severe personal injury may result.



Anti-lock Brake System

Features/Construction/Operation

In a conventional brake system, if the brake pedal is depressed very hard, the wheels can lock before the vehicle comes to a stop. In such a case, the stability of the vehicle is reduced if the rear wheels are locked, and maneuverability of the vehicle is reduced if the front wheels are locked, creating an extremely unstable condition.

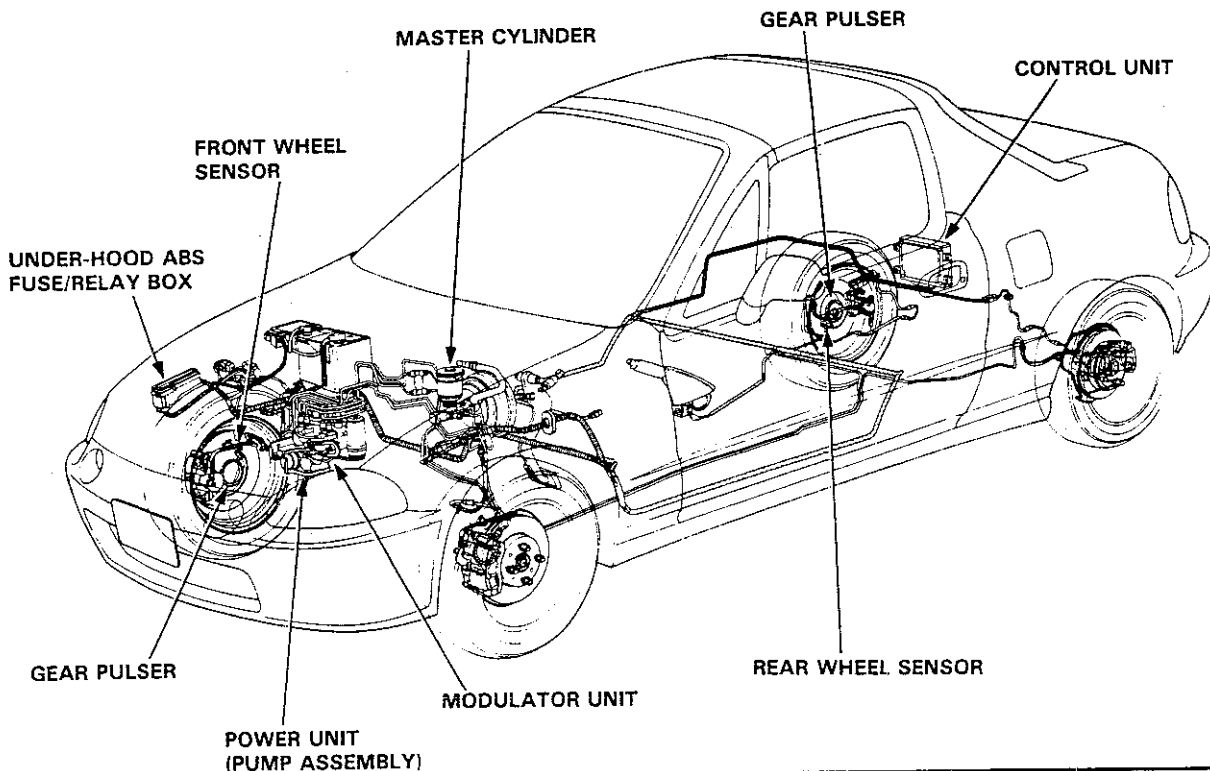
The Anti-lock Brake System (ABS) modulates the pressure of the brake fluid applied to each front caliper or both rear calipers thereby preventing the locking of the wheels, whenever the wheels are likely to be locked due to hard braking. It then restores normal hydraulic pressure when there is no longer any possibility of wheel locking.

Features

- Increased braking stability can be achieved regardless of changing driving conditions.
- The maneuverability of the vehicle is improved as the system prevents the front wheels from locking.
- When the anti-lock brake system goes into action, a kickback is felt on the brake pedal.
- The system is equipped with a self-diagnosis function. When an abnormality is detected, the anti-lock brake system indicator light comes on. The location of the system's trouble can be diagnosed from the frequency of the system indicator light blinks.
- This system has individual control of the front wheels and common control ("Select Low") for the rear wheels. "Select Low" means that the rear wheel that would lock first (the one with the lowest resistance to lock-up) determines anti-lock brake system activation for both rear wheels.
- The system has a fail-safe function that allows normal braking if there's a problem with the anti-lock brake system.

Construction

In addition to the conventional braking system, the anti-lock brake system consists of: gear pulsers attached to the rotating part of individual wheels; wheel sensors, which generate pulse signals corresponding to the revolution of the gear pulsers; control unit, which controls the working of the anti-lock brake system by performing calculations based on the signals from the individual wheel sensors and the individual switches; modulator unit, which adjusts the hydraulic pressure applied to each caliper on the basis of the signals received from the control unit; an accumulator, in which high-pressure brake fluid is stored, a pressure switch, which detects the pressure in the accumulator and transmits signals to the control unit; a power unit, which supplies the high-pressure working fluid to the accumulator by means of a pump; a motor relay for driving the power unit; a fail-safe relay, which cuts off the solenoid valve ground circuit when the fail-safe device is at work; and, an indicator light.



Master Cylinder

1 Construction

A tandem master cylinder is used to improve the safety of the braking system. In addition, center valves are used so as to match the anti-lock brake system operation.

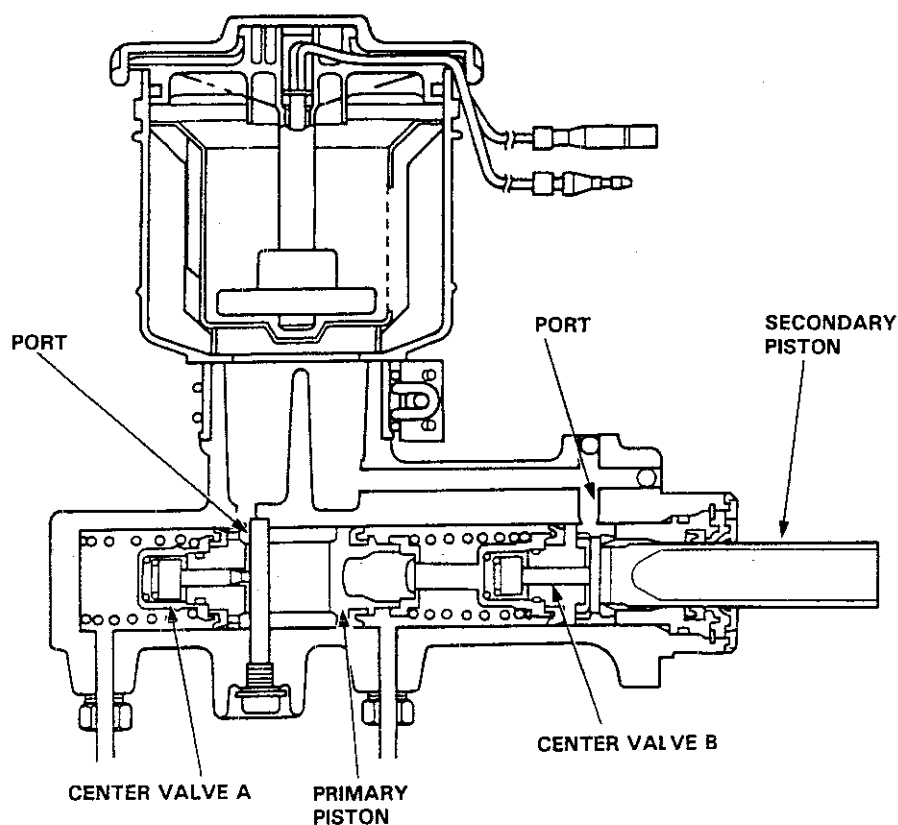
The master cylinder has one reservoir tank which is connected to the cylinder sections by two small holes. It has two pistons: primary and secondary, which are criss-cross connected with the calipers so that the fluid pressure works separately on each system (front right wheel & rear left wheel, and front left wheel & rear right wheel).

A stop bolt for controlling movement of the primary piston is provided at the side of the master cylinder body. A reed switch for detecting the brake fluid volume is also provided in the cap of the reservoir tank.

2. Operation

When the brake pedal is depressed, the secondary piston is pushed through the brake booster and the center valve B is closed so that fluid pressure is generated on the secondary side. At the same time, the primary piston is pushed by the secondary fluid pressure and the center valve A is closed so that braking fluid pressure is generated both on the primary and secondary sides.

When the brake pedal is released, the primary and secondary pistons are returned to the original position by the brake fluid pressure and piston spring.



(cont'd)

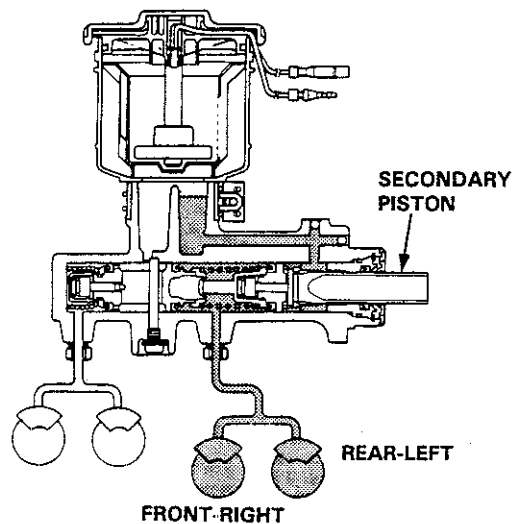
Anti-lock Brake System

Features/Construction/Operation (cont'd)

3. Responses when fluid is leaking

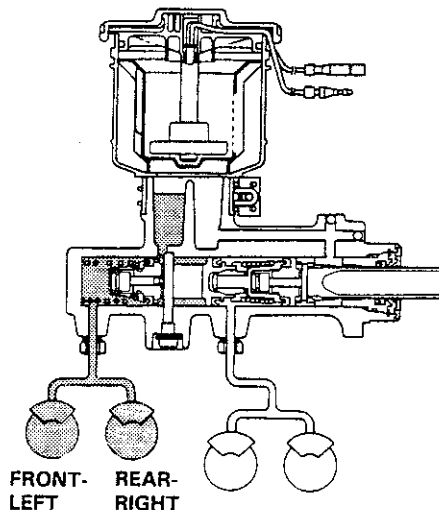
(1) In case of leaking from the primary system:

Since the fluid pressure on the primary side does not rise, the primary piston is pushed by the fluid pressure of the secondary piston and the tension of the piston spring until the end hits on the cylinder. The braking is performed by the fluid pressure on the secondary side.



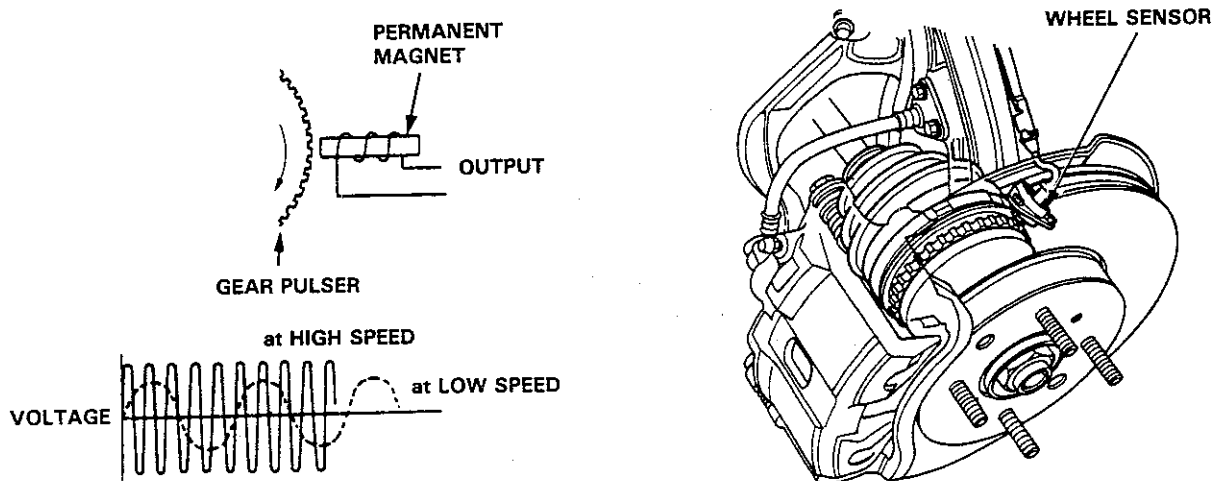
(2) In case of leaking from the secondary system:

The secondary piston does not produce fluid pressure, keeps moving ahead, hits on the end surface of the primary piston so that the primary piston is pushed under the same condition as an ordinary rod. Therefore, the braking is conducted by the fluid pressure on the primary side.



Wheel Sensor

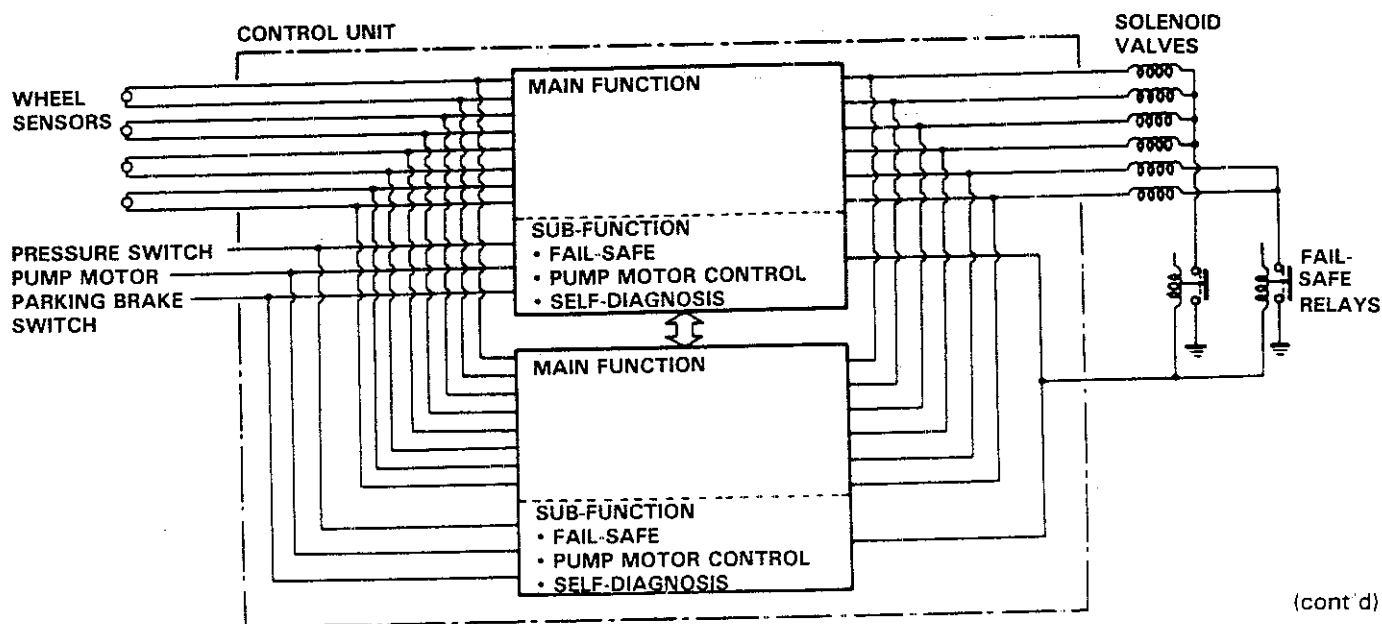
The wheel sensor is a contactless type that detects the rotating speed of a wheel. It is comprised of a permanent magnet and coil. When the gear pulsers attached to the rotating parts of each wheel (front wheel: outboard joint of the driveshaft, rear: hub bearing unit) turn, the magnetic flux around the coil in the wheel sensor alternates, generating voltages with frequency in proportion to wheel rotating speed. These pulses are sent to the control unit and the control unit identifies the wheel speeds.



Control Unit

The control unit consists of a main function section, which controls the operation of the anti-lock brake system, and sub-function, which controls the pump motor and "self-diagnosis".

1. Main Function
The main function section of the control unit performs calculations on the basis of the signals from each wheel sensor and controls the operation of the anti-lock brake system by putting into action the solenoid valves in the modulator unit for each front brake and for the two rear brakes.
2. Sub-function
The sub-function section gives driving signals to the pump motor and also gives "self-diagnosis" signals, necessary for backing up the anti-lock brake system.



(cont'd)

Anti-lock Brake System

Features/Construction/Operation (cont'd)

1. Self-diagnostic Function

Since the anti-lock brake system modulates the braking pressure when a wheel is about to lock, regardless of the driver's intention, the system operation and the braking power will be impaired if there is a malfunction in the system. To prevent this possibility, at speeds above 4 mph (6 km/h), the self-diagnosis function, provided in the sub-function of the control unit, monitors the main system functions. When an abnormality is detected, the anti-lock brake system indicator light goes on. There is also a check mode of the self-diagnosis system itself; when the ignition switch is first turned on, the anti-lock brake system indicator light comes on and stays on for a few seconds after the engine starts, to signify that the self-diagnosis system is functional.

2. Fail-safe Function

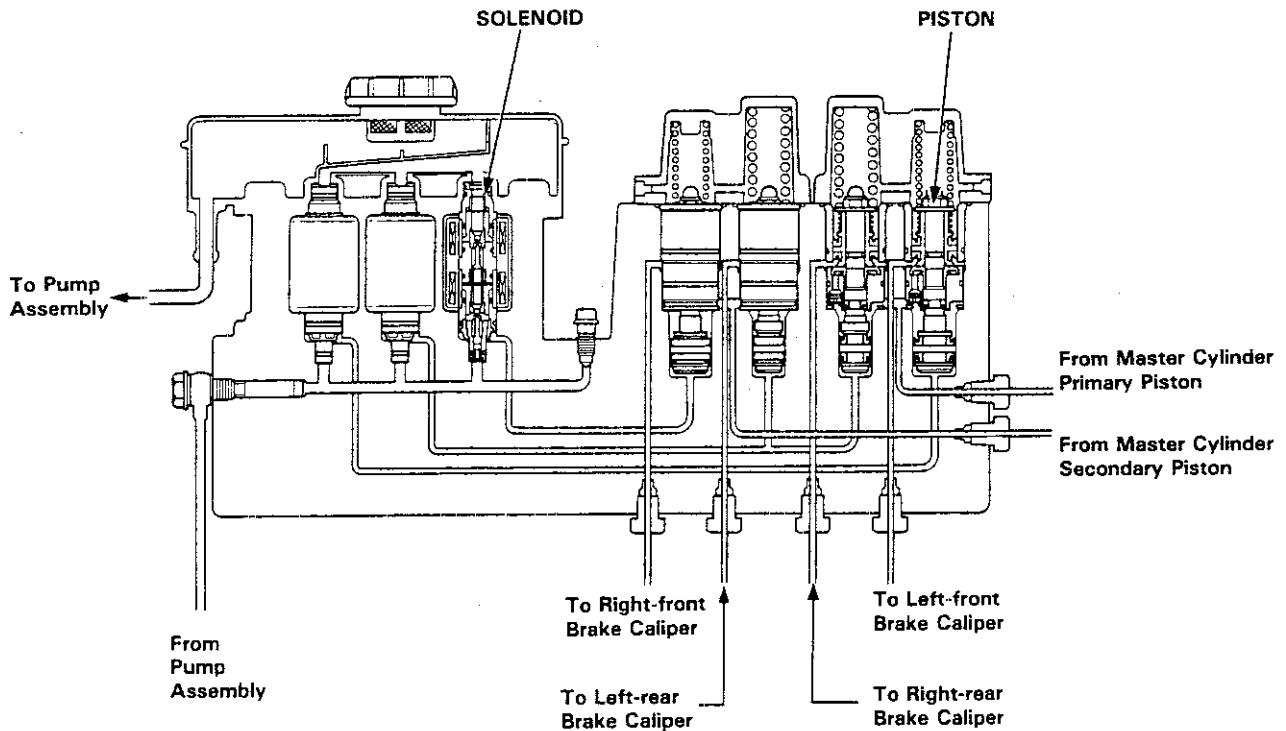
When abnormality is detected in the control system by the self-diagnosis, the solenoid operations are suspended by turning off the relay (fail-safe relay) which disconnects the ground lines of all the solenoid valves to inhibit anti-lock brake system operations. Under these conditions, the braking system functions just as an ordinary one, maintaining the necessary braking function. When the anti-lock brake system indicator light is turned on, it means the fail-safe is functioning.

Modulator Unit

Modulators for each wheel and solenoid valves are integrated in the modulator unit.

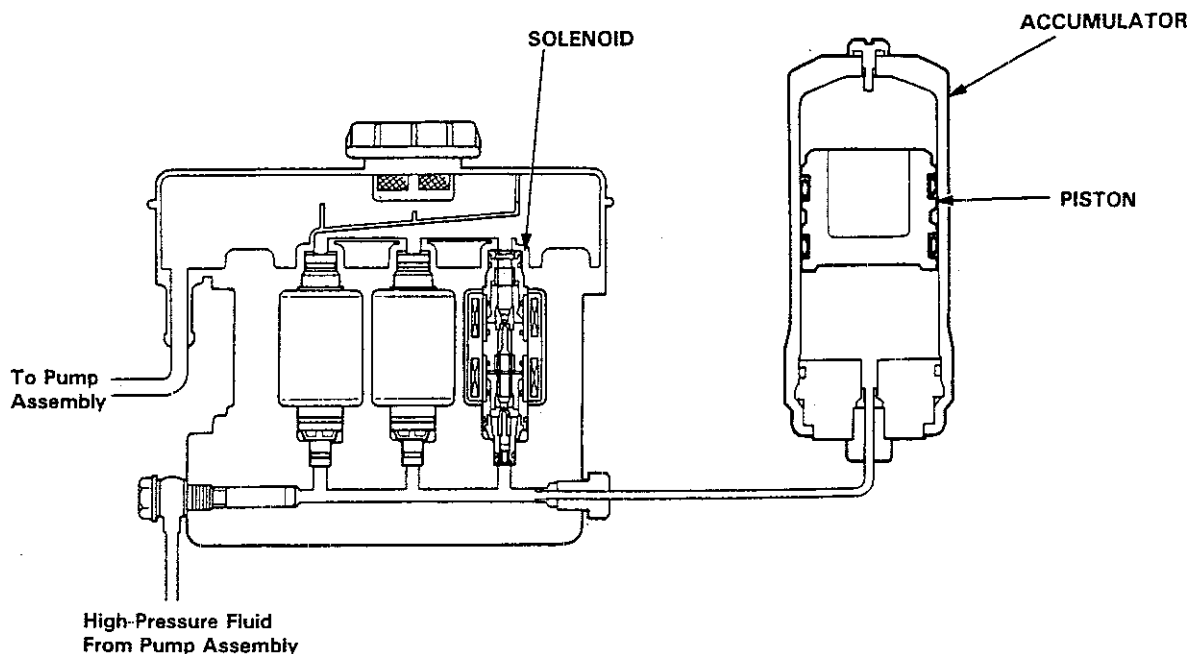
The modulators for front and rear brakes are of independent construction and are positioned vertically for improved maintainability. The modulators for rear brakes are provided with a PCV function (Proportioning Control Valve) in order to prevent the rear wheel from locking when the anti-lock brake system is malfunctioning or the anti-lock brake system is not activated.

The solenoid valve features quick response (5 ms or less). The inlet and outlet valves are integrated in the solenoid valve unit. There are three solenoid valves provided, one for each front wheel, and one for the rear wheels.



Accumulator

The accumulator is a pneumatic type which accumulates high-pressure brake fluid fed from the pump incorporated in the power unit. When the anti-lock brake system operates, the accumulator and the power unit supply high-pressure brake fluid to the modulator valve via the inlet side of the solenoid valve.

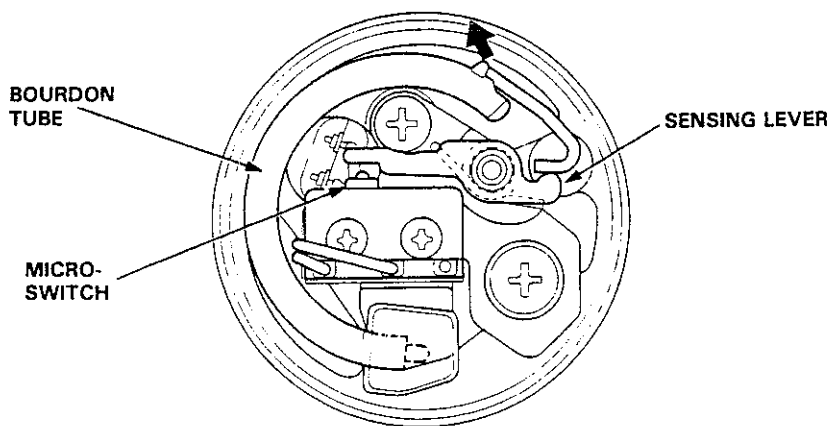


Pressure Switch

The pressure switch monitors the pressure accumulation (pressure from the pump) in the accumulator and is turned off when the pressure becomes lower than a prescribed level. When the pressure switch is turned off, the switching signal is sent to the control unit. Upon receiving the signal, the control unit activates the pump motor relay to operate the motor. If the pressure doesn't reach the prescribed value, the anti-lock brake system indicator light comes on.

