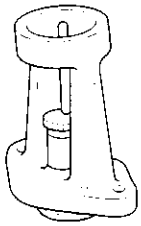
Brakes

Conventional Brake Components

Special Tools

Ref.No.	Tool Number	Description	Qty
①	07JAG-SD40100	Pushrod Adjustment Gauge	1



①

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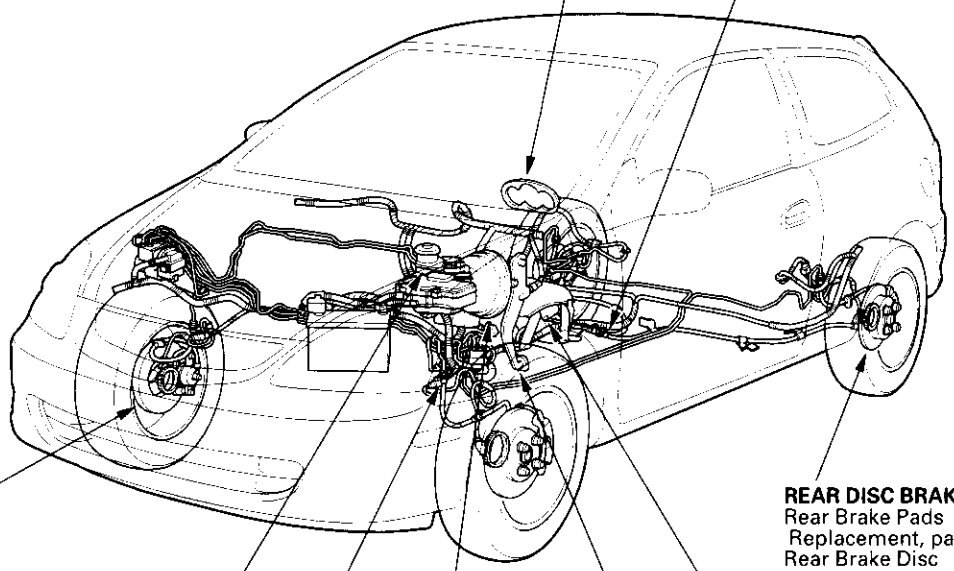

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Brake System Inspection and Tests

Component Inspections:

Component	Procedure	Also check for:
Master Cylinder	Look for damage or signs of fluid leakage at: • Reservoir or reservoir grommets • Line joints • Between master cylinder and booster	
Brake Hoses	Look for damage or signs of fluid leakage at: • Line joints and banjo bolt connections • Hoses and lines, also inspect for twisting or damage	Bulging, twisted or bent lines.
Caliper	Look for damage or signs of fluid leakage at: • Piston seal • Banjo bolt connections • Bleeder screw	Seized or sticking caliper pins.
ABS Modulator	Look for damage or signs of fluid leakage at: • Line joints • Modulator	

Brake System Test

Brake pedal sinks/fades when braking

1. Start the engine, and let it warm up to operating temperature.
2. Attach a 2-inch piece of masking tape along the bottom of the steering wheel, and draw a horizontal reference mark across it.
3. With the transmission in Neutral, press and hold the brake pedal lightly, then release the parking brake.
4. While still holding the brake pedal, hook the end of the tape measure behind it. Then pull the tape up to the steering wheel, noting where the tape measure lines up with the reference mark you made on the masking tape.
5. Apply steady pressure to the brake pedal for 3 minutes.
6. Watch the tape measure.
   - if it moves less than 10 mm, the master cylinder is OK.
   - if it moves more than 10 mm replace the master cylinder.

Rapid brake pad wear, Vehicle vibration (after a long drive), or High, hard brake pedal

1. Drive the vehicle until the brakes drag or until the pedal is high and hard. This can take 20 or more brake pedal applications during an extended test drive.

2. With the engine running, raise the vehicle on a lift, and spin all four wheels by hand.

   Is there brake drag at any of the wheels?

   YES—Go to step 3.

   NO—Look for other causes of the pad wear, high pedal, or vehicle vibration.■

3. Turn the engine off, pump the brake pedal to deplete the vacuum in the brake booster, and then spin the wheels again to check for brake drag.

   Is there brake drag at any of the wheels?

   YES—Go to step 4.

   NO—Replace the brake booster.■

4. Without removing the brake lines, unbolt and separate the master cylinder from the booster, then spin the wheels to check for brake drag.

   Is there brake drag at any of the wheels?

   YES—Go to step 5.

   NO—Check the brake pedal position switch adjustment and pedal free play.■

5. Loosen the hydraulic lines at the master cylinder, then spin the wheels to check for brake drag.

   Is there brake drag at any of the wheels?

   YES—Go to step 6.

   NO—Replace the master cylinder.■

6. Loosen the bleeder screws at each caliper, then spin the wheels to check for brake drag.

   Is there brake drag at any of the wheels?

   YES—Disassemble and repair the caliper on the wheel(s) with brake drag.■

   NO—Inspect brake hose (s)/line (s).

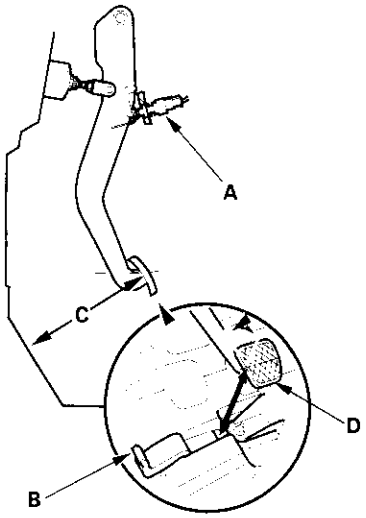
Brake Pedal and Brake Pedal Position Switch Adjustment

Pedal Height

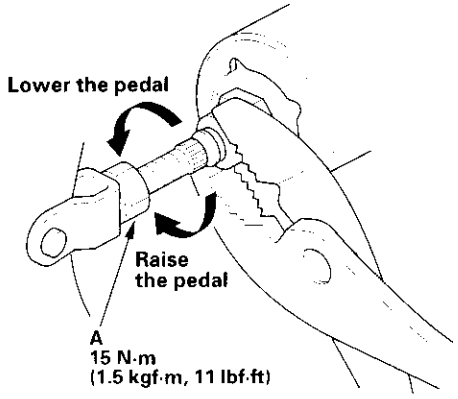
1. Disconnect the brake pedal position switch connector, turn the brake pedal position switch (A) counterclockwise, and pull it back until it is no longer touching the brake pedal.

2. Lift up the carpet and the insulator cutout (B). Measure the pedal height (C) from the middle of the left side of the pedal pad (D).

   Standard Pedal Height (with carpet removed): 184 mm (7 4/16 in.)



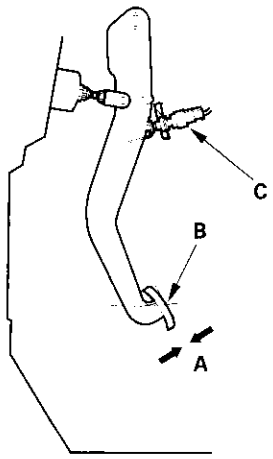
3. Loosen the pushrod locknut (A), and screw the pushrod in or out with pliers until the standard pedal height from the floor is reached. After adjustment, tighten the locknut firmly. Do not adjust the pedal height with the pushrod pressed.



Pedal Free Play

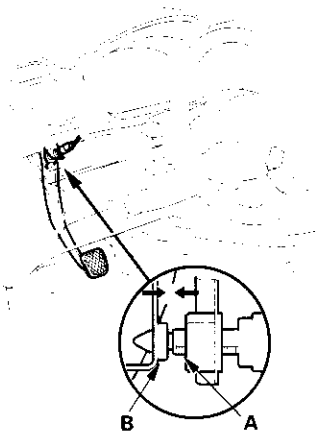
4. With the engine off, inspect the play (A) on the pedal pad (B) by pushing the pedal by hand.

   Free Play: 0.4 – 3.0 mm (0.016–0.118 in.)



5. If the pedal free play is out of specification, adjust the brake pedal position switch (C). If the pedal free play is insufficient, it may result in brake drag.

6. Push in the brake pedal position switch until its plunger is fully pressed (threaded end (A) touching the pad (B) on the pedal arm). Then, turn the switch 45° clockwise to lock it. The gap between the brake pedal position switch and the pad is automatically adjusted to 0.4 to 3.0 mm (0.016–0.118 in.) by locking the switch. Make sure the brake lights go off when the pedal is released.



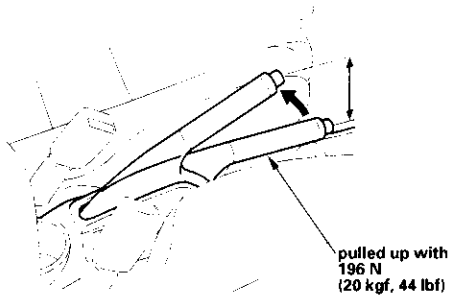
7. Check the brake pedal free play as described below.

Parking Brake Check and Adjustment

Check

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

   Lever locked clicks: 7—8

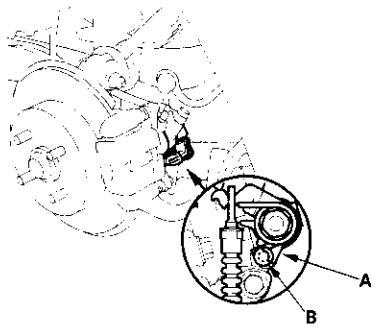


2. Adjust the parking brake if the lever clicks are not within the specification.

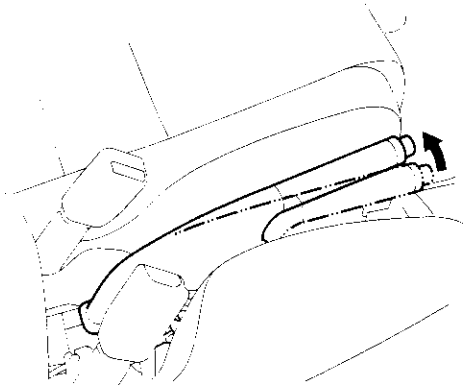
Adjustment

1. Release the parking brake lever fully.
2. Loosen the parking brake adjusting nut, start the engine, and press the brake pedal several times to set the self-adjusting brake before adjusting the parking brake.
3. Block the front wheels, then raise the rear of the vehicle, and support it with safety stands in the proper location (see page 1-8).
4. Make sure the parking brake arm (A) on the rear brake caliper contacts the brake caliper pin (B).

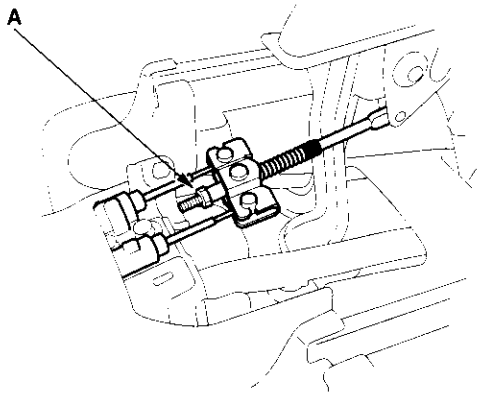
   NOTE: The parking brake arm will only contact the brake caliper pin when the parking brake adjusting nut is loosened.



5. Remove the rear console (see page 20-57).
6. Pull the parking brake lever up one click.



7. Tighten the adjusting nut (A) until the parking brakes drag slightly when the rear wheels are turned.

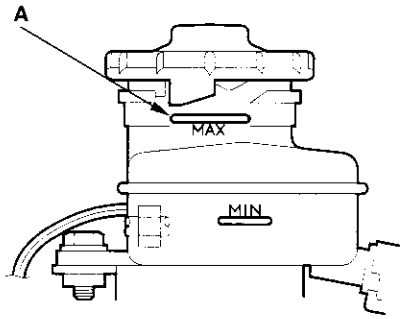


8. Release the parking brake lever fully, and check that the parking brakes do not drag when the rear wheels are turned. Readjust if necessary.
9. Make sure the parking brakes are fully applied when the parking brake lever is pulled up fully.
10. Reinstall the rear console.

Brake System Bleeding

NOTE:
- 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.
- 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.
- Do not reuse the drained fluid.
- Always use Honda DOT 3 brake fluid. Non-Honda brake fluid can cause corrosion and shorten the life of the system.
- Make sure no dirt or other foreign matter is allowed to contaminate the brake fluid.

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



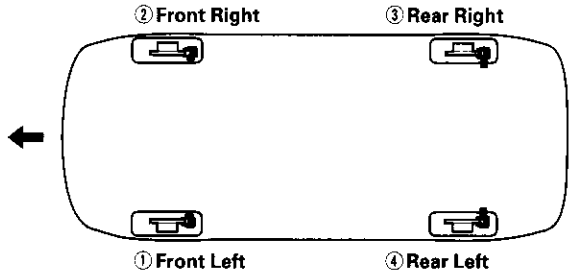
2. Slide a piece of clear plastic hose over the first bleed screw, and submerge the other end in a container of new brake fluid.

3. Have someone slowly pump the brake pedal several times, then apply steady pressure.

4. Starting at the left-front, loosen the brake bleed screw to allow air to escape from the system. Then tighten the bleed screw securely.

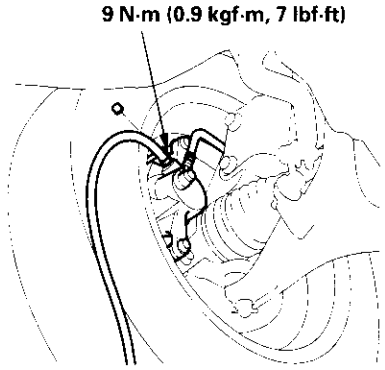
5. Repeat the procedure for each wheel in the sequence shown below until air bubbles no longer appear in the fluid.

BLEEDING SEQUENCE:

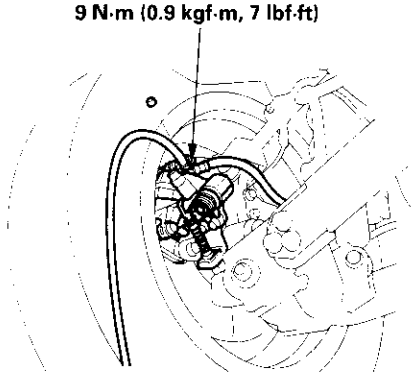


6. Refill the master cylinder reservoir to the MAX (upper) level line.

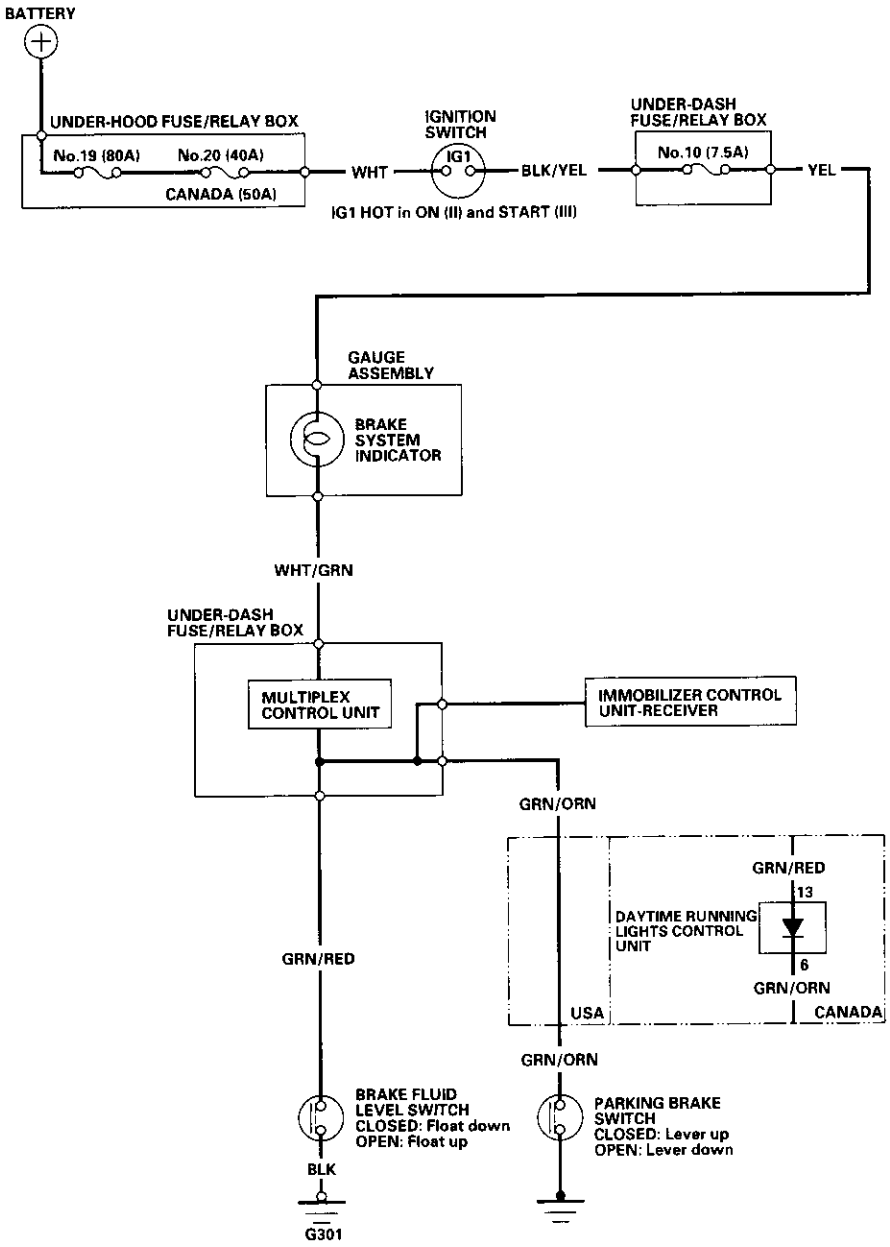
FRONT BRAKE:



REAR BRAKE:

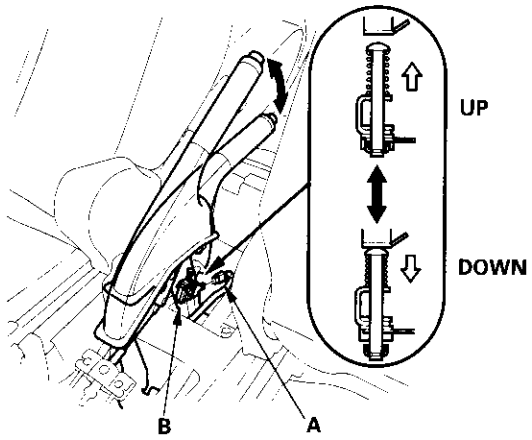


Brake System Indicator Circuit Diagram



Parking Brake Switch Test

1. Remove the rear console, and disconnect the connector (A) from the switch (B).



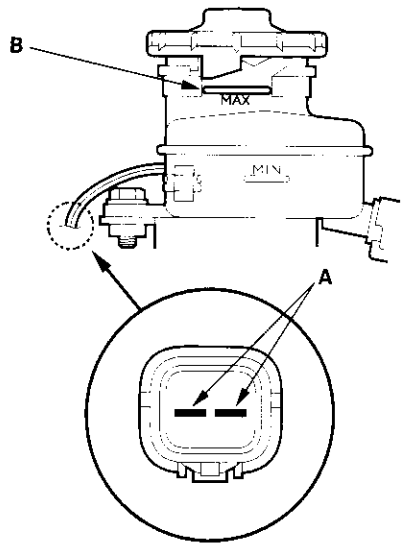
2. Check for continuity between the switch terminal and body ground:

   - With the brake lever up, there should be continuity.
   - With the brake lever down, there should be no continuity.

