

STEERING SYSTEM - 4-WHEEL

Article Text

1993 Honda Prelude

For Cadi Centre Nsk CA 95051

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Sunday, July 08, 2001 11:36AM

ARTICLE BEGINNING

1993 STEERING

Honda - 4-Wheel Steering

Prelude

DESCRIPTION & OPERATION

The 4-Wheel Steering system consists of a rack and pinion steering gear at the front and a steering actuator at the rear. These units are linked electronically through the 4WS control unit. Steering information is supplied to the 4WS control unit by the front main steering angle sensor, front sub (secondary) steering angle sensor and the vehicle speed sensor. The control unit determines the best angle to steer the rear wheels. See Figs. 1 and 2.

The rear wheels are steered by the actuator motor which moves a rack connected to rear steering knuckles by tie rods. Rear wheel steering angle is determined by the rear main steering angle sensor and the rear secondary steering angle sensor. The control unit adjusts rear wheel steering angles according to differences of sensed steering angle and targeted steering angle.

Vehicle speed, determined by speed sensor mounted on transaxle, is supplied to 4WS control unit. At low speed, electronically controlled 4WS steers rear wheels in reverse direction of front wheels. At high speed, rear wheels are steered in same direction as front wheels.

4WS system incorporates a fail-safe function. In the event of system failure, integral spring centering and a damping mechanism will slowly center the rear wheels. Rear wheels remain centered until problem is corrected. See SELF-DIAGNOSTICS.

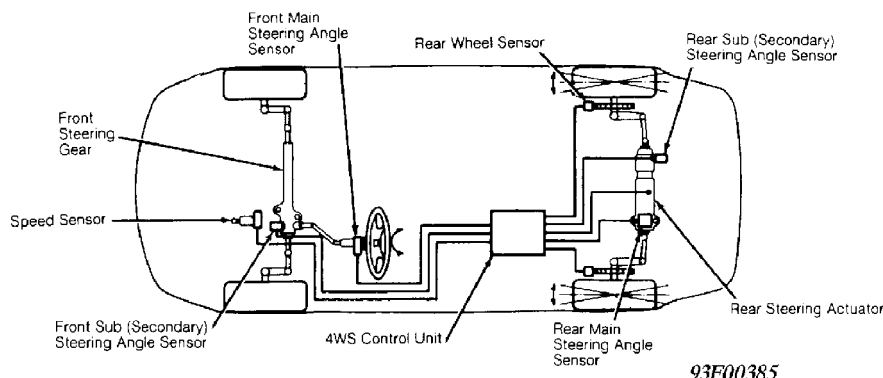


Fig. 1: Locating 4-Wheel Steering Components
Courtesy of American Honda Motor Co., Inc.

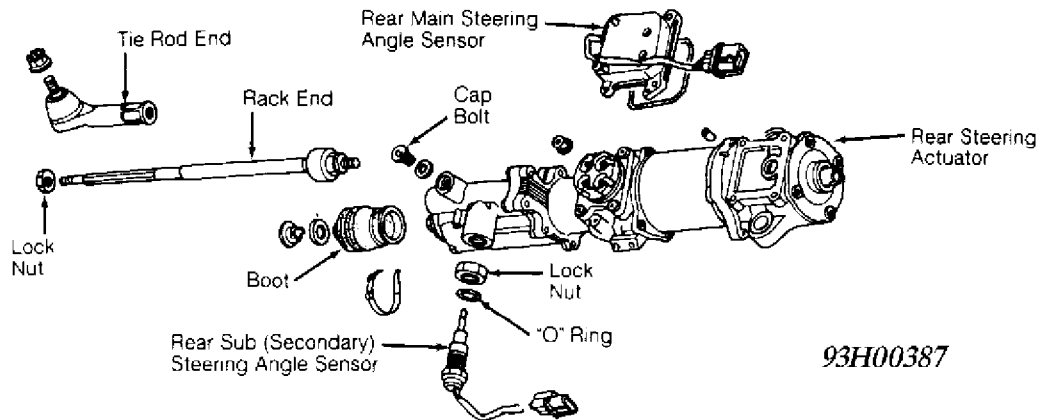


Fig. 2: Exploded View Of Rear Steering Actuator Assembly
Courtesy of American Honda Motor Co., Inc.

ADJUSTMENTS

CAUTION: All models are equipped with Supplemental Restraint System (SRS). SRS wiring harness is routed close to instrument cluster, steering wheel, and related components. All SRS wiring harnesses are covered by Yellow outer insulation. DO NOT use electrical test equipment on these circuits. Before working on steering column components, disable air bag system. See AIR BAG RESTRAINT SYSTEM article in the ACCESSORIES/SAFETY EQUIPMENT section.

MAIN STEERING ANGLE SENSOR

NOTE: If power to 4WS control unit was shut down for battery replacement, 4WS control unit removal, or removal and/or replacement of No. 43 (10-amp) fuse from dash fuse box, 4WS control must be reset. To reset 4WS control unit, start engine and turn steering wheel to right lock then to left lock.

Front

1) Raise vehicle and place wheels on turning radius gauge turn tables. Position wheels in straight-ahead position. Check steering wheel position. If steering wheel spoke is NOT horizontal when wheels are in straight-ahead position, remove steering wheel. See STEERING WHEEL & HORN PAD under REMOVAL & INSTALLATION in STEERING COLUMN article in the STEERING section.

2) Check yellow paint mark on front main steering angle sensor. Mark should be pointed down. See Fig. 3. This indicates sensor is in neutral position. If mark is not as specified, loosely install

and turn steering wheel until yellow paint mark is pointed down. Install steering wheel with spoke as nearly horizontal as possible. Tighten steering wheel nut to specification. See TORQUE SPECIFICATIONS TABLE. Check front wheel alignment. Adjust alignment as necessary. See WHEEL ALIGNMENT SPECIFICATIONS & PROCEDURES article in the WHEEL ALIGNMENT section.

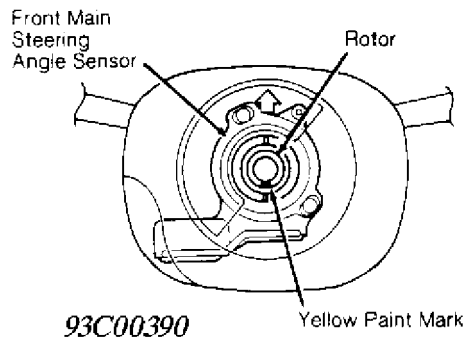


Fig. 3: Adjusting Front Main Steering Angle Sensor
Courtesy of American Honda Motor Co., Inc.

Rear

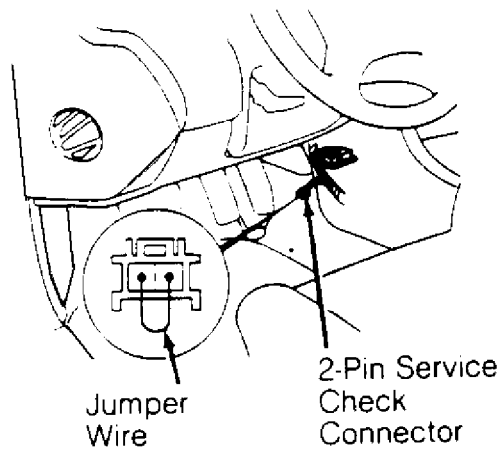
Rear main steering angle sensor is not adjustable. If test results are not within specification, remove sensor and inspect for wear or damage. If defective, replace sensor as a unit. See MAIN STEERING ANGLE SENSOR CHECK (REAR) under ANGLE SENSOR NEUTRAL TEST under TESTING.

SUB (SECONDARY) STEERING ANGLE SENSOR

Front

1) Ensure front main steering angle sensor is properly adjusted. See MAIN STEERING ANGLE SENSOR. Raise and support vehicle. Take 2-pin service connector (Blue wires) from behind center console. Connect terminals with jumper wire. See Fig. 4. 4WS indicator light will display problem codes. Record and verify problem codes before continuing with adjustments. See SELF-DIAGNOSTICS.

2) Turn ignition switch to ON position. Apply parking brake. Ensure parking brake light functions. Turn ignition switch to OFF position.

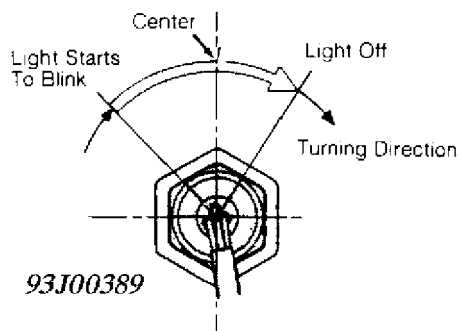


93B01873

Fig. 4: Locating Service Check Connector
Courtesy of American Honda Motor Co., Inc.

3) Secondary steering angle sensor is mounted on front steering gear. Remove cover from secondary steering angle sensor. Disconnect harness connector. Loosen sensor lock nut. Tighten lock nut by hand, then back it off about 3/4 turn. Connect harness connector. Turn ignition switch to ON position. Ensure steering wheel is in straight-ahead position. If main steering angle sensor is properly adjusted, 4WS indicator light will blink.

4) Slowly rotate secondary sensor clockwise to determine point where indicator light starts blinking and where it stops. See Fig. 5. Position secondary sensor in center of the range from where the indicator starts to blink to where it stops. Tighten secondary sensor lock nut to specification. See TORQUE SPECIFICATIONS TABLE. Ensure wire harness is not kinked. Install secondary sensor cover, and secure harness.



STEERING S

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Fig. 5: Adjusting Sub (Secondary) Steering Angle Sensor
Courtesy of American Honda Motor Co., Inc.

Rear

1) Raise and support vehicle. Set steering wheel in straight-ahead position. Ensure front main steering angle sensor is properly adjusted. See MAIN STEERING ANGLE SENSOR

2) Take 2-pin service connector (Blue wires) from behind center console. Connect terminals with jumper wire. See Fig. 4. 4WS indicator light will display problem codes. Record and verify problem codes before continuing with adjustments. See SELF-DIAGNOSTICS.

3) Release parking brake fully. Turn ignition switch to ON position. Ensure parking brake warning light is off. Turn ignition switch to OFF position.

CAUTION: DO NOT start engine with lock pin in actuator. Steering actuator will attempt to operate if wheel is turned while engine is running. Steering actuator damage will result. Set rear wheels in straight-ahead position to prevent damage if engine is started in error.

4) Remove rear actuator cover. Remove cap bolt and washer. Screw Locking Pin (07NAJ-SS00220A) into actuator as far as possible. Disconnect harness connector from rear secondary sensor. Loosen sensor lock nut. Tighten sensor fully by hand, then back it off about 1/2 turn. Connect harness connector.

5) Slowly rotate secondary angle sensor clockwise to determine point where indicator light starts blinking and where it stops. See Fig. 5. Position secondary angle sensor in center of the range from where the indicator starts to blink to where it stops. Tighten secondary angle sensor lock nut to specification. See TORQUE SPECIFICATIONS TABLE. Ensure wire harness is not kinked. Install secondary angle sensor cover and secure harness. Remove lock pin. Install cap bolt and washer. Remove jumper wire from service connector.

TESTING

ANGLE SENSOR NEUTRAL TEST

Preparation

1) Raise vehicle. Set each wheel in the center of turning radius gauge tables. Set wheels in straight-ahead position. Attach a piece of masking tape about 11.8" (300 mm) to top of steering wheel. Mark center line of steering wheel on tape. Add marks at appropriate measurement on both sides of center mark. See Fig. 6. Use heavy wire stock to make pointer. Attach pointer to dash aligned with center mark on steering wheel.

2) Take 2-pin service connector (Blue wires) from behind center console. Connect terminals with jumper wire. See Fig. 4. 4WS indicator light will display problem codes. Record and correct problem

codes before continuing with neutral check. See Figs. 7-10.

3) Apply parking brake and turn ignition switch to ON position. This will turn parking brake indicator light on and set front sensors in inspection mode.

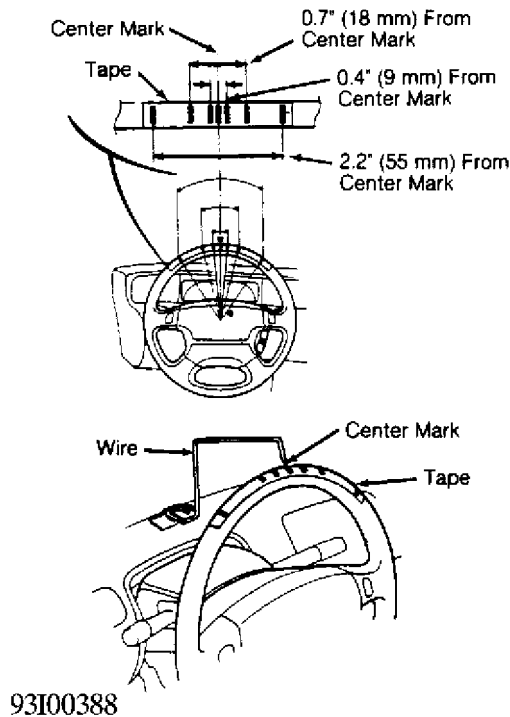


Fig. 6: Checking Steering Angle Sensor Centering
Courtesy of American Honda Motor Co., Inc.

Main Steering Angle Sensor Check (Front)

1) Turn ignition switch to ON position. Turn steering wheel slowly from center position to the left, then to the right past the center mark. Align center mark on steering wheel with pointer. Turn steering wheel slowly to the right, then to the left past the center mark. Repeat procedure several times until 4WS indicator light illumination point is positively identified. See STEERING ANGLE SENSOR TEST table.

NOTE: The 4WS indicator light may appear to blink near the point at which light comes on. To determine the point at which the indicator light is not blinking, the indicator light must remain on for more than 2 seconds.

2) The 4WS indicator light should come on within 0.4" (9 mm) on either side of center mark. If illumination point is not as specified, front main steering angle sensor must be adjusted. See MAIN STEERING

STEERING ANGLE SENSOR under ADJUSTMENTS.

Sub (Secondary) Steering Angle Sensor Check (Front)

1) Turn ignition switch to ON position (engine off). Turn steering wheel slowly from center position to the right, then to the left past the center mark. Align center mark on steering wheel with pointer. Turn steering wheel slowly to the left, then to the right past the center mark. Repeat procedure several times until center point of range where 4WS indicator light blinks is positively identified. See STEERING ANGLE SENSOR TEST table.

2) The 4WS indicator light should blink within 2.2" (55 mm) on either side of steering wheel center mark. If indicator light does not blink within the range specified, adjust front main steering angle sensor. See MAIN STEERING ANGLE SENSOR under ADJUSTMENTS. After adjustment, the center point should be within 0.7" (18 mm) on either side of steering wheel center mark.

Sub (Secondary) Steering Angle Sensor Check (Rear)

1) Release parking brake fully to set the rear sensors in inspection mode. Turn ignition switch to OFF position. Remove cap bolt and washer from rear steering actuator. Screw Lock Pin (07NAJ-SS0020A) into actuator as far as it will go.

CAUTION: DO NOT start engine with lock pin in actuator. Steering actuator will attempt to operate if wheel is turned while engine is running. Steering actuator damage will result. Set rear wheels in straight-ahead position to prevent damage if engine is started in error.

2) Turn ignition switch to ON position to check rear secondary steering angle sensor. Turn left rear wheel fully to the right by hand, then slowly turn wheel fully to the left. The 4WS indicator light should blink at intervals of 0.2 seconds when wheel is turned to the left. If indicator light does not blink, adjust rear secondary steering sensor. See SUB (SECONDARY) STEERING ANGLE SENSOR under ADJUSTMENTS.

Main Steering Angle Sensor Check (Rear)

1) Turn ignition switch to ON position to check rear main steering angle sensor. Turn left rear wheel fully to left by hand, then slowly turn wheel fully to the right. The 4WS indicator light should illuminate when wheel is turned to the right. If indicator light does not illuminate, remove rear main steering angle sensor and inspect for damage. If faulty, replace sensor.

NOTE: The 4WS indicator light may appear to blink near the point at which light comes on. To determine the point at which the indicator light is not blinking, the indicator light must

STEERI

remain on for more than 2 seconds.

2) Turn ignition to OFF position. Remove lock pin from rear steering actuator. Remove jumper wire from 2-pin service connector. Return service connector behind center console. Install any parts removed.

STEERING ANGLE SENSOR TEST TABLE

AA

Sensor	Turn Wheels (Direction)	1) 4WS Indicator Light Condition
Front Main Front (To Right)	... 2) On (Steady)
Front Secondary Front (Left) 3) Blinking
Rear Main Rear (Left) 4) Blinking
Rear Secondary Rear (Right) 4) Blinking

- (1) - Ensure parking brake indicator light operates properly before testing steering angle sensors.
- (2) - Pull up parking brake to set front sensors in inspection mode. The 4WS indicator light might appear to be blinking at a point near each end of the turning range.
- (3) - The 4WS indicator light should blink at 0.2 second intervals. When light is indicating front main sensor position, the secondary steering angle sensor indicating condition is canceled.
- (4) - Release parking brake to set rear sensors in inspection mode. Turn rear wheels slowly BY HAND with lock pin set in the rear actuator. Indicator light should blink at 0.2 second intervals.

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SPEED SENSOR

See STEERING WHEEL TURNING FORCE under TESTING in STEERING SYSTEM - POWER article in the STEERING section.

REMOVAL & INSTALLATION

REAR STEERING ACTUATOR

Removal & Installation

1) Raise and support rear of vehicle. Using a Torx T-40 bit, remove cap bolt from actuator. See Fig. 2. Install Lock Pin (07NAJ-SS0020A) in actuator.

CAUTION: DO NOT start engine with lock pin in actuator. Steering actuator will attempt to operate if wheel is turned while engine is running. Steering actuator damage will result.

2) Remove cotter pin and nut from tie rod end. Using Tie Rod End Remover (07MAC-SL00200), separate tie rod end from knuckle.

3) Remove steering actuator cover. Disconnect connectors and terminals from actuator. Remove actuator mounting bolts. Remove steering actuator. To install, reverse removal procedure. Adjust rear sub steering angle sensor. See SUB (SECONDARY) STEERING ANGLE SENSOR under ADJUSTMENTS.

4WS CONTROL UNIT

Removal & Installation

Ensure ignition switch is in OFF position. Remove rear seat back. Disconnect harness connectors. Loosen terminal nuts and disconnect wires from control unit. Remove mounting screws. Remove control unit. To install, reverse removal procedure.

