

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

The Acura TL 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 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, side airbags, and/or side curtain airbags.
- Do not bump or impact the SRS unit, front impact sensors, side impact sensors, or rear safing sensor, especially when the ignition switch is in ON (II)/the ON mode, for at least 3 minutes after the ignition switch is turned to LOCK (0), or after the engine start/stop button is pressed to select the OFF mode; 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, center console, dashboard, dashboard undercover, 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.

Brakes

Conventional Brake Components19-1

VSA System Components19-45



Brakes

Conventional Brake Components

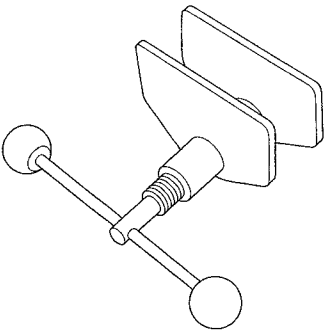
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Conventional Brake Components

Special Tools

Ref.No.	Tool Number	Description	Qty
①	07AAE-SEPA101	Brake Caliper Piston Compressor	1

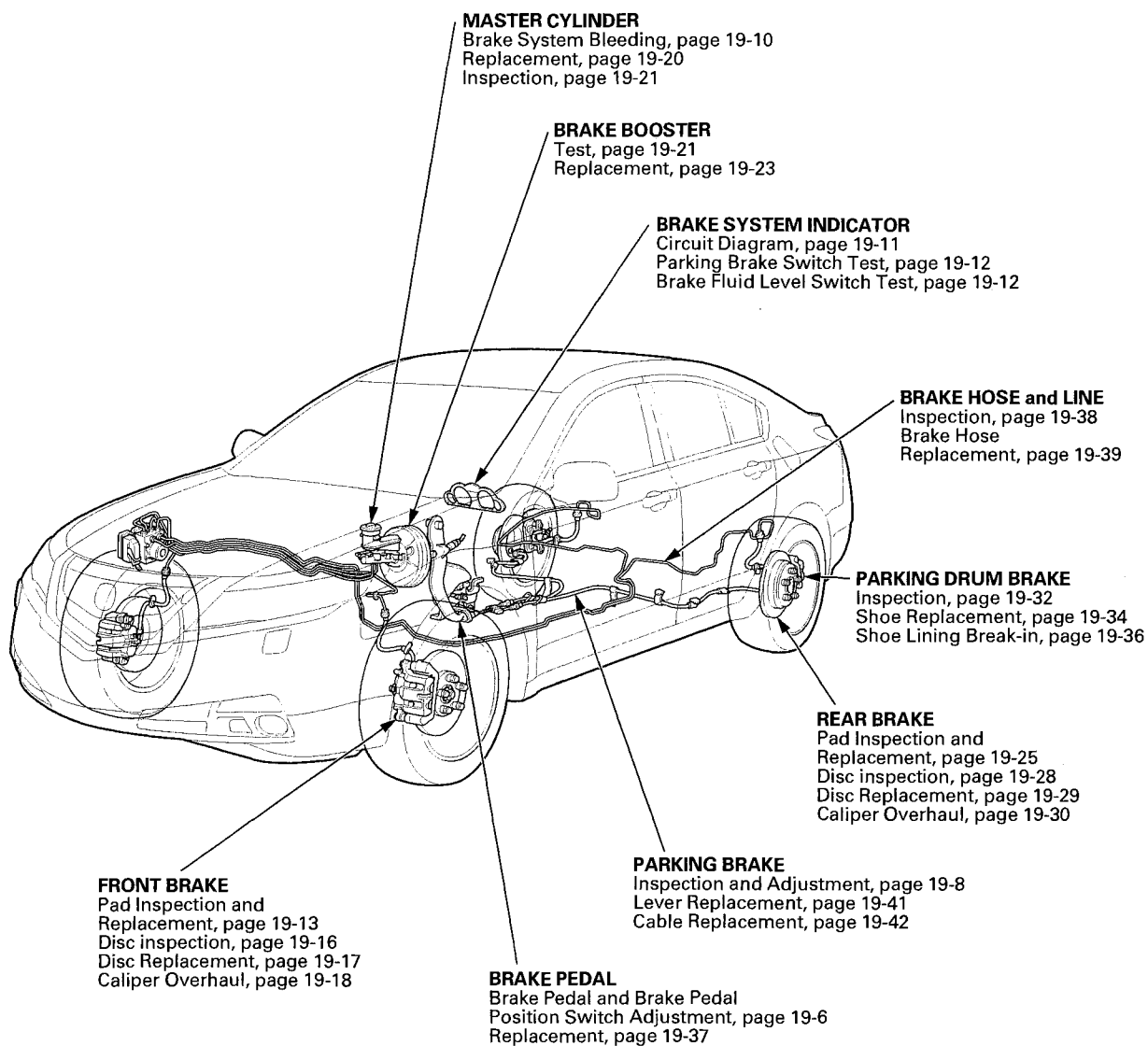


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Component Location Index



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 seal 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. 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 neutral (M/T) or P or N (A/T), 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 (0.39 in) or less, the master cylinder is OK.
 - If the measurement increases more than 10 mm (0.39 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. 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 brake pad wear, and possibly uneven tire wear. For proper caliper pin location (see page 19-18).

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 and support the vehicle (see page 1-10), 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 pad wear, high pedal, or vehicle vibration. ■

3. Turn the ignition switch to LOCK (0), or press the engine start/stop button to select the OFF mode (see page 22-512), 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 19-23). ■

4. Without removing the brake lines, unbolt and separate the master cylinder from the brake 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, then replace all rubber parts in the brake system that were exposed to contaminated fluid. If the brake fluid is OK, replace the master cylinder (see page 19-20). ■

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, then replace all rubber parts in the brake system that were exposed to 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 19-120). ■

Conventional Brake Components

Brake Pedal and Brake Pedal Position Switch Adjustment

Pedal Height

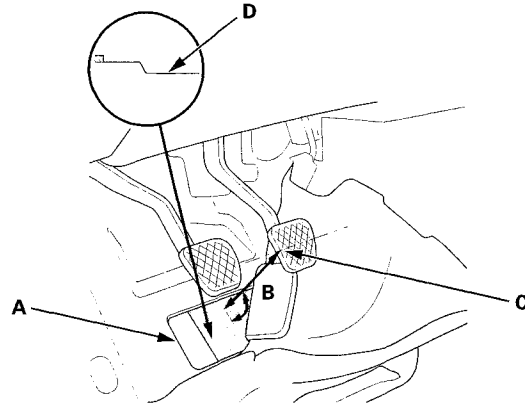
1. Remove the driver's dashboard undercover (see page 20-118).
2. Turn the brake pedal position switch 45° counterclockwise, and pull it back until it is no longer touching the brake pedal.
3. Remove the driver's side kick panel (see step 3 on page 20-81).
4. Remove the footrest (see step 4 on page 20-105).
5. Remove the steering joint cover (see step 6 on page 17-9).
6. Pull back the carpet, and find the cutout (A) in the insulation. Measure the pedal height (B) from the left side middle of the pedal pad (C) to the floor (D) without the insulation.

Standard pedal height (with carpet removed):

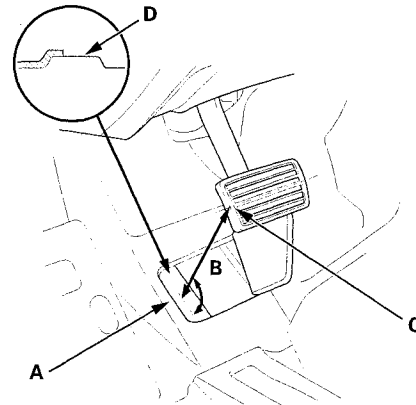
M/T: 156 mm (6.14 in)

A/T: 155 mm (6.10 in)

M/T

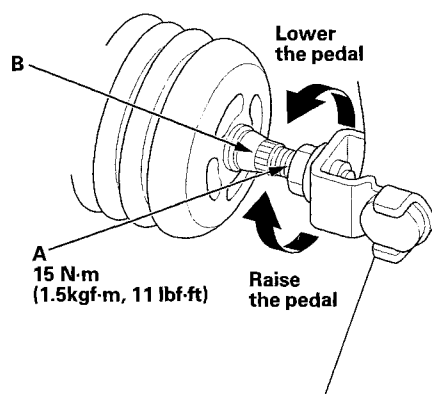


A/T



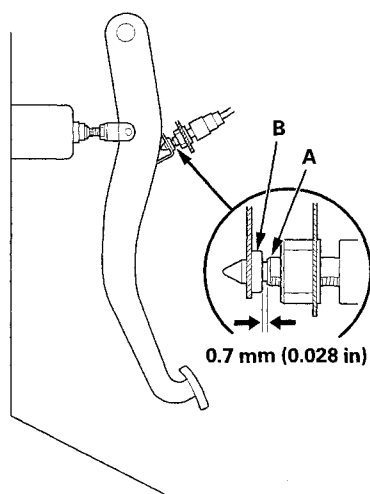


7. Loosen the pushrod locknut (A), and screw the pushrod (B) in or out with pliers until the standard pedal height from the floor is reached. After adjustment, tighten the locknut firmly. Do not adjust the pedal height with the pushrod pressed.



Brake Pedal Position Switch Adjustment

8. 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). 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.

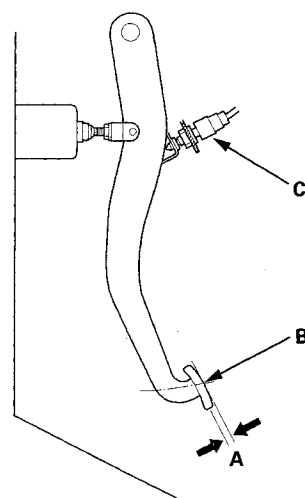


9. Install all removed parts in the reverse order of removal.
10. Check the brake pedal free play.

Pedal Free Play

1. With the ignition switch in LOCK (0), or press the engine start/stop button to select the OFF mode, inspect the free play (A) at 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 (0.04–0.20 in)



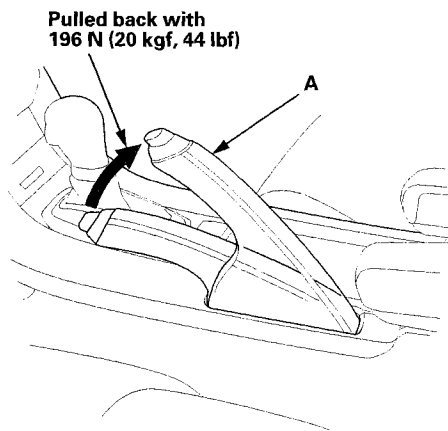
Conventional Brake Components

Parking Brake Inspection and Adjustment

Inspection

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

Lever locked clicks: 6 to 8 clicks



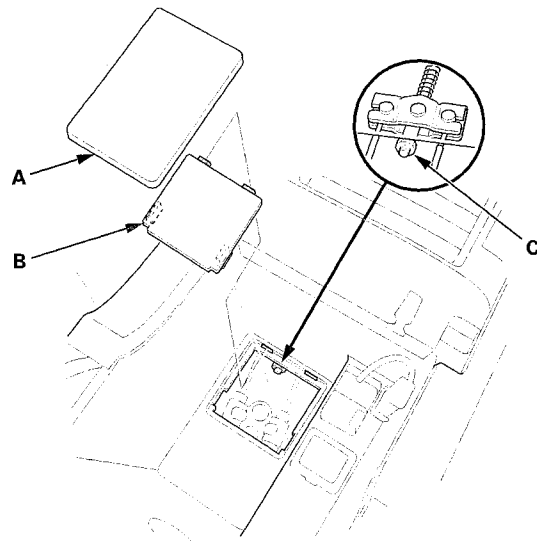
2. If the number of lever clicks is not as specified, adjust the parking brake.

NOTE: Minor parking brake lever adjustments (1 to 2 clicks) can be made with the adjusting nut (see parking brake minor adjustment). 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). After installing new parking brake shoes and/or new brake disc/drum, make sure you drive the vehicle for "break-in" (see page 19-36).

Minor Adjustment

1. Raise and support the vehicle (see page 1-10).
2. Release the parking brake lever fully.
3. Remove the console box mat (A), then remove the lid (B).

NOTE: It is easier to use packing tape to remove the console box mat.



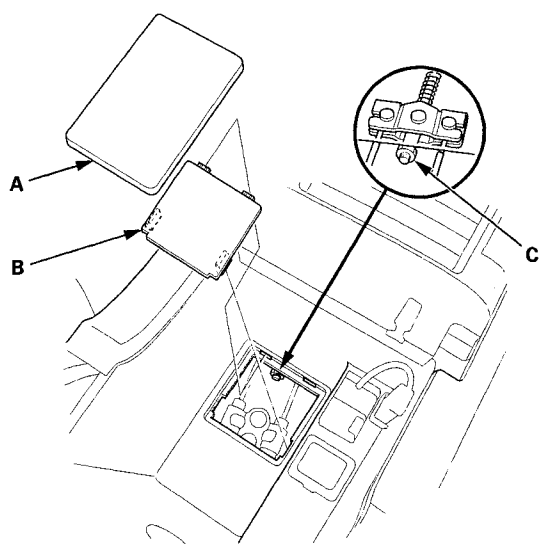
4. Pull the parking brake lever 1 click.
5. Tighten the parking brake adjusting nut (C) until the parking brakes drag slightly when the rear wheels are turned.
6. Release the parking brake lever fully, and check that the parking brakes do not drag when the rear wheels are turned. Readjust if necessary.
7. Make sure the parking brake lever is within the specified number of clicks (6 to 8 clicks).
8. Install the lid, then install the console box mat.



Major Adjustment (to be done when replacing parking brake shoes)

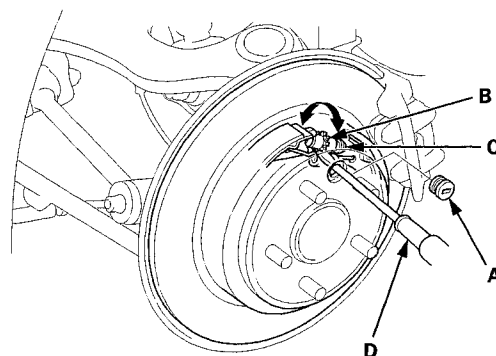
1. Raise and support the vehicle (see page 1-10).
2. Release the parking brake lever fully.
3. Remove the console box mat (A), then remove the lid (B).

NOTE: It is easier to use packing tape to remove the console box mat.



4. Loosen the parking brake adjusting nut (C).
5. Remove the rear wheels.

6. Remove the access plug (A).



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

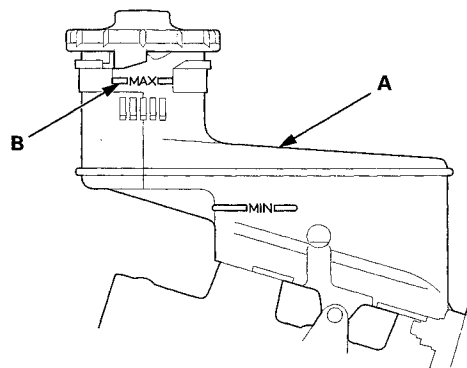
Conventional Brake Components

Brake System Bleeding

NOTE:

- Do not reuse the drained fluid. Use only new 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.
- Make sure no dirt or other foreign matter gets in 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 wheel location. Add fluid as required.

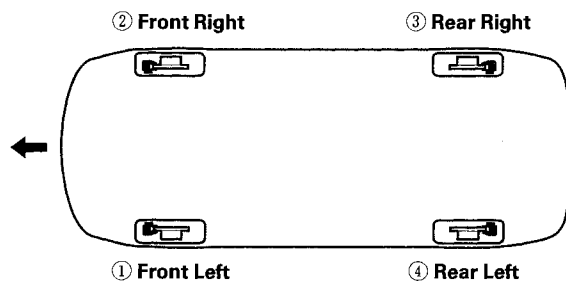
1. Make sure the brake fluid level in the reservoir (A) is at the MAX (upper) level line (B).



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.

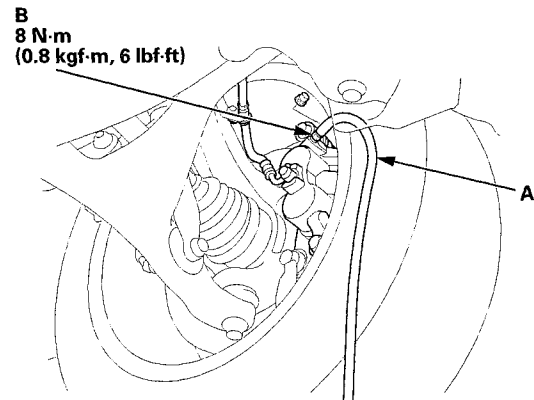
NOTE: Bleed the calipers in the sequence shown.

BLEEDING SEQUENCE:

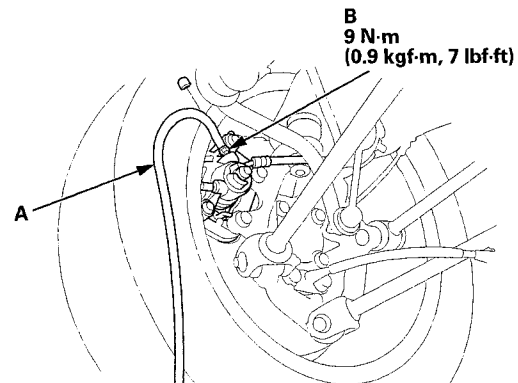


4. Attach a length of clear drain tube (A) to the bleed screw (B), then loosen the bleed screw to allow air to escape from the system. Then tighten the bleed screw securely.

Front



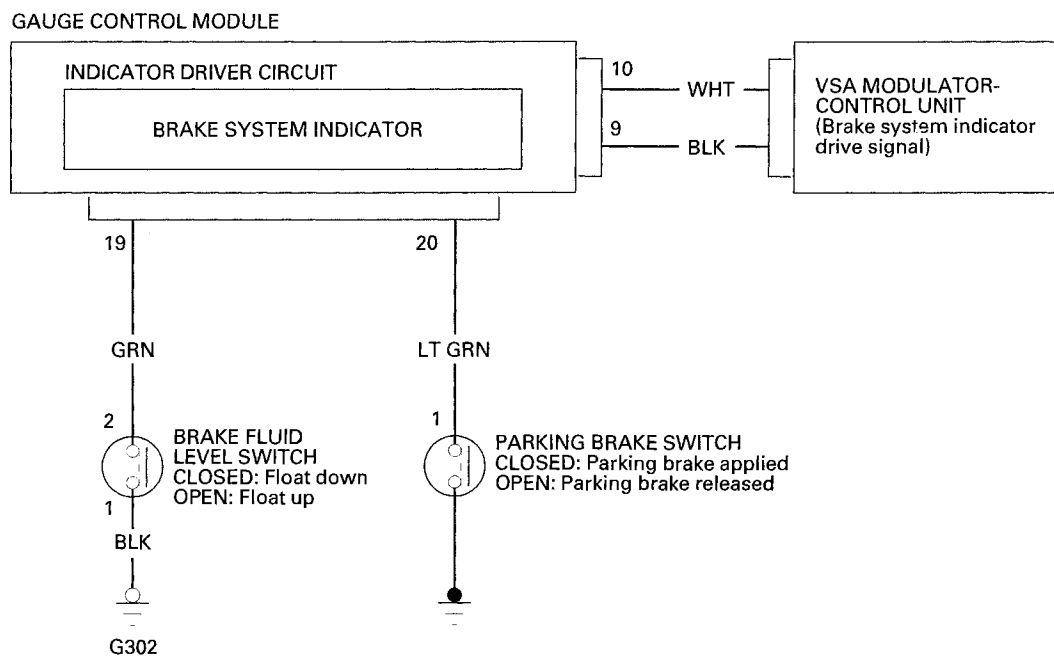
Rear



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.



Brake System Indicator Circuit Diagram

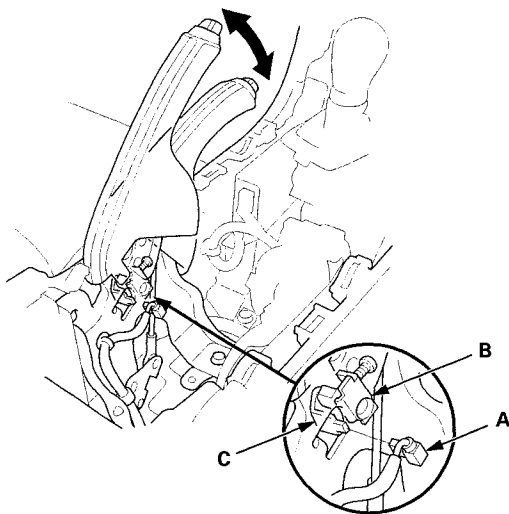


Conventional Brake Components

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 for DTC's first (see page 19-48).

1. Remove the center console panel (see page 20-108).
2. Disconnect the parking brake switch connector (A) from the parking brake switch (B).



3. Check for continuity between the switch terminal (C) and body ground.
 - With the parking brake lever pulled, there should be continuity.
 - With the parking brake lever released, there should be no continuity.

NOTE: If the parking brake switch and the brake fluid level switch are OK, but the brake system indicator does not function, do the gauge control module self-diagnostic function (see page 22-342).

4. Reconnect the parking brake switch connector.
5. Install the center console panel (see page 20-108).

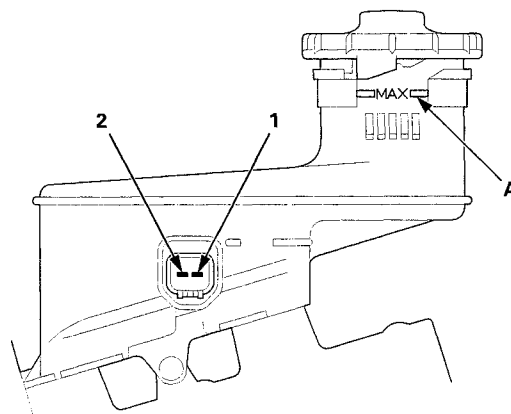
Brake Fluid Level Switch Test

NOTE: If both the ABS/VSA indicator and the brake system indicator come on at the same time, check the VSA system for DTC's first (see page 19-48).

1. Disconnect the brake fluid level switch connector.
2. 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 the parking brake switch and brake fluid level switch are OK, but the brake system indicator does not function, do the gauge control module self-diagnostic function (see page 22-342).



3. Reconnect the brake fluid level switch connector.



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.

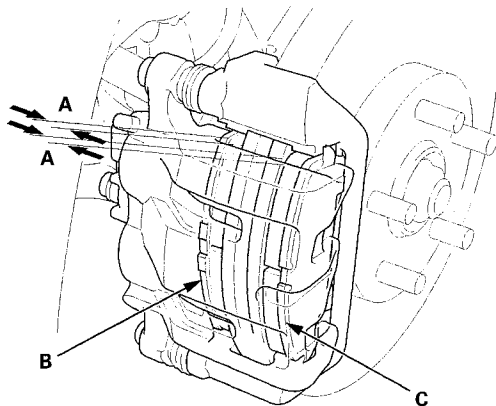
Inspection

1. Raise and support the vehicle (see page 1-10).
2. Remove the front wheels.
3. Check the thickness (A) of the inner pad (B) and the outer pad (C). Do not include the thickness of the backing plate.

Brake pad thickness:

Standard: 11.5–12.2 mm (0.45–0.48 in)

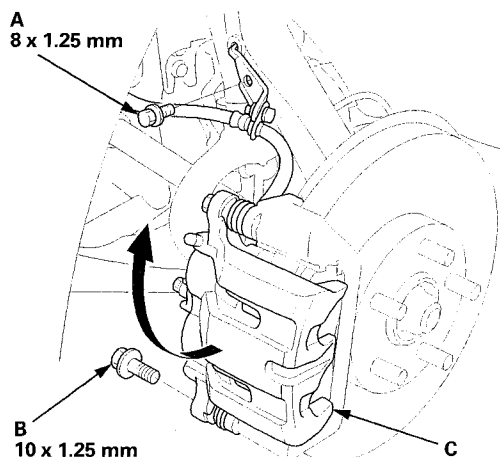
Service limit: 1.6 mm (0.06 in)



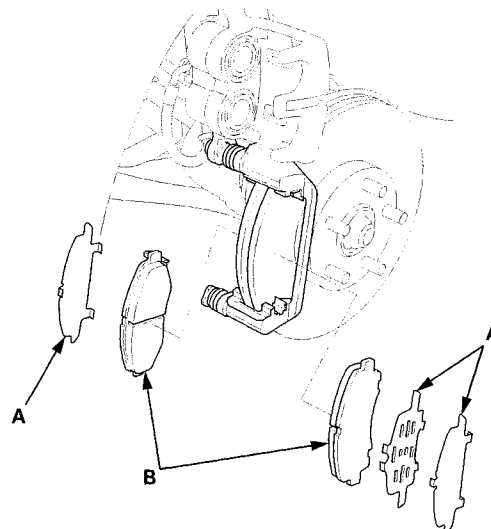
4. If any part of the brake pad thickness is less than the service limit, replace all of the front brake pads as a set.
5. Clean the mating surface between the brake disc and the inside of the wheel, then install the front wheels.

Replacement

1. Remove some brake fluid from the master cylinder.
2. Raise and support the vehicle (see page 1-10).
3. Remove the front wheels.
4. Remove the brake hose mounting bolt (A).



5. Remove the flange bolt (B), and pivot the caliper (C) up out of the way. Check the hose and the pin boots for damage and deterioration.
6. Remove the pad shims (A) and the brake pads (B).

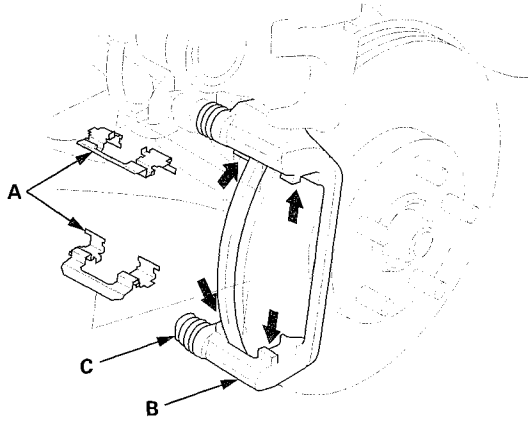


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Conventional Brake Components

Front Brake Pad Inspection and Replacement (cont'd)

7. Remove the pad retainers (A).



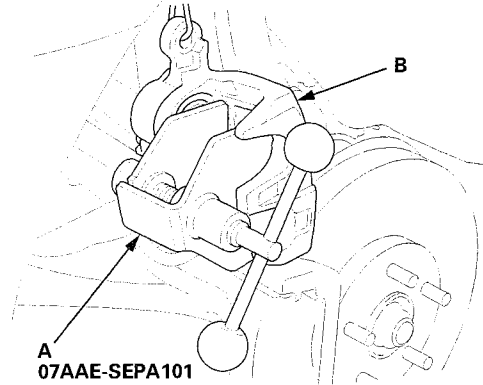
8. Clean the caliper bracket (B) thoroughly; remove any rust, and check for grooves and cracks. Verify that the caliper pins (C) move in and out smoothly. Clean and lube if needed.

9. Inspect the brake disc for runout, thickness, parallelism (see page 19-16), and check for damage and cracks.

10. Apply a thin coat of M-77 assembly paste (P/N 08798-9010) to the retainer mating surface of the caliper bracket (indicated by the arrows).

11. Install the pad retainers. Wipe excess assembly paste off the retainers. Keep any assembly paste off the brake disc and the brake pads.

12. Install the brake caliper piston compressor tool (A) on the caliper body (B).



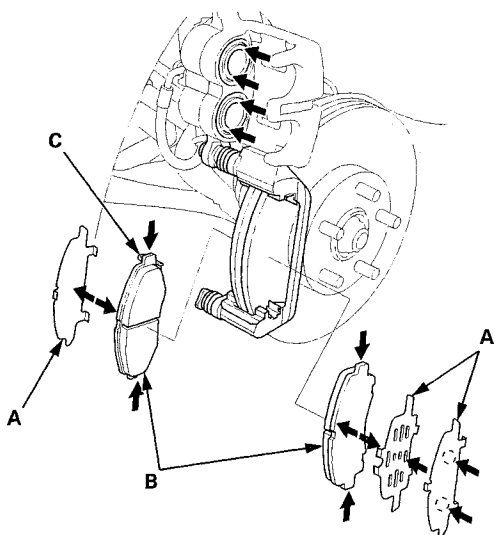
13. Press in the piston with the brake caliper piston compressor tool so the caliper will fit over the brake pads. Make sure the piston boot is in position to prevent damaging it when pivoting the caliper down.

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.

14. Remove the brake caliper piston compressor tool.

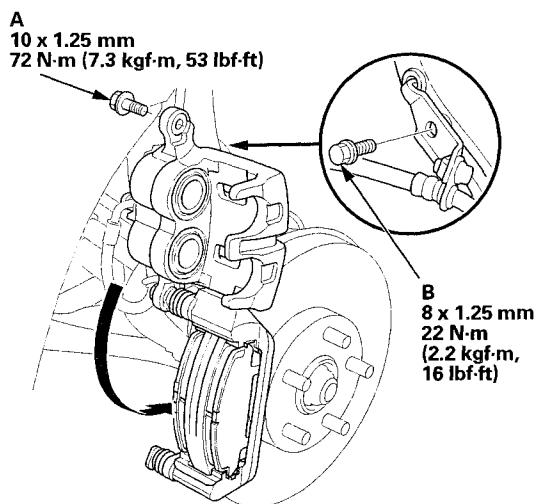


15. Apply a thin coat of M-77 assembly paste (P/N 08798-9010) to the pad side of the shims (A), the back of the brake pads (B) and the other areas indicated by the arrows. Wipe excess assembly paste off the pad shims and the brake pads friction material. Keep grease and assembly paste off the brake disc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



16. 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 temporary loss of braking efficiency.

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



18. Install the brake hose mounting bolt (B).
19. Clean the mating surface between the brake disc and the inside of the wheel, then install the front wheels.
20. 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.

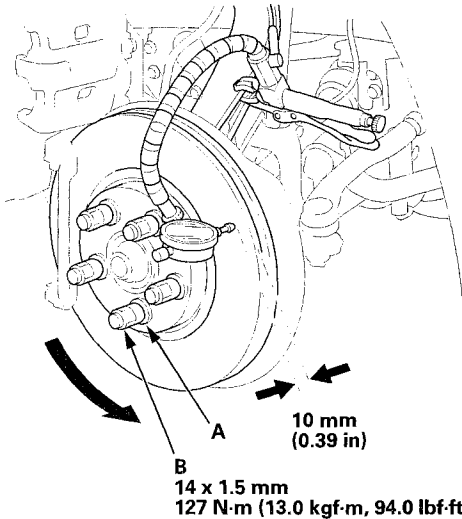
21. Add brake fluid as needed.
22. After installation, check for leaks at hose and line joints or connections, and retighten if necessary. Test-drive the vehicle, then check for leaks (see page 19-38).

Conventional Brake Components

Front Brake Disc Inspection

Runout

1. Raise and support the vehicle (see page 1-10).
2. Remove the front wheels.
3. Remove the brake pads (see page 19-13).
4. Inspect the brake disc to wheel surface for damage and cracks. Clean the brake disc thoroughly, and remove all rust.
5. Install suitable flat washers (A) and the 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 (0.39 in) from the outer edge of the brake disc.

Brake disc runout:

Service limit: 0.04 mm (0.002 in)

7. If the brake disc is beyond the service limit, refinish the brake disc with a Honda-approved commercially available on-car brake lathe.

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 19-17).
- If the brake disc is replaced with a new one, check the new disc for runout. If the new disc is out of specification, refinish the disc.

8. Install the brake pads (see page 19-13).
9. Clean the mating surfaces between the brake disc and the inside of the wheel, then install the front wheels.

Thickness and Parallelism

1. Raise and support the vehicle (see page 1-10).
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 (0.39 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.

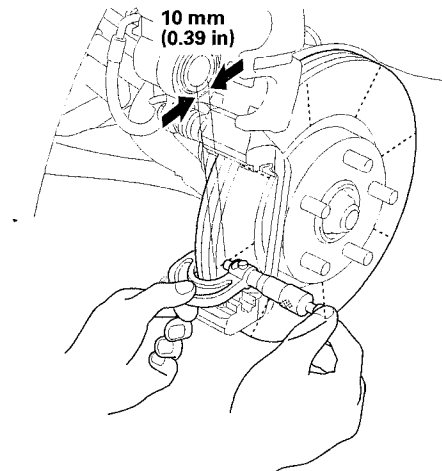
Brake disc thickness:

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 a Honda-approved commercially available on-car brake lathe.

NOTE: If the brake disc is beyond the service limit for refinishing, replace it (see page 19-17).

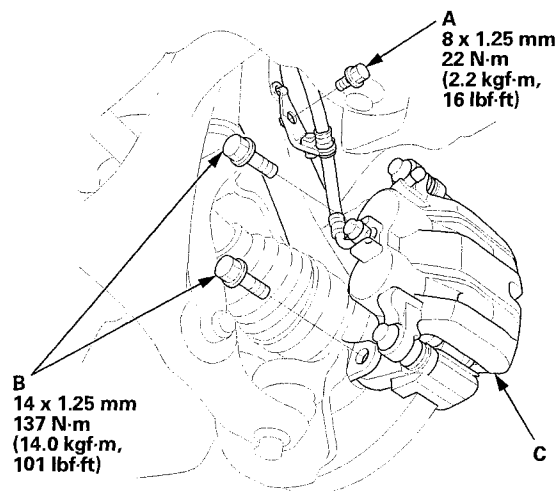
6. Install the brake pads (see page 19-13).
7. Clean the mating surfaces between the brake disc and the inside of the wheel, then install the front wheels.



Front Brake Disc Replacement

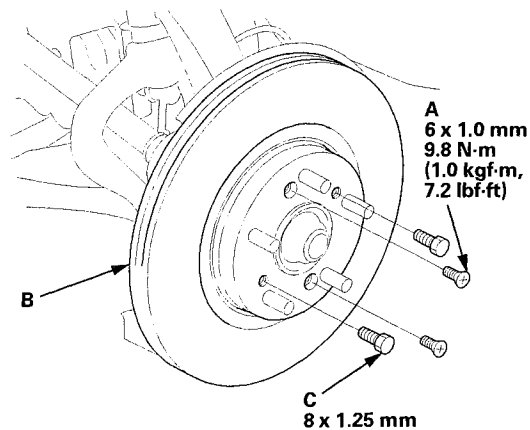
NOTE: Keep any grease off the brake disc and the brake pads.

1. Raise and support the vehicle (see page 1-10).
2. Remove the front wheel.
3. Remove the brake hose mounting bolt (A).



4. Remove the brake caliper bracket mounting bolts (B), then remove the caliper assembly (C) from the knuckle. To prevent damage to the caliper assembly or brake hose, use a short piece of wire to hang the caliper assembly from the undercarriage. Do not twist the brake hose excessively.

5. Remove the brake disc flathead screws (A).



6. Remove the brake disc (B) from the front hub.

NOTE: If the brake disc is stuck to the front hub, thread two 8 x 1.25 mm bolts (C) into the brake disc to push it away from the front hub. Turn each bolt 90 degrees at a time to prevent the brake disc from binding.

7. Install the brake disc in the reverse order of removal.

NOTE: Before installing the brake disc, clean the mating surfaces between the front hub and the inside of the brake disc.

8. Inspect the brake disc runout (see page 19-16).
9. Clean the mating surfaces between the brake disc and the inside of the wheel, then install the front wheel.

Conventional Brake Components

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.

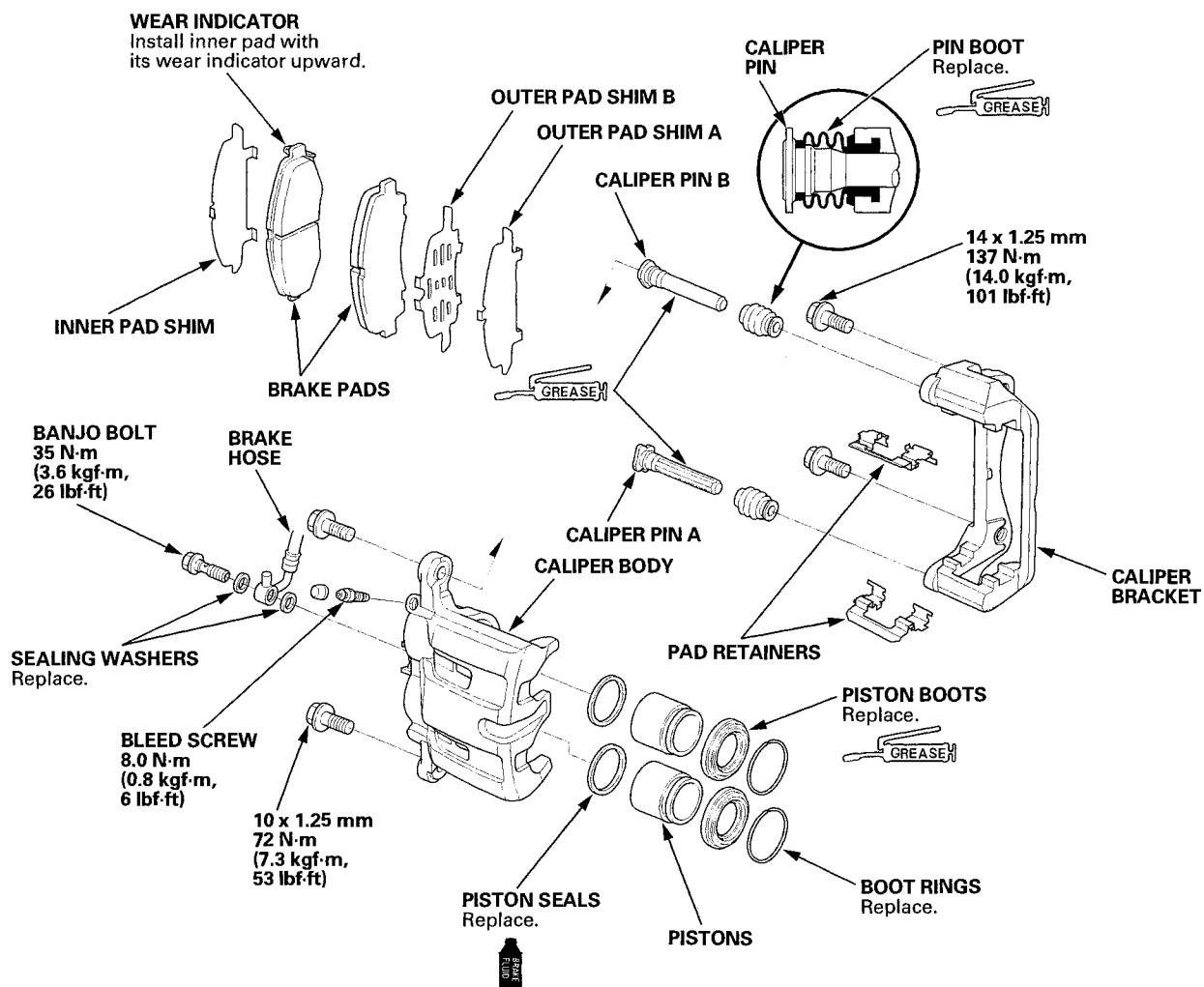
Remove, disassemble, inspect, reassemble, and install the caliper, and note these items:

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 brake 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 clean 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 the 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 new 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.
- Coat the pistons, the piston seal grooves, and the caliper bores with clean brake fluid.
- Use recommended greases in the front caliper set.
- After installing the caliper, check the brake hose and line for leaks, interference, and twisting.



