SECTION HAC

HEATER & AIR CONDITIONING CONTROL SYSTEM

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BASIC INSPECTION

DIAGNOSIS AND REPAIR WORKFLOW

How to Perform Trouble Diagnosis For Quick and Accurate Repair

INFOID:0000000001203051

DETAILED FLOW

1. LISTEN TO CUSTOMER COMPLAINT

Listen to customer complaint. Get detailed information about the conditions and environment when the symptom occurs.

>> GO TO 2

2. VERIFY THE SYMPTOM WITH OPERATIONAL CHECK

Verify the symptom with operational check. Refer to HAC-6, "Operational Check".

>> GO TO 3

3. GO TO APPROPRIATE TROUBLE DIAGNOSIS

Go to appropriate trouble diagnosis. Refer to XXXX SYMPTOM TABLE below.

>> GO TO 4

4. REPAIR OR REPLACE

Repair or replace the specific parts.

>> GO TO 5

5. FINAL CHECK

Final check.

Is the inspection result normal?

YES >> CHECK OUT
NO >> GO TO 3

INSPECTION AND ADJUSTMENT

Operational Check

INFOID:0000000001203052

The purpose of the operational check is to confirm that the system operates properly.

Conditions : Engine running at normal operating temperature

CHECKING BLOWER

1. Turn blower control dial clockwise to "1" position. Blower should operate on low speed.
2. Turn blower control dial clockwise to "2" position, and continue checking blower speed until all speeds are checked.
3. Leave blower on Maximum speed.

If NG, go to trouble diagnosis procedure for xxx BLOWER MOTOR CIR HAC-19, "Front Blower Motor Diagnosis Procedure".
If OK, continue the check.

CHECKING DISCHARGE AIR

1. Turn mode door control dial to each position.
2. Confirm that discharge air comes out according to the air distribution table. Refer to XXXX DISCHARGE AIR FLOW.

If NG, go to trouble diagnosis procedure for HAC-16, "Mode Door Diagnostic Procedure".
If OK, continue the check.

CHECKING RECIRCULATION

1. Set intake door lever to REC position.
2. Operate intake door lever to FRE position.
3. Listen for intake door position change (you should hear blower sound change slightly).

If NG, go to trouble diagnosis procedure for XXXX INTAKE DOOR.
If OK, continue the check.

CHECKING TEMPERATURE DECREASE

1. Turn temperature control dial counterclockwise to full cold position.
2. Check for cold air at discharge air outlets.

If NG, go to trouble diagnosis procedure for XXXX INSUFFICIENT COOLING.
If OK, continue the check.

CHECKING TEMPERATURE INCREASE

1. Turn temperature control dial clockwise to full hot position.
2. Check for hot air at discharge air outlets.

If NG, go to trouble diagnosis procedure for XXXX INSUFFICIENT HEATING.
If OK, continue the check.

CHECKING A/C SWITCH (IF EQUIPPED)

1. Turn fan control dial to the desired (1 to 4 speed) position.
2. Press A/C switch.
3. A/C switch indicator will turn ON.
   - Confirm that the compressor clutch engages (sound or visual inspection).

If NG, go to trouble diagnosis procedure for XXXX MAG CLUTCH CIR.
If OK, continue the check.

CHECKING DEFROST A/C SWITCH (IF EQUIPPED)

1. Turn fan control dial to the desired (1 to 4 speed) position.
2. Turn mode dial to ( ) DEF.
3. Confirm that the compressor clutch engages (sound or visual inspection).

If NG, go to trouble diagnosis procedure for XXXX MAG CLUTCH CIR .
If all operational checks are OK (symptom cannot be duplicated), go to XXXX WORK FLOW and perform tests as outlined. If symptom appears, refer to XXXX WORK FLOW and perform applicable trouble diagnosis procedures.

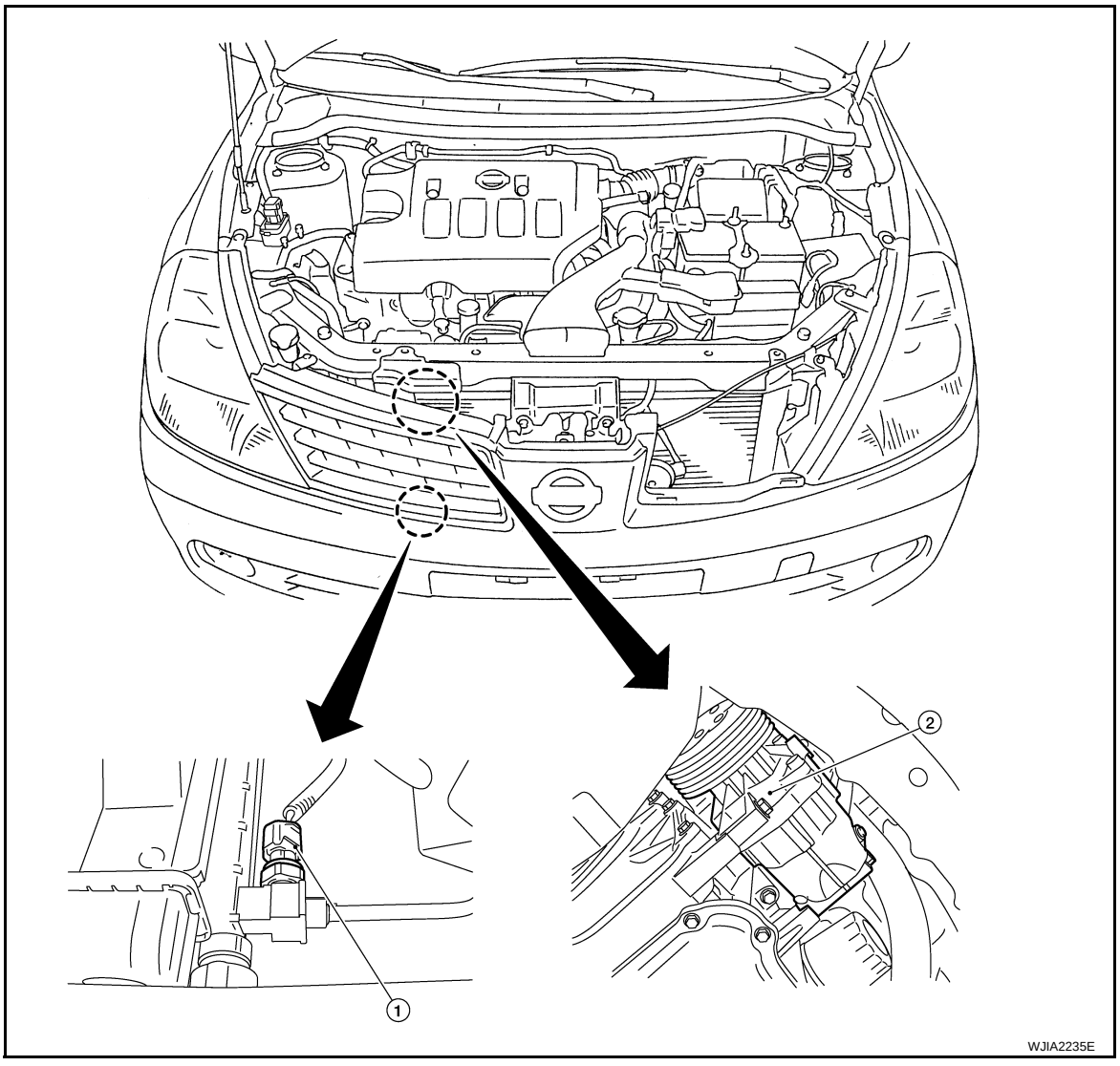
FUNCTION DIAGNOSIS

FUNCTION INFORMATION

Component Part Location

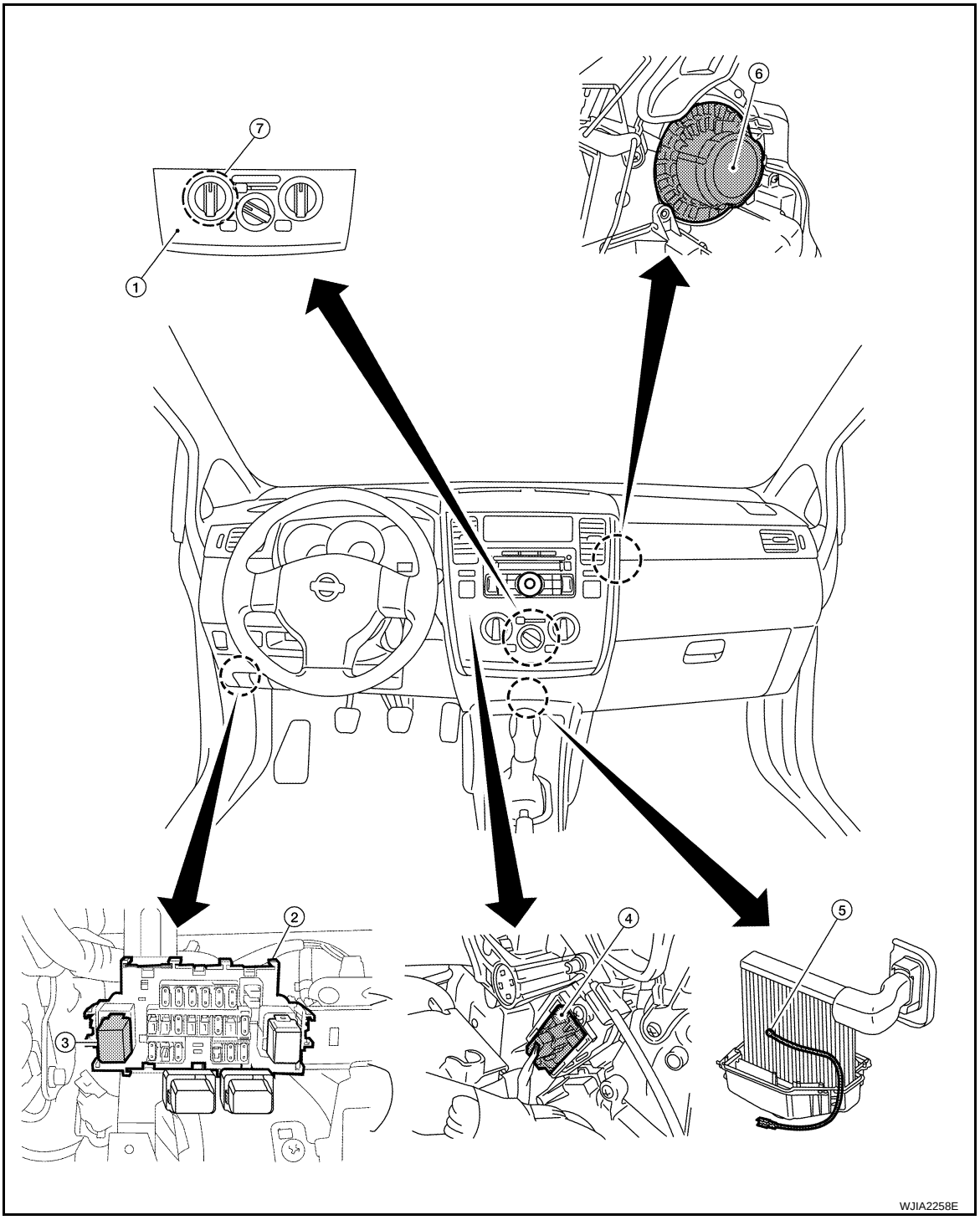
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ENGINE COMPARTMENT



1. Refrigerant pressure sensor E17 (if equipped)
2. A/C compressor F3 (if equipped)

PASSENGER COMPARTMENT



1. Front air control M33, M49
2. Fuse Block (J/B)
3. Blower relay J-1
4. Front blower motor resistor M95
5. Intake sensor M42
6. Front blower motor M62
7. Defrost A/C switch M49

REFRIGERATION SYSTEM

Refrigerant Cycle

INFOID:0000000001547091

Refer to HA-16, "Refrigerant Cycle".

Refrigerant System Protection

INFOID:0000000001547092

Refer to HA-16, "Refrigerant System Protection".

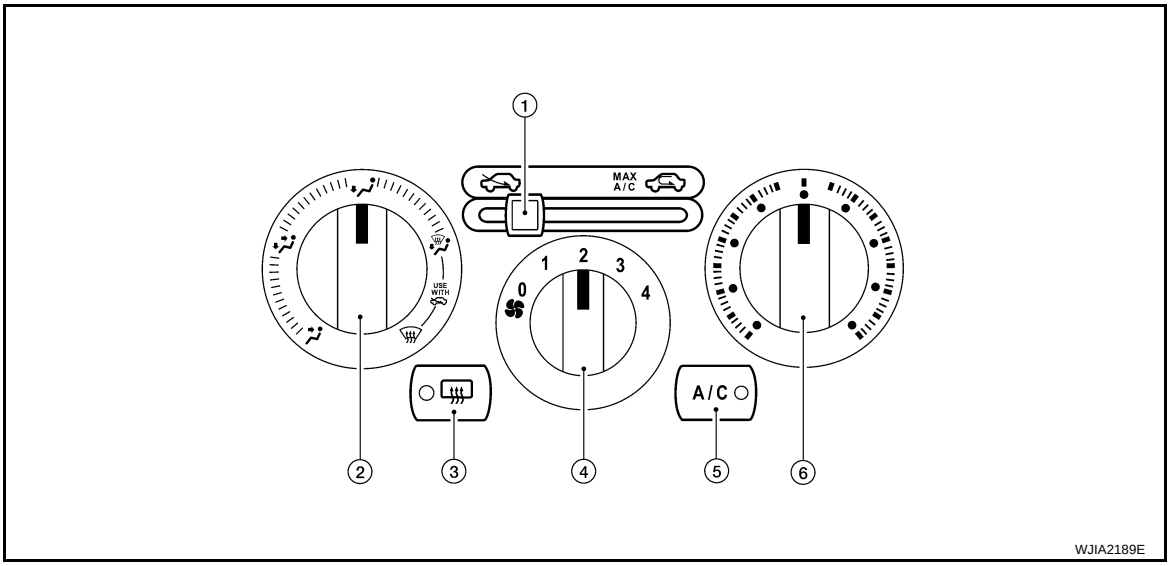
AIR CONDITIONER CONTROL

System Diagram

INFOID:0000000001203055

System Description

INFOID:0000000001203056



1. Intake door lever
2. Mode door control dial
3. Rear window defogger switch
4. Blower control dial
5. A/C switch (if equipped)
6. Temperature control dial

BLOWER CONTROL DIAL

This dial turns the fan ON and OFF, and controls fan speed.

TEMPERATURE CONTROL DIAL

This dial allows you to adjust the temperature of the discharge air.

MODE DOOR CONTROL DIAL

This dial controls the outlet air flow.

INTAKE DOOR LEVER

- Recirculation (REC) position: Interior air is recirculated inside the vehicle.
- Fresh (FRE) position: Outside air is drawn into the passenger compartment.

REAR WINDOW DEFOGGER SWITCH

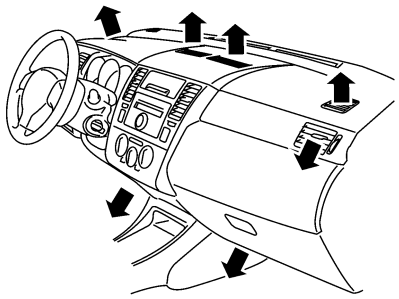
When illumination is ON, rear window is defogged.

A/C SWITCH (IF EQUIPPED)

The A/C switch controls the air conditioner system. When the switch is depressed with the fan ON, the compressor will turn ON. The indicator lamp also illuminates.

Discharge Air Flow

INFOID:0000000001547285



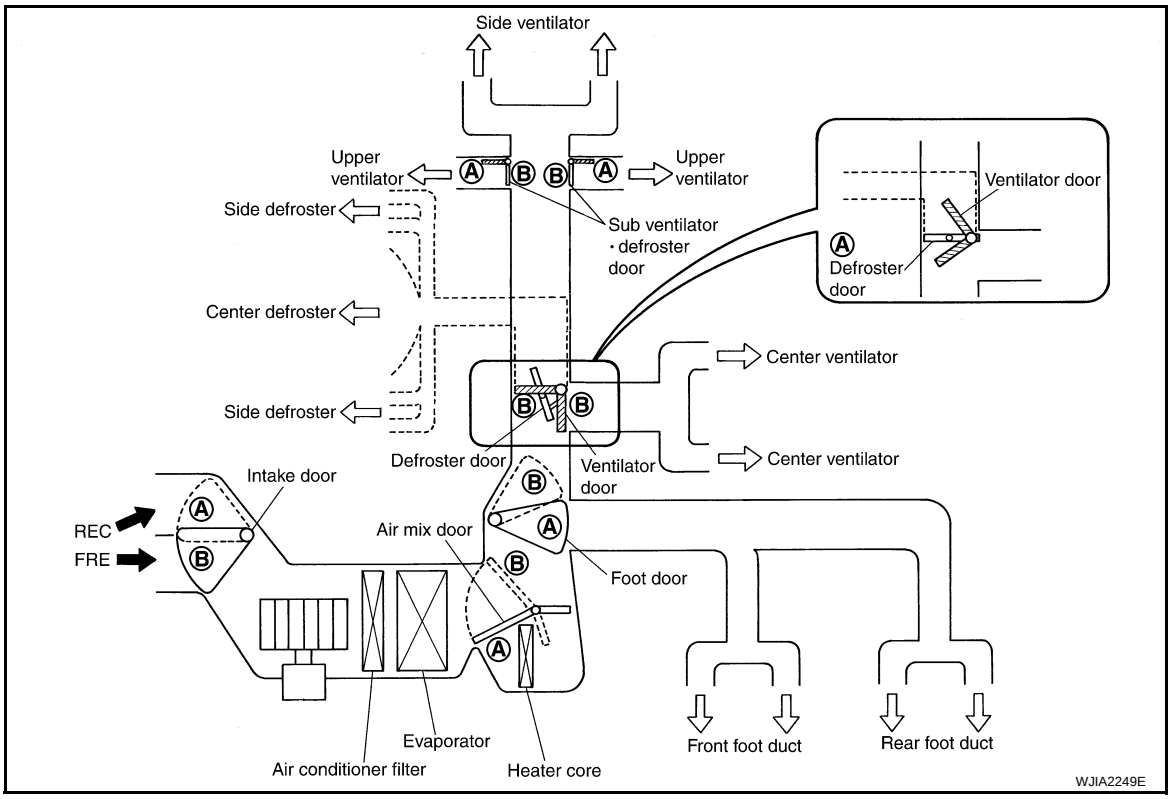
WJIA2190E

Mode door position	Air outlet/distribution		
	Vent	Foot	Defroster
	100%	—	—
	56%	44%	—
	16%	64%	20%
	16%	53%	31%
	17%	—	83%
Airflow always present at driver and passenger side demisters			

Switches And Their Control Function

INFOID:0000000001547286

SWITCHES AND THEIR CONTROL FUNCTION



Door \ Mode control dial	MODE Position					Intake door lever		Temperature control dial		
	VENT	B/L	FOOT	D/F	DEF	FRE	REC	Full cold	◄—►	Full hot
Ventilator door	Ⓐ	Ⓐ	Ⓑ *1	Ⓑ *1	Ⓑ *1	—		—		
Sub ventilator door	Ⓐ	Ⓐ	Ⓑ	Ⓑ	Ⓑ	—		—		
Defroster door	Ⓐ	Ⓐ	*2 Ⓐ ~ Ⓑ	*3 Ⓐ ~ Ⓑ	Ⓑ	—		—		
Foot door	Ⓐ	Ⓐ ~ Ⓑ	Ⓑ *1	Ⓐ ~ Ⓑ	Ⓐ	—		—		
Intake door	—					Ⓑ	Ⓐ	—		
Air mix door	—					—		Ⓐ	Ⓐ~Ⓑ	Ⓑ

*1 In the Ⓑ position, the ventilator and foot doors are not completely closed.
*2 In the Ⓐ ~ Ⓑ position, the foot door is 60% open.
*3 In the Ⓐ ~ Ⓑ position, the defroster is 75% open.

WJIA2234E

Component Description

INFOID:0000000001203058

Refer to XX-XX, "*****".

CAN COMMUNICATION SYSTEM

System Description

INFOID:0000000001203059

Refer to XX-XX, "*****".

DIAGNOSIS SYSTEM (BCM)

CONSULT-III Function (BCM)

INFOID:0000000001203060

CONSULT-III can display each diagnostic item using the diagnostic test modes shown following.

BCM diagnostic test item	Diagnostic mode	Description
Inspection by part	WORK SUPPORT	Supports inspections and adjustments. Commands are transmitted to the BCM for setting the status suitable for required operation, input/output signals are received from the BCM and received data is displayed.
	DATA MONITOR	Displays BCM input/output data in real time.
	ACTIVE TEST	Operation of electrical loads can be checked by sending drive signal to them.
	SELF-DIAG RESULTS	Displays BCM self-diagnosis results.
	CAN DIAG SUPPORT MNTR	The result of transmit/receive diagnosis of CAN communication can be read.
	ECU PART NUMBER	BCM part number can be read.
	CONFIGURATION	Performs BCM configuration read/write functions.

DATA MONITOR

Display Item List

Monitor item name “operation or unit”		Contents
IGN ON SW	“ON/OFF”	Displays “IGN Position (ON)/OFF, ACC Position (OFF)” status as judged from ignition switch signal through the CAN communication.
FAN ON SIG	“ON/OFF”	Displays “FAN (ON)/FAN (OFF)” status as judged from blower fan motor switch signal through CAN communication.
AIR COND SW	“ON/OFF”	Displays “COMP (ON)/COMP (OFF)” status as judged from air conditioner switch signal through the CAN communication.

COMPONENT DIAGNOSIS

MODE DOOR

Mode Door Diagnostic Procedure

INFOID:0000000001547062

SYMPTOM: Air outlet does not change.

INSPECTION FLOW

1. CONFIRM SYMPTOM BY PERFORMING OPERATIONAL CHECK - DISCHARGE AIR

1. Rotate the mode door control dial to each position.
2. Confirm that discharge air comes out according to the air distribution table. Refer to HAC-11, "Discharge Air Flow".
   NOTE:
   Confirm that the compressor clutch (with A/C) is engaged (visual inspection) when DEF ( ) or D/F ( ) is selected.

Can a symptom be duplicated?

YES >> GO TO 3.
NO >> GO TO 2.

2. PERFORM COMPLETE OPERATIONAL CHECK

Perform a complete operational check and check for any symptoms. Refer to HAC-6, "Operational Check".

Can a symptom be duplicated?

YES >> Refer to HAC-5, "How to Perform Trouble Diagnosis For Quick and Accurate Repair".
NO >> System OK.

3. CHECK FOR SERVICE BULLETINS

Check for any service bulletins.

>> GO TO 4.

4. CHECK MODE DOOR CONTROL CABLE

Check and verify mode door mechanism for smooth operation in each mode.

OK or NG

OK >> If the symptom still exists, perform a complete operational check and check for other symptoms. Refer to HAC-6, "Operational Check". If other symptoms exist, refer to HAC-5, "How to Perform Trouble Diagnosis For Quick and Accurate Repair" .
NG >> Repair or adjust mode door control cable. Refer to XXXX MODE DOOR CABLE ADJUSTMENT.

AIR MIX DOOR

Air Mix Door Diagnostic Procedure

INFOID:0000000001547064

SYMPTOM: Air mix door does not change.

INSPECTION FLOW

1. CONFIRM SYMPTOM BY PERFORMING OPERATIONAL CHECK - TEMPERATURE INCREASE

1. Turn the temperature control dial clockwise until maximum heat.
2. Check for hot air at discharge air outlets.

>> GO TO 2.

2. CONFIRM SYMPTOM BY PERFORMING OPERATIONAL CHECK - TEMPERATURE DECREASE

1. Turn the temperature control dial counterclockwise until maximum cold.
2. Check for cold air at discharge air outlets.

Can a symptom be duplicated?

YES >> GO TO 4.
NO >> GO TO 3.

3. PERFORM COMPLETE OPERATIONAL CHECK

Perform a complete operational check and check for any symptoms. Refer to HAC-6, "Operational Check".

Can a symptom be duplicated?

YES >> Refer to HAC-5, "How to Perform Trouble Diagnosis For Quick and Accurate Repair".
NO >> System OK.

4. CHECK FOR SERVICE BULLETINS

Check for any service bulletins.

>> GO TO 5.

5. CHECK AIR MIX DOOR CONTROL LINKAGE

Check and verify air mix door mechanism for smooth operation.

OK or NG

OK >> If the symptom still exists, perform a complete operational check. Refer to HAC-6, "Operational Check" If other symptoms exist, refer to HAC-5, "How to Perform Trouble Diagnosis For Quick and Accurate Repair".
NG >> Repair or adjust air mix door control linkage. Refer to XXXX AIR MIX DOOR CABLE ADJUSTMENT.

INTAKE DOOR

Intake Door Diagnostic Procedure

INFOID:0000000001547065

SYMPTOM:
- Intake door does not change.

INSPECTION FLOW

1.CONFIRM SYMPTOM BY PERFORMING OPERATIONAL CHECK - REC ( )

1. Slide the intake door lever to the REC ( ) position.
2. Turn the blower motor to maximum speed.
3. Slide the intake door lever to the FRE position.
4. Listen for intake door position change (you should hear blower sound change slightly).

Can a symptom be duplicated?

YES >> GO TO 3.
NO >> GO TO 2.

2.PERFORM COMPLETE OPERATIONAL CHECK

Perform a complete operational check and check for any symptoms. Refer to HAC-6, "Operational Check" .

Can a symptom be duplicated?

YES >> Refer to HAC-5, "How to Perform Trouble Diagnosis For Quick and Accurate Repair" .
NO >> System OK.

3.CHECK FOR SERVICE BULLETINS

Check for any service bulletins.

>> GO TO 4.

4.CHECK INTAKE DOOR CONTROL LINKAGE

Check intake door control linkage mechanism for smooth operation.

OK or NG

OK >> If the symptom still exists, perform a complete operational check. Refer to HAC-6, "Operational Check" . If other symptoms exist, refer to HAC-5, "How to Perform Trouble Diagnosis For Quick and Accurate Repair" .
NG >> Repair or adjust control linkage. Refer to XXXX INTAKE DOOR CABLE ADJUSTMENT .

BLOWER MOTOR

Front Blower Motor Component Function Check

INFOID:0000000001547066

SYMPTOM: Front blower motor operation is malfunctioning.

INSPECTION FLOW

1.CONFIRM SYMPTOM BY PERFORMING OPERATIONAL CHECK - FRONT BLOWER

1. Turn blower control dial to "1" position. Blower should operate on low speed.
2. Turn the blower control dial to "2" position, and continue checking blower speed until all speeds are checked.

Can the symptom be duplicated?

YES >> GO TO 3.
NO >> GO TO 2.

2.PERFORM COMPLETE OPERATIONAL CHECK

Perform a complete operational check and check for any symptoms. Refer to HAC-6, "Operational Check".

Can a symptom be duplicated?

YES >> Refer to HAC-5, "How to Perform Trouble Diagnosis For Quick and Accurate Repair".
NO >> System OK.

3.CHECK FOR SERVICE BULLETINS

Check for any service bulletins.

>> GO TO 4.

4.CHECK FRONT BLOWER MOTOR CIRCUIT

Check front blower motor circuit. Refer to HAC-19, "Front Blower Motor Component Function Check".

OK or NG?

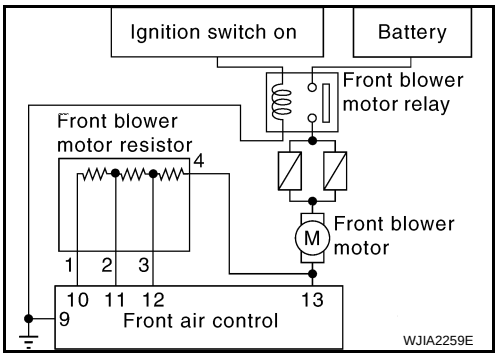
OK >> If the symptom still exists, perform a complete operational check. Refer to HAC-6, "Operational Check" . If other symptoms exist, refer to HAC-5, "How to Perform Trouble Diagnosis For Quick and Accurate Repair".
NG >> Repair as necessary.

Front Blower Motor Diagnosis Procedure

INFOID:0000000001547067

DIAGNOSTIC PROCEDURE FOR FRONT BLOWER MOTOR

SYMPTOM: Front blower motor operation is malfunctioning.



1.CHECK FRONT BLOWER MOTOR OPERATION

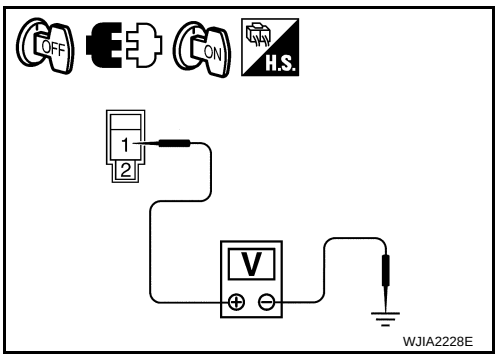
1. Turn ignition switch ON.
2. Check front blower motor operation at each fan speed.

OK or NG

OK >> Inspection End.
NG >> • Front blower motor does not operate at any speed, GO TO 2.
• Front blower motor does not operate at one or more of the four speeds, GO TO 10.

2.CHECK POWER SUPPLY FOR FRONT BLOWER MOTOR

1. Turn ignition switch OFF.
2. Disconnect front blower motor connector.
3. Turn ignition switch ON.
4. Check voltage between front blower motor harness connector M62 terminal 1 and ground.



Terminals			Voltage (Approx.)
(+)		(–)	
Connector	Terminal	Ground	
Front blower motor: M62	1		Battery voltage

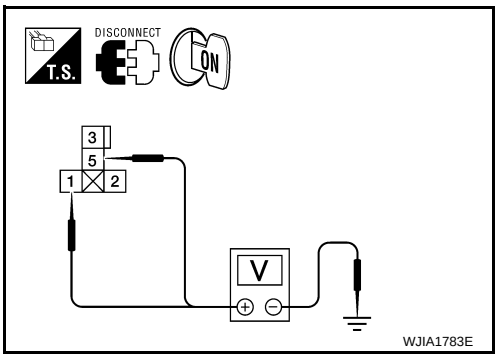
OK or NG

OK >> GO TO 6.
NG >> Check power supply circuit and 15A fuses [Nos. 15 and 17, located in the fuse block (J/B)].
- If fuses are OK, reinstall fuses and GO TO 3.
- If fuses are NG, replace fuse and check harness for short circuit. Repair or replace if necessary.

3.CHECK BLOWER MOTOR RELAY POWER SUPPLY CIRCUITS

1. Turn ignition switch OFF.
2. Disconnect blower motor relay connector.
3. Turn ignition switch ON.
4. Check voltage between blower motor relay harness connector J-1 terminal 1, 5 and ground.

1 - Ground Battery voltage should exist.
5 - Ground Battery voltage should exist.



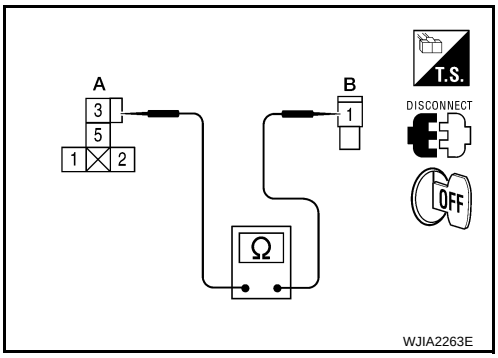
OK or NG

OK >> GO TO 4.
NG >> Repair harness or connector.

4.CHECK BLOWER MOTOR RELAY (SWITCH SIDE) CIRCUIT FOR OPEN

1. Turn ignition switch OFF.
2. Check continuity between blower motor relay harness connector J-1 (A) terminal 3 and front blower motor harness connector M62 (B) terminal 1.

Continuity should exist.



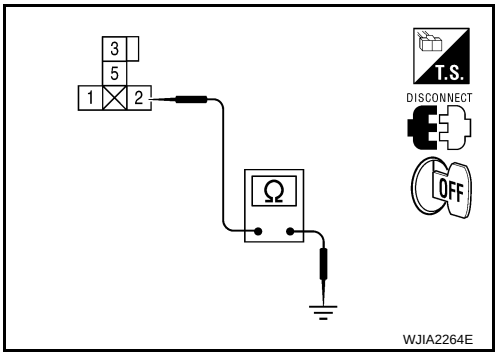
OK or NG

OK >> GO TO 5.
NG >> Repair harness or connector.

5.CHECK BLOWER MOTOR RELAY GROUND CIRCUIT

Check continuity between blower motor relay harness connector J-1 terminal 2 and ground.

Continuity should exist.



OK or NG

OK >> Replace blower motor relay.
NG >> Repair harness or connector.

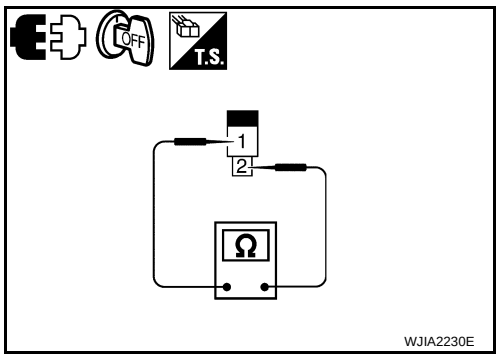
6.CHECK FRONT BLOWER MOTOR

Check continuity between front blower motor terminals 1 and 2.

NOTE:

Ensure that there are no foreign particles inside the A/C unit assembly for a smooth rotation of the front blower motor.

1 - 2 : Continuity should exist.



OK or NG

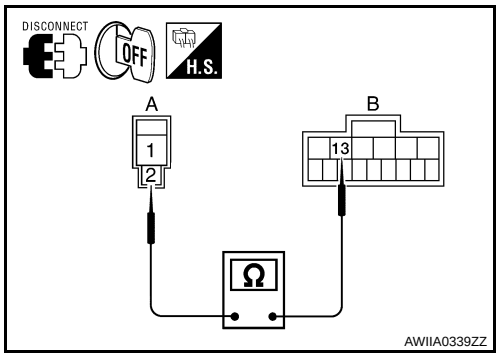
OK >> GO TO 7.

NG >> Replace front blower motor. Refer to XX-XX, "*****".

7.CHECK CIRCUIT CONTINUITY BETWEEN FRONT BLOWER MOTOR AND FRONT AIR CONTROL

1. Disconnect front air control connector.
2. Check continuity between front blower motor harness connector M62 (A) terminal 2 and front air control harness connector M33 (B) terminal 13.

2 - 13 : Continuity should exist.



OK or NG

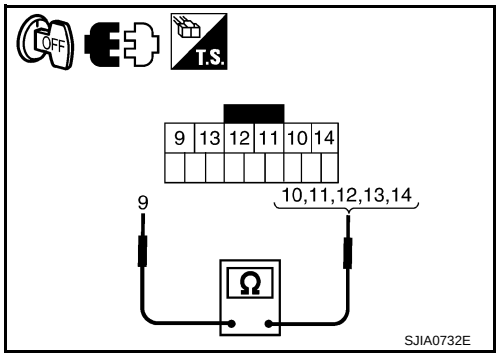
OK >> GO TO 8.

NG >> Repair harness or connector.

8.CHECK FAN SWITCH

Check continuity between front air control terminal 9 and 10, 11, 12, 13, 14.

Terminals		Condition	Continuity
9	14	Blower control dial: OFF	Yes
	10	Blower control dial: 1-speed	
	11	Blower control dial: 2-speed	
	12	Blower control dial: 3-speed	
	13	Blower control dial: 4-speed	



OK or NG

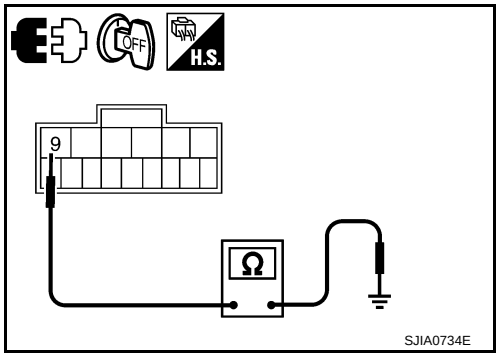
OK >> GO TO 9.

NG >> Replace front air control. Refer to XX-XX, "*****".

9.CHECK FAN SWITCH GROUND CIRCUIT

Check continuity between front air control harness connector M33 terminal 9 and ground.

Continuity should exist.



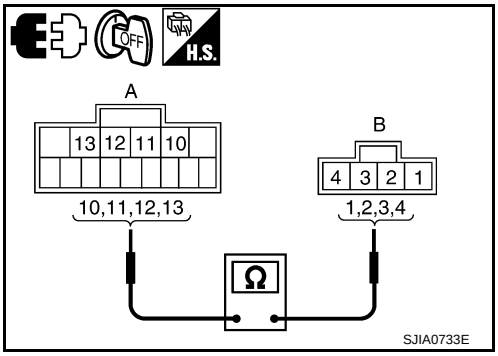
OK or NG

OK >> Inspection End.

NG >> Repair harness or connector.

10.CHECK CIRCUIT CONTINUITY BETWEEN FRONT AIR CONTROL AND FRONT BLOWER MOTOR RESISTOR

1. Turn ignition switch OFF.
2. Disconnect front blower motor resistor and front air control connectors.
3. Check continuity between front air control harness connector M33 (A) terminals and front blower motor resistor harness connector M95 (B) terminals.



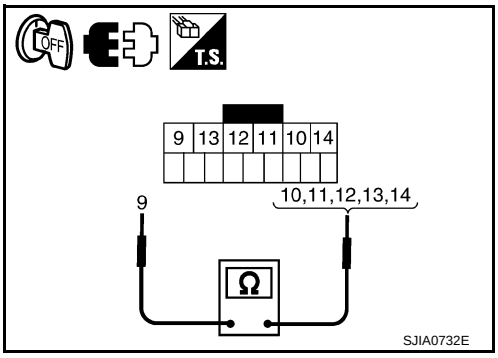
A		B		Continuity
Connector	Terminal	Connector	Terminal	
Front air control: M33	10	Front blower motor resistor: M95	1	Yes
	11		2	
	12		3	
	13		4	

OK or NG

OK >> GO TO 11.
NG >> Repair harness or connector.

11. CHECK FAN SWITCH

Check continuity between front air control terminal 9 and 10, 11, 12, 13, 14.



Terminals		Condition	Continuity
9	14	Fan control dial: OFF	Yes
	10	Fan control dial: 1-speed	
	11	Fan control dial: 2-speed	
	12	Fan control dial: 3-speed	
	13	Fan control dial: 4-speed	

OK or NG

OK >> Replace the front blower motor resistor. Refer to XX-XX, "*****".
NG >> Replace front air control. Refer to XX-XX, "*****".

MAGNET CLUTCH

System Description

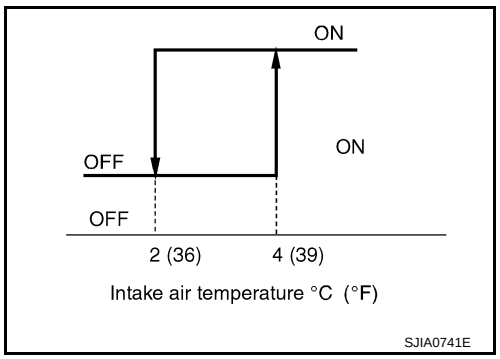
INFOID:0000000001547069

SYSTEM DESCRIPTION

Intake sensor controls A/C compressor operation by intake air temperature and signal from ECM.
The defrost A/C switch controls A/C compressor operation by the BCM when the mode switch is turned to the (DEF) position.

Low Temperature Protection Control

When intake air temperatures are higher than 4°C (39°F), the compressor turns ON. The compressor turns OFF when intake air temperatures are lower than 2°C (36°F).



Magnet Clutch Component Function Check

INFOID:0000000001547070

SYMPTOM: Magnet clutch does not engage.

INSPECTION FLOW

1. CONFIRM SYMPTOM BY PERFORMING OPERATIONAL CHECK - MAGNET CLUTCH

1. Turn ignition switch ON.
2. Turn blower control dial to the desired (1 to 4 speed) position.
3. Press the A/C switch. A/C indicator will turn on.
4. Confirm that the compressor clutch engages (sound or visual inspection).

Can the symptom be duplicated?

YES >> GO TO 3.
NO >> GO TO 2.

2. CHECK FOR ANY SYMPTOMS

Perform a complete operational check for any symptoms. Refer to HAC-6, "Operational Check".

Does another symptom exist?

YES >> Refer to HAC-5, "How to Perform Trouble Diagnosis For Quick and Accurate Repair".
NO >> System OK.

3. CHECK FOR SERVICE BULLETINS

Check for any service bulletins.

>> GO TO 4.

4. CHECK COMPRESSOR BELT TENSION

Check compressor belt tension. Refer to EM-15, "Checking" (HR16DE) or EM-142, "Checking Drive Belts" (MR18DE) or EM-263, "Inspection and Adjustment" (K9K).

OK or NG

OK >> GO TO 5.
NG >> Adjust or replace A/C compressor belt.

5. CHECK REFRIGERANT PRESSURE

Check refrigerant pressure with manifold gauge connected. Refer to HAC-73, "Component Function Check".

OK or NG

OK >> GO TO 6.

NG >> Perform trouble diagnosis for unusual pressure. Refer to HAC-77, "Trouble Diagnoses for Unusual Pressure".

6.CHECK MAGNET CLUTCH CIRCUIT

Perform diagnostic procedure for the magnetic clutch. Refer to "DIAGNOSTIC PROCEDURE FOR MAGNET CLUTCH".

OK or NG

OK >> If the symptom still exists, perform a complete operational check. Refer to HAC-6, "Operational Check". If other symptoms exist, refer to HAC-5, "How to Perform Trouble Diagnosis For Quick and Accurate Repair".

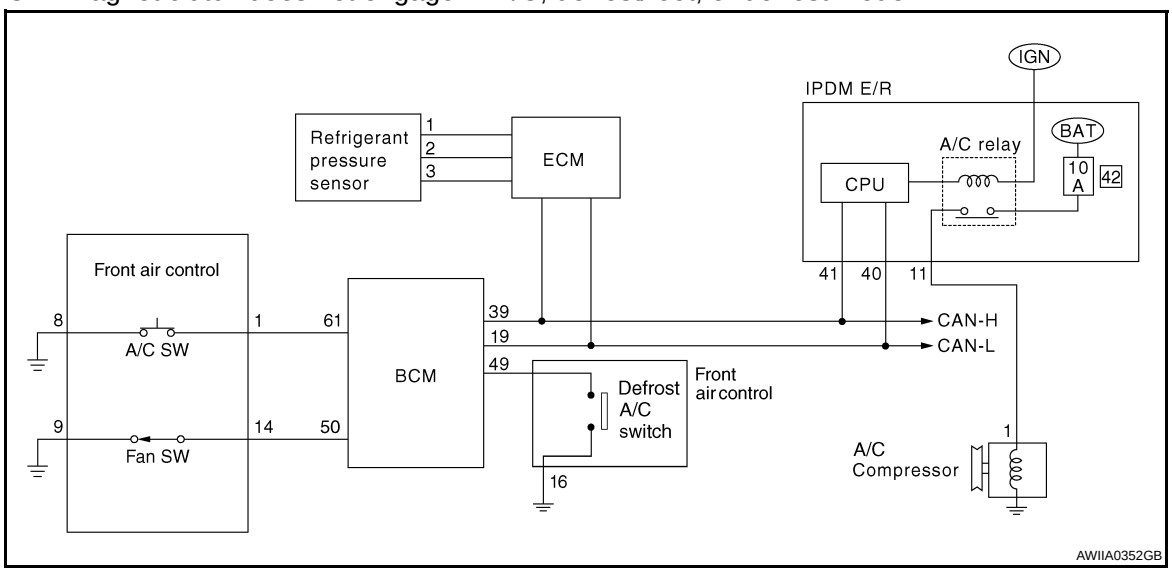
NG >> Repair as necessary.

Magnet Clutch Diagnosis Procedure

INFOID:0000000001547071

DIAGNOSTIC PROCEDURE FOR MAGNET CLUTCH

SYMPTOM: Magnet clutch does not engage in A/C, defrost/foot, or defrost mode.



1.PERFORM AUTO ACTIVE TEST

Refer to XX.

Does the magnet clutch operate?

YES >> GO TO 5.

NO >> Check 10A fuse (No. 42, located in the IPDM E/R).
- If fuse is OK, GO TO 2.
- If fuse is NG, replace fuse and check harness for short circuit. Repair or replace if necessary.

2.CHECK POWER SUPPLY FOR IPDM E/R

Check power supply to 10A fuse (No. 42 located in the IPDM E/R).

:Battery voltage should exist

OK or NG

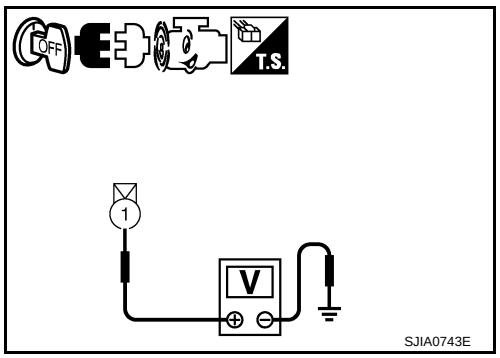
OK >> GO TO 3.

NG >> Check harness for open circuit. Repair or replace if necessary.

3.CHECK POWER SUPPLY FOR A/C COMPRESSOR

1. Disconnect A/C compressor connector.
2. Start the engine.
3. Turn blower control dial and A/C switch ON.
4. Check voltage between A/C compressor harness connector F3 terminal 1 and ground.

1 - Ground **:Battery voltage**



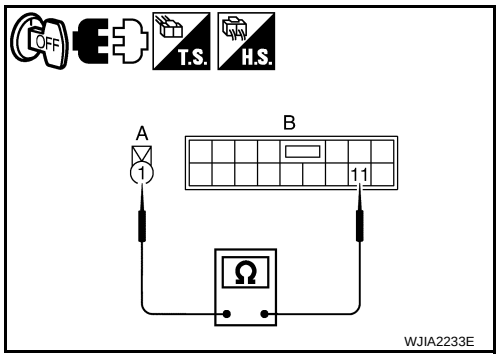
OK or NG

OK >> Replace magnet clutch. Refer to XX.
NG >> GO TO 4.

4. CHECK CIRCUIT CONTINUITY BETWEEN IPDM E/R AND COMPRESSOR

1. Turn ignition switch OFF.
2. Disconnect IPDM E/R connector.
3. Check continuity between A/C compressor harness connector F3 (A) terminal 1 and IPDM E/R harness connector E43 (B) terminal 11.

1 - 11 **:Continuity should exist**



OK or NG

OK >> Replace IPDM E/R. Refer to XX.
NG >> Repair harness or connector.

5. CHECK DEFROST A/C SWITCH

1. Start the engine.
2. Turn the mode control dial to (DEF) position.

Does the magnet clutch operate

OK >> GO TO 6.
NG >> GO TO 19.

6. CHECK BCM INPUT (COMPRESSOR ON) SIGNAL

1. Turn ignition switch OFF.
2. Check compressor ON/OFF signal. Refer to HAC-15, "CONSULT-III Function (BCM)".

A/C SW ON **: AIR COND SW ON**
A/C SW OFF **: AIR COND SW OFF**

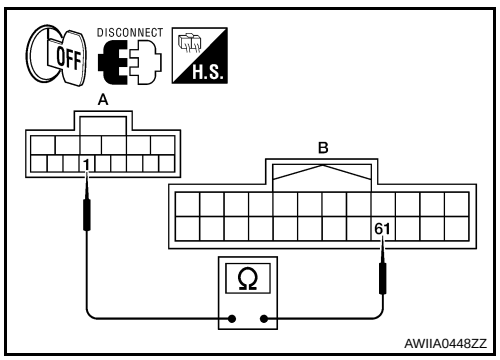
OK or NG

OK >> GO TO 8.
NG >> GO TO 7.

7. CHECK CIRCUIT CONTINUITY BETWEEN FRONT AIR CONTROL AND BCM

1. Turn ignition switch OFF.
2. Disconnect front air control and BCM connector.
3. Check continuity between front air control harness connector M33 (A) terminal 1and BCM harness connector M19 (B) terminal 61.

1 - 61 **:Continuity should exist**



OK or NG

OK >> GO TO 8.
NG >> Repair harness or connector.

8. CHECK REFRIGERANT PRESSURE SENSOR

1. Reconnect front air control connector and BCM connector.

2. Check refrigerant pressure sensor. Refer to EC-326, "Component Function Check" (HR16DE with EURO-OBD), XX-XX, "*****" (HR16DE without EURO-OBD), EC-988, "Component Function Check" (MR18DE) or EC-1166, "Diagnosis Procedure" (K9K).

.OK or NG

OK >> • WITH CONSULT-III
GO TO 9.
• WITHOUT CONSULT-III
GO TO 10.

NG >> Replace as necessary.

9. CHECK BCM INPUT (FAN ON) SIGNAL

Check FAN ON/OFF signal. Refer to XX.

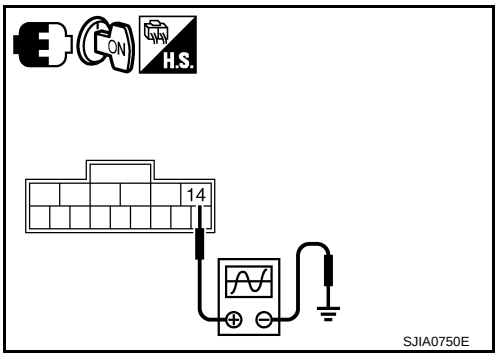
FAN CONTROL DIAL ON : FAN ON SIG ON
FAN CONTROL DIAL OFF : FAN ON SIG OFF

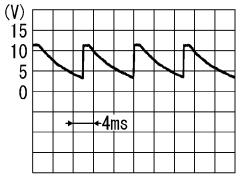
OK or NG

OK >> GO TO 12.
NG >> GO TO 10.

10. CHECK BCM INPUT (FAN ON) SIGNAL

1. Turn ignition switch ON.
2. Turn blower control dial to "1" position.
3. Confirm fan on signal between front air control harness connector M33 terminal 14 and ground using oscilloscope.



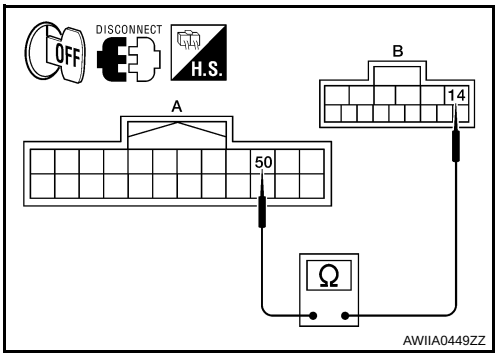
Terminals			Voltage (Approx.)
(+)		(-)	
Connector	Terminal		
Front air control: M33	14	Ground	

OK or NG

OK >> GO TO 12.
NG >> GO TO 11.

11. CHECK CIRCUIT CONTINUITY BETWEEN BCM AND FRONT AIR CONTROL

1. Turn ignition switch OFF.
2. Disconnect front air control connector and BCM connector.
3. Check continuity between BCM harness connector M19 (A) terminal 50 and front air control harness connector M33 (B) terminal 14.



A		B		Continuity
Connector	Terminal	Connector	Terminal	
BCM: M19	50	Front air control: M33	14	Yes

OK or NG

OK >> GO TO 12.
NG >> Repair harness or connector.

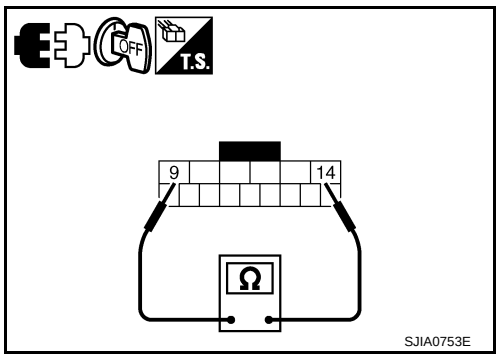
12. CHECK FAN SWITCH CIRCUIT

1. Turn blower control dial to the OFF position.
2. Check continuity between front air control terminals 9 and 14.

9 - 14 :Continuity should exist

OK or NG

OK >> GO TO 13.
NG >> Replace front air control. Refer to XX.



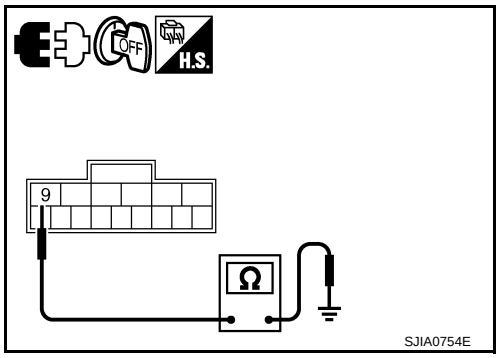
13. CHECK FRONT AIR CONTROL GROUND CIRCUIT

Check continuity between front air control harness connector M33 terminal 9 and ground.

9 - Ground :Continuity should exist

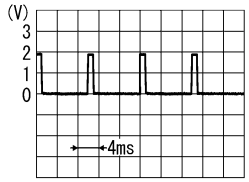
OK or NG

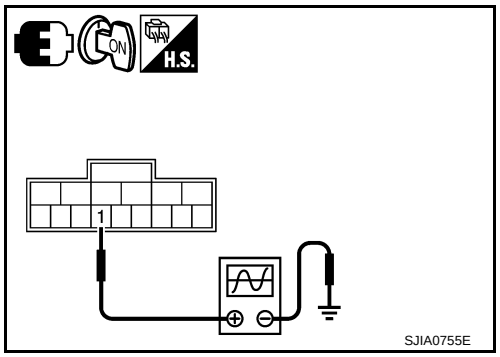
OK >> GO TO 14.
NG >> Repair harness or connector.



14. CHECK BCM INPUT (COMPRESSOR ON) SIGNAL

1. Reconnect BCM connector and front air control connectors.
2. Turn ignition switch ON.
3. Turn blower control dial clockwise to position "1".
4. Confirm compressor on signal between front air control harness connector M33 terminal 1 and ground using oscilloscope.

Terminals			Voltage (Approx.)
(+)		(-)	
Connector	Terminal		
Front air control: M33	1	Ground	

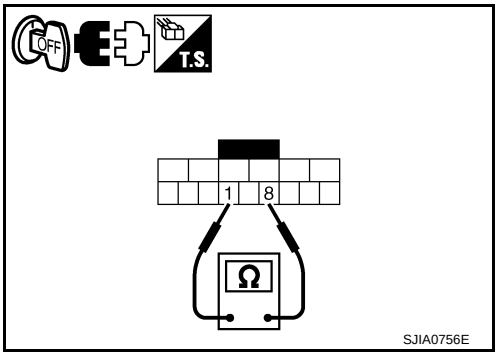


OK or NG

OK >> GO TO 15.
NG >> GO TO 17.

15. CHECK A/C SWITCH CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect front air control connector.
3. While pressing the A/C switch, check continuity between front air control terminals 1 and 8.



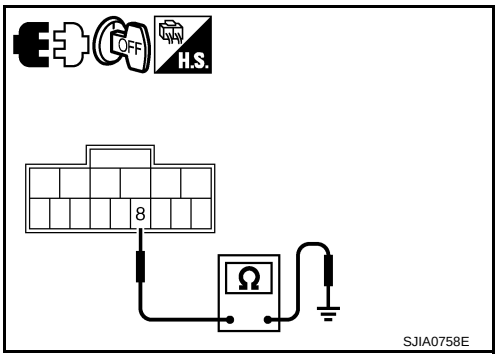
1 - 8 :Continuity should exist

OK or NG

OK >> GO TO 16.
NG >> Replace front air control. Refer to XX.

16. CHECK FRONT AIR CONTROL GROUND CIRCUIT

Check continuity between front air control harness connector M33 terminal 8 and ground.



8 - Ground :Continuity should exist

OK or NG

OK >> GO TO 17.
NG >> Repair harness or connector.

17. CHECK INTAKE SENSOR

Refer to HAC-31, "Intake Sensor Component Inspection".

OK or NG

OK >> GO TO 18.
NG >> Repair or replace as necessary.

18. CHECK CAN COMMUNICATION

Check CAN communication. Refer to LAN-22, "Trouble Diagnosis Flow Chart".

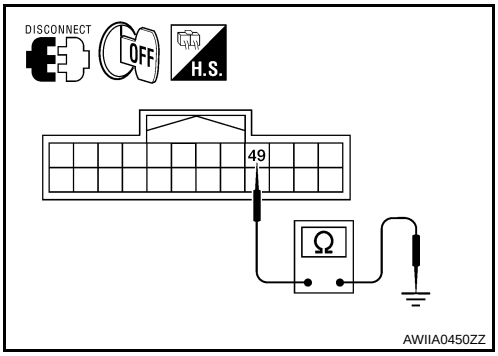
- BCM – ECM
- ECM – IPDM E/R

OK or NG

OK >> Replace BCM. Refer to BCS-57, "Removal and Installation of BCM".
NG >> Repair or replace malfunctioning part(s).

19. CHECK DEFROST A/C SWITCH CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect BCM connector.
3. Press the defrost A/C switch.
   NOTE:
   The defrost A/C switch is located on back side of the front air control.
4. Check continuity between BCM harness connector M19 terminal 49 and ground.



49 - Ground :Continuity should exist

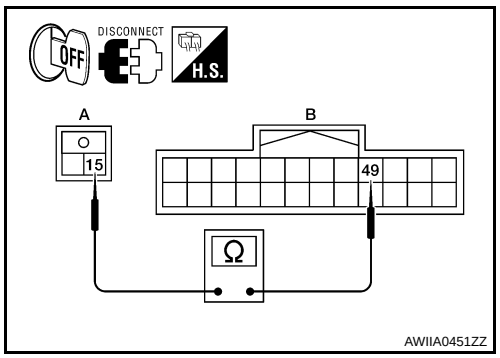
OK or NG

OK >> Replace BCM. Refer to BCS-57, "Removal and Installation of BCM".
NG >> GO TO 20.

20. CHECK CIRCUIT CONTINUITY BETWEEN DEFROST A/C SWITCH AND BCM

1. Disconnect defrost A/C switch connector.
2. Check continuity between BCM harness connector M19 (A) terminal 49 and defrost A/C switch harness connector M49 (B) terminal 15.

49 - 15 :Continuity should exist



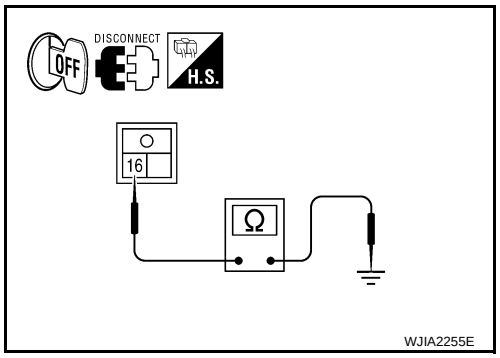
OK or NG

OK >> GO TO 21.
NG >> Repair harness or connector.

21. CHECK CIRCUIT CONTINUITY BETWEEN DEFROST A/C SWITCH AND GROUND

Check continuity between A/C defrost switch harness connector M49 terminal 16 and ground.

16 - Ground :Continuity should exist



OK or NG

OK >> Replace defrost A/C switch.
NG >> Repair harness or connector.

INTAKE SENSOR

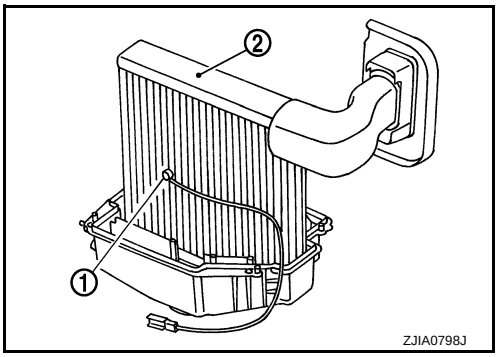
Component Inspection

INFOID:0000000001675415

COMPONENT DESCRIPTION

Intake Sensor

The intake sensor (1) is located on the A/C unit. It converts temperature of air after it passes through the evaporator (2) into a resistance value which is then input to the BCM.

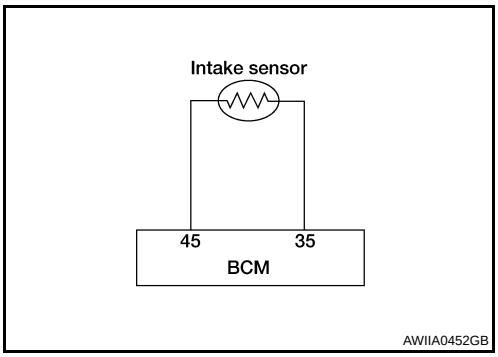


Intake Sensor Diagnosis Procedure

INFOID:0000000001675416

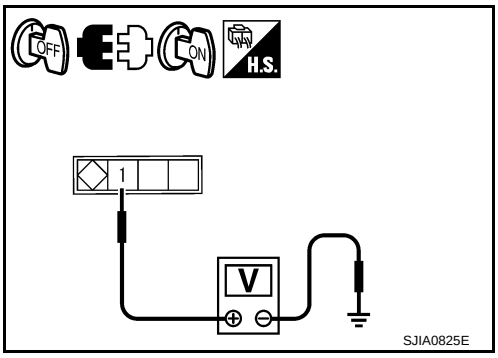
DIAGNOSTIC PROCEDURE FOR INTAKE SENSOR

SYMPTOM: Intake sensor circuit is open or shorted.



1. CHECK VOLTAGE BETWEEN INTAKE SENSOR AND GROUND

1. Turn ignition switch OFF.
2. Disconnect intake sensor connector.
3. Turn ignition switch ON.
4. Check voltage between intake sensor harness connector M42 terminal 1 and ground.



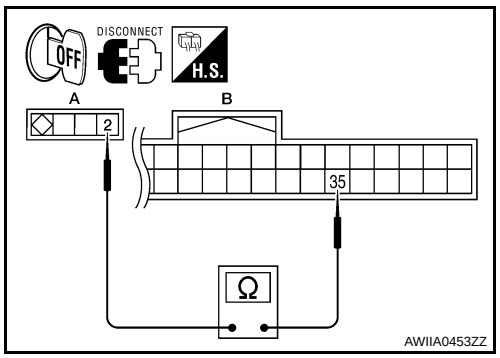
Terminals			Voltage (Approx.)
(+)		(–)	
Connector	Terminal	Ground	
Intake sensor: M42	1		5V

OK or NG

OK >> GO TO 2.
NG >> GO TO 4.

2. CHECK CIRCUIT CONTINUITY BETWEEN INTAKE SENSOR AND BCM

1. Turn ignition switch OFF.
2. Disconnect BCM connector.
3. Check continuity between intake sensor harness connector M42 (A) terminal 2 and BCM harness connector M18 (B) terminal 35.



A		B		Continuity
Connector	Terminal	Connector	Terminal	
Intake sensor: M42	2	BCM: M18	35	Yes

OK or NG

OK >> GO TO 3.
NG >> Repair harness or connector.

3. CHECK INTAKE SENSOR

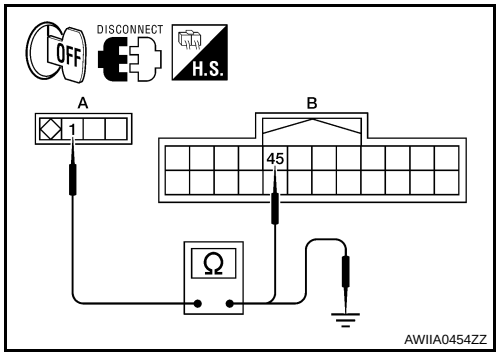
Refer to HAC-31, "Intake Sensor Component Inspection".

OK or NG

OK >> Replace BCM. Refer to BCS-57, "Removal and Installation of BCM".
NG >> Replace intake sensor. Refer to XX.

4. CHECK CIRCUIT CONTINUITY BETWEEN INTAKE SENSOR AND BCM

1. Turn ignition switch OFF.
2. Disconnect BCM connector.
3. Check continuity between intake sensor harness connector M42 (A) terminal 1 and BCM harness connector M19 (B) terminal 45.



A		B		Continuity
Connector	Terminal	Connector	Terminal	
Intake sensor: M42	1	BCM: M19	45	Yes

4. Check continuity between intake sensor harness connector M42 (A) terminal 1 and ground.

A		Ground	Continuity
Connector	Terminal		
Intake sensor: M42	1		No

OK or NG

OK >> Replace BCM. Refer to BCS-57, "Removal and Installation of BCM".
NG >> Repair harness or connector.

Intake Sensor Component Inspection

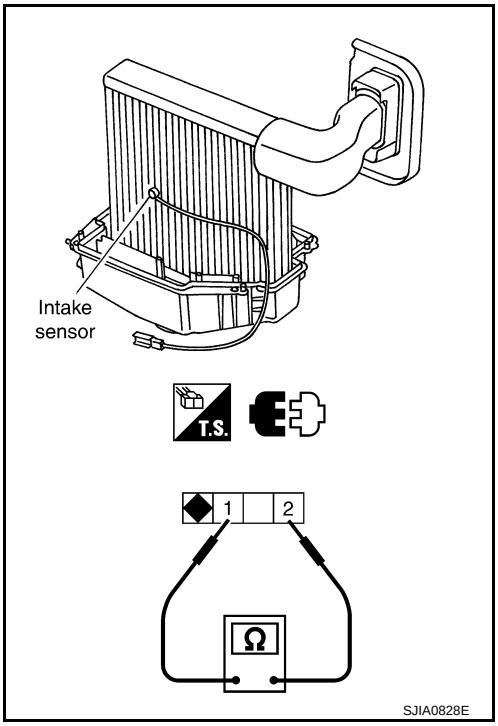
INFOID:0000000001675417

COMPONENT INSPECTION

Intake Sensor

After disconnecting intake sensor connector M42, measure resistance between terminals 1 and 2 at sensor side, using the table below.

Temperature °C (°F)	Resistance kΩ
–15 (5)	12.34
–10 (14)	9.62
–5 (23)	7.56
0 (32)	6.00
5 (41)	4.80
10 (50)	3.87
15 (59)	3.15
20 (68)	2.57
25 (77)	2.12
30 (86)	1.76
35 (95)	1.47
40 (104)	1.23
45 (113)	1.04



If NG, replace intake sensor. Refer to XXXX.

PTC HEATER CONTROL SYSTEM
PTC HEATER (300 WATT)
PTC HEATER (300 WATT) : PTC Heater System Description

INFOID:0000000001674171

SYSTEM DESCRIPTION

The PTC heater system is controlled by ambient temperature, water temperature, FAN ON signal and temperature control dial. Hot air is supplied to a discharge air outlet by PTC heater that generates heat electrically even when engine coolant temperature is low.

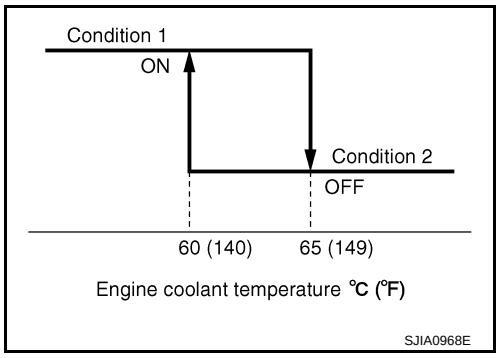
Component Parts

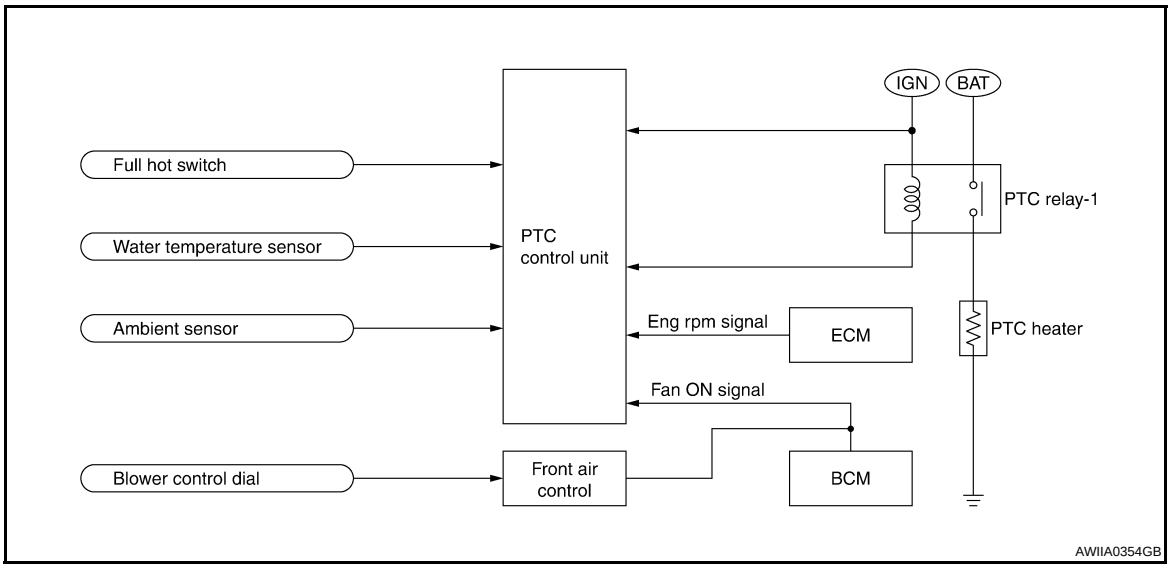
PTC heater system components are:
- PTC control unit
- PTC heater
- PTC relay-1
- Water temperature sensor
- Full hot switch
- Ambient sensor

System Operation

PTC heater system starts when all the following conditions are met:
- Less than 35 minutes after ignition switch ON.
- Blower control dial ON (Blower motor operates.) and temperature control dial full hot position (Full hot switch ON).
- Ambient temperature is lower than 0°C (32°F).
- Engine coolant temperature is lower than 65°C (149°F) (condition 1), or when it becomes lower than 60°C (140°F) again (condition 2) on startup.
- Engine speed is more than 1100 rpm and after a lapse of more than 10 seconds.

PTC heater system stops when any of the following conditions is met:
- More than 35 minutes later after ignition switch ON.
- Blower control dial OFF (Blower motor OFF) and/or temperature control dial except full hot position (Full hot switch OFF).
- Ambient temperature is higher than 0°C (32°F).
- Engine coolant temperature is higher than 65°C (149°F).
- When engine speed becomes less than 800 rpm.





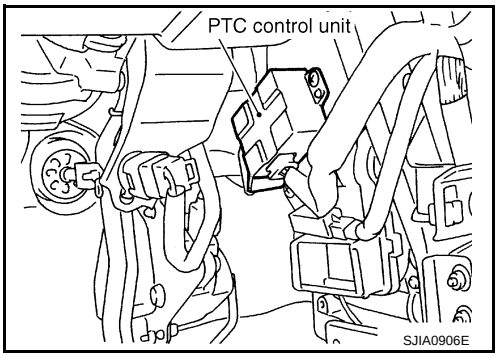
PTC HEATER (300 WATT) : PTC Heater Component Description

INFOID:0000000001674172

COMPONENT DESCRIPTION

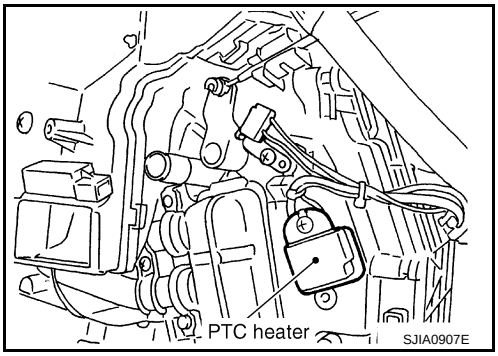
PTC Control Unit

The PTC control unit is attached on the A/C unit assembly. It controls PTC heater by ambient temperature, water temperature, FAN ON signal and temperature control dial.



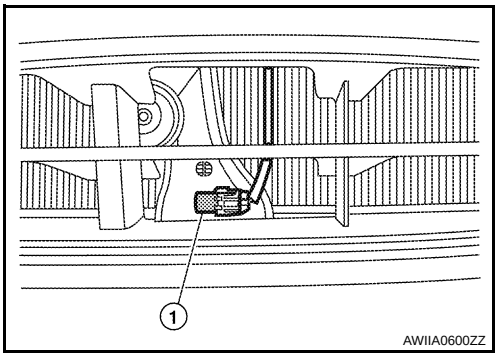
PTC Heater

The PTC heater is attached on the A/C unit assembly. It generates heat electrically.



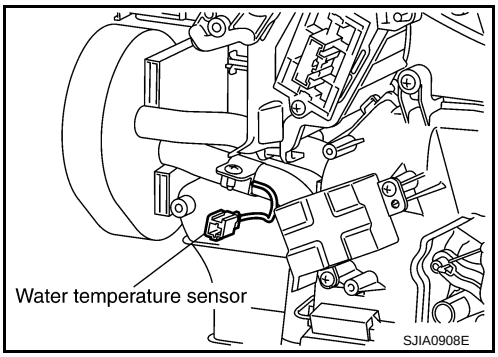
Ambient Sensor

The ambient sensor is attached on the radiator core support upper. It detects ambient temperature and converts it into a resistance value which is then input into the PTC control unit.



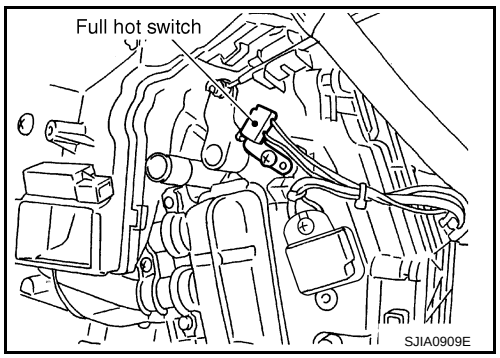
Water Temperature Sensor

The water temperature sensor is attached on heater pipe. It detects water temperature and converts it into a resistance value which is then input in to PTC control unit.



Full Hot Switch

The full hot switch is attached on the A/C unit assembly. When the temperature control dial at full hot position, and then full hot switch turned ON.



PTC HEATER (300 WATT) : PTC Heater (300 Watt) Diagnosis Procedure

INFOID:0000000001674173

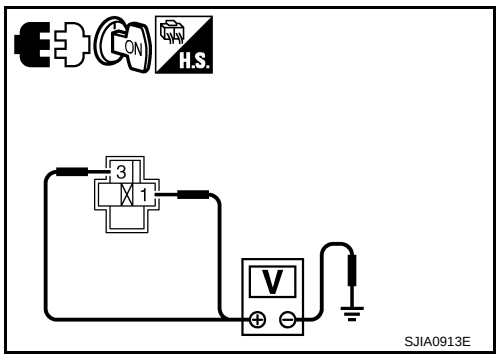
DIAGNOSTIC PROCEDURE FOR PTC SYSTEM

SYMPTOM: PTC heater system operation is malfunction.

1.CHECK POWER SUPPLY FOR PTC RELAY-1

1. Turn ignition switch ON.
2. Check voltage between PTC relay-1 harness connector E61 terminals 2, 3, and ground.

Terminals			Voltage (Approx.)
(+)		(–)	
Connector	Terminal		
PTC relay-1: E61	2	Ground	Battery voltage
	3		



Is the inspection result normal

YES >> GO TO 2.

NO >> Check power supply circuit and 10A fuse and 40A fusible link (No. 2 and I, located in the fuse block). Refer to XX.
- If fuses are OK, check harness for open circuit. Repair or replace if necessary.
- If fuses are NG, replace fuse and check harness for short circuit. Repair or replace if necessary.

2.CHECK PTC RELAY-1

1. Turn ignition switch OFF.
2. Check PTC relay-1. Refer to HAC-41, "PTC HEATER (300 WATT) : PTC Heater (300 Watt) Component Inspection".

Is the inspection result normal

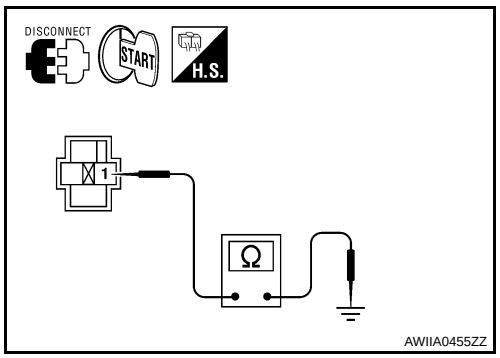
YES >> GO TO 3.

NO >> Replace PTC relay-1. Refer to XX.

3.CHECK PTC RELAY-1 OUTPUT CIRCUIT

1. Disconnect ambient sensor, PTC heater and water temperature sensor connectors.
2. Turn temperature control dial clockwise until full hot position.
3. Turn mode control dial to foot position.
4. Start the engine.
5. Turn blower control dial to maximum speed.
6. Check resistance between PTC relay-1 harness connector E61 terminal 1 and ground.

Connector	Terminal	Ground	Continuity
PTC relay-1: E61	1		Yes



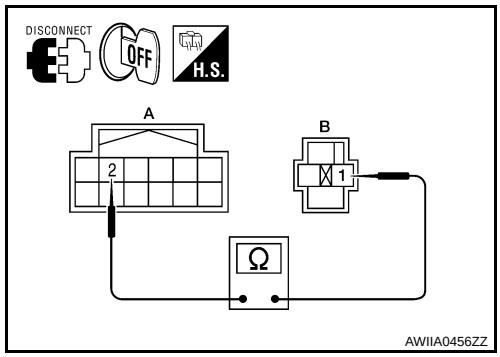
Is the inspection result normal

YES >> GO TO 5.

NO >> GO TO 4.

4. CHECK CIRCUIT CONTINUITY BETWEEN PTC RELAY-1 AND PTC CONTROL UNIT

1. Turn ignition switch OFF.
2. Disconnect PTC control unit connector.
3. Check continuity between PTC control unit harness connector M84 (A) terminal 2 and PTC relay-1 harness connector E61 (B) terminal 1.



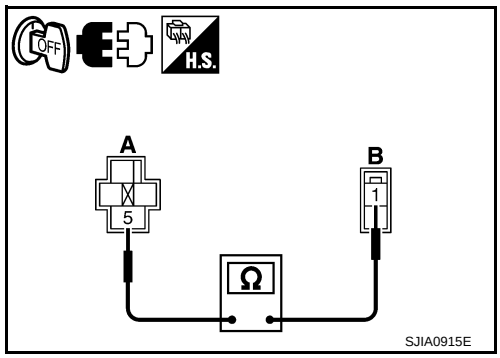
A		B		Continuity
Connector	Terminal	Connector	Terminal	
PTC control unit: M84	2	PTC relay-1: E61	1	Yes

Is the inspection result normal

YES >> GO TO 5.
NO >> GO TO 7.

5. CHECK CIRCUIT CONTINUITY BETWEEN PTC RELAY-1 AND PTC HEATER

1. Disconnect PTC heater connector.
2. Check continuity between PTC relay-1 harness connector E61 (A) terminal 5 and PTC heater harness connector M66 (B) terminal 1.



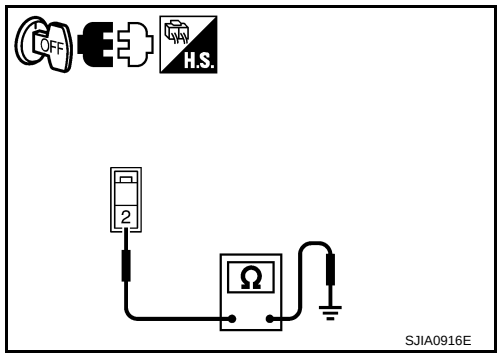
A		B		Continuity
Connector	Terminal	Connector	Terminal	
PTC relay-1: E61	5	PTC heater: M66	1	Yes

Is the inspection result normal

YES >> GO TO 6.
NO >> Repair harness or connector.

6. CHECK PTC HEATER GROUND CIRCUIT

Check continuity between PTC heater harness connector M66 terminal 2 and ground.



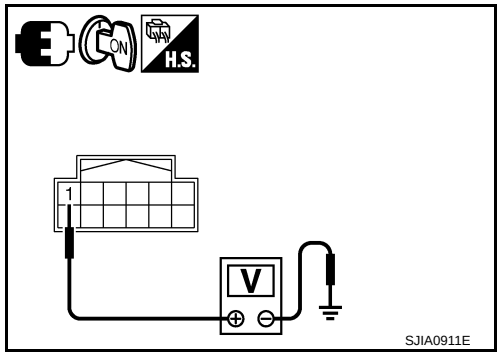
Connector	Terminal	Ground	Continuity
PTC heater: M66	2		Yes

Is the inspection result normal

YES >> Replace PTC heater. Refer to XX.
NO >> Repair harness or connector.

7. CHECK POWER SUPPLY VOLTAGE FOR PTC CONTROL UNIT

1. Turn ignition switch ON.
2. Check voltage between PTC control unit harness connector M84 terminal 1 and ground.



Terminals			Voltage (Approx.)
(+)		(–)	
Connector	Terminal	Ground	Battery voltage
PTC control unit: M84	1		

Is the inspection result normal

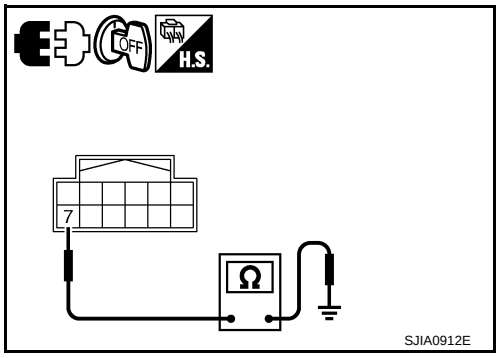
YES >> GO TO 8.

NO >> Repair harness or connector.

8. CHECK GROUND CIRCUIT FOR PTC CONTROL UNIT

1. Turn ignition switch OFF.
2. Check continuity between PTC control unit harness connector M84 terminal 7 and ground.

Connector	Terminal	Ground	Continuity
PTC control unit: M84	7		Yes



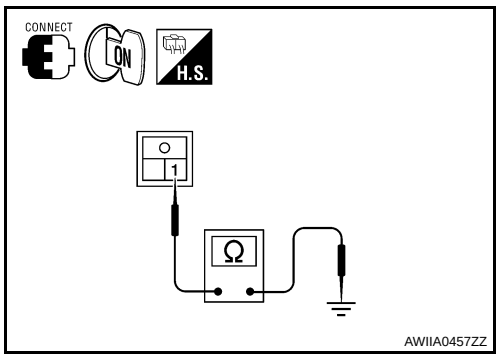
Is the inspection result normal

YES >> GO TO 9.
NO >> Repair harness or connector.

9. CHECK FULL HOT CIRCUIT BETWEEN PTC CONTROL UNIT AND GROUND

1. Reconnect PTC control unit and PTC relay-1 connector.
2. Turn ignition switch ON.
3. Check voltage between full hot switch harness connector M65 terminal 1 and ground.

Terminals			Condition	Voltage (Approx.)
(+)		(–)		
Connector	Terminal			
PTC control unit: M65	1	Ground	Temperature control dial: Full hot position.	0V
			Temperature control dial: Except full hot position.	5V



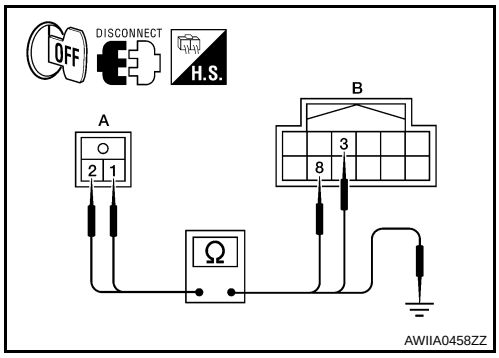
Is the inspection result normal

YES >> GO TO 12.
NO >> GO TO 10.

10. CHECK CIRCUIT CONTINUITY BETWEEN FULL HOT SWITCH AND PTC CONTROL UNIT

1. Turn ignition switch OFF.
2. Disconnect full hot switch and PTC control unit connector.
3. Check continuity between full hot switch harness connector M65 (A) terminal 1, 2 and PTC control unit harness connector M84 (B) terminal 3, 8.

A		B		Continuity
Connector	Terminal	Connector	Terminal	
Full hot switch: M65	1	PTC control unit: M84	3	Yes
	2		8	



4. Check continuity between full hot switch harness connector M65 (A) terminal 1, 2 and ground.

(+)		(-)	Continuity
Connector	Terminal		
Full hot switch: M65	1	Ground	Yes
	2		

Is the inspection result normal

YES >> GO TO 11.
NO >> Repair harness or connector.

11. CHECK FULL HOT SWITCH

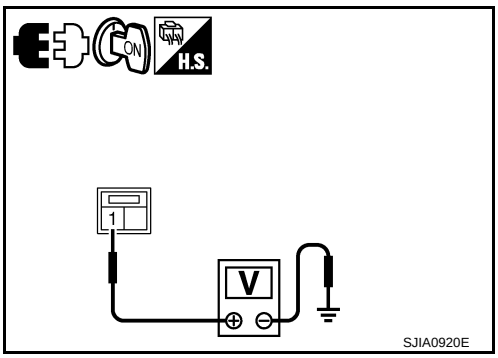
Check full hot switch. Refer to HAC-41, "PTC HEATER (300 WATT) : PTC Heater (300 Watt) Component Inspection".

Is the inspection result normal

YES >> Replace the PTC control unit. Refer to XX.
NO >> Replace full hot switch. Refer to XX.

12. CHECK VOLTAGE BETWEEN WATER TEMPERATURE SENSOR AND GROUND

Check voltage between water temperature sensor harness connector M64 terminal 1 and ground.



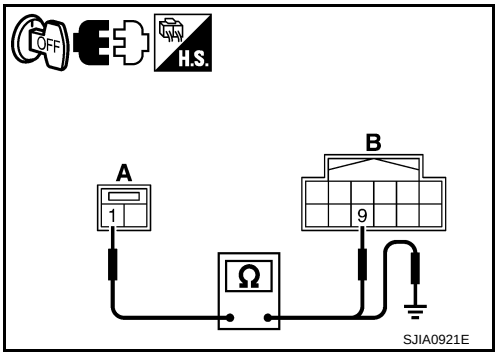
Terminals			Voltage (Approx.)
(+)		(–)	
Connector	Terminal	Ground	5V
Water temperature sensor: M64	1		

Is the inspection result normal

YES >> GO TO 14.
NO >> GO TO 13.

13. CHECK CIRCUIT CONTINUITY BETWEEN WATER TEMPERATURE SENSOR AND PTC CONTROL UNIT

1. Turn ignition switch OFF.
2. Disconnect PTC control unit.
3. Check continuity between water temperature sensor harness connector M64 (A) terminal 1 and PTC control unit harness connector M84 (B) terminal 9.



A		B		Continuity
Connector	Terminal	Connector	Terminal	
Water temperature sensor: M64	1	PTC control unit: M84	9	Yes

4. Check continuity between water temperature sensor harness connector M64 (A) terminal 1 and ground.

A			Continuity
Connector	Terminal		
Water temperature sensor: M64	1	Ground	No

Is the inspection result normal

YES >> Replace PTC control unit. Refer to XX.
NO >> Repair harness or connector.

14. CHECK WATER TEMPERATURE SENSOR

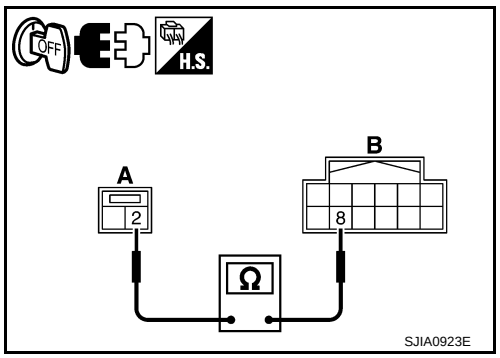
Refer to HAC-41, "PTC HEATER (300 WATT) : PTC Heater (300 Watt) Component Inspection".

Is the inspection result normal

YES >> GO TO 15.
NO >> Replace water temperature sensor. Refer to XX.

15. CHECK CIRCUIT CONTINUITY BETWEEN WATER TEMPERATURE SENSOR AND PTC CONTROL UNIT

Check continuity between water temperature sensor harness connector M64 (A) terminal 2 and PTC control unit harness connector M84 (B) terminal 8.



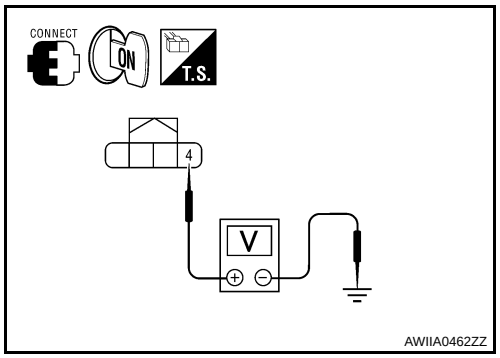
A		B		Continuity
Connector	Terminal	Connector	Terminal	
Water temperature sensor: M64	2	PTC control unit: M84	8	Yes

Is the inspection result normal

YES >> GO TO 16.
NO >> Repair harness or connector.

16. CHECK VOLTAGE BETWEEN AMBIENT TEMPERATURE SENSOR AND GROUND

1. Reconnect PTC control unit connector.
2. Turn ignition switch ON.
3. Check voltage between ambient temperature sensor harness connector M60 terminal 4 and ground.



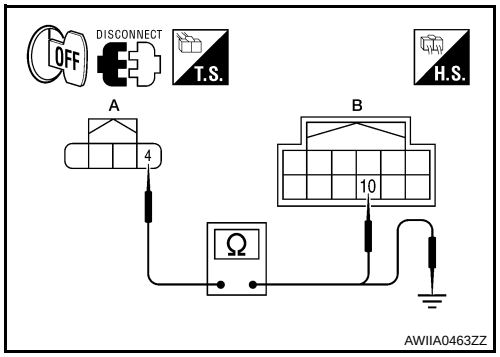
Terminals			Voltage (Approx.)
(+)		(–)	
Connector	Terminal		
Ambient temperature sensor: M60	4	Ground	5V

Is the inspection result normal

YES >> GO TO 18.
NO >> GO TO 17.

17. CHECK CIRCUIT CONTINUITY BETWEEN AMBIENT TEMPERATURE SENSOR AND PTC CONTROL UNIT

1. Turn ignition switch OFF.
2. Check continuity between ambient temperature sensor harness connector M60 (A) terminal 4 and PTC control unit harness connector M84 (B) terminal 10.



A		B		Continuity
Connector	Terminal	Connector	Terminal	
Ambient temperature sensor: E60	4	PTC control unit: M84	10	Yes

3. Check continuity between ambient temperature sensor harness connector E60 (A) terminal 4 and ground.

A		Ground	Continuity
Connector	Terminal		
Ambient temperature sensor: E60	4		No

Is the inspection result normal

YES >> Replace PTC control unit. Refer to XXXX.
NO >> Repair harness or connector.

18. CHECK AMBIENT TEMPERATURE SENSOR

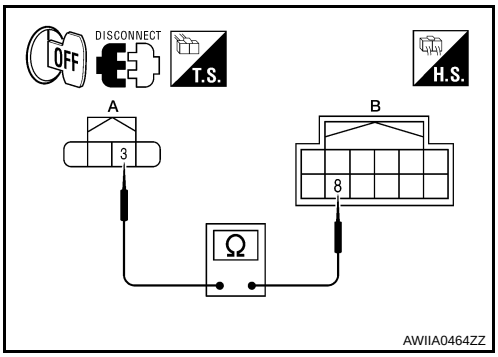
Refer to HAC-245, "Ambient Sensor Component Inspection".

Is the inspection result normal

YES >> GO TO 19.
NO >> Replace ambient temperature sensor. Refer to XX.

19. CHECK CIRCUIT CONTINUITY BETWEEN AMBIENT TEMPERATURE SENSOR AND PTC CONTROL UNIT

Check continuity between ambient temperature sensor harness connector M60 (A) terminal 3 and PTC control unit harness connector M84 (B) terminal 8.



A		B		Continuity
Connector	Terminal	Connector	Terminal	
Ambient temperature sensor: M64	3	PTC control unit: M84	8	Yes

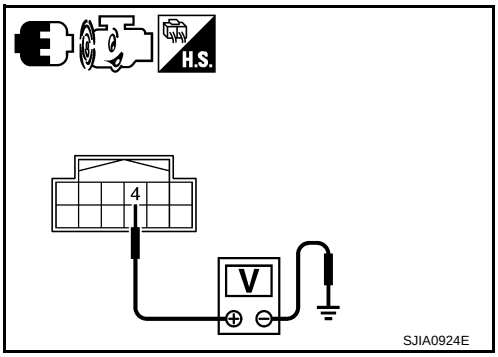
Is the inspection result normal

YES >> 1. If equipped with manual transmission, GO TO 20.
2. If equipped with automatic transmission, GO TO 22.

NO >> Repair harness or connector.

20. CHECK ENGINE RPM SIGNAL (MANUAL TRANSMISSION)

1. Reconnect PTC control unit.
2. Start the engine.
3. Check voltage between PTC control unit harness connector M84 terminal 4 and ground.



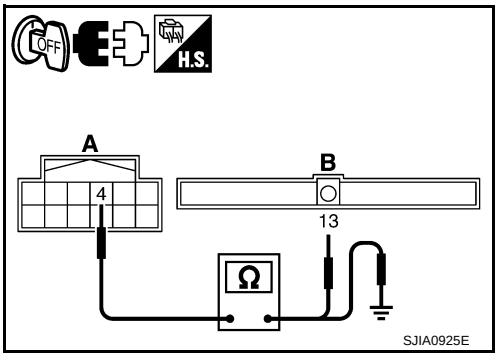
Terminals			Voltage (Approx.)
(+)		(–)	
Connector	Terminal	Ground	
PTC control unit: M84	4		4.2V

Is the inspection result normal

YES >> GO TO 22.
NO >> GO TO 21.

21. CHECK CONTINUITY OF ENGINE RPM CIRCUIT BETWEEN FRONT AIR CONNTROL AND PTC CONTROL UNIT (MANUAL TRANSMISSION)

1. Turn ignition switch OFF.
2. Disconnect ECM and PTC control unit connector.
3. Check continuity between PTC control unit harness connector M84 (A) terminal 4 and ECM harness connector F10 (B) terminal 13.



A		B		Continuity
Connector	Terminal	Connector	Terminal	
PTC control unit: M84	4	ECM: F10	13	Yes

4. Check continuity between PTC control unit harness connector M84 (A) terminal 4 and ground.

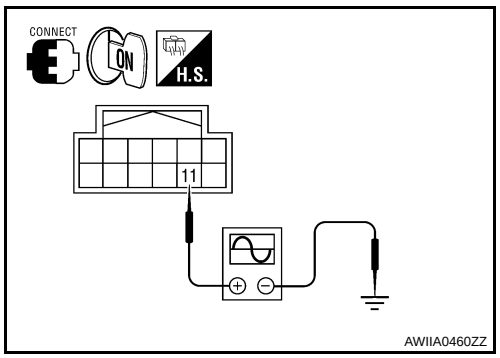
A		Ground	Continuity
Connector	Terminal		
PTC control unit: M84	4		No

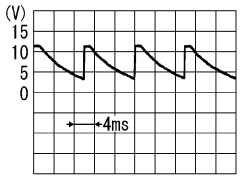
Is the inspection result normal

YES >> Replace ECM. Refer to XX.
NO >> Repair harness or connector.

22. CHECK BCM INPUT (FAN ON) SIGNAL

1. Turn blower control dial to "1" position.
2. Confirm fan on signal between PTC control unit harness connector M84 terminal 11 and ground using oscilloscope.



Terminals			Voltage (Approx.)
(+)		(-)	
Connector	Terminal		
PTC control unit: M84	11	Ground	

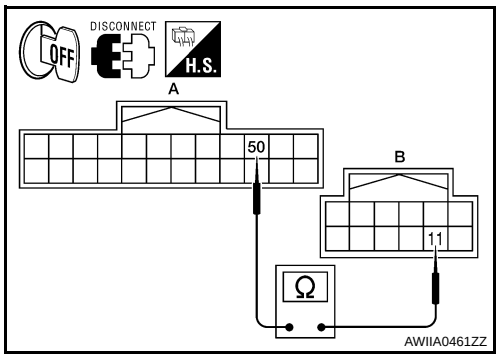
ZJIA0583J

Is the inspection result normal

YES >> Replace PTC control unit.
NO >> GO TO 23.

23. CHECK CIRCUIT CONTINUITY BETWEEN BCM AND PTC CONTROL UNIT

1. Turn ignition switch OFF.
2. Disconnect BCM connector and PTC control unit connector.
3. Check continuity between BCM harness connector M19 (A) terminal 50 and PTC control unit harness connector M84 (B) terminal 11.



A		B		Continuity
Connector	Terminal	Connector	Terminal	
BCM: M19	50	PTC control unit: M84	11	Yes

4. Check continuity between PTC control unit harness connector M84 (A) terminal 11 and ground.

A		Ground	Continuity
Connector	Terminal		
PTC control unit: M84	11		No

Is the inspection result normal

YES >> Replace BCM. Refer to XX.
NO >> Repair harness or connector.

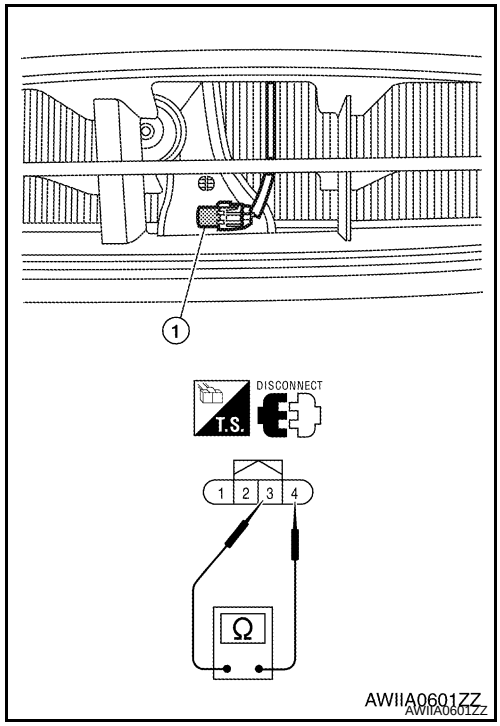
PTC HEATER (300 WATT) : PTC Heater (300 Watt) Component Inspection

INFOID:0000000001674174

COMPONENT INSPECTION

Ambient Sensor

After disconnecting ambient sensor connector E60, measure resistance between terminals 3 and 4 at sensor side, using the table below.

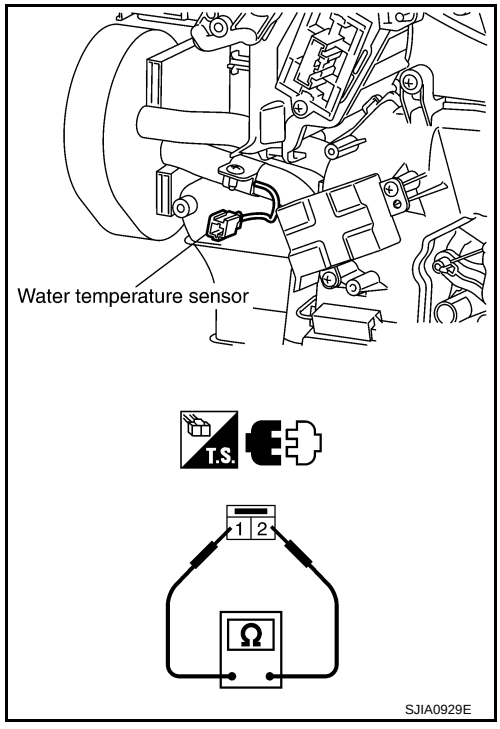


Temperature °C (°F)	Resistance kΩ
–15 (5)	12.73
–10 (14)	9.92
–5 (23)	7.80
0 (32)	6.19
5 (41)	4.95
10 (50)	3.99
15 (59)	3.24
20 (68)	2.65
25 (77)	2.19
30 (86)	1.81
35 (95)	1.51
40 (104)	1.27
45 (113)	1.07

If NG, replace ambient sensor. Refer to XX.

Water Temperature Sensor

After disconnecting water temperature sensor connector M64, measure resistance between terminals 1 and 2 at sensor side, using the table below.



Temperature °C (°F)	Resistance kΩ
–20 (–4)	31.62
–10 (14)	17.47
0 (32)	10.09
10 (50)	6.05
20 (68)	3.76
30 (86)	2.41
40 (104)	1.59
50 (122)	1.08
60 (140)	0.75
70 (158)	0.53
80 (176)	0.38
90 (194)	0.28
100 (212)	0.21

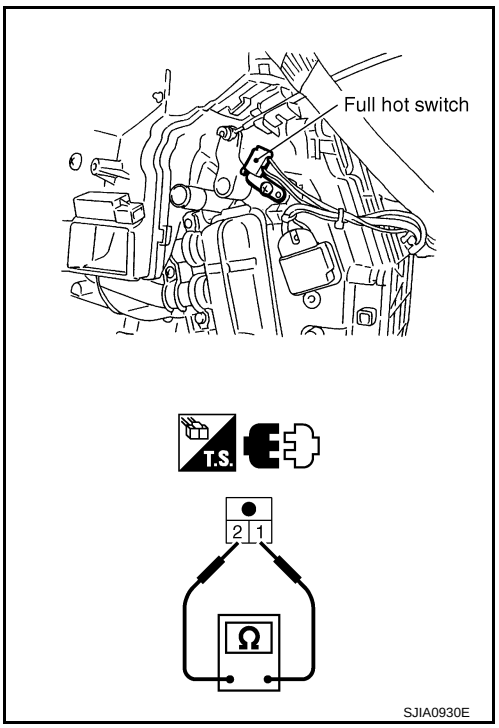
If NG, replace water temperature sensor. Refer to XX.

Full Hot Switch

After disconnecting full hot switch connector M65, check continuity between terminals 1 and 2 at switch side.

Connector	Terminals		Condition	Continuity
Full hot switch: M65	1	2	Temperature control dial: Full hot position	Yes
			Temperature control dial: Except full hot position	No

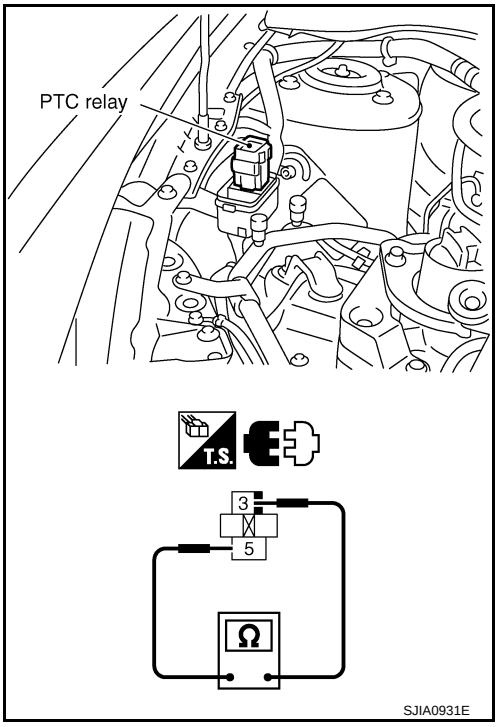
If NG, replace full hot switch. Refer to XX.



PTC relay-1
Check continuity between terminal Nos. 3 and 5.

Condition	Continuity
12V direct current supply between terminal Nos. 1 and 2	Yes
No current supply	No

If NG, replace PTC relay-1. Refer to XX.



PTC HEATER (1500 WATT)

PTC HEATER (1500 WATT) : System Description

INFOID:0000000001682730

SYSTEM DESCRIPTION

The PTC heater system is controlled by ambient temperature, water temperature, FAN ON signal. Hot air is supplied to a discharge air outlet by PTC heater that generates heat electrically even when engine coolant temperature is low.

