2007-2008 BRAKES

VSA (Vehicle Stability Assist) System Components - Element

COMPONENT LOCATION INDEX

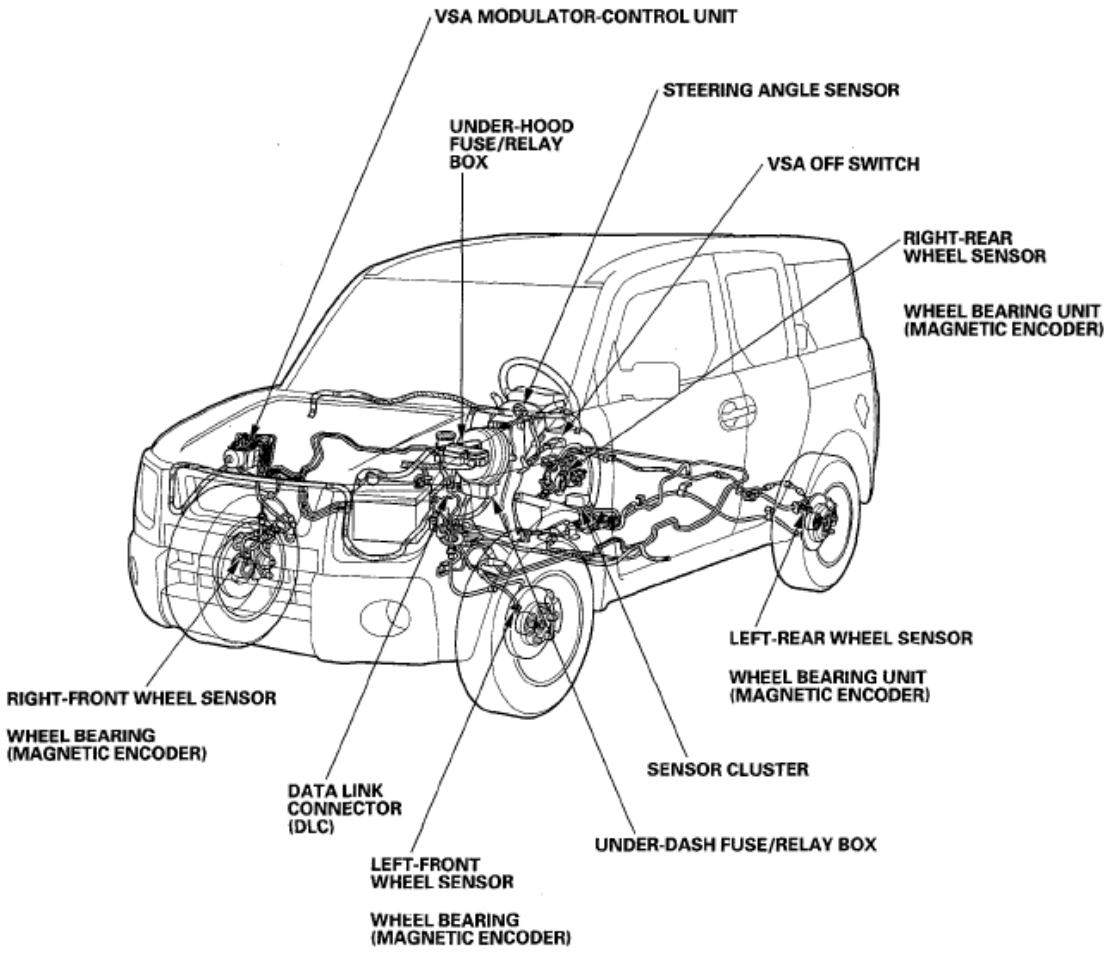


Fig. 1: Identifying Vehicle Stability Assist System Components
Courtesy of AMERICAN HONDA MOTOR CO., INC.

GENERAL TROUBLESHOOTING INFORMATION

SYSTEM INDICATOR

This system has four indicators:

- ABS indicator (A)
- Brake system indicator (B)
- VSA indicator (C)

- VSA activation indicator (D)

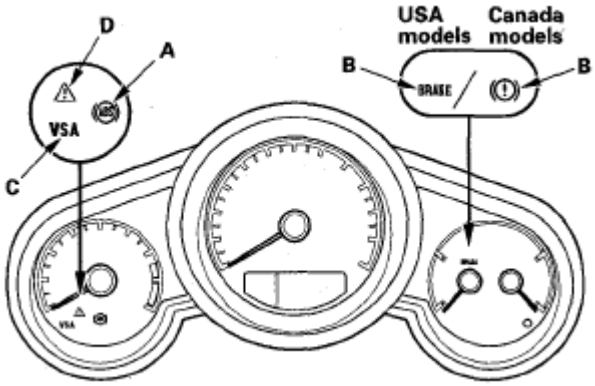


Fig. 2: Identifying ABS Indicator And Brake System Indicator
Courtesy of AMERICAN HONDA MOTOR CO., INC.

When the system detects a problem, it will turn the appropriate indicator 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 ON (II), then goes off.

ABS Indicator

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

Brake System Indicator

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

VSA Indicator

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

VSA Activation Indicator

The VSA activation indicator blinks, when the VSA function is activating. The VSA activation indicator comes on, when the VSA is turned OFF by using the VSA OFF switch, or the VSA function is lost.

ABS/VSA INDICATOR

- If the system is OK, the ABS and VSA indicators go off 2 seconds after turning the ignition switch ON (II).
- The ABS and VSA indicators come on when the control unit detects a problem in the system. However, even though the system is operating properly, the indicator may come on under these conditions:

- Only the drive wheels rotate.
- One drive wheel is stuck.
- The vehicle goes into a spin.
- The ABS or VSA continues to operate for a long time.
- The vehicle is subjected to an electrical signal disturbance.

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

- When a problem is detected, there are cases when the indicator stays on until the ignition switch is turned OFF, and cases when the indicator goes off automatically when the system returns to normal.
  - DTC 61 or 62:

    The ABS and VSA indicators go off automatically when the system returns to normal.

  - DTC 28, 31, 32,33, 34, 35, 36, 37, 38, 54, 81,121, 122,123, or 124:

    The ABS and VSA indicators stay on until the ignition switch is turned OFF whether or not the system returns to normal.

  - DTC 11, 12, 13,14, 15, 16, 17, 18, 21, 22, 23, 24, 51, or 52:

    The ABS and VSA indicators stay on until the system returns to normal after the engine is restarted, and the vehicle is driven.

  - DTC 25, 26, 27,64, 65, 66, 68, 83, 86, 91,104, or 105:

    The VSA indicator stays on until the ignition switch is turned OFF whether or not the system returns to normal.

  - DTC 84:

    The VSA activation indicator goes off automatically when the system returns to normal.

DIAGNOSTIC TROUBLE CODE (DTC)

- The memory can hold any number of 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 the EEPROM. 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 ON (II) and until the ABS and VSA indicators go off.
  - Regular diagnosis: Done right after the initial diagnosis until the ignition switch is turned OFF.
- When the system detects a problem, the VSA modulator-control unit shifts to 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 12 mph (20 km/h). You may hear the motor operate at this time, but it is normal.

BRAKE FLUID REPLACEMENT/AIR BLEEDING

Brake fluid replacement and air bleeding procedures are identical to the procedures used on vehicles without the VSA system (see **BRAKE SYSTEM BLEEDING**).

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 the troubleshooting procedure when the ABS and/or VSA indicator does not come on (no problem is present) can result in incorrect diagnosis.

The connector illustrations show the female terminal connectors with a single outline and the male terminal connectors with a double outline.

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

INTERMITTENT FAILURES

The term "intermittent failure" means a system may have had a failure, but it checks OK now. If the indicator(s) of the system does not come on, check for loose connectors and grounds, poor contact of the terminals related to the circuit that you are troubleshooting.

HOW TO USE THE HDS (HONDA DIAGNOSTIC SYSTEM)

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

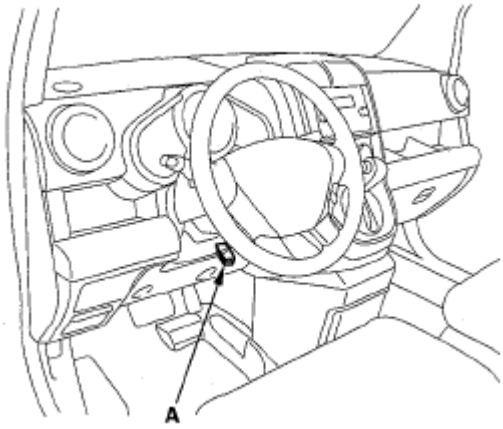


Fig. 3: Identifying Data Link Connector
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

NOTE:

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

HOW TO RETRIEVE DTCS

1. With the ignition switch OFF, connect the HDS to the data link connector (DLC) under the driver's side of the dashboard.
2. Turn the ignition switch ON (II).
3. Make sure the HDS communicates with the vehicle and the VSA modulator-control unit. If it doesn't, troubleshoot the DLC circuit (see **DLC CIRCUIT TROUBLESHOOTING**).

4. Follow the prompts on the HDS to display the DTC(s) on the screen. After determining the DTC, refer to the **DTC TROUBLESHOOTING**.
5. Turn the ignition switch OFF.

HOW TO CLEAR DTCS

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

DTC TROUBLESHOOTING INDEX

DTC TROUBLESHOOTING INDEX

DTC	Detection Item	ABS Indicator	Brake System Indicator	VSA Indicator	VSA Activation Indicator
11	Right-front wheel sensor (short to power/short to body ground/open)	ON	ON or OFF(1)	ON	ON
12	Right-front wheel sensor (electrical noise/intermittent interruption)	ON	ON or OFF(1)	ON	ON
13	Left-front wheel sensor (short to power/short to body ground/open)	ON	ON or OFF(1)	ON	ON
14	Left-front wheel sensor (electrical noise/intermittent interruption)	ON	ON or OFF(1)	ON	ON
15	Right-rear wheel sensor (short to power/short to body ground/open)	ON	ON or OFF(1)	ON	ON
16	Right-rear wheel sensor (electrical noise/intermittent interruption)	ON	ON or OFF(1)	ON	ON
17	Left-rear wheel	ON	ON or OFF(1)	ON	ON

	sensor (short to power/short to body ground/open)				
18	Left-rear wheel sensor (electrical noise/intermittent interruption)	ON	ON or OFF(1)	ON	ON
21	Right-front magnetic encoder	ON	ON or OFF(1)	ON	ON
22	Left-front magnetic encoder	ON	ON or OFF(1)	ON	ON
23	Right-rear magnetic encoder	ON	ON or OFF(1)	ON	ON
24	Left-rear magnetic encoder	ON	ON or OFF(1)	ON	ON
25	Yaw rate sensor	OFF/ON or OFF (2)	OFF	ON	ON
26	Lateral acceleration sensor	OFF/ON or OFF (2)	OFF	ON	ON
27	Steering angle sensor	OFF	OFF	ON	ON
28(2)	Longitudinal acceleration sensor	ON	OFF	ON	ON
31	ABS solenoid	ON	ON	ON	ON
32	ABS solenoid	ON	ON	ON	ON
33	ABS solenoid	ON	ON	ON	ON
34	ABS solenoid	ON	ON	ON	ON
35	ABS solenoid	ON	ON	ON	ON
36	ABS solenoid	ON	ON	ON	ON
37	ABS solenoid	ON	ON	ON	ON
38	ABS solenoid	ON	ON	ON	ON
51	Motor lock	ON	OFF	ON	ON
52	Motor stuck ON/OFF	ON	OFF	ON	ON
54	Fail-safe relay	ON	ON	ON	ON
61	Low +B-FSR voltage	ON	ON or OFF	ON	ON
62	High +B-FSR voltage	ON	ON	ON	ON
64	Sensor power voltage	OFF/ON(2)	OFF	ON	ON
65	Brake fluid level	OFF	OFF	ON	ON
66	VSA pressure	OFF	OFF	ON	ON

	sensor (inside of VSA modulator-control unit)				
68	Brake pedal position switch	OFF	OFF	ON	ON
81	Central processing unit (CPU)	ON or OFF	ON or OFF	ON	ON
83	ECM/PCM communication	OFF	OFF	ON	ON
84	VSA sensor neutral position	OFF	OFF	OFF	ON
86	F-CAN communication	OFF	OFF	ON	ON
91	VSA operation	OFF	OFF	ON	ON
104	Sensor cluster	OFF/ON(2)	OFF	ON	ON
105	Hydraulic unit temperature sensor	OFF	OFF	ON	ON
121	VSA solenoid	ON	ON	ON	ON
122	VSA solenoid	ON	ON	ON	ON
123	VSA solenoid	ON	ON	ON	ON
124	VSA solenoid	ON	ON	ON	ON

(1) Brake system indicator turns ON when two or more wheel sensors fail

(2) 4WD

SYMPTOM TROUBLESHOOTING INDEX

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

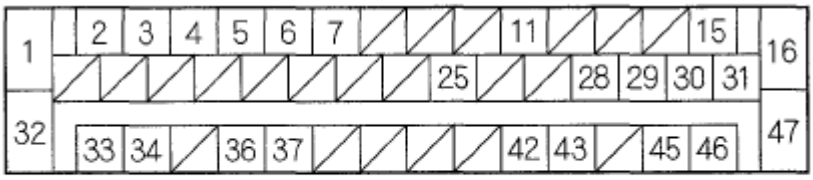
SYMPTOM TROUBLESHOOTING INDEX

Symptom	Diagnostic procedure
HDS does not communicate with the VSA modulator-control unit or the vehicle	Troubleshoot the DLC circuit (see **DLC CIRCUIT TROUBLESHOOTING**).
ABS indicator does not come on	1. Do the gauge control module troubleshooting (see **SELF-DIAGNOSTIC FUNCTION**). 2. Substitute a known-good VSA modulator-control unit, then recheck. If it is OK, replace the original VSA modulator-control unit (see **VSA MODULATOR-CONTROL UNIT REMOVAL AND INSTALLATION**).
ABS indicator or VSA	1. Symptom troubleshooting (see **SYMPTOM TROUBLESHOOTING**).

indicator does not go off, and no DTCs are stored	2. Do the gauge control module troubleshooting (see **SELF-DIAGNOSTIC FUNCTION**).
Brake system indicator does not come on	1. Do the gauge control module troubleshooting (see **SELF-DIAGNOSTIC FUNCTION**). 2. Substitute a known-good VSA modulator-control unit, then recheck. If it is OK, replace the original VSA modulator-control unit (see **VSA MODULATOR-CONTROL UNIT REMOVAL AND INSTALLATION**).
Brake system indicator does not go off, and no DTCs are stored	1. Symptom troubleshooting (see **BRAKE SYSTEM INDICATOR DOES NOT GO OFF, AND NO DTCS ARE STORED**). 2. Do the gauge control module troubleshooting (see **SELF-DIAGNOSTIC FUNCTION**).
VSA indicator does not come on	1. Do the gauge control module troubleshooting (see **SELF-DIAGNOSTIC FUNCTION**). 2. Substitute a known-good VSA modulator-control unit, then recheck. If it is OK, replace the original VSA modulator-control unit (see **VSA MODULATOR-CONTROL UNIT REMOVAL AND INSTALLATION**).
VSA activation indicator does not come on at start-up (bulb check)	1. Do the gauge control module troubleshooting (see **SELF-DIAGNOSTIC FUNCTION**). 2. Substitute a known-good VSA modulator-control unit, then recheck. If it is OK, replace the original VSA modulator-control unit (see **VSA MODULATOR-CONTROL UNIT REMOVAL AND INSTALLATION**).
VSA activation indicator does not go off, and no DTCs are stored	1. Symptom troubleshooting (see **VSA ACTIVATION INDICATOR DOES NOT GO OFF, AND NO DTCS ARE STORED**). 2. Do the gauge control module troubleshooting (see **SELF-DIAGNOSTIC FUNCTION**). 3. Substitute a known-good VSA modulator-control unit, then recheck. If it is OK, replace the original VSA modulator-control unit (see **VSA MODULATOR-CONTROL UNIT REMOVAL AND INSTALLATION**).
ABS indicator, brake system indicator, and VSA indicator do not go off at the same time	1. Symptom troubleshooting (see **ABS INDICATOR, BRAKE SYSTEM INDICATOR, AND VSA INDICATOR DO NOT GO OFF AT THE SAME TIME**). 2. Do the gauge control module troubleshooting (see **SELF-DIAGNOSTIC FUNCTION**).