Operation

When the pressure in the accumulator rises, the Bourdon tube in the pressure switch deforms outwards. When the free end of the Bourdon tube moves more than the prescribed amount, the micro-switch is activated by the force of the spring attached to the sensing lever. When the pressure in the accumulator decreases due to anti-lock brake system operations, the Bourdon tube moves in the direction opposite to the one described above, and the micro-switch is eventually turned off. Upon receiving this signal, the control unit activates the motor relay to operate the motor.



(cont'd)

Anti-lock Brake System

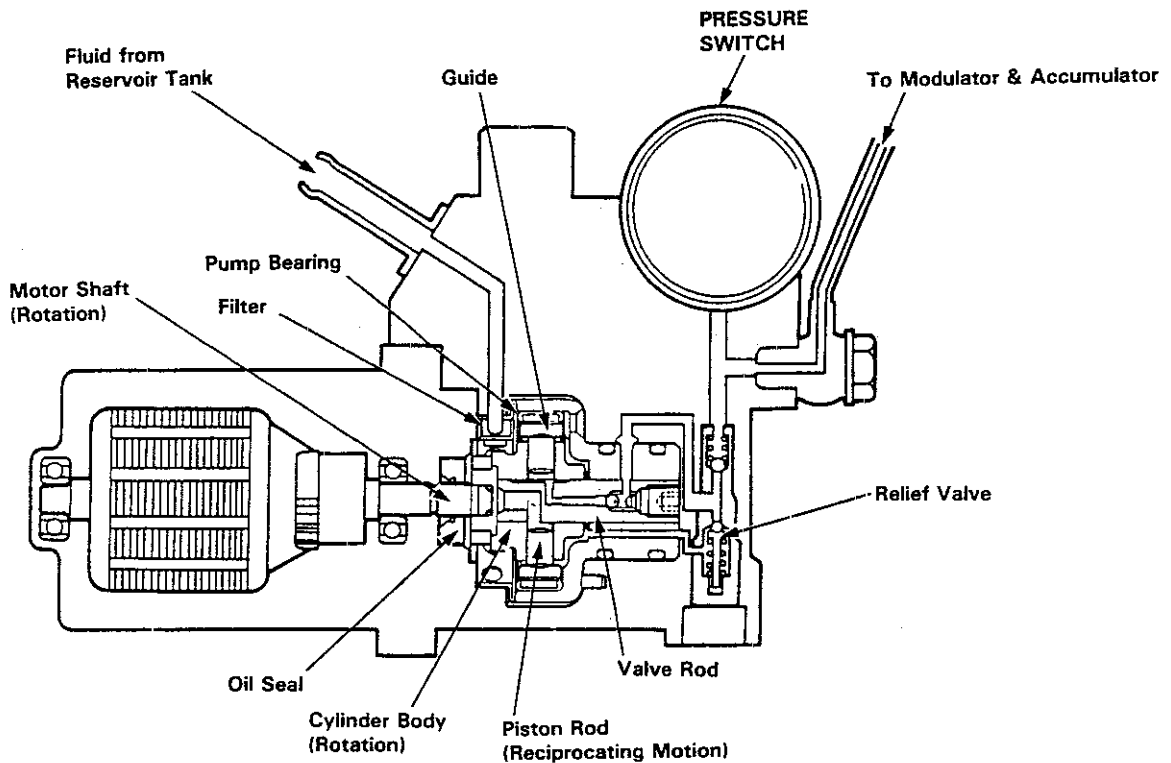
Features/Construction/Operation (cont'd)

Power Unit (Pump Assembly)

The power unit consists of a motor, filter, guide, piston rod and cylinder body. Since a guide is positioned off-set to the center of the motor shaft, the rotation of the motor and cylinder body provides the reciprocating motion to the piston rod. The brake fluid is thus pressurized and fed to the relief valve, accumulator and modulator.

As the pressure in the accumulator exceeds the prescribed level, the pressure switch is turned on. Approx. 0.5 seconds after receiving the ON-signal, the control unit stops the motor relay operation. In this state, the pressure in the accumulator reaches 2,300 kPa (230 kg/cm², 3,555 psi).

If the pressure doesn't reach the prescribed value after the motor has operated continuously for a specified period, the control unit stops the motor and activates the anti-lock brake system indicator light.



Anti-lock Brake System Indicator Light

This warning system turns on the anti-lock brake indicator light when one or more of the below described abnormalities is detected. This is only a partial list.

- When the operating time of the motor in the power unit exceeds the specified period.
- When vehicle running time exceeds 30 seconds without releasing the parking brake lever.
- When one of the rear wheels is locked during running.
- When absence of speed signals from any of the four speed sensors is detected.
- When the activation time of all solenoids exceeds a given time or an open circuit is detected in the solenoid system.
- When solenoid output is not detected in the simulated anti-lock brake system operation carried out during running at speeds of 6 mph (10 km/h) or more.

To check the indicator light bulb, the light is activated when the ignition switch is turned on. It is turned off after the engine is started if there is no abnormality in the system.

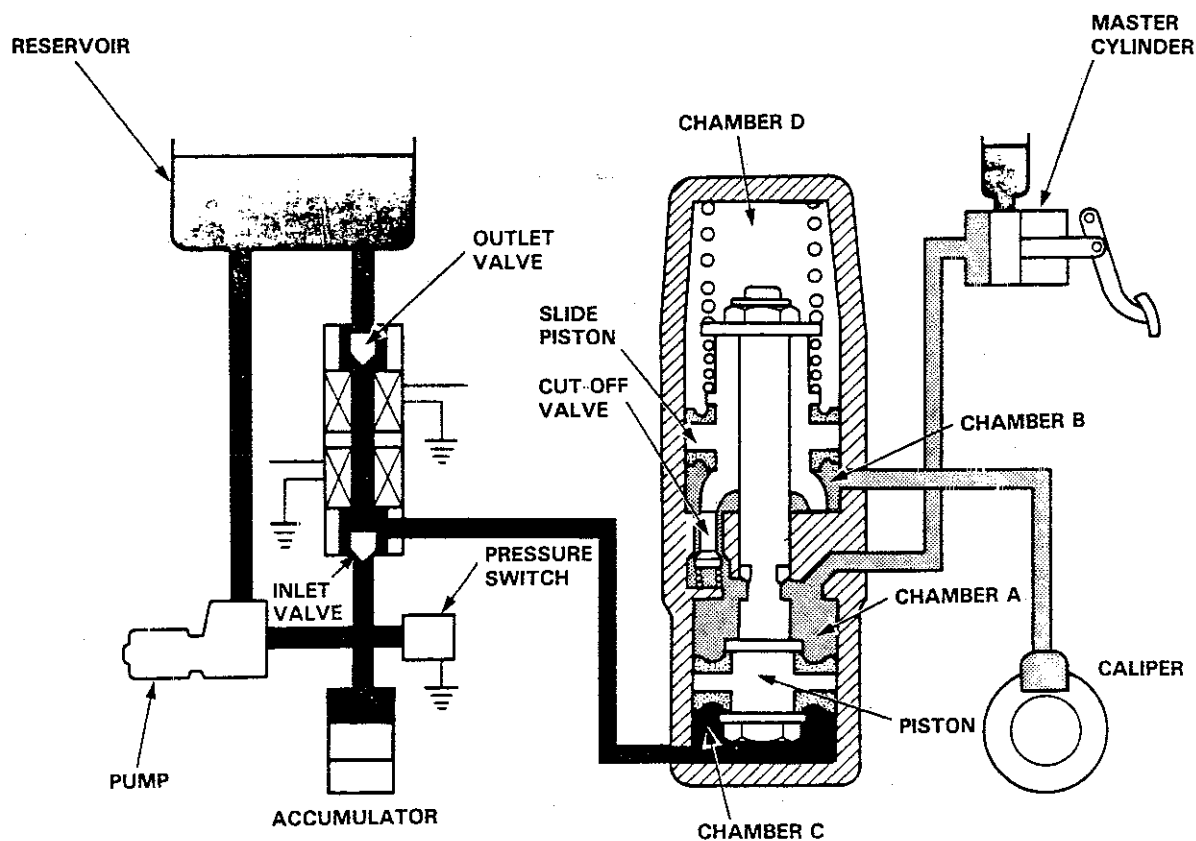
Operation

1. Ordinary Braking Function

In ordinary brake operations, the cut-off valve in the modulator is open, transmitting the hydraulic pressure from the master cylinder to the brake calipers via chamber A and chamber B.

Chamber C is connected to the reservoir through the outlet valve, which is normally open. It is also connected to the hydraulic pressure source (pump, accumulator, pressure switch, etc.) via the inlet valve, which is normally closed.

Chamber D serves as an air chamber. Under these conditions, the pressures of chambers C and D are maintained at about atmospheric pressure, permitting regular braking operations.



(cont d)

Anti-lock Brake System

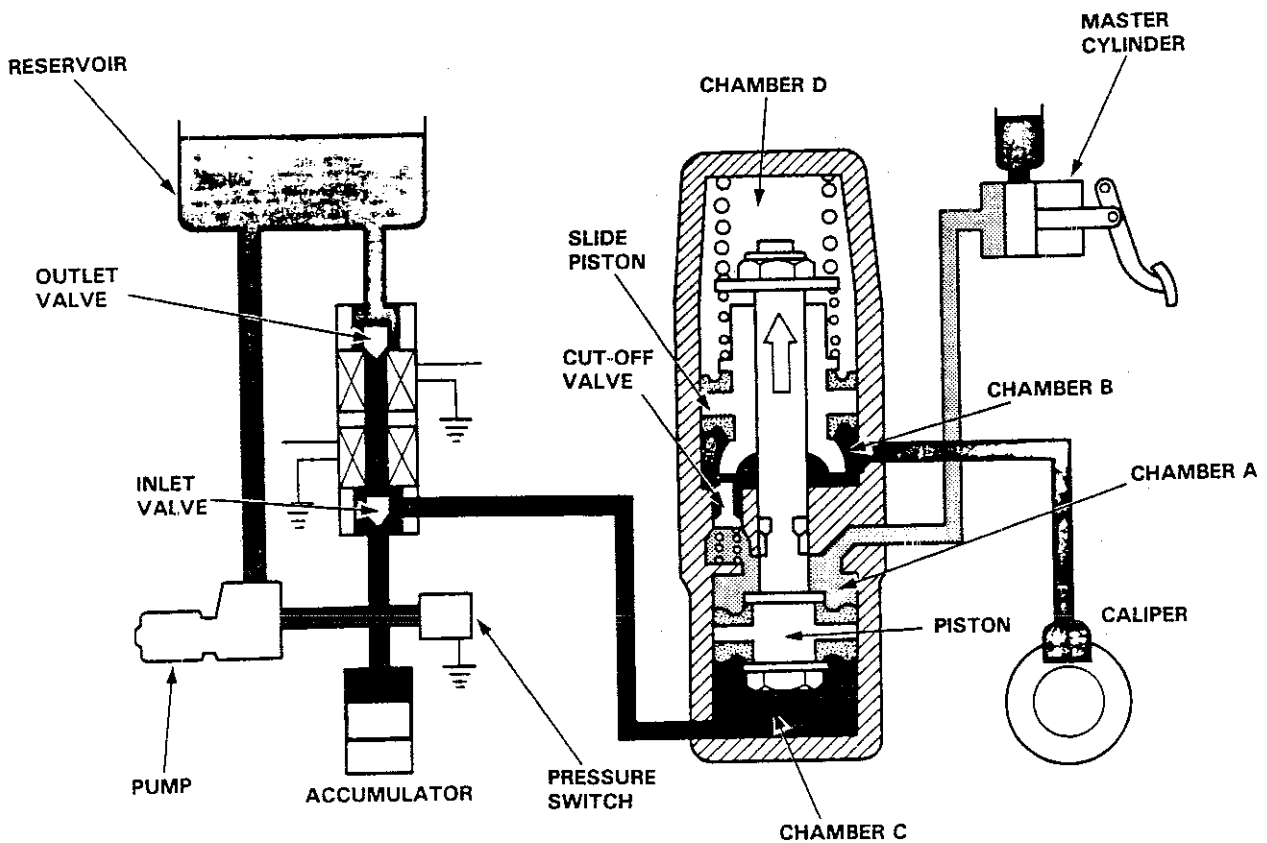
Features/Construction/Operation (cont'd)

If brake inputs (force exerted on brake pedal) are excessively large and a possibility of wheel locking occurs, the control unit operates the solenoid valve, closing the outlet valve and opening the inlet valve. As a result, the high pressure is directed into chamber C, the piston is pushed upward, causing the slide piston to move upward and the cut-off valve to close. As the cut-off valve closes, the flow from the master cylinder to the caliper is interrupted. The volume of chamber B, which is connected to the caliper, increases, and the fluid pressure in the caliper declines.

When both of the valves, inlet and outlet, are closed (when only the outlet valve is activated) the pressure in the caliper is maintained constant.

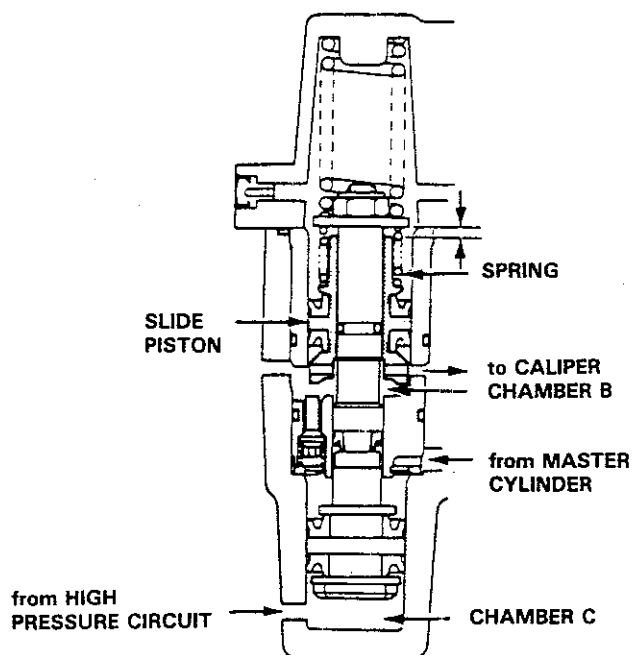
When the possibility of wheel locking ceases, it is necessary to restore the pressure in the caliper. The solenoid valve is therefore turned off (outlet valve: open, inlet valve closed).

Process	Caliper Pressure	Outlet Valve		Inlet Valve	
		Electric Power	Hydraulic Circuit	Electric Power	Hydraulic Circuit
Caliper pressure declining	→	ON	Close	ON	Open
Caliper pressure constant	→	ON	Close	OFF	Close
Caliper pressure increasing	→	OFF	Open	OFF	Close



2. Slide Piston Function

When the car is used on rough roads where the tires sometimes lose adhesion, the anti-lock brake system may function excessively, causing a very large volume of brake fluid to flow into chamber C. When this occurs, the piston is moved excessively, resulting in an abnormal loss of pressure in chamber B. In order to overcome this problem, the slide piston is kept in proper position by spring force to prevent the pressure in chamber B from becoming negative.



(cont'd)

Anti-lock Brake System

Features/Construction/Operation (cont'd)

3. Kickback

When the anti-lock brake system is functioning, the piston moves upward, the volume of chamber B increases, and the fluid pressure on the caliper side is reduced. At the same time, the volume of chamber A is reduced and the brake fluid is returned to the master cylinder. When the brake fluid is pushed back to the master cylinder, the driver can feel the functioning of the anti-lock brake system because the brake pedal is kicked back.

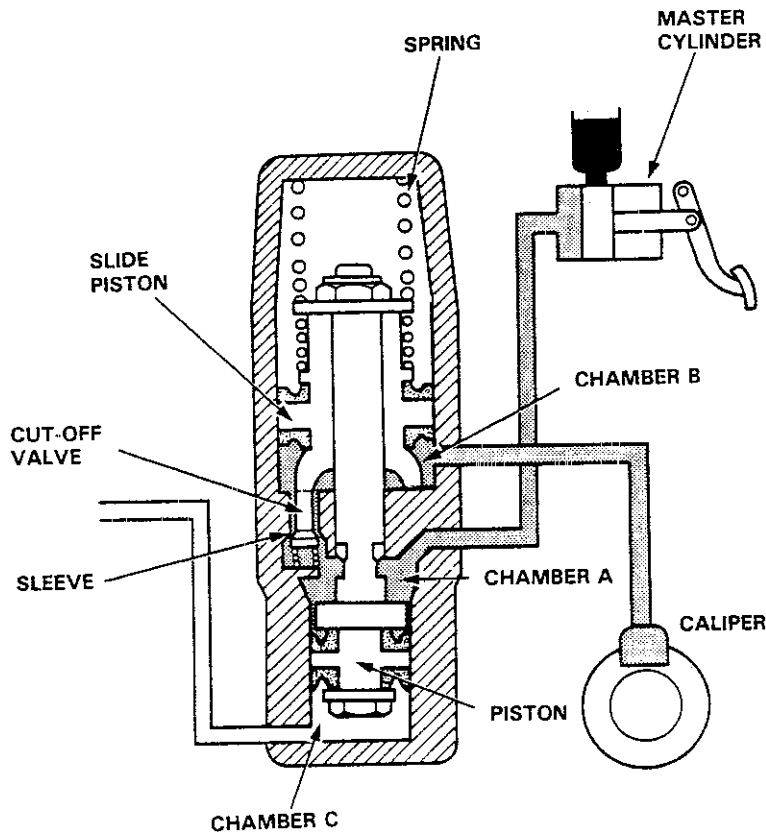
4. PCV (Proportioning Control Valve) Function

In the modulator for the rear wheels, the diameters of the piston and the slide piston are distinctly different. This provides a PCV (Proportioning Control Valve) function to prevent the rear wheels from locking during an emergency stop.

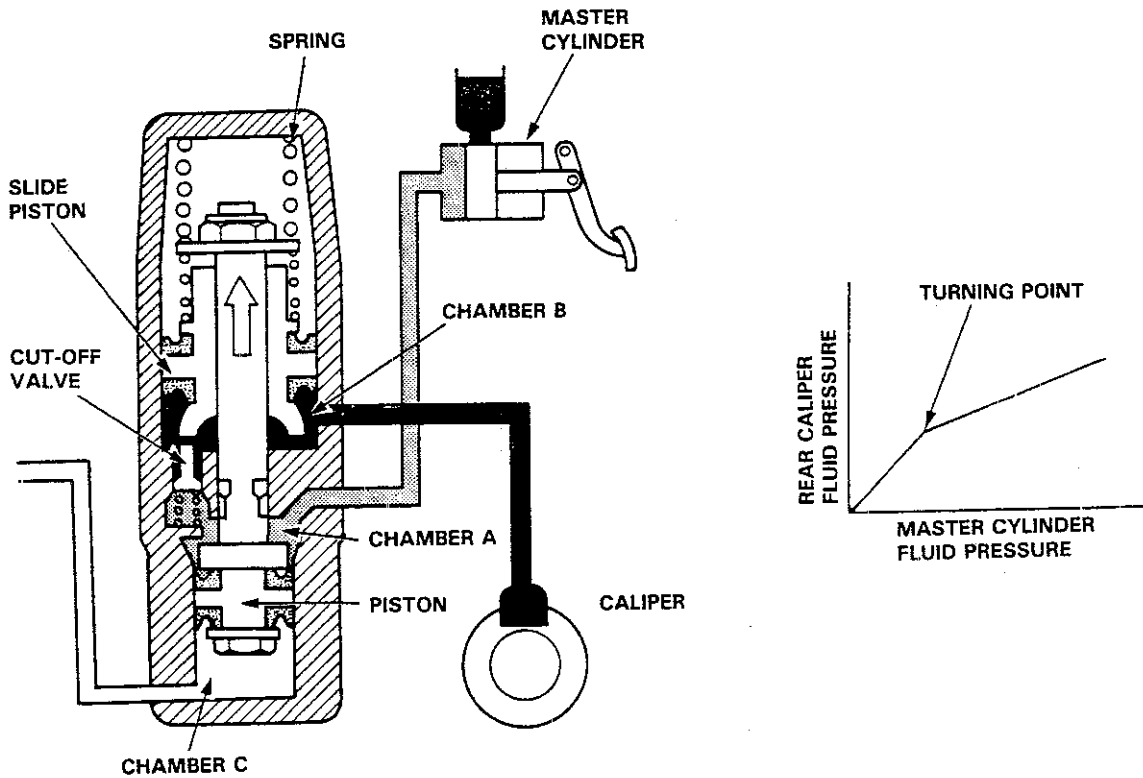
(1) Before the Turning Point:

- 1) When the fluid pressure from the master cylinder is below the turning point, the cut-off valve is always pushed downward by the force of the slide piston and its spring.

Under these conditions, there is a gap between the cut-off valve shoulder and the sleeve. Chamber A and chamber B are therefore connected through the gap. The pressure from the master cylinder flows into the rear calipers through chamber A and chamber B.



- 2) When the fluid pressure from the master cylinder reaches the turning point, the force on the slide piston overcomes the force of the spring, causing the slide piston to travel upward. The cut-off valve, previously being in contact with the bottom of the slide piston, then moves upward and the cut-off valve shoulder hits the sleeve, blocking the fluid passages (the fluid pressure at this point is called the turning point).