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



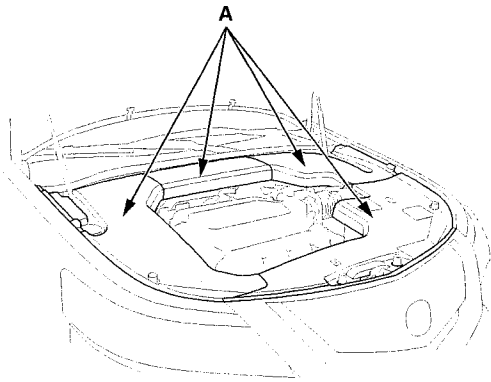
Conventional Brake Components

Master Cylinder Replacement

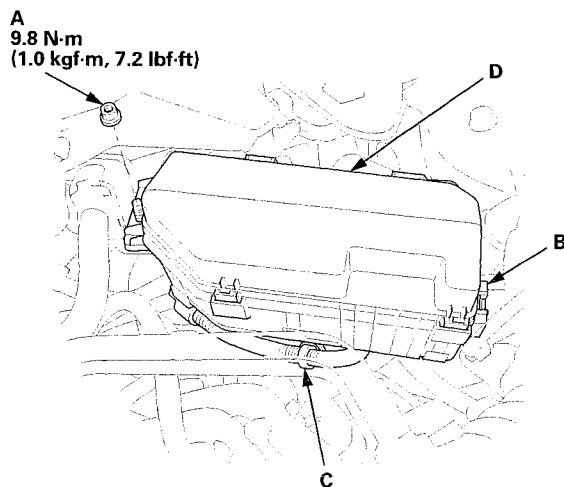
NOTICE

- 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 bend the brake lines during removal and installation.
- After removal, plug the ends of the hoses and the joints to prevent spilling brake fluid.

1. Remove the engine compartment covers (A) in the engine compartment (see page 20-186).

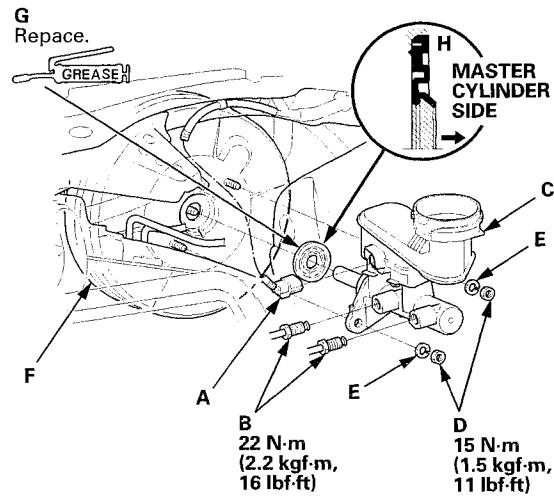


2. Remove the strut brace (see page 20-210).
3. Remove the under-hood fuse/relay box mount nut (A) and release the clip (B).



4. Remove the harness clamp (C), then move the under-hood fuse/relay box (D) aside.
5. Remove the reservoir cap and the brake fluid from the master cylinder reservoir with a syringe.

6. Disconnect the brake fluid level switch connector (A).



7. Disconnect the brake lines (B) from the master cylinder (C). To prevent spills, cover the hose joints with clean rags or shop towels.

8. Remove the master cylinder mounting nuts (D) and the washers (E).

9. Remove the master cylinder from the brake booster (F). Be careful not to bend or damage the brake lines when removing the master cylinder.

10. Remove the rod seal (G) from the master cylinder.

NOTE: During installation, set a new rod seal onto the master cylinder with its grooved side (H) toward the master cylinder.

11. Install the master cylinder with a new rod seal in the reverse order of removal, and note these items:
 - Coat the inner bore lip and the outer circumference of the new rod seal with the Shin-Etsu silicone grease (P/N 08798-9013).
 - Make sure not to get any silicone grease on the terminal part of the connectors and switches, especially if you have silicone grease on your hands or gloves.
 - Check the brake pedal height and free play after installing the master cylinder, and adjust it if necessary (see page 19-6).

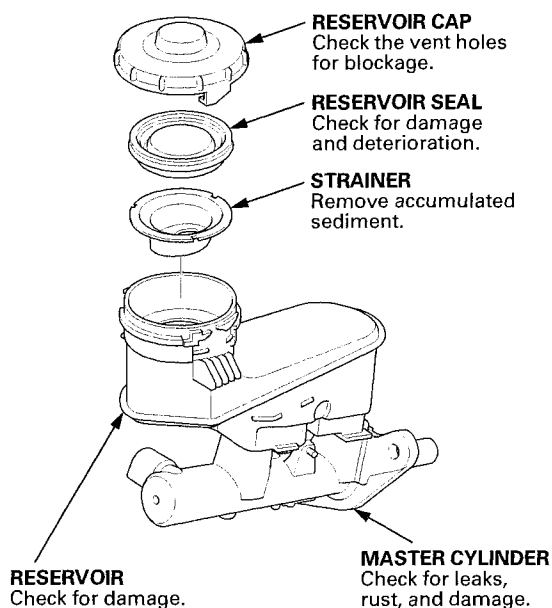
12. Bleed the brake system (see page 19-10).

13. Spin the wheels to check for brake drag.



Master Cylinder Inspection

1. Remove the master cylinder (see page 19-20).
2. 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.



3. Install the master cylinder (see page 19-20).

Brake Booster Test

Functional Test

1. With the ignition switch in LOCK (0), or press the engine start/stop button to select the OFF mode, 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 19-38).
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

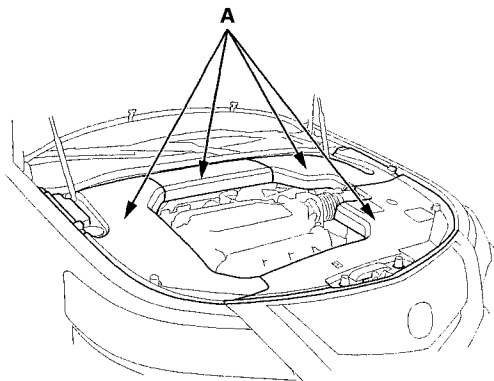
1. Press the brake pedal with the engine running, then turn the ignition switch to LOCK (0), or press the engine start/stop button to select the OFF mode. The brake pedal height should not vary while pressed for 30 seconds.
 - If the pedal height rises, go to step 7.
 - If it does not rise, go to step 2.
2. Start the engine and let it idle for 30 seconds. Turn the ignition switch to LOCK (0), or press the engine start/stop button to select the OFF mode, 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 it rises, the booster is OK.
 - If it does not rise, go to step 4.

(cont'd)

Conventional Brake Components

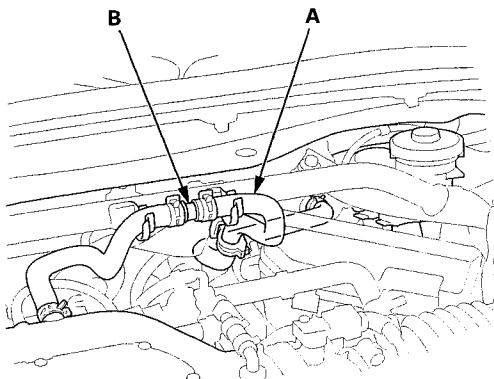
Brake Booster Test (cont'd)

3. Remove the engine compartment covers (A) in the engine compartment (see page 20-186).



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

NOTE: If the check valve is faulty, replace the brake booster vacuum hose/check valve as an assembly.



5. 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 the check valve, and retest.
- If vacuum is found, go to step 6.

6. With the ignition switch in LOCK (0), or press the engine start/stop button to select the OFF mode, reconnect the vacuum hose to the brake booster.

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

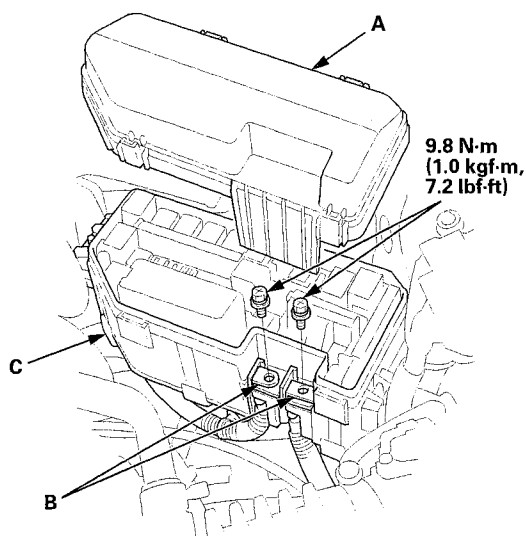
8. Turn the ignition switch to LOCK (0), or press the engine start/stop button to select the OFF mode, and wait 30 seconds. Press the brake pedal several times using normal pressure. When the pedal is first pressed, it should be low. On consecutive applications, the pedal height should gradually rise.

- If the pedal position does not vary, inspect the seal between the master cylinder and the booster. If the seal is OK, replace the brake booster.
- If the pedal position varies, replace the brake booster vacuum hose/check valve as an assembly.



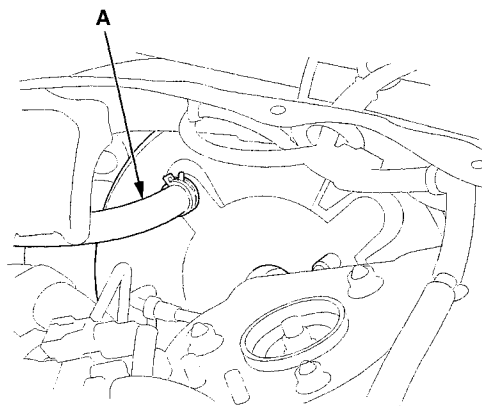
Brake Booster Replacement

1. Do the battery terminal disconnection procedure (see page 22-86).
2. Remove the master cylinder (see page 19-20).
3. Remove the cowl cover (see page 20-189).
4. Remove the upper cover (A), then remove the two positive (+) terminals (B).

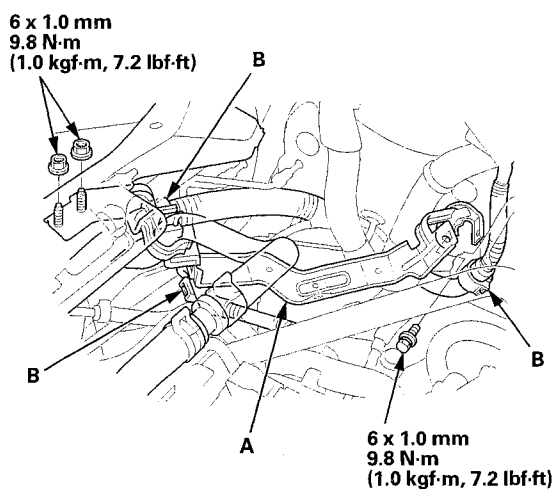


5. Move the under-hood fuse/relay box (C) aside.

6. Disconnect the brake booster vacuum hose (A) from the brake booster.



7. Remove the under-hood fuse/relay box bracket (A), then remove the engine wire harness clamps (B).

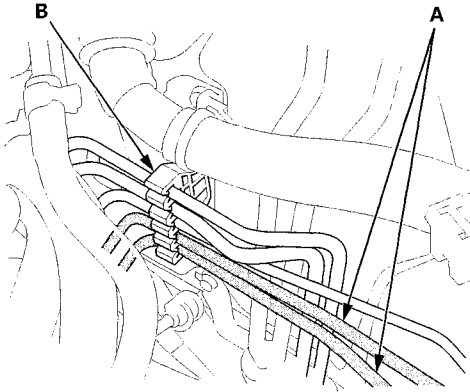


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Conventional Brake Components

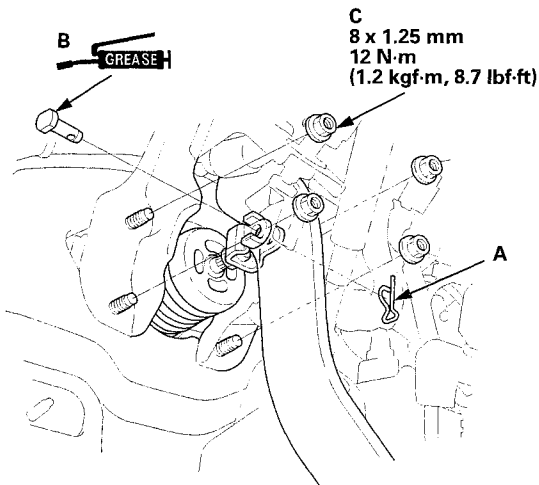
Brake Booster Replacement (cont'd)

8. Remove the brake lines (A) from the hose clamp (B).



9. Remove the driver's dashboard undercover (see page 20-118).

10. Remove the lock pin (A) and the clevis pin (B), then disconnect the yoke from the brake pedal.



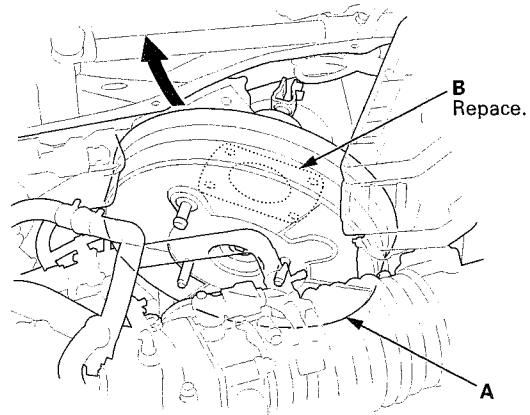
11. Remove the brake booster mounting nuts (C).

12. Remove the brake booster (A) from the engine compartment.

NOTICE

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

NOTE: Use the new brake booster gasket (B) during reassembly.



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

- Install the master cylinder after installing the brake booster (see page 19-20).
- 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 19-10).

14. Do the battery terminal reconnection procedure (see page 22-86).



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.

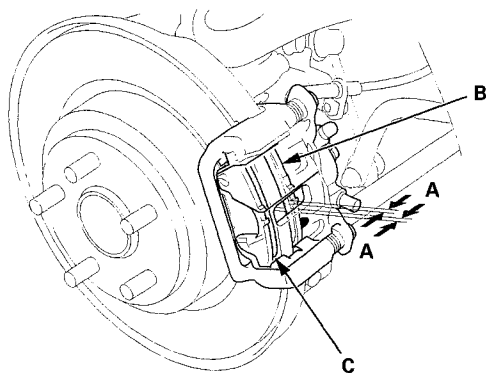
Inspection

1. Raise and support the vehicle (see page 1-10).
2. Remove the rear wheels.
3. Check the thickness (A) of the inner pad (B) and the 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)

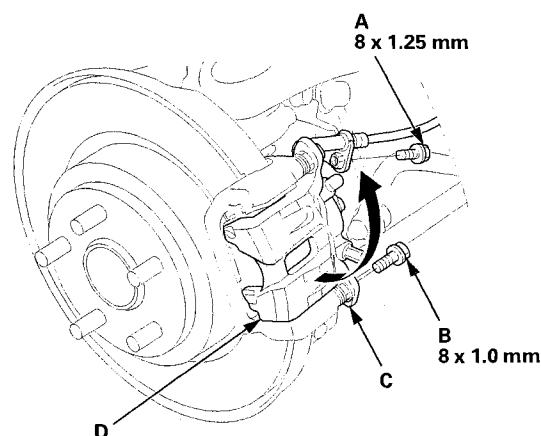
Service limit: 1.6 mm (0.06 in)



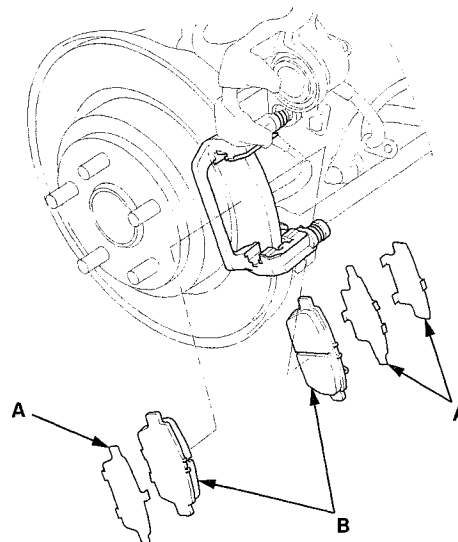
4. If any part of the brake pad thickness is less than the service limit, replace the rear brake pads as a set.
5. Clean the mating surfaces between the brake disc/drum and the inside of the wheel, then install the rear wheels.

Replacement

1. Remove some brake fluid from the master cylinder.
2. Raise and support the vehicle (see page 1-10).
3. Remove the rear wheels.
4. Remove the brake hose mounting bolt (A).



5. Remove the flange bolt (B) while holding the caliper pin (C) with a wrench. Be careful not to damage the pin boot, and pivot the caliper (D) up out of the way. Check the hose and the pin boots for damage and deterioration.
6. Remove the pad shims (A) and the brake pads (B).



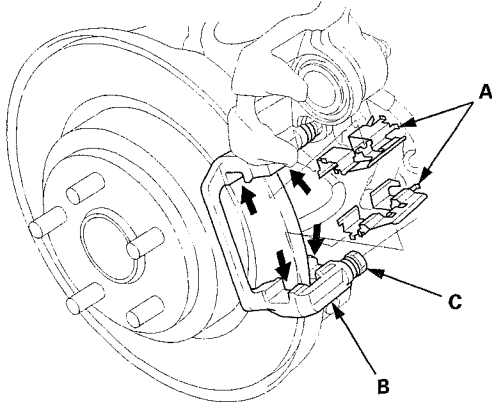
(cont'd)

Conventional Brake Components

Rear Brake Pad Inspection and Replacement (cont'd)

7. Remove the upper and lower pad retainers (A).

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



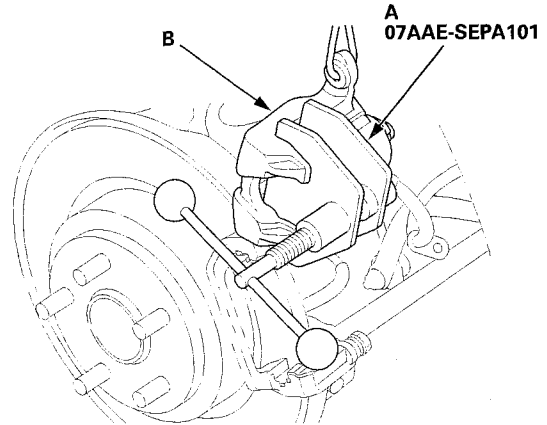
8. Clean the caliper bracket (B) thoroughly; remove any rust, and check for grooves and cracks. Verify that the caliper pins (C) move in and out smoothly. Clean and lube if needed.

9. Inspect the brake disc/drum for runout, thickness, parallelism (see page 19-28), and check for damage and cracks.

10. Apply a thin coat of M-77 assembly paste (P/N 08798-9010) to the retainer mating surface of the caliper bracket (indicated by the arrows).

11. Install the upper and lower pad retainers. Wipe excess assembly paste off the retainers. Keep the assembly paste off the brake disc/drum and the brake pads.

12. Install the brake caliper piston compressor tool (A) on the caliper body (B).



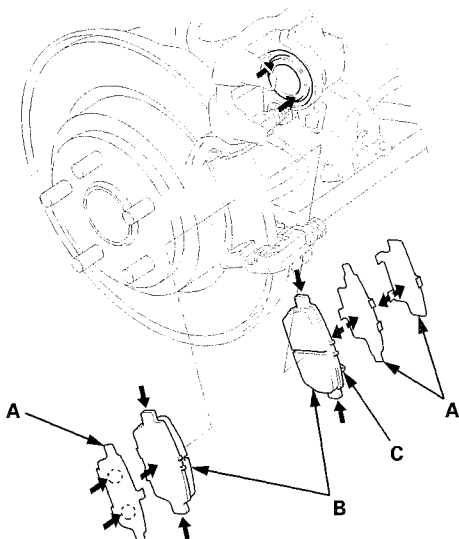
13. Press in the piston with the brake caliper piston compressor tool so the caliper will fit over the brake pads. Make sure the piston boot is in position to prevent damaging it when pivoting the caliper down.

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.

14. Remove the brake caliper piston compressor tool.

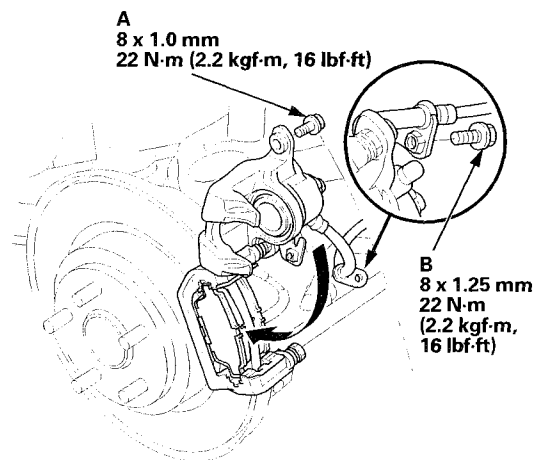


15. Apply a thin coat of M-77 assembly paste (P/N 08798-9010) to the pad side of the shims (A), the back of the brake pads (B), and the other areas indicated by the arrows. Wipe excess assembly paste off the pad shims and the brake pads friction material. Keep grease and assembly paste off the brake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



16. 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 temporary loss of braking efficiency.

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



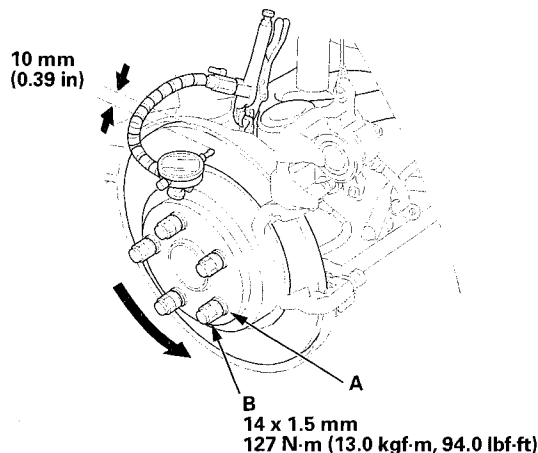
18. Install the brake hose mounting bolt (B).
19. Clean the mating surfaces between the brake disc/drum and the inside of the wheel, then install the rear wheels.
20. Press the brake pedal several times to make sure the brakes work.
- NOTE: Engagement may require a greater pedal stroke immediately after the brake pads have been replaced as a set. Several applications of the brake pedal will restore the normal pedal stroke.
21. Add brake fluid as needed.
22. After installation, check for leaks at hose and line joints or connections, and retighten if necessary. Test-drive the vehicle, then recheck for leaks (see page 19-38).

Conventional Brake Components

Rear Brake Disc Inspection

Runout

1. Raise and support the vehicle (see page 1-10).
2. Remove the rear wheels.
3. Remove the brake pads (see page 19-25).
4. Inspect the brake disc/drum to wheel surface for damage and cracks. Clean the brake disc/drum thoroughly, and remove all rust.
5. Install suitable flat washers (A) and the 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 (0.39 in) from the outer edge of the brake disc/drum.

Brake disc/drum runout:

Service limit: 0.04 mm (0.002 in)

7. If the brake disc/drum is beyond the service limit, refinish the brake disc/drum with a Honda-approved commercially available on-car brake lathe.

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 19-29).
- If the brake disc/drum is replaced with a new one, check the new disc/drum for runout. If the new disc/drum is out of specification, refinish the disc/drum.

8. Install the brake pads (see page 19-25).
9. Clean the mating surfaces between the brake disc/drum and the inside of the wheel, then install the rear wheels.

Thickness and Parallelism

1. Raise and support the vehicle (see page 1-10).
2. Remove the rear wheels.
3. Remove the brake pads (see page 19-25).
4. Using a micrometer, measure the brake disc/drum thickness at eight points, about 45 ° apart and 10 mm (0.39 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.

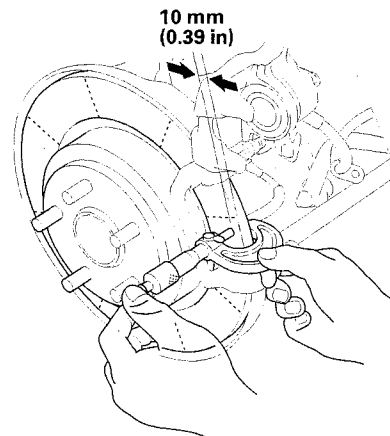
Brake disc/drum thickness:

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 a Honda-approved commercially available on-car brake lathe.

NOTE: If the brake disc/drum is beyond the service limit for refinishing, replace it (see page 19-29).

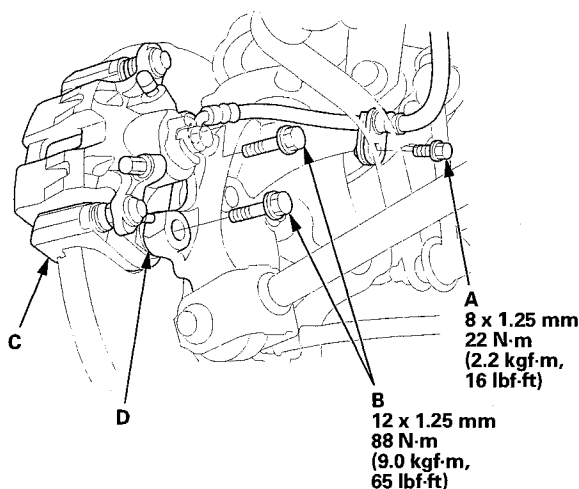
6. Install the brake pads (see page 19-25).
7. Clean the mating surfaces between the brake disc/drum and the inside of the wheel, then install the rear wheels.



Rear Brake Disc Replacement

NOTE: Keep any grease off the brake disc/drum and the brake pads.

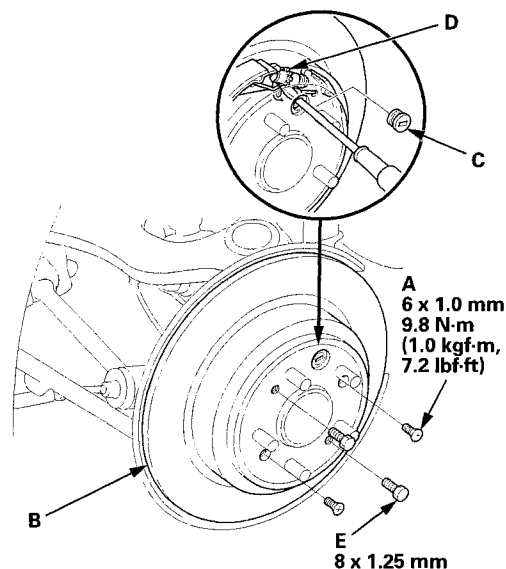
1. Raise and support the vehicle (see page 1-10).
2. Remove the rear wheel.
3. Release the parking brake lever fully.
4. Remove the brake hose mounting bolt (A).



5. Remove the brake caliper bracket mounting bolts (B), then remove the caliper assembly (C) from the knuckle. To prevent damage to the caliper assembly or brake hose, use a short piece of wire to hang the caliper assembly from the undercarriage. Do not twist the brake hose excessively.

NOTE: Make sure the washers (D) are in position on reassembly, if they are removed (see page 18-39).

6. Remove the brake disc/drum flathead screws (A).



7. Remove the brake disc/drum (B) from the hub bearing unit.

NOTE:

- Remove the access plug (C), then if necessary, turn the adjuster nut (D) with a flat-tip screwdriver until the shoes become loose.
- If the brake disc/drum is stuck to the hub bearing unit, thread two 8 x 1.25 mm bolts (E) into the brake disc/drum to push it away from the hub bearing unit. Turn each bolt 90 degrees at a time to prevent the brake disc/drum from binding.

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

- Before installing the brake disc/drum, clean the mating surfaces between the hub bearing unit and the inside of the brake disc/drum.
- Adjust the parking brake (see page 19-8).

9. Inspect the brake disc runout (see page 19-28).

10. Clean the mating surfaces between the brake disc/drum and the inside of the wheel, then install the rear wheel.

Conventional Brake Components

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.

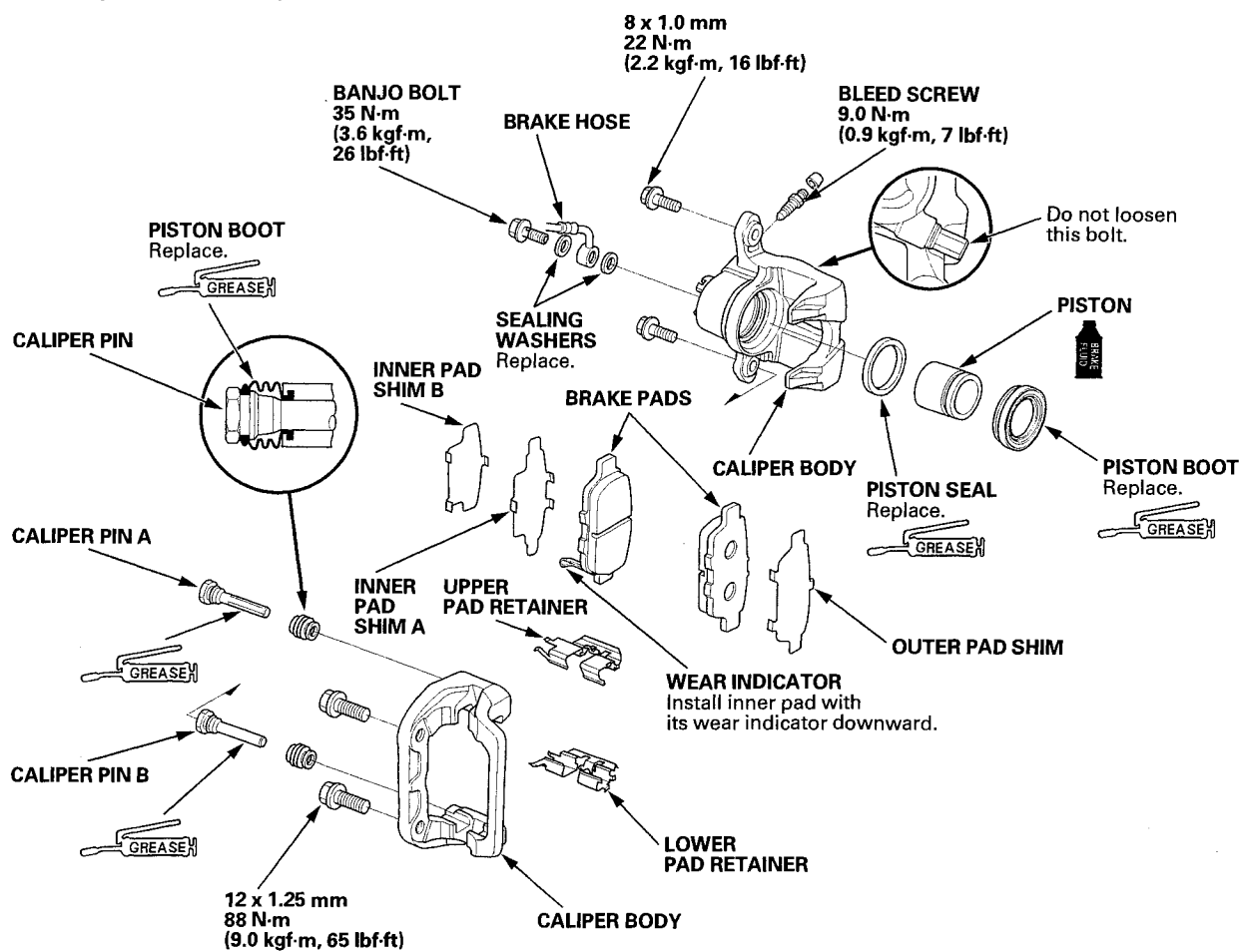
Remove, disassemble, inspect, reassemble, and install the caliper, and note these items:

NOTE: Make sure that the caliper pins are installed correctly. Upper caliper pin A and lower caliper pin B are different. If these caliper pins are installed in the wrong location, it will cause vibration, uneven or rapid brake 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 clean 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 the 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 new 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.
- Coat the piston, the piston seal groove, and the caliper bore with clean brake fluid.
- Use recommended greases in the rear caliper set.
- After installing the caliper, check the brake hose and line for leaks, interference, and twisting.



 : Honda silicone grease (P/N 08C30-B0234M)



Conventional Brake Components

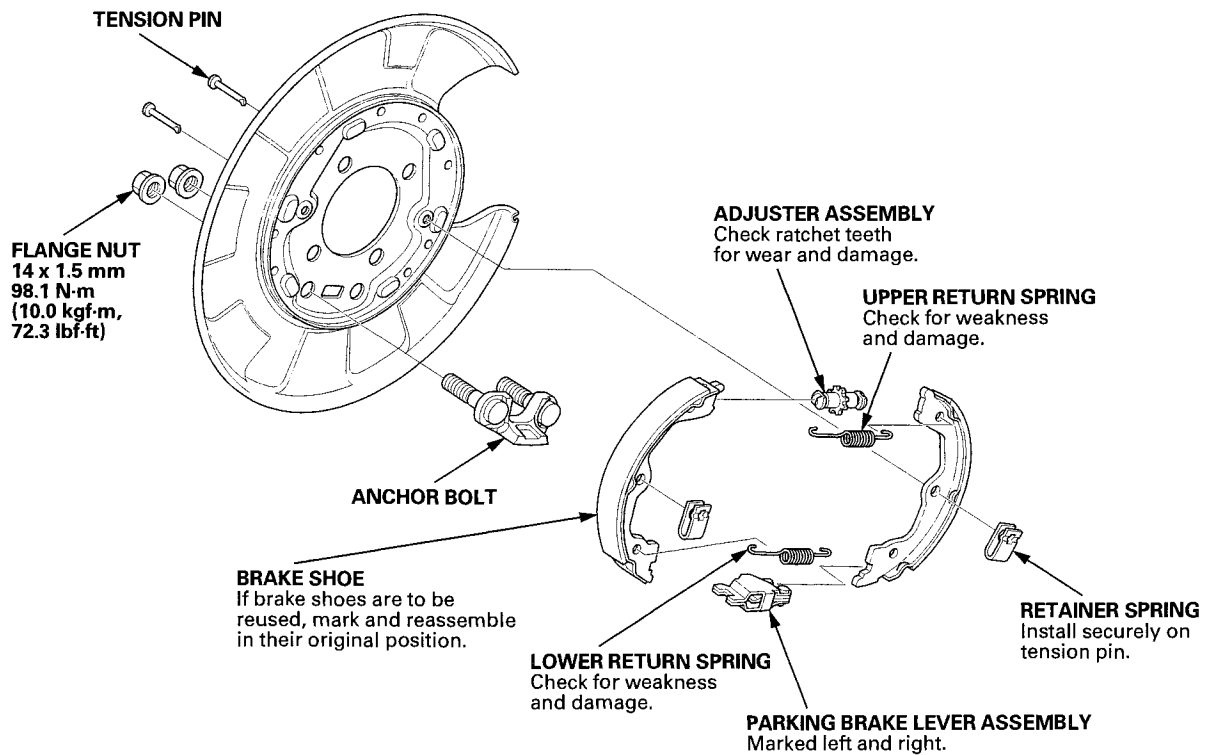
Parking Brake Inspection

⚠ CAUTION

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

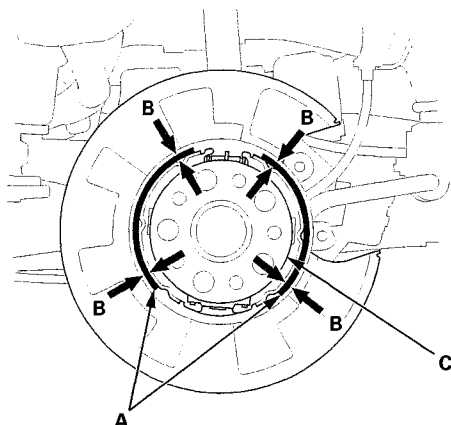
- Avoid breathing dust particles.
- Never use an air hose or brush to clean brake assemblies. Use an OSHA-approved vacuum cleaner.

1. Raise and support the vehicle (see page 1-10).
2. Remove the rear wheels.
3. Release the parking brake, and remove the rear brake disc/drum (see page 19-29).





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: 3.4 mm (0.13 in)

Service limit: 1.0 mm (0.04 in)

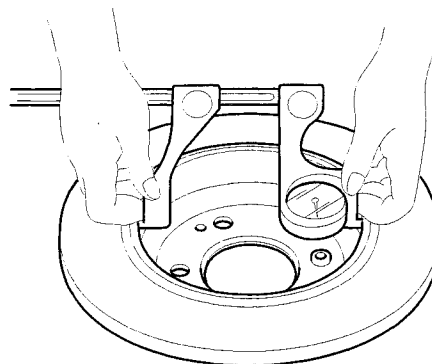
6. If any part of the parking brake lining thickness is less than the service limit, replace all the parking brake shoes as a set (see page 19-34).
7. Check the hub (C) for smooth operation. If it requires servicing, replace the hub bearing unit (see page 18-39).

