

# ANTI-LOCK BRAKE SYSTEM

## Article Text

1993 Honda Prelude

For Cadi Centre Nsk CA 95051

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Sunday, July 08, 2001 11:20AM

## ARTICLE BEGINNING

### 1993 BRAKES

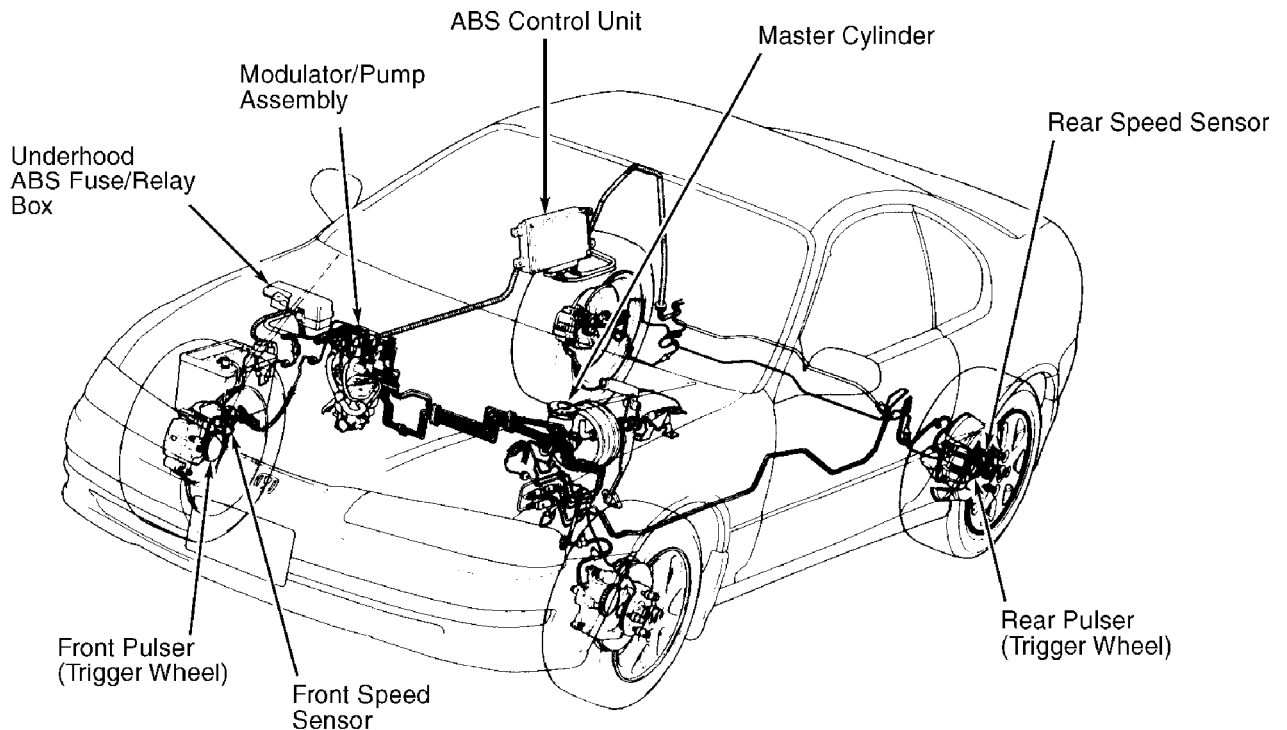
#### Honda - Anti-Lock Brake System

#### Prelude

## DESCRIPTION

The Anti-Lock Brake System (ABS) is designed to prevent wheel lock-up during hard braking, allowing driver to maintain vehicle control. System consists of control unit, accumulator, ABS pump (power unit), 4 speed sensors, modulator, warning light, master cylinder, power booster assembly and connecting wiring. See Fig. 1.

**NOTE:** For more information on brake system, see BRAKE SYSTEM article in BRAKES section.



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**Fig. 1: Locating ABS Components (Typical)**  
Courtesy of American Honda Motor Co., Inc.

## OPERATION

### ABS PUMP (POWER UNIT)

The power unit consists of an electric motor, filter, guide, piston rod and cylinder body. Guide is positioned off-set to the center of the motor shaft. Rotation of motor and cylinder body provides the reciprocating motion to the piston rod. This pressurizes brake fluid which is fed to relief valve, accumulator and modulator.

As the motor rotates and pressure in the accumulator exceeds a predetermined level, the pressure switch is turned on. Upon receiving this switching signal, the control unit stops motor relay operation. If accumulator pressure does not reach predetermined level after motor has run continuously for at least 2 minutes, the control unit stops motor operation and turns on ABS warning light in instrument panel.

#### ACCUMULATOR

The accumulator is a pneumatic, nitrogen-gas filled reservoir which accumulates high-pressure brake fluid. Accumulator feeds high-pressure brake fluid to modulator valve through inlet side of solenoid valve. Accumulator charging pressure is 1721 psi (121 kg/cm<sup>2</sup>). Maximum operating pressure is 3271 psi (230 kg/cm<sup>2</sup>).

#### CONTROL UNIT

The control unit has a main function, sub-function, self-diagnostic function and fail-safe function.

##### Main Function

Controls overall ABS system operation by interpreting speed sensor signals and activating solenoid valve in modulator unit.

##### Sub-Function

Controls pump motor and self-diagnostic function.

##### Self-Diagnostic Function

Monitors the main ABS system. When an abnormality is detected, ABS warning light comes on.

##### Fail-Safe Function

When an abnormality is detected in the main system, solenoid valve operation is turned off by fail-safe relay. Under these conditions, the ABS system operates as a conventional brake system. The fail-safe function comes on with ABS warning light.

#### MODULATOR

The modulator consists of 4 modulator pistons and 3 solenoid valves. Individual pistons and solenoids are used for the front wheels. Individual modulator pistons are used for each rear wheel, but

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are connected to a single solenoid valve used for both rear wheels. The modulator pistons for the rear brakes have proportioning control valves to prevent rear wheel lock-up if ABS system malfunctions.

#### PRESSURE SWITCH

The pressure switch monitors accumulator pump pressure. When pressure switch is turned off, the control unit activates pump motor relay to operate ABS pump motor. If accumulator pressure does not reach predetermined level, ABS warning light comes on.

#### SPEED SENSOR

The speed sensor detects wheel rotation speed. Speed sensor consists of a permanent magnet, coil and trigger wheel (pulser). As trigger wheel rotates, the magnetic flux around the coil in each speed sensor alternates, generating a voltage frequency proportional to wheel rotation speed. These pulses are sent to the control unit to determine wheel speed.

### BLEEDING BRAKE SYSTEM

#### HYDRAULIC SYSTEM BLEEDING

**CAUTION:** DO NOT spill brake fluid on painted surfaces. To avoid paint damage, clean any spilled brake fluid with a clean cloth and clear water, immediately.

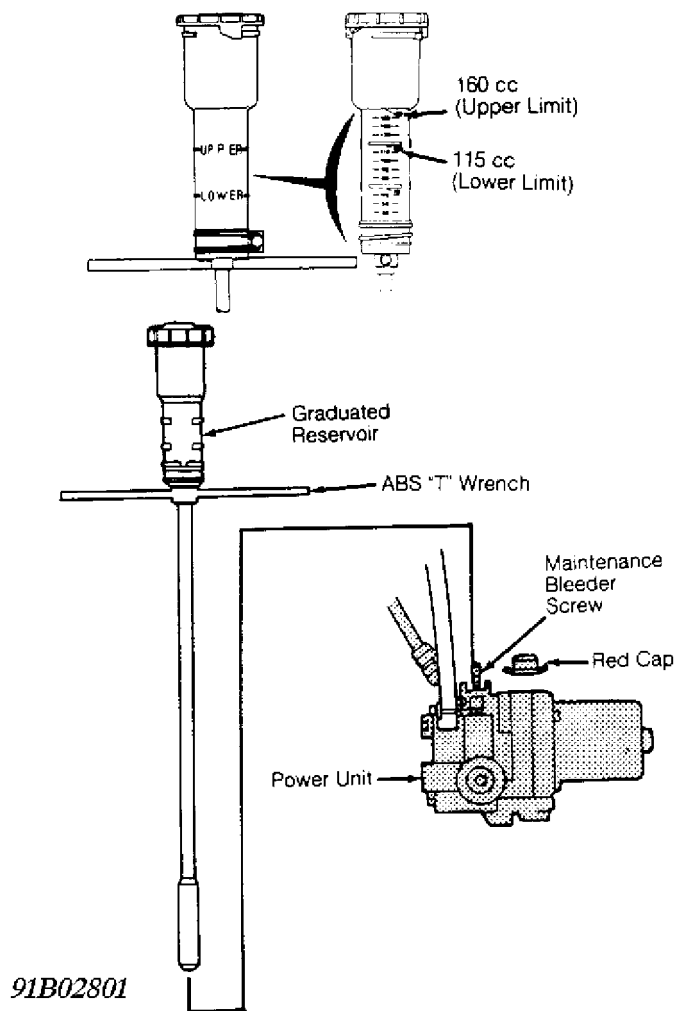
Fill master cylinder with clean brake fluid. Fluid should meet DOT 3 or DOT 4 specifications. Bleed master cylinder with bleeder valves (if equipped). Bleed wheel positions in sequence. See BRAKE LINE BLEEDING SEQUENCE table.

#### BRAKE LINE BLEEDING SEQUENCE TABLE

Application		Sequence
Prelude	.....	RR, LF, LR, RF

#### RELIEVING ACCUMULATOR/LINE PRESSURE

Drain brake fluid from master cylinder and modulator reservoir. Remove Red cap from maintenance bleeder screw. See Fig. 2. Using ABS "T" Wrench (07HAA-SG00101), loosen maintenance bleeder screw. Turn "T" wrench one complete turn to relieve accumulator line pressure. Tighten bleeder screw, and install Red cap.



**Fig. 2: Relieving Accumulator/Line Pressure (Typical)**  
 Courtesy of American Honda Motor Co., Inc.

#### ACCUMULATOR, MODULATOR & ABS PUMP (POWER UNIT) BLEEDING

1) Ensure vehicle is on level ground. Ensure automatic transmission is in Park or manual transmission is in Neutral. Block wheels, and set parking brake. Turn ignition off. Connect ABS Tester (07HAJ-SG0010A or 07HAJ-SG0010B) to Orange 6-pin test connector, located under passenger's seat.

2) Fill modulator reservoir to MAX level. Start engine and allow to idle for a few minutes. Shut down engine and recheck fluid level. Relieve accumulator line pressure. See RELIEVING ACCUMULATOR/LINE PRESSURE.

NOTE: Depress brake pedal firmly when operating ABS tester.

3) Start engine and allow to idle for a few minutes. Turn mode selector to "2" position. While depressing brake pedal firmly, press START TEST button to operate modulator/pump. See Fig. 3. There should be kickback on brake pedal. If there is no kickback or kickback is weak, repeat steps 2) and 3).

4) Turn mode selector to "3", "4" and "5". Perform steps 2) and 3) in each mode. Refill reservoir to MAX level.

## ADJUSTMENTS

### PARKING BRAKE

NOTE: Before adjusting parking brake, loosen park brake equalizer adjusting nut. Start engine, and depress brake pedal several times to set self-adjusting brakes before adjusting parking brake.

1) With rear brakes adjusted, raise and support rear of vehicle. Loosen equalizer nut, and pull parking brake lever up one notch. Tighten equalizer adjusting nut until rear wheels drag slightly.

2) Release parking brake lever. Rear wheels should rotate freely. Rear wheels should lock when parking brake lever is pulled up 6-10 clicks.

### BRAKE WARNING LIGHT

To adjust parking brake light operation, turn ignition on. Bend switch plate down until light comes on when parking brake lever is pulled one notch, and goes out when lever is released.

## TROUBLE SHOOTING

### ANTI-LOCK (ABS) WARNING LIGHT

NOTE: ABS system is okay if ABS warning light goes out after engine is started.

#### Trouble Code Recognition

1) ABS control unit recognizes system related problems and causes ABS warning light to come on and stay on under any of following conditions:

\* ABS pump runs longer than 2 minutes.

\* Vehicle is driven with parking brake on longer than 30

seconds.

- \* One rear wheel is locked.
- \* Wheel speed sensor does not transmit a signal.
- \* Vehicle is driven on extremely rough road.
- \* Low battery voltage.
- \* Operation time of solenoid valves exceeds a specified value and control unit indicates open circuit in solenoid circuit.
- \* Output signals from control unit are not transmitted to solenoid valves.
- \* Temporary loss of traction due to excessive cornering speed or starting from stuck condition (mud, snow or sand).

2) If ABS warning light comes on intermittently, use ABS Tester (07HAJ-SG0010A or 07HAJ-SG0010B) to confirm problem. See ABS FUNCTION TEST under DIAGNOSIS & TESTING.

3) ABS warning light comes on and trouble code is stored in control unit when insufficient battery voltage exists at control unit. If low battery voltage caused problem, recharge battery and clear trouble code(s). See CLEARING TROUBLE CODES under SELF-DIAGNOSTICS.

#### ABS Warning Light Does Not Come On

If ABS warning light does not come on when ignition is on:

- \* Check bulb.
- \* Check Yellow wire between fuse No. 13 and instrument cluster.
- \* Check Blue/Red wire between instrument cluster and control unit.
- \* Check control unit ground circuit.

#### ABS Warning Light Stays On Without Trouble Codes

If ABS warning light stays on and no trouble code(s) have been stored in control unit, check for following items:

- \* Loose or poor control unit connector.
- \* Blown ABS fuse No. B2 in underhood fuse/relay box.
- \* Open circuit in White wire between ABS fuse No. B2 and control unit.
- \* Open circuit in Black/Yellow wire between fuse No. 13 No. 9 and fail-safe relays.
- \* Short circuit in Blue/Red wire between instrument cluster and control unit.
- \* Open circuit in White/Blue wire between alternator and control unit.

If problem cannot be found, substitute a known good control unit, and retest.

#### ABS Warning Light Stays On With Trouble Codes

Turn ignition on. Ensure ABS warning light comes on. <sup>Start</sup> engine and observe ABS warning light. If ABS warning light stays on, **ANTI-LOCK BRA**

retrieve and record trouble codes. See RETRIEVING TROUBLE CODES under SELF-DIAGNOSTICS. If ABS warning light goes out after engine starts, ABS system is okay.

## DIAGNOSIS & TESTING

### ABS FUNCTION TEST

**WARNING:** DO NOT drive vehicle with ABS tester connected to vehicle, or brake system failure may occur.

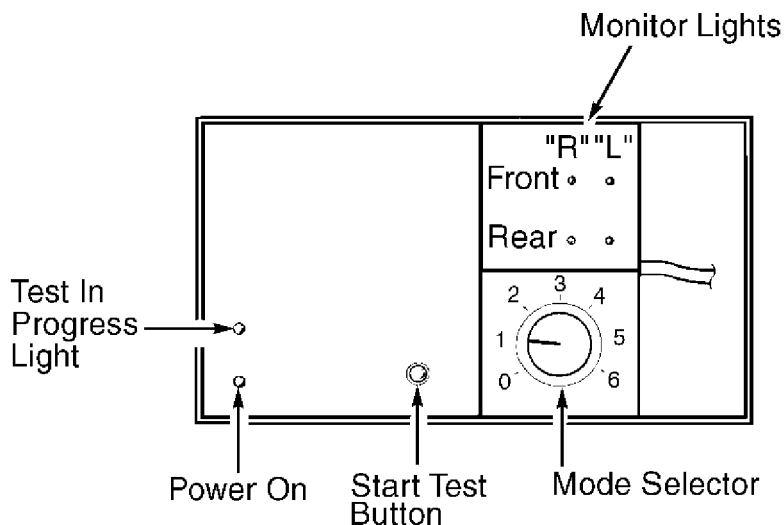
#### Preliminary Procedure

Confirm ABS warning light indicates system malfunction. See ANTI-LOCK (ABS) WARNING LIGHT under TROUBLE SHOOTING. Park vehicle on level surface. Block wheels, and put automatic transmission in Park or manual transmission in Neutral.

**CAUTION:** DO NOT move mode selector switch while TEST IN PROGRESS light is on.

#### Testing

1) With ignition off, connect ABS Tester (07HAJ-SG0010A or 07HAJ-SG0010B) to Orange 6-pin test connector, located under passenger's seat. Start engine. Release parking brake. Place mode selector to "1" position. Push START TEST button. See Fig. 3. TEST IN PROGRESS light should come on. Within 1-2 seconds, all 4 monitor lights should come on. If tester lights do not illuminate, ABS tester is faulty.



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**Fig. 3: Identifying ABS Tester Lights & Functions**  
Courtesy of American Honda Motor Co., Inc.