SYSTEM DESCRIPTION

VSA MODULATOR-CONTROL UNIT INPUTS AND OUTPUTS FOR 47P CONNECTOR

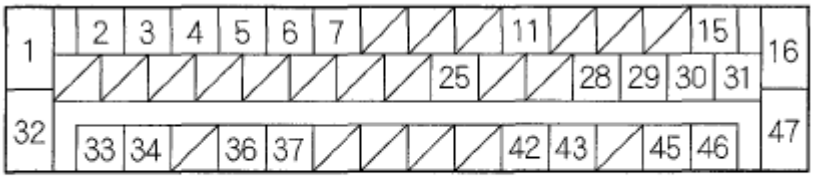


Wire side of female terminals

Fig. 4: Identifying 47P Connector
Courtesy of AMERICAN HONDA MOTOR CO., INC.

SYSTEM DESCRIPTION

Terminal number	Wire color	Terminal sign	Description	Measurement (Disconnect the VSA modulator-control unit 47P connector)		
				Terminal	Conditions	Result
1	WHT/RED	+B-P	Power source for the pump motor	1-GND	At all times	Battery voltage
2	LT BLU	K-LINE	Communication with HDS	-	-	-
3	BLU/WHT	STR-Z	Detects steering angle sensor signal	-	-	-
4	GRN/YEL	IG1	Power source for activating the system	4-GND	Ignition switch ON (II)	Battery voltage
5	BLU/ORN	STR-G	Ground for the steering angle sensor	5-GND	At all times	continuity
6	GRN/WHT	CLST-IG	Power source for the sensor cluster	6-GND	Ignition switch ON (II)	About 5 V
7	YEL/BLK	STR-VCC	Power source for the steering angle sensor	7-GND	Ignition switch ON (II)	About 5 V
11	WHT	CAN1-H	F-CAN communication circuit	-	-	-
15	RED	CAN1-L	F-CAN communication circuit	-	-	-



Wire side of female terminals

Fig. 5: Identifying 47P Connector

Courtesy of AMERICAN HONDA MOTOR CO., INC.

SYSTEM DESCRIPTION

Terminal number	Wire color	Terminal sign	Description	Measurement (Disconnect the VSA modulator-control unit 47P connector)		
				Terminal	Conditions	Result
16	BLK	GND-V	Ground for the VSA modulator-control unit	16-GND	At all times	Continuity
25	RED	CAN2-L	CAN2 communication circuit	-	-	-
28	RED/YEL	STR-A	Detects steering angle sensor signal	-	-	-
29	WHT	CAN2-H	CAN2 communication circuit	-	-	-
30	YEL/RED	STR-B	Detects steering angle sensor signal	-	-	-
31	LT GRN	CLST-GND	Ground for the sensor cluster	31-GND	At all times	Continuity
32	WHT/GRN	+B-V	Power source for the fail-safe relay	32-GND	At all times	Battery voltage
33	BLU	FR-GND	Detects right-front wheel sensor signal	-	-	-
34	GRN/BLK	FR+B				
36	YEL/RED	RL+B	Detects left-rear wheel sensor signal	-	-	-
37	GRY/RED	RL-GND				
42	BLU/YEL	RR-GND	Detects right-rear wheel sensor signal	-	-	-
43	GRN/YEL	RR+B				
45	BLU/ORN	FL+B	Detects left-front wheel sensor signal	-	-	-
46	BRN/WHT	FL-GND				
47	BLK	GND-P	Ground for the pump motor	47-GND	At all times	Continuity

ABS Features

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

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

Grip force of tire and road surface

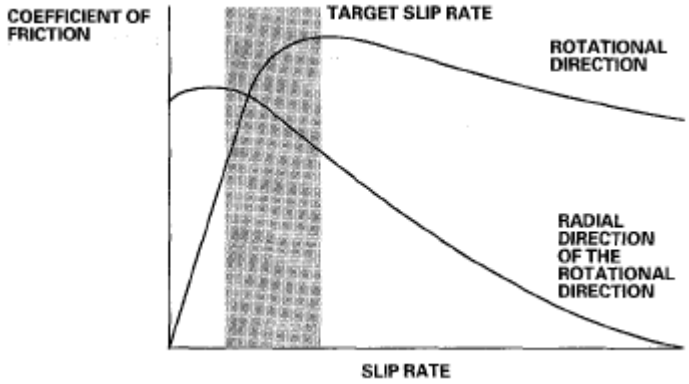


Fig. 6: Grip Force Graph Of Tire And Road Surface
Courtesy of AMERICAN HONDA MOTOR CO., INC.

TCS Features

The TCS provides low-speed traction. When a drive wheel loses traction on a slippery road surface and starts to spin, the VSA modulator-control unit applies brake pressure to slow the spinning wheel. At that time, the VSA modulator-control unit sends a traction control signal to the ECM/PCM to reduce engine power.

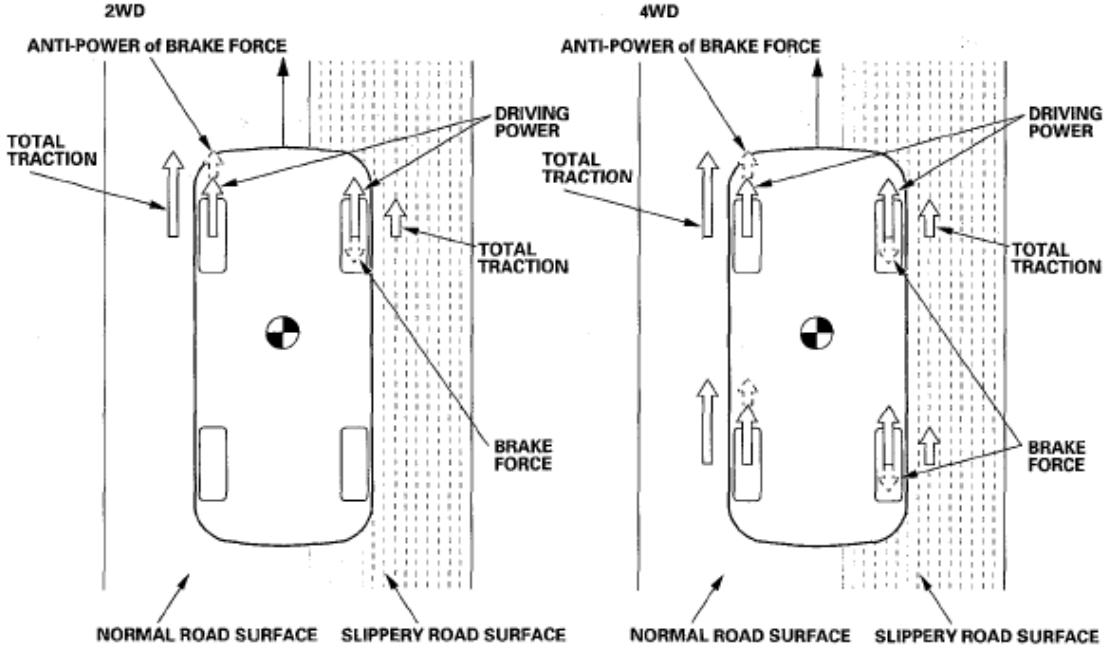


Fig. 7: Identifying TCS Features
Courtesy of AMERICAN HONDA MOTOR CO., INC.

VSA SYSTEM FEATURES

Oversteer control

Applies the brake to the front outside wheel

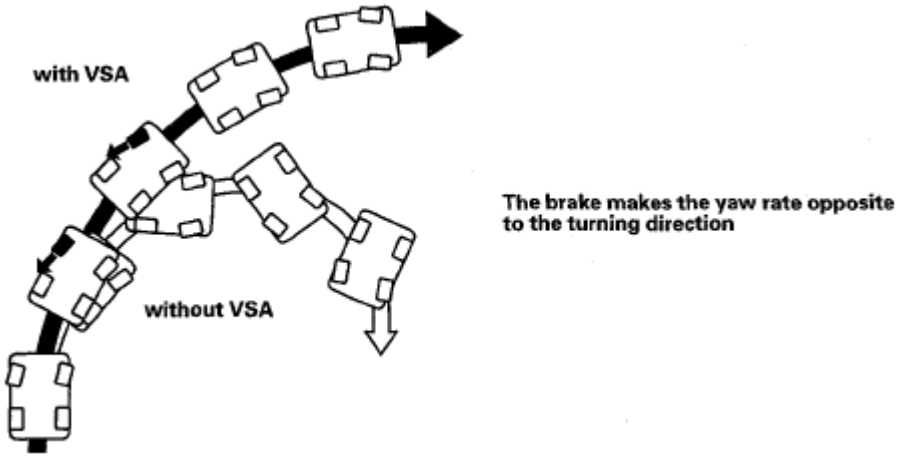


Fig. 8: VSA System Features - Oversteer Control
Courtesy of AMERICAN HONDA MOTOR CO., INC.

Under steer control

- Applies the brake to the rear inside wheel
- Controls the engine torque when accelerating

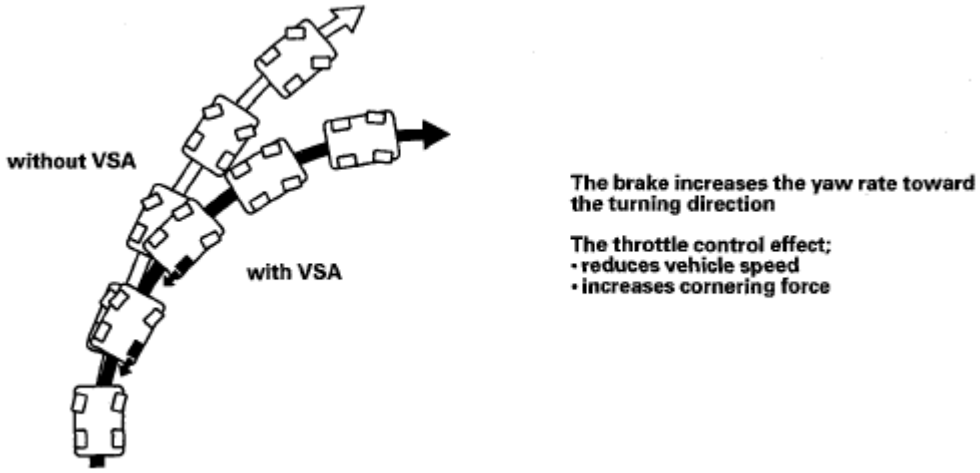


Fig. 9: VSA System Features - Under Steer Control
Courtesy of AMERICAN HONDA MOTOR CO., INC.

ELECTRONIC BRAKE DISTRIBUTION (EBD)

Electronic brake distribution (EBD) has been added to the VSA system. EBD eliminates the need for an external, mechanical proportioning valve and improves overall braking performance.

When the vehicle is heavily loaded, most of the increase in weight is born by the rear wheels, increasing braking capability. Proportioning valves maintain a fixed distribution of brake pressure between the front and the rear wheels, making it very difficult to fully utilize increased rear wheel braking capability. EBD varies

brake pressure distribution according to load, using input from the wheel speed sensors, which improves overall braking performance.

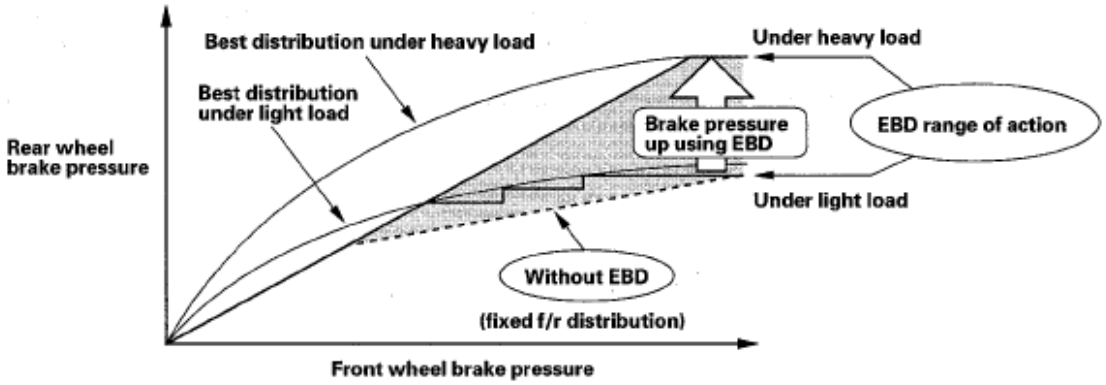


Fig. 10: Identifying Electronic Brake Distribution
Courtesy of AMERICAN HONDA MOTOR CO., INC.

Normal Braking

Under normal braking conditions, brake pressure is evenly distributed between the front and rear brakes, and EBD is not used.

Firm Braking

Under hard braking conditions, the VSA modulator-control unit monitors wheel speed in order to allow a maximum amount of brake distribution individually to the rear wheels. Once the VSA modulator-control unit detects that one or both rear wheels are nearing their maximum braking potential, the inlet valve closes for one or both rear wheels, maintaining the current pressure. If the traction is improved, and the wheel(s) is no longer nearing its limits, the VSA modulator-control unit will open the inlet solenoid allowing additional pressure to be distributed to the rear wheel. The rear wheels are controlled independently of each other during EBD function.

If during EBD function the VSA modulator-control unit determines that the wheels are beginning to slip more than a predetermined amount, the control unit abandons EBD control and shifts to select low 3-channel ABS control.

BRAKE ASSIST

Brake assist has been added to the VSA system. 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.

Each time the ignition switch is turned ON (II), the VSA modulator-control unit learns the current driver's normal braking characteristics by monitoring the brake pressure sensor and the brake pedal position switch at each stop. Using these inputs and their values, the VSA modulator-control unit is able to learn the driver's normal braking habits, and then determine the difference between a normal stop and a panic stop for the individual driver of the vehicle. If during a panic stop the VSA modulator-control unit determines that the brake system pressure increases above a learned threshold in less than a learned amount of time, the VSA modulator-

control unit engages brake assist.

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

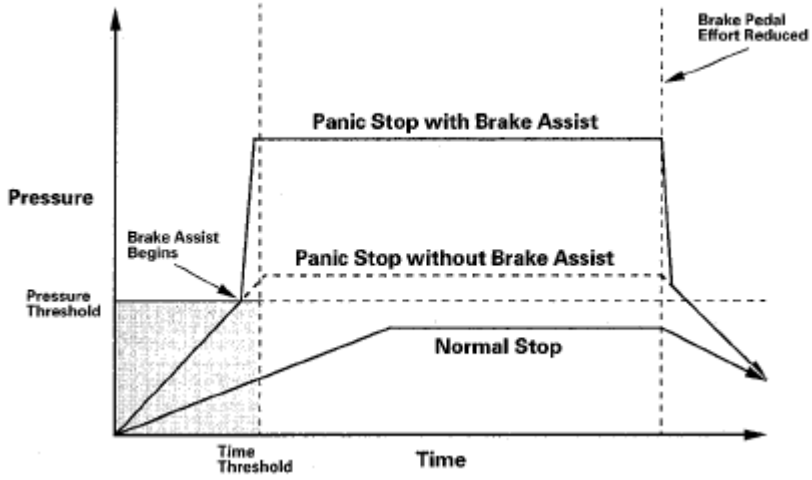


Fig. 11: Pressure And Time Graph
Courtesy of AMERICAN HONDA MOTOR CO., INC.

Normal Braking

During normal braking conditions, brake assist does not affect brake system pressure.

Panic Stop

During a panic stop, the control unit turns the VSA pump ON, and opens the inlet valve. This brings the brake system pressure up high enough to cause a full ABS stop. As soon as the brake pedal is released, brake assist is stopped and the brake system returns to normal operation.

MODULATOR UNIT

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

The modulator controls the caliper fluid pressure directly. It is a circulating-type modulator because the brake fluid circulates through the caliper, the reservoir, and the master cylinder.

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

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

ABS CONTROL

Pressure Intensifying Mode

VSA NO valve open, VSA NC valve closed, inlet valve open, outlet valve closed.

Master cylinder fluid is pumped out to the caliper.

Pump Motor

When starting the pressure reducing mode, the pump motor is ON. When stopping ABS operation, the pump motor is OFF.

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

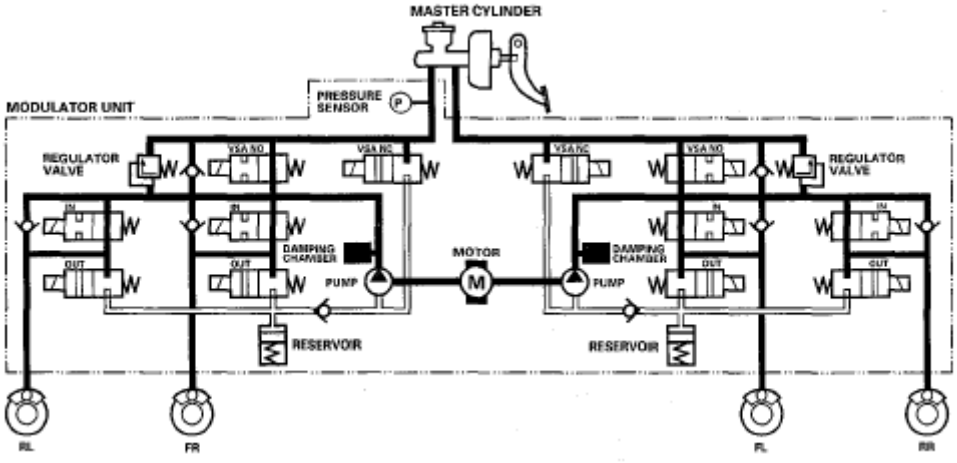


Fig. 12: Pump Motor System Diagram
Courtesy of AMERICAN HONDA MOTOR CO., INC.