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

Parking brake drum inside diameter:

Standard: 189.9–190.0 mm (7.476–7.480 in)

Service limit: 191.0mm (7.520 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. Install the brake disc/drum and the rear brake caliper (see page 19-29).
12. Do the major parking brake adjustment (see page 19-9).
13. Clean the mating surface between the brake disc/drum and the inside of the wheel, then install the rear wheels.

Conventional Brake Components

Parking Brake Shoe Replacement

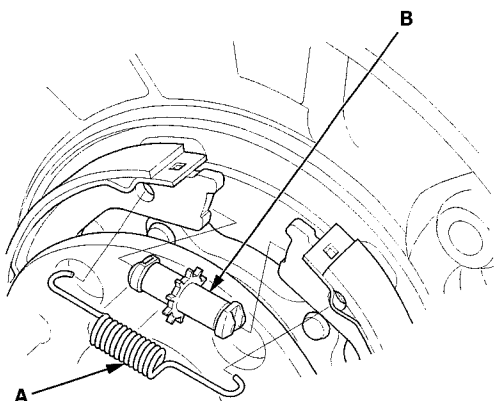
⚠ CAUTION

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

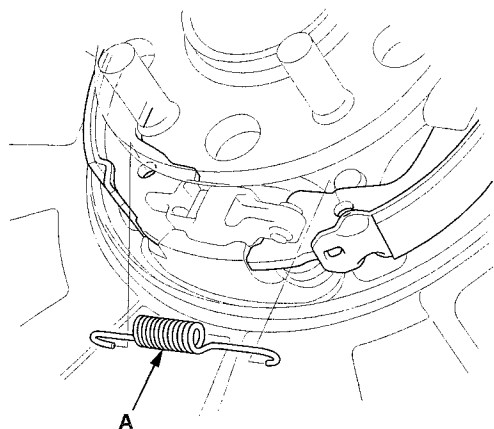
- Avoid breathing dust particles.
- Never use an air hose or brush to clean brake assemblies. Use an OSHA-approved vacuum cleaner.

Disassembly

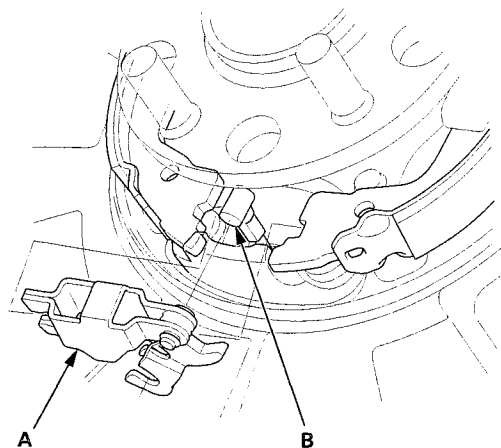
1. Raise and support the vehicle (see page 1-10).
2. Remove the rear wheels.
3. Release the parking brake, and remove the rear brake disc/drum (see page 19-29).
4. Disconnect and remove the upper return spring (A).



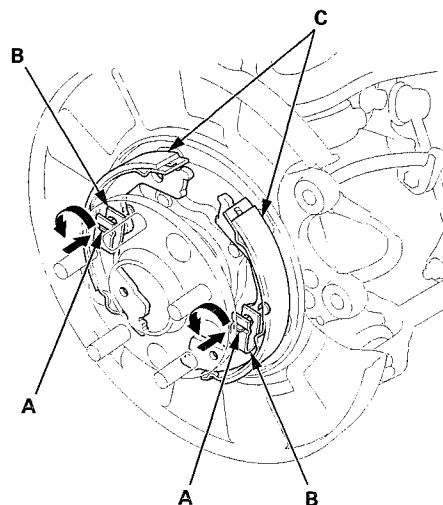
5. Remove the adjuster assembly (B).
6. Disconnect and remove the lower return spring (A).



7. Remove the parking brake lever assembly (A), and disconnect it from the parking brake cable end (B).



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

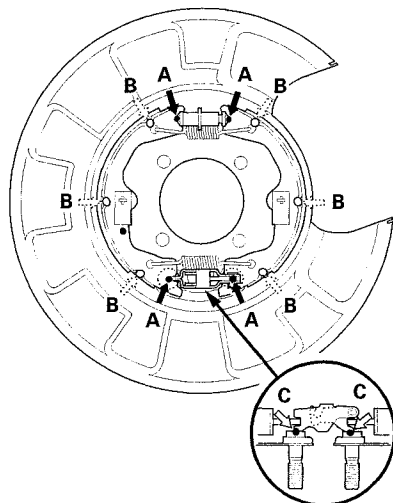


9. Remove the parking brake shoes (C).



Reassembly

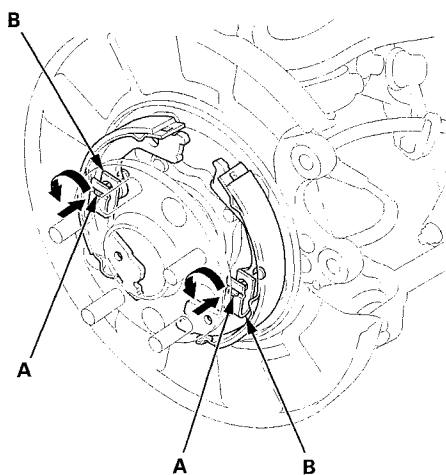
1. Apply Molykote 44MA grease to the shoe ends (A), sliding surfaces (B), and opposite edges of the parking brake shoe (C) as shown. Wipe off any excess. Keep grease off the brake linings.



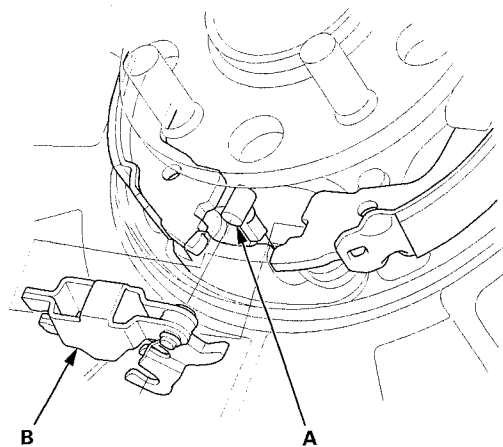
Greasing symbols:

- Brake shoe ends
- Sliding surface
- ⇒ Opposite edge of the shoe

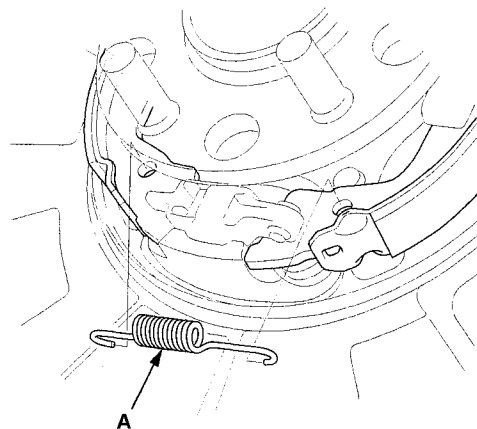
2. Reinstall the tension pins (A) and retainer springs (B).



3. Connect the parking brake cable end (A) to the parking brake lever assembly (B), and install the parking brake lever assembly.



4. Reinstall the lower return spring (A).

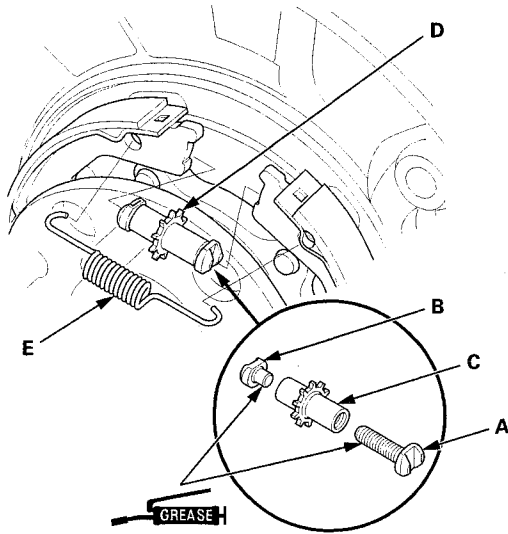


(cont'd)

Conventional Brake Components

Parking Brake Shoe Replacement (cont'd)

5. Clean the threaded portions of the clevis pin A, and coat the threads of the clevis pin A with grease. Clean the sliding surface of the clevis pin B, and coat the sliding surface of the clevis pin B with grease. Install the clevis pin A and B on the adjuster (C) and shorten the clevis pin A by turning the adjuster.



6. Position the brake shoe adjuster assembly (D) on the parking brake shoes.
7. Reinstall the upper return spring (E).
8. Install the rear brake disc/drum and the rear brake caliper (see page 19-29).
9. Do the major parking brake adjustment (see page 19-9).
10. Clean the mating surfaces between the brake disc/drum and the inside of the wheel, then install the rear wheels.

Parking Brake Shoe Lining Break-in

⚠ 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 19-9).

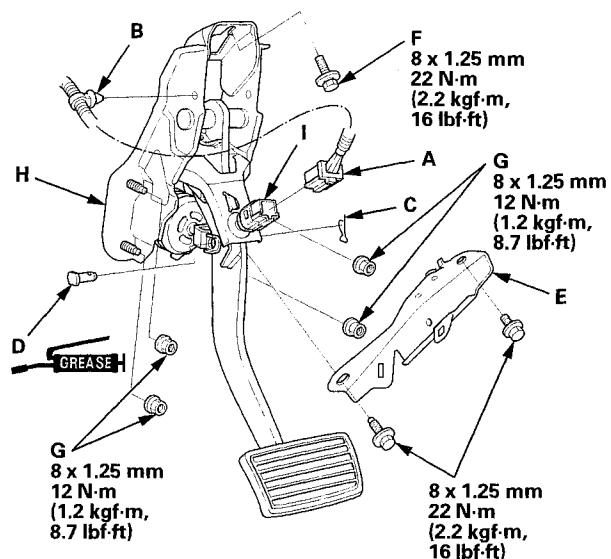
1. Park the vehicle on a firm, level surface.
2. Release the parking brake lever.
3. Drive the vehicle at 28 mph (45 km/h) and set cruise.
4. Pull the parking brake lever with 88 N (9 kgf, 20 lbf) (2 clicks) of force for 3 seconds.
5. Pull the parking brake lever with 167 N (17 kgf, 38 lbf) (5 clicks) of force for 12 seconds.
6. Check the parking brake lever adjustment (see page 19-8).



Brake Pedal Replacement

NOTE: The illustration shows A/T.

1. Remove the driver's dashboard undercover (see page 20-118).
2. Disconnect the brake pedal position switch connector (A).



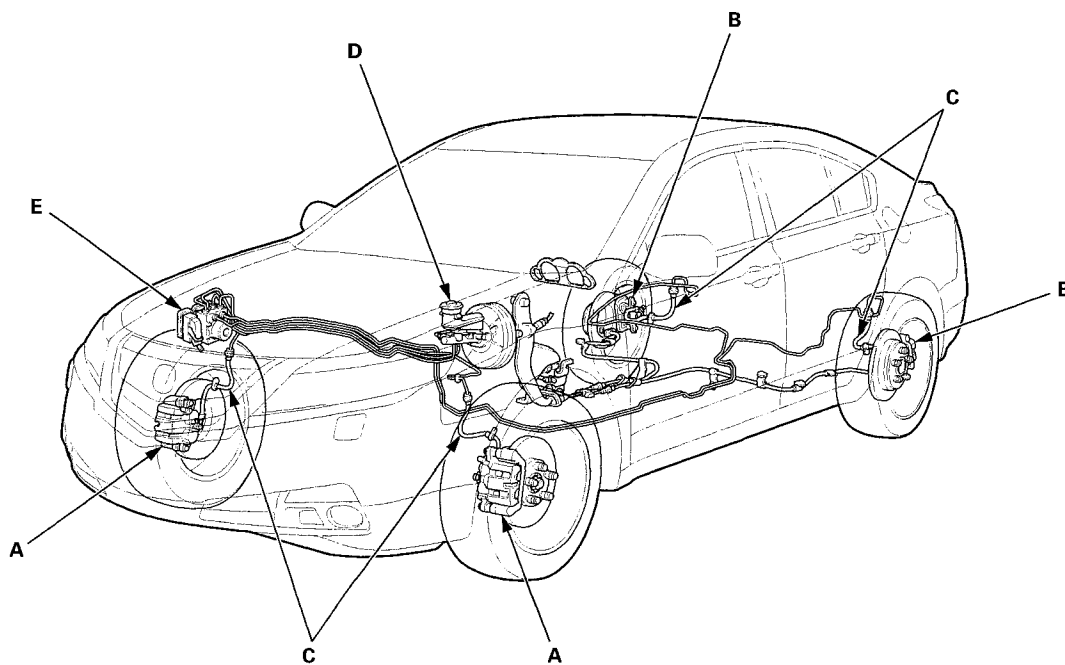
3. A/T: Remove the wire harness clip (B).
4. Remove the lock pin (C) and the clevis pin (D).
5. Remove the brake pedal support member (E).
6. Remove the brake pedal bracket mounting bolt (F) and the nuts (G).
7. Remove the brake pedal with bracket (H).
8. Remove the brake pedal position switch (I) by turning it 45° counterclockwise.
9. Install the brake pedal in the reverse order of removal.
10. Adjust the brake pedal and the brake pedal position switch (see page 19-6).

Conventional Brake Components

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	35 N·m (3.6 kgf·m, 26 lbf·ft)	Banjo bolt
		Bleed screw	8 N·m (0.8 kgf·m, 6 lbf·ft)	
B	Rear brake caliper	Brake hose	35 N·m (3.6 kgf·m, 26 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 (10 mm nut)	15 N·m (1.5 kgf·m, 11 lbf·ft)	Flare nut
		Brake line (12 mm nut)	22 N·m (2.2 kgf·m, 16 lbf·ft)	





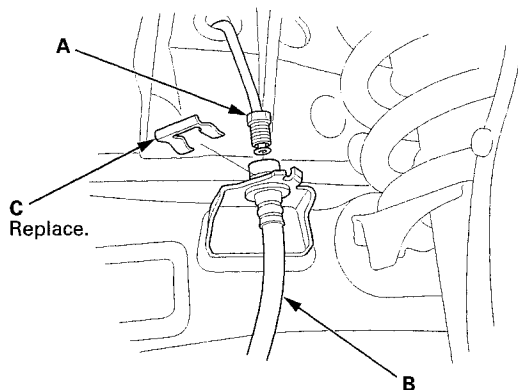
Brake Hose Replacement

NOTE:

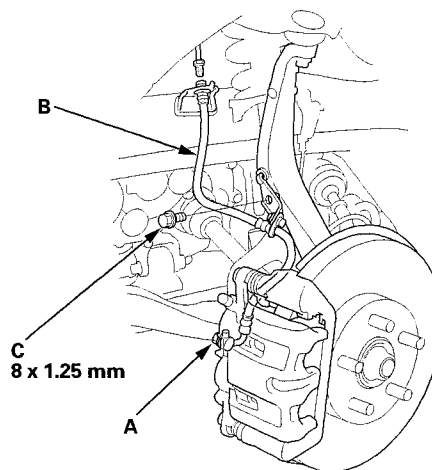
- Before reassembling, check that all parts are free of dirt and other foreign particles.
- Replace parts with new ones whenever specified to do so.
- Do not spill brake fluid on the vehicle; it may damage the paint. If brake fluid gets on the paint, wash it off immediately with water.
- After removal, plug the ends of the hoses and the joints to prevent spilling brake fluid.

Front

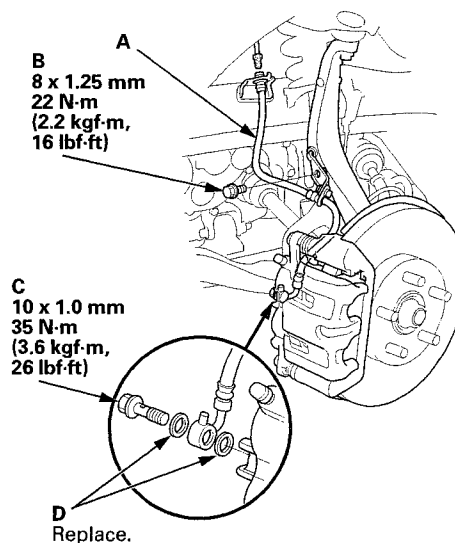
1. Raise and support the vehicle (see page 1-10).
2. Remove the front wheel.
3. Disconnect the brake line (A) from the brake hose (B), then remove the brake hose clip (C).



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



5. Remove the brake hose mounting bolt (C), then remove the brake hose.
6. Install the brake hose (A) with the mounting bolt (B).



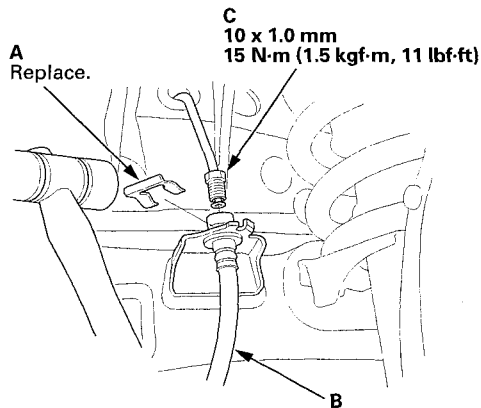
7. Connect the brake hose to the caliper with the banjo bolt (C) and new sealing washers (D).

(cont'd)

Conventional Brake Components

Brake Hose Replacement (cont'd)

8. 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.



9. After installing the brake hose, bleed the brake system (see page 19-10).

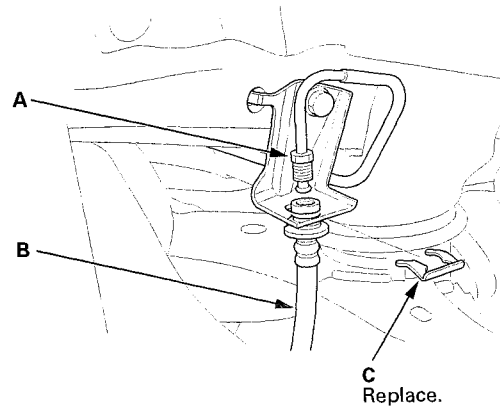
10. Do the following checks:

- Check the brake hose and line joint for leaks, and tighten if necessary.
- Check the brake hoses for interference and twisting.

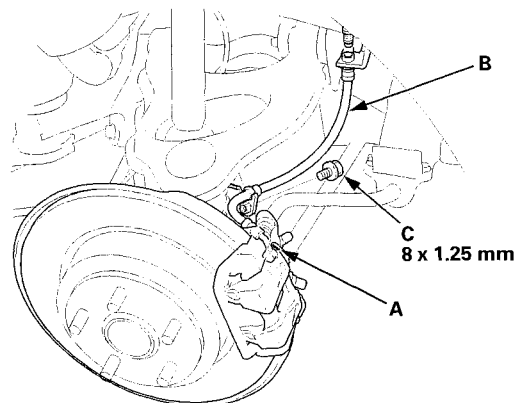
11. Clean the mating surfaces between the brake disc and the inside of the wheel, then install the front wheel.

Rear

1. Raise and support the vehicle (see page 1-10).
2. Remove the rear wheel.
3. Disconnect the brake line (A) from the brake hose (B), then remove the brake hose clip (C).



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

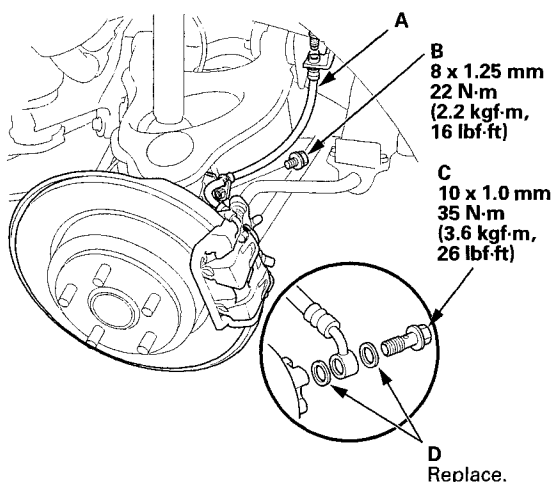


5. Remove the brake hose mounting bolt (C), then remove the brake hose.

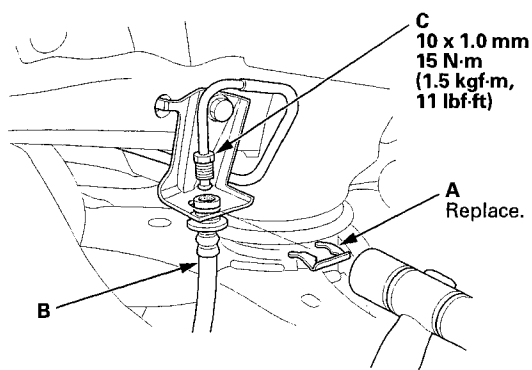


Parking Brake Lever Replacement

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

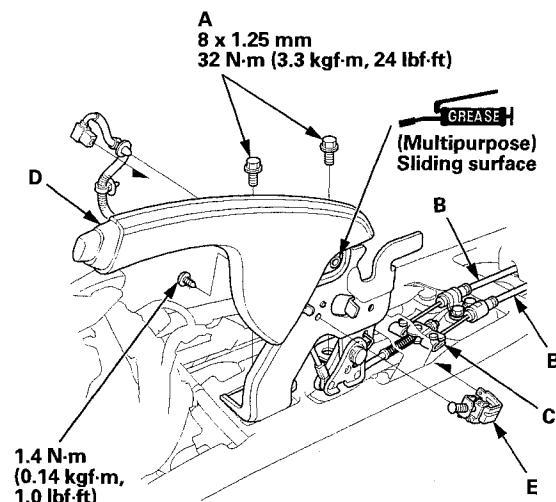


7. Connect the brake hose to the caliper with the banjo bolt (C) and new sealing washers (D).
8. Install a new brake hose clip (A) to the brake hose (B) on the bracket, then connect the brake line (C). Do not twist the brake hose.



9. After installing the brake hoses, bleed the brake system (see page 19-10).
10. Do the following checks:
- Check the brake hose and line joint for leaks, and tighten if necessary.
 - Check the brake hose for interference and twisting.
11. Clean the mating surfaces between the brake disc and the inside of the wheel, then install the rear wheel.

1. Release the parking brake lever fully.
2. Remove the center console (see page 20-109).
3. Remove the RF unit 1 (if equipped) (see page 22-616).
4. Remove the parking brake lever mount bolts (A).



5. Disconnect the parking brake cables (B) from the equalizer (C), then remove the parking brake lever (D).
6. Remove the parking brake switch (E).
7. Install the parking brake lever in the reverse order of removal.

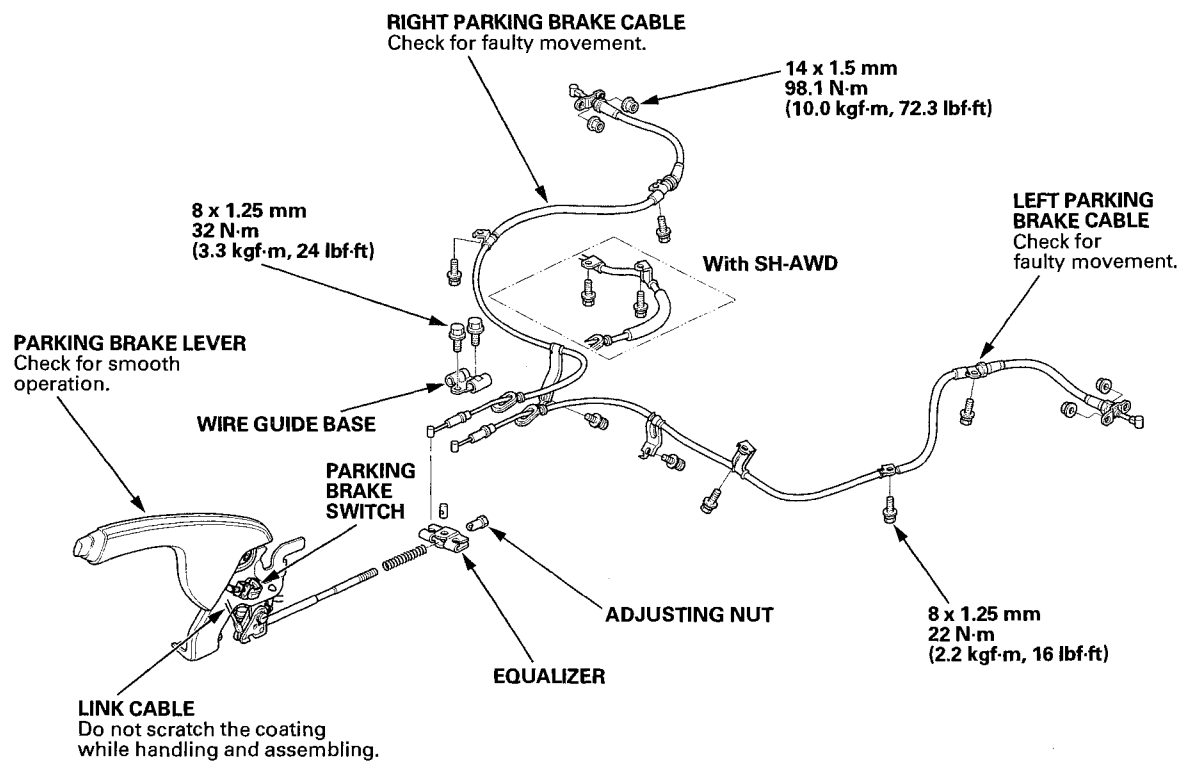
NOTE: Do not scratch the coating on the link cable while handling and assembling the parking brake lever.

8. Adjust the parking brake (see page 19-8).

Conventional Brake Components

Parking Brake Cable Replacement

Exploded View

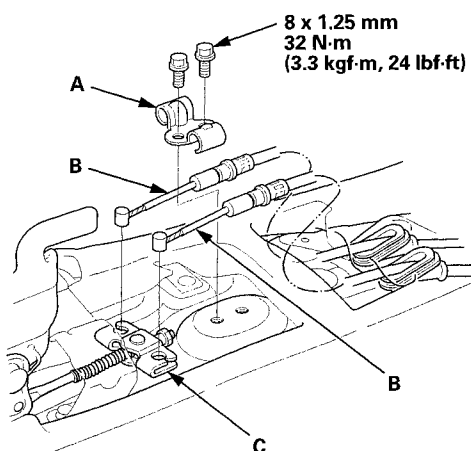




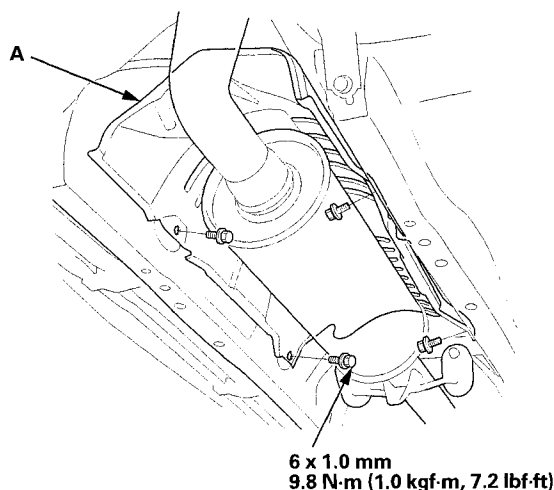
NOTE:

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

1. Release the parking brake lever fully.
2. Remove the center console (see page 20-109).
3. Remove the wire guide base (A), then disconnect the parking brake cables (B) from the equalizer (C).



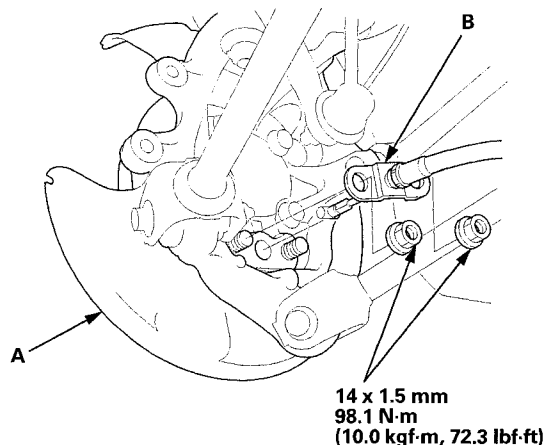
4. Without SH-AWD: Remove the heat shield (A).



5. Remove the parking brake cable grommets, and pull out the parking brake cable from the body floor.

6. Remove the parking brake shoes, and disconnect the parking brake cable from the parking brake lever assembly (see page 19-34).

7. Remove the parking brake cable mounting nuts from the backing plate (A), and remove the parking brake cable (B).



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

9. Install 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 parking brake lever assembly, and install the brake shoes and drum (see page 19-34).
- Adjust the parking brake (see page 19-8). Apply the parking brake firmly 10 times then adjust it again.

Brakes

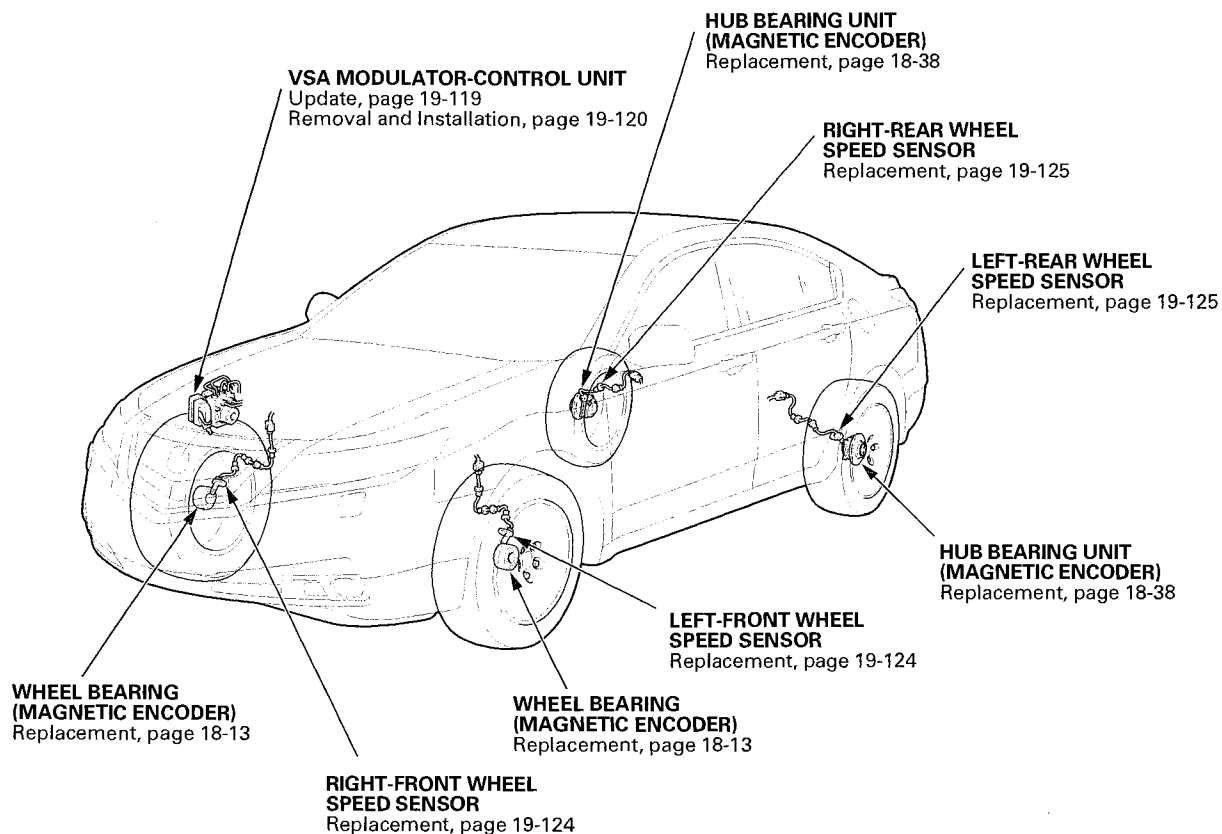
VSA System Components

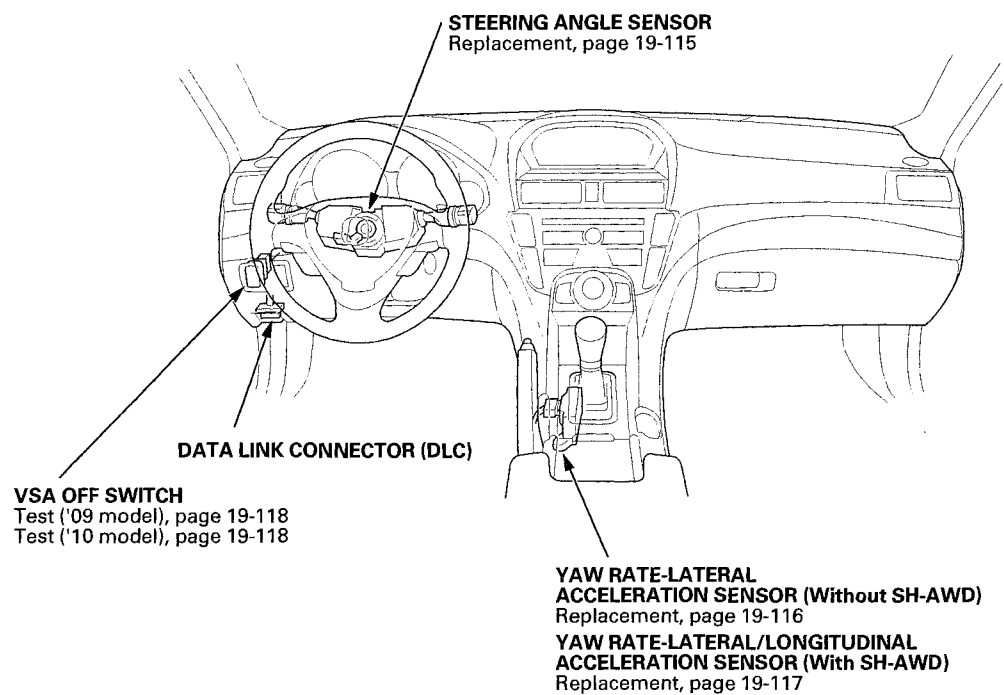
Component Location Index	19-46
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Yaw Rate-Lateral/Longitudinal Acceleration Sensor Replacement	19-117
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VSA Modulator-Control Unit Removal and Installation	19-120
Wheel Speed Sensor Replacement	19-124



VSA System Components

Component Location Index





VSA System Components

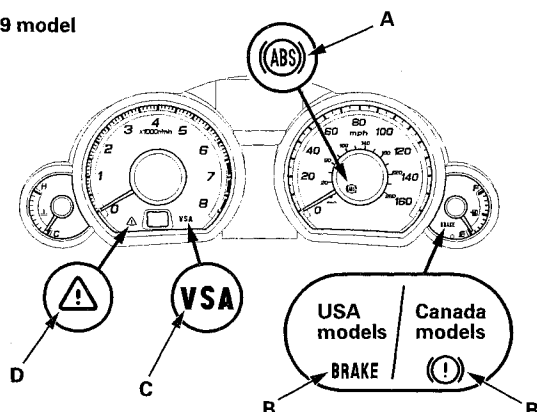
General Troubleshooting Information

System Indicator

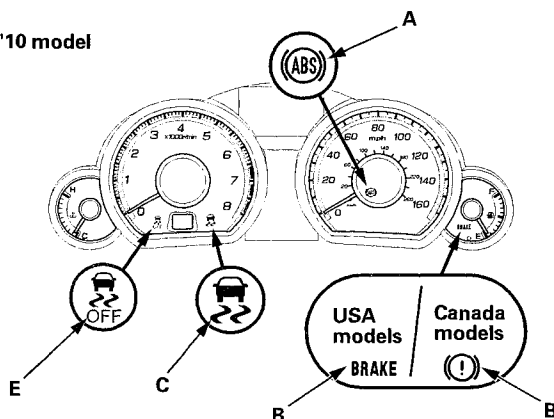
This system has four indicators:

- ABS indicator (A)
- Brake system indicator (B)
- VSA indicator (C)
- VSA activation indicator (D) ('09 model)
- VSA OFF indicator ('10 model) (E)

'09 model



'10 model



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

When the system is OK, each indicator comes on for about 2 seconds after turning the ignition switch to ON (II), or press the engine start/stop button to select the ON mode, 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.

NOTE: If two or more wheel speed sensors fail, the brake system indicator comes on.

VSA Indicator

- '09 model: The VSA indicator comes on when the VSA function is lost.
- '10 model: The VSA indicator comes on when the VSA function is lost. The VSA indicator blinks when the VSA function is activating.

VSA Activation Indicator ('09 model)

The VSA activation indicator blinks when the VSA function is activating. The VSA activation indicator comes on and stays on when the VSA is turned OFF by using the VSA OFF switch, or when the VSA sensor neutral position is not memorized.

VSA OFF Indicator ('10 model)

The VSA OFF indicator comes on when the VSA is turned OFF by using the VSA OFF switch, or VSA sensor neutral position is not memorized.

ABS and VSA Indicators go off

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

- DTC 61, 62, 84-01, 84-12, 158:
The indicators go off automatically when the system returns to normal.
- DTC 25-28, 31-38, 54, 64-66, 68, 81, 83, 86, 91, 104, 105, 111, 118, 121-124:
The indicators stay on until the ignition switch is turned to LOCK (0), or when pressing the engine start/stop button to select the OFF mode, whether or not the system returns to normal.
- DTC 11-18, 21-24, 51, 52:
The indicators stay on until the vehicle is driven after the system returns to normal.