MAIN STEERING ANGLE SENSOR

WARNING: Before performing ANY repairs on steering column or column components, Supplemental Restraint System (SRS) MUST be disabled. See DISABLING & ACTIVATING AIR BAG SYSTEM in STEERING COLUMN article in the STEERING section. Accidental air bag deployment could cause serious bodily injury.

Removal & Installation (Front)

Remove steering wheel and combination switch. See STEERING COLUMN article in the STEERING section. Remove harness connector from front main steering angle sensor. Slide sensor off steering shaft. To install, reverse removal procedure.

Removal & Installation (Rear)

Disconnect harness connector. Loosen terminal nuts and disconnect wires from sensor. Remove sensor retaining screws. Remove sensor. Cover sensor port to prevent contamination. Inspect sensor for dirt or rust contamination. Clean as necessary. Coat NEW "O" ring with grease and install in sensor groove. To complete installation, reverse removal procedure.

SUB (SECONDARY) STEERING ANGLE SENSOR

Removal & Installation

Disconnect harness connector. Remove sensor cover screws and sensor cover. Loosen secondary sensor lock nut. Remove sensor and lock nut. To install, grease NEW "O" ring and install in sensor port. Screw

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lock nut on secondary sensor. Screw secondary sensor into sensor port. Adjust sensor as necessary. See SUB (SECONDARY) STEERING ANGLE SENSOR under ADJUSTMENTS.

SPEED SENSOR

Removal

Remove speed sensor mounting bracket stay. Unplug harness connector. Remove speed sensor mounting bolt, and pull speed sensor from transmission housing. Disconnect and plug speed sensor hoses and plug fittings.

Installation

To install, reverse removal procedure. After installing sensor, turn steering wheel from lock to lock several times with engine idling to bleed air from system. Check for leaks.

OVERHAUL

REAR STEERING ACTUATOR

NOTE: Overhaul procedure not available from manufacturer.

TORQUE SPECIFICATIONS

TORQUE SPECIFICATIONS TABLE

AA
Application Ft. Lbs. (N.m)

Actuator Rack End-To-Rack	41 (55)
Rear Steering Actuator Bracket Bolts	29 (39)
Rear Steering Actuator Cap Bolt	16 (22)
Rear Steering Actuator Mounting Bolts	32 (44)
Steering Angle Sub	
(Secondary) Sensor Lock Nut	18 (25)
Steering Wheel Nut	37 (50)
Tie Rod End Nuts	37-44 (50-60)
Tie Rod End Lock Nut	33 (45)

INCH Lbs. (N.m)

Rear Main Angle Sensor Bolts	89 (10)
4WS Control Unit Wire Terminal Nuts	71 (8)
AA	

SELF-DIAGNOSTICS

NOTE: Fail-safe function will activate when failure is detected in 4WS system. Rear wheels will be slowly centered, and will remain centered until problem(s) is corrected and codes are cleared.

RETRIEVING PROBLEM CODES

NOTE: The 4WS control unit may store 10 codes each in its main and secondary CPUs. Codes from the main CPU will be displayed first, followed by a 1.6 second pause and 3 seconds of rapid blinking. The codes stored in the secondary CPU will then be displayed. The cycle will repeat until ignition is turned off.

The 4WS indicator light will illuminate whenever a fault is sensed in system. Problem codes are stored in 4WS control unit even if condition is temporary. To retrieve problem codes, pull 2-pin service connector (Blue wires) from behind center console. Connect terminals with jumper wire. See Fig. 4. 4WS indicator light will display problem codes. Record codes and address them in numerical order. The 4WS indicator light will NOT come on when Code 71, 72 or 73 is set. Indicator light will flash these codes, if stored, when code retrieval function is activated. See Figs. 7-10.

CLEARING PROBLEM CODES

Problem codes may be cleared from system memory by removing clock/radio fuse No. 43 (10-amp), disconnecting 4WS control unit harness connector or by disconnecting battery.

STEERING S

PROBLEM CODE	FAIL-SAFE (F/S) ITEM			AFFECTED													ACTION	
	SYSTEM	POINT	4WS CONTROL UNIT TERMINAL NUMBER	FRONT SUB STEERING ANGLE SENSOR	REAR SUB STEERING ANGLE SENSOR	FRONT MAIN STEERING ANGLE SENSOR	REAR MAIN STEERING ANGLE SENSOR	FRONT WHEEL SPEED SENSOR	*REAR LEFT WHEEL SPEED SENSOR	*REAR RIGHT WHEEL SPEED SENSOR	ABS CONTROL UNIT	4WS CONTROL UNIT	REAR ACTUATOR MOTOR	POWER SYSTEM HARNESS	ALTERNATOR	PARKING BRAKE		HARNESS CONNECTOR
No code	—	—	7 + 23									○					○	1
No code	—	—	18 25 4 2 18 + 24									○			○		○	1
10	SUB STEERING ANGLE SENSOR	FRONT	22 28	○								○					○	1
11		REAR	29 17		○							○					○	1
12		FRONT	26 21	○								○					○	1
13		REAR	17 28		○							○					○	1
14		FRONT	—									○						Replace 4WS control unit
15		REAR	—									○						Replace 4WS control unit
16		FRONT	22 26 21	○								○					○	1
17		REAR	29 17 28		○							○					○	1
18		—	—									○						Replace 4WS control unit

1 - Go to SELF-DIAGNOSTIC FLOW CHARTS.

93D01874

Fig. 7: Identifying 4WS Problem Codes (1 Of 4)
Courtesy of American Honda Motor Co., Inc.

PROBLEM CODE	FAIL-SAFE (F/S) ITEM			AFFECTED														ACTION
	SYSTEM	POINT	4WS CONTROL UNIT TERMINAL NUMBER	FRONT SUB STEERING ANGLE SENSOR	REAR SUB STEERING ANGLE SENSOR	FRONT MAIN STEERING ANGLE SENSOR	REAR MAIN STEERING ANGLE SENSOR	FRONT WHEEL SPEED SENSOR	*REAR LEFT WHEEL SPEED SENSOR	*REAR RIGHT WHEEL SPEED SENSOR	ABS CONTROL UNIT	4WS CONTROL UNIT	REAR ACTUATOR MOTOR	POWER SYSTEM HARNESS	ALTERNATOR	PARKING BRAKE	HARNESS CONNECTOR	
20	MAIN STEERING ANGLE SENSOR	FRONT	8 15	○		○						○					○	1
21		REAR	6 13		○		○					○					○	1
22		FRONT	8 15	○		○						○					○	1
23		REAR	6 13		○		○					○					○	1
24		FRONT	8 15	○		○						○					○	1
25		REAR	6 13		○		○					○					○	1
26		FRONT	—									○						Replace 4WS control unit
27		REAR	—									○						Replace 4WS control unit
28		FRONT	12	○		○						○					○	1
29		REAR	20		○		○					○					○	1
30	WHEEL SPEED	FRONT	19					○				○					○	1
31		REAR L	3						○		○	○					○	1
32		REAR R	1							○	○	○					○	1

1 - Go to SELF-DIAGNOSTIC FLOW CHARTS.
93G01875

PROBLEM CODE	FAIL-SAFE (F/S) ITEM			AFFECTED													ACTION		
	SYSTEM	POINT	4WS CONTROL UNIT TERMINAL NUMBER	FRONT SUB STEERING ANGLE SENSOR	REAR SUB STEERING ANGLE SENSOR	FRONT MAIN STEERING ANGLE SENSOR	REAR MAIN STEERING ANGLE SENSOR	FRONT WHEEL SPEED SENSOR	* REAR LEFT WHEEL SPEED SENSOR	* REAR RIGHT WHEEL SPEED SENSOR	ABS CONTROL UNIT	4WS CONTROL UNIT	REAR ACTUATOR MOTOR	POWER SYSTEM HARNESS	ALTERNATOR	PARKING BRAKE		HARNESS CONNECTOR	
33	WHEEL SPEED	REAR R/L	3 1								○	○					○	1	
34		FRONT	19					○				○					○	1	
35		REAR L	3						○		○	○						1	
36		REAR R	1							○	○	○						○	1
37		REAR L	—										○						Replace 4WS control unit
38		VEHICLE SPEED	—										○						Replace 4WS control unit
40	4WS CONTROL UNIT	4WS CONTROL UNIT	—									○						Replace 4WS control unit	
41		4WS CONTROL UNIT	—									○						Replace 4WS control unit	
42		4WS CONTROL UNIT	—									○						Replace 4WS control unit	
43		4WS CONTROL UNIT	—									○						Replace 4WS control unit	
44		4WS CONTROL UNIT	—									○						Replace 4WS control unit	
45		4WS CONTROL UNIT	—									○						Replace 4WS control unit	
46		4WS CONTROL UNIT	—									○						Replace 4WS control unit	
50	CONTROL LOGIC	Motor lock	C + D -									○	○				○	1	
51		Wheel caught in ditch; Motor malfunction	C + D -										○	○				○	1

1 - Go to SELF-DIAGNOSTIC FLOW CHARTS.
93101876

Fig. 9: Identifying 4WS Problem Codes (3 Of 4)
Courtesy of American Honda Motor Co., Inc.

PROBLEM CODE	FAIL-SAFE (F/S) ITEM			AFFECTED														ACTION	
	SYSTEM	POINT	4WS CONTROL UNIT TERMINAL NUMBER	FRONT SUB STEERING ANGLE SENSOR	REAR SUB STEERING ANGLE SENSOR	FRONT MAIN STEERING ANGLE SENSOR	REAR MAIN STEERING ANGLE SENSOR	FRONT WHEEL SPEED SENSOR	*REAR LEFT WHEEL SPEED SENSOR	*REAR RIGHT WHEEL SPEED SENSOR	ABS CONTROL UNIT	4WS CONTROL UNIT	REAR ACTUATOR MOTOR	POWER SYSTEM HARNESS	ALTERNATOR	PARKING BRAKE	HARNESS CONNECTOR		
60	POWER UNIT	MOTOR	C+•0- 33+•34-									○	○	○			○	1	
61			C+•0-									○	○	○			○	1	
62		Motor	33+•34-										○	○	○			○	1
63													○	○	○			○	1
64		4WS CONTROL UNIT	—										○						Replace 4WS control unit
65		4WS CONTROL UNIT	—										○						Replace 4WS control unit
70	TEMPORARY DRIVING CONDITIONS	—	25									○					○	Ask customer for symptoms, conditions	
71		—	—									○						Ask customer for symptoms, conditions	
72		—	4										○				○	Ask customer for symptoms, conditions	
73		—											○		○			Ask customer for symptoms, conditions	
74		—	14									○				○	○	Ask customer for symptoms, conditions	

1 - Go to SELF-DIAGNOSTIC FLOW CHARTS.

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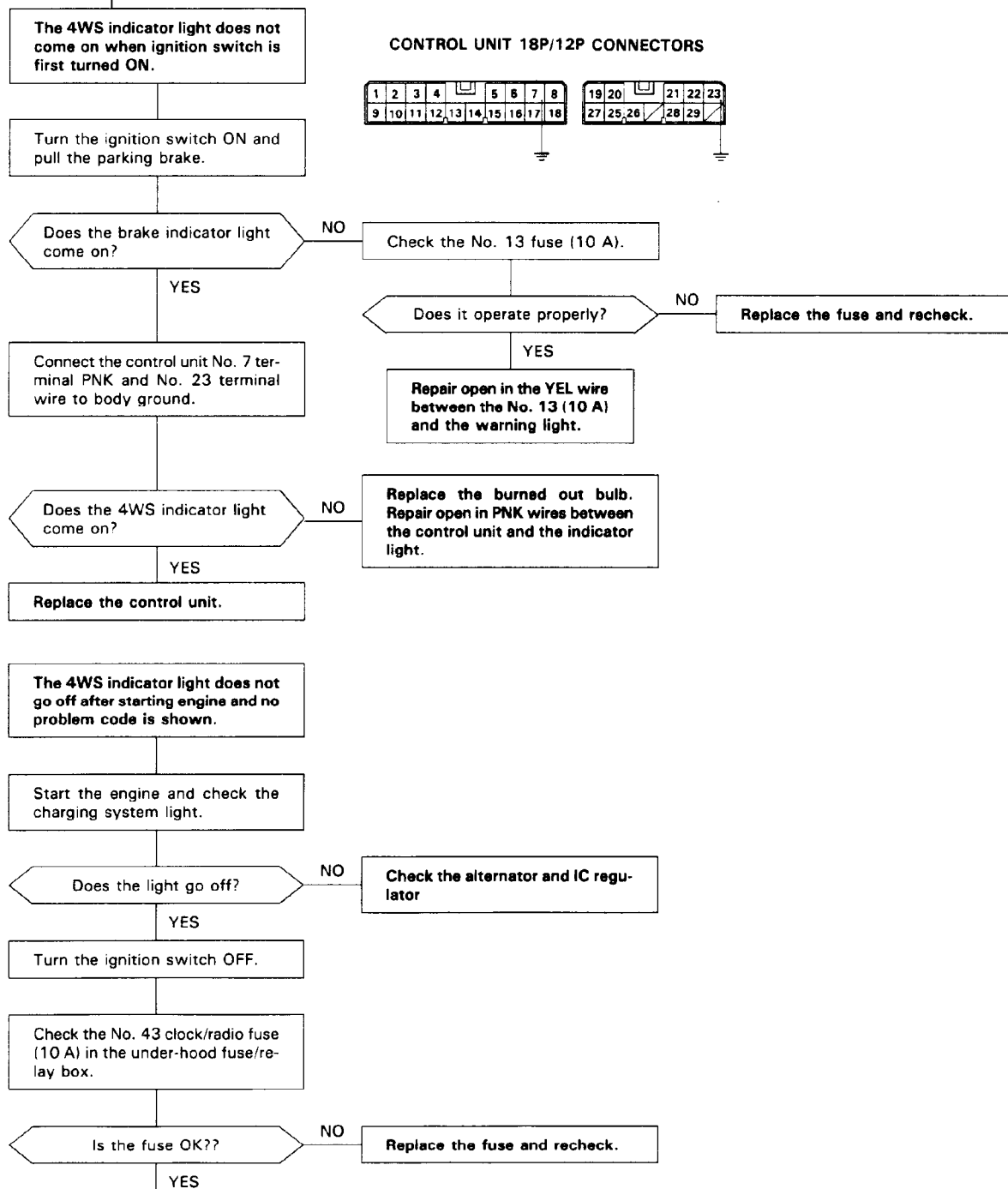
Fig. 10: Identifying 4WS Problem Codes (4 Of 4)

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SELF-DIAGNOSTIC FLOW CHARTS

4WS INDICATOR LIGHT CIRCUIT

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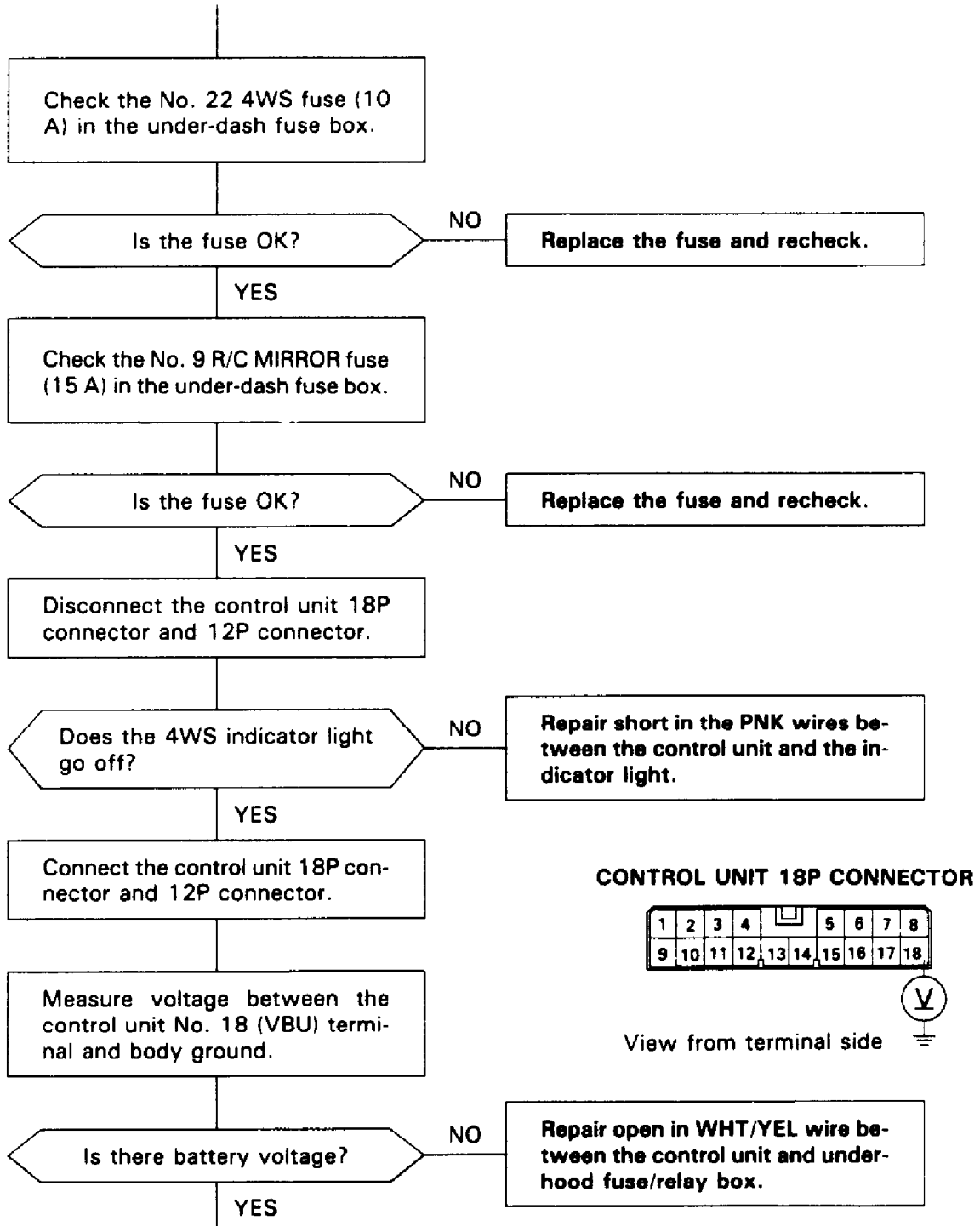
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Fig. 11: 4WS Indicator Light Circuit (1 Of 3)