Brake Fluid Level Switch Test

Check for continuity between the terminals (A) with the float in the down position and the up position.

- Remove the brake fluid completely from the reservoir. With the float down, there should be continuity.
- Fill the reservoir with brake fluid to MAX (upper) level (B). With the float up, there should be no continuity.



Front Brake Pads Inspection and Replacement

⚠CAUTION

Frequent inhalation of brake pad dust, regardless of material composition, could be hazardous to your health.
- Avoid breathing dust particles.
- Never use an air hose or brush to clean brake assemblies. Use an OSHA-approved vacuum cleaner.

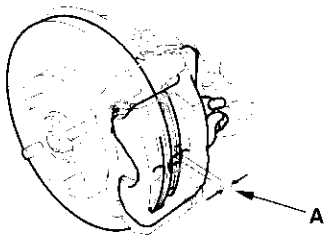
Inspection

1. Raise the front of the vehicle, and support it with safety stands in the proper location (see page 1-8). Remove the front wheels.

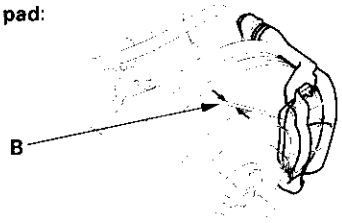
2. Check the thickness of the inner pad (A) and outer pad (B). Do not include the thickness of the brake pad backing plate.

   Brake pad thickness:
   Standard: 9.5—10.5 mm (0.37—0.41 in.)
   Service limit: 1.6 mm (0.06 in.)

Inner pad:



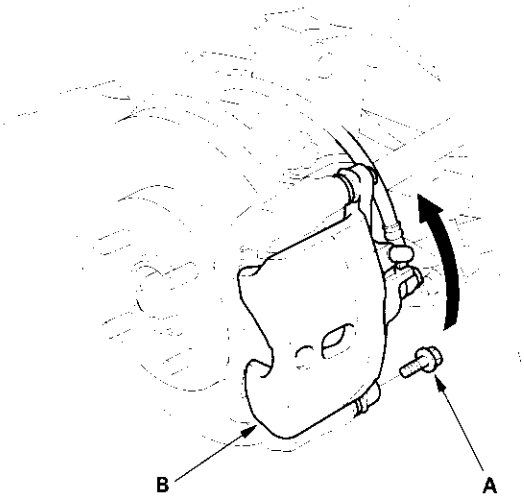
Outer pad:



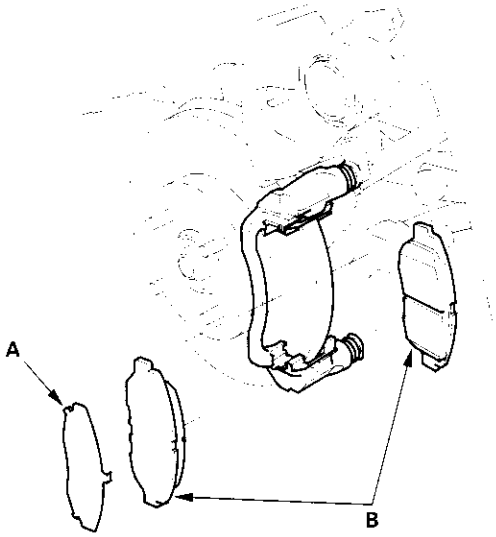
3. If the brake pad thickness is less than the service limit, replace all the pads as a set.

Replacement

1. Remove the bolt (A), and pivot the caliper (B) up out of the way. Check the hose and pin boots for damage and deterioration.



2. Remove the pad shim (A) and pads (B).



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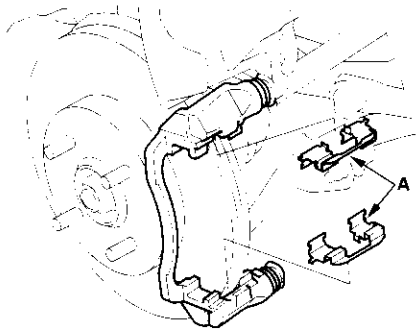
Front Brake Pads Inspection and Replacement (cont'd)

3. Remove the pad retainers (A), and check the caliper pins for free movement.



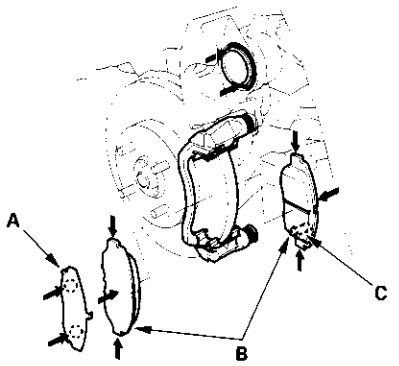
4. Clean the caliper thoroughly; remove any rust, and check for grooves and cracks.

5. Check the brake disc for damage and cracks.

6. Apply Dow Corning Molykote M77 grease to the retainers on their mating surfaces against the caliper bracket.

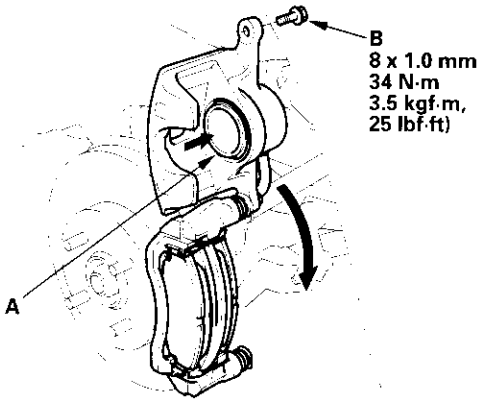
7. Install the pad retainers. Wipe excess grease off the retainers. Contaminated brake discs and pads reduce stopping ability. Keep grease off the discs and pads.

8. Apply Molykote M77 grease to both sides of the pad shim (A), the back of the pads (B), and the other areas indicated by the arrows.
Wipe excess grease off the shim. Contaminated brake discs and pads reduce stopping ability. Keep grease off the discs and pads.



9. Install the brake pads and pad shim correctly. Install the pads with the wear indicators (C) on the inside.
If you are reusing the pads, always reinstall the brake pads in their original positions to prevent a momentary loss of braking efficiency.

10. Push in the piston (A) so the caliper will fit over the pads. Check the brake fluid level. The brake fluid may overflow if the reservoir is too full. Make sure the piston boot is in position to prevent damaging it when pivoting the caliper down.



11. Pivot the caliper down into position. Being careful not to damage the pin boots, install the bolt (B), and tighten it to the specified torque.

12. Press the brake pedal several times to make sure the brake works, then test-drive.

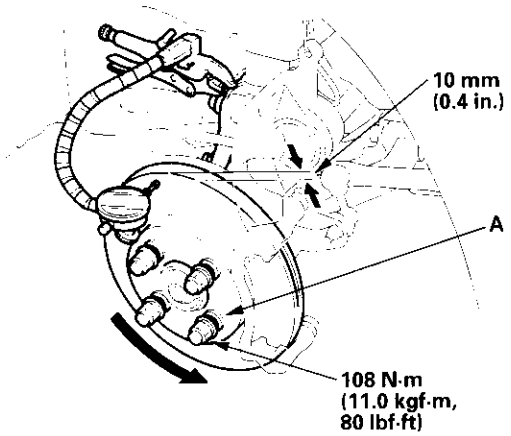
NOTE: Engagement of the brake may require a greater pedal stroke immediately after the brake pads have been replaced as a set. Several applications of the brake pedal will restore the normal pedal stroke.

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

Front Brake Disc Inspection

Runout

1. Raise the front of the vehicle, and support it with safety stands in the proper location (see page 1-8). Remove the front wheels.
2. Remove the brake pads (see page 19-11).
3. Inspect the disc surface for damage and cracks. Clean the disc thoroughly, and remove all rust.
4. Install suitable flat washers (A) and wheel nuts, and tighten the nuts to the specified torque to hold the brake disc securely against the hub.



5. Set up the dial gauge against the brake disc 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.)

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

   Max. Refinish Limit: 19.0 mm (0.75 in.)

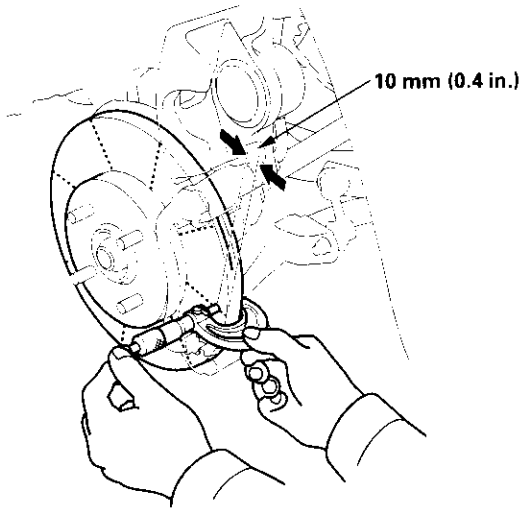
   NOTE:
   - If the brake disc is beyond the service limit for refinishing, replace it (see page 18-11).
   - A new disc should be refinished if its runout is greater than 0.10 mm (0.004 in.).

Thickness and Parallelism

1. Raise the front of the vehicle, and support it with safety stands in the proper location (see page 1-8). Remove the front wheels.
2. Remove the brake pads (see page 19-11).
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.)
   Brake Disc Parallelism: 0.015 mm (0.0006 in.) max.

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



4. If the smallest measurement is less than the max. refinishing limit, replace the brake disc (see page 18-11).
5. 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.

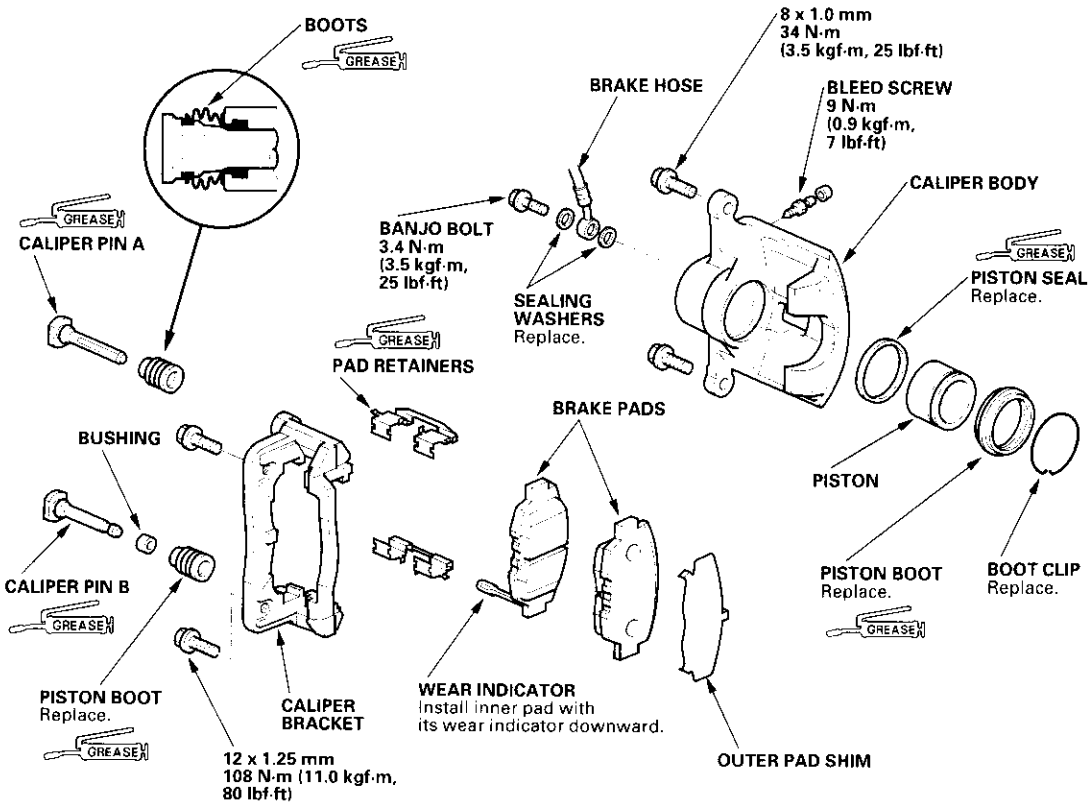
Front Brake Caliper Overhaul

⚠CAUTION

Frequent inhalation of brake pad dust, regardless of material composition, could be hazardous to your health.
- Avoid breathing dust particles.
- Never use an air hose or brush to clean brake assemblies. Use an OSHA-approved vacuum cleaner.

Remove, disassemble, inspect, reassemble, and install the caliper, and note these items:
- Do not spill brake fluid on the vehicle; it may damage the paint; if brake fluid gets on the paint, wash it off immediately with water.
- To prevent dripping, cover disconnected hose joints with rags or shop towels.
- Clean all parts in brake fluid and air dry; blow out all passages with compressed air.
- Before reassembling, check that all parts are free of dust and other foreign particles.
- Replace parts with new ones as specified in the illustration.
- Make sure no dirt or other foreign matter is allowed to contaminate the brake fluid.
- When reusing pads, always reinstall them in their original positions to prevent loss of braking efficiency.
- Do not reuse drained brake fluid.
- Always use Honda DOT 3 brake fluid. Non-Honda brake fluid can cause corrosion and shorten the life of the system.
- Do not mix different brands of brake fluid as they may not be compatible.
- Coat the piston, piston seal groove, and caliper bore with clean brake fluid.
- Make sure no grease or oil gets on the brake discs or pads.
- Replace all rubber parts with new ones whenever disassembled.
- After installing the caliper, check the brake hose and line for leaks, interference, and twisting.

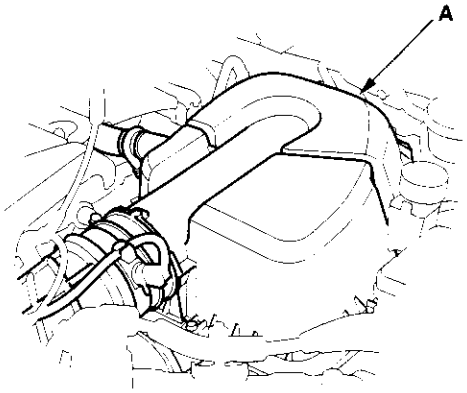
GREASE: **Honda caliper grease (P/N 08C30-B0234M)**



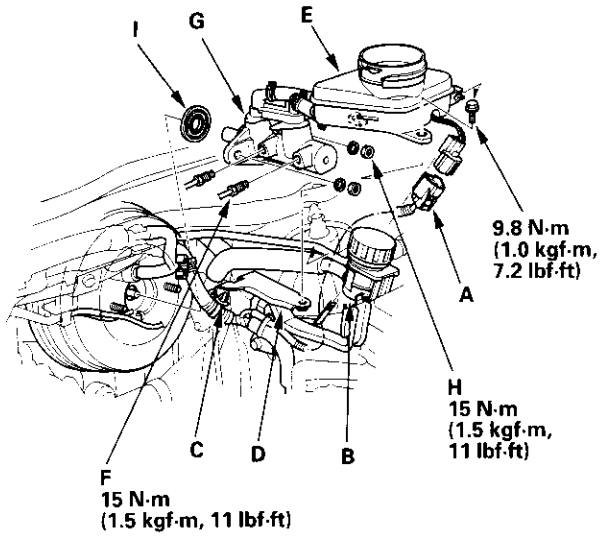
Master Cylinder Replacement

NOTE: 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. Remove the air cleaner assembly (A).



2. Disconnect the brake fluid level sensor connector (A).



3. Remove the clutch reservoir (B) and engine wire harness clip (C) from the master cylinder mounting base (D).

4. Remove the reservoir cap and brake fuid from the reservoir.

5. Remove the reservoir (E) on the master cylinder mounting base.

6. Disconnect the brake lines (F) from the master cylinder (G). To prevent spills, cover the hose joints with rags or shop towels.

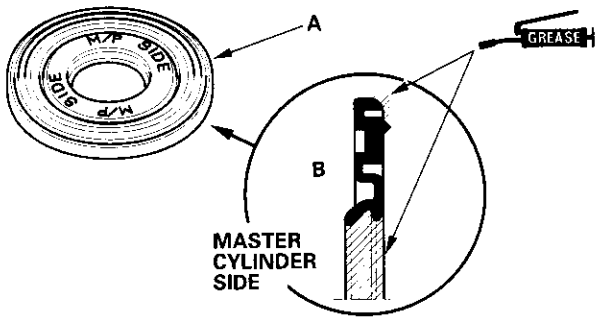
7. Remove the master cylinder mounting nuts (H) and washers.

8. Remove the master cylinder from the brake booster. Be careful not to bend or damage the brake lines when removing the master cylinder.