Diagnostic Trouble Code (DTC)

- The memory can hold all 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 ascending number order, not in the order they occur.
- The DTCs are memorized in an EEPROM in the VSA modulator-control unit. Therefore, the memorized DTCs cannot be erased 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 to ON (II), or the engine start/stop button is pressed to select the ON mode and until the ABS and VSA indicators go off.
 - Regular diagnosis: Done right after the initial diagnosis until the ignition switch is turned to LOCK (0), or the engine start/stop button is pressed to select the OFF mode.
- When the system detects a problem, the VSA modulator-control unit shifts to 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 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 one time after completing initial diagnosis during regular diagnosis when the vehicle is driven over 9 mph (15 km/h).

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 19-10).

How to Troubleshoot DTCs

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

NOTE: Always troubleshoot powertrain DTCs first.

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 and/or VSA indicator 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 or VSA indicator does not come on during the test-drive, check for loose connectors, poor contact of the terminals, etc. in the circuit indicated by the DTC 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 and VSA indicators do not come on.
4. Check for DTCs from other systems which are connected via F-CAN. If there are DTCs that are related to F-CAN, one possible cause was that the ignition switch was turned to ON (II), or the engine start/stop button was pressed to select the ON mode with the VSA modulator-control unit connector disconnected. Clear the DTCs. Check for powertrain DTCs first.

Intermittent Failures

The term "intermittent failure" means a system may have had a failure, but it checks OK now. If you cannot reproduce the condition, check for loose connections and terminals. Also check ground and power connections related to the circuit that you are troubleshooting.

(cont'd)

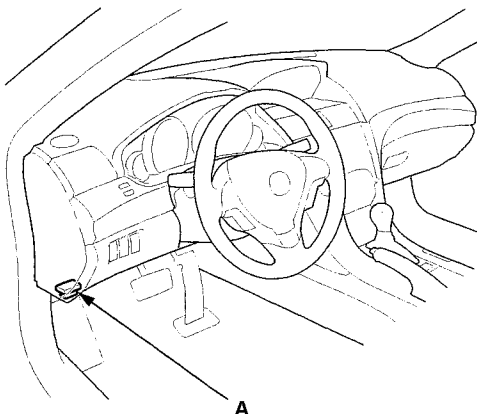
VSA System Components

General Troubleshooting Information (cont'd)

How to Use the HDS (Honda Diagnostic System)

NOTE: Make sure the battery is in good condition and fully charged.

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 to ON (II), or press the engine start/stop button to select the ON mode.
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 11-258).
4. Check the diagnostic trouble code (DTC) and the freeze data, for all systems, troubleshoot the powertrain DTCs first and note them. Then refer to the indicated DTC's troubleshooting, and do the appropriate troubleshooting procedure.

NOTE:

- Freeze data indicates the VSA conditions when the first system malfunction that activated the indicator was detected.
- The HDS reads the DTC, the freeze data, 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 in LOCK (0) or vehicle in OFF mode, connect the HDS to the data link connector (DLC) under the driver's side of the dashboard.
2. Turn the ignition switch to ON (II), or press the engine start/stop button to select the ON mode.
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 11-258).
4. Follow the prompts on the HDS to display the DTC(s) on the screen. After determining the DTC, refer to the DTC troubleshooting. Do the all systems DTC check, and troubleshoot any powertrain DTCs first.
5. Turn the ignition switch to LOCK (0), or press the engine start/stop button to select the OFF mode.

How to Clear DTCs

1. With the ignition switch in LOCK (0) or vehicle in OFF mode, connect the HDS to the data link connector (DLC) under the driver's side of the dashboard.
2. Turn the ignition switch to ON (II), or press the engine start/stop button to select the ON mode.
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 11-258).
4. Clear the DTC(s) by following the screen prompts on the HDS.
5. Turn the ignition switch to LOCK (0), or press the engine start/stop button to select the OFF mode.

DTC Troubleshooting Index

'09 model

DTC	Detection Item	ABS Indicator	Brake System Indicator	VSA Indicator	VSA Activation Indicator	Note
11	Right-front Wheel Speed Sensor (Short to Power/Short to Body Ground/Open)	ON	OFF ^{*1}	ON	ON	DTC Troubleshooting (see page 19-75)
12	Right-front Wheel Speed Sensor (Electrical Noise/Intermittent Interruption)	ON ^{*2}	OFF ^{*1}	ON ^{*2}	ON ^{*2}	DTC Troubleshooting (see page 19-79)
13	Left-front Wheel Speed Sensor (Short to Power/Short to Body Ground/Open)	ON	OFF ^{*1}	ON	ON	DTC Troubleshooting (see page 19-75)
14	Left-front Wheel Speed Sensor (Electrical Noise/Intermittent Interruption)	ON ^{*2}	OFF ^{*1}	ON ^{*2}	ON ^{*2}	DTC Troubleshooting (see page 19-79)
15	Right-rear Wheel Speed Sensor (Short to Power/Short to Body Ground/Open)	ON	OFF ^{*1}	ON	ON	DTC Troubleshooting (see page 19-75)
16	Right-rear Wheel Speed Sensor (Electrical Noise/Intermittent Interruption)	ON ^{*2}	OFF ^{*1}	ON ^{*2}	ON ^{*2}	DTC Troubleshooting (see page 19-79)
17	Left-rear Wheel Speed Sensor (Short to Power/Short to Body Ground/Open)	ON	OFF ^{*1}	ON	ON	DTC Troubleshooting (see page 19-75)
18	Left-rear Wheel Speed Sensor (Electrical Noise/Intermittent Interruption)	ON ^{*2}	OFF ^{*1}	ON ^{*2}	ON ^{*2}	DTC Troubleshooting (see page 19-79)
21	Right-front Magnetic Encoder (Wheel Bearing)	ON ^{*2}	OFF ^{*1}	ON ^{*2}	ON ^{*2}	DTC Troubleshooting (see page 19-81)
22	Left-front Magnetic Encoder (Wheel Bearing)	ON ^{*2}	OFF ^{*1}	ON ^{*2}	ON ^{*2}	DTC Troubleshooting (see page 19-81)
23	Right-rear Magnetic Encoder (Wheel Bearing)	ON ^{*2}	OFF ^{*1}	ON ^{*2}	ON ^{*2}	DTC Troubleshooting (see page 19-81)
24	Left-rear Magnetic Encoder (Wheel Bearing)	ON ^{*2}	OFF ^{*1}	ON ^{*2}	ON ^{*2}	DTC Troubleshooting (see page 19-81)
25	Yaw Rate Sensor	OFF	OFF	ON	ON	DTC Troubleshooting (see page 19-82)
26	Lateral Acceleration Sensor	OFF	OFF	ON	ON	DTC Troubleshooting (see page 19-82)
27 ^{*3}	Steering Angle Sensor (Without SH-AWD)	OFF	OFF	ON	ON	DTC Troubleshooting (see page 19-85)
27 ^{*4}	Steering Angle Sensor (With SH-AWD)	OFF	OFF	ON	ON	DTC Troubleshooting (see page 19-88)
28 ^{*4}	Longitudinal Acceleration Sensor (With SH-AWD)	ON or OFF	OFF	ON	ON	DTC Troubleshooting (see page 19-82)
31	ABS Solenoid	ON	ON	ON	ON	DTC Troubleshooting (see page 19-91)
32	ABS Solenoid	ON	ON	ON	ON	DTC Troubleshooting (see page 19-91)
33	ABS Solenoid	ON	ON	ON	ON	DTC Troubleshooting (see page 19-91)
34	ABS Solenoid	ON	ON	ON	ON	DTC Troubleshooting (see page 19-91)
35	ABS Solenoid	ON	ON	ON	ON	DTC Troubleshooting (see page 19-91)
36	ABS Solenoid	ON	ON	ON	ON	DTC Troubleshooting (see page 19-91)
37	ABS Solenoid	ON	ON	ON	ON	DTC Troubleshooting (see page 19-91)
38	ABS Solenoid	ON	ON	ON	ON	DTC Troubleshooting (see page 19-91)

*1: Brake system indicator turns ON when two or more wheels fail.

*2: When a failure occurs during an ABS activation, each indicator stays OFF.

*3: Without SH-AWD

*4: With SH-AWD

(cont'd)

VSA System Components

DTC Troubleshooting Index (cont'd)

DTC	Detection Item	ABS Indicator	Brake System Indicator	VSA Indicator	VSA Activation Indicator	Note
51	Motor Lock	ON	OFF	ON	ON	DTC Troubleshooting (see page 19-91)
52	Motor Stuck ON/OFF	ON	OFF	ON	ON	DTC Troubleshooting (see page 19-91)
54	Fail-safe Relay	ON	ON	ON	ON	DTC Troubleshooting (see page 19-93)
61	Low +B-FSR Voltage	ON	ON or OFF	ON	ON	DTC Troubleshooting (see page 19-95)
62	High +B-FSR Voltage	ON	ON	ON	ON	DTC Troubleshooting (see page 19-95)
64 ^{*3}	Sensor Power Voltage (Without SH-AWD)	ON	OFF	ON	ON	DTC Troubleshooting (see page 19-95)
64 ^{*4}	Sensor Power Voltage (With SH-AWD)	ON	OFF	ON	ON	DTC Troubleshooting (see page 19-96)
65	Brake Fluid Level	OFF	OFF	ON	ON	DTC Troubleshooting (see page 19-97)
66	VSA Pressure Sensor (Inside of VSA Modulator-control Unit)	ON	OFF	ON	ON	DTC Troubleshooting (see page 19-98)
68	Brake Pedal Position Switch	OFF	OFF	ON	ON	DTC Troubleshooting (see page 19-98)
81	Central Processing Unit (CPU)	ON or OFF	ON or OFF	ON or OFF	ON	DTC Troubleshooting (see page 19-99)
83	PCM Communication	OFF	OFF	ON	ON	DTC Troubleshooting (see page 19-100)
84-01	VSA Sensor Neutral Position	OFF	OFF	OFF	ON	DTC Troubleshooting (see page 19-101)
86	F-CAN Communication	OFF	OFF	ON	ON	DTC Troubleshooting (see page 19-102)
91	VSA Operation	OFF	OFF	ON	ON	DTC Troubleshooting (see page 19-105)
104 ^{*3}	Yaw Rate-Lateral Acceleration Sensor (Without SH-AWD)	OFF	OFF	ON	ON	DTC Troubleshooting (see page 19-82)
104 ^{*4}	Yaw Rate-Lateral/Longitudinal Acceleration Sensor (With SH-AWD)	ON	OFF	ON	ON	DTC Troubleshooting (see page 19-82)
105	Hydraulic Unit Temperature Sensor	ON	OFF	ON	ON	DTC Troubleshooting (see page 19-106)
121	VSA Solenoid	ON	ON	ON	ON	DTC Troubleshooting (see page 19-110)
122	VSA Solenoid	ON	ON	ON	ON	DTC Troubleshooting (see page 19-110)
123	VSA Solenoid	ON	ON	ON	ON	DTC Troubleshooting (see page 19-110)
124	VSA Solenoid	ON	ON	ON	ON	DTC Troubleshooting (see page 19-110)
158	ECU Software Reprogramming	ON	ON	ON	OFF	DTC Troubleshooting (see page 19-110)

*3: Without SH-AWD

*4: With SH-AWD

***10 model**

DTC	Detection Item	ABS Indicator	Brake System Indicator	VSA Indicator	VSA OFF Indicator	Note
11	Right-front Wheel Speed Sensor (Short to Power/Short to Body Ground/Open)	ON	OFF ^{*1}	ON	OFF	DTC Troubleshooting (see page 19-75)
12	Right-front Wheel Speed Sensor (Electrical Noise/Intermittent Interruption)	ON ^{*2}	OFF ^{*1}	ON ^{*2}	OFF	DTC Troubleshooting (see page 19-79)
13	Left-front Wheel Speed Sensor (Short to Power/Short to Body Ground/Open)	ON	OFF ^{*1}	ON	OFF	DTC Troubleshooting (see page 19-75)
14	Left-front Wheel Speed Sensor (Electrical Noise/Intermittent Interruption)	ON ^{*2}	OFF ^{*1}	ON ^{*2}	OFF	DTC Troubleshooting (see page 19-79)
15	Right-rear Wheel Speed Sensor (Short to Power/Short to Body Ground/Open)	ON	OFF ^{*1}	ON	OFF	DTC Troubleshooting (see page 19-75)
16	Right-rear Wheel Speed Sensor (Electrical Noise/Intermittent Interruption)	ON ^{*2}	OFF ^{*1}	ON ^{*2}	OFF	DTC Troubleshooting (see page 19-79)
17	Left-rear Wheel Speed Sensor (Short to Power/Short to Body Ground/Open)	ON	OFF ^{*1}	ON	OFF	DTC Troubleshooting (see page 19-75)
18	Left-rear Wheel Speed Sensor (Electrical Noise/Intermittent Interruption)	ON ^{*2}	OFF ^{*1}	ON ^{*2}	OFF	DTC Troubleshooting (see page 19-79)
21	Right-front Magnetic Encoder (Wheel Bearing)	ON ^{*2}	OFF ^{*1}	ON ^{*2}	OFF	DTC Troubleshooting (see page 19-81)
22	Left-front Magnetic Encoder (Wheel Bearing)	ON ^{*2}	OFF ^{*1}	ON ^{*2}	OFF	DTC Troubleshooting (see page 19-81)
23	Right-rear Magnetic Encoder (Wheel Bearing)	ON ^{*2}	OFF ^{*1}	ON ^{*2}	OFF	DTC Troubleshooting (see page 19-81)
24	Left-rear Magnetic Encoder (Wheel Bearing)	ON ^{*2}	OFF ^{*1}	ON ^{*2}	OFF	DTC Troubleshooting (see page 19-81)
25	Yaw Rate Sensor	OFF	OFF	ON	OFF	DTC Troubleshooting (see page 19-82)
26	Lateral Acceleration Sensor	OFF	OFF	ON	OFF	DTC Troubleshooting (see page 19-82)
27 ^{*3}	Steering Angle Sensor (Without SH-AWD)	OFF	OFF	ON	OFF	DTC Troubleshooting (see page 19-85)
27 ^{*4}	Steering Angle Sensor (With SH-AWD)	OFF	OFF	ON	OFF	DTC Troubleshooting (see page 19-88)
28 ^{*4}	Longitudinal Acceleration Sensor (With SH-AWD)	ON or OFF	OFF	ON	OFF	DTC Troubleshooting (see page 19-82)
31	ABS Solenoid	ON	ON	ON	OFF	DTC Troubleshooting (see page 19-91)
32	ABS Solenoid	ON	ON	ON	OFF	DTC Troubleshooting (see page 19-91)
33	ABS Solenoid	ON	ON	ON	OFF	DTC Troubleshooting (see page 19-91)
34	ABS Solenoid	ON	ON	ON	OFF	DTC Troubleshooting (see page 19-91)
35	ABS Solenoid	ON	ON	ON	OFF	DTC Troubleshooting (see page 19-91)
36	ABS Solenoid	ON	ON	ON	OFF	DTC Troubleshooting (see page 19-91)
37	ABS Solenoid	ON	ON	ON	OFF	DTC Troubleshooting (see page 19-91)
38	ABS Solenoid	ON	ON	ON	OFF	DTC Troubleshooting (see page 19-91)

*1: Brake system indicator turns ON when two or more wheels fail.

*2: When a failure occurs during an ABS activation, each indicator stays OFF.

*3: Without SH-AWD

*4: With SH-AWD

(cont'd)

VSA System Components

DTC Troubleshooting Index (cont'd)

DTC	Detection Item	ABS Indicator	Brake System Indicator	VSA Indicator	VSA OFF Indicator	Note
51	Motor Lock	ON	OFF	ON	OFF	DTC Troubleshooting (see page 19-91)
52	Motor Stuck ON/OFF	ON	OFF	ON	OFF	DTC Troubleshooting (see page 19-91)
54	Fail-safe Relay	ON	ON	ON	OFF	DTC Troubleshooting (see page 19-93)
61	Low +B-FSR Voltage	ON	ON or OFF	ON	OFF	DTC Troubleshooting (see page 19-95)
62	High +B-FSR Voltage	ON	ON	ON	OFF	DTC Troubleshooting (see page 19-95)
64 ^{*3}	Sensor Power Voltage (Without SH-AWD)	ON	OFF	ON	OFF	DTC Troubleshooting (see page 19-95)
64 ^{*4}	Sensor Power Voltage (With SH-AWD)	ON	OFF	ON	OFF	DTC Troubleshooting (see page 19-96)
65	Brake Fluid Level	OFF	OFF	ON	OFF	DTC Troubleshooting (see page 19-97)
66	VSA Pressure Sensor (Inside of VSA Modulator-control Unit)	ON	OFF	ON	OFF	DTC Troubleshooting (see page 19-98)
68	Brake Pedal Position Switch	OFF	OFF	ON	OFF	DTC Troubleshooting (see page 19-98)
81	Central Processing Unit (CPU)	ON	ON or OFF	ON	OFF	DTC Troubleshooting (see page 19-99)
83	ECM/PCM Communication	OFF	OFF	ON	OFF	DTC Troubleshooting (see page 19-100)
84-01	VSA Sensor Neutral Position	OFF	OFF	OFF	ON	DTC Troubleshooting (see page 19-101)
84-12 ^{*3}	Steering Angle Sensor Neutral Position	OFF	OFF	OFF	ON	DTC Troubleshooting (see page 19-101)
86	F-CAN Communication	OFF	OFF	ON	OFF	DTC Troubleshooting (see page 19-102)
91	VSA Operation	OFF	OFF	ON	OFF	DTC Troubleshooting (see page 19-105)
104 ^{*3}	Yaw Rate-Lateral Acceleration Sensor (Without SH-AWD)	OFF	OFF	ON	OFF	DTC Troubleshooting (see page 19-82)
104 ^{*4}	Yaw Rate-Lateral/Longitudinal Acceleration Sensor (With SH-AWD)	ON	OFF	ON	OFF	DTC Troubleshooting (see page 19-82)
105	Hydraulic Unit Temperature Sensor	ON ^{*3} or OFF ^{*4}	OFF	ON	OFF	DTC Troubleshooting (see page 19-106)
111 ^{*5}	Back-up Light Switch	OFF	OFF	ON	OFF	DTC Troubleshooting (see page 19-106)
118 ^{*5}	Clutch Pedal Position Switch B	OFF	OFF	ON	OFF	DTC Troubleshooting (see page 19-109)
121	VSA Solenoid	ON	ON	ON	OFF	DTC Troubleshooting (see page 19-110)
122	VSA Solenoid	ON	ON	ON	OFF	DTC Troubleshooting (see page 19-110)
123	VSA Solenoid	ON	ON	ON	OFF	DTC Troubleshooting (see page 19-110)
124	VSA Solenoid	ON	ON	ON	OFF	DTC Troubleshooting (see page 19-110)
158	ECU Software Reprogramming	ON	ON	ON	OFF	DTC Troubleshooting (see page 19-110)

*3: Without SH-AWD

*4: With SH-AWD

*5: M/T



Symptom Troubleshooting Index

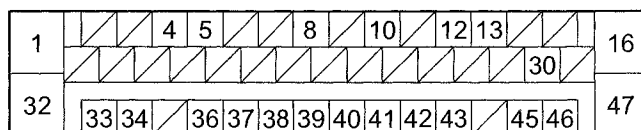
When the vehicle has one of these symptoms, check for VSA diagnostic trouble codes (DTCs) with the HDS. If there are no DTCs, do the diagnostic procedure for the symptom, in the sequence listed, until you find the cause.

Symptom	Diagnostic procedure	Also check for
HDS does not communicate with the VSA modulator-control unit or the vehicle	Troubleshoot the DLC circuit (see page 11-258).	
VSA activation indicator does not come on at start-up (bulb check) ('09 model)	1. Do the gauge control module troubleshooting (see page 22-342). 2. Update the VSA modulator-control unit if it does not have the latest software (see page 19-119), or substitute a known-good VSA modulator-control unit (see page 19-120), then retest. If it is OK, the VSA modulator-control unit was updated, troubleshooting is complete. If the VSA modulator-control unit was substituted, replace the original VSA modulator-control unit (see page 19-120).	
VSA activation indicator does not go off, and no DTCs are stored ('09 model)	1. Symptom troubleshooting (see page 19-111). 2. Update the VSA modulator-control unit if it does not have the latest software (see page 19-119), or substitute a known-good VSA modulator-control unit (see page 19-120), then retest. If it is OK, the VSA modulator-control unit was updated, troubleshooting is complete. If the VSA modulator-control unit was substituted, replace the original VSA modulator-control unit (see page 19-120).	
VSA OFF indicator does not come on at start-up (bulb check) ('10 model)	1. Do the gauge control module troubleshooting (see page 22-342). 2. Update the VSA modulator-control unit if it does not have the latest software (see page 19-119), or substitute a known-good VSA modulator-control unit (see page 19-120), then retest. If it is OK, the VSA modulator-control unit was updated, troubleshooting is complete. If the VSA modulator-control unit was substituted, replace the original VSA modulator-control unit (see page 19-120).	
ABS indicator, brake system indicator, and VSA indicator do not come on	1. Do the gauge control module troubleshooting (see page 22-342). 2. Update the VSA modulator-control unit if it does not have the latest software (see page 19-119), or substitute a known-good VSA modulator-control unit (see page 19-120), then retest. If it is OK, the VSA modulator-control unit was updated, troubleshooting is complete. If the VSA modulator-control unit was substituted, replace the original VSA modulator-control unit (see page 19-120).	
ABS indicator, brake system indicator, and VSA indicator do not go off	1. Check for F-CAN DTCs, and troubleshoot and repair those first (see page 11-3). 2. Symptom troubleshooting (see page 19-112). 3. Do the gauge control module troubleshooting (see page 22-342).	
VSA OFF switch does not work (VSA cannot be turned OFF) ('10 model)	1. Symptom troubleshooting (see page 19-114). 2. Update the VSA modulator-control unit if it does not have the latest software (see page 19-119), or substitute a known-good VSA modulator-control unit (see page 19-120), then retest. If it is OK, the VSA modulator-control unit was updated, troubleshooting is complete. If the VSA modulator-control unit was substituted, replace the original VSA modulator-control unit (see page 19-120).	

VSA System Components

System Description

VSA Modulator-control Unit Inputs and Outputs for 47P Connector (Connector Disconnected)



Wire side of female terminals

Terminal number	Wire color	Terminal sign	Description	Signal
1	RED	MR + B	Power source for the motor relay	Battery voltage (about 12 V) at all times
4 ^{*1}	BRN	BACK LT	Detects back-up light switch signal	Back-up light switch ON: battery voltage (about 12 V)
5 ^{*2}	ORN	SVCC	Power source for the steering angle sensor	With ignition switch ON (II), or vehicle in ON mode: about 5.0 V
8	PUR	IG1	Power source for activating the system	With ignition switch ON (II), or vehicle in ON mode: battery voltage (about 12 V)
10	LT BLU	K-LINE	Communication with HDS	
12	WHT	CAN-H	F-CAN communication circuit	
13	BLK	CAN-L	F-CAN communication circuit	
16	BLK	GND	Ground for the VSA modulator-control unit	Continuity to ground
30 ^{*2}	WHT	STR-Z	Detects steering angle sensor signal	
32	WHT	FSR + B	Power source for the fail-safe relay	Battery voltage (about 12 V) at all times
33	PUR	FR-GND	Detects right-front wheel speed sensor signal	
34	LT GRN	FR + B	Detects right-front wheel speed sensor signal	

*1: M/T

*2: Without SH-AWD

Terminal number	Wire color	Terminal sign	Description	Signal
36	BLU	RL +B	Detects left-rear wheel speed sensor signal	—
37	RED	RL-GND	Detects left-rear wheel speed sensor signal	
38*2	PUR	STR-B	Detects steering angle sensor signal	
39	RED	WEN	Detects write enable signal	
40*2	YEL	SGND	Ground for the steering angle sensor	
41*2	GRN	STR-A	Detects steering angle sensor signal	
42	PUR	RR-GND	Detects right-rear wheel speed sensor signal	
43	PNK	RR +B	Detects right-rear wheel speed sensor signal	
45	GRY	FL +B	Detects left-front wheel speed sensor signal	
46	LT BLU	FL-GND	Detects left-front wheel speed sensor signal	
47	BLK	MR-GND	Ground for the pump motor	Continuity to ground

*2: Without SH-AWD

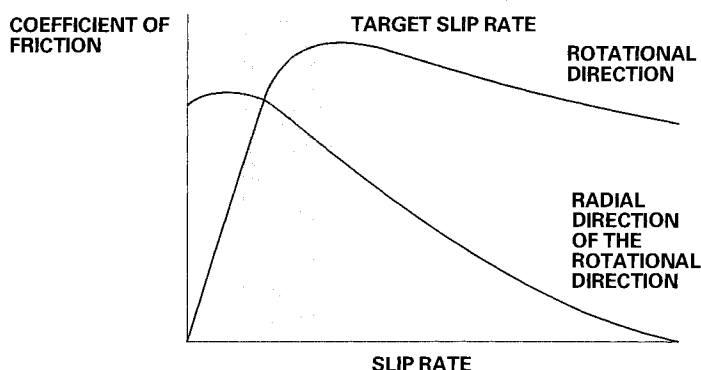
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ABS (Anti-lock Brake System) Features

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

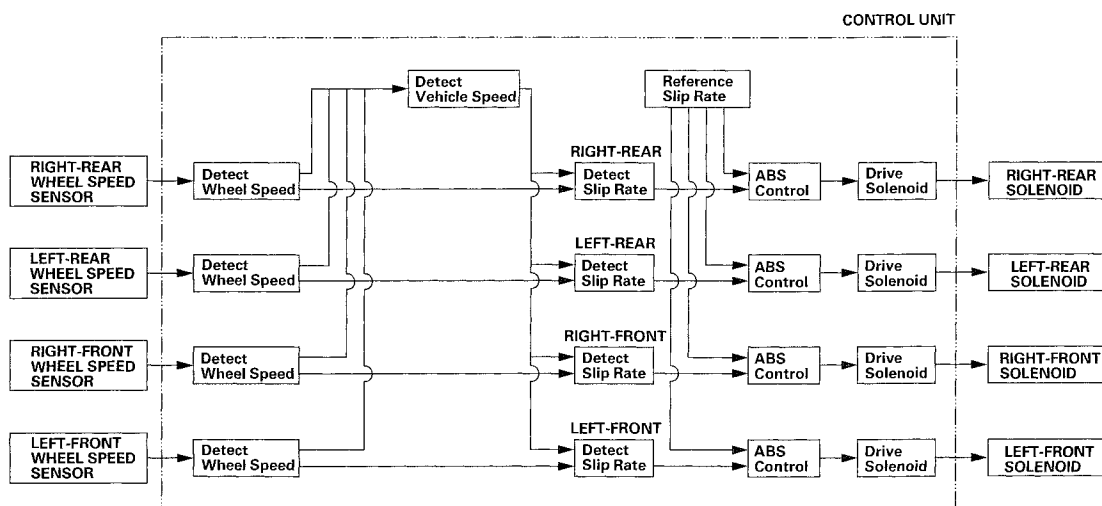


Main Control

The control unit detects the wheel speed based on the wheel speed 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.



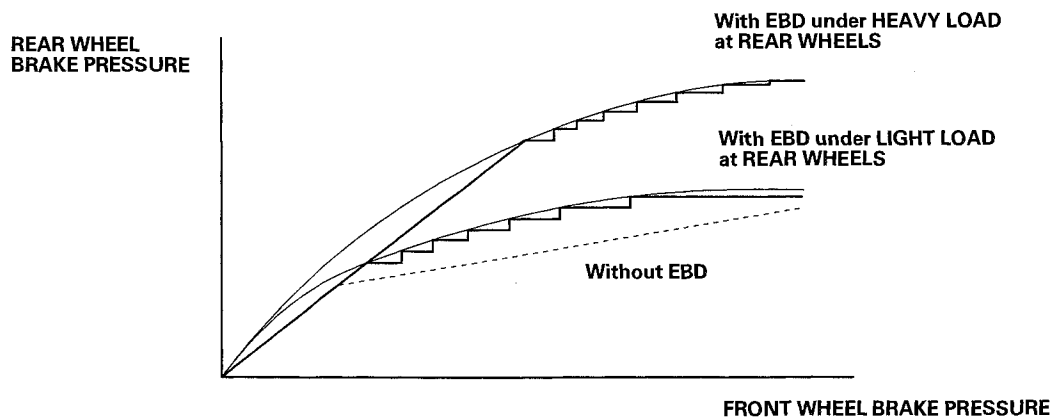
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VSA System Components

System Description (cont'd)

EBD (Electronic Brake Distribution) Features

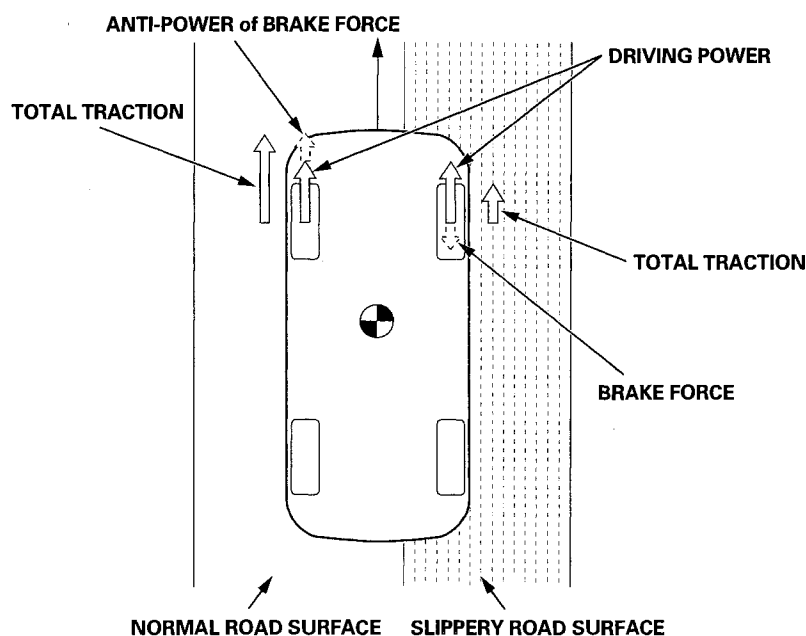
The EBD feature helps control vehicle braking by adjusting the rear brake force in accordance with the rear wheel load before the ABS operates. Based on the wheel speed sensor signals, the control unit uses the modulator to control the rear brakes individually. When the rear wheel speed is less than 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, you may also hear a muted buzzing sound from the VSA modulator-control unit. This is normal.



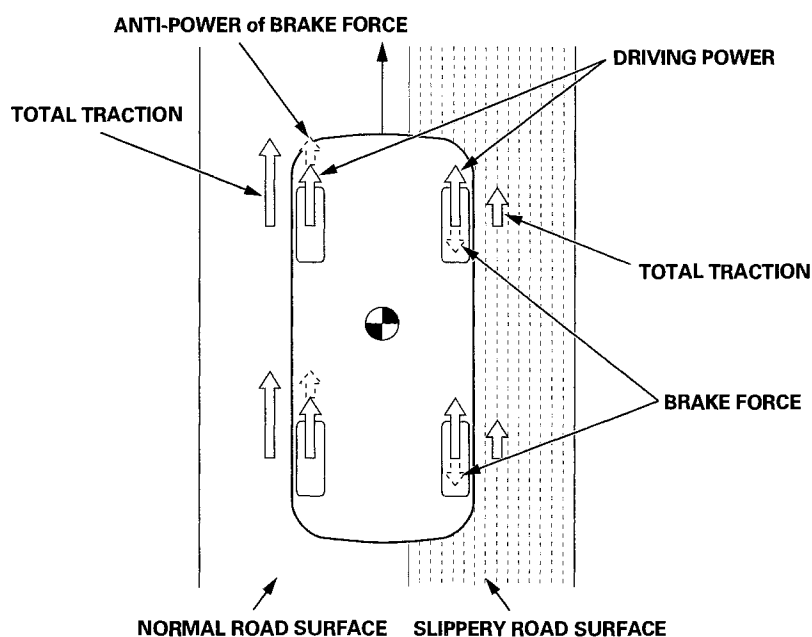
TCS (Traction Control System) Features

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 ECM/PCM to slow the spinning wheel, and keep traction.

Without SH-AWD



With SH-AWD



(cont'd)

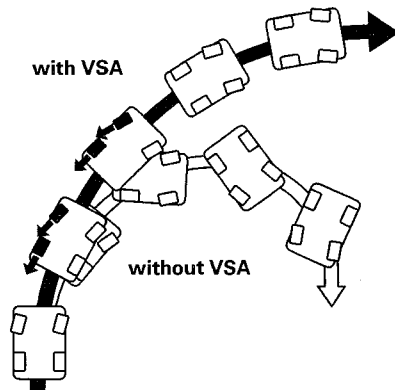
VSA System Components

System Description (cont'd)

VSA (Vehicle Stability Assist) System Features

Oversteer control

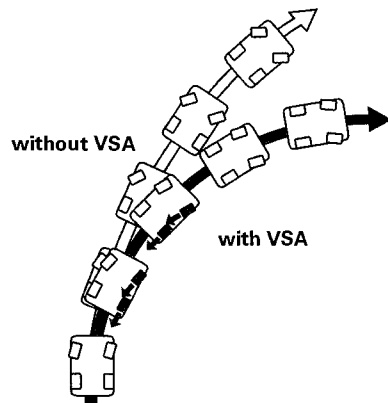
Applies the brakes to the front and rear outside wheels



The brake makes the yaw rate opposite to the turning direction

Understeer control

- Applies the brakes 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

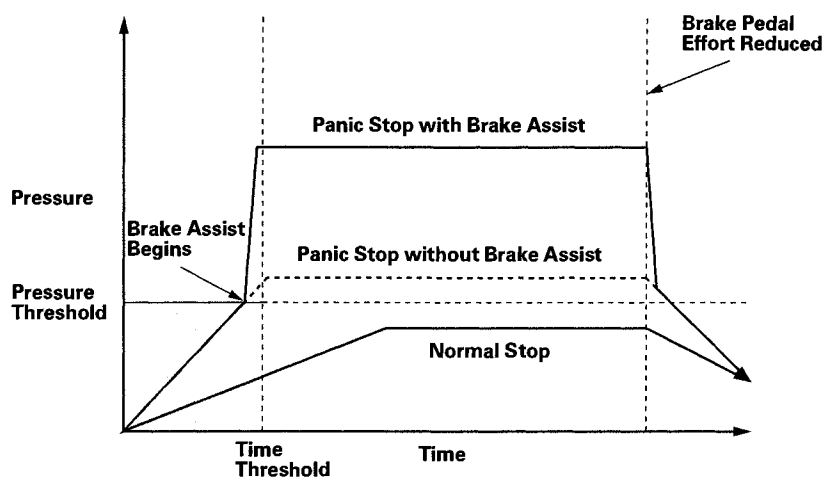


Brake Assist Features

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

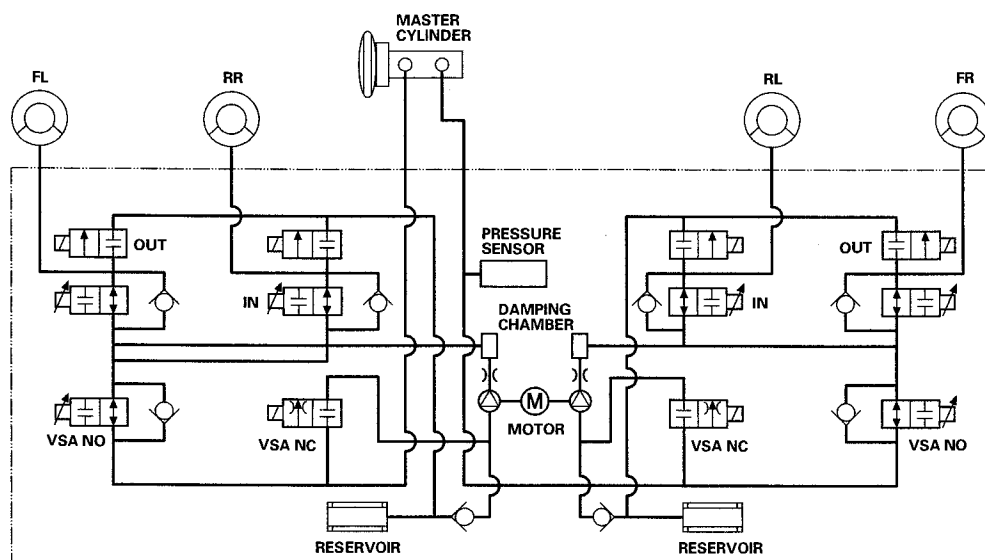
System Description (cont'd)

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, and the pump motor.

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

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



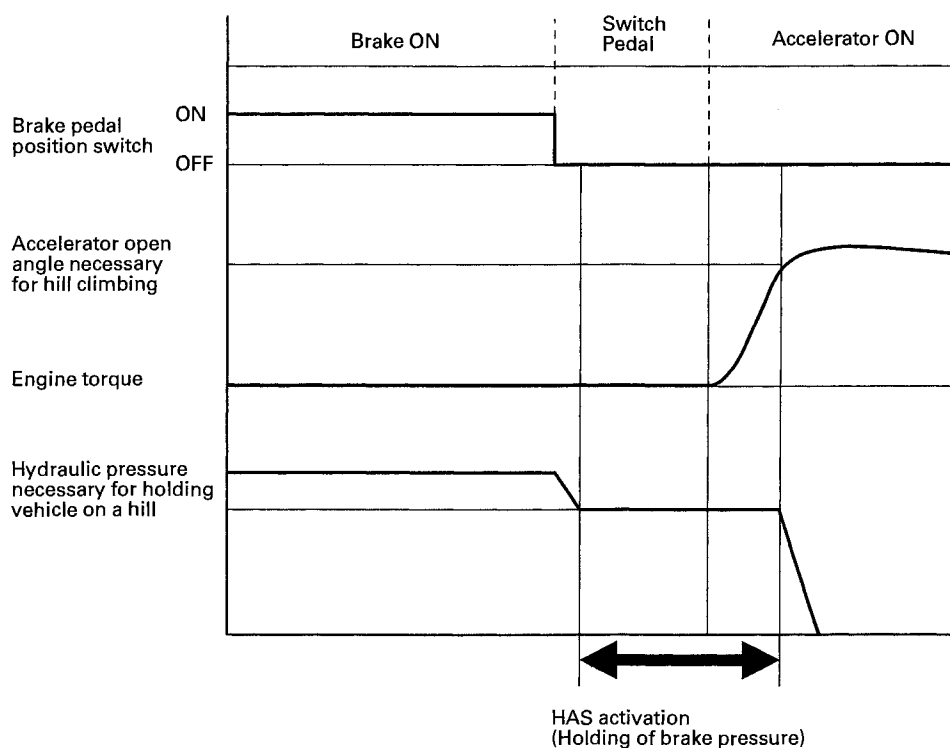
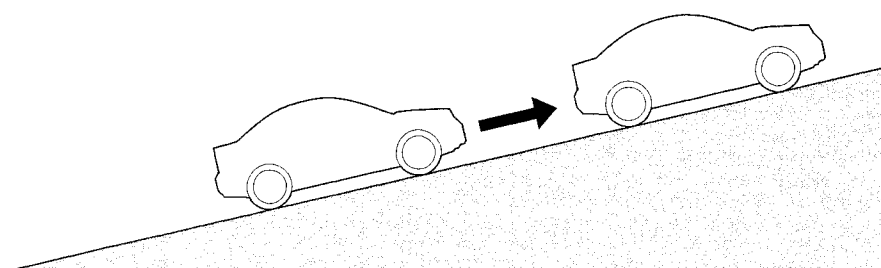
IN: INLET SOLENOID VALVE (NORMALLY OPEN)
OUT: OUTLET SOLENOID VALVE (NORMALLY CLOSED)

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 exceeds master cylinder pressure.

