A/C-HEATER SYSTEM - AUTOMATIC
Article Text
1992 Nissan Maxima
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ARTICLE BEGINNING

1990-92 Automatic A/C-Heat System

Maxima

DESCRIPTION

Automatic A/C-heater system consists of electronically controlled components added to standard air conditioning system. Automatic A/C system is controlled by the auto amplifier. See Figs. 1 and 2.

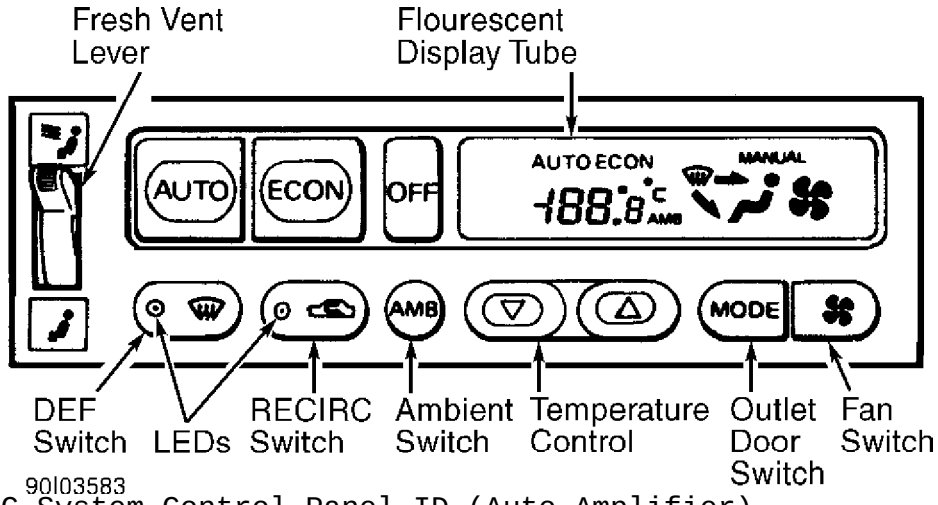


Fig. 1: A/C System Control Panel ID (Auto Amplifier)
Courtesy of Nissan Motor Co., U.S.A.

Auto amplifier unit is a switch control panel and microcomputer assembly. It processes various sensor information and controls air mix door, fan speed, outlet door, intake door, A/C compressor clutch, memory function and water cock (heater control valve) solenoid.

NOTE: For A/C-heater components not covered in this article, refer to MANUAL A/C-HEATER SYSTEM article in the AIR CONDITIONING & HEAT Section.

OPERATION

Automatic A/C-heater system controls optimum airflow (fan speed), outlet air temperature and outlet air vents to maintain vehicle interior temperature at desired setting.

AIR MIX DOOR MOTOR

Air mix door motor is attached to heater unit. Auto amplifier commands air mix door motor to rotate a shaft to move air mix door to

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a set position/angle. Air mix door position/angle is monitored by Potentiometer Balance Resistor (PBR), located inside air mix door motor. Door position/angle is continuously being fed back to auto amplifier by PBR to allow auto amplifier to move door position/angle for desired temperature.

AMBIENT TEMPERATURE SENSOR

Ambient temperature sensor, located below hood latch, detects ambient (outside) temperature and converts this reading into a resistance value read by the auto amplifier. See Fig. 2.

If auto amplifier detects an abrupt change, it gradually adjusts interior temperature (.6øF per 100 seconds) until desired setting is reached. If vehicle stops in traffic after highway speeds, ambient temperature sensor detects high temperature from heat off radiator. To counteract this sudden temperature change, ambient temperature input process (inside auto amplifier) gradually adjusts interior temperature to prevent an unpleasant temperature changes.

ASPIRATOR

Aspirator, located on lower, front of heater unit, produces a vacuum from outlet air discharged from heater unit. This aspirator vacuum pulls air from driver's side area, through in-vehicle temperature sensor.

AUTO AMPLIFIER

A/C system control panel (auto amplifier), is a microcomputer that monitors and processes information from various sensors. Auto amplifier controls air mix door motor, mode door motor, intake door motor, fan motor and compressor clutch operation. Self-diagnostic functions are built into auto amplifier to check A/C system malfunctions. See Fig. 1.

Auto amplifier detects sensor voltage differences by monitoring an internal, fixed resistor for each sensor. Each sensor is fed 5-volts through the fixed resistor by a constant voltage circuit within auto amplifier. Voltage is then applied to ground through sensor resistance. This resistance value is the input read by auto amplifier.

FAN CONTROL AMPLIFIER

Fan control amplifier, located on evaporator housing, amplifies base current flowing from auto amplifier to fan blower motor. These changes in base current are what changes blower speed. Operating voltage range is from 5-10.5 volts. If auto amplifier senses the need for more than 10.5 volts, high speed relay then applies a direct ground to blower motor for full 12 volts. See Fig. 2.

HIGH SPEED RELAY

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High speed relay, located on intake unit, receives its signal from auto amplifier to enable blower motor to operate at high speed.

NOTE: High speed relay may also be referred to as HI relay in TROUBLE SHOOTING charts.

INTAKE DOOR MOTOR

Intake door motor, attached to blower motor unit, is controlled by auto amplifier. Motor rotation is transferred by a rod and lever to position intake door for correct air intake.

INTAKE SENSOR

Intake sensor is located in evaporator housing. After air passes through the evaporator, intake sensor detects air temperature and converts this into a resistance value, monitored by auto amplifier.

IN-VEHICLE TEMPERATURE SENSOR

In-vehicle temperature sensor is located on center dash console, to left of radio. Driver's area air is drawn through sensor by the aspirator. In-vehicle temperature sensor converts temperature variations to a resistance value, monitored by auto amplifier.

MODE DOOR MOTOR

Mode door motor, attached to heater unit, rotates so air is discharged from outlet(s) controlled by auto amplifier. Motor rotation is transferred by a rod and link to position mode door.

POTENTIOMETER BALANCE RESISTOR (PBR)

This variable resistor is built into air mix door motor and converts air mix door position into a resistance value, monitored by auto amplifier.

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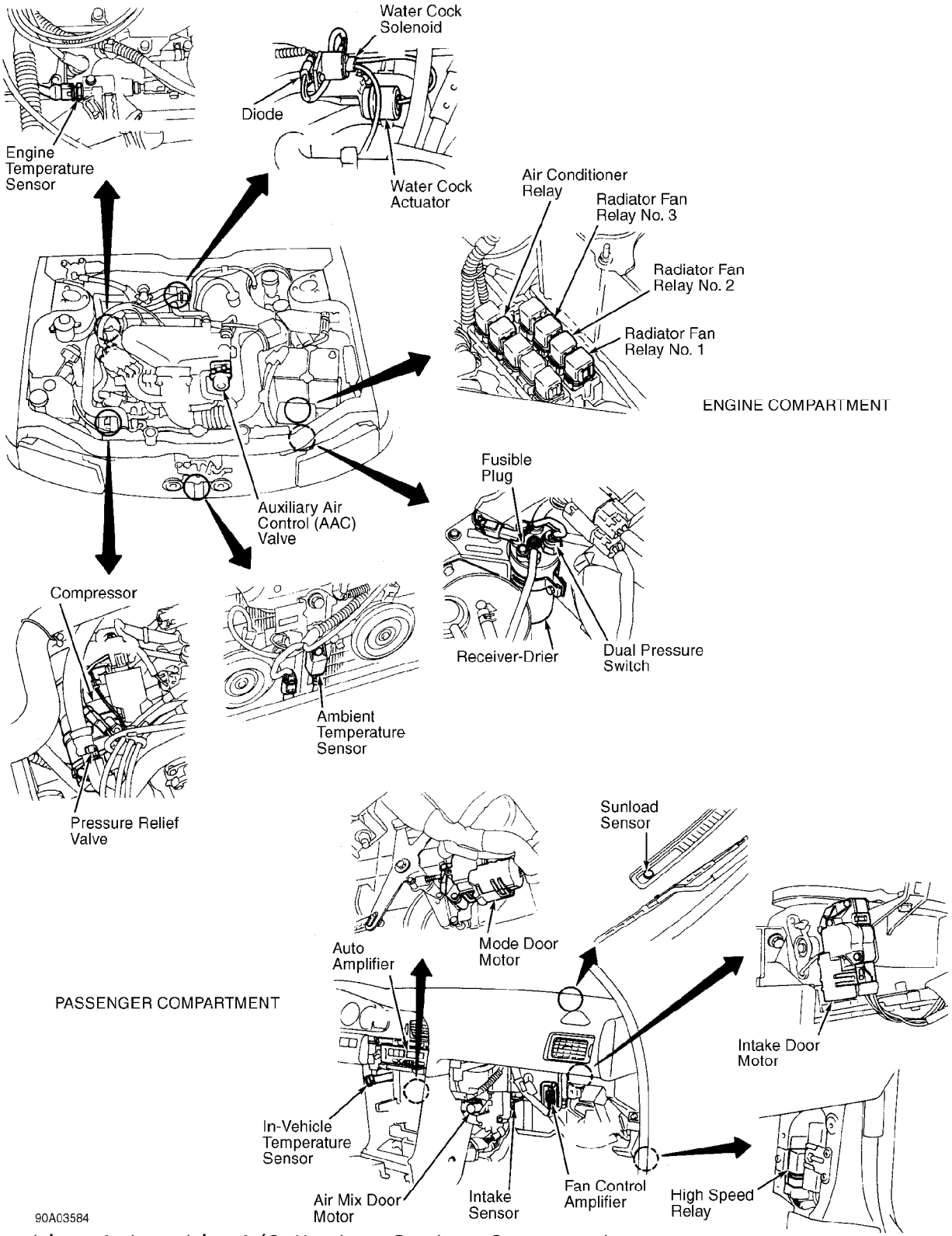


Fig. 2: Locating Automatic A/C-Heater System Components
Courtesy of Nissan Motor Co., U.S.A.

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POTENTIOMETER TEMPERATURE CONTROL

Potentiometer Temperature Control (PTC) circuit is built into auto amplifier and is adjustable by temperature control switches. See Fig. 1. Temperature can be set in one (1) degree Fahrenheit increments between 65øF (18øC) and 90øF (32øC). Ambient and set temperatures are digitally displayed on auto amplifier.

SUNLOAD SENSOR

Sunload sensor is a photo diode and is located on right defroster grille. Sunlight is converted into a current (voltage) value processed through sunload input process system inside auto amplifier. If sunload input process system detects an abrupt change in sunload sensor input (i.e. vehicle entering a tunnel), sunload input to auto amplifier will vary for approximately 38 seconds to prevent an unpleasant, quick temperature change by automatic A/C system operation.

WATER COCK SOLENOID

Auto amplifier controls ground circuit to water cock (heater control valve) solenoid. When full cold temperature is selected on auto amplifier, water cock solenoid is energized and manifold vacuum closes water cock actuator, preventing coolant flow to heater unit.

ADJUSTMENTS

AIR MIX DOOR

1) Install air mix door motor onto heater unit and connect wiring harness. See Fig. 2. Enter self-diagnosis and access Code 41. See SELF-DIAGNOSIS STEP 4 under SELF-DIAGNOSTICS.
2) Move air mix door lever by hand and hold door in full cold setting. Attach air mix door lever to rod holder. See Figs. 3 and 4.
3) Ensure air mix door operates to correct positions when accessing Codes 41-46 by pushing DEF switch. See SELF-DIAGNOSIS STEP 4 under SELF-DIAGNOSTICS. Adjust as needed.

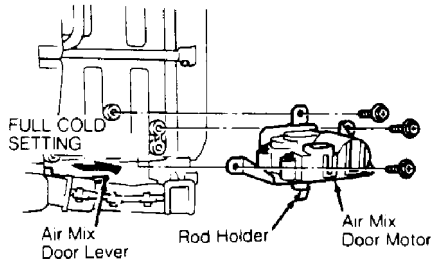


Fig. 3: Adjusting Air Mix Door
Courtesy of Nissan Motor Co., U.S.A.

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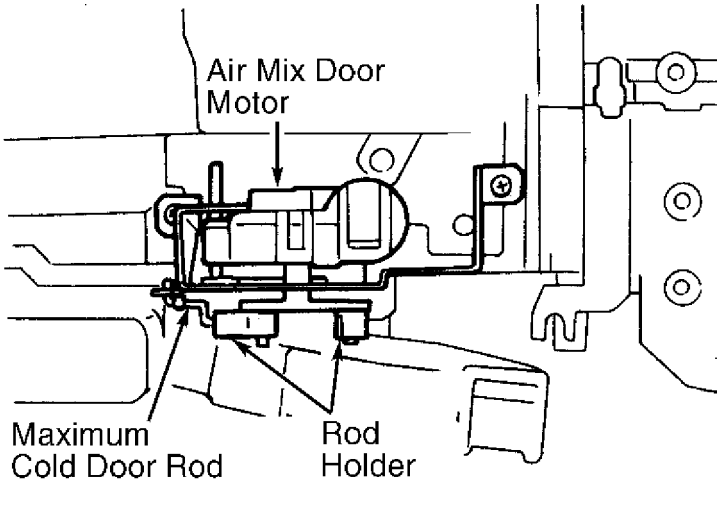


Fig. 4: Adjusting Air Mix Door
Courtesy of Nissan Motor Co., U.S.A.

INTAKE DOOR

1) Install intake door motor on intake unit and connect wiring harness. See Fig. 2. Enter self-diagnosis and access Code 41. See SELF-DIAGNOSIS STEP 4 under SELF-DIAGNOSTICS.

2) Move intake door link by hand and hold intake door in recirculate setting. See Fig. 5. Attach intake door motor rod to intake door link rod holder.

3) Ensure intake door operates to correct positions when accessing Codes 41-46 by pushing DEF switch. See SELF-DIAGNOSIS STEP 4 under SELF-DIAGNOSTICS.

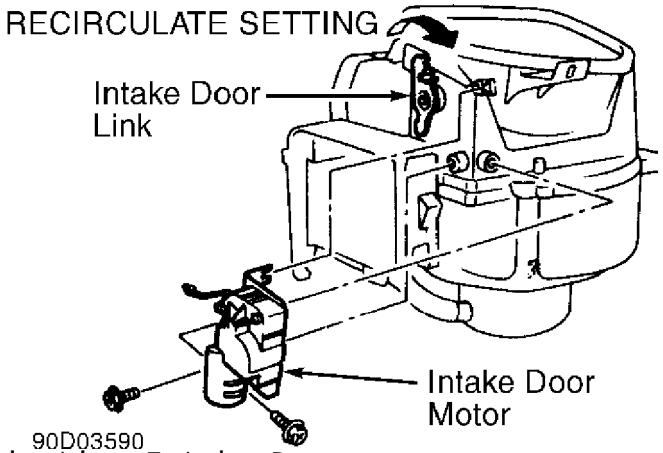


Fig. 5: Adjusting Intake Door
Courtesy of Nissan Motor Co., U.S.A.

MODE DOOR

1) Install mode door motor onto heater unit and connect wiring harness. See Fig. 2. Enter self-diagnosis and access Code 41.

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See SELF-DIAGNOSIS STEP 4 under SELF-DIAGNOSTICS.

2) Move side link by hand and hold mode door in VENT setting. Attach mode door motor rod to side link rod holder. See Fig. 6.

3) Ensure mode door operates to correct positions when accessing Codes 41-46 by pushing DEF switch. See SELF-DIAGNOSIS STEP 4 under SELF-DIAGNOSTICS.

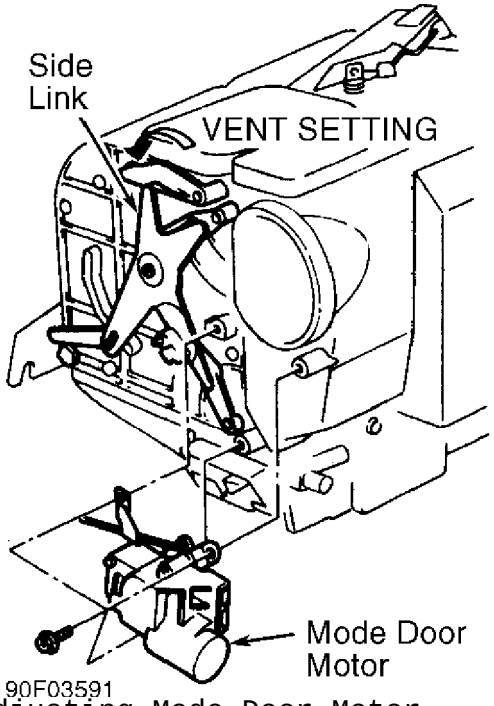


Fig. 6: Adjusting Mode Door Motor
Courtesy of Nissan Motor Co., U.S.A.

TROUBLE SHOOTING

NOTE: During all self-diagnostic functions, ensure fresh air vent on auto amplifier is in OFF position, unless otherwise indicated. Also see TROUBLE SHOOTING CHARTS at the end of this article.

SELF-DIAGNOSTICS

SELF-DIAGNOSTIC INFORMATION

Preliminary Information

To properly diagnose this system, self-diagnostics should be performed in the following order:

* Read ENTERING/EXITING SELF-DIAGNOSTICS.
* Perform SELF-DIAGNOSIS STEPS 1-5.
* Perform appropriate PRELIMINARY CHECK chart under TROUBLE SHOOTING CHARTS for symptom diagnosis. PRELIMINARY CHECK charts refer to proper DIAGNOSTIC PROCEDURE chart(s).

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* Perform DIAGNOSTIC PROCEDURE chart(s) under TROUBLE SHOOTING CHARTS.

ENTERING/EXITING SELF-DIAGNOSTICS

1) Start engine and immediately depress and hold OFF switch on auto amplifier for at least 5 seconds. DO NOT enter self-diagnostics without engine running.
2) Select self-diagnosis steps 1-5 by pressing temperature control switches. After selecting step 5, auxiliary mechanism test may be selected by pressing FAN switch. Auxiliary mechanism test checks temperature setting trimmer.
3) To cancel self-diagnostics, press AUTO switch or turn ignition to OFF position.

SELF-DIAGNOSIS STEP 1

Checks Light Emitting Diodes (LEDs) & Segments
Step 1 starts automatically when self-diagnostics are entered. All LEDs and fluorescent display tubes should illuminate. See Fig. 1. If all LEDs and fluorescent display tubes DO NOT illuminate, repair or replace as necessary. If LEDs and fluorescent display tubes test okay, replace auto amplifier.

SELF-DIAGNOSIS STEP 2

Checks Sensors For Open/Short Circuits
1) Position vehicle to enable sunlight to shine on sunload sensor. Enter self-diagnosis step 2 by pressing UP temperature control switch on auto amplifier. Display will illuminate a 2. If all sensor circuits are okay and no trouble codes are present, display will change to Code 20. It takes auto amplifier about 4 seconds to check all sensor circuits.
2) If a sensor circuit is faulty, circuit code number will flash on display. Shorted circuit will have a flashing "--" in front of the number 2. Open circuit will NOT have a flashing "--". If, for example, 21 is displayed on auto amplifier by an illuminated 2 and a flashing 1, an open circuit is indicated.
3) If two sensor circuits are faulty, each circuit code number will blink twice. See SELF-DIAGNOSIS STEP 2 CODE EXPLANATIONS table to determine what a code number means.

SELF-DIAGNOSIS STEP 2 CODE EXPLANATIONS TABLE

Code	Sensor
20	No Trouble Codes
21	Ambient Temperature Sensor
22	In-Vehicle Temperature Sensor
24	Intake Sensor
25	Sunload Sensor
26	Potentiometer Balance Resistor (PBR)

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SELF-DIAGNOSIS STEP 3

Checks Mode Door Position
1) To enter self-diagnosis step 3, press UP temperature control switch on auto amplifier. Display will illuminate a 3. If all doors are operational, display will change to 30. It takes about 16 seconds to check all doors.
2) If a door is faulty, code number will flash. If two doors are faulty, each code number will blink twice. To determine what a code number means, see SELF-DIAGNOSIS STEP 3 CODE EXPLANATIONS table.

NOTE: If ANY mode door motor position switch is malfunctioning, mode door motor will also malfunction.

SELF-DIAGNOSIS STEP 3 CODE EXPLANATIONS TABLE

Code	Door
30	No Trouble Codes
31	Vent
32	Bi-Level (B/L)
33	Bi-Level (B/L)
34 (1)	Foot/Defrost Mode 1 (F/D 1)
35 (2)	Foot/Defrost Mode 2 (F/D 2)
36	Defrost (DEF)

(1) - Foot/Defrost Mode 1 is used when manual mode is selected on auto amplifier. Mode 1 directs 75% air to foot area.
(2) - Foot/Defrost Mode 2 is used when automatic mode is selected on auto amplifier. Mode 2 directs 50% air to foot area.

