

Brakes (Anti-lock Brake System)

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SUPPLEMENTAL RESTRAINT SYSTEM (SRS)

The Legend includes a driver's side Airbag, located in the steering wheel hub. Information necessary to safely service the SRS is included in this Shop Manual. Items marked * in each section table of contents include, or are located near, SRS components. Servicing, disassembling or replacing these items will require special precautions and tools, and should therefore be done only by an authorized HONDA dealer.

⚠ WARNING

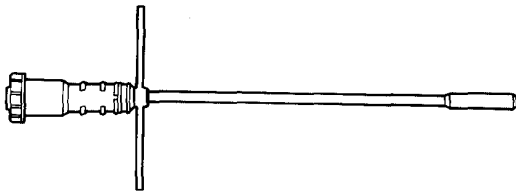
- To avoid rendering the SRS inoperative, which can lead to personal injury or death in the event of a severe frontal collision, all maintenance must be performed by an authorized HONDA dealer.
- Improper maintenance, including incorrect removal and installation of the SRS, can lead to personal injury caused by unintentional activation of the Airbag.
- All SRS electrical wiring harnesses are covered with yellow outer insulation. Related components are located in the steering column, center armrest and dashboard lower panel. Do not use electrical test equipment on these circuits.



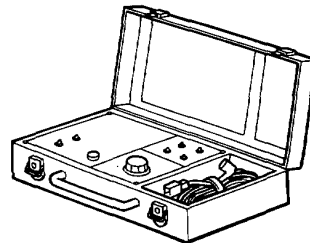
ALB

Special Tools

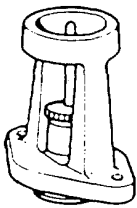
Ref. No.	Tool Number	Description	Q'ty	Page Reference
①	07HAA—SG00100 or 07HAA—SG00101	Bleeder T-Wrench	1	19-59, 64, 65, 66, 78, 86
②	07HAJ—SG00601 or 07508—SB00000	ALB Checker ALB Checker	1 1	19-53, 55, 68 86 19-53, 55, 68
	07HAJ—SG00400	Adaptor	1	86 19-53, 55, 68
③	07JAG—SD40100	Pushrod Adjustment Gauge	1	19-20
④	07MAK—SP00100	Brake Shoe Equipment	1	19-4
⑤	07410—5790100	Pressure Gauge Attachment	1	19-19
⑥	07510—6340101	Pressure Gauge Joint Pipe	1	19-19
⑦	07HAK—SG00110	Pressure Gauge Joint Pipe	1	19-19
⑧	07510—6340300	Vacuum Joint Tube A	1	19-19
⑨	07404—5790300	Vacuum Gauge	1	19-19
⑩	07410—5790500	Tube Joint Adaptor	1	19-19
⑪	07406—5790200	Pressure Gauges	2	19-19



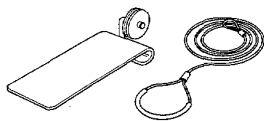
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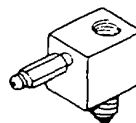
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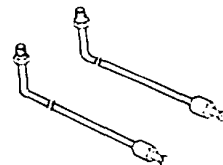
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④

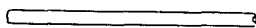


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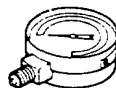


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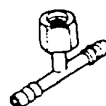
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⑨

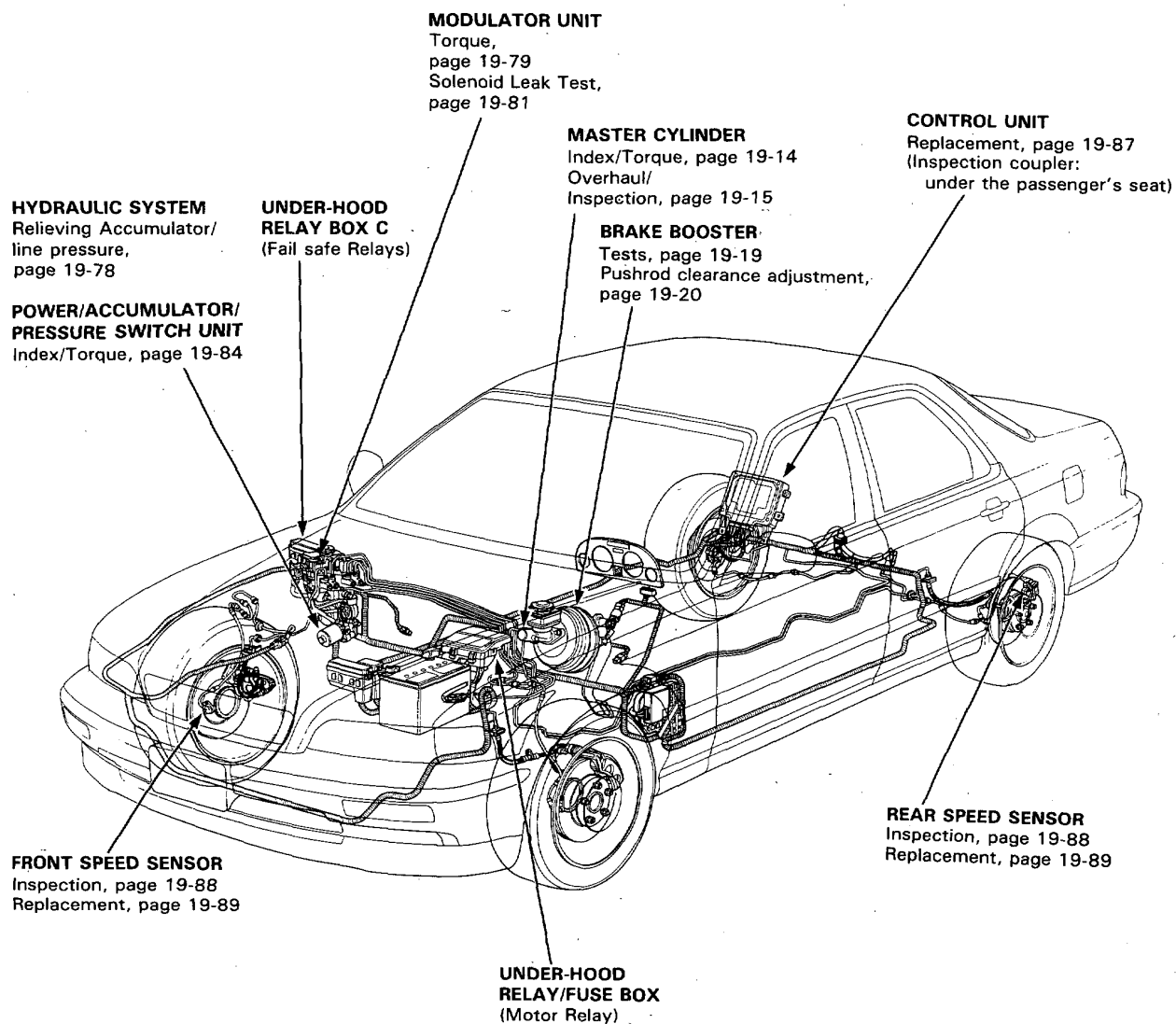


⑩



⑪

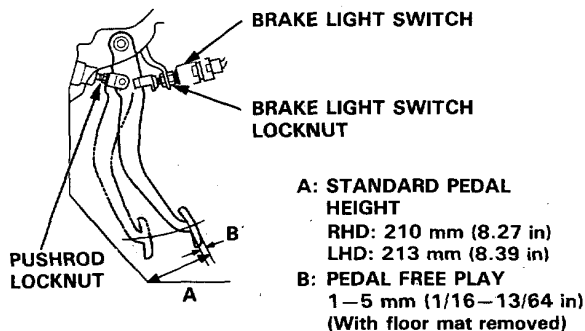
⚠ WARNING The accumulator contains high-pressure nitrogen gas, do not puncture, expose to flame or attempt to disassemble the accumulator or it may explode; severe personal injury may result.



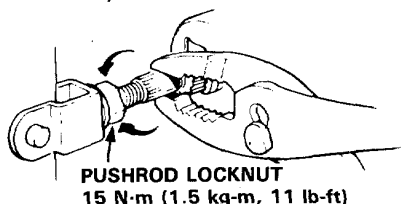
Pedal Height

Adjustment

1. Loosen the brake light switch locknut and back off the brake light switch until it is no longer touching the brake pedal.

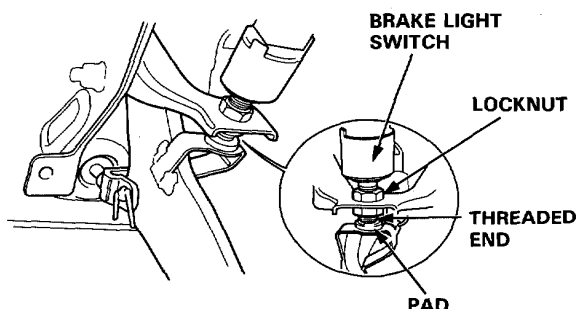


2. Loosen the pushrod locknut and screw the pushrod in or out with pliers until the standard pedal height from the floor. After adjustment, tighten the locknut firmly.



3. Screw in the brake light switch until its plunger is fully depressed (threaded end touching the pad on the pedal arm). Then back off the switch 1/2 turn and tighten the locknut firmly.

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.

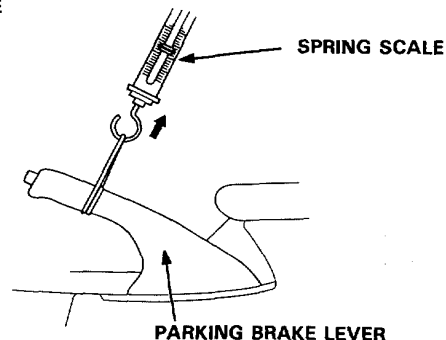
CAUTION: If the pedal free play is out of specification, brake drag may occur.

Parking Brake

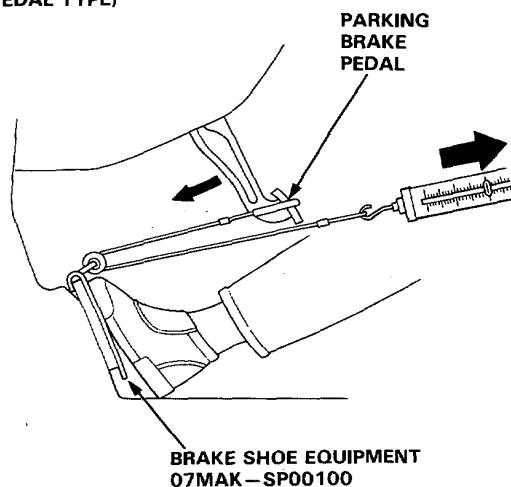
Inspection/Adjustment

1. The rear drum brakes should be applied when the parking brake lever (pedal) is pulled up (pushed down) with 20 (30) kg, 8 (6) to 12 (8) clicks.

LEVER TYPE



(PEDAL TYPE)



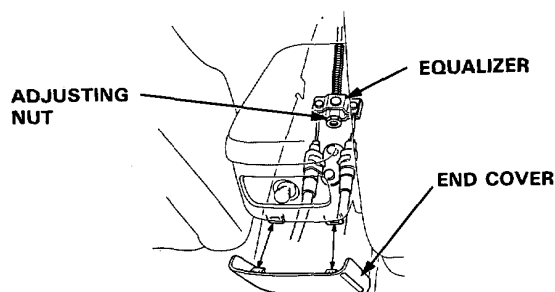
2. If the number of lever (pedal) clicks is excessive, inspect the lining wear (page 19-26). If the parking brake linings are not worn beyond the service limit, minor adjustments (1–2 clicks) can be made with the adjusting nut in the equalizer. For major adjustment, see the next page.

● **Minor adjustment:**

3. Remove the end cover.
4. Pull parking lever up one click or Push the parking pedal down one click.

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

5. Raise the rear wheels off the ground.
6. Tighten the adjusting nut until the rear wheels drag slightly when turned.
7. Release the parking lever (pedal) and check that the rear wheels do not drag when turned. Readjust if necessary.
8. With the equalizer properly adjusted, the rear brakes should be fully applied when the parking brake lever (pedal) is pulled up (pushed down) 8 (6) to 12 (8) clicks.



● **Major adjustment:**

Adjust the parking brake shoe lining-to-drum clearance with the adjuster in the drums on both rear wheels.

NOTE:

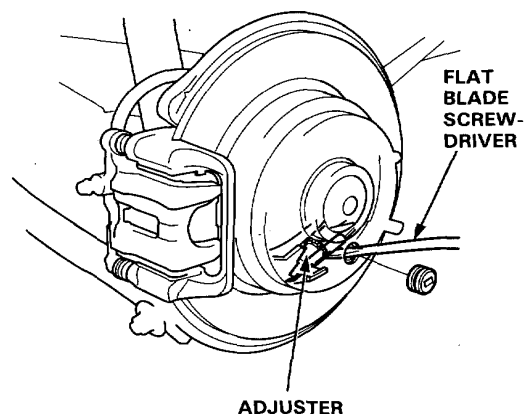
Make sure the parking brake linings are not worn beyond the recommended limit (page 19-22). If either lining is worn beyond the limit, both brake shoes must be replaced.

CAUTION: After replacing the linings, be sure to drive the car for "break-in" purposes. Refer to page 19-25 for the lining surface adjustment.

9. Remove the rear wheels.

NOTE: When making a major adjustment, release the parking brake lever and back off the adjusting nut in the equalizer.

10. Turn the brake shoe adjuster up with a screwdriver until the shoes lock, then back off 8 stops.



11. Adjust the adjusting nut in the equalizer. Refer to step 1 on page 19-4.
12. Install the console rear cover.
13. Install the rear wheels.
14. Lower the car.

Front Brakes

Torque/Inspection

WARNING

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

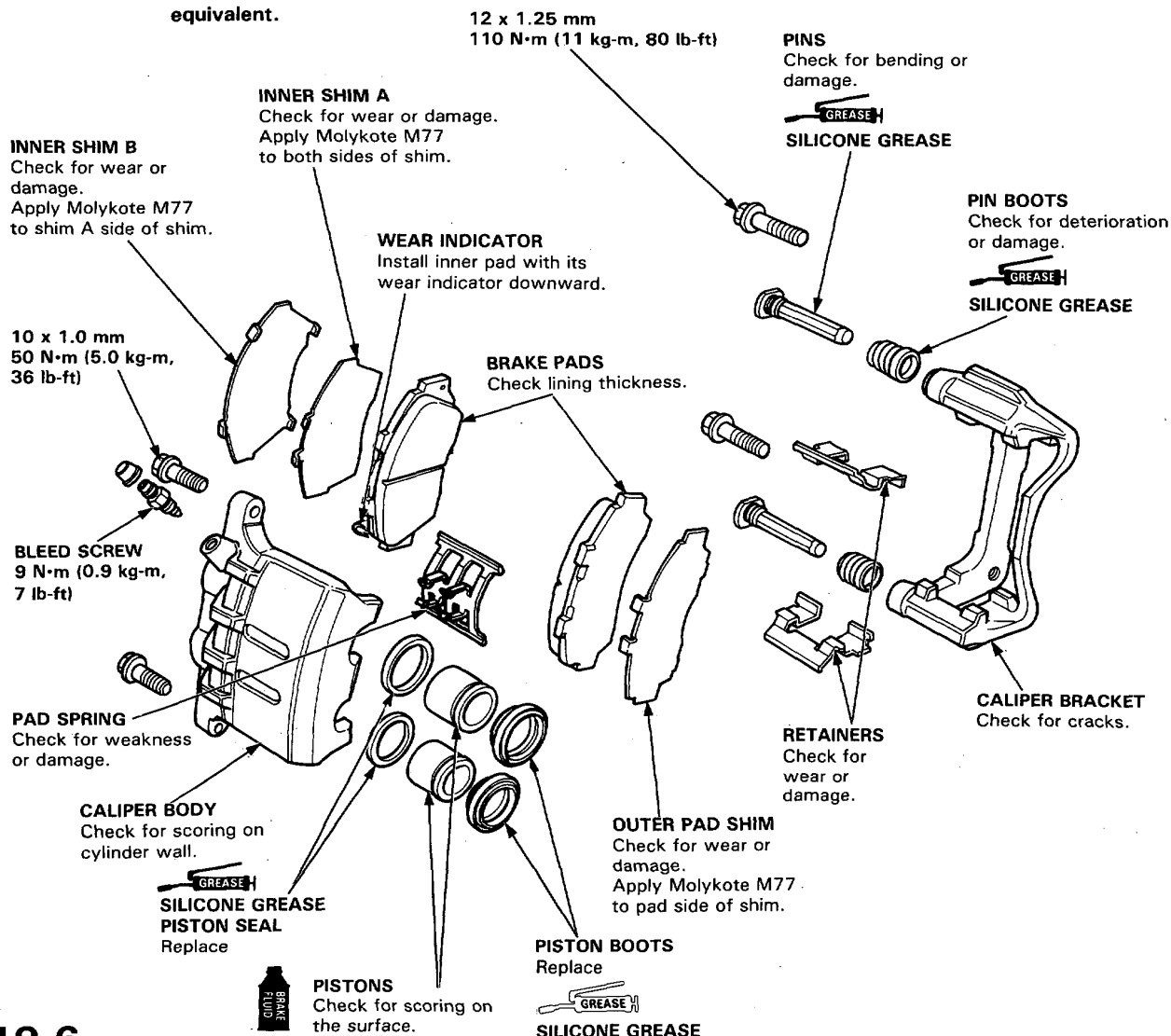
NOTE:

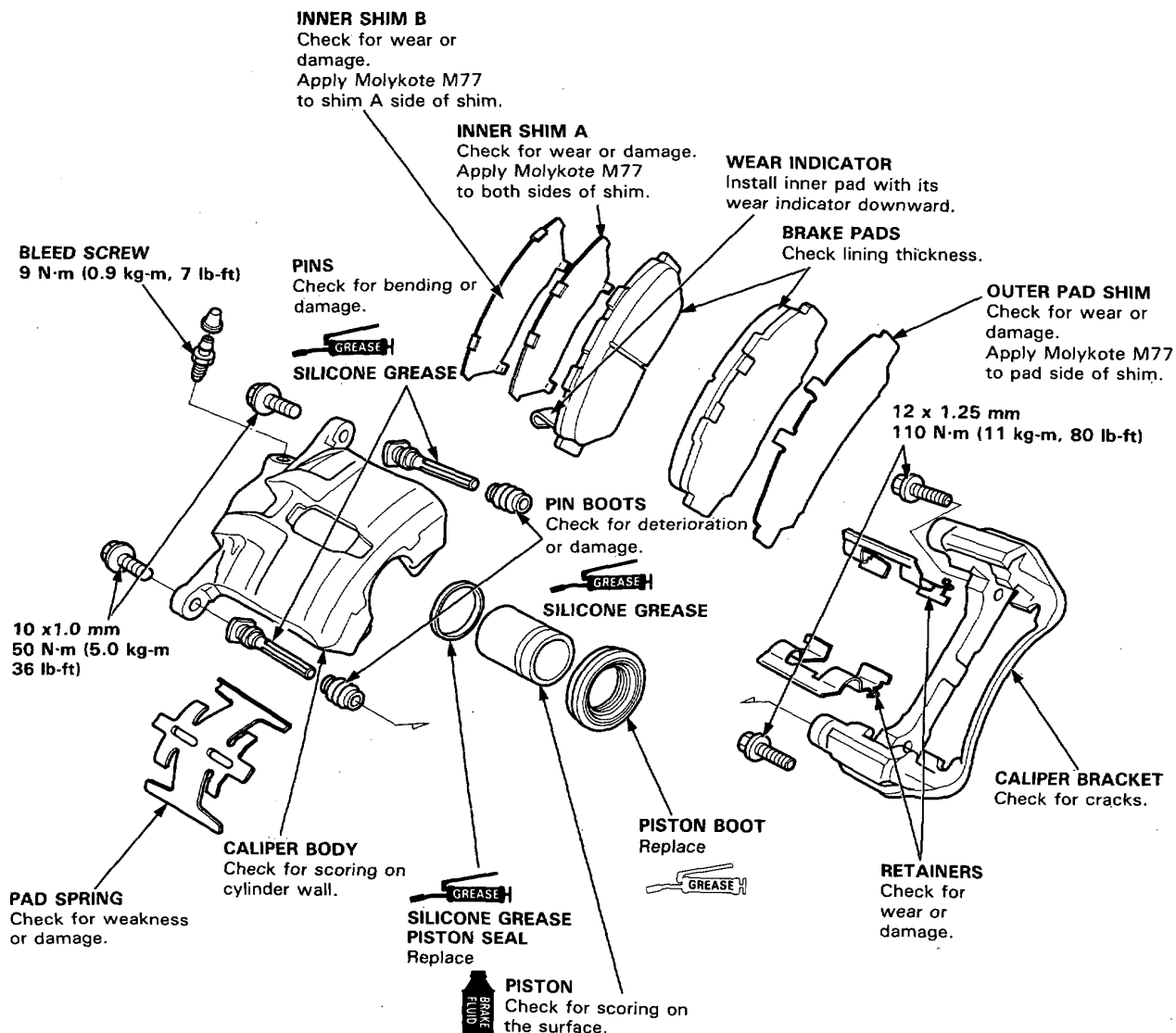
- Coat piston, piston seal, and caliper bore with clean brake fluid.
- Replace all rubber parts with new ones whenever disassembled.
-  This symbol represents brake fluid. Use only DOT 3 or 4 brake fluid.

-  Use only HONDA Brake Cylinder Grease (P/N 08733-B020E) or equivalent.

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.





Front Brake Pads

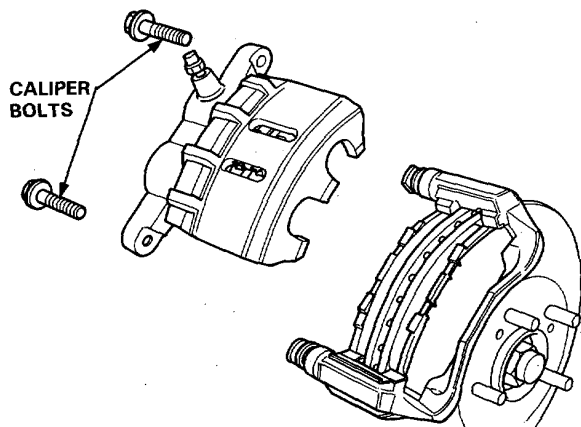
Inspection/Replacement

⚠ WARNING

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

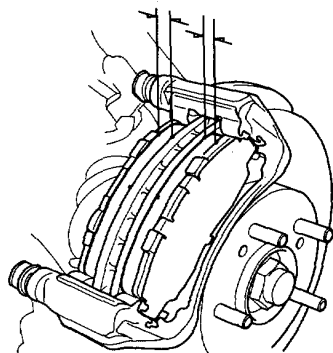
1. Loosen the front wheel lug nuts slightly, then support the front of the car on safety stands. Remove the front wheels.
2. Remove the caliper bolts and move the caliper out of the way.

CAUTION: Support the caliper with a piece of wire so that it does not hang from the brake hose.



3. If lining thickness is less than service limit, replace both pads as a set.

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.

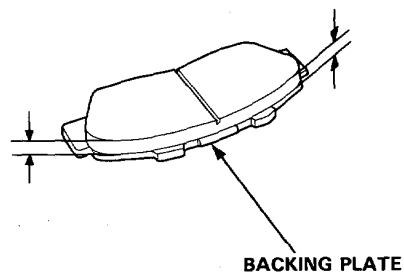


4. Remove the shims, pads and retainers.
5. Using a vernier caliper, measure the thickness of each brake pad lining.

Brake Pad Thickness:

Standard: 11 mm (0.43 in)

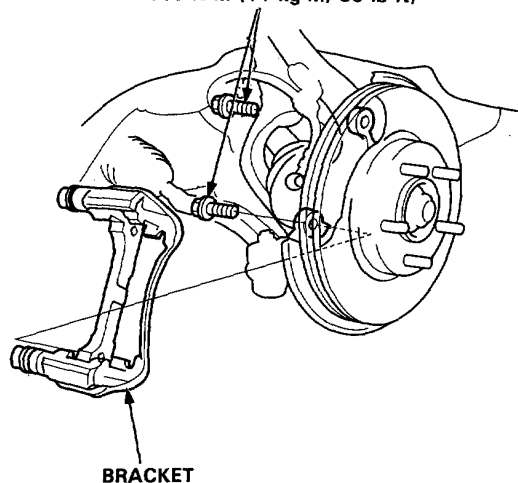
Service Limit: 1.6 mm (0.06 in)



NOTE: Measurement does not include pad backing plate thickness.

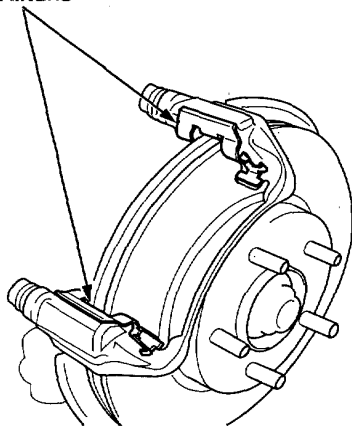
6. Remove the bracket and bracket bolts.
7. Clean the caliper and bracket thoroughly; remove any rust, and check for grooves or cracks.
8. Install the bracket and bracket bolts. Tighten the bracket bolts.

**12 x 1.25 mm FLANGE BOLTS
(BRACKET BOLTS)
110 N·m (11 kg·m, 80 lb·ft)**



9. Install the pad retainers.

RETAINERS



10. Apply Molykote M77 to the shims and the pads as shown on page 19-6 or 7. Wipe excess grease off the shims.

11. Install the shims to the back of the pads.

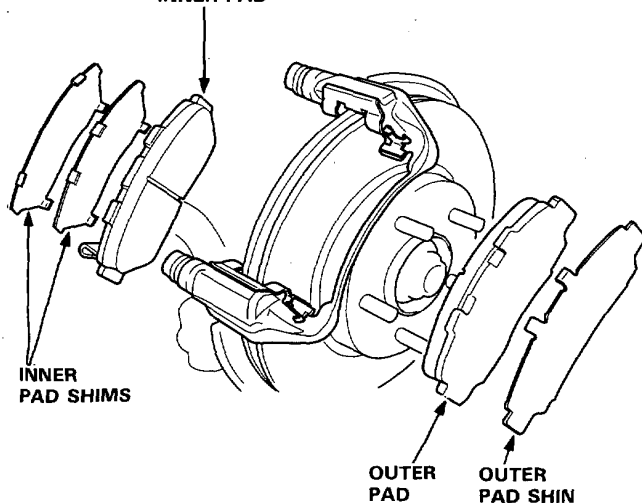
12. Install the pads in the bracket.

NOTE:

- Install the inner pad with its wear indicator facing downward.

⚠ WARNING When reusing the pads, always reinstall the brake pads in the original positions to prevent loss of braking efficiency.

INNER PAD

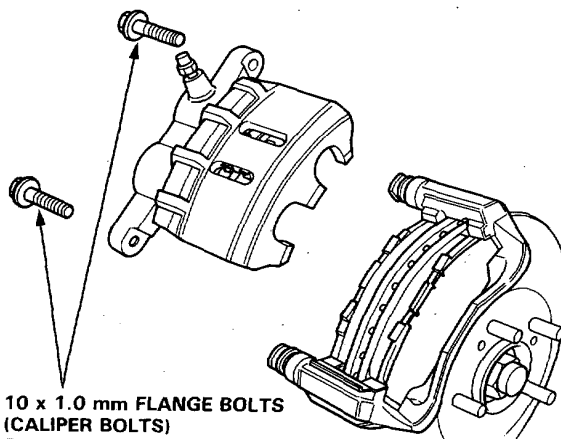


13. Push in the piston so that the caliper will fit over the pads.

14. Set the caliper down into position, then install the caliper bolts.

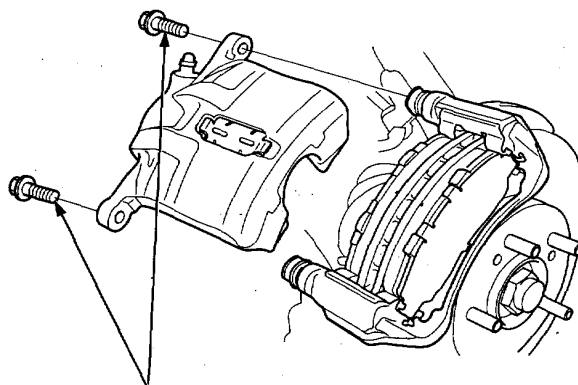
Tighten the bolts to the specified torque.

[Dual pot caliper type]



10 x 1.0 mm FLANGE BOLTS
(CALIPER BOLTS)
50 N·m (5.0 kg-m, 36 lb-ft)

[Single pot caliper type]



10 x 1.0 mm FLANGE BOLTS
(CALIPER BOLTS)
50 N·m (5.0 kg-m, 36 lb-ft)

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

NOTE: Clean the mating surface of the wheel and hub before installing the wheel.

⚠ WARNING Contaminated brake discs or pads reduce stopping ability. Keep grease off the discs or pads.

Front Caliper

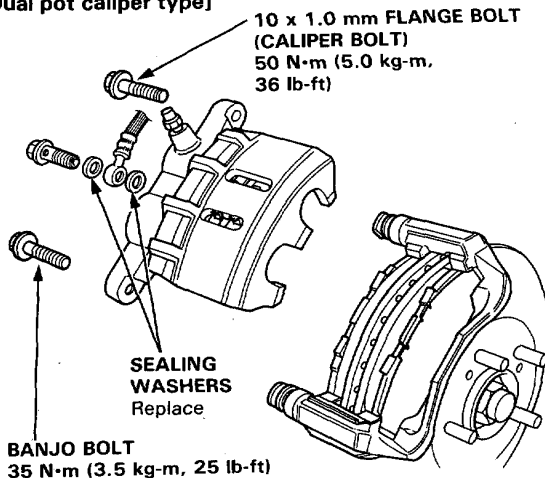
Disassembly

CAUTION:

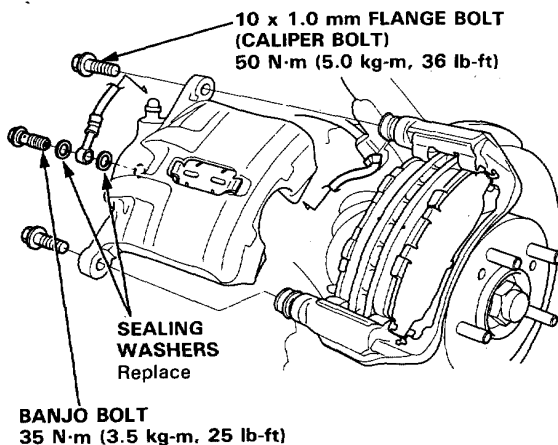
- Before reassembling, check that all parts are free of dust and other foreign particles.
- Replace parts with new ones whenever specified to do so.
- Use only clean DOT 3 or 4 brake fluid.
- Make sure no dirt or other foreign matter is allowed to contaminate the brake fluid.
- Do not mix different brands 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. Remove the banjo bolt and disconnect the brake hose from the caliper.
2. Remove the caliper bolts, then remove the caliper.