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

HSA (Hill Start Assist) Features (With SH-AWD)

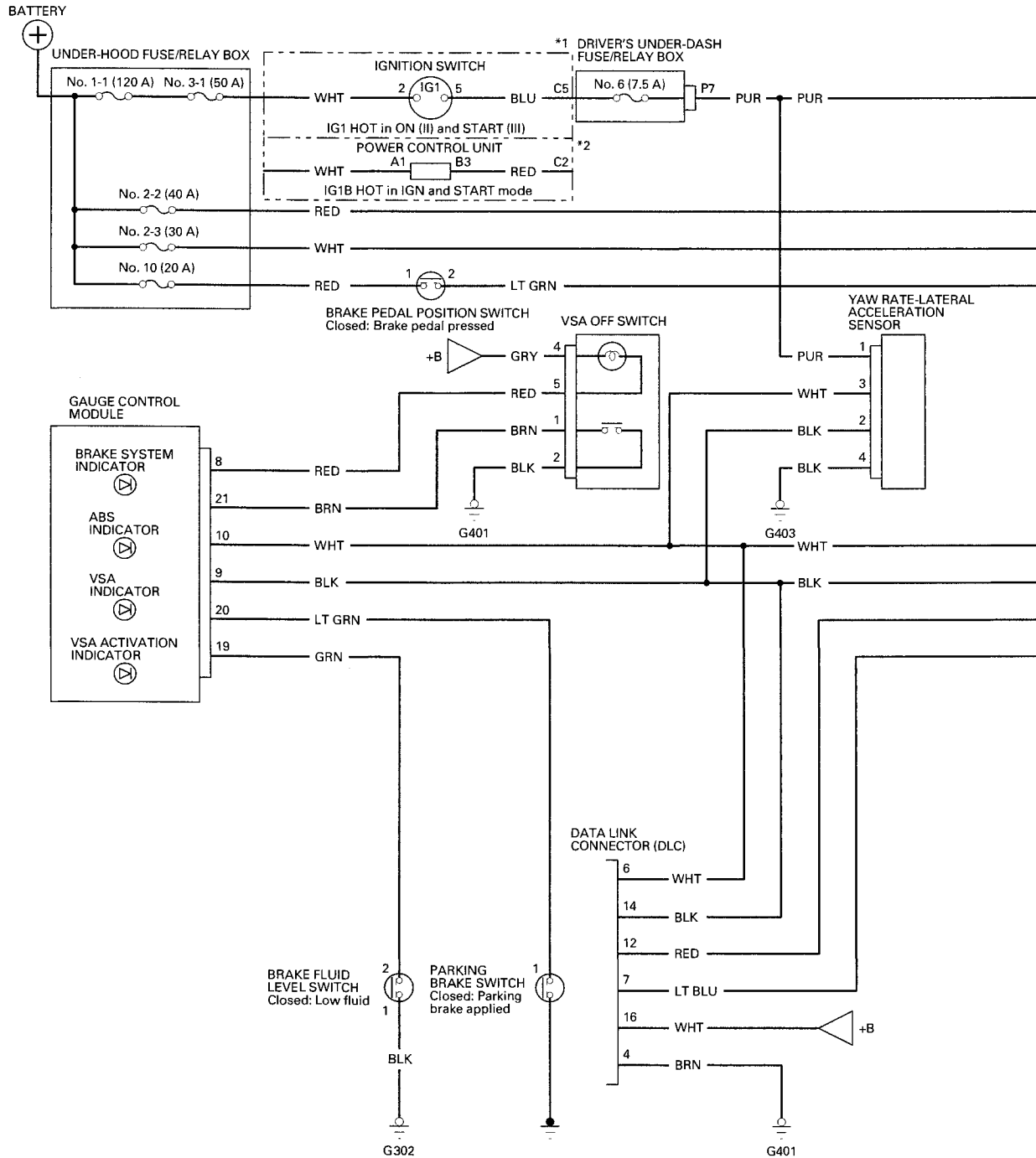
Prevents the vehicle from rolling backwards when moving your feet from the brake pedal to the accelerator pedal while stopped on a hill. The control unit reads the angle of inclination from the Yaw rate-lateral/longitudinal acceleration sensor, and that all four wheels are stopped, then it calculates the amount of fluid pressure required to keep the vehicle from rolling backward when the control unit sees the brake pressure decrease as the driver lifts his foot off of the brake pedal, and moves his foot to the accelerator pedal. The hill start assist also works when the vehicle is stopped on a downhill slope.

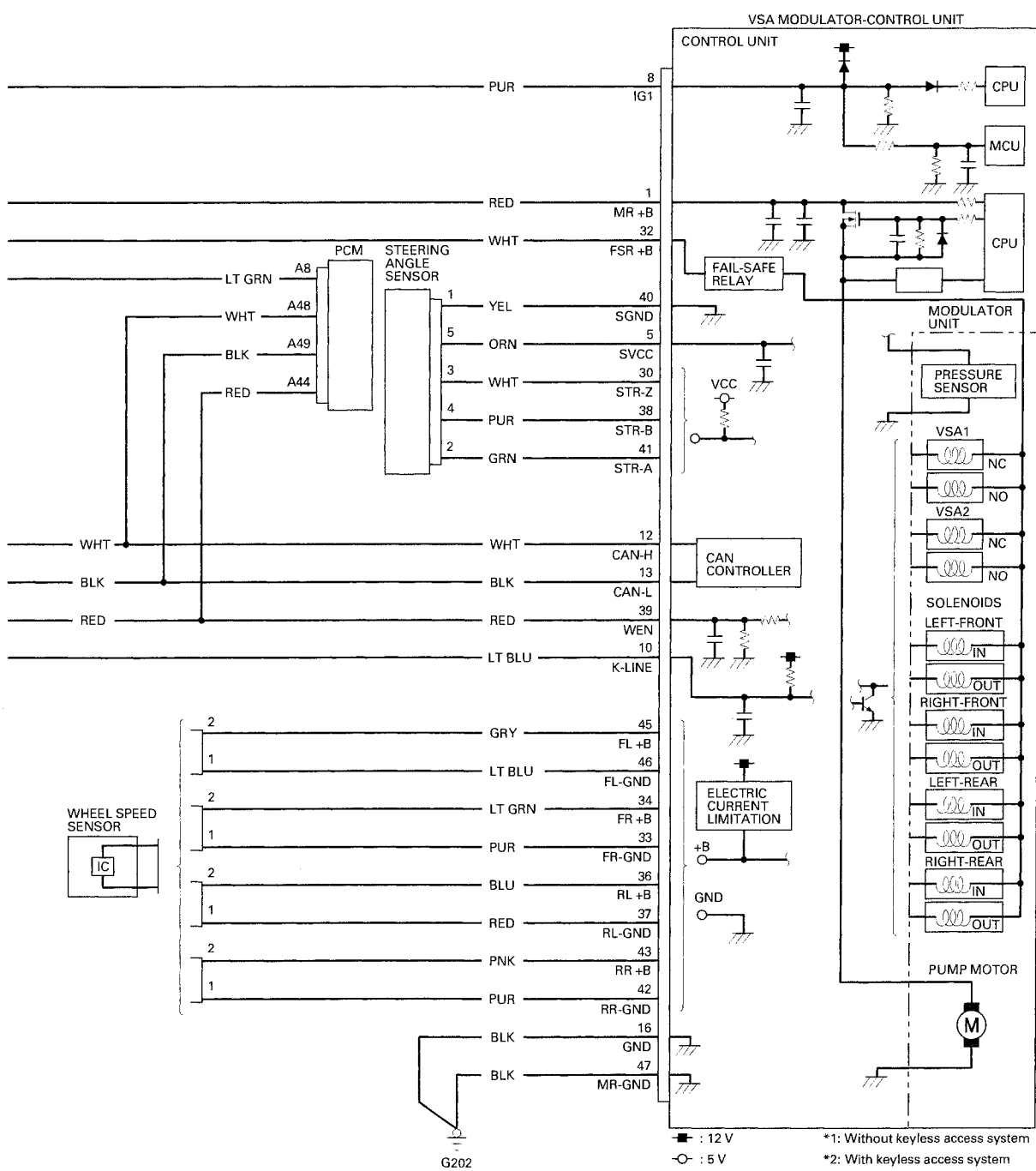


VSA System Components

Circuit Diagram

'09 model without SH-AWD



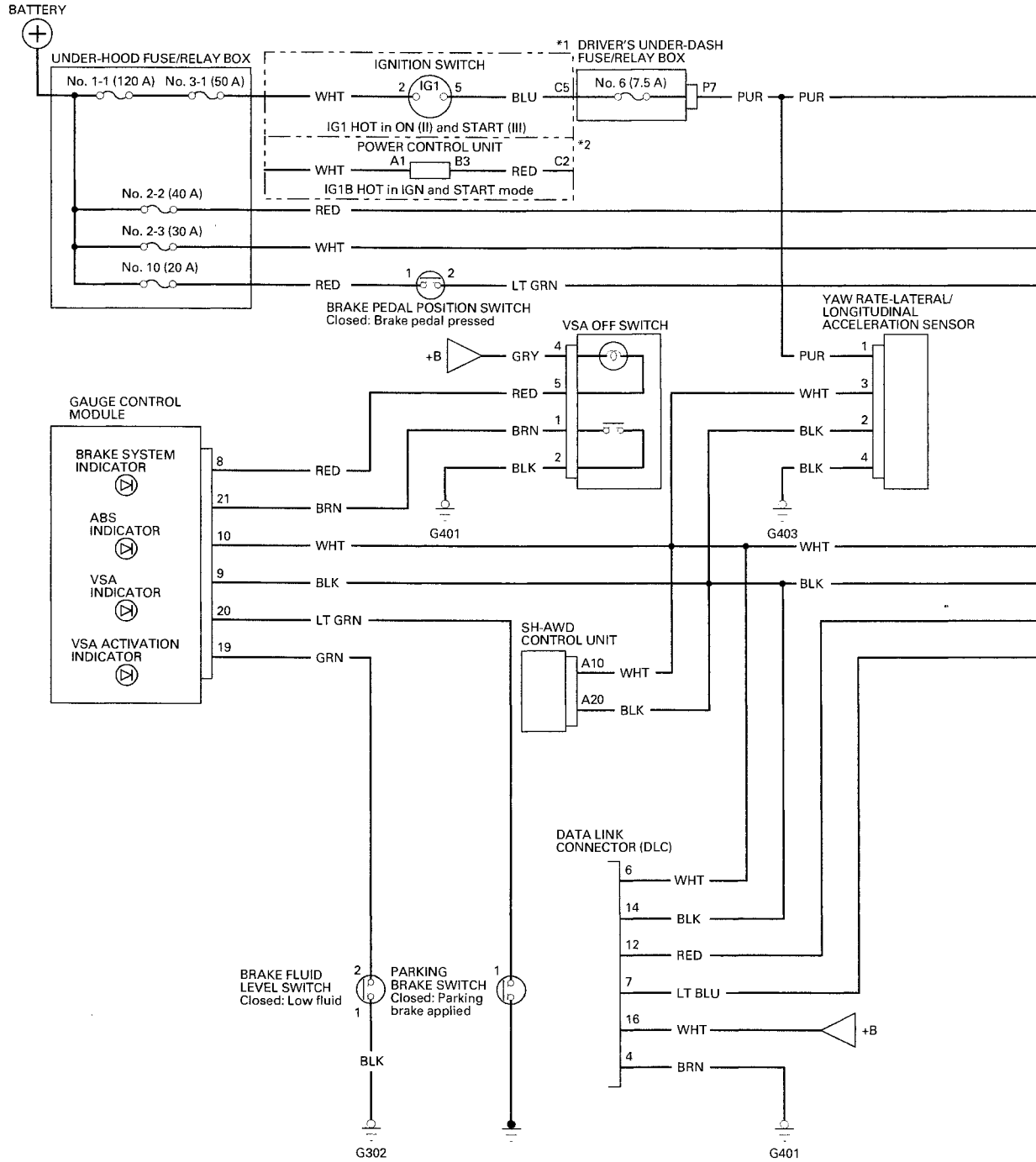


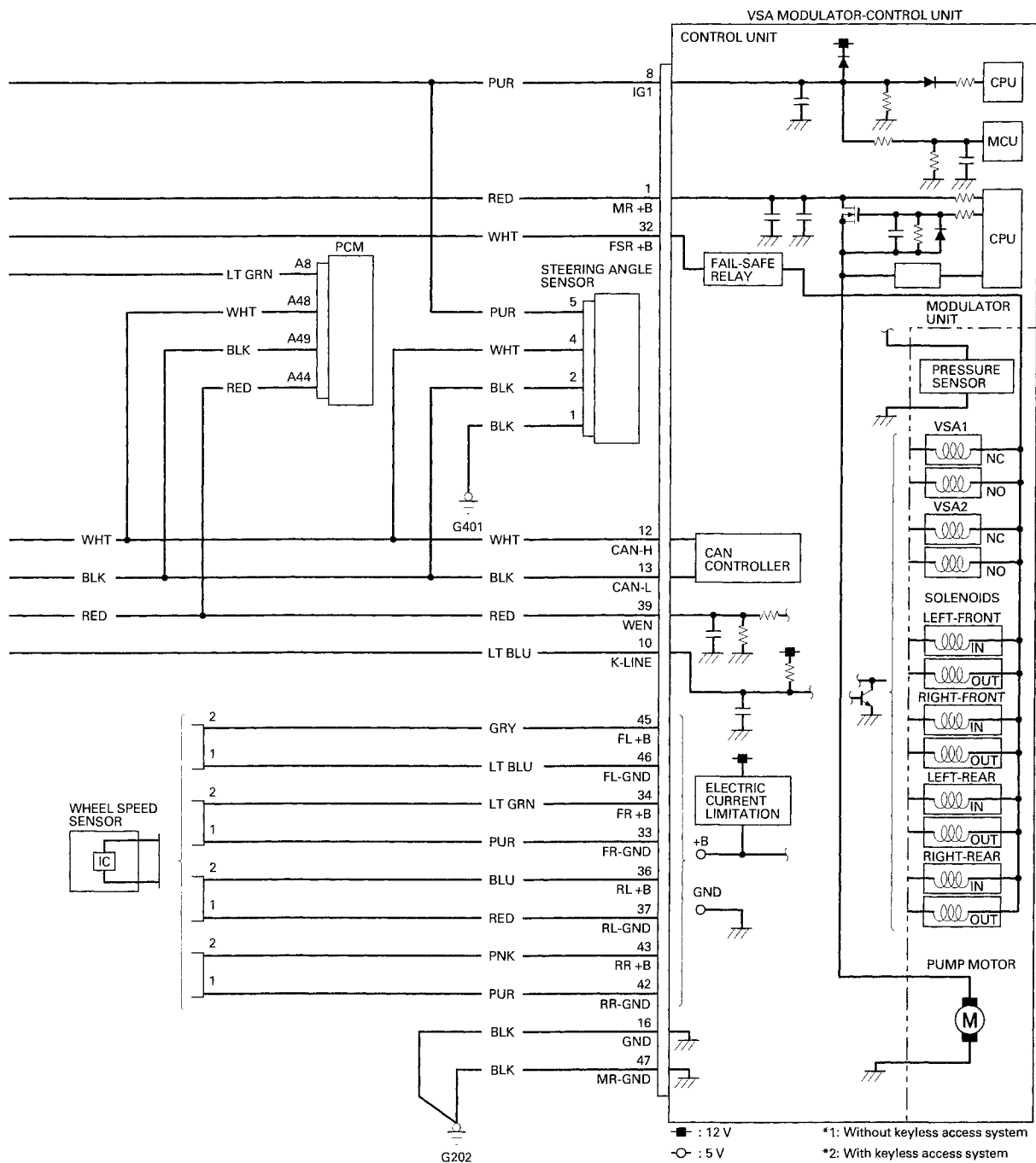
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VSA System Components

Circuit Diagram (cont'd)

'09 model with SH-AWD



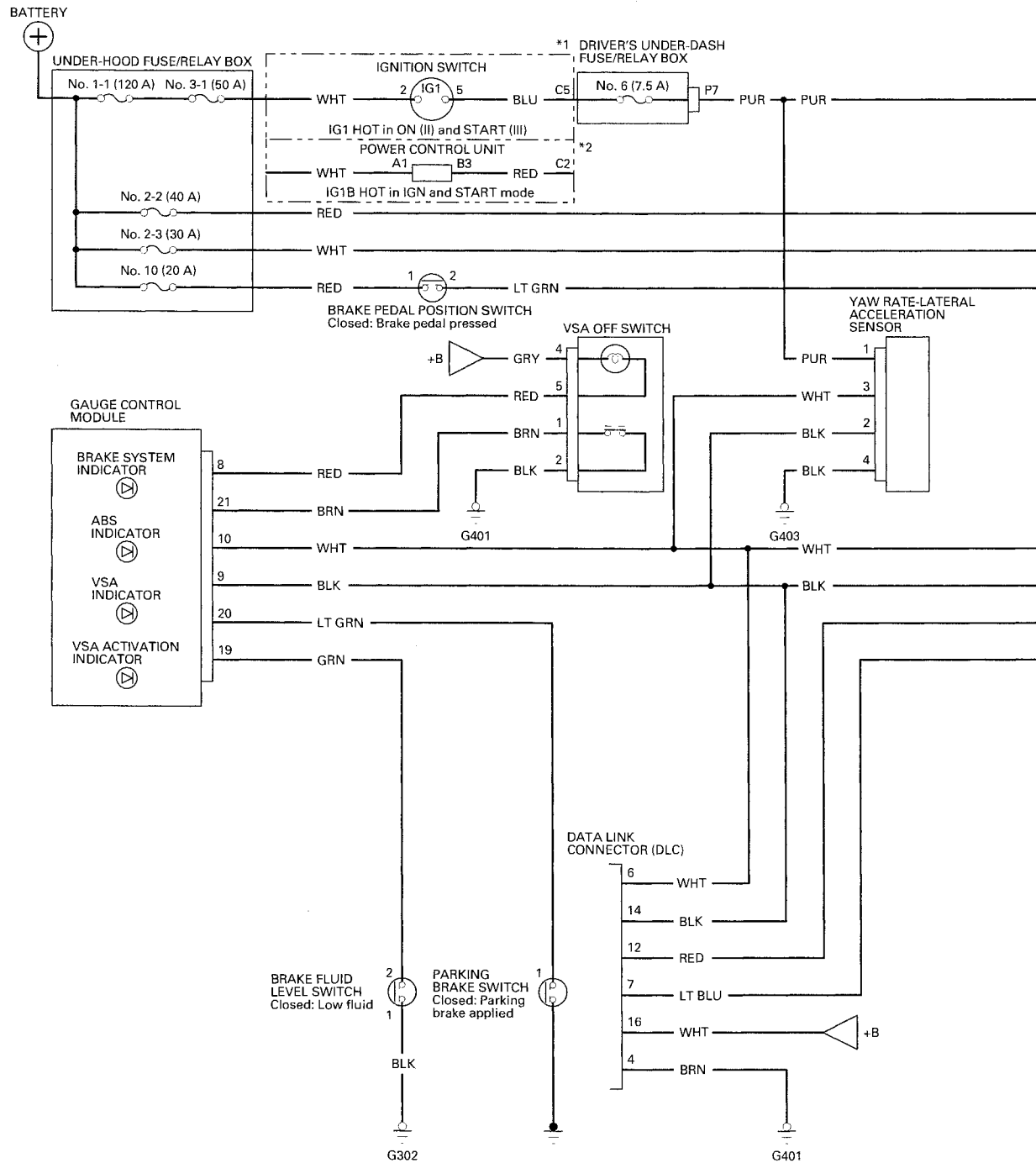


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VSA System Components

Circuit Diagram (cont'd)

'10 model without SH-AWD



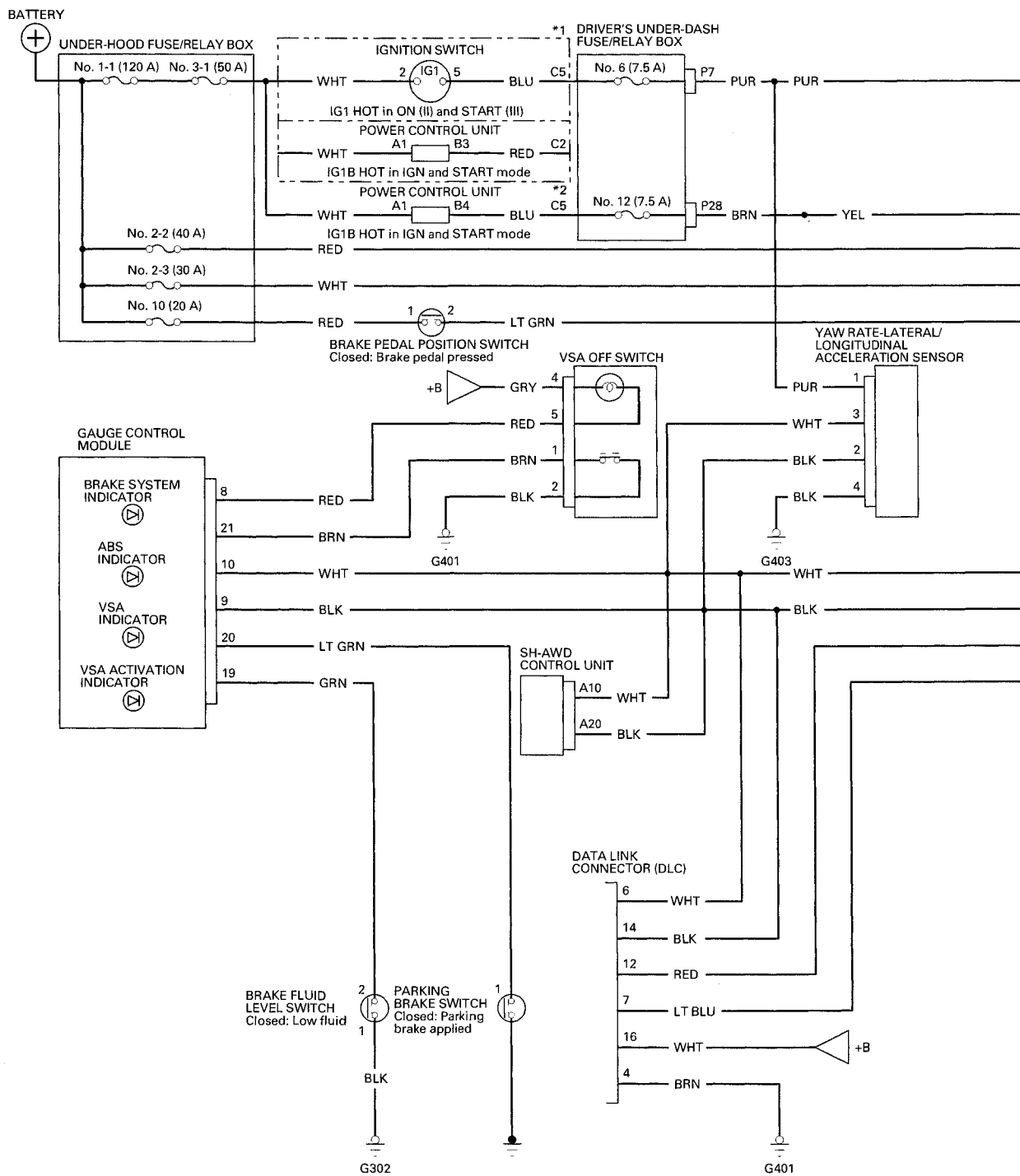
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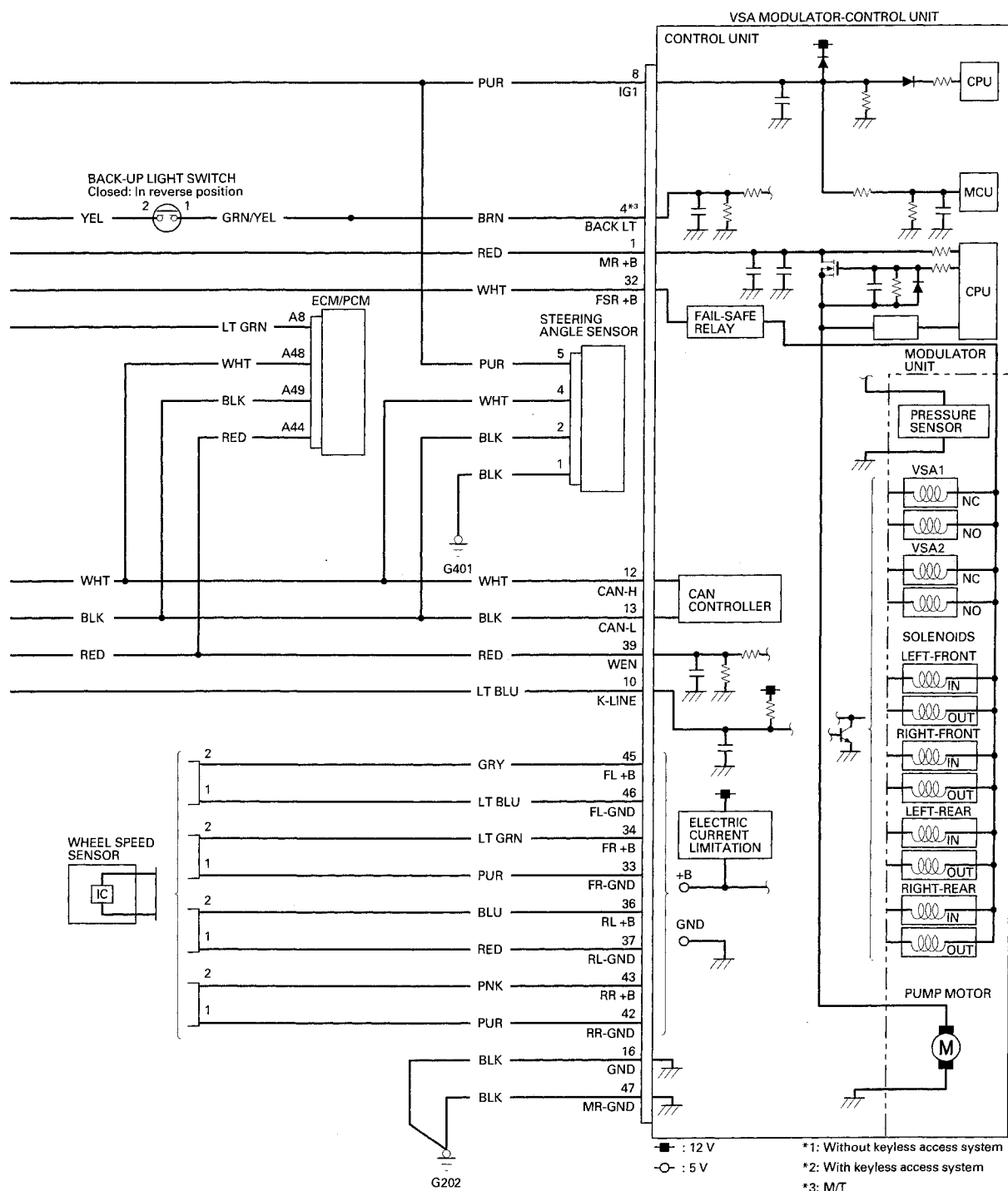


VSA System Components

Circuit Diagram (cont'd)

'10 model with SH-AWD



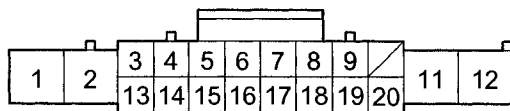


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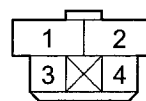
VSA System Components

Circuit Diagram (cont'd)

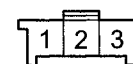
DRIVER'S UNDER-DASH FUSE/RELAY BOX CONNECTOR P (20P)



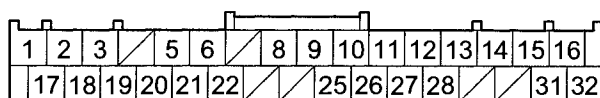
BRAKE PEDAL POSITION SWITCH 4P CONNECTOR



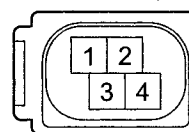
CLUTCH PEDAL POSITION SWITCH B 3P CONNECTOR



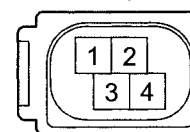
GAUGE CONTROL MODULE 32P CONNECTOR



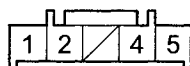
YAW RATE-LATERAL ACCELERATION SENSOR 4P CONNECTOR (Without SH-AWD)



YAW RATE-LATERAL/ LONGITUDINAL ACCELERATION SENSOR 4P CONNECTOR (With SH-AWD)



VSA OFF SWITCH 5P CONNECTOR



PARKING BRAKE SWITCH 1P CONNECTOR



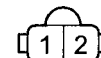
WHEEL SPEED SENSOR 2P CONNECTOR



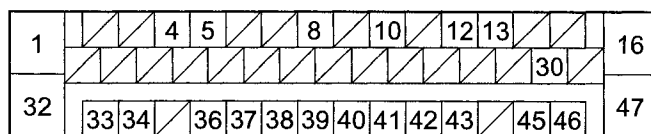
BRAKE FLUID LEVEL SWITCH 2P CONNECTOR



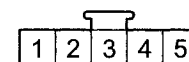
BACK-UP LIGHT SWITCH 2P CONNECTOR



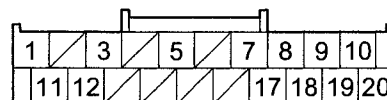
VSA MODULATOR-CONTROL UNIT 47P CONNECTOR



STEERING ANGLE SENSOR 5P CONNECTOR

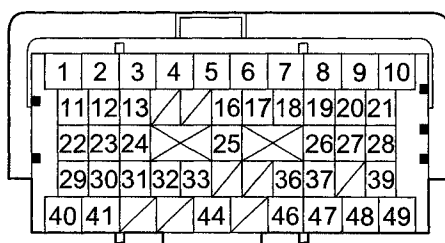


SH-AWD CONTROL UNIT CONNECTOR A (20P) (With SH-AWD)



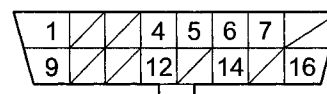
Wire side of female terminals

ECM/PCM CONNECTOR A (49P)



Terminal side of female terminals

DATA LINK CONNECTOR (DLC)



DTC Troubleshooting

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

1. Turn the ignition switch to ON (II), or press the engine start/stop button to select the ON mode.
2. Clear the DTC with the HDS.
3. Test-drive the vehicle at 19 mph (30 km/h) or more.
NOTE: Drive the vehicle on the road, not on a lift.
4. Check for DTCs with the HDS.

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

YES—Go to step 5.

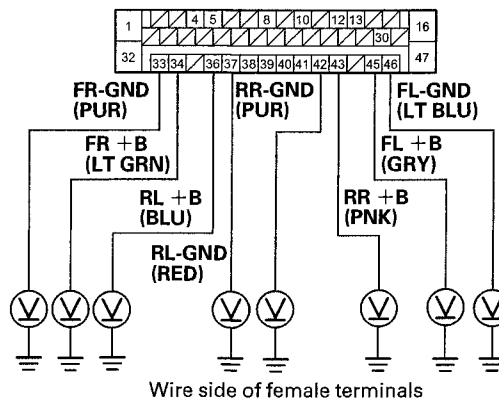
NO—Intermittent failure, the system is OK at this time. Check for loose terminals between the wheel speed sensor 2P connector and the VSA modulator-control unit 47P connector. Refer to intermittent failures troubleshooting (see page 19-49). ■

5. Turn the ignition switch to LOCK (0), or press the engine start/stop button to select the OFF mode.
6. Disconnect the VSA modulator-control unit 47P connector (see step 5 on page 19-120).
7. Start the engine.

8. Measure the voltage between body ground and the appropriate wheel speed sensor +B and GND terminals of the VSA modulator-control unit 47P connector individually (see table).

DTC	Appropriate Terminal	
	+B	GND
11 (Right-front)	FR +B: No. 34	FR-GND: No. 33
13 (Left-front)	FL +B: No. 45	FL-GND: No. 46
15 (Right-rear)	RR +B: No. 43	RR-GND: No. 42
17 (Left-rear)	RL +B: No. 36	RL-GND: No. 37

VSA MODULATOR-CONTROL UNIT 47P CONNECTOR



Is there 0.1 V or more?

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

NO—Go to step 9.

9. Turn the ignition switch to LOCK (0), or press the engine start/stop button to select the OFF mode.

(cont'd)

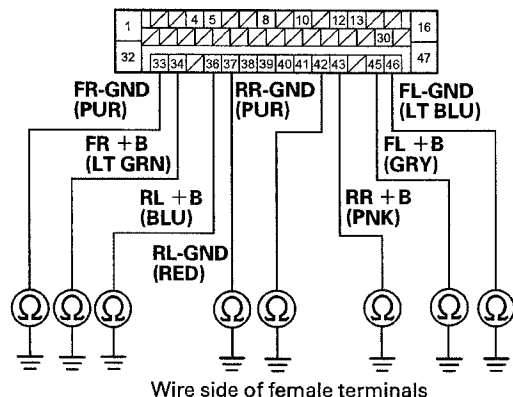
VSA System Components

DTC Troubleshooting (cont'd)

10. Check for continuity between body ground and the appropriate wheel speed sensor +B and GND terminals of the VSA modulator-control unit 47P connector individually (see table).

DTC	Appropriate Terminal	
	+B	GND
11 (Right-front)	FR +B: No. 34	FR-GND: No. 33
13 (Left-front)	FL +B: No. 45	FL-GND: No. 46
15 (Right-rear)	RR +B: No. 43	RR-GND: No. 42
17 (Left-rear)	RL +B: No. 36	RL-GND: No. 37

VSA MODULATOR-CONTROL UNIT 47P CONNECTOR



Is there continuity?

YES—Go to step 11.

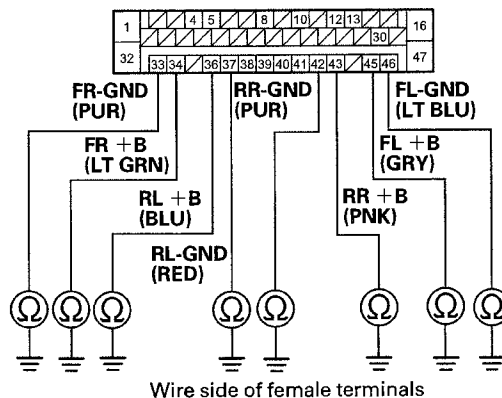
NO—Go to step 13.

11. Disconnect the appropriate wheel speed sensor 2P connector (see page 19-124).

12. Check for continuity between body ground and the appropriate wheel speed sensor +B and GND terminals of the VSA modulator-control unit 47P connector individually (see table).

DTC	Appropriate Terminal	
	+B	GND
11 (Right-front)	FR +B: No. 34	FR-GND: No. 33
13 (Left-front)	FL +B: No. 45	FL-GND: No. 46
15 (Right-rear)	RR +B: No. 43	RR-GND: No. 42
17 (Left-rear)	RL +B: No. 36	RL-GND: No. 37

VSA MODULATOR-CONTROL UNIT 47P CONNECTOR



Is there continuity?

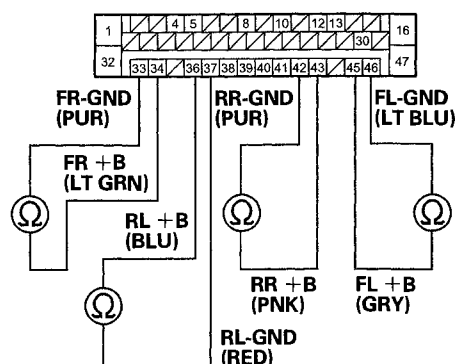
YES—Repair a short to body ground in the wire between the VSA modulator-control unit and the wheel speed sensor. ■

NO—Replace the wheel speed sensor (see page 19-124). ■

13. Disconnect the appropriate wheel speed sensor 2P connector (see page 19-124).
14. Check for continuity between the appropriate wheel speed sensor +B and GND terminals of the VSA modulator-control unit 47P connector (see table).

DTC	Appropriate Terminal	
	+B	GND
11 (Right-front)	FR +B: No. 34	FR-GND: No. 33
13 (Left-front)	FL +B: No. 45	FL-GND: No. 46
15 (Right-rear)	RR +B: No. 43	RR-GND: No. 42
17 (Left-rear)	RL +B: No. 36	RL-GND: No. 37

VSA MODULATOR-CONTROL UNIT 47P CONNECTOR



Wire side of female terminals

Is there continuity?

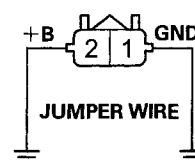
YES—Repair a short in the wires between the VSA modulator-control unit and the wheel speed sensor. ■

NO—Go to step 15.