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CONTROL UNIT 18P CONNECTOR

1	2	3	4			5	6	7	8
9	10	11	12	13	14	15	16	17	18



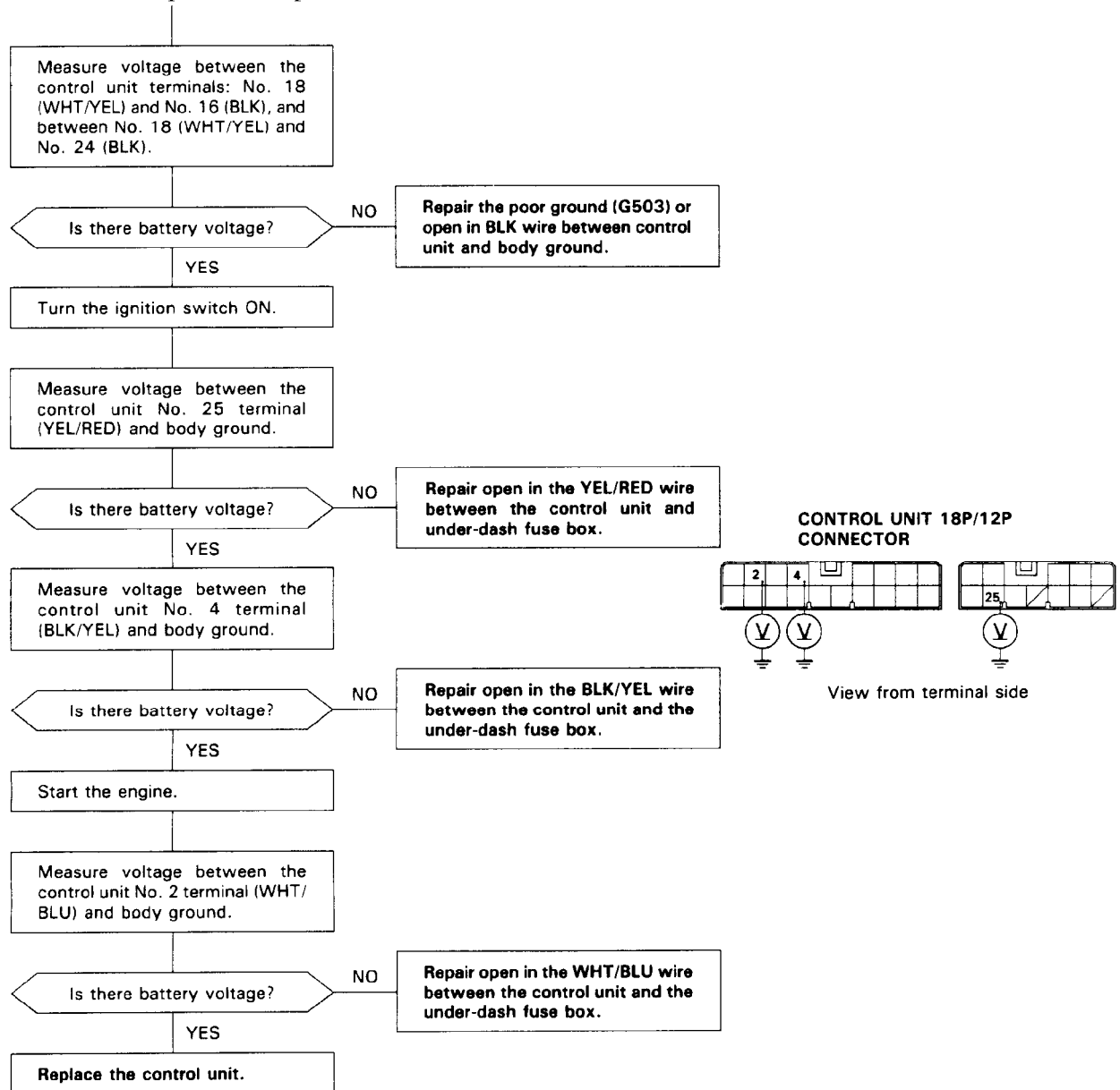
View from terminal side

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Fig. 12: 4WS Indicator Light Circuit (2 Of 3)

Courtesy of American Honda Motor Co., Inc.

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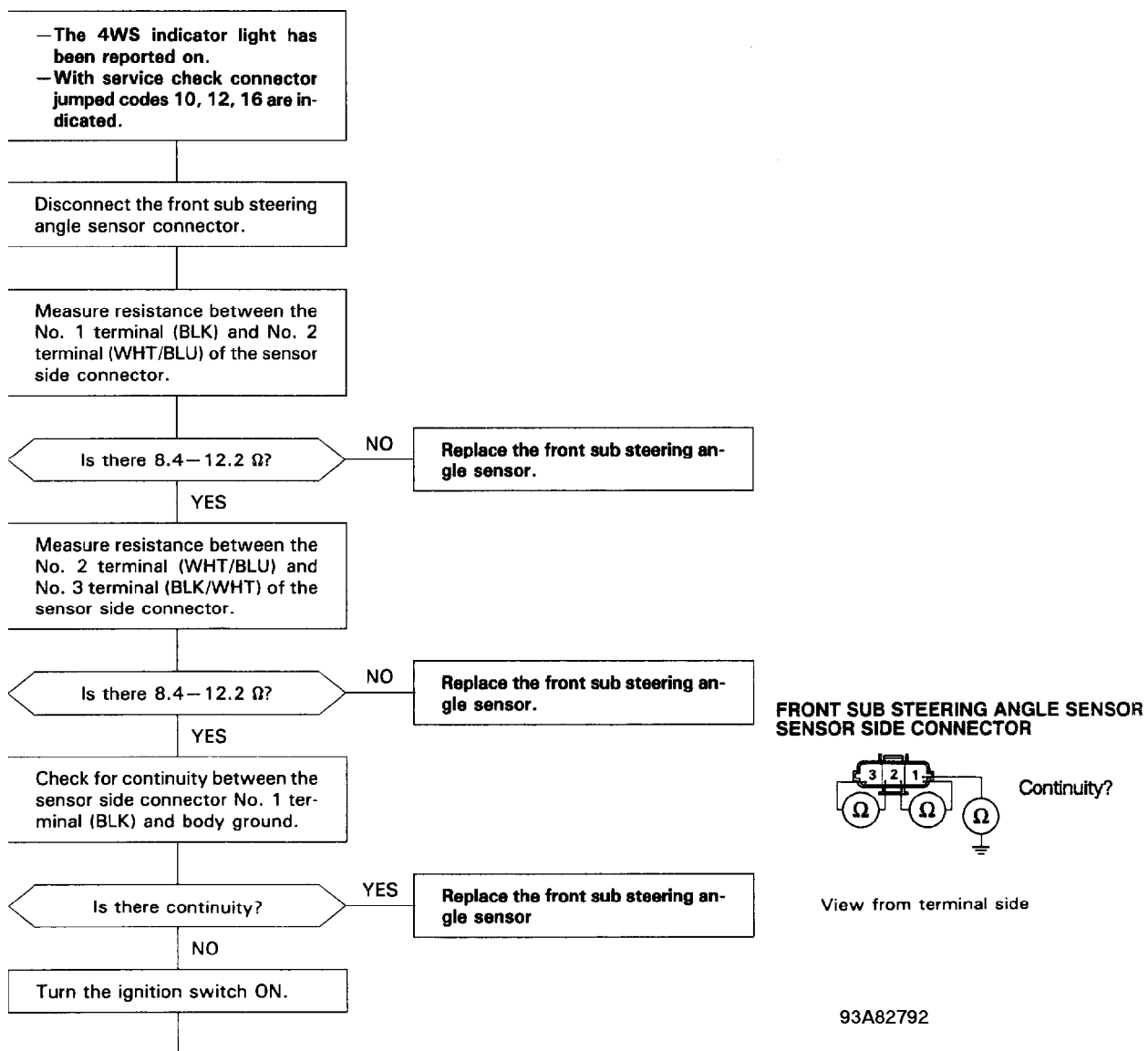


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Fig. 13: 4WS Indicator Light Circuit (3 Of 3)

Courtesy of American Honda Motor Co., Inc.

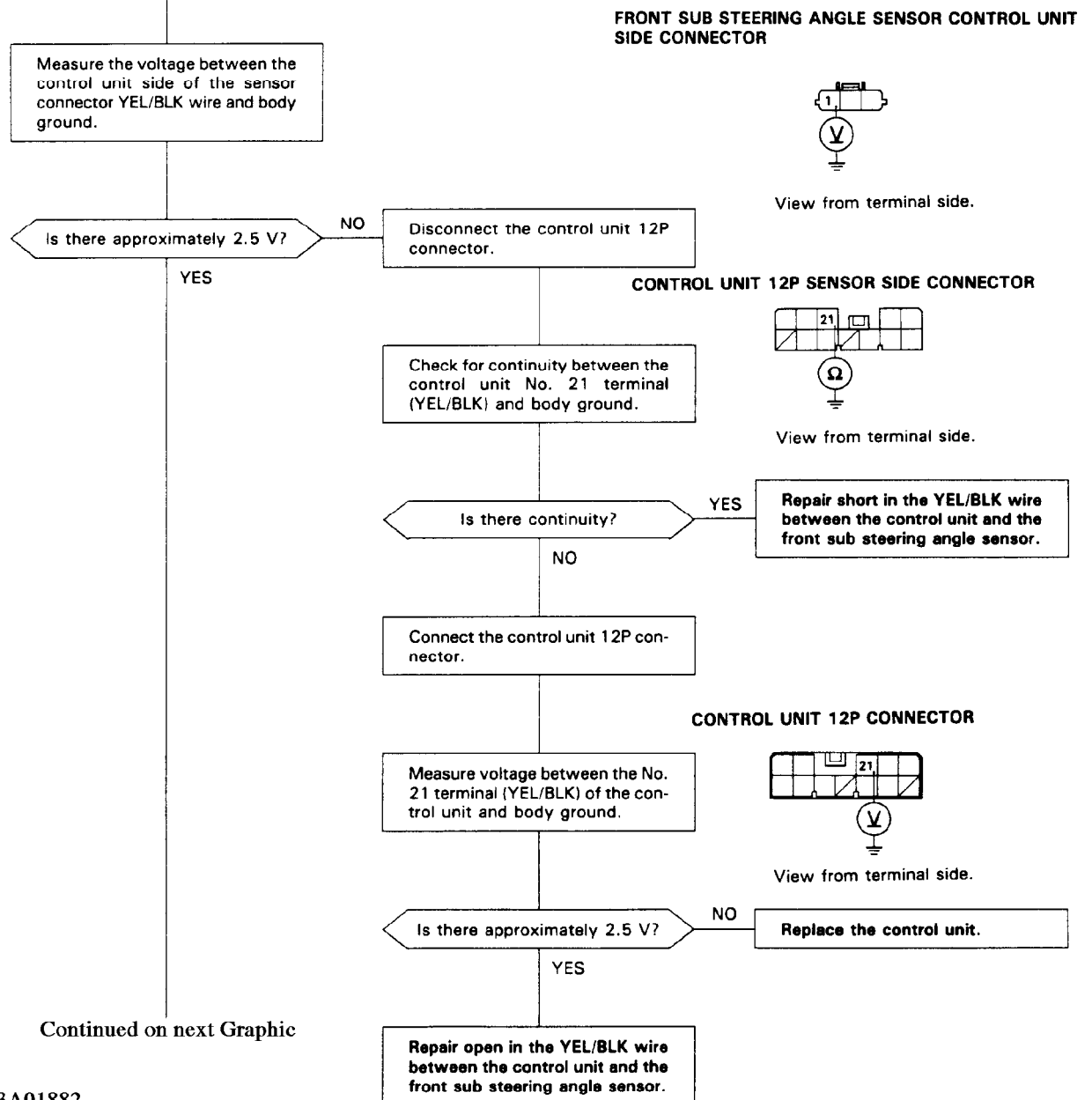
PROBLEM CODE 10, 12, 16



Continued On Next Page

Fig. 14: Problem Code 10, 12, 16 (1 Of 5)
Courtesy of American Honda Motor Co., Inc.

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STEERING S

93A01882

Fig. 15: Problem Code 10, 12, 16 (2 Of 5)
Courtesy of American Honda Motor Co., Inc.

Continued From Previous Page

Measure the voltage between the 4WS control unit side of the sensor connector No. 2 terminal (YEL/GRN) and body ground.

Is there approximately 1.25 V?

NO

Disconnect the 4WS control unit 12P connector.

Check for continuity between the 4WS control unit No. 26 terminal (YEL/GRN) and body ground.

Is there continuity?

YES

Repair short in the YEL/GRN wire between the 4WS control unit and the sub steering angle sensor.

NO

Connect the 4WS control unit 12P connector.

Measure voltage between the 4WS control unit No. 26 terminal (YEL/GRN) and body ground.

Is there approximately 1.25 V?

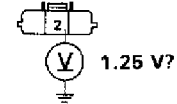
NO

Replace the 4WS control unit.

YES

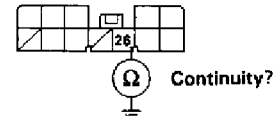
Repair open in the YEL/GRN wire between the 4WS control unit and the front sub steering angle sensor.

FRONT SUB STEERING ANGLE SENSOR 4WS CONTROL UNIT SIDE CONNECTOR



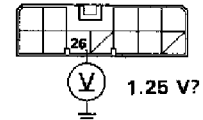
View from terminal side.

4WS CONTROL UNIT 12P SENSOR SIDE CONNECTOR



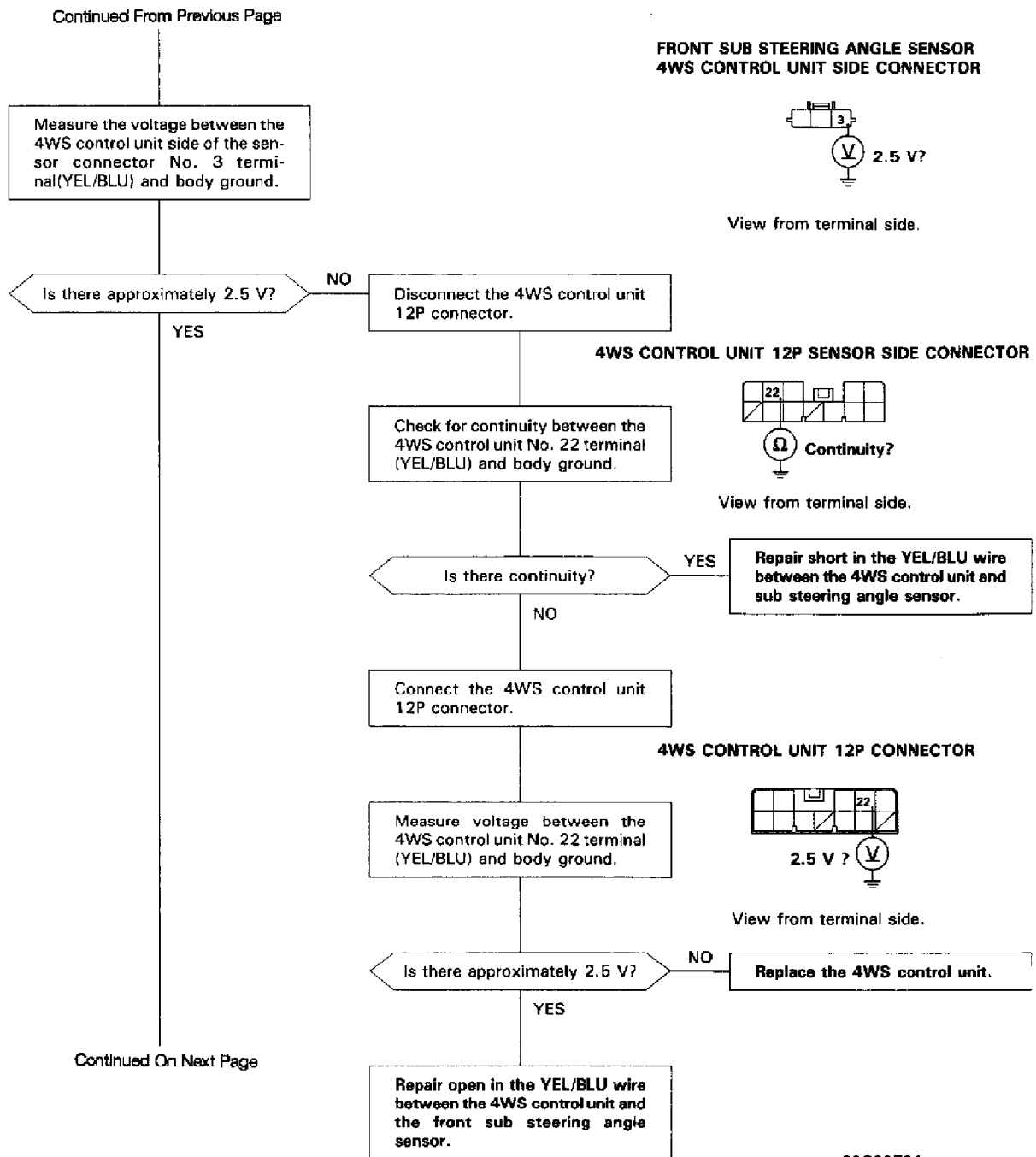
View from terminal side.