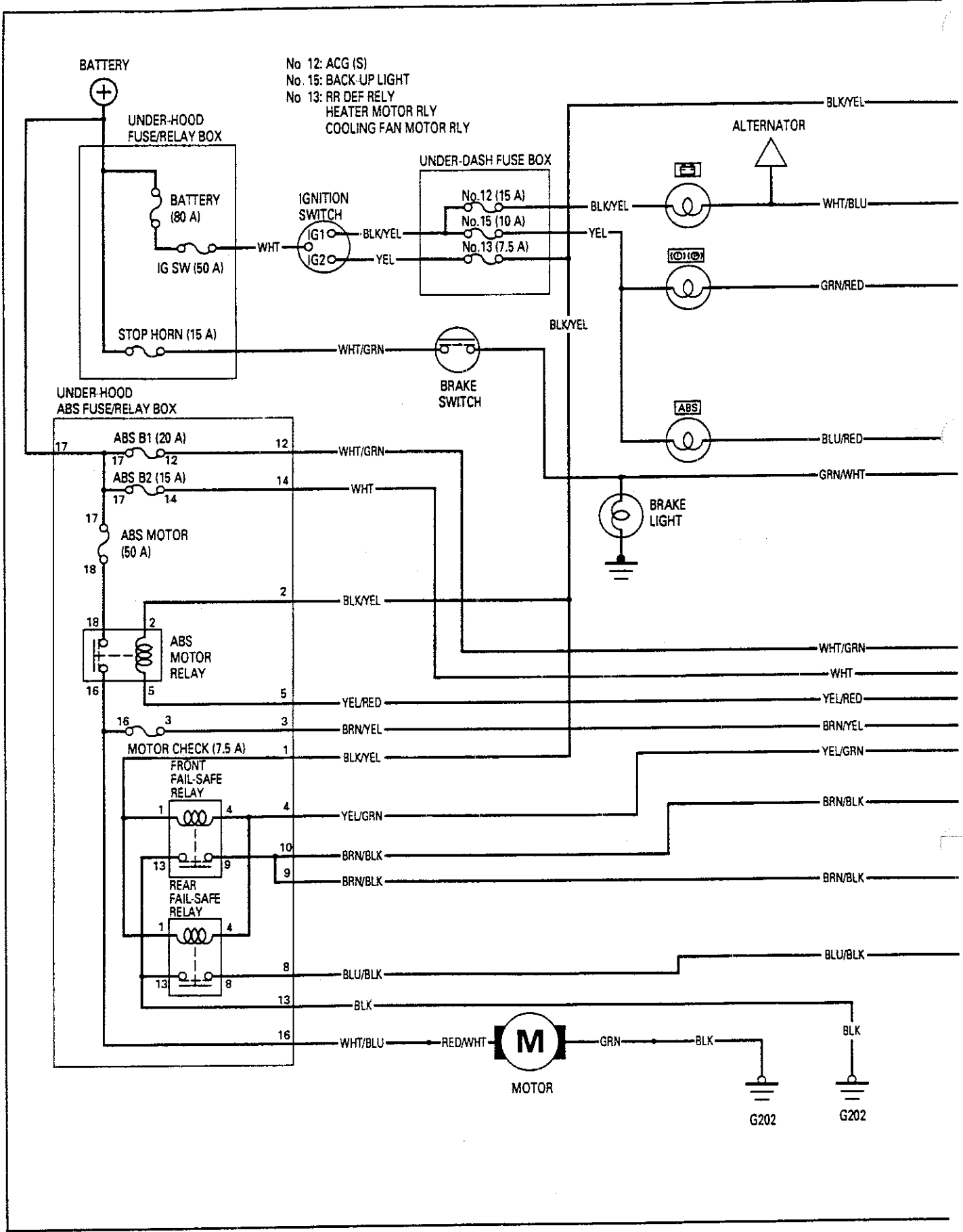


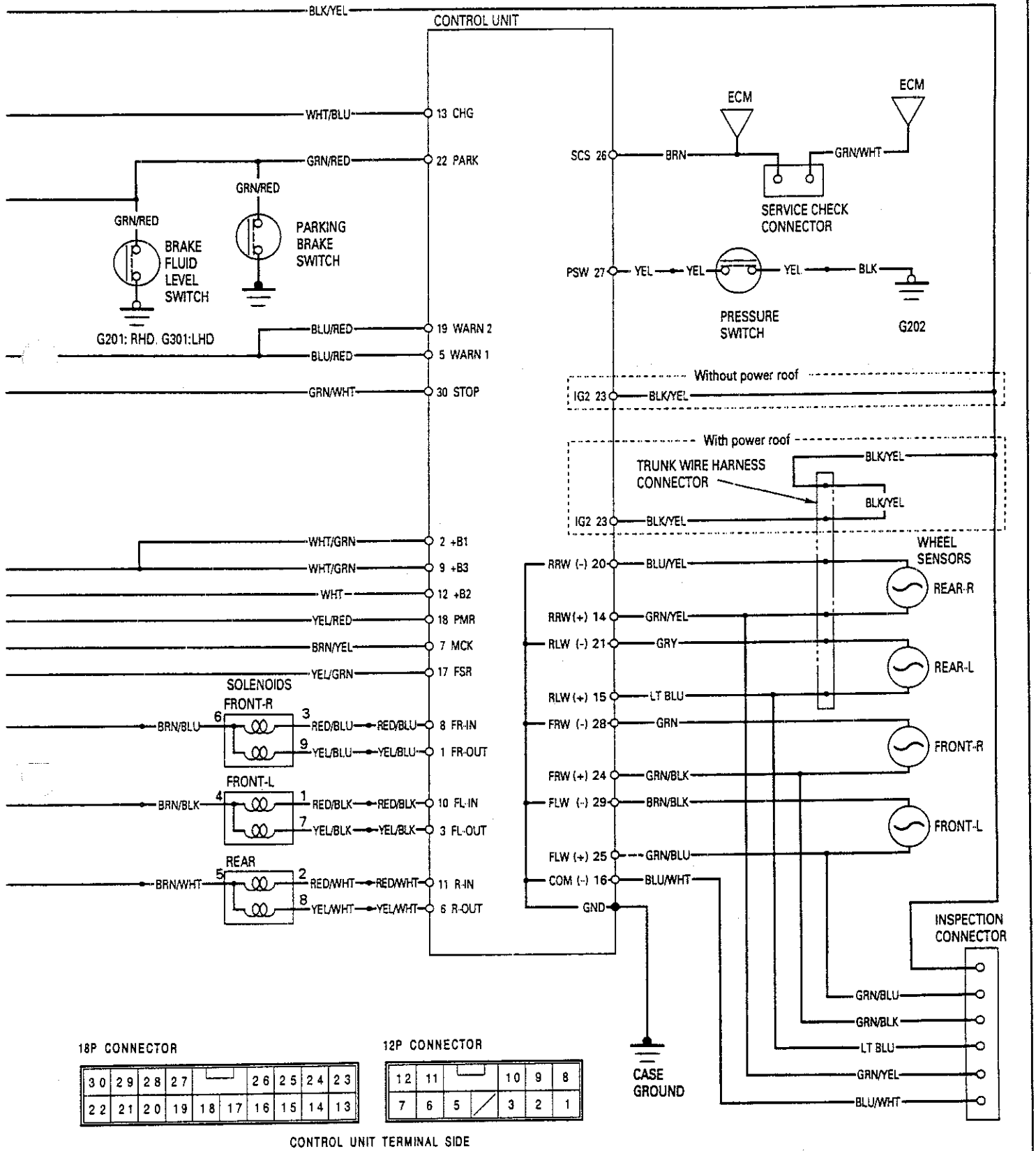
- (2) After the turning point:

As the fluid pressure from the master cylinder increases, the pressure in chamber A becomes higher, causing a force to push down the large diameter portion of the piston. Consequently, the slide piston comes down, the cut-off valve is pushed downward by the bottom of the slide piston, allowing chambers A and B to connect momentarily. As this occurs, pressure in chamber B increases, the slide piston is pushed upward, the cut-off valve goes up, and the connection between chamber A and chamber B is blocked again. As described above, when the pressure in the master cylinder is above the turning point, the slide piston reduces the pressure in the rear caliper to the prescribed amount by repeating this process.

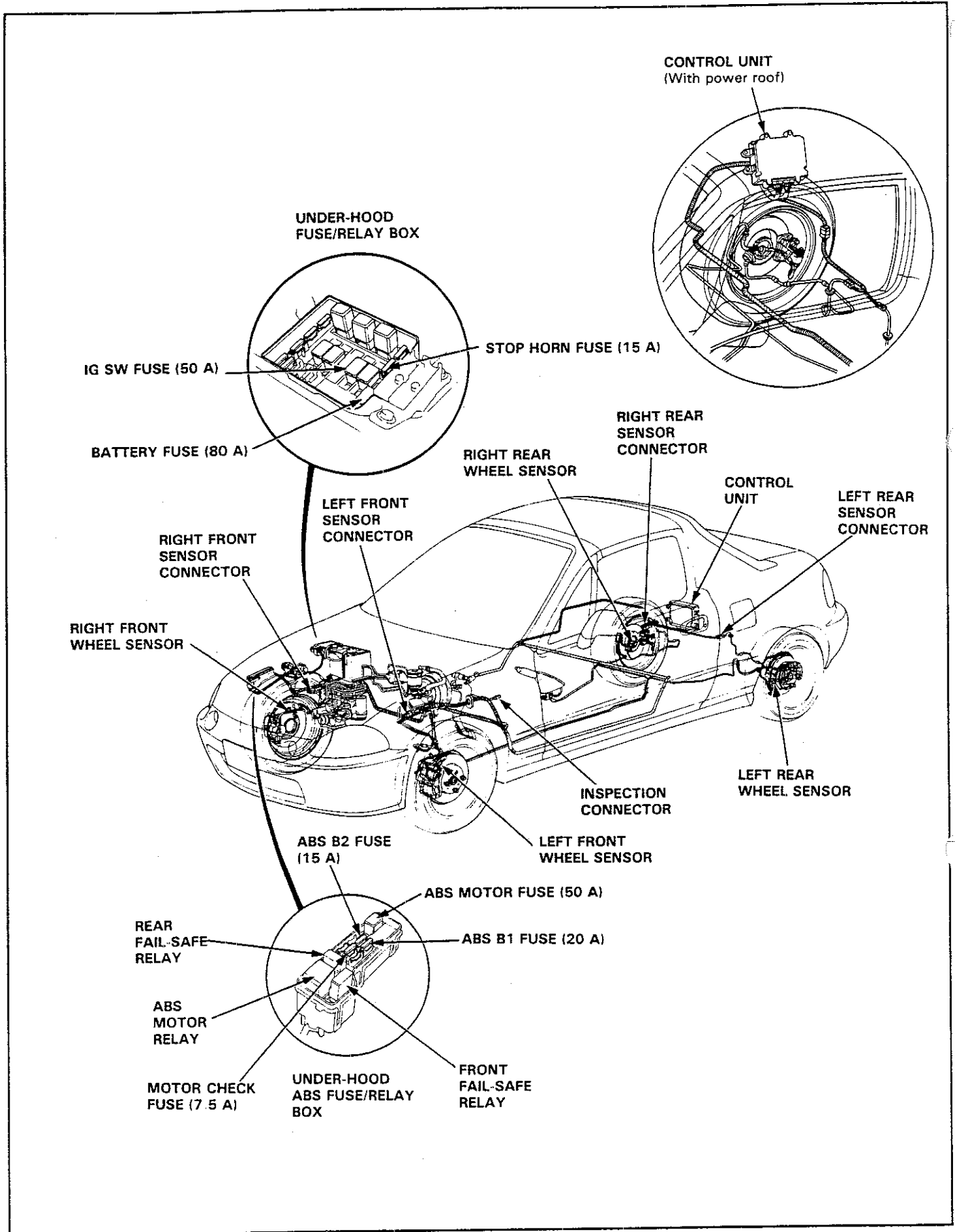
(cont'd)

Circuit Diagram





Wiring/Connector Locations



ALB Checker

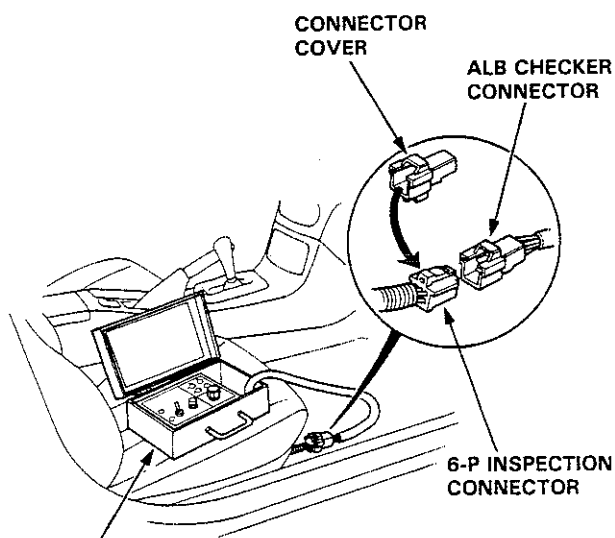
Function Test

NOTE:

- The ALB checker is designed to confirm proper operation of the anti-lock brake system by simulating each system function and operating condition. Before using the checker, confirm that the anti-lock brake system indicator light is not indicating some other problem with the system. The light should go on when the ignition is first turned on and then go off and stay off one second after the engine is started.
- The checker should be used through modes 1–5 to confirm proper operation of the system in any one of the following situations:
 - After replacing any anti-lock brake system component.
 - After replacing or bleeding the system fluid (0 mode not necessary)
 - After any body or suspension repair that may have affected the sensors or their wiring.
- The procedure for modes 1–5 are on this page and 19-58, mode 0 (wheel sensor signal) is on page 19-59.

⚠ WARNING Disconnect the ALB checker before driving the car. A collision can result from a reduction, or complete loss of braking ability causing severe personal injury or death.

1. With the ignition switch off, disconnect the 6-P inspection connector from the connector cover located on the cross-member under the passenger's seat and connect the 6-P inspection connector to the ALB checker.



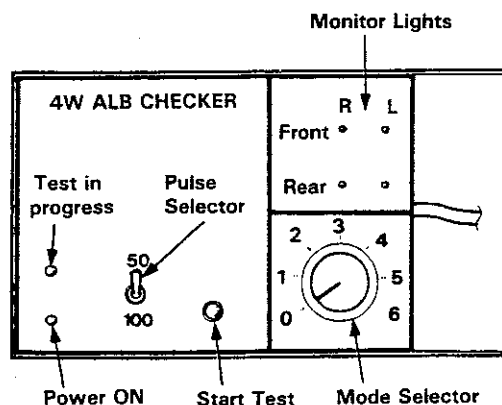
ALB CHECKER
07HAJ-SG00602

See page 19-44 for other applicable checkers

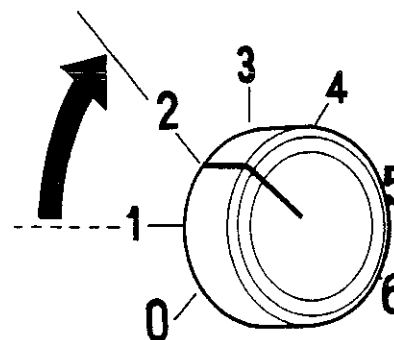
NOTE: Place the vehicle on level ground with the wheels blocked, put the transmission in neutral.

- 2 Start the engine and release the parking brake.
- 3 Operate the ALB checker as follows:
 - (1) Set the pulse selector switch to 50.
 - (2) Turn the Mode Selector switch to "1".
 - (3) Push the Start Test switch:
 - The test in progress light should come ON
 - In one or two more seconds, all four monitor lights should come on (If not the checker is faulty).
 - The anti-lock brake system indicator light should not come ON (If it comes on the checker harness to the 6-P connector connection is faulty).

NOTE: When the test in progress indicator light is ON, don't turn the Mode Selector switch.



4. Turn the Mode Selector Switch to "2".



(cont'd)

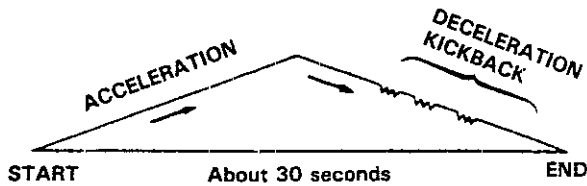
ALB Checker

Function Test (cont'd)

- 5 Depress the brake pedal firmly and push the Start Test switch.

The anti-lock brake system indicator light should not go on while the Test in Progress light is ON. There should be kickback on the brake pedal. If not as described, go to troubleshooting, page 19-64.

NOTE: The operation sequence simulated by Modes 2, 3, 4 and 5:



- 6 Turn the Mode Selector switch to 3, 4 and 5. Perform step 5 for each of the test mode positions.

Mode 1:

Sends the simulated driving signal 0 km/h (0 mph) → 180 km/h (112.5 mph) → 0 km/h (0 mph) of each wheel to the control unit to check the control unit self diagnosis circuit. There should be NO kickback.

Mode 2:

Sends the driving signal of each wheel, then sends the lock signal of the left rear wheel to the control unit. There should be kickback.

Mode 3:

Sends the driving signal of each wheel, then sends the lock signal of the right rear wheel to the control unit. There should be kickback.

Mode 4:

Sends the driving signal of each wheel, then sends the lock signal of the left front wheel to the control unit. There should be kickback.

Mode 5:

Sends the driving signal of each wheel, then sends the lock signal of the right front wheel to the control unit. There should be kickback.

Mode 6:

Not used on this model.

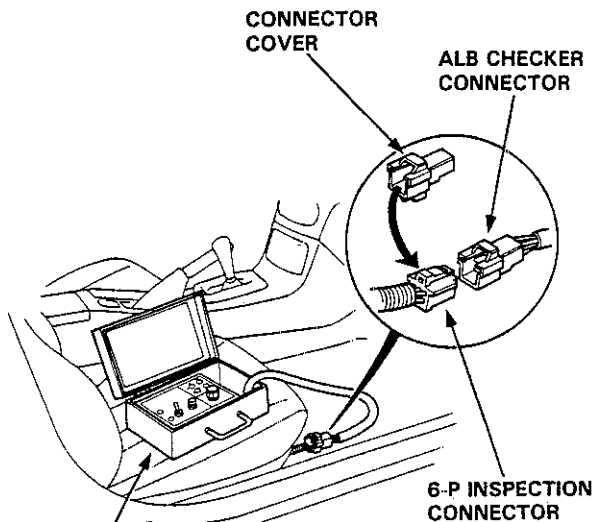
Inspection points:

1. The anti-lock brake system indicator light comes ON in mode 1.
 - Check the wiring.
2. There is no kickback in modes 2 through 5.
 - Shorted wires.
 - Faulty or disconnected pump assembly connector
 - Faulty pump assembly.

Wheel Sensor Signal Confirmation

NOTE: Use the ALB checker (mode 0) to confirm proper wheel sensor operation.

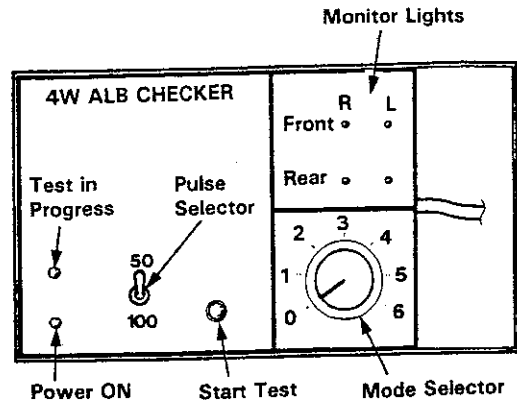
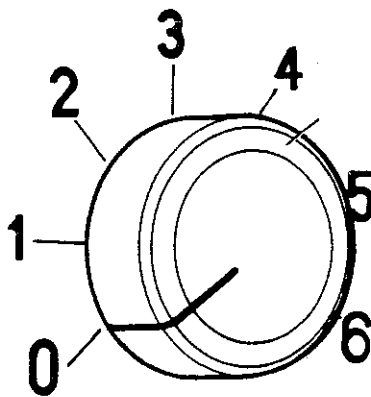
1. Disconnect the 6-P inspection connector from the connector cover located on the cross-member under the passenger's seat and connect the 6-P inspection connector to the ALB checker.



ALB CHECKER
07HAJ-SG00602

See page 19-44 for other applicable checkers.

2. Raise the car so that all four wheels are off the ground and support on safety stands.
3. Set the pulse selector switch to 50
4. Turn the ignition switch ON.
5. Turn the Mode Selector switch to '0'.



6. With the transmission in neutral, rotate each wheel briskly (one revolution per second) by hand and confirm that its respective monitor light on the checker blinks as the wheel rotates.

NOTE:

- Rotating a wheel too slowly will produce only a weak blink of its monitor light that may be difficult to see
- In bright sunlight, the monitor light may be difficult to see. Perform tests in a shaded area.
- In some instances, it may not be possible to spin the front wheels fast enough to get a monitor indication. If necessary, start the engine and slowly accelerate and decelerate the front wheels. The monitor lights should blink, indicating a good wheel sensor signal

If any monitor light fails to blink, check the suspected sensor, its air gap and its wiring/connectors.

Troubleshooting

Anti-lock Brake System Indicator Light

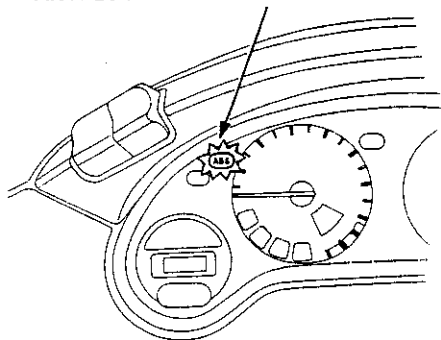
Temporary Driving Conditions:

1. The anti-lock brake system indicator light comes on and the control unit memorizes the problem under certain conditions

NOTE: Diagnostic trouble codes are explained on page 19-60

- The tire(s) adhesion is lost due to excessive cornering speed
Diagnostic trouble codes: 5, 5-4, 5-8.
 - The vehicle loses traction when starting from a stuck condition on a muddy, snowy, or sandy road.
Diagnostic trouble code: 4-1, 4-2, 4-4, 4-8.
 - When the parking brake is applied for more than 30 seconds while the vehicle is being driven
Diagnostic trouble code: 2-1.
 - The vehicle is driven on an extremely rough road.
2. The anti-lock brake system is OK if the anti-lock brake system indicator light goes off after the engine is restarted.

ANTI-LOCK BRAKE SYSTEM INDICATOR LIGHT



3. If you receive a customer's report that the anti-lock brake system indicator light sometimes comes on, check the system using the ALB checker to confirm whether there is any trouble in the system. See page 19-61.
4. The anti-lock brake system indicator light will come on and the control unit will memorize a diagnostic trouble code when there is insufficient battery voltage to the control unit. An example would be when the battery is so weak that the car must be jump-started. After the battery is sufficiently recharged, the anti-lock brake system indicator light will work normally after the engine is stopped and restarted.

However, after recharging the battery, the diagnostic trouble code must be cleared from the control unit's memory by disconnecting the ABS B2 (15 A) fuse for at least 3 seconds

Anti-lock Brake System Indicator Light Circuit:

CAUTION: Use only the digital multimeter to check the system.

1. The indicator light does not go on when the ignition switch is turned on.

Check the following items. If they are OK, check the control unit connectors. If not loose or disconnected, substitute a known-good control unit and recheck:

- Blown anti-lock brake system indicator light bulb.
 - Open circuit in YEL. wire between the No 15 BACK-UP LIGHT (10 A) fuse and gauge assembly.
 - Open circuit in BLU/RED wire between the gauge assembly and control unit
 - Poor ground connection between the control unit and the body.
2. The anti-lock brake system indicator light remains ON after the engine is started, however the anti-lock brake system indicator light does not blink any code or sub-code. Check the following items:

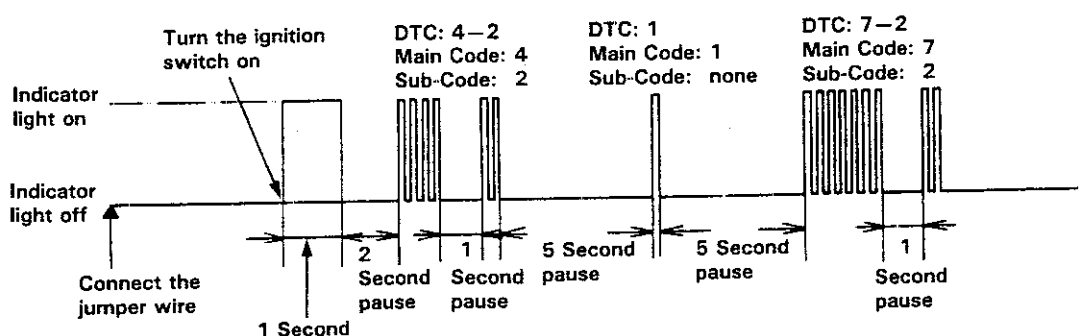
- Loose or poor connection of the wire harness at the control unit.
- Faulty ABS B2 (15 A) fuse.
- Open circuit in WHT wire between the ABS B2 (15 A) fuse and control unit
- Open circuit in BLK/YEL. wire between the No 13 RR DEF RLY/HEATER MOTOR RLY/COOLING FAN MOTOR RLY (7.5 A) fuse and control unit.
- Short circuit in BLU/RED wire between gauge assembly and control unit.
- Open circuit in WHT/BLU wire between alternator and control unit.

If the problem is not found, substitute a known-good control unit and recheck whether the anti-lock brake system indicator light remains ON.

Comes on and remains on while running:

1. Stop the engine.
2. Turn the ignition switch on and make sure that the anti-lock brake system indicator light comes on.
3. Restart the engine and check the anti-lock brake system indicator light.
 - There is no problem in the anti-lock brake system if the anti-lock brake system indicator light goes off.
 - Go to step 4 if the anti-lock brake system indicator light goes off and then comes back on.
4. Stop the engine.
5. Disconnect the service check connector from the connector cover located under the glove box. Connect the two terminals of the service check connector with a jumper wire.
6. Turn the ignition switch on, but do not start the engine.
7. Record the blinking frequency of the anti-lock brake system indicator light. The blinking frequency indicates the diagnostic trouble code (DTC).

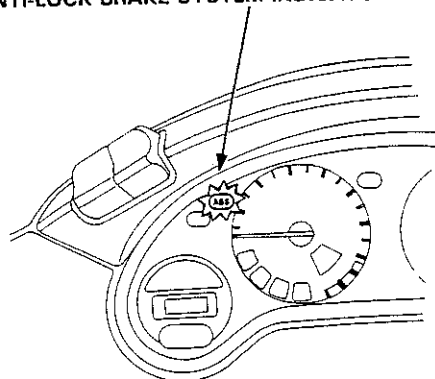
CAUTION: Before starting the engine, disconnect the jumper wire from the service check connector, or else the Malfunction Indicator Light (MIL) will stay on with the engine running.



NOTE:

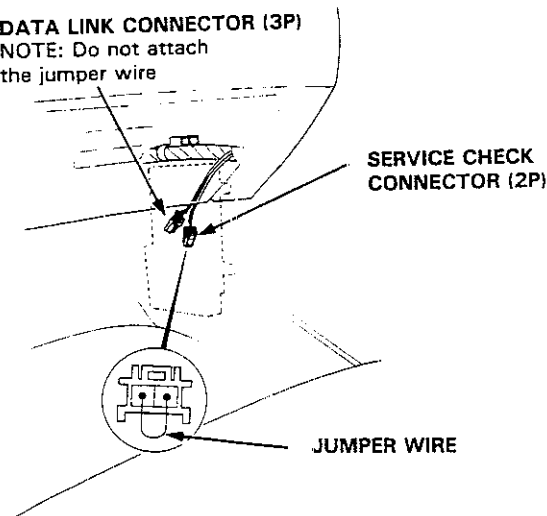
- The control unit can indicate three diagnostic trouble codes (one, two or three troubles).
- If the anti-lock brake system indicator light does not light, see Troubleshooting of Anti-lock Brake System Indicator Light Circuit page 19-64.
- If you miscount the blinking frequency, turn the ignition switch off then on to cycle the anti-lock brake system indicator light again.
- After the repair is completed, disconnect the ABS B2 (15 A) fuse for at least 3 seconds to erase the control unit's memory. Then turn the ignition key on again and recheck.
- The memory is erased if the connector is disconnected from the control unit or the control unit is removed from the body.
- After recording the main and sub-code (if applicable), refer to the Symptom-to-System Chart.