15. Connect the wheel speed sensor 2P connector terminals No. 1 and No. 2 to body ground with a jumper wire.

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

WHEEL SPEED SENSOR 2P CONNECTOR



Terminal side of female terminals

(cont'd)

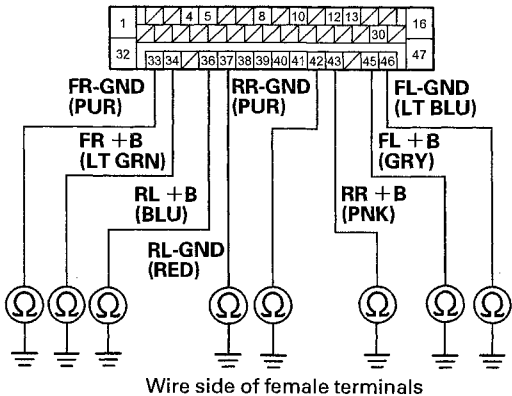
VSA System Components

DTC Troubleshooting (cont'd)

16. Check for continuity between body ground and the appropriate wheel speed sensor +B and GND terminals of the VSA modulator-control unit 47P connector individually (see table).

DTC	Appropriate Terminal	
	+B	GND
11 (Right-front)	FR +B: No. 34	FR-GND: No. 33
13 (Left-front)	FL +B: No. 45	FL-GND: No. 46
15 (Right-rear)	RR +B: No. 43	RR-GND: No. 42
17 (Left-rear)	RL +B: No. 36	RL-GND: No. 37

VSA MODULATOR-CONTROL UNIT 47P CONNECTOR



Is there continuity?

YES—Go to step 17.

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

17. Substitute the appropriate wheel speed sensor with the opposite side wheel speed sensor, or with a known-good wheel speed sensor (see page 19-124).

18. Reconnect all connectors.

19. Turn the ignition switch to ON (II), or press the engine start/stop button to select the ON mode.

20. Clear the DTC with the HDS.

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

NOTE: Drive the vehicle on the road, not on a lift.

22. Check for DTCs with the HDS.

Is the same DTC indicated that is indicated in step 4?

YES—Go to step 23.

NO—Replace the original wheel speed sensor (see page 19-124). ■

23. Update the VSA modulator-control unit if it does not have the latest software (see page 19-119). If the unit already has the latest software, substitute a known-good VSA modulator-control unit (see page 19-120).

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

NOTE: Drive the vehicle on the road, not on a lift.

25. Check for DTCs with the HDS.

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

YES—Check for loose terminals in the VSA modulator-control unit 47P connector. If the VSA modulator-control unit was updated, substitute a known-good VSA modulator-control unit (see page 19-120), then retest. If the VSA modulator-control unit was substituted, go to step 1.

NO—If the VSA modulator-control unit was updated, troubleshooting is complete. If the VSA modulator-control unit was substituted, replace the original VSA modulator-control unit (see page 19-120). If any other DTCs are indicated, go to the indicated DTCs troubleshooting. ■

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

NOTE: If the ABS and the VSA indicators came on because of electrical noise, the indicator will go off when you test-drive the vehicle at 9 mph (15 km/h) after the system returns to normal.

1. Turn the ignition switch to LOCK (0), or press the engine start/stop button to select the OFF mode.
2. Check that the appropriate wheel speed sensor is properly mounted (see page 19-124).

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

Is the wheel speed sensor installation OK?

YES—Go to step 3.

NO—Reinstall the wheel speed sensor, and check the mounting position (see page 19-124). Then go to step 3.

3. Inspect the appropriate magnetic encoder for damage, debris, and correct installation.

DTC	Appropriate Magnetic Encoder	Note
12	Right-front	Remove the driveshaft outboard joint from the appropriate wheel hub (see page 18-13).
14	Left-front	
16	Right-rear	Remove the hub bearing unit (see page 18-38).
18	Left-rear	

Is the magnetic encoder OK?

YES—Go to step 4.

NO—Remove the debris from the magnetic encoder, or replace the wheel bearing (front) or the hub bearing unit (rear):

- Front: Replace the wheel bearing (see page 18-13). ■
- Rear: Replace the hub bearing unit (see page 18-38). ■

4. Disconnect the VSA modulator-control unit 47P connector (see step 5 on page 19-120).

5. Check for continuity between the appropriate wheel speed sensor GND terminal and other wheel speed sensor GND terminals of the VSA modulator-control unit 47P connector (see table).

DTC	Appropriate Terminal	Other Terminals		
12	FR-GND: No. 33	No. 46	No. 42	No. 37
14	FL-GND: No. 46	No. 33	No. 42	No. 37
16	RR-GND: No. 42	No. 33	No. 46	No. 37
18	RL-GND: No. 37	No. 33	No. 46	No. 42

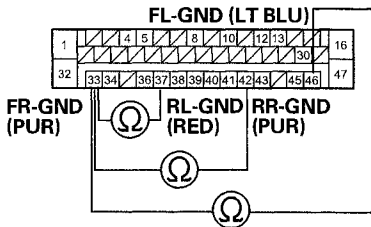
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VSA System Components

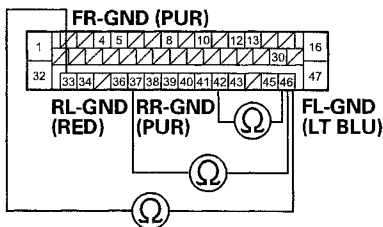
DTC Troubleshooting (cont'd)

VSA MODULATOR-CONTROL UNIT 47P CONNECTOR

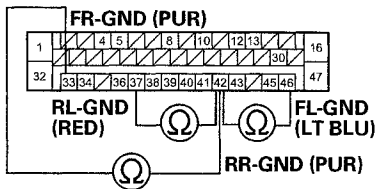
DTC12



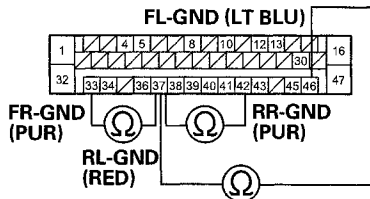
DTC14



DTC16



DTC18



Wire side of female terminals

Is there continuity?

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

NO—Go to step 6.

6. Substitute a known-good wheel speed sensor (see page 19-124).

7. Reconnect all connectors.

8. Turn the ignition switch to ON (II), or press the engine start/stop button to select the ON mode.

9. Clear the DTC with the HDS.

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

NOTE: Drive the vehicle on the road, not on a lift.

11. Check for DTCs with the HDS.

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

YES—Go to step 12.

NO—Replace the original wheel speed sensor (see page 19-124). ■

12. Update the VSA modulator-control unit if it does not have the latest software (see page 19-119). If the unit already has the latest software, substitute a known-good VSA modulator-control unit (see page 19-120).

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

NOTE: Drive the vehicle on the road, not on a lift.

14. Check for DTCs with the HDS.

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

YES—Check for loose terminals in the VSA modulator-control unit 47P connector. If the VSA modulator-control unit was updated, substitute a known-good VSA modulator-control unit (see page 19-120), then retest. If the VSA modulator-control unit was substituted, go to step 1.

NO—If the VSA modulator-control unit was updated, troubleshooting is complete. If the VSA modulator-control unit was substituted, replace the original VSA modulator-control unit (see page 19-120). If any other DTCs are indicated, go to the indicated DTCs troubleshooting. ■



DTC 21, 22, 23, 24: Magnetic Encoder (Wheel Bearing)

1. Turn the ignition switch to ON (II), or press the engine start/stop button to select the ON mode.
2. Clear the DTC with the HDS.
3. Test-drive the vehicle at 19 mph (30 km/h) or more.

NOTE: Drive the vehicle on the road, not on a lift.

4. Check for DTCs with the HDS.

Is DTC 21, 22, 23, or 24 indicated?

YES—Go to step 5.

NO—The system is OK at this time. ■

5. Inspect the appropriate magnetic encoder for damage, debris, and correct installation.

DTC	Appropriate Magnetic Encoder	Note
21	Right-front	Remove the driveshaft outboard joint from the appropriate wheel hub (see page 18-13).
22	Left-front	
23	Right-rear	Remove the hub bearing unit (see page 18-38).
24	Left-rear	

Is the magnetic encoder OK?

YES—Go to step 6.

NO—Remove the debris from the magnetic encoder, or replace the wheel bearing (front) or the hub bearing unit (rear):

- Front: Replace the wheel bearing (see page 18-13). ■
- Rear: Replace the hub bearing unit (see page 18-38). ■

6. Update the VSA modulator-control unit if it does not have the latest software (see page 19-119). If the unit already has the latest software, substitute a known-good VSA modulator-control unit (see page 19-120).

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

NOTE: Drive the vehicle on the road, not on a lift.

8. Check for DTCs with the HDS.

Is DTC 21, 22, 23, or 24 indicated?

YES—Check for loose terminals in the VSA modulator-control unit 47P connector. If the VSA modulator-control unit was updated, substitute a known-good VSA modulator-control unit (see page 19-120), then retest. If the VSA modulator-control unit was substituted, go to step 1.

NO—If the VSA modulator-control unit was updated, troubleshooting is complete. If the VSA modulator-control unit was substituted, replace the original VSA modulator-control unit (see page 19-120). If any other DTCs are indicated, go to the indicated DTCs troubleshooting. ■

VSA System Components

DTC Troubleshooting (cont'd)

DTC 25: Yaw Rate Sensor

DTC 26: Lateral Acceleration Sensor

DTC 28: Longitudinal Acceleration Sensor (With SH-AWD)

DTC 104: Yaw Rate-Lateral Acceleration Sensor (Without SH-AWD)

DTC 104: Yaw Rate-Lateral/Longitudinal Acceleration Sensor (With SH-AWD)

1. Turn the ignition switch to ON (II), or press the engine start/stop button to select the ON mode.
2. Clear the DTC with the HDS.
3. Turn the ignition switch to LOCK (0), then turn it to ON (II) again, or select the OFF mode, then the ON mode.
4. Check for DTCs with the HDS.

Is DTC 25, 26, 28, or 104 indicated?

YES—Go to step 8.

NO—Go to step 5.

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

NOTE: Drive the vehicle on the road, not on a lift.

6. Check for DTCs with the HDS.

Is DTC 25, 26, 28, or 104 indicated?

YES—Go to step 7.

NO—Intermittent failure, the system is OK at this time. Check for loose terminals between the yaw rate-lateral acceleration sensor 4P connector or the yaw rate-lateral/longitudinal acceleration sensor 4P connector, and the VSA modulator-control unit 47P connector. Refer to intermittent failures troubleshooting (see page 19-49). ■

7. Check the size, air pressure, and the amount of wear of all four tires, and check the wheel alignment (see page 18-5).

Is the tire condition and wheel alignment OK?

YES—Go to step 8.

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

8. Check the YAW/G SENSOR DIAGNOSIS in the VSA FREEZE DATA with the HDS.

Is the YAW/G SENSOR DIAGNOSIS OK?

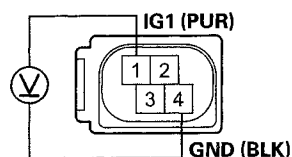
YES—Go to step 9.

NO—Replace the yaw rate-lateral acceleration sensor (see page 19-116), or the yaw rate-lateral/longitudinal acceleration sensor (see page 19-117). ■

9. Turn the ignition switch to LOCK (0), or press the engine start/stop button to select the OFF mode.
10. Disconnect the yaw rate-lateral acceleration sensor 4P connector (see page 19-116), or the yaw rate-lateral/longitudinal acceleration 4P connector (see page 19-117).
11. Turn the ignition switch to ON (II), or press the engine start/stop button to select the ON mode.

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

**YAW RATE-LATERAL/(LONGITUDINAL)*1
ACCELERATION SENSOR 4P CONNECTOR**



Wire side of female terminals

***1: With SH-AWD**

Is there battery voltage?

YES—Go to step 17.

NO—Go to step 13.

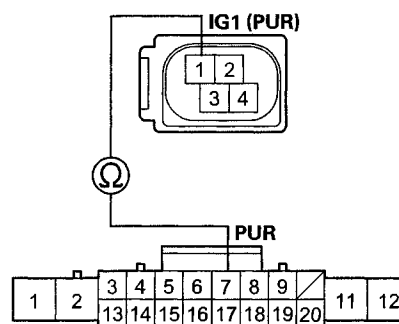
13. Turn the ignition switch to LOCK (0), or press the engine start/stop button to select the OFF mode.

14. Disconnect the driver's under-dash fuse/relay box connector P (20P) (see page 22-81).

15. Check for continuity between yaw rate-lateral acceleration sensor 4P connector or yaw rate-lateral/longitudinal acceleration sensor 4P connector terminal No. 1 and driver's under-dash fuse/relay box connector P (20P) terminal No. 7.

**YAW RATE-LATERAL/(LONGITUDINAL)*1
ACCELERATION SENSOR 4P CONNECTOR**

Wire side of female terminals



**DRIVER'S UNDER-DASH FUSE/RELAY
BOX CONNECTOR P (20P)**

Wire side of female terminals

***1: With SH-AWD**

Is there continuity?

YES—Go to step 16.

NO—Repair an open in the wire between the yaw rate-lateral acceleration sensor or the yaw rate-lateral/longitudinal acceleration sensor, and the driver's under-dash fuse/relay box.■

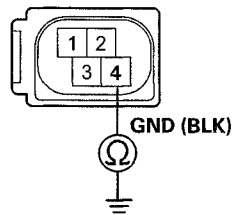
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VSA System Components

DTC Troubleshooting (cont'd)

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

YAW RATE-LATERAL/(LONGITUDINAL)*1 ACCELERATION SENSOR 4P CONNECTOR



Wire side of female terminals

***1: With SH-AWD**

Is there continuity?

YES—Go to step 17.

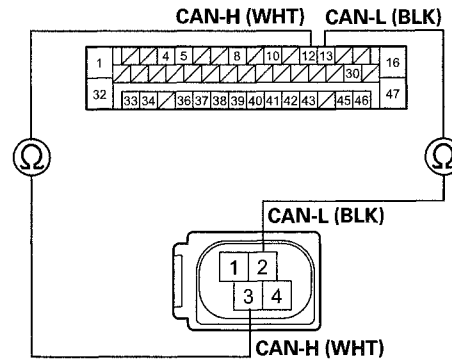
NO—Repair an open in the wire between the yaw rate-lateral acceleration sensor or the yaw rate-lateral/longitudinal acceleration sensor, and body ground (G403). ■

17. Disconnect the VSA modulator-control unit 47P connector (see step 5 on page 19-120).

18. Check for continuity between VSA modulator-control unit 47P connector terminals No. 12, No. 13, and yaw rate-lateral acceleration sensor 4P connector or yaw rate-lateral/longitudinal acceleration sensor 4P connector terminals No. 3, No. 2 individually.

VSA MODULATOR-CONTROL UNIT 47P CONNECTOR

Wire side of female terminals



YAW RATE-LATERAL/(LONGITUDINAL)*1 ACCELERATION SENSOR 4P CONNECTOR

Wire side of female terminals

***1: With SH-AWD**

Is there continuity?

YES—Go to step 19.

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

19. Substitute a known-good yaw rate-lateral acceleration sensor (see page 19-116), or the yaw rate-lateral/longitudinal acceleration sensor (see page 19-117).

20. Reconnect all connectors.

21. Turn the ignition switch to ON (II), or press the engine start/stop button to select the ON mode.

22. Clear the DTC with the HDS.

23. Do the VSA sensor neutral position memorization (see page 19-117).

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

NOTE: Drive the vehicle on the road, not on a lift.

25. Check for DTCs with the HDS.

Is DTC 25, 26, 28, or 104 indicated?

YES—Go to step 26.

NO—Replace the original yaw rate-lateral acceleration sensor (see page 19-116), or the yaw rate-lateral/longitudinal acceleration sensor (see page 19-117).■

26. Update the VSA modulator-control unit if it does not have the latest software (see page 19-119). If the unit already has the latest software, substitute a known-good VSA modulator-control unit (see page 19-120).

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

NOTE: Drive the vehicle on the road, not on a lift.

28. Check for DTCs with the HDS.

Is DTC 25, 26, 28, or 104 indicated?

YES—Check for loose terminals in the VSA modulator-control unit 47P connector. If the VSA modulator-control unit was updated, substitute a known-good VSA modulator-control unit (see page 19-120), then retest. If the VSA modulator-control unit was substituted, go to step 1.

NO—If the VSA modulator-control unit was updated, troubleshooting is complete. If the VSA modulator-control unit was substituted, replace the original VSA modulator-control unit (see page 19-120). If any other DTCs are indicated, go to the indicated DTCs troubleshooting.■

DTC 27: Steering Angle Sensor (Without SH-AWD)

1. Check the size, air pressure, and the amount of wear of all four tires, and check the wheel alignment (see page 18-5).

Is the tire condition and wheel alignment OK?

YES—Go to step 2.

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

2. Turn the ignition switch to ON (II), or press the engine start/stop button to select the ON mode.

3. Clear the DTC with the HDS.

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

NOTE: Drive the vehicle on the road, not on a lift.

5. Check for DTCs with the HDS.

Is DTC 27 indicated?

YES—Go to step 6.

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 47P connector. Refer to intermittent failures troubleshooting (see page 19-49).■

6. Turn the ignition switch to LOCK (0), or press the engine start/stop button to select the OFF mode.

7. Disconnect the steering angle sensor 5P connector (see page 19-115).

8. Disconnect the VSA modulator-control unit 47P connector (see step 5 on page 19-120).

9. Turn the ignition switch to ON (II), or press the engine start/stop button to select the ON mode.

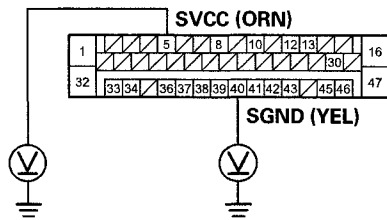
(cont'd)

VSA System Components

DTC Troubleshooting (cont'd)

10. Measure the voltage between body ground and VSA modulator-control unit 47P connector terminals No. 5 and No. 40 individually.

VSA MODULATOR-CONTROL UNIT 47P CONNECTOR



Wire side of female terminals

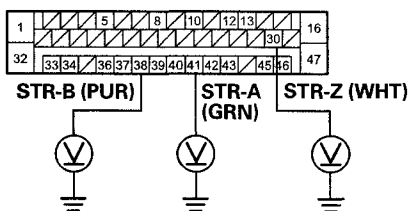
Is there 0.1 V or more?

YES—Repair a short to power in the wire between the VSA modulator-control unit and the steering angle sensor. ■

NO—Go to step 11.

11. Measure the voltage between body ground and VSA modulator-control unit 47P connector terminals No. 30, No. 38, and No. 41 individually.

VSA MODULATOR-CONTROL UNIT 47P CONNECTOR



Wire side of female terminals

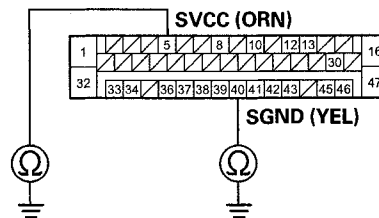
Is there 0.1 V or more?

YES—Repair a short to power in the wire between the VSA modulator-control unit and the steering angle sensor. ■

NO—Go to step 12.

12. Turn the ignition switch to LOCK (0), or press the engine start/stop button to select the OFF mode.
13. Check for continuity between body ground and VSA modulator-control unit 47P connector terminals No. 5 and No. 40 individually.

VSA MODULATOR-CONTROL UNIT 47P CONNECTOR



Wire side of female terminals

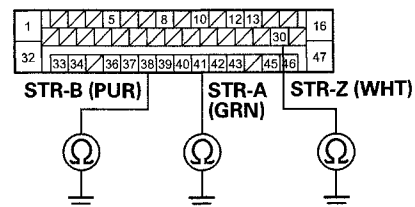
Is there continuity?

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

NO—Go to step 14.

14. Check for continuity between body ground and VSA modulator-control unit 47P connector terminals No. 30, No. 38, and No. 41 individually.

VSA MODULATOR-CONTROL UNIT 47P CONNECTOR



Wire side of female terminals

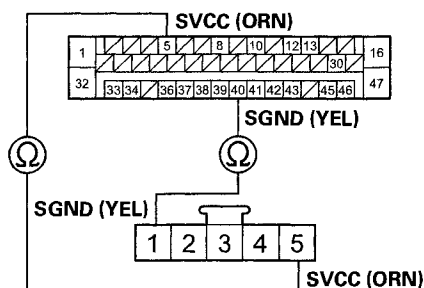
Is there continuity?

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

NO—Go to step 15.

15. Check for continuity between VSA modulator-control unit 47P connector terminals No. 5, No. 40 and steering angle sensor 5P connector terminals No. 5, No. 1 individually.

VSA MODULATOR-CONTROL UNIT 47P CONNECTOR
Wire side of female terminals



STEERING ANGLE SENSOR 5P CONNECTOR
Wire side of female terminals

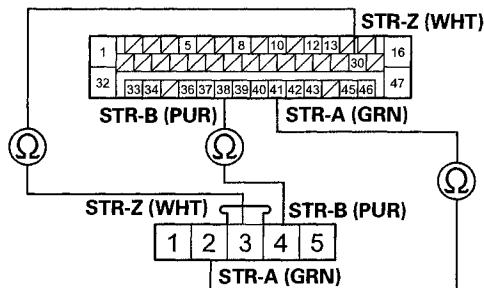
Is there continuity?

YES—Go to step 16.

NO—Repair an open in the wire between the VSA modulator-control unit and the steering angle sensor. ■

16. Check for continuity between VSA modulator-control unit 47P connector terminals No. 30, No. 38, No. 41 and steering angle sensor 5P connector terminals No. 3, No. 4, and No. 2 individually.

VSA MODULATOR-CONTROL UNIT 47P CONNECTOR
Wire side of female terminals



STEERING ANGLE SENSOR 5P CONNECTOR
Wire side of female terminals

Is there continuity?

YES—Go to step 17.

NO—Repair an open in the wire between the VSA modulator-control unit and the steering angle sensor. ■

17. Substitute a known-good steering angle sensor (see page 19-115).
18. Reconnect all connectors.
19. Turn the ignition switch to ON (II), or press the engine start/stop button to select the ON mode.
20. Clear the DTC with the HDS.
21. Test-drive the vehicle around a number of corners.
- NOTE: Drive the vehicle on the road, not on a lift.
22. Check for DTCs with the HDS.

Is DTC 27 indicated?

YES—Go to step 23.

NO—Replace the original steering angle sensor (see page 19-115). ■

(cont'd)

VSA System Components

DTC Troubleshooting (cont'd)

23. Update the VSA modulator-control unit if it does not have the latest software (see page 19-119). If the unit already has the latest software, substitute a known-good VSA modulator-control unit (see page 19-120).

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

NOTE: Drive the vehicle on the road, not on a lift.

25. Check for DTCs with the HDS.

Is DTC 27 indicated?

YES—Check for loose terminals in the VSA modulator-control unit 47P connector. If the VSA modulator-control unit was updated, substitute a known-good VSA modulator-control unit (see page 19-120), then retest. If the VSA modulator-control unit was substituted, go to step 1.

NO—If the VSA modulator-control unit was updated, troubleshooting is complete. If the VSA modulator-control unit was substituted, replace the original VSA modulator-control unit (see page 19-120). If any other DTCs are indicated, go to the indicated DTCs troubleshooting.■

DTC 27: Steering Angle Sensor (With SH-AWD)

1. Check the size, air pressure, and the amount of wear of all four tires, and check the wheel alignment (see page 18-5).

Is the tire condition and wheel alignment OK?

YES—Go to step 2.

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

2. Turn the ignition switch to ON (II), or press the engine start/stop button to select the ON mode.

3. Slowly drive the vehicle straight ahead without turning the steering wheel for 10 ft (3 m) or more, then park the vehicle while holding the steering wheel in the straight ahead position.

4. Check the STEERING ANGLE in the VSA DATA LIST with the HDS.

Is it $0^\circ \pm 3^\circ$?

YES—Go to step 6.

NO—Go to step 5.

5. Do the VSA sensor neutral position memorization (see page 19-117).

6. Clear the DTC with the HDS.

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

NOTE: Drive the vehicle on the road, not on a lift.

8. Check for DTCs with the HDS.

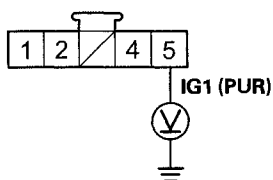
Is DTC 27 indicated?

YES—Go to step 9.

NO—The system is OK at this time.■

9. Turn the ignition switch to LOCK (0), or press the engine start/stop button to select the OFF mode.
10. Disconnect the steering angle sensor 5P connector (see page 19-115).
11. Turn the ignition switch to ON (II), or press the engine start/stop button to select the ON mode.
12. Measure the voltage between the steering angle sensor 5P connector terminal No. 5 and body ground.

STEERING ANGLE SENSOR 5P CONNECTOR



Wire side of female terminals

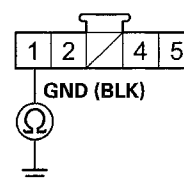
Is there battery voltage?

YES—Go to step 13.

NO—Repair an open in the wire between the No. 6 (7.5 A) fuse in the driver's under-dash fuse/relay box and the steering angle sensor. ■

13. Turn the ignition switch to LOCK (0), or press the engine start/stop button to select the OFF mode.
14. Check for continuity between the steering angle sensor 5P connector terminal No. 1 and body ground.

STEERING ANGLE SENSOR 5P CONNECTOR



Wire side of female terminals

Is there continuity?

YES—Go to step 15.

NO—Repair an open in the wire between the steering angle sensor and body ground (G401). ■

15. Disconnect the VSA modulator-control unit 47P connector (see step 5 on page 19-120).

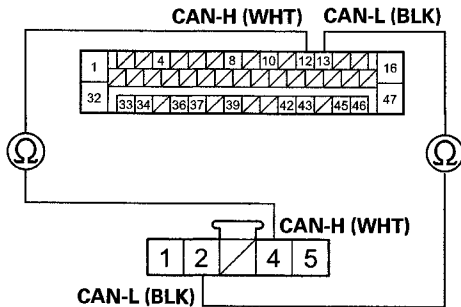
(cont'd)

VSA System Components

DTC Troubleshooting (cont'd)

16. Check for continuity between VSA modulator-control unit 47P connector terminals No. 12, No 13 and steering angle sensor 5P connector terminals No. 4, No. 2 individually.

VSA MODULATOR-CONTROL UNIT 47P CONNECTOR
Wire side of female terminals



STEERING ANGLE SENSOR 5P CONNECTOR
Wire side of female terminals

Is there continuity?

YES—Go to step 17.

NO—Repair an open in the wire between the VSA modulator-control unit and the steering angle sensor. ■

17. Substitute a known-good steering angle sensor (see page 19-115).
18. Reconnect all connectors.
19. Turn the ignition switch to ON (II), or press the engine start/stop button to select the ON mode.

20. Clear the DTC with the HDS.

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

NOTE: Drive the vehicle on the road, not on a lift.

22. Check for DTCs with the HDS.

Is DTC 27 indicated?

YES—Go to step 23.

NO—Replace the original steering angle sensor (see page 19-115). ■

23. Update the VSA modulator-control unit if it does not have the latest software (see page 19-119). If the unit already has the latest software, substitute a known-good VSA modulator-control unit (see page 19-120).

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

NOTE: Drive the vehicle on the road, not on a lift.

25. Check for DTCs with the HDS.

Is DTC 27 indicated?

YES—Check for loose terminals in the VSA modulator-control unit 47P connector. If the VSA modulator-control unit was updated, substitute a known-good VSA modulator-control unit (see page 19-120), then retest. If the VSA modulator-control unit was substituted, go to step 1.

NO—If the VSA modulator-control unit was updated, troubleshooting is complete. If the VSA modulator-control unit was substituted, replace the original VSA modulator-control unit (see page 19-120). If any other DTCs are indicated, go to the indicated DTCs troubleshooting. ■



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

1. Turn the ignition switch to ON (II), or press the engine start/stop button to select the ON mode.
2. Clear the DTC with the HDS.
3. Turn the ignition switch to LOCK (0), then turn it to ON (II) again, or select the OFF mode, then the ON mode.
4. Check for DTCs with the HDS.

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

YES—Go to step 5.

NO—The system is OK at this time. ■

5. Update the VSA modulator-control unit if it does not have the latest software (see page 19-119). If the unit already has the latest software, substitute a known-good VSA modulator-control unit (see page 19-120).
6. Turn the ignition switch to LOCK (0), then turn it to ON (II) again, or select the OFF mode, then the ON mode.
7. Check for DTCs with the HDS.

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

YES—Check for loose terminals in the VSA modulator-control unit 47P connector. If the VSA modulator-control unit was updated, substitute a known-good VSA modulator-control unit (see page 19-120), then retest. If the VSA modulator-control unit was substituted, go to step 1.

NO—If the VSA modulator-control unit was updated, troubleshooting is complete. If the VSA modulator-control unit was substituted, replace the original VSA modulator-control unit (see page 19-120). If any other DTCs are indicated, go to the indicated DTCs troubleshooting. ■

DTC 51: Motor Lock

DTC 52: Motor Stuck ON/OFF

1. Turn the ignition switch to ON (II), or press the engine start/stop button to select the ON mode.
2. Clear the DTC with the HDS.
3. Test-drive the vehicle at 19 mph (30 km/h) or more.

NOTE: Drive the vehicle on the road, not on a lift.

4. Check for DTCs with the HDS.

Is DTC 51 or 52 indicated?

YES—Go to step 5.

NO—Intermittent failure, the system is OK at this time. Check for loose terminals in the VSA modulator-control unit 47P connector. Refer to intermittent failures troubleshooting (see page 19-49). ■

5. Turn the ignition switch to LOCK (0), or press the engine start/stop button to select the OFF mode.
6. Check the No. 2-2 (40 A) fuse in the under-hood fuse/relay box.

Is the fuse blown?

YES—Go to step 7.

NO—Reinstall the checked fuse, then go to step 14.

7. Disconnect the VSA modulator-control unit 47P connector (see step 5 on page 19-120).

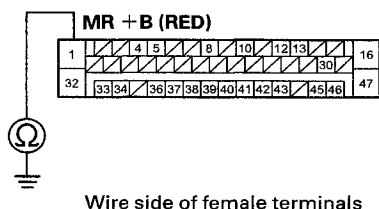
(cont'd)

VSA System Components

DTC Troubleshooting (cont'd)

8. Check for continuity between VSA modulator-control unit 47P connector terminal No. 1 and body ground.

VSA MODULATOR-CONTROL UNIT 47P CONNECTOR



Is there continuity?

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

NO—Install a new No. 2-2 (40 A) fuse in the under-hood fuse/relay box, then go to step 9.

9. Reconnect the VSA modulator-control unit 47P connector.
10. Turn the ignition switch to ON (II), or press the engine start/stop button to select the ON mode.
11. Clear the DTC with the HDS.
12. Test-drive the vehicle at 19 mph (30 km/h) or more.
- NOTE: Drive the vehicle on the road, not on a lift.
13. Check for DTCs with the HDS.

Is DTC 51 or 52 indicated?

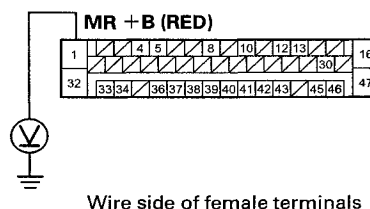
YES—Replace the VSA modulator-control unit (see page 19-120). ■

NO—Troubleshooting is complete. ■

14. Disconnect the VSA modulator-control unit 47P connector (see step 5 on page 19-120).

15. Measure the voltage between VSA modulator-control unit 47P connector terminal No. 1 and body ground.

VSA MODULATOR-CONTROL UNIT 47P CONNECTOR



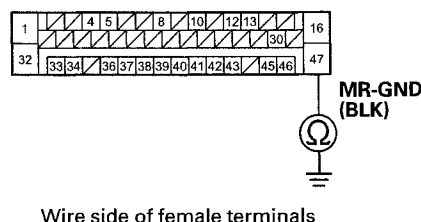
Is there battery voltage?

YES—Go to step 16.

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

16. Check for continuity between VSA modulator-control unit 47P connector terminal No. 47 and body ground.

VSA MODULATOR-CONTROL UNIT 47P CONNECTOR



Is there continuity?

YES—Go to step 17.

NO—Repair an open in the wire between the VSA modulator-control unit and body ground (G202). ■



17. Reconnect the VSA modulator-control unit 47P connector.

18. Update the VSA modulator-control unit if it does not have the latest software (see page 19-119). If the unit already has the latest software, substitute a known-good VSA modulator-control unit (see page 19-120).

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

NOTE: Drive the vehicle on the road, not on a lift.

20. Check for DTCs with the HDS.

Is DTC 51 or 52 indicated?

YES—Check for loose terminals in the VSA modulator-control unit 47P connector. If the VSA modulator-control unit was updated, substitute a known-good VSA modulator-control unit (see page 19-120), then retest. If the VSA modulator-control unit was substituted, go to step 1.

NO—If the VSA modulator-control unit was updated, troubleshooting is complete. If the VSA modulator-control unit was substituted, replace the original VSA modulator-control unit (see page 19-120). If any other DTCs are indicated, go to the indicated DTCs troubleshooting. ■

DTC 54: Fail-safe Relay

1. Turn the ignition switch to ON (II), or press the engine start/stop button to select the ON mode.

2. Clear the DTC with the HDS.

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

NOTE: Drive the vehicle on the road, not on a lift.

4. Check for DTCs with the HDS.

Is DTC 54 indicated?

YES—Go to step 5.

NO—Intermittent failure, the system is OK at this time. ■

5. Turn the ignition switch to LOCK (0), or press the engine start/stop button to select the OFF mode.

6. Check the No. 2-3 (30 A) fuse in the under-hood fuse/relay box.

Is the fuse blown?

YES—Go to step 7.

NO—Reinstall the checked fuse, then go to step 14.

7. Disconnect the VSA modulator-control unit 47P connector (see step 5 on page 19-120).

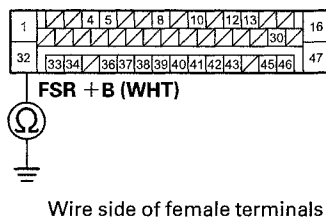
(cont'd)

VSA System Components

DTC Troubleshooting (cont'd)

8. Check for continuity between VSA modulator-control unit 47P connector terminal No. 32 and body ground.

VSA MODULATOR-CONTROL UNIT 47P CONNECTOR



Is there continuity?

YES—Repair a short to body ground in the wire between the No. 2-3 (30 A) fuse in the under-hood fuse/relay box and the VSA modulator-control unit. ■

NO—Install a new No. 2-3 (30 A) fuse in the under-hood fuse/relay box, then go to step 9.

9. Reconnect the VSA modulator-control unit 47P connector.
10. Turn the ignition switch to ON (II), or press the engine start/stop button to select the ON mode.
11. Clear the DTC with the HDS.
12. Test-drive the vehicle at 19 mph (30 km/h) or more.
- NOTE: Drive the vehicle on the road, not on a lift.
13. Check for DTCs with the HDS.

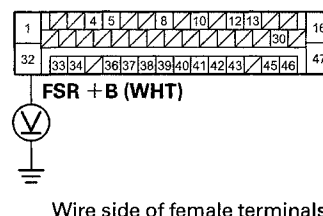
Is DTC 54 indicated?

YES—Replace the VSA modulator-control unit (see page 19-120). ■

NO—Troubleshooting is complete. ■

14. Disconnect the VSA modulator-control unit 47P connector (see step 5 on page 19-120).
15. Measure the voltage between VSA modulator-control unit 47P connector terminal No. 32 and body ground.

VSA MODULATOR-CONTROL UNIT 47P CONNECTOR



Is there battery voltage?

YES—Go to step 16.

NO—Repair an open in the wire between the No. 2-3 (30 A) fuse in the under-hood fuse/relay box and the VSA modulator-control unit. ■

16. Reconnect the VSA modulator-control unit 47P connector.
17. Update the VSA modulator-control unit if it does not have the latest software (see page 19-119). If the unit already has the latest software, substitute a known-good VSA modulator-control unit (see page 19-120).
18. Test-drive the vehicle at 19 mph (30 km/h) or more.
- NOTE: Drive the vehicle on the road, not on a lift.
19. Check for DTCs with the HDS.

Is DTC 54 indicated?

YES—Check for loose terminals in the VSA modulator-control unit 47P connector. If the VSA modulator-control unit was updated, substitute a known-good VSA modulator-control unit (see page 19-120), then retest. If the VSA modulator-control unit was substituted, go to step 1.

NO—If the VSA modulator-control unit was updated, troubleshooting is complete. If the VSA modulator-control unit was substituted, replace the original VSA modulator-control unit (see page 19-120). If any other DTCs are indicated, go to the indicated DTCs troubleshooting. ■

DTC 61: Low +B-FSR Voltage

DTC 62: High +B-FSR Voltage

NOTE: If the vehicle has high electric load or a weak battery, DTC 61 may be stored when starting the engine.

1. Turn the ignition switch to ON (II), or press the engine start/stop button to select the ON mode.
2. Clear the DTC with the HDS.
3. Turn the ignition switch to LOCK (0), then turn it to ON (II) again, or select the OFF mode, then the ON mode.

Does the ABS indicator stay on?

YES—Go to step 4.

NO—The system is OK at this time. ■

4. Check for DTCs with the HDS.

Is DTC 61 or 62 indicated?

YES—Check the battery (see page 22-84) and the charging system (see page 4-41). ■

NO—Do the appropriate troubleshooting for the DTC indicated. ■

DTC 64: Sensor Power Voltage (Without SH-AWD)

1. Turn the ignition switch to ON (II), or press the engine start/stop button to select the ON mode.
2. Clear the DTC with the HDS.
3. Test-drive the vehicle at 19 mph (30 km/h) or more.

NOTE: Drive the vehicle on the road, not on a lift.

4. Check for DTCs with the HDS.

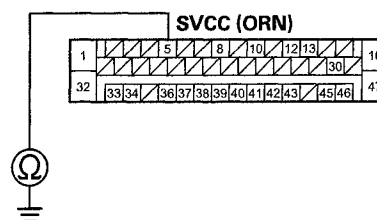
Is DTC 64 indicated?

