# SECTION HAC

# HEATER & AIR CONDITIONING CONTROL SYSTEM

## CONTENTS

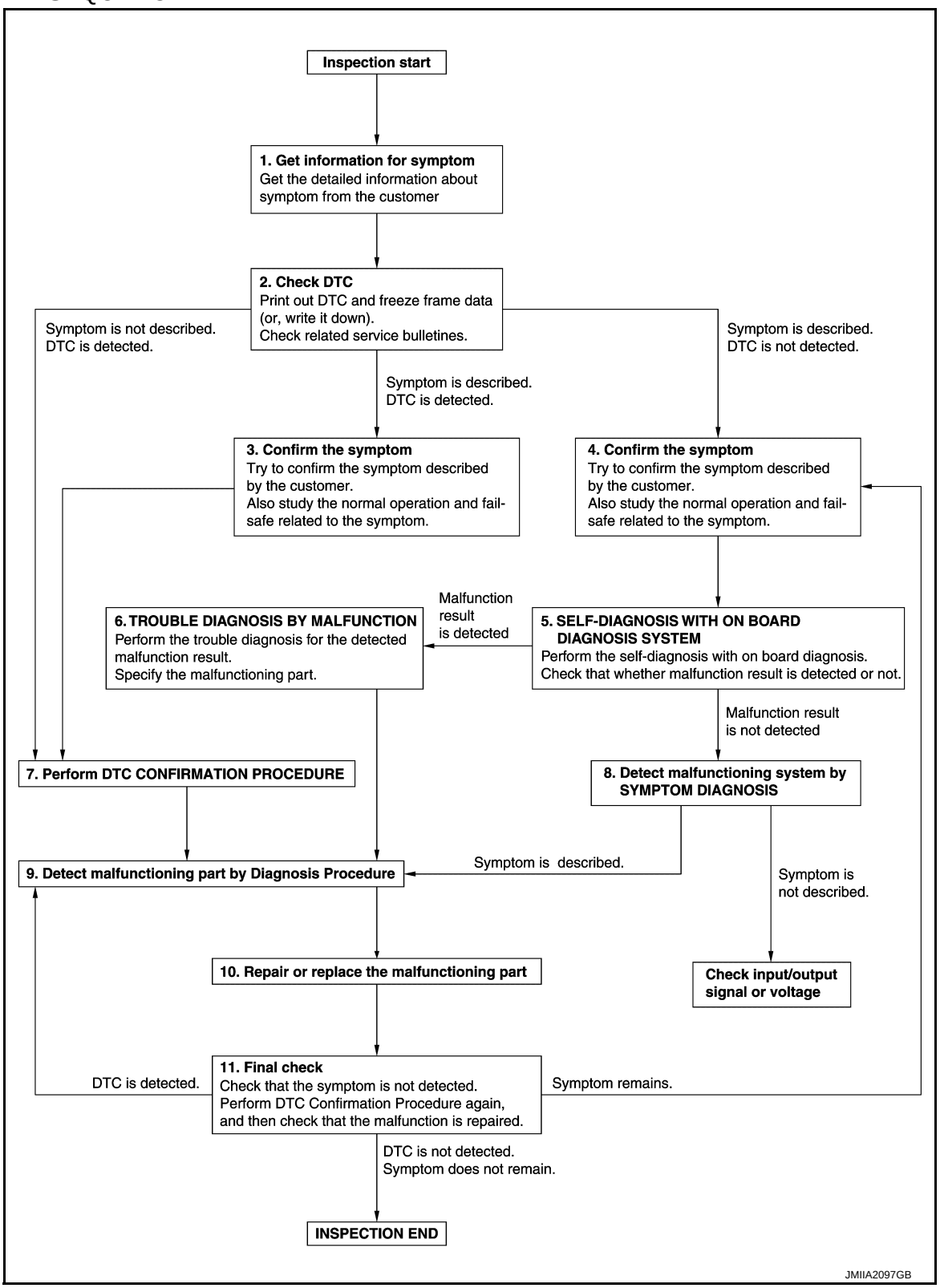
# BASIC INSPECTION

## DIAGNOSIS AND REPAIR WORKFLOW

### Work Flow

INFOID:0000000008293174

#### OVERALL SEQUENCE




#### DETAILED FLOW

## 1.GET INFORMATION FOR SYMPTOM

1. Get detailed information from the customer about the symptom (the condition and the environment when the incident/malfunction occurs).
2. Check operation condition of the function that is malfunctioning.

>> GO TO 2.

## 2.CHECK DTC

1. Check DTC.
2. Perform the following procedure if DTC is detected.

- Record DTC and freeze frame data (Print them out using CONSULT.)
- Erase DTC.
- Study the relationship between the cause detected by DTC and the symptom described by the customer.

3. Check related service bulletins for information.

Are any symptoms described and any DTC detected?

Symptom is described, DTC is detected>>GO TO 3.
Symptom is described, DTC is not detected>>GO TO 4.
Symptom is not described, DTC is detected>>GO TO 7.

## 3.CONFIRM THE SYMPTOM

Try to confirm the symptom described by the customer.
Also study the normal operation and fail-safe related to the symptom.
Verify relation between the symptom and the condition when the symptom is detected.

>> GO TO 7.

## 4.CONFIRM THE SYMPTOM

Try to confirm the symptom described by the customer.
Also study the normal operation and fail-safe related to the symptom.
Verify relation between the symptom and the condition when the symptom is detected.

>> GO TO 5.

## 5.SELF-DIAGNOSIS WITH ON BOARD DIAGNOSIS SYSTEM

Perform the self-diagnosis with on board diagnosis. Check that whether malfunction result is detected or not.

Is malfunction result detected?

YES >> GO TO 6.
NO >> GO TO 8.

## 6.TROUBLE DIAGNOSIS BY MALFUNCTION

Perform the trouble diagnosis for the detected malfunction result. Specify the malfunctioning part.

>> GO TO 9.

## 7.PERFORM DTC CONFIRMATION PROCEDURE

Perform DTC CONFIRMATION PROCEDURE for the detected DTC, and then check that DTC is detected again. At this time, always connect CONSULT to the vehicle, and check self diagnostic results in real time.
If two or more DTCs are detected, refer to DTC INSPECTION PRIORITY CHART, and determine trouble diagnosis order.

**NOTE:**

- Freeze frame data is useful if the DTC is not detected.
- Perform Component Function Check if DTC CONFIRMATION PROCEDURE is not included on Service Manual. This simplified check procedure is an effective alternative though DTC cannot be detected during this check.
  If the result of Component Function Check is NG, it is the same as the detection of DTC by DTC CONFIRMATION PROCEDURE.

Is DTC detected?

YES >> GO TO 9.
NO >> Check according to GI-43, "Intermittent Incident".

## 8. DETECT MALFUNCTIONING SYSTEM BY SYMPTOM DIAGNOSIS

Detect malfunctioning system according to SYMPTOM DIAGNOSIS based on the confirmed symptom in step 4, and determine the trouble diagnosis order based on possible causes and symptom.

Is the symptom described?

YES >> GO TO 9.
NO >> Monitor input data from related sensors or check voltage of related module terminals using CONSULT.

## 9. DETECT MALFUNCTIONING PART BY DIAGNOSIS PROCEDURE

Inspect according to Diagnosis Procedure of the system.

Is malfunctioning part detected?

YES >> GO TO 10.
NO >> Check according to GI-43, "Intermittent Incident".

## 10. REPAIR OR REPLACE THE MALFUNCTIONING PART

1. Repair or replace the malfunctioning part.
2. Reconnect parts or connectors disconnected during Diagnosis Procedure again after repair and replacement.
3. Check DTC. If DTC is detected, erase it.