4WS CONTROL UNIT 12P CONNECTOR



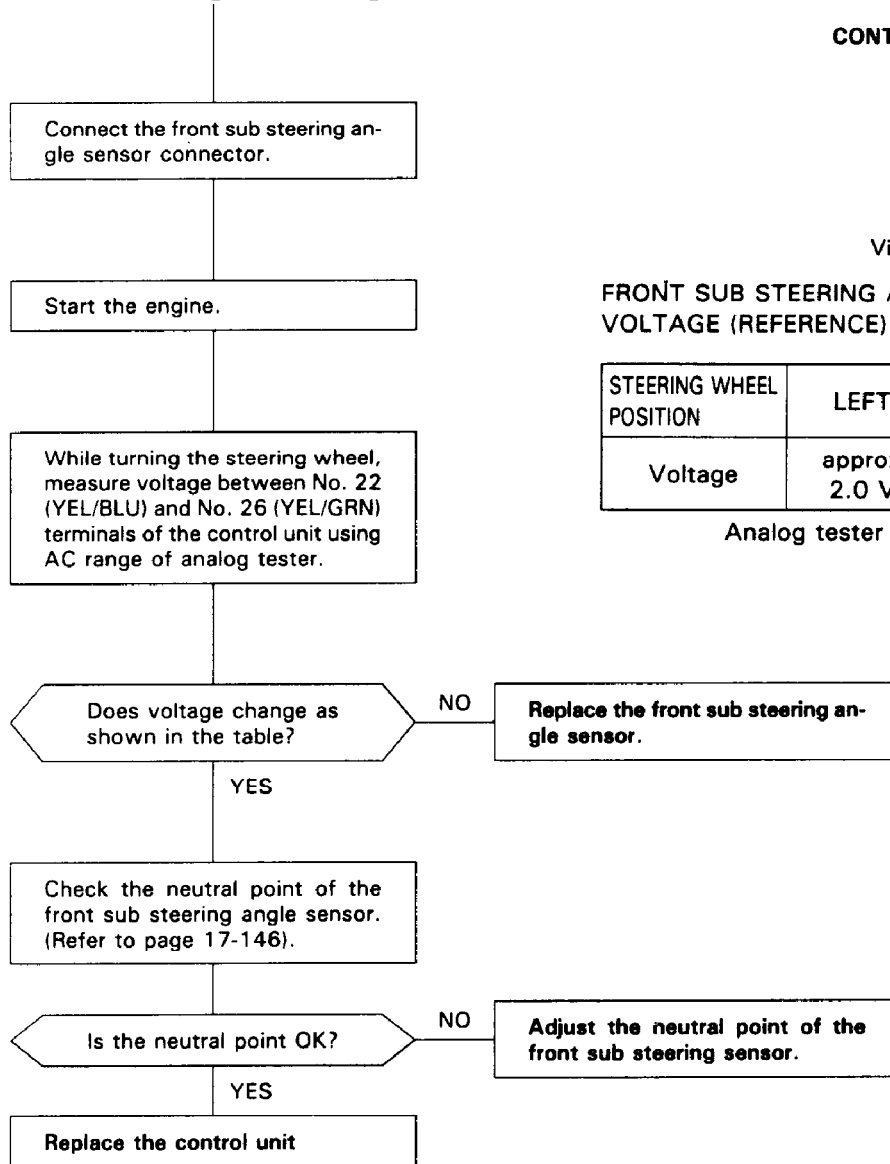
View from terminal side.

Continued On Next Page

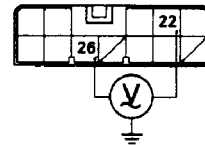


93C82794

Continued from previous Graphic



CONTROL UNIT 12P CONNECTOR



View from terminal side.

FRONT SUB STEERING ANGLE SENSOR TERMINAL VOLTAGE (REFERENCE)

STEERING WHEEL POSITION	LEFT	CENTER	RIGHT
Voltage	approx 2.0 V	approx 2.5 V	approx 3.0 V

Analog tester

AC range

93H01885

Fig. 18: Problem Code 10, 12, 16 (5 Of 5)
Courtesy of American Honda Motor Co., Inc.

PROBLEM CODE 11, 13, 17

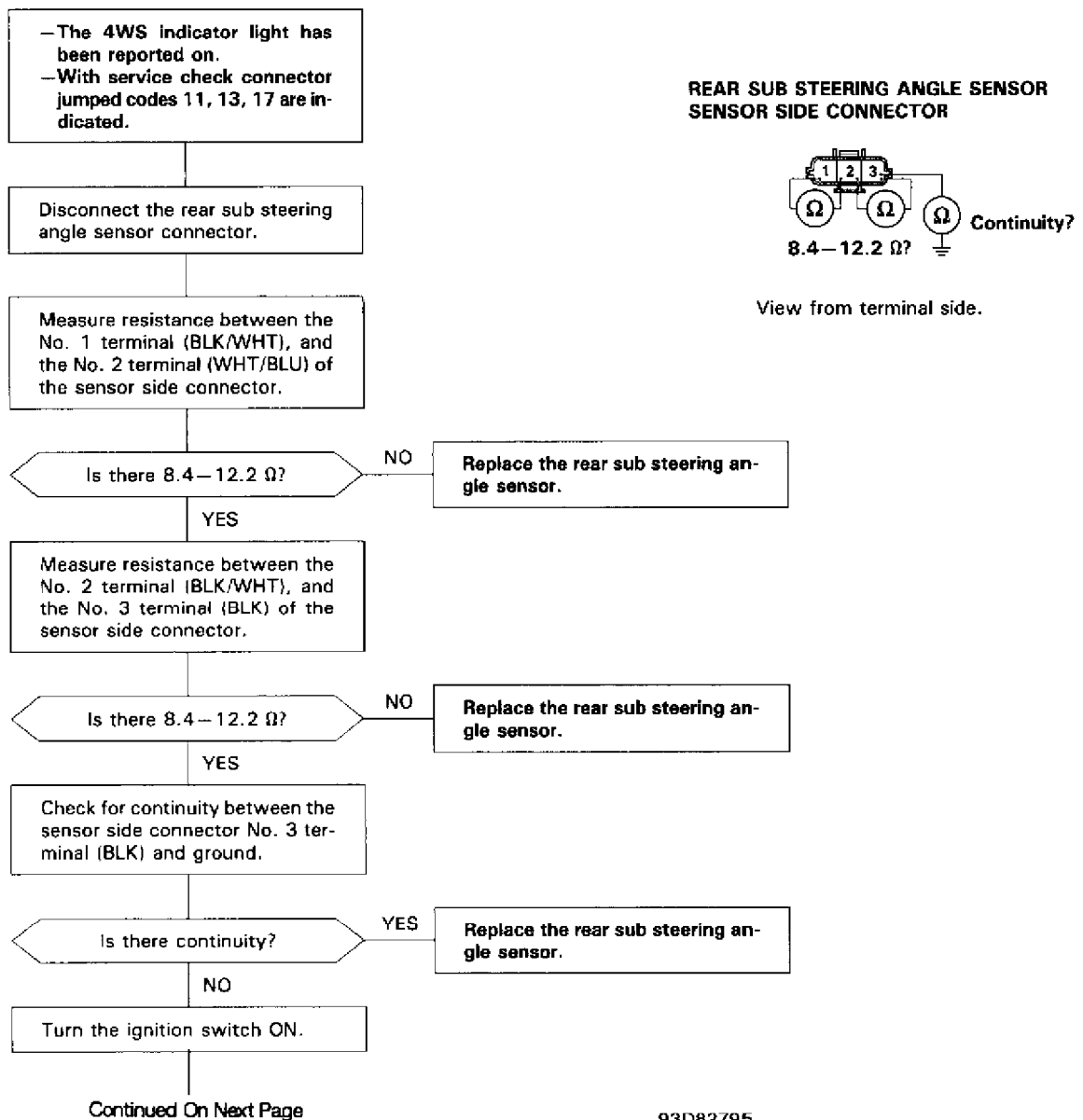
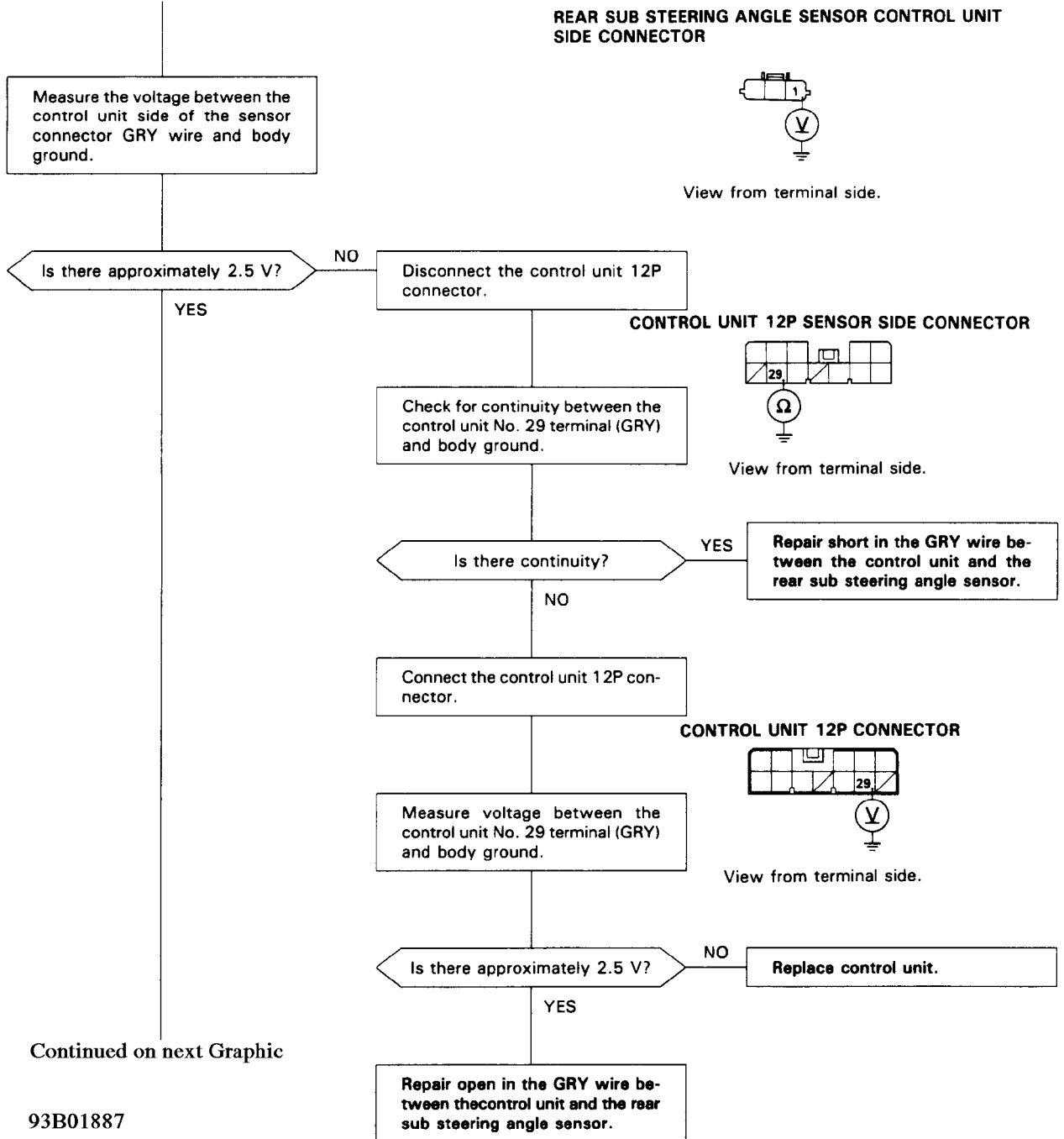


Fig. 19: Problem Code 11, 13, 17 (1 Of 5)
Courtesy of American Honda Motor Co., Inc.

Continued from previous Graphic

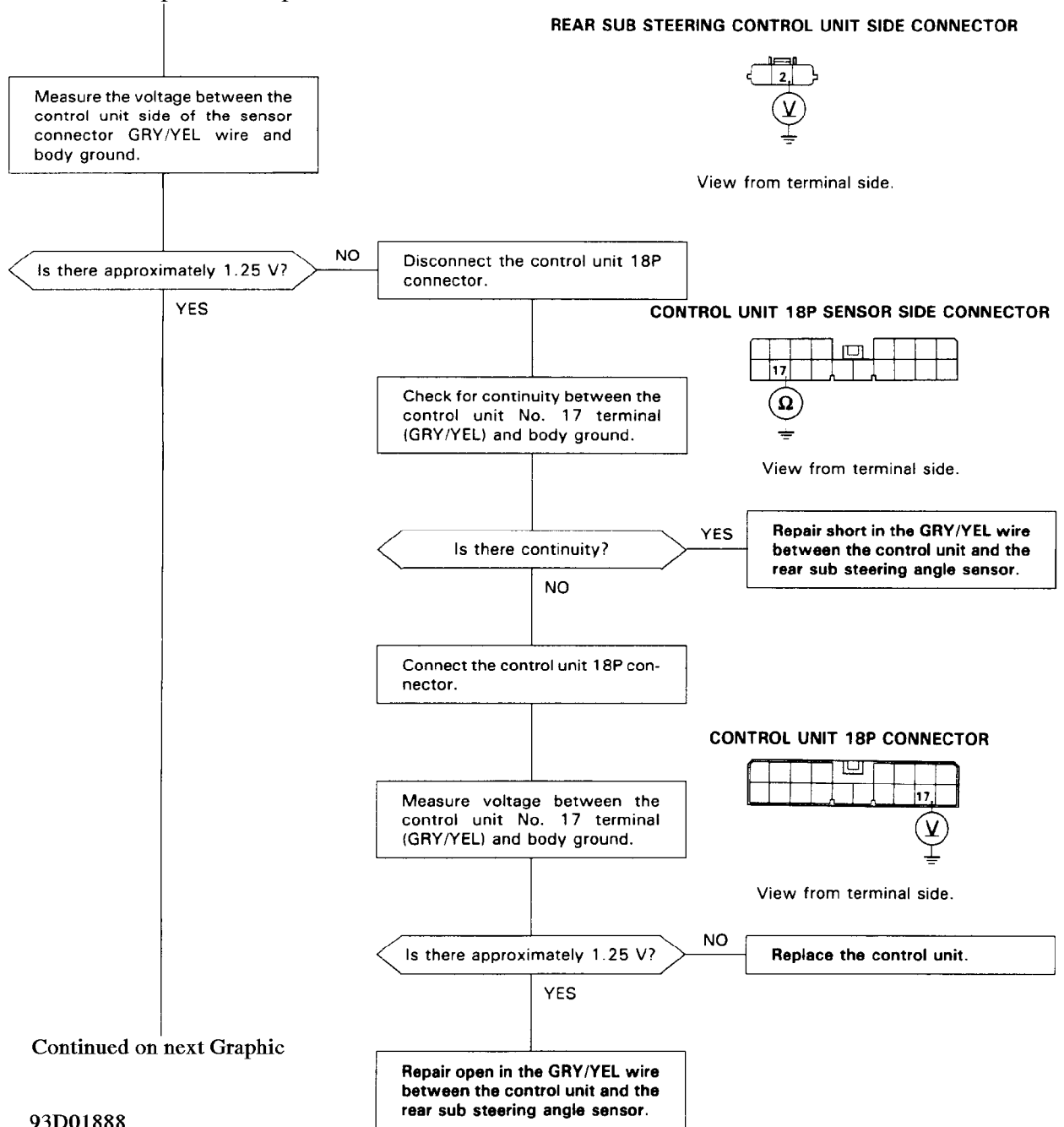


STEERING S 93B01887

Fig. 20: Problem Code 11, 13, 17 (2 Of 5)

Courtesy of American Honda Motor Co., Inc.

Continued from previous Graphic



Continued on next Graphic

93D01888

Fig. 21: Problem Code 11, 13, 17 (3 Of 5)
Courtesy of American Honda Motor Co., Inc.