2) If ABS warning light comes on, 6-pin connector or ABS tester harness is faulty. Turn mode selector to "2" position. Press brake pedal. Push START TEST button. ABS warning light should not come on and kickback should be felt on brake pedal.

3) If ABS warning light comes on or kickback is not felt, see ANTI-LOCK (ABS) WARNING LIGHT under TROUBLE SHOOTING. Place mode selector in "3", "4" and then "5" positions. Repeat step 2) for each test mode. Results should be same as in test mode "2". If results are not same as in test mode "2", see ANTI-LOCK (ABS) WARNING LIGHT under TROUBLE SHOOTING.

4) Breakdown of each test mode is as follows:

Mode 1

Sends simulated driving signal of each wheel to control unit to check self-diagnostic circuit. No kickback should be felt in brake pedal.

Mode 2

Sends driving signal of each wheel, and then sends lock signal of left rear wheel to control unit. A kickback should be felt in brake pedal.

Mode 3

Sends driving signal of each wheel, and then sends lock signal of right rear wheel to control unit. A kickback should be felt in brake pedal.

Mode 4

Sends driving signal of each wheel, and then sends lock signal of left front wheel to control unit. A kickback should be felt in brake pedal.

Mode 5

Sends driving signal of each wheel, and then sends lock signal of right front wheel to control unit. A kickback should be felt in brake pedal.

5) If brake pedal does not kickback in Modes 2-5 as indicated and ABS indicator light does not come on, repeat function test several times. If test results remain the same. check for air in high pressure line, restriction in high pressure line or faulty modulator unit.

## SPEED SENSOR TEST

1) Turn ignition off, and connect ABS Tester (07HAJ-SG0010A or 07HAJ-SG0010B) to Orange 6-pin test connector, located under passenger's seat. Turn ignition on. Place ABS tester mode selector to

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2) Raise and support vehicle so wheels can be turned. Place transmission in Neutral. Turn wheels by hand at one revolution per second. Appropriate monitor light should blink each time wheel is rotated.

3) In some instances, front wheels may not rotate fast enough to make tester light blink. If this happens, start engine. Slowly accelerate and decelerate front wheels. If light does not blink, check appropriate speed sensor, sensor air gap and wiring.

#### MODULATOR SOLENOID LEAK TEST

1) Park vehicle on level surface. Block wheels, and place automatic transmission in Park or manual transmission in Neutral. Turn ignition off. Connect ABS Tester (07HAJ-SG0010A or 07HAJ-SG0010B) to Orange 6-pin test connector, located under passenger's seat.

2) Remove modulator reservoir filter, and fill reservoir to MAX level. DO NOT use aerated brake fluid bled from power unit. Use ABS "T" Wrench (07HAA-SG00101) to relieve accumulator line pressure. See Fig. 2.

3) Start engine, and release parking brake. Place ABS tester mode selector to "1" position. Push START TEST button. See Fig. 3. With pump motor running, place finger over top of solenoid return tube inside modulator reservoir. See Fig. 4. If equipped with separator in reservoir, place finger over separator.

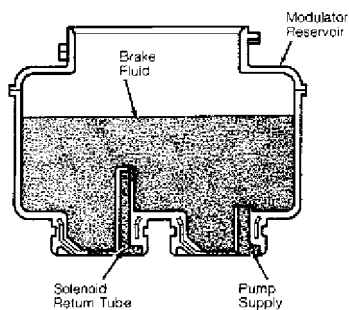


Fig. 4: Locating Sol. Return Tube In Modulator Reservoir (Typical)  
Courtesy of American Honda Motor Co., Inc.

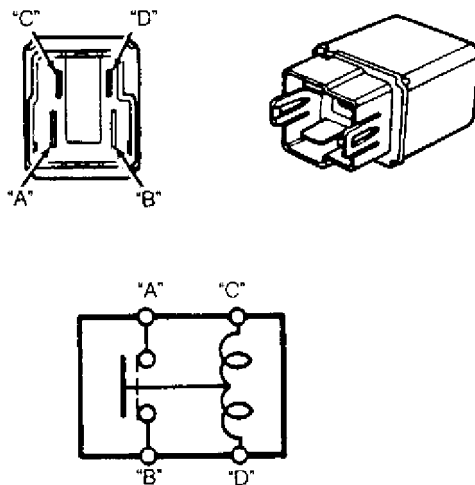
4) If brake fluid is felt coming from return tube or passing through separator, a solenoid is leaking. Proceed to next step. If brake fluid is not felt coming from return tube or through separator, solenoids are okay. Install modulator reservoir filter, and refill reservoir to MAX level.

5) Relieve accumulator line pressure again. Place ABS tester mode selector to "3", "4" and "5" positions. Repeat pressure relief procedure at least 3-4 times at each position. Repeat steps 3) and 4).

6) If solenoid leakage has stopped, install modulator reservoir filter, and refill reservoir to MAX level. If any solenoid is still leaking, replace modulator.

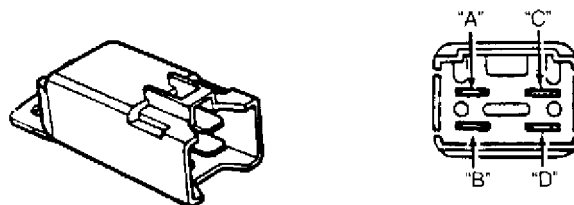
## RELAY TEST

Check continuity between relay terminals "A" and "B". See Figs. 5 & 6. Continuity should not exist. Apply battery voltage across terminals "C" and "D". Continuity should exist between terminals "A" and "B". If continuity is not as indicated, replace relay.



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Fig. 5: Identifying Motor Relay Terminal  
Courtesy of American Honda Motor Co., Inc.



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FAIL-SAFE RELAY

Fig. 6: Identifying Relay Terminals  
Courtesy of American Honda Motor Co., Inc.

## REMOVAL & INSTALLATION

### ABS CONTROL UNIT

#### Removal & Installation

Open trunk and remove right side trim panel. Disconnect electrical connectors. Remove ABS control unit. **ANTI-LOCK BRAKE SYSTEM Article Text (p. 10)** 1993

control unit. See Fig. 1. To install, reverse removal procedure. Turn ignition on and observe ABS warning light. ABS system is okay if ABS warning light goes out after engine is started.

## ACCUMULATOR

**WARNING:** Accumulator contains high-pressure nitrogen gas. DO NOT puncture, expose to flame or attempt to disassemble accumulator. Explosion and serious injury could result.

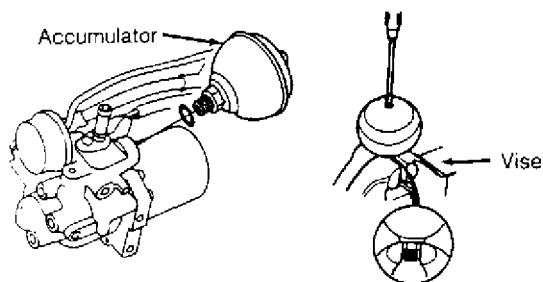
### Removal & Installation

1) Relieve accumulator line pressure. See RELIEVING ACCUMULATOR/LINE PRESSURE under BLEEDING BRAKE SYSTEM. Secure pump assembly in vise. Using an open end wrench on accumulator mounting boss, unscrew and remove accumulator. See Fig. 7.

**NOTE:** Before disposal, accumulator pressure MUST be relieved. Failure to relieve accumulator pressure could result in explosion and serious injury.

2) To depressurize accumulator, secure accumulator in vise with relief plug pointing straight up. DO NOT tighten accumulator body in vise. SLOWLY turn relief plug 3 1/2 turns, and wait at least 3 minutes for all pressure to escape. Remove relief plug, and dispose of accumulator.

3) To install, reverse removal procedure. If necessary, bleed air from system. See ACCUMULATOR, MODULATOR and ABS PUMP (POWER UNIT) BLEEDING under BLEEDING BRAKE SYSTEM.



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**Fig. 7: Removing & Depressurizing Accumulator**  
Courtesy of American Honda Motor Co., Inc.

## SPEED SENSOR

### Removal & Installation

Unplug speed sensor connector. Remove mounting bolts. Remove speed sensor from vehicle. To install, reverse removal procedure. **ANTI-LOCK BR.**

Ensure air gap between speed sensor and trigger wheel (pulser) is .016-.039" (.40-1.0 mm). If air gap exceeds specification at any point, probable cause is a distorted knuckle. Replace knuckle. See HUB & KNUCKLE under REMOVAL & INSTALLATION in SUSPENSION - FRONT article in SUSPENSION section.

#### PULSER (TRIGGER WHEEL)

Removal and installation procedures not available from manufacturer.

#### MODULATOR/PUMP ASSEMBLY

##### Removal & Installation

1) Relieve accumulator/line pressure. See RELIEVING ACCUMULATOR/LINE PRESSURE. Drain fluid from modulator assembly. Remove intake air duct and emission control box. Disconnect solenoid, pump motor and pressure switch connectors.

2) Disconnect brake pipes from modulator. Disconnect brake hose from modulator reservoir. Remove clamp from modulator bracket. Remove mounting bolts. Remove modulator assembly. To install, reverse removal procedure. Bleed hydraulic system. See BLEEDING BRAKE SYSTEM.

#### PRESSURE SWITCH

##### Removal & Installation

Secure modulator/pump assembly in vise. Remove banjo bolt and sealing washers. Remove pressure switch. To install, reverse removal procedure, using NEW sealing washers.

#### TORQUE SPECIFICATIONS

##### TORQUE SPECIFICATIONS TABLE

Application		Ft. Lbs. (N.m)	
Banjo Bolt Fittings	.....	26	(35)
Brake Line Flare Nuts	.....	14	(19)
Modulator Mounting Bolts	.....	16	(22)
Speed Sensor Mounting Bolts	.....	16	(22)
		INCH Lbs. (N.m)	
ABS Control Unit Mounting Bolts	.....	84	(9.5)
ABS Pump Mounting Bolts	.....	89	(10)
Accumulator Mounting Bolts	.....	89	(10)
Maintenance Bleeder Screw	.....	48	(5.4)
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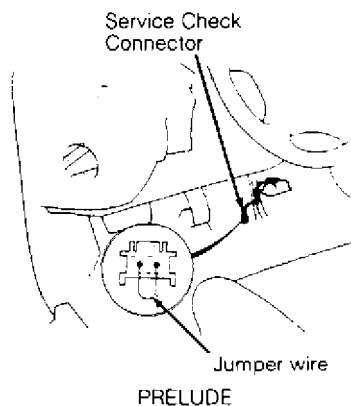
## SELF-DIAGNOSTICS

### RETRIEVING TROUBLE CODES

1) Turn ignition on (without engine running). Ensure ABS warning light comes on. Start engine, and observe ABS warning light. If warning light goes out, no trouble codes exist.

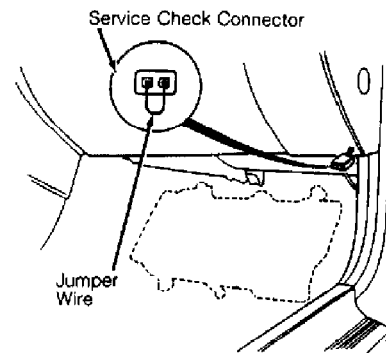
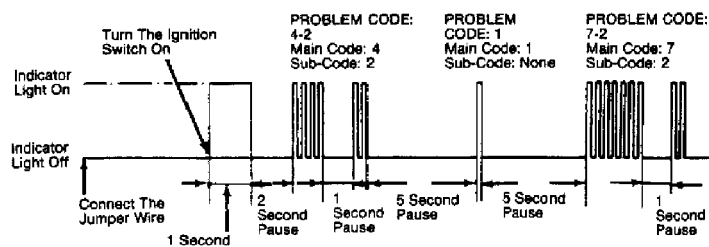
2) If ABS warning light stays on, turn ignition off. Remove access cover on passenger-side of center console to locate 2-pin connector. See Fig. 8. Install jumper wire between pins on 2-pin connector. Turn ignition on (without engine running). Record blinking ABS warning light sequence. See Fig. 9.

3) After ignition is turned on, ABS warning light will turn on for one second, then pause for 2 seconds before blinking first code. First code number indicates main code and second code number indicates sub code. Three codes can be set at once. To recheck sequence, turn ignition off for a few seconds, and then turn it on again. After trouble codes have been retrieved, conduct appropriate test procedures outlined in flow charts. See ABS SELF-DIAGNOSTIC FLOW CHARTS.

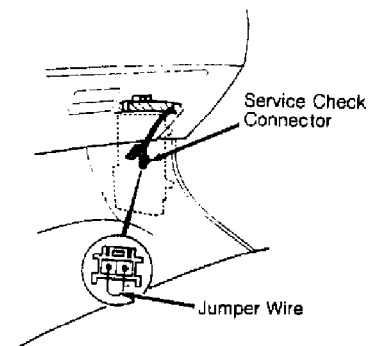


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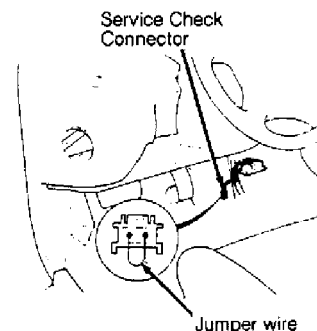
Fig. 8: Identifying Service Check Connector  
Courtesy of American Honda Motor Co., Inc.



ACCORD



CIVIC



PRELUDE 93001911

PROBLEM CODE		PROBLEMATIC COMPONENT/ SYSTEM	AFFECTED				OTHER COMPONENT
MAIN CODE	SUB-CODE		FRONT RIGHT	FRONT LEFT	REAR RIGHT	REAR LEFT	
①	-	Pump motor over-run	-	-	-	-	Pressure switch
	②	Pump motor circuit problem	-	-	-	-	Motor relay, Unit fuse, Motor fuse
	③	High pressure leakage	-	-	-	-	Solenoid
	④	Pressure switch	-	-	-	-	
	⑤	Accumulator gas leakage	-	-	-	-	
②	①	Parking brake switch-related problem	-	-	-	-	Brake fluid level switch BRAKE light
③	①	Pulsar(s)	○				
	②			○			
	④				○	○	
④	①	Speed sensor	○				
	②			○			
	④				○		
	⑤					○	
⑤	-	Speed sensor(s)			○	○	Modulator
	①				○		
	②					○	
⑥	-	Fail-safe relay (Open, short)	-	-	-	-	Front or rear fail-safe relay
	①		-	-	-	-	Front fail-safe relay
	②		-	-	-	-	Rear fail-safe relay
⑦	①	Solenoid related problem (Open)	○				ABS B1 fuse
	②			○			Front fail-safe relay
	④				○	○	Rear fail-safe relay

Fig. 9: Self-Diagnostics & Trouble Code Diagnosis Chart

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## CLEARING TROUBLE CODES

With ignition off, remove ABS fuse No. B2 for at least 3 seconds. Install fuse, and turn ignition on. Observe ABS warning light. Codes are cleared if ABS warning light goes out after engine is started.

## TROUBLE CODES

### TROUBLE CODES TABLE

AA	
Code	System Affected
1 To 1-8 .....	Hydraulically Controlled Components
2-1 .....	Parking Brake Switch
3-1 To 3-4 .....	Pulser(s)
4-1 To 4-8 .....	Front & Rear Speed Sensor(s)
5 To 5-8 .....	Rear Speed Sensor(s)
6 To 6-4 .....	Front & Rear Fail-Safe Relay(s)
7-1 To 7-4 .....	Front & Rear Solenoid(s)
AA	

### ABS SELF-DIAGNOSTIC FLOW CHARTS

#### CODE 1 PUMP MOTOR OVERRUN

## DTC 1: (1 OF 2) PUMP MOTOR OVERRUN PRELUDE

**CAUTION:** Use only the digital multimeter to check the system.

### Pre-test step:

- Check for fluid leaks from the functional parts and replace the faulty parts if there is a leak.

### Functional parts:

- Modulator
- Pump assembly
- High pressure hose/pipe

- With engine running, ABS indicator light is ON.
- With service check connector jumped → problem code 1 is indicated.

Bleed high pressure fluid from the maintenance bleeder with the Bleeder T-wrench

Remove the pump motor relay.

Connect the No. 29 and 30 terminals using a jumper wire for about 8 seconds.

Does the pump motor run with an increasingly loud, raspy sound?

NO

Pump runs with a constant soft sound:  
Bleed air from anti-lock brake system

YES

Check the accumulator fluid quantity by bleeding the high pressure line with the Bleeder T-wrench.

Is there 40–70 cc?

