

Brakes

Conventional Brake Components

Special Tools	19-2
Component Location Index	19-3
Brake System Inspection and Test	19-4
Symptom Troubleshooting	19-5
Brake Pedal and Brake Pedal Position Switch Adjustment	19-6
Parking Brake Inspection and Adjustment	19-7
Brake System Bleeding	19-9
Brake System Indicator Circuit Diagram	19-10
Parking Brake Switch Test	19-11
Brake Fluid Level Switch Test	19-11
Front Brake Pad Inspection and Replacement	19-12
Front Brake Disc Inspection	19-16
Front Brake Caliper Overhaul	19-17
Master Cylinder Replacement	19-18
Master Cylinder Inspection	19-19
Brake Booster Test	19-20
Brake Booster Pushrod Clearance Adjustment	19-21
Brake Booster Replacement	19-22
Rear Brake Pad Inspection and Replacement	19-23
Rear Brake Disc Inspection	19-26
Rear Brake Caliper Overhaul	19-27
Parking Brake Inspection	19-28
Parking Brake Shoe Replacement	19-30
Parking Brake Shoe Lining Break-in	19-33
Brake Pedal Replacement	19-34
Brake Hose and Line Inspection	19-35
Brake Hose Replacement	19-36
Parking Brake Cable Replacement	19-38

VSA (Vehicle Stability Assist)

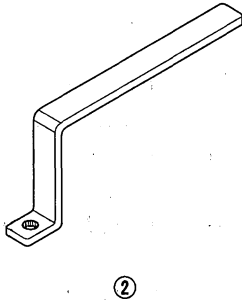
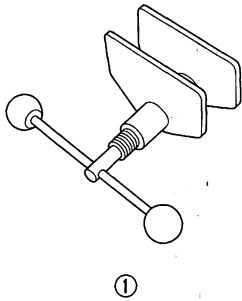
System Components	19-41
-------------------------	-------



Conventional Brake Components

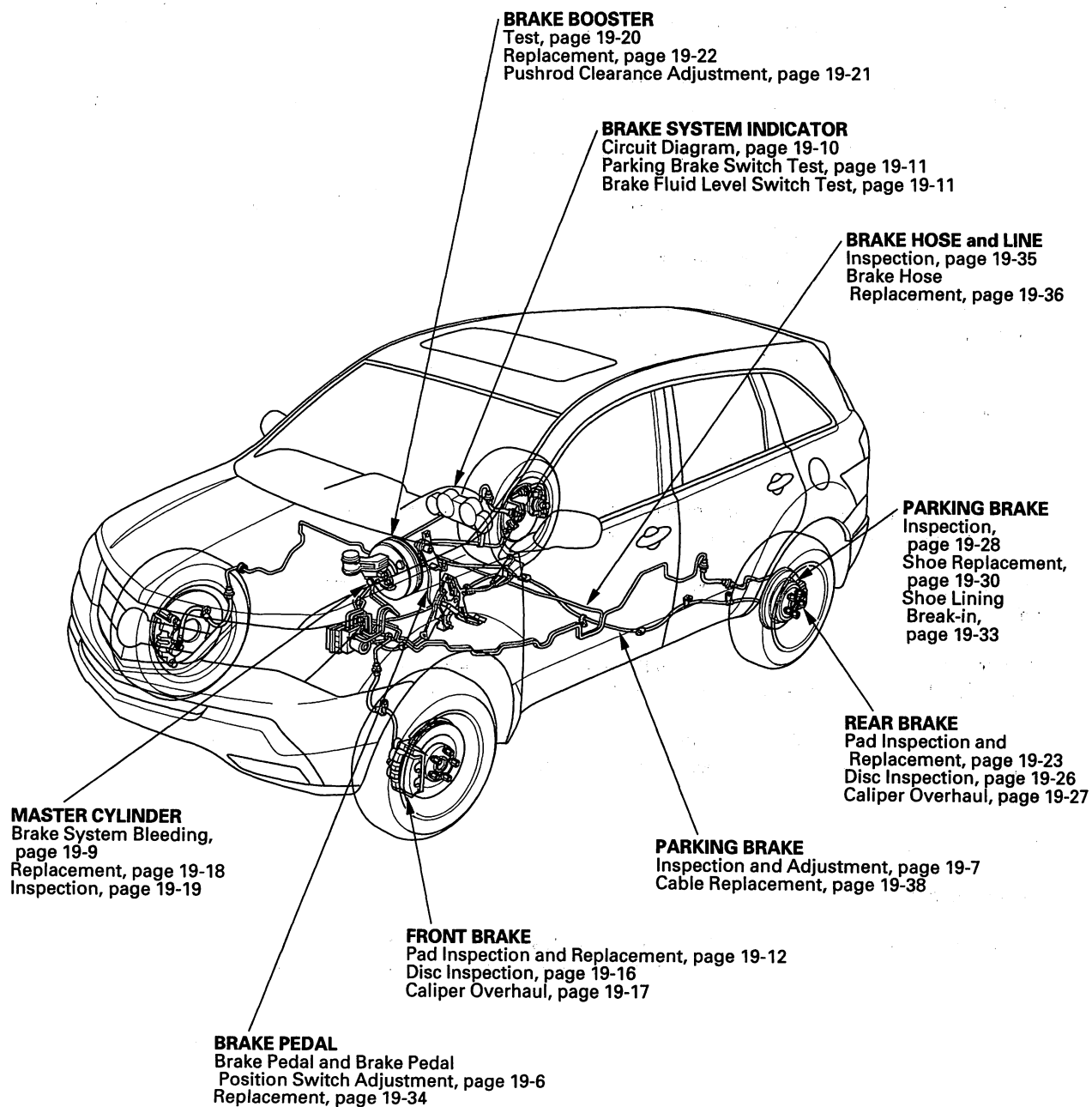
Special Tools

Ref. No.	Tool Number	Description	Qty
①	07AAE-SEPA101	Brake Caliper Piston Compressor	1
②	070AB-SJA0100	Booster Piston Holder	1





Component Location Index



Conventional Brake Components

Brake System Inspection and Test

Inspect the brake system components listed. Repair or replace any parts that are leaking or damaged.

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.	Bulging seat at reservoir cap. This is a sign of fluid contamination.
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. • Bleed screw.	Seized or sticking caliper pins.
VSA Modulator-control Unit	Look for damage or signs of fluid leakage at: • Line joints. • Modulator-control unit.	

Brake System Test

Brake pedal sinks/fades when braking

1. Set the parking brake, and start the engine, then turn off the A/C switch. Allow the engine to warm up to normal operating temperature (radiator fan comes on twice).
2. Attach a 50 mm (2 in.) piece of masking tape along the bottom of the steering wheel, and draw a horizontal reference mark across it.
3. With the transmission in P or N position, press and hold the brake pedal lightly (about the same pressure needed to keep an A/T-equipped vehicle from creeping), then release the parking brake.
4. While still holding the brake pedal, hook the end of the tape measure behind the brake pedal, then pull the tape up to the steering wheel. Note the measurement between the brake pedal and the reference mark on the steering wheel.
5. Apply steady pressure to the brake pedal for 3 minutes.
6. Watch the tape measure.
 - If the measurement increases 10 mm (3/8 in.) or less, the master cylinder is OK.
 - If the measurement increases more than 10 mm (3/8 in.), replace the master cylinder.



Symptom Troubleshooting

Rapid brake pad wear, vehicle vibration (after a long drive), or high, hard brake pedal

NOTE: Make sure that the caliper pins are installed correctly.

The upper caliper pin B and lower caliper pin A are different. If the pins are installed in the wrong location, it will cause vibration, uneven or rapid brake pad wear, and possibly uneven tire wear. For proper caliper pin location (see page 19-17).

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, press the brake pedal several times 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 (see page 19-22). ■

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 (see page 19-6). ■

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—Check the master cylinder reservoir for contamination in the brake fluid. If you find contamination, flush the entire brake system of all contaminated fluid. If the brake fluid is OK, replace the master cylinder (see page 19-18). ■

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

Is there brake drag at any of the wheels?

YES—Check the master cylinder reservoir for contamination in the brake fluid. If you find contamination, flush the entire brake system of all contaminated fluid. If the brake fluid is OK, disassemble and repair the caliper on the wheel(s) with brake drag. ■

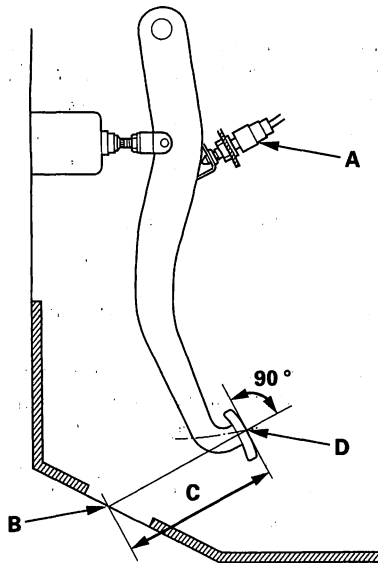
NO—Look for and replace any damaged brake lines. If all brake lines are OK, replace the VSA modulator-control unit (see page 19-102). ■

Conventional Brake Components

Brake Pedal and Brake Pedal Position Switch Adjustment

Pedal Height

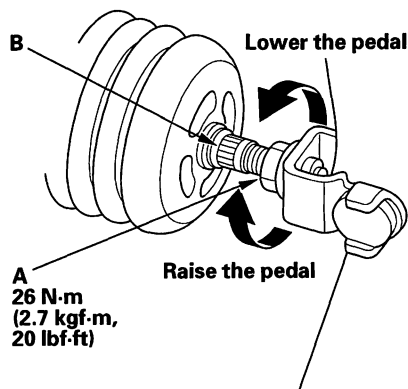
1. Turn the brake pedal position switch (A) counterclockwise, and pull it back until it is no longer touching the brake pedal.



2. Pull back the carpet and find the cutout (B) in the insulator. Measure the pedal height (C) at the center of the pedal pad (D) to the floor without the insulator.

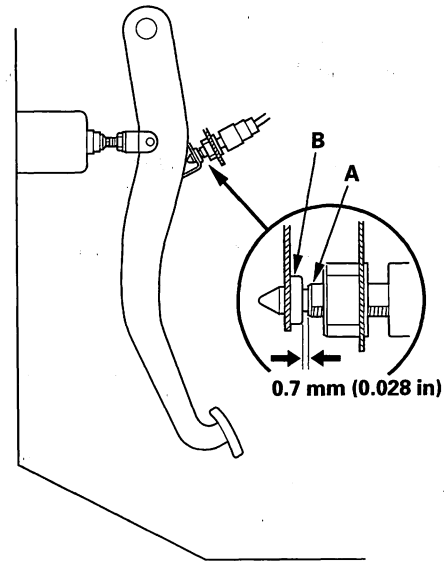
Standard pedal height (with carpet removed):
178 mm (7 in.)

3. Loosen the pushrod locknut (A), and screw the pushrod (B) 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.



Brake Pedal Position Switch Clearance

4. Lift up on the brake pedal by hand. 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 0.7 mm (0.028 in.) by locking the switch. Make sure the brake lights go off when the pedal is released.



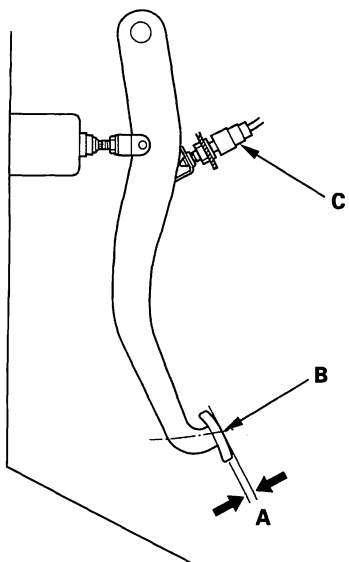
5. Check the brake pedal free play.



Pedal Free Play

1. With the engine off, inspect the play (A) on the brake pedal pad (B) by pushing the brake pedal by hand. If the brake pedal free play is out of specification, adjust the brake pedal position switch (C). If the brake pedal free play is insufficient, it may result in brake drag.

Free play: 1–5 mm (1/16–3/16 in.)

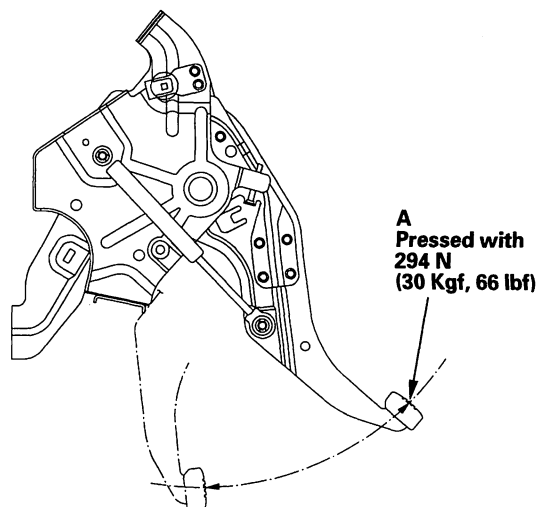


Parking Brake Inspection and Adjustment

Inspection

1. Press the parking brake pedal (A) with 294 N (30 kgf, 66 lbf) of force to fully apply the parking brake. The parking brake pedal should be locked within the specified number of clicks.

Pedal locked clicks: 9 to 11



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

NOTE: Minor parking brake pedal adjustments (1 to 2 clicks) can be made with the adjusting nut (see parking brake minor adjustment, page 19-8). If a larger adjustment is required, follow the major adjustment procedure using the adjuster nut at the parking brake drum (see parking brake major adjustment, page 19-8). After installing new parking brake shoes and/or new brake disc/drum, make sure you drive the vehicle for "break-in" (see page 19-33).

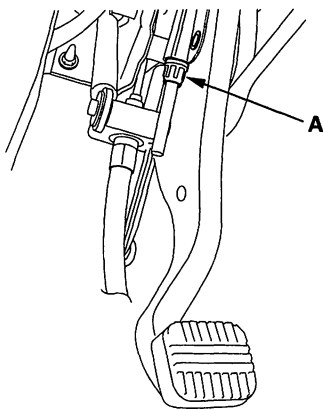
(cont'd)

Conventional Brake Components

Parking Brake Inspection and Adjustment (cont'd)

Minor Adjustment

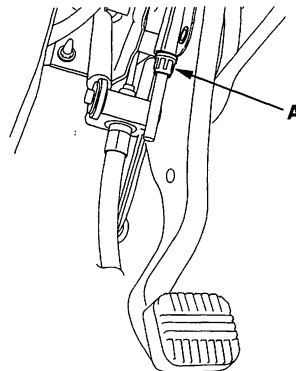
1. Raise the rear of the vehicle, and support it with safety stands in the proper locations (see page 1-7).
2. Fully release the parking brake pedal.
3. Press the parking brake pedal 1 click.
4. Tighten the parking brake adjusting nut (A) until the parking brakes drag slightly when the rear wheels are turned.



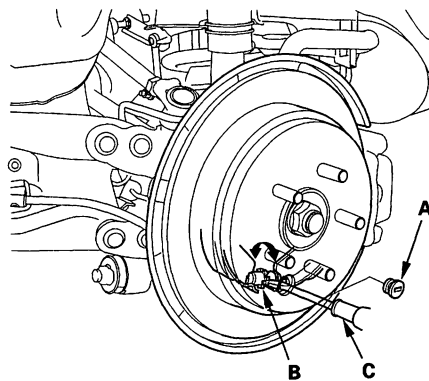
5. Release the parking brake pedal fully, and check that the parking brakes do not drag when the rear wheels are turned. Readjust if necessary.
6. Make sure the parking brakes are fully applied when the parking brake pedal is pressed all the way.

Major Adjustment (to be done when replacing parking brake shoes and after lining surface break-in)

1. Raise the rear of the vehicle, and support it with safety stands in the proper locations (see page 1-7).
2. Fully release the parking brake pedal.
3. Back off the parking brake adjusting nut (A) in the parking brake pedal.



4. Remove the rear wheels.
5. Remove the access plug (A).



6. Turn the ratchet teeth on the adjuster nut (B) with a flat-tip screwdriver (C) until the shoes lock against the parking brake drum. Then back off the adjuster 10 clicks, and install the access plug.
7. Clean the mating surface of the brake disc/drum and the inside of the wheel, then install the rear wheels.
8. Do the minor adjustment procedure.

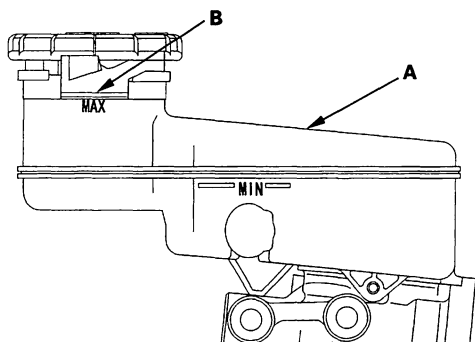


Brake System Bleeding

NOTE:

- Do not reuse the drained fluid. Use only clean Acura DOT 3 Brake Fluid from an unopened container. Using a non-Acura brake fluid can cause corrosion and shorten the life of the system.
- Do not mix different brands of brake fluid; they may not be compatible.
- 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.
- The reservoir connected to the master cylinder must be at the MAX (upper) level mark at the start of the bleeding procedure and checked after bleeding each brake circuit. Add fluid as required.

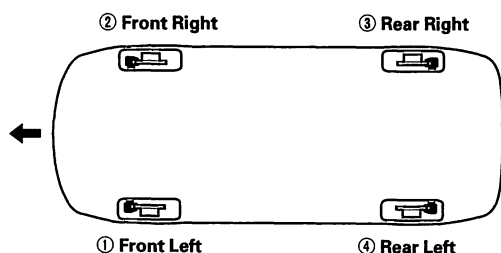
1. Make sure the brake fluid level in the reservoir (A) is at the MAX (upper) level line (B).



2. Have someone slowly pump the brake pedal several times, then apply steady pressure.
3. Start the bleeding at the driver's side of the front brake system.

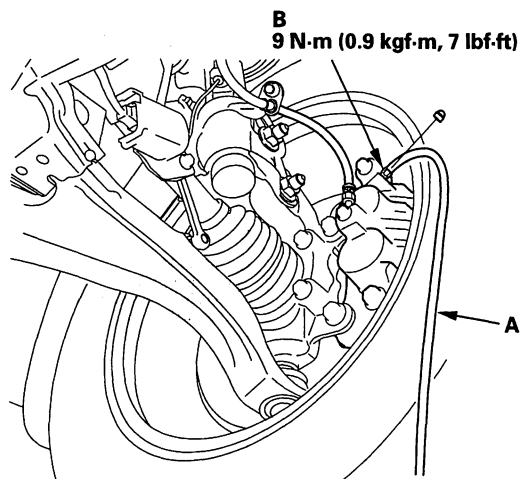
NOTE: Bleed the calipers or the wheel cylinders in the sequence shown.

BLEEDING SEQUENCE:

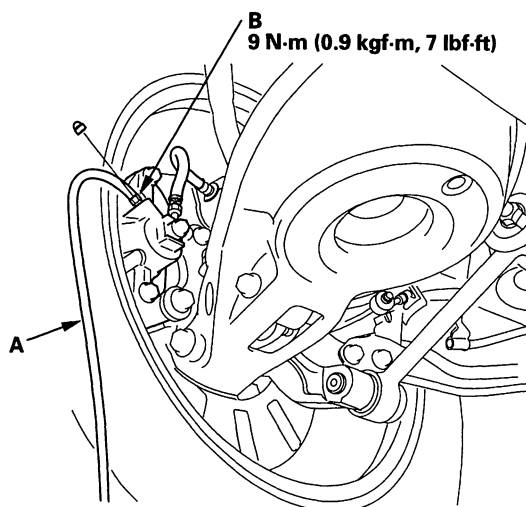


4. Attach a length of clear drain tube (A) to the bleed screw (B), then, loosen the bleed screw to allow air to escape from the system. Then tighten the bleed screw securely.

Front



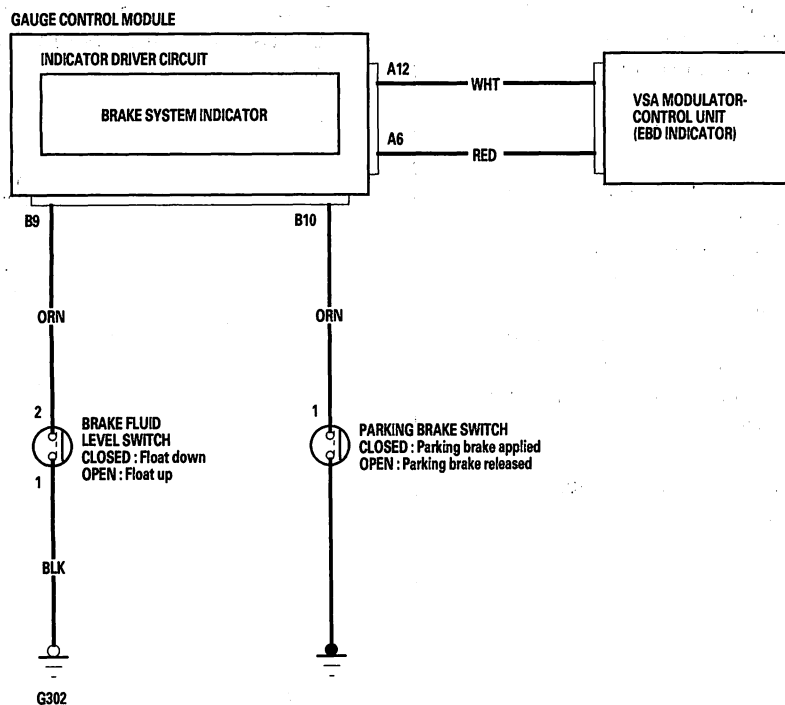
Rear



5. Refill the master cylinder reservoir to the MAX (upper) level line.
6. Repeat the procedure for each brake circuit until there are no air bubbles in the fluid.

Conventional Brake Components

Brake System Indicator Circuit Diagram

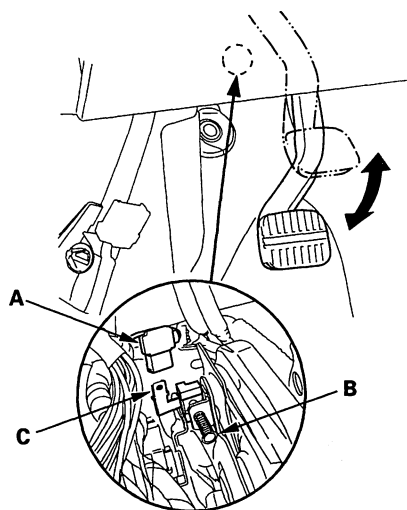




Parking Brake Switch Test

NOTE: If both the ABS/VSA indicator and the brake system indicator come on at the same time, check the VSA system first (see page 19-43).

1. Disconnect the parking brake switch connector (A) from the parking brake switch (B).



2. Check for continuity between the positive terminal (C) and body ground.

- With the parking brake pedal pressed, there should be continuity.
- With the parking brake pedal released, there should be no continuity.

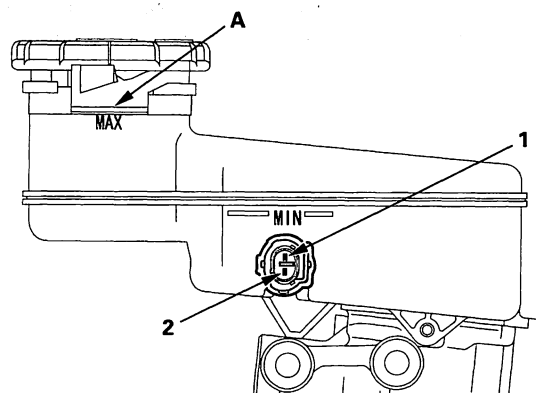
NOTE: If the parking brake switch and the fluid level switch are OK, but the brake system indicator does not function, do the gauge control module test (see page 22-315).

Brake Fluid Level Switch Test

Check for continuity between the terminals (1) and (2) with the float in the down position and in the up position.

NOTE:

- Remove the brake fluid completely from the reservoir. With the float down, there should be continuity.
- Fill the reservoir with brake fluid to the MAX (upper) level (A). With the float up, there should be no continuity.
- If both the ABS/VSA indicator and the brake system indicator come on at the same time, check the VSA system first (see page 19-43).
- If the parking brake switch and fluid level switch are OK, but the brake system indicator does not function, do the gauge control module test (see page 22-315).



Conventional Brake Components

Front Brake Pad Inspection and Replacement

Special Tools Required

Brake caliper piston compressor 07AAE-SEPA101

⚠ 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 locations (see page 1-7).
2. Remove the front wheels.

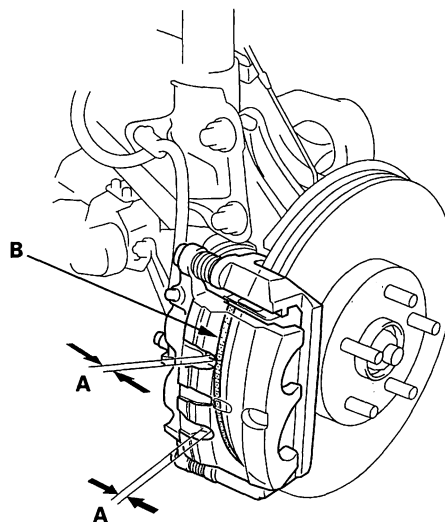
3. Check the thickness (A) of the inner pad (B) and outer pad (C). Do not include the thickness of the backing plate.

Brake pad thickness:

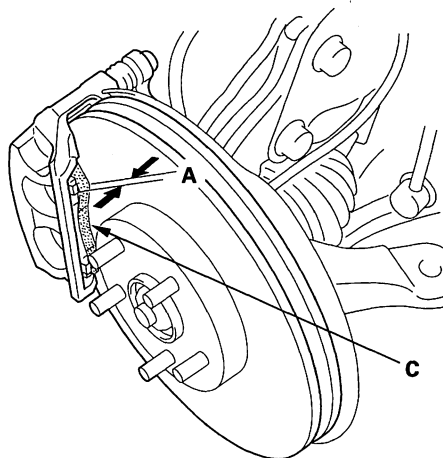
Standard: 10.6—11.2 mm (0.42—0.44 in.)

Service limit: 1.6 mm (0.06 in.)

Inner pad



Outer pad

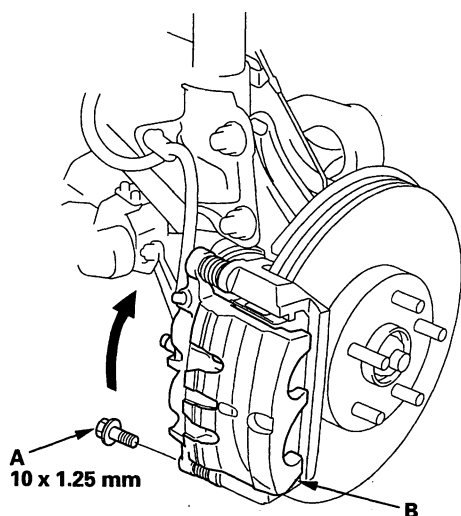


4. If the brake pad thickness is less than the service limit, replace the front brake pads as a set.
5. Clean the mating surface of the brake disc and the inside of the wheel, then install the front wheels.

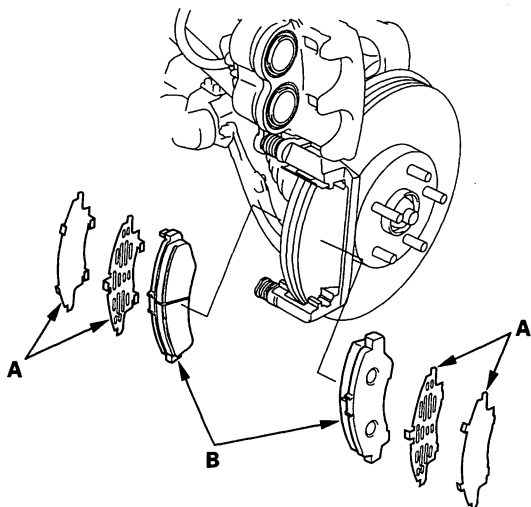


Replacement

1. Remove some brake fluid from the master cylinder.
2. Raise the front of the vehicle, and support it with safety stands in the proper locations (see page 1-7).
3. Remove the front wheels.
4. Remove the flange bolt (A), and pivot the caliper (B) up out of the way. Check the hose and pin boots for damage and deterioration.

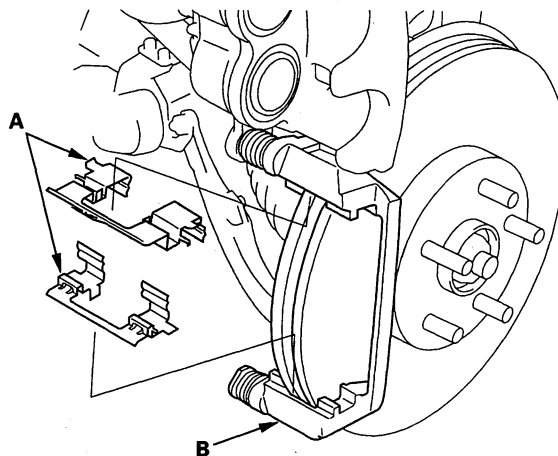


5. Remove the pad shims (A) and brake pads (B).



6. Remove the pad retainers (A).

NOTE: The upper and lower pad retainers are different. During installation, make sure the pad retainers are in proper positions.