SELF-DIAGNOSIS STEP 4

Checks Operation of Each Actuator
1) Ensure fresh air lever on auto amplifier is off during tests. To enter self-diagnosis step 4, press UP temperature control switch on auto amplifier. Display will illuminate Code 41. Each time DEF switch is pressed, display will advance one code number. After Code 46 is reached, numbers go back to Code 41.
2) As code numbers advance, auto amplifier commands will change air intake and outlet routes. Ensure doors are switching properly by listening for door operation and/or feeling for air flow from proper outlet(s). See SELF-DIAGNOSIS STEP 4 CODE EXPLANATIONS table to determine what a code number means.

SELF-DIAGNOSIS STEP 4 CODE EXPLANATIONS TABLE

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Application	Door Position
Code 41	
Mode Door	Vent
Intake Door	Recirculate
Air Mix Door	Full Cold
Blower Motor	Low ((1) 4-5 Volts)
Compressor	On
Code 42	
Mode Door	Bi-Level
Intake Door	Recirculate
Air Mix Door	Full Cold
Blower Motor	Medium High ((1) 9-11 Volts)
Compressor	On
Code 43	
Mode Door	Bi-Level
Intake Door	20% Fresh
Air Mix Door	Full Hot
Blower Motor	Medium Low ((1) 7-9 Volts)
Compressor	On
Code 44	
Mode Door	(2) Foot/Defrost Mode 1
Intake Door	Fresh
Air Mix Door	Full Hot
Blower Motor	Medium Low ((1) 7-9 Volts)
Compressor	Off
Code 45	
Mode Door	(3) Foot/Defrost Mode 2
Intake Door	Fresh
Air Mix Door	Full Hot
Blower Motor	Medium Low ((1) 7-9 Volts)
Compressor	Off
Code 46	
Mode Door	Defrost
Intake Door	Fresh
Air Mix Door	Full Hot
Blower Motor	High ((1) 10-12 Volts)
Compressor	On

(1) - Voltage applied to blower motor for desired speed.
(2) - Foot/Defrost Mode 1 is used when manual mode is selected on auto amplifier. Mode 1 directs 75% air to foot area.
(3) - Foot/Defrost Mode 2 is used when automatic mode is selected on auto amplifier. Mode 2 directs 50% air to foot area.

SELF-DIAGNOSIS STEP 5

Checks Temperature Detected By Sensors

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1) To enter self-diagnosis step 5, press UP temperature control switch on auto amplifier. Display will illuminate a 5. When DEF switch is pressed once, display will show temperature detected by ambient temperature sensor.
2) Press DEF switch again, display will show temperature detected by in-vehicle sensor. Press DEF switch again (3rd time), display will show temperature detected by intake sensor.
3) Press DEF switch again (4th time), display will return to 5. If temperature shown on display is greatly different from actual temperature, inspect sensor circuit. If sensor circuit is okay, check sensor. See appropriate sensor under TESTING.

AUXILIARY MECHANISM SETTING

Temperature Setting Trimmer
1) Temperature setting trimmer compensates for small differences between temperature setting on display and actual temperature within a range of ñ6øF (ñ3øC).
2) With system in SELF-DIAGNOSIS STEP 5, press FAN switch. System is now in auxiliary mode to set trimmer. Each time UP or DOWN temperature control switch is pressed, temperature display changes in one (1) degree Fahrenheit increments.

NOTE: If battery is disconnected, temperature trimmer setting goes to 0ø on both Fahrenheit and Celsius scale and will have to be reset.

TESTING

AIR CONDITIONER & HIGH SPEED RELAY

Remove suspected relay from vehicle. See Fig. 2. Apply 12 volts to coil side of relay. See Fig. 7. Ensure continuity exists between 2 remaining terminals of relay. If continuity does not exist, replace relay.

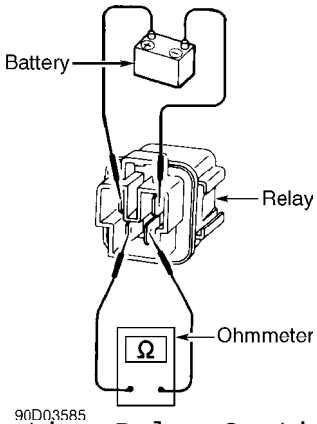


Fig. 7: Testing Relay Continuity (Typical)
Courtesy of Nissan Motor Co., U.S.A.

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AUTO AMPLIFIER

Power Supply Check

1) Ensure ignition is off. Disconnect auto amplifier connector. Turn ignition on. Connect a voltmeter between ground and auto amplifier harness terminals No. 1, No. 2 and No. 3, one at a time. For terminal identification, See Fig. 10. Battery voltage should be present at each terminal.

2) If battery voltage is not present, repair wiring as necessary. If malfunction still exists after following proper trouble shooting procedures and voltage readings are okay, replace auto amplifier.

Ground Circuit Check

Ensure ignition is off. Disconnect auto amplifier connector. Connect an ohmmeter between auto amplifier connector harness terminal No. 8 and ground. Continuity should exist. If continuity does not exist, repair as necessary. If malfunction still exists and continuity is okay, replace auto amplifier.

AMBIENT TEMPERATURE SENSOR

Turn ignition off. Disconnect underhood ambient temperature sensor connector, in front of condenser, near hood latch. See Fig. 2. Using an ohmmeter, measure resistance between sensor terminals. See AMBIENT TEMP, IN-VEHICLE & INTAKE SENSORS SPECIFICATIONS table.

IN-VEHICLE TEMPERATURE SENSOR

Turn ignition off. Disconnect in-vehicle temperature sensor connector. See Fig. 2. Using an ohmmeter, measure resistance between sensor terminals. See AMBIENT TEMP, IN-VEHICLE & INTAKE SENSORS SPECIFICATIONS table.

INTAKE SENSOR

Turn ignition off. Disconnect underdash intake sensor connector. See Fig. 2. Using an ohmmeter, measure resistance between harness terminals. See AMBIENT TEMP, IN-VEHICLE & INTAKE SENSORS SPECIFICATIONS table.

AMBIENT TEMP, IN-VEHICLE & INTAKE SENSORS RESISTANCE TABLE

Temperature øF (øC)	Ohms
-31 (-35)	38,350
-22 (-30)	28,620
-13 (-25)	21,610
-4 (-20)	16,500
5 (-15)	12,730
14 (-10)	9920
23 (-5)	7800

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32 (0)	6190
41 (5)	4950
50 (10)	3990
59 (15)	3240
68 (20)	2650
77 (25)	2190
86 (30)	1810
95 (35)	1510
104 (40)	1270
113 (45)	1070
122 (50)	910
131 (55)	770
140 (60)	660
149 (65)	570

DUAL PRESSURE SWITCH

Using an ohmmeter, check dual pressure switch continuity with the engine running. See Fig. 2 for dual pressure switch location. See DUAL PRESSURE SWITCH SPECIFICATIONS table.

DUAL PRESSURE SWITCH SPECIFICATIONS TABLE

High Side Line Pressure psi (kg/cmý)	System Operation	Continuity Exists
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

FAN CONTROL AMPLIFIER

For fan control amplifier testing, see DIAGNOSTIC PROCEDURE 15 under TROUBLE SHOOTING CHARTS at the end of this article.

POTENTIOMETER BALANCE RESISTOR (PBR)

1) Turn ignition on. Backprobe air mix door motor connector with voltmeter and measure voltage between terminals No. 16 and No. 27. See Fig. 8. Set temperature control switch to coldest setting. With air mix door in full cold position, voltmeter should indicate zero volts.

2) Slowly adjust temperature control switch to hottest setting. As air mix door motor moves from full cold-to-full hot position, voltage should slowly rise to 5 volts. If voltage is not as described, replace air mix door motor. PBR is located inside air mix door motor.

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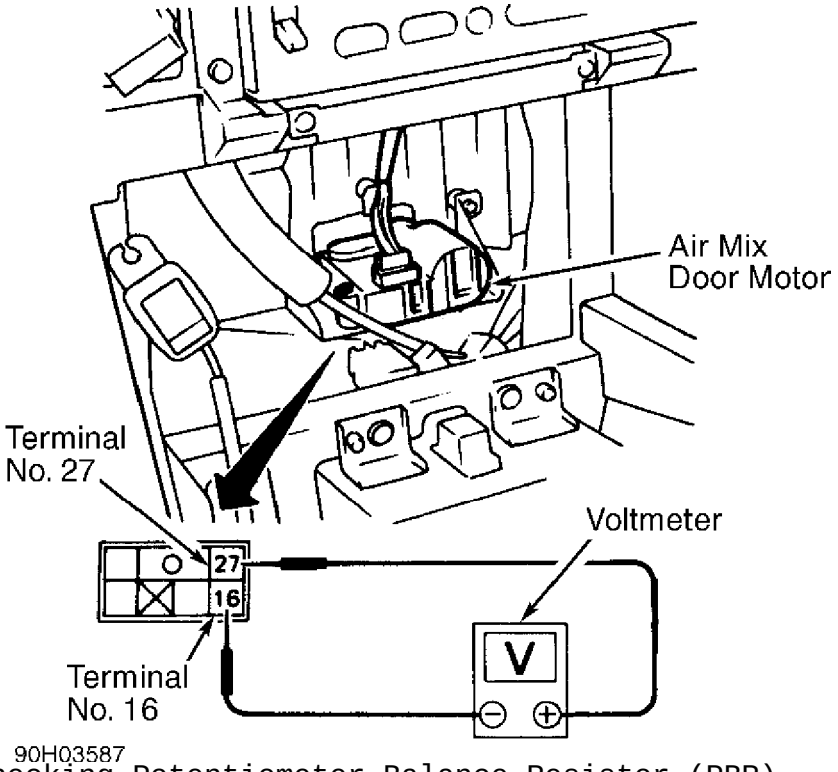


Fig. 8: Checking Potentiometer Balance Resistor (PBR)
Courtesy of Nissan Motor Co., U.S.A.

SUNLOAD SENSOR

1) Turn ignition off. Using voltmeter, measure output voltage between auto amplifier connector terminals No. 16 and No. 35. See Fig. 9. To vary voltage reading for testing, apply direct sunlight to sensor, then slowly cover sensor.

2) To measure sunload sensor input to auto amplifier, disconnect sensor from vehicle harness above intake unit. Connect an ammeter between sensor connector terminals. To vary current reading, apply direct sunlight to the sensor then slowly cover sensor. See SUNLOAD SENSOR SPECIFICATIONS table.

SUNLOAD SENSOR SPECIFICATIONS TABLE

Input Current (Milliamps)	Output Voltage
0	5.0
.1	4.1
.2	3.1
.3	2.2
.4	1.3
.5	.4

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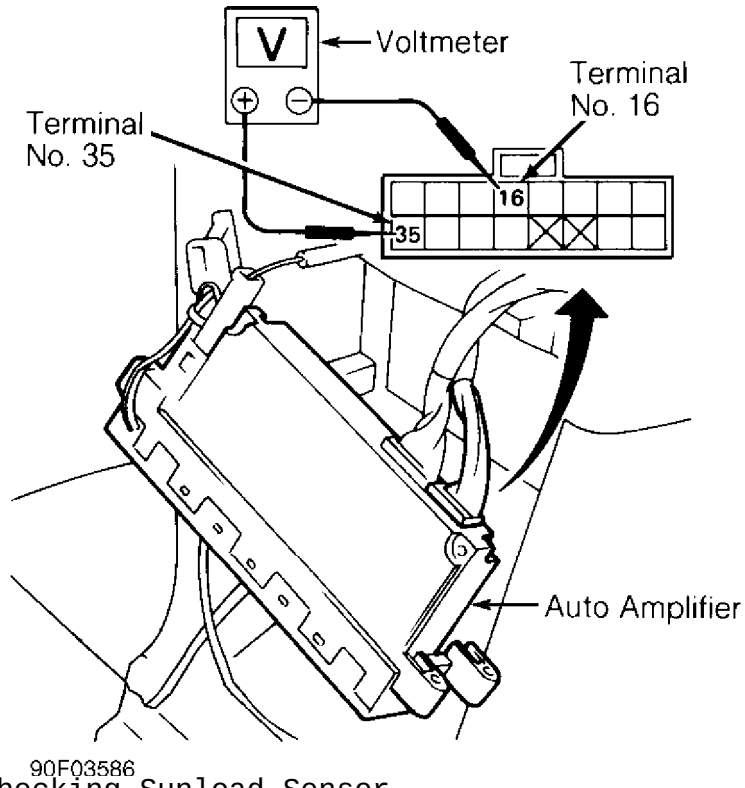


Fig. 9: Checking Sunload Sensor
Courtesy of Nissan Motor Co., U.S.A.

WATER COCK SOLENOID

Disconnect water cock solenoid electrical connector. See Fig. 2. Using an ohmmeter, check for continuity between solenoid terminals. If continuity is not present, replace solenoid.

REMOVAL & INSTALLATION

NOTE: For removal of basic A/C-heater system components, see appropriate MANUAL A/C-HEATER SYSTEM article in the AIR CONDITIONING & HEAT Section.

TROUBLE SHOOTING CHARTS

NOTE: The following charts are courtesy of Nissan Motor Co., U.S.A.

PRELIMINARY CHECKS

PRELIMINARY CHECK 1 - Air Outlet Does Not Change

NOTE: Perform Self-Diagnosis STEP 1 under SELF DIAGNOSTICS before referring to following flow chart.

NOTE: Foot/Defrost Mode 1 (F/D 1) is used when manual mode is

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selected on auto amplifier. F/D 1 directs 75% air to foot area. Foot/Defrost Mode 2 (F/D 2) is used when automatic mode is selected on auto amplifier. F/D 2 directs 50% air to foot area. N.G. is an abbreviation for NO GOOD in all flow charts.

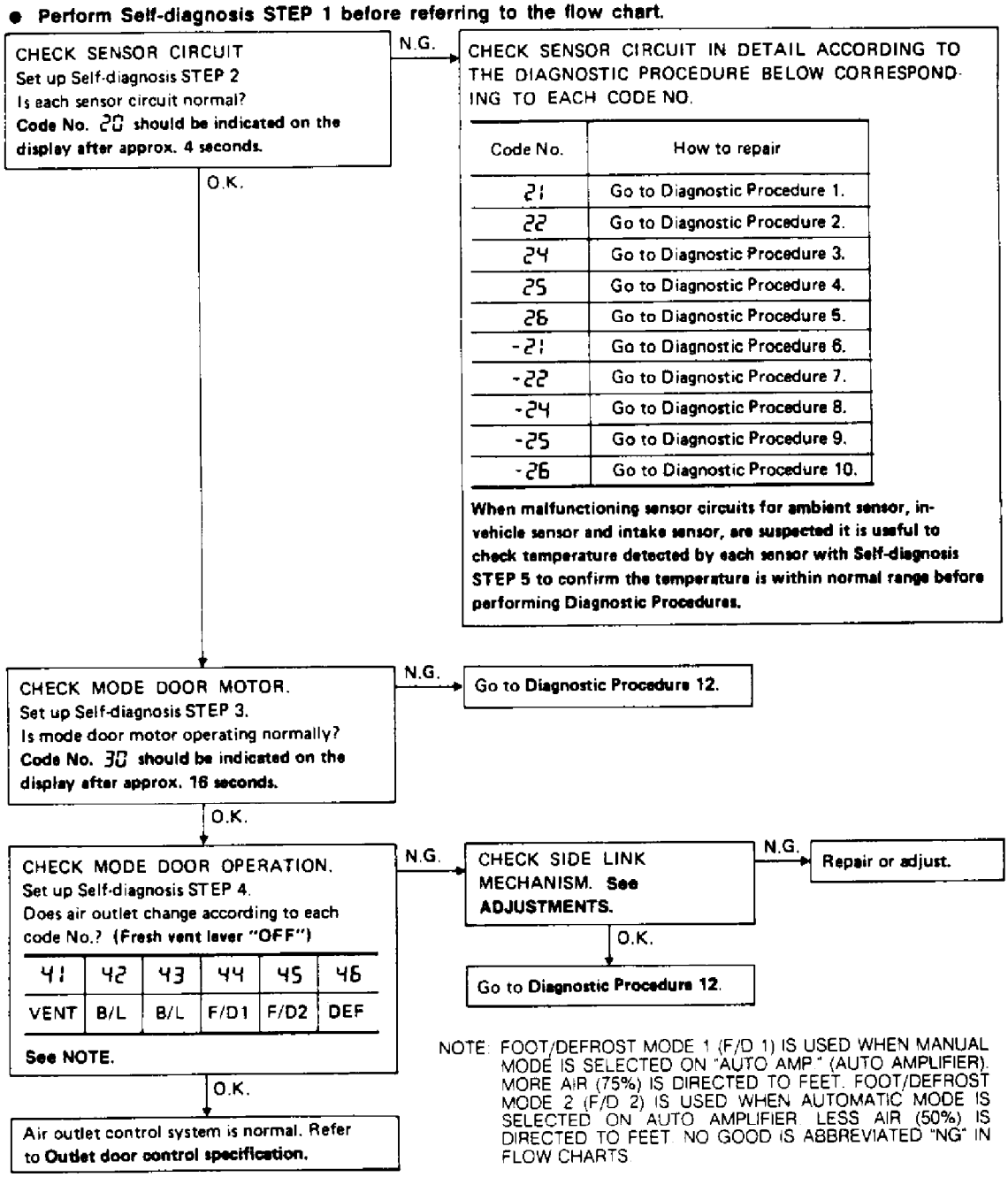


Fig. 10: Preliminary Check 1 Flow Chart

PRELIMINARY CHECK 2 - Intake Door Does Not Change

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NOTE: Perform Self-Diagnosis STEP 1 under SELF DIAGNOSTICS before referring to following flow chart.