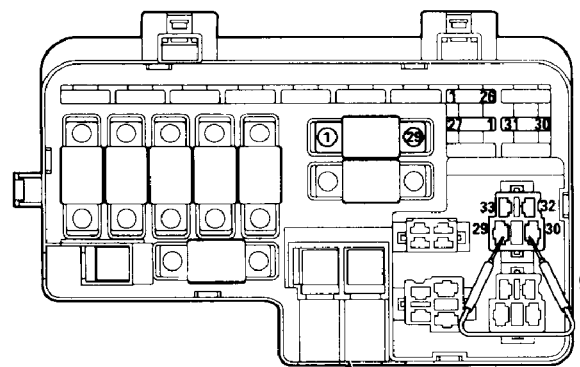
NO

See "B"

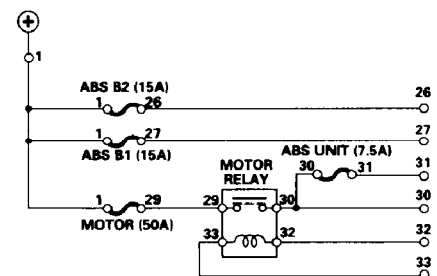
YES

See "A"

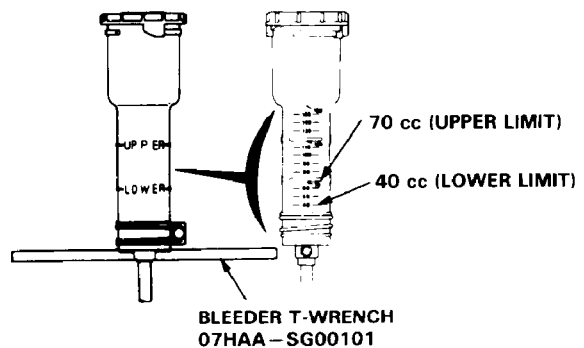
View from under-hood fuse/relay box terminal side.



UNDER-HOOD FUSE/RELAY BOX



UNDER-HOOD FUSE/RELAY BOX CIRCUIT DIAGRAM



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Fig. 10: Code 1 Flow Chart (1 Of 2), Pump Motor Overrun  
Courtesy of American Honda Motor Co., Inc.



**"A"**

**"B"**

Connect the No. 29 and No. 30 terminals using a jumper wire for about 10 seconds.

Check if there is any change in the fluid level in the reservoir tank.

Is there any change?

NO

Faulty pump motor (Relief valve is defective and open).

YES

Faulty solenoid (leakage).

Diagram of the under-hood fuse/relay box. A jumper wire connects terminal 29 to terminal 30. The box is labeled "UNDER-HOOD FUSE/RELAY BOX".

Diagram of the switch-side connector. It shows a connector with two terminals labeled 1 and 2, both marked "YEL". A resistance symbol (Ω) is shown below the connector. The diagram is labeled "View from terminal side."

Diagram of the pressure switch. It shows a switch with two terminals labeled 1 and 2, both marked "YEL". The diagram is labeled "View from terminal side."

Diagram of the pressure switch. It shows a switch with two terminals labeled 1 and 2, both marked "YEL". The diagram is labeled "View from terminal side."

Diagram of the pressure switch. It shows a switch with two terminals labeled 1 and 2, both marked "YEL". The diagram is labeled "View from terminal side."

Fig. 11: Code 1 Flow Chart (2 Of 2), Pump Motor Overrun  
Courtesy of American Honda Motor Co., Inc.

## CODE 1-2 PUMP MOTOR CIRCUIT

### Problem Code 1-2: Pump Motor Circuit Problem

**CAUTION:** Use only the digital multimeter to check the system.

**NOTE:** If a malfunction is detected, this code appears and the fail-safe function is activated. The indicator light comes ON after restarting the engine until the malfunction code is erased (by disconnecting the ABS B2 fuse for 3 seconds).

#### Pre-test steps:

- Check ABS MOTOR (50 A) FUSE
- Check ABS UNIT (7.5 A) FUSE
- Check for loose under-hood fuse/relay box connectors.

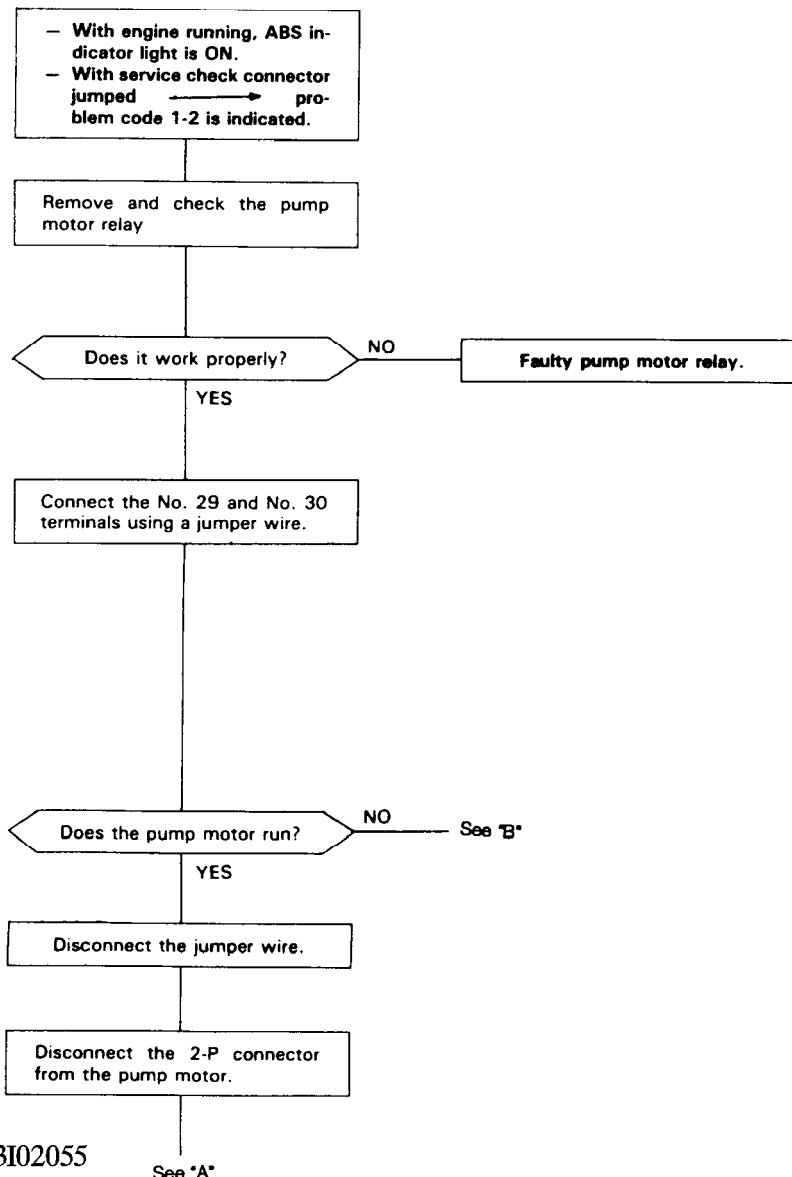
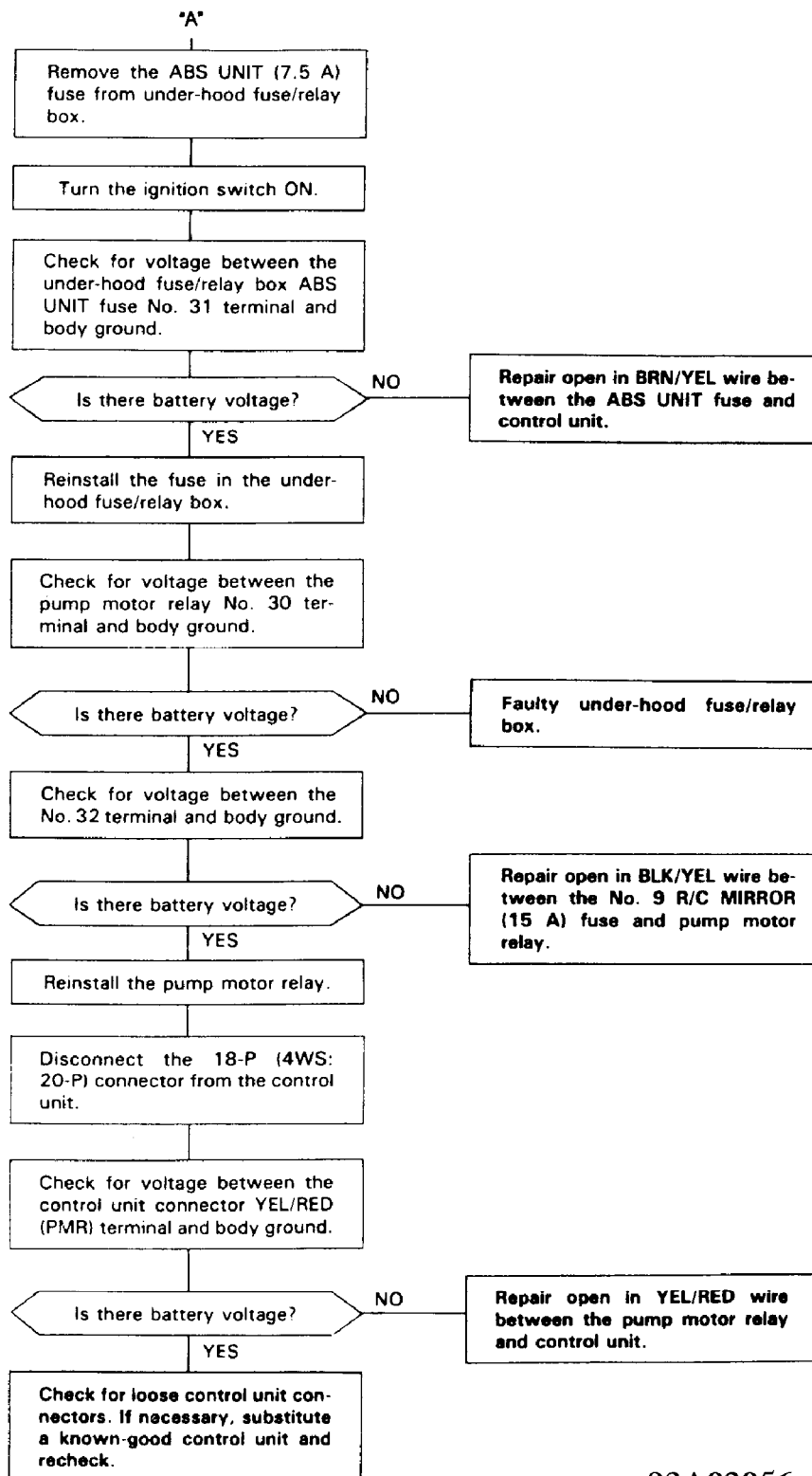


Fig. 12: Code 1-2 Flow Chart (1 Of 3), Pump Motor Circuit

Courtesy of American Honda Motor Co., Inc.

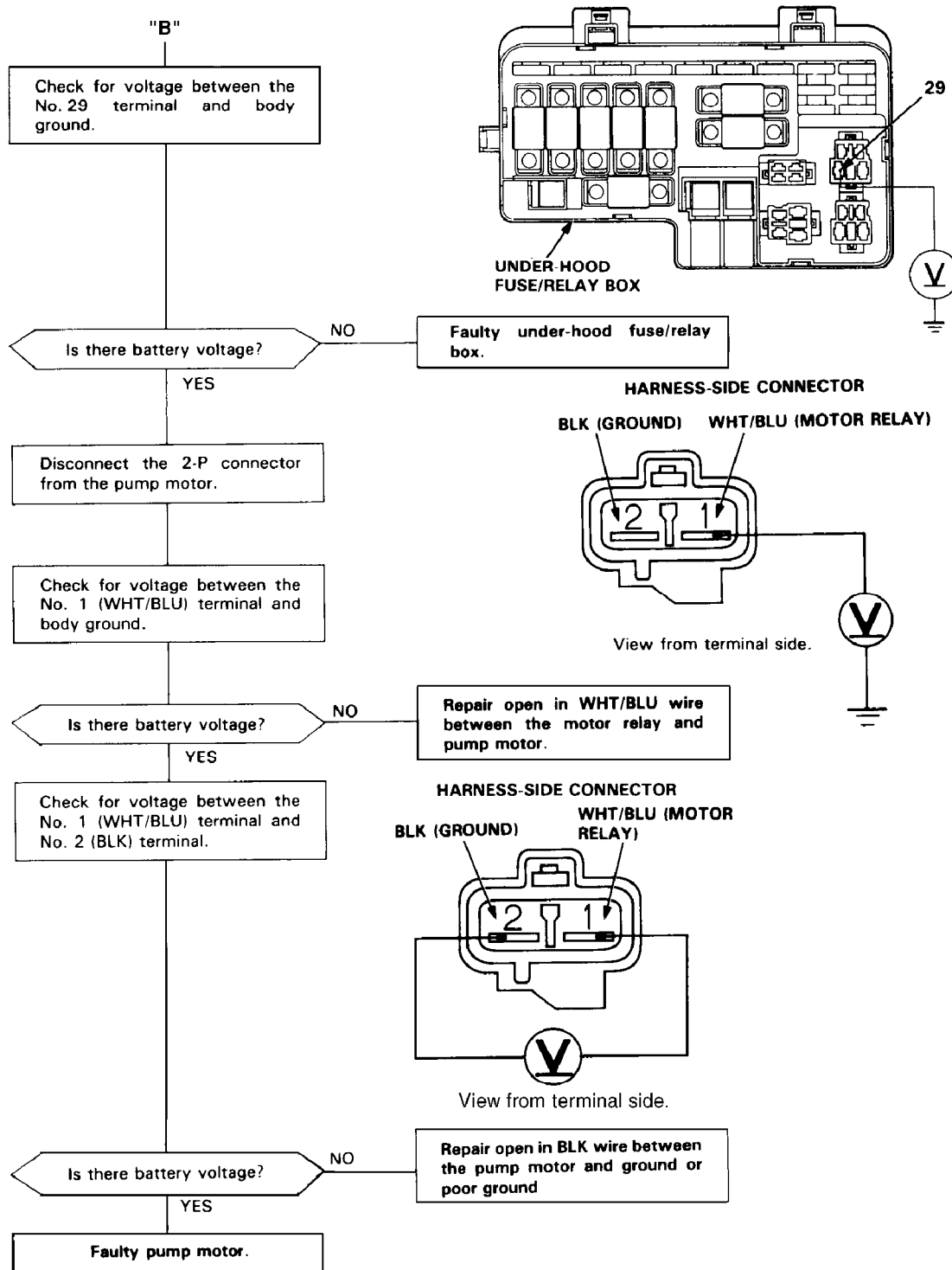


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Fig. 13: Code 1-2 Flow Chart (2 Of 3), Pump Motor Circuit

Courtesy of American Honda Motor Co., Inc.

## DTC 1-2: (3 OF 3) PUMP MOTOR CIRCUIT PRELUDE



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Fig. 14: Code 1-2 Flow Chart (3 Of 3), Pump Motor Circuit

Courtesy of American Honda Motor Co., Inc.