Component Parts

PTC heater system components are:
- PTC control unit

- PTC heater
- PTC relays
- Ambient sensor
- Blower relay

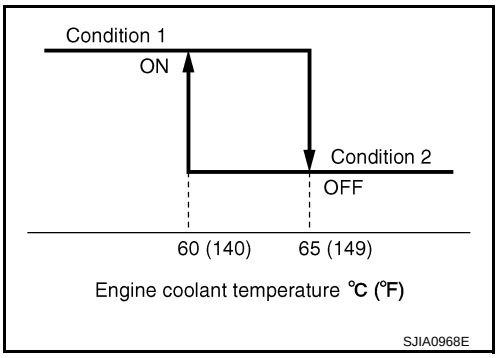
System Operation

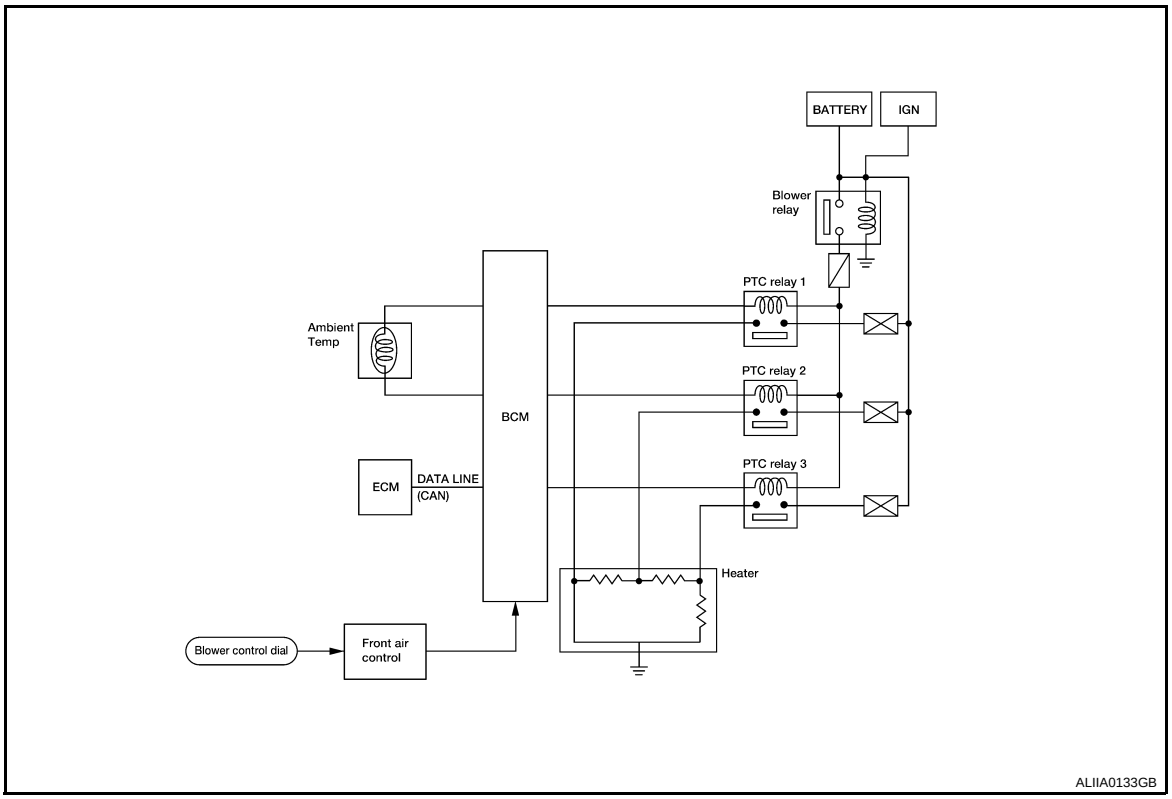
PTC heater system starts when all the following conditions are met:

- Less than 35 minutes after ignition switch ON.
- Blower control dial ON (Blower motor operates.)
- Ambient temperature is lower than 0°C (32°F).
- Engine coolant temperature is lower than 65°C (149°F) (condition 1), or when it becomes lower than 60°C (140°F) again (condition 2) on startup.
- Engine speed is more than 1100 rpm and after a lapse of more than 10 seconds.

PTC heater system stops when any of the following conditions is met:

- More than 35 minutes later after ignition switch ON.
- Fan control dial OFF (Blower motor OFF).
- Ambient temperature is higher than 0°C (32°F).
- Engine coolant temperature is higher than 65°C (149°F).
- When engine speed becomes less than 800 rpm.





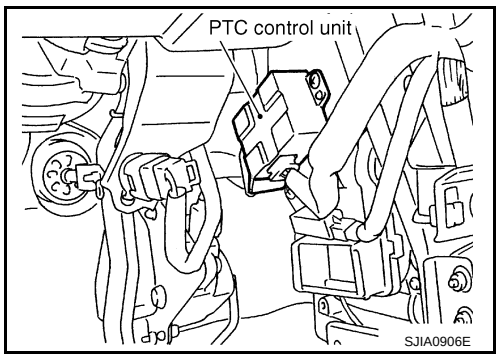
PTC HEATER (1500 WATT) : Component Description

INFOID:0000000001682731

COMPONENT DESCRIPTION

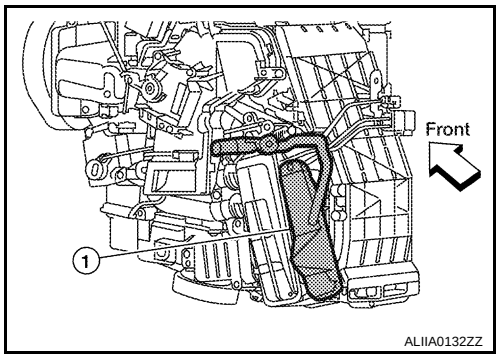
PTC Control Unit

The PTC control unit is attached on the A/C unit assembly. It controls PTC heater by ambient temperature, and FAN ON signal.



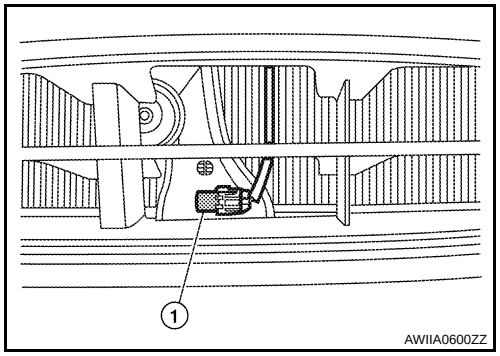
PTC Heater

The PTC heater is attached on the A/C unit assembly. It generates heat electrically.



Ambient Sensor

The ambient sensor is attached on the radiator core support upper. It detects ambient temperature and converts it into a resistance value which is then input into the PTC control unit.



PTC HEATER (1500 WATT) : PTC Heater (1500 Watt) Diagnosis Procedure

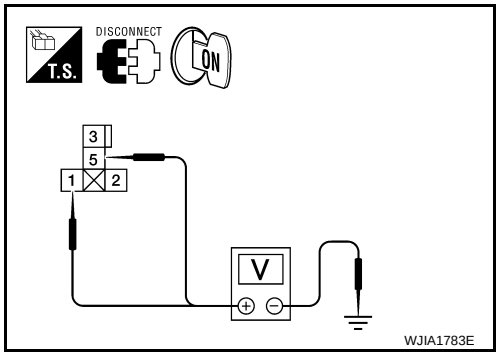
INFOID:0000000001682732

DIAGNOSTIC PROCEDURE FOR PTC SYSTEM

SYMPTOM: PTC heater system operation is malfunction.

1.CHECK POWER SUPPLY FOR BLOWER RELAY

1. Turn ignition switch ON.
2. Disconnect blower relay.
3. Check voltage between blower relay harness connector J-1 terminals 1, 5, and ground.



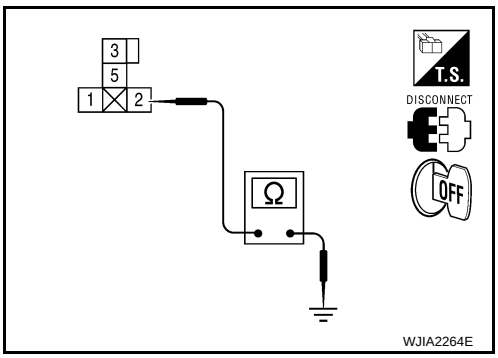
Terminals			Voltage (Approx.)
(+)		(–)	
Connector	Terminal		
Blower relay: J-1	1	Ground	Battery voltage
	5		

Is the inspection result normal

YES >> GO TO 2.
NO >> Repair harness or connector.

2.CHECK BLOWER RELAY GROUND CIRCUIT

1. Turn ignition switch OFF.
2. Check continuity between blower relay harness connector J-1 terminal 2 and ground.



Connector	Terminal	Ground	Continuity
Blower relay: J-1	2		Yes

Is the inspection result normal

YES >> GO TO 3.
NO >> Repair harness or connector.

3.CHECK BLOWER RELAY

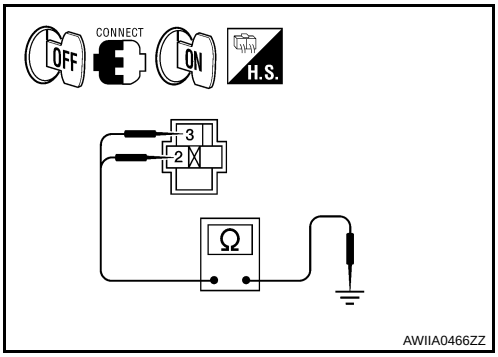
1. Turn ignition switch OFF.
2. Check blower relay. Refer to XX-XX, "*****".

Is the inspection result normal

YES >> GO TO 4.
NO >> Replace blower relay.

4.CHECK POWER SUPPLY FOR PTC RELAY-1

1. Turn ignition switch OFF.
2. Reconnect blower relay.
3. Turn ignition switch ON.
4. Check voltage between PTC relay-1 harness connector E61 terminals 2, 3, and ground.



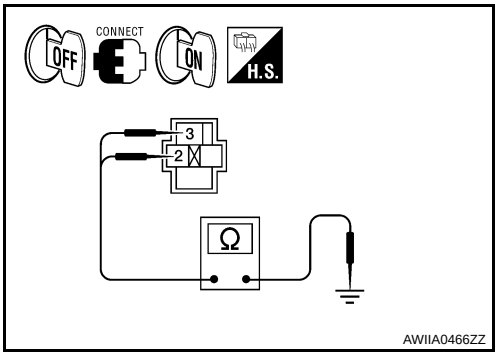
Terminals			Voltage (Approx.)
(+)		(–)	
Connector	Terminal		
PTC relay-2: E61	2	Ground	Battery voltage
	3		

Is the inspection result normal

YES >> GO TO 5.
NO >> Check power supply circuit and 10A and 40A fuse (No. 16 and I, located in the fuse block). Refer to XX.
- If fuses are OK, check harness for open circuit. Repair or replace if necessary.
- If fuses are NG, replace fuse and check harness for short circuit. Repair or replace if necessary.

5.CHECK POWER SUPPLY FOR PTC RELAY-2

Check voltage between PTC relay-2 harness connector E62 terminals 2, 3, and ground.



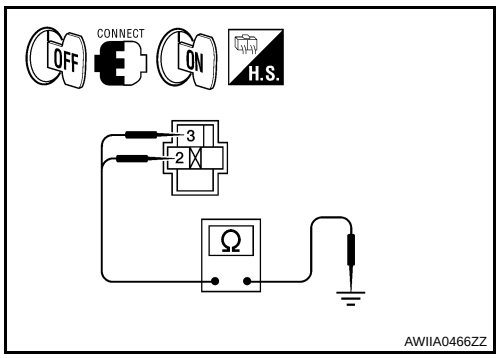
Terminals			Voltage (Approx.)
(+)		(–)	
Connector	Terminal		
PTC relay-2: E62	2	Ground	Battery voltage
	3		

Is the inspection result normal

YES >> GO TO 6.
NO >> Check power supply circuit and 80A fuse (N, located in the fuse block). Refer to XX.
- If fuses are OK, check harness for open circuit. Repair or replace if necessary.
- If fuses are NG, replace fuse and check harness for short circuit. Repair or replace if necessary.

6.CHECK POWER SUPPLY FOR PTC RELAY-3

Check voltage between PTC relay-3 harness connector E61 terminals 2, 3, and ground.



Terminals			Voltage (Approx.)
(+)		(–)	
Connector	Terminal		
PTC relay-3: E63	2	Ground	Battery voltage
	3		

Is the inspection result normal

YES >> GO TO 5.
NO >> Check power supply circuit and 80A fuse (P, located in the fuse block). Refer to XX-XX.
- If fuses are OK, check harness for open circuit. Repair or replace if necessary.
- If fuses are NG, replace fuse and check harness for short circuit. Repair or replace if necessary.

7.CHECK PTC RELAYS

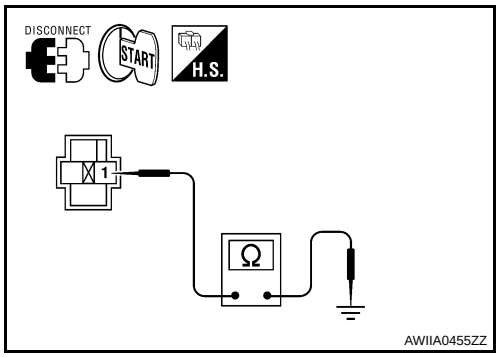
1. Turn ignition switch OFF.
2. Check PTC relay. Refer to XX-XX, "*****".

Is the inspection result normal

YES >> GO TO 6.
NO >> Replace inoperative PTC relay.

8.CHECK PTC RELAY-1 GROUND CIRCUIT

1. Disconnect ambient sensor, and PTC heater connectors.
2. Turn temperature control dial clockwise until full hot position.
3. Turn mode control dial to foot position.
4. Start the engine (1,000 RPM minimum).
5. Turn blower control dial to low speed.
6. Check continuity between PTC relay-1 harness connector E61 terminal 1 and ground.



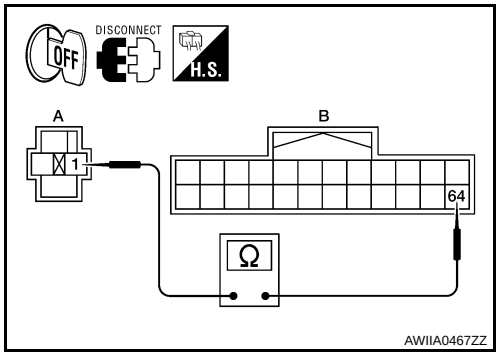
Connector	Terminal	Ground	Continuity
PTC relay-1: E61	1		Yes

Is the inspection result normal

YES >> GO TO 10.
NO >> GO TO 9.

9.CHECK CIRCUIT CONTINUITY BETWEEN PTC RELAY-1 AND BCM

1. Turn ignition switch OFF.
2. Disconnect BCM connector.
3. Check continuity between PTC relay-1 harness connector E61 (A) terminal 1 and BCM harness connector M19 (B) terminal 64.



A		B		Continuity
Connector	Terminal	Connector	Terminal	
PTC relay-1: E61	1	BCM: M19	64	Yes

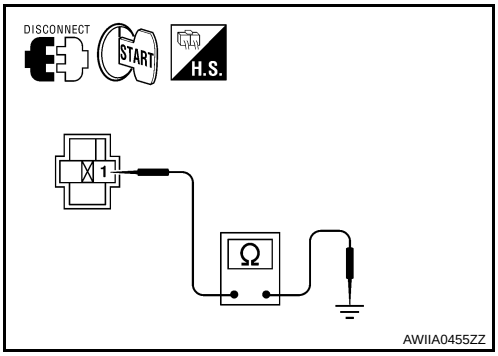
Is the inspection result normal

YES >> Replace BCM. Refer to XXXX.
NO >> Repair harness or connector.

10.CHECK PTC RELAY-2 GROUND CIRCUIT

Check continuity between PTC relay-2 harness connector E62 terminal 1 and ground.

Connector	Terminal	Ground	Continuity
PTC relay-2: E62	1		Yes



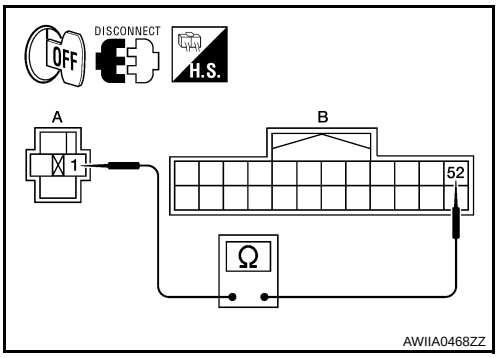
Is the inspection result normal

YES >> GO TO 12.
NO >> GO TO 11.

11. CHECK CIRCUIT CONTINUITY BETWEEN PTC RELAY-2 AND BCM

1. Turn ignition switch OFF.
2. Disconnect BCM connector.
3. Check continuity between BCM harness connector M19 (B) terminal 52 and PTC relay-1 harness connector E62 (A) terminal 1.

A		B		Continuity
Connector	Terminal	Connector	Terminal	
PTC relay-2: E62	1	BCM: M19	52	Yes



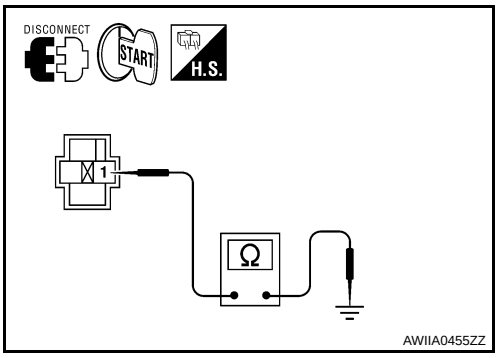
Is the inspection result normal

YES >> Replace BCM. Refer to XXXX.
NO >> Repair harness or connector.

12. CHECK PTC RELAY-3 GROUND CIRCUIT

Check continuity between PTC relay-3 harness connector E63 terminal 1 and ground.

Connector	Terminal	Ground	Continuity
PTC relay-3: E63	1		Yes



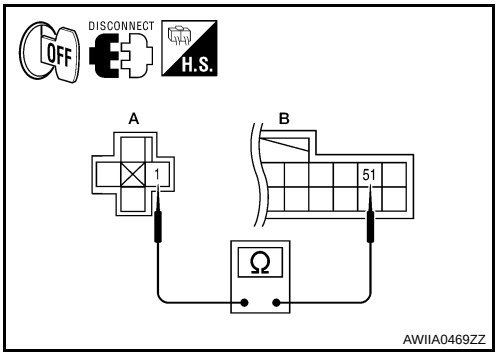
Is the inspection result normal

YES >> GO TO 14.
NO >> GO TO 13.

13. CHECK CIRCUIT CONTINUITY BETWEEN PTC RELAY-3 AND BCM

1. Turn ignition switch OFF.
2. Disconnect BCM connector.
3. Check continuity between BCM harness connector M19 (B) terminal 51 and PTC relay-3 harness connector E63 (A) terminal 1.

A		B		Continuity
Connector	Terminal	Connector	Terminal	
PTC relay-3: E63	1	BCM: M19	51	Yes

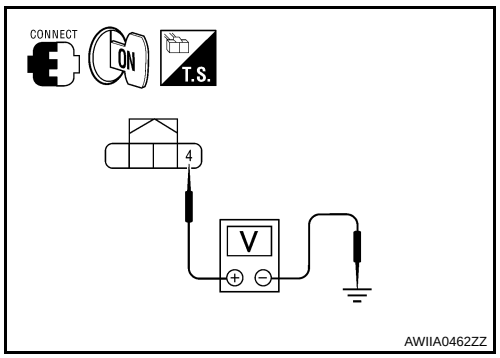


Is the inspection result normal

YES >> GO TO 14.
NO >> Repair harness or connector.

14. CHECK VOLTAGE BETWEEN AMBIENT TEMPERATURE SENSOR AND GROUND

1. Turn ignition switch OFF.
2. Reconnect BCM connector.
3. Disconnect ambient temperature sensor.
4. Turn ignition switch ON.
5. Check voltage between ambient temperature sensor harness connector E60 terminal 4 and ground.



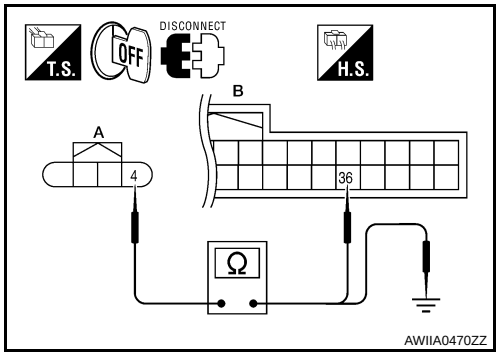
Terminals			Voltage (Approx.)
(+)		(–)	
Connector	Terminal	Ground	
Ambient temperature sensor: E60	4		5V

Is the inspection result normal

YES >> GO TO 16.
NO >> GO TO 15.

15. CHECK CIRCUIT CONTINUITY BETWEEN AMBIENT TEMPERATURE SENSOR AND BCM CONTROL UNIT

1. Turn ignition switch OFF.
2. Disconnect BCM connector.
3. Check continuity between ambient temperature sensor harness connector E60 (A) terminal 4 and BCM harness connector M18 (B) terminal 36.



A		B		Continuity
Connector	Terminal	Connector	Terminal	
Ambient temperature sensor: E60	4	BCM: M18	36	Yes

4. Check continuity between ambient temperature sensor harness connector E60 (A) terminal 4 and ground.

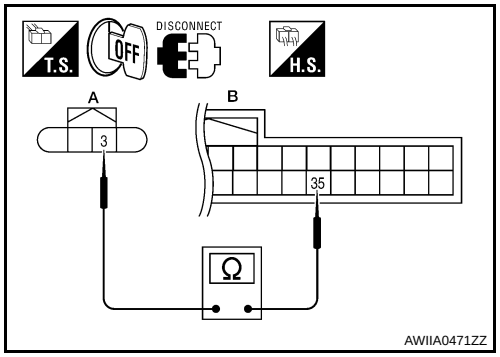
A		Ground	Continuity
Connector	Terminal		
Ambient temperature sensor: E60	4		No

Is the inspection result normal

YES >> Replace BCM. Refer to XXXX.
NO >> Repair harness or connector.

16. CHECK CONTINUITY OF AMBIENT TEMPERATURE SENSOR GROUND CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect BCM connector.
3. Check continuity between ambient temperature sensor harness connector E60 (A) terminal 3 and BCM harness connector M18 (B) terminal 35.



A		B		Continuity
Connector	Terminal	Connector	Terminal	
Ambient temperature sensor: E64	3	BCM: M18	35	Yes

Is the inspection result normal?

YES >> GO TO 17.
NO >> Repair harness or connector.

17. CHECK AMBIENT TEMPERATURE SENSOR

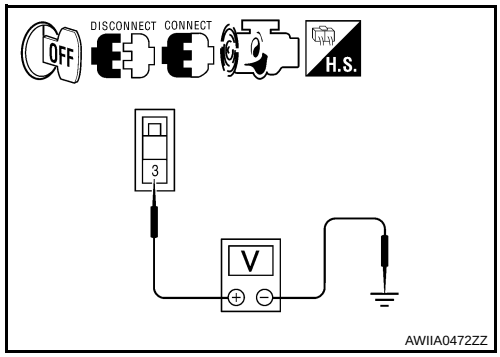
Refer to XX-XX, "*****".

Is the inspection result normal?

YES >> GO TO 18.
NO >> Replace ambient temperature sensor. Refer to XX.

18. CHECK PTC HEATER RELAY-1 POWER SUPPLY CIRCUIT

1. Disconnect PTC heater connector.
2. Reconnect all PTC relays.
3. Start the engine (1,000 RPM minimum).
4. Check voltage between PTC heater harness connector E65 terminal 3 and ground.



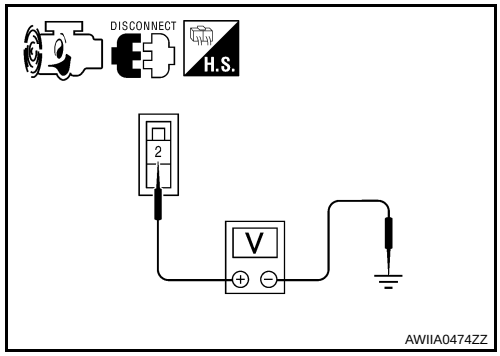
Terminals			Voltage (Approx.)
(+)		(–)	
Connector	Terminal	Ground	
PTC heater: E65	3		Battery voltage

Is the inspection result normal?

YES >> GO TO 19.
NO >> Repair harness or connector.

19. CHECK PTC HEATER RELAY-2 POWER SUPPLY CIRCUIT

Check voltage between PTC heater harness connector E65 terminal 2 and ground.



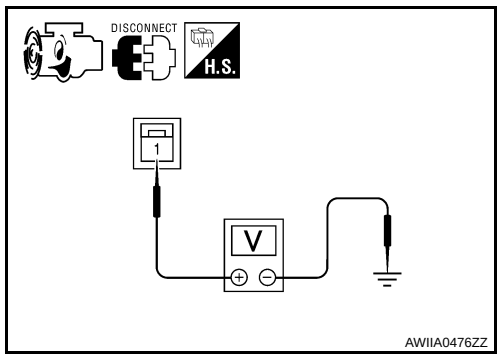
Terminals			Voltage (Approx.)
(+)		(–)	
Connector	Terminal	Ground	
PTC heater: E65	2		Battery voltage

Is the inspection result normal

YES >> GO TO 20.
NO >> Repair harness or connector.

20. CHECK PTC HEATER RELAY-3 POWER SUPPLY CIRCUIT

Check voltage between PTC heater harness connector E65 terminal 1 and ground.



Terminals			Voltage (Approx.)
(+)		(–)	
Connector	Terminal	Ground	
PTC heater: E65	1		Battery voltage

Is the inspection result normal

YES >> Replace PTC heater. Refer to XXXX.
NO >> Repair harness or connector.

PTC HEATER (1500 WATT) : PTC Heater (1500 Watt) Component Inspection

INFOID:0000000001682733

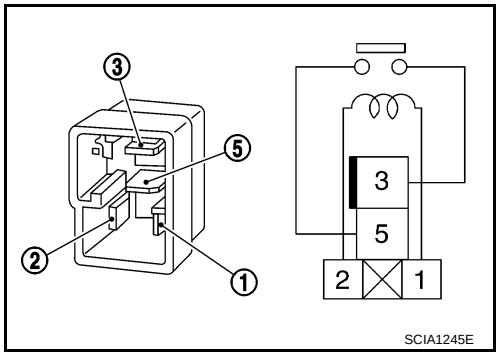
COMPONENT INSPECTION

Blower Relay

Check continuity between relay terminals 3 and 5.

Condition	Continuity
12V direct current supply between terminals 1 and 2	Yes
OFF	No

If NG, replace the blower relay. Refer to XX.

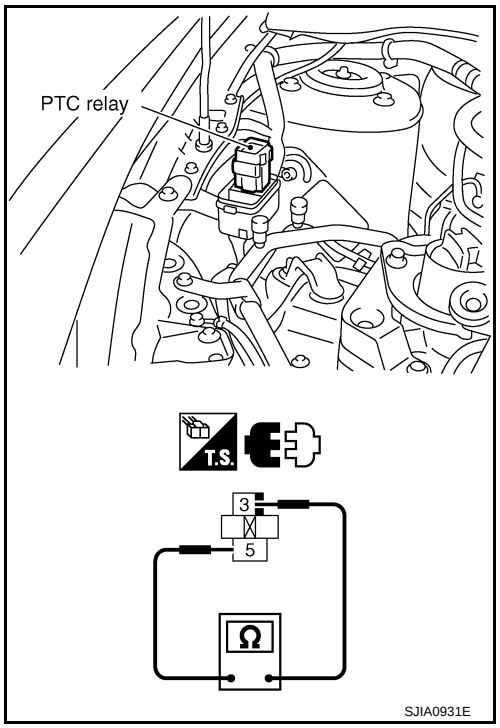


PTC relay

Check continuity between terminal Nos. 3 and 5.

Condition	Continuity
12V direct current supply between terminal Nos. 1 and 2	Yes
No current supply	No

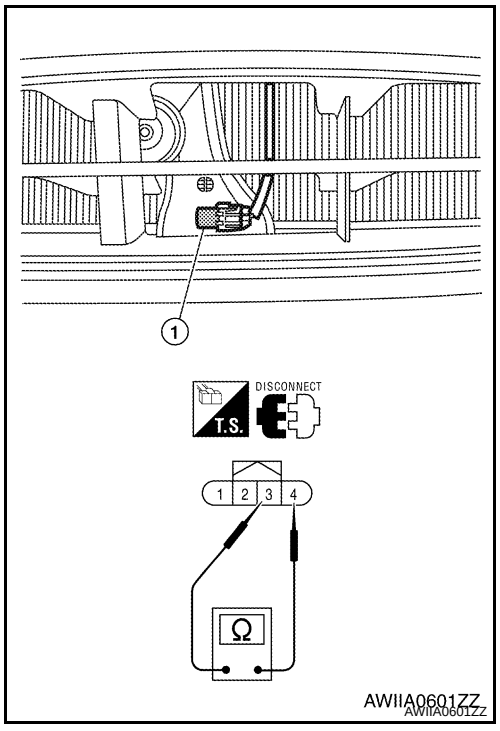
If NG, replace PTC relay. Refer to XX.



Ambient Sensor

After disconnecting ambient sensor connector E60, measure resistance between terminals 3 and 4 at sensor side, using the table below.

Temperature °C (°F)	Resistance kΩ
–15 (5)	12.73
–10 (14)	9.92
–5 (23)	7.80
0 (32)	6.19
5 (41)	4.95
10 (50)	3.99
15 (59)	3.24
20 (68)	2.65
25 (77)	2.19
30 (86)	1.81
35 (95)	1.51
40 (104)	1.27
45 (113)	1.07



If NG, replace ambient sensor. Refer to XX.

ECU DIAGNOSIS

AIR CONDITIONER CONTROL

Reference Value

INFOID:0000000001203072

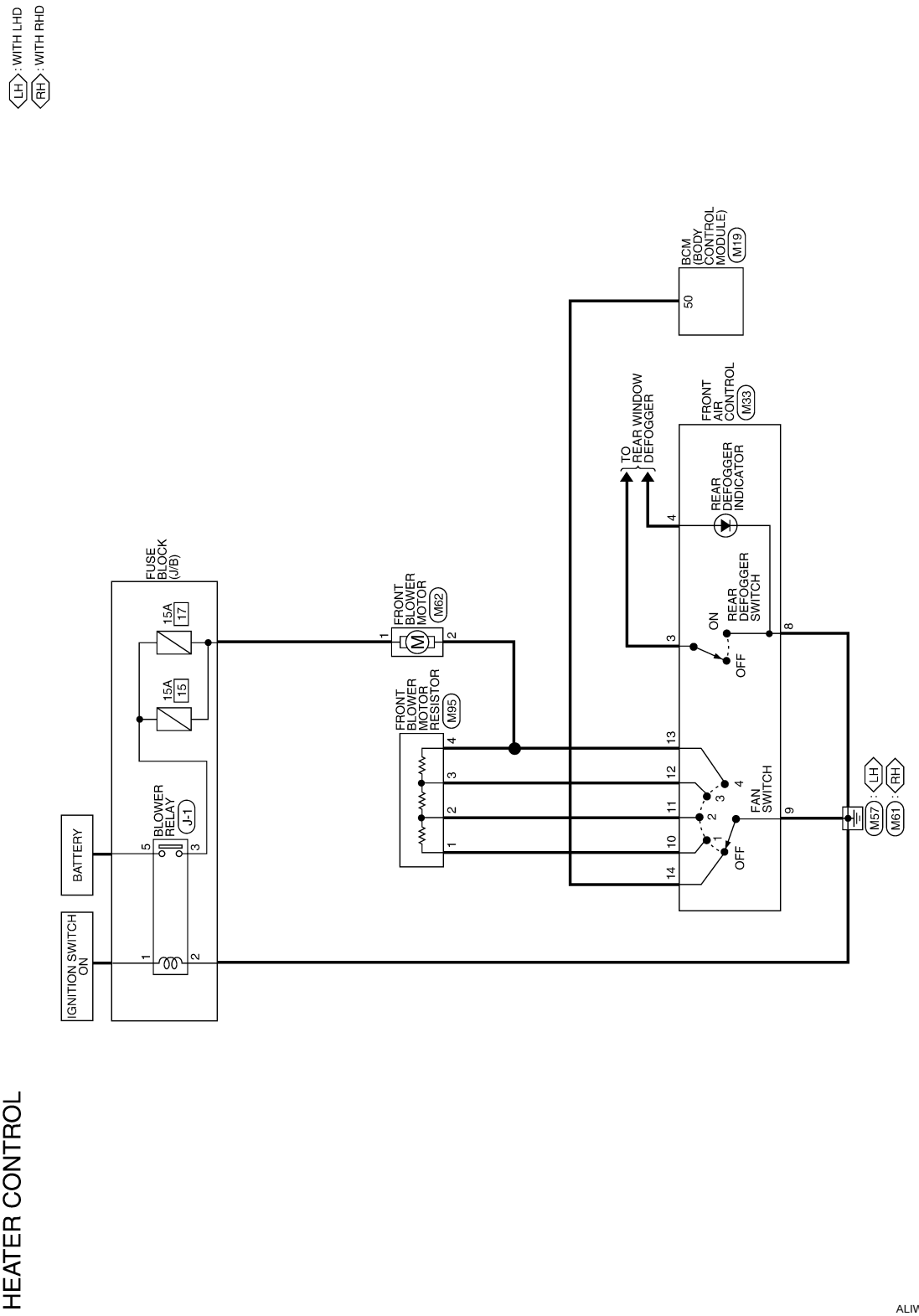
VALUES ON THE DIAGNOSIS TOOL

Display Item List

Monitor item name “operation or unit”		Contents
FAN ON SIG	“ON/OFF”	Displays “FAN (ON)/FAN (OFF)” status as judged from blower fan motor switch signal.
AIR COND SW	“ON/OFF”	Displays “COMP (ON)/COMP (OFF)” status as judged from air conditioner switch signal.

Wiring Diagram - Heater Control (without A/C) -

INFOID:0000000001683778



HEATER CONTROL CONNECTORS

Connector No.	M19
Connector Name	BCM (BODY CONTROL MODULE)
Connector Color	WHITE

H.S.

52	51	50	49	48	47	46	45	44	43	42	41
64	63	62	61	60	59	58	57	56	55	54	53

Terminal No.	Color of Wire	Signal Name
50	P	BLOWER FAN SW

Connector No.	M33
Connector Name	FRONT AIR CONTROL
Connector Color	BLACK

H.S.

9	13	12	11	10	14
6	7	2	1	8	3	4	5

Terminal No.	Color of Wire	Signal Name
3	W	RR DEF SW
4	R	RR DEF IND
8	B	GND
9	B	ILL
10	BR	LO
11	R	ML
12	Y	MH
13	L	HI
14	P	ILL

Connector No.	M62
Connector Name	FRONT BLOWER MOTOR
Connector Color	WHITE

H.S.

Terminal No.	Color of Wire	Signal Name
1	R	—
2	Y	—

Connector No.	M95
Connector Name	FRONT BLOWER MOTOR RESISTOR
Connector Color	WHITE

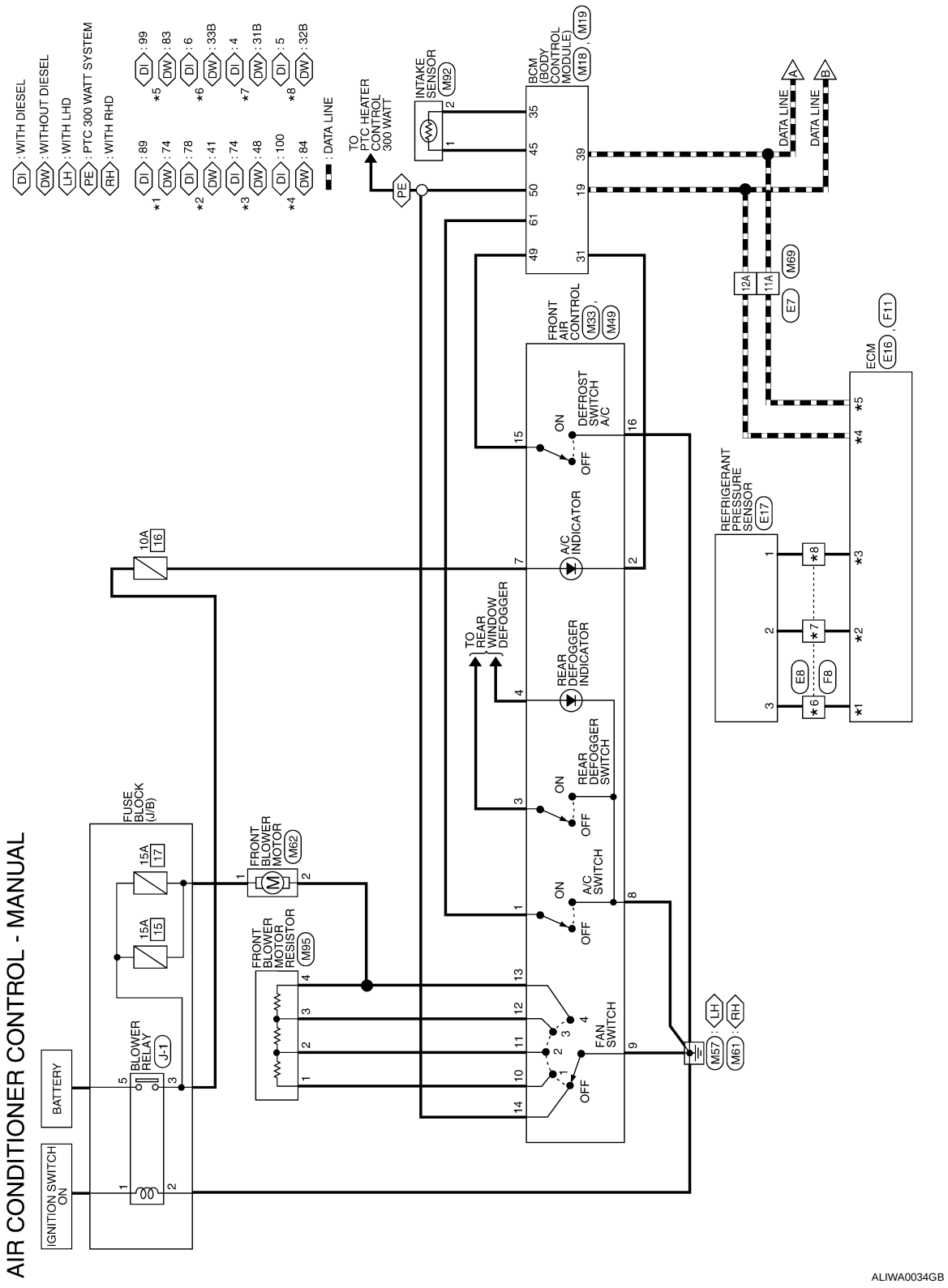
H.S.

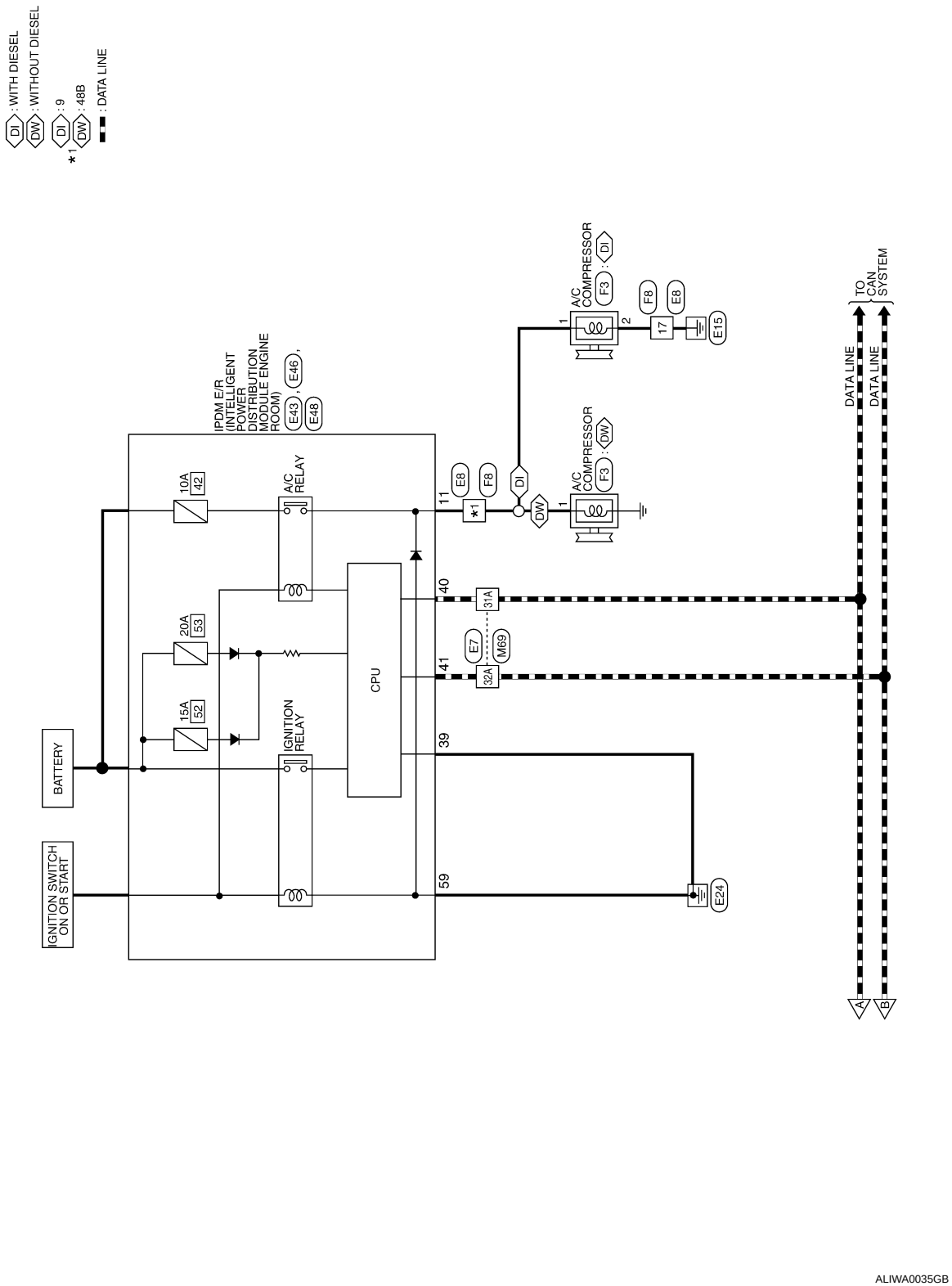
Terminal No.	Color of Wire	Signal Name
1	BR	
2	R	
3	Y	
4	L	

ALIIA0139GB

Wiring Diagram - Air Conditioner Control -

INFOID:0000000001203073

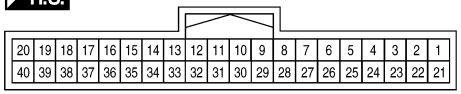



DI : WITH DIESEL
DW : WITHOUT DIESEL
DI : 9
*1 DW : 48B
: DATA LINE
IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)
E43, E46, E48
10A 42
A/C RELAY
20A 53
15A 52
IGNITION RELAY
CPU
BATTERY
IGNITION SWITCH ON OR START
11
40
41
39
59
E8
F8
*1
DI
DW
A/C COMPRESSOR
F3
F8
E8
17
E15
E24
31A
32A
E7
M69
TO CAN SYSTEM
DATA LINE
DATA LINE
A
B
ALIWA0035GB

AIR CONDITIONER CONTROL - MANUAL CONNECTORS

Connector No.	M18
Connector Name	BCM (BODY CONTROL MODULE)
Connector Color	WHITE

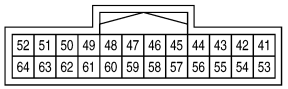
H.S.



Terminal No.	Color of Wire	Signal Name
19	L	CAN-H
31	SB	A/C INDICATOR
35	BR	OAT SENSOR GND
39	P	CAN-L

Connector No.	M19
Connector Name	BCM (BODY CONTROL MODULE)
Connector Color	WHITE

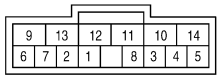
H.S.



Terminal No.	Color of Wire	Signal Name
45	GR	AIRCON EVAPORATOR SENSOR
49	R	DEFROST SWITCH A/C
50	P	BLOWER FAN SW
61	O	AIRCON SWITCH

Connector No.	M33
Connector Name	FRONT AIR CONTROL
Connector Color	BLACK

H.S.



Terminal No.	Color of Wire	Signal Name
1	O	A/C SW
2	SB	A/C IND
3	W	RR DEF SW
4	R	RR DEF IND
7	R	A/C IND
8	B	GND
9	B	ILL
10	BR	LO
11	R	ML
12	Y	MH
13	L	HI
14	P	ILL

Connector No.	M49
Connector Name	DEFROST SWITCH A/C
Connector Color	WHITE

H.S.



Terminal No.	Color of Wire	Signal Name
15	R	—
16	B	—

ALIIA0140GB

Connector No.	M62
Connector Name	FRONT BLOWER MOTOR
Connector Color	WHITE

H.S.

Terminal No.	Color of Wire	Signal Name
1	R	—
2	Y	—

Connector No.	M69
Connector Name	WIRE TO WIRE
Connector Color	WHITE

H.S.

Terminal No.	Color of Wire	Signal Name
11A	P	—
12A	L	—
31A	P	—
32A	L	—

Connector No.	M92
Connector Name	INTAKE SENSOR
Connector Color	WHITE

H.S.

Terminal No.	Color of Wire	Signal Name
1	O	—
2	BR	—

Connector No.	M95
Connector Name	FRONT BLOWER MOTOR RESISTOR
Connector Color	WHITE

H.S.

Terminal No.	Color of Wire	Signal Name
1	BR	—
2	R	—
3	Y	—
4	L	—

ALIIA0145GB

Connector No.	E8
Connector Name	WIRE TO WIRE (WITH DIESEL)
Connector Color	BLACK

H.S.

Terminal No.	Color of Wire	Signal Name
4	GR	—
5	BR	—
6	W	—
9	W	—

Connector No.	E16
Connector Name	ECM (WITH DIESEL)
Connector Color	BLACK

H.S.

Terminal No.	Color of Wire	Signal Name
99	P	CAN-L
100	L	CAN-P

Connector No.	E7
Connector Name	WIRE TO WIRE
Connector Color	WHITE

H.S.

Terminal No.	Color of Wire	Signal Name
11A	P	—
12A	L	—
31A	P	—
32A	L	—

Connector No.	E8
Connector Name	WIRE TO WIRE (WITHOUT DIESEL)
Connector Color	BLACK

H.S.

Terminal No.	Color of Wire	Signal Name
31B	GR	—
32B	BR	—
33B	W	—
48B	W	—

ALIIA0146GB

Connector No.	E16
Connector Name	ECM (WITHOUT DIESEL)
Connector Color	BLACK

H.S.

81	85	89	93	97	101	105	109
82	86	90	94	98	102	106	110
83	87	91	95	99	103	107	111
84	88	92	96	100	104	108	112

Terminal No.	Color of Wire	Signal Name
83	P	CAN-L
84	L	CAN-H

Connector No.	E43
Connector Name	IPDM E/R (INTELLIGENT POWER DISTRIBUTUION MODULE ENGINE ROOM)
Connector Color	WHITE

H.S.

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

Terminal No.	Color of Wire	Signal Name
11	W	A/C COMPRESSOR

Connector No.	E46
Connector Name	IPDM E/R (INTELLIGENT POWER DISTRIBUTUION MODULE ENGINE ROOM)
Connector Color	WHITE

H.S.

42	41	40	39	38	37
48	47	46	45	44	43

Terminal No.	Color of Wire	Signal Name
39	B	SIGNAL GND
40	P	CAN-L
41	L	CAN-H

Connector No.	E48
Connector Name	IPDM E/R (INTELLIGENT POWER DISTRIBUTUION MODULE ENGINE ROOM)
Connector Color	BLACK

H.S.

59	58	57
62	61	60

Terminal No.	Color of Wire	Signal Name
59	B	POWER GND

Connector No.	F3
Connector Name	A/C COMPRESSOR (WITH DIESEL)
Connector Color	GRAY

H.S.

1	2

Terminal No.	Color of Wire	Signal Name
1	W	—
2	B	—

Connector No.	F3
Connector Name	A/C COMPRESSOR (WITHOUT DIESEL)
Connector Color	BLACK

H.S.

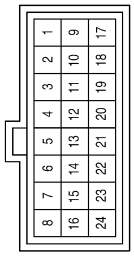
1

Terminal No.	Color of Wire	Signal Name
1	W	—

ALIIA0147GB

Connector No.	F8
Connector Name	WIRE TO WIRE (WITH DIESEL)
Connector Color	BLACK

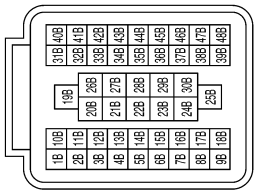
H.S.



Terminal No.	Color of Wire	Signal Name
4	GR	—
5	BR	—
6	W	—
9	W	—
17	B	—

Connector No.	F8
Connector Name	WIRE TO WIRE (WITHOUT DIESEL)
Connector Color	BLACK

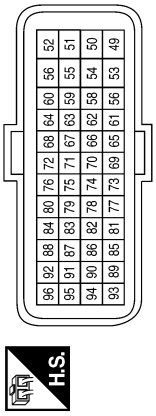
H.S.



Terminal No.	Color of Wire	Signal Name
31B	GR	—
32B	BR	—
33B	W	—
48B	W	—

Connector No.	F11
Connector Name	ECM (WITH DIESEL)
Connector Color	BROWN

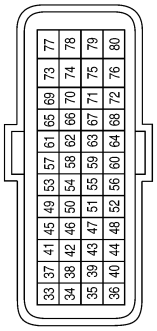
H.S.



Terminal No.	Color of Wire	Signal Name
74	BR	FREON PRESS GND
78	GR	FREON PRESS
89	W	FREON PRESS SUPPLY

Connector No.	F11
Connector Name	ECM (WITHOUT DIESEL)
Connector Color	BROWN

H.S.



Terminal No.	Color of Wire	Signal Name
41	GR	PDPRES
48	BR	GND-A (PDPRES)
74	W	AVCC (PDPRES)

ALIIA0144GB

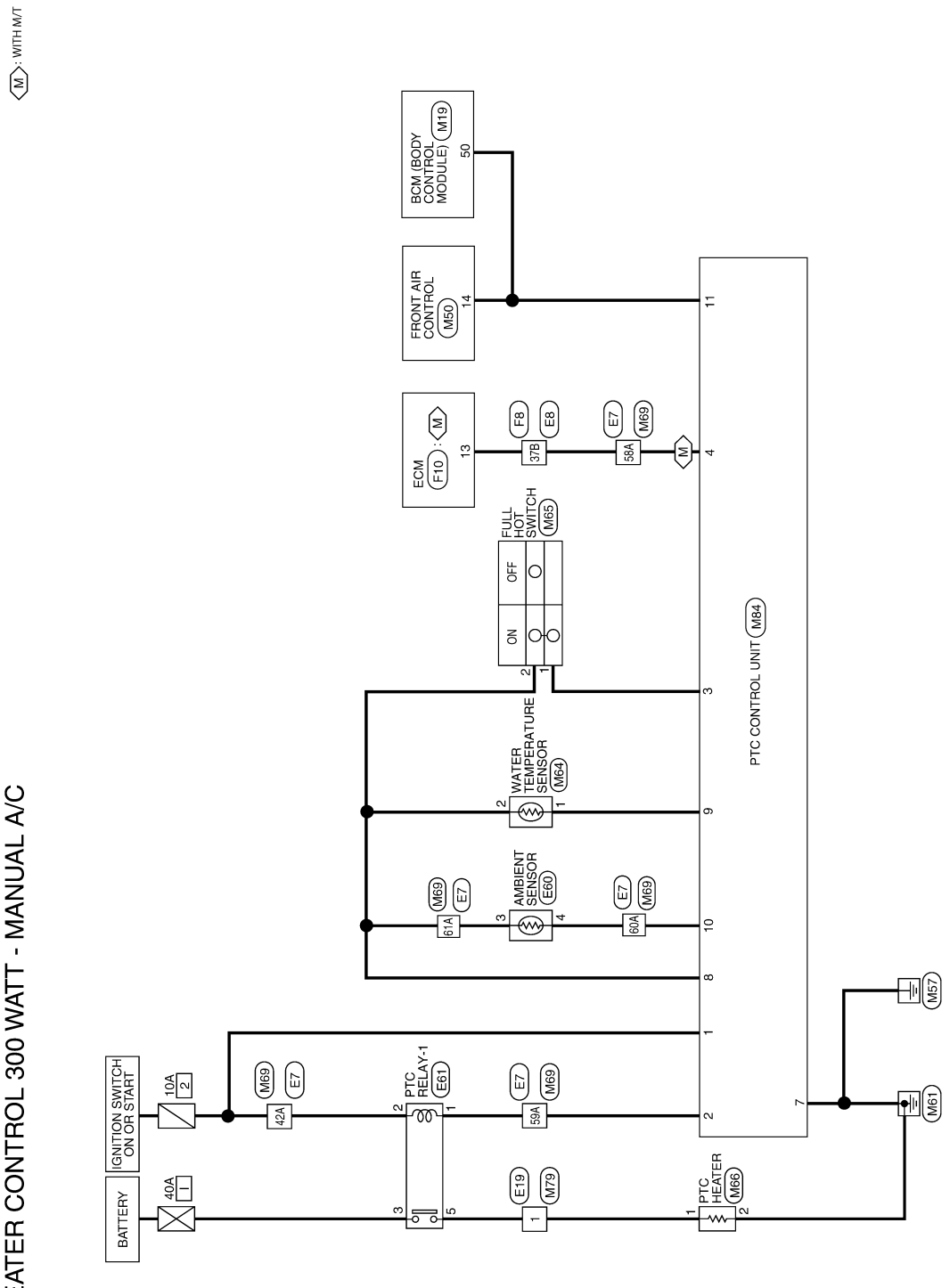
PTC HEATER CONTROL SYSTEM

PTC HEATER (300 WATT)

PTC HEATER (300 WATT) : Wiring Diagram - PTC Heater (300 Watt) -

INFOID:0000000001678413

PTC HEATER CONTROL 300 WATT - MANUAL A/C



ALIWA0040GB

PTC HEATER CONTROL 300 WATT - MANUAL A/C

Connector No.	M19
Connector Name	BCM (BODY CONTROL MODULE)
Connector Color	WHITE

H.S.

52	51	50	49	48	47	46	45	44	43	42	41
64	63	62	61	60	59	58	57	56	55	54	53

Terminal No.	Color of Wire	Signal Name
50	P	BLOWER FAN SW

Connector No.	M50
Connector Name	FRONT AIR CONTROL
Connector Color	BLACK

H.S.

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

Terminal No.	Color of Wire	Signal Name
12	P	FAN ON

Connector No.	M64
Connector Name	WATER TEMPERATURE SENSOR
Connector Color	WHITE

H.S.

1	2

Terminal No.	Color of Wire	Signal Name
1	BR	–
2	R	–

Connector No.	M65
Connector Name	FULL HOT SWITCH
Connector Color	WHITE

H.S.

2	1

Terminal No.	Color of Wire	Signal Name
1	Y	–
2	R	–

Connector No.	M66
Connector Name	PTC HEATER
Connector Color	BLACK

H.S.

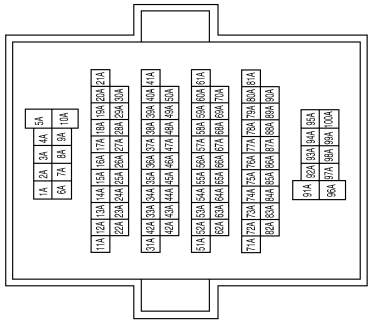
1	2

Terminal No.	Color of Wire	Signal Name
1	Y	–
2	B	–

ALIIA0161GB

Connector No.	M69
Connector Name	WIRE TO WIRE
Connector Color	WHITE

H.S.



Terminal No.	Color of Wire	Signal Name
42A	O	–
58A	SB	–
59A	W	–
60A	V	–
61A	BR	–

Connector No.	M79
Connector Name	WIRE TO WIRE
Connector Color	BLUE

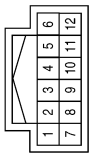
H.S.



Terminal No.	Color of Wire	Signal Name
1	Y	–

Connector No.	M84
Connector Name	PTC CONTROL UNIT
Connector Color	WHITE

H.S.

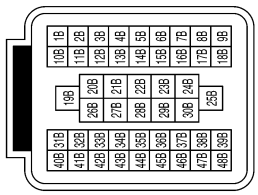


Terminal No.	Color of Wire	Signal Name
1	O	IGN
2	W	PTC
3	Y	F/H
4	SB	ENG
7	B	GND
8	BR	SEN GND
9	BR	SENS
10	V	SENS
11	P	FAN ON

ALIIA0162GB

Connector No.	E8
Connector Name	WIRE TO WIRE (WITHOUT DIESEL)
Connector Color	BLACK

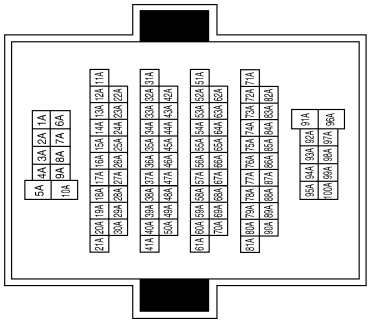
H.S.



Terminal No.	Color of Wire	Signal Name
37B	SB	–

Connector No.	E7
Connector Name	WIRE TO WIRE
Connector Color	WHITE

H.S.



Terminal No.	Color of Wire	Signal Name
42A	Y	–
58A	SB	–
59A	L	–
60A	LG	–
61A	G	–

Connector No.	E61
Connector Name	PTC RELAY 1
Connector Color	BLACK

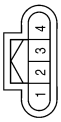
H.S.



Terminal No.	Color of Wire	Signal Name
1	Y	–
2	L	–
3	R	–
5	Y	–

Connector No.	E60
Connector Name	AMBIENT SENSOR
Connector Color	BLACK

H.S.



Terminal No.	Color of Wire	Signal Name
3	G	SENS GND B
4	LG	SENS SIG B

Connector No.	E19
Connector Name	WIRE TO WIRE
Connector Color	BLUE

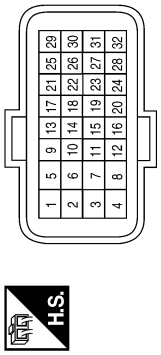
H.S.



Terminal No.	Color of Wire	Signal Name
1	Y	–

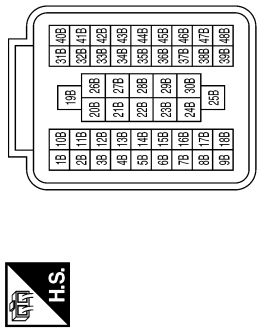
ALIIA0163GB

Connector No.	F10
Connector Name	ECM (WITHOUT DIESEL)
Connector Color	GRAY



Terminal No.	Color of Wire	Signal Name
13	L	TACHO

Connector No.	F8
Connector Name	WIRE TO WIRE (WITHOUT DIESEL)
Connector Color	BLACK

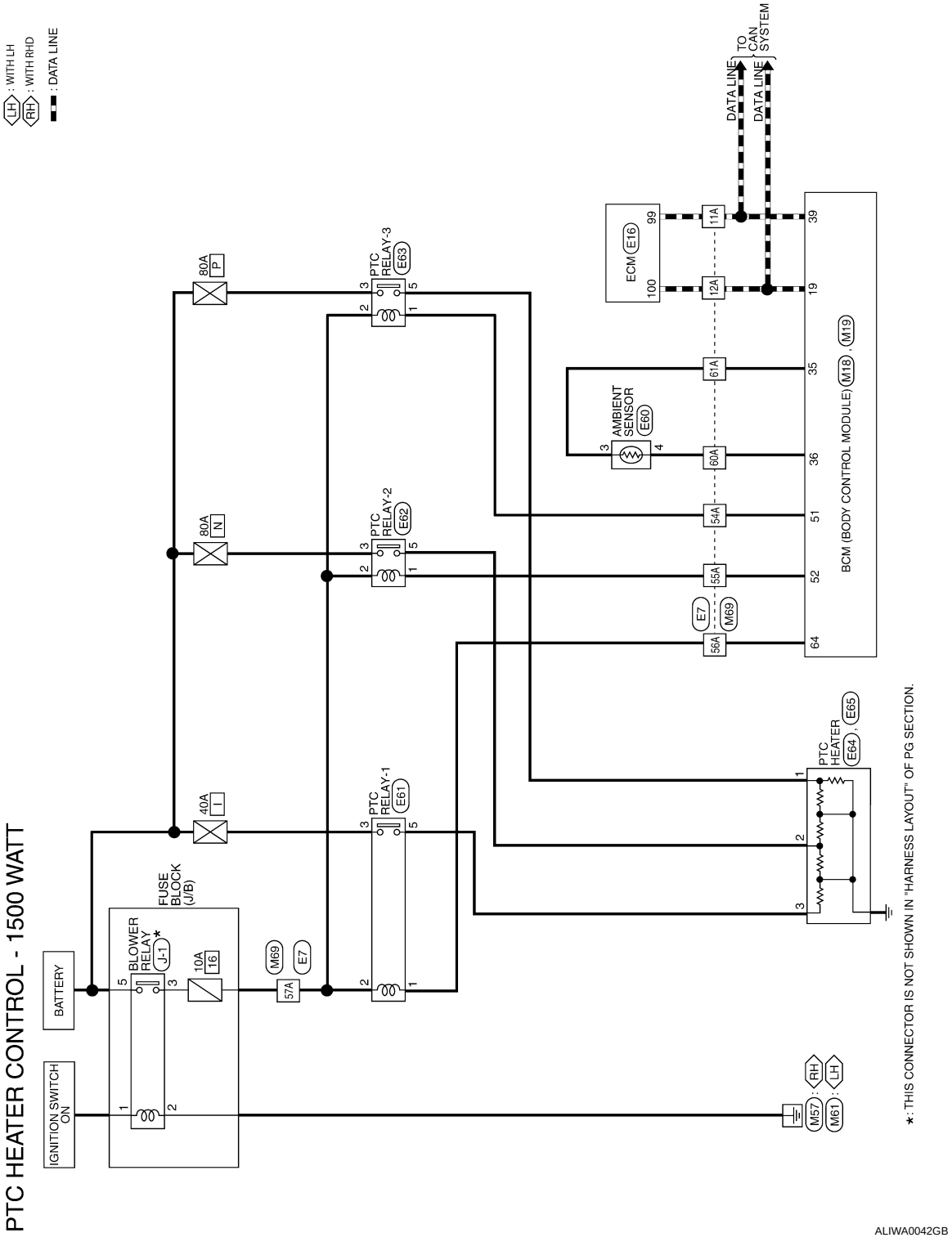


Terminal No.	Color of Wire	Signal Name
37B	SB	–

ALIIA0164GB

PTC HEATER (1500 WATT)

PTC HEATER (1500 WATT) : Wiring Diagram - PTC Heater (1500 Watt) - INFOID:0000000001678415



PTC HEATER CONTROL - 1500 WATT CONNECTORS

Connector No.	M18
Connector Name	BCM (BODY CONTROL MODULE)
Connector Color	WHITE

H.S.

20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1
40	39	38	37	36	35	34	33	32	31	30	29	28	27	26	25	24	23	22	21

Terminal No.	Color of Wire	Signal Name
19	L	CAN-H
35	BR	OAT SENSOR GND
36	V	OAT SENSOR
39	P	CAN-L

Connector No.	M19
Connector Name	BCM (BODY CONTROL MODULE)
Connector Color	WHITE

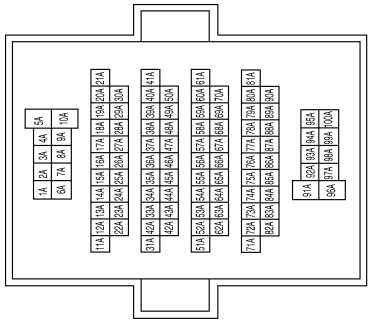
H.S.

52	51	50	49	48	47	46	45	44	43	42	41
64	63	62	61	60	59	58	57	56	55	54	53

Terminal No.	Color of Wire	Signal Name
51	L	PTC HEATER RELAY 3
52	GR	PTC HEATER RELAY 2
64	O	PTC HEATER RELAY 1

Connector No.	M69
Connector Name	WIRE TO WIRE
Connector Color	WHITE

H.S.



Terminal No.	Color of Wire	Signal Name
11A	P	–
12A	L	–
54A	L	–
55A	GR	–
56A	O	–
57A	G	–
60A	V	–
61A	BR	–

ALIIA0141GB

Connector No.	E7
Connector Name	WIRE TO WIRE
Connector Color	WHITE

H.S.

Connector No.	E16
Connector Name	ECM
Connector Color	BLACK

H.S.

Terminal No.	Color of Wire	Signal Name
99	P	CAN L
100	L	CAN L

Terminal No.	Color of Wire	Signal Name
11A	P	–
12A	L	–
54A	L	–
55A	GR	–
56A	O	–
57A	G	–
60A	V	–
61A	BR	–

Connector No.	E60
Connector Name	AMBIENT SENSOR
Connector Color	BLACK

H.S.

Terminal No.	Color of Wire	Signal Name
3	G	SENS GND B
4	LG	SENS SIG B

Connector No.	E61
Connector Name	PTC RELAY 1
Connector Color	BLACK

H.S.

Terminal No.	Color of Wire	Signal Name
1	Y	–
2	L	–
3	R	–
5	Y	–

Connector No.	E62
Connector Name	PTC RELAY 2
Connector Color	BLACK

H.S.

Terminal No.	Color of Wire	Signal Name
1	G	–
2	GR	–
3	R	–
5	L	–

ALIIA0142GB

Connector No.	E63
Connector Name	PTC RELAY 3
Connector Color	BLACK

H.S.



Terminal No.	Color of Wire	Signal Name
1	G	–
2	L	–
3	R	–
5	W	–

Connector No.	E64
Connector Name	PTC HEATER
Connector Color	BLACK

H.S.



Terminal No.	Color of Wire	Signal Name
1	W	–

Connector No.	E65
Connector Name	PTC HEATER
Connector Color	BLACK

H.S.



Terminal No.	Color of Wire	Signal Name
2	L	–
3	W	–

Connector No.	J-1
Connector Name	BLOWER RELAY 1
Connector Color	BLACK

H.S.



Terminal No.	Color of Wire	Signal Name
1	Y	–
2	L	–
3	R	–
5	Y	–

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SYMPTOM DIAGNOSIS

AIR CONDITIONER CONTROL

Symptom Matrix Chart

INFOID:0000000001203074

SYMPTOM TABLE

Symptom	Reference Page	
Air outlet does not change.	Go to Trouble Diagnosis Procedure for Mode Door.	HAC-16
Discharge air temperature does not change.	Go to Trouble Diagnosis Procedure for Air Mix Door.	HAC-17
Intake door does not change.	Go to Trouble Diagnosis Procedure for Intake Door.	HAC-18
Blower motor operation is malfunctioning.	Go to Trouble Diagnosis Procedure for Blower Motor.	HAC-19
Magnet clutch does not engage in A/C, defrost/foot, or defrost mode.	Go to Trouble Diagnosis Procedure for Magnet Clutch.	HAC-24
Insufficient cooling	Go to Trouble Diagnosis Procedure for Insufficient Cooling.	HAC-73
Insufficient heating	Go to Trouble Diagnosis Procedure for Insufficient Heating.	HAC-81
Noise	Go to Trouble Diagnosis Procedure for Noise.	HAC-83

INSUFFICIENT COOLING

Component Function Check

INFOID:0000000001547073

SYMPTOM: Insufficient cooling

INSPECTION FLOW

1. CONFIRM SYMPTOM BY PERFORMING OPERATIONAL CHECK - TEMPERATURE DECREASE

1. Turn temperature control dial counterclockwise to maximum cold position.
2. Check for cold air at discharge air outlets.

Can the symptom be duplicated?

YES >> GO TO 3.
NO >> GO TO 2.

2. CHECK FOR ANY SYMPTOMS

Perform a complete operational check for any symptoms. Refer to HAC-6, "Operational Check".

Does another symptom exist?

YES >> Refer to HAC-5, "How to Perform Trouble Diagnosis For Quick and Accurate Repair".
NO >> System OK.

3. CHECK FOR SERVICE BULLETINS

Check for any service bulletins.

>> GO TO 4.

4. CHECK COMPRESSOR DRIVE BELT TENSION

Check compressor belt tension. Refer to EM-15, "Checking" (HR16DE) or EM-142, "Checking Drive Belts" (MR18DE), or EM-263, "Inspection and Adjustment" (K9K).

OK or NG

OK >> GO TO 5.
NG >> Adjust or replace compressor belt. Refer to EM-15, "Checking" (HR16DE) or EM-142, "Checking Drive Belts" (MR18DE), or EM-263, "Inspection and Adjustment" (K9K)

5. CHECK AIR MIX DOOR CABLE

Check and verify air mix door cable operation. Refer to XXXX AIR MIX DOOR CABLE ADJUST.

Does air mix door operate correctly?

YES >> GO TO 6.
NO >> Repair or replace as necessary.

6. CHECK COOLING FAN MOTOR OPERATION

Check and verify cooling fan motor for smooth operation. Refer to XX-XX, "*****".

Does cooling fan motor operate correctly?

YES >> GO TO 7.
NO >> Check cooling fan motor. Refer to XX-XX, "*****".

7. CHECK FOR EVAPORATOR FREEZE UP

Start engine and run A/C. Check for evaporator freeze up.

Does evaporator freeze up?

YES >> Perform performance test diagnoses. Refer to "PERFORMANCE TEST DIAGNOSIS".
NO >> GO TO 8.

8. CHECK REFRIGERANT PRESSURE

Check refrigerant pressure with manifold gauge connected. Refer to "Test Reading".

OK or NG

OK >> GO TO 9.
NG >> Perform performance test diagnoses. Refer to "PERFORMANCE TEST DIAGNOSIS".

9.CHECK AIR DUCTS

Check ducts for air leaks.

OK or NG

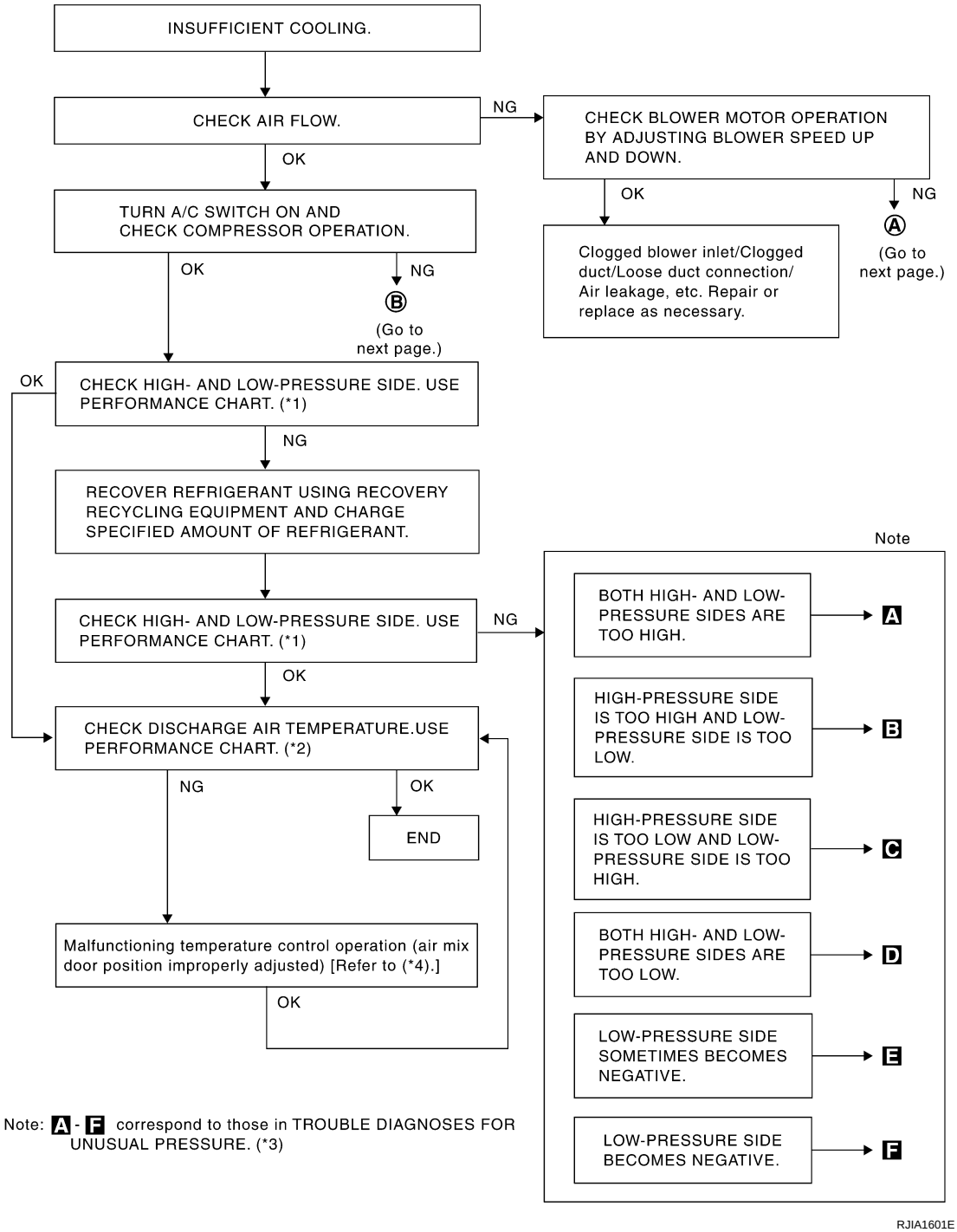
OK >> If the symptom still exists, perform a complete operational check. Refer to HAC-6, "Operational Check". If other symptoms exist, refer to HAC-5, "How to Perform Trouble Diagnosis For Quick and Accurate Repair".

NG >> Repair air leaks.

Performance Test Diagnoses

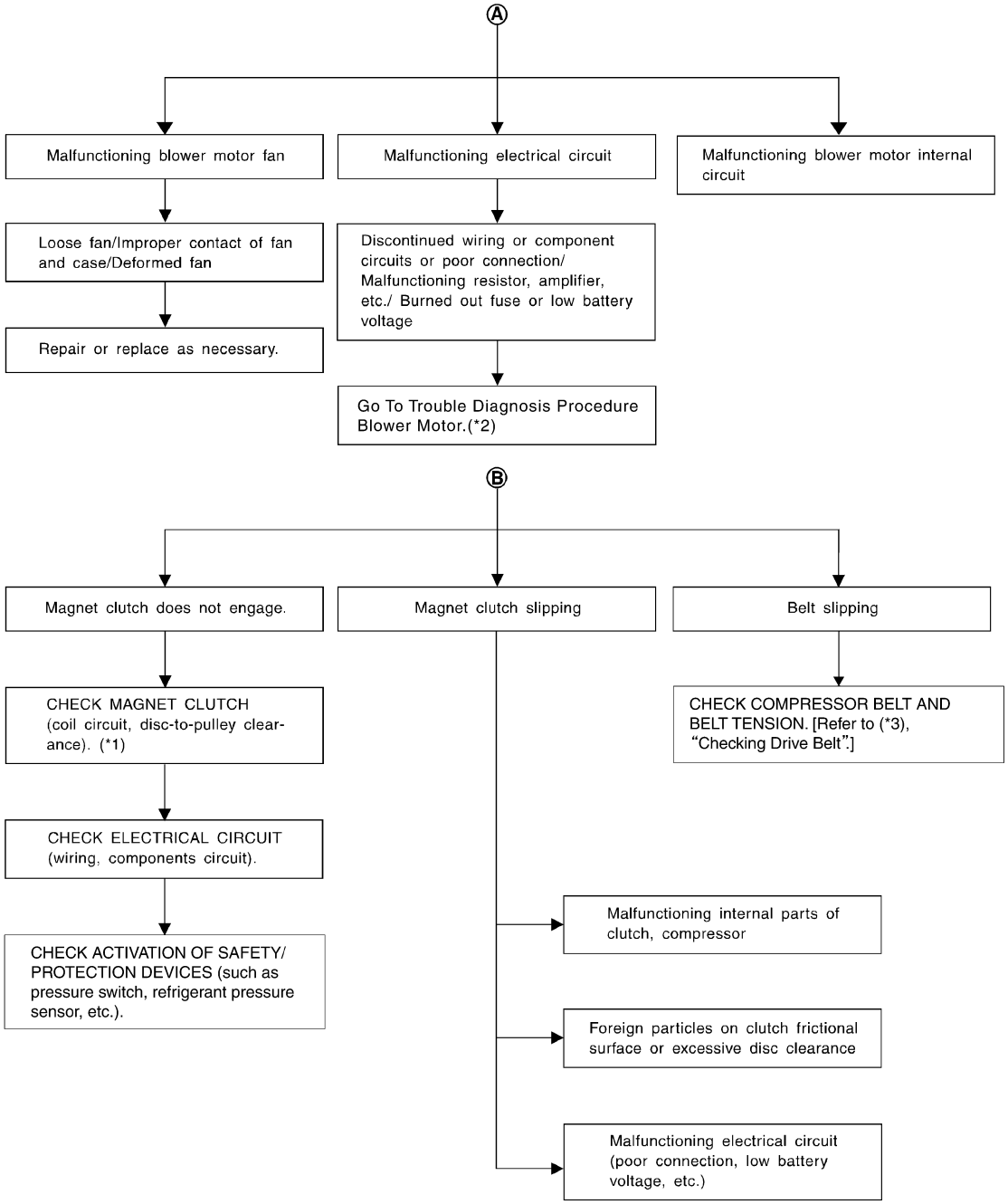
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PERFORMANCE TEST DIAGNOSIS



*1 "PERFORMANCE CHART" *2 "Test Reading" *3 "TROUBLE DIAGNOSIS FOR UNUSUAL PRESSURE "

*4



RJIA3107E

*1 XXXX REMOVAL OF COMPRESSOR *2 XXXX BLOWER MOTOR CIR. *3 XX-XX, "*****"

Performance Chart

INFOID:0000000001547075

PERFORMANCE CHART

Test Condition

Testing must be performed as follows:

Vehicle condition	Indoors or in the shade (in a well-ventilated place)
Doors	Closed
Door window	Open
Hood	Open
TEMP.	Max. COLD
Mode control dial	(Ventilation) set
Intake door lever	(Recirculation) set
Blower speed	Max. speed set
Engine speed	Idle speed
Operate the air conditioning system for 10 minutes before taking measurements.	

Test Reading

Recirculating-to-discharge Air Temperature Table

Inside air (Recirculating air) at blower assembly inlet		Discharge air temperature at center ventilator °C (°F)
Relative humidity %	Air temperature °C (°F)	
50 - 60	20 (68)	7.2 - 9.1 (45 - 48)
	25 (77)	11.4 - 13.8 (53 - 57)
	30 (86)	15.5 - 18.4 (60 - 65)
	35 (95)	20.3 - 23.7 (69 - 75)
60 - 70	20 (68)	9.1 - 10.9 (48 - 52)
	25 (77)	13.8 - 16.2 (57 - 61)
	30 (86)	18.4 - 21.3 (65 - 70)
	35 (95)	23.7 - 27.1 (75 - 81)

Ambient Air Temperature-to-operating Pressure Table

Ambient air		High-pressure (Discharge side) kPa (bar, kg/cm^2 , psi)	Low-pressure (Suction side) kPa (bar, kg/cm^2 , psi)
Relative humidity %	Air temperature °C (°F)		
50 - 70	20 (68)	843 - 1,036 *1 (11.08 - 13.63, 8.6 - 10.6, 122 - 150)	159.0 - 194.0 (1.59 - 1.94, 1.62 - 1.98, 23.1 - 28.1)
	25 (77)	1,094 - 1,338 *1 (10.94 - 13.38, 11.2 - 13.6, 159 - 194)	196.3 - 240.0 (1.96 - 2.40, 2.00 - 2.45, 28.5 - 34.8)
	30 (86)	1,298 - 1,590 *1 (12.98 - 15.90, 13.2 - 16.2, 188 - 231)	248.0 - 302.7 (2.48 - 3.03, 2.53 - 3.09, 36.0 - 43.9)
	35 (95)	1,383 - 1,688 *2 (13.83 - 16.88, 14.1 - 17.2, 201 - 245)	308.8 - 377.4 (3.09 - 3.77, 3.15 - 3.85, 44.8 - 54.7)
	40 (104)	1,628 - 1,988 *2 (16.28 - 19.88, 16.6 - 20.3, 236 - 288)	377.4 - 461.2 (3.77 - 4.61, 3.85 - 4.70, 54.7 - 66.8)

*1: With blower control dial in the "1" position
*2: With blower control dial in the "4" position.

Test Reading

INFOID:0000000001547076

Recirculating-to-discharge Air Temperature Table

Inside air (Recirculating air) at blower assembly inlet		Discharge air temperature at center ventilator °C (°F)
Relative humidity %	Air temperature °C (°F)	
50 - 60	20 (68)	7.2 - 9.1 (45 - 48)
	25 (77)	11.4 - 13.8 (53 - 57)
	30 (86)	15.5 - 18.4 (60 - 65)
	35 (95)	20.3 - 23.7 (69 - 75)
60 - 70	20 (68)	9.1 - 10.9 (48 - 52)
	25 (77)	13.8 - 16.2 (57 - 61)
	30 (86)	18.4 - 21.3 (65 - 70)
	35 (95)	23.7 - 27.1 (75 - 81)

Ambient Air Temperature-to-operating Pressure Table

Ambient air		High-pressure (Discharge side) kPa (bar, kg/cm^2 , psi)	Low-pressure (Suction side) kPa (bar, kg/cm^2 , psi)
Relative humidity %	Air temperature °C (°F)		
50 - 70	20 (68)	843 - 1,036 *1 (11.08 - 13.63, 8.6 - 10.6, 122 - 150)	159.0 - 194.0 (1.59 - 1.94, 1.62 - 1.98, 23.1 - 28.1)
	25 (77)	1,094 - 1,338 *1 (10.94 - 13.38, 11.2 - 13.6, 159 - 194)	196.3 - 240.0 (1.96 - 2.40, 2.00 - 2.45, 28.5 - 34.8)
	30 (86)	1,298 - 1,590 *1 (12.98 - 15.90, 13.2 - 16.2, 188 - 231)	248.0 - 302.7 (2.48 - 3.03, 2.53 - 3.09, 36.0 - 43.9)
	35 (95)	1,383 - 1,688 *2 (13.83 - 16.88, 14.1 - 17.2, 201 - 245)	308.8 - 377.4 (3.09 - 3.77, 3.15 - 3.85, 44.8 - 54.7)
	40 (104)	1,628 - 1,988 *2 (16.28 - 19.88, 16.6 - 20.3, 236 - 288)	377.4 - 461.2 (3.77 - 4.61, 3.85 - 4.70, 54.7 - 66.8)

*1: With blower control dial in the "1" position
*2: With blower control dial in the "4" position.

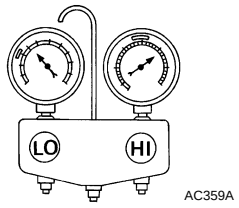
Trouble Diagnoses for Unusual Pressure

INFOID:0000000001547077

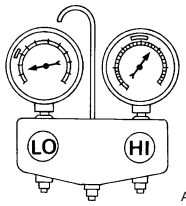
TROUBLE DIAGNOSIS FOR UNUSUAL PRESSURE

Whenever system's high and/or low side pressure(s) is/are unusual, diagnose using a manifold gauge. The marker above the gauge scale in the following tables indicates the standard (usual) pressure range. Since the standard (usual) pressure, however, differs from vehicle to vehicle, refer to above table (Ambient air temperature-to-operating pressure table).

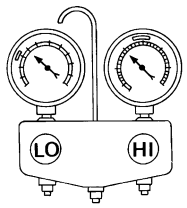
Both High- and Low-pressure Sides are Too High

Gauge indication	Refrigerant cycle	Probable cause	Corrective action
Both high- and low-pressure sides are too high.  AC359A	Pressure is reduced soon after water is splashed on condenser.	Excessive refrigerant charge in refrigeration cycle.	Reduce refrigerant until specified pressure is obtained.
	Air suction by cooling fan is insufficient.	Insufficient condenser cooling performance. ↓ 1. Condenser fins are clogged. 2. Improper fan rotation of cooling fan.	• Clean condenser. • Check and repair cooling fan if necessary.
	• Low-pressure pipe is not cold. • When compressor is stopped high-pressure value quickly drops by approximately 196 kPa (1.96 bar, 2 kg/cm^2 , 28 psi). It then decreases gradually thereafter.	Poor heat exchange in condenser (After compressor operation stops, high-pressure decreases too slowly.). ↓ Air in refrigeration cycle.	Evacuate repeatedly and recharge system.
	Engine tends to overheat.	Engine cooling systems malfunction.	Check and repair each engine cooling system.
	• An area of the low-pressure pipe is colder than areas near the evaporator outlet. • Plates are sometimes covered with frost.	• Excessive liquid refrigerant on low-pressure side. • Excessive refrigerant discharge flow. • Expansion valve is open a little compared with the specification. ↓ Improper expansion valve adjustment.	Replace expansion valve.

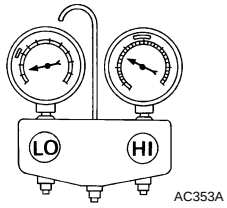
High-pressure Side is Too High and Low-pressure Side is Too Low

Gauge indication	Refrigerant cycle	Probable cause	Corrective action
High-pressure side is too high and low-pressure side is too low.  AC360A	Upper side of condenser and high-pressure side are hot, however, liquid tank is not so hot.	High-pressure tube or parts located between compressor and condenser are clogged or crushed.	• Check and repair or replace malfunctioning parts. • Check oil for contamination.

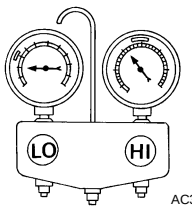
High-pressure Side is Too Low and Low-pressure Side is Too High

Gauge indication	Refrigerant cycle	Probable cause	Corrective action
High-pressure side is too low and low-pressure side is too high.  AC356A	High- and low-pressure sides become equal soon after compressor operation stops.	Compressor pressure operation is improper. ↓ Damaged inside compressor packings.	Replace compressor.
	No temperature difference between high- and low-pressure sides.	Compressor pressure operation is improper. ↓ Damaged inside compressor packings.	Replace compressor.

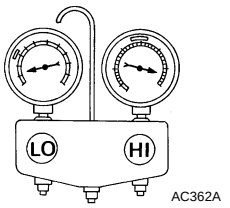
Both High- and Low-pressure Sides are Too Low

Gauge indication	Refrigerant cycle	Probable cause	Corrective action
Both high- and low-pressure sides are too low.  AC353A	• There is a big temperature difference between liquid tank outlet and inlet. Outlet temperature is extremely low. • Liquid tank inlet and expansion valve are frosted.	Liquid tank inside is slightly clogged.	• Replace liquid tank. • Check oil for contamination.
	• Temperature of expansion valve inlet is extremely low as compared with areas near liquid tank. • Expansion valve inlet may be frosted. • Temperature difference occurs somewhere in high-pressure side.	High-pressure pipe located between liquid tank and expansion valve is clogged.	• Check and repair malfunctioning parts. • Check oil for contamination.
	Expansion valve and liquid tank are warm or only cool when touched.	Low refrigerant charge. ↓ Leaking fittings or components	Check refrigerant for leaks. Refer to XXXX CHECKING OF REFRIG LEAKS .
	There is a big temperature difference between expansion valve inlet and outlet while the valve itself is frosted.	Expansion valve closes a little compared with the specification. ↓ 1. Improper expansion valve adjustment. 2. Malfunctioning expansion valve. 3. Outlet and inlet may be clogged.	• Remove foreign particles by using compressed air. • Replace expansion valve. • Check oil for contamination.
	An area of the low-pressure pipe is colder than areas near the evaporator outlet.	Low-pressure pipe is clogged or crushed.	• Check and repair malfunctioning parts. • Check oil for contamination.
	Air flow volume is not enough or is too low.	Evaporator is frozen.	• Check thermo control amp. Refer to XXXX MAG CLUTCH CIR.. • Replace compressor. • Repair evaporator fins. • Replace evaporator. • Refer to XXXX BLOWER MOTOR CIR. .

Low-pressure Side Sometimes Becomes Negative

Gauge indication	Refrigerant cycle	Probable cause	Corrective action
Low-pressure side sometimes becomes negative.  AC354A	• Air conditioning system does not function and does not cyclically cool the compartment air. • The system constantly functions for a certain period of time after compressor is stopped and restarted.	Refrigerant does not discharge cyclically. ↓ Moisture is frozen at expansion valve outlet and inlet. ↓ Water is mixed with refrigerant.	• Drain water from refrigerant or replace refrigerant. • Replace liquid tank.

Low-pressure Side Becomes Negative

Gauge indication	Refrigerant cycle	Probable cause	Corrective action
Low-pressure side becomes negative.  AC362A	Liquid tank or front/rear side of expansion valve's pipe is frosted or dewed.	High-pressure side is closed and refrigerant does not flow. ↓ Expansion valve or liquid tank is frosted.	Leave the system at rest until no frost is present. Start it again to check whether or not the malfunction is caused by water or foreign particles. • If water is the cause, initially cooling is okay. Then the water freezes causing a blockage. Drain water from refrigerant or replace refrigerant. • If due to foreign particles, remove expansion valve and remove the particles with dry and compressed air (not shop air). • If either of the above methods cannot correct the malfunction, replace expansion valve. • Replace liquid tank. • Check oil for contamination.

INSUFFICIENT HEATING

Component Function Check

INFOID:0000000001547078

SYMPTOM: Insufficient heating

INSPECTION FLOW

1.CONFIRM SYMPTOM BY PERFORMING OPERATIONAL CHECK - TEMPERATURE DECREASE

1. Turn temperature control dial clockwise to maximum heat position.
2. Check for hot air at discharge air outlets.

Can the symptom be duplicated?

YES >> GO TO 3.
NO >> GO TO 2.

2.CHECK FOR ANY SYMPTOMS

Perform a complete operational check for any symptoms. Refer to HAC-6, "Operational Check".

Does another symptom exist?

YES >> Refer to HAC-5, "How to Perform Trouble Diagnosis For Quick and Accurate Repair" .
NO >> System OK.

3.CHECK FOR SERVICE BULLETINS

Check for any service bulletins.

>> GO TO 4.

4.CHECK COOLANT SYSTEM

1. Check engine coolant level. Refer to XX-XX, "*****" .
2. Check hoses for leaks or kinks.
3. Check Radiator cap. Refer to XX-XX, "*****" .

OK or NG

OK >> GO TO 5.
NG >> Repair/replace as necessary.

5.CHECK AIR MIX DOOR CABLE

Check air mix door cable operation. Refer to XXXX AIR MIX DOOR CABLE ADJUSTMENT .

OK or NG

YES >> GO TO 6.
NO >> Adjust or replace air mix door cable. Refer to XXXX AIR MIX DOOR CABLE ADJUST. .

6.CHECK AIR DUCTS

Check ducts for air leaks.

OK or NG

OK >> GO TO 7.
NG >> Repair air leaks.

7.CHECK HEATER HOSE TEMPERATURES

1. Start engine and warm it up to normal operating temperature.
2. Touch both the inlet and outlet heater hoses.

Is the inlet hose hot and the outlet hose warm?

YES >> GO TO 8.
NO >> Both hoses warm: GO TO 9.

8.CHECK ENGINE COOLANT TEMPERATURE SENSOR

Check engine control temperature sensor. Refer to XX-XX, "*****" .

OK or NG

OK >> System OK.

NG >> Repair or replace as necessary. Retest.

9. CHECK HEATER HOSES

Check heater hoses for proper installation.

OK or NG

OK >> GO TO 10.
NG >> Repair /replace as necessary. Retest GO TO 7.

10. BACK FLUSH HEATER CORE

1. Back flush heater core.
2. Drain the water from the system.
3. Refill system with new engine coolant. Refer to XX-XX, "*****" .
4. Start engine and warm it up to normal operating temperature.
5. Touch both the inlet and outlet heater hoses.

Is the inlet hose hot and the outlet hose warm? YES or NO

YES >> System OK.
NO >> Replace heater core and refill engine coolant. Refer to XXXX .

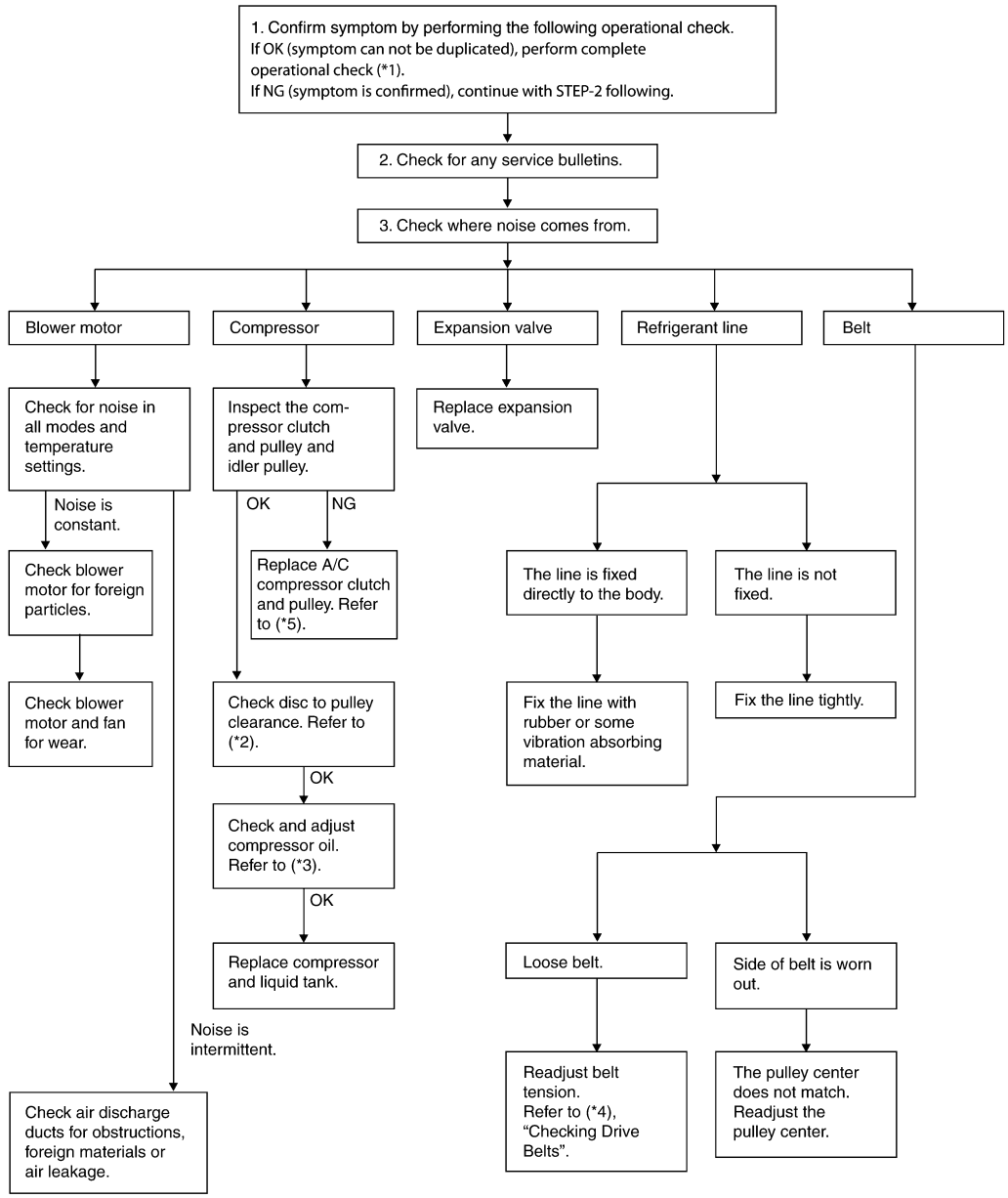
NOISE

Component Function Check

INFOID:0000000001547079

SYMPTOM: Noise

INSPECTION FLOW



WJIA2226E

*1. XXXX OPER. CHECK

*2. XXXX REMOVE OF COMPRESSOR

*3. XXXX MAIN. OF OIL QUALITY IM COMPR.

*4. XX-XX, "*****"

*5. XXXX REMOVE COMPRESSOR

PRECAUTION

PRECAUTIONS

Precaution for Supplemental Restraint System (SRS) "AIR BAG" and "SEAT BELT PRE-TENSIONER"

INFOID:0000000001683796

The Supplemental Restraint System such as “AIR BAG” and “SEAT BELT PRE-TENSIONER”, used along with a front seat belt, helps to reduce the risk or severity of injury to the driver and front passenger for certain types of collision. Information necessary to service the system safely is included in the SRS and SB section of this Service Manual.

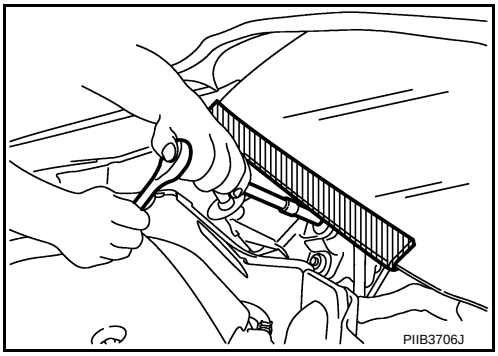
WARNING:

- **To avoid rendering the SRS inoperative, which could increase the risk of personal injury or death in the event of a collision which would result in air bag inflation, all maintenance must be performed by an authorized NISSAN/INFINITI dealer.**
- **Improper maintenance, including incorrect removal and installation of the SRS, can lead to personal injury caused by unintentional activation of the system. For removal of Spiral Cable and Air Bag Module, see the SRS section.**
- **Do not use electrical test equipment on any circuit related to the SRS unless instructed to in this Service Manual. SRS wiring harnesses can be identified by yellow and/or orange harnesses or harness connectors.**

Precaution for Procedures Without Cowl Top Cover

INFOID:0000000001203084

When performing the procedure after removing cowl top cover, cover the lower end of windshield with urethane, etc.



Working with HFC-134a (R-134a)

INFOID:0000000001203085

WARNING:

- **CFC-12 (R-12) refrigerant and HFC-134a (R-134a) refrigerant are not compatible. These refrigerants must never be mixed, even in the smallest amounts. If the refrigerants are mixed a compressor malfunction is likely to occur.**
- **Use only specified oil for the HFC-134a (R-134a) A/C system and HFC-134a (R-134a) components. If oil other than that specified is used, compressor malfunction is likely to occur.**
- **The specified HFC-134a (R-134a) oil rapidly absorbs moisture from the atmosphere. The following handling precautions must be observed:**

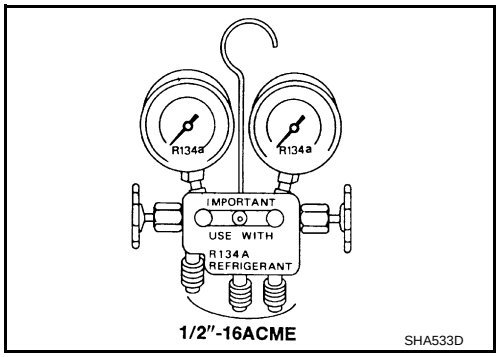
- When removing refrigerant components from a vehicle, immediately cap (seal) the component to minimize the entry of moisture from the atmosphere.
- When installing refrigerant components to a vehicle, do not remove the caps (unseal) until just before connecting the components. Connect all refrigerant loop components as quickly as possible to minimize the entry of moisture into system.
- Only use the specified oil from a sealed container. Immediately reseal containers of oil. Without proper sealing, oil will become moisture saturated and should not be used.
- Avoid breathing A/C refrigerant and oil vapor or mist. Exposure may irritate eyes, nose and throat. Use only approved recovery/recycling equipment to discharge HFC-134a (R-134a) refrigerant. If accidental system discharge occurs, ventilate work area before resuming service. Additional health and safety information may be obtained from refrigerant and oil manufacturers.
- Do not allow A/C oil to come in contact with styrofoam parts. Damage may result.

Precaution for Service Equipment

INFOID:0000000001203086

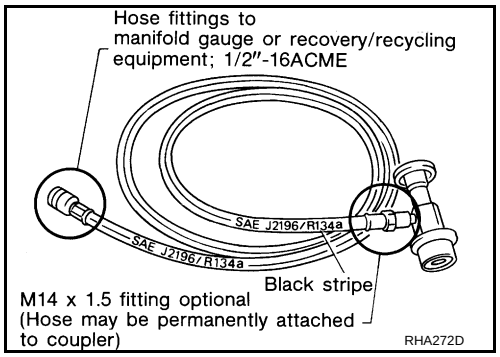
MANIFOLD GAUGE SET

Be certain that the gauge face indicates R-134a or 134a. Make sure the gauge set has 1/2″-16 ACME threaded connections for service hoses. Confirm the set has been used only with refrigerant HFC-134a (R-134a) along with specified oil.



SERVICE HOSES

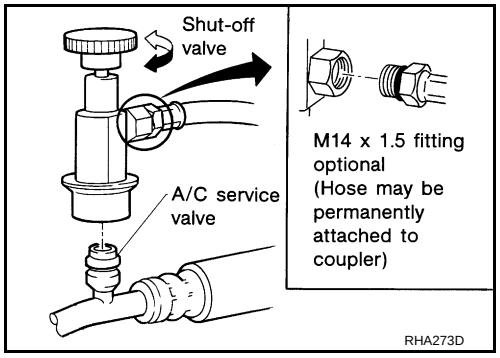
Be certain that the service hoses display the markings described (colored hose with black stripe). All hoses must include positive shut-off devices (either manual or automatic) near the end of the hoses opposite the manifold gauge.



SERVICE COUPLERS

Never attempt to connect HFC-134a (R-134a) service couplers to a CFC-12 (R-12) A/C system. The HFC-134a (R-134a) couplers will not properly connect to the CFC-12 (R-12) system. However, if an improper connection is attempted, discharging and contamination may occur.

Shut-off valve rotation	A/C service valve
Clockwise	Open
Counterclockwise	Close



BASIC INSPECTION

DIAGNOSIS AND REPAIR WORKFLOW

How to Perform Trouble Diagnosis For Quick And Accurate Repair

INFOID:0000000001547385

WORK FLOW

1.LISTEN TO CUSTOMER COMPLAINT

Listen to customer complaint. Get detailed information about the conditions and environment when the symptom occurs.

>> GO TO 2

2.CHECK FOR SERVICE BULLETINS

Check for any service bulletins.

>> GO TO 3.

3.VERIFY THE SYMPTOM WITH OPERATIONAL CHECK

Verify the symptom with operational check. Refer to HAC-87, "Operational Check".

Can a symptom be duplicated?

YES >> GO TO 4
NO >> GO TO 5

4.GO TO APPROPRIATE TROUBLE DIAGNOSIS

Go to appropriate trouble diagnosis. Refer to HAC-184, "Symptom Matrix Chart".

Can a symptom be duplicated?

>> GO TO 5.