>> GO TO 11.

## 11. FINAL CHECK

When DTC is detected in step 2, perform DTC CONFIRMATION PROCEDURE again, and then check that the malfunction is repaired securely.
When symptom is described by the customer, refer to confirmed symptom in step 3 or 4, and check that the symptom is not detected.

Is DTC detected and does symptom remain?

YES-1 >> DTC is detected: GO TO 9.
YES-2 >> Symptom remains: GO TO 4.
NO >> Before returning the vehicle to the customer, always erase DTC.

# INSPECTION AND ADJUSTMENT
# WITHOUT PLASMACLUSTER SYSTEM

## WITHOUT PLASMACLUSTER SYSTEM : Description & Inspection

INFOID:0000000008293175

### DESCRIPTION

The purpose of the operational check is to check that the individual system operates normally.

**Conditions : Engine running at normal operating temperature**

### INSPECTION PROCEDURE

#### 1.CHECK MEMORY FUNCTION

1. Start the engine.
2. Turn temperature control dial (driver side) clockwise until 32.0°C (90°F) is displayed.
3. Press the OFF switch.
4. Turn the ignition switch OFF.
5. Turn the ignition switch ON.
6. Press the AUTO switch.
7. Check that the temperature setting before turning the ignition switch OFF is stored.

Is the inspection result normal?

YES >> GO TO 2
NO >> Memory function malfunction: HAC-162, "Inspection procedure".

#### 2.CHECK BLOWER MOTOR SPEED

1. Start the engine.
2. Press fan (UP: +) switch*1 (turn fan control dial clockwise*2). Check that the fan speed is changed. Check the operation for all fan speeds.
   **NOTE:**
   *1: With left and right ventilation temperature separately system.
   *2: Without left and right ventilation temperature separately system.
3. Set the fan speed to max speed.

Is the inspection result normal?

YES >> GO TO 3
NO >> Blower motor system malfunction: HAC-91, "Diagnosis Procedure".

#### 3.CHECK DISCHARGE AIR

1. Press the MODE switch and the DEF switch.
2. Each position indicator should change shape.
3. Confirm that discharge air comes out according to the air distribution table as follows:

Without rear ventilation

| Discharge air flow | | | | | |
|---|---|---|---|---|---|
| Mode position indication | Condition | Air outlet/distribution | | | |
| | | VENT | FOOT | | DEF |
| | | | Front | Rear | |
| | DUAL switch: OFF* | 100% | — | — | — |
| | | 53% | 29% | 18% | — |
| | | 11% | 39% | 24% | 26% |
| | | 9% | 33% | 21% | 37% |
| | | 16% | — | — | 84% |

*: With left and right ventilation temperature separately control system.

With rear ventilation

| Discharge air flow | | | | | | |
|---|---|---|---|---|---|---|
| Mode position indication | Condition | Air outlet/distribution | | | | |
| | | VENT | | FOOT | | DEF |
| | | Front | Rear | Front | Rear | |
| | DUAL switch: OFF*<br>Rear ventilator: OPEN | 88% | 12% | — | — | — |
| | | 49% | 10% | 25% | 16% | — |
| | | 10% | 12% | 33% | 22% | 23% |
| | | 9% | 11% | 29% | 18% | 33% |
| | | 15% | — | — | — | 85% |

*: With left and right ventilation temperature separately control system.

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

Is the inspection result normal?

YES >> GO TO 4
NO >> Mode door system malfunction: HAC-82, "Diagnosis Procedure".

## 4. CHECK INTAKE AIR

1. Press intake switch. REC indicator turns ON.
2. Press intake switch again. FRE indicator turns ON.
3. Listen for intake door position change. (Slight change of blower sound can be heard.)

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

Is the inspection result normal?

YES >> GO TO 5
NO >> Intake door system malfunction: HAC-89, "Diagnosis Procedure".

## 5. CHECK A/C SWITCH

1. Press the A/C switch.
2. A/C switch indicator turns ON.
   Confirm that the compressor clutch engages (sound or visual inspection).

Is the inspection result normal?

YES >> GO TO 6
NO >> Magnet clutch system malfunction: HAC-95, "Diagnosis Procedure".

## 6. CHECK WITH TEMPERATURE SETTING LOWERED

1. Turn temperature control dial (driver side) counterclockwise until 18°C (64°F) is displayed.
2. Check that the cool air blows from the outlets.

Is the inspection result normal?

YES >> GO TO 7
NO >> Insufficient cooling: HAC-155, "Inspection procedure".

## 7. CHECK WITH TEMPERATURE SETTING RAISED

1. Turn temperature control dial (driver side) clockwise until 32°C (90°F) is displayed.
2. Check that the warm air blows from the outlets.

Is the inspection result normal?

YES-1 >> With left and right ventilation temperature separately system. GO TO 8
YES-2 >> Without left and right ventilation temperature separately system. GO TO 9
NO >> Insufficient heating: HAC-157, "Inspection procedure".

## 8. CHECK LEFT AND RIGHT VENTILATION TEMPERATURE SEPARATELY CONTROL SYSTEM FUNCTION

1. Press the DUAL switch, and then check that “DUAL” is shown on the display.
2. Operate temperature control dial (driver side). Check that the discharge air temperature (driver side) changes.
3. Operate the temperature control dial (passenger side). Check that the discharge air temperature (passenger side) changes.
4. Press the DUAL switch, and then check that the temperature setting (LH/RH) is unified to the driver side temperature setting.

Is the inspection result normal?

YES >> GO TO 9.
NO >> Refer to HAC-153, "Diagnosis Chart By Symptom" and perform the appropriate diagnosis.

## 9. CHECK AUTO MODE

1. Press the AUTO switch, and then check that “AUTO” is shown on the display.
2. Check that the discharge air and fan speed depend on ambient temperature, in-vehicle temperature and temperature setting.

Is the inspection result normal?

YES >> INSPECTION END
NO >> Refer to HAC-153, "Diagnosis Chart By Symptom" and perform the appropriate diagnosis.