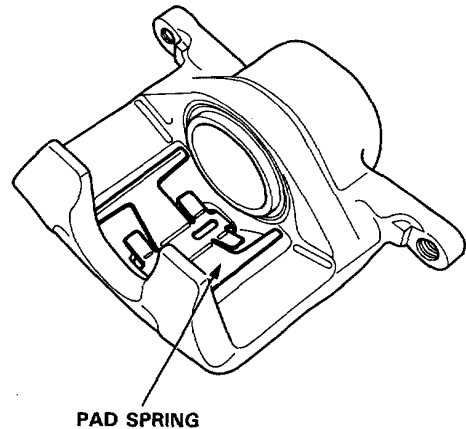
[Dual pot caliper type]



[Single pot caliper type]



3. Remove the pad spring from the caliper body.

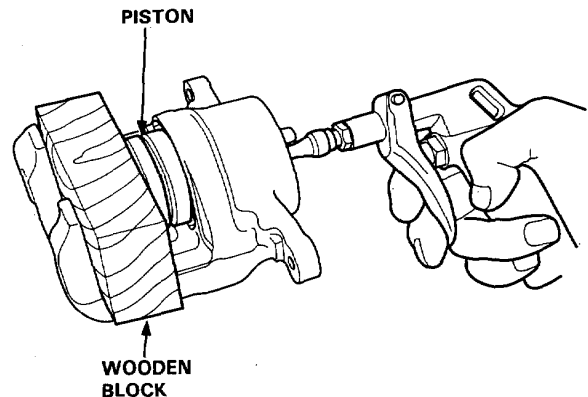


4. Remove the piston(s) from the caliper. If necessary, apply compressed air to the caliper fluid inlet to get the piston(s) out. Place a shop rag or wooden block as shown to cushion the piston(s) when it is expelled.

Use low pressure air in short spurts.

⚠ WARNING

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



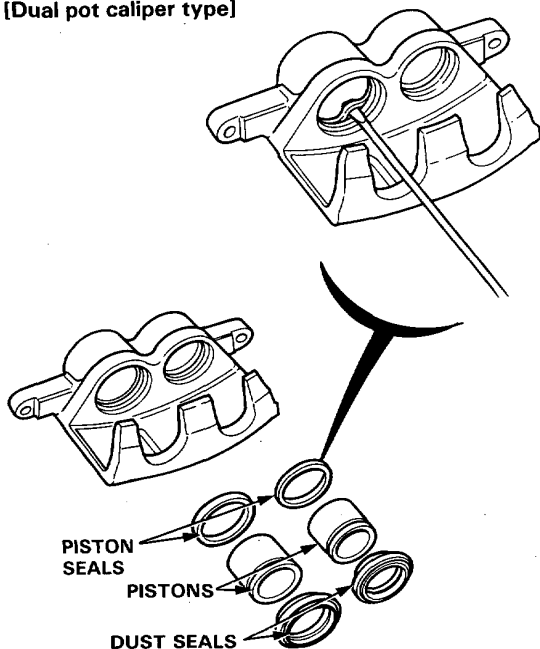
Front Caliper

Reassembly

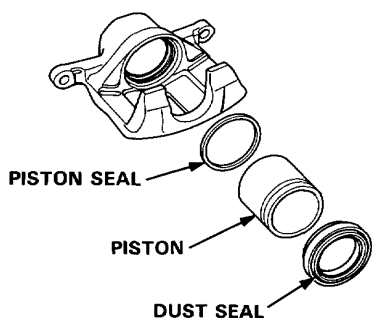
5. Remove the piston boot(s) and piston seal(s).

CAUTION: Take care not damage the cylinder(s).

[Dual pot caliper type]



[Single pot caliper type]

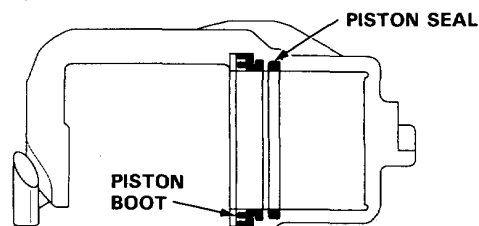


CAUTION:

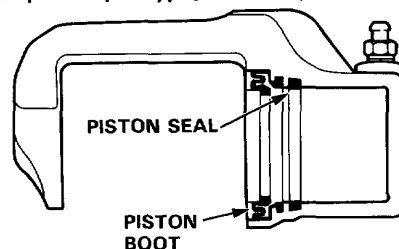
- Before reassembling, check that all parts are free of dust and other foreign particles.
- Replace parts with new ones whenever specified to do so.
- Use only clean DOT3 or 4 brake fluid.
- Make sure no dirt or other foreign matter is allowed to contaminate the brake fluid.
- Do not mix different brands 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.

1. Clean the piston and caliper bore with brake fluid and inspect for wear or damage.
2. Apply silicone grease to new piston seal, then install the piston seal in the cylinder groove.
3. Apply rubber grease to new piston boot, then install the piston boot in the cylinder groove.

[Dual pot caliper type]



[Single pot caliper type]



4. Lubricate the caliper cylinder and piston with brake fluid, then install the piston in the cylinder with the dished end facing in.
5. Reinstall the caliper in the reverse order of removal.

⚠ WARNING When reusing the pads, always reinstall the brake pads in their original positions to prevent loss of braking efficiency.

6. Fill the brake reservoir up and bleed the brake system (page 19-12).

Front Brake Disc

Run-Out Inspection

1. Support the front of the car on safety stands and remove the front wheels.
2. Remove the front brake disc pads (page 19-8).
3. Inspect the disc surface for grooves, cracks, and rust.
Clean the disc thoroughly and remove all rust.
4. Use suitable nuts (12 x 1.5 mm) and plain washers to hold the disc securely against the hub. Torque nuts to 11 kg-m (80 lb-ft). Mount a dial indicator as shown.

Brake Disc Runout:

Single pot caliper type

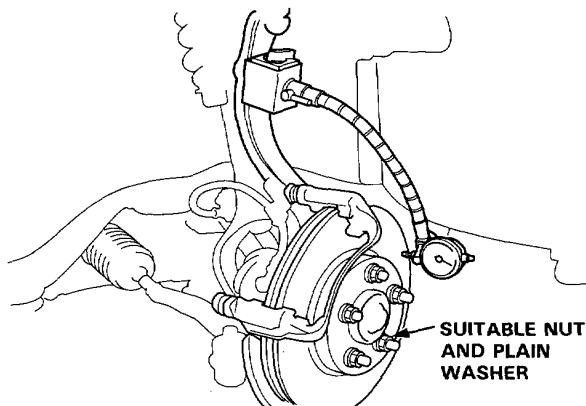
Service Limit: 0.10 mm (0.004 in)

Max. Refinishing Limit: 21 mm (0.83 in)

Dual pot caliper type

Service Limit: 0.10 mm (0.004 in)

Max. Refinishing Limit: 26 mm (1.024 in)

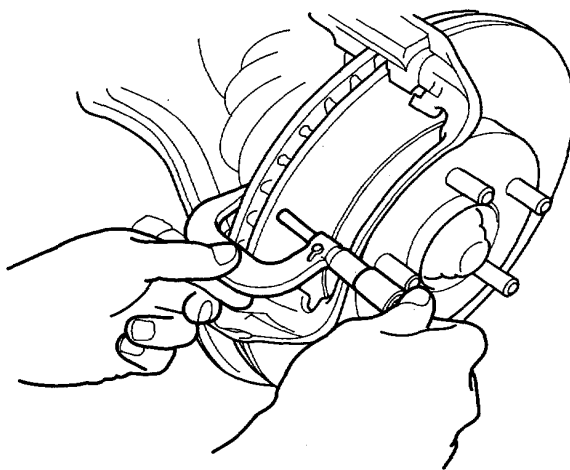


5. If the disc is beyond the service limit, refinish the disc with an on-car brake lathe. Be sure to install washers and nuts to hold disc securely to hub. Torque to 11 kg-m (80 lb-ft). The Kwik-Lathe produced by Kwik-Way Manufacturing Co. and the Front Wheel Drive Disc Brake Lathe offered by Snap-on 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. Support the front of the car on safety stands and remove the front wheels.
2. Remove the front brake disc pads. (page 19-8).
3. Using a micrometer, measure disc thickness at eight points, approximately 45° apart and 10 mm (0.39 in) in from the outer edge of the disc.



Brake disc thickness:

Single pot caliper type

Standard: 23 mm (0.91 in)

Max. Refinishing Limit: 21 mm (0.83 in)

Dual pot caliper type

Standard: 28 mm (1.10 in)

Max. Refinishing Limit: 26 mm (1.02 in)

Brake Disc Parallelism:

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

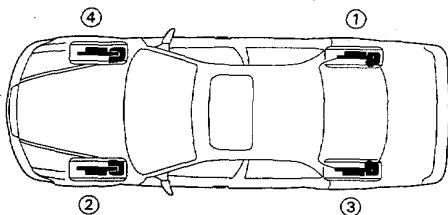
4. If the disc is beyond the limits for parallelism, refinish the disc with an on-car brake lathe. Be sure to install washers and nuts to hold disc securely to hub. Torque to 11 kg-m (80 lb-ft). The Kwik-Lathe produced by Kwik-Way Manufacturing Co. and the Front Wheel Drive Disc Brake Lathe offered by Snap-on Tools Co. are approved for this operation.

CAUTION:

- Use only clean DOT3 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.

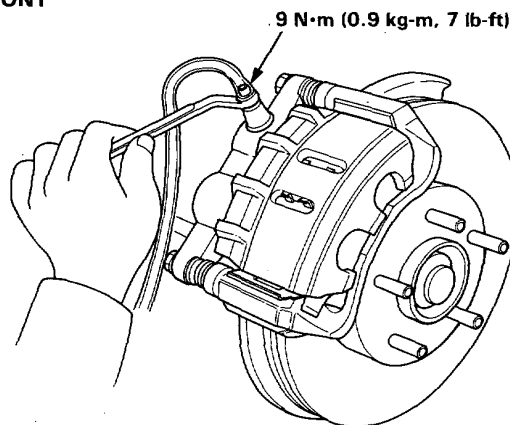
NOTE: The reservoir on the master cylinder must be full at the start of *bleeding procedure*, and checked after bleeding each brake caliper. Add fluid as required. Use only clean DOT3 or 4 brake fluid.

BLEEDING SEQUENCE

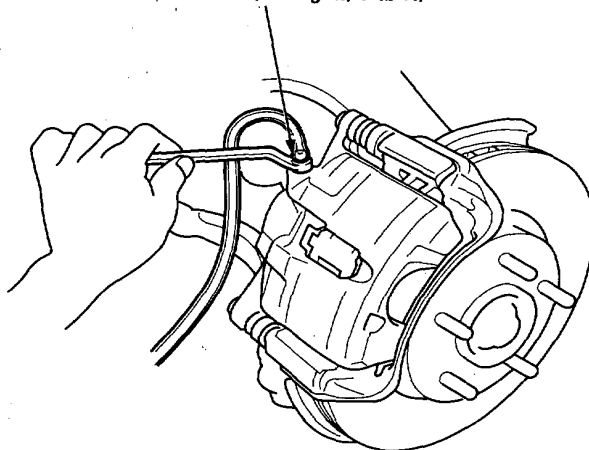


1. Have someone slowly pump the brake pedal several times, then apply steady pressure.
2. Loosen the brake bleed screw to allow air to escape from the system. Then tighten the bleed screw securely.
3. Repeat the procedure for each wheel in the sequence shown above until air bubbles no longer appear in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

FRONT

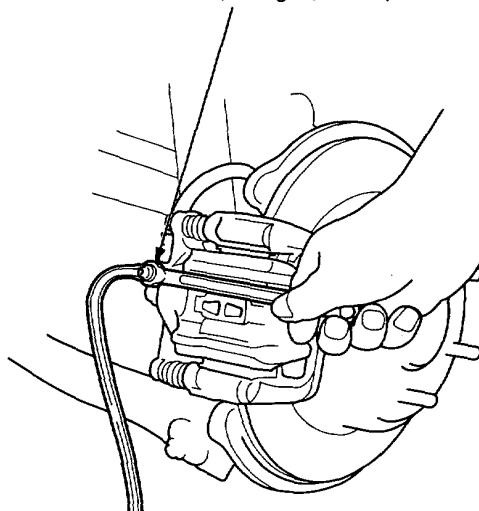


9 N·m (0.9 kg-m, 7 lb-ft)



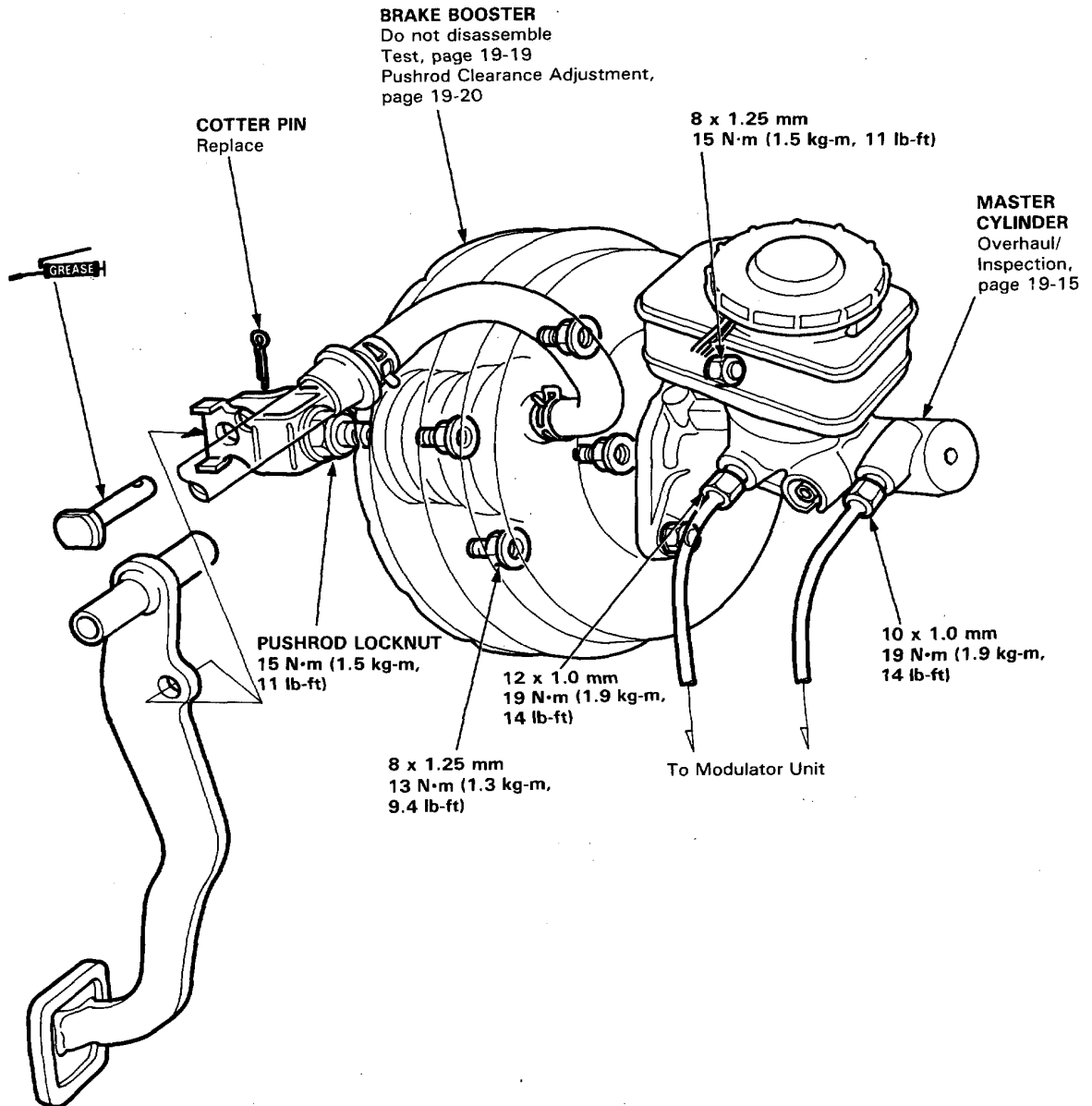
REAR

9 N·m (0.9 kg-m, 7 lb-ft)



Master Cylinder and Brake Booster

Index/Torque



Master Cylinder

Overhaul/Inspection



CAUTION:

- Avoid spilling brake fluid on painted surfaces as severe damage can result. Wipe up spilled fluid at once and rinse well with clean water.
-  This symbol represents brake fluid. Use only DOT 3 or 4 brake fluid.
-  Use only HONDA Brake Cylinder Grease (P/N 08733-B020E) or equivalent.

- Carefully inspect the bore of the master cylinder for pits, scratches or scoring.
- Replace the master cylinder if the bore is damaged or worn. Do not hone or attempt to refinish the bore.

NOTE:

- Wash all removed parts in brake fluid and blow dry with compressed air. Blow open all passages and fluid ports.
- Replace all rubber parts with new ones whenever the cylinder is disassembled.
- To prevent damage, liberally apply clean brake fluid to the piston cups before installation.
- Do not attempt to refinish master cylinder bore. Replace if pitted or worn.

RESERVOIR CAP
Check for clogged air hole.

RESERVOIR SEAL

STRAINER
Remove accumulated sediment.

STOP BOLT
Replace.
9 N·m (0.9 kg-m,
7 lb-ft)

SEALING WASHER
Replace

FLUID RESERVOIR

MASTER CYLINDER
Check for damage or wear.

 (INNER WALL OF CYLINDER)

15 N·m
(1.5 kg-m,
11 lb-ft)

PRIMARY PISTON ASSEMBLY

 **SILICONE GREASE**

 **PISTON CUP**

SECONDARY PISTON ASSEMBLY

 **SILICONE GREASE**

 **PISTON CUP**

O-RING

 **GREASE**

ROD SEAL
Replace

PISTON GUIDE



SNAP RING
Replace

 **SILICONE GREASE**

cardiagn.com

Master Cylinder

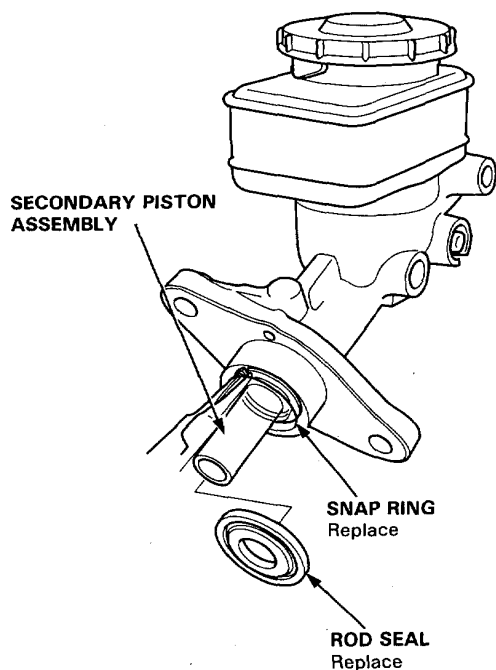
Disassembly

CAUTION:

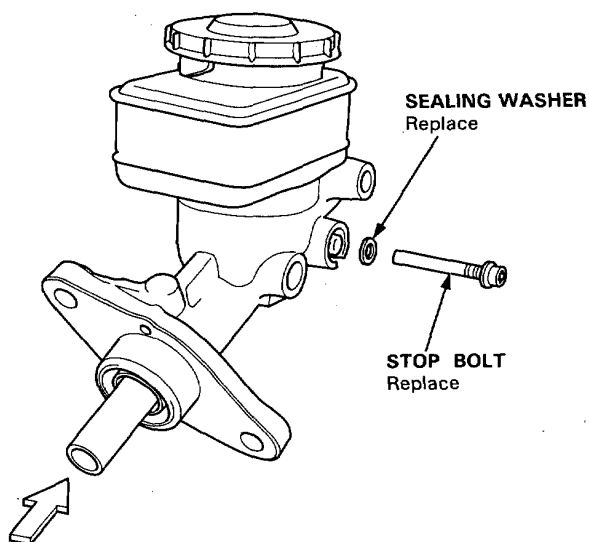
- Avoid spilling fluid on painted, plastic or rubber parts as it may damage the finish.
- Plug the end of the brake hose with a shop rag to prevent brake fluid from flowing out of the brake hose after disconnecting.
- Use only new clean DOT 3 or DOT 4 brake fluid.
- Clean all parts thoroughly with brake fluid. Blow out all passages with compressed air.
- Do not allow foreign matter to enter the system.
- Be careful not to bend or damage the brake pipe when removing the master cylinder.

1. Remove the rod seal.
2. Push the secondary piston assembly, then remove the snap ring.

CAUTION: Avoid damaging the master cylinder wall.



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 outlet.

CAUTION:

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

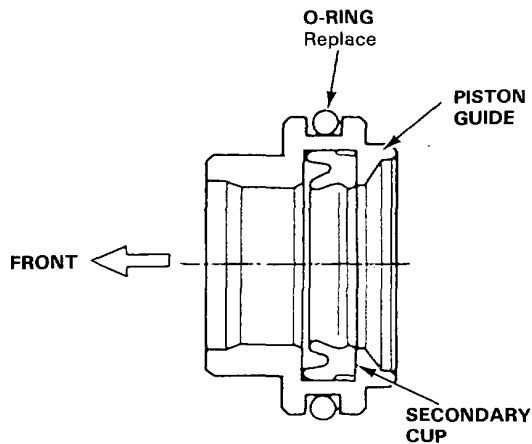
Reassembly

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.
- 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.
- Use only new clean DOT3 or DOT4 brake fluid.
- 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.

1. Lubricate the new piston parts with brake fluid.
2. Install the new O-ring and secondary cup onto the piston guide.

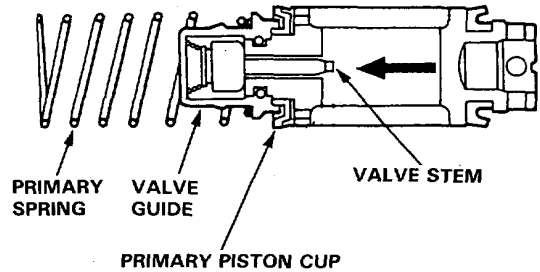
PISTON GUIDE ASSEMBLY



NOTE: Replace the secondary cup and piston guide as a set if necessary.

3. Make sure that the primary piston assembly and secondary piston assembly are in good condition.

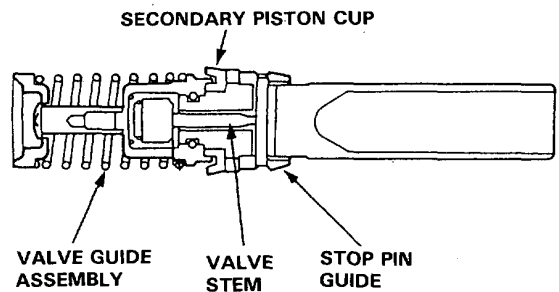
PRIMARY PISTON ASSEMBLY



NOTE:

- Reaching through the primary piston stop bolt hole, lightly press on the valve stem to see if it moves smoothly.

SECONDARY PISTON ASSEMBLY



NOTE:

- Lightly press the stop pin guide to see if the valve stem moves smoothly.

(cont'd)

Master Cylinder

Reassembly (cont'd)

4. Assemble the primary piston assembly, secondary piston assembly and piston guide assembly in the master cylinder body.

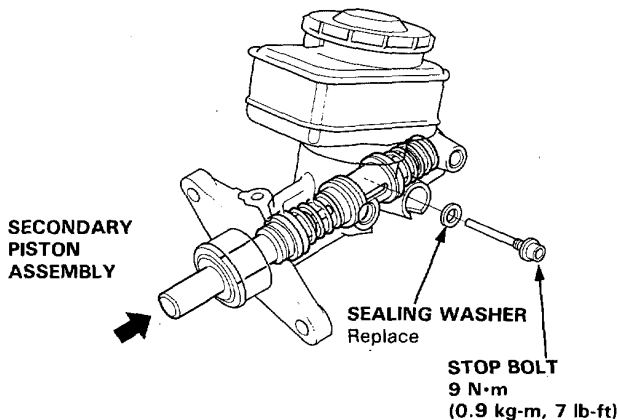
NOTE: Install the primary piston with the slot on the cylinder facing the stop bolt hole side.

5. Push the secondary piston in until slot aligns with the stop bolt hole, then install and tighten the stop bolt.

CAUTION:

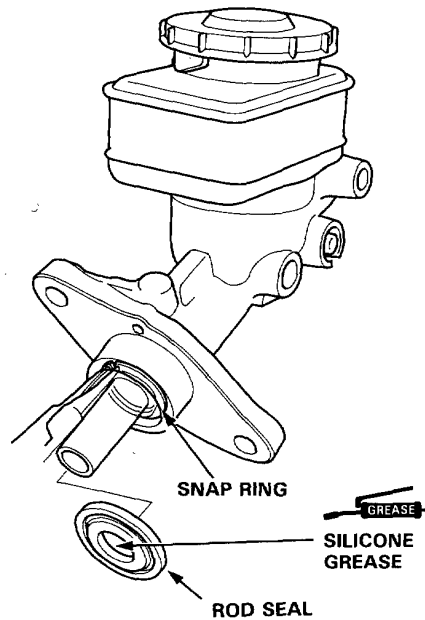
- Replace the stop bolt seal with a new one whenever disassembled.
- Apply brake fluid to the inner wall of the cylinder and piston cups, being careful that they are not turned inside out during installation.

6. Press the secondary piston in and install the snap ring.



CAUTION: Avoid damaging the sliding surface of the secondary piston when installing the snap ring.

7. Install the rod seal.



CAUTION:

- Make sure that there is no interference between the brake pipes and other parts when installing.
- Adjust the pushrod length and clearance (page 19-20).

Brake Booster

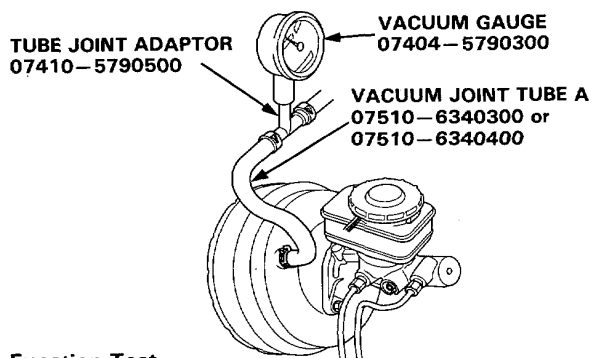
Tests

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 in-Hg), then stop the engine.
3. Read the vacuum gauge.

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

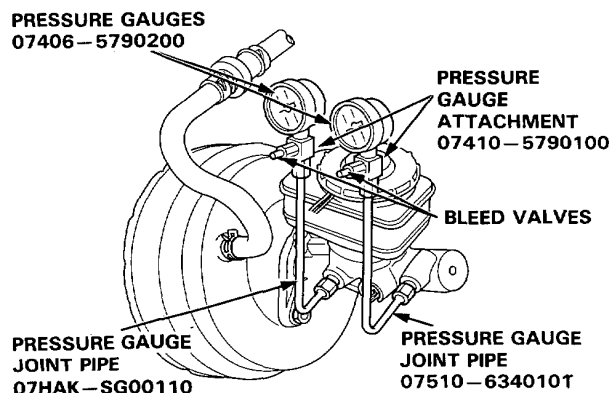
- Check valve
- Vacuum hose
- Seals
- Diaphragm
- Master cylinder O-ring and cup



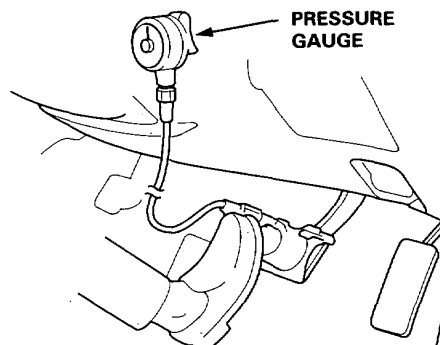
Function Test

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.

CAUTION: Avoid spilling brake fluid on painted, plastic or rubber parts as it may damage the finish.



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.