ANTI-LOCK BRAKE SYSTEM INDICATOR LIGHT



DATA LINK CONNECTOR (3P)

NOTE: Do not attach the jumper wire



Troubleshooting

Symptom-to-System Chart

DIAGNOSTIC TROUBLE CODE		PROBLEMATIC COMPONENT/ SYSTEM	AFFECTED				See page	OTHER COMPONENT	See page
MAIN CODE	SUB-CODE		FRONT RIGHT	FRONT LEFT	REAR RIGHT	REAR LEFT			
①	-	Pump motor over-run	-	-	-	-	19-67	Solenoid Pump motor Pressure switch	
	②	Pump motor circuit problem	-	-	-	-	19-69	Motor relay Motor check fuse Motor fuse	19-105
	③	High pressure leakage	-	-	-	-	19-72	Solenoid	19-95
	④	Pressure switch	-	-	-	-	19-73		
	⑧	Accumulator gas leakage	-	-	-	-	19-74	Pump motor	
②	①	Parking brake switch-related problem	-	-	-	-	19-74	Brake fluid level switch, BRAKE indicator light	
③	①	Pulser(s)	○				19-106	Wheel sensor installation	
	②			○					
	④				○	○			
④	①	Wheel sensor	○				19-75		
	②			○					
	④				○				
	⑧					○			
⑤	-	Wheel sensor(s)			○	○	19-77	Modulator Rear brake drag	
	④				○				
	⑧					○			
⑥	-	Fail-safe relay (Open, short)		○		○	19-79 (Function Test)		19-105
	①			○		-			
	④			-		○			
⑦	①	Solenoid related problem (Open)	○				19-85	ABS B1 fuse Front fail-safe relay	
	②			○					
	④					○	○	19-88 Rear fail-safe relay	

Flowcharts

Diagnostic Trouble Code 1: Pump Motor Over-run

CAUTION: Use only the digital multimeter to check the system.

Bleed high pressure fluid from the maintenance bleeder with the Bleeder T-wrench (page 19-92).

Remove the pump motor relay

Connect the No 16 and 18 terminals using a jumper wire for about 8 seconds.

Does the pump motor run with an increasingly loud, raspy sound?

NO

Pump runs with a constant soft sound:
Bleed air from anti-lock brake system using the procedure on page 19-97 and check the pump sound again.

YES

Check the accumulator fluid quantity by bleeding the high pressure line with the Bleeder T-wrench.

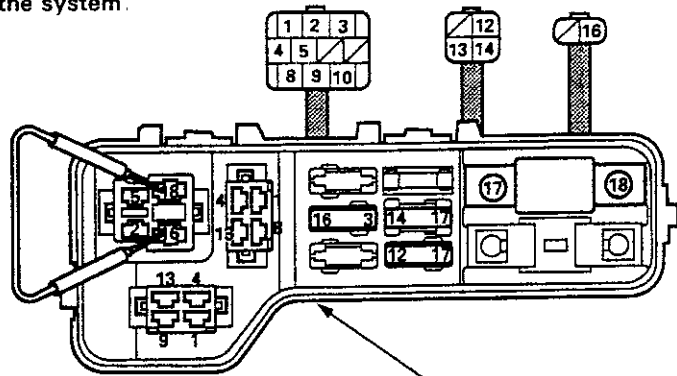
Is there 40–70 cc?

NO

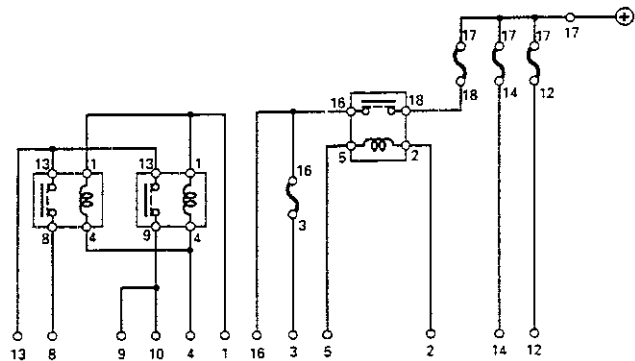
(To page 19-68)

YES

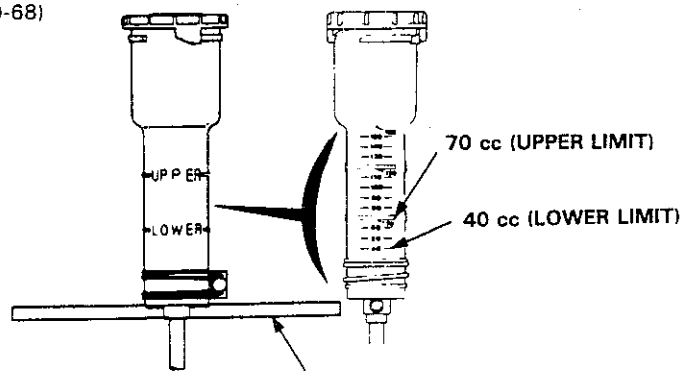
(To page 19-68)



UNDER-HOOD ABS FUSE/RELAY BOX



UNDER-HOOD ABS FUSE/RELAY BOX CIRCUIT DIAGRAM



BLEEDER T-WRENCH
07HAA-SG00100
or 07HAA-SG00101

(cont'd)

Troubleshooting

Flowcharts (cont'd)

(From page 19-67)

(From page 19-67)

Connect the No 16 and No 18 terminals using a jumper wire for about 10 seconds.

Check if there is any change in the fluid level in the reservoir tank.

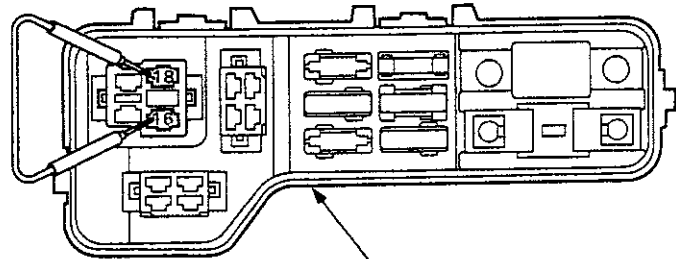
Is there any change?

NO

Faulty pump motor (Relief valve is defective and open).

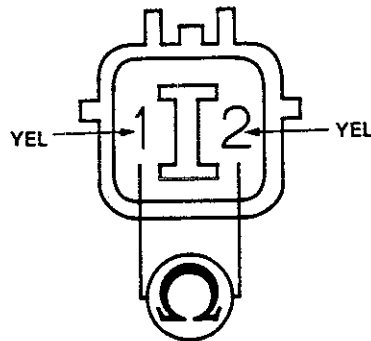
YES

Faulty solenoid (leakage).



UNDER-HOOD ABS FUSE/RELAY BOX

SWITCH-SIDE CONNECTOR



View from terminal side

Connect the No 16 and No 18 terminals using a jumper wire for about 10 seconds.

Disconnect the pressure switch 2-P connector and check the continuity between the No 1 (YEL) and No 2 (YEL) terminals

Is there continuity?

NO

Faulty pressure switch.

YES

Vehicle is OK at this time.

Diagnostic Trouble Code 1-2: Pump Motor Circuit Problem

CAUTION: Use only the digital multimeter to check the system.

NOTE: If a malfunction is detected, this code appears and the fail-safe function is activated. The indicator light comes ON after restarting the engine until the diagnostic trouble code is erased (by disconnecting the ABS B2 fuse for 3 seconds).

Pre-test steps:

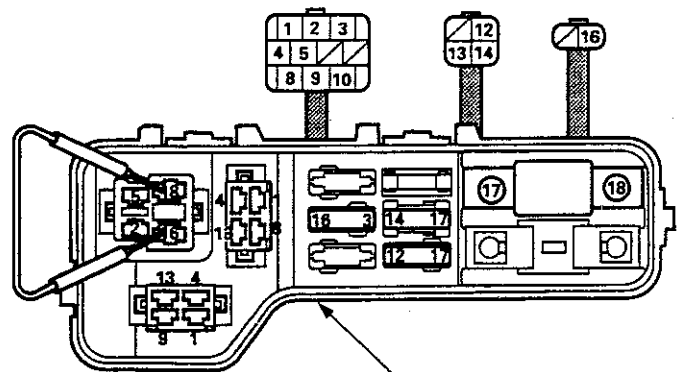
- Check ABS MOTOR (50 A) FUSE
- Check MOTOR CHECK (7.5 A) FUSE
- Check for loose under-hood ABS fuse/relay box connectors

Remove and check the pump motor relay (page 19-105).

Does it work properly? NO Faulty pump motor relay

YES

Connect the No. 16 and No. 18 terminals using a jumper wire.



UNDER-HOOD ABS FUSE/RELAY BOX

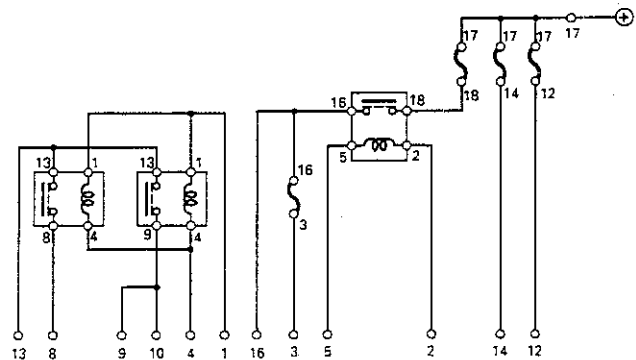
Does the pump motor run? NO (To page 19-71)

YES

Disconnect the jumper wire.

Disconnect the 2-P connector from the pump motor.

(To page 19-70)



UNDER-HOOD ABS FUSE/RELAY BOX
CIRCUIT DIAGRAM

(cont'd)

Troubleshooting

Flowcharts (cont'd)

(From page 19-69)

Remove the MOTOR CHECK (7.5 A) fuse from under-hood ABS fuse/relay box

Turn the ignition switch ON.

Check for voltage between the under-hood ABS fuse/relay box MOTOR CHECK fuse No. 3 terminal and body ground

Is there battery voltage?

NO

Repair open in BRN/YEL wire between the MOTOR CHECK fuse and control unit

YES

Reinstall the fuse in the under-hood ABS fuse/relay box.

Check for voltage between the pump motor relay No. 16 terminal (+) and body ground (-).

Is there battery voltage?

NO

Faulty under-hood ABS fuse/relay box

YES

Check for voltage between the No 2 terminal and body ground

Is there battery voltage?

NO

Repair open in BLK/YEL wire between the No. 13 RR DEF RLY/HEATER MOTOR RLY/COOLING FAN MOTOR RLY (7.5 A) fuse and pump motor relay.

YES

Reinstall the pump motor relay.

Disconnect the 18-P connector from the control unit

Check for voltage between the control unit connector YEL/RED (PMR) terminal and body ground.

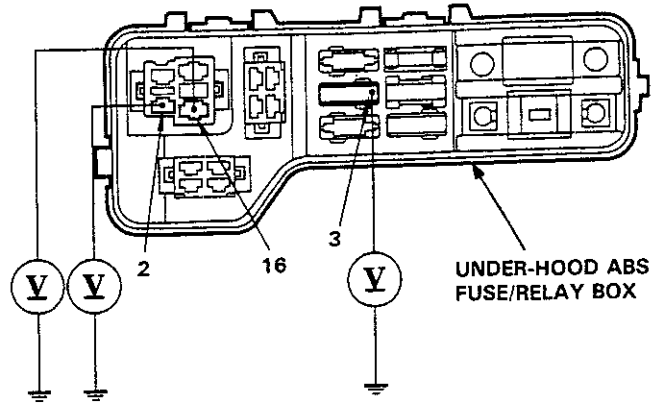
Is there battery voltage?

NO

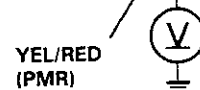
Repair open in YEL/RED wire between the pump motor relay and control unit.

YES

Check for loose control unit connectors. If necessary, substitute a known-good control unit and recheck.



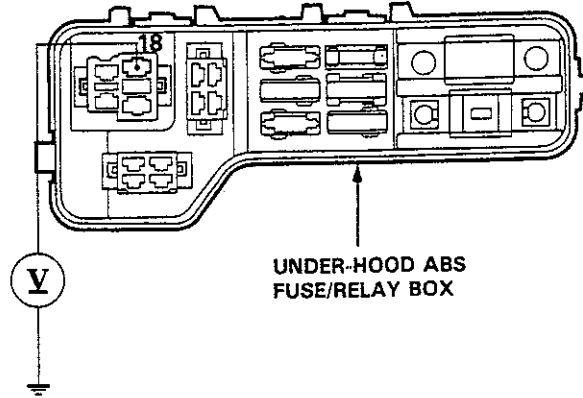
18-P CONNECTOR



View from control unit terminal side.

(From page 19-69)

Check for voltage between the No. 18 terminal (+) and body ground (-)



UNDER-HOOD ABS FUSE/RELAY BOX

Is there battery voltage?

NO

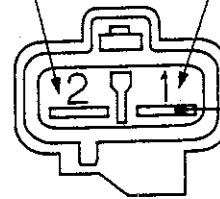
Faulty under-hood ABS fuse/relay box.

YES

Disconnect the 2-P connector from the pump motor.

HARNESS-SIDE CONNECTOR

BLK (GROUND) WHT/BLU (MOTOR RELAY)



View from terminal side.

Check for voltage between the No. 1 (WHT/BLU) terminal (+) and body ground (-)

Is there battery voltage?

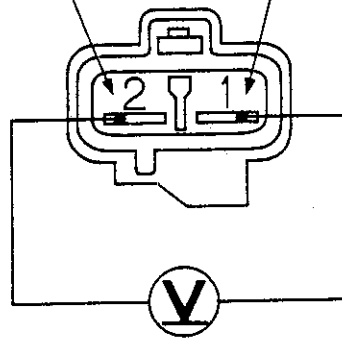
NO

Repair open in WHT/BLU wire between the motor relay and pump motor.

YES

Check for voltage between the No. 1 (WHT/BLU) terminal (+) and No. 2 (BLK) terminal (-).

HARNESS-SIDE CONNECTOR
BLK (GROUND) WHT/BLU (MOTOR RELAY)



View from terminal side.

Is there battery voltage?

NO

Repair open in BLK wire between the pump motor and ground or poor ground (G202)

YES

Faulty pump motor.

(cont'd)

Troubleshooting

Flowcharts (cont'd)

Diagnostic Trouble Code 1-3: High Pressure Leakage

CAUTION: Use only the digital multimeter to check the system.

Pre-test steps:

- Check reservoir fluid level, and if necessary, fill to the MAX level.
- Check for fluid leaks from the functional parts and replace the faulty parts if there is a leak.

Functional parts:

- Modulator
- Pump assembly
- High pressure hose/pipe

Bleed high pressure fluid from the maintenance bleeder with the Bleeder T-wrench (page 19-92).

Remove the pump motor relay

Connect the No 16 and No 18 terminals using a jumper wire for about 10 seconds

Disconnect the 2-P connector from the pressure switch.

After 30 minutes, check for continuity between the No. 1 (YEL) and No 2 (YEL) terminals on the switch side of connector.

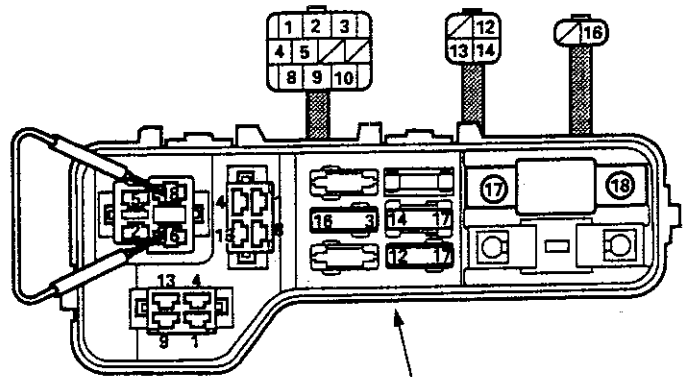
Is there continuity?

YES

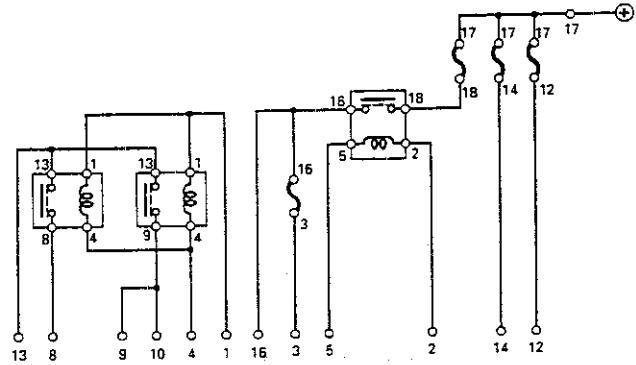
Vehicle is OK at this time.

NO

Faulty solenoid (leakage).

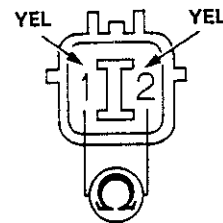


UNDER-HOOD ABS FUSE/RELAY BOX



UNDER-HOOD ABS FUSE/RELAY BOX CIRCUIT DIAGRAM

SWITCH-SIDE CONNECTOR



View from terminal side.

Diagnostic Trouble Code 1-4: Pressure Switch Circuit

CAUTION: Use only the digital multimeter to check the system.

Bleed high pressure fluid from the maintenance bleeder with the Bleeder T-wrench (page 19-92).

Disconnect the 2-P connector from the pressure switch.

Check the continuity of pressure switch between the No 1 (YEL) and No 2 (YEL) terminals

Is there continuity?

YES
Faulty pressure switch (closed).

NO

Check for continuity between the No 1 (YEL) terminal and body ground on the harness-side connector

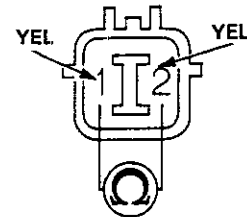
Is there continuity?

YES
Repair short in YEL wire between the control unit and pressure switch.

NO

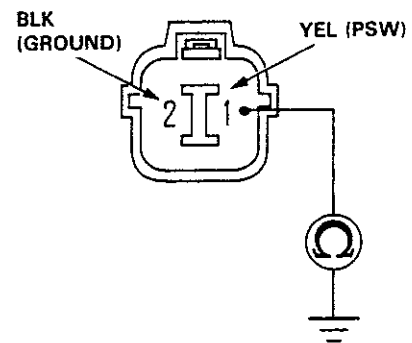
Check for loose control unit connectors. If necessary, substitute a known-good control unit and recheck.

SWITCH-SIDE CONNECTOR



View from terminal side.

HARNESS-SIDE CONNECTOR



View from terminal side

(cont'd)

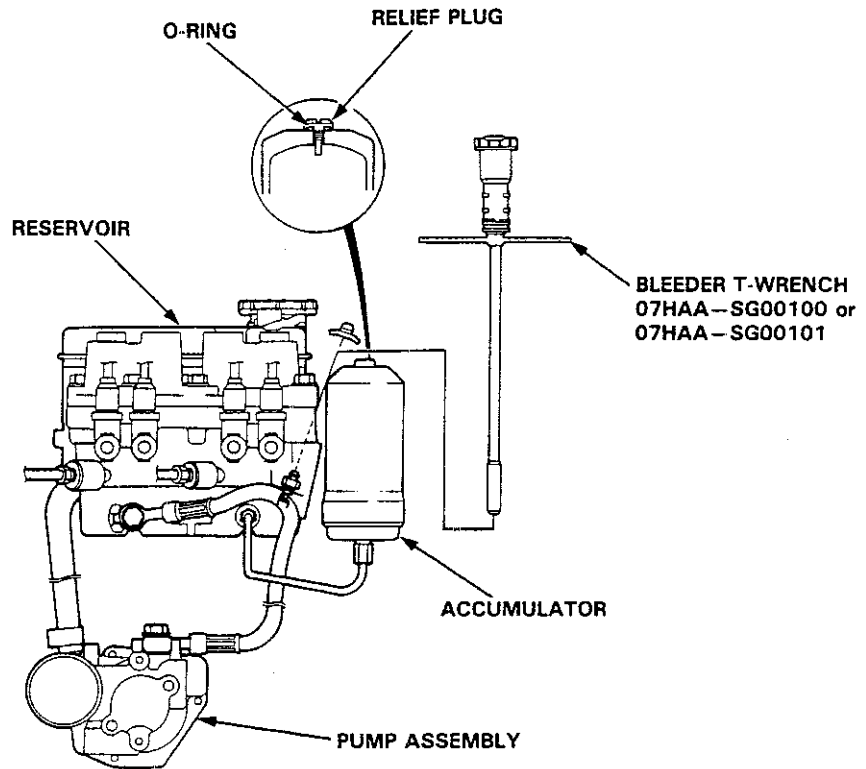
Troubleshooting

Flowcharts (cont'd)

Diagnostic Trouble Code 1-8: Accumulator Gas Leakage

Check the following items:

- The relief plug is loose.
- The relief plug O-ring is out of place.
- Bleed the high pressure line with the Bleeder T-wrench. Operate the pump motor for 10 seconds and bleed the high pressure line again with the Bleeder T-wrench. If no fluid or more than 70 cc of fluid comes out, replace the accumulator. If 40–70 cc of fluid comes out, replace the pump assembly (faulty relief valve).



Diagnostic Trouble Code 2-1: Parking Brake Switch Related Problem

If the parking brake has been released, the following items are possible causes. If they are OK, check the control unit connectors for good connection. If not loose or disconnected, substitute a known-good control unit and recheck.

NOTE: Before Diagnostic Trouble Code 2-1, remove the ABS B2 (15 A) fuse for 3 seconds to clear the control unit's memory, then test drive the car.

If the anti-lock brake system indicator light stays off, the probability is that the car was driven with the parking brake applied.

- The parking brake is applied for more than 30 seconds while driving.
- The brake fluid level in the master cylinder is too low.
- GRN/RED wire is shorted between the **BRAKE** indicator light and parking brake switch.
- GRN/RED wire is shorted between the **BRAKE** indicator light and brake fluid level switch.
- The **BRAKE** indicator light is blown.
- GRN/RED has an open between the **BRAKE** indicator light and the control unit.

Diagnostic Trouble Code 4-1 to 4-8: Wheel Sensor

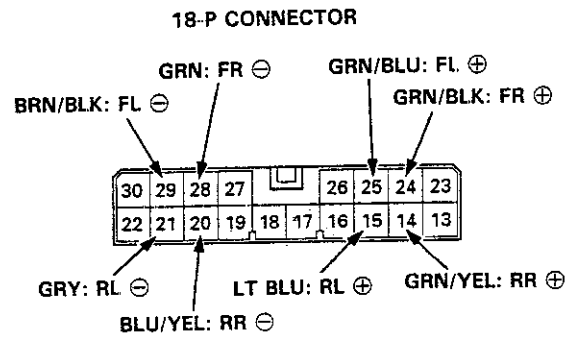
CAUTION: Use only the digital multimeter to check the system.

NOTE: If a malfunction is detected, this code appears and the fail-safe function is activated. The indicator light may come ON after restarting the engine until the diagnostic trouble code is erased (by disconnecting the ABS B2 fuse for 3 seconds).

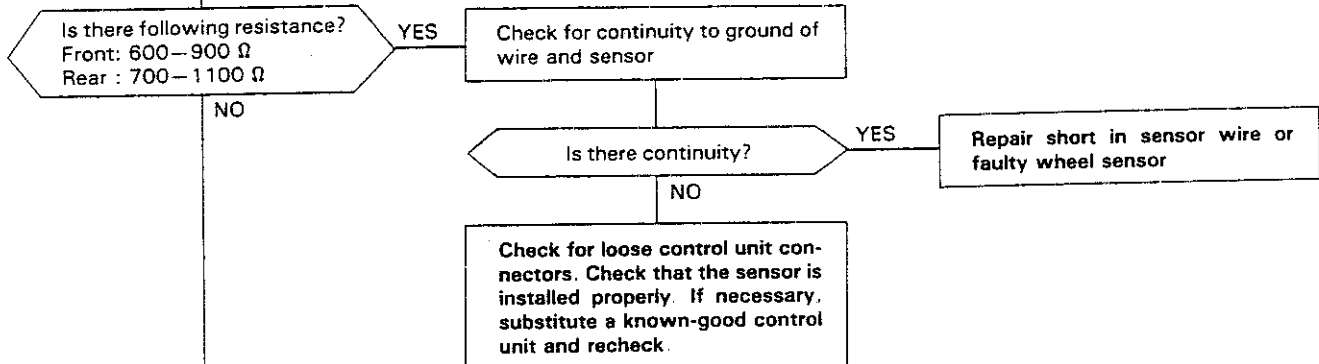
Disconnect the 18-P connector from the control unit.