Pressure Retaining Mode

VSA NO valve open, VSA NC valve closed, inlet valve closed, outlet valve closed.

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

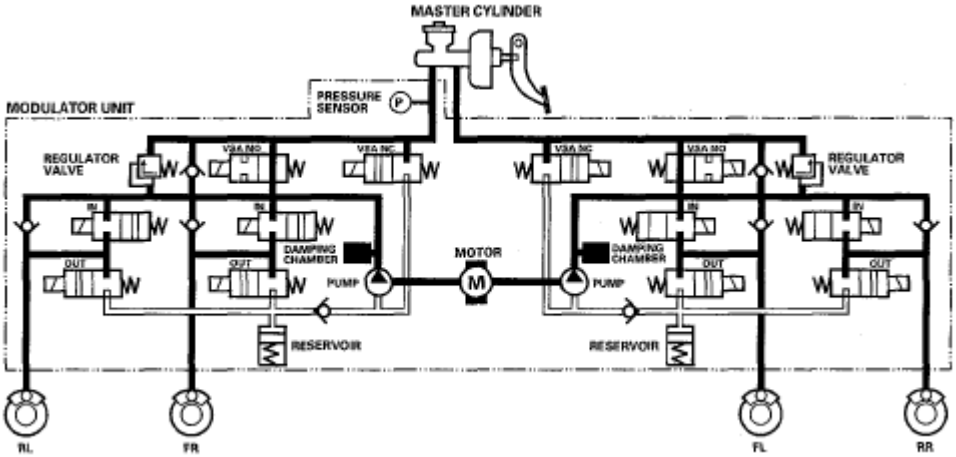


Fig. 13: Pressure Retaining Mode - System Diagram
Courtesy of AMERICAN HONDA MOTOR CO., INC.

Pressure Reducing Mode

VSA NO valve open, VSA NC valve closed, inlet valve closed, outlet valve open.

Caliper fluid flows through the outlet valve to the reservoir.

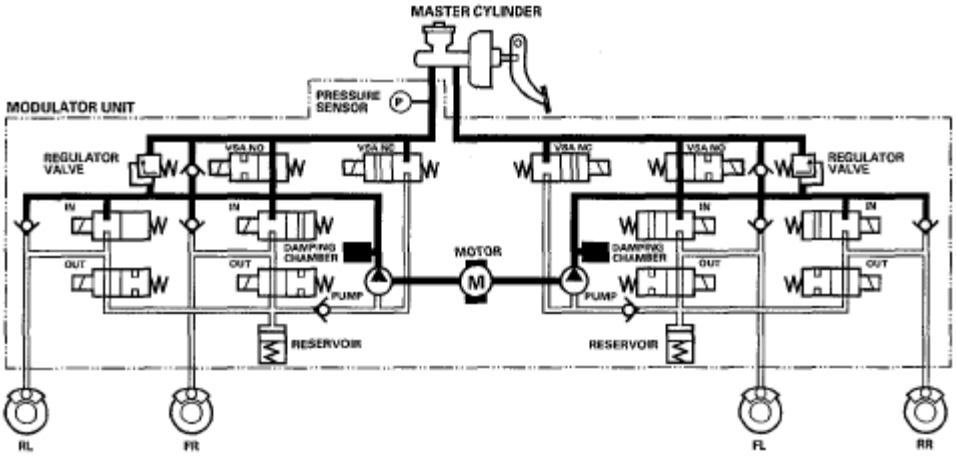


Fig. 14: Pressure Reducing Mode - System Diagram
Courtesy of AMERICAN HONDA MOTOR CO., INC.

TCS CONTROL

Pressure Intensifying Mode

VSA NO valve closed, VSA NC valve open, inlet valve open, outlet valve closed, pump motor ON.

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

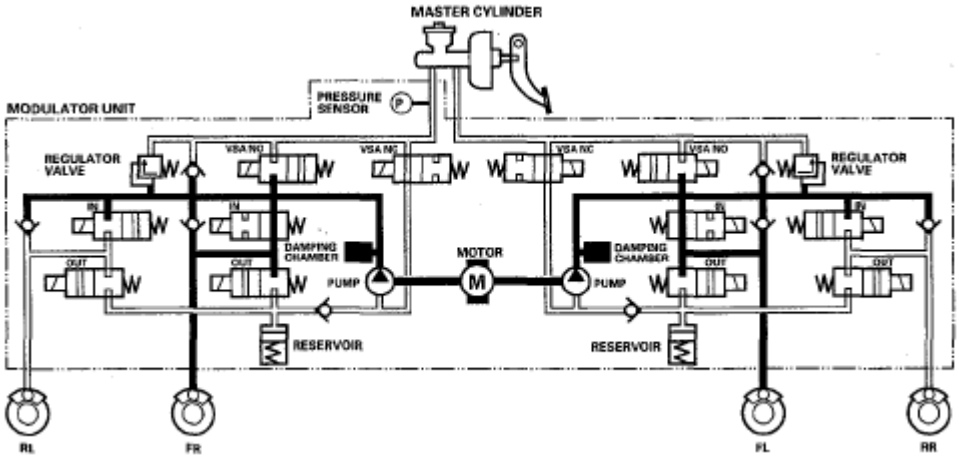


Fig. 15: TCS Control - Pressure Intensifying Mode
Courtesy of AMERICAN HONDA MOTOR CO., INC.

Pressure Retaining Mode

VSA NO valve closed, VSA NC valve open, inlet valve closed, outlet valve closed, pump motor ON.

Front caliper fluid is retained by the inlet valve and outlet valve.

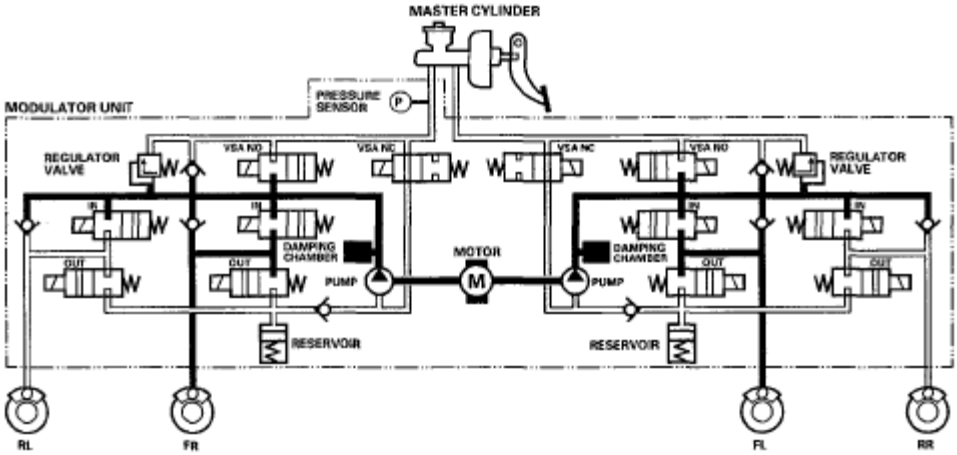


Fig. 16: TCS Control - Pressure Retaining Mode
Courtesy of AMERICAN HONDA MOTOR CO., INC.

Pressure Reducing Mode

VSA NO valve open, VSA NC valve closed, inlet valve closed, front outlet valve open, pump motor ON.

Caliper fluid flows through the outlet valve to the reservoir.

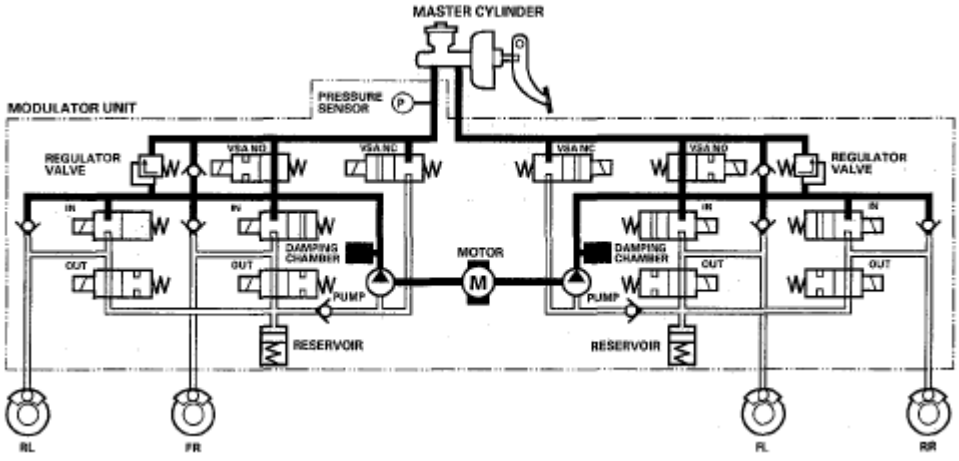


Fig. 17: TCS Control - Pressure Reducing Mode
Courtesy of AMERICAN HONDA MOTOR CO., INC.

VSA CONTROL

Pressure Intensifying Mode

VSA NO valve closed, VSA NC valve open, inlet valve open, outlet valve closed, pump motor ON.

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

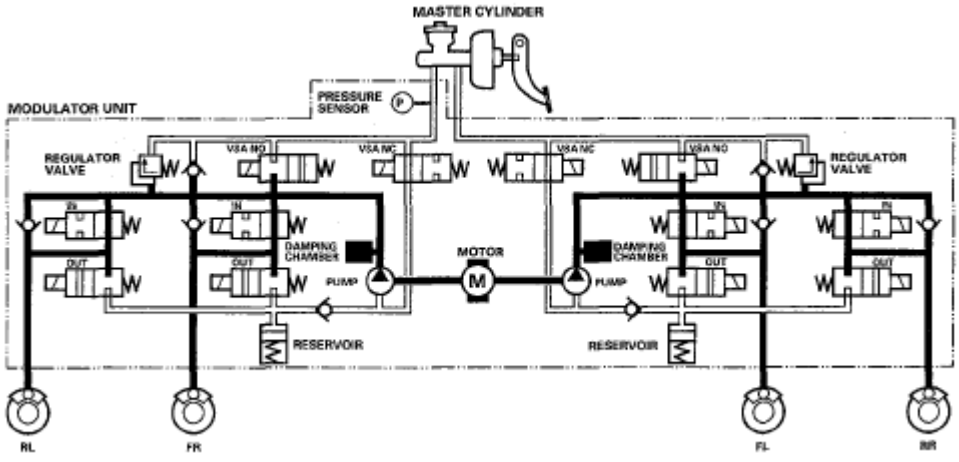


Fig. 18: VSA Control - Pressure Intensifying Mode
Courtesy of AMERICAN HONDA MOTOR CO., INC.

Pressure Retaining Mode

VSA NO valve closed, VSA NC valve open, inlet valve closed, outlet valve closed, pump motor ON.

Front and rear caliper fluid is retained by the inlet valve and outlet valve.

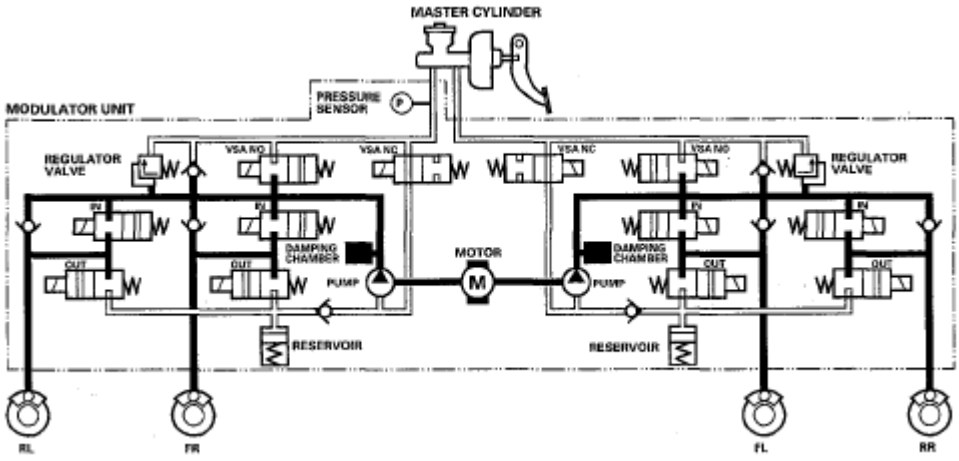


Fig. 19: VSA Control - Pressure Retaining Mode
Courtesy of AMERICAN HONDA MOTOR CO., INC.

Pressure Reducing Mode

VSA NO valve open, VSA NC valve closed, inlet valve closed, outlet valve open, pump motor ON.

Caliper fluid flows through the outlet valve to the reservoir.

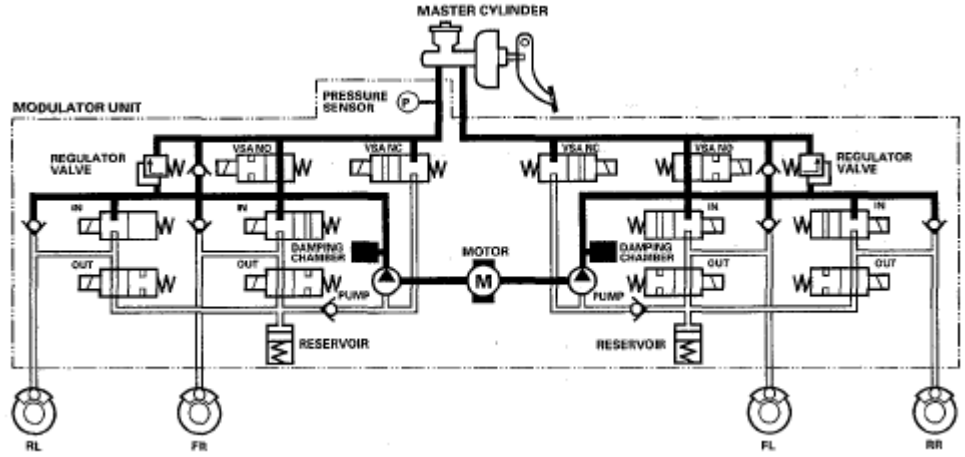


Fig. 20: VSA Control - Pressure Reducing Mode
Courtesy of AMERICAN HONDA MOTOR CO., INC.

