

Brakes

Conventional Brakes	19-1
Anti-lock Brake System (ABS)	19-43



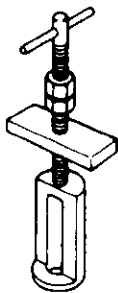
Conventional Brake

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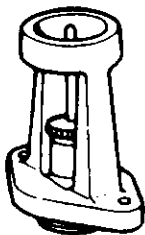


Special Tools

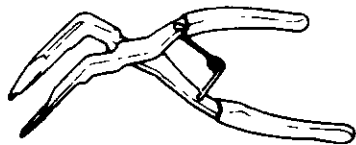
Ref. No.	Tool Number	Description	Qty	Page Reference
①	07HAE - SG00100	Brake Spring Compressor	1	19-28, 33
②	07JAG - SD40100	Pushrod Adjustment Gauge	1	19-22
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①



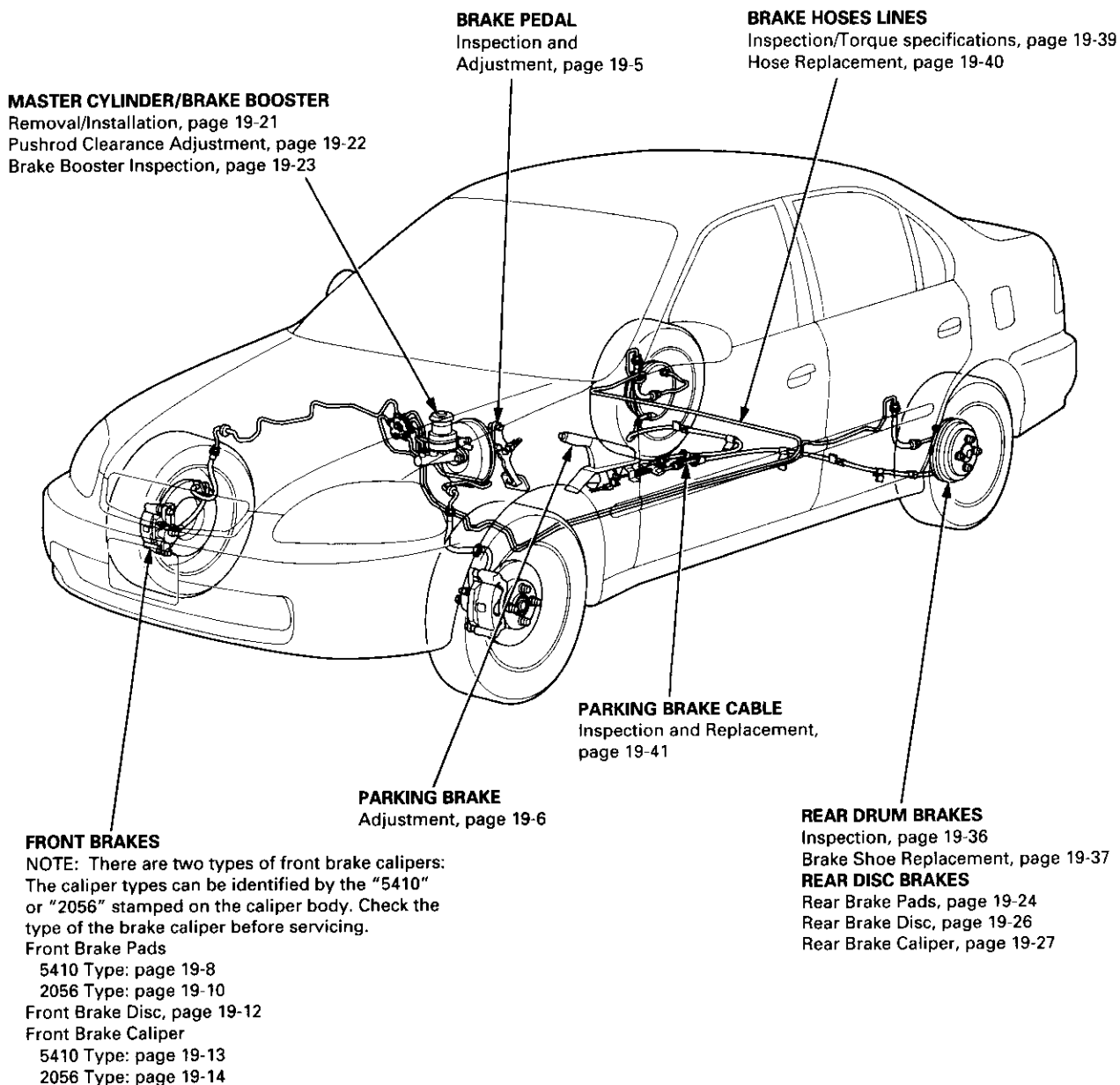
②



③



Index



Inspection and Adjustment

Brake System Rubber Parts and Brake Booster

A Brake Booster

Check brake operation by applying the brakes. If the brakes do not work properly, check the brake booster. Replace the brake booster as an assembly if it does not work properly or if there are signs of leakage.

B Piston Cup and Pressure Cup Inspection

- Check brake operation by applying the brakes. Visually check for damage or signs of fluid leakage. Replace the master cylinder as an assembly if the pedal does not work properly or if there is damage or signs of fluid leakage.
- Check for a difference in brake pedal stroke between quick and slow brake applications. Replace the master cylinder if there is a difference in pedal stroke.

C Brake Hoses

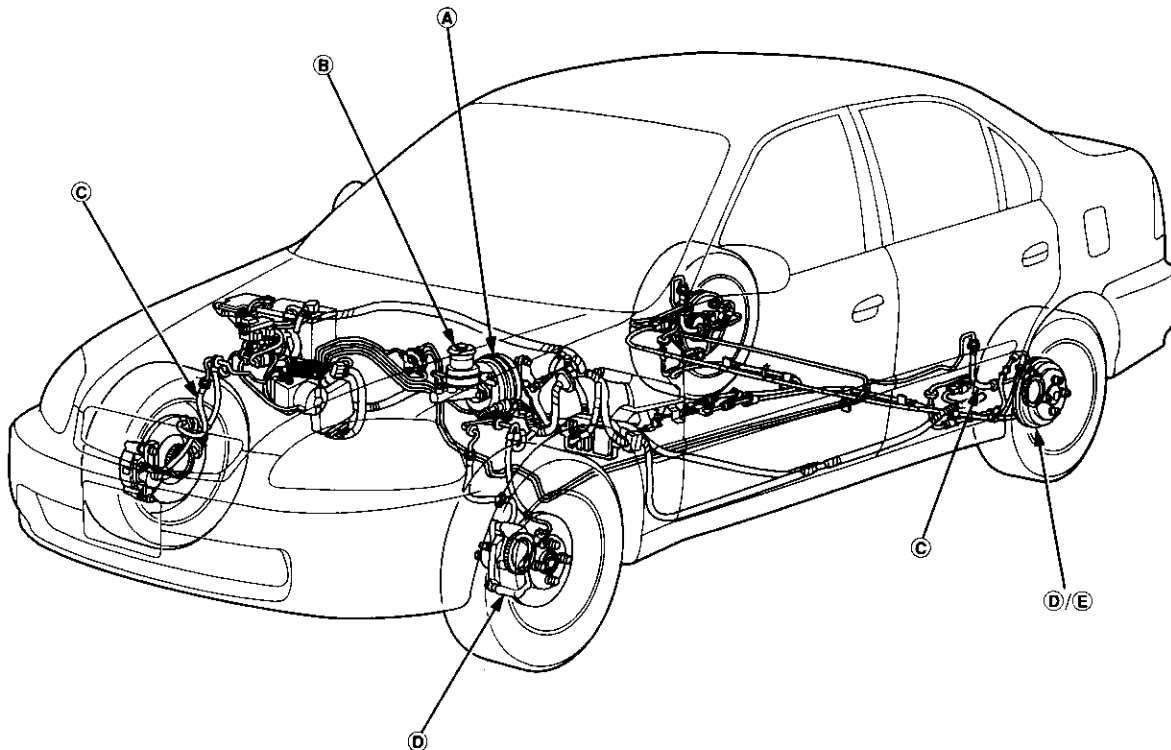
Visually check for damage or signs of fluid leakage. Replace the brake hose with a new one if it is damaged or leaking.

D Caliper Piston Seal and Piston Boots

Check brake operation by applying the brakes. Visually check for damage or signs of fluid leakage. If the pedal does not operate properly, the brakes drag, or there is damage or signs of fluid leakage, disassemble and inspect the brake caliper. Replace the boots and seals with new ones whenever the brake caliper is disassembled.

E Wheel Cylinder Piston Cup and Dust Cover

Check brake operation by applying the brakes. Visually check for damage or signs of fluid leakage. If the pedal does not operate properly, the brakes drag, or there is damage or signs of fluid leakage, disassemble and inspect the wheel cylinder. If necessary, replace the wheel cylinder as an assembly.

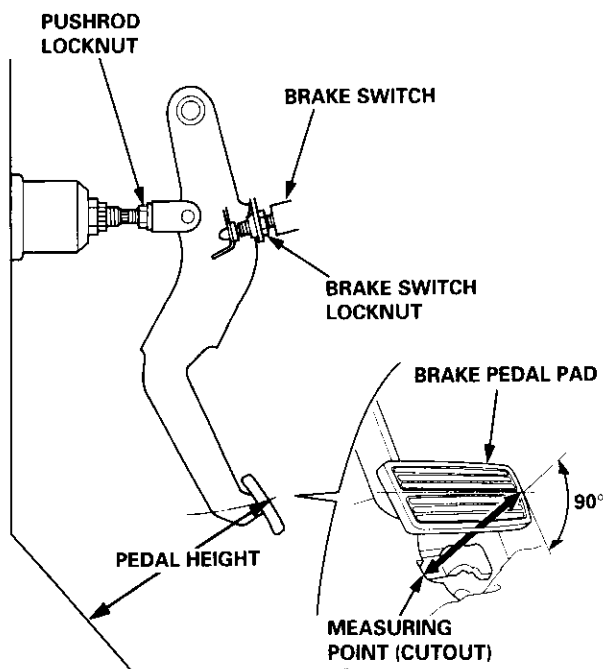




Brake Pedal

Pedal Height

1. Disconnect the brake switch connector, loosen the brake switch locknut, and back off the brake switch until it is no longer touching the brake pedal.
2. At the carpet cutout, measure the pedal height from the right side center of the pedal pad.



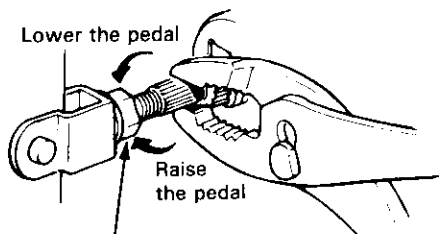
Standard Pedal Height (with carpet removed):

M/T: 156.5 mm (6.16 in)

A/T, CVT: 161 mm (6 5/16 in)

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

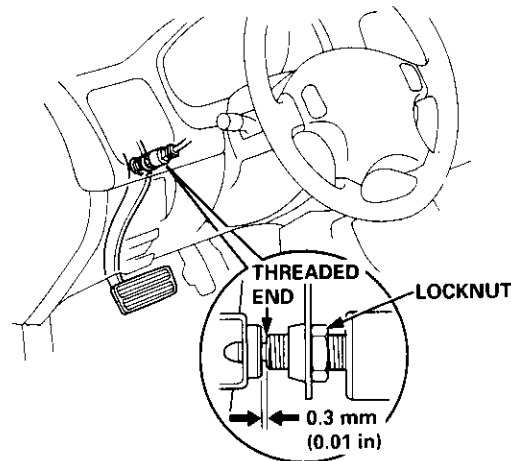
NOTE: Do not adjust the pedal height with the pushrod depressed.



PUSHROD LOCKNUT
15 N·m
(1.5 kgf·m, 11 lbf·ft)

4. Screw in the brake switch until its plunger is fully depressed (threaded end touching the pad on the pedal arm). Then back off the switch 1/4 turn to make 0.3 mm (0.01 in) of clearance between the threaded end and pad. Tighten the locknut firmly. Connect the brake switch connector.

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



5. Check the brake pedal free play as described below.

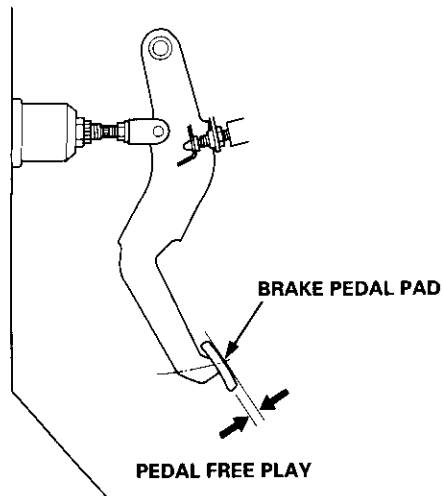
Pedal Free Play

1. With the engine off, inspect the play on the pedal pad by pushing the pedal by hand.

Free Play: 1 – 5 mm (1/16 – 3/16 in)

2. If the pedal free play is out of specification, adjust the brake switch.

CAUTION: If the pedal free play is insufficient, it may result in brake drag.



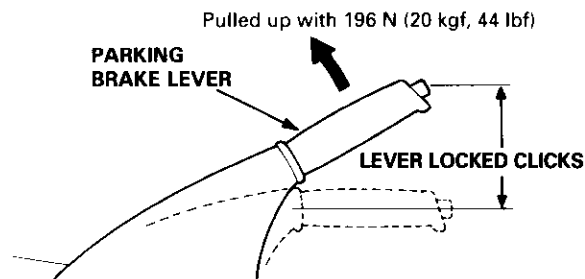
Inspection and Adjustment

Parking Brake

Inspection

1. Pull the parking brake lever with 196 N (20 kgf, 44 lbf) force to fully apply the parking brake. The parking brake lever should be locked within the specified number of clicks.

Lever Locked clicks: 6 – 9



2. Adjust the parking brake if the lever clicks are out of specification.

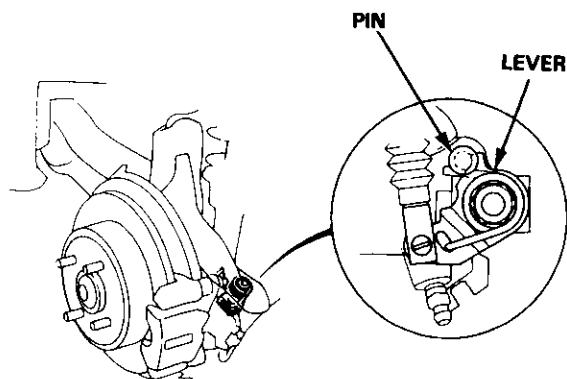
Adjustment

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

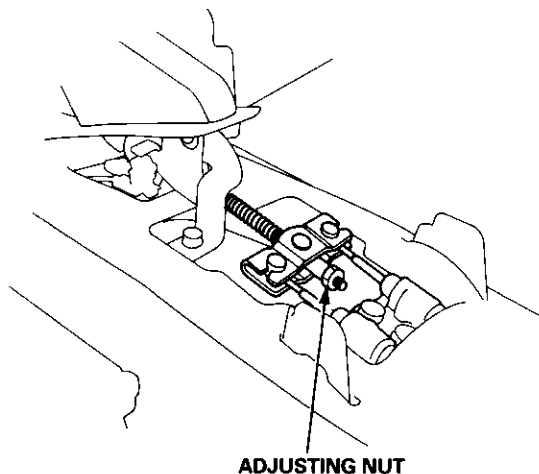
1. Raise the rear wheels off the ground, and support the vehicle on safety stands.

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

2. On vehicles with rear disc brakes, make sure the parking brake arm on the rear brake caliper contacts the brake caliper pin.



3. Remove the rear console (see section 20).
4. Pull the parking brake lever up one click.
5. Tighten the adjusting nut until the rear wheels drag slightly when turned.



6. Release the parking brake lever fully, and check that the rear wheels do not drag when turned. Readjust if necessary.
7. Make sure that the parking brakes are fully applied when the parking brake lever is pulled up fully.
8. Reinstall the rear console.



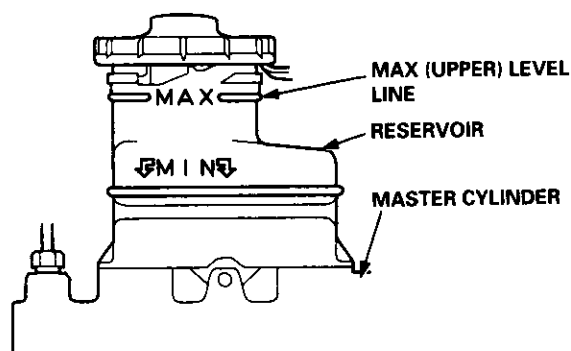
Bleeding

CAUTION:

- Always use Genuine Honda DOT 3 Brake Fluid. Using a non-Honda brake fluid can cause corrosion and decrease the life of the system.
- Make sure no dirt or other foreign matter is allowed to contaminate the brake fluid.
- Do not spill brake fluid on the vehicle, it may damage the paint; if brake fluid does contact the paint, wash it off immediately with water.

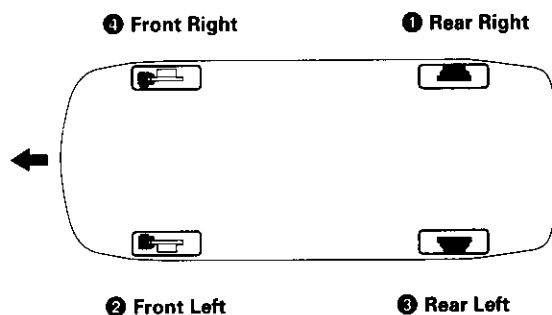
NOTE: The reservoir on the master cylinder must be at the MAX (upper) level mark at the start of the bleeding procedure and checked after bleeding each brake caliper. Add fluid as required.

1. Make sure the brake fluid level in the reservoir is at the MAX (upper) level line.

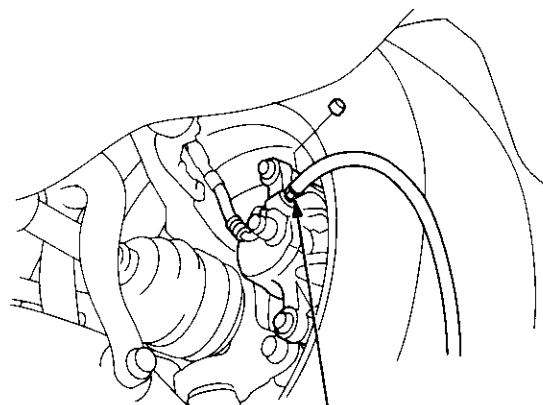


2. Have someone slowly pump the brake pedal several times, then apply steady pressure.
3. Loosen the brake bleed screw to allow air to escape from the system. Then tighten the bleed screw securely.
4. Repeat the procedure for each wheel in the sequence shown below until air bubbles no longer appear in the fluid.
5. Refill the master cylinder reservoir to the MAX (upper) level line.

BLEEDING SEQUENCE:

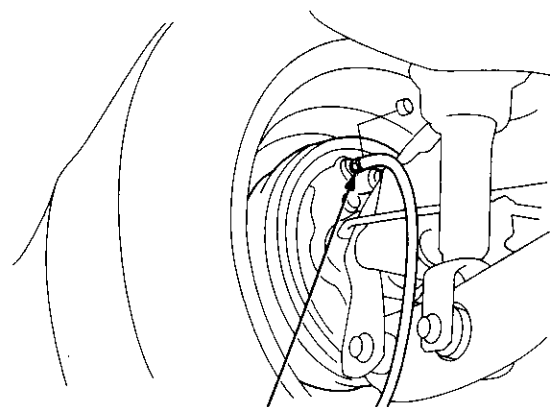


FRONT:



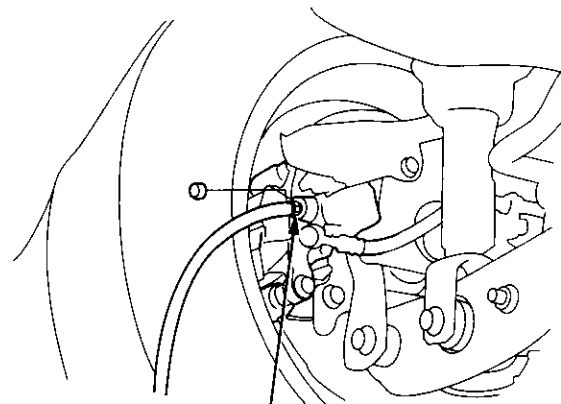
BLEED SCREW
9 N-m (0.9 kgf-m, 6.5 lbf-ft)

REAR (Drum Brake):



BLEED SCREW
7 N-m (0.7 kgf-m, 5 lbf-ft)

REAR (Disc Brake):

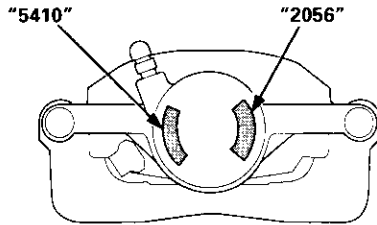


BLEED SCREW
9 N-m (0.9 kgf-m, 6.5 lbf-ft)

Front Brake Pads

Inspection and Replacement

NOTE: There are two types of front brake calipers: The caliper types can be identified by the "5410" or "2056" stamped on the caliper body as shown below. Check the type of the brake caliper before servicing.



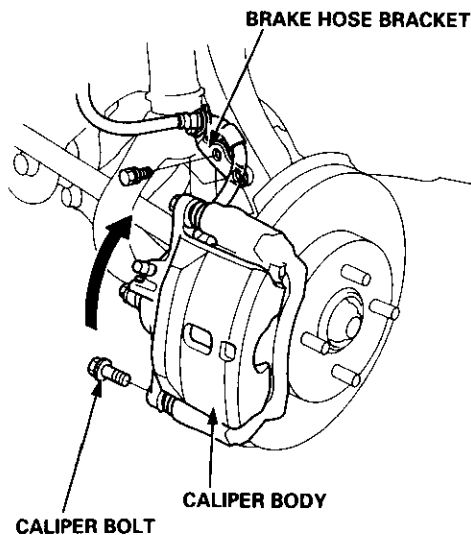
5410 Type:

NOTE: For 2056 type disassembly procedures, see page 19-10.

⚠ WARNING

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

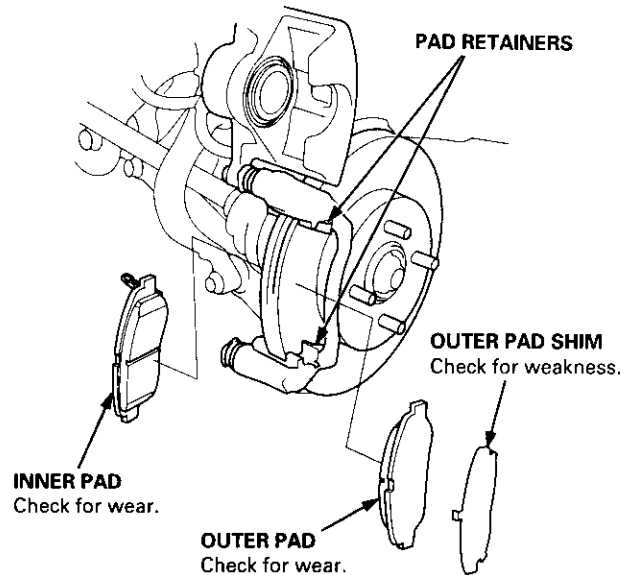
1. Loosen the front wheel nuts slightly, then raise the vehicle, and support it on safety stands. Remove the front wheels.
2. Remove the brake hose bracket from the knuckle.
3. Remove the caliper bolt, and pivot the caliper up out of the way.



NOTE: Check the hoses and pin boots for damage and deterioration.

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

NOTE: When the caliper is equipped with an outer pad shim, replace the shim together with the pads as a set.

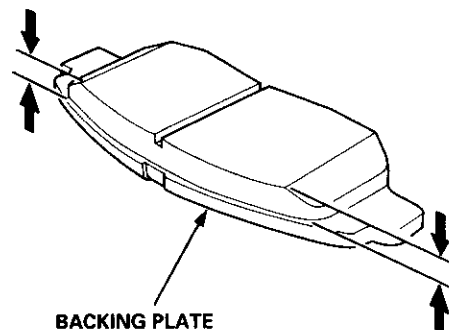


5. Using vernier calipers, measure the thickness of each brake pad lining. The measurement does not include the pad backing plate thickness.

Brake Pad Thickness:

Standard: 9.5 – 10.5 mm (0.37 – 0.41 in)

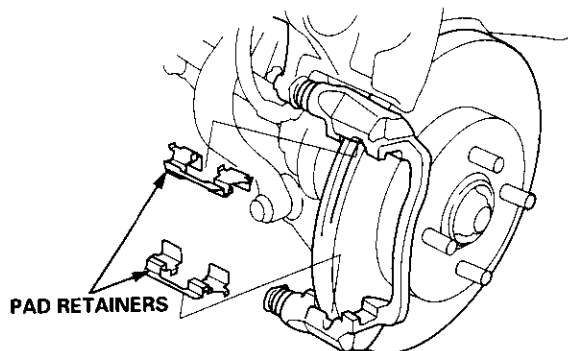
Service Limit: 1.6 mm (0.06 in)



6. If the brake pad thickness is less than the service limit, replace the front pads as a set.



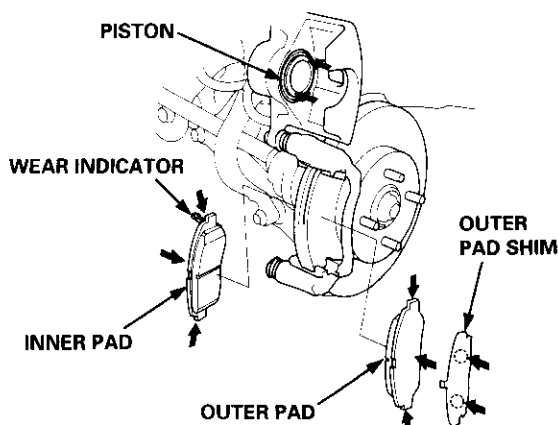
7. Clean the caliper thoroughly; remove any rust, and check for grooves and cracks.
8. Check the brake disc for damage and cracks.
9. Install the pad retainers.



10. Apply grease to the points indicated by the arrows in the following illustration:

NOTE: Use the pad grease included in the pad set or Molykote M77 grease, and apply a thin coat of grease evenly to the designated points.

- Piston end and inner pad contact surface
- Pad and caliper bracket contact surface
- Outer pad and caliper body contact surface
- Outer pad shim and outer pad contact surface
- Outer pad shim and caliper body contact surface



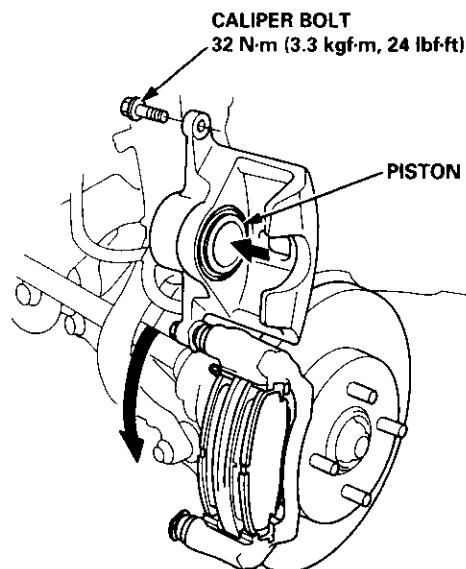
11. Install the brake pads and pad shim correctly.

⚠ WARNING

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

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

12. Push in the piston so that the caliper will fit over the pads. Make sure that the piston boot is in position to prevent damaging it when pivoting the caliper down.



13. Pivot the caliper down into position, then install the caliper bolt and tighten it.

CAUTION: Be careful not damage the pin boot when pivoting the caliper down.

14. Install the brake hose bracket on the knuckle.

NOTE: Inspect the brake hose for interference or twisting.

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

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.

16. After installation, check for leaks at hose and line joints or connections, and retighten if necessary.

(cont'd)

Front Brake Pads

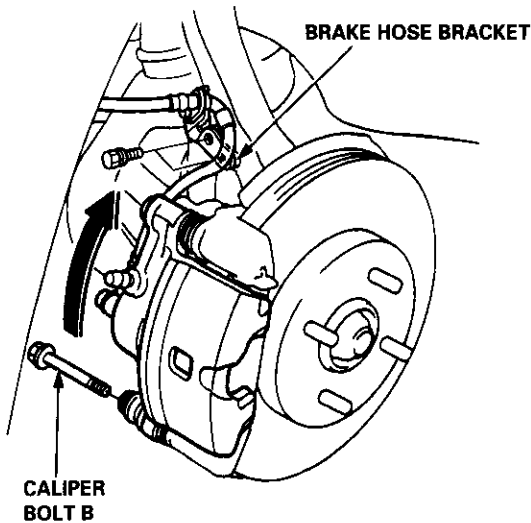
Inspection and Replacement (cont'd)

2056 Type:

⚠ WARNING

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

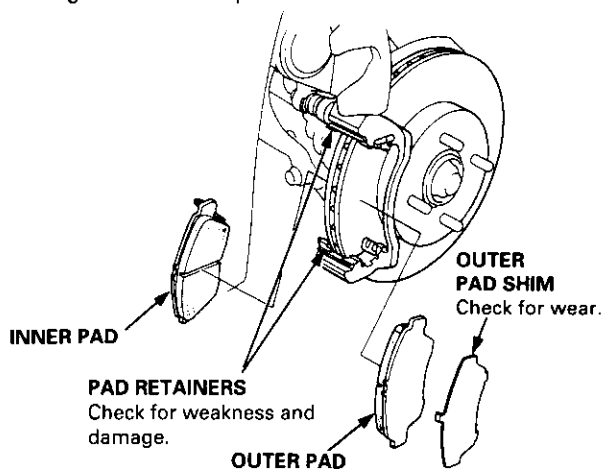
1. Loosen the front wheel nuts slightly, then raise the vehicle, and support it on safety stands. Remove the front wheels.
2. Remove the brake hose bracket from the knuckle.
3. Remove the caliper bolt B, and pivot the caliper up out of the way.



NOTE: Check the hoses and pin boots for damage and deterioration.

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

NOTE: When replacing the pads, replace the shim together with the pads as a set.

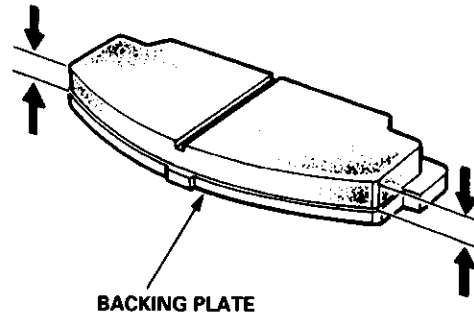


5. Using vernier calipers, measure the thickness of each brake pad lining. The measurement does not include the pad backing plate thickness.

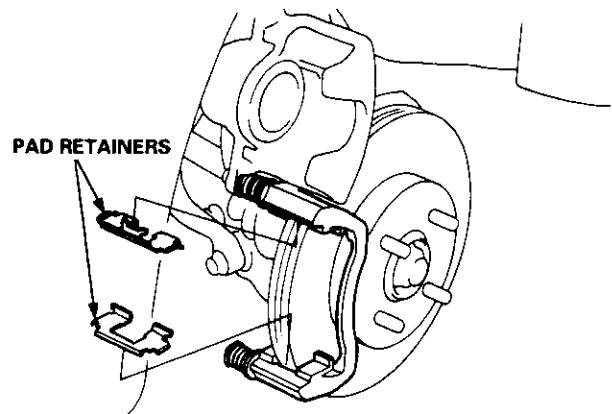
Brake Pad Thickness:

Standard: 8.5 – 9.5 mm (0.33 – 0.37 in)

Service Limit: 1.6 mm (0.06 in)



6. If the brake pad thickness is less than the service limit, replace the front pads as a set.
7. Clean the caliper thoroughly; remove any rust, and check for grooves and cracks.
8. Check the brake disc for damage and cracks.
9. Install the pad retainers.