Check each sensor for continuity between the positive and negative:

- GRN/BLK: Front Right Positive
GRN: Front Right Negative
- GRN/BLU: Front Left Positive
BRN/BLK: Front Left Negative
- GRN/YEL: Rear Right Positive
BLU/YEL: Rear Right Negative
- LT BLU: Rear Left Positive
GRY: Rear Left Negative



View from control unit terminal side.



(To page 19-76)

(cont'd)

Troubleshooting

Flowcharts (cont'd)

(From page 19-75)

Disconnect the 2-P connector of the wheel sensor.

Check for resistance between the sensor terminals.

Is there following resistance?
Front: 600–900 Ω
Rear : 700–1100 Ω

NO

Faulty wheel sensor

YES

Reconnect the 18-P connector to the control unit.

Check each wire for continuity between the wheel sensor harness-side terminals and body ground.

Is there continuity?

NO

Repair open in wire harness.

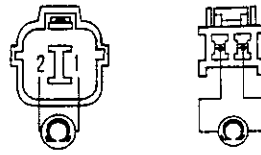
YES

Check for loose wheel sensor connectors. If necessary, substitute a known-good control unit and recheck.

SENSOR-SIDE CONNECTOR

FRONT

REAR

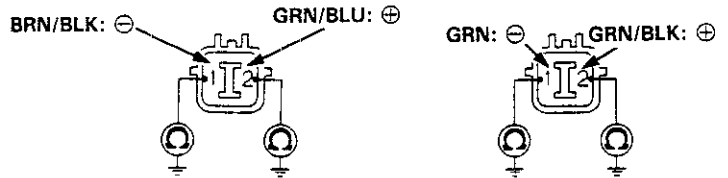


View from terminal side

HARNESS-SIDE CONNECTOR

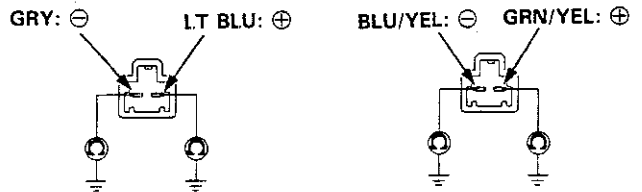
FRONT LEFT

FRONT RIGHT



REAR LEFT

REAR RIGHT



View from terminal side

Positive: 3.3 kΩ ± 15% is OK
Negative: Less than 1 Ω is OK

Diagnostic Trouble Code 5 to 5-8: Wheel Sensor(s)

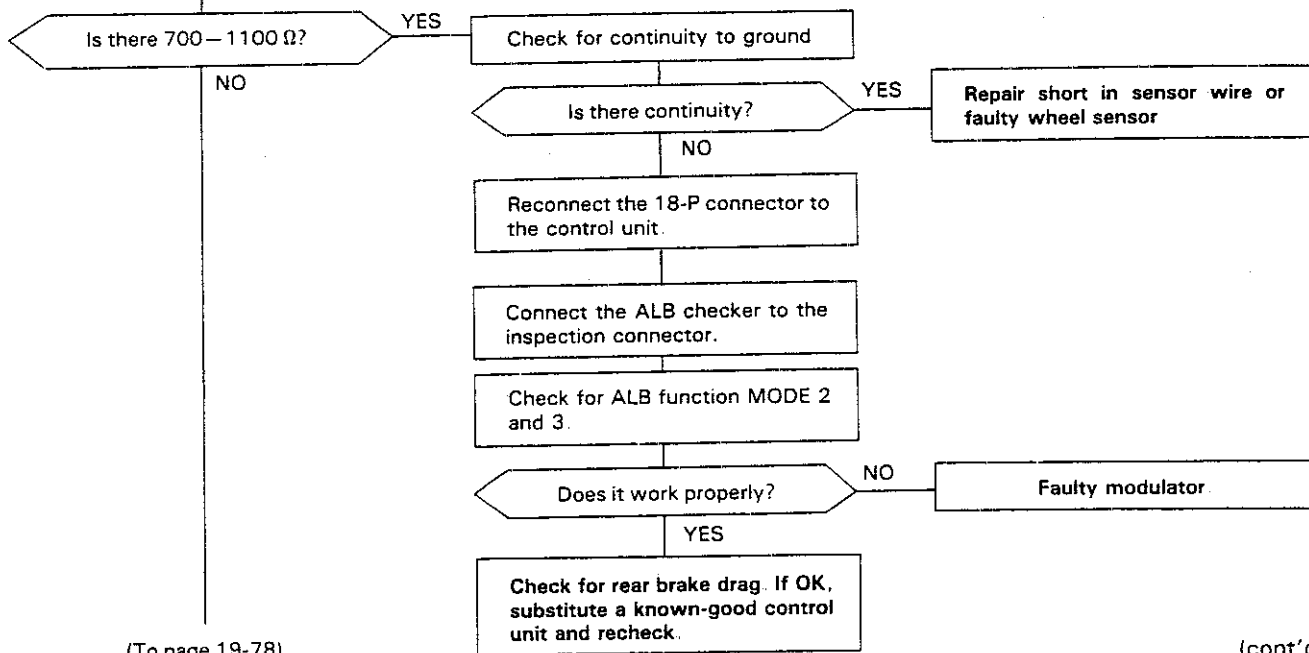
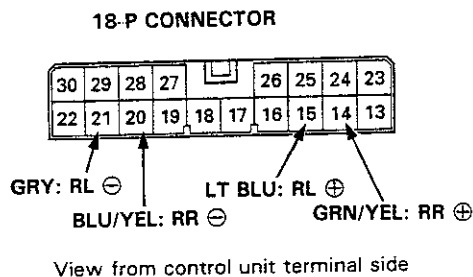
CAUTION: Use only the digital multimeter to check the system.

NOTE: If a malfunction is detected, this code appears and the fail-safe function is activated. The indicator light may come ON after restarting the engine until the diagnostic trouble code is erased (by disconnecting the ABS B2 fuse for 3 seconds).

Disconnect the 18-P connector from the control unit.

Check each sensor for continuity between the positive and negative:

- GRN/YEL: Rear Right Positive
- BLU/YEL: Rear Right Negative
- LT BLU: Rear Left Positive
- GRY: Rear Left Negative



Troubleshooting

Flowcharts (cont'd)

(From page 19-77)

Disconnect the wire harness from rear wheel sensor

Check for resistance between the sensor terminals.

SENSOR-SIDE CONNECTOR



View from terminal side

Is there 700–1100 Ω?

NO

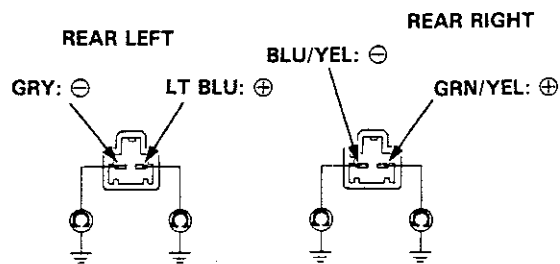
Faulty wheel sensor

YES

Reconnect the 18-P connector to the control unit.

Check each wire for continuity between the wheel sensor harness-side terminals and body ground.

HARNESS-SIDE CONNECTOR



View from terminal side.

Is there continuity?

NO

Repair open in wire harness

YES

Check for loose wheel sensor connectors. If necessary, substitute a known-good control unit and recheck.

Positive: 3.3 kΩ ± 15% is OK
Negative: Less than 1 Ω is OK

Diagnostic Trouble Code 6-1: Front Fail-Safe Relay Circuit

CAUTION: Use only the digital multimeter to check the system.

Pre-test steps:

- Check ABS B1 (20 A) FUSE
- Check for loose under-hood ABS fuse/relay box connectors

Remove the front fail-safe relay from the under-hood ABS fuse/relay box.

Check relay function (page 19-105)

Does it work properly?

NO

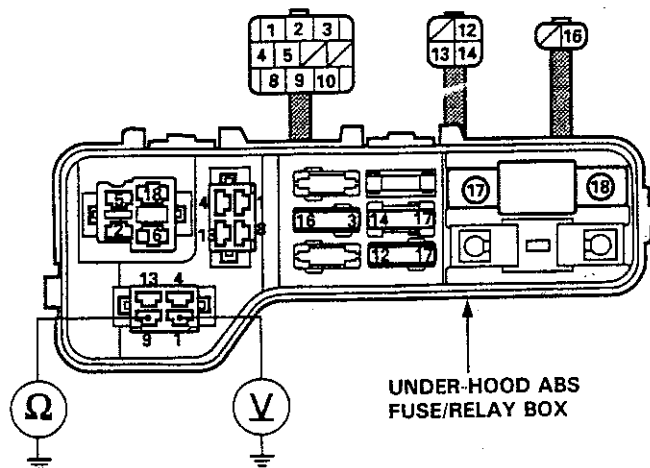
Faulty front fail-safe relay.

YES

Disconnect the 10-P connector from the solenoid.

Turn the ignition switch ON.

Check for voltage between the fail-safe relay No. 1 (BLK/YEL) terminal and body ground



Is there battery voltage?

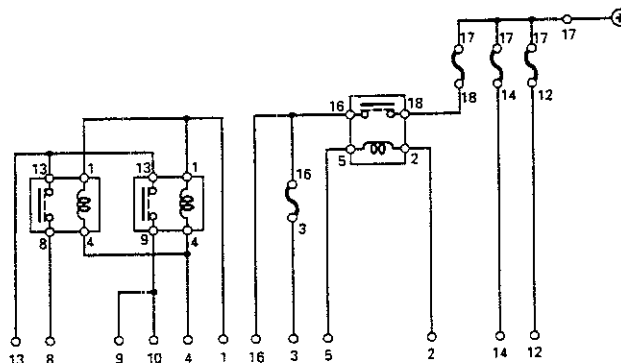
NO

Repair open in BLK/YEL wire between the fuse and front fail-safe relay

YES

Turn the ignition switch OFF.

Check for continuity between the fail-safe relay No 9, 10 (BRN/BLK) terminal and body ground.



(To page 19-80)

UNDER-HOOD ABS FUSE/RELAY BOX CIRCUIT DIAGRAM

(cont'd)

Troubleshooting

Flowcharts (cont'd)

(From page 19-79)

Is there continuity?

YES

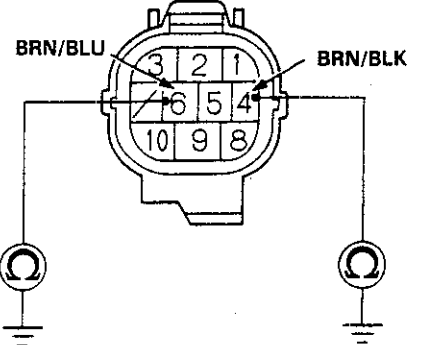
Repair short in BRN/BLK wire between the solenoid and front fail-safe relay

NO

Reinstall the front fail-safe relay

Check each wire for continuity between the solenoid terminals and body ground
 No. 6 (BRN/BLU): Front Right
 No. 4 (BRN/BLK): Front Left

SOLENOID-SIDE CONNECTOR



View from terminal side

Is there continuity?

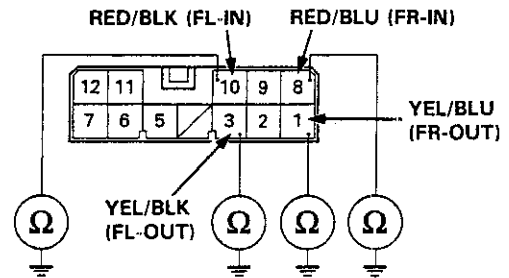
YES

Faulty solenoid (short).

NO

Disconnect the 18-P and 12-P connectors from the control unit.

12-P CONNECTOR



View from control unit terminal side

Check each wire for continuity between the control unit and body ground
 RED/BLU: Front Right Inlet
 YEL/BLU: Front Right Outlet
 RED/BLK: Front Left Inlet
 YEL/BLK: Front Left Outlet

Is there continuity?

YES

Repair short in wire between the solenoid and control unit:
 RED/BLU: Front Right Inlet
 YEL/BLU: Front Right Outlet
 RED/BLK: Front Left Inlet
 YEL/BLK: Front Left Outlet

NO

(To page 19-81)

(From page 19-80)

Remove the rear fail-safe relay.

Check for continuity between the YEL/GRN (FSR) terminal and body ground.

Is there continuity?

YES

Repair short in YEL/GRN wire between the control unit and front fail-safe relay.

NO

Turn the ignition switch ON

Check for voltage between the control unit connector YEL/GRN (FSR) terminal and body ground

Is there battery voltage?

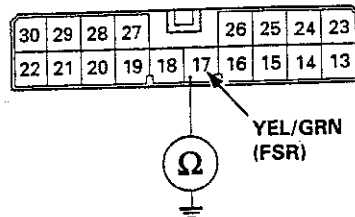
YES

Repair open in YEL/GRN wire between the front fail-safe relay and control unit.

NO

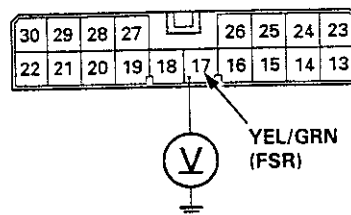
Check for loose control unit connectors. If necessary, substitute a known-good control unit and recheck.

18-P CONNECTOR



View from control unit terminal side.

18-P CONNECTOR



View from control unit terminal side.

(cont'd)

Troubleshooting

Flowcharts (cont'd)

Diagnostic Trouble Code 6-4: Rear Fail-Safe Relay Circuit

CAUTION: Use only digital multimeter to check the system.

Pre-test step:

- Check for loose under-hood ABS fuse/relay box connectors.

Remove the rear fail-safe relay from the under-hood ABS fuse/relay box.

Check relay function (page 19-105).

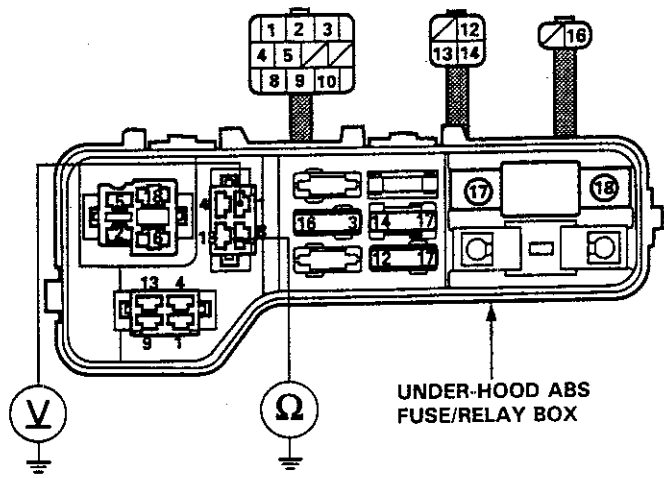
Does it work properly? NO Faulty rear fail-safe relay.

YES

Disconnect the 10-P connector from the solenoid.

Turn the ignition switch ON

Check for voltage between the fail-safe relay No. 1 (BLK/YEL) terminal and body ground.



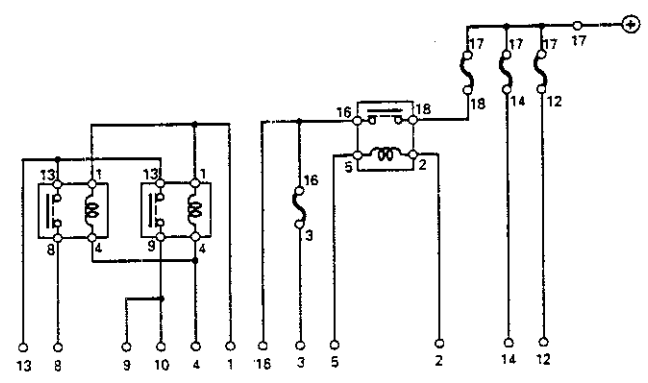
UNDER-HOOD ABS FUSE/RELAY BOX

Is there battery voltage? NO Repair open in BLK/YEL wire between the fuse and front fail-safe relay.

YES

Turn the ignition switch OFF.

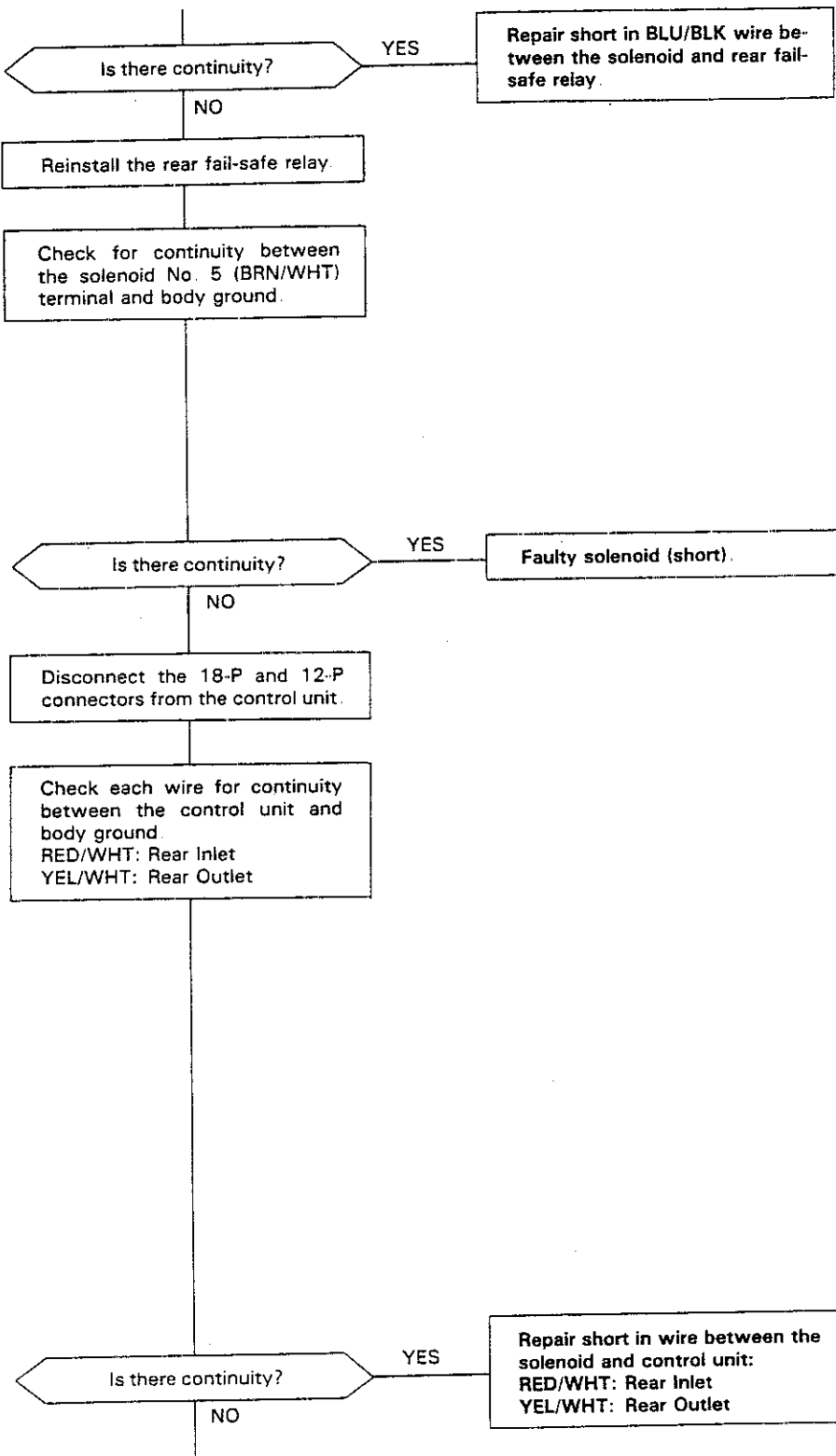
Check for continuity between the fail-safe relay No 8 (BLU/BLK) terminal and body ground.



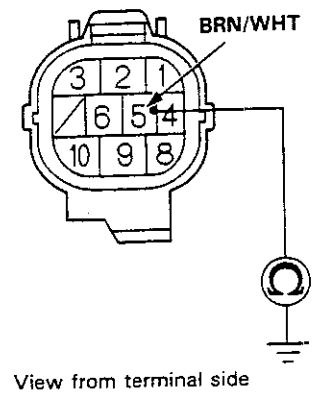
UNDER-HOOD ABS FUSE/RELAY BOX CIRCUIT DIAGRAM

(To page 19-83)

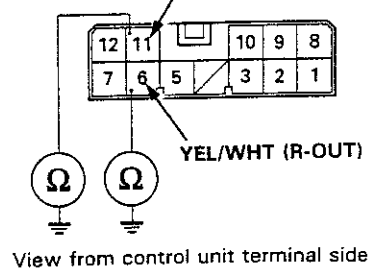
(From page 19-82)



SOLENOID-SIDE CONNECTOR



12-P CONNECTOR
RED/WHT (R-IN)



(To page 19-84)

(cont'd)

Troubleshooting

Flowcharts (cont'd)

(From page 19-83)

Remove the front fail-safe relay

Check for continuity between the YEL/GRN (FSR) terminal and body ground.

Is there continuity?

YES

Repair short in YEL/GRN wire between the control unit and rear fail-safe relay.

NO

Turn the ignition switch ON.

Check for voltage between the control unit connector YEL/GRN (FSR) terminal and body ground

Is there battery voltage?

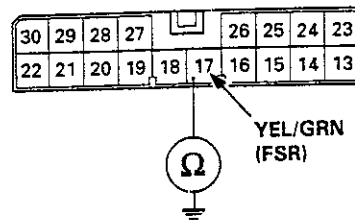
NO

Repair open in YEL/GRN wire between the rear fail-safe relay and control unit.

YES

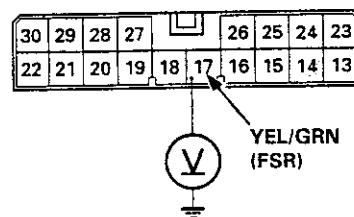
Check for loose control unit connectors. If necessary, substitute a known-good control unit and recheck

18-P CONNECTOR



View from control unit terminal side

18-P CONNECTOR



View from control unit terminal side.

Diagnostic Trouble code 7-1 and 7-2 Front Solenoid Related Problem

CAUTION: Use only the digital multimeter to check the system.

Pre-test steps:

- Check ABS B1 (20 A) FUSE
- Check for loose under-hood ABS fuse/relay box connectors.

Disconnect the 10-P connector from the solenoids.

Check for resistance between the solenoid terminals:
 No. 3 (RED/BLU) and No. 6 (BRN/BLU): Front Right Inlet
 No. 1 (RED/BLK) and No. 4 (BRN/BLK): Front Left Inlet

Is there 1-3 Ω?

NO → Faulty solenoid.

YES

Check for resistance between the solenoid terminals:
 No. 10 (YEL/BLU) and No. 6 (BRN/BLU): Front Right Outlet
 No. 8 (YEL/BLK) and No. 4 (BRN/BLK): Front Left Outlet

Is there 1-3 Ω?

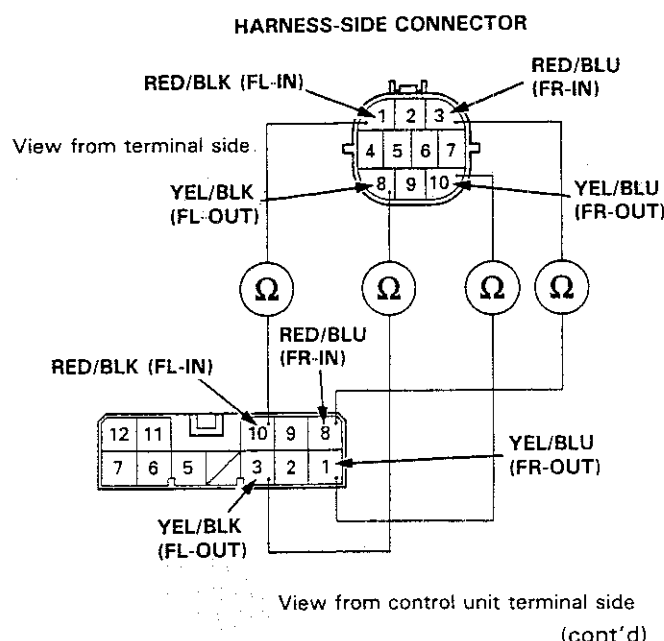
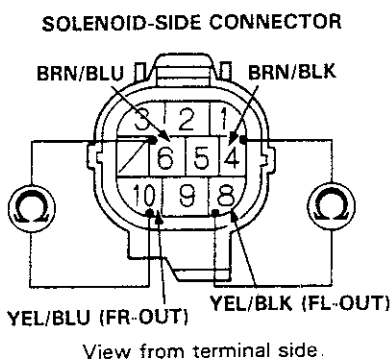
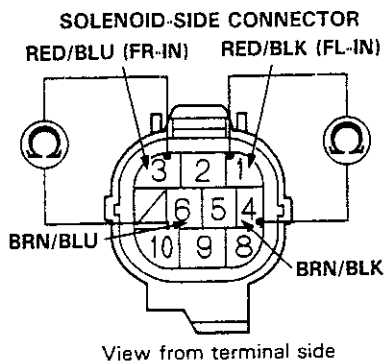
NO → Faulty solenoid.