# WITHOUT PLASMACLUSTER SYSTEM : Temperature Setting Trimmer

INFOID:0000000008293176

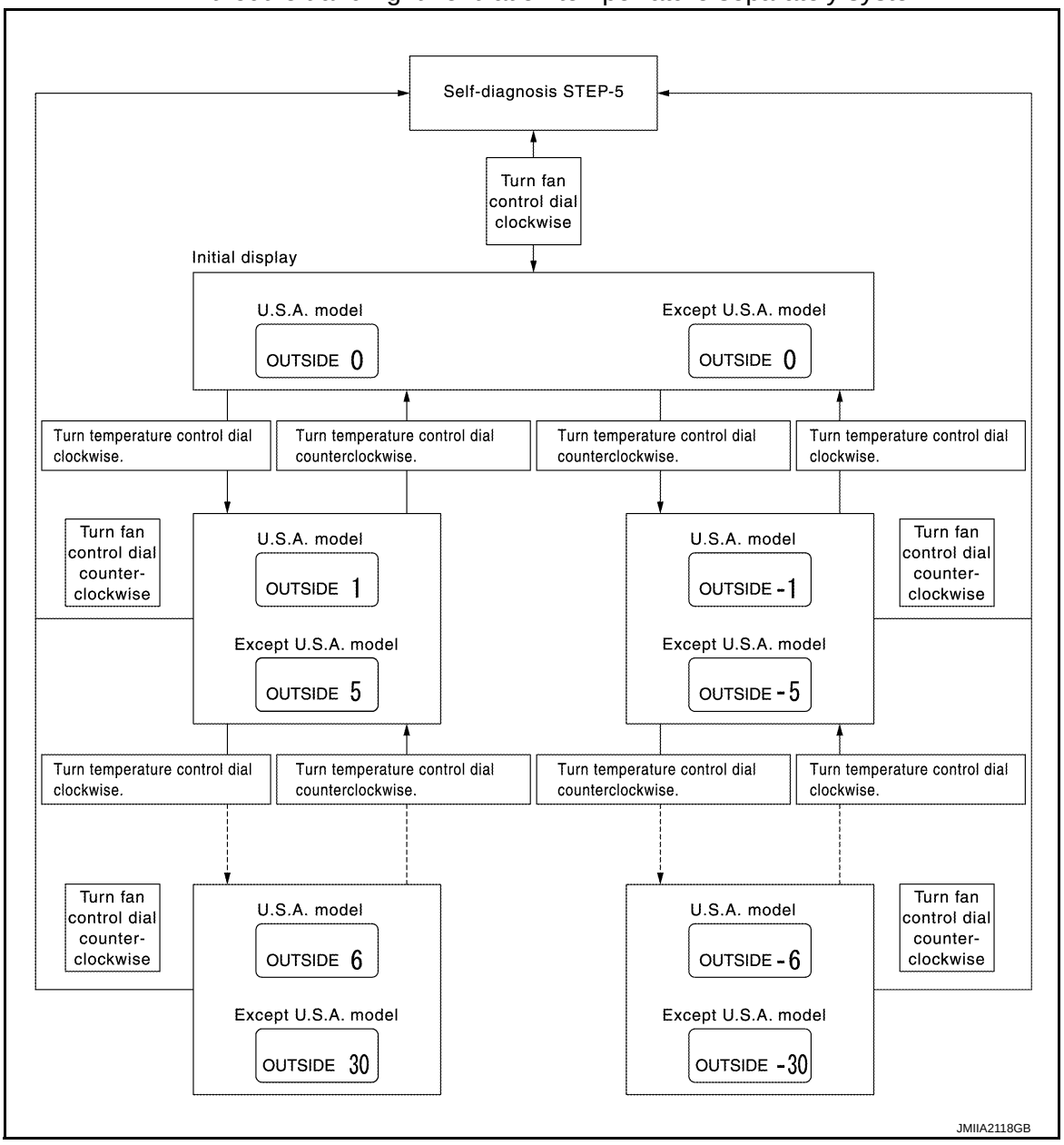
## DESCRIPTION

The trimmer compensates for differences in range of ±3°C (±6°F) between temperature setting (displayed digitally) and temperature felt by customer.

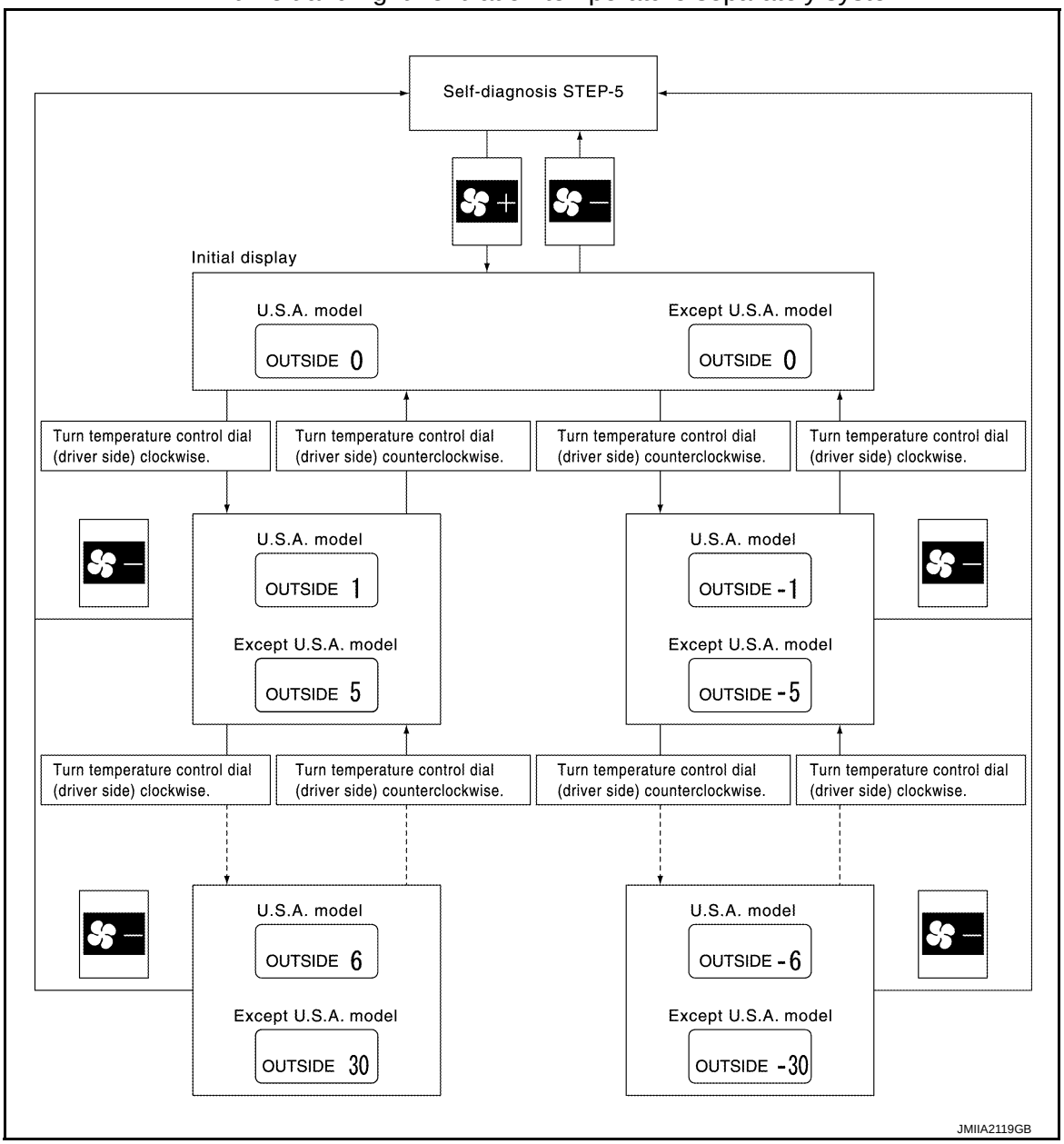
Operating procedures for this trimmer are as per the following:

1. Begin self-diagnosis STEP-5 mode. Refer to HAC-69, "WITHOUT PLASMACLUSTER SYSTEM : Diagnosis Description".
2. Press fan (UP: +) switch*1 (turn fan control dial clockwise*2) to set system in auxiliary mode.
   **NOTE:**
   *1: With left and right ventilation temperature separately system.
   *2: Without left and right ventilation temperature separately system.
3. Display shows “61” in auxiliary mechanism. It takes approximately 3 seconds to enable setting operation.
4. Turn temperature control dial (driver side) as desired. Temperature will change at a rate of 0.5°C (1.0°F) each time a dial is turned.
   **CAUTION:**
   **A decimal point is not indicated on the display.**

Without left and right ventilation temperrature separately system



With left and right ventilation temperature separately system




**NOTE:**
When battery cable is disconnected or battery voltage is below 10 V, trimmer operation is canceled. Temperature set becomes that of initial condition, i.e. 0°C (0°F).

## WITHOUT PLASMACLUSTER SYSTEM : Foot Position Setting Trimmer

INFOID:0000000008293177

### DESCRIPTION

Wind distribution ratio in FOOT mode can be set.