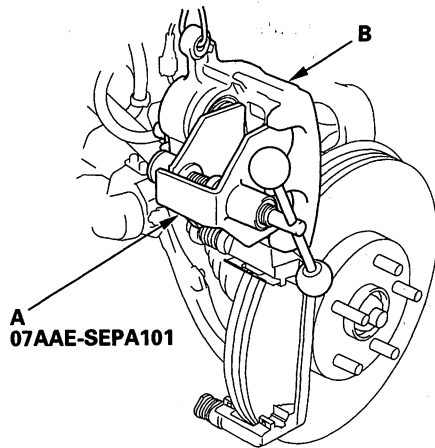
7. Clean the caliper bracket (B) thoroughly; remove any rust, and check for grooves and cracks.
8. Inspect the brake disc, and check for damage and cracks (see page 19-16).
9. Install the pad retainers. Wipe excess assembly paste off the retainers. Keep the assembly paste off the discs and pads.

(cont'd)

Conventional Brake Components

Front Brake Pad Inspection and Replacement (cont'd)

10. Mount the brake caliper piston compressor (A) on the caliper body (B).

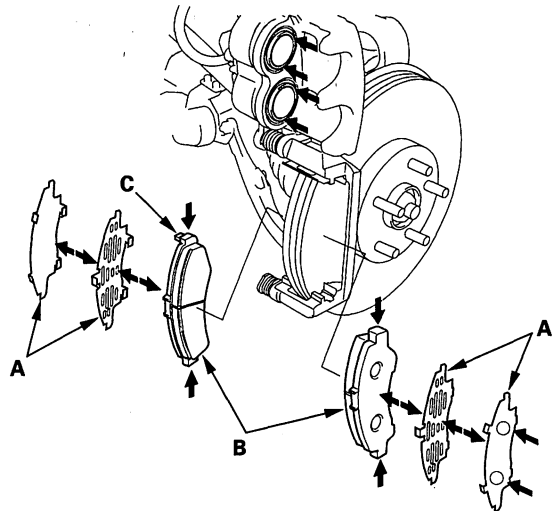


11. Press in the piston with the brake caliper piston compressor so the caliper will fit over the brake pads. Make sure the piston boot is in position to prevent damaging it when pivoting the caliper down.

NOTE: Be careful when pressing in the piston; brake fluid might overflow from the master cylinder's reservoir. If brake fluid gets on any painted surface, wash it off immediately with water.

12. Remove the brake caliper piston compressor.

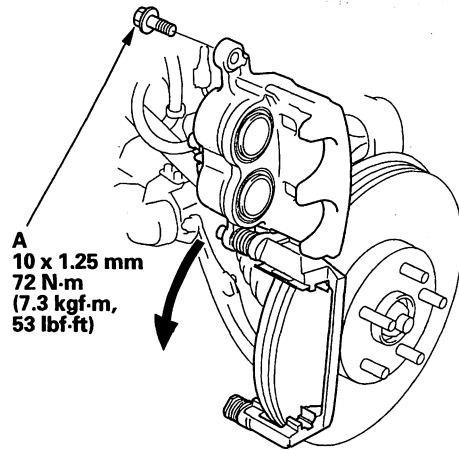
13. Apply a thin coat of M-77 assembly paste (P/N 08798-9010) to the pad side of the shims (A), the back of the brake pads (B) and the other areas indicated by the arrows. Wipe excess assembly paste off the pad shims and brake pads. Contaminated brake discs or brake pads reduce stopping ability. Keep grease and assembly paste off the brake discs and brake pads.



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



15. Pivot the caliper down into position. Install the flange bolt (A), and tighten it to the specified torque.



16. Clean the mating surface of the brake disc and the inside of the wheel, then install the front wheels.
17. Press the brake pedal several times to make sure the brakes work.

NOTE: Engagement 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.

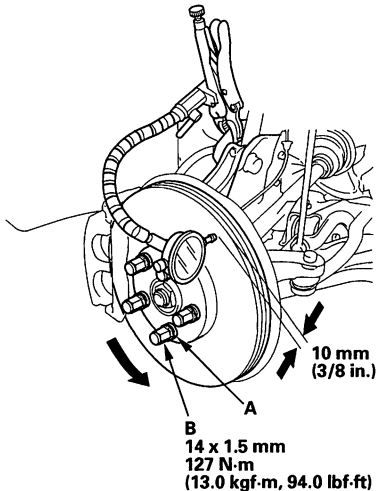
18. Add brake fluid as needed.
19. After installation, check for leaks at hose and line joints or connections, and retighten if necessary. Test-drive the vehicle, then check for leaks (see page 19-35).

Conventional Brake Components

Front Brake Disc Inspection

Runout

1. Raise the front of the vehicle, and support it with safety stands in the proper locations (see page 1-7).
2. Remove the front wheels.
3. Remove the brake pads (see page 19-13).
4. Inspect the brake disc surface for damage and cracks. Clean the brake disc thoroughly, and remove all rust.
5. Install suitable flat washers (A) and wheel nuts (B), and tighten the wheel nuts to the specified torque to hold the brake disc securely against the hub.



6. Set up the dial gauge against the brake disc as shown, and measure the runout at 10 mm (3/8 in.) from the outer edge of the brake disc.

Brake disc runout:

Service limit: 0.10 mm (0.004 in.)

7. If the brake 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. refinishing limit: 26.0 mm (1.02 in.)

NOTE:

- If the brake disc is beyond the service limit for refinishing, replace it (see page 18-13).
- A new brake 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 locations (see page 1-7).
2. Remove the front wheels.
3. Remove the brake pads (see page 19-13).
4. Using a micrometer, measure the brake disc thickness at eight points, about 45 ° apart and 10 mm (3/8 in.) in from the outer edge of the brake disc. Replace the brake disc if the smallest measurement is less than the max. refinishing limit.

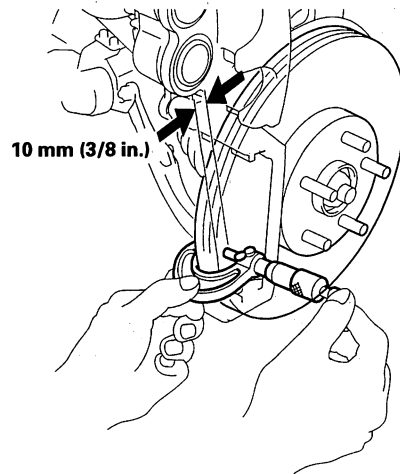
Brake disc thickness:

Standard: 27.9—28.1 mm (1.10—1.11 in.)

Max. refinishing limit: 26.0 mm (1.02 in.)

Brake disc parallelism: 0.015 mm (0.0006 in.) max.

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



5. If the brake 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: If the brake disc is beyond the service limit for refinishing, replace it. Remove the following items:

- Front brake caliper bracket (see step 4 on page 18-13).
- Front brake disc (see step 6 on page 18-13).



Front Brake Caliper Overhaul

⚠ CAUTION

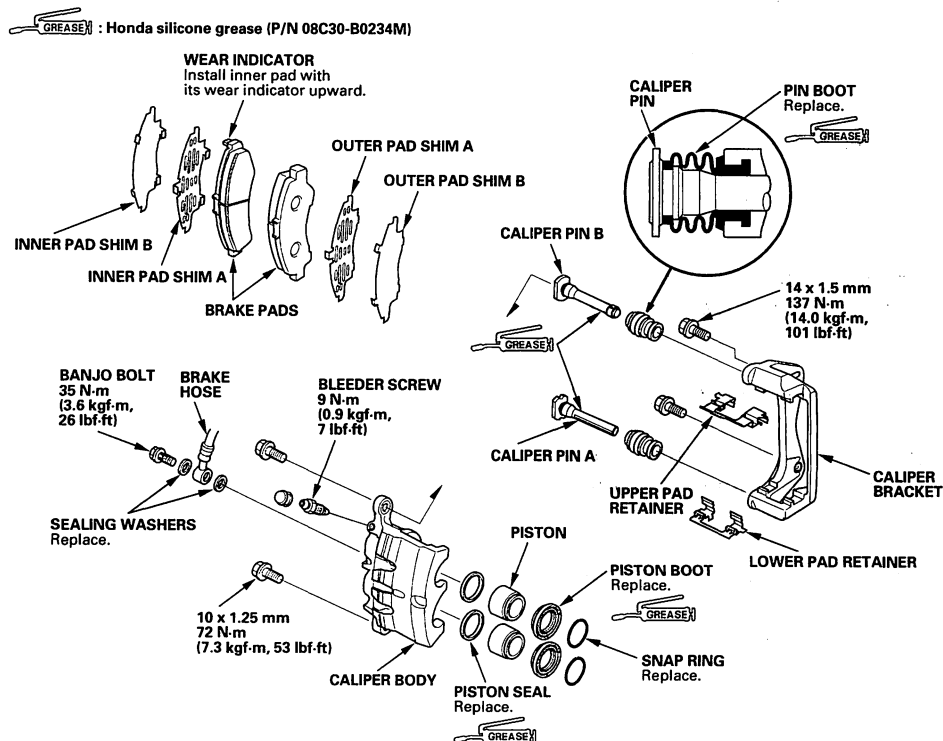
Frequent inhalation of brake pad dust, regardless of material composition, could be hazardous to your health.

- 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:

NOTE: Make sure that the caliper pins are installed correctly. Upper caliper pin B and lower caliper pin A are different. If these caliper pins are installed in the wrong location, it will cause vibration, uneven or rapid pad wear, and possibly uneven tire wear.

- 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 brake fluid, 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 dirt and other foreign particles.
- Replace parts with new ones as specified in the illustration.
- Make sure no dirt or other foreign matter gets in the brake fluid.
- Make sure no grease or oil gets on the brake discs or pads.
- When reusing brake pads, always reinstall them in their original positions to prevent loss of braking efficiency.
- Do not reuse drained brake fluid. Use only clean Acura DOT 3 Brake Fluid from an unopened container. Using a non-Acura 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 pistons, piston seal grooves, and caliper bores with clean brake fluid.
- Replace all rubber parts with new ones whenever disassembled.
- After installing the caliper, check the brake hose and line for leaks, interference, and twisting.



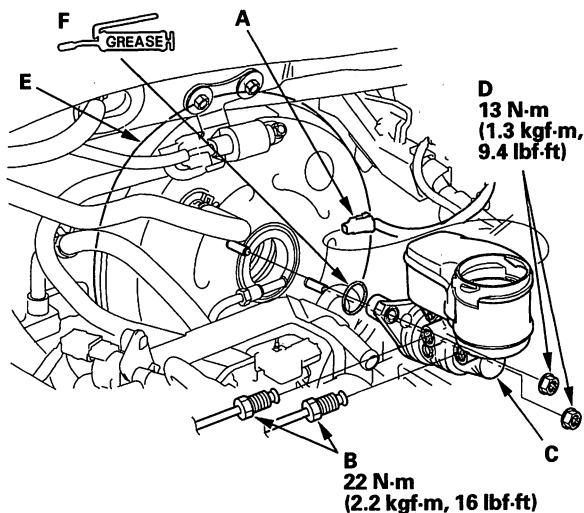
Conventional Brake Components

Master Cylinder Replacement

NOTICE

- 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.

1. Open the air cleaner housing cover (see page 11-364).
2. Remove the reservoir cap and the brake fluid from the master cylinder reservoir with a syringe.
3. Disconnect the brake fluid level switch connector (A).



4. Disconnect the brake lines (B) from the master cylinder (C). To prevent spills, cover the hose joints with rags or shop towels.
5. Remove the master cylinder mounting nuts (D).
6. Remove the master cylinder from the brake booster (E). Be careful not to bend or damage the brake lines when removing the master cylinder.
7. Remove the O-ring (F) from the master cylinder.

NOTE: Replace the O-ring whenever the master cylinder is removed.

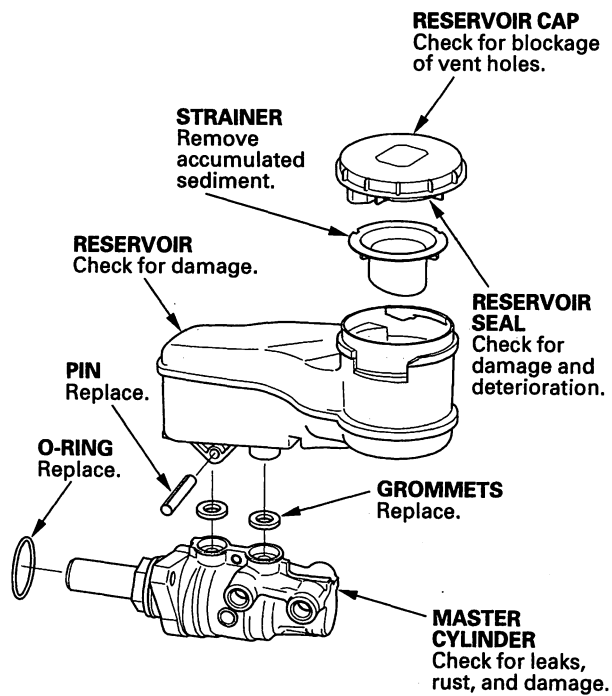
8. Install the master cylinder in the reverse order of removal, and note these items:
 - Check the brake booster pushrod clearance (see page 19-21).
 - Coat the new O-ring with silicone oil (Shin-Etsu KF 54).
 - Check the brake pedal height and free play after installing the master cylinder, and adjust it if necessary (see page 19-6).
9. Bleed the brake system (see page 19-9).
10. Spin the wheels to check for brake drag.



Master Cylinder Inspection

1. Inspect and note these items:

- Before reassembling, check that all parts are free of dirt 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.



Conventional Brake Components

Brake Booster Test

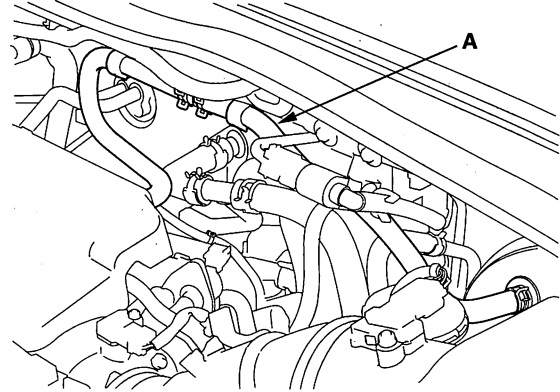
Functional Test

1. With the engine off, press the brake pedal several times to deplete the vacuum reservoir, then press the brake pedal hard, and hold it for 15 seconds. If the brake pedal sinks, either the master cylinder is bypassing internally, or the brake system is leaking. Inspect the brake hoses and lines (see page 19-35).
2. Start the engine with the brake pedal pressed. If the brake pedal sinks slightly, the vacuum booster is operating normally. If the brake pedal height does not vary, do the brake system test (see page 19-4).

Leak Test

1. Press the brake pedal with the engine running, then stop the engine. The brake pedal height should not vary while pressed for 30 seconds. If the pedal height rises, go to step 6. If it does not rise, go to step 2.
2. Start the engine and let it idle for 30 seconds. 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. Does the pedal rise on each consecutive application? If it rises, the booster is OK. If it does not, go to step 3.

3. Disconnect the brake booster vacuum hose (A) at the booster. The check valve is built into the hose.



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. If vacuum is found, go to step 5.
5. With the engine off, reconnect the vacuum hose to the brake booster.
6. Start the engine, and then pinch the brake booster vacuum hose between the check valve and the booster.
7. 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, inspect the seal between the master cylinder and booster. If the seal is OK, replace the brake booster.
 - If the pedal position varies, replace the brake booster vacuum hose/check valve assembly.



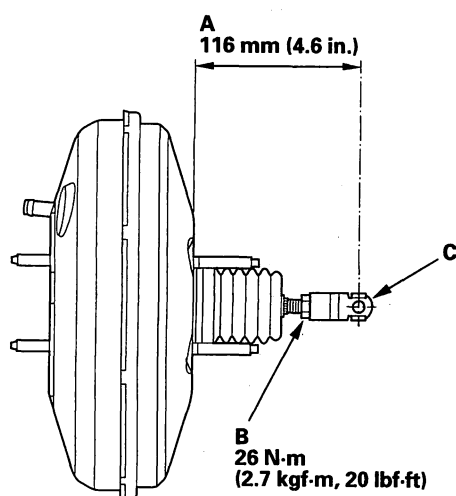
Brake Booster Pushrod Clearance Adjustment

Special Tools Required

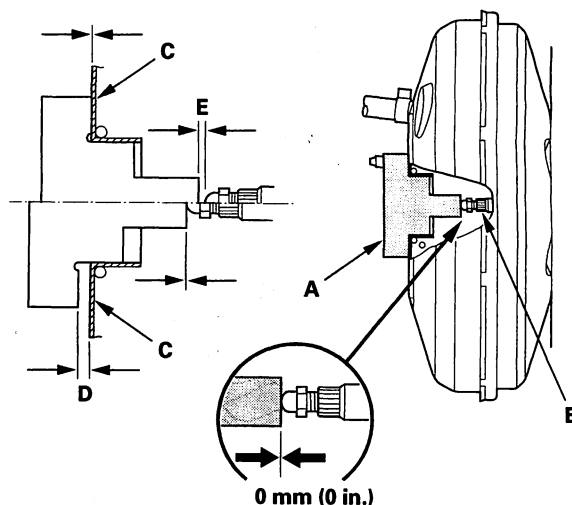
Booster piston holder 070AB-SJA0100

NOTE:

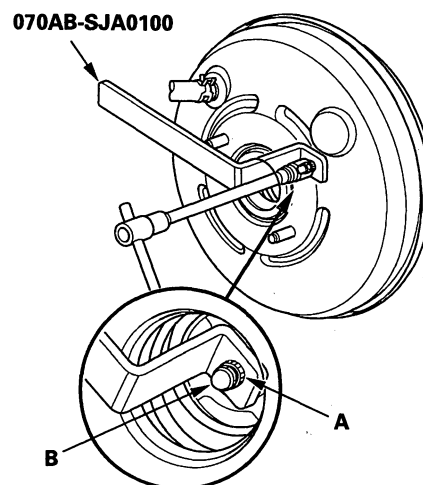
- Brake booster pushrod to piston clearance must be checked and readjusted before installing a new master cylinder.
- The master cylinder assembly comes with a tool that must be used to adjust the clearance between the brake booster pushrod and the master cylinder piston.
- Use only the tool that comes with the new master cylinder to check the pushrod clearance. Do not use any other tool.
- Make sure to discard the tool supplied with the master cylinder after its use.
- The brake booster must be installed on the vehicle before doing the pushrod clearance adjustment.
- If the booster is removed, check the pushrod length (A) as shown. If the length is incorrect, loosen the pushrod locknut (B), and turn the yoke (C) in or out to adjust.



1. Measure the clearance between the plate (A) supplied with master cylinder and brake booster pushrod (B). Make sure that the tool is lying flat against the surface (C) of the brake booster, and that the tip of the tool contacts the pushrod. If the tool will not lie flat (D) or there is a gap (E) between the tool and the pushrod, go to step 2 to adjust the pushrod in or out.



2. If the clearance is incorrect, use the booster piston holder to hold the pushrod (A) and turn the adjusting screw (B) clockwise to inward or counterclockwise to outward.

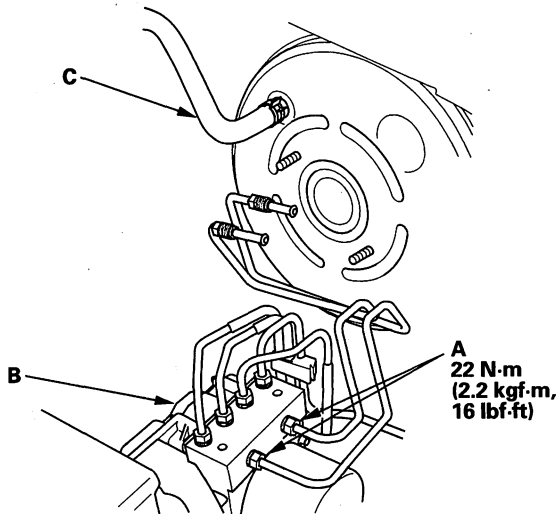


3. Install the master cylinder (see page 19-19).

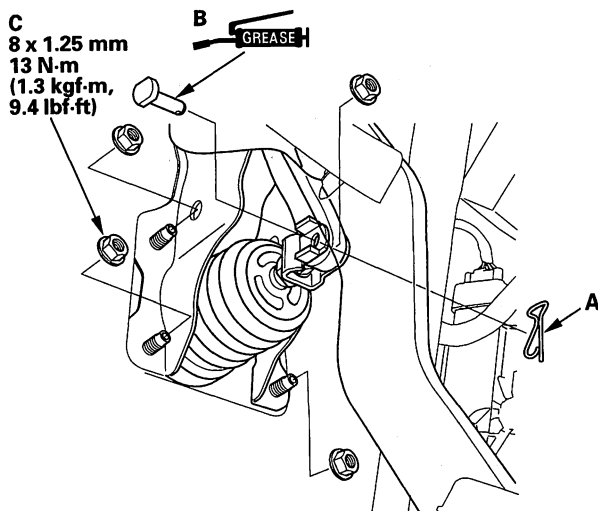
Conventional Brake Components

Brake Booster Replacement

1. Remove the air cleaner (see page 11-363).
2. Remove the master cylinder (see page 19-18).
3. Remove the brake lines (A) from the VSA modulator-control unit (B).



4. Disconnect the brake booster vacuum hose (C) from the brake booster.
5. Remove the driver's dashboard undercover (see page 20-120).
6. Remove the lock pin (A) and the joint pin (B), then disconnect the yoke from the brake pedal.

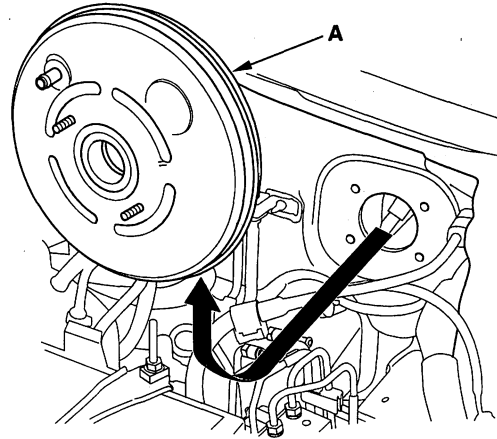


7. Remove the brake booster mounting nuts (C).

8. 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.



9. 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 19-21).
- Install the master cylinder after installing the brake booster (see page 19-18).
- Check the brake pedal height and free play after installing the master cylinder, and adjust it if necessary (see page 19-6).
- Bleed the brake system (see page 19-9).



Rear Brake Pad Inspection and Replacement

Special Tools Required

Brake caliper piston compressor 07AAE-SEPA101

⚠ 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.

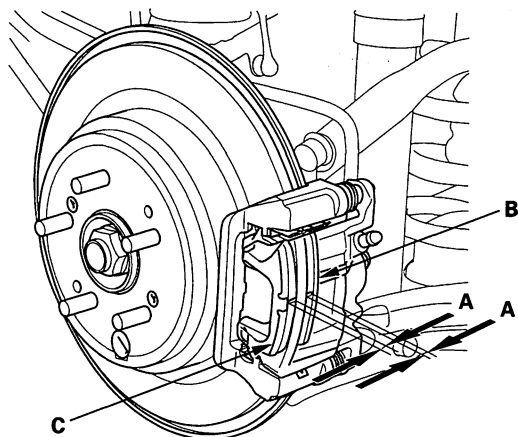
Inspection

1. Raise the rear of the vehicle, and support it with safety stands in the proper locations (see page 1-7).
2. Remove the rear wheels.
3. Check the thickness (A) of the inner pad (B) and outer pad (C). Do not include the thickness of the backing plate.

Brake pad thickness:

Standard: 9.6—10.2 mm (0.38—0.40 in.)

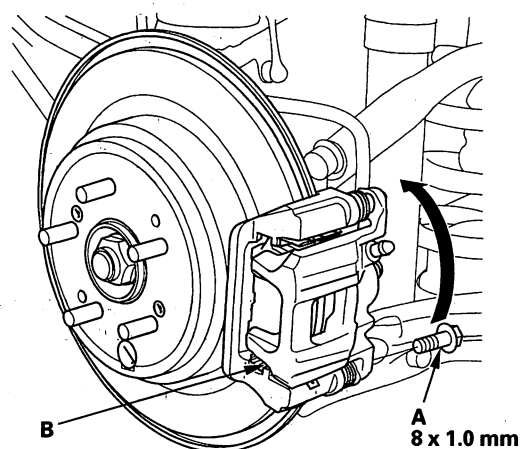
Service limit: 1.6 mm (0.06 in.)



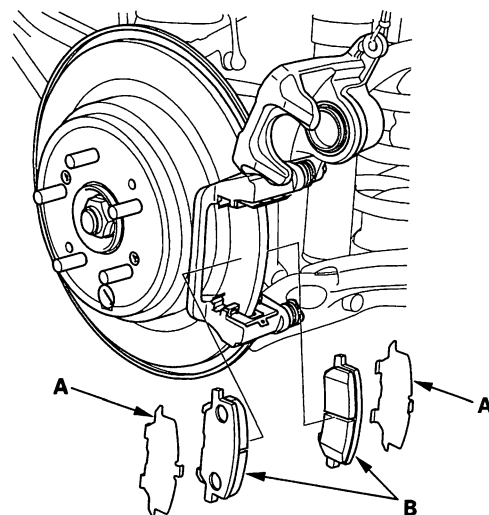
4. If the brake pad thickness is less than the service limit, replace the rear brake pads as a set.
5. Clean the mating surface of the brake disc/drum and the inside of the wheel, then install the rear wheels.

Replacement

1. Remove some brake fluid from the master cylinder.
2. Raise the rear of the vehicle, and support it with safety stands in the proper locations (see page 1-7).
3. Remove the rear wheels.
4. Remove the flange bolt (A), and pivot the caliper (B) up out of the way. Check the hose and pin boots for damage and deterioration.



5. Remove the pad shims (A) and brake pads (B).



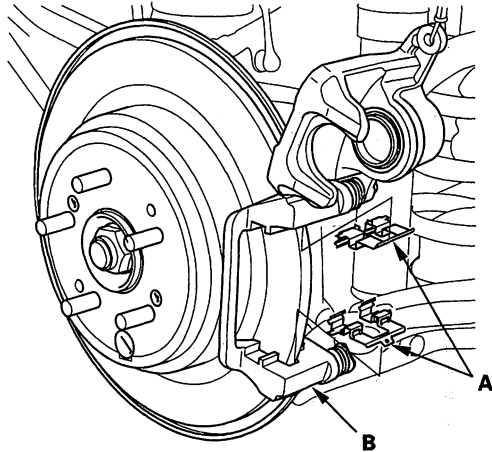
(cont'd)

Conventional Brake Components

Rear Brake Pad Inspection and Replacement (cont'd)

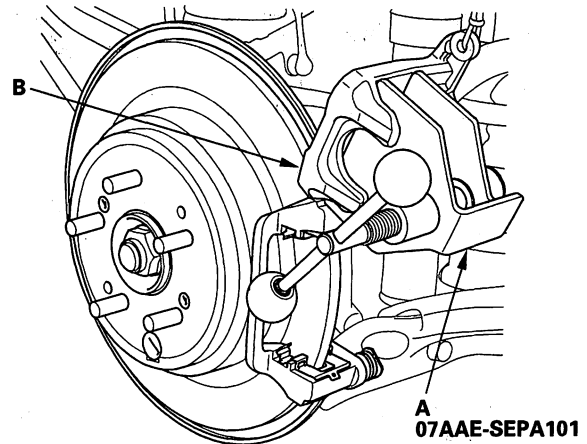
6. Remove the pad retainers (A).

NOTE: The upper and lower pad retainers are different. During installation, make sure the pad retainers are in their proper positions.



7. Clean the caliper bracket (B) thoroughly; remove any rust, and check for grooves and cracks.
8. Inspect the brake disc/drum, and check for damage and cracks (see page 19-26).
9. Install the pad retainers. Wipe excess assembly paste off the retainers. Keep the assembly paste off the discs and pads.

10. Mount the brake caliper piston compressor (A) on the caliper body (B).



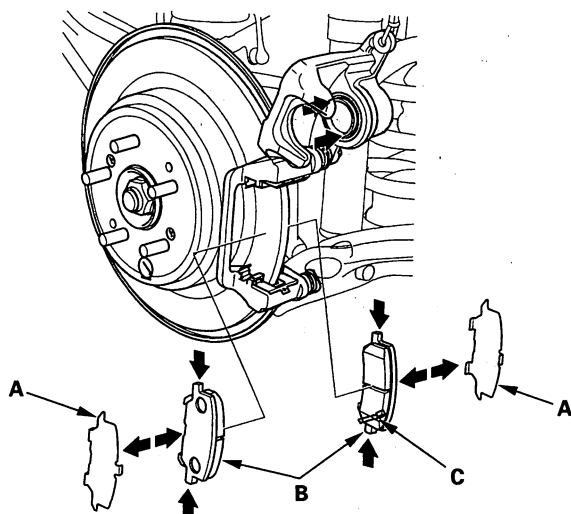
11. Press in the piston with the brake caliper piston compressor so the caliper will fit over the brake pads. Make sure the piston boot is in position to prevent damaging it when pivoting the caliper down.

NOTE: Be careful when pressing in the piston; brake fluid might overflow from the master cylinder's reservoir. If brake fluid gets on any painted surface, wash it off immediately with water.

12. Remove the brake caliper piston compressor.

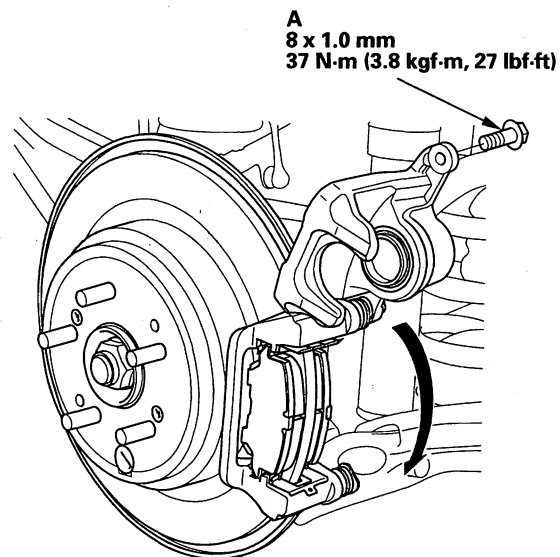


13. Apply a thin coat of M-77 assembly paste (P/N 08798-9010) to the pad side of the shims (A), the back of the brake pads (B), and the other areas indicated by the arrows. Wipe excess assembly paste off the pad shims and brake pads. Contaminated brake discs or brake pads reduce stopping ability. Keep grease and assembly paste off the brake discs and brake pads.