5.PERFORM THE FRONT AIR CONTROL SELF-DIAGNOSIS

Perform A/C auto amp. self-diagnosis. Refer toHAC-98, "Front Air Control Self-Diagnosis".

>> If any diagnostic trouble codes set, refer to HAC-104, "A/C System Self-Diagnosis Code Chart".
>> Confirm the repair by performing operational check. Refer to HAC-87, "Operational Check".

INSPECTION AND ADJUSTMENT

Operational Check

INFOID:0000000001547386

The purpose of the operational check is to confirm that the system operates properly.

Conditions : Engine running at usual operating temperature

CHECKING MEMORY FUNCTION

1. Press temperature control switch (UP:▲) until 32°C is displayed.
2. Press OFF switch.
3. Turn the ignition switch OFF.
4. Turn the ignition switch ON.
5. Press the AUTO switch.
6. Confirm that the set temperature remains at previous temperature.
7. Press OFF switch.

If NG, go to trouble diagnosis procedure for HAC-198, "Memory Function Check".
If OK, continue the check.

CHECKING BLOWER

1. Press blower motor switch (UP:▲). Blower should operate on low speed. The fan symbol should have one blade lit.
2. Press blower motor switch (UP:▲), and continue checking blower speed and fan symbol until all speeds are checked.
3. Leave blower on max. speed.

If NG, go to trouble diagnosis procedure for HAC-120, "Front Blower Motor Diagnosis Procedure".
If OK, continue the check.

CHECKING DISCHARGE AIR

1. Press MODE switch and DEF switch.
2. Each position indicator should change shape.
3. Confirm that discharge air comes out according to the air distribution table. Refer to HAC-94, "Discharge Air Flow".

Intake door position is checked in the next step.
If NG, go to trouble diagnosis procedure for HAC-109, "Mode Door Motor Diagnosis Procedure".
If OK, continue the check.

NOTE:
Confirm that the compressor clutch is engaged (sound or visual inspection) and intake door position is at FRESH when the DEF is selected.

CHECKING RECIRCULATION

1. Press recirculation (REC) switch one time. Recirculation LED should illuminate.
2. Press fresh (FRE) switch one time. Fresh LED should illuminate.
3. Listen for intake door position change (you should hear blower sound change slightly).

If NG, go to trouble diagnosis procedure for HAC-116, "Intake Door Motor Diagnosis Procedure".
If OK, continue the check.

CHECKING TEMPERATURE INCREASE

1. Press temperature control switch (UP:▲) until 32°C is displayed.
2. Check for hot air at discharge air outlets.

If NG, go to trouble diagnosis procedure for HAC-193, "Component Function Check".
If OK, continue the check.

CHECKING TEMPERATURE DECREASE

1. Press temperature control switch (DOWN:▼) until 18°C is displayed.

2. Check for cold air at discharge air outlets.

If NG, go to trouble diagnosis procedure for HAC-185, "Component Function Check".
If OK, continue the check.

CHECK A/C SWITCH

1. Press AUTO and A/C switches.
2. A/C switch LED will turn ON.
   - Confirm that the compressor clutch engages (sound or visual inspection).

If NG, go to trouble diagnosis procedure for HAC-125, "Magnet Clutch Diagnosis Procedure".
If OK, continue the check.

CHECKING AUTO MODE

1. Press AUTO switch.
2. Display should indicate AUTO.
   - Confirm that discharge air and blower speed will depend on ambient, in-vehicle, and set temperatures.

- If NG, go to trouble diagnosis procedure for HAC-163, "Front Air Control Power and Ground Diagnosis Procedure", then if necessary, trouble diagnosis procedure for HAC-125, "Magnet Clutch Diagnosis Procedure".
- If all operational checks are OK (symptom cannot be duplicated), go to Incident Simulation Tests in XX-XX, "*****" and perform tests as outlined to simulate driving conditions environment.
- If symptom appears, refer to HAC-86, "How to Perform Trouble Diagnosis For Quick And Accurate Repair" and perform applicable trouble diagnosis procedures.

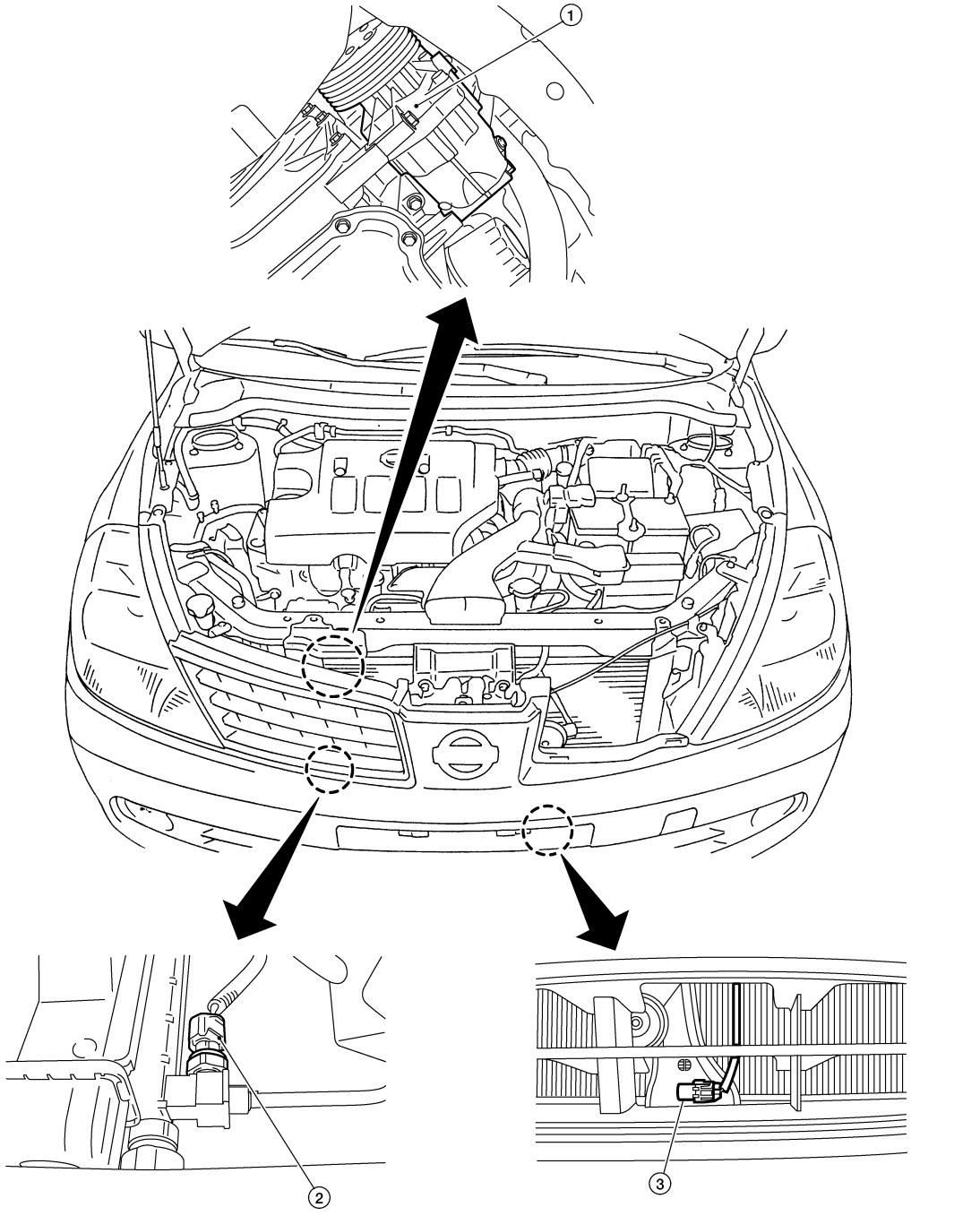
FUNCTION DIAGNOSIS

FUNCTION INFORMATION

Component Part Location

INFOID:0000000001547388

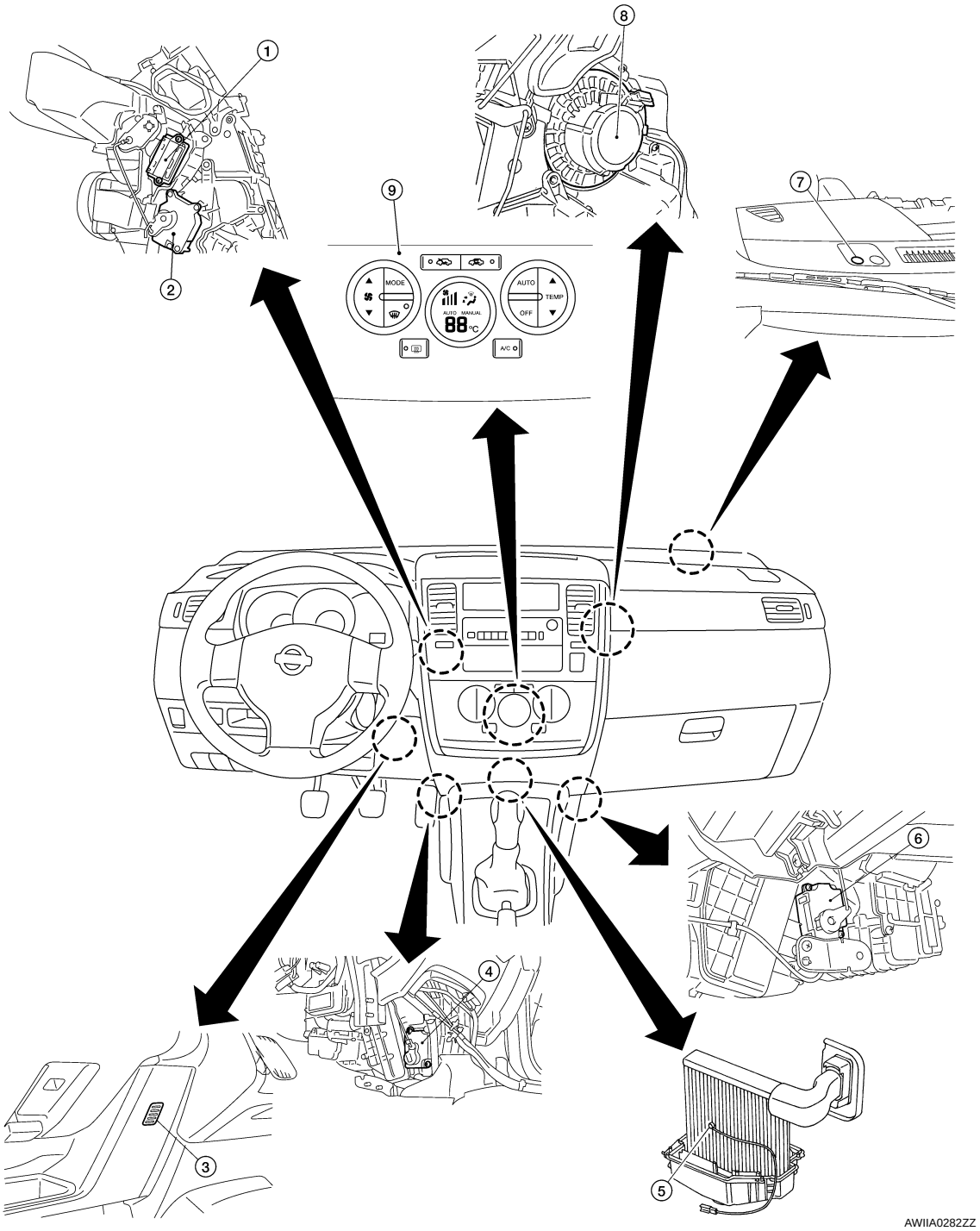
ENGINE COMPARTMENT



AWIIA0602ZZ

1. Compressor (magnet clutch) F3
2. Refrigerant pressure sensor E17
3. Ambient sensor E60

PASSENGER COMPARTMENT



1. Variable blower control M90, M91
2. Intake door motor M89
3. In-vehicle sensor M93
4. Air mix door motor M88
5. Intake sensor M92
6. Mode door motor M87
7. Sunload sensor M94
8. Front blower motor M62
9. Front air control M50, M51

REFRIGERATION SYSTEM

Refrigerant Cycle

INFOID:0000000001547390

Refer to XX-XX, "*****".

Refrigerant System Protection

INFOID:0000000001547391

Refer to XX-XX, "*****".

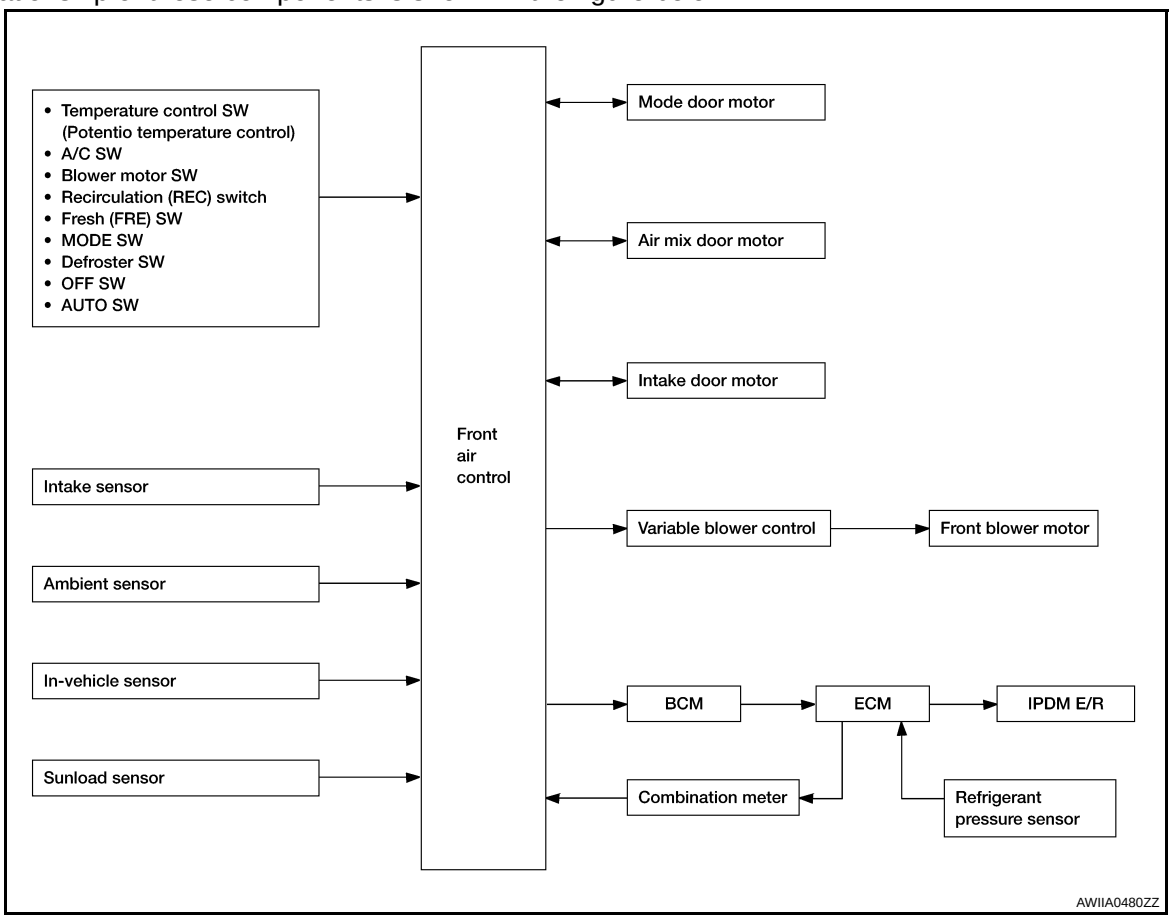
AUTOMATIC AIR CONDITIONER SYSTEM

Control System Diagram

INFOID:0000000001547392

CONTROL SYSTEM

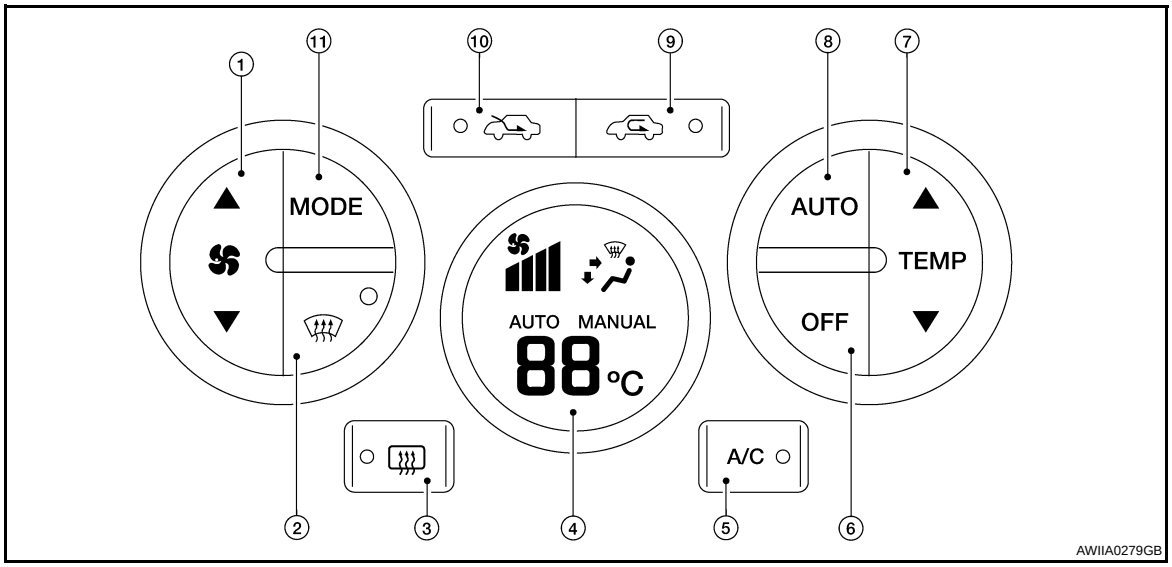
The control system consists of input sensors, switches, the front air control (microcomputer) and outputs. The relationship of these components is shown in the figure below:



Control System Description

INFOID:0000000001547393

CONTROL OPERATION



1. Blower motor switch
2. Defroster (DEF) switch
3. Rear window defogger switch
4. Display
5. A/C switch
6. OFF switch
7. Temperature control switch
8. AUTO switch
9. Recirculation (REC) switch
10. Fresh (FRE) switch
11. MODE switch

DISPLAY
Displays the operational status of the system.

AUTO SWITCH
- The compressor, intake doors, air mix doors, outlet doors and blower speed are automatically controlled so that the in-vehicle temperature will reach, and be maintained at the set temperature selected by the operator.
- When pressing AUTO switch, air inlet, air outlet, fan speed, and discharge air temperature are automatically controlled. (Inlet is automatically controlled only when FRE or REC switch is OFF.)

TEMPERATURE CONTROL SWITCH (POTENTIO TEMPERATURE CONTROL)
Increases or decreases the set temperature.

RECIRCULATION (REC) SWITCH
- When REC switch is ON, REC switch indicator turns ON, air inlet is fixed to REC, and compressor will turn ON.
- When FRE switch is turned ON, air outlet switches to D/F or DEF position, or when compressor is turned from ON to OFF, REC switch is automatically turned OFF (fixed to FRE mode).

FRESH (FRE) SWITCH
- When FRE switch is ON, FRE switch indicator turns ON, and air inlet is fixed to FRE.
- When REC switch is turned ON, FRE switch is automatically turned OFF (fixed to REC mode). FRE mode can be re-entered by pressing FRE switch again.

DEFROSTER (DEF) SWITCH
Positions the air outlet doors to the defrost position. Also positions the intake doors to the outside air position, and compressor will turn ON.

REAR WINDOW DEFOGGER SWITCH
When illumination is ON, rear window is defogged.

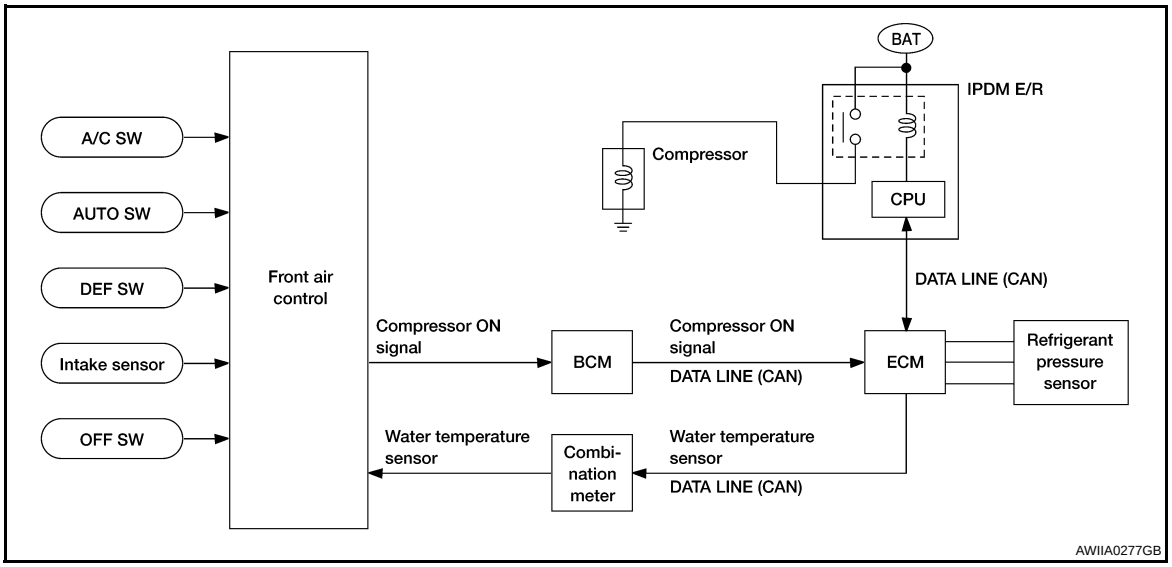
OFF SWITCH
The compressor and blower are OFF, the intake doors are set to the outside air position, and the air outlet doors are set to the foot position.

A/C SWITCH
The compressor is ON or OFF.
(Pressing the A/C switch when the A/C switch is ON will turn off the A/C switch and compressor.)

MODE SWITCH
Controls the air discharge outlets.
When air outlet switches to D/F position, compressor will turn ON and fixed to REC mode.

BLOWER MOTOR SWITCH
Manually control the blower speed. Four speeds are available for manual control (as shown on the display).

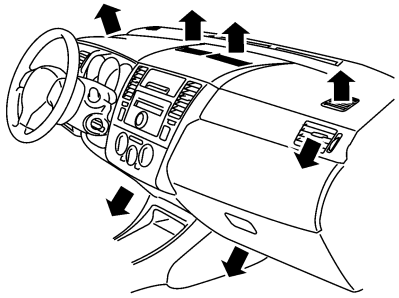
MAGNET CLUTCH CONTROL



When A/C switch, AUTO switch or DEF switch is pressed, front air control inputs compressor ON signal to BCM.
BCM sends compressor ON signal to ECM, via CAN communication line.
ECM judges whether compressor can be turned ON, based on each sensor status (refrigerant-pressure sensor signal, throttle angle, etc.). If it judges compressor can be turned ON, it sends compressor ON signal to IPDM E/R, via CAN communication line.
Upon receipt of compressor ON signal from ECM, IPDM E/R turns air conditioner relay ON to operate compressor.

Discharge Air Flow

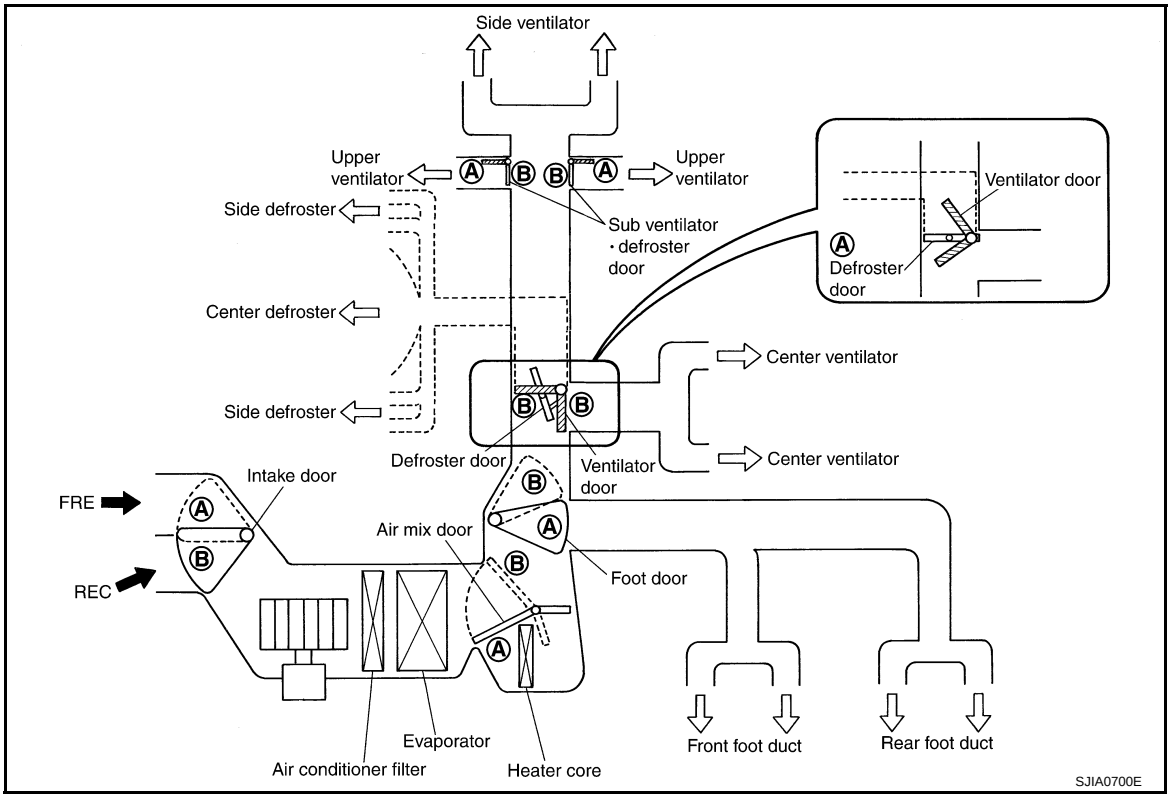
INFOID:0000000001547394



Mode door position	Air outlet/distribution		
	Vent	Foot	Defroster
	100%	—	—
	56%	44%	—
	16%	64%	20%
	16%	53%	31%
	17%	—	83%
Airflow always present at driver and passenger side demisters			

Switches And Their Control Function

INFOID:0000000001547396



Position or switch / Door	MODE SW				DEF SW		AUTO SW	Intake SW		Temperature control SW			OFF SW
	VENT	B/L	FOOT	D/F	ON	OFF		FRE SW	REC SW				
							AUTO						OFF
						O			O	18°C		32°C	
Ventilator door	A	A	B *1	B *1	B *1		AUTO	—		—			B *1
Sub ventilator door	A	A	B	B	B			—		—			B
Defroster door	A	A	B	B	B			—		—			B
Foot door	A	A~B	B *1	A~B	A	—		—		—			B *1
Intake door	—				B		—	B	AUTO	A	—		B
Air mix door	—				—		AUTO	—		A	AUTO	B	—

*1 When in the B position, ventilator door and foot door are not completely shut.

AWIIA0280GB

CAN COMMUNICATION SYSTEM

System Description

INFOID:0000000001547398

Refer to LAN-13, "System Description".

DIAGNOSIS SYSTEM (BCM)

CONSULT-III Function (BCM)

INFOID:0000000001547400

CONSULT-III can display each diagnostic item using the diagnostic test modes shown following.

BCM diagnostic test item	Diagnostic mode	Description
Inspection by part	WORK SUPPORT	Supports inspections and adjustments. Commands are transmitted to the BCM for setting the status suitable for required operation, input/output signals are received from the BCM and received data is displayed.
	DATA MONITOR	Displays BCM input/output data in real time.
	ACTIVE TEST	Operation of electrical loads can be checked by sending drive signal to them.
	SELF-DIAG RESULTS	Displays BCM self-diagnosis results.
	CAN DIAG SUPPORT MNTR	The result of transmit/receive diagnosis of CAN communication can be read.
	ECU PART NUMBER	BCM part number can be read.
	CONFIGURATION	Performs BCM configuration read/write functions.

DATA MONITOR

Display Item List

Monitor item name “operation or unit”		Contents
IGN ON SW	“ON/OFF”	Displays “IGN Position (ON)/OFF, ACC Position (OFF)” status as judged from ignition switch signal.
FAN ON SIG	“ON/OFF”	Displays “FAN (ON)/FAN (OFF)” status as judged from blower motor switch signal.
COMP ON SIG	“ON/OFF”	Displays “COMP (ON)/COMP (OFF)” status as judged from air conditioner switch signal.

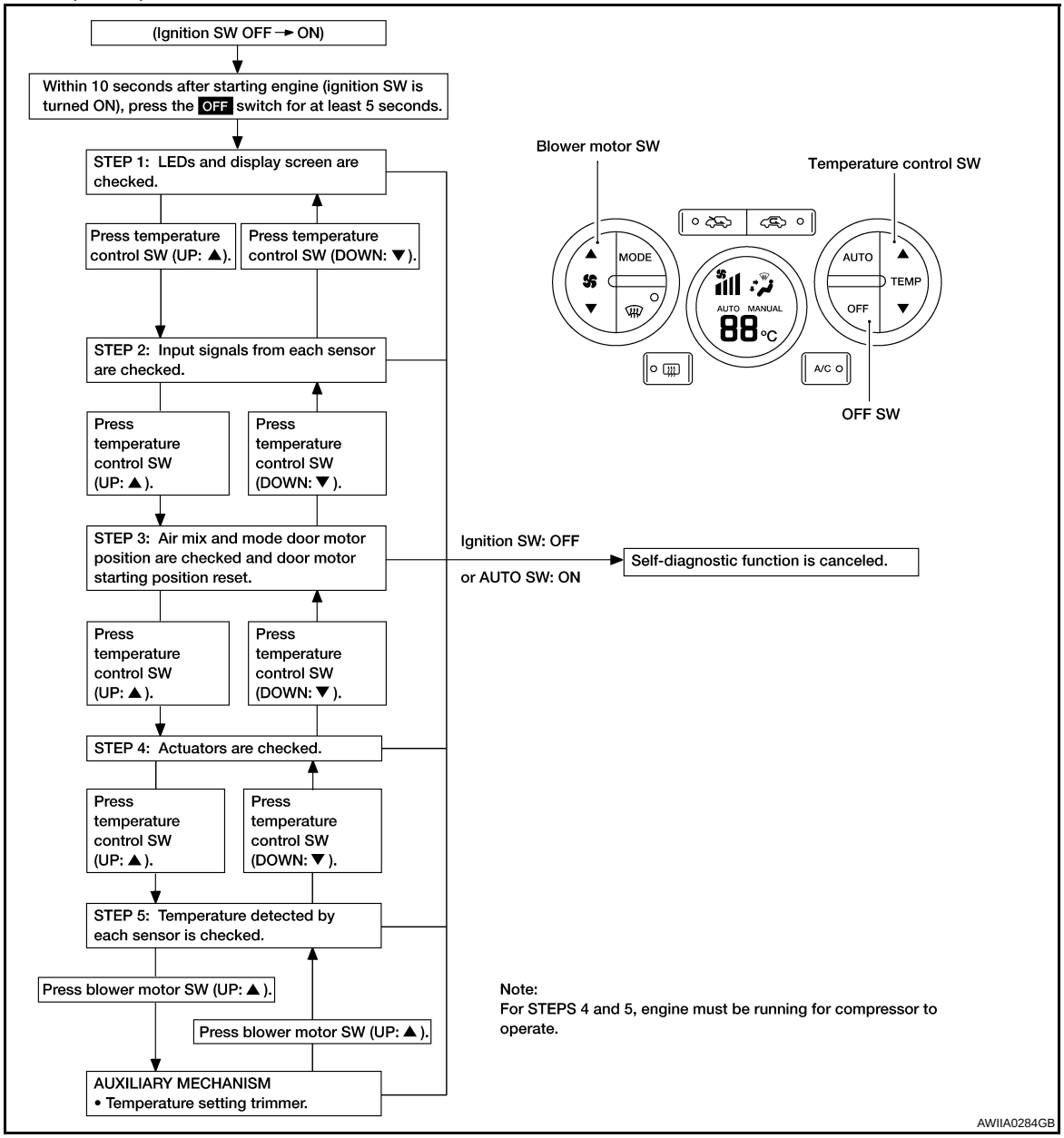
SELF-DIAGNOSIS FUNCTION

Front Air Control Self-Diagnosis

INFOID:0000000001547401

DESCRIPTION

The self-diagnostic system diagnoses sensors, door motors, blower motor, etc. by system line. Refer to applicable sections (items) for details. Shifting from usual control to the self-diagnostic system is accomplished by starting the engine (turning the ignition switch ON) and pressing OFF switch for at least 5 seconds. The OFF switch must be pressed within 10 seconds after starting the engine (ignition switch is turned ON). This system will be cancelled by either pressing AUTO switch or turning the ignition switch OFF. Shifting from one step to another is accomplished by means of pushing front air control switches, as required.
Additionally shifting from STEP-5 to AUXILIARY MECHANISM is accomplished by means of pushing blower motor switch (UP:▲).



FUNCTION CONFIRMATION PROCEDURE

1. SET IN SELF-DIAGNOSTIC MODE

1. Turn ignition switch ON.
2. Set in self-diagnostic mode as follows. Within 10 seconds after starting engine (ignition switch is turned ON.), press OFF switch for at least 5 seconds.

CAUTION:
If battery voltage drops below 12V during diagnosis STEP-3, door motor speed becomes slower and as a result, the system may generate an error even when operation is usual. To avoid this, start engine before performing this diagnosis.

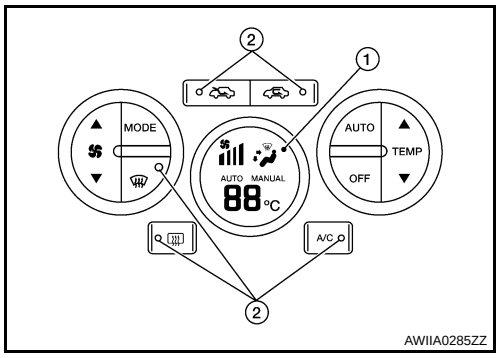
>> GO TO 2.

2. STEP-1: LED AND DISPLAY ARE CHECKED

Check display screen (1) and LED illumination (2).

OK or NG

OK >> GO TO 3.
NG >> Malfunction OFF switch or AUTO switch. Refer to HAC-311, "Self-Diagnosis".



3. CHECK TO ADVANCE SELF-DIAGNOSIS STEP-2

Press temperature control switch (UP: ▲).

Advance to self-diagnosis STEP-2?

YES >> GO TO 4.
NO >> Replace front air control (temperature control switch is malfunctioning). Refer to XX.

4. CHECK TO RETURN SELF-DIAGNOSIS STEP-1

Press temperature control switch (DOWN: ▼).

Return to self-diagnosis STEP-1?

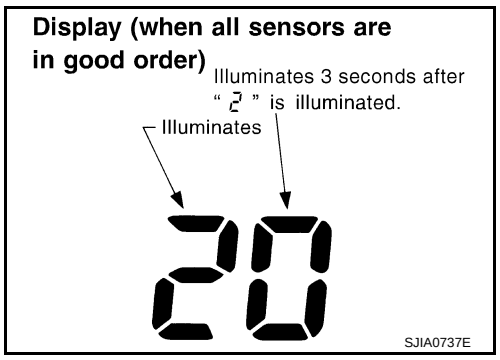
YES >> GO TO 5.
NO >> Replace front air control (temperature control switch is malfunctioning). Refer to XX.

5. STEP-2: SENSOR CIRCUITS ARE CHECKED FOR OPEN OR SHORT CIRCUIT

Press temperature control switch (UP: ▲).

Does code No. 20 appear on the display?

YES >> GO TO 6.
NO >> GO TO 13.

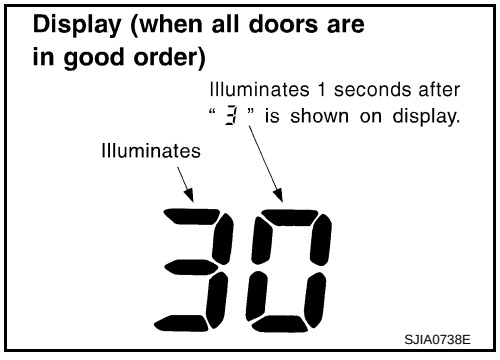


6. STEP-3: AIR MIX DOOR AND MODE DOOR POSITIONS ARE CHECKED

Press temperature control switch (UP: ▲).

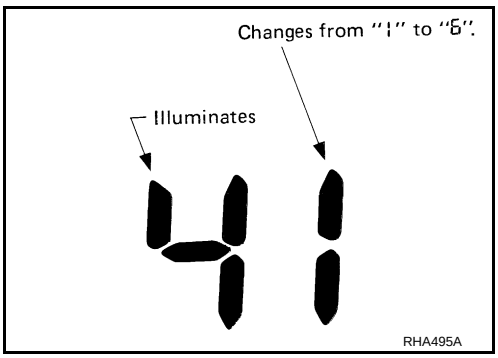
Does code No. 30 appear on the display?

YES >> GO TO 7.
NO >> GO TO 14.



7. STEP-4: OPERATION OF EACH DOOR MOTOR IS CHECKED

1. Press temperature control switch (UP: ▲).
2. Press (DEF) switch. Code No. of each door motor test is indicated on the display.



>> GO TO 8.

8. CHECK ACTUATORS

Refer to HAC-94, "Discharge Air Flow" and confirm discharge air flow, air temperature, blower motor voltage and compressor operation.

Code No.	41	42	43	44	45	46
Mode door position	VENT	B/L 1	B/L 2	FOOT	D/F	DEF
Intake door position	REC	REC	20% FRE	80% FRE	FRE	FRE
Air mix door position	FULL COLD	FULL COLD	50%	50%	FULL HOT	FULL HOT
Blower motor voltage	5V	10.5V	8.5V	8.5V	8.5V	Battery voltage
Compressor	ON	ON	ON	OFF	OFF	ON
Blower motor ON signal	12V	12V	12V	1V	1V	12V

Checks must be made visually, by listening to any noise, or by touching air outlets with your hand, etc. for improper operation.

OK or NG

OK >> GO TO 9.

NG >>
- Air outlet does not change.
  Go to Mode Door Motor Circuit. Refer to HAC-109, "Mode Door Motor Diagnosis Procedure".
- Intake door does not change.
  Go to Intake Door Motor Circuit. Refer to HAC-116, "Intake Door Motor Diagnosis Procedure".
- Blower motor operation is malfunctioning.
  Go to Blower Motor Circuit. Refer to HAC-120, "Front Blower Motor Diagnosis Procedure".
- Magnet clutch does not engage.
  Go to Magnet Clutch Circuit. Refer to HAC-125, "Magnet Clutch Diagnosis Procedure".
- Discharge air temperature does not change.
  Go to Air Mix Door Motor Circuit. Refer to HAC-112, "Air Mix Door Motor Diagnosis Procedure".

9. STEP-5: TEMPERATURE OF EACH SENSOR IS CHECKED

1. Press temperature control switch (UP: ▲).
2. Code No. 5 appears on the display.

>> GO TO 10.

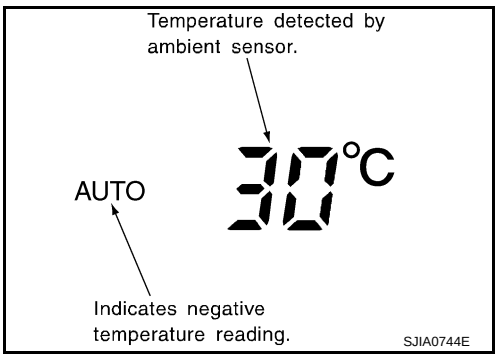
10. CHECK AMBIENT SENSOR

Press (DEF) switch one time. Temperature detected by ambient sensor is indicated on the display.

NOTE:
If temperature shown on display greatly differs from actual temperature, check sensor circuit first, then inspect sensor.

OK or NG

OK >> GO TO 11.
NG >> Go to Ambient Sensor Circuit. Refer to HAC-130, "Ambient Sensor Diagnosis Procedure".



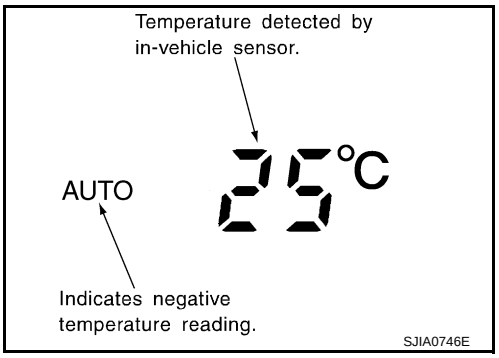
11. CHECK IN-VEHICLE SENSOR

Press (DEF) switch second time. Temperature detected by in-vehicle sensor is indicated on the display.

NOTE:
If temperature shown on display greatly differs from actual temperature, check sensor circuit first, then inspect sensor.

OK or NG

OK >> GO TO 12.
NG >> Go to In-vehicle Sensor Circuit. Refer to HAC-133, "In-Vehicle Sensor Diagnosis Procedure".



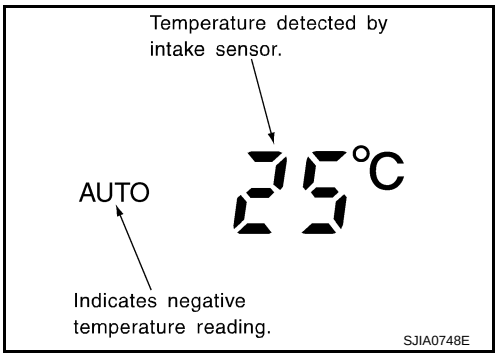
12. CHECK INTAKE SENSOR

Press (DEF) switch third time. Temperature detected by intake sensor is indicated on the display.

NOTE:
If temperature shown on display greatly differs from actual temperature, check sensor circuit first, then inspect sensor.

OK or NG

OK >> 1. Turn ignition switch OFF or AUTO switch ON.
2. INSPECTION END
NG >> Go to Intake Sensor Circuit. Refer to HAC-139, "Intake Sensor Diagnosis Procedure".



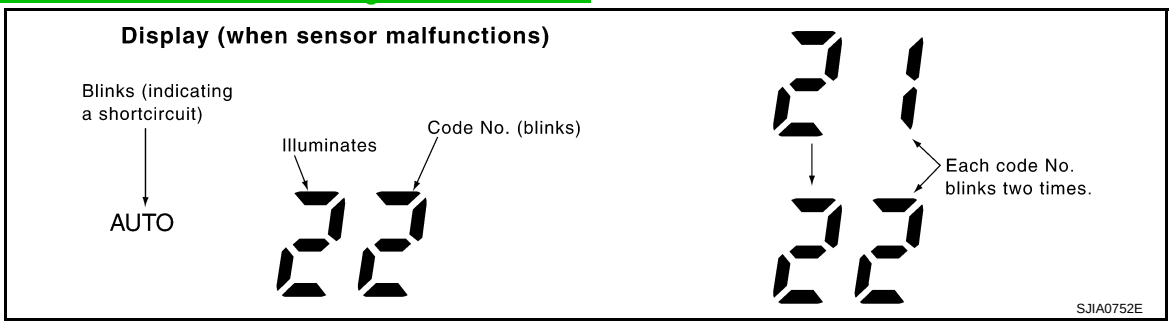
13. CHECK MALFUNCTIONING SENSOR

Refer to the following chart for malfunctioning code No.
(If two or more sensors malfunction, corresponding code No. blink respectively twice.)
*1: Perform self-diagnosis STEP-2 under sunshine.
When performing indoors, aim a light (more than 60W) at sunload sensor, otherwise code No.25 will indicate despite that sunload sensor is functioning properly.

Code No.	Malfunctioning sensor (Including circuits)	Reference page
21 / AUTO 21	Ambient sensor	*2
22 / AUTO 22	In-vehicle sensor	*3
24 / AUTO 24	Intake sensor	*4
25 / AUTO 25	Sunload sensor *1	*5
26 / AUTO 26	Intake door motor PBR	*6

*2: HAC-130, "Ambient Sensor Diagnosis Procedure".
*3: HAC-133, "In-Vehicle Sensor Diagnosis Procedure".
*4: HAC-139, "Intake Sensor Diagnosis Procedure".
*5: HAC-136, "Sunload Sensor Diagnosis Procedure".

*6: HAC-116, "Intake Door Motor Diagnosis Procedure".



>> INSPECTION END

14. CHECK MALFUNCTIONING DOOR MOTOR POSITION SWITCH

Air mix and/or mode door motor is/are malfunctioning.

Door motor corresponding to the DTC

Code No.*1 *2	31, 32, 33, 34	35, 36, 37, 38
Corresponding door motor	Air mix door	Mode door

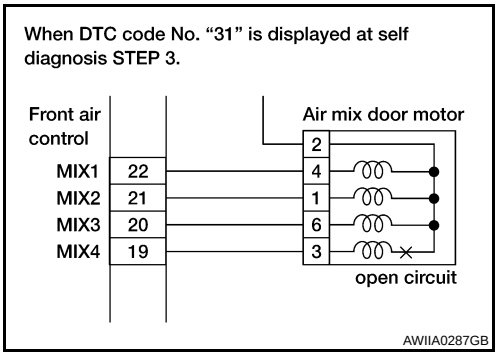
DTC for an inoperative harness

Corresponding door motor	Air mix door motor				Mode door motor			
Corresponding terminal (Door motor side)	3	4	1	6	3	4	1	6
Corresponding terminal (Front air control side)	19	22	21	20	23	26	25	24
Code number for short circuit	AUTO31	AUTO32	AUTO33	AUTO34	AUTO35	AUTO36	AUTO37	AUTO38
Code number for open circuit	31	32	33	34	35	36	37	38
Reference Page	*3				*4			

(If two or more air mix or mode doors are out of order, corresponding code numbers blink respectively twice.)
*1: If air mix door motor harness connector is disconnected, the following display pattern will appear.
31→32→33→34→Return to 31
*2: If mode door motor harness connector is disconnected, the following display pattern will appear.
35→36→37→38→Return to 35
*3: HAC-112, "Air Mix Door Motor Diagnosis Procedure".
*4: HAC-109, "Mode Door Motor Diagnosis Procedure".

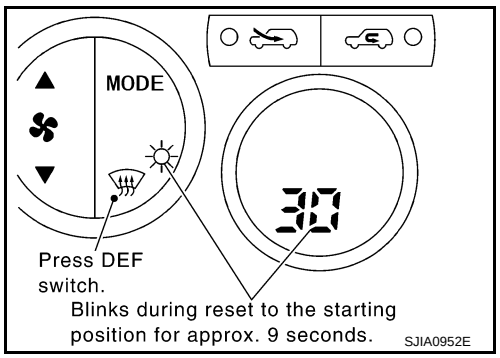
NOTE:

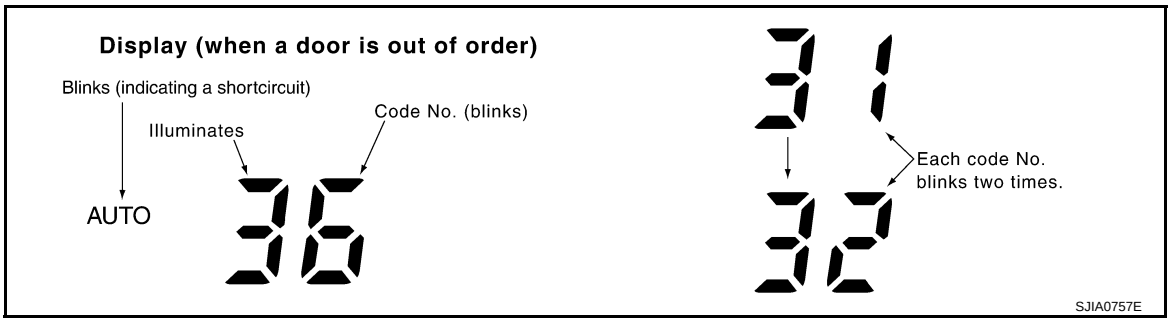
- If all four terminals of each door motor show an open circuit, there is probably a disconnected connector or an open circuit in actuator drive power supply harness.
- If a short circuit occurs in the harness between terminal for each door motor and drive signal, although it cannot be detected by self-diagnosis, the door motor will vibrate when it operate.



Door Motor Starting Position Reset

- Pressing the DEF switch during STEP-3 will send a reset signal to air mix door and mode door motor to reset them to the starting position.
  During reset: The 30 and DEF switch LED will blinks. (For approx. 9 seconds)





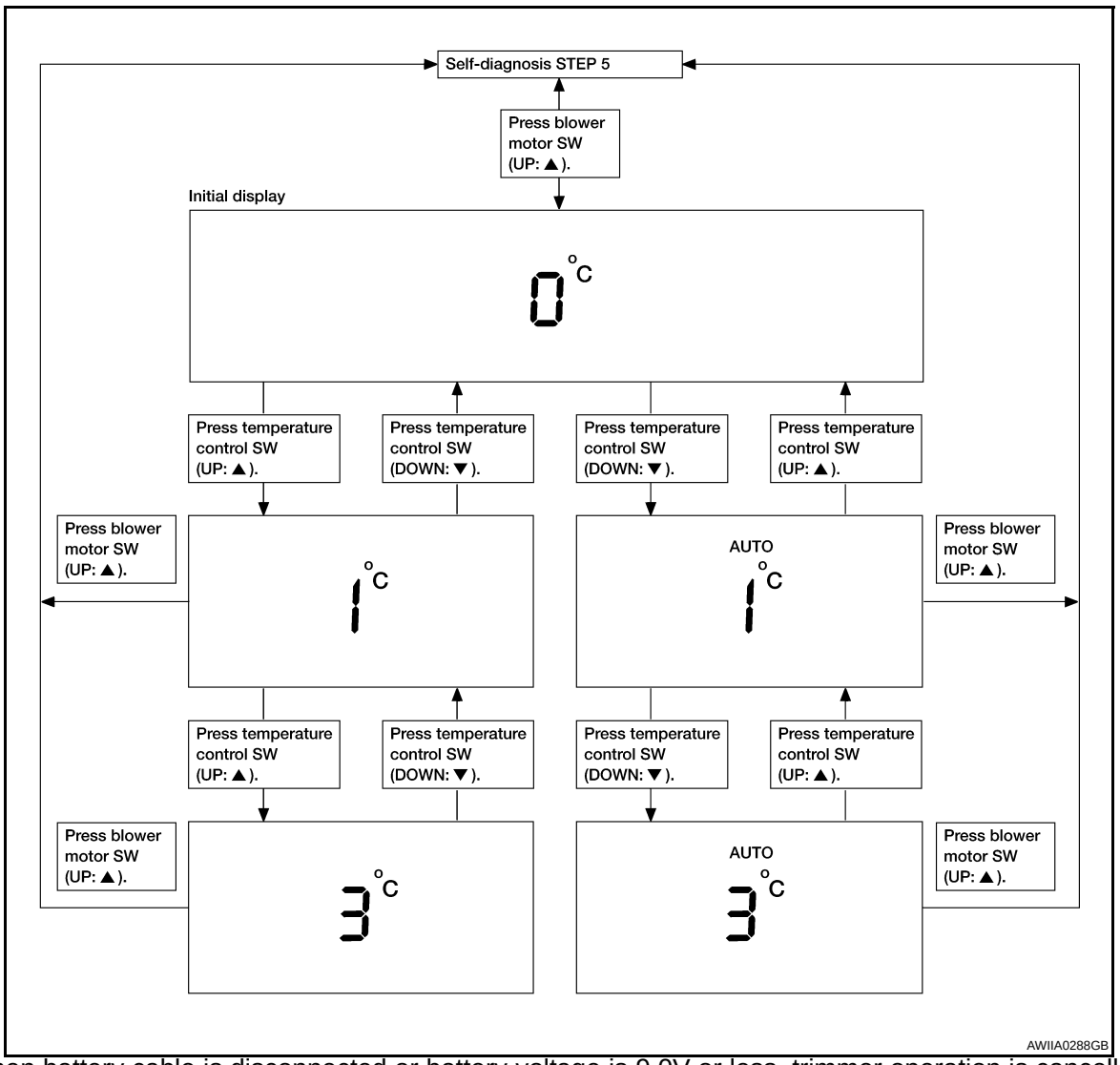
>> INSPECTION END

AUXILIARY MECHANISM: TEMPERATURE SETTING TRIMMER

The trimmer compensates for differences in range of ±3°C between temperature setting (displayed digitally) and temperature felt by driver.
Operating procedures for this trimmer are as follows:

1. Begin self-diagnosis STEP-5 mode. Refer to "Self-diagnosis Function".
2. Press blower motor switch (UP:▲) to set system in auxiliary mode.
3. Display shows 0°C in auxiliary mechanism.

4. Press temperature control switch as desired. Temperature will change at a rate of 1°C each time a switch is pressed.



When battery cable is disconnected or battery voltage is 9.0V or less, trimmer operation is cancelled. Set temperature returns to the initial condition, i.e. 0°C.

A/C System Self-Diagnosis Code Chart

INFOID:0000000001547403

SYMPTOM TABLE

Symptom	Reference Page	
A/C system does not come on.	Go to Trouble Diagnosis Procedure for A/C System.	HAC-163
Air outlet does not change.	Go to Trouble Diagnosis Procedure for Mode Door Motor.	HAC-109
Mode door motor does not operate normally.		
Discharge air temperature does not change.	Go to Trouble Diagnosis Procedure for Air Mix Door Motor.	HAC-112
Air mix door motor does not operate normally.		
Intake door does not change.	Go to Trouble Diagnosis Procedure for Intake Door Motor.	HAC-116
Intake door motor does not operate normally.		
Blower motor operation is malfunctioning.	Go to Trouble Diagnosis Procedure for Blower Motor.	HAC-120
Magnet clutch does not engage.	Go to Trouble Diagnosis Procedure for Magnet Clutch.	HAC-125
Insufficient cooling	Go to Trouble Diagnosis Procedure for Insufficient Cooling.	HAC-185
Insufficient heating	Go to Trouble Diagnosis Procedure for Insufficient Heating.	HAC-193

Symptom	Reference Page	
Noise	Go to Trouble Diagnosis Procedure for Noise.	HAC-195
Self-diagnosis cannot be performed.	Go to Trouble Diagnosis Procedure for Self-diagnosis.	HAC-311
Memory function does not operate.	Go to Trouble Diagnosis Procedure for Memory Function.	HAC-198

COMPONENT DIAGNOSIS

MODE DOOR MOTOR

System Description

INFOID:0000000001547404

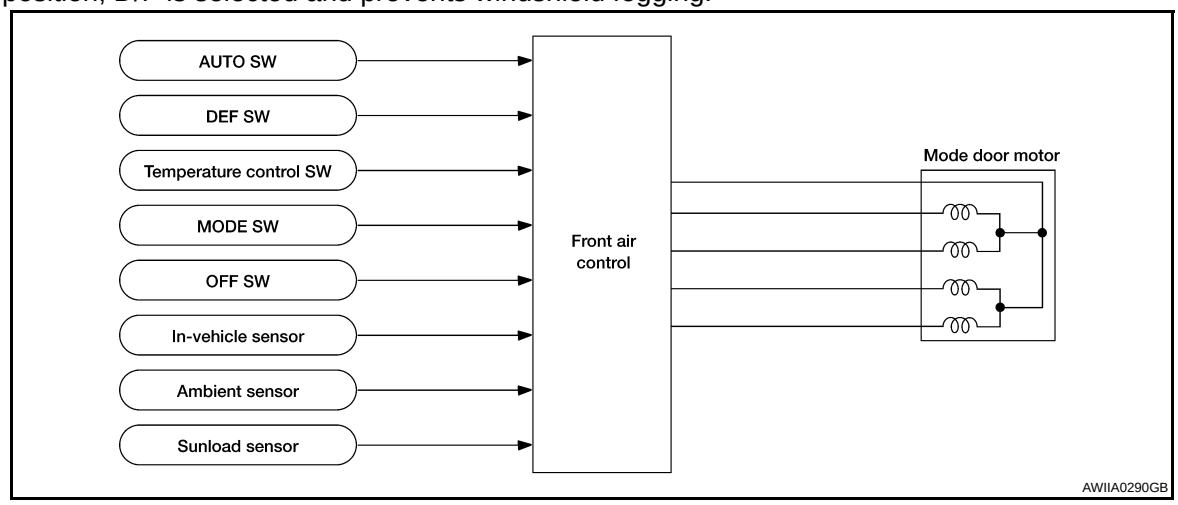
SYSTEM DESCRIPTION

Component Parts

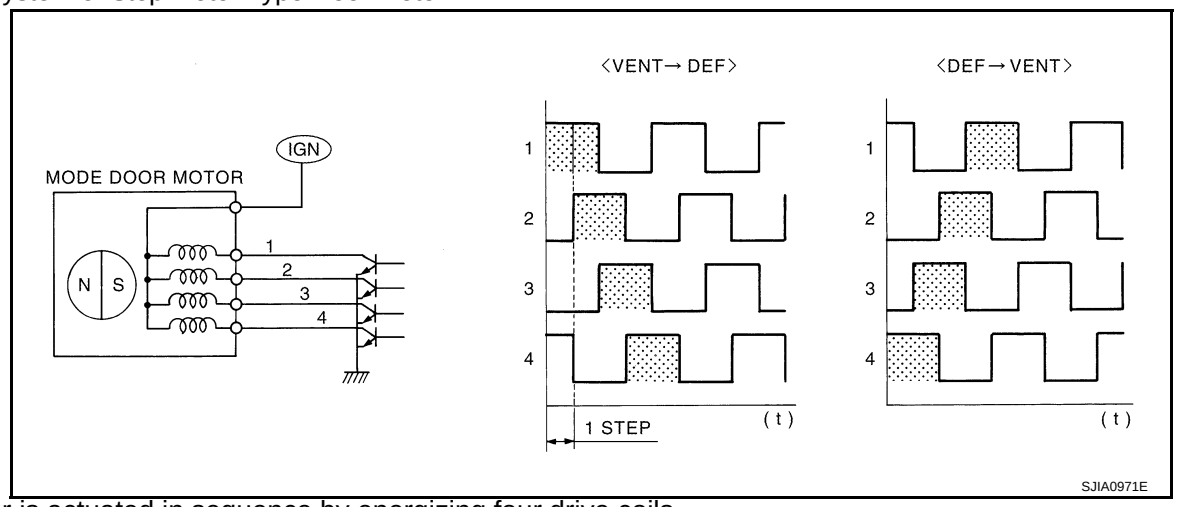
Mode door control system components are:
- Front air control
- Mode door motor
- In-vehicle sensor
- Ambient sensor
- Sunload sensor

System Operation

The front air control receives data from each of the sensors. When a drive signal is input from front air control to door motor, a step motor built into the door motor rotates according to the drive signal, and then stops at the position of target door.
Mode door changes to manual select mode by pressing MODE/DEF switch of the controller. That allows mode door to be fixed.
Pressing AUTO switch allows automatic control by front air control, and mode door is fixed in the FOOT position by pressing OFF switch.
During automatic operation of mode door, mode door position (VENT, B/L, FOOT) is selected according to the temperature of discharge air calculated by front air control based on the target opening angle of air mix door and the amount of sunload. And only when ambient temperature is extremely low with the mode door in the FOOT position, D/F is selected and prevents windshield fogging.

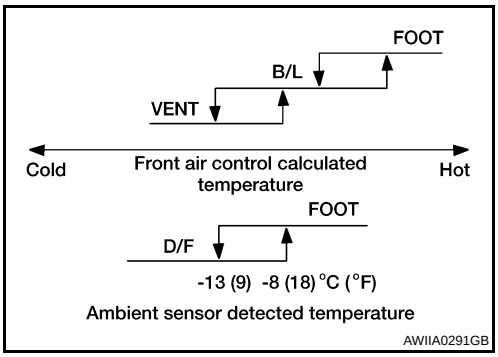


Drive System of Step Motor Type Door Motor



- Motor is actuated in sequence by energizing four drive coils.
- Rotation direction can be changed by changing pattern of excitation.

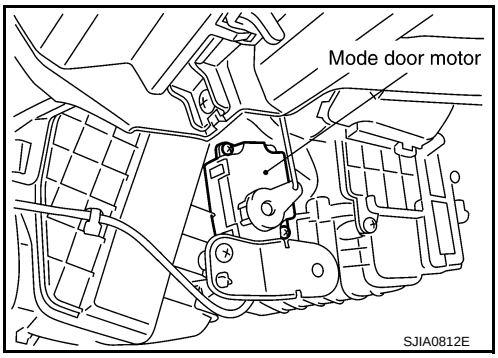
Mode Door Control Specification



COMPONENT DESCRIPTION

Mode Door Motor

The mode door motor is attached to the A/C unit assembly. It rotates so that air is discharged from the outlet set by the front air control. Motor rotation is conveyed to a link which activates the mode door.



Mode Door Motor Component Function Check

INFOID:0000000001569468

INSPECTION FLOW

1. CONFIRM SYMPTOM BY PERFORMING OPERATIONAL CHECK - DISCHARGE AIR

1. Press the MODE switch and DEF ( ) switch.
2. Each position indicator should change shape.
3. Confirm that discharge air comes out according to the air distribution table. Refer to HAC-94, "Discharge Air Flow".

NOTE:

Confirm that the compressor clutch is engaged (sound or visual inspection) and intake door position is at FRESH ( ) when DEF ( ) is selected.

Can a symptom be duplicated?

YES >> GO TO 2.
NO >> Perform a complete operational check. Refer to HAC-87, "Operational Check".

2.CHECK FOR SERVICE BULLETINS

Check for any service bulletins.

>> GO TO 3.

3.PERFORM SELF-DIAGNOSIS.

Perform the self-diagnosis function. Refer to HAC-98, "Front Air Control Self-Diagnosis".

Are any self-diagnosis codes present?

YES >> Repair as necessary.
NO >> GO TO 4.

4. CHECK AMBIENT SENSOR CIRCUIT

Perform diagnostic procedure for the ambient sensor circuit. Refer to HAC-130, "Ambient Sensor Diagnosis Procedure".

Is the inspection result normal?

YES >> GO TO 5.
NO >> Repair as necessary.

5. CHECK IN-VEHICLE SENSOR CIRCUIT

Perform diagnostic procedure for the in-vehicle sensor circuit. Refer to HAC-133, "In-Vehicle Sensor Diagnosis Procedure".

Is the inspection result normal?

YES >> GO TO 6.
NO >> Repair as necessary.

6. CHECK SUNLOAD SENSOR CIRCUIT

Perform diagnostic procedure for the sunload sensor circuit. Refer to HAC-136, "Sunload Sensor Diagnosis Procedure".

Is the inspection result normal?

YES >> GO TO 7.
NO >> Repair as necessary.

7. CHECK INTAKE SENSOR CIRCUIT

Perform diagnostic procedure for the intake sensor circuit. Refer to HAC-139, "Intake Sensor Diagnosis Procedure".

Is the inspection result normal?

YES >> GO TO 8.
NO >> Repair as necessary.

8. CHECK AIR MIX DOOR MOTOR PBR CIRCUIT

Perform diagnostic procedure for the air mix door motor PBR circuit. Refer to HAC-112, "Air Mix Door Motor Diagnosis Procedure".

Is the inspection result normal?

YES >> GO TO 9.
NO >> Repair as necessary.

9. RECHECK FOR SYMPTOMS

Perform a complete operational check and check for any symptoms. Refer to HAC-87, "Operational Check".

Does another symptom exist?

YES >> Repair as necessary.
NO >> Replace front air control. Refer to XX.

Mode Door Motor Diagnosis Procedure

INFOID:0000000001547406

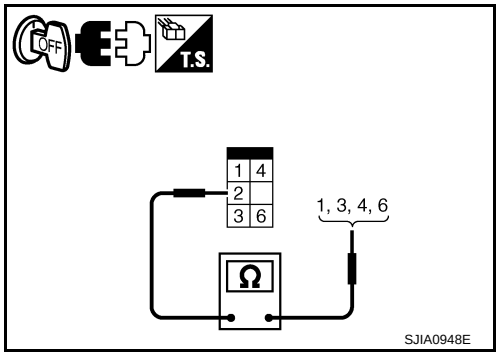
SYMPTOM:
- Air outlet does not change.
- Mode door motor does not operate normally.

DIAGNOSTIC PROCEDURE FOR MODE DOOR MOTOR

1.CHECK MODE DOOR MOTOR

1. Turn ignition switch OFF.
2. Disconnect mode door motor connector M87.
3. Check continuity between mode door motor terminals 2 and 1, 3, 4, 6.

Terminals		Continuity
2	1	Yes
	3	
	4	
	6	



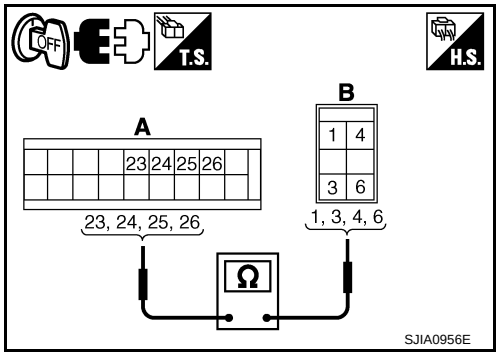
Is the inspection result normal?

YES >> GO TO 2.
NO >> Replace mode door motor. Refer to XX.

2.CHECK CIRCUIT CONTINUITY BETWEEN FRONT AIR CONTROL AND MODE DOOR MOTOR

1. Disconnect front air control connector M51.
2. Check continuity between front air control harness connector M51 (A) terminal 23, 24, 25, 26 and mode door motor harness connector M87 (B) terminal 3, 6, 1, 4.

A		B		Continuity
Connector	Terminal	Connector	Terminal	
Front air control: M51	23	Mode door motor: M87	3	Yes
	24		6	
	25		1	
	26		4	



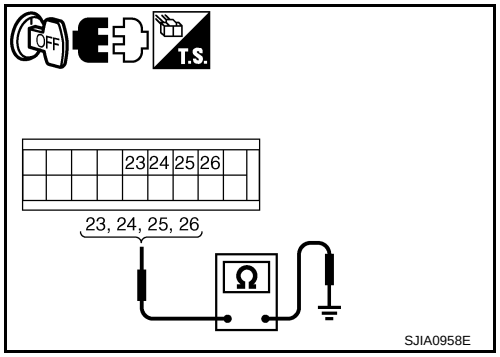
Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair harness or connector.

3.CHECK CIRCUIT CONTINUITY BETWEEN FRONT AIR CONTROL AND GROUND

Check continuity between front air control harness connector M51 terminal 23, 24, 25, 26 and ground.

Connector	Terminal		Continuity
Front air control: M51	23	Ground	No
	24		
	25		
	26		



Is the inspection result normal?

YES >> Replace front air control. Refer to XX.
NO >> Repair harness or connector.

AIR MIX DOOR MOTOR

System Description

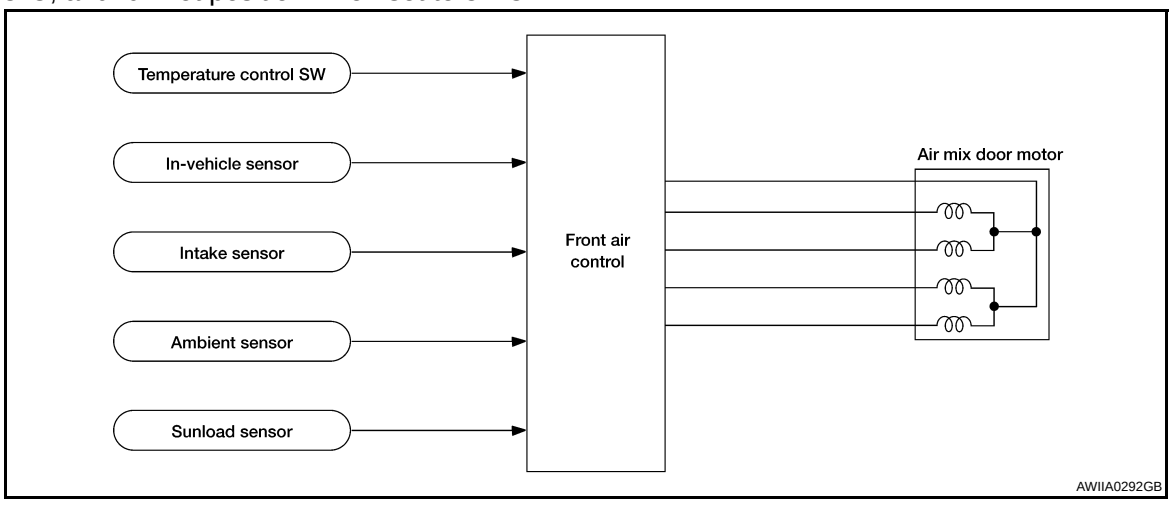
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SYSTEM DESCRIPTION

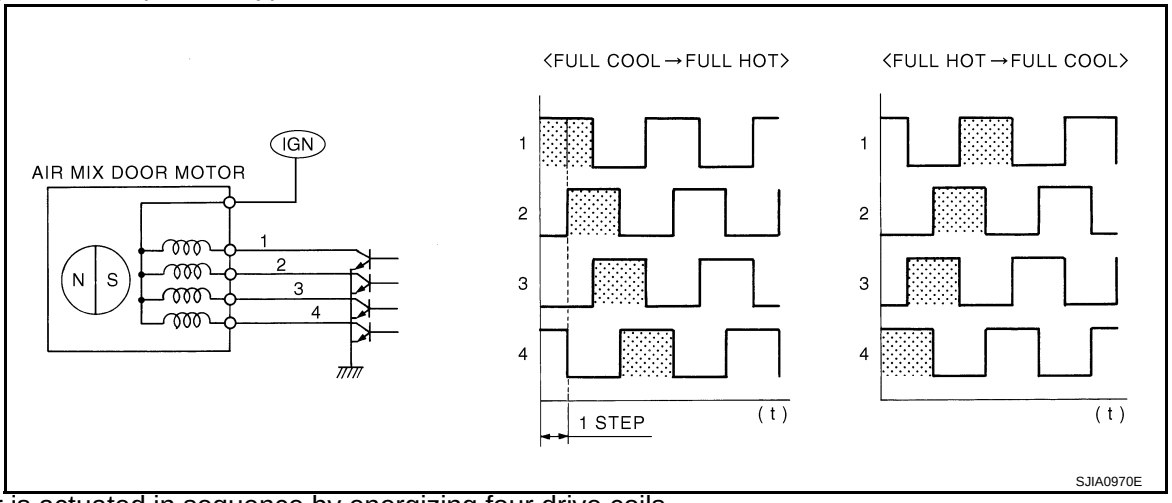
Component Parts

Air mix door control system components are:
- Front air control
- Air mix door motor
- In-vehicle sensor
- Intake sensor
- Ambient sensor
- Sunload sensor

System Operation
The front air control receives data from each of the sensors. When setting a target temperature by using temperature button, front air control corrects preset temperature, performs an arithmetical operation based on signals from sensors and determines opening angle of target air mix door.
Air mix door is constantly controlled so as to keep optimum opening angle of air mix door based on target and present opening angles of air mix door. Air mix door is fixed in the full cold position when preset temperature is set to 18°C, and full hot position when set to 32°C.

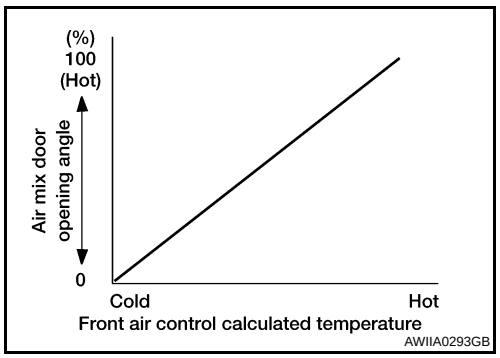


Drive System of Step Motor Type Door Motor



- Motor is actuated in sequence by energizing four drive coils.
- Rotation direction can be changed by changing pattern of excitation.

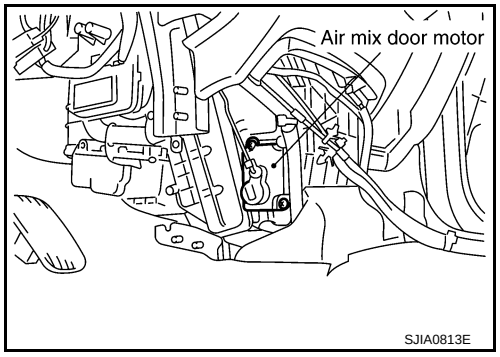
Air Mix Door Control Specification



COMPONENT DESCRIPTION

Air Mix Door Motor

The air mix door motor is attached to the A/C unit assembly. It rotates so that the air mix door is opened or closed to a position set by the front air control Motor rotation is conveyed through a shaft and the air mix door position is then feedback to the front air control by PBR built-in air mix door motor.



Air Mix Door Motor Component Function Check

INFOID:0000000001569469

INSPECTION FLOW

1.CONFIRM SYMPTOM BY PERFORMING OPERATIONAL CHECK - TEMPERATURE INCREASE

1. Press the temperature control switch UP until 32°C (90°F) is displayed.
2. Check for hot air at discharge air outlets.

>> GO TO 2.

2.CONFIRM SYMPTOM BY PERFORMING OPERATIONAL CHECK - TEMPERATURE DECREASE

1. Press the temperature control switch DOWN until 18°C (64°F) is displayed.
2. Check for cold air at discharge air outlets.

Can a symptom be duplicated?

YES >> GO TO 3.
NO >> Perform a complete operational check. Refer to HAC-87, "Operational Check".

3.CHECK FOR SERVICE BULLETINS

Check for any service bulletins.

>> GO TO 4.

4.PERFORM SELF-DIAGNOSIS.

Perform the self-diagnosis function. Refer to HAC-98, "Front Air Control Self-Diagnosis".

Are any self-diagnosis codes present?

YES >> Repair as necessary.
NO >> GO TO 5.

5. CHECK AMBIENT SENSOR CIRCUIT

Perform diagnostic procedure for the ambient sensor circuit. Refer to HAC-130, "Ambient Sensor Diagnosis Procedure".

Is the inspection result normal?

YES >> GO TO 6.
NO >> Repair as necessary.

6. CHECK IN-VEHICLE SENSOR CIRCUIT

Perform diagnostic procedure for the in-vehicle sensor circuit. Refer to HAC-133, "In-Vehicle Sensor Diagnosis Procedure".

Is the inspection result normal?

YES >> GO TO 7.
NO >> Repair as necessary.

7. CHECK SUNLOAD SENSOR CIRCUIT

Perform diagnostic procedure for the sunload sensor circuit. Refer to HAC-136, "Sunload Sensor Diagnosis Procedure".

Is the inspection result normal?

YES >> GO TO 8.
NO >> Repair as necessary.

8. CHECK INTAKE SENSOR CIRCUIT

Perform diagnostic procedure for the intake sensor circuit. Refer to HAC-139, "Intake Sensor Diagnosis Procedure".

Is the inspection result normal?

YES >> GO TO 9.
NO >> Repair as necessary.

9. CHECK AIR MIX DOOR MOTOR PBR CIRCUIT

Perform diagnostic procedure for the air mix door motor PBR circuit. Refer to HAC-112, "Air Mix Door Motor Diagnosis Procedure".

Is the inspection result normal?

YES >> GO TO 10
NO >> Repair as necessary.

10. RECHECK FOR SYMPTOMS

Perform a complete operational check and check for any symptoms. Refer to HAC-87, "Operational Check".

Does another symptom exist?

YES >> Repair as necessary.
NO >> Replace front air control. Refer to XX.

Air Mix Door Motor Diagnosis Procedure

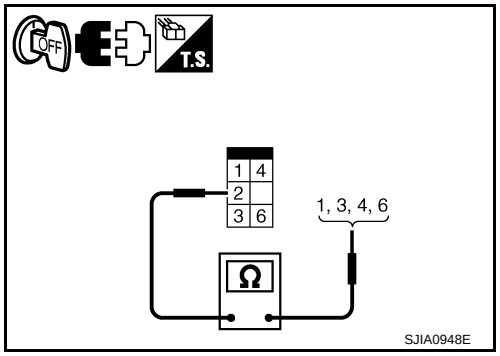
INFOID:0000000001547409

SYMPTOM:
- Discharge air temperature does not change.
- Air mix door motor does not operate.

DIAGNOSTIC PROCEDURE FOR AIR MIX DOOR MOTOR

1. CHECK AIR MIX DOOR MOTOR

1. Turn ignition switch OFF.
2. Disconnect air mix door motor connector M88.
3. Check continuity between air mix door motor terminals 2 and 1, 3, 4, 6.



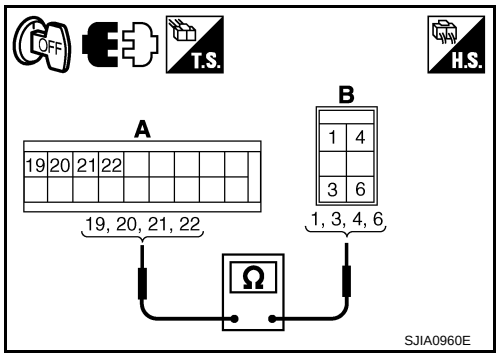
Terminals		Continuity
2	1	Yes
	3	
	4	
	6	

Is the inspection result normal?

YES >> GO TO 2.
NO >> Replace air mix door motor. Refer to XX.

2.CHECK CIRCUIT CONTINUITY BETWEEN FRONT AIR CONTROL AND AIR MIX DOOR MOTOR

1. Disconnect front air control connector M51.
2. Check continuity between front air control harness connector M51 (A) terminal 19, 20, 21, 22 and air mix door motor harness connector M88 (B) terminal 3, 6, 1, 4.



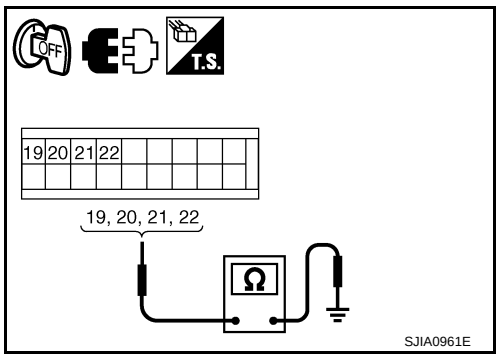
A		B		Continuity
Connector	Terminal	Connector	Terminal	
Front air control: M51	19	Air mix door motor: M88	3	Yes
	20		6	
	21		1	
	22		4	

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair harness or connector.

3.CHECK CIRCUIT CONTINUITY BETWEEN FRONT AIR CONTROL AND GROUND

Check continuity between front air control harness connector M51 terminal 19, 20, 21, 22 and ground.



Connector	Terminal		Continuity
Front air control: M51	19	Ground	No
	20		
	21		
	22		

Is the inspection result normal?

YES >> Replace front air control. Refer to XX.
NO >> Repair harness or connector.

INTAKE DOOR MOTOR

System Description

INFOID:0000000001547411

SYSTEM DESCRIPTION

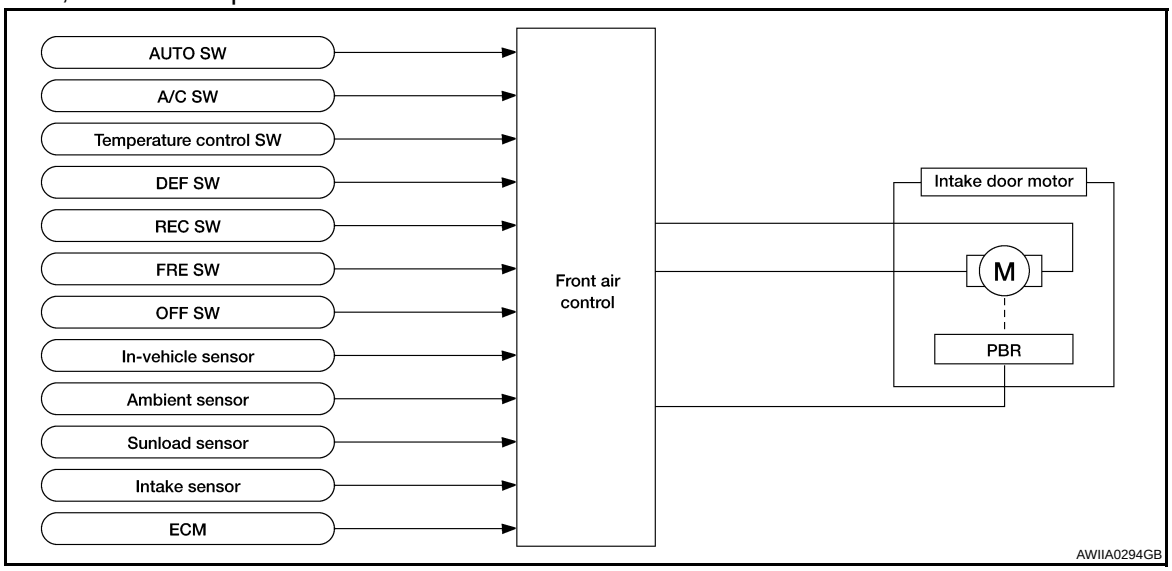
Component Parts

Intake door control system components are:
- Front air control
- Intake door motor
- In-vehicle sensor
- Ambient sensor
- Sunload sensor
- Intake sensor
- ECM

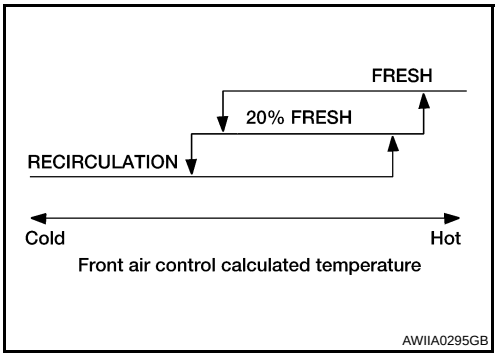
System Operation

Suction opening is basically fixed in the position FRESH when DEF switch, FRE switch, or OFF switch (only at the time of REC switch OFF) is pressed or when A/C switch is OFF. It is fixed in the position RECIRCULATION when REC switch is pressed. It is automatically controlled at all other times.

During automatic control of suction opening, any of FRESH, 20% FRESH and RECIRCULATION is selected according to the target opening angle of air mix door calculated by front air control based on the in-vehicle temperature, ambient temperature and the amount of sunload.



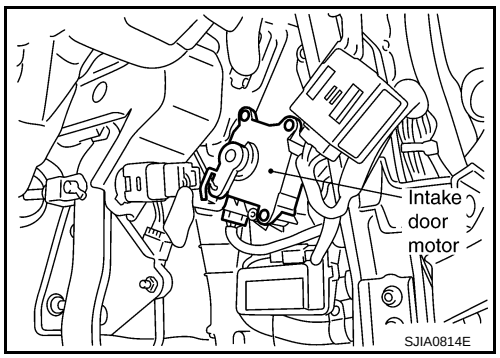
Intake Door Control Specification



COMPONENT DESCRIPTION

Intake Door Motor

The intake door motor is attached to the A/C unit assembly. It rotates so that air is drawn from inlets set by the front air control Motor rotation is conveyed to a lever which activates the intake door.



Intake Door Motor Component Function Check

INFOID:0000000001569474

INSPECTION FLOW

1. CONFIRM SYMPTOM BY PERFORMING OPERATIONAL CHECK - INTAKE DOOR

1. Press REC ( ) switch one time. The recirculation indicator should illuminate.
2. Press FRE ( ) switch one time. The fresh indicator should illuminate.
3. Listen for intake door position change (you should hear blower sound change slightly).

Can a symptom be duplicated?

YES >> GO TO 2.
NO >> Perform a complete operational check. Refer to HAC-87, "Operational Check".

2. CHECK FOR SERVICE BULLETINS

Check for any service bulletins.

>> GO TO 3.

3. PERFORM SELF-DIAGNOSIS.

Perform the self-diagnosis function. Refer to HAC-98, "Front Air Control Self-Diagnosis".

Are any self-diagnosis codes present?

YES >> Repair as necessary.
NO >> GO TO 4.

4. CHECK AMBIENT SENSOR CIRCUIT

Perform diagnostic procedure for the ambient sensor circuit. Refer to HAC-130, "Ambient Sensor Diagnosis Procedure".

Is the inspection result normal?

YES >> GO TO 5.
NO >> Repair as necessary.

5. CHECK IN-VEHICLE SENSOR CIRCUIT

Perform diagnostic procedure for the in-vehicle sensor circuit. Refer to HAC-133, "In-Vehicle Sensor Diagnosis Procedure".

Is the inspection result normal?

YES >> GO TO 6.
NO >> Repair as necessary.

6. CHECK SUNLOAD SENSOR CIRCUIT

Perform diagnostic procedure for the sunload sensor circuit. Refer to HAC-136, "Sunload Sensor Diagnosis Procedure".

Is the inspection result normal?

YES >> GO TO 7.
NO >> Repair as necessary.

7. CHECK INTAKE SENSOR CIRCUIT

Perform diagnostic procedure for the intake sensor circuit. Refer to HAC-139, "Intake Sensor Diagnosis Procedure".

Is the inspection result normal?

YES >> GO TO 8.
NO >> Repair as necessary.

8. CHECK AIR MIX DOOR MOTOR PBR CIRCUIT

Perform diagnostic procedure for the air mix door motor PBR circuit. Refer to HAC-112, "Air Mix Door Motor Diagnosis Procedure".

Is the inspection result normal?

YES >> GO TO 9.
NO >> Repair as necessary.

9. RECHECK FOR SYMPTOMS

Perform a complete operational check and check for any symptoms. Refer to HAC-87, "Operational Check".

Does another symptom exist?

YES >> Repair as necessary.
NO >> Replace front air control. Refer to .

Intake Door Motor Diagnosis Procedure

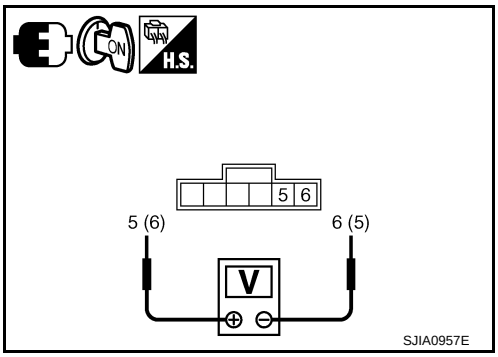
INFOID:0000000001547413

SYMPTOM:
- Intake door does not change.
- Intake door motor does not operate normally.

DIAGNOSTIC PROCEDURE FOR INTAKE DOOR MOTOR

1. CHECK POWER SUPPLY FOR INTAKE DOOR MOTOR

1. Turn ignition switch ON.
2. Check voltage between intake door motor harness connector M89 terminal 5, 6 and 6, 5.



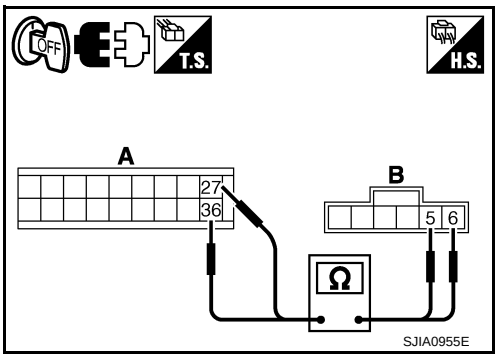
Terminals			Condition	Voltage (Approx.)
Connector	Terminal			
	(+)	(–)		
Intake door motor: M89	5	6	FRE → REC	12 V
	6	5	REC → FRE	

Is the inspection result normal?

YES >> Replace intake door motor. Refer to XX.
NO >> GO TO 2.

2. CHECK CIRCUIT CONTINUITY BETWEEN FRONT AIR CONTROL AND INTAKE DOOR MOTOR

1. Turn ignition switch OFF.
2. Disconnect front air control connector M51.
3. Disconnect intake door motor connector M89.
4. Check continuity between front air control harness connector M51 (A) terminal 27, 36 and intake door motor harness connector M89 (B) terminal 5, 6.



A		B		Continuity
Connector	Terminal	Connector	Terminal	
Front air control: M51	27	Intake door motor: M89	5	Yes
	36		6	

Is the inspection result normal?

YES >> Replace front air control. Refer to XX.

NO >> Repair harness or connector.

BLOWER MOTOR CONTROL SYSTEM

System Description

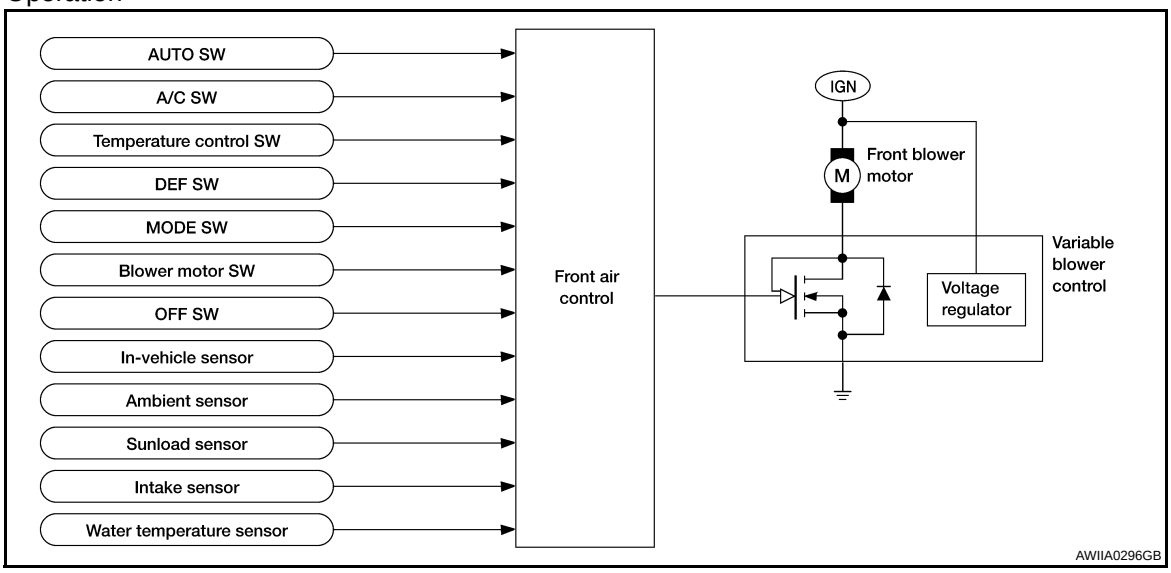
INFOID:0000000001547417

SYSTEM DESCRIPTION

Component Parts

Fan speed control system components are:
- Front air control
- In-vehicle sensor
- Ambient sensor
- Sunload sensor
- Intake sensor

System Operation



Automatic Mode

In the automatic mode, the blower motor speed is calculated by the front air control based on input from in-vehicle sensor, sunload sensor, intake sensor and ambient sensor.

The blower motor is applied voltage ranges from approximately 3.0 volts (lowest speed) to 12 volts (highest speed).

The control blower speed (in the range of 3.0 to 12V), front air control supplies a gate voltage to the power transistor. Based on this voltage, front air control controls voltage supplied to the blower motor.

Starting Fan Speed Control

Start up from COLD SOAK Condition (Automatic mode)

In a cold start up condition where the engine coolant temperature is below 56°C, the blower will not operate for a short period of time (up to 150 seconds). The exact start delay time varies depending on the ambient and engine coolant temperature.

In the most extreme case (very low ambient) the blower starting delay will be 150 seconds as described above. After this delay, the blower will operate at low speed until the engine coolant temperature rises above 56°C, at which time the blower speed will increase to the objective speed.

Start up from usual or HOT SOAK Condition (Automatic mode)

The blower will begin operation momentarily after the A/C switch is pushed. The blower speed will gradually rise to the objective speed over a time period of 3 seconds or less (actual time depends on the objective blower speed).

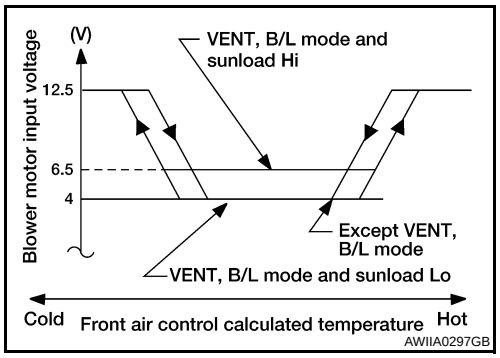
Blower Speed Compensation

Sunload

When the in-vehicle temperature and the set temperature are very close, the blower will be operating at low speed. The low speed will vary depending on the sunload. During conditions of low or no sunload, the blower

low speed is usual low speed (approx. 4.0V). During high sunload conditions, front air control causes the blower speed to increase (approx. 6.5V).

Fan Speed Control Specification



Front Blower Motor Component Function Check

INFOID:0000000001569475

INSPECTION FLOW

1. CONFIRM SYMPTOM BY PERFORMING OPERATIONAL CHECK - FRONT BLOWER

1. Press blower motor switch UP. Blower motor should operate on low speed. The fan indicator should have one blade illuminated.
2. Press blower motor switch UP, and continue checking blower motor speed and fan indicator until all speeds are checked.

Can the symptom be duplicated?

YES >> GO TO 2.
NO >> Perform a complete operational check. Refer to HAC-87, "Operational Check".

2. CHECK FOR SERVICE BULLETINS

Check for any service bulletins.

>> GO TO 3.

3. PERFORM SELF-DIAGNOSIS.

Perform the self-diagnostic function. Refer to HAC-98, "Front Air Control Self-Diagnosis".

Are any self-diagnosis codes present?

YES >> Repair as necessary.
NO >> GO TO 4.

4. CHECK AMBIENT SENSOR CIRCUIT

Perform diagnostic procedure for the ambient sensor circuit. Refer to HAC-130, "Ambient Sensor Diagnosis Procedure".

Is the inspection result normal?

YES >> GO TO 5.
NO >> Repair as necessary.

5. CHECK IN-VEHICLE SENSOR CIRCUIT

Perform diagnostic procedure for the in-vehicle sensor circuit. Refer to HAC-133, "In-Vehicle Sensor Diagnosis Procedure".

Is the inspection result normal?

YES >> GO TO 6.
NO >> Repair as necessary.

6. CHECK SUNLOAD SENSOR CIRCUIT

Perform diagnostic procedure for the sunload sensor circuit. Refer to HAC-136, "Sunload Sensor Diagnosis Procedure".

Is the inspection result normal?

YES >> GO TO 7.
NO >> Repair as necessary.

7. CHECK INTAKE SENSOR CIRCUIT

Perform diagnostic procedure for the intake sensor circuit. Refer to HAC-139, "Intake Sensor Diagnosis Procedure".

Is the inspection result normal?

YES >> GO TO 8.
NO >> Repair as necessary.

8. RECHECK FOR SYMPTOMS

Perform a complete operational check and check for any symptoms. Refer to HAC-87, "Operational Check".

Does another symptom exist?

YES >> Repair as necessary.
NO >> Replace front air control. Refer to .

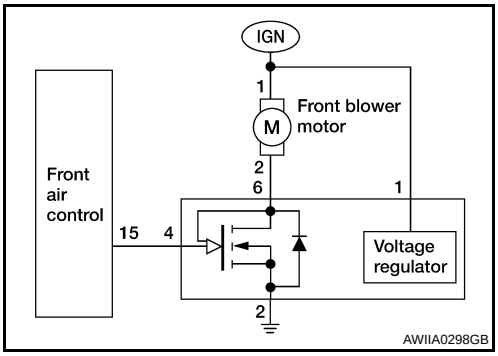
Front Blower Motor Diagnosis Procedure

INFOID:0000000001547419

SYMPTOM: Front blower motor operation is malfunctioning.

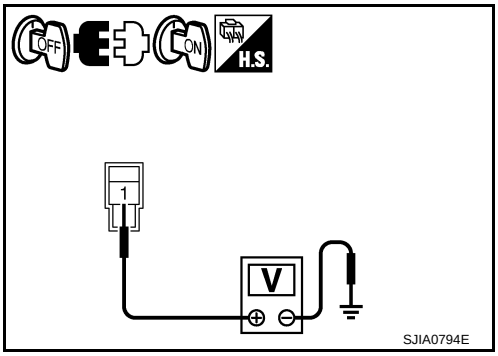
DIAGNOSTIC PROCEDURE FOR BLOWER MOTOR

SYMPTOM: Front blower motor operation is malfunctioning.



1. CHECK POWER SUPPLY FOR FRONT BLOWER MOTOR

1. Disconnect front blower motor connector M62.
2. Turn ignition switch ON.
3. Check voltage between front blower motor harness connector M62 terminal 1 and ground.



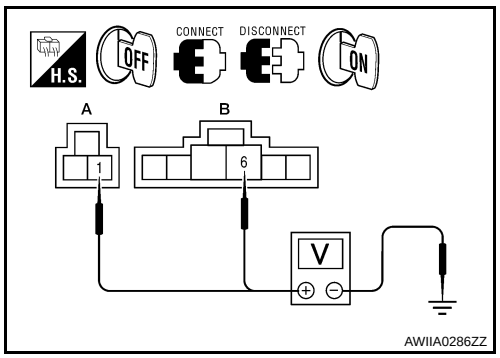
Terminals			Voltage (Approx.)
(+)		(–)	
Connector	Terminal		
Front blower motor: M62	1	Ground	Battery voltage

Is the inspection result normal?

YES >> GO TO 2.
NO >> Check power supply circuit and 15A fuses [Nos. 15 and 17, located in the fuse block (J/B)].
- If fuses are OK, check harness for open circuit. Repair or replace if necessary.
- If fuses are NG, replace fuse and check harness for short circuit. Repair or replace if necessary.

2. CHECK CIRCUIT POWER SUPPLY FOR VARIABLE BLOWER CONTROL

1. Turn ignition switch OFF.
2. Connect front blower motor connector M62.
3. Disconnect variable blower control connectors M90, M91.
4. Turn ignition switch ON.
5. Check voltage between variable blower control harness connector M91 (A) terminal 1, M90 (B) terminal 6 and ground.



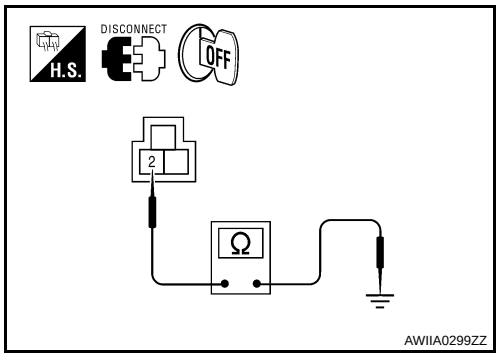
Terminals				Voltage (Approx.)
(+)			(–)	
Connector		Terminal		
A	Variable blower control: M91	1	Ground	Battery voltage
B	Variable blower control: M90	6		

Is the inspection result normal?

YES >> GO TO 3.
NO >> • Terminal 1 - Ground: Repair harness or connector.
• Terminal 6 - Ground: GO TO 5.

3. CHECK GROUND CIRCUIT FOR VARIABLE BLOWER CONTROL

1. Turn ignition switch OFF.
2. Check continuity between variable blower control harness connector M91 terminal 2 and ground.



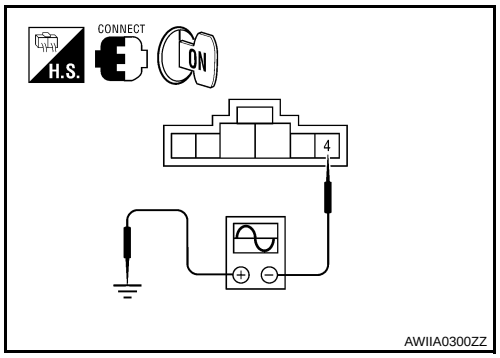
Connector	Terminal		Continuity
Variable blower control: M91	2	Ground	Yes

Is the inspection result normal?

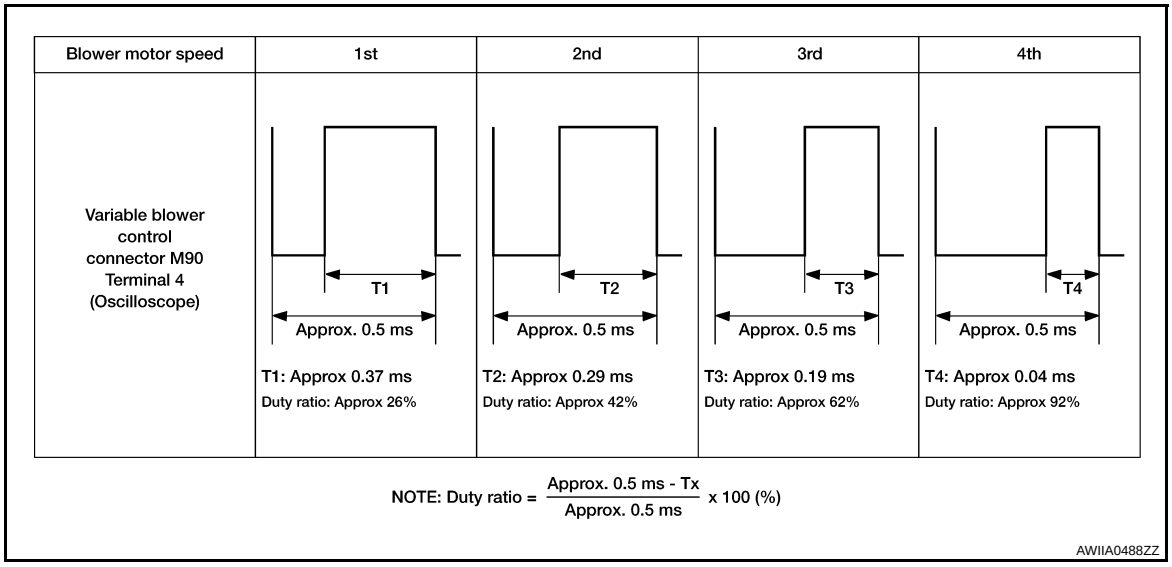
YES >> GO TO 4.
NO >> Repair harness or connector.

4. CHECK FOR FRONT AIR CONTROL OUTPUT

1. Reconnect variable blower control connector M91.
2. Turn ignition switch ON.



3. Change the blower motor speed from Lo to Hi, and confirm the duty ratios between variable blower control harness connector M90 terminal 4 and ground using an oscilloscope. Usual terminal 4 drive signal duty ratios are shown in the table below.

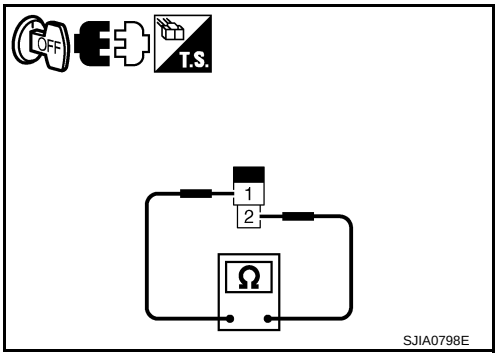


Is the inspection result normal?

YES >> GO TO 5.
NO >> • Blower motor speed is stuck at speed 4: GO TO 7.
• Blower motor speed is stuck at speed 1: GO TO 8.

5.CHECK FRONT BLOWER MOTOR

1. Turn ignition switch OFF.
2. Disconnect front blower motor connector M62.
3. Check continuity between front blower motor terminals.



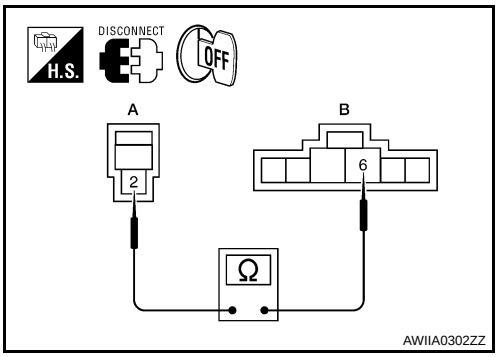
Terminal		Continuity
1	2	Yes

Is the inspection result normal?