9. Remove the rod seal (I) from the master cylinder.

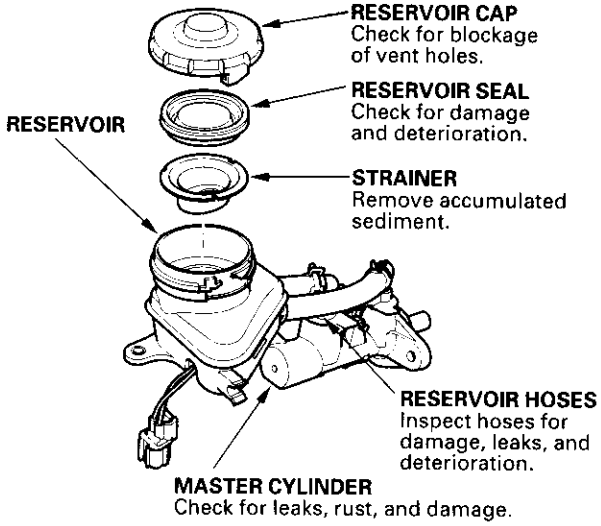
10. Install the master cylinder in the reverse order of removal, and note these items:

- Replace all the rubber parts with new ones whenever the master cylinder is removed.
- Check the pushrod clearance before installing the master cylinder, and adjust it if necessary (see page 19-16).
- Use a new rod seal on reassembly.
- Coat the inner bore lip and outer circumference of the new rod seal (A) with the recommended seal grease in the master cylinder set.
- Install the rod seal onto the master cylinder with its grooved side (B) toward the master cylinder.
- Check the brake pedal height and free play after installing the master cylinder, and adjust it if necessary (see page 19-6).



Master Cylinder Inspection

NOTE:
- Before reassembling, check that all parts are free of dust and other foreign particles.
- Do not try to disassemble the master cylinder assembly. Replace the master cylinder assembly with a new part if necessary.
- Do not allow dirt or foreign matter to contaminate the brake fluid.

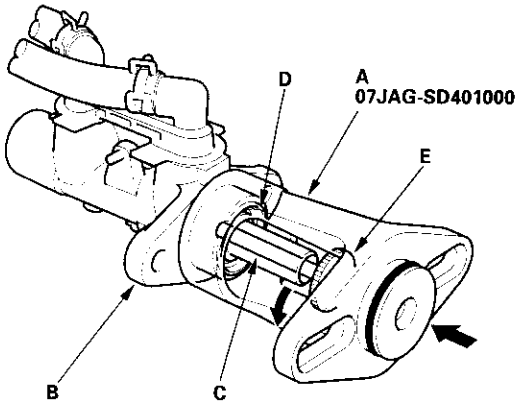


Brake Booster Pushrod Clearance Adjustment

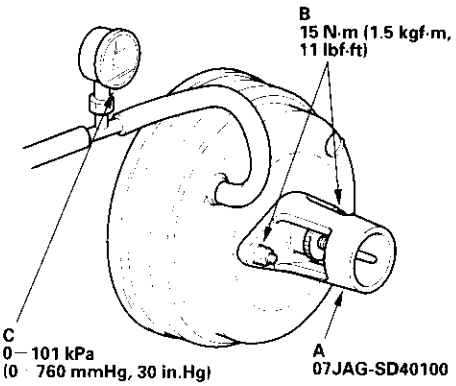
Special Tools Required
Pushrod adjustment gauge 07JAG-SD40100

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

1. Set the special tool (A) on the master cylinder body (B), push in the center shaft (C) until the top of it contacts the end of the secondary piston (D) by turning the adjusting nut (E).



2. Without disturbing the center shaft's position, install the special tool (A) backwards on the booster.

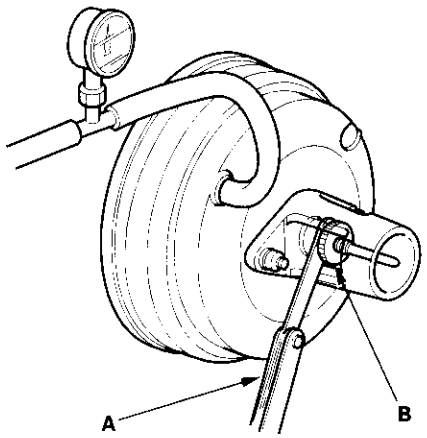


3. Install the master cylinder nuts (B), and tighten them to the specified torque.

4. Connect the booster in-line with a vacuum gauge (C) 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.

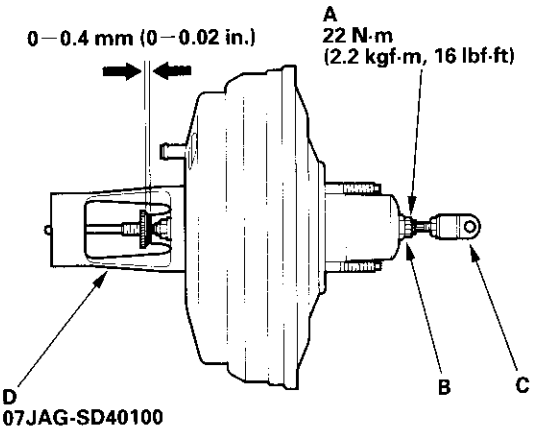
5. With a feeler gauge (A), measure the clearance between the gauge body and the adjusting nut (B) as shown.
   If the clearance between the gauge body and the adjusting nut is 0.4 mm (0.02 in.), the pushrod-to-piston clearance is 0 mm. However, if the clearance between the gauge body and the adjusting 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.

   Clearance: 0—0.4 mm (0—0.02 in.)



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

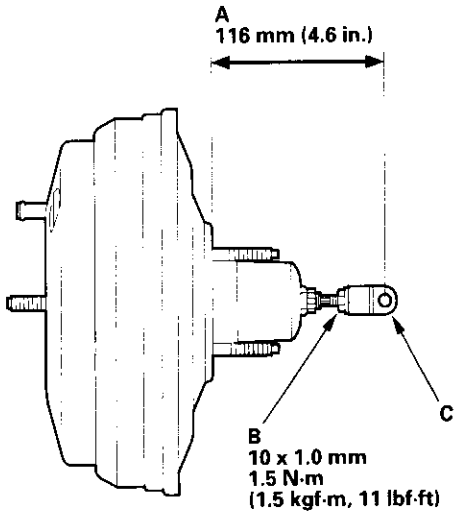
   - Adjust the clearance while the specified vacuum is applied to the booster.
   - Hold the clevis (C) while adjusting.



7. Tighten the star locknut securely.

8. Remove the special tool (D).

9. Check the pushrod length (A) as shown if the booster is removed. If the length is incorrect, loosen the pushrod locknut (B), and turn the clevis (C) in or out to adjust.



10. Install the master cylinder (see page 19-15).

Brake Booster Test

Functional Test

1. With the engine stopped, press the brake pedal several times to deplete the vacuum reservoir, then press 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, or calipers) is leaking.

2. Start the engine with the brake pedal pressed. If the pedal sinks slightly, the vacuum booster is working properly. If the pedal height does not vary, the booster or check valve is faulty.

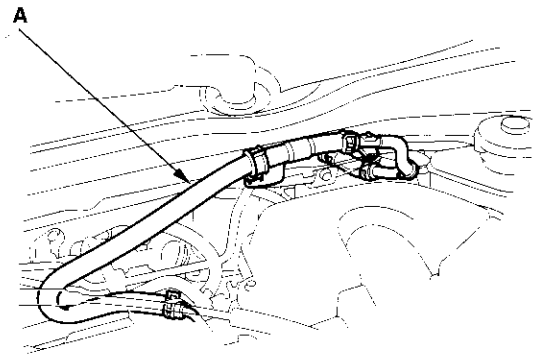
3. With the engine running, press the brake pedal lightly. If the brake pedal sinks more than 10 mm (3/8 in.) in 3 minutes, the master cylinder is faulty. A slight change in pedal height when the A/C compressor cycles on and off is normal. (The A/C compressor load changes the vacuum available to the booster.)

Leak Test

1. Press the brake pedal with the engine running, then stop the engine. If the pedal height does not vary while pressed for 30 seconds, the vacuum booster is OK. If the pedal rises, the booster is faulty.

2. With the engine stopped, press the brake pedal several times using normal pressure. When the pedal is first pressed, 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.

3. Disconnect the brake booster vacuum hose (check valve built-in) (A) at the booster side.



4. Start the engine, and let it idle. There should be vacuum available. If no vacuum is available, the check valve is not working properly. Replace the brake booster vacuum hose and check valve, and retest.

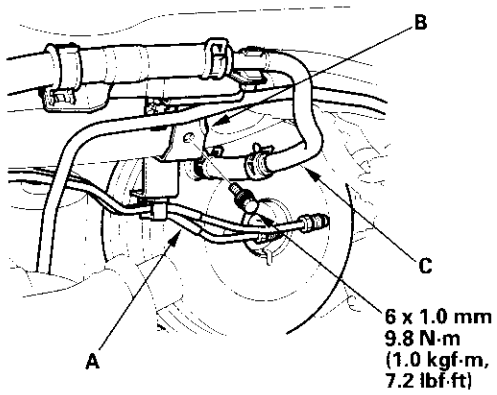
5. Reconnect the brake booster vacuum hose.
   Start the engine, and then pinch the brake booster vacuum hose between the check valve and the booster.

6. Turn the ignition switch OFF, and wait 30 seconds. Press the brake pedal several times using normal pressure.
   When the pedal is first pressed, it should be low.
   On consecutive applications, the pedal height should gradually rise.

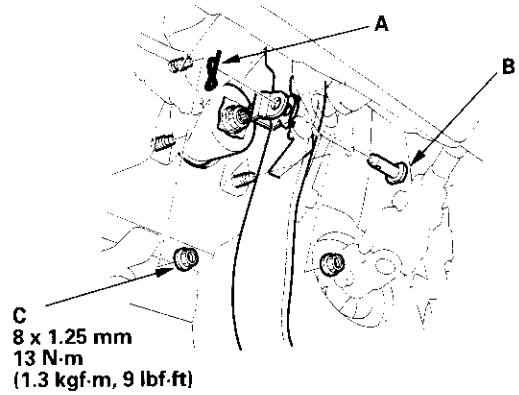
   - If the pedal position does not vary, replace the brake booster.
   - If the pedal position varies, replace the brake booster vacuum hose/check valve assembly.

Brake Booster Replacement

1. Remove the master cylinder (see page 19-15).
2. Remove the master cylinder brake lines (A) from the brake line clip.



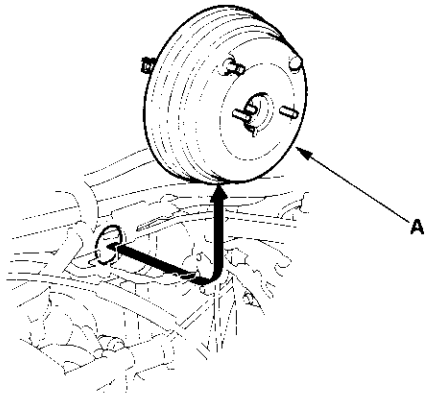
3. Remove the vacuum hose mounting bracket (B).
4. Disconnect the vacuum hose (C) from the brake booster.
5. Remove the clip (A) and the joint pin (B), and disconnect the yoke from the brake pedal.



6. Remove the brake booster mounting nuts (C).
7. Remove the brake booster (A) from the engine compartment.

NOTICE

- Be careful not to damage the booster surfaces and threads of the booster stud bolts.
- Be careful not to bend or damage the brake lines.



8. Install the brake booster in the reverse order of removal, and note these items:

- Adjust the pushrod clearance before installing the brake booster (see page 19-16).
- Use a new clip whenever installing.
- After installing the brake booster and master cylinder, fill the reservoir with new brake fluid, bleed the brake system (see page 19-8), and adjust the brake pedal height and free play (see page 19-6).

Rear Brake Pads Inspection and Replacement

⚠CAUTION

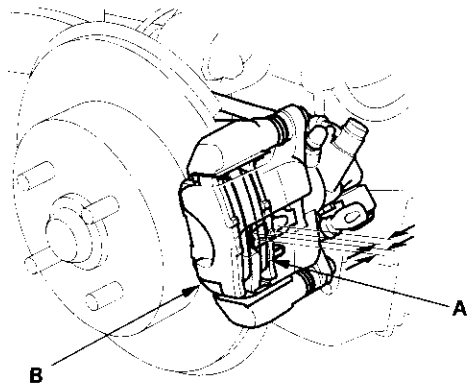
Frequent inhalation of brake pad dust, regardless of material composition, could be hazardous to your health.
- Avoid breathing dust particles.
- Never use an air hose or brush to clean brake assemblies. Use an OSHA-approved vacuum cleaner.

Inspection

1. Raise the rear of the vehicle, and support it with safety stands in the proper location (see page 1-8). Remove the rear wheels.

2. Check the thickness of the inner pad (A) and outer pad (B). Do not include the thickness of the brake pad backing plate.

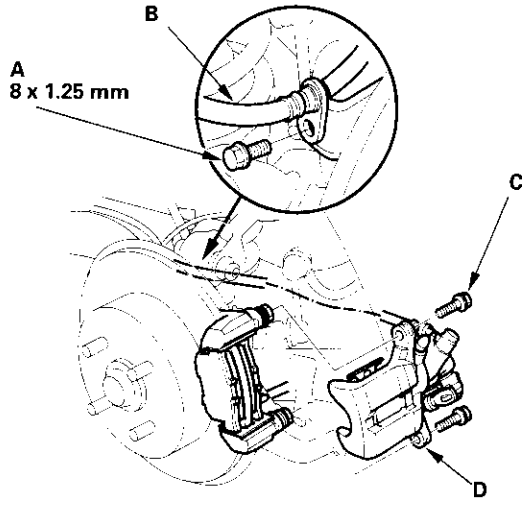
Brake pad thickness:
Standard: 8.5—9.5 mm (0.33—0.37 in.)
Service limit: 1.6 mm (0.06 in.)



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

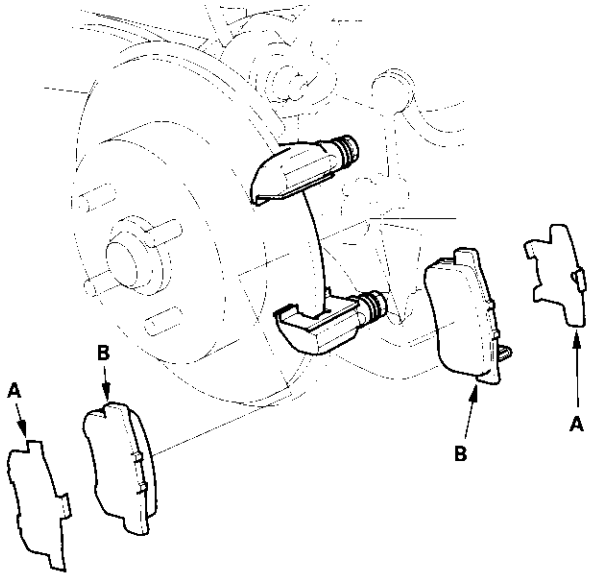
Replacement

1. Remove the bolt (A) and brake hose (B) from the mounting bracket.

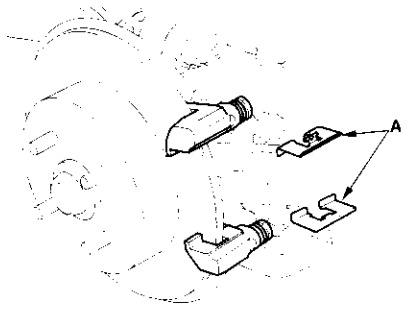


2. Remove the caliper bolts (C), and remove the caliper (D) from the caliper bracket.

3. Remove the pad shims (A) and pads (B).



4. Remove the pad retainers (A), and check the caliper pins for free movement.



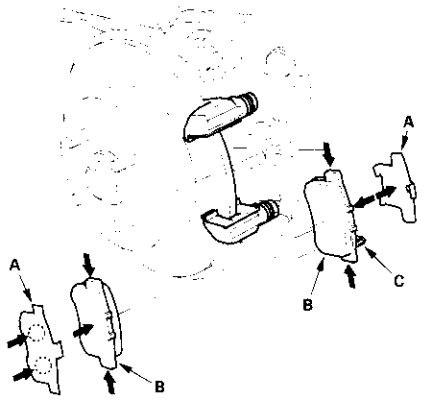
5. Clean the caliper thoroughly; remove any rust, and check for grooves and cracks.

6. Check the brake disc for damage and cracks.

7. Apply Dow Corning Molykote M77 grease to the retainers on their mating surfaces against the caliper bracket.

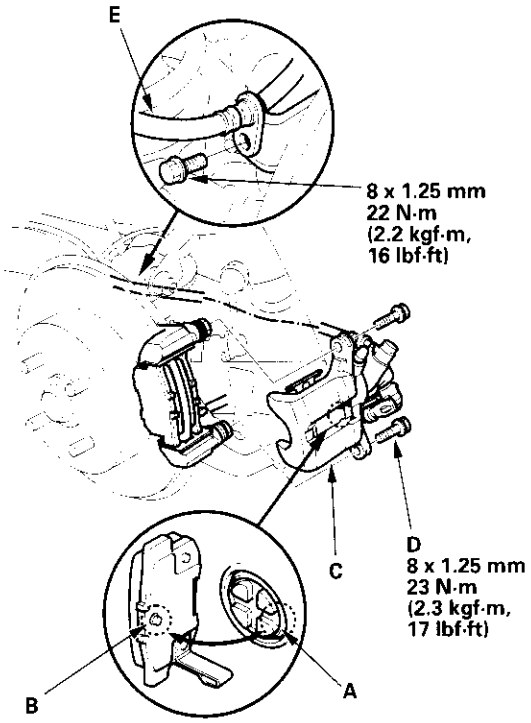
8. Install the pad retainers. Wipe excess grease off the retainers. Contaminated brake discs and pads reduce stopping ability. Keep grease off the discs and pads.

9. Apply Dow Corning Molykote M77 grease to both sides of the pad shims (A), the back of the pads (B), and the other areas indicated by the arrows. Wipe excess grease off the shim. Contaminated brake discs and pads reduce stopping ability. Keep grease off the discs and pads.



10. Install the brake pads and pad shims correctly. Install the pads with the wear indicators (C) on the inside.
    If you are reusing the pads, always reinstall the brake pads in their original positions to prevent a momentary loss of braking efficiency.

11. Rotate the caliper piston clockwise into the cylinder, then align the cutout (A) in the piston with the tab (B) on the inner pad by turning the piston back so the caliper can be installed on the pad. Lubricate the boot with rubber grease to avoid twisting the piston boot. If the piston boot is twisted, back it out so it is positioned properly.