CIRCUIT DIAGRAM

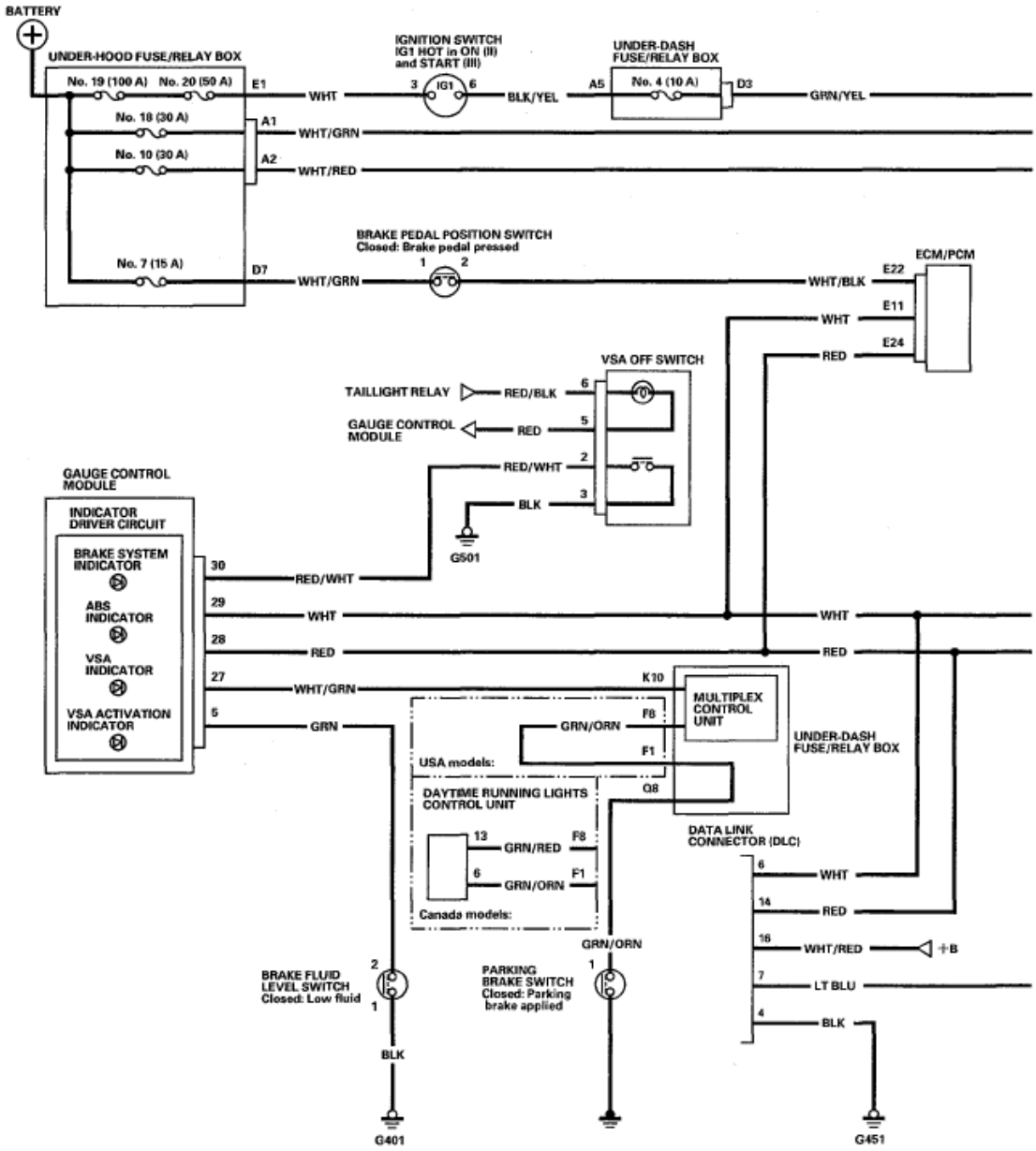


Fig. 21: VSA System Circuit Diagram (1 Of 3)
Courtesy of AMERICAN HONDA MOTOR CO., INC.

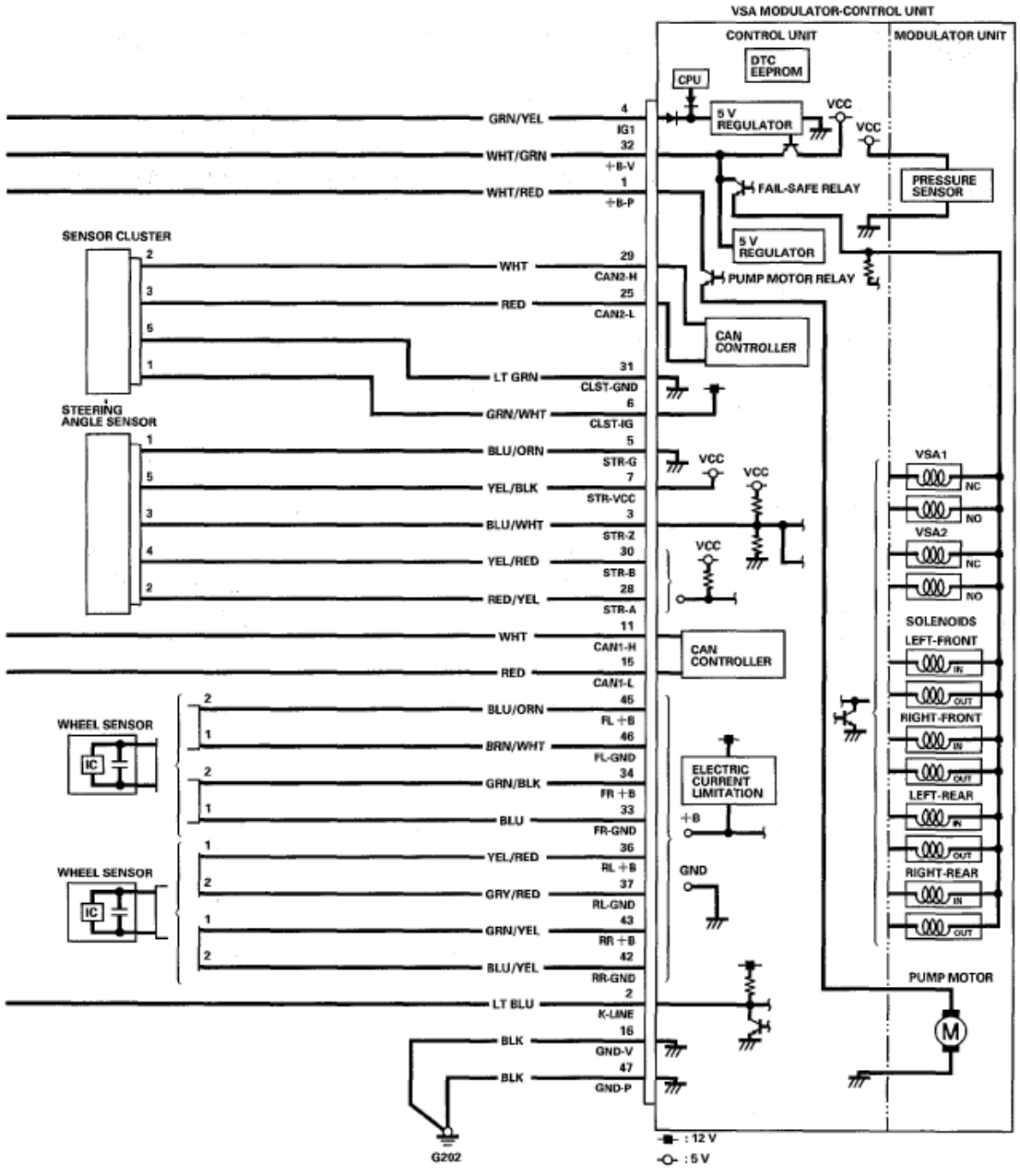


Fig. 22: VSA System Circuit Diagram (2 Of 3)
Courtesy of AMERICAN HONDA MOTOR CO., INC.

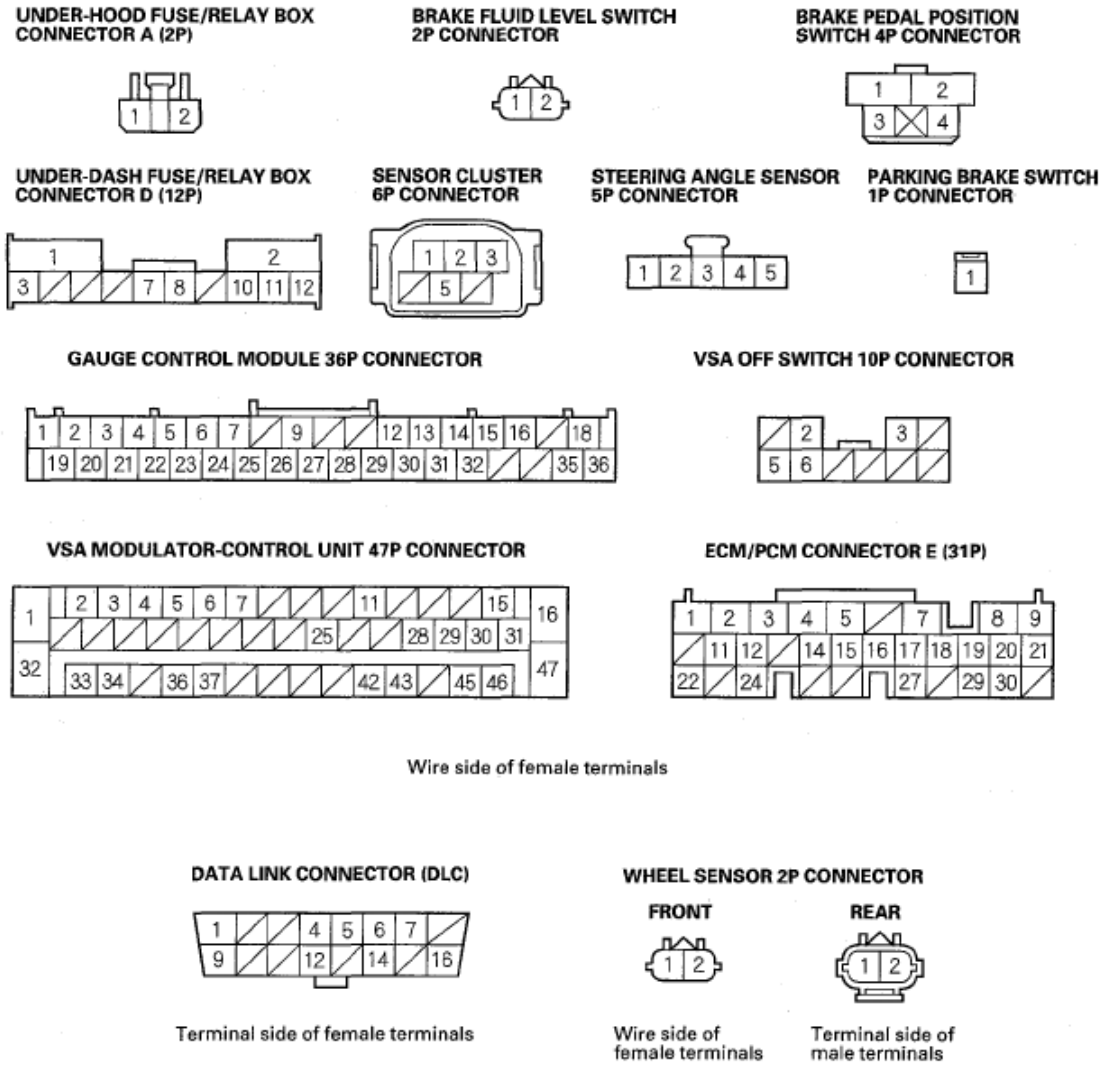


Fig. 23: VSA System Circuit Diagram (3 Of 3)
Courtesy of AMERICAN HONDA MOTOR CO., INC.

DTC TROUBLESHOOTING

DTC 11,13,15,17: WHEEL SENSOR (SHORT TO POWER/SHORT TO BODY GROUND/OPEN)

1. Turn the ignition switch OFF.
2. Disconnect the VSA modulator-control unit 47P connector.
3. Start the engine.
4. Measure the voltage between body ground and the appropriate wheel sensor +B and GND terminals of the VSA modulator-control unit 47P connector individually (see table).

DTC TROUBLESHOOTING

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

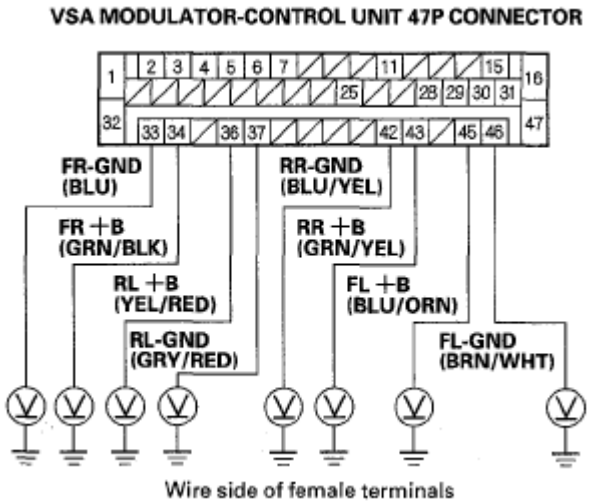


Fig. 24: Measuring Voltage Between Body Ground And Appropriate Wheel Sensor +B And GND Terminals
Courtesy of AMERICAN HONDA MOTOR CO., INC.

Is there 0.1 V or more?

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

NO -Go to step 5.

5. Turn the ignition switch OFF.
6. Check for continuity between body ground and the appropriate wheel sensor +B and GND terminals of the VSA modulator-control unit 47P connector individually (see table).

CONTINUITY SPECIFICATIONS

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-f-B: No. 43	RR-GND: No. 42
17 (Left-rear)	RL+B: No. 36	RL-GND: No. 37

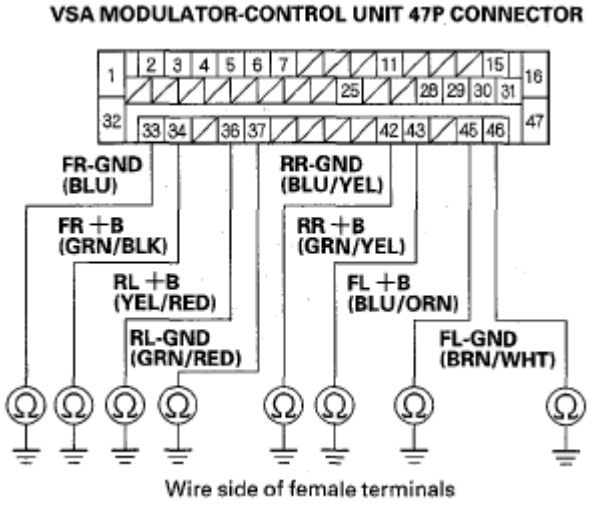


Fig. 25: Checking Continuity Between Body Ground And Appropriate Wheel Sensor +B And Gnd Terminals
Courtesy of AMERICAN HONDA MOTOR CO., INC.

Is there continuity?

YES -Go to step 7.

NO -Go to step 9.

7. Disconnect the appropriate wheel sensor 2P connector.
8. Check for continuity between body ground and the appropriate wheel sensor +B and GND terminals of the VSA modulator-control unit 47P connector individually (see table).

CONTINUITY SPECIFICATIONS

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

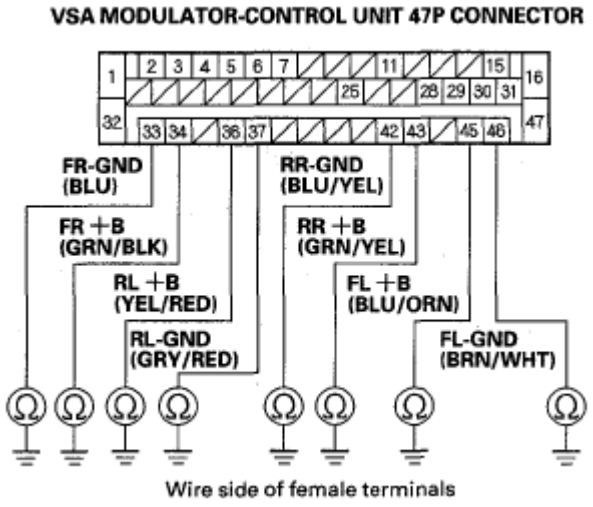


Fig. 26: Checking Continuity Between Body Ground And Appropriate Wheel Sensor +B And Gnd Terminals
Courtesy of AMERICAN HONDA MOTOR CO., INC.

Is there continuity?

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

NO -Replace the wheel sensor (see **WHEEL SENSOR REPLACEMENT**).

9. Disconnect the appropriate wheel sensor 2P connector.
10. Check for continuity between the appropriate wheel sensor +B and GND terminals of the VSA modulator-control unit 47P connector (see table).

CONTINUITY SPECIFICATIONS

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

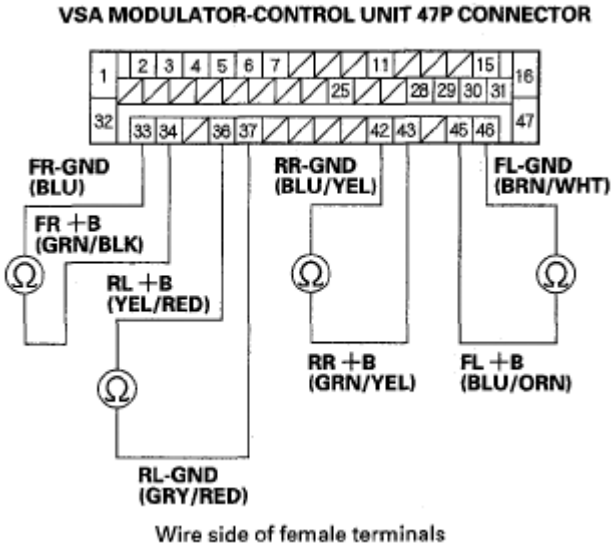


Fig. 27: Checking Continuity Between Appropriate Wheel Sensor +B And Gnd Terminals Of VSA Modulator-Control Unit 47P Connector
Courtesy of AMERICAN HONDA MOTOR CO., INC.

Is there continuity?

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

NO -Go to step 11.