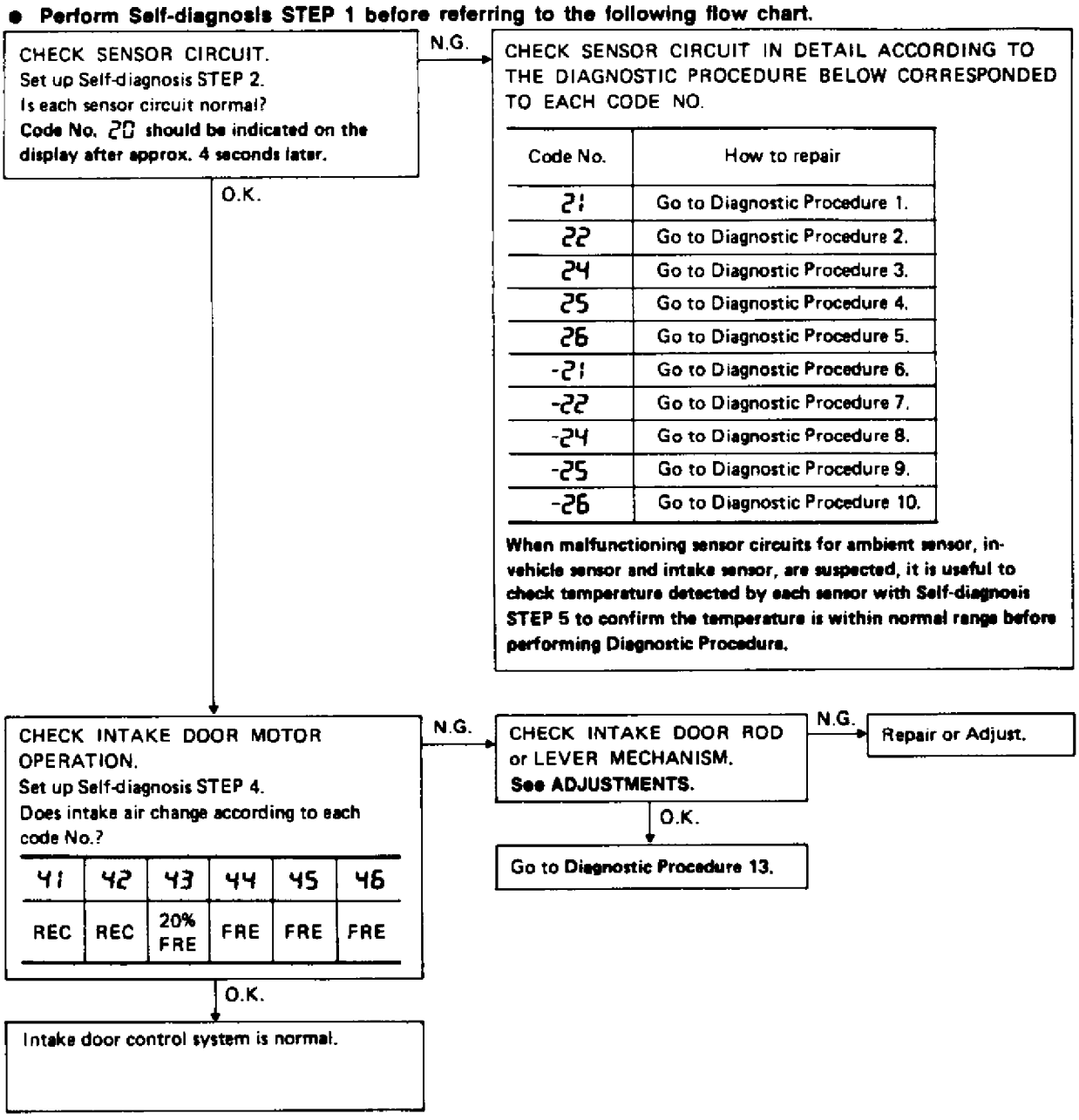
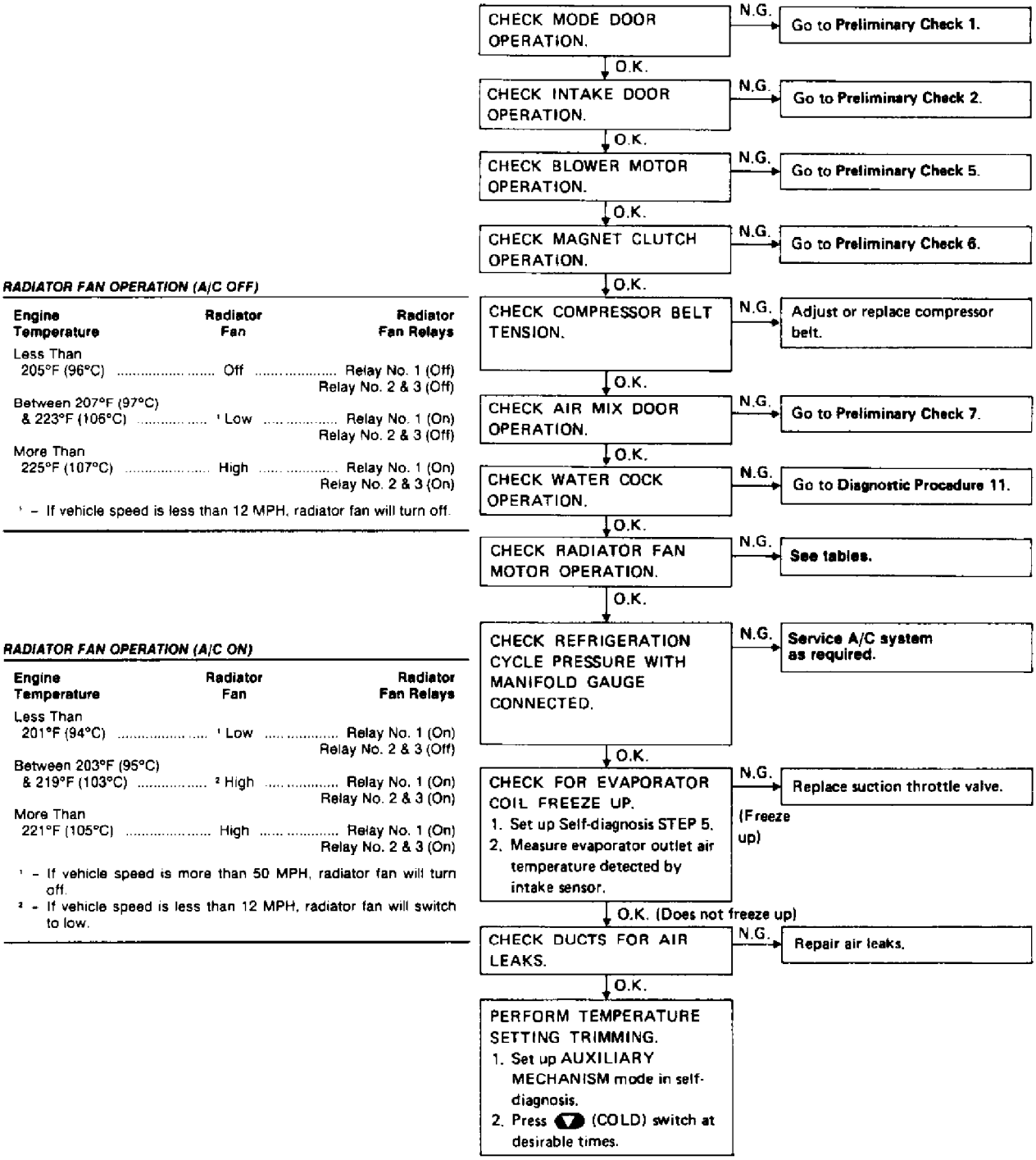


Fig. 11: Preliminary Check 2 Flow Chart

PRELIMINARY CHECK 3 - Insufficient Cooling

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RADIATOR FAN OPERATION (A/C OFF)

Engine Temperature	Radiator Fan	Radiator Fan Relays
Less Than 205°F (96°C)	Off	Relay No. 1 (Off) Relay No. 2 & 3 (Off)
Between 207°F (97°C) & 223°F (106°C)	[1] Low	Relay No. 1 (On) Relay No. 2 & 3 (Off)
More Than 225°F (107°C)	High	Relay No. 1 (On) Relay No. 2 & 3 (On)

[1] – If vehicle speed is less than 12 MPH, radiator fan will turn off.

RADIATOR FAN OPERATION (A/C ON)

Engine Temperature	Radiator Fan	Radiator Fan Relays
Less Than 201°F (94°C)	[1] Low	Relay No. 1 (On) Relay No. 2 & 3 (Off)
Between 203°F (95°C) & 219°F (103°C)	[2] High	Relay No. 1 (On) Relay No. 2 & 3 (On)
More Than 221°F (105°C)	High	Relay No. 1 (On) Relay No. 2 & 3 (On)

[1] – If vehicle speed is more than 50 MPH, radiator fan will turn off.
[2] – If vehicle speed is less than 12 MPH, radiator fan will switch to low.

Fig. 12: Preliminary Check 3 - Insufficient Cooling
Courtesy of Nissan Motor Co., U.S.A.

RADIATOR FAN OPERATION TABLE (A/C OFF)

Engine Temperature	Radiator Fan	Fan Relays

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Less Than 205øF (96øC) ..... Off ..... Relay No. 1 (Off)
Relays No. 2 & 3 (Off)
207-223øF (97-106øC) ..... (1) Low ..... Relay No. 1 (On)
Relays No. 2 & 3 (Off)
More Than 225øF (107øC) ..... High ..... Relay No. 1 (On)
Relays No. 2 & 3 (On)

(1) - If vehicle speed is less than 12 MPH, radiator fan will turn off.

RADIATOR FAN OPERATION TABLE (A/C ON)

Engine Temperature	Radiator Fan	Fan Relays
Less Than 201øF (94øC)	(1) Low	Relay No. 1 (On) Relays No. 2 & 3 (Off)
203-219øF (95-103øC)	(2) High	Relay No. 1 (On) Relays No. 2 & 3 (On)
More Than 221øF (105øC)	High	Relay No. 1 (On) Relays No. 2 & 3 (On)

(1) - If vehicle speed is more than 50 MPH, radiator fan will turn off.
(2) - If vehicle speed is less than 12 MPH, radiator fan will switch to low.

PRELIMINARY CHECK 4 - Insufficient Heating

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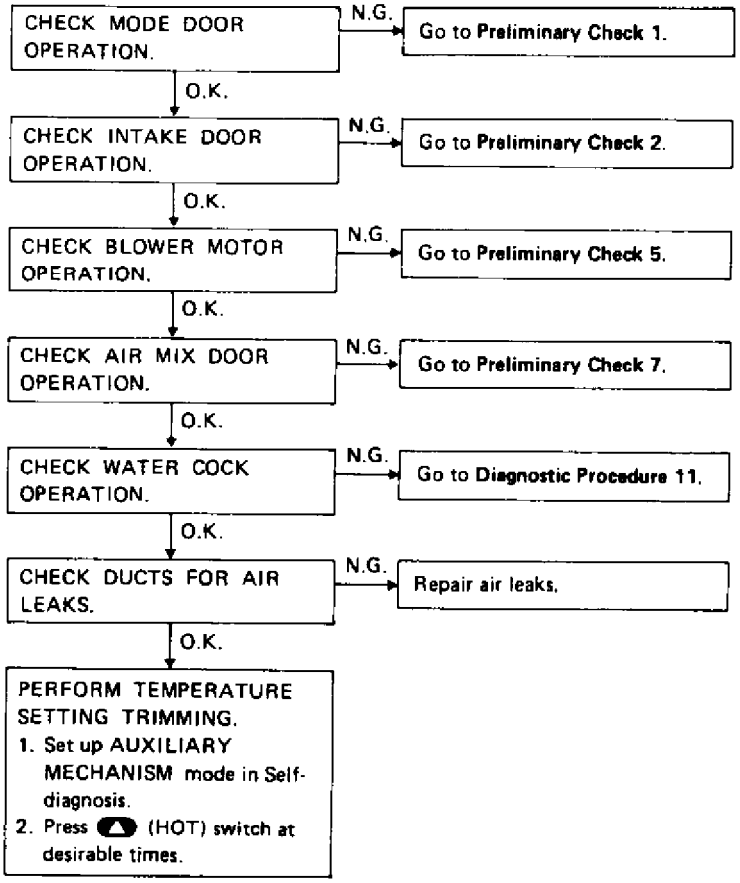


Fig. 13: Preliminary Check 4 Flow Chart

PRELIMINARY CHECK 5 - Blower Motor Is Malfunctioning

NOTE: Perform Self-Diagnosis STEP 1 under SELF DIAGNOSTICS before referring to the following flow chart.

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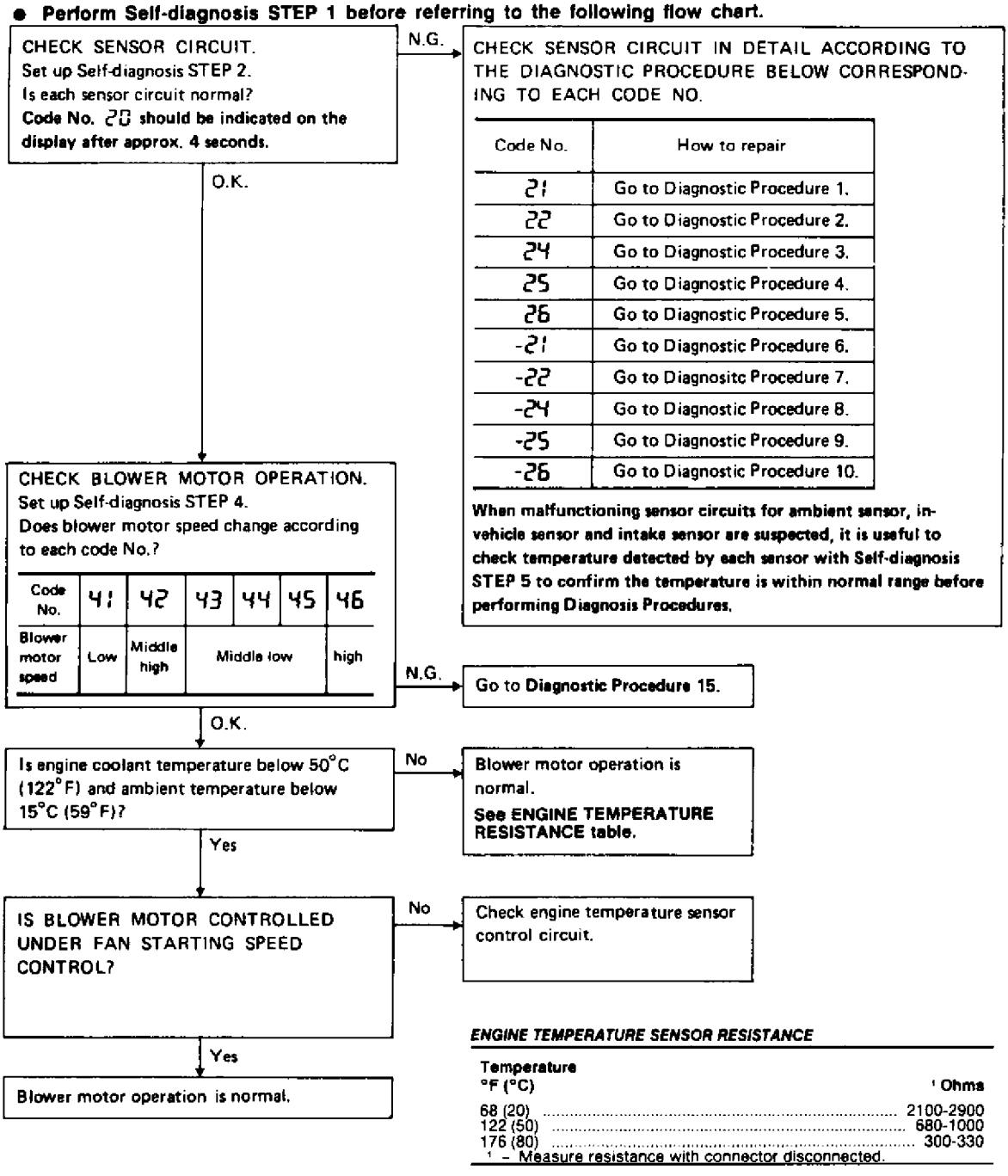


Fig. 14: Preliminary Check 5 Flow Chart

ENGINE TEMPERATURE SENSOR RESISTANCE TABLE

Temperature	(1) Ohms

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68øF (20øC) 2100-2900
122øF (50øC) 680-1000
176øF (80øC) 300-330

(1) - Measure resistance with connector disconnected.

**ÄÄÄ

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PRELIMINARY CHECK 7 - Discharged Air Temperature Does Not Change

NOTE: Perform Self-Diagnosis STEP 1 under SELF DIAGNOSTICS before referring to following flow chart.

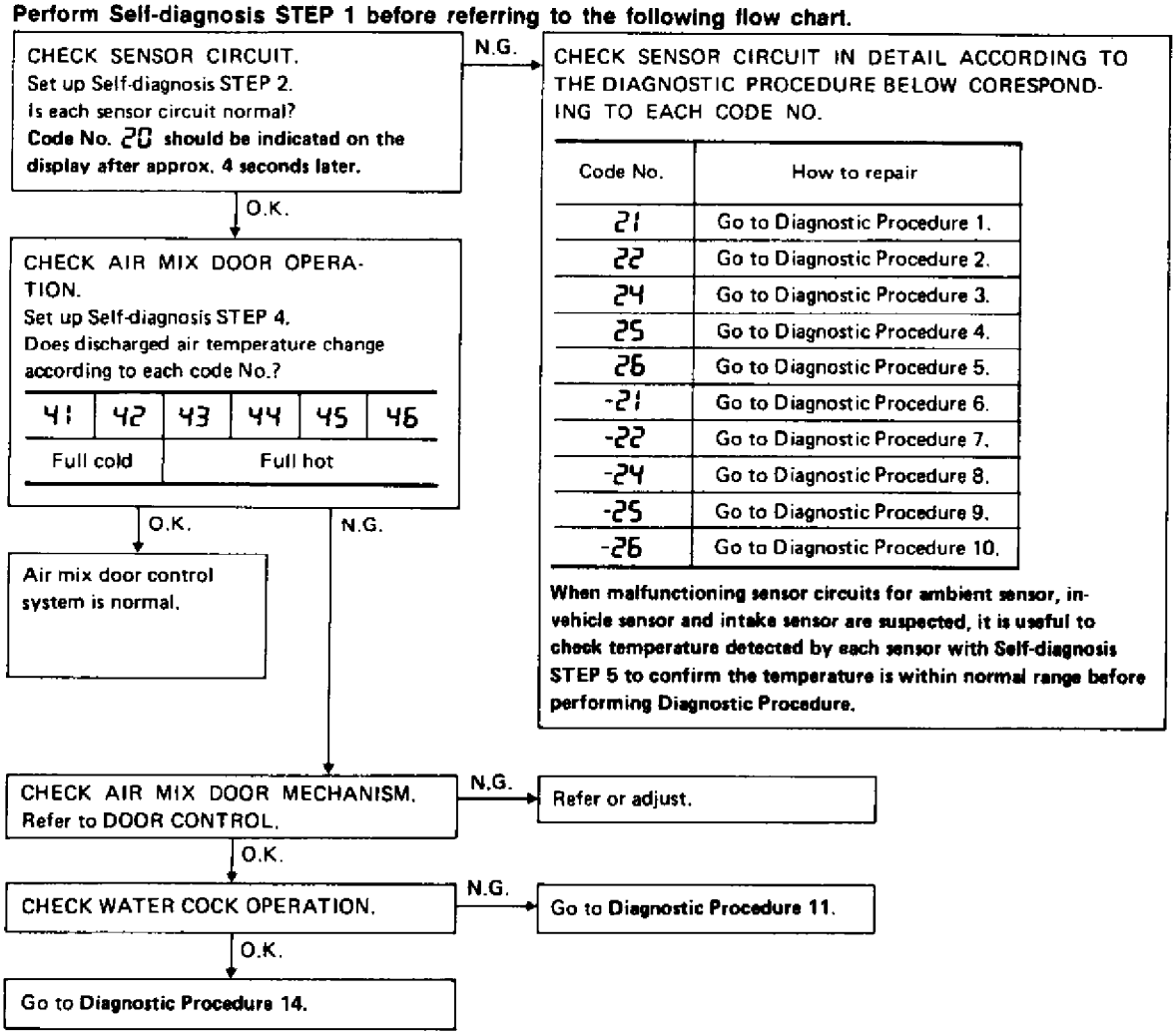


Fig. 16: Preliminary Check 7 Flow Chart

PRELIMINARY CHECK 8 - Noise

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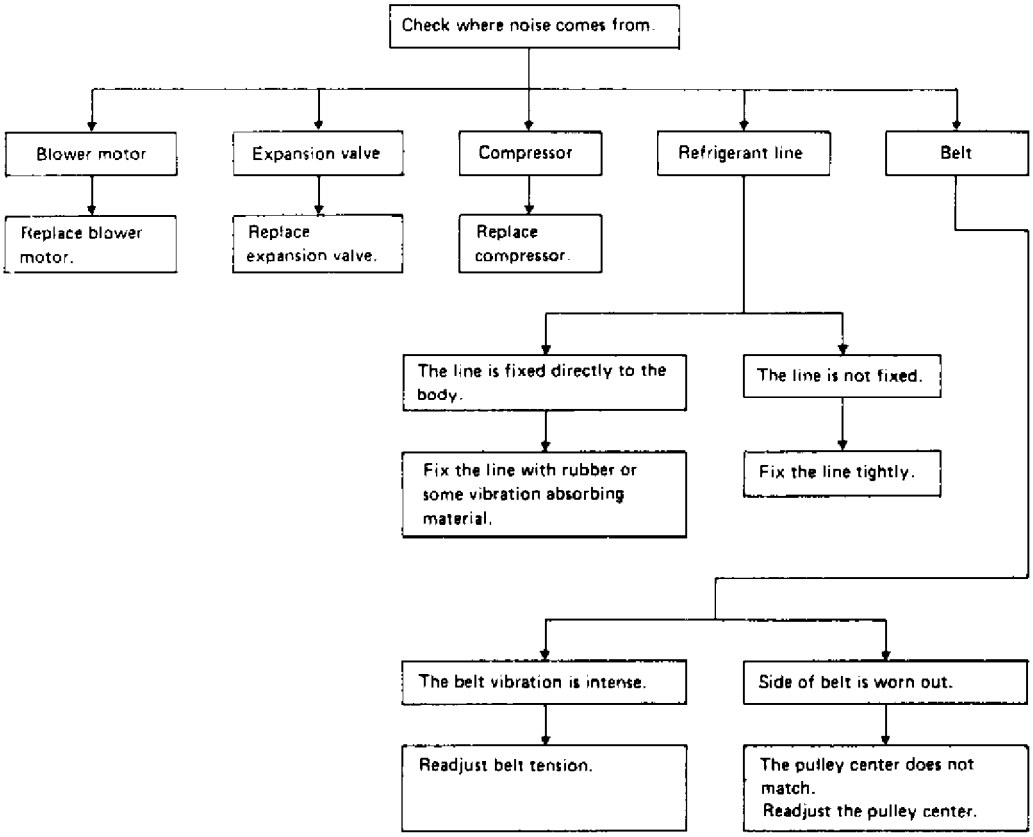


Fig. 17: Preliminary Check 8 Flow Chart

PRELIMINARY CHECK 9 - Power Supply Circuit Check For Auto A/C System

* Auto Amplifier Check

1. Disconnect auto amplifier harness connectors.
2. Turn ignition ON.
3. Connect voltmeter from harness side.
4. Ensure battery voltage at terminals No. 1, 2, and 3.
5. Turn ignition OFF.
6. Connect ohmmeter from harness side.
7. Ensure continuity between terminal No. 8 and ground.