YES

Disconnect the 12-P connector from the control unit

Check each wire for continuity between the control unit and front solenoid:
 RED/BLU: Front Right Inlet
 YEL/BLU: Front Right Outlet
 RED/BLK: Front Left Inlet
 YEL/BLK: Front Left Outlet

(To page 19-86)



Troubleshooting

Flowcharts (cont'd)

(From page 19-85)

Is there continuity?

NO

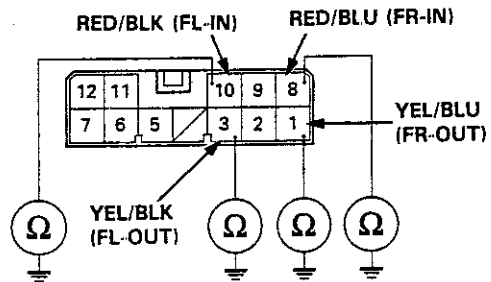
Repair open in wire between the solenoid and control unit:
RED/BLU: Front Right Inlet
YEL/BLU: Front Right Outlet
RED/BLK: Front Left Inlet
YEL/BLK: Front Left Outlet

Check each wire for continuity between the control unit and body ground:
RED/BLU: Front Right Inlet
YEL/BLU: Front Right Outlet
RED/BLK: Front Left Inlet
YEL/BLK: Front Left Outlet

YES

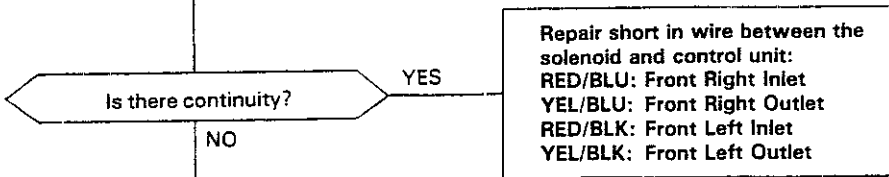
(To page 19-87)

12-P CONNECTOR



View from control unit terminal side

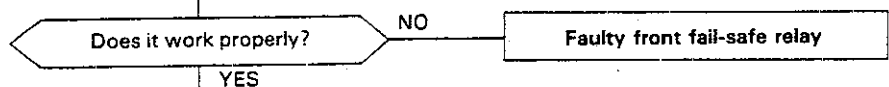
(From page 19-86)



NO

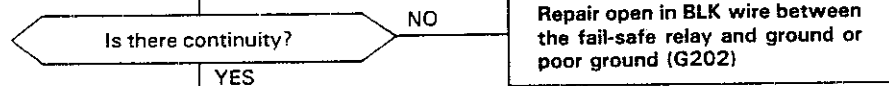
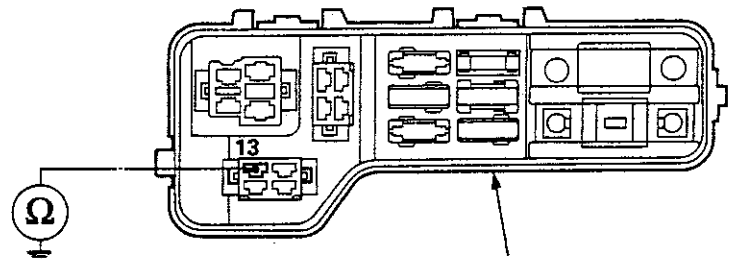
Remove the front fail-safe relay from the under-hood fuse/relay box.

Check for relay function (page 19-105).



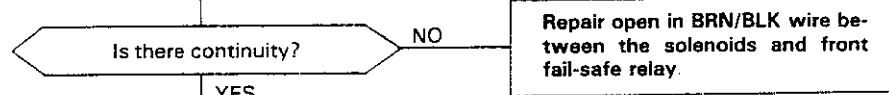
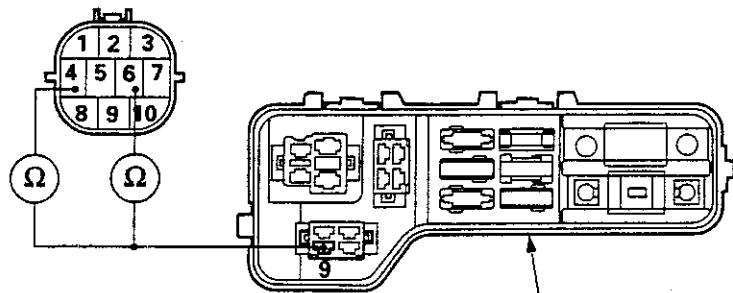
YES

Check for continuity between the No. 13 terminal and body ground.



YES

Check BRN/BLK wire for continuity between the solenoids and front fail-safe relay.



YES

Check for loose control unit connectors. If necessary, substitute a known-good control unit and recheck.

(cont'd)

Troubleshooting

Flowcharts (cont'd)

Diagnostic Trouble Code 7-4: Rear Solenoid Problem

CAUTION: Use only the digital multimeter to check the system.

Pre-test step:

- Check for loose under-hood ABS fuse/relay box connectors

Disconnect the 10-P connector from the solenoids.

Check for resistance between the solenoid terminals:
 No. 2 (RED/WHT) and No 5 (BRN/WHT): Rear Inlet
 No. 9 (YEL/WHT) and No 5 (BRN/WHT): Rear Outlet

Is there 1–3 Ω?

NO

Faulty solenoid.

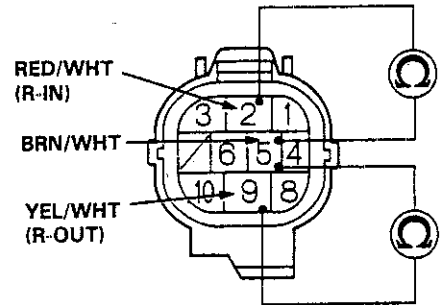
YES

Disconnect the 12-P connector from control unit

Check each wire for continuity between the control unit and rear solenoid:
 RED/WHT: Rear Inlet
 YEL/WHT: Rear Outlet

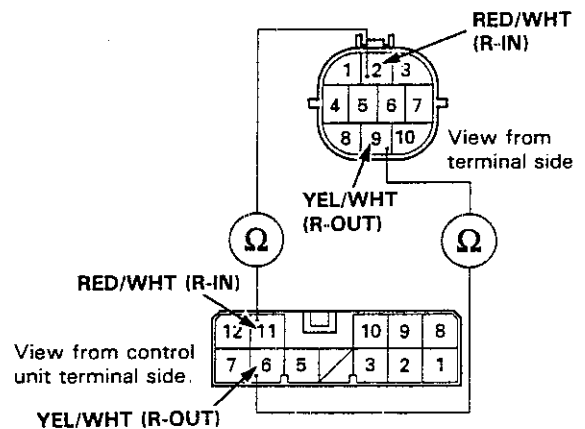
(To page 19-89)

SOLENOID-SIDE CONNECTOR



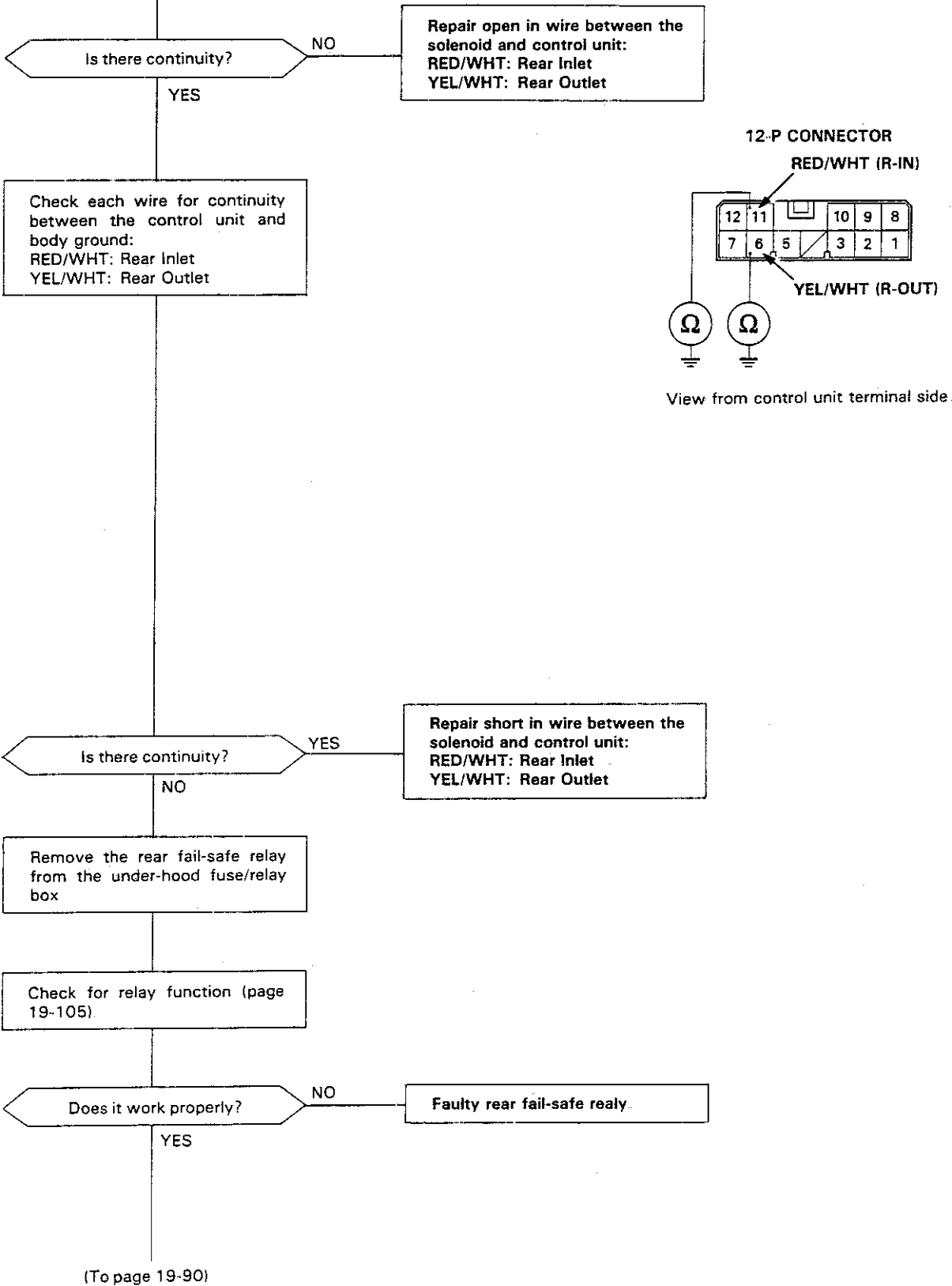
View from terminal side

HARNESS-SIDE CONNECTOR



View from control unit terminal side.

(From page 19-88)



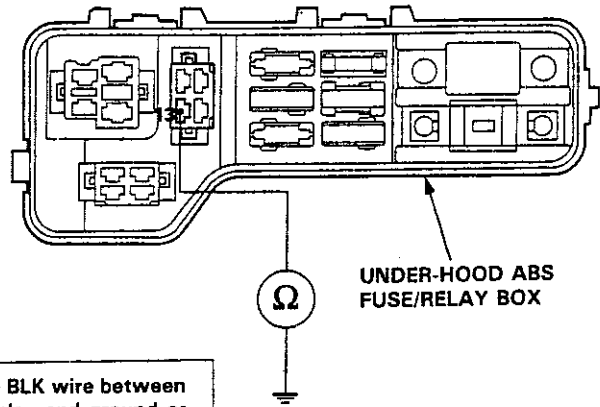
(cont'd)

Troubleshooting

Flowcharts (cont'd)

(From page 19-89)

Check for continuity between the No. 13 (BLK) terminal and body ground.



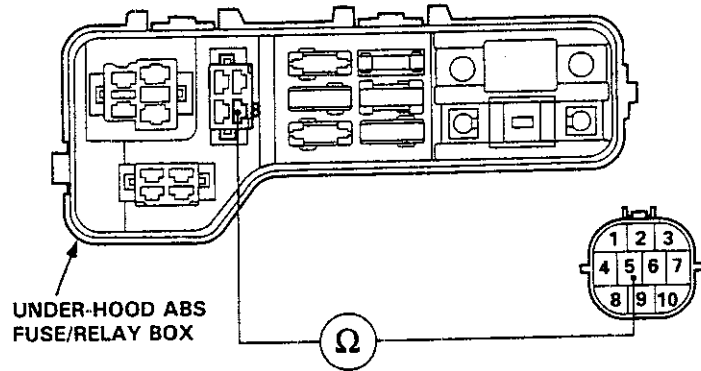
Is there continuity?

NO

Repair open in BLK wire between the fail-safe relay and ground or poor ground (G202).

YES

Check BLU/BLK wire for continuity between the solenoid and rear fail-safe relay.



Is there continuity?

NO

Repair open in BLU/BLK wire between the solenoid and rear fail-safe relay.

YES

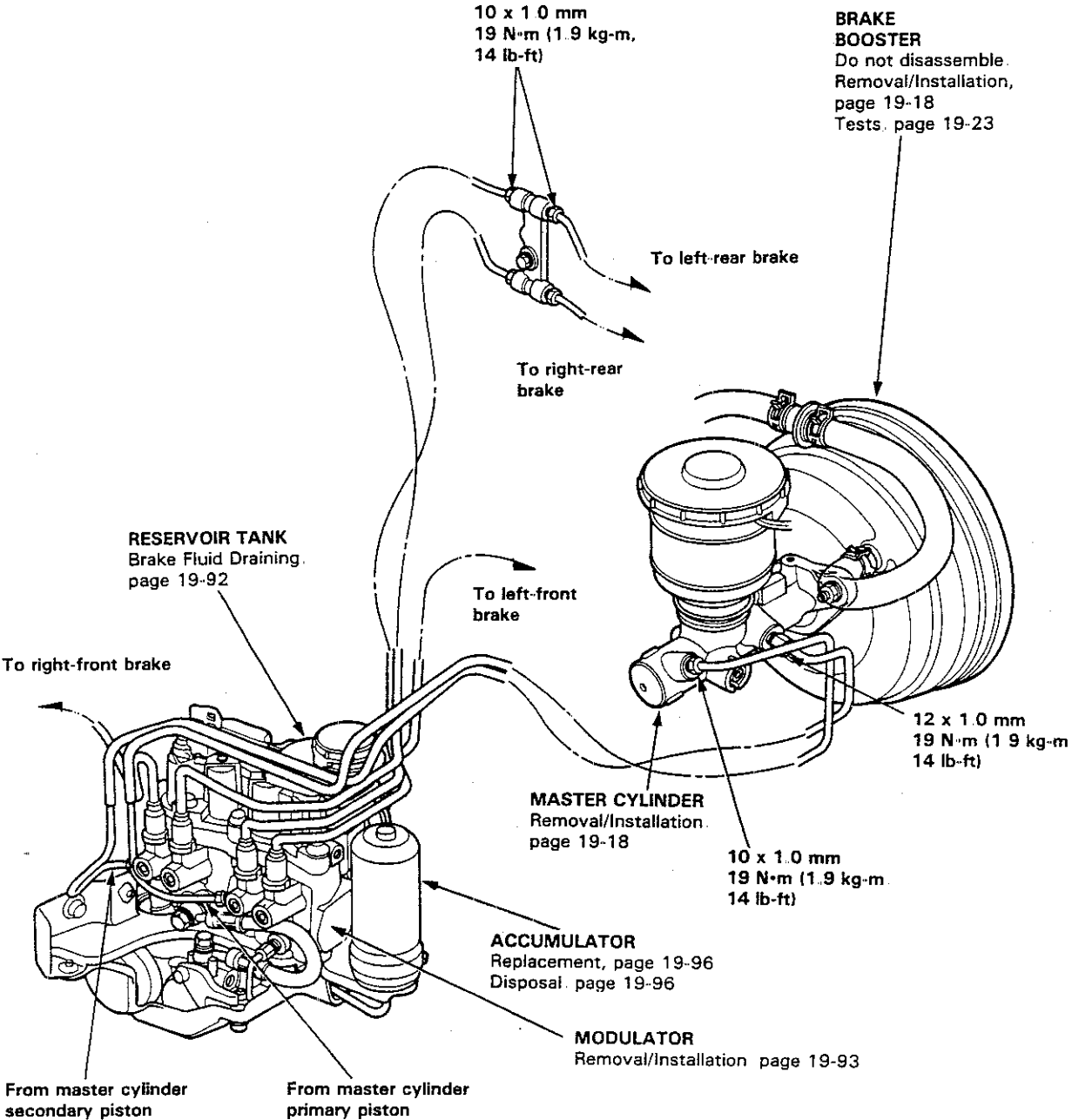
Check for loose control unit connectors. If necessary, substitute a known-good control unit and recheck



Hydraulic System

Index/Hydraulic Connections

CAUTION: Do not spill brake fluid on the car; it may damage the paint; if brake fluid does contact the paint, wash it off immediately with water.



Hydraulic System

Relieving Accumulator/Line Pressure

▲ WARNING Use the Bleeder T-wrench before disassembling the parts shaded in the illustration.

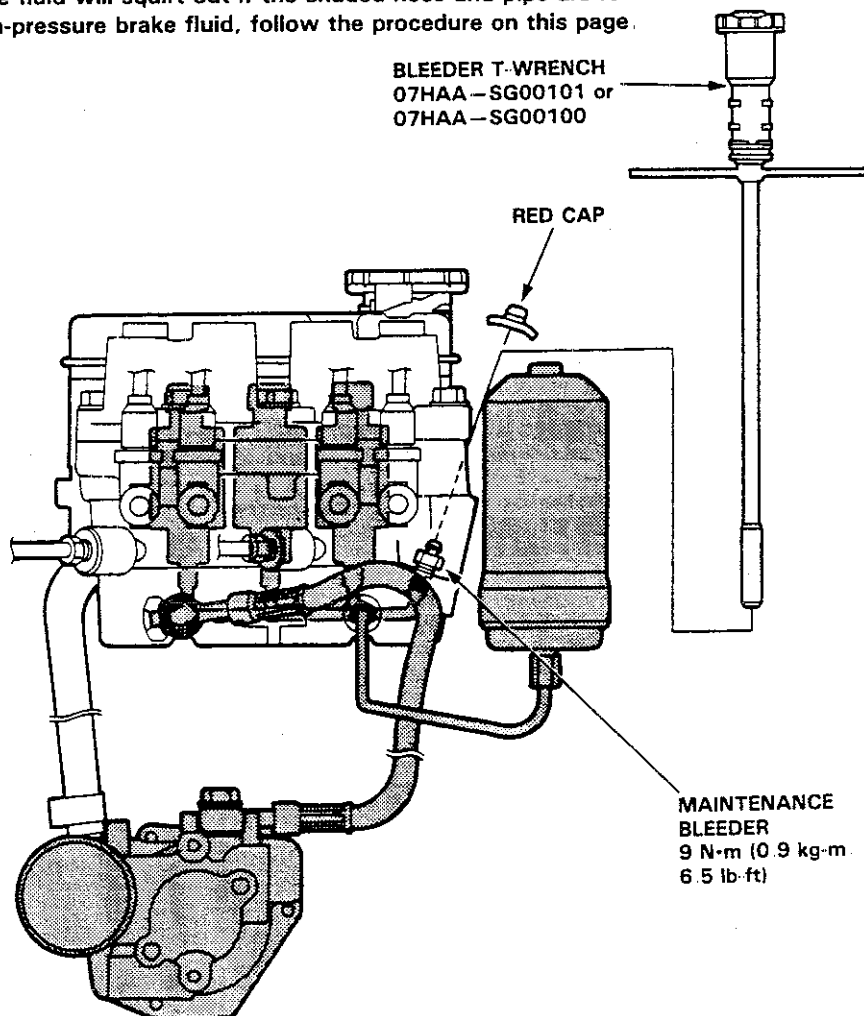
1. Open the hood
2. Remove the red cap from the bleeder on the modulator body
3. Install the special tool on the maintenance bleeder and turn it out slowly 90° to collect high-pressure fluid into the reservoir. Turn the special tool out one complete turn to drain the brake fluid thoroughly.
4. Retighten the maintenance bleeder and discard the fluid
5. Reinstall the red cap

Reservoir Brake Fluid Draining

1. Draining brake fluid from modulator tank:
The brake fluid may be sucked out through the top of the modulator tank with a syringe. It may also be drained through the pump joint after disconnecting the pump hose.
2. Draining brake fluid from master cylinder:
Loosen the bleed screw and pump the brake pedal to drain the brake fluid from the master cylinder.

▲ WARNING

- High-pressure fluid will squirt out if the shaded hose and pipe are removed.
- To drain high-pressure brake fluid, follow the procedure on this page.



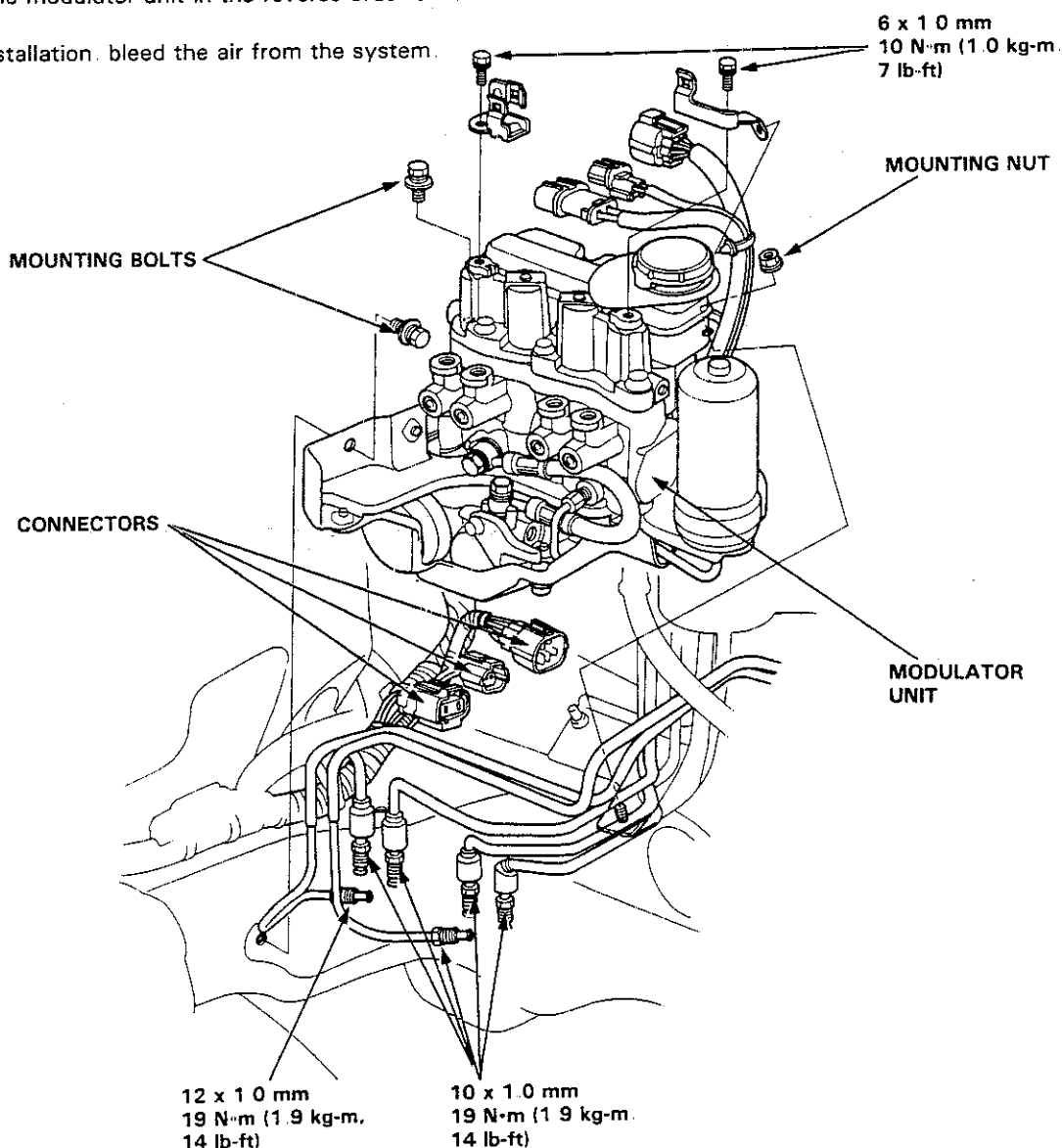
Modulator Unit

Removal/Installation

CAUTION:

- Be careful not to bend or damage; the brake pipes when removing the modulator unit.
- Do not spill brake fluid on the car; it may damage the paint; if brake fluid does contact the paint, wash it off immediately with water.
- To prevent spills, cover the hose joints with rags or shop towels.
- Before reassembling, check that all parts are free of dust and other foreign particles.
- Do not mix different brands of brake fluid as they may not be compatible.
- Do not reuse the drained fluid. Use only clean DOT 3 or 4 brake fluid.
- When connecting the brake pipes, make sure that there is no interference between the brake pipes and other parts

1. Remove the battery and battery tray
2. Remove the air intake duct
3. Disconnect the solenoid, motor and pressure switch connectors.
4. Disconnect the brake pipes from the modulator
5. Remove the two mounting bolts and nut, then remove the modulator unit from the frame
6. Install the modulator unit in the reverse order of removal
7. After installation, bleed the air from the system.