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## CODE 1-3 HIGH PRESSURE LEAKAGE

### DTC 1-3 HIGH PRESSURE LEAKAGE PRELUDE

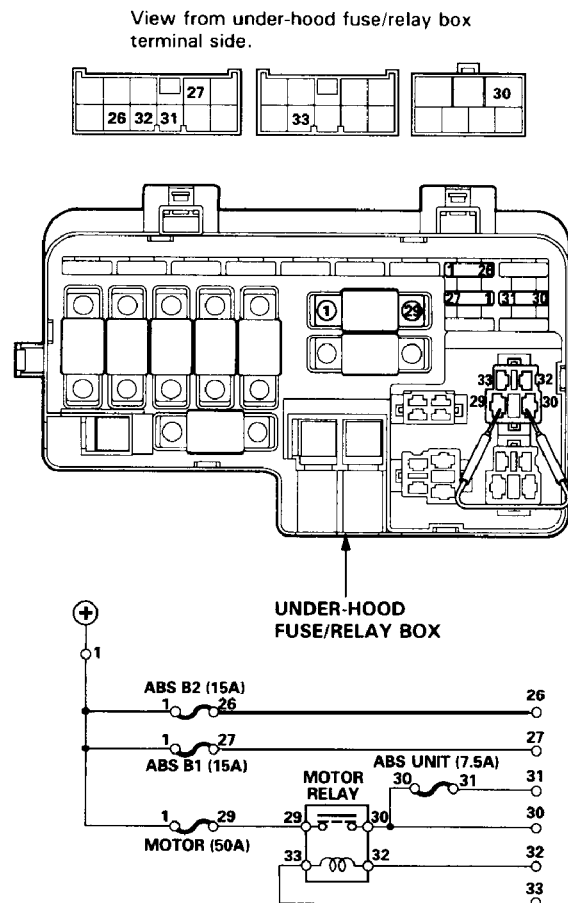
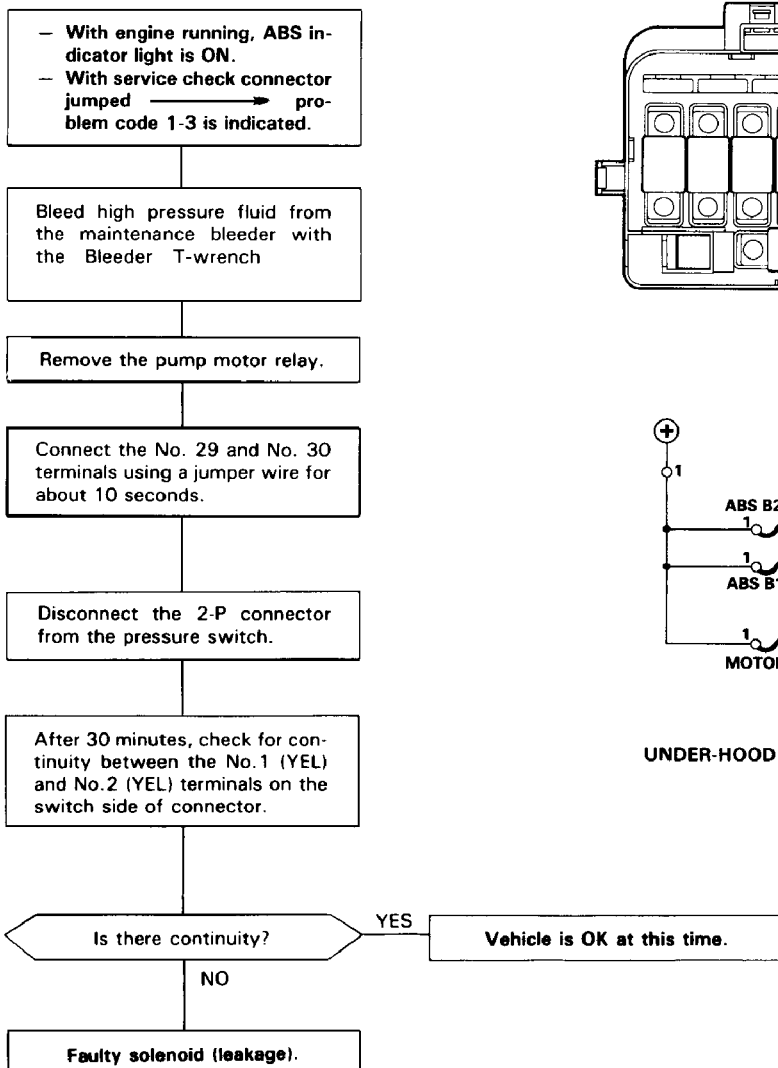
**CAUTION:** Use only the digital multimeter to check the system.

#### Pre-test steps:

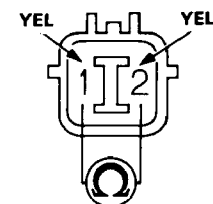
- Check reservoir fluid level, and if necessary, fill to the MAX level.
- Check for fluid leaks from the functional parts and replace the faulty parts if there is a leak.

#### Functional parts:

- Modulator
- Pump assembly
- High pressure hose/pipe



#### SWITCH-SIDE CONNECTOR



93E02058

**Fig. 15: Code 1-3 Flow Chart, High Pressure Leakage**

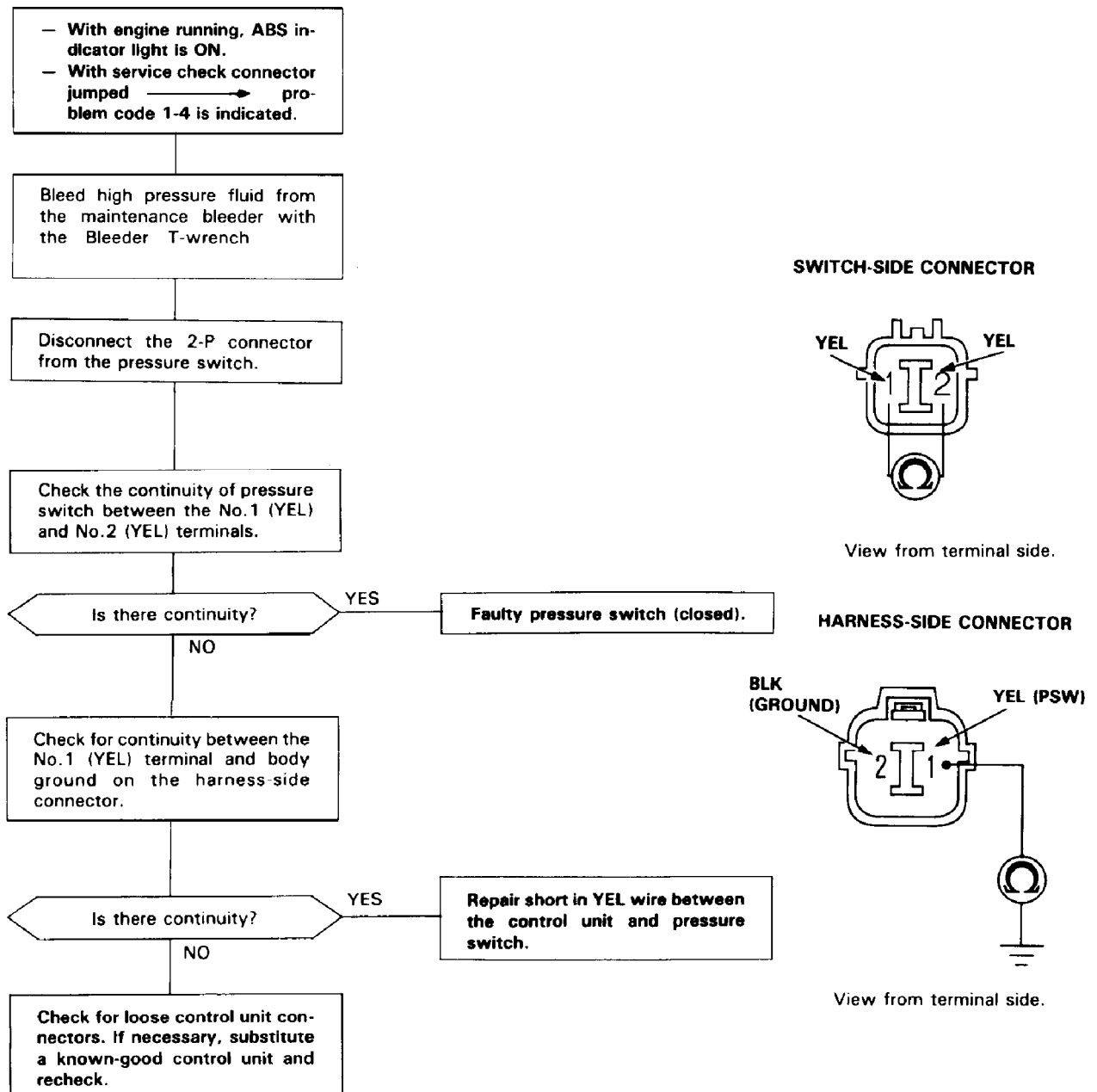
Courtesy of American Honda Motor Co., Inc.

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## CODE 1-4 PRESSURE SWITCH CIRCUIT

### DTC 1-4 PRESSURE SWITCH CIRCUIT PRELUDE

**CAUTION:** Use only the digital multimeter to check the system.



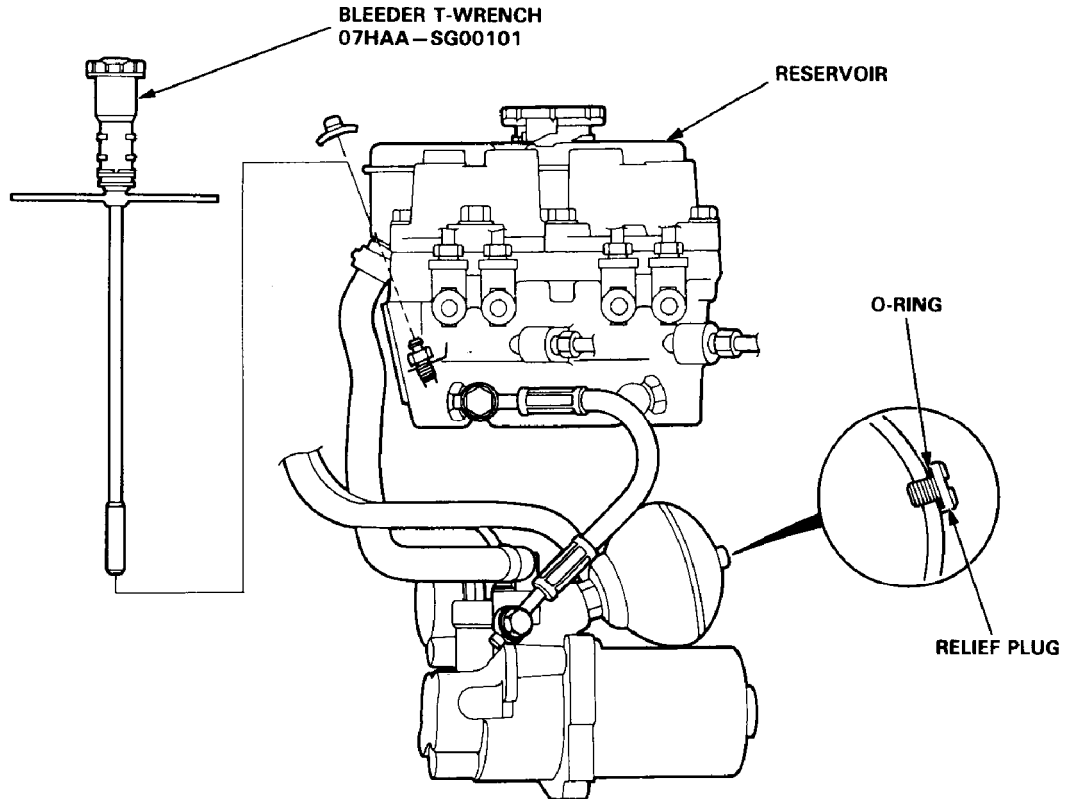
93G02059  
**Fig. 16: Code 1-4 Flow Chart, Pressure Switch Circuit**  
Courtesy of American Honda Motor Co., Inc.

## CODE 1-8 ACCUMULATOR GAS LEAKAGE

## DTC 1-8 ACCUMULATOR GAS LEAKAGE PRELUDE

Check the following items:

- The relief plug is loose.
- The relief plug O-ring is out of place.
- Bleed the high pressure line with the Bleeder T-wrench. Operate the pump motor for 10 seconds and bleed the high pressure line again with the Bleeder T-wrench. If no fluid or more than 70 cc of fluid come out, it is likely that the gas has leaked out.



93I02060

**Fig. 17: Code 1-8, Accumulator Gas Leakage**  
 Courtesy of American Honda Motor Co., Inc.

## CODE 2-1 PARKING BRAKE SWITCH

### DTC 2-1 PARKING BRAKE SWITCH PRELUDE

If the parking brake has been released, the following items are possible causes. If they are OK, check the control unit connectors for good connection. If not loose or disconnected, substitute a known-good control unit and recheck.

NOTE: Before Troubleshooting Problem Code 2-1, remove the ABS B2 (15 A) fuse for 3 seconds to clear the control unit's memory, then test drive the car.

If the anti-lock brake system indicator light stays off, the probability is that the car was driven with the parking brake applied.

- The parking brake is applied for more than 30 seconds while driving.
- The brake fluid level in the master cylinder is too low.
- GRN/RED wire is shorted between the **BRAKE** indicator light and parking brake switch.
- GRN/RED wire is shorted between the **BRAKE** indicator light and brake fluid level switch.
- The **BRAKE** indicator light is blown.
- GRN/RED wire has an open between the **BRAKE** indicator light and the control unit.

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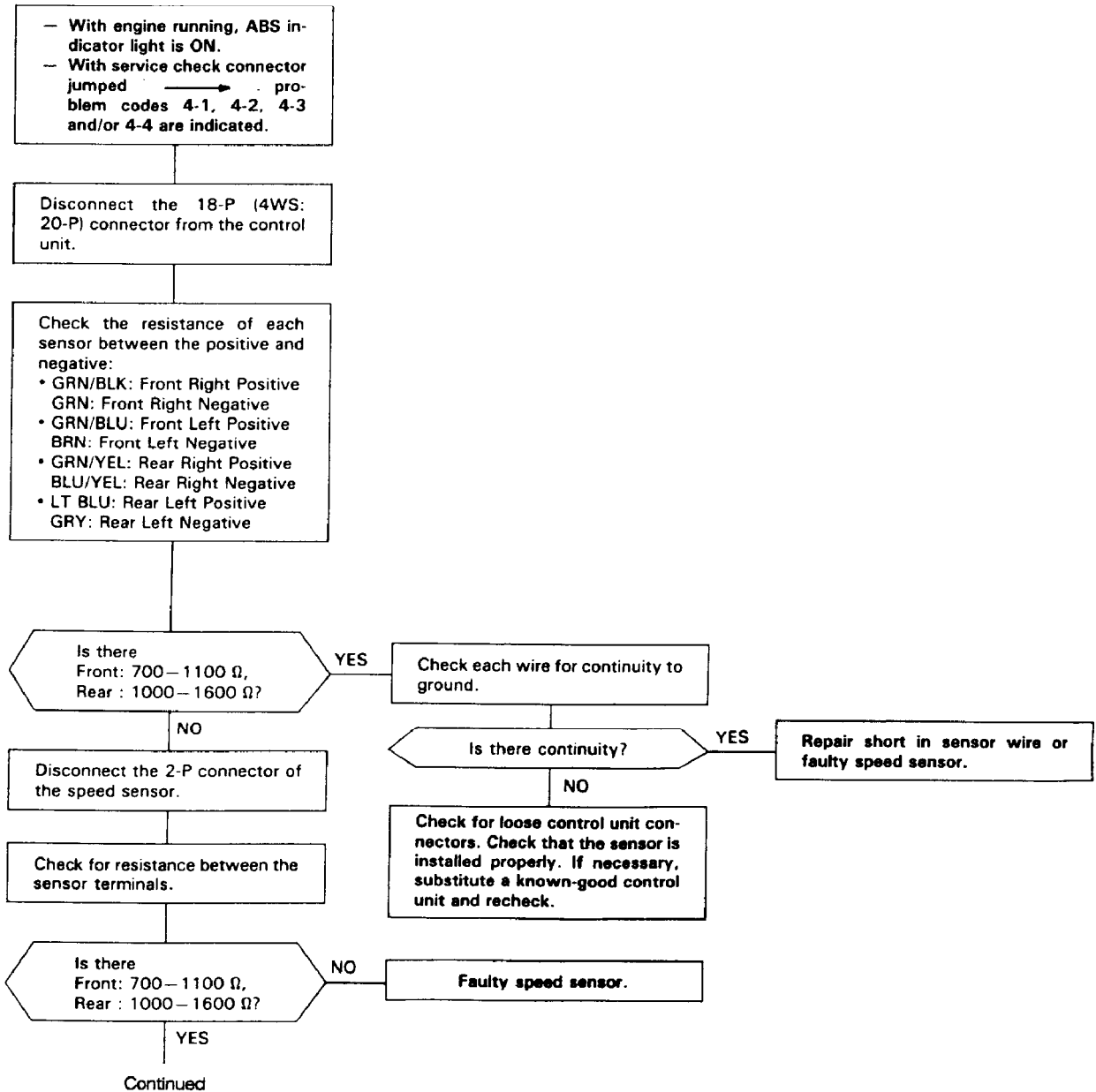
**Fig. 18: Code 2-1, Parking Brake Switch**

Courtesy of American Honda Motor Co., Inc.

## CODE 4-1 TO 4-8 SPEED SENSOR

**CAUTION:** Use only the digital multimeter to check the system.

**NOTE:** If a malfunction is detected, this code appears and the fail-safe function is activated. The indicator light may come ON after restarting the engine until the malfunction code is erased (by disconnecting the ABS B2 fuse for 3 seconds).



93A02061

Fig. 19: CODE 4-1 TO 4-8 Flow Chart (1 OF 2), SPEED SENSOR  
Courtesy of American Honda Motor Co., Inc.