YES >> GO TO 6.
NO >> Replace front blower motor. Refer to XX.

6.CHECK CIRCUIT CONTINUITY BETWEEN FRONT BLOWER MOTOR AND VARIABLE BLOWER CONTROL

Check continuity between front blower motor harness connector M62 (A) terminal 2 and variable blower control harness connector M90 (B) terminal 6.



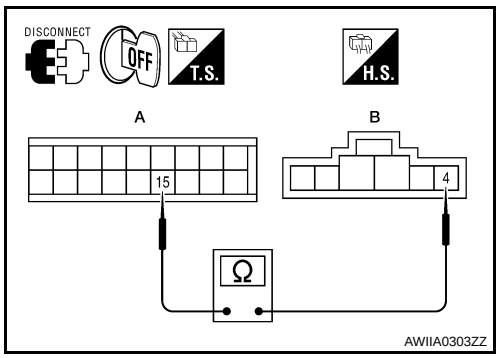
A		B		Continuity
Connector	Terminal	Connector	Terminal	
Front blower motor: M62	2	Variable blower control: M90	6	Yes

Is the inspection result normal?

YES >> GO TO 7.
NO >> Repair harness or connector.

7.CHECK CIRCUIT CONTINUITY BETWEEN FRONT AIR CONTROL AND VARIABLE BLOWER CONTROL

1. Turn ignition switch OFF.
2. Disconnect front air control connector M50.
3. Check continuity between front air control harness connector M33 (A) terminal 15 and variable blower control harness connector M64 (B) terminal 8.



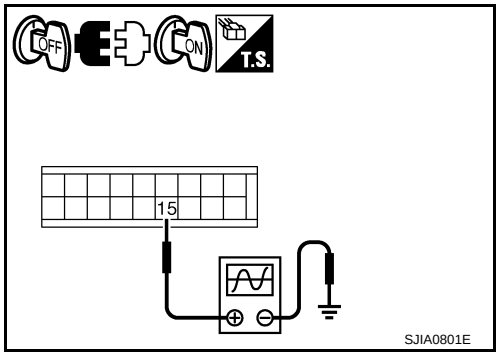
A		B		Continuity
Connector	Terminal	Connector	Terminal	
Front air control: M50	15	Variable blower control: M90	4	Yes

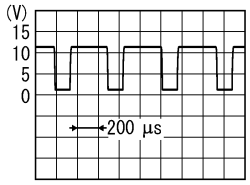
Is the inspection result normal?

YES >> Replace variable blower control Refer to XX.
NO >> Repair harness or connector.

8. CHECK FOR FRONT AIR CONTROL OUT PUT 2

1. Turn ignition switch OFF.
2. Disconnect front air control connector M50.
3. Turn ignition switch ON.
4. Check output signal between front air control harness connector M50 terminal 15 and ground.



Terminals			Condition	Voltage (Approx.)
(+)		(–)		
Connector	Terminal			
Front air control: M50	15	Ground	Blower motor speed: 1st	

Is the inspection result normal?

YES >> Replace front air control. Refer to XX.
NO >> Replace variable blower control. Refer to XX.

Front Blower Motor Component Inspection

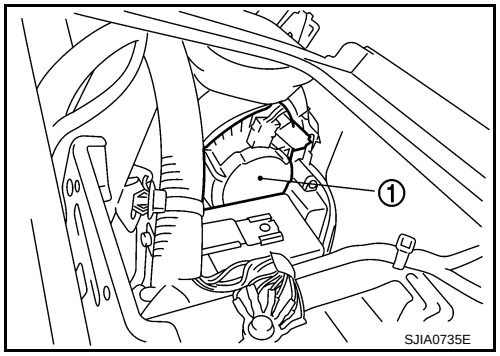
INFOID:0000000001547420

COMPONENT INSPECTION

Blower Motor

Confirm smooth rotation of the blower motor (1).

- Ensure that there are no foreign particles inside the A/C unit assembly.



MAGNET CLUTCH

System Description

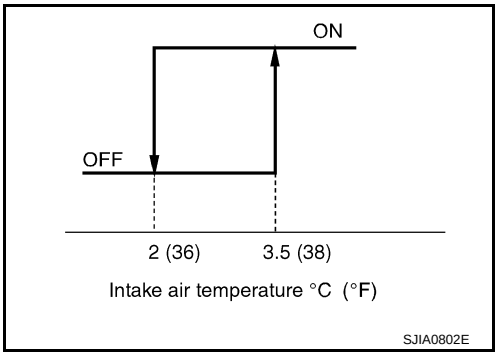
INFOID:0000000001547430

SYSTEM DESCRIPTION

Front air control controls compressor operation by intake air temperature and signal from ECM.

Low Temperature Protection Control

Front air control will turn compressor ON or OFF as determined by a signal detected by intake sensor. When intake air temperatures are higher than 3.5°C (38°F), the compressor turns ON. The compressor turns OFF when intake air temperatures are lower than 2°C (36°F).



Magnet Clutch Component Function Check

INFOID:0000000001569476

INSPECTION FLOW

1. CONFIRM SYMPTOM BY PERFORMING OPERATIONAL CHECK - A/C SWITCH

1. Press the AUTO switch and A/C switch.
2. The A/C switch indicator will illuminate. Confirm that the compressor clutch engages (sound or visual inspection).

Can the symptom be duplicated?

YES >> GO TO 2.
NO >> Perform a complete operational check. Refer to HAC-87, "Operational Check".

2. CHECK FOR SERVICE BULLETINS

Check for any service bulletins.

>> GO TO 3.

3. PERFORM SELF-DIAGNOSIS.

Perform the self-diagnosis function. Refer to HAC-98, "Front Air Control Self-Diagnosis".

Are any self-diagnosis codes present?

YES >> Repair as necessary.
NO >> GO TO 4.

4. CHECK AMBIENT SENSOR CIRCUIT

Perform diagnostic procedure for the ambient sensor circuit. Refer to HAC-130, "Ambient Sensor Diagnosis Procedure".

Is the inspection result normal?

YES >> GO TO 5.
NO >> Repair as necessary.

5. CHECK INTAKE SENSOR CIRCUIT

Perform diagnostic procedure for the intake sensor circuit. Refer to HAC-139, "Intake Sensor Diagnosis Procedure".

Is the inspection result normal?

YES >> GO TO 6.
NO >> Repair as necessary.

6. RECHECK FOR SYMPTOMS

Perform a complete operational check and check for any symptoms. Refer to HAC-87, "Operational Check".

Does another symptom exist?

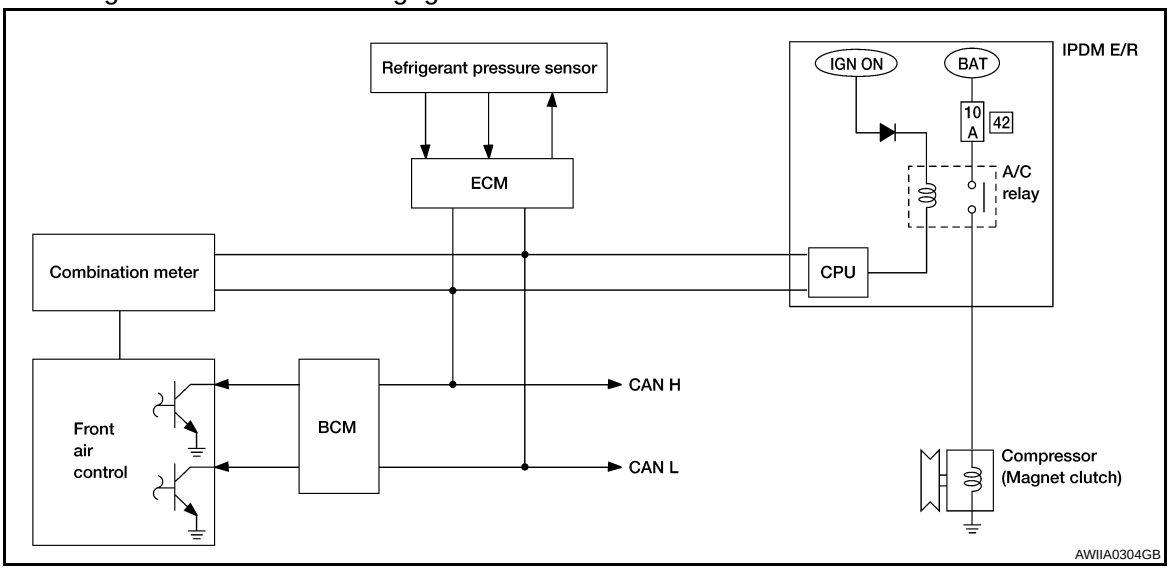
YES >> Repair as necessary.
NO >> Replace front air control. Refer to XX.

Magnet Clutch Diagnosis Procedure

INFOID:0000000001547432

DIAGNOSTIC PROCEDURE FOR MAGNET CLUTCH

SYMPTOM: Magnet clutch does not engage when A/C switch is ON.



1. CHECK INTAKE SENSOR CIRCUIT

Refer to HAC-139, "Intake Sensor Diagnosis Procedure".

Is the inspection result normal?

YES >> GO TO 2.
NO >> Malfunctioning intake sensor: Refer to XX.

2. PERFORM AUTO ACTIVE TEST

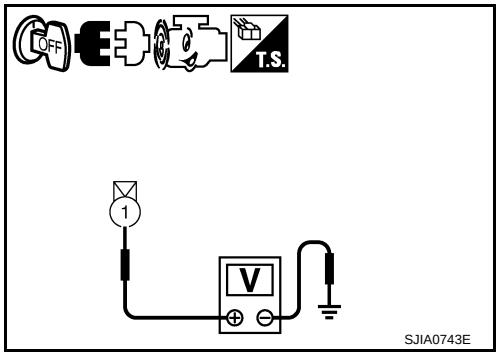
Refer to XX-XX, "*****".

Does the magnet clutch operate?

YES >> • WITH CONSULT-III
GO TO 6.
• WITHOUT CONSULT-III
GO TO 7.
NO >> GO TO 3.

3. CHECK POWER SUPPLY FOR MAGNET CLUTCH

1. Turn ignition switch OFF.
2. Disconnect compressor connector F3.
3. Start the engine.
4. Press AUTO switch and A/C switch ON.
5. Check voltage between compressor harness connector F3 terminal 1 and ground.



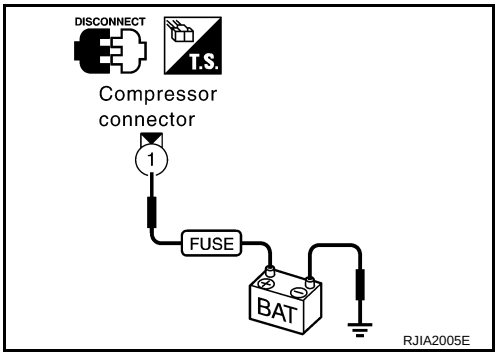
Terminals			Voltage (Approx.)
(+)		(–)	
Connector	Terminal	Ground	
Compressor: F3	1		12V

Is the inspection result normal?

YES >> Replace A/C compressor. Refer to XX-XX, "*****".
NO >> Check 10A fuse (No. 42), located in the IPDM E/R.
- If fuse is OK, GO TO 4.
- If fuse is NG, replace fuse and check harness for short circuit. Repair or replace if necessary.

4. CHECK MAGNET CLUTCH CIRCUIT

Check for operation sound when applying battery voltage direct current to terminal.

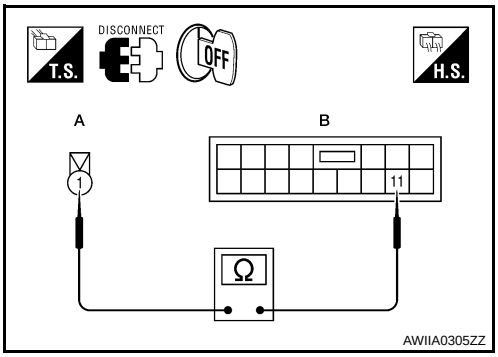


Is the inspection result normal?

OK >> GO TO 5.
NO >> Replace A/C compressor. Refer to XX-XX, "*****".

5. CHECK CIRCUIT CONTINUITY BETWEEN IPDM E/R AND COMPRESSOR

1. Turn ignition switch OFF.
2. Disconnect IPDM E/R connector E43.
3. Check continuity between compressor harness connector F3 (A) terminal 1 and IPDM E/R harness connector E43 (B) terminal 11.



A		B		Continuity
Connector	Terminal	Connector	Terminal	
Compressor: F3	1	IPDM E/R: E43	11	Yes

Is the inspection result normal?

YES >> Replace IPDM E/R. Refer to XX-XX, "*****".
NO >> Repair harness or connector.

6. CHECK BCM INPUT (COMPRESSOR ON) SIGNAL

Check compressor ON/OFF signal. Refer to HAC-97, "CONSULT-III Function (BCM)".

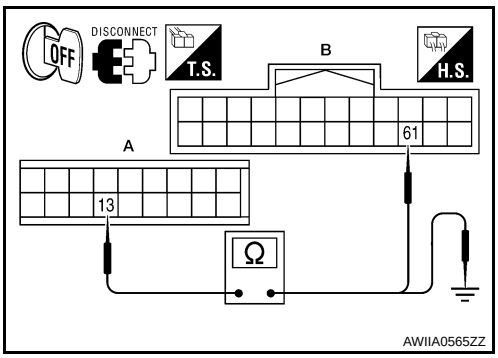
A/C SW ON : AIR COND SW ON
A/C SW OFF : AIR COND SW OFF

Is the inspection result normal?

YES >> GO TO 9.
NO >> GO TO 7.

7. CHECK CIRCUIT CONTINUITY BETWEEN FRONT AIR CONTROL AND BCM.

1. Turn ignition switch OFF.
2. Disconnect front air control harness connector M50.
3. Disconnect BCM harness connector M19.
4. Check continuity between front air control harness connector M33 (A) terminal 13 and BCM harness connector M19 (B) terminal 61.



A		B		Continuity
Connector	Terminal	Connector	Terminal	
Front air control: M50	13	BCM: M19	61	Yes

5. Check continuity between front air control harness connector M33 (A) terminal 13 and ground.

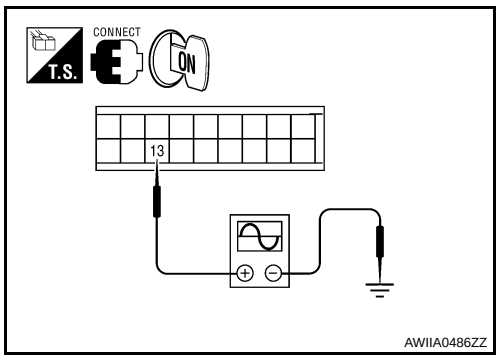
A		Ground	Continuity
Connector	Terminal		
Front air control: M50	13		No

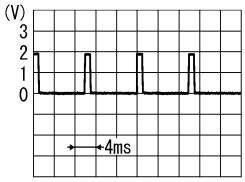
Is the inspection result normal?

YES >> GO TO 8.
NO >> Repair harness or connector.

8. CHECK VOLTAGE FOR FRONT AIR CONTROL (COMPRESSOR ON SIGNAL)

1. Reconnect front air control harness connector M50 and BCM harness connector M19.
2. Turn ignition switch ON.
3. Confirm compressor ON signal between front air control harness connector M50 terminal 13 and ground.



Terminals			Condition	Voltage (Approx.)
(+)		(-)		
Connector	Terminal			
Front air control: M50	13	Ground	A/C switch: ON (Blower motor operates.)	

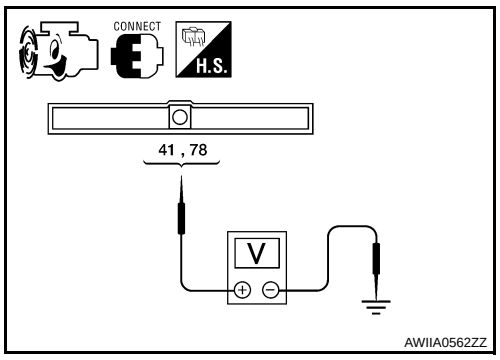
Is the inspection result normal?

YES >> GO TO 9.
NO >> Replace front air control. Refer to XX.

9. CHECK REFRIGERANT PRESSURE SENSOR

WITH CONSULT-III
1. Start the engine.
2. Check the voltage of refrigerant pressure sensor. Refer to XX-XX, "*****".

WITHOUT CONSULT-III
1. Start the engine.
2. Check voltage between ECM harness connector F11 and ground.



Terminals			Condition	Voltage (Approx.)
(+)		(-)		
Connector	Terminal			
ECM: F11	41 without diesel	Ground	A/C switch: ON (Blower motor operates.)	1-4V
	78 with diesel			

Is the inspection result normal?

YES >> • WITH CONSULT-III
GO TO 10.
• WITHOUT CONSULT-III
GO TO 11.
NO >> Refer to XX-XX, "*****".

10. CHECK BCM INPUT (FAN ON) SIGNAL

Check FAN ON/OFF signal. Refer to HAC-97, "CONSULT-III Function (BCM)".

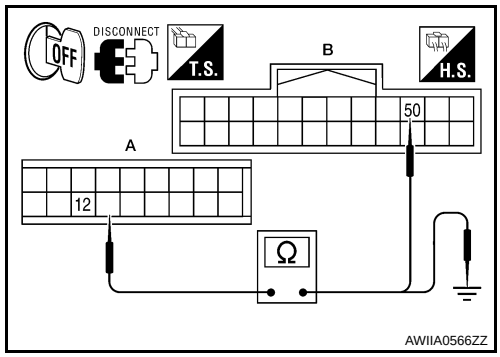
FAN SW ON : FAN ON SIG ON
FAN SW OFF : FAN ON SIG OFF

Is the inspection result normal?

YES >> GO TO 13.
NO >> GO TO 11.

11. CHECK CIRCUIT CONTINUITY BETWEEN FRONT AIR CONTROL AND BCM

1. Turn ignition switch OFF.
2. Disconnect front air control connector M50 and BCM connector M19.
3. Check continuity between front air control harness connector M50 (A) terminal 12 and BCM harness connector M19 (B) terminal 50.



A		B		Continuity
Connector	Terminal	Connector	Terminal	
Front air control: M50	12	BCM: M19	50	Yes

4. Check continuity between front air control harness connector M50 (A) terminal 12 and ground.

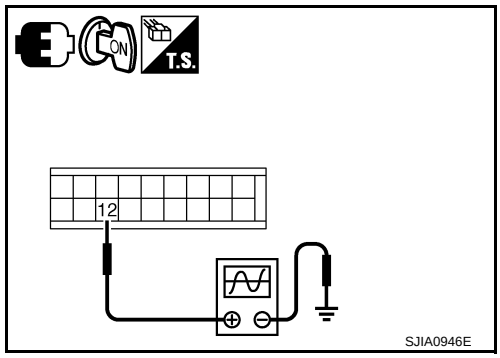
A		Ground	Continuity
Connector	Terminal		
Front air control: M50	12		No

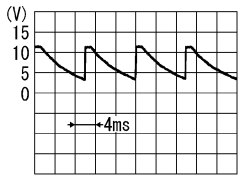
Is the inspection result normal?

YES >> GO TO 12.
NO >> Repair harness or connector.

12. CHECK VOLTAGE FOR FRONT AIR CONTROL (FAN ON SIGNAL)

1. Reconnect front air control connector M50 and BCM connector M18.
2. Turn ignition switch ON.
3. Confirm fan ON signal between front air control harness connector M50 terminal 12 and ground using oscilloscope.



Terminals			Condition	Voltage (Approx.)
(+)		(–)		
Connector	Terminal			
Front air control: M50	12	Ground	Fan speed: 1st	

Is the inspection result normal?

YES >> Replace front air control. Refer to XX.
NO >> Replace BCM. Refer to XX.

13. CHECK CAN COMMUNICATION

Check CAN communication. Refer to XX-XX, "*****".
- BCM – ECM

• ECM – IPDM E/R

Is the inspection result normal?

YES >> INSPECTION END
NO >> Repair or replace malfunction part(s).

AMBIENT SENSOR

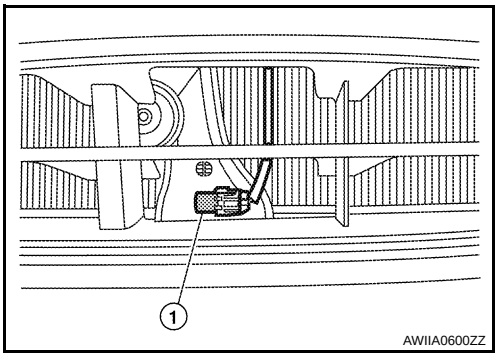
Component Description

INFOID:0000000001547435

COMPONENT DESCRIPTION

Ambient Sensor

The ambient sensor is attached on the radiator core support upper. It detects ambient temperature and converts it into a resistance value which is then input into the front air control.



AMBIENT TEMPERATURE INPUT PROCESS

The front air control includes a processing circuit for the ambient sensor input. However, when the temperature detected by the ambient sensor increases quickly, the processing circuit retards the front air control function. It only allows the front air control to recognize an ambient temperature increase of 0.33°C (0.6°F) per 100 seconds.

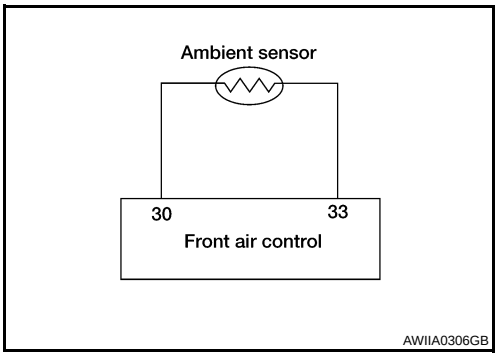
As an example, consider stopping for a few minutes after high speed driving. Although the actual ambient temperature has not changed, the temperature detected by the ambient sensor will increase. This is because the heat from the engine compartment can radiate to the front grille area, location of the ambient sensor.

Ambient Sensor Diagnosis Procedure

INFOID:0000000001547436

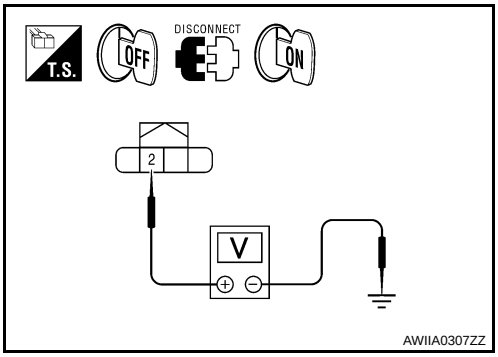
DIAGNOSTIC PROCEDURE FOR AMBIENT SENSOR

SYMPTOM: Ambient sensor circuit is open or shorted. (21 or ^{AUTO}21 is indicated on front air control As a result of performing self-diagnosis STEP-2.)



1. CHECK VOLTAGE BETWEEN AMBIENT SENSOR AND GROUND

1. Turn ignition switch OFF.
2. Disconnect ambient sensor connector E60.
3. Turn ignition switch ON.
4. Check voltage between ambient sensor harness connector E60 terminal 2 and ground.



Terminals			Voltage (Approx.)
(+)		(–)	
Connector	Terminal	Ground	
Ambient sensor: E60	2		5V

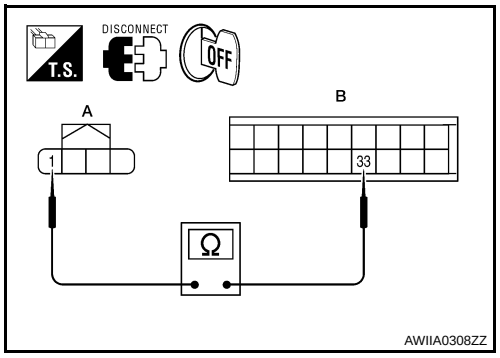
Is the inspection result normal?

YES >> GO TO 2.

NO >> GO TO 4.

2. CHECK CIRCUIT CONTINUITY BETWEEN AMBIENT SENSOR AND FRONT AIR CONTROL

1. Turn ignition switch OFF.
2. Disconnect front air control connector M60.
3. Check continuity between ambient sensor harness connector E60 (A) terminal 1 and front air control harness connector M51 (B) terminal 33.



A		B		Continuity
Connector	Terminal	Connector	Terminal	
Ambient sensor: E60	1	Front air control: M51	33	Yes

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair harness or connector.

3. CHECK AMBIENT SENSOR

Refer to HAC-131, "Ambient Sensor Component Inspection".

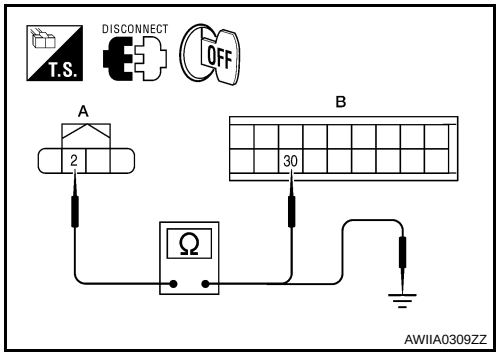
Is the inspection result normal?

YES >> 1. Replace front air control. Refer to XX.
2. Go to self-diagnosis HAC-98, "Front Air Control Self-Diagnosis" and perform self-diagnosis STEP-2. Confirm that code No. 20 is displayed.

NO >> 1. Replace ambient sensor. Refer to XX.
2. Go to self-diagnosis HAC-98, "Front Air Control Self-Diagnosis" and perform self-diagnosis STEP-2. Confirm that code No. 20 is displayed.

4. CHECK CIRCUIT CONTINUITY BETWEEN AMBIENT SENSOR AND FRONT AIR CONTROL

1. Turn ignition switch OFF.
2. Disconnect front air control connector M51.
3. Check continuity between ambient sensor harness connector E60 (A) terminal 2 and front air control harness connector M51 (B) terminal 30.



A		B		Continuity
Connector	Terminal	Connector	Terminal	
Ambient sensor: E60	2	Front air control: M51	30	Yes

4. Check continuity between ambient sensor harness connector E34 (A) terminal 2 and ground.

A		Ground	Continuity
Connector	Terminal		
Ambient sensor: E60	2		No

Is the inspection result normal?

YES >> 1. Replace front air control. Refer to XX.
2. Go to self-diagnosis HAC-98, "Front Air Control Self-Diagnosis" and perform self-diagnosis STEP-2. Confirm that code No. 20 is displayed.

NO >> Repair harness or connector.

Ambient Sensor Component Inspection

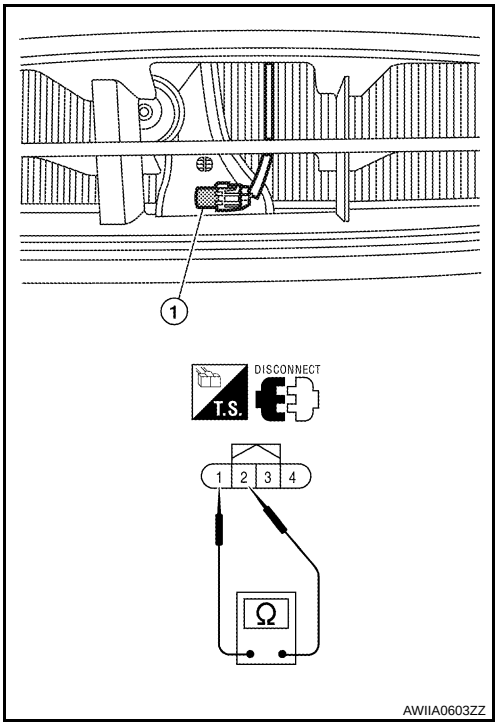
INFOID:0000000001547437

COMPONENT INSPECTION

Ambient Sensor

After disconnecting ambient sensor (1) connector E60, measure resistance between terminals 1 and 2 at sensor side, using the table below.

Temperature °C (°F)	Resistance kΩ
–15 (5)	12.73
–10 (14)	9.92
–5 (23)	7.80
0 (32)	6.19
5 (41)	4.95
10 (50)	3.99
15 (59)	3.24
20 (68)	2.65
25 (77)	2.19
30 (86)	1.81
35 (95)	1.51
40 (104)	1.27
45 (113)	1.07



If NG, replace ambient sensor. Refer to XX.

IN-VEHICLE SENSOR

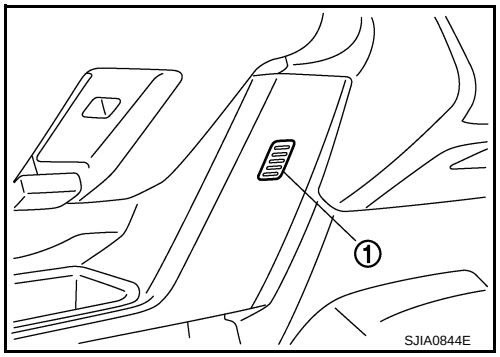
Component Description

INFOID:0000000001547438

COMPONENT DESCRIPTION

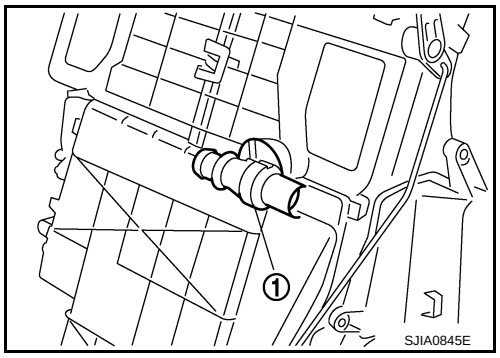
In-vehicle Sensor

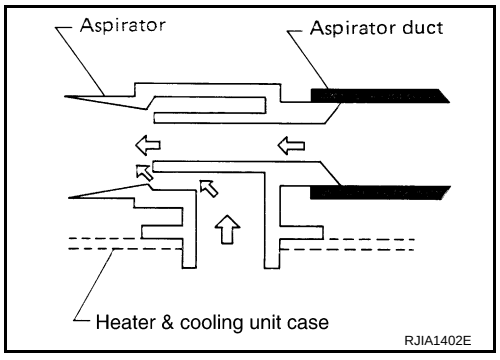
The in-vehicle sensor (1) is located on instrument lower finisher. It converts variations in temperature of compartment air drawn from the aspirator into a resistance value. It is then input into the front air control.



Aspirator

The aspirator (1) is located on passenger's side of A/C unit assembly. It produces vacuum pressure due to air discharged from the A/C unit, continuously taking compartment air in the aspirator.



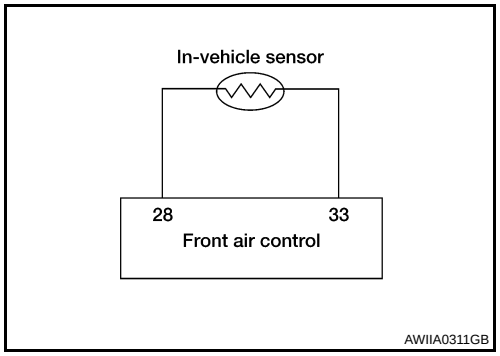


In-Vehicle Sensor Diagnosis Procedure

INFOID:0000000001547439

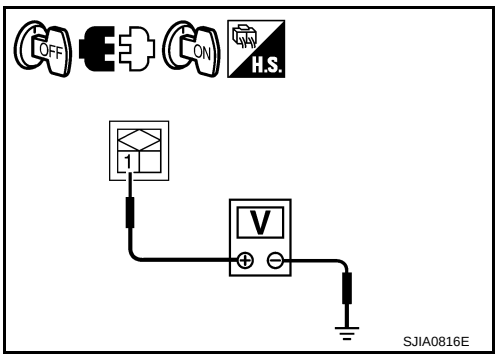
DIAGNOSTIC PROCEDURE FOR IN-VEHICLE SENSOR

SYMPTOM: In-vehicle sensor circuit is open or shorted. (22 or ^{AUTO}22 is indicated on front air control as a result of performing self-diagnosis STEP-2.)



1. CHECK VOLTAGE BETWEEN IN-VEHICLE SENSOR AND GROUND

1. Turn ignition switch OFF.
2. Disconnect in-vehicle sensor connector M93.
3. Turn ignition switch ON.
4. Check voltage between in-vehicle sensor harness connector M93 terminal 1 and ground.



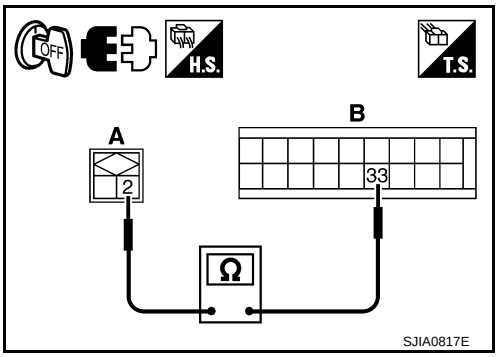
Terminals			Voltage (Approx.)
(+)		(–)	
Connector	Terminal	Ground	
In-vehicle sensor: M93	1		5V

Is the inspection result normal?

YES >> GO TO 2.
NO >> GO TO 4.

2. CHECK CIRCUIT CONTINUITY BETWEEN IN-VEHICLE SENSOR AND FRONT AIR CONTROL

1. Turn ignition switch OFF.
2. Disconnect front air control connector M51.
3. Check continuity between in-vehicle sensor harness connector M93 (A) terminal 2 and front air control harness connector M51 (B) terminal 33.



A		B		Continuity
Connector	Terminal	Connector	Terminal	
In-vehicle sensor: M93	2	Front air control: M51	33	Yes

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair harness or connector.

3. CHECK IN-VEHICLE SENSOR

Refer to HAC-135, "In-Vehicle Sensor Component Inspection".

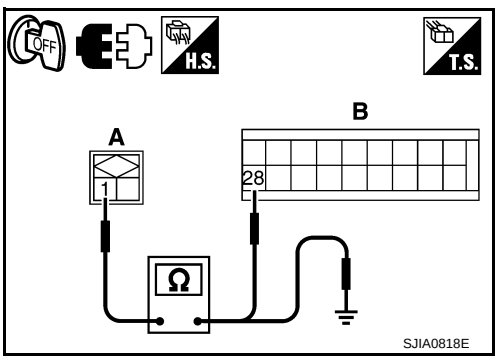
Is the inspection result normal?

YES >> 1. Replace front air control. Refer to XX.
2. Go to self-diagnosis HAC-98, "Front Air Control Self-Diagnosis" and perform self-diagnosis STEP-2. Confirm that code No. 20 is displayed.

NO >> 1. Replace in-vehicle sensor. Refer to XX.
2. Go to self-diagnosis HAC-98, "Front Air Control Self-Diagnosis" and perform self-diagnosis STEP-2. Confirm that code No. 20 is displayed.

4. CHECK CIRCUIT CONTINUITY BETWEEN IN-VEHICLE SENSOR AND FRONT AIR CONTROL

1. Turn ignition switch OFF.
2. Disconnect front air control connector M51.
3. Check continuity between in-vehicle sensor harness connector M93 (A) terminal 1 and front air control harness connector M51 (B) terminal 28.



A		B		Continuity
Connector	Terminal	Connector	Terminal	
In-vehicle sensor: M93	1	Front air control: M51	28	Yes

4. Check continuity between in-vehicle sensor harness connector M93 (A) terminal 1 and ground.

A		Ground	Continuity
Connector	Terminal		
In-vehicle sensor: M93	1		No

Is the inspection result normal?

YES >> 1. Replace front air control. Refer to XX.
2. Go to self-diagnosis HAC-98, "Front Air Control Self-Diagnosis" and perform self-diagnosis STEP-2. Confirm that code No. 20 is displayed.

NO >> Repair harness or connector.

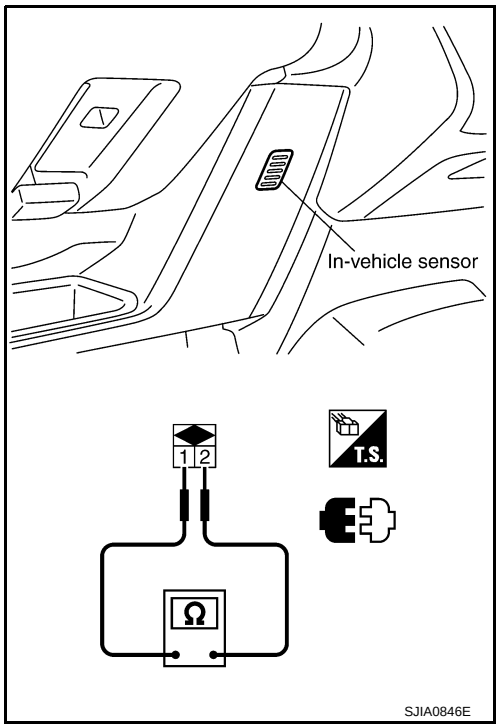
In-Vehicle Sensor Component Inspection

INFOID:0000000001547440

COMPONENT INSPECTION

In-vehicle Sensor

After disconnecting in-vehicle sensor connector M93, measure resistance between terminals 1 and 2 at sensor side, using the table below.



Temperature °C (°F)	Resistance kΩ
–15 (5)	12.73
–10 (14)	9.92
–5 (23)	7.80
0 (32)	6.19
5 (41)	4.95
10 (50)	3.99
15 (59)	3.24
20 (68)	2.65
25 (77)	2.19
30 (86)	1.81
35 (95)	1.51
40 (104)	1.27
45 (113)	1.07

If NG, replace in-vehicle sensor Refer to XX.

SUNLOAD SENSOR

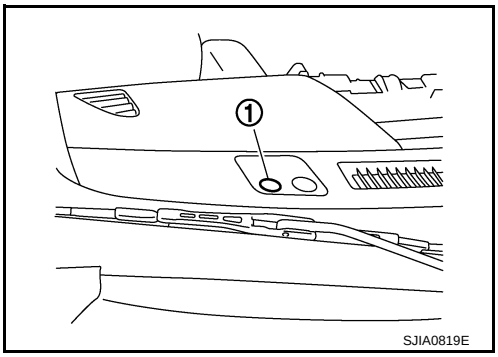
System Description

INFOID:0000000001547443

COMPONENT DESCRIPTION

Sunload Sensor

The sunload sensor (1) is located on the instrument upper mask. It detects sunload entering through windshield by means of a photo diode. The sensor converts the sunload into a current value which is then input into the front air control.



SUNLOAD INPUT PROCESS

The front air control also includes a processing circuit which averages the variations in detected sunload over a period of time. This prevents drastic swings in the ATC system operation due to small or quick variations in detected sunload.

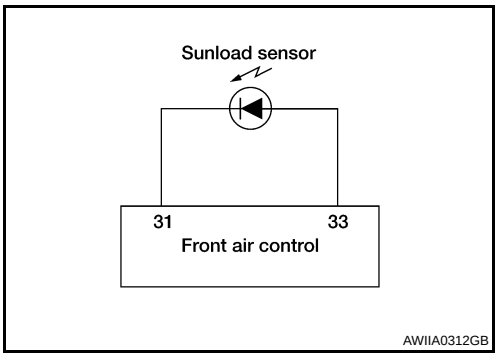
For example, consider driving along a road bordered by an occasional group of large trees. The sunload detected by the sunload sensor will vary whenever the trees obstruct the sunlight. The processing circuit averages the detected sunload over a period of time, so that the (insignificant) effect of the trees momentarily obstructing the sunlight does not cause any change in the ATC system operation. On the other hand, shortly after entering a long tunnel, the system will recognize the change in sunload, and the system will react accordingly.

Sunload Sensor Diagnosis Procedure

INFOID:0000000001547442

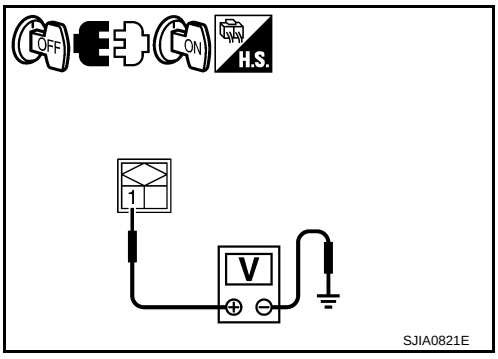
DIAGNOSTIC PROCEDURE FOR SUNLOAD SENSOR

SYMPTOM: Sunload sensor circuit is open or shorted. (25 or $^{AUTO}25$ is indicated on front air control as a result of performing self-diagnosis STEP-2.)



1. CHECK VOLTAGE BETWEEN SUNLOAD SENSOR AND GROUND

1. Turn ignition switch OFF.
2. Disconnect sunload sensor connector M94.
3. Turn ignition switch ON.
4. Check voltage between sunload sensor harness connector M94 terminal 1 and ground.



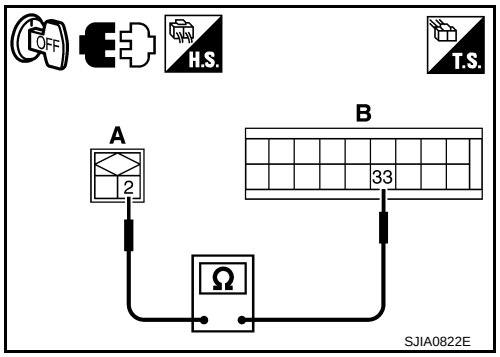
Terminals			Voltage (Approx.)
(+)		(–)	
Connector	Terminal	Ground	
Sunload sensor: M94	1		5V

Is the inspection result normal?

YES >> GO TO 2.
NO >> GO TO 4.

2. CHECK CIRCUIT CONTINUITY BETWEEN SUNLOAD SENSOR AND FRONT AIR CONTROL

1. Turn ignition switch OFF.
2. Disconnect front air control connector M51.
3. Check continuity between sunload sensor harness connector M94 (A) terminal 2 and front air control harness connector M51 (B) terminal 33.



A		B		Continuity
Connector	Terminal	Connector	Terminal	
Sunload sensor: M94	2	Front air control: M51	33	Yes

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair harness or connector.

3. CHECK SUNLOAD SENSOR

Refer to HAC-137, "Sunload Component Inspection".

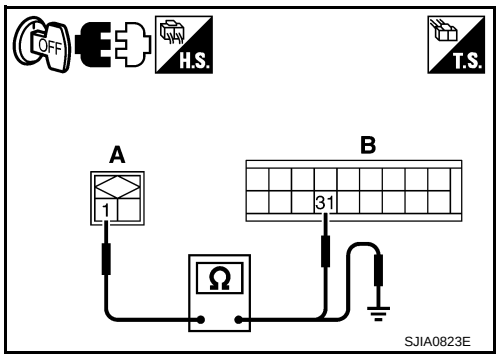
Is the inspection result normal?

YES >> 1. Replace front air control. Refer to XX.
2. Go to self-diagnosis HAC-98, "Front Air Control Self-Diagnosis" and perform self-diagnosis STEP-2. Confirm that code No. 20 is displayed.

NO >> 1. Replace sunload sensor. Refer to XX.
2. Go to self-diagnosis HAC-98, "Front Air Control Self-Diagnosis" and perform self-diagnosis STEP-2. Confirm that code No. 20 is displayed.

4. CHECK CIRCUIT CONTINUITY BETWEEN SUNLOAD SENSOR AND FRONT AIR CONTROL

1. Turn ignition switch OFF.
2. Disconnect front air control connector M51.
3. Check continuity between sunload sensor harness connector M94 (B) terminal 1 and front air control harness connector M51 (B) terminal 31.



A		B		Continuity
Connector	Terminal	Connector	Terminal	
Sunload sensor: M94	1	Front air control: M51	31	Yes

4. Check continuity between sunload sensor harness connector M94 (A) terminal 1 and ground.

A		Ground	Continuity
Connector	Terminal		
Sunload sensor: M94	1		No

Is the inspection result normal?

YES >> 1. Replace front air control. Refer to XX.
2. Go to self-diagnosis HAC-98, "Front Air Control Self-Diagnosis" and perform self-diagnosis STEP-2. Confirm that code No. 20 is displayed.

NO >> Repair harness or connector.

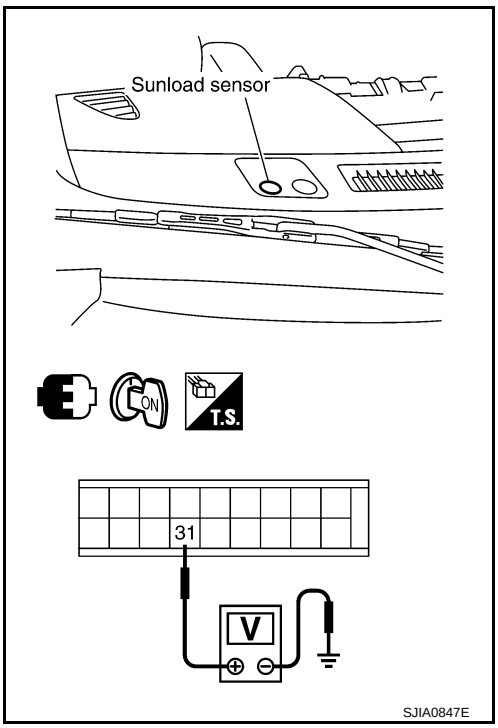
Sunload Component Inspection

INFOID:0000000001569485

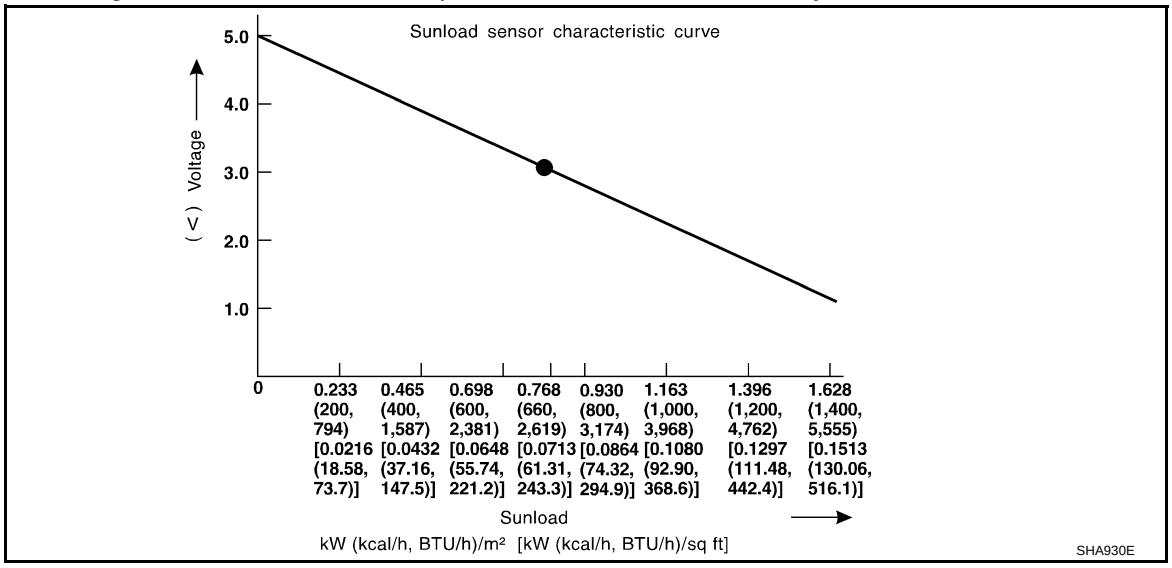
COMPONENT INSPECTION

Sunload Sensor

Measure voltage between front air control harness connector M51 terminal 31 and ground.
If NG, replace sunload sensor. Refer to XX.



- When checking sunload sensor, select a place where sun shines directly on it.



INTAKE SENSOR

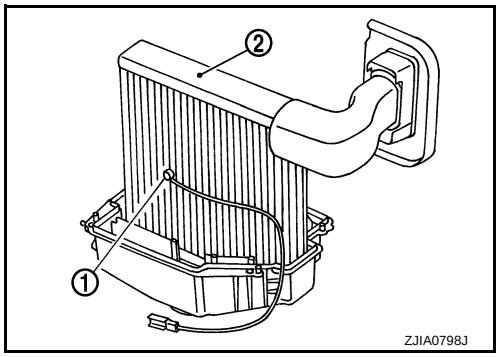
Component Inspection

INFOID:0000000001572418

COMPONENT DESCRIPTION

Intake Sensor

The intake sensor (1) is located on the A/C unit. It converts temperature of air after it passes through the evaporator (2) into a resistance value which is then input to the front air control.

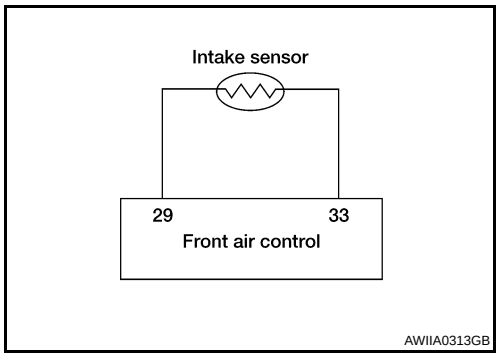


Intake Sensor Diagnosis Procedure

INFOID:0000000001547444

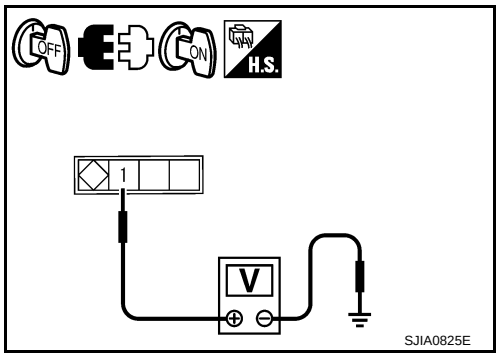
DIAGNOSTIC PROCEDURE FOR INTAKE SENSOR

SYMPTOM: Intake sensor circuit is open or shorted. (24 or ^{AUTO}24 is indicated on front air control as a result of performing self-diagnosis STEP-2.)



1. CHECK VOLTAGE BETWEEN INTAKE SENSOR AND GROUND

1. Turn ignition switch OFF.
2. Disconnect intake sensor connector M92.
3. Turn ignition switch ON.
4. Check voltage between intake sensor harness connector M92 terminal 1 and ground.



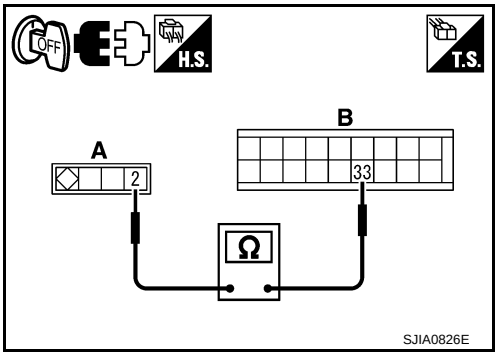
Terminals			Voltage (Approx.)
(+)		(–)	
Connector	Terminal	Ground	
Intake sensor: M92	1		5V

Is the inspection result normal?

YES >> GO TO 2.
NO >> GO TO 4.

2. CHECK CIRCUIT CONTINUITY BETWEEN INTAKE SENSOR AND FRONT AIR CONTROL

1. Turn ignition switch OFF.
2. Disconnect front air control connector M51.
3. Check continuity between intake sensor harness connector M92 (A) terminal 2 and front air control harness connector M51 (B) terminal 33.



A		B		Continuity
Connector	Terminal	Connector	Terminal	
Intake sensor: M92	2	Front air control: M51	33	Yes

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair harness or connector.

3. CHECK INTAKE SENSOR

Refer to HAC-140, "Intake Sensor Component Inspection".

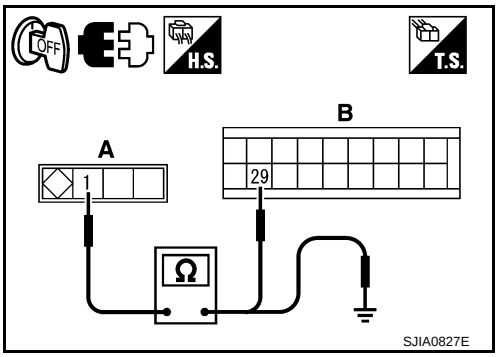
Is the inspection result normal?

YES >> 1. Replace front air control. Refer to XX.
2. Go to self-diagnosis HAC-98, "Front Air Control Self-Diagnosis" and perform self-diagnosis STEP-2. Confirm that code No. 20 is displayed.

NO >> 1. Replace intake sensor. Refer to XX.
2. Go to self-diagnosis HAC-98, "Front Air Control Self-Diagnosis" and perform self-diagnosis STEP-2. Confirm that code No. 20 is displayed.

4. CHECK CIRCUIT CONTINUITY BETWEEN INTAKE SENSOR AND FRONT AIR CONTROL

1. Turn ignition switch OFF.
2. Disconnect front air control connector M51.
3. Check continuity between intake sensor harness connector M92 (A) terminal 1 and front air control harness connector M51 (B) terminal 29.



A		B		Continuity
Connector	Terminal	Connector	Terminal	
Intake sensor: M92	1	Front air control: M51	29	Yes

4. Check continuity between intake sensor harness connector M92 (A) terminal 1 and ground.

A		Ground	Continuity
Connector	Terminal		
Intake sensor: M92	1		No

Is the inspection result normal?

YES >> 1. Replace front air control. Refer to XX.
2. Go to self-diagnosis HAC-98, "Front Air Control Self-Diagnosis" and perform self-diagnosis STEP-2. Confirm that code No. 20 is displayed.

NO >> Repair harness or connector.

Intake Sensor Component Inspection

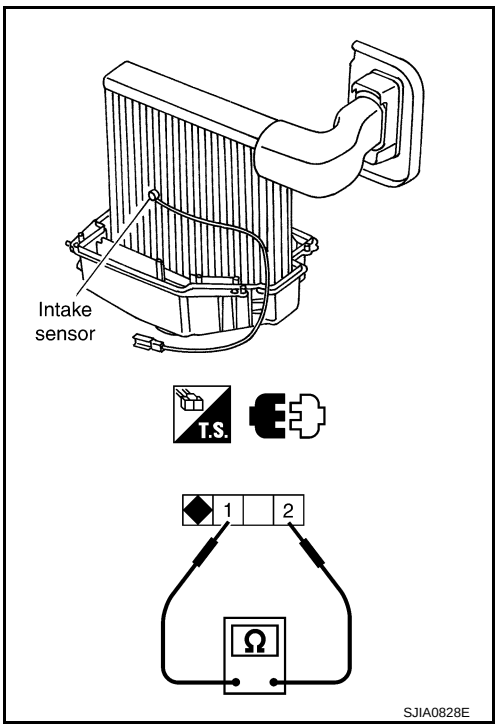
INFOID:0000000001547445

COMPONENT INSPECTION

Intake Sensor

After disconnecting intake sensor connector M42, measure resistance between terminals 1 and 2 at sensor side, using the table below.

Temperature °C (°F)	Resistance kΩ
–15 (5)	12.34
–10 (14)	9.62
–5 (23)	7.56
0 (32)	6.00
5 (41)	4.80
10 (50)	3.87
15 (59)	3.15
20 (68)	2.57
25 (77)	2.12
30 (86)	1.76
35 (95)	1.47
40 (104)	1.23
45 (113)	1.04



If NG, replace intake sensor. Refer to XXXX.

PTC HEATER CONTROL SYSTEM
PTC HEATER (300 WATT)
PTC HEATER (300 WATT) : PTC Heater System Description

INFOID:0000000001682706

SYSTEM DESCRIPTION

The PTC heater system is controlled by ambient temperature, water temperature, FAN ON signal and temperature control dial. Hot air is supplied to the discharge air outlets by a PTC heater that generates heat electrically even when engine coolant temperature is low.

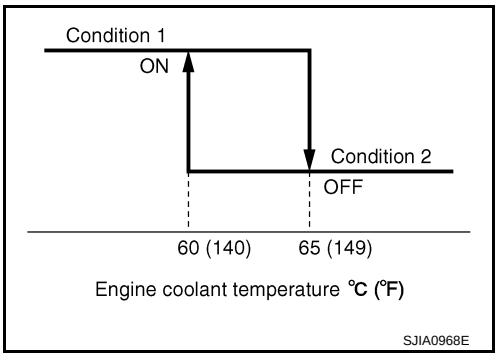
Component Parts

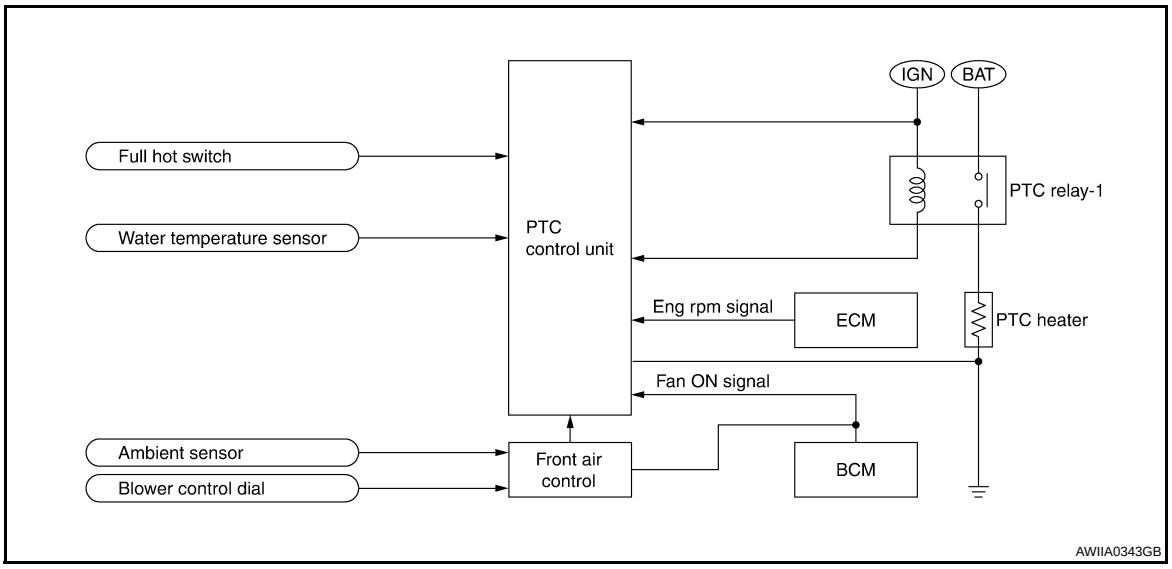
PTC heater system components are:
- PTC control unit
- PTC heater
- PTC relay-1
- Water temperature sensor
- Full hot switch
- Ambient sensor

System Operation

PTC heater system starts when all the following conditions are met:
- Less than 35 minutes after ignition switch ON.
- Blower control dial ON (Blower motor operates.) and temperature control dial full hot position (Full hot switch ON).
- Ambient temperature is lower than 0°C (32°).
- Engine coolant temperature is lower than 65°C (149°) (condition 1), or when it becomes lower than 60°C (140°) again (condition 2) on startup.
- Engine speed is more than 1100 rpm and after a lapse of more than 10 seconds.

PTC heater system stops when any of the following conditions is met:
- More than 35 minutes later after ignition switch ON.
- Blower control dial OFF (Blower motor OFF) and/or temperature control dial except full hot position (Full hot switch OFF).
- Ambient temperature is higher than 0°C (32°).
- Engine coolant temperature is higher than 65°C (149°).
- When engine speed becomes less than 800 rpm.





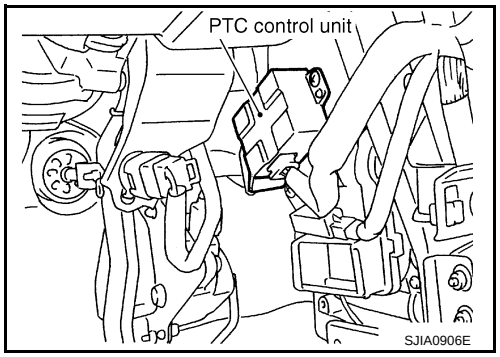
PTC HEATER (300 WATT) : PTC Heater Component Description

INFOID:0000000001682707

COMPONENT DESCRIPTION

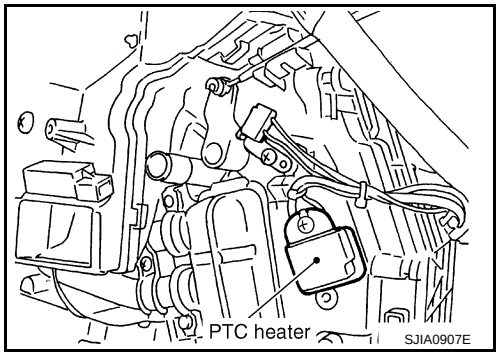
PTC Control Unit

The PTC control unit is attached on the A/C unit assembly. It controls PTC heater by ambient temperature, water temperature, FAN ON signal and temperature control dial.



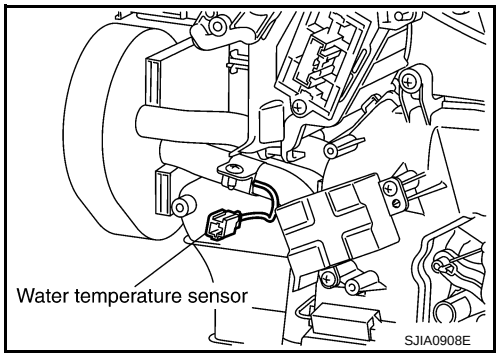
PTC Heater

The PTC heater is attached on the A/C unit assembly. It generates heat electrically.



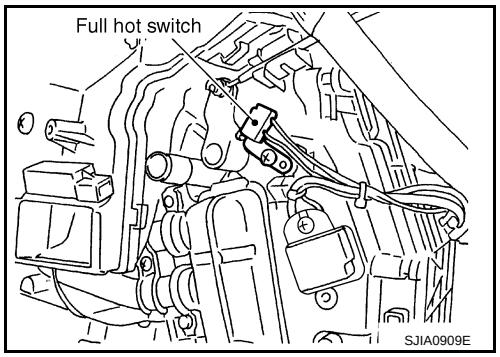
Water Temperature Sensor

The water temperature sensor is attached on heater pipe. It detects water temperature and converts it into a resistance value which is then input in to PTC control unit.



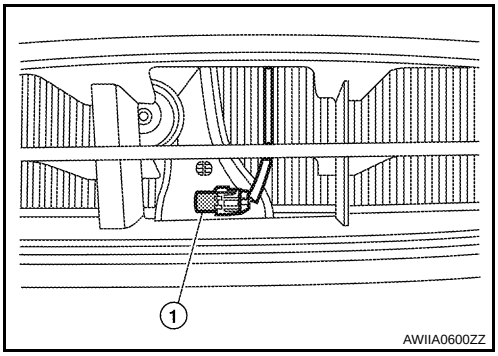
Full Hot Switch

The full hot switch is attached on the A/C unit assembly. When the temperature control dial at full hot position, then full hot switch is turned ON.



Ambient Sensor

The ambient sensor is attached on the radiator core support upper. It detects ambient temperature and converts it into a resistance value which is then input into the front air control.



PTC HEATER (300 WATT) : PTC Heater (300 Watt) Diagnosis Procedure

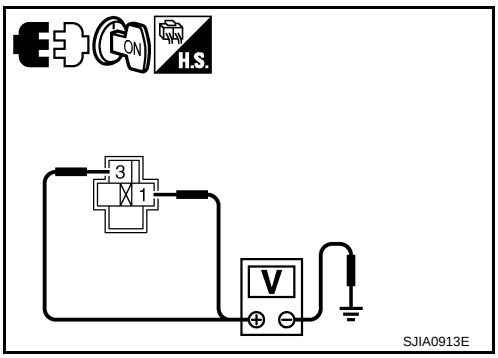
INFOID:0000000001682708

DIAGNOSTIC PROCEDURE FOR PTC SYSTEM

SYMPTOM: PTC heater system operation is malfunction.

1.CHECK POWER SUPPLY FOR PTC RELAY-1

1. Turn ignition switch ON.
2. Check voltage between PTC relay-1 harness connector E61 terminals 2, 3, and ground.



Terminals			Voltage (Approx.)
(+)		(–)	
Connector	Terminal		
PTC relay-1: E61	2	Ground	Battery voltage
	3		

Is the inspection result normal

YES >> GO TO 2.

NO >> Check power supply circuit and 10A fuse (No. 2) and 40A fusible link (No. I), located in the fuse and fusible link box.
- If fuses are OK, check harness for open circuit. Repair or replace if necessary.
- If fuses are NG, replace fuse and check harness for short circuit. Repair or replace if necessary.

2.CHECK PTC RELAY-1

1. Turn ignition switch OFF.
2. Check PTC relay-1. Refer to HAC-151, "PTC HEATER (300 WATT) : PTC Heater (300 Watt) Component Inspection".

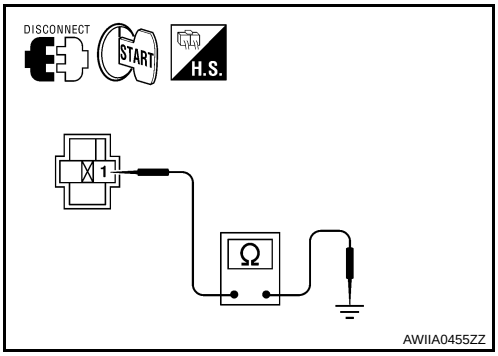
Is the inspection result normal

YES >> GO TO 3.

NO >> Replace PTC relay-1. Refer to XX.

3.CHECK PTC RELAY-1 OUTPUT CIRCUIT

1. Disconnect ambient sensor, PTC heater and water temperature sensor connectors.
2. Turn temperature control dial clockwise until full hot position.
3. Turn mode control dial to foot position.
4. Start the engine.
5. Turn blower control dial to maximum speed.
6. Check continuity between PTC relay-1 harness connector E61 terminal 1 and ground.



Connector	Terminal	Ground	Continuity
PTC relay-1: E61	1		Yes

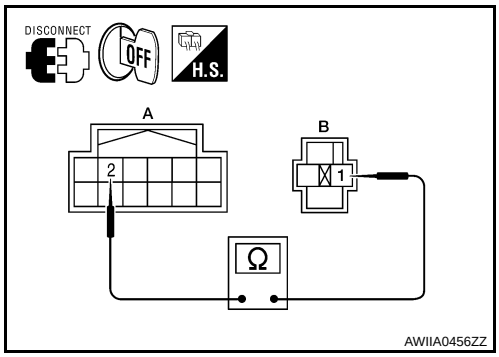
Is the inspection result normal

YES >> GO TO 5.

NO >> GO TO 4.

4. CHECK CIRCUIT CONTINUITY BETWEEN PTC RELAY-1 AND PTC CONTROL UNIT

1. Turn ignition switch OFF.
2. Disconnect PTC control unit connector.
3. Check continuity between PTC control unit harness connector M84 (A) terminal 2 and PTC relay-1 harness connector E61 (B) terminal 1.



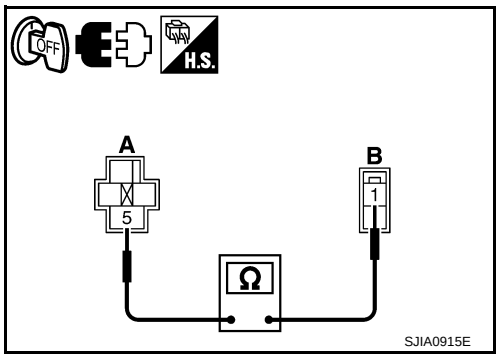
A		B		Continuity
Connector	Terminal	Connector	Terminal	
PTC control unit: M84	2	PTC relay-1: E61	1	Yes

Is the inspection result normal

YES >> GO TO 5.
NO >> GO TO 7.

5. CHECK CIRCUIT CONTINUITY BETWEEN PTC RELAY-1 AND PTC HEATER

1. Disconnect PTC heater connector.
2. Check continuity between PTC relay-1 harness connector E61 (A) terminal 5 and PTC heater harness connector M66 (B) terminal 1.



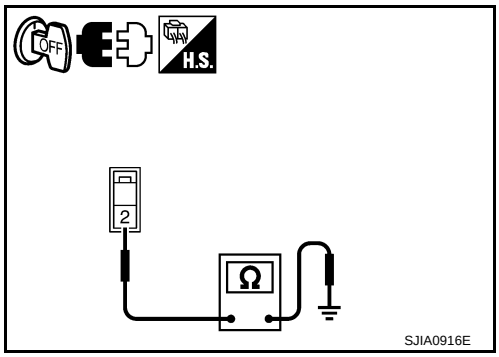
A		B		Continuity
Connector	Terminal	Connector	Terminal	
PTC relay-1: E61	5	PTC heater: M66	1	Yes

Is the inspection result normal

YES >> GO TO 6.
NO >> Repair harness or connector.

6. CHECK PTC HEATER GROUND CIRCUIT

Check continuity between PTC heater harness connector M66 terminal 2 and ground.



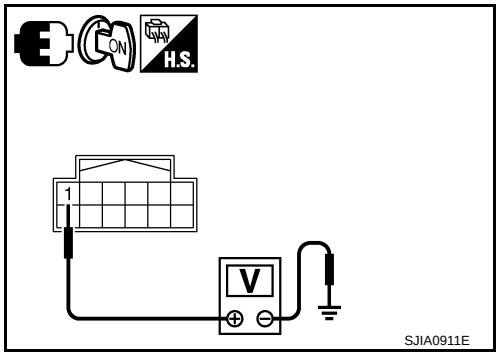
Connector	Terminal	Ground	Continuity
PTC heater: M66	2		Yes

Is the inspection result normal

YES >> Replace PTC heater. Refer to XX.
NO >> Repair harness or connector.

7. CHECK POWER SUPPLY VOLTAGE FOR PTC CONTROL UNIT

1. Turn ignition switch ON.
2. Check voltage between PTC control unit harness connector M84 terminal 1 and ground.



Terminals			Voltage (Approx.)
(+)		(–)	
Connector	Terminal	Ground	Battery voltage
PTC control unit: M84	1		

Is the inspection result normal

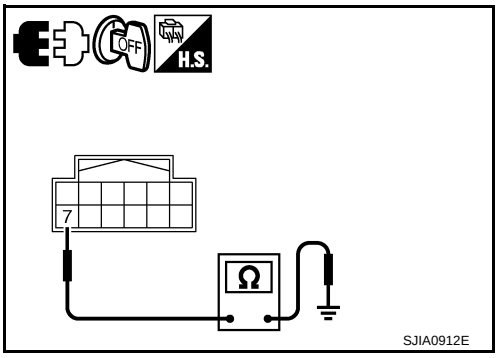
YES >> GO TO 8.

NO >> Repair harness or connector.

8. CHECK GROUND CIRCUIT FOR PTC CONTROL UNIT

1. Turn ignition switch OFF.
2. Check continuity between PTC control unit harness connector M84 terminal 7 and ground.

Connector	Terminal	Ground	Continuity
PTC control unit: M84	7		Yes



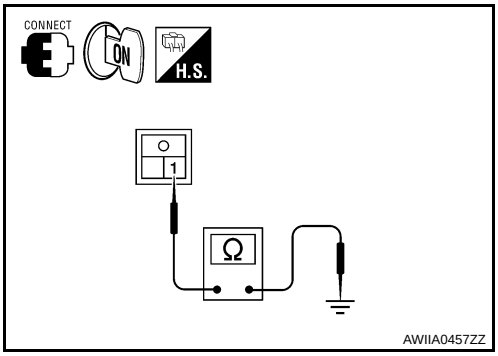
Is the inspection result normal

YES >> GO TO 9.
NO >> Repair harness or connector.

9. CHECK FULL HOT CIRCUIT BETWEEN PTC CONTROL UNIT AND GROUND

1. Reconnect PTC control unit and PTC relay-1 connector.
2. Turn ignition switch ON.
3. Check voltage between full hot switch harness connector M65 terminal 1 and ground.

Terminals			Condition	Voltage (Approx.)
(+)		(–)		
Connector	Terminal			
Full hot switch: M65	1	Ground	Temperature control dial: Full hot position.	0V
			Temperature control dial: Except full hot position.	5V



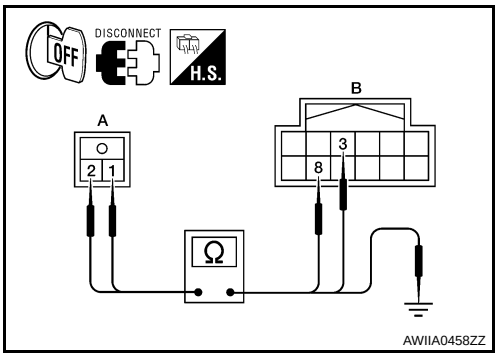
Is the inspection result normal

YES >> GO TO 12.
NO >> GO TO 10.

10. CHECK CIRCUIT CONTINUITY BETWEEN FULL HOT SWITCH AND PTC CONTROL UNIT

1. Turn ignition switch OFF.
2. Disconnect full hot switch and PTC control unit connector.
3. Check continuity between full hot switch harness connector M65 (A) terminal 1, 2 and PTC control unit harness connector M84 (B) terminal 3, 8.

A		B		Continuity
Connector	Terminal	Connector	Terminal	
Full hot switch: M65	1	PTC control unit: M84	3	Yes
	2		8	



4. Check continuity between full hot switch harness connector M65 (A) terminal 1, 2 and ground.

(+)		(-)	Continuity
Connector	Terminal		
Full hot switch: M65	1	Ground	Yes
	2		

Is the inspection result normal

YES >> GO TO 11.
NO >> Repair harness or connector.

11. CHECK FULL HOT SWITCH

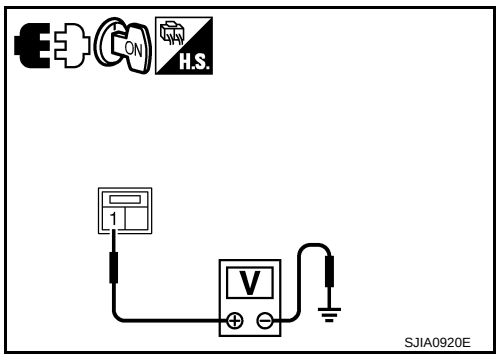
Check full hot switch. Refer to HAC-151, "PTC HEATER (300 WATT) : PTC Heater (300 Watt) Component Inspection".

Is the inspection result normal

YES >> Replace the PTC control unit. Refer to XX.
NO >> Replace full hot switch. Refer to XX.

12. CHECK VOLTAGE BETWEEN WATER TEMPERATURE SENSOR AND GROUND

Check voltage between water temperature sensor harness connector M64 terminal 1 and ground.



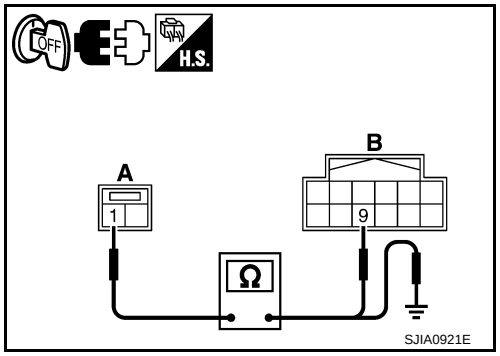
Terminals			Voltage (Approx.)
(+)		(–)	
Connector	Terminal	Ground	5V
Water temperature sensor: M64	1		

Is the inspection result normal

YES >> GO TO 14.
NO >> GO TO 13.

13. CHECK CIRCUIT CONTINUITY BETWEEN WATER TEMPERATURE SENSOR AND PTC CONTROL UNIT

1. Turn ignition switch OFF.
2. Disconnect PTC control unit.
3. Check continuity between water temperature sensor harness connector M64 (A) terminal 1 and PTC control unit harness connector M84 (B) terminal 9.



A		B		Continuity
Connector	Terminal	Connector	Terminal	
Water temperature sensor: M64	1	PTC control unit: M84	9	Yes

4. Check continuity between water temperature sensor harness connector M64 (A) terminal 1 and ground.

A			Continuity
Connector	Terminal		
Water temperature sensor: M64	1	Ground	No

Is the inspection result normal

YES >> Replace PTC control unit. Refer to XX.
NO >> Repair harness or connector.

14. CHECK WATER TEMPERATURE SENSOR

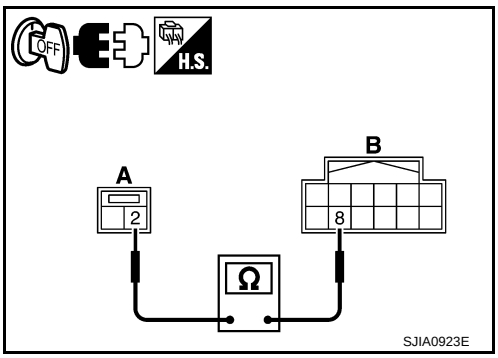
Refer to HAC-151, "PTC HEATER (300 WATT) : PTC Heater (300 Watt) Component Inspection".

Is the inspection result normal

YES >> GO TO 15.
NO >> Replace water temperature sensor. Refer to XX.

15. CHECK CIRCUIT CONTINUITY BETWEEN WATER TEMPERATURE SENSOR AND PTC CONTROL UNIT

Check continuity between water temperature sensor harness connector M64 (A) terminal 2 and PTC control unit harness connector M84 (B) terminal 8.



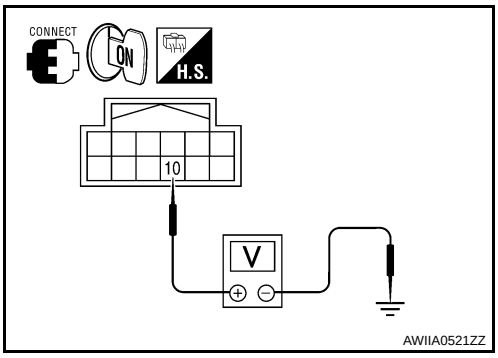
A		B		Continuity
Connector	Terminal	Connector	Terminal	
Water temperature sensor: M64	2	PTC control unit: M84	8	Yes

Is the inspection result normal

YES >> GO TO 16.
NO >> Repair harness or connector.

16. CHECK VOLTAGE BETWEEN PTC CONTROL UNIT AND GROUND

1. Turn ignition switch ON.
2. Check voltage between PTC heater harness connector M84 terminal 10 and ground.



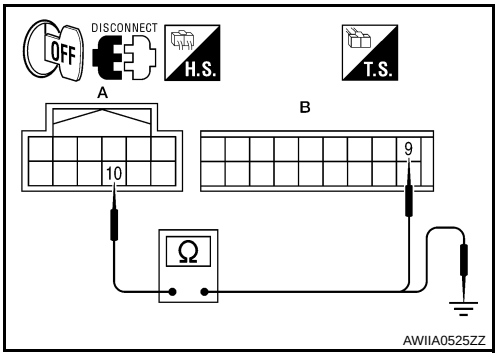
Terminals			Voltage (Approx.)
(+)		(–)	
Connector	Terminal	Ground	5V
PTC control unit: M84	10		

Is the inspection result normal

YES >> 1. If equipped with manual transmission, GO TO 22.
2. If equipped with automatic transmission, GO TO 24.
NO >> GO TO 17.

17. CHECK CIRCUIT CONTINUITY BETWEEN PTC CONTROL UNIT AND FRONT AIR CONTROL

1. Turn ignition switch OFF.
2. Disconnect front air control and PTC control unit connector.
3. Check continuity between PTC control unit harness connector M84 (A) terminal 10 and front air control harness connector M85 (B) terminal 9.



A		B		Continuity
Connector	Terminal	Connector	Terminal	
PTC control unit: M84	10	Front air control: M85	9	Yes

4. Check continuity between PTC control unit harness connector M84 (A) terminal 10 and ground.

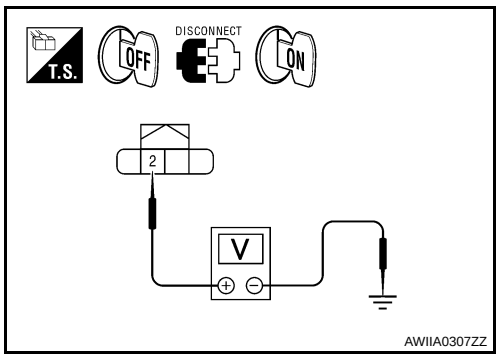
A		Ground	Continuity
Connector	Terminal		
PTC control unit: M84	10		No

Is the inspection result normal

YES >> GO TO 18.
NO >> Repair harness or connector.

18. CHECK VOLTAGE BETWEEN AMBIENT SENSOR AND GROUND

1. Turn ignition switch OFF.
2. Disconnect ambient sensor connector E60.
3. Turn ignition switch ON.
4. Check voltage between ambient sensor harness connector E60 terminal 2 and ground.



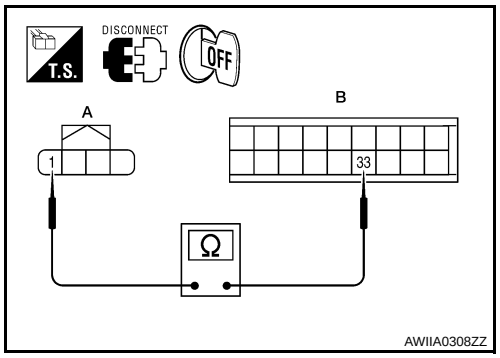
Terminals			Voltage (Approx.)
(+)		(–)	
Connector	Terminal	Ground	
Ambient sensor: E60	2		5V

Is the inspection result normal?

YES >> GO TO 19.
NO >> GO TO 21.

19. CHECK CIRCUIT CONTINUITY BETWEEN AMBIENT SENSOR AND FRONT AIR CONTROL

1. Turn ignition switch OFF.
2. Disconnect front air control connector M51.
3. Check continuity between ambient sensor harness connector E60 (A) terminal 1 and front air control harness connector M51 (B) terminal 33.



A		B		Continuity
Connector	Terminal	Connector	Terminal	
Ambient sensor: E60	1	Front air control: M51	33	Yes

Is the inspection result normal?

YES >> GO TO 20.
NO >> Repair harness or connector.

20. CHECK AMBIENT SENSOR

Refer to HAC-151, "PTC HEATER (300 WATT) : PTC Heater (300 Watt) Component Inspection".

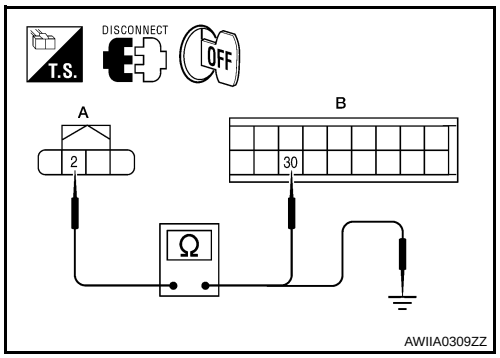
Is the inspection result normal?

YES >> 1. Replace front air control. Refer to XX.
2. Go to self-diagnosis HAC-213, "Front Air Control Self-Diagnosis" and perform self-diagnosis STEP-2. Confirm that code No. 20 is displayed.

NO >> 1. Replace ambient sensor. Refer to XX.
2. Go to self-diagnosis HAC-213, "Front Air Control Self-Diagnosis" and perform self-diagnosis STEP-2. Confirm that code No. 20 is displayed.

21. CHECK CIRCUIT CONTINUITY BETWEEN AMBIENT SENSOR AND FRONT AIR CONTROL

1. Turn ignition switch OFF.
2. Disconnect front air control connector M51.
3. Check continuity between ambient sensor harness connector E60 (A) terminal 2 and front air control harness connector M51 (B) terminal 30.



A		B		Continuity
Connector	Terminal	Connector	Terminal	
Ambient sensor: E60	2	Front air control: M51	30	Yes

4. Check continuity between ambient sensor harness connector E34 (A) terminal 2 and ground.

A		Ground	Continuity
Connector	Terminal		
Ambient sensor: E60	2		No

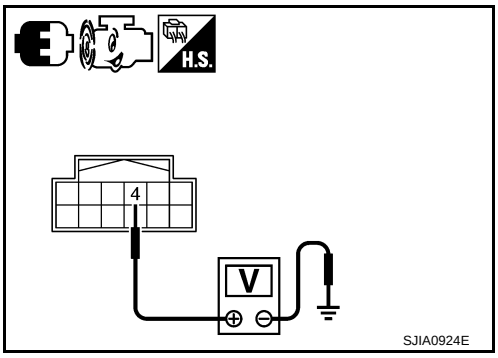
Is the inspection result normal?

YES >> 1. Replace front air control. Refer to XX.
2. Go to self-diagnosis HAC-213, "Front Air Control Self-Diagnosis" and perform self-diagnosis STEP-2. Confirm that code No. 20 is displayed.

NO >> Repair harness or connector.

22. CHECK ENGINE RPM SIGNAL (MANUAL TRANSMISSION)

1. Reconnect PTC control unit.
2. Start the engine.
3. Check voltage between PTC control unit harness connector M84 terminal 4 and ground.



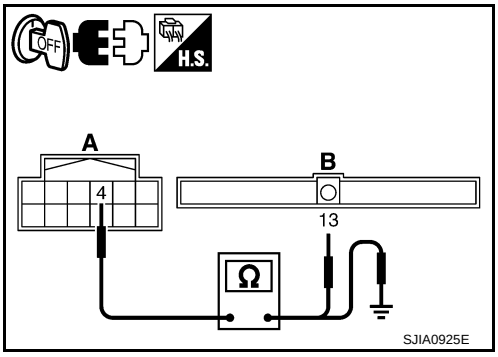
Terminals			Voltage (Approx.)
(+)		(–)	
Connector	Terminal	Ground	
PTC control unit: M84	4		4.2V

Is the inspection result normal

YES >> GO TO 24.
NO >> GO TO 23.

23. CHECK CONTINUITY OF ENGINE RPM CIRCUIT BETWEEN FRONT AIR CONTROL AND PTC CONTROL UNIT (MANUAL TRANSMISSION)

1. Turn ignition switch OFF.
2. Disconnect ECM and PTC control unit connector.
3. Check continuity between PTC control unit harness connector M84 (A) terminal 4 and ECM harness connector F10 (B) terminal 13.



A		B		Continuity
Connector	Terminal	Connector	Terminal	
PTC control unit: M84	4	ECM: F10	13	Yes

4. Check continuity between PTC control unit harness connector M84 (A) terminal 4 and ground.

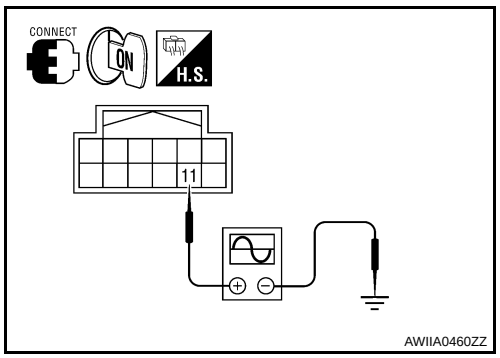
A		Ground	Continuity
Connector	Terminal		
PTC control unit: M84	4		No

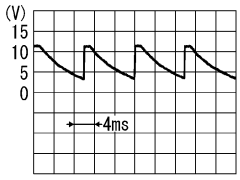
Is the inspection result normal

YES >> Replace ECM. Refer to XX.
NO >> Repair harness or connector.

24. CHECK BCM INPUT (FAN ON) SIGNAL

1. Turn blower control dial to "1" position.
2. Confirm fan on signal between PTC control unit harness connector M84 terminal 11 and ground using oscilloscope.



Terminals			Voltage (Approx.)
(+)		(-)	
Connector	Terminal		
PTC control unit: M84	11	Ground	

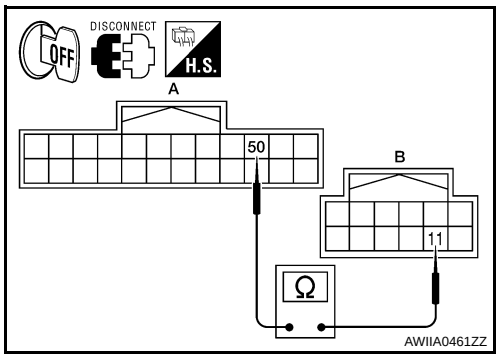
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Is the inspection result normal

YES >> Replace PTC control unit.
NO >> GO TO 25.

25. CHECK CIRCUIT CONTINUITY BETWEEN BCM AND PTC CONTROL UNIT

1. Turn ignition switch OFF.
2. Disconnect BCM connector and PTC control unit connector.
3. Check continuity between BCM harness connector M19 (A) terminal 50 and PTC control unit harness connector M84 (B) terminal 11.



A		B		Continuity
Connector	Terminal	Connector	Terminal	
BCM: M19	50	PTC control unit: M84	11	Yes

4. Check continuity between PTC control unit harness connector M84 (A) terminal 11 and ground.

A		Ground	Continuity
Connector	Terminal		
PTC control unit: M84	11		No

Is the inspection result normal

YES >> Replace BCM. Refer to XX.
NO >> Repair harness or connector.

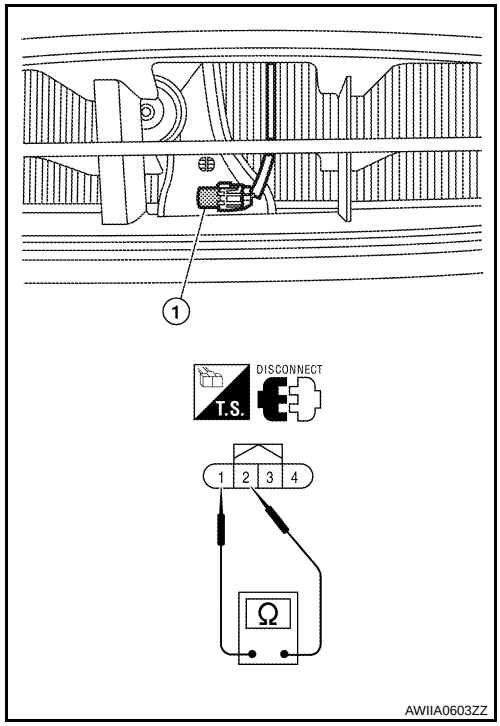
PTC HEATER (300 WATT) : PTC Heater (300 Watt) Component Inspection

INFOID:0000000001682709

COMPONENT INSPECTION

Ambient Sensor

After disconnecting ambient sensor (1) connector E60, measure resistance between terminals 1 and 2 at sensor side, using the table below.

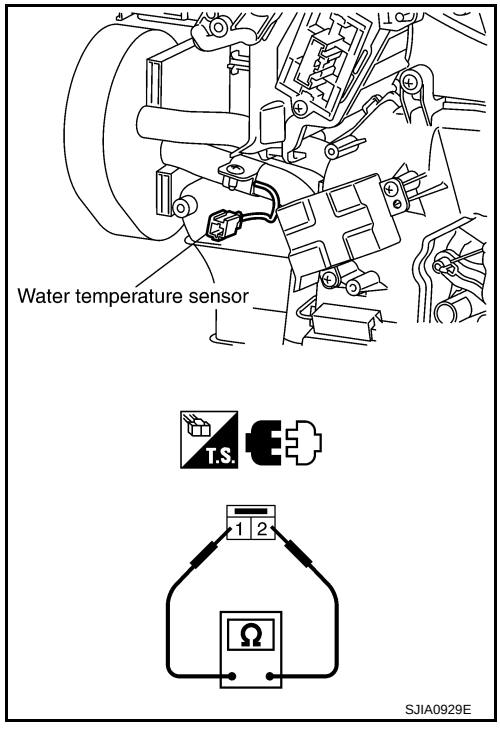


Temperature °C (°F)	Resistance kΩ
–15 (5)	12.73
–10 (14)	9.92
–5 (23)	7.80
0 (32)	6.19
5 (41)	4.95
10 (50)	3.99
15 (59)	3.24
20 (68)	2.65
25 (77)	2.19
30 (86)	1.81
35 (95)	1.51
40 (104)	1.27
45 (113)	1.07

If NG, replace ambient sensor. Refer to XX.

Water Temperature Sensor

After disconnecting water temperature sensor connector M64, measure resistance between terminals 1 and 2 at sensor side, using the table below.



Temperature °C (°F)	Resistance kΩ
–20 (–4)	31.62
–10 (14)	17.47
0 (32)	10.09
10 (50)	6.05
20 (68)	3.76
30 (86)	2.41
40 (104)	1.59
50 (122)	1.08
60 (140)	0.75
70 (158)	0.53
80 (176)	0.38
90 (194)	0.28
100 (212)	0.21

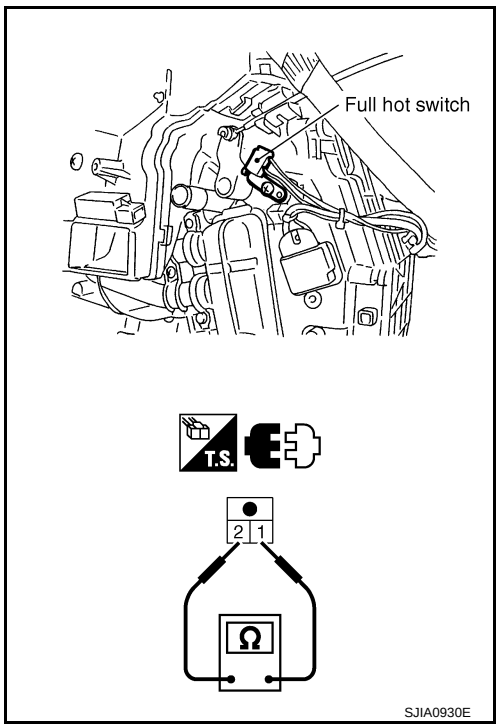
If NG, replace water temperature sensor.

Full Hot Switch

After disconnecting full hot switch connector M65, check continuity between terminals 1 and 2 at switch side.

Terminals		Condition	Continuity
1	2	Temperature control dial: Full hot position	Yes
		Temperature control dial: Except full hot position	No

If NG, replace full hot switch.

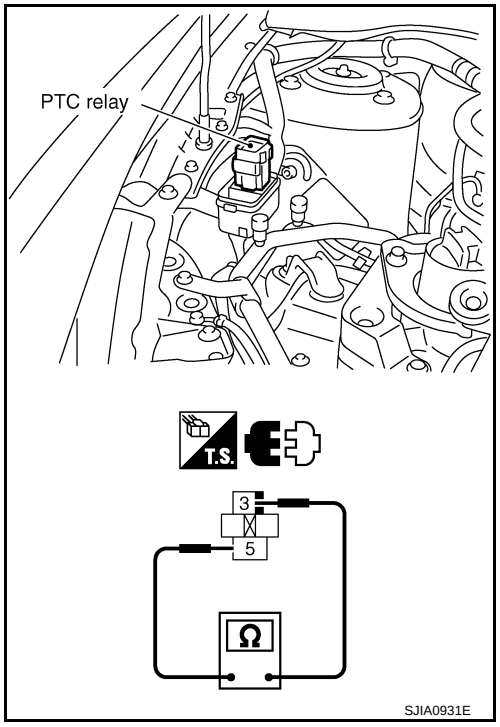


PTC relay

Check continuity between terminal Nos. 3 and 5.

Condition	Continuity
12V direct current supply between terminal Nos. 1 and 2	Yes
No current supply	No

If NG, replace PTC relay.



PTC HEATER (1500 WATT)

PTC HEATER (1500 WATT) : System Description

INFOID:0000000001682723

SYSTEM DESCRIPTION

The PTC heater system is controlled by ambient temperature, water temperature, FAN ON signal. Hot air is supplied to a discharge air outlet by PTC heater that generates heat electrically even when engine coolant temperature is low.

Component Parts

PTC heater system components are:

- PTC control unit

- PTC heater
- PTC relays
- Ambient sensor
- Blower relay

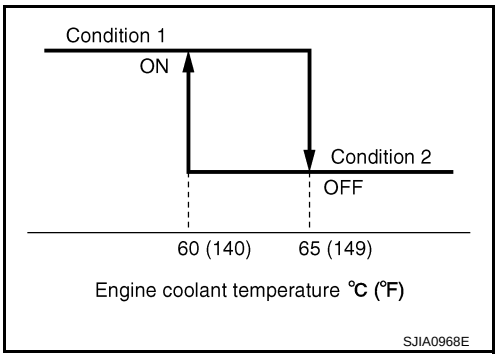
System Operation

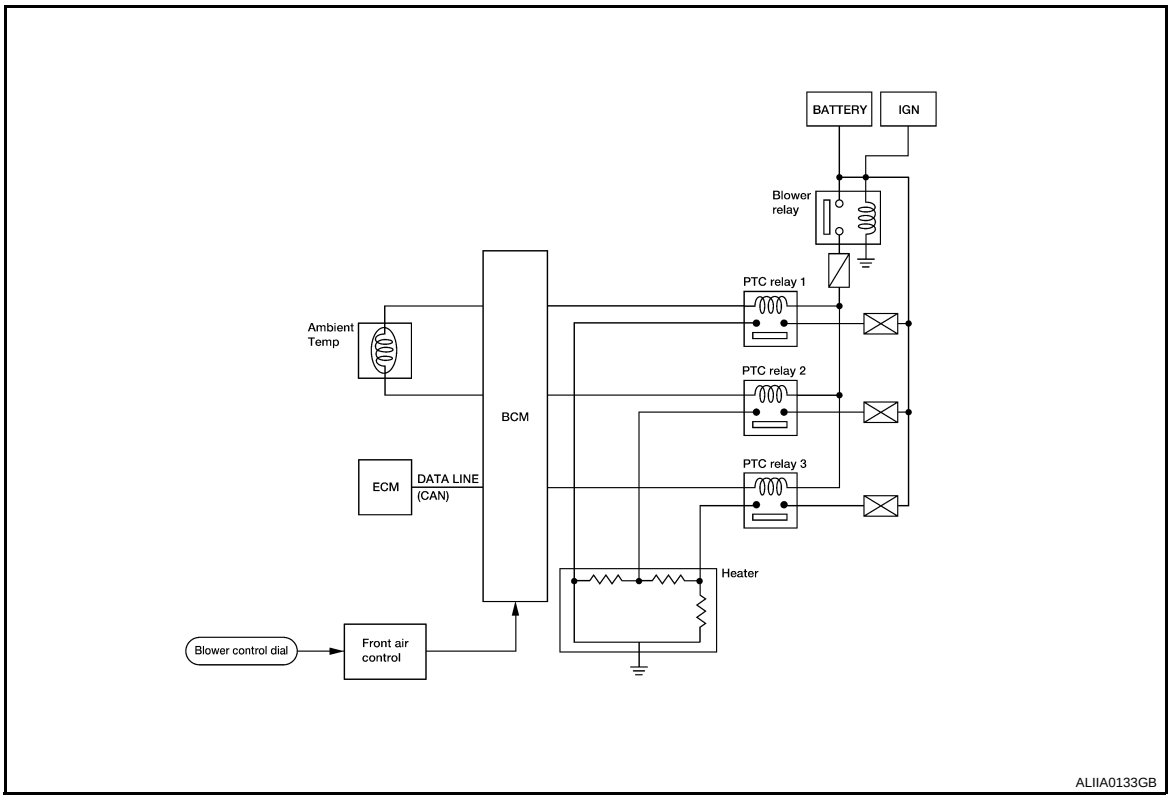
PTC heater system starts when all the following conditions are met:

- Less than 35 minutes after ignition switch ON.
- Blower control dial ON (Blower motor operates.)
- Ambient temperature is lower than 0°C (32°F).
- Engine coolant temperature is lower than 65°C (149°F) (condition 1), or when it becomes lower than 60°C (140°F) again (condition 2) on startup.
- Engine speed is more than 1100 rpm and after a lapse of more than 10 seconds.

PTC heater system stops when any of the following conditions is met:

- More than 35 minutes later after ignition switch ON.
- Fan control dial OFF (Blower motor OFF).
- Ambient temperature is higher than 0°C (32°F).
- Engine coolant temperature is higher than 65°C (149°F).
- When engine speed becomes less than 800 rpm.





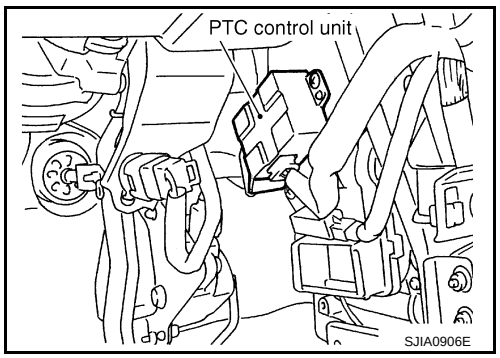
PTC HEATER (1500 WATT) : Component Description

INFOID:0000000001682724

COMPONENT DESCRIPTION

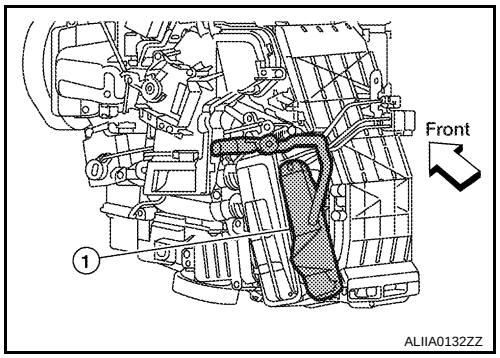
PTC Control Unit

The PTC control unit is attached on the A/C unit assembly. It controls PTC heater by ambient temperature, and FAN ON signal.



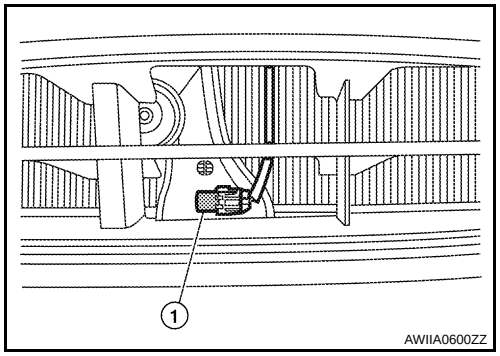
PTC Heater

The PTC heater is attached on the A/C unit assembly. It generates heat electrically.



Ambient Sensor

The ambient sensor is attached on the radiator core support upper. It detects ambient temperature and converts it into a resistance value which is then input into the PTC control unit.



PTC HEATER (1500 WATT) : PTC Heater (1500 Watt) Diagnosis Procedure

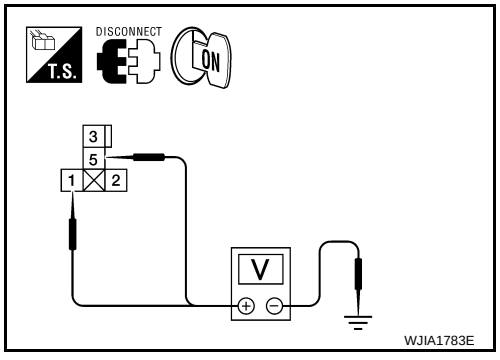
INFOID:0000000001682725

DIAGNOSTIC PROCEDURE FOR PTC SYSTEM

SYMPTOM: PTC heater system operation is malfunction.

1.CHECK POWER SUPPLY FOR BLOWER RELAY

1. Turn ignition switch ON.
2. Disconnect blower relay.
3. Check voltage between blower relay harness connector J-1 terminals 1, 5, and ground.



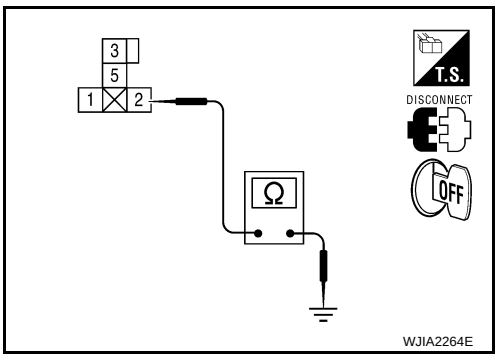
Terminals			Voltage (Approx.)
(+)		(–)	
Connector	Terminal		
Blower relay: J-1	1	Ground	Battery voltage
	5		

Is the inspection result normal

YES >> GO TO 2.
NO >> Repair harness or connector.