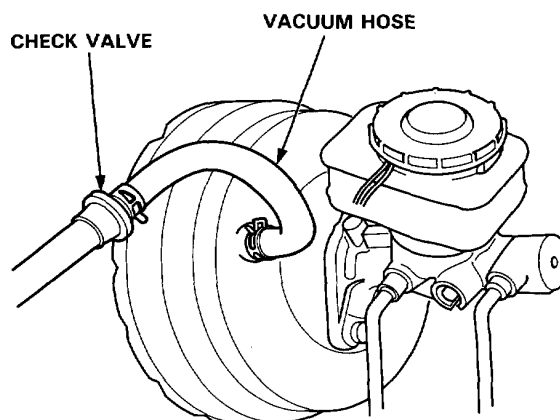


Vacuum mmHg	Line Pressure kPa (kg/cm ² , psi)
0	686 (7.0, 99.5)
300	6110 (62.3, 886)
500	9728 (99.2, 1411)

6. Inspect the master cylinder pistons and cups in 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.

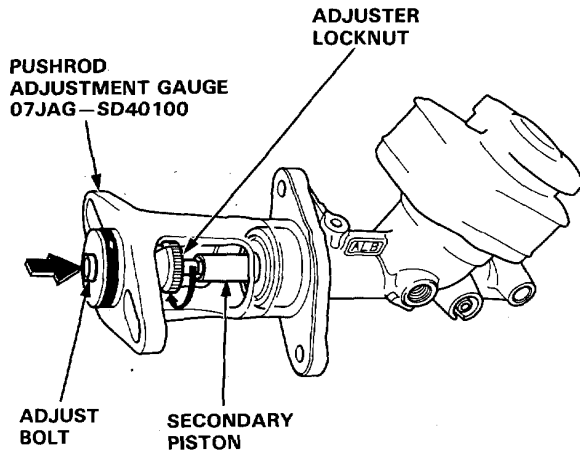


Brake Booster

Pushrod Clearance Adjustment

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

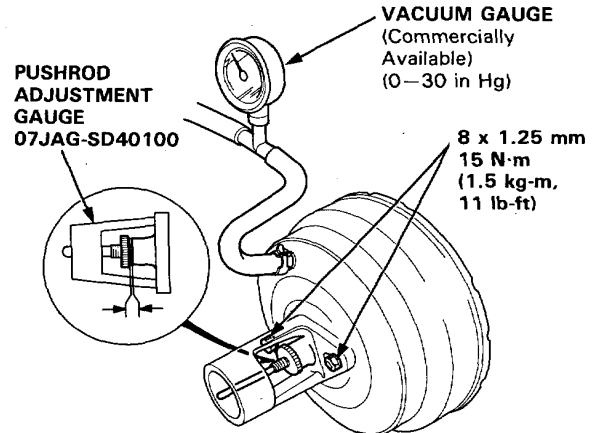
1. Using the special tool, adjust bolt so the top of it is flush with end of master cylinder piston.



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 (0–30 in Hg) to the booster's engine vacuum supply, and maintain an engine speed that will deliver 500 mm Hg (20 in Hg) vacuum or connect the booster in-line with a vacuum gauge to the booster's apply a 500 mm Hg (20 in Hg) vacuum and hold.

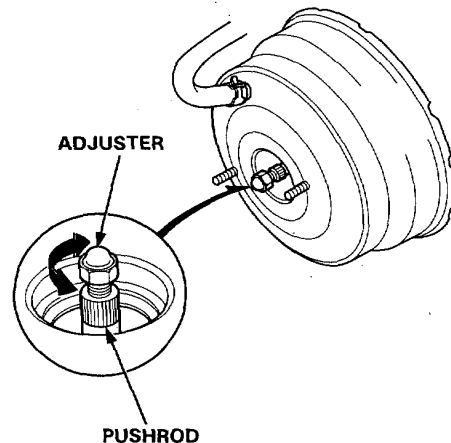
5. With a feeler gauge, measure the clearance between the gauge body and the adjusting nut as shown.

CLEARANCE: 0.1 ± 0.1 mm (0.004 ± 0.004 in)



6. If the clearance is incorrect, remove the tool, and adjust the clearance by holding the pushrod and turning the adjuster in or out.

CAUTION: Do not pull the pushrod out of the brake booster.



NOTE: If the clearance between the gauge body and adjuster locknut is 0.1 mm, the pushrod-to-piston clearance is 0.1 mm or more. If the clearance between the gauge body and adjuster locknut is 0.2 mm, the pushrod-to-piston clearance is 0 mm.

PUSHROD-TO-PISTON CLEARANCE:
0–0.2 mm (0–0.0008 in.)

7. Install the master cylinder.

Rear Brakes



Torque/Inspection

⚠ WARNING

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

: BRAKE CYLINDER GREASE (P/N 08733-B020E) OR EQUIVALENT RUBBER GREASE

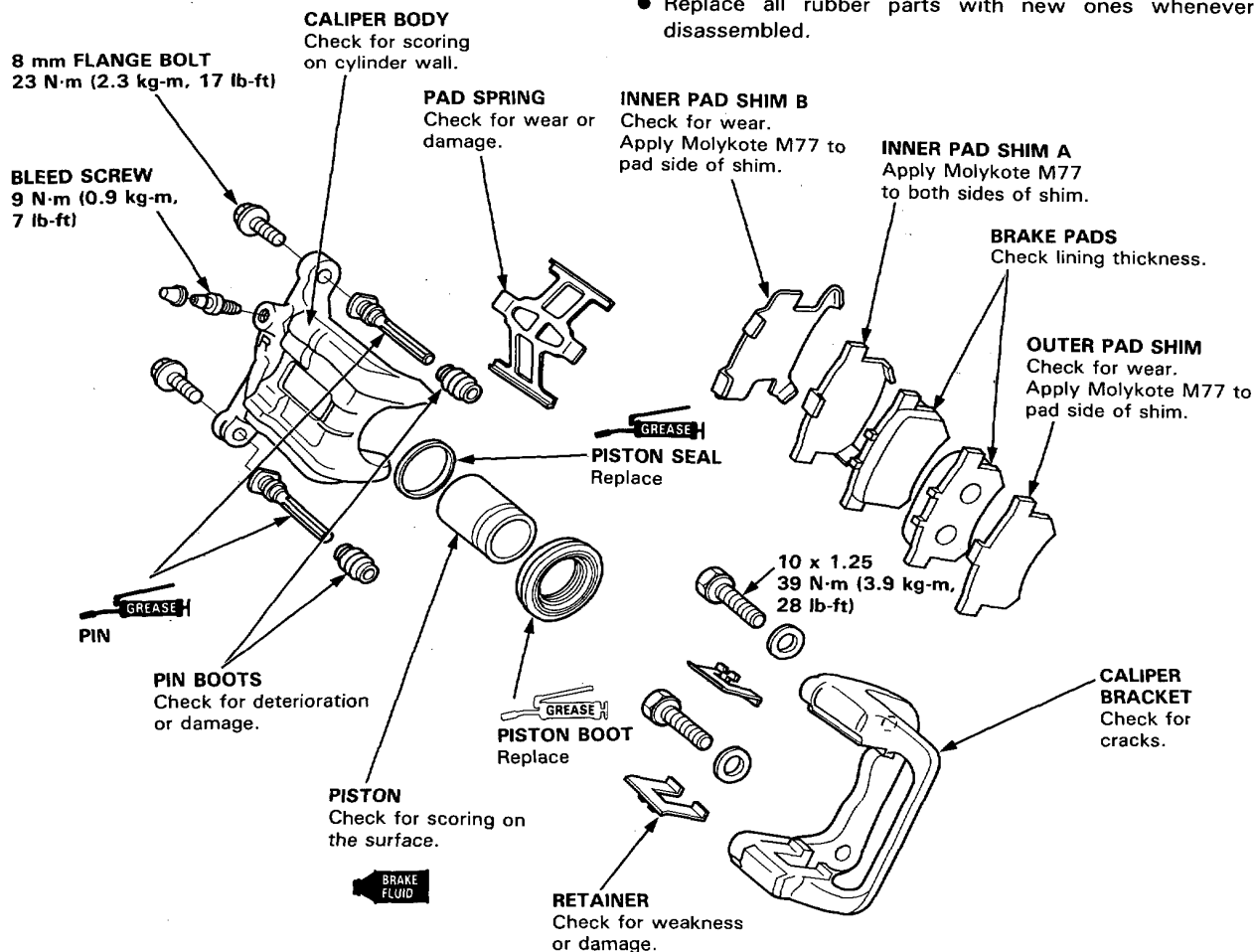
: SILICONE GREASE

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 DOT3 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 and Replacement

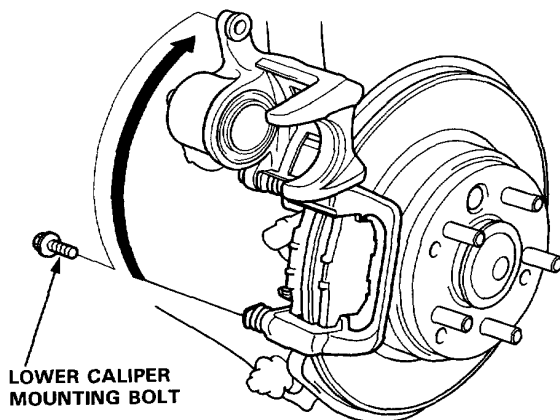
⚠ WARNING

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

1. Block the front wheels, support the rear of the car on safety stands, then remove the rear wheels.
2. Remove the lower caliper mounting bolt and pivot caliper up out of the way.

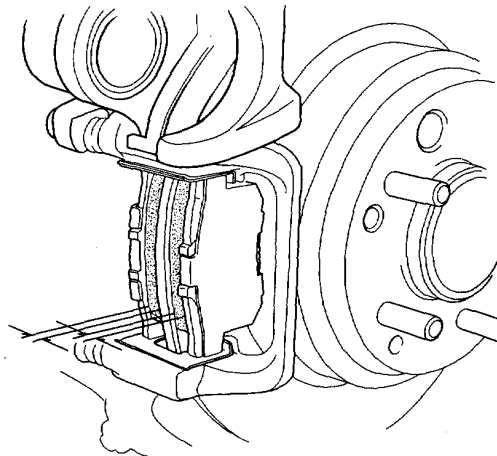
CAUTION:

- Thoroughly clean the outside of the caliper to prevent dust and dirt from entering inside.



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

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.

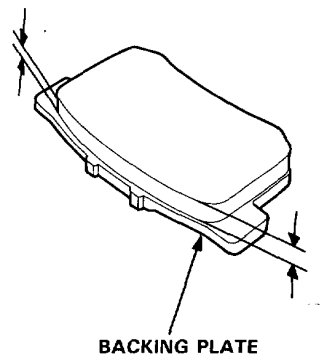


4. Remove the shims, pads and retainers.
5. Remove the pads and measure the thickness of each brake pad lining using a vernier caliper.

Brake Pad Thickness:

Standard: 9.0 mm (0.35 in)

Service limit: 1.6 mm (0.6 in)

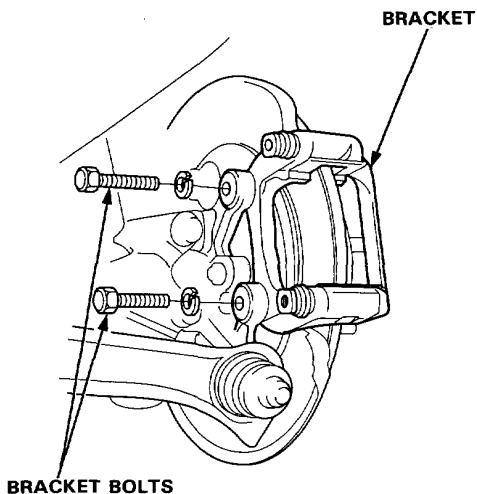


NOTE: Measurement does not include pad backing plate thickness.

6. To remove the caliper bracket, remove the upper caliper mounting bolt and move the caliper up out of the way.

CAUTION: Support the caliper with a piece of wire so that it does not hang from the brake hose.

7. Remove the bracket bolts and bracket.



8. Clean the caliper and bracket thoroughly; remove any rust, and check for grooves or cracks.

9. Install the caliper bracket with two bracket bolts and washers.
Tighten the bracket bolt to the specified torque.

10. Install the retainers in the correct positions.

11. Install the new brake pads and pad shims on caliper bracket.

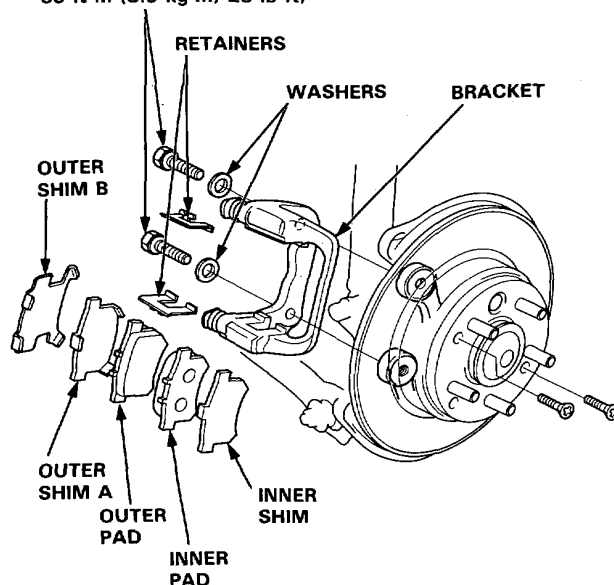
WARNING

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

NOTE:

- Apply Molykote 77 to the shims (page 19-21). Wipe excess grease off the shims.
- Install the inner pad with its wear indicator facing downward.
- Make sure that the pad spring is installed onto the caliper body.

10 x 1.25 mm BOLTS
(BRACKET BOLTS)
39 N·m (3.9 kg-m, 28 lb-ft)



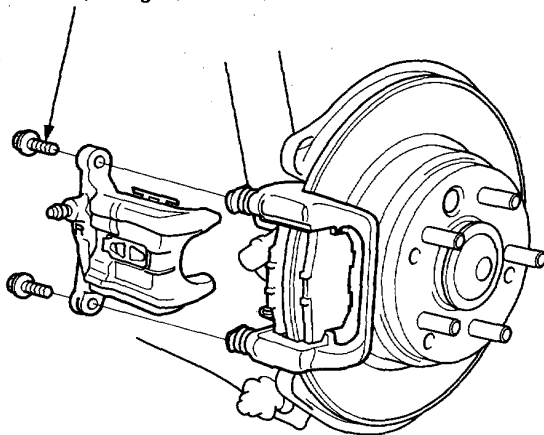
(cont'd)

Rear Brake Pads

Inspection and Replacement (cont'd)

12. Push in the piston so that the caliper will fit over the pads.
13. If the caliper bracket is not removed, pivot the caliper down into position, then install and torque the lower caliper mounting bolt.
If the caliper bracket was removed, set the caliper down into position, then install the caliper bolts.
Tighten the bolts to the specified torque.

CALIPER MOUNTING BOLT (10 mm FLANGE BOLT)
23 N·m (2.3 kg-m, 17 lb-ft)



NOTE: Clean the mating surface of the wheel and hub before installing the wheel.

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

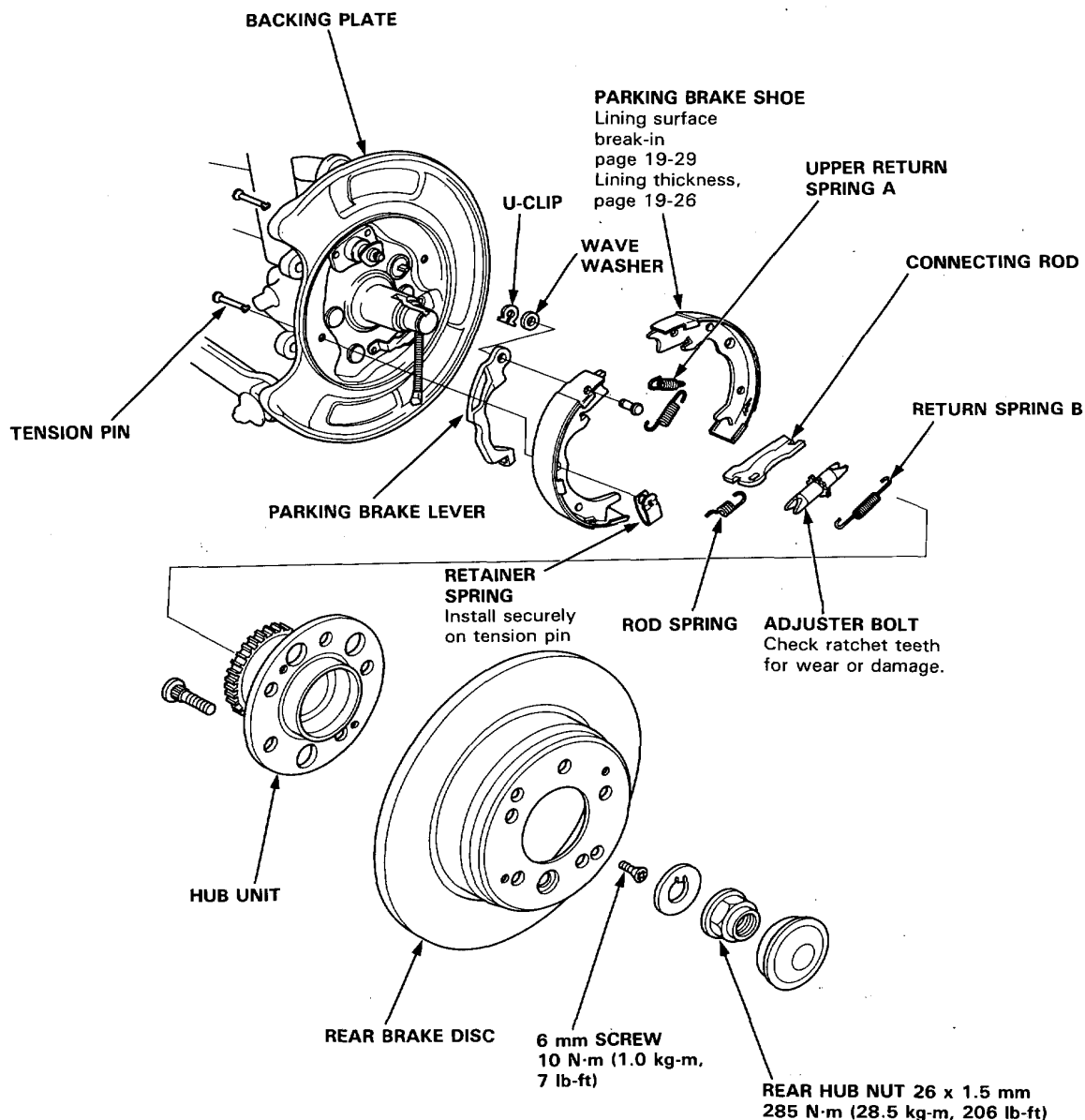
Parking Drum Brakes

Index

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

1. Raise the rear of the car and support with safety stands in proper locations.
2. Loosen the parking brake.
3. Remove the rear wheels.

⚠ WARNING Do not use an air hose to blow the brake assembly clean. Use an vacuum cleaner, to avoid breathing brake lining dust.



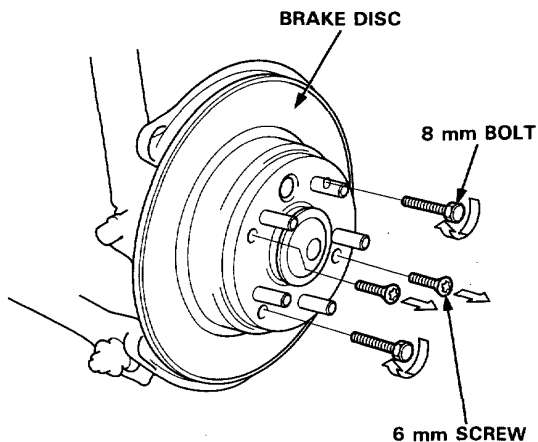
Parking Drum Brake

Inspection

1. Remove the two 6 mm screws and brake disc.

NOTE:

- If the brake disc is difficult to remove, install 8 mm bolts into the threaded holes and tighten them.
- Rear discs can be refinished with an off-car disc lathe.



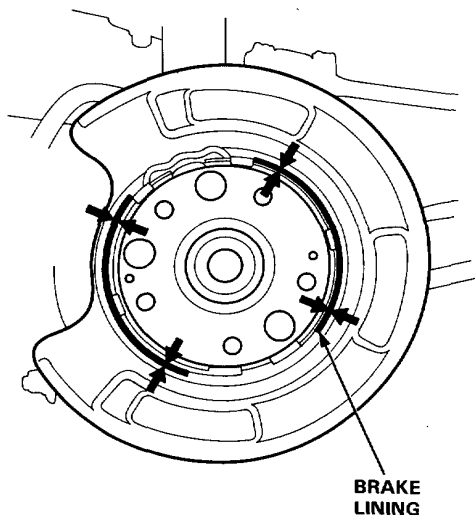
2. Inspect the brake linings for cracking, glazing, wear or contamination.
3. Measure the brake lining thickness.

Lining Thickness

(Does not include brake shoe thickness)

Standard: 2.5 mm (0.098 in)

Service Limit: 1.0 mm (0.039 in)



4. Measure inside diameter of the drum.

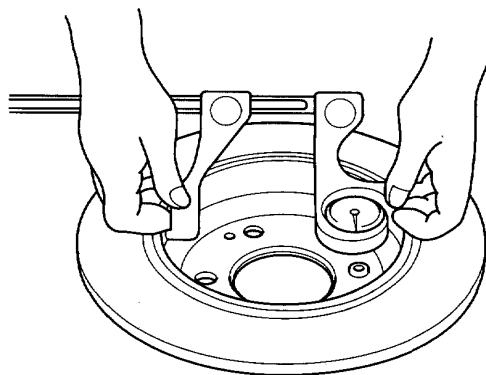
Drum Inside Diameter:

Standard: 170 mm (6.693 in)

Service Limit: 171 mm (6.732 in)

NOTE: If the refinishing limit stamped on the drum does not match the one listed above, use the one on the drum.

Replace the disc/drum if the service limit is exceeded.



5. Inspect the drum sliding surface for scoring, grooving or cracks.
Replace the disc/drum if there is excessive scoring or scratching, or cracks.

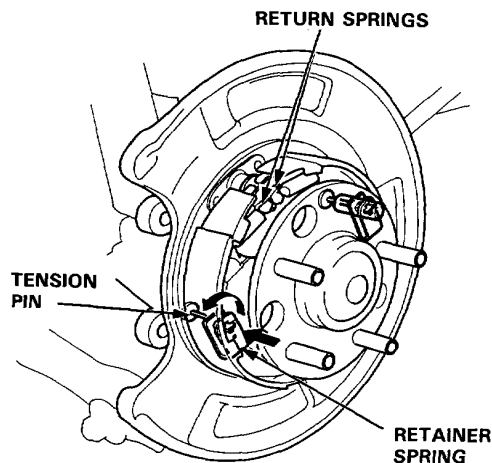
Disassembly

1. Remove the tension pins by pushing the retainer spring and turning them.
2. Disconnect and remove the return springs.

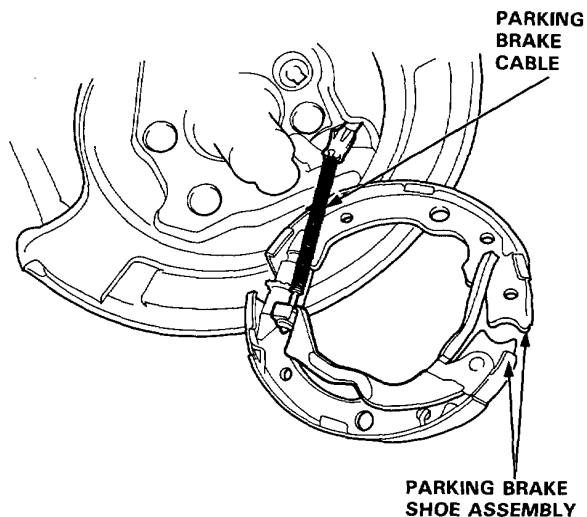
NOTE: Remove the rear hub unit (page 19-25) when removing the shoes if necessary.

⚠ WARNING

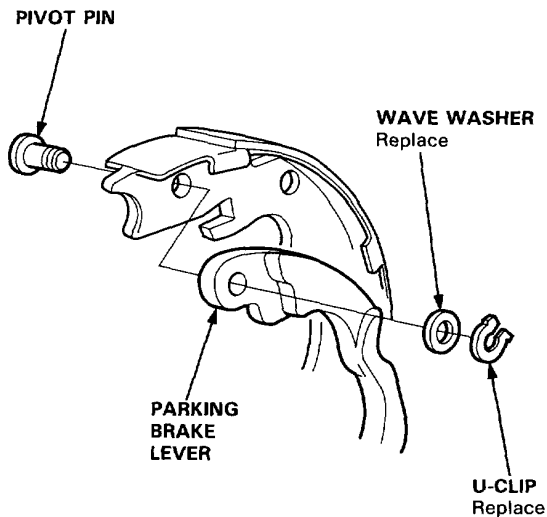
Do not use an air hose to blow the brake assembly clean. To avoid breathing lining dust, use an vacuum cleaner.



3. Lower the parking brake shoe assembly.
4. Disconnect the parking brake cable from the parking brake arm.



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

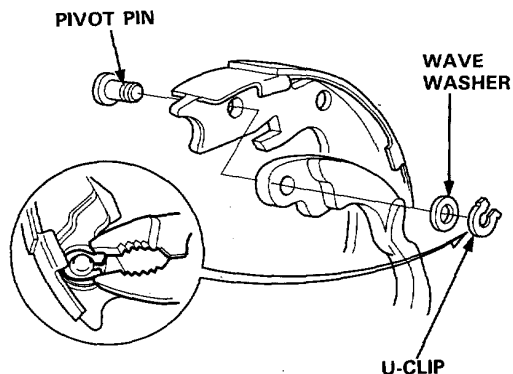


Parking Drum Brakes

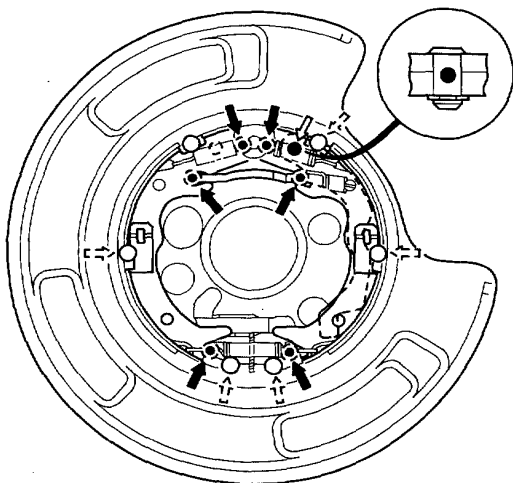
Reassembly

1. Apply brake cylinder 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 U-clip securely to prevent the pivot pin from coming out of the brake shoe.



3. Apply grease on each sliding surface.



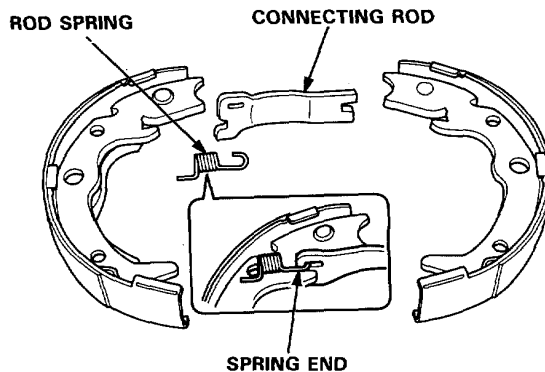
Greasing symbols:

- ➔ ○ Brake shoe ends
- ➔ ○ Opposite the edge of the shoe
- ➔ ● Sliding surface

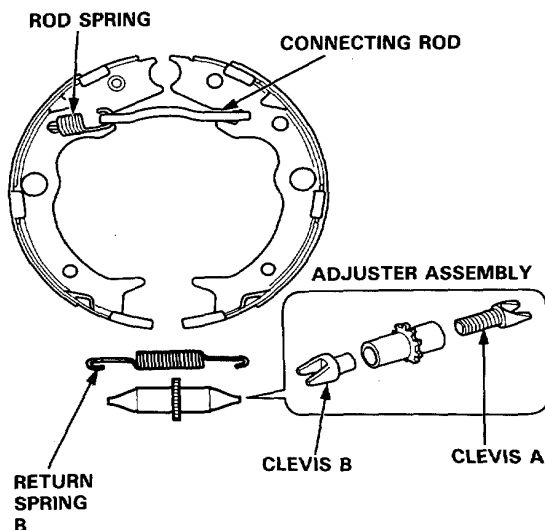
4. Connect the rod spring to the connecting rod and brake shoe as shown.

NOTE: Hook the left rear rod spring to the connecting rod with the end pointing upward.

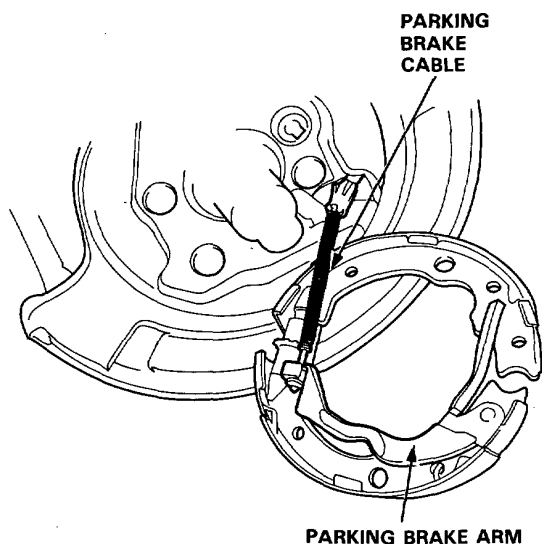
Right Parking Brake shoes shown:



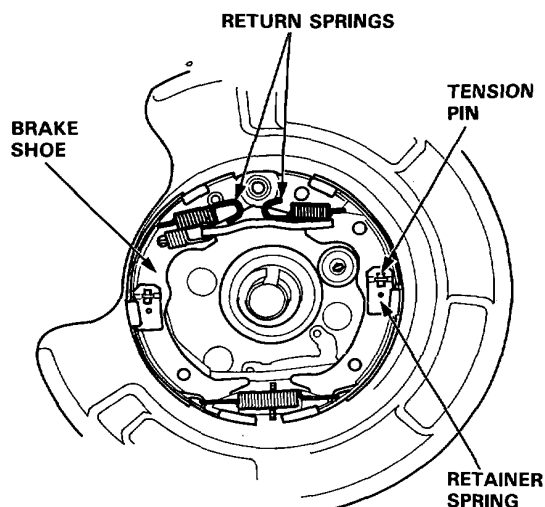
5. Clean the threaded portions of clevises A and B. Coat the threads of the clevises with grease. To shorten the clevises, turn the adjuster bolt.
6. Install the adjuster assembly and return spring B.



7. Connect the parking brake cable to the parking brake arm.



8. Install the tension pins and retainer spring.
9. Install the return springs.



10. If the hub unit was removed, Install it and tighten the nut to the specified torque.

TORQUE: 285 N·m (28.5 kg·m, 206 lb·ft)

11. Install the disc (drum) and 6 mm screws.
 - Adjust the parking brake. (page 19-5)
 - Install the rear brake caliper. (page 19-22)

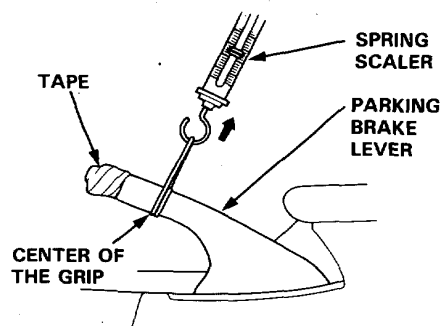
Lining Surface Break-in

⚠ WARNING

- Perform the lining surface break-in when replacing the shoes with new linings and/or new discs (drums).
- Check the number of parking lever (or pedal) clicks. Adjust the lever (pedal) before breaking-in the lining surface. (page 19-4)
- Park the car on a firm, level surface.