## DTC 4-1, 4-2, 4-4 & 4-8: (2 OF 2) SPEED SENSOR PRELUDE

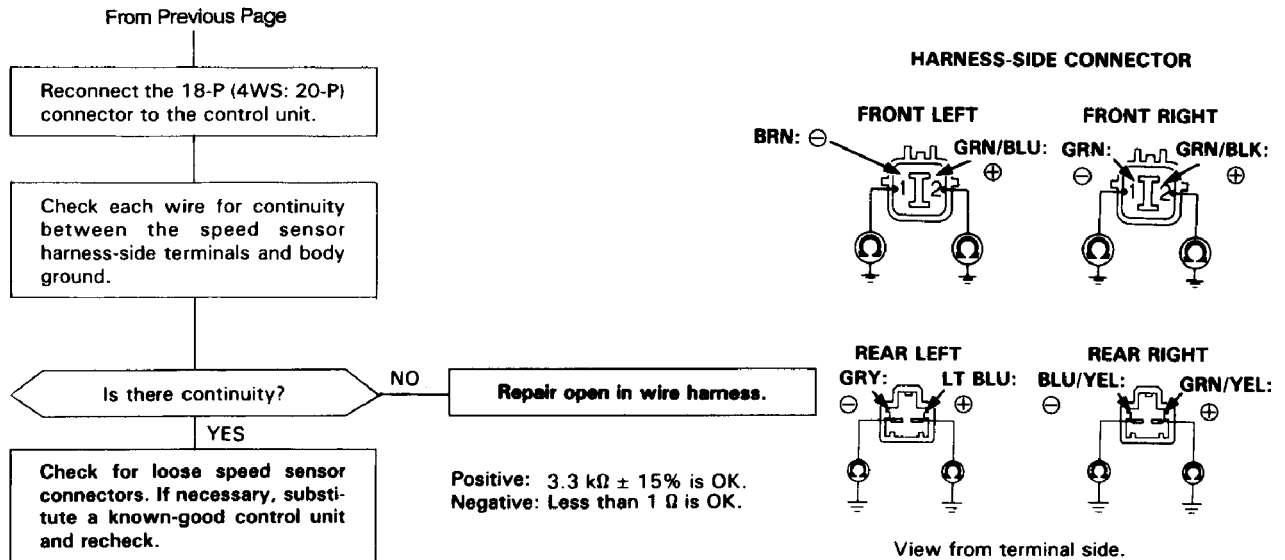


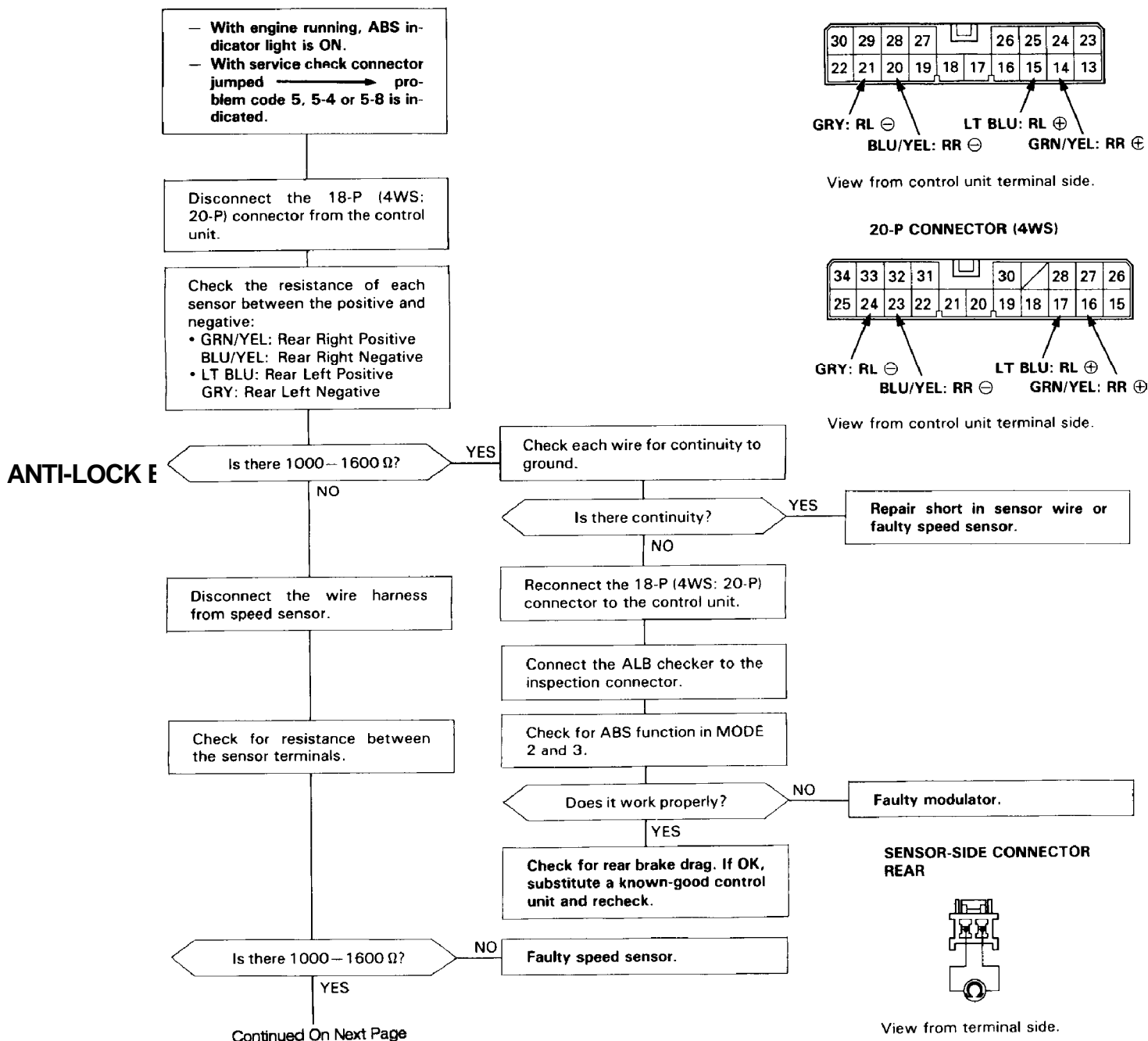
Fig. 20: Code 4-1 To 4-8 Flow Chart (2 Of 2), Speed Sensor  
Courtesy of American Honda Motor Co., Inc.

CODE 5 TO 5-8 SPEED SENSOR(S)

## DTC 5, 5-4 & 5-8: (1 OF 2) SPEED SENSOR(S) PRELUDE

**CAUTION:** Use only the digital multimeter to check the system.

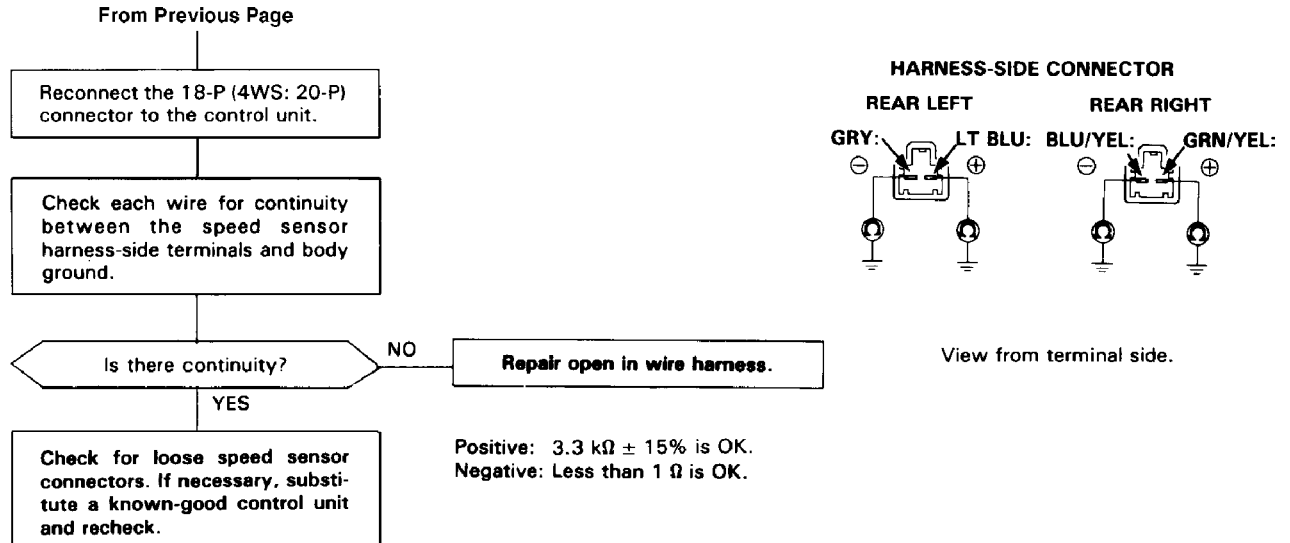
**NOTE:** If a malfunction is detected, this code appears and the fail-safe function is activated. The indicator light may come ON after restarting the engine until the malfunction code is erased (by disconnecting the ABS B2 fuse for 3 seconds.)



93E02063

**Fig. 21: Code 5 To 5-8 Flow Chart (1 Of 2), Speed Sensor(s)**  
 Courtesy of American Honda Motor Co., Inc.

## DTC 5, 5-4 & 5-8: (2 OF 2) SPEED SENSOR(S) PRELUDE



93G02064  
**Fig. 22: Code 5 To 5-8 Flow Chart (2 Of 2), Speed Sensor(s)**  
 Courtesy of American Honda Motor Co., Inc.

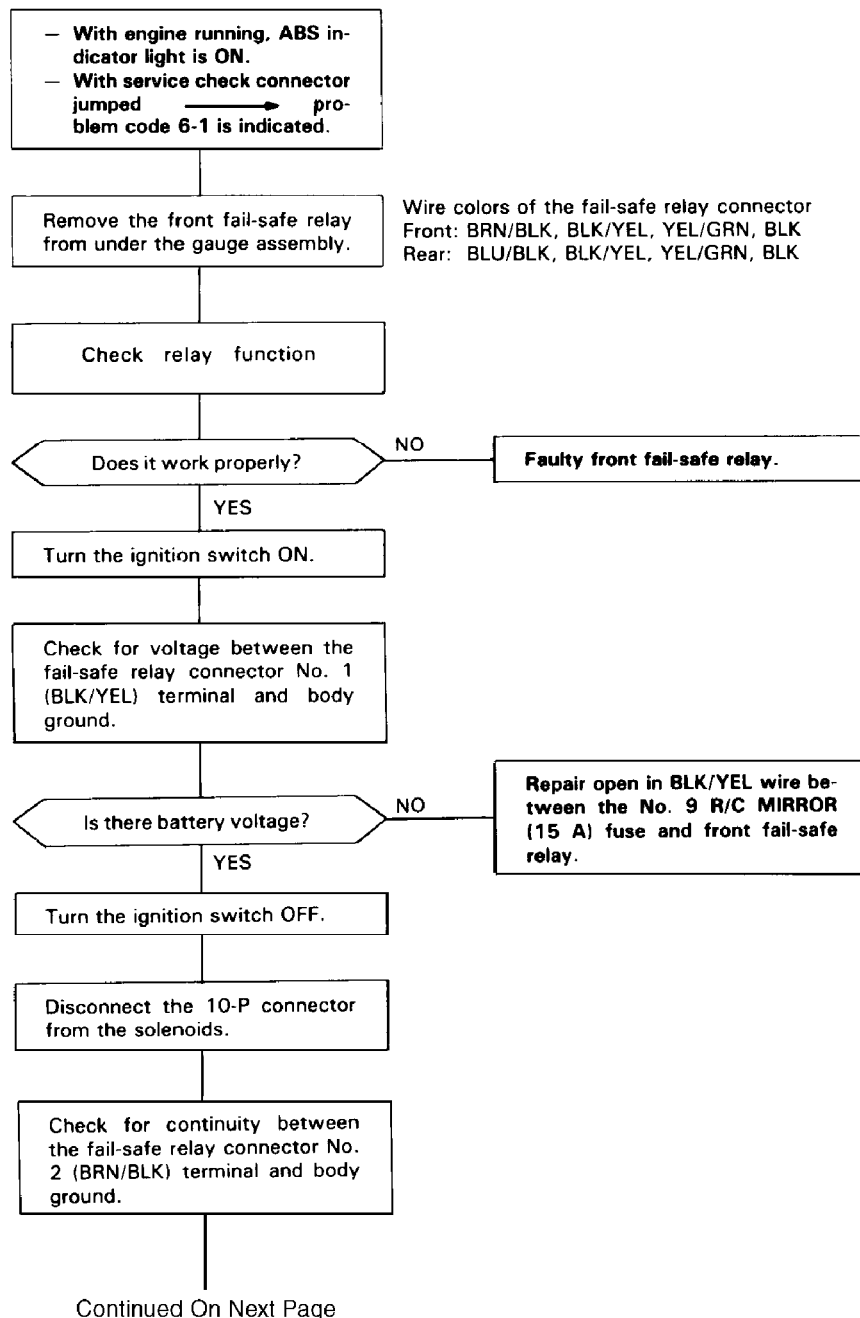
CODE 6-1 FRONT FAIL-SAFE RELAY CIRCUIT

## DTC 6-1: (1 OF 3) FRONT FAIL-SAFE RELAY CIRCUIT PRELUDE

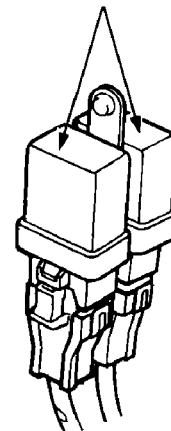
**CAUTION:** Use only the digital multimeter to check the system.

### Pre-test steps:

- Check ABS B1 (20 A) FUSE
- Check for loose under-hood fuse/relay box connectors.

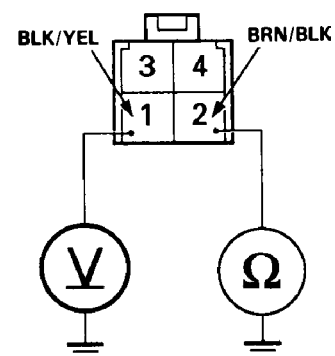


FAIL-SAFE RELAYS



ANTI-LOCK E

HARNESS-SIDE CONNECTOR



View from terminal side.

93J02065

**Fig. 23: Code 6-1 Flow Chart (1 Of 3), Front Fail-safe Relay Circuit**  
Courtesy of American Honda Motor Co., Inc.

## DTC 6-1: (2 OF 3) FRONT FAIL-SAFE RELAY CIRCUIT PRELUDE

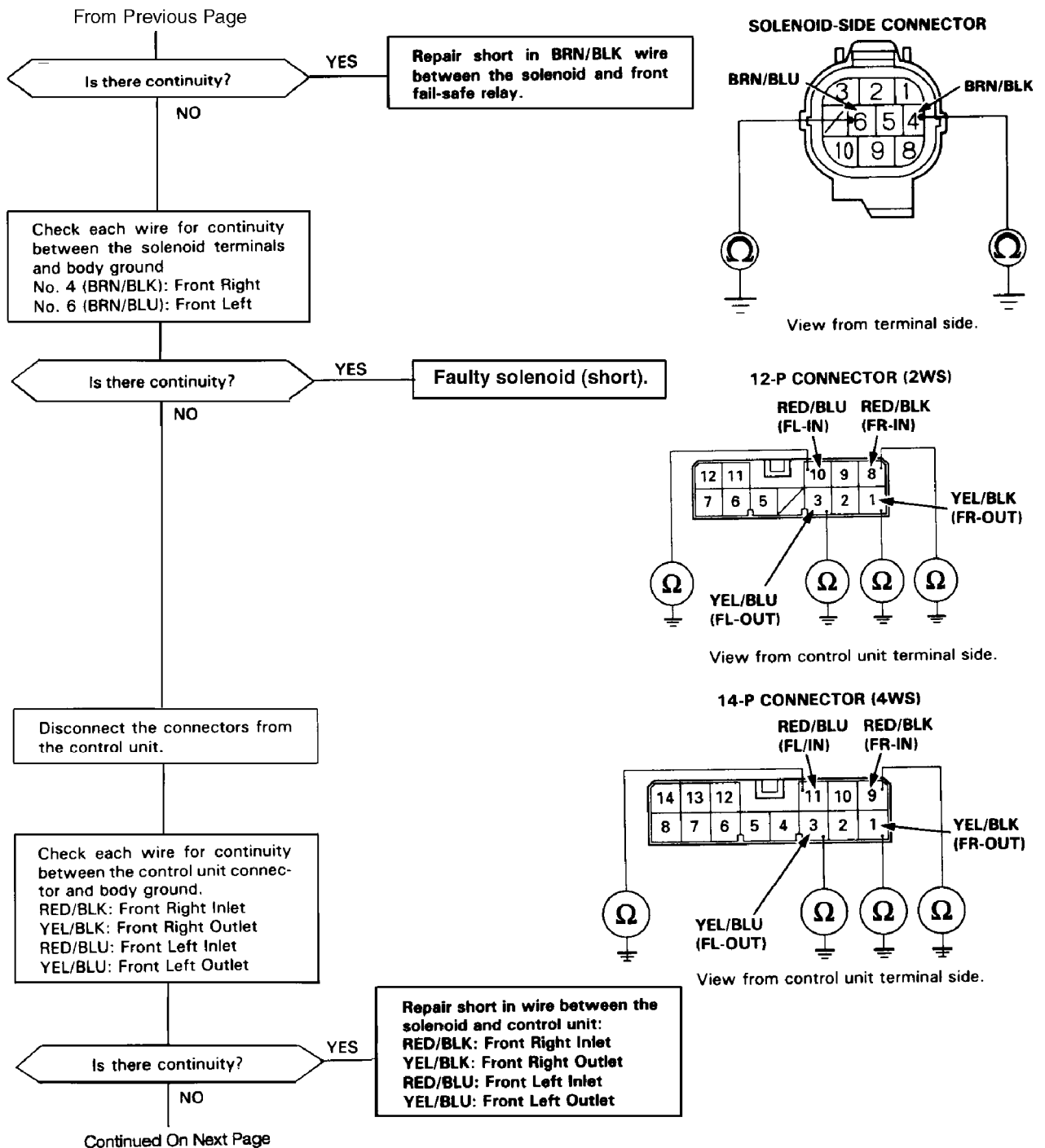


Fig. 24: Code 6-1 Flow Chart (2 Of 3), Front Fail-safe Relay Circuit  
Courtesy of American Honda Motor Co., Inc.