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

CONTINUITY SPECIFICATIONS

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

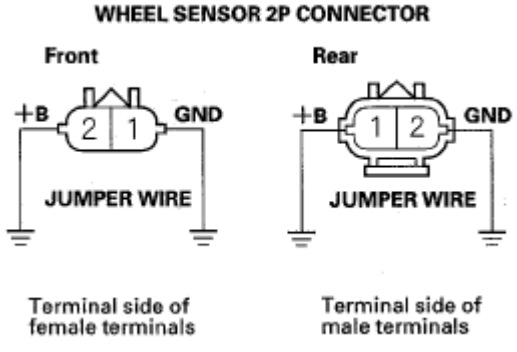


Fig. 28: Connecting Wheel Sensor 2P Connector Terminals No. 1 And 2 To Body Ground With Jumper Wire
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

CONTINUITY SPECIFICATIONS

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

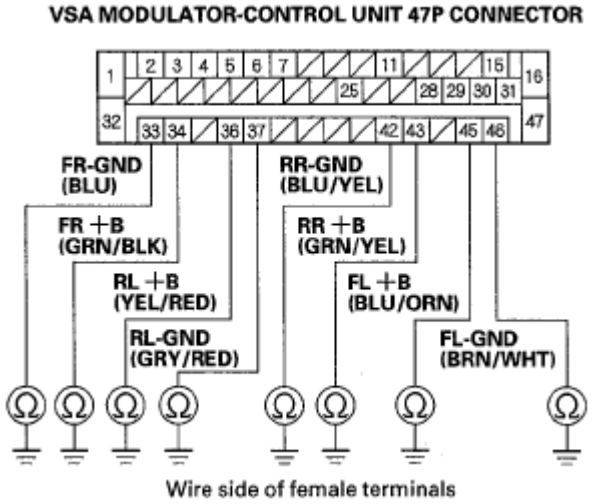


Fig. 29: Checking Continuity Between Body Ground And Appropriate Wheel Sensor +B And Gnd Terminals Of VSA Modulator-Control Unit
Courtesy of AMERICAN HONDA MOTOR CO., INC.

Is there continuity?

YES -Go to step 13.

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

13. On the sensor side, measure the resistance between the appropriate wheel sensor 2P connector terminals, then re-measure the resistance between the same terminals after reversing the positive tester probe and negative tester probe.

RESISTANCE SPECIFICATIONS

DTC	Appropriate Wheel Sensor

11	Right-front
13	Left-front
15	Right-rear
17	Left-rear

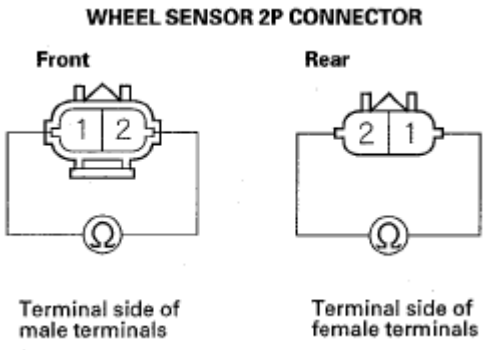


Fig. 30: Measuring Resistance Between Appropriate Wheel Sensor 2P Connector Terminals
Courtesy of AMERICAN HONDA MOTOR CO., INC.

Is the resistance infinity (open circuit) or has continuity in both directions?

YES -Replace the wheel sensor (see **WHEEL SENSOR REPLACEMENT**).

NO -Check for loose terminals in the VSA modulator-control unit 47P connector. If necessary, substitute a known-good VSA modulator-control unit (see **VSA MODULATOR-CONTROL UNIT REMOVAL AND INSTALLATION**), and retest.

DTC 12,14,16,18: WHEEL SENSOR (ELECTRICAL NOISE/INTERMITTENT INTERRUPTION)

NOTE: If the ABS and VSA indicators come on because of electrical noise, the indicator goes off when you test-drive the vehicle at 19 mph (30 km/h).

1. Turn the ignition switch OFF.
2. Check the appropriate wheel sensor and magnetic encoder (see **WHEEL SENSOR REPLACEMENT**).

RESISTANCE SPECIFICATIONS

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

Are they OK?

YES -Go to step 3.

NO -Reinstall or replace the appropriate wheel sensor or magnetic encoder.

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

CONTINUITY SPECIFICATIONS

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

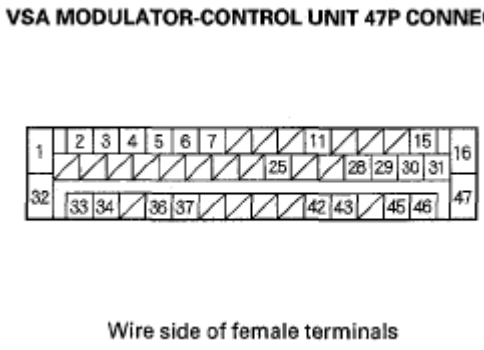


Fig. 31: Checking Continuity Between Appropriate Wheel Sensor Gnd Terminal And Other Wheel Sensor GND Terminals
Courtesy of AMERICAN HONDA MOTOR CO., INC.

Is there continuity?

YES -Repair short in the wires between the appropriate wheel sensor and the other wheel sensor.

NO -Go to step 5.

5. Substitute a known-good wheel sensor for the appropriate wheel sensor (see table).

CONTINUITY SPECIFICATIONS

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

6. Reconnect all of the disconnected connectors.
7. Turn the ignition switch ON (II).

8. Clear the DTC with the HDS.
9. Turn the ignition switch OFF, then disconnect the HDS.
10. Test-drive the vehicle at 19 mph (30 km/h) or more.
11. 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 necessary, substitute a known-good VSA modulator-control unit (see **VSA MODULATOR-CONTROL UNIT REMOVAL AND INSTALLATION**), and retest.

NO -Replace the original wheel sensor (see **WHEEL SENSOR REPLACEMENT**).

DTC 21,22,23,24: MAGNETIC ENCODER

1. Turn the ignition switch ON (II).
2. Clear the DTC with the HDS.
3. Turn the ignition switch OFF, then disconnect the HDS.
4. Test-drive the vehicle at 19 mph (30 km/h) or more.
5. Check for DTCs with the HDS.

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

YES -Go to step 6.

NO -The system is OK at this time.

6. Check the appropriate magnetic encoder (see table) (see **WHEEL SENSOR REPLACEMENT**).

CONTINUITY SPECIFICATIONS

DTC	Appropriate Wheel Sensor
21	Right-front
22	Left-front
23	Right-rear
24	Left-rear

Is the sensor OK?

YES -Check for loose terminals in the VSA modulator-control unit 47P connector. If necessary, substitute a known-good VSA modulator-control unit (see **VSA MODULATOR-CONTROL UNIT REMOVAL AND INSTALLATION**), and retest.

NO -Replace the magnetic encoder.

DTC 25: YAW RATE SENSOR; DTC 26: LATERAL ACCELERATION SENSOR; DTC 28: LONGITUDINAL ACCELERATION SENSOR; DTC 104: SENSOR CLUSTER

1. Check the size, air pressure, and the amount of wear of all four tires, and check the wheel alignment (see **WHEEL ALIGNMENT**).

   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 correctly, and recheck by test-driving.

2. Turn the ignition switch OFF.
3. Disconnect the sensor cluster 6P connector.
4. Disconnect the VSA modulator-control unit 47P connector.
5. Turn the ignition switch ON (II).
6. Measure the voltage between body ground and VSA modulator-control unit 47P connector terminals No. 6, No. 25, No. 29, and No. 31 individually.

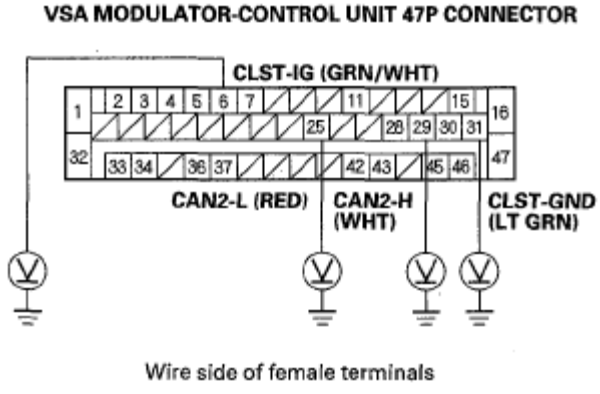


Fig. 32: Measuring Voltage Between Body Ground And VSA Modulator-Control Unit 47P Connector Terminals
Courtesy of AMERICAN HONDA MOTOR CO., INC.

Is there 0.1 V or more?

YES -Repair short to power in the wire between the VSA modulator-control unit and the sensor cluster.

NO -Go to step 7.

7. Turn the ignition switch OFF.
8. Check for continuity between body ground and VSA modulator-control unit 47P connector terminals No. 6, No. 25, No. 29, and No. 31 individually.

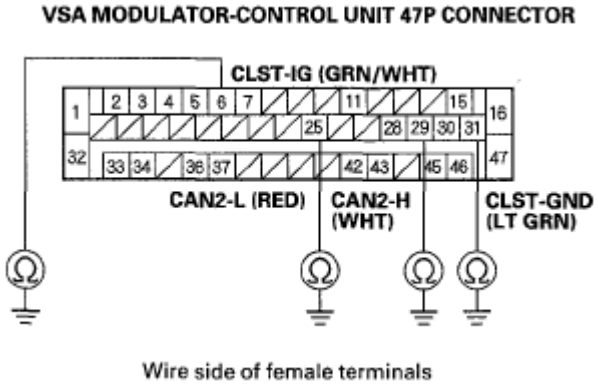


Fig. 33: Checking Continuity Between Body Ground And VSA Modulator-Control Unit 47P Connector Terminals
Courtesy of AMERICAN HONDA MOTOR CO., INC.

Is there continuity?

YES -Repair short to body ground in the wire between the VSA modulator-control unit and the sensor cluster.

NO -Go to step 9.

9. Check for continuity between VSA modulator-control unit 47P connector terminals No. 6, No. 25, No. 29, and No. 31 and sensor cluster 6P connector terminals No. 1, No. 3, No. 2, and No. 5.

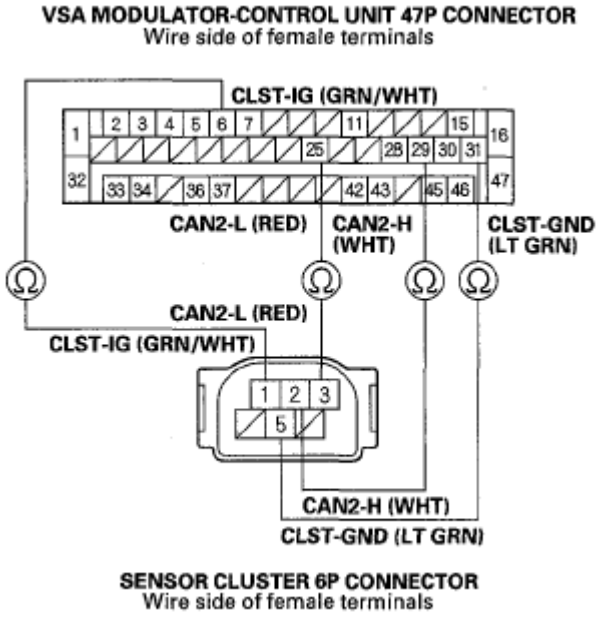


Fig. 34: Checking Continuity Between VSA Modulator-Control Unit 47P Connector Terminals
Courtesy of AMERICAN HONDA MOTOR CO., INC.

Is there continuity?

YES -Go to step 10.

NO -Repair open in the wire between the VSA modulator-control unit and the sensor cluster.

10. Substitute a known-good sensor cluster (see **SENSOR CLUSTER REPLACEMENT**).

NOTE: Check that the sensor cluster mounting bracket is not bent or twisted, and make sure the sensor cluster is mounted properly and fixed.

11. Reconnect all of the disconnected connectors.
12. Turn the ignition switch ON (II).
13. Clear the DTC with the HDS.
14. Do the VSA sensor neutral position memorization (see **VSA SENSOR NEUTRAL POSITION MEMORIZATION**).
15. Turn the ignition switch OFF, then disconnect the HDS.
16. Test-drive the vehicle around a number of corners.
17. 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 necessary, substitute a known-good VSA modulator-control unit (see **VSA MODULATOR-CONTROL UNIT REMOVAL AND INSTALLATION**), and retest.

NO -Replace the sensor cluster (see **SENSOR CLUSTER REPLACEMENT**).

DTC 27: STEERING ANGLE SENSOR

1. Check the size, air pressure, and amount of wear of all four tires, and check the wheel alignment (see **WHEEL ALIGNMENT**).

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 correctly, and recheck by test-driving.

2. Turn the ignition switch ON (II).
3. Clear the DTC with the HDS.
4. Turn the ignition switch OFF, then disconnect the HDS.
5. Test-drive the vehicle around a number of corners.

6. Check for DTCs with the HDS.

   Is DTC 64 indicated?

   YES -Do the appropriate troubleshooting for the DTC.

   NO -Go to step 7.

7. Turn the ignition switch OFF.
8. Disconnect the steering angle sensor 5P connector.
9. Disconnect the VSA modulator-control unit 47P connector.
10. Turn the ignition switch ON (II).
11. Measure the voltage between body ground and VSA modulator-control unit 47P connector terminals No. 5, and No. 7 individually.

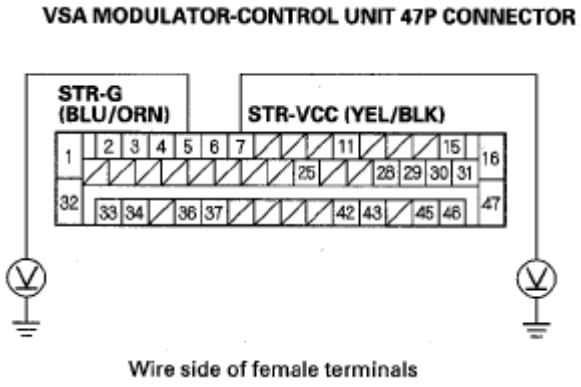


Fig. 35: Measuring Voltage Between Body Ground And VSA Modulator - Control Unit 47P Connector Terminals No. 5, And 7
Courtesy of AMERICAN HONDA MOTOR CO., INC.

Is there 0.1 V or more?

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

NO -Go to step 12.

12. Measure the voltage between body ground and VSA modulator-control unit 47P connector terminals No. 3, No. 28, and No. 30 individually.

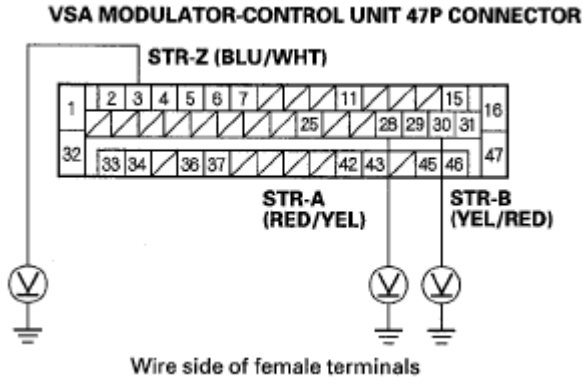


Fig. 36: Measuring Voltage Between Body Ground And VSA Modulator - Control Unit 47P Connector Terminals No. 3, 28 And 30
Courtesy of AMERICAN HONDA MOTOR CO., INC.

Is there 0.1 V or more?

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

NO -Go to step 13.

13. Turn the ignition switch OFF.
14. Check for continuity between body ground and VSA modulator-control unit 47P connector terminals No. 5, and No. 7 individually.

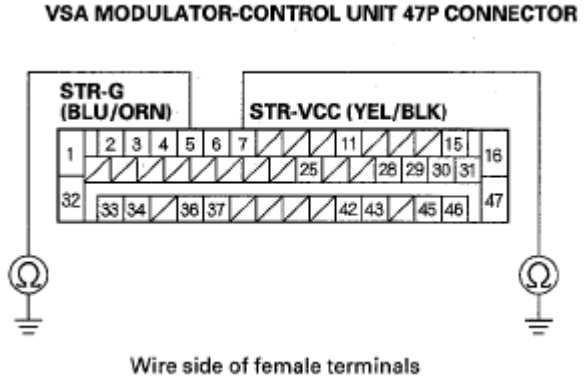


Fig. 37: Checking Continuity Between Body Ground And VSA Modulator-Control Unit 47P Connector Terminals No. 5 And 7
Courtesy of AMERICAN HONDA MOTOR CO., INC.

Is there continuity?

YES -Repair 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 body ground and VSA modulator-control unit 47P connector terminals No. 3, No. 28, and No. 30 individually.