12. Install the brake caliper (C) and caliper bolts (D), and tighten the bolts to the specified torque.

13. Install the brake hose (E).

14. Press the brake pedal several times to make sure the brake works, then test-drive.

    NOTE: Engagement of the brake may require a greeter 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.

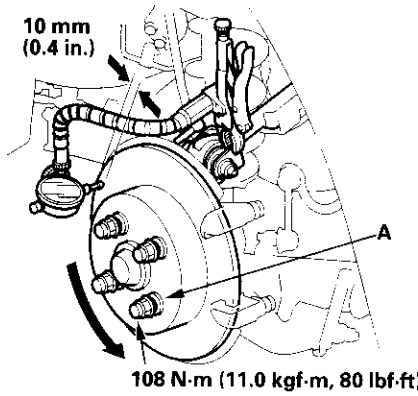
15. Check the parking brake adjustment (see page 19-7).

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

Rear Brake Disc Inspection

Runout

1. Raise the rear of the vehicle, and support it with safety stands in the proper location (see page 1-8). Remove the rear wheels.
2. Remove the brake pads (see page 19-20).
3. Inspect the disc surface for damage and cracks. Clean the disc thoroughly, and remove all rust.
4. Install suitable flat washers (A) and wheel nuts, and tighten the nuts to the specified torque to hold the brake disc securely against the hub.



5. Set up the dial gauge against the brake disc 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.)

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

   Max. Refinish Limit: 9.0 mm (0.35 in.)

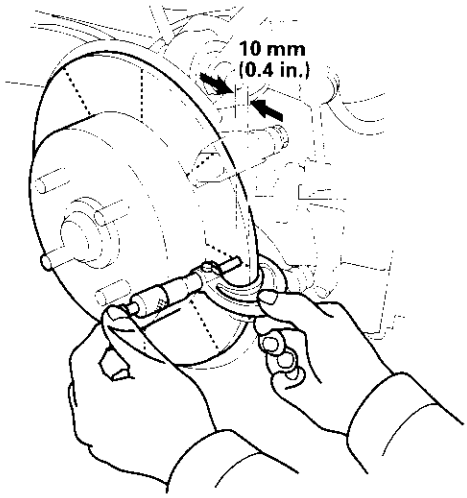
   NOTE:
   - If the brake disc is beyond the service limit for refinishing, replace it (see page 18-26).
   - A new disc should be refinished if its runout is greater than 0.10 mm (0.004 in.).

Thickness and Parallelism

1. Raise the rear of the vehicle, and support with safety stands in the proper location (see page 1-8). Remove the rear wheels.
2. Remove the brake pads (see page 19-20).
3. Using a micrometer, measure disc thickness at eight points, approximately 45° apart and 10 mm (0.4 in.) from the outer edge of the disc.

   Brake Disc Thickness:
   Standard: 9.9—10.1 mm (0.389—0.397 in.)
   Max. Refinishing Limit: 9.0 mm (0.35 in.)
   Brake Disc Parallelism: 0.016 mm (0.0006 in.) max.

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



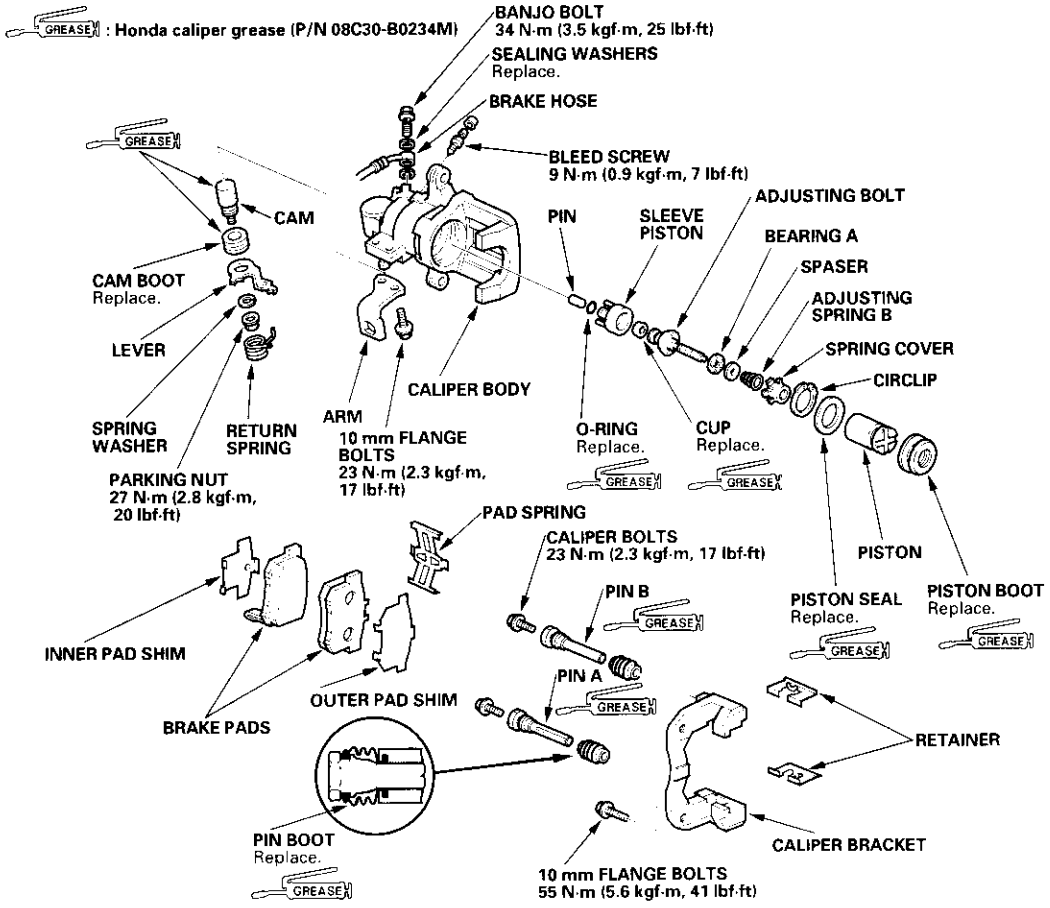
4. If the smallest measurement is less than the max. refinishing limit, replace the brake disc (see page 18-26).
5. If the disc is beyond the service limit for parallelism, refinish the brake disc with an on-car brake lathe.

Rear Brake Caliper Overhaul

⚠CAUTION

Frequent inhalation of brake pad dust, regardless of material composition, could be hazardous to your health.
- Avoid breathing dust particles.
- Never use an air hose or brush to clean brake assemblies. Use an OSHA-approved vacuum cleaner.

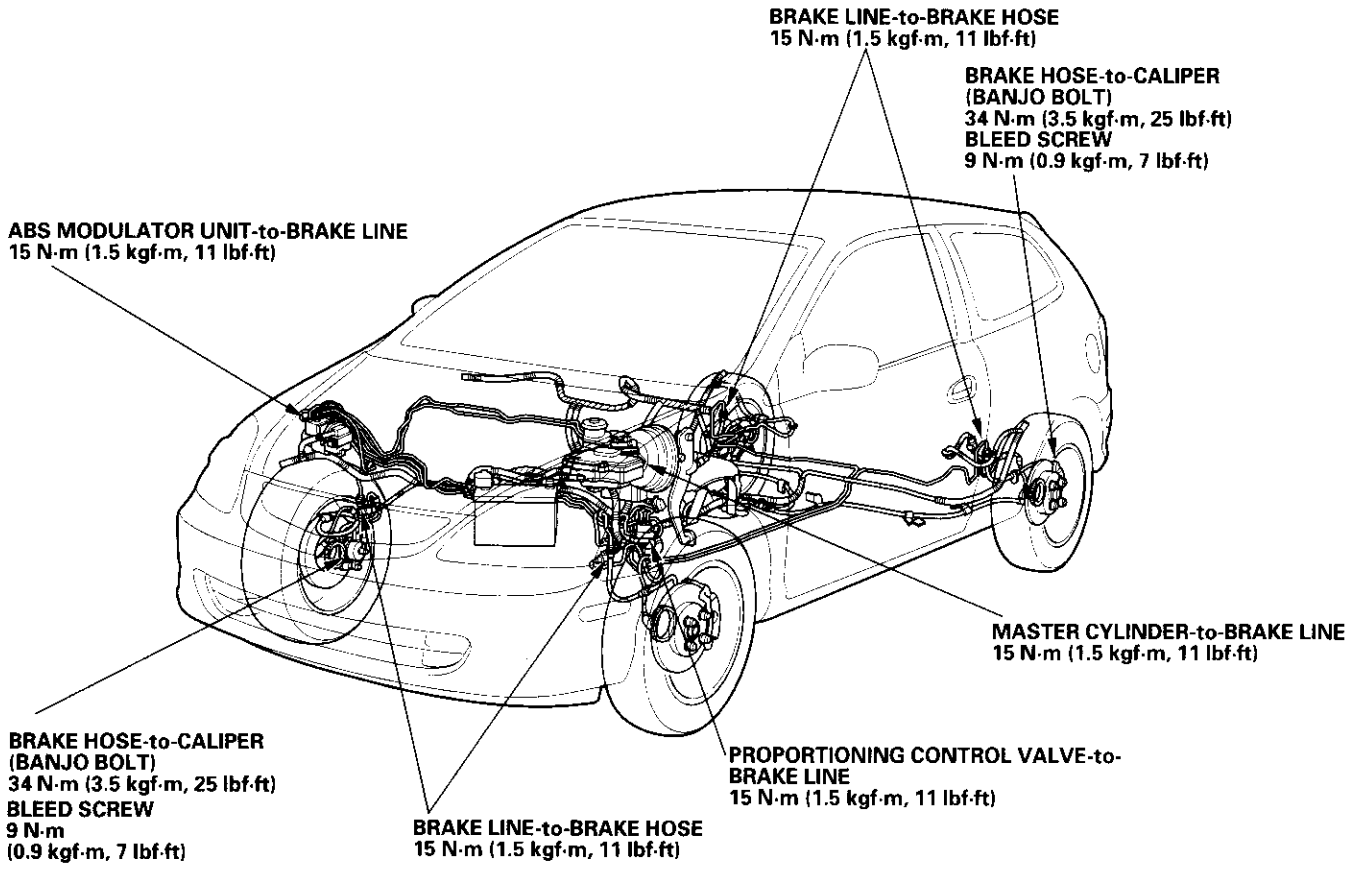
Remove, disassemble, inspect, reassemble, and install the caliper, and note these items:
- Do not spill brake fluid on the vehicle; it may damage the paint; if brake fluid gets on the paint, wash it off immediately with water.
- To prevent dripping, cover disconnected hose joints with rags or shop towels.
- Clean all parts in brake fluid and air dry; blow out all passages with compressed air.
- Before reassembling, check that all parts are free of dust and other foreign particles.
- Replace parts with new ones as specified in the illustration.
- Make sure no dirt or other foreign matter contaminates the brake fluid.
- When reusing pads, always reinstall them in their original positions to prevent loss of braking efficiency.
- Do not reuse drained brake fluid.
- Use only clean Honda DOT 3 brake fluid. Non-Honda brake fluid can cause corrosion and shorten the life of the system.
- Do not mix different brands of brake fluid as they may not be compatible.
- Coat the piston, piston seal groove, and caliper bore with clean brake fluid.
- Make sure no grease or oil gets on the brake discs or pads.
- Replace all rubber parts with new ones whenever disassembled.
- After installing the caliper, check the brake hose and line for leaks, interference, and twisting.



Brake Hoses and Lines Inspection

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 or connections, and retighten if necessary.
4. Check the master cylinder and ABS modulator unit for damage and leakage.

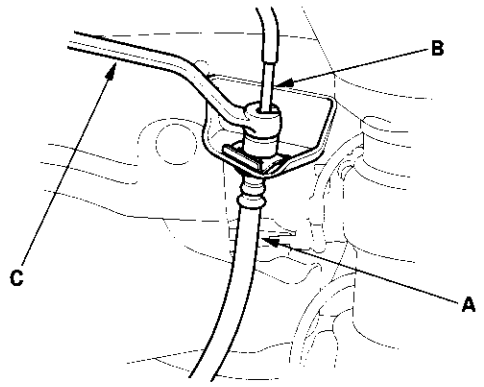
NOTE: Replace the brake hose clip whenever the brake hose is serviced.



Brake Hose Replacement

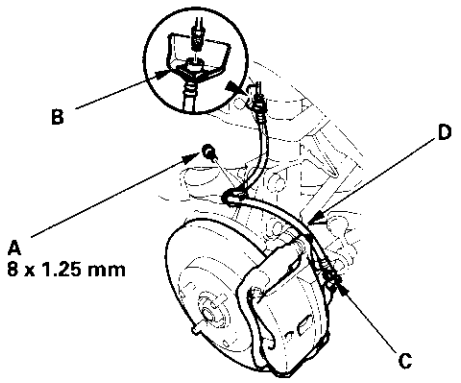
NOTE:
- Do not spill brake fluid on the vehicle; it may damage the paint; if brake fluid gets on the paint, wash it off immediately with water.
- To prevent dripping, cover disconnected line joints with rags or shop towels.
- Before reassembling, check that all parts are free of dust and other foreign particles.
- Replace parts with new ones whenever specified to do so.

1. Replace the brake hose (A) if the hose is twisted, cracked, or if it leaks.



2. Disconnect the brake hose from the brake line (B) using a 10 mm flare nut wrench (C).

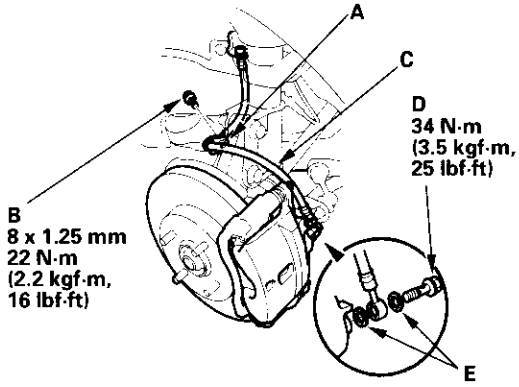
3. Remove the flange bolt (A), and remove the brake hose brackets from the damper.



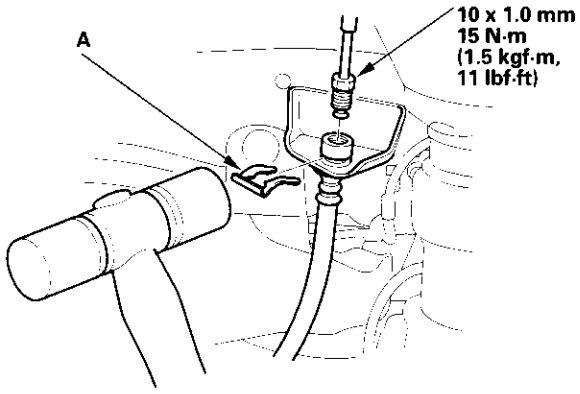
4. Remove and discard the hose clip (B).

5. Remove the banjo bolt (C), and remove the brake hose (D) from the caliper.

6. Install the brake hose bracket (A) on the damper with the flange bolt (B) first, then connect the brake hose (C) to the caliper with the banjo bolt (D) and new sealing washers (E).



7. Install the hose onto the hose bracket on the body with a new hose clip (A).



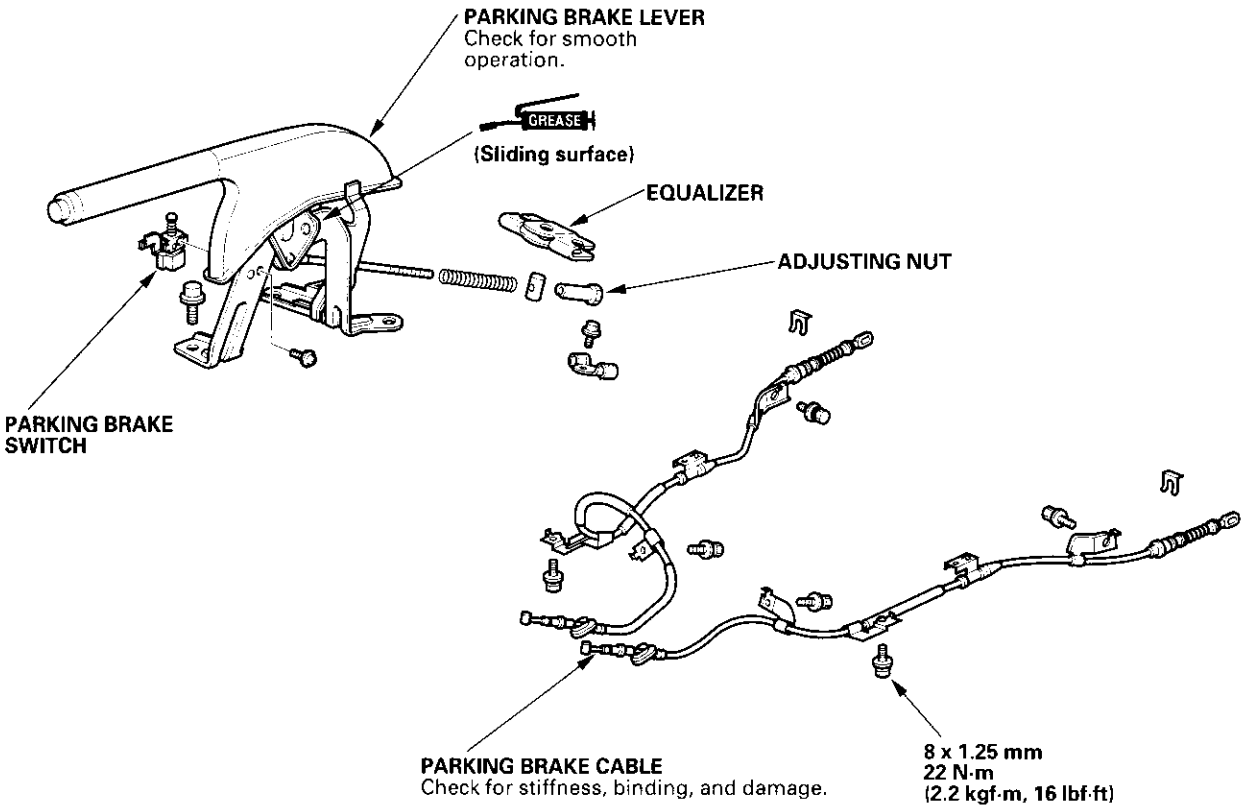
8. Connect the brake line to the brake hose.