Continued from previous Graphic

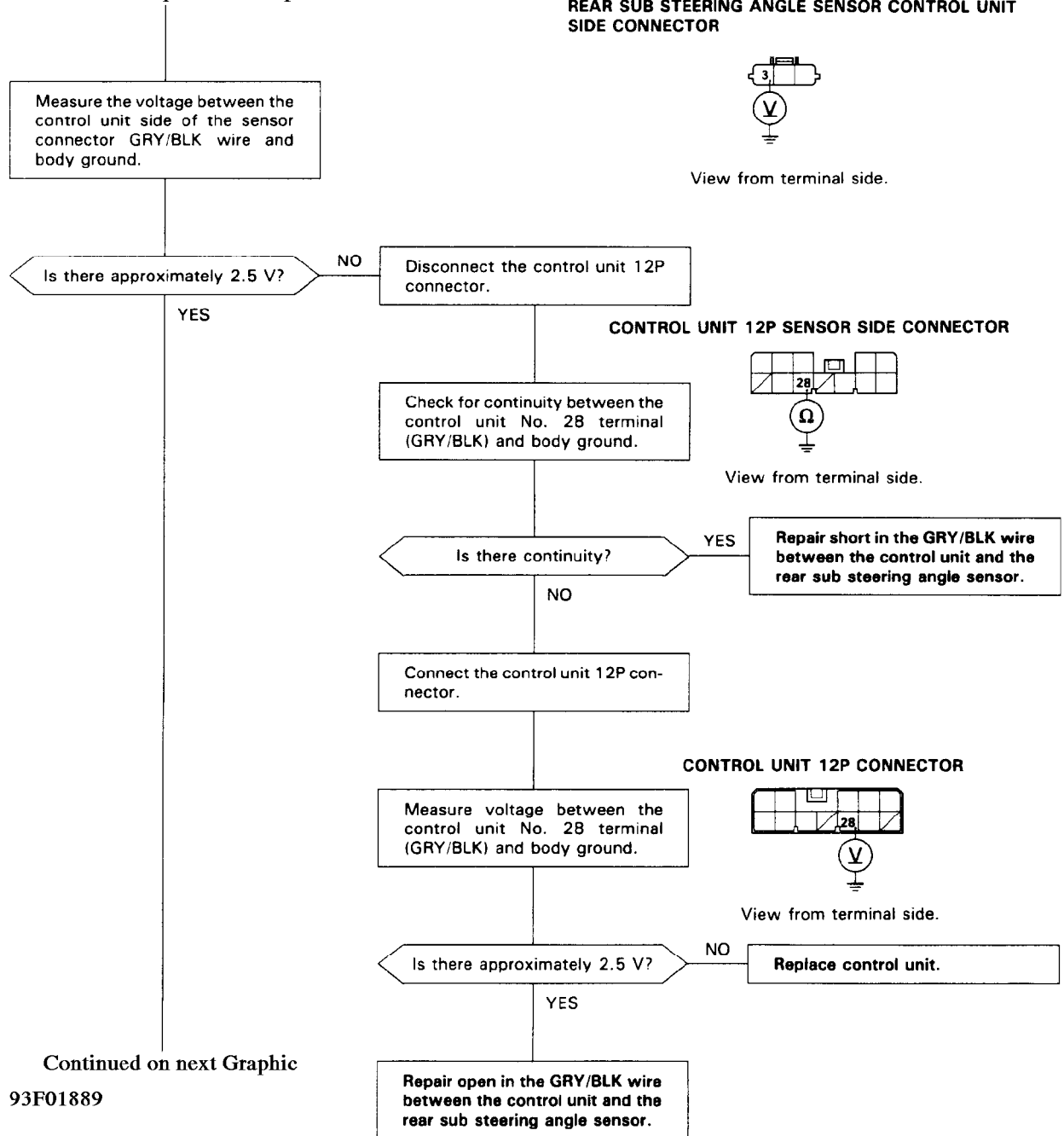
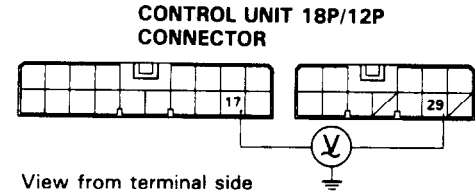
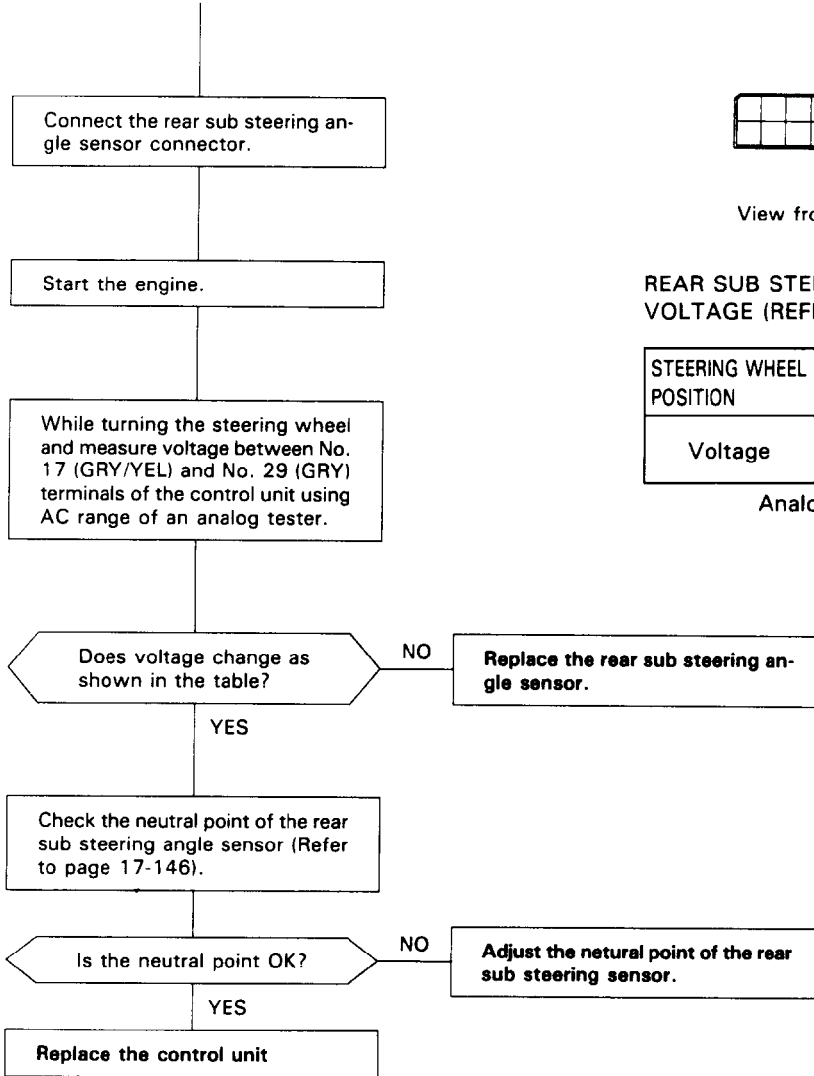


Fig. 22: Problem Code 11, 13, 17 (4 Of 5)

Courtesy of American Honda Motor Co., Inc.

Continued from previous Graphic



REAR SUB STEERING ANGLE SENSOR TERMINAL VOLTAGE (REFERENCE)

STEERING WHEEL POSITION	LEFT	CENTER	RIGHT
Voltage	approx 3.0 V	approx 2.5 V	approx 2.0 V

Analog tester

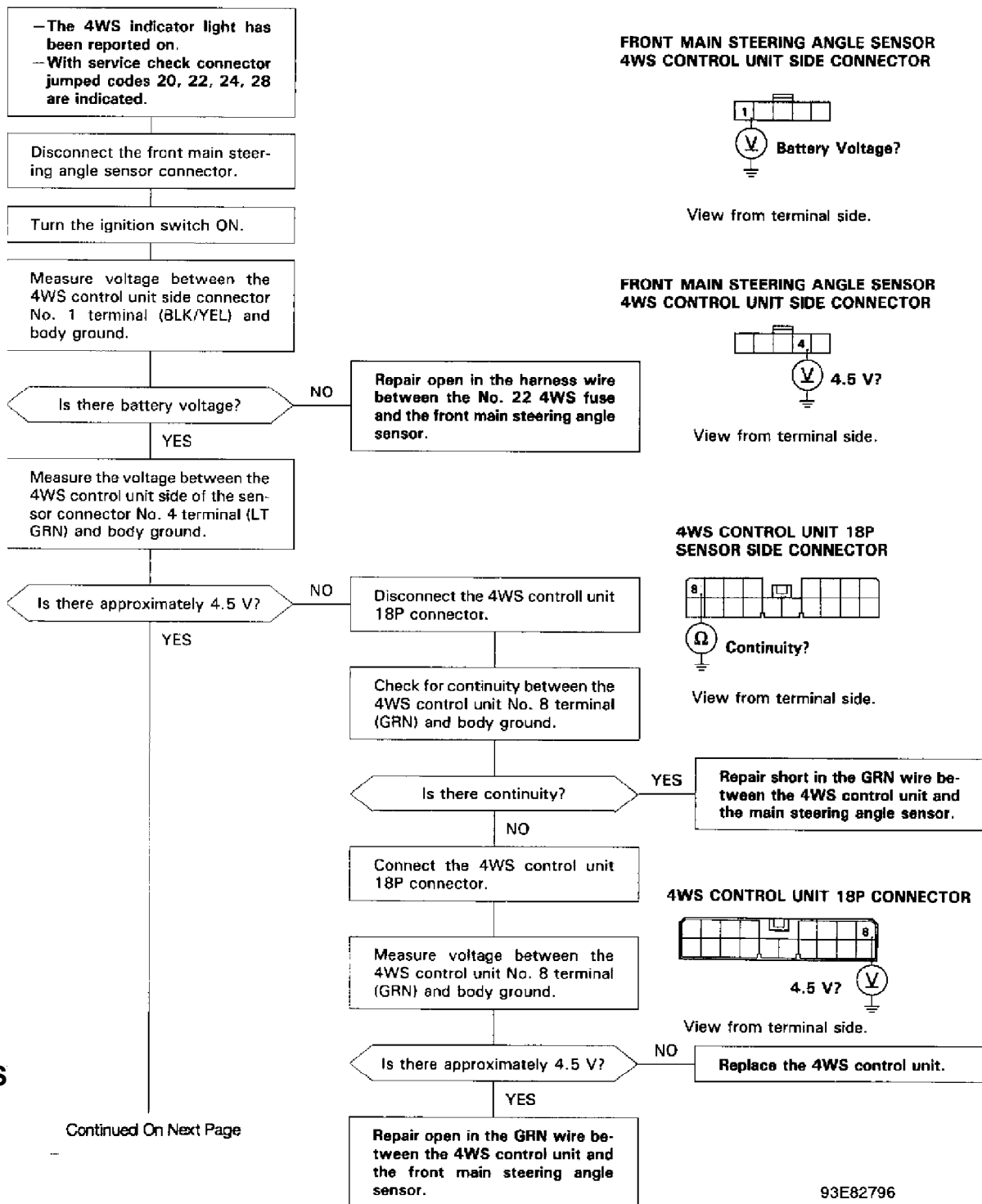
AC range

93H01890

Fig. 23: Problem Code 11, 13, 17 (5 Of 5)
Courtesy of American Honda Motor Co., Inc.

PROBLEM CODE 20, 22, 24, 28

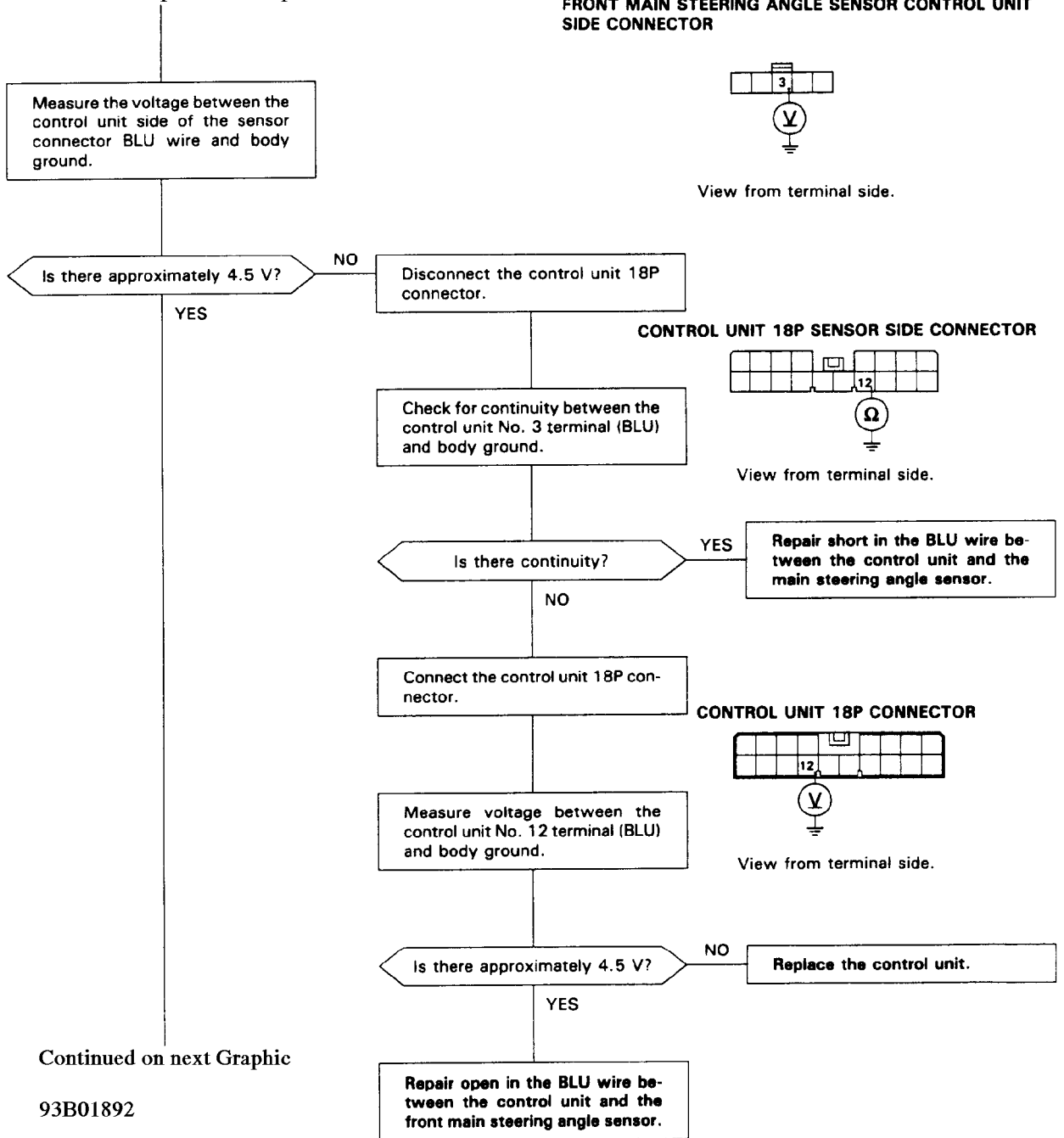
STEERING S



93E82796

Fig. 24: Problem Code 20, 22, 24, 28 (1 Of 4)
Courtesy of American Honda Motor Co., Inc.

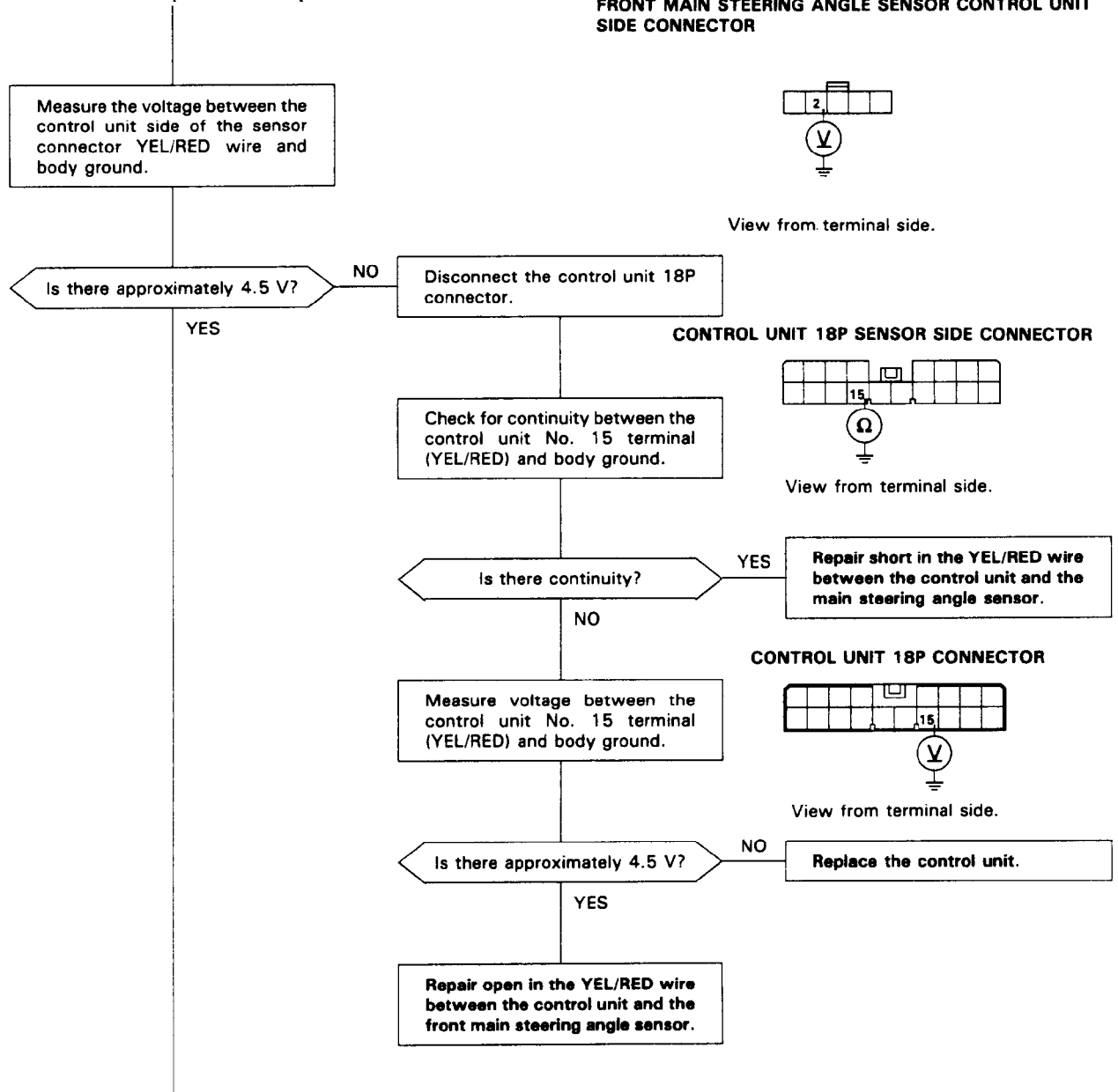
Continued from previous Graphic



93B01892

Fig. 25: Problem Code 20, 22, 24, 28 (2 Of 4)
Courtesy of American Honda Motor Co., Inc.

Continued from previous Graphic



Continued on next Graphic

93D01893

Fig. 26: Problem Code 20, 22, 24, 28 (3 Of 4)
Courtesy of American Honda Motor Co., Inc.

Continued From Previous Page

Check for voltage between the No. 2 terminal (YEL/RED) and the No. 5 terminal (BLK) of the 4WS control unit side connector of the front main steering angle sensor.

Is there approximately 4.5 V?

NO

Repair the poor ground or open in the BLK wire between the front main steering angle sensor and body ground.

YES

Reconnect the front main steering angle sensor 5P connector.

While turning the steering wheel, check for the signals between the following 4WS control unit terminals and the body ground with an analog voltmeter on the DC range.

A-phase:

Between the No. 8 terminal (GRN) and body ground: should pulse 0→4.5 V rapidly (every 2°)

B-phase:

Between the No. 15 terminal (YEL/RED) and body ground: should pulse 0→4.5 V rapidly (every 2°)

Z-phase:

Between the No. 12 terminal (BLU) and body ground: should pulse 0→4.5 V once per steering wheel revolution

Are the signals available between the respective terminal and the body ground?

NO

Replace the front main steering angle sensor.

YES

Check the Z-phase neutral position

Is the Z-phase in the straight driving position?

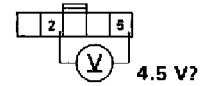
NO

Adjust the front main steering angle sensor neutral position

YES

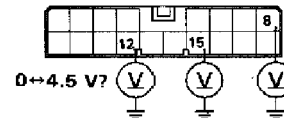
Perform troubleshooting for DTCs 10, 12, 16.

FRONT MAIN STEERING ANGLE SENSOR 4WS CONTROL UNIT SIDE CONNECTOR



View from terminal side

4WS CONTROL UNIT 18P CONNECTOR



View from terminal side

STEERING S

93F82797

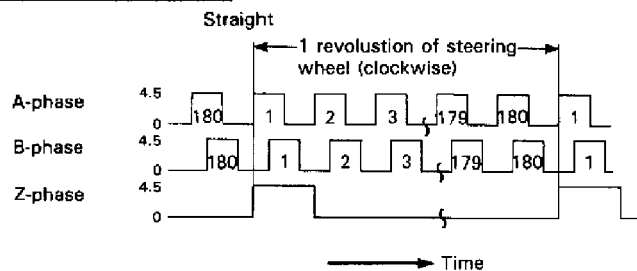


Fig. 27: Problem Code 20, 22, 24, 28 (4 Of 4)
Courtesy of American Honda Motor Co., Inc.