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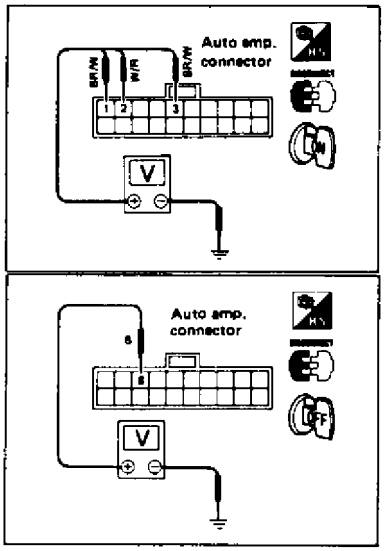


Fig. 18: Preliminary Check 9

DIAGNOSTIC PROCEDURES

DIAGNOSTIC PROCEDURE 1 - Ambient Temperature Sensor Circuit Is Open

SYMPTOM: Ambient sensor circuit is open ("21" is indicated on auto. amp. as a result of conducting Self-Diagnosis STEP 2.)

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

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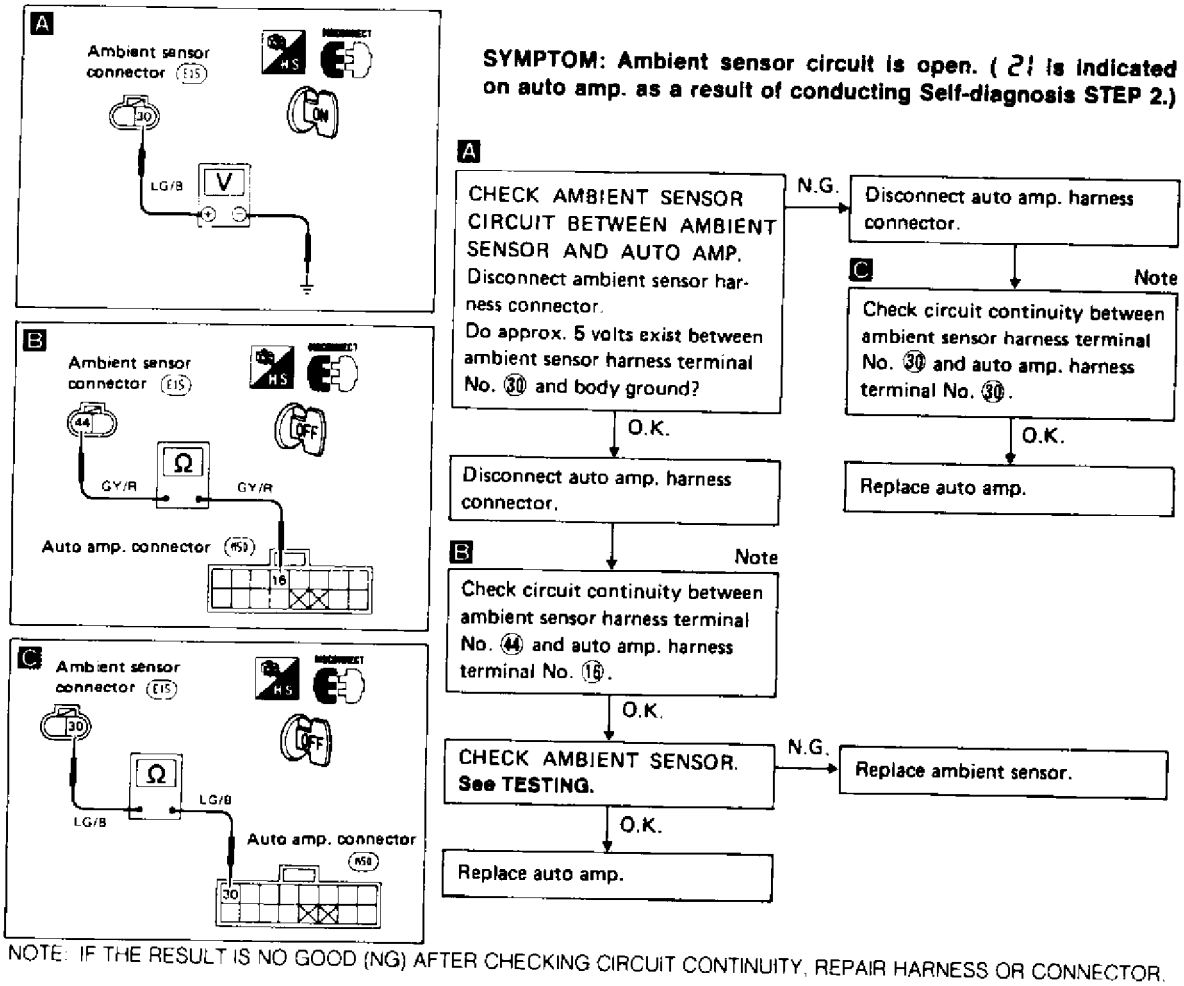


Fig. 19: Diagnostic Procedure 1 Flow Chart

DIAGNOSTIC PROCEDURE 2 - In-Vehicle Temperature Sensor Circuit Is Open

SYMPTOM: In-vehicle sensor circuit is open ("22" is indicated on auto. amp. as a result of conducting Self-Diagnosis STEP 2.)

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

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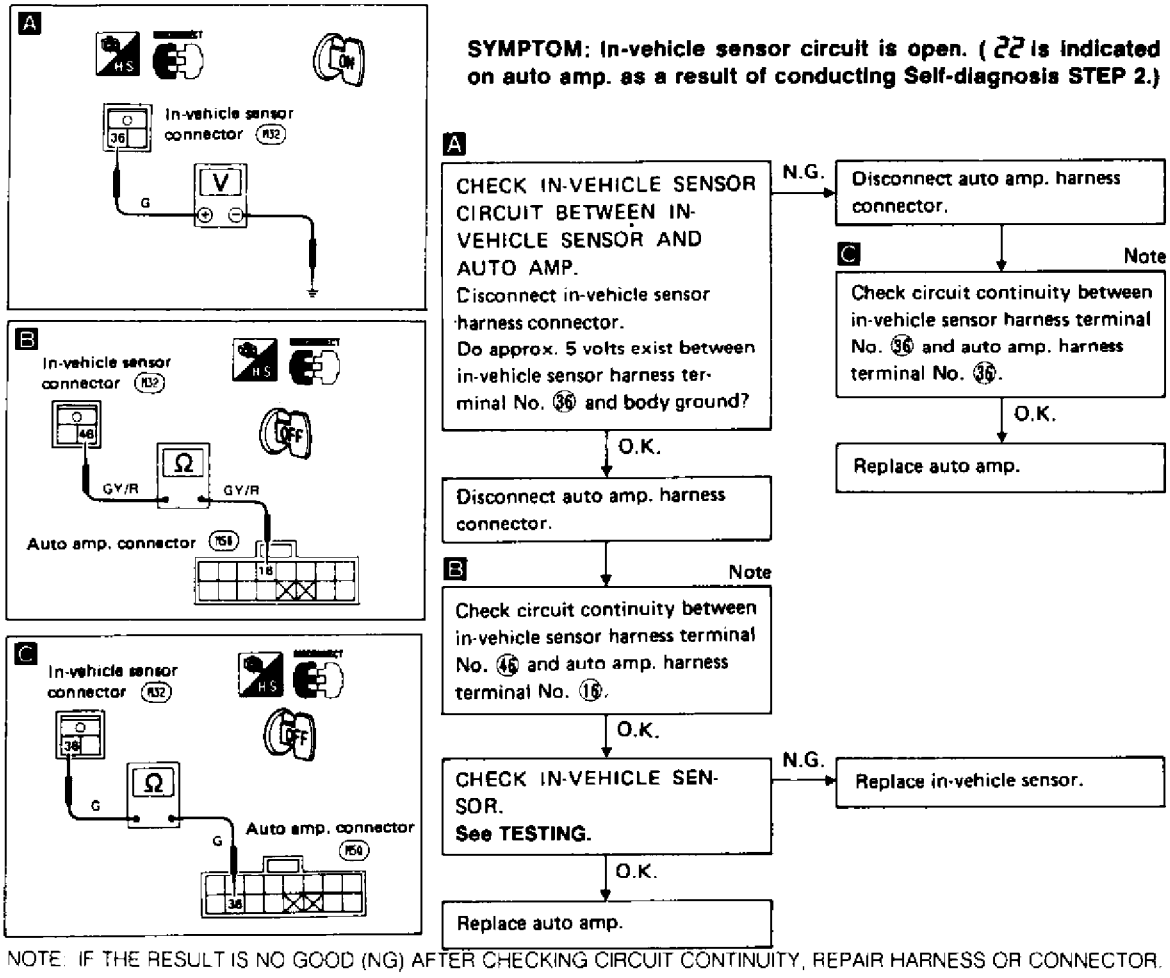


Fig. 20: Diagnostic Procedure 2 Flow Chart

DIAGNOSTIC PROCEDURE 3 - Intake Sensor Circuit Is Open

SYMPTOM: Intake sensor circuit is open ("24" is indicated on auto. amp. as a result of conducting Self-Diagnosis STEP 2.)

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

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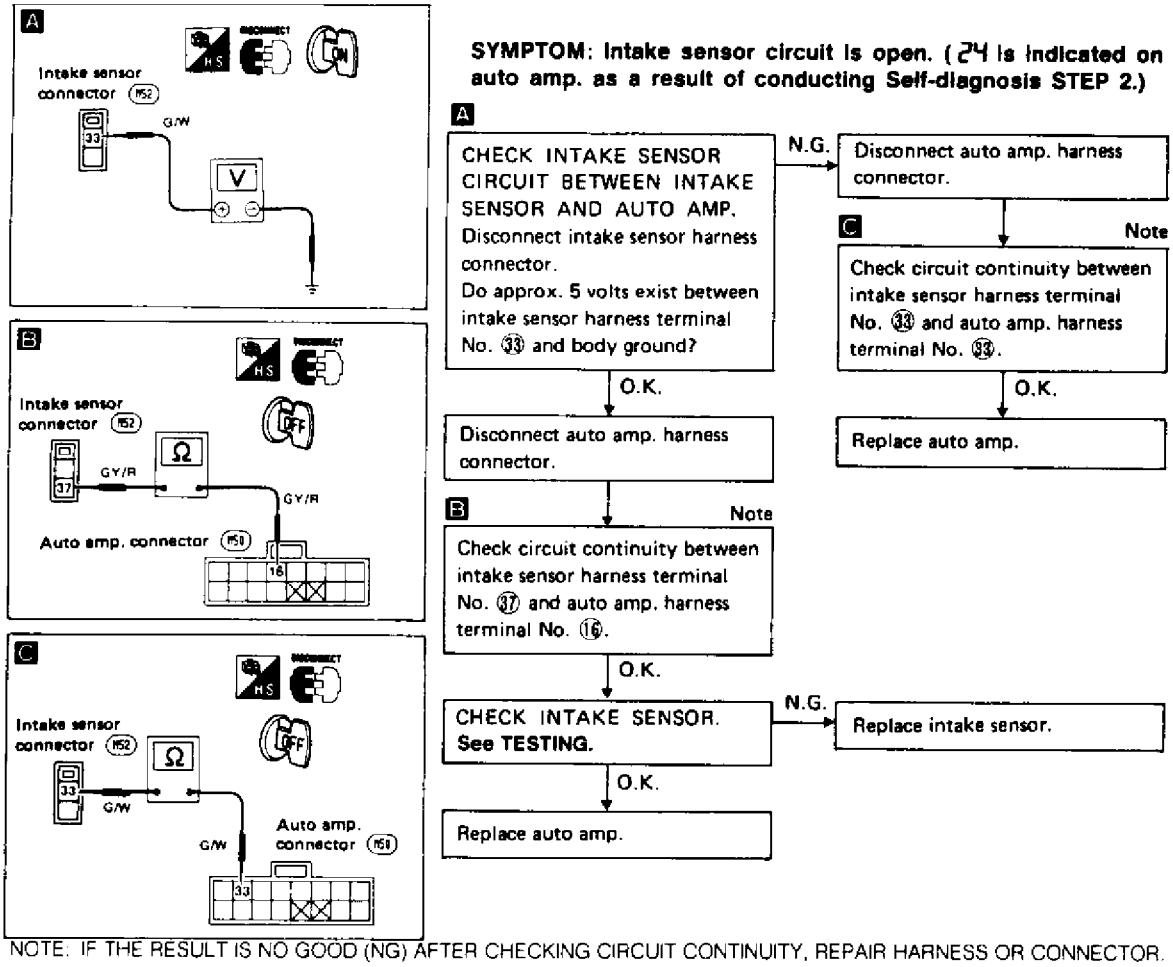


Fig. 21: Diagnostic Procedure 3 Flow Chart

DIAGNOSTIC PROCEDURE 4 - Sunload Sensor Circuit Is Open

SYMPTOM: Sunload sensor circuit is open ("25" is indicated on auto. amp. as a result of conducting Self-Diagnosis STEP 2.)

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

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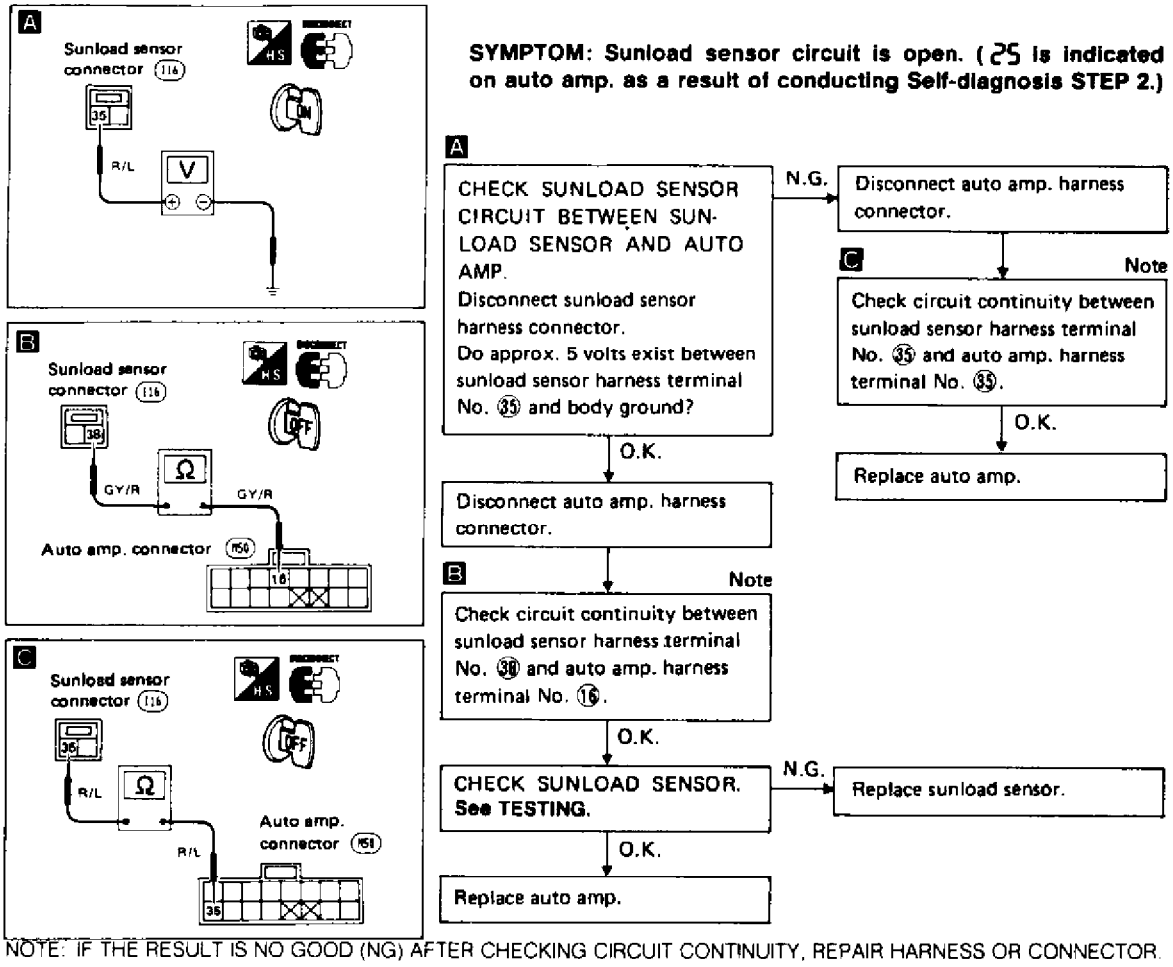


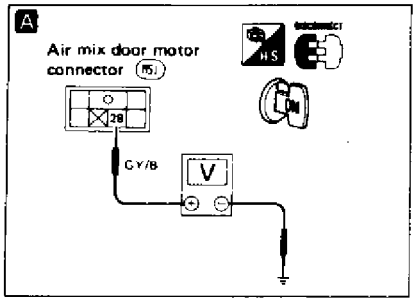
Fig. 22: Diagnostic Procedure 4 Flow Chart

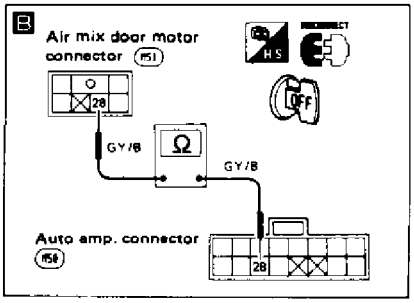
DIAGNOSTIC PROCEDURE 5 - Potentiometer Balance Resistor Circuit Is Open

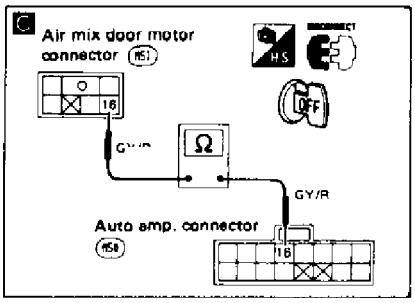
SYMPTOM: P.B.R. circuit is open ("26" is indicated on auto. amp. as a result of conducting Self-Diagnosis STEP 2.)

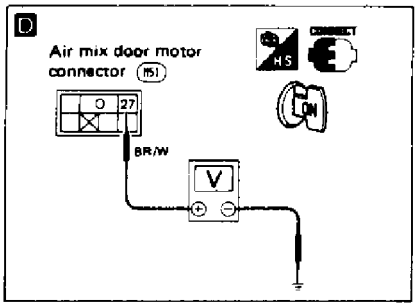
NOTE: If the result is no good (N.G.) after checking circuit continuity, repair harness or connector.

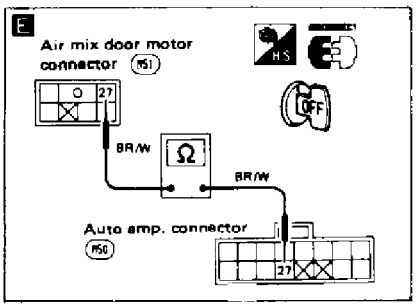
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SYMPTOM: P.B.R. circuit is open. (26 is indicated on auto amp. as a result of conducting Self-diagnosis STEP 2.)

A
CHECK P.B.R. CIRCUIT BETWEEN P.B.R. AND AUTO AMP.
Disconnect air mix door motor harness connector.
Do approx. 5 volts exist between air mix door motor harness terminal No. 28 and body ground?
N.G. → Disconnect auto amp. harness connector.
B
Note
Check circuit continuity between air mix door motor harness terminal No. 28 and auto amp. harness terminal No. 28.
O.K. → Replace auto amp.
O.K. → Disconnect auto amp. harness connector.
C
Check circuit continuity between air mix door motor harness terminal No. 16 and auto amp. harness terminal No. 16.
O.K.
D
Note
CHECK P.B.R. CIRCUIT BETWEEN P.B.R. AND AUTO AMP.
Reconnect auto amp. harness connector.
Do approx. 5 volts exist between air mix door motor harness terminal No. 27 and body ground?
N.G. → Disconnect auto amp. harness connector.
E
Note
Check circuit continuity between air mix door motor harness terminal No. 27 and auto amp. harness terminal No. 27.
O.K. → Replace auto amp.
O.K.
CHECK P.B.R. **See TESTING.**
N.G. → Replace air mix door motor (P.B.R.).
O.K. → Replace auto amp.