9. After installing the brake hose, bleed the brake system (see page 19-8).

10. Do 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 Replacement

Exploded View

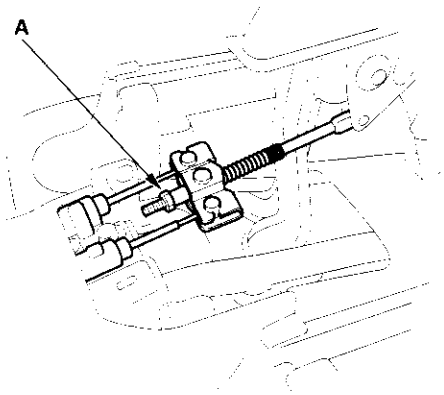


NOTE:
- The parking brake cables must not be bent or distorted. This will lead to stiff operation and premature failure.
- Refer to the Exploded View as needed during this procedure.

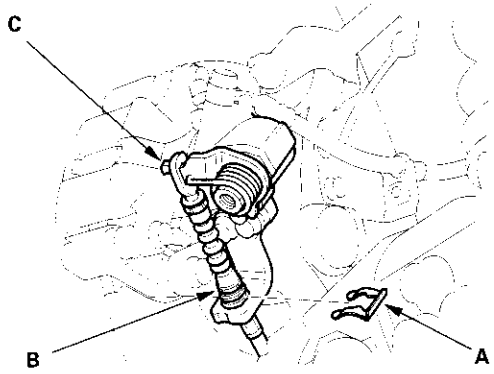
1. Release the parking brake lever fully.

2. Remove the rear console (see page 20-57).

3. Loosen the parking brake cable adjusting nut (A).



4. Remove the parking brake cable clip (A) from the brake cable (B).



5. Disconnect the parking brake cable from the lever (C).

6. Remove the parking brake cable mounting hardware, then remove the cable.

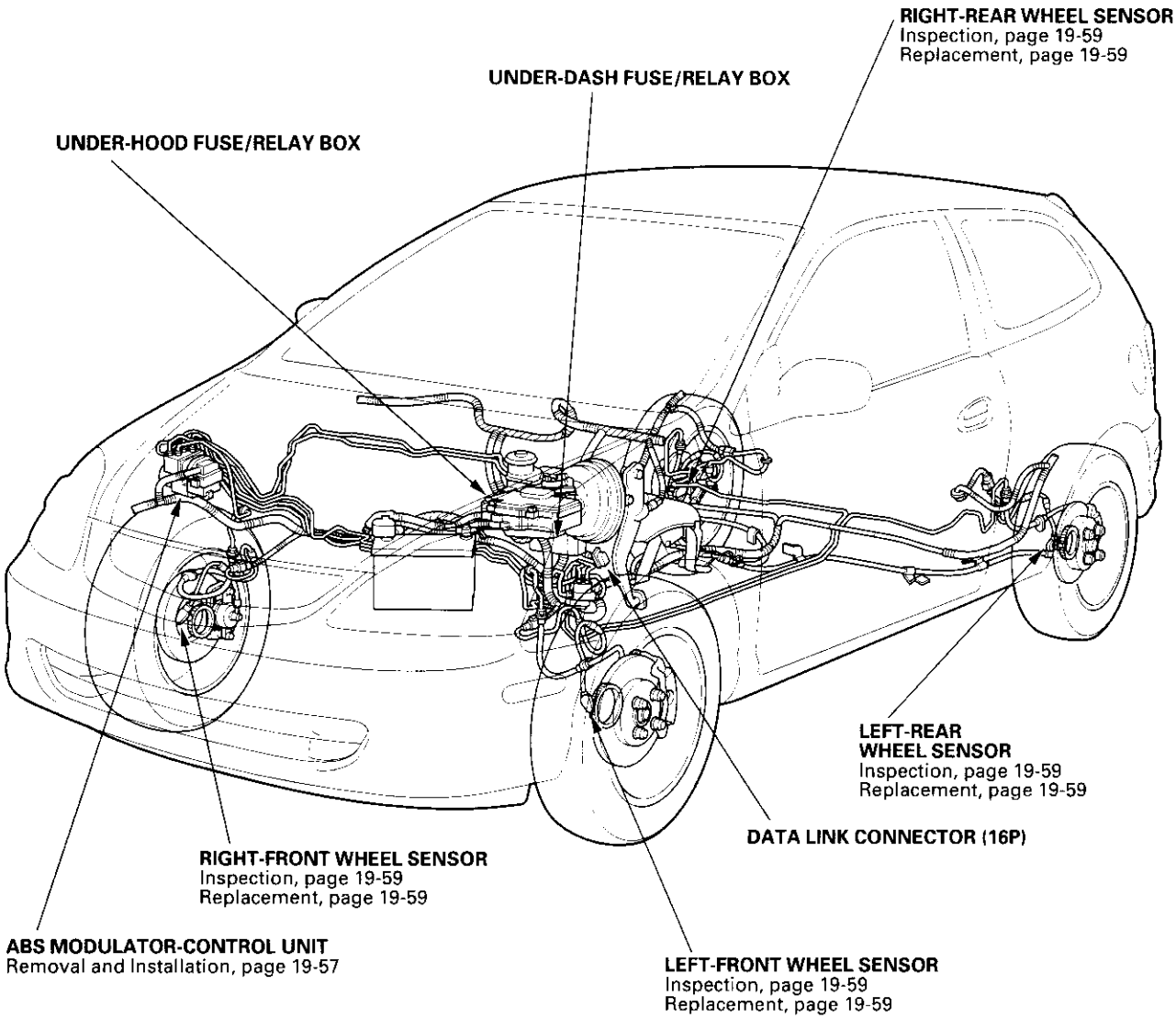
7. Install the new cable in the reverse order of removal, and note these items:

   - Be careful not to bend or distort the cable.
   - Make sure the parking brake cable clip is fully seated on the cable housing.
   - Do the parking brake cable adjustment (see page 19-7).

Brakes

ABS Components

Component Location Index



General Troubleshooting Information

ABS Indicator

- If the system is OK, the ABS indicator goes off 2 seconds after turning the ignition switch ON (II) without starting the engine, and then comes on again and goes off 2 seconds later after starting the engine. This occurs because the ABS control unit is turned on by the IG2 power source.
- The ABS indicator comes on when the ABS control unit detects a problem in the system. However, even though the system is operating properly, the indicator will come on under these conditions:
  - Only the drive wheels rotate
  - One drive wheel is stuck
  - The vehicle goes into a spin
  - The ABS continues to operate for a long time.
  - The vehicle is subjected to an electrical signal disturbance

To determine the actual cause of the problem, question the customer about the problem, taking the above conditions into consideration.

- When a problem is detected and the ABS indicator comes on, there are cases when the indicator stays on until the ignition switch is turned OFF, and cases when the indicator goes off automatically when the system returns to normal.
  - DTC 61: The ABS indicator goes off automatically when the system returns to normal.
  - DTC 11, 13, 15, 17, 31, 32, 33, 34, 35, 36, 37, 38, 54, or 81: The ABS indicator stays on until the ignition switch is turned OFF whether or not the system returns to normal.
  - DTC 12, 14, 16, 18, 21, 51, 52, or 53: The ABS indicator goes off when the vehicle is driven again and the system is OK after the ignition switch is turned from OFF to ON (II).

Diagnostic Trouble Code (DTC)

- The memory can hold three DTCs. However, when the same DTC is detected more than once, the more recent DTC is written over the earlier one. Therefore, when the same problem is detected repeatedly, it is memorized as a single DTC.
- The DTCs are in the order they occurred, beginning with the most recent.
- The DTCs are memorized in the EEPROM (non-volatile memory). Therefore, the memorized DTCs are not cleared when the battery is disconnected, the ignition switch is turned off, or the system returns to normal. Do the specified procedures to clear the DTCs.

Self-diagnosis

- Self-diagnosis can be classified into two categories:
  - Initial diagnosis:
    Done right after the engine starts and until the ABS indicator goes off
  - Regular diagnosis:
    Done right after the initial diagnosis until the ignition switch is turned OFF
- When a problem is detected by self-diagnosis, the system does the following:
  - Turns the ABS indicator on
  - Memorizes the DTC
  - Stops ABS control

Kickback

The pump 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.

Pump Motor

- The pump motor operates when the ABS is functioning.
- The ABS control unit checks the pump motor operation when the vehicle is started the first time after the ignition switch is turned ON (II). You may hear the motor operate at this time, but it is normal.

(cont'd)

General Troubleshooting Information (cont'd)

How to Troubleshoot ABS DTCs

The troubleshooting flowchart procedures assume that the cause of the problem is still present and the ABS indicator is still on. Following the flowchart when the ABS indicator does not come on can result in incorrect diagnosis.
The connector illustrations show the female terminal connectors with a single outline and the male terminal connectors with a double outline.

1. Question the customer about the conditions when the problem occured, and try to reproduce the same conditions for troubleshooting. Find out when the ABS indicator came on, such as during ABS control, after ABS control, when the vehicle was at a certain speed, etc.

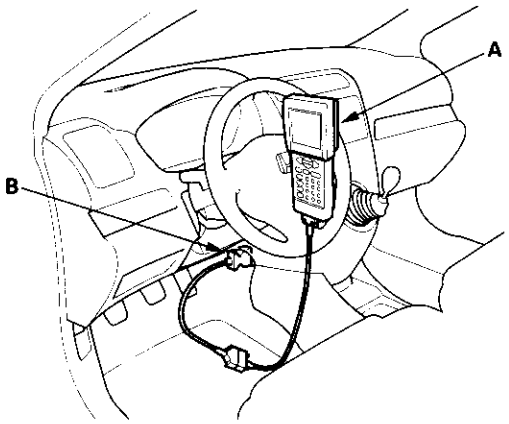
2. When the ABS indicator does not come on during the test-drive, but troubleshooting is done based on the DTC, check for loose connectors, poor terminal contact, etc., before you start troubleshooting.

3. After troubleshooting, clear the DTC,disconnect the Honda PGM Tester, and test-drive the vehicle. Make sure the ABS indicator does not come on.

How to Retrieve ABS DTCs

Honda PGM Tester Method:

1. With the ignition switch OFF, connect the Honda PGM Tester (A) to the 16P data link connector (DLC) (B) under the driver's side of the dashboard.

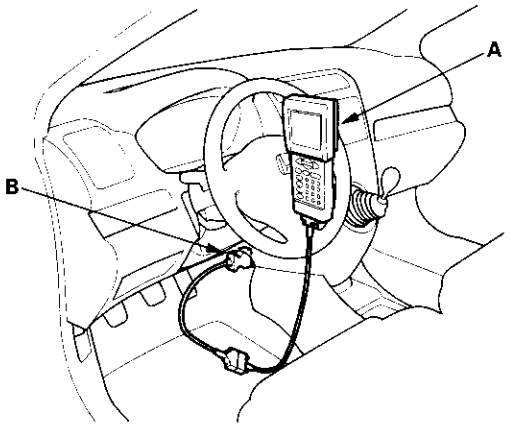


2. Turn the ignition switch ON (II), and follow the prompts on the PGM Tester to display the DTC(s) on the screen. After determining the DTC, refer to the DTC Troubleshooting Index.

   NOTE: See the Honda PGM Tester user's manual for specific instructions.

Service Check Signal (SCS) Circuit Method:

1. With the ignition switch OFF, connect the Honda PGM Tester (A) to the 16P data link connector (DLC) (B) under the driver's side of the dashboard.



2. Short the SCS circuit to body ground using the Honda PGM Tester.

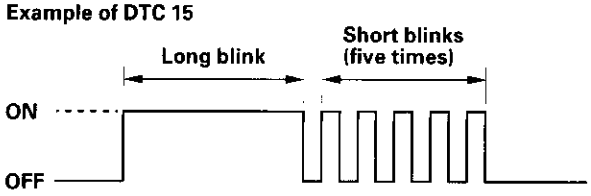
3. Turn the ignition switch ON (II).

4. The blinking frequency indicates the DTC. DTCs are indicated by a series of long and short blinks. One long blink equals 10 short blinks. Add the long and short blinks together to determine the DTC. After determining the DTC, refer to the DTC Troubleshooting Index.

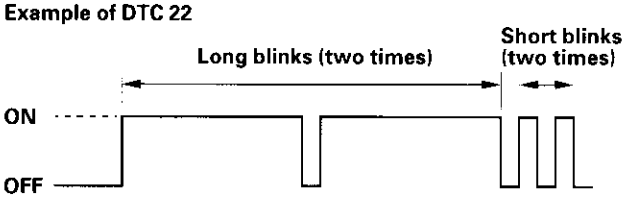
   NOTE:
   - If the DTC is not memorized, the ABS indicator will go off for 3.6 seconds, and then come back on.
   - If the ABS indicator stays on, troubleshoot for "ABS indicator does not go off" (see step 1 on page 19-53).

   The system will not indicate the DTC unless these conditions are met:
   - The brake pedal is not pressed.
   - The ignition switch is turned ON (II).
   - The SCS circuit is shorted to body ground before the ignition switch is turned ON (II).

Example of DTC 15



Example of DTC 22



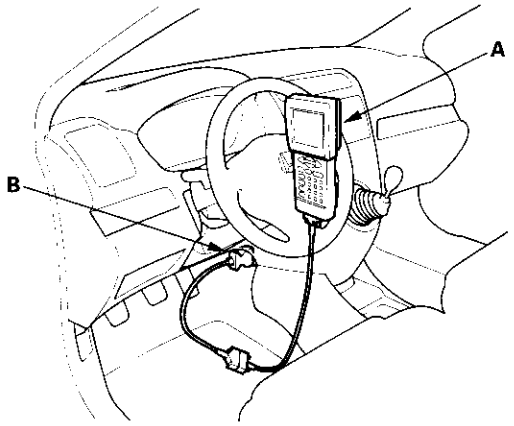
5. Turn the ignition switch OFF.

6. Disconnect the Honda PGM Tester from the DLC.

How to Clear ABS DTCs

Honda PGM Tester Method:

1. With the ignition switch OFF, connect the Honda PGM Tester (A) to the 16P data link connector (DLC) (B) under the driver's side of the dashboard.



2. Turn the ignition switch ON (II), and clear the DTC(s) by following the screen prompts on the PGM Tester.

   NOTE: See the Honda PGM Tester user's manual for specific instructions.

Cycling the Ignition Switch Method:

Clear the DTC by turning the ignition switch ON (II) then OFF at least 20 times.

DTC Troubleshooting Index

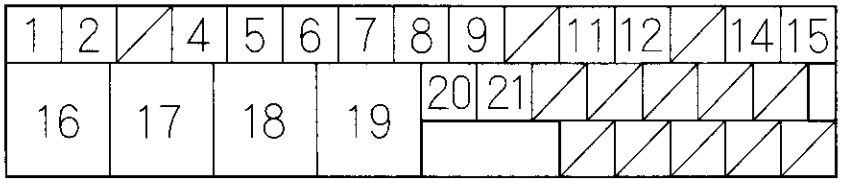
DTC	Detection Item	Note
DTC:11	Right-front wheel sensor (open/short to body ground/short to power)	(see page 19-45)
DTC:12	Faulty right-front wheel sensor pulse signal	(see page 19-46)
DTC:13	Left-front wheel sensor (open/short to body ground/short to power)	(see page 19-45)
DTC:14	Faulty left-front wheel sensor pulse signal	(see page 19-46)
DTC:15	Right-rear wheel sensor (open/short to body ground/short to power)	(see page 19-45)
DTC:16	Faulty right-rear wheel sensor pulse signal	(see page 19-46)
DTC:17	Left-rear wheel sensor (open/short to body ground/short to power)	(see page 19-45)
DTC:18	Faulty left-rear wheel sensor pulse signal	(see page 19-46)
DTC:21	Continuous operation (chipped pulser)	(see page 19-47)
DTC:31	Solenoid	(see page 19-48)
DTC:32	Solenoid	(see page 19-48)
DTC:33	Solenoid	(see page 19-48)
DTC:34	Solenoid	(see page 19-48)
DTC:35	Solenoid	(see page 19-48)
DTC:36	Solenoid	(see page 19-48)
DTC:37	Solenoid	(see page 19-48)
DTC:38	Solenoid	(see page 19-48)
DTC:51	Motor locked	(see page 19-48)
DTC:52	Motor stuck off	(see page 19-49)
DTC:53	Motor stuck on	(see page 19-50)
DTC:54	Main relay stuck off	(see page 19-51)
DTC:61	IG2 voltage	(see page 19-51)
DTC:81	CPU (Central Processing Unit)	(see page 19-52)

Symptom Troubleshooting Index

Symptom	Diagnostic procedure	Also check for
ABS indicator does not come on	ABS Indicator Circuit Troubleshooting (see page 19-52)	
ABS indicator does not go off and no ABS DTC is stored	ABS Indicator Circuit Troubleshooting (see step 1 on page 19-53)	
Brake system indicator does not come on	Brake System Indicator Circuit Troubleshooting (see page 19-55)	
Brake system indicator does not go off and no ABS DTC is stored	Brake System Indicator Circuit Troubleshooting (see step 1 on page 19-55)	

System Description

ABS Control Unit Inputs and Outputs for 31P Connector



Wire side of female terminals

Terminal number	Wire color	Terminal sign	Description	Measurement		
				Terminals	Conditions (Ignition switch ON (II))	Voltage
1	BLU/YEL	RRS (−)	Detects right-rear wheel sensor signal	1−2	Spin wheel at 1 turn/second	AC: 0.053 V or above
2	GRN/YEL	RRS (+)				
4	BLU	FRS (−)	Detects right-front wheel sensor signal	4−5		
5	GRN/BLK	FRS (+)				Oscilloscope 0.15 Vp-p or above
6	BRN/WHT	FLS (−)	Detects left-front wheel sensor signal	6−7		
7	BLU/ORN	FLS (+)				
8	GRY/RED	RLS (−)	Detects left-rear wheel sensor signal	8−9		
9	YEL/RED	RLS (+)				
11	LT BLU	DIAG−K	Communications with Honda PGM tester	—	—	—
12	BRN	DIAG−L	DTC indication	—	—	—

Terminal number	Wire color	Terminal sign	Description	Measurement			
				Terminals	Conditions (Ignition switch ON (II))		Voltage
14	WHT/BLK	STOP	Detects brake switch signal	14-GND	Brake pedal	Pressed	Battery voltage
						Released	
15	BLK/ORN	IG2	Power source for activating the system	15-GND	———		Battery voltage
16	BLK	M-GND	Ground for the pump motor	16-GND	———		Below 0.3 V
17	WHT/RED	+B-MR	Power source for the pump motor	17-GND	At all times		Battery voltage
18	WHT/GRN	+B-FSR	Power source for the valve relay	18-GND	At all times		Battery voltage
19	BLK	GND	Ground for the modulator assembly	19-GND	———		Below 0.3 V
20	BLU/RED	ABS	Drives ABS indicator	20-GND	ABS indicator	ON	About 11 V
						OFF	Below 1 V
21	BRN/YEL	EBD (Electronic brake distribution)	Drives brake system indicator	21-GND	Brake system indicator	OFF	Below 0.3 V
						ON for bulb check	Battery voltage

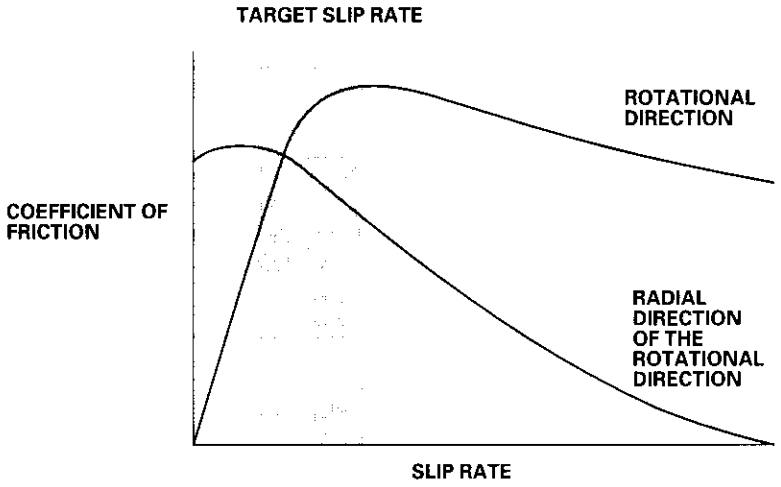
(cont'd)

System Description (cont'd)

Features

When the brake pedal is pressed during driving, the wheels can lock before the vehicle comes to a stop. In such an event, 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 maximum grip force from the tires, thereby ensuring the maneuverability and stability of the vehicle.
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 reach the target slip rate.