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

15. Pivot the caliper down into position. Install the flange bolt (A), and tighten it to the specified torque.



16. Clean the mating surface of the brake disc/drum and the inside of the wheel, then install the rear wheels.

17. Press the brake pedal several times to make sure the brakes work.

NOTE: Engagement 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.

18. Add brake fluid as needed.

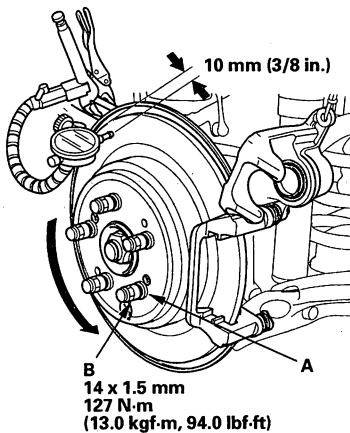
19. After installation, check for leaks at hose and line joints or connections, and retighten if necessary. Test-drive the vehicle, then check for leaks (see page 19-35).

Conventional Brake Components

Rear Brake Disc Inspection

Runout

1. Raise the rear of the vehicle, and support it with safety stands in the proper locations (see page 1-7).
2. Remove the rear wheels.
3. Remove the brake pads (see page 19-23).
4. Inspect the brake disc/drum surface for damage and cracks. Clean the brake disc/drum thoroughly, and remove all rust.
5. Install suitable flat washers (A) and wheel nuts (B), and tighten the wheel nuts to the specified torque to hold the brake disc/drum securely against the hub.



6. Set up the dial gauge against the brake disc/drum as shown, and measure the runout at 10 mm (3/8 in.) from the outer edge of the brake disc/drum.

Brake disc/drum runout:

Service limit: 0.10 mm (0.004 in.)

7. If the brake disc/drum is beyond the service limit, refinish the brake disc/drum 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. refinishing limit: 9.0 mm (0.35 in.)

NOTE:

- If the brake disc/drum is beyond the service limit for refinishing, replace it (see page 18-30).
- A new brake disc/drum 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 it with safety stands in the proper locations (see page 1-7).
2. Remove the rear wheels.
3. Remove the brake pads (see page 19-23).
4. Using a micrometer, measure the brake disc/drum thickness at eight points, about 45 ° apart and 10 mm (3/8 in.) in from the outer edge of the brake disc/drum. Replace the brake disc/drum if the smallest measurement is less than the max. refinishing limit.

Brake disc/drum thickness:

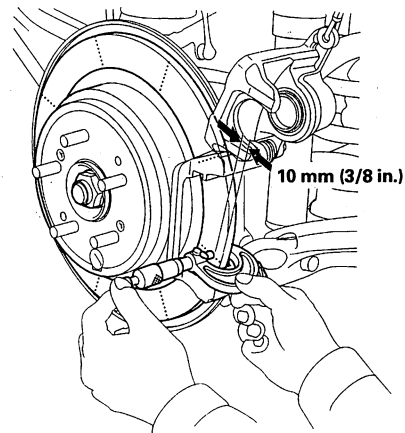
Standard: 10.9—11.1 mm (0.43—0.44 in.)

Max. refinishing limit: 9.0 mm (0.35 in.)

Brake disc/drum parallelism:

0.015 mm (0.0006 in.) max.

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



5. If the brake disc/drum is beyond the service limit for parallelism, refinish the brake disc/drum 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: If the brake disc/drum is beyond the service limit for refinishing, replace it. Remove the following items:

- Rear brake caliper bracket (see step 3 on page 18-30).
- Rear brake disc/drum (see step 6 on page 18-31).



Rear Brake Caliper Overhaul

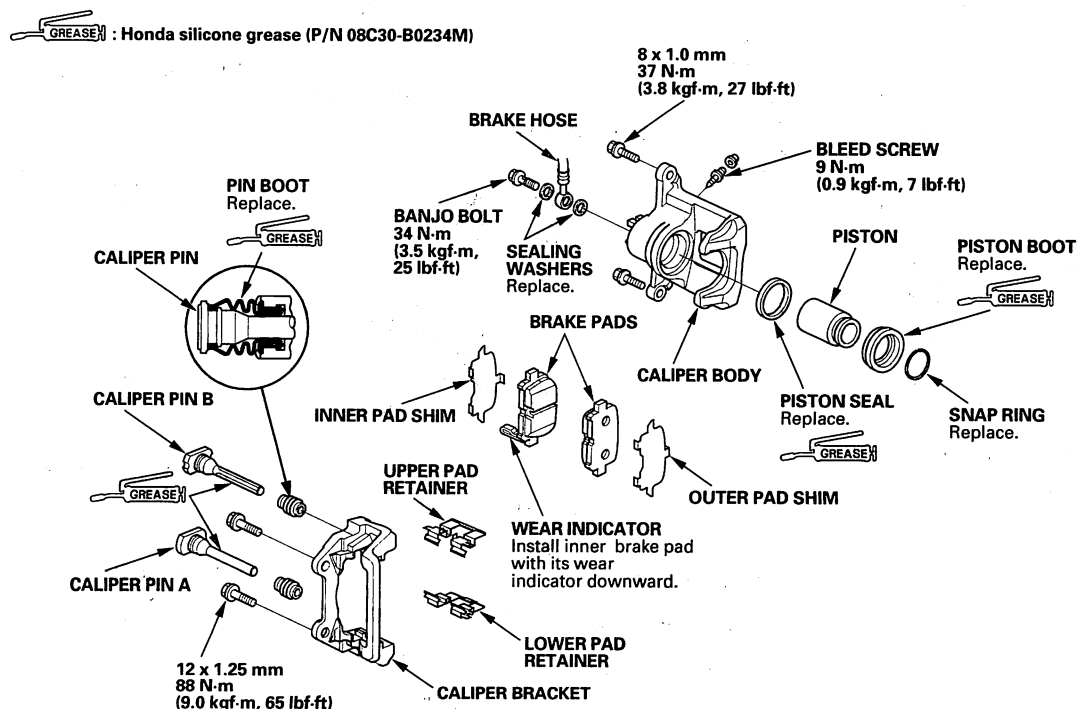
⚠ CAUTION

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 brake fluid, 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 dirt and other foreign particles.
- Replace parts with new ones as specified in the illustration.
- Make sure no dirt or other foreign matter gets in the brake fluid.
- Make sure no grease or oil gets on the brake discs or pads.
- When reusing brake pads, always reinstall them in their original positions to prevent loss of braking efficiency.
- Do not reuse drained brake fluid. Use only clean Acura DOT 3 Brake Fluid from an unopened container. Using a non-Acura 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 pistons, piston seal grooves, and caliper bores with clean brake fluid.
- Replace all rubber parts with new ones whenever disassembled.
- After installing the caliper, check the brake hose and line for leaks, interference, and twisting.



Conventional Brake Components

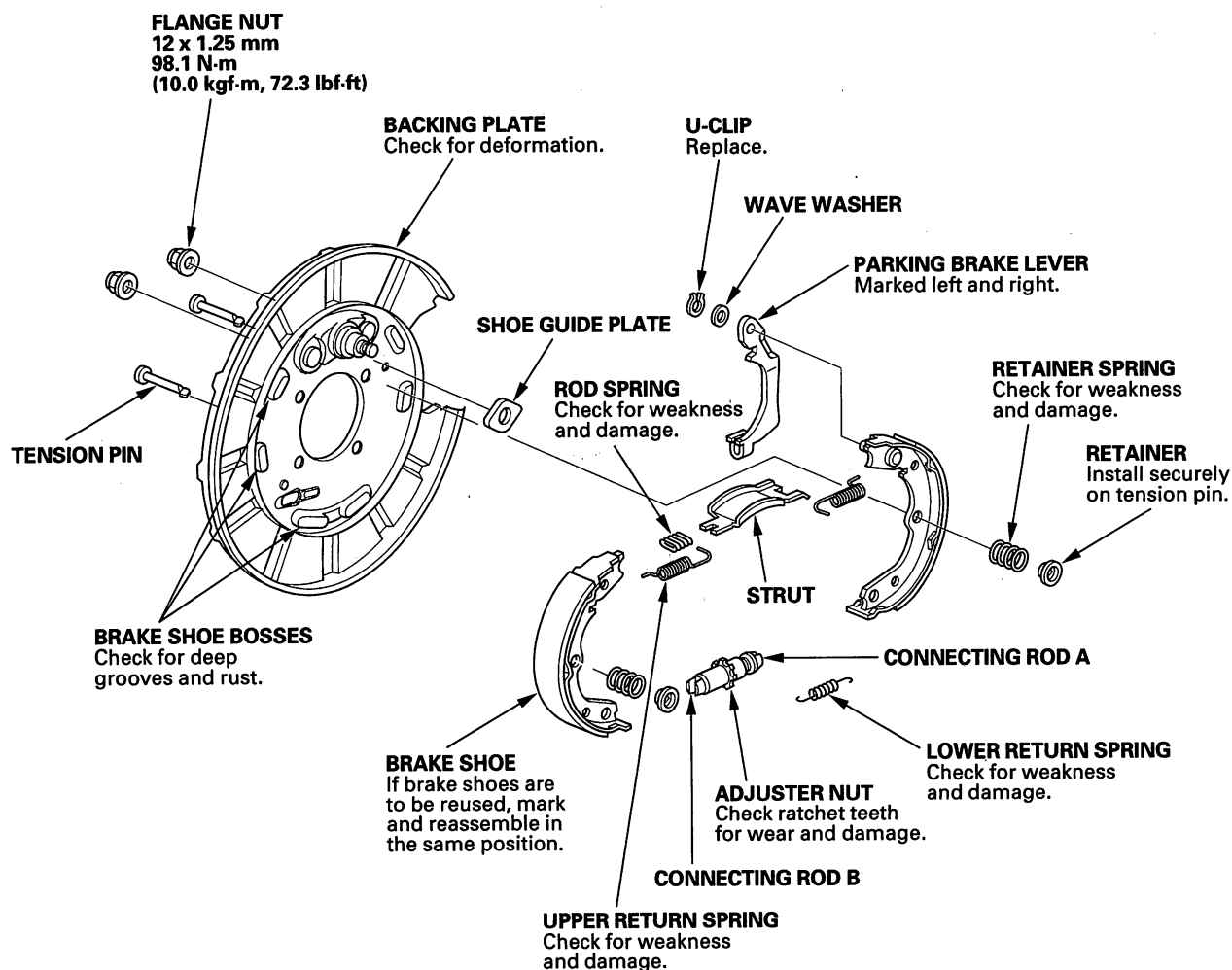
Parking Brake Inspection

⚠ CAUTION

Frequent inhalation of brake pad dust, regardless of material composition, could be hazardous to your health.

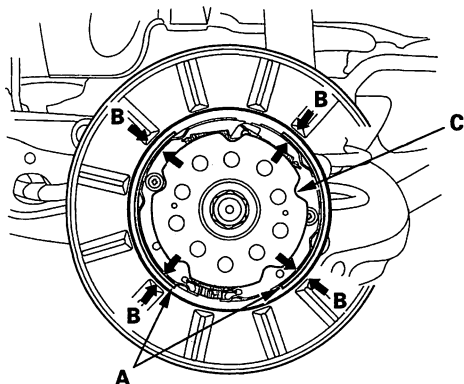
- Avoid breathing dust particles.
- Never use an air hose or brush to clean brake assemblies. Use an OSHA-approved vacuum cleaner.

1. Raise the rear of the vehicle, and support it with safety stands in the proper locations (see page 1-7).
2. Remove the rear wheels.
3. Release the parking brake, and remove the following items:
 - Rear brake caliper bracket (see step 3 on page 18-30).
 - Rear brake disc/drum (see step 6 on page 18-31).





4. Check the parking brake linings (A) for cracking, glazing, wear, and contamination.



5. Measure the parking brake lining thickness (B). Measurement does not include brake shoe thickness.

Parking brake lining thickness:

Standard: 3.9 mm (0.15 in.)

Service limit: 1.0 mm (0.04 in.)

6. If the parking brake lining thickness is less than the service limit, replace all the parking brake shoes as a set (see page 19-30).
7. Check the hub (C) for smooth operation. If it requires servicing, replace the hub bearing unit (see page 18-30).

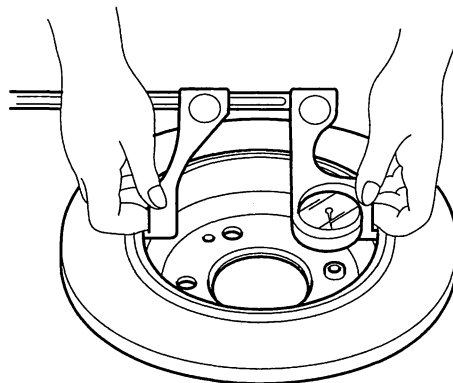
8. Measure the inside diameter of the parking brake drum with inside vernier calipers.

Parking brake drum inside diameter:

Standard: 210.0–210.1 mm

(8.268–8.272 in.)

Service limit: 211.0 mm (8.307 in.)



9. If the inside diameter of the parking brake drum is more than service limit, replace the brake disc/drum.
10. Check the parking brake disc/drum for scoring, grooves, and cracks.
11. Clean the mating surface of the brake disc/drum and the inside of the wheel, then install the rear wheels.

Conventional Brake Components

Parking Brake Shoe Replacement

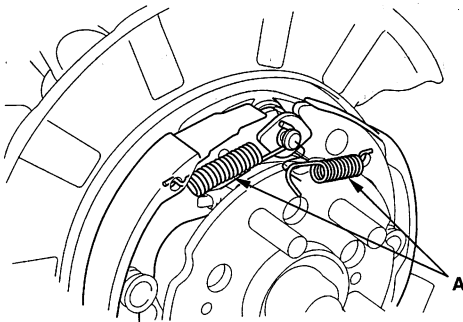
⚠ CAUTION

Frequent inhalation of brake pad dust, regardless of material composition, could be hazardous to your health.

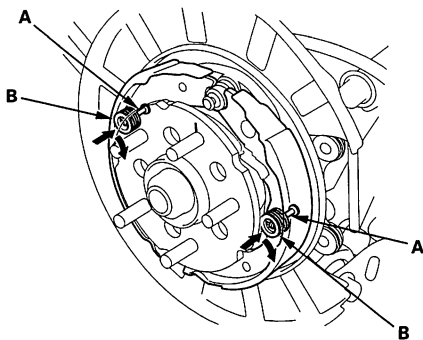
- Avoid breathing dust particles.
- Never use an air hose or brush to clean brake assemblies. Use an OSHA-approved vacuum cleaner.

Disassembly

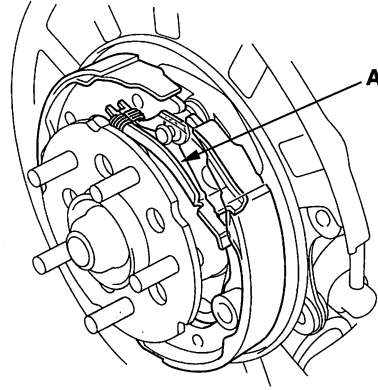
1. Raise the rear of the vehicle, and support it with safety stands in the proper locations (see page 1-7).
2. Remove the rear wheels.
3. Release the parking brake, and remove the following items:
 - Rear brake caliper bracket (see step 3 on page 18-30).
 - Rear brake disc/drum (see step 6 on page 18-31).
4. Disconnect and remove the upper return springs (A).



5. Remove the tension pins (A) by pushing the respective retainer (B) and turning the pin.

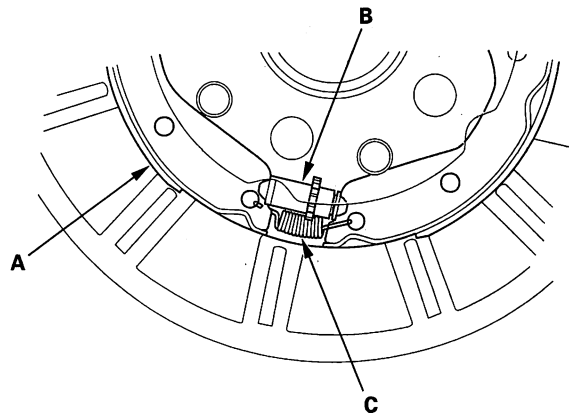


6. Remove the strut (A).



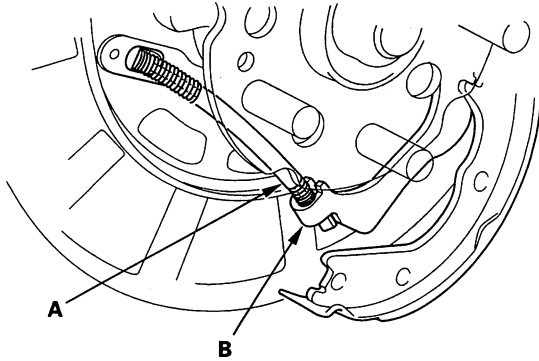
7. Lower the parking brake shoe assembly.

8. Remove the forward brake shoe (A) and the adjuster assembly (B) by removing the lower return spring (C).

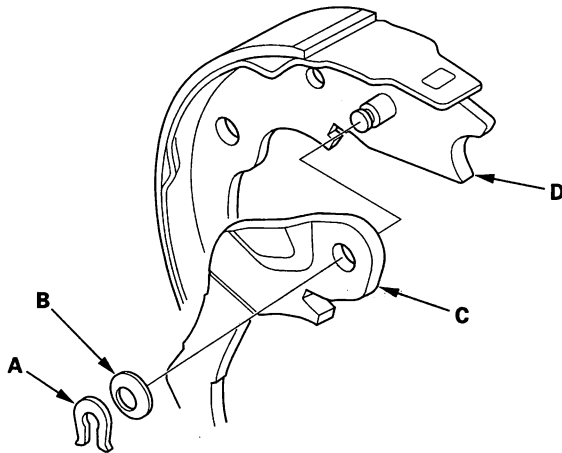




9. Remove the rearward brake shoe by disconnecting the parking brake cable (A) from the parking brake lever (B).

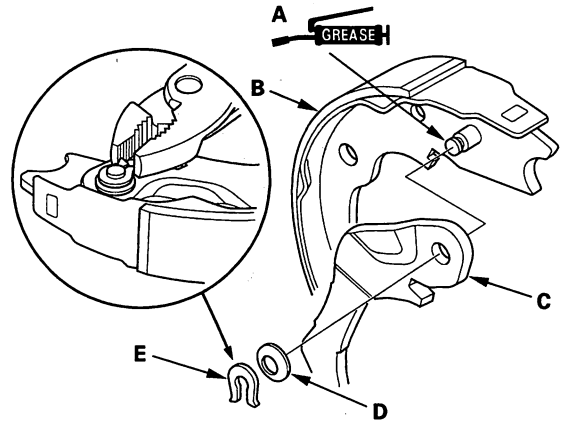


10. Remove the U-clip (A), wave washer (B), and parking brake lever (C) from the brake shoe (D).



Reassembly

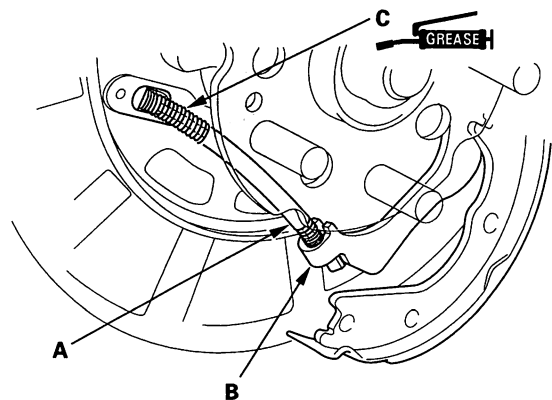
1. Apply Molykote Plastilube # 2 grease to the sliding surface of the pivot pin (A) of the rearward brake shoe (B).



2. Install the parking brake lever (C) and wave washer (D) on the pivot pin, and secure with a new U-clip (E).

- Install the wave washer with its convex side facing out.
- Pinch the U-clip securely to prevent the parking brake lever from coming off the brake shoe.

3. Connect the parking brake cable (A) to the parking brake lever (B). Apply Plastilube # 2 grease to the cable contact surface (C) on the backing plate.

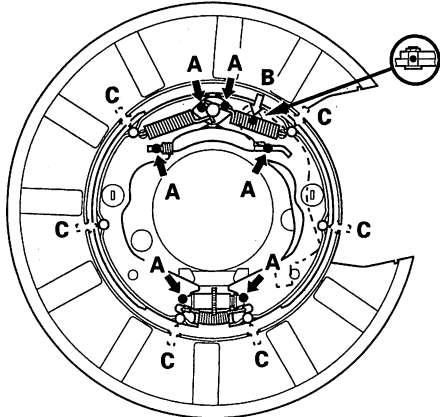


(cont'd)

Conventional Brake Components

Parking Brake Shoe Replacement (cont'd)

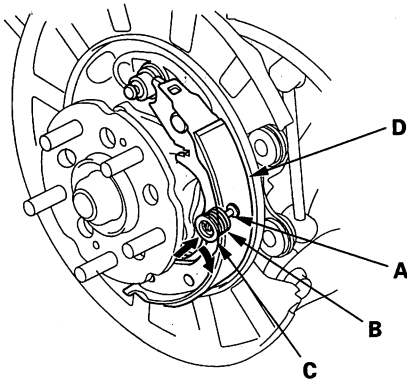
4. Apply a thin coat of Plastilube #2 grease to the shoe ends and strut ends (A), sliding surfaces (B), and opposite edges of the parking brake shoe (C) as shown. Wipe off any excess. Keep the grease off the brake linings.



Greasing symbols:

- ➡• Brake shoe ends and strut ends
- ⋯• Opposite edge of the shoe
- ⇨• Sliding surface

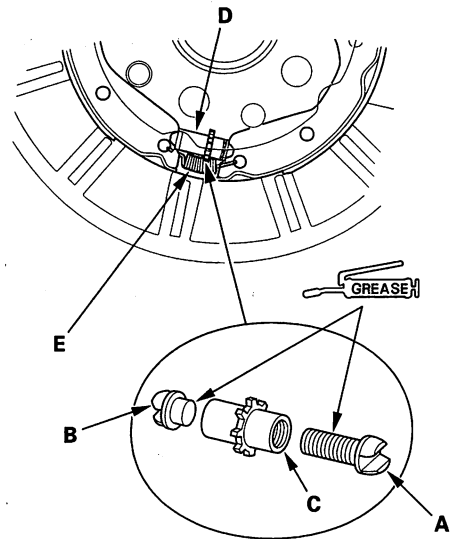
5. Install the tension pin (A), the retainer spring (B), and the retainer (C) on the rearward brake shoe (D). Make sure the tension pin does not contact the parking brake lever.



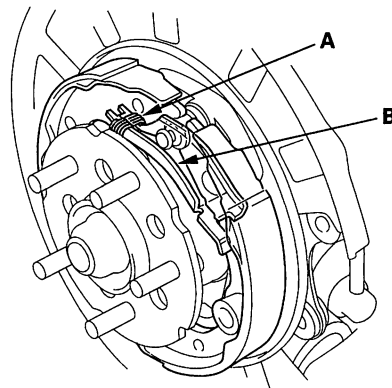
6. Install connecting rods A and B on the adjuster nut (C).

NOTE:

- Clean the threaded portions of connecting rod A and the sliding surface of connecting rod B, then coat them with rubber grease.
- Shorten connecting rod A by fully turning the adjuster nut.



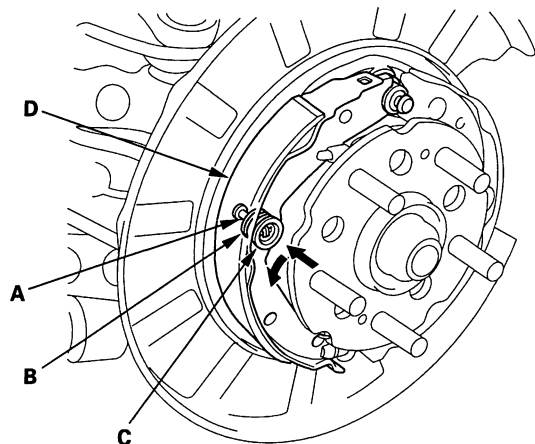
7. Position the brake shoe adjuster assembly (D) on the parking brake shoes.
8. Hook the lower return spring (E) on the parking brake shoes.
9. Install the rod spring (A) to the strut (B) first. Then install the strut on the parking brake shoes.



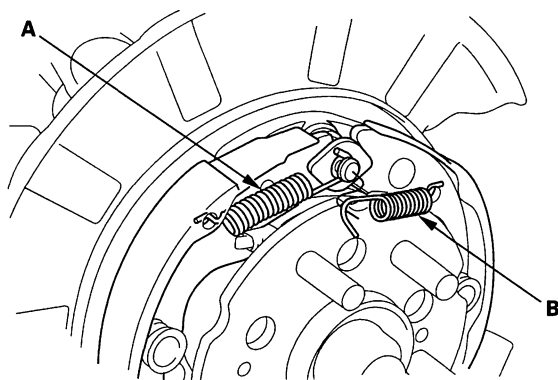


Parking Brake Shoe Lining Break-in

10. Install the tension pin (A), the retainer spring (B), and the retainer (C) on the forward brake shoe (D).



11. Install the forward upper return spring (A) as shown.



12. Install the rearward upper return spring (B) as shown.
13. Install the rear brake disc/drum and the rear brake caliper bracket in the reverse order of removal.
14. Do the major parking brake adjustment (see page 19-8).

⚠ WARNING

Do this operation in a safe area.

NOTE:

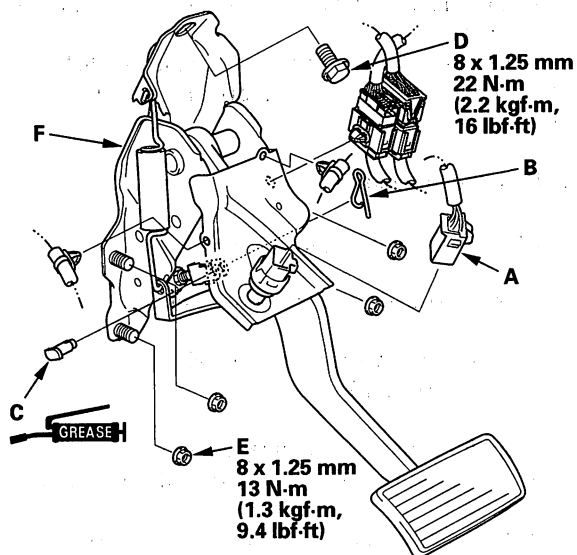
- Do the brake lining surface break-in when replacing shoes with new brake linings and/or new rear brake disc/drum.
- Check the number of parking brake lever clicks. Adjust the parking brake before lining surface break-in (see page 19-8).

1. Park the vehicle on a firm, level surface.
2. Release the parking brake pedal.
3. Press the parking brake pedal 5 clicks.
4. Drive the vehicle for 1/4 mile (400 m) at about 31 mph (50 km/h).
5. Stop the vehicle, and release the parking brake for 5—10 minutes to allow the brake disc/drum to cool.
6. Repeat steps 3 through 5 two more times.
7. Check the parking brake pedal adjustment (see page 19-7).

Conventional Brake Components

Brake Pedal Replacement

1. Remove the driver's dashboard undercover (see page 20-120).
2. Remove the TPMS control unit (see page 18-162).
3. Disconnect the brake pedal position switch connector (A), and remove the harness clips.



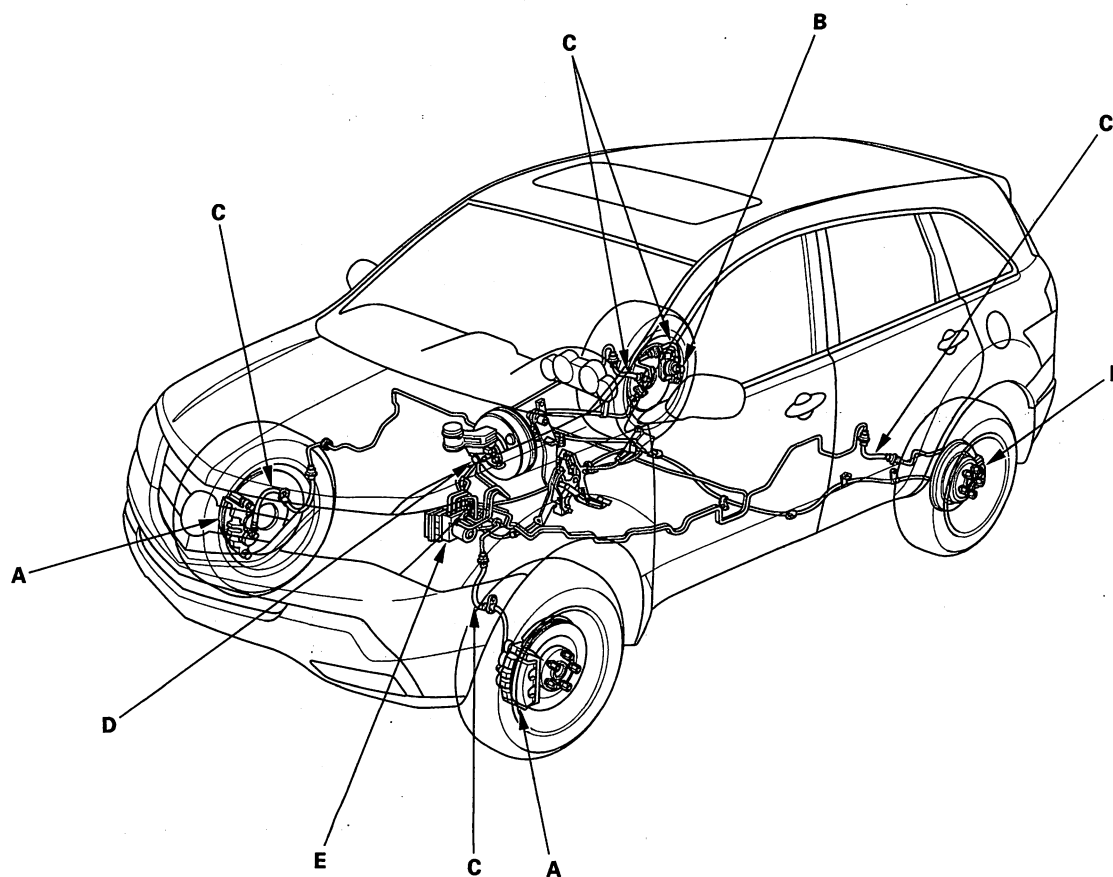
4. Remove the lock pin (B) and joint pin (C).
5. Remove the harness and connector clips.
6. Remove the brake pedal bracket mounting bolt (D) and nuts (E).
7. Remove the brake pedal with bracket (F).
8. Install in the reverse order of removal.
9. Do the brake pedal and brake pedal position switch adjustment (see page 19-6).