YES—Go to step 5.

NO—The system is OK at this time. ■

5. Turn the ignition switch to LOCK (0), or press the engine start/stop button to select the OFF mode.
6. Disconnect the steering angle sensor 5P connector (see page 19-115).
7. Disconnect the VSA modulator-control unit 47P connector (see step 5 on page 19-120).
8. Check for continuity between VSA modulator-control unit 47P connector terminal No. 5 and body ground.

VSA MODULATOR-CONTROL UNIT 47P CONNECTOR



Is there continuity?

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

NO—Go to step 9.

(cont'd)

VSA System Components

DTC Troubleshooting (cont'd)

9. Reconnect all connectors.

10. Update the VSA modulator-control unit if it does not have the latest software (see page 19-119). If the unit already has the latest software, substitute a known-good VSA modulator-control unit (see page 19-120).

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

NOTE: Drive the vehicle on the road, not on a lift.

12. Check for DTCs with the HDS.

Is DTC 64 indicated?

YES—Check for loose terminals in the VSA modulator-control unit 47P connector. If the VSA modulator-control unit was updated, substitute a known-good VSA modulator-control unit (see page 19-120), then retest. If the VSA modulator-control unit was substituted, go to step 1.

NO—If the VSA modulator-control unit was updated, troubleshooting is complete. If the VSA modulator-control unit was substituted, replace the original VSA modulator-control unit (see page 19-120). If any other DTCs are indicated, go to the indicated DTCs troubleshooting.■

DTC 64: Sensor Power Voltage (With SH-AWD)

1. Turn the ignition switch to ON (II), or press the engine start/stop button to select the ON mode.

2. Clear the DTC with the HDS.

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

NOTE: Drive the vehicle on the road, not on a lift.

4. Check for DTCs with the HDS.

Is DTC 64 indicated?

YES—Go to step 5.

NO—The system is OK at this time.■

5. Update the VSA modulator-control unit if it does not have the latest software (see page 19-119). If the unit already has the latest software, substitute a known-good VSA modulator-control unit (see page 19-120).

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

NOTE: Drive the vehicle on the road, not on a lift.

7. Check for DTCs with the HDS.

Is DTC 64 indicated?

YES—Check for loose terminals in the VSA modulator-control unit 47P connector. If the VSA modulator-control unit was updated, substitute a known-good VSA modulator-control unit (see page 19-120), then retest. If the VSA modulator-control unit was substituted, go to step 1.

NO—If the VSA modulator-control unit was updated, troubleshooting is complete. If the VSA modulator-control unit was substituted, replace the original VSA modulator-control unit (see page 19-120). If any other DTCs are indicated, go to the indicated DTCs troubleshooting.■

DTC 65: Brake Fluid Level

1. Check the brake fluid level in the master cylinder reservoir.

Is the brake fluid level OK?

YES—Go to step 2.

NO—Inspect the brake pads: Front (see page 19-13), rear (see page 19-25), and replace worn out brake pads, then recheck. ■

2. Turn the ignition switch to ON (II), or press the engine start/stop button to select the ON mode.
3. Clear the DTC with the HDS.
4. Turn the ignition switch to LOCK (0), or press the engine start/stop button to select the OFF mode.
5. Disconnect the brake fluid level switch 2P connector (see step 6 on page 19-20).
6. Turn the ignition switch to ON (II), or press the engine start/stop button to select the ON mode.
7. Check for DTCs with the HDS.

Is DTC 65 indicated?

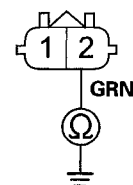
YES—Go to step 8.

NO—Replace the reservoir (brake fluid level switch is included) on the master cylinder (see page 19-20). ■

8. Turn the ignition switch to LOCK (0), or press the engine start/stop button to select the OFF mode.
9. Disconnect the gauge control module 32P connector (see page 22-367).

10. Check for continuity between brake fluid level switch 2P connector terminal No. 2 and body ground.

BRAKE FLUID LEVEL SWITCH 2P CONNECTOR



Wire side of female terminals

Is there continuity?

YES—Repair a short to body ground in the wire between the gauge control module and the brake fluid level switch. ■

NO—Go to step 11.

11. Update the VSA modulator-control unit if it does not have the latest software (see page 19-119). If the unit already has the latest software, substitute a known-good VSA modulator-control unit (see page 19-120).
12. Turn the ignition switch to LOCK (0), then turn it to ON (II) again, or select the OFF mode, then the ON mode.
13. Check for DTCs with the HDS.

Is DTC 65 indicated?

YES—Check for loose terminals in the VSA modulator-control unit 47P connector. If the VSA modulator-control unit was updated, substitute a known-good VSA modulator-control unit (see page 19-120), then retest. If the VSA modulator-control unit was substituted, go to step 1.

NO—If the VSA modulator-control unit was updated, troubleshooting is complete. If the VSA modulator-control unit was substituted, replace the original VSA modulator-control unit (see page 19-120). If any other DTCs are indicated, go to the indicated DTCs troubleshooting. ■

VSA System Components

DTC Troubleshooting (cont'd)

DTC 66: VSA Pressure Sensor (Inside of VSA Modulator-control Unit)

1. Turn the ignition switch to ON (II), or press the engine start/stop button to select the ON mode.

2. Clear the DTC with the HDS.

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

NOTE: Drive the vehicle on the road, not on a lift.

4. Check for DTCs with the HDS.

Is DTC 66 indicated?

YES—Go to step 5.

NO—The system is OK at this time. ■

5. Update the VSA modulator-control unit if it does not have the latest software (see page 19-119). If the unit already has the latest software, substitute a known-good VSA modulator-control unit (see page 19-120).

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

NOTE: Drive the vehicle on the road, not on a lift.

7. Check for DTCs with the HDS.

Is DTC 66 indicated?

YES—Check for loose terminals in the VSA modulator-control unit 47P connector. If the VSA modulator-control unit was updated, substitute a known-good VSA modulator-control unit (see page 19-120), then retest. If the VSA modulator-control unit was substituted, go to step 1.

NO—If the VSA modulator-control unit was updated, troubleshooting is complete. If the VSA modulator-control unit was substituted, replace the original VSA modulator-control unit (see page 19-120). If any other DTCs are indicated, go to the indicated DTCs troubleshooting. ■

DTC 68: Brake Pedal Position Switch

1. Turn the ignition switch to ON (II), or press the engine start/stop button to select the ON mode.

2. Check for other system DTCs.

Are there other DTCs indicated?

YES—Do the appropriate troubleshooting for the DTC. ■

NO—Go to step 3.

3. Turn the ignition switch to LOCK (0), or press the engine start/stop button to select the OFF mode.

4. Check the brake pedal position switch (see page 22-240), and adjustment (see page 19-6).

Is the brake pedal position switch and adjustment OK?

YES—Go to step 5.

NO—Adjust the brake pedal position switch. If necessary, replace the brake pedal position switch (see page 19-6). ■

5. Turn the ignition switch to ON (II), or press the engine start/stop button to select the ON mode.

6. Clear the DTC with the HDS.

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

NOTE: Drive the vehicle on the road, not on a lift.

8. Check for DTCs with the HDS.

Is DTC 68 indicated?

YES—Go to step 9.

NO—The system is OK at this time. ■

9. Troubleshoot the brake pedal position switch signal circuit (see page 11-335).

Is the brake pedal position switch circuit OK?

YES—Go to step 10.

NO—Repair the brake pedal position switch circuit (see page 11-335). ■



10. Reconnect all connectors.
11. Update the ECM/PCM if it does not have the latest software (see page 11-281), or substitute a known-good ECM/PCM (see page 11-7).
12. Clear the DTC with the HDS.
13. Test-drive the vehicle at 19 mph (30 km/h) or more.

NOTE: Drive the vehicle on the road, not on a lift.

14. Check for DTCs with the HDS.

Is DTC 68 indicated?

YES—Check for loose terminals in the ECM/PCM connector A (49P). If the ECM/PCM was updated, substitute a known-good ECM/PCM (see page 11-7), then retest. If the ECM/PCM was substituted, go to step 15.

NO—If the ECM/PCM was updated, troubleshooting is complete. If the ECM/PCM was substituted, replace the original ECM/PCM (see page 11-282). ■

15. Update the VSA modulator-control unit if it does not have the latest software (see page 19-119). If the unit already has the latest software, substitute a known-good VSA modulator-control unit (see page 19-120).
16. Test-drive the vehicle at 19 mph (30 km/h) or more.

NOTE: Drive the vehicle on the road, not on a lift.

17. Check for DTCs with the HDS.

Is DTC 68 indicated?

YES—Check for loose terminals in the VSA modulator-control unit 47P connector. If the VSA modulator-control unit was updated, substitute a known-good VSA modulator-control unit (see page 19-120), then retest. If the VSA modulator-control unit was substituted, go to step 1.

NO—If the VSA modulator-control unit was updated, troubleshooting is complete. If the VSA modulator-control unit was substituted, replace the original VSA modulator-control unit (see page 19-120). If any other DTCs are indicated, go to the indicated DTCs troubleshooting. ■

DTC 81: Central Processing Unit (CPU)

1. Turn the ignition switch to ON (II), or press the engine start/stop button to select the ON mode.

2. Check for other system DTCs.

Are there other DTCs indicated?

YES—Do the appropriate troubleshooting for the DTC. ■

NO—Go to step 3.

3. Clear the DTC with the HDS.

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

NOTE: Drive the vehicle on the road, not on a lift.

5. Check for DTCs with the HDS.

Is DTC 81 indicated?

YES—Go to step 6.

NO—Intermittent failure, the system is OK at this time. ■

6. Update the VSA modulator-control unit if it does not have the latest software (see page 19-119). If the unit already has the latest software, substitute a known-good VSA modulator-control unit (see page 19-120).

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

NOTE: Drive the vehicle on the road, not on a lift.

8. Check for DTCs with the HDS.

Is DTC 81 indicated?

YES—Check for loose terminals in the VSA modulator-control unit 47P connector. If the VSA modulator-control unit was updated, substitute a known-good VSA modulator-control unit (see page 19-120), then retest. If the VSA modulator-control unit was substituted, go to step 1.

NO—If the VSA modulator-control unit was updated, troubleshooting is complete. If the VSA modulator-control unit was substituted, replace the original VSA modulator-control unit (see page 19-120). If any other DTCs are indicated, go to the indicated DTCs troubleshooting. ■

VSA System Components

DTC Troubleshooting (cont'd)

DTC 83: ECM/PCM Communication

1. Turn the ignition switch to ON (II), or press the engine start/stop button to select the ON mode.

2. Check for DTCs with the HDS.

Is DTC 86 indicated?

YES—Do the troubleshooting for DTC 86 (see page 19-102). ■

NO—Go to step 3.

3. Clear the DTC with the HDS.

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

NOTE: Drive the vehicle on the road, not on a lift.

5. Check for DTCs with the HDS.

Is DTC 83 indicated?

YES—Go to step 6.

NO—The system is OK at this time. ■

6. Check for fuel and emissions systems DTCs with the HDS (see page 11-3).

Are any ECM/PCM DTCs indicated?

YES—Do the applicable troubleshooting for the ECM/PCM. ■

NO—Go to step 7.

7. Update the VSA modulator-control unit if it does not have the latest software (see page 19-119). If the unit already has the latest software, substitute a known-good VSA modulator-control unit (see page 19-120).

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

NOTE: Drive the vehicle on the road, not on a lift.

9. Check for DTCs with the HDS.

Is DTC 83 indicated?

YES—Check for loose terminals in the VSA modulator-control unit 47P connector. If the VSA modulator-control unit was updated, substitute a known-good VSA modulator-control unit (see page 19-120), then retest. If the VSA modulator-control unit was substituted, go to step 1.

NO—If the VSA modulator-control unit was updated, troubleshooting is complete. If the VSA modulator-control unit was substituted, replace the original VSA modulator-control unit (see page 19-120). If any other DTCs are indicated, go to the indicated DTCs troubleshooting. ■



DTC 84-01: VSA Sensor Neutral Position

1. Do the VSA sensor neutral position memorization (see page 19-117).
2. Clear the DTC with the HDS.
3. Turn the ignition switch to LOCK (0), then turn it to ON (II) again, or select the OFF mode, then the ON mode.

4. Check for DTCs with the HDS.

Is DTC 84-01 indicated?

YES—Go to step 5.

NO—The system is OK at this time. ■

5. Update the VSA modulator-control unit if it does not have the latest software (see page 19-119). If the unit already has the latest software, substitute a known-good VSA modulator-control unit (see page 19-120).

6. Turn the ignition switch to LOCK (0), then turn it to ON (II) again, or select the OFF mode, then the ON mode.

7. Check for DTCs with the HDS.

Is DTC 84-01 indicated?

YES—Check for loose terminals in the VSA modulator-control unit 47P connector. If the VSA modulator-control unit was updated, substitute a known-good VSA modulator-control unit (see page 19-120), then retest. If the VSA modulator-control unit was substituted, go to step 1.

NO—If the VSA modulator-control unit was updated, troubleshooting is complete. If the VSA modulator-control unit was substituted, replace the original VSA modulator-control unit (see page 19-120). If any other DTCs are indicated, go to the indicated DTCs troubleshooting. ■

DTC 84-12: Steering Angle Sensor Neutral Position

1. Turn the ignition switch to ON (II), or press the engine start/stop button to select the ON mode.
2. Check for DTCs with the HDS.

Are any DTCs indicated with DTC 84-12 at the same time?

YES—Troubleshoot any other DTCs first. ■

NO—Go to step 3.

3. Clear the DTC with the HDS.

4. Test-drive the vehicle at 25 mph (40 km/h) or more in the straight ahead driving position, then turn the steering wheel left and right at 30 degrees or more once for each side. Continue test-drive afterwards more than 120 seconds.

NOTE: Drive the vehicle on the road, not on a lift.

5. Check for DTCs with the HDS.

Is DTC 84-12 indicated?

YES—Go to step 6.

NO—Intermittent failure, the system is OK at this time. ■

6. Check the size, air pressure, and the amount of wear of all four tires, and check the wheel alignment (see page 18-5).

Is the tire condition and wheel alignment OK?

YES—Go to step 7.

NO—Make sure the suspension is not modified, and adjust the wheel alignment (see page 18-5), and recheck by test-driving. ■

7. Update the VSA modulator-control unit if it does not have the latest software (see page 19-119). If the unit already has the latest software, substitute a known-good VSA modulator-control unit (see page 19-120).

(cont'd)

VSA System Components

DTC Troubleshooting (cont'd)

8. Test-drive the vehicle at 25 mph (40 km/h) or more in the straight ahead driving position, then turn the steering wheel left and right at 30 degrees or more each for once. Continue test-drive afterwards more than 120 seconds.

NOTE: Drive the vehicle on the road, not on a lift.

9. Check for DTCs with the HDS.

Is DTC 84-12 indicated?

YES—Check for loose terminals in the VSA modulator-control unit 47P connector. If the VSA modulator-control unit was updated, substitute a known-good VSA modulator-control unit (see page 19-120), then retest. If the VSA modulator-control unit was substituted, go to step 1.

NO—If the VSA modulator-control unit was updated, troubleshooting is complete. If the VSA modulator-control unit was substituted, replace the original VSA modulator-control unit (see page 19-120). If any other DTCs are indicated, go to the indicated DTCs troubleshooting. ■

DTC 86: F-CAN Communication

NOTE: Troubleshoot fuel and emissions DTC's first.

1. Turn the ignition switch to ON (II), or press the engine start/stop button to select the ON mode.
2. Clear the DTC with the HDS.
3. Start and run the engine for at least 5 seconds.
4. Check for DTCs with the HDS.

Is DTC 86 indicated?

YES—Go to step 5.

NO—Check the COMMU FI ECU, COMMU A/T (A/T), COMMU GAUGE, COMMU YAW RATE/G, COMMU STEERING ANGLE S (With SH-AWD), and COMMU 4WD (With SH-AWD) in the VSA FREEZE DATA with the HDS. Then check for F-CAN communication lines continuity to the appropriate system or sensor and loose terminals in the appropriate system or sensor connectors. ■

5. Check the COMMU FI ECU, COMMU A/T (A/T), COMMU GAUGE, COMMU YAW RATE/G, COMMU STEERING ANGLES (With SH-AWD), and COMMU 4WD (With SH-AWD) in the VSA DATA LIST with the HDS.

Is there a communication error in the system or sensor?

YES—Go to step 6.

NO—Go to step 15.

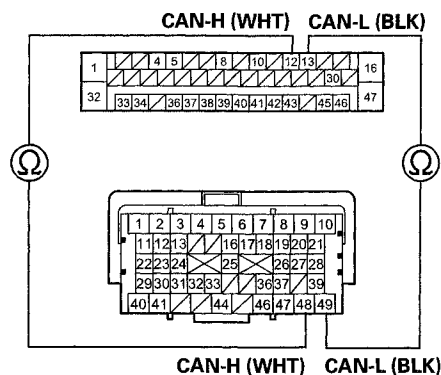
6. Turn the ignition switch to LOCK (0), or press the engine start/stop button to select the OFF mode.
7. Short the SCS line with the HDS.
8. Disconnect ECM/PCM connector A (49P) (see page 11-282).
9. Disconnect the VSA modulator-control unit 47P connector (see step 5 on page 19-120).
10. Disconnect the gauge control module 32P connector (see page 22-367).
11. Disconnect the yaw rate-lateral acceleration sensor 4P connector (see page 19-116), or the yaw rate-lateral/longitudinal acceleration sensor 4P connector (see page 19-117).
12. With SH-AWD: Disconnect the steering angle sensor 5P connector (see page 19-115).
13. With SH-AWD: Disconnect SH-AWD control unit connector A (20P) (see page 15-70).

14. Check the F-CAN communication lines for continuity between the VSA modulator-control unit and the appropriate system or sensor (see table).

Component	CAN-L Terminal	CAN-H Terminal
VSA modulator-control unit	No. 13	No. 12
ECM/PCM	No. A49	No. A48
Gauge Control Module	No. 9	No. 10
Yaw Rate-lateral Acceleration Sensor or Yaw Rate-lateral/longitudinal Acceleration Sensor	No. 2	No. 3
Steering Angle Sensor (With SH-AWD)	No. 2	No. 4
SH-AWD Control Unit (With SH-AWD)	No. A20	No. A10

VSA MODULATOR-CONTROL UNIT 47P CONNECTOR

Wire side of female terminals



ECM/PCM CONNECTOR A (49P)

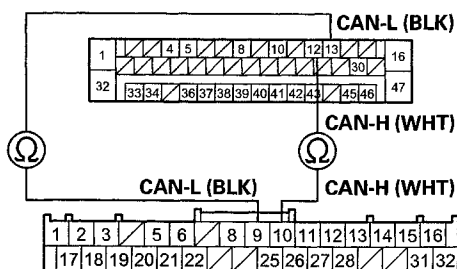
Terminal side of female terminals

(cont'd)

VSA System Components

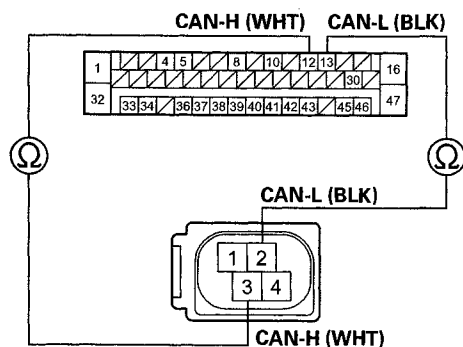
DTC Troubleshooting (cont'd)

VSA MODULATOR-CONTROL UNIT 47P CONNECTOR
Wire side of female terminals



GAUGE CONTROL MODULE 32P CONNECTOR
Wire side of female terminals

VSA MODULATOR-CONTROL UNIT 47P CONNECTOR
Wire side of female terminals

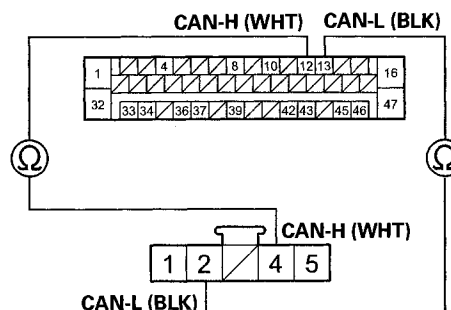


**YAW RATE-LATERAL/(LONGITUDINAL)*1
ACCELERATION SENSOR 4P CONNECTOR**
Wire side of female terminals

*1: With SH-AWD

With SH-AWD:

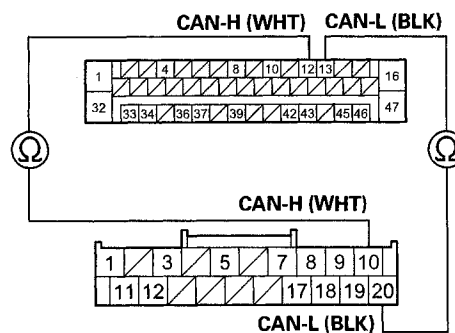
VSA MODULATOR-CONTROL UNIT 47P CONNECTOR
Wire side of female terminals



STEERING ANGLE SENSOR 5P CONNECTOR
Wire side of female terminals

With SH-AWD:

VSA MODULATOR-CONTROL UNIT 47P CONNECTOR
Wire side of female terminals



SH-AWD CONTROL UNIT CONNECTOR A (20P)
Wire side of female terminals

Do the F-CAN communication lines have continuity?

YES—Go to step 15.

NO—Repair an open in the appropriate wire. ■



15. Check for loose terminals in the appropriate system or sensor connectors.

Are the appropriate system or sensor connectors OK?

YES—Go to step 16.

NO—Repair or reconnect the connector securely.■

16. Check for other system or sensor DTCs with the HDS.

Are there other DTCs indicated?

YES—Do the appropriate DTC troubleshooting.■

NO—Go to step 17.

17. Update the VSA modulator-control unit if it does not have the latest software (see page 19-119). If the unit already has the latest software, substitute a known-good VSA modulator-control unit (see page 19-120).

18. Start and run the engine for at least 5 seconds.

19. Check for DTCs with the HDS.

Is DTC 86 indicated?

YES—Check for loose terminals in the VSA modulator-control unit 47P connector. If the VSA modulator-control unit was updated, substitute a known-good VSA modulator-control unit (see page 19-120), then retest. If the VSA modulator-control unit was substituted, go to step 1.

NO—If the VSA modulator-control unit was updated, troubleshooting is complete. If the VSA modulator-control unit was substituted, replace the original VSA modulator-control unit (see page 19-120). If any other DTCs are indicated, go to the indicated DTCs troubleshooting.■

DTC 91: VSA Operation

1. Turn the ignition switch to ON (II), or press the engine start/stop button to select the ON mode.

2. Clear the DTC with the HDS.

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

NOTE: Drive the vehicle on the road, not on a lift.

4. Check for DTCs with the HDS.

Is DTC 91 indicated?

YES—Go to step 5.

NO—The system is OK at this time.■

5. Update the VSA modulator-control unit if it does not have the latest software (see page 19-119). If the unit already has the latest software, substitute a known-good VSA modulator-control unit (see page 19-120).

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

NOTE: Drive the vehicle on the road, not on a lift.

7. Check for DTCs with the HDS.

Is DTC 91 indicated?

YES—Check for loose terminals in the VSA modulator-control unit 47P connector. If the VSA modulator-control unit was updated, substitute a known-good VSA modulator-control unit (see page 19-120), then retest. If the VSA modulator-control unit was substituted, go to step 1.

NO—If the VSA modulator-control unit was updated, troubleshooting is complete. If the VSA modulator-control unit was substituted, replace the original VSA modulator-control unit (see page 19-120). If any other DTCs are indicated, go to the indicated DTCs troubleshooting.■

VSA System Components

DTC Troubleshooting (cont'd)

DTC 105: Hydraulic Unit Temperature Sensor

1. Turn the ignition switch to ON (II), or press the engine start/stop button to select the ON mode.
2. Clear the DTC with the HDS.
3. Test-drive the vehicle at 19 mph (30 km/h) or more.

NOTE: Drive the vehicle on the road, not on a lift.

4. Check for DTCs with the HDS.

Is DTC 105 indicated?

YES—Go to step 5.

NO—The system is OK at this time. ■

5. Update the VSA modulator-control unit if it does not have the latest software (see page 19-119). If the unit already has the latest software, substitute a known-good VSA modulator-control unit (see page 19-120).
6. Test-drive the vehicle at 19 mph (30 km/h) or more.

NOTE: Drive the vehicle on the road, not on a lift.

7. Check for DTCs with the HDS.

Is DTC 105 indicated?

YES—Check for loose terminals in the VSA modulator-control unit 47P connector. If the VSA modulator-control unit was updated, substitute a known-good VSA modulator-control unit (see page 19-120), then retest. If the VSA modulator-control unit was substituted, go to step 1.

NO—If the VSA modulator-control unit was updated, troubleshooting is complete. If the VSA modulator-control unit was substituted, replace the original VSA modulator-control unit (see page 19-120). If any other DTCs are indicated, go to the indicated DTCs troubleshooting. ■

DTC 111: Back-up Light Switch

1. Turn the ignition switch to ON (II), or press the engine start/stop button to select the ON mode.
2. Clear the DTC with the HDS.
3. Turn the ignition switch to LOCK (0), then turn it to ON (II) again, or select the OFF mode, then the ON mode.

4. Check the REVERSE SWITCH STATUS in the VSA DATA LIST with the HDS.

Does it indicate ON when the shift lever is in reverse, and OFF when the shift lever is in neutral?

YES—Intermittent failure, the system is OK at this time. Check for loose terminals between the back-up light switch 2P connector and the VSA modulator-control unit 47P connector. Refer to intermittent failures troubleshooting (see page 19-49). ■

NO—Go to step 5.

5. Turn the ignition switch to LOCK (0), or press the engine start/stop button to select the OFF mode.
6. Check the back-up light switch (see page 13-15).

Is the back-up light switch OK?

YES—Go to step 7.

NO—Replace the back-up light switch (see page 13-15). ■

7. Check the No. 12 (7.5 A) fuse in the driver's under-dash fuse/relay box.

Is the fuse blown?

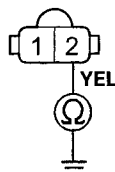
YES—Go to step 8.

NO—Reinstall the checked fuse, then go to step 18.

8. Disconnect the driver's under-dash fuse/relay box connector F (33P) (see page 22-81).
9. Disconnect the back-up light switch 2P connector (see page 13-15).

10. Check for continuity between back-up light switch 2P connector terminal No. 2 and body ground.

BACK-UP LIGHT SWITCH 2P CONNECTOR



Wire side of female terminals

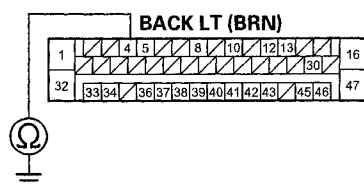
Is there continuity?

YES—Repair a short to body ground in the wire between the No. 12 (7.5 A) fuse in the driver's under-dash fuse/relay box and the back-up light switch. ■

NO—Go to step 11.

11. Disconnect the VSA modulator-control unit 47P connector (see step 5 on page 19-120).
12. Check for continuity between VSA modulator-control unit 47P connector terminal No. 4 and body ground.

VSA MODULATOR-CONTROL UNIT 47P CONNECTOR



Wire side of female terminals

Is there continuity?

YES—Repair a short to body ground in the wire between the VSA modulator-control unit and the back-up light switch. ■

NO—Install a new No. 12 (7.5 A) fuse in the driver's under-dash fuse/relay box, then go to step 13.

13. Reconnect all connectors.
14. Turn the ignition switch to ON (II), or press the engine start/stop button to select the ON mode.
15. Clear the DTC with the HDS.
16. Test-drive the vehicle at 19 mph (30 km/h) or more.
- NOTE: Drive the vehicle on the road, not on a lift.
17. Check for DTCs with the HDS.

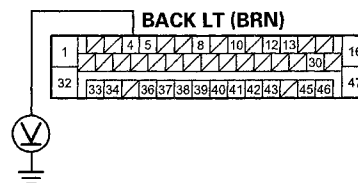
Is DTC 111 indicated?

YES—Replace the VSA modulator-control unit (see page 19-120). ■

NO—Troubleshooting is complete. ■

18. Disconnect the VSA modulator-control unit 47P connector (see step 5 on page 19-120).
19. shift the shift lever into reverse.
20. Turn the ignition switch to ON (II), or press the engine start/stop button to select the ON mode.
21. Measure the voltage between VSA modulator-control unit 47P connector terminal No. 4 and body ground.

VSA MODULATOR-CONTROL UNIT 47P CONNECTOR



Wire side of female terminals

Is there battery voltage?

YES—Go to step 22.

NO—Repair an open in the wire between the No. 12 (7.5 A) fuse in the driver's under-dash fuse/relay box and the VSA modulator-control unit. ■

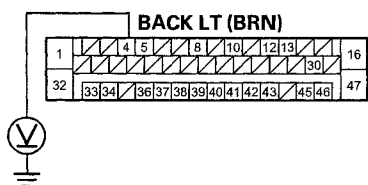
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VSA System Components

DTC Troubleshooting (cont'd)

22. Turn the ignition switch to LOCK (0), then turn it to ON (II) again, or select the OFF mode, then the ON mode.
23. Disconnect the back-up light switch 2P connector (see page 13-15).
24. Turn the ignition switch to ON (II), or press the engine start/stop button to select the ON mode.
25. Measure the voltage between VSA modulator-control unit 47P connector terminal No. 4 and body ground.

VSA MODULATOR-CONTROL UNIT 47P CONNECTOR



Wire side of female terminals

Is there 0.1 V or more?

YES—Repair a short to power in the wire between the VSA modulator-control unit and the back-up light switch. ■

NO—Go to step 26.

26. Turn the ignition switch to LOCK (0), then turn it to ON (II) again, or select the OFF mode, then the ON mode.
27. Reconnect all connectors.
28. shift the shift lever into neutral.
29. Update the VSA modulator-control unit if it does not have the latest software (see page 19-119). If the unit already has the latest software, substitute a known-good VSA modulator-control unit (see page 19-120).

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

NOTE: Drive the vehicle on the road, not on a lift.

31. Check for DTCs with the HDS.

Is DTC 111 indicated?

YES—Check for loose terminals in the VSA modulator-control unit 47P connector. If the VSA modulator-control unit was updated, substitute a known-good VSA modulator-control unit (see page 19-120), then retest. If the VSA modulator-control unit was substituted, go to step 1.

NO—If the VSA modulator-control unit was updated, troubleshooting is complete. If the VSA modulator-control unit was substituted, replace the original VSA modulator-control unit (see page 19-120). If any other DTCs are indicated, go to the indicated DTCs troubleshooting. ■

DTC 118: Clutch Pedal Position Switch B

1. Turn the ignition switch to ON (II), or press the engine start/stop button to select the ON mode.
2. Clear the DTC with the HDS.
3. Start and run the engine for at least 5 seconds.
4. Check for DTCs with the HDS.

Is DTC 86 indicated?

YES—Do the troubleshooting for DTC 86 (see page 19-102). ■

NO—Go to step 5.

5. Check for fuel and emissions systems DTCs with the HDS (see page 11-3).

Is DTC P0835 indicated?

YES—Do the troubleshooting for DTC P0835 (see page 11-186). ■

NO—Go to step 6.

6. Check the CRUISE CANCEL CLUTCH SWITCH STATUS in the VSA DATA LIST with the HDS while moving the clutch pedal.

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

YES—Intermittent failure, the system is OK at this time. ■

NO—Go to step 7.

7. Turn the ignition switch to LOCK (0), or press the engine start/stop button to select the OFF mode.
8. Check the clutch pedal position switch B (see page 4-61).

Is the clutch pedal position switch B OK?

YES—Go to step 9.

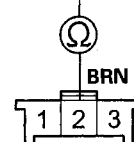
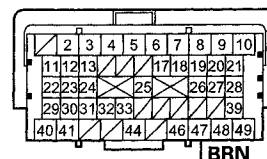
NO—Replace the clutch pedal position switch B (see page 4-62). ■

9. Short the SCS line with the HDS.
10. Disconnect ECM connector A (49P) (see page 11-282).
11. Disconnect the clutch pedal position switch B 3P connector (see step 1 on page 4-62).

12. Check for continuity between clutch pedal position switch B 3P connector terminal No. 2 and ECM connector A (49P) terminal No. 47.

ECM CONNECTOR A (49P)

Terminal side of female terminals



CLUTCH PEDAL POSITION SWITCH B 3P CONNECTOR

Wire side of female terminals

Is there continuity?

YES—Go to step 13.

NO—Repair an open in the wire between the ECM and the clutch pedal position switch B. ■

13. Update the VSA modulator-control unit if it does not have the latest software (see page 19-119). If the unit already has the latest software, substitute a known-good VSA modulator-control unit (see page 19-120).

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

NOTE: Drive the vehicle on the road, not on a lift.

15. Check for DTCs with the HDS.

Is DTC 118 indicated?

YES—Check for loose terminals in the VSA modulator-control unit 47P connector. If the VSA modulator-control unit was updated, substitute a known-good VSA modulator-control unit (see page 19-120), then retest. If the VSA modulator-control unit was substituted, go to step 1.

NO—If the VSA modulator-control unit was updated, troubleshooting is complete. If the VSA modulator-control unit was substituted, replace the original VSA modulator-control unit (see page 19-120). If any other DTCs are indicated, go to the indicated DTCs troubleshooting. ■

VSA System Components

DTC Troubleshooting (cont'd)

DTC 121, 122, 123, 124: VSA Solenoid

1. Turn the ignition switch to ON (II), or press the engine start/stop button to select the ON mode.
2. Clear the DTC with the HDS.
3. Test-drive the vehicle at 19 mph (30 km/h) or more.

NOTE: Drive the vehicle on the road, not on a lift.

4. Check for DTCs with the HDS.

Is DTC 121, 122, 123, or 124 indicated?

YES—Go to step 5.

NO—Intermittent failure, the system is OK at this time. ■

5. Update the VSA modulator-control unit if it does not have the latest software (see page 19-119). If the unit already has the latest software, substitute a known-good VSA modulator-control unit (see page 19-120).

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

NOTE: Drive the vehicle on the road, not on a lift.

7. Check for DTCs with the HDS.

Is DTC 121, 122, 123, or 124 indicated?

YES—Check for loose terminals in the VSA modulator-control unit 47P connector. If the VSA modulator-control unit was updated, substitute a known-good VSA modulator-control unit (see page 19-120), then retest. If the VSA modulator-control unit was substituted, go to step 1.

NO—If the VSA modulator-control unit was updated, troubleshooting is complete. If the VSA modulator-control unit was substituted, replace the original VSA modulator-control unit (see page 19-120). If any other DTCs are indicated, go to the indicated DTCs troubleshooting. ■

DTC 158: ECU Software Reprogramming

1. Update the VSA modulator-control unit (see page 19-119).
2. Turn the ignition switch to LOCK (0), then turn it to ON (II) again, or select the OFF mode, then the ON mode.
3. Check for DTCs with the HDS.

Is DTC 158 indicated?

YES—Check for loose terminals in the VSA modulator-control unit 47P connector. If necessary, substitute a known-good VSA modulator-control unit (see page 19-120), and retest. ■

NO—The system is OK at this time. ■

Symptom Troubleshooting

VSA activation indicator does not go off, and no DTCs are stored ('09 model)

NOTE: If the VSA modulator-control unit was replaced prior to the activation indicator turning on, do the VSA sensor neutral position memorization (see page 19-117).

1. Turn the ignition switch to ON (II), or press the engine start/stop button to select the ON mode.
2. Check the VSA activation indicator for several seconds when the ignition switch is turned to ON (II), or press the engine start/stop button to select the ON mode.

Does the indicator come on then go off?

YES—The system is OK at this time. ■

NO—Go to step 3.

3. Turn the ignition switch to LOCK (0), or press the engine start/stop button to select the OFF mode.
4. Disconnect the VSA OFF switch 5P connector (see page 19-118).
5. Check the VSA OFF switch (see page 19-118).

Is the VSA OFF switch OK?

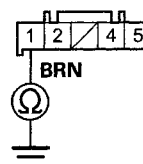
YES—Go to step 6.

NO—Replace the VSA OFF switch (see page 19-118). ■

6. Disconnect the gauge control module 32P connector (see page 22-367).

7. Check for continuity between VSA OFF switch 5P connector terminal No. 1 and body ground.

VSA OFF SWITCH 5P CONNECTOR



Wire side of female terminals

Is there continuity?

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

NO—Substitute a known-good gauge control module (see page 22-367), then go to step 1 and recheck. If it is OK, replace the original gauge control module (see page 22-367). ■

VSA System Components

Symptom Troubleshooting (cont'd)

ABS indicator, brake system indicator, and VSA indicator do not go off

1. Turn the ignition switch to LOCK (0), or press the engine start/stop button to select the OFF mode.
2. Check the No. 6 (7.5 A) fuse in the driver's under-dash fuse/relay box.

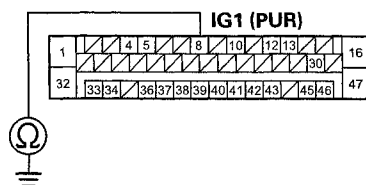
Is the fuse blown?

YES—Go to step 3.

NO—Reinstall the checked fuse, then go to step 12.

3. Disconnect the VSA modulator-control unit 47P connector (see step 5 on page 19-120).
 4. Disconnect the yaw rate-lateral acceleration sensor 4P connector (see page 19-116), or the yaw rate-lateral/longitudinal acceleration sensor 4P connector (see page 19-117).
 5. With SH-AWD: Disconnect the steering angle sensor 5P connector (see page 19-115).
- NOTE: Without SH-AWD, the steering angle sensor is not powered by IG1.
6. Check for continuity between VSA modulator-control unit 47P connector terminal No. 8 and body ground.

VSA MODULATOR-CONTROL UNIT 47P CONNECTOR



Wire side of female terminals

Is there continuity?

