

ANTI-LOCK BRAKE SYSTEM

1990 Nissan 240SX

1989-91 BRAKES

Nissan Anti-Lock Brake System

NISSAN; MAXIMA, STANZA, 240SX & 300ZX

DESCRIPTION

Anti-Lock Brake System (ABS) is designed to allow driver to maintain steering control during heavy braking. ABS system consists of an Electronic Control Unit (ECU), actuator (electro-hydraulic unit), warning lights, wheel speed sensors, wiring and hydraulic lines. See Figs. 1-4.

Actuator (electro-hydraulic unit) consists of a pump motor, accumulator, solenoid valves for each channel, actuator relay, pump motor relay, check valves and reservoirs. Maxima, Stanza and 300ZX use a 4-channel system, and 240SX uses a 3-channel system. ECU has self-diagnostic capability to alert driver in the event of a system malfunction. An LED located on the ABS Electronic Control Unit (ECU) will flash (indicating trouble codes) when warning light is illuminated.

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

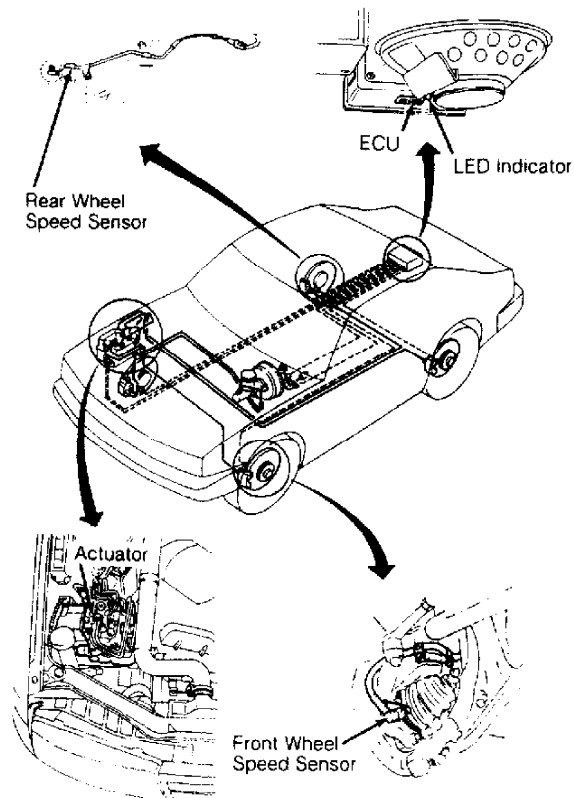


Fig. 1: Locating ABS Components (Maxima)
Courtesy of Nissan Motor Co., U.S.A.

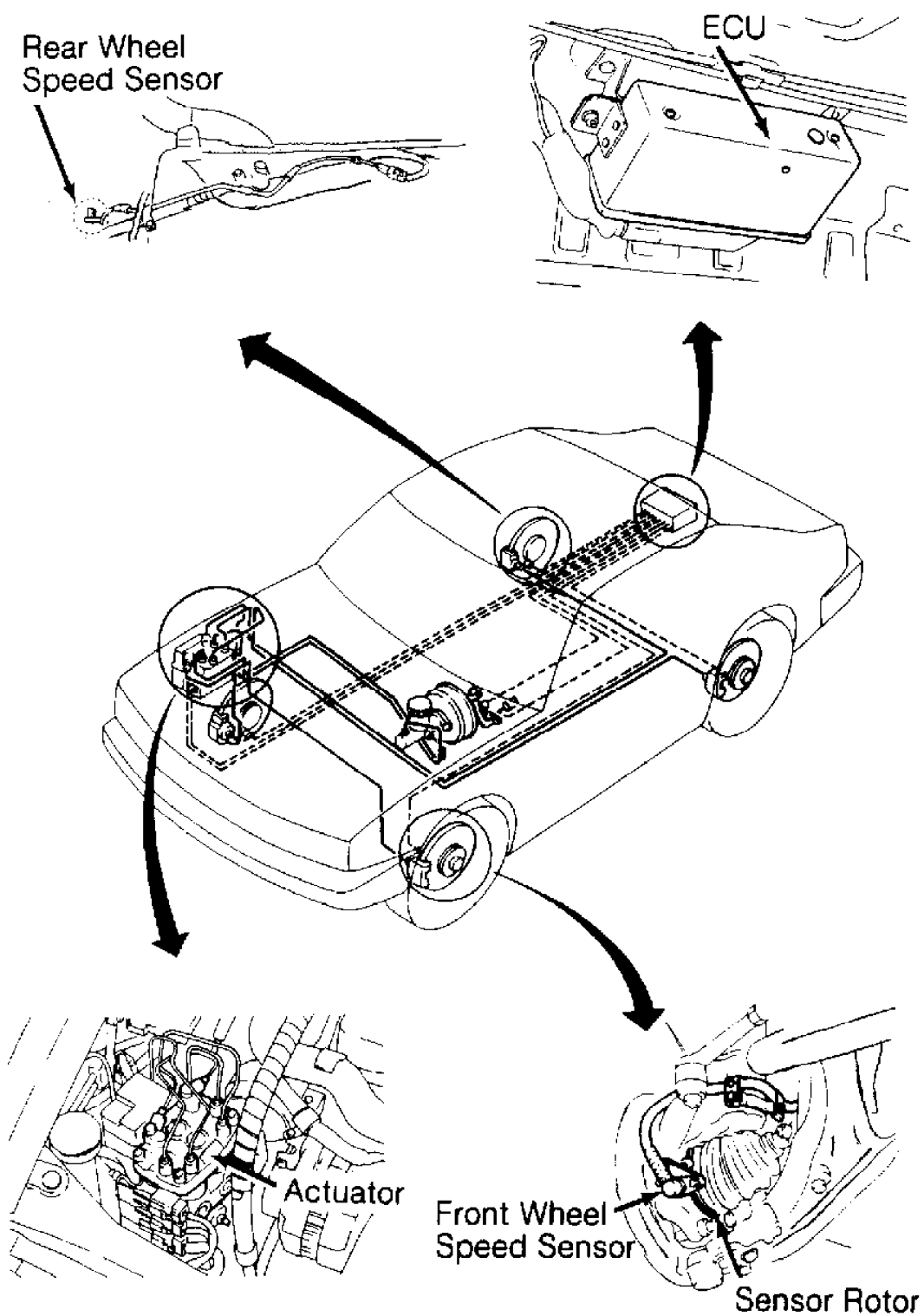


Fig. 2: Locating ABS Components (Stanza)
Courtesy of Nissan Motor Co., U.S.A.

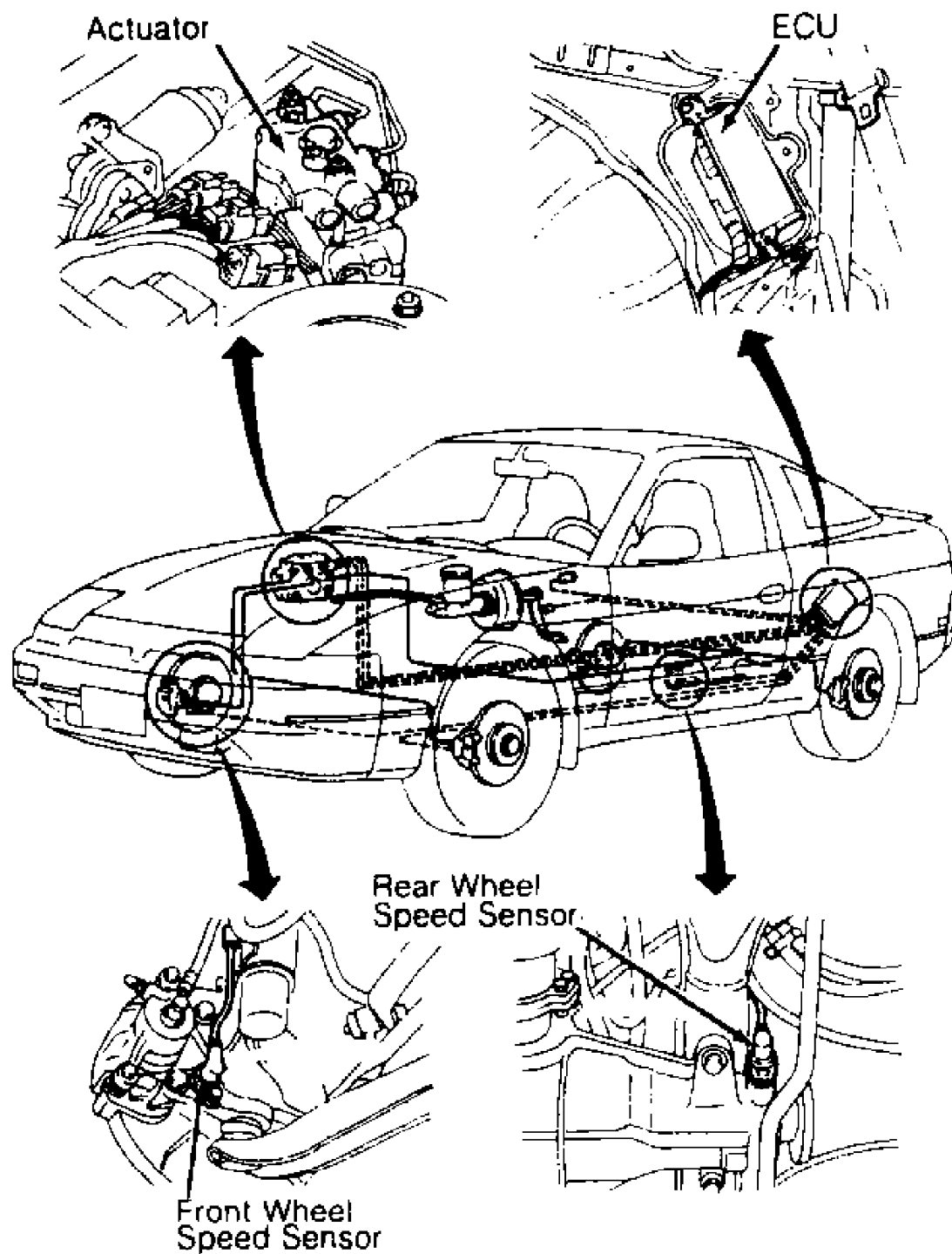


Fig. 3: Locating ABS Components (240SX)
Courtesy of Nissan Motor Co., U.S.A.

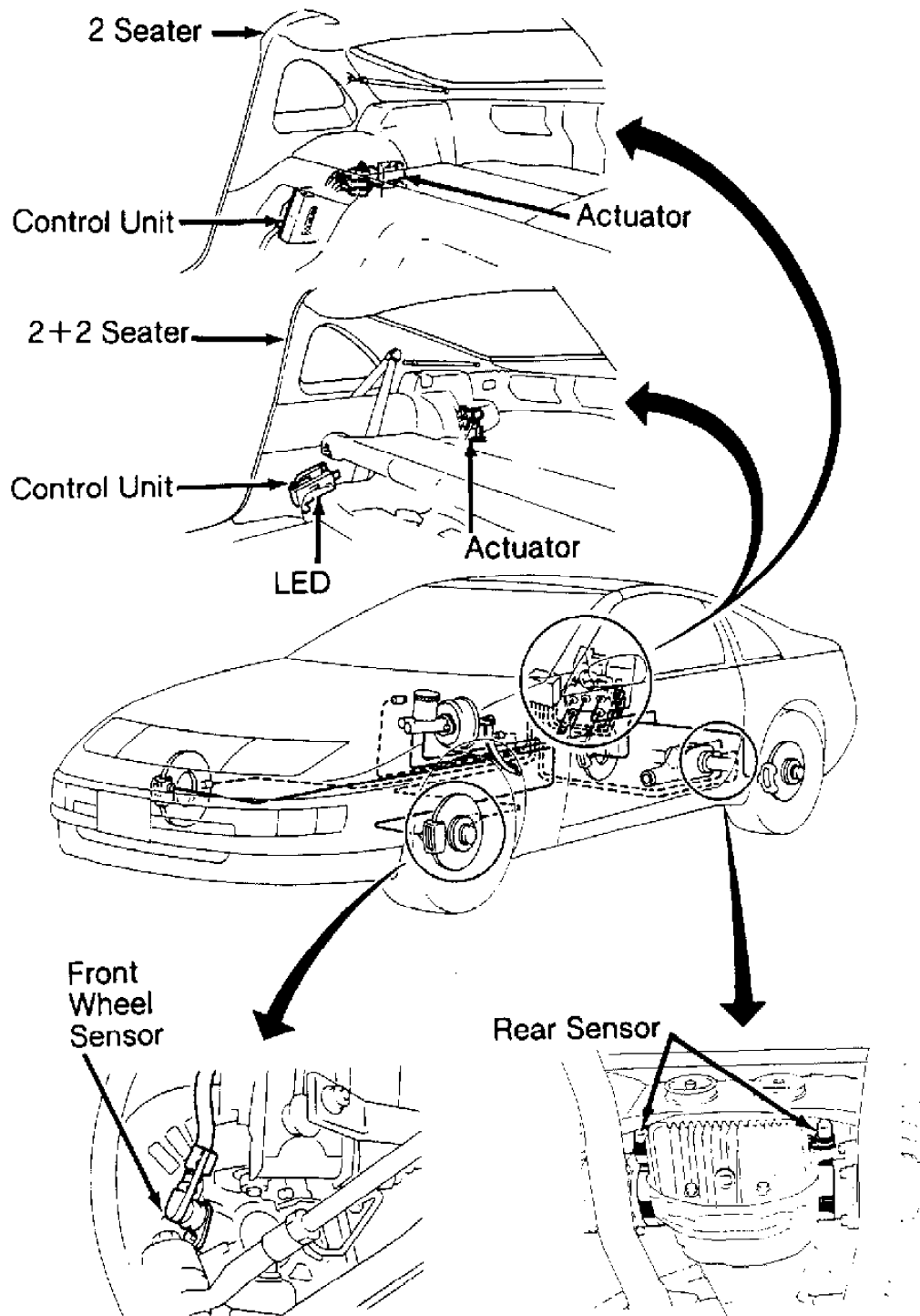


Fig. 4: Locating ABS Components (300ZX)
 Courtesy of Nissan Motor Co., U.S.A.

OPERATION

As vehicle is moving, speed sensors send an AC signal to ECU. ECU monitors the stoplight switch to determine when driver presses brake pedal. When brake pedal is pressed, ECU monitors signals from each speed sensor to determine rate of deceleration.

If rate of deceleration from any speed sensor reaches a preprogrammed rate, ECU activates solenoid valves inside actuator. Solenoid valves are cycled to apply, release or maintain hydraulic pressure to each wheel in any combination.

Regulating hydraulic pressure to each circuit prevents wheel lock-up. When driver releases brake pedal, ECU deactivates solenoid valves, placing brake system back into a conventional mode until ABS is again needed.

If a fault is detected by ECU, an ANTI-LOCK light located on the instrument panel illuminates. Although ECU deactivates ABS when a fault is detected, conventional brake system is not be affected.

WARNING: Failure to depressurize ABS could lead to physical injury.

ANTI-LOCK BRAKE SAFETY PRECAUTIONS

- * NEVER open a bleeder valve or loosen a hydraulic line while ABS is pressurized.
- * NEVER disconnect or reconnect any electrical connectors while ignition is on. Damage to ABS control unit may result.
- * DO NOT attempt to bleed hydraulic system without first referring to the appropriate article.
- * Only use specially designed brake hoses/lines on ABS-equipped vehicles.
- * DO NOT tap on speed sensor components (sensor, sensor rings). Speed rings must be pressed, NOT hammered into hubs. Striking these components can cause demagnetization or a loss of polarization, affecting the accuracy of the speed signal returning to the ABS control unit.
- * DO NOT mix tire sizes. Increasing the width, as long as tires remain close to the original diameter, is acceptable. Rolling diameter must be identical for all 4 tires. Some manufacturers recommend tires of the same brand, style and type. Failure to follow this precaution may cause inaccurate wheel speed readings.
- * DO NOT contaminate speed sensor components with grease. Only use recommended anti-corrosion coating.
- * When speed sensor components have been removed, ALWAYS check sensor-to-ring air gaps when applicable. These specifications can be found in each appropriate article.
- * ONLY use recommended brake fluids. DO NOT use silicone brake fluids in an ABS-equipped vehicle.
- * When installing transmitting devices (CB's, telephones, etc.) on ABS-equipped vehicles, DO NOT locate the antenna near the ABS control unit (or any control unit).
- * Disconnect all on-board computers, when using electric welding equipment.
- * DO NOT expose the ABS control unit to prolonged periods of high heat (185°F/85°C for 2 hours is generally considered a maximum limit).