PROBLEM CODE 21, 23, 25, 29 (1 OF 4)

Problem codes: 21, 23, 25, 29

— The 4WS indicator light has been reported on.
— With service check connector jumped CODES 21, 23, 25, 29 are indicated.

Disconnect the rear main steering angle sensor connector.

Turn the ignition switch ON.

Measure voltage between the No. 1 terminal (RED) of the control unit side connector of the rear main steering angle sensor and body ground.

Is there battery voltage?

NO

Repair open in the harness wire between the No. 22 4WS fuse and the rear main steering angle sensor.

YES

Measure the voltage between the control unit side of the connector (WHT/GRN) wire and body ground.

Is there approximately 4.5 V?

NO

Disconnect the control unit 18P connector.

YES

Check for continuity between the control unit No. 6 terminal (WHT/GRN) and body ground.

Is there continuity?

NO

Repair short in the WHT/GRN wire between the control unit and the main steering angle sensor.

YES

Connect the control unit 18P connector.

Measure voltage between the control unit No. 6 terminal (WHT/GRN) and body ground.

Is there approximately 4.5 V?

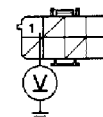
NO

Replace the control unit.

YES

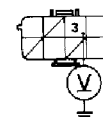
Repair open in the WHT/GRN wire between the control unit and the rear main steering angle sensor.

REAR MAIN STEERING ANGLE SENSOR
CONTROL UNIT SIDE CONNECTOR



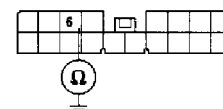
View from terminal side

REAR MAIN STEERING ANGLE SENSOR
CONTROL UNIT SIDE CONNECTOR



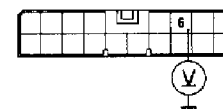
View from terminal side

CONTROL UNIT 18P SENSOR
SIDE CONNECTOR



View from terminal side

CONTROL UNIT 18P CONNECTOR



View from terminal side

Continued on next Graphic

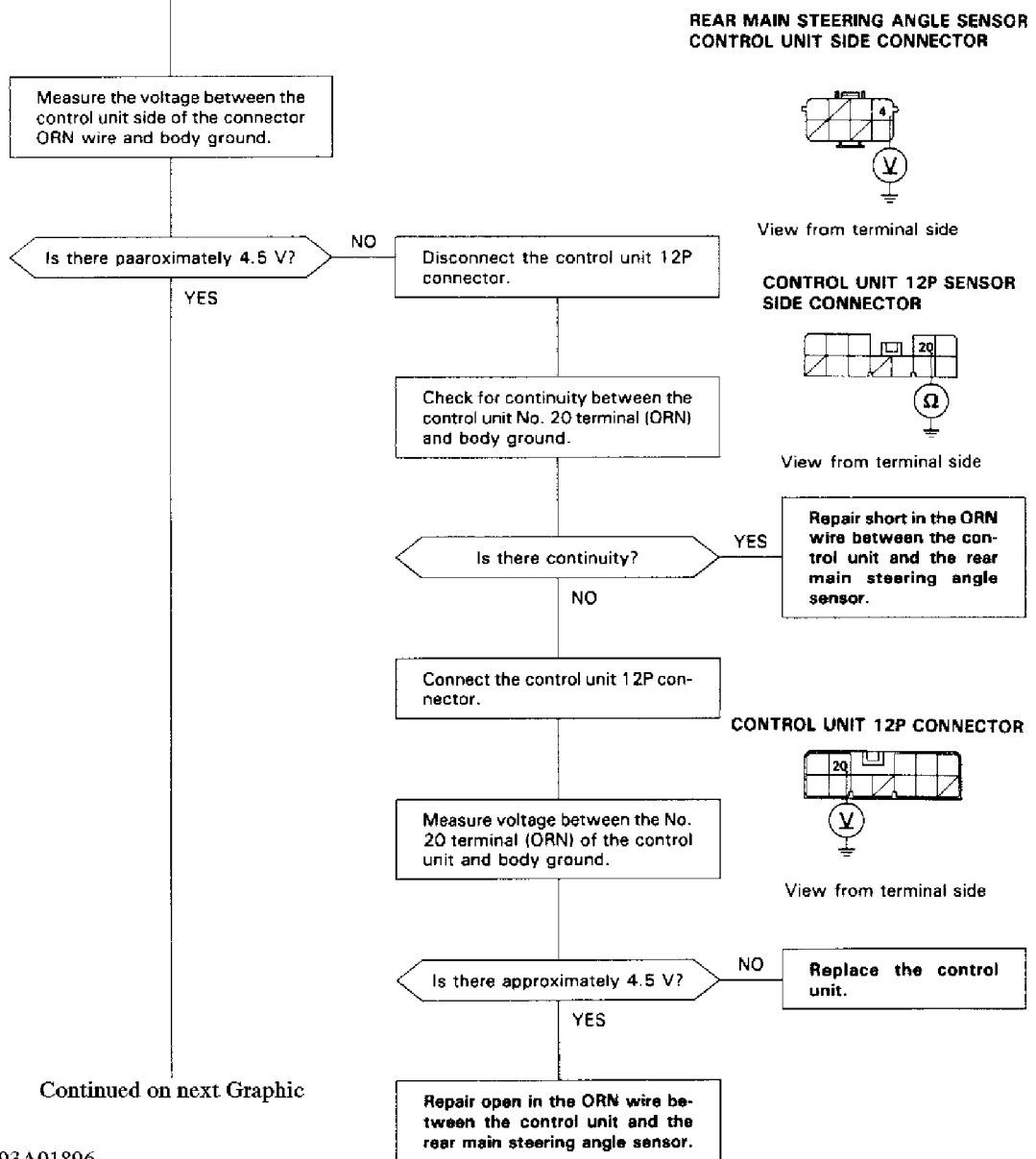
93I01895

Fig. 28: Problem Code 21, 23, 25, 29 (1 Of 4)

Courtesy of American Honda Motor Co., Inc.

STEERING SYSTEM - 4-WHEEL Article Text (p. 33)1993 Honda PreludeFor Cadi Centre Nsk CA 95051Copyri

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93A01896

Fig. 29: Problem Code 21, 23, 25, 29 (2 Of 4)
Courtesy of American Honda Motor Co., Inc.

Continued from previous Graphic

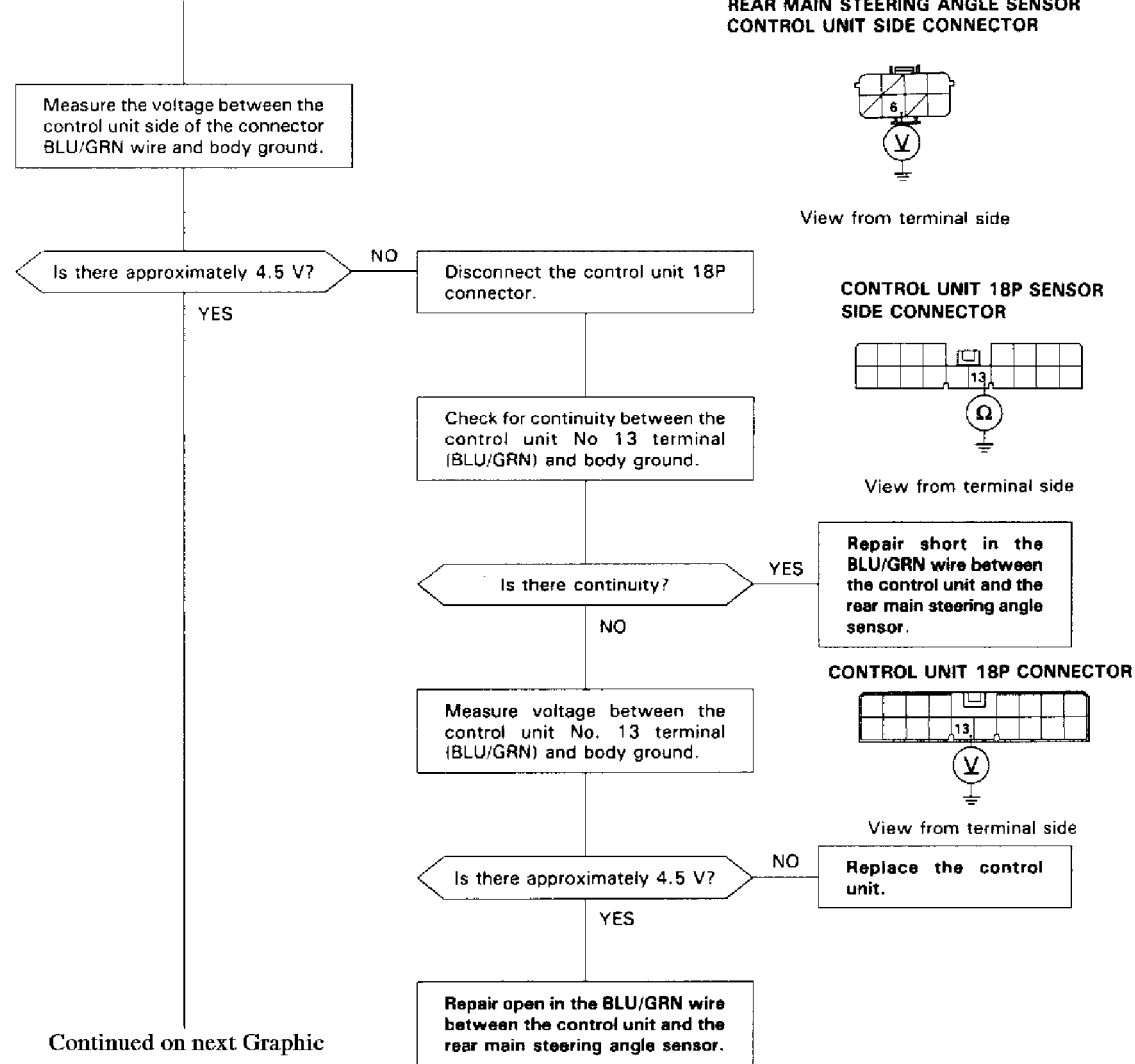


Fig. 30: Problem Code 21, 23, 25, 29 (3 Of 4)
Courtesy of American Honda Motor Co., Inc.

Continued from Previous Page

Measure voltage between the No. 6 terminal (BLU/GRN) and the No. 8 terminal (RED) of the 4WS control unit side connector of the rear main steering angle sensor.

Is there approximately 4.5 V?

NO

Repair open in the RED wire between the 4WS control unit and the rear main steering angle sensor.

YES

Reconnect the rear main steering angle sensor 8P connector.

While turning the steering wheel, check for the signals between the following 4WS control unit terminals and the body ground with an analog voltmeter on the DC range.

A-phase:

Between the No. 6 terminal (WHT/GRN) and body ground: should pulse 0→4.5 V rapidly (every 2°)

B-phase:

Between the No. 13 terminal (BLU/GRN) and body ground: should pulse 0→4.5 V rapidly (every 2°)

Z-phase:

Between the No. 20 terminal (ORN) and body ground: should pulse 0→4.5 V once per steering wheel revolution

Are the signals available between the respective terminal and the body ground?

NO

Replace the rear main steering angle sensor.

YES

Check the Z-phase neutral position

Is the Z-phase in the straight driving position?

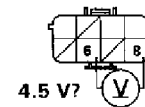
NO

Replace the rear actuator.

YES

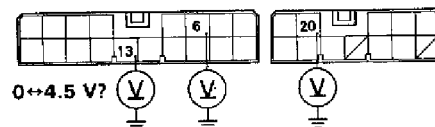
Perform troubleshooting of the DTCs 11, 13, 17.

REAR MAIN STEERING ANGLE SENSOR 4WS CONTROL UNIT SIDE CONNECTOR



View from terminal side

4WS CONTROL UNIT 18P/12P CONNECTOR



View from terminal side

STEERING S

93G82798

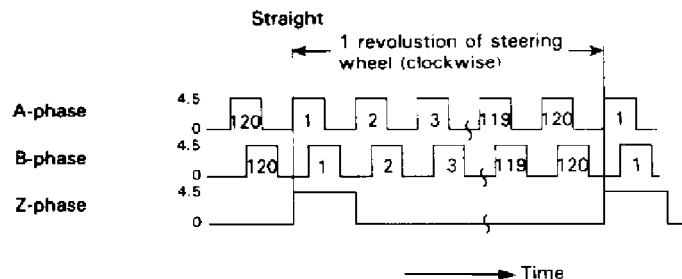
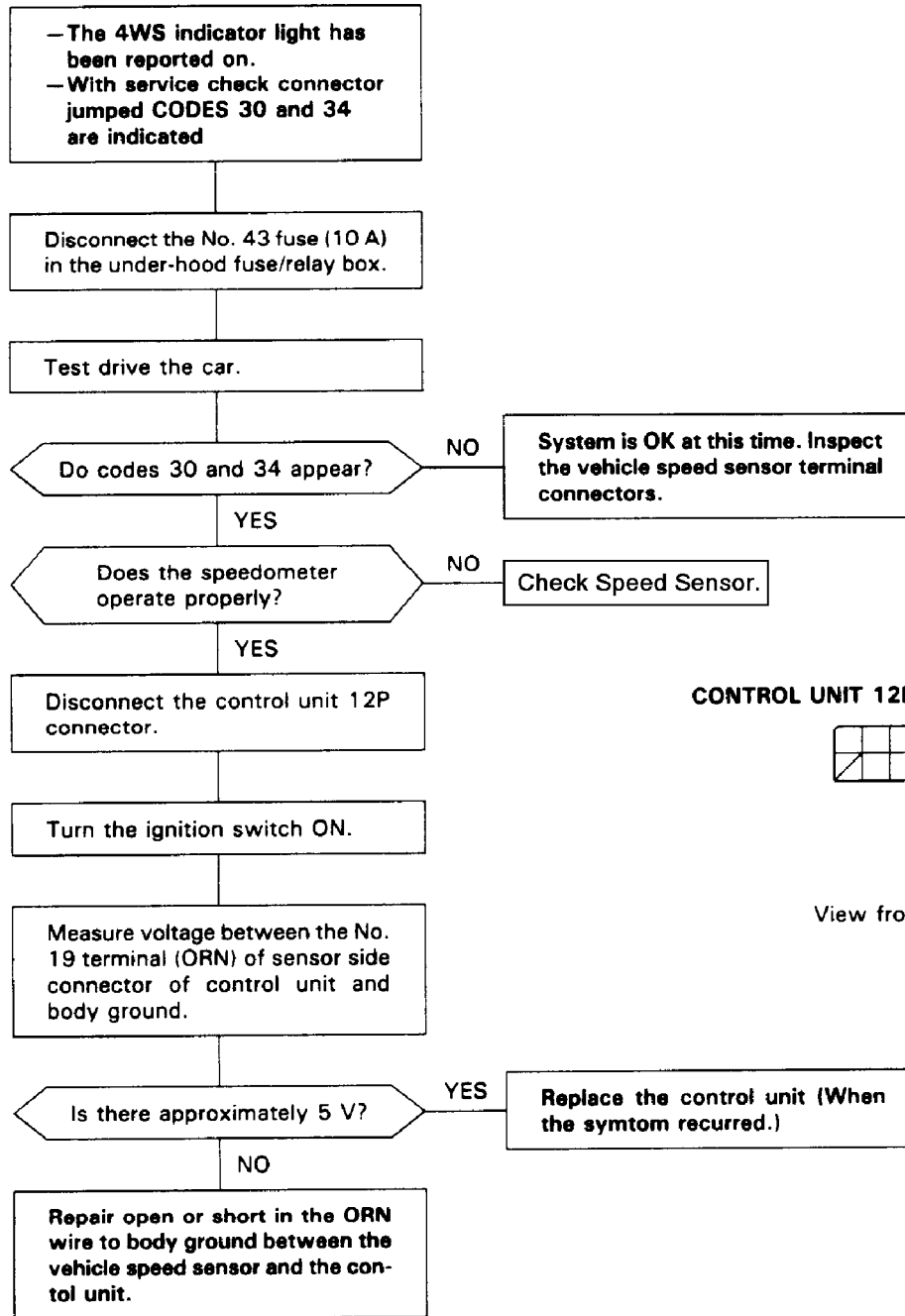


Fig. 31: Problem Code 21, 23, 25, 29 (4 Of 4)
Courtesy of American Honda Motor Co., Inc.

PROBLEM CODE 30, 34

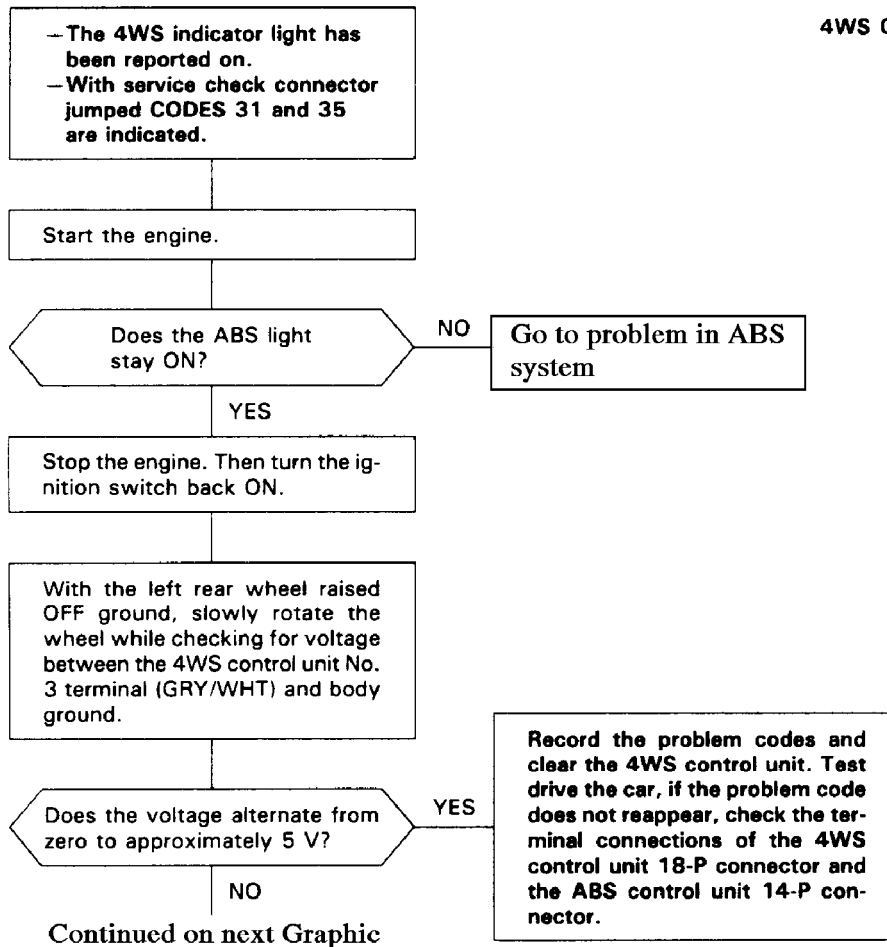
Problem code 30, 34 vehicle speed sensor



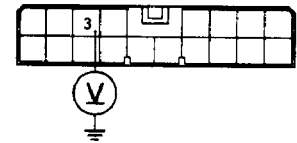
93G01899

Fig. 32: Problem Code 30, 34
Courtesy of American Honda Motor Co., Inc.