2.CHECK BLOWER RELAY GROUND CIRCUIT

1. Turn ignition switch OFF.
2. Check continuity between blower relay harness connector J-1 terminal 2 and ground.



Connector	Terminal	Ground	Continuity
Blower relay: J-1	2		Yes

Is the inspection result normal

YES >> GO TO 3.
NO >> Repair harness or connector.

3.CHECK BLOWER RELAY

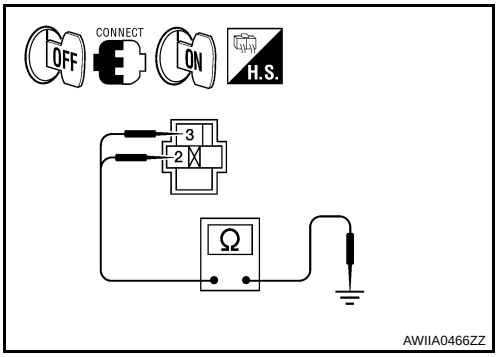
1. Turn ignition switch OFF.
2. Check blower relay. Refer to XX-XX, "*****".

Is the inspection result normal

YES >> GO TO 4.
NO >> Replace blower relay.

4.CHECK POWER SUPPLY FOR PTC RELAY-1

1. Turn ignition switch OFF.
2. Reconnect blower relay.
3. Turn ignition switch ON.
4. Check voltage between PTC relay-1 harness connector E61 terminals 2, 3, and ground.



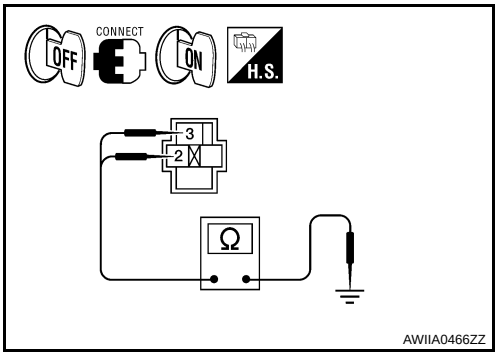
Terminals			Voltage (Approx.)
(+)		(–)	
Connector	Terminal		
PTC relay-2: E61	2	Ground	Battery voltage
	3		

Is the inspection result normal

YES >> GO TO 5.
NO >> Check power supply circuit and 10A and 40A fuse (No. 16 and I, located in the fuse block). Refer to XX.
- If fuses are OK, check harness for open circuit. Repair or replace if necessary.
- If fuses are NG, replace fuse and check harness for short circuit. Repair or replace if necessary.

5.CHECK POWER SUPPLY FOR PTC RELAY-2

Check voltage between PTC relay-2 harness connector E62 terminals 2, 3, and ground.



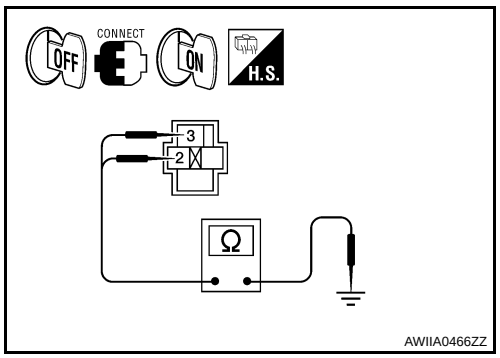
Terminals			Voltage (Approx.)
(+)		(–)	
Connector	Terminal		
PTC relay-2: E62	2	Ground	Battery voltage
	3		

Is the inspection result normal

YES >> GO TO 6.
NO >> Check power supply circuit and 80A fuse (N, located in the fuse block). Refer to XX.
- If fuses are OK, check harness for open circuit. Repair or replace if necessary.
- If fuses are NG, replace fuse and check harness for short circuit. Repair or replace if necessary.

6. CHECK POWER SUPPLY FOR PTC RELAY-3

Check voltage between PTC relay-3 harness connector E61 terminals 2, 3, and ground.



Terminals			Voltage (Approx.)
(+)		(–)	
Connector	Terminal		
PTC relay-3: E63	2	Ground	Battery voltage
	3		

Is the inspection result normal

YES >> GO TO 5.
NO >> Check power supply circuit and 80A fuse (P, located in the fuse block). Refer to XX-XX.
- If fuses are OK, check harness for open circuit. Repair or replace if necessary.
- If fuses are NG, replace fuse and check harness for short circuit. Repair or replace if necessary.

7. CHECK PTC RELAYS

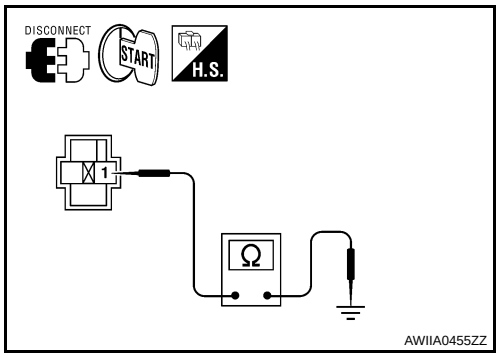
1. Turn ignition switch OFF.
2. Check PTC relay. Refer to XX-XX, "*****".

Is the inspection result normal

YES >> GO TO 6.
NO >> Replace inoperative PTC relay.

8. CHECK PTC RELAY-1 GROUND CIRCUIT

1. Disconnect ambient sensor, and PTC heater connectors.
2. Turn temperature control dial clockwise until full hot position.
3. Turn mode control dial to foot position.
4. Start the engine (1,000 RPM minimum).
5. Turn blower control dial to low speed.
6. Check continuity between PTC relay-1 harness connector E61 terminal 1 and ground.



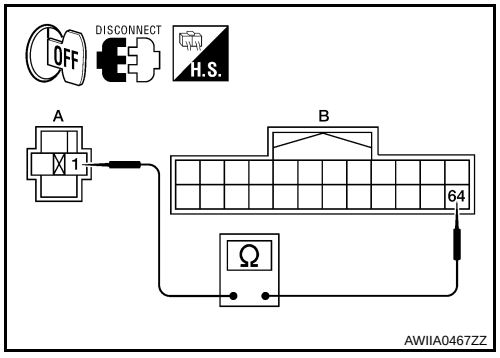
Connector	Terminal	Ground	Continuity
PTC relay-1: E61	1		Yes

Is the inspection result normal

YES >> GO TO 10.
NO >> GO TO 9.

9. CHECK CIRCUIT CONTINUITY BETWEEN PTC RELAY-1 AND BCM

1. Turn ignition switch OFF.
2. Disconnect BCM connector.
3. Check continuity between PTC relay-1 harness connector E61 (A) terminal 1 and BCM harness connector M19 (B) terminal 64.



A		B		Continuity
Connector	Terminal	Connector	Terminal	
PTC relay-1: E61	1	BCM: M19	64	Yes

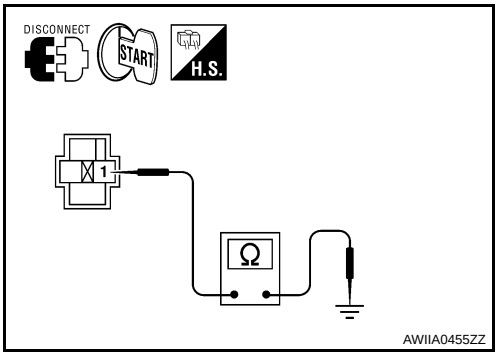
Is the inspection result normal

YES >> Replace BCM. Refer to XXXX.
NO >> Repair harness or connector.

10. CHECK PTC RELAY-2 GROUND CIRCUIT

Check continuity between PTC relay-2 harness connector E62 terminal 1 and ground.

Connector	Terminal	Ground	Continuity
PTC relay-2: E62	1		Yes



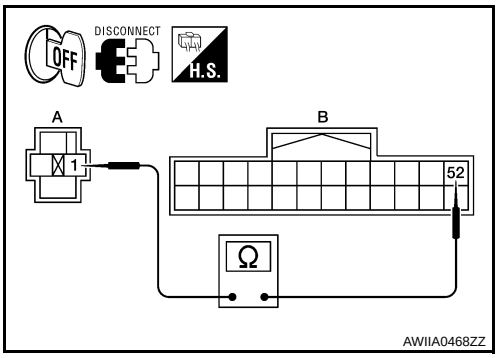
Is the inspection result normal

YES >> GO TO 12.
NO >> GO TO 11.

11. CHECK CIRCUIT CONTINUITY BETWEEN PTC RELAY-2 AND BCM

1. Turn ignition switch OFF.
2. Disconnect BCM connector.
3. Check continuity between BCM harness connector M19 (B) terminal 52 and PTC relay-1 harness connector E62 (A) terminal 1.

A		B		Continuity
Connector	Terminal	Connector	Terminal	
PTC relay-2: E62	1	BCM: M19	52	Yes



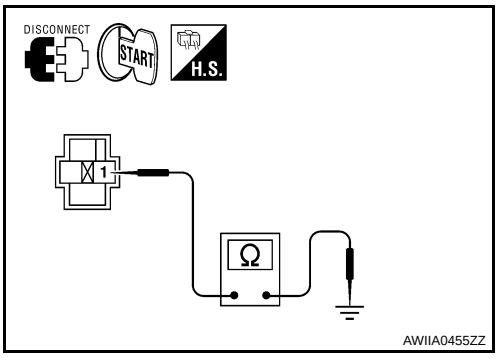
Is the inspection result normal

YES >> Replace BCM. Refer to XXXX.
NO >> Repair harness or connector.

12. CHECK PTC RELAY-3 GROUND CIRCUIT

Check continuity between PTC relay-3 harness connector E63 terminal 1 and ground.

Connector	Terminal	Ground	Continuity
PTC relay-3: E63	1		Yes



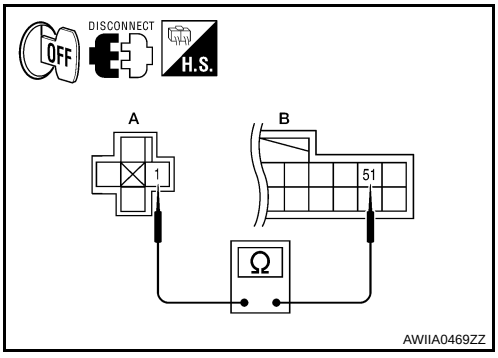
Is the inspection result normal

YES >> GO TO 14.
NO >> GO TO 13.

13. CHECK CIRCUIT CONTINUITY BETWEEN PTC RELAY-3 AND BCM

1. Turn ignition switch OFF.
2. Disconnect BCM connector.
3. Check continuity between BCM harness connector M19 (B) terminal 51 and PTC relay-3 harness connector E63 (A) terminal 1.

A		B		Continuity
Connector	Terminal	Connector	Terminal	
PTC relay-3: E63	1	BCM: M19	51	Yes

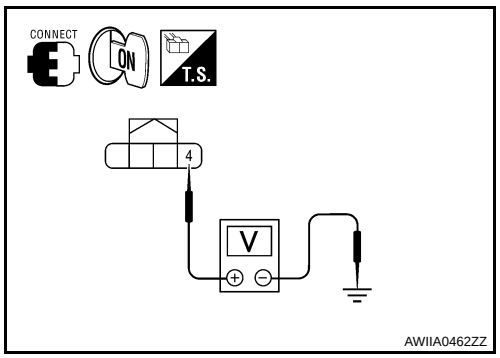


Is the inspection result normal

YES >> GO TO 14.
NO >> Repair harness or connector.

14. CHECK VOLTAGE BETWEEN AMBIENT TEMPERATURE SENSOR AND GROUND

1. Turn ignition switch OFF.
2. Reconnect BCM connector.
3. Disconnect ambient temperature sensor.
4. Turn ignition switch ON.
5. Check voltage between ambient temperature sensor harness connector E60 terminal 4 and ground.



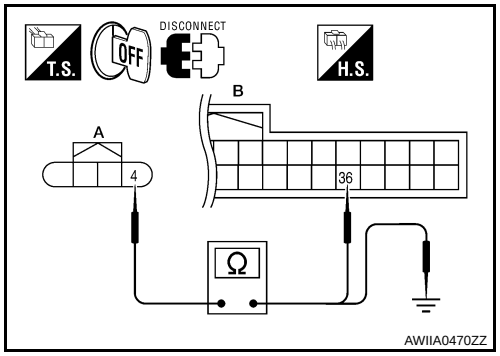
Terminals			Voltage (Approx.)
(+)		(–)	
Connector	Terminal	Ground	
Ambient temperature sensor: E60	4		5V

Is the inspection result normal

YES >> GO TO 16.
NO >> GO TO 15.

15. CHECK CIRCUIT CONTINUITY BETWEEN AMBIENT TEMPERATURE SENSOR AND BCM CONTROL UNIT

1. Turn ignition switch OFF.
2. Disconnect BCM connector.
3. Check continuity between ambient temperature sensor harness connector E60 (A) terminal 4 and BCM harness connector M18 (B) terminal 36.



A		B		Continuity
Connector	Terminal	Connector	Terminal	
Ambient temperature sensor: E60	4	BCM: M18	36	Yes

4. Check continuity between ambient temperature sensor harness connector E60 (A) terminal 4 and ground.

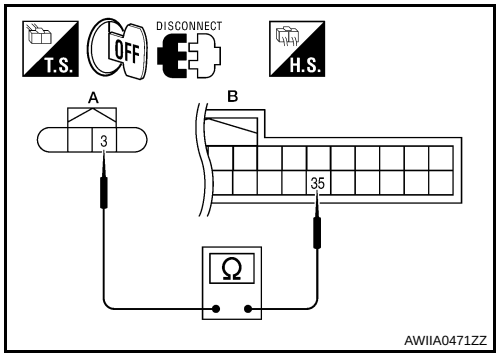
A		Ground	Continuity
Connector	Terminal		
Ambient temperature sensor: E60	4		No

Is the inspection result normal

YES >> Replace BCM. Refer to XXXX.
NO >> Repair harness or connector.

16. CHECK CONTINUITY OF AMBIENT TEMPERATURE SENSOR GROUND CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect BCM connector.
3. Check continuity between ambient temperature sensor harness connector E60 (A) terminal 3 and BCM harness connector M18 (B) terminal 35.



A		B		Continuity
Connector	Terminal	Connector	Terminal	
Ambient temperature sensor: E64	3	BCM: M18	35	Yes

Is the inspection result normal?

YES >> GO TO 17.
NO >> Repair harness or connector.

17. CHECK AMBIENT TEMPERATURE SENSOR

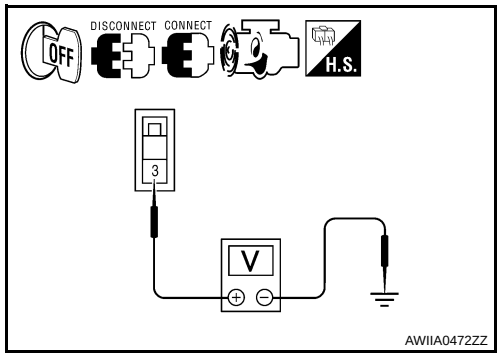
Refer to XX-XX, "*****".

Is the inspection result normal?

YES >> GO TO 18.
NO >> Replace ambient temperature sensor. Refer to XX.

18. CHECK PTC HEATER RELAY-1 POWER SUPPLY CIRCUIT

1. Disconnect PTC heater connector.
2. Reconnect all PTC relays.
3. Start the engine (1,000 RPM minimum).
4. Check voltage between PTC heater harness connector E65 terminal 3 and ground.



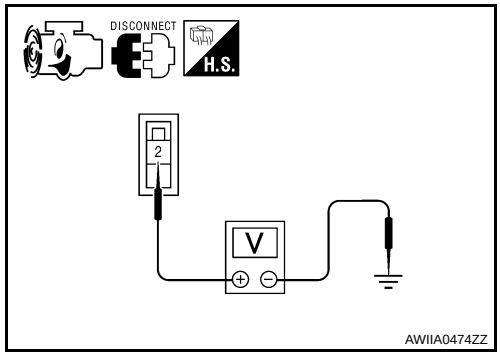
Terminals			Voltage (Approx.)
(+)		(–)	
Connector	Terminal	Ground	
PTC heater: E65	3		Battery voltage

Is the inspection result normal?

YES >> GO TO 19.
NO >> Repair harness or connector.

19. CHECK PTC HEATER RELAY-2 POWER SUPPLY CIRCUIT

Check voltage between PTC heater harness connector E65 terminal 2 and ground.



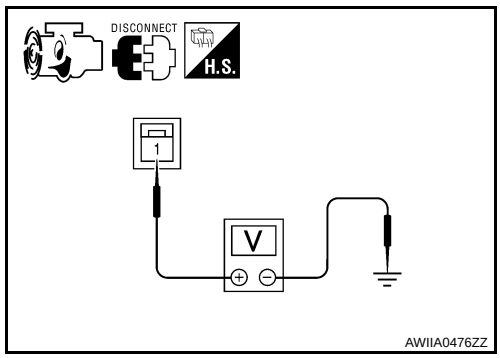
Terminals			Voltage (Approx.)
(+)		(–)	
Connector	Terminal	Ground	
PTC heater: E65	2		Battery voltage

Is the inspection result normal

YES >> GO TO 20.
NO >> Repair harness or connector.

20. CHECK PTC HEATER RELAY-3 POWER SUPPLY CIRCUIT

Check voltage between PTC heater harness connector E65 terminal 1 and ground.



Terminals			Voltage (Approx.)
(+)		(–)	
Connector	Terminal	Ground	
PTC heater: E65	1		Battery voltage

Is the inspection result normal

YES >> Replace PTC heater. Refer to XXXX.
NO >> Repair harness or connector.

PTC HEATER (1500 WATT) : PTC Heater (1500 Watt) Component Inspection

INFOID:0000000001682726

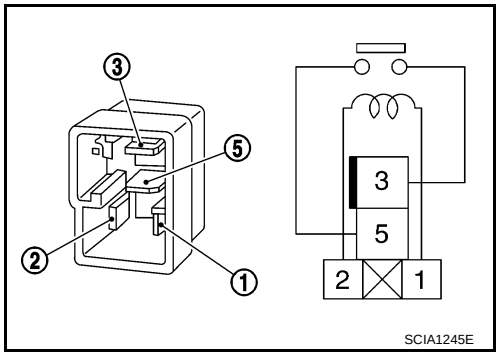
COMPONENT INSPECTION

Blower Relay

Check continuity between relay terminals 3 and 5.

Condition	Continuity
12V direct current supply between terminals 1 and 2	Yes
OFF	No

If NG, replace the blower relay. Refer to XX.



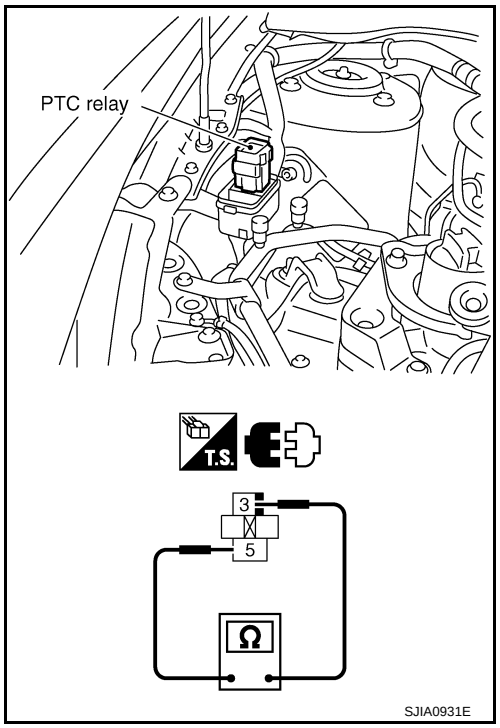
SCIA1245E

PTC relay

Check continuity between terminal Nos. 3 and 5.

Condition	Continuity
12V direct current supply between terminal Nos. 1 and 2	Yes
No current supply	No

If NG, replace PTC relay. Refer to XX.

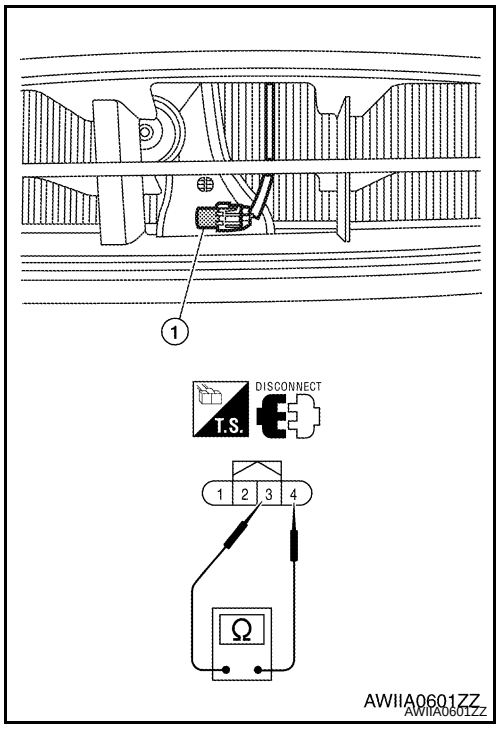


SJIA0931E

Ambient Sensor

After disconnecting ambient sensor connector E60, measure resistance between terminals 3 and 4 at sensor side, using the table below.

Temperature °C (°F)	Resistance kΩ
–15 (5)	12.73
–10 (14)	9.92
–5 (23)	7.80
0 (32)	6.19
5 (41)	4.95
10 (50)	3.99
15 (59)	3.24
20 (68)	2.65
25 (77)	2.19
30 (86)	1.81
35 (95)	1.51
40 (104)	1.27
45 (113)	1.07



AWIIA0601ZZ

If NG, replace ambient sensor. Refer to XX.

POWER SUPPLY AND GROUND CIRCUIT FOR CONTROLLER

Component Description

INFOID:0000000001547446

COMPONENT DESCRIPTION

Front Air Control

The front air control has a built-in microcomputer which processes information sent from various sensors needed for air conditioner operation. The air mix door motor, mode door motor, intake door motor, blower motor and compressor are then controlled.

The front air control is unitized with control mechanisms. Signal from various switches and Potentio Temperature Control (PTC) are directly entered into front air control.

Self-diagnostic functions are also built into front air control to provide quick check of malfunctions in the auto air conditioner system.

Potentio Temperature Control (PTC)

The PTC is built into the front air control. It can be set at an interval of 1°C (34°F) in the 18°C (64°F) to 32°C (90°F) temperature range by turning temperature control switch. The set temperature is displayed.

Front Air Control Component Function Check

INFOID:0000000001547447

SYMPTOM: A/C system does not come on.

INSPECTION FLOW

1. CONFIRM SYMPTOM BY PERFORMING OPERATIONAL CHECK - AUTO MODE

1. Press the AUTO switch and A/C switch.
2. Display should indicate AUTO. Confirm that the compressor clutch engages (sound or visual inspection). (Discharge air and blower speed will depend on ambient, in-vehicle and set temperatures.)

Can a symptom be duplicated?

YES >> GO TO 2.
NO >> Perform a complete operational check. Refer to HAC-87, "Operational Check".

2. CHECK FOR SERVICE BULLETINS

Check for any service bulletins.

>> GO TO 3.

3. CHECK POWER AND GROUND CIRCUIT

Check main power supply and ground circuit. Refer to HAC-163, "Front Air Control Power and Ground Diagnosis Procedure".

Is the inspection result normal?

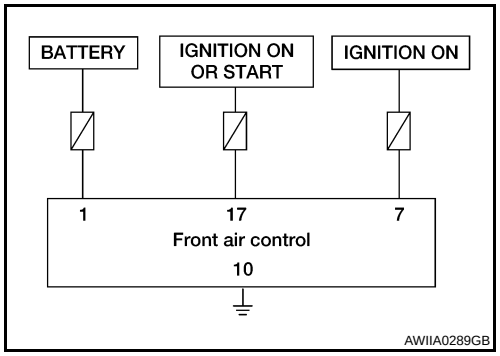
YES >> System OK.
NO >> Replace Front air control. Refer to XX.

Front Air Control Power and Ground Diagnosis Procedure

INFOID:0000000001547448

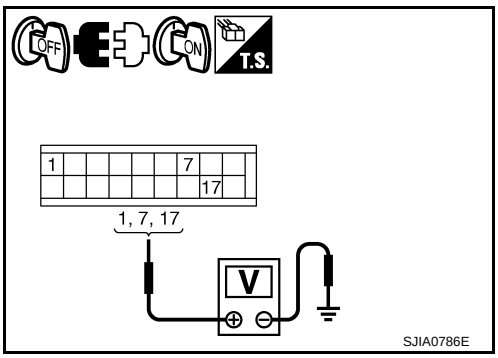
DIAGNOSTIC PROCEDURE FOR A/C SYSTEM

SYMPTOM: A/C system does not come on.



1.CHECK POWER SUPPLY CIRCUIT FOR FRONT AIR CONTROL

1. Turn ignition switch OFF.
2. Disconnect front air control connector M50.
3. Check voltage between front air control harness connector M50 terminal 1, 7, 17 and ground.



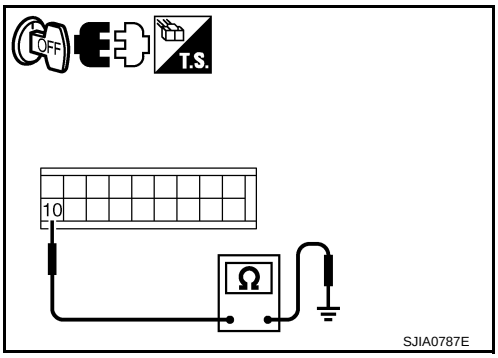
Terminals			Ignition switch position		
(+)		(-)	OFF	ACC	ON
Connector	Terminal				
Front air control: M50	1	Ground	Battery voltage	Battery voltage	Battery voltage
	7		Approx. 0V	Approx. 0V	Battery voltage
	17		Approx. 0V	Approx. 0V	Battery voltage

Is the inspection result normal?

YES >> GO TO 2.
NO >> Check 10A fuses [Nos. 2, 13 and 16, located in the fuse block (J/B)].
- If fuses are OK, check harness for open circuit. Repair or replace if necessary.
- If fuses are NG, replace fuse and check harness for short circuit. Repair or replace if necessary.

2.CHECK GROUND CIRCUIT FOR FRONT AIR CONTROL

1. Turn ignition switch OFF.
2. Check continuity between front air control harness connector M50 terminal 10 and ground.



Connector	Terminal	Ground	Continuity
Front air control: M50	10		Yes

Is the inspection result normal?

YES >> Replace front air control. Refer to XX.
NO >> Repair or replace harness.

ECU DIAGNOSIS

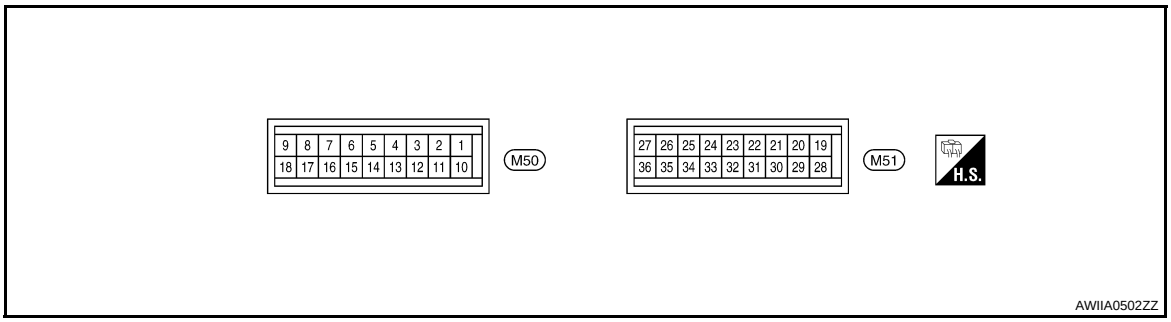
AIR CONDITIONER CONTROL

Front Air Control Terminals Reference Values

INFOID:0000000001547449

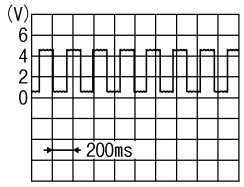
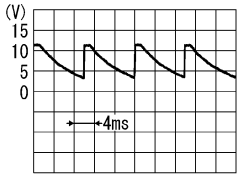
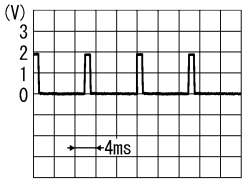
Measure voltage between each terminal and ground by following terminals and reference value for front air control.

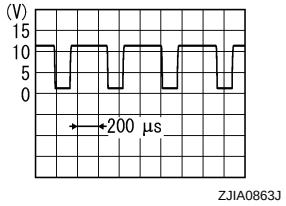
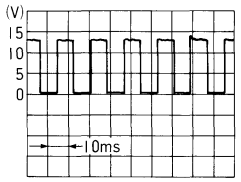
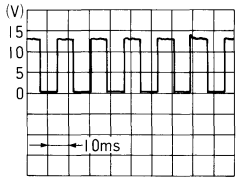
PIN CONNECTOR TERMINAL LAYOUT



AWIIA0502ZZ

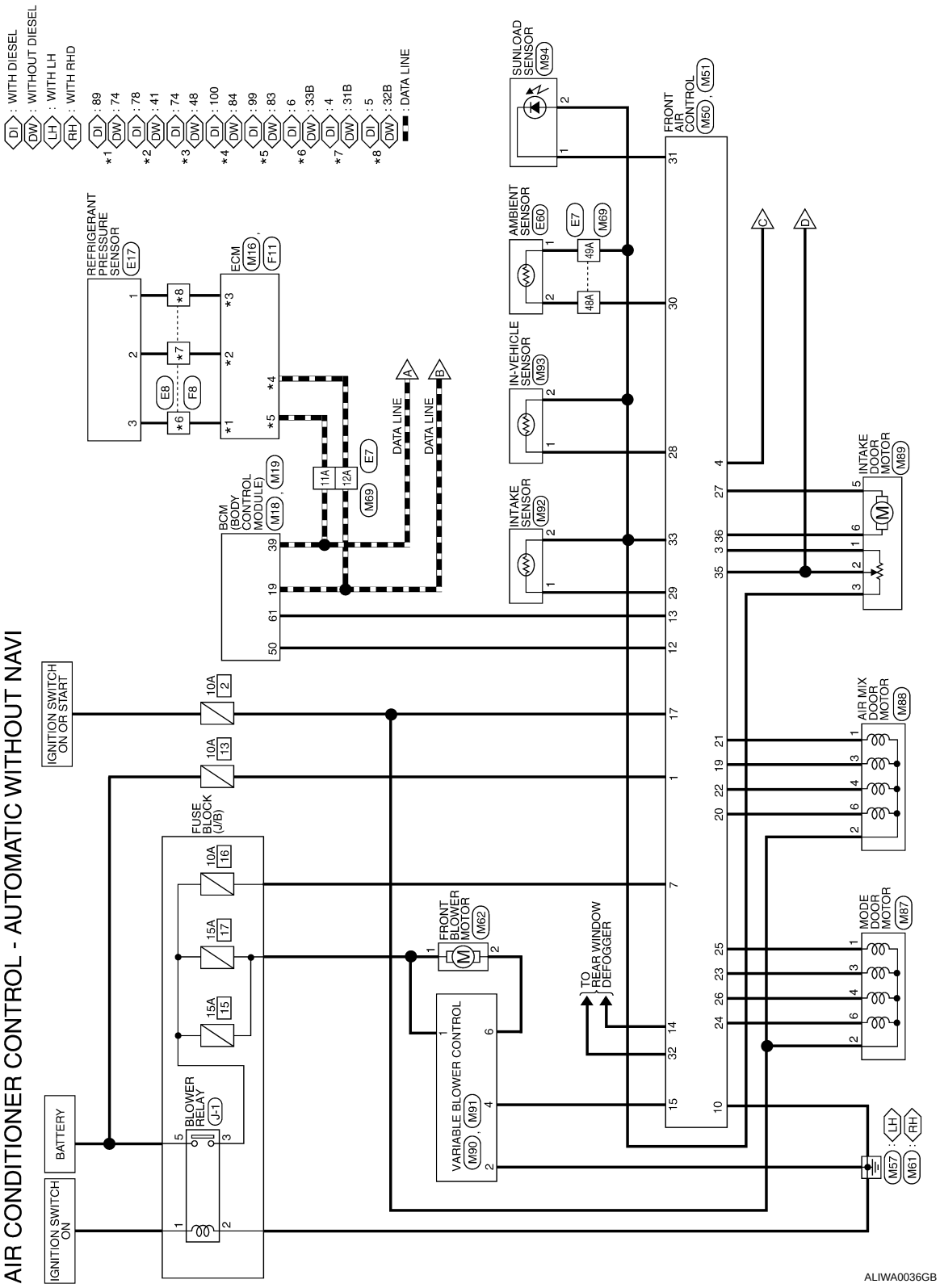
TERMINALS AND REFERENCE VALUE FOR FRONT AIR CONTROL

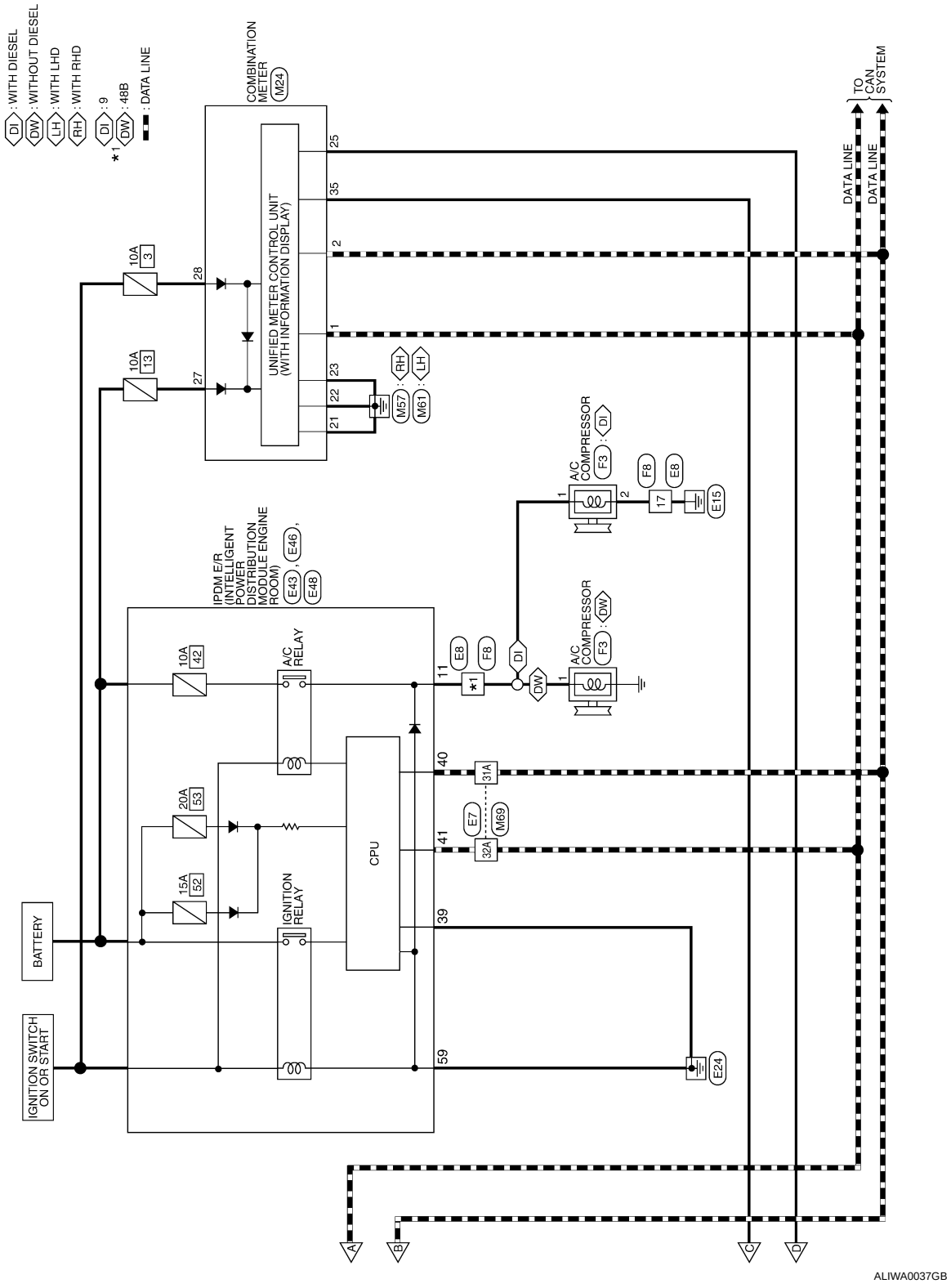
Terminal No.	Wire color	Item	Ignition switch	Condition	Voltage (V)
1	LG	Power supply for BAT	OFF	-	Battery voltage
3	R	Power supply for intake door PBR (5V output)	ON	-	Approx. 5
4	BR	Engine coolant temperature sensor signal	ON	At idle (after warming up, approx. 80°C) **CAUTION:** **The wave forms vary depending on coolant temperature.**	 SKIB3651J
5	B	Illumination ground	ON	-	Approx. 0
7	R	Power supply for IGN 2	OFF	-	Battery voltage
9	V	PTC Heater ON/OFF signal	ON	Full Hot switch ON	Approx. 12
10	B	Ground	ON	-	Approx. 0
12	P	Blower motor ON signal	ON	FAN speed: 1st step (manual)	 ZJIA0583J
13	O	Compressor ON signal	ON	A/C switch: ON (Blower motor operates.)	 ZJIA0584J

Terminal No.	Wire color	Item	Ignition switch	Condition		Voltage (V)
14	W	Rear window defogger ON signal	ON	When rear window defogger switch is depressed.		Approx. 0
				When rear window defogger switch is released.		Approx. 5
15	GR	Blower PWM	ON	Blower motor speed: 1st step (manual)		 ZJIA0863J
16	GR	Illumination signal	ON	Light switch: ON		Approx. 12
				Light switch: OFF		Approx. 0
17	O	Power supply for IGN 1	ON	-		Battery voltage
19	BR	Air mix door motor drive signal	ON	Immediately after temperature adjustment switch operation		 HAK0627D
20	G					
21	LG					
22	R					
23	GR	Mode door motor drive signal	ON	Immediately after mode switch operation		 HAK0627D
24	W					
25	Y					
26	V					
27	G	Intake door motor drive signal	ON	REC or FRE switch	REC→FRE	Approx. 0
					FRE→REC	Approx. 12
28	LG	In-vehicle sensor	-	-		-
29	O	Intake sensor	-	-		-
30	SB	Ambient sensor	-	-		-
31	P	Sunload sensor	-	-		-
32	R	Rear window defogger feedback signal	ON	Rear window defogger: ON		Approx. 12
				Rear window defogger: OFF		Approx. 0
33	BR	Sensor ground	ON	-		Approx. 0
34	L	Gas sensor signal	ON	-		Approx. 0.5 - 5
35	SB	Intake door motor feedback signal	ON	REC position		Approx. 5
				FRE position		Approx. 0
36	V	Intake door motor drive signal	ON	REC or FRE switch	REC→FRE	Approx. 12
					FRE→REC	Approx. 0

Wiring Diagram - Air Conditioner Control -

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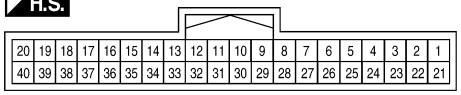



: WITH DIESEL
: WITHOUT DIESEL
: WITH LHD
: WITH RHD
*1 : 9
: 48B
: DATA LINE
COMBINATION METER (M24)
UNIFIED METER CONTROL UNIT (WITH INFORMATION DISPLAY)
TO CAN SYSTEM
DATA LINE
DATA LINE
10A 3
10A 13
IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM) E43, E46, E48
10A 42
A/C RELAY
20A 53
15A 52
IGNITION RELAY
CPU
BATTERY
IGNITION SWITCH ON OR START
A/C COMPRESSOR F3
E8
F8
E7
M69
31A
32A
E24
E15
M57, M61
RH
LH
ALIWA0037GB

AIR CONDITIONER CONTROL - AUTOMATIC WITHOUT NAVI CONNECTORS

Connector No.	M18
Connector Name	BCM (BODY CONTROL MODULE)
Connector Color	WHITE

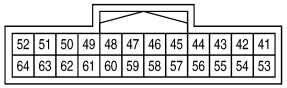
H.S.



Terminal No.	Color of Wire	Signal Name
19	L	CAN-H
35	BR	OAT SENSOR GND
36	V	OAT SENSOR
39	P	CAN-L

Connector No.	M19
Connector Name	BCM (BODY CONTROL MODULE)
Connector Color	WHITE

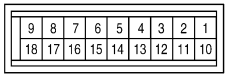
H.S.



Terminal No.	Color of Wire	Signal Name
50	P	BLOWER FAN SW
61	O	AIRCON SWITCH

Connector No.	M50
Connector Name	FRONT AIR CONTROL
Connector Color	BLACK

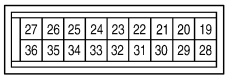
H.S.



Terminal No.	Color of Wire	Signal Name
1	LG	B+
3	R	5V_OUT
4	BR	W/TEMP
7	R	IGN2
9	V	PTC ON/OFF
10	B	GND
12	P	FAN ON
13	O	COMPR ON
14	W	RR DEF SW
15	GR	FAN GATE
17	O	IGN 1

Connector No.	M51
Connector Name	FRONT AIR CONTROL
Connector Color	WHITE

H.S.



Terminal No.	Color of Wire	Signal Name
19	BR	MIX 4
20	G	MIX 3
21	LG	MIX 2
22	R	MIX 1
23	GR	MODE 4

Terminal No.	Color of Wire	Signal Name
24	W	MODE 3
25	Y	MODE 2
26	V	MODE 1
27	G	REC
28	LG	INCAR SENS
29	O	INTAKE SENS
30	SB	AMB SENS
31	P	SUN SENS
32	R	RR DEF IND
33	BR	SENS GND
35	SB	INT F/B
36	V	FRE

Connector No.	M62
Connector Name	FRONT BLOWER MOTOR
Connector Color	WHITE

H.S.

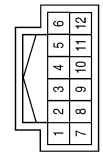


Terminal No.	Color of Wire	Signal Name
1	R	—
2	Y	—

ALIIA0148GB

Connector No.	M84
Connector Name	PTC CONTROL UNIT
Connector Color	WHITE

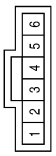
H.S.



Terminal No.	Color of Wire	Signal Name
10	V	SENS
11	P	FAN ON

Connector No.	M89
Connector Name	INTAKE DOOR MOTOR
Connector Color	WHITE

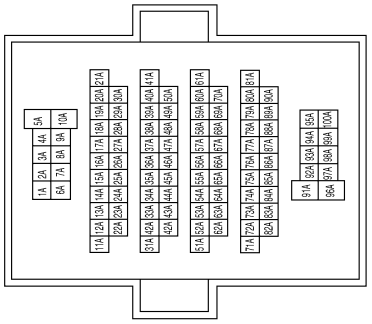
H.S.



Terminal No.	Color of Wire	Signal Name
1	R	5V
2	SB	INT_F/B
3	BR	GND
5	G	REC
6	V	FRE

Connector No.	M69
Connector Name	WIRE TO WIRE
Connector Color	WHITE

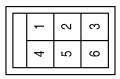
H.S.



Terminal No.	Color of Wire	Signal Name
11A	P	—
12A	L	—
31A	P	—
32A	L	—
48A	V	—
49A	BR	—
60A	V	—
61A	BR	—

Connector No.	M88
Connector Name	AIR MIX DOOR MOTOR
Connector Color	BLACK

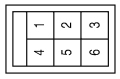
H.S.



Terminal No.	Color of Wire	Signal Name
1	LG	MIX 2
2	O	IGN
3	BR	MIX 4
4	R	MIX 1
6	G	MIX 3

Connector No.	M87
Connector Name	MODE DOOR MOTOR
Connector Color	BLACK

H.S.

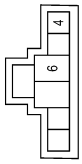


Terminal No.	Color of Wire	Signal Name
1	Y	MODE 2
2	O	IGN
3	GR	MODE 4
4	V	MODE 1
6	W	MODE 3

ALIIA0149GB

Connector No.	M90
Connector Name	VARIABLE BLOWER CONTROL
Connector Color	GRAY

H.S.



Terminal No.	Color of Wire	Signal Name
4	GR	—
6	R	—

Connector No.	M91
Connector Name	VARIABLE BLOWER CONTROL
Connector Color	GRAY

H.S.



Terminal No.	Color of Wire	Signal Name
1	Y	—
2	B	—

Connector No.	M92
Connector Name	INTAKE SENSOR
Connector Color	WHITE

H.S.



Terminal No.	Color of Wire	Signal Name
1	O	—
2	BR	—

Connector No.	M93
Connector Name	IN-VEHICLE SENSOR
Connector Color	WHITE

H.S.



Terminal No.	Color of Wire	Signal Name
1	LG	—
2	BR	—

Connector No.	M94
Connector Name	SUNLOAD SENSOR
Connector Color	WHITE

H.S.

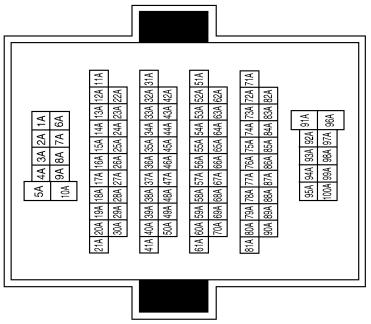


Terminal No.	Color of Wire	Signal Name
1	P	—
2	BR	—

ALIIA0150GB

Connector No.	E7
Connector Name	WIRE TO WIRE
Connector Color	WHITE

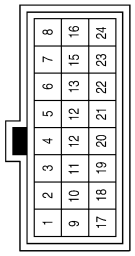
H.S.



Terminal No.	Color of Wire	Signal Name
11A	P	—
12A	L	—
31A	P	—
32A	L	—
48A	V	—
49A	BR	—
60A	LG	—
61A	G	—

Connector No.	E8
Connector Name	WIRE TO WIRE (WITH DIESEL)
Connector Color	BLACK

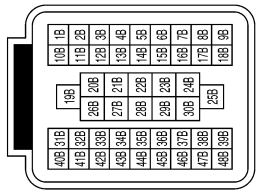
H.S.



Terminal No.	Color of Wire	Signal Name
4	GR	—
5	BR	—
6	W	—
9	W	—
17	B	—

Connector No.	E8
Connector Name	WIRE TO WIRE (WITHOUT DIESEL)
Connector Color	BLACK

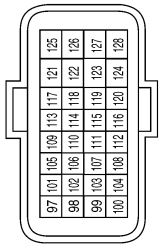
H.S.



Terminal No.	Color of Wire	Signal Name
31B	GR	—
32B	BR	—
33B	W	—
48B	W	—

Connector No.	E16
Connector Name	ECM (WITH DIESEL)
Connector Color	BLACK

H.S.



Terminal No.	Color of Wire	Signal Name
99	P	CAN-L
100	L	CAN-P

ALIIA0151GB

Connector No.	E16
Connector Name	ECM (WITHOUT DIESEL)
Connector Color	BLACK

H.S.

81	85	89	93	97	101	105	109
82	86	90	94	98	102	106	110
83	87	91	95	99	103	107	111
84	88	92	96	100	104	108	112

Terminal No.	Color of Wire	Signal Name
83	P	CAN-L
84	L	CAN-H

Connector No.	E43
Connector Name	IPDM E/R (INTELLIGENT POWER DISTRIBUTUION MODULE ENGINE ROOM)
Connector Color	WHITE

H.S.

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

Terminal No.	Color of Wire	Signal Name
11	W	A/C COMPRESSOR

Connector No.	E46
Connector Name	IPDM E/R (INTELLIGENT POWER DISTRIBUTUION MODULE ENGINE ROOM)
Connector Color	WHITE

H.S.

42	41	40	39	38	37
48	47	46	45	44	43

Terminal No.	Color of Wire	Signal Name
39	B	SIGNAL GND
40	P	CAN-L
41	L	CAN-H

Connector No.	E48
Connector Name	IPDM E/R (INTELLIGENT POWER DISTRIBUTUION MODULE ENGINE ROOM)
Connector Color	BLACK

H.S.

59	58	57
62	61	60

Terminal No.	Color of Wire	Signal Name
59	B	POWER GND

Connector No.	E60
Connector Name	AMBIENT SENSOR
Connector Color	BLACK

H.S.

1	2	3	4

Terminal No.	Color of Wire	Signal Name
1	BR	SENS GND A
2	V	SENS SIG A
3	G	SENS GND B
4	LG	SENS SIG B

Connector No.	F3
Connector Name	A/C COMPRESSOR (WITH DIESEL)
Connector Color	GRAY

H.S.

1	2

Terminal No.	Color of Wire	Signal Name
1	W	—
2	B	—

ALIIA0152GB

Connector No.	F3
Connector Name	A/C COMPRESSOR (WITHOUT DIESEL)
Connector Color	BLACK

H.S.

Terminal No.	Color of Wire	Signal Name
1	W	—

Connector No.	F8
Connector Name	WIRE TO WIRE (WITH DIESEL)
Connector Color	BLACK

H.S.

Terminal No.	Color of Wire	Signal Name
4	GR	—
5	BR	—
6	W	—
9	W	—
17	B	—

Connector No.	F8
Connector Name	WIRE TO WIRE (WITHOUT DIESEL)
Connector Color	BLACK

H.S.

Terminal No.	Color of Wire	Signal Name
31B	GR	—
32B	BR	—
33B	W	—
48B	W	—

Connector No.	F11
Connector Name	ECM (WITH DIESEL)
Connector Color	BROWN

H.S.

Terminal No.	Color of Wire	Signal Name
74	BR	FREON PRESS GND
78	GR	FREON PRESS
89	W	FREON PRESS SUPPLY

Connector No.	F11
Connector Name	ECM (WITHOUT DIESEL)
Connector Color	BROWN

H.S.

Terminal No.	Color of Wire	Signal Name
41	GR	PDPRES
48	BR	GND-A (PDPRES)
74	W	AVCC (PDPRES)

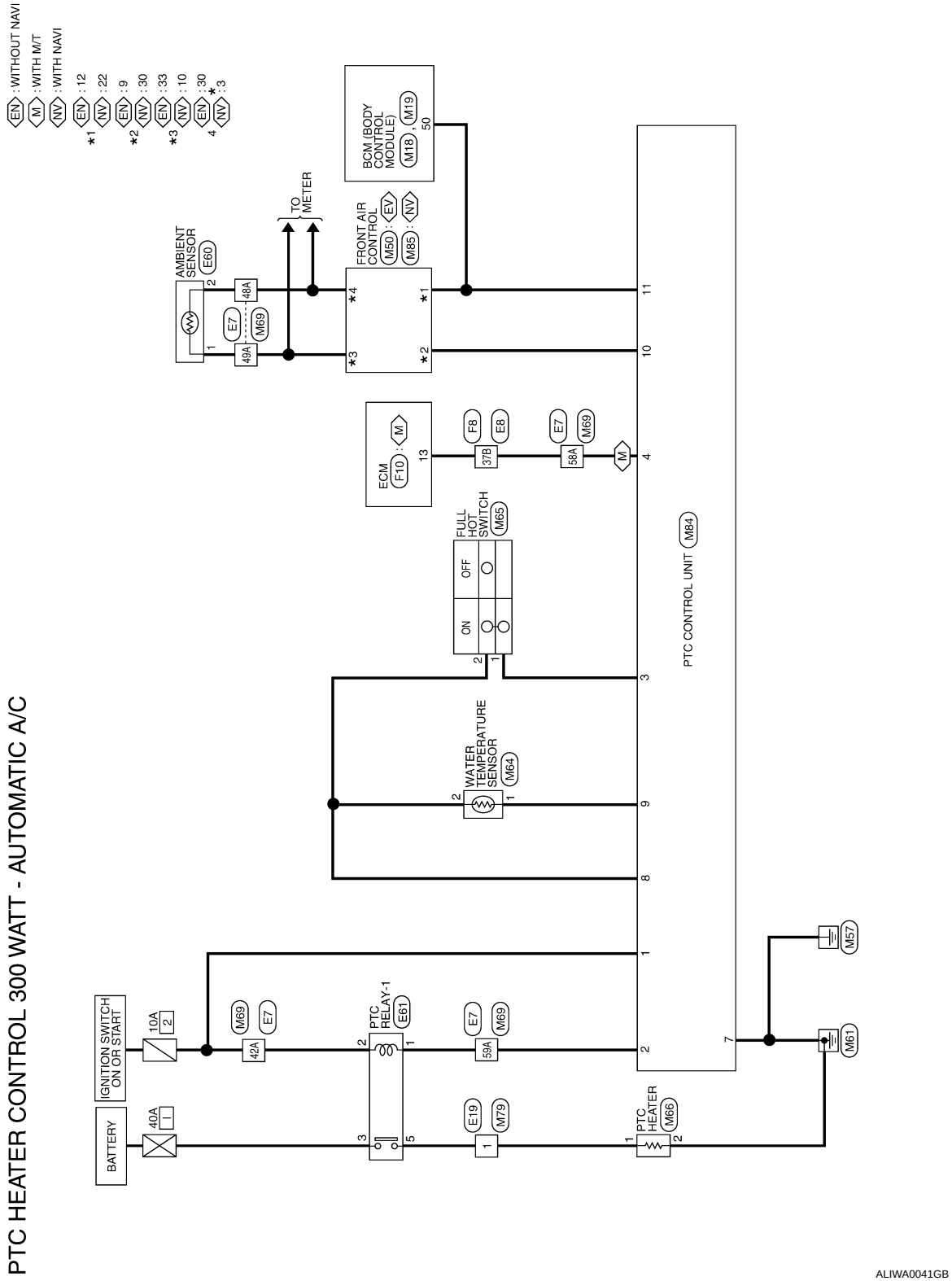
ALIIA0153GB

PTC HEATER CONTROL SYSTEM

PTC HEATER (300 WATT)

PTC HEATER (300 WATT) : Wiring Diagram - PTC Heater (300 Watt) -

INFOID:0000000001677662

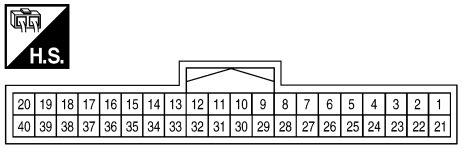


PTC HEATER CONTROL 300 WATT - AUTOMATIC A/C

ALIWA0041GB

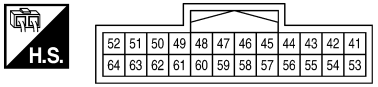
PTC HEATER CONTROL 300 WATT - AUTOMATIC A/C

Connector No.	M18
Connector Name	BCM (BODY CONTROL MODULE)
Connector Color	WHITE



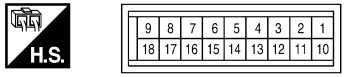
Terminal No.	Color of Wire	Signal Name
35	BR	OAT SENSOR GND
36	V	OAT SENSOR

Connector No.	M19
Connector Name	BCM (BODY CONTROL MODULE)
Connector Color	WHITE



Terminal No.	Color of Wire	Signal Name
50	P	BLOWER FAN SW

Connector No.	M50
Connector Name	FRONT AIR CONTROL
Connector Color	BLACK



Terminal No.	Color of Wire	Signal Name
9	V	PTC ON/OFF
12	P	FAN ON

Connector No.	M64
Connector Name	WATER TEMPERATURE SENSOR
Connector Color	WHITE



Terminal No.	Color of Wire	Signal Name
1	BR	–
2	R	–

Connector No.	M65
Connector Name	FULL HOT SWITCH
Connector Color	WHITE



Terminal No.	Color of Wire	Signal Name
1	Y	–
2	R	–

Connector No.	M66
Connector Name	PTC HEATER
Connector Color	BLACK

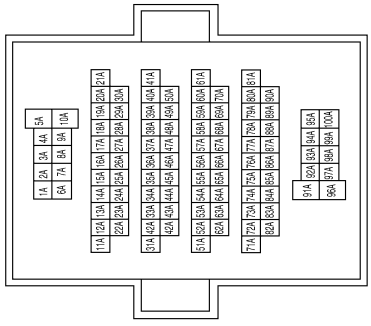


Terminal No.	Color of Wire	Signal Name
1	Y	–
2	B	–

ALIIA0167GB

Connector No.	M69
Connector Name	WIRE TO WIRE
Connector Color	WHITE

H.S.



Terminal No.	Color of Wire	Signal Name
42A	O	–
58A	SB	–
59A	W	–
60A	V	–
61A	BR	–

Connector No.	M79
Connector Name	WIRE TO WIRE
Connector Color	BLUE

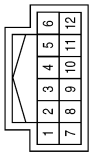
H.S.



Terminal No.	Color of Wire	Signal Name
1	Y	–

Connector No.	M84
Connector Name	PTC CONTROL UNIT
Connector Color	WHITE

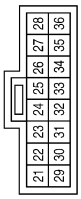
H.S.



Terminal No.	Color of Wire	Signal Name
1	O	IGN
2	W	PTC
3	Y	F/H
4	SB	ENG
7	B	GND
8	BR	SEN GND
9	BR	SENS
10	V	SENS
11	P	FAN ON

Connector No.	M85
Connector Name	FRONT AIR CONTROL
Connector Color	GRAY

H.S.

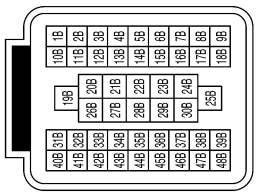


Terminal No.	Color of Wire	Signal Name
22	O	A/C ON O/P
30	P	PTC ON/OFF

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Connector No.	E8
Connector Name	WIRE TO WIRE (WITHOUT DIESEL)
Connector Color	BLACK

H.S.



Terminal No.	Color of Wire	Signal Name
37B	SB	–

Terminal No.	Color of Wire	Signal Name
42A	Y	–
58A	SB	–
59A	L	–
60A	LG	–
61A	G	–

Connector No.	E61
Connector Name	PTC RELAY 1
Connector Color	BLACK

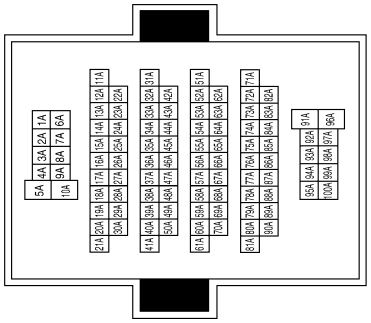
H.S.



Terminal No.	Color of Wire	Signal Name
1	Y	–
2	L	–
3	R	–
5	Y	–

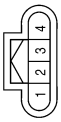
Connector No.	E7
Connector Name	WIRE TO WIRE
Connector Color	WHITE

H.S.



Connector No.	E60
Connector Name	AMBIENT SENSOR
Connector Color	BLACK

H.S.



Terminal No.	Color of Wire	Signal Name
3	G	SENS GND B
4	LG	SENS SIG B

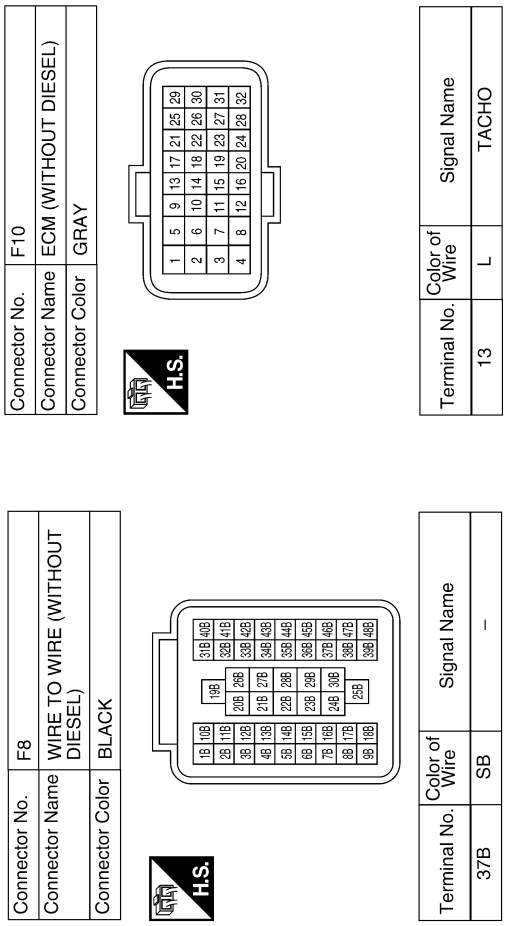
Connector No.	E19
Connector Name	WIRE TO WIRE
Connector Color	BLUE

H.S.



Terminal No.	Color of Wire	Signal Name
1	Y	–

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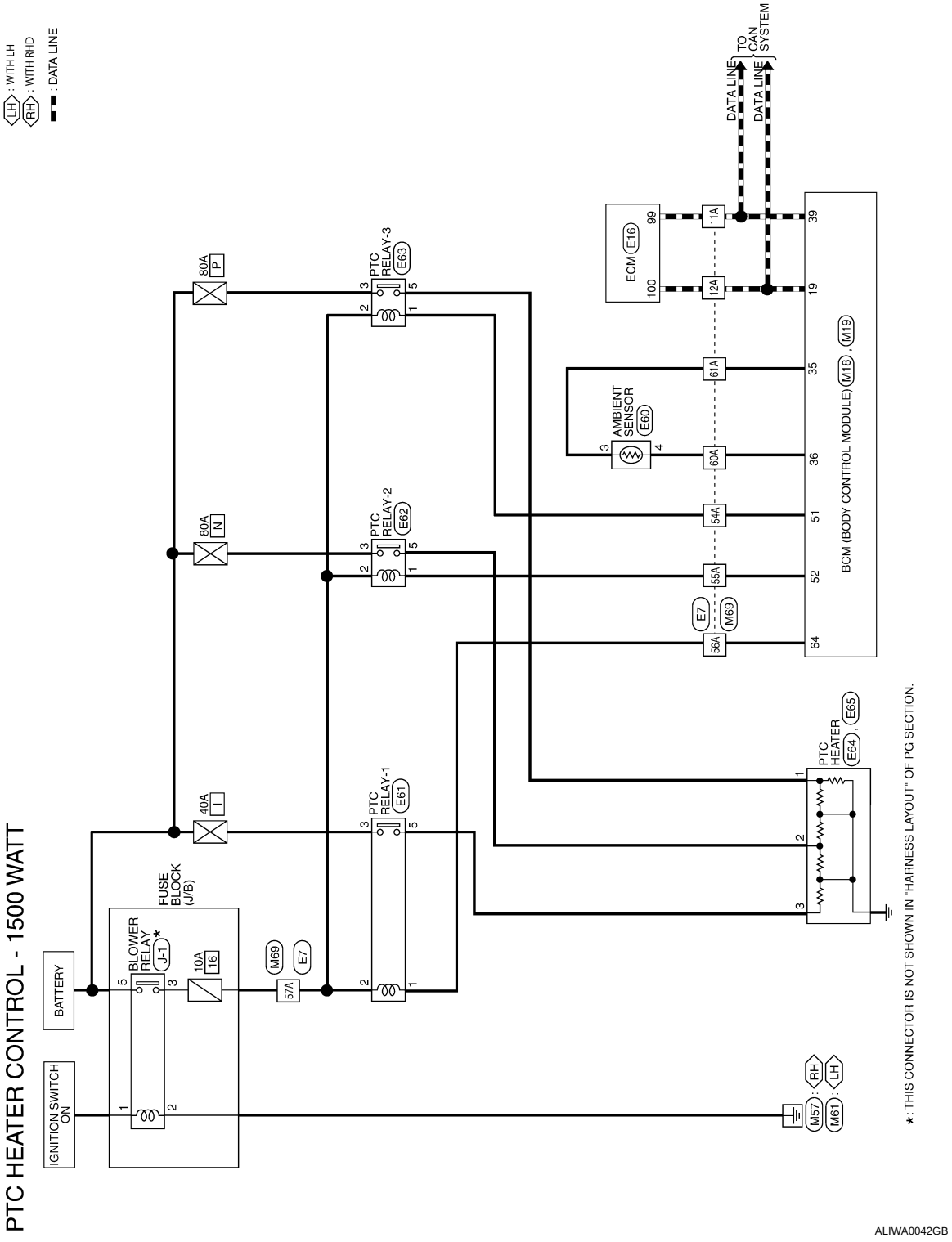


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PTC HEATER (1500 WATT)

PTC HEATER (1500 WATT) : Wiring Diagram - PTC Heater (1500 Watt) -

INFOID:0000000001683833



PTC HEATER CONTROL - 1500 WATT CONNECTORS

Connector No.	M18
Connector Name	BCM (BODY CONTROL MODULE)
Connector Color	WHITE

H.S.

20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1
40	39	38	37	36	35	34	33	32	31	30	29	28	27	26	25	24	23	22	21

Terminal No.	Color of Wire	Signal Name
19	L	CAN-H
35	BR	OAT SENSOR GND
36	V	OAT SENSOR
39	P	CAN-L

Connector No.	M19
Connector Name	BCM (BODY CONTROL MODULE)
Connector Color	WHITE

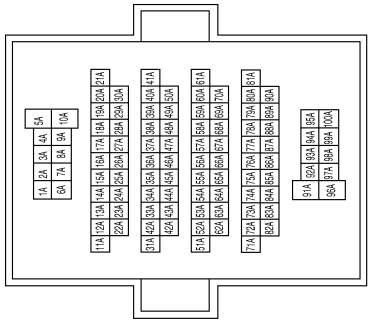
H.S.

52	51	50	49	48	47	46	45	44	43	42	41
64	63	62	61	60	59	58	57	56	55	54	53

Terminal No.	Color of Wire	Signal Name
51	L	PTC HEATER RELAY 3
52	GR	PTC HEATER RELAY 2
64	O	PTC HEATER RELAY 1

Connector No.	M69
Connector Name	WIRE TO WIRE
Connector Color	WHITE

H.S.

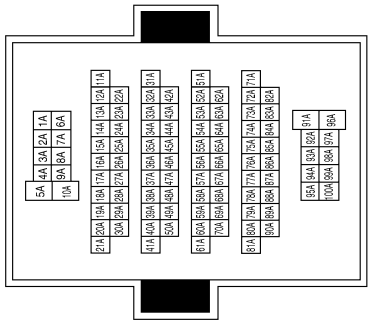


Terminal No.	Color of Wire	Signal Name
11A	P	–
12A	L	–
54A	L	–
55A	GR	–
56A	O	–
57A	G	–
60A	V	–
61A	BR	–

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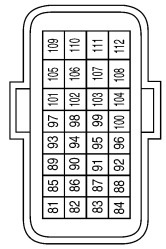
Connector No.	E7
Connector Name	WIRE TO WIRE
Connector Color	WHITE

H.S.



Connector No.	E16
Connector Name	ECM
Connector Color	BLACK

H.S.



Terminal No.	Color of Wire	Signal Name
99	P	CAN L
100	L	CAN L

Terminal No.	Color of Wire	Signal Name
11A	P	–
12A	L	–
54A	L	–
55A	GR	–
56A	O	–
57A	G	–
60A	V	–
61A	BR	–

Connector No.	E60
Connector Name	AMBIENT SENSOR
Connector Color	BLACK

H.S.

Terminal No.	Color of Wire	Signal Name
3	G	SENS GND B
4	LG	SENS SIG B

Connector No.	E61
Connector Name	PTC RELAY 1
Connector Color	BLACK

H.S.



Terminal No.	Color of Wire	Signal Name
1	Y	–
2	L	–
3	R	–
5	Y	–

Connector No.	E62
Connector Name	PTC RELAY 2
Connector Color	BLACK

H.S.



Terminal No.	Color of Wire	Signal Name
1	G	–
2	GR	–
3	R	–
5	L	–

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Connector No.	E63
Connector Name	PTC RELAY 3
Connector Color	BLACK

H.S.

Terminal No.	Color of Wire	Signal Name
1	G	–
2	L	–
3	R	–
5	W	–

Connector No.	E64
Connector Name	PTC HEATER
Connector Color	BLACK

H.S.

Terminal No.	Color of Wire	Signal Name
1	W	–

Connector No.	E65
Connector Name	PTC HEATER
Connector Color	BLACK

H.S.

Terminal No.	Color of Wire	Signal Name
2	L	–
3	W	–

Connector No.	J-1
Connector Name	BLOWER RELAY 1
Connector Color	BLACK

H.S.

Terminal No.	Color of Wire	Signal Name
1	Y	–
2	L	–
3	R	–
5	Y	–

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SYMPTOM DIAGNOSIS

AIR CONDITIONER CONTROL

Symptom Matrix Chart

INFOID:0000000001547451

SYMPTOM TABLE

Symptom	Reference Page	
A/C system does not come on.	Go to Trouble Diagnosis Procedure for A/C System.	HAC-163
Air outlet does not change.	Go to Trouble Diagnosis Procedure for Mode Door Motor.	HAC-109
Mode door motor does not operate normally.		
Discharge air temperature does not change.	Go to Trouble Diagnosis Procedure for Air Mix Door Motor.	HAC-112
Air mix door motor does not operate normally.		
Intake door does not change.	Go to Trouble Diagnosis Procedure for Intake Door Motor.	HAC-116
Intake door motor does not operate normally.		
Blower motor operation is malfunctioning.	Go to Trouble Diagnosis Procedure for Blower Motor.	HAC-120
Blower motor operation is malfunctioning under out of starting fan speed control.		
Magnet clutch does not engage.	Go to Trouble Diagnosis Procedure for Magnet Clutch.	HAC-125
Insufficient cooling	Go to Trouble Diagnosis Procedure for Insufficient Cooling.	HAC-185
Insufficient heating	Go to Trouble Diagnosis Procedure for Insufficient Heating.	HAC-193
Noise	Go to Trouble Diagnosis Procedure for Noise.	HAC-195
Self-diagnosis cannot be performed.	Go to Trouble Diagnosis Procedure for Self-diagnosis.	HAC-197
Memory function does not operate.	Go to Trouble Diagnosis Procedure for Memory Function.	HAC-198

INSUFFICIENT COOLING

Component Function Check

INFOID:0000000001547452

SYMPTOM: Insufficient cooling

INSPECTION FLOW

1.CONFIRM SYMPTOM BY PERFORMING OPERATIONAL CHECK - TEMPERATURE DECREASE

1. Press the AUTO switch.
2. Turn temperature control dial (driver) counterclockwise until 16° C (60° F) is displayed.
3. Check for cold air at discharge air outlets.

Can the symptom be duplicated?

YES >> GO TO 3.
NO >> GO TO 2.

2.CHECK FOR ANY SYMPTOMS

Perform a complete operational check for any symptoms. Refer to HAC-87, "Operational Check".

Does another symptom exist?

YES >> Refer to HAC-184, "Symptom Matrix Chart".
NO >> System OK.

3.CHECK FOR SERVICE BULLETINS

Check for any service bulletins.

>> GO TO 3.

4.PERFORM SELF-DIAGNOSIS

Perform self-diagnosis Refer to HAC-98, "Front Air Control Self-Diagnosis".

Is the inspection result normal?

YES >> GO TO 5.
NO >> Refer to HAC-104, "A/C System Self-Diagnosis Code Chart".

5.CHECK DRIVE BELTS

Check compressor belt tension. Refer to XX-XX, "*****".

Is the inspection result normal?

OK >> GO TO 6.
NG >> Adjust or replace compressor belt. Refer to XX-XX, "*****".

6.CHECK AIR MIX DOOR OPERATION

Check and verify air mix door mechanism for smooth operation. Refer to XX-XX, "*****"

Does air mix door operate correctly?

YES >> GO TO 7.
NO >> Check air mix door motor circuit. Refer to HAC-112, "Air Mix Door Motor Diagnosis Procedure" or XX-XX, "*****".

7.CHECK COOLING FAN MOTOR OPERATION

Check and verify cooling fan motor for smooth operation. Refer to XX-XX, "*****".

Does cooling fan motor operate correctly?

YES >> GO TO 8.
NO >> Check cooling fan motor. Refer to XX-XX, "*****".

8.CHECK RECOVERY/RECYCLING EQUIPMENT BEFORE USAGE

Check recovery/recycling equipment before connecting to vehicle. Verify there is no pressure in the recovery/recycling equipment by checking the gauges. If pressure exists, recover refrigerant from equipment lines.

>> GO TO 9.

9.CHECK REFRIGERANT PURITY

1. Connect recovery/recycling equipment to vehicle.
2. Confirm refrigerant purity in supply tank using recovery/recycling and refrigerant identifier.

Is the inspection result normal?

YES >> GO TO 10.
NO >> Check contaminated refrigerant. Refer to HAC-199, "Working with HFC-134a (R-134a)".

10.CHECK FOR EVAPORATOR FREEZE UP

Start engine and run A/C. Check for evaporator freeze up.

Does evaporator freeze up?

YES >> Perform performance test diagnoses. Refer to HAC-186, "Performance Test Diagnoses".
NO >> GO TO 11.

11.CHECK REFRIGERANT PRESSURE

Check refrigerant pressure with manifold gauge connected. Refer to HAC-189, "Test Reading".

Is the inspection result normal?

YES >> Perform performance test diagnoses. Refer to HAC-186, "Performance Test Diagnoses".
NO >> GO TO 12.

12.CHECK AIR DUCTS

Check ducts for air leaks.

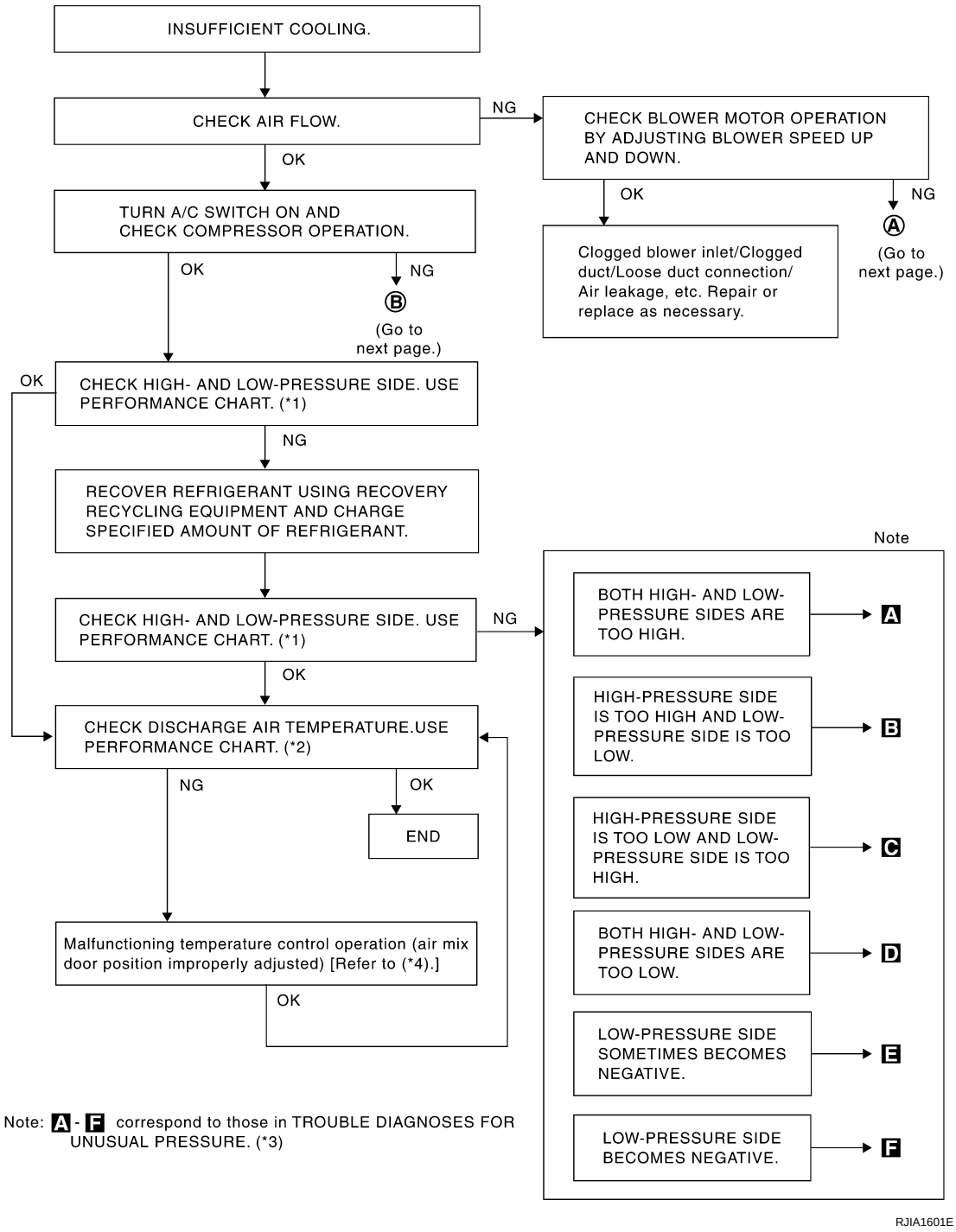
Is the inspection result normal?

YES >> System OK.
NO >> Repair air leaks.

Performance Test Diagnoses

INFOID:0000000001547453

PERFORMANCE TEST DIAGNOSIS

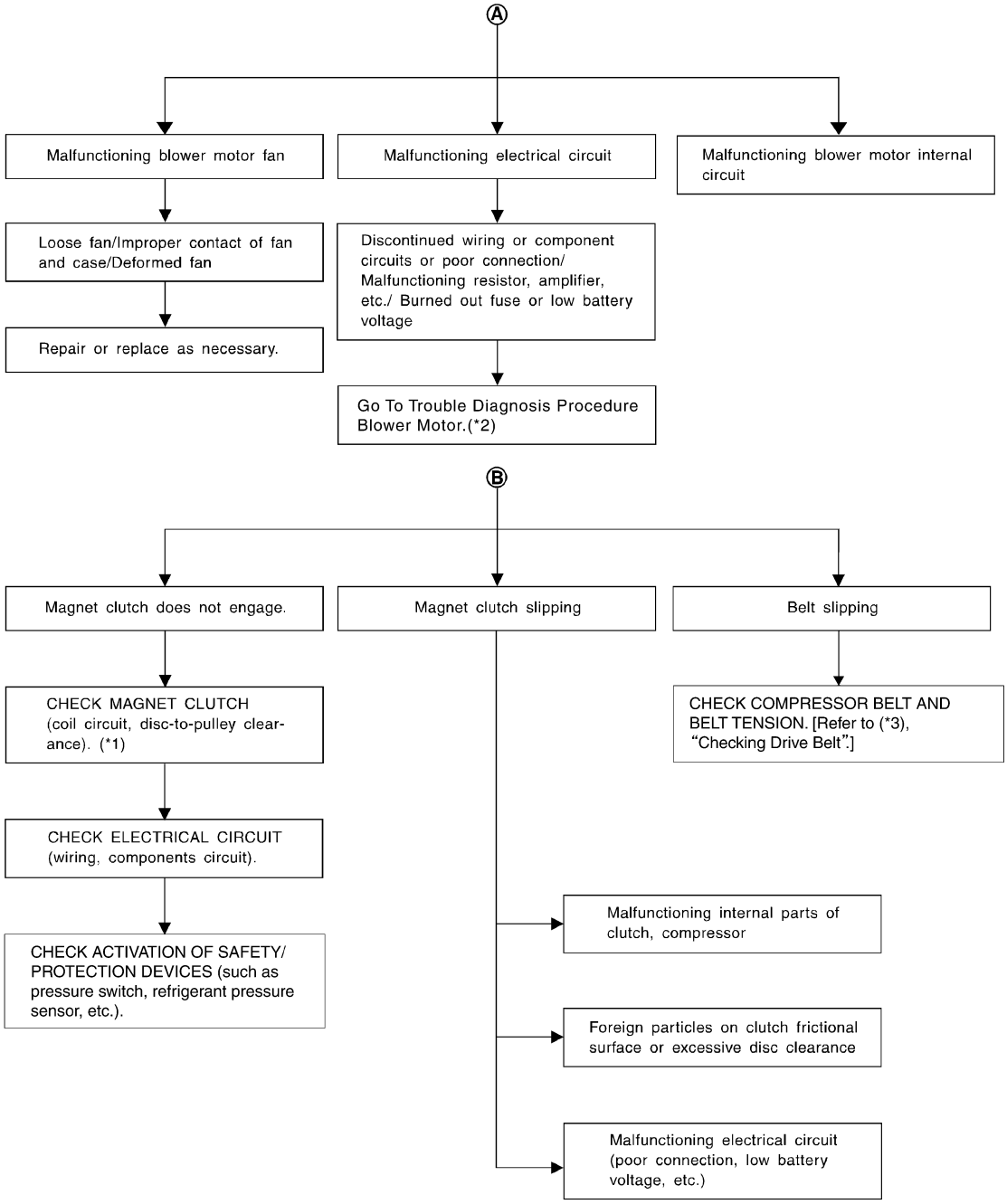


*1 "PERFORMANCE CHART"

*2 "PERFORMANCE CHART"

*3 "TROUBLE DIAGNOSIS FOR UNUSUAL PRESSURE "

*4 XXXX AIR MIX DOOR MOTOR CIR



RJIA3107E

*1 XXXX REMOVE AND INSTALL OF COMPRESSOR *2 XXXX BLOWER MOTOR CIR *3 XX-XX, "*****"

Performance Chart

INFOID:0000000001547454

PERFORMANCE CHART

Test Condition

Testing must be performed as follows:

Vehicle condition	Indoors or in the shade (in a well-ventilated place)
Doors	Closed
Door window	Open
Hood	Open
TEMP.	Max. COLD
Mode switch	(Ventilation) set
Recirculation (REC) switch	(Recirculation) set
Fan (blower) speed	Max. speed set
Engine speed	Idle speed
Operate the air conditioning system for 10 minutes before taking measurements.	

Test Reading

INFOID:0000000001547455

TEST READING

Recirculating-to-discharge Air Temperature Table

Inside air (Recirculating air) at blower assembly inlet		Discharge air temperature at center ventilator °C (°F)
Relative humidity %	Air temperature °C (°F)	
50 - 60	20 (68)	7.2 - 9.1 (45 - 48)
	25 (77)	11.4 - 13.8 (53 - 57)
	30 (86)	15.5 - 18.4 (60 - 65)
	35 (95)	20.3 - 23.7 (69 - 75)
60 - 70	20 (68)	9.1 - 10.9 (48 - 52)
	25 (77)	13.8 - 16.2 (57 - 61)
	30 (86)	18.4 - 21.3 (65 - 70)
	35 (95)	23.7 - 27.1 (75 - 81)

Ambient Air Temperature-to-operating Pressure Table

Ambient air		High-pressure (Discharge side) kPa (bar, kg/cm^2, psi)	Low-pressure (Suction side) kPa (bar, kg/cm^2, psi)
Relative humidity %	Air temperature °C (°F)		
50 - 70	20 (68)	843 - 1,036 *1 (11.08 - 13.63, 8.6 - 10.6, 122 - 150)	159.0 - 194.0 (1.59 - 1.94, 1.62 - 1.98, 23.1 - 28.1)
	25 (77)	1,094 - 1,338 *1 (10.94 - 13.38, 11.2 - 13.6, 159 - 194)	196.3 - 240.0 (1.96 - 2.40, 2.00 - 2.45, 28.5 - 34.8)
	30 (86)	1,298 - 1,590 *1 (12.98 - 15.90, 13.2 - 16.2, 188 - 231)	248.0 - 302.7 (2.48 - 3.03, 2.53 - 3.09, 36.0 - 43.9)
	35 (95)	1,383 - 1,688 *2 (13.83 - 16.88, 14.1 - 17.2, 201 - 245)	308.8 - 377.4 (3.09 - 3.77, 3.15 - 3.85, 44.8 - 54.7)
	40 (104)	1,628 - 1,988 *2 (16.28 - 19.88, 16.6 - 20.3, 236 - 288)	377.4 - 461.2 (3.77 - 4.61, 3.85 - 4.70, 54.7 - 66.8)

*1: In the motor fan low-speed control
*2: In the motor fan high-speed control

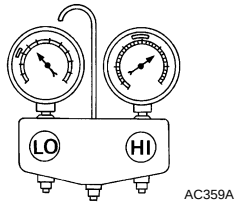
Trouble Diagnoses for Unusual Pressure

INFOID:0000000001547456

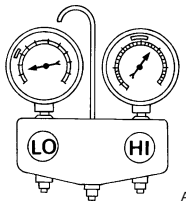
TROUBLE DIAGNOSIS FOR UNUSUAL PRESSURE

Whenever system's high and/or low side pressure(s) is/are unusual, diagnose using a manifold gauge. The marker above the gauge scale in the following tables indicates the standard (usual) pressure range. Since the standard (usual) pressure, however, differs from vehicle to vehicle, refer to above table (Ambient air temperature-to-operating pressure table).

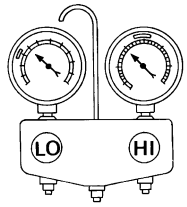
Both High- and Low-pressure Sides are Too High

Gauge indication	Refrigerant cycle	Probable cause	Corrective action
Both high- and low-pressure sides are too high.  AC359A	Pressure is reduced soon after water is splashed on condenser.	Excessive refrigerant charge in refrigeration cycle.	Reduce refrigerant until specified pressure is obtained.
	Air suction by cooling fan is insufficient.	Insufficient condenser cooling performance. ↓ 1. Condenser fins are clogged. 2. Improper fan rotation of cooling fan.	• Clean condenser. • Check and repair cooling fan if necessary.
	• Low-pressure pipe is not cold. • When compressor is stopped high-pressure value quickly drops by approximately 196 kPa (1.96 bar, 2 kg/cm^2, 28 psi). It then decreases gradually thereafter.	Poor heat exchange in condenser (After compressor operation stops, high-pressure decreases too slowly.). ↓ Air in refrigeration cycle.	Evacuate repeatedly and recharge system.
	Engine tends to overheat.	Engine cooling systems malfunction.	Check and repair each engine cooling system.
	• An area of the low-pressure pipe is colder than areas near the evaporator outlet. • Plates are sometimes covered with frost.	• Excessive liquid refrigerant on low-pressure side. • Excessive refrigerant discharge flow. • Expansion valve is open a little compared with the specification. ↓ Improper expansion valve adjustment.	Replace expansion valve.

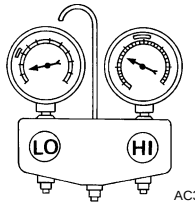
High-pressure Side is Too High and Low-pressure Side is Too Low

Gauge indication	Refrigerant cycle	Probable cause	Corrective action
High-pressure side is too high and low-pressure side is too low.  AC360A	Upper side of condenser and high-pressure side are hot, however, liquid tank is not so hot.	High-pressure tube or parts located between compressor and condenser are clogged or crushed.	• Check and repair or replace malfunctioning parts. • Check oil for contamination.

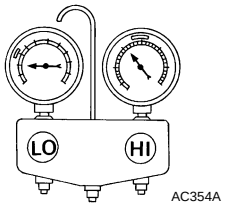
High-pressure Side is Too Low and Low-pressure Side is Too High

Gauge indication	Refrigerant cycle	Probable cause	Corrective action
High-pressure side is too low and low-pressure side is too high.  AC356A	High- and low-pressure sides become equal soon after compressor operation stops.	Compressor pressure operation is improper. ↓ Damaged inside compressor packings.	Replace compressor.
	No temperature difference between high- and low-pressure sides.	Compressor pressure operation is improper. ↓ Damaged inside compressor packings.	Replace compressor.

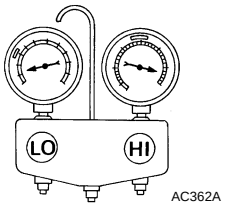
Both High- and Low-pressure Sides are Too Low

Gauge indication	Refrigerant cycle	Probable cause	Corrective action
Both high- and low-pressure sides are too low.  AC353A	• There is a big temperature difference between liquid tank outlet and inlet. Outlet temperature is extremely low. • Liquid tank inlet and expansion valve are frosted.	Liquid tank inside is slightly clogged.	• Replace liquid tank. • Check oil for contamination.
	• Temperature of expansion valve inlet is extremely low as compared with areas near liquid tank. • Expansion valve inlet may be frosted. • Temperature difference occurs somewhere in high-pressure side.	High-pressure pipe located between liquid tank and expansion valve is clogged.	• Check and repair malfunctioning parts. • Check oil for contamination.
	Expansion valve and liquid tank are warm or only cool when touched.	Low refrigerant charge. ↓ Leaking fittings or components	Check refrigerant for leaks. Refer to XXXX CHECKING OF REFRIG LEAKS .
	There is a big temperature difference between expansion valve inlet and outlet while the valve itself is frosted.	Expansion valve closes a little compared with the specification. ↓ 1. Improper expansion valve adjustment. 2. Malfunctioning expansion valve. 3. Outlet and inlet may be clogged.	• Remove foreign particles by using compressed air. • Replace expansion valve. • Check oil for contamination.
	An area of the low-pressure pipe is colder than areas near the evaporator outlet.	Low-pressure pipe is clogged or crushed.	• Check and repair malfunctioning parts. • Check oil for contamination.
	Air flow volume is not enough or is too low.	Evaporator is frozen.	• Check intake sensor circuit. Refer to XXXX INTAKE SENSOR CIR . • Replace compressor. • Repair evaporator fins. • Replace evaporator. • Refer to XXXX BLOWER MOTOR CIR..

Low-pressure Side Sometimes Becomes Negative

Gauge indication	Refrigerant cycle	Probable cause	Corrective action
Low-pressure side sometimes becomes negative.  AC354A	• Air conditioning system does not function and does not cyclically cool the compartment air. • The system constantly functions for a certain period of time after compressor is stopped and restarted.	Refrigerant does not discharge cyclically. ↓ Moisture is frozen at expansion valve outlet and inlet. ↓ Water is mixed with refrigerant.	• Drain water from refrigerant or replace refrigerant. • Replace liquid tank.

Low-pressure Side Becomes Negative

Gauge indication	Refrigerant cycle	Probable cause	Corrective action
Low-pressure side becomes negative.  AC362A	Liquid tank or front/rear side of expansion valve's pipe is frosted or dewed.	High-pressure side is closed and refrigerant does not flow. ↓ Expansion valve or liquid tank is frosted.	Leave the system at rest until no frost is present. Start it again to check whether or not the malfunction is caused by water or foreign particles. • If water is the cause, initially cooling is okay. Then the water freezes causing a blockage. Drain water from refrigerant or replace refrigerant. • If due to foreign particles, remove expansion valve and remove the particles with dry and compressed air (not shop air). • If either of the above methods cannot correct the malfunction, replace expansion valve. • Replace liquid tank. • Check oil for contamination.

INSUFFICIENT HEATING

Component Function Check

INFOID:0000000001547457

SYMPTOM: Insufficient heating

INSPECTION FLOW

1.CONFIRM SYMPTOM BY PERFORMING OPERATIONAL CHECK - TEMPERATURE INCREASE

1. Press the AUTO switch.
2. Turn the temperature control dial (driver) clockwise until 32° C (90° F) is displayed.
3. Check for hot air at discharge air outlets.

Can this symptom be duplicated?

YES >> GO TO 2.
NO >> Perform complete system operational check. Refer to HAC-87, "Operational Check".

2.CHECK FOR SERVICE BULLETINS

Check for any service bulletins.

>> GO TO 3.

3.PERFORM SELF-DIAGNOSIS

Perform self-diagnosis. Refer to HAC-98, "Front Air Control Self-Diagnosis".

Is the inspection results normal?

YES >> GO TO 4.
NO >> Refer to HAC-197, "Self-Diagnosis".

4.CHECK ENGINE COOLING SYSTEM

1. Check for proper engine coolant level. Refer to XX-XX, "*****".
2. Check hoses for leaks or kinks.
3. Check radiator cap. Refer to XX-XX, "*****".
4. Check for air in cooling system.

>> GO TO 5.

5.CHECK AIR MIX DOOR OPERATION

Check the operation of the air mix door.

Is the inspection result normal?

YES >> GO TO 6.
NO >> Check the air mix door motor circuit. Refer to HAC-112, "Air Mix Door Motor Diagnosis Procedure".

6.CHECK AIR DUCTS

Check for disconnected or leaking air ducts.

Is the inspection result normal?

YES >> GO TO 7.
NO >> Repair all disconnected or leaking air ducts.

7.CHECK HEATER HOSE TEMPERATURES

1. Start engine and warm it up to normal operating temperature.
2. Touch both the inlet and outlet heater hoses.

Is the inspection result normal?

YES >> Hot inlet hose and a warm outlet hose: GO TO 8.
NO >> Both hoses warm: GO TO 9.

8.CHECK ENGINE COOLANT SYSTEM

Check engine control temperature sensor. Refer to XX-XX, "*****".

Is the inspection result normal?

YES >> System OK.
NO >> Repair or replace as necessary. Retest.

9. CHECK HEATER HOSES

Check heater hoses for proper installation.

Is the inspection result normal?

YES >> System OK.
NO >> 1. Back flush heater core.
2. Drain the water from the system.
3. Refill system with new engine coolant. Refer to XX-XX, "*****".
4. GO TO 10 to retest.

10. CHECK HEATER HOSE TEMPERATURES

1. Start engine and warm it up to normal operating temperature.
2. Touch both the inlet and outlet heater hoses.

Is the inspection result normal?

YES >> System OK.
NO >> Replace heater core. Refer to XX-XX, "*****".

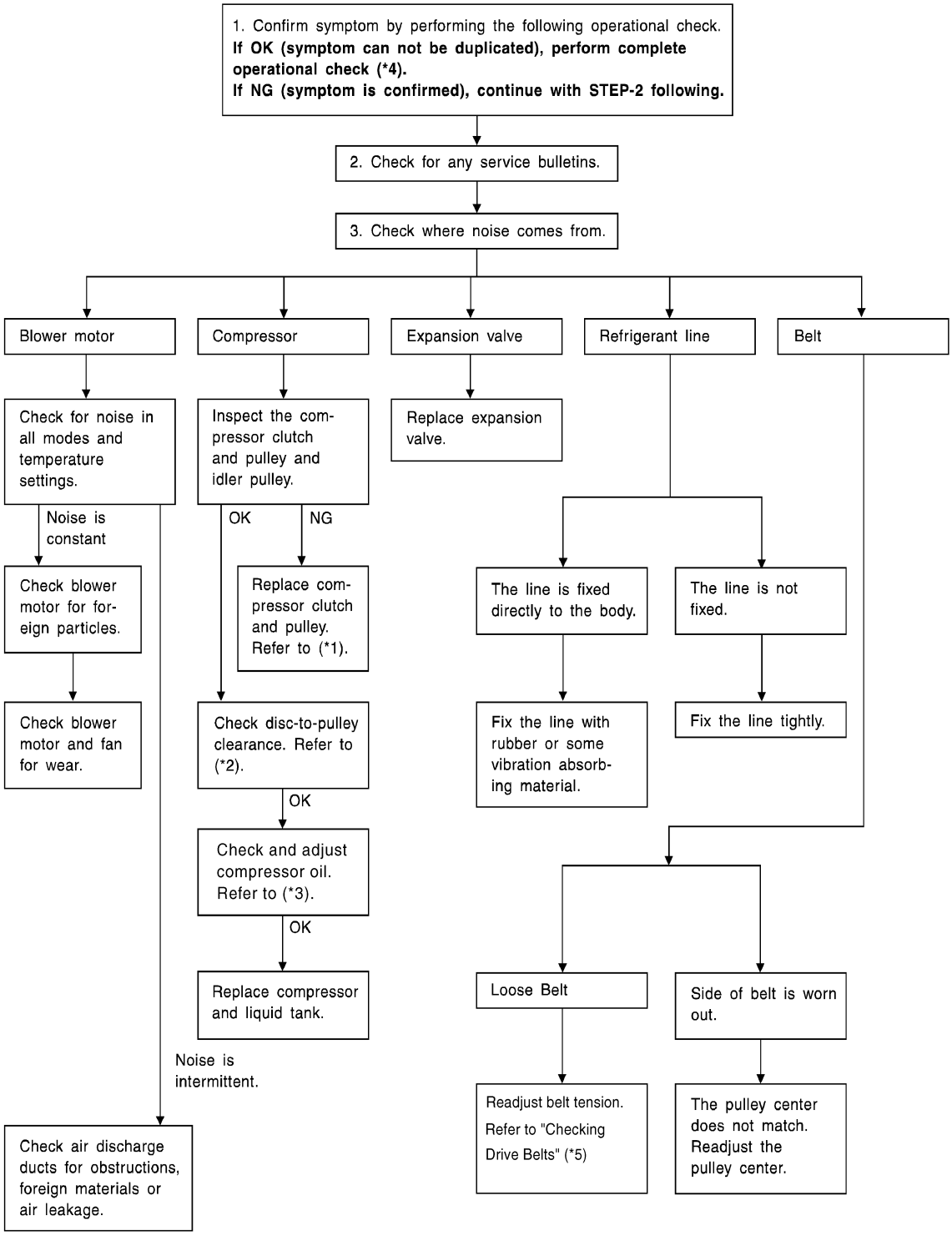
NOISE

Component Function Check

INFOID:0000000001547458

SYMPTOM: Noise

INSPECTION FLOW



WJIA1972E

*1 XX-XX, "*****"
*2 XX-XX, "*****"
*3 XX-XX, "*****"
*4 HAC-87, "Operational Check" or XX-XX, "*****"
*5 XX-XX, "*****"

SELF-DIAGNOSIS CANNOT BE PERFORMED

Self-Diagnosis

INFOID:0000000001682699

SYMPTOM: Self-diagnosis cannot be performed.

INSPECTION FLOW

1. CONFIRM SYMPTOM BY PERFORMING OPERATIONAL CHECK - AUTO MODE

1. Press the AUTO switch.
2. Display should indicate AUTO. Discharge air and blower speed will depend on ambient, in-vehicle and set temperatures.

Can a symptom be duplicated?

YES >> GO TO 2.
NO >> Perform a complete operational check. Refer to XX-XX, "*****".

2. CHECK FOR SERVICE BULLETINS

Check for any service bulletins.

>> GO TO 3.

3. CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and ground circuit. Refer to XX-XX, "*****".

Is the inspection result normal?

YES >> Cause cannot be confirmed by self-diagnosis.
NO >> GO TO 4.

4. CHECK AMBIENT SENSOR CIRCUIT

Check ambient sensor circuit. Refer to XX-XX, "*****".

Is the inspection result normal?

YES >> GO TO 5.
NO >> Repair or replace as necessary.

5. CHECK IN-VEHICLE SENSOR CIRCUIT

Check in-vehicle sensor circuit. Refer to XX-XX, "*****".

Is the inspection result normal?

YES >> GO TO 6.
NO >> Repair or replace as necessary.

6. CHECK INTAKE SENSOR CIRCUIT

Check intake sensor circuit. Refer to XX-XX, "*****".

Is the inspection result normal?

YES >> GO TO 7.
NO >> Repair or replace as necessary.

7. CHECK AIR MIX DOOR MOTOR PBR CIRCUIT

Check air mix door motor PBR circuit. Refer to XX-XX, "*****".

Is the inspection result normal?

OK >> Perform a complete operational check and check for other symptoms. Refer to XX-XX, "*****".
NG >> Repair or replace as necessary.

MEMORY FUNCTION DOES NOT OPERATE

Memory Function Check

INFOID:0000000001547459

SYMPTOM: Memory function does not operate.

INSPECTION FLOW

1. CONFIRM SYMPTOM BY PERFORMING OPERATIONAL CHECK - MEMORY FUNCTION

1. Set the temperature to 32°C (90°F).
2. Rotate the front blower control dial (driver) to turn system OFF.
3. Turn ignition switch OFF.
4. Turn ignition switch ON.
5. Press the AUTO switch.
6. Confirm that the set temperature remains at previous temperature.
7. Rotate the front blower control dial (LH) to turn system OFF.

Can the symptom be duplicated?

YES >> GO TO 3.
NO >> GO TO 2.

2. PERFORM COMPLETE OPERATIONAL CHECK

Perform a complete operational check and check for any symptoms. Refer to HAC-87, "Operational Check".

Can a symptom be duplicated?

YES >> Refer to HAC-86, "How to Perform Trouble Diagnosis For Quick And Accurate Repair".
NO >> System OK.

3. CHECK FOR SERVICE BULLETINS

Check for any service bulletins.

>> GO TO 4.

4. PERFORM SELF-DIAGNOSIS

Perform self-diagnosis to check for any codes. Refer to HAC-98, "Front Air Control Self-Diagnosis".

Are any self-diagnosis codes present?

YES >> Refer to HAC-104, "A/C System Self-Diagnosis Code Chart".
NO >> GO TO 5.

5. CHECK POWER AND GROUND CIRCUIT

Check main power supply and ground circuit. Refer to HAC-163, "Front Air Control Component Function Check".

Is the inspection result normal?

YES >> GO TO 6.
NO >> Repair or replace as necessary.

6. RECHECK FOR SYMPTOMS

Perform a complete operational check for any symptoms. Refer to HAC-87, "Operational Check".

Does another symptom exist?

YES >> Refer to HAC-86, "How to Perform Trouble Diagnosis For Quick And Accurate Repair".
NO >> Replace A/C Auto amp. Refer to XX-XX, "*****".

PRECAUTION

PRECAUTIONS

Precaution for Supplemental Restraint System (SRS) "AIR BAG" and "SEAT BELT PRE-TENSIONER"

INFOID:0000000001548138

The Supplemental Restraint System such as “AIR BAG” and “SEAT BELT PRE-TENSIONER”, used along with a front seat belt, helps to reduce the risk or severity of injury to the driver and front passenger for certain types of collision. Information necessary to service the system safely is included in the SRS and SB section of this Service Manual.

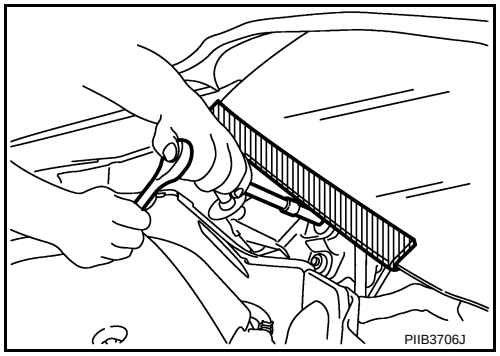
WARNING:

- **To avoid rendering the SRS inoperative, which could increase the risk of personal injury or death in the event of a collision which would result in air bag inflation, all maintenance must be performed by an authorized NISSAN/INFINITI dealer.**
- **Improper maintenance, including incorrect removal and installation of the SRS, can lead to personal injury caused by unintentional activation of the system. For removal of Spiral Cable and Air Bag Module, see the SRS section.**
- **Do not use electrical test equipment on any circuit related to the SRS unless instructed to in this Service Manual. SRS wiring harnesses can be identified by yellow and/or orange harnesses or harness connectors.**

Precaution for Procedures Without Cowl Top Cover

INFOID:0000000001548139

When performing the procedure after removing cowl top cover, cover the lower end of windshield with urethane, etc.