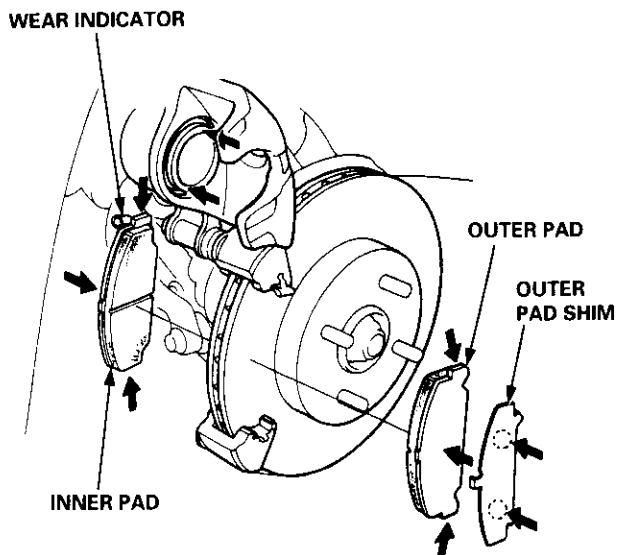




10. Apply grease to the points indicated by the arrows in the following illustration:

NOTE: Use the pad grease included in the pad set or Molykote M77 grease, and apply a thin coat of grease evenly to the designated points.

- Piston end and inner pad contact surface
- Pad and caliper bracket contact surface
- Outer pad and caliper body contact surface
- Outer pad shim and outer pad contact surface
- Outer pad shim and caliper body contact surface



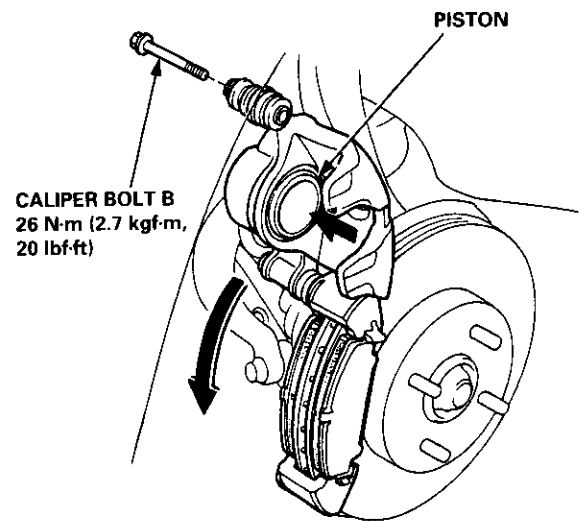
11. Install the brake pads and pad shim correctly.

⚠ WARNING

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

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

12. Push in the piston so that the caliper will fit over the pads. Make sure that the piston boot is in position to prevent damaging it when pivoting the caliper down.



13. Pivot the caliper down into position, then install caliper bolt B and tighten it.

14. Install the brake hose bracket on the knuckle.

NOTE: Inspect the brake hose for interference and twisting.

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

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.

16. After installation, check for leaks at hose and line joints and connections, and retighten if necessary.

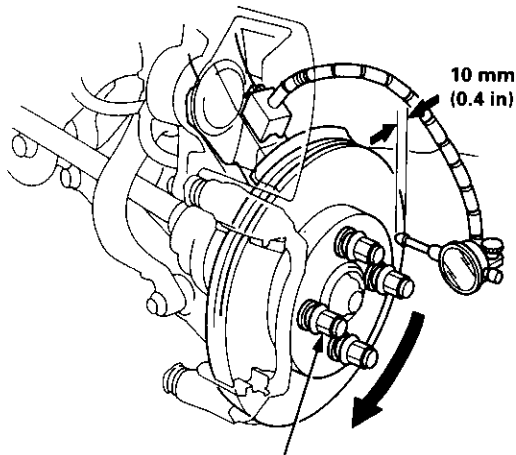
Front Brake Disc

Disc Runout Inspection

1. Loosen the front wheel nuts slightly, then raise the vehicle, and support it on safety stands. Remove the front wheels.
2. Remove the brake pads (see page 19-8).
3. Inspect the disc surface for damage and cracks. Clean the disc thoroughly and remove all rust.
4. Use wheel nuts and suitable plain washers to hold the disc securely against the hub, then mount a dial indicator as shown, and measure the runout at 10 mm (0.4 in) from the outer edge of the disc.

Brake Disc Runout:

Service Limit: 0.10 mm (0.004 in)



**WHEEL NUT AND
PLAIN WASHER**
108 N·m
(11 kgf·m, 80 lbf·ft)

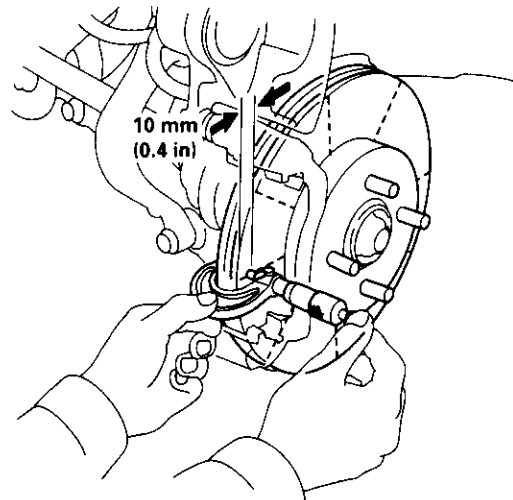
5. If the disc is beyond the service limit, refinish the brake disc with an on-car brake lathe. The Kwik-Lathe produced by Kwik-way Manufacturing Co. and the "Front Brake Disc Lathe" offered by Snap-on Tools Co. are approved for this operation.

Max. Refinish Limit: 19.0 mm (0.75 in)

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

Disc Thickness and Parallelism Inspection

1. Loosen the front wheel nuts slightly, then raise the vehicle, and support it on safety stands. Remove the front wheels.
2. Remove the brake pads (see page 19-8).
3. Using a micrometer, measure disc thickness at eight points, approximately 45° apart and 10 mm (0.4 in) in from the outer edge of the disc.



Brake Disc Thickness:

Standard: 20.9 – 21.8 mm (0.82 – 0.86 in)

Max. Refinishing Limit: 19.0 mm (0.75 in)

NOTE: Replace the brake disc if the smallest measurement is less than the max. refinishing limit.

Brake Disc Parallelism: 0.015 mm (0.0006 in) max.

NOTE: This is the maximum allowable difference between the thickness measurements.

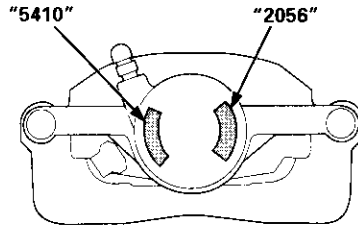
4. If the disc is beyond the service limit for parallelism, refinish the brake disc with an on-car brake lathe. The Kwik-Lathe produced by Kwik-Way Manufacturing Co. and the "Front Brake Disc Lathe" offered by Snap-on Tools Co. are approved for this operation.

NOTE: See section 18 for brake disc replacement.



Disassembly

NOTE: There are two types of front brake calipers: The caliper types can be identified by the "5410" or "2056" stamped on the caliper body as shown below. Check the type of the brake caliper before servicing.



5410 Type:

NOTE: For 2056 type disassembly procedures, see page 19-14.

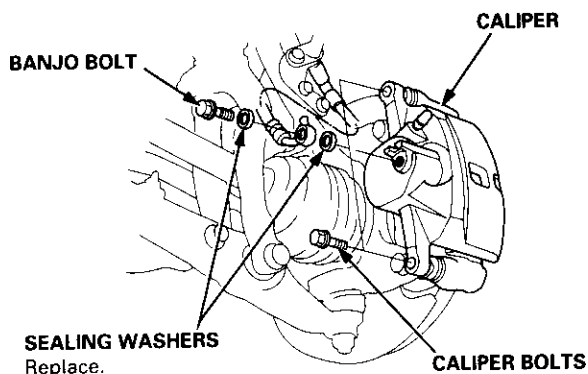
⚠ WARNING

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

CAUTION:

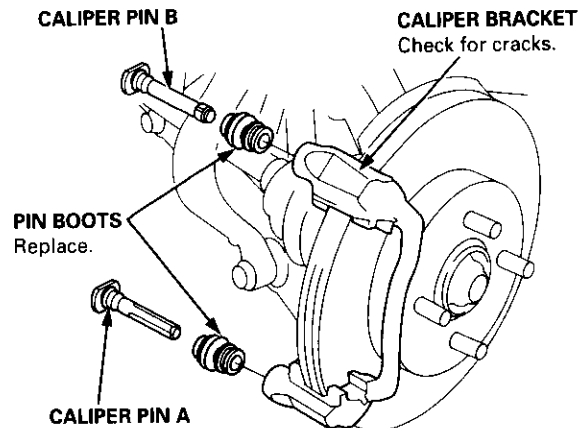
- Do not spill brake fluid on the vehicle; it may damage the paint; if brake fluid does contact the paint, wash it off immediately with water.
- To prevent spills, cover the hose joints with rags or shop towels.
- Clean all parts in brake fluid and air dry; blow out all passages with compressed air.

1. Remove the banjo bolt, and disconnect the brake hose from the caliper.



2. Remove the caliper bolts, then remove the caliper from the bracket.

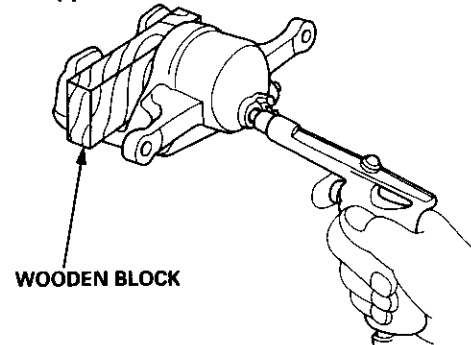
3. Remove the caliper pins and pin boots from the caliper bracket.



4. 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 spurts.

⚠ WARNING

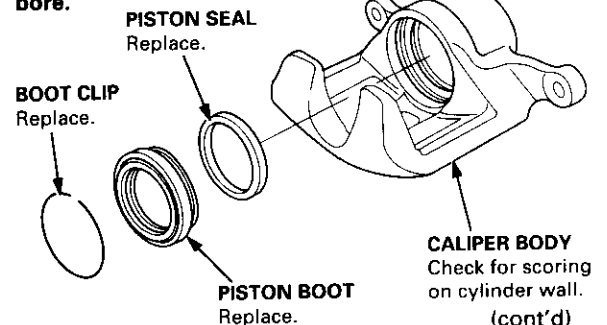
- Do not place your fingers in front of the piston.
- Do not use high air pressure; use an OSHA approved 30 PSI nozzle.



5. Remove the piston from the caliper, and check the piston for scoring.

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

CAUTION: Take care not to damage the cylinder bore.



Front Brake Caliper

Disassembly (cont'd)

2056 Type:

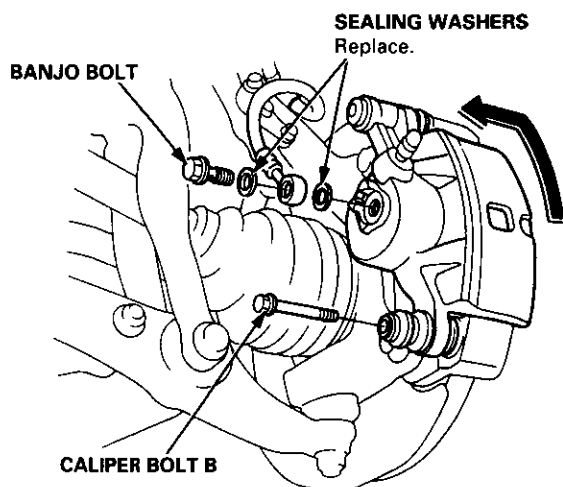
⚠ WARNING

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

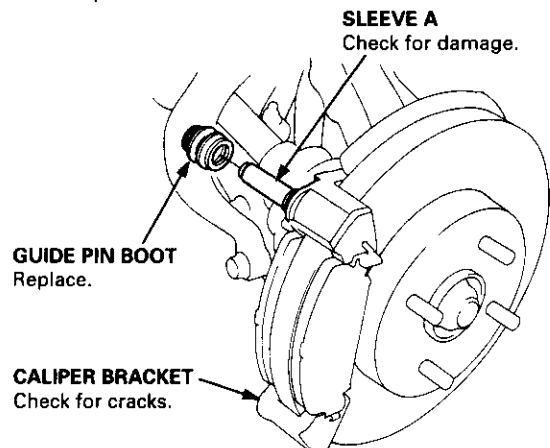
CAUTION:

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

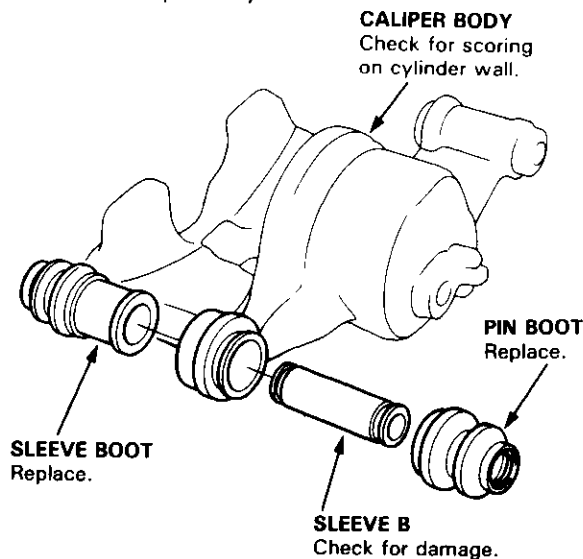
1. Remove the banjo bolt, and disconnect the brake hose from the caliper.



2. Remove caliper bolt B, pivot the caliper up out of the way, then remove the caliper from the bracket.
3. Remove the guide pin boot from sleeve A on the caliper bracket.



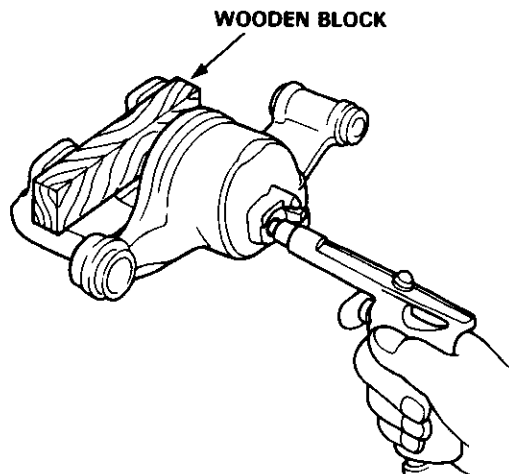
4. Remove the pin boot, sleeve B and sleeve boot from the caliper body.



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

⚠ WARNING

- Do not place your fingers in front of the piston.
- Do not use high air pressure; use an OSHA approved 30 PSI nozzle.

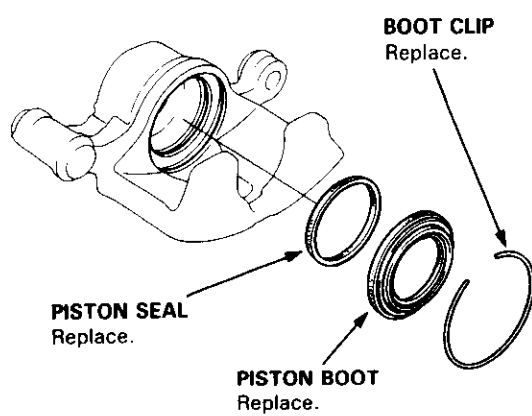


6. Remove the piston from the caliper, and check the piston for scoring.



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

CAUTION: Take care not to damage the cylinder bore.



Front Brake Caliper

Reassembly

5410 Type:

NOTE: For 2056 type reassembly procedures, see page 19-18.

⚠ WARNING

- Never use an air hose or dry brush to clean brake assemblies.
- Use an OSHA approved vacuum cleaner to avoid breathing brake dust.
- Contaminated brake discs or pads reduce stopping ability.
- When reusing the pads, always reinstall the brake pads in their original positions to prevent loss of braking efficiency.


CAUTION:

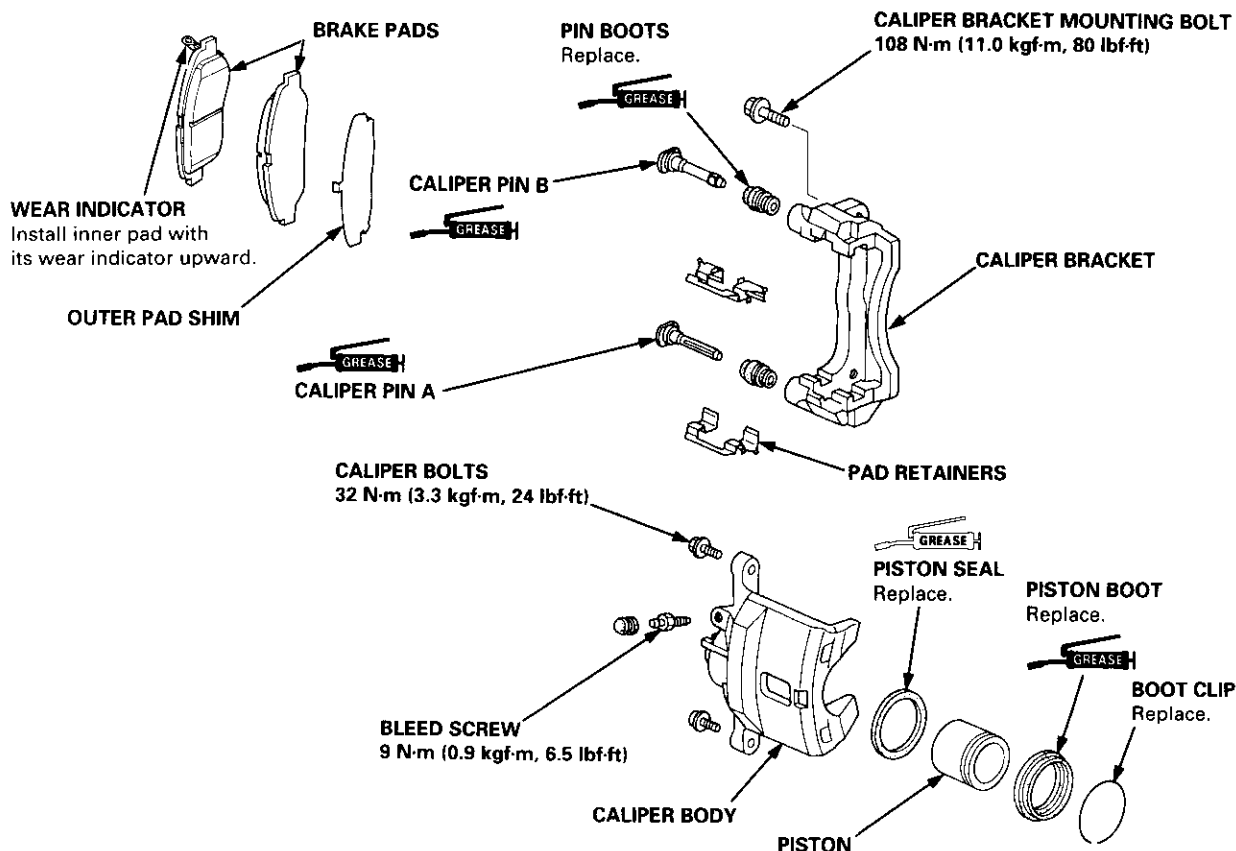
- Do not spill brake fluid on the vehicle; it may damage the paint; if brake fluid does contact the paint, wash it off immediately with water.
- Clean all parts in brake fluid and air dry; blow out all passages with compressed air.
- Before reassembling, check that all parts are free of dust and other foreign particles.
- Replace parts with new ones whenever specified to do so.
- Make sure no dirt or other foreign matter is allowed to contaminate the brake fluid.
- Always use Genuine Honda DOT 3 Brake Fluid. Using a non-Honda brake fluid can cause corrosion and decrease the life of the system.

NOTE:

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

 GREASE: Use recommended rubber grease in the caliper seal set.

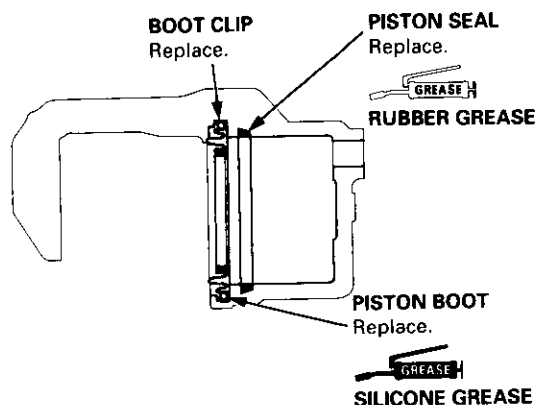
 GREASE: Use recommended seal grease in the caliper seal set.



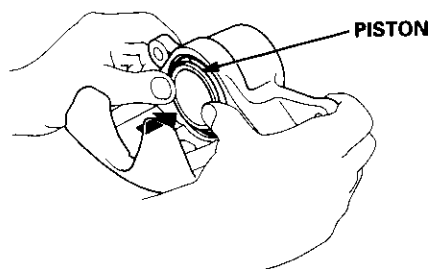


1. Clean the piston and caliper bore with brake fluid, and inspect for wear and damage.
2. Coat the new piston seal with the recommended rubber grease in the caliper seal set, and install the seal in the cylinder groove.
3. Apply the recommended seal grease in the caliper seal set to the sealing lips and inside of a new piston boot, and securely install it in the caliper with the new boot clip.

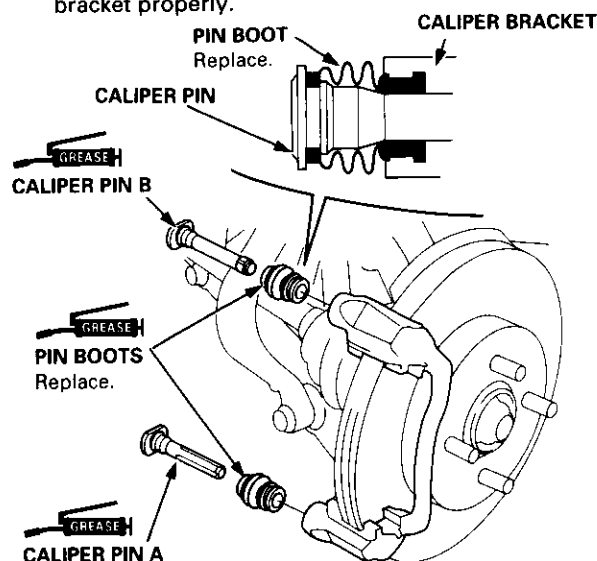
CAUTION: Be careful not to damage the caliper cylinder wall.



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



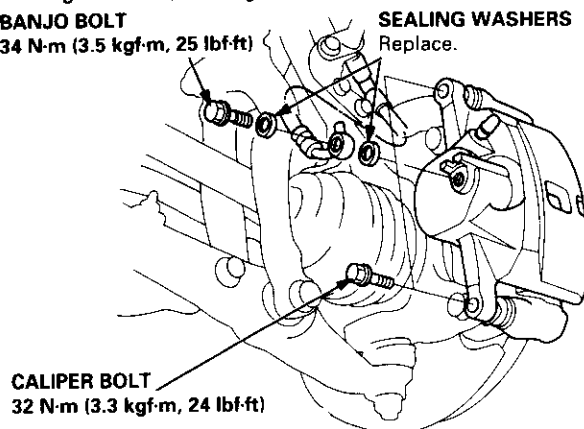
5. Apply the recommended seal grease in the caliper seal set to the sliding surface of the pins and the inside of the new pin boots.
6. Install the pin boots into the grooves in the caliper bracket properly.



7. Insert pin A and pin B into the caliper bracket.
8. Install the pin boots into the grooves in the pins properly.
9. Install the brake pads in their original positions (see page 19-9).
10. Push in the piston so that the caliper will fit over the pads, and install the caliper.
11. Tighten the caliper bolts.
12. Connect the brake hose to the caliper with new sealing washers, and tighten the banjo bolt.

BANJO BOLT
34 N·m (3.5 kgf·m, 25 lbf·ft)

SEALING WASHERS
Replace.



13. Fill the brake reservoir, and bleed the brake system (see page 19-7).
14. Perform the following checks:
 - Check for leaks at hose and line joints and connections, and retighten if necessary.
 - Check for brake hoses for interference and twisting.

(cont'd)

Front Brake Caliper

Reassembly (cont'd)

2056 Type:

⚠ WARNING

- Never use an air hose or dry brush to clean brake assemblies.
- Use an OSHA approved vacuum cleaner to avoid breathing brake dust.
- Contaminated brake discs or pads reduce stopping ability.
- When reusing the pads, always reinstall the brake pads in their original positions to prevent loss of braking efficiency.

CAUTION:

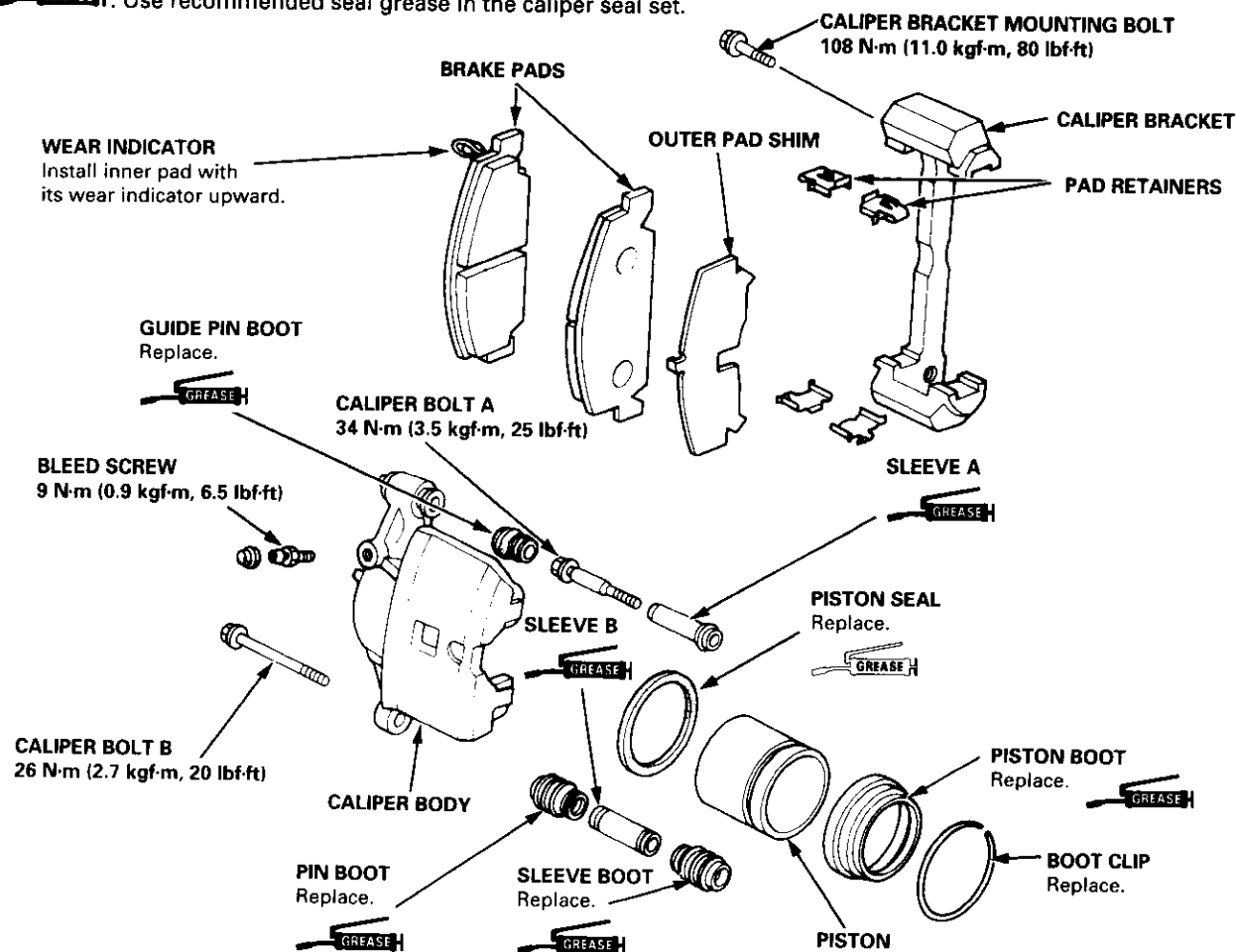
- Do not spill brake fluid on the vehicle; it may damage the paint; if brake fluid does contact the paint, wash it off immediately with water.
- Clean all parts in brake fluid and air dry; blow out all passages with compressed air.
- Before reassembling, check that all parts are free of dust and other foreign particles.
- Replace parts with new ones whenever specified to do so.
- Make sure no dirt or other foreign matter is allowed to contaminate the brake fluid.
- Always use Genuine Honda DOT 3 Brake Fluid. Using a non-Honda brake fluid can cause corrosion and decrease the life of the system.

NOTE:

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

: Use recommended rubber grease in the caliper seal set.

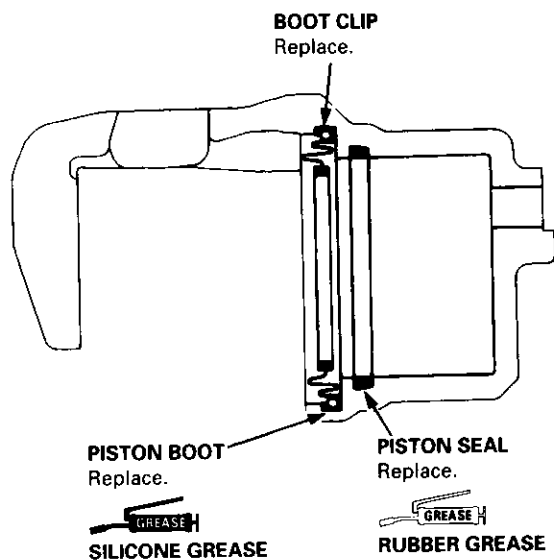
: Use recommended seal grease in the caliper seal set.



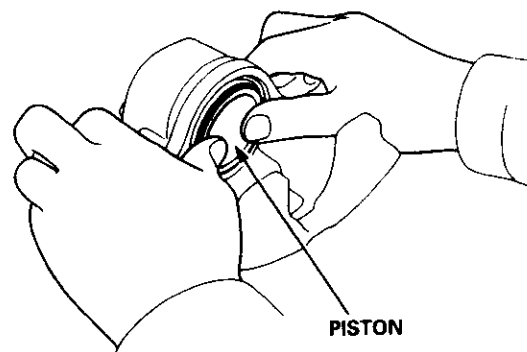


1. Clean the piston and caliper bore with brake fluid, and inspect for wear and damage.
2. Coat a new piston seal with the recommended rubber grease in the caliper seal set, and install the seal in the cylinder groove.
3. Apply the recommended seal grease in the caliper seal set to the sealing lips and inside of a new piston boot, and securely install it in the caliper with a new boot clip.

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

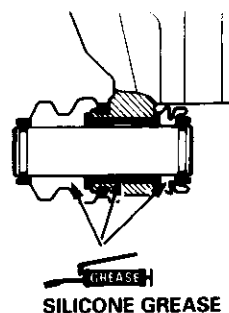
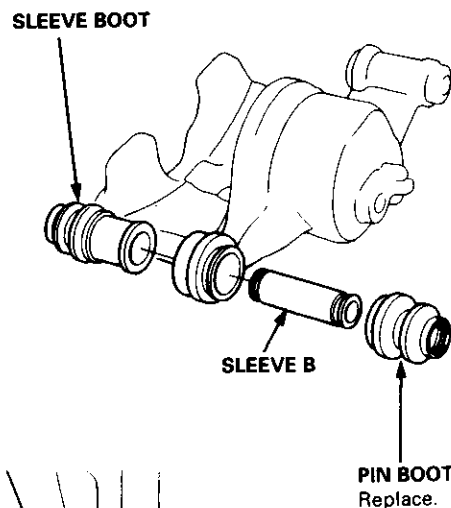


4. Lubricate the caliper and piston with brake fluid, then install the piston in the cylinder with the dished end facing in.



5. Apply the recommended seal grease in the caliper seal set to the sliding surface of sleeve B and the inside of the new pin and sleeve boots.
6. Install the new sleeve and pin boots and sleeve B on the caliper.