Grip Force of Tire and Road Surface



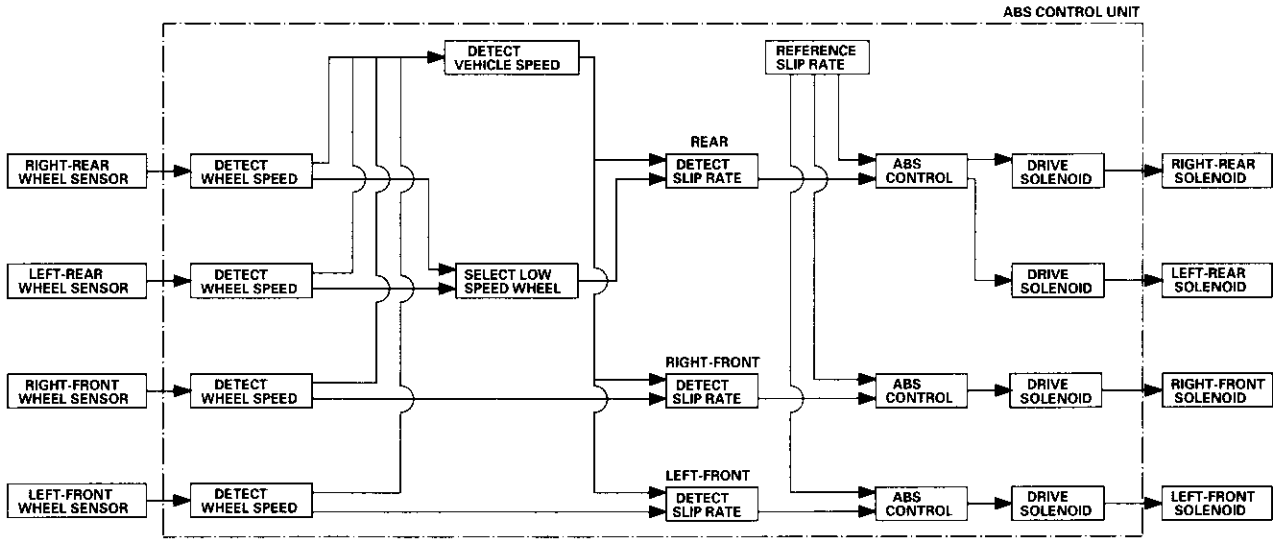
ABS Control Unit

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 transmits the control signal to the modulator unit solenoid valve when the slip rate is high.

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



Self-diagnosis Function

1. The ABS control unit is equipped with a main CPU and a sub-CPU. Each CPU checks the other for problems.
2. The CPUs check the circuit of the system.
3. The ABS control unit turns on the ABS indicator when the unit detects a problem and the unit stops the system.
4. The self-diagnosis can be classified into these two categories:
   - Initial diagnosis
   - Regular diagnosis

On-board Diagnosis Function

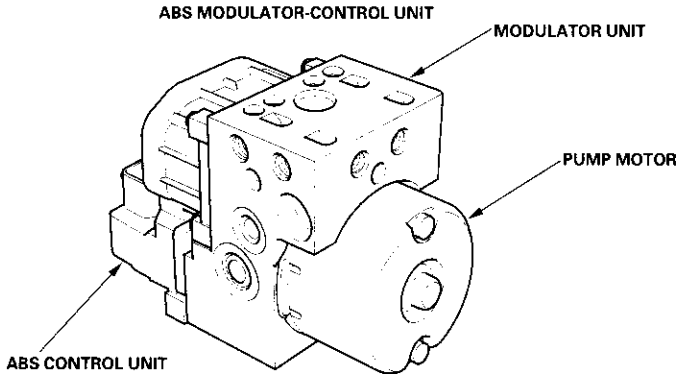
The ABS can be diagnosed with the Honda PGM Tester.
The ALB Checker cannot be used with this system. For air bleeding and checking wheel sensor signals, use the Honda PGM Tester. See the Honda PGM Tester user's manual for specific operating instructions.

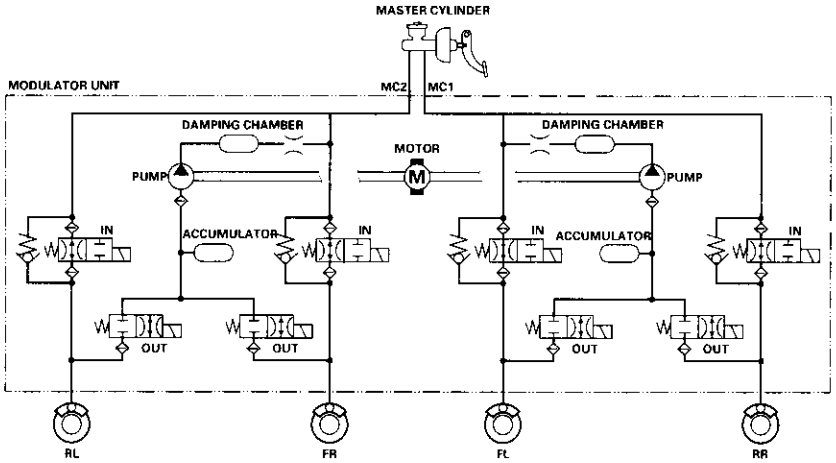
(cont'd)

System Description (cont'd)

ABS Modulator

The ABS modulator consists of the inlet solenoid valves, outlet solenoid valves, reservoir, pump, pump motor, and the damping chamber. The modulator reduces the caliper fluid pressure directly. It is a circulating-type modulator because the brake fluid circulates through the caliper, reservoir, and the master cylinder. The hydraulic control has three modes: pressure intensifying, pressure retaining, and pressure reducing. The hydraulic circuit is an 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.

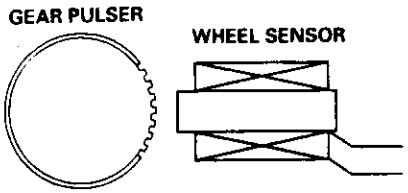
Pressure retaining mode: Inlet valve closed, outlet valve closed
Caliper fluid is retained by the inlet valve and outlet valve.

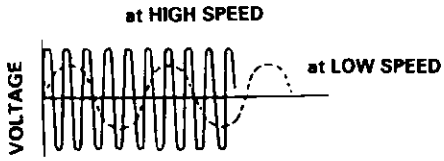
Pressure reducing mode: Inlet valve closed, outlet valve open
Caliper fluid flows through the outlet valve to the reservoir.

Motor operation mode: When starting the pressure reducing mode, the pump motor is ON.
When stopping ABS operation, the pump motor is OFF.
The caliper fluid is pumped out by the pump, through the damping chamber, to the master cylinder.

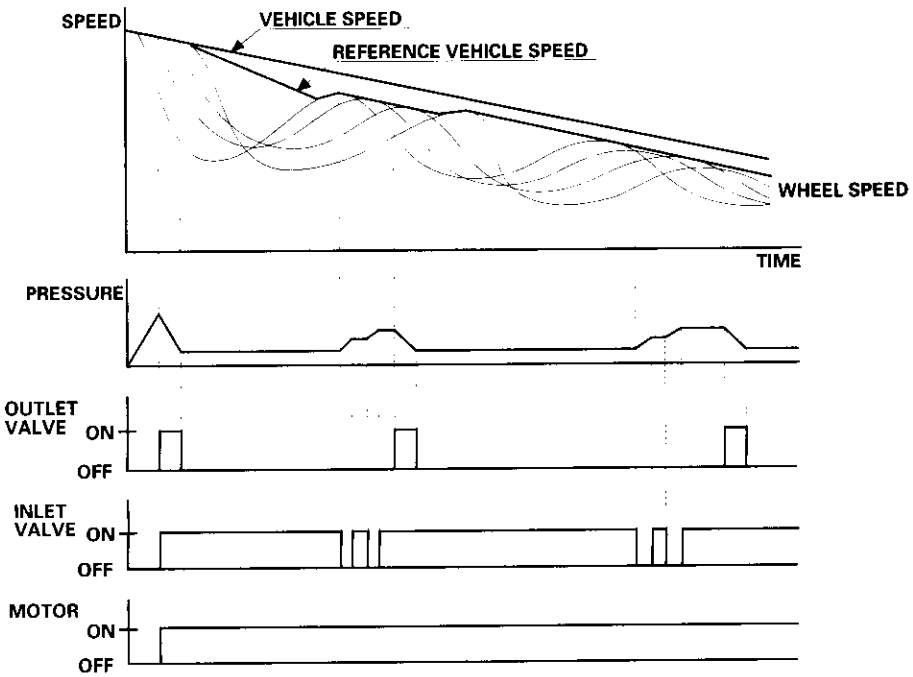
Wheel Sensors

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.





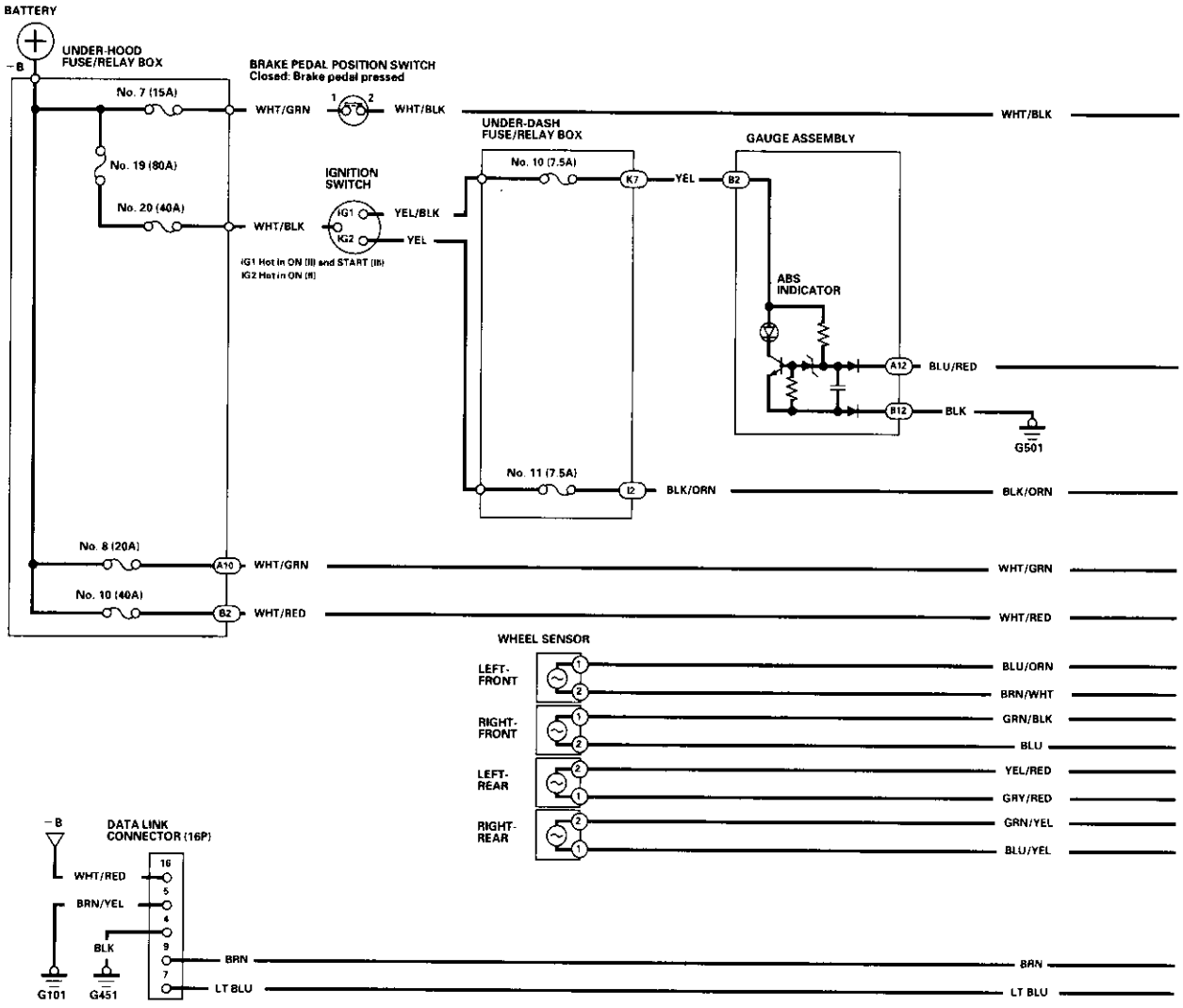
Wheel Speed and Modulator Control

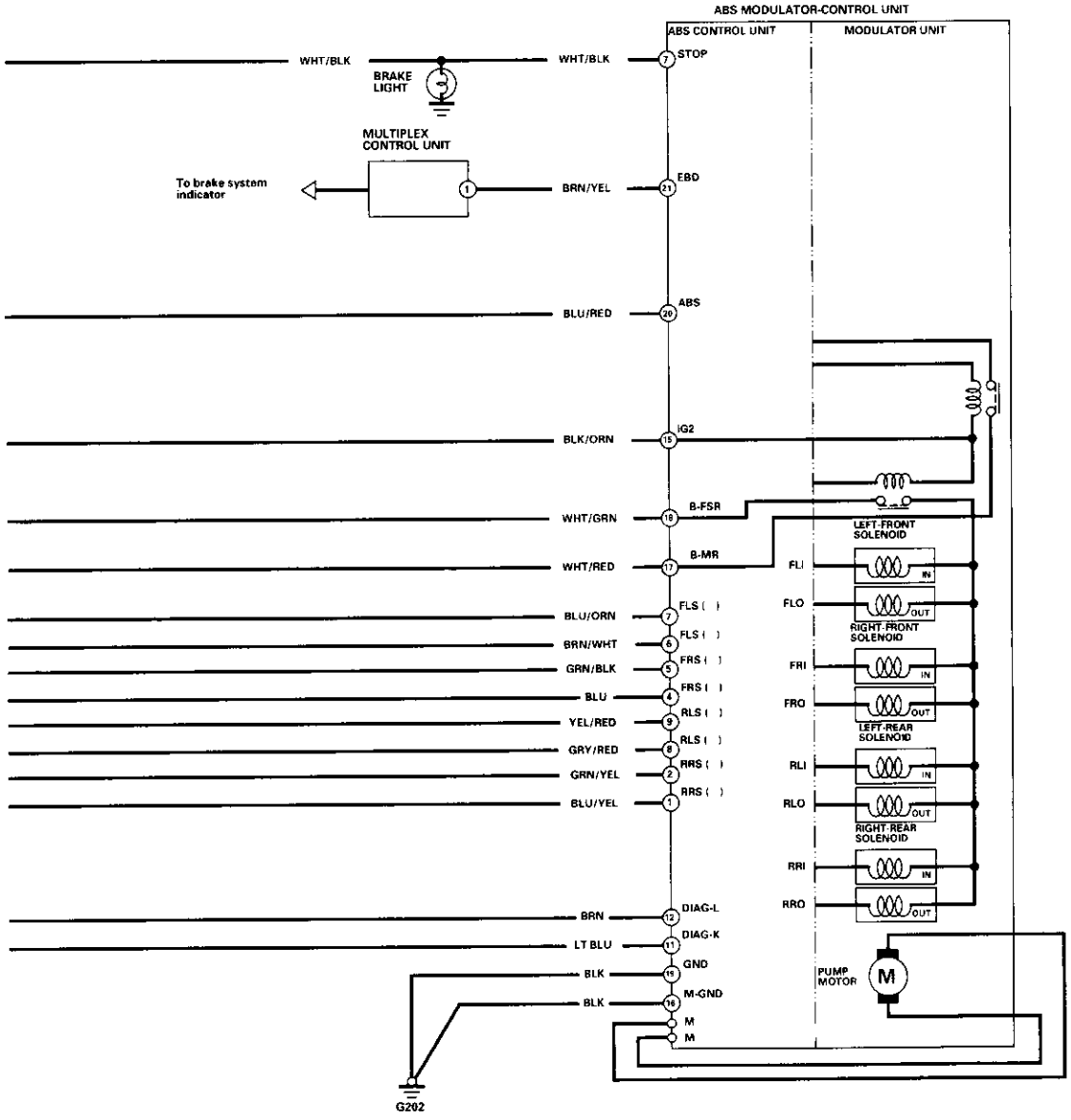


When the wheel speed drops sharply below the vehicle speed, the inlet valve closes and if necessary, the outlet valve opens momentarily to reduce the caliper fluid pressure. The pump motor starts at this time. As the wheel speed is restored, and the outlet valve closes, the inlet valve opens momentarily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