Working with HFC-134a (R-134a)

INFOID:0000000001547461

WARNING:

- **CFC-12 (R-12) refrigerant and HFC-134a (R-134a) refrigerant are not compatible. If the refrigerants are mixed compressor failure is likely to occur. Refer to XX-XX, "*****". To determine the purity of HFC-134a (R-134a) in the vehicle and recovery tank, use Refrigerant Recovery/Recycling Recharging equipment and Refrigerant Identifier.**
- **Use only specified oil for the HFC-134a (R-134a) A/C system and HFC-134a (R-134a) components. If oil other than that specified is used, compressor failure is likely to occur.**
- **The specified HFC-134a (R-134a) oil rapidly absorbs moisture from the atmosphere. The following handling precautions must be observed:**
- **When removing refrigerant components from a vehicle, immediately cap (seal) the component to minimize the entry of moisture from the atmosphere.**
- **When installing refrigerant components to a vehicle, do not remove the caps (unseal) until just before connecting the components. Connect all refrigerant loop components as quickly as possible to minimize the entry of moisture into system.**
- **Only use the specified oil from a sealed container. Immediately reseal containers of oil. Without proper sealing, oil will become moisture saturated and should not be used.**
- **Avoid breathing A/C refrigerant and oil vapor or mist. Exposure may irritate eyes, nose and throat. Remove HFC-134a (R-134a) from the A/C system using certified service equipment meeting requirements of SAE J2210 [HFC-134a (R-134a) recycling equipment], or J2209 [HFC-134a (R-134a) recycling equipment], If accidental system discharge occurs, ventilate work area before resuming service. Additional health and safety information may be obtained from refrigerant and oil manufacturers.**

- Do not allow A/C oil to come in contact with styrofoam parts. Damage may result.

CONTAMINATED REFRIGERANT

If a refrigerant other than pure HFC-134a (R-134a) is identified in a vehicle, your options are:

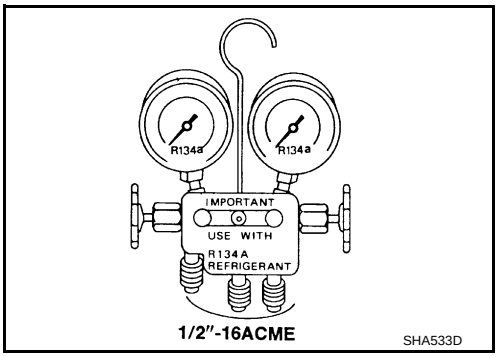
- Explain to the customer that environmental regulations prohibit the release of contaminated refrigerant into the atmosphere.
- Explain that recovery of the contaminated refrigerant could damage your service equipment and refrigerant supply.
- Suggest the customer return the vehicle to the location of previous service where the contamination may have occurred.
- If you choose to perform the repair, recover the refrigerant using only **dedicated equipment and containers. Do not recover contaminated refrigerant into your existing service equipment.** If your facility does not have dedicated recovery equipment, you may contact a local refrigerant product retailer for available service. This refrigerant must be disposed of in accordance with all federal and local regulations. In addition, replacement of all refrigerant system components on the vehicle is recommended.
- If the vehicle is within the warranty period, the air conditioner warranty is void. Please contact NISSAN Customer Affairs for further assistance.

Precaution for Service Equipment

INFOID:0000000001547462

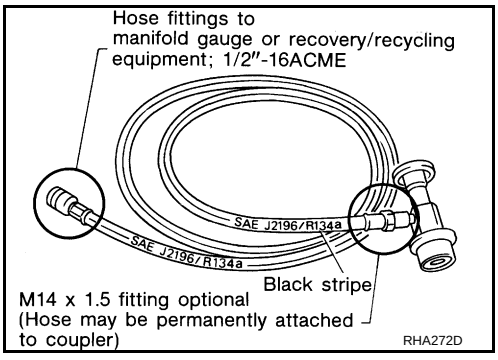
MANIFOLD GAUGE SET

Be certain that the gauge face indicates R-134a or 134a. Make sure the gauge set has 1/2″-16 ACME threaded connections for service hoses. Confirm the set has been used only with refrigerant HFC-134a (R-134a) along with specified oil.



SERVICE HOSES

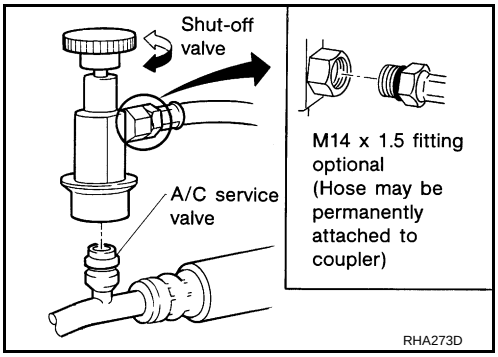
Be certain that the service hoses display the markings described (colored hose with black stripe). All hoses must include positive shut-off devices (either manual or automatic) near the end of the hoses opposite the manifold gauge.



SERVICE COUPLERS

Never attempt to connect HFC-134a (R-134a) service couplers to a CFC-12 (R-12) A/C system. The HFC-134a (R-134a) couplers will not properly connect to the CFC-12 (R-12) system. However, if an improper connection is attempted, discharging and contamination may occur.

Shut-off valve rotation	A/C service valve
Clockwise	Open
Counterclockwise	Close



BASIC INSPECTION

DIAGNOSIS AND REPAIR WORKFLOW

How to Perform Trouble Diagnosis For Quick And Accurate Repair

INFOID:0000000001547305

WORK FLOW

1. LISTEN TO CUSTOMER COMPLAINT

Listen to customer complaint. Get detailed information about the conditions and environment when the symptom occurs.

>> GO TO 2

2. CHECK FOR SERVICE BULLETINS

Check for any service bulletins.

>> GO TO 3.

3. VERIFY THE SYMPTOM WITH OPERATIONAL CHECK

Verify the symptom with operational check. Refer to HAC-202, "Operational Check".

Can a symptom be duplicated?

YES >> GO TO 4
NO >> GO TO 5

4. GO TO APPROPRIATE TROUBLE DIAGNOSIS

Go to appropriate trouble diagnosis. Refer to HAC-298, "Symptom Matrix Chart".

Can a symptom be duplicated?

>> GO TO 5.

5. PERFORM THE FRONT AIR CONTROL SELF-DIAGNOSIS

Perform front air control self-diagnosis. Refer to HAC-213, "Front Air Control Self-Diagnosis".

>> If any diagnostic trouble codes set. Refer to HAC-218, "Front Air Control Self-Diagnosis Code Chart".
>> Confirm the repair by performing operational check. Refer to HAC-202, "Operational Check".

INSPECTION AND ADJUSTMENT

Operational Check

INFOID:0000000001547306

The purpose of the operational check is to confirm that the system operates properly.

Conditions : Engine running at usual operating temperature

CHECKING BLOWER

1. Turn blower control dial to 1st speed. Blower should operate on low speed.
2. Turn blower control dial to 2nd speed, and continue checking blower motor until all speed are checked.
3. Leave blower on max. speed.

If NG, go to trouble diagnosis procedure for HAC-234, "Front Blower Motor Diagnosis Procedure".
If OK, continue the check.

CHECKING DISCHARGE AIR

1. Turn mode control dial to each position.
2. Confirm that discharge air comes out according to the air distribution table. Refer to HAC-208, "Discharge Air Flow".

Intake door position is checked in the next step.
If NG, go to trouble diagnosis procedure for HAC-222, "Mode Door Motor Diagnosis Procedure".
If OK, continue the check.

NOTE:
Confirm that the compressor clutch is engaged (sound or visual inspection) and intake door position is at FRESH when the DEF is selected.

CHECKING INTAKE DOOR

1. Press intake switch. Recirculation indicator should illuminate.
2. Press intake switch again. Fresh indicator should illuminate.
3. Listen for intake door position change (you should hear blower sound change slightly).

If NG, go to trouble diagnosis procedure for HAC-230, "Intake Door Motor Diagnosis Procedure".
If OK, continue the check.

CHECKING TEMPERATURE DECREASE

1. Turn temperature control dial counterclockwise until 18°C (64°F).
2. Check for cold air at discharge air outlets.

If NG, go to trouble diagnosis procedure for HAC-299, "Component Function Check".
If OK, continue the check.

CHECKING TEMPERATURE INCREASE

1. Turn temperature control dial clockwise until 32°C (90°F).
2. Check for hot air at discharge air outlets.

If NG, go to trouble diagnosis procedure for HAC-307, "Component Function Check".
If OK, continue the check.

CHECKING A/C SWITCH

1. Turn blower control dial to ON.
2. Press A/C switch.
3. A/C switch indicator will turn ON.
   - Confirm that the compressor clutch engages (sound or visual inspection).

If NG, go to trouble diagnosis procedure for HAC-239, "Magnet Clutch Diagnosis Procedure".
If OK, continue the check.

CHECKING AUTO MODE

1. Set mode control dial and blower control dial to AUTO position.
2. Press A/C switch.

- Confirm that discharge air and blower speed will depend on ambient, in-vehicle, and set temperatures.

- If NG, go to trouble diagnosis procedure for HAC-278, "A/C Auto Amp Power and Ground Diagnosis Procedure", then if necessary, trouble diagnosis procedure for HAC-239, "Magnet Clutch Diagnosis Procedure".
- If all operational checks are OK (symptom cannot be duplicated), go to HAC-201, "How to Perform Trouble Diagnosis For Quick And Accurate Repair" and perform tests as outlined to simulate driving conditions environment.
- If symptom appears, refer to HAC-298, "Symptom Matrix Chart" and perform applicable trouble diagnosis procedures.

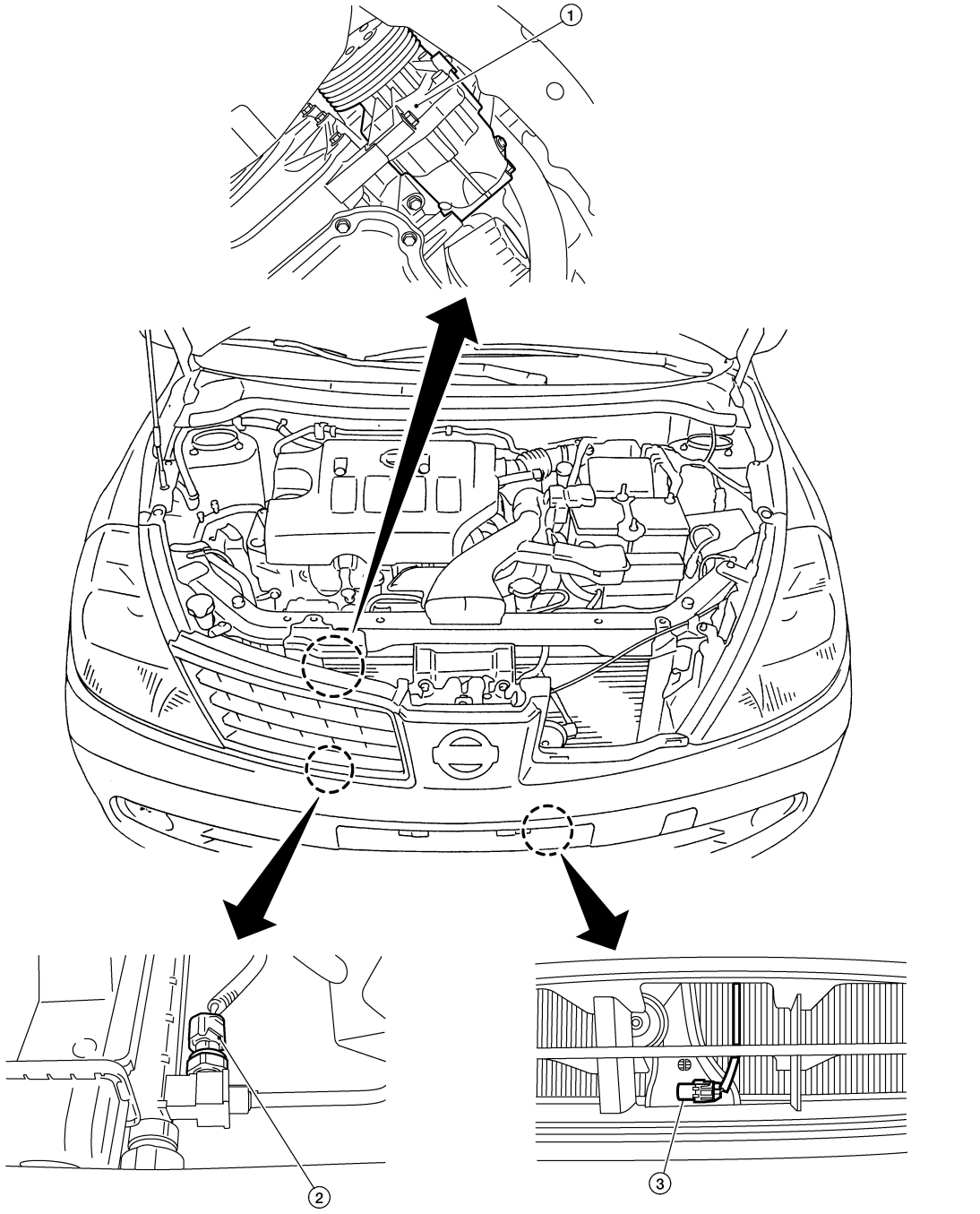
FUNCTION DIAGNOSIS

FUNCTION INFORMATION

Component Part Location

INFOID:0000000001548103

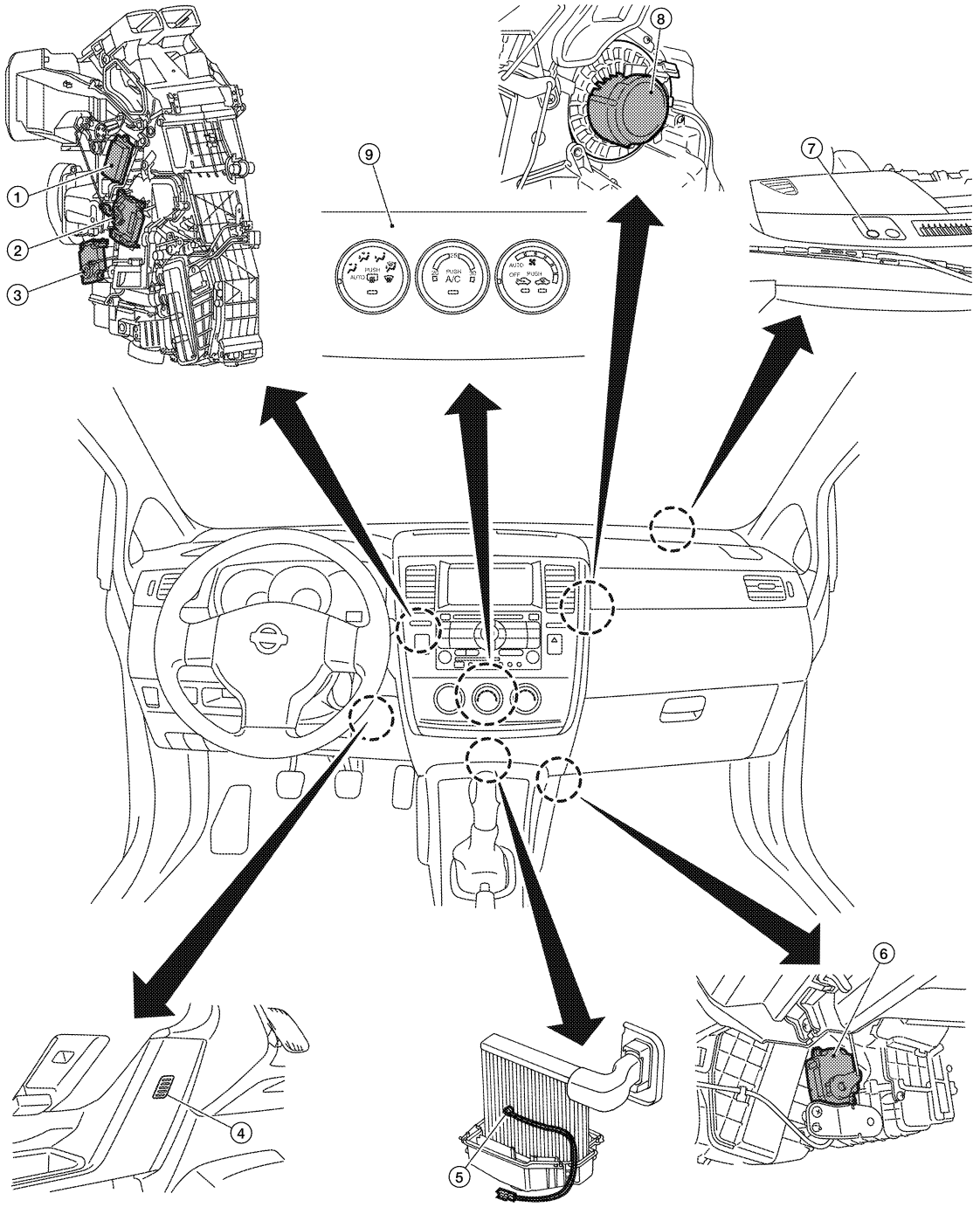
ENGINE COMPARTMENT



AWIIA0602ZZ

1. A/C Compressor F3
2. Refrigerant pressure sensor E17
3. Ambient sensor E60

PASSENGER COMPARTMENT



1. Variable blower control M90, M91
2. Intake door motor M89
3. Air mix door motor M88
4. In-vehicle sensor M93
5. Intake sensor M92
6. Mode door motor M87
7. Sunload sensor M94
8. Front blower motor M62
9. Front air control M85, M86

REFRIGERATION SYSTEM

Refrigerant Cycle

INFOID:0000000001547310

Refer to HA-16, "Refrigerant Cycle".

Refrigerant System Protection

INFOID:0000000001547311

Refer to HA-16, "Refrigerant System Protection".

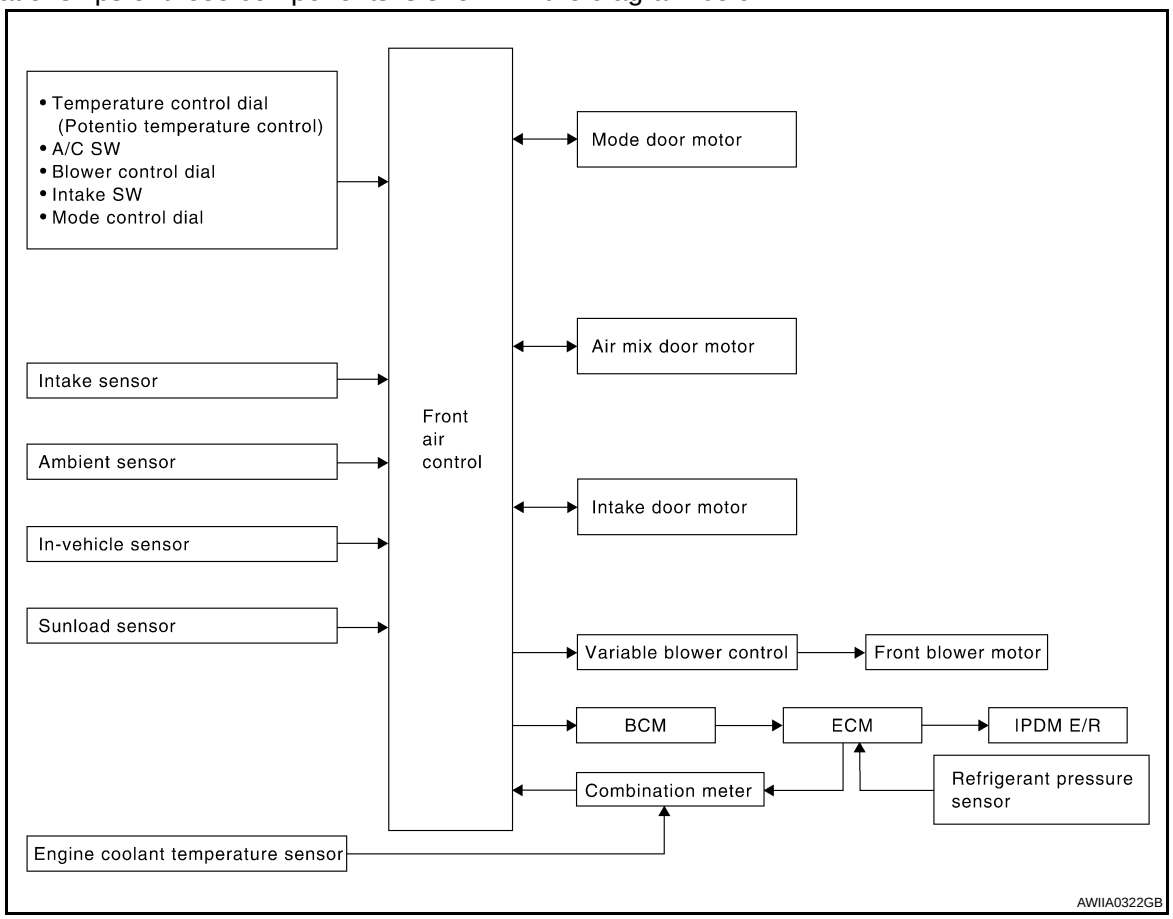
AUTOMATIC AIR CONDITIONER SYSTEM

Control System Diagram

INFOID:0000000001547312

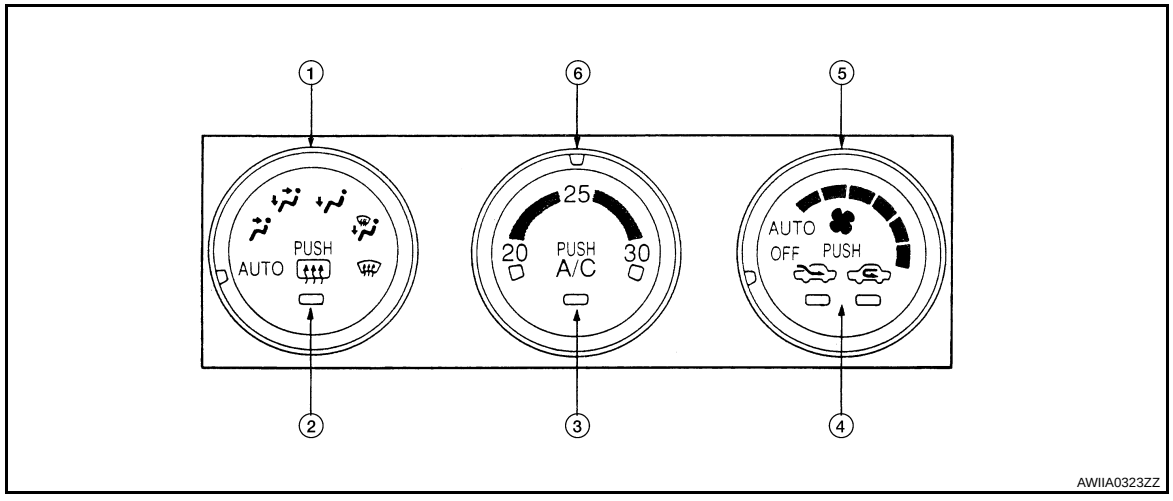
CONTROL SYSTEM

The control system consists of input sensors, switches, the front air control (microcomputer) and outputs. The relationships of these components is shown in the diagram below:



Control System Description

INFOID:0000000001547313



1. Mode control dial
2. Rear window defogger switch
3. A/C switch
4. Intake switch
5. Blower control dial
6. Temperature control dial

MODE CONTROL DIAL

Controls the air discharge outlets.
Positions the air outlet doors to the defrost position. Also positions the intake doors to the outside air position.
When shifting mode control dial to DEF under the following conditions, compressor is turned ON. (A/C LED ON)

- BLOWER: ON
- A/C: OFF

TEMPERATURE CONTROL DIAL (POTENTIO TEMPERATURE CONTROL)

Increase or decrease the set temperature.

BLOWER CONTROL DIAL

Automatically or manually control the blower speed. Seven speeds are available for manual control.
Shifting blower control dial to AUTO, compressor is turned ON automatically.

REAR WINDOW DEFOGGER SWITCH

When illumination is ON, rear window is defogged.

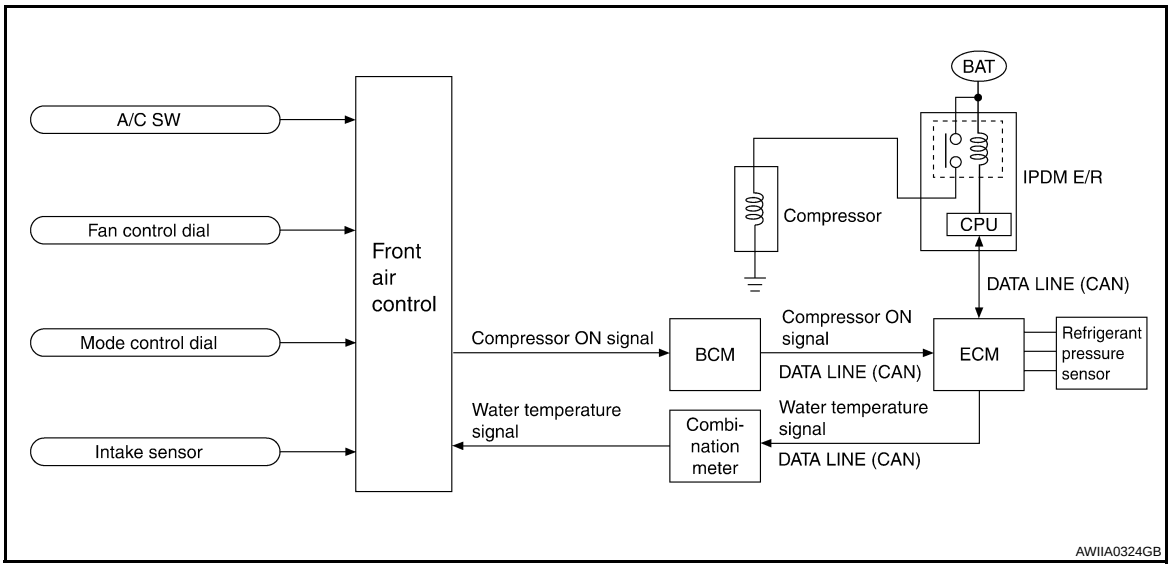
A/C SWITCH

The compressor is ON or OFF.
(Pressing the A/C switch when the blower control dial is ON will turn off the A/C switch and compressor.)

INTAKE SWITCH

- When intake switch is ON, REC indicator turns ON, and air inlet is fixed to REC.
- When press intake switch again, FRE indicator turns ON, and air inlet is fixed to FRE.
- When DEF position or FRE indicator is turned ON, or when compressor is turned from ON to OFF, REC switch is automatically turned OFF (fixed to FRE mode).
  REC mode can be re-entered by pressing intake switch again. (Except DEF position)

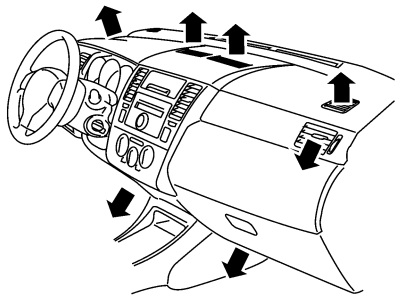
MAGNET CLUTCH CONTROL



When mode control dial and blower control dial is turned to AUTO position, AUTO switch or DEF switch is pressed, front air control inputs compressor ON signal to BCM.
BCM sends compressor ON signal to ECM, via CAN communication line.
ECM judges whether compressor can be turned ON, based on each sensor status (refrigerant-pressure sensor signal, throttle angle, etc.). If it judges compressor can be turned ON, it sends compressor ON signal to IPDM E/R, via CAN communication line.
Upon receipt of compressor ON signal from ECM, IPDM E/R turns air conditioner relay ON to operate compressor.

Discharge Air Flow

INFOID:0000000001547314



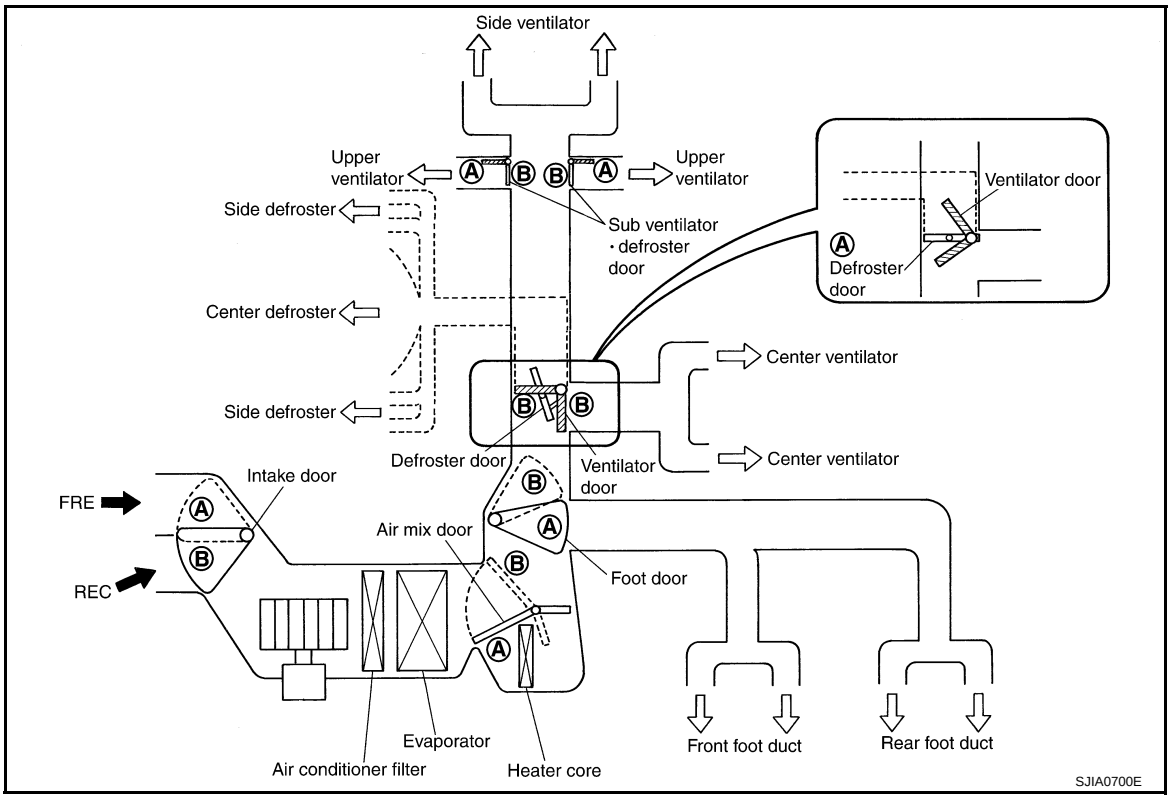
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Mode door position	Air outlet/distribution		
	Vent	Foot	Defroster
	100%	—	—
	56%	44%	—
	16%	64%	20%
	16%	53%	31%
	17%	—	83%
Airflow always present at driver and passenger side demisters			

Switches And Their Control Function

INFOID:0000000001547316

SWITCHES AND THEIR CONTROL FUNCTION



Position or switch / Door	Mode control dial						Intake SW			Temperature control dial		
	AUTO	VENT	B/L	FOOT	D/F	DEF	REC		FRE			
	AUTO											
										18 ℃	～	32 ℃
Ventilator door	AUTO	Ⓐ	Ⓐ	Ⓑ *1	Ⓑ *1	Ⓑ *1	—			—		
Sub ventilator door		Ⓐ	Ⓑ	Ⓑ	Ⓑ	Ⓑ	—			—		
Defroster door		Ⓐ	Ⓐ	Ⓑ	Ⓑ	Ⓑ	—			—		
Foot door		Ⓐ	Ⓐ～Ⓑ	Ⓑ *1	Ⓐ～Ⓑ	Ⓐ	—			—		
Intake door	—					Ⓑ	Ⓑ	AUTO	Ⓐ	—		
Air mix door	—						—			Ⓐ	AUTO	Ⓑ

*1 When in the Ⓑ position, ventilator door and foot door are not completely shut.

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CAN COMMUNICATION SYSTEM

System Description

INFOID:0000000001547318

Refer to LAN-13, "System Description".

DIAGNOSIS SYSTEM (BCM)

CONSULT-III Function (BCM)

INFOID:0000000001547320

CONSULT-III can display each diagnostic item using the diagnostic test modes shown following.

BCM diagnostic test item	Diagnostic mode	Description
Inspection by part	WORK SUPPORT	Supports inspections and adjustments. Commands are transmitted to the BCM for setting the status suitable for required operation, input/output signals are received from the BCM and received data is displayed.
	DATA MONITOR	Displays BCM input/output data in real time.
	ACTIVE TEST	Operation of electrical loads can be checked by sending drive signal to them.
	SELF-DIAG RESULTS	Displays BCM self-diagnosis results.
	CAN DIAG SUPPORT MNTR	The result of transmit/receive diagnosis of CAN communication can be read.
	ECU PART NUMBER	BCM part number can be read.
	CONFIGURATION	Performs BCM configuration read/write functions.

DATA MONITOR

Display Item List

Monitor item name “operation or unit”		Contents
IGN ON SW	“ON/OFF”	Displays “IGN Position (ON)/OFF, ACC Position (OFF)” status as judged from ignition switch signal through the CAN communication.
FAN ON SIG	“ON/OFF”	Displays “FAN (ON)/FAN (OFF)” status as judged from blower motor switch signal through CAN communication.
AIR COND SW	“ON/OFF”	Displays “COMP (ON)/COMP (OFF)” status as judged from air conditioner switch signal through the CAN communication.

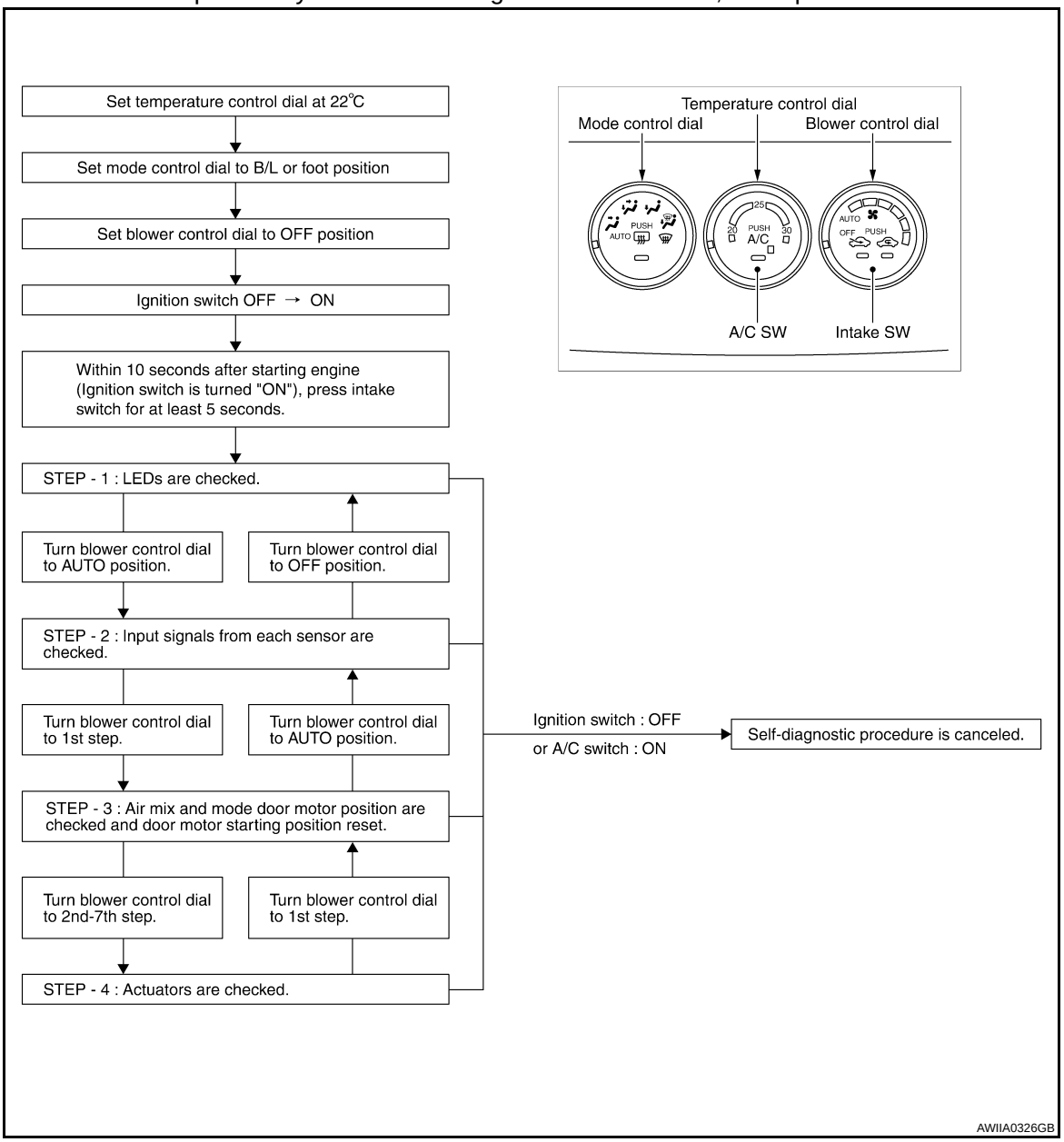
SELF-DIAGNOSIS FUNCTION

Front Air Control Self-Diagnosis

INFOID:0000000001547321

DESCRIPTION

The self-diagnostic system diagnoses sensors, door motors, blower motor, etc. by system line. Refer to applicable sections (items) for details. Shifting from usual control to the self-diagnostic system is accomplished by starting the engine (turning the ignition switch ON) and pressing intake switch for at least 5 seconds. The intake switch must be pressed within 10 seconds after starting the engine (ignition switch is turned ON). This system will be cancelled by either pressing A/C switch or turning the ignition switch OFF. Shifting from one step to another is accomplished by means of turning blower control dial, as required.



FUNCTION CONFIRMATION PROCEDURE

1. SET IN SELF-DIAGNOSTIC MODE

1. Set temperature control dial at 22°C (72°.
2. Set mode control dial to B/L or FOOT position.
3. Set blower control dial to OFF position.
4. Turn ignition switch ON.

5. Set in self-diagnostic mode as follows. Within 10 seconds after starting engine (ignition switch is turned ON.), press intake switch for at least 5 seconds.

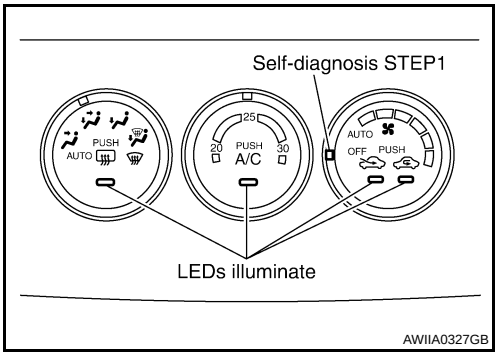
CAUTION:

If battery voltage drops below 12V during diagnosis STEP-3, door motor speed becomes slower and as a result, the system may generate an error even when operation is usual. To avoid this, start engine before performing this diagnosis.

>> GO TO 2.

2. STEP-1: LEDS ARE CHECKED

1. Check rear defogger switch, A/C switch and intake switch LEDs illumination.
2. Check indicator LEDs illumination.



OK or NG

OK >> GO TO 3.

NG >> • Does not illuminate rear defogger switch, A/C switch and intake switch LEDs illumination. Refer to HAC-311, "Self-Diagnosis".

3. STEP-2: CHECK TO ADVANCE SELF-DIAGNOSIS STEP-2

Turn blower control dial to AUTO position.

CAUTION:

When switched to STEP-2, LEDs of FRE and REC position blinks for approximately 5 seconds.

Check intake switch (FRE, REC) indicator LEDs illumination

OK >> GO TO 4.

NG >> Replace front air control (Blower control dial is malfunctioning.)

4. CHECK TO RETURN SELF-DIAGNOSIS STEP-1

Turn blower control dial to OFF position.

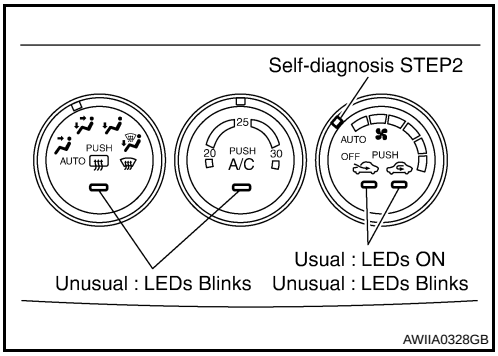
Return to self-diagnosis STEP-1?

YES >> GO TO 5.

NO >> Replace front air control (Blower control dial is malfunctioning.)

5. STEP-2: SENSOR CIRCUIT ARE CHECKED

1. Turn blower control dial to AUTO position.
   CAUTION:
   When switched to STEP-2, LEDs of FRE and REC position blinks for approximately 5 seconds.
2. Check intake switch (FRE, REC) indicator LEDs illumination.



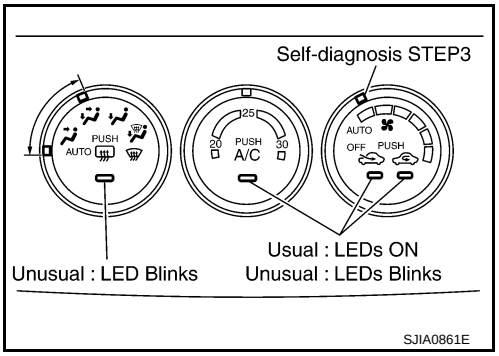
OK or NG

OK >> GO TO 6.

NG >> GO TO 9.

6. STEP-3: AIR MIX DOOR AND MODE DOOR MOTOR ARE CHECKED

1. Turn mode control dial to AUTO, VENT or B/L position. (Except for FOOT, D/F and DEF position)
2. Turn blower control dial to 1st position.
3. LEDs for A/C switch and intake switch blink for approximately 5 seconds. Then evaluation results are displayed.
4. Check intake switch (FRE, REC) and A/C switch LEDs illumination.



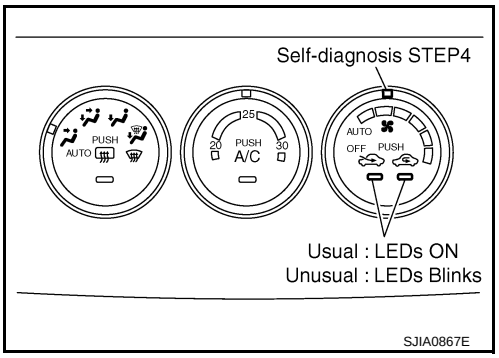
OK or NG

OK >> GO TO 7.
NG >> GO TO 10.

7. STEP-4: OPERATION OF EACH DOOR MOTOR IS CHECKED

1. Turn blower control dial to 2nd position. When switched to STEP-4, LED for intake switch (FRE, REC) turns ON.
2. Every time rear window defogger switch is pressed, output pattern shifts in following order: 1→2→3→4→5→6→1.

>> GO TO 8.



8. CHECK ACTUATORS

Confirm discharge air flow (refer to HAC-208, "Discharge Air Flow"), air temperature, blower motor voltage, and A/C compressor operation.

Item		1	2	3	4	5	6
Display (ON/Blinks)	Continuously ON						
	Blinking pattern	RR DEF 1 blinks	RR DEF 2 blinks	RR DEF 3 blinks	RR DEF 4 blinks	RR DEF 5 blinks	RR DEF 6 blinks
Mode door		VENT	B/L	B/L	FOOT	D/F	DEF
Intake door		REC	REC	20% FRE	80% FRE	FRE	FRE
Air mix door		FULL COLD	FULL COLD	MED (50%)	MED (50%)	FULL HOT	FULL HOT
Blower motor (Voltage)		5V	10.5V	8.5V	8.5V	8.5V	Battery voltage
Compressor		ON	ON	ON	OFF	OFF	ON

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Checks must be made visually, by listening to any noise, or by touching air outlets with your hand, etc. for improper operation.

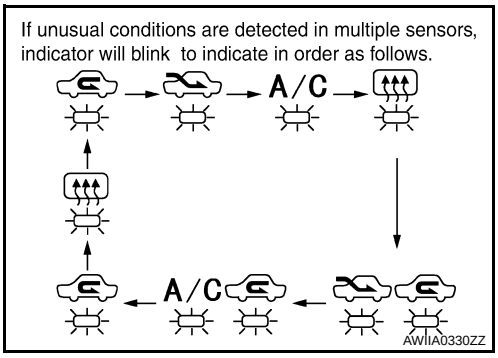
OK or NG

OK >> INSPECTION END
NG >>
- Air outlet does not change.
  Go to Mode Door Motor Circuit. Refer to HAC-222, "Mode Door Motor Diagnosis Procedure".
- Intake door does not change.
  Go to Intake Door Motor Circuit. Refer to HAC-230, "Intake Door Motor Diagnosis Procedure".
- Discharge air temperature does not change.
  Go to Air Mix Door Motor Circuit. Refer to HAC-226, "Air Mix Door Motor Diagnosis Procedure".
- Blower motor operation is malfunctioning.
  Go to Blower Motor Circuit. Refer to HAC-234, "Front Blower Motor Diagnosis Procedure".
- Magnet clutch does not engage.

Go to Magnet Clutch Circuit. Refer to HAC-239, "Magnet Clutch Diagnosis Procedure".

9. CHECK MALFUNCTION SENSOR

Refer to the following chart.
*1: Perform self-diagnosis STEP-2 under sunshine.
When performing indoors, aim a light (more than 60W) at sunload sensor, otherwise LED of rear window defogger switch will illuminate despite that sunload sensor is functioning properly.



Indicator position	Malfunctioning sensor (Including circuits)	Reference page
	Ambient sensor	*2
	In-vehicle sensor	*3
A/C	Intake sensor	*4
	Sunload sensor *1	*5
	Air mix door	*6
A/C	Mode door	*7
	Intake door motor PRB	*8

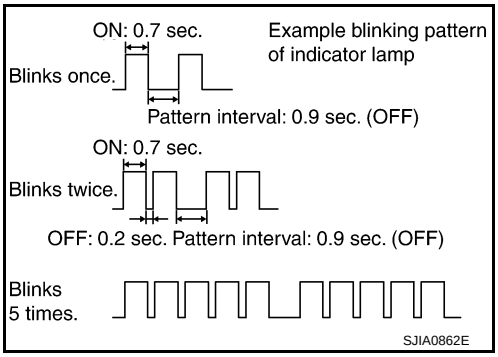
AWIIA0331GB

*2: HAC-244, "Ambient Sensor Diagnosis Procedure".
*3: HAC-247, "In-Vehicle Sensor Diagnosis Procedure".
*4: HAC-253, "Intake Sensor Diagnosis Procedure".
*5: HAC-250, "Sunload Sensor Diagnosis Procedure".
*6: HAC-226, "Air Mix Door Motor Diagnosis Procedure".
*7: HAC-222, "Mode Door Motor Diagnosis Procedure".
*8: HAC-230, "Intake Door Motor Diagnosis Procedure".
In case of a break in the ambient sensor, front air control regards ambient temperature as extreme cold (approximately –42°C or less) and then start warming.

>> INSPECTION END

10. CHECK MALFUNCTION DOOR MOTOR POSITION SWITCH

Usual: LED for A/C switch and intake switch turn ON.
Unusual: LED for malfunctioning door motor blinks. If unusual conditions are detected in multiple door motor-positions, appropriate switch LED blink twice respectively.



Door motor corresponding to the DTC

Mode control dial position	Corresponding door motor	Malfunction display for door motor terminals				
		Indicator (LED) ◎ : ON ○ : Blinks				Display pattern
			A/C			
AUTO	Usual		◎	◎	◎	Continuously ON
	Air mix door		○	○	○	
	Mode door	○	○	○		

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DTC for an inoperative harness
If a corresponding door motor blinks, set mode control dial to appropriate position to check each door motor.

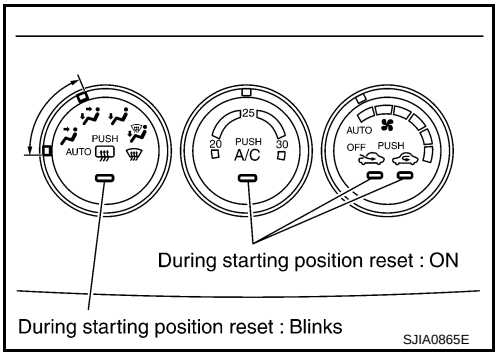
Mode control dial position	Corresponding door motor	Corresponding terminal No.		Malfunction display for door motor terminals				
		Door motor side	Front air control	Indicator (LED) ◎ : ON ○ : Blinks				Display pattern (for 2 cycles)
					A/C			
		Normal		◎		◎	◎	Continuously ON
		3	15		○	○	○	
	Air mix door	4	28		○	○	○	
		1	27		○	○	○	
		6	26		○	○	○	
		Normal		◎		◎	◎	Continuously ON
		3	33	○	○	○		
	Mode door	4	36	○	○	○		
		1	35	○	○	○		
		6	34	○	○	○		

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NOTE:
- If all four terminals of each door motor show an open circuit, there is probably a disconnected connector or an open circuit in door motor drive power supply harness.
- If a short circuit occurs in harness between terminals for each door motor drive signal, although it cannot be detected by self-diagnosis, door motor will vibrate when it operates.

Door Motor Starting Position Reset

- Pressing the rear window defogger switch during STEP-3 will send a reset signal to air mix door and mode door motor to reset them to the starting position.
  During reset: The rear window defogger switch LED will blink, (approx. 10 seconds) Intake switch and A/C switch LEDs will blink. (For approx. 6 seconds)



	Indicator (LED) ◎ : ON ○ : Blinks				Display pattern
		A/C			
Starting position reset	○	◎	◎	◎	(Only indicator for RR DEF blinks)

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OK or NG

OK >> INSPECTION END
NG >> Refer to HAC-222, "Mode Door Motor Diagnosis Procedure" or HAC-226, "Air Mix Door Motor Diagnosis Procedure".

Front Air Control Self-Diagnosis Code Chart

INFOID:0000000001547323

SELF-DIAGNOSTIC CODE CHART

Code No.	Reference page	
03	Battery voltage out of range	XXXX
30	In-vehicle sensor circuit out of range (low)	HAC-247, "In-Vehicle Sensor Diagnosis Procedure"
31	In-vehicle sensor circuit out of range (high)	
40	Ambient sensor circuit short	HAC-244, "Ambient Sensor Diagnosis Procedure"
41	Ambient sensor circuit open	
50	Optical sensor (Driver) circuit open or short	HAC-250, "Sunload Sensor Diagnosis Procedure"
52	Optical sensor (Passenger) circuit open or short	
56	Intake sensor circuit short	HAC-253, "Intake Sensor Diagnosis Procedure"
57	Intake sensor circuit open	
80	CAN bus fault	LAN-22, "Trouble Diagnosis Flow Chart"

COMPONENT DIAGNOSIS

MODE DOOR MOTOR

System Description

INFOID:0000000001547326

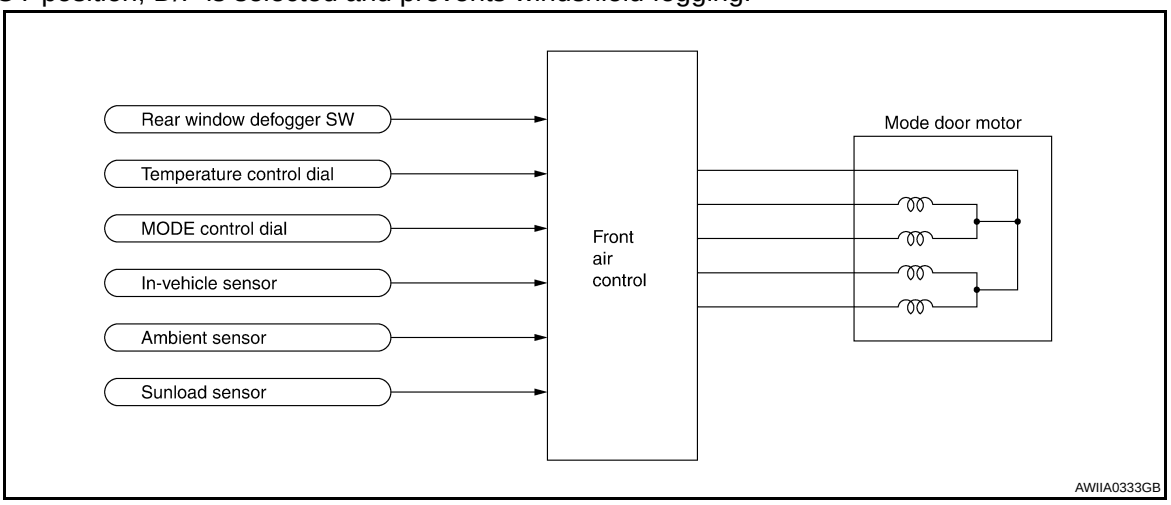
SYSTEM DESCRIPTION

Component Parts

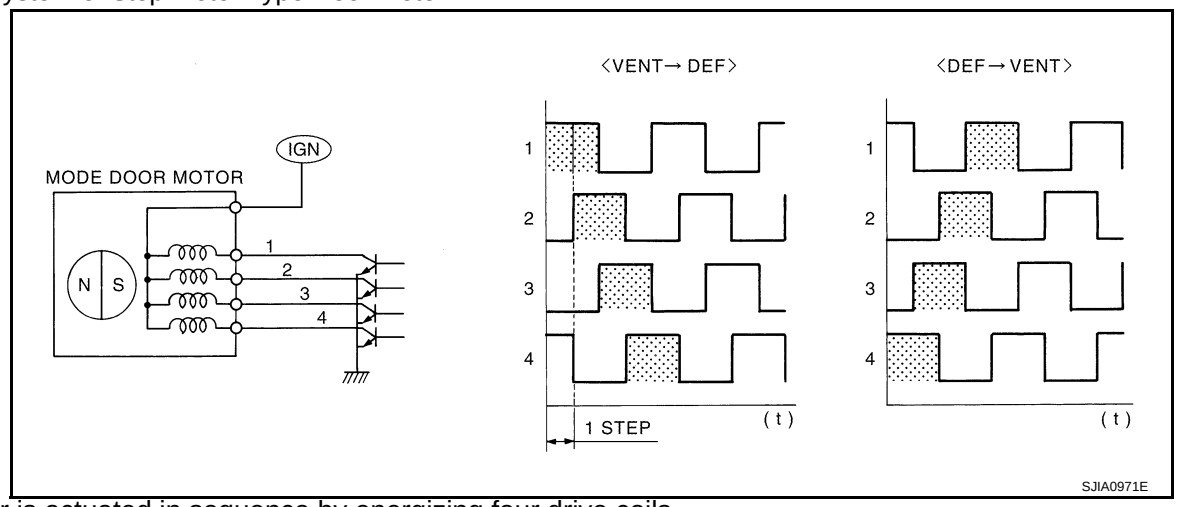
Mode door control system components are:
- Front air control
- Mode door motor
- In-vehicle sensor
- Ambient sensor
- Sunload sensor

System Operation

The front air control receives data from each of the sensors. When a drive signal is input from front air control to door motor, a step motor built into the door motor rotates according to the drive signal, and then stops at the position of target door.
Mode door changes to manual select mode by turning mode control dial of the controller. That allows mode door to be fixed.
Pressing AUTO switch allows automatic control by front air control, and mode door is fixed in the FOOT position by pressing OFF switch.
During automatic operation of mode door, mode door position (VENT, B/L, FOOT) is selected according to the temperature of blow-off wind calculated by front air control based on the target opening angle of air mix door and the amount of solar radiation. And only when ambient temperature is extremely low with the mode door in the FOOT position, D/F is selected and prevents windshield fogging.

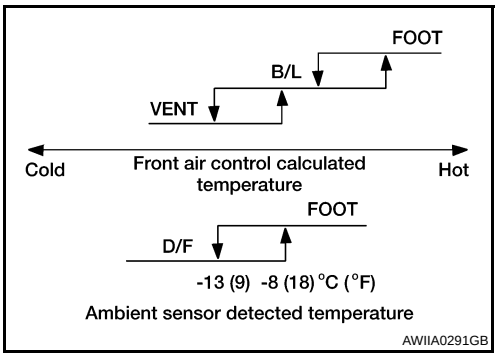


Drive System of Step Motor Type Door Motor



- Motor is actuated in sequence by energizing four drive coils.
- Rotation direction can be changed by changing pattern of excitation.

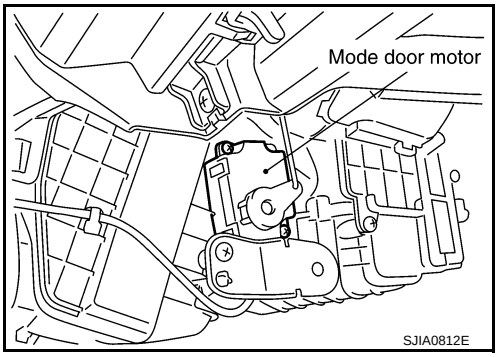
Mode Door Control Specification



COMPONENT DESCRIPTION

Mode Door Motor

The mode door motor is attached to the A/C unit assembly. It rotates so that air is discharged from the outlet set by the front air control Motor rotation is conveyed to a link which activates the mode door.



Mode Door Motor Component Function Check

INFOID:0000000001547327

INSPECTION FLOW

1. CONFIRM SYMPTOM BY PERFORMING OPERATIONAL CHECK - DISCHARGE AIR

1. Turn mode control dial to each position.
2. Confirm that discharge air comes out according to the air distribution table. Refer to HAC-208, "Discharge Air Flow".

NOTE:

Confirm that the compressor clutch is engaged (visual inspection) and intake door position is at FRESH when DEF ( ) or D/F ( ) is selected.

Can a symptom be duplicated?

YES >> GO TO 3.

NO >> GO TO 2.

2. PERFORM COMPLETE OPERATIONAL CHECK

Perform a complete operational check and check for any symptoms. Refer to HAC-202, "Operational Check".

Can a symptom be duplicated?

YES >> Refer to HAC-201, "How to Perform Trouble Diagnosis For Quick And Accurate Repair".
NO >> System OK.

3. CHECK FOR SERVICE BULLETINS

Check for any service bulletins.

>> GO TO 4.

4. PERFORM SELF-DIAGNOSIS.

Set in Self-diagnostic mode. Refer to HAC-213, "Front Air Control Self-Diagnosis".

Are any self-diagnosis codes present?

YES >> Repair as necessary.
NO >> GO TO 5.

5. CHECK MODE DOOR OPERATION

Check and verify mode door mechanism for smooth operation in each mode.

YES or NO

YES >> GO TO 6
NO >> Repair as necessary.

6. CHECK AMBIENT SENSOR CIRCUIT

Perform diagnostic procedure for the ambient sensor. Refer to HAC-244, "Ambient Sensor Diagnosis Procedure".

YES or NO

YES >> GO TO 7
NO >> Repair as necessary.

7. CHECK IN-VEHICLE SENSOR CIRCUIT

Perform diagnostic procedure for the in-vehicle sensor circuit. Refer to HAC-247, "In-Vehicle Sensor Diagnosis Procedure".

YES or NO

YES >> GO TO 8
NO >> Repair as necessary.

8. CHECK SUNLOAD SENSOR CIRCUIT

Perform diagnostic procedure for the sunload sensor circuit. Refer to HAC-250, "Sunload Sensor Diagnosis Procedure" .

YES or NO

YES >> GO TO 9
NO >> Repair as necessary.

9. CHECK INTAKE SENSOR CIRCUIT

Perform diagnostic procedure for the intake sensor circuit. Refer to HAC-253, "Intake Sensor Diagnosis Procedure".

YES or NO

YES >> GO TO 10
NO >> Repair as necessary.

10. CHECK AIR MIX DOOR MOTOR PBR CIRCUIT

Perform diagnostic procedure for the air mix door circuit. Refer to HAC-226, "Air Mix Door Motor Diagnosis Procedure".

YES or NO

YES >> GO TO 11
NO >> Repair as necessary.

11. RECHECK FOR SYMPTOMS

Perform a complete operational check and check for any symptoms. Refer to HAC-202, "Operational Check".

Does another symptom exist?

YES >> Repair as necessary.
NO >> Replace front air control . Refer to XXXX.

Mode Door Motor Diagnosis Procedure

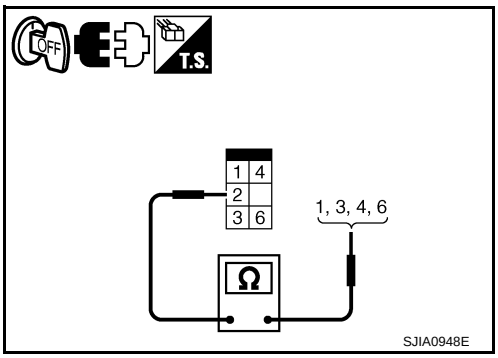
INFOID:0000000001547328

SYMPTOM:
- Air outlet does not change.
- Mode door motor does not operate normally.

DIAGNOSTIC PROCEDURE FOR MODE DOOR MOTOR

1. CHECK MODE DOOR MOTOR

1. Turn ignition switch OFF.
2. Disconnect mode door motor harness connector.
3. Check continuity between mode door motor terminals.



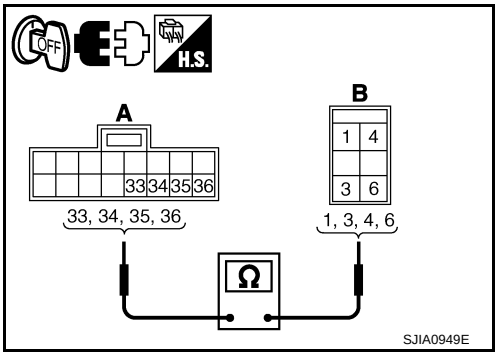
Connector	Terminals		Continuity
Mode door motor: M72	2	1	Yes
		3	
		4	
		6	

OK or NG

OK >> GO TO 2.
NG >> Replace mode door motor.

2. CHECK CIRCUIT CONTINUITY BETWEEN FRONT AIR CONTROL AND MODE DOOR MOTOR

1. Disconnect front air control harness connector.
2. Check continuity between front air control harness connector M86 (A) terminals and mode door motor harness connector M87 (B) terminals.



A		B		Continuity
Connector	Terminal	Connector	Terminal	
Front air control: M86	33	Mode door motor: M87	3	Yes
	34		6	
	35		1	
	36		4	

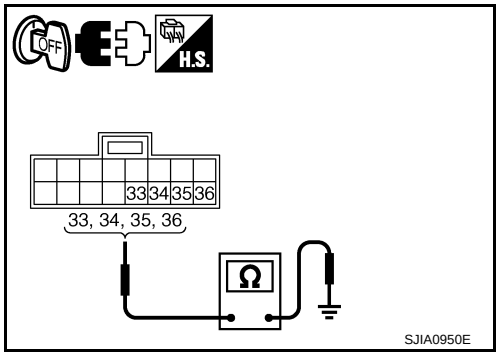
OK or NG

OK >> GO TO 3.
NG >> Repair harness or connector.

3. CHECK CIRCUIT CONTINUITY BETWEEN FRONT AIR CONTROL AND GROUND

Check continuity between front air control harness connector and ground.

Connector	Terminal		Continuity
Front air control: M86	33	Ground	No
	34		
	35		
	36		



OK or NG

OK >> Replace front air control. Refer to XXXX
NG >> Repair harness or connector.

AIR MIX DOOR MOTOR

System Description

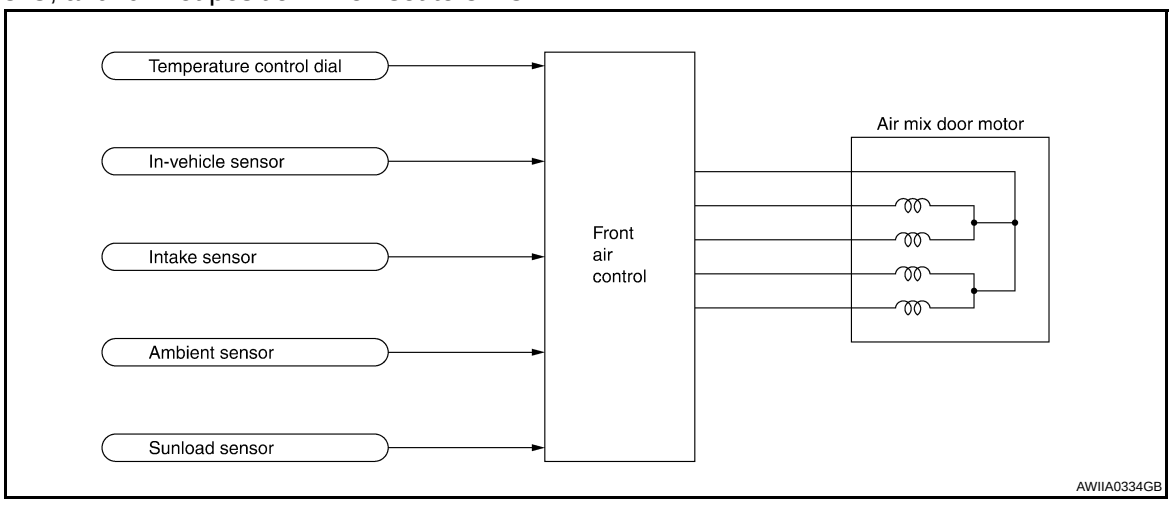
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SYSTEM DESCRIPTION

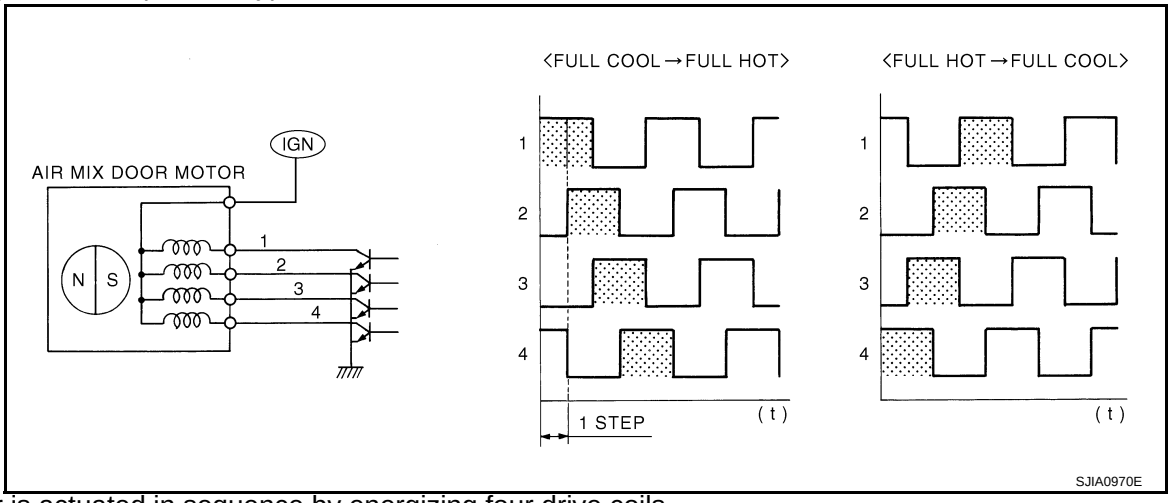
Component Parts

Air mix door control system components are:
- Front air control
- Air mix door motor
- In-vehicle sensor
- Intake sensor
- Ambient sensor
- Sunload sensor

System Operation
The front air control receives data from each of the sensors. When setting a target temperature by using temperature button, front air control corrects preset temperature, performs an arithmetical operation based on signals from sensors and determines opening angle of target air mix door.
Air mix door is constantly controlled so as to keep optimum opening angle of air mix door based on target and present opening angles of air mix door. Air mix door is fixed in the full cold position when preset temperature is set to 18°C, and full hot position when set to 32°C.

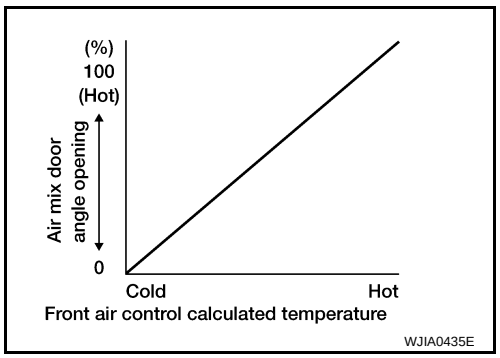


Drive System of Step Motor Type Door Motor



- Motor is actuated in sequence by energizing four drive coils.
- Rotation direction can be changed by changing pattern of excitation.

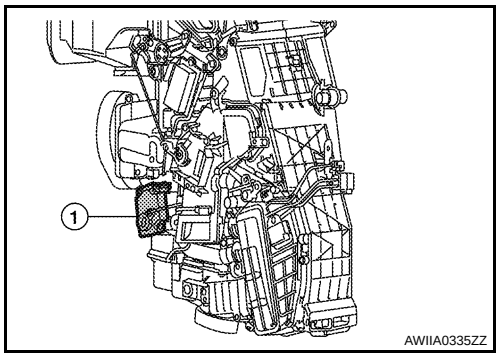
Air Mix Door Control Specification



COMPONENT DESCRIPTION

Air Mix Door Motor

The air mix door motor is attached to the A/C unit assembly. It rotates so that the air mix door is opened or closed to a position set by the front air control. Motor rotation is conveyed through a shaft and the air mix door position is then feedback to the front air control by PBR built-in air mix door motor.



Air Mix Door Motor Component Function Check

INFOID:0000000001547330

INSPECTION FLOW

1. CONFIRM SYMPTOM BY PERFORMING OPERATIONAL CHECK - TEMPERATURE INCREASE

1. Turn the temperature control dial clockwise until 32°C (90°F) is displayed.
2. Check for hot air at discharge air outlets.

>> GO TO 2.

2. CONFIRM SYMPTOM BY PERFORMING OPERATIONAL CHECK - TEMPERATURE DECREASE

1. Turn the temperature control dial counterclockwise until 18°C (64°F) is displayed.
2. Check for cold air at discharge air outlets.

Can a symptom be duplicated?

YES >> GO TO 4.
NO >> GO TO 3.

3. PERFORM COMPLETE OPERATIONAL CHECK

Perform a complete operational check and check for any symptoms. Refer to HAC-202, "Operational Check".

Can a symptom be duplicated?

YES >> Refer to HAC-201, "How to Perform Trouble Diagnosis For Quick And Accurate Repair".
NO >> System OK.

4. CHECK FOR SERVICE BULLETINS

Check for any service bulletins.

>> GO TO 4.

5. PERFORM SELF-DIAGNOSIS.

Set in Self-diagnostic mode. Refer to HAC-213, "Front Air Control Self-Diagnosis".

Are any self-diagnosis codes present?

YES >> Repair as necessary.
NO >> GO TO 5.

6. CHECK AMBIENT SENSOR CIRCUIT

Perform diagnostic procedure for the ambient sensor circuit. Refer to HAC-244, "Ambient Sensor Diagnosis Procedure".

YES or NO

YES >> GO TO 7
NO >> Repair as necessary.

7. CHECK IN-VEHICLE SENSOR CIRCUIT

Perform diagnostic procedure for the in-vehicle sensor circuit. Refer to HAC-247, "In-Vehicle Sensor Diagnosis Procedure".

YES or NO

YES >> GO TO 8
NO >> Repair as necessary.

8. CHECK SUNLOAD SENSOR CIRCUIT

Perform diagnostic procedure for the sunload sensor circuit. Refer to HAC-250, "Sunload Sensor Diagnosis Procedure".

YES or NO

YES >> GO TO 9
NO >> Repair as necessary.

9. CHECK INTAKE SENSOR CIRCUIT

Perform diagnostic procedure for the intake sensor circuit. Refer to HAC-253, "Intake Sensor Diagnosis Procedure".

YES or NO

YES >> GO TO 10
NO >> Repair as necessary.

10. CHECK AIR MIX DOOR MOTOR PBR CIRCUIT

Perform diagnostic procedure for the air mix door motor PBR circuit. Refer to HAC-226, "Air Mix Door Motor Diagnosis Procedure".

YES or NO

YES >> GO TO 11
NO >> Repair as necessary.

11. RECHECK FOR SYMPTOMS

Perform a complete operational check and check for any symptoms. Refer to HAC-202, "Operational Check".

Does another symptom exist?

YES >> Repair as necessary.
NO >> Replace front air control. Refer to XXXX.

Air Mix Door Motor Diagnosis Procedure

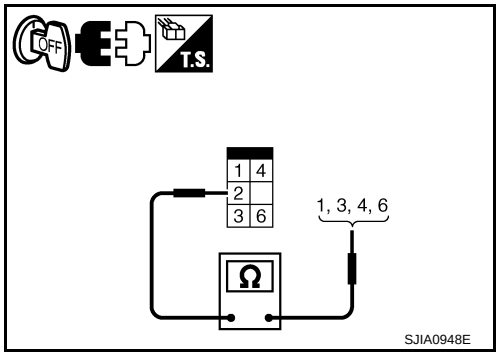
INFOID:0000000001547331

SYMPTOM:
- Discharge air temperature does not change.
- Air mix door motor does not operate.

DIAGNOSTIC PROCEDURE FOR AIR MIX DOOR MOTOR

1. CHECK AIR MIX DOOR MOTOR

1. Turn ignition switch OFF.
2. Disconnect air mix door motor harness connector.
3. Check continuity between air mix door motor terminals.



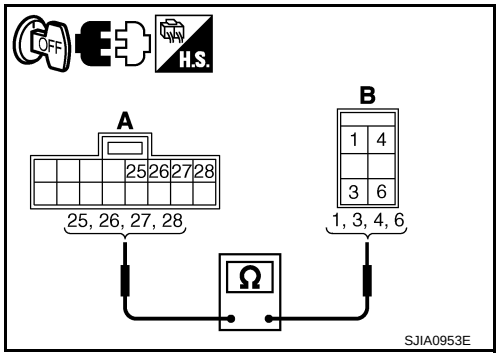
Connector	Terminals		Continuity
Air mix door motor: M88	2	1	Yes
		3	
		4	
		6	

OK or NG

OK >> GO TO 2.
NG >> Replace air mix door motor. Refer to XXXX

2. CHECK CIRCUIT CONTINUITY BETWEEN FRONT AIR CONTROL AND AIR MIX DOOR MOTOR

1. Disconnect front air control harness connector.
2. Check continuity between front air control harness connector M86 (A) terminals and air mix door motor harness connector M88 (B) terminals.



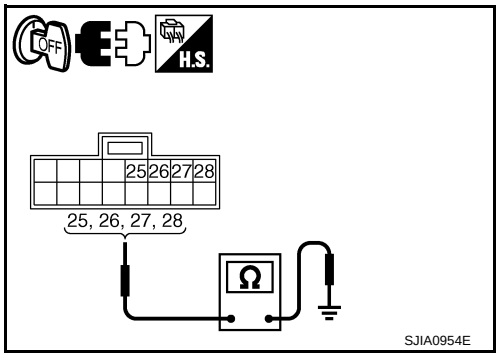
A		B		Continuity
Connector	Terminal	Connector	Terminal	
Front air control: M86	25	Air mix door motor: M88	3	Yes
	26		6	
	27		1	
	28		4	

OK or NG

OK >> GO TO 3.
NG >> Repair harness or connector.

3. CHECK CIRCUIT CONTINUITY BETWEEN FRONT AIR CONTROL AND GROUND

Check continuity between front air control harness connector and ground.



Connector	Terminal		Continuity
Front air control: M86	25	Ground	No
	26		
	27		
	28		

OK or NG

OK >> Replace front air control. Refer to XXXX
NG >> Repair harness or connector.

INTAKE DOOR MOTOR

System Description

INFOID:0000000001547333

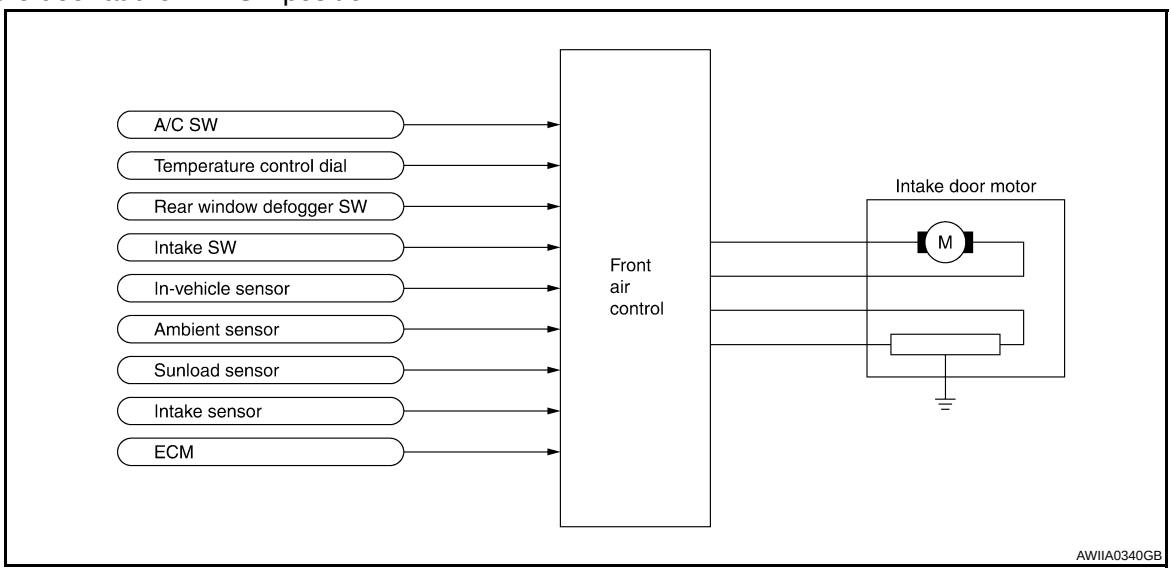
SYSTEM DESCRIPTION

Component Parts

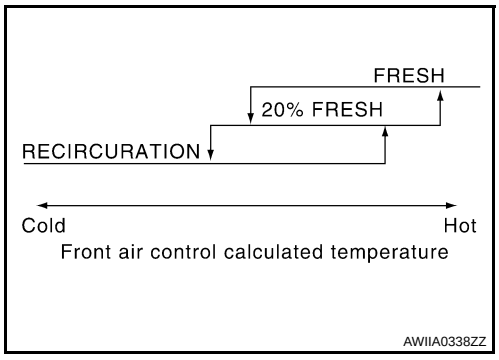
Intake door control system components are:
- Front air control
- Intake door motor
- In-vehicle sensor
- Ambient sensor
- Sunload sensor
- Intake sensor
- ECM

System Operation

The intake door control determines intake door position based on the ambient temperature, the intake air temperature and the in-vehicle temperature. When the DEF, or OFF switches are pushed, the front air control sets the intake door at the FRESH position.



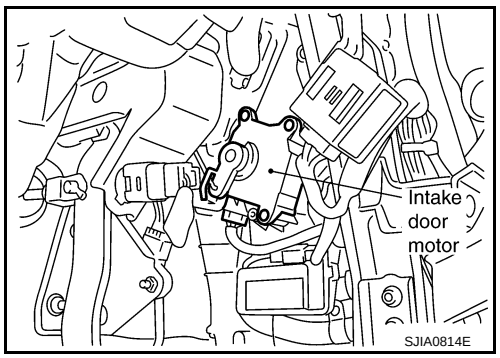
Intake Door Control Specification



COMPONENT DESCRIPTION

Intake Door Motor

The intake door motor is attached to the A/C unit assembly. It rotates so that air is drawn from inlets set by the front air control Motor rotation is conveyed to a lever which activates the intake door.



Intake Door Motor Component Function Check

INFOID:0000000001547334

INSPECTION FLOW

1. CONFIRM SYMPTOM BY PERFORMING OPERATIONAL CHECK - REC ( )

1. Turn mode control dial to vent mode( ).
2. Press REC ( ) switch. The REC ( )indicator should illuminate.
3. Press REC ( ) switch again. The REC ( ) indicator should go out.
4. Listen for intake door position change (you should hear blower sound change slightly).

Can a symptom be duplicated?

YES >> GO TO 3.
NO >> GO TO 2.

2. PERFORM COMPLETE OPERATIONAL CHECK

Perform a complete operational check and check for any symptoms. Refer to HAC-202, "Operational Check".

Can a symptom be duplicated?

YES >> Refer to HAC-201, "How to Perform Trouble Diagnosis For Quick And Accurate Repair".
NO >> System OK.

3. CHECK FOR SERVICE BULLETINS

Check for any service bulletins.

>> GO TO 4.

4. PERFORM SELF-DIAGNOSIS.

Set in Self-diagnostic mode. Refer to HAC-213, "Front Air Control Self-Diagnosis".

Are any self-diagnosis codes present?

YES >> Repair as necessary.
NO >> GO TO 5.

5. CHECK AMBIENT SENSOR CIRCUIT

Perform diagnostic procedure for the ambient sensor circuit. Refer to HAC-244, "Ambient Sensor Diagnosis Procedure".

YES or NO

YES >> GO TO 7
NO >> Repair as necessary.

6. CHECK IN-VEHICLE SENSOR CIRCUIT

Perform diagnostic procedure for the in-vehicle sensor circuit. Refer to XXXX IN-VEHICLE SENS DIAG.

YES or NO

YES >> GO TO 8
NO >> Repair as necessary.

7. CHECK SUNLOAD SENSOR CIRCUIT

Perform diagnostic procedure for the sunload sensor circuit. Refer to HAC-250, "Sunload Sensor Diagnosis Procedure".

YES or NO

YES >> GO TO 9
NO >> Repair as necessary.

8. CHECK INTAKE SENSOR CIRCUIT

Perform diagnostic procedure for the intake sensor circuit. Refer to HAC-253, "Intake Sensor Diagnosis Procedure".

YES or NO

YES >> GO TO 10
NO >> Repair as necessary.

9. CHECK AIR MIX DOOR MOTOR PBR CIRCUIT

Perform diagnostic procedure for the air mix door motor PBR circuit. Refer to HAC-226, "Air Mix Door Motor Diagnosis Procedure".

YES or NO

YES >> GO TO 11
NO >> Repair as necessary.

10. RECHECK FOR SYMPTOMS

Perform a complete operational check and check for any symptoms. Refer to XXXX.

Does another symptom exist?

YES >> Repair as necessary.
NO >> Replace front air control. Refer to XXXX.

Intake Door Motor Diagnosis Procedure

INFOID:0000000001547335

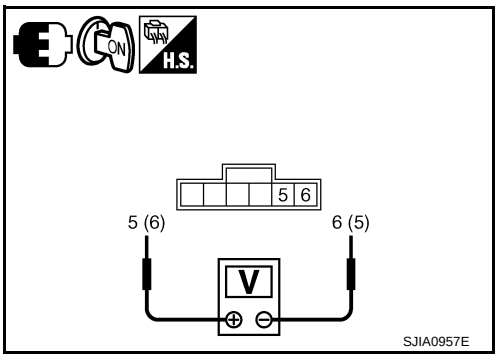
SYMPTOM:
- Intake door does not change.
- Intake door motor does not operate normally.

DIAGNOSTIC PROCEDURE FOR INTAKE DOOR MOTOR

1. CHECK POWER SUPPLY FOR INTAKE DOOR MOTOR

1. Turn ignition switch ON.
2. Check voltage between intake door motor harness connector.

Terminals			Condition	Voltage (Approx.)
Connector	Terminal			
	(+)	(–)		
Intake door motor: M89	5	6	FRE → REC	12V
	6	5	REC → FRE	

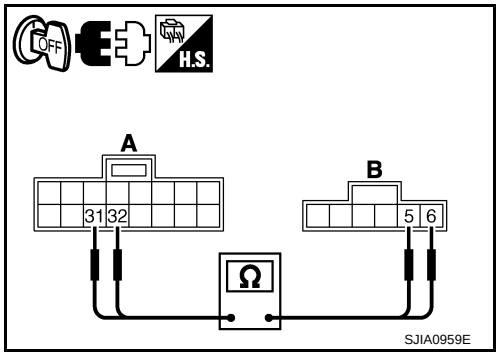


OK or NG

OK >> Replace intake door motor.
NG >> GO TO 2.

2. CHECK CIRCUIT CONTINUITY BETWEEN FRONT AIR CONTROL AND INTAKE DOOR MOTOR

1. Turn ignition switch OFF.
2. Disconnect front air control harness connector.
3. Disconnect intake door motor harness connector.
4. Check continuity between front air control harness connector (A) and intake door motor harness connector (B).



A		B		Continuity
Connector	Terminal	Connector	Terminal	
Front air control: M85	31	Intake door motor: M68	5	Yes
	32		6	

OK or NG

OK >> Replace front air control. Refer to XXXX
NG >> Repair harness or connector.

BLOWER MOTOR CONTROL SYSTEM

System Description

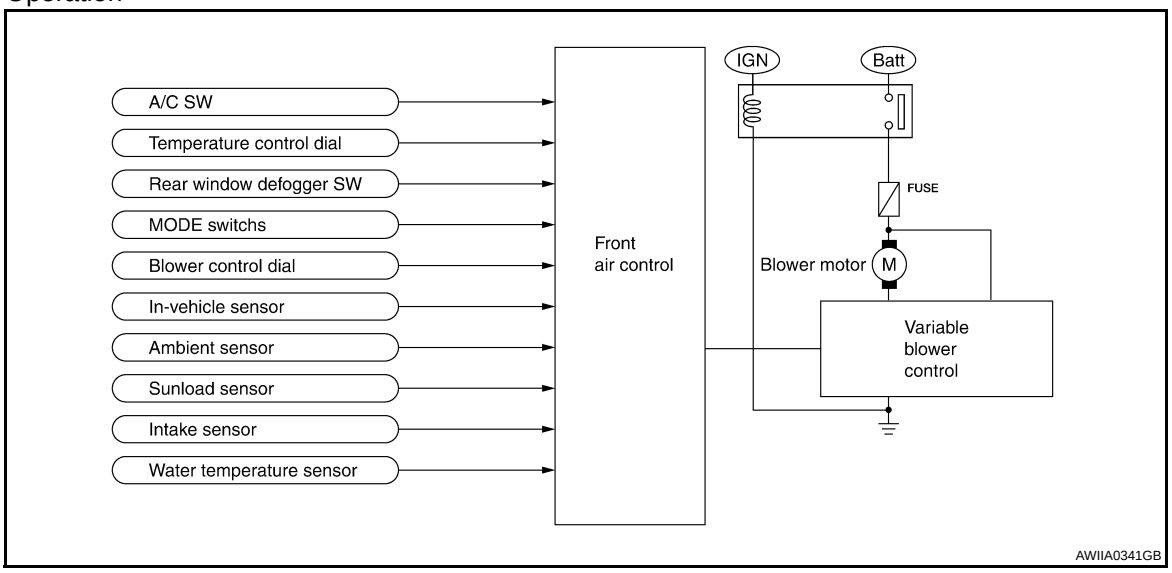
INFOID:0000000001547339

SYSTEM DESCRIPTION

Component Parts

Blower motor speed control system components are:
- Front air control
- In-vehicle sensor
- Ambient sensor
- Sunload sensor
- Intake sensor

System Operation



Automatic Mode

In the automatic mode, the blower motor speed is calculated by the front air control based on input from in-vehicle sensor, sunload sensor, intake sensor and ambient sensor.

The blower motor is applied voltage ranges from approximately 3.0 volts (lowest speed) to 12 volts (highest speed).

The control blower speed (in the range of 3.0 to 12V), front air control supplies a gate voltage to the power transistor. Based on this voltage, front air control controls voltage supplied to the blower motor.

Starting Blower Motor Speed Control

Start up from COLD SOAK Condition (Automatic mode)

In a cold start up condition where the engine coolant temperature is below 56°C, the blower will not operate for a short period of time (up to 150 seconds). The exact start delay time varies depending on the ambient and engine coolant temperature.

In the most extreme case (very low ambient) the blower starting delay will be 150 seconds as described above. After this delay, the blower will operate at low speed until the engine coolant temperature rises above 56°C, at which time the blower speed will increase to the objective speed.

Start up from usual or HOT SOAK Condition (Automatic mode)

The blower will begin operation momentarily after the A/C switch is pushed. The blower speed will gradually rise to the objective speed over a time period of 3 seconds or less (actual time depends on the objective blower speed).

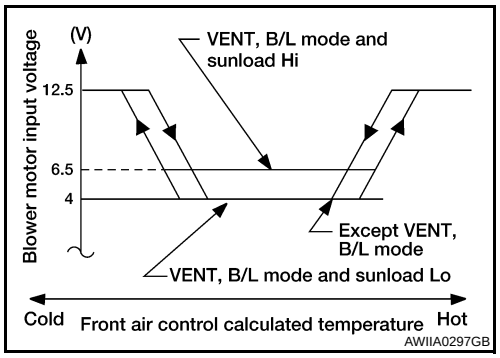
Blower Speed Compensation

Sunload

When the in-vehicle temperature and the set temperature are very close, the blower will be operating at low speed. The low speed will vary depending on the sunload. During conditions of low or no sunload, the blower

low speed is usual low speed (approx. 4.0V). During high sunload conditions, the front air control causes the blower motor speed to increase (approx. 6.5V).

Blower Motor Speed Control Specification



Front Blower Motor Component Function Check

INFOID:0000000001547340

INSPECTION FLOW

1. CONFIRM SYMPTOM BY PERFORMING OPERATIONAL CHECK - FRONT BLOWER

1. Turn the blower control dial. Blower motor should operate.
2. Rotate the blower control dial clockwise, and continue checking blower speed and fan symbol until all speeds are checked.

Can the symptom be duplicated?

YES >> GO TO 3.
NO >> GO TO 2.

2. PERFORM COMPLETE OPERATIONAL CHECK

Perform a complete operational check and check for any symptoms. Refer to HAC-202, "Operational Check".

Can a symptom be duplicated?

YES >> Refer to HAC-201, "How to Perform Trouble Diagnosis For Quick And Accurate Repair".
NO >> System OK.

3. CHECK FOR SERVICE BULLETINS

Check for any service bulletins.

>> GO TO 4.

4. PERFORM SELF-DIAGNOSIS.

Set in Self-diagnostic mode. Refer to HAC-213, "Front Air Control Self-Diagnosis".

Are any self-diagnosis codes present?

YES >> Repair as necessary.
NO >> GO TO 5.

5. CHECK AMBIENT SENSOR CIRCUIT

Perform diagnostic procedure for the ambient sensor circuit. Refer to HAC-244, "Ambient Sensor Diagnosis Procedure".

YES or NO

YES >> GO TO 6.
NO >> Repair as necessary.

6. CHECK IN-VEHICLE SENSOR CIRCUIT

Perform diagnostic procedure for the in-vehicle sensor circuit. Refer to HAC-247, "In-Vehicle Sensor Diagnosis Procedure".

YES or NO

YES >> GO TO 7.
NO >> Repair as necessary.

7. CHECK SUNLOAD SENSOR CIRCUIT

Perform diagnostic procedure for the sunload sensor circuit. Refer to HAC-250, "Sunload Sensor Diagnosis Procedure".

YES or NO

YES >> GO TO 8.
NO >> Repair as necessary.

8. CHECK INTAKE SENSOR CIRCUIT

Perform diagnostic procedure for the intake sensor circuit. Refer to HAC-253, "Intake Sensor Diagnosis Procedure".

YES or NO

YES >> GO TO 9.
NO >> Repair as necessary.

9. RECHECK FOR SYMPTOMS

Perform a complete operational check and check for any symptoms. Refer to HAC-202, "Operational Check".

Does another symptom exist?

YES >> Repair as necessary.
NO >> Replace front air control. Refer to XXXX.

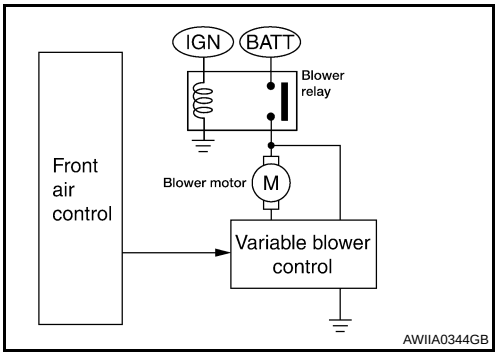
Front Blower Motor Diagnosis Procedure

INFOID:0000000001547341

SYMPTOM: Front blower motor operation is malfunctioning.

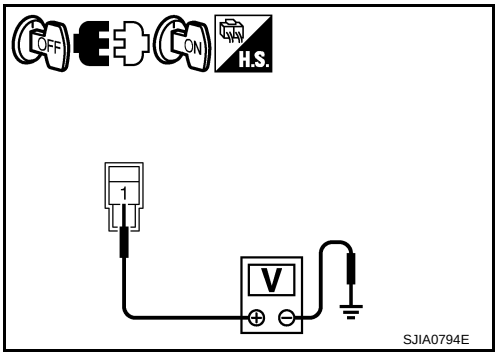
DIAGNOSTIC PROCEDURE FOR BLOWER MOTOR

SYMPTOM: Front blower motor operation is malfunctioning.



1. CHECK POWER SUPPLY FOR FRONT BLOWER MOTOR

1. Disconnect front blower motor connector.
2. Turn ignition switch ON.
3. Rotate blower control dial to maximum speed.
4. Check voltage between front blower motor harness connector M62 terminal 1 and ground.



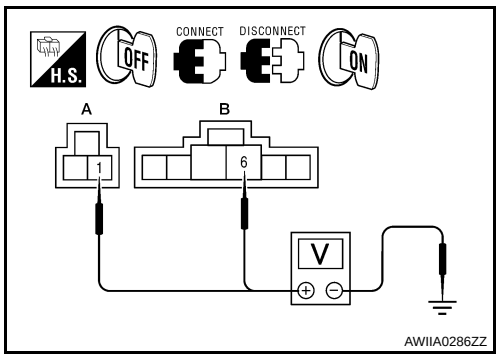
Terminals			Voltage (Approx.)
(+)		(–)	
Connector	Terminal	Ground	
Front blower motor: M62	1		Battery voltage

Is the inspection result normal

YES >> GO TO 2.
NO >> Check power supply circuit and 15A fuses (Nos. 15 and 17), located in the fuse block.
- If fuses are OK, check harness for open circuit. Repair or replace if necessary.
- If fuses are NG, replace fuse and check harness for short circuit. Repair or replace if necessary.

2. CHECK CIRCUIT POWER SUPPLY FOR VARIABLE BLOWER CONTROL

1. Turn ignition switch OFF.
2. Connect front blower motor connector.
3. Disconnect variable blower control connector.
4. Turn ignition switch ON.
5. Check voltage between variable blower control harness connectors M91 (A) terminal 1, and M90 (B) terminal 6 and ground.



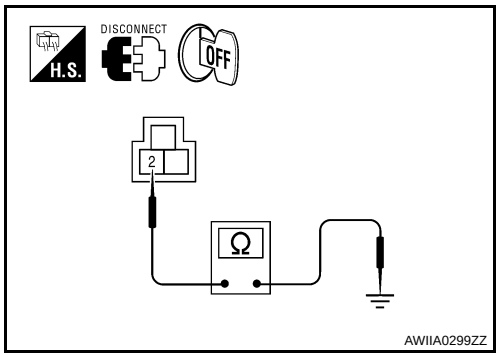
Terminals			Voltage (Approx.)
(+)		(–)	
Connector	Terminal	Ground	
Variable blower control: M91	1		Battery voltage
Variable blower control: M90	6	Ground	Battery voltage

Is the inspection result normal

YES >> GO TO 3.
NO >> • Terminal 1 - Ground: Repair harness or connector.
• Terminal 6 - Ground: GO TO 5.

3. CHECK GROUND CIRCUIT FOR VARIABLE BLOWER CONTROL

1. Turn ignition switch OFF.
2. Check continuity between variable blower control harness connector M91 terminal 2 and ground.



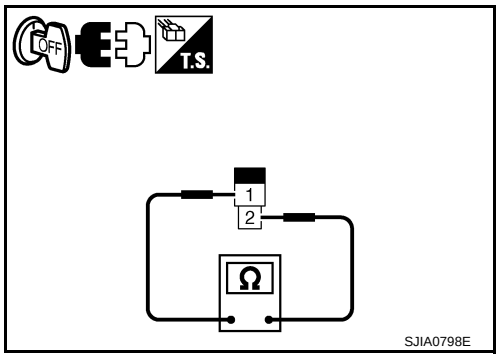
Connector	Terminal	Ground	Continuity
Variable blower control: M91	2		Yes

Is the inspection result normal

YES >> GO TO 4.
NO >> Repair harness or connector.

4. CHECK BLOWER MOTOR

1. Disconnect front blower motor connector.
2. Check continuity between front blower motor terminals.



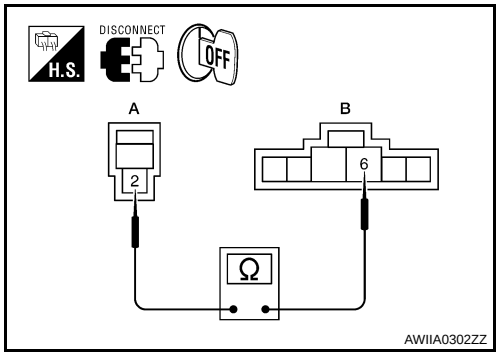
Terminals		Continuity
1	2	Yes

Is the inspection result normal

YES >> GO TO 5.
NO >> Replace blower motor. Refer to XXXX.

5. CHECK CIRCUIT CONTINUITY BETWEEN FRONT BLOWER MOTOR AND VARIABLE BLOWER CONTROL

Check continuity between front blower motor harness connector M62 (A) terminal 2 and variable blower control harness connector M90 (B) terminal 6.



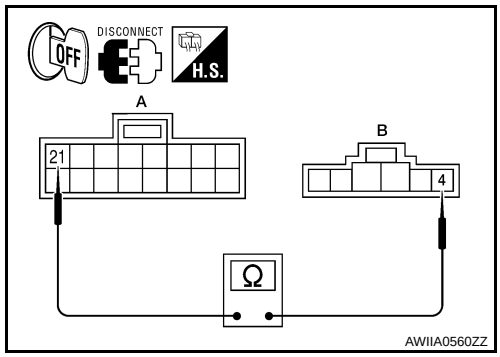
A		B		Continuity
Connector	Terminal	Connector	Terminal	
Front blower motor: M62	2	Variable blower control: M90	6	Yes

Is the inspection result normal

YES >> GO TO 6.
NO >> Repair harness or connector.

6. CHECK CIRCUIT CONTINUITY BETWEEN FRONT AIR CONTROL AND VARIABLE BLOWER CONTROL

1. Disconnect front air control connector.
2. Check continuity between front air control harness connector M85 (A) terminal 21 and variable blower control harness connector M90 (B) terminal 4.



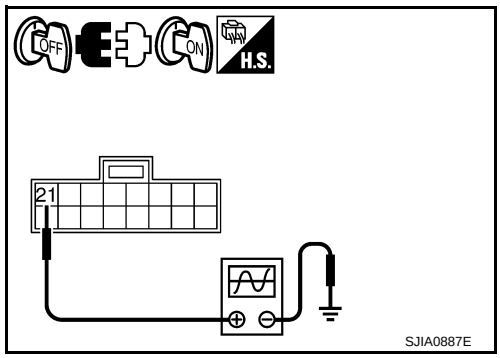
A		B		Continuity
Connector	Terminal	Connector	Terminal	
Front air control: M85	21	Variable blower control: M90	4	Yes

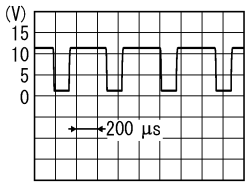
Is the inspection result normal

YES >> Replace variable blower control. Refer to XXXX
NO >> Repair harness or connector.

7. CHECK FOR FRONT AIR CONTROL OUTPUT 2

1. Reconnect the front blower motor and the variable blower control.
2. Turn ignition switch ON.
3. Check output signal between front air control harness connector M85 terminal 21 and ground.



Terminals			Condition	Voltage (Approx.)
(+)		(–)		
Connector	Terminal			
Front air control: M85	21	Ground	Blower speed: 1st	

Is the inspection result normal

YES >> Replace front air control. Refer to XXXX.
NO >> Replace variable blower control. Refer to XXXX.

Front Blower Motor Component Inspection

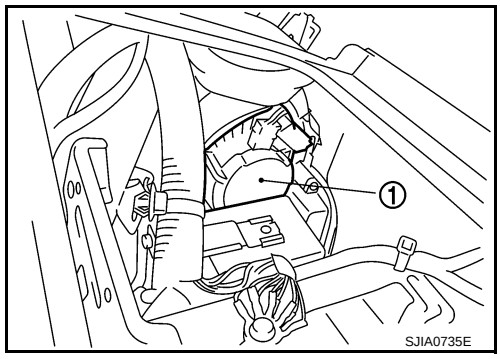
INFOID:0000000001547342

COMPONENT INSPECTION

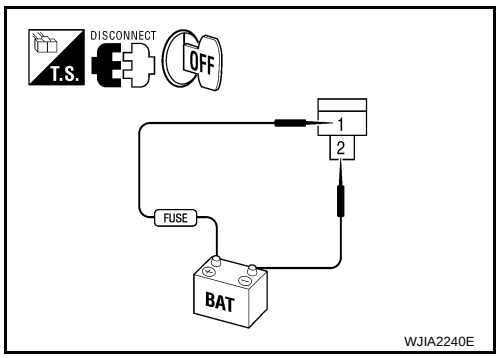
Front Blower Motor

Confirm smooth rotation of the blower motor (1).

- Ensure that there are no foreign particles inside the A/C unit assembly.

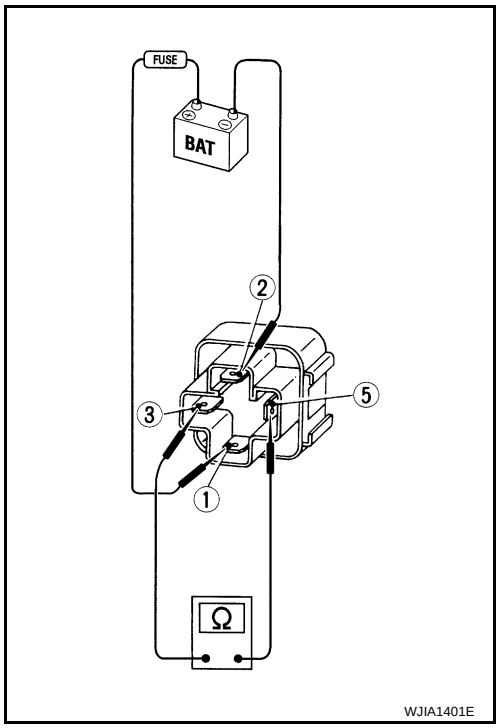


Apply 12 volts to terminal 1 and ground to terminal 2 and verify that the motor operates freely and quietly.



Blower Relay

Check continuity between terminals by supplying 12 volts and ground to coil side terminals of relay.



MAGNET CLUTCH

System Description

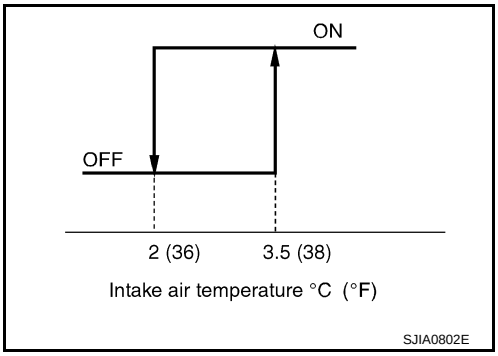
INFOID:0000000001547352

SYSTEM DESCRIPTION

Front air control controls compressor operation by intake air temperature and signal from ECM.

Low Temperature Protection Control

Front air control will turn compressor ON or OFF as determined by a signal detected by intake sensor. When intake air temperatures are higher than 3.5°C (38°F), the compressor turns ON. The compressor turns OFF when intake air temperatures are lower than 2°C (36°F).



Magnet Clutch Component Function Check

INFOID:0000000001547353

INSPECTION FLOW

1. CONFIRM SYMPTOM BY PERFORMING OPERATIONAL CHECK - MAGNET CLUTCH

1. Turn ignition switch ON.
2. Press the A/C switch.
3. Turn mode control dial to vent mode ( ). Confirm that the compressor clutch engages (sound or visual inspection). (Discharge air and blower speed will depend on ambient, in-vehicle and set temperatures.)

Can the symptom be duplicated?

YES >> GO TO 3.
NO >> GO TO 2.