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

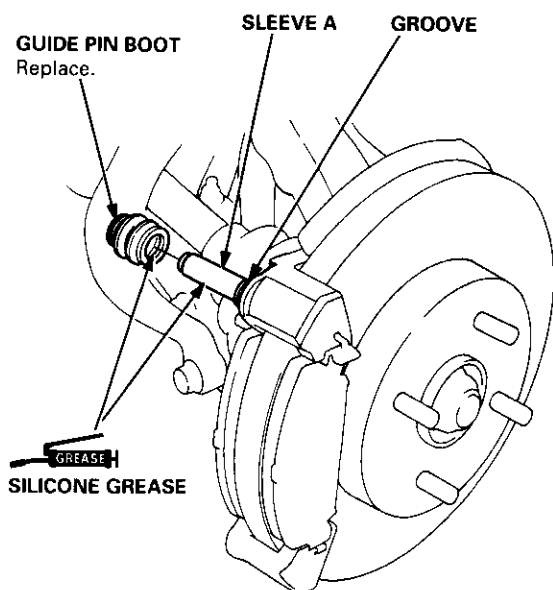


(cont'd)

Front Brake Caliper

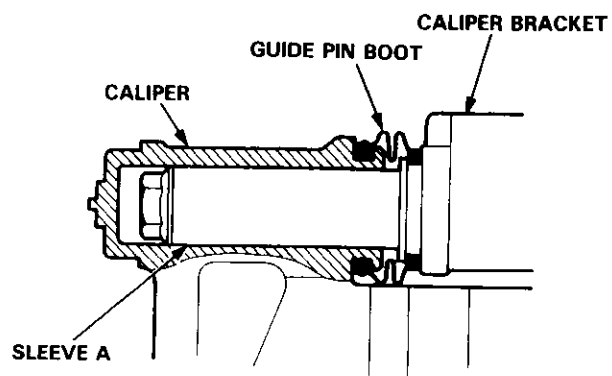
Reassembly (cont'd)

7. Apply the recommended seal grease in the caliper seal set to the sliding surface of sleeve A and the inside of a new guide pin boot.
8. Install the guide pin boot into the groove in the sleeve A.
9. Make sure that the brake pad retainers and brake pads are in their original positions (see page 19-10).



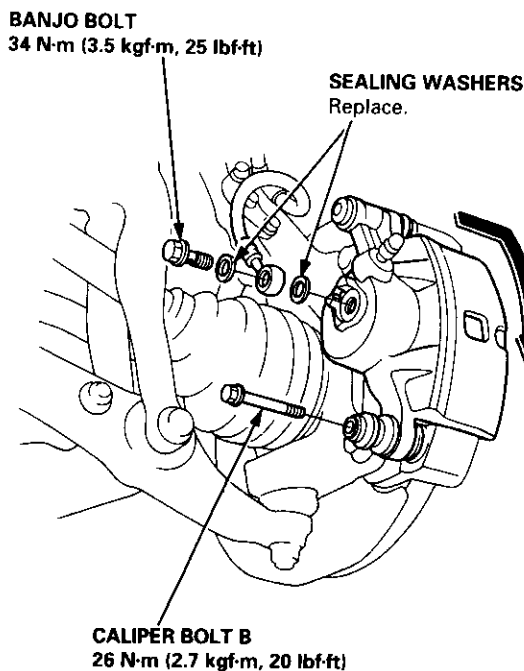
10. Install the caliper onto sleeve A, and pivot it down into position.

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



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

12. Tighten the caliper bolt B.



13. Fill the brake reservoir and bleed the brake system (see page 19-7).

14. Perform the following checks.

- Check for leaks at hose and line joints and connections, and retighten if necessary.
- Check for brake hoses for interference and twisting.

Master Cylinder/Brake Booster



Removal/Installation

CAUTION:

- Be careful not to bend or damage the brake lines when removing the master cylinder.
- Do not spill brake fluid on the vehicle; 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.

1. Disconnect the brake fluid level switch connectors.
2. Remove the reservoir cap from the master cylinder.
3. The brake fluid may be sucked out through the top of the master cylinder reservoir with a syringe.
4. Disconnect the brake lines from the master cylinder.
5. Remove the master cylinder mounting nuts and washers.
6. Remove the master cylinder from the brake booster.
7. Disconnect the vacuum hose from the brake booster.
8. Remove the cotter pin and clevis pin from the clevis.

CAUTION: Do not disconnect the clevis by removing it from the operating rod of the brake booster. If the clevis is loosened, adjust the pushrod length before installing the brake booster (see page 19-22).

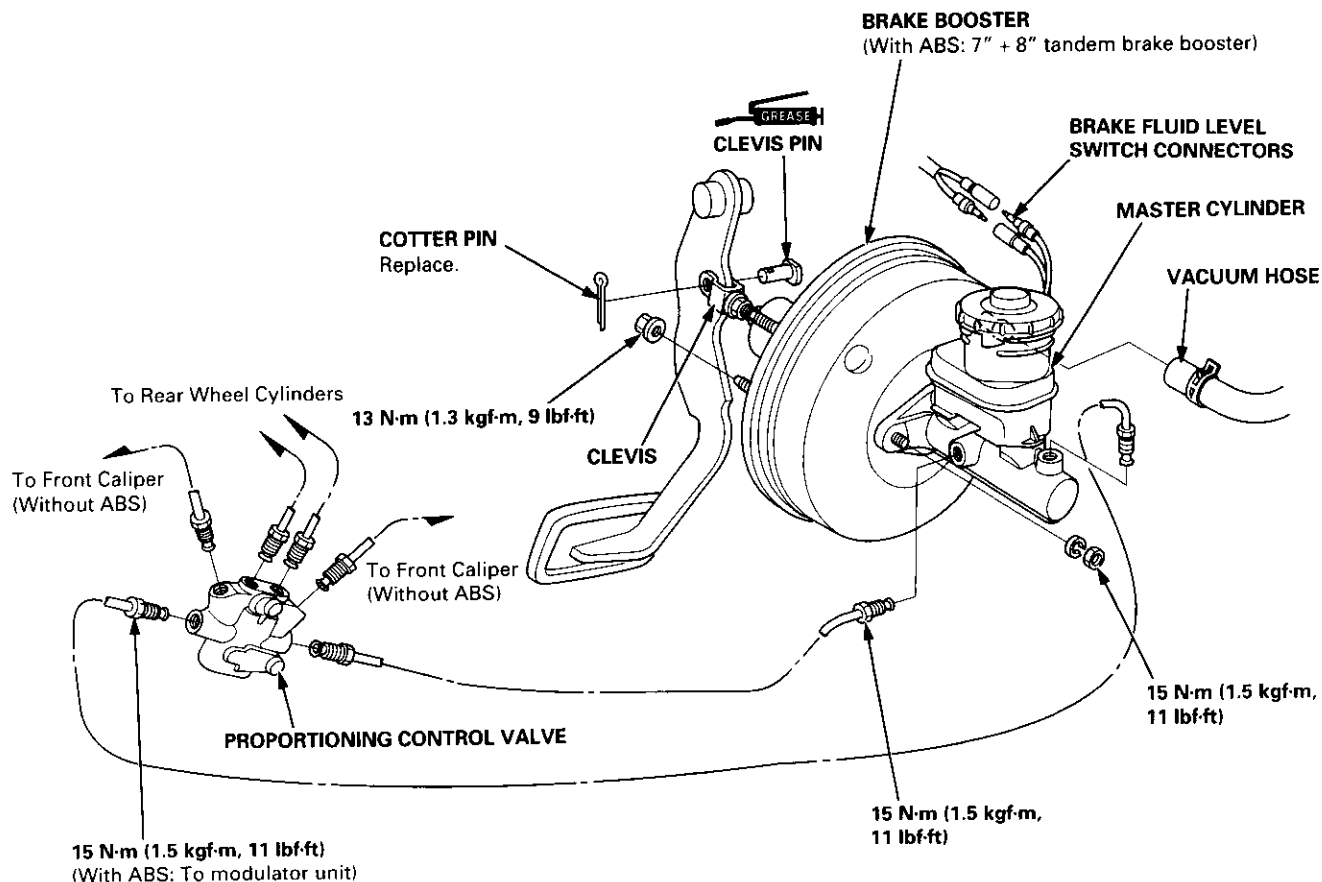
9. Remove the four booster mounting nuts.
10. Pull the brake booster forward until the clevis is clear of the bulkhead.
11. Remove the brake booster from the engine compartment.
12. Install the brake booster and master cylinder in the reverse order of removal.

CAUTION:

- When connecting the brake lines, make sure that there is no interference between the brake lines and other parts.
- Be careful not to bend or damage the brake lines when installing the master cylinder.

NOTE: If replacing the master cylinder or brake booster, check and adjust the pushrod clearance before installing the master cylinder (see page 19-22).

13. Fill the master cylinder reservoir, and bleed the brake system (see page 19-7).
14. After installation, check the brake pedal height and brake pedal free play (see page 19-5) and adjust if necessary.



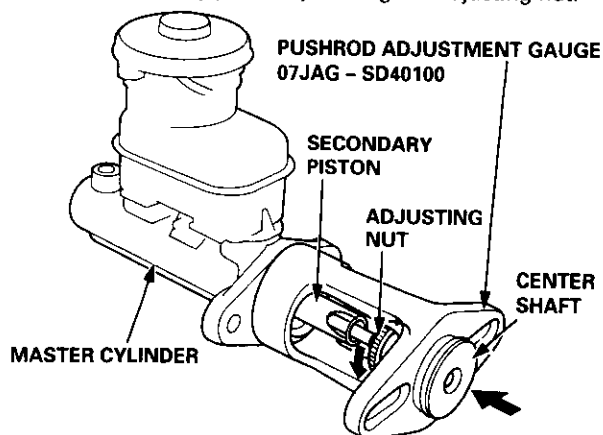
Master Cylinder/Brake Booster

Pushrod Clearance Adjustment

NOTE:

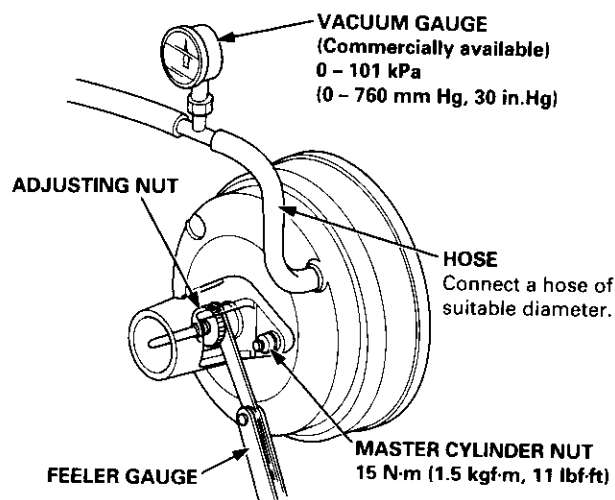
- The master cylinder pushrod-to-piston clearance must be checked and adjustments made, if necessary, before installing the master cylinder.
- ABS type is shown, conventional brake type is similar.

1. Set the special tool on the master cylinder body; push in the center shaft until the top of it contacts the end of the secondary piston by turning the adjusting nut.



2. Without disturbing the center shaft'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 – 101 kPa (0 – 760 mmHg, 30 in.Hg) to the booster's engine vacuum supply, and maintain an engine speed that will deliver 66 kPa (500 mmHg, 20 in.Hg) vacuum.
5. With a feeler gauge, measure the clearance between the gauge body and the adjusting nut as shown.

Clearance: 0 – 0.4 mm (0 – 0.02 in)



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

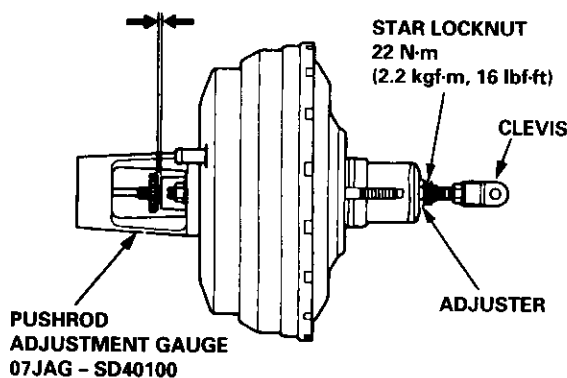
6. If clearance is incorrect, loosen the star locknut, and turn the adjuster in or out to adjust.

NOTE:

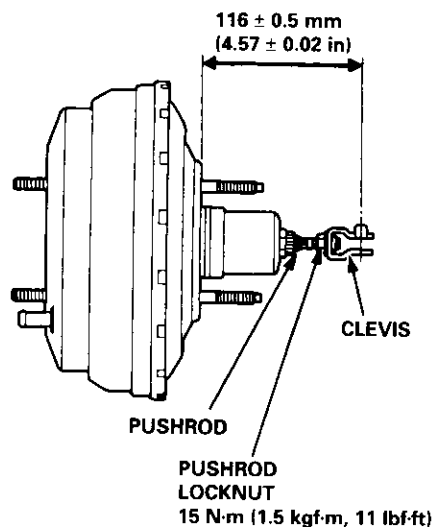
- Adjust the clearance while the specified vacuum is applied to the booster.
- Hold the clevis while adjusting.

7. Tighten the star locknut securely.

8. Remove the special tool.
0 – 0.4 mm (0 – 0.02 in)



9. Adjust the pushrod length as shown if the booster is removed.



10. Install the master cylinder (see page 19-21).



Brake Booster Inspection

Functional Test

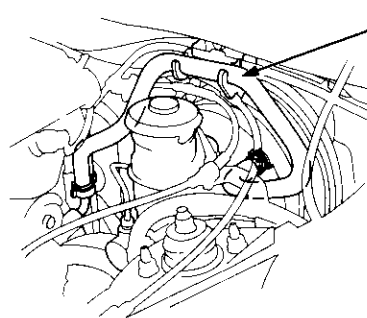
1. With the engine stopped, depress the brake pedal several times to deplete the vacuum reservoir, then depress the pedal hard and hold it for 15 seconds. If the pedal sinks, either the master cylinder is bypassing internally, or the brake system (master cylinder, lines, modulator, proportioning control valve, or caliper) is leaking.
2. Start the engine with the pedal depressed. If the pedal sinks slightly, the vacuum booster is operating normally. If the pedal height does not vary, the booster or check valve is faulty.
3. With the engine running, depress the brake pedal lightly. Apply just enough pressure to hold back automatic transmission creep. If the brake pedal sinks more than 25 mm (1.0 in.) in three minutes, the master cylinder is faulty. A slight change in pedal height when the A/C compressor cycles on and off is normal. (The A/C compressor load changes the vacuum available to the booster.)

Leak Test

1. Depress the brake pedal with the engine running, then stop the engine. If the pedal height does not vary while depressed for 30 seconds, the vacuum booster is OK. If the pedal rises, the booster is faulty.
2. With the engine stopped, depress the brake pedal several times using normal pressure. When the pedal is first depressed, it should be low. On consecutive applications, the pedal height should gradually rise. If the pedal position does not vary, check the booster check valve.

Booster 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. If no vacuum is available, the check valve is not working properly. Replace the brake booster vacuum hose and check valve, and retest.



**BRAKE BOOSTER
VACUUM HOSE**
(Check valve
built-in)

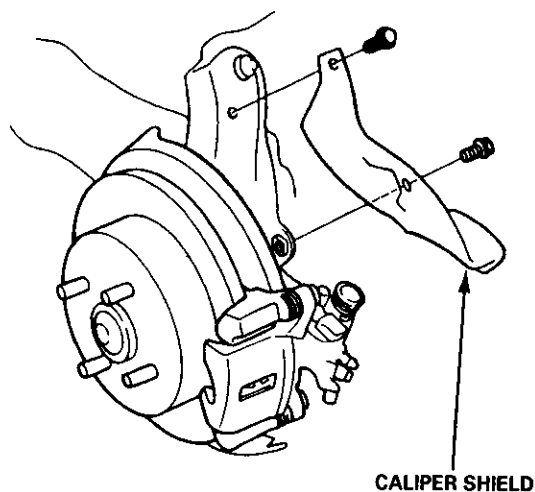
Rear Brake Pads

Inspection and Replacement

⚠ WARNING

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

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

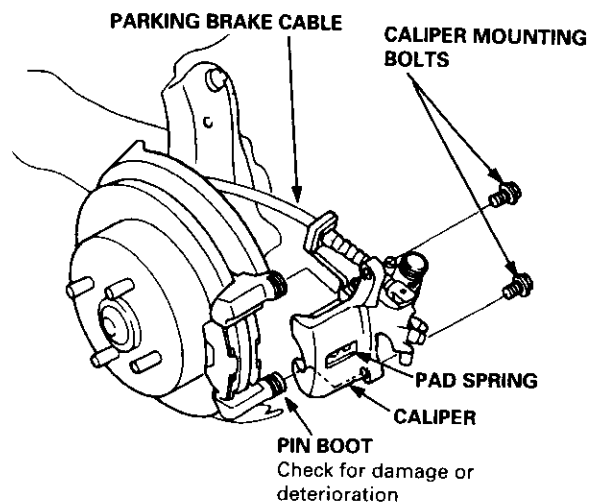


3. Remove the brake hose clamp bolt from the trailing arm first, then remove the two caliper mounting bolts and the caliper from the bracket.

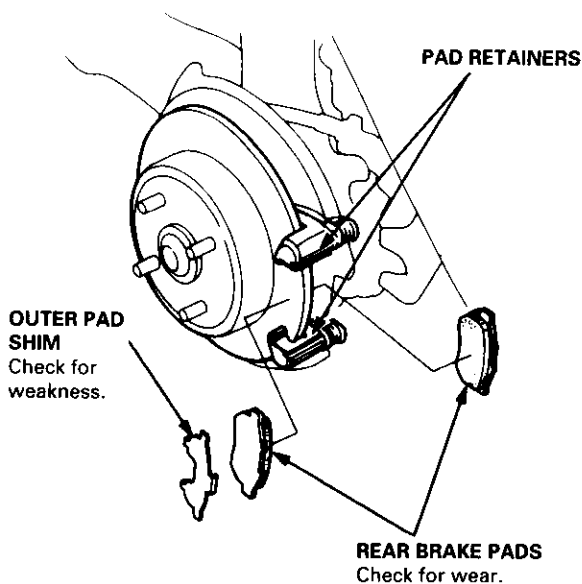
CAUTION:

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

NOTE: Check the hoses and pin boots for damage or deterioration.



4. Remove the outer pad shim, pads, and pad retainers.

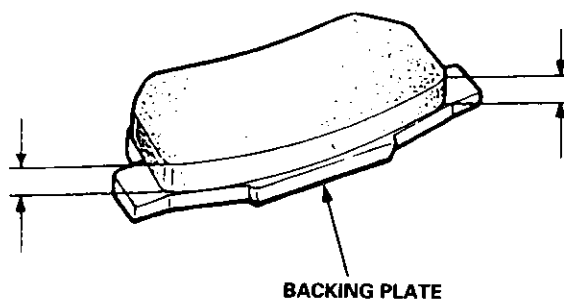


5. Using vernier calipers, measure the thickness of each brake pad lining. The measurement does not include the pad backing plate thickness.

Brake Pad Thickness:

Standard: 7.0 – 8.0 mm (0.28 – 0.31 in)

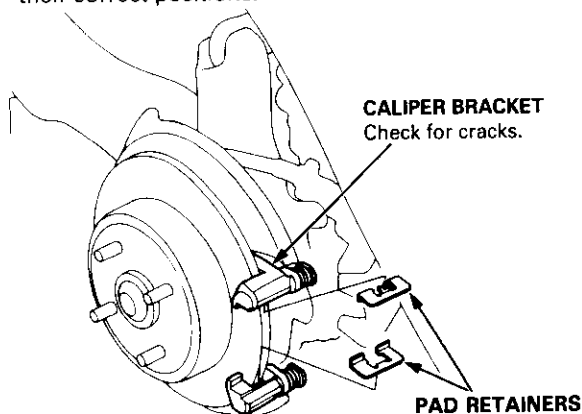
Service Limit: 1.6 mm (0.06 in)



6. If the pad thickness is less than the service limit, replace the pads and shims together as a set.



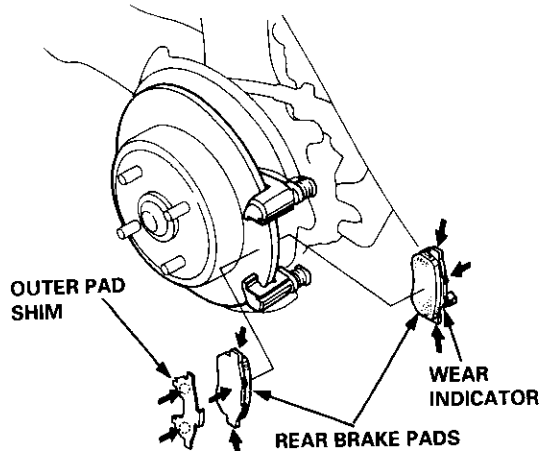
7. Clean the caliper thoroughly; remove any rust, and check for grooves and cracks.
8. Check the brake disc for damage and cracks.
9. Make sure that the pad retainers are installed in their correct positions.



10. Apply grease to the points indicated by the arrow in the following drawing:

NOTE: Use the pad grease included in the pad set or Molykote M77 grease, and apply a thin coat of grease evenly to the designated points.

- Piston end and inner pad contact surface
- Pad and caliper bracket contact surface
- Outer pad shim and outer pad contact surface
- Outer pad shim and caliper body contact surface



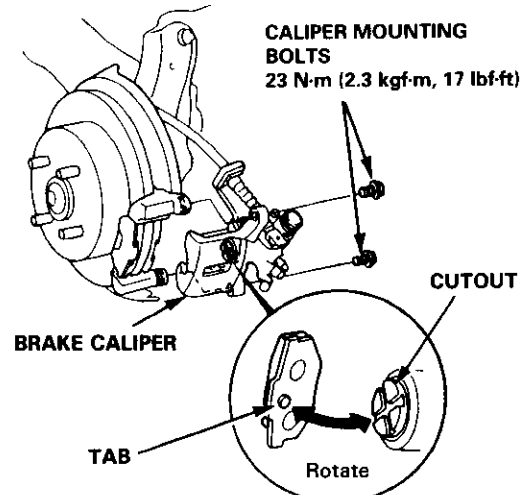
11. Install the brake pads and outer pad shim on the caliper bracket. Install the inner pad with its wear indicator facing downward.

⚠ WARNING

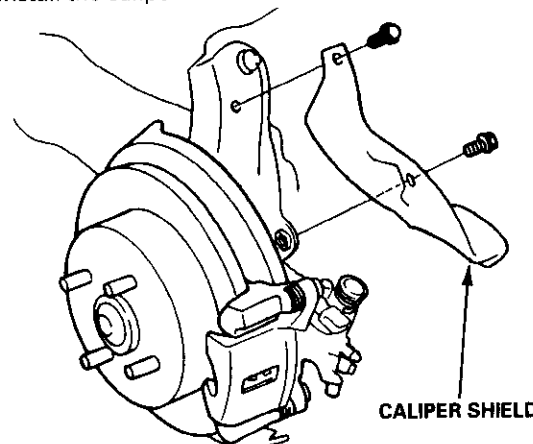
- When reusing the pads, always reinstall the brake pads in their original positions to prevent loss of braking efficiency.
- Contaminated brake discs or pads reduce stopping ability. Keep grease off the discs and pads.

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

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



13. Install the brake hose clamp on the trailing arm.
14. Install and tighten the caliper mounting bolts.
15. Install the caliper shield.



16. After installation, check for leaks at hose and line joints and connections, and retighten if necessary.
17. Depress the brake pedal several times to make sure the brakes work, then test-drive.

NOTE: Engagement of the brake may require greater pedal travel immediately after the brake pads have been replaced as a set. Several light applications of the brake pedal will restore the normal pedal travel. Greater than normal pedal travel may damage the master cylinder.

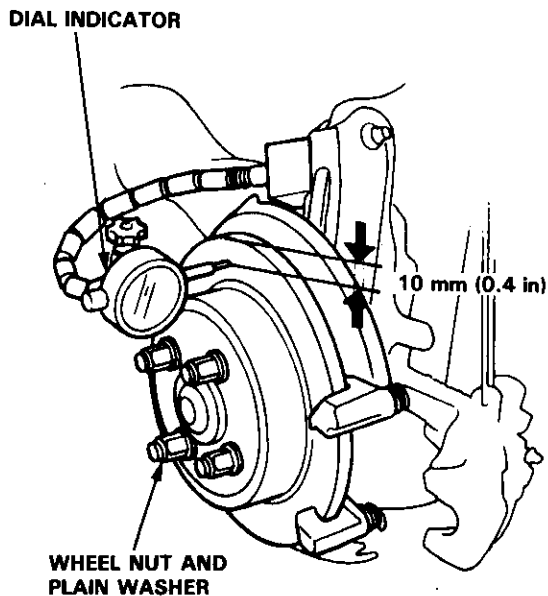
Rear Brake Disc

Disc Runout Inspection

1. Loosen the front wheel nuts slightly, then raise the vehicle, and support it on safety stands. Remove the front wheels.
2. Remove the brake pads (see page 19-24).
3. Inspect the disc surface for damage and cracks. Clean the disc thoroughly, and remove all rust.
4. Use wheel nuts and suitable plain washers to hold the disc securely against the hub, then mount a dial indicator as shown, and measure the runout at 10 mm (0.4 in) from the outer edge of the disc.

Brake Disc Runout:

Service Limit: 0.10 mm (0.004 in)



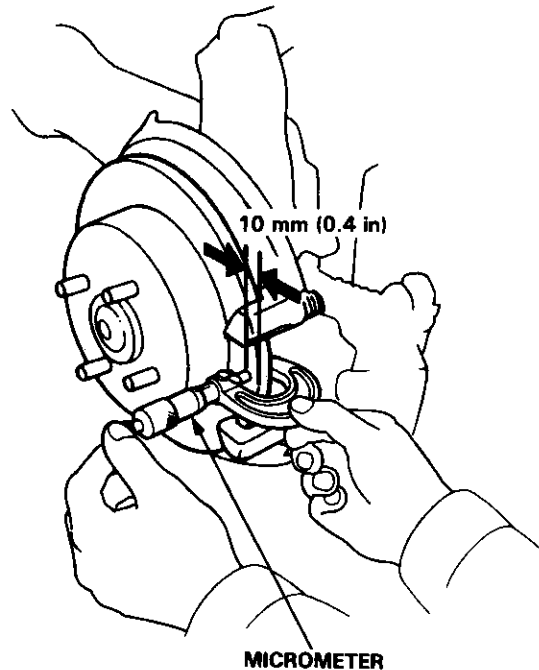
5. If the disc is beyond the service limit, refinish the brake disc.

Max. Refinishing Limit: 8.0 mm (0.31 in)

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

Disc Thickness and Parallelism Inspection

1. Loosen the front wheel nuts slightly, then raise the vehicle, and support it on safety stands. Remove the front wheels.
2. Remove the brake pads (see page 19-24).
3. Using a micrometer, measure disc thickness at eight points, approximately 45° apart and 10 mm (0.4 in) in from the outer edge of the disc. Replace the brake disc if the smallest measurement is less than the max. refinishing limit.



Brake Disc Thickness:

Standard: 8.9 – 9.1 mm (0.350 – 0.358 in)

Max. Refinishing Limit: 8.0 mm (0.31 in)

Brake Disc Parallelism: 0.015 mm

(0.0006 in) max.

NOTE: This is the maximum allowable difference between the thickness measurements.

4. If the disc is beyond the service limit for parallelism, refinish the brake disc.

NOTE: See section 18 for brake disc replacement.

Rear Brake Caliper



Disassembly

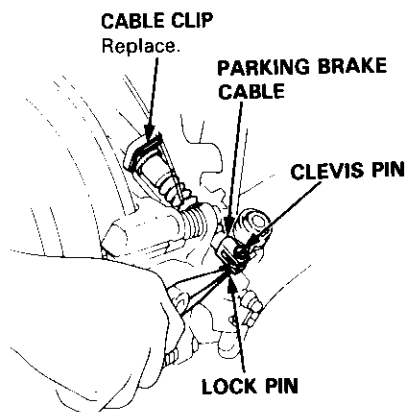
⚠ WARNING

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

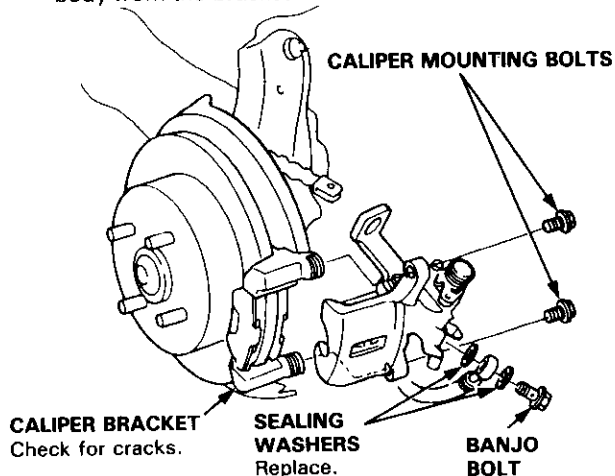
CAUTION:

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

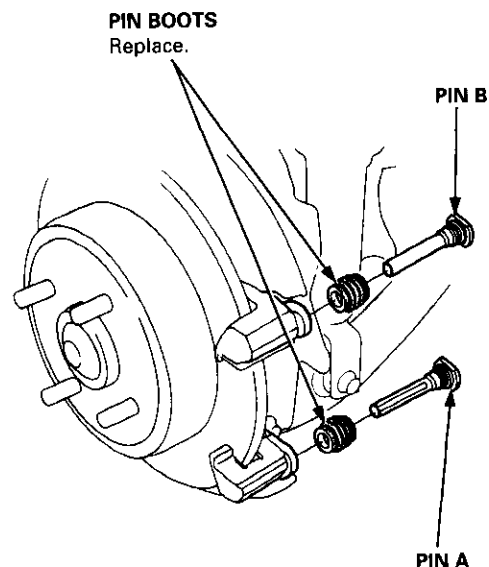
1. Remove the caliper shield (see page 19-24).
2. Remove the lock pin and clevis pin. Remove the cable clip, and disconnect the cable from the arm.



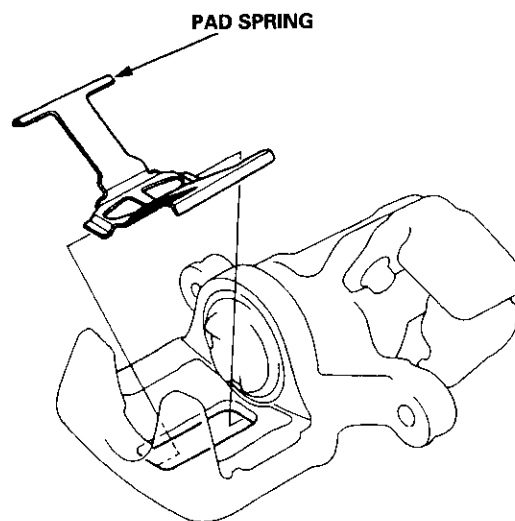
3. Remove the banjo bolt and two sealing washers.
4. Remove the two caliper mounting bolts and caliper body from the bracket.



5. Remove the pins and pin boots from the caliper bracket.



6. Remove the pad spring from the caliper body.



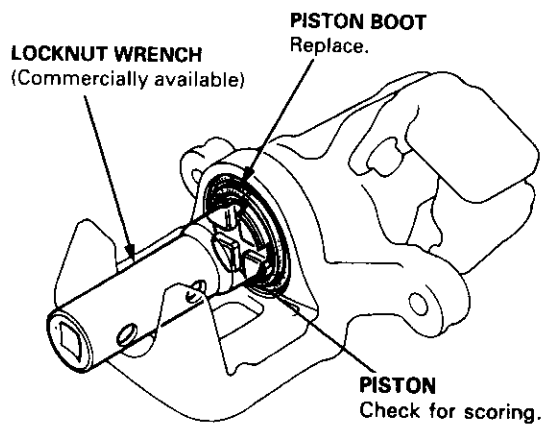
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Rear Brake Caliper

Disassembly (cont'd)

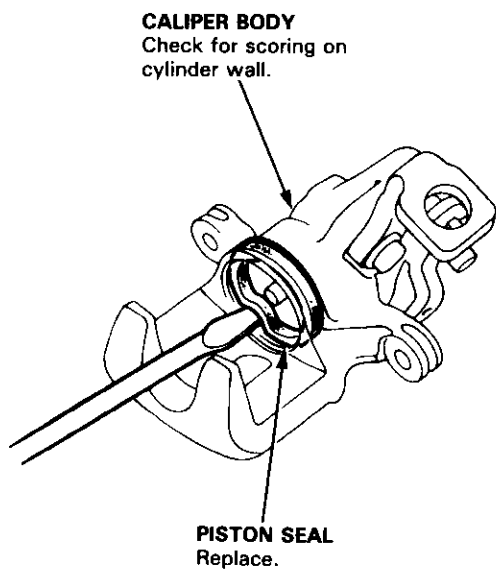
7. Remove the piston by rotating the piston counter-clockwise with the tool, and remove the piston boot.