BLEEDING BRAKE SYSTEM

To bleed system, unplug electrical connectors from actuator. Bleed brake system the same as a conventional system using appropriate bleeding sequence. See HYDRAULIC LINE BLEEDING SEQUENCE TABLE. After bleeding brakes, bleed front side of actuator and then rear side of actuator. Use DOT 3 brake fluid only.

HYDRAULIC LINE BLEEDING SEQUENCE TABLE

Application	Sequence
Maxima & Stanza	Left Rear Right Front Right Rear Left Front
240SX & 300ZX	Left Rear Right Rear Right Front Left Front

ADJUSTMENTS

BRAKE PEDAL HEIGHT & FREE PLAY

1) Measure pedal height from pressure face of pedal pad to floor pan insulator, without carpet. See BRAKE PEDAL HEIGHT SPECIFICATIONS TABLE.

2) To adjust to pedal height, loosen brake booster input rod lock nut, and rotate input rod to attain proper height. Tighten lock nut and adjust stoplight switch. Ensure pedal free play is .04-.12" (1-3 mm).

BRAKE PEDAL HEIGHT SPECIFICATIONS TABLE

Application	Pedal Height - In. (mm)
Maxima & Stanza	
Auto. Trans.	6.65-7.05 (169-179)
Man. Trans.	6.26-6.65 (159-169)
240SX	
Auto. Trans.	7.32-7.72 (186-196)
Man. Trans.	6.97-7.36 (177-187)
300ZX	
Auto. Trans.	7.68-8.07 (195-205)
Man. Trans.	7.32-7.72 (186-196)

LOAD-SENSING PROPORTIONING VALVE

NOTE: If pressure cannot be adjusted to within specifications, replace entire valve assembly as a unit.

Pressure Adjustment (Maxima)

1) With one person inside vehicle, set rear axle load to 1323 lbs. (595 kg) of weight in trunk. Attach 2 pressure gauges, one to front and one to rear brake bleeder. Bleed air from front and rear bleeders.

2) Depress brake pedal until front brake pressure reading is 711 psi (50 kg/cm²). Check rear brake pressure. See LSPV PRESSURE SPECIFICATIONS TABLE. Depress brake pedal until front brake pressure reading is 1422 psi (100 kg/cm²). Check rear brake pressure. See LSPV PRESSURE SPECIFICATIONS TABLE.

CAUTION: Check rear brake pressure 2 seconds after front brake pressure reaches specified value.

LSPV PRESSURE SPECIFICATIONS TABLE

Application	Front Brake Pressure psi (kg/cm ²)		Rear Brake Pressure psi (kg/cm ²)	
Maxima	711	(50)	555-697	(39-49)
Maxima	1422	(100)	739-939	(52-66)

3) If readings are not correct, adjust sensor spring length by turning adjusting bolt. See Fig. 5. Repeat test and recheck pressure. If pressure cannot be adjusted to specification, replace LSPV.

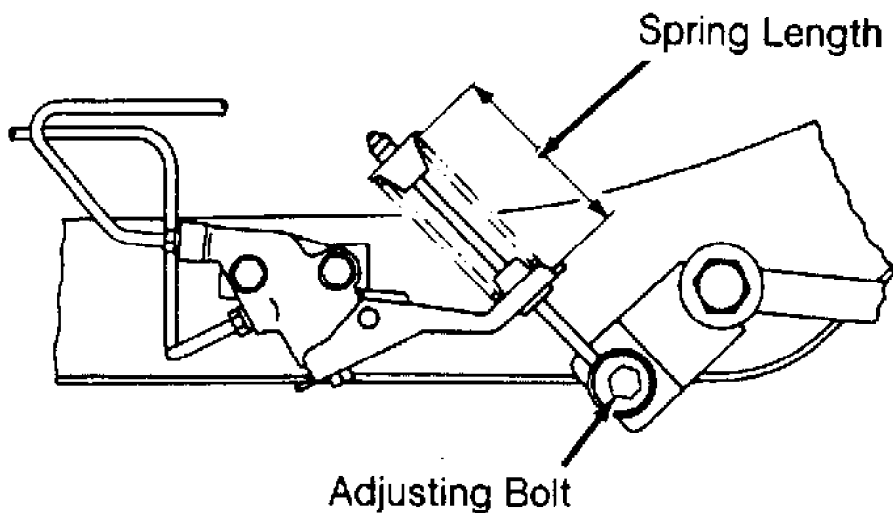


Fig. 5: Adjusting Load-Sensing Proportioning Valve (Maxima)
Courtesy of Nissan Motor Co., U.S.A.

PARKING BRAKE

1) Remove parking brake lever cover. Raise and support rear of vehicle. Pull up on parking brake lever using 44 lbs. (20 kg) of force. Rear wheels should lock at appropriate lever stroke. See PARKING BRAKE LEVER STROKE SPECIFICATIONS TABLE.

2) Adjust parking brake using adjusting nut beside or below parking brake lever. After releasing lever, ensure rear wheels rotate freely. No slack should be present at rear cables.

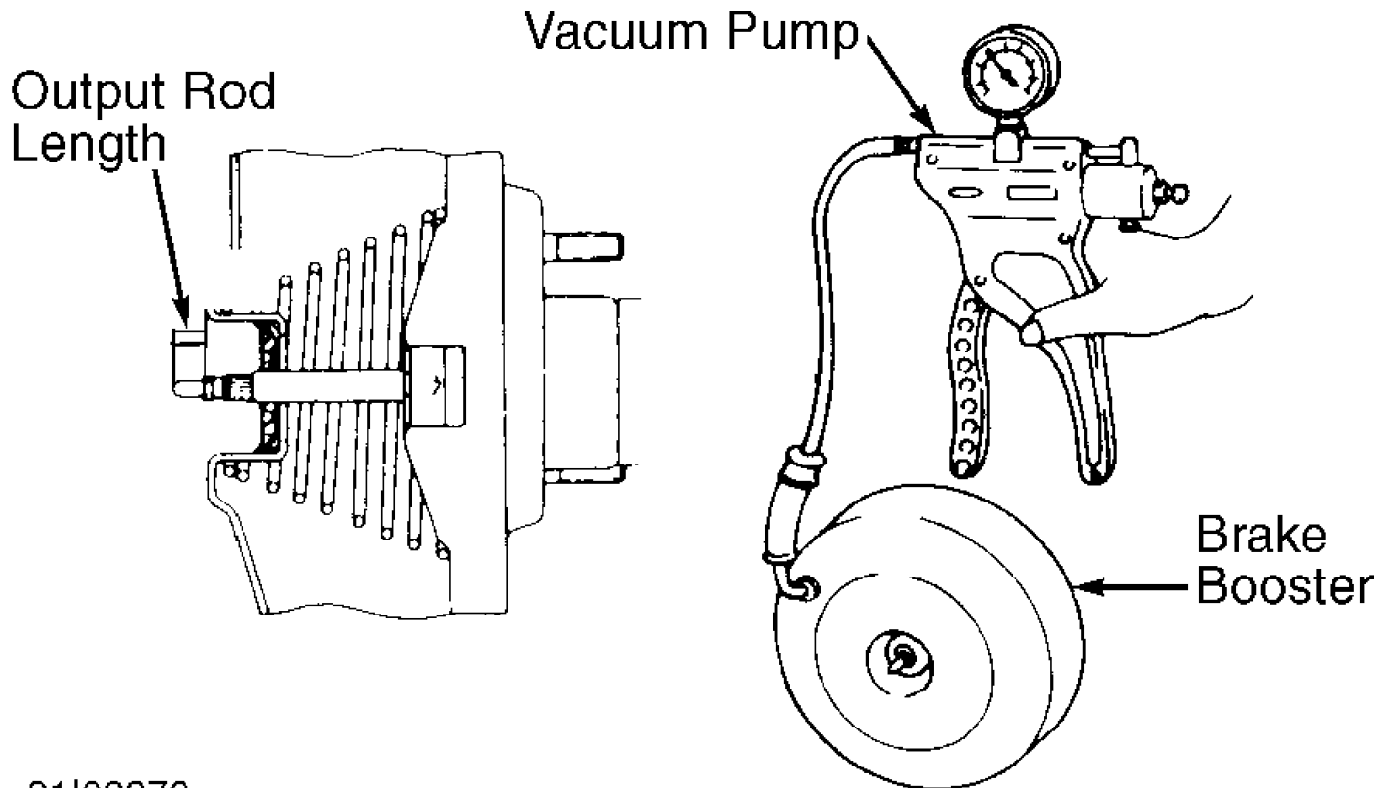
PARKING BRAKE LEVER STROKE SPECIFICATIONS TABLE

Application	Notches
Maxima & Stanza	9-11
240SX	6-8
300ZX	6-7

POWER BRAKE UNIT OUTPUT ROD

1) Attach a hand-held vacuum pump to power brake unit supply port. Apply 20 in. Hg vacuum to power brake unit. Measure length of output rod extending from power brake unit housing. See Fig. 6.

2) Output rod length should be .40-.41" (10.3-10.5 mm). Adjust output rod length, if necessary. See Fig. 6. If adjustment cannot be obtained, replace power brake unit.



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Fig. 6: Measuring Length of Output Rod Extending from Power Brake Unit Housing. Courtesy of Nissan Motor Co., U.S.A.

STOPLIGHT SWITCH & AUTOMATIC SPEED CONTROL DEVICE SWITCH

Clearance Adjustment

1) Both switches are located below dash panel at brake pedal bracket. Adjust brake pedal height. See BRAKE PEDAL HEIGHT & FREE PLAY under ADJUSTMENTS.

2) Check clearance and position of switches. Clearance between brake pedal stopper rubber and threaded end of switch should be .01-.04" (.3-1 mm). To adjust, loosen lock nut and turn switch body. After adjustment, tighten lock nut.

TROUBLE SHOOTING

SYMPTOMS

- Pedal Vibration & Noise - See Fig. 8.
- Long Stopping Distance - See Fig. 9.
- Abnormal Pedal Action - See Fig. 10.
- ABS Does Not Work - See Fig. 11.
- ABS Works But ANTI-LOCK Light Activates - See Fig. 12.

ABS Works Too Frequently - See Fig. 13, 14, 15, or 16.
ANTI-LOCK Light On, LED Does Not Flash - See Fig. 17.

DIAGNOSIS & TESTING

NOTE: Actuator testing requires the use of Tester (KV999P1000) and Adapter (KV999P1010).

PRE-INSPECTION

1) To correctly diagnose system, inspect all brake components for wear or damage. Ensure hydraulic system is full and no leaks exist. Ensure brake booster is functioning properly. Check air gap at each speed sensor. See WHEEL SPEED SENSOR AIR GAP TABLE.

2) On 240SX, measure rear speed sensor air gap by inserting feeler gauge between sensor mating face on differential to exciter ring on pinion flange. Measure speed sensor pole piece from sensor mating face to pole piece tip. Subtract sensor measurement from differential measurement to obtain air gap.

3) On all models, if air gap exceeds specification, replace speed sensor, pinion flange (240SX) or wheel hub assembly. Inspect rotor teeth. Replace rotor (and companion flange, if necessary) if teeth are damaged. Go to PRELIMINARY CHECK.

WHEEL SPEED SENSOR AIR GAP TABLE

Application	In. (mm)
Maxima & Stanza	
Front & Rear008-.039 (.20-1.00)
240SX	
Front011-.030 (.28-.75)
Rear014-.025 (.35-.63)
300ZX	
Front009-.028 (.23-.71)
Rear002-.037 (.05-.94)

PRELIMINARY CHECK

1) After completing PRE-INSPECTION, check resistance of each wheel speed sensor. If resistance is not 800-1200 ohms, replace sensor, and retest. If resistance is okay, turn ignition on and check ANTI-LOCK warning light operation. Light should illuminate when ignition is turned on. If light does not come on, check fuse, wiring and bulb for fault.

2) If warning light comes on, start engine and observe ANTI-LOCK warning light. Warning light should go out when engine is started. If warning light stays on after starting engine, leave ignition on and go to RETRIEVING TROUBLE CODES. If light goes off after starting engine, go to next step.

3) Drive vehicle for at least one minute at a minimum speed of 19 MPH. If warning light stays off during road test, no fault is present in ABS. If light comes on and stays on during road test, leave ignition on and go to RETRIEVING TROUBLE CODES. Ensure shielding wire ground for each sensor and ground for pump motors have continuity to ground.

RETRIEVING TROUBLE CODES

NOTE: ECU can store (and indicate with LED) only one trouble code at a time. After indicated code circuit is repaired, road

test vehicle and recheck codes for additional indicated faults.

If ANTI-LOCK light on instrument panel is on, a trouble code has been set. DO NOT turn ignition off. To retrieve trouble code, locate ECU. See Figs. 1-4. Count number of times LED on ECU flashes. See Fig. 7. See appropriate ABS TROUBLE CODES TABLE and go to appropriate trouble shooting chart to properly diagnose problem.

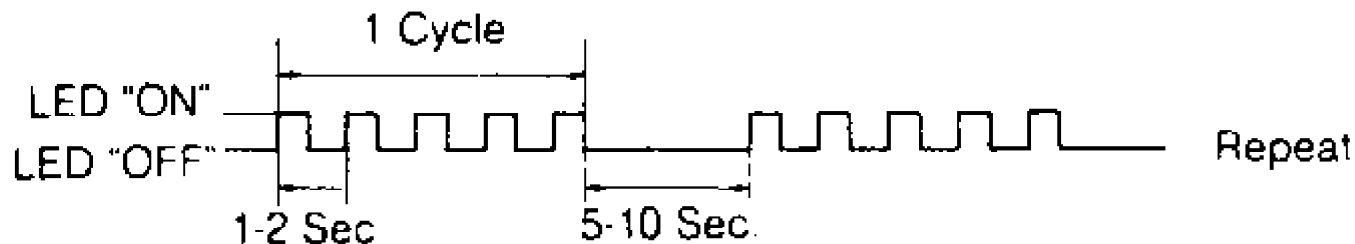


Fig. 7: Identifying Codes by Counting LED Flashes
Courtesy of Nissan Motor Co., U.S.A.

ABS TROUBLE CODES TABLE (MAXIMA & STANZA)

Trouble Code	Circuit	Go To
1	L/F Actuator Solenoid	Fig. 18
2	R/F Actuator Solenoid	Fig. 18
3	R/R Actuator Solenoid	Fig. 18
4	L/R Actuator Solenoid	Fig. 18
5	L/F Wheel Speed Sensor	Fig. 20
6	R/F Wheel Speed Sensor	Fig. 20
7	R/R Wheel Speed Sensor	Fig. 20
8	L/R Wheel Speed Sensor	Fig. 20
9	Pump Motor	Fig. 23
10	Solenoid Valve	Fig. 26/27
16 Or Continuous	ECU	(1)

(1) - Replace ABS control unit (ECU).

ABS TROUBLE CODES TABLE (240SX)

Trouble Code	Circuit	Go To
1	L/F Actuator Solenoid	Fig. 19
2	R/F Actuator Solenoid	Fig. 19
3 Or 4	Rear Actuator Solenoid	Fig. 19
5	L/F Wheel Speed Sensor	Fig. 21
6	R/F Wheel Speed Sensor	Fig. 21
7 Or 8	R/R Wheel Speed Sensor	Fig. 21
9	Pump Motor	Fig. 24
10	Solenoid Valve	Fig. 28
16 Or Continuous	ECU	(1)

(1) - Replace ABS control unit (ECU).

ABS TROUBLE CODES TABLE (300ZX)

Code	Circuit	Go To
1	L/F Actuator Solenoid	Fig. 19
2	R/F Actuator Solenoid	Fig. 19
3 Or 4	Rear Actuator Solenoid	Fig. 19
5	L/F Speed Sensor	Fig. 22
6	R/F Speed Sensor	Fig. 22
7	R/R Speed Sensor	Fig. 22
8	L/R Speed Sensor	Fig. 22
9	Actuator Motor, Motor Relay	Fig. 25
10	Actuator Sol. Relay	Fig. 29
16	ECU	(1)

(1) - Replace ABS control unit (ECU).

REMOVAL & INSTALLATION

ACTUATOR

Removal & Installation

Disconnect negative battery cable. Disconnect electrical connectors and hydraulic lines at actuator. Remove mounting bolts and actuator. To install, reverse removal procedure. Bleed brake system. See BLEEDING BRAKE SYSTEM.

ELECTRONIC CONTROL UNIT (ECU)

CAUTION: Before servicing ECU, ground yourself and ground the work area to discharge stored electricity. As little as a 30-volt charge created by static electricity can cause a total or degrading failure in ECU or other electronic components containing integrated circuits.

Removal & Installation

Disconnect negative battery cable. Locate ECU. See Figs. 1-4. Disconnect electrical connector and remove ECU. To install, reverse removal procedure.

WHEEL SPEED SENSORS

Removal & Installation

To remove front sensor or rear wheel speed sensor, remove sensor retaining bolt and sensor. To install, reverse removal procedure. Tighten sensor mounting bolts to specification. See TORQUE SPECIFICATIONS TABLE.

WHEEL SPEED SENSOR ROTORS

Removal & Installation

1) To remove front wheel speed sensor rotor, remove steering hub and axle assembly. To remove rear wheel speed sensor rotor on Maxima and Stanza, remove rear wheel hub bearing.

2) To remove rear speed sensor rotor on 240SX, remove drive shaft and drive pinion flange. To remove rear speed sensor rotor on 300ZX, remove with differential side flange after removing axle shaft. To install components, reverse removal procedure.

DIAGNOSTIC TROUBLE SHOOTING CHARTS

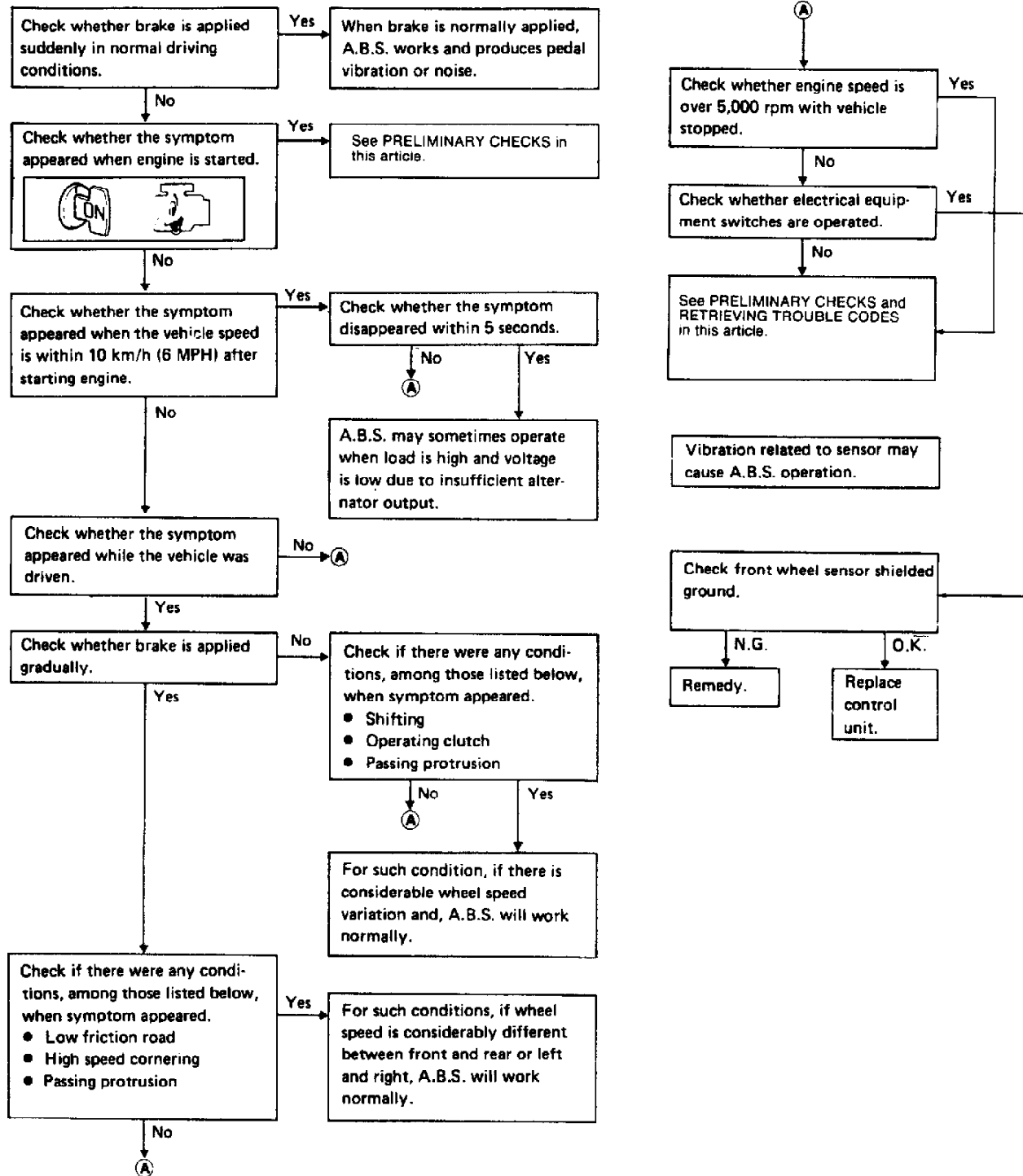


Fig. 8: No Code - Pedal Vibration & Noise Troubleshooting Chart
Courtesy of Nissan Motor Co., U.S.A.

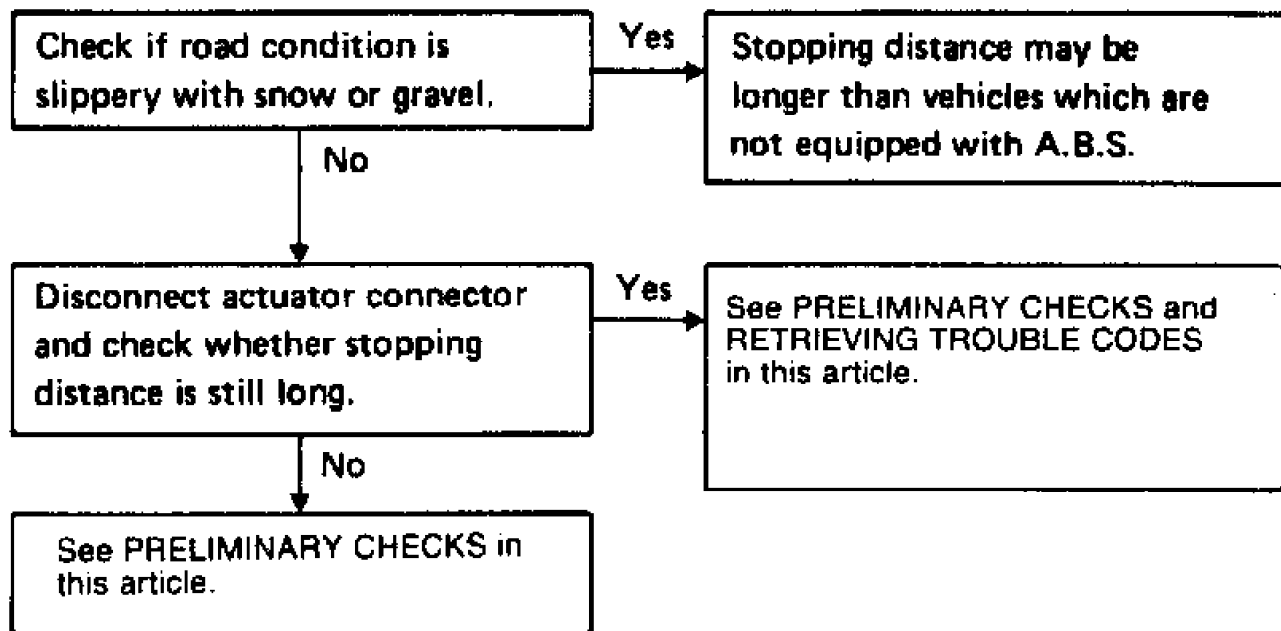


Fig. 9: No Code - Long Stopping Distance Trouble Shooting Chart
 Courtesy of Nissan Motor Co., U.S.A.

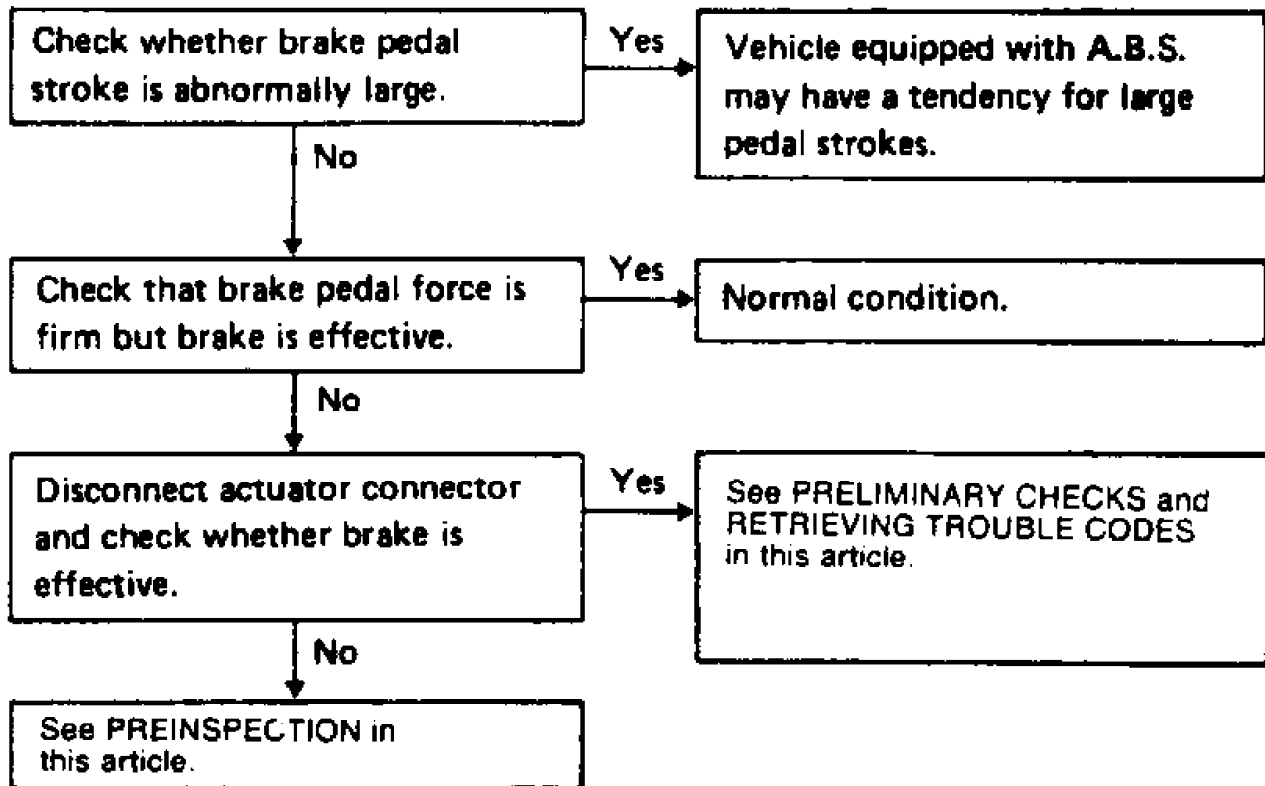


Fig. 10: No Code - Abnormal Pedal Action Trouble Shooting Chart
 Courtesy of Nissan Motor Co., U.S.A.

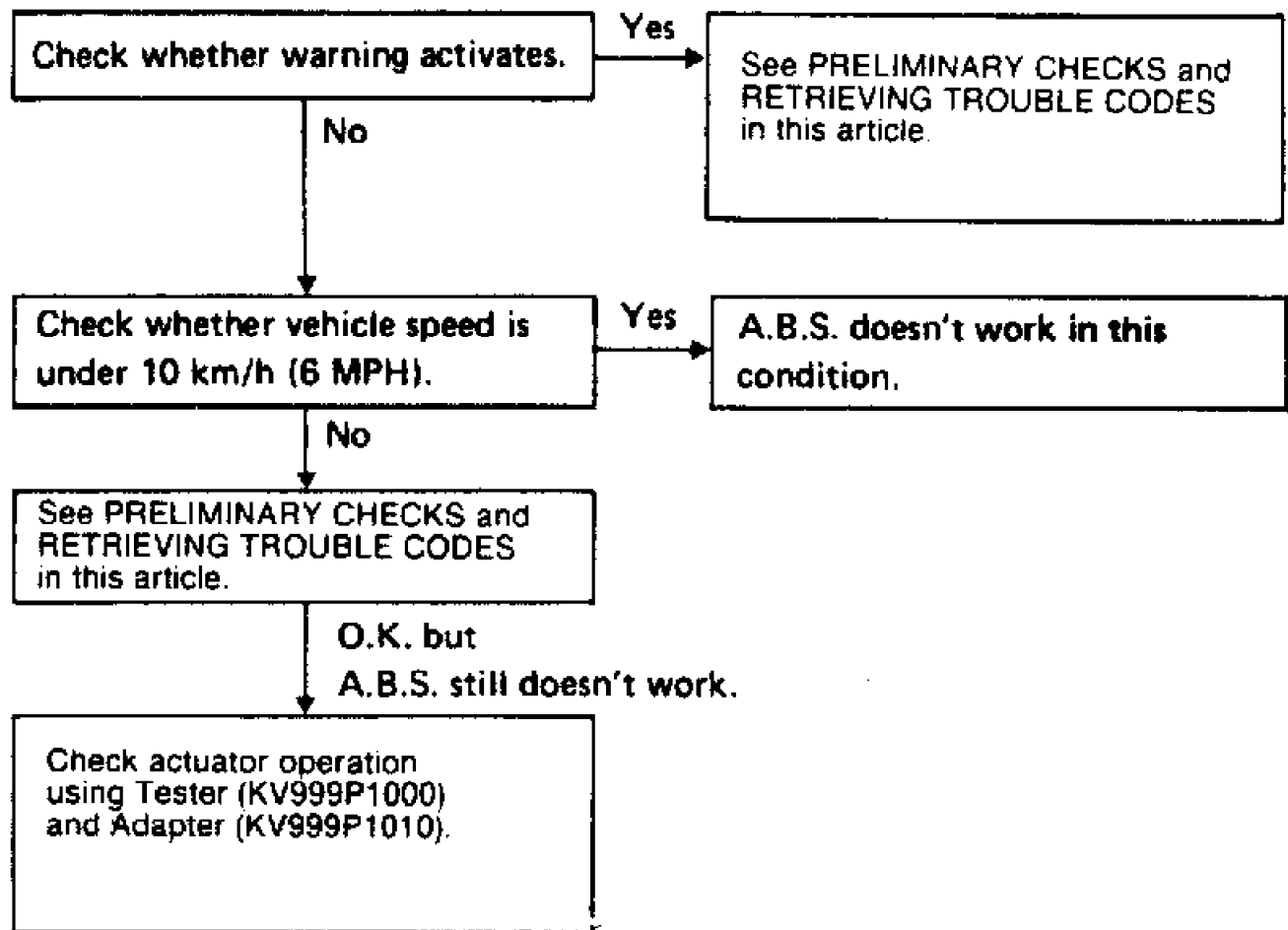


Fig. 11: ABS Does Not Work Trouble Shooting Chart
Courtesy of Nissan Motor Co., U.S.A.

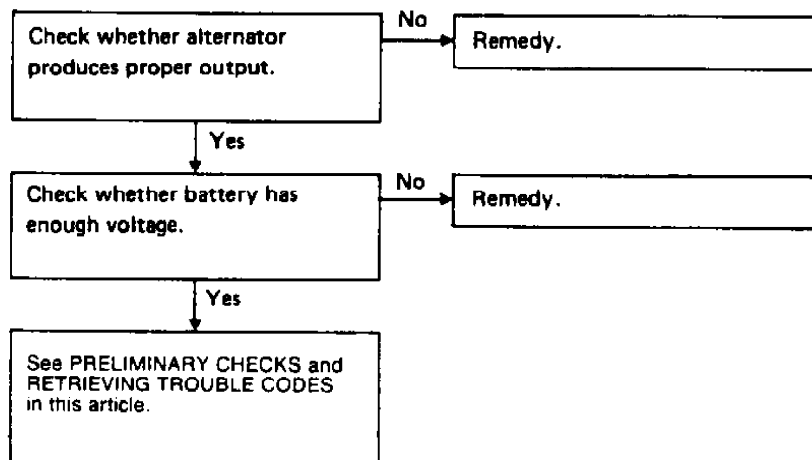


Fig. 12: No-Code - ABS Works, But ANTI-LOCK Light Activates Trouble Shooting Chart. Courtesy of Nissan Motor Co., U.S.A.

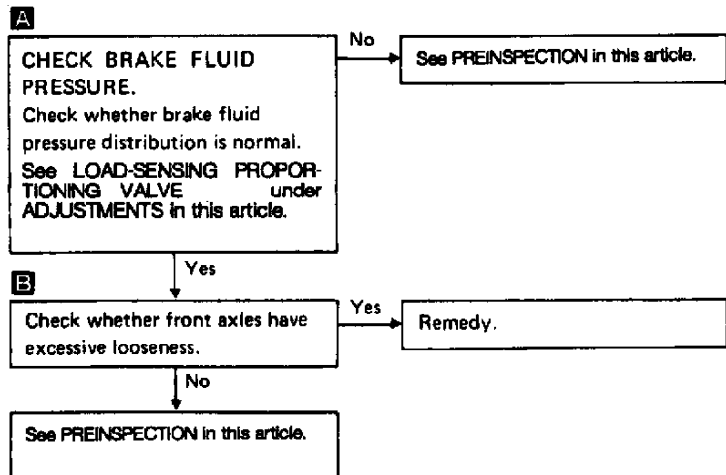
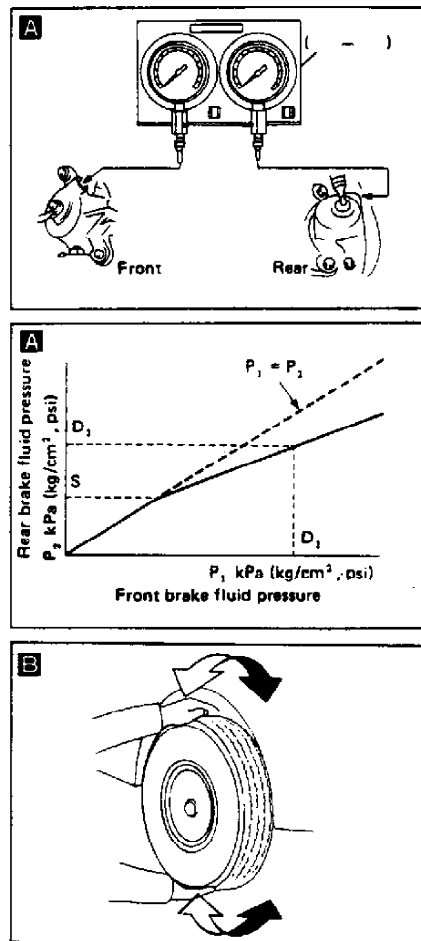


Fig. 13: No Code - ABS Works Too Frequently Trouble Shooting Chart Maxima. Courtesy of Nissan Motor Co., U.S.A.

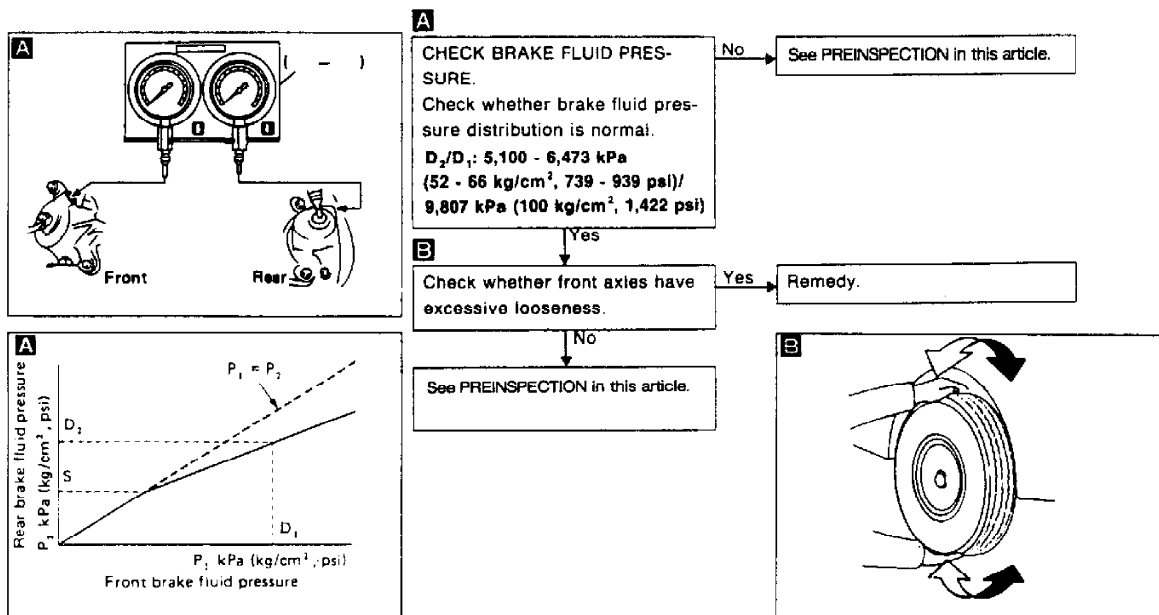


Fig. 14: No Code - ABS Works Too Frequently Trouble Shooting Chart Stanza. Courtesy of Nissan Motor Co., U.S.A.

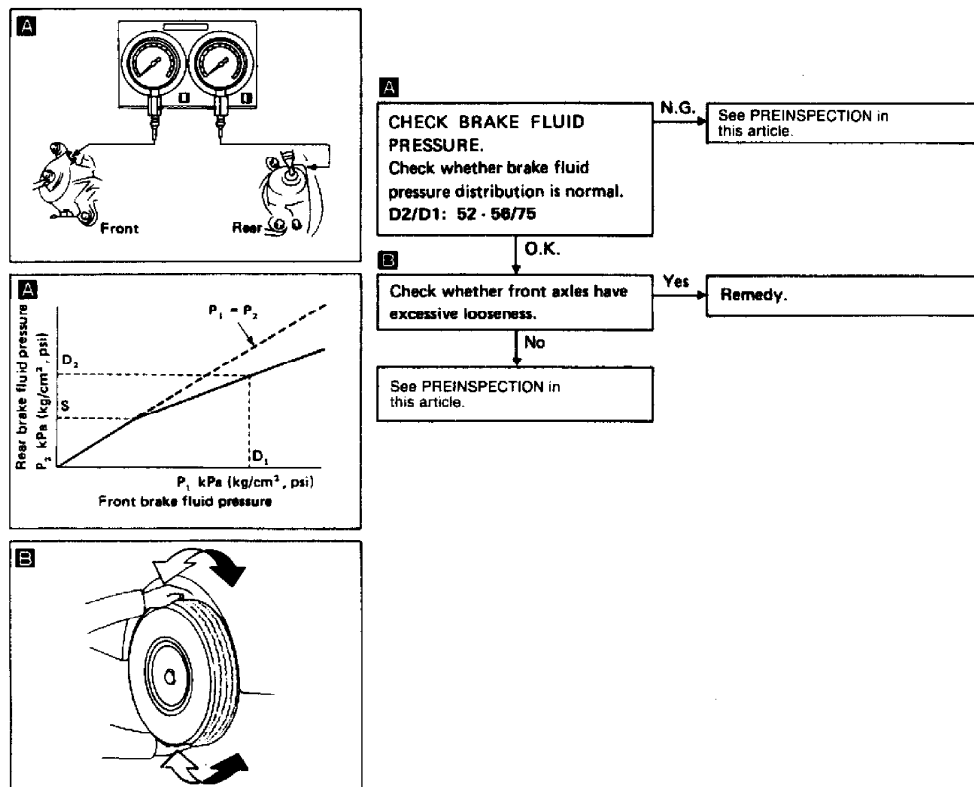


Fig. 15: No Code - ABS Works Too Frequently Trouble Shooting Chart 240SX. Courtesy of Nissan Motor Co., U.S.A.

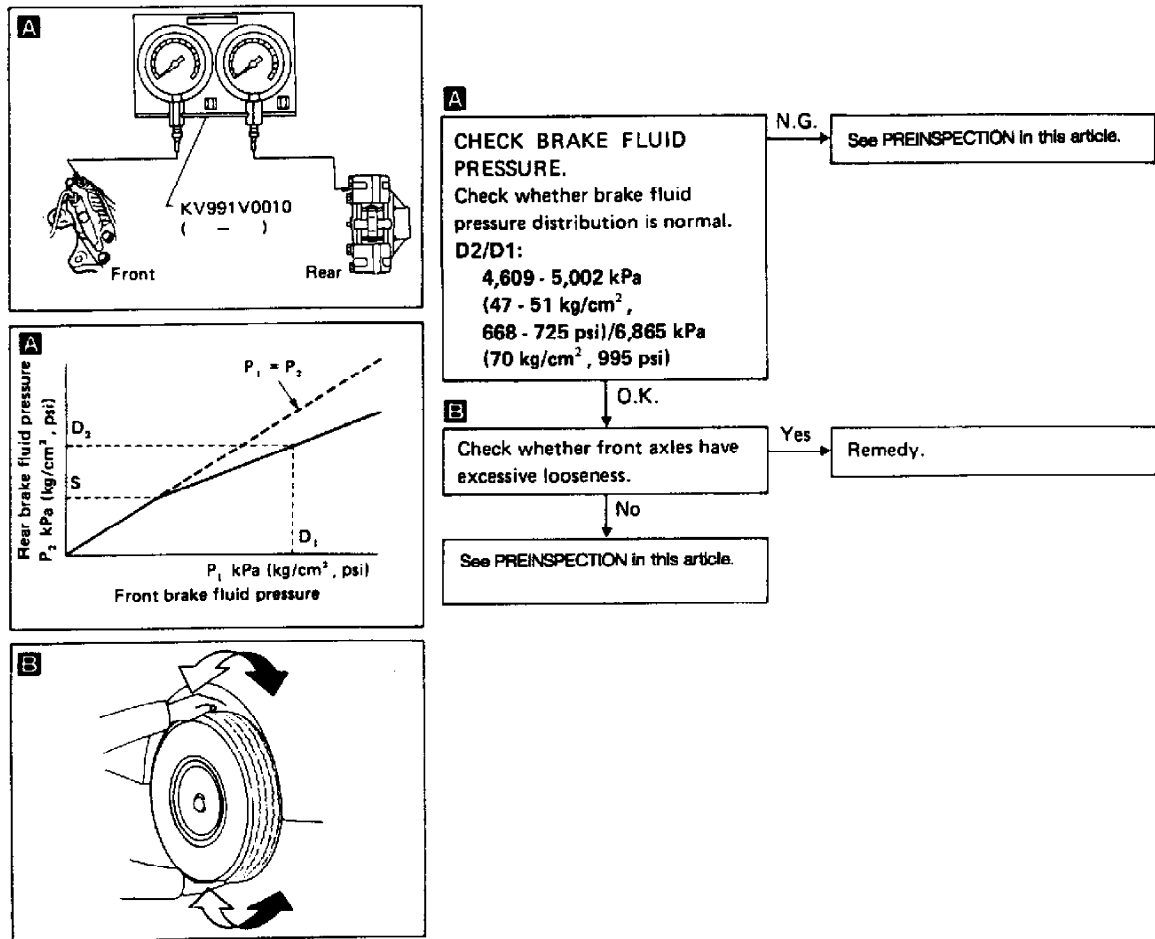
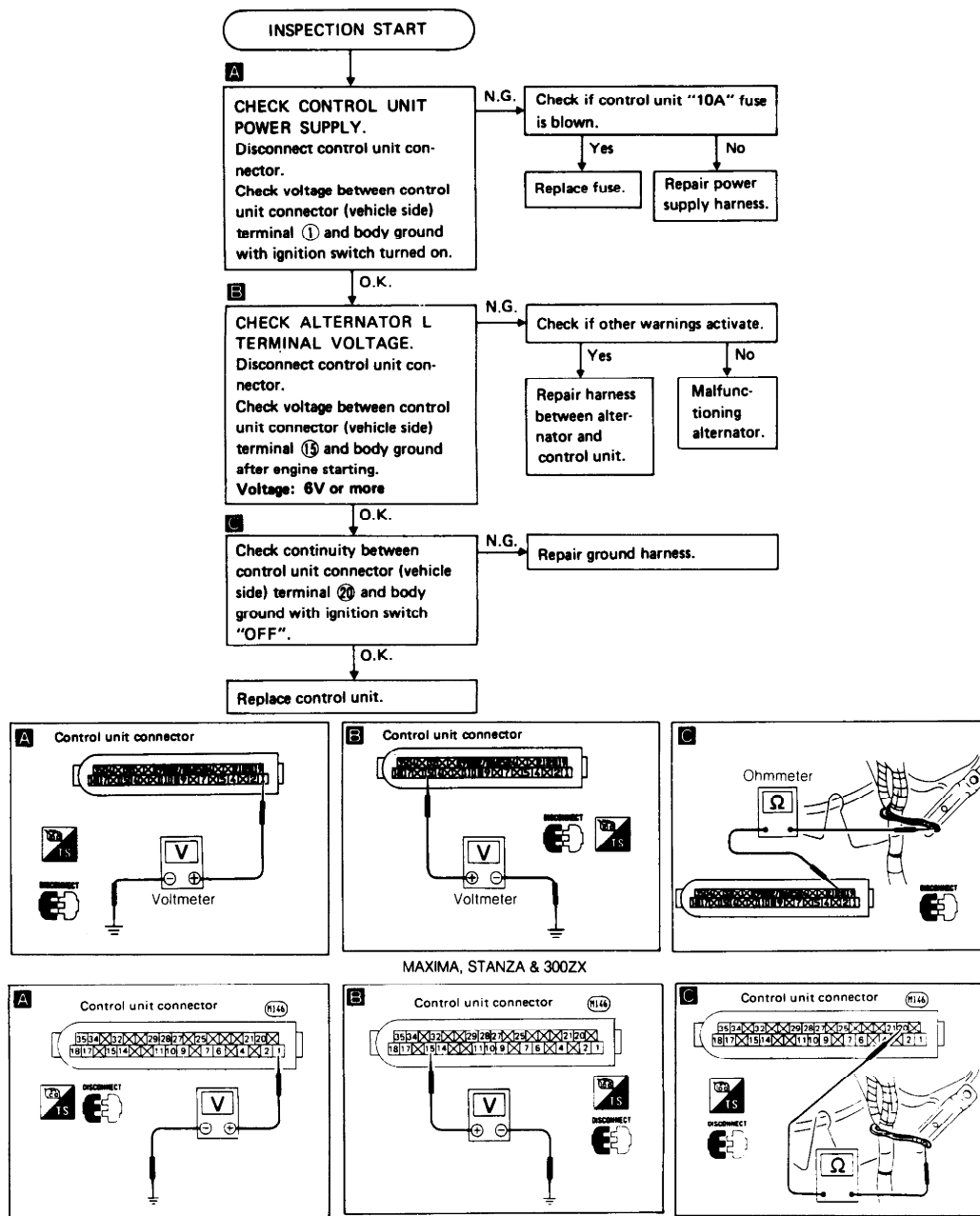


Fig. 16: No Code - ABS Works Too Frequently Trouble Shooting Chart 300ZX. Courtesy of Nissan Motor Co., U.S.A.



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240SX

Fig. 17: No Code - ANTI-LOCK Light On, LED Does Not Flash Trouble Shooting Chart. Courtesy of Nissan Motor Co., U.S.A.

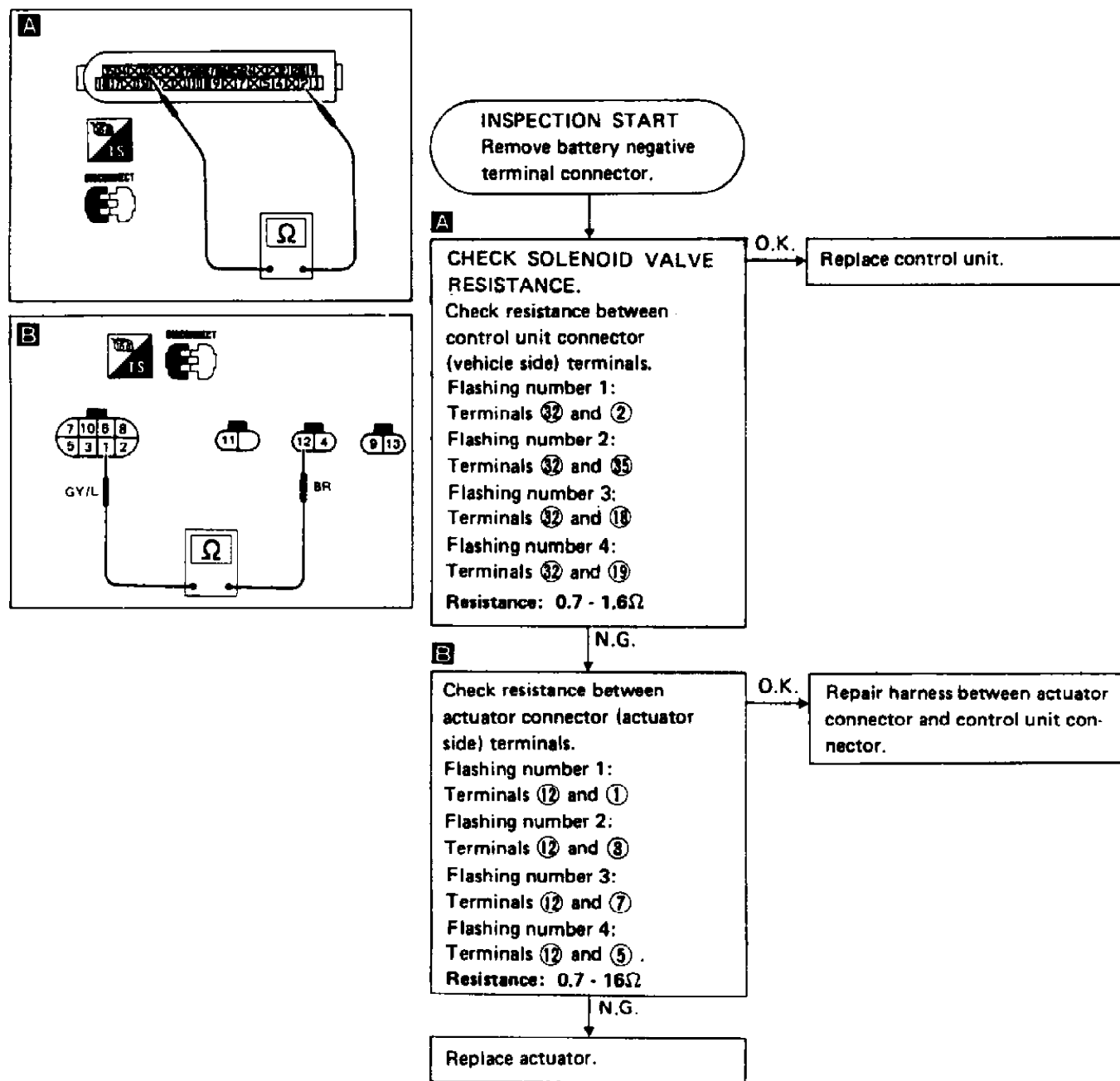
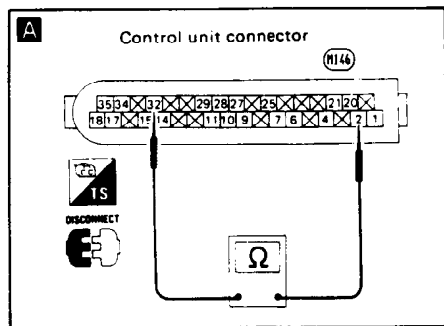
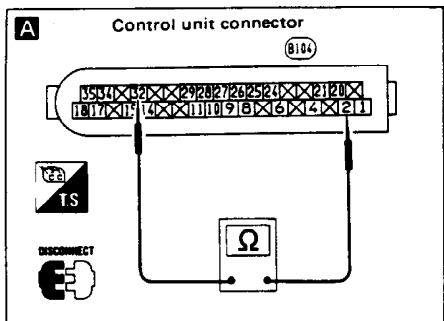


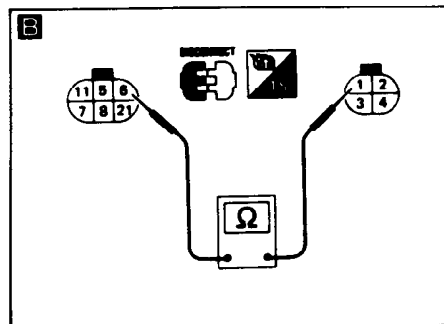
Fig. 18: Codes 1-4 - Actuator Solenoid Circuit Trouble Shooting Chart Maxima & Stanza. Courtesy of Nissan Motor Co., U.S.A.



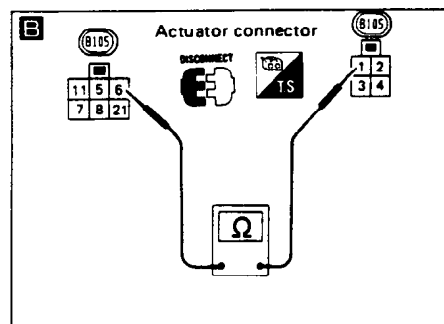
240SX



300ZX

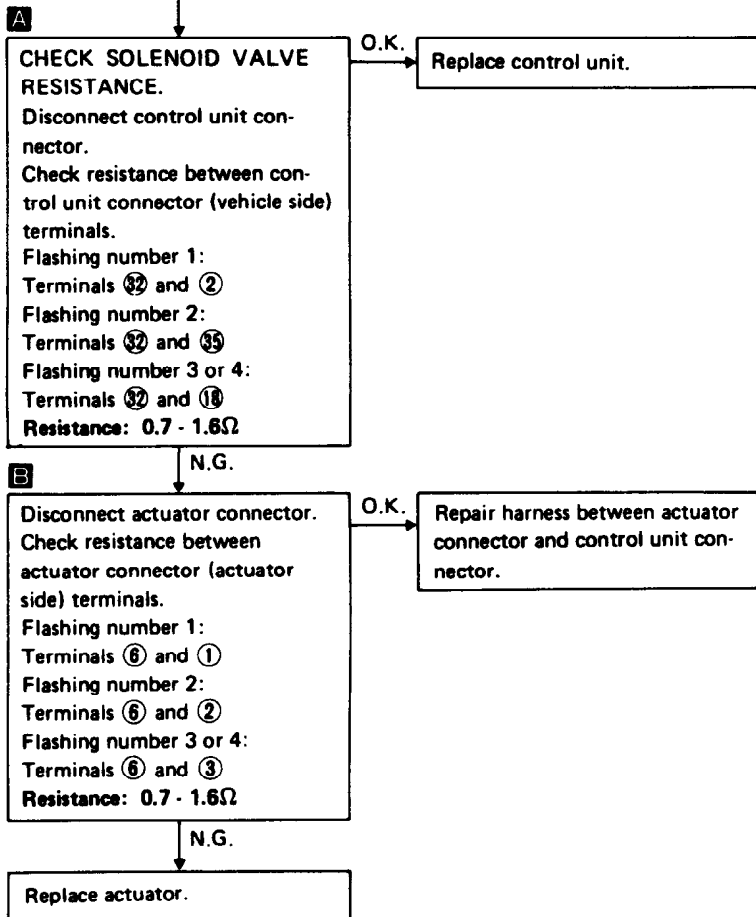


240SX



300ZX

INSPECTION START
Remove battery negative terminal connector.



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Fig. 19: Codes 1-4 - Actuator Solenoid Circuit Trouble Shooting Chart 240SX & 300ZX. Courtesy of Nissan Motor Co., U.S.A.

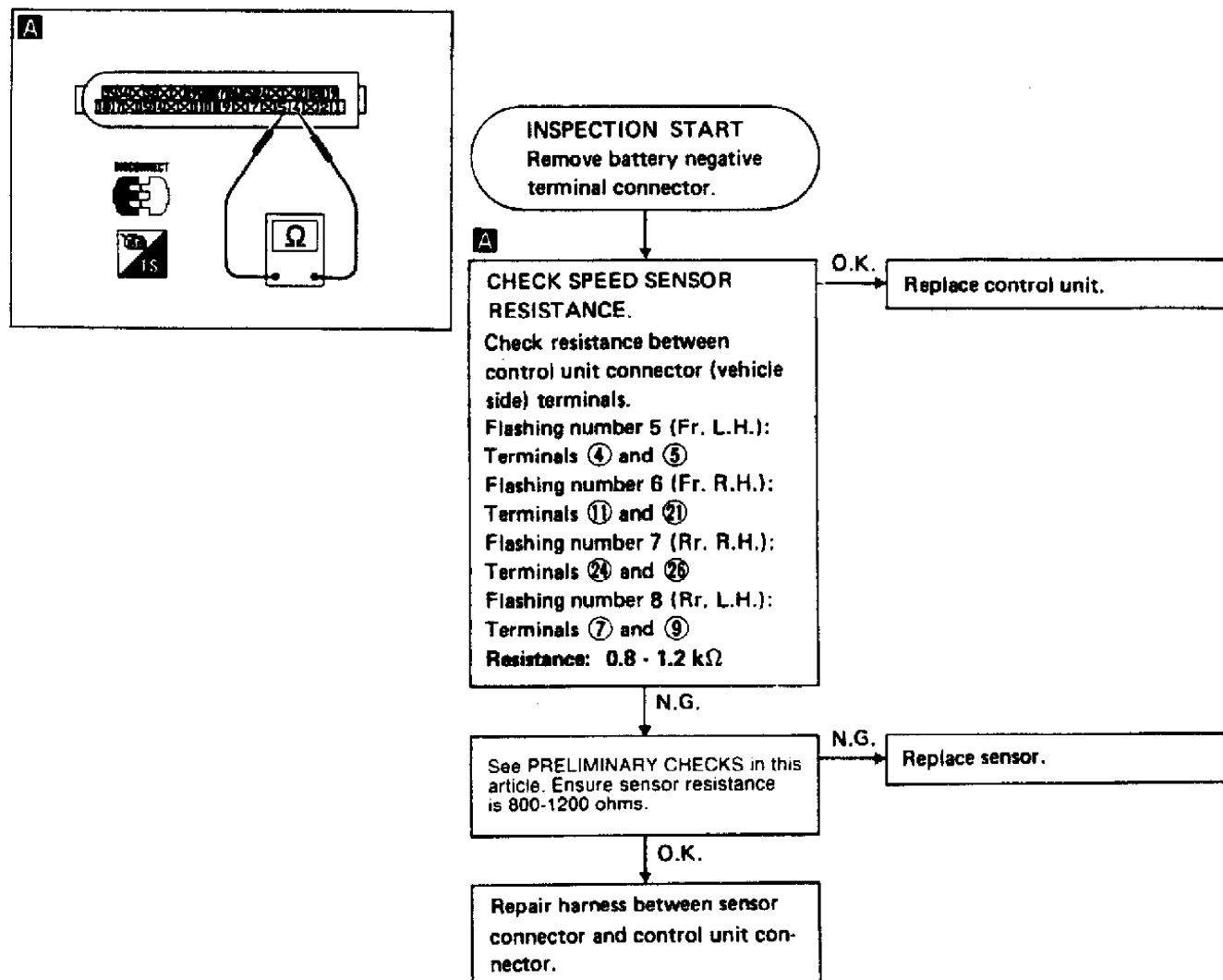


Fig. 20: Codes 5-8 - Wheel Speed Sensor Circuit Trouble Shooting Chart Maxima & Stanza. Courtesy of Nissan Motor Co., U.S.A.

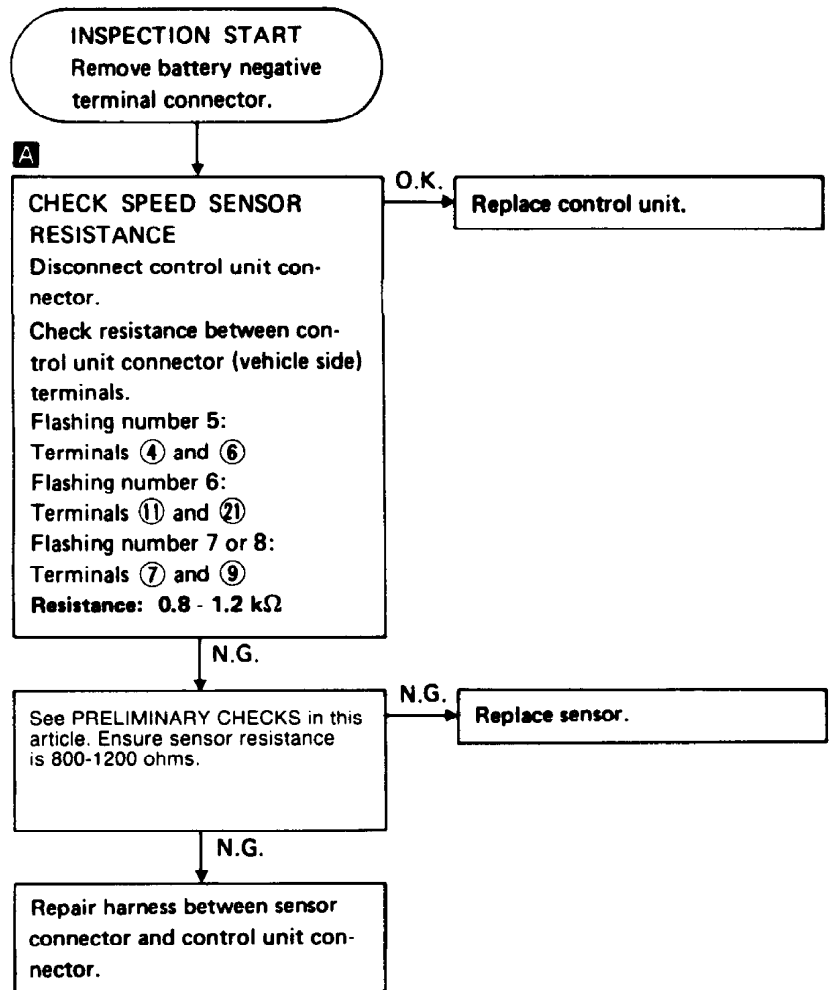
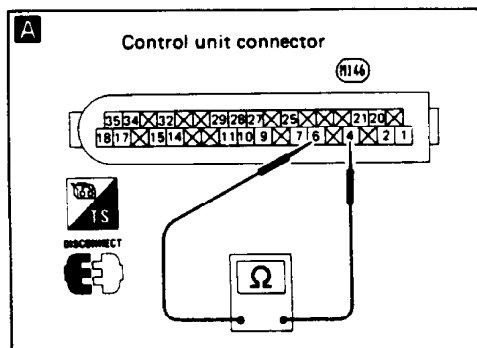


Fig. 21: Codes 5-8 - Wheel Speed Sensor Circuit Trouble Shooting Chart 240SX. Courtesy of Nissan Motor Co., U.S.A.

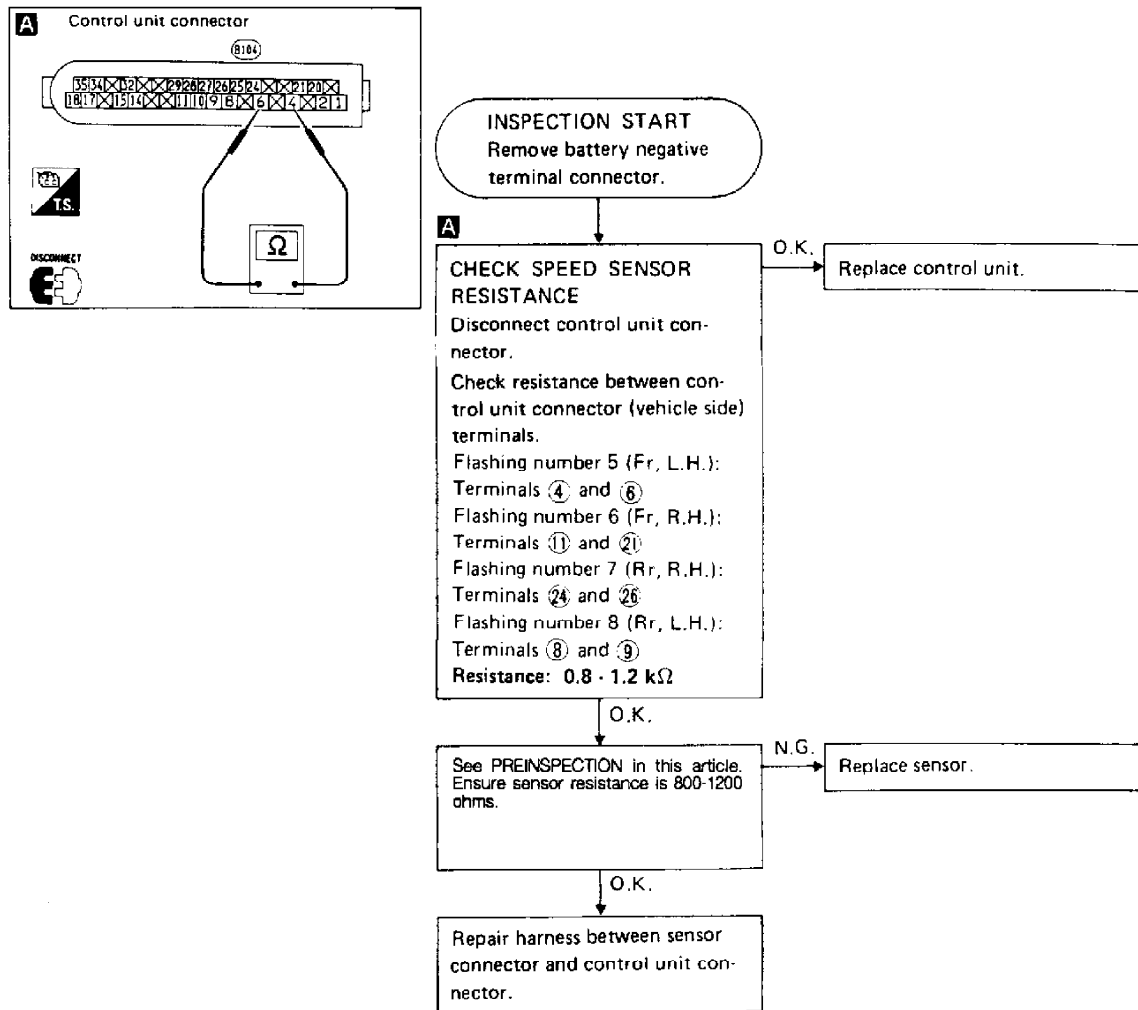


Fig. 22: Codes 5-8 - Wheel Speed Sensor Circuit Trouble Shooting Chart 300ZX. Courtesy of Nissan Motor Co., U.S.A.

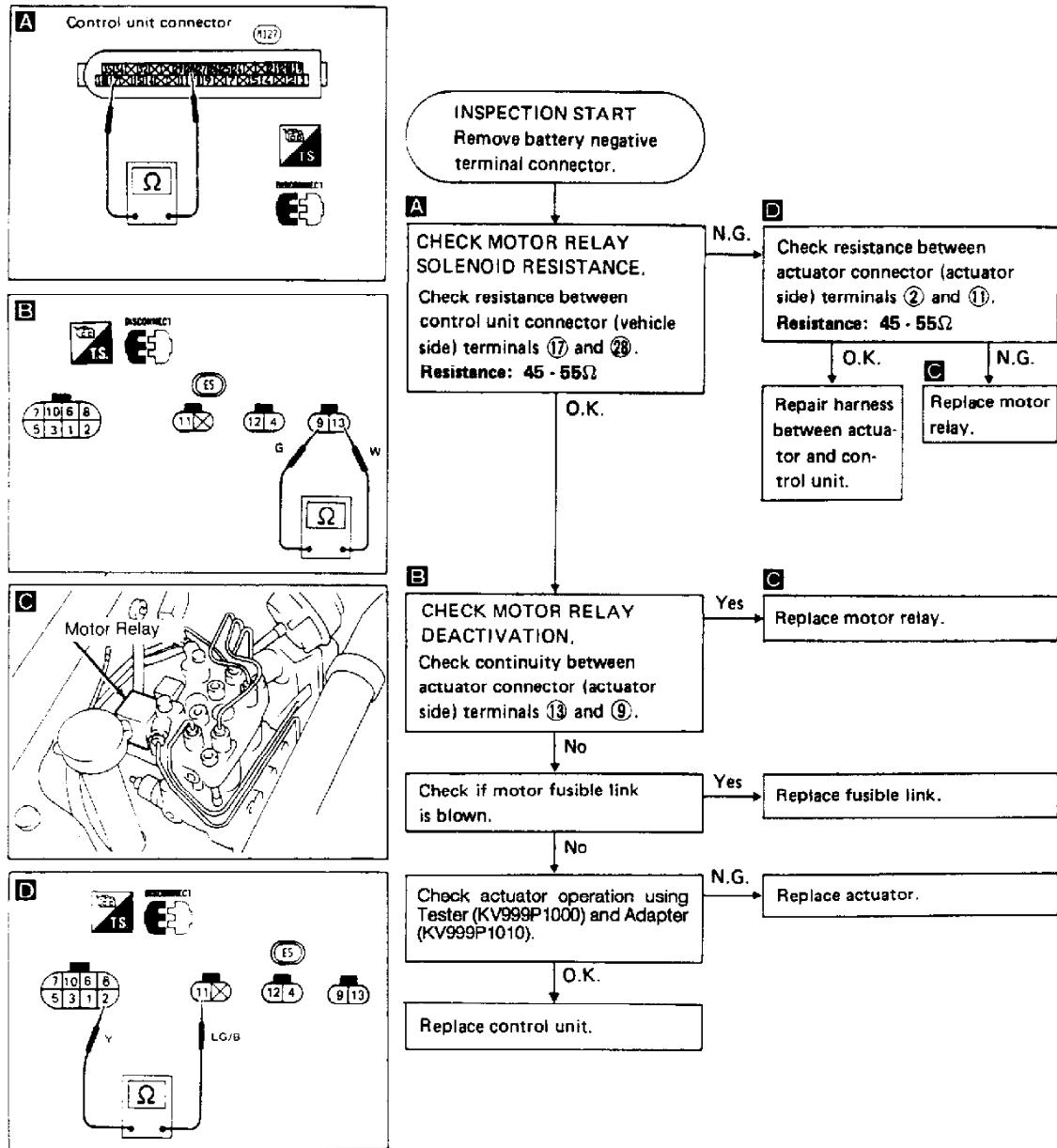


Fig. 23: Code 9 - Pump Motor Circuit Trouble Shooting Chart
Maxima & Stanza. Courtesy of Nissan Motor Co., U.S.A.

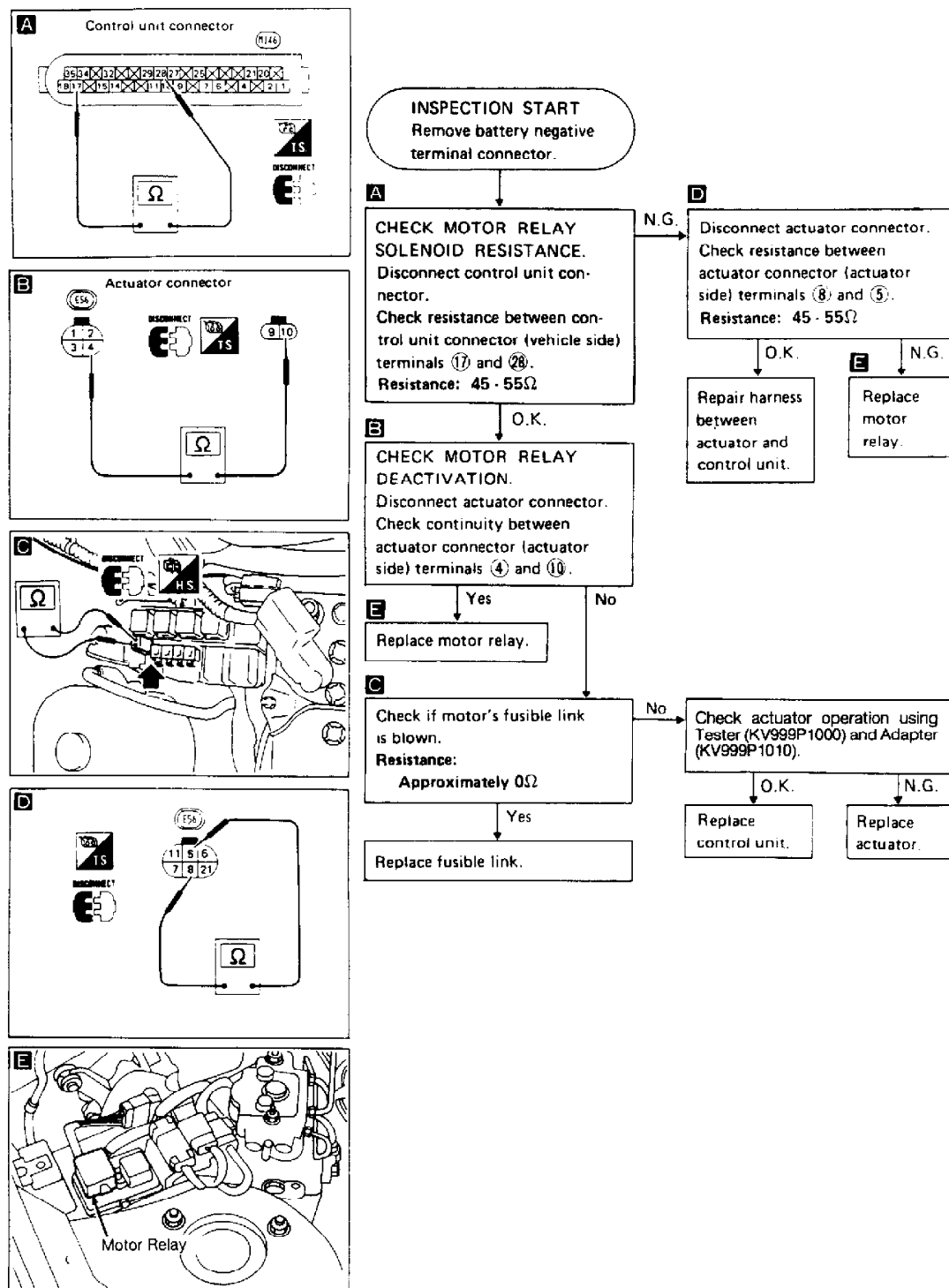


Fig. 24: Code 9 - Pump Motor Circuit Trouble Shooting Chart (240SX)
Courtesy of Nissan Motor Co., U.S.A.

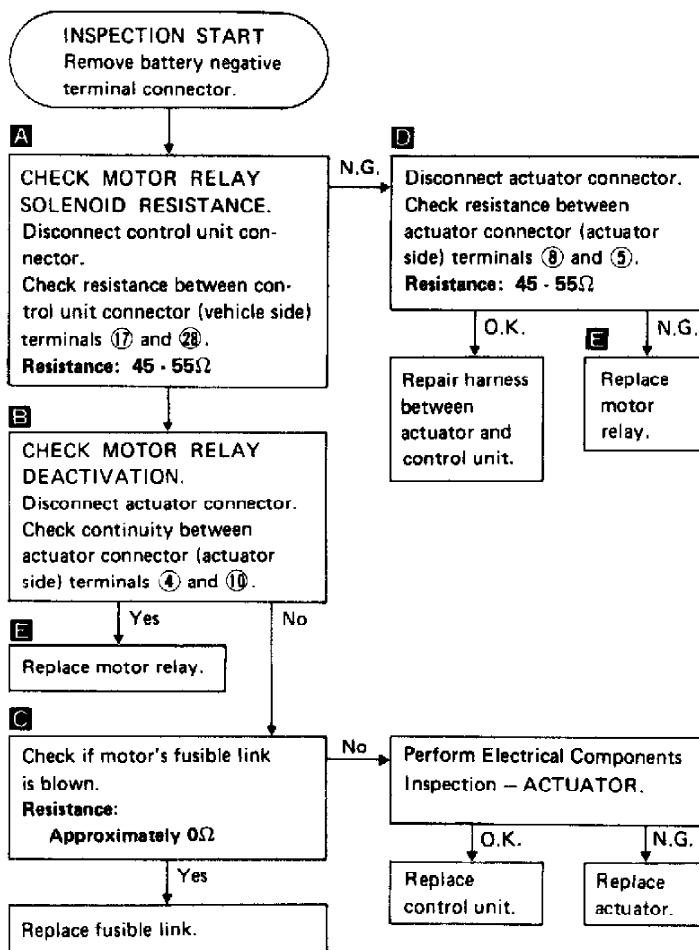
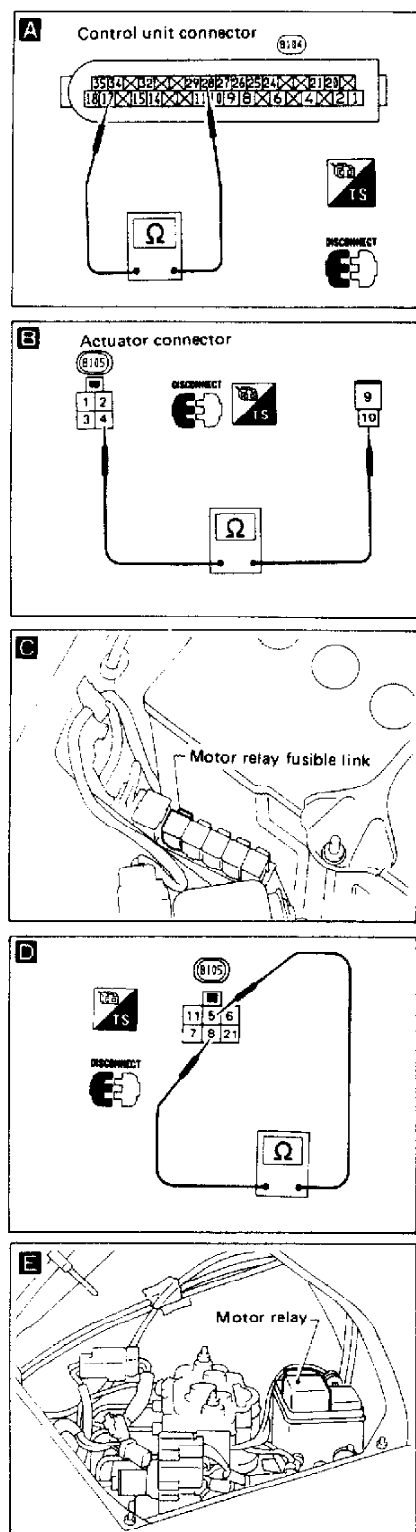


Fig. 25: Code 9 - Pump Motor Circuit Trouble Shooting Chart (300ZX)
Courtesy of Nissan Motor Co., U.S.A.

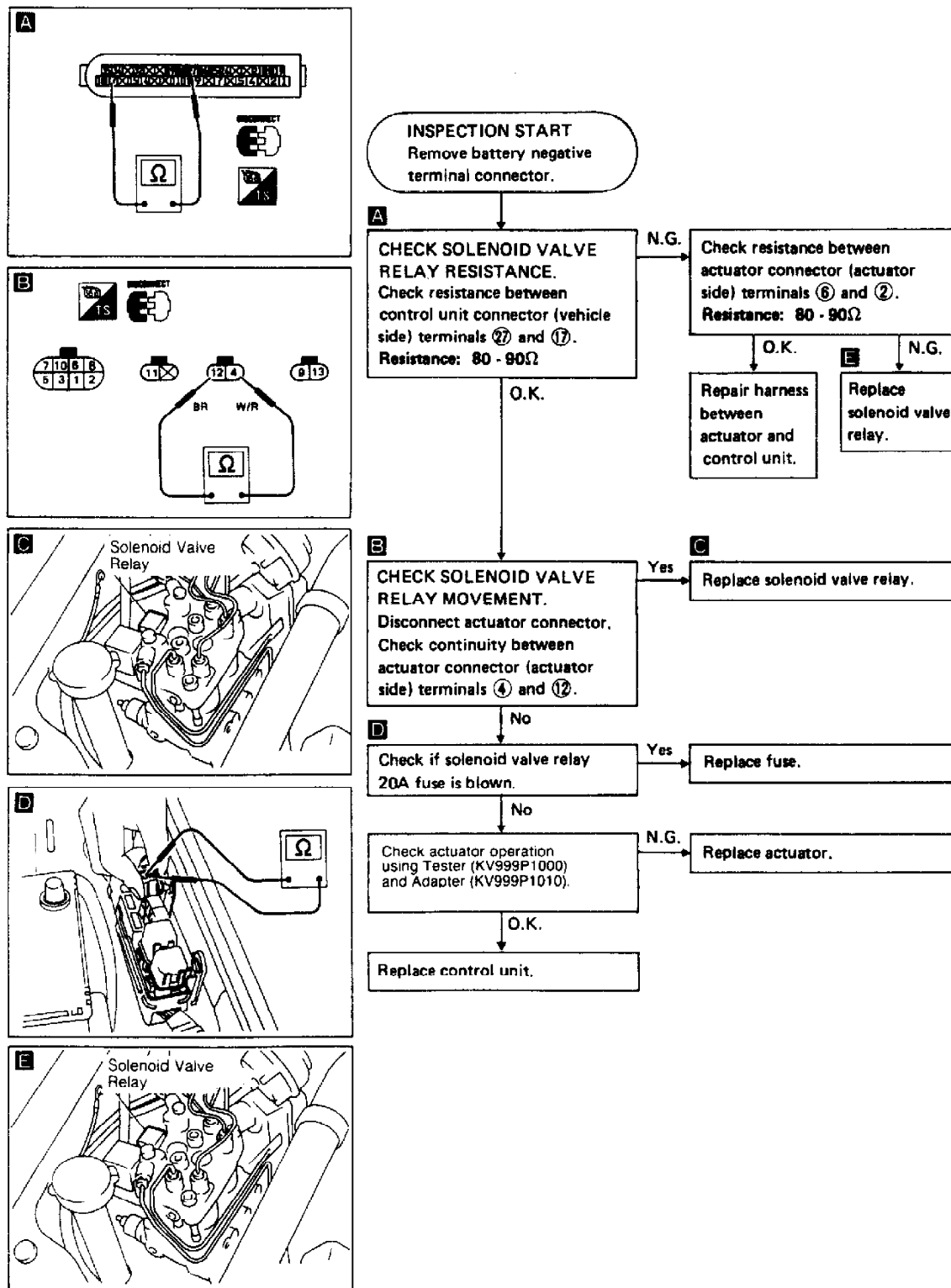


Fig. 26: Code 10 - Solenoid Valve Circuit Trouble Shooting Chart Maxima. Courtesy of Nissan Motor Co., U.S.A.

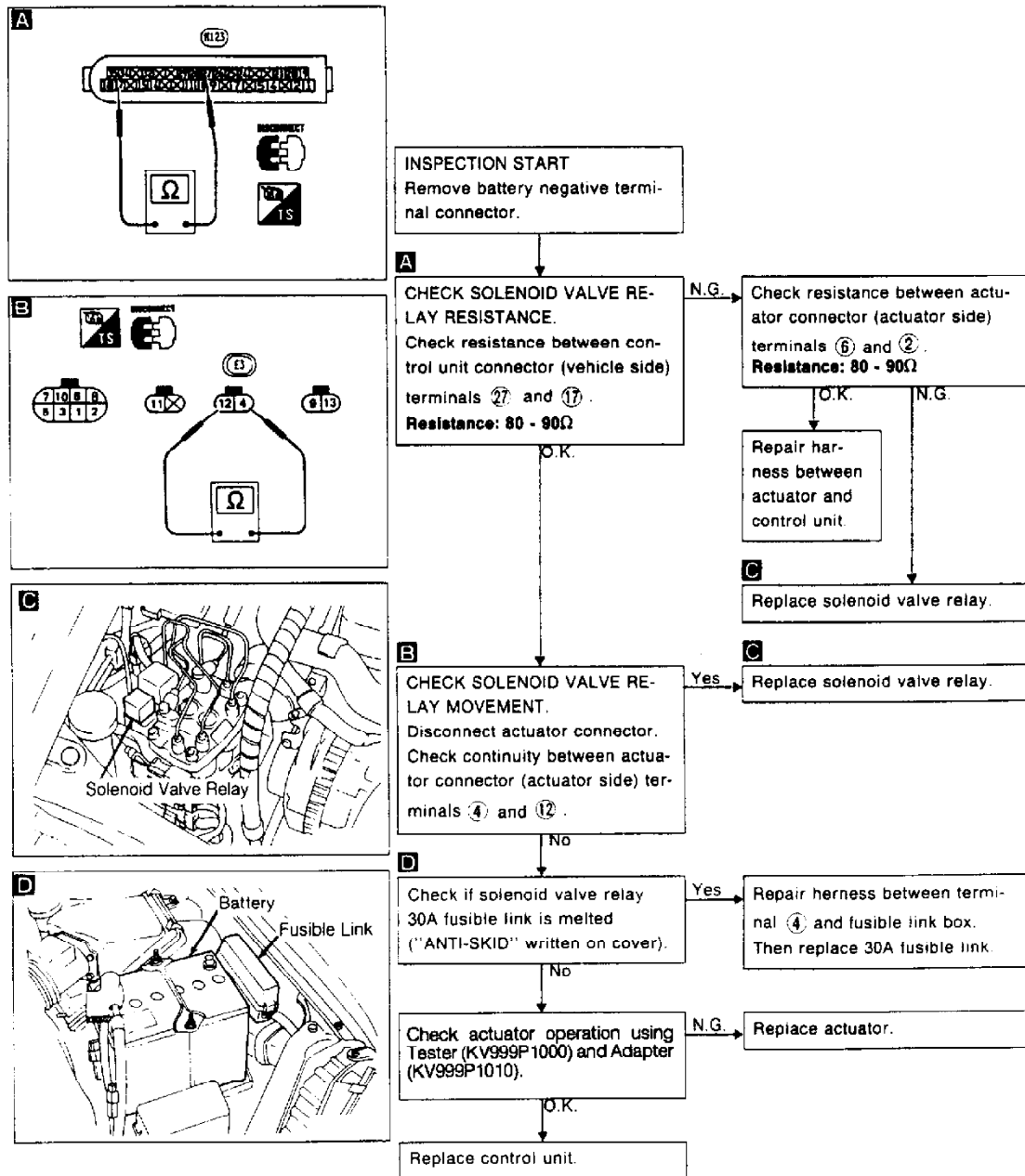
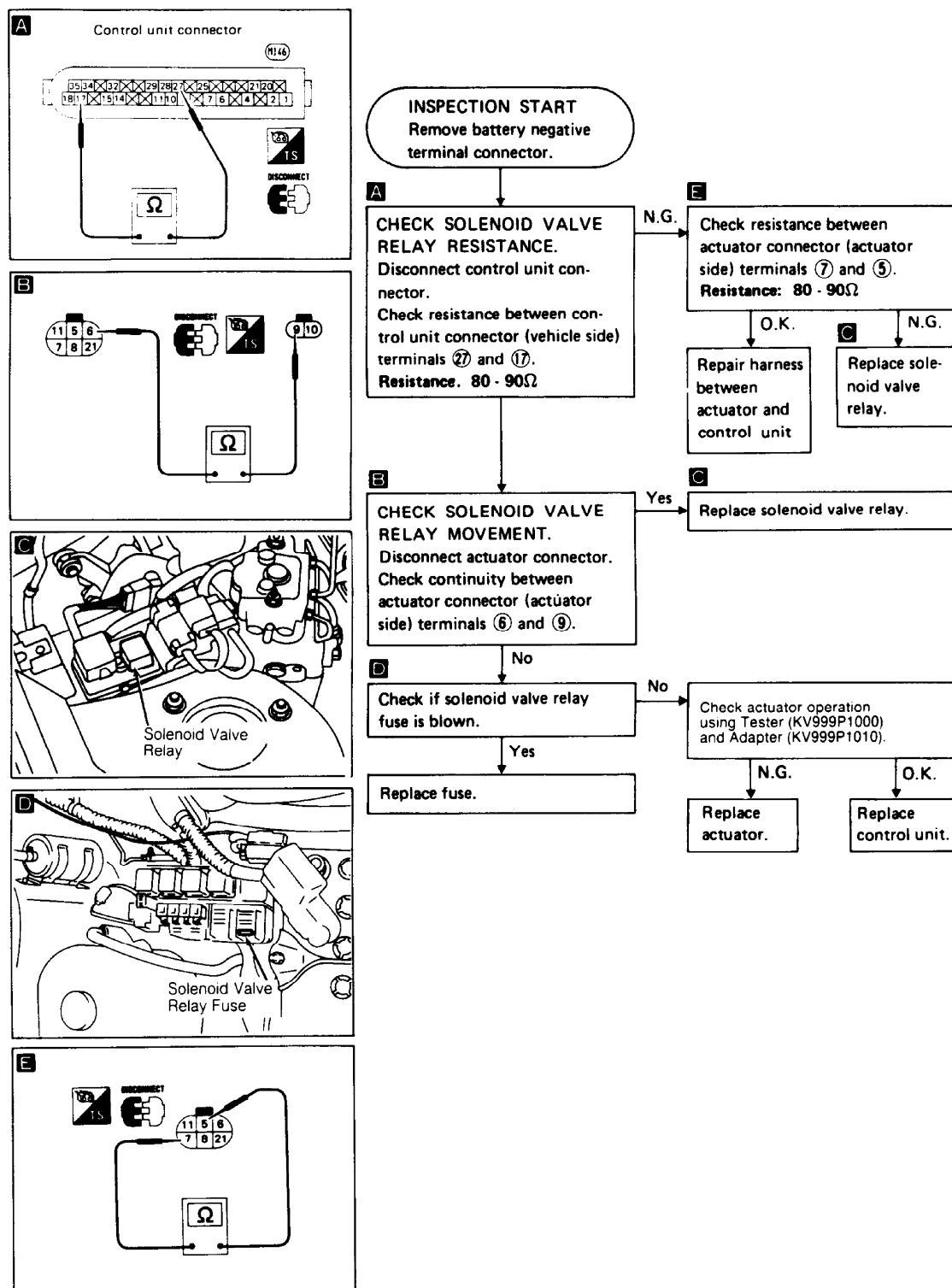


Fig. 27: Code 10 - Solenoid Valve Circuit Trouble Shooting Chart
Stanza. Courtesy of Nissan Motor Co., U.S.A.



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Fig. 28: Code 10 - Solenoid Valve Circuit Trouble Shooting Chart 240SX. Courtesy of Nissan Motor Co., U.S.A.

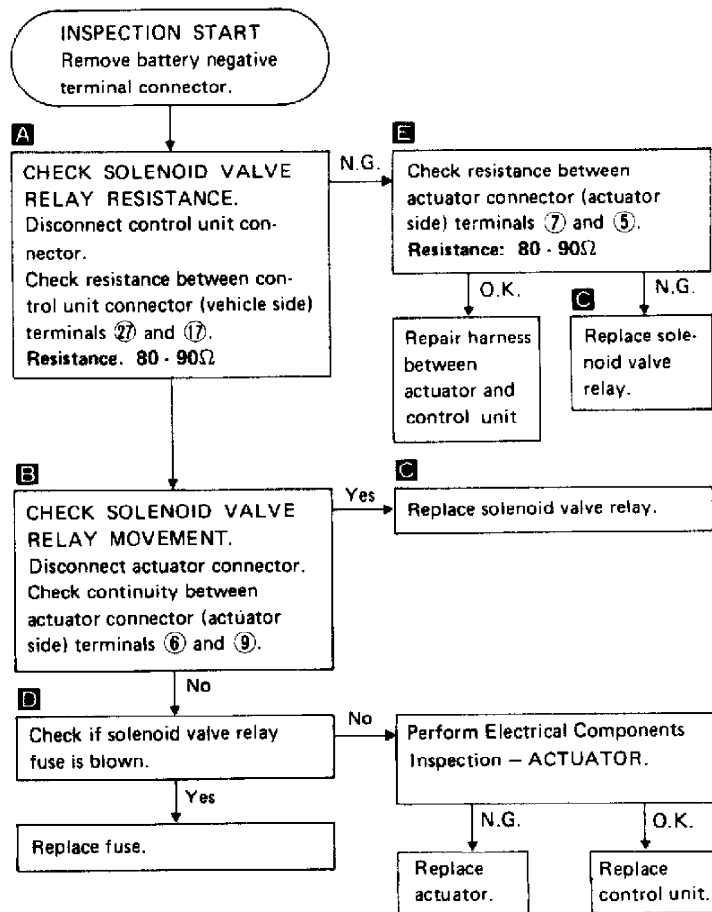
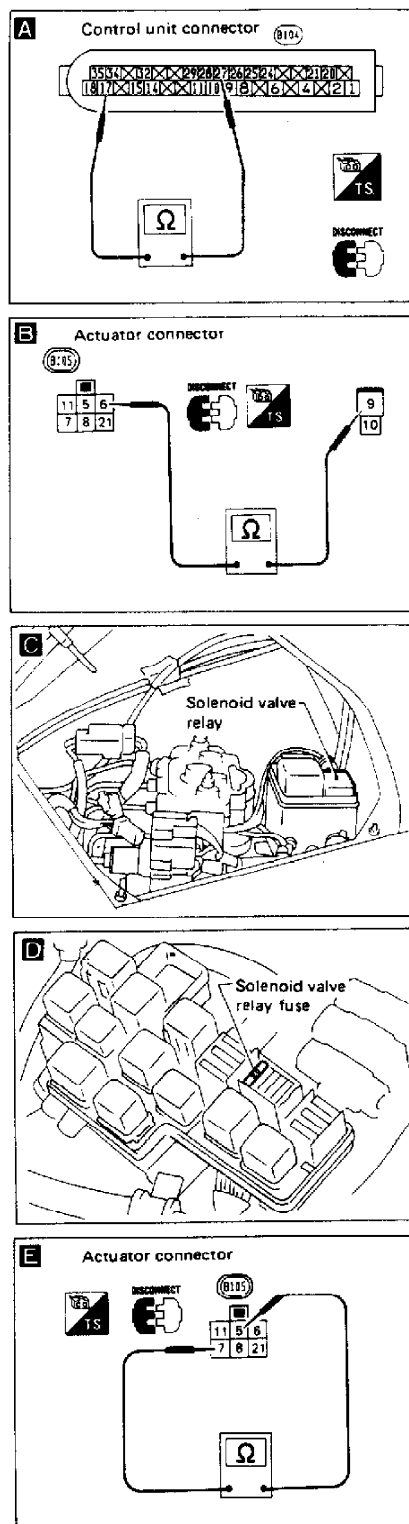


Fig. 29: Code 10 - Solenoid Valve Circuit Trouble Shooting Chart 300ZX. Courtesy of Nissan Motor Co., U.S.A.