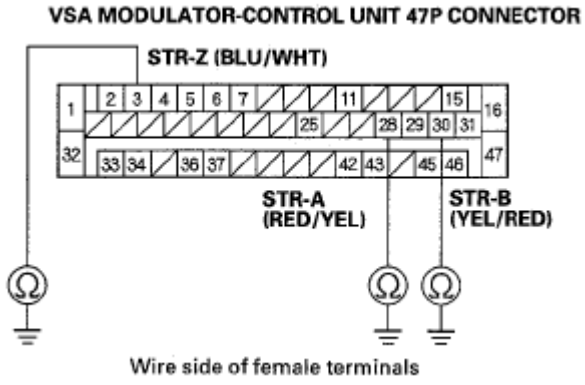


Fig. 38: Checking Continuity Between Body Ground And VSA Modulator-Control Unit 47P Connector Terminals No. 3, 28 And 30
Courtesy of AMERICAN HONDA MOTOR CO., INC.

Is there continuity?

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

NO -Go to step 16.

16. Check for continuity between VSA modulator-control unit 47P connector terminals No. 5, No. 7 and steering angle sensor 5P connector terminals No. 1, No. 5 individually.

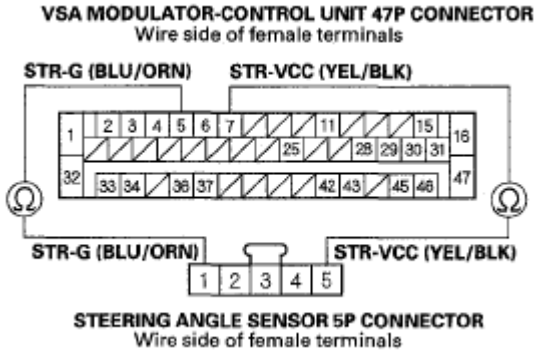


Fig. 39: Checking Continuity Between VSA Modulator-Control Unit 47P Connector Terminals No. 5, No. 7
Courtesy of AMERICAN HONDA MOTOR CO., INC.

Is there continuity?

YES -Go to step 17.

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

17. Check for continuity between VSA modulator-control unit 47P connector terminals No. 3, No. 28, No. 30 and steering angle sensor 5P connector terminals No. 3, No. 2, and No. 4 individually.

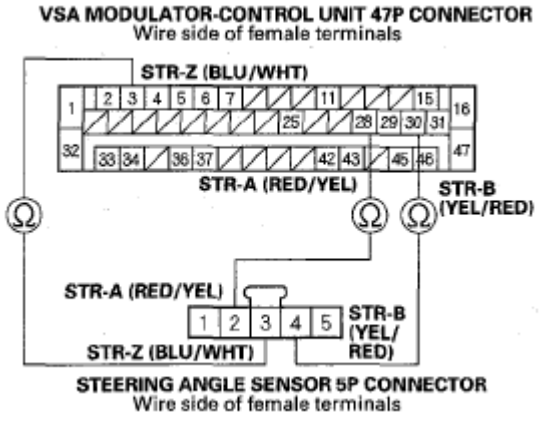


Fig. 40: Checking Continuity Between VSA Modulator-Control Unit 47P Connector Terminals No. 3, 28 And 30
Courtesy of AMERICAN HONDA MOTOR CO., INC.

Is there continuity?

YES -Go to step 18.

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

18. Substitute a known-good steering angle sensor (see **STEERING ANGLE SENSOR REPLACEMENT**).

NOTE: Make sure the steering angle sensor and combination switch is mounted properly.

19. Reconnect all of the disconnected connectors.
20. Turn the ignition switch ON (II).
21. Clear the DTC with the HDS.
22. Turn the ignition switch OFF, then disconnect the HDS.
23. Test-drive the vehicle around a number of corners.
24. Check for DTCs with the HDS.

Is DTC 27 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 **VSA MODULATOR-CONTROL UNIT REMOVAL AND INSTALLATION**), and retest.

NO -Check for loose terminals in the steering angle sensor 5P connector. If the connections are OK, replace the steering angle sensor (see **STEERING ANGLE SENSOR REPLACEMENT**).

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

1. Turn the ignition switch ON (II).
2. Clear the DTC with the HDS.
3. Turn the ignition switch OFF, then ON (II) again.
4. 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 necessary, substitute a known-good VSA modulator-control unit (see **VSA MODULATOR-CONTROL UNIT REMOVAL AND INSTALLATION**), and retest.

NO -The system is OK at this time.

DTC 51: MOTOR LOCK; DTC 52: MOTOR STUCK ON/OFF

1. Turn the ignition switch OFF.
2. Check the No. 10(30 A) fuse in the under-hood fuse/relay box.

Is the fuse blown?

YES -Install the new No. 10 (30 A) fuse, and recheck. If the fuse continues to blow, check for short to body ground in the wire between the No. 10 (30 A) fuse in the under-hood fuse/relay box and the VSA modulator-control unit. If necessary, substitute a known-good VSA modulator-control unit (see **VSA MODULATOR-CONTROL UNIT REMOVAL AND INSTALLATION**), and retest.

NO -Reinstall the fuse, and go to step 3.

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

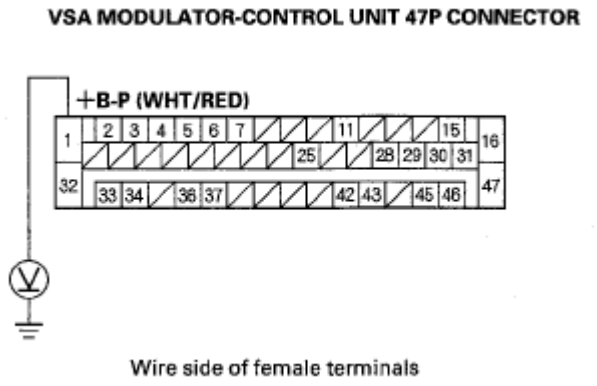


Fig. 41: Measuring Voltage Between VSA Modulator - Control Unit 47P Connector Terminal No. 1 And Body Ground
Courtesy of AMERICAN HONDA MOTOR CO., INC.

Is there battery voltage?

YES -Go to step 5.

NO -Repair open in the wire between the No. 10 (30 A) fuse in the under-hood fuse/relay box and the VSA modulator-control unit.

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

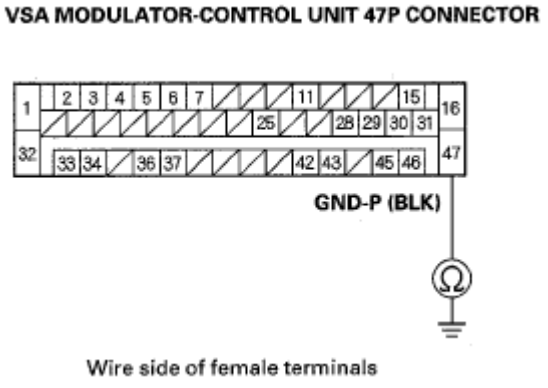


Fig. 42: Checking Continuity Between VSA Modulator-Control Unit 47P Connector Terminal No. 47 And Body Ground
Courtesy of AMERICAN HONDA MOTOR CO., INC.

Is there continuity?

YES -Go to step 6.

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

6. Reconnect the VSA modulator-control unit 47P connector.
7. Turn the ignition switch ON (II).
8. Clear the DTC with the HDS.
9. Turn the ignition switch OFF, then disconnect the HDS.
10. Test-drive the vehicle at 10 mph (15 km/h) or more.
11. 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 necessary, substitute a known-good VSA modulator-control unit (see **VSA MODULATOR-CONTROL UNIT REMOVAL AND INSTALLATION**), and retest.

NO -The system is OK at this time.

DTC 54: FAIL-SAFE RELAY

1. Turn the ignition switch ON (II).
2. Clear the DTC with the HDS.
3. Turn the ignition switch OFF, then disconnect the HDS.
4. Test-drive the vehicle.
5. Check for DTCs with the HDS.

Is DTC 54 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 **VSA MODULATOR-CONTROL UNIT REMOVAL AND INSTALLATION**), and retest.

NO -Intermittent failure, the vehicle is OK at this time.

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

Does the ABS indicator come 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 and the charging system (see **CHARGING SYSTEM INDICATOR CIRCUIT TROUBLESHOOTING**).

   NO -Do the appropriate troubleshooting for the DTC indicated.

DTC 64: SENSOR POWER VOLTAGE

1. Turn the ignition switch ON (II).
2. Clear the DTC with the HDS.
3. Turn the ignition switch OFF, then disconnect the HDS.
4. Test-drive the vehicle.
5. Check for DTCs with the HDS.

   Is DTC 64 indicated?

   YES -Go to step 6.

   NO -The system is OK at this time.

6. Turn the ignition switch OFF.
7. Disconnect the steering angle sensor 5P connector.
8. Disconnect the VSA modulator-control unit 47P connector.
9. Check for continuity between VSA modulator-control unit 47P connector terminal No. 7 and body ground.

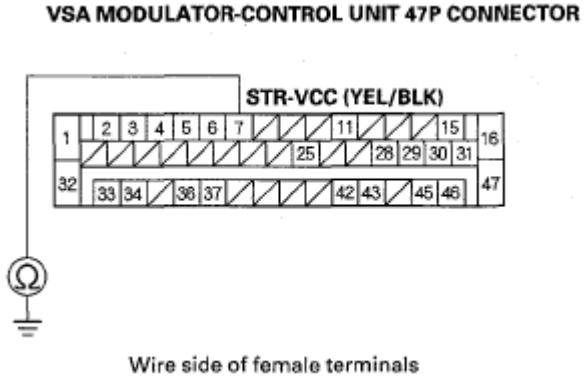


Fig. 43: Checking Continuity Between VSA Modulator-Control Unit 47P Connector Terminal No. 7 And Body Ground
Courtesy of AMERICAN HONDA MOTOR CO., INC.

Is there continuity?

YES -Repair short to body ground between the VSA modulator-control unit and the steering angle sensor.

NO -Check for loose terminals in the VSA modulator-control unit 47P connector. If necessary, substitute a known-good VSA modulator-control unit (see **VSA MODULATOR-CONTROL UNIT REMOVAL AND INSTALLATION**), and retest.

DTC 65: BRAKE FLUID LEVEL

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

   Is brake fluid level OK?

   YES -Go to step 2.

   NO -Inspect the brake pads: Front (see **FRONT BRAKE PAD INSPECTION AND REPLACEMENT**), rear (see **REAR BRAKE PAD INSPECTION AND REPLACEMENT**), and replace worn out brake pads, then recheck.

2. Turn the ignition switch ON (II).
3. Clear the DTC with the HDS.
4. Turn the ignition switch OFF.
5. Disconnect the brake fluid level switch 2P connector.
6. Turn the ignition switch ON (II).
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 **MASTER CYLINDER INSPECTION**).

8. Turn the ignition switch OFF.
9. Disconnect the gauge control module 36P connector.
10. Check for continuity between brake fluid level switch 2P connector terminal No. 2 and body ground.

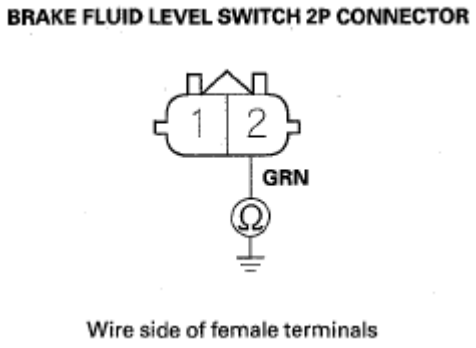


Fig. 44: Checking Continuity Between Brake Fluid Level Switch 2P Connector Terminal No. 2 And Body Ground
Courtesy of AMERICAN HONDA MOTOR CO., INC.

Is there continuity?

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

NO -Check for loose terminals in the VSA modulator-control unit 47P connector. If necessary, substitute a known-good VSA modulator-control unit (see **VSA MODULATOR-CONTROL UNIT REMOVAL AND INSTALLATION**), and retest.

DTC 66: VSA PRESSURE SENSOR (INSIDE OF VSA MODULATOR-CONTROL UNIT)

1. Turn the ignition switch ON (II).
2. Clear the DTC with the HDS.
3. Turn the ignition switch OFF, then disconnect the HDS.
4. Test-drive the vehicle.
5. Check for DTCs with the HDS.

Is DTC 66 indicated?

YES -Replace the VSA modulator-control unit (see **VSA MODULATOR-CONTROL UNIT REMOVAL AND INSTALLATION**).

NO -The system is OK at this time.

DTC 68: BRAKE PEDAL POSITION SWITCH

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

Is another DTC indicated?

YES -Do the appropriate troubleshooting for the DTC.

NO -Go to step 3.

3. Turn the ignition switch OFF.
4. Check the brake pedal position switch (see **LICENSE PLATE LIGHT REPLACEMENT**), and adjustment (see **BRAKE PEDAL AND BRAKE PEDAL POSITION SWITCH ADJUSTMENT**).

   Is the switch and adjustment OK?

   YES -Go to step 5.

   NO -Adjust the brake pedal position switch. If necessary, replace the switch (see **BRAKE PEDAL AND BRAKE PEDAL POSITION SWITCH ADJUSTMENT**).

5. Turn the ignition switch ON (II).
6. Clear the DTC with the HDS.
7. Turn the ignition switch OFF, then disconnect the HDS.
8. Test-drive the vehicle.
9. Check for DTCs with the HDS.

   Is DTC 68 indicated?

   YES -Go to step 10.

   NO -The system is OK at this time.

10. Troubleshoot the brake pedal position switch signal circuit (see **BRAKE PEDAL POSITION SWITCH SIGNAL CIRCUIT TROUBLESHOOTING**).

    Is the brake pedal position switch circuit OK?

    YES -Check for loose terminals in the ECM/PCM connector, if the connections are OK, substitute a known-good ECM/PCM and recheck. If the problem is gone, replace the original ECM/PCM. If the problem continues, replace the VSA modulator-control unit (see **VSA MODULATOR-CONTROL UNIT REMOVAL AND INSTALLATION**).

    NO -Repair the brake pedal position switch circuit.

DTC 81: CENTRAL PROCESSING UNIT (CPU)

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

   Is another DTC indicated?

YES -Do the appropriate troubleshooting for the DTC.

NO -Go to step 3.

3. Clear the DTC with the HDS.
4. Turn the ignition switch OFF, then disconnect the HDS.
5. Test-drive the vehicle.
6. Check for DTCs with the HDS.

Is DTC 81 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 **VSA MODULATOR-CONTROL UNIT REMOVAL AND INSTALLATION**), and retest.

NO -Intermittent failure, the vehicle is OK at this time.

DTC 83: ECM/PCM COMMUNICATION

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

Is DTC 86 indicated?

YES -Do the troubleshooting for DTC 86.

NO -Go to step 3.

3. Clear the DTC with the HDS.
4. Turn the ignition switch OFF, then disconnect the HDS.
5. Test-drive the vehicle.
6. Check for DTCs with the HDS.

Is DTC 83 indicated?

YES -Go to step 7.

NO -The system is OK at this time.

7. Check for fuel and emission systems (PGM-FI) DTCs with the HDS (see **GENERAL TROUBLESHOOTING INFORMATION**).

Are any ECM/PCM DTCs indicated?

YES -Do the applicable troubleshooting for the ECM/PCM.

NO -Check for loose terminals in the VSA modulator-control unit 47P connector. If necessary, substitute a known-good VSA modulator-control unit (see **VSA MODULATOR-CONTROL UNIT REMOVAL AND INSTALLATION**), and retest.

DTC 84: VSA SENSOR NEUTRAL POSITION

NOTE: If DTC 84 is stored, the VSA activation indicator does not go off until doing the VSA sensor neutral position memorization (see VSA SENSOR NEUTRAL POSITION MEMORIZATION).

1. Do the VSA sensor neutral position memorization (see **VSA SENSOR NEUTRAL POSITION MEMORIZATION**).
2. Clear the DTC with the HDS.
3. Turn the ignition switch OFF, then turn it ON (II) again.
4. Check for DTCs with the HDS.

Is DTC 84 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 **VSA MODULATOR-CONTROL UNIT REMOVAL AND INSTALLATION**), and retest.

NO -The system is OK at this time.

DTC 86: F-CAN COMMUNICATION

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

Is DTC 86 indicated?

YES -Go to step 5.

NO -The system is OK at this time.

5. Clear the DTC with the HDS.
6. Start and run the engine for at least 5 seconds.
7. Check for DTCs with the HDS.

Is DTC 86 indicated?

YES -Go to step 8.

NO -Intermittent failure, the F-CAN communication line is OK at this time.

8. Check for fuel and emission systems DTCs with the HDS (see **GENERAL TROUBLESHOOTING INFORMATION**).

   Are any ECM/PCM DTCs indicated?

   YES -Do the appropriate troubleshooting for the ECM/PCM.

   NO -Check for loose terminals in the VSA modulator-control unit 47P connector. If necessary, substitute a known-good VSA modulator-control unit (see **VSA MODULATOR-CONTROL UNIT REMOVAL AND INSTALLATION**), and retest.