CAUTION: Avoid damaging the piston.



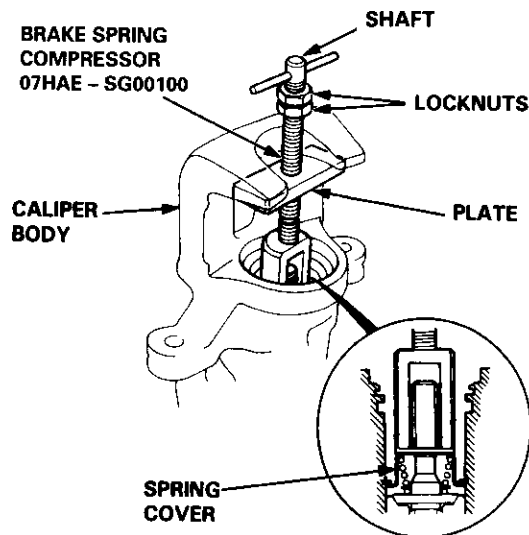
8. Remove the piston seal.

CAUTION: Take care not to damage the cylinder bore.



9. Install the special tool between the caliper body and spring cover.

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

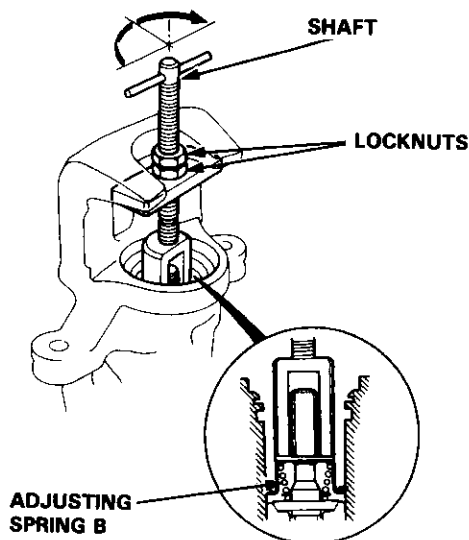


10. Position the locknuts as shown, then turn the shaft until the plate just contacts the caliper body.

NOTE: Do not compress the spring under the spring cover.

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

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

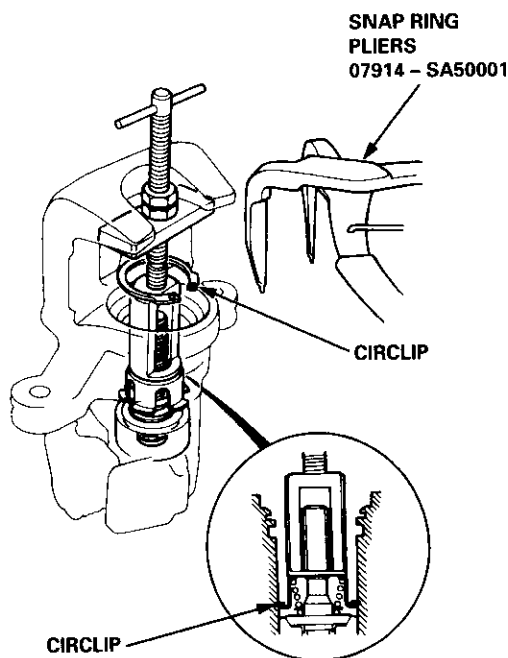




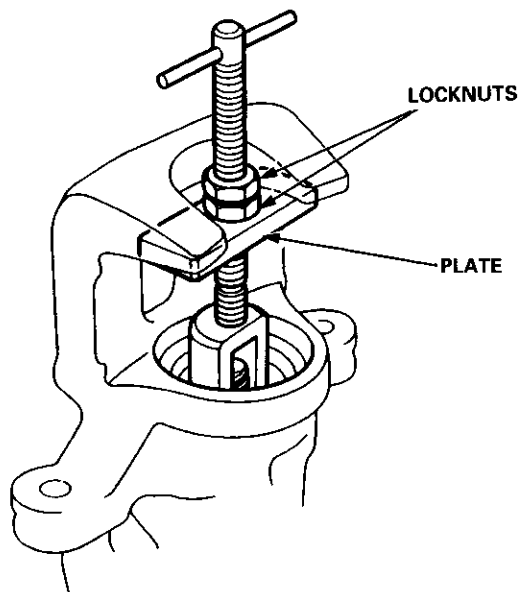
12. Lower the locknuts fully, and tighten them securely.

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

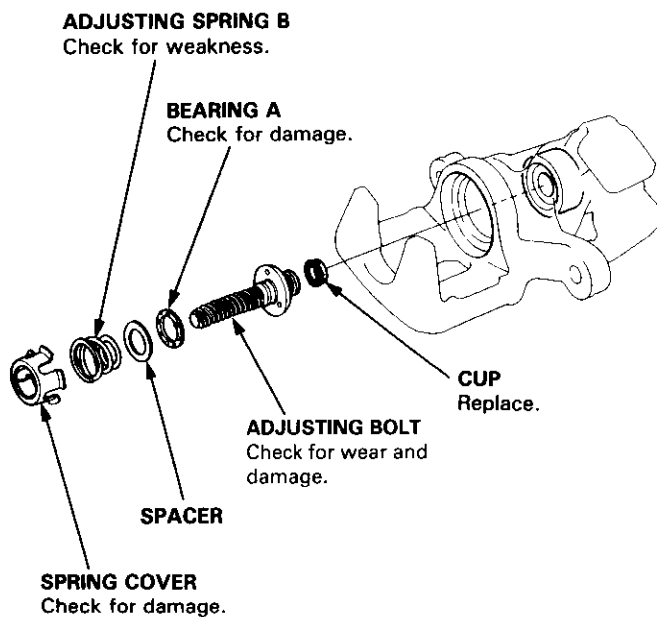
13. Remove the circlip with snap ring pliers.



14. Hold the plate with your fingers, and turn the shaft counterclockwise. Remove the special tool from the caliper.

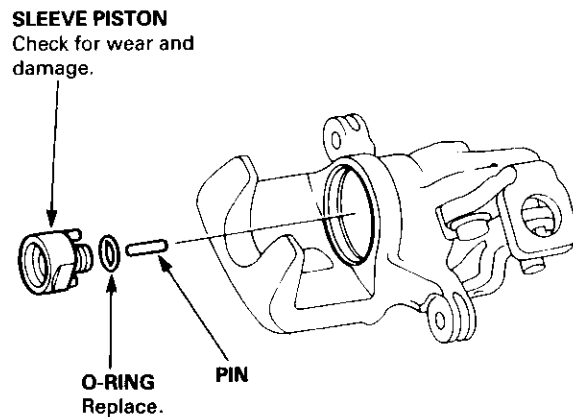


15. Remove the adjusting bolt.



16. Remove the spring cover, adjusting spring B, spacer, bearing A, and cup from the adjusting bolt.

17. Remove the sleeve piston, and remove the pin from the cam in the caliper body.

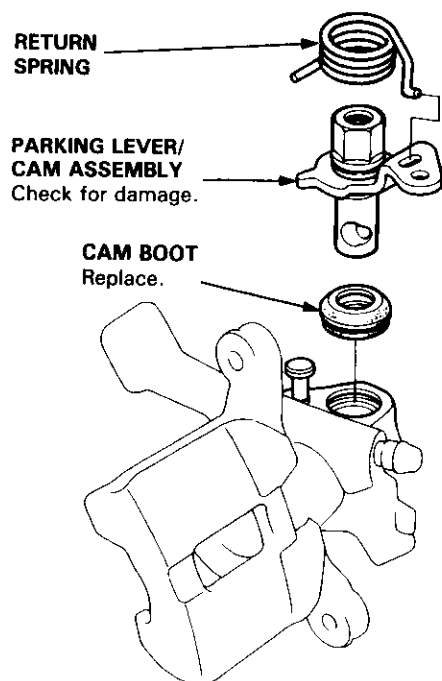


(cont'd)

Rear Brake Caliper

Disassembly (cont'd)

18. Remove the return spring.



19. Remove the parking lever and cam as an assembly from the caliper body.

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

20. Remove the cam boot.



Reassembly



⚠ WARNING

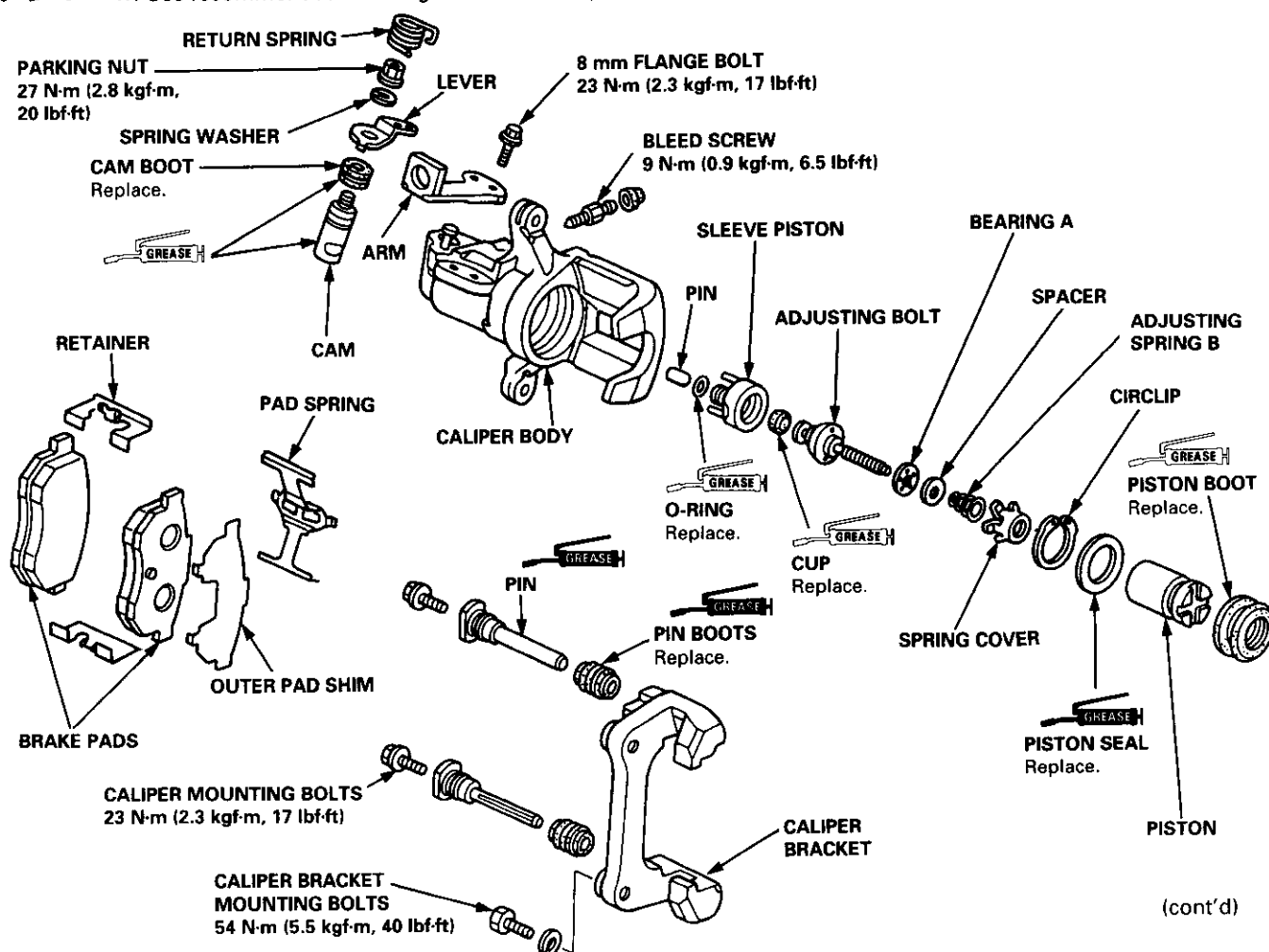
- Never use an air hose or dry brush to clean brake assemblies.
- Use an OSHA-approved vacuum cleaner to avoid breathing brake dust.
- Contaminated brake discs or pads reduce stopping ability.
- When reusing the pads, install them in their original positions to prevent loss of braking efficiency.

CAUTION:

- Do not spill brake fluid on the vehicle; It may damage the paint; if brake fluid does contact the paint, wash it off immediately with water.
- Clean all parts in brake fluid and air dry; blow out all passages with compressed air.
- Before reassembling, check that all parts are free of dust and other foreign particles.
- Replace parts with new ones whenever specified to do so.
- Make sure no dirt or other foreign matter is allowed to contaminate the brake fluid.
- Always use Genuine Honda DOT 3 Brake fluid. Using a non-Honda brake fluid can cause corrosion and decrease the life of the system.

NOTE:

- Coat piston, piston seal, and caliper bore with clean brake fluid.
- Replace all rubber parts with new ones whenever disassembled.
- : Use recommended silicone and pin greases in the caliper seal set.
- : Use recommended rubber grease in the caliper seal set.

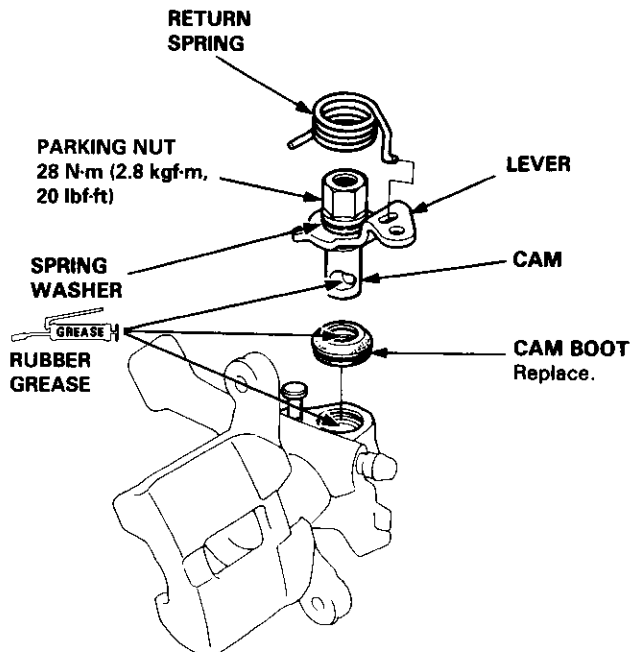


(cont'd)

Rear Brake Caliper

Reassembly (cont'd)

1. Pack all cavities of the needle bearing with the recommended rubber grease in the caliper seal set.
2. Coat a new cam boot with recommended rubber grease in the caliper seal set, and install it in the caliper body.

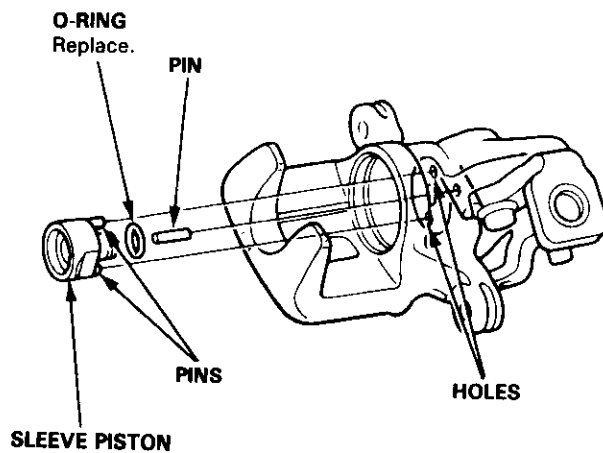


3. Apply recommended rubber grease in the caliper seal set to the pin contacting area of the cam, and install the cam and lever assembly into the caliper body.
4. Install the return spring.

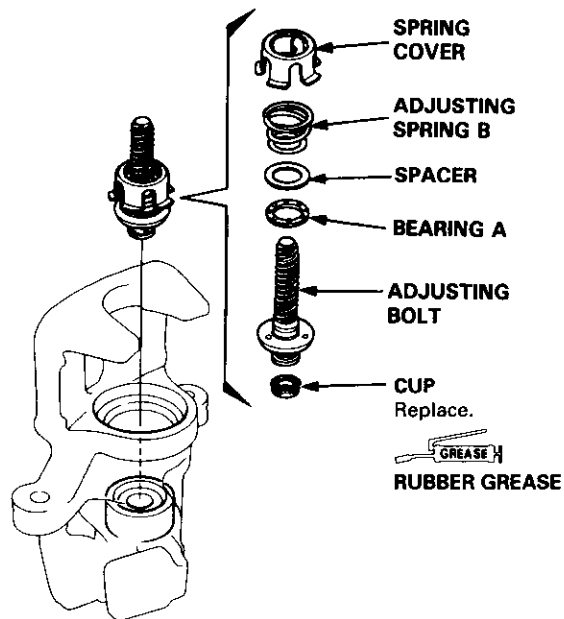
CAUTION:

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

5. Install the pin in the cam.



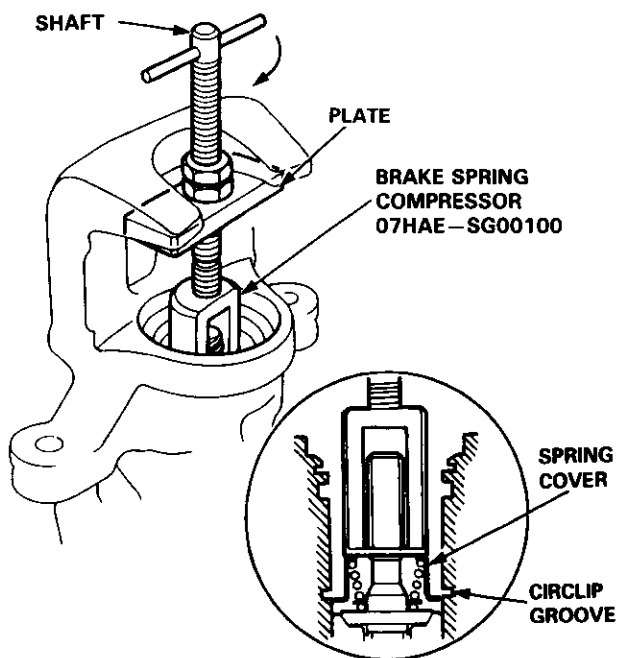
6. Install a new O-ring on the sleeve piston.
7. Install the sleeve piston so that the hole in the bottom of the piston is aligned with the pin in the cam, and the two pins on the piston are aligned with the holes in the caliper.
8. Coat a new cup with recommended rubber grease in the caliper seal set, and install it with its groove facing the bearing A side of the adjusting bolt.



9. Fit the bearing A, spacer, adjusting spring B, and spring cover on the adjusting bolt, and install them in the caliper cylinder.

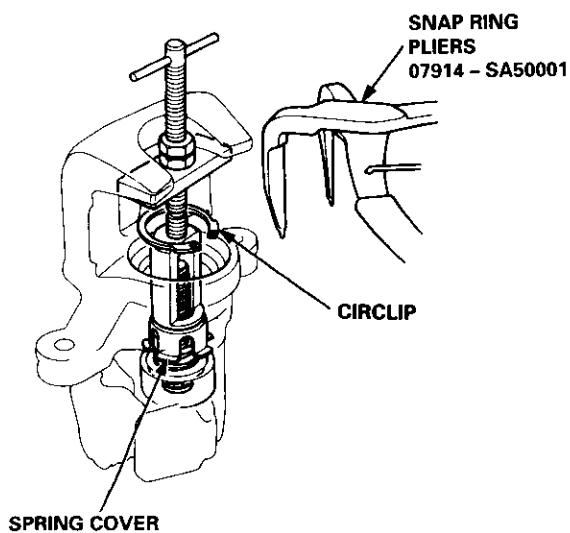


10. Install the special tool onto the spring cover, and turn the shaft until the locknut contacts the plate.

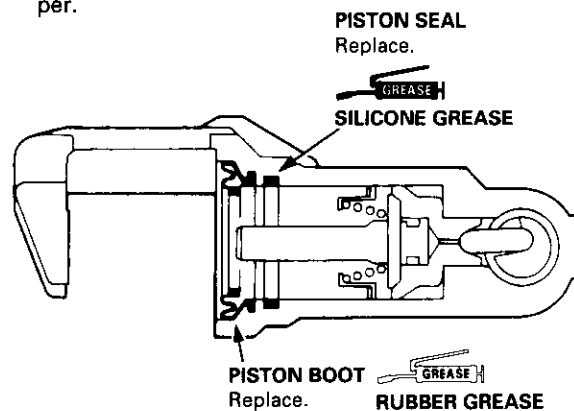


11. Check that the flared end of the spring cover is below the circlip groove.
12. Install the circlip into the groove, then remove the special tool.

NOTE: Check that the circlip is seated in the groove properly.



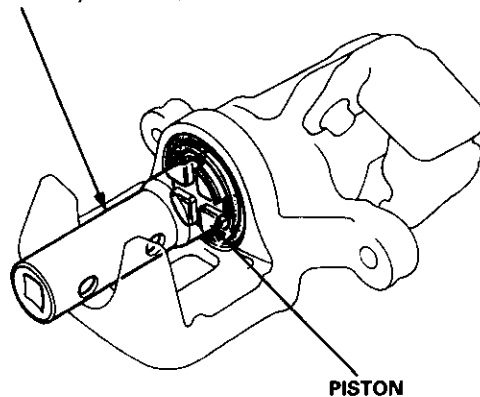
13. Coat a new piston seal with recommended silicone grease in the caliper seal set, and install it in the caliper.



14. Apply recommended rubber grease in the caliper seal set to the sealing lips and inside of a new piston boot, and install it in the caliper.
15. Coat the outside of the piston with brake fluid, and install it onto the adjusting bolt while rotating it clockwise with the tool.

CAUTION: Avoid damaging the piston and piston boot.

LOCKNUT WRENCH
(Commercially available)

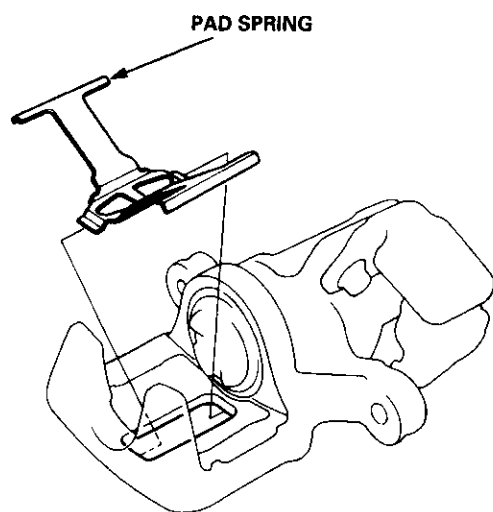


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Rear Brake Caliper

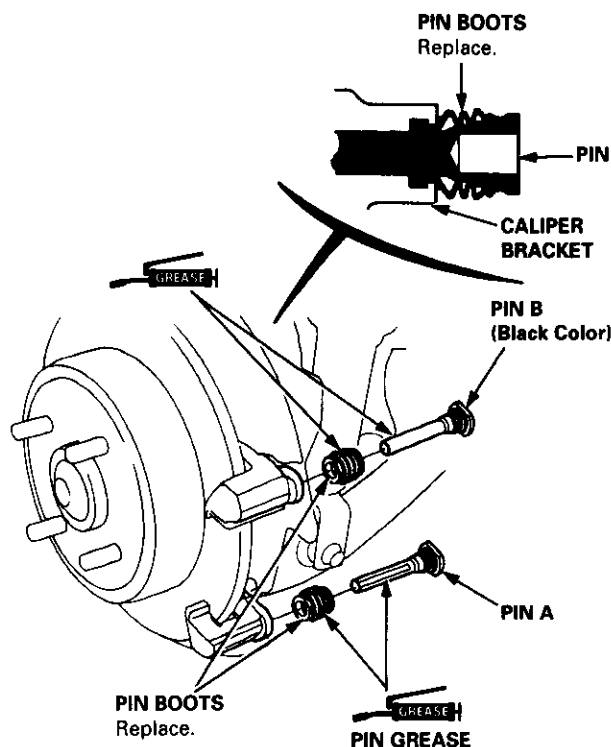
Reassembly (cont'd)

16. Install the pad spring onto the caliper.



17. Apply the recommended pin grease in the caliper seal set to the sliding surface of the pins and inside of the new pin boots.

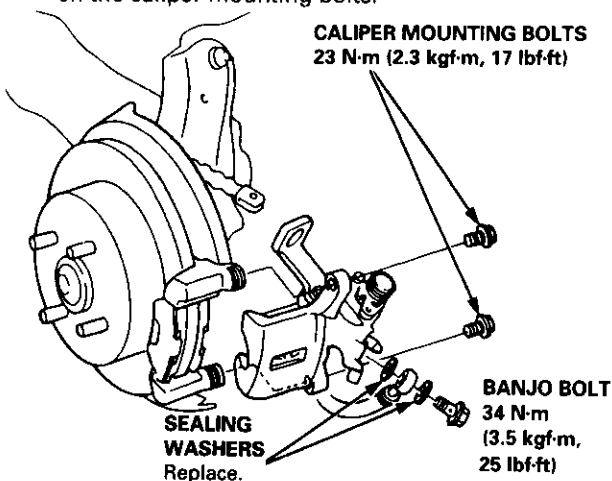
18. Install the pin boots into the grooves in the caliper bracket properly.



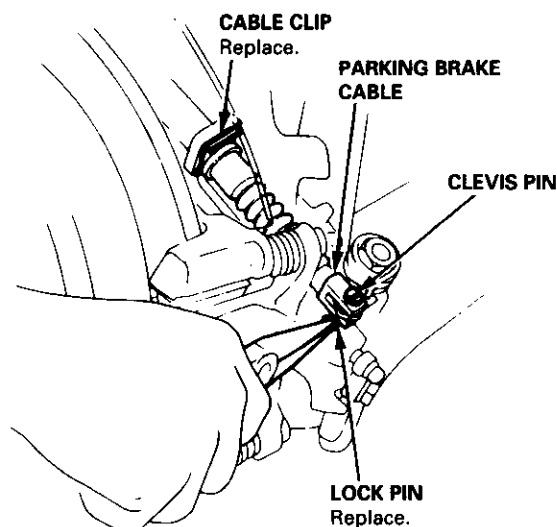
19. Insert pin A and pin B into the caliper bracket.

20. Install the pin boots into the grooves in the pins properly.

21. Install the brake pad retainers and brake pads (see page 19-25).
22. Align the cutout in the piston with the tab on the inner pad (see page 19-25).
23. Install the caliper onto the caliper bracket, and tighten the caliper mounting bolts.



24. Connect the brake hose to the caliper with new sealing washers, and tighten the banjo bolt.
25. Insert the cable through the arm, and connect the cable to the lever with the clevis pin and lock pin. Install the cable clip securely.



26. Install the caliper shield.
27. Fill the brake reservoir, and bleed the brake system (see page 19-7).
28. Operate the brake pedal several times, then adjust the parking brake (see page 19-6).
29. After installation, perform the following checks:
- Check for leaks at hose and line joints and connections, and retighten if necessary.
 - Check the parking brake lever for operation, and adjust it if necessary.
 - Check for brake hose for interference or twisting.

Rear Drum Brake

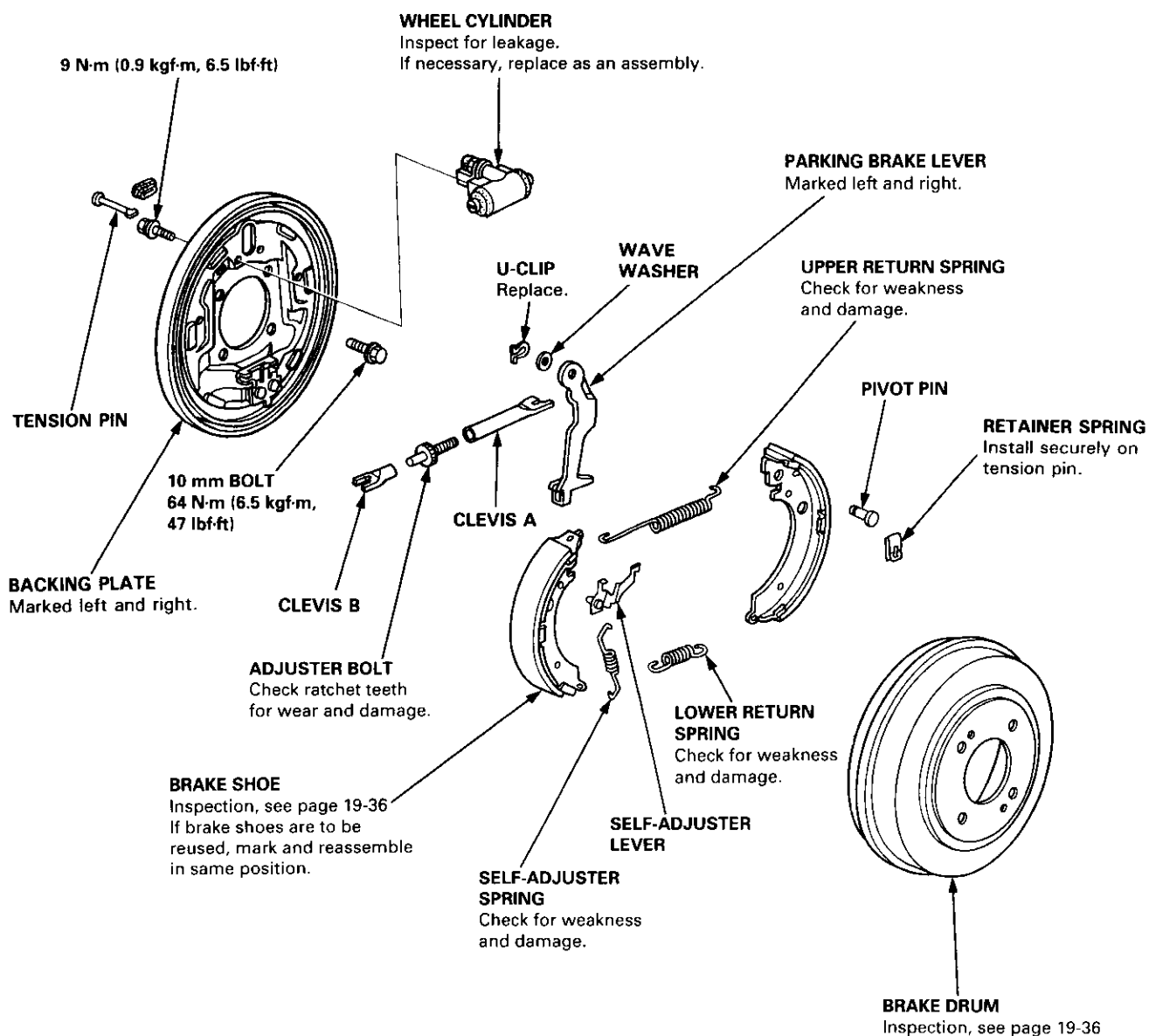


Index/Inspection

⚠ WARNING

- Never use an air hose or dry brush to clean brake assemblies.
- Use an OSHA approved vacuum cleaner to avoid breathing brake dust.
- Contaminated brake linings or drums reduce stopping ability.
- Block the front wheels before jacking up the rear of the vehicle.

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



Rear Drum Brake

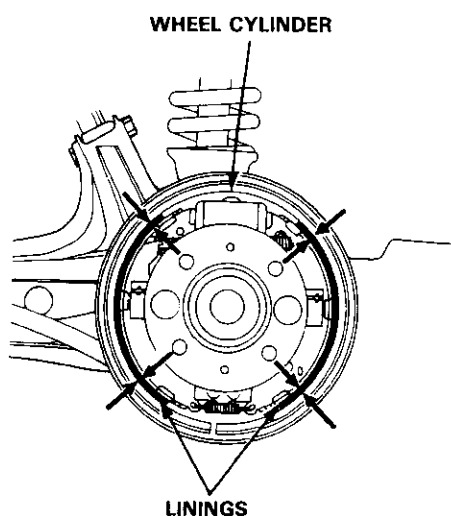
Inspection

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

Brake Lining Thickness:

Standard: 4.0 mm (0.157 in)

Service Limit: 2.0 mm (0.08 in)



NOTE: Measurement does not include brake shoe thickness.