(LEVER TYPE)

1. Keep the parking brake lever release button pushed with a piece of tape.
2. Attach a spring scale to the center of the lever grip.



3. Have an assistant pull the parking brake lever up with 9 kg (19.8 lb) of force while you drive the car at about 50 km/h for 400 m.

⚠ WARNING Perform this operation with an assistant, in a safe area.

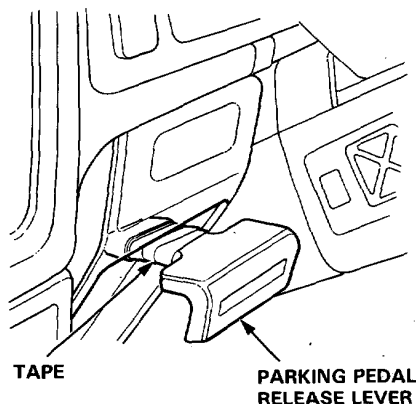
4. Release the button and park the car for 5–10 minutes to allow the drums to cool. Then repeat step 4.
5. Check the parking brake lever adjustment (page 19-4).

(cont'd)

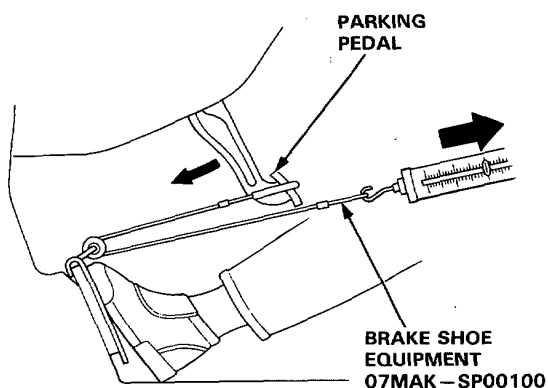
Lining surface Break-in (cont'd)

(PEDAL TYPE)

1. Keep the parking brake pedal release lever pulled with a piece of tape.



2. Set the special tool as shown.



3. Attach a spring scale to the rope of the special tool.
4. Have an assistant pull the parking brake pedal up with 12 kg (26.5 lb) of force while you drive the car at 50 km for 400 m.

⚠ WARNING Perform this operation with an assistant, in a safe area.

5. Release the lever and park the car for 5–10 minutes to allow the drum to cool. Then step 4.
6. Check the parking brake pedal adjustment (page 19-4).

Rear Caliper

Disassembly/Reassembly

CAUTION:

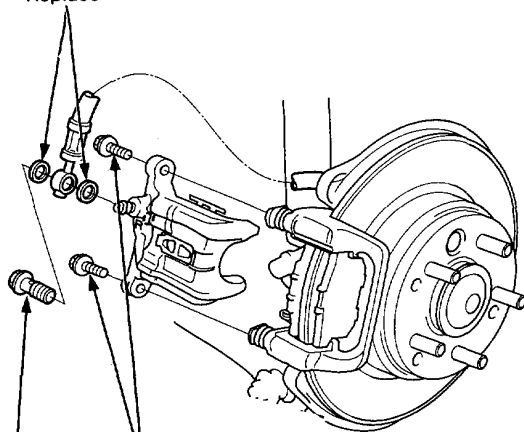
- Make sure all parts are clean before reassembly.
 - Use only new replacement parts.
 - Use only new clean brake fluid.
 - Do not allow dirt or other foreign matter to contaminate the brake fluid.
 - Do not mix different brands of brake fluid.
 - Avoid spilling brake fluid on painted, plastic or rubber surfaces as it can damage the finish.
- Wash spilled brake fluid off immediately with clean water.

1. Remove the banjo bolt and disconnect the brake hose from the caliper.
2. 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.
- Plug the end of the brake hose to prevent brake fluid from flowing out.

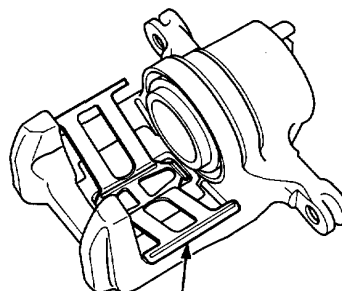
**SEALING
WASHERS**
Replace



**CALIPER MOUNTING
BOLTS**
23 N·m (2.3 kg-m, 17 lb-ft)

BANJO BOLT
35 N·m (3.5 kg-m, 25 lb-ft)

3. Remove the pad spring.



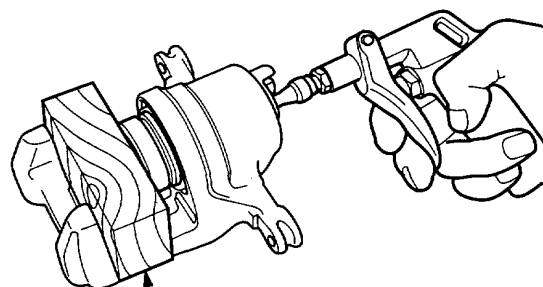
PAD SPRING

4. Remove the piston from the caliper. 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.

Use low pressure air in short bursts.

⚠ WARNING

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



WOODEN BLOCK

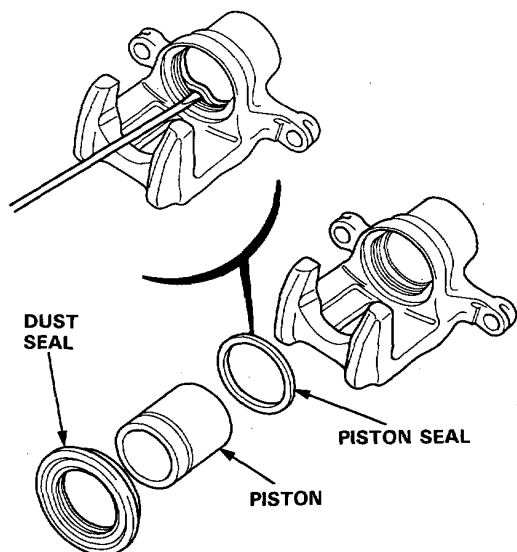
(cont'd)

Rear Caliper

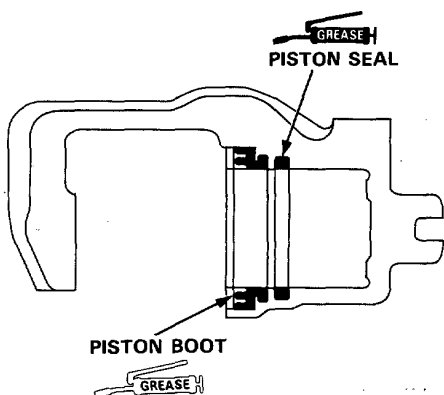
Disassembly/Reassembly (cont'd)

5. Remove the piston seal.

CAUTION: Take care not to damage the cylinder bore.



6. Coat the new piston seal and piston boot with grease (page 19-21) and install them in the caliper.



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

8. Install the brake pad retainers and brake pads.

9. Install the pad spring on the caliper.

WARNING When reusing the brake pads, always reinstall the brake pads in their original positions to prevent loss of braking efficiency.

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

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

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

13. Operate the brake pedal several times.

Rear Brake Disc

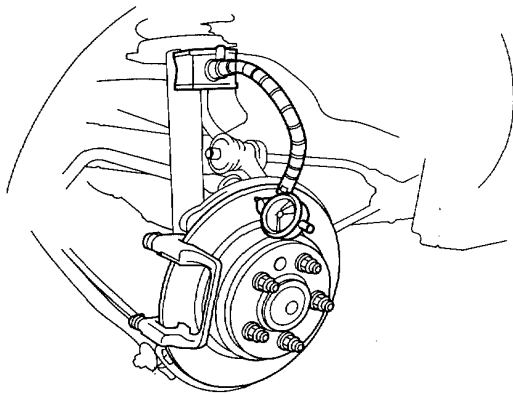
Run-Out Inspection

1. Support the rear of the car on safety stands and remove the rear wheels.
2. Remove the rear brake disc caliper. (page 19-22)
3. Inspect the disc surface for grooves, cracks, and rust. Clean the disc thoroughly and remove all rust.
4. Use suitable nuts (12 x 1.5 mm) and plain washers to hold the disc securely against the hub. Torque nuts to 11 kg-m (80 lb-ft). Mount a dial indicator as shown.

Brake Disc Run-out:

Service Limit: 0.10 mm (0.004 in)

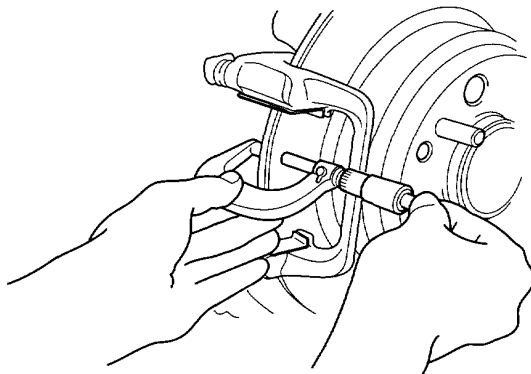
If the disc is beyond the service limit, refinish the disc.



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

Thickness and Parallelism Inspection

1. Support the rear of the car on safety stands and remove the rear wheels.
2. Remove the rear brake disc caliper. (page 19-22)
3. Using a micrometer, measure the brake disc thickness at eight points, approximately 45° apart and 10 mm (0.39 in) in from the outer edge of the disc.



Brake Disc Thickness:

Standard: 9.0 mm (0.35 in)
Service limit: 7.5 mm (0.30 in)

Brake Disc Parallelism:

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

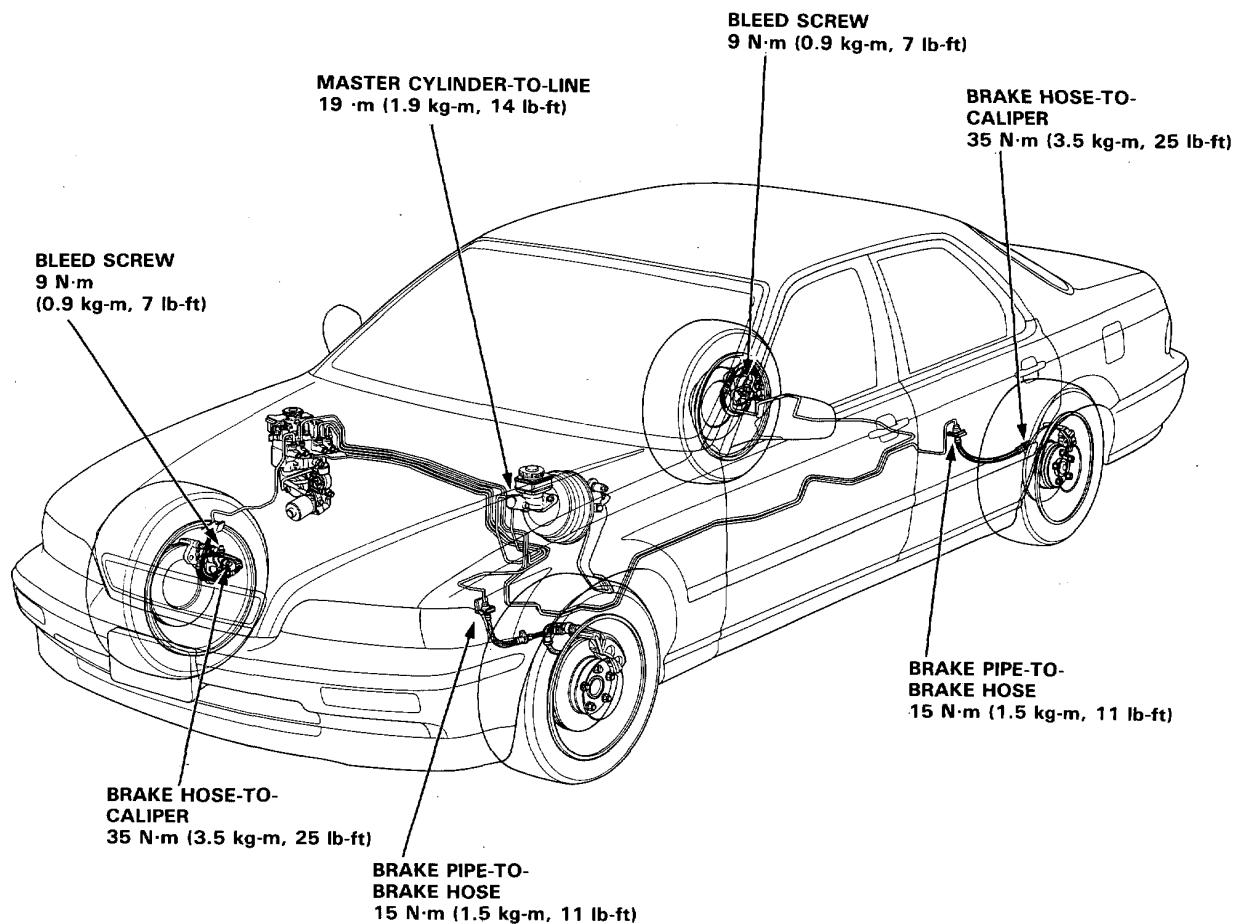
If the disc is beyond the limits for parallelism, refinish the disc.

Brake Hoses/Pipes

Inspection

1. Inspect the brake hoses for damage, leaks, interference or twisting.
2. Check the brake lines for damage, 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.



Parking Brake Cable

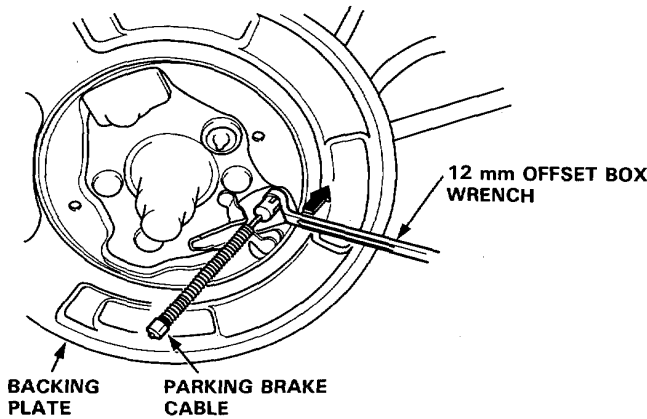
Disassembly/Assembly

CAUTION: Block the front wheels before jacking up the rear of the car.

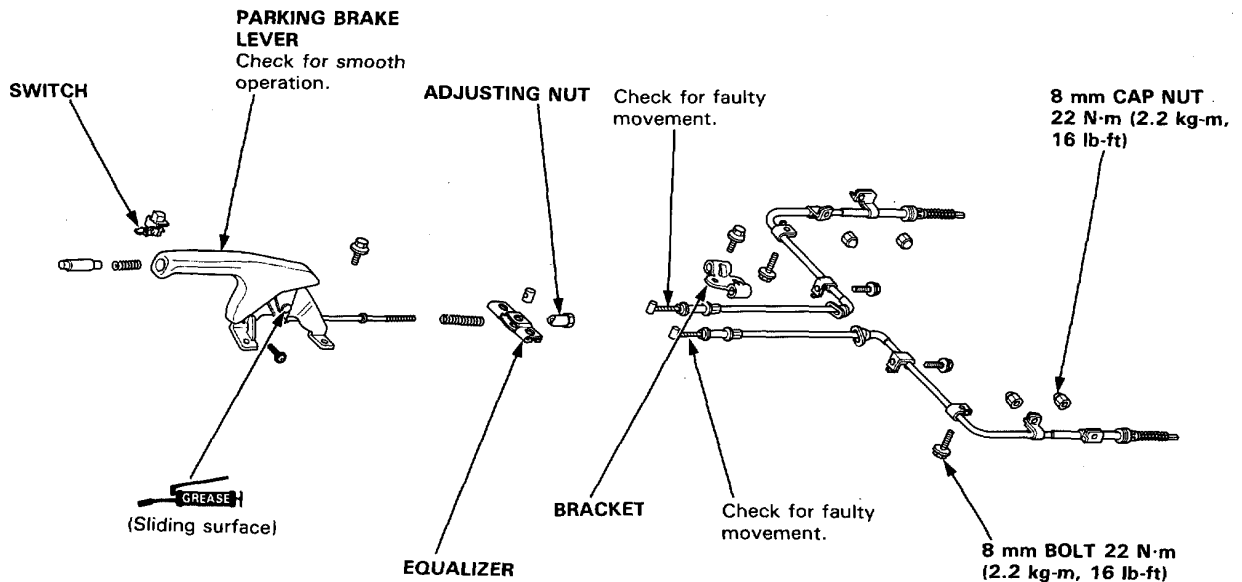
NOTE: Remove the parking brake cable from the backing plate using a 12 mm box offset wrench as shown.

WARNING SRS wire harnesses are routed near the center console panel and center armrest. All SRS wire harnesses and connectors are colored yellow. Do not use electrical test equipment on these circuits.

CAUTION: Be careful not to damage the SRS wire harnesses when servicing the center console panel and center armrest.



(LEVER TYPE)

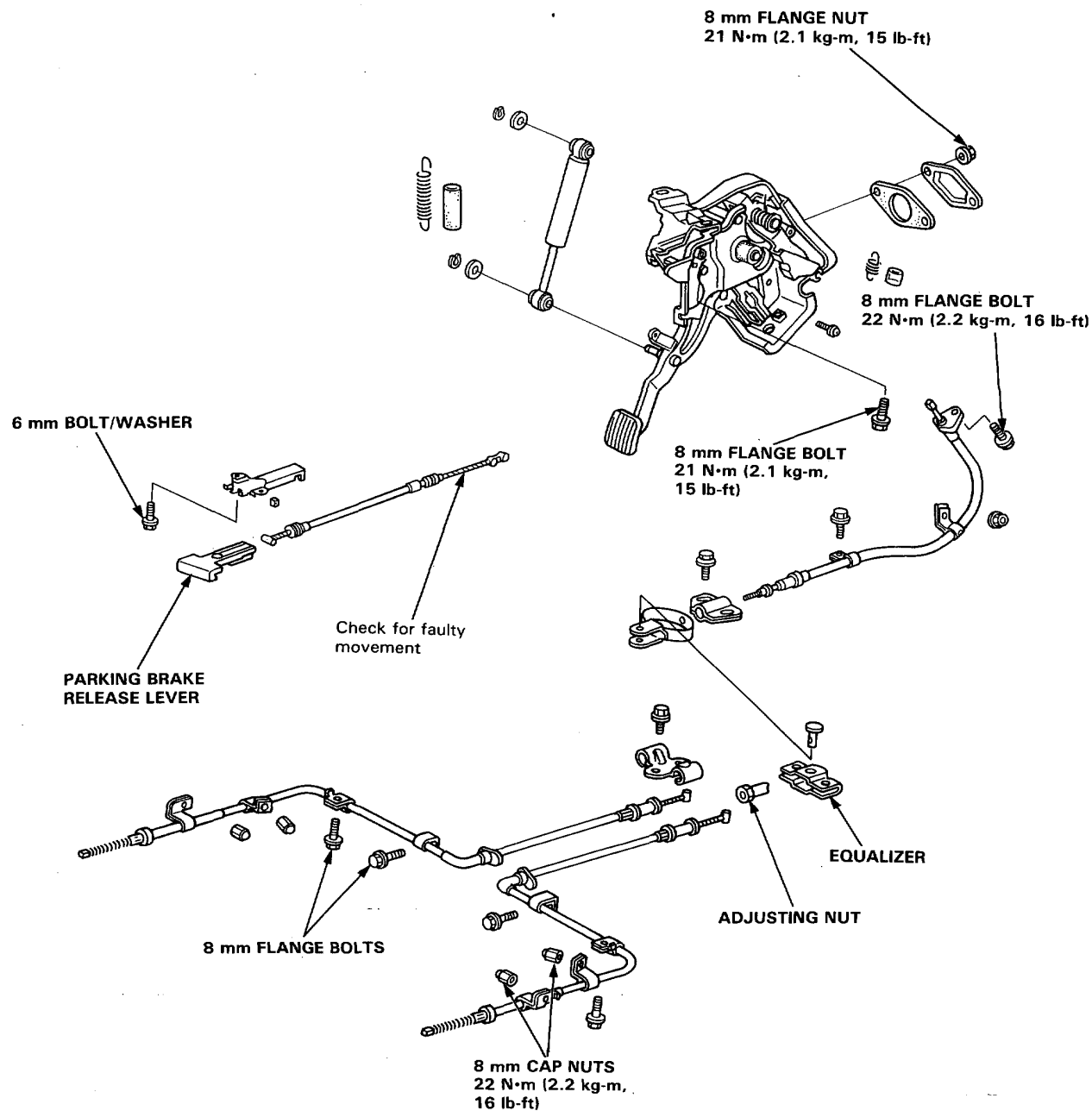


(cont'd)

Parking Brake Cable

Disassembly/Assembly (cont'd)

(PEDAL TYPE)



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.

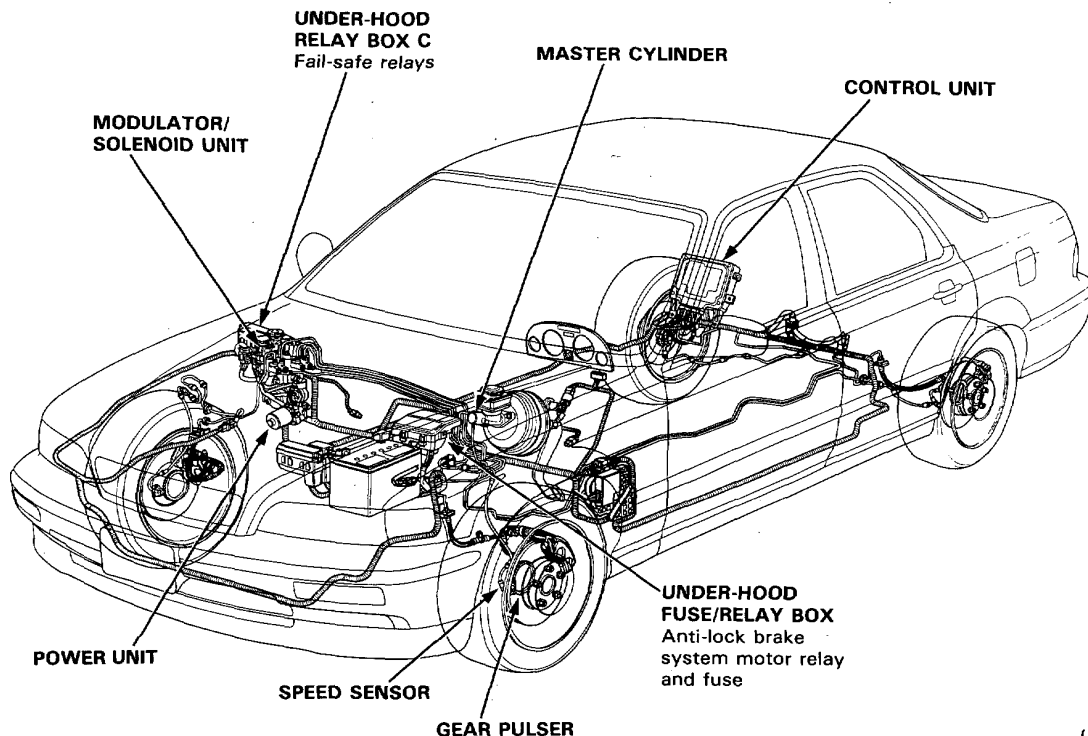
The Anti-Lock Brake System modulates the pressure of the brake fluid applied to each caliper, thereby preventing the locking of the wheels, whenever the wheels are likely to be locked due to hard braking. It then restores normal hydraulic pressure when there is no longer any possibility of wheel locking.

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 kick-back 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 is composed of : gear pulsers attached to the rotating part of individual wheels; speed 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 speed 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.



(cont'd)

Anti-lock Brake System

Features/Construction/Operation (cont'd)

Master Cylinder

1. Construction

A tandem master cylinder is adopted to improve the safety of the braking system. In addition, a center valve method is introduced so as to match the anti-lock brake system operation.

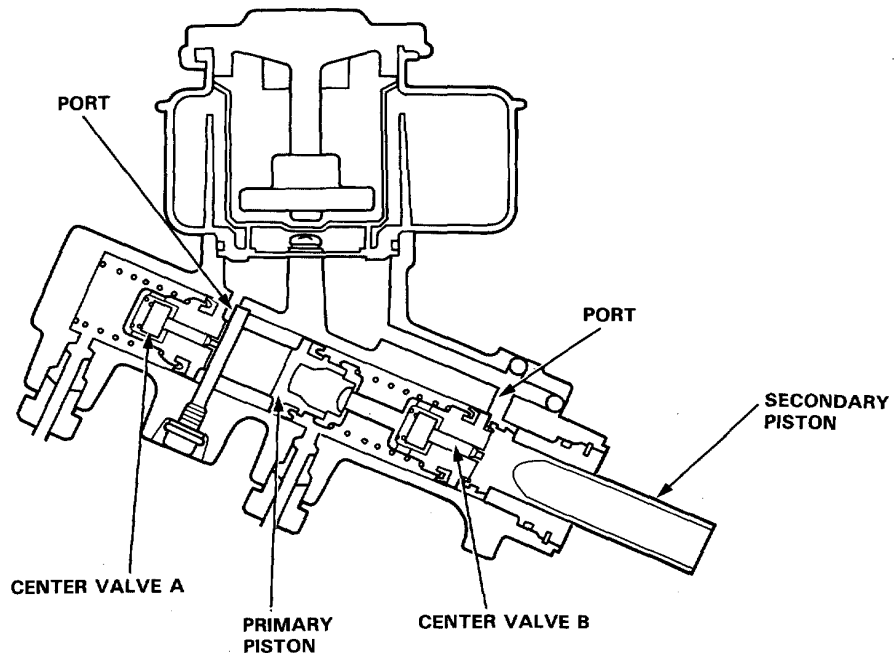
The master cylinder has one reservoir tank which is connected to the cylinder sections by two small holes. It has two pistons--primary and secondary, which are criss-cross connected with the calipers so that the fluid pressure works separately on each system (front right wheel & rear left wheel, and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

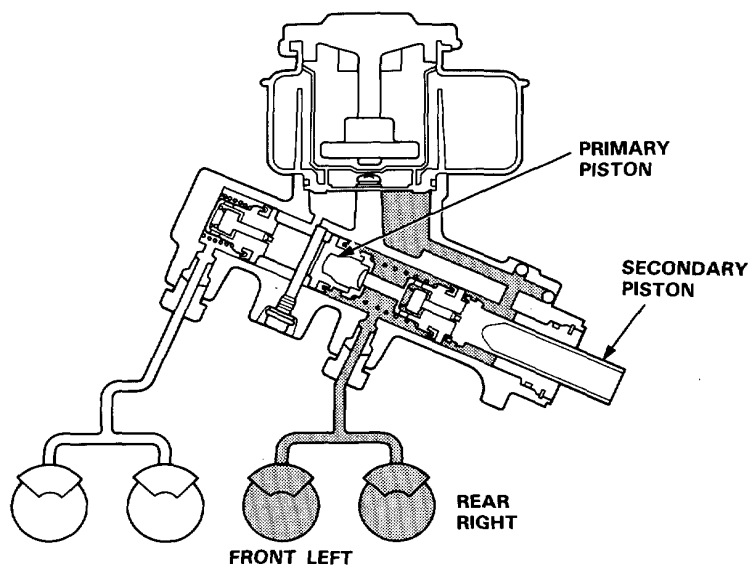
When the brake pedal is released, the primary and secondary pistons are returned to the original position by the brake fluid pressure and piston spring.



3. Responses when fluid is leaking

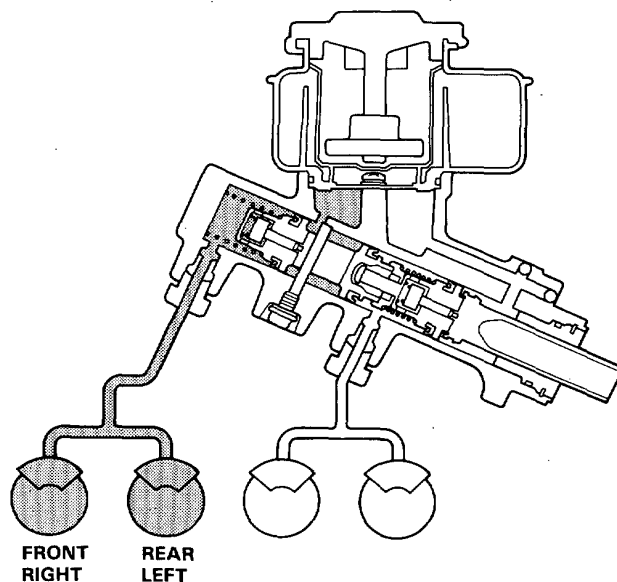
(1) In case of leaking from the primary system:

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.