Problem code 31, 35



4WS CONTROL UNIT 18P CONNECTOR



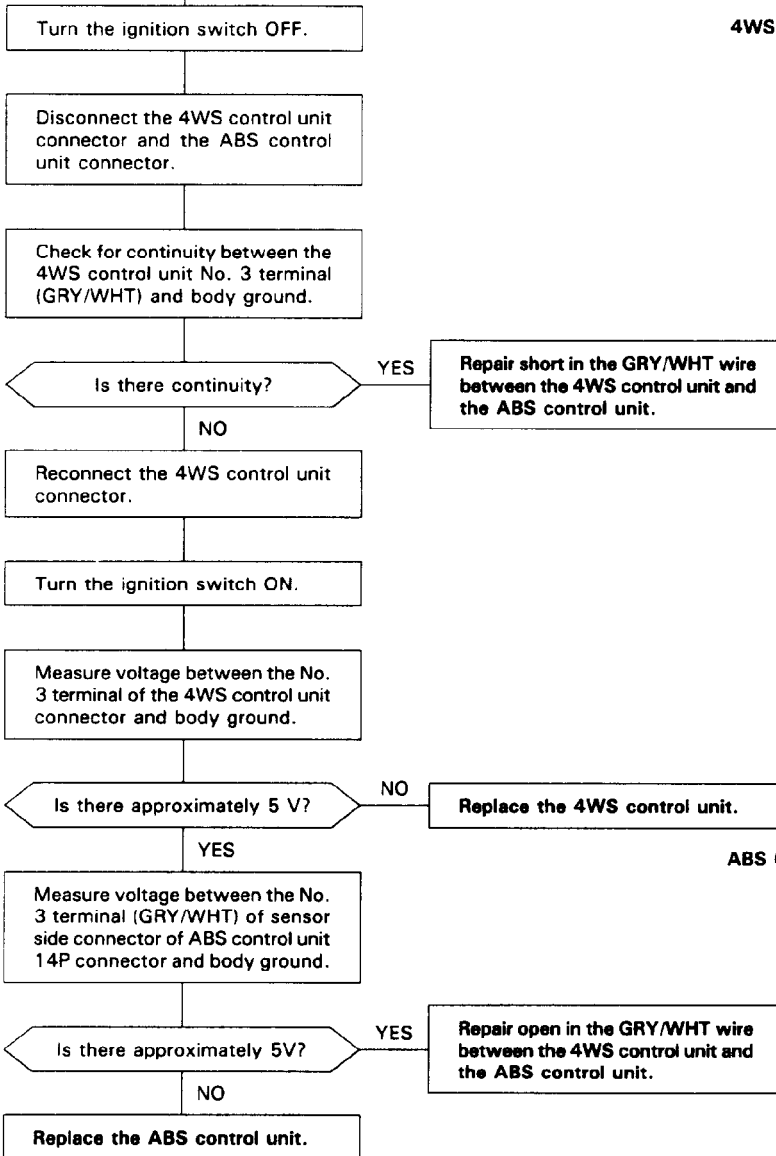
View from terminal side

93A01900

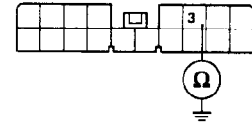
Fig. 33: Problem Code 31, 35 (1 Of 2)

Courtesy of American Honda Motor Co., Inc.

Continued from previous Graphic

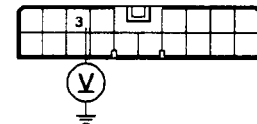


4WS CONTROL UNIT 18P SENSOR SIDE CONNECTOR



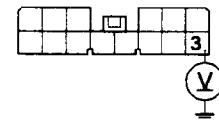
View from terminal side

4WS CONTROL UNIT 18P CONNECTOR



View from terminal side

ABS CONTROL UNIT 14P SENSOR SIDE CONNECTOR



View from terminal side

STEERING S

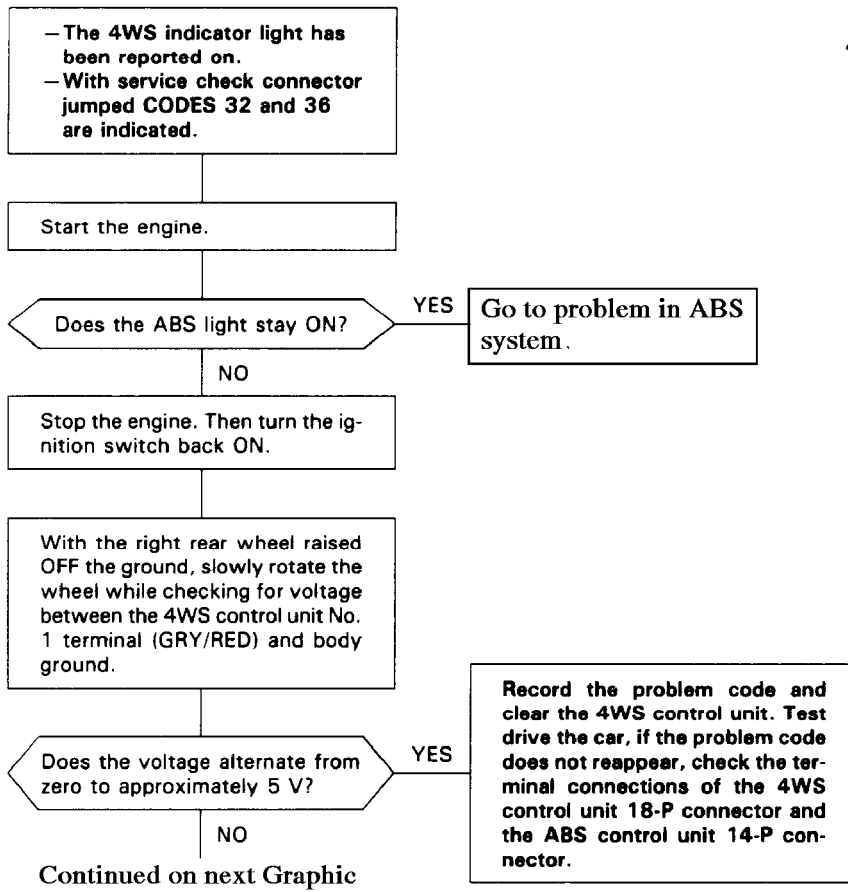
93C01901

Fig. 34: Problem Code 31, 35 (2 Of 2)

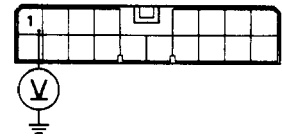
Courtesy of American Honda Motor Co., Inc.

PROBLEM CODE 32, 36

Problem codes: 32, 36



4WS CONTROL UNIT 18P CONNECTOR



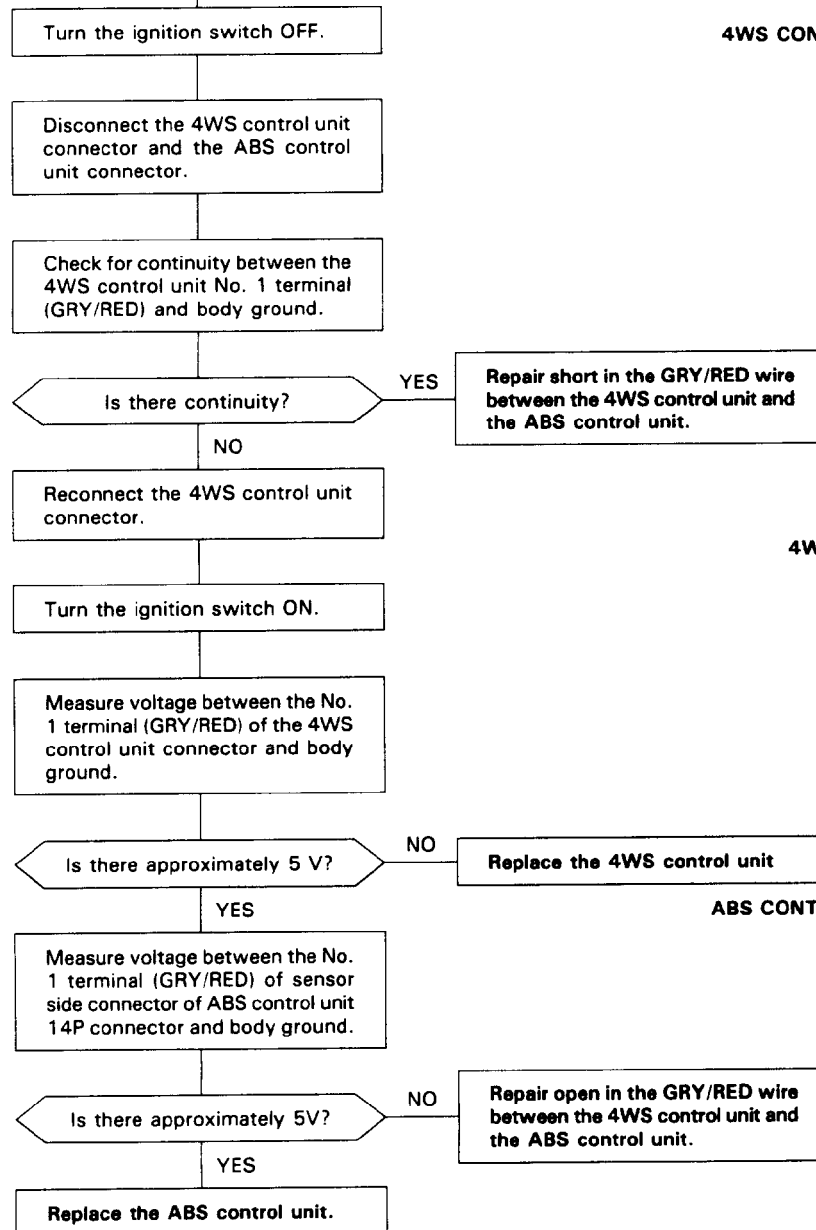
View from terminal side

93E01902

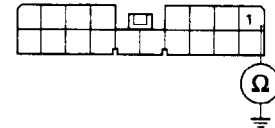
Fig. 35: Problem Code 32, 36 (1 Of 2)

Courtesy of American Honda Motor Co., Inc.

Continued from previous Graphic



4WS CONTROL UNIT 18P SENSOR SIDE CONNECTOR



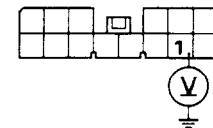
View from terminal side

4WS CONTROL UNIT 18P CONNECTOR



View from terminal side

ABS CONTROL UNIT 14P SENSOR SIDE CONNECTOR



View from terminal side

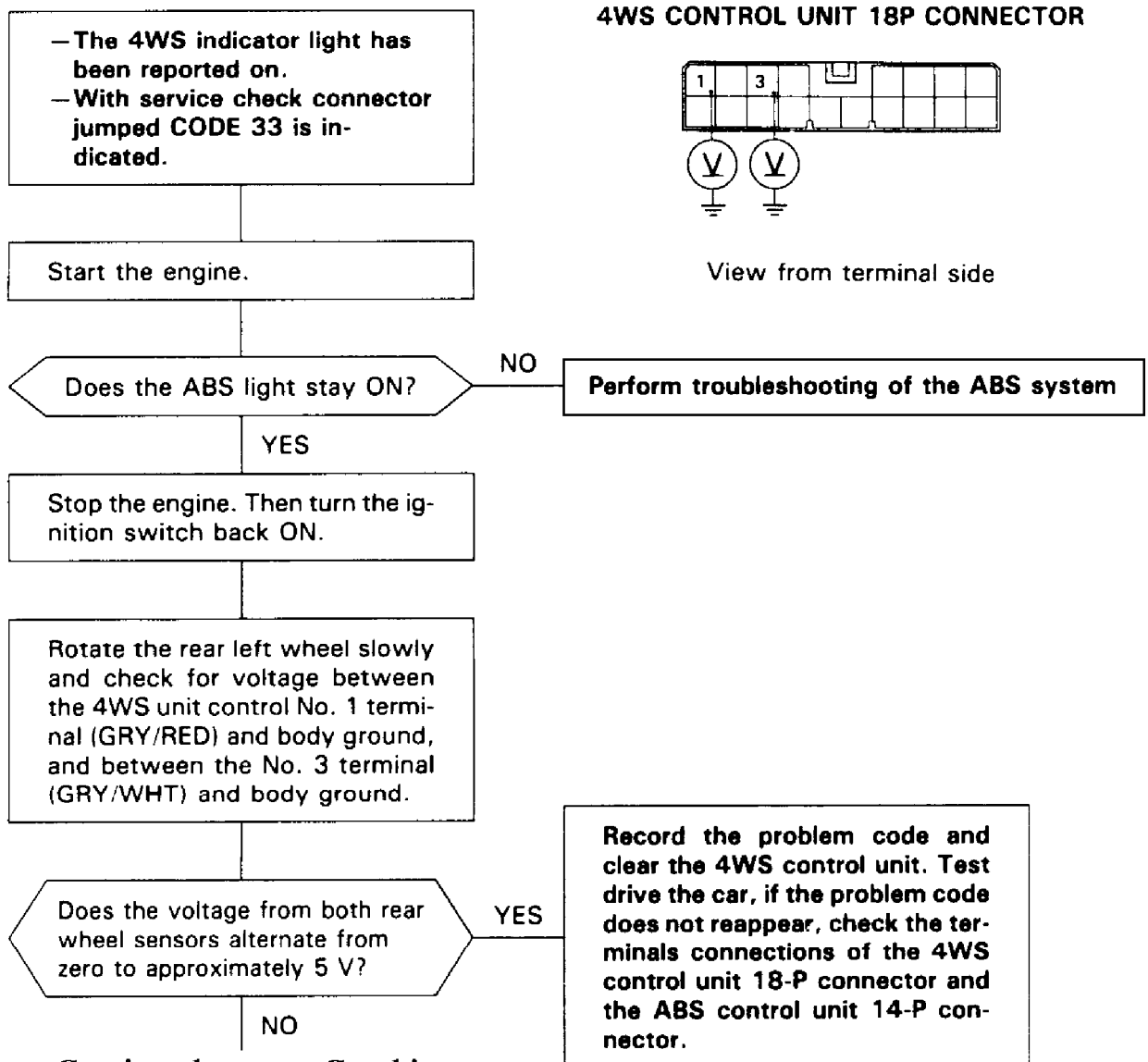
STEERING S

Fig. 36: Problem Code 32, 36 (2 Of 2)
Courtesy of American Honda Motor Co., Inc.

PROBLEM CODE 33 (1 OF 3)

Problem code: 33.

NOTE: Problem code 33 is memorized when the front wheels are turned at a speed of 30 km/h for 2 minutes with the front wheels raised off the ground and the rear wheels blocked. (Parking brake must be off to test this code.)



STEERING S

Continued on next Graphic

93I01904

Fig. 37: Problem Code 33 (1 Of 3)
Courtesy of American Honda Motor Co., Inc.

Continued from previous Graphic

Disconnect the 4WS control unit connector and the ABS control unit connector.

Check for continuity between the 4WS control unit No. 1 terminal (GRY/RED) and body ground.

Is there continuity?

YES

Repair short in the GRY/RED wire between 4WS control unit and the ABS control unit.

NO

Check for continuity between the 4WS control unit No. 3 terminal (GRY/WHT) and body ground.

Is there continuity?

YES

Repair short in the GRY/WHT wire between the 4WS control unit and the ABS control unit.

NO

Reconnect the 4WS control unit connector.

Measure voltage between the 4WS control unit No. 1 terminal (GRY/RED) and body ground.

Is there approximately 5 V?

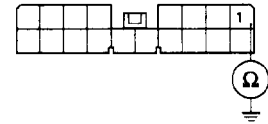
NO

Replace the 4WS control unit.