Operating procedures for this trimmer are as per the following:

1. Begin self-diagnosis STEP-5 mode. Refer to HAC-69, "WITHOUT PLASMACLUSTER SYSTEM : Diagnosis Description".
2. Press fan (UP: +) switch*1 (turn fan control dial clockwise*2) to set system in auxiliary mode.
   **NOTE:**
   *1: With left and right ventilation temperature separately system.
   *2: Without left and right ventilation temperature separately system.
3. Press mode switch as desired.

Without rear ventiration

| Display | Discharge air flow | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Automatically controls the mode door | | | | Manually controls the mode door | | | |
| | VENT | FOOT | | DEF | VENT | FOOT | | DEF |
| | | Front | Rear | | | Front | Rear | |
| (Initial setting) | 11% | 39% | 24% | 26% | 11% | 39% | 24% | 26% |
| | 11% | 39% | 24% | 26% | 15% | 53% | 32% | – |
| | 15% | 53% | 32% | – | 11% | 39% | 24% | 26% |
| | 15% | 53% | 32% | – | 15% | 53% | 32% | – |

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With rear ventiration

| Display | Discharge air flow | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Automatically controls the mode door | | | | | Manually controls the mode door | | | | |
| | VENT | | FOOT | | DEF | VENT | | FOOT | | DEF |
| | Front | Rear | Front | Rear | | Front | Rear | Front | Rear | |
| (Initial setting) | 10% | 12% | 33% | 22% | 23% | 10% | 12% | 33% | 22% | 23% |
| | 10% | 12% | 33% | 22% | 23% | 13% | 16% | 43% | 28% | – |
| | 13% | 16% | 43% | 28% | – | 10% | 12% | 33% | 22% | 23% |
| | 13% | 16% | 43% | 28% | – | 13% | 16% | 43% | 28% | – |

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**NOTE:**
When battery cable is disconnected or battery voltage is below 10 V, trimmer operation is canceled. Air distribution ratio set becomes that of initial condition.

## WITHOUT PLASMACLUSTER SYSTEM : Inlet Port Memory Function

*INFOID:0000000008293178*

### DESCRIPTION

When ignition switch is turned from OFF to ON, inlet port can be set to AUTO or manual.

Operating procedures for this trimmer are as per the following:

1. Begin self-diagnosis STEP-5 mode. Refer to HAC-69, "WITHOUT PLASMACLUSTER SYSTEM : Diagnosis Description".
2. Press fan (UP: +) switch*1 (turn fan control dial clockwise*2) to set system in auxiliary mode.
   **NOTE:**
   *1: With left and right ventilation temperature separately system.
   *2: Without left and right ventilation temperature separately system.
3. Press intake switch as desired.

| FRE indicator | REC indicator | Setting status | | Setting changeover method |
|---|---|---|---|---|
| | | FRE | REC | |
| OFF | ON | AUTO control (Initial setting) | Manual REC status is memorized. (Initial setting) | Intake switch: ON |
| ON | ON | Manual FRE status is memorized. | Manual REC status is memorized. | |
| ON | OFF | Manual FRE status is memorized. | AUTO control | |
| OFF | OFF | AUTO control | AUTO control | |

**NOTE:**
When battery cable is disconnected or battery voltage is below 10 V, memory function is canceled. Memory function set becomes that of initial condition.

## WITH PLASMACLUSTER SYSTEM

## WITH PLASMACLUSTER SYSTEM : Description & Inspection

INFOID:0000000008293179

### DESCRIPTION

The purpose of the operational check is to check that the individual system operates normally.

**Conditions : Engine running at normal operating temperature**

### INSPECTION PROCEDURE

### 1.CHECK MEMORY FUNCTION

1. Start the engine.
2. Turn temperature control dial (driver side) clockwise until 32.0°C (90°F) is displayed.
3. Press the OFF switch.
4. Turn the ignition switch OFF.
5. Turn the ignition switch ON.
6. Press the AUTO switch.
7. Check that the temperature setting before turning the ignition switch OFF is stored.

Is the inspection result normal?

YES >> GO TO 2.
NO >> Memory function malfunction: HAC-162, "Inspection procedure".

### 2.CHECK BLOWER MOTOR SPEED

1. Start the engine.
2. Press fan (UP: +) switch. Check that the fan speed is changed. Check the operation for all fan speeds.
3. Set the fan speed to max speed.

Is the inspection result normal?

YES >> GO TO 3.
NO >> Blower motor system malfunction: HAC-91, "Diagnosis Procedure".

### 3.CHECK DISCHARGE AIR

1. Press the MODE switch and the DEF switch.
2. Each position indicator should change shape.
3. Confirm that discharge air comes out according to the air distribution table as follows:

Without rear ventilation

| Discharge air flow | | | | | |
|---|---|---|---|---|---|
| Mode position indication | Condition | Air outlet/distribution | | | |
| | | VENT | FOOT | | DEF |
| | | | Front | Rear | |
| | DUAL switch: OFF | 100% | — | — | — |
| | | 53% | 29% | 18% | — |
| | | 11% | 39% | 24% | 26% |
| | | 9% | 33% | 21% | 37% |
| | | 16% | — | — | 84% |

With rear ventilation

| Discharge air flow | | | | | | |
|---|---|---|---|---|---|---|
| Mode position indication | Condition | Air outlet/distribution | | | | |
| | | VENT | | FOOT | | DEF |
| | | Front | Rear | Front | Rear | |
| | DUAL switch: OFF<br>Rear ventilator: OPEN | 88% | 12% | — | — | — |
| | | 49% | 10% | 25% | 16% | — |
| | | 10% | 12% | 33% | 22% | 23% |
| | | 9% | 11% | 29% | 18% | 33% |
| | | 15% | — | — | — | 85% |

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

Is the inspection result normal?

YES >> GO TO 4.
NO >> Mode door system malfunction: HAC-82, "Diagnosis Procedure".

## 4. CHECK INTAKE AIR

1. Press AUTO switch. AUTO INTAKE indicator and REC indicator turns ON (auto intake mode).
2. Press intake switch. AUTO INTAKE indicator and REC indicator turns OFF (fixed FRE mode).
3. Press intake switch again. REC indicator turns ON (fixed REC mode).
4. Press intake switch again. AUTO INTAKE indicator and REC indicator turns ON (auto intake mode).
5. Listen for intake door position change. (Slight change of blower sound can be heard.)

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

Is the inspection result normal?

YES >> GO TO 5.
NO >> Intake door system malfunction: HAC-89, "Diagnosis Procedure".

## 5. CHECK A/C SWITCH

1. Press the A/C switch.
2. A/C switch indicator turns ON.
   Confirm that the compressor clutch engages (sound or visual inspection).

Is the inspection result normal?

YES >> GO TO 6.
NO >> Magnet clutch system malfunction: HAC-95, "Diagnosis Procedure".

## 6. CHECK WITH TEMPERATURE SETTING LOWERED

1. Turn temperature control dial (driver side) counterclockwise until 18°C (64°F) is displayed.
2. Check that the cool air blows from the outlets.

Is the inspection result normal?

YES >> GO TO 7.
NO >> Insufficient cooling: HAC-155, "Inspection procedure".

## 7. CHECK WITH TEMPERATURE SETTING RAISED

1. Turn temperature control dial (driver side) clockwise until 32°C (90°F) is displayed.
2. Check that the warm air blows from the outlets.

Is the inspection result normal?

YES- >> GO TO 8.
NO >> Insufficient heating: HAC-157, "Inspection procedure".