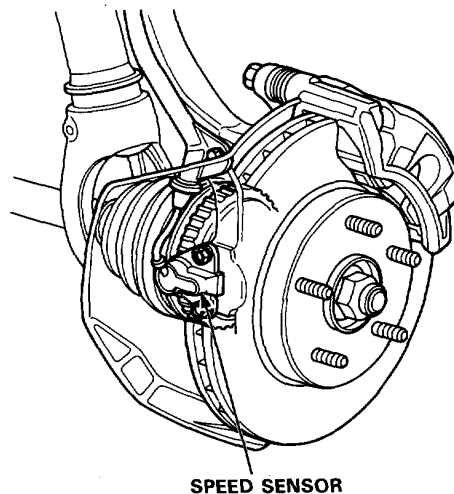
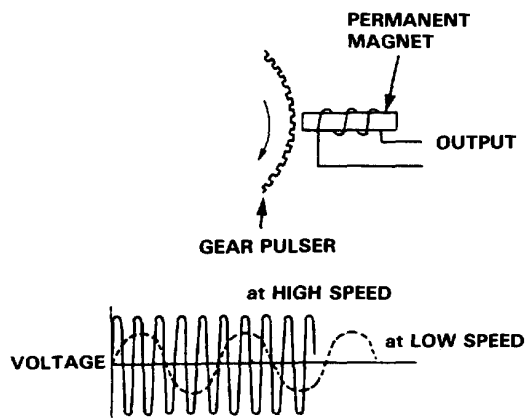
(cont'd)

Anti-lock Brake System

Features/Construction/Operation (cont'd)

Speed Sensor

The speed sensor is a contactless type that detects the rotating speed of a wheel. It is composed 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 speed 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

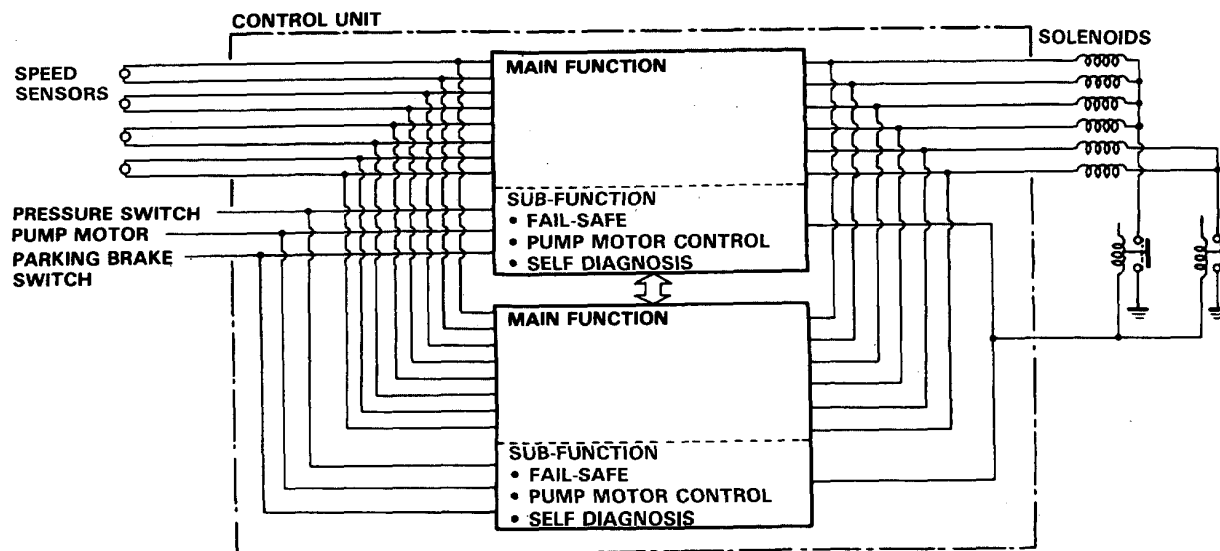
The control unit consists of a main function section, which controls the operation of the anti-lock brake system, and subfunction, which controls the pump motor and "self-diagnosis".

1. Main Function

The main function section of the control unit performs calculations on the basis of the signals from each speed 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.



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 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.

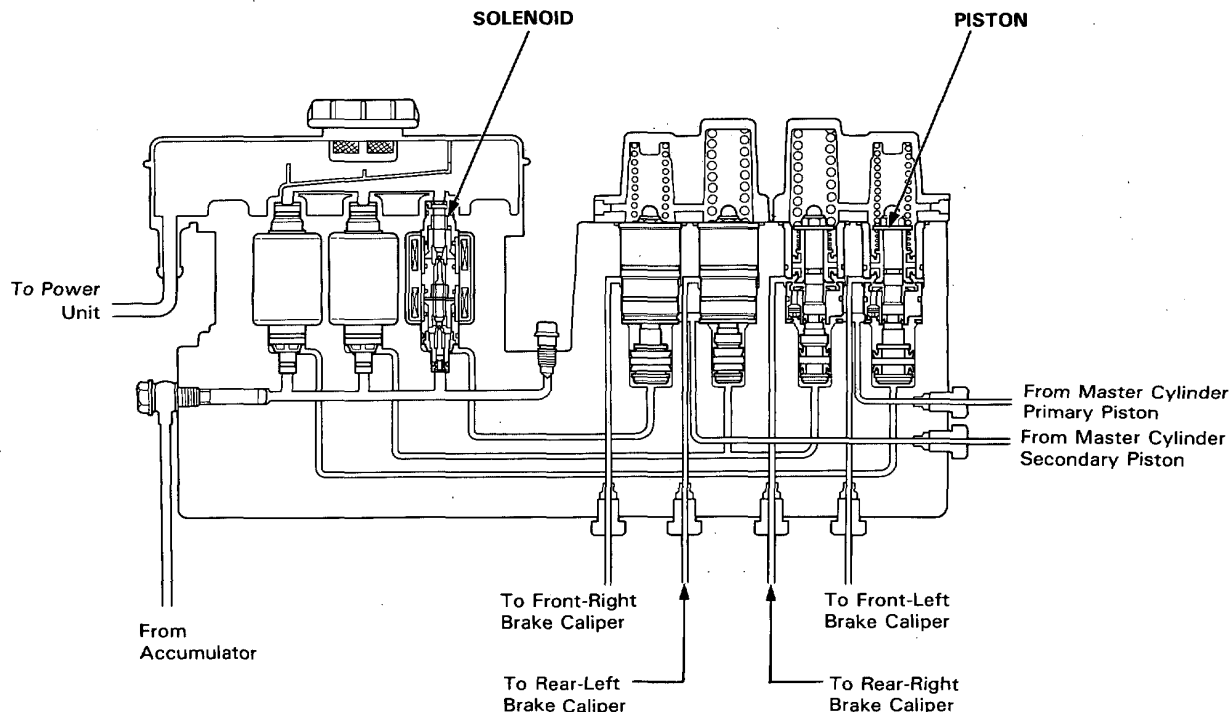
Modulator Unit

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 each for the front-right wheel, for the front-left wheel and for the rear wheels.



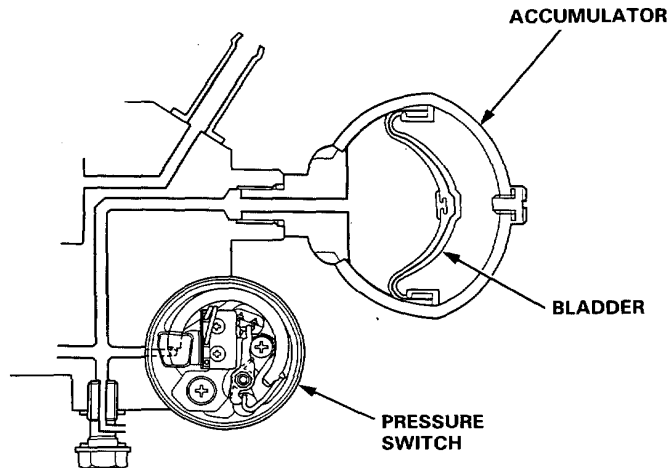
(cont'd)

Anti-lock Brake System

Features/Construction/Operation (cont'd)

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.

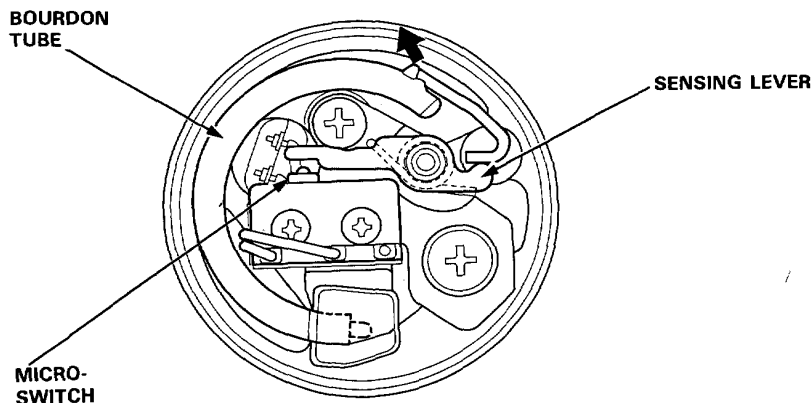


Pressure Switch

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.

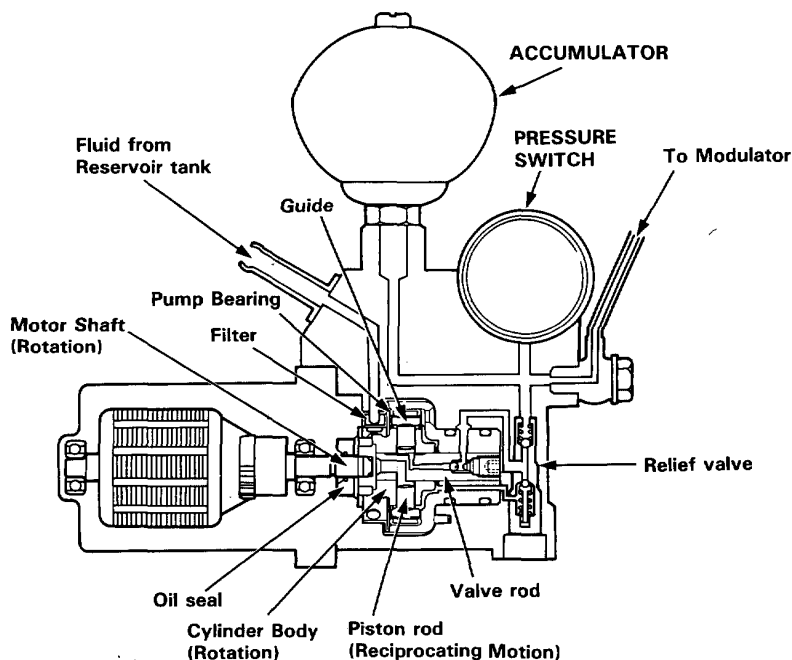


Power Unit

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 230 kg/cm².

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.

(cont'd)

Anti-lock Brake System

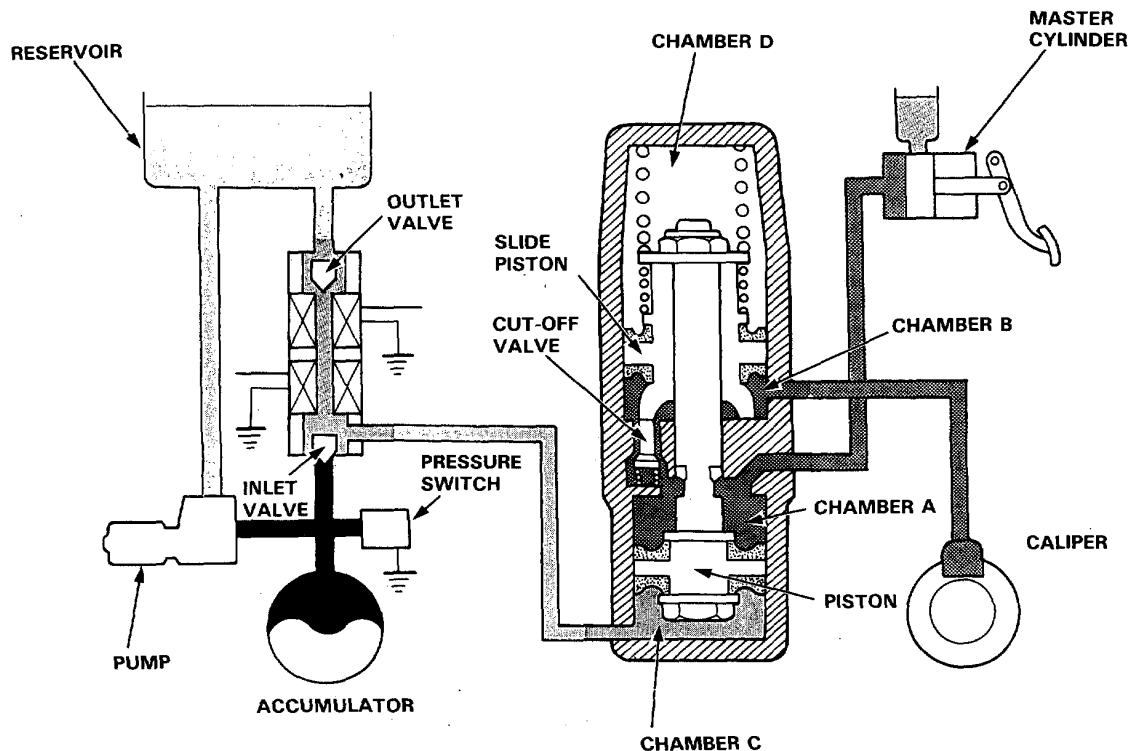
Features/Construction/Operation (cont'd)

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.

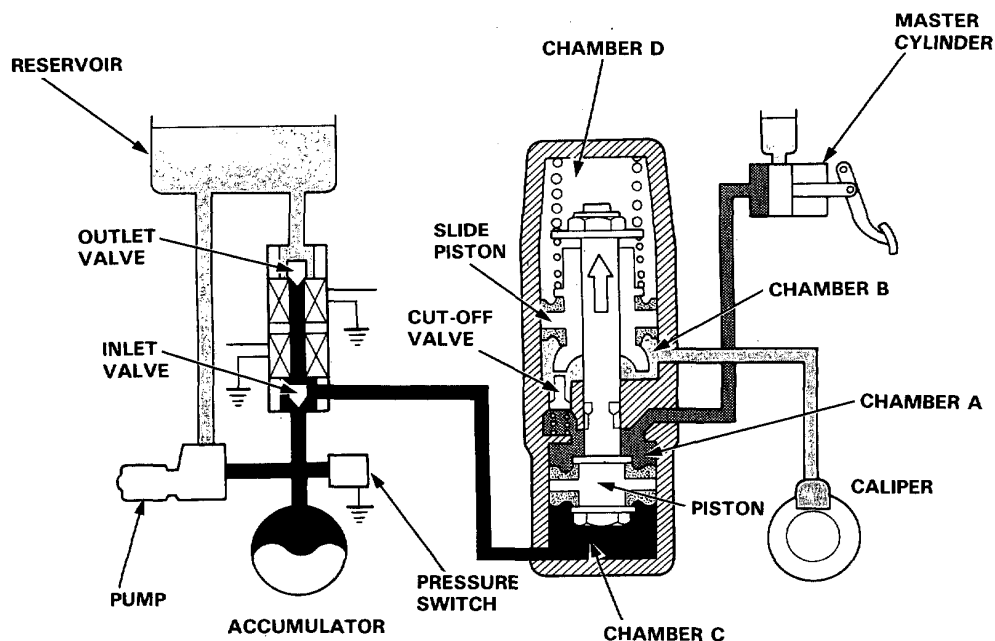


If brake inputs (force exerted on brake pedal) are excessively large and a possibility of wheel locking occurs, the control unit operates the solenoid valve, closing the outlet valve and opening the inlet valve. As a result, the high pressure is directed into chamber C, the piston is pushed upward, causing 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



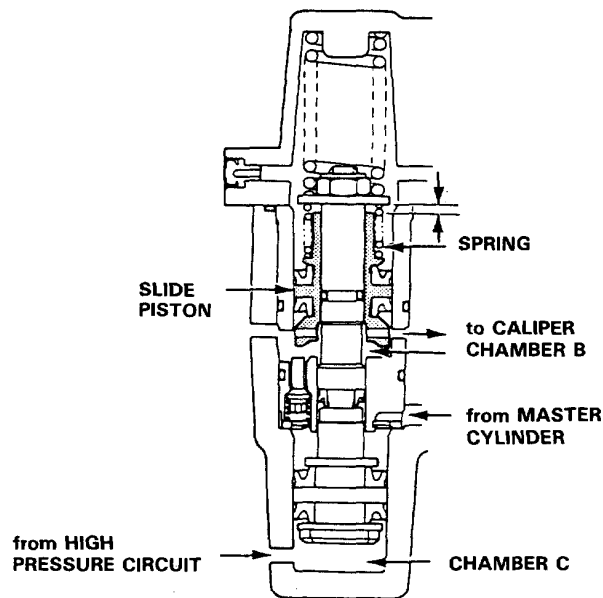
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Anti-lock Brake System

Features/Construction/Operation (cont'd)

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.



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.

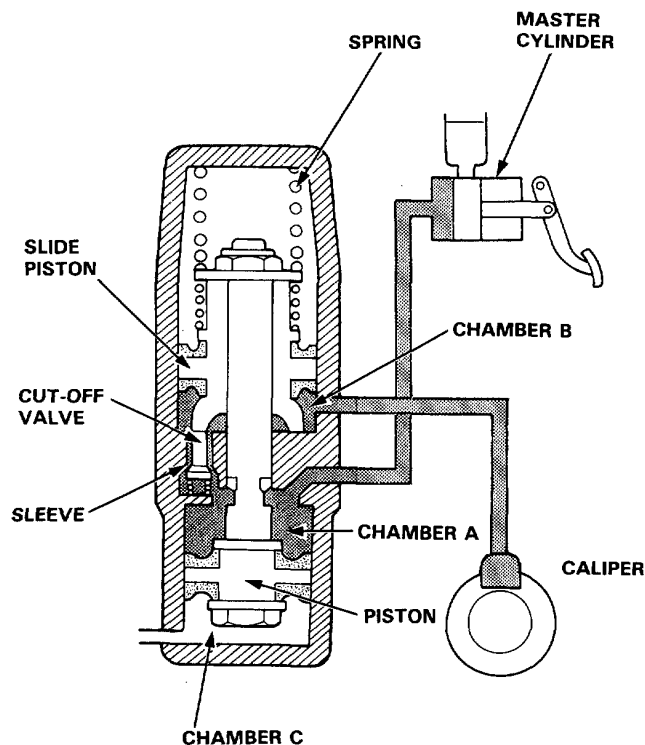
4. PCV (Proportioning Control Valve) Function

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.

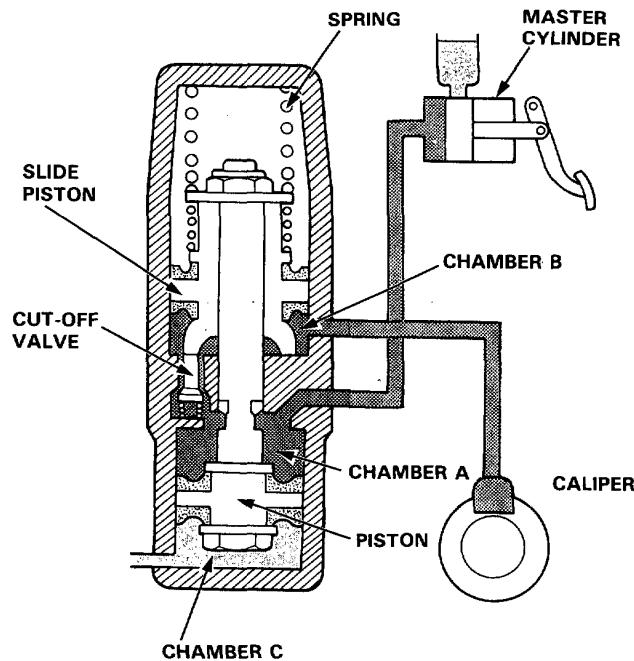


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Anti-lock Brake System

Features/Construction/Operation (cont'd)

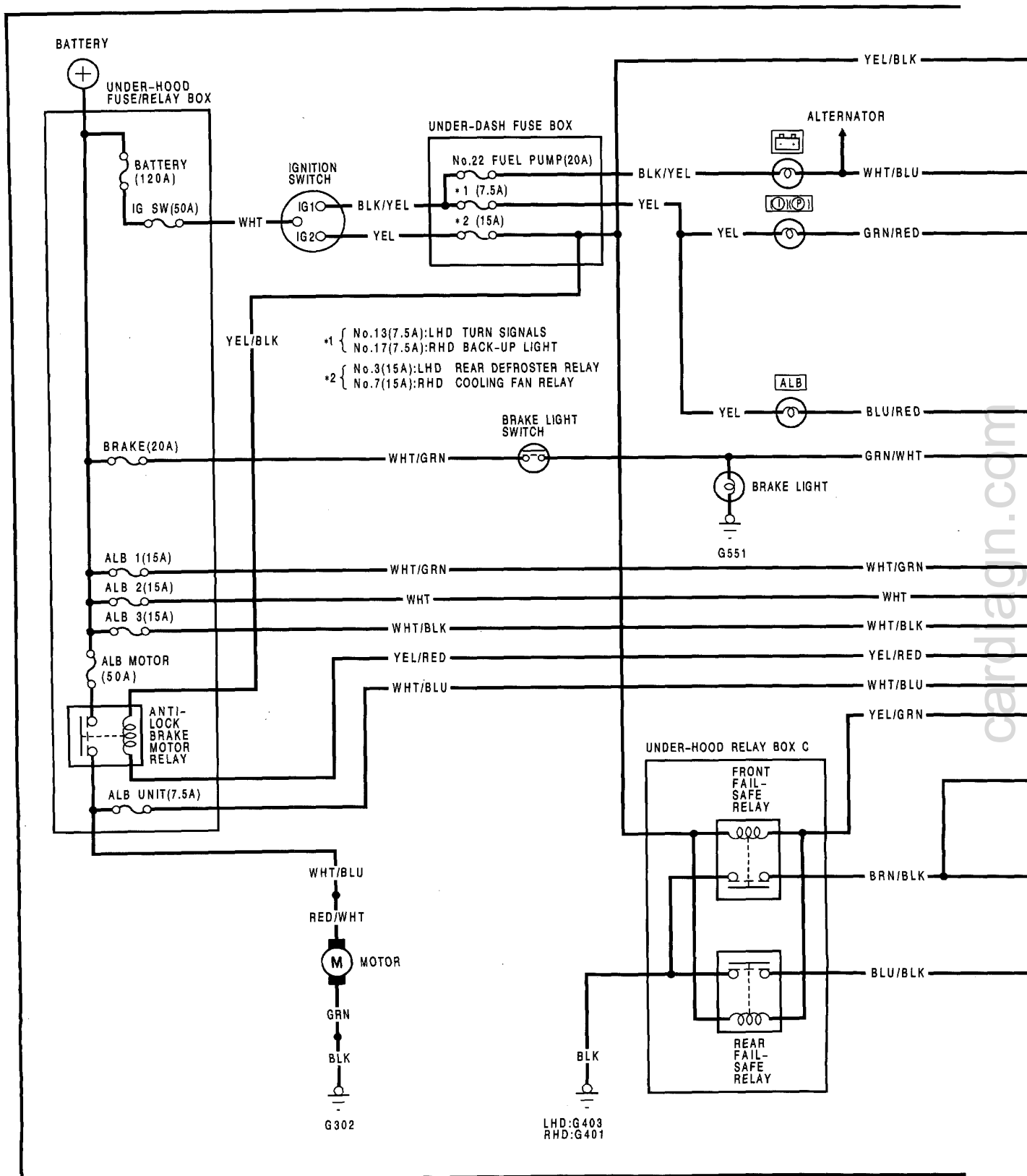
- 2) When the fluid pressure from the master cylinder reaches the turning point, the force on the slide piston overcomes the force of the spring, causing the slide piston to travel upward. The cut-off valve, previously being in contact with the bottom of the slide piston, then moves upward and the cut-off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

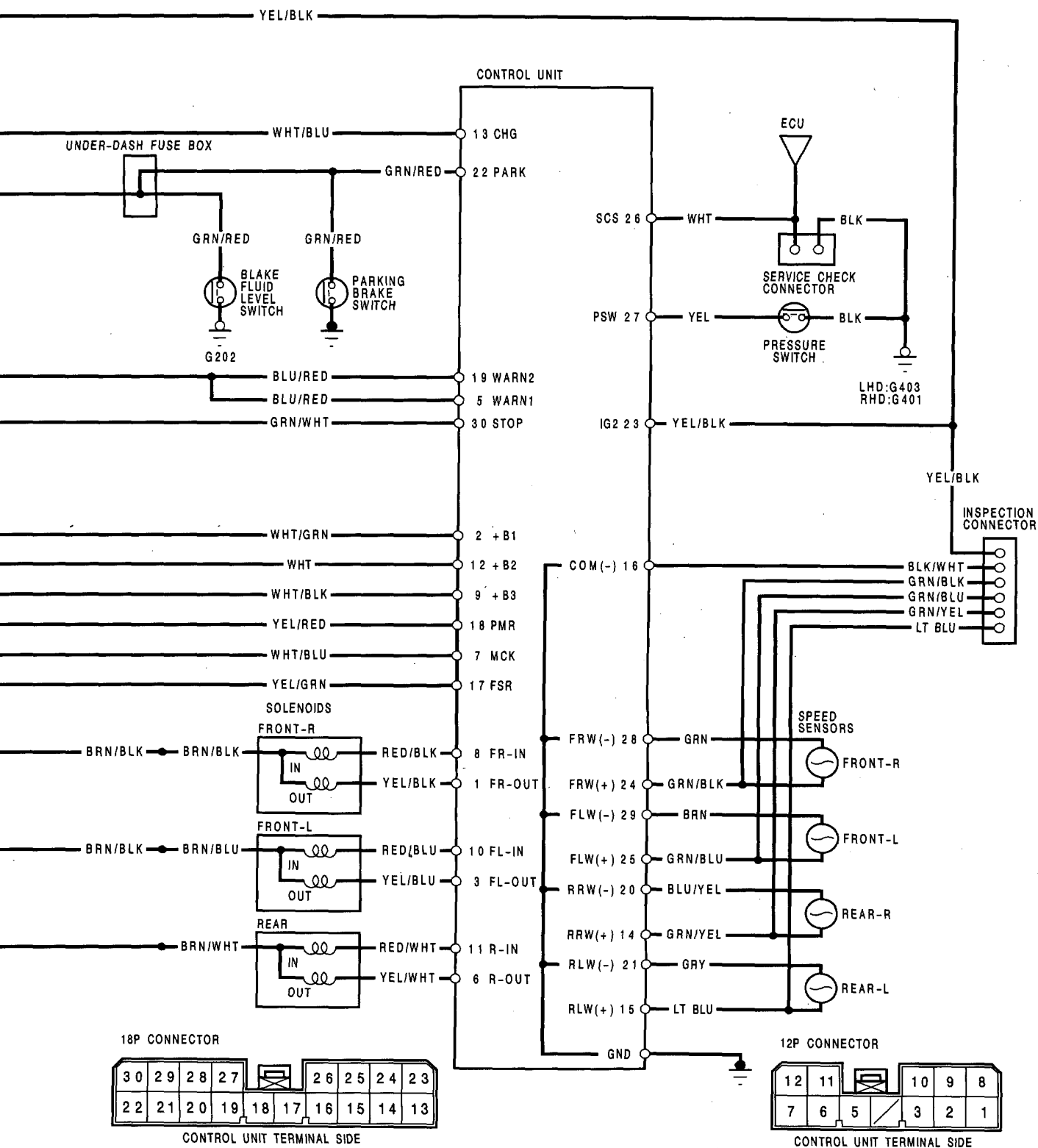


- (2) After the turning point:

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.

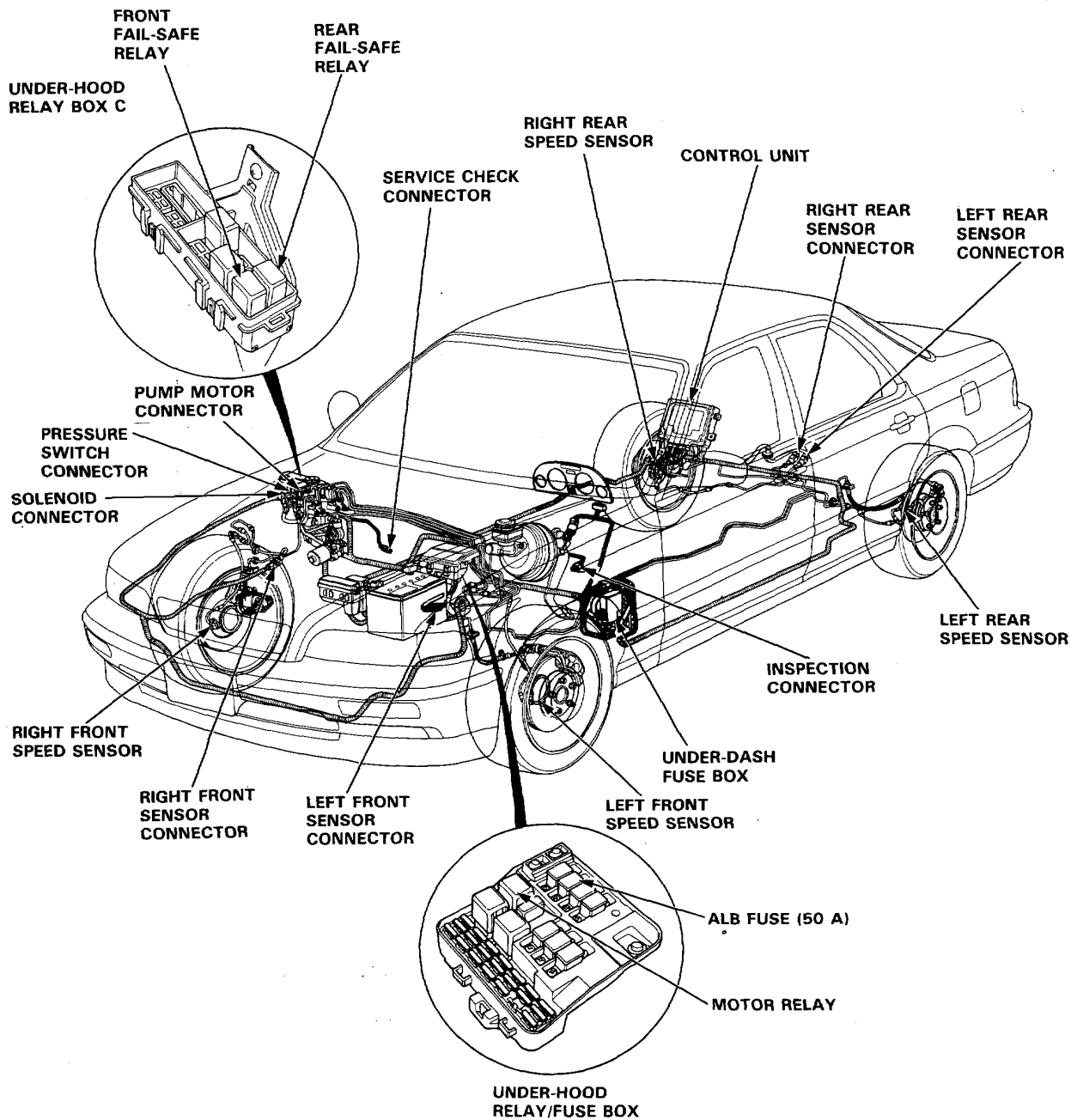
Circuit Diagram





Wiring/Connector Location

NOTE: RHD type is symmetrical to LHD type.