NOTE: IF THE RESULT IS NO GOOD (NG) AFTER CHECKING CIRCUIT CONTINUITY, REPAIR HARNESS OR CONNECTOR.

Fig. 23: Diagnostic Procedure 5 Flow Chart

DIAGNOSTIC PROCEDURE 6 - Ambient Temperature Sensor Circuit

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Is Shorted

SYMPTOM: Ambient sensor circuit is shorted ("-21" is indicated on auto. amp. as a result of conducting Self-Diagnosis STEP 2.)

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

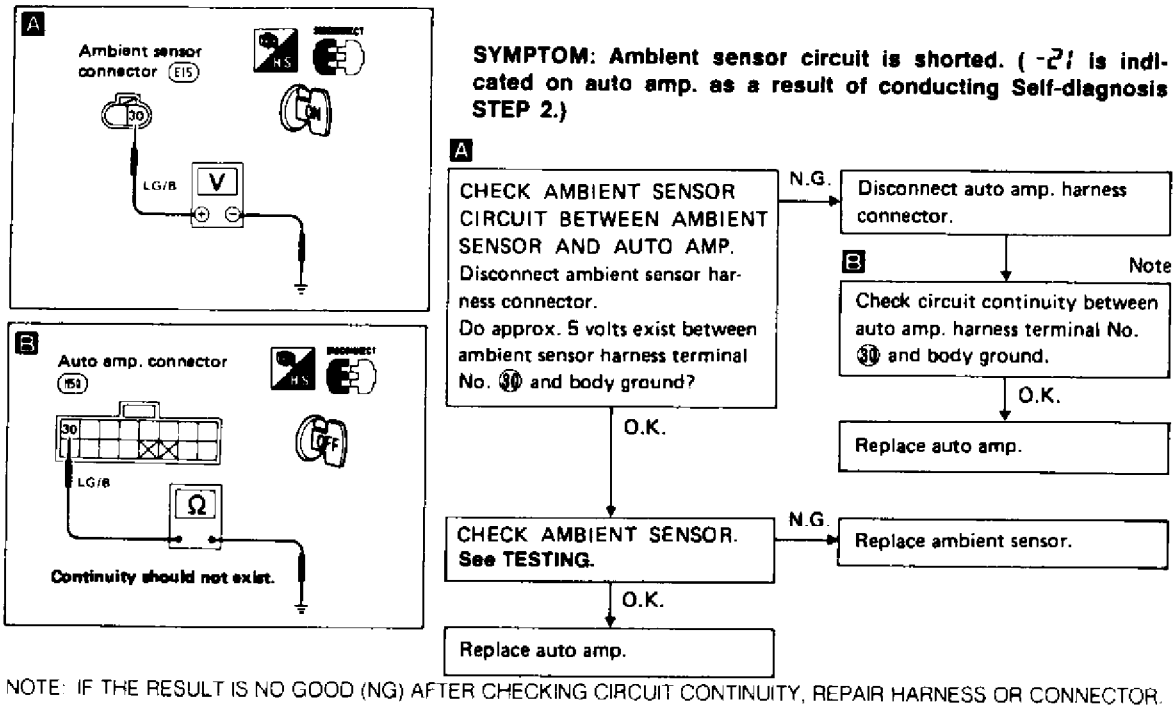


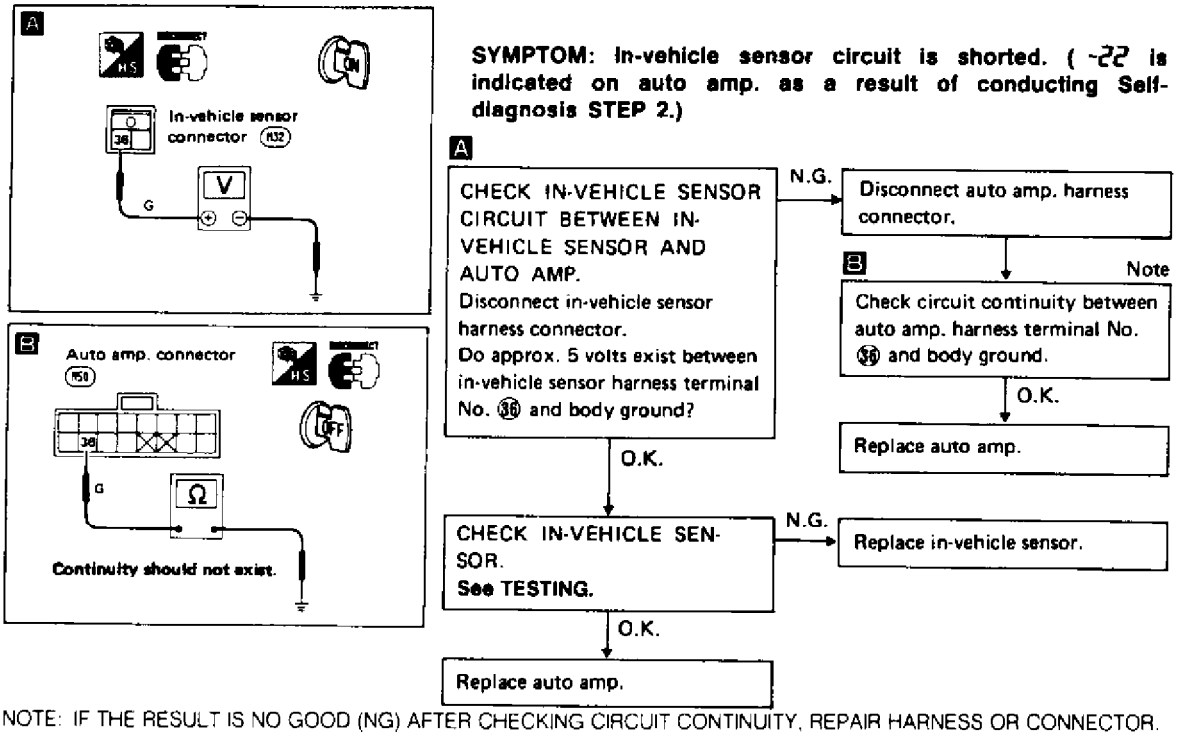
Fig. 24: Diagnostic Procedure 6 Flow Chart

DIAGNOSTIC PROCEDURE 7 - In-Vehicle Temperature Sensor Circuit Is Shorted

SYMPTOM: In-vehicle sensor circuit is shorted ("-22" is indicated on auto. amp. as a result of conducting Self-Diagnosis STEP 2.)

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

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NOTE: IF THE RESULT IS NO GOOD (NG) AFTER CHECKING CIRCUIT CONTINUITY, REPAIR HARNESS OR CONNECTOR.

Fig. 25: Diagnostic Procedure 7 Flow Chart

DIAGNOSTIC PROCEDURE 8 - Intake Sensor Circuit Is Shorted

SYMPTOM: Intake sensor circuit is shorted ("-24" is indicated on auto. amp. as a result of conducting Self-Diagnosis STEP 2.)

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

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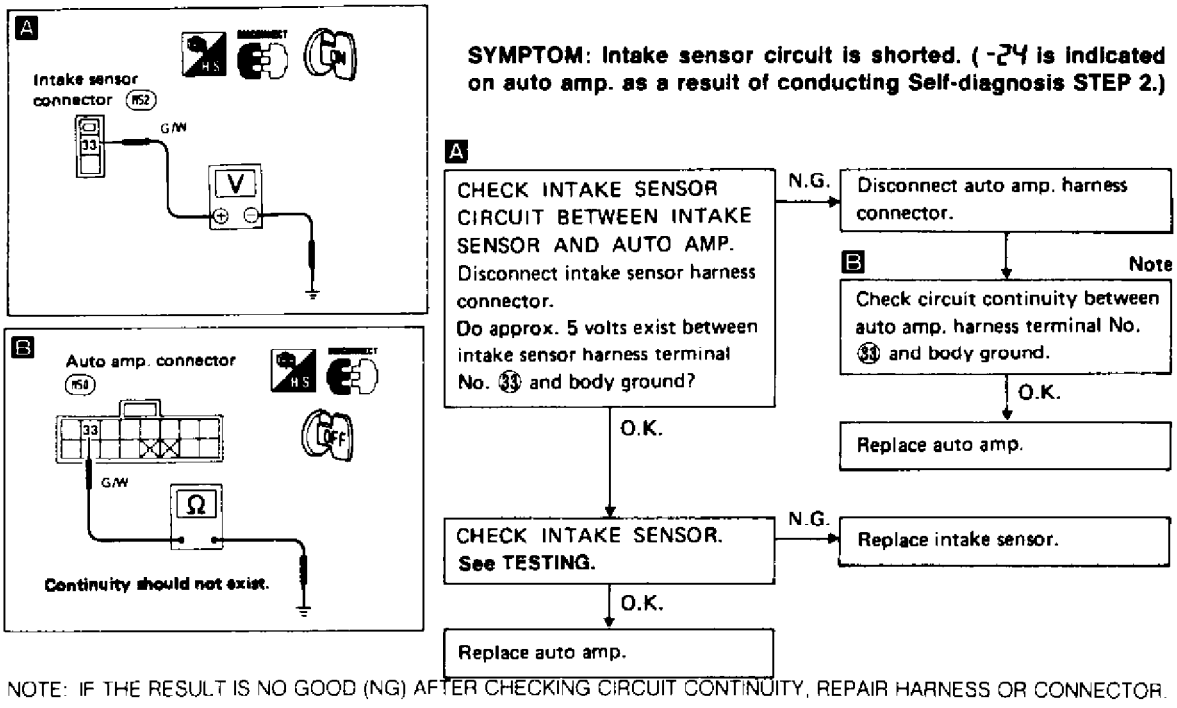


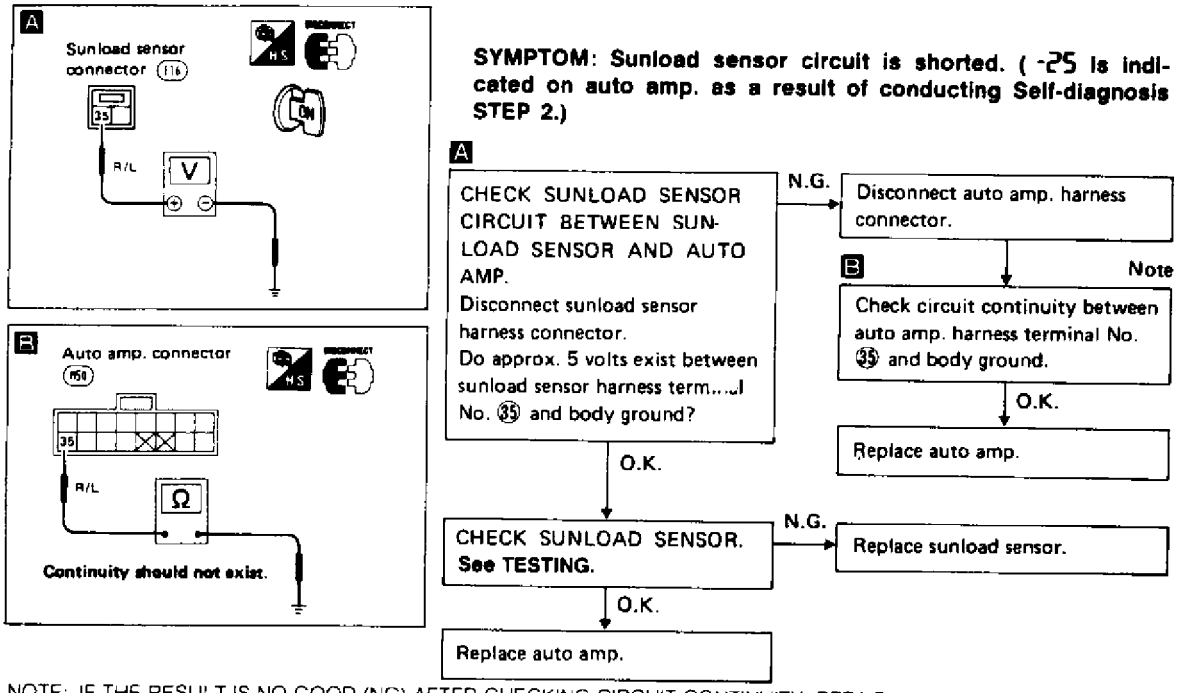
Fig. 26: Diagnostic Procedure 8 Flow Chart

DIAGNOSTIC PROCEDURE 9 - Sunload Sensor Circuit Is Shorted

SYMPTOM: Sunload sensor circuit is shorted ("-25" is indicated on auto. amp. as a result of conducting Self-Diagnosis STEP 2.)

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

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NOTE: IF THE RESULT IS NO GOOD (NG) AFTER CHECKING CIRCUIT CONTINUITY, REPAIR HARNESS OR CONNECTOR.

Fig. 27: Diagnostic Procedure 9 Flow Chart

DIAGNOSTIC PROCEDURE 10 - Potentiometer Balance Resistor Circuit Shorted

SYMPTOM: P.B.R. circuit is shorted ("-26" is indicated on auto. amp. as a result of conducting Self-Diagnosis STEP 2.)

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

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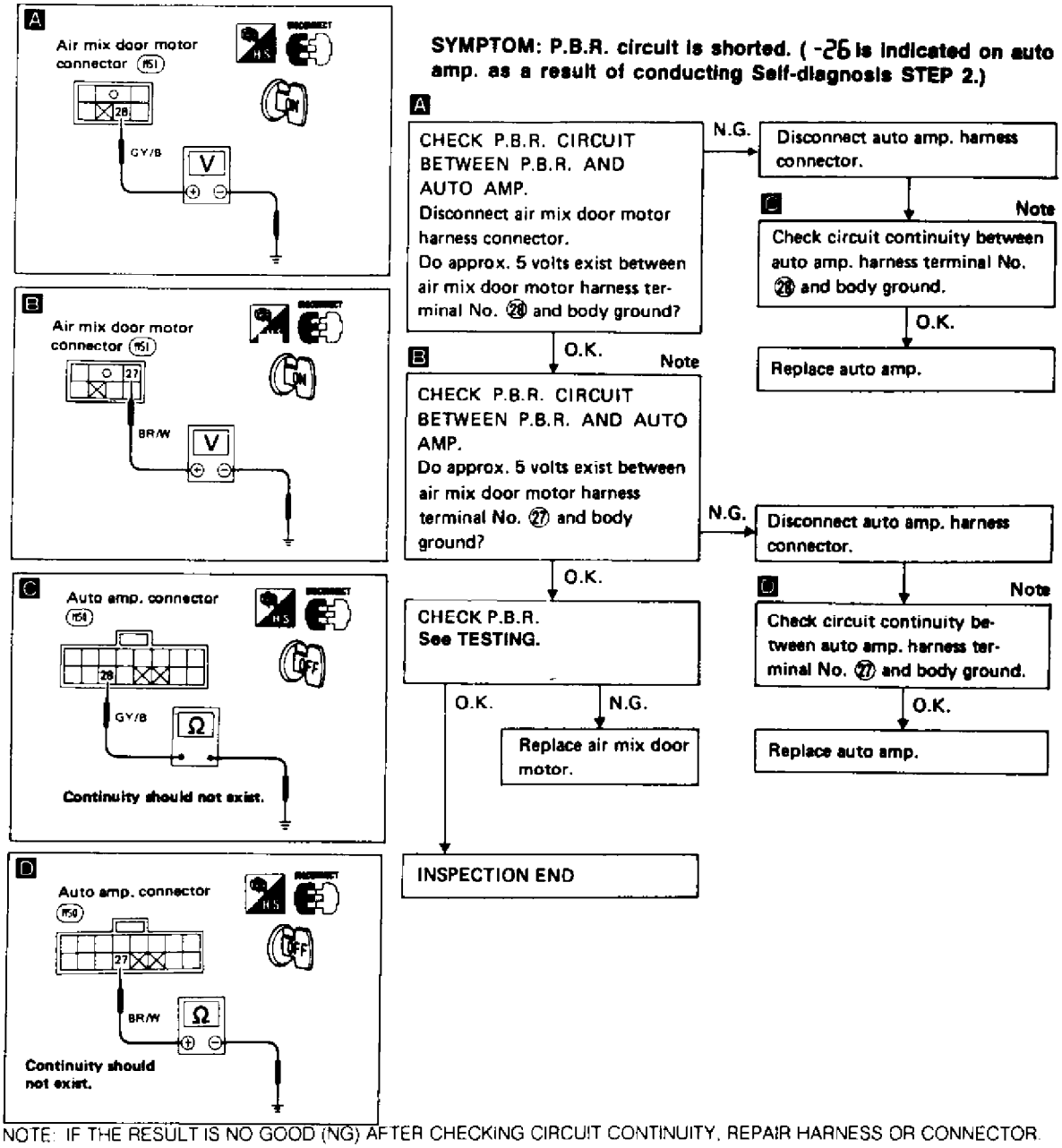


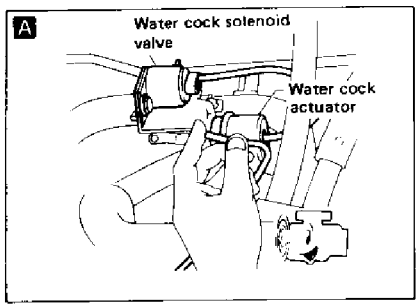
Fig. 28: Diagnostic Procedure 10 Flow Chart

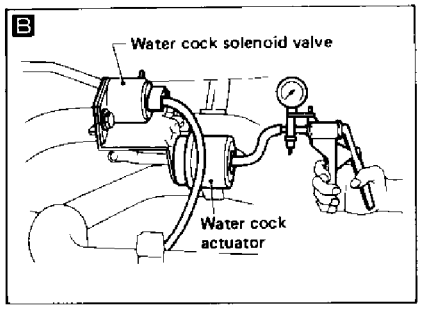
DIAGNOSTIC PROCEDURE 11 - Water Cock Solenoid Does Not Operate

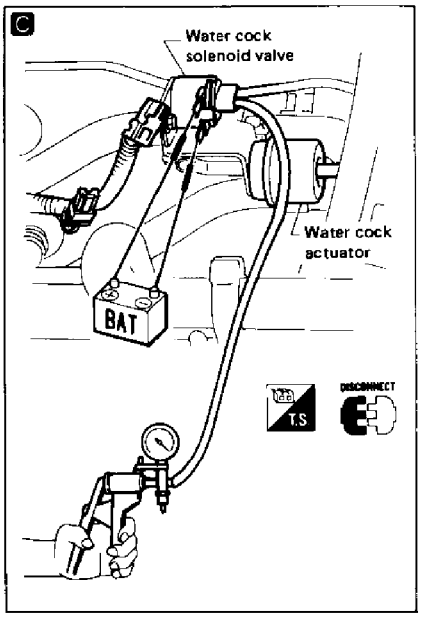
SYMPTOM: Water cock does not operate.

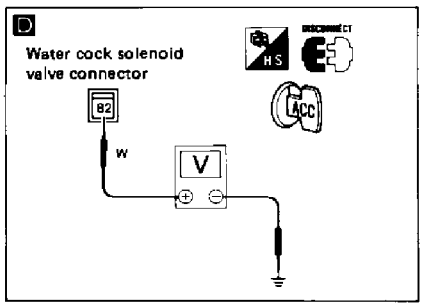
NOTE: If the result is no good (N.G.) after checking circuit continuity, repair harness or connector.

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SYMPTOM: Water cock does not operate.

A

CHECK VACUUM PRESSURE SUPPLY.
Disconnect w/cock solenoid valve vacuum hose.
Does vacuum pressure exist at w/cock solenoid valve vacuum hose when vacuum pump is ON?

N.G. → CHECK VACUUM HOSE BETWEEN W/COCK SOLENOID VALVE AND VACUUM PUMP.

O.K. ↓

B

CHECK W/COCK ACTUATOR.
Disconnect w/cock solenoid valve vacuum hose.
Supply the w/cock actuator with vacuum using a handy vacuum pump.
Is w/cock actuator operating normally?

N.G. → CHECK VACUUM HOSE BETWEEN W/COCK SOLENOID VALVE AND W/COCK ACTUATOR.

CHECK VACUUM HOSE BETWEEN W/COCK SOLENOID VALVE AND W/COCK ACTUATOR.
O.K. → Replace w/cock assembly.
N.G. → Replace vacuum hose.

O.K. ↓

Reconnect w/cock solenoid valve vacuum hoses.

C

CHECK W/COCK SOLENOID VALVE.
Ground w/cock solenoid valve terminal No. 50 and apply 12 volts, D/C, to terminal No. 3.
Supply the w/cock actuator with vacuum using a handy vacuum pump.
Is w/cock actuator operating normally?

N.G. → Replace w/cock solenoid valve.