## DTC 6-1: (3 OF 3) FRONT FAIL-SAFE RELAY CIRCUIT PRELUDE

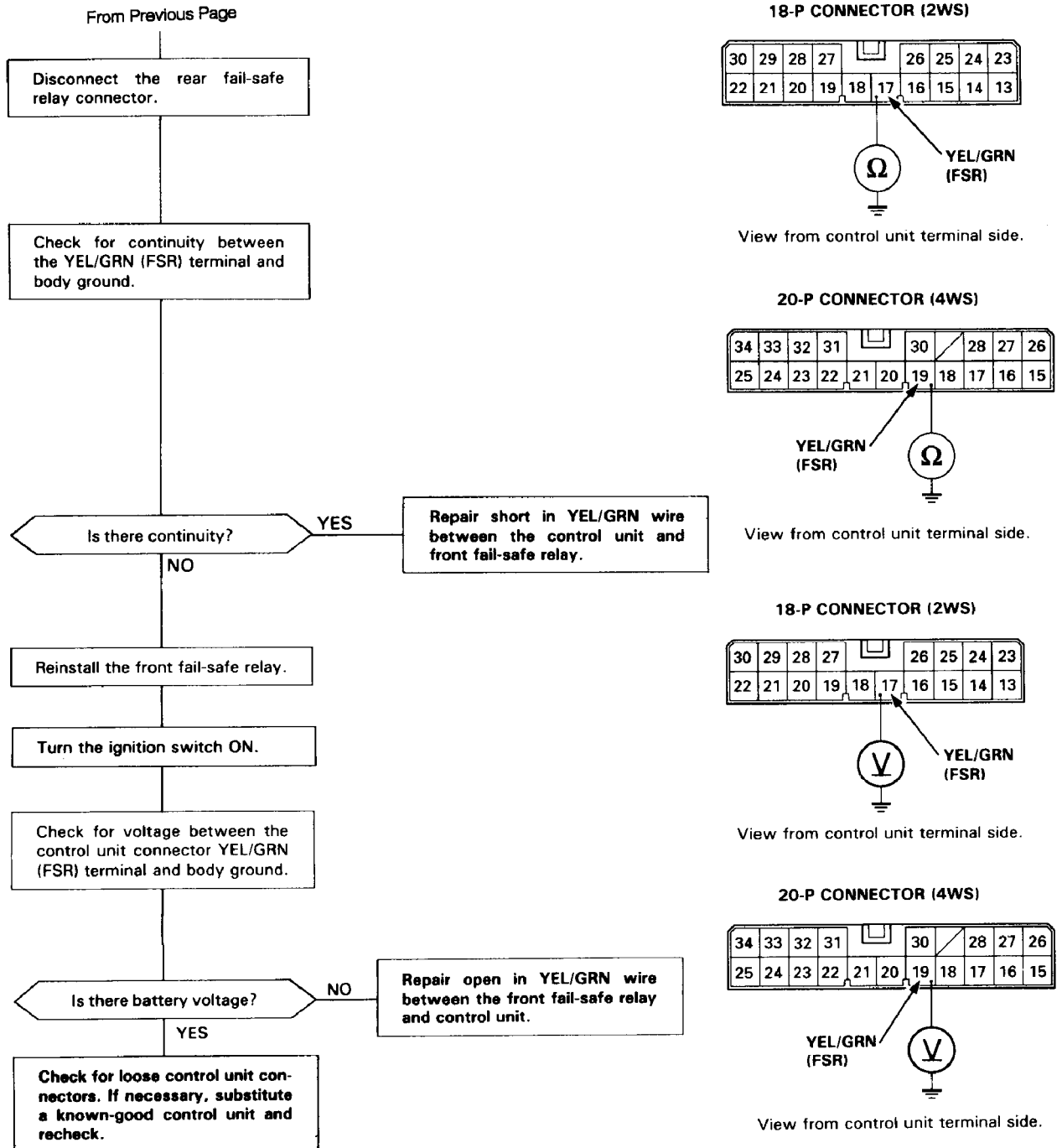
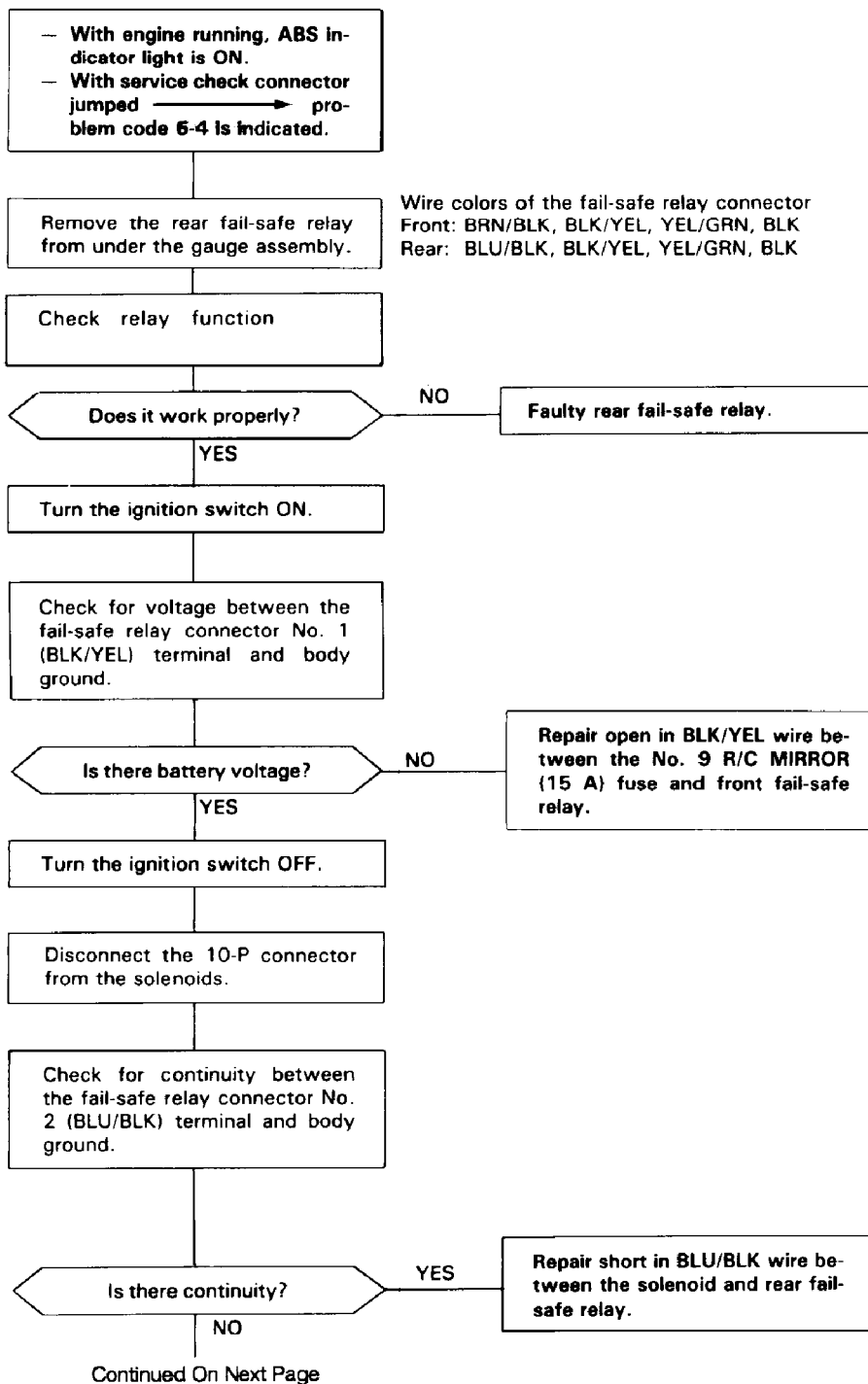


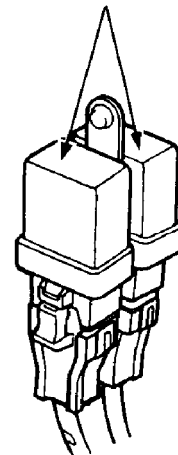
Fig. 25: Code 6-1 Flow Chart (3 Of 3), Front Fail-safe Relay Circuit  
Courtesy of American Honda Motor Co., Inc.

## DTC 6-4: (1 OF 3) REAR FAIL-SAFE RELAY CIRCUIT PRELUDE

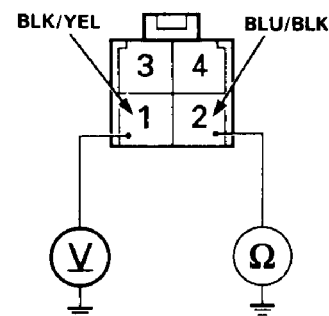
**CAUTION:** Use only digital multimeter to check the system.



FAIL-SAFE RELAYS



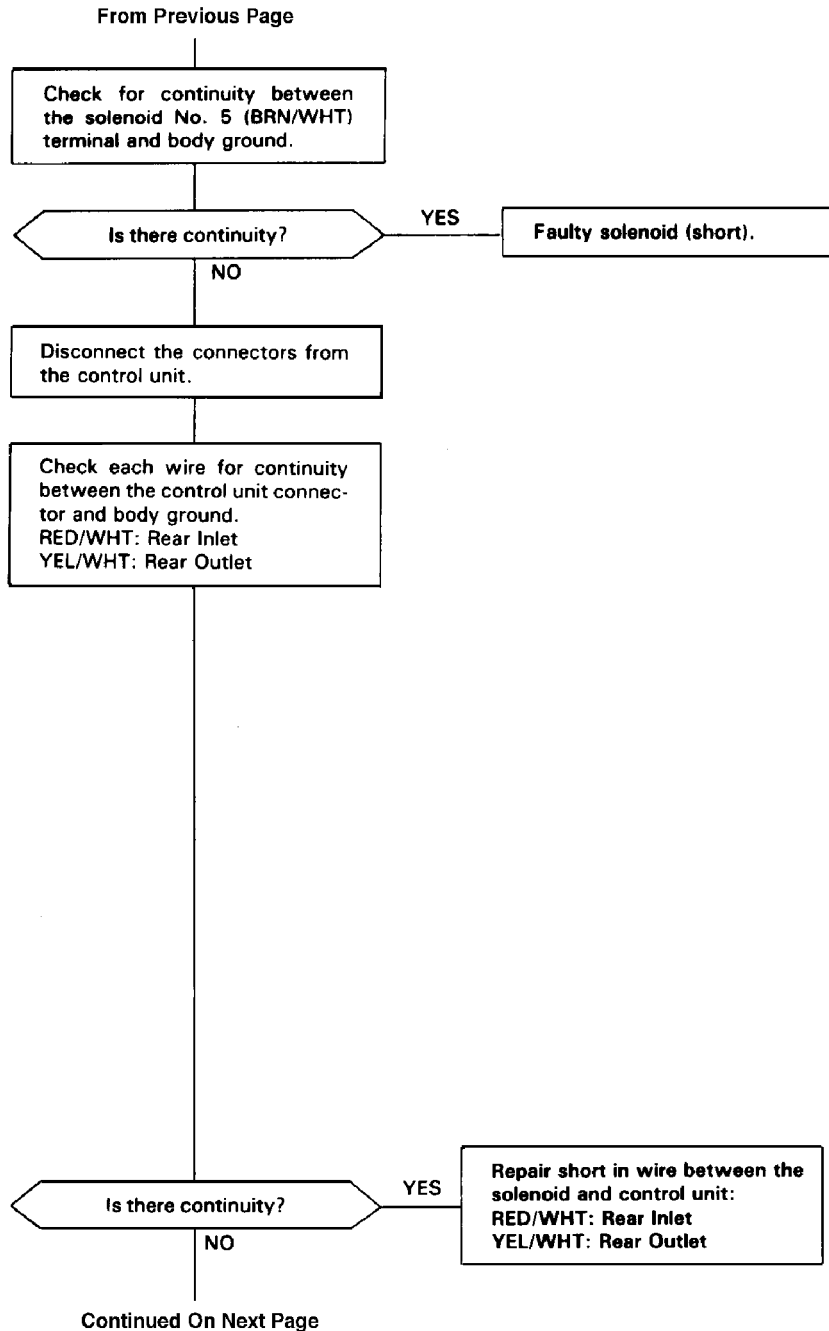
HARNESS-SIDE CONNECTOR



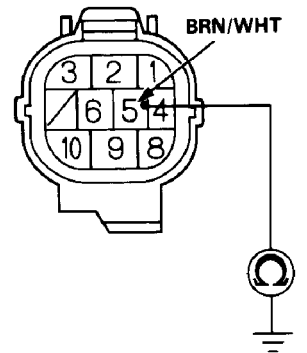
View from terminal side.

93F02068

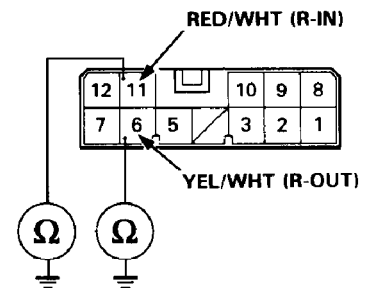
## DTC 6-4: (2 OF 3) REAR FAIL-SAFE RELAY CIRCUIT PRELUDE



SOLENOID-SIDE CONNECTOR



12-P CONNECTOR (2WS)



14-P CONNECTOR (4WS)

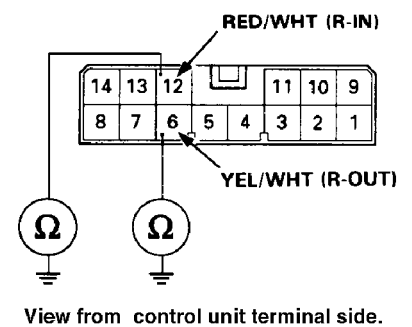
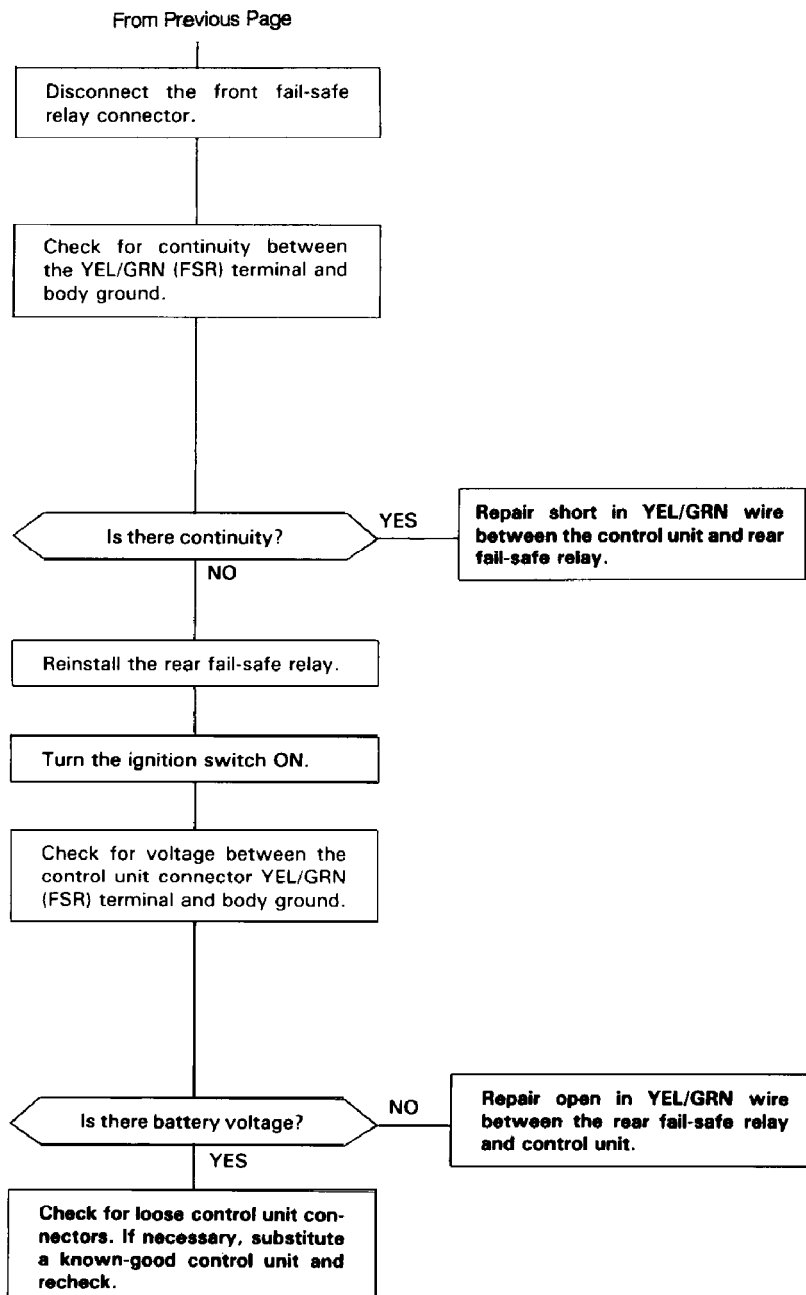


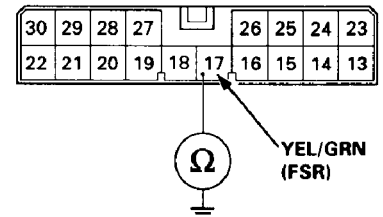
Fig. 27: Code 6-4 Flow Chart (2 Of 3), Rear Fail-safe Relay Circuit  
Courtesy of American Honda Motor Co., Inc.