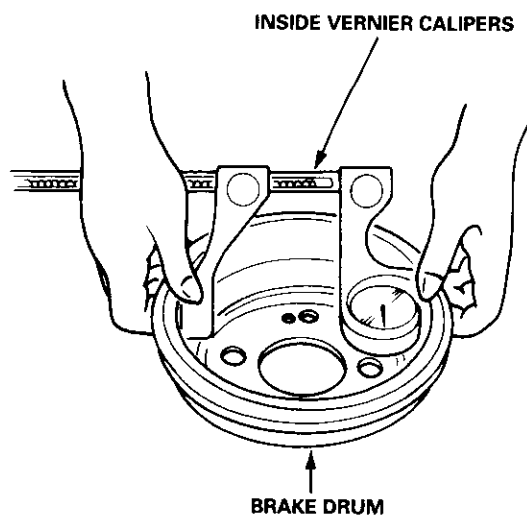
4. If the brake lining thickness is less than the service limit, replace the brake shoes as a set.
5. Check the bearings in the hub unit for smooth operation. If defective, refer to section 18.

6. Measure the inside diameter of the brake drum using the inside vernier calipers.

Drum Inside Diameter:

Standard: 199.9 – 200.0 mm (7.870 – 7.874 in)

Service Limit: 201.0 mm (7.913 in)

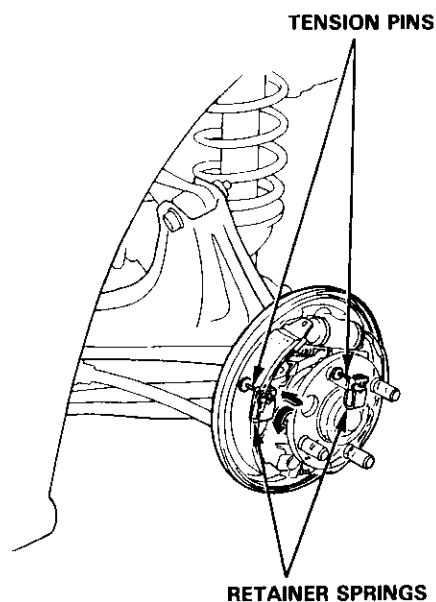


7. If the inside diameter of the brake drum is more than the service limit, replace the brake drum.
8. Check the brake drum for scoring, grooves, and cracks.



Brake Shoe Disassembly

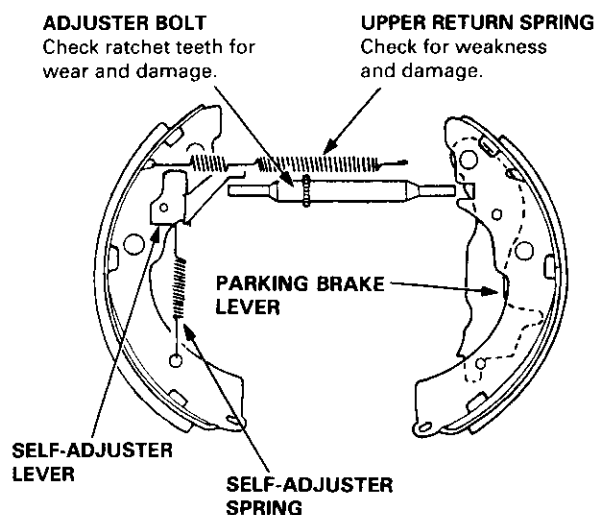
1. Remove the tension pins by pushing the retainer springs and turning them.



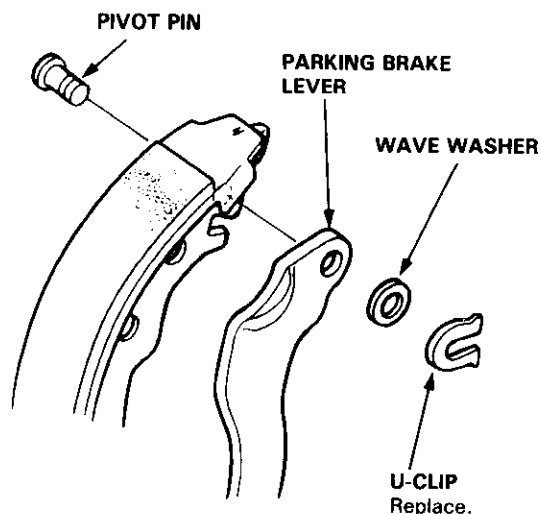
2. Lower the brake shoe assembly, and remove the lower return spring.

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

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



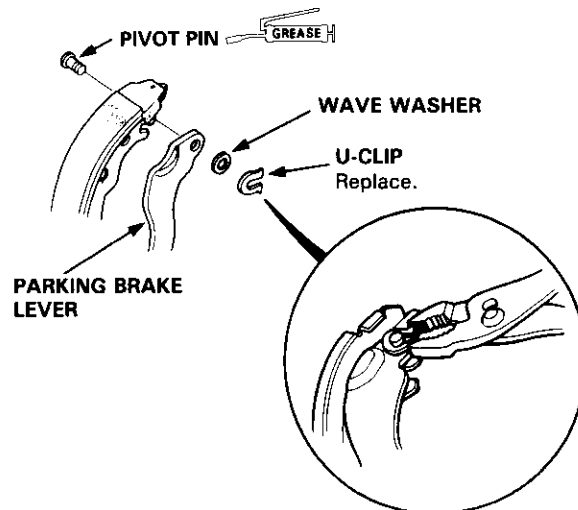
6. Remove the wave washer, parking brake lever, and pivot pin from the brake shoe by removing the U-clip.



Brake Shoe Reassembly

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

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



(cont'd)

Rear Drum Brake

Brake Shoe Reassembly (cont'd)

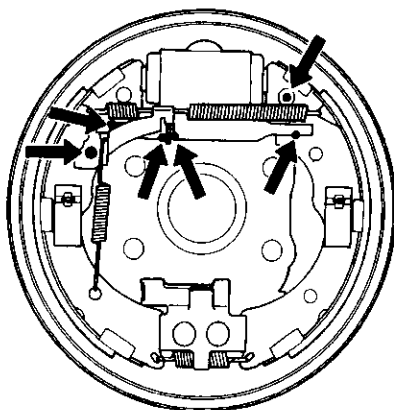
3. Connect the parking brake cable to the parking brake lever.

4. Apply grease on each sliding surface.

⚠ WARNING Contaminated brake linings reduce stopping ability. Keep grease or oil off the brake linings. Wipe any excess grease off the parts.

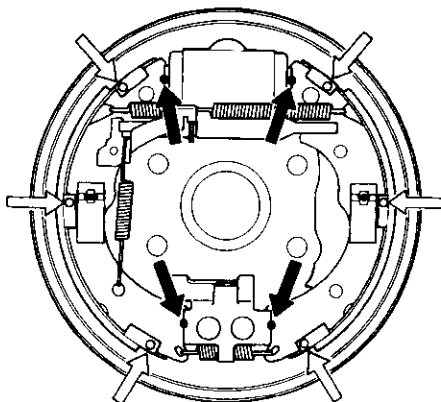
- Apply brake cylinder grease (P/N: 08733 – B020E) or equivalent rubber grease to the sliding surfaces as shown.

→ ● Sliding surface



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

→ ● Opposite edge of the shoe
⇒ ○ Brake shoe ends



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

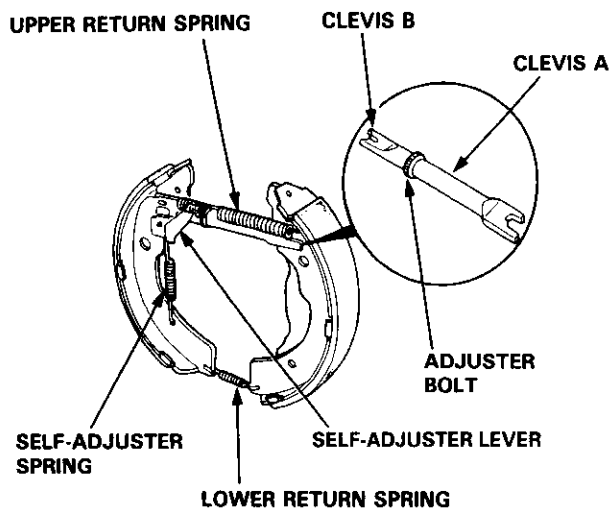
6. Hook the self-adjuster spring to the self-adjuster lever first, then to the brake shoe.

7. Install the clevises and upper return spring, noting the installation direction.

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

8. Install the lower return spring.

9. Install the tension pins and retaining springs.



10. Install the brake drum.

11. If the wheel cylinder has been removed, bleed the brake system (see page 19-7), and check for leaks at brake line connections, and retighten if necessary.

12. Depress the brake pedal several times to set the self-adjusting brake.

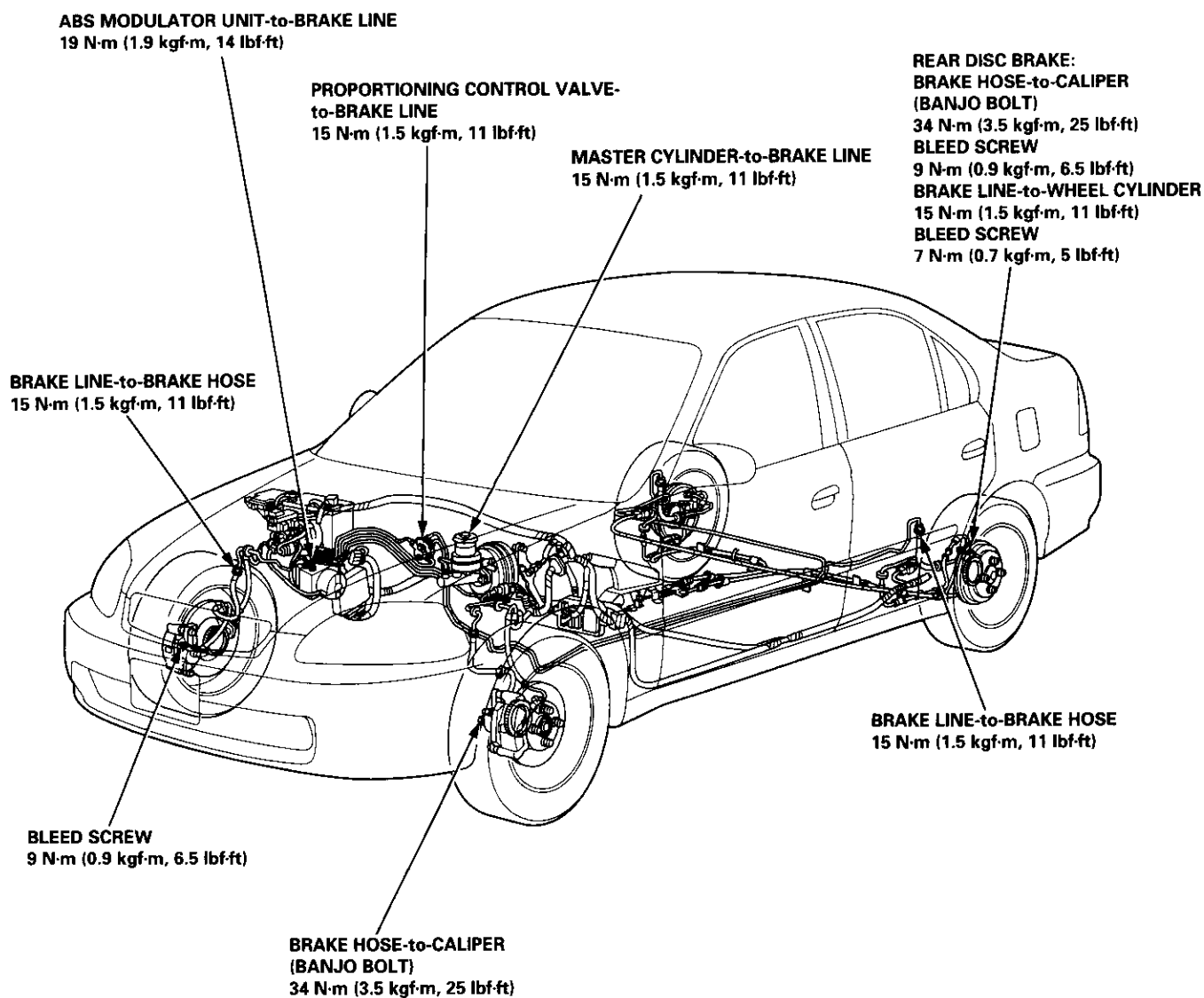
13. Adjust the parking brake (see page 19-6).



Inspection/Torque Specifications

1. Inspect the brake hoses for damage, deterioration, leaks, interference, and twisting.
2. Check the brake lines for damage, rusting, and leakage. Also check for bent brake lines.
3. Check for leaks at hose and line joints and connections, and retighten if necessary.
4. Check the master cylinder and ABS modulator unit for damage and leakage.

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



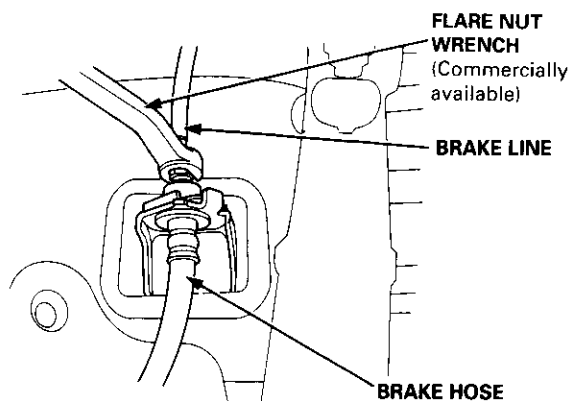
Brake Hoses/Lines

Hose Replacement

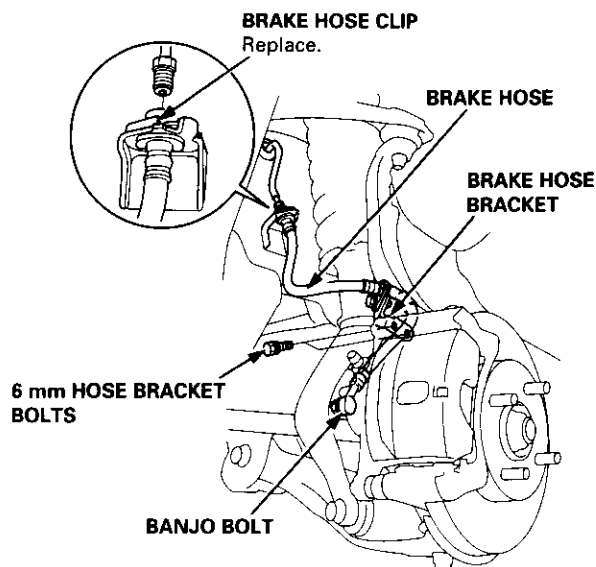
CAUTION:

- Before reassembling, check that all parts are free of dust and other foreign particles.
- Replace parts with new ones whenever specified to do so.
- Do not spill brake fluid on the vehicle; it may damage the paint; if brake fluid does contact the paint, wash it off immediately with water.

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

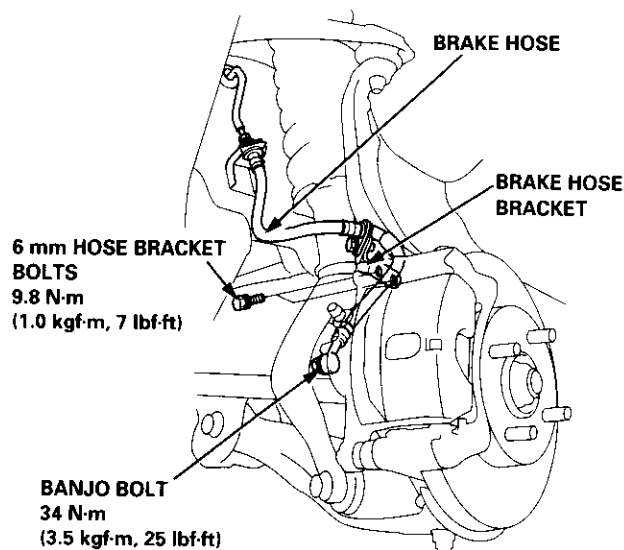


3. Remove and discard the brake hose clip from the brake hose.

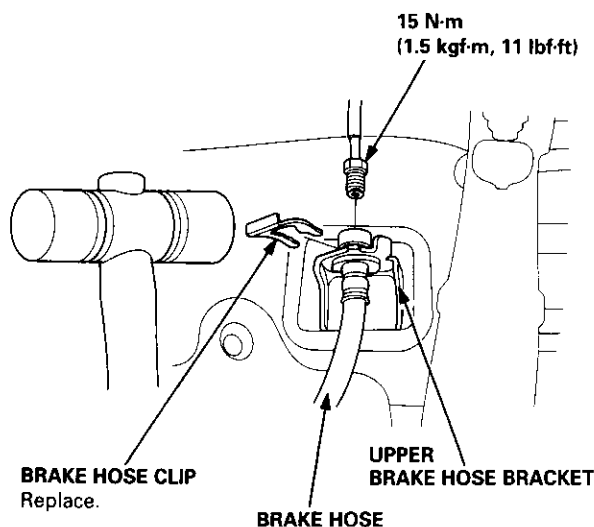


4. Remove the banjo bolt, and disconnect the brake hose from the caliper.
5. Remove the brake hose bracket from the knuckle.

6. Install the brake hose bracket and brake hose onto the knuckle first, then connect the brake hose to the caliper with the banjo bolt and new sealing washers.



7. Install the brake hose onto the upper brake hose bracket with a new brake hose clip.



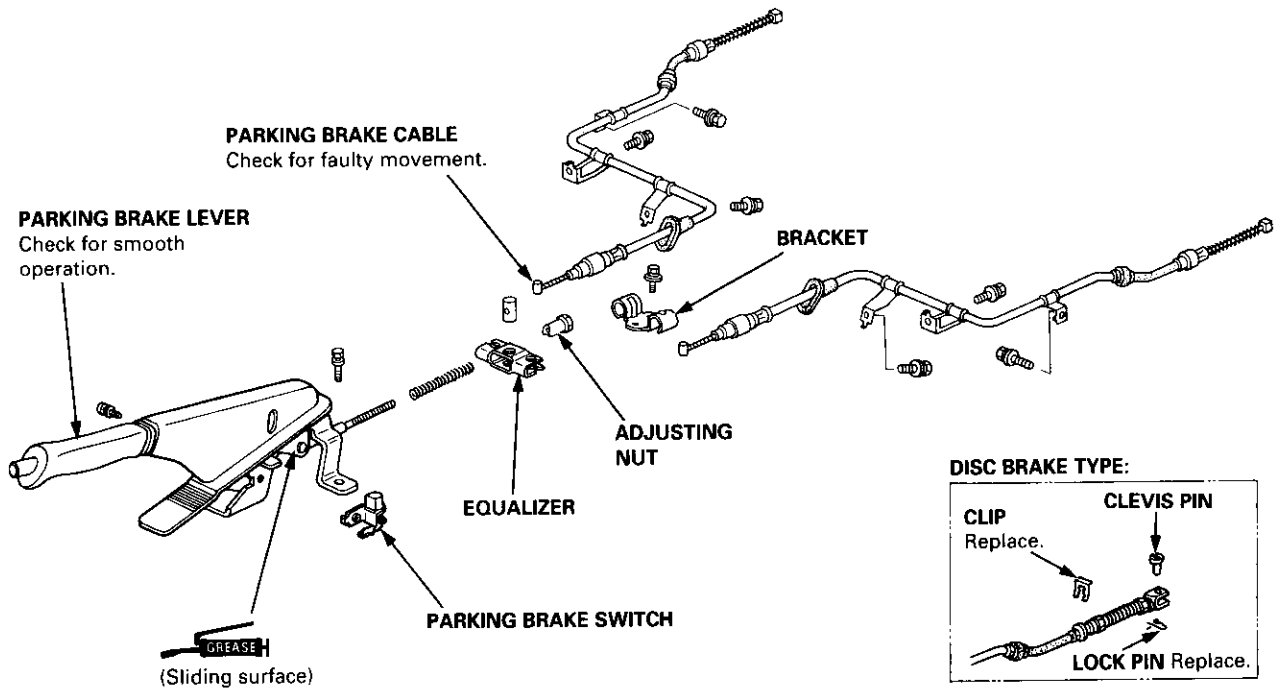
8. Connect the brake line to the brake hose.
9. After installing the brake hose, bleed the brake system (see page 19-7).
10. Perform the following checks:
 - Check the brake hose and line joint for leaks, and tighten if necessary.
 - Check the brake hoses for interference and twisting.

Parking Brake Cable



Inspection and Replacement

CAUTION: The parking brake cables must not be bent or distorted. This will lead to stiff operation and premature cable failure.

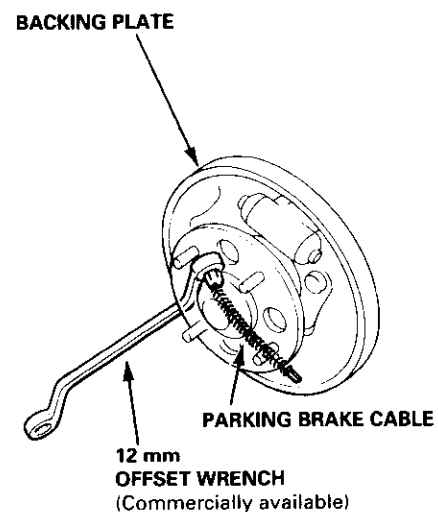
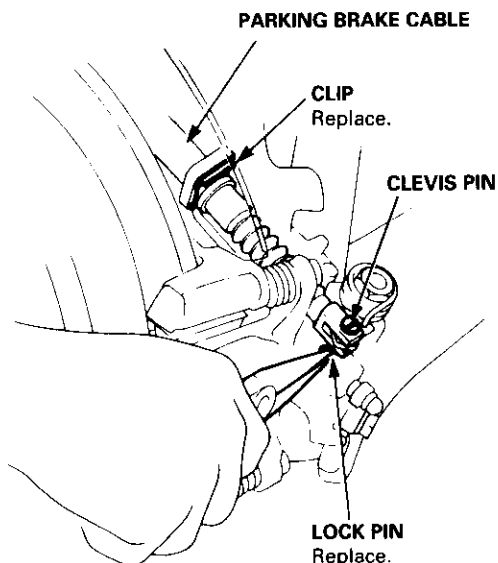


Disc Brake Type:

Disconnect the parking brake cable from the lever on the caliper by removing the lock pin and clevis pin, and remove the cable from the arm by removing the clip.

Drum Brake Type:

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

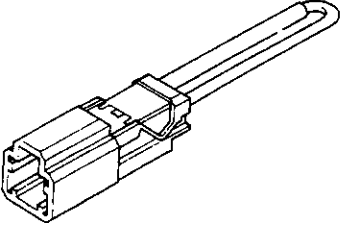


Anti-lock Brake System (ABS)

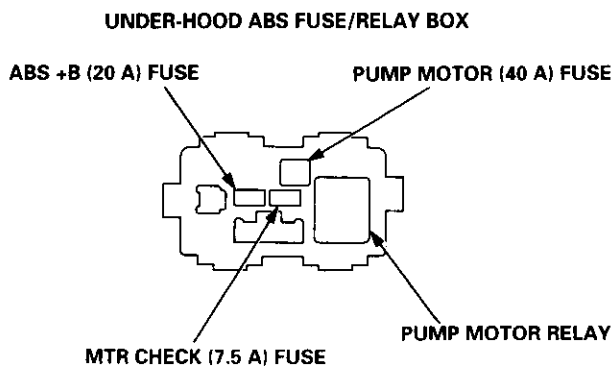
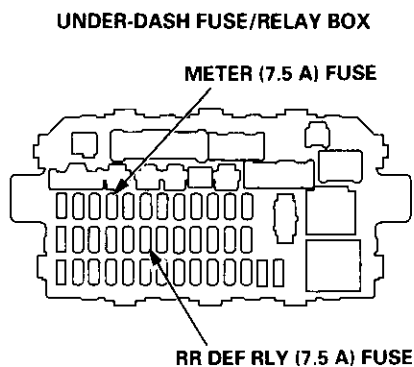
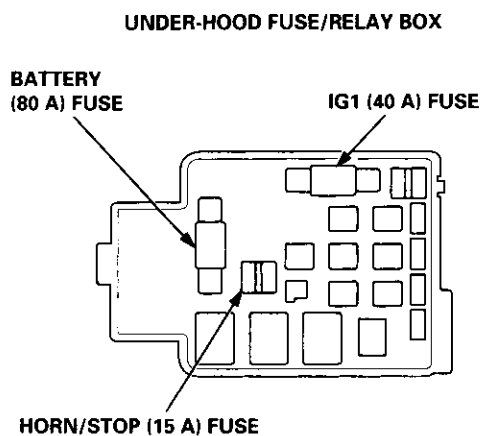
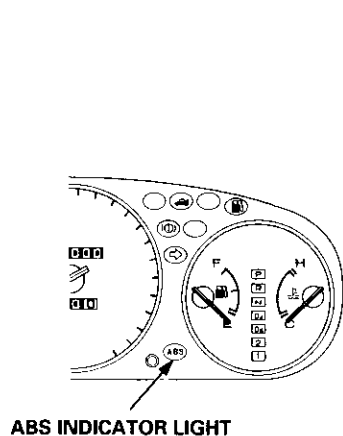
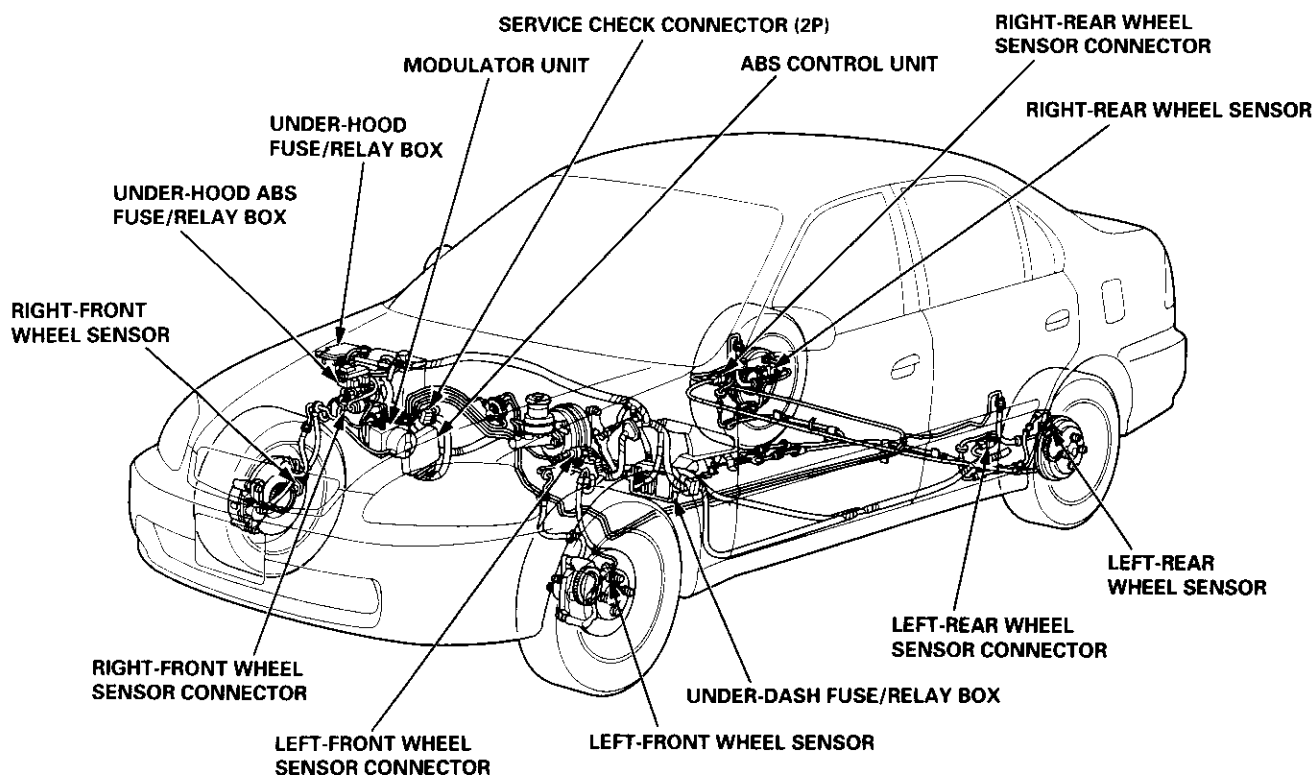
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Special Tools

Ref. No.	Tool Number	Description	Qty	Page Reference
①	07PAZ - 0010100	SCS Service Connector	1	19-56
<div></div>				

Component Locations



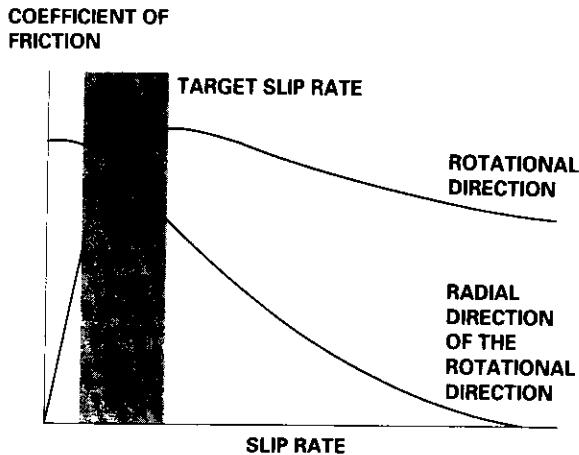
Anti-lock Brake System (ABS)

Features/Construction

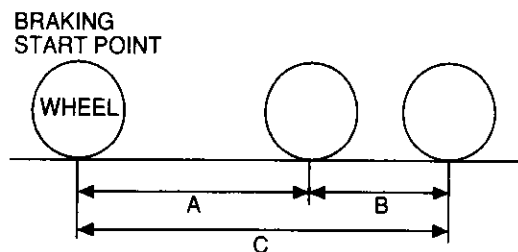
When the brake pedal is depressed during driving, the wheels can lock before the vehicle comes to a stop. In such a case, the maneuverability of the vehicle is reduced if the front wheels are locked, and the stability of the vehicle is reduced if the rear wheels are locked, creating an extremely unstable condition. The ABS precisely controls the slip rate of the wheels to ensure the grip force of the tires, and it thereby ensures the maneuverability and stability of the vehicle.

Judging the vehicle speed, the ABS calculates the slip rate of the wheels based on the vehicle speed and the wheel speed, then it controls the brake fluid pressure to attain the target slip rate.