DTC 91: VSA OPERATION

1. Turn the ignition switch ON (II).
2. Clear the DTC with the HDS.
3. Turn the ignition switch OFF, then disconnect the HDS.
4. Test-drive the vehicle.
5. Check for DTCs with the HDS.

   Is DTC 91 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 **VSA MODULATOR-CONTROL UNIT REMOVAL AND INSTALLATION**), and retest.

   NO -The system is OK at this time.

DTC 105: HYDRAULIC UNIT TEMPERATURE SENSOR

1. Turn the ignition switch ON (II).
2. Clear the DTC with the HDS.
3. Turn the ignition switch OFF, then disconnect the HDS.
4. Test-drive the vehicle.
5. Check for DTCs with the HDS.

   Is DTC 105 indicated?

   YES -Replace the VSA modulator-control unit (see **VSA MODULATOR-CONTROL UNIT REMOVAL AND INSTALLATION**).

   NO -The system is OK at this time.

DTC 121,122,123,124: VSA SOLENOID

1. Turn the ignition switch ON (II).
2. Clear the DTC with the HDS.
3. Turn the ignition switch OFF, then disconnect the HDS.
4. Test-drive the vehicle.
5. 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 necessary, substitute a known-good VSA modulator-control unit (see **VSA MODULATOR-CONTROL UNIT REMOVAL AND INSTALLATION**), and retest.

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

SYMPTOM TROUBLESHOOTING

ABS INDICATOR OR VSA INDICATOR DOES NOT GO OFF, AND NO DTCS ARE STORED

1. Check for the communication between the vehicle and the HDS.

   Is there communication?

   YES -Check for loose terminals in the gauge control module 36P connector. If necessary, substitute a known-good gauge control module, then recheck. If it is OK, replace the original gauge control module (see **REWRITING THE ODO DATA AND TRANSFERRING MAINTENANCE MINDER ON A NEW GAUGE CONTROL MODULE**).

   NO -If the HDS does not communicate with all the systems of the vehicle, troubleshoot the DLC circuit (see **DLC CIRCUIT TROUBLESHOOTING**). If the HDS does not communicate with the VSA system only, go to step 2.

2. Turn the ignition switch OFF.
3. Check the No. 18 (30 A) fuse in the under-hood fuse/relay box.

   Is the fuse blown?

   YES -Install a new No. 18 (30 A) fuse, and recheck. If the fuse continues to blow, check for short to body ground in the wire between the No. 18 (30 A) fuse in the under-hood fuse/relay box and the VSA modulator-control unit. If necessary, substitute a known-good VSA modulator-control unit (see **VSA MODULATOR-CONTROL UNIT REMOVAL AND INSTALLATION**), and retest.

   NO -Reinstall the fuse, then go to step 4.

4. Check the No. 4 (10 A) fuse in the under-dash fuse/relay box.

Is the fuse blown?

YES -Install the new No. 4 (10 A) fuse, and recheck. If the fuse continues to blow, check for short to body ground in the wire between the No. 4 (10 A) fuse in the under-dash fuse/relay box and the VSA modulator-control unit. If necessary, substitute a known-good VSA modulator-control unit (see **VSA MODULATOR-CONTROL UNIT REMOVAL AND INSTALLATION**), and retest.

NO -Go to step 5.

5. Disconnect the VSA modulator-control unit 47P connector.
6. Measure voltage between VSA modulator-control unit 47P connector terminal No. 32 and body ground.

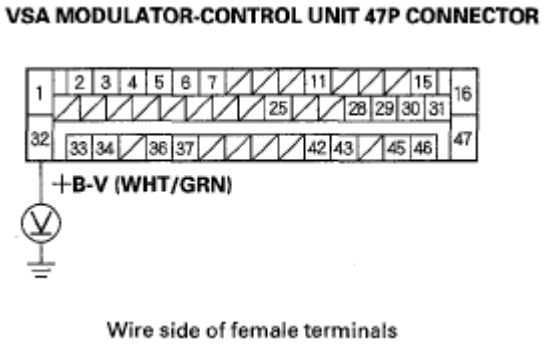


Fig. 45: Measuring Voltage Between VSA Modulator-Control Unit 47P Connector Terminal No. 32 And Body Ground
Courtesy of AMERICAN HONDA MOTOR CO., INC.

Is there battery voltage?

YES -Go to step 7.

NO -Repair open in the wire between the No. 18 (30 A) in the under-hood fuse/relay box and the VSA modulator-control unit.

7. Turn the ignition switch ON (II).
8. Measure voltage between VSA modulator-control unit 47P connector terminal No. 4 and body ground.

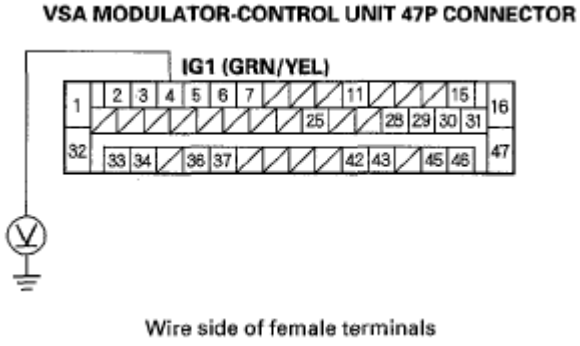


Fig. 46: Measuring Voltage Between VSA Modulator-Control Unit 47P Connector Terminal No. 4 And Body Ground
Courtesy of AMERICAN HONDA MOTOR CO., INC.

Is there battery voltage?

YES -Go to step 9.

NO -Repair open in the wire between the No. 4 (10 A) in the under-dash fuse/relay box and the VSA modulator-control unit.

9. Turn the ignition switch OFF.
10. Check for continuity between VSA modulator-control unit 47P connector terminal No. 16 and body ground.

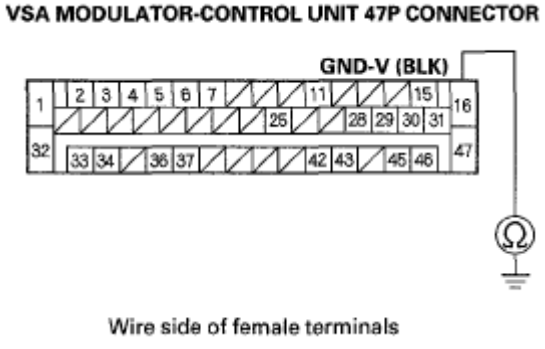


Fig. 47: Checking Continuity Between VSA Modulator-Control Unit 47P Connector Terminal No. 16 And Body Ground
Courtesy of AMERICAN HONDA MOTOR CO., INC.

Is there continuity?

YES -Check for loose terminals in the VSA modulator-control unit 47P connector, clean terminal G202 and recheck. If necessary, substitute a known-good VSA modulator-control unit (see **VSA MODULATOR-CONTROL UNIT REMOVAL AND INSTALLATION**), and retest.

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

BRAKE SYSTEM INDICATOR DOES NOT GO OFF, AND NO DTCS ARE STORED

1. Release the parking brake.
2. Turn the ignition switch ON (II).
3. Check the brake system indicator when the ignition switch is turned ON (II).

Does the indicator come on then go off?

YES -Intermittent failure, the system is OK at this time. Check for loose terminals between the gauge

control module 36P connector and the VSA modulator-control unit 47P connector. Refer to intermittent failures troubleshooting (see **INTERMITTENT FAILURES**).

NO -Go to step 4.

4. Check the BRAKE INDICATOR in the VSA DATA LIST with the HDS.

   Does it indicate OFF?

   YES -

   - USA models: Go to step 6.
   - Canada models: Go to step 5.

   NO -Check for loose terminals in the VSA modulator-control unit 47P connector. If necessary, substitute a known-good VSA modulator-control unit (see **VSA MODULATOR-CONTROL UNIT REMOVAL AND INSTALLATION**), and retest.

5. Canada models: Do the daytime running lights control unit input test (see **DAYTIME RUNNING LIGHTS CONTROL UNIT INPUT TEST**).

   Is the test OK?

   YES -Go to step 6.

   NO -Troubleshoot the daytime running lights system.

6. Turn the ignition switch OFF.
7. Disconnect the parking brake switch 1P connector.
8. Turn the ignition switch ON (II).

   Does the brake system indicator go off ?

   YES -Replace the parking brake switch (see **PARKING BRAKE CABLE REPLACEMENT**).

   NO -Go to step 9.

9. Turn the ignition switch OFF.
10. Disconnect the gauge control module 36P connector.
11. Check for continuity between parking brake switch 1P connector terminal No. 1 and body ground.

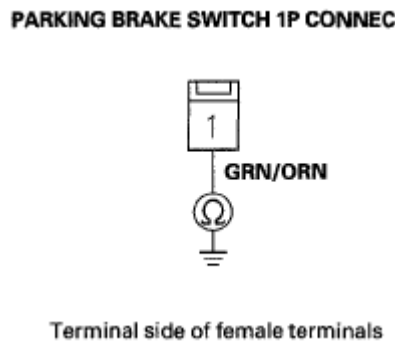


Fig. 48: Checking Continuity Between Parking Brake Switch 1P Connector Terminal No. 1 And Body Ground
Courtesy of AMERICAN HONDA MOTOR CO., INC.

Is there continuity?

YES -Repair short to body ground in the wire between the gauge control module and the parking brake switch.

NO -Check for loose terminals in the gauge control module 36P connector. If necessary, substitute a known-good gauge control module, then go to step 1 and recheck. If it is OK, replace the original gauge control module (see **REWRITING THE ODO DATA AND TRANSFERRING MAINTENANCE MINDER ON A NEW GAUGE CONTROL MODULE**).

VSA ACTIVATION INDICATOR DOES NOT GO OFF, AND NO DTCS ARE STORED

1. Turn the ignition switch ON (II).
2. Check the VSA activation indicator for several seconds when the ignition switch is turned ON (II).

   Does the indicator come on then go off?

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

   NO -Go to step 3.

3. Turn the ignition switch OFF.
4. Check the VSA OFF switch (see **VSA OFF SWITCH TEST**).

   Is the VSA OFF switch OK?

   YES -Go to step 5.

   NO -Replace the VSA OFF switch (see **VSA OFF SWITCH TEST**).

5. Disconnect the gauge control module 36P connector.
6. Disconnect the VSA OFF switch 10P connector.

7. Check for continuity between VSA OFF switch 10P connector terminal No. 2 and body ground.

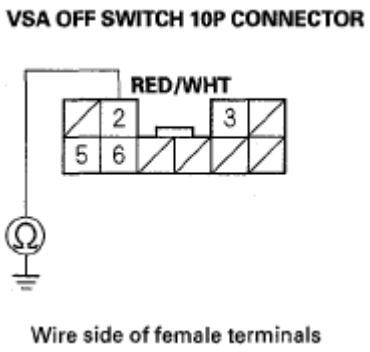


Fig. 49: Checking Continuity Between VSA Off Switch 10P Connector Terminal No. 2 And Body Ground
Courtesy of AMERICAN HONDA MOTOR CO., INC.

Is there continuity?

YES -Repair short to body ground in the wire between the gauge control module and the VSA OFF switch.

NO -Substitute a known-good gauge control module, then go to step 1 and recheck. If it is OK, replace the original gauge control module (see **REWRITING THE ODO DATA AND TRANSFERRING MAINTENANCE MINDER ON A NEW GAUGE CONTROL MODULE**).

ABS INDICATOR, BRAKE SYSTEM INDICATOR, AND VSA INDICATOR DO NOT GO OFF AT THE SAME TIME

NOTE: Check for gauges DTCs with the HDS (see WIRE COLOR CODES). If gauges DTCs are stored, troubleshoot those DTCs first.

1. Release the parking brake.
2. Turn the ignition switch ON (II).
3. Check the ABS indicator, the brake system indicator, and VSA indicator for several seconds when the ignition switch is turned ON (II).

Do the indicators come on then go off?

YES -Intermittent failure, the system is OK at this time. Check for loose terminals between the gauge control module 36P connector and the VSA modulator-control unit 47P connector. Refer to intermittent failures troubleshooting (see **INTERMITTENT FAILURES**).

NO -Go to step 4.

4. Turn the ignition switch OFF.

5. Short the SCS line with the HDS.
6. Disconnect ECM/PCM connector E (31P).
7. Disconnect the gauge control module 36P connector.
8. Disconnect the VSA modulator-control unit 47P connector.
9. Check for continuity between the VSA modulator-control unit 47P connector terminals No. 11, and No. 15 and body ground individually.

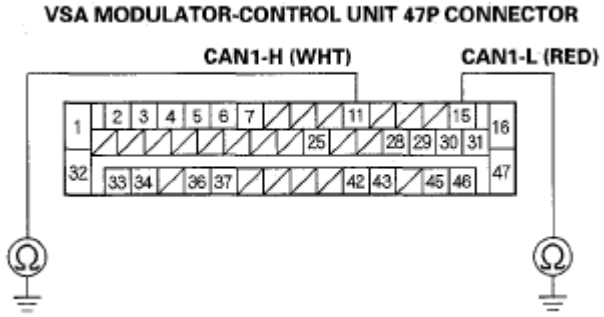


Fig. 50: Checking Continuity Between VSA Modulator-Control Unit 47P Connector Terminals No. 11, And 15 And Body Ground
Courtesy of AMERICAN HONDA MOTOR CO., INC.

Is there continuity?

YES -Repair the short to body ground on the appropriate wire.

NO -Go to step 10.

10. Check for continuity between VSA modulator-control unit 47P connector terminals No. 11 and No. 15.

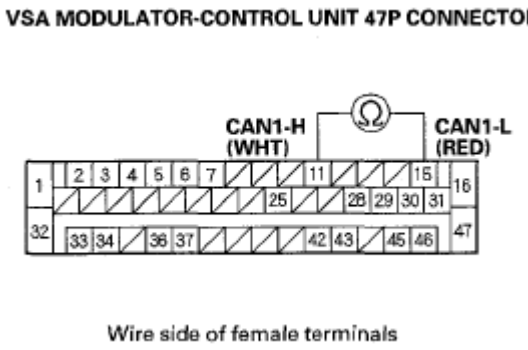


Fig. 51: Checking Continuity Between VSA Modulator-Control Unit 47P Connector Terminals No. 11 And No. 15
Courtesy of AMERICAN HONDA MOTOR CO., INC.

Is there continuity?

YES -Repair short in the wire between VSA modulator-control unit 47P connector terminals No. 11 (CAN1-H line) and No. 15 (CAN1-L line).

NO -Go to step 11.

11. Check for continuity between VSA modulator-control unit 47P connector terminal and gauge control module 36P connector terminal (see table).

CONTINUITY SPECIFICATIONS

Sign	Connector Terminal No.	
	VSA Modulator-control Unit	Gauge Control Module
CAN1-L	15	28
CAN1-H	11	29

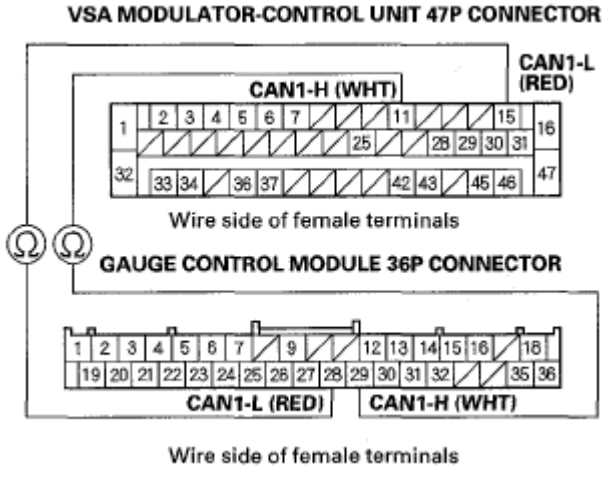


Fig. 52: Checking Continuity Between VSA Modulator-Control Unit 47P Connector Terminal And Gauge Control Module 36P Connector Terminal
Courtesy of AMERICAN HONDA MOTOR CO., INC.

Is there continuity?

YES -Check for loose terminals in the gauge control module 36P connector. If necessary, substitute a known-good gauge control module, then go to step 1 and recheck. If it is OK, replace the original gauge control module (see **REWRITING THE ODO DATA AND TRANSFERRING MAINTENANCE MINDER ON A NEW GAUGE CONTROL MODULE**). If DTCs are indicated, replace the VSA modulator-control unit (see **VSA MODULATOR-CONTROL UNIT REMOVAL AND INSTALLATION**).

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

STEERING ANGLE SENSOR REPLACEMENT

NOTE: Do not damage or drop the combination switch as the steering angle sensor is

sensitive to shock and vibration.