## DTC 6-4: (3 OF 3) REAR FAIL-SAFE RELAY CIRCUIT PRELUDE

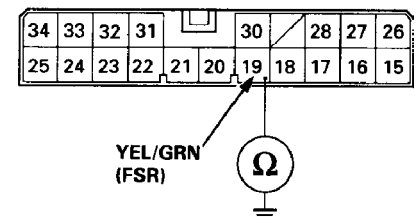


18-P CONNECTOR (2WS)



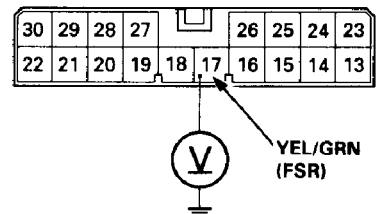
View from control unit terminal side.

20-P CONNECTOR (4WS)



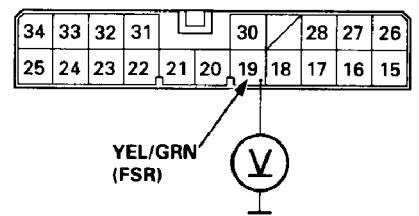
View from control unit terminal side.

18-P CONNECTOR (2WS)



View from control unit terminal side.

20-P CONNECTOR (4WS)



View from control unit terminal side.

Fig. 28: Code 6-4 Flow Chart (3 Of 3), Rear Fail-safe Relay Circuit  
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CODE 7-1 & 7-2 FRONT SOLENOID

## DTC 7-1 & 7-2: (1 OF 3) FRONT SOLENOID PRELUDE

**CAUTION:** Use only the digital multimeter to check the system.

### Pre-test steps:

- Check ABS B1 (20 A) FUSE
- Check for loose under-hood fuse/relay box connectors.

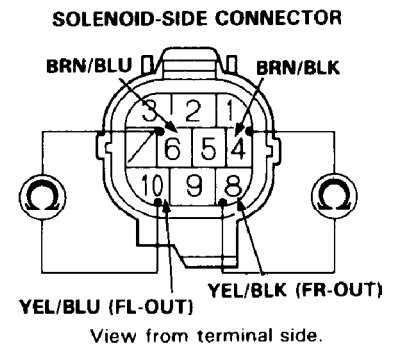
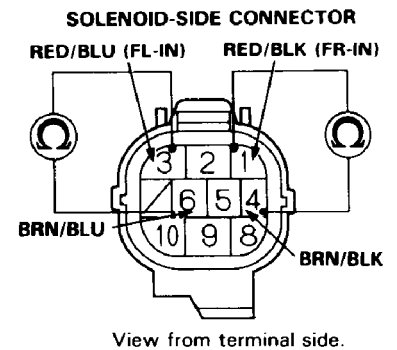
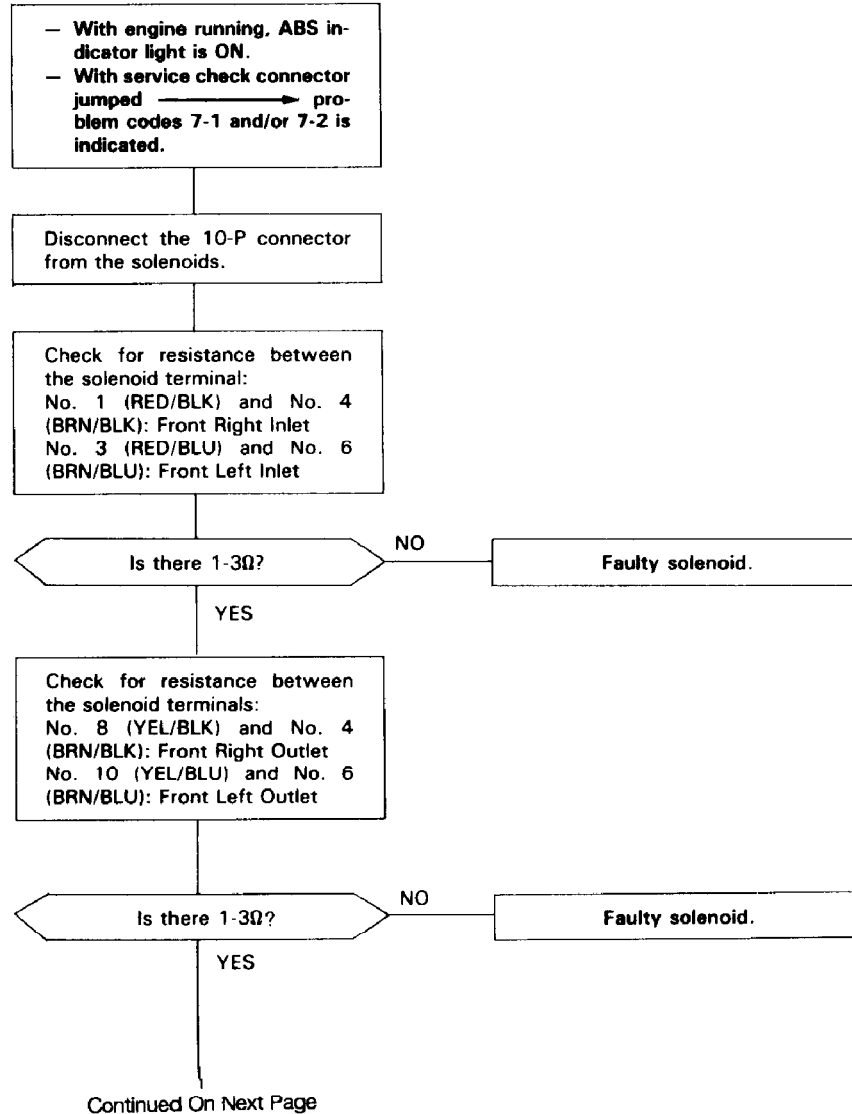


Fig. 29: Code 7-1 & 7-2 Flow Chart (1 Of 3), Front Solenoid  
Courtesy of American Honda Motor Co., Inc.

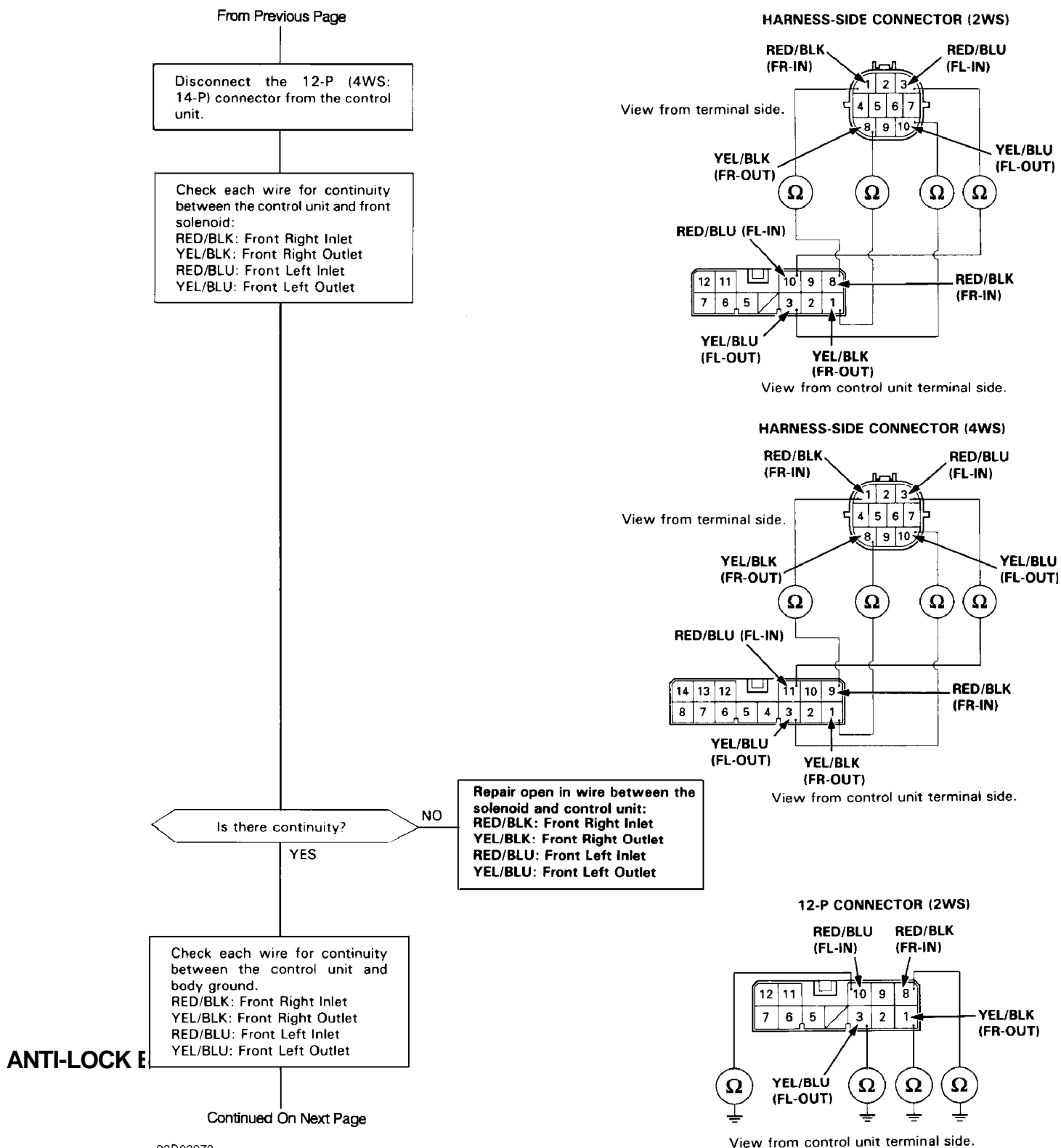
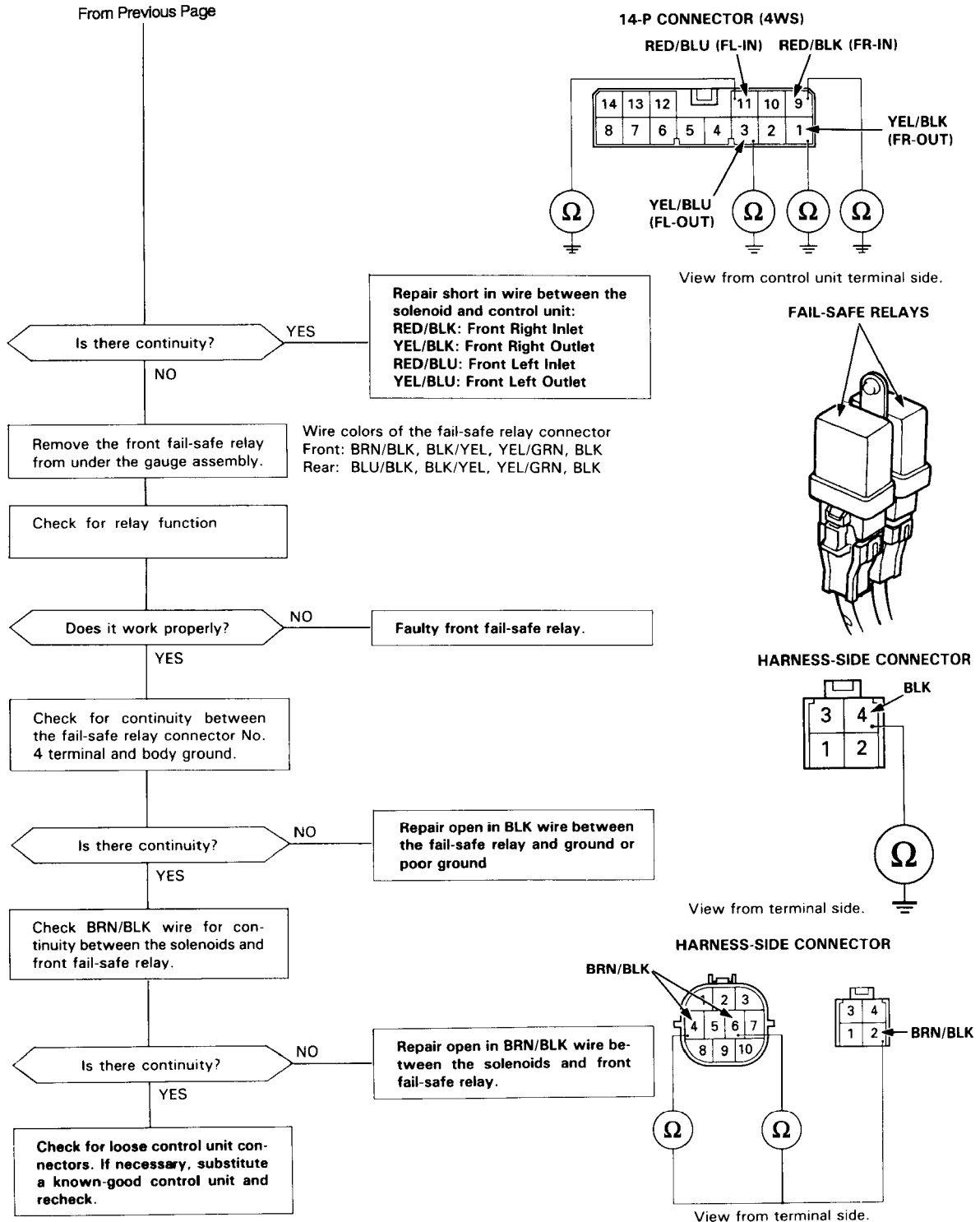


Fig. 30: Code 7-1 & 7-2 Flow Chart (2 Of 3), Front Solenoid  
 Courtesy of American Honda Motor Co., Inc.