Grip Force of Tire and Road Surface

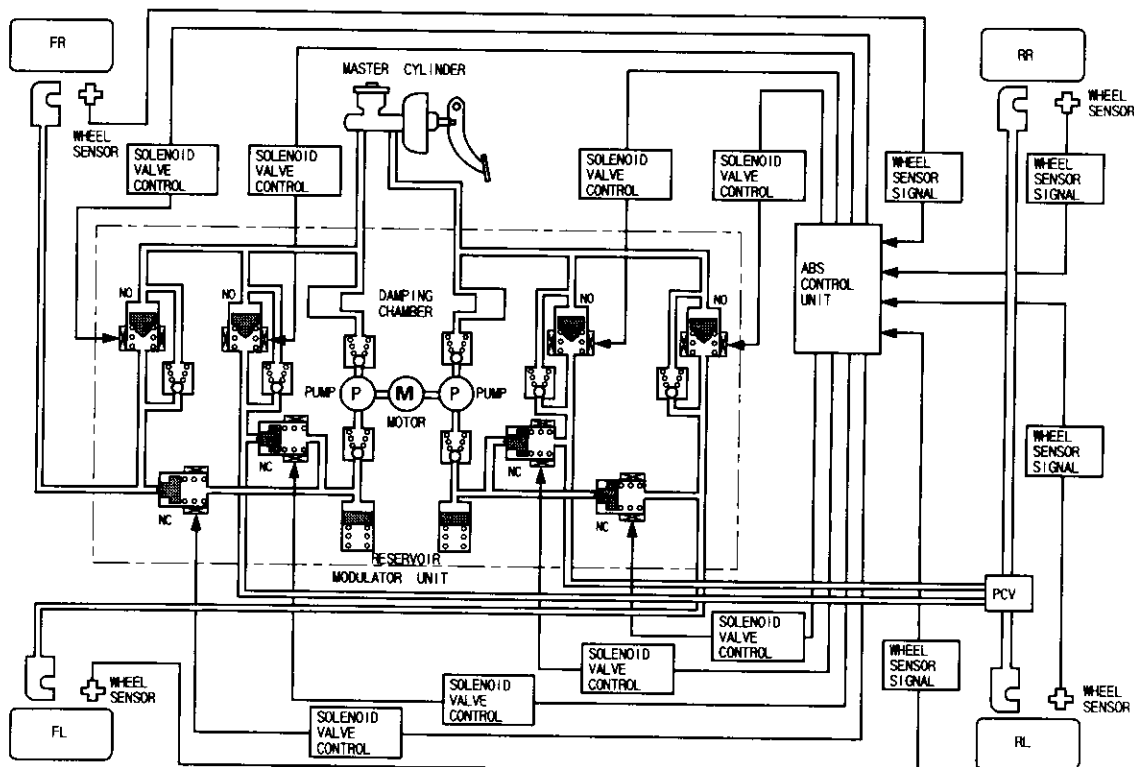


Slip Rate



A: Distance without slip
B: Slipped distance
C: Actual distance

$$\text{SLIP RATE} = \frac{B}{C} = \frac{\text{VEHICLE SPEED} - \text{WHEEL SPEED}}{\text{VEHICLE SPEED}}$$



Operation

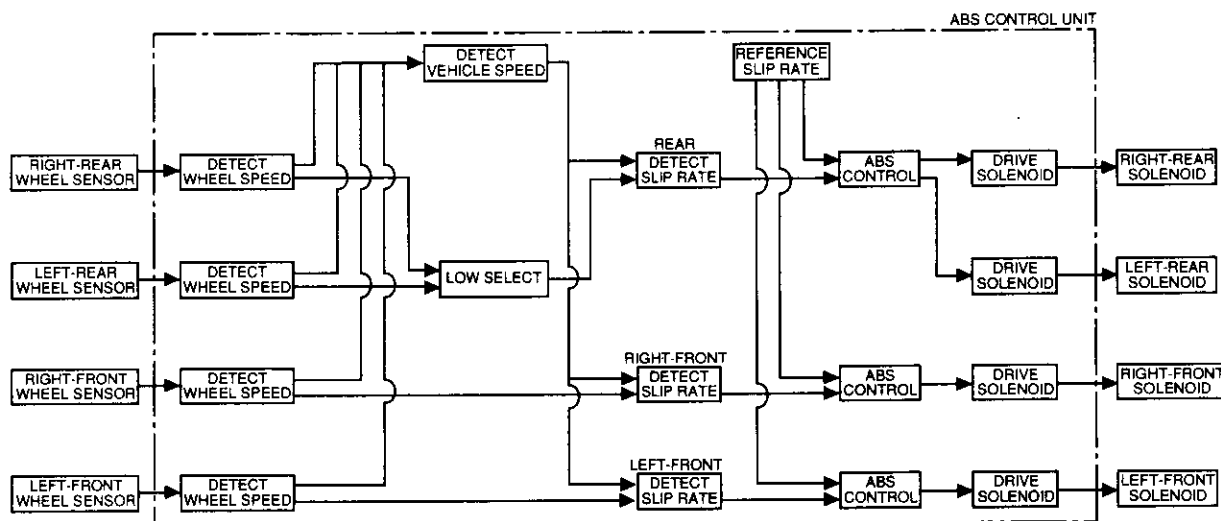
ABS Control Unit

Main Control

The ABS control unit detects the wheel speed based on the wheel sensor signal it received, then it calculates the vehicle speed based on the detected wheel speed. The control unit detects the vehicle speed during deceleration based on the rate of deceleration.

The ABS control unit calculates the slip rate of each wheel, and it transmits the control signal to the modulator unit solenoid valve when the slip rate is high.

The pressure reduction control is a three-mode system, that is pressure reduction, pressure retaining and pressure intensifying modes.



Self-diagnosis Function

The ABS control unit is equipped with a main CPU and a sub CPU, and the CPUs check each other.

The CPUs check the circuit of the system.

When the CPUs detect failure, they shift to the "system down mode" or the "control inhibition mode".

MODE	ABS INDICATOR LIGHT	MAIN RELAY	SOLENOID VALVE	CPU	Restart condition		DTC
SYSTEM DOWN	ON	No operation	Drive inhibition	Operation*1	Ignition switch	OFF → ON	Memory
CONTROL INHIBITION	ON	No operation	Drive inhibition	Operation	Automatic		Memory

*1: Except CPU failure

The self-diagnosis can be classified into these four categories:

- ①: Initial diagnosis
- ②: Except ABS control
- ③: During ABS control
- ④: During warning

On-board Diagnosis Function

The ABS control unit is connected to the data link connector (16P).

The ABS system can be diagnosed with the Honda PGM Tester.

(cont'd)

Anti-lock Brake System (ABS)

Operation (cont'd)

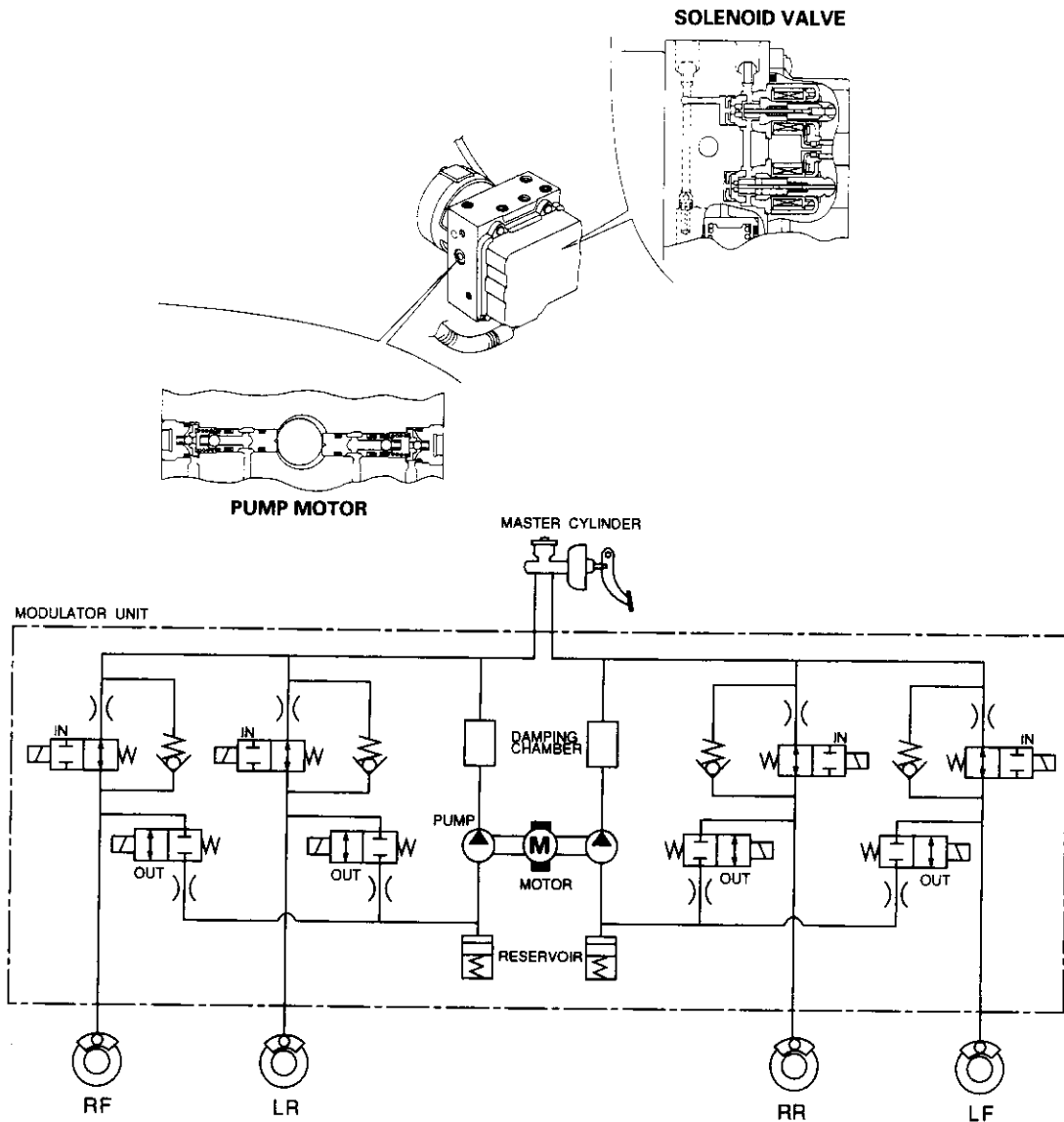
ABS Modulator

The ABS modulator consists of the inlet solenoid valve, outlet solenoid valve, reservoir, pump, pump motor and the damping chamber.

The modulator reduces the caliper fluid pressure directly, and it is also referred to as a circulating type because the brake fluid circulates through the caliper, reservoir and the master cylinder.

The hydraulic control has three modes: pressure reducing, pressure retaining, and pressure intensifying.

The hydraulic circuit is the independent four channel type, one channel for each wheel.



Pressure intensifying mode: Inlet valve open, outlet valve closed

Master cylinder fluid is pumped out to the caliper.

Pressure retaining mode: Inlet valve closed, outlet valve closed

Caliper fluid is retained by the inlet valve and outlet valve.

Pressure reducing mode: Inlet valve closed, outlet valve open

Caliper fluid flows through the outlet valve to the reservoir.

Motor operation mode:

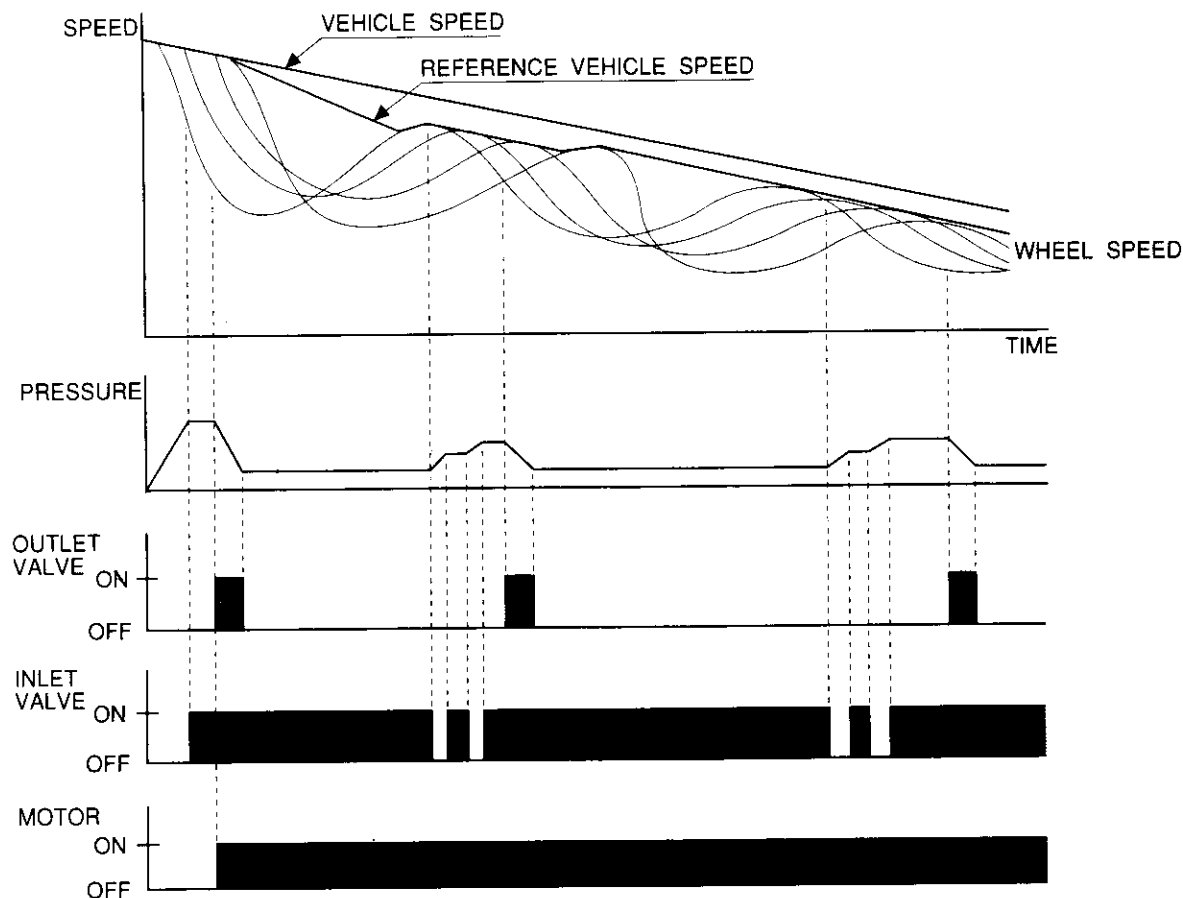
When starting the pressure reducing mode, the pump motor is ON.

When stopping ABS operation, the pump motor is OFF.

The reservoir fluid is pumped out by the pump, through the damping chamber, to the master cylinder.

IN: INLET VALVE (NORMALLY OPEN)
OUT: OUTLET VALVE (NORMALLY CLOSED)

Wheel Speed and Modulator Control



When the wheel speed drops sharply below the vehicle speed, the inlet valve closes to retain the caliper fluid pressure. When the wheel speed drops further, the outlet valve opens momentarily to reduce the caliper fluid pressure. The pump motor starts at this time. As the wheel speed is restored, the inlet valve opens momentarily to increase the caliper fluid pressure.

Wheel Sensor

The wheel sensors are the magnetic contactless type.

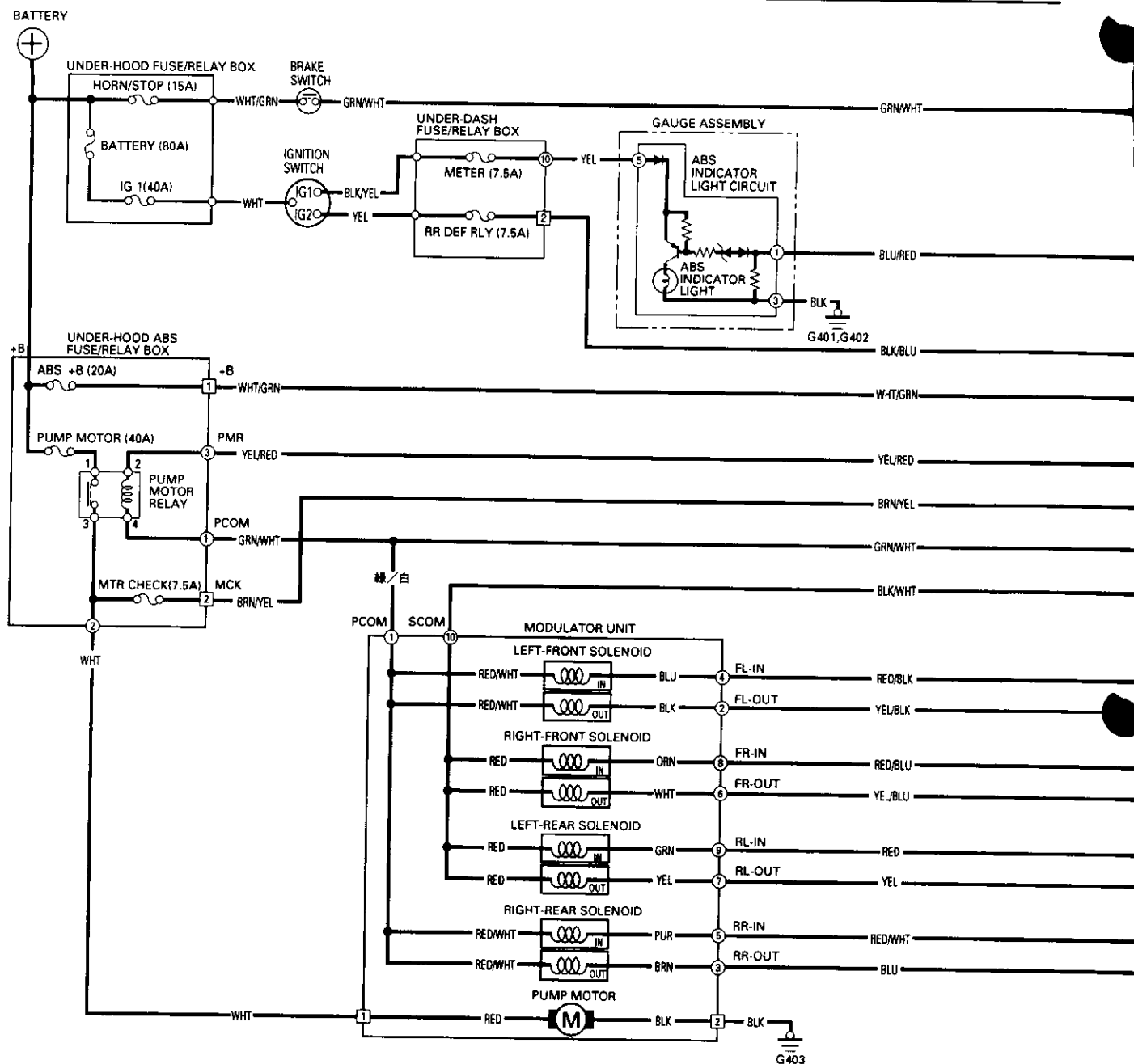
As the gear pulser teeth rotate past the wheel sensor's magnetic coil, AC current is generated. The AC frequency changes in accordance with the wheel speed. The ABS control unit detects the wheel sensor signal frequency and thereby detects the wheel speed.

There are four wheel sensors, one for each wheel.

The gear pulser has 50 teeth.



Circuit Diagram



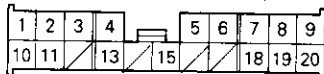
UNDER-HOOD ABS FUSE/RELAY BOX
3P CONNECTOR (○ number)



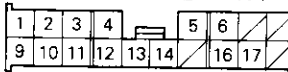
UNDER-HOOD ABS FUSE/RELAY BOX
2P CONNECTOR (□ number)



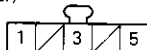
UNDER-DASH FUSE/RELAY BOX
20P CONNECTOR (○ number)



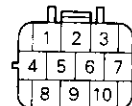
UNDER-DASH FUSE/RELAY BOX
18P CONNECTOR (□ number)



GAUGE ASSEMBLY 5P CONNECTOR
(○ number)



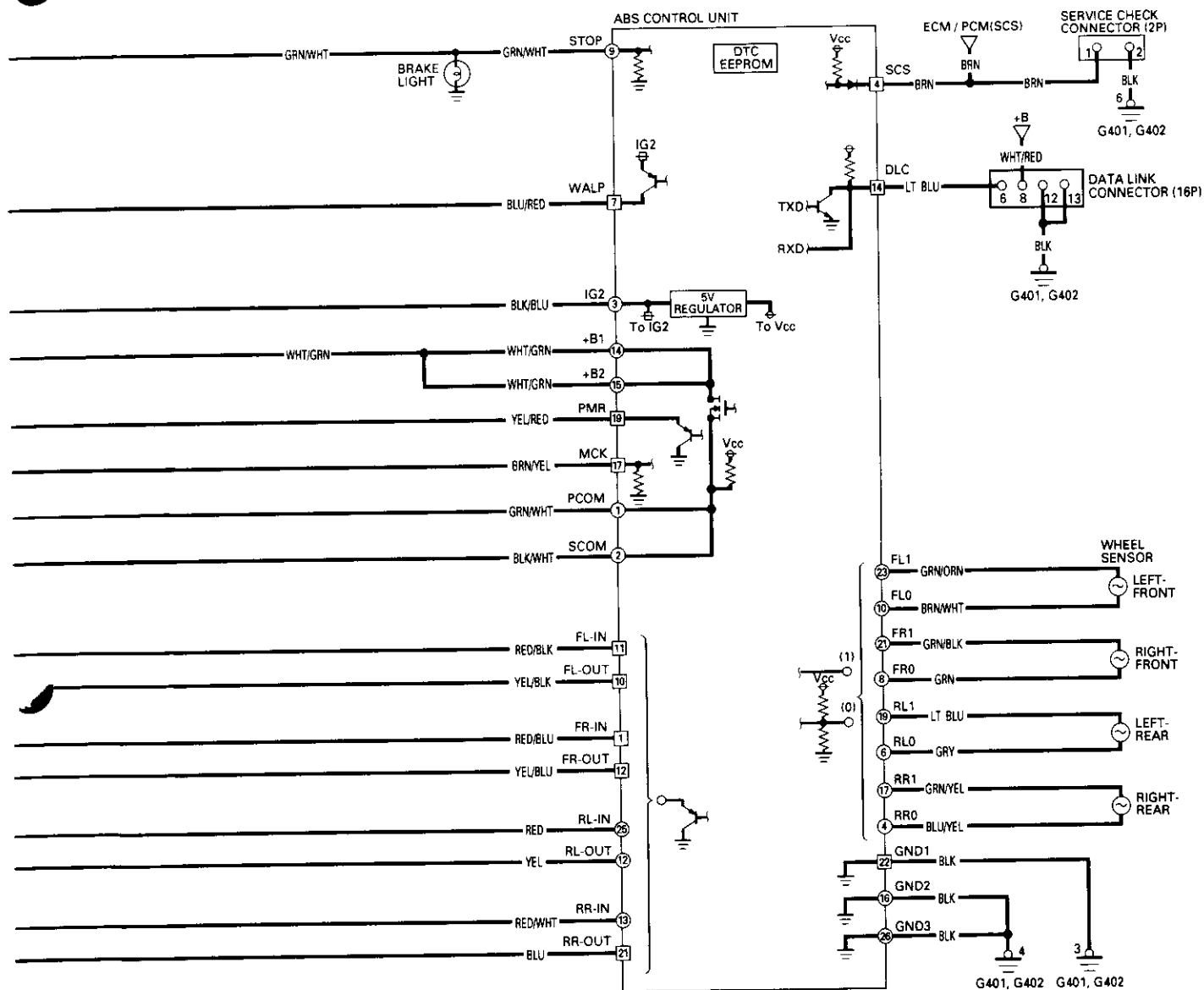
MODULATOR UNIT 10P CONNECTOR
(○ number)



PUMP MOTOR 2P CONNECTOR
(□ number)



Wire side of female terminals



ABS CONTROL UNIT 26P CONNECTOR
(○ number)

1	2	3	4	6	8	9	10	12	13
14	15	16	17	19	21	23	25	26	

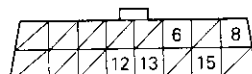
ABS CONTROL UNIT 22P CONNECTOR
(□ number)

1	4	7	8	10	11
12	14	17	19	21	22

SERVICE CHECK CONNECTOR (2P)



DATA LINK CONNECTOR (16P)



WHEEL SENSOR 2P CONNECTOR

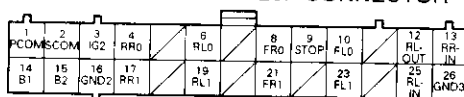


Terminal side of male terminals

Wire side of female terminals

ABS Control Unit Terminal Arrangement

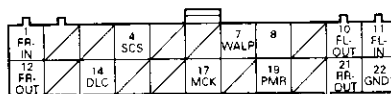
ABS CONTROL UNIT 26P CONNECTOR



Wire side of female terminals

Terminal number	Wire color	Terminal sign (Terminal name)	Description	Measurement terminals	Voltage				
					Conditions (Ignition Switch ON (III))			Output voltage	
1	GRN/WHT	PCOM (Primary common)	Power source for the solenoid valve and pump motor.	1-GND	Engine	ON	Solenoid	ON	0 V
2	BLK/WHT	SCOM (Secondary common)	Power source for the solenoid valve.	2-GND		OFF (Connect the SCS service connector)	OFF	AC: 3~6 V	
3	BLK/BLU	IG2 (Ignition 2)	Detects ignition switch 2 signal. (System activate signal)	3-GND					Battery voltage
4	BLU/YEL	RR0 (Rear-right 0)	Detects right-rear wheel sensor signal.	4-17	When the wheel is turned at 1 turn/second.			53 mV or above on digital tester (AC range) (Reference) 150 mVp-p or above on oscilloscope	
6	GRY	RL0 (Rear-left 0)	Detects left-rear wheel sensor signal.	6-19					
8	GRN	FR0 (Front-right 0)	Detects right-front wheel sensor signal.	8-21					
9	GRN/WHT	STOP (Stop)	Detects brake switch signal. (Prevents unnecessary ABS operation)	9-GND	Stops			Approx. 2.5 V	
10	BRN/WHT	FL0 (Front-left 0)	Detects left-front wheel sensor signal.	10-23	Brake pedal depressed.			Battery voltage	
					Brake pedal released.			0 V	
					When the wheel is turned at 1 turn/second.			53 mV or above on digital tester (AC range) (Reference) 150 mVp-p or above on oscilloscope	
12	YEL	RL-OUT (Rear-left outlet)	Drives left-rear outlet solenoid valve.	12-GND	Engine	ON	Solenoid	ON	0 V
13	RED/WHT	RR-IN (Rear-right inlet)	Drives right-rear inlet solenoid valve.	13-GND		OFF (Connect the SCS service connector)	OFF	AC: 3~6 V	
14	WHT/GRN	B1 (Battery 1)	Power source for the solenoid valve and pump motor.	14-GND					Battery voltage
15	WHT/GRN	B2 (Battery 2)	Power source for the solenoid valve and pump motor.	15-GND				Battery voltage	
16	BLK	GND2 (Ground 2)	Ground for the ABS control unit.	16-GND				Below 0.3 V	
17	GRN/YEL	RR1 (Rear-right 1)	Detects right-rear wheel sensor signal.	17-4	When the wheel is turned at 1 turn/second.			53 mV or above on digital tester (AC range) (Reference) 150 mVp-p or above on oscilloscope	
19	LT BLU	RL1 (Rear-left 1)	Detects left-rear wheel sensor signal.	19-6					
21	GRN/BLK	FR1 (Front-right 1)	Detects right-front wheel sensor signal.	21-8					
23	GRN/ORN	FL1 (Front-left 1)	Detects left-front wheel sensor signal.	23-10					
25	RED	RL-IN (Rear-left inlet)	Drives left-rear inlet solenoid valve.	25-GND	Engine	ON	Solenoid	ON	0 V
						OFF (Connect the SCS service connector)	OFF	AC: 3~6 V	
									Approx. 3 V
26	BLK	GND3 (Ground 3)	Ground for the ABS control unit.	26-GND				Below 0.3 V	

ABS CONTROL UNIT 22P CONNECTOR



Wire side of female terminals

Terminal number	Wire color	Terminal sign (Terminal name)	Description	Measurement terminals	Voltage			
					Conditions (Ignition Switch ON (III))			Output voltage
1	RED/BLU	FR-IN (Front-right inlet)	Drives right-front inlet solenoid valve.	1-GND	Engine	ON	Solenoid ON	0 V
							OFF	AC: 3~6 V
						(Connect the SCS service connector)		Approx. 3 V
4	BRN	SCS (Service check signal)	Detects service check signal (Diagnostic trouble code indication)	4-GND	SCS service connector connected.			0 V
					SCS service connector disconnected.			Approx. 5 V
7	BLU/RED	WALP (Warning lamp)	Drives ABS indicator light (The indicator light goes off when ABS control unit outputs battery voltage).	7-GND	Indicator light ON			Approx. 2 V
					Indicator light OFF			Battery voltage
8	BLU/YEL		Not used.					
10	YEL/BLK	FL-OUT (Front-left outlet)	Drives left-front outlet solenoid valve.	10-GND	Engine	ON	Solenoid ON	0 V
							OFF	AC: 3~6 V
11	RED/BLK	FL-IN (Front-left inlet)	Drives left-front inlet solenoid valve.	11-GND	Engine	OFF (Connect the SCS service connector)		Approx. 3 V
12	YEL/BLU	FR-OUT (Front-right outlet)	Drives right-front outlet solenoid valve.	12-GND				
14	LT BLU	DLC (Data link connector)	Communicates with Honda PGM Tester.	14-GND	—			Approx. 5 V
17	BRN/YEL	MCK (Motor check)	Detects pump motor drive signal.	17-GND	Pump motor relay	ON		Battery voltage
						OFF		0 V
19	YEL/RED	PMR (Pump motor relay)	Drives pump motor relay.	19-GND	Engine	ON	Solenoid ON	0 V
							OFF	AC: 3~6 V
						(Connect the SCS service connector)		Approx. 3 V
21	BLU	RR-OUT (Rear-right outlet)	Drives right-rear outlet solenoid valve.	21-GND	Engine	ON	Pump motor relay ON	0 V
							OFF	AC: 3~6 V
						(Connect the SCS service connector)		Approx. 3 V
22	BLK	GND2 (Ground 2)	Ground for the ABS control unit.	22-GND				Below 0.3 V

Troubleshooting Precautions

ABS Indicator Light

1. The ABS indicator light comes on when the ABS control unit detects a problem in the system. However, even though the system is normal, the ABS indicator light can come on, too, under the following conditions. To determine the actual cause of the problem, question the customer about the problem, taking the following conditions into consideration.
 - Signal disturbance
 - Wheel spin
 - Only drive wheels rotate
 - Battery voltage fluctuates
2. When a problem is detected and the ABS indicator light comes on, the indicator light can stay on until the ignition switch is turned off, or it can automatically go off, depending on the mode.
 - Light stays on until the ignition switch is turned off: When the system is in the system down mode.
 - Light automatically goes off: When the system is in the control inhibition mode.
(refer to symptom-to-system chart)
3. The ABS indicator light stays on when the system is reactivated without erasing the DTC, but it goes off after starting the car.

When the wheel sensor system is faulty and the ABS indicator light comes on, the algorithm of the system automatically turns off the ABS indicator light after the wheel speed signal returns to the normal speed. While, when the DTC is erased, the CPU is reset and the ABS indicator light goes off when the system checked out normal by the initial diagnosis. Therefore, test-drive the car after servicing the wheel sensor system, and be sure that the ABS indicator light does not come on.
4. When the ABS control unit outputs battery voltage to the gauge assembly, the ABS indicator light goes off.

Diagnostic Trouble Code (DTC)

1. The diagnostic trouble code (DTC) is memorized when a problem is detected and the ABS indicator light does not go off, or when the ABS indicator light comes on.

The DTC is not memorized when the ABS indicator light comes on unless the CPU is activated.
2. The memory can hold any number of DTCs. However, when the same DTC is detected twice or more, the later one is written over the old one.

Therefore, when the same problem is detected repeatedly, it is recorded as one DTC.
3. The DTCs are indicated in the order of ascending number, not in the order they occur.
4. The DTCs are memorized in the EEPROM (non-volatile memory).

Therefore, the memorized DTCs cannot be canceled by disconnecting the battery. Perform the specified procedures to erase.

Self-diagnosis

1. The self-diagnosis can be classified into these four categories:
 - Initial diagnosis: Performed right after the engine starts and until the ABS indicator light goes off.
 - Except ABS control: Performed when the ABS is not functioning.
 - During ABS control: Performed when the ABS is functioning.
 - During warning: Performed when the ABS indicator light is ON.
2. The system performs the following controls when a problem is detected by the self-diagnosis:
 - ABS indicator light ON
 - Memory of DTC
 - Mode change to the "system down mode" or the "control inhibition mode".

MODE	ABS INDICATOR LIGHT	MAIN RELAY	SOLENOID VALVE	CPU	Restart condition		DTC
SYSTEM DOWN	ON	No operation	Drive inhibition	Operation*1	Ignition switch	OFF → ON	Memory
CONTROL INHIBITION	ON	No operation	Drive inhibition	Operation	Automatic		Memory

*1: Except CPU failure

Kickback

1. The motor operates when the ABS is functioning, and the fluid in the reservoir is forced out to the master cylinder causing kickback at the brake pedal.
2. The ABS control unit operates the solenoid valve when the brake pedal is released after the initial diagnosis. You may hear the faint solenoid valve operation sound at this time, but it is normal.

Pump Motor

1. The pump motor operates when the ABS is functioning.
2. The ABS control unit checks the pump motor operation during acceleration. You may hear the faint operation sound at this time, but it is normal.

Brake Fluid Replacement/Air Bleeding

1. Brake fluid replacement and air bleeding procedures are the same as for conventional brakes.

Troubleshooting

1. The troubleshooting flowcharts explain the procedures on the assumption that the cause of the problem is still present and the ABS indicator light is still on.
Note that troubleshooting following the flowchart when the ABS indicator light does not come on can result in incorrect judgment.
2. Question the customer about the conditions when the problem occurred, and try to reproduce the same conditions for troubleshooting.
Self-diagnosis is made at various times such as the initial diagnosis, except ABS control, during ABS control, during acceleration, during the specified vehicle speed, etc. Therefore, the symptom cannot be checked unless the check conditions match with the problem conditions.
3. When the ABS indicator light does not come on during the test drive, but the troubleshooting is performed based on the DTC, check for the loose connectors, poor contact of the terminals, etc, before troubleshooting.
4. After troubleshooting, erase the DTC and test-drive the car. Be sure that the ABS indicator light does not come on.
5. The connector illustrations show the female connectors with a single outline and the male connectors with a double outline.
6. The connector terminal cavities containing female terminals are always numbered by looking at the connector from the wire side, and the cavities containing male terminals are always numbered by looking at the connector from the terminal side.