Brake Hose and Line Inspection

1. Inspect the brake hoses for damage, deterioration, leaks, interference, and twisting.
2. Check the brake lines for damage, rusting, and leaks. 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 the VSA modulator-control unit for damage and leaks.

Connection Point	Component	Connected to	Specified Torque Value	Note
A	Front brake caliper	Brake hose	34 N·m (3.5 kgf·m, 25 lbf·ft)	Banjo bolt
		Bleed screw	9 N·m (0.9 kgf·m, 7 lbf·ft)	
B	Rear brake caliper	Brake hose	34 N·m (3.5 kgf·m, 25 lbf·ft)	Banjo bolt
		Bleed screw	9 N·m (0.9 kgf·m, 7 lbf·ft)	
C	Brake hose	Brake line	15 N·m (1.5 kgf·m, 11 lbf·ft)	Flare nut
D	Master cylinder	Brake line	22 N·m (2.2 kgf·m, 16 lbf·ft)	Flare nut
E	VSA modulator-control unit	Brake line (12 mm nut)	22 N·m (2.2 kgf·m, 16 lbf·ft)	Flare nut
		Brake line (10 mm nut)	15 N·m (1.5 kgf·m, 11 lbf·ft)	Flare nut



Conventional Brake Components

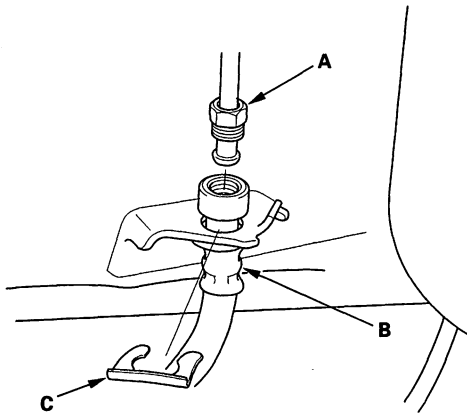
Brake Hose Replacement

NOTE:

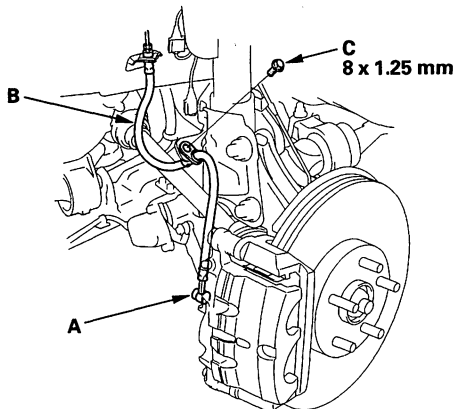
- Before reassembling, check that all parts are free of dirt and other foreign particles.
- Replace parts with new ones whenever specified to do so.
- Do not spill brake fluid on the vehicle; it may damage the paint; if brake fluid gets on the paint, wash it off immediately with water.
- To prevent the brake fluid from flowing, plug and cover the hose ends and joints with a shop towel or equivalent material.

Removal - Front

1. Remove the front wheel.
2. Disconnect the brake line (A) from the brake hose (B), then remove the brake hose clip (C).



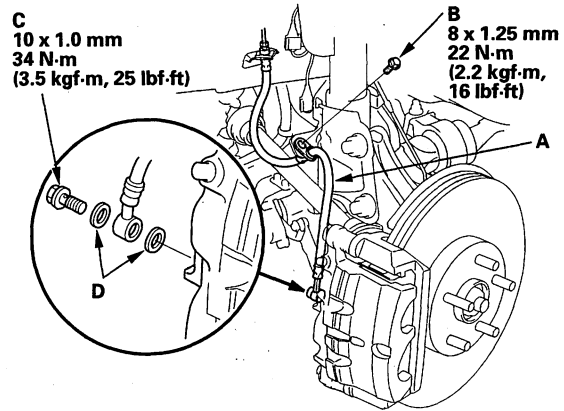
3. Remove the banjo bolt (A), and disconnect the brake hose (B) from the caliper.



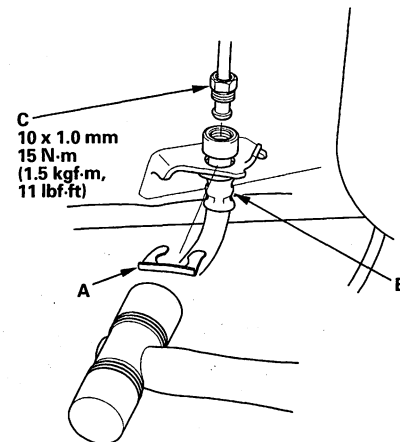
4. Remove the brake hose mounting bolt (C), then remove the brake hose.

Installation - Front

1. Install the brake hose (A) with the mounting bolt (B).



2. Connect the brake hose to the caliper with the banjo bolt (C) and new sealing washers (D).
3. Install a new brake hose clip (A) to the brake hose (B) on the bracket, then connect the brake line (C). Do not twist the brake hose.

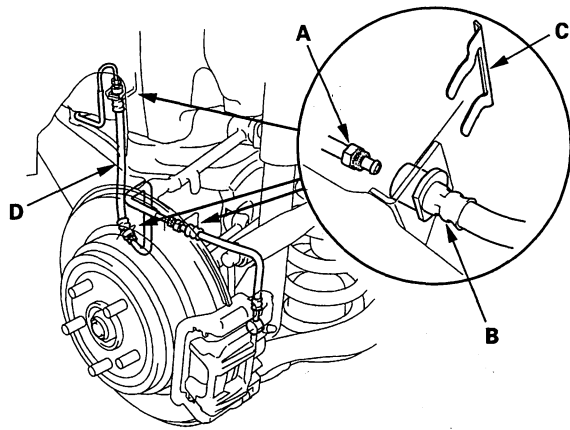


4. After installing the brake hose, bleed the brake system (see page 19-9).
5. Do the following checks:
 - Check the brake hose and line joint for leaks, and tighten if necessary.
 - Check the brake hoses for interference and twisting.
6. Clean the mating surface of the brake disc and the inside of the wheel, then install the front wheel.

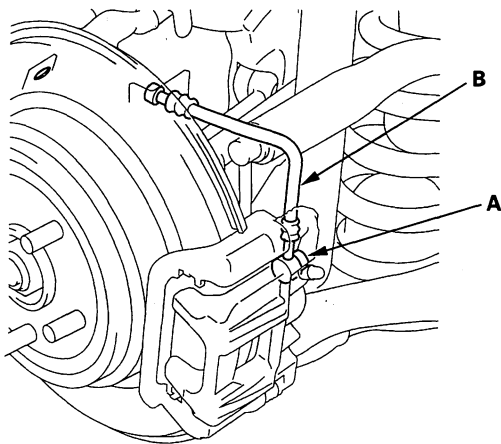


Removal - Rear

1. Remove the rear wheel.
2. Disconnect the brake lines (A) from the brake hoses (B), then remove the brake hose clips (C).



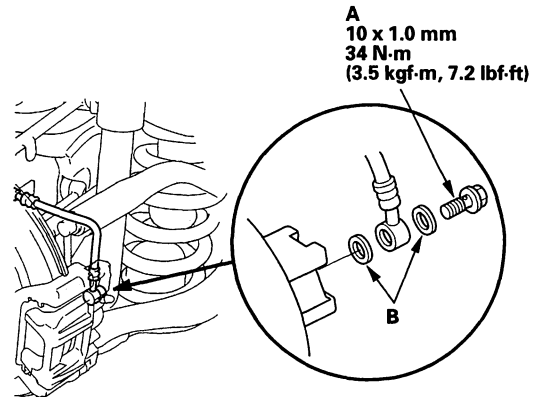
3. Remove the front side brake hose (D).
4. Remove the banjo bolt (A), and disconnect the brake hose from the caliper.



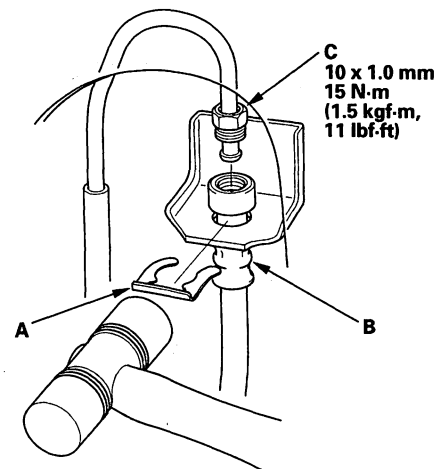
5. Remove the rear side brake hose (B).

Installation - Rear

1. Connect the rear side brake hose to the caliper with the banjo bolt (A) and new sealing washers (B).



2. Install new brake hose clip (A) to the brake hoses (B) on the brackets, then connect the brake lines (C). Do not twist the brake hoses.

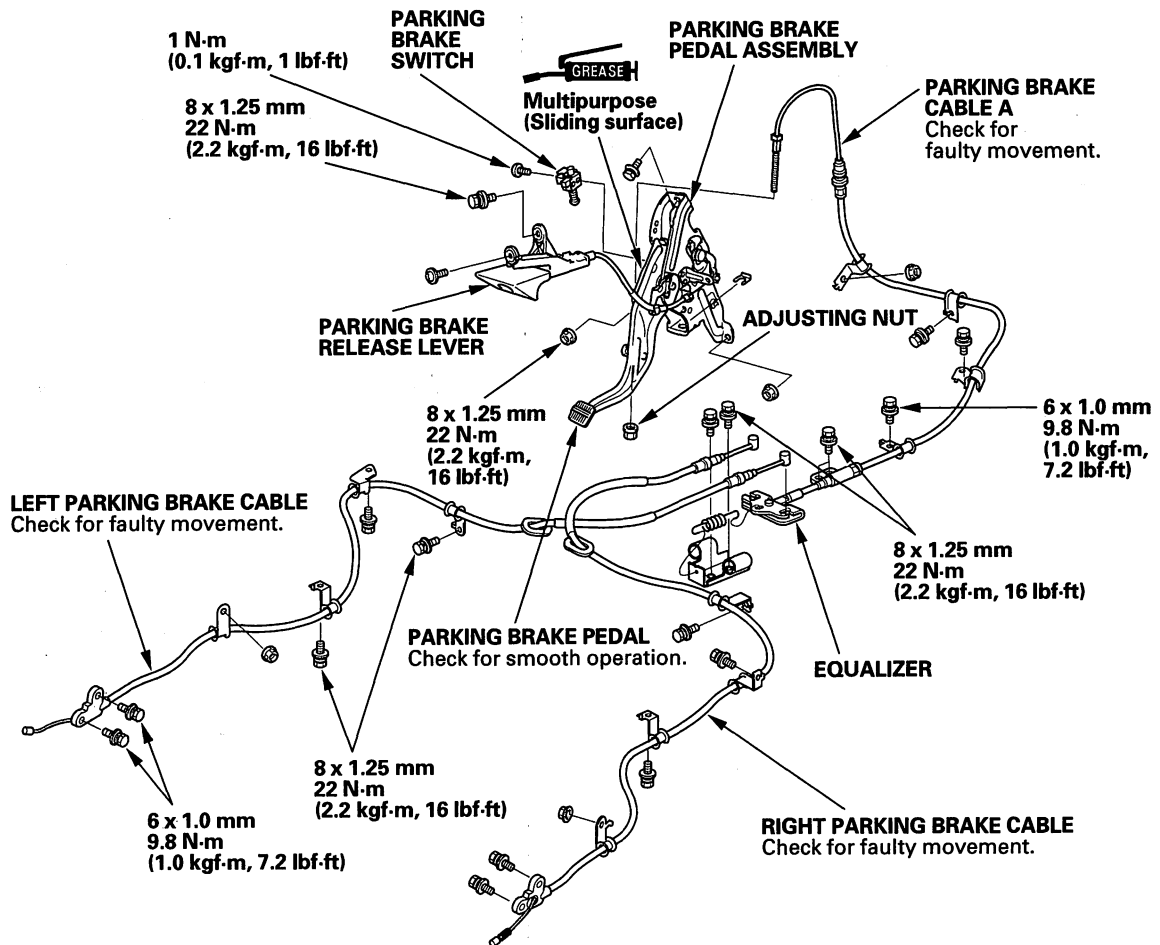


3. After installing the brake hoses, bleed the brake system (see page 19-9).
4. Do the following checks:
 - Check the brake hose and line joint for leaks, and tighten if necessary.
 - Check the brake hoses for interference and twisting.
5. Clean the mating surface of the brake disc/drum and the inside of the wheel, then install the rear wheel.

Conventional Brake Components

Parking Brake Cable Replacement

Exploded View

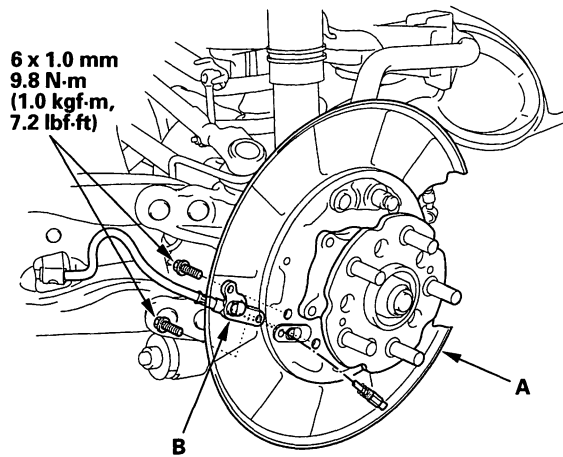




NOTE:

- 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. Loosen the parking brake cable adjusting nut (see page 19-8).
2. Remove the parking brake shoes, and disconnect the parking brake cable from the parking brake lever (see page 19-30).
3. Remove the parking brake cable mounting bolts from the backing plate (A).



4. Pull the parking brake cable (B) and remove it from the backing plate.

5. Reinstall the parking brake cable in the reverse order of removal, and note these items:

- Be careful not to bend or distort the cable.
- Connect the parking brake cable to the brake lever, and install the parking brake shoes and drum (see page 19-31).
- Do the parking brake adjustment (see page 19-8). Apply the parking brake firmly 10 times then adjust it again.

BACK

Brakes

Conventional Brake Components 19-1

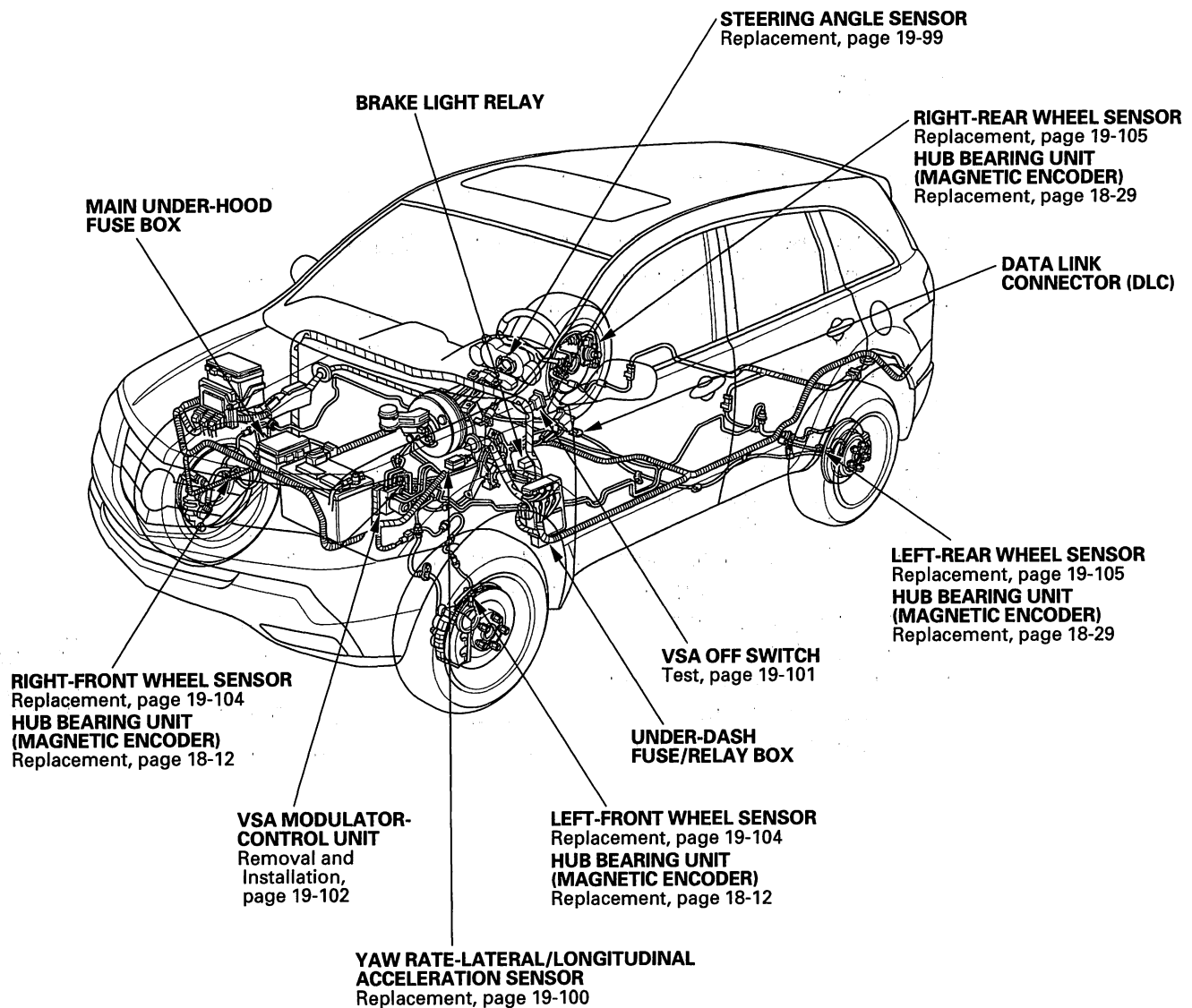
VSA (Vehicle Stability Assist) System Components

Component Location Index	19-42
General Troubleshooting Information	19-43
DTC Troubleshooting Index	19-46
Symptom Troubleshooting Index	19-48
System Description	19-49
Circuit Diagram	19-58
DTC Troubleshooting	19-61
Symptom Troubleshooting	19-96
Steering Angle Sensor Replacement	19-99
Steering Angle Sensor Center Point Writing	19-100
Yaw Rate-Lateral/Longitudinal Acceleration	
Sensor Replacement	19-100
VSA Off Switch Test	19-101
VSA Modulator-Control Unit	
Removal and Installation	19-102
Wheel Sensor Replacement	19-104



VSA System Components

Component Location Index



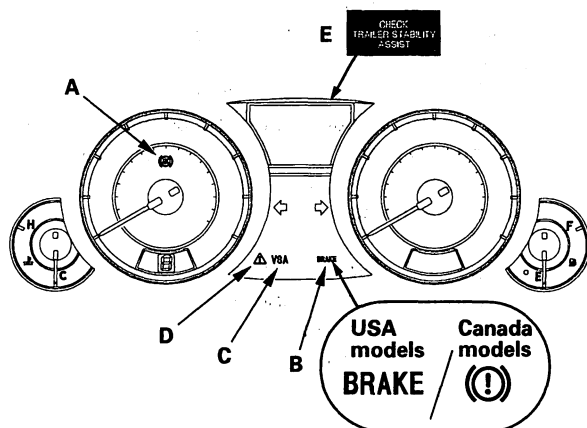
cardiagn.com

General Troubleshooting Information

System Indicator

This system has four indicators and one warning:

- ABS indicator (A)
- Brake system indicator (B)
- VSA indicator (C)
- VSA activation indicator (D)
- Trailer stability assist warning (E)



When the system detects a problem, it will turn the appropriate indicators on or warning indicate. Depending on the failure, the VSA modulator-control unit determines which indicators are turned on or warning indicate.

When the system is OK, each indicator comes on for about 2 seconds after turning the ignition switch ON (II), then goes off.

ABS Indicator

The ABS indicator comes on when the ABS function is lost. The brakes still work like a conventional system.

Brake System Indicator

The brake system indicator comes on when the EBD function is lost, the parking brake is applied, and/or the brake fluid level is low.

VSA Indicator

The VSA indicator comes on, when VSA function is lost.

VSA Activation Indicator

The VSA activation indicator blinks, when the VSA function is activating. The VSA activation indicator comes on, when the VSA is turned OFF by using the VSA OFF switch, or the VSA function is lost. The VSA activation indicator is on until the steering angle sensor center point writing is done (see page 19-100).

Trailer Stability Assist Warning

Trailer stability assist warning comes on, when brake light relay has malfunctioned or when VSA function is lost.

ABS, VSA Indicators, and Trailer Stability Assist Warning go off

Each indicator or warning will go off after a problem goes away, but the timing which the VSA modulator-control unit turns off the indicators or warning varies between DTCs.

- DTC 61, 62:
The indicators go off automatically when the system returns to normal.
- DTC 11, 13, 15, 17, 21*, 22, 25, 26, 27, 31, 32, 33, 34, 35, 36, 37, 38, 45, 46, 47, 48, 54, 59, 65, 66, 67, 68, 69, 72, 73, 74, 75, 76, 81, 84, 91, 92, or 97**:
The indicators stay on until the ignition switch is turned OFF whether or not the system returns to normal.
* : There are some cases that the indicators stay on until the vehicle is driven after the system returns to normal.
* * : There are some cases that the indicators go off automatically when the system returns to normal.
- DTC 12, 14, 16, 18, 51, 52, or 53:
The indicators stay on until the vehicle is driven after the system returns to normal.

(cont'd)

VSA System Components

General Troubleshooting Information (cont'd)

Diagnostic Trouble Code (DTC)

- The memory can hold up to 10 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 indicated in the order they occur.
- The DTCs are memorized in the EEPROM. Therefore, the memorized DTCs cannot be cancelled by disconnecting the battery. Do the specified procedures to clear the DTCs.

Self-diagnosis

- Self-diagnosis can be classified into two categories:
 - Initial diagnosis: Done right after the ignition switch is turned ON (II) and until the ABS and VSA indicators go off.
 - Regular diagnosis: Done right after the initial diagnosis until the ignition switch is turned OFF.
- When the system detects a problem, the VSA modulator-control unit shifts to the fail-safe mode.

Kickback

The pump motor operates when the VSA modulator-control unit is functioning, and the fluid in the reservoir is forced out to the master cylinder, causing a kickback at the brake pedal.

Pump Motor

- The pump motor operates when the VSA modulator-control unit is functioning.
- The VSA modulator-control unit checks the pump motor operation during regular diagnosis when the vehicle is driven over 10 mph (15 km/h) and at 19 mph (30 km/h) the first time after the ignition switch is turned ON (II). You may hear the motor operate at this time and feel some vibration, but it is normal.

Brake Fluid Replacement/Air Bleeding

Brake fluid replacement and air bleeding procedures are identical to the procedures used on vehicles without the VSA system (see page 19-9).

How to Troubleshoot DTCs

The troubleshooting procedures assume that the cause of the problem is still present and the ABS, VSA indicators, and/or trailer stability assist warning are still on. Following a troubleshooting procedure for a code that has been cleared but does not reset can result in incorrect diagnosis.

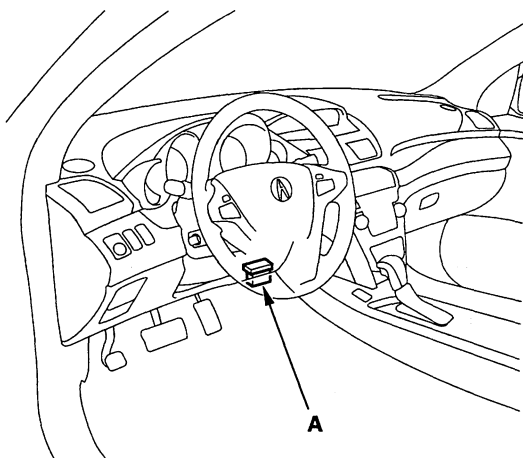
1. Question the client about the conditions when the problem occurred, and try to reproduce the same conditions for troubleshooting. Find out when the ABS, VSA indicators, and/or trailer stability assist warning came on, such as during activation, after activation, when the vehicle was traveling at a certain speed, etc. If necessary, have the client demonstrate the concern.
2. When the ABS, VSA indicators, or trailer stability assist warning does not come on during the test-drive, but troubleshooting is done based on the DTC, check for loose connectors, poor contact of the terminals, etc. before you start troubleshooting.
3. After troubleshooting, or the repairs are done, clear the DTCs, and test-drive the vehicle under the same conditions that originally set the DTCs. Make sure the ABS, VSA indicators, and trailer stability assist warning do not come on.
4. Check for DTCs from other control unit DTCs which connected via F-CAN. If there are DTCs that are related to F-CAN, the most likely cause was that the ignition switch was turned ON (II) with the VSA modulator-control unit connector disconnected. Clear the DTCs. Check for fuel and emissions, and VSA codes, first. Be sure to troubleshoot those first.

Intermittent Failures

The term "intermittent failure" means a system may have had a failure, but it checks OK now. If the indicator(s) of the system does not come on, check for loose connectors or poor contacts in the terminals related to the circuit that you are troubleshooting. If the indicators were on, but then went out, the original problem may have been intermittent.

How to Use the HDS (Honda Diagnostic System)

1. If the system indicators stay on, connect the HDS to the data link connector (DLC) (A) located under the driver's side of the dashboard.



2. Turn the ignition switch ON (II).
3. Make sure the HDS communicates with the vehicle and the VSA modulator-control unit. If it doesn't, troubleshoot the DLC circuit (see page 11-223).
4. Check the diagnostic trouble code (DTC) and note it. Also check the on-board snapshot data, and download any data found. Then refer to the indicated DTC's troubleshooting, and do the appropriate troubleshooting procedure.

NOTE:

- The HDS can read the DTC, the current data, and other system data.
- For specific operations, refer to the Help menu that came with the HDS.

How to Retrieve DTCs

1. With the ignition switch OFF, connect the HDS to the data link connector (DLC) under the driver's side of the dashboard.
2. Turn the ignition switch ON (II).
3. Make sure the HDS communicates with the vehicle and the VSA modulator-control unit. If it doesn't, troubleshoot the DLC circuit (see page 11-223).
4. Follow the prompts on the HDS to display the DTC(s) on the screen. After determining the DTC, refer to the DTC troubleshooting.
5. Turn the ignition switch OFF.

How to Clear DTCs

1. With the ignition switch OFF, connect the HDS to the data link connector (DLC) under the driver's side of the dashboard.
2. Turn the ignition switch ON (II).
3. Make sure the HDS communicates with the vehicle and the VSA modulator-control unit. If it doesn't, troubleshoot the DLC circuit (see page 11-223).
4. Clear the DTC(s) by following the screen prompts on the HDS.
5. Turn the ignition switch OFF.

VSA System Components

DTC Troubleshooting Index

DTC	Detection Item	ABS Indicator	Brake System Indicator	VSA Indicator	VSA Activation Indicator	Trailer Stability Assist Warning	Note
11	Right-front wheel sensor (open/short to body ground/short to power)	ON	ON or OFF*	ON	ON	ON	(see page 19-61)
12	Right-front wheel sensor (electrical noise/intermittent interruption)	ON	ON or OFF*	ON	ON	ON	(see page 19-66)
13	Left-front wheel sensor (open/short to body ground/short to power)	ON	ON or OFF*	ON	ON	ON	(see page 19-61)
14	Left-front wheel sensor (electrical noise/intermittent interruption)	ON	ON or OFF*	ON	ON	ON	(see page 19-66)
15	Right-rear wheel sensor (open/short to body ground/short to power)	ON	ON or OFF*	ON	ON	ON	(see page 19-61)
16	Right-rear wheel sensor (electrical noise/intermittent interruption)	ON	ON or OFF*	ON	ON	ON	(see page 19-66)
17	Left-rear wheel sensor (open/short to body ground/short to power)	ON	ON or OFF*	ON	ON	ON	(see page 19-61)
18	Left-rear wheel sensor (electrical noise/intermittent interruption)	ON	ON or OFF*	ON	ON	ON	(see page 19-66)
21	Difference in wheel speed	ON	ON or OFF	ON	ON	ON	(see page 19-67)
22	Current flow into wheel sensor input amplifier	ON	OFF	ON	ON	ON	(see page 19-68)
25	Yaw rate sensor (sensor unit)	OFF	OFF	ON	ON	ON	(see page 19-68)
26	Lateral/longitudinal acceleration sensor (sensor unit)	OFF	OFF	ON	ON	ON	(see page 19-68)
27	Steering angle sensor (hardware)	OFF	OFF	ON	ON	ON	(see page 19-69)
31	ABS solenoid	ON	ON	ON	ON	ON	(see page 19-69)
32	ABS solenoid	ON	ON	ON	ON	ON	(see page 19-69)
33	ABS solenoid	ON	ON	ON	ON	ON	(see page 19-69)
34	ABS solenoid	ON	ON	ON	ON	ON	(see page 19-69)
35	ABS solenoid	ON	ON	ON	ON	ON	(see page 19-69)
36	ABS solenoid	ON	ON	ON	ON	ON	(see page 19-69)
37	ABS solenoid	ON	ON	ON	ON	ON	(see page 19-69)
38	ABS solenoid	ON	ON	ON	ON	ON	(see page 19-69)

* : Brake system indicator turns ON when three or more wheel sensors fail.