O.K. ↓

D

CHECK POWER SUPPLY FOR WATER COCK SOLENOID VALVE.
Do approx. 12 volts exist between water cock solenoid valve harness terminal No. 82 and body ground?

N.G. → Check 10A fuse at fuse block.
See WIRING DIAGRAMS.

O.K. ↓

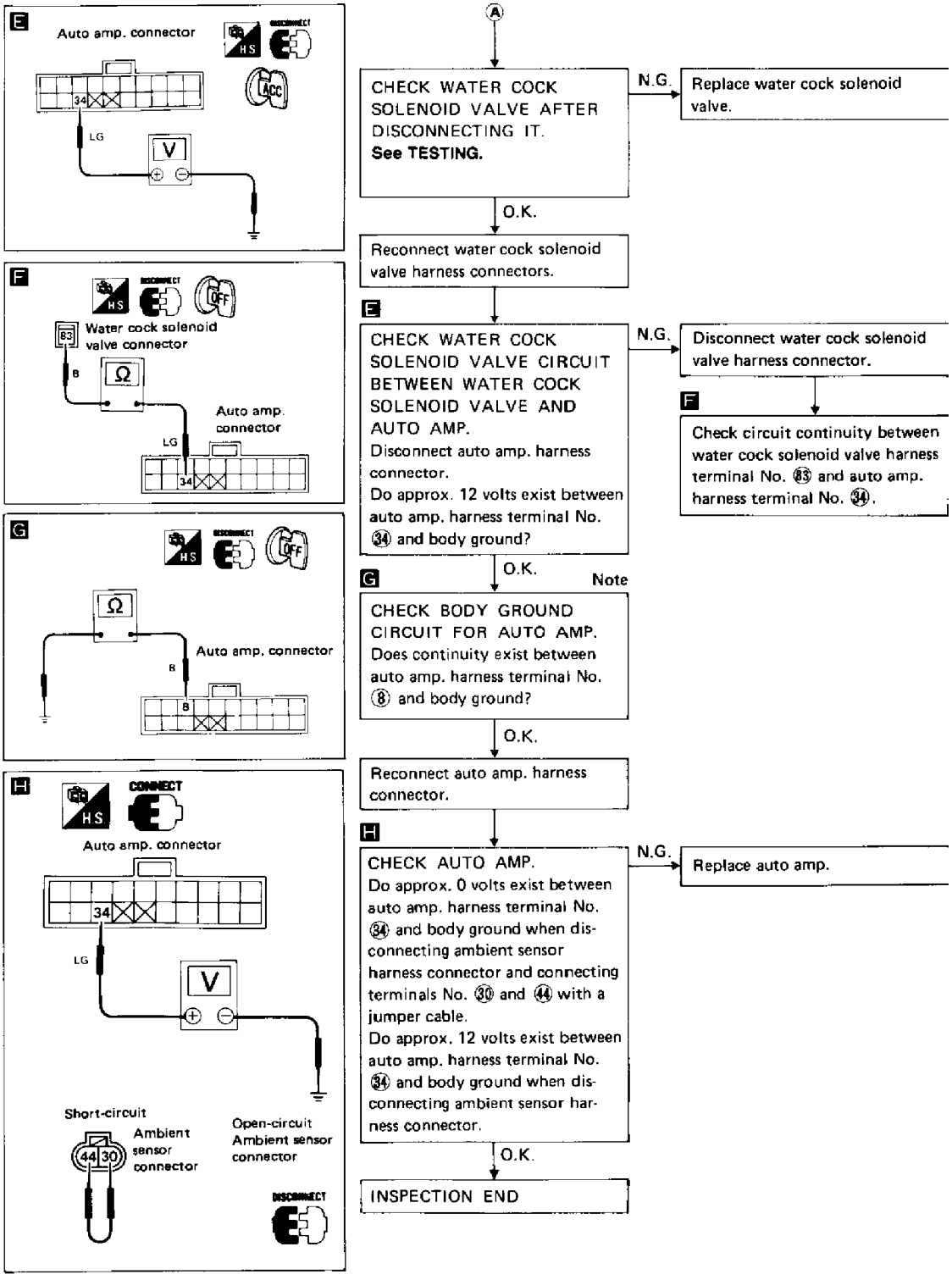
Ⓐ

Go To Next Figure

90H03610

Fig. 29: Diagnostic Procedure 11 Flow Chart (1 of 2)

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

90J03611

Fig. 30: Diagnostic Procedure 11 Flow Chart (2 of 2)

DIAGNOSTIC PROCEDURE 12 - Mode Door Motor Does Not Operate

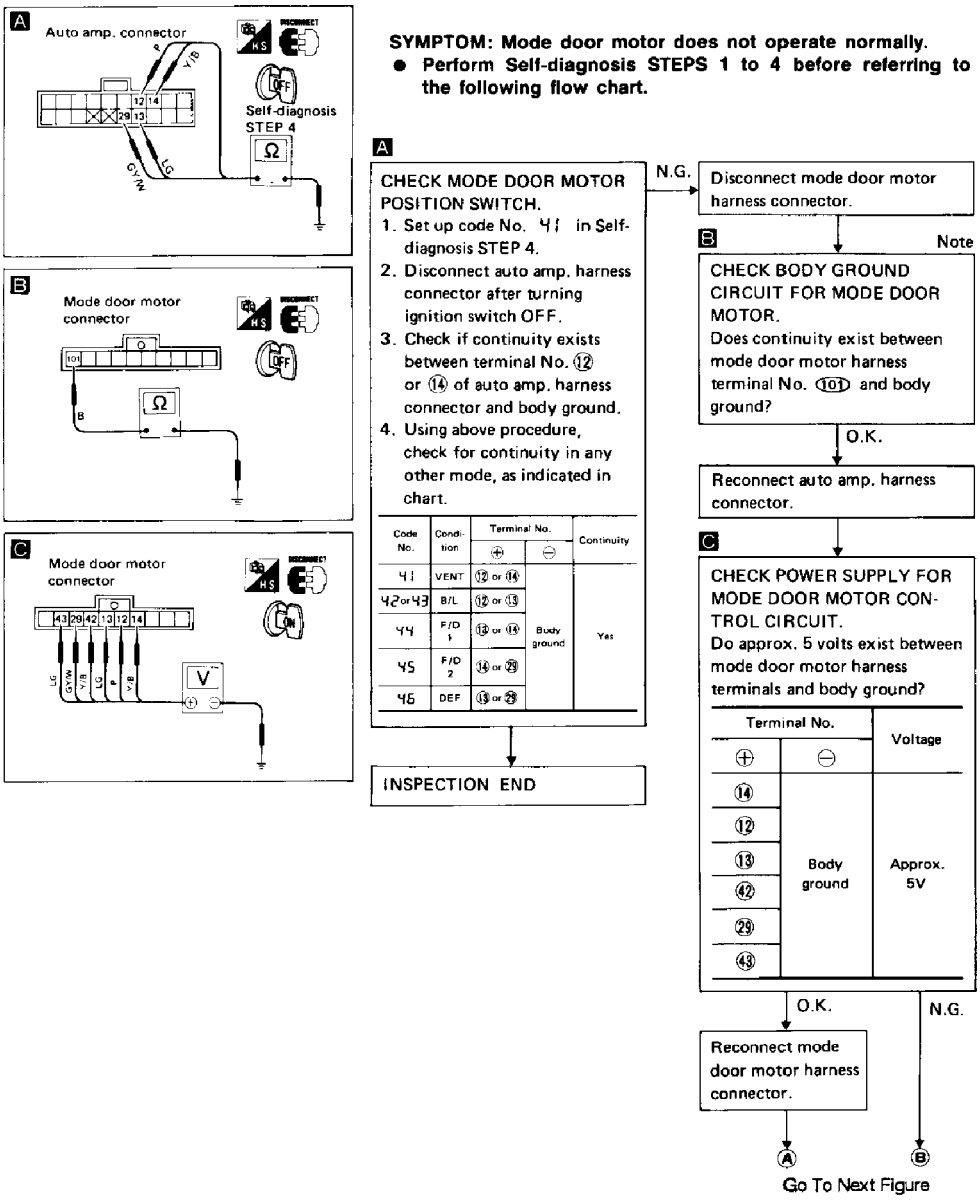
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Normally

NOTE: Perform Self-diagnosis STEPS 1 to 4 under SELF DIAGNOSTICS before referring to following flow chart.

SYMPTOM: Mode door motor does not operate normally.

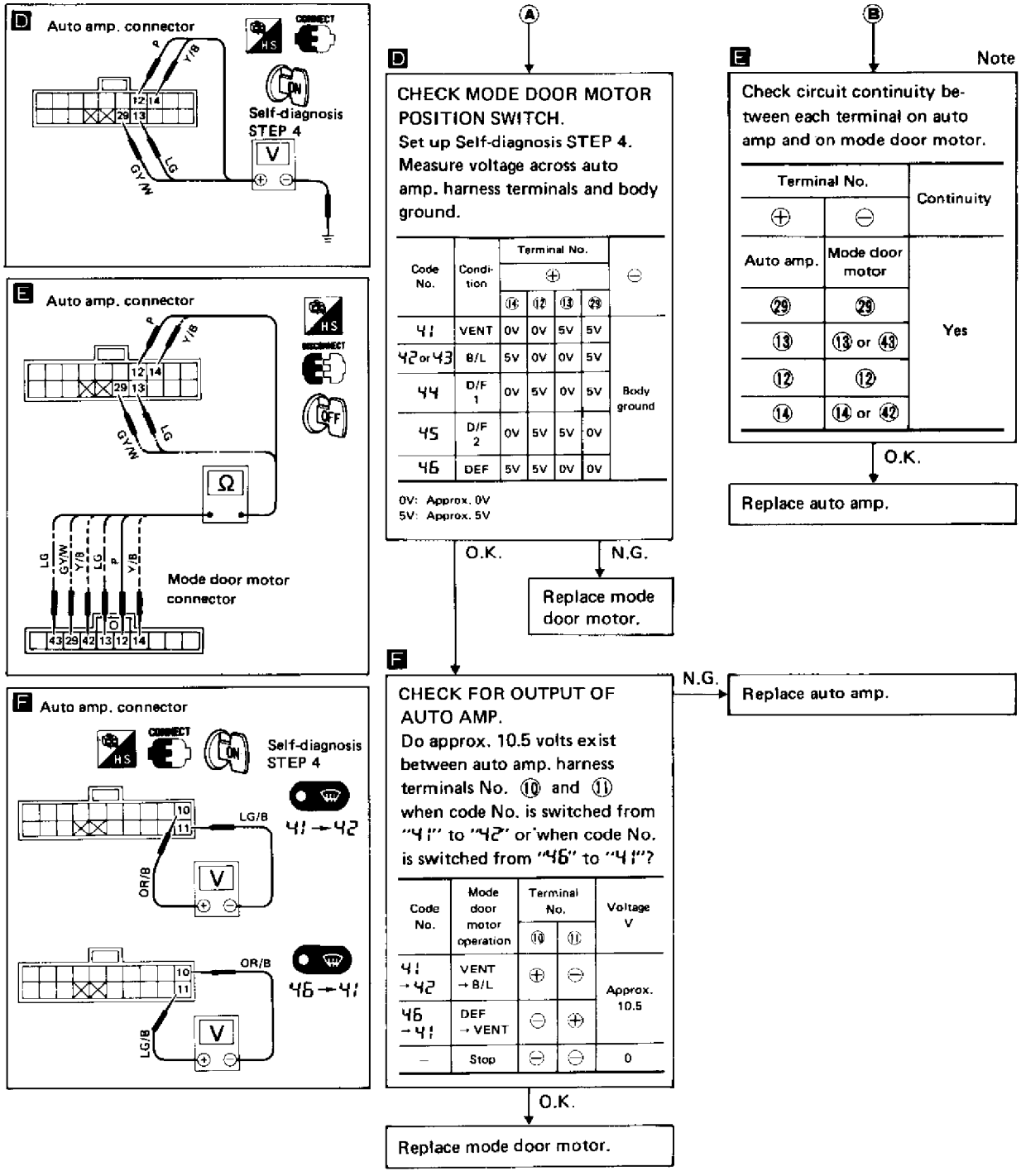
NOTE: If the result is no good (N.G.) after checking circuit continuity, repair harness or connector.



90B03612

Fig. 31: Diagnostic Procedure 12 Flow Chart (1 of 2)

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

90D03613

Fig. 32: Diagnostic Procedure 12 Flow Chart (2 of 2)

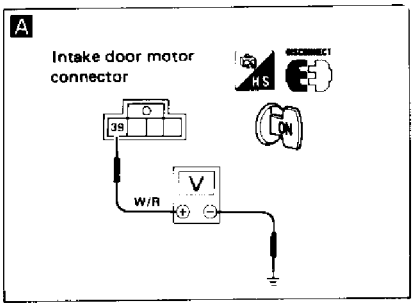
DIAGNOSTIC PROCEDURE 13 - Intake Door Motor Does Not Operate Normally

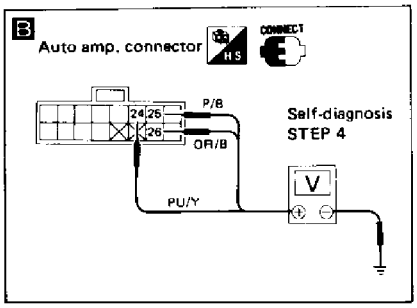
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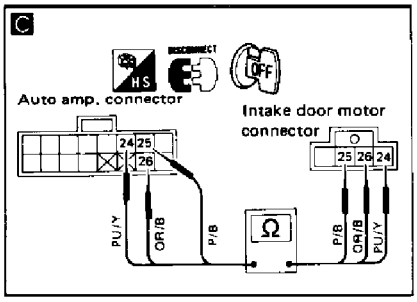
NOTE: Perform Self-Diagnosis STEP 1, 2 and 4 under SELF DIAGNOSTICS before referring to following flow chart.

SYMPTOM: Intake door motor does not operate normally.

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







SYMPTOM: Intake door motor does not operate normally.
- **Perform Self-diagnosis STEPS 1, 2 and 4 before referring to the following flow chart.**

A

CHECK POWER SUPPLY FOR INTAKE DOOR MOTOR.
Disconnect intake door motor harness connector.
Do approx. 12 volts exist between intake door motor harness terminal No. (39) and body ground?

N.G. → Check 10A fuse at fuse block.
See WIRING DIAGRAM.

O.K. ↓

Reconnect intake door motor harness connector.

O.K. ↓

B

CHECK FOR OUTPUT OF AUTO AMP.
Set up Self-diagnosis STEP 4.
Measure voltage across auto amp. harness terminals and body ground.

Code No.	Terminal No. ⊕	Terminal No. ⊖	Condition	Voltage V
41, 42	(24)	Body ground	REC	0
Other				12
43	(25)		20% FRE	0
Other				12
44,45,46	(26)		FRE	0
Other				12

0V: Approx. 0V
12V: Approx. 12V

N.G. → Disconnect auto amp. and intake door motor harness connectors.

C

Note
Check circuit continuity between each terminal on auto amp. and on intake door motor.

Terminal No. ⊕ (Auto amp.)	Terminal No. ⊖ (Intake door motor)	
(24)	(24)	Continuity
(25)	(25)	Yes
(26)	(26)	

O.K. ↓

INSPECTION END

Ⓐ Go To Next Figure

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

90F03614

Fig. 33: Diagnostic Procedure 13 Flow Chart (1 of 2)

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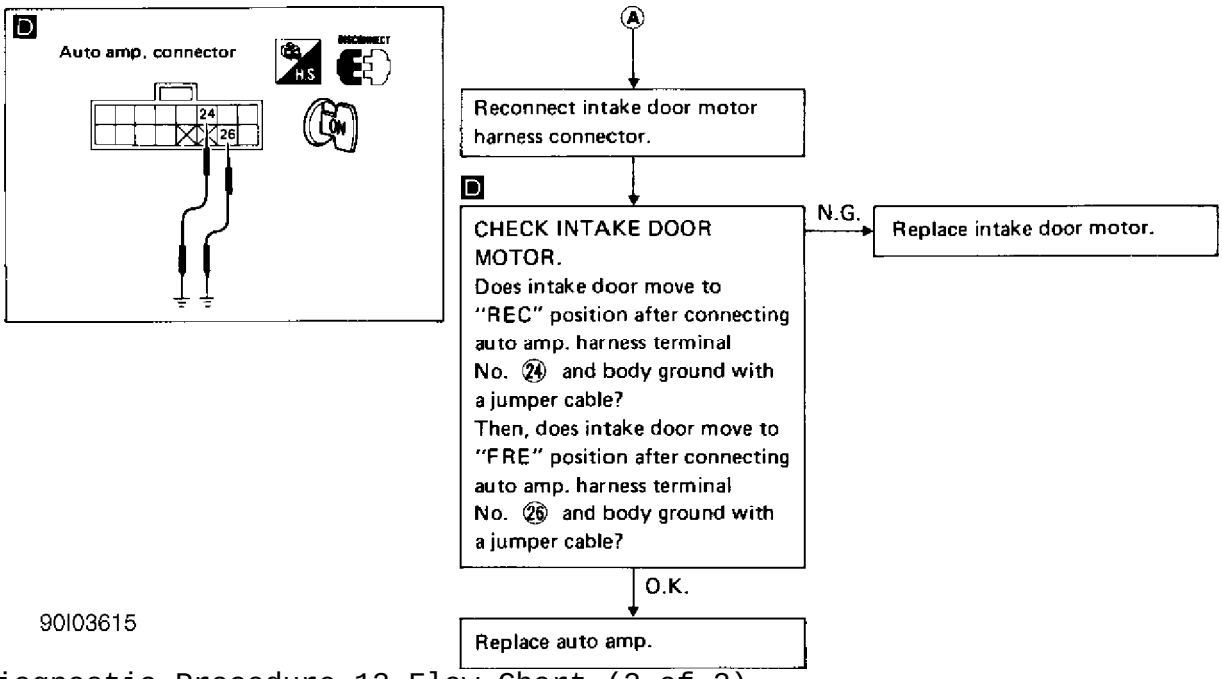


Fig. 34: Diagnostic Procedure 13 Flow Chart (2 of 2)

DIAGNOSTIC PROCEDURE 14 - Air Mix Door Does Not Operate Normally

NOTE: Perform Self-Diagnosis STEP 1, 2 and 4 under SELF DIAGNOSTICS before referring to following flow chart.

SYMPTOM: Air mix door motor does not operate normally.