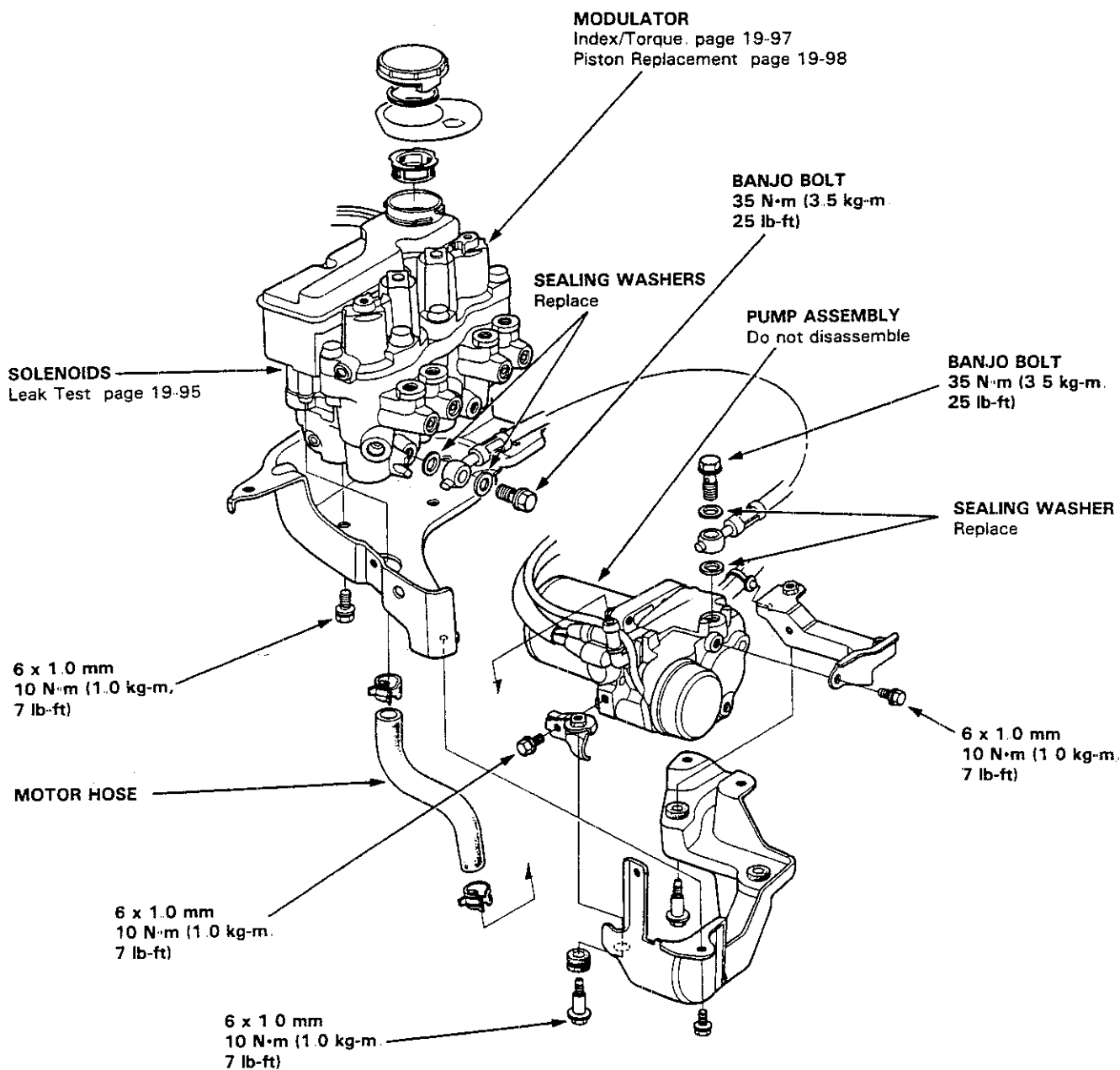
Modulator/Pump

Index/Torque

⚠ WARNING Before removing the modulator-to-pump high-pressure line, be sure to relieve the pressure fluid from the maintenance bleeder (page 19-92).

CAUTION:

- Do not spill brake fluid on the car; it may damage the paint; if brake fluid does contact the paint, wash it off immediately with water.
- To prevent spills, cover the hose joints with rags or shop towels.
- Before reassembling, check that all parts are free of dust and other foreign particles.
- Do not mix different brands of brake fluid as they may not be compatible.
- Do not reuse the drained fluid. Use only clean DOT 3 or 4 brake fluid.
- Do not disassemble the pump (except pressure switch).

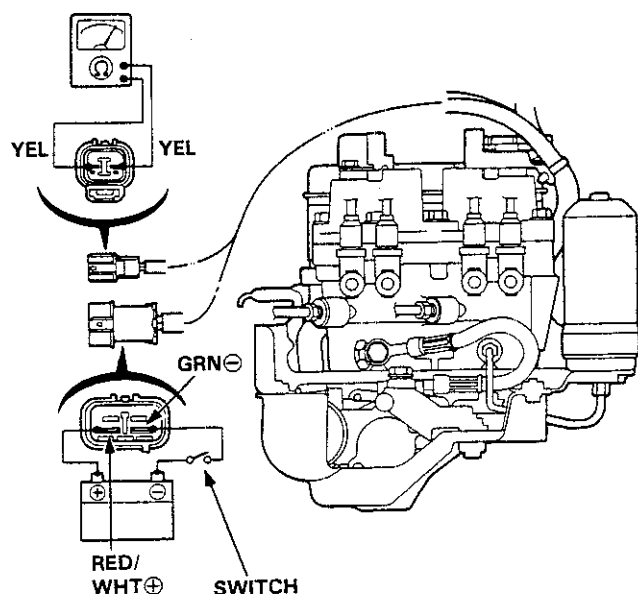


Solenoids

Leak Test

NOTE: If a solenoid leaks excessively, the brake fluid level in the modulator reservoir tank will rise when operating the pump motor. The modulator reservoir may also overflow.

1. Connect an ohmmeter between the YEL and YEL terminals of the pressure switch connector.
2. Attach the positive (+) lead of a fully charged 12 V battery to the RED/WHT terminal of the motor connector and negative (-) lead to the GRN terminal, and install a switch between negative lead and GRN terminal as shown.
3. Turn the switch on to allow sufficient pressure to build up within the accumulator and check for continuity. If the ohmmeter shows continuity (pressure switch turned on), run the motor for 10 seconds more, then turn the switch off.



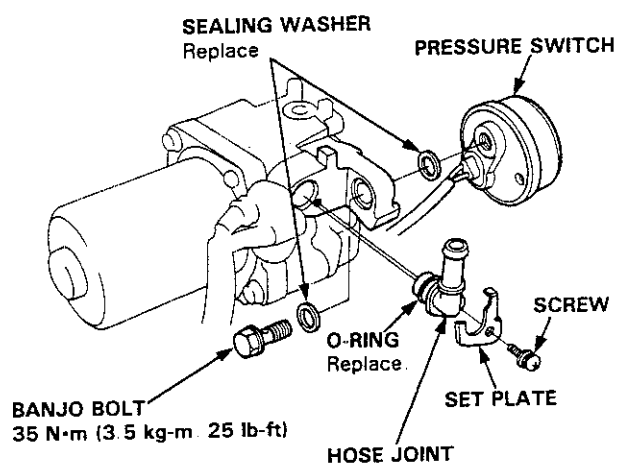
- Check if the solenoid hisses or squeaks. Replace the modulator if the solenoid hisses or squeaks.
- Check the pressure switch for continuity within 30 minutes. It is normal if there is continuity. If there is no continuity, a solenoid is faulty or high-pressure line leaks.

Pump

Pressure Switch Replacement

Removal

1. Secure the pump assembly in a vise.
2. Remove the set plate and hose joint by removing the screw.
3. Remove the banjo bolt, then remove the pressure switch from the pump housing.



Installation

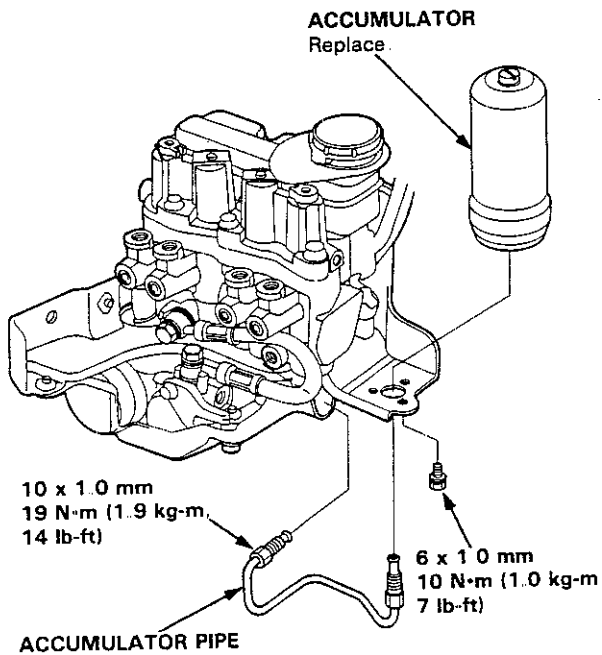
1. Install the pressure switch with the banjo bolt and new sealing washer, then tighten the bolt.
2. Apply brake fluid to the new O-ring.
3. Install the new O-ring onto the hose joint.
4. Install the hose joint and set plate with the screw, then tighten the screw.

Accumulator

Replacement

⚠ WARNING Before removing the modulator-to-accumulator high pressure line, be sure to relieve the pressure fluid from the maintenance bleeder (page 19-92).

1. Loosen the flare nuts and remove the accumulator pipe.
2. Remove the three mounting bolts and the accumulator from the modulator unit.

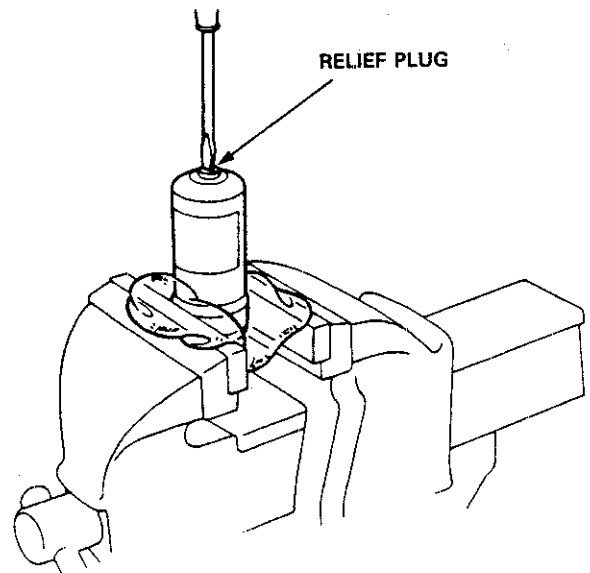


3. Install a new accumulator in the reverse order of removal.
4. Bleed the air from the high-pressure line (page 19-100)

Disposal

⚠ WARNING The accumulator contains high pressure nitrogen gas. Do not puncture, expose to the flame, or attempt to disassemble the accumulator or it may explode and severe personal injury may result.

1. Secure the accumulator in a vise so that the relief plug points straight up.
2. Slowly turn the plug 3-1/2 turns and then wait 3 minutes for all pressure to escape.
3. Remove the plug completely and dispose of the accumulator.

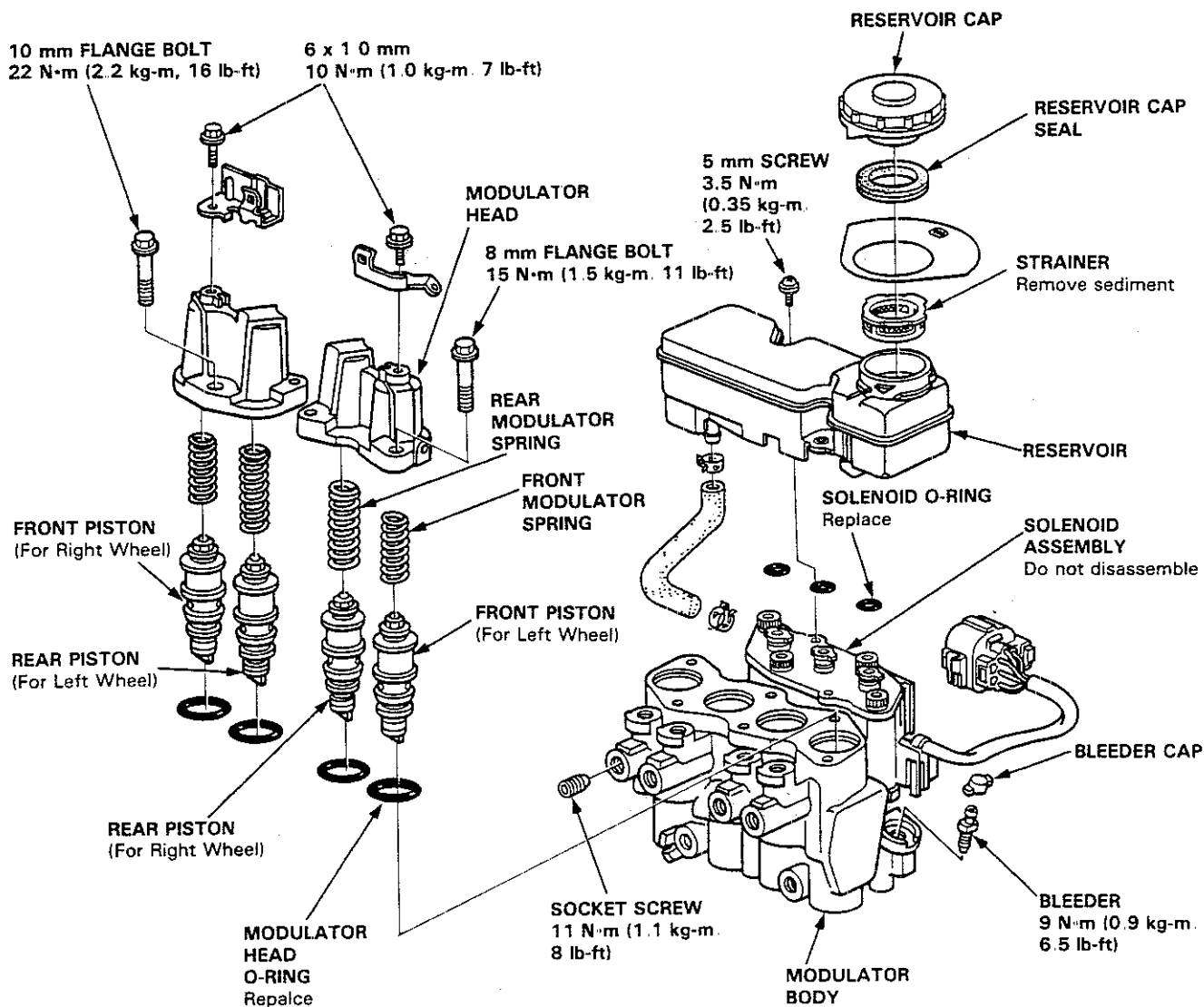


Modulator

Index/Torque

CAUTION:

- Do not spill brake fluid on the car; it may damage the paint; if brake fluid does contact the paint, wash it off immediately with water.
- Before reassembling, check that all parts are free of dust and other foreign particles
- Replace parts with new ones whenever specified to do so.
- Make sure no dirt or other foreign matter is allowed to contaminate the brake fluid.
- Do not mix different brands of brake fluid as they may not be compatible.
- Do not reuse the drained fluid. Use only clean DOT 3 or 4 brake fluid.



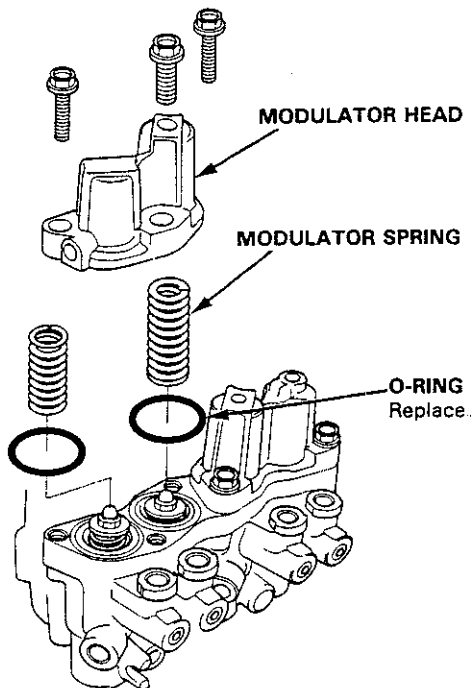
Modulator

Piston Replacement

CAUTION:

- Do not spill brake fluid on the car; it may damage the paint; if brake fluid does contact the paint, wash it off immediately with water.
- Before reassembling, check that all parts are free of dust and other foreign particles.
- Replace parts with new ones whenever specified to do so.
- Make sure no dirt or other foreign matter is allowed to contaminate the brake fluid.
- Do not mix different brands of brake fluid as they may not be compatible.
- Do not reuse the drained fluid. Use only clean DOT 3 or 4 brake fluid.

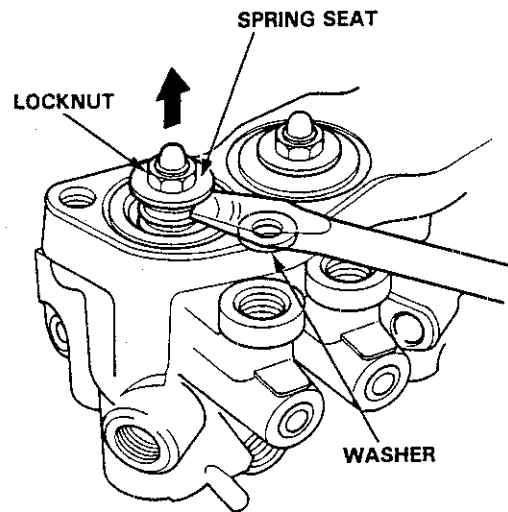
1. Remove the modulator head.
2. Remove the modulator springs and O-rings.



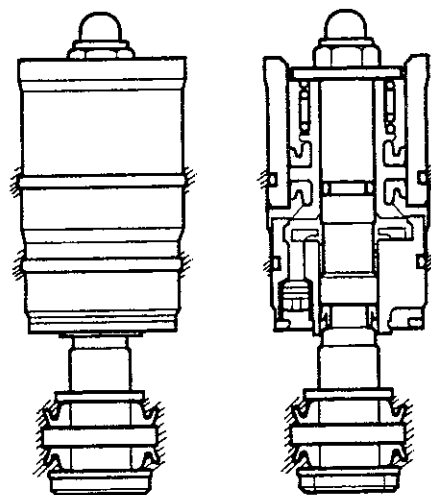
3. Insert the screwdriver under the spring seat, pry the piston assembly off slightly, then pull the piston assembly while grasping the locknut with pliers.

NOTE:

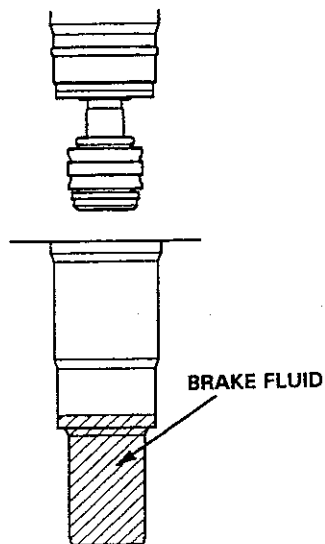
- Place a suitable washer between the screwdriver and modulator body to prevent damage to the modulator body.
- Be careful not to damage the piston sleeve.



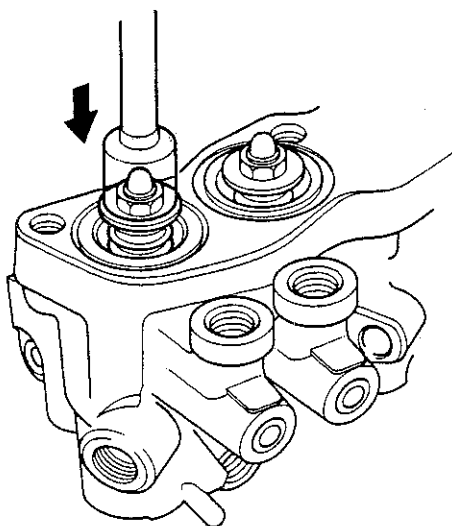
4. Apply rubber grease to the shaded areas of a new piston assembly as shown.



5. Pour brake fluid into the piston hole in the modulator body.
6. Coat the sliding surface of the piston with brake fluid and install the piston assembly into the modulator body.



7. Push down the piston several times until no bubbles come out from the solenoid side.

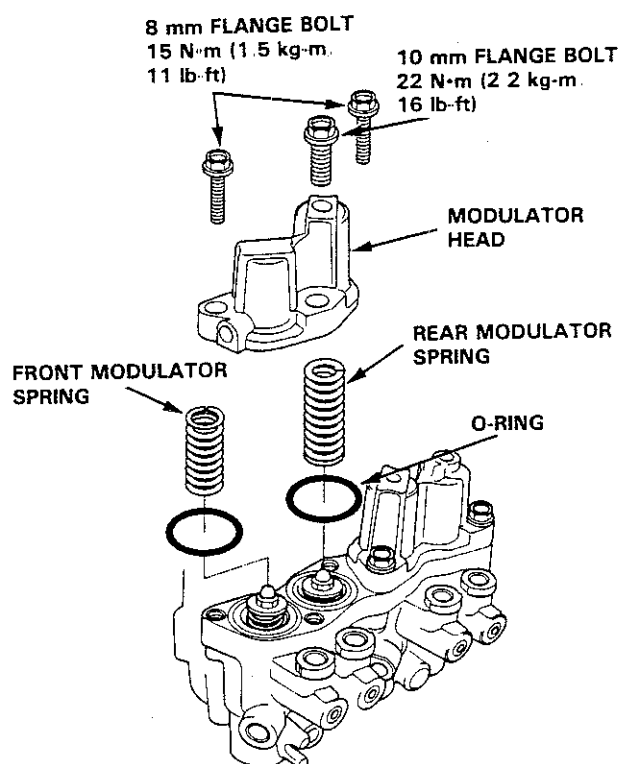


8. Install new O-rings into the grooves in the modulator body.

9. Install the modulator springs

NOTE: Do not interchange the front and rear modulator springs. The longer spring is the rear modulator spring.

10. Install the modulator head onto the body, being careful not to bind the O-rings.



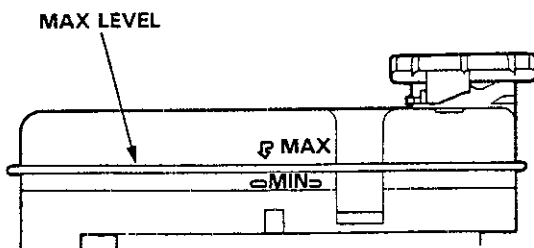
Bleeding

Air Bleeding with ALB Checker

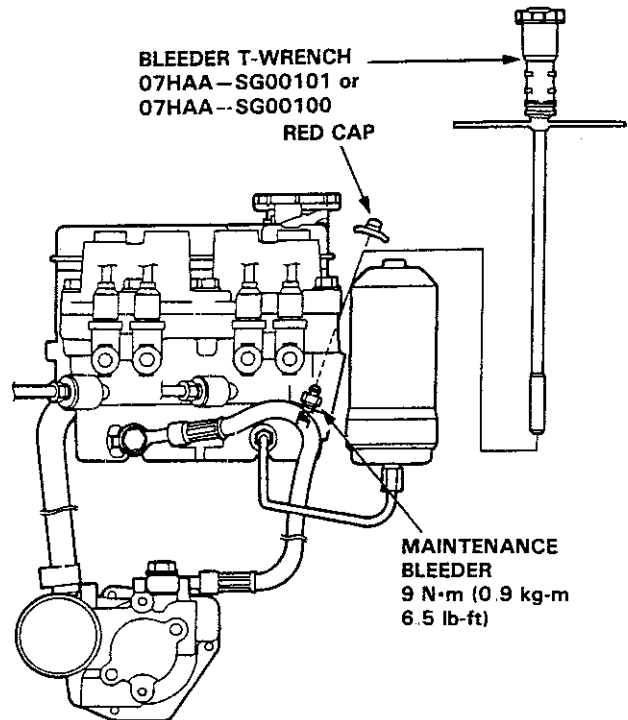
CAUTION:

- Do not spill brake fluid on the car; it may damage the paint; if brake fluid does contact the paint, wash it off immediately with water.
- Make sure no dirt or other foreign matter is allowed to contaminate the brake fluid.
- Do not mix different brands of brake fluid as they may not be compatible.
- Do not reuse the drained fluid. Use only clean DOT 3 or 4 brake fluid.