## 8. CHECK LEFT AND RIGHT VENTILATION TEMPERATURE SEPARATELY CONTROL SYSTEM FUNCTION

1. Press the DUAL switch, and then check that “DUAL” is shown on the display.
2. Operate temperature control dial (driver side). Check that the discharge air temperature (driver side) changes.
3. Operate the temperature control dial (passenger side). Check that the discharge air temperature (passenger side) changes.
4. Press the DUAL switch, and then check that the temperature setting (LH/RH) is unified to the driver side temperature setting.

Is the inspection result normal?

YES >> GO TO 9.
NO >> Refer to HAC-153, "Diagnosis Chart By Symptom" and perform the appropriate diagnosis.

## 9. CHECK AUTO MODE

1. Press the AUTO switch, and then check that “AUTO” is shown on the display.
2. Check that the discharge air and fan speed depend on ambient temperature, in-vehicle temperature and temperature setting.

Is the inspection result normal?

YES >> GO TO 10.
NO >> Refer to HAC-153, "Diagnosis Chart By Symptom" and perform the appropriate diagnosis.

## 10. CHECK PLASMACLUSTER ION CONTROL FUNCTION

1. Turn ignition switch OFF and restart the engine.
2. Ion indicator is shown on the display.
3. Press OFF switch.
4. Ion indicator is turned OFF.

Is the inspection result normal?

YES >> GO TO 11.
NO >> Refer to HAC-113, "Diagnosis Procedure".

## 11. CHECK ION CONTROL MODE

1. Turn ignition switch OFF and restart the engine.
2. Operate fan control dial to the blower fan lowest speed and highest speed. Check display of ion indicator each time blower fan is at lowest speed and at highest speed.

**When blower fan speed is at lowest speed: CLEAN**
**When blower fan speed is at highest speed: QUICK CLEAN**

Is the inspection result normal?

YES >> INSPECTION END
NO >> Replace unified meter and A/C amp.

## WITH PLASMACLUSTER SYSTEM : Temperature Setting Trimmer

INFOID:0000000008293180

### DESCRIPTION

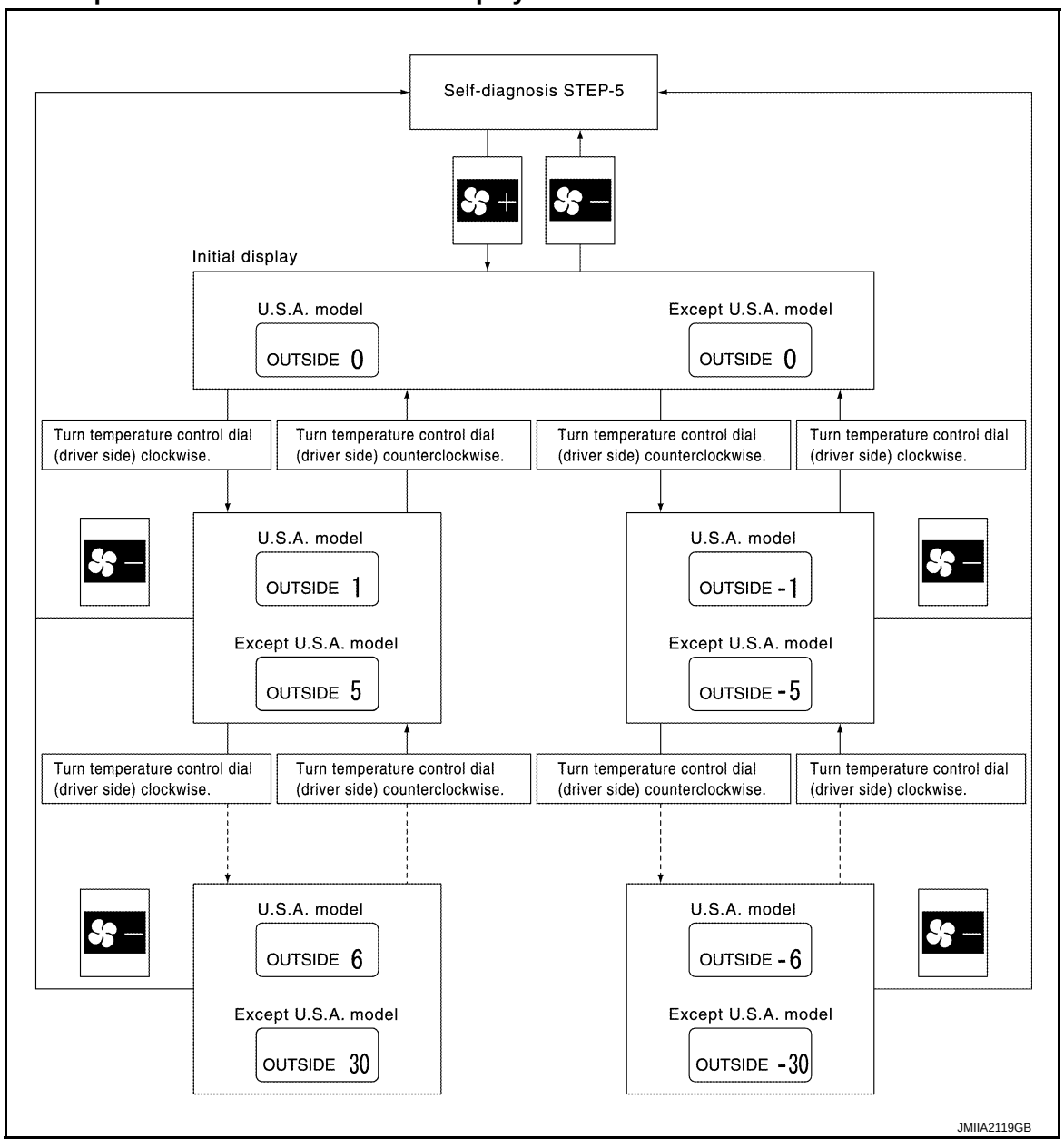
The trimmer compensates for differences in range of ±3°C (±6°F) between temperature setting (displayed digitally) and temperature felt by customer.

Operating procedures for this trimmer are as per the following:

1. Begin self-diagnosis STEP-5 mode. Refer to HAC-69, "WITHOUT PLASMACLUSTER SYSTEM : Diagnosis Description".
2. Press fan (UP: +) switch to set system in auxiliary mode.
3. Display shows “61” in auxiliary mechanism. It takes approximately 3 seconds to enable setting operation.
4. Turn temperature control dial (driver side) as desired. Temperature will change at a rate of 0.5°C (1.0°F) each time a dial is turned.

**CAUTION:**

**A decimal point is not indicated on the display.**




**NOTE:**

When battery cable is disconnected or battery voltage is below 10 V, trimmer operation is canceled. Temperature set becomes that of initial condition, i.e. 0°C (0°F).

## WITH PLASMACLUSTER SYSTEM : Foot Position Setting Trimmer

INFOID:0000000008293181

### DESCRIPTION

Wind distribution ratio in FOOT mode can be set.