DTC	Detection Item	ABS Indicator	Brake System Indicator	VSA Indicator	VSA Activation Indicator	Trailer Stability Assist Warning	Note
45	VSA solenoid	ON	ON	ON	ON	ON	(see page 19-70)
46	VSA solenoid	ON	ON	ON	ON	ON	(see page 19-70)
47	VSA solenoid	ON	ON	ON	ON	ON	(see page 19-70)
48	VSA solenoid	ON	ON	ON	ON	ON	(see page 19-70)
51	Motor Locked	ON	ON	ON	ON	ON	(see page 19-70)
52	Motor stuck OFF	ON	ON	ON	ON	ON	(see page 19-71)
53	Motor stuck ON	ON	ON	ON	ON	ON	(see page 19-73)
54	Valve relay	ON	ON or OFF	ON	ON	ON	(see page 19-74)
59	BRKDIAG high	OFF	OFF	OFF	OFF	ON	(see page 19-75)
61	IG1 voltage low	ON	ON or OFF	ON	ON	ON	(see page 19-77)
62	IG1 voltage high	ON	ON	ON	ON	ON	(see page 19-78)
65	VSA pressure sensor (hardware)	ON	OFF	ON	ON	ON	(see page 19-78)
66	VSA pressure sensor (software)	ON	OFF	ON	ON	ON	(see page 19-79)
67	Brake pedal position switch stuck ON (hardware)	OFF	OFF	ON	ON	ON	(see page 19-80)
68	Brake pedal position switch stuck OFF (software)	ON	OFF	ON	ON	ON	(see page 19-81)
69	BRKDIAG low	OFF	OFF	OFF	OFF	ON	(see page 19-83)
72	Steering angle sensor (software)	OFF	OFF	ON	ON	ON	(see page 19-87)
73	Yaw rate sensor (power supply)	OFF	OFF	ON	ON	ON	(see page 19-88)
74	Yaw rate sensor (software)	OFF	OFF	ON	ON	ON	(see page 19-89)
75	Lateral/longitudinal acceleration sensor (joint failure)	OFF	OFF	ON	ON	ON	(see page 19-90)
76	Lateral/longitudinal acceleration sensor (software)	OFF	OFF	ON	ON	ON	(see page 19-90)
81	Central processing unit (CPU)	ON or OFF	ON or OFF	ON or OFF	ON or OFF	ON or OFF	(see page 19-91)
84	Steering angle sensor No center point writing	OFF	OFF	ON or OFF	ON	ON	(see page 19-91)
91	F-CAN communication	OFF	OFF	ON	ON	ON or OFF	(see page 19-92)
92	F-CAN system (bus-off)	ON or OFF	ON or OFF	ON or OFF	ON or OFF	ON or OFF	(see page 19-94)
97	VSA system	ON	OFF	ON	ON	ON	(see page 19-95)

*: Brake system indicator turns ON when three or more wheel sensors fail.

VSA System Components

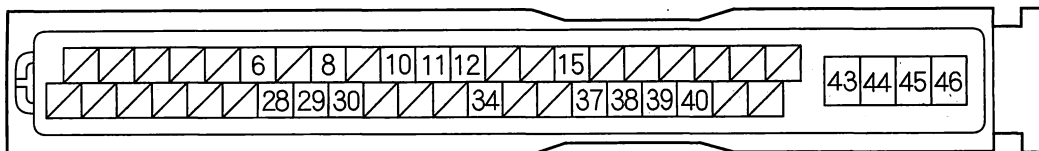
Symptom Troubleshooting Index

When the vehicle has one of these symptoms, check for a diagnostic trouble code (DTC) with the HDS. If there is no DTC, do the diagnostic procedure for the symptom, in the sequence listed, until you find the cause.

Symptom	Diagnostic procedure
HDS does not communicate with the VSA modulator-control unit or the vehicle	Troubleshoot the DLC circuit (see page 11-223).
VSA activation indicator does not come on at start-up (bulb check)	1. Do the gauge control module troubleshooting (see page 22-315). 2. Substitute a known-good VSA modulator-control unit, then recheck. If it is OK, replace the original VSA modulator-control unit (see page 19-102).
VSA activation indicator does not go off, and no DTCs are stored	1. Do the Steering Angle Sensor center point writing procedure. 2. Symptom troubleshooting (see page 19-96). 3. Do the gauge control module troubleshooting (see page 22-315). 4. Substitute a known-good VSA modulator-control unit, then recheck. If it is OK, replace the original VSA modulator-control unit (see page 19-102).
ABS indicator, brake system indicator, and VSA indicator do not come on at the same time	1. Do the gauge control module troubleshooting (see page 22-315). 2. Substitute a known-good VSA modulator-control unit, then recheck. If it is OK, replace the original VSA modulator-control unit (see page 19-102).
ABS indicator, brake system indicator, and VSA indicator do not go off at the same time	1. Check for F-CAN DTCs, and troubleshoot and repair those first. 2. Symptom troubleshooting (see page 19-97). 3. Do the gauge control module troubleshooting (see page 22-315). 4. Substitute a known-good VSA modulator-control unit, then recheck. If it is OK, replace the original VSA modulator-control unit (see page 19-102).

System Description

VSA Modulator-control Unit Inputs and Outputs for 46P Connector



Wire side of female terminals

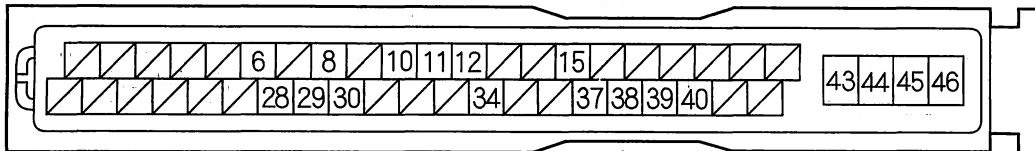
Terminal number	Wire color	Terminal sign	Description	Measurement (Disconnect the VSA modulator-control unit 46P connector)		
				Terminal	Conditions	Result
6	ORN	BRK DIAG	Detects brake light relay	6—GND	Trailer stability assist brake operated or brake pedal pressed	Battery voltage
8	GRY	RR-GND	Detects right-rear wheel sensor signal	—	—	—
10	RED	RL-GND	Detects left-rear wheel sensor signal	—	—	—
11	YEL	RL +B	Detects left-rear wheel sensor signal	—	—	—
12	ORN	FL +B	Detects left-front wheel sensor signal	—	—	—
15	LT BLU	K-LINE	Communicates with HDS	—	—	—

(cont'd)

VSA System Components

System Description (cont'd)

VSA Modulator-control Unit Inputs and Outputs for 46P Connector (cont'd)



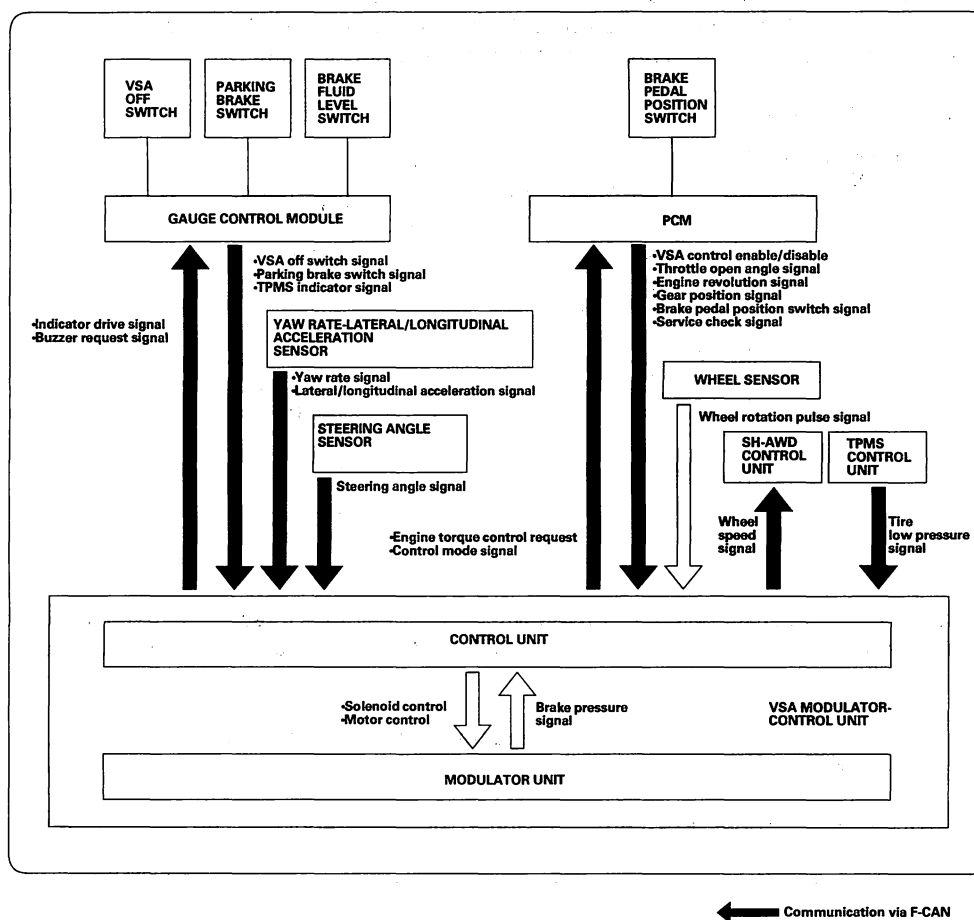
Wire side of female terminals

Terminal number	Wire color	Terminal sign	Description	Measurement (Disconnect the VSA modulator-control unit 46P connector)		
				Terminal	Conditions	Result
28	PNK	FR-GND	Detects right-front wheel sensor signal	—	—	—
29	GRN	FR +B	Detects right-front wheel sensor signal	—	—	—
30	LT BLU	RR +B	Detects right-rear wheel sensor signal	—	—	—
34	GRY	FL-GND	Detects left-front wheel sensor signal	—	—	—
37	YEL	BRK LAMP	Drives the brake light relay	37—GND	Ignition switch ON (II)	Battery voltage
38	RED	CAN-L	F-CAN communication circuit	—	—	—
39	WHT	CAN-H	F-CAN communication circuit	—	—	—
40	ORN	IG1	Power source for activating the system	40—GND	Ignition switch ON (II)	Battery voltage
43	BRN	GND2	Ground for the VSA modulator-control unit	43—GND	At all times	Continuity to ground
44	LT GRN	+B SOL	Power source for the valve relay	44—GND	At all times	Battery voltage
45	RED	+B MOT	Power source for the motor relay	45—GND	At all times	Battery voltage
46	BLK	GND1	Ground for the pump motor	46—GND	At all times	Continuity to ground

cardiagn.com

System Outline

This system is composed of the VSA modulator-control unit, the wheel sensors, the steering angle sensor, and the yaw rate-lateral/longitudinal acceleration sensor, and the system indicators in the gauge control module. The VSA modulator-control unit controls the ABS, EBD, TCS, VSA, TSA, and brake assist with the brake pressure of each wheel and the engine torque.



(cont'd)

VSA System Components

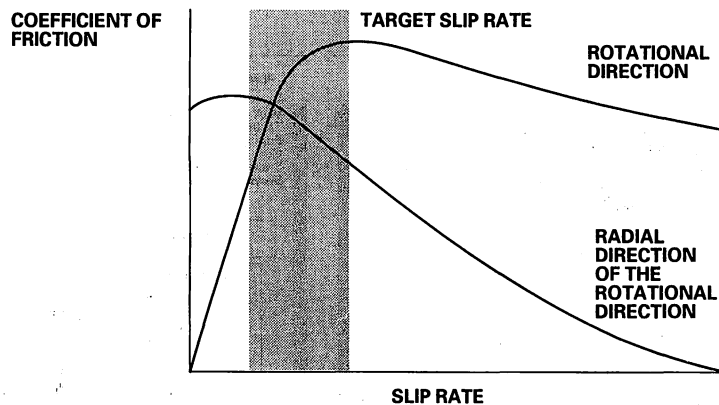
System Description (cont'd)

ABS Features

Anti-lock control

Without ABS, when the brake pedal is pressed while driving, the wheels sometimes 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. With ABS, the system precisely controls the slip rate of the wheels to ensure maximum grip force from the tires, and it thereby ensures maneuverability and stability of the vehicle. The ABS calculates the slip rate of the wheels based on the four wheel speeds, and then it controls the brake fluid pressure to reach the target slip rate.

Grip force of tire and road surface

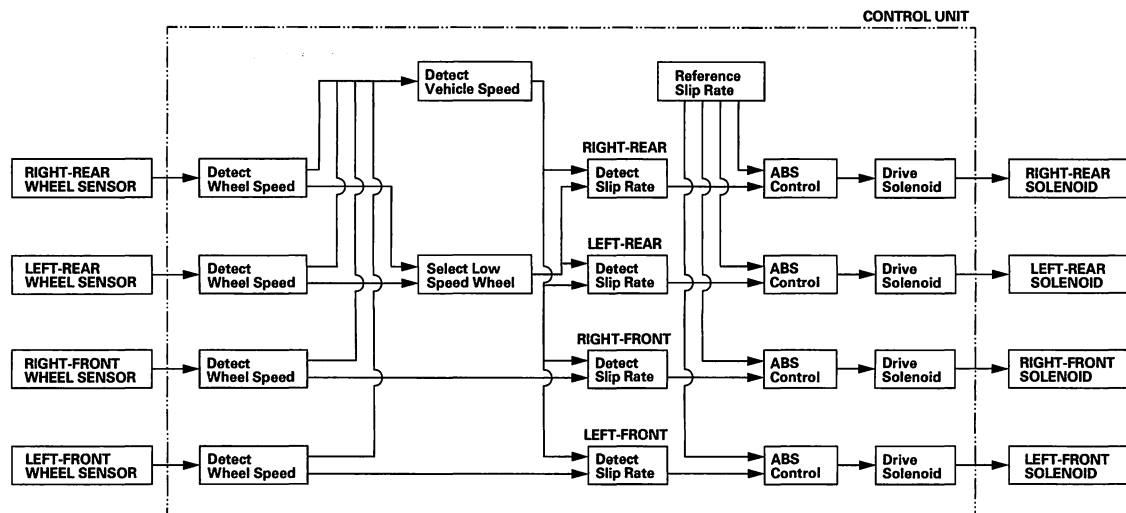


Main Control

The control unit detects the wheel speed based on the wheel sensor signals it receives, then it calculates the vehicle speed based on the detected wheel speed. The control unit detects the vehicle speed during deceleration based on the wheel speeds.

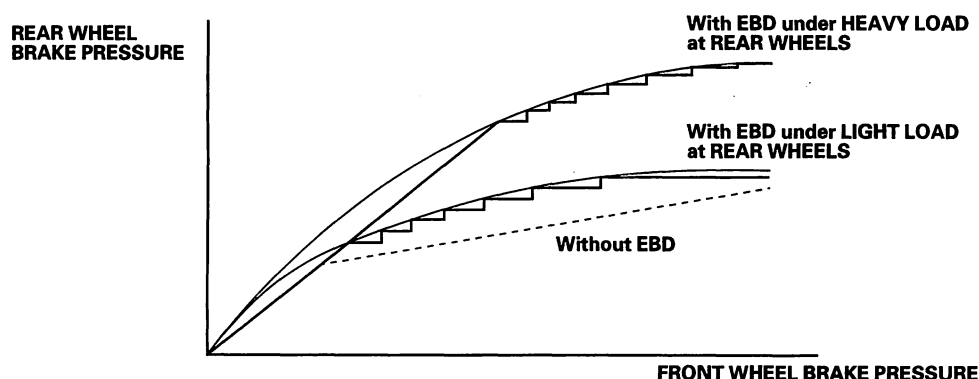
The control unit calculates the slip rate of each wheel, and transmits the control signal to the modulator unit solenoid valve when the slip rate is high.

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



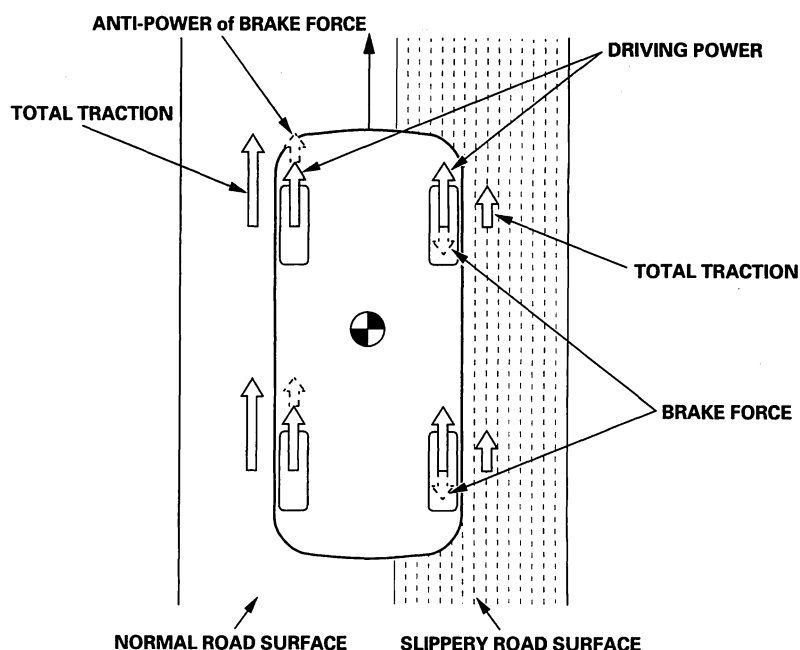
EBD Features

The electronic brake distribution (EBD) feature helps control vehicle braking by adjusting the rear brake force in accordance with the rear wheel load before the ABS operates. Based on the wheel sensor signals, the control unit uses the modulator to control the rear brakes individually. When the rear wheel speed is less than the front wheel speed, the VSA modulator-control unit retains the current rear brake fluid pressure by closing the inlet valve in the modulator. As the rear wheel speed increases and approaches the front wheel speed, the VSA modulator-control unit increases the rear brake fluid pressure by momentarily opening the inlet valve. This whole process is repeated very rapidly. While this is happening, kickback may be felt at the brake pedal.



TCS Features

When a drive wheel loses traction on a slippery road surface and starts to spin, the VSA modulator-control unit applies brake pressure to the spinning wheel and sends an engine torque control request to the PCM to slow the spinning wheel and keep traction.



(cont'd)

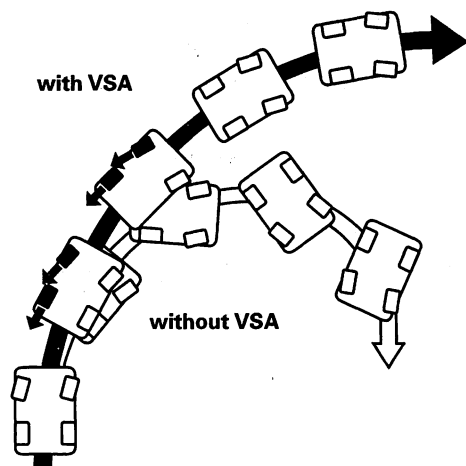
VSA System Components

System Description (cont'd)

VSA System Features

Oversteer control

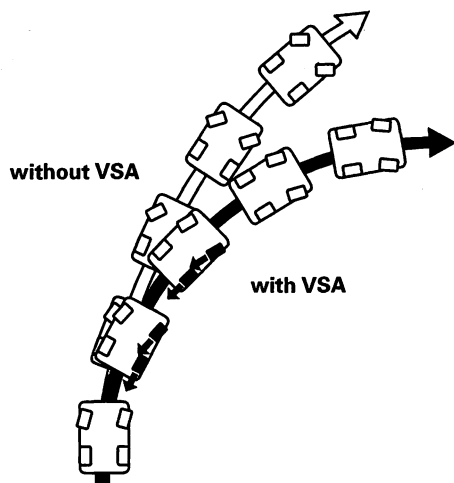
Applies the brake to the front and rear outside wheels



The brake makes the yaw rate opposite to the turning direction

Understeer control

- Applies the brake to the front and rear inside wheels
- Controls the engine torque when accelerating



The brake increases the yaw rate toward the turning direction

The throttle control effect:

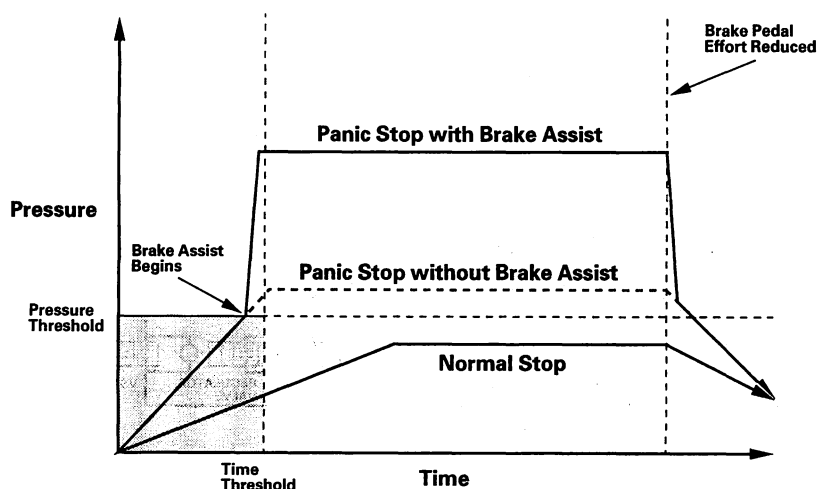
- reduces vehicle speed
- increases cornering force

Brake Assist Features

Brake assist helps ensure that any driver can achieve the full braking potential of the vehicle by increasing brake system pressure in a panic situation, bringing the vehicle into a full ABS stop.

If during a panic stop the VSA modulator-control unit determines that the brake system pressure increases above a threshold in less than a certain amount of time, the VSA modulator-control unit engages brake assist.

Because the brake system pressure crossed the pressure threshold before the time threshold had expired, the VSA modulator-control unit goes into brake assist mode.



(cont'd)

VSA System Components

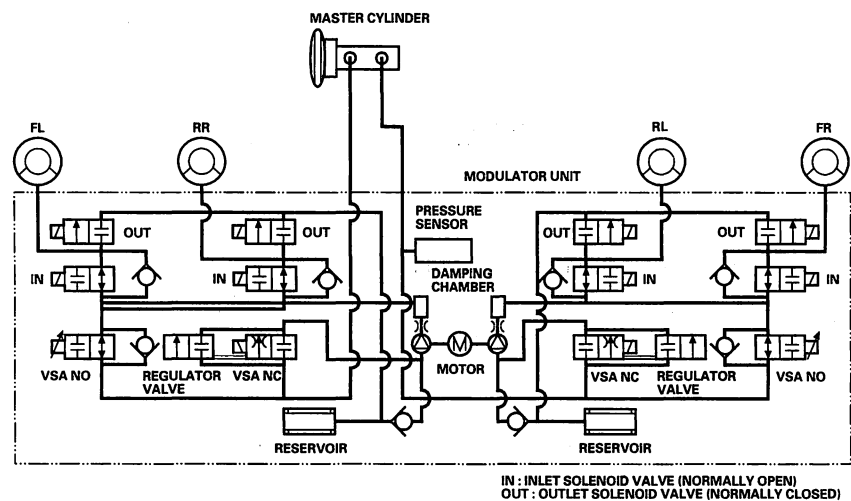
System Description (cont'd)

Modulator Unit

The modulator unit consists of the inlet solenoid valve, the outlet solenoid valve, the VSA NO (normally open) solenoid valve, the VSA NC (normally closed) solenoid valve, the reservoir, the pump, the pump motor, and the damping chamber.

The hydraulic control has three modes of ABS action; pressure intensifying, pressure retaining, and pressure reducing. Pressure adding mode is a combination of at TCS, VSA, and brake assist action.

The hydraulic circuit is an independent four channel type; one channel for each wheel.

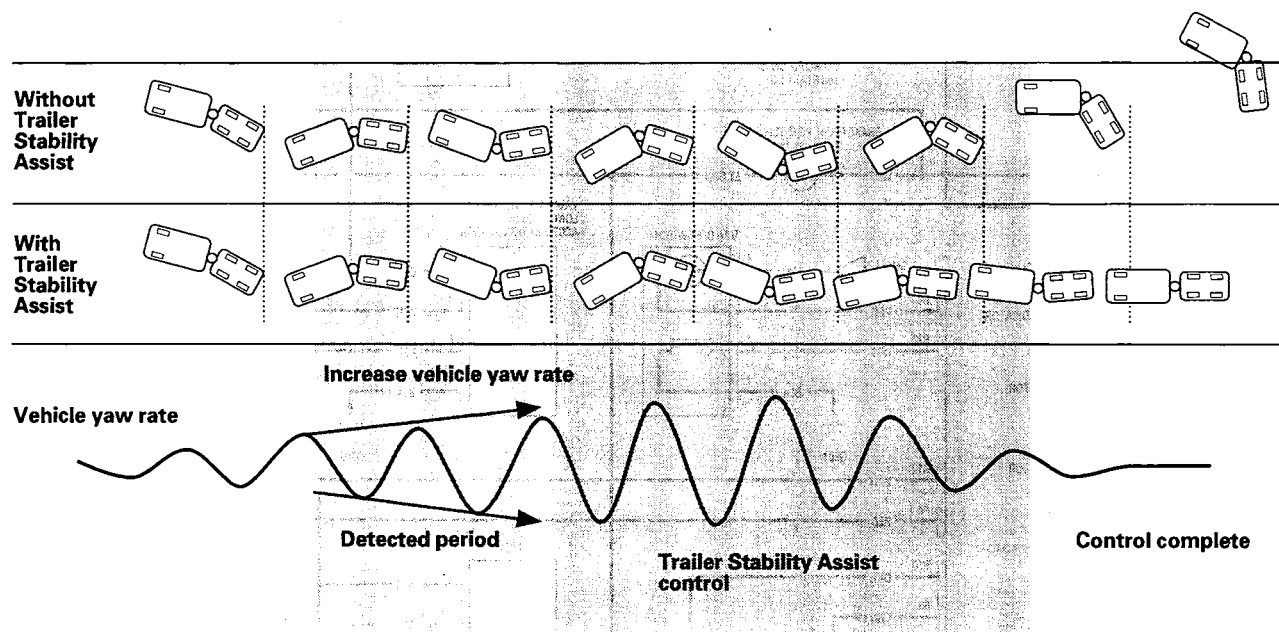


Mode	VSA NO Valve	VSA NC Valve	Inlet Solenoid Valve	Outlet Solenoid Valve	Brake Fluid
Pressure intensifying mode	open	closed	open	closed	Master cylinder fluid is pumped out to the caliper.
Pressure retaining mode	open	closed	closed	closed	Caliper fluid is retained by the inlet and outlet valves.
Pressure reducing mode	open	closed	closed	open	- Caliper fluid flows through the outlet valve to the reservoir. - The motor pumps the reservoir fluid through the damping chamber to the master cylinder*.
Pressure intensifying mode (VSA)	closed	open	open	closed	- Master cylinder fluid is pumped out by pump with motor through VSA NC valve to the caliper. - Caliper fluid pressure exceed master cylinder pressure.

* : The motor will continue running until the operation of the one anti-lock brake control is finished with the first pressure reducing mode.