Diagnostic Trouble Code (DTC)

Diagnostic Trouble Code (DTC) Indication

NOTE: This operation can also be carried out with the Honda PGM Tester.

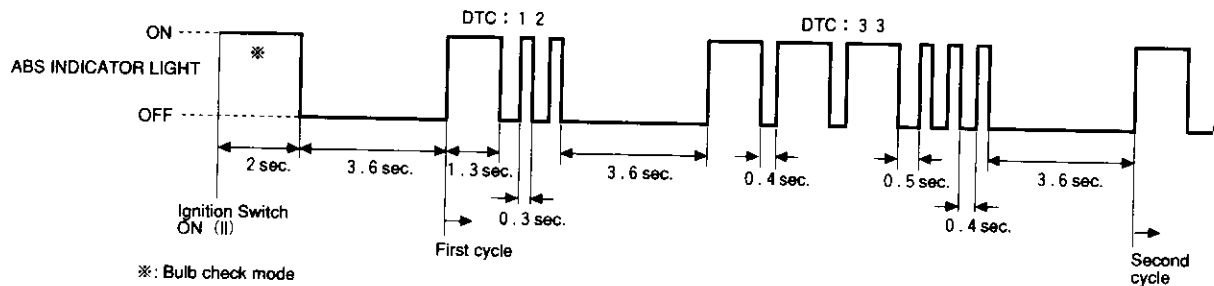
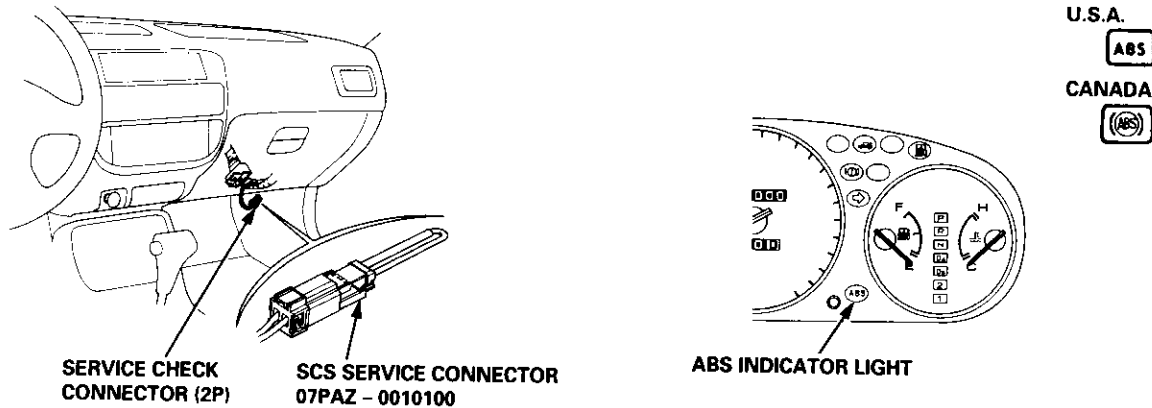
1. Connect the SCS service connector to the service check connector inside the passenger's side kick panel.
2. Turn the ignition switch ON (II), but do not start the engine.
NOTE: Do not depress the brake pedal when turning the ignition switch.
3. Record the blinking frequency of the ABS indicator light. The blinking frequency indicates the DTC.
4. Turn the ignition switch OFF, and remove the SCS service connector.
NOTE: The Malfunction Indicator Lamp (MIL) will stay on after the engine is started if the SCS service connector is connected.
5. Erase the DTC.

Conditions for DTC indication

- The vehicle is stopped.
- The SCS service connector is connected before the ignition switch is turned ON (II).
- The brake pedal is released.
- The SCS service connector remains connected during this procedure.

The DTC indication stops and the ABS control unit executes the software function if at least one of the following conditions is satisfied:

- The vehicle is not stopped.
- The ABS control unit receives the normal signal (which is for the ABS control unit) from a Honda PGM Tester.
- The SCS service connector is disconnected during this procedure.



- When the ignition switch is turned ON (II), the ABS indicator light comes on to check the bulb. Do not count it as a DTC.
- The ABS control unit can memorize any number of DTCs.
- The new DTC is not memorized when the ABS control unit has already memorized the same DTC.
- If the DTC is not memorized, the ABS indicator light stays ON after it goes off for 3.6 seconds.

DTC Erasure

1. Connect the SCS service connector to the service check connector inside the passenger's side kick panel.
2. Depress the brake pedal.
3. Turn the ignition switch ON (II) while holding the brake pedal, but do not start the engine. The ABS indicator light goes off after two seconds.
4. After the indicator light goes off, release the brake pedal. The indicator light comes on after four seconds.
5. After the indicator light comes on, depress the brake pedal again. The indicator light goes off again after four seconds. The brake pedal is still depressed.
6. After the indicator light goes off, release the brake pedal again.
7. After four seconds, the indicator light blinks twice for 0.3 second and the DTC is erased.
8. Confirm the DTC indication, and check that the DTC was erased.

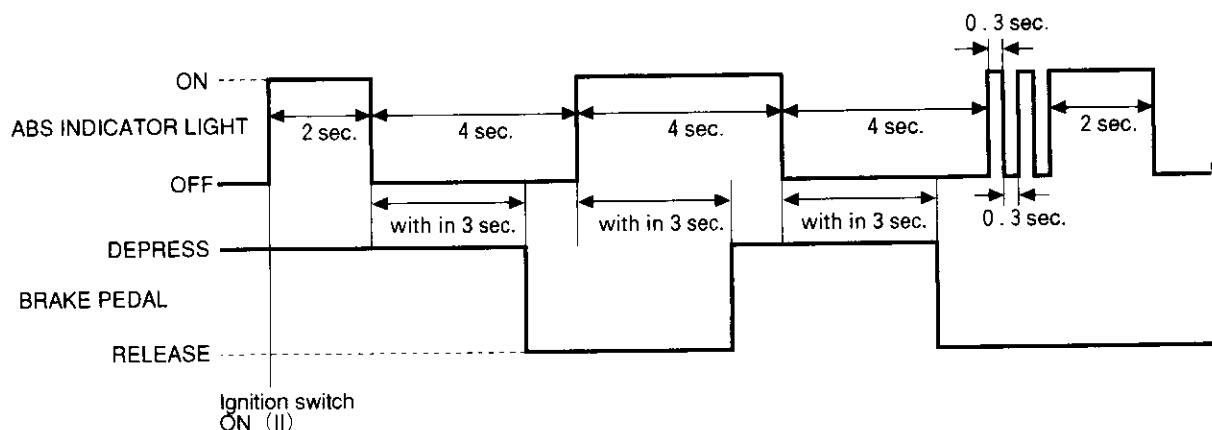
NOTE: Always maintain these steps. If you disconnect the SCS service connector and/or fail to operate the brake pedal according to the indicator light indication, the DTC will not be erased.

Conditions for DTC erasure

- The vehicle is stopped.
- The SCS service connector is connected before the ignition switch is turned ON (II).
- The brake pedal is depressed before the ignition switch is turned ON (II).
- The SCS service connector remains connected during this procedure.

The DTC erasure stops and ABS control unit executes the software function if at least one of the following conditions is satisfied:

- The vehicle is not stopped.
- The SCS service connector is disconnected during this service.
- The ABS control unit receives the normal signal (which is for the ABS control unit) from a Honda PGM Tester.
- The brake pedal is not operated according to the indicator light indication.
- The DTC erasure is finished.



Diagnostic Trouble Code (DTC)

Symptom-to-System Chart

DTC	ABS INDICATOR LIGHT	DIAGNOSIS/ SYMPTOM	DETECTION TIMING				PROBLEM LOCATION	PROBABLE CAUSE
			INITIAL DIAG- NOSIS	EXCEPT ABS CON- TROL	DURING ABS CONTROL	DURING WARN- ING		
NO DTC	OFF	ABS indicator light does not come on when ignition switch is turned on (II)						<ul style="list-style-type: none"> Open in the power source circuit for the ABS indicator light Blown ABS indicator light bulb Open in the ABS indicator light drive circuit. Short to power in the WALP circuit Faulty ABS control unit
	ON	ABS indicator light does not go off after engine is started						<ul style="list-style-type: none"> Open in the IG2 circuit Open in the +B circuit Open and/or short to body ground in the WALP circuit Faulty ABS control unit
11	ON*	Wheel sensor (open/short to body ground/short to power)	○	○	○	○	FR	<ul style="list-style-type: none"> Open, short to body ground and/or short to power in the wheel sensor circuit Faulty wheel sensor Faulty ABS control unit
13							FL	
15							RR	
17							RL	
12	ON*	Wheel sensor/Pulser (chipped pulser gear/noise)		○	○	○	FR	<ul style="list-style-type: none"> Short to wheel sensor (0) circuit in the wheel sensor (1) circuit Faulty wheel sensor installation Chipped pulser gear Faulty ABS control unit
14							FL	
16							RR	
18							RL	
31	ON	Solenoid (open/short to body ground/short to power/stuck)	○	○	○		FR-IN	<ul style="list-style-type: none"> Open, short to body ground and/or short to power in the solenoid drive circuit Open in the COM circuit Open solenoid Faulty ABS control unit
32							FR-OUT	
33							FL-IN	
34							FL-OUT	
35							RR-IN	
36							RR-OUT	
37							RL-IN	
38							RL-OUT	
51	ON	Motor lock		○	○			<ul style="list-style-type: none"> Open in the motor power source circuit Open in the motor GND circuit Faulty pump motor Faulty ABS control unit
52	ON	Motor stuck OFF		○	○			<ul style="list-style-type: none"> Open in the COM, PMR and/or MCK circuit Open and/or blown fuse in the under-hood ABS fuse/relay box power source circuit Faulty pump motor relay Faulty ABS control unit
53	ON	Motor stuck ON		○				<ul style="list-style-type: none"> Short to body ground in the PMR circuit Short to power in the pump motor power source circuit Faulty pump motor relay Faulty ABS control unit
54	ON	Main relay stuck OFF	○	○	○			<ul style="list-style-type: none"> Open, short to body ground and/or blown fuse in the B1 or B2 circuit Short to body ground and/or short to power in the COM circuit Faulty modulator unit Faulty ABS control unit
61	ON	Ignition voltage (low voltage/high voltage)	○	○	○	○		<ul style="list-style-type: none"> Connection of the 24 V battery for engine start Faulty charging system Open in the IG2 circuit Faulty ABS control unit
81	ON	CPU	○	○	○	○		<ul style="list-style-type: none"> External factor(s) can be the cause(s) of the problem Faulty ABS control unit

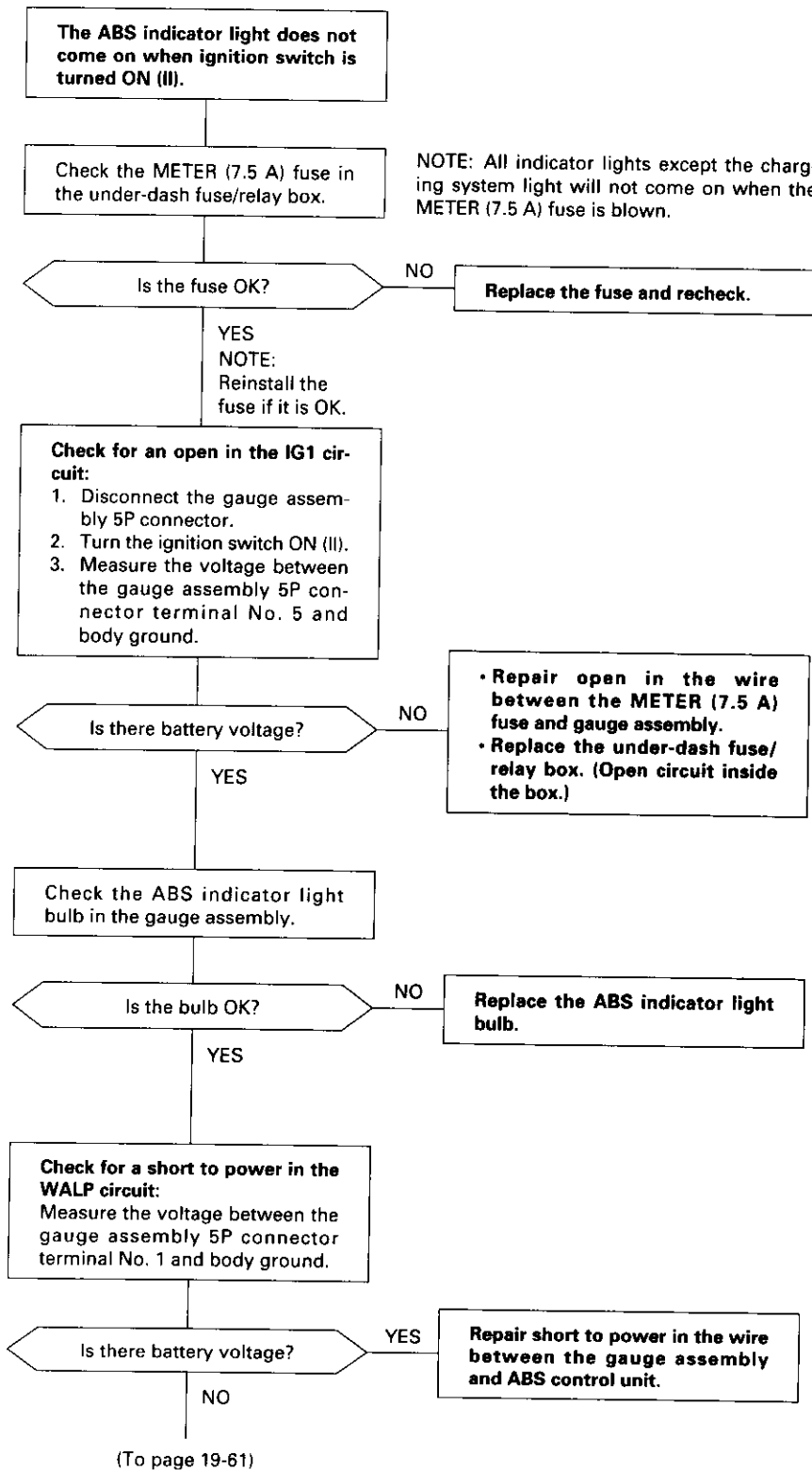
*: If DTCs 11-18 (wheel sensor codes) were detected the last time the vehicle was driven, the ABS indicator light will stay on until the ignition switch is turned ON (II), and the control unit confirms that the wheel sensors are OK.

CONDITION FOR DETECTION	MANAGEMENT		REFER TO PAGE
	DURING ABS CONTROL	EXCEPT ABS CONTROL	
			19-60
			19-62
The ABS indicator light comes on when vehicle is stopped and wheel sensor a given voltage does not input.	System down	System down	19-64
<p>The ABS indicator comes on under the following conditions.</p> <ul style="list-style-type: none"> When more than one of wheels are at a standstill and the velocity of the fastest wheel reaches a given speed. When the velocity of the fastest wheel reaches or exceeds a given speed, and if there are some wheels whose velocity is slower than a certain percentage of the fastest wheel speed for a given period. When there are temporary open or short circuits of the wheel sensor, chipped pulser gear, or signal disturbance. 	System down	System down	19-64
<p>The main relay repeats ON/OFF switching at all times.</p> <ul style="list-style-type: none"> When the main relay is ON, a short test pulse is sent to each valve. If there is some discrepancy, the ABS indicator light comes on. When the main relay is OFF, a short test pulse is sent to each valve. If the solenoid drive voltage is out of a given range, the ABS indicator light comes on. 	System down	System down	19-66
<ul style="list-style-type: none"> The pump motor is activated once or twice after every ignition switch ON (II) operation while the vehicle accelerates, then the motor drive voltage is checked. When the voltage is abnormal, the ABS indicator light comes on. After ABS control completion, the motor is switched off and the main CPU checks the motor drive voltage. When the voltage is abnormal, the ABS indicator light comes on. 	—	System down	19-68
During an active motor test or ABS control, the main CPU checks the supply voltage to the motor. When the voltage is abnormal, the ABS indicator light comes on.	System down	System down	19-68
If the motor drive voltage indicates motor operation when the main CPU does not switch the motor ON, the ABS indicator comes on.	—	System down	19-68
<ul style="list-style-type: none"> When a solenoid valve failure is detected, the CPU checks the voltage of the main relay output. If the voltage is lower than a given voltage, the ABS indicator light comes on. The main relay repeats ON/OFF switching at all times. When the main relay is off, a short test pulse is sent to each valve. The CPU monitors the reference voltage. If the voltage is out of a given range, the ABS indicator light comes on. 	System down	System down	19-71
When the ignition voltage is lower or higher than a given voltage, the CPU inhibits ABS control and switches off the main relay, and the ABS indicator light comes on. When the ignition voltage recovers to normal range, ABS inhibition is canceled.	Inhibit all wheels	Inhibit all wheels	19-73
<p>The main CPU and sub CPU check each other under certain conditions. When the CPUs detect the following discrepancies, the ABS indicator light comes on.</p> <ul style="list-style-type: none"> When there is discrepancy in the calculated wheel speed velocity that continues for more than a given period. When there is discrepancy in the phase information that continues for more than a given period. When there is discrepancy in the calculated control parameter. When the watch dog control pulse fails for a given period. When the check of the ROM fails. When there is discrepancy in the data reading and writing procedure of RAM. 	System down	System down	19-74

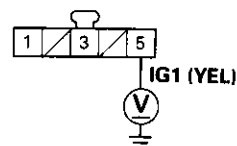
Troubleshooting

ABS Indicator Light Does Not Come On

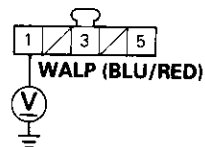
The ABS indicator light does not come on when ignition switch is turned ON (II).



GAUGE ASSEMBLY 5P CONNECTOR



Wire side of female terminals



(From page 19-60)

Check the gauge assembly:

1. Turn the ignition switch OFF.
2. Connect the gauge assembly 5P connector.
3. Connect the terminal No. 3 to body ground with a jumper wire.
4. Turn the ignition switch ON (II).

Does the ABS indicator light come on?

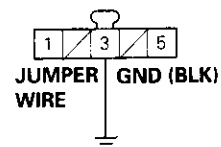
NO

Replace the ABS indicator light drive circuit in the gauge assembly.

YES

- Repair open in the wire between the gauge assembly and body ground.
- Repair poor ground (G401, G402).

GAUGE ASSEMBLY 5P CONNECTOR



Troubleshooting

ABS Indicator Light Does Not Go Off

The ABS indicator light does not go off after the engine is started.

- With engine running, ABS indicator light is ON.
- With the SCS service connector connected (see page 19-56), no DTC is indicated.

Check the RR DEF RLY (7.5 A) fuse in the under-dash fuse/relay box.

Is the fuse OK?

NO

Replace the fuse and recheck.

YES NOTE: Reinstall the fuse if it is OK.

Check the ABS +B (20 A) fuse in the under-hood fuse/relay box.

Is the fuse OK?

NO

Replace the fuse and recheck.

YES NOTE: Reinstall the fuse if it is OK.

Check for an open in the IG2 circuit:

1. Turn the ignition switch ON (II).
2. Measure the voltage between the ABS control unit 26P connector terminal No. 3 and body ground.

Is there battery voltage?

NO

Repair open in the wire between the RR DEF RLY (7.5 A) fuse and ABS control unit.

YES

Check for an open in the B1 and B2 circuit:

Measure the voltage between body ground and terminals No. 14 and No. 15 individually.

Is there battery voltage?

NO

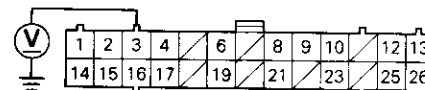
Repair open in the wire between the ABS +B (20 A) fuse and ABS control unit.

YES

(To page 19-63)

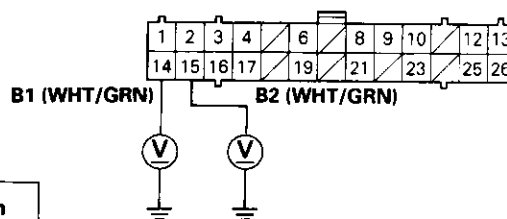
ABS CONTROL UNIT 26P CONNECTOR

IG2 (BLK/BLU)



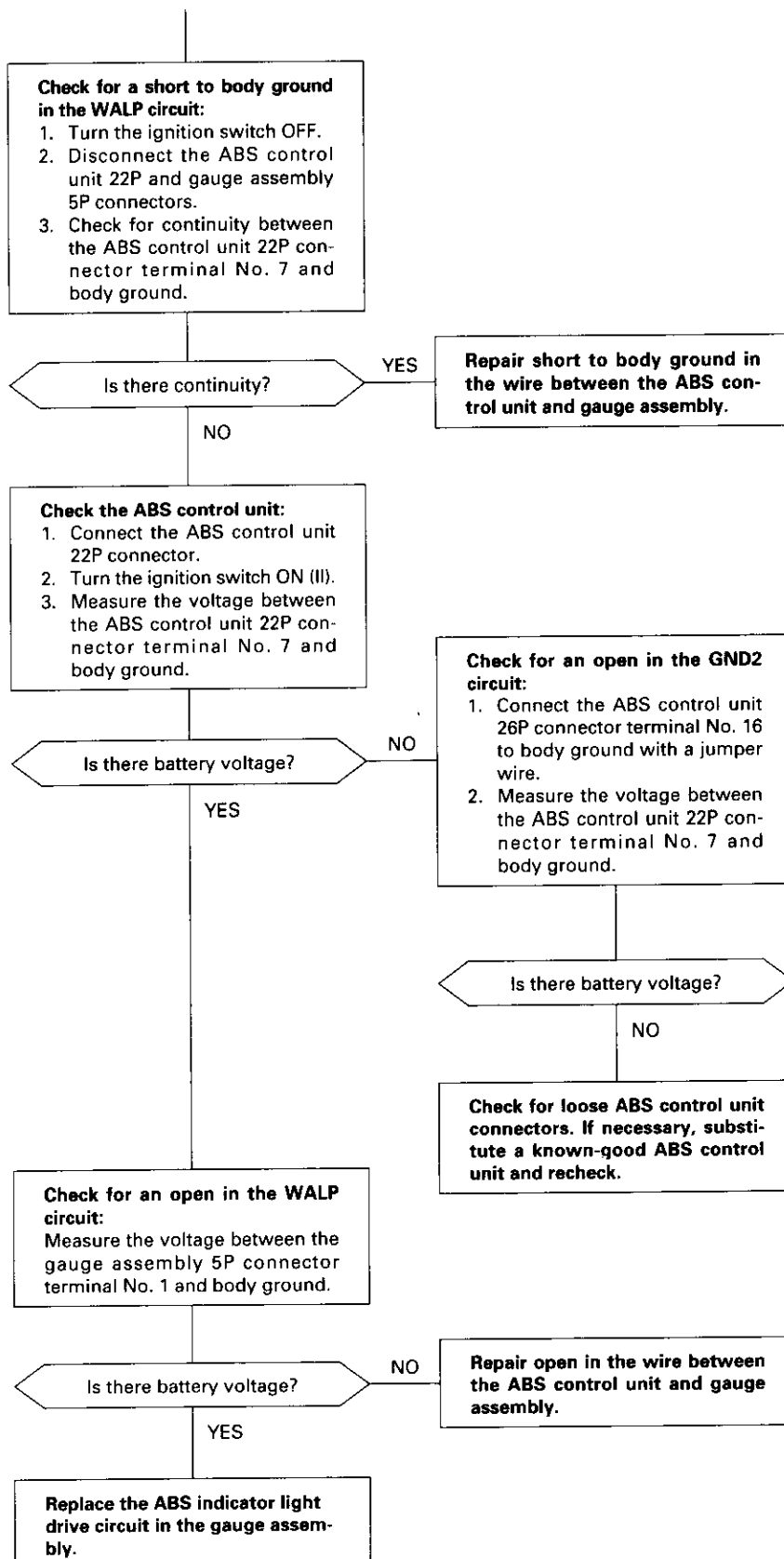
Wire side of female terminals

ABS CONTROL UNIT 26P CONNECTOR

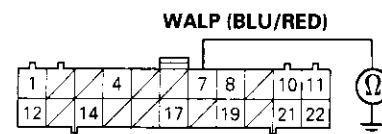


Wire side of female terminals

(From page 19-62)

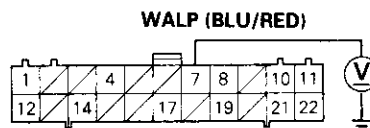


ABS CONTROL UNIT 22P CONNECTOR



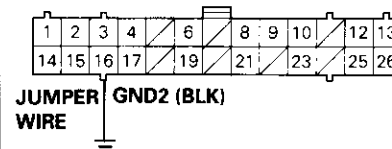
Wire side of female terminals

ABS CONTROL UNIT 22P CONNECTOR



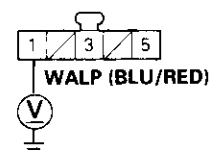
Wire side of female terminals

ABS CONTROL UNIT 26P CONNECTOR



Wire side of female terminals

GAUGE ASSEMBLY 5P CONNECTOR



Wire side of female terminals

Troubleshooting

Wheel Sensor

Diagnostic Trouble Code (DTC) 11~18: Wheel Sensor Diagnosis

NOTE: The ABS indicator light comes on when only the drive wheels are turning, signal disturbance is detected, etc. Therefore, test-drive the car at a speed of 12 mph (20 km/h) or more after turning the ignition switch from OFF to ON (II), and if the ABS indicator light does not come on, the system is OK.

- With the ignition switch ON (II), ABS indicator light does not go off.
- After driving, ABS indicator light comes on.
- With the SCS service connector connected (see page 19-56), DTCs 11~18 are indicated.

Check the wheel sensor circuit:

1. Disconnect the ABS control unit 26P connector.
2. Measure the resistance between the appropriate wheel sensor (0) and (1) circuit terminals*.

Is the resistance OK?
(Front: 750 – 1050 Ω/20°C, 68°F)
(Rear: 850 – 1150 Ω/20°C, 68°F)

NO

- Repair open in the (0) or (1) circuit wire, or short to the (0) circuit wire in the (1) circuit wire between the ABS control unit and appropriate wheel sensor.
- Replace the appropriate wheel sensor.

Check for a short to body ground in the wheel sensor circuit:

Check for continuity between the ABS control unit 26P connector appropriate wheel sensor (0) circuit terminal* and body ground.

Is there continuity?

YES

- Repair short to body ground in the (0) or (1) circuit wire between the ABS control unit and appropriate wheel sensor.
- Replace the appropriate wheel sensor.

NO

Check for a short to power in the wheel sensor circuit:

1. Reconnect the ABS control unit 26P connector.
2. Start the engine.
3. Measure the voltage between the ABS control unit 26P connector appropriate wheel sensor (0) circuit terminal and body ground.

Is there 4 V or more?

YES

- Repair short to power in the (0) or (1) circuit wire between the ABS control unit and appropriate wheel sensor.

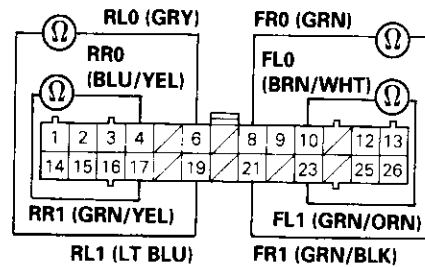
NO

NOTE:

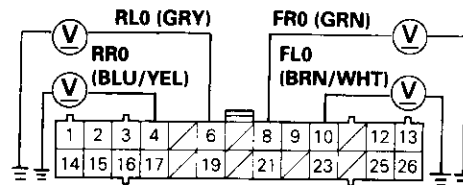
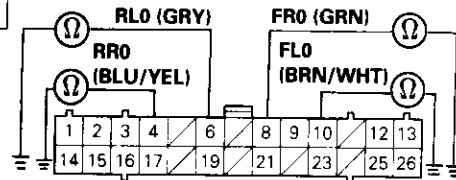
- Normal voltage: Approx. 2 V
- 0 V: Replace the ABS control unit.
- 4 V or more indicates a short to power.

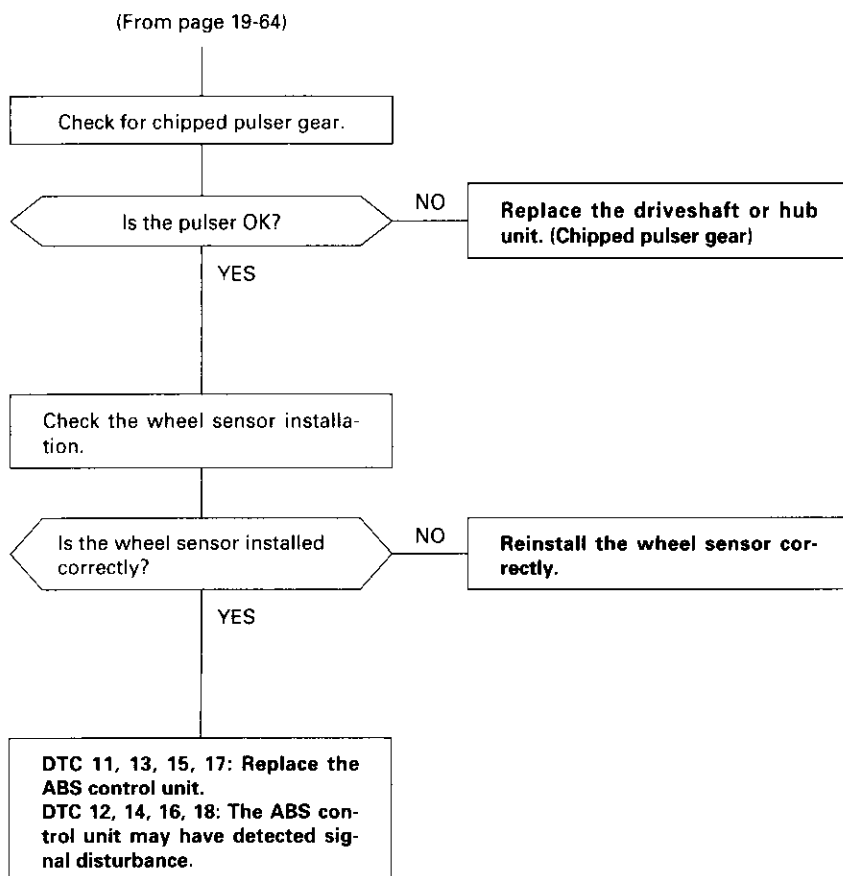
(To page 19-65)

ABS CONTROL UNIT 26P CONNECTOR



Wire side of female terminals





Troubleshooting

Solenoid

Diagnostic Trouble Code (DTC) 31-38: Solenoid Diagnosis

- With the ignition switch ON (II), ABS indicator light does not go off, or ABS indicator light comes on while ABS is functioning.
- With the SCS service connector connected (see page 19-56), DTCs 31-38 are indicated.

Check for a short to power in the solenoid circuit:

1. Disconnect the ABS control unit 22P and 26P connectors.
2. Start the engine.
3. Measure the voltage between the ABS control unit connector appropriate solenoid circuit terminal* and body ground.

Is there battery voltage?

YES

Repair short to power in the appropriate solenoid circuit wire between the ABS control unit and modulator unit.

NO

Check for a short to body ground in the solenoid circuit:

Check for continuity between the appropriate solenoid circuit terminal* and body ground.

Is there continuity?

YES

- Repair short to body ground in the appropriate solenoid circuit wire between the ABS control unit and modulator unit.
- Replace the modulator unit.

NO

Check the ABS control unit:

1. Turn the ignition switch OFF.
2. Connect the ABS control unit 22P and 26P connectors.
3. Connect the SCS service connector.
4. Turn the ignition switch ON (II).
5. Measure the voltage between the ABS control unit 26P connector appropriate COM circuit terminal** and body ground.

Is there approx. 3 V?