2. PERFORM COMPLETE OPERATIONAL CHECK

Perform a complete operational check and check for any symptoms. Refer to HAC-202, "Operational Check".

Can a symptom be duplicated?

YES >> Refer to HAC-201, "How to Perform Trouble Diagnosis For Quick And Accurate Repair".
NO >> System OK.

3. CHECK FOR SERVICE BULLETINS

Check for any service bulletins.

>> GO TO 4.

4. PERFORM SELF-DIAGNOSIS.

Set in Self-diagnostic mode. Refer to HAC-213, "Front Air Control Self-Diagnosis".

Are any self-diagnosis codes present?

YES >> Repair as necessary.
NO >> GO TO 5.

5. CHECK AMBIENT SENSOR CIRCUIT

Perform diagnostic procedure for the mode door motor. Refer to HAC-244, "Ambient Sensor Diagnosis Procedure".

YES or NO

YES >> GO TO 6.
NO >> Repair as necessary.

6. CHECK INTAKE SENSOR CIRCUIT

Perform diagnostic procedure for the intake sensor circuit. Refer to HAC-253, "Intake Sensor Diagnosis Procedure".

YES or NO

YES >> GO TO 7.
NO >> Repair as necessary.

7. RECHECK FOR SYMPTOMS

Perform a complete operational check and check for any symptoms. Refer to HAC-202, "Operational Check".

Does another symptom exist?

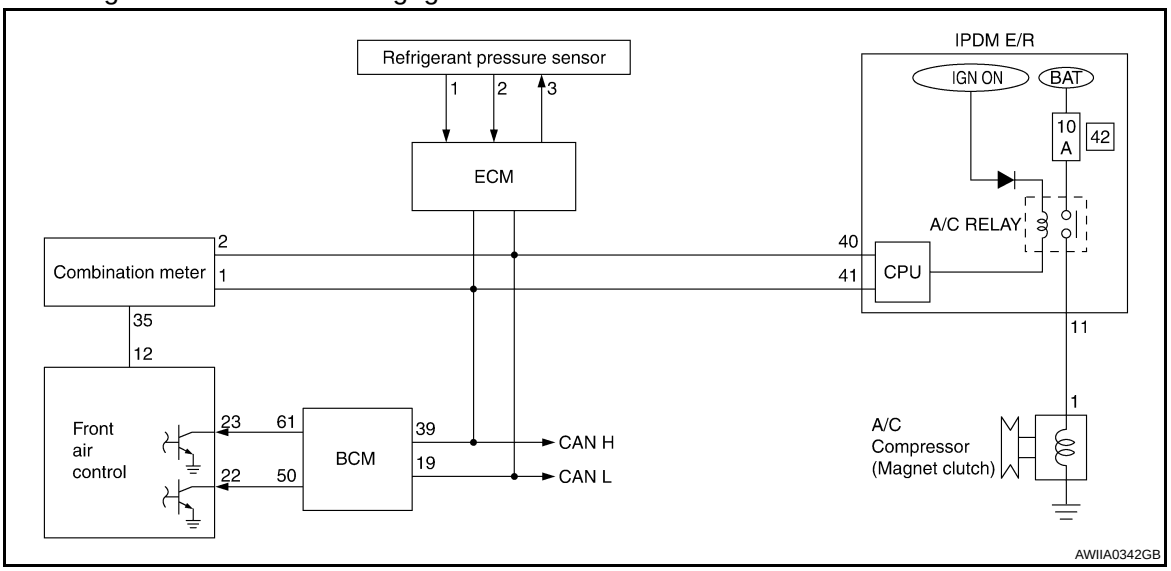
YES >> Repair as necessary.
NO >> Replace front air control. Refer to XXXX.

Magnet Clutch Diagnosis Procedure

INFOID:0000000001547354

DIAGNOSTIC PROCEDURE FOR MAGNET CLUTCH

SYMPTOM: Magnet clutch does not engage when A/C switch is ON.



1. CHECK INTAKE SENSOR CIRCUIT

Refer to HAC-253, "Intake Sensor Diagnosis Procedure".

Is the inspection result normal

YES >> GO TO 2.
NO >> Malfunctioning intake sensor: Refer to XX.

2. PERFORM AUTO ACTIVE TEST

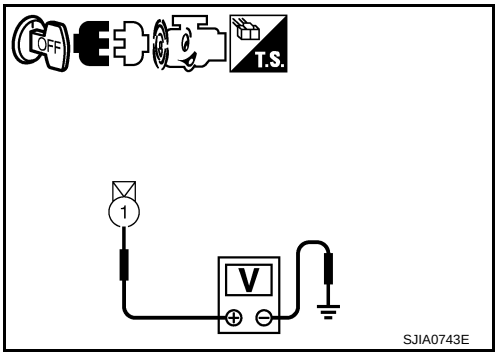
Refer to XX.

Does the magnet clutch operate?

YES >> • WITH CONSULT-III
GO TO 6.
• WITHOUT CONSULT-III
GO TO 7.
NO >> GO TO 3.

3. CHECK POWER SUPPLY FOR MAGNET CLUTCH

1. Turn ignition switch OFF.
2. Disconnect A/C compressor connector.
3. Start the engine.
4. Press AUTO switch and A/C switch ON.
5. Check voltage between A/C compressor harness connector F3 terminal 1 and ground.



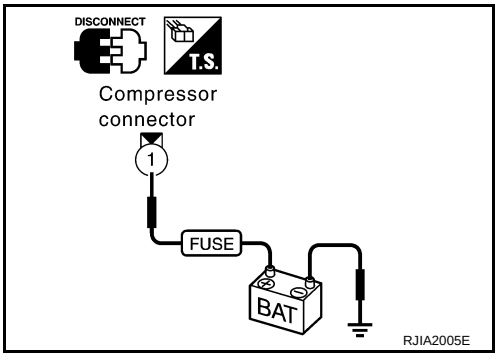
Terminals			Voltage (Approx.)
(+)		(–)	
Connector	Terminal	Ground	
Compressor: F3	1		12V

Is the inspection result normal

YES >> Replace A/C compressor. Refer to XX.
NO >> Check 10A fuse (No. 42), located in the IPDM ER.
- If fuse is OK, GO TO 4.
- If fuse is NG, replace fuse and check harness for short circuit. Repair or replace if necessary.

4. CHECK MAGNET CLUTCH

Check for operation sound when applying battery voltage direct current to terminal.

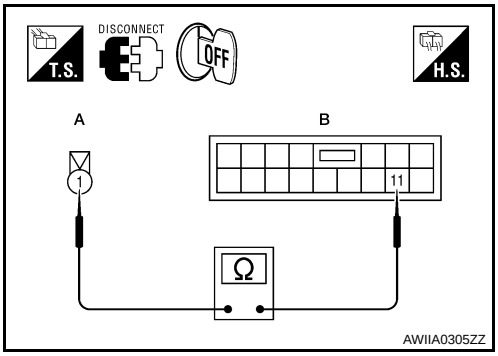


Is the inspection result normal?

OK >> GO TO 5.
NO >> Replace A/C compressor. Refer to XX.

5. CHECK CIRCUIT CONTINUITY BETWEEN IPDM E/R AND COMPRESSOR

1. Turn ignition switch OFF.
2. Disconnect IPDM E/R connector.
3. Check continuity between A/C compressor harness connector F3 (A) terminal 1 and IPDM E/R harness connector E43 (B) terminal 11.



A		B		Continuity
Connector	Terminal	Connector	Terminal	
Compressor: F3	1	IPDM E/R: E43	11	Yes

Is the inspection result normal

YES >> Replace IPDM E/R. Refer to XX.
NO >> Repair harness or connector.

6. CHECK BCM INPUT (A/C COMPRESSOR ON) SIGNAL

Check A/C compressor ON/OFF signal. Refer to HAC-212, "CONSULT-III Function (BCM)".

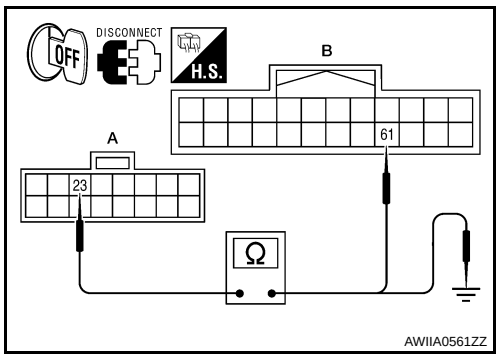
A/C SW ON : AIR COND SW ON
A/C SW OFF : AIR COND SW OFF

Is the inspection result normal

YES >> GO TO 9.
NO >> GO TO 7.

7. CHECK CIRCUIT CONTINUITY BETWEEN FRONT AIR CONTROL AND BCM.

1. Turn ignition switch OFF.
2. Disconnect front air control connector and BCM connector.
3. Check continuity between front air control harness connector M85 (A) terminal 23 and BCM harness connector M19 (B) terminal 61.



A		B		Continuity
Connector	Terminal	Connector	Terminal	
Front air control: M85	23	BCM: M19	61	Yes

4. Check continuity between front air control harness connector M85 (A) terminal 23 and ground.

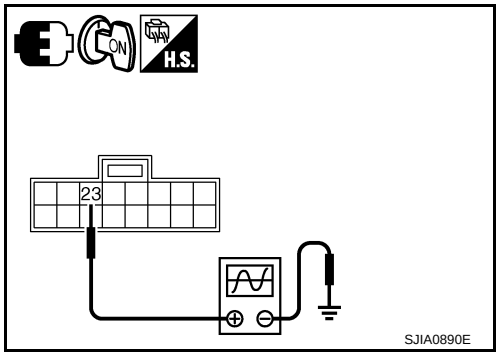
A		Ground	Continuity
Connector	Terminal		
Front air control: M85	23		No

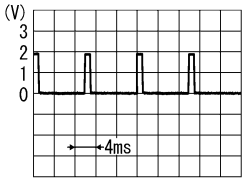
Is the inspection result normal

YES >> GO TO 8.
NO >> Repair harness or connector.

8. CHECK VOLTAGE FOR FRONT AIR CONTROL (A/C COMPRESSOR ON SIGNAL)

1. Reconnect front air control connector and BCM connector.
2. Turn ignition switch ON.
3. Confirm A/C compressor ON signal between front air control harness connector M85 terminal 23 and ground using oscilloscope.



Terminals			Condition	Voltage (Approx.)
(+)		(-)		
connector	Terminal			
Front air control: M85	23	Ground	A/C switch: ON (Blower motor operates.)	

Is the inspection result normal

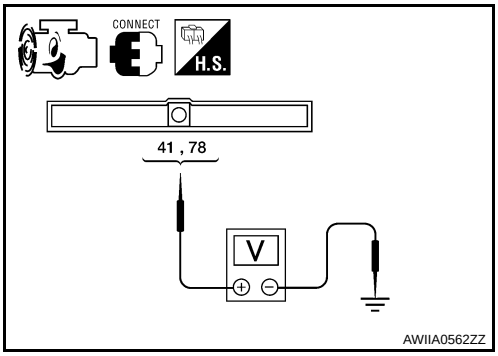
YES >> GO TO 9.
NO >> Replace front air control. Refer to XXXX.

9. CHECK REFRIGERANT PRESSURE SENSOR

WITH CONSULT-III
1. Start the engine.
2. Check the voltage of refrigerant pressure sensor.

WITHOUT CONSULT-III

1. Start the engine.
2. Check voltage between ECM harness connector F11 and ground.



Terminals			Condition	Voltage (Approx.)
(+)		(-)		
Connector	Terminal			
ECM: F11	41 without diesel	Ground	A/C switch: ON (Blower motor operates.)	1-4V
	78 with diesel			

Is the inspection result normal

YES >> • WITH CONSULT-III
GO TO 10.
• WITHOUT CONSULT-III
GO TO 11.

NO >> Refer to XX-XX, "*****" (HR16DE W/EURO-OBD), XX-XX, "*****" (HR16DE W/O EURO-OBD), EC-988, "Component Function Check" (MR18DE W/EURO-OBD), XX-XX, "*****" (MR18DE W/O DURO-OBD) or EC-1166, "Diagnosis Procedure" (K9K).

10. CHECK BCM INPUT (FAN ON) SIGNAL

Check FAN ON/OFF signal. Refer to HAC-212, "CONSULT-III Function (BCM)".

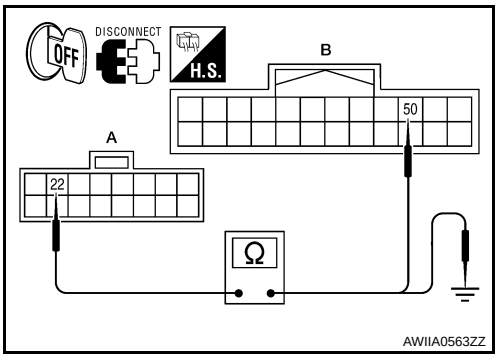
FAN SW ON : FAN ON SIG ON
FAN SW OFF : FAN ON SIG OFF

Is the inspection result normal

YES >> GO TO 13.
NO >> GO TO 11.

11. CHECK CIRCUIT CONTINUITY BETWEEN FRONT AIR CONTROL AND BCM

1. Turn ignition switch OFF.
2. Disconnect front air control connector and BCM connector.
3. Check continuity between front air control harness connector M85 (A) terminal 22 and BCM harness connector M19 (B) terminal 61.



A		B		Continuity
Connector	Terminal	Connector	Terminal	
Front air control: M85	22	BCM: M19	50	Yes

4. Check continuity between front air control harness connector M85 (A) terminal 22 and ground.

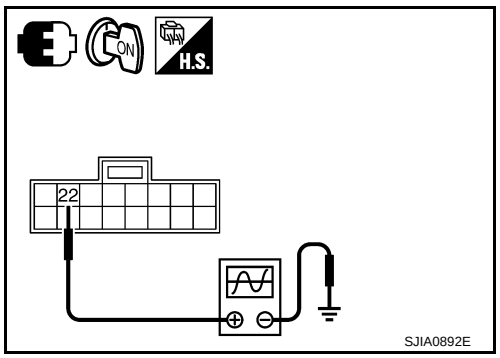
A		Ground	Continuity
Connector	Terminal		
Front air control: M85	22		No

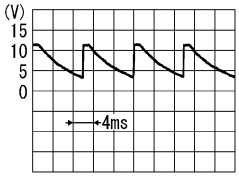
Is the inspection result normal

YES >> GO TO 12.
NO >> Repair harness or connector.

12. CHECK VOLTAGE FOR FRONT AIR CONTROL (FAN ON SIGNAL)

1. Reconnect front air control connector and BCM connector.
2. Turn ignition switch ON.
3. Confirm fan ON signal between front air control harness connector M85 terminal 22 and ground using oscilloscope.



Terminals			Condition	Output waveform
(+)		(–)		
Connector	Terminal			
Front air control: M85	22	Ground	blower speed: 1st	

ZJIA0583J

Is the inspection result normal

YES >> Replace front air control. Refer to XXXX.
NO >> Replace BCM. Refer to XXXX.

13. CHECK CAN COMMUNICATION

Check CAN communication. Refer to LAN-22, "Trouble Diagnosis Flow Chart"

- BCM – ECM
- ECM – IPDM E/R

Is the inspection result normal

YES >> INSPECTION END
NO >> Repair or replace malfunction part(s).

AMBIENT SENSOR

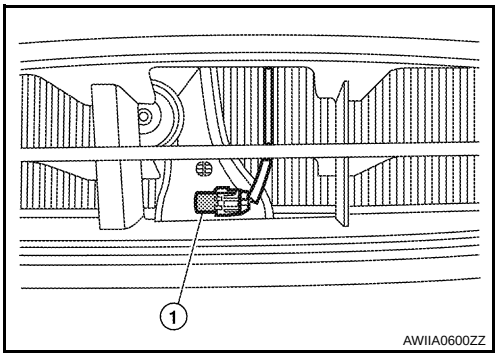
Component Description

INFOID:0000000001547357

COMPONENT DESCRIPTION

Ambient Sensor

The ambient sensor is attached on the radiator core support upper. It detects ambient temperature and converts it into a resistance value which is then input into the front air control



AMBIENT TEMPERATURE INPUT PROCESS

The front air control includes a processing circuit for the ambient sensor input. However, when the temperature detected by the ambient sensor increases quickly, the processing circuit retards the front air control function. It only allows the front air control to recognize an ambient temperature increase of 0.33°C (0.6°F) per 100 seconds.

As an example, consider stopping for a few minutes after high speed driving. Although the actual ambient temperature has not changed, the temperature detected by the ambient sensor will increase. This is because the heat from the engine compartment can radiate to the front grille area, location of the ambient sensor.

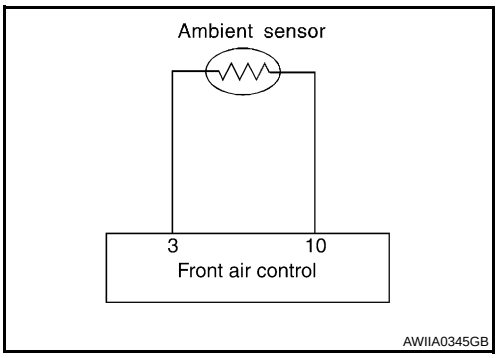
Ambient Sensor Diagnosis Procedure

INFOID:0000000001547358

DIAGNOSTIC PROCEDURE FOR AMBIENT SENSOR

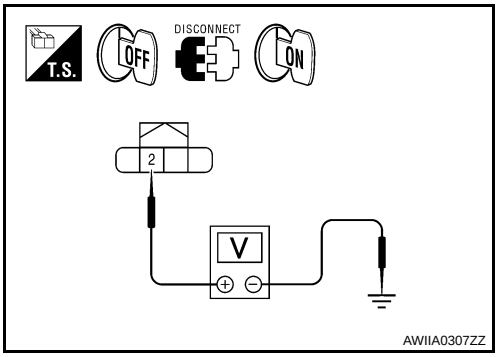
SYMPTOM: Ambient sensor circuit is open or shorted.

LEDs of intake switch (FRE, REC) does not illuminate as a result of performing self-diagnosis STEP-2.



1. CHECK VOLTAGE BETWEEN AMBIENT SENSOR AND GROUND

1. Turn ignition switch OFF.
2. Disconnect ambient sensor connector.
3. Turn ignition switch ON.
4. Check voltage between ambient sensor harness connector E60 terminal 2 and ground.



Terminals			Voltage (Approx.)
(+)		(–)	
Connector	Terminal	Ground	
Ambient sensor: E60	2		5V

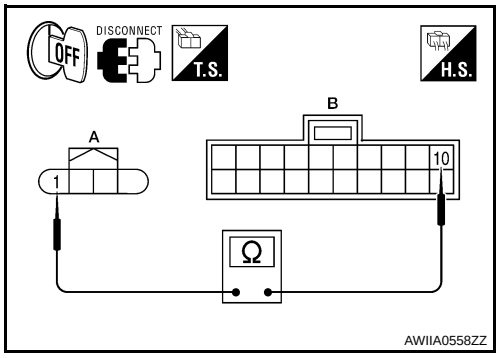
Is the inspection result normal

YES >> GO TO 2.

NO >> GO TO 4.

2.CHECK CIRCUIT CONTINUITY BETWEEN AMBIENT SENSOR AND FRONT AIR CONTROL

1. Turn ignition switch OFF.
2. Disconnect front air control connector.
3. Check continuity between ambient sensor harness connector E60 (A) terminal 1 and front air control harness connector M85 (B) terminal 3.



A		B		Continuity
Connector	Terminal	Connector	Terminal	
Ambient sensor: E60	1	Front air control: M86	10	Yes

Is the inspection result normal

YES >> GO TO 3.
NO >> Repair harness or connector.

3.CHECK AMBIENT SENSOR

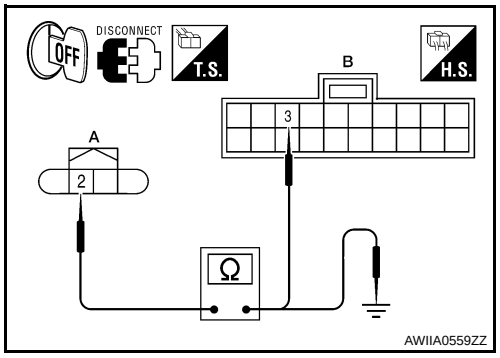
Refer to HAC-245, "Ambient Sensor Component Inspection"

Is the inspection result normal

YES >> 1. Replace front air control. Refer to XXXX
2. Go to self-diagnosis HAC-213, "Front Air Control Self-Diagnosis" and perform self-diagnosis.
NO >> 1. Replace ambient sensor.
2. Go to self-diagnosis HAC-213, "Front Air Control Self-Diagnosis" and perform self-diagnosis.

4.CHECK CIRCUIT CONTINUITY BETWEEN AMBIENT SENSOR AND FRONT AIR CONTROL

1. Turn ignition switch OFF.
2. Disconnect front air control connector.
3. Check continuity between ambient sensor harness connector E60 (A) terminal 1 and front air control harness connector M85 (B) terminal.



A		B		Continuity
Connector	Terminal	Connector	Terminal	
Ambient sensor: E60	2	Front air control: M86	3	Yes

4. Check continuity between ambient sensor harness connector (A) and ground.

A		Ground	Continuity
Connector	Terminal		
Ambient sensor: E60	2		No

Is the inspection result normal

YES >> 1. Replace front air control. Refer to XXXX.
2. Go to self-diagnosis HAC-213, "Front Air Control Self-Diagnosis" and perform self-diagnosis-.
NO >> Repair harness or connector.

Ambient Sensor Component Inspection

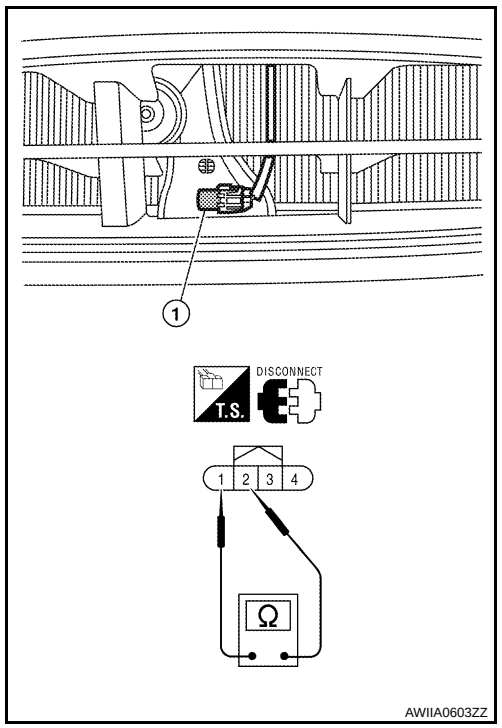
INFOID:0000000001547359

COMPONENT INSPECTION

Ambient Sensor

After disconnecting ambient sensor connector E60, measure resistance between terminals 1 and 2 at sensor side, using the table below.

Temperature °C (°F)	Resistance kΩ
–15 (5)	12.73
–10 (14)	9.92
–5 (23)	7.80
0 (32)	6.19
5 (41)	4.95
10 (50)	3.99
15 (59)	3.24
20 (68)	2.65
25 (77)	2.19
30 (86)	1.81
35 (95)	1.51
40 (104)	1.27
45 (113)	1.07



If NG, replace ambient sensor. Refer to XXXX.

IN-VEHICLE SENSOR

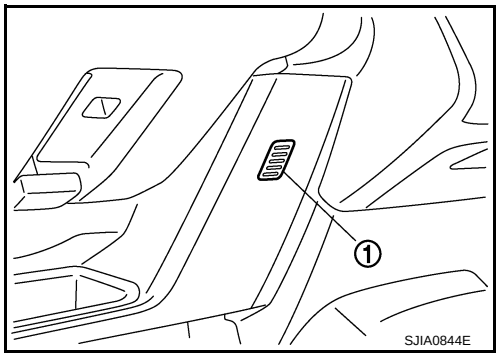
Component Description

INFOID:0000000001547360

COMPONENT DESCRIPTION

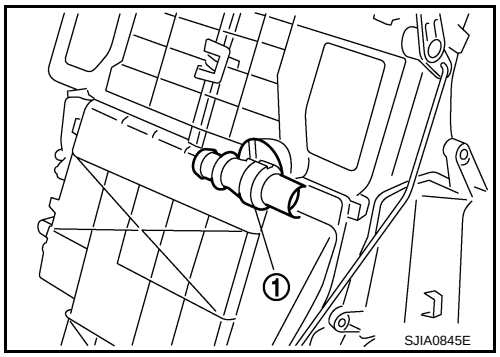
In-vehicle Sensor

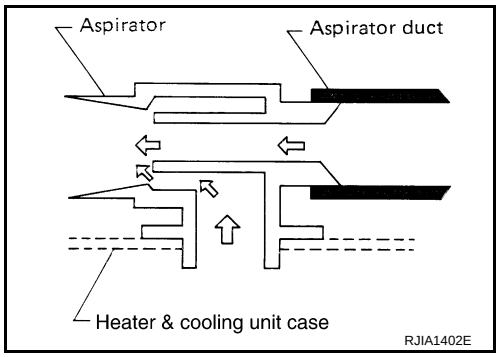
The in-vehicle sensor (1) is located on instrument lower finisher. It converts variations in temperature of compartment air drawn from the aspirator into a resistance value. It is then input into the front air control.



Aspirator

The aspirator (1) is located on passenger's side of A/C unit. It produces vacuum pressure due to air discharged from the A/C unit, continuously taking compartment air in the aspirator.





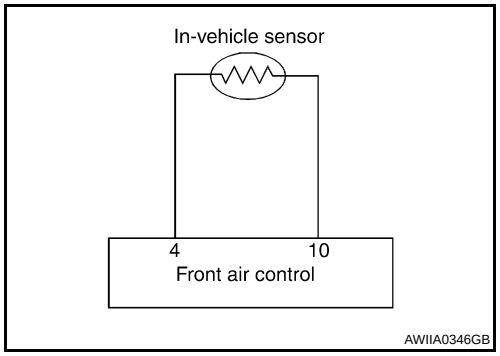
In-Vehicle Sensor Diagnosis Procedure

INFOID:0000000001547361

DIAGNOSTIC PROCEDURE FOR IN-VEHICLE SENSOR

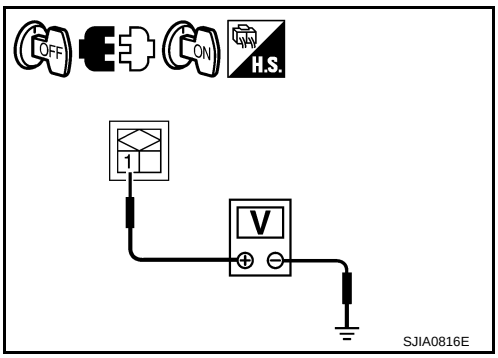
SYMPTOM: In-vehicle sensor circuit is open or shorted.

LEDs of intake switch (FRE, REC) does not illuminate as a result of performing self-diagnosis STEP-2.



1.CHECK VOLTAGE BETWEEN IN-VEHICLE SENSOR AND GROUND

1. Turn ignition switch OFF.
2. Disconnect in-vehicle sensor connector.
3. Turn ignition switch ON.
4. Check voltage between in-vehicle sensor harness connector and ground.



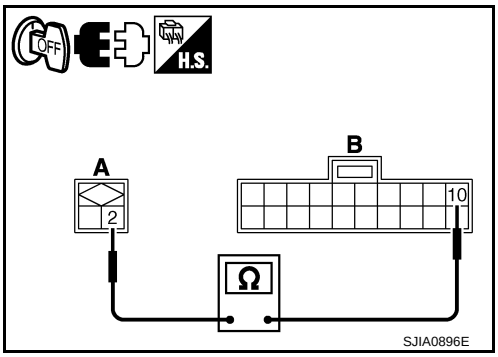
Terminals			Voltage (Approx.)
(+)		(–)	
Connector	Terminal	Ground	
In-vehicle sensor: M93	1		5V

Is the inspection result normal

YES >> GO TO 2.
NO >> GO TO 4.

2.CHECK CIRCUIT CONTINUITY BETWEEN IN-VEHICLE SENSOR AND FRONT AIR CONTROL

1. Turn ignition switch OFF.
2. Disconnect front air control connector.
3. Check continuity between in-vehicle sensor harness connector M93 (A) terminal 2 and front air control harness connector M85 (B) terminal 10.



A		B		Continuity
Connector	Terminal	Connector	Terminal	
In-vehicle sensor: M93	2	Front air control: M85	10	Yes

Is the inspection result normal

YES >> GO TO 3.
NO >> Repair harness or connector.

3.CHECK IN-VEHICLE SENSOR

Refer to HAC-249, "In-Vehicle Sensor Component Inspection"

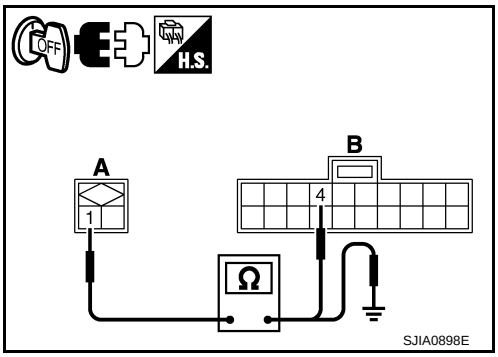
Is the inspection result normal

YES >> 1. Replace front air control. Refer to XXXX
2. Go to self-diagnosis HAC-213, "Front Air Control Self-Diagnosis" and perform self-diagnosis.

NO >> 1. Replace in-vehicle sensor.
2. Go to self-diagnosis HAC-213, "Front Air Control Self-Diagnosis" and perform self-diagnosis.

4.CHECK CIRCUIT CONTINUITY BETWEEN IN-VEHICLE SENSOR AND FRONT AIR CONTROL

1. Turn ignition switch OFF.
2. Disconnect front air control connector.
3. Check continuity between in-vehicle sensor harness connector M41 (A) terminal 1 and front air control harness connector M85 (B) terminal 4.



A		B		Continuity
Connector	Terminal	Connector	Terminal	
In-vehicle sensor: M93	1	Front air control: M85	4	Yes

4. Check continuity between in-vehicle sensor harness connector M93 (A) terminal 1 and ground.

A		Ground	Continuity
Connector	Terminal		
In-vehicle sensor: M93	1		No

Is the inspection result normal

YES >> 1. Replace front air control.
2. Go to self-diagnosis HAC-213, "Front Air Control Self-Diagnosis" and perform self-diagnosis.

NO >> Repair harness or connector.

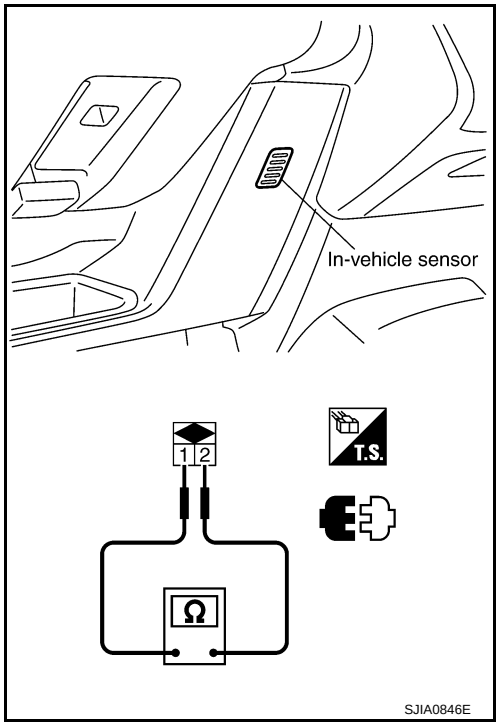
In-Vehicle Sensor Component Inspection

INFOID:0000000001547362

COMPONENT INSPECTION

In-vehicle Sensor

After disconnecting in-vehicle sensor connector M41, measure resistance between terminals 1 and 2 at sensor side, using the table below.



Temperature °C (°F)	Resistance kΩ
–15 (5)	12.73
–10 (14)	9.92
–5 (23)	7.80
0 (32)	6.19
5 (41)	4.95
10 (50)	3.99
15 (59)	3.24
20 (68)	2.65
25 (77)	2.19
30 (86)	1.81
35 (95)	1.51
40 (104)	1.27
45 (113)	1.07

If NG, replace in-vehicle sensor. Refer to XXXX

SUNLOAD SENSOR

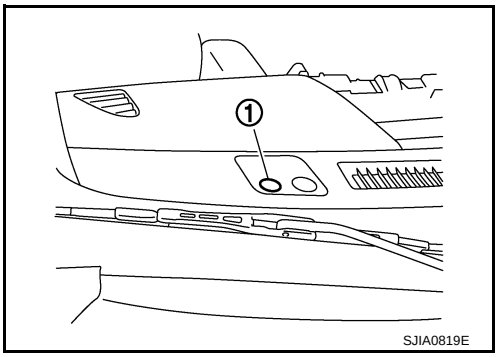
Component Description

INFOID:0000000001547363

COMPONENT DESCRIPTION

Sunload Sensor

The sunload sensor (1) is located on the instrument upper mask. It detects sunload entering through windshield by means of a photo diode. The sensor converts the sunload into a current value which is then input into the front air control.



SUNLOAD INPUT PROCESS

The front air control also includes a processing circuit which averages the variations in detected sunload over a period of time. This prevents drastic swings in the ATC system operation due to small or quick variations in detected sunload.

For example, consider driving along a road bordered by an occasional group of large trees. The sunload detected by the sunload sensor will vary whenever the trees obstruct the sunlight. The processing circuit averages the detected sunload over a period of time, so that the (insignificant) effect of the trees momentarily obstructing the sunlight does not cause any change in the ATC system operation. On the other hand, shortly after entering a long tunnel, the system will recognize the change in sunload, and the system will react accordingly.

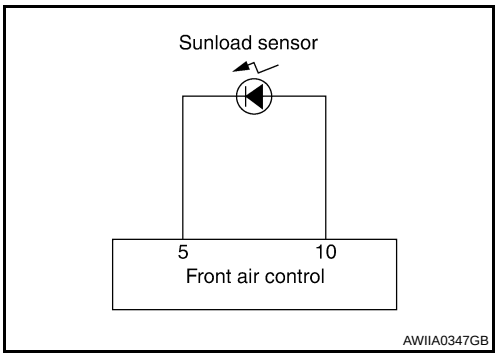
Sunload Sensor Diagnosis Procedure

INFOID:0000000001547364

DIAGNOSTIC PROCEDURE FOR SUNLOAD SENSOR

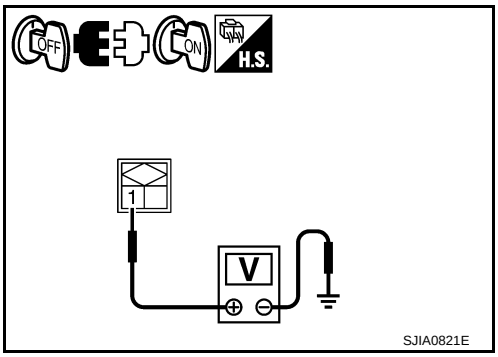
SYMPTOM: Sunload sensor circuit is open or shorted.

LEDs of intake switch (FRE, REC) does not illuminate as a result of performing self-diagnosis STEP-2.



1. CHECK VOLTAGE BETWEEN SUNLOAD SENSOR AND GROUND

1. Turn ignition switch OFF.
2. Disconnect sunload sensor connector.
3. Turn ignition switch ON.
4. Check voltage between sunload sensor harness connector M94 terminal 1 and ground.



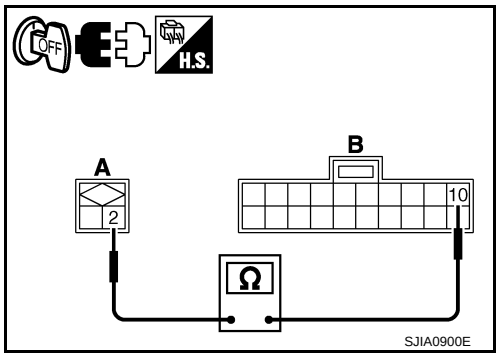
Terminals			Voltage (Approx.)
(+)		(–)	
Connector	Terminal	Ground	
Sunload sensor: M94	1		5V

Is the inspection result normal

YES >> GO TO 2.
NO >> GO TO 4.

2.CHECK CIRCUIT CONTINUITY BETWEEN SUNLOAD SENSOR AND FRONT AIR CONTROL

1. Turn ignition switch OFF.
2. Disconnect front air control connector.
3. Check continuity between sunload sensor harness connector M94 (A) terminal 2 and front air control harness connector M86 (B) terminal 10.



A		B		Continuity
Connector	Terminal	Connector	Terminal	
Sunload sensor: M94	2	Front air control: M86	10	Yes

Is the inspection result normal

YES >> GO TO 3.
NO >> Repair harness or connector.

3.CHECK SUNLOAD SENSOR

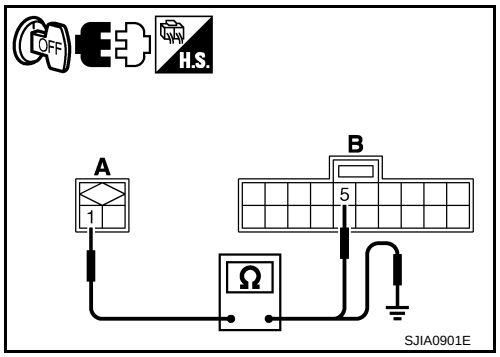
Refer to HAC-251, "Sunload Sensor Component Inspection".

Is the inspection result normal

YES >> 1. Replace front air control. Refer to XX.
2. Go to self-diagnosis HAC-213, "Front Air Control Self-Diagnosis" and perform self-diagnosis.
NO >> 1. Replace sunload sensor.
2. Go to self-diagnosis HAC-213, "Front Air Control Self-Diagnosis" and perform self-diagnosis.

4.CHECK CIRCUIT CONTINUITY BETWEEN SUNLOAD SENSOR AND FRONT AIR CONTROL

1. Turn ignition switch OFF.
2. Disconnect front air control connector.
3. Check continuity between sunload sensor harness connector M94 (B) terminal 1 and front air control harness connector M86 (B) terminal 5.



A		B		Continuity
Connector	Terminal	Connector	Terminal	
Sunload sensor: M94	1	Front air control: M86	5	Yes

4. Check continuity between sunload sensor harness connector M94 (A) terminal 1 and ground.

A		Ground	Continuity
Connector	Terminal		
Sunload sensor: M94	1		No

Is the inspection result normal

YES >> 1. Replace front air control. Refer to XXXX
2. Go to self-diagnosis HAC-213, "Front Air Control Self-Diagnosis" and perform self-diagnosis.
NO >> Repair harness or connector.

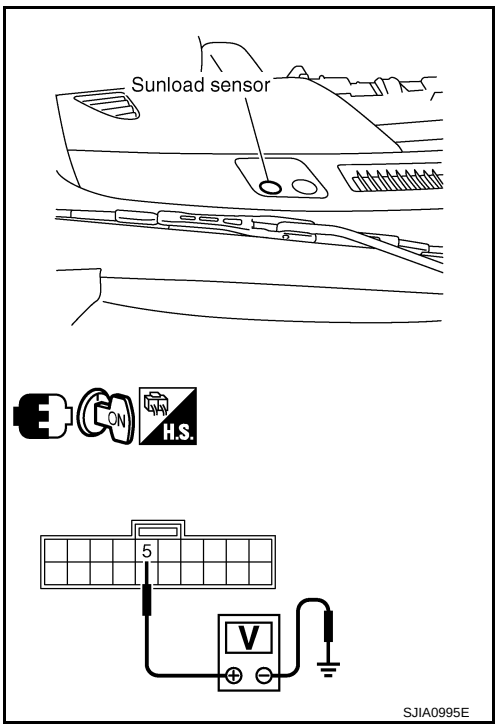
Sunload Sensor Component Inspection

INFOID:0000000001555023

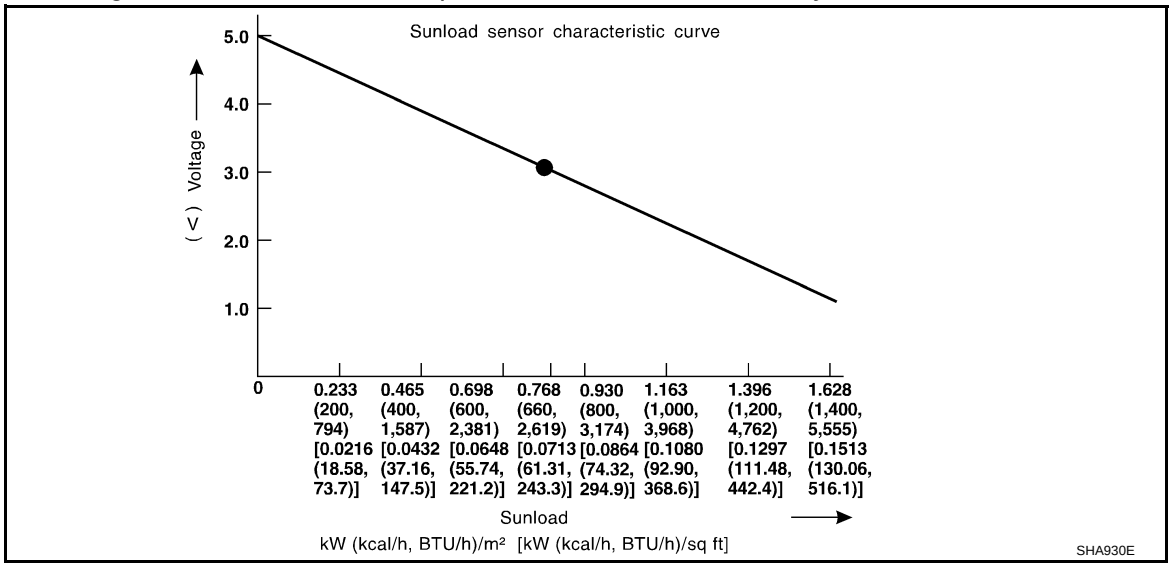
COMPONENT INSPECTION

Sunload Sensor

Measure voltage between front air control harness connector M86 terminal 5 and ground.
If NG, replace sunload sensor. Refer to XXXX



- When checking sunload sensor, select a place where sun shines directly on it.



INTAKE SENSOR

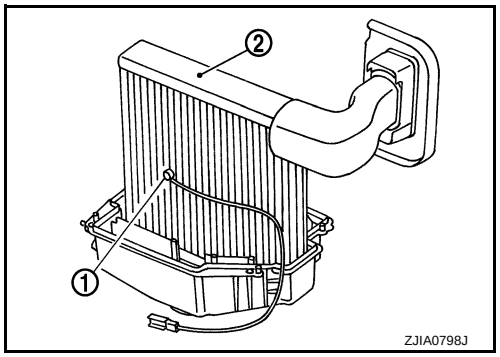
System Description

INFOID:0000000001547365

COMPONENT DESCRIPTION

Intake Sensor

The intake sensor (1) is located on the A/C unit. It converts temperature of air after it passes through the evaporator (2) into a resistance value which is then input to the front air control.

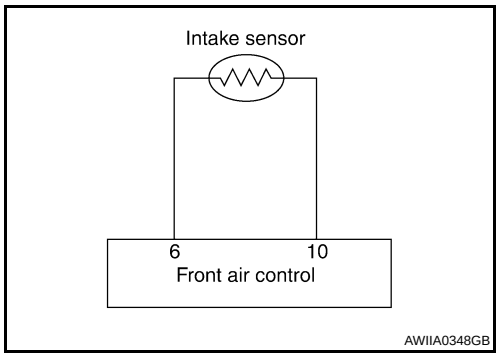


Intake Sensor Diagnosis Procedure

INFOID:0000000001547366

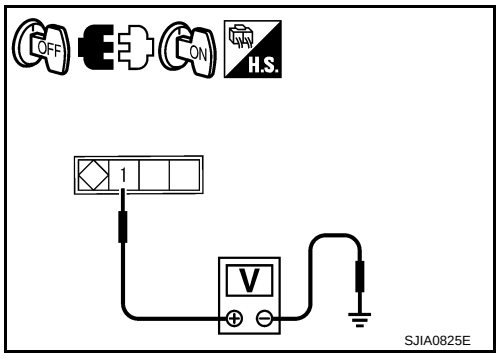
DIAGNOSTIC PROCEDURE FOR INTAKE SENSOR

SYMPTOM: Intake sensor circuit is open or shorted.
LEDs of intake switch (FRE, REC) does not illuminate as a result of performing self-diagnosis STEP-2.



1. CHECK VOLTAGE BETWEEN INTAKE SENSOR AND GROUND

1. Turn ignition switch OFF.
2. Disconnect intake sensor connector.
3. Turn ignition switch ON.
4. Check voltage between intake sensor harness connector M92 terminal 1 and ground.



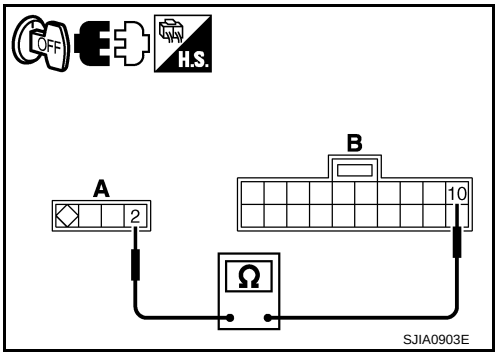
Terminals			Voltage (Approx.)
(+)		(–)	
Connector	Terminal	Ground	
Intake sensor: M92	1		5V

Is the inspection result normal

YES >> GO TO 2.
NO >> GO TO 4.

2. CHECK CIRCUIT CONTINUITY BETWEEN INTAKE SENSOR AND FRONT AIR CONTROL

1. Turn ignition switch OFF.
2. Disconnect front air control connector.
3. Check continuity between intake sensor harness connector M92 (A) terminal 2 and front air control harness connector M86 (B) terminal 10.



A		B		Continuity
Connector	Terminal	Connector	Terminal	
Intake sensor: M92	2	Front air control: M86	10	Yes

Is the inspection result normal

YES >> GO TO 3.
NO >> Repair harness or connector.

3.CHECK INTAKE SENSOR

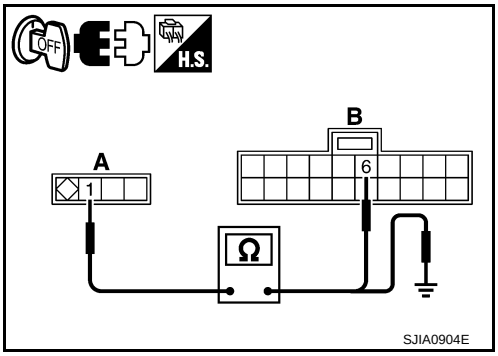
Refer to HAC-254, "Intake Sensor Component Inspection".

Is the inspection result normal

YES >> 1. Replace front air control. Refer to XXXX
2. Go to self-diagnosis HAC-213, "Front Air Control Self-Diagnosis" and perform self-diagnosis.
NO >> 1. Replace intake sensor. Refer to XXXX
2. Go to self-diagnosis HAC-213, "Front Air Control Self-Diagnosis" and perform self-diagnosis.

4.CHECK CIRCUIT CONTINUITY BETWEEN INTAKE SENSOR AND FRONT AIR CONTROL

1. Turn ignition switch OFF.
2. Disconnect front air control connector.
3. Check continuity between intake sensor harness connector M92 (A) terminal 1 and front air control harness connector M86 (B) terminal 6.



A		B		Continuity
Connector	Terminal	Connector	Terminal	
Intake sensor: M92	1	Front air control: M86	6	Yes

4. Check continuity between intake sensor harness connector M92 (A) terminal 1 and ground.

A		Ground	Continuity
Connector	Terminal		
Intake sensor: M92	1		No

Is the inspection result normal

YES >> 1. Replace front air control. Refer to XXXX
2. Go to self-diagnosis HAC-213, "Front Air Control Self-Diagnosis" and perform self-diagnosis.
NO >> Repair harness or connector.

Intake Sensor Component Inspection

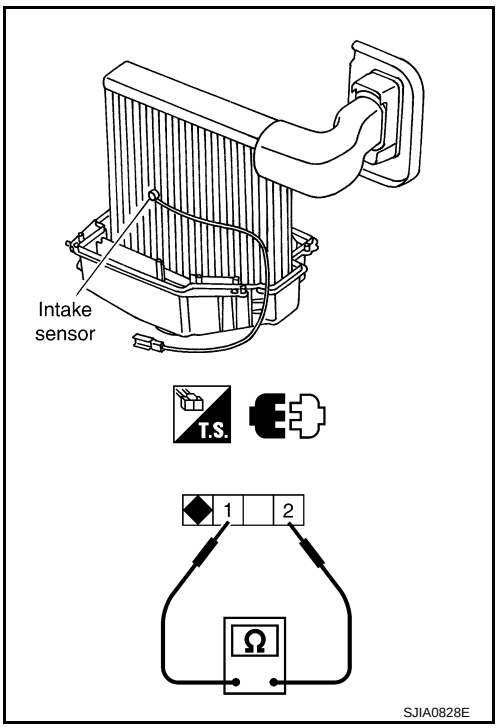
INFOID:0000000001547367

COMPONENT INSPECTION

Intake Sensor

After disconnecting intake sensor connector M42, measure resistance between terminals 1 and 2 at sensor side, using the table below.

Temperature °C (°F)	Resistance kΩ
–15 (5)	12.34
–10 (14)	9.62
–5 (23)	7.56
0 (32)	6.00
5 (41)	4.80
10 (50)	3.87
15 (59)	3.15
20 (68)	2.57
25 (77)	2.12
30 (86)	1.76
35 (95)	1.47
40 (104)	1.23
45 (113)	1.04



If NG, replace intake sensor. Refer to XXXX

PTC HEATER CONTROL SYSTEM
PTC HEATER (300 WATT)
PTC HEATER (300 WATT) : PTC Heater System Description

INFOID:0000000001548105

SYSTEM DESCRIPTION

The PTC heater system is controlled by ambient temperature, water temperature, FAN ON signal and temperature control dial. Hot air is supplied to the discharge air outlets by a PTC heater that generates heat electrically even when engine coolant temperature is low.

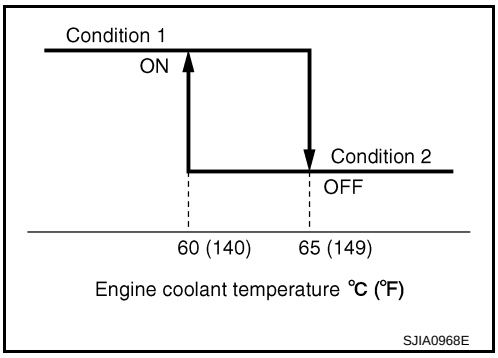
Component Parts

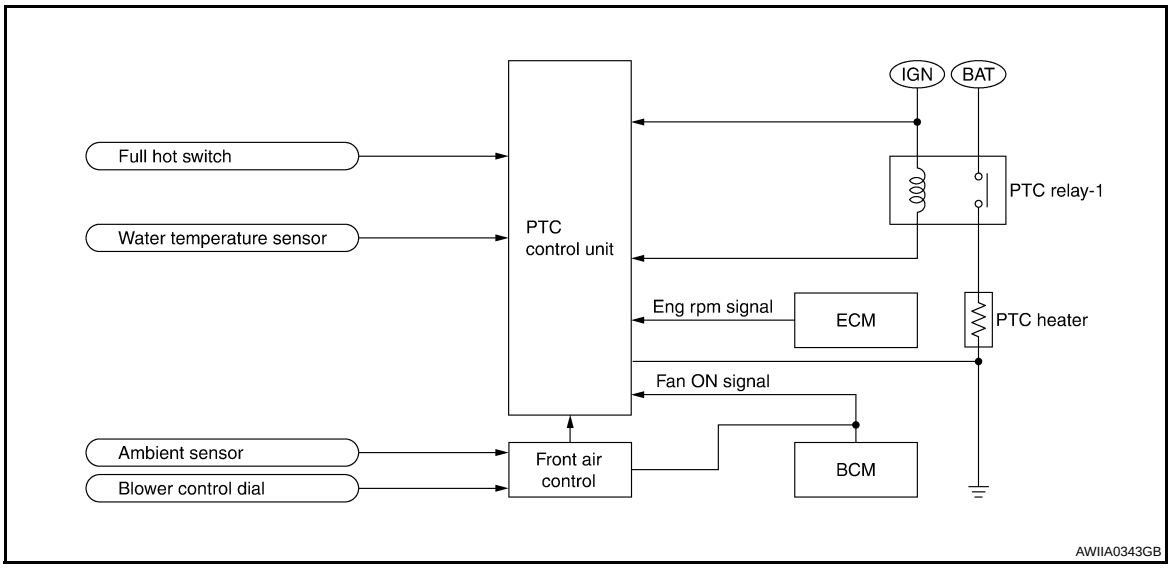
PTC heater system components are:
- PTC control unit
- PTC heater
- PTC relay-1
- Water temperature sensor
- Full hot switch
- Ambient sensor

System Operation

PTC heater system starts when all the following conditions are met:
- Less than 35 minutes after ignition switch ON.
- Blower control dial ON (Blower motor operates.) and temperature control dial full hot position (Full hot switch ON).
- Ambient temperature is lower than 0°C (32°).
- Engine coolant temperature is lower than 65°C (149°) (condition 1), or when it becomes lower than 60°C (140°) again (condition 2) on startup.
- Engine speed is more than 1100 rpm and after a lapse of more than 10 seconds.

PTC heater system stops when any of the following conditions is met:
- More than 35 minutes later after ignition switch ON.
- Blower control dial OFF (Blower motor OFF) and/or temperature control dial except full hot position (Full hot switch OFF).
- Ambient temperature is higher than 0°C (32°).
- Engine coolant temperature is higher than 65°C (149°).
- When engine speed becomes less than 800 rpm.





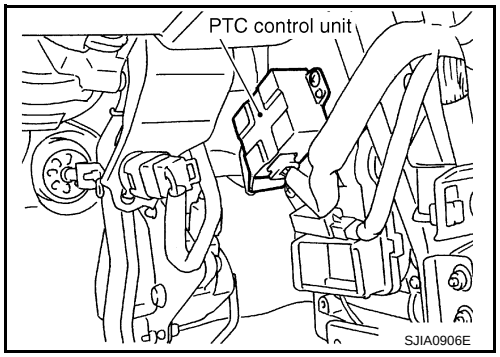
PTC HEATER (300 WATT) : PTC Heater Component Description

INFOID:0000000001548106

COMPONENT DESCRIPTION

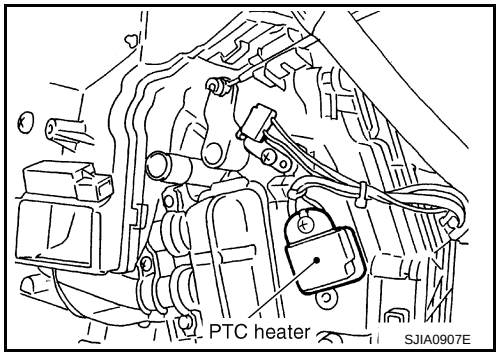
PTC Control Unit

The PTC control unit is attached on the A/C unit assembly. It controls PTC heater by ambient temperature, water temperature, FAN ON signal and temperature control dial.



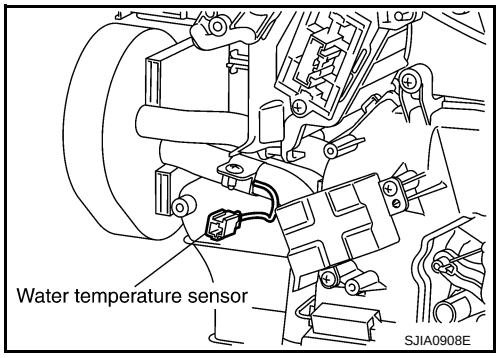
PTC Heater

The PTC heater is attached on the A/C unit assembly. It generates heat electrically.



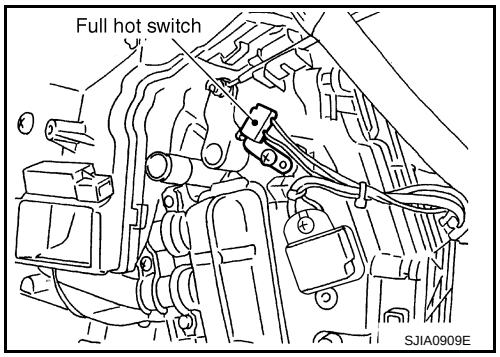
Water Temperature Sensor

The water temperature sensor is attached on heater pipe. It detects water temperature and converts it into a resistance value which is then input in to PTC control unit.



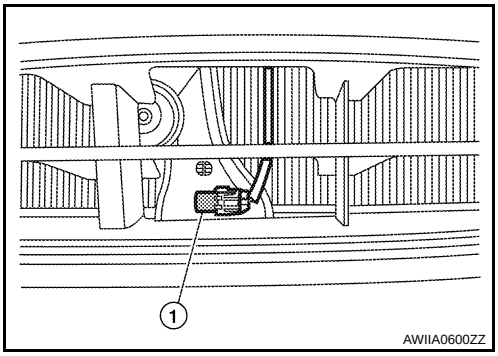
Full Hot Switch

The full hot switch is attached on the A/C unit assembly. When the temperature control dial at full hot position, then full hot switch is turned ON.



Ambient Sensor

The ambient sensor is attached on the radiator core support upper. It detects ambient temperature and converts it into a resistance value which is then input into the front air control.



PTC HEATER (300 WATT) : PTC Heater (300 Watt) Diagnosis Procedure

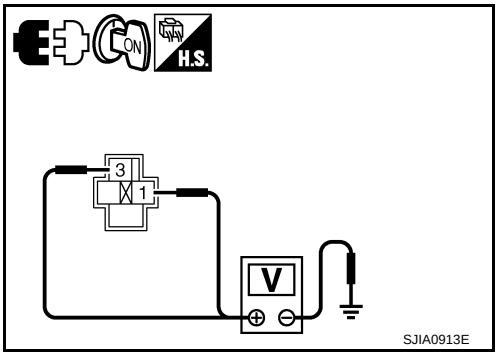
INFOID:0000000001548107

DIAGNOSTIC PROCEDURE FOR PTC SYSTEM

SYMPTOM: PTC heater system operation is malfunction.

1.CHECK POWER SUPPLY FOR PTC RELAY-1

1. Turn ignition switch ON.
2. Check voltage between PTC relay-1 harness connector E61 terminals 2, 3, and ground.



Terminals			Voltage (Approx.)
(+)		(–)	
Connector	Terminal		
PTC relay-1: E61	2	Ground	Battery voltage
	3		

Is the inspection result normal

YES >> GO TO 2.

NO >> Check power supply circuit and 10A fuse (No. 2) and 40A fusible link (No. I), located in the fuse and fusible link box.
- If fuses are OK, check harness for open circuit. Repair or replace if necessary.
- If fuses are NG, replace fuse and check harness for short circuit. Repair or replace if necessary.

2.CHECK PTC RELAY-1

1. Turn ignition switch OFF.
2. Check PTC relay-1. Refer to HAC-265, "PTC HEATER (300 WATT) : PTC Heater (300 Watt) Component Inspection".

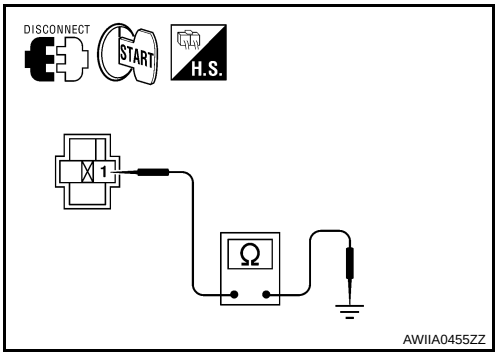
Is the inspection result normal

YES >> GO TO 3.

NO >> Replace PTC relay-1. Refer to XX.

3.CHECK PTC RELAY-1 OUTPUT CIRCUIT

1. Disconnect ambient sensor, PTC heater and water temperature sensor connectors.
2. Turn temperature control dial clockwise until full hot position.
3. Turn mode control dial to foot position.
4. Start the engine.
5. Turn blower control dial to maximum speed.
6. Check continuity between PTC relay-1 harness connector E61 terminal 1 and ground.



Connector	Terminal	Ground	Continuity
PTC relay-1: E61	1		Yes

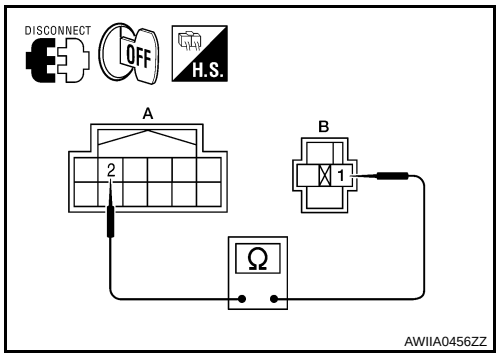
Is the inspection result normal

YES >> GO TO 5.

NO >> GO TO 4.

4. CHECK CIRCUIT CONTINUITY BETWEEN PTC RELAY-1 AND PTC CONTROL UNIT

1. Turn ignition switch OFF.
2. Disconnect PTC control unit connector.
3. Check continuity between PTC control unit harness connector M84 (A) terminal 2 and PTC relay-1 harness connector E61 (B) terminal 1.



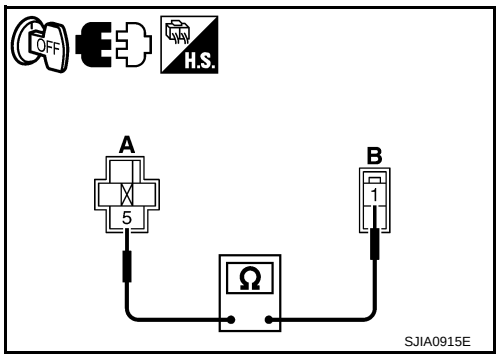
A		B		Continuity
Connector	Terminal	Connector	Terminal	
PTC control unit: M84	2	PTC relay-1: E61	1	Yes

Is the inspection result normal

YES >> GO TO 5.
NO >> GO TO 7.

5. CHECK CIRCUIT CONTINUITY BETWEEN PTC RELAY-1 AND PTC HEATER

1. Disconnect PTC heater connector.
2. Check continuity between PTC relay-1 harness connector E61 (A) terminal 5 and PTC heater harness connector M66 (B) terminal 1.



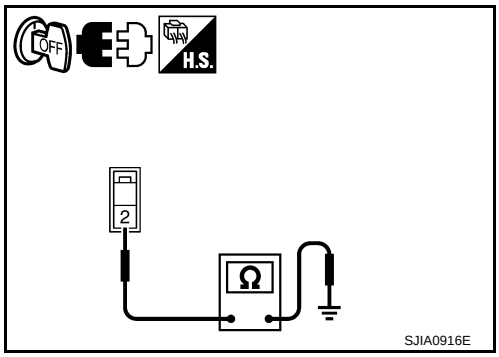
A		B		Continuity
Connector	Terminal	Connector	Terminal	
PTC relay-1: E61	5	PTC heater: M66	1	Yes

Is the inspection result normal

YES >> GO TO 6.
NO >> Repair harness or connector.

6. CHECK PTC HEATER GROUND CIRCUIT

Check continuity between PTC heater harness connector M66 terminal 2 and ground.



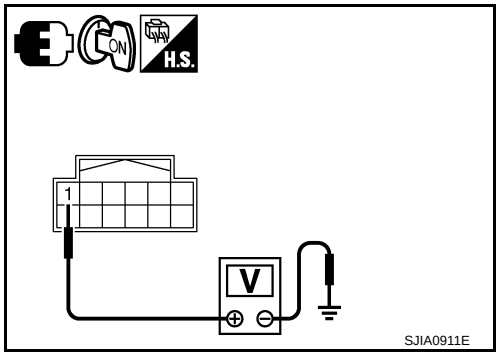
Connector	Terminal	Ground	Continuity
PTC heater: M66	2		Yes

Is the inspection result normal

YES >> Replace PTC heater. Refer to XX.
NO >> Repair harness or connector.

7. CHECK POWER SUPPLY VOLTAGE FOR PTC CONTROL UNIT

1. Turn ignition switch ON.
2. Check voltage between PTC control unit harness connector M84 terminal 1 and ground.



Terminals			Voltage (Approx.)
(+)		(–)	
Connector	Terminal	Ground	Battery voltage
PTC control unit: M84	1		

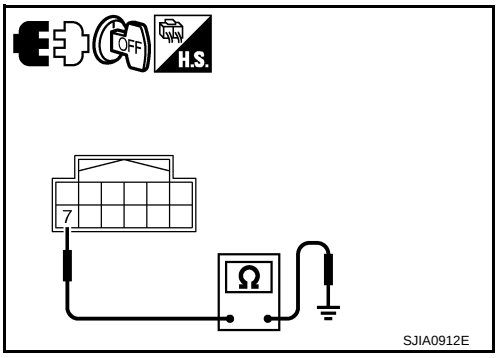
Is the inspection result normal

YES >> GO TO 8.

NO >> Repair harness or connector.

8. CHECK GROUND CIRCUIT FOR PTC CONTROL UNIT

1. Turn ignition switch OFF.
2. Check continuity between PTC control unit harness connector M84 terminal 7 and ground.



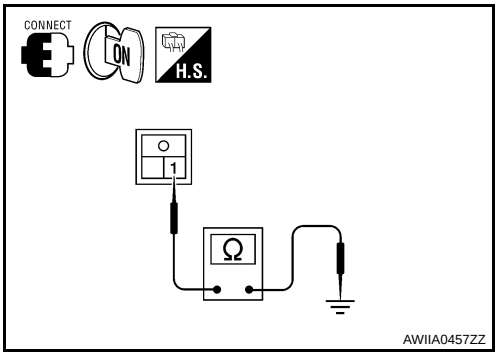
Connector	Terminal	Ground	Continuity
PTC control unit: M84	7		Yes

Is the inspection result normal

YES >> GO TO 9.
NO >> Repair harness or connector.

9. CHECK FULL HOT CIRCUIT BETWEEN PTC CONTROL UNIT AND GROUND

1. Reconnect PTC control unit and PTC relay-1 connector.
2. Turn ignition switch ON.
3. Check voltage between full hot switch harness connector M65 terminal 1 and ground.



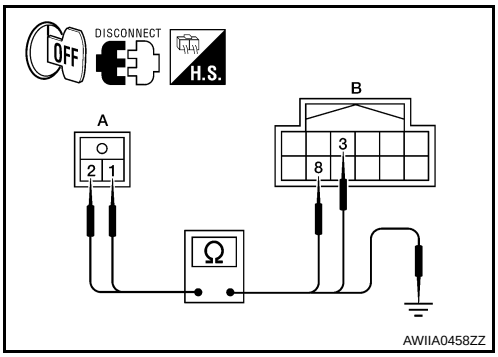
Terminals			Condition	Voltage (Approx.)
(+)		(–)		
Connector	Terminal			
Full hot switch: M65	1	Ground	Temperature control dial: Full hot position.	0V
			Temperature control dial: Except full hot position.	5V

Is the inspection result normal

YES >> GO TO 12.
NO >> GO TO 10.

10. CHECK CIRCUIT CONTINUITY BETWEEN FULL HOT SWITCH AND PTC CONTROL UNIT

1. Turn ignition switch OFF.
2. Disconnect full hot switch and PTC control unit connector.
3. Check continuity between full hot switch harness connector M65 (A) terminal 1, 2 and PTC control unit harness connector M84 (B) terminal 3, 8.



A		B		Continuity
Connector	Terminal	Connector	Terminal	
Full hot switch: M65	1	PTC control unit: M84	3	Yes
	2		8	

4. Check continuity between full hot switch harness connector M65 (A) terminal 1, 2 and ground.

(+)		(-)	Continuity
Connector	Terminal		
Full hot switch: M65	1	Ground	Yes
	2		

Is the inspection result normal

YES >> GO TO 11.
NO >> Repair harness or connector.

11. CHECK FULL HOT SWITCH

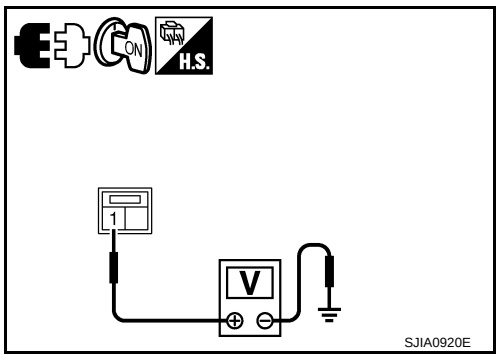
Check full hot switch. Refer to HAC-265, "PTC HEATER (300 WATT) : PTC Heater (300 Watt) Component Inspection".

Is the inspection result normal

YES >> Replace the PTC control unit. Refer to XX.
NO >> Replace full hot switch. Refer to XX.

12. CHECK VOLTAGE BETWEEN WATER TEMPERATURE SENSOR AND GROUND

Check voltage between water temperature sensor harness connector M64 terminal 1 and ground.



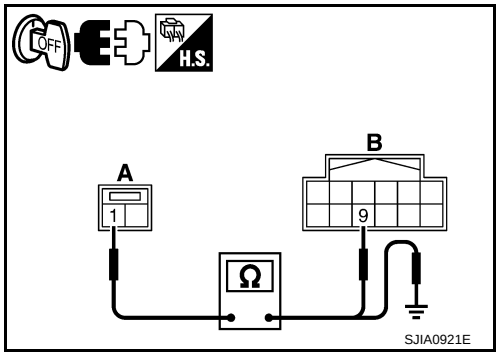
Terminals			Voltage (Approx.)
(+)		(–)	
Connector	Terminal	Ground	5V
Water temperature sensor: M64	1		

Is the inspection result normal

YES >> GO TO 14.
NO >> GO TO 13.

13. CHECK CIRCUIT CONTINUITY BETWEEN WATER TEMPERATURE SENSOR AND PTC CONTROL UNIT

1. Turn ignition switch OFF.
2. Disconnect PTC control unit.
3. Check continuity between water temperature sensor harness connector M64 (A) terminal 1 and PTC control unit harness connector M84 (B) terminal 9.



A		B		Continuity
Connector	Terminal	Connector	Terminal	
Water temperature sensor: M64	1	PTC control unit: M84	9	Yes

4. Check continuity between water temperature sensor harness connector M64 (A) terminal 1 and ground.

A			Continuity
Connector	Terminal		
Water temperature sensor: M64	1	Ground	No

Is the inspection result normal

YES >> Replace PTC control unit. Refer to XX.
NO >> Repair harness or connector.

14. CHECK WATER TEMPERATURE SENSOR

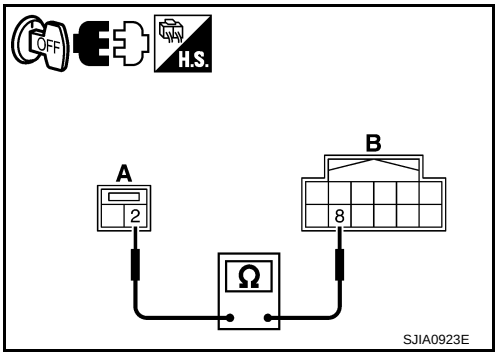
Refer to HAC-265, "PTC HEATER (300 WATT) : PTC Heater (300 Watt) Component Inspection".

Is the inspection result normal

YES >> GO TO 15.
NO >> Replace water temperature sensor. Refer to XX.

15. CHECK CIRCUIT CONTINUITY BETWEEN WATER TEMPERATURE SENSOR AND PTC CONTROL UNIT

Check continuity between water temperature sensor harness connector M64 (A) terminal 2 and PTC control unit harness connector M84 (B) terminal 8.



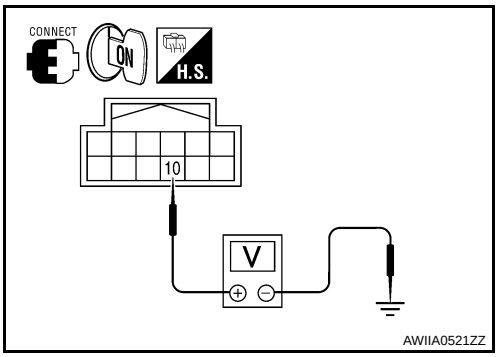
A		B		Continuity
Connector	Terminal	Connector	Terminal	
Water temperature sensor: M64	2	PTC control unit: M84	8	Yes

Is the inspection result normal

YES >> GO TO 16.
NO >> Repair harness or connector.

16. CHECK VOLTAGE BETWEEN PTC CONTROL UNIT AND GROUND

1. Turn ignition switch ON.
2. Check voltage between PTC heater harness connector M84 terminal 10 and ground.



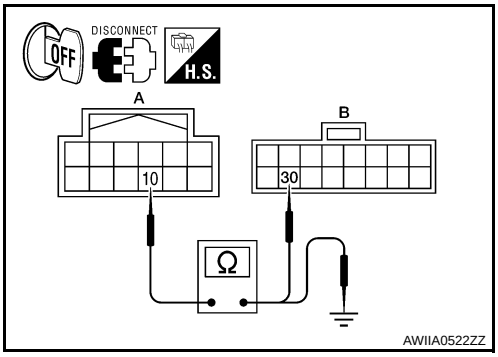
Terminals			Voltage (Approx.)
(+)		(–)	
Connector	Terminal	Ground	5V
PTC control unit: M84	10		

Is the inspection result normal

YES >> 1. If equipped with manual transmission, GO TO 22.
2. If equipped with automatic transmission, GO TO 24.
NO >> GO TO 17.

17. CHECK CIRCUIT CONTINUITY BETWEEN PTC CONTROL UNIT AND FRONT AIR CONTROL

1. Turn ignition switch OFF.
2. Disconnect front air control and PTC control unit connector.
3. Check continuity between PTC control unit harness connector M84 (A) terminal 10 and front air control harness connector M85 (B) terminal 30.



A		B		Continuity
Connector	Terminal	Connector	Terminal	
PTC control unit: M84	10	Front air control: M85	30	Yes

4. Check continuity between PTC control unit harness connector M84 (A) terminal 10 and ground.

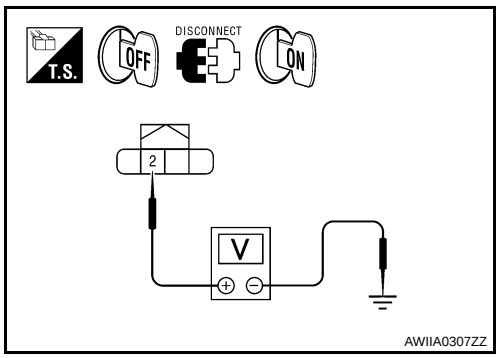
A		Ground	Continuity
Connector	Terminal		
PTC control unit: M84	10		No

Is the inspection result normal

YES >> GO TO 18.
NO >> Repair harness or connector.

18. CHECK VOLTAGE BETWEEN AMBIENT SENSOR AND GROUND

1. Turn ignition switch OFF.
2. Disconnect ambient sensor connector E60.
3. Turn ignition switch ON.
4. Check voltage between ambient sensor harness connector E60 terminal 2 and ground.



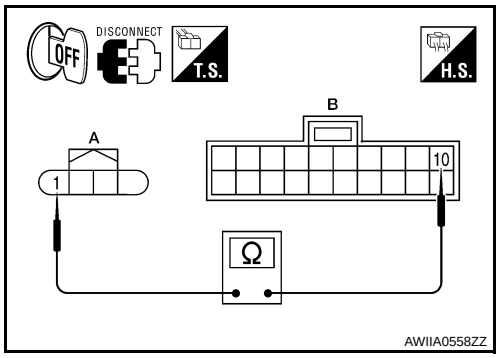
Terminals			Voltage (Approx.)
(+)		(–)	
Connector	Terminal	Ground	
Ambient sensor: E60	2		5V

Is the inspection result normal?

YES >> GO TO 19.
NO >> GO TO 21.

19. CHECK CIRCUIT CONTINUITY BETWEEN AMBIENT SENSOR AND FRONT AIR CONTROL

1. Turn ignition switch OFF.
2. Disconnect front air control connector M86.
3. Check continuity between ambient sensor harness connector E60 (A) terminal 1 and front air control harness connector M85 (B) terminal 10.



A		B		Continuity
Connector	Terminal	Connector	Terminal	
Ambient sensor: E60	1	Front air control: M86	10	Yes

Is the inspection result normal?

YES >> GO TO 20.
NO >> Repair harness or connector.

20. CHECK AMBIENT SENSOR

Refer to HAC-265, "PTC HEATER (300 WATT) : PTC Heater (300 Watt) Component Inspection".

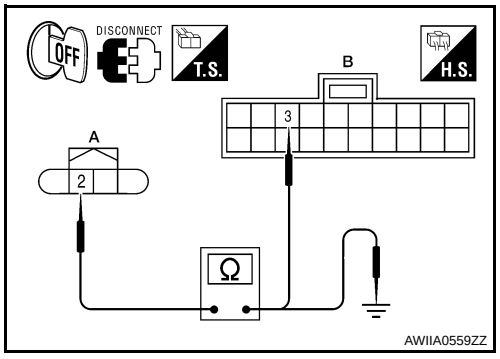
Is the inspection result normal?

YES >> 1. Replace front air control. Refer to XX.
2. Go to self-diagnosis HAC-213, "Front Air Control Self-Diagnosis" and perform self-diagnosis STEP-2. Confirm that code No. 20 is displayed.

NO >> 1. Replace ambient sensor. Refer to XX.
2. Go to self-diagnosis HAC-213, "Front Air Control Self-Diagnosis" and perform self-diagnosis STEP-2. Confirm that code No. 20 is displayed.

21. CHECK CIRCUIT CONTINUITY BETWEEN AMBIENT SENSOR AND FRONT AIR CONTROL

1. Turn ignition switch OFF.
2. Disconnect front air control connector M86.
3. Check continuity between ambient sensor harness connector E60 (A) terminal 2 and front air control harness connector M86 (B) terminal 3.



A		B		Continuity
Connector	Terminal	Connector	Terminal	
Ambient sensor: E60	2	Front air control: M86	3	Yes

4. Check continuity between ambient sensor harness connector E34 (A) terminal 2 and ground.

A		Ground	Continuity
Connector	Terminal		
Ambient sensor: E60	2		No

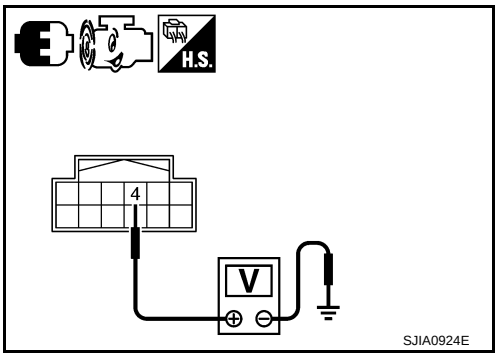
Is the inspection result normal?

YES >> 1. Replace front air control. Refer to XX.
2. Go to self-diagnosis HAC-213, "Front Air Control Self-Diagnosis" and perform self-diagnosis STEP-2. Confirm that code No. 20 is displayed.

NO >> Repair harness or connector.

22. CHECK ENGINE RPM SIGNAL (MANUAL TRANSMISSION)

1. Reconnect PTC control unit.
2. Start the engine.
3. Check voltage between PTC control unit harness connector M84 terminal 4 and ground.



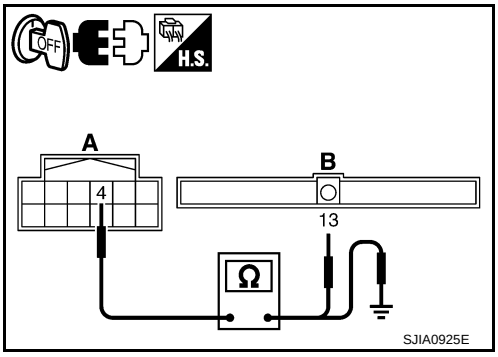
Terminals			Voltage (Approx.)
(+)		(–)	
Connector	Terminal	Ground	
PTC control unit: M84	4		4.2V

Is the inspection result normal

YES >> GO TO 24.
NO >> GO TO 23.

23. CHECK CONTINUITY OF ENGINE RPM CIRCUIT BETWEEN FRONT AIR CONTROL AND PTC CONTROL UNIT (MANUAL TRANSMISSION)

1. Turn ignition switch OFF.
2. Disconnect ECM and PTC control unit connector.
3. Check continuity between PTC control unit harness connector M84 (A) terminal 4 and ECM harness connector F10 (B) terminal 13.



A		B		Continuity
Connector	Terminal	Connector	Terminal	
PTC control unit: M84	4	ECM: F10	13	Yes

4. Check continuity between PTC control unit harness connector M84 (A) terminal 4 and ground.

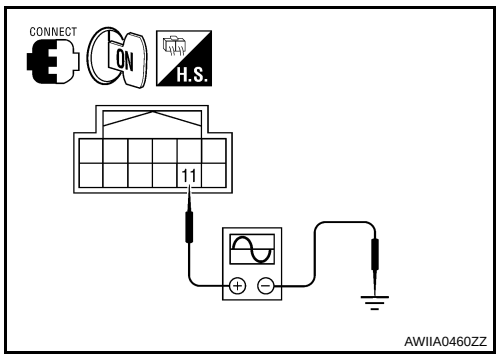
A		Ground	Continuity
Connector	Terminal		
PTC control unit: M84	4		No

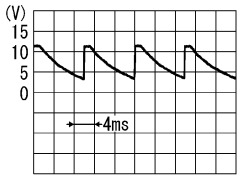
Is the inspection result normal

YES >> Replace ECM. Refer to XX.
NO >> Repair harness or connector.

24. CHECK BCM INPUT (FAN ON) SIGNAL

1. Turn blower control dial to "1" position.
2. Confirm fan on signal between PTC control unit harness connector M84 terminal 11 and ground using oscilloscope.



Terminals			Voltage (Approx.)
(+)		(-)	
Connector	Terminal		
PTC control unit: M84	11	Ground	

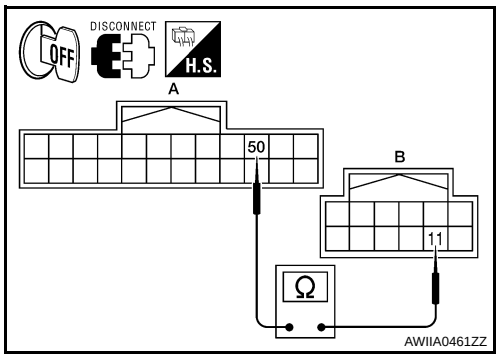
ZJIA0583J

Is the inspection result normal

YES >> Replace PTC control unit.
NO >> GO TO 25.

25. CHECK CIRCUIT CONTINUITY BETWEEN BCM AND PTC CONTROL UNIT

1. Turn ignition switch OFF.
2. Disconnect BCM connector and PTC control unit connector.
3. Check continuity between BCM harness connector M19 (A) terminal 50 and PTC control unit harness connector M84 (B) terminal 11.



A		B		Continuity
Connector	Terminal	Connector	Terminal	
BCM: M19	50	PTC control unit: M84	11	Yes

4. Check continuity between PTC control unit harness connector M84 (A) terminal 11 and ground.

A		Ground	Continuity
Connector	Terminal		
PTC control unit: M84	11		No

Is the inspection result normal

YES >> Replace BCM. Refer to XX.
NO >> Repair harness or connector.

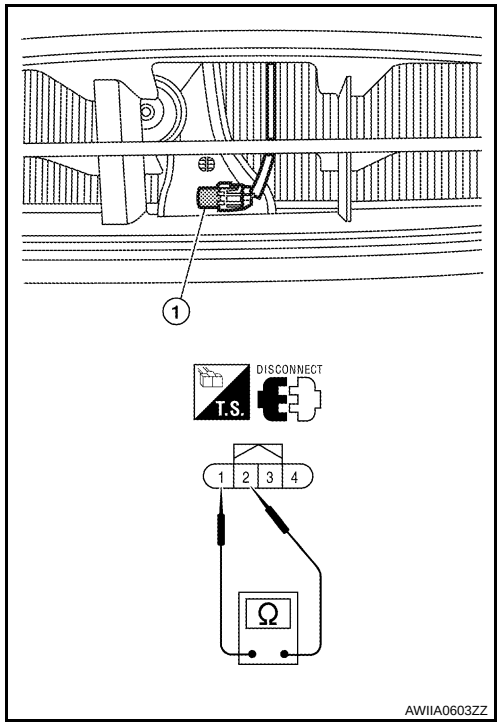
PTC HEATER (300 WATT) : PTC Heater (300 Watt) Component Inspection

INFOID:0000000001548108

COMPONENT INSPECTION

Ambient Sensor

After disconnecting ambient sensor (1) connector E60, measure resistance between terminals 1 and 2 at sensor side, using the table below.

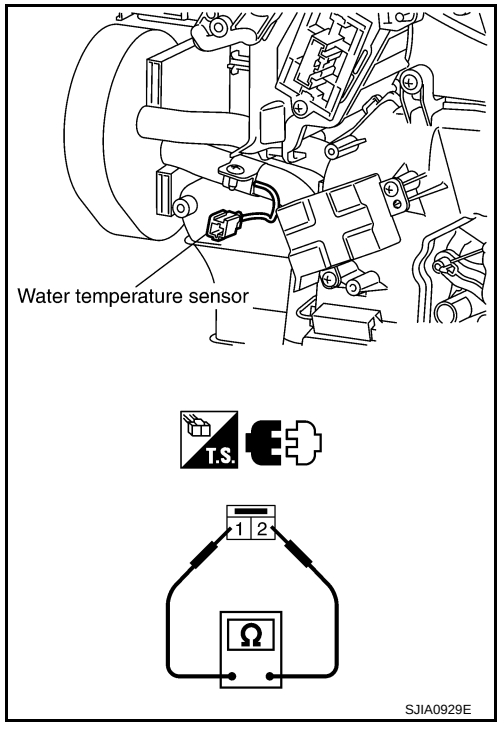


Temperature °C (°F)	Resistance kΩ
–15 (5)	12.73
–10 (14)	9.92
–5 (23)	7.80
0 (32)	6.19
5 (41)	4.95
10 (50)	3.99
15 (59)	3.24
20 (68)	2.65
25 (77)	2.19
30 (86)	1.81
35 (95)	1.51
40 (104)	1.27
45 (113)	1.07

If NG, replace ambient sensor. Refer to XX.

Water Temperature Sensor

After disconnecting water temperature sensor connector M64, measure resistance between terminals 1 and 2 at sensor side, using the table below.



Temperature °C (°F)	Resistance kΩ
–20 (–4)	31.62
–10 (14)	17.47
0 (32)	10.09
10 (50)	6.05
20 (68)	3.76
30 (86)	2.41
40 (104)	1.59
50 (122)	1.08
60 (140)	0.75
70 (158)	0.53
80 (176)	0.38
90 (194)	0.28
100 (212)	0.21

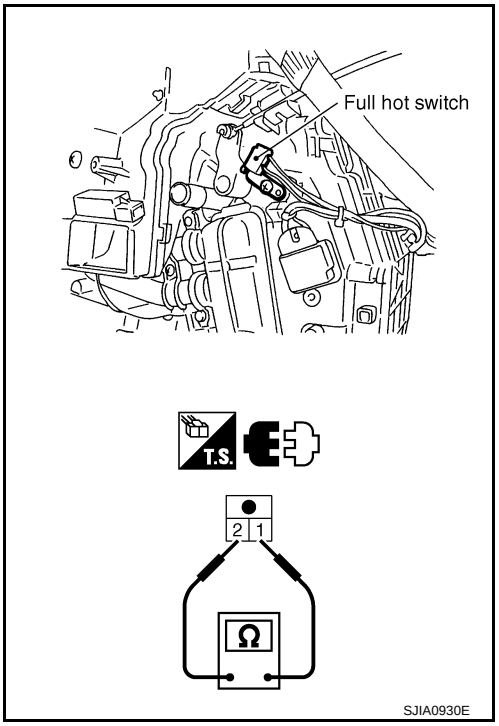
If NG, replace water temperature sensor.

Full Hot Switch

After disconnecting full hot switch connector M65, check continuity between terminals 1 and 2 at switch side.

Terminals		Condition	Continuity
1	2	Temperature control dial: Full hot position	Yes
		Temperature control dial: Except full hot position	No

If NG, replace full hot switch.

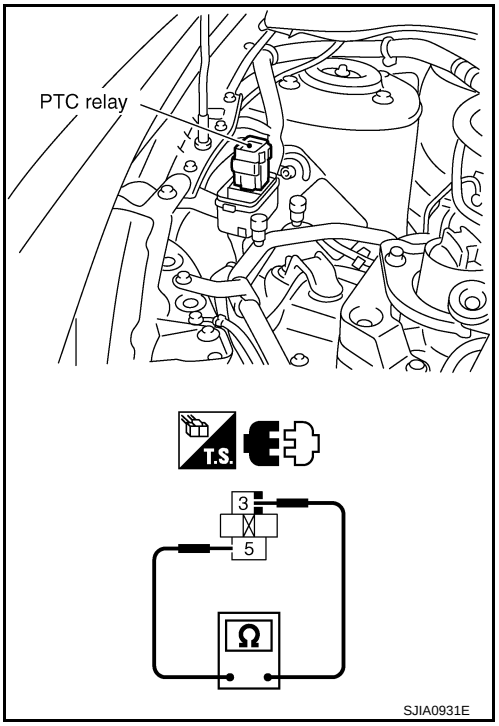


PTC relay

Check continuity between terminal Nos. 3 and 5.

Condition	Continuity
12V direct current supply between terminal Nos. 1 and 2	Yes
No current supply	No

If NG, replace PTC relay.



PTC HEATER (1500 WATT)

PTC HEATER (1500 WATT) : System Description

INFOID:0000000001679705

SYSTEM DESCRIPTION

The PTC heater system is controlled by ambient temperature, water temperature, FAN ON signal. Hot air is supplied to a discharge air outlet by PTC heater that generates heat electrically even when engine coolant temperature is low.

Component Parts

PTC heater system components are:

- PTC control unit

- PTC heater
- PTC relays
- Ambient sensor
- Blower relay

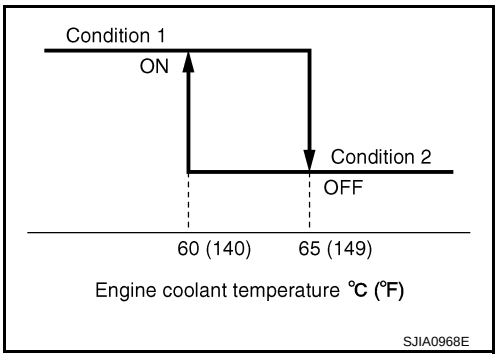
System Operation

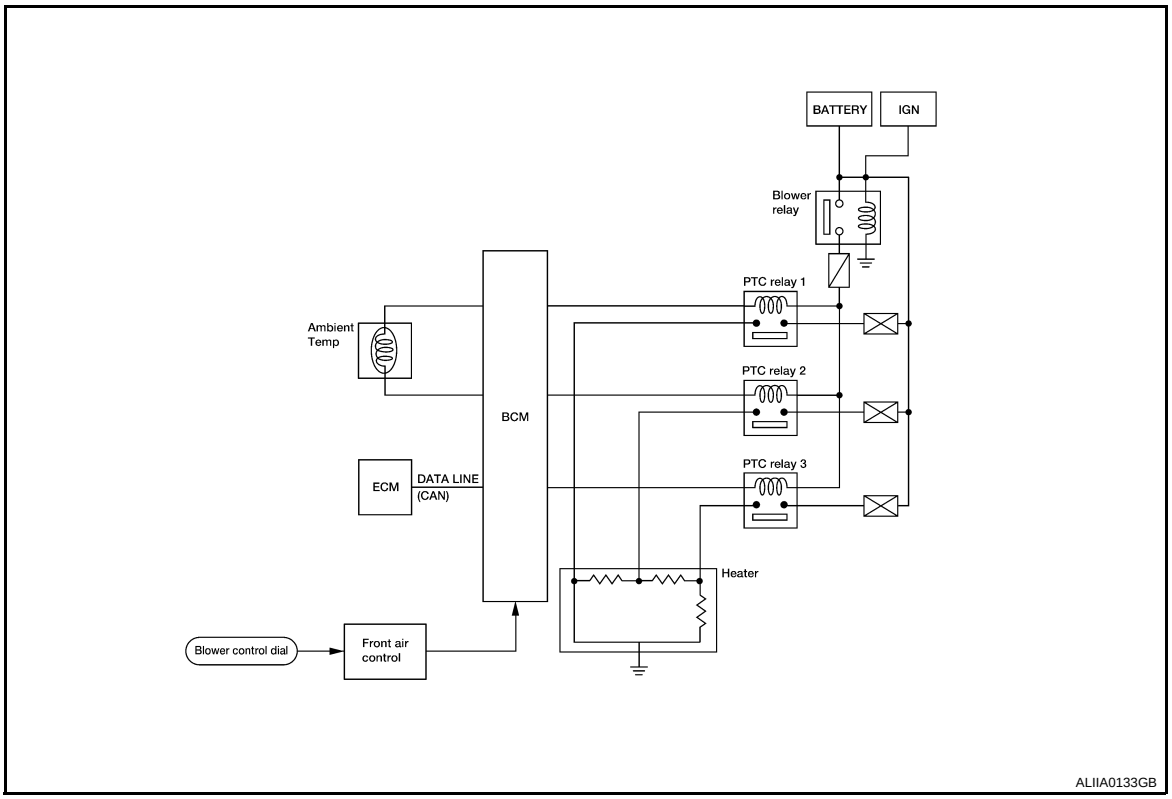
PTC heater system starts when all the following conditions are met:

- Less than 35 minutes after ignition switch ON.
- Blower control dial ON (Blower motor operates.)
- Ambient temperature is lower than 0°C (32°F).
- Engine coolant temperature is lower than 65°C (149°F) (condition 1), or when it becomes lower than 60°C (140°F) again (condition 2) on startup.
- Engine speed is more than 1100 rpm and after a lapse of more than 10 seconds.

PTC heater system stops when any of the following conditions is met:

- More than 35 minutes later after ignition switch ON.
- Fan control dial OFF (Blower motor OFF).
- Ambient temperature is higher than 0°C (32°F).
- Engine coolant temperature is higher than 65°C (149°F).
- When engine speed becomes less than 800 rpm.





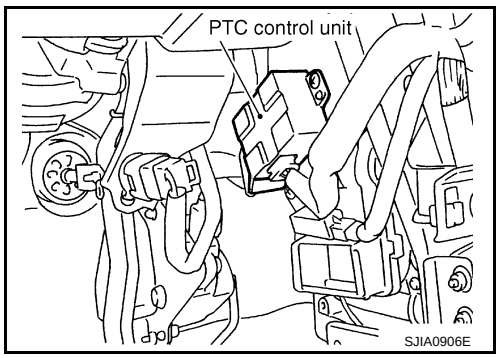
PTC HEATER (1500 WATT) : Component Description

INFOID:0000000001679706

COMPONENT DESCRIPTION

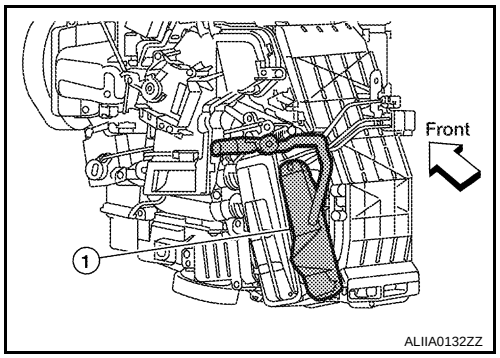
PTC Control Unit

The PTC control unit is attached on the A/C unit assembly. It controls PTC heater by ambient temperature, and FAN ON signal.



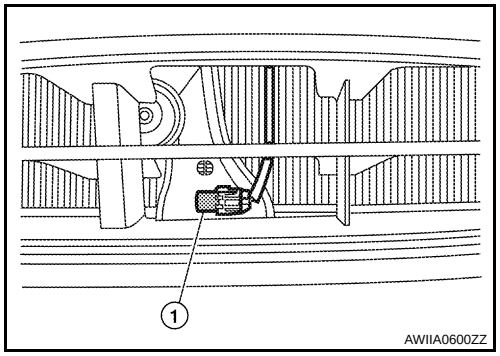
PTC Heater

The PTC heater is attached on the A/C unit assembly. It generates heat electrically.



Ambient Sensor

The ambient sensor is attached on the radiator core support upper. It detects ambient temperature and converts it into a resistance value which is then input into the PTC control unit.



PTC HEATER (1500 WATT) : PTC Heater (1500 Watt) Diagnosis Procedure

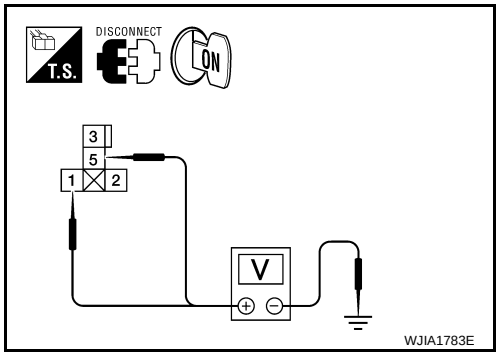
INFOID:0000000001679707

DIAGNOSTIC PROCEDURE FOR PTC SYSTEM

SYMPTOM: PTC heater system operation is malfunction.

1.CHECK POWER SUPPLY FOR BLOWER RELAY

1. Turn ignition switch ON.
2. Disconnect blower relay.
3. Check voltage between blower relay harness connector J-1 terminals 1, 5, and ground.



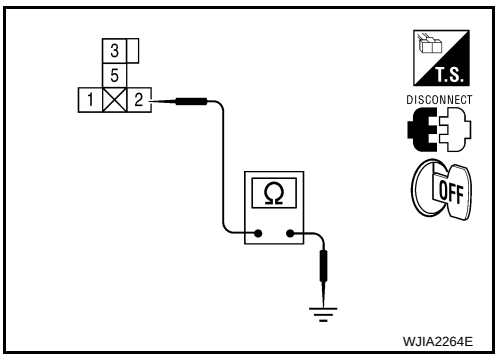
Terminals			Voltage (Approx.)
(+)		(–)	
Connector	Terminal		
Blower relay: J-1	1	Ground	Battery voltage
	5		

Is the inspection result normal

YES >> GO TO 2.
NO >> Repair harness or connector.

2.CHECK BLOWER RELAY GROUND CIRCUIT

1. Turn ignition switch OFF.
2. Check continuity between blower relay harness connector J-1 terminal 2 and ground.



Connector	Terminal	Ground	Continuity
Blower relay: J-1	2		Yes

Is the inspection result normal

YES >> GO TO 3.
NO >> Repair harness or connector.

3.CHECK BLOWER RELAY

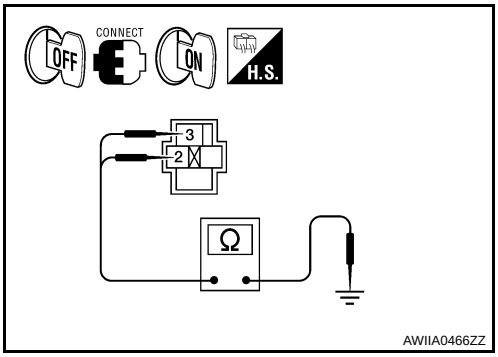
1. Turn ignition switch OFF.
2. Check blower relay. Refer to XX-XX, "*****".

Is the inspection result normal

YES >> GO TO 4.
NO >> Replace blower relay.

4.CHECK POWER SUPPLY FOR PTC RELAY-1

1. Turn ignition switch OFF.
2. Reconnect blower relay.
3. Turn ignition switch ON.
4. Check voltage between PTC relay-1 harness connector E61 terminals 2, 3, and ground.



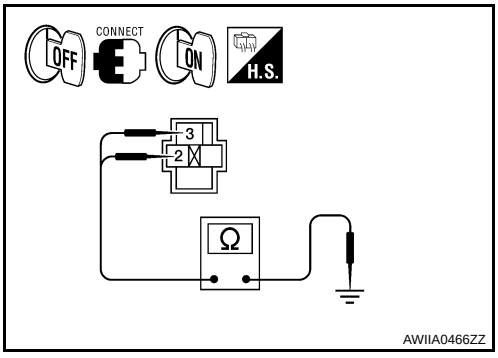
Terminals			Voltage (Approx.)
(+)		(–)	
Connector	Terminal	Ground	Battery voltage
PTC relay-2: E61	2		
	3		

Is the inspection result normal

YES >> GO TO 5.
NO >> Check power supply circuit and 10A and 40A fuse (No. 16 and I, located in the fuse block). Refer to XX.
- If fuses are OK, check harness for open circuit. Repair or replace if necessary.
- If fuses are NG, replace fuse and check harness for short circuit. Repair or replace if necessary.

5.CHECK POWER SUPPLY FOR PTC RELAY-2

Check voltage between PTC relay-2 harness connector E62 terminals 2, 3, and ground.



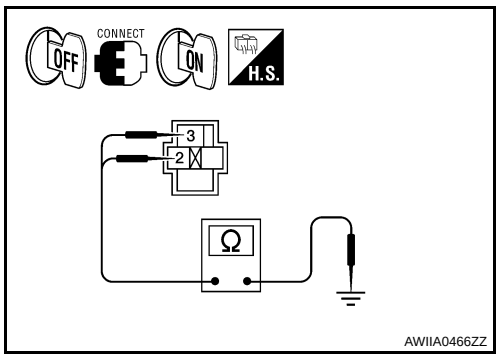
Terminals			Voltage (Approx.)
(+)		(–)	
Connector	Terminal	Ground	Battery voltage
PTC relay-2: E62	2		
	3		

Is the inspection result normal

YES >> GO TO 6.
NO >> Check power supply circuit and 80A fuse (N, located in the fuse block). Refer to XX.
- If fuses are OK, check harness for open circuit. Repair or replace if necessary.
- If fuses are NG, replace fuse and check harness for short circuit. Repair or replace if necessary.

6.CHECK POWER SUPPLY FOR PTC RELAY-3

Check voltage between PTC relay-3 harness connector E61 terminals 2, 3, and ground.



Terminals			Voltage (Approx.)
(+)		(–)	
Connector	Terminal		
PTC relay-3: E63	2	Ground	Battery voltage
	3		

Is the inspection result normal

YES >> GO TO 5.
NO >> Check power supply circuit and 80A fuse (P, located in the fuse block). Refer to XX-XX.
- If fuses are OK, check harness for open circuit. Repair or replace if necessary.
- If fuses are NG, replace fuse and check harness for short circuit. Repair or replace if necessary.

7.CHECK PTC RELAYS

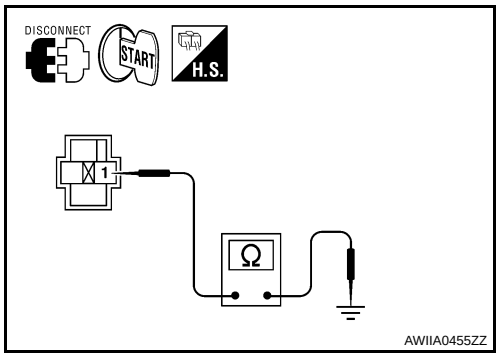
1. Turn ignition switch OFF.
2. Check PTC relay. Refer to XX-XX, "*****".

Is the inspection result normal

YES >> GO TO 6.
NO >> Replace inoperative PTC relay.

8.CHECK PTC RELAY-1 GROUND CIRCUIT

1. Disconnect ambient sensor, and PTC heater connectors.
2. Turn temperature control dial clockwise until full hot position.
3. Turn mode control dial to foot position.
4. Start the engine (1,000 RPM minimum).
5. Turn blower control dial to low speed.
6. Check continuity between PTC relay-1 harness connector E61 terminal 1 and ground.