Operating procedures for this trimmer are as per the following:

1. Begin self-diagnosis STEP-5 mode. Refer to HAC-69, "WITHOUT PLASMACLUSTER SYSTEM : Diagnosis Description".

2. Press fan (UP: +) switch to set system in auxiliary mode.
3. Press mode switch as desired.

Without rear ventiration

| Display | Discharge air flow | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Automatically controls the mode door | | | | Manually controls the mode door | | | |
| | VENT | FOOT | | DEF | VENT | FOOT | | DEF |
| | | Front | Rear | | | Front | Rear | |
| (Initial setting) | 11% | 39% | 24% | 26% | 11% | 39% | 24% | 26% |
| | 11% | 39% | 24% | 26% | 15% | 53% | 32% | – |
| | 15% | 53% | 32% | – | 11% | 39% | 24% | 26% |
| | 15% | 53% | 32% | – | 15% | 53% | 32% | – |

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With rear ventiration

| Display | Discharge air flow | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Automatically controls the mode door | | | | | Manually controls the mode door | | | | |
| | VENT | | FOOT | | DEF | VENT | | FOOT | | DEF |
| | Front | Rear | Front | Rear | | Front | Rear | Front | Rear | |
| (Initial setting) | 10% | 12% | 33% | 22% | 23% | 10% | 12% | 33% | 22% | 23% |
| | 10% | 12% | 33% | 22% | 23% | 13% | 16% | 43% | 28% | – |
| | 13% | 16% | 43% | 28% | – | 10% | 12% | 33% | 22% | 23% |
| | 13% | 16% | 43% | 28% | – | 13% | 16% | 43% | 28% | – |

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**NOTE:**
When battery cable is disconnected or battery voltage is below 10 V, trimmer operation is canceled. Air distribution ratio set becomes that of initial condition.

## WITH PLASMACLUSTER SYSTEM : Inlet Port Memory Function

INFOID:0000000008293182

### DESCRIPTION

When ignition switch is turned from OFF to ON, inlet port can be set to AUTO or manual.

Operating procedures for this trimmer are as per the following:
1. Begin self-diagnosis STEP-5 mode. Refer to HAC-69, "WITHOUT PLASMACLUSTER SYSTEM : Diagnosis Description".
2. Press fan (UP: +) switch to set system in auxiliary mode.
3. Press intake switch as desired.

| FRE indicator | REC indicator | Setting status | | Setting changeover method |
|---|---|---|---|---|
| | | FRE | REC | |
| OFF | ON | AUTO control (Initial setting) | Manual REC status is memorized. (Initial setting) | Intake switch: ON |
| ON | ON | Manual FRE status is memorized. | Manual REC status is memorized. | |
| ON | OFF | Manual FRE status is memorized. | AUTO control | |
| OFF | OFF | AUTO control | AUTO control | |

**NOTE:**
When battery cable is disconnected or battery voltage is below 10 V, memory function is canceled. Memory function set becomes that of initial condition.

## WITH PLASMACLUSTER SYSTEM : Exhaust Gas/Outside Odor Detecting Sensor Sensitivity Adjustment Function

INFOID:0000000008293183

### DESCRIPTION

According to customer's sense of smell, exhaust gas/outside odor detecting sensor sensitivity can be changed.

Operating procedures for this trimmer are as follows:
1. Begin self-diagnosis STEP-5 mode. Refer to HAC-74, "WITH PLASMACLUSTER SYSTEM : Diagnosis Description".
2. Press fan (UP: +) switch two times to set system in auxiliary mode.
3. Turn temperature control dial (driver side) as desired.

| Display | Setting |
|---|---|
| 71 | Less sensitive setting than display 72 setting (the change to REC is later than display 72 operation) |
| 72 | Less sensitive setting than normal setting (the change to REC is later than normal operation) |
| 73 | Normal (Initial setting) |
| 74 | More sensitive setting than normal setting (the change to REC is earlier than normal operation) |
| 75 | More sensitive setting than display 74 setting (the change to REC is earlier than display 74 operation) |

**NOTE:**
When battery cable is disconnected or battery voltage is below 10 V, exhaust gas/outside odor detecting sensor sensitivity adjustment function is canceled. Exhaust gas/outside odor detecting sensor sensitivity adjustment function set becomes that of initial condition.

## WITH PLASMACLUSTER SYSTEM : Auto Intake Interlocking Movement Change Function

INFOID:0000000008293184

### DESCRIPTION

Conditions for interlocking movement of intake switch (auto intake mode) and A/C switch can be changed. In addition, operation of the intake switch, which activates the auto intake control system, can be set to become available when the A/C switch is ON.

Operating procedures for this trimmer are as follows:
1. Begin self-diagnosis STEP-5 mode. Refer to HAC-74, "WITH PLASMACLUSTER SYSTEM : Diagnosis Description".
2. Press fan (UP:+) switch three times to set system in auxiliary mode.
3. Press A/C switch and intake switch as desired.

| A/C indicator | AUTO INTAKE indicator | Setting status |
|---|---|---|
| ON | ON | A/C switch indicator turns ON automatically when auto intake mode is selected with Intake switch.<br>Auto intake mode continues after A/C switch turns OFF. |
| OFF | ON | A/C switch indicator stays OFF when auto intake mode is selected with Intake switch.<br>Auto intake mode continues after A/C switch turns OFF. |
| ON | OFF | A/C switch indicator turns ON automatically when auto intake mode is selected with Intake switch.<br>When A/C switch turns OFF, auto intake mode turns OFF automatically.<br>(Initial setting) |
| OFF | OFF | Auto intake mode can be set only when A/C switch is ON.<br>When A/C switch turns OFF, auto intake mode turns OFF automatically. |

**NOTE:**
When battery cable is disconnected or battery voltage is below 10 V, auto intake interlocking movement change function is canceled. Auto intake interlocking movement change function set becomes that of initial condition.