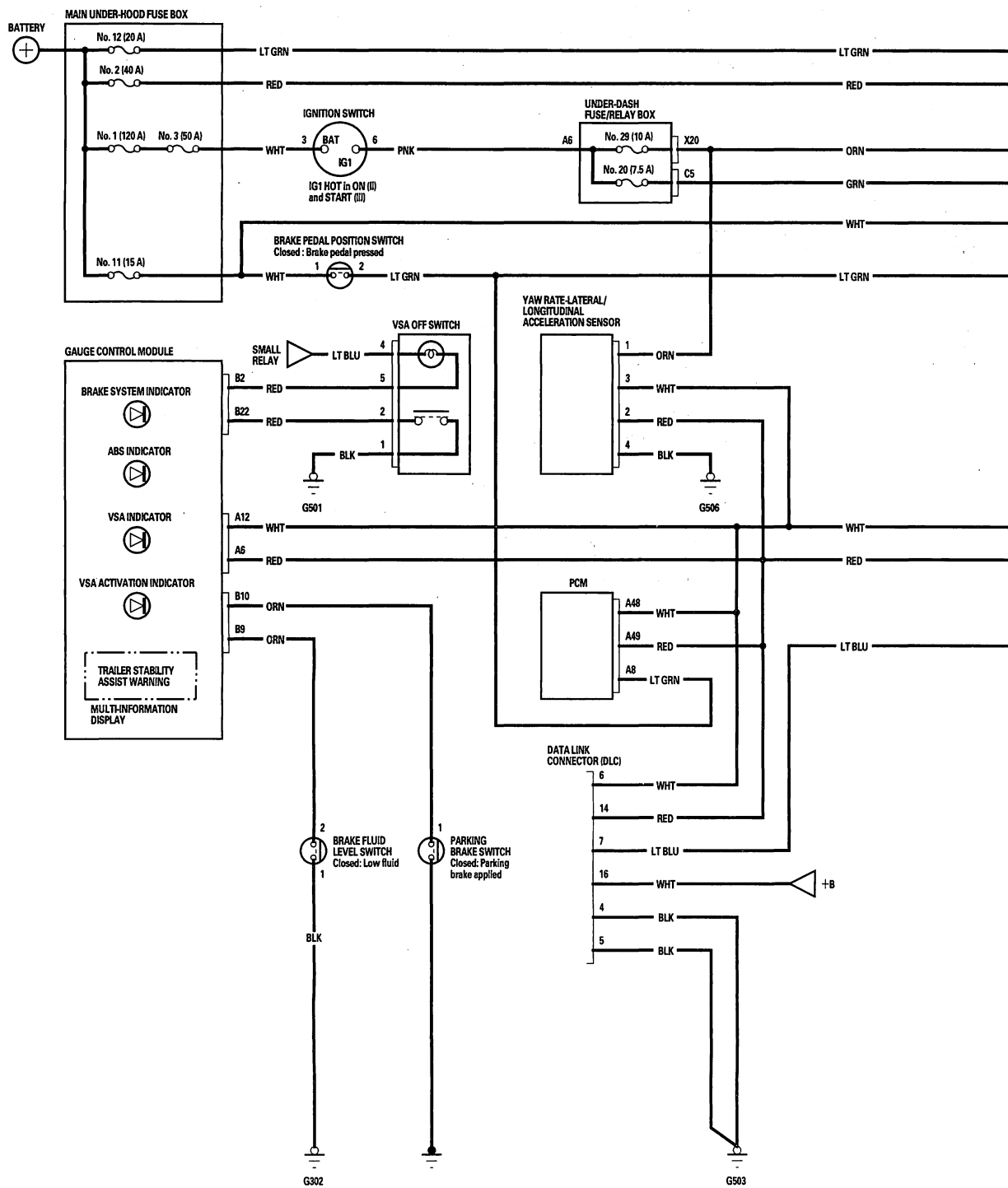
Trailer Stability Assist Features

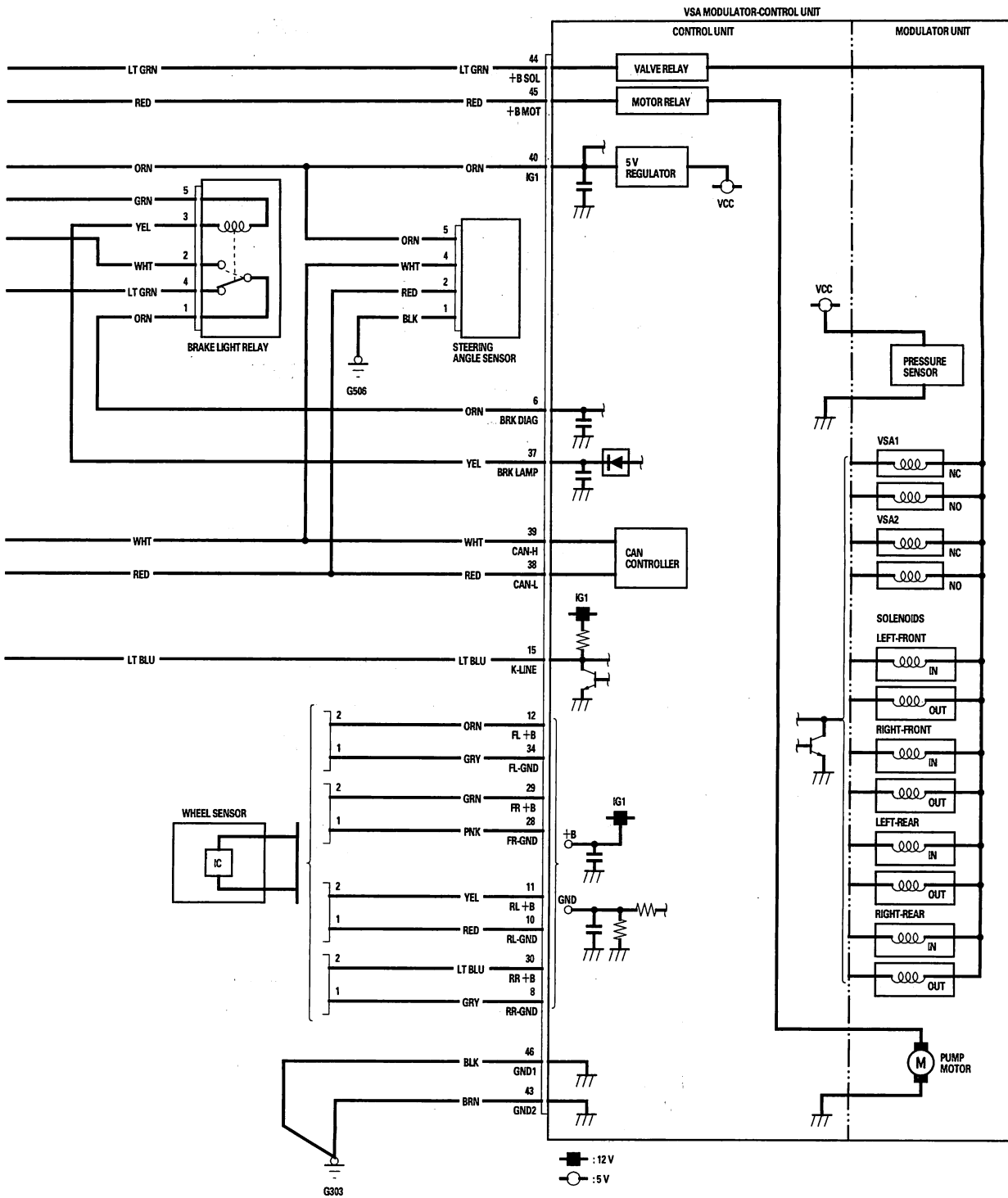
While towing a trailer, factors, such as a lane change, inappropriate tongue weight, and crosswind, can cause trailer sway. This may also cause the vehicle to sway. The trailer stability assist helps stabilize the vehicle, using the same system as VSA (VSA modulator-control unit and sensors). With signals from each sensor, the trailer stability assist detects when trailer sway affects the vehicle, and then reduces vehicle speed while stabilizing the vehicle. The rear brake lights automatically turn on when the trailer stability assist activates.



VSA System Components

Circuit Diagram





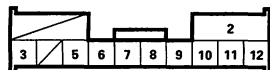
(cont'd)

BACK

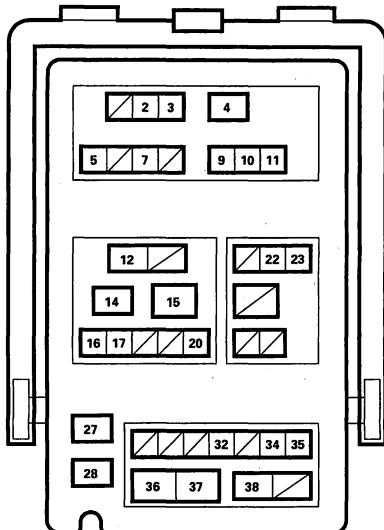
VSA System Components

Circuit Diagram (cont'd)

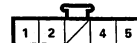
UNDER-DASH FUSE/RELAY BOX CONNECTOR C (12P)



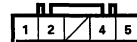
UNDER-DASH FUSE/RELAY BOX CONNECTOR X (39P)



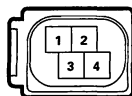
STEERING ANGLE SENSOR
5P CONNECTOR



VSA OFF SWITCH
5P CONNECTOR



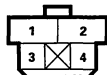
YAW RATE-LATERAL/
LONGITUDINAL
ACCELERATION SENSOR
4P CONNECTOR



BRAKE FLUID LEVEL SWITCH
2P CONNECTOR



BRAKE PEDAL POSITION
SWITCH 4P CONNECTOR



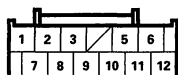
PARKING BRAKE SWITCH
1P CONNECTOR



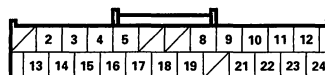
WHEEL SENSOR
2P CONNECTOR



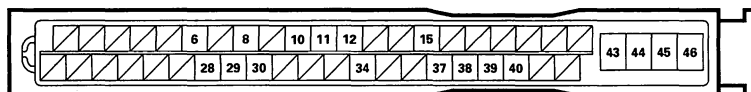
GAUGE CONTROL MODULE CONNECTOR A (12P)



GAUGE CONTROL MODULE CONNECTOR B (24P)

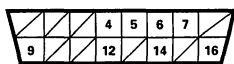


VSA MODULATOR-CONTROL UNIT 46P CONNECTOR

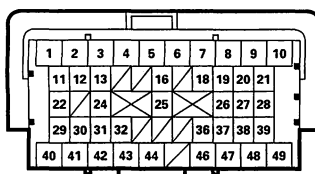


Wire side of female terminals

DATA LINK CONNECTOR (DLC)



PCM CONNECTOR A (49P)



Terminal side of female terminals

BRAKE LIGHT RELAY 5P CONNECTOR



DTC Troubleshooting

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

1. Turn the ignition switch ON (II).
2. Check for DTCs with the HDS.

Is DTC 22 indicated with DTC 11, 13, 15, and/or 17 at the same time?

YES—Go to step 9.

NO—Go to step 3.

3. Clear the DTC with the HDS.
4. Turn the ignition switch OFF, then turn it ON (II) again.
5. Check for DTCs with the HDS.

Is DTC 11, 13, 15, and/or 17 indicated?

YES—Go to step 6.

NO—Intermittent failure, the system is OK at this time. Check for loose terminals between the wheel sensor 2P connector and the VSA modulator-control unit 46P connector. Check for a loose connection at G303. Refer to intermittent failures troubleshooting (see page 19-44). ■

6. Turn the ignition switch OFF.

7. Check for loose terminals between the wheel sensor 2P connector and the VSA modulator-control unit 46P connector.

Are their connections OK?

YES—Go to step 8.

NO—Reconnect the connector and retest. ■

8. Check that the appropriate wheel sensor is properly mounted (see page 19-104).

DTC	Appropriate Wheel Sensor
11	Right-front
13	Left-front
15	Right-rear
17	Left-rear

Is the wheel sensor installation OK?

YES—Go to step 10.

NO—Reinstall the wheel sensor, and check the mounting position (see page 19-104). ■

9. Turn the ignition switch OFF.
10. Disconnect the VSA modulator-control unit 46P connector.
11. Start the engine.

(cont'd)

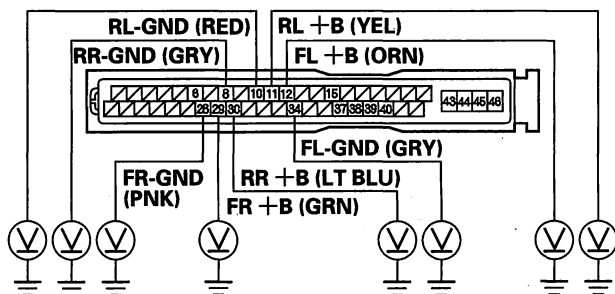
VSA System Components

DTC Troubleshooting (cont'd)

12. Measure the voltage between body ground and the appropriate wheel sensor +B and GND terminals of the VSA modulator-control unit 46P connector respectively (see table).

DTC	Appropriate Terminal	
	+B	GND
11 (Right-front)	FR +B: No. 29	FR-GND: No. 28
13 (Left-front)	FL +B: No. 12	FL-GND: No. 34
15 (Right-rear)	RR +B: No. 30	RR-GND: No. 8
17 (Left-rear)	RL +B: No. 11	RL-GND: No. 10

VSA MODULATOR-CONTROL UNIT 46P CONNECTOR



Wire side of female terminals

Is there 0.1 V or more?

YES—Repair short to power in the wire between the VSA modulator-control unit and the appropriate wheel sensor. ■

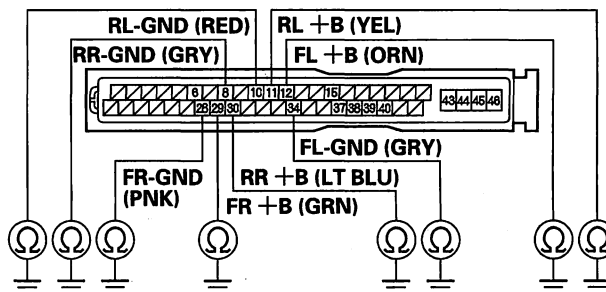
NO—Go to step 13.

13. Turn the ignition switch OFF.

14. Check for continuity between body ground and the appropriate wheel sensor +B and GND terminals of the VSA modulator-control unit 46P connector respectively (see table).

DTC	Appropriate Terminal	
	+B	GND
11 (Right-front)	FR +B: No. 29	FR-GND: No. 28
13 (Left-front)	FL +B: No. 12	FL-GND: No. 34
15 (Right-rear)	RR +B: No. 30	RR-GND: No. 8
17 (Left-rear)	RL +B: No. 11	RL-GND: No. 10

VSA MODULATOR-CONTROL UNIT 46P CONNECTOR



Wire side of female terminals

Is there continuity?

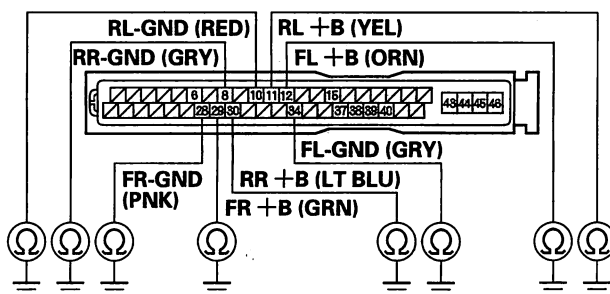
YES—Go to step 15.

NO—Go to step 17.

15. Disconnect the appropriate wheel sensor 2P connector.
16. Check for continuity between body ground and the appropriate wheel sensor +B and GND terminals of the VSA modulator-control unit 46P connector respectively (see table).

DTC	Appropriate Terminal	
	+B	GND
11 (Right-front)	FR +B: No. 29	FR-GND: No. 28
13 (Left-front)	FL +B: No. 12	FL-GND: No. 34
15 (Right-rear)	RR +B: No. 30	RR-GND: No. 8
17 (Left-rear)	RL +B: No. 11	RL-GND: No. 10

VSA MODULATOR-CONTROL UNIT 46P CONNECTOR



Wire side of female terminals

Is there continuity?

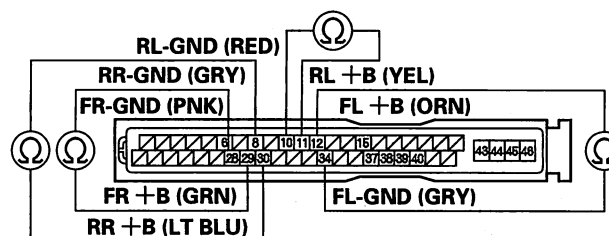
YES—Repair short to body ground in the wire between the VSA modulator-control unit and the appropriate wheel sensor. ■

NO—Replace the appropriate wheel sensor (see page 19-104). ■

17. Measure the resistance between the appropriate VSA modulator-control unit 46P connector wheel sensor +B and GND terminals (see table), then measure the resistance between the same terminals and reverse the positive and negative tester probes.

DTC	Appropriate Terminal	
	+B	GND
11 (Right-front)	FR +B: No. 29	FR-GND: No. 28
13 (Left-front)	FL +B: No. 12	FL-GND: No. 34
15 (Right-rear)	RR +B: No. 30	RR-GND: No. 8
17 (Left-rear)	RL +B: No. 11	RL-GND: No. 10

VSA MODULATOR-CONTROL UNIT 46P CONNECTOR



Wire side of female terminals

Is the resistance infinity (ohmmeter may read OL) in both directions?

YES—Go to step 18.

NO—Go to step 20.

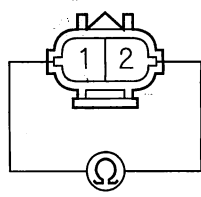
(cont'd)

VSA System Components

DTC Troubleshooting (cont'd)

- 18. Disconnect the appropriate wheel sensor 2P connector.
- 19. On the sensor side, measure the resistance between appropriate wheel sensor 2P connector terminals No. 1 and No. 2, then measure resistance between the same terminals and reverse the positive and negative tester probes.

WHEEL SENSOR 2P CONNECTOR



Terminal side of male terminals

Is the resistance infinity (ohmmeter may read OL) in both directions?

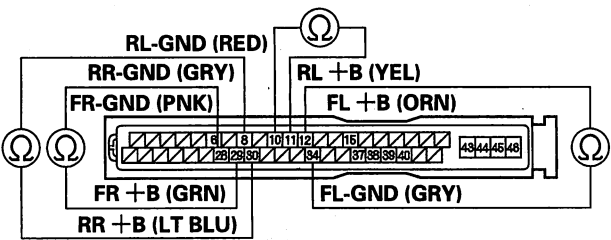
YES—Replace the appropriate wheel sensor (see page 19-104). ■

NO—Repair open in the wire between the appropriate wheel sensor and the VSA modulator-control unit. ■

- 20. Check for continuity between the appropriate VSA modulator-control unit 46P connector wheel sensor +B and GND terminals (see table), then check for continuity between the same terminals and reverse the positive and negative tester probes.

DTC	Appropriate Terminal	
	+B	GND
11 (Right-front)	FR +B: No. 29	FR-GND: No. 28
13 (Left-front)	FL +B: No. 12	FL-GND: No. 34
15 (Right-rear)	RR +B: No. 30	RR-GND: No. 8
17 (Left-rear)	RL +B: No. 11	RL-GND: No. 10

VSA MODULATOR-CONTROL UNIT 46P CONNECTOR



Wire side of female terminals

Is there continuity in both directions?

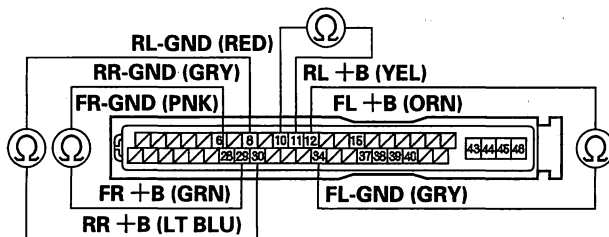
YES—Go to step 21.

NO—Check for loose terminals in the VSA modulator-control unit 46P connector. Check for a loose connection at G303. If necessary, substitute a known-good VSA modulator-control unit (see page 19-102) and retest. ■

21. Disconnect the appropriate wheel sensor 2P connector.
22. Check for continuity between the appropriate VSA modulator-control unit 46P connector wheel sensor +B and GND terminals (see table), then check for continuity between the same terminals and reverse the positive and negative tester probes.

DTC	Appropriate Terminal	
	+B	GND
11 (Right-front)	FR +B: No. 29	FR-GND: No. 28
13 (Left-front)	FL +B: No. 12	FL-GND: No. 34
15 (Right-rear)	RR +B: No. 30	RR-GND: No. 8
17 (Left-rear)	RL +B: No. 11	RL-GND: No. 10

VSA MODULATOR-CONTROL UNIT 46P CONNECTOR



Wire side of female terminals

Is there continuity in both directions?

YES—Repair short in the wires between the VSA modulator-control unit and the appropriate wheel sensor. ■

NO—Replace the appropriate wheel sensor (see page 19-104). ■

VSA System Components

DTC Troubleshooting (cont'd)

DTC 12, 14, 16, 18: Wheel Sensor (Electrical Noise/Intermittent Interruption)

NOTE:

- If the ABS and other indicators come on because of electrical noise, the indicators will go off when you test-drive the vehicle speed at 10 mph (15 km/h) or more and the noise is gone.
- An incorrectly installed wheel bearing can cause one of these DTCs.

1. Turn the ignition switch OFF.
2. Check the appropriate wheel sensor and inspect the magnetic encoder on the appropriate hub bearing for debris: Front (see page 18-12), rear (see page 18-29).

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

Are they installed correctly in good condition, and free of debris?

YES—Go to step 3.

NO—Reinstall or replace the appropriate wheel sensor, hub bearing unit, and recheck by test-driving. ■

3. Substitute an appropriate known-good wheel sensor (see page 19-104).
4. Turn the ignition switch ON (II).
5. Clear the DTC with the HDS.
6. Test-drive the vehicle at 10 mph (15 km/h) or more.

7. Check for DTCs with the HDS.

Is DTC 12, 14, 16, and/or 18 indicated?

YES—Go to step 8.

NO—Replace the original wheel sensor (see page 19-104). ■

8. Turn the ignition switch OFF.
9. Substitute an appropriate known-good hub bearing unit: Front (see page 18-12), rear (see page 18-29).
10. Turn the ignition switch ON (II).
11. Clear the DTC with the HDS.
12. Test-drive the vehicle at 10 mph (15 km/h) or more.
13. Check for DTCs with the HDS.

Is DTC 12, 14, 16, and/or 18 indicated?

YES—Check for loose terminals in the VSA modulator-control unit 46P connector. Check for a loose connection at G303. If necessary, substitute a known-good VSA modulator-control unit (see page 19-102) and retest. ■

NO—Replace the original hub bearing unit:

- Front: Replace the original front hub bearing unit (see page 18-12). ■
- Rear: Replace the original rear hub bearing unit (see page 18-29). ■

DTC 21: Difference in Wheel Speed

NOTE: A wheel bearing that is installed backwards can cause this DTC.

1. Check all four tires for size, inflation, and wear.

Are all four tires the correct size, properly inflated, and worn evenly?

YES—Go to step 2.

NO—Install the correct tires, a known-good set of tires, or set the tires to the correct pressure, and retest by test-driving. ■

2. Test-drive the vehicle.

3. Check the RF, LF, RR, LR WHEEL SPD in the VSA DATA LIST with the HDS.

Are all four the same indicated value?

YES—Go to step 4.

NO—Reinstall or replace the wheel sensor(s) (see page 19-104), and recheck by test-driving. ■

4. Check all magnetic encoders on the hub bearing units: Front (see page 18-12), rear (see page 18-29).

Are they installed correctly and in good condition?

YES—Check for loose terminals in the VSA modulator-control unit 46P connector. Check for a loose connection at G303. If necessary, substitute a known-good VSA modulator-control unit (see page 19-102) and retest. ■

NO—Replace the hub bearing unit(s), and recheck by test-driving:

- Front: Replace the front hub bearing unit (see page 18-12). ■
- Rear: Replace the rear hub bearing unit (see page 18-29). ■

VSA System Components

DTC Troubleshooting (cont'd)

DTC 22: Current Flow into Wheel Sensor Input Amplifier

1. Turn the ignition switch ON (II).
2. Clear the DTC with the HDS.
3. Turn the ignition switch OFF, then turn it ON (II) again.
4. Check for DTCs with the HDS.

Is DTC 22 indicated?

YES—Do the DTC 11, 13, 15, and/or 17 troubleshooting (see page 19-61). ■

NO—Intermittent failure, the system is OK at this time. Check for loose terminals between the wheel sensor 2P connector and the VSA modulator-control unit 46P connector. Check for a loose connection at G303. Refer to intermittent failures troubleshooting (see page 19-44). ■

DTC 25: Yaw Rate Sensor (Sensor Unit)

DTC 26: Lateral/Longitudinal Acceleration Sensor (Sensor Unit)

NOTE: These code(s) will set after a test drive if the sensor is installed incorrectly.

1. Turn the ignition switch ON (II).
2. Check for DTCs with the HDS.

Is DTC 91 or 92 indicated with DTC 25 or 26 at the same time?

YES—Do the DTC 91 or 92 troubleshooting: DTC 91 (see page 19-92), DTC 92 (see page 19-94). ■

NO—Go to step 3.

3. Substitute a known-good yaw rate-lateral/longitudinal acceleration sensor.
4. Turn the ignition switch ON (II).
5. Clear the DTC with the HDS.
6. Test-drive the vehicle. Drive the vehicle at 19 mph (30 km/h) or more, and go a distance of 985 ft (300 m) or more.
7. Check for DTCs with the HDS.

Is DTC 25 or 26 indicated?

YES—Check for loose terminals in the VSA modulator-control unit 46P connector. Check for a loose connection at G303. If necessary, substitute a known-good VSA modulator-control unit (see page 19-102) and retest. ■

NO—Replace the original yaw rate-lateral/longitudinal acceleration sensor. ■

DTC 27: Steering Angle Sensor (Hardware)

1. Turn the ignition switch ON (II).
2. Check for DTCs with the HDS.

Is DTC 91 or 92 indicated with DTC 27 at the same time?

YES—Do the DTC 91 or 92 troubleshooting: DTC 91 (see page 19-92), DTC 92 (see page 19-94). ■

NO—Go to step 3.

3. Check the steering angle sensor installation.

Is the steering angle sensor installed correctly?

YES—Replace the steering angle sensor, then do the steering angle sensor center point write procedure. ■

NO—Reinstall the steering angle sensor correctly (see page 19-99), then do the steering angle sensor center point writing procedure. ■

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

1. Turn the ignition switch ON (II).
2. Clear the DTC with the HDS.
3. Turn the ignition switch OFF, then turn it ON (II) again.
4. Check for DTCs with the HDS.

Is DTC 31, 32, 33, 34, 35, 36, 37, and/or 38 indicated?

YES—Replace the VSA modulator-control unit (see page 19-102). ■

NO—Intermittent failure, the system is OK at this time. Check for a loose connection at G303. ■

VSA System Components

DTC Troubleshooting (cont'd)

DTC 45, 46, 47, 48: VSA Solenoid

1. Turn the ignition switch ON (II).
2. Clear the DTC with the HDS.
3. Turn the ignition switch OFF, then turn it ON (II) again.
4. Check for DTCs with the HDS.

Is DTC 45, 46, 47, and/or 48 indicated?

YES—Replace the VSA modulator-control unit (see page 19-102). ■

NO—Intermittent failure, the system is OK at this time. Check for a loose connection at G303. ■

DTC 51: Motor Locked

1. Turn the ignition switch ON (III).
2. Clear the DTC with the HDS.
3. Test-drive the vehicle. Drive the vehicle at 10 mph (15 km/h) or more, with the engine speed at 2,500 rpm or higher.
4. Check for DTCs with the HDS.

Is DTC 51 indicated?

YES—Inspect G303 for loose or poor connection, then replace the VSA modulator-control unit (see page 19-102). ■

NO—Intermittent failure, the system is OK at this time. Check for a loose connection at G303. ■

DTC 52: Motor Stuck OFF

1. Turn the ignition switch OFF.
2. Check the No. 2 (40 A) fuse in the main under-hood fuse box.

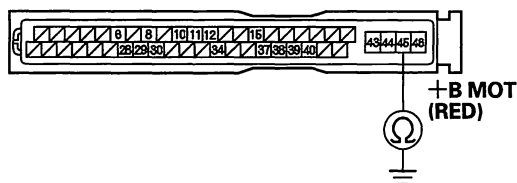
Is the fuse blown?

YES—Go to step 3.

NO—Reinstall the checked fuse, then go to step 5.

3. Disconnect the VSA modulator-control unit 46P connector.
4. Check for continuity between VSA modulator-control unit 46P connector terminal No. 45 and body ground.

VSA MODULATOR-CONTROL UNIT 46P CONNECTOR



Wire side of female terminals

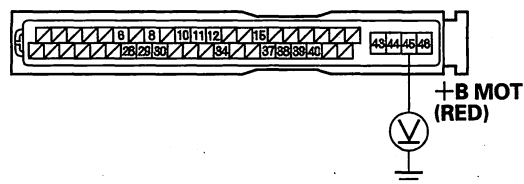
Is there continuity?

YES—Repair short to body ground in the wire between the No. 2 (40 A) fuse in the main under-hood fuse box and the VSA modulator-control unit. ■

NO—Install a new No. 2 (40 A) fuse, then go to step 6.

5. Disconnect the VSA modulator-control unit 46P connector.
6. Measure the voltage between VSA modulator-control unit 46P connector terminal No. 45 and body ground.

VSA MODULATOR-CONTROL UNIT 46P CONNECTOR



Wire side of female terminals

Is there battery voltage?

YES—Go to step 7.

NO—Repair open in the wire between the No. 2 (40 A) fuse in the main under-hood fuse box and the VSA modulator-control unit. ■

(cont'd)

VSA System Components

DTC Troubleshooting (cont'd)

7. Reconnect the VSA modulator-control unit 46P connector.
8. Turn the ignition switch ON (II).
9. Clear the DTC with the HDS.
10. Test-drive the vehicle. Drive the vehicle at 10 mph (15 km/h) or more, with the engine speed at 2,500 rpm or higher.
11. Check for DTCs with the HDS.

Is DTC 52 indicated?

YES—Check for loose terminals in the VSA modulator-control unit 46P connector. Check for a loose connection at G303. If necessary, substitute a known-good VSA modulator-control unit (see page 19-102) and retest. ■

NO—Intermittent failure, the system is OK at this time. Check for loose terminals at the VSA modulator-control unit 46P connector. Check for a loose connection at G303. Refer to intermittent failures troubleshooting (see page 19-44). ■

DTC 53: Motor Stuck ON

1. Turn the ignition switch ON (II).

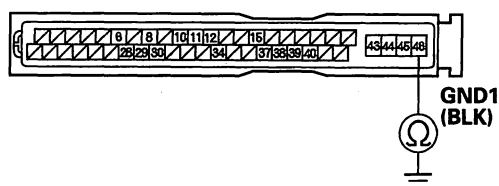
Is the pump motor running?

YES—Replace the VSA modulator-control unit (see page 19-102). ■

NO—Go to step 2.

2. Turn the ignition switch OFF.
3. Disconnect the VSA modulator-control unit 46P connector.
4. Check for continuity between VSA modulator-control unit 46P connector terminal No. 46 and body ground.

VSA MODULATOR-CONTROL UNIT 46P CONNECTOR



Wire side of female terminals

Is there continuity?

YES—Go to step 5.

NO—Repair open in the wire between the VSA modulator-control unit and body ground (G303). ■

5. Reconnect the VSA modulator-control unit 46P connector.
6. Turn the ignition switch ON (II).

7. Clear the DTC with the HDS.

8. Test-drive the vehicle. Drive the vehicle at 10 mph (15 km/h) or more, with the engine speed at 2,500 rpm or higher.

9. Check for DTCs with the HDS.

Is DTC 53 indicated?