NO

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

YES

(To page 19-67)

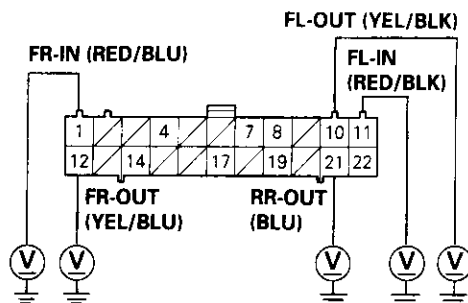
*

DTC	Appropriate Connector	Appropriate Terminal
31: FR-IN	22P	No. 1
32: FR-OUT	22P	No. 12
33: FL-IN	22P	No. 11
34: FL-OUT	22P	No. 10
35: RR-IN	26P	No. 13
36: RR-OUT	22P	No. 21
37: RL-IN	26P	No. 25
38: RL-OUT	26P	No. 12

**

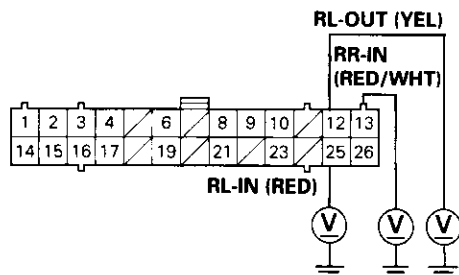
DTC	Appropriate Terminal
31: FR-IN	No. 2: SCOM
32: FR-OUT	No. 2: SCOM
33: FL-IN	No. 1: PCOM
34: FL-OUT	No. 1: PCOM
35: RR-IN	No. 1: PCOM
36: RR-OUT	No. 1: PCOM
37: RL-IN	No. 2: SCOM
38: RL-OUT	No. 2: SCOM

ABS CONTROL UNIT 22P CONNECTOR

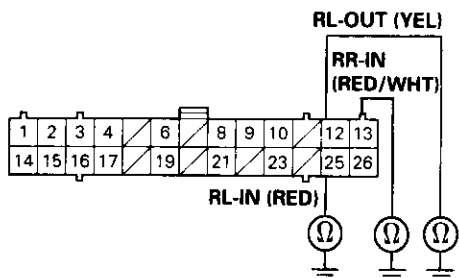
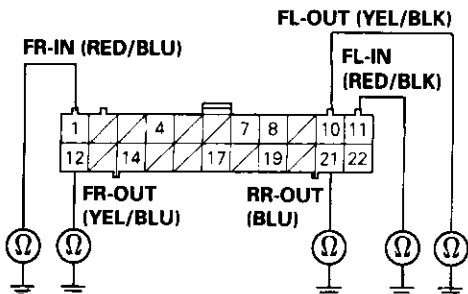


Wire side of female terminals

ABS CONTROL UNIT 26P CONNECTOR

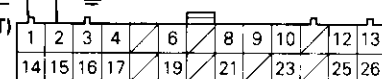


Wire side of female terminals



PCOM (GRN/WHT)

SCOM (BLK/WHT)



(From page 19-66)

Check for an open in the solenoid circuit:
Measure the voltage between the ABS control unit connector appropriate solenoid circuit terminal* and body ground.

Is there approx. 3 V?

YES

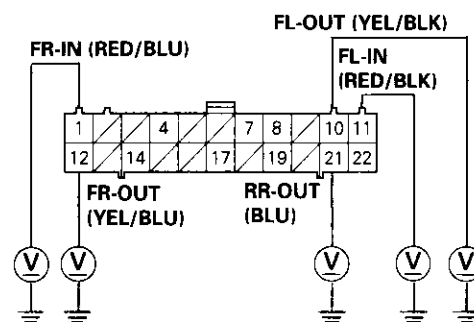
Check for loose ABS control unit connectors. If necessary, substitute a known-good ABS control unit and recheck.

*

DTC	Appropriate Connector	Appropriate Terminal
31: FR-IN	22P	No. 1
32: FR-OUT	22P	No. 12
33: FL-IN	22P	No. 11
34: FL-OUT	22P	No. 10
35: RR-IN	26P	No. 13
36: RR-OUT	22P	No. 21
37: RL-IN	26P	No. 25
38: RL-OUT	26P	No. 12

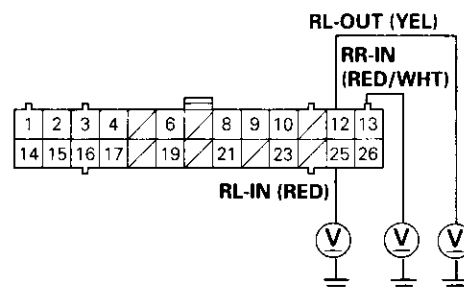
- Repair open in the appropriate COM circuit wire between the ABS control unit and modulator unit.
- Repair open in the appropriate solenoid circuit wire between the ABS control unit and modulator unit.
- Replace the modulator unit.

ABS CONTROL UNIT 22P CONNECTOR



Wire side of female terminals

ABS CONTROL UNIT 26P CONNECTOR

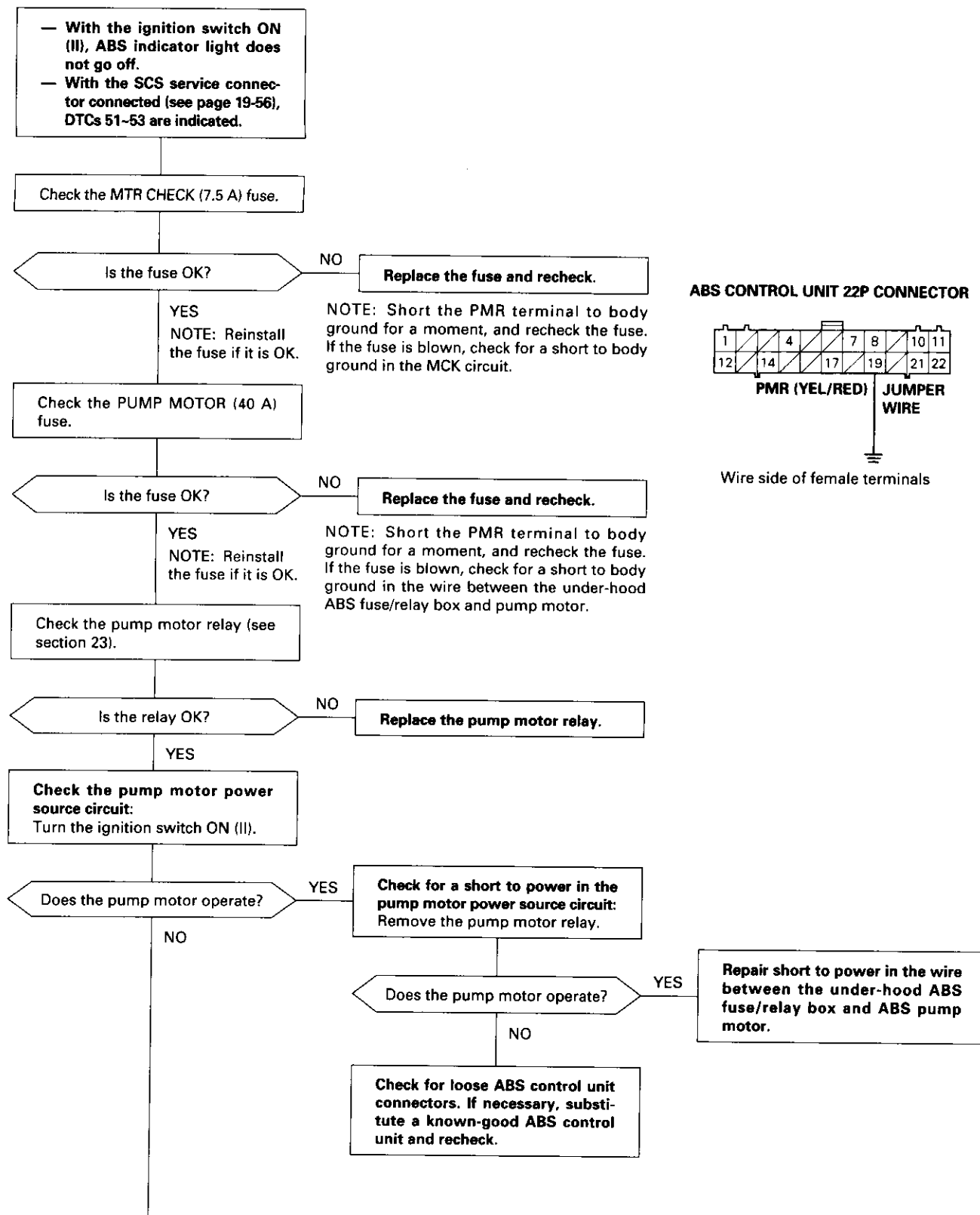


Wire side of female terminals

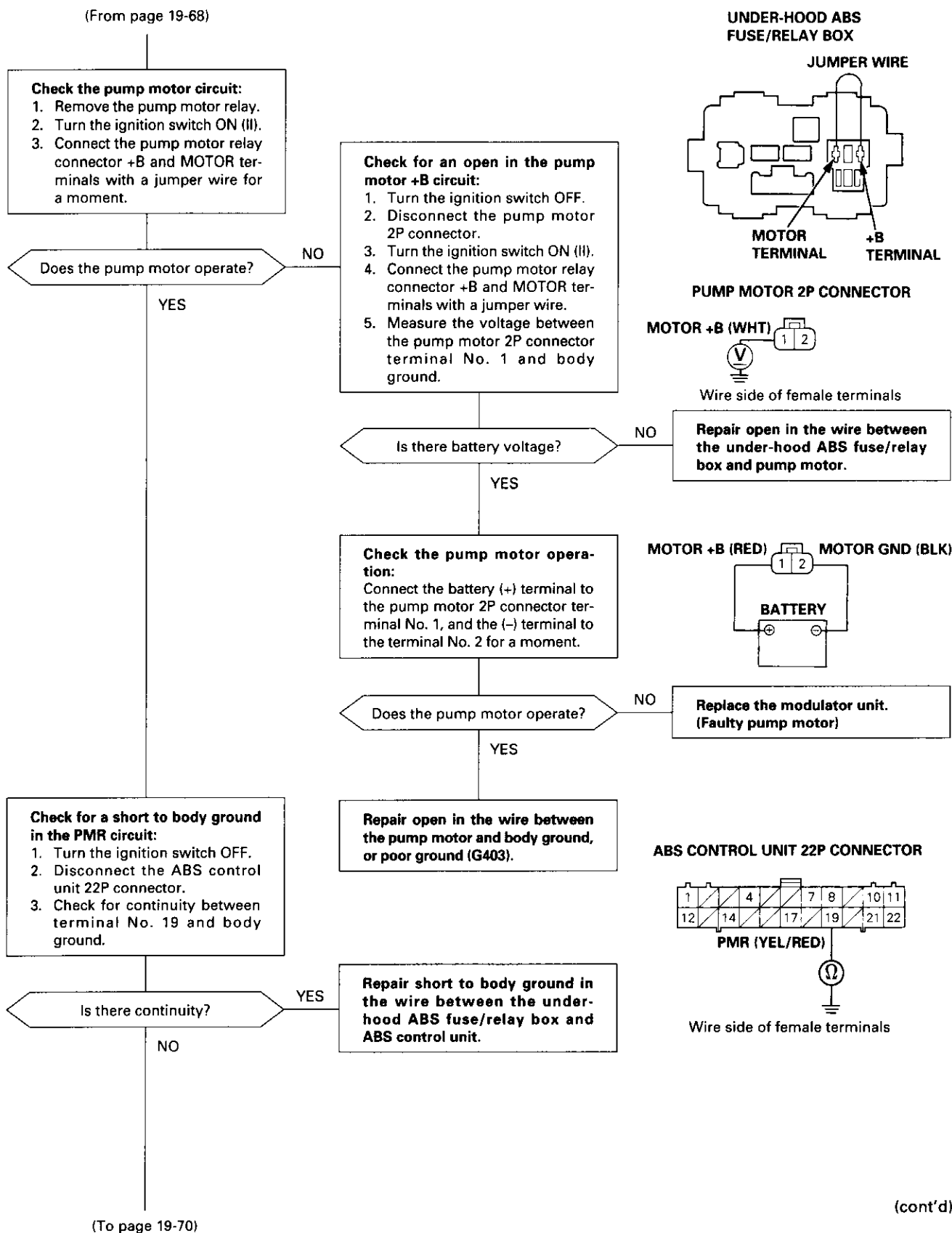
Troubleshooting

ABS Pump Motor

Diagnostic Trouble Code (DTC) 51~53: ABS Pump Motor Diagnosis



(To page 19-69)



(cont'd)

Troubleshooting

ABS Pump Motor (cont'd)

(From page 19-69)

Check for an open in the PCOM circuit:

1. Turn the ignition switch OFF.
2. Reconnect the ABS control unit 22P connector.
3. Connect the SCS service connector.
4. Turn the ignition switch ON (II).
5. Measure the voltage between the pump motor relay connector PCOM terminal and body ground.

Is there approx. 3 V?

NO

Repair open in the wire between the under-hood ABS fuse/relay box and ABS control unit.

YES

Check for an open in the PMR circuit:
Measure the voltage between the ABS control unit 22P connector terminal No. 19 and body ground.

Is there approx. 3 V?

NO

Repair open in the wire between the under-hood ABS fuse/relay box and ABS control unit.

YES

Check for an open in the MCK circuit:

1. Turn the ignition switch OFF.
2. Disconnect the SCS service connector.
3. Turn the ignition switch ON (II).
4. Measure the voltage between the ABS control unit 22P connector terminal No. 17 and body ground while connecting the pump motor relay connector +B and MOTOR terminal with a jumper wire for moment.

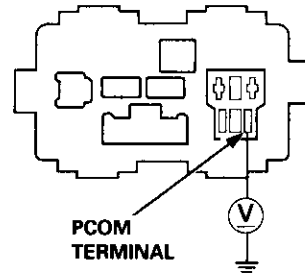
Is there battery voltage?

NO

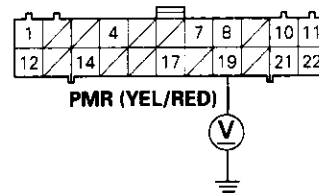
Repair open in the wire between the under-hood ABS fuse/relay box and ABS control unit.

YES

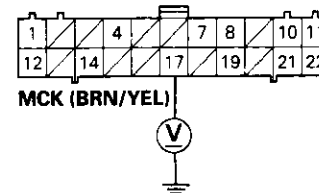
Check for loose ABS control unit connectors. If necessary, substitute a known-good ABS control unit and recheck.



ABS CONTROL UNIT 22P CONNECTOR



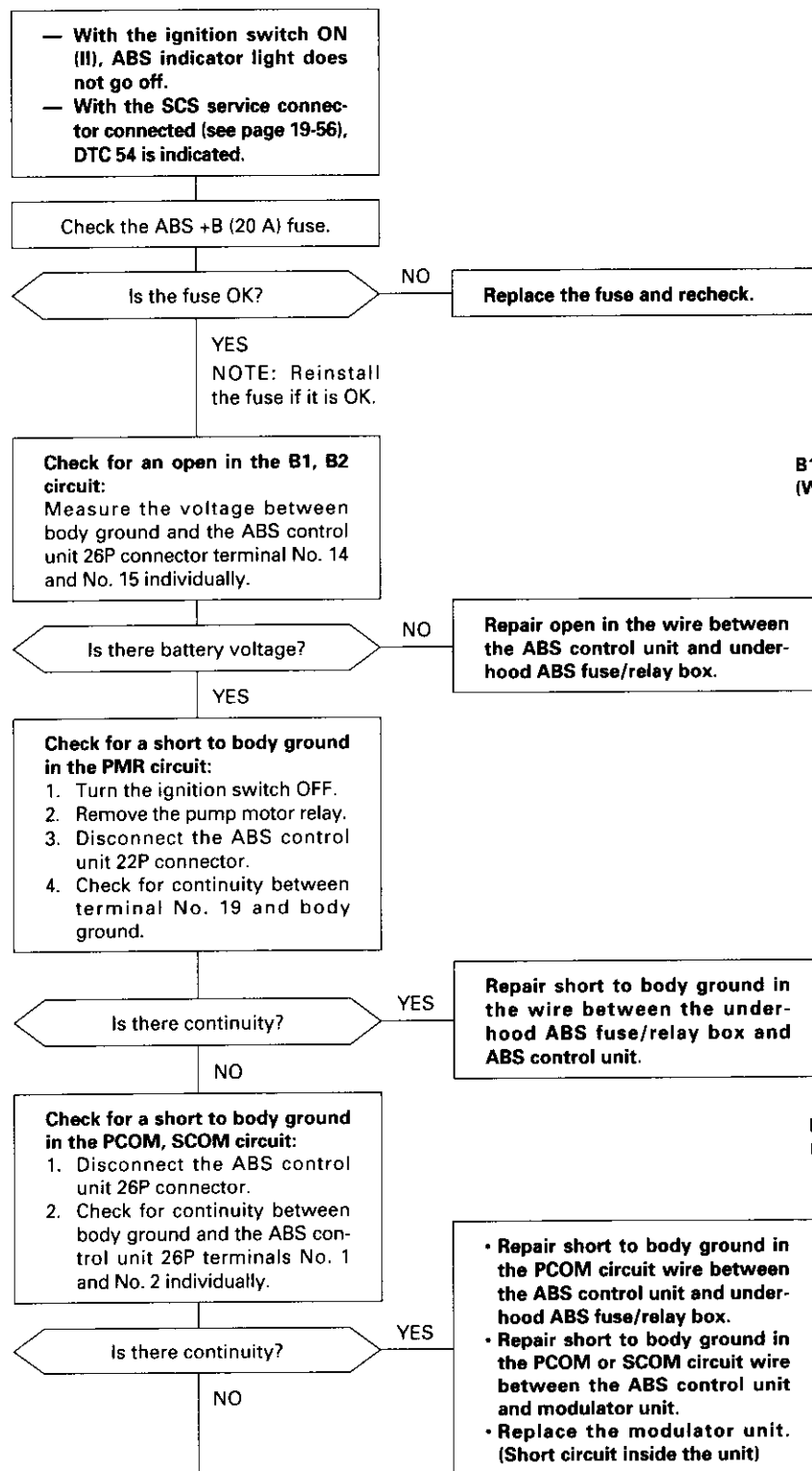
Wire side of female terminals



MCK (BRN/YEL)

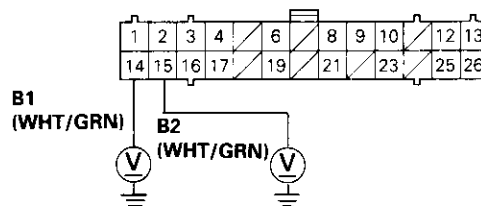
Main Relay

Diagnostic Trouble Code (DTC) 54: Main Relay Diagnosis



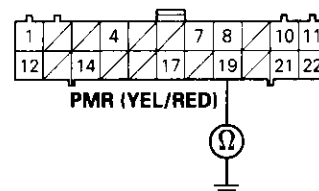
(To page 19-72)

ABS CONTROL UNIT 26P CONNECTOR

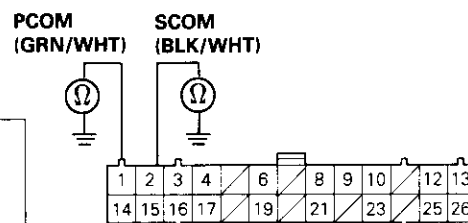


Wire side of female terminals

ABS CONTROL UNIT 22P CONNECTOR



Wire side of female terminals



(cont'd)

Troubleshooting

Main Relay (cont'd)

(From page 19-71)

Check for a short to power in the PCOM, SCOM circuit:
1. Turn the ignition switch ON (II).
2. Measure the voltage between body ground and ABS control unit 26P connector terminals No. 1 and No. 2 individually.

Is there voltage?

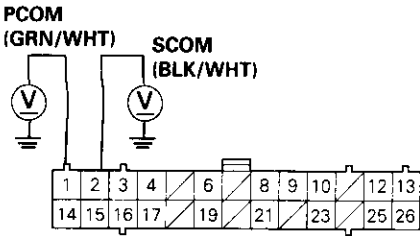
YES

NO

Replace the ABS control unit.

- Repair short to power in the PCOM circuit wire between the ABS control unit and underhood ABS fuse/relay box.
- Repair short to power in the PCOM or SCOM circuit wire between the ABS control unit and modulator unit.
- Replace the modulator unit. (Short to power inside the unit)

NOTE: Voltage indicates a short to power.



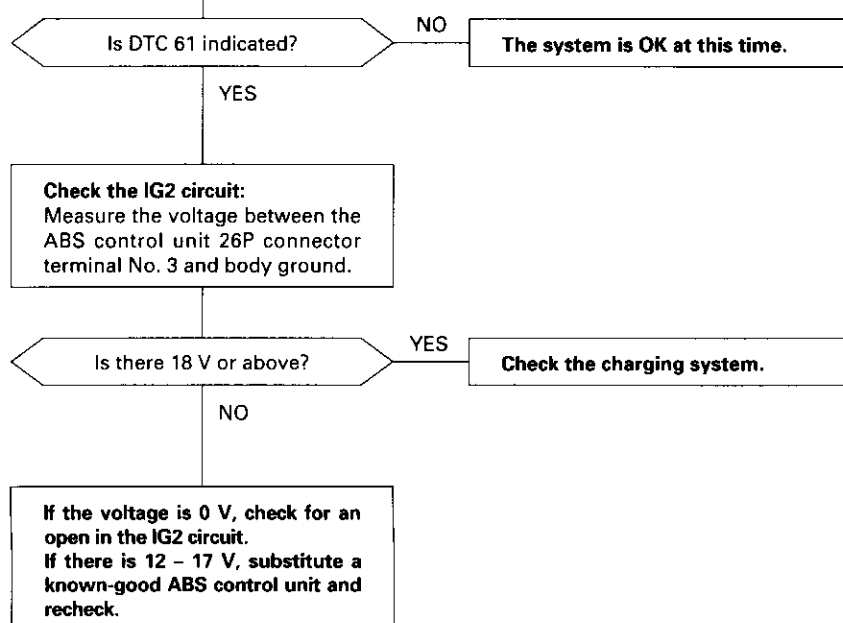
Ignition Voltage

Diagnostic Trouble Code (DTC) 61: Ignition Voltage Diagnosis

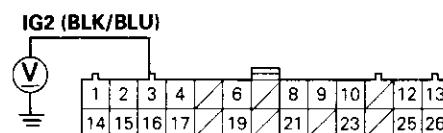
- With the engine running, ABS indicator light is ON.
- With the SCS service connector connected (see page 19-56), DTC 61 is indicated.

Problem verification:

1. Erase the DTC.
2. Start the engine.
3. Make sure that the ABS indicator light comes on and DTC 61 is indicated.



ABS CONTROL UNIT 26P CONNECTOR

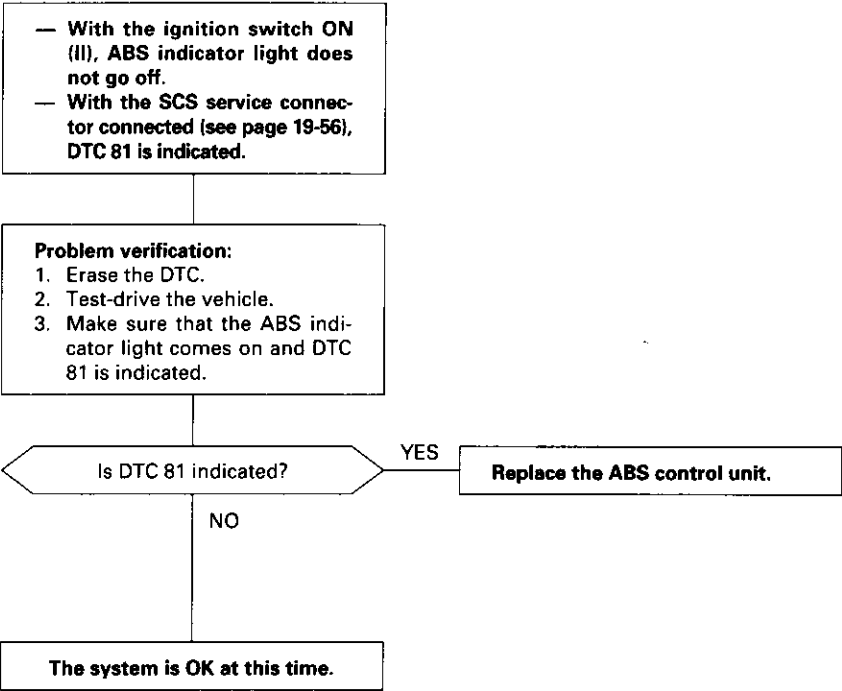


Wire side of female terminals

Troubleshooting

Central Processing Unit (CPU)

Diagnostic Trouble Code (DTC) 81: CPU Diagnosis



Removal/Installation

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.
- Take care not to damage or deform the brake lines during removal and installation.
- To prevent the brake fluid from flowing, plug and cover the hose ends and joints with a shop towel or equivalent material.

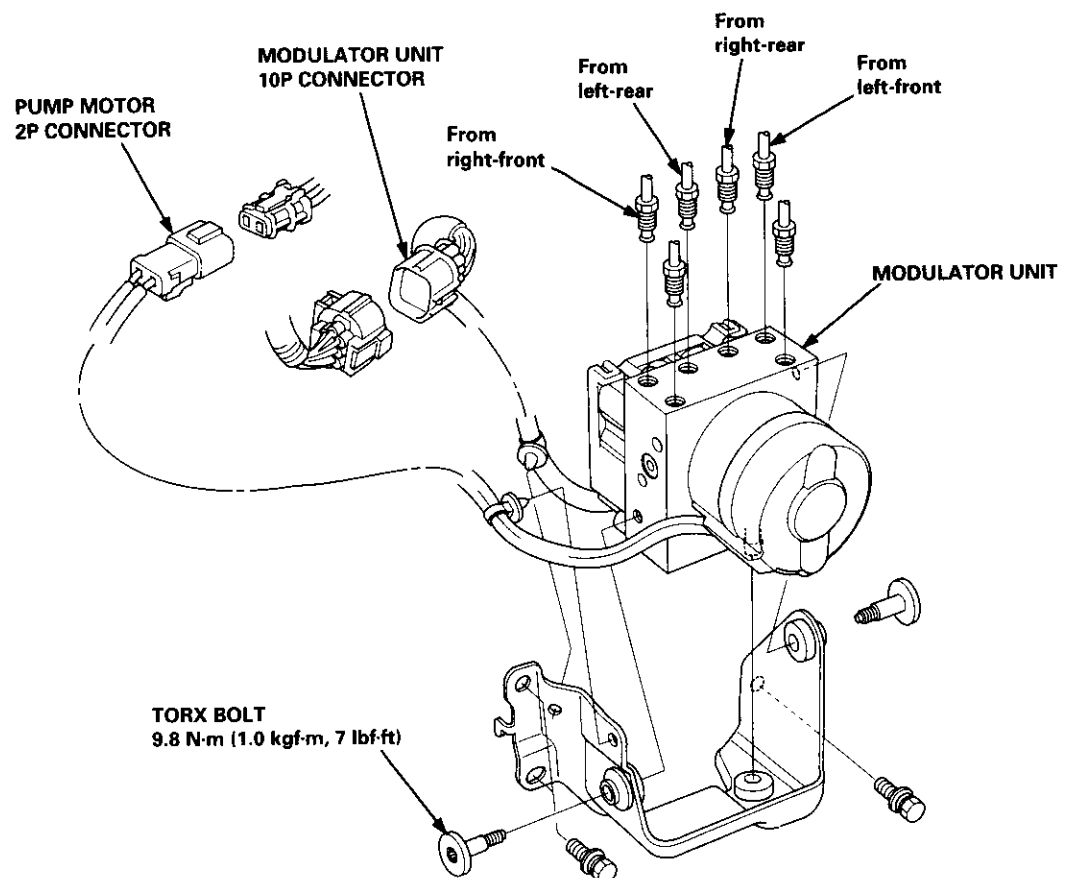
NOTE: Tighten the flare nuts to 15 N·m (1.5 kgf·m, 11 lbf·ft).

Removal

1. Disconnect the modulator unit 10P and pump motor 2P connectors.
2. Disconnect the brake lines, then remove the modulator unit.

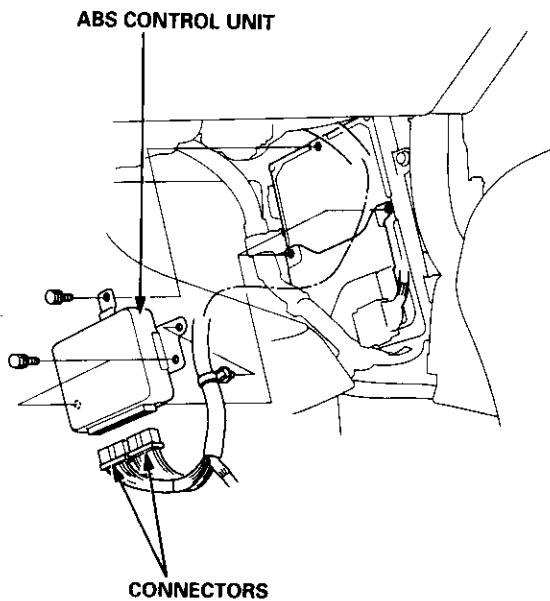
Installation

1. Install the modulator unit, then connect the brake lines.
2. Connect the modulator unit 10P and pump motor 2P connectors.
3. Bleed the brake system.
4. Start the engine, and check that the ABS indicator light goes off.



Replacement

1. Remove the right side kick panel.
2. Disconnect the ABS control unit connectors.
3. Remove the ABS control unit.
4. Install the ABS control unit in the reverse order of removal.

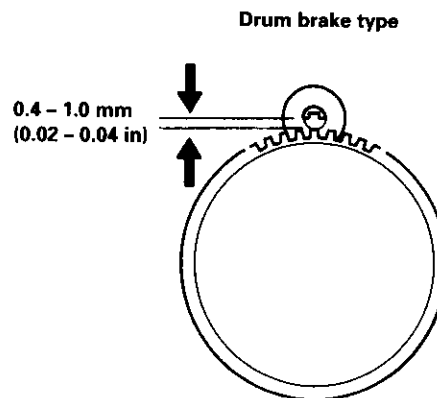
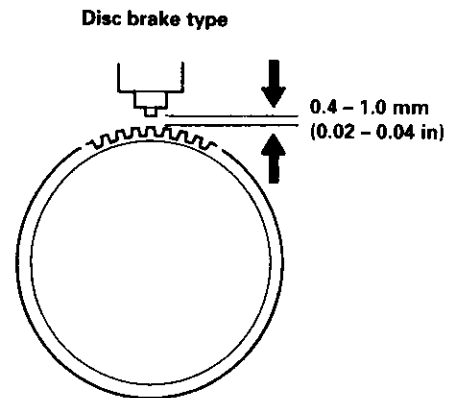


Inspection

1. Check the front and rear pulser for chipped or damaged teeth.
2. Measure the air gap between the wheel sensor and pulser all the way around while rotating the pulser.

Standard: 0.4 – 1.0 mm (0.02 – 0.04 in)

NOTE: If the gap exceeds 1.0 mm (0.04 in), the probability is a distorted suspension arm which should be replaced.

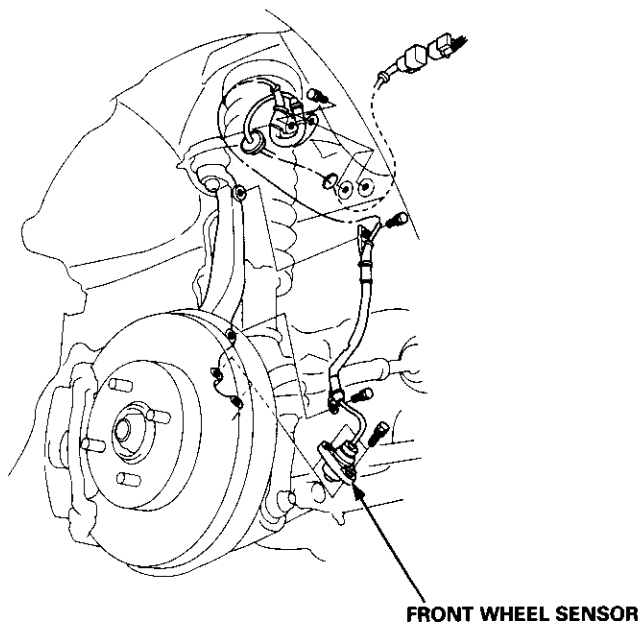


Wheel Sensor Replacement

NOTE:

- Be careful when installing the sensors to avoid twisting the wires.
- The torque value of the bolts is 9.8 N·m (1.0 kgf·m, 7 lbf·ft).

Front



Rear

1. Remove the hub bearing unit (see section 18).
2. Remove the four backing plate bolts.
3. Pull the backing plate away from the trailing arm, then remove the wheel sensor. It is not necessary to disconnect the brake line.

NOTE: This illustration is drum brake type. The torque value of the disk type is same as drum type.