# SYSTEM DESCRIPTION

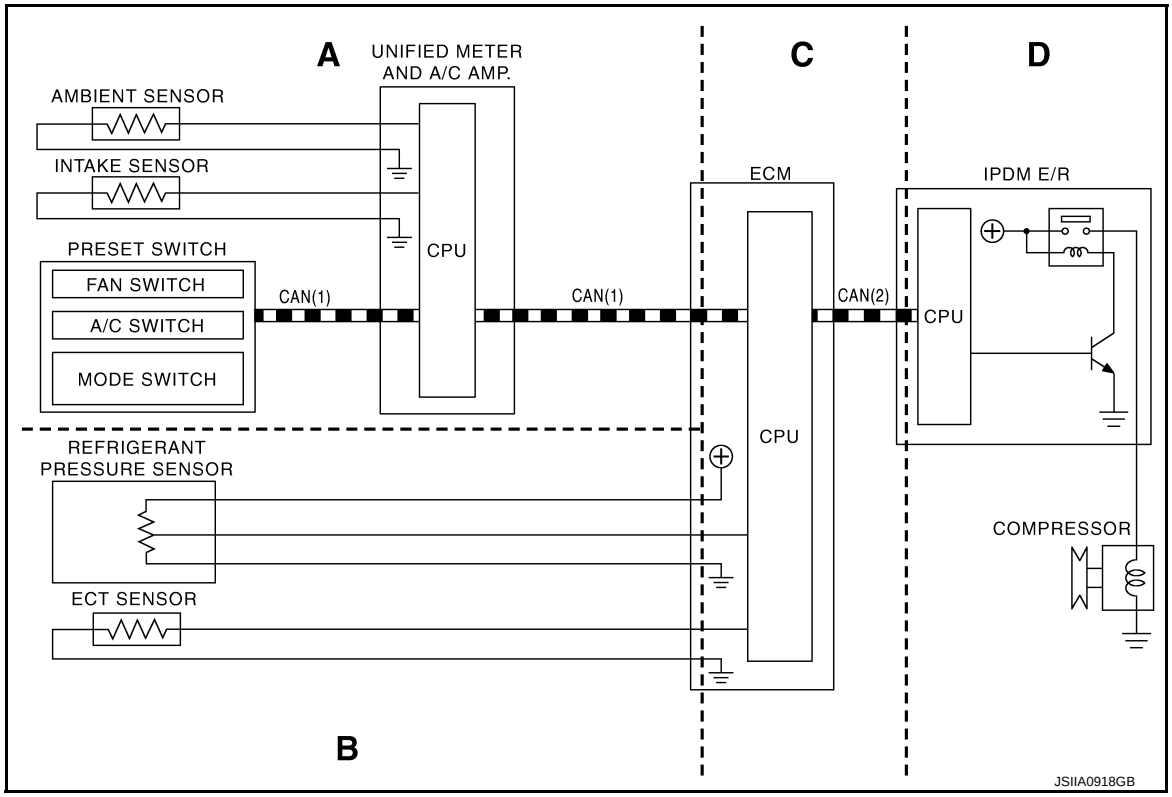
## COMPRESSOR CONTROL FUNCTION

### Description

INFOID:0000000008293185

#### PRINCIPLE OF OPERATION

Functional Circuit Diagram




CAN(1) : A/C switch signal
: Blower fan motor switch signal

CAN(2) : A/C compressor request signal

Functional Initial Inspection Chart

×: Applicable

| Control unit | Diagnosis Item | | Location | | | |
|---|---|---|---|---|---|---|
| | | | A | B | C | D |
| Unified meter and A/C amp. | Self-diagnosis function | | × | – | – | – |
| ECM | "ENGINE" | Self-diagnosis (CAN system diagnosis) | – | – | × | – |
| | | Data monitor | × | × | × | – |
| IPDM E/R | "IPDM E/R" | Self-diagnosis (CAN system diagnosis) | – | – | – | × |
| | | Data monitor | – | – | × | – |
| | Auto active test | | – | – | – | × |

### Fail-safe

INFOID:0000000008293186

#### FAIL-SAFE FUNCTION

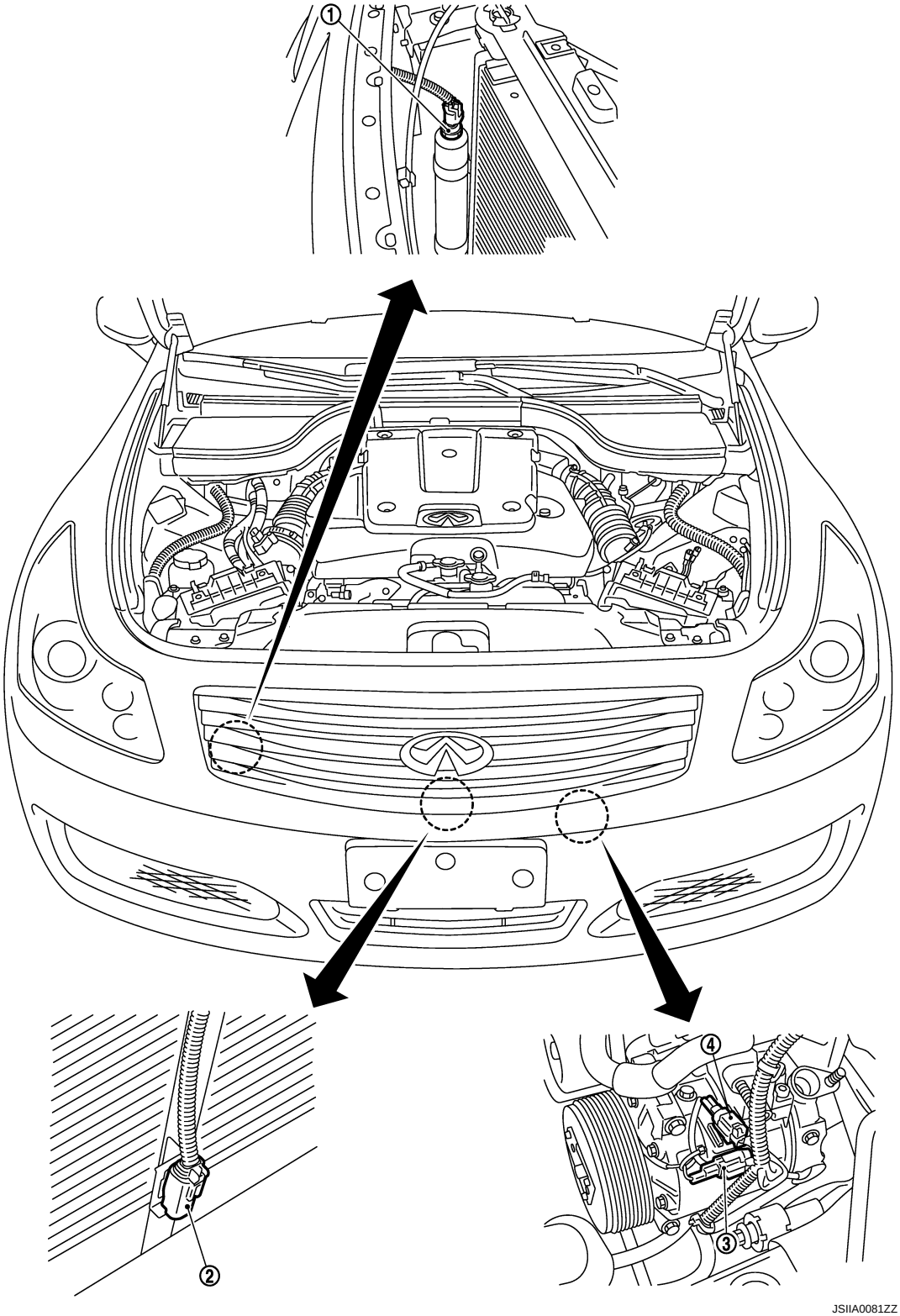
- If a communication error exists between the unified meter and A/C amp., and preset switch for 30 seconds or longer, air conditioning system is controlled under the following conditions:

| | |
|---|---|
| **Compressor** | **: ON** |
| **Air outlet** | **: AUTO** |
| **Air inlet** | **: FRE (Fresh)** |
| **Fan speed** | **: AUTO** |
| **Set temperature** | **: Setting before communication error occurs** |