YES—Check for loose terminals in the VSA modulator-control unit 46P connector. Check for a loose connection at G303. If necessary, substitute a known-good VSA modulator-control unit (see page 19-102) and retest. ■

NO—Intermittent failure, the system is OK at this time. Check for loose terminals at the VSA modulator-control unit 46P connector. Check for a loose connection at G303. Refer to intermittent failures troubleshooting (see page 19-44). ■

VSA System Components

DTC Troubleshooting (cont'd)

DTC 54: Valve Relay

1. Turn the ignition switch OFF.
2. Check the No. 12 (20 A) fuse in the main under-hood fuse box.

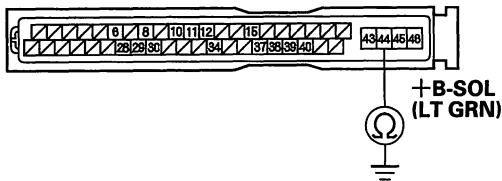
Is the fuse blown?

YES—Go to step 3.

NO—Reinstall the checked fuse, then go to step 5.

3. Disconnect the VSA modulator-control unit 46P connector.
4. Check for continuity between VSA modulator-control unit 46P connector terminal No. 44 and body ground.

VSA MODULATOR-CONTROL UNIT 46P CONNECTOR



Wire side of female terminals

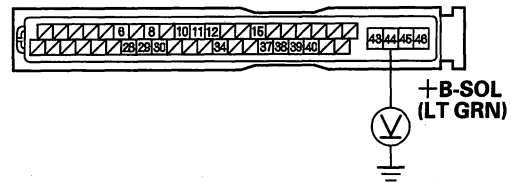
Is there continuity?

YES—Repair short to body ground in the wire between the No. 12 (20 A) fuse in the main under-hood fuse box and the VSA modulator-control unit. ■

NO—Install a new No. 12 (20 A) fuse, then go to step 6.

5. Disconnect the VSA modulator-control unit 46P connector.
6. Measure the voltage between VSA modulator-control unit 46P connector terminal No. 44 and body ground.

VSA MODULATOR-CONTROL UNIT 46P CONNECTOR



Wire side of female terminals

Is there battery voltage?

YES—Go to step 7.

NO—Repair open in the wire between the No. 12 (20 A) fuse in the main under-hood fuse box and the VSA modulator-control unit. ■

7. Reconnect the VSA modulator-control unit 46P connector.
8. Turn the ignition switch ON (II).
9. Clear the DTC with the HDS.
10. Turn the ignition switch OFF, then turn it ON (II) again.
11. Check for DTCs with the HDS.

Is DTC 54 indicated?

YES—Check for loose terminals between terminal No. 20 of the driver's under-dash fuse/relay box connector X (38P) and in the VSA modulator-control unit 46P connector. Check for a loose connection at G303. If necessary, substitute a known-good VSA modulator-control unit (see page 19-102) and retest. ■

NO—Intermittent failure, the system is OK at this time. Check for loose terminals at the VSA modulator-control unit 46P connector. Check for a loose connection at G303. Refer to intermittent failures troubleshooting (see page 19-44). ■

DTC 59: BRKDIAG High

1. Turn the ignition switch OFF.
2. Check the brake lights without pressing the brake pedal.

Are the brake lights on?

YES—Replace the brake light relay. ■

NO—Go to step 3.

3. Turn the ignition switch ON (II).
4. Check the brake lights without pressing the brake pedal.

Are the brake lights on?

YES—Go to step 5.

NO—Go to step 9.

5. Turn the ignition switch OFF.
6. Disconnect the VSA modulator-control unit 46P connector.
7. Turn the ignition switch ON (II).

(cont'd)

VSA System Components

DTC Troubleshooting (cont'd)

8. Check the brake lights without pressing the brake pedal.

Are the brake lights on?

YES—Go to step 9.

NO—Check for loose terminals in the VSA modulator-control unit 46P connector. Check for a loose connection at G303. If necessary, substitute a known-good VSA modulator-control unit (see page 19-102) and retest. ■

9. Clear the DTC with the HDS.

10. Press the brake pedal for 3 seconds or more.

11. Check for DTCs with the HDS.

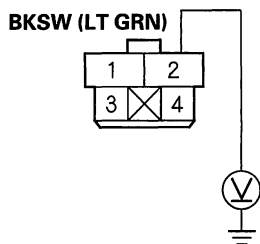
Is DTC 59 indicated?

YES—Go to step 12.

NO—Check for loose terminals in the VSA modulator-control unit 46P connector. Check for a loose connection at G303. If necessary, substitute a known-good VSA modulator-control unit (see page 19-102) and retest. ■

12. Measure the voltage between the brake pedal position switch 4P connector terminal No. 2 and body ground with the headlights OFF and ON.

BRAKE PEDAL POSITION SWITCH 4P CONNECTOR



Wire side of female terminals

Is there less than 0.5 V?

YES—Go to step 13.

NO—Disconnect the taillight assemblies one at a time and recheck. If the voltage is OK, check the taillight ground connection and then replace the faulty taillight. ■

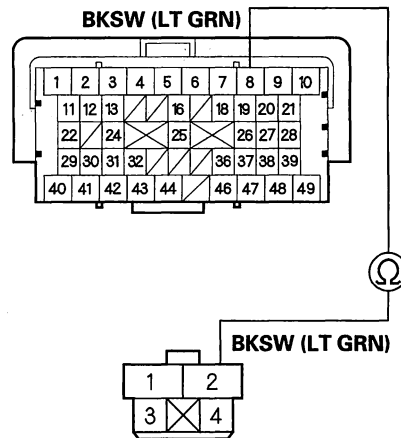
13. Turn the ignition switch OFF.

14. Short the SCS line with the HDS.

15. Disconnect the PCM connector A (49P), and the brake pedal position switch 4P connector.

16. Check for continuity between brake pedal position switch 4P connector terminal No. 2 and PCM connector A (49P) terminal No. 8.

PCM CONNECTOR A (49P) Terminal side of female terminals



BRAKE PEDAL POSITION SWITCH 4P CONNECTOR Wire side of female terminals

Is there continuity?

YES—Replace the PCM (see page 11-244). ■

NO—Repair open in the wire between the PCM and the brake pedal position switch. ■

DTC 61: IG1 Voltage Low

1. Turn the ignition switch ON (II).
2. Clear the DTC with the HDS.
3. Test-drive the vehicle at 2 mph (3 km/h) or more.
4. Check for DTCs with the HDS.

Is DTC 61 indicated?

YES—Go to step 5.

NO—Intermittent failure, the system is OK at this time. Check for loose terminals at the VSA modulator-control unit 46P connector. Check for a loose connection at G303. Refer to intermittent failures troubleshooting (see page 19-44). ■

5. Test the battery and connections.

Are the battery and battery connections OK?

YES—Check for a poor connection at the battery terminals, and all IG1 circuit connections between the VSA modulator-control unit 46P connector terminal No. 40 and the under-dash fuse/relay box No. 29 (10A) fuse. If the connections are good, go to the Alternator and Regulator Circuit Troubleshooting (see page 4-30). ■

NO—Replace or charge the battery (see page 22-76), or repair the connections. ■

VSA System Components

DTC Troubleshooting (cont'd)

DTC 62: IG1 Voltage High

NOTE: An overcharging a alternator can cause this DTC.

1. Turn the ignition switch ON (II).
2. Clear the DTC with the HDS.
3. Test-drive the vehicle at 2 mph (3 km/h) or more.
4. Check for DTCs with the HDS.

Is DTC 62 indicated?

YES—Check for a poor connection at the battery terminals. Check for a loose connection at G303. If the connections are good, go to the Alternator and Regulator Circuit Troubleshooting (see page 4-30). ■

NO—Intermittent failure, the system is OK at this time. Check for loose terminals at the VSA modulator-control unit 46P connector. Check for a loose connection at G303. Refer to intermittent failures troubleshooting (see page 19-44). ■

DTC 65: VSA Pressure Sensor (Hardware)

1. Turn the ignition switch ON (II).
2. Clear the DTC with the HDS.
3. Turn the ignition switch OFF, then turn it ON (II) again.
4. Check for DTCs with the HDS.

Is DTC 65 indicated?

YES—Replace the VSA modulator-control unit (see page 19-102). ■

NO—Intermittent failure, the system is OK at this time. Check for a loose connection at G303. ■

DTC 66: VSA Pressure Sensor (Software)

1. Turn the ignition switch ON (II).
2. Check for DTCs with the HDS.

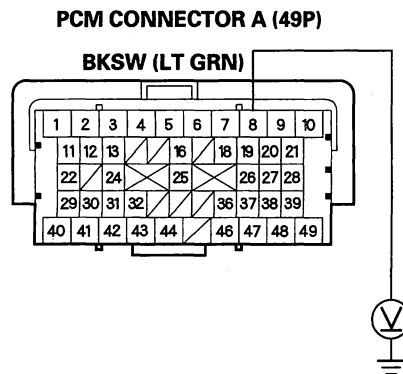
Is DTC 91 or 92 indicated with DTC 66 at the same time?

YES—Do the DTC 91 or 92 troubleshooting: DTC 91 (see page 19-92), DTC 92 (see page 19-94). ■

NO—Go to step 3.

3. Turn the ignition switch OFF.
4. Disconnect the brake pedal position switch 4P connector.
5. Do the brake pedal position switch test (see page 22-214).
Is the switch OK?
YES—Go to step 6.
NO—Replace the brake pedal position switch (see page 19-6). ■
6. Short the SCS line with the HDS.
7. Disconnect the PCM connector A (49P).
8. Turn the ignition switch ON (II).

9. Measure the voltage between PCM connector A (49P) terminal No. 8 and body ground.



Is there 0.1 V or more when the brake pedal is released?

YES—Repair short to power in the wire between the brake pedal position switch and the PCM. ■

NO—Go to step 10.

10. Turn the ignition switch OFF.
11. Substitute a known-good PCM (see page 11-244).
12. Turn the ignition switch ON (II).
13. Clear the DTC with the HDS.
14. Test-drive the vehicle at 8 mph (12 km/h) for 60 seconds or more.
15. Check for DTCs with the HDS.

Is DTC 66 indicated?

YES—Check for loose terminals in the VSA modulator-control unit 46P connector. Check for a loose connection at G303. If necessary, substitute a known-good VSA modulator-control unit (see page 19-102), and retest. ■

NO—Replace the original PCM (see page 11-244). ■

VSA System Components

DTC Troubleshooting (cont'd)

DTC 67: Brake Pedal Position Switch Stuck ON (Hardware)

1. Turn the ignition switch ON (II).
2. Check for DTCs with the HDS.

Is DTC 91 or 92 indicated with DTC 67 at the same time?

YES—Do the DTC 91 or 92 troubleshooting: DTC 91 (see page 19-92), DTC 92 (see page 19-94). ■

NO—Go to step 3.

3. Check the BRAKE SWITCH in the VSA DATA LIST with the HDS while moving the brake pedal.

Does it indicate ON when the pedal is pressed, and OFF when the pedal is released?

YES—Go to step 4.

NO—Go to step 7.

4. Clear the DTC with the HDS.
5. Test-drive the vehicle at 10 mph (15 km/h) for 60 seconds or more.
6. Check for DTCs with the HDS.

Is DTC 67 indicated?

YES—Check for loose terminals in the VSA modulator-control unit 46P connector. Check for a loose connection at G303. If necessary, substitute a known-good VSA modulator-control unit (see page 19-102) and retest. ■

NO—Intermittent failure, the system is OK at this time. Check for loose terminals at the VSA modulator-control unit 46P connector. Check for a loose connection at G303. Refer to intermittent failures troubleshooting (see page 19-44). ■

7. Turn the ignition switch OFF.
8. Disconnect the brake pedal position switch 4P connector.
9. Do the brake pedal position switch test (see page 22-214).

Is the switch OK?

YES—Check for fuel and emissions systems DTCs, and troubleshoot those DTCs first, if no fuel and emissions DTCs are found troubleshoot the brake pedal position switch signal circuit (see page 11-308). ■

NO—Replace the brake pedal position switch (see page 19-6). ■

DTC 68: Brake Pedal Position Switch Stuck OFF (Software)

1. Turn the ignition switch OFF.
2. Check the No. 11 (15 A) fuse in the main under-hood fuse box.

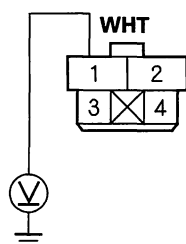
Is the fuse OK?

YES—Reinstall the fuse, and go to step 3.

NO—Replace the fuse, and recheck. If the fuse is blown, check for a short to body ground in the brake pedal position switch circuit. ■

3. Disconnect the brake pedal position switch 4P connector.
4. Measure the voltage between brake pedal position switch 4P connector terminal No. 1 and body ground.

BRAKE PEDAL POSITION SWITCH 4P CONNECTOR



Wire side of female terminals

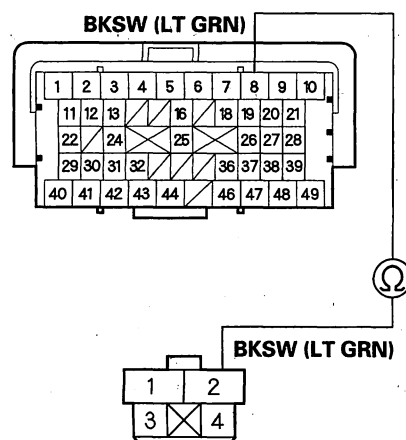
Is there battery voltage?

YES—Go to step 5.

NO—Repair open in the wire between the No. 11 (15 A) fuse in the main under-hood fuse box and the brake pedal position switch. ■

5. Short the SCS line with the HDS.
6. Disconnect the PCM connector A (49P).
7. Check for continuity between brake pedal position switch 4P connector terminal No. 2 and PCM connector A (49P) terminal No. 8.

PCM CONNECTOR A (49P) Terminal side of female terminals



BRAKE PEDAL POSITION SWITCH 4P CONNECTOR Wire side of female terminals

Is there continuity?

YES—Go to step 8.

NO—Repair open in the wire between the PCM and the brake pedal position switch. ■

(cont'd)

VSA System Components

DTC Troubleshooting (cont'd)

8. Do the brake pedal position switch test (see page 22-214).

Is the switch OK?

YES—Go to step 9.

NO—Replace the brake pedal position switch (see page 19-6). ■

9. Substitute a known-good PCM (see page 11-244).

10. Start the engine, then press the brake pedal slowly and hard.

11. Check for DTCs with the HDS.

Is DTC 68 indicated?

YES—Check for loose terminals in the VSA modulator-control unit 46P connector. Check for a loose connection at G303. If necessary, substitute a known-good VSA modulator-control unit (see page 19-102) and retest. ■

NO—Replace the original PCM (see page 11-244). ■

DTC 69: BRKDIAG Low

1. Turn the ignition switch ON (II).
2. Clear the DTC with the HDS.
3. Turn the ignition switch OFF, then turn it ON (II) again.
4. After the VSA indicator goes off, press the brake pedal for 3 seconds or more.
5. Check for DTCs with the HDS.

Is DTC 69 indicated?

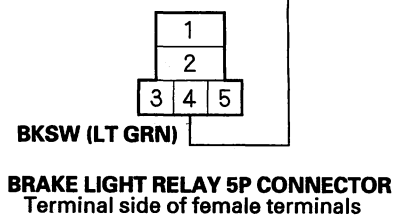
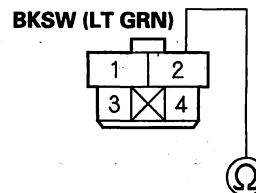
YES—Go to step 6.

NO—Go to step 19.

6. Turn the ignition switch OFF.
7. Remove the brake light relay.
8. Disconnect the brake pedal position switch 4P connector.

9. Check for continuity between the brake pedal position switch 4P connector terminal No. 2 and the brake light relay 5P connector No. 4.

BRAKE PEDAL POSITION SWITCH 4P CONNECTOR Wire side of female terminals



Is there continuity?

YES—Go to step 10.

NO—Repair open in the wire between the brake pedal position switch and the brake light relay. ■

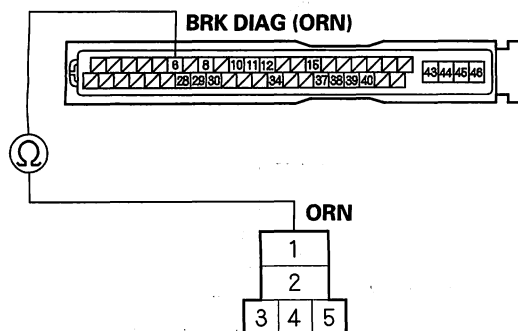
(cont'd)

VSA System Components

DTC Troubleshooting (cont'd)

10. Disconnect the VSA modulator-control unit 46P connector.
11. Check for continuity between the VSA modulator-control unit 46P connector terminal No. 6 and the brake light relay 5P connector No. 1.

VSA MODULATOR-CONTROL UNIT 46P CONNECTOR
Wire side of female terminals



BRAKE LIGHT RELAY 5P CONNECTOR
Terminal side of female terminals

Is there continuity?

YES—Go to step 12.

NO—Repair open in the wire between the VSA modulator-control unit and the brake light relay. ■

12. Substitute a known-good brake light relay.
13. Connect the VSA modulator-control unit 46P connector.
14. Turn the ignition switch ON (II).
15. Clear the DTC with the HDS.
16. Turn the ignition switch OFF, then turn it ON (II) again.
17. After the VSA indicator goes off, press the brake pedal for 3 seconds or more.
18. Check for DTCs with the HDS.

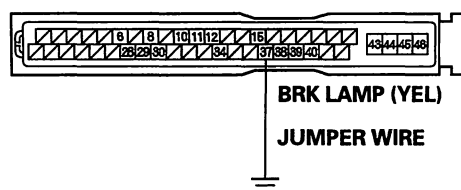
Is DTC 69 indicated?

YES—Check for loose terminals in the VSA modulator-control unit 46P connector. Check for a loose connection at G303. If necessary, substitute a known-good VSA modulator-control unit (see page 19-102) and retest. ■

NO—Replace the original brake light relay. ■

19. Turn the ignition switch OFF.
20. Remove the brake light relay.
21. Disconnect the VSA modulator-control unit 46P connector.
22. Turn the ignition switch ON (II).
23. Connect the VSA modulator-control unit 46P connector terminal No. 37 to body ground with a jumper wire.

VSA MODULATOR-CONTROL UNIT 46P CONNECTOR



Wire side of female terminals

24. Check the brake lights without pressing the brake pedal.

Are the brake lights on?

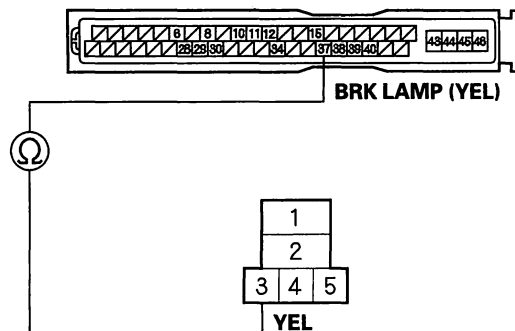
YES—Go to step 25.

NO—Go to step 29.

25. Turn the ignition switch OFF.

26. Check for continuity between the VSA modulator-control unit 46P connector terminal No. 37 and the brake light relay 5P connector No. 3.

VSA MODULATOR-CONTROL UNIT 46P CONNECTOR Wire side of female terminals



BRAKE LIGHT RELAY 5P CONNECTOR Terminal side of female terminals

Is there continuity?

YES—Go to step 27.

NO—Repair open in the wire between the VSA modulator-control unit and the brake light relay. ■

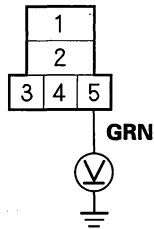
(cont'd)

VSA System Components

DTC Troubleshooting (cont'd)

27. Turn the ignition switch ON (II).
28. Measure the voltage between brake light relay 5P connector terminal No. 5 and body ground.

BRAKE LIGHT RELAY 5P CONNECTOR



Terminal side of female terminals

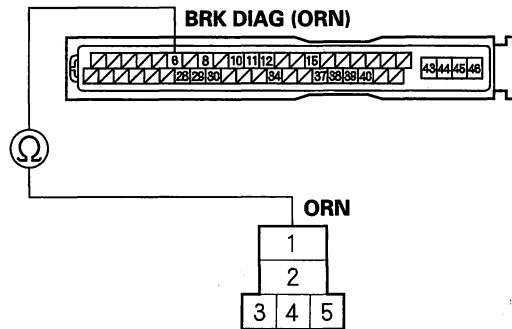
Is there battery voltage?

YES—Replace the brake light relay. ■

NO—Repair open in the wire between the No. 20 (7.5 A) fuse in the under-dash fuse/relay box and the brake light relay. ■

29. Turn the ignition switch OFF.
30. Check for continuity between the VSA modulator-control unit 46P connector terminal No. 6 and the brake light relay 5P connector No. 1.

VSA MODULATOR-CONTROL UNIT 46P CONNECTOR
Wire side of female terminals



BRAKE LIGHT RELAY 5P CONNECTOR
Terminal side of female terminals

Is there continuity?

YES—Check for loose terminals in the VSA modulator-control unit 46P connector. Check for a loose connection at G303. If necessary, substitute a known-good VSA modulator-control unit (see page 19-102) and retest. ■

NO—Repair open in the wire between the VSA modulator-control unit and the brake light relay. ■

DTC 72: Steering Angle Sensor (Software)

1. Turn the ignition switch ON (II).
2. Check for DTCs with the HDS.

Is DTC 91 or 92 indicated with DTC 72 at the same time?

YES—Do the DTC 91 or 92 troubleshooting: DTC 91 (see page 19-92), DTC 92 (see page 19-94). ■

NO—Go to step 3.

3. Put the vehicle on a level surface, and center the steering wheel spokes.
4. Check STEERING ANGLE in the VSA DATA LIST with the HDS.

With steering wheel in the straight ahead position, is STEERING ANGLE within $\pm 5^\circ$?

YES—Go to step 5.

NO—Check for installation of the steering angle sensor. If installation is good, do the steering angle sensor center point writing (see page 19-100). ■

5. Check for wheel alignment (see page 18-5).

Is the wheel alignment within the specification?

YES—Go to step 6.

NO—Make sure the suspension is not modified, and adjust the wheel alignment correctly, and recheck by test-driving the vehicle. ■

6. Turn the ignition switch ON (III).
7. Clear the DTCs with the HDS.
8. Test-drive the vehicle around a number of corners.
9. Check for DTCs with the HDS.

Is DTC 72 indicated?

YES—Replace the VSA modulator-control unit (see page 19-102). ■

NO—The system is OK at this time. ■

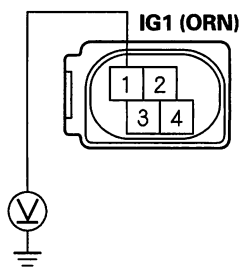
VSA System Components

DTC Troubleshooting (cont'd)

DTC 73: Yaw Rate Sensor (Power Supply)

1. Turn the ignition switch OFF.
2. Disconnect the yaw rate-lateral/longitudinal acceleration sensor 4P connector.
3. Turn the ignition switch ON (II).
4. Measure the voltage between body ground and yaw rate-lateral/longitudinal acceleration sensor 4P connector terminal No. 1.

YAW RATE-LATERAL/LONGITUDINAL ACCELERATION SENSOR 4P CONNECTOR



Wire side of female terminals

Is there battery voltage?

YES—Replace the yaw rate-lateral/longitudinal acceleration sensor. ■

NO—Repair open in the wire between the No. 29 (10 A) fuse in the under-dash fuse/relay box and the yaw rate-lateral/longitudinal acceleration sensor. ■

DTC 74: Yaw Rate Sensor (Software)

NOTE: Driving on an extremely angled road can cause this DTC.

1. Turn the ignition switch ON (II).
2. Check for DTCs with the HDS.

Is DTC 97 indicated with DTC 74 at the same time?

YES—Do the DTC 97 troubleshooting (see page 19-95). ■

NO—Go to step 3.

3. Turn the ignition switch OFF.
4. Check that the yaw rate-lateral/longitudinal acceleration sensor is properly mounted (see page 19-100).

Is the yaw rate-lateral/longitudinal acceleration sensor installation OK?

YES—Go to step 5.

NO—Reinstall the yaw rate-lateral/longitudinal acceleration sensor, and recheck by test-driving. ■

5. Put the vehicle on a level surface.
6. Turn the ignition switch ON (II).
7. Check the YAW RATE S in the VSA DATA LIST with the HDS.

Is it indicated within $\pm 5\%$?

YES—Go to step 8.

NO—Replace the yaw rate-lateral/longitudinal acceleration sensor (see page 19-100). ■

8. Clear the DTC with the HDS.

9. Test-drive the vehicle around a number of corners.

10. Check for DTCs with the HDS.

Is DTC 74 indicated?

YES—Go to step 11.

NO—Intermittent failure; the most probable cause is the vehicle has been driven on an extremely angled road. The system is OK at this time. ■

11. Turn the ignition switch OFF.
12. Substitute a known-good yaw rate-lateral/longitudinal acceleration sensor (see page 19-100).
13. Turn the ignition switch ON (II).
14. Clear the DTC with the HDS.
15. Test-drive the vehicle around a number of corners.
16. Check for DTCs with the HDS.

Is DTC 74 indicated?

YES—Check for loose terminal in the VSA modulator-control unit 46P connector. If necessary, substitute a known-good VSA modulator-control unit (see page 19-102) and retest. ■

NO—Replace the original yaw rate-lateral/longitudinal acceleration sensor (see page 19-100). ■

VSA System Components

DTC Troubleshooting (cont'd)

DTC 75: Lateral/Longitudinal Acceleration Sensor (Joint Failure)

DTC 76: Lateral/Longitudinal Acceleration Sensor (Software)

NOTE: Driving on an extremely angled road can cause this DTC.

1. Turn the ignition switch ON (II).
2. Check for DTCs with the HDS.

Is DTC 97 indicated with DTC 75 or 76 at the same time?

YES—Do the DTC 97 troubleshooting (see page 19-95). ■

NO—Go to step 3.

3. Turn the ignition switch OFF.
4. Check that the yaw rate-lateral/longitudinal acceleration sensor is properly mounted (see page 19-100).

Is the yaw rate-lateral/longitudinal acceleration sensor installation OK?

YES—Go to step 5.

NO—Reinstall the yaw rate-lateral/longitudinal acceleration sensor, and recheck by test-driving. ■

5. Put the vehicle on a level surface.
6. Turn the ignition switch ON (II).
7. Check the LATERAL ACCELERATION SENSOR in the VSA DATA LIST with the HDS.

Is it indicated within ± 1 m/s?

YES—Go to step 8.

NO—Replace the yaw rate-lateral/longitudinal acceleration sensor (see page 19-100). ■

8. Clear the DTC with the HDS.

9. Test-drive the vehicle around a number of corners.

10. Check for DTCs with the HDS.

Is DTC 75 or 76 indicated?

YES—Go to step 11.

NO—Intermittent failure; the most probable cause is the vehicle has been driven on an extremely angled road. The system is OK at this time. ■

11. Turn the ignition switch OFF.
12. Substitute a known-good yaw rate-lateral/longitudinal acceleration sensor (see page 19-100).
13. Turn the ignition switch ON (II).
14. Clear the DTC with the HDS.
15. Test-drive the vehicle around a number of corners.
16. Check for DTCs with the HDS.

Is DTC 75 or 76 indicated?

YES—Replace the VSA modulator-control unit (see page 19-102). ■

NO—Replace the original yaw rate-lateral/longitudinal acceleration sensor (see page 19-100). ■

DTC 81: Central Processing Unit (CPU)

1. Turn the ignition switch ON (II).
2. Clear the DTC with the HDS.
3. Turn the ignition switch OFF, then turn it ON (II) again.
4. Check for DTCs with the HDS.

Is DTC 81 indicated?

YES—Replace the VSA modulator-control unit (see page 19-102). ■

NO—Intermittent failure, the system is OK at this time. Check for loose terminals in the VSA modulator-control unit 46P connector. Check for a loose connection at G303. ■

DTC 84: Steering Angle Sensor No Center Point Writing

1. Turn the ignition switch ON (II).
2. Check for DTCs with the HDS.

Are any DTCs indicated with DTC 84 at the same time?

YES—Troubleshoot any other DTCs, and recheck. ■

NO—Go to step 3.

3. Do the steering angle sensor center point writing with the HDS (see page 19-100).
4. Clear the DTC with the HDS.
5. Turn the ignition switch OFF, then turn it ON (II) again.
6. Check for DTCs with the HDS.

Is DTC 84 indicated?

YES—Replace the steering angle sensor (see page 19-99), then do the steering angle sensor center point writing (see page 19-100). ■

NO—Intermittent failure, the system is OK at this time. Check for loose terminals between the steering angle sensor 5P connector and the VSA modulator-control unit 46P connector. Check for a loose connection at G303. Refer to intermittent failures troubleshooting (see page 19-44). ■

VSA System Components

DTC Troubleshooting (cont'd)

DTC 91: F-CAN Communication

NOTE: Check the PCM for DTCs. If there are DTCs present, troubleshoot them first.

1. Turn the ignition switch ON (II).
2. Clear the DTC with the HDS.
3. Turn the ignition switch OFF, then turn it ON (II) again.
4. Check for DTCs with the HDS.

Is DTC 92 indicated with DTC 91 at the same time?