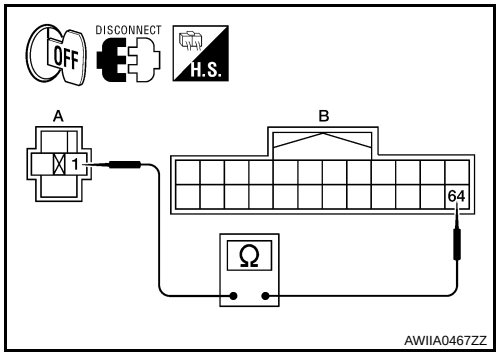
Connector	Terminal	Ground	Continuity
PTC relay-1: E61	1		Yes

Is the inspection result normal

YES >> GO TO 10.
NO >> GO TO 9.

9.CHECK CIRCUIT CONTINUITY BETWEEN PTC RELAY-1 AND BCM

1. Turn ignition switch OFF.
2. Disconnect BCM connector.
3. Check continuity between PTC relay-1 harness connector E61 (A) terminal 1 and BCM harness connector M19 (B) terminal 64.



A		B		Continuity
Connector	Terminal	Connector	Terminal	
PTC relay-1: E61	1	BCM: M19	64	Yes

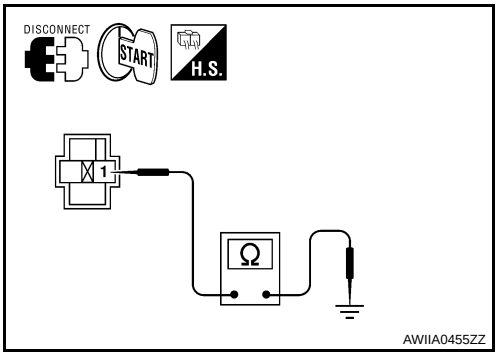
Is the inspection result normal

YES >> Replace BCM. Refer to XXXX.
NO >> Repair harness or connector.

10.CHECK PTC RELAY-2 GROUND CIRCUIT

Check continuity between PTC relay-2 harness connector E62 terminal 1 and ground.

Connector	Terminal	Ground	Continuity
PTC relay-2: E62	1		Yes



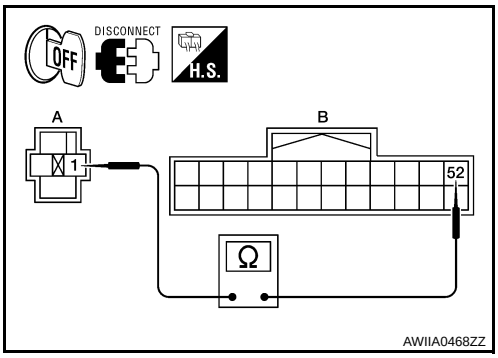
Is the inspection result normal

YES >> GO TO 12.
NO >> GO TO 11.

11. CHECK CIRCUIT CONTINUITY BETWEEN PTC RELAY-2 AND BCM

1. Turn ignition switch OFF.
2. Disconnect BCM connector.
3. Check continuity between BCM harness connector M19 (B) terminal 52 and PTC relay-1 harness connector E62 (A) terminal 1.

A		B		Continuity
Connector	Terminal	Connector	Terminal	
PTC relay-2: E62	1	BCM: M19	52	Yes



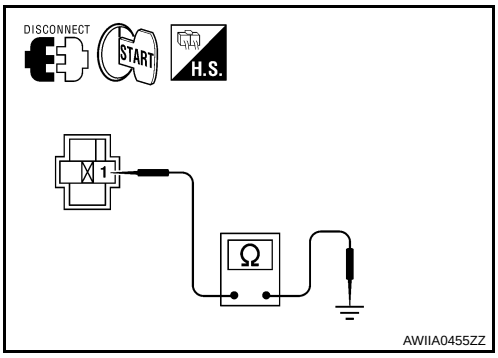
Is the inspection result normal

YES >> Replace BCM. Refer to XXXX.
NO >> Repair harness or connector.

12. CHECK PTC RELAY-3 GROUND CIRCUIT

Check continuity between PTC relay-3 harness connector E63 terminal 1 and ground.

Connector	Terminal	Ground	Continuity
PTC relay-3: E63	1		Yes



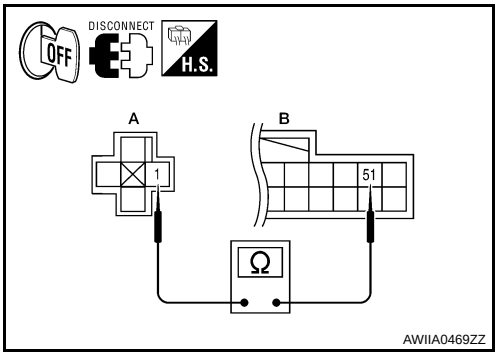
Is the inspection result normal

YES >> GO TO 14.
NO >> GO TO 13.

13. CHECK CIRCUIT CONTINUITY BETWEEN PTC RELAY-3 AND BCM

1. Turn ignition switch OFF.
2. Disconnect BCM connector.
3. Check continuity between BCM harness connector M19 (B) terminal 51 and PTC relay-3 harness connector E63 (A) terminal 1.

A		B		Continuity
Connector	Terminal	Connector	Terminal	
PTC relay-3: E63	1	BCM: M19	51	Yes

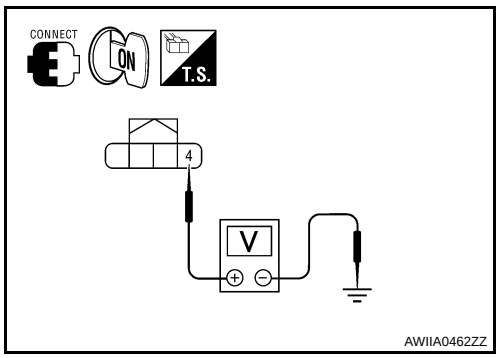


Is the inspection result normal

YES >> GO TO 14.
NO >> Repair harness or connector.

14. CHECK VOLTAGE BETWEEN AMBIENT TEMPERATURE SENSOR AND GROUND

1. Turn ignition switch OFF.
2. Reconnect BCM connector.
3. Disconnect ambient temperature sensor.
4. Turn ignition switch ON.
5. Check voltage between ambient temperature sensor harness connector E60 terminal 4 and ground.



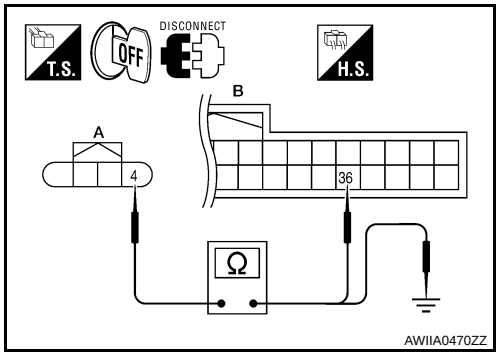
Terminals			Voltage (Approx.)
(+)		(–)	
Connector	Terminal	Ground	
Ambient temperature sensor: E60	4		5V

Is the inspection result normal

YES >> GO TO 16.
NO >> GO TO 15.

15. CHECK CIRCUIT CONTINUITY BETWEEN AMBIENT TEMPERATURE SENSOR AND BCM CONTROL UNIT

1. Turn ignition switch OFF.
2. Disconnect BCM connector.
3. Check continuity between ambient temperature sensor harness connector E60 (A) terminal 4 and BCM harness connector M18 (B) terminal 36.



A		B		Continuity
Connector	Terminal	Connector	Terminal	
Ambient temperature sensor: E60	4	BCM: M18	36	Yes

4. Check continuity between ambient temperature sensor harness connector E60 (A) terminal 4 and ground.

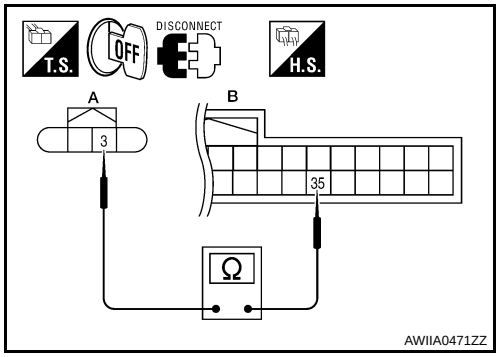
A		Ground	Continuity
Connector	Terminal		
Ambient temperature sensor: E60	4		No

Is the inspection result normal

YES >> Replace BCM. Refer to XXXX.
NO >> Repair harness or connector.

16. CHECK CONTINUITY OF AMBIENT TEMPERATURE SENSOR GROUND CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect BCM connector.
3. Check continuity between ambient temperature sensor harness connector E60 (A) terminal 3 and BCM harness connector M18 (B) terminal 35.



A		B		Continuity
Connector	Terminal	Connector	Terminal	
Ambient temperature sensor: E64	3	BCM: M18	35	Yes

Is the inspection result normal?

YES >> GO TO 17.
NO >> Repair harness or connector.

17. CHECK AMBIENT TEMPERATURE SENSOR

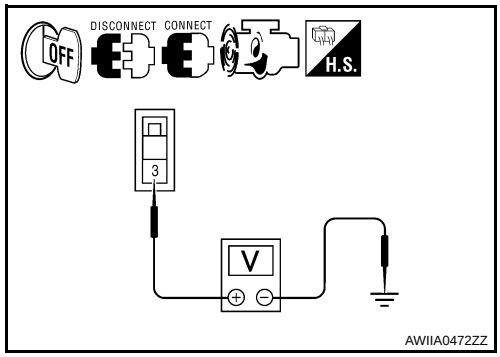
Refer to XX-XX, "*****".

Is the inspection result normal?

YES >> GO TO 18.
NO >> Replace ambient temperature sensor. Refer to XX.

18. CHECK PTC HEATER RELAY-1 POWER SUPPLY CIRCUIT

1. Disconnect PTC heater connector.
2. Reconnect all PTC relays.
3. Start the engine (1,000 RPM minimum).
4. Check voltage between PTC heater harness connector E65 terminal 3 and ground.



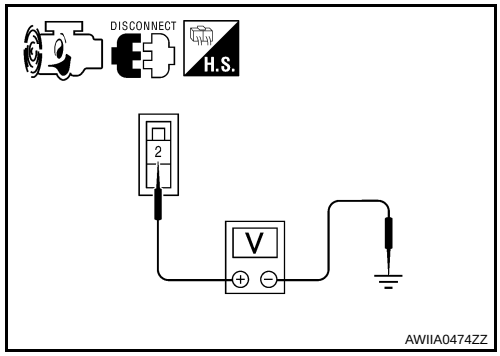
Terminals			Voltage (Approx.)
(+)		(–)	
Connector	Terminal	Ground	
PTC heater: E65	3		Battery voltage

Is the inspection result normal?

YES >> GO TO 19.
NO >> Repair harness or connector.

19. CHECK PTC HEATER RELAY-2 POWER SUPPLY CIRCUIT

Check voltage between PTC heater harness connector E65 terminal 2 and ground.



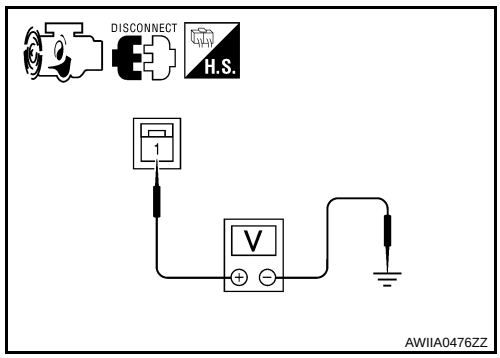
Terminals			Voltage (Approx.)
(+)		(–)	
Connector	Terminal	Ground	
PTC heater: E65	2		Battery voltage

Is the inspection result normal

YES >> GO TO 20.
NO >> Repair harness or connector.

20. CHECK PTC HEATER RELAY-3 POWER SUPPLY CIRCUIT

Check voltage between PTC heater harness connector E65 terminal 1 and ground.



Terminals			Voltage (Approx.)
(+)		(–)	
Connector	Terminal	Ground	
PTC heater: E65	1		Battery voltage

Is the inspection result normal

YES >> Replace PTC heater. Refer to XXXX.
NO >> Repair harness or connector.

PTC HEATER (1500 WATT) : PTC Heater (1500 Watt) Component Inspection

INFOID:0000000001679708

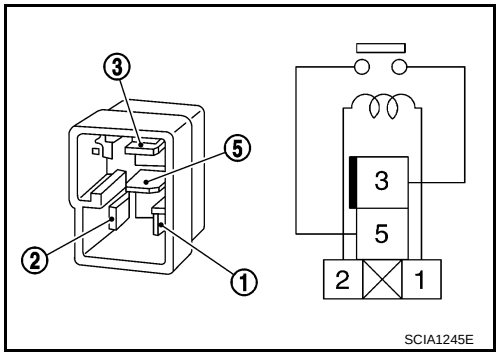
COMPONENT INSPECTION

Blower Relay

Check continuity between relay terminals 3 and 5.

Condition	Continuity
12V direct current supply between terminals 1 and 2	Yes
OFF	No

If NG, replace the blower relay. Refer to XX.

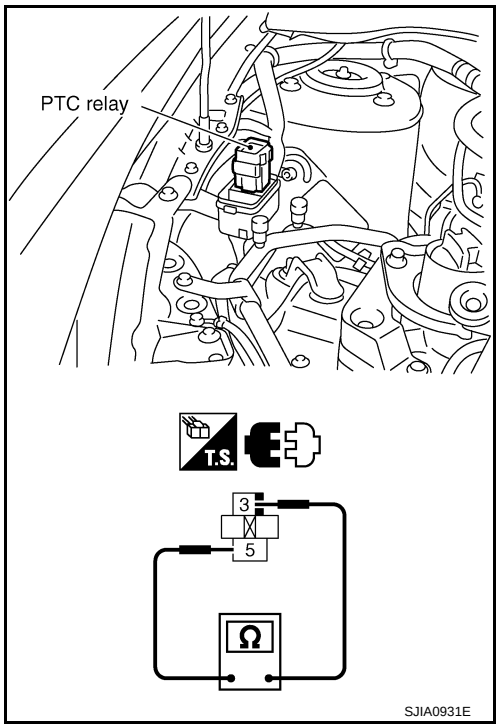


PTC relay

Check continuity between terminal Nos. 3 and 5.

Condition	Continuity
12V direct current supply between terminal Nos. 1 and 2	Yes
No current supply	No

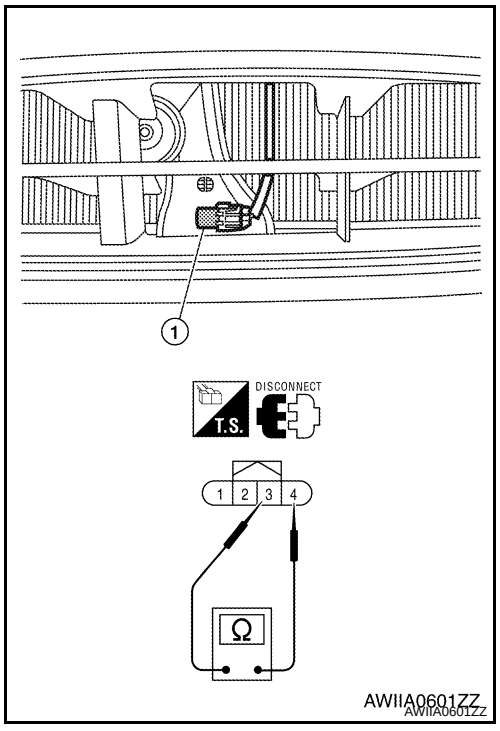
If NG, replace PTC relay. Refer to XX.



Ambient Sensor

After disconnecting ambient sensor connector E60, measure resistance between terminals 3 and 4 at sensor side, using the table below.

Temperature °C (°F)	Resistance kΩ
–15 (5)	12.73
–10 (14)	9.92
–5 (23)	7.80
0 (32)	6.19
5 (41)	4.95
10 (50)	3.99
15 (59)	3.24
20 (68)	2.65
25 (77)	2.19
30 (86)	1.81
35 (95)	1.51
40 (104)	1.27
45 (113)	1.07



If NG, replace ambient sensor. Refer to XX.

POWER SUPPLY AND GROUND CIRCUIT FOR CONTROLLER

Component Description

INFOID:0000000001547368

COMPONENT DESCRIPTION

Front air control

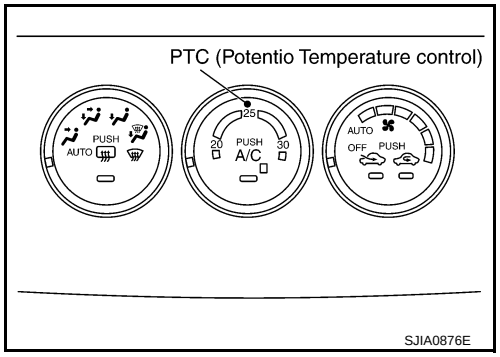
The front air control has a built-in microcomputer which processes information sent from various sensors needed for air conditioner operation. The air mix door motor, mode door motor, intake door motor, blower motor and compressor are then controlled.

The front air control is unitized with control mechanisms. Signal from various switches and Potentio Temperature Control (PTC) are directly entered into front air control

Self-diagnostic functions are also built into front air control to provide quick check of malfunctions in the auto air conditioner system.

Potentio Temperature Control (PTC)

The PTC is built into the front air control It can be set at an interval of 1°C (34°F) in the 18°C (64°F) to 32°C (90°F) temperature range by turning temperature control switch. The set temperature is displayed.



A/C Auto Amp. Component Function Check

INFOID:0000000001547369

SYMPTOM: A/C system does not come on.

INSPECTION FLOW

1. CONFIRM SYMPTOM BY PERFORMING OPERATIONAL CHECK - AUTO MODE

1. Rotate the mode dial to the AUTO position.
2. Display should indicate AUTO. Confirm that the compressor clutch engages (sound or visual inspection). (Discharge air and blower speed will depend on ambient, in-vehicle and set temperatures.)

Can a symptom be duplicated?

YES >> GO TO 3.
NO >> GO TO 2.

2. PERFORM COMPLETE OPERATIONAL CHECK

Perform a complete operational check and check for any symptoms. Refer to HAC-202, "Operational Check".

Can a symptom be duplicated?

YES >> Refer to HAC-201, "How to Perform Trouble Diagnosis For Quick And Accurate Repair".
NO >> System OK.

3. CHECK FOR SERVICE BULLETINS

Check for any service bulletins.

>> GO TO 4.

4. CHECK POWER AND GROUND CIRCUIT

Check main power supply and ground circuit. Refer to HAC-278, "A/C Auto Amp Power and Ground Diagnosis Procedure".

Is the inspection result normal?

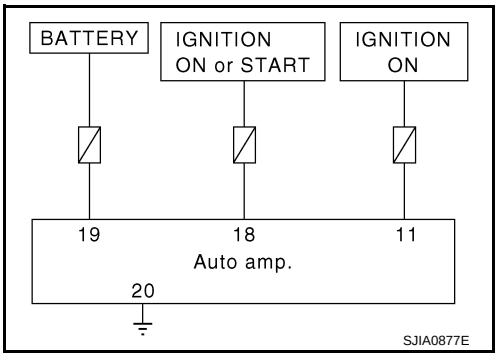
YES >> System OK.
NO >> Replace Front air control. Refer to XXXX.

A/C Auto Amp Power and Ground Diagnosis Procedure

INFOID:0000000001547370

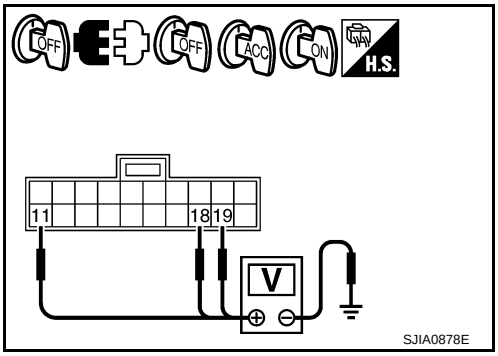
DIAGNOSTIC PROCEDURE FOR A/C SYSTEM

SYMPTOM: A/C system does not come on.



1. CHECK POWER SUPPLY CIRCUIT FOR FRONT AIR CONTROL.

1. Turn ignition switch OFF.
2. Disconnect front air control connector.
3. Check voltage between front air control harness connector and ground.



Terminals			Ignition switch position		
(+)		(-)	OFF	ACC	ON
Connector	Terminal				
front air control: M85	19	Ground	Battery voltage	Battery voltage	Battery voltage
	11		Approx. 0V	Approx. 0V	Battery voltage
	18		Approx. 0V	Approx. 0V	Battery voltage

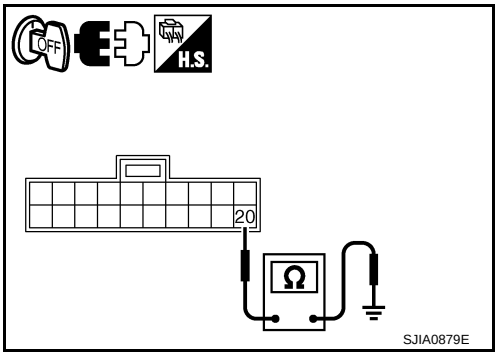
OK or NG

OK >> GO TO 2.

NG >> Check 10A fuses Nos. 2, 13 and 16, located in the fuse block (J/B).
- If fuses are OK, check harness for open circuit. Repair or replace if necessary.
- If fuses are NG, replace fuse and check harness for short circuit. Repair or replace if necessary.

2. CHECK GROUND CIRCUIT FOR FRONT AIR CONTROL

1. Turn ignition switch OFF.
2. Check continuity between front air control harness connector and ground.



Connector	Terminal	Ground	Continuity
front air control: M85	20		Yes

OK or NG

OK >> Replace front air control Refer to XX.

NG >> Repair or replace harness.

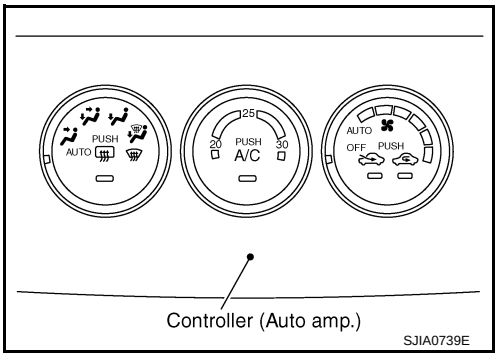
ECU DIAGNOSIS

AIR CONDITIONER CONTROL

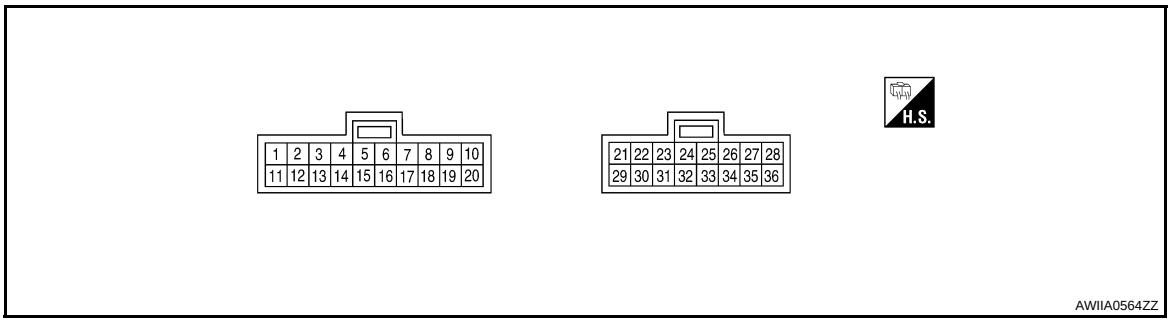
Front Air Control Terminals Reference Values

INFOID:0000000001547371

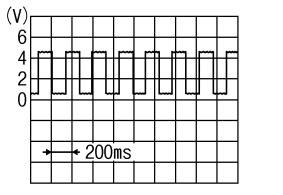
Measure voltage between each terminal and ground by following terminals and reference value for front air control

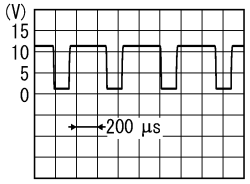
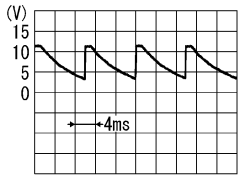
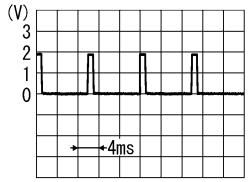
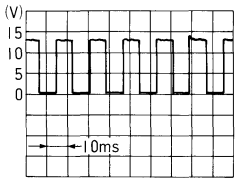
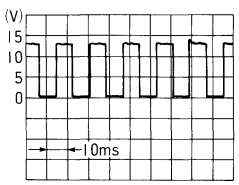


A/C FRONT AIR CONTROL HARNESS CONNECTOR TERMINAL LAYOUT



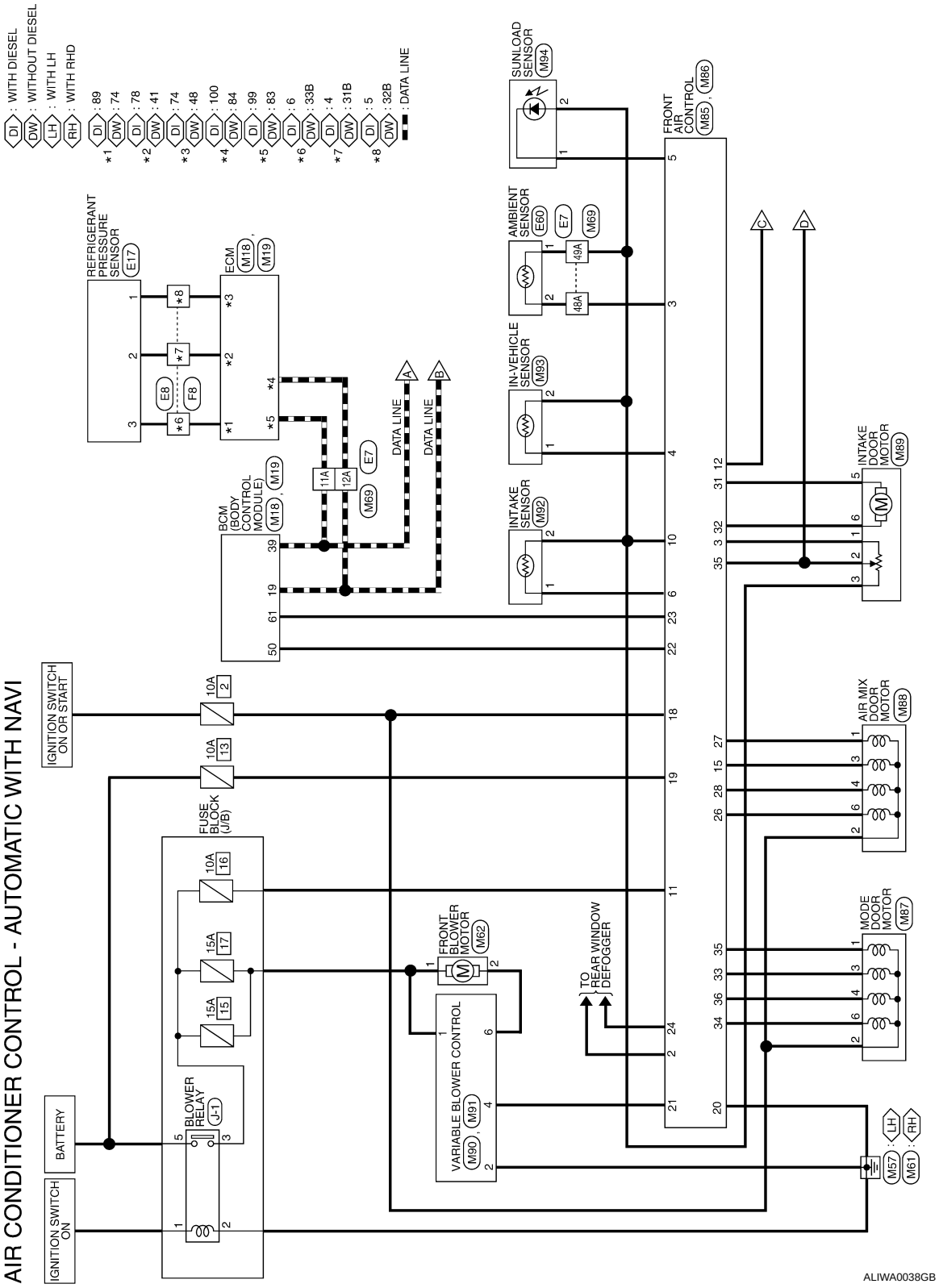
TERMINALS AND REFERENCE VALUE FOR FRONT AIR CONTROL

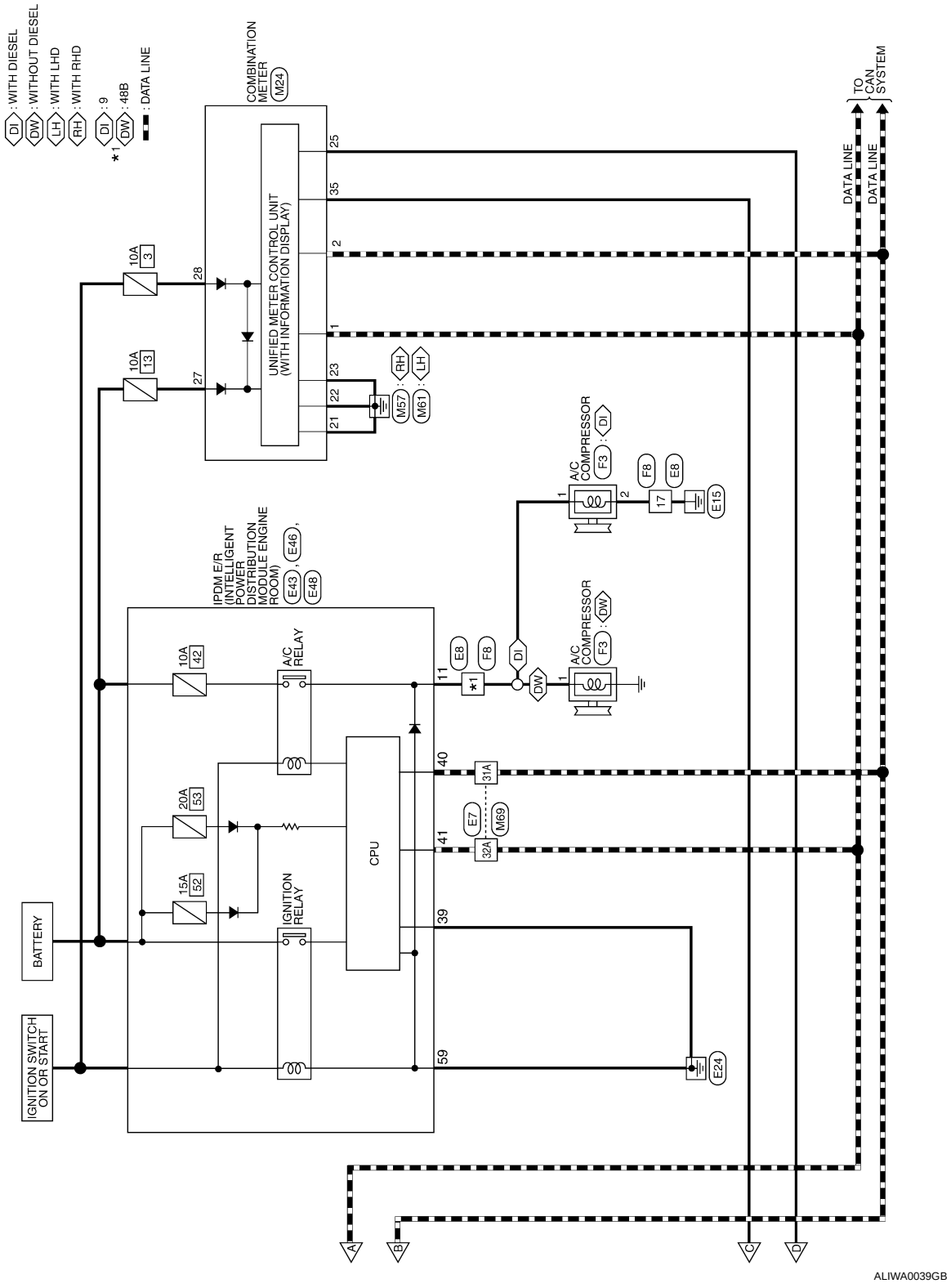
Terminal No.	Wire color	Item	Ignition switch	Condition	Voltage (V)
1	R	• Gas sensor • Power supply for intake door PBR (5V output)	ON	-	Approx. 5
2	R	Rear window defogger feedback signal	ON	Rear window defogger: ON	Approx. 12
3	SB	Ambient sensor	-	-	-
4	LG	In-vehicle sensor	-	-	-
5	P	Sunload sensor	-	-	-
6	O	Intake sensor	-	-	-
9	B	Illumination Ground	ON	-	Approx. 0
10	BR	Sensor ground	ON	-	Approx. 0
11	R	Power supply for IGN 2	ON	-	Battery voltage
12	BR	Engine coolant temperature sensor signal	ON	At idle (after warming up, approx. 80°C) **CAUTION:** **The waveforms vary depending on coolant temperature.**	 SKIB3651J
14	SB	Intake door motor feedback signal	ON	REC position	Approx. 5
				FRE position	Approx. 0

Terminal No.	Wire color	Item	Ignition switch	Condition		Voltage (V)
16	GR	Illumination signal	ON	Light switch: ON		Approx. 12
18	O	Power supply for IGN 1	ON	-		Battery voltage
19	LG	Power supply for BAT	OFF	-		Battery voltage
20	B	Ground	ON	-		Approx. 0
21	GR	Blower PWM	ON	FAN speed: 1st step (manual)		 ZJIA0863J
22	P	FAN ON signal	ON	FAN speed: 1st step (manual)		 ZJIA0583J
23	O	Compressor ON signal	ON	A/C switch: ON (Blower motor operates.)		 ZJIA0584J
24	W	Rear window defogger ON signal	ON	When rear window defogger switch is depressed.		Approx. 0
				When rear window defogger switch is released.		Approx. 5
25	BR	Air mix door motor drive signal	ON	Immediately after temperature adjustment dial operation.		 HAK0627D
26	G					
27	LG					
28	R					
30	V	PTC ON/OFF signal	ON	Blower fan: ON		Approx. 0
				Blower fan: OFF		Approx. 5
31	G	Intake door motor drive signal	ON	Intake switch	REC→FRE	Approx. 0
					FRE→REC	Approx. 12
32	V	Intake door motor drive signal	ON	Intake switch	REC→FRE	Approx. 12
					FRE→REC	Approx. 0
33	GR	Mode door motor drive signal	ON	Immediately after mode control dial operation.		 HAK0627D
34	W					
35	Y					
36	V					

Wiring Diagram - Air Conditioner Control -

INFOID:0000000001547372




DI : WITH DIESEL
DW : WITHOUT DIESEL
LH : WITH LHD
RH : WITH RHD
*1 DI : 9
DW : 48B
: DATA LINE
COMBINATION METER (M24)
UNIFIED METER CONTROL UNIT (WITH INFORMATION DISPLAY)
TO CAN SYSTEM
DATA LINE
DATA LINE
10A 3
10A 13
RH : M57
LH : M61
A/C COMPRESSOR F3 : DI
A/C COMPRESSOR F3 : DW
F8
E8
E15
17
IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM) E43, E46, E48
10A 42
A/C RELAY
20A 53
15A 52
IGNITION RELAY
CPU
*1
31A
32A
E7
M69
E24
BATTERY
IGNITION SWITCH ON OR START
ALIWA0039GB

AIR CONDITIONER CONTROL - AUTOMATIC WITH NAVI CONNECTORS

Connector No.	M18
Connector Name	BCM (BODY CONTROL MODULE)
Connector Color	WHITE

H.S.

20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1
40	39	38	37	36	35	34	33	32	31	30	29	28	27	26	25	24	23	22	21

Terminal No.	Color of Wire	Signal Name
19	L	CAN-H
35	BR	OAT SENSOR GND
36	V	OAT SENSOR
39	P	CAN-L

Connector No.	M19
Connector Name	BCM (BODY CONTROL MODULE)
Connector Color	WHITE

H.S.

52	51	50	49	48	47	46	45	44	43	42	41
64	63	62	61	60	59	58	57	56	55	54	53

Terminal No.	Color of Wire	Signal Name
50	P	BLOWER FAN SW
61	O	AIRCON SWITCH

Connector No.	M62
Connector Name	FRONT BLOWER MOTOR
Connector Color	WHITE

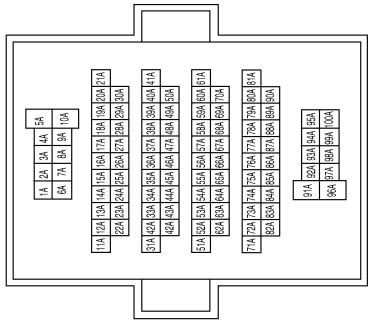
H.S.

1
2

Terminal No.	Color of Wire	Signal Name
1	R	—
2	Y	—

Connector No.	M69
Connector Name	WIRE TO WIRE
Connector Color	WHITE

H.S.



Terminal No.	Color of Wire	Signal Name
11A	P	—
12A	L	—
31A	P	—
32A	L	—
48A	V	—
49A	BR	—
60A	V	—
61A	BR	—

Connector No.	M84
Connector Name	PTC CONTROL UNIT
Connector Color	WHITE

H.S.

1	2	3	4	5	6
7	8	9	10	11	12

Terminal No.	Color of Wire	Signal Name
10	V	SENS
11	P	FAN ON

ALIIA0154GB

Connector No.	M85
Connector Name	FRONT AIR CONTROL
Connector Color	GRAY

H.S.

21	22	23	24	25	26	27	28
29	30	31	32	33	34	35	36

Terminal No.	Color of Wire	Signal Name
21	GR	FAN OUT
22	O	A/C ON O/P
23	P	FAN ON O/P
24	W	RR DEF SW O/P
25	BR	MIX 4
26	G	MIX 3
27	LG	MIX 2
28	R	MIX 1

Terminal No.	Color of Wire	Signal Name
31	G	REC
32	V	FRE
33	GR	MODE 4
34	W	MODE 3
35	Y	MODE 2
36	V	MODE 1

Connector No.	M86
Connector Name	FRONT AIR CONTROL
Connector Color	GRAY

H.S.

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20

Terminal No.	Color of Wire	Signal Name
1	R	5V OUT
2	R	RR DEF IND
3	SB	AMB
4	LG	INCAR
5	P	SUN
6	O	INTAKE

Terminal No.	Color of Wire	Signal Name
10	BR	SENS GND
11	R	IGN 2
12	BR	W/TEMP SIGNAL
14	SB	INT F/B
18	O	IGN 1
19	LG	BATT
20	B	GND

Connector No.	M87
Connector Name	MODE DOOR MOTOR
Connector Color	BLACK

H.S.

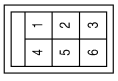
4	1
5	2
6	3

Terminal No.	Color of Wire	Signal Name
1	Y	MODE 2
2	O	IGN
3	GR	MODE 4
4	V	MODE 1
6	W	MODE 3

ALIIA0155GB

Connector No.	M88
Connector Name	AIR MIX DOOR MOTOR
Connector Color	BLACK

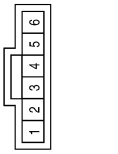
H.S.



Terminal No.	Color of Wire	Signal Name
1	LG	MIX 2
2	O	IGN
3	BR	MIX 4
4	R	MIX 1
6	G	MIX 3

Connector No.	M89
Connector Name	INTAKE DOOR MOTOR
Connector Color	WHITE

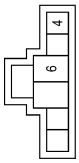
H.S.



Terminal No.	Color of Wire	Signal Name
1	R	5V
2	SB	INT_F/B
3	BR	GND
5	G	REC
6	V	FRE

Connector No.	M90
Connector Name	VARIABLE BLOWER CONTROL
Connector Color	GRAY

H.S.



Terminal No.	Color of Wire	Signal Name
4	GR	—
6	R	—

Connector No.	M91
Connector Name	VARIABLE BLOWER CONTROL
Connector Color	GRAY

H.S.



Terminal No.	Color of Wire	Signal Name
1	Y	—
2	B	—

Connector No.	M92
Connector Name	INTAKE SENSOR
Connector Color	WHITE

H.S.



Terminal No.	Color of Wire	Signal Name
1	O	—
2	BR	—

Connector No.	M93
Connector Name	IN-VEHICLE SENSOR
Connector Color	WHITE

H.S.



Terminal No.	Color of Wire	Signal Name
1	LG	—
2	BR	—

ALIIA0156GB

Connector No.	M94
Connector Name	SUNLOAD SENSOR
Connector Color	WHITE

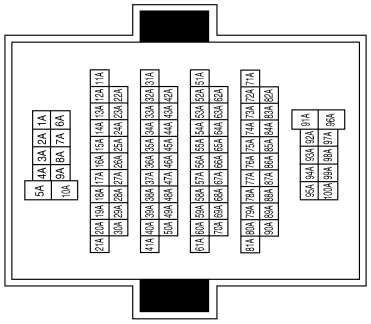
H.S.



Terminal No.	Color of Wire	Signal Name
1	P	
2	BR	

Connector No.	E7
Connector Name	WIRE TO WIRE
Connector Color	WHITE

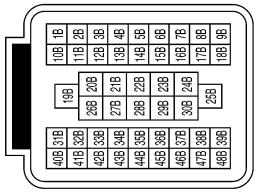
H.S.



Terminal No.	Color of Wire	Signal Name
11A	P	—
12A	L	—
31A	P	—
32A	L	—
48A	V	—
49A	BR	—
60A	LG	—
61A	G	—

Connector No.	E8
Connector Name	WIRE TO WIRE (WITH DIESEL)
Connector Color	BLACK

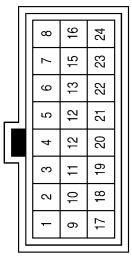
H.S.



Terminal No.	Color of Wire	Signal Name
31B	GR	—
32B	BR	—
33B	W	—
48B	W	—

Connector No.	E8
Connector Name	WIRE TO WIRE (WITH DIESEL)
Connector Color	BLACK

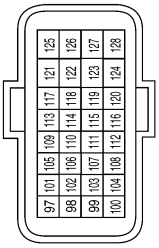
H.S.



Terminal No.	Color of Wire	Signal Name
4	GR	—
5	BR	—
6	W	—
9	W	—
17	B	—

Connector No.	E16
Connector Name	ECM (WITH DIESEL)
Connector Color	BLACK

H.S.



Terminal No.	Color of Wire	Signal Name
99	P	CAN-L
100	L	CAN-P

ALIIA0157GB

Connector No.	E16
Connector Name	ECM (WITHOUT DIESEL)
Connector Color	BLACK

H.S.

81	85	89	93	97	101	105	109
82	86	90	94	98	102	106	110
83	87	91	95	99	103	107	111
84	88	92	96	100	104	108	112

Terminal No.	Color of Wire	Signal Name
83	P	CAN-L
84	L	CAN-H

Connector No.	E43
Connector Name	IPDM E/R (INTELLIGENT POWER DISTRIBUTUION MODULE ENGINE ROOM)
Connector Color	WHITE

H.S.

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

Terminal No.	Color of Wire	Signal Name
11	W	A/C COMPRESSOR

Connector No.	E46
Connector Name	IPDM E/R (INTELLIGENT POWER DISTRIBUTUION MODULE ENGINE ROOM)
Connector Color	WHITE

H.S.

42	41	40	39	38	37
48	47	46	45	44	43

Terminal No.	Color of Wire	Signal Name
39	B	SIGNAL GND
40	P	CAN-L
41	L	CAN-H

Connector No.	E48
Connector Name	IPDM E/R (INTELLIGENT POWER DISTRIBUTUION MODULE ENGINE ROOM)
Connector Color	BLACK

H.S.

59	58	57
62	61	60

Terminal No.	Color of Wire	Signal Name
59	B	POWER GND

Connector No.	E60
Connector Name	AMBIENT SENSOR
Connector Color	BLACK

H.S.

1	2	3	4

Terminal No.	Color of Wire	Signal Name
1	BR	SENS GND A
2	V	SENS SIG A
3	G	SENS GND B
4	LG	SENS SIG B

Connector No.	F3
Connector Name	A/C COMPRESSOR (WITH DIESEL)
Connector Color	GRAY

H.S.

1	2

Terminal No.	Color of Wire	Signal Name
1	W	—
2	B	—

ALIIA0158GB

Connector No.	F3
Connector Name	A/C COMPRESSOR (WITHOUT DIESEL)
Connector Color	BLACK

H.S.

Terminal No.	Color of Wire	Signal Name
1	W	—

Connector No.	F8
Connector Name	WIRE TO WIRE (WITH DIESEL)
Connector Color	BLACK

H.S.

Terminal No.	Color of Wire	Signal Name
4	GR	—
5	BR	—
6	W	—
9	W	—
17	B	—

Connector No.	F8
Connector Name	WIRE TO WIRE (WITHOUT DIESEL)
Connector Color	BLACK

H.S.

Terminal No.	Color of Wire	Signal Name
31B	GR	—
32B	BR	—
33B	W	—
48B	W	—

Connector No.	F11
Connector Name	ECM (WITHOUT DIESEL)
Connector Color	BROWN

H.S.

Terminal No.	Color of Wire	Signal Name
41	GR	PDPRES
48	BR	GND-A (PDPRES)
74	W	AVCC (PDPRES)

Connector No.	F11
Connector Name	ECM (WITH DIESEL)
Connector Color	BROWN

H.S.

Terminal No.	Color of Wire	Signal Name
74	BR	FREON PRESS GND
78	GR	FREON PRESS
89	W	FREON PRESS SUPPLY

ALIIA0159GB

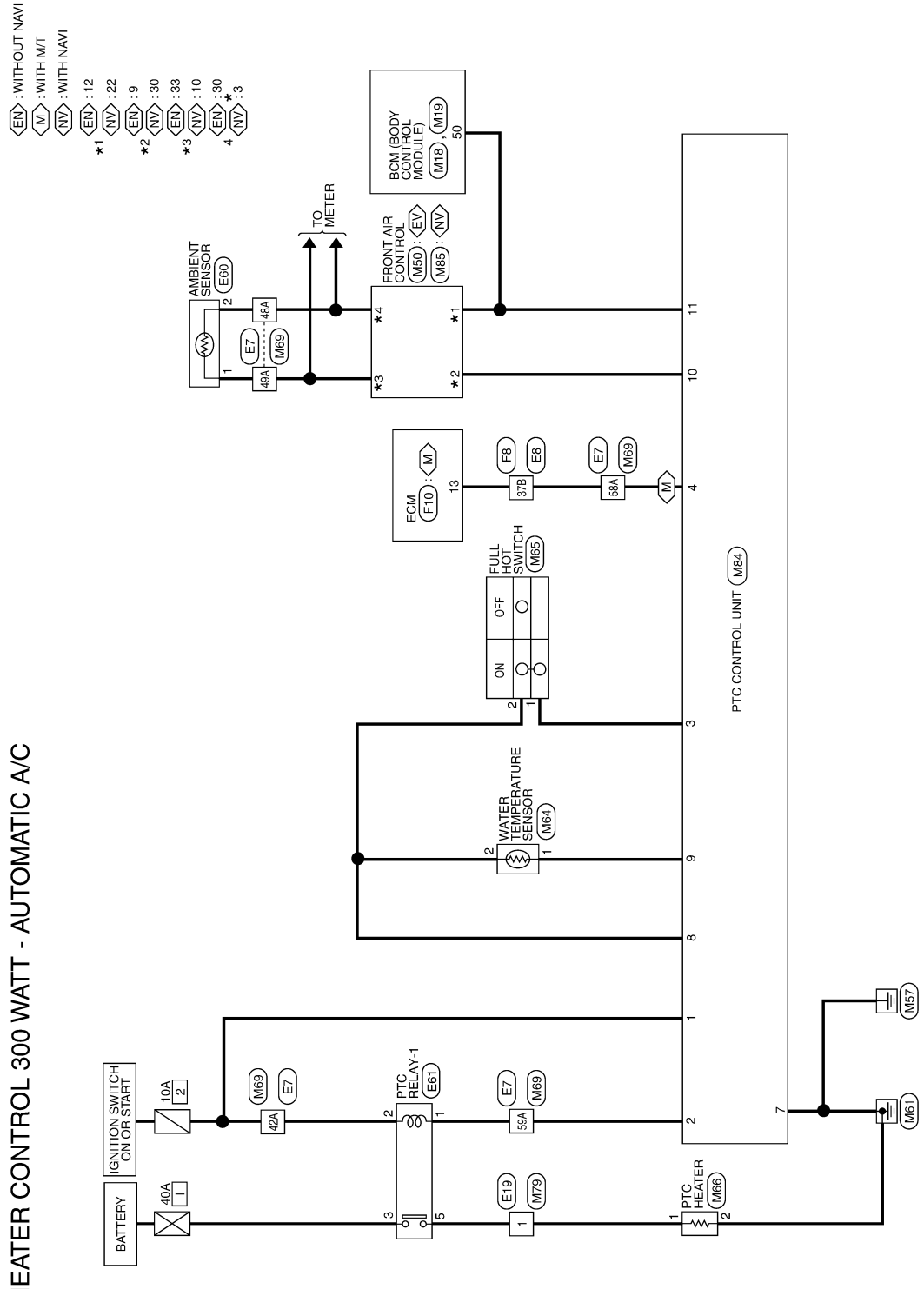
PTC HEATER CONTROL SYSTEM

PTC HEATER (300 WATT)

PTC HEATER (300 WATT) : Wiring Diagram - PTC Heater (300 Watt) -

INFOID:0000000001686215

PTC HEATER CONTROL 300 WATT - AUTOMATIC A/C



ALIWA0041GB

PTC HEATER CONTROL 300 WATT - AUTOMATIC A/C

Connector No.	M18
Connector Name	BCM (BODY CONTROL MODULE)
Connector Color	WHITE

H.S.

20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1
40	39	38	37	36	35	34	33	32	31	30	29	28	27	26	25	24	23	22	21

Terminal No.	Color of Wire	Signal Name
35	BR	OAT SENSOR GND
36	V	OAT SENSOR

Connector No.	M19
Connector Name	BCM (BODY CONTROL MODULE)
Connector Color	WHITE

H.S.

52	51	50	49	48	47	46	45	44	43	42	41
64	63	62	61	60	59	58	57	56	55	54	53

Terminal No.	Color of Wire	Signal Name
50	P	BLOWER FAN SW

Connector No.	M50
Connector Name	FRONT AIR CONTROL
Connector Color	BLACK

H.S.

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

Terminal No.	Color of Wire	Signal Name
9	V	PTC ON/OFF
12	P	FAN ON

Connector No.	M64
Connector Name	WATER TEMPERATURE SENSOR
Connector Color	WHITE

H.S.

1	2

Terminal No.	Color of Wire	Signal Name
1	BR	–
2	R	–

Connector No.	M65
Connector Name	FULL HOT SWITCH
Connector Color	WHITE

H.S.

2	1

Terminal No.	Color of Wire	Signal Name
1	Y	–
2	R	–

Connector No.	M66
Connector Name	PTC HEATER
Connector Color	BLACK

H.S.

1	2

Terminal No.	Color of Wire	Signal Name
1	Y	–
2	B	–

ALIIA0167GB

Connector No.	M79
Connector Name	WIRE TO WIRE
Connector Color	BLUE

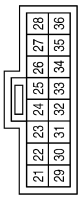
H.S.



Terminal No.	Color of Wire	Signal Name
1	Y	–

Connector No.	M85
Connector Name	FRONT AIR CONTROL
Connector Color	GRAY

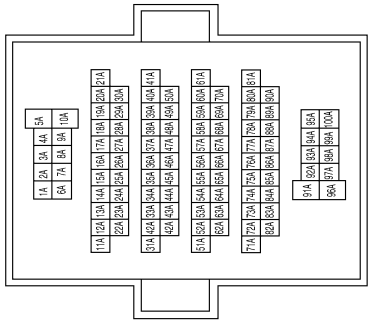
H.S.



Terminal No.	Color of Wire	Signal Name
22	O	A/C ON O/P
30	P	PTC ON/OFF

Connector No.	M69
Connector Name	WIRE TO WIRE
Connector Color	WHITE

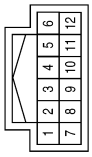
H.S.



Terminal No.	Color of Wire	Signal Name
42A	O	–
58A	SB	–
59A	W	–
60A	V	–
61A	BR	–

Connector No.	M84
Connector Name	PTC CONTROL UNIT
Connector Color	WHITE

H.S.

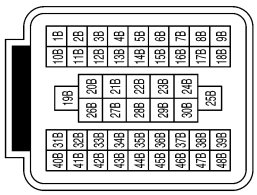


Terminal No.	Color of Wire	Signal Name
1	O	IGN
2	W	PTC
3	Y	F/H
4	SB	ENG
7	B	GND
8	BR	SEN GND
9	BR	SENS
10	V	SENS
11	P	FAN ON

ALIIA0168GB

Connector No.	E8
Connector Name	WIRE TO WIRE (WITHOUT DIESEL)
Connector Color	BLACK

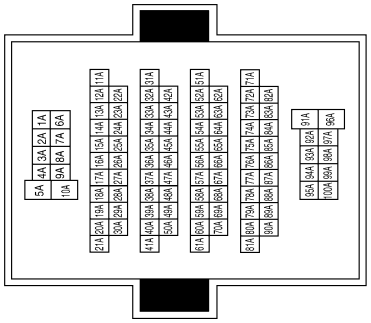
H.S.



Terminal No.	Color of Wire	Signal Name
37B	SB	–

Connector No.	E7
Connector Name	WIRE TO WIRE
Connector Color	WHITE

H.S.



Terminal No.	Color of Wire	Signal Name
42A	Y	–
58A	SB	–
59A	L	–
60A	LG	–
61A	G	–

Connector No.	E61
Connector Name	PTC RELAY 1
Connector Color	BLACK

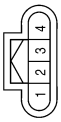
H.S.



Terminal No.	Color of Wire	Signal Name
1	Y	–
2	L	–
3	R	–
5	Y	–

Connector No.	E60
Connector Name	AMBIENT SENSOR
Connector Color	BLACK

H.S.



Terminal No.	Color of Wire	Signal Name
3	G	SENS GND B
4	LG	SENS SIG B

Connector No.	E19
Connector Name	WIRE TO WIRE
Connector Color	BLUE

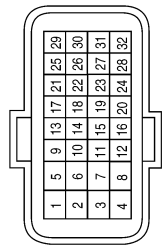
H.S.



Terminal No.	Color of Wire	Signal Name
1	Y	–

ALIIA0169GB

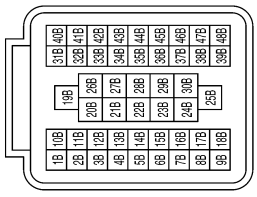
Connector No.	F10
Connector Name	ECM (WITHOUT DIESEL)
Connector Color	GRAY



H.S.

Terminal No.	Color of Wire	Signal Name
13	L	TACHO

Connector No.	F8
Connector Name	WIRE TO WIRE (WITHOUT DIESEL)
Connector Color	BLACK



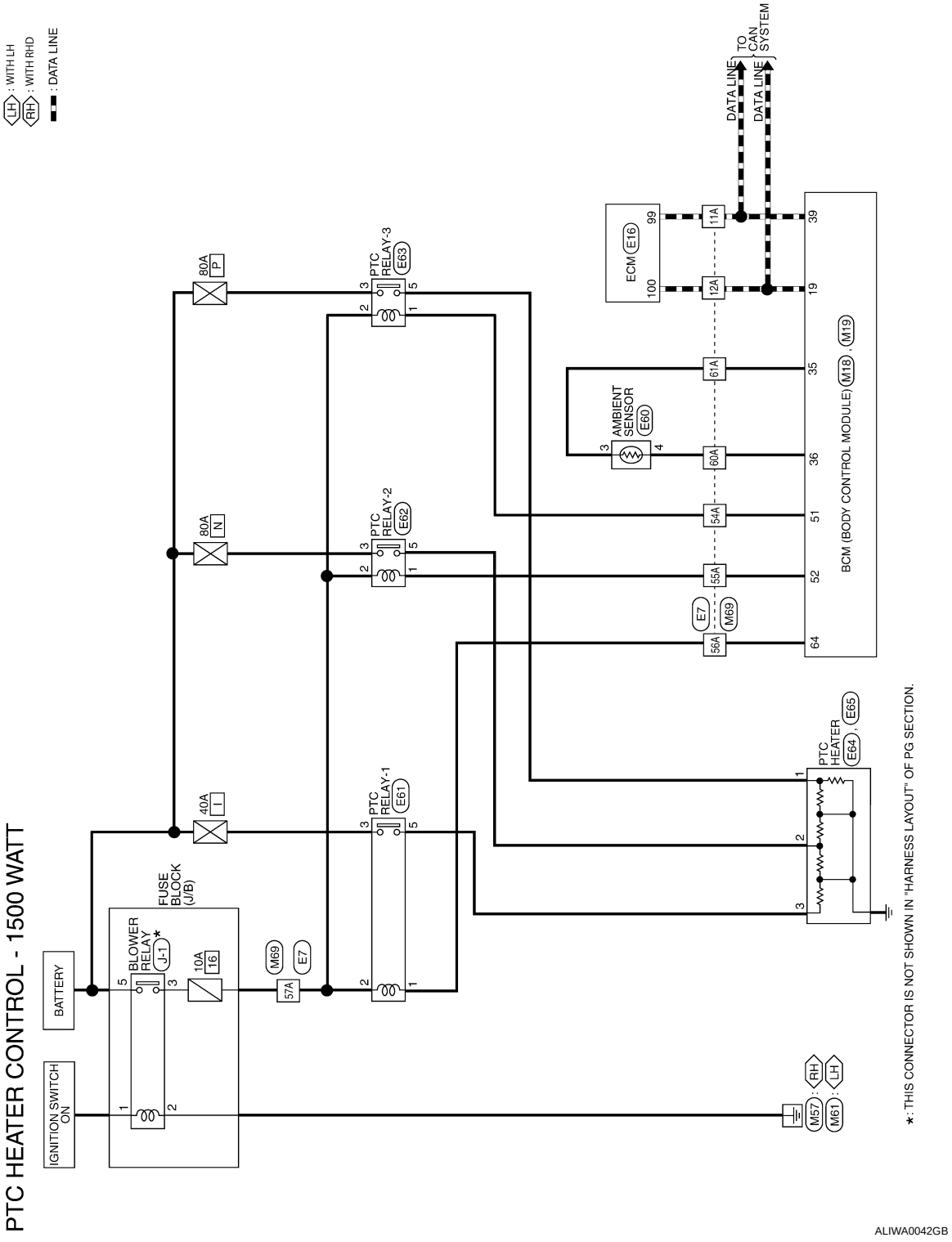
H.S.

Terminal No.	Color of Wire	Signal Name
37B	SB	–

ALIIA0170GB

PTC HEATER (1500 WATT)

PTC HEATER (1500 WATT) : Wiring Diagram - PTC Heater (1500 Watt) - INFOID:0000000001683835



PTC HEATER CONTROL - 1500 WATT CONNECTORS

Connector No.	M18
Connector Name	BCM (BODY CONTROL MODULE)
Connector Color	WHITE

H.S.

20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1
40	39	38	37	36	35	34	33	32	31	30	29	28	27	26	25	24	23	22	21

Terminal No.	Color of Wire	Signal Name
19	L	CAN-H
35	BR	OAT SENSOR GND
36	V	OAT SENSOR
39	P	CAN-L

Connector No.	M19
Connector Name	BCM (BODY CONTROL MODULE)
Connector Color	WHITE

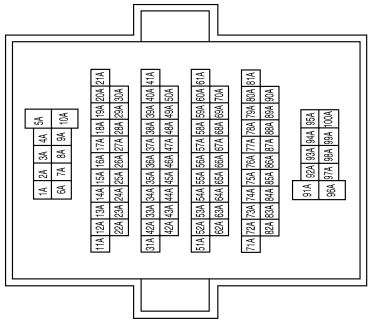
H.S.

52	51	50	49	48	47	46	45	44	43	42	41
64	63	62	61	60	59	58	57	56	55	54	53

Terminal No.	Color of Wire	Signal Name
51	L	PTC HEATER RELAY 3
52	GR	PTC HEATER RELAY 2
64	O	PTC HEATER RELAY 1

Connector No.	M69
Connector Name	WIRE TO WIRE
Connector Color	WHITE

H.S.

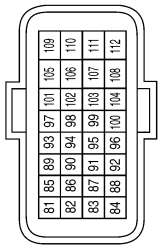


Terminal No.	Color of Wire	Signal Name
11A	P	–
12A	L	–
54A	L	–
55A	GR	–
56A	O	–
57A	G	–
60A	V	–
61A	BR	–

ALIIA0141GB

Connector No.	E16
Connector Name	ECM
Connector Color	BLACK

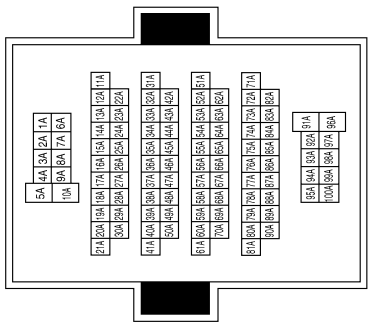
H.S.



Terminal No.	Color of Wire	Signal Name
99	P	CAN L
100	L	CAN L

Connector No.	E7
Connector Name	WIRE TO WIRE
Connector Color	WHITE

H.S.



Terminal No.	Color of Wire	Signal Name
11A	P	–
12A	L	–
54A	L	–
55A	GR	–
56A	O	–
57A	G	–
60A	V	–
61A	BR	–

Connector No.	E61
Connector Name	PTC RELAY 1
Connector Color	BLACK

H.S.



Terminal No.	Color of Wire	Signal Name
1	Y	–
2	L	–
3	R	–
5	Y	–

Connector No.	E62
Connector Name	PTC RELAY 2
Connector Color	BLACK

H.S.



Terminal No.	Color of Wire	Signal Name
1	G	–
2	GR	–
3	R	–
5	L	–

Connector No.	E60
Connector Name	AMBIENT SENSOR
Connector Color	BLACK

H.S.

Terminal No.	Color of Wire	Signal Name
3	G	SENS GND B
4	LG	SENS SIG B

ALIIA0142GB

Connector No.	E63
Connector Name	PTC RELAY 3
Connector Color	BLACK

H.S.

Terminal No.	Color of Wire	Signal Name
1	G	–
2	L	–
3	R	–
5	W	–

Connector No.	E64
Connector Name	PTC HEATER
Connector Color	BLACK

H.S.

Terminal No.	Color of Wire	Signal Name
1	W	–

Connector No.	E65
Connector Name	PTC HEATER
Connector Color	BLACK

H.S.

Terminal No.	Color of Wire	Signal Name
2	L	–
3	W	–

Connector No.	J-1
Connector Name	BLOWER RELAY 1
Connector Color	BLACK

H.S.

Terminal No.	Color of Wire	Signal Name
1	Y	–
2	L	–
3	R	–
5	Y	–

ALIIA0143GB

SYMPTOM DIAGNOSIS

AIR CONDITIONER CONTROL

Symptom Matrix Chart

INFOID:0000000001547373

SYMPTOM TABLE

Symptom	Reference Page	
A/C system does not come on.	Go to Trouble Diagnosis Procedure for A/C System.	HAC-278
Air outlet does not change.	Go to Trouble Diagnosis Procedure for Mode Door Motor.	HAC-222
Mode door motor does not operate normally.		
Discharge air temperature does not change.	Go to Trouble Diagnosis Procedure for Air Mix Door Motor.	HAC-226
Air mix door motor does not operate normally.		
Intake door does not change.	Go to Trouble Diagnosis Procedure for Intake Door Motor.	HAC-230
Intake door motor does not operate normally.		
Blower motor operation is malfunctioning.	Go to Trouble Diagnosis Procedure for Blower Motor.	HAC-234
Blower motor operation is malfunctioning under out of starting fan speed control.		
Magnet clutch does not engage.	Go to Trouble Diagnosis Procedure for Magnet Clutch.	HAC-239
Insufficient cooling	Go to Trouble Diagnosis Procedure for Insufficient Cooling.	HAC-299
Insufficient heating	Go to Trouble Diagnosis Procedure for Insufficient Heating.	HAC-307
Noise	Go to Trouble Diagnosis Procedure for Noise.	HAC-309
Self-diagnosis cannot be performed.	Go to Trouble Diagnosis Procedure for Self-diagnosis.	HAC-311
Memory function does not operate.	Go to Trouble Diagnosis Procedure for Memory Function.	HAC-312

INSUFFICIENT COOLING

Component Function Check

INFOID:0000000001547374

SYMPTOM: Insufficient cooling

INSPECTION FLOW

1.CONFIRM SYMPTOM BY PERFORMING OPERATIONAL CHECK - TEMPERATURE DECREASE

1. Press the AUTO switch.
2. Turn temperature control dial counterclockwise until 18° C (60° F) is displayed.
3. Check for cold air at discharge air outlets.

Can the symptom be duplicated?

YES >> GO TO 3.
NO >> GO TO 2.

2.CHECK FOR ANY SYMPTOMS

Perform a complete operational check for any symptoms. Refer to HAC-202, "Operational Check".

Does another symptom exist?

YES >> Refer to HAC-298, "Symptom Matrix Chart".
NO >> System OK.

3.CHECK FOR SERVICE BULLETINS

Check for any service bulletins.

>> GO TO 3.

4.PERFORM SELF-DIAGNOSIS

Perform self-diagnosis Refer to HAC-213, "Front Air Control Self-Diagnosis".

Is the inspection result normal?

YES >> GO TO 5.
NO >> Refer to HAC-218, "Front Air Control Self-Diagnosis Code Chart".

5.CHECK DRIVE BELTS

Check compressor belt tension. Refer to EM-15, "Checking" HR16DE EM-142, "Checking Drive Belts" or HR18DE or EM-263, "Inspection and Adjustment" K9K.

Is the inspection result normal?

OK >> GO TO 6.
NG >> Adjust or replace compressor belt. Refer to XX-XX, "*****".

6.CHECK AIR MIX DOOR OPERATION

Check and verify air mix door mechanism for smooth operation. Refer to HAC-225, "Air Mix Door Motor Component Function Check"

Does air mix door operate correctly?

YES >> GO TO 7.
NO >> Check air mix door motor circuit. Refer to HAC-226, "Air Mix Door Motor Diagnosis Procedure".

7.CHECK COOLING FAN MOTOR OPERATION

Check and verify cooling fan motor for smooth operation.

Does cooling fan motor operate correctly?

YES >> GO TO 8.
NO >> Check cooling fan motor. Refer to CO-18, "Component (Models with A/C)".

8.CHECK RECOVERY/RECYCLING EQUIPMENT BEFORE USAGE

Check recovery/recycling equipment before connecting to vehicle. Verify there is no pressure in the recovery/recycling equipment by checking the gauges. If pressure exists, recover refrigerant from equipment lines.

>> GO TO 9.

9.CHECK REFRIGERANT PURITY

1. Connect recovery/recycling equipment to vehicle.
2. Confirm refrigerant purity in supply tank using recovery/recycling and refrigerant identifier.

Is the inspection result normal?

YES >> GO TO 10.
NO >> Check contaminated refrigerant. Refer to HA-21, "HFC-134a (R-134a) Service Procedure".

10.CHECK FOR EVAPORATOR FREEZE UP

Start engine and run A/C. Check for evaporator freeze up.

Does evaporator freeze up?

YES >> Perform performance test diagnoses. Refer to HAC-300, "Performance Test Diagnoses".
NO >> GO TO 11.

11.CHECK REFRIGERANT PRESSURE

Check refrigerant pressure with manifold gauge connected. Refer to HAC-303, "Test Reading".

Is the inspection result normal?

YES >> Perform performance test diagnoses. Refer to HAC-300, "Performance Test Diagnoses".
NO >> GO TO 12.

12.CHECK AIR DUCTS

Check ducts for air leaks.

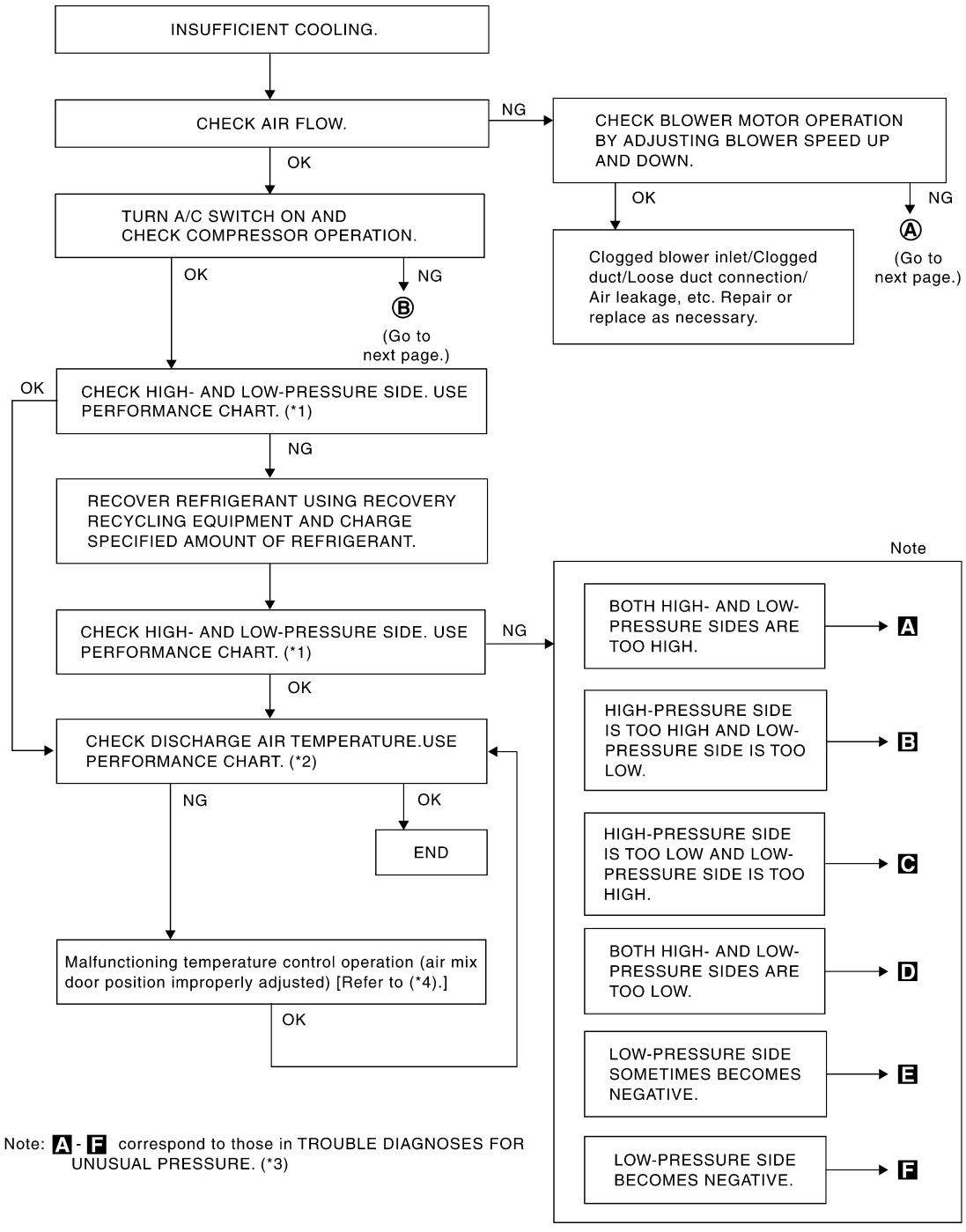
Is the inspection result normal?

YES >> System OK.
NO >> Repair air leaks.

Performance Test Diagnoses

INFOID:0000000001547375

PERFORMANCE TEST DIAGNOSIS

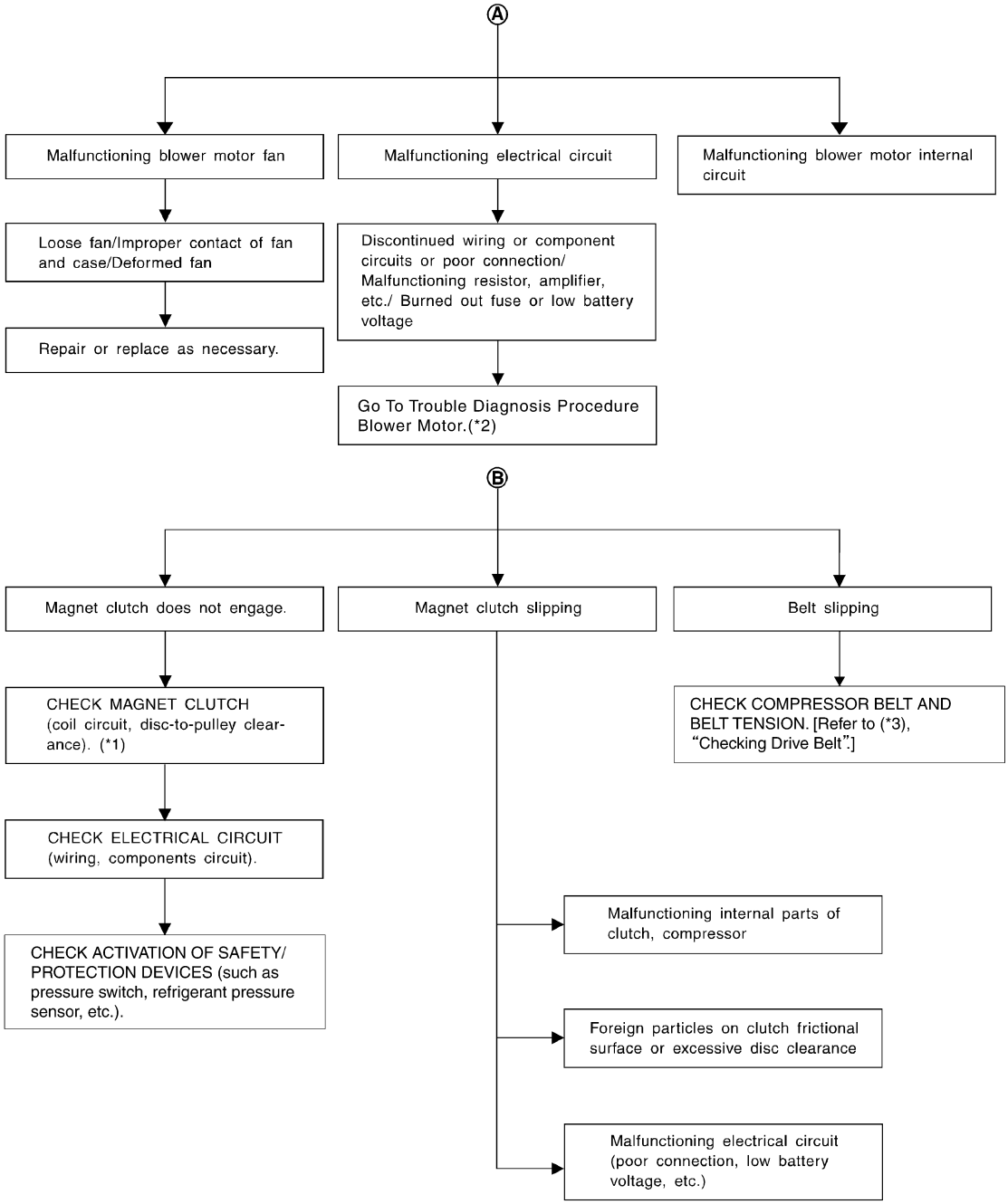


*1 HAC-302, "Performance Chart"

*2 HAC-302, "Performance Chart"

*3 HAC-303, "Trouble Diagnoses for Unusual Pressure"

*4 HAC-226, "Air Mix Door Motor Diagnosis Procedure"



RJIA3107E

*1 HA-32, "Removal and Installation of Compressor - MR18DE" or HA-34, "Removal and Installation of Compressor - HR16DE" or HA-35, "Removal and Installation of Compressor - K9K"

*2 HAC-233, "Front Blower Motor Component Function Check"

*3 EM-15, "Checking" (HR16DE) or EM-142, "Checking Drive Belts" (MR18DE) or EM-263, "Inspection and Adjustment" (K9K)

Performance Chart

INFOID:0000000001547376

PERFORMANCE CHART

Test Condition

Testing must be performed as follows:

Vehicle condition	Indoors or in the shade (in a well-ventilated place)
Doors	Closed
Door window	Open
Hood	Open
TEMP.	Max. COLD
Mode control dial	(Ventilation) set
Intake switch	(Recirculation) set
Blower speed	Max. speed set
Engine speed	Idle speed
Operate the air conditioning system for 10 minutes before taking measurements.	

Test Reading

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TEST READING

Recirculating-to-discharge Air Temperature Table

Inside air (Recirculating air) at blower assembly inlet		Discharge air temperature at center ventilator °C (°F)
Relative humidity %	Air temperature °C (°F)	
50 - 60	20 (68)	7.2 - 9.1 (45 - 48)
	25 (77)	11.4 - 13.8 (53 - 57)
	30 (86)	15.5 - 18.4 (60 - 65)
	35 (95)	20.3 - 23.7 (69 - 75)
60 - 70	20 (68)	9.1 - 10.9 (48 - 52)
	25 (77)	13.8 - 16.2 (57 - 61)
	30 (86)	18.4 - 21.3 (65 - 70)
	35 (95)	23.7 - 27.1 (75 - 81)

Ambient Air Temperature-to-operating Pressure Table

Ambient air		High-pressure (Discharge side) kPa (bar, kg/cm^2, psi)	Low-pressure (Suction side) kPa (bar, kg/cm^2, psi)
Relative humidity %	Air temperature °C (°F)		
50 - 70	20 (68)	843 - 1,036 *1 (11.08 - 13.63, 8.6 - 10.6, 122 - 150)	159.0 - 194.0 (1.59 - 1.94, 1.62 - 1.98, 23.1 - 28.1)
	25 (77)	1,094 - 1,338 *1 (10.94 - 13.38, 11.2 - 13.6, 159 - 194)	196.3 - 240.0 (1.96 - 2.40, 2.00 - 2.45, 28.5 - 34.8)
	30 (86)	1,298 - 1,590 *1 (12.98 - 15.90, 13.2 - 16.2, 188 - 231)	248.0 - 302.7 (2.48 - 3.03, 2.53 - 3.09, 36.0 - 43.9)
	35 (95)	1,383 - 1,688 *2 (13.83 - 16.88, 14.1 - 17.2, 201 - 245)	308.8 - 377.4 (3.09 - 3.77, 3.15 - 3.85, 44.8 - 54.7)
	40 (104)	1,628 - 1,988 *2 (16.28 - 19.88, 16.6 - 20.3, 236 - 288)	377.4 - 461.2 (3.77 - 4.61, 3.85 - 4.70, 54.7 - 66.8)

*1: In the blower motor low-speed control
*2: In the blower motor high-speed control

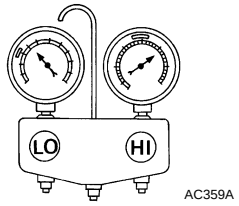
Trouble Diagnoses for Unusual Pressure

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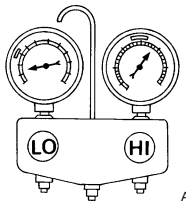
TROUBLE DIAGNOSIS FOR UNUSUAL PRESSURE

Whenever system's high and/or low side pressure(s) is/are unusual, diagnose using a manifold gauge. The marker above the gauge scale in the following tables indicates the standard (usual) pressure range. Since the standard (usual) pressure, however, differs from vehicle to vehicle, refer to above table (Ambient air temperature-to-operating pressure table).

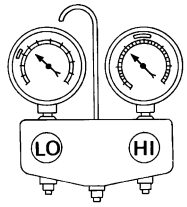
Both High- and Low-pressure Sides are Too High

Gauge indication	Refrigerant cycle	Probable cause	Corrective action
Both high- and low-pressure sides are too high.  AC359A	Pressure is reduced soon after water is splashed on condenser.	Excessive refrigerant charge in refrigeration cycle.	Reduce refrigerant until specified pressure is obtained.
	Air suction by cooling fan is insufficient.	Insufficient condenser cooling performance. ↓ 1. Condenser fins are clogged. 2. Improper fan rotation of cooling fan.	• Clean condenser. • Check and repair cooling fan if necessary.
	• Low-pressure pipe is not cold. • When compressor is stopped high-pressure value quickly drops by approximately 196 kPa (1.96 bar, 2 kg/cm^2, 28 psi). It then decreases gradually thereafter.	Poor heat exchange in condenser (After compressor operation stops, high-pressure decreases too slowly.). ↓ Air in refrigeration cycle.	Evacuate repeatedly and recharge system.
	Engine tends to overheat.	Engine cooling systems malfunction.	Check and repair each engine cooling system.
	• An area of the low-pressure pipe is colder than areas near the evaporator outlet. • Plates are sometimes covered with frost.	• Excessive liquid refrigerant on low-pressure side. • Excessive refrigerant discharge flow. • Expansion valve is open a little compared with the specification. ↓ Improper expansion valve adjustment.	Replace expansion valve.

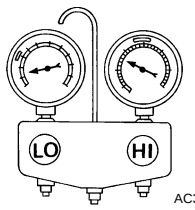
High-pressure Side is Too High and Low-pressure Side is Too Low

Gauge indication	Refrigerant cycle	Probable cause	Corrective action
High-pressure side is too high and low-pressure side is too low.  AC360A	Upper side of condenser and high-pressure side are hot, however, liquid tank is not so hot.	High-pressure tube or parts located between compressor and condenser are clogged or crushed.	• Check and repair or replace malfunctioning parts. • Check oil for contamination.

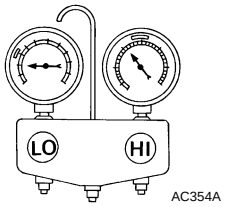
High-pressure Side is Too Low and Low-pressure Side is Too High

Gauge indication	Refrigerant cycle	Probable cause	Corrective action
High-pressure side is too low and low-pressure side is too high.  AC356A	High- and low-pressure sides become equal soon after compressor operation stops.	Compressor pressure operation is improper. ↓ Damaged inside compressor packings.	Replace compressor.
	No temperature difference between high- and low-pressure sides.	Compressor pressure operation is improper. ↓ Damaged inside compressor packings.	Replace compressor.

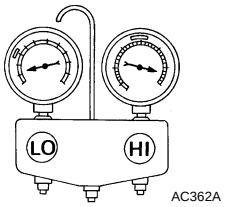
Both High- and Low-pressure Sides are Too Low

Gauge indication	Refrigerant cycle	Probable cause	Corrective action
Both high- and low-pressure sides are too low.  AC353A	• There is a big temperature difference between liquid tank outlet and inlet. Outlet temperature is extremely low. • Liquid tank inlet and expansion valve are frosted.	Liquid tank inside is slightly clogged.	• Replace liquid tank. • Check oil for contamination.
	• Temperature of expansion valve inlet is extremely low as compared with areas near liquid tank. • Expansion valve inlet may be frosted. • Temperature difference occurs somewhere in high-pressure side.	High-pressure pipe located between liquid tank and expansion valve is clogged.	• Check and repair malfunctioning parts. • Check oil for contamination.
	Expansion valve and liquid tank are warm or only cool when touched.	Low refrigerant charge. ↓ Leaking fittings or components	Check refrigerant for leaks. Refer to HA-22, "Checking of Refrigerant Leaks".
	There is a big temperature difference between expansion valve inlet and outlet while the valve itself is frosted.	Expansion valve closes a little compared with the specification. ↓ 1. Improper expansion valve adjustment. 2. Malfunctioning expansion valve. 3. Outlet and inlet may be clogged.	• Remove foreign particles by using compressed air. • Replace expansion valve. • Check oil for contamination.
	An area of the low-pressure pipe is colder than areas near the evaporator outlet.	Low-pressure pipe is clogged or crushed.	• Check and repair malfunctioning parts. • Check oil for contamination.
	Air flow volume is not enough or is too low.	Evaporator is frozen.	• Check intake sensor circuit. Refer to HAC-229, "Intake Door Motor Component Function Check". • Replace compressor. • Repair evaporator fins. • Replace evaporator. • Refer to HAC-233, "Front Blower Motor Component Function Check".

Low-pressure Side Sometimes Becomes Negative

Gauge indication	Refrigerant cycle	Probable cause	Corrective action
Low-pressure side sometimes becomes negative.  AC354A	• Air conditioning system does not function and does not cyclically cool the compartment air. • The system constantly functions for a certain period of time after compressor is stopped and restarted.	Refrigerant does not discharge cyclically. ↓ Moisture is frozen at expansion valve outlet and inlet. ↓ Water is mixed with refrigerant.	• Drain water from refrigerant or replace refrigerant. • Replace liquid tank.

Low-pressure Side Becomes Negative

Gauge indication	Refrigerant cycle	Probable cause	Corrective action
Low-pressure side becomes negative.  AC362A	Liquid tank or front/rear side of expansion valve's pipe is frosted or dewed.	High-pressure side is closed and refrigerant does not flow. ↓ Expansion valve or liquid tank is frosted.	Leave the system at rest until no frost is present. Start it again to check whether or not the malfunction is caused by water or foreign particles. • If water is the cause, initially cooling is okay. Then the water freezes causing a blockage. Drain water from refrigerant or replace refrigerant. • If due to foreign particles, remove expansion valve and remove the particles with dry and compressed air (not shop air). • If either of the above methods cannot correct the malfunction, replace expansion valve. • Replace liquid tank. • Check oil for contamination.

INSUFFICIENT HEATING

Component Function Check

INFOID:0000000001547379

SYMPTOM: Insufficient heating

INSPECTION FLOW

1.CONFIRM SYMPTOM BY PERFORMING OPERATIONAL CHECK - TEMPERATURE INCREASE

1. Press the AUTO switch.
2. Turn the temperature control dial (driver) clockwise until 32° C (90° F) is displayed.
3. Check for hot air at discharge air outlets.

Can this symptom be duplicated?

YES >> GO TO 2.
NO >> Perform complete system operational check. Refer to HAC-202, "Operational Check".

2.CHECK FOR SERVICE BULLETINS

Check for any service bulletins.

>> GO TO 3.

3.PERFORM SELF-DIAGNOSIS

Perform self-diagnosis. Refer to HAC-213, "Front Air Control Self-Diagnosis".

Is the inspection results normal?

YES >> GO TO 4.
NO >> Refer to HAC-218, "Front Air Control Self-Diagnosis Code Chart".

4.CHECK ENGINE COOLING SYSTEM

1. Check for proper engine coolant level. Refer to CO-11, "Inspection" (HR16DE) or CO-35, "Inspection" (HR18DE) or CO-58, "Inspection" (K9K).
2. Check hoses for leaks or kinks.
3. Check radiator cap. Refer to CO-14, "Checking Radiator Cap" (HR16DE) CO-38, "Checking Radiator Cap" or (HR18DE) or CO-60, "Checking Radiator Cap" (K9K).
4. Check for air in cooling system.

>> GO TO 5.

5.CHECK AIR MIX DOOR OPERATION

Check the operation of the air mix door. Refer to HAC-225, "Air Mix Door Motor Component Function Check".

Is the inspection result normal?

YES >> GO TO 6.
NO >> Check the air mix door motor circuit. Refer to HAC-226, "Air Mix Door Motor Diagnosis Procedure".

6.CHECK AIR DUCTS

Check for disconnected or leaking air ducts.

Is the inspection result normal?

YES >> GO TO 7.
NO >> Repair all disconnected or leaking air ducts.

7.CHECK HEATER HOSE TEMPERATURES

1. Start engine and warm it up to normal operating temperature.
2. Touch both the inlet and outlet heater hoses.

Is the inspection result normal?

YES >> Hot inlet hose and a warm outlet hose: GO TO 8.
NO >> • Inlet hose cold: GO TO 11.
• Both hoses warm: GO TO 9.

8.CHECK ENGINE COOLANT SYSTEM

Check engine control temperature sensor. Refer to XX-XX, "*****" HR16DE WITH EURO-OBD or XX-XX, "*****" HR16DE WITHOUT EURO-OBD or EC-808, "Component Inspection" MRDE or EC-1133, "Component Inspection" K9K.

Is the inspection result normal?

YES >> System OK.
NO >> Repair or replace as necessary. Retest.

9.CHECK HEATER HOSES

Check heater hoses for proper installation.

Is the inspection result normal?

YES >> System OK.
NO >> 1. Back flush heater core.
2. Drain the water from the system.
3. Refill system with new engine coolant. Refer to CO-11, "Changing Engine Coolant" HR16DE CO-35, "Changing Engine Coolant" HR18DE or CO-58, "Inspection" K9K.
4. GO TO 10 to retest.

10.CHECK HEATER HOSE TEMPERATURES

1. Start engine and warm it up to normal operating temperature.
2. Touch both the inlet and outlet heater hoses.

Is the inspection result normal?

YES >> System OK.
NO >> Replace heater core. Refer to XXXX.

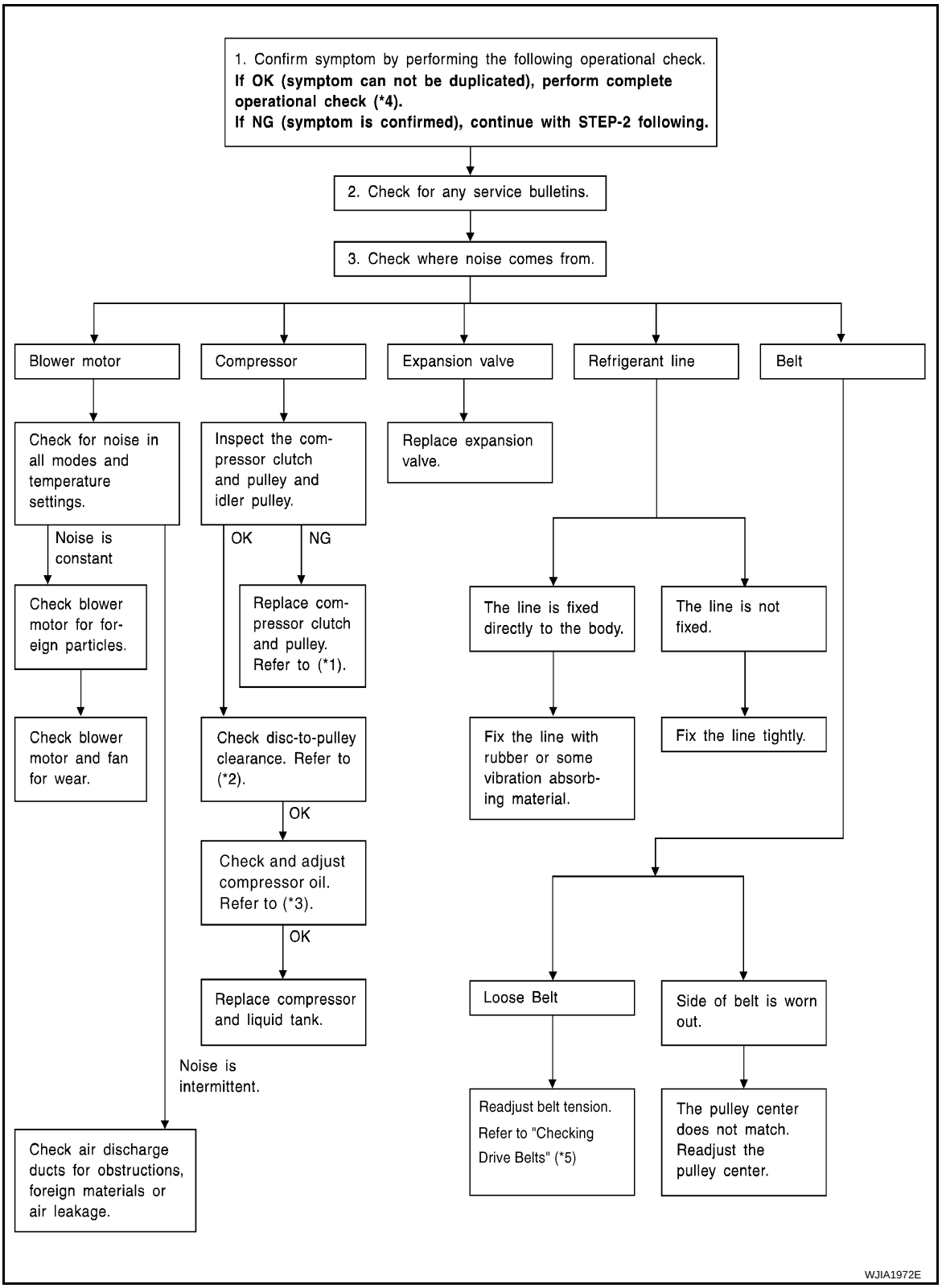
NOISE

Component Function Check

INFOID:0000000001547380

SYMPTOM: Noise

INSPECTION FLOW



*1 HA-32, "Removal and Installation of Compressor - MR18DE" or HA-34, "Removal and Installation of Compressor - HR16DE" or HA-35, "Removal and Installation of Compressor - K9K"

*2 HA-32, "Removal and Installation of Compressor - MR18DE" or HA-34, "Removal and Installation of Compressor - HR16DE" or HA-35, "Removal and Installation of Compressor - K9K"

*3 HA-19, "Maintenance of Oil Quantity in Compressor"

*4 HAC-202, "Operational Check"

5. EM-15, "Checking" (HR16DE) or EM-142, "Checking Drive Belts" (HR18DE) or EM-263, "Inspection and Adjustment" (K9K)

SELF-DIAGNOSIS CANNOT BE PERFORMED

Self-Diagnosis

INFOID:0000000001679728

SYMPTOM: Self-diagnosis cannot be performed.

INSPECTION FLOW

1. CONFIRM SYMPTOM BY PERFORMING OPERATIONAL CHECK - AUTO MODE

1. Press the AUTO switch.
2. Display should indicate AUTO. Discharge air and blower speed will depend on ambient, in-vehicle and set temperatures.

Can a symptom be duplicated?

YES >> GO TO 2.
NO >> Perform a complete operational check. Refer to XX-XX, "*****".

2. CHECK FOR SERVICE BULLETINS

Check for any service bulletins.

>> GO TO 3.

3. CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and ground circuit. Refer to XX-XX, "*****".

Is the inspection result normal?

YES >> Cause cannot be confirmed by self-diagnosis.
NO >> GO TO 4.

4. CHECK AMBIENT SENSOR CIRCUIT

Check ambient sensor circuit. Refer to XX-XX, "*****".

Is the inspection result normal?

YES >> GO TO 5.
NO >> Repair or replace as necessary.

5. CHECK IN-VEHICLE SENSOR CIRCUIT

Check in-vehicle sensor circuit. Refer to XX-XX, "*****".

Is the inspection result normal?

YES >> GO TO 6.
NO >> Repair or replace as necessary.

6. CHECK INTAKE SENSOR CIRCUIT

Check intake sensor circuit. Refer to XX-XX, "*****".

Is the inspection result normal?

YES >> GO TO 7.
NO >> Repair or replace as necessary.

7. CHECK AIR MIX DOOR MOTOR PBR CIRCUIT

Check air mix door motor PBR circuit. Refer to XX-XX, "*****".

Is the inspection result normal?

OK >> Perform a complete operational check and check for other symptoms. Refer to XX-XX, "*****".
NG >> Repair or replace as necessary.

MEMORY FUNCTION DOES NOT OPERATE

Memory Function Check

INFOID:0000000001682705

SYMPTOM: Memory function does not operate.

INSPECTION FLOW

1. CONFIRM SYMPTOM BY PERFORMING OPERATIONAL CHECK - MEMORY FUNCTION

1. Set the temperature to 32°C (90°F).
2. Rotate the front blower control dial (driver) to turn system OFF.
3. Turn ignition switch OFF.
4. Turn ignition switch ON.
5. Press the AUTO switch.
6. Confirm that the set temperature remains at previous temperature.
7. Rotate the front blower control dial (LH) to turn system OFF.

Can the symptom be duplicated?

YES >> GO TO 3.
NO >> GO TO 2.

2. PERFORM COMPLETE OPERATIONAL CHECK

Perform a complete operational check and check for any symptoms. Refer to HAC-87, "Operational Check".

Can a symptom be duplicated?

YES >> Refer to HAC-86, "How to Perform Trouble Diagnosis For Quick And Accurate Repair".
NO >> System OK.

3. CHECK FOR SERVICE BULLETINS

Check for any service bulletins.

>> GO TO 4.

4. PERFORM SELF-DIAGNOSIS

Perform self-diagnosis to check for any codes. Refer to HAC-98, "Front Air Control Self-Diagnosis".

Are any self-diagnosis codes present?

YES >> Refer to HAC-104, "A/C System Self-Diagnosis Code Chart".
NO >> GO TO 5.

5. CHECK POWER AND GROUND CIRCUIT

Check main power supply and ground circuit. Refer to HAC-163, "Front Air Control Component Function Check".

Is the inspection result normal?

YES >> GO TO 6.
NO >> Repair or replace as necessary.

6. RECHECK FOR SYMPTOMS

Perform a complete operational check for any symptoms. Refer to HAC-87, "Operational Check".

Does another symptom exist?

YES >> Refer to HAC-86, "How to Perform Trouble Diagnosis For Quick And Accurate Repair".
NO >> Replace A/C Auto amp. Refer to XX-XX, "*****".

PRECAUTION

PRECAUTIONS

Precaution for Supplemental Restraint System (SRS) "AIR BAG" and "SEAT BELT PRE-TENSIONER"

INFOID:0000000001548120

The Supplemental Restraint System such as “AIR BAG” and “SEAT BELT PRE-TENSIONER”, used along with a front seat belt, helps to reduce the risk or severity of injury to the driver and front passenger for certain types of collision. Information necessary to service the system safely is included in the SRS and SB section of this Service Manual.

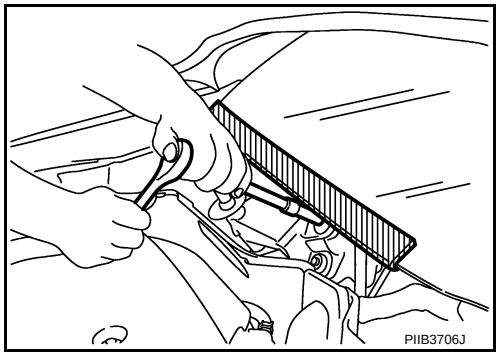
WARNING:

- **To avoid rendering the SRS inoperative, which could increase the risk of personal injury or death in the event of a collision which would result in air bag inflation, all maintenance must be performed by an authorized NISSAN/INFINITI dealer.**
- **Improper maintenance, including incorrect removal and installation of the SRS, can lead to personal injury caused by unintentional activation of the system. For removal of Spiral Cable and Air Bag Module, see the SRS section.**
- **Do not use electrical test equipment on any circuit related to the SRS unless instructed to in this Service Manual. SRS wiring harnesses can be identified by yellow and/or orange harnesses or harness connectors.**

Precaution for Procedures Without Cowl Top Cover

INFOID:0000000001548121

When performing the procedure after removing cowl top cover, cover the lower end of windshield with urethane, etc.



Working with HFC-134a (R-134a)

INFOID:0000000001547383

WARNING:

- **CFC-12 (R-12) refrigerant and HFC-134a (R-134a) refrigerant are not compatible. If the refrigerants are mixed compressor failure is likely to occur. Refer to XX-XX, "*****". To determine the purity of HFC-134a (R-134a) in the vehicle and recovery tank, use Refrigerant Recovery/Recycling Recharging equipment and Refrigerant Identifier.**
- **Use only specified oil for the HFC-134a (R-134a) A/C system and HFC-134a (R-134a) components. If oil other than that specified is used, compressor failure is likely to occur.**
- **The specified HFC-134a (R-134a) oil rapidly absorbs moisture from the atmosphere. The following handling precautions must be observed:**
- **When removing refrigerant components from a vehicle, immediately cap (seal) the component to minimize the entry of moisture from the atmosphere.**
- **When installing refrigerant components to a vehicle, do not remove the caps (unseal) until just before connecting the components. Connect all refrigerant loop components as quickly as possible to minimize the entry of moisture into system.**
- **Only use the specified oil from a sealed container. Immediately reseal containers of oil. Without proper sealing, oil will become moisture saturated and should not be used.**
- **Avoid breathing A/C refrigerant and oil vapor or mist. Exposure may irritate eyes, nose and throat. Remove HFC-134a (R-134a) from the A/C system using certified service equipment meeting requirements of SAE J2210 [HFC-134a (R-134a) recycling equipment], or J2209 [HFC-134a (R-134a) recycling equipment], If accidental system discharge occurs, ventilate work area before resuming service. Additional health and safety information may be obtained from refrigerant and oil manufacturers.**

- Do not allow A/C oil to come in contact with styrofoam parts. Damage may result.

CONTAMINATED REFRIGERANT

If a refrigerant other than pure HFC-134a (R-134a) is identified in a vehicle, your options are:

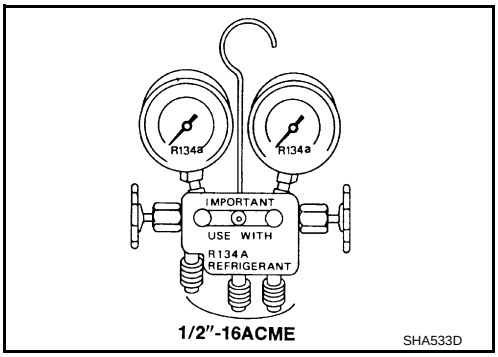
- Explain to the customer that environmental regulations prohibit the release of contaminated refrigerant into the atmosphere.
- Explain that recovery of the contaminated refrigerant could damage your service equipment and refrigerant supply.
- Suggest the customer return the vehicle to the location of previous service where the contamination may have occurred.
- If you choose to perform the repair, recover the refrigerant using only **dedicated equipment and containers. Do not recover contaminated refrigerant into your existing service equipment.** If your facility does not have dedicated recovery equipment, you may contact a local refrigerant product retailer for available service. This refrigerant must be disposed of in accordance with all federal and local regulations. In addition, replacement of all refrigerant system components on the vehicle is recommended.
- If the vehicle is within the warranty period, the air conditioner warranty is void. Please contact NISSAN Customer Affairs for further assistance.

Precaution for Service Equipment

INFOID:0000000001547384

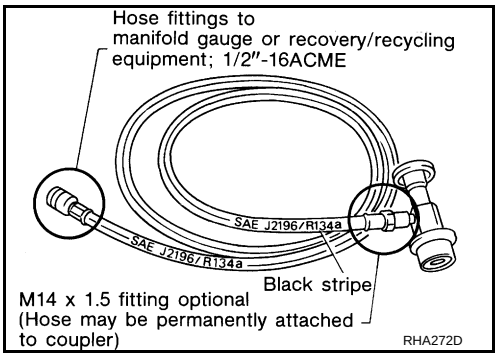
MANIFOLD GAUGE SET

Be certain that the gauge face indicates R-134a or 134a. Make sure the gauge set has 1/2″-16 ACME threaded connections for service hoses. Confirm the set has been used only with refrigerant HFC-134a (R-134a) along with specified oil.



SERVICE HOSES

Be certain that the service hoses display the markings described (colored hose with black stripe). All hoses must include positive shut-off devices (either manual or automatic) near the end of the hoses opposite the manifold gauge.



SERVICE COUPLERS

Never attempt to connect HFC-134a (R-134a) service couplers to a CFC-12 (R-12) A/C system. The HFC-134a (R-134a) couplers will not properly connect to the CFC-12 (R-12) system. However, if an improper connection is attempted, discharging and contamination may occur.

Shut-off valve rotation	A/C service valve
Clockwise	Open
Counterclockwise	Close