YES

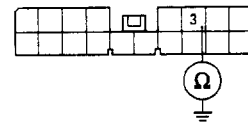
Continued on next Graphic

4WS CONTROL UNIT 18P SENSOR SIDE CONNECTOR



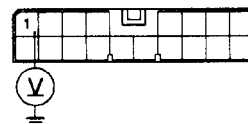
View from terminal side

4WS CONTROL UNIT 18P SENSOR SIDE CONNECTOR



View from terminal side

4WS CONTROL UNIT 18P CONNECTOR

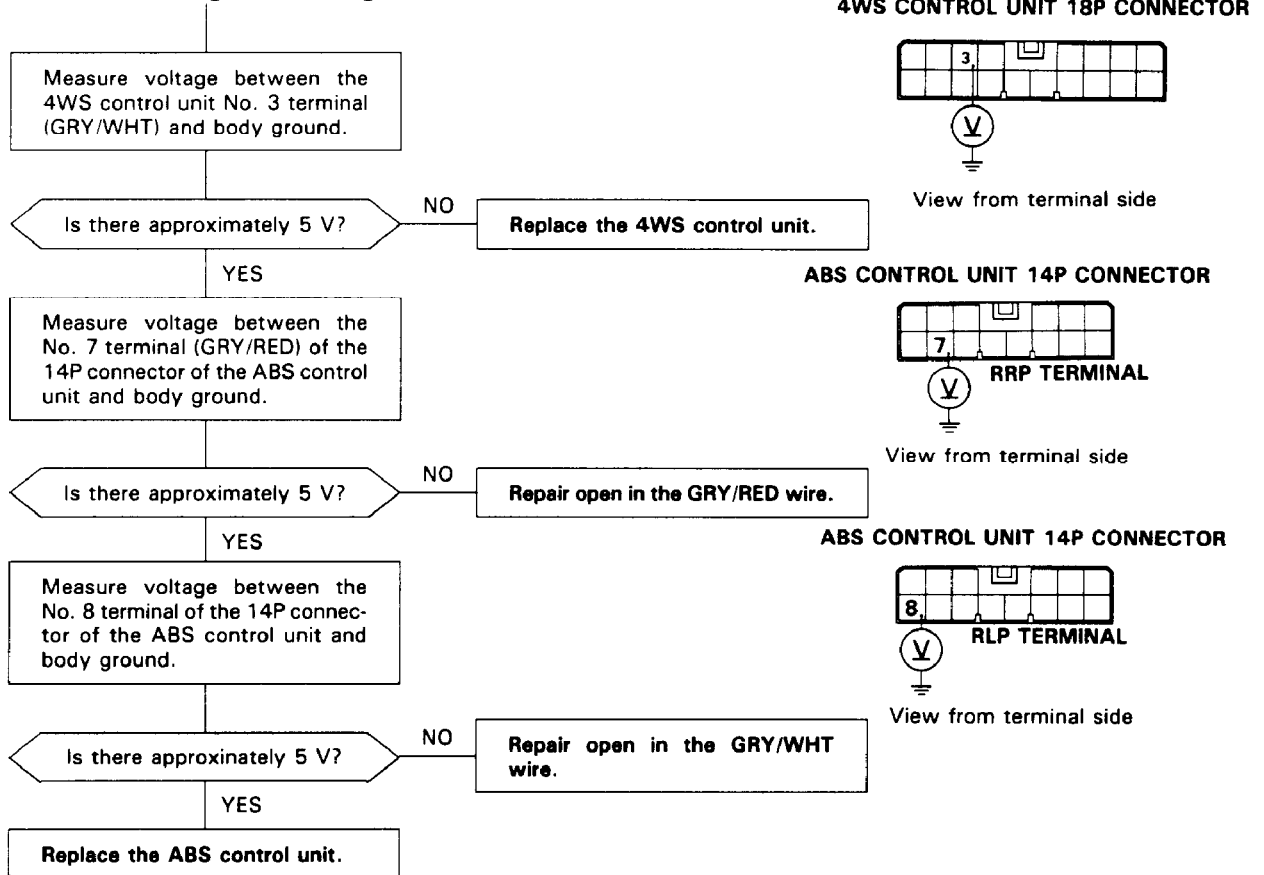


View from terminal side

93B01905

Fig. 38: Problem Code 33 (2 Of 3)
Courtesy of American Honda Motor Co., Inc.

Continued from previous Graphic



93D01906

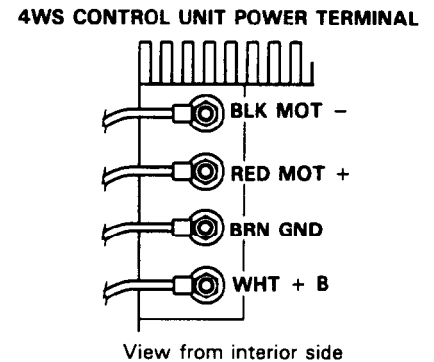
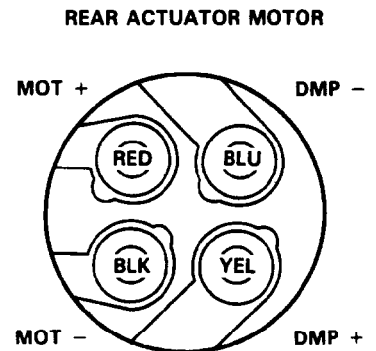
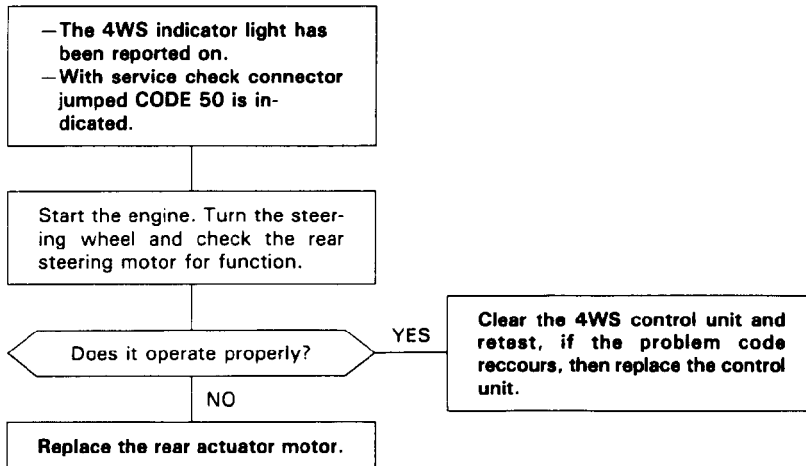
Fig. 39: Problem Code 33 (2 Of 3)

Courtesy of American Honda Motor Co., Inc.

PROBLEM CODE 50

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Problem code: 50



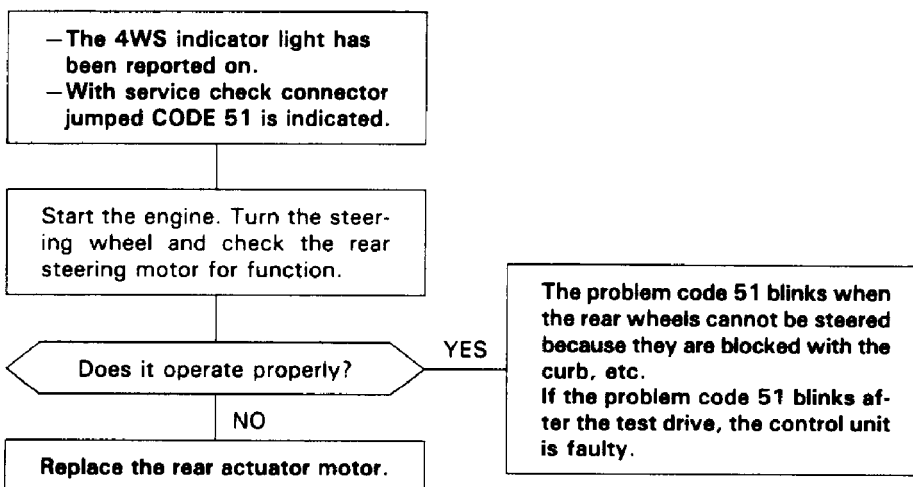
93A02080

Fig. 40: Problem Code 50
Courtesy of American Honda Motor Co., Inc.

PROBLEM CODE 51

Problem code: 51

STEERING S

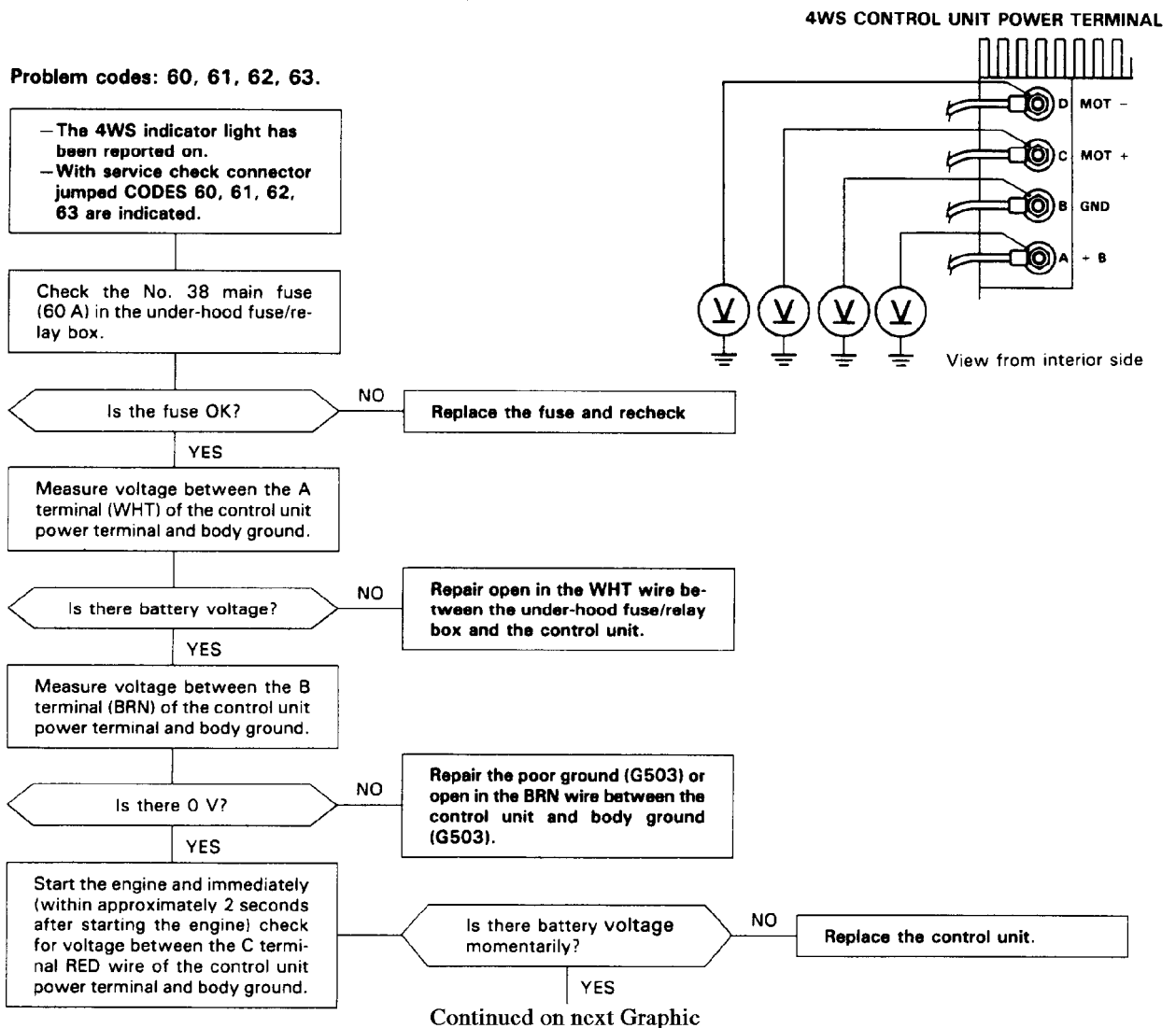


entre Nsk CA 95051 Copyright

93F01907

Fig. 41: Problem Code 51
Courtesy of American Honda Motor Co., Inc.

PROBLEM CODE 60, 61, 62, 63 (1 OF 3)



93E02237

Fig. 42: Problem Code 60, 61, 62, 63 (1 Of 3)
 Courtesy of American Honda Motor Co., Inc.

STEERING S

Continued from previous Graphic

Start the engine and turn the ignition switch ON.

Measure voltage between the D terminal (BLK) of the control unit power terminal and body ground immediately after (within approximately 2 seconds) starting the engine.

Is there battery voltage momentarily?

NO

Replace the control unit

YES

Measure voltage between the C terminal (RED) of the rear actuator motor and body ground immediately after (within approximately 2 seconds) starting the engine.

Is there battery voltage?

NO

Repair open in the RED wire between the control unit and the rear actuator motor.

YES

Measure voltage between the D terminal (BLK) of the rear actuator motor and body ground immediately after (within approximately 2 seconds) starting the engine.

Is there battery voltage?

NO

Repair open in the BLK wire between the control unit and the rear actuator motor.

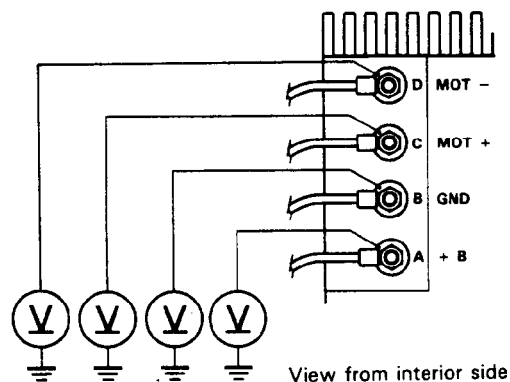
YES

Measure voltage between the No. 33 terminal (YEL) of the rear actuator motor and body ground immediately after (within approximately 2 seconds) starting the engine.

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93H01908

4WS CONTROL UNIT POWER TERMINAL



ACTUATOR MOTOR

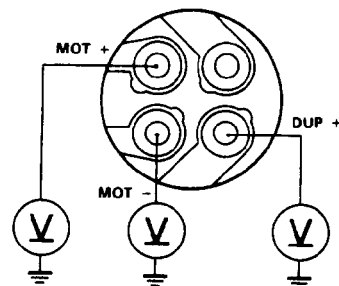
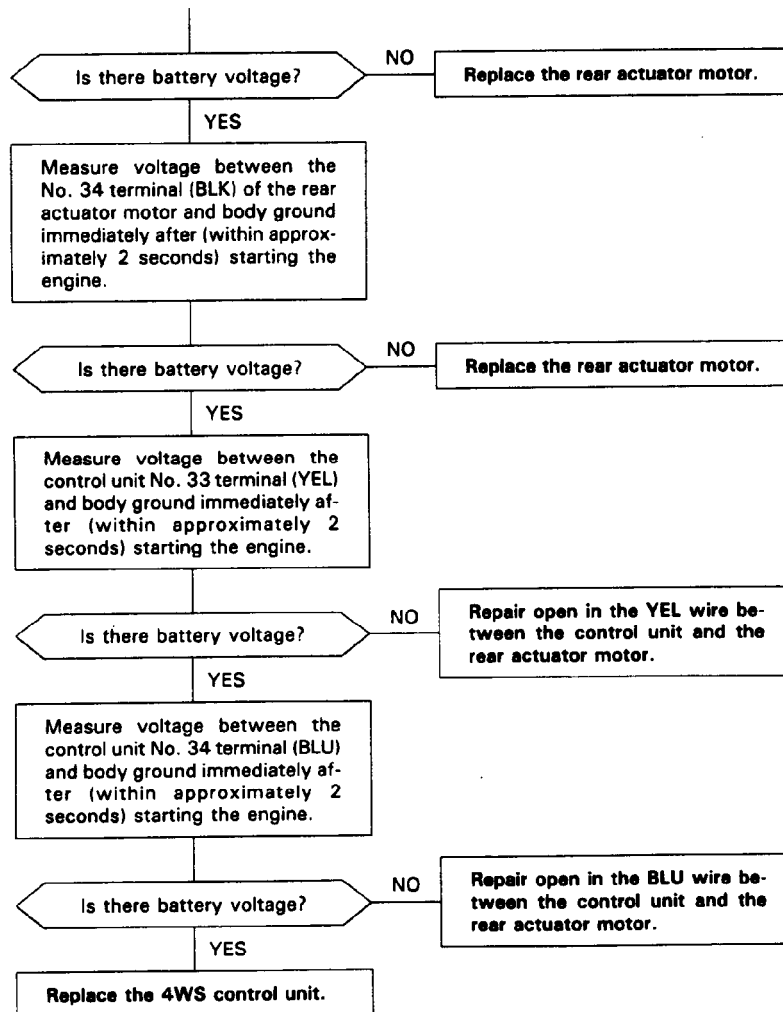


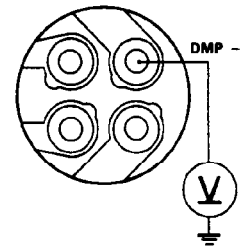
Fig. 43: Problem Code 60, 61, 62, 63 (2 Of 3)
Courtesy of American Honda Motor Co., Inc.

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93J01909

ACTUATOR MOTOR



CONTROL UNIT 4P CONNECTOR

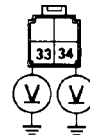


Fig. 44: Problem Code 60, 61, 62, 63 (2 Of 3)
Courtesy of American Honda Motor Co., Inc.

WIRING DIAGRAM

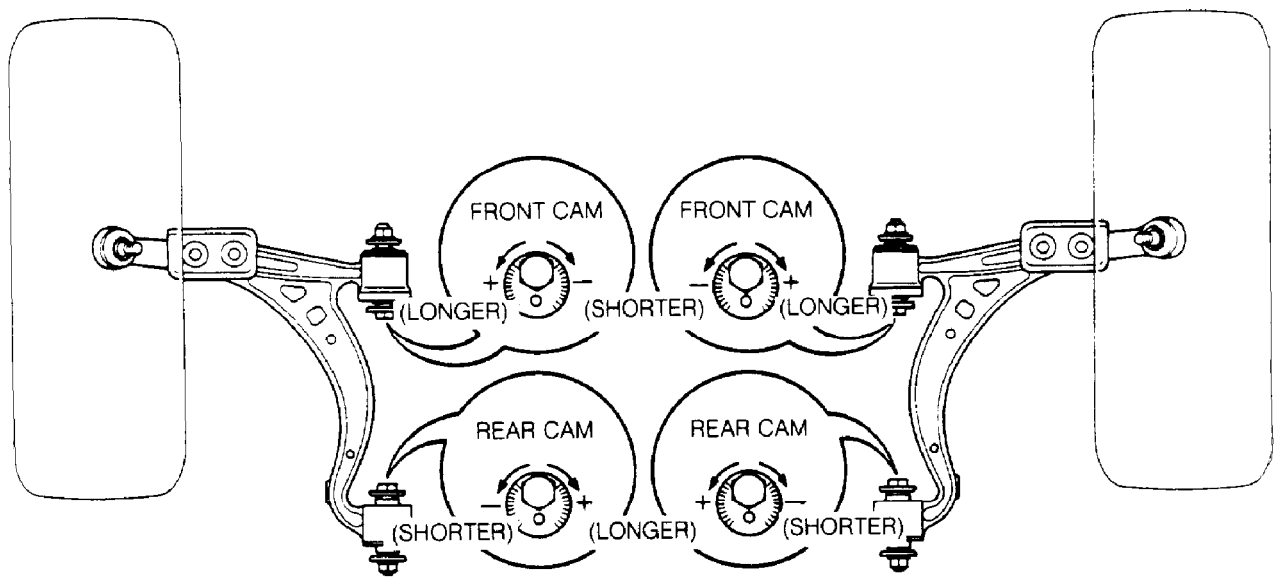


Fig. 45: 4-Wheel Steering Wiring Diagram

93D84700

END OF ARTICLE