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

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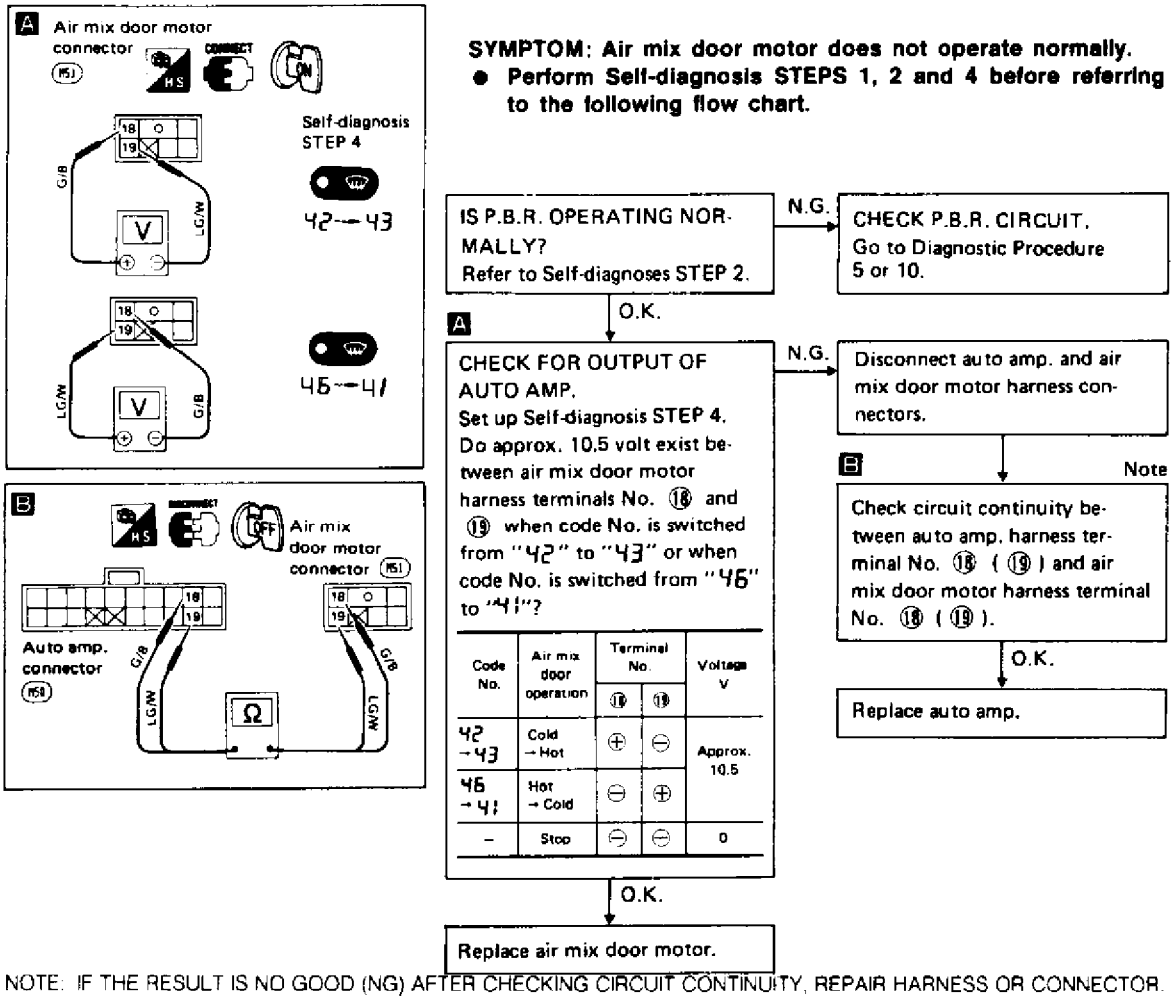


Fig. 35: Diagnostic Procedure 14

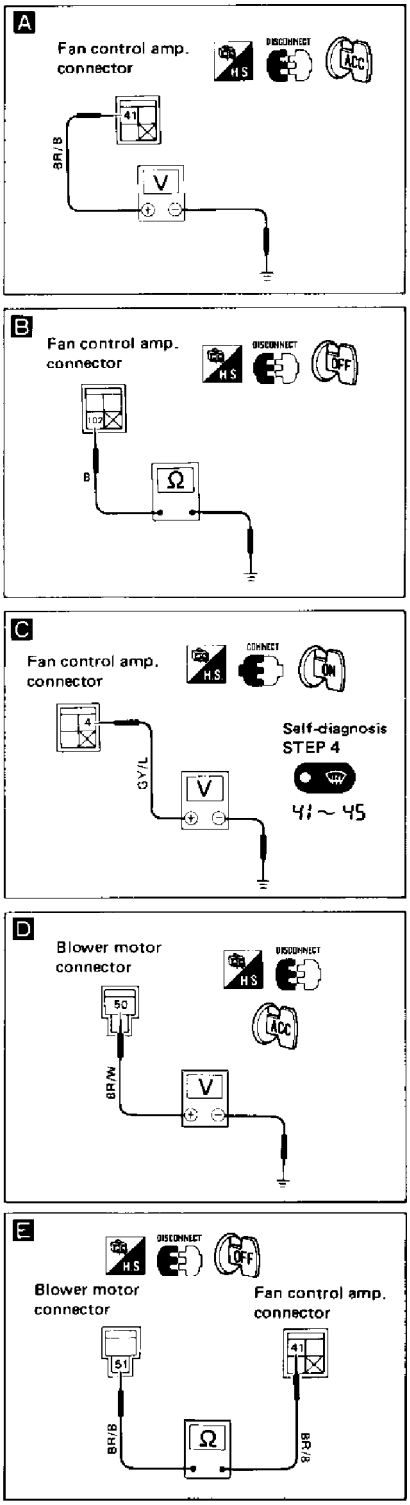
DIAGNOSTIC PROCEDURE 15 - Blower Motor Operation Is Malfunctioning

NOTE: Perform Preliminary Check 5 before referring to following flow chart.

SYMPTOM: Blower motor operation is malfunctioning under out of Starting Fan Speed Control.

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

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SYMPTOM: Blower motor operation is malfunctioning under out of Starting Fan Speed Control.

- **Perform Preliminary Check 5 before referring to the following flow chart.**

A CHECK POWER SUPPLY FOR FAN CONTROL AMP.
Disconnect fan control amp. harness connector.
Do approx. 12 volts exist between fan control amp. harness terminal No. (41) and body ground?

N.G. → **D** CHECK POWER SUPPLY FOR BLOWER MOTOR.
Disconnect blower motor harness connector.
Do approx. 12 volts exist between blower motor harness terminal No. (50) and body ground?

D: O.K. → **E**; N.G. → Check 15A fuses at fuse block. See WIRING DIAGRAMS.

A: O.K. → **B** CHECK BODY GROUND CIRCUIT FOR FAN CONTROL AMP.
Does continuity exist between fan control amp. harness terminal No. (102) and body ground?

B: Note

Reconnect fan control amp. harness connector.

C CHECK FOR OUTPUT OF AUTO AMP.
Set up Self-diagnosis STEP 4.
Measure voltage across fan control amp. harness terminal No. (4) and body ground.

Code No.	Terminal No. ⊕	Terminal No. ⊖	Voltage
41 - 45	(4)	Body ground	Approx. 1 - 3V

C: N.G. → Go To (A) Next Figure

C: O.K. → Replace fan control amp.

E Check circuit continuity between blower motor harness terminal No. (51) and fan control amp. harness terminal No. (41).

E: Note

E: O.K. → CHECK BLOWER MOTOR.

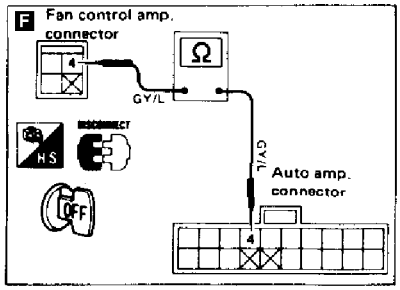
CHECK BLOWER MOTOR: N.G. → Replace blower motor.

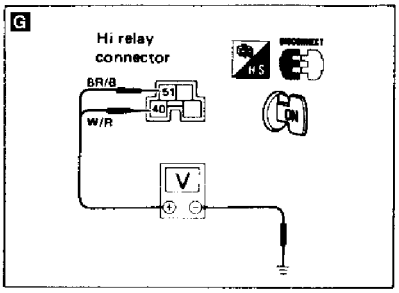
NOTE: If the result is no good (NG) after checking circuit continuity, repair harness or connector.

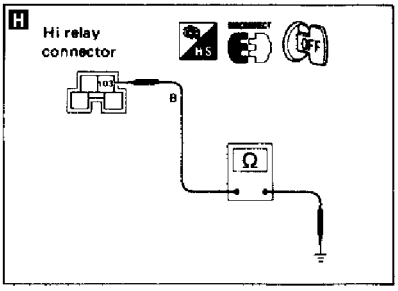
90C03617

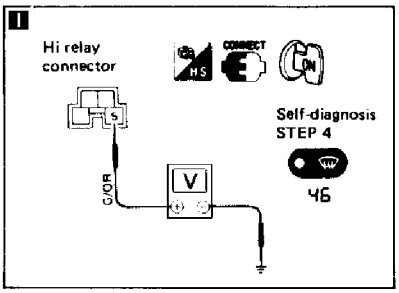
Fig. 36: Diagnostic Procedure 15 Flow Chart (1 of 3)

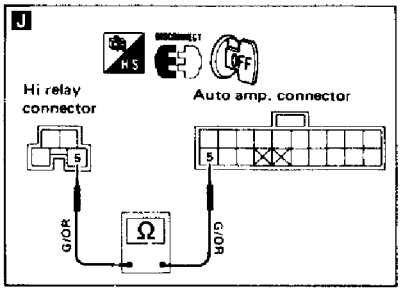
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Disconnect auto amp. and fan control amp. harness connector.

F Note
Does continuity exist between auto amp. harness terminal No. ④ and fan control amp. harness terminal No. ④ ?

G
CHECK POWER SUPPLY FOR HI RELAY.
Do approx. 12 volts exist between Hi relay harness terminals No. ㊵ , ㊶ and body ground?
N.G. → Check 10A or 15A fuses at fuse block.
See WIRING DIAGRAMS.
O.K.

H
CHECK BODY GROUND CIRCUIT FOR HI RELAY.
Does continuity exist between Hi relay harness terminal No. ⑩③ and body ground?
O.K.

CHECK HI RELAY AFTER DISCONNECTING IT.
See TESTING.
N.G. → Replace Hi relay.
O.K.

Reconnect Hi relay.

I
CHECK FOR OUTLET OF AUTO AMP.
Set up Self-diagnosis STEP 4.
Measure voltage across Hi relay harness terminal No. ⑤ and body ground.

Code No.	Terminal No. ⊕	Terminal No. ⊖	Voltage
46	⑤	Body ground	Less than approx. 1.5V

N.G. → Disconnect Hi relay and auto amp. harness connectors.

J Note
Does continuity exist between Hi relay harness terminal No. ⑤ and auto amp. harness terminal No. ⑤ ?
O.K.
Replace auto amp.

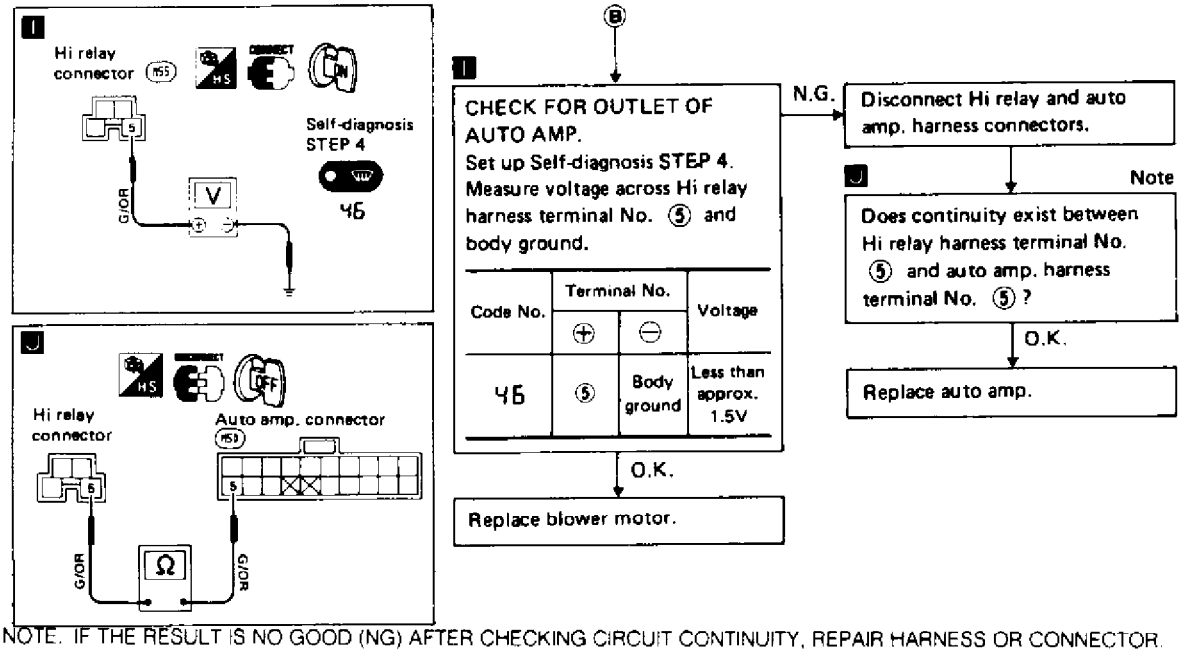
O.K.
Replace blower motor.

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

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Fig. 37: Diagnostic Procedure 15 Flow Chart (2 of 3)

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NOTE: IF THE RESULT IS NO GOOD (NG) AFTER CHECKING CIRCUIT CONTINUITY, REPAIR HARNESS OR CONNECTOR.

Fig. 38: Diagnostic Procedure 15 Flow Chart (3 of 3)

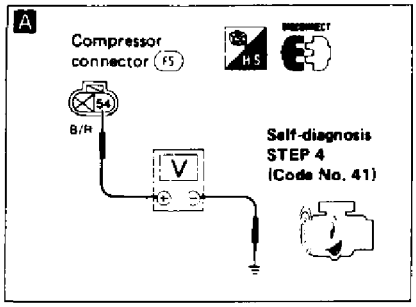
DIAGNOSTIC PROCEDURE 16 - Magnet Clutch Does Not Engage

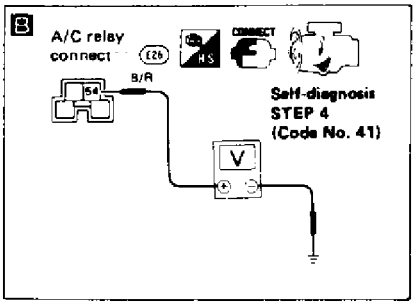
NOTE: Perform Preliminary Check 6 before referring to following flow chart.

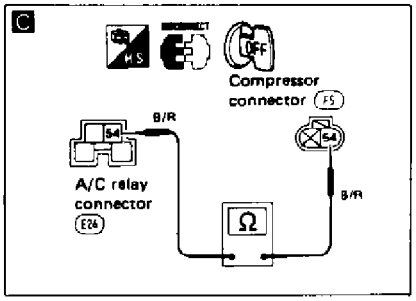
SYMPTOM: Magnet clutch does not engage after performing Preliminary Check 6.

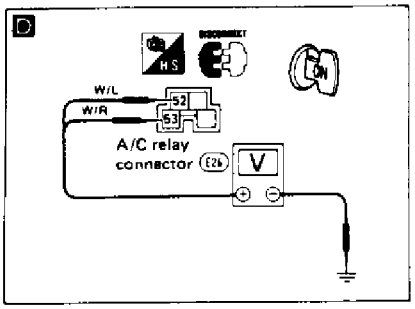
NOTE: If the result is no good (N.G.) after checking circuit continuity, repair harness or connector.

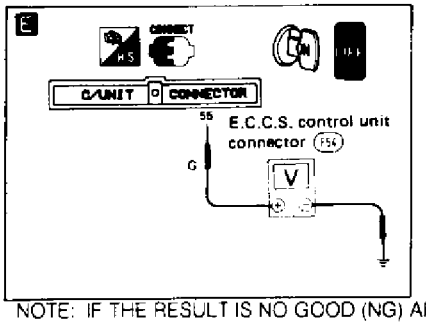
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SYMPTOM: Magnet clutch does not engage after performing Preliminary Check 6.

- **Perform Preliminary Check 6 before referring to the flow chart.**

A

CHECK POWER SUPPLY FOR COMPRESSOR.
1. Disconnect compressor harness connector.
2. Set up code No. 41 in Self-diagnosis STEP 4.
3. Do approx. 12 volts exist between compressor harness terminal No. 54 and body ground?

N.G. → **B**

B

CHECK A/C RELAY OPERATION.
Do approx. 12 volts exist between A/C relay harness terminal No. 54 and body ground?

N.G. → **C**

O.K. → Disconnect A/C relay harness connector.

C

Note: Check circuit continuity between A/C relay harness terminal No. 54 and compressor harness terminal No. 54.

O.K. → Check magnet clutch.

N.G. → Replace magnet clutch.

Turn ignition switch OFF to cancel Self-diagnosis STEP 4.

D

CHECK POWER SUPPLY FOR A/C RELAY.
Disconnect A/C relay.
Do approx. 12 volts exist between A/C relay harness terminal No. 52, 53 and body ground?

N.G. → CHECK POWER SUPPLY CIRCUIT AND 10A FUSE AT FUSE BLOCK.

O.K.

CHECK A/C RELAY AFTER DISCONNECTING IT.
See TESTING.

N.G. → Replace A/C relay.

O.K. → Reconnect A/C relay.

Turn ignition switch ON and press switch.

E

CHECK COIL SIDE CIRCUIT OF A/C RELAY.
Do approx. 12 volts exist between E.C.C.S. control unit harness terminal No. 55 and body ground?

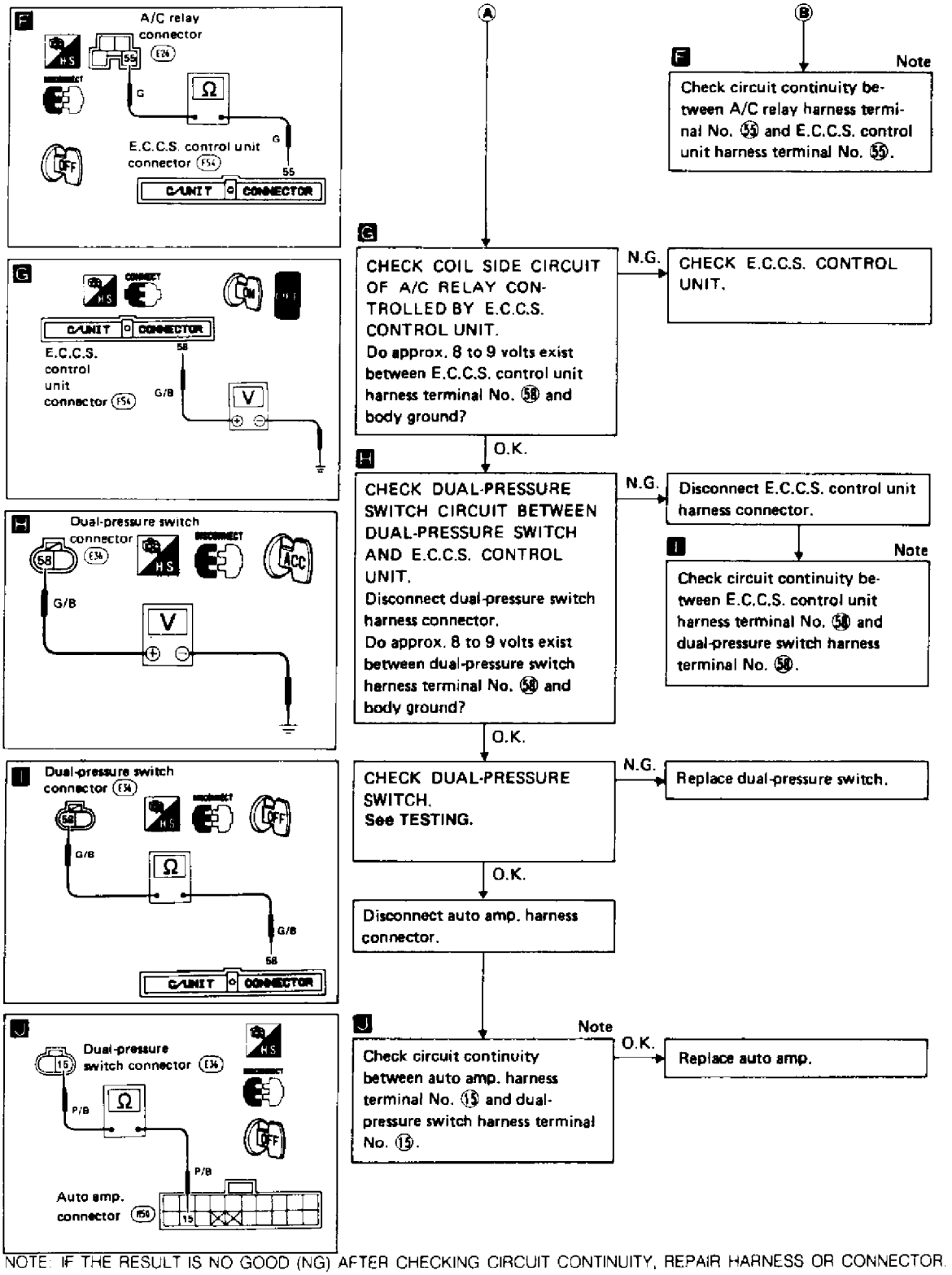
O.K. → (A)

N.G. → (B)

NOTE: IF THE RESULT IS NO GOOD (NG) AFTER CHECKING CIRCUIT CONTINUITY, REPAIR HARNESS OR CONNECTOR.

Fig. 39: Diagnostic Procedure 16 Flow Chart (1 of 2)

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NOTE: IF THE RESULT IS NO GOOD (NG) AFTER CHECKING CIRCUIT CONTINUITY, REPAIR HARNESS OR CONNECTOR.