ALB Checker

Function Test

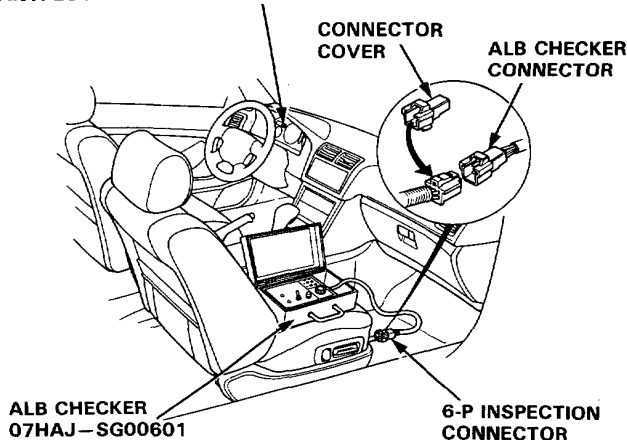
NOTE:

- 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 19-54, mode 0 (wheel sensor signal) is on page 19-55.
- Use the following models of ALB checkers:
 - 07HAJ—SG00601
 - or
 - 07508—SB00000
 - and
 - 07HAJ—SG00400 (Adaptor)

⚠ 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.

ANTI-LOCK BRAKE SYSTEM INDICATOR LIGHT

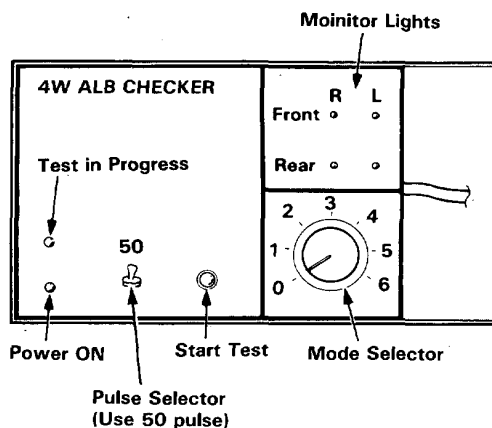


ALB CHECKER
07HAJ—SG00601
or
07508—SB00000
and
07HAJ—SG00400
(Adaptor)

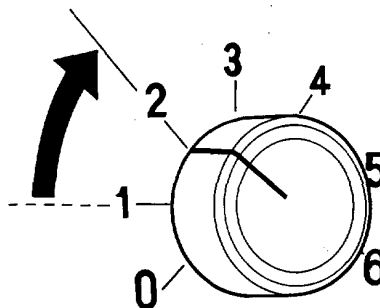
NOTE: Place the vehicle on level ground with the wheels blocked, put the transmission in neutral for manual transmission models, and in P for automatic transmission models.

2. Start the engine and release the parking brake.
3. Operate the ALB checker as follows:
 - (1) Turn the Mode Selector switch to "1."
 - (2) 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)

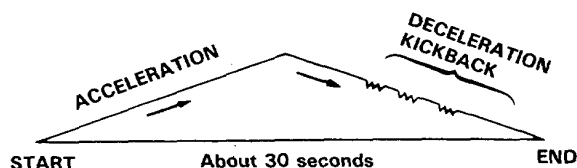
ALB Checker

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 19-58.

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.

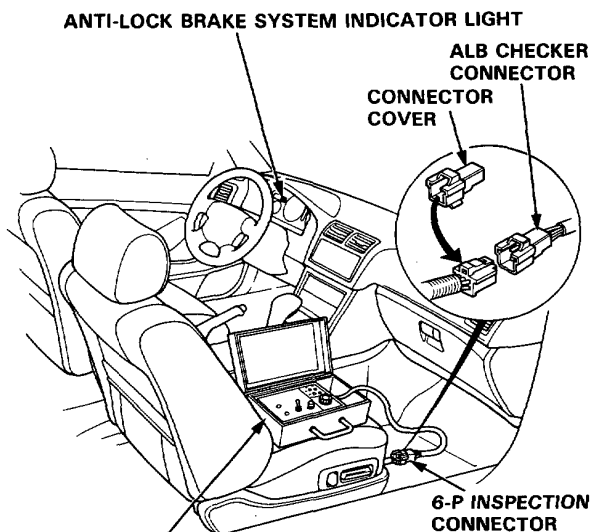
Inspection points:

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 power unit connector.
 - Faulty power unit.

Wheel Sensor Signal Confirmation

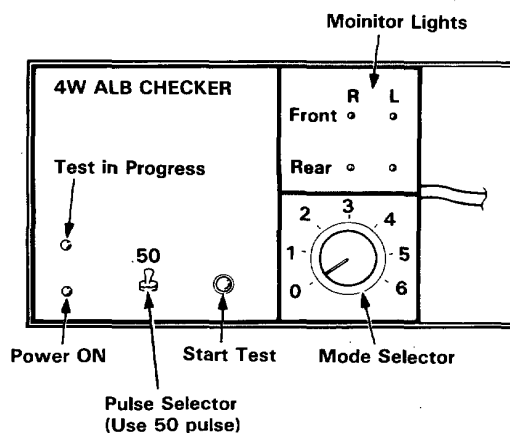
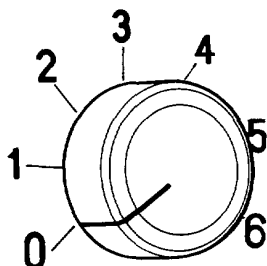
NOTE: Use the ALB checker (mode 0) to confirm proper wheel sensor operation.

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—SG00601
or
07508—SB00000
and
07HAJ—SG00400 (Adaptor)

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



5. 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

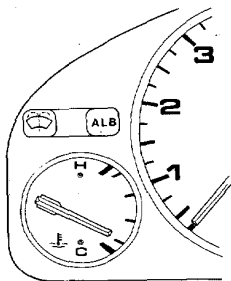
Temporary Driving Conditions:

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

NOTE: Problem codes explained on pages 19-58.

- The tire(s) adhesion is lost due to excessive cornering speed.
Problem codes: 5, 5-4, 5-8.
 - The vehicle loses traction when starting from a stuck condition on a muddy, snowy, or sandy road.
Problem 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.
Problem 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 19-53.
4. The anti-lock brake system indicator light will come on and the control unit will memorize a problem 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 problem code must be cleared from the control unit's memory by disconnecting the ALB 2 (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:

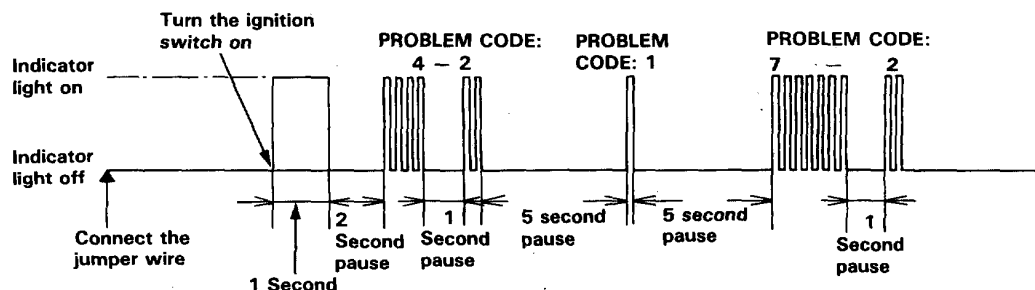
- Blown anti-lock brake system indicator light bulb.
 - Open circuit in YEL wire between No. 13 (7.5 A) fuse and gauge assembly.
 - Open circuit in BLU/RED wire between gauge assembly and control unit.
 - Loose component grounding of the control unit to the body.
2. The anti-lock brake system indicator 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 ALB 2 (15 A) fuse.
 - Open circuit in WHT wire between ALB 2 (15 A) fuse and control unit.
 - Open circuit in YEL/BLK wire between fuse No. 3 (15 A) and fail-safe relay(s).
 - Open or short circuit in the YEL/GRN wire between fail-safe relay(s).
 - 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 problem code.

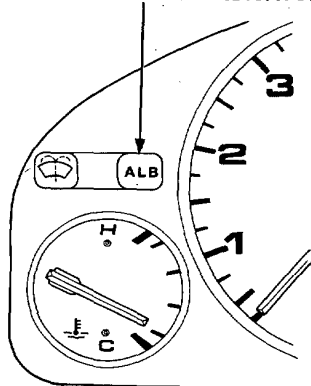
CAUTION: Before starting the engine, disconnect the jumper wire from the service check connector, or else the Check Engine light will stay on with the engine running.



NOTE:

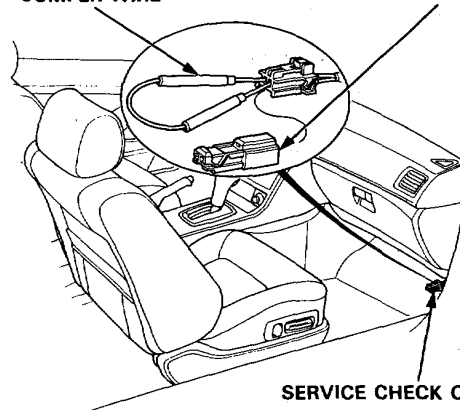
- The control unit can indicate three problem codes (one, two or three problems).
- If the anti-lock brake system indicator light does not light, see Troubleshooting of Anti-lock Brake System Indicator Light Circuit page 19-56.
- If you miscount the blinking frequency, turn the ignition switch off then on to cycle the anti-lock brake system indicator light again.
- After the repair is completed, disconnect the ALB 2 (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.

ANTI-LOCK BRAKE SYSTEM INDICATOR LIGHT



JUMPER WIRE

CONNECTOR COVER



SERVICE CHECK CONNECTOR

Troubleshooting

Symptom-to-System Chart

PROBLEM 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	—	—	—	—	19-59	Motor fuse Motor relay Pressure switch	19-87
	②	Pump motor circuit problem	—	—	—	—	19-61	Motor relay unit fuse	19-87
	③	High pressure leakage	—	—	—	—	19-64	Solenoid	
	④	Pressure switch	—	—	—	—	19-65		
	⑥	Accumulator gas leakage	—	—	—	—	19-66		
②	①	Parking brake switch-related problem	—	—	—	—	19-66	Brake fluid level switch (OK) light	
③	①	Pulser(s)	○				19-88		
	②			○					
	④				○				
	⑧					○			
④	①	Speed sensor	○				19-67		
	②			○					
	④				○				
	⑧					○			
⑤	—	Speed sensor(s)			○	○	19-68	Modulator	
	④				○				
	⑧					○			
⑥	—	Fail-safe relay (short)	—	—	—	—	19-69 (Function Test)	Front or rear fail-safe relay	19-87
	①		—	—	—	—		Front fail-safe relay	
	④		—	—	—	—		Rear fail-safe relay	
⑦	①	Solenoid related problem (Open)	○				19-73	ALB 3 fuse	
	②			○				ALB 1 fuse Front fail-safe relay	
	④				○	○		Rear fail-safe relay	

Flowcharts

Problem 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 (see page 19-78).

Remove the pump motor relay.

Connect the No. 1 and No. 2 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 19-78 and check the pump sound again.

YES

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

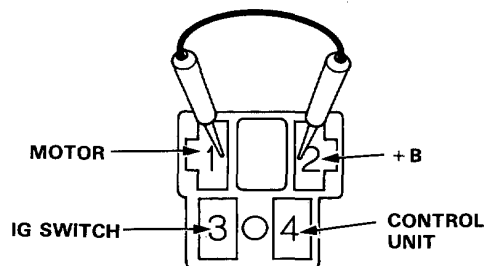
Is there 40–70 cc?

NO

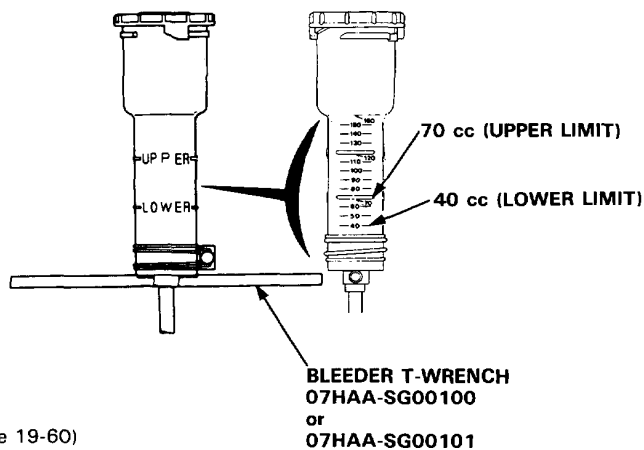
(To page 19-60)

YES

(To page 19-60)



View from under-hood relay/fuse box terminal side.



(cont'd)

Troubleshooting

Flowcharts (cont'd)

(From page 19-59)

(From page 19-59)

Connect the No. 1 and No. 2 terminals using a jumper wire for about 10 seconds.

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

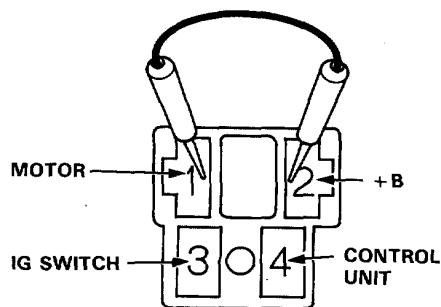
Is there any change?

NO

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

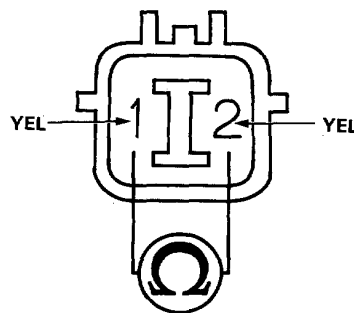
YES

Faulty solenoid (leakage).



View from under-hood relay/fuse box terminal side.

SWITCH-SIDE CONNECTOR



View from terminal side.

Connect the No. 1 and No. 2 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

Faulty accumulator (leakage).

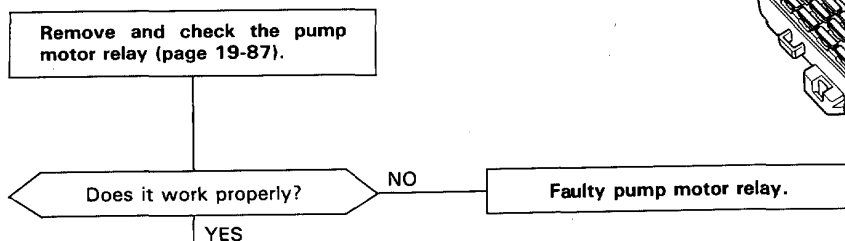
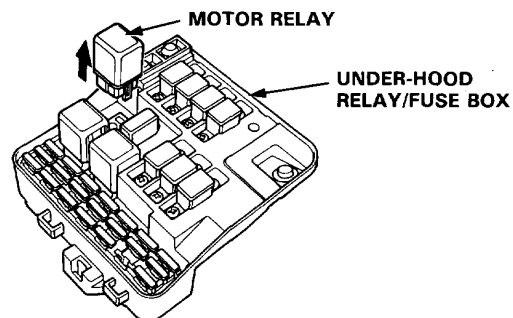
Problem code 1-2: Pump Motor Circuit Problem

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

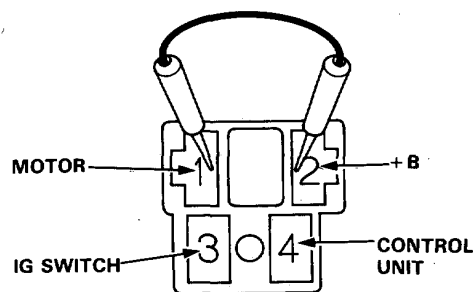
NOTE: If a malfunction is detected, this code appears and the fail-safe function is activated. The indicator light comes ON after restarting the engine until the malfunction code is erased (by disconnecting the ALB 2 fuse for 3 seconds).

Pre-test steps:

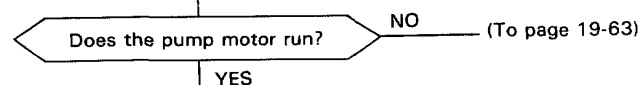
- Check ALB MOTOR (50A) FUSE
- Check No.3 (15A) FUSE
- Check ALB UNIT (7.5A) FUSE



Connect the No.1 and No.2 terminals using a jumper wire.



View from under-hood relay/fuse box terminal side.



Disconnect the jumper wire.

Disconnect the 2-P connector from the pump motor.

(To page 19-62)

(cont'd)

Troubleshooting

Flowcharts (cont'd)

(From page 19-61)

Remove the ALB UNIT (7.5A) fuse from under-hood relay/fuse box.

Turn the ignition switch ON.

Check for voltage between the under-hood relay/fuse box ALB unit fuse A terminal and body ground.

Is there battery voltage?

NO

Repair open in WHT/BLU wire between the ALB unit fuse and control unit.

YES

Reinstall the fuse to the under-hood relay/fuse box.

Check for voltage between the pump motor relay No.1 terminal (+) and body ground (-).

Is there battery voltage?

NO

Faulty under-hood relay/fuse box.

YES

Check for voltage between the No.3 terminal and body ground.

Is there battery voltage?

ON

Repair open in YEL/BLK wire between the 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 No.18 (YEL/RED) terminal and body ground.

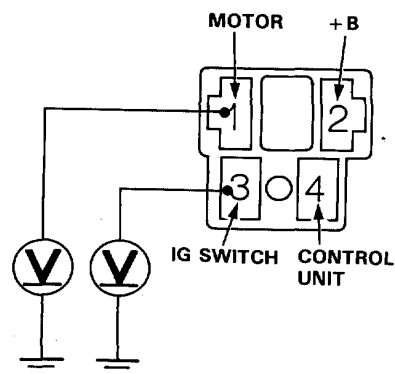
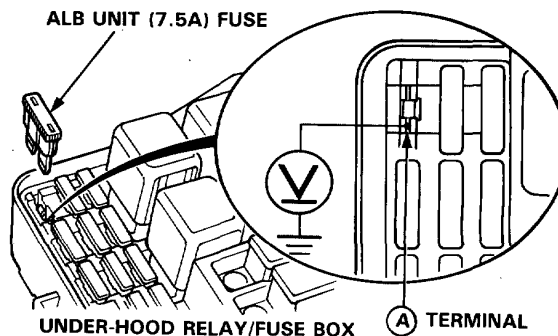
Is there battery voltage?

ON

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

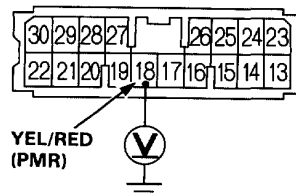
YES

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



View from under-hood relay/fuse box terminal side.

18-P CONNECTOR



View from control unit terminal side.

(From page 19-61)

Check for voltage between the No.2 terminal (+) and body ground (-).

Is there battery voltage?

NO

Faulty under-hood relay/fuse box.

YES

Disconnect the 2-P connectors from the pump motor.

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 (-).

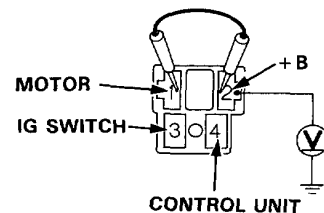
Is there battery voltage?

NO

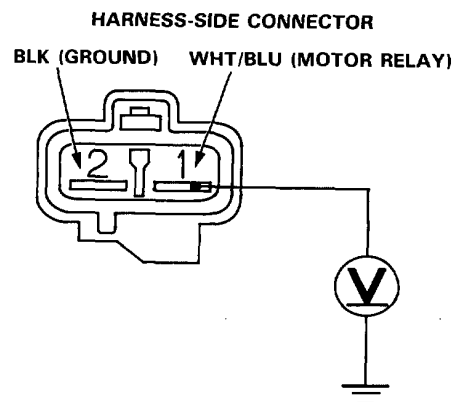
Repair open in BLK wire between the pump motor and ground or poor ground (G 302).

YES

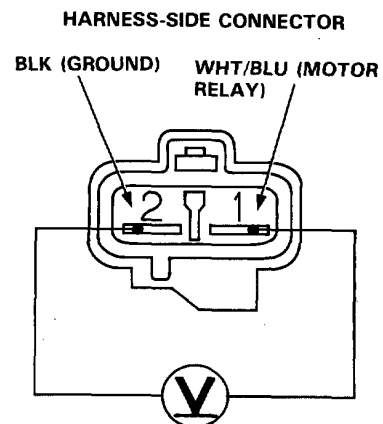
Faulty pump motor.



View from under-hood relay/fuse box terminal side.



View from terminal side.



View from terminal side.

(cont'd)

Troubleshooting

Flowcharts (cont'd)

Problem 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
- Power unit
- High pressure hoses

Bleed high pressure fluid from the maintenance bleeder with the Bleeder T-wrench (See page 19-78).

Remove the pump motor relay.

Connect the No.1 and No.2 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.

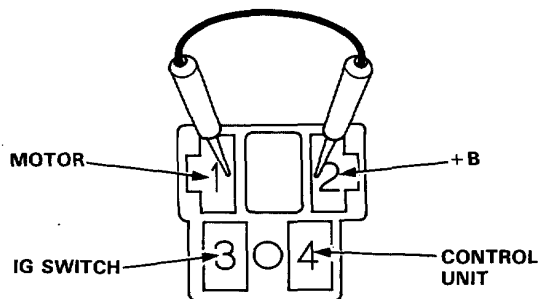
Is there continuity?

YES

Vehicle is OK at this time.

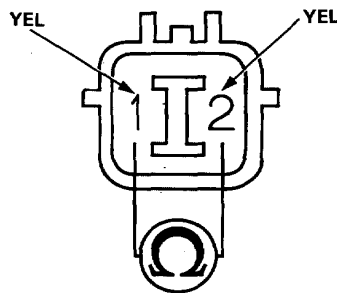
NO

Faulty solenoid (leakage).



View from under-hood relay/fuse box terminal side.

SWITCH-SIDE CONNECTOR



View from terminal side.

Problem 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 (See page 19-78).

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?

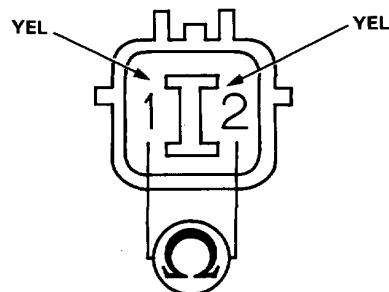
YES

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

NO

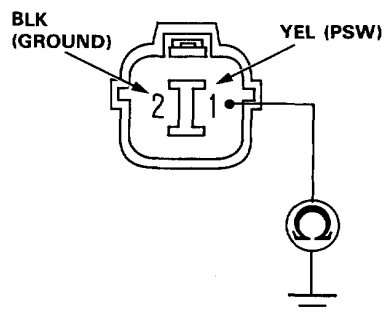
Check for loose control unit connectors. If necessary, substitute a known-good control unit and recheck.

SWITCH-SIDE CONNECTOR



View from terminal side.

HARNESS-SIDE CONNECTOR



View from terminal side.

(cont'd)

Troubleshooting

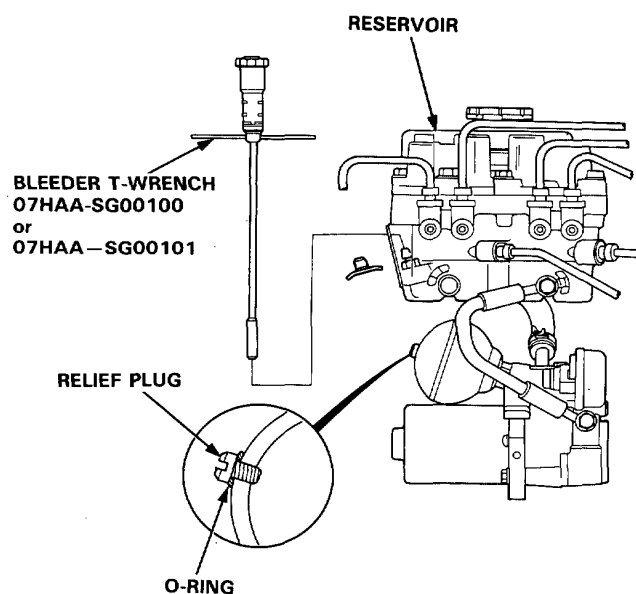
Flowcharts (cont'd)

Problem 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. If no fluid comes out, it is likely that all gas has leaked.

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 malfunction code is erased (by disconnecting the ALB 2 fuse for 3 seconds).



Problem 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 Troubleshooting Problem Code 2-1, remove the ALB 2 (15A) fuse for 3 seconds to clear the control unit's memory, then test drive the car.

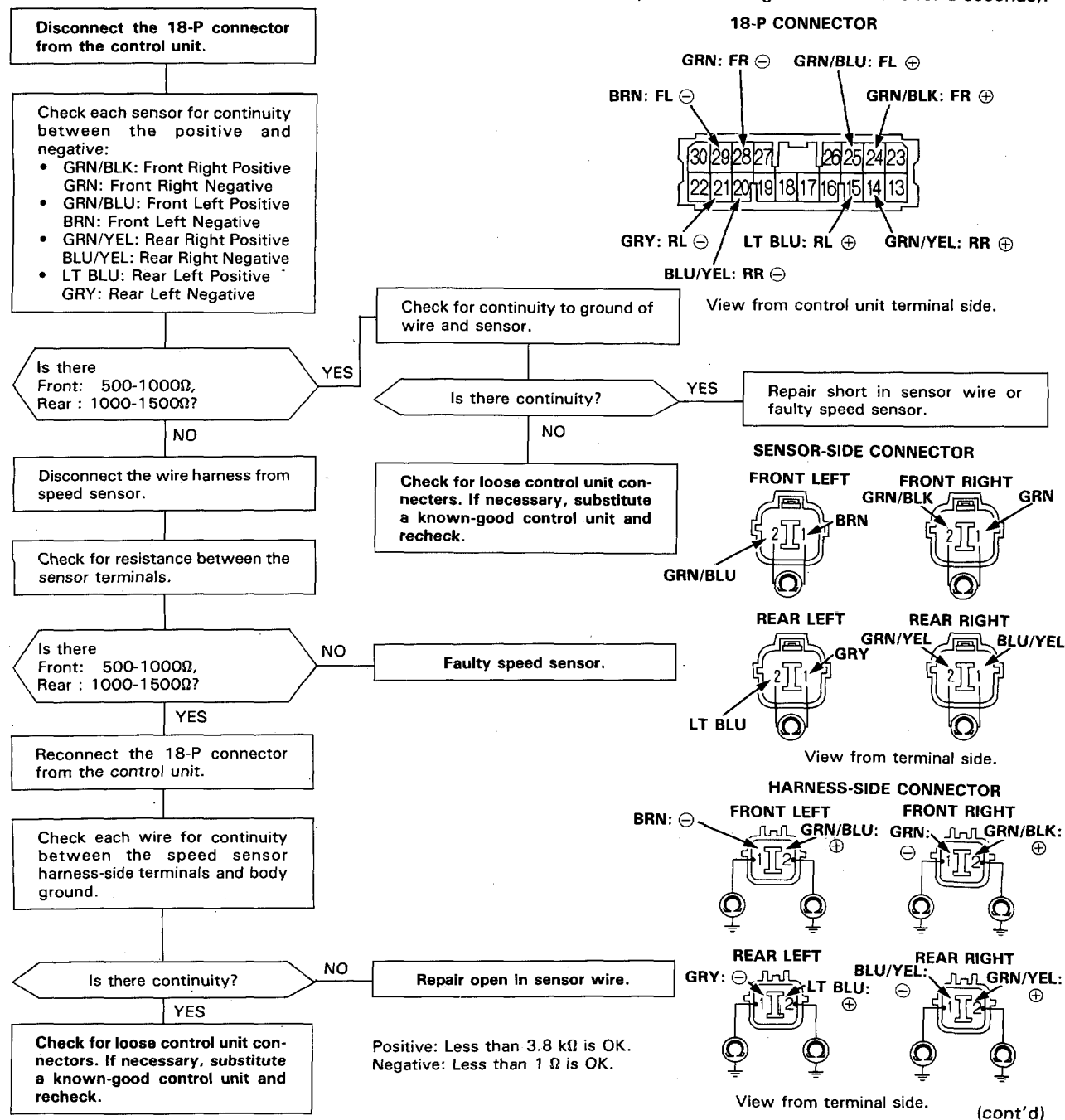
If the anti-lock brake system indicator light stays off, the probability is that the car was driven with the parking brake applied.

- 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 **(ONE)** indicator light and parking brake switch.
- GRN/RED wire is shorted between the **(ONE)** indicator light and brake fluid level switch.
- The **(ONE)** indicator light is blown.
- GRN/RED has an open between the **(ONE)** indicator light and parking brake switch.
- GRN/RED has an open between the parking brake switch and control unit.

Problem Code 4-1 to 4-8: Speed 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 comes ON after restarting the engine until the malfunction code is erased (by disconnecting the ALB 2 fuse for 3 seconds).