ABS Components

Circuit Diagram

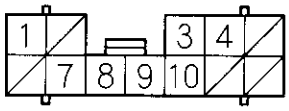



ABS MODULATOR-CONTROL UNIT
ABS CONTROL UNIT
MODULATOR UNIT
WHT/BLK
BRAKE LIGHT
WHT/BLK
7 STOP
MULTIPLEX CONTROL UNIT
To brake system indicator
1
BRN/YEL
21 EBD
BLU/RED
20 ABS
BLK/ORN
15 IG2
WHT/GRN
18 B-FSR
WHT/RED
17 B-MR
BLU/ORN
7 FLS ( )
BRN/WHT
6 FLS ( )
GRN/BLK
5 FRS ( )
BLU
4 FRS ( )
YEL/RED
9 RLS ( )
GRY/RED
8 RLS ( )
GRN/YEL
2 RRS ( )
BLU/YEL
1 RRS ( )
LEFT-FRONT SOLENOID
FLI
FLO
IN
OUT
RIGHT-FRONT SOLENOID
FRI
FRO
LEFT-REAR SOLENOID
RLI
RLO
RIGHT-REAR SOLENOID
RRI
RRO
BRN
12 DIAG-L
LT BLU
11 DIAG-K
BLK
19 GND
BLK
16 M-GND
M
M
PUMP MOTOR
M
G202

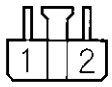
(cont'd)

Circuit Diagram (cont'd)

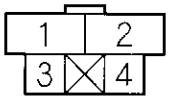
UNDER-HOOD FUSE/RELAY BOX CONNECTORS
CONNECTOR A (12P)



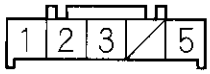
CONNECTOR B (2P)



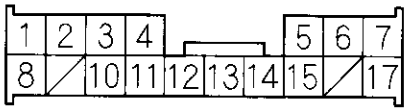
BRAKE PEDAL POSITION SWITCH 4P CONNECTOR



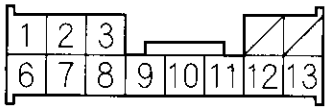
UNDER-DASH FUSE/RELAY BOX CONNECTORS
CONNECTOR I (5P)



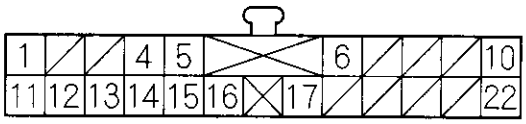
CONNECTOR K (17P)



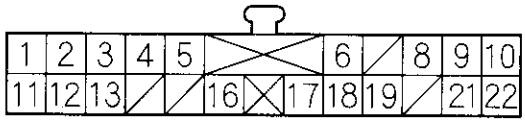
MULTIPLEX CONTROL UNIT 13P CONNECTOR



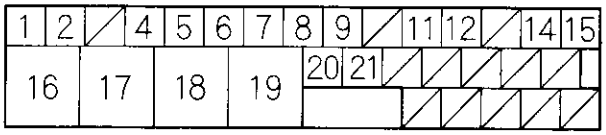
GAUGE ASSEMBLY CONNECTORS
CONNECTOR A (22P)



CONNECTOR B (22P)

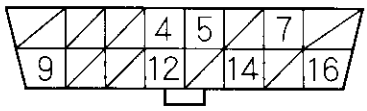


ABS CONTROL UNIT 31P CONNECTOR



Wire side of female terminals

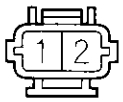
DATA LINK CONNECTOR (16P)



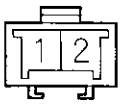
Terminal side of female terminals

WHEEL SENSOR 2P CONNECTORS

FRONT



RIGHT-REAR



LEFT-REAR

Terminal side of male terminals

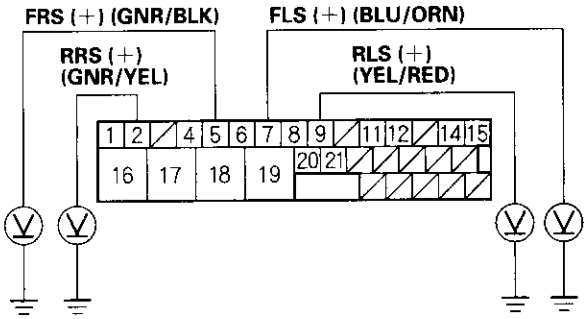
DTC Troubleshooting

DTC 11, 13, 15, 17: Wheel Sensor (Open/Short to Body Ground/Short to Power)

1. Disconnect the ABS control unit 31P connector.
2. Start the engine.
3. Measure the voltage between the appropriate wheel sensor (+) circuit terminal of the ABS control unit 31P connector and body ground (see table).

DTC	Appropriate Terminal
11 (Right-front)	No. 5: FRS (+)
13 (Left-front)	No. 7: FLS (+)
15 (Right-rear)	No. 2: RRS (+)
17 (Left-rear)	No. 9 RLS (+)

ABS CONTROL UNIT 31P CONNECTOR



Wire side of female terminals

Is there battery voltage?

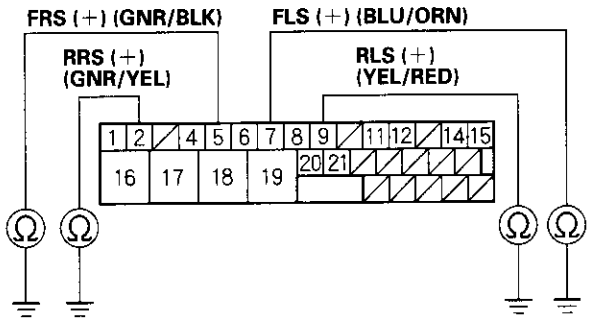
YES—Repair short to power in the (+) circuit wire between the ABS modulator-control unit and the appropriate wheel sensor. ■

NO—Go to step 4.

4. Turn the ignition switch OFF.
5. Check for continuity between the appropriate wheel sensor (+) circuit terminal and body ground (see table).

DTC	Appropriate Terminal
11 (Right-front)	No. 5: FRS (+)
13 (Left-front)	No. 7: FLS (+)
15 (Right-rear)	No. 2: RRS (+)
17 (Left-rear)	No. 9 RLS (+)

ABS CONTROL UNIT 31P CONNECTOR



Wire side of female terminals

Is there continuity?

YES—Go to step 6.

NO—Go to step 7.

6. Disconnect the harness 2P connector from the appropriate wheel sensor, then check for continuity between the (+) and (−) terminals of the harness and body ground.

Is there continuity?

YES—Repair short to body ground in the (+) or (−) circuit wire between the ABS modulator-control unit and the wheel sensor. ■

NO—Replace the wheel sensor. ■

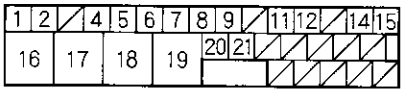
(cont'd)

DTC Troubleshooting (cont'd)

7. Check the resistance between the appropriate wheel sensor (+) and (−) circuit terminals (see table).

DTC	Appropriate Terminal	
	(+) Side	(−) Side
11 (Right-front)	No. 5: FRS (+)	No. 4: FRS (-)
13 (Left-front)	No. 7: FLS (+)	No. 6: FLS (-)
15 (Right-rear)	No. 2: RRS (+)	No. 1: RRS (-)
17 (Left-rear)	No. 9: RLS (−)	No. 8: RLS (-)

ABS CONTROL UNIT 31P CONNECTOR



Wire side of female terminals

Is the resistance between 450—2,000 Ω ?

YES—Check for a loose ABS control unit 31P connector. If necessary, substitute a known-good ABS modulator-control unit, and recheck.■

NO—Go to step 8.

8. Disconnect the harness 2P connector from the appropriate wheel sensor, and check the resistance between the (+) and (−) terminals of the wheel sensor.

Is the resistance between 450—2,000 Ω ?

YES—Repair open in the (+) or (−) circuit wire, or short between the (+) circuit wire and the (−) circuit wire between the ABS modulator-control unit and the wheel sensor.■

NO—Replace the wheel sensor.■

DTC 12, 14, 16, 18: Wheel Sensor Pulse Signal

NOTE: If the ABS indicator comes on for the reasons described below, the indicator goes off when you test-drive the vehicle at 31 mph (50 km/h).

- Only the drive wheel rotated
- The vehicle spun
- Electrical noise

1. Visually check for appropriate wheel sensor and pulser installation and condition (see table).

DTC	Appropriate Wheel Sensor
12	Right-front
14	Left-front
16	Right-rear
18	Left-rear

Are they installed correctly and not damaged?

YES—Go to step 2.

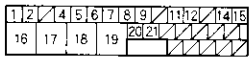
NO—Reinstall or replace the appropriate wheel sensor or pulser.■

2. Disconnect the ABS control unit 31P connector.

3. Measure the resistance between the appropriate wheel sensor (+) and (−) circuit terminals (see table).

DTC	Appropriate Terminal	
	(+) Side	(−) Side
12 (Right-front)	No. 5: FRS (+)	No. 4: FRS (−)
14 (Left-front)	No. 7: FLS (+)	No. 6: FLS (−)
16 (Right-rear)	No. 2: RRS (+)	No. 1: RRS (−)
18 (Left-rear)	No. 9: RLS (−)	No. 8: RLS (−)

ABS CONTROL UNIT 31P CONNECTOR



Wire side of female terminals

Is there less than 450 Ω ?

YES—Go to step 1.

NO—Go to step 4.

4. Check for continuity between the appropriate wheel sensor (+) circuit terminal and other wheel sensor (+) circuit terminals (see table).

DTC	Appropriate Terminal	Other Terminal		
12	No. 5: FRW (+)	No. 7	No. 2	No. 9
14	No. 7: FLW (+)	No. 5	No. 2	No. 9
16	No. 2: RRW (+)	No. 5	No. 7	No. 9
18	No. 9: RLW (+)	No. 5	No. 7	No. 2

Is there continuity?

YES—Repair short in the wires between the appropriate wheel sensor and the other wheel sensor harnesses.■

NO—Clear the DTC, disconnect the Honda PGM Tester, and test-drive the vehicle. If the ABS indicator comes on and the same DTC is indicated, replace the ABS modulator-control unit.■

5. Disconnect the harness 2P connector from the appropriate wheel sensor and check the resistance between the (+) side and the (−) side of the wheel sensor.

Is there less than 450 Ω ?

YES—Replace the wheel sensor.

NO—Repair short to wire between the appropriate wheel sensor (+) and (−) circuits.■

DTC 21: Continuous Operation (Chipped pulser)

1. Clear the DTC, then disconnect the Honda PGM tester.

2. Test-drive the vehicle at 19 mph (30 km/h) or more.

Does the ABS indicator come on and is DTC 21 indicated?

YES—Go to step 3.

NO—The system is OK at this time.■

3. Check the pulser gear for a chipped tooth.

Is the pulser OK?

YES—Check for a loose ABS control unit 31P connector. If necessary, substitute a known-good ABS modulator-control unit, and recheck.■

NO—Replace the driveshaft or hub unit (chipped pulser gear).■

DTC Troubleshooting (cont'd)

DTC 31, 32, 33, 34, 35, 36, 37, 38: Solenoid

1. Clear the DTC, then disconnect the Honda PGM Tester.
2. Test-drive the vehicle.

   Does the ABS indicator come on and are DTCs 31, 32, 33, 34, 35, 36, 37, 38 indicated?

   YES—Replace the ABS modulator-control unit. ■

   NO—The system is OK at this time. ■

DTC 51: Motor Locked

1. Check the No. 10 (40A) fuse in the under-hood fuse/relay box.

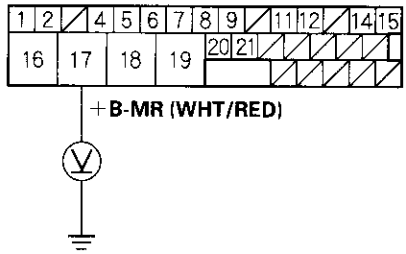
   Is the fuse OK?

   YES—Reinstall the fuse, and go to step 2.

   NO—Replace the fuse, and recheck. ■

2. Disconnect the ABS control unit 31P connector.
3. Measure the voltage between the ABS control unit 31P connector terminal No. 17 and body ground.

ABS CONTROL UNIT 31P CONNECTOR



Wire side of female terminals

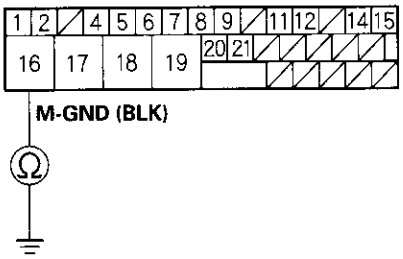
Is there battery voltage?

YES—Go to step 4.

NO—Repair open in the wire between the No. 10 (40A) fuse and the ABS control unit. ■

4. Check for continuity between the ABS control unit 31P connector terminal No. 16 and body ground.

ABS CONTROL UNIT 31P CONNECTOR



Wire side of female terminals

Is there continuity?

YES—Go to step 5.

NO—Repair open in the wire between the ABS control unit and body ground (G202).■

5. Reconnect the ABS control unit 31P connector.
6. Clear the DTC, then disconnect the Honda PGM tester.
7. Test-drive the vehicle at 6 mph (10 km/h) or more.

Does the ABS indicator come on, and is DTC 51 indicated?

YES—Replace the ABS modulator-control unit.■

NO—The system is OK at this time.■

DTC 52: Motor Stuck OFF

1. Check the No. 10 (40A) fuse in the under-hood fuse/relay box.

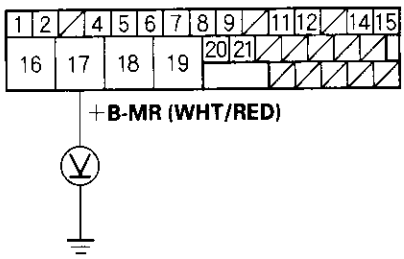
Is the fuse OK?

YES—Reinstall the fuse, and go to step 2.

NO—Replace the fuse, and recheck.■

2. Disconnect the ABS control unit 31P connector.
3. Measure the voltage between the ABS control unit 31P connector terminal No. 17 and body ground.

ABS CONTROL UNIT 31P CONNECTOR



Wire side of female terminals

Is there battery voltage?

YES—Go to step 4.

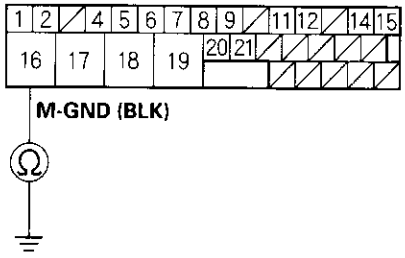
NO—Repair open in the wire between the No. 10 (40A) fuse and the ABS control unit.■

(cont'd)

DTC Troubleshooting (cont'd)

4. Check for continuity between the ABS control unit 31P connector terminal No. 16 and body ground.

ABS CONTROL UNIT 31P CONNECTOR



Wire side of female terminals

Is there continuity?

YES—Check for loose terminals in the ABS control unit 31P connector. If necessary, substitute a known-good ABS modulator-control unit, and recheck. ■

NO—Repair open in the wire between the ABS control unit and body ground (G202). ■

DTC 53: Motor Stuck ON

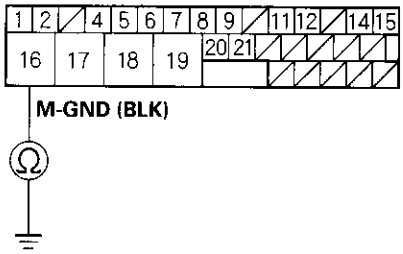
1. Clear the DTC, then disconnect the Honda PGM Tester.
2. Test-drive the vehicle.

   Does the ABS indicator come on and is DTC 53 indicated?

   YES—Go to step 3.

   NO—Intermittent failure, the system is OK at this time. ■
3. Disconnect the ABS control unit 31P connector.
4. Check for continuity between the ABS control unit 31P connector terminal No. 16 and body ground.

ABS CONTROL UNIT 31P CONNECTOR



Wire side of female terminals

Is there continuity?

YES—Replace the ABS modulator-control unit. ■

NO—Repair open in the wire between the ABS control unit and body ground (G202). ■

DTC 54: Main Relay Stuck OFF

1. Check the No. 8 (20A) fuse in the under-hood fuse/relay box, and reinstall the fuse if it is OK.

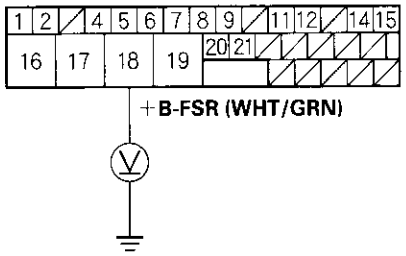
   Is the fuse OK?

   YES—Go to step 2.

   NO—Replace the fuse, and recheck. ■

2. Disconnect the ABS control unit 31P connector.
3. Measure the voltage between the ABS control unit connector terminal No. 18 and body ground.

ABS CONTROL UNIT 31P CONNECTOR



Wire side of female terminals

Is there battery voltage?

YES—Replace the ABS modulator-control unit. ■

NO—Repair open in the wire between the ABS control unit and the under-hood fuse/relay box. ■

DTC 61: IG2 Voltage

NOTE: Check the No. 11 (7.5A) fuse in the under-dash fuse/relay box before troubleshooting.

1. Clear the DTC, then disconnect the Honda PGM tester.
2. Test-drive the vehicle.

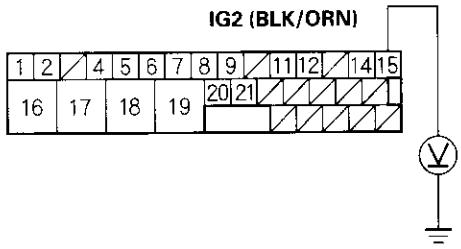
   Does the ABS indicator come on and is DTC 61 indicated?

   YES—Go to step 3.