Fig. 40: Diagnostic Procedure 16 Flow Chart (2 of 2)

DIAGNOSTIC PROCEDURE 16 - Magnet Clutch Does Not Engage

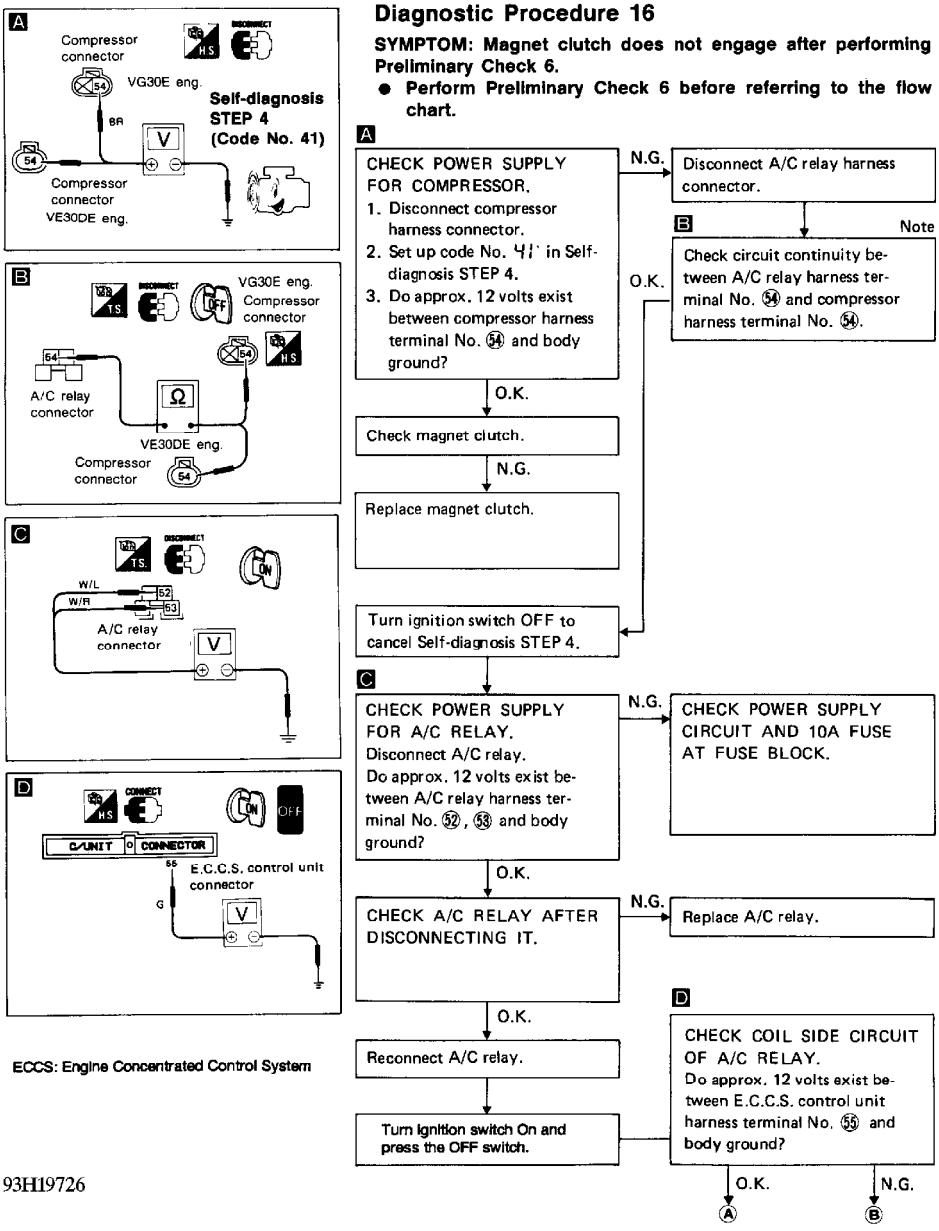
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(1992 Models)

NOTE: Perform Preliminary Check 6 before referring to following flow chart.

SYMPTOM: Magnet clutch does not engage after performing Preliminary Check 6.

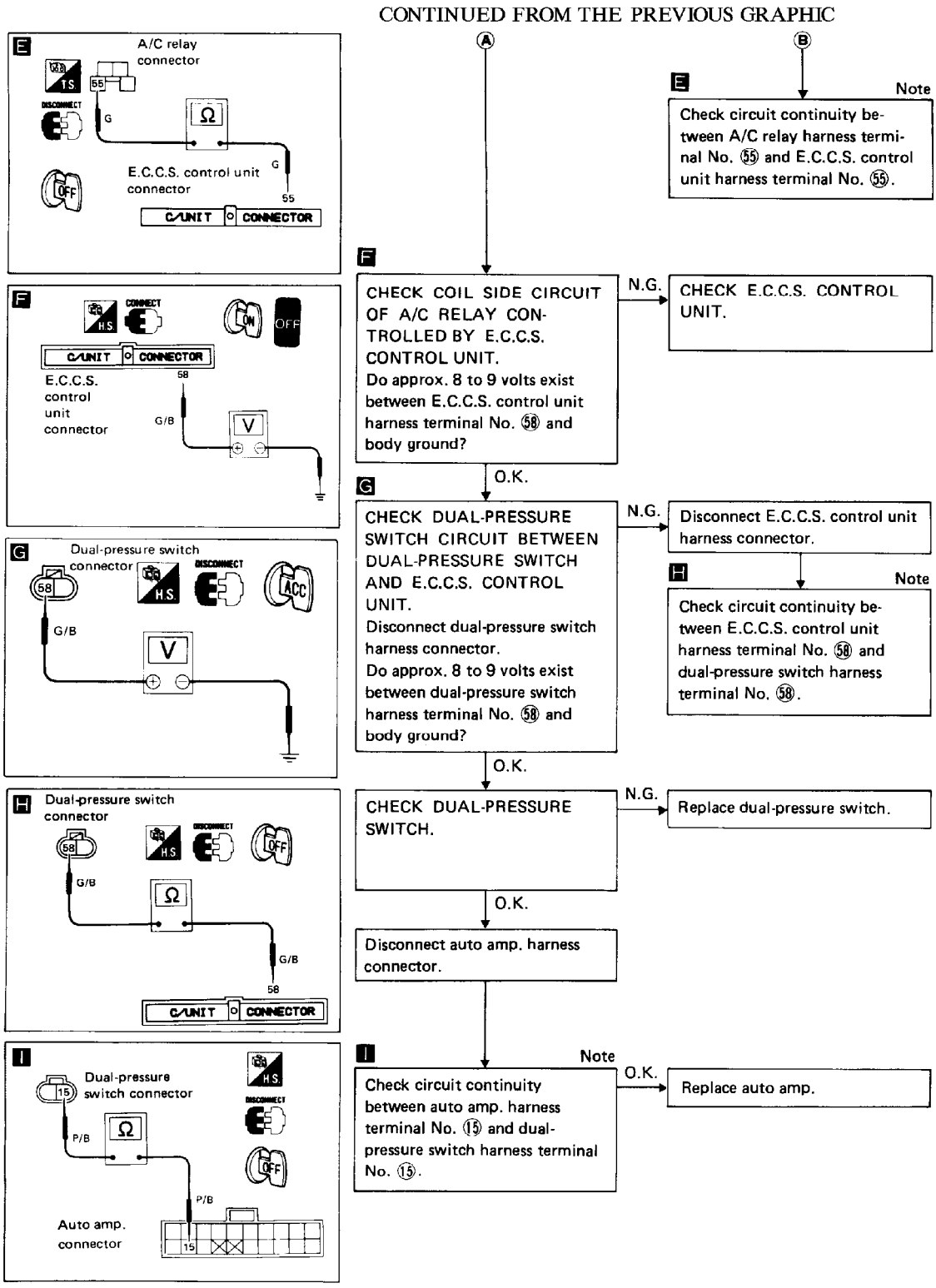
NOTE: If the result is no good (N.G.) after checking circuit continuity, repair harness or connector.



NOTE: IF THE RESULT IS NO GOOD (N.G.) AFTER CHECKING CIRCUIT CONTINUITY, REPAIR HARNESS OR CONNECTOR.

Fig. 41: Diagnostic Procedure 16 Flow Chart (1 of 2)

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93119727 **NOTE:** IF THE RESULT IS NO GOOD (N.G.) AFTER CHECKING CIRCUIT CONTINUITY, REPAIR HARNESS OR CONNECTOR.

Fig. 42: Diagnostic Procedure 16 Flow Chart (2 of 2)

DIAGNOSTIC PROCEDURE 17 - Self-Diagnosis Cannot Be Performed

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SYMPTOM: Self-diagnosis cannot be performed.

Check main power supply and ground circuit for auto amplifier. See chris PRELIMINARY CHECK 9 under TROUBLE SHOOTING CHARTS. Repair main power supply and/or ground circuit as necessary. If the main power supply and ground circuit are O.K., replace auto amplifier.

A/C SYSTEM SPECIFICATIONS

A/C SYSTEM SPECIFICATIONS TABLE

Application	Specification
Compressor Type	Diesel Kiki 6-cyl.
Compressor Belt Deflection (1)	
New	15/32-13/64" (4-5 mm)
Used	113/64-15/64" (5-6 mm)
Refrigerant (R-12) Capacity	30-33 ozs.
System Oil Capacity	6.8 ozs.
1990-91 System Operating Pressures (2)	
High Side	128-186 psi (9.0-13.1 kg/cmý)
Low Side	12.1-21.3 psi (.85-1.5 kg/cmý)
1992 System Operating Pressures (2)	
High Side	155-213 psi (7.6-11.5 kg/cmý)
Low Side	16-27 psi (1.1-1.9 kg/cmý)

(1) - Deflection is measured with 22 lbs. (10 kg) pressure applied midway on belt longest run.
(2) - Measured at ambient temperature of 77øF (25øC), with 50 percent relative humidity. Operate system for at least 10 minutes before checking.

WIRING DIAGRAMS

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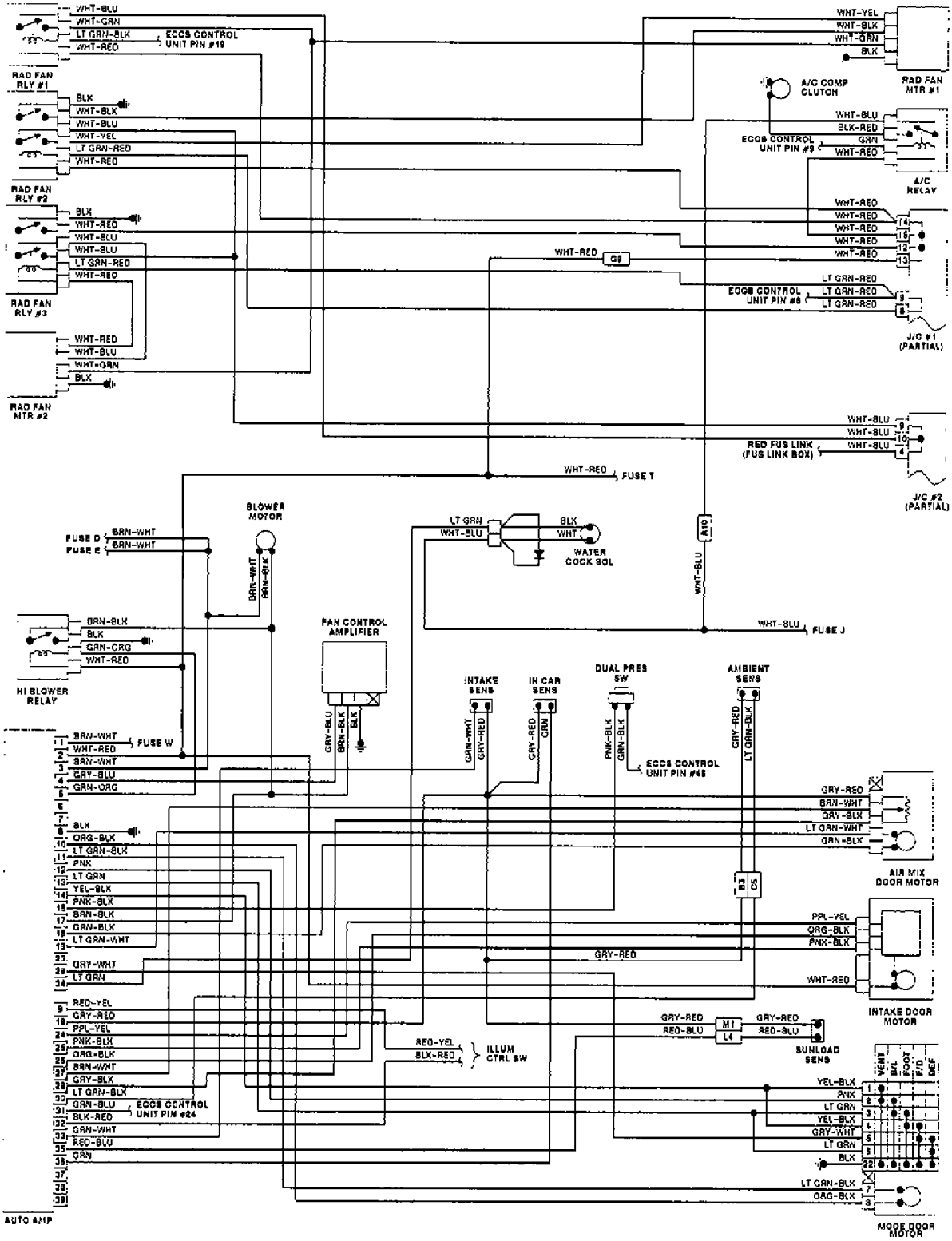


Fig. 43: Automatic A/C-Heater System Wiring Diagram (1990 Models)

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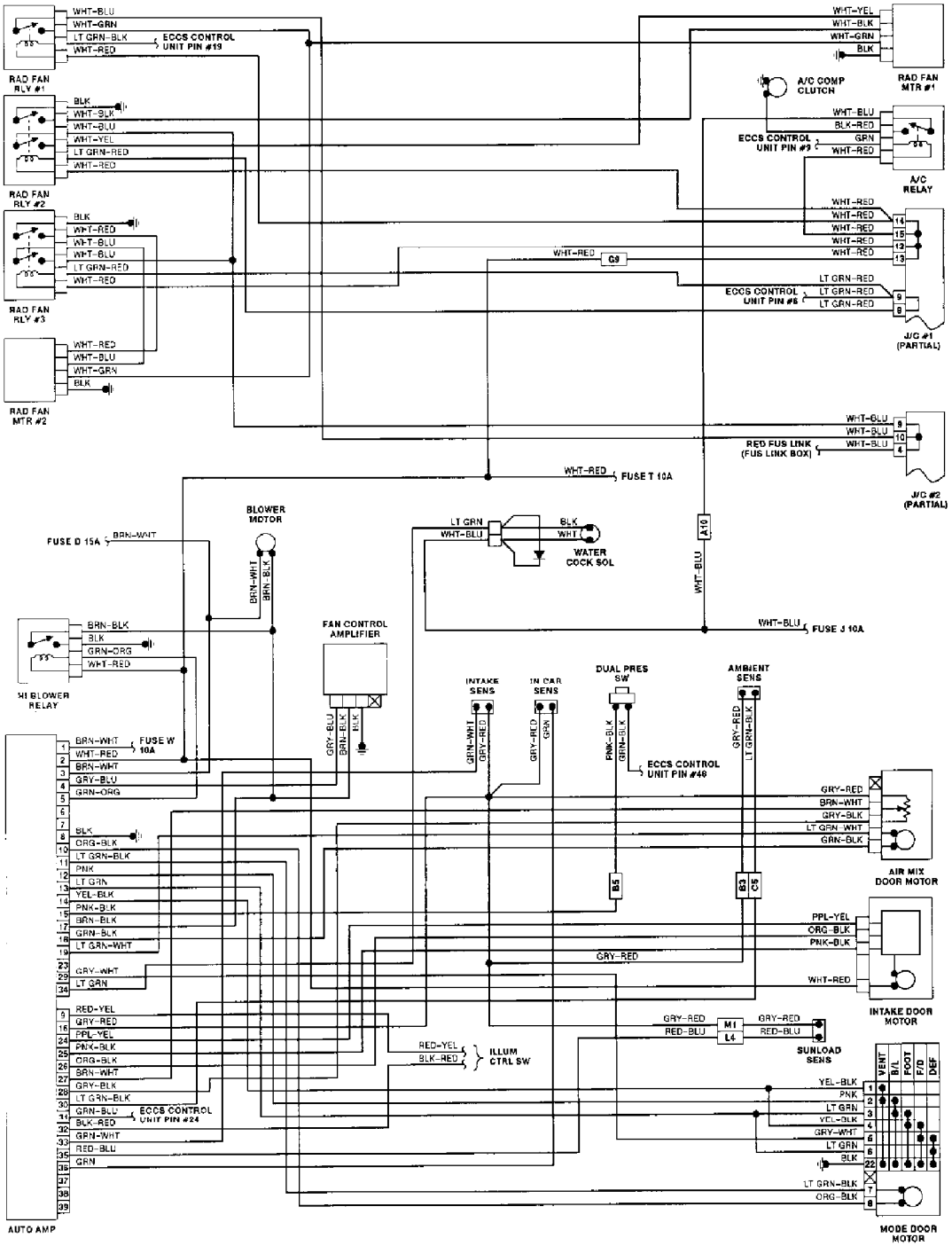
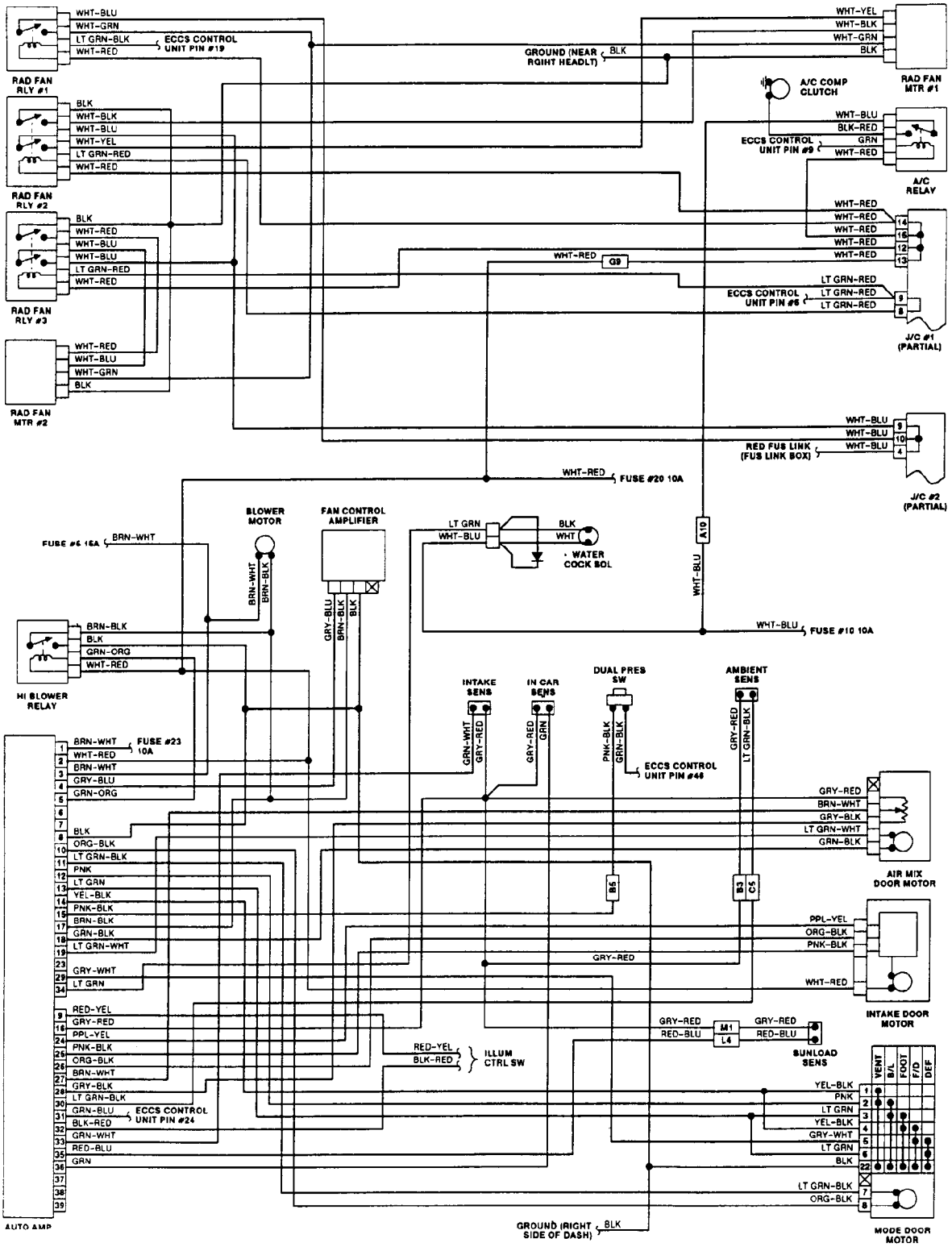


Fig. 44: Automatic A/C-Heater System Wiring Diagram (1991 Models)

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Fig. 45: Automatic A/C-Heater System Wiring Diagram (1992 Models)

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