1. Place the vehicle on level ground with the wheels blocked. Put the transmission in neutral for manual transmission models, and in P for automatic transmission models. Release the parking brake.
2. Disconnect the 6-P inspection (orange) connector from the cross-member under the passenger's seat and connect the inspection connector to the ALB checker (see page 19-61).
3. Fill the modulator reservoir to the MAX level and install the reservoir cap.



4. Start the engine and allow it to idle for a few minutes, then stop it. Check the fluid level in the modulator reservoir and refill to the MAX level if necessary.
5. Bleed high-pressure fluid from the maintenance bleeder with the special tool



6. Start the engine and allow it to idle for a few minutes, then stop it. Check the fluid level in the modulator reservoir and refill to the MAX level if necessary.
7. Turn the Mode Selector switch of the checker to 2.
8. While depressing the brake pedal firmly, push the Start Test switch to operate the modulator. There should be kickback on the brake pedal. If not, repeat steps 5 to 8.

NOTE: Continue to depress the brake pedal firmly when operating the checker.

9. Turn the Mode Selector to 3, 4, and 5. Perform step 8 for each of the test mode positions.
10. Refill the modulator reservoir to the MAX level and install the reservoir cap.

▲ WARNING Disconnect the ALB checker before driving the car. A collision can result from a reduction, or complete loss of braking ability causing severe personal injury or death.

Master Cylinder



Index/Inspection

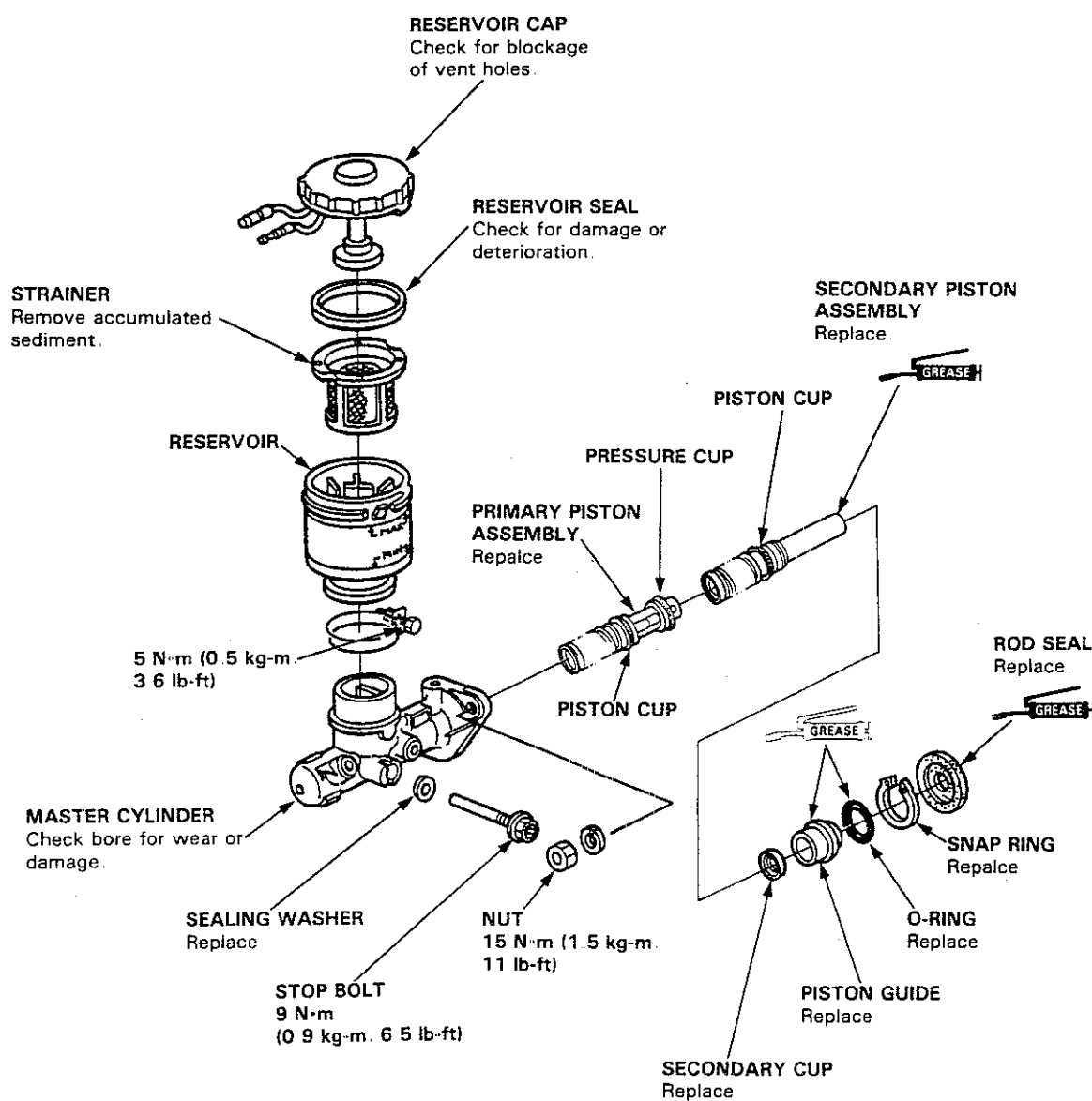
CAUTION:

- Do not spill brake fluid on the car, it may damage the paint; if brake fluid does contact the paint, wash it off immediately with water
- Clean all parts in brake fluid and air dry; blow out all passages with compressed air.
- Before reassembling, check that all parts are free of dust and other foreign particles.
- Replace parts with new ones whenever specified to do so.
- Make sure no dirt or other foreign matter is allowed to contaminate the brake fluid.
- Do not mix different brands of brake fluid as they may not be compatible.
- Do not reuse the drained fluid. Use only clean DOT 3 or 4 brake fluid.
- Replace the master cylinder if the bore is damaged or worn. Do not hone or attempt to refinish the bore.

NOTE:

- Coat piston cup, pressure cup and master cylinder bore with clean brake fluid.
- Replace all rubber parts with new ones whenever disassembled.

: Brake cylinder grease (P/N:08733-B020E) or equivalent rubber grease : Silicone grease.



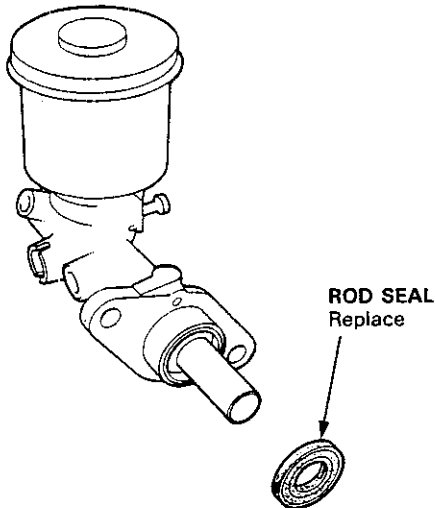
Master Cylinder

Disassembly

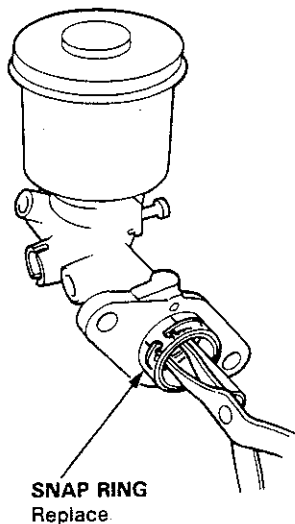
CAUTION:

- Do not spill brake fluid on the car; it may damage the paint; if brake fluid does contact the paint, wash it off immediately with water.
- Clean all parts in brake fluid and air dry; blow out all passages with compressed air.

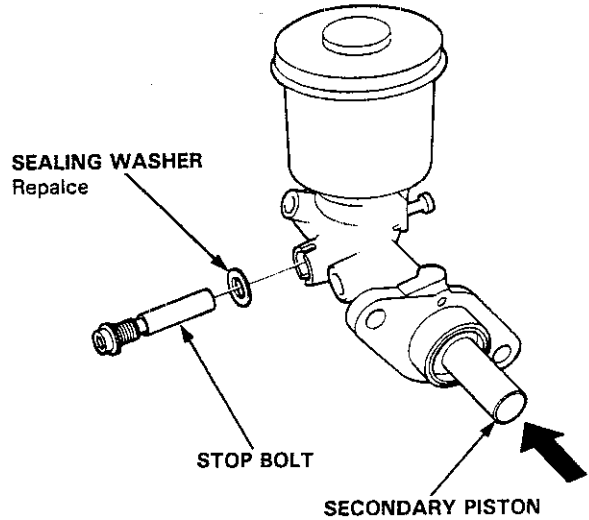
1. Remove the rod seal



2. Push the secondary piston assembly, then remove the snap ring



3. Remove the stop bolt while pushing in the secondary piston assembly.



4. Remove the piston guide, secondary piston assembly and primary piston assembly.

NOTE: If the primary piston assembly is difficult to remove, apply compressed air from the primary piston side port.

CAUTION:

- Do not use high pressure air or bring the nozzle too close to the port.
- Place a shop rag over the master cylinder to prevent the primary piston from becoming a projectile.

Reassembly

CAUTION:

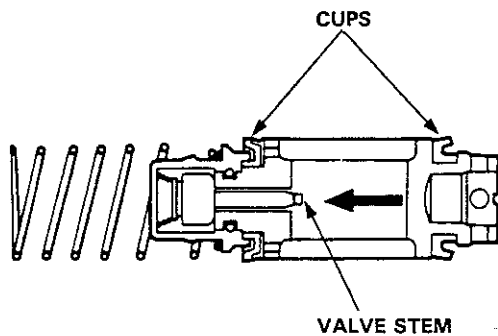
- Do not spill brake fluid on the car; it may damage the paint; if brake fluid does contact the paint, wash it off immediately with water.
- Before reassembling, check that all parts are free of dust and other foreign particles.)
- Replace parts with new ones whenever specified to do so.
- Make sure no dirt or other foreign matter is allowed to contaminate the brake fluid.
- Do not mix different brands of brake fluid as they may not be compatible.
- Do not reuse the drained fluid. Use only clean DOT 3 or 4 brake fluid.

1. Coat the cups of a new primary piston assembly into the master cylinder.

NOTE:

- Before installation, check that the valve stem moves smoothly by lightly pushing it through the slot in the piston.
- Install the piston so that the slot in the piston align with the stop bolt hole in the master cylinder

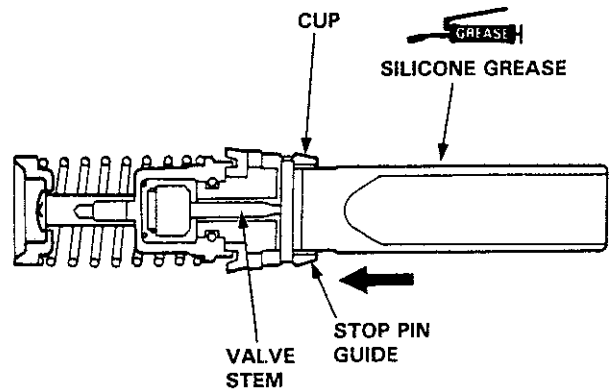
PRIMARY PISTON ASSEMBLY



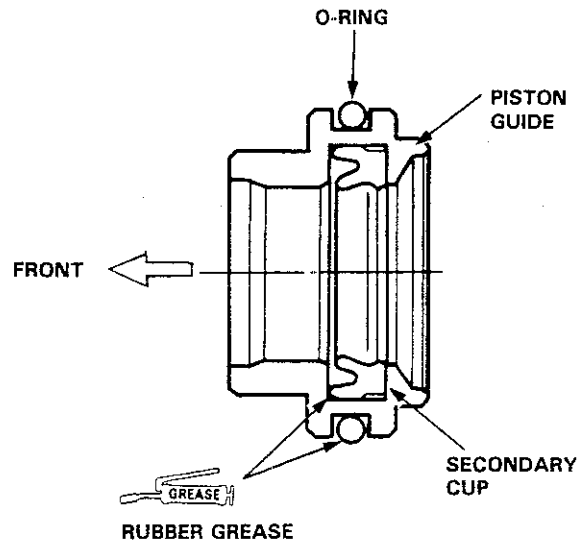
2. Coat the cup of a new secondary piston with brake fluid, apply silicone grease to the piston and install the piston into the master cylinder.

NOTE: Check that the valve stem moves smoothly by pushing the stop pin guide.

SECONDARY PISTON ASSEMBLY



3. Apply brake cylinder grease (P/N: 08733-B020E) or equivalent rubber grease to new O-ring and secondary cup, and install the secondary cup and O-ring onto the piston guide.

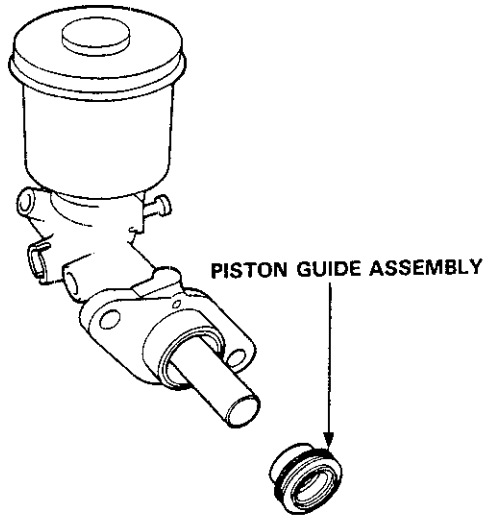


(cont'd)

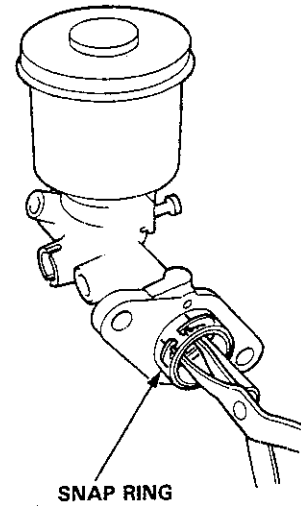
Master Cylinder

Reassembly (cont'd)

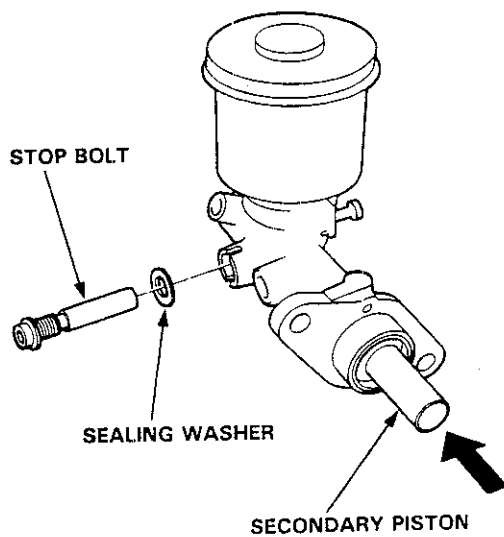
4. Install the piston guide assembly into the master cylinder



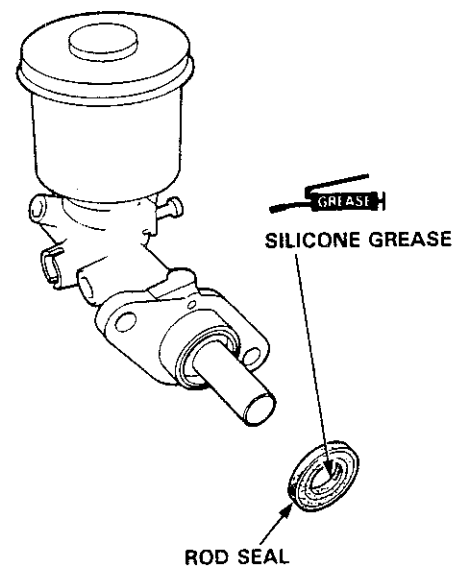
6. Install a new snap ring while pushing in the secondary piston.



5. Align the slot in the primary piston with the stop bolt hole by pushing the secondary piston in, and install the stop bolt with a new sealing washer



7. Apply silicone grease to a new rod seal and install the seal onto the master cylinder.



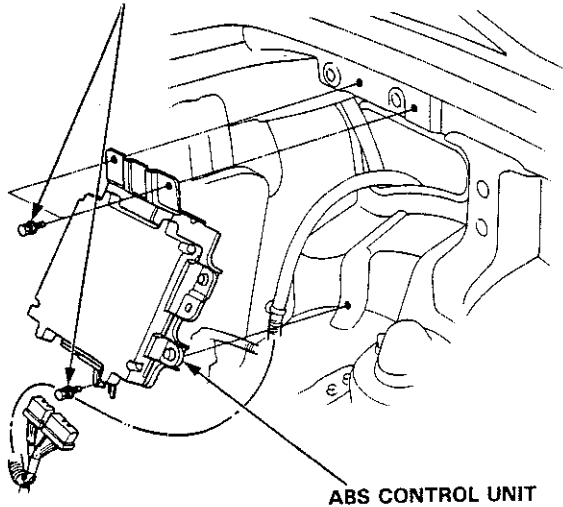
Electronic Components

- Control Unit Replacement

1. With power roof: Remove the right trunk side trim panel
With manual roof: Remove the trunk front trim panel
2. Disconnect the control unit connectors.
3. Remove the control unit attaching bolts, then remove the control unit

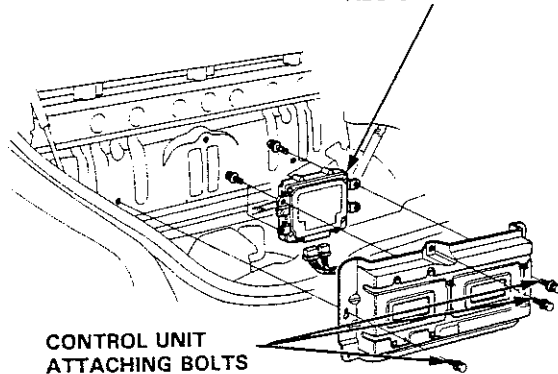
With power roof:

CONTROL UNIT ATTACHING BOLTS



With manual roof:

ABS CONTROL UNIT

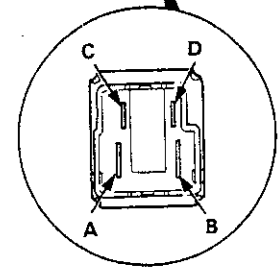
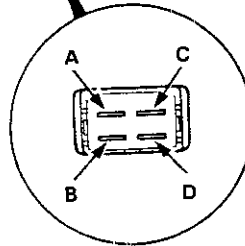
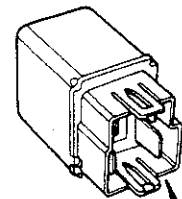
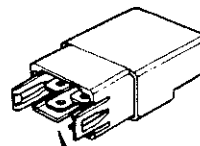


Relay Inspection

1. Remove the fail-safe relay and motor relay from the under-hood ABS fuse/relay box (Location: see page 19-60)
2. Check for continuity between the terminals C and D
There should be continuity.
3. Check for continuity between the terminals A and B.
There should be continuity when the battery is connected between the terminals C and D.
There should be no continuity when the battery is disconnected

Fail-Safe Relay

Motor Relay



Pulsers/Sensors

Inspection

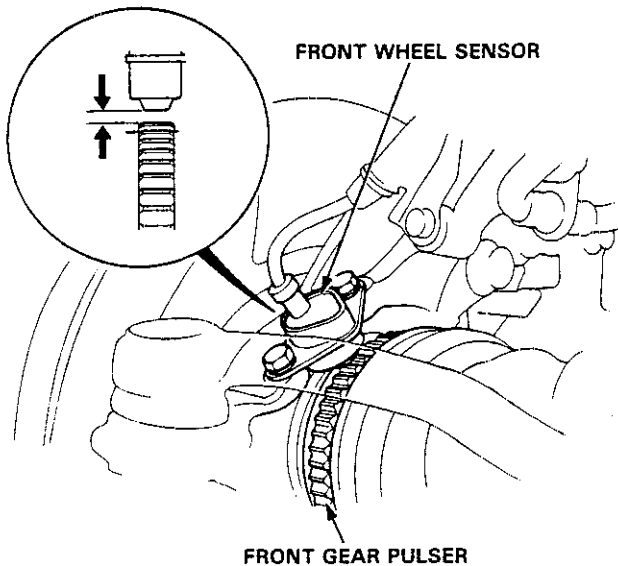
Front

1. Check the pulser for chipped or damaged teeth and replace if necessary.
2. Measure the air gap between the sensor and pulser all the way around while rotating the driveshaft by hand.

Standard: 0.4–1.0 mm (0.02–0.04 in)

NOTE: If out of specification, check that the sensor is installed properly. If it is OK, check the knuckle for distortion and the wheel bearing for wear or damage.

0.4–1.0 mm
(0.02–0.04 in)



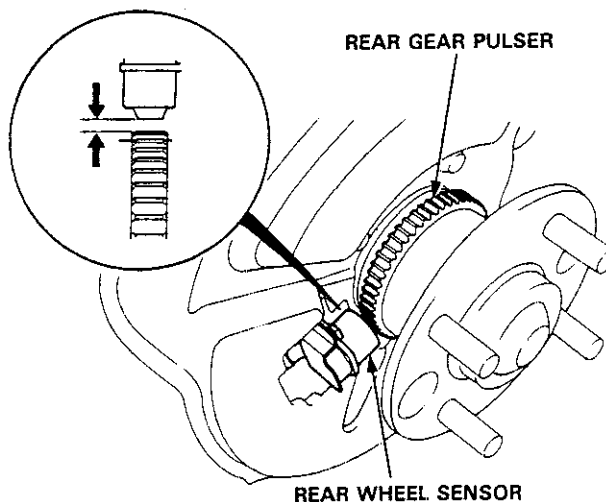
Rear

1. Remove the rear caliper assembly.
2. Remove the rear brake disc.
3. Check the rear pulser for chipped or damaged teeth and replace if necessary.
4. Measure the air gap between the sensor and pulser all the way around while rotating the hub bearing unit by hand.

Standard: 0.4–1.0 mm (0.02–0.04 in)

NOTE: If out of specification, check that the sensor is installed properly. If it is OK, check the trailing arm for distortion and the hub bearing unit for wear or damage.

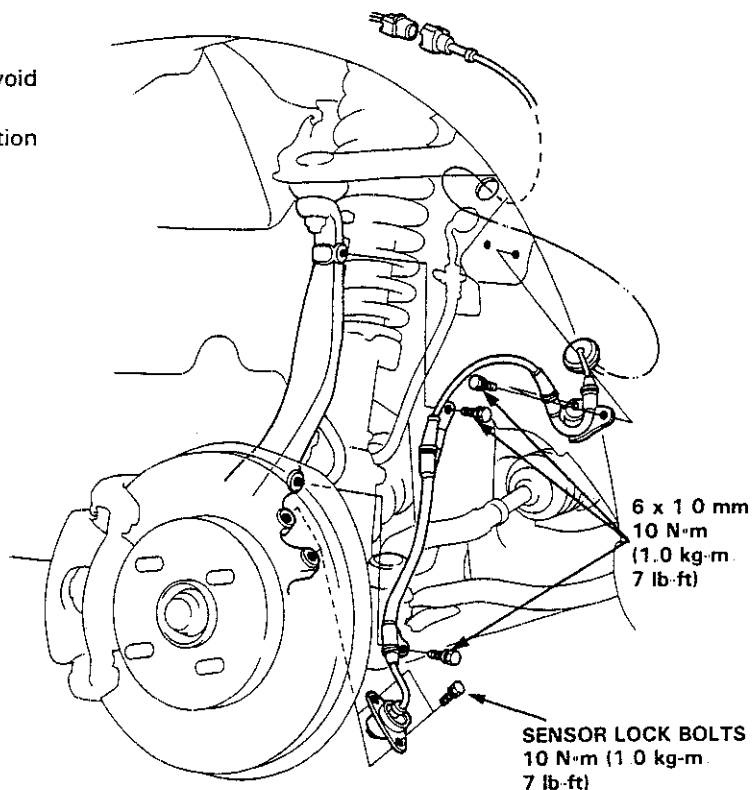
0.4–1.0 mm
(0.02–0.04 in)



Front Sensor Replacement

NOTE:

- Be careful when installing the sensors to avoid twisting the wires
- After sensor replacement, confirm proper operation (page 19-63).



Rear Sensor Replacement

NOTE:

- Be careful when installing the sensors to avoid twisting the wires
- After sensor replacement, confirm proper operation (page 19-63).