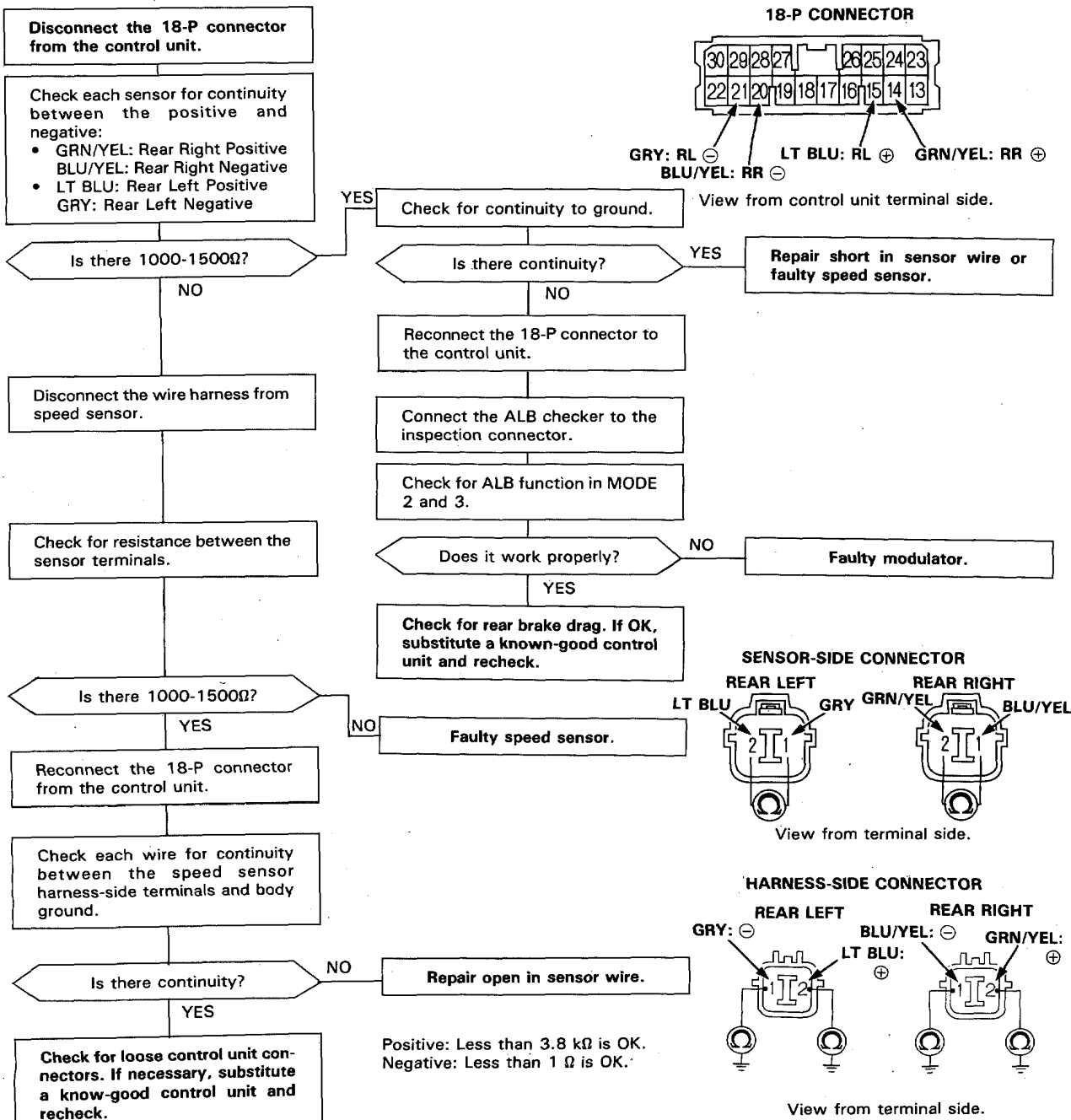
Troubleshooting

Flowcharts (cont'd)

Problem Code 5 to 5-8: Speed Sensor(s)

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

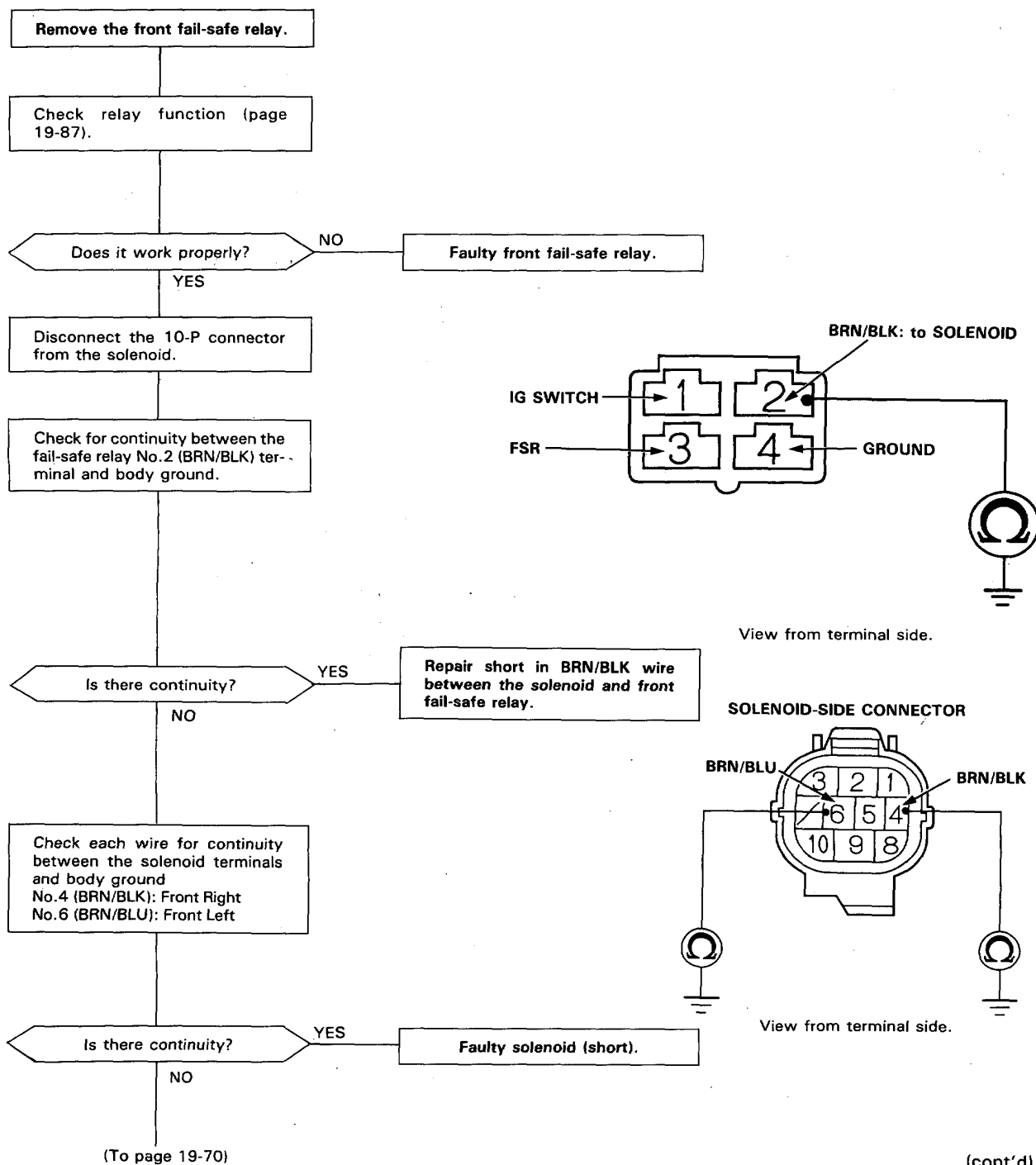
NOTE: If a malfunction is detected, this code appears and the fail-safe function is activated. The indicator light comes ON after restarting the engine until the malfunction code is erased (by disconnecting the ALB 2 fuse for 3 seconds).



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Problem Code 6-1: Front Fail-Safe Relay Circuit

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



Troubleshooting

Flowcharts (cont'd)

(From page 19-69)

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

Check each wire for continuity between the control unit and body ground.

No.8 (RED/BLK): Front Right Inlet
No.1 (YEL/BLK): Front Right Outlet
No. 10 (RED/BLU): Front Left Inlet
No. 3 (YEL/BLU): Front Left Outlet

Is there continuity?

YES

Repair short in wire between the solenoid and control unit:

RED/BLK: Front Right Inlet
YEL/BLK: Front Right Outlet
RED/BLU: Front Left Inlet
YEL/BLU: Front Left Outlet

NO

Check for continuity between the No.17 (YEL/GRN) terminal and body ground.

Is there continuity?

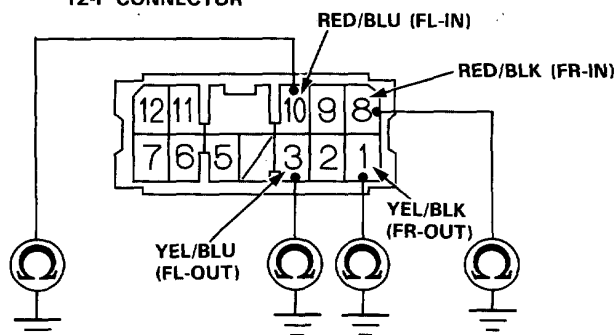
YES

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

NO

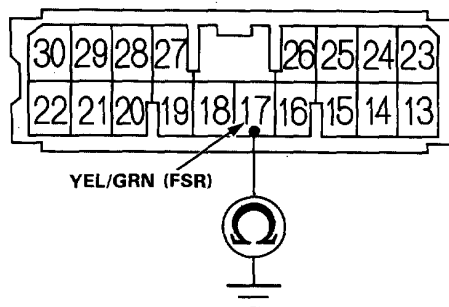
Check for loose control unit connectors. If necessary, substitute a know-good control unit and recheck.

12-P CONNECTOR



View from control unit terminal side.

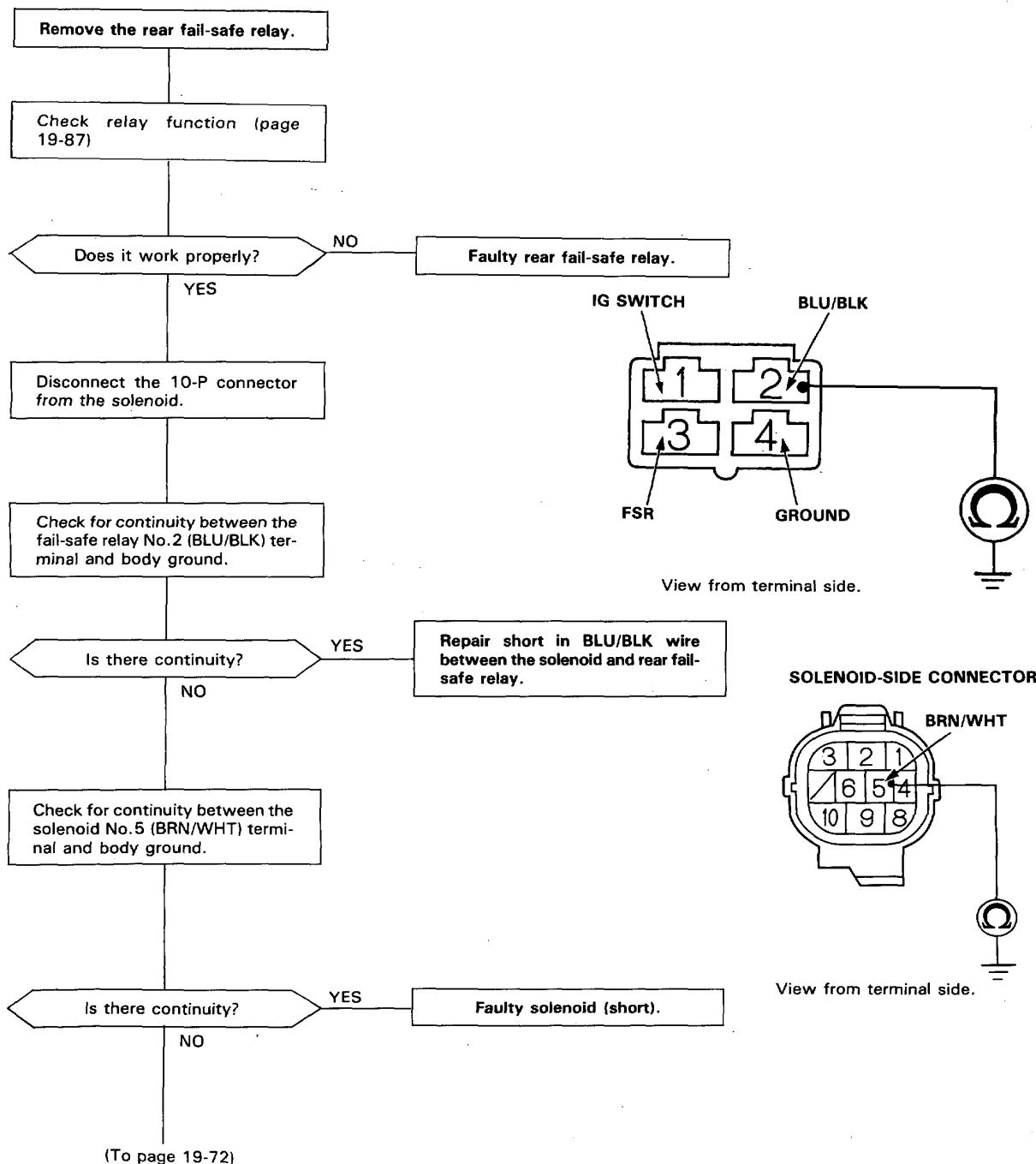
18-P CONNECTOR



View from control unit terminal side.

Problem Code 6-4: Rear Fail-Safe Relay Circuit

CAUTION: Use only digital multimeter to check the system.



(cont'd)

Troubleshooting

Flowcharts (cont'd)

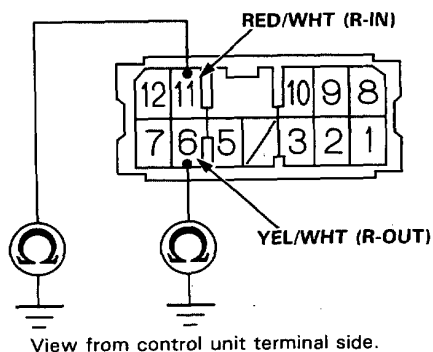
(From page 19-71)

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

Check each wire for continuity between the control unit and body ground.

No.11 (RED/WHT): Rear Inlet
No.6 (YEL/WHT): Rear Outlet

12-P CONNECTOR



Is there continuity?

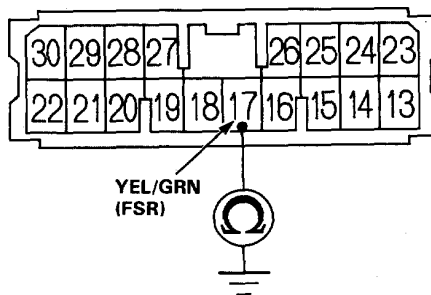
YES

Repair short in wire between the solenoid and control unit
RED/WHT: Rear Inlet
YEL/WHT: Rear Outlet

NO

Check for continuity between the No.17 (YEL/GRN) terminal and body ground.

18-P CONNECTOR



Is there continuity?

YES

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

NO

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

Problem Code 7-1 and 7-2 Front Solenoid Related Problem

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

Disconnect the 10-P connector from the solenoids.

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

Is there 1-3Ω?

NO

Faulty solenoid.

YES

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

Is there 1-3Ω?

NO

Faulty solenoid.

YES

Disconnect the 12-P connector from control unit.

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

Is there continuity?

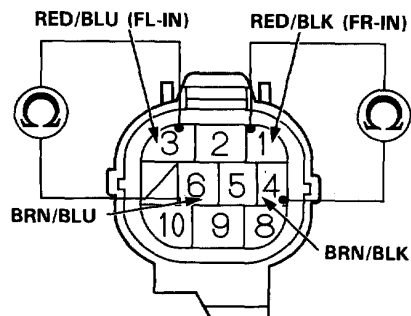
NO

Repair open in wire:
RED/BLK: Front Right Inlet
YEL/BLK: Front Right Outlet
RED/BLU: Front Left Inlet
YEL/BLU: Front left Outlet

YES

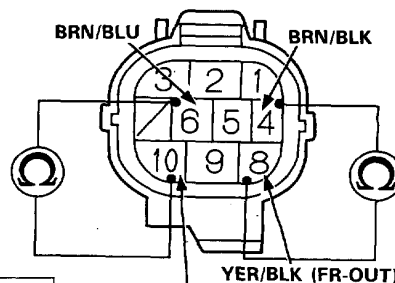
(To page 19-74)

SOLENOID-SIDE CONNECTOR



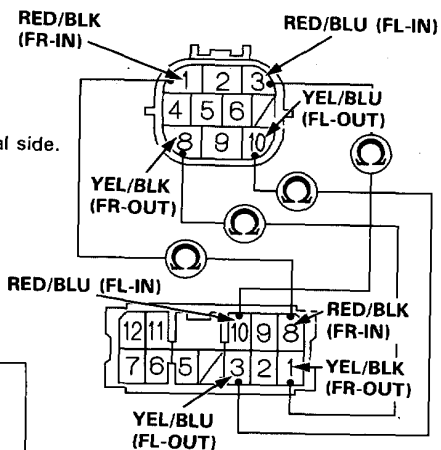
View from terminal side.

SOLENOID-SIDE CONNECTOR



View from terminal side.

HARNESS-SIDE CONNECTOR



View from terminal side.

View from control unit terminal side.

(cont'd)

Troubleshooting

Flowcharts (cont'd)

(From page 19-73)

Check each wire for continuity between the control unit and body ground:
No.8 (RED/BLK): Front Right Inlet
No.1 (YEL/BLK): Front Right Outlet
No.10 (RED/BLU): Front Left Inlet
No.3 (YEL/BLU): Front Left Outlet

Is there continuity?

YES

NO

Remove the front fail-safe relay.

Check for relay function (page 19-87).

Does it work properly?

NO

YES

Check for continuity between the No.4 (BLK) terminal and body ground.

Is there continuity?

NO

YES

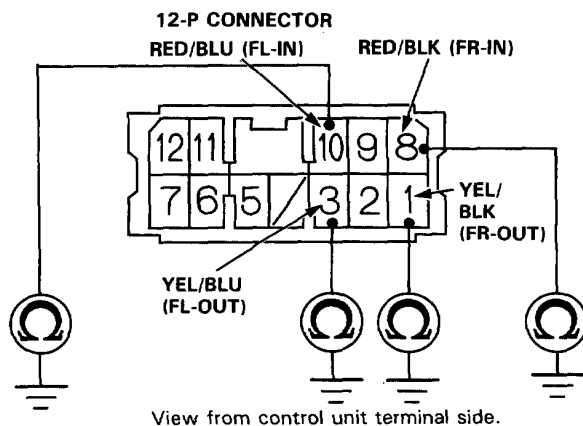
Check BRN/BLK wire for continuity between the solenoids and front fail-safe relay.

Is there continuity?

NO

YES

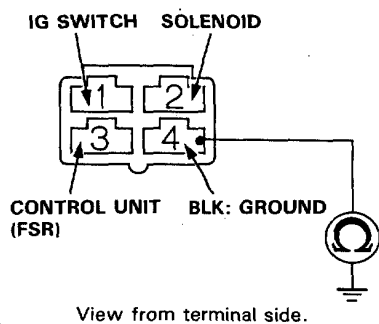
Check for loose control unit connectors. If necessary, substitute a known-good control unit and recheck.



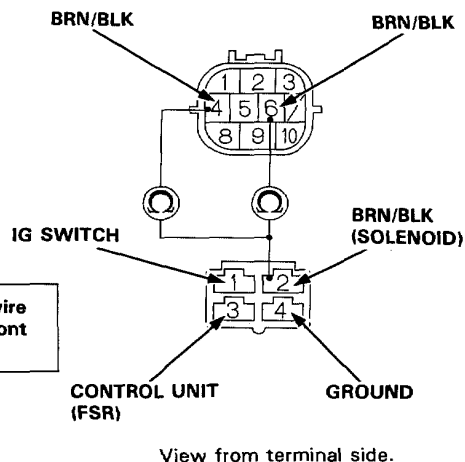
Repair short in wire:
RED/BLK: Front Right Inlet
YEL/BLK: Front Right Outlet
RED/BLU: Front Left Inlet
YEL/BLU: Front Left Outlet

Faulty front fail-safe relay.

Repair open in BLK wire between the fail-safe relay and ground or poor ground (LHD: G403, RHD: G401).



HARNESS-SIDE CONNECTOR



Repair open in BRN/BLK wire between the solenoids and front fail-safe relay.

Problem Code 7-4: Rear Solenoid Problem

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

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

Is there continuity?

NO

Repair open in wire:
RED/WHT: Rear Inlet
YEL/WHT: Rear Outlet

YES

Check each wire for continuity between the control unit and body ground:
No.11 (RED/WHT): Rear Inlet
No.6 (YEL/WHT): Rear Outlet

Is there continuity?

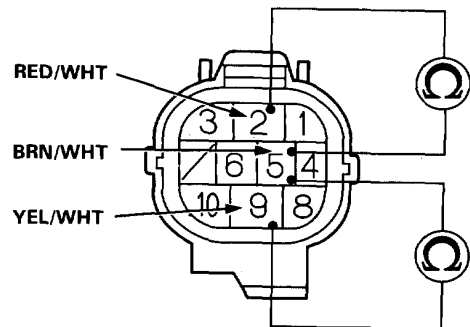
YES

Repair short in wire:
RED/WHT: Rear Inlet
YEL/WHT: Rear Outlet

NO

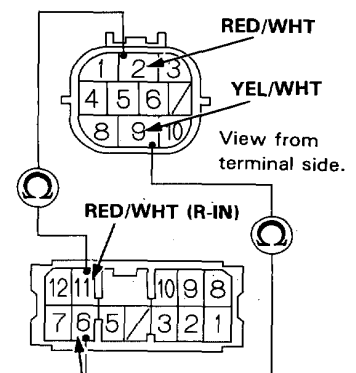
(To page 19-76)

SOLENOID-SIDE CONNECTOR



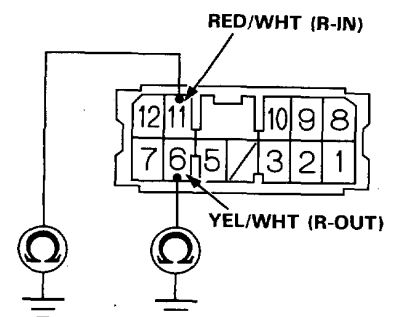
View from terminal side.

HARNESS-SIDE CONNECTOR



View from control unit terminal side.

12-P CONNECTOR



View from control unit terminal side.

(cont'd)

Troubleshooting

Flowcharts (cont'd)

(From page 19-75)

Remove the rear fail-safe relay.

Check for relay function (page 19-87).

Does it work properly?

NO

Faulty rear fail-safe relay.

YES

Check for continuity between the No.4 (BLK) terminal and body ground.

Is there continuity?

NO

Repair open in BLK wire between the fail-safe relay and ground or poor ground (LHD: G403, RHD: G401).

YES

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

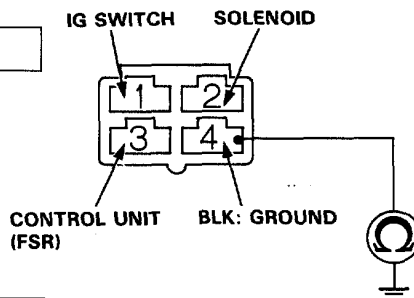
Is there continuity?

NO

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

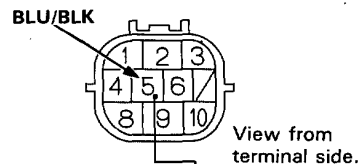
YES

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

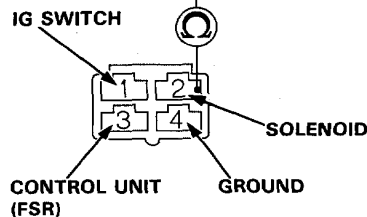


View from terminal side.

HARNESS-SIDE CONNECTOR



View from terminal side.



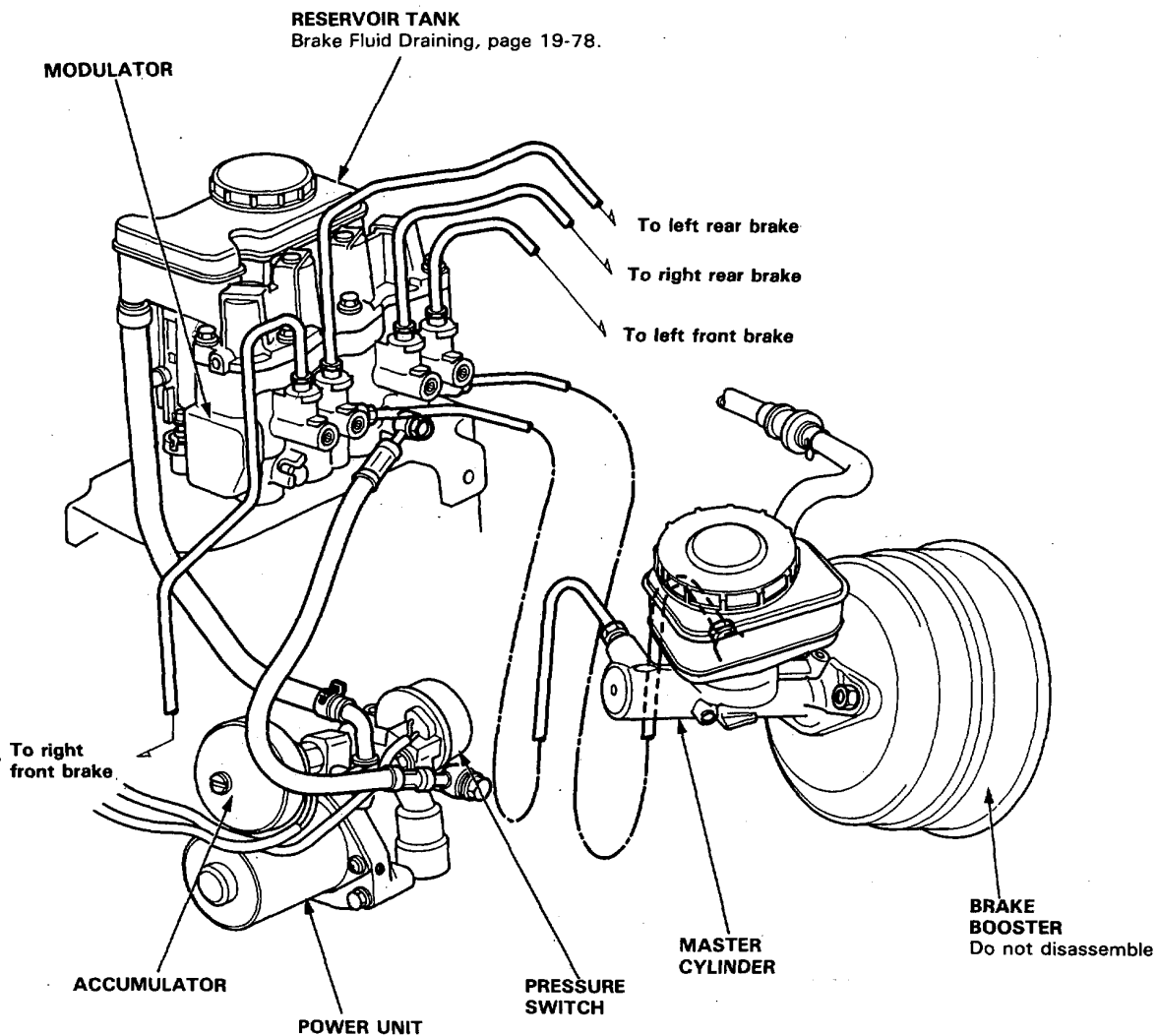
Hydraulic System



Index

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.



NOTE: Replace the accumulator, power unit and pressure switch, as an assembly.

Relieving Accumulator/Line Pressure

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

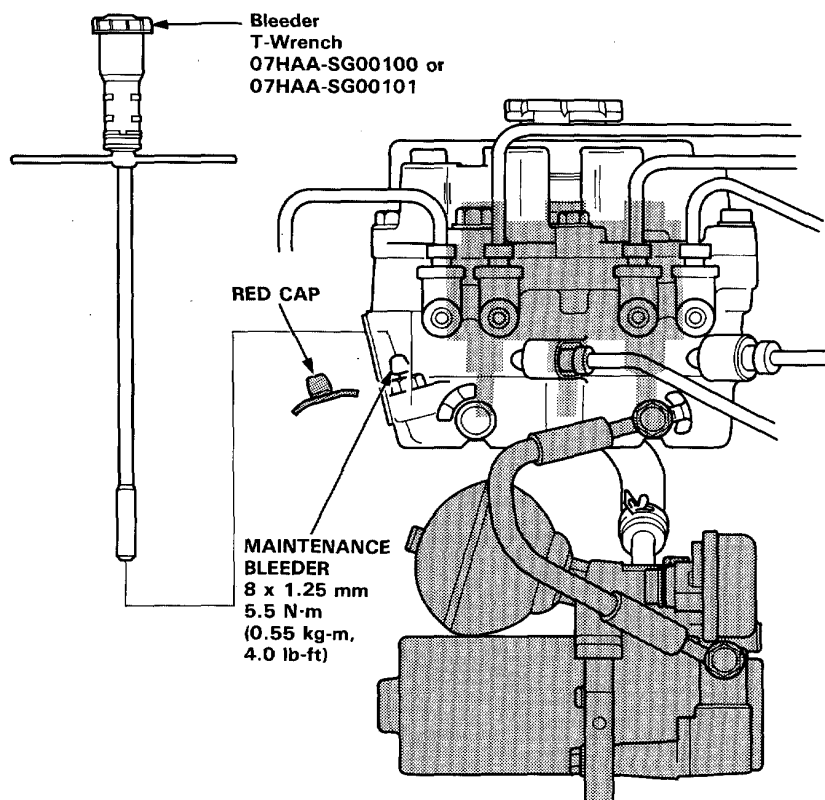
1. Open the hood.
2. Remove the red cap from the bleeder on the top of the power unit.
3. Install the Bleeder T-wrench on the bleeder screw and turn it out slowly 90° to collect high-pressure fluid into the reservoir. Turn the T-wrench out one complete turn to drain the brake fluid thoroughly.
4. Retighten the bleeder screw 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 tube is removed or the modulator head 8 mm and 10 mm bolts are loosened.
- To drain high-pressure brake fluid, follow the procedure on this page.