   NO—The system is OK at this time. ■

3. Disconnect the ABS control unit 31P connector.
4. Turn the ignition switch ON (II).
5. Measure the voltage between the ABS control unit 31P connector terminal No. 15 and body ground.

ABS CONTROL UNIT 31P CONNECTOR



Wire side of female terminals

Is there battery voltage?

YES—Replace the ABS modulator-control unit. ■

NO—Repair open in the wire between the ABS control unit and the under-hood fuse/relay box. ■

DTC Troubleshooting (cont'd)

DTC 81: CPU (Central Processing Unit)

1. Clear the DTC, then disconnect the Honda PGM Tester.
2. Test-drive the vehicle.

   Does the ABS indicator come on and is DTC 81 indicated?

   YES—Replace the ABS modulator-control unit. ■

   NO—The system is OK at this time. ■

ABS Indicator Circuit Troubleshooting

ABS indicator does not come on

1. Turn the ignition switch ON (II), and watch the ABS indicator.

   Does the ABS indicator come on?

   YES—The system is OK at this time. ■

   NO—Go to step 2.

2. Pull up the parking brake lever.

   Does the brake system indicator come on?

   YES—Go to step 3.

   NO—Repair open in the indicator power source circuit. If necassary, substitute a known-good ABS modulator-control unit, and recheck. ■
   - Blown No. 10 (7.5A) fuse.
   - Open in the wire between the No. 10 (7.5A) fuse and the gauge assembly.
   - Open circuit inside the fuse box.

3. Turn the ignition switch OFF.
4. Disconnect the ABS control unit 31P connector.
5. Turn the ignition switch ON (II).

   Does the ABS indicator come on?

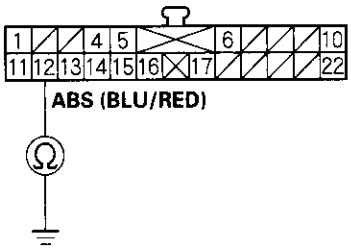
   YES—Check for loose terminals in the ABS control unit 31P connector. If necessary, substitute a known-good ABS modulator-control unit, and recheck. ■

   NO—Go to step 6.

6. Turn the ignition switch OFF.
7. Remove the gauge assembly (see page 22-64).

8. Disconnect the gauge assembly connector A (22P).
9. Check for continuity between gauge assembly connector A (22P) terminal No. 12 and body ground.

GAUGE ASSEMBLY CONNECTOR A (22P)



Wire side of female terminals

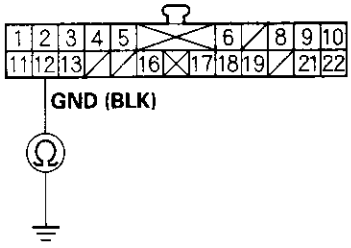
Is there continuity?

YES—Repair short to body ground in the wire between the gauge assembly and the ABS control unit.■

NO—Go to step 10.

10. Disconnect the gauge assembly connector B (22P).
11. Check for continuity between gauge assembly connector B (22P) terminal No. 12 and body ground.

GAUGE ASSEMBLY CONNECTOR B (22P)



Wire side of female terminals

Is there continuity?

YES—Check for loose terminals in the gauge assembly connectors. If the connectors are OK, replace the gauge assembly.■

NO—Repair open in the wire between the gauge assembly and body ground (G501).■

ABS indicator does not go off

1. Check the No. 8 (20A) fuse in the under-hood fuse/relay box, and reinstall the fuse if it is OK.

Is the fuse OK?

YES—Go to step 2.

NO—Replace the fuse, and recheck. If the fuse is blown, check for a short to body ground in this fuse circuit. If the circuit is OK, replace the ABS modulator-control unit.■

2. Check the No. 11 (7.5A) fuse in the under-dash fuse/relay box, and reinstall the fuse if it is OK.

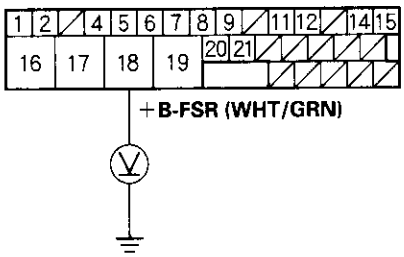
Is the fuse OK?

YES—Go to step 3.

NO—Replace the fuse, and recheck. If the fuse is blown, check for a short to body ground in this fuse circuit. If the circuit is OK, replace the ABS modulator-control unit.■

3. Disconnect the ABS control unit 31P connector.
4. Measure the voltage between terminal No. 18 and body ground.

ABS CONTROL UNIT 31P CONNECTOR



Wire side of female terminals

Is there battery voltage?

YES—Go to step 5.

NO—Repair open in the wire between the No. 8 (20A) fuse and the ABS control unit.■

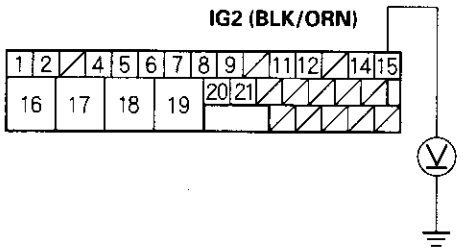
(cont'd)

ABS Indicator Circuit Troubleshooting (cont'd)

5. Turn the ignition switch ON (II).

6. Measure the voltage between the ABS control unit 31P connector terminal No. 15 and body ground.

ABS CONTROL UNIT 31P CONNECTOR



Wire side of female terminals

Is there battery voltage?

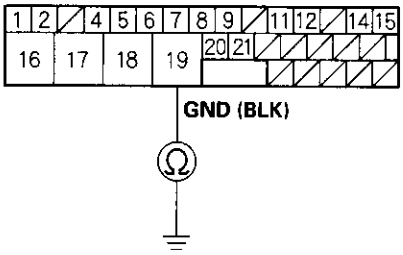
YES—Go to step 7.

NO—Repair open in the wire between the No. 11 (7.5A) fuse and the ABS control unit. ■

7. Turn the ignition switch OFF.

8. Check for continuity between the ABS control unit 31P connector terminal No. 19 and body ground.

ABS CONTROL UNIT 31P CONNECTOR



Wire side of female terminals

Is there continuity?

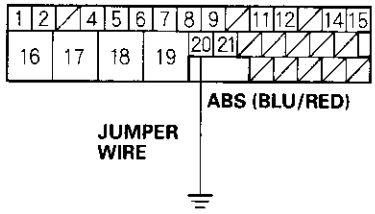
YES—Go to step 9.

NO—Repair open in the wire between the ABS control unit and body ground (G202). ■

9. Turn the ignition switch ON (II).

10. Connect the ABS control unit 31P connector terminal No. 20 and body ground with a jumper wire.

ABS CONTROL UNIT 31P CONNECTOR



Wire side of female terminals

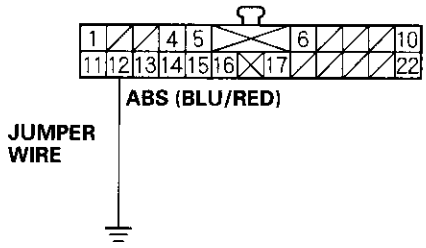
Does the ABS indicator go off?

YES—Check for loose terminals in the ABS control unit 31P connector. If necessary, substitute a known-good ABS modulator-control unit, and recheck. ■

NO—Go to step 11.

11. Remove the gauge assembly, and leave the connectors connected. Connect the gauge assembly connector A (22P) terminal No. 12 and body ground with a jumper wire.

GAUGE ASSEMBLY CONNECTOR A (22P)



Wire side of female terminals

Does the ABS indicator go off?

YES—Repair open in the wire between the gauge assembly and the ABS control unit. ■

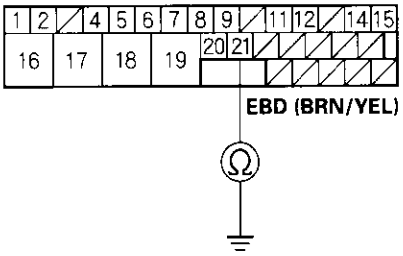
NO—Check for loose gauge assembly connectors. If the connectors are OK, replace the printed circuit board in the gauge assembly. ■

Brake System Indicator Circuit Troubleshooting

Brake system indicator does not come on

1. Disconnect the multiplex control unit 13P connector and the ABS control unit 31P connector.
2. Check for continuity between the ABS control unit 31P connector terminal No. 21 and body ground.

ABS CONTROL UNIT 31P CONNECTOR



Wire side of female terminals

Is there continuity?

YES—Repair short to body ground in the wire between the multiplex control unit and the ABS control unit.■

NO—Go to multiplex control system troubleshooting (see page 22-172).■

Brake system indicator does not go off

1. Turn the ignition switch ON (II).
2. Release the parking brake.

   Does the brake system indicator go off after several seconds?

   YES—The system is OK at this time.■

   NO—Go to step 3.
3. Check the brake fluid level.

   Is the level OK?

   YES—Go to step 4.

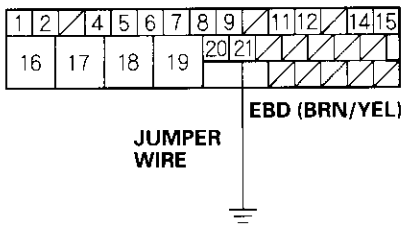
   NO—Refill the brake fluid, and recheck.■
4. Check the ABS indicator.

   Does the ABS indicator stay on?

   YES—Read the ABS DTC (see step 1 on page 19-32). and do the applicable troubleshooting for the DTC.

   NO—Go to step 5.
5. Turn the ignition switch OFF.
6. Disconnect the ABS control unit 31P connector.
7. Connect the ABS control unit 31P connector terminal No. 21 and body ground with a jumper wire.

ABS CONTROL UNIT 31P CONNECTOR



Wire side of female terminals

(cont'd)

Brake System Indicator Circuit Troubleshooting (cont'd)

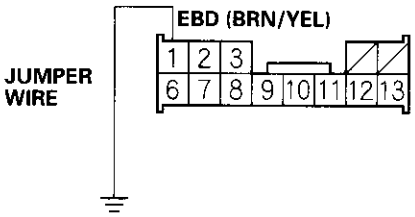
8. Turn the ignititon switch ON (II).
9. Check the brake system indicator.

   Does the brake system indicator go off?

   YES—Replace the ABS modulator-control unit. ■

   NO—Go to step 10.
10. Turn the ignition switch OFF.
11. Connect the multiplex control unit 13P connector terminal No. 1 and body ground with a jumper wire.

MULTIPLEX CONTROL UNIT 13P CONNECTOR



Wire side of female terminals

12. Turn the ignition switch ON (II).
13. Check the brake system indicator.

    Does the brake system indicator go off?

    YES—Repair open in the wire between the multiplex control unit and the ABS control unit. ■

    NO—Go to multiplex control system troubleshooting (see page 22-172). ■

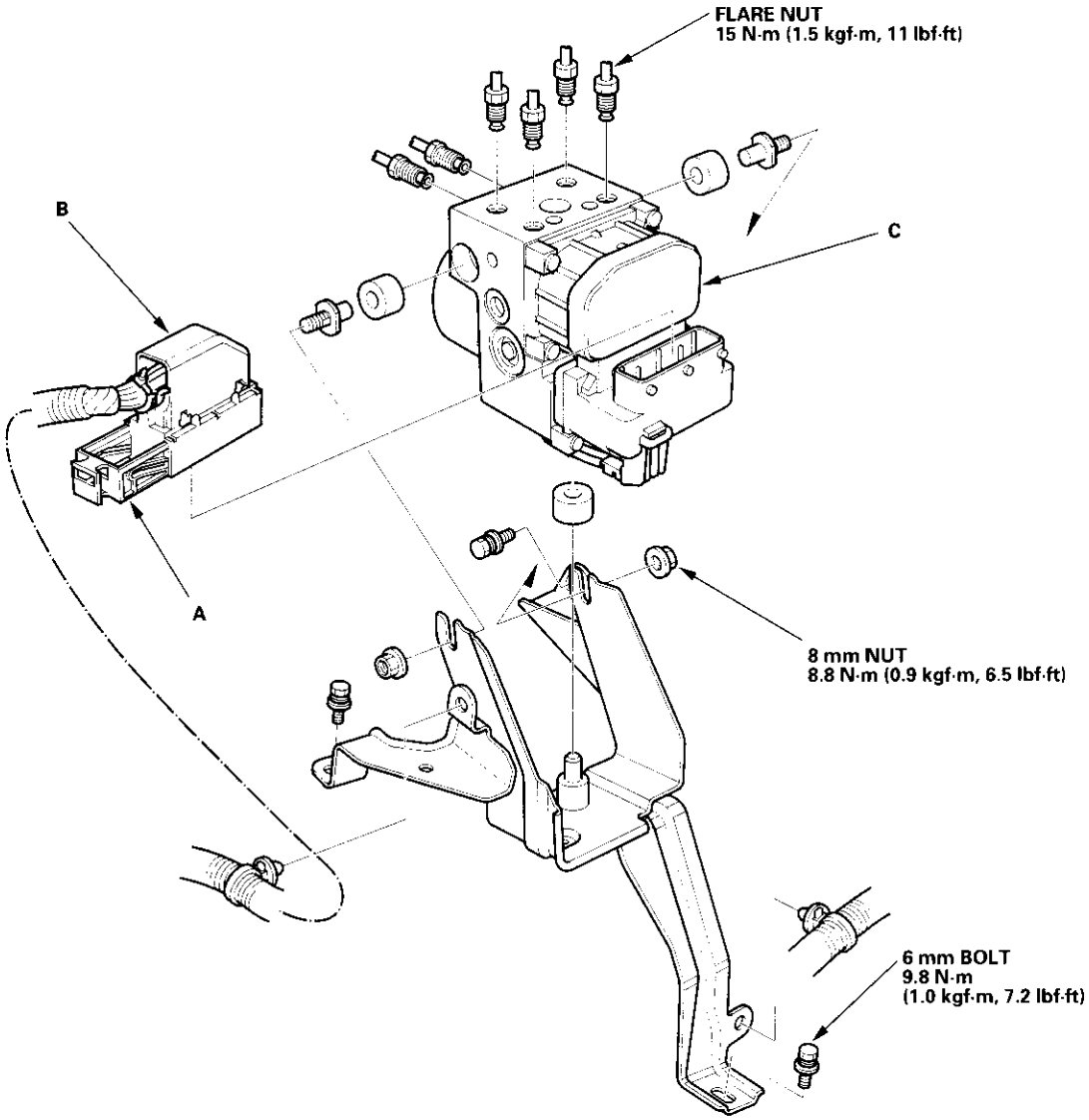
ABS Modulator-Control Unit Removal and Installation

NOTE:
- Do not spill brake fluid on the vehicle; it may damage the paint; if brake fluid gets on the paint, wash it off immediately with water.
- Be careful 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.

Removal

1. Turn the ignition switch OFF.

2. Pull up the lock (A) of the ABS control unit 31P connector (B), then disconnect the connector.



(cont'd)

ABS Modulator-Control Unit Removal and Installation (cont'd)

3. Disconnect the six brake lines.
4. Remove the two 8 mm nuts.
5. Remove the ABS modulator-control unit (C).

Installation

1. Install the ABS modulator-control unit, then tighten the two 8 mm nuts.
2. Align the connecting surface of the ABS control unit 31P connector.
3. Push in the lock of the ABS control unit 31P connector until you hear it click into place, then connect the connector.
4. Connect the six brake lines.
5. Bleed the brake system, starting with the front wheels.
6. Connect the PGM Tester, and do the solenoid function test for each wheel.
7. Bleed the brake system again, starting with the front wheels.
8. Start the engine, and check that the ABS indicator and brake system indicator go off.
9. Disconnect the Honda PGM Tester. Test-drive the vehicle, and check that the ABS indicator and brake system indicator do not come on.

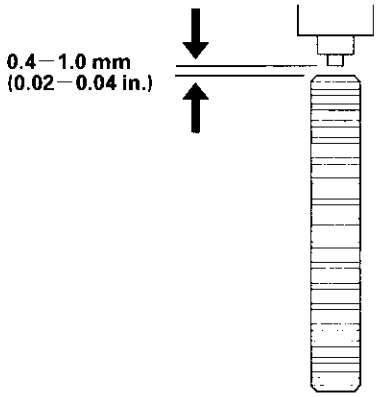
Wheel Sensor Inspection

1. Inspect the front and rear pulsers for chipped or damaged teeth.
2. Measure the air gap between the wheel sensor and the pulser all the way around while rotating the pulser. Remove the rear brake disc to measure the gap on the rear wheel sensor. If the gap exceeds 1.0 mm (0.04 in.), check for a bent suspension arm.

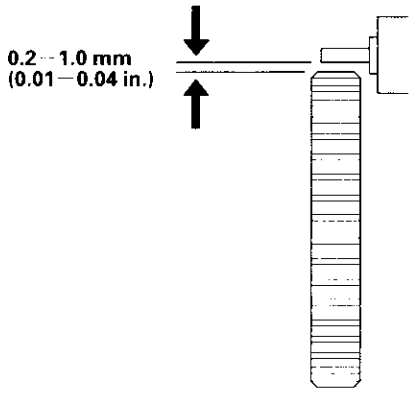
Standard:

Front:	**0.4—1.0 mm (0.02—0.04 in.)**
Rear:	**0.2—1.0 mm (0.01—0.04 in.)**

Front:



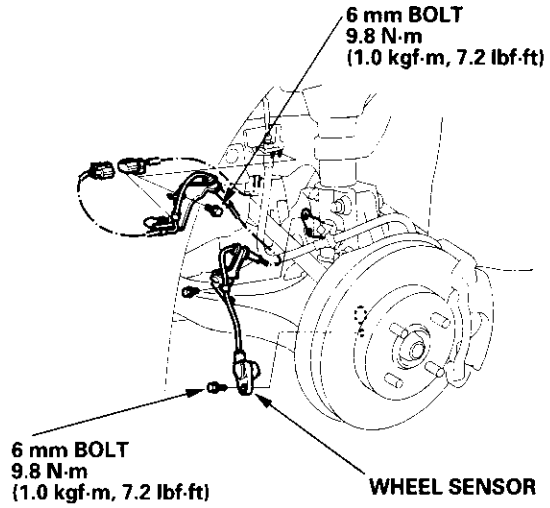
Rear:



Wheel Sensor Replacement

NOTE: Install the sensors carefully to avoid twisting the wires.

Front:



Rear: