A/C-HEATER SYSTEM - MANUAL

1993 Nissan Sentra

1993 Manual A/C-Heater Systems

NX & Sentra

SPECIFICATIONS

SPECIFICATIONS TABLE

Application	Specification
Compressor Type	Zexel DKV-14C Rotary Vane
Compressor Belt Deflection	
New Belt	9/32-5/16" (7-8 mm)
Used Belt	9/32-5/16" (7-8 mm)
System Oil Capacity	6.8 ozs.
Refrigerant (R-12) Capacity	23-26 ozs.
System Operating Pressures (1)	
High Side	118-166 psi (8.3-11.7 kg/cm²)
Low Side	27-37 psi (1.9-2.6 kg/cm²)

(1) - Measured at ambient temperature of about 77°F (25°C), with 50-70 percent relative humidity.

WARNING: To avoid injury from accidental air bag deployment, read and carefully follow all SERVICE PRECAUTIONS and DISABLING & ACTIVATING AIR BAG SYSTEM procedures in appropriate AIR BAG RESTRAINT SYSTEM article in ACCESSORIES & ELECTRICAL section.

DESCRIPTION

A separate evaporator housing assembly is combined with a standard heater core assembly to create an integrated A/C-heating unit. Blower motor directs airflow through evaporator and then heater core, to ducting and outlets.

OPERATION

CONTROL PANEL

Fan speed is controlled by a dial knob or a slide lever. See Fig. 1. Desired air control mode is achieved by push buttons or lever-type controls on A/C-heater control panel. A/C switch and fan controls are independent of mode controls. Slide lever controls temperature setting, and A/C button controls air conditioner operation. Sliding intake lever to the left or pressing air recirculation button will stop fresh air intake and recirculate inside air.

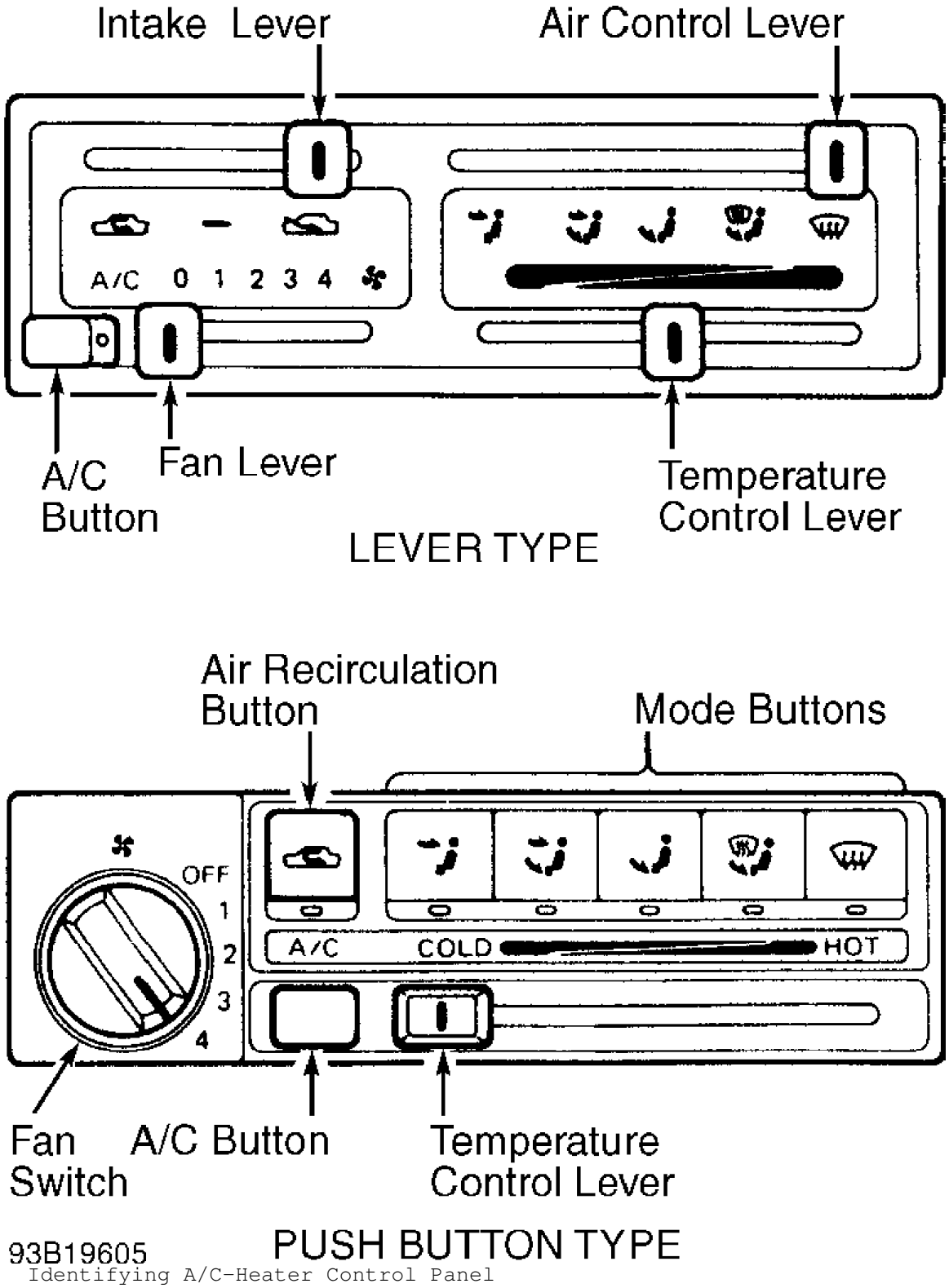

Fig. 1: Identifying A/C-Heater Control Panel
Courtesy of Nissan Motor Co., U.S.A.

FUSIBLE PLUG

Fusible plug, mounted on receiver-drier, is a high temperature relief valve. When temperature is 221°F (105°C), plug melts to vent refrigerant to atmosphere, thereby protecting the system.

FAST IDLE CONTROL DEVICE (FICD)

When A/C system is energized, the engine control module signals FICD to adjust Auxiliary Air Control (AAC) valve to by-pass additional air and increase idle speed. This higher idle speed allows engine to idle smoothly during compressor operation.

DUAL-PRESSURE SWITCH

The dual-pressure switch is mounted on receiver-drier. See Fig. 2. Dual-pressure switch protects A/C system from high pressure build-up due to restriction, overcharge or compressor malfunction. If excessively low or high system pressure is sensed, the switch stops compressor clutch operation.

HIGH PRESSURE RELIEF VALVE

A high pressure relief valve is located on end of high pressure hose, near A/C compressor. When high pressure of 540 psi (38 kg/cm^2) is sensed, relief valve opens, venting refrigerant to atmosphere.

THERMO CONTROL AMPLIFIER

An electrical thermo control amplifier is mounted on evaporator housing. See Fig. 3. A temperature sensor (thermistor), inside evaporator housing, senses air temperature and sends signal to thermo control amplifier. Thermo control amplifier then cycles compressor clutch on and off according to temperature setting on control panel.

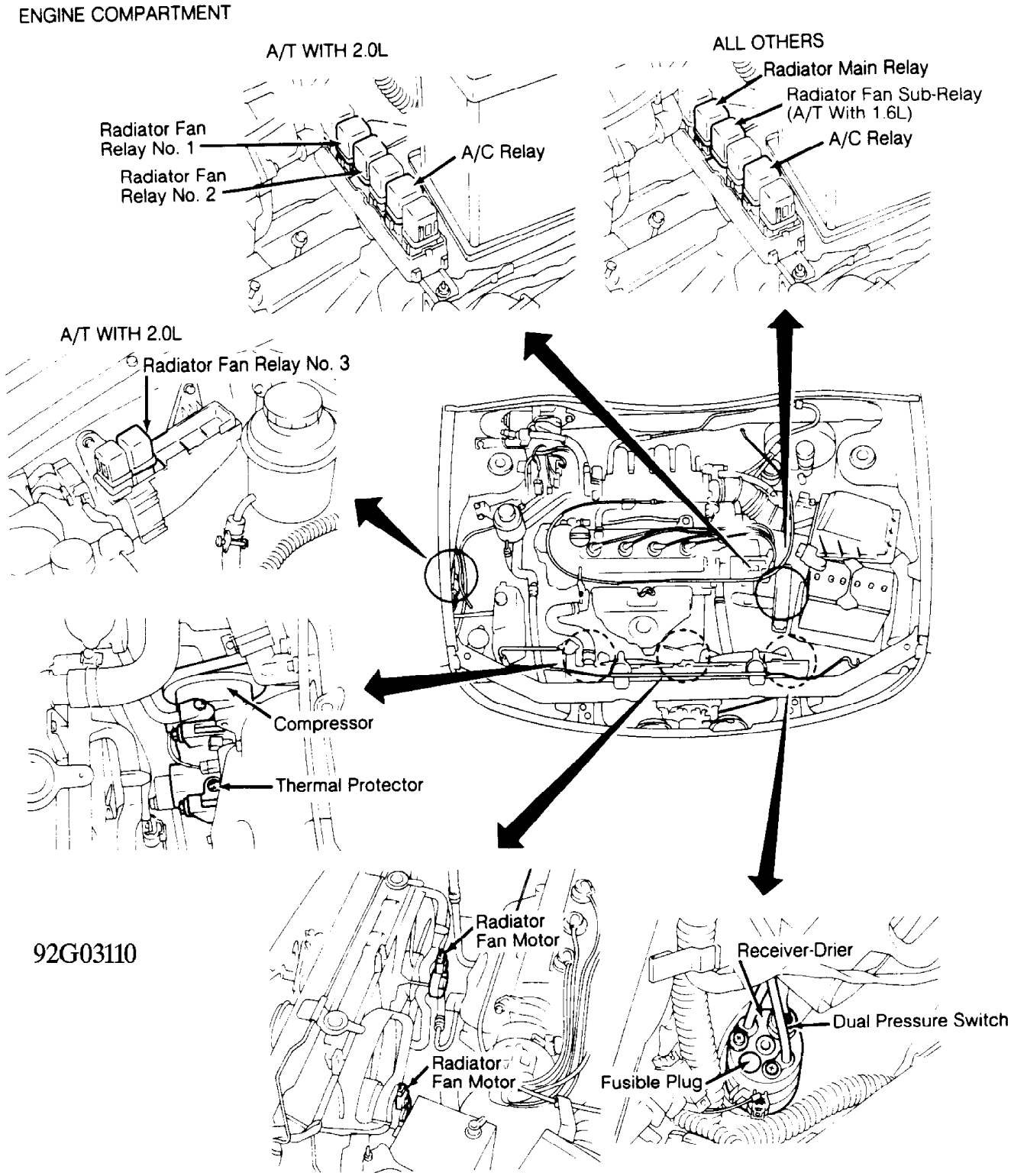

Fig. 2: Locating System Electrical Components (Engine Compartment)
Courtesy of Nissan Motor Co., U.S.A.

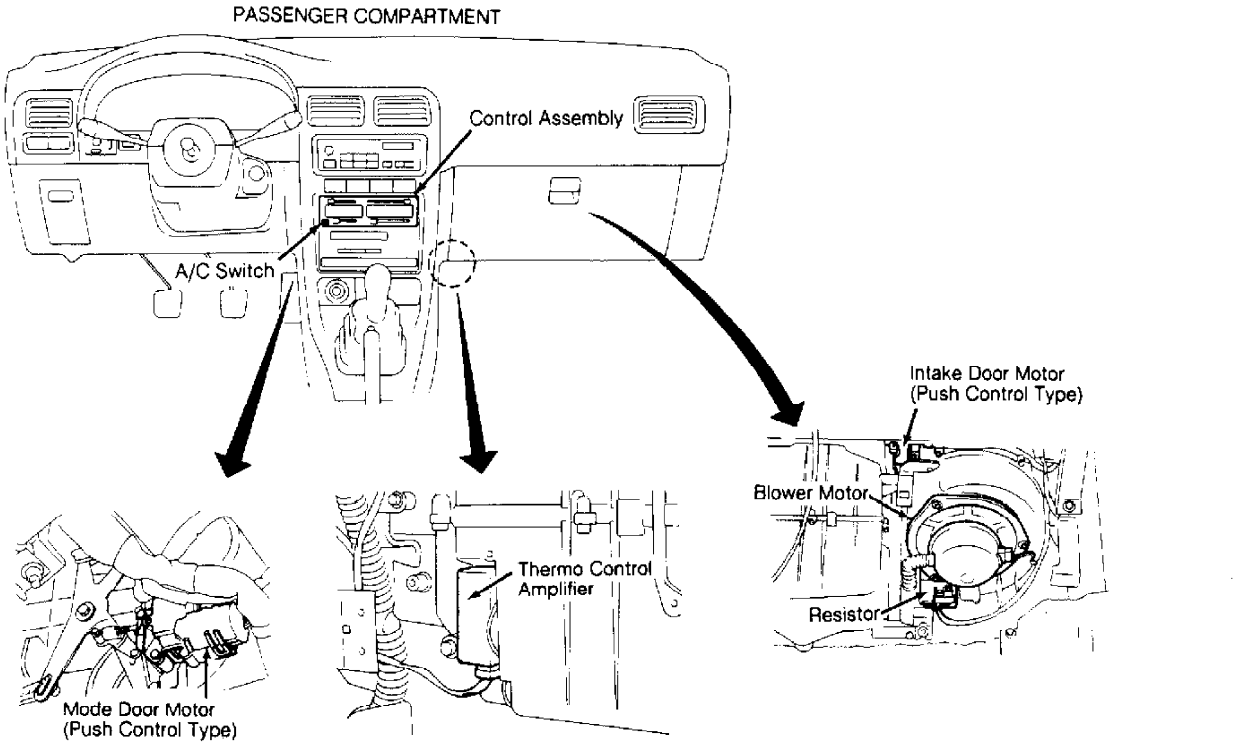

Fig. 3: Locating System Electrical Components (Passenger Compartment)
Courtesy of Nissan Motor Co., U.S.A.

ADJUSTMENTS

NOTE: For control cable and door rod adjustments, see appropriate HEATER SYSTEM article.

TROUBLE SHOOTING

PRELIMINARY CHECK 1 - INTAKE DOOR IS SET AT FRESH IN DEFROST OR FOOT/DEFROST MODE

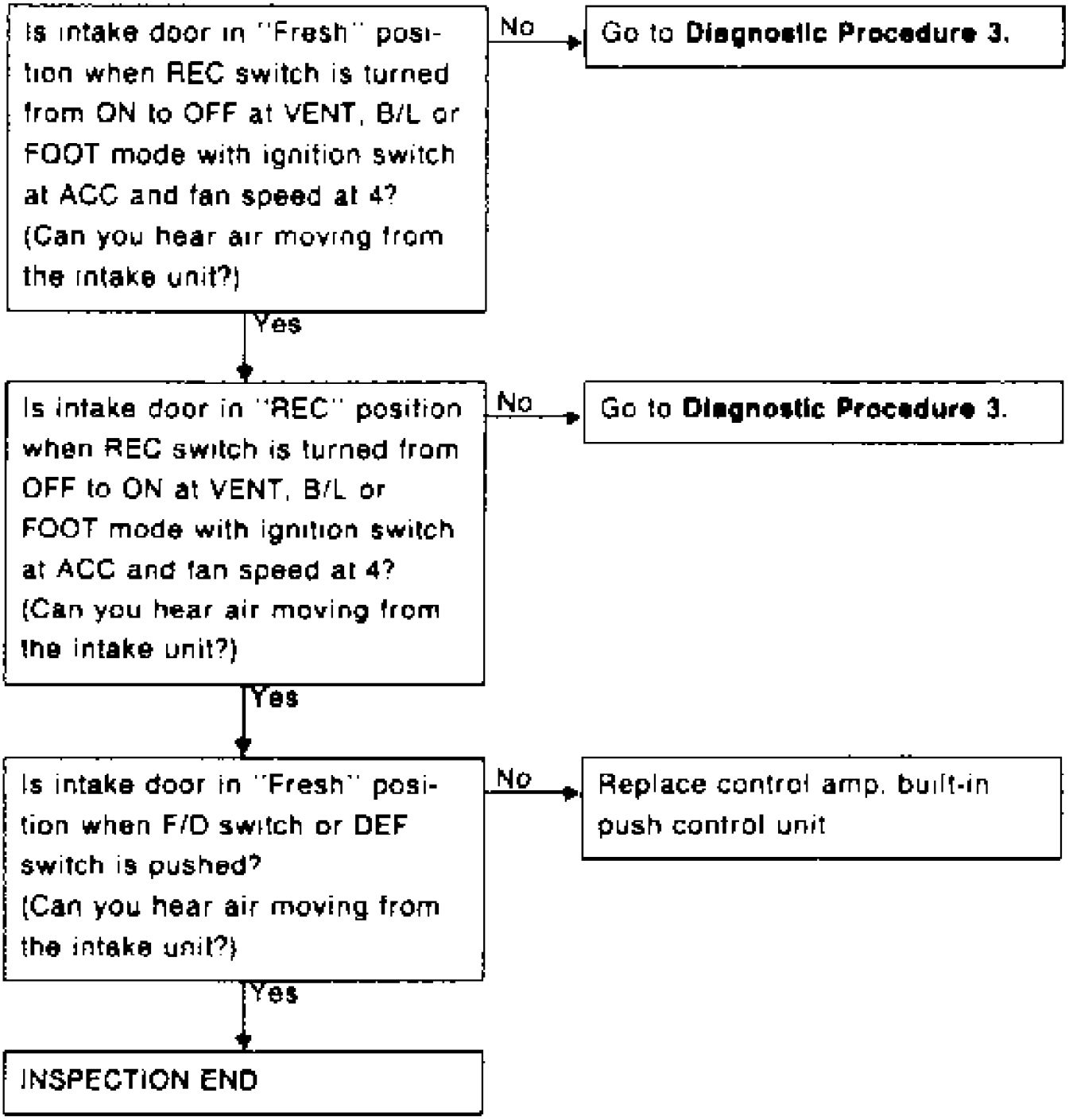

Fig. 4: Preliminary Check 1 - Trouble Shooting Chart
Courtesy Of Nissan Motor Co., U.S.A.

PRELIMINARY CHECK 2 - A/C DOES NOT BLOW COLD AIR

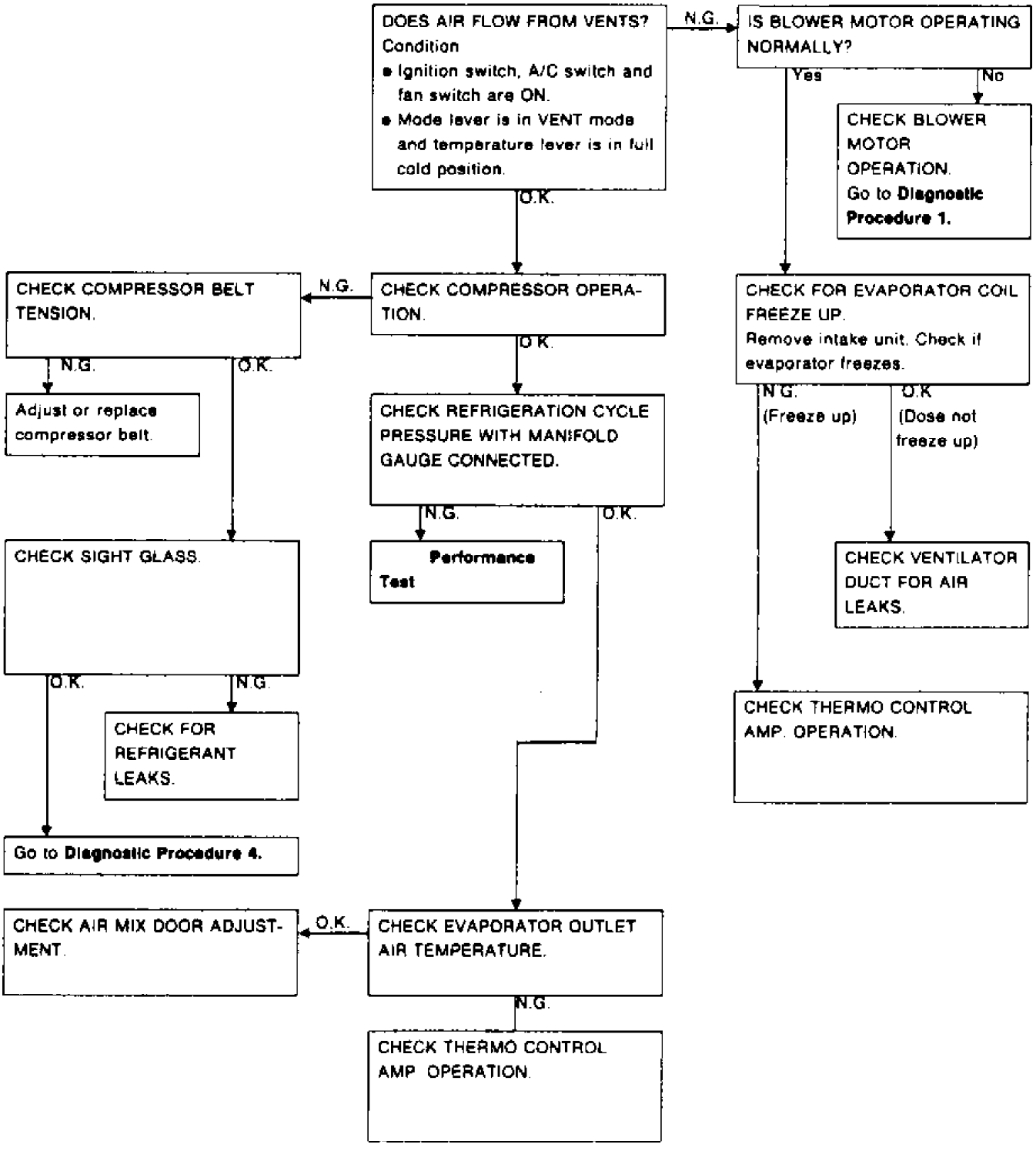

Fig. 5: Preliminary Check 2 - Trouble Shooting Chart
Courtesy Of Nissan Motor Co., U.S.A.

PRELIMINARY CHECK 3 - AIR OUTLET DOES NOT CHANGE

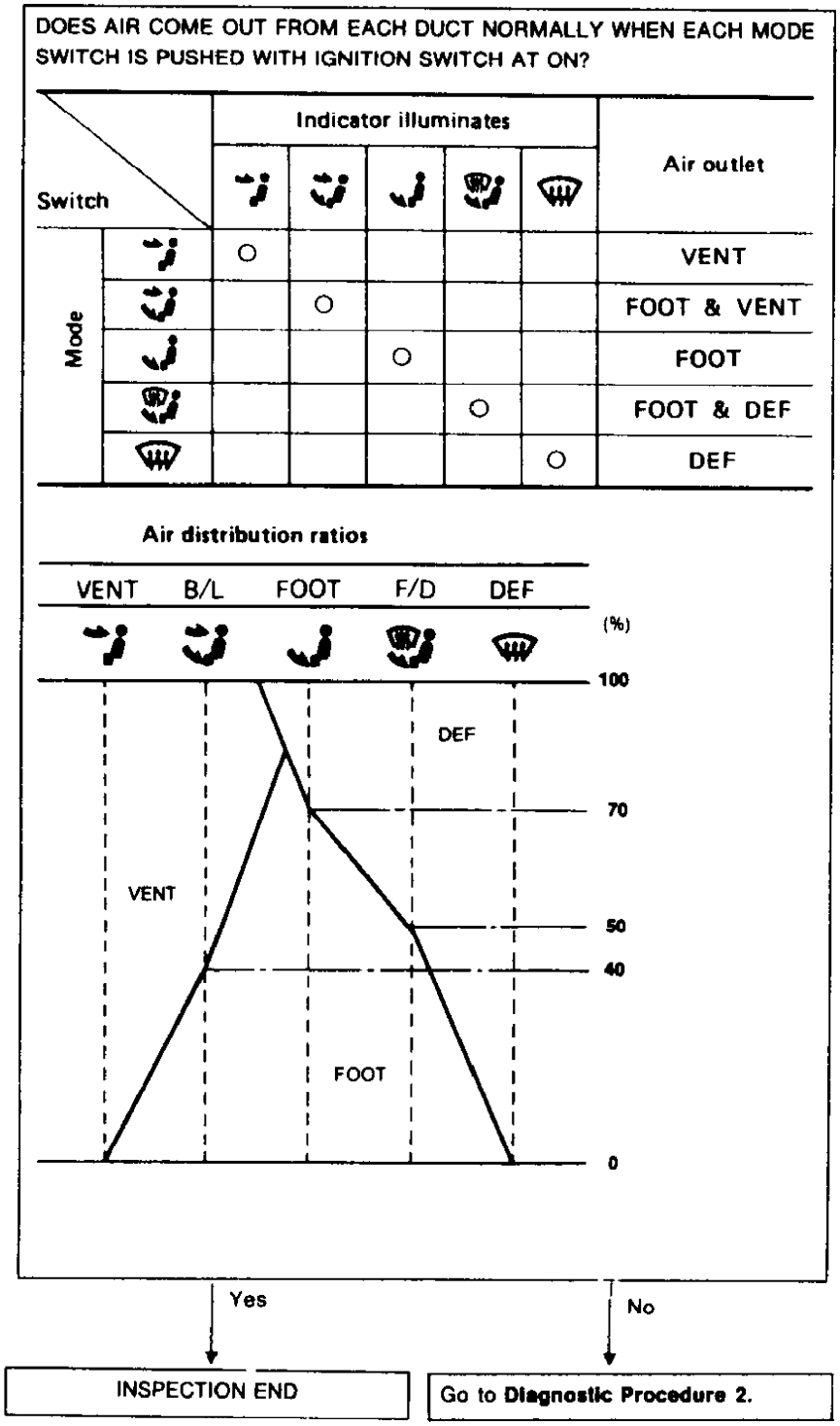

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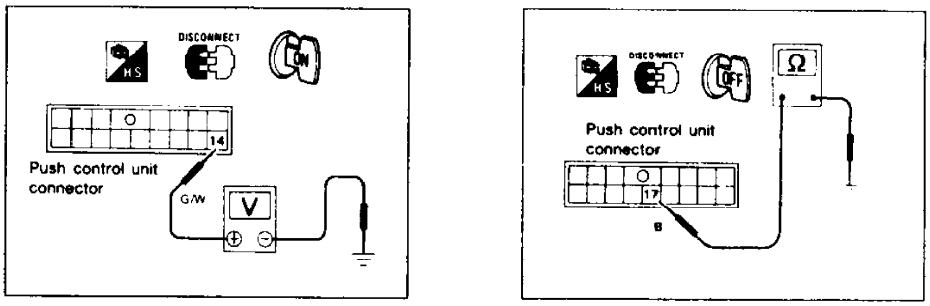
Fig. 6: Preliminary Check 3 - Trouble Shooting Chart
Courtesy Of Nissan Motor Co., U.S.A.

PRELIMINARY CHECK 4 - POWER SUPPLY CIRCUIT CHECK FOR A/C SYSTEM

Push Control Unit Check

1. Disconnect push control unit harness connector.
2. Turn ignition switch to ACC position.
3. Using voltmeter, ensure battery voltage exists at terminal No. 14 of harness connector.
4. Turn ignition switch to OFF position.
5. Using ohmmeter, ensure continuity exists between terminal No. 17 of harness connector and ground.



Thermo Control Amplifier Check

1. Disconnect thermo control amplifier harness connector.
2. Turn ignition switch to ON position.
3. Using voltmeter, ensure battery voltage exists at terminal No. 34 of harness connector.
4. Turn ignition switch off. Turn A/C and fan switches on.
5. Using ohmmeter, ensure continuity exists between terminal No. 22 of harness connector and ground.

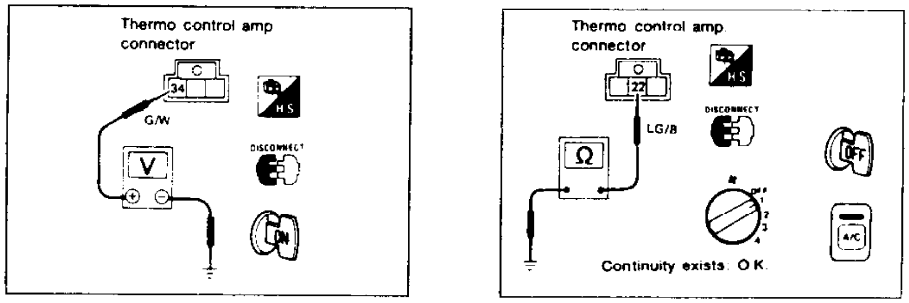


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Fig. 7: Preliminary Check 4 - Trouble Shooting Chart
Courtesy Of Nissan Motor Co., U.S.A.

DIAGNOSTIC PROCEDURE 1 - BLOWER MOTOR DOES NOT ROTATE

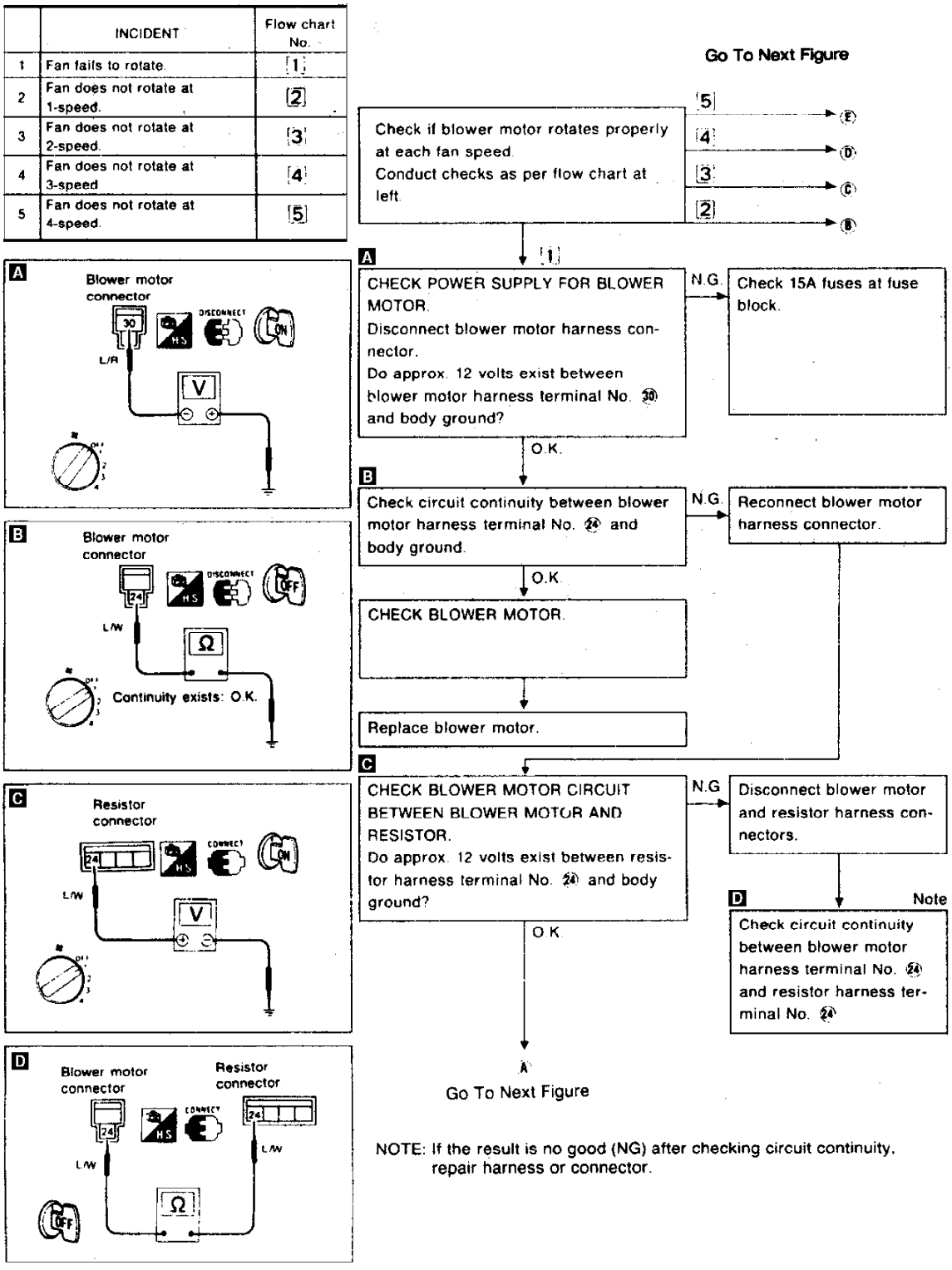
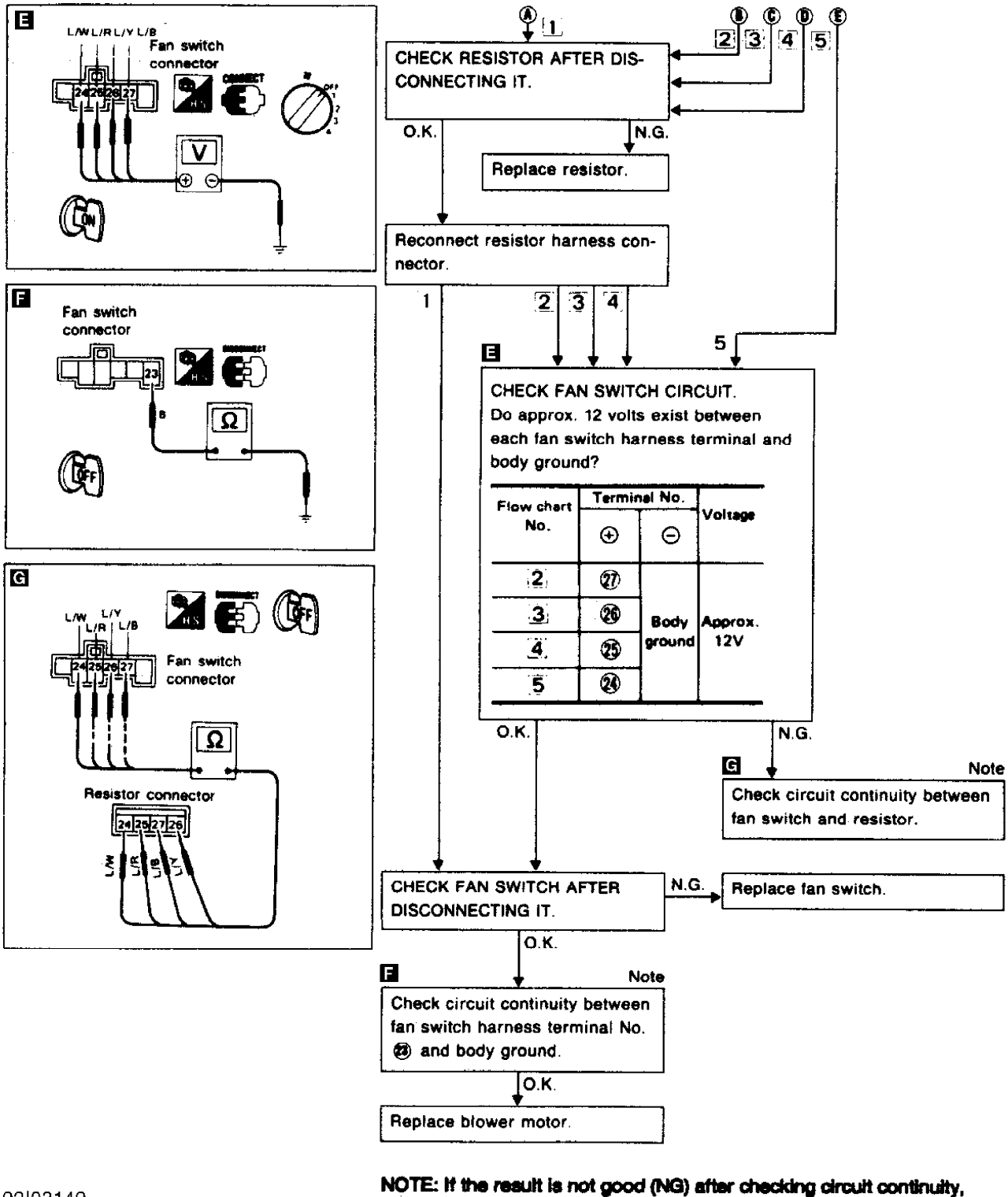


Fig. 8: Diagnostic Procedure 1 - Trouble Shooting Chart (1 Of 2)
Courtesy Of Nissan Motor Co., U.S.A.



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NOTE: If the result is not good (NG) after checking circuit continuity, repair harness or connector.

Fig. 9: Diagnostic Procedure 1 - Trouble Shooting Chart (2 Of 2)
Courtesy Of Nissan Motor Co., U.S.A.

DIAGNOSTIC PROCEDURE 2 - AIR OUTLET DOES NOT CHANGE

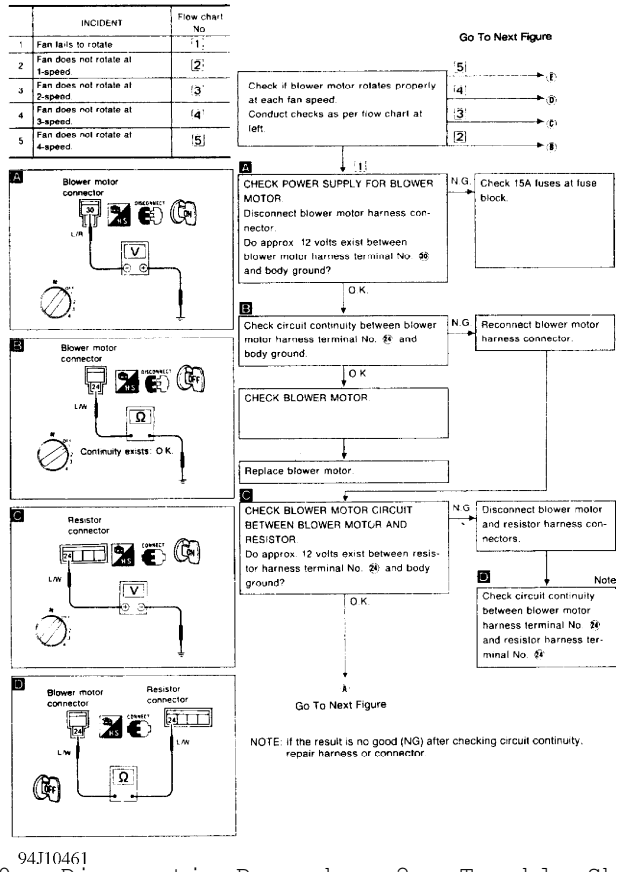

Fig. 10: Diagnostic Procedure 2 - Trouble Shooting Chart (1 Of 2)
Courtesy Of Nissan Motor Co., U.S.A.

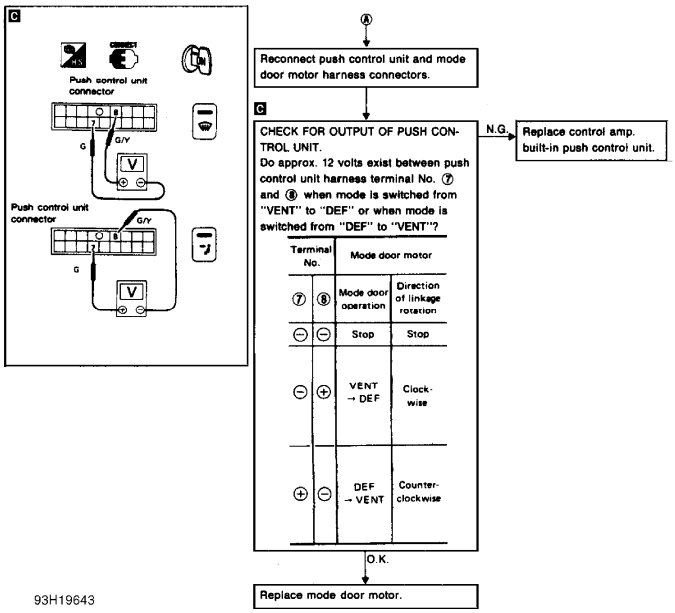

Fig. 11: Diagnostic Procedure 2 - Trouble Shooting Chart (2 Of 2)
Courtesy Of Nissan Motor Co., U.S.A.

DIAGNOSTIC PROCEDURE 3 - INTAKE DOOR DOES NOT CHANGE IN VENT, BI-LEVEL OR FOOT MODE

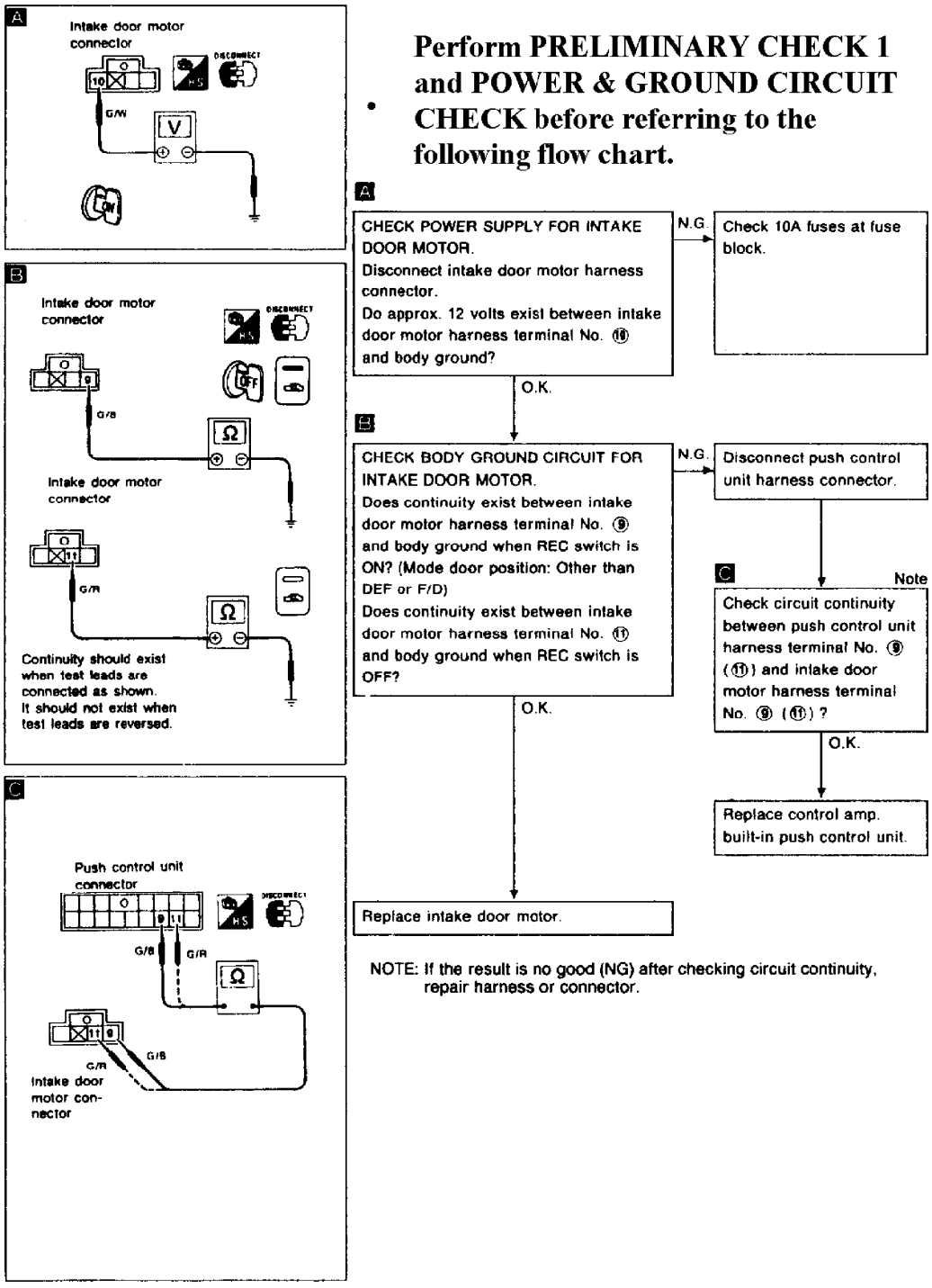

Fig. 12: Diagnostic Procedure 3 - Trouble Shooting Chart
Courtesy Of Nissan Motor Co., U.S.A.

DIAGNOSTIC PROCEDURE 4 - COMPRESSOR (MAGNET) CLUTCH DOES NOT ENGAGE WITH A/C & FAN SWITCHES ON

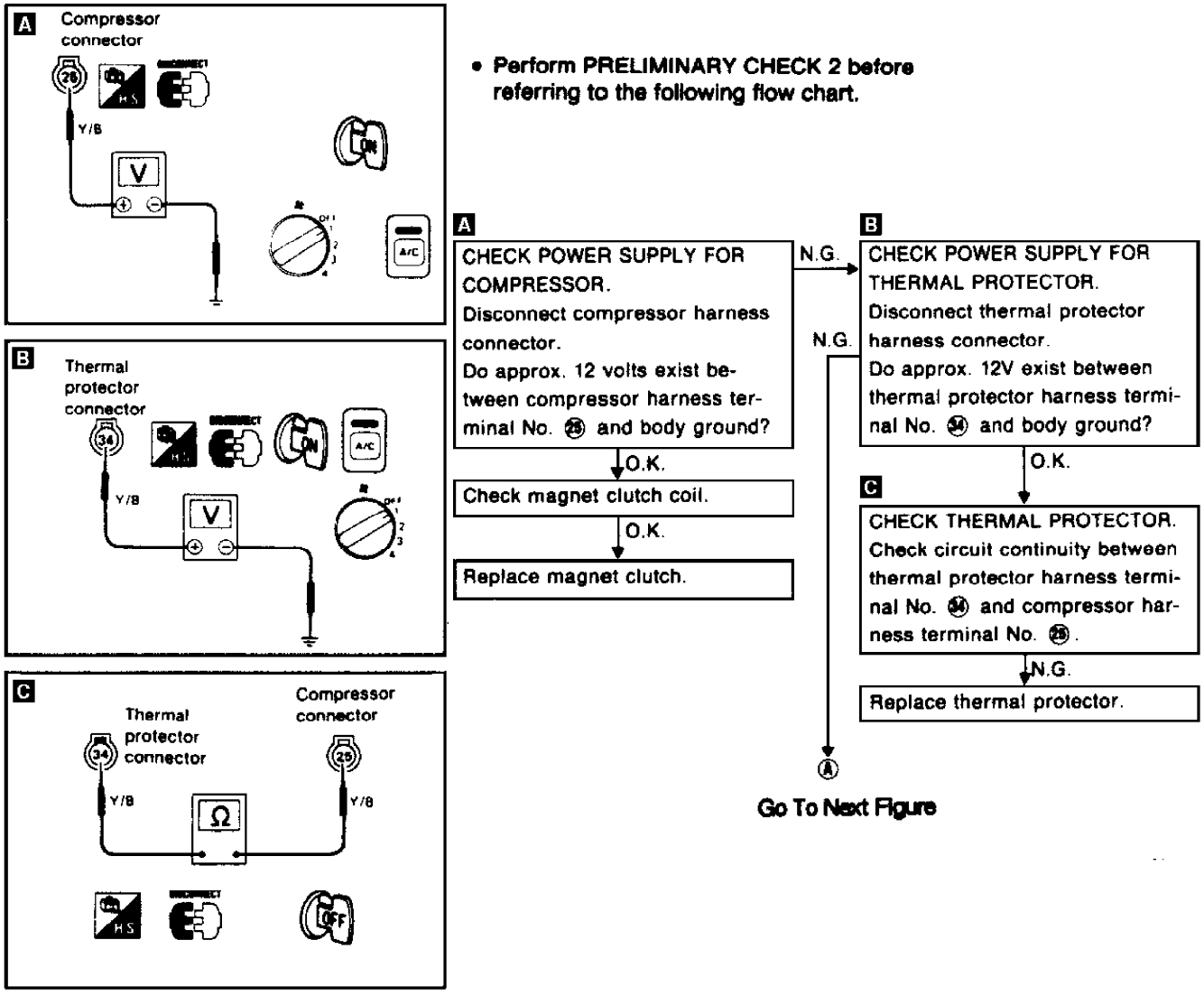

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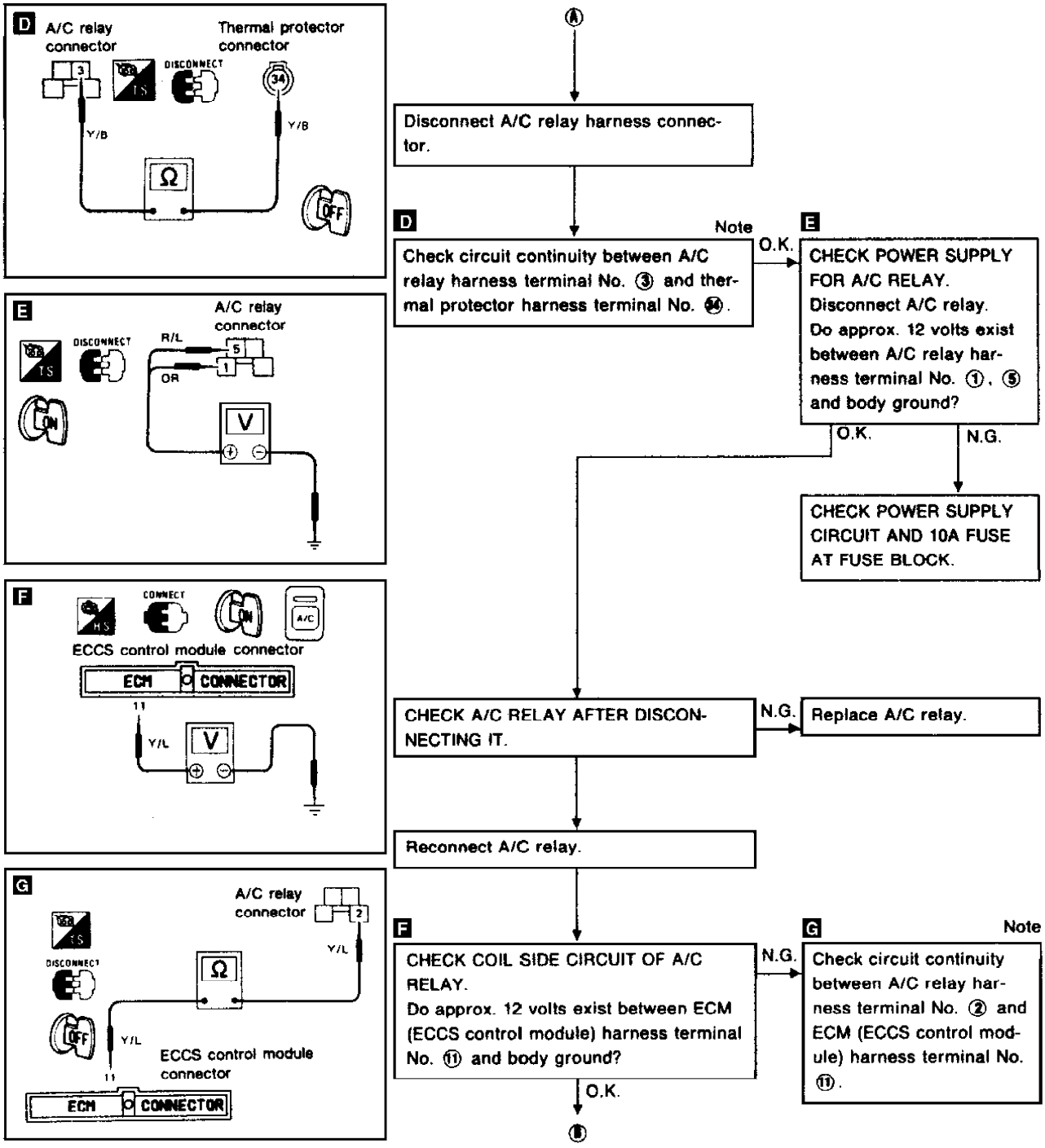
Fig. 13: Diagnostic Procedure 4 - Trouble Shooting Chart (1 Of 4)
Courtesy Of Nissan Motor Co., U.S.A.



NOTE: If the result is no good (NG) after checking circuit continuity, repair harness or connector.

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Fig. 14: Diagnostic Procedure 4 - Trouble Shooting Chart (2 Of 4)
Courtesy Of Nissan Motor Co., U.S.A.

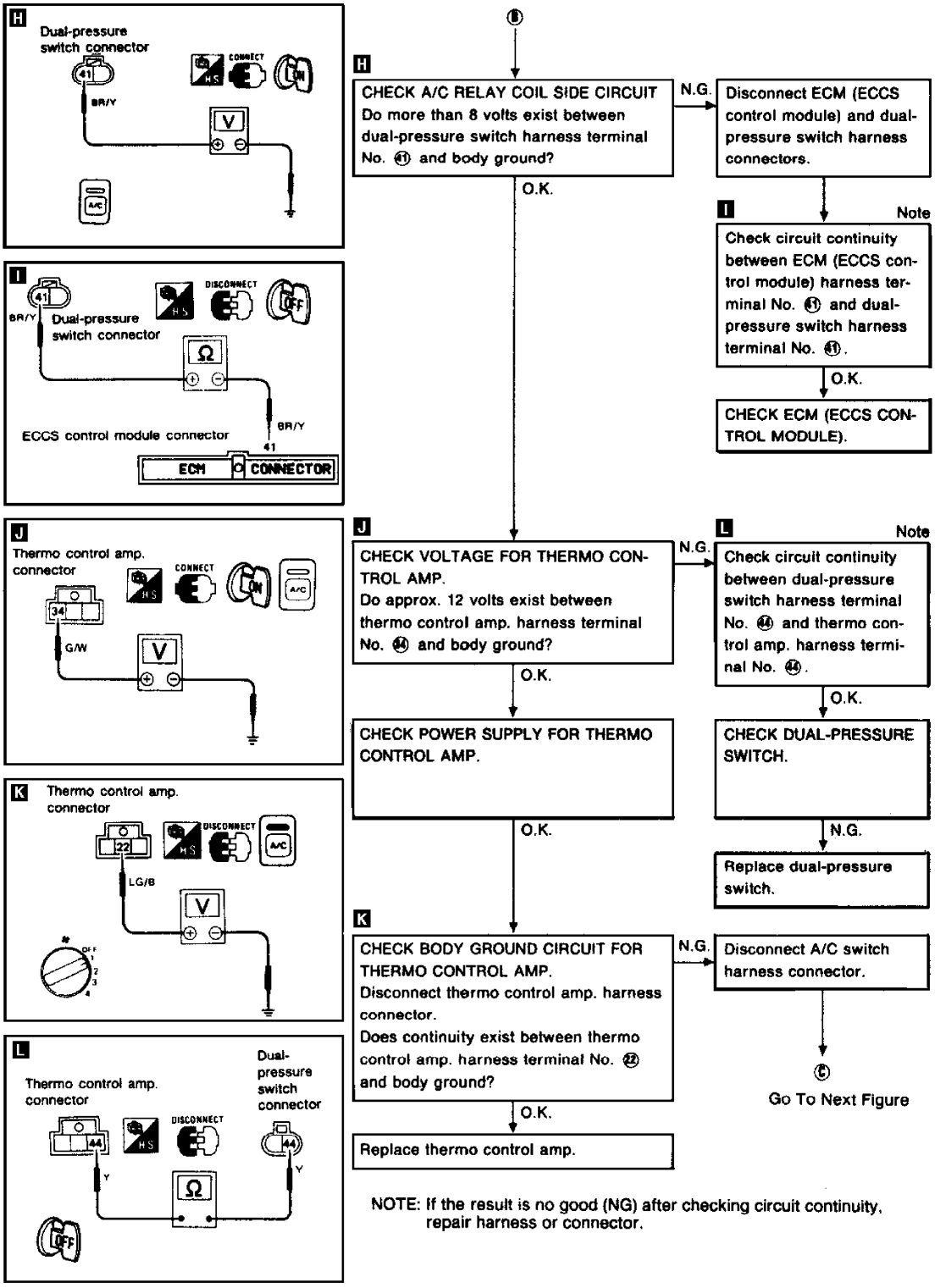


Fig. 15: Diagnostic Procedure 4 - Trouble Shooting Chart (3 Of 4)
Courtesy Of Nissan Motor Co., U.S.A.

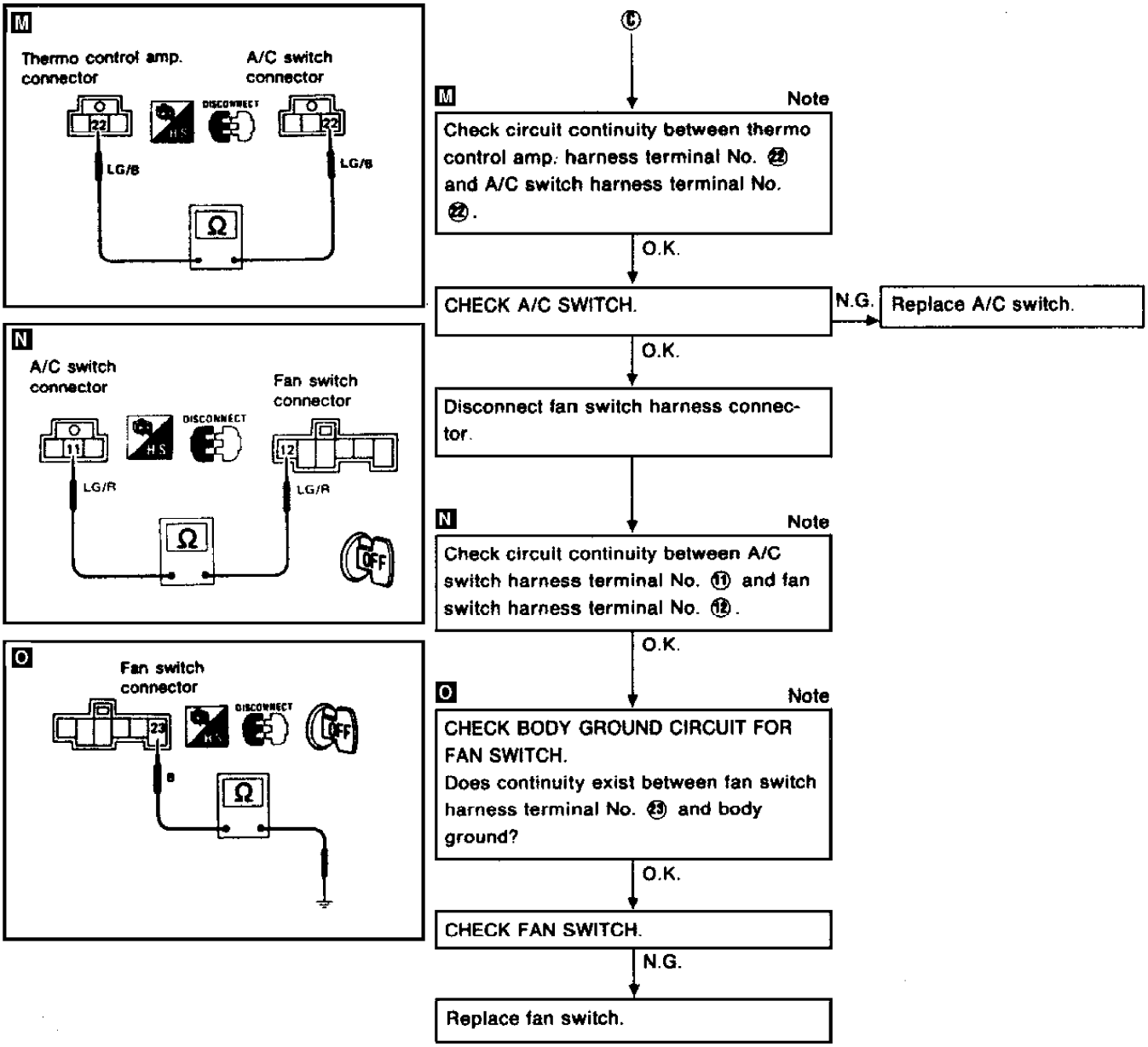
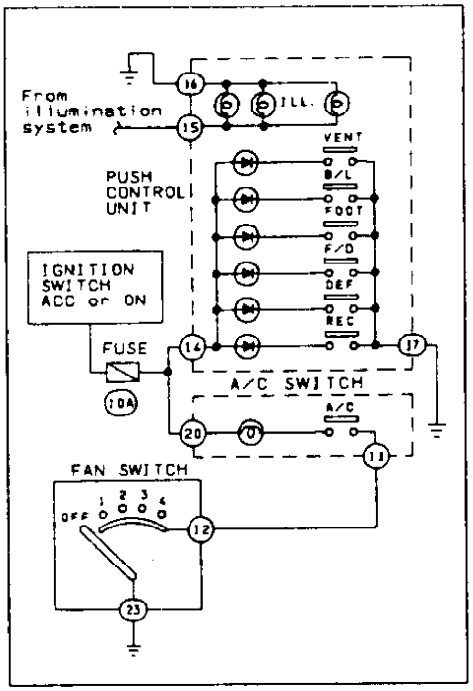


Fig. 16: Diagnostic Procedure 4 - Trouble Shooting Chart (4 Of 4)
Courtesy Of Nissan Motor Co., U.S.A.

DIAGNOSTIC PROCEDURE 5 - ILLUMINATION OR INDICATORS OF PUSH CONTROL UNIT DO NOT COME ON



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Perform POWER & GROUND CIRCUIT CHECK before referring to the following flow chart.

Turn ignition switch and lighting switch ON.

CHECK ILLUMINATION AND INDICATORS.

- Turn A/C, REC and fan switches ON.
- Push VENT, B/L, FOOT, F/D and DEF switches in order.
- Check for incidents and follow the repairing methods as shown:

INCIDENTS								"How to repair"
ILL.	VENT	B/L	FOOT	F/D	DEF	REC	A/C	
X	○	○	○	○	○	○	—	Go to DIAGNOSTIC PROCEDURE 5-1.
—	○	○	○	○	○	○	X	Go to DIAGNOSTIC PROCEDURE 5-2.
○	X	X	X	X	X	X	—	Go to DIAGNOSTIC PROCEDURE 5-3.
—	Δ						—	Replace control amp. built-in push control unit.
○	X	X	X	X	X	X	○	Replace control amp. built-in push control unit.

X : Illumination or indicator does not come on

Δ : Some indicators for VENT, B/L, FOOT, F/D, DEF or REC come on.

Fig. 17: Diagnostic Procedure 5 - Trouble Shooting Chart
Courtesy Of Nissan Motor Co., U.S.A.

DIAGNOSTIC PROCEDURE 5-1 - ILLUMINATION OR INDICATORS OF PUSH CONTROL UNIT DO NOT COME ON

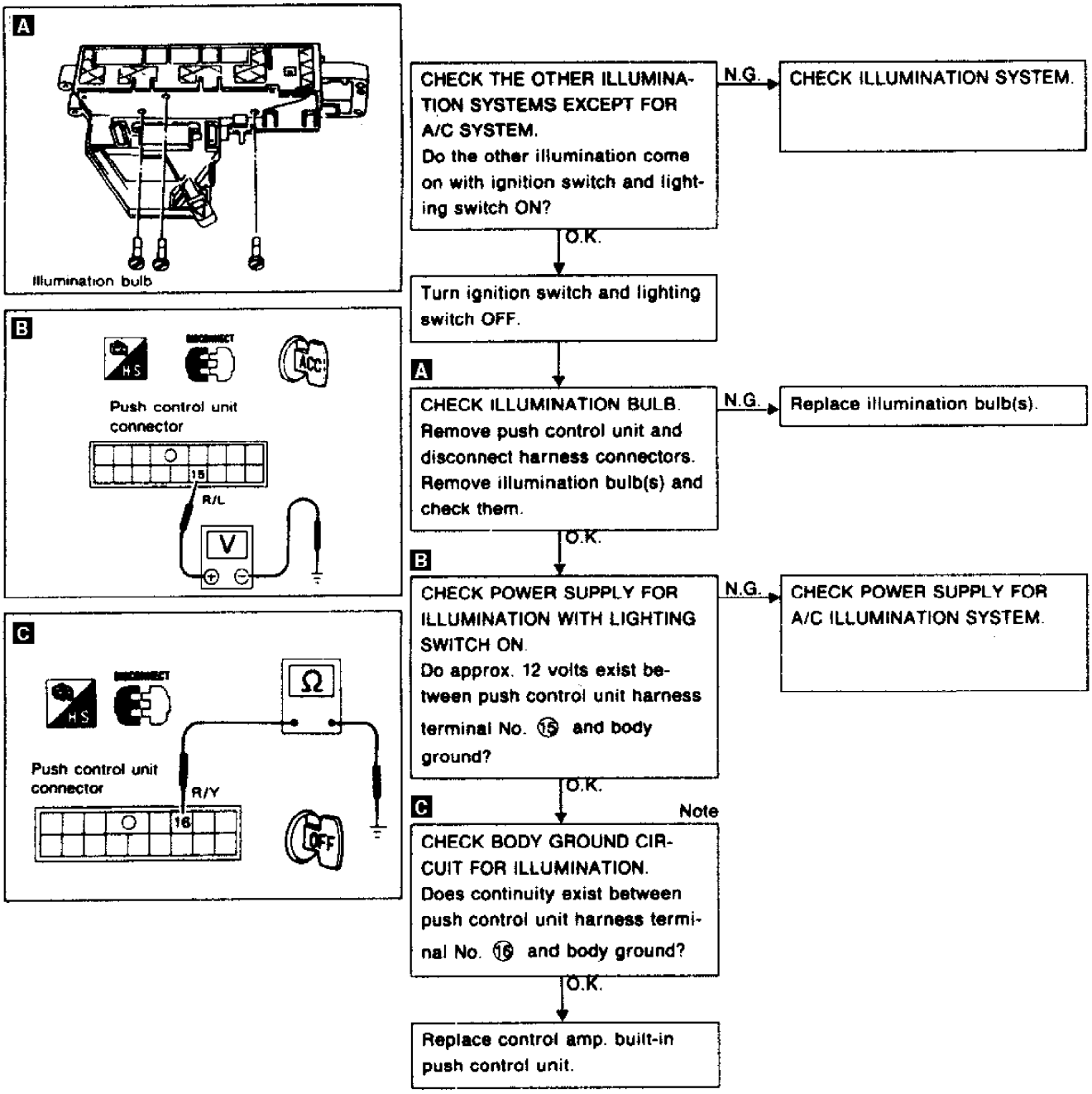

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Fig. 18: Diagnostic Procedure 5-1 - Trouble Shooting Chart
Courtesy Of Nissan Motor Co., U.S.A.

DIAGNOSTIC PROCEDURE 5-2 - ILLUMINATION OR INDICATORS OF PUSH CONTROL UNIT DO NOT COME ON

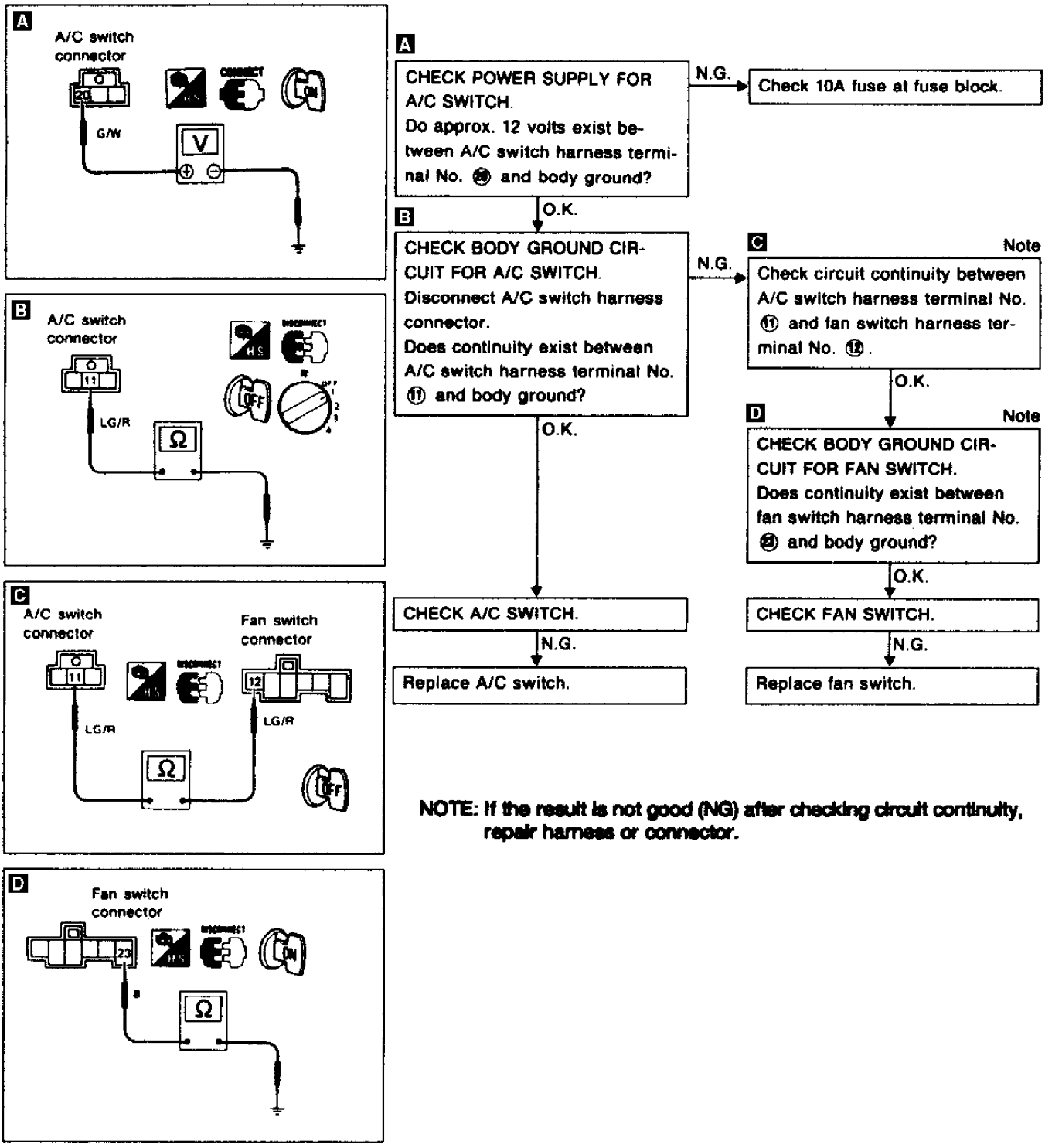

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Fig. 19: Diagnostic Procedure 5-2 - Trouble Shooting Chart
Courtesy Of Nissan Motor Co., U.S.A.

DIAGNOSTIC PROCEDURE 5-3 - ILLUMINATION OR INDICATORS OF PUSH CONTROL UNIT DO NOT COME ON

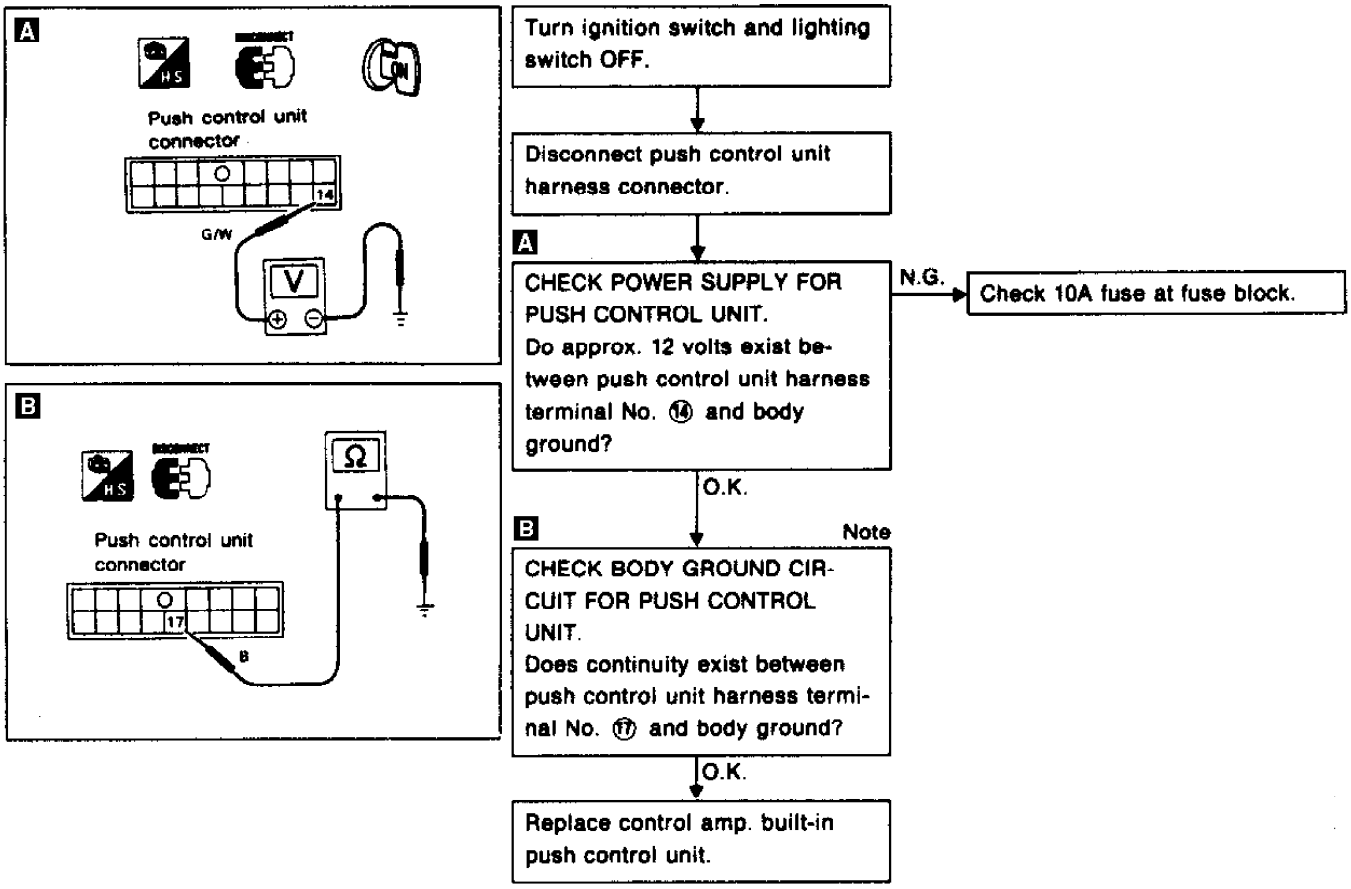

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Fig. 20: Diagnostic Procedure 5-3 - Trouble Shooting Chart
Courtesy Of Nissan Motor Co., U.S.A.

DIAGNOSTIC PROCEDURE 6 - RADIATOR FAN CONTROL (2.0L WITH M/T)

RADIATOR FAN CONTROL (Not self-diagnostic item)

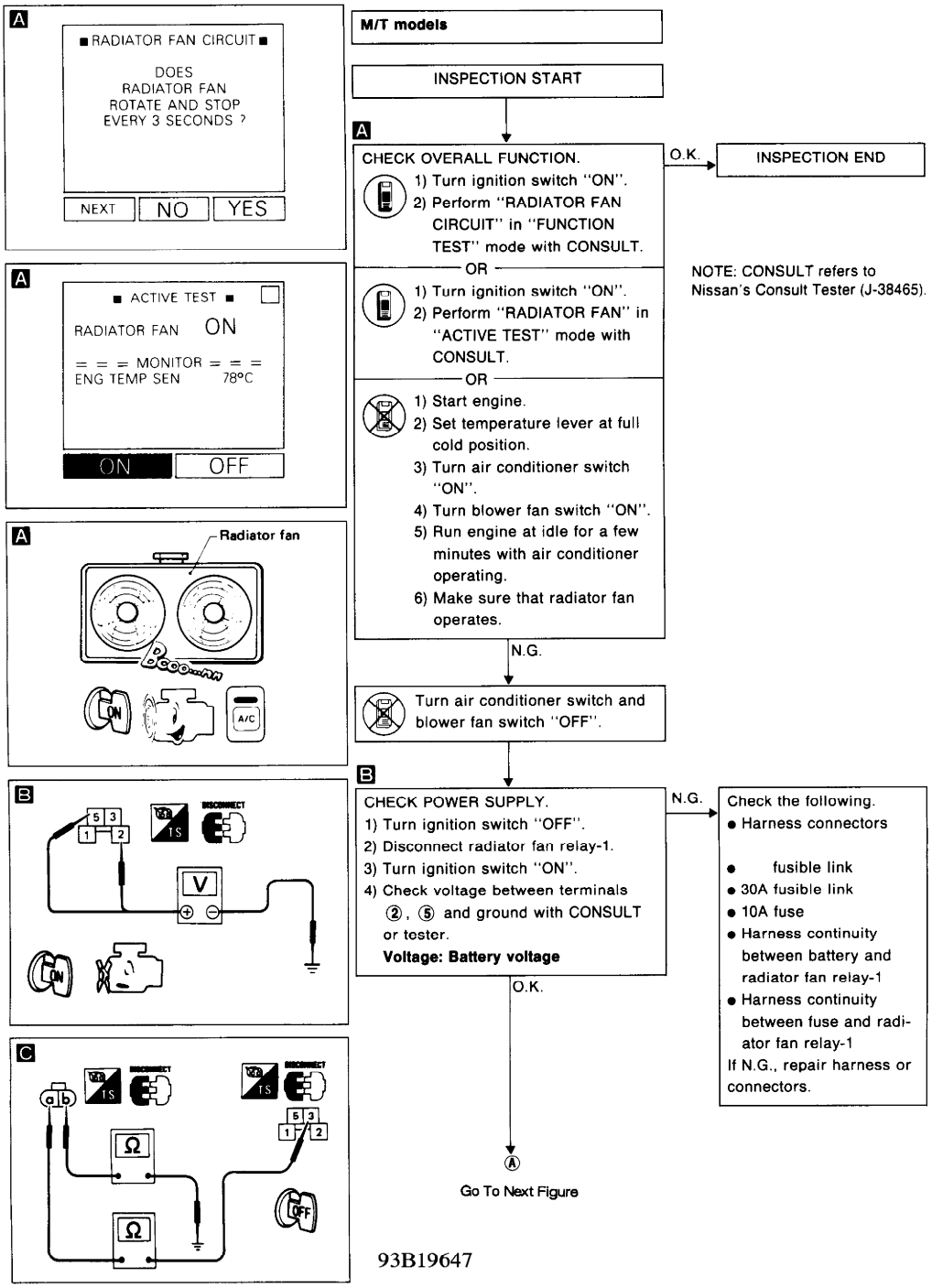

Fig. 21: Diagnostic Procedure 6 - Trouble Shooting Chart (1 Of 2)
Courtesy Of Nissan Motor Co., U.S.A.

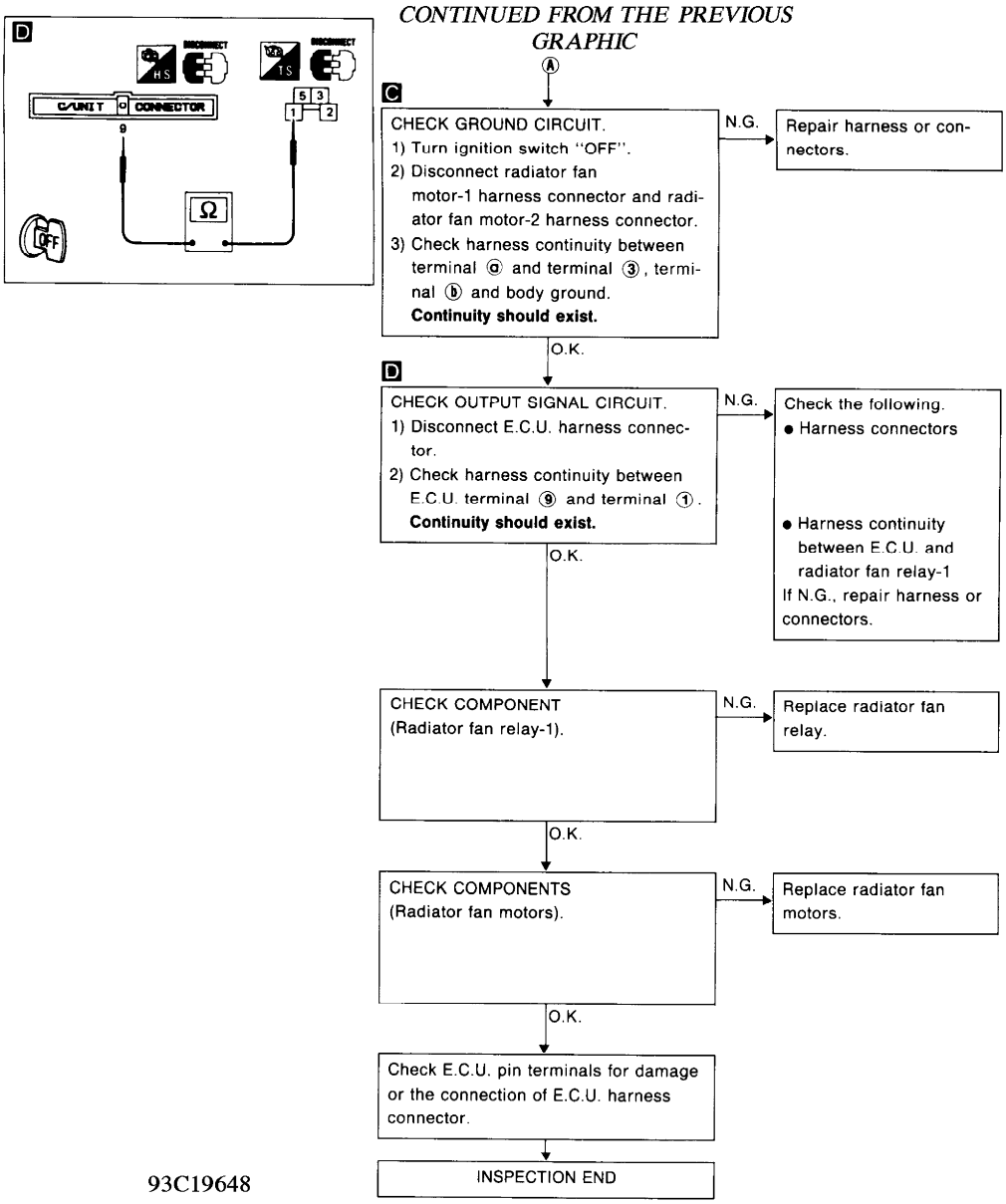

Fig. 22: Diagnostic Procedure 6 - Trouble Shooting Chart (2 Of 2)
Courtesy Of Nissan Motor Co., U.S.A.

DIAGNOSTIC PROCEDURE 7 - RADIATOR FAN CONTROL (2.0L WITH A/T)

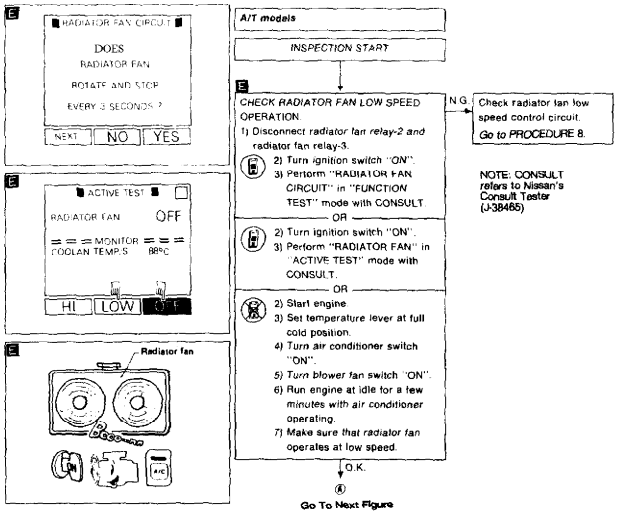

Fig. 23: Diagnostic Procedure 7 - Trouble Shooting Chart (1 Of 2)
Courtesy Of Nissan Motor Co., U.S.A.

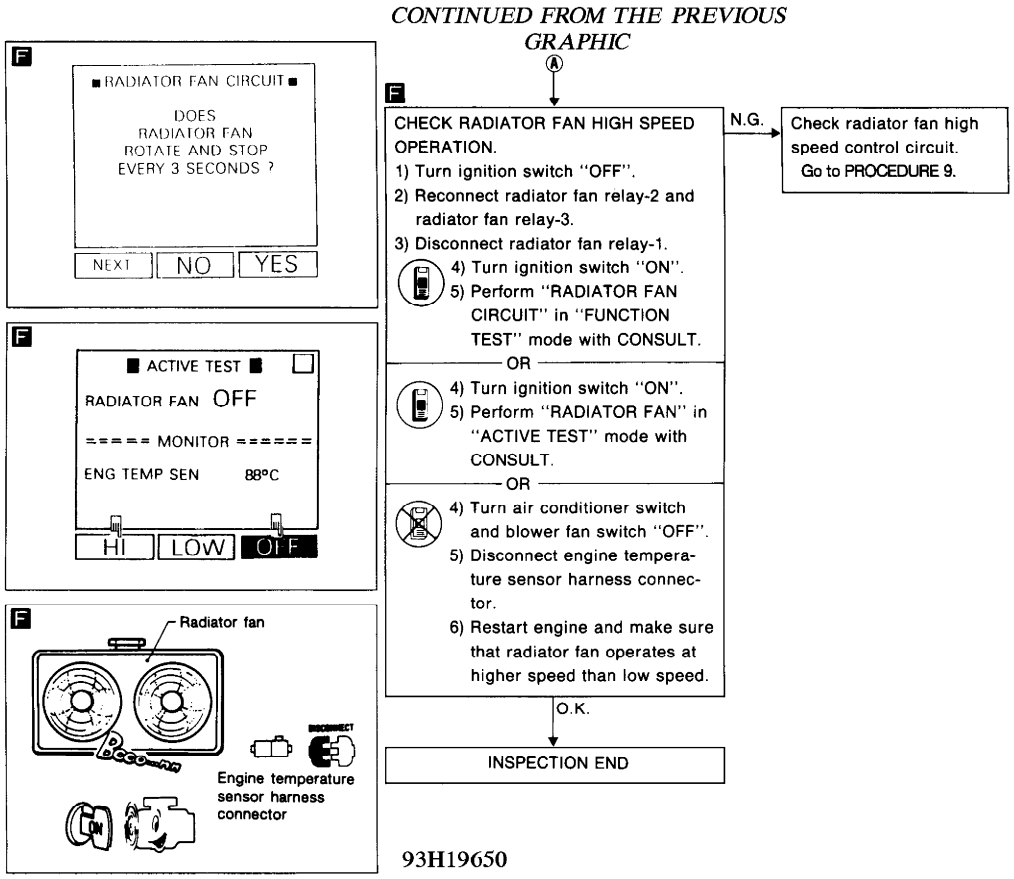

Fig. 24: Diagnostic Procedure 7 - Trouble Shooting Chart (2 Of 2)
Courtesy Of Nissan Motor Co., U.S.A.

DIAGNOSTIC PROCEDURE 8 - RADIATOR FAN CONTROL (2.0L WITH A/T)

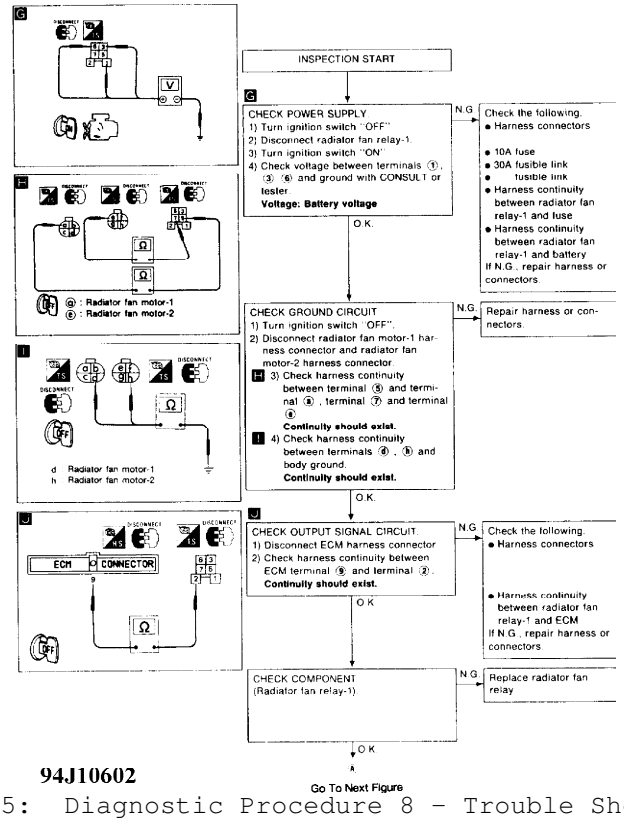

Fig. 25: Diagnostic Procedure 8 - Trouble Shooting Chart (1 Of 2)
Courtesy Of Nissan Motor Co., U.S.A.

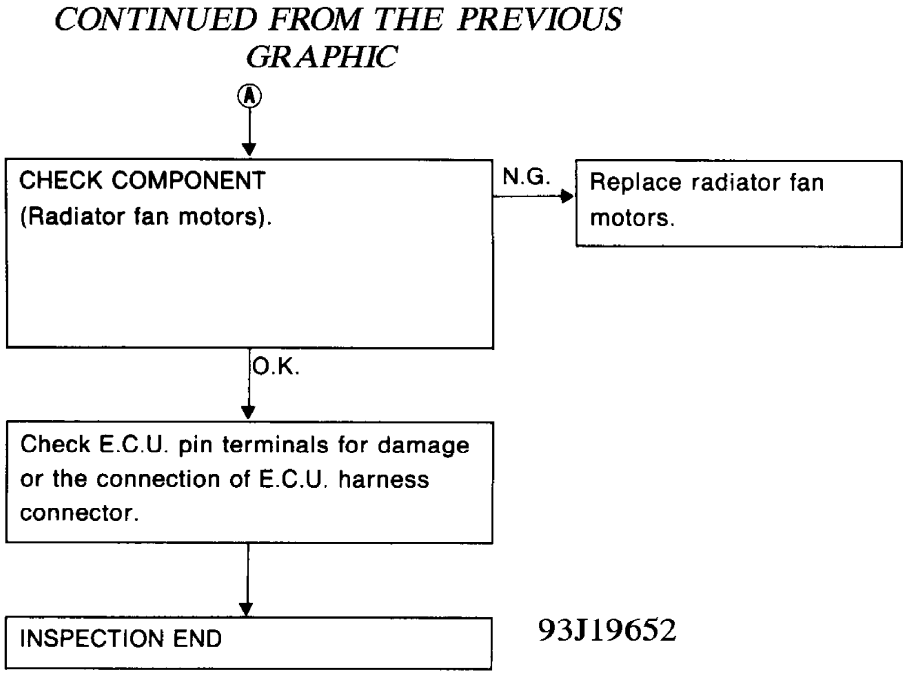

Fig. 26: Diagnostic Procedure 8 - Trouble Shooting Chart (1 Of 2)
Courtesy Of Nissan Motor Co., U.S.A.

DIAGNOSTIC PROCEDURE 9 - RADIATOR FAN CONTROL (2.0L WITH A/T)

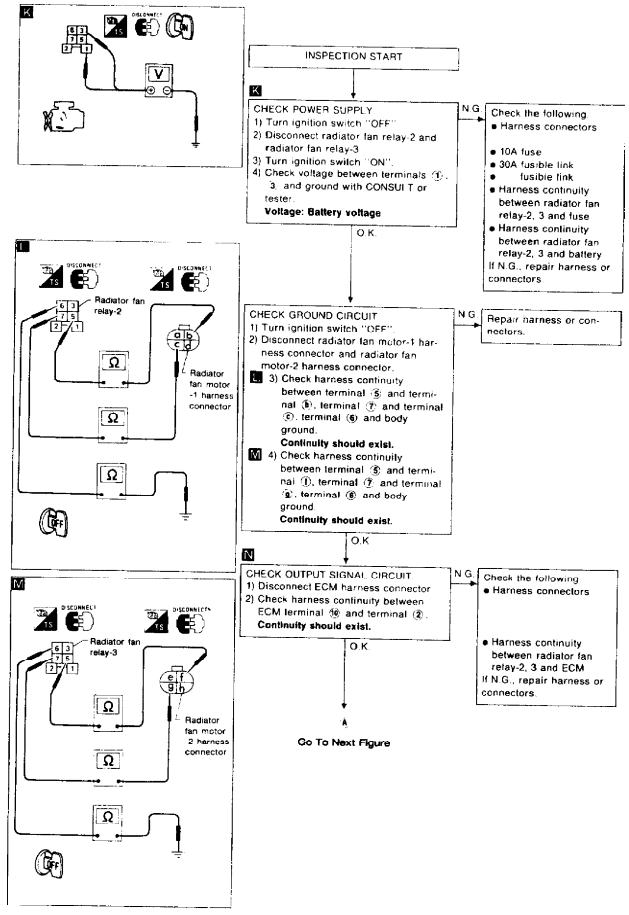

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Fig. 27: Diagnostic Procedure 9 - Trouble Shooting Chart (1 Of 2)
Courtesy Of Nissan Motor Co., U.S.A.

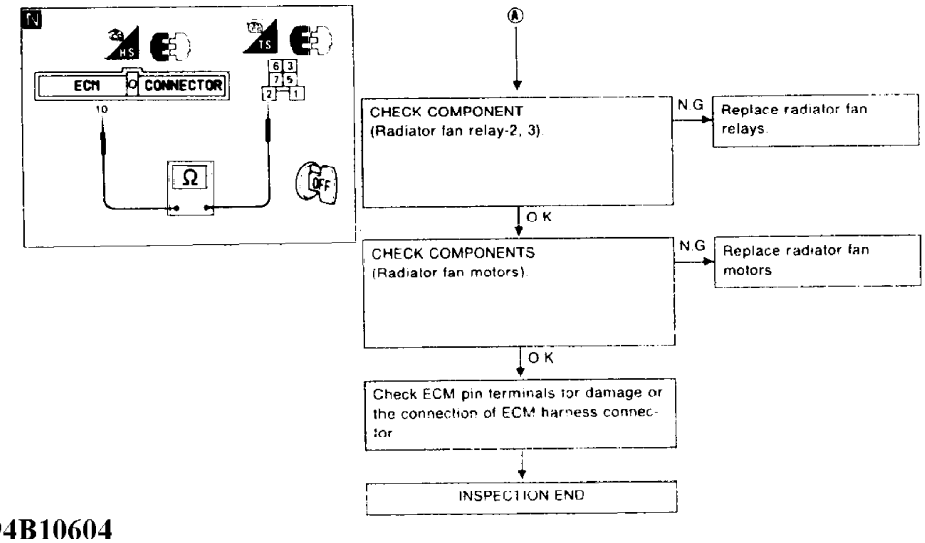

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Fig. 28: Diagnostic Procedure 9 - Trouble Shooting Chart (2 Of 2)
Courtesy Of Nissan Motor Co., U.S.A.

DIAGNOSTIC PROCEDURE 10 - RADIATOR FAN CONTROL (1.6L M/T)

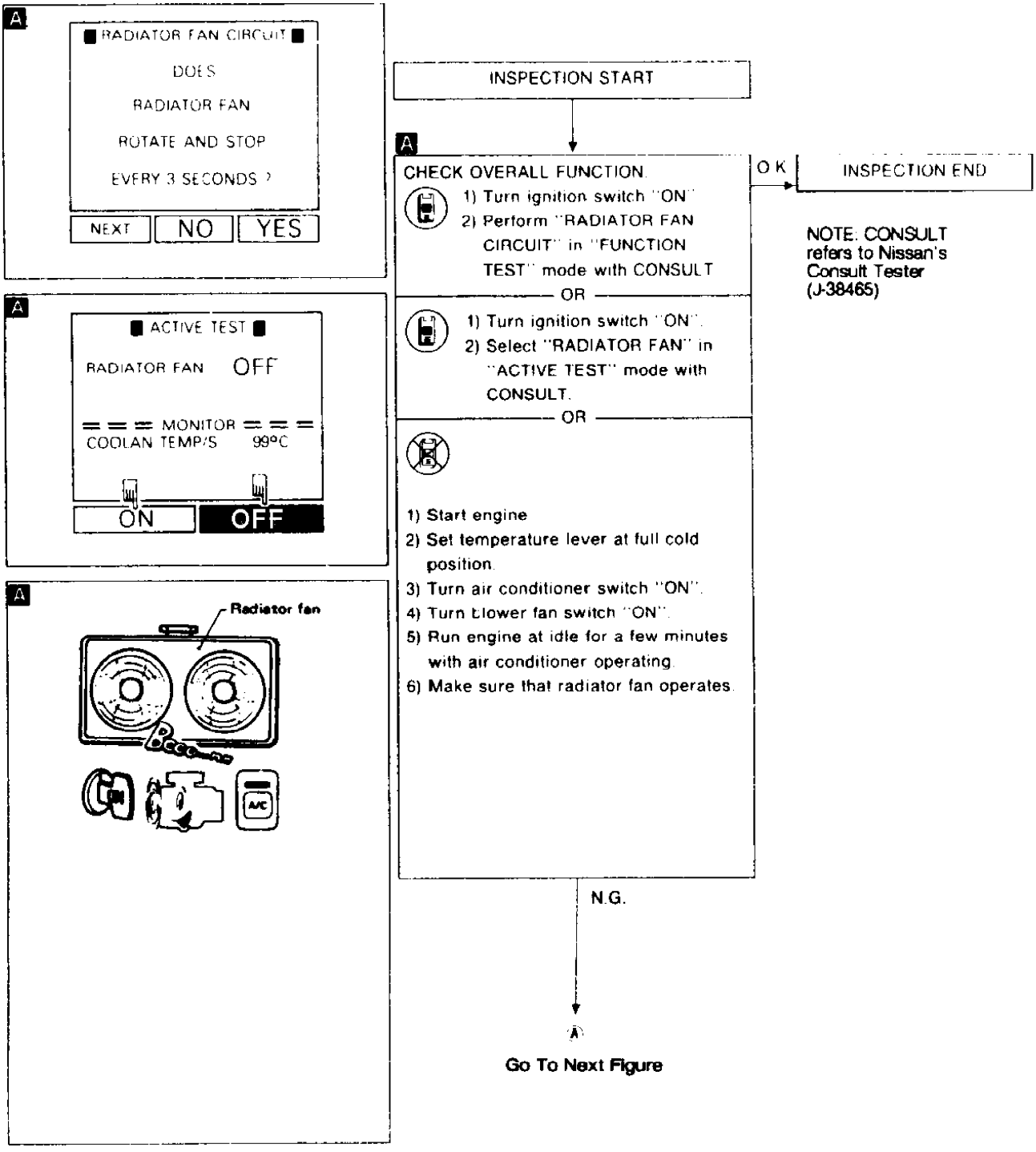

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Fig. 29: Diagnostic Procedure 10 - Trouble Shooting Chart (1 Of 3)
Courtesy Of Nissan Motor Co., U.S.A.

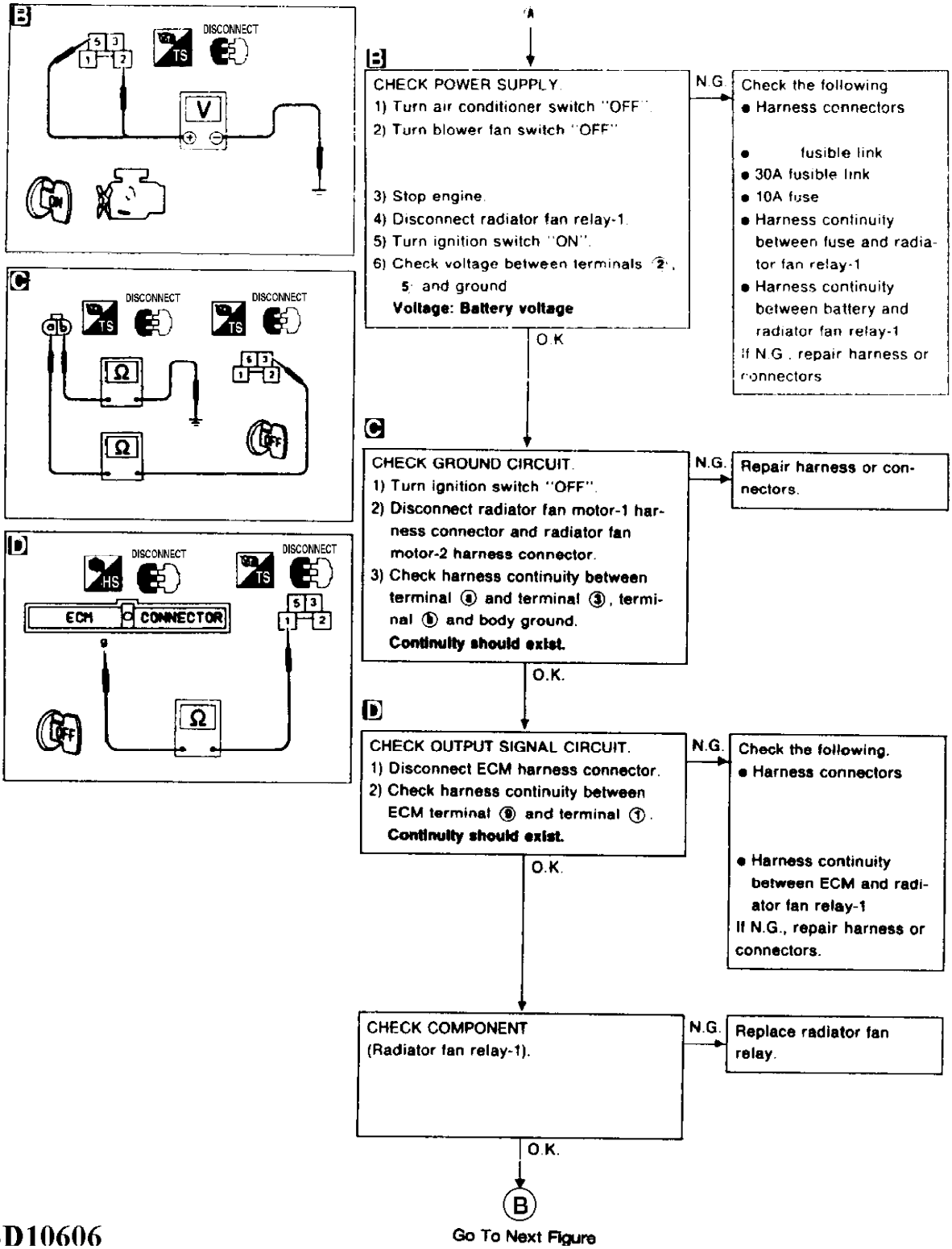

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Fig. 30: Diagnostic Procedure 10 - Trouble Shooting Chart (2 Of 3)
Courtesy Of Nissan Motor Co., U.S.A.

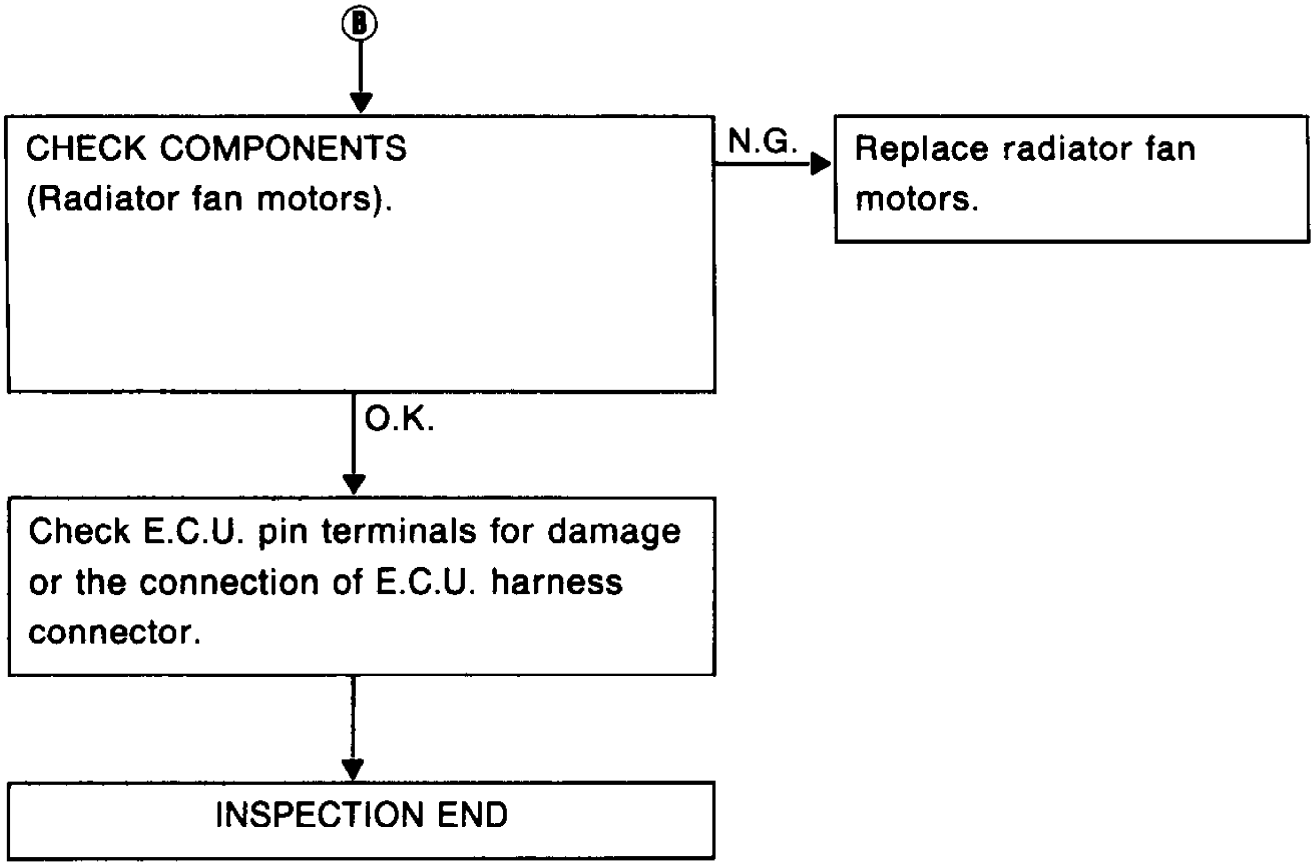

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Fig. 31: Diagnostic Procedure 10 - Trouble Shooting Chart (3 Of 3)
Courtesy Of Nissan Motor Co., U.S.A.

DIAGNOSTIC PROCEDURE 11 - RADIATOR FAN CONTROL (1.6L A/T)

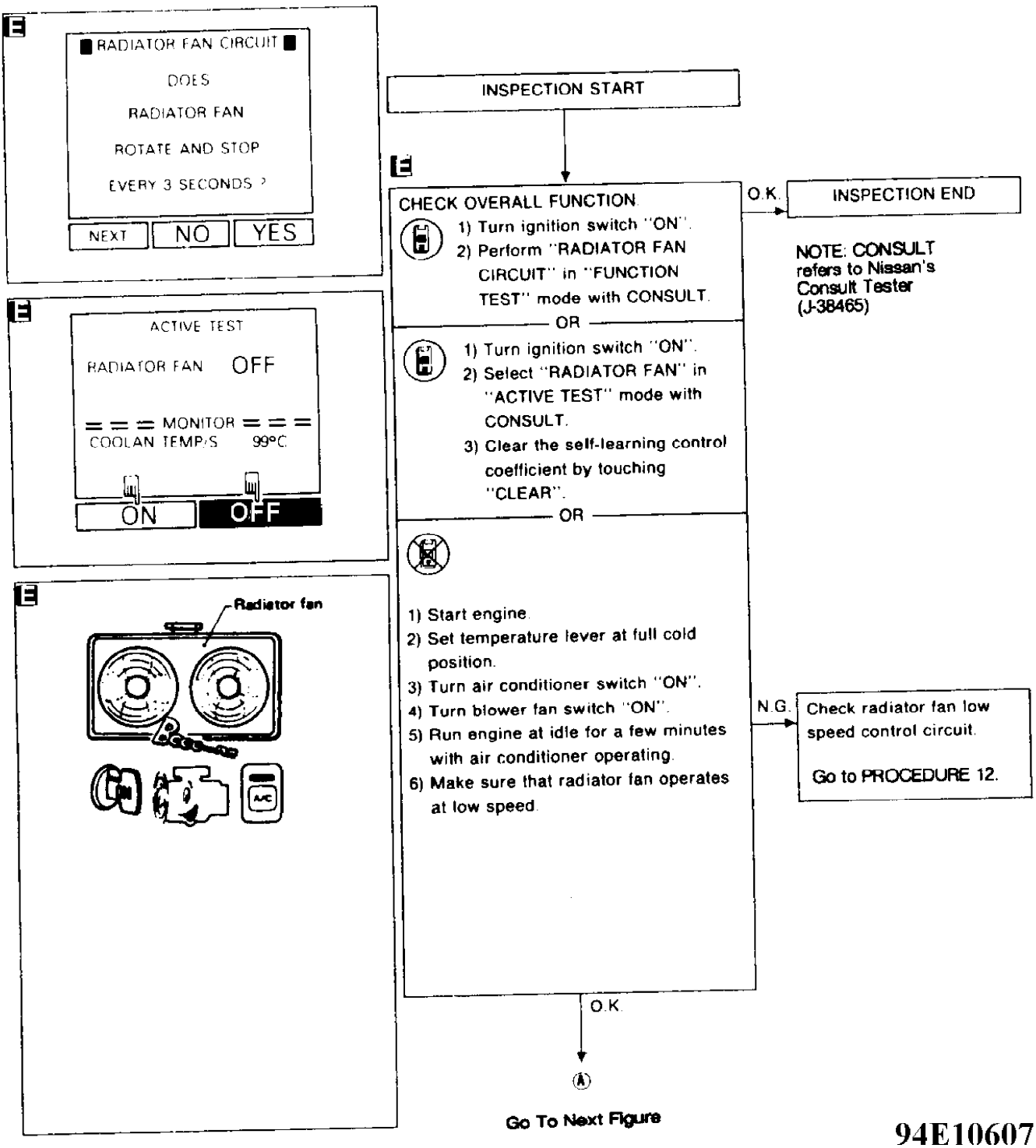

Fig. 32: Diagnostic Procedure 11 - Trouble Shooting Chart (1 Of 2)
Courtesy Of Nissan Motor Co., U.S.A.

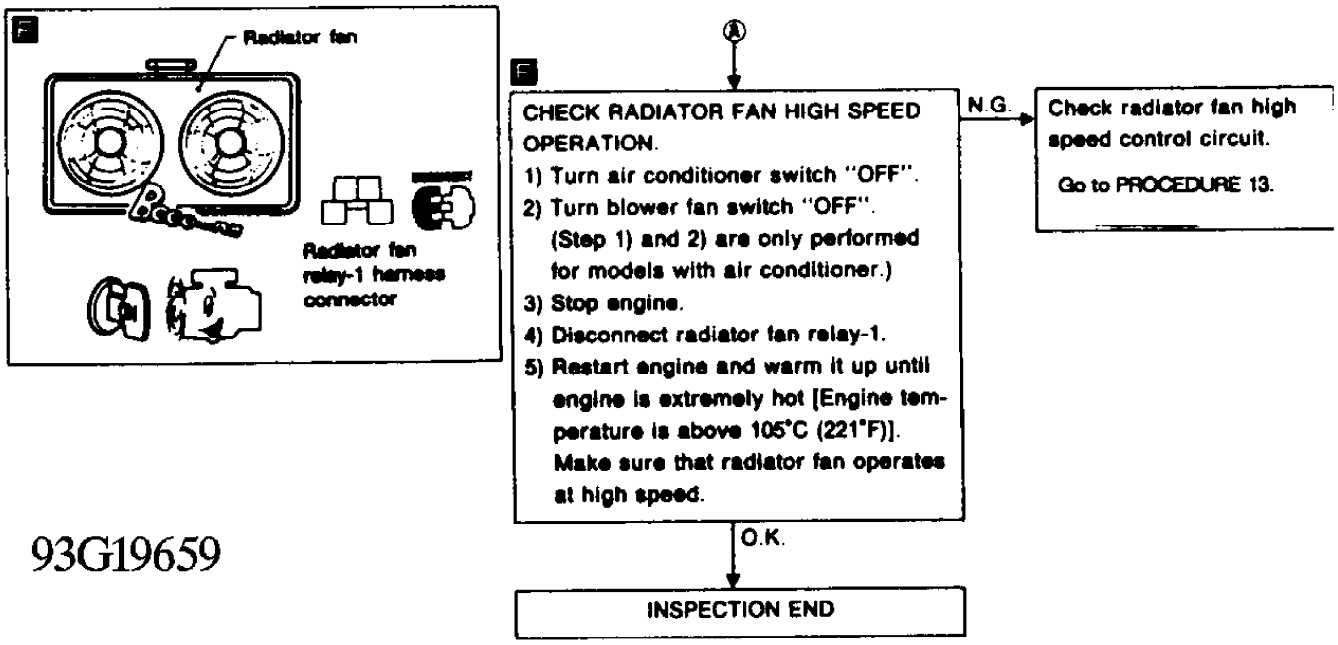

Fig. 33: Diagnostic Procedure 11 - Trouble Shooting Chart (2 Of 2)
Courtesy Of Nissan Motor Co., U.S.A.

DIAGNOSTIC PROCEDURE 12 - RADIATOR FAN CONTROL (1.6L A/T)

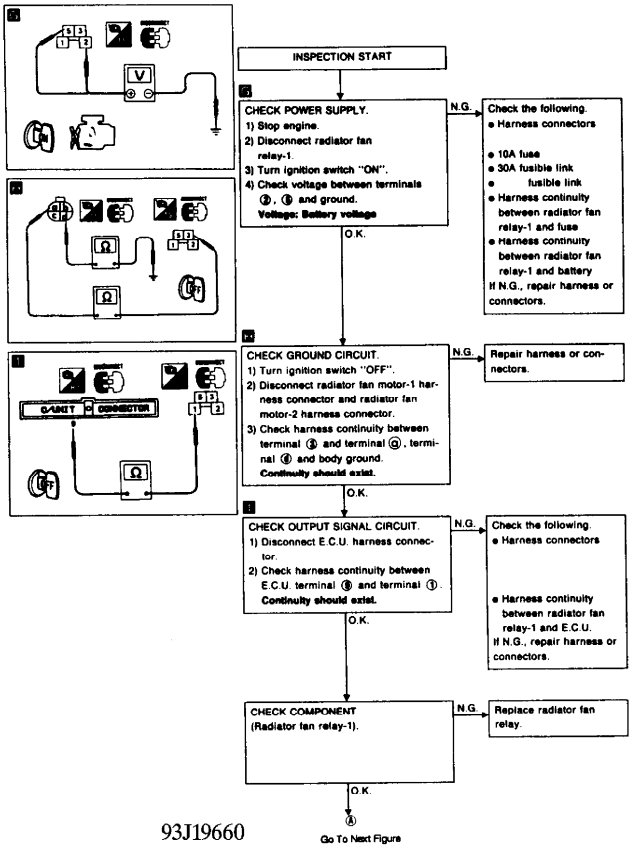

Fig. 34: Diagnostic Procedure 12 - Trouble Shooting Chart (1 Of 2)
Courtesy Of Nissan Motor Co., U.S.A.

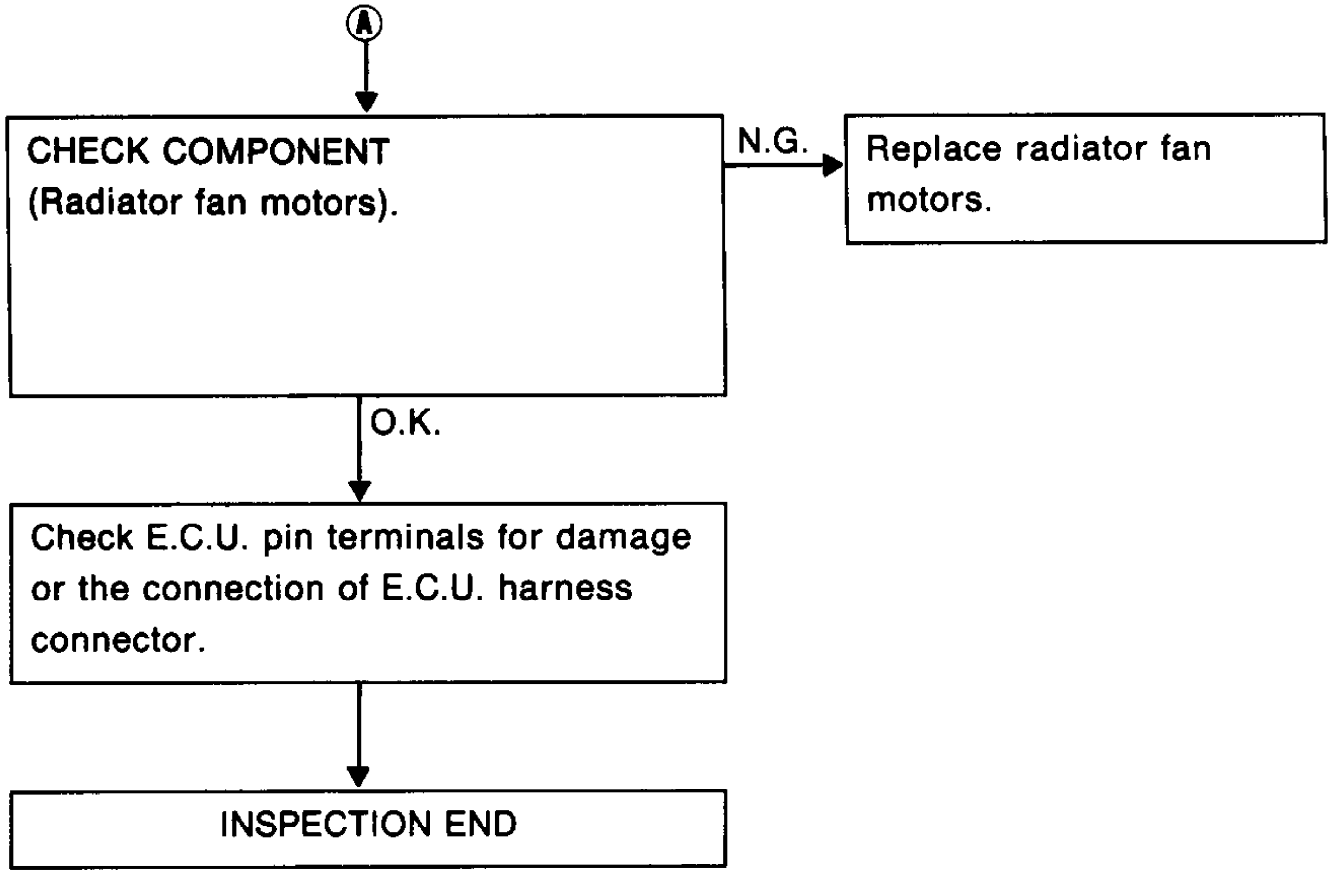

Fig. 35: Diagnostic Procedure 12 - Trouble Shooting Chart (2 Of 2)
Courtesy Of Nissan Motor Co., U.S.A.

DIAGNOSTIC PROCEDURE 13 - RADIATOR FAN CONTROL (1.6L A/T)

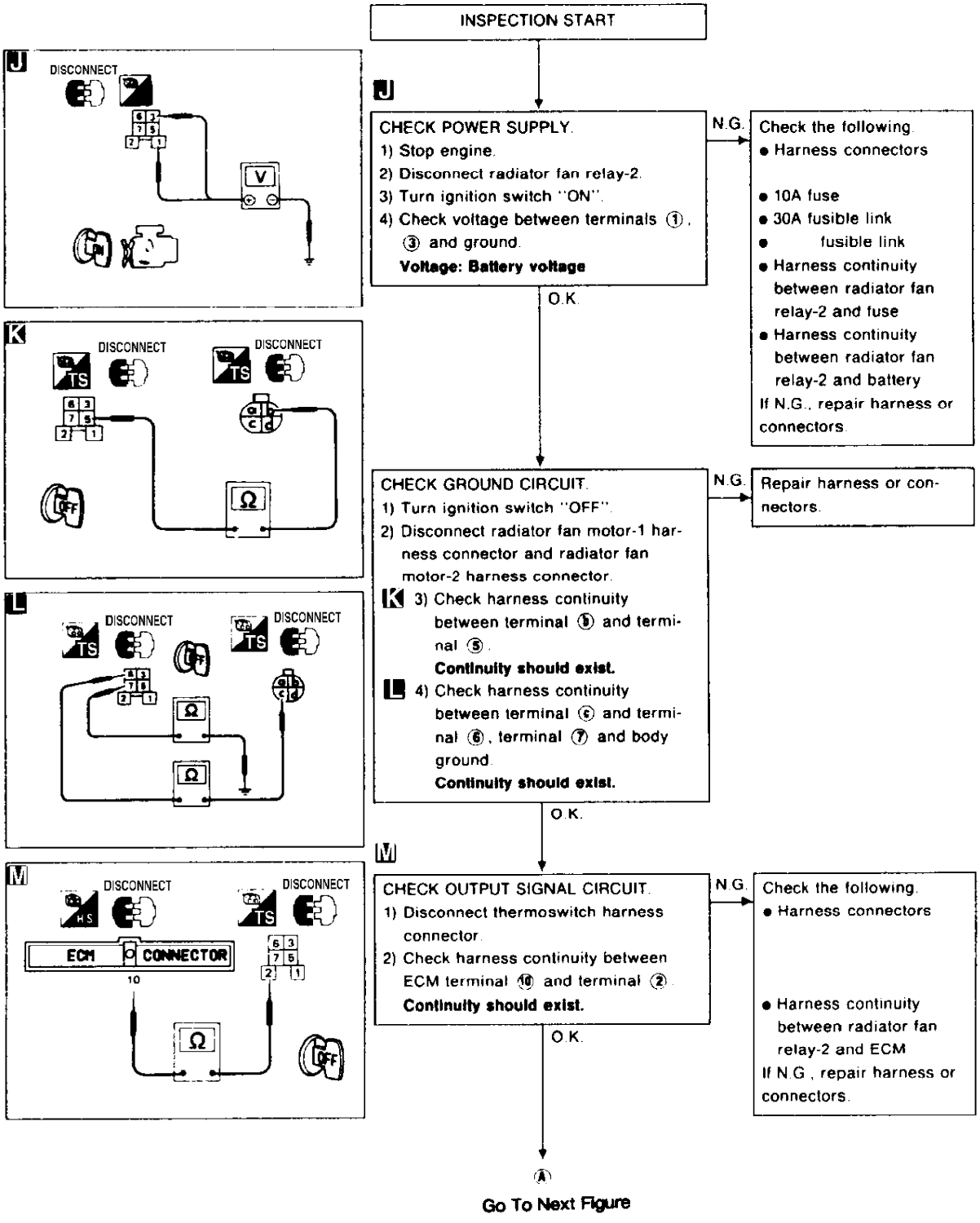

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Fig. 36: Diagnostic Procedure 13 - Trouble Shooting Chart (1 Of 2)
Courtesy Of Nissan Motor Co., U.S.A.

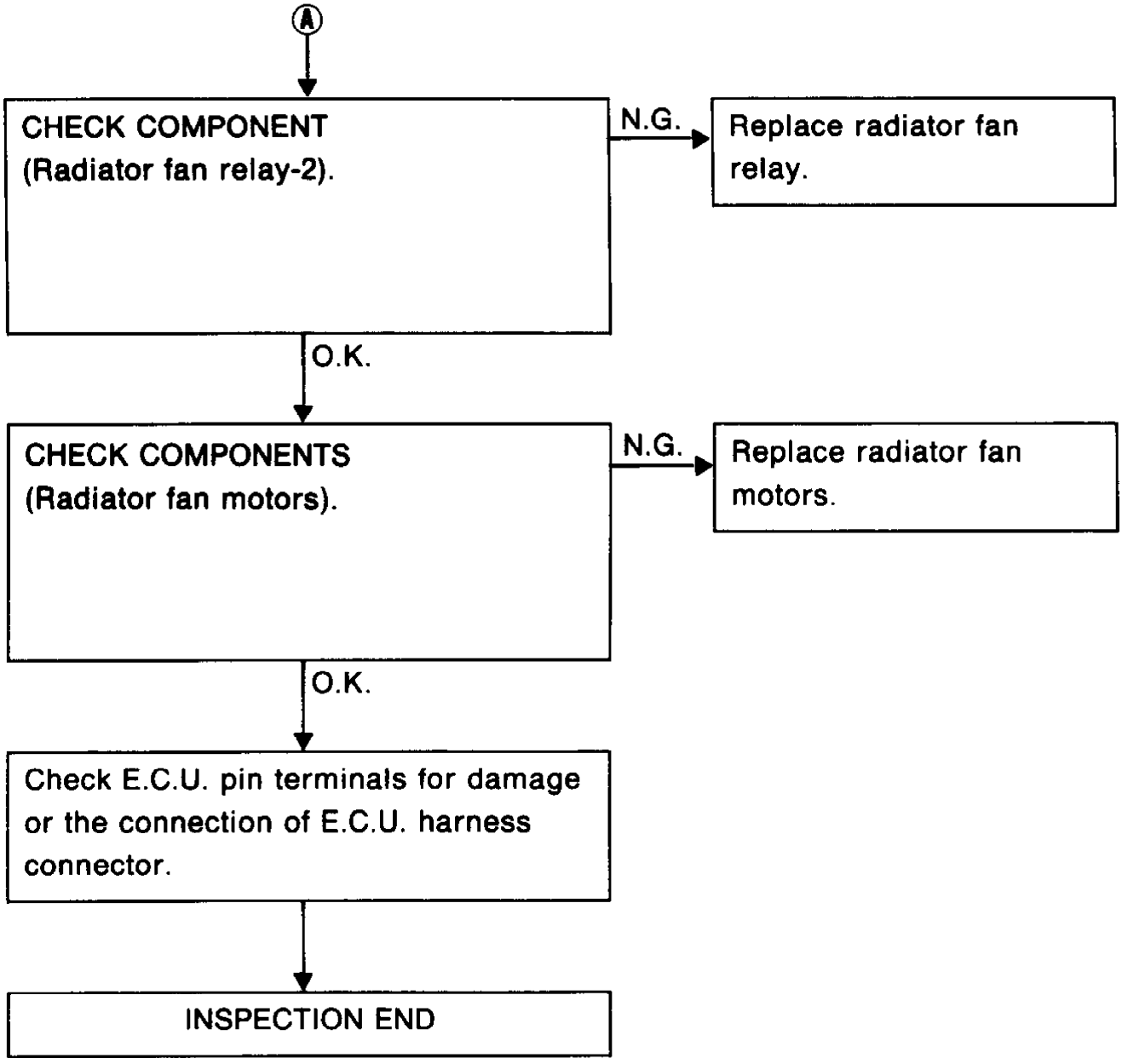

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Fig. 37: Diagnostic Procedure 13 - Trouble Shooting Chart (2 Of 2)
Courtesy Of Nissan Motor Co., U.S.A.

TESTING

WARNING: To avoid injury from accidental air bag deployment, read and carefully follow all SERVICE PRECAUTIONS and DISABLING & ACTIVATING AIR BAG SYSTEM procedures in appropriate AIR BAG RESTRAINT SYSTEM article in ACCESSORIES & ELECTRICAL section.

A/C SYSTEM PERFORMANCE

1) Park vehicle out of direct sunlight. Close all doors and open engine hood and windows. Connect A/C manifold gauge set. Determine relative humidity and ambient air temperature.

2) Set temperature control to maximum cold, mode control to face vent and recirculation switch to recirculation positions. Turn blower fan switch to highest position. Start and run engine at 1500 RPM.

3) After running A/C for 10 minutes, check high and low side system pressures. See A/C-HEATER PERFORMANCE TEST table to determine if system is operating within range.

A/C-HEATER PERFORMANCE TEST TABLE

Ambient Air Temp. °F (°C) (1)	High Pressure psi (kg/cm²)	Low Pressure psi (kg/cm²)
68 (20)	88-132 (6.2-9.3)	26-36 (1.8-2.5)
77 (25)	118-166 (8.3-11.7)	27-37 (1.9-2.6)
86 (30)	148-203 (10.4-14.3)	28-38 (2.0-2.7)
95 (35)	179-237 (12.6-16.7)	33-46 (2.3-3.2)

(1) - Specification is with relative humidity at 50-70%.

A/C SWITCH

Disconnect negative battery cable. Remove A/C switch from control panel. Turn A/C on. Using an ohmmeter, check continuity between switch terminals. Continuity should exist. If no continuity exists, replace A/C switch.

BLOWER MOTOR

Disconnect wiring harness at blower motor. Apply battery voltage to blower motor terminals. Ensure blower motor operation is smooth. If blower motor operation is rough or not up to speed, replace blower motor.

BLOWER SPEED CONTROL SWITCH

See TESTING in HEATER SYSTEM article.

BLOWER MOTOR RESISTOR

Disconnect harness connector. Check continuity between all resistor terminals. See Fig. 3. Ensure continuity exists. If continuity does not exist, replace resistor.

DUAL-PRESSURE SWITCH

Remove dual-pressure switch connector. Dual-pressure switch is located on top of receiver-drier. Using an ohmmeter, check continuity across switch terminals. See DUAL-PRESSURE SWITCH SPECIFICATIONS table. Replace switch if it does not test as indicated.

DUAL-PRESSURE SWITCH SPECIFICATIONS TABLE

Pressure: psi (kg/cm²)	System Operation	Continuity?
Decreasing To 26-31 (1.8-2.2)	Off	No
Increasing To 356-412 (25-29)	Off	No

Increasing To 26-34 (1.8-2.4)	.....	On	..... Yes
Decreasing To 270-327 (19-23)	.....	On	..... Yes

RELAYS

4-Terminal Type

Remove relay to be tested. See Fig. 2. Apply battery voltage between terminals No. 1 and No. 2. See Fig. 38. Check for continuity between remaining relay terminals. Continuity should exist. If no continuity exists, replace relay.

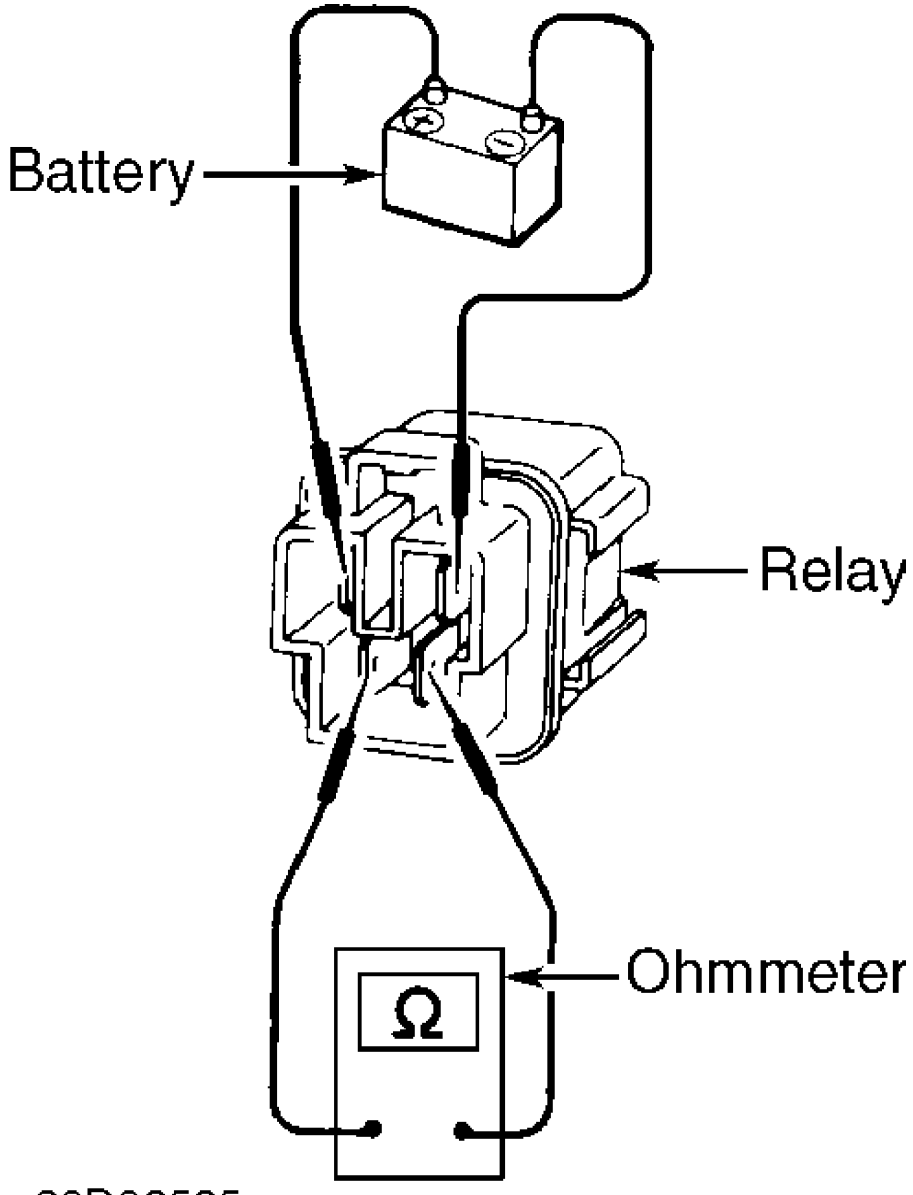

Fig. 38: Testing Relay (4-Terminal Type)
Courtesy of Nissan Motor Co., U.S.A.

THERMO CONTROL AMPLIFIER

Check the thermo control amplifier as indicated in the THERMO CONTROL AMPLIFIER SPECIFICATIONS table. Replace amplifier if it does not test as specified.

THERMO CONTROL AMPLIFIER SPECIFICATIONS TABLE

Evaporator Temp: °F (°C)	Thermo Amp. Operation	Volts
Decreasing To 37-38 (2.5-3.5)	Off	About 12
Increasing To 39-41 (4-5)	On	Zero

THERMAL PROTECTOR SWITCH

Check compressor operation at indicated temperature. See THERMAL PROTECTOR SWITCH TEST table. Replace switch if compressor does not test as specified.

THERMAL PROTECTOR SWITCH TEST TABLE

Compressor Temp. °F (°C)	Compressor Operation
Increasing To 275-293 (135-145)	Off
Decreasing To 248-266 (120-130)	On

REMOVAL & INSTALLATION

WARNING: To avoid injury from accidental air bag deployment, read and carefully follow all SERVICE PRECAUTIONS and DISABLING & ACTIVATING AIR BAG SYSTEM procedures in appropriate AIR BAG RESTRAINT SYSTEM article in ACCESSORIES & ELECTRICAL section.

A/C COMPRESSOR

Removal

Loosen idler pulley bolt, and remove compressor belt. Discharge A/C system using approved refrigerant recovery/recycling equipment. Disconnect compressor clutch lead. Remove discharge and suction hoses from compressor, and plug hose openings. Remove compressor bolts and compressor.

Installation

To install, reverse removal procedure. Tighten compressor bolts to 33-44 ft. lbs. (45-60 N.m). Coat new "O" rings with refrigerant oil when attaching hoses to compressor. Evacuate and recharge system.

EVAPORATOR & HEATER CORE ASSEMBLY

Removal

Discharge A/C system using approved refrigerant recovery/recycling equipment. Drain cooling system. Disconnect negative battery cable. Deactivate air bag. See appropriate AIR BAG RESTRAINT SYSTEM article in ACCESSORIES & ELECTRICAL section. Remove components in order listed in illustrations. See Figs. 5 and 6.

Installation

To install, reverse removal procedure. Coat NEW "O" rings with refrigerant oil before assembling connections. If installing a new evaporator core, add 2 ounces of refrigerant oil to new core

before installation. Evacuate and recharge system.

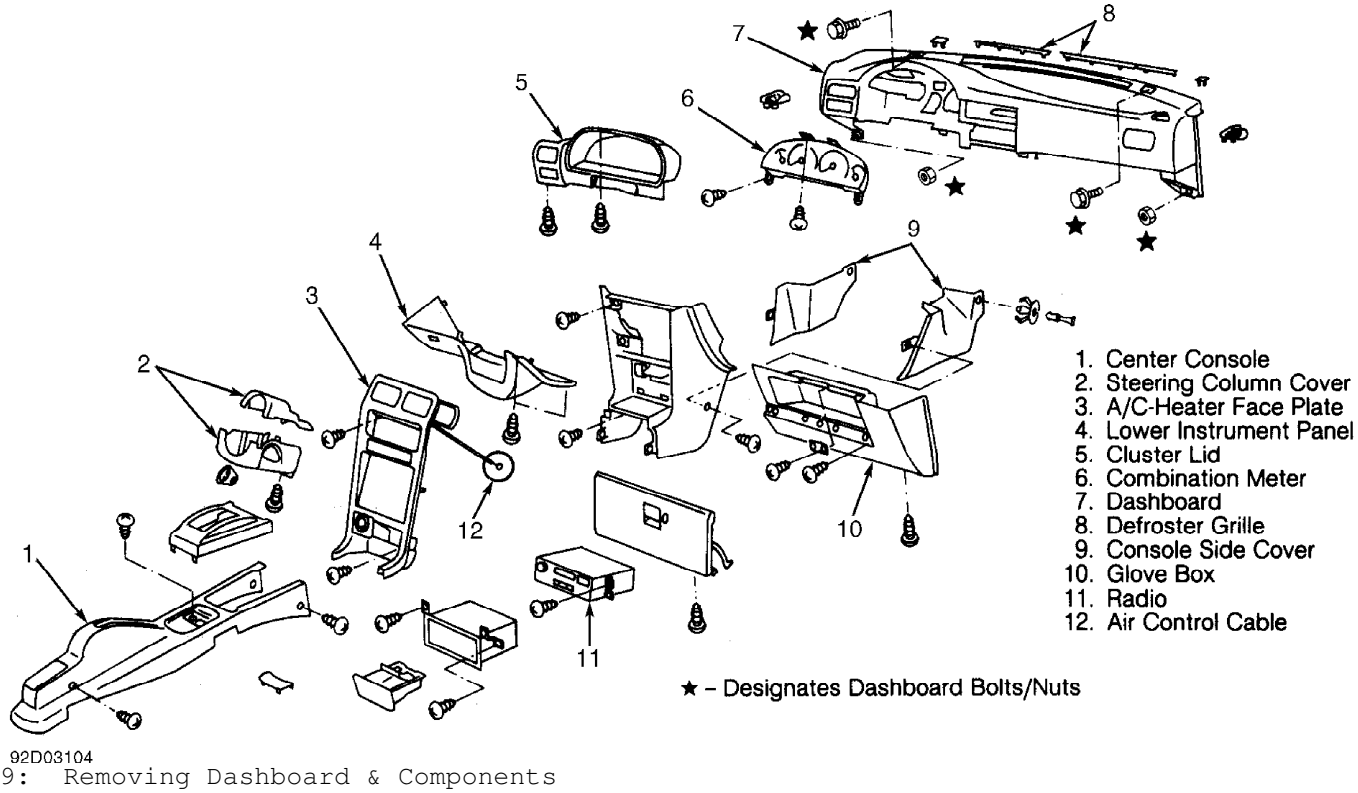

Fig. 39: Removing Dashboard & Components
Courtesy of Nissan Motor Co., U.S.A.

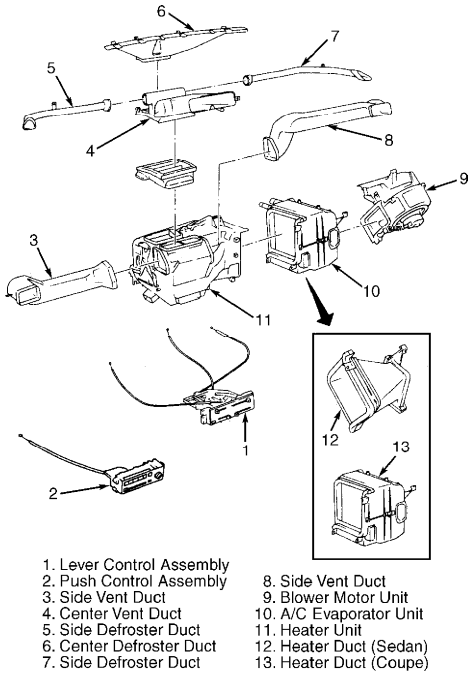

Fig. 40: Exploded View Of A/C-Heater System Components
Courtesy of Nissan Motor Co., U.S.A.

Disconnect negative battery cable. Deactivate air bag. See AIR BAG SYSTEM SAFETY article in GENERAL SERVICING. Remove components in order listed in illustration. See Fig. 39.

WIRING DIAGRAMS

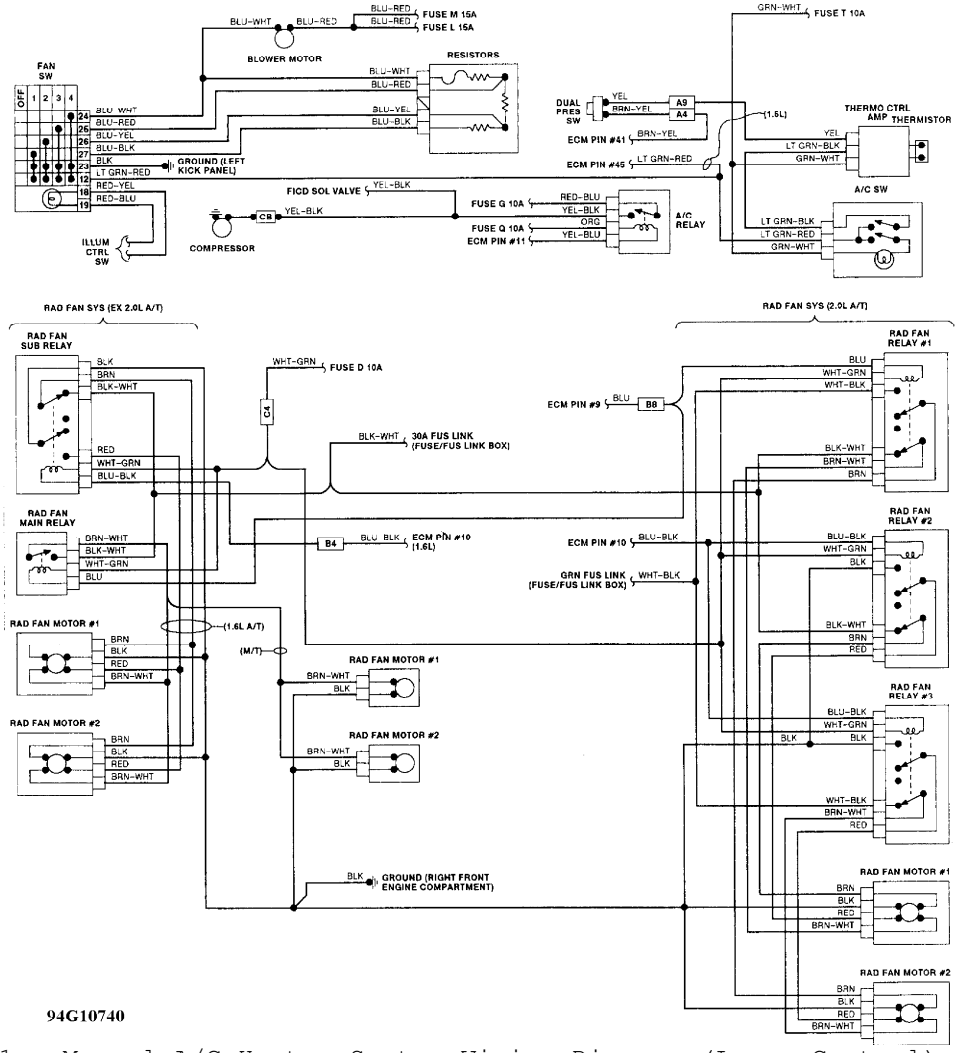

Fig. 41: Manual A/C-Heater System Wiring Diagram (Lever Control)

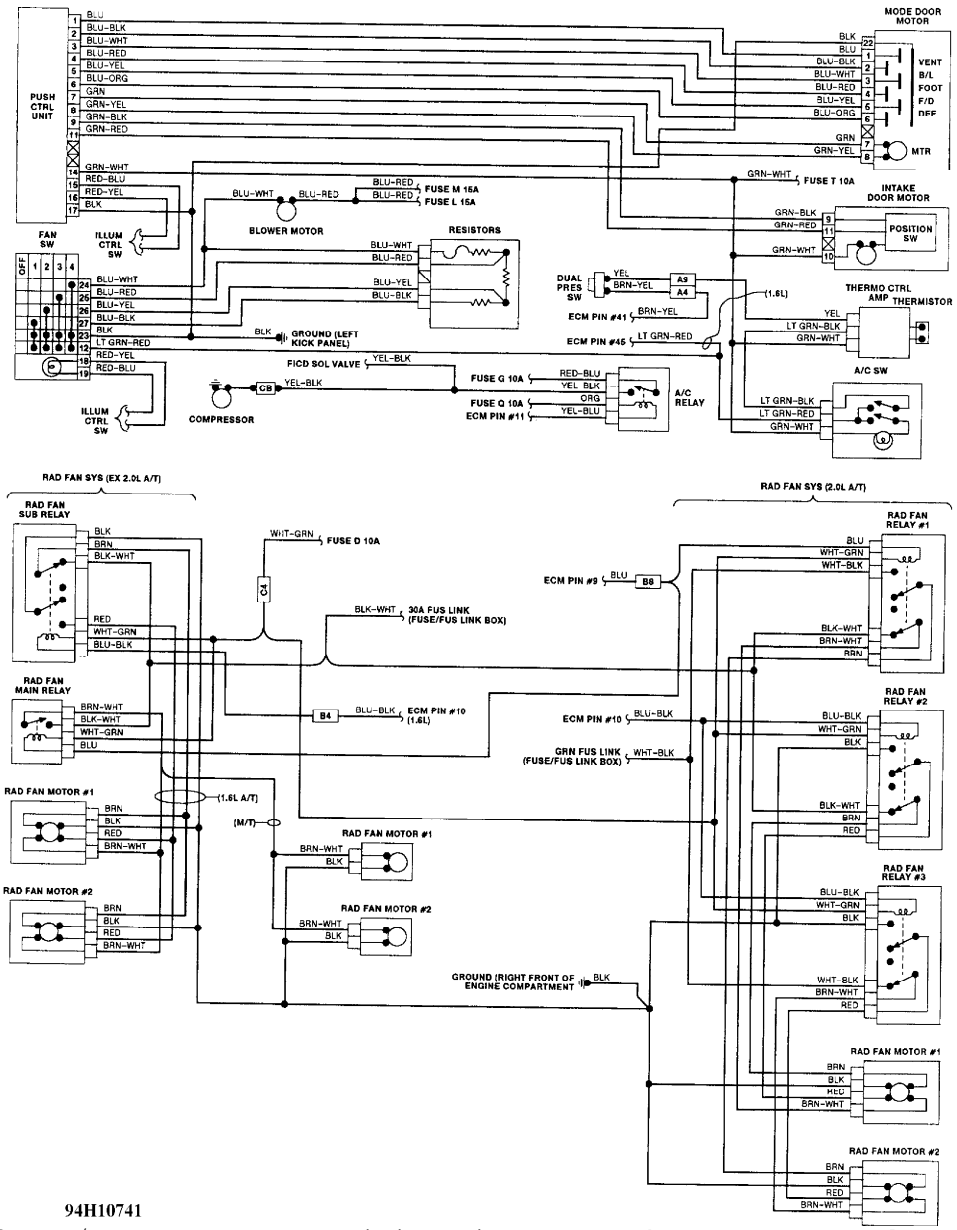

Fig. 42: A/C-Heater System Wiring Diagram (Push Button Control)

END OF ARTICLE