1. Remove the steering wheel (see **STEERING WHEEL REMOVAL**).
2. Remove the steering column covers (see **STEERING COLUMN REMOVAL AND INSTALLATION**) and the cable reel (see **CABLE REEL REPLACEMENT**).
3. Remove the combination switch assembly (see **STEERING COLUMN REMOVAL AND INSTALLATION**).
4. Remove the combination light switch (A) and the wiper/washer switch (B).

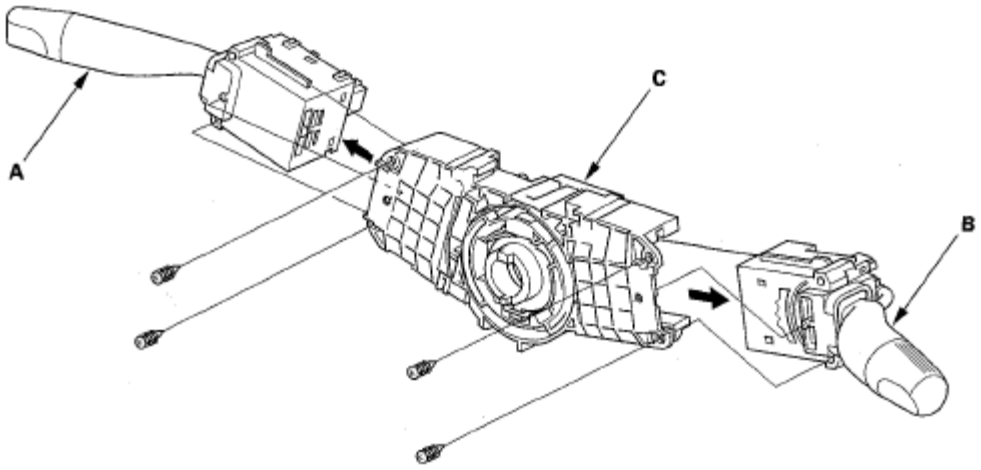


Fig. 53: Removing Combination Light Switch And Wiper/Washer Switch
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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

NOTE:

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

SENSOR CLUSTER REPLACEMENT

NOTE:

- **Do not damage or drop the sensor as it is sensitive.**
- **Do not use air or electric impact tools.**

1. Make sure the ignition switch OFF.
2. Remove the center console: SC model (see **CENTER CONSOLE REMOVAL/INSTALLATION**), Except SC model (see **LX, EX MODELS**).
3. Disconnect the sensor cluster 6P connector (A).

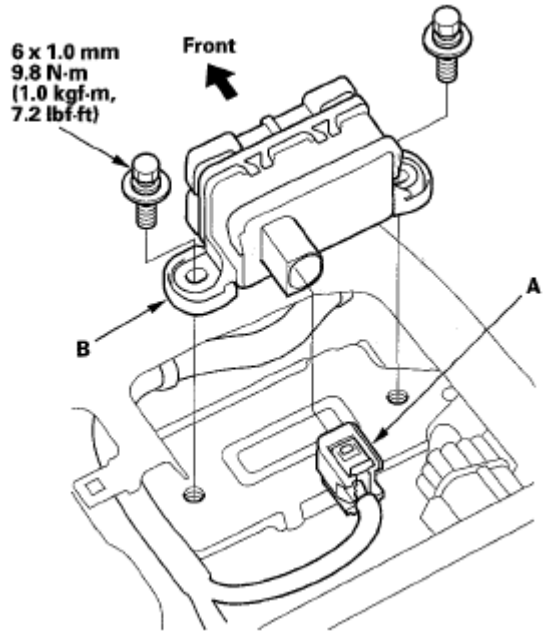


Fig. 54: Disconnecting Sensor Cluster 6P Connector With Torque Specification
Courtesy of AMERICAN HONDA MOTOR CO., INC.

4. Remove the sensor cluster (B).
5. Install the sensor in the reverse order of removal.
6. Do the VSA sensor neutral position memorization (see **VSA SENSOR NEUTRAL POSITION MEMORIZATION**).

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

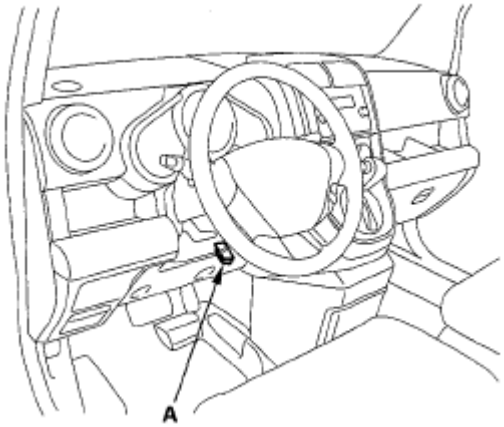


Fig. 55: Identifying Data Link Connector
Courtesy of AMERICAN HONDA MOTOR CO., INC.

3. Turn the ignition switch ON (II).
4. Make sure the HDS communicates with the vehicle and the VSA modulator-control unit. If it doesn't, troubleshoot the DLC circuit (see **DLC CIRCUIT TROUBLESHOOTING**).
5. Do the VSA sensor neutral position memorization in the VSA ADJUSTMENT with the HDS.

NOTE: See the HDS Help menu for specific instructions.

6. Turn the ignition switch OFF.

VSA OFF SWITCH TEST

1. Make sure the ignition switch OFF.
2. Remove the driver's dashboard lower cover (see **DRIVER'S DASHBOARD LOWER COVER REMOVAL/INSTALLATION**).
3. Push out the VSA OFF switch (A) from the back of the instrument panel.

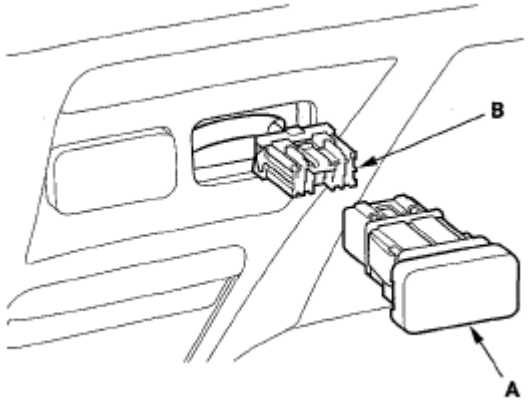


Fig. 56: Pushing Out VSA Off Switch From Back Of Instrument Panel

Courtesy of AMERICAN HONDA MOTOR CO., INC.

4. Disconnect the VSA OFF switch 10P connector (B).
5. Check for continuity between VSA OFF switch 10P connector terminals No. 2 and No. 3. There should be continuity when the switch is pressed, and no continuity when the switch is released.

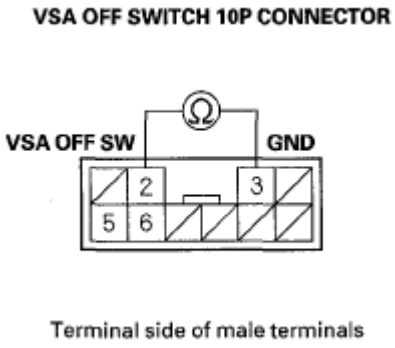


Fig. 57: Identifying VSA Off Switch 10P Connector
Courtesy of AMERICAN HONDA MOTOR CO., INC.

6. Check for continuity between VSA OFF switch 10P connector terminals No. 5 and No. 6. There should be continuity at all times.

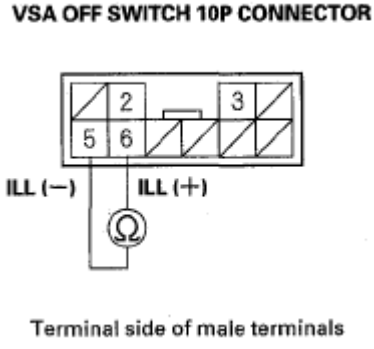


Fig. 58: Checking Continuity Between VSA Off Switch 10P Connector Terminals No. 5 And No. 6
Courtesy of AMERICAN HONDA MOTOR CO., INC.

VSA MODULATOR-CONTROL UNIT REMOVAL AND INSTALLATION

NOTE:

- **Do not spill brake fluid on the vehicle; it may damage the paint; if brake fluid gets on the paint, wash it off immediately with water.**
- **Be careful not to damage or deform the brake lines during removal and installation.**
- **To prevent the brake fluid from flowing, plug and cover the hose ends and joints with a shop towel or equivalent material.**

REMOVAL

1. Make sure the ignition switch OFF.
2. Disconnect the VSA modulator-control unit 47P connector (A) by pushing the lock (B) and pulling up the lever (C); the connector disconnects itself.

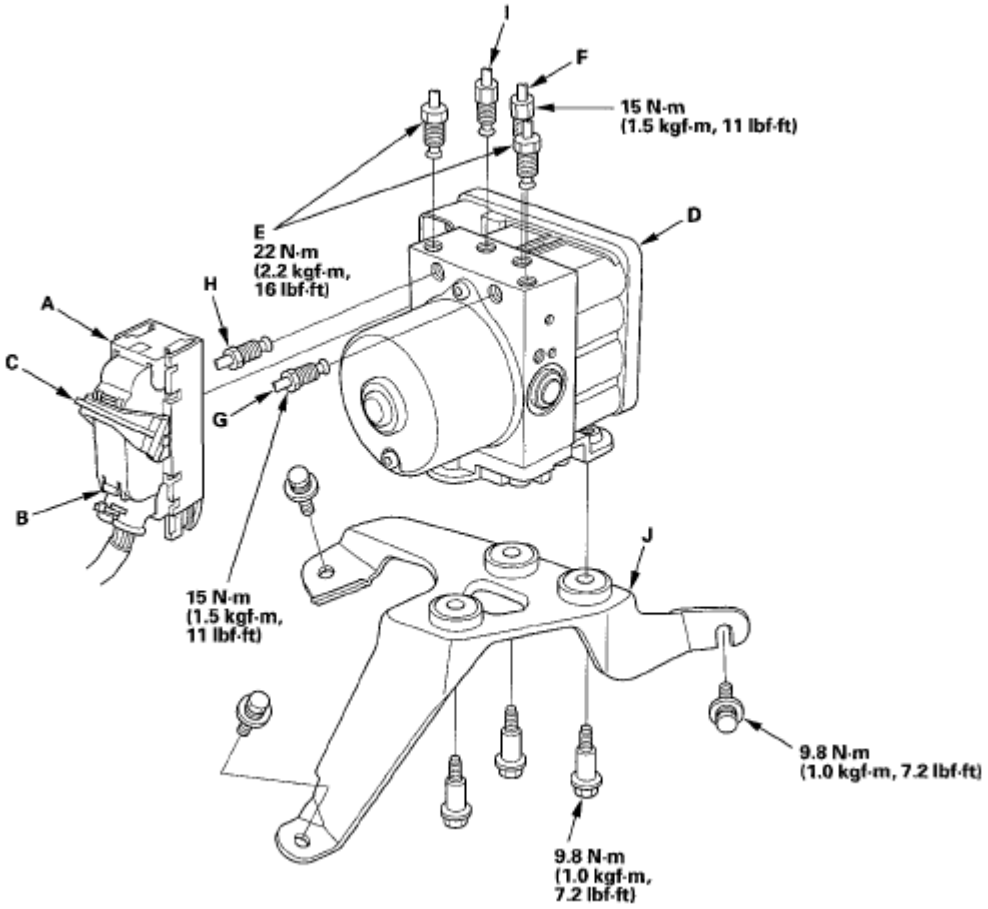


Fig. 59: Disconnecting VSA Modulator - Control Unit 47P Connector With Torque Specifications
Courtesy of AMERICAN HONDA MOTOR CO., INC.

3. Disconnect the six brake lines from the VSA modulator-control unit (D).

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

4. Remove the VSA modulator-control unit with the bracket (J) from the body.
5. Remove the VSA modulator-control unit from the bracket.

Installation

1. Install the VSA modulator-control unit on the bracket.

2. Install the bracket with the VSA modulator-control unit to the body.
3. Reconnect the six brake lines, then tighten the flare nuts to the specified torque.
4. Align the connecting surface of the VSA modulator-control unit 47P connector to the VSA modulator-control unit.
5. Lower the lock of the VSA modulator-control unit 47P connector, then confirm the connector is fully seated.
6. Bleed the brake system (see **BRAKE SYSTEM BLEEDING**).
7. Do the VSA sensor neutral position memorization (see **VSA SENSOR NEUTRAL POSITION MEMORIZATION**).
8. Start the engine, and check that the ABS and VSA indicators go off.
9. Test-drive the vehicle, and check that the ABS and VSA indicators do not come on.

NOTE: If the brake pedal is spongy, there may be air trapped in the modulator and then induced into the normal brake system during modulation. Bleed the brake system again (see BRAKE SYSTEM BLEEDING).

WHEEL SENSOR REPLACEMENT

FRONT

1. Make sure the ignition switch OFF.
2. Remove the bracket (A), then disconnect the wheel sensor connector (B).

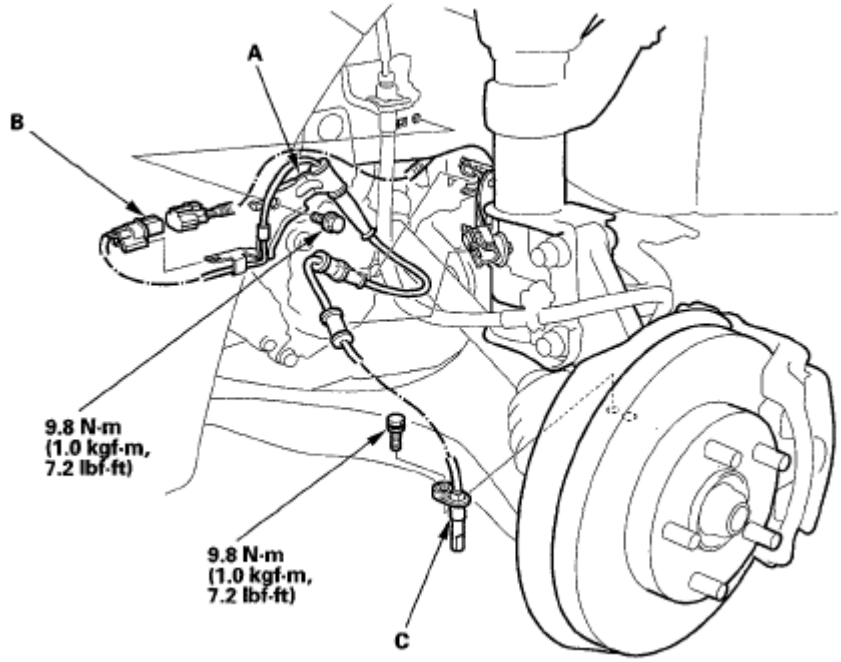


Fig. 60: Removing Bracket And Wheel Sensor Connector With Torque Specifications
Courtesy of AMERICAN HONDA MOTOR CO., INC.

3. Release from the clamps, then remove the bolt, and the wheel sensor (C).
4. Install the wheel sensor in the reverse order of removal, and note these items:
    - Install the sensor carefully to avoid twisting the wires.
    - If the wheel sensor comes in contact with the wheel bearing, it is faulty.
5. Start the engine, and check that the ABS and VSA indicators go off.
6. Test-drive the vehicle, and check that the ABS and VSA indicators do not come on.

REAR

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

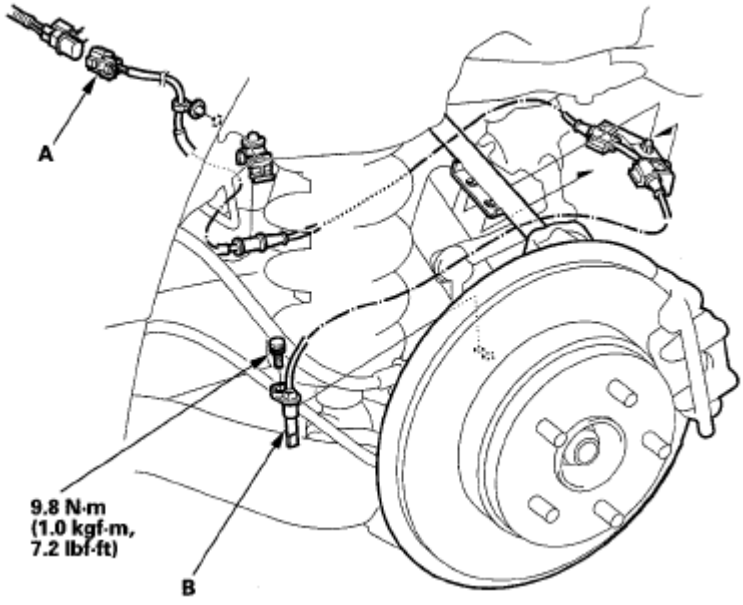


Fig. 61: Disconnecting Wheel Sensor Connector With Torque Specification
Courtesy of AMERICAN HONDA MOTOR CO., INC.

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