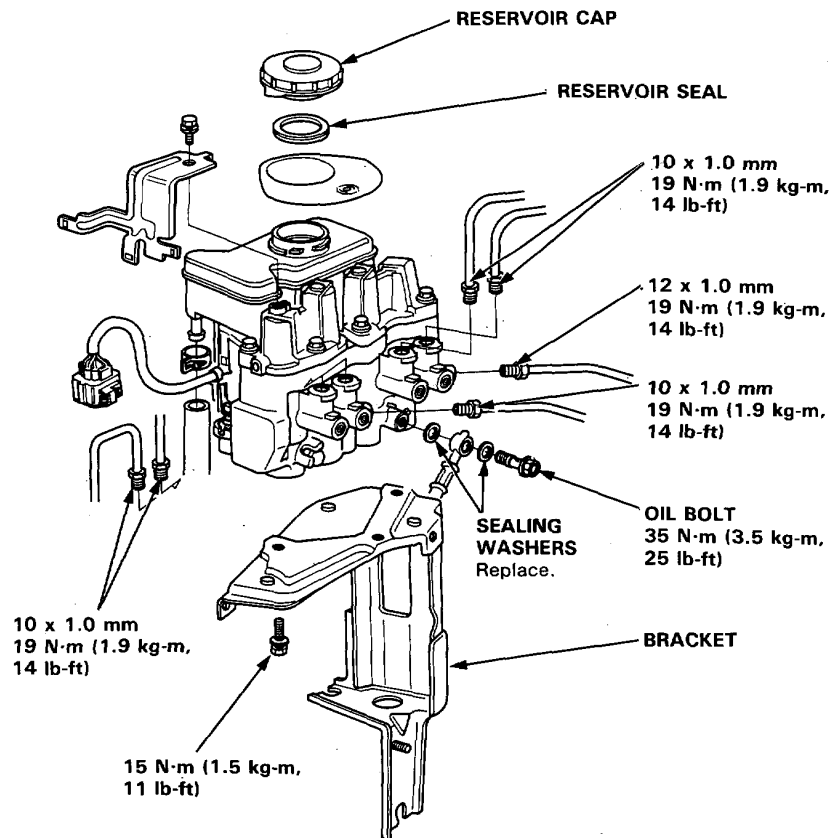
Modulator Unit



Torque

CAUTION:

- Be careful not to bend or damage the brake pipes when removing the modulator.
- 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.
- Replace the modulator as an assembly if it is defective for any reason.
- 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.

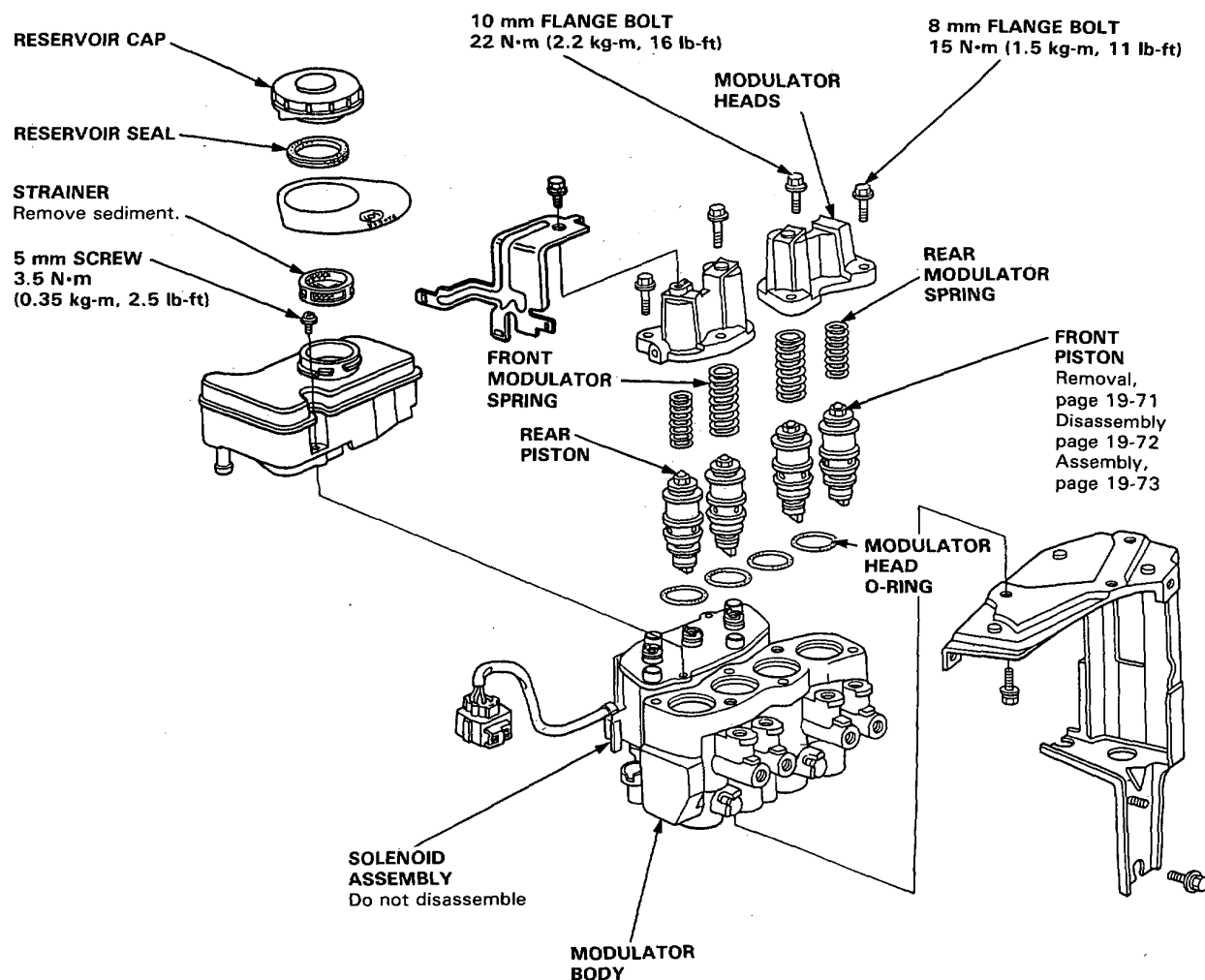


Modulator Unit

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.
- 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.
- Use only new DOT3 or DOT4 clean brake fluid.
- 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.
- Replace all rubber parts with new ones whenever the modulator is disassembled.



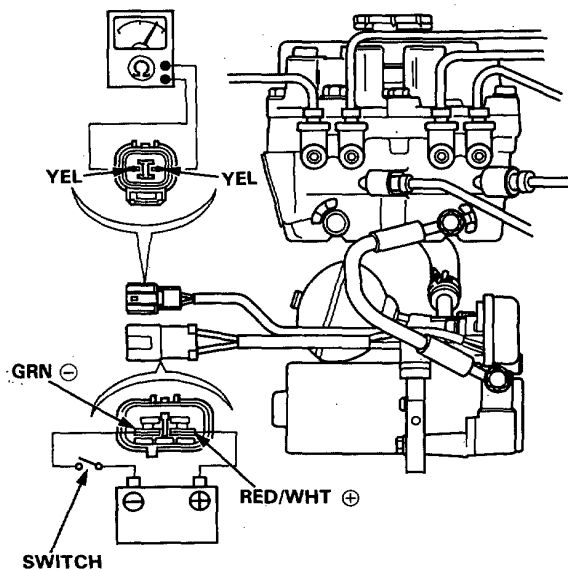
Solenoids



Leak Test

NOTE: If the solenoid leaks excessively, the brake fluid level in the modulator reservoir tank will rise when operating the ALB motor. Modulator reservoir may overflow.

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

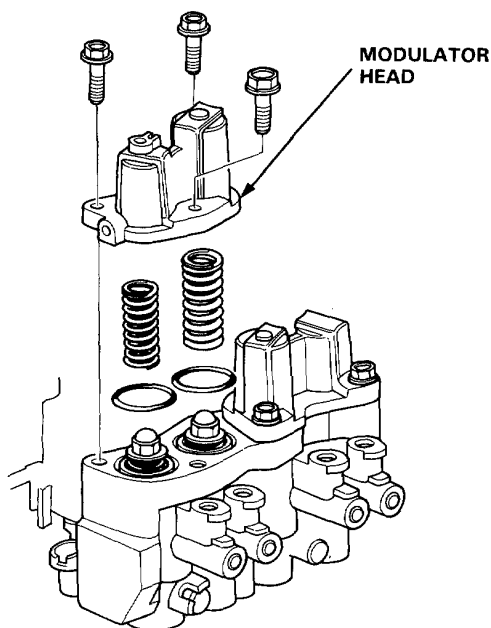


- Check if the solenoid hisses or squeaks. Replace the modulator if the solenoid hisses or squeaks.
- Check the pressure switch for continuity within 30 minutes. It is normal if there is continuity. If there is no continuity, solenoid is faulty and must be replaced.

Piston

Removal

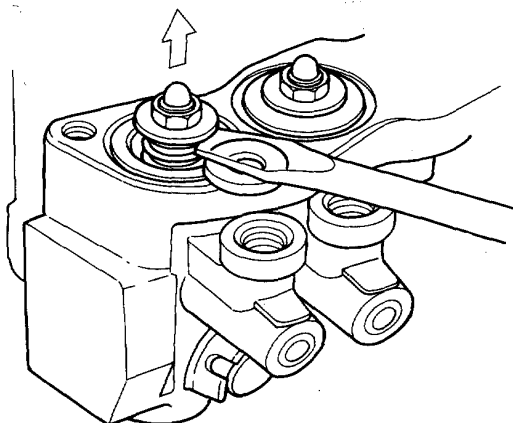
1. Remove the modulator heads.



2. Insert the driver into the spring, pry off the piston assembly until it lifts up slightly and pull out the lock nut with a pair of pliers.

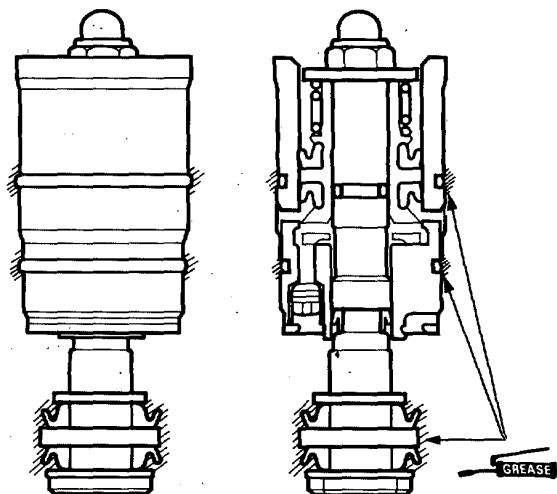
CAUTION:

- Set the washer between the driver and modulator body to prevent damage to the body.
- Be careful not to damage the piston sleeve.

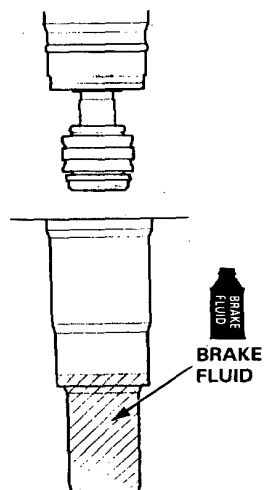


Installation

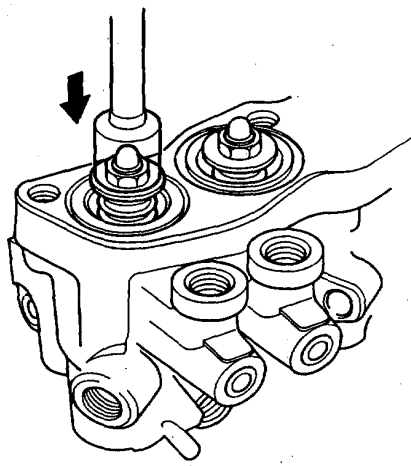
1. Apply rubber grease to the shaded sections of the piston assembly, shown in the drawing below.



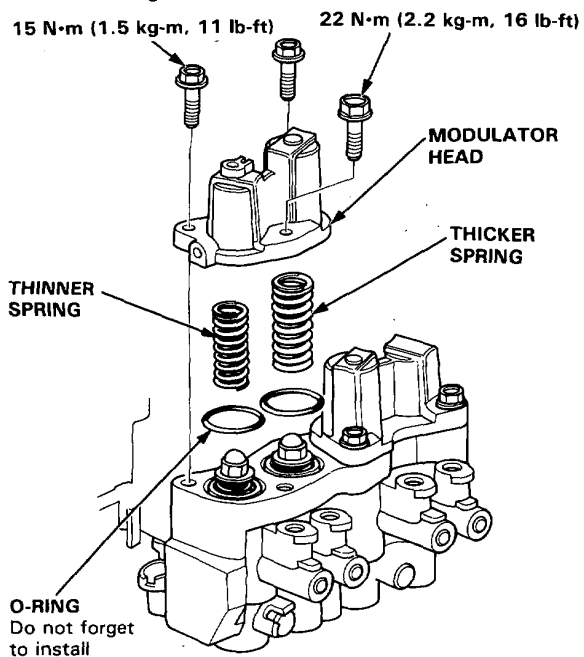
2. Adjust so that the brake fluid flows into the piston mounting hole in the modulator body.



3. Set the piston assembly in the piston mounting hole in the modulator body and push down on the piston.
4. Push on the piston about 5 times until no bubbles come out of the solenoid side.



5. Install the modulator springs.
6. Install the modulator heads with care not to pinch the O-rings.

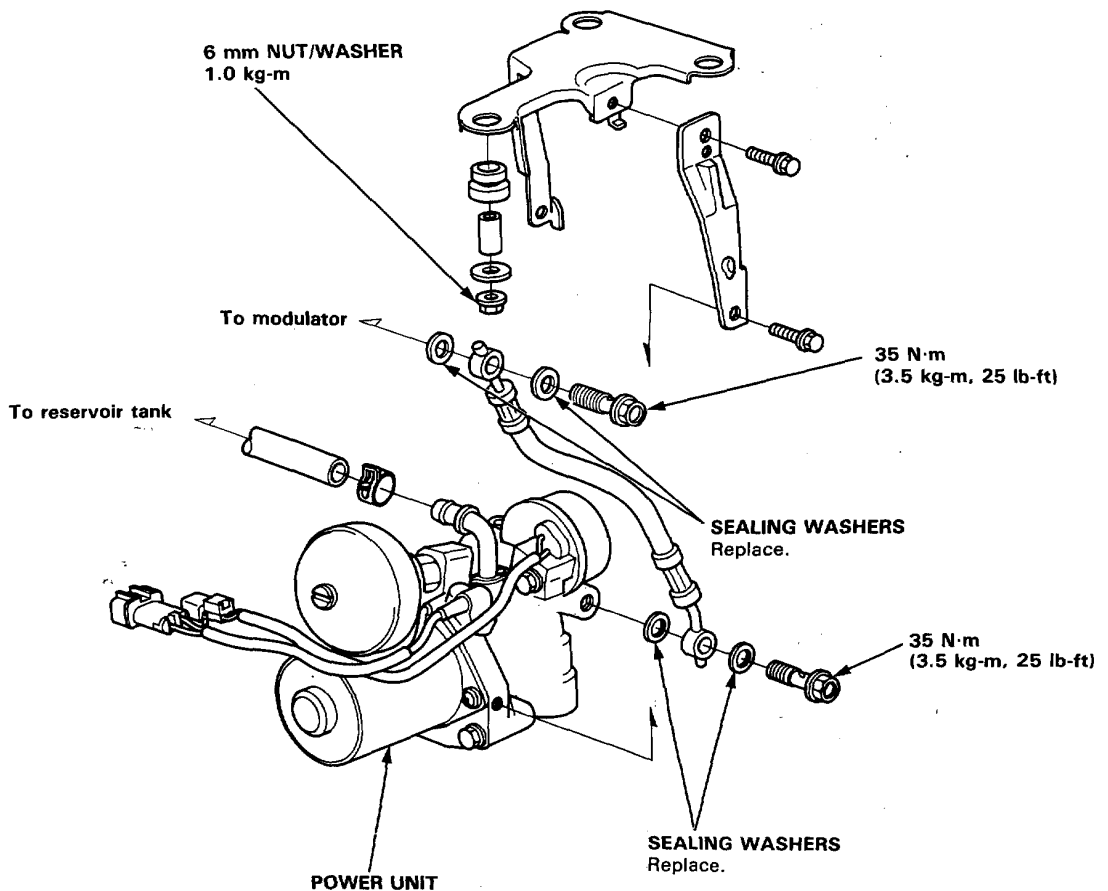


Power/Accumulator/Pressure Switch Unit

Index/Torque

CAUTION:

- Be careful not to bend or damage the brake pipe when removing the power unit and accumulator.
- 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 try to disassemble the power/accumulator unit assembly. Replace the assembly with a new part if necessary.
- 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.

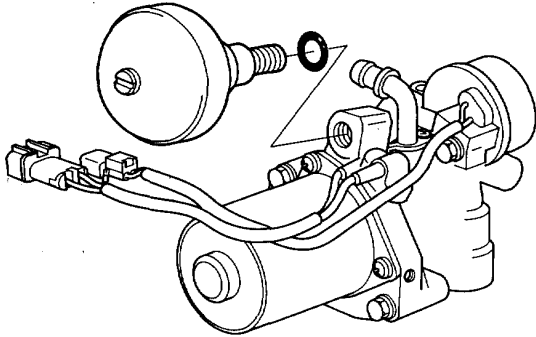


Accumulator

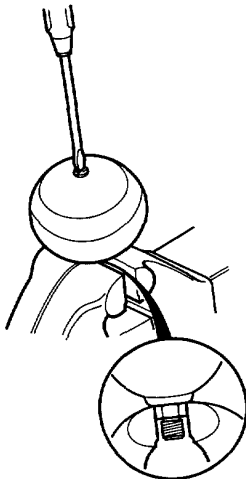
Disposal

⚠ 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. Remove the accumulator.



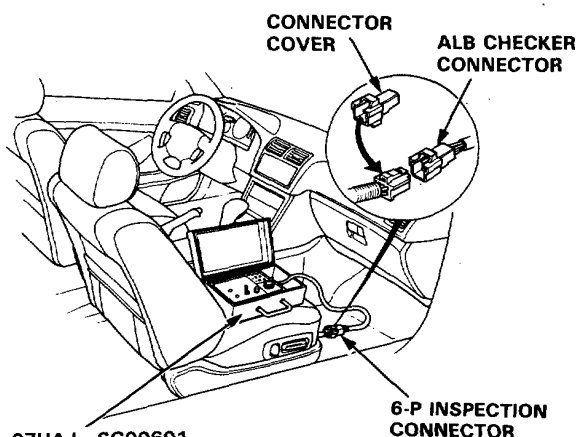
2. Secure the accumulator in a vise so that the relief plug points straight up.
3. Slowly turn the plug 3-1/2 turns and then wait 3 minutes for all pressure to escape.
4. Remove the plug completely and dispose of the accumulator unit.



Bleeding

Air Bleeding with ALB Checker

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

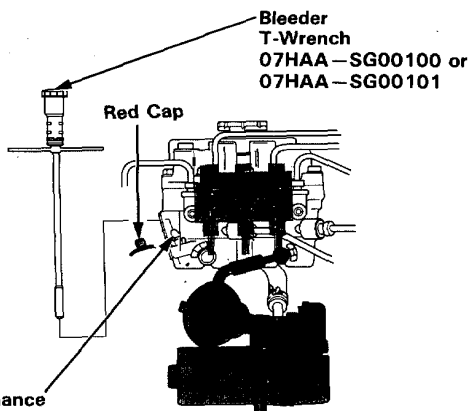


07HAJ-SG00601
or
07508-SB00000
and
07HAJ-SG00400 (Adaptor)

CAUTION: 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.

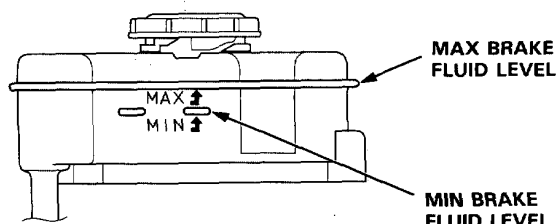
2. Bleed high-pressure fluid from the maintenance bleeder with the special tool.
3. Fill the modulator reservoir to the MAX level.

NOTE: Do not reuse aerated brake fluid that has been bled from the power unit.



8 x 1.25 mm
5.5 N·m
(0.55 kg-m,
4.0 lb-ft)

4. Start the engine and release the parking brake.
5. Turn the Mode Selector to 2, 3, 4, 5 and press the Start Test button. Visually inspect the kickbacks of the brake pedal. There should be at least two kickbacks. If not, repeat steps 2 through 5, as necessary.
6. Fill the modulator reservoir up to the MAX level.



7. Install the reservoir cap.
8. Check the anti-lock brake system function in all modes by using the ALB checker.

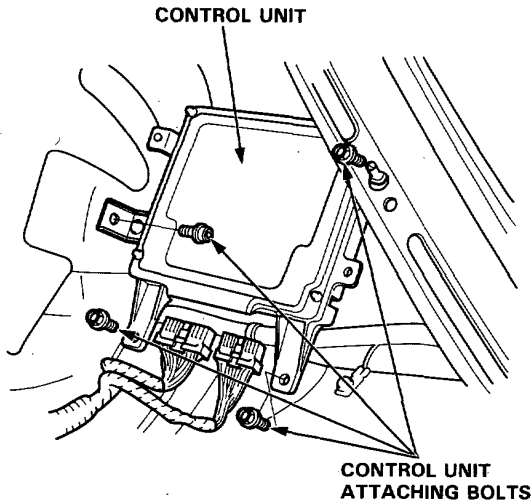
Electronic Components

Control Unit Replacement

1. Remove the rear seat back.
2. Remove the control unit attaching bolts, then remove the control unit.

CAUTION:

- When the control unit mounting bolts are removed, the control unit's memory is cleared.
- Handle the control unit with care. Do not drop it.

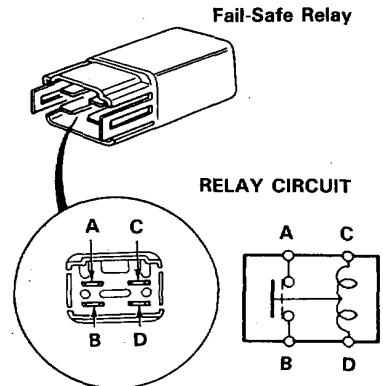


Installation is the reverse order of removal.

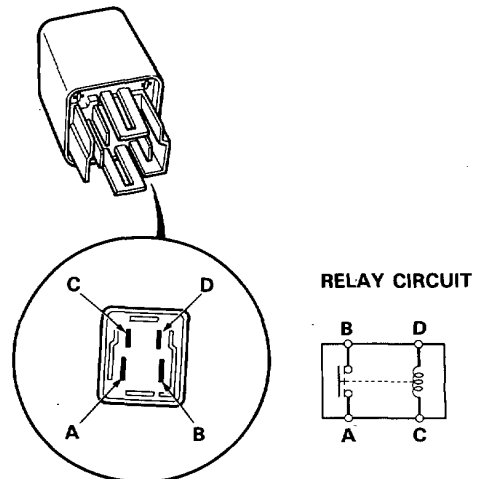
NOTE: After installation, turn the ignition switch on and check the anti-lock brake system indicator light for operation.

Relays Inspection

1. Remove the fail safe-relay from the relay box C (Location: page 19-37).
2. Check for continuity between the terminals A and B. There should be no continuity.
3. Connect a 12 V battery across the terminals C and D. There should be continuity between the terminals A and B.



4. Remove the motor relay from the under-hood relay/fuse box (Location: page 19-37).
5. There should be continuity between the C and D terminals.
6. There should be continuity between the A and B terminals when the battery is connected to C and D terminals. There should be no continuity when the battery is disconnected.



Pulsers/Sensors

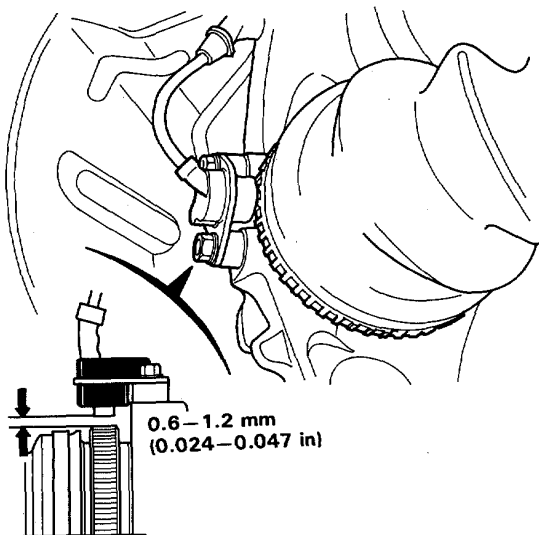
Inspection

Front

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

Standard: 0.6—1.2 mm (0.024—0.047 in)

NOTE: If the gap exceeds 1.2 mm (0.047 in) at any point, the probability is a distorted knuckle which should be replaced.

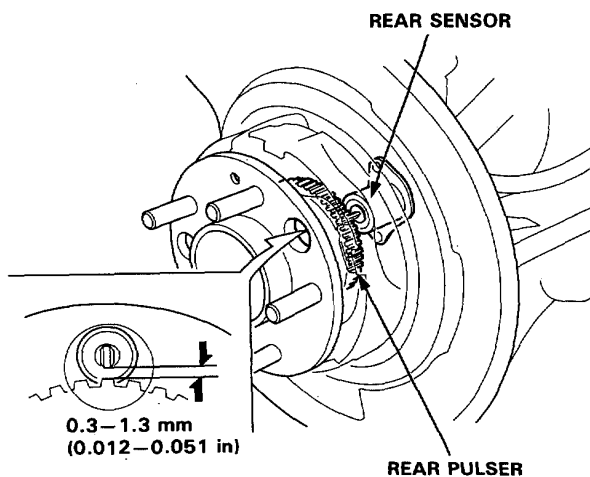


Rear

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: 0.3—1.3 mm (0.012—0.051 in)

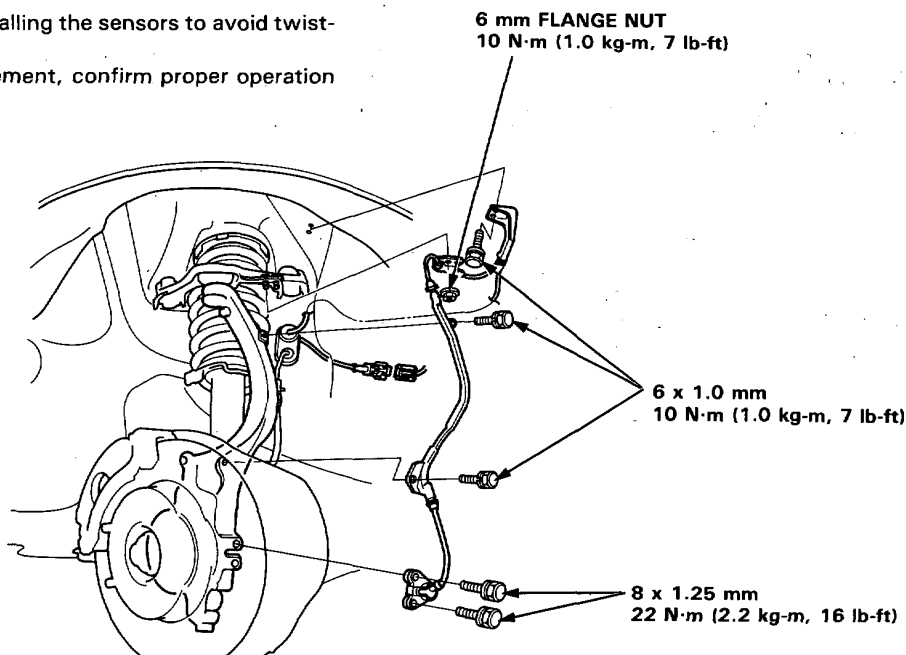
NOTE: If the gap exceeds 1.3 mm (0.051 in) at any point, the probability is a distorted knuckle which should be replaced.



Front Sensor Replacement

NOTE:

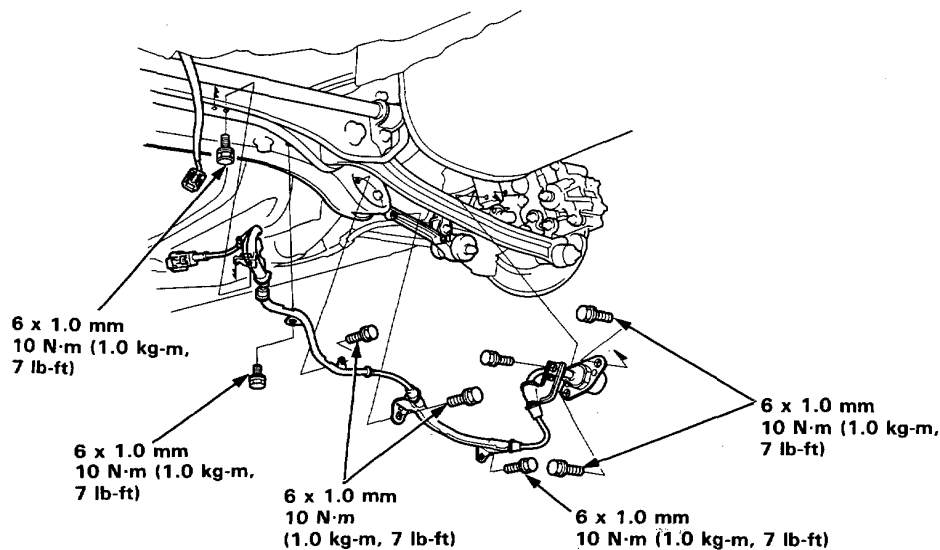
- Be careful when installing the sensors to avoid twisting the wires.
- After sensor replacement, confirm proper operation (page 19-55).



Rear Sensor Replacement

NOTE:

- Be careful when installing the sensors to avoid twisting the wires.
- After sensor replacement, confirm proper operation (page 19-55).



SUPPLEMENTAL RESTRAINT SYSTEM (SRS) (if body maintenance is required)

The Legend includes a driver's side Airbag, located in the steering wheel hub. Information necessary to safely service the SRS is included in this Shop Manual. Items marked * in each section table of contents include, or are located near, SRS components. Servicing, disassembling or replacing these items will require special precautions and tools, and should therefore be done only by an authorized HONDA dealer.

▲ WARNING

- To avoid rendering the SRS inoperative, which can lead to personal injury or death in the event of a severe frontal collision, all maintenance must be performed by an authorized HONDA dealer.
- Improper maintenance, including incorrect removal and installation of the SRS, can lead to personal injury caused by unintentional activation of the Airbag.
- All SRS electrical wiring harnesses are covered with yellow outer insulation. Related components are located in the steering column, center armrest and dashboard lower panel. Do not use electrical test equipment on these circuits.