TORQUE SPECIFICATIONS

TORQUE SPECIFICATIONS TABLE

Application	Ft. Lbs. (N.m)
Hydraulic Brake Lines At Actuator	14-18 (19-24)
Wheel Lug Nuts	72-87 (98-118)
Wheel Speed Sensor Mounting Bolt	
Maxima & Stanza	13-17 (18-23)
240SX & 300ZX	13-20 (18-27)

WIRING DIAGRAMS

For additional wiring diagrams, see appropriate chassis wiring in WIRING DIAGRAMS.

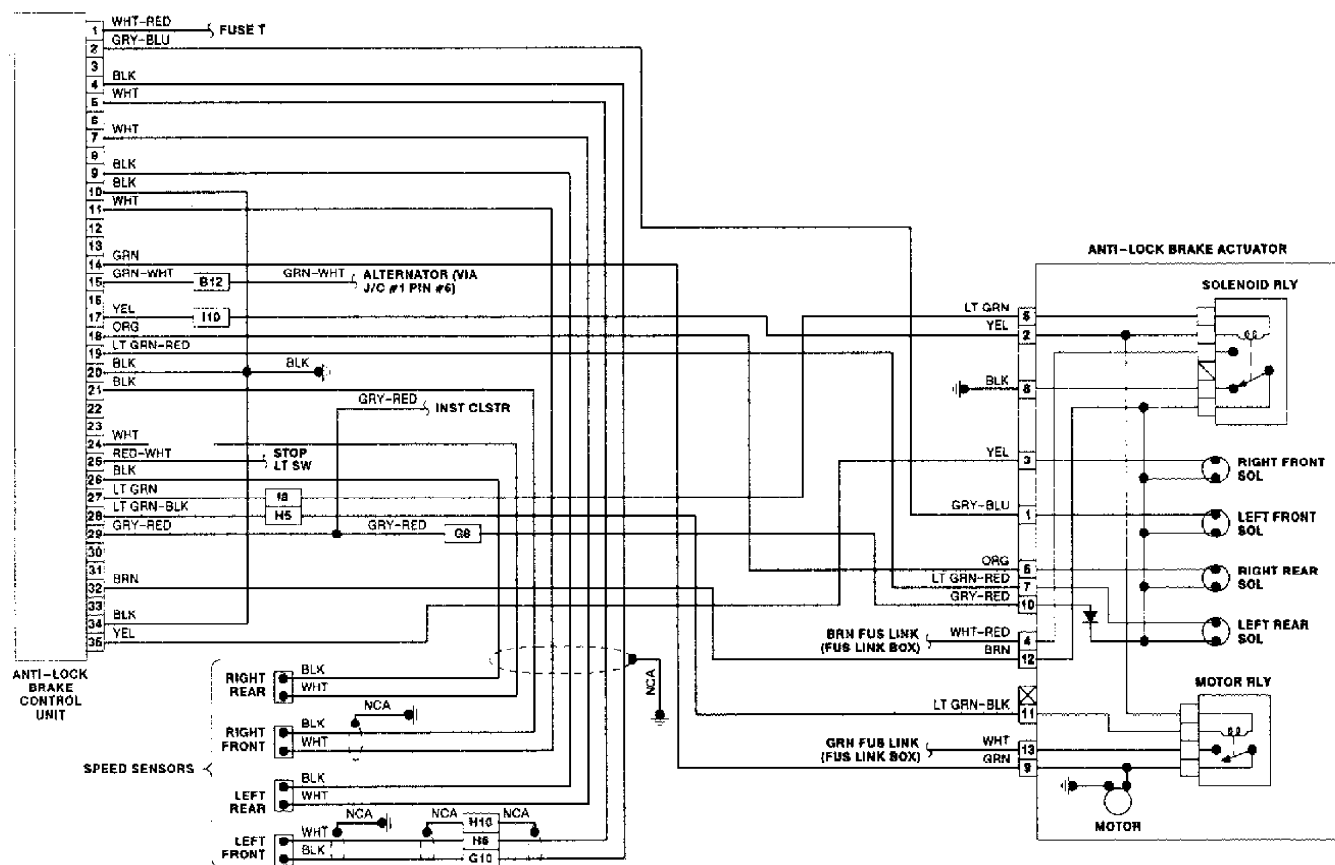


Fig. 30: ABS Wiring Diagram (1989-90 Maxima)

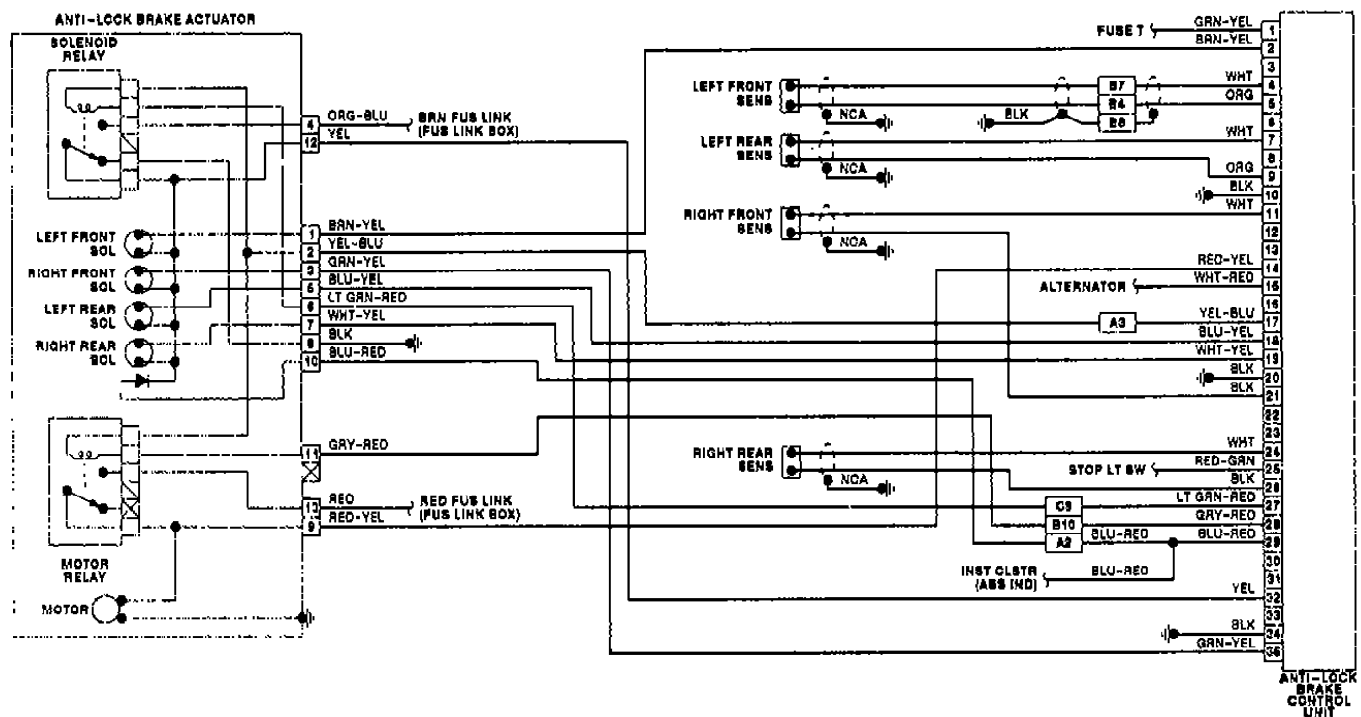


Fig. 31: Anti-Lock Brake (ABS) Wiring Diagram (1990 Stanza)

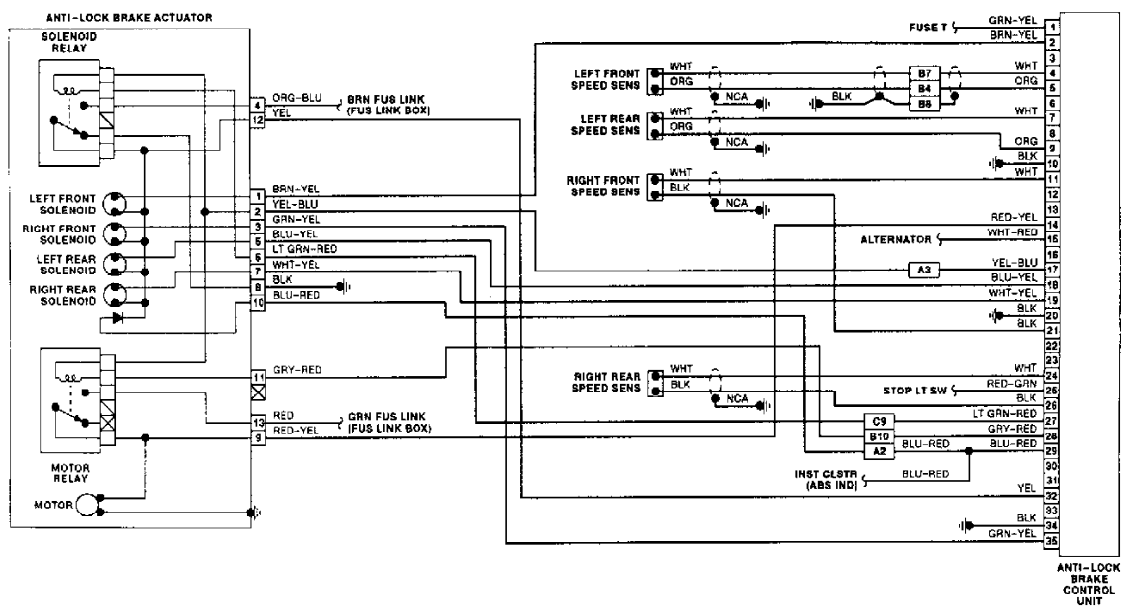


Fig. 32: Anti-Lock Brake (ABS) Wiring Diagram (Stanza)

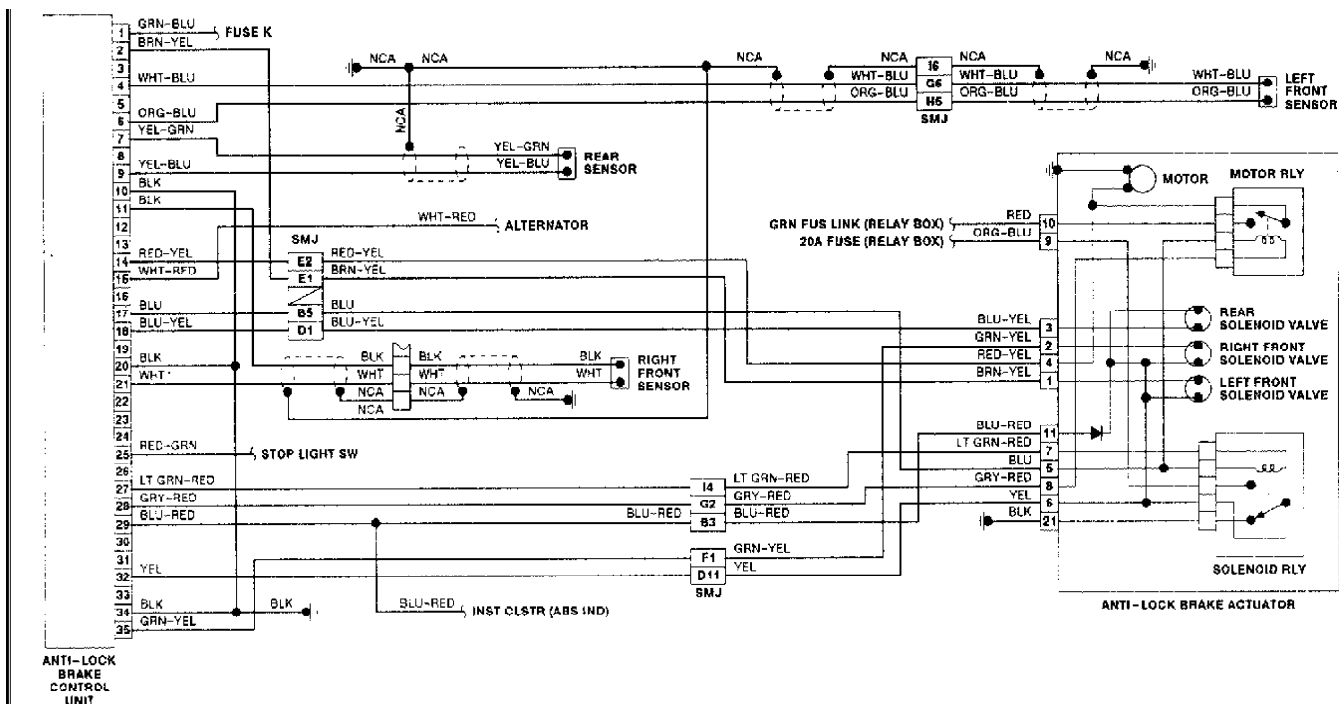


Fig. 33: Anti-Lock Brake (ABS) Wiring Diagram (1989 240SX)

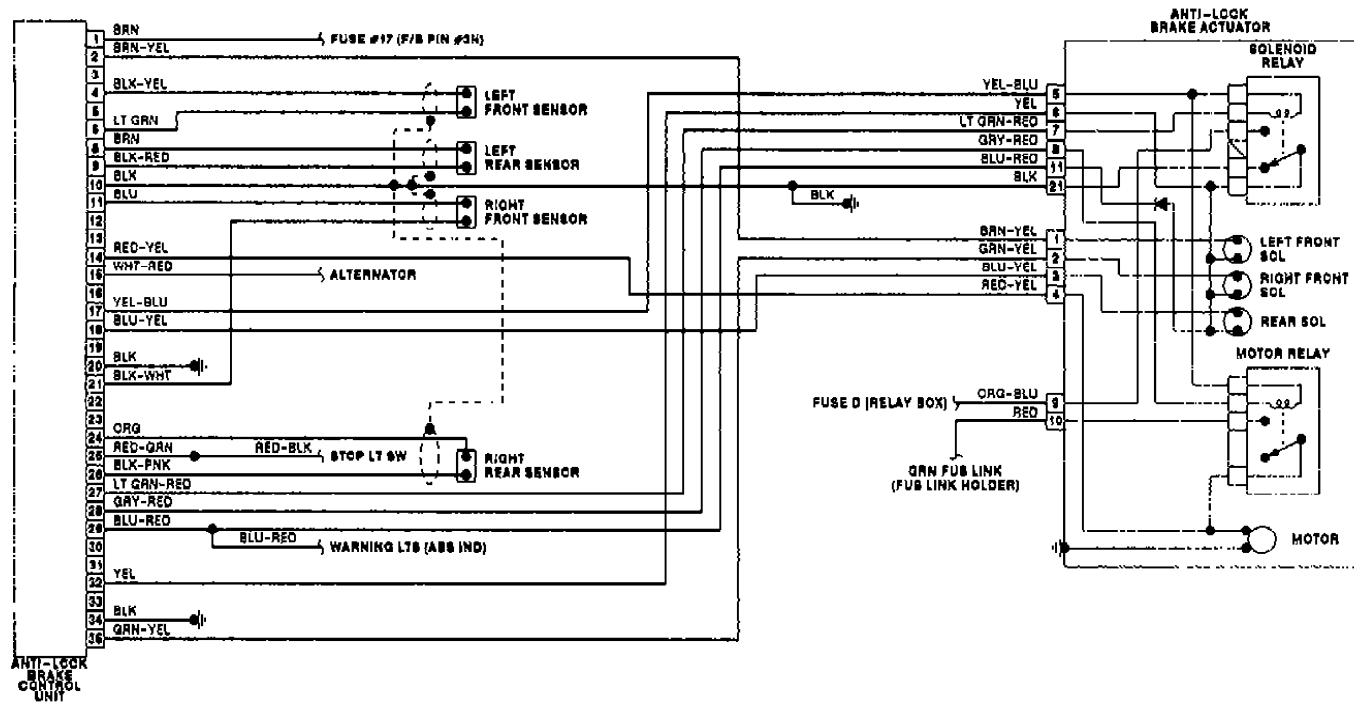


Fig. 34: Anti-Lock Brake (ABS) Wiring Diagram (300ZX)