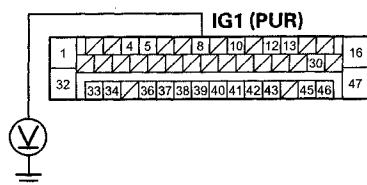
YES—Repair a short to body ground in the wire between the No. 6 (7.5 A) fuse in the driver's under-dash fuse/relay box and the VSA modulator-control unit, the yaw rate-lateral acceleration sensor (Without SH-AWD), or the yaw rate-lateral/longitudinal acceleration sensor, and the steering angle sensor (With SH-AWD).■

NO—Install a new No. 6 (7.5 A) fuse in the driver's under-dash fuse/relay box, then go to step 7.

7. Reconnect the VSA modulator-control unit 47P connector.
 8. Reconnect the yaw rate-lateral acceleration sensor 4P connector or the yaw rate-lateral/longitudinal acceleration sensor 4P connector.
 9. With SH-AWD: Reconnect the steering angle sensor 5P connector.
 10. Turn the ignition switch to ON (II), or press the engine start/stop button to select the ON mode.
 11. Check the ABS indicator, the brake system indicator, and the VSA indicator for several seconds when the ignition switch is turned to ON (II), or press the engine start/stop button to select the ON mode.
- Do the indicators come on then go off?*
- YES**—Troubleshooting is complete.■
- NO**—Replace the VSA modulator-control unit (see page 19-120).■
12. Do the gauge control module troubleshooting (see page 22-342).
- Is the gauge control module OK?*
- YES**—Go to step 13.
- NO**—Substitute a known-good gauge control module (see page 22-367). If it is OK, replace the original gauge control module (see page 22-367).
13. Disconnect the VSA modulator-control unit 47P connector (see step 5 on page 19-120).

14. Turn the ignition switch to ON (II), or press the engine start/stop button to select the ON mode.
15. Measure the voltage between VSA modulator-control unit 47P connector terminal No. 8 and body ground.

VSA MODULATOR-CONTROL UNIT 47P CONNECTOR



Wire side of female terminals

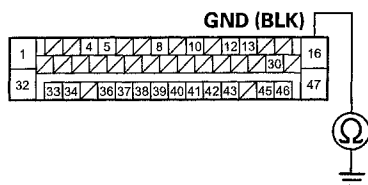
Is there battery voltage?

YES—Go to step 16.

NO—Repair an open in the wire between the No. 6 (7.5 A) fuse in the driver's under-dash fuse/relay box and the VSA modulator-control unit. ■

16. Turn the ignition switch to LOCK (0), or press the engine start/stop button to select the OFF mode.
17. Check for continuity between VSA modulator-control unit 47P connector terminal No. 16 and body ground.

VSA MODULATOR-CONTROL UNIT 47P CONNECTOR



Wire side of female terminals

Is there continuity?

YES—Go to step 18.

NO—Repair an open in the wire between the VSA modulator-control unit and body ground (G202). ■

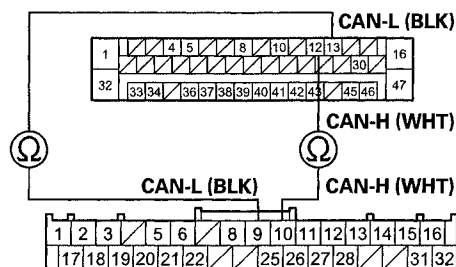
18. Disconnect the gauge control module 32P connector (see page 22-367).

19. Check for continuity between the VSA modulator-control unit 47P connector terminal and gauge control module 32P connector terminal (see table).

Sign	VSA Modulator-control Unit 47P Connector Terminal	Gauge Control Module 32P Connector Terminal
CAN-L	No. 13	No. 9
CAN-H	No. 12	No. 10

VSA MODULATOR-CONTROL UNIT 47P CONNECTOR

Wire side of female terminals



GAUGE CONTROL MODULE 32P CONNECTOR

Wire side of female terminals

Is there continuity?

YES—Go to step 20.

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

(cont'd)

VSA System Components

Symptom Troubleshooting (cont'd)

20. Reconnect all connectors.
21. Update the VSA modulator-control unit if it does not have the latest software (see page 19-119). If the unit already has the latest software, substitute a known-good VSA modulator-control unit (see page 19-120).
22. Turn the ignition switch to LOCK (0), then turn it to ON (II) again, or select the OFF mode, then the ON mode.
23. Check the ABS indicator, the brake system indicator, and the VSA indicator for several seconds when the ignition switch is turned to ON (II), or press the engine start/stop button to select the ON mode.

Do the indicators come on then go off?

YES—If the VSA modulator-control unit was updated, troubleshooting is complete. If the VSA modulator-control unit was substituted, replace the original VSA modulator-control unit (see page 19-120). ■

NO—Check for loose terminals in the VSA modulator-control unit 47P connector. If the VSA modulator-control unit was updated, substitute a known-good VSA modulator-control unit (see page 19-120), then retest. If the VSA modulator-control unit was substituted, go to step 1.

VSA OFF switch does not work (VSA cannot be turned OFF) ('10 model)

NOTE: If the low tire pressure indicator turns ON, the VSA cannot be turned OFF. Check the tire pressure first.

1. Turn the ignition switch to LOCK (0), or press the engine start/stop button to select the OFF mode.
2. Check the VSA OFF switch (see page 19-118).

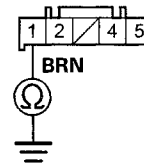
Is the VSA OFF switch OK?

YES—Go to step 3.

NO—Replace the VSA OFF switch (see page 19-118). ■

3. Disconnect the VSA OFF switch 5P connector (see page 19-118).
4. Disconnect the gauge control module 32P connector (see page 22-367).
5. Check for continuity between VSA OFF switch 5P connector terminal No. 1 and body ground.

VSA OFF SWITCH 5P CONNECTOR



Wire side of female terminals

Is there continuity?

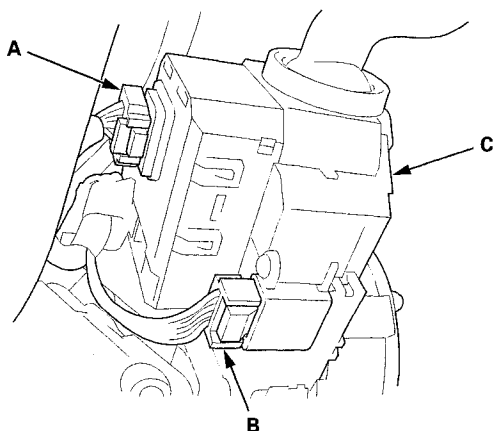
YES—Repair a short to body ground between the gauge control module and the VSA OFF switch. ■

NO—Substitute a known-good gauge control module (see page 22-367), then go to step 1 and recheck. If it is OK, replace the original gauge control module (see page 22-367). ■

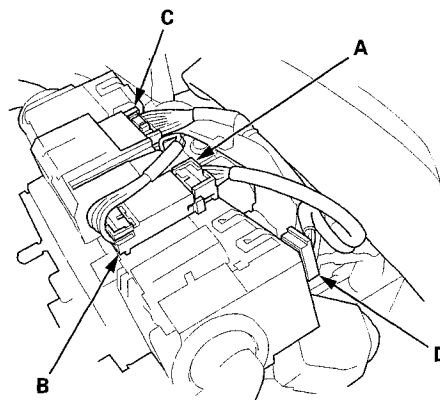
Steering Angle Sensor Replacement

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

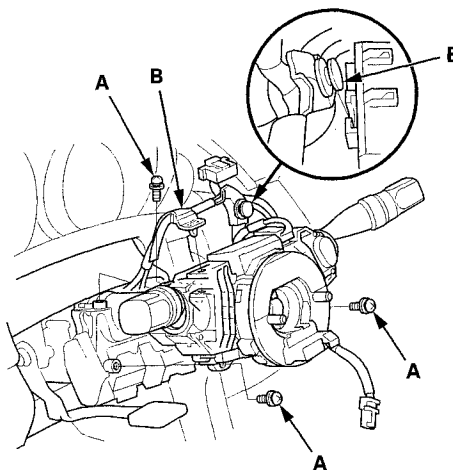
1. With the wheels in the straight ahead position and the steering wheel centered, then remove the steering wheel (see page 17-6).
2. Remove the steering column covers (see page 20-126).
3. Disconnect the combination light switch 12P connector (A) and the steering angle sensor 5P connector (B) from the combination switch assembly/cable reel (C).



4. Disconnect the dashboard wire harness 4P connector (A) from the cable reel 4P connector (B), then disconnect the dashboard wire harness 20P connector (C) and the wiper/washer switch 8P connector (D).



5. Remove the combination switch assembly/cable reel mounting screws (A).



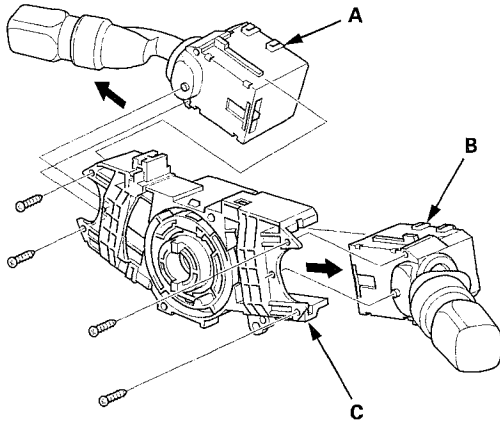
6. Remove the wire harness clips (B), then remove the combination switch assembly/cable reel from the steering column.
7. Remove the cable reel (see step 8 on page 24-172).

(cont'd)

VSA System Components

Steering Angle Sensor Replacement (cont'd)

8. Remove the combination light switch (A) and the wiper/washer switch (B) from the combination switch body assembly (C).



9. Install the combination switch body assembly in the reverse order of removal, and note these items:
- Do not remove the steering angle sensor from the combination switch body assembly.
 - When installing the cable reel, set the turn signal canceling sleeve position so that the arrow points straight up (see page 24-172).
 - Tighten the combination switch mounting screw in the proper sequence (see page 17-11).
 - With SH-AWD: Do the VSA sensor neutral position memorization (see page 19-117).

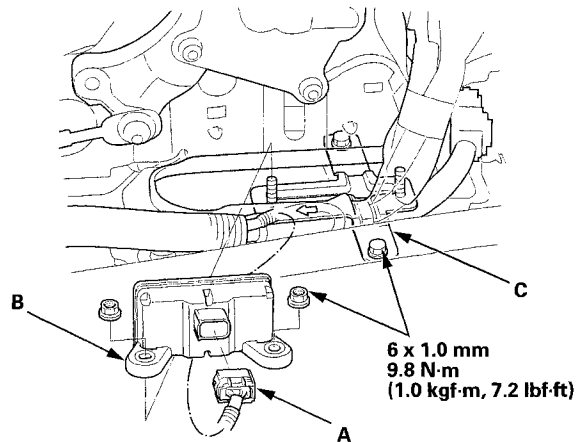
Yaw Rate-Lateral Acceleration Sensor Replacement

Without SH-AWD

NOTE:

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

1. Turn the ignition switch to LOCK (0), or press the engine start/stop button to select the OFF mode.
2. Remove the center console (see page 20-109).
3. Disconnect the yaw rate-lateral acceleration sensor 4P connector (A), then remove the yaw rate-lateral acceleration sensor (B).



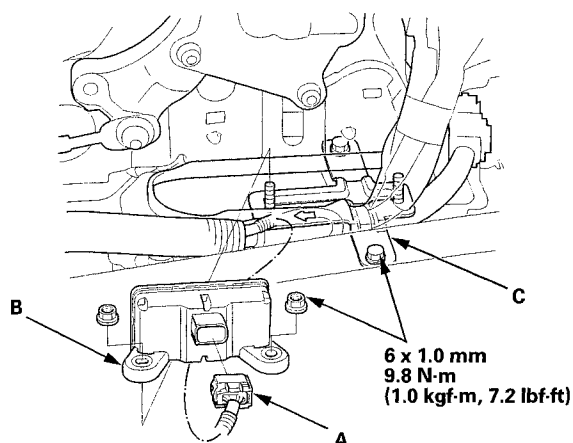
4. Check for deformation in the bracket (C). If necessary replace it.
5. Install the yaw rate-lateral acceleration sensor in the reverse order of removal.
6. Do the VSA sensor neutral position memorization (see page 19-117).

Yaw Rate-Lateral/Longitudinal Acceleration Sensor Replacement

With SH-AWD

NOTE:

- Do not damage or drop the sensor as it is sensitive.
 - Do not use power tools.
1. Turn the ignition switch to LOCK (0), or press the engine start/stop button to select the OFF mode.
 2. Remove the center console (see page 20-109).
 3. MT: Remove the shift lever assembly (see page 13-87).
 4. Disconnect the yaw rate-lateral/longitudinal acceleration sensor 4P connector (A), then remove the yaw rate-lateral/longitudinal acceleration sensor (B).

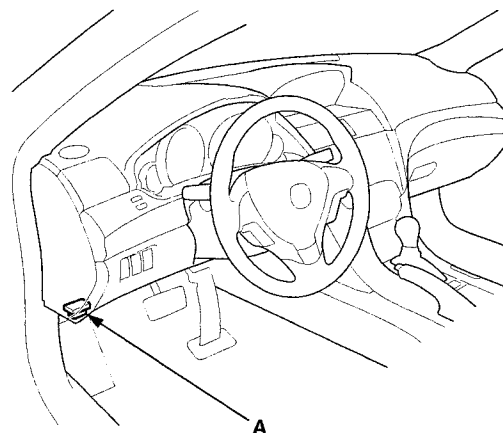


5. Check for deformation in the bracket (C). If necessary replace it.
6. Install the yaw rate-lateral/longitudinal acceleration sensor in the reverse order of removal.
7. Do the VSA sensor neutral position memorization (see page 19-117).
8. Do the yaw rate-lateral/longitudinal acceleration neutral position memorization (see page 15-9).

VSA Sensor Neutral Position Memorization

NOTE: Do not press the brake pedal during this procedure.

1. Park the vehicle on a flat and level surface, with the steering wheel in the straight ahead position.
2. With the ignition switch in LOCK (0), or press the engine start/stop button to select the OFF mode, connect the HDS to the data link connector (DLC) (A) under the driver's side of the dashboard.



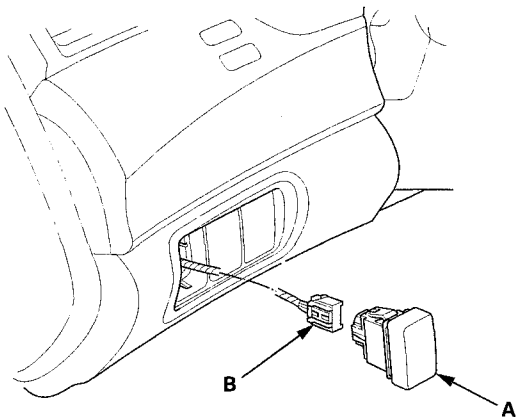
3. Turn the ignition switch to ON (II), or press the engine start/stop button to select the ON mode.
 4. Make sure the HDS communicates with the vehicle and the VSA modulator-control unit. If it doesn't, troubleshoot the DLC circuit (see page 11-258).
 5. Select VSA ADJUSTMENT with the HDS, and follow the screen prompts.
- NOTE: See the HDS Help menu for specific instructions.
6. Turn the ignition switch to LOCK (0), or press the engine start/stop button to select the OFF mode.

VSA System Components

VSA Off Switch Test

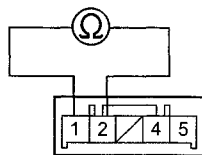
'09 model

1. Turn the ignition switch to LOCK (0), or press the engine start/stop button to select the OFF mode.
2. Remove the driver's dashboard undercover (see page 20-118).
3. Push out the VSA OFF switch (A) from the back of the dashboard.



4. Disconnect the VSA OFF switch 5P connector (B).
5. On the switch side, check for continuity between the VSA OFF switch 5P connector terminals No. 1 and No. 2. There should be continuity when the button is pressed, and no continuity when the button is released.

VSA OFF SWITCH 5P CONNECTOR



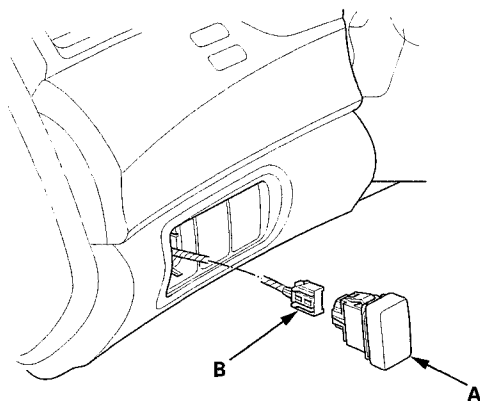
Terminal side of male terminals

6. Install the VSA OFF switch in the reverse order of removal.

'10 model

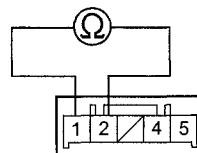
NOTE: If the low tire pressure indicator turns ON, the VSA cannot be turned OFF. Check the tire pressure first.

1. Turn the ignition switch to LOCK (0), or press the engine start/stop button to select the OFF mode.
2. Remove the driver's dashboard undercover (see page 20-118).
3. Push out the VSA OFF switch (A) from the back of the dashboard.



4. Disconnect the VSA OFF switch 5P connector (B).
5. On the switch side, check for continuity between the VSA OFF switch 5P connector terminals No. 1 and No. 2. There should be no continuity when the button is pressed, and continuity when the button is released.

VSA OFF SWITCH 5P CONNECTOR



Terminal side of male terminals

6. Install the VSA OFF switch in the reverse order of removal.

VSA Modulator-Control Unit Update

Special Tools Required

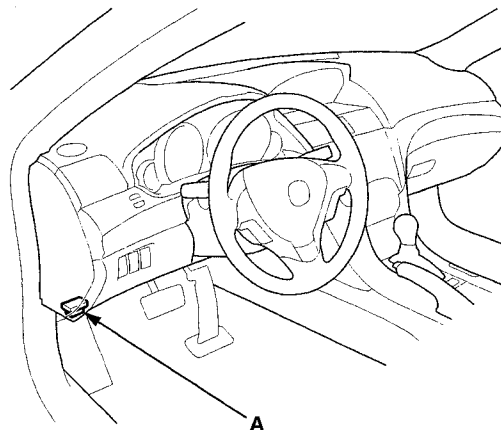
- Honda Diagnostic System (HDS) tablet tester
- Honda Interface Module (HIM) and an iN workstation with the latest HDS software version
- HDS pocket tester
- GNA600 and an iN workstation with the latest HDS software version

Any one of above updating tools can be used.

NOTE:

- Use this procedure when you need to update the VSA modulator-control unit at any time.
- Make sure the HDS/iN workstation has the latest HDS software version.
- Before you update the VSA modulator-control unit, make sure the battery in the vehicle is fully charged, and connect a jumper battery (not a battery charger) to maintain system voltage.
- Never turn the ignition switch to LOCK (0) or ACC (I), or press the engine start/stop button to select the OFF or ACC mode, during the update. If there is a problem with the update, leave the ignition switch ON (II), or the ON mode.
- To prevent VSA modulator-control unit damage, do not operate anything electrical (headlights, audio system, brakes, A/C, power windows, door locks, etc.) during the update.
- To ensure the latest program is installed, do a VSA modulator-control unit update whenever the VSA modulator-control unit is substituted or replaced.
- You cannot update a VSA modulator-control unit with a program it already has. It will only accept a new program.
- High temperature in the engine compartment might cause the VSA modulator-control unit to become too hot to run the update. If the engine has been running before this procedure, open the hood and cool the engine compartment.
- If you need to diagnose the Honda interface module (HIM) because the HIM's red (#3) light came on or was flashing during the update, leave the ignition switch in ON (II), or in the ON mode when you disconnect the HIM from the data link connector (DLC). This will prevent VSA modulator-control unit damage.
- DTCs stored in memory are cleared when the VSA modulator-control unit is updated.

1. Turn the ignition switch to ON (II), or press the engine start/stop button to select the ON mode, but do not start the engine.
2. Connect the HDS to the data link connector (DLC) (A) located under the driver's side of the dashboard.



3. Make sure the HDS communicates with the vehicle and the VSA modulator-control unit. If it doesn't, troubleshooting the DLC circuit (see page 11-258).
4. Select the update mode, and follow the screen prompts to update the VSA modulator-control unit.
5. If the software in the VSA modulator-control unit is the latest, disconnect the HDS/HIM/GNA600 from the DLC. If the software in the VSA modulator-control unit is not the latest, follow the instructions on the screen.
6. Do the VSA sensor neutral position memorization procedure (see page 19-117).

VSA System Components

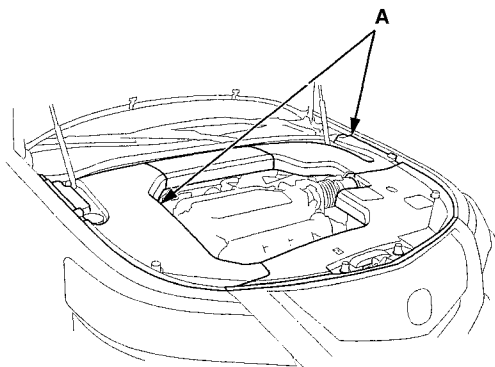
VSA Modulator-Control Unit Removal and Installation

NOTE:

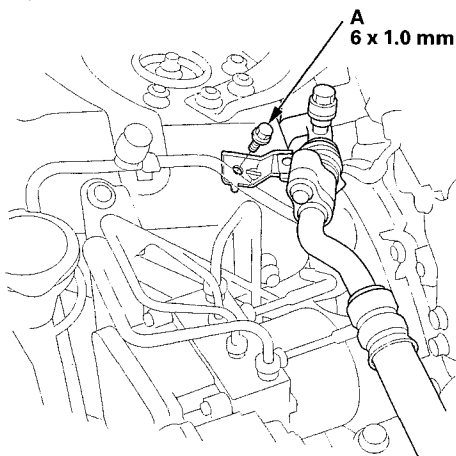
- Do not spill brake fluid on the vehicle; it may damage the paint. If brake fluid gets on the paint, wash it off immediately with water.
- Be careful not to damage or deform the brake lines during removal and installation.
- After removal, plug the ends of the hoses and the joints to prevent spilling brake fluid.

Removal

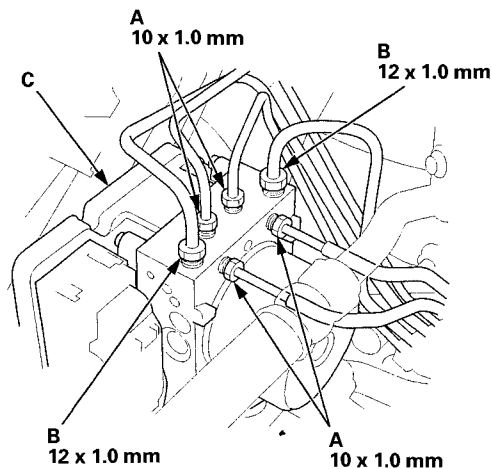
1. Turn the ignition switch to LOCK (0), or press the engine start/stop button to select the OFF mode.
2. Remove the left and right engine compartment covers (A) (see page 20-186).



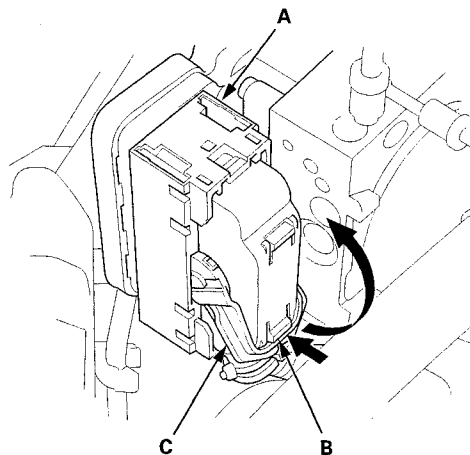
3. Remove the suction line mounting bolt (A) from the bracket.



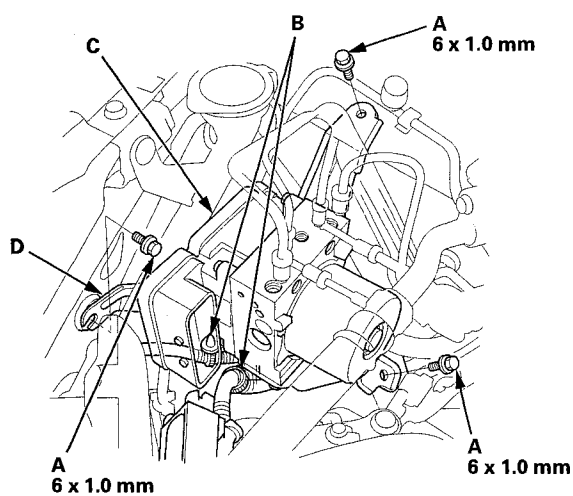
4. Disconnect the 10 mm brake lines (A) and the 12 mm brake lines (B) from the VSA modulator-control unit (C).



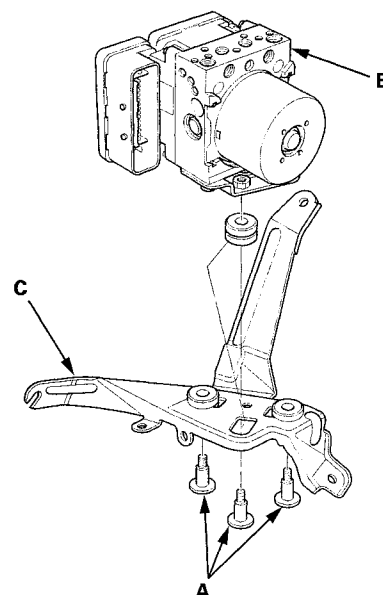
5. Disconnect the VSA modulator-control unit 47P connector (A) by pushing the lock (B) and pulling up the lever (C); the connector disconnects itself.



6. Remove the VSA modulator-control unit bracket mounting bolts (A) and the wire harness clips (B), then remove the VSA modulator-control unit (C) with the bracket (D) from the body.



7. Remove the TORX bolts (A), then remove the VSA modulator-control unit (B) from the bracket (C).



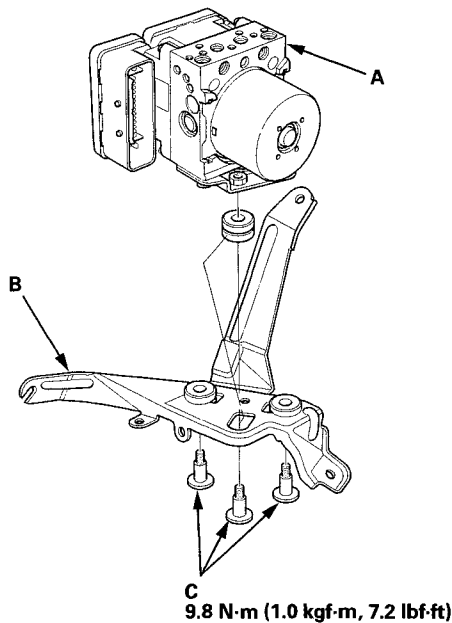
(cont'd)

VSA System Components

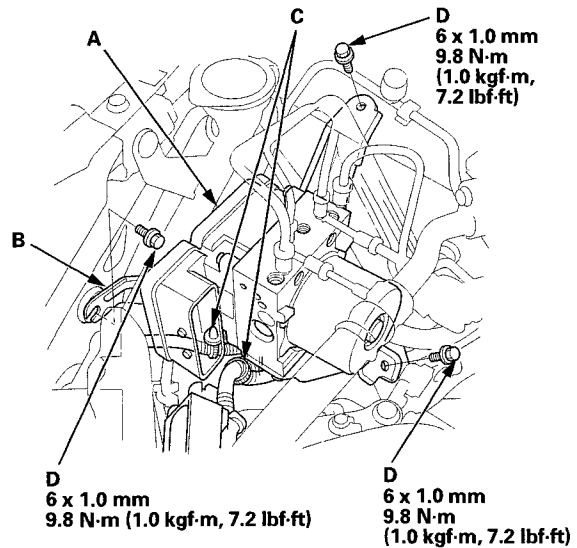
VSA Modulator-Control Unit Removal and Installation (cont'd)

Installation

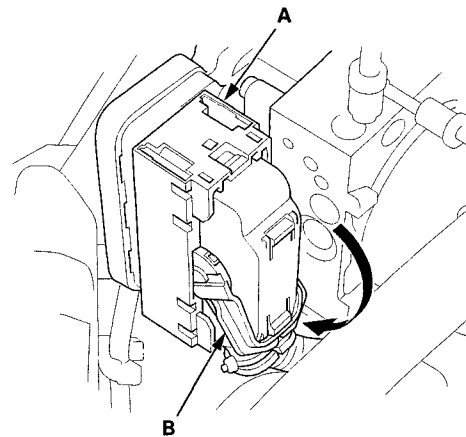
1. Install the VSA modulator-control unit (A) onto the bracket (B), then tighten the TORX bolts (C).



2. Install the VSA modulator-control unit (A) with the bracket (B) to the body, then install the wire harness clips (C) and the VSA modulator-control unit bracket mounting bolts (D).



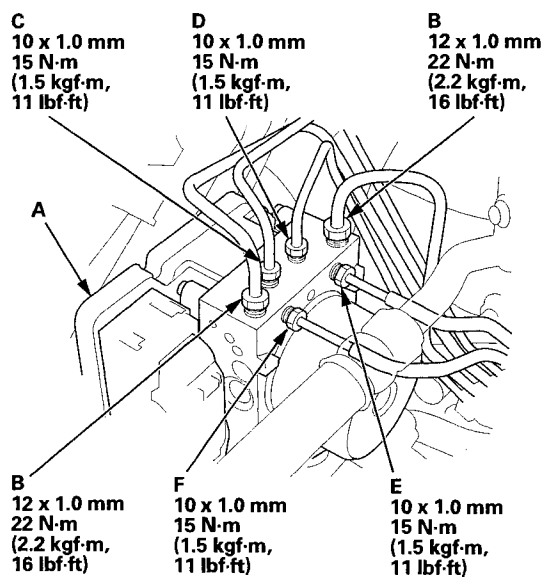
3. Align the connecting surface of the VSA modulator-control unit 47P connector (A) to the VSA modulator-control unit.



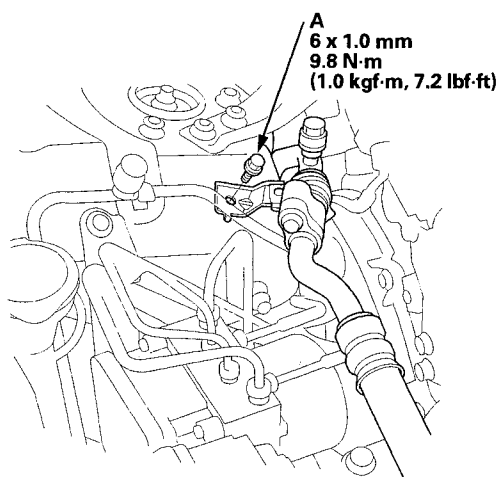
4. Pull down the lever (B) of the VSA modulator-control unit 47P connector, then confirm the connector is fully seated.

5. Connect the 10 mm brake lines and the 12 mm brake lines to the VSA modulator-control unit (A).

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

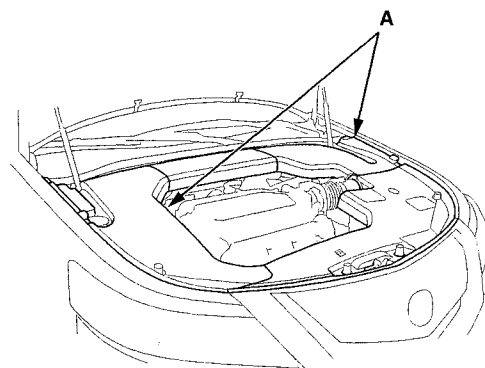


6. Install the suction line mounting bolt (A) to the bracket.



7. Bleed the brake system (see page 19-10).

8. Install the left and right engine compartment covers (A) (see page 20-186).



9. Do the VSA modulator-control unit update (see page 19-119).
10. Do the VSA sensor neutral position memorization procedure (see page 19-117).
11. Start the engine, and make sure the ABS and the VSA indicators go off.
12. Test-drive the vehicle, and make sure the ABS and the VSA indicators do not come on.

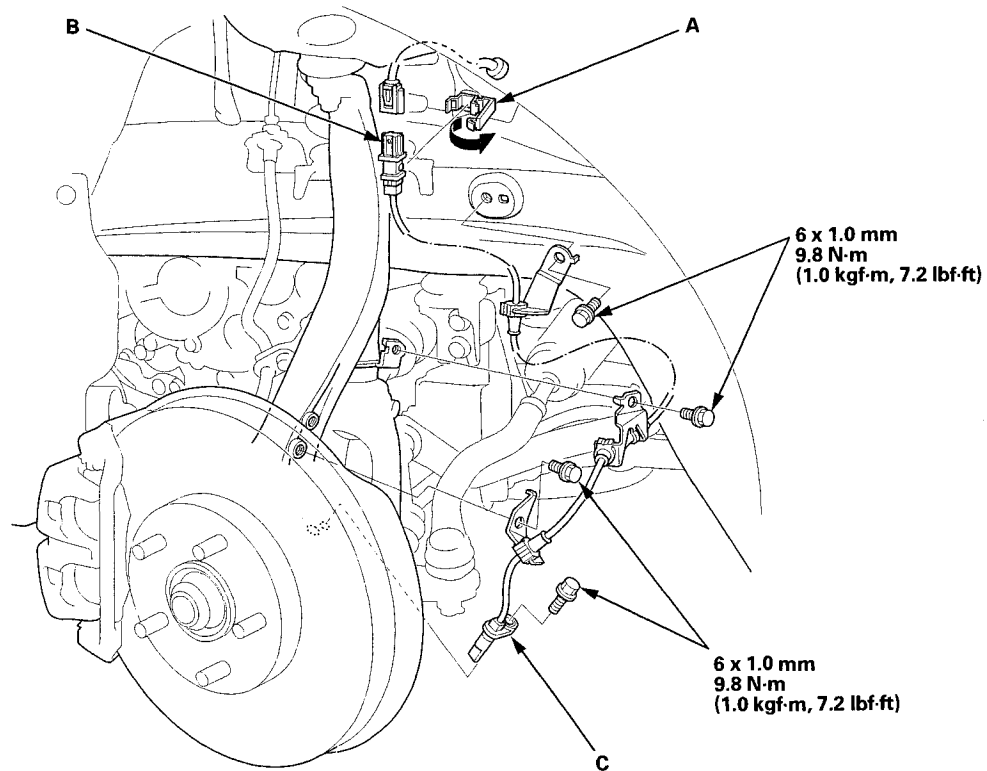
NOTE: If the brake pedal is spongy, there may be air trapped in the modulator which could then be induced into the normal brake system during modulation. Bleed the brake system again (see page 19-10).

VSA System Components

Wheel Speed Sensor Replacement

Front

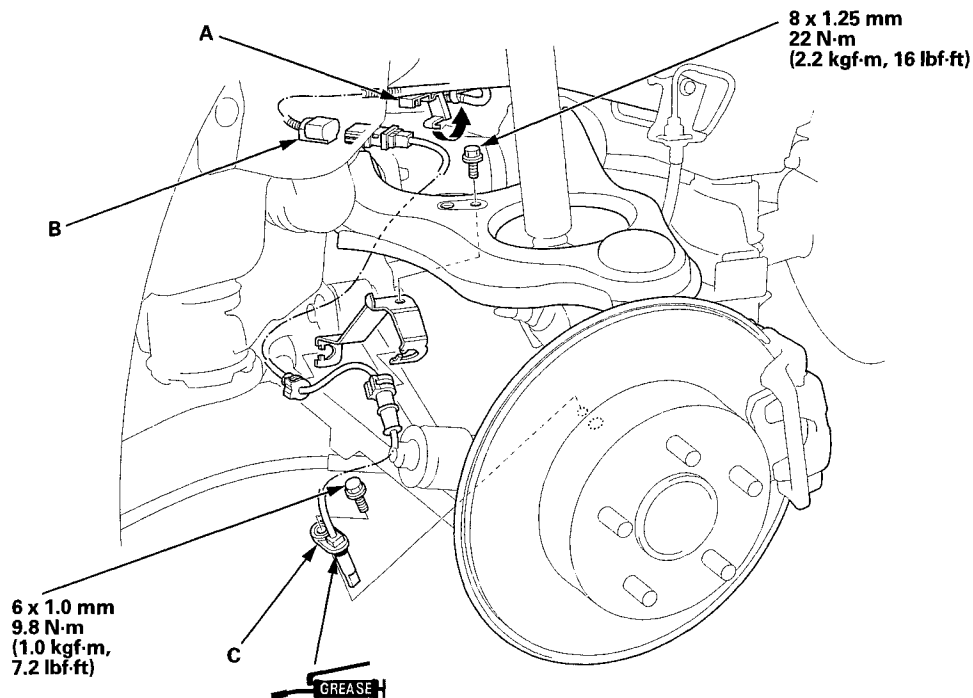
1. Turn the ignition switch to LOCK (0), or press the engine start/stop button to select the OFF mode.
2. Remove the front wheel.
3. Release the clamp (A), then disconnect the wheel speed sensor connector (B).



4. Remove the bolts and the wheel speed sensor (C).
5. Install the wheel speed sensor in the reverse order of removal, and note these items:
 - Do not twist the sensor wires.
 - If the wheel speed sensor comes in contact with the wheel bearing, it is faulty.
 - Make sure there is no debris in the sensor mounting hole.
6. Start the engine, and make sure the ABS and the VSA indicators go off.
7. Test-drive the vehicle, and make sure the ABS and the VSA indicators do not come on.

Rear

1. Turn the ignition switch to LOCK (0), or press the engine start/stop button to select the OFF mode.
2. Remove the rear wheel.
3. Release the clamp (A), then disconnect the wheel speed sensor connector (B).



4. Remove the clamps, the bolt, and the wheel speed sensor (C).
5. Install the wheel speed sensor in the reverse order of removal, and note these items:
 - Do not twist the sensor wires.
 - If the wheel speed sensor comes in contact with the hub bearing unit, it is faulty.
 - Make sure there is no debris in the sensor mounting hole.
 - Lubricate the O-ring on the wheel speed sensor.
6. Start the engine, and make sure the ABS and the VSA indicators go off.
7. Test-drive the vehicle, and make sure the ABS and the VSA indicators do not come on.