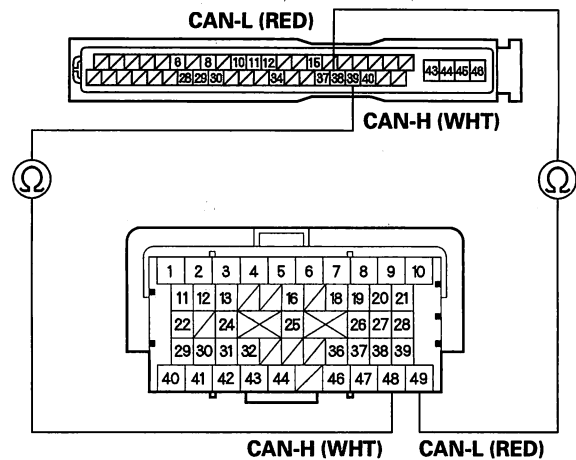
YES—Do the DTC 92 troubleshooting (see page 19-94). ■

NO—If only DTC 91 is indicated, go to step 5. If no DTCs are indicated, intermittent failure, the system is OK at this time. Check for loose terminals between the yaw rate-lateral/longitudinal acceleration sensor 4P connector, the PCM connector A (49P), and the VSA modulator-control unit 46P connector. Check for a loose connection at G303. Refer to intermittent failures troubleshooting (see page 19-44).

5. Turn the ignition switch OFF.
6. Short the SCS line with the HDS.
7. Disconnect the PCM connector A (49P).
8. Disconnect the VSA modulator-control unit 46P connector.

9. Check for continuity between VSA modulator-control unit 46P connector terminal No. 38, and No. 39 and PCM connector A (49P) terminal No. 49, and No. 48 respectively.

VSA MODULATOR-CONTROL UNIT 46P CONNECTOR
Wire side of female terminals



Is there continuity?

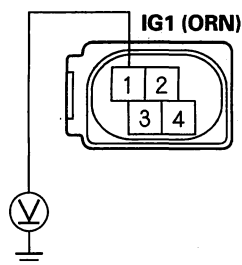
YES—Go to step 10.

NO—Repair open in the wire between the PCM and the VSA modulator-control unit. ■

10. Disconnect the yaw rate-lateral/longitudinal acceleration sensor 4P connector.
11. Turn the ignition switch ON (II).

12. Measure the voltage between yaw rate-lateral/longitudinal acceleration sensor 4P connector terminal No. 1 and body ground.

**YAW RATE-LATERAL/LONGITUDINAL
ACCELERATION SENSOR 4P CONNECTOR**



Wire side of female terminals

Is there battery voltage?

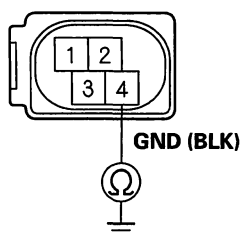
YES—Go to step 13.

NO—Repair open in the wire between the No. 29 (10 A) fuse in the under-dash fuse/relay box and the yaw rate-lateral/longitudinal acceleration sensor. ■

13. Turn the ignition switch OFF.

14. Check for continuity between yaw rate-lateral/longitudinal acceleration sensor 4P connector terminal No. 4 and body ground.

**YAW RATE-LATERAL/LONGITUDINAL
ACCELERATION SENSOR 4P CONNECTOR**



Wire side of female terminals

Is there continuity?

YES—Go to step 15.

NO—Repair open in the wire between the yaw rate-lateral/longitudinal acceleration sensor and body ground (G506). ■

15. Reconnect all connectors.

16. Test-drive the vehicle. Check the YAW RATE S in the VSA DATA LIST with the HDS while driving in corners.

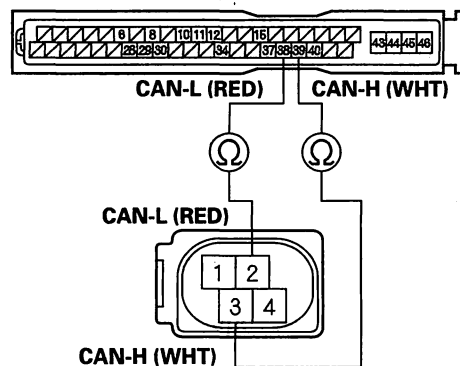
Are there 0 %s indicated?

YES—Go to step 17.

NO—Check the fuel and emissions DTCs (see page 11-3), and troubleshoot the indicated DTC. ■

17. Check for continuity between VSA modulator-control unit 46P connector terminal No. 38, and No. 39 and yaw rate-lateral/longitudinal acceleration sensor 4P connector terminal No. 2, and No. 3 respectively.

VSA MODULATOR-CONTROL UNIT 46P CONNECTOR
Wire side of female terminals



**YAW RATE-LATERAL/LONGITUDINAL
ACCELERATION SENSOR 4P CONNECTOR**
Wire side of female terminals

Is there continuity?

YES—Replace the yaw rate-lateral/longitudinal acceleration sensor (see page 19-100). ■

NO—Repair open in the wire between the yaw rate-lateral/longitudinal acceleration sensor and the VSA modulator-control unit. ■

VSA System Components

DTC Troubleshooting (cont'd)

DTC 92: F-CAN System (Bus-off)

NOTE: Check the PCM for DTCs. If there are DTCs present, troubleshoot them first.

1. Turn the ignition switch ON (II).
2. Clear the DTC with the HDS.
3. Turn the ignition switch OFF, then turn it ON (II) again.
4. Check for DTCs with the HDS.

Is DTC 92 indicated?

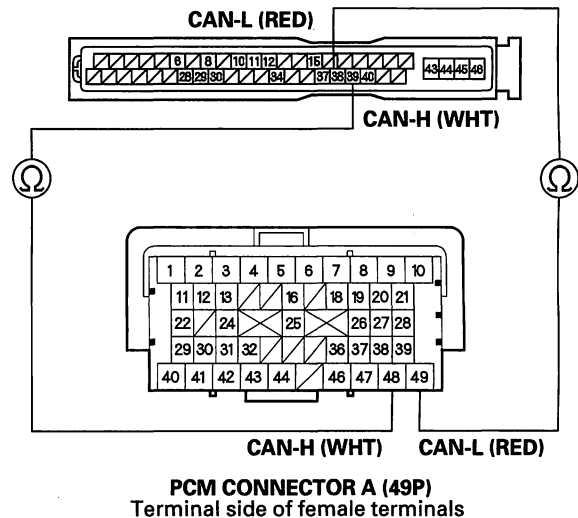
YES—Go to step 5.

NO—Intermittent failure, the system is OK at this time. Check for loose terminals between the PCM connector A (49P), and the VSA modulator-control unit 46P connector. Check for a loose connection at G303. Refer to intermittent failures troubleshooting (see page 19-44). ■

5. Turn the ignition switch OFF.
6. Short the SCS line with the HDS.
7. Disconnect the PCM connector A (44P).
8. Disconnect the VSA modulator-control unit 46P connector.

9. Check for continuity between VSA modulator-control unit 46P connector terminal No. 38, and No. 39 and PCM connector A (49P) terminal No. 49, and No. 48 respectively.

VSA MODULATOR-CONTROL UNIT 46P CONNECTOR
Wire side of female terminals



Is there continuity?

YES—Check for loose terminals in the VSA modulator-control unit 46P connector. Check for a loose connection at G303. If necessary, substitute a known-good VSA modulator-control unit (see page 19-102) and retest. ■

NO—Repair open in the wire between the PCM and the VSA modulator-control unit. ■

DTC 97: VSA System

1. Check the brake system for leaks or mechanical problems.

Is the brake system OK? (No brake fluid leakage, no air trapped in the brake system, no brake pads worn out.)

YES—Go to step 2.

NO—Repair the brake system, then recheck. ■

2. Turn the ignition switch ON (II).
3. Clear the DTC with the HDS.
4. Test-drive the vehicle in a straight line. Accelerate the vehicle up to 6 mph (10 km/h), and stop, then accelerate up to 6 mph (10 km/h).
5. Check for DTCs with the HDS.

Is DTC 97 indicated?

YES—Check for loose terminals in the VSA modulator-control unit 46P connector. Check for a loose connection at G303. If necessary, substitute a known-good VSA modulator-control unit (see page 19-102) and retest. ■

NO—Intermittent failure, the system is OK at this time. Check for loose terminals at the VSA modulator-control unit 46P connector. Check for a loose connection at G303. Refer to intermittent failures troubleshooting (see page 19-44). ■

VSA System Components

Symptom Troubleshooting

VSA activation indicator does not go off, and no DTCs are stored

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

Does VSA activation indicator go off within 2 seconds?

YES—The system is OK at this time. ■

NO—Go to step 2.

2. Turn the ignition switch OFF.
3. Disconnect the VSA OFF switch 5P connector.
4. Check the VSA OFF switch (see page 19-101).

Is the VSA OFF switch OK?

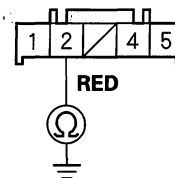
YES—Go to step 5.

NO—Replace the VSA OFF switch (see page 19-101). ■

5. Remove the gauge control module (see page 22-337).
6. Disconnect gauge control module connector B (24P).

7. Check for continuity between VSA OFF switch 5P connector terminal No. 2 and body ground.

VSA OFF SWITCH 5P CONNECTOR



Wire side of female terminals

Is there continuity?

YES—Repair short to body ground between the gauge control module and the VSA OFF switch. ■

NO—Substitute a known-good gauge control module, then go to step 1 and recheck. If it is OK, replace the original gauge control module (see page 22-337). ■

ABS indicator, brake system indicator, and VSA indicator do not go off at the same time

1. Turn the ignition switch OFF.
2. Check the No. 29 (10 A) fuse in the under-dash fuse/relay box.

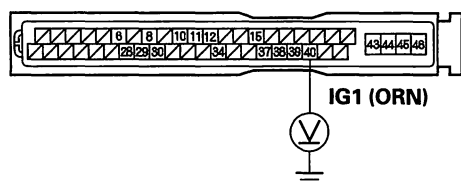
Is the fuse blown?

YES—Install a new No. 29 (10 A) fuse, and recheck. ■

NO—Reinstall the checked fuse, then go to step 3.

3. Disconnect the VSA modulator-control unit 46P connector.
4. Turn the ignition switch ON (II).
5. Measure the voltage between VSA modulator-control unit 46P connector terminal No. 40 and body ground.

VSA MODULATOR-CONTROL UNIT 46P CONNECTOR



Wire side of female terminals

Is there battery voltage?

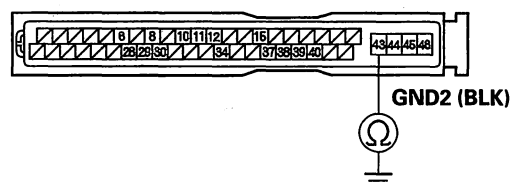
YES—Go to step 6.

NO—Repair open in the wire between the No. 29 (10 A) fuse in the under-dash fuse/relay box and the VSA modulator-control unit. ■

6. Turn the ignition switch OFF.

7. Check for continuity between VSA modulator-control unit 46P connector terminal No. 43 and body ground.

VSA MODULATOR-CONTROL UNIT 46P CONNECTOR



Wire side of female terminals

Is there continuity?

YES—Go to step 8.

NO—Repair open in the wire between the VSA modulator-control unit and body ground (G303). ■

8. Disconnect gauge control module connector A (12P).

(cont'd)

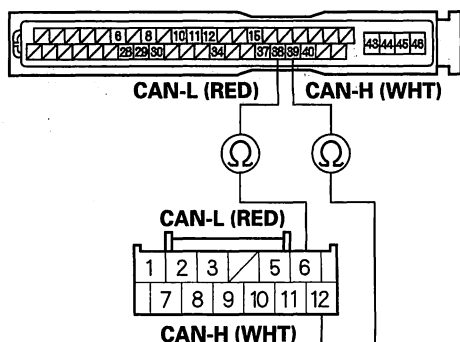
VSA System Components

Symptom Troubleshooting (cont'd)

9. Check for continuity between VSA modulator-control unit 46P connector terminal No. 38, and No. 39 and gauge control module connector A (12P) No. 6, and No. 12 respectively.

VSA MODULATOR-CONTROL UNIT 46P CONNECTOR

Wire side of female terminals



GAUGE CONTROL MODULE CONNECTOR A (12P)

Wire side of female terminals

Is there continuity?

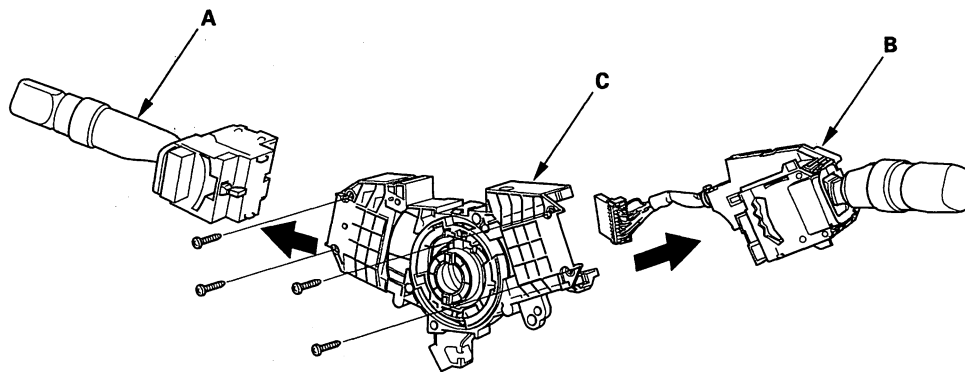
YES—Check for loose terminals in the VSA modulator-control unit 46P connector. Check for a loose connection at G303. If necessary, substitute a known-good VSA modulator-control unit (see page 19-102) and retest. ■

NO—Repair open in the wire between the gauge control module and the VSA modulator-control unit. ■

Steering Angle Sensor Replacement

NOTE: Do not damage or drop the combination switch as the steering angle sensor is sensitive to shock and vibration.

1. Remove the steering wheel (see page 17-22).
2. Remove the steering column covers (see page 20-129) and the cable reel (see page 24-149).
3. Remove the combination switch assembly (see step 9 on page 17-26).
4. Remove the combination light switch (A) and the wiper/washer switch (B).



5. Replace the combination switch body assembly (C).
6. Install the combination switch in the reverse order of removal.

NOTE:

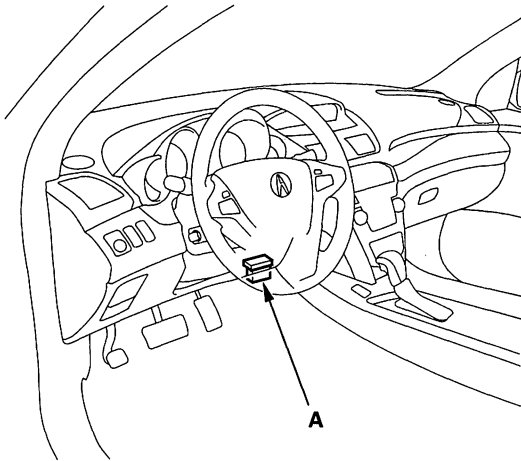
- Do not remove the steering angle sensor from the combination switch body.
- When installing the cable reel, set the turn signal canceling sleeve position (see page 24-150).

VSA System Components

Steering Angle Sensor Center Point Writing

NOTE: Before doing the steering angle sensor center point writing, place the vehicle on a flat level surface, and turn the steering wheel to the straight ahead position while moving the vehicle.

1. With the ignition switch OFF, connect the HDS to the data link connector (DLC) (A) under the driver's side of the dashboard.



2. Turn the ignition switch ON (II).
3. Make sure the HDS communicates with the vehicle and the VSA modulator-control unit. If it doesn't, troubleshoot the DLC circuit (see page 11-223).
4. Do the steering angle sensor center point writing in the VSA ADJUSTMENT menu with the HDS.

NOTE: See the HDS Help menu for specific instructions.

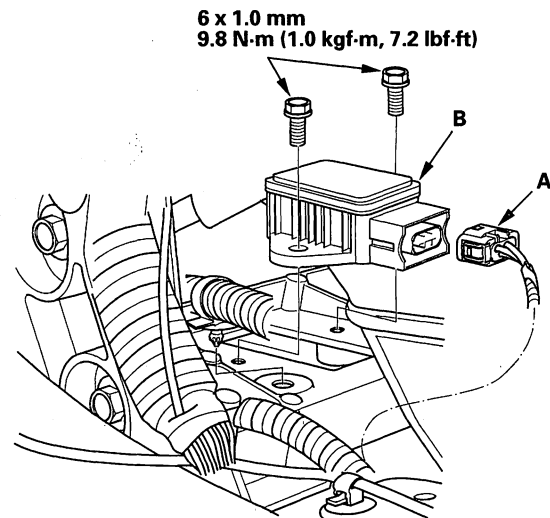
5. Turn the ignition switch OFF.
6. Verify DTC 84 clears and does not return. If DTC 84 is indicated, do the appropriate troubleshooting.

Yaw Rate-Lateral/Longitudinal Acceleration Sensor Replacement

NOTE:

- Do not damage or drop the sensor as it is sensitive.
- Do not use power tools.

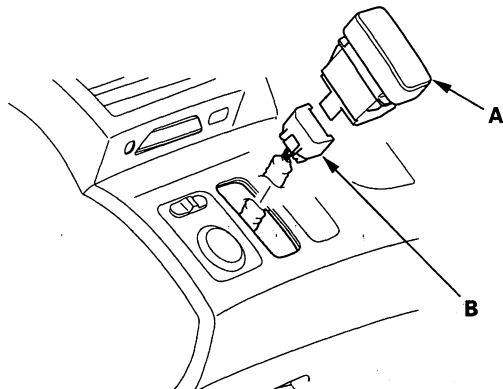
1. Turn the ignition switch OFF.
2. Remove the driver's center console trim (see step 5 on page 20-107).
3. Disconnect the yaw rate-lateral/longitudinal acceleration sensor 4P connector (A).



4. Remove the sensor mounting nuts, and remove the yaw rate-lateral/longitudinal acceleration sensor (B).
5. Install in the reverse order of removal.
6. Do the yaw rate-lateral/longitudinal acceleration neutral position memorization (see page 15-7).

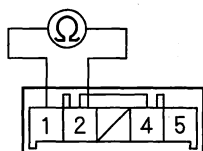
VSA Off Switch Test

1. Remove the driver's dashboard lower cover (see page 20-119).
2. Push out the VSA OFF switch (A) from the back of the instrument panel.



3. Disconnect the VSA OFF switch 5P connector (B).
4. Check for continuity between the VSA OFF switch 5P connector terminal No. 1 and No. 2. There should be continuity when the switch is pressed, and no continuity when the switch is released.

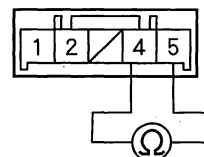
VSA OFF SWITCH 5P CONNECTOR



Terminal side of male terminals

5. Check for continuity between the VSA OFF switch 5P connector terminal No. 4 and No. 5. There should be continuity at all times.

VSA OFF SWITCH 5P CONNECTOR



Terminal side of male terminals

VSA System Components

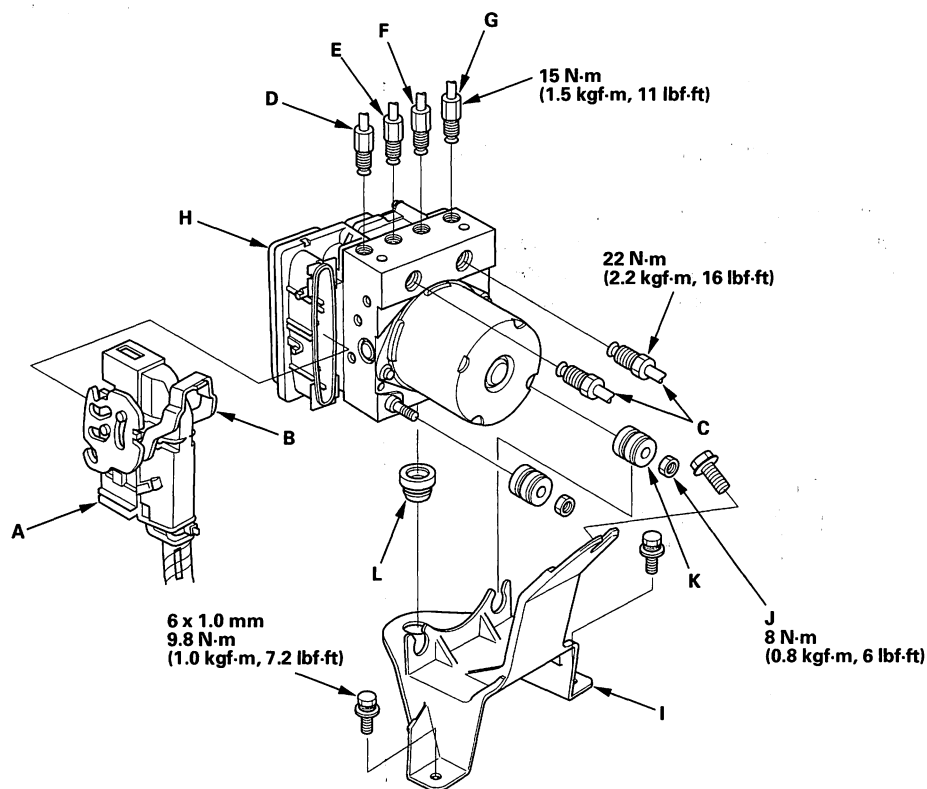
VSA Modulator-Control Unit Removal and Installation

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. Remove the air cleaner box (see page 11-363).
3. Disconnect the VSA modulator-control unit 46P connector (A) by pulling up the lock (B); the connector disconnects itself.



4. Disconnect the six brake lines from the VSA modulator-control unit.

NOTE: Brake lines are connected to the master cylinder (C) and to the right-front (D), the left-rear (E), the right-rear (F), and the left-front (G) brake systems.

5. Remove the VSA modulator-control unit (H) with the bracket (I) from the body.
6. Remove the locknuts (J), then remove the VSA modulator-control unit from the bracket.

NOTE: During installation, install a new bushing (K) and new grommets (L). Otherwise, unwanted noise and vibration may be transmitted to the vehicle.

Installation

1. Install the new bushing and new grommets. (Otherwise, unwanted noise and vibration may be transmitted to the vehicle.)
2. Install the VSA modulator-control unit on the bracket, then install new locknuts.
3. Install the bracket with the VSA modulator-control unit.
4. Reconnect the six brake lines, then tighten the flare nuts with the specified torque.
5. Align the connecting surface of the VSA modulator-control unit 46P connector to the VSA modulator-control unit.
6. Lower the lock of the VSA modulator-control unit 46P connector, then confirm the connector is fully seated.
7. Reinstall the air cleaner box (see page 11-363).
8. Bleed the brake system (see page 19-9).
9. Do the steering angle center point write procedure (see page 19-100).
10. Start the engine, and check that the ABS, the VSA indicators, and the trailer stability assist warning goes off.
11. Test-drive the vehicle, and check that the ABS, the VSA indicators, and the trailer stability assist warning do not come on.

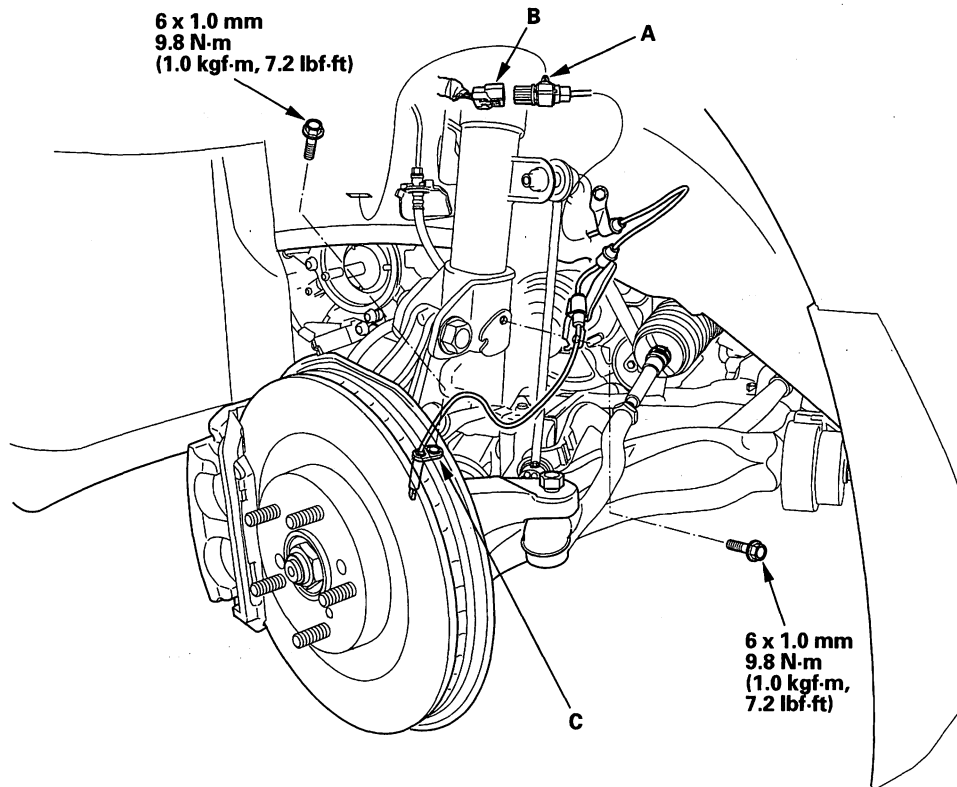
NOTE: If the brake pedal is spongy, there may be air trapped in the modulator which could then be induced into the normal brake system during modulation. Bleed the brake system again (see page 19-9).

VSA System Components

Wheel Sensor Replacement

Front

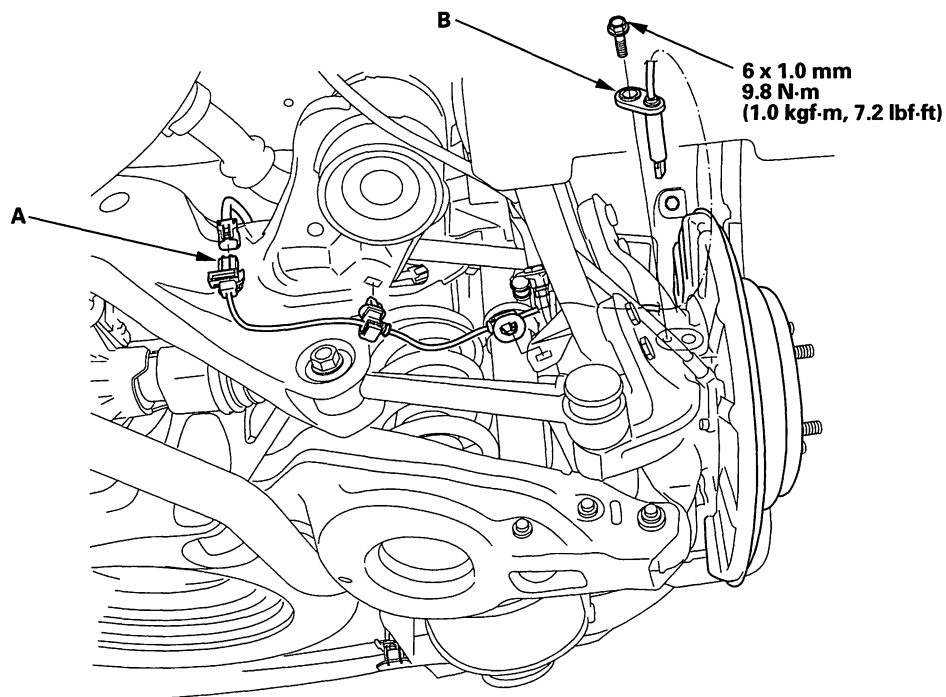
1. Turn the ignition switch OFF.
2. Remove the clip (A), then disconnect the wheel sensor connector (B).



3. Remove the bolts and the wheel sensor (C).
4. Install the wheel sensor in the reverse order of removal, and note these items:
 - Install the sensor carefully to avoid twisting the wires.
 - If the wheel sensor comes in contact with the hub bearing unit, it is faulty.
5. Start the engine, and check that the ABS, the VSA indicators, and the trailer stability assist warning goes off.
6. Test-drive the vehicle, and check that the ABS, the VSA indicators, and the trailer stability assist warning do not come on.

Rear

1. Turn the ignition switch OFF.
2. Disconnect the wheel sensor connector (A).



3. Remove the clips, the bolt, and the wheel sensor (B).
4. Install the wheel sensor in the reverse order of removal, and note these items:
 - Install the sensor carefully to avoid twisting the wires.
 - If the wheel sensor comes in contact with the hub bearing unit, it is faulty.
5. Start the engine, and check that the ABS, the VSA indicators, and the trailer stability assist warning goes off.
6. Test-drive the vehicle, and check that the ABS, the VSA indicators, and the trailer stability assist warning do not come on.

BACK

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

The Acura MDX SRS includes a driver's airbag in the steering wheel hub, a passenger's airbag in the dashboard above the glove box, seat belt tensioners in the front seat belt retractors, side curtain airbags in the sides of the roof, and side airbags in the front seat-backs. Information necessary to safely service the SRS is included in this Service Manual. Items marked with an asterisk (*) on the contents page include or are located near SRS components. Servicing, disassembling, or replacing these items requires special precautions and tools, and should be done only by an authorized Acura dealer.

- To avoid rendering the SRS inoperative, which could lead to personal injury or death in the event of a severe frontal or side collision, all SRS service work should be done by an authorized Acura dealer.
- Improper service procedures, including incorrect removal and installation of the SRS, could lead to personal injury caused by unintentional deployment of the airbags and/or side airbags.
- Do not bump or impact the SRS unit, front impact sensors, side impact sensors, or roll rate sensor when the ignition switch is ON (II), or for at least 3 minutes after the ignition switch is turned OFF; otherwise, the system may fail in a collision, or the airbags may deploy.
- SRS electrical connectors are identified by yellow color coding. Related components are located in the steering column, front console, dashboard, dashboard lower panel, in the dashboard above the glove box, in the front seats, in the roof side, and around the floor. Do not use electrical test equipment on these circuits.