## DTC 7-1 & 7-2: (3 OF 3) FRONT SOLENOID PRELUDE



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Fig. 31: Code 7-1 & 7-2 Flow Chart (3 Of 3), Front Solenoid

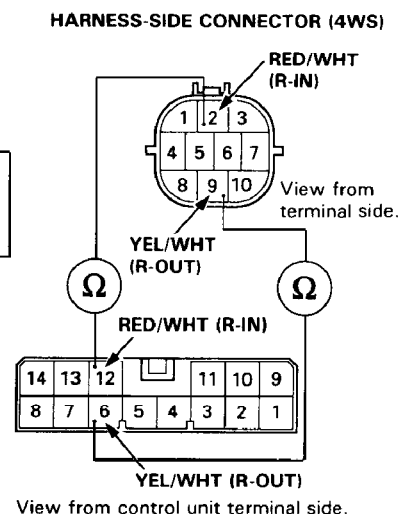
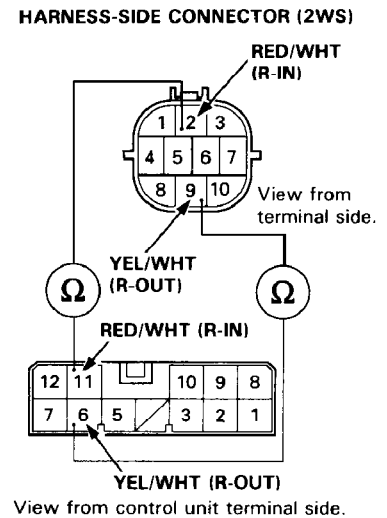
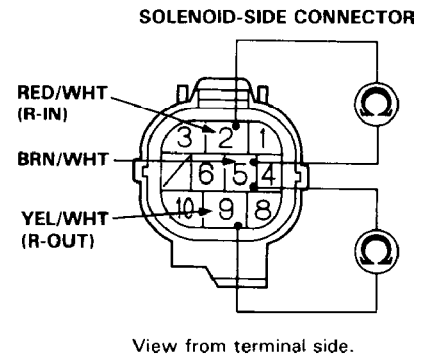
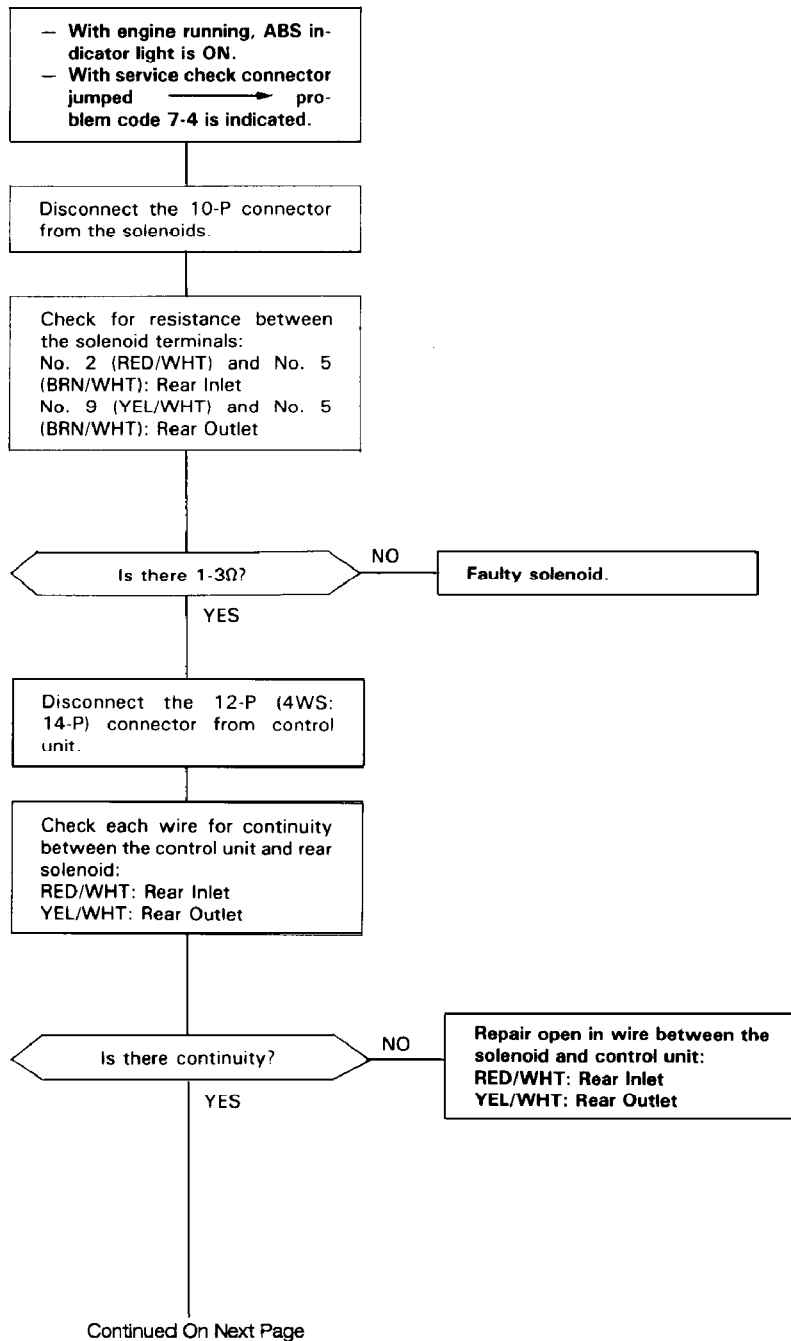
Courtesy of American Honda Motor Co., Inc.

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## CODE 7-4 REAR SOLENOID

### DTC 7-4: (1 OF 2) REAR SOLENOID PRELUDE

**CAUTION:** Use only the digital multimeter to check the system.



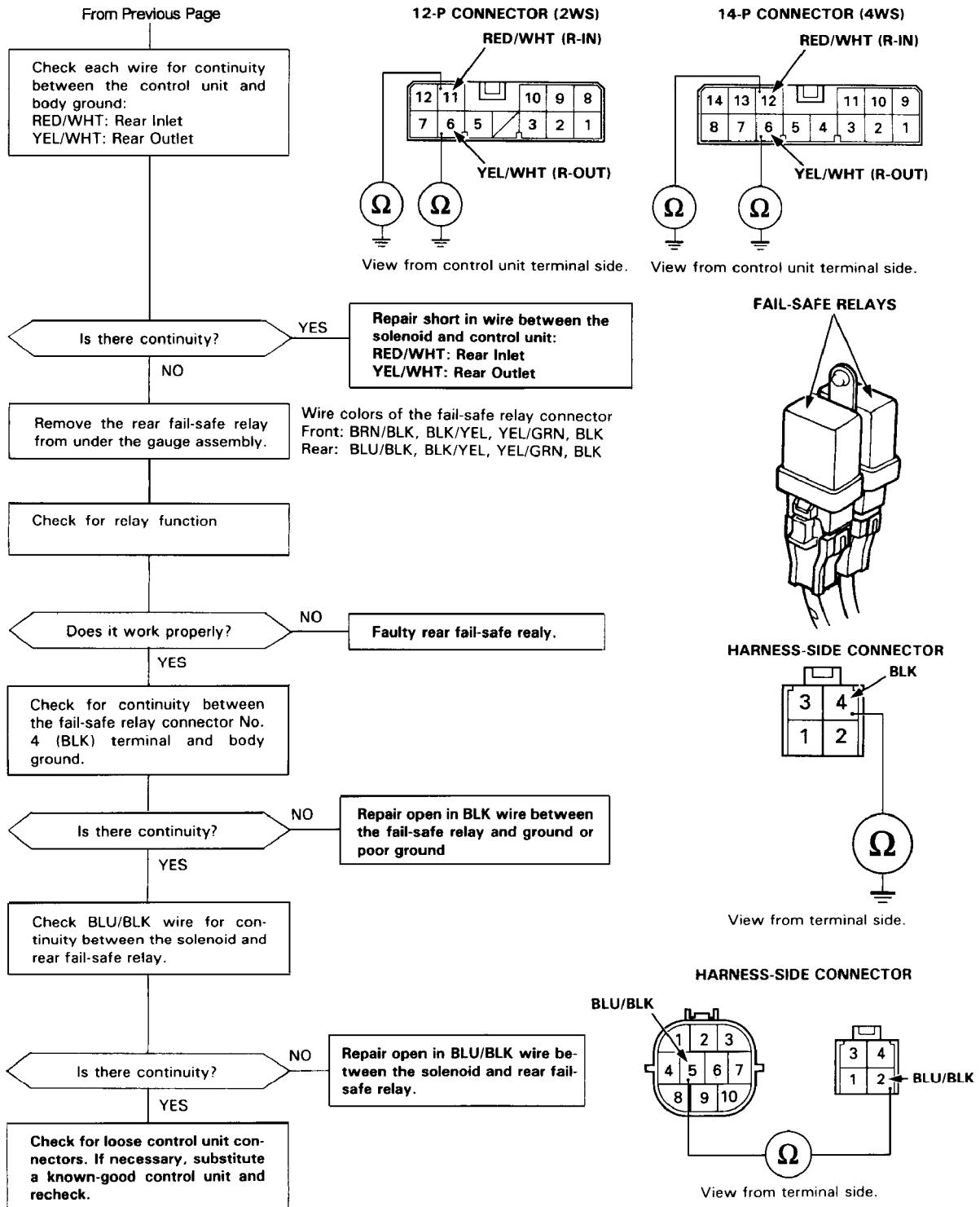
93H02074

**Fig. 32: Code 7-4 Flow Chart (1 Of 2), Rear Solenoid**

Courtesy of American Honda Motor Co., Inc.

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## DTC 7-4: (2 OF 2) REAR SOLENOID PRELUDE



93A02075

Fig. 33: Code 7-4 Flow Chart (2 Of 2), Rear Solenoid

Courtesy of American Honda Motor Co., Inc.

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## WIRING DIAGRAMS

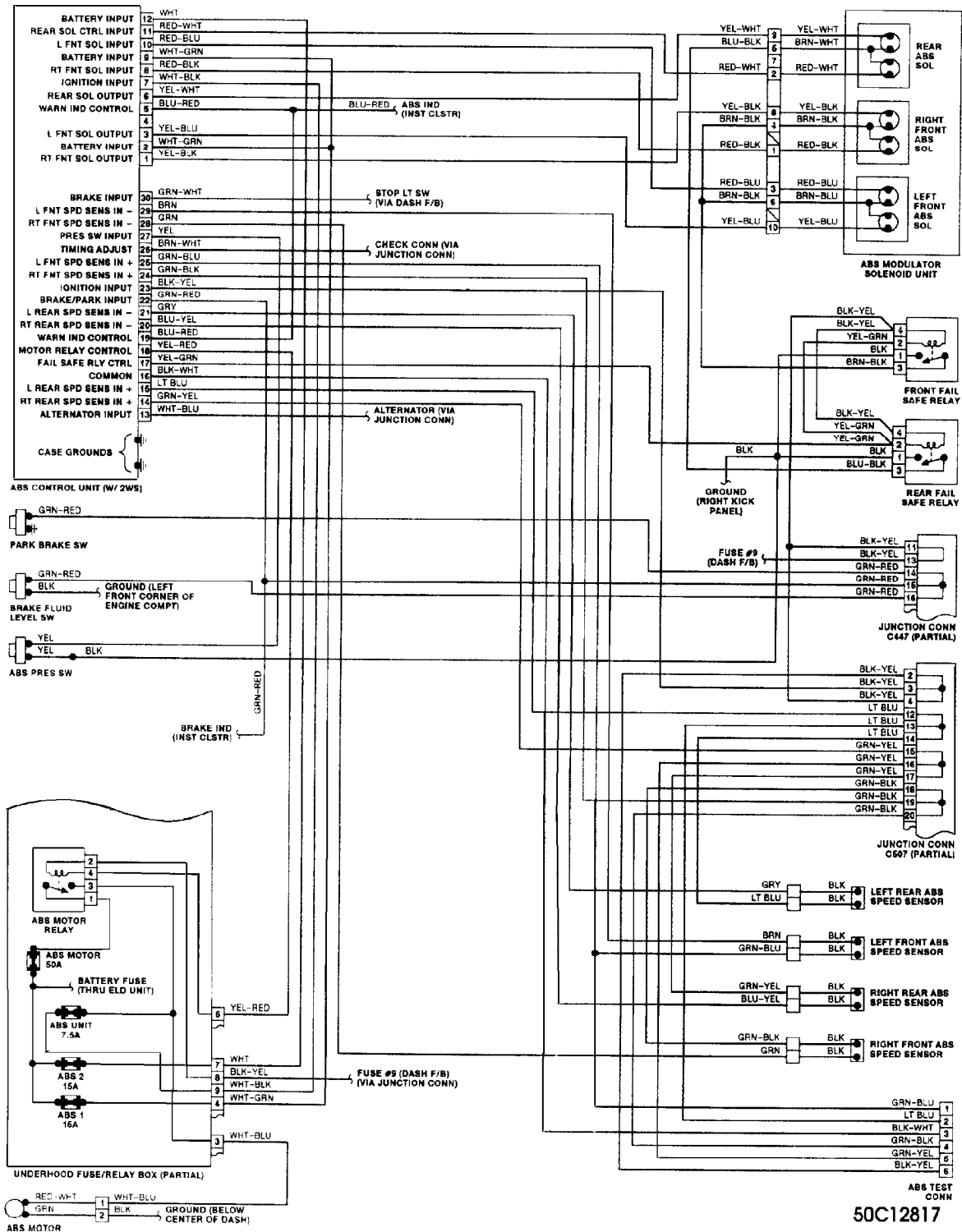


Fig. 34: Anti-Lock Brake System Wiring Diagram (Prelude 2WS)

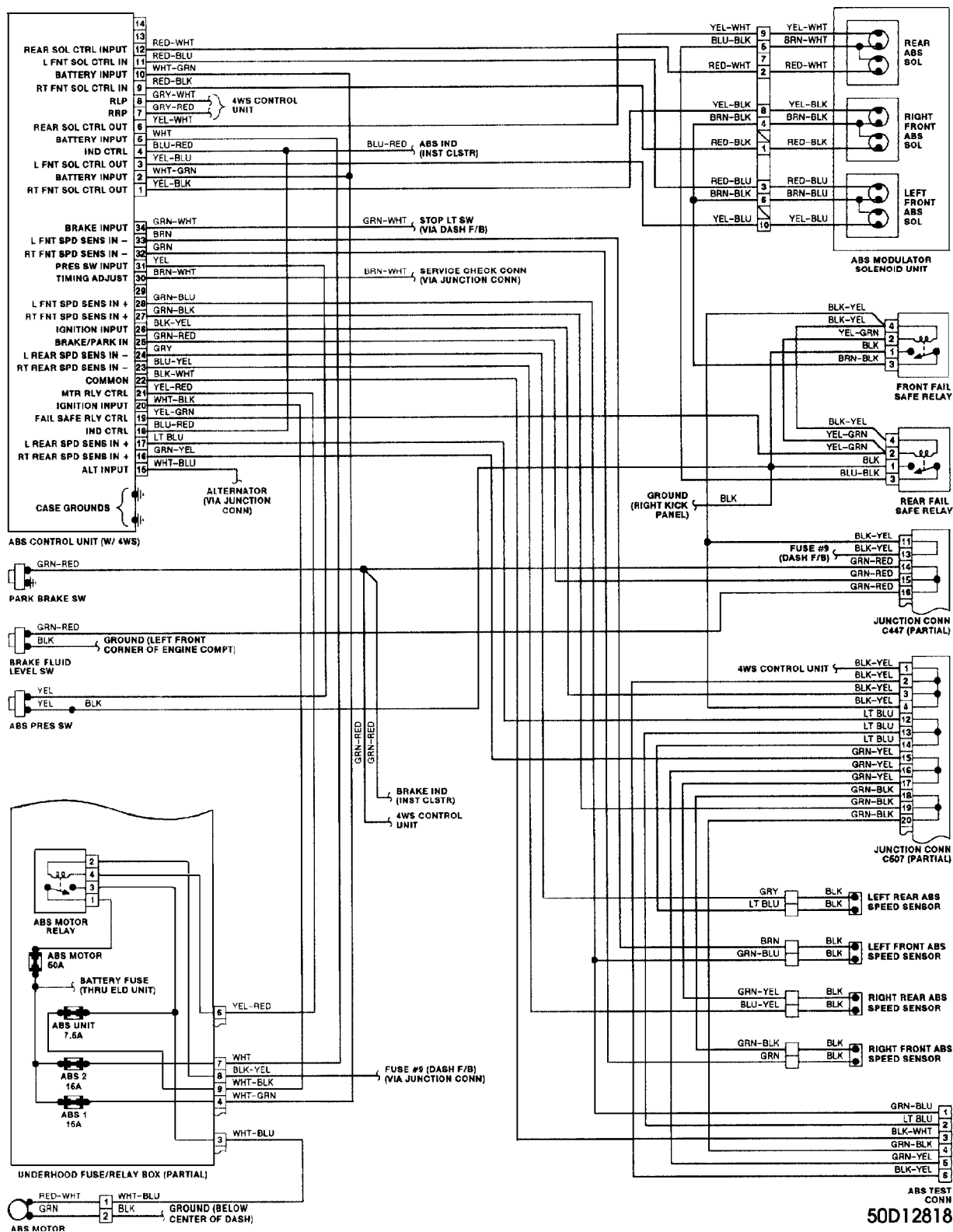


Fig. 35: Anti-Lock Brake System Wiring Diagram (Prelude 4WS)