## Component Part Location

INFOID:0000000008293187

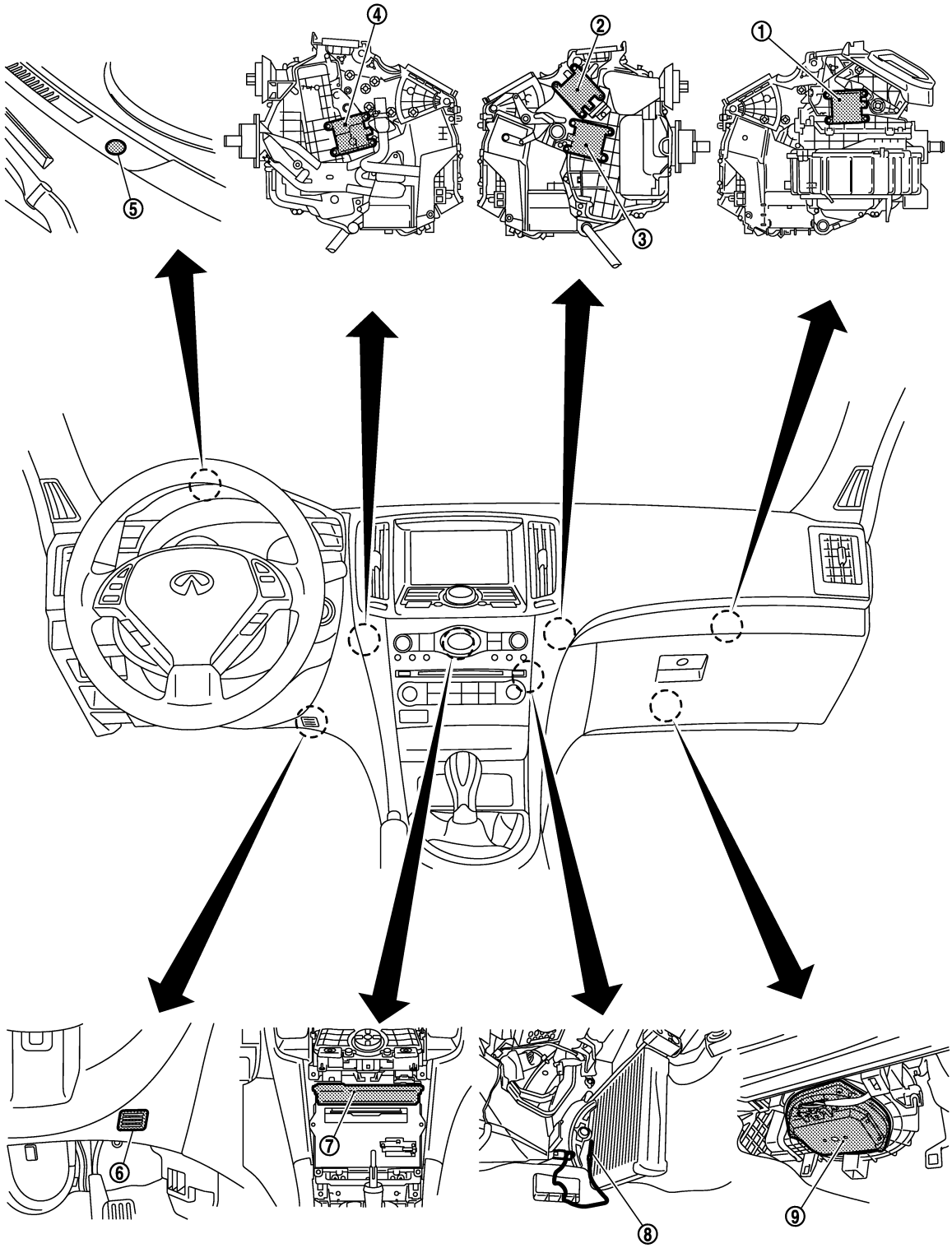
ENGINE COMPARTMENT




JSIIA0081ZZ

1. Refrigerant pressure sensor
2. Ambient sensor
3. Compressor (magnet clutch)
4. Compressor (ECV)

PASSENGER COMPARTMENT




1. Intake door motor
2. Mode door motor
3. Air mix door motor (passenger side)
4. Air mix door motor (driver side)*
5. Sunload sensor
6. In-vehicle sensor
7. Unified meter and A/C amp.
8. Intake sensor
9. Blower motor

*: With left and right ventilation temperature separately control system.

## Component Description

INFOID:0000000008293188

| Component | Reference |
|---|---|
| Air mix door motor*1 | HAC-84, "WITHOUT LEFT AND RIGHT VENTILATION TEMPERATURE SEPARATELY CONTROL SYSTEM : Description" |
| Air mix door motor (driver side)*2 | HAC-85, "WITH LEFT AND RIGHT VENTILATION TEMPERATURE SEPARATELY CONTROL SYSTEM : Description" |
| Air mix door motor (passenger side)*2 | |
| Ambient sensor | HAC-99, "Description" |
| Blower motor | HAC-91, "Description" |
| Compressor | HAC-95, "Description" |
| Intake door motor | HAC-89, "Description" |
| Intake sensor | HAC-108, "Description" |
| In-vehicle sensor | HAC-102, "Description" |
| Mode door motor | HAC-82, "Description" |
| Refrigerant pressure sensor | EC-547, "Description" |
| Sunload sensor | HAC-105, "Description" |
| Unified meter and A/C amp. | HAC-81, "Description" |

*1: Without left and right ventilation temperature separately control system.

*2: With left and right ventilation temperature separately control system.

# AUTOMATIC AIR CONDITIONING SYSTEM
## WITHOUT LEFT AND RIGHT VENTILATION TEMPERATURE SEPARATELY CONTROL SYSTEM

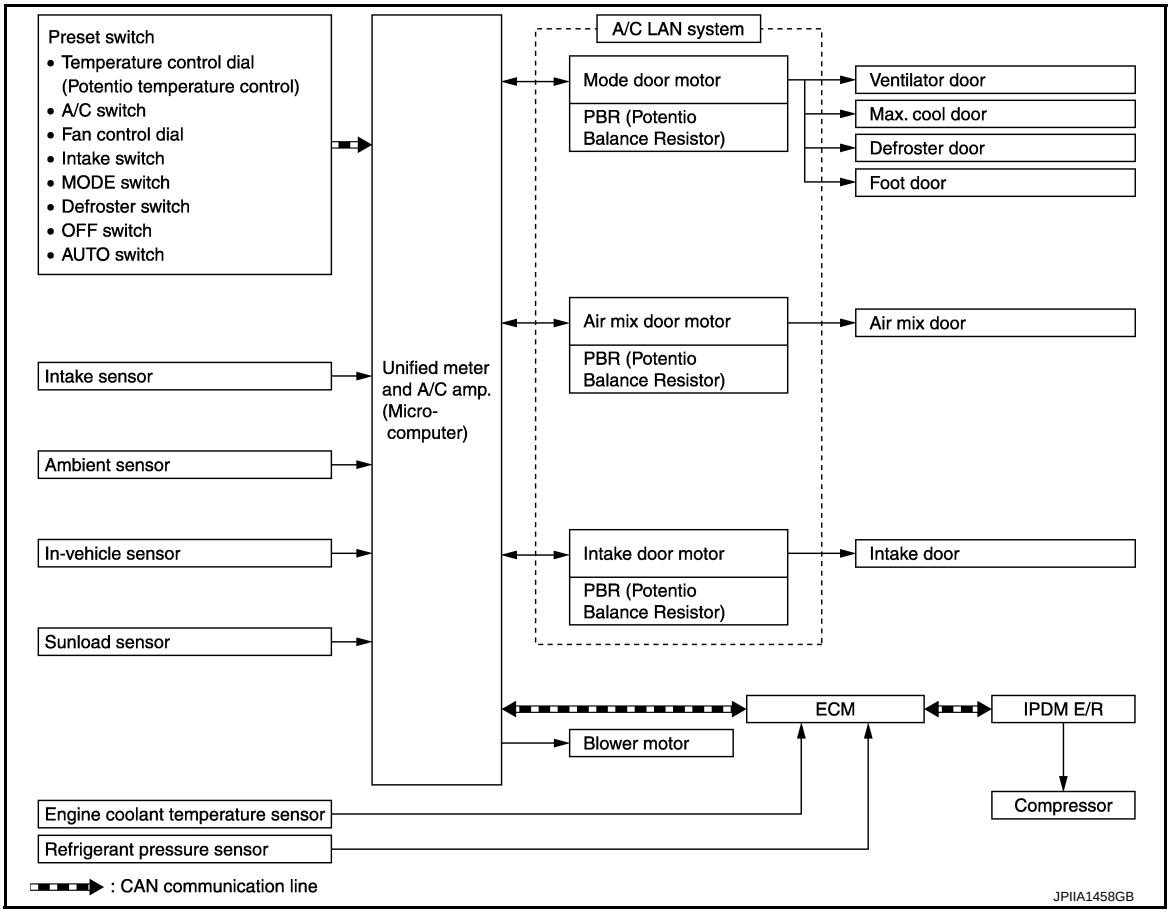
## WITHOUT LEFT AND RIGHT VENTILATION TEMPERATURE SEPARATELY CONTROL SYSTEM : System Diagram

INFOID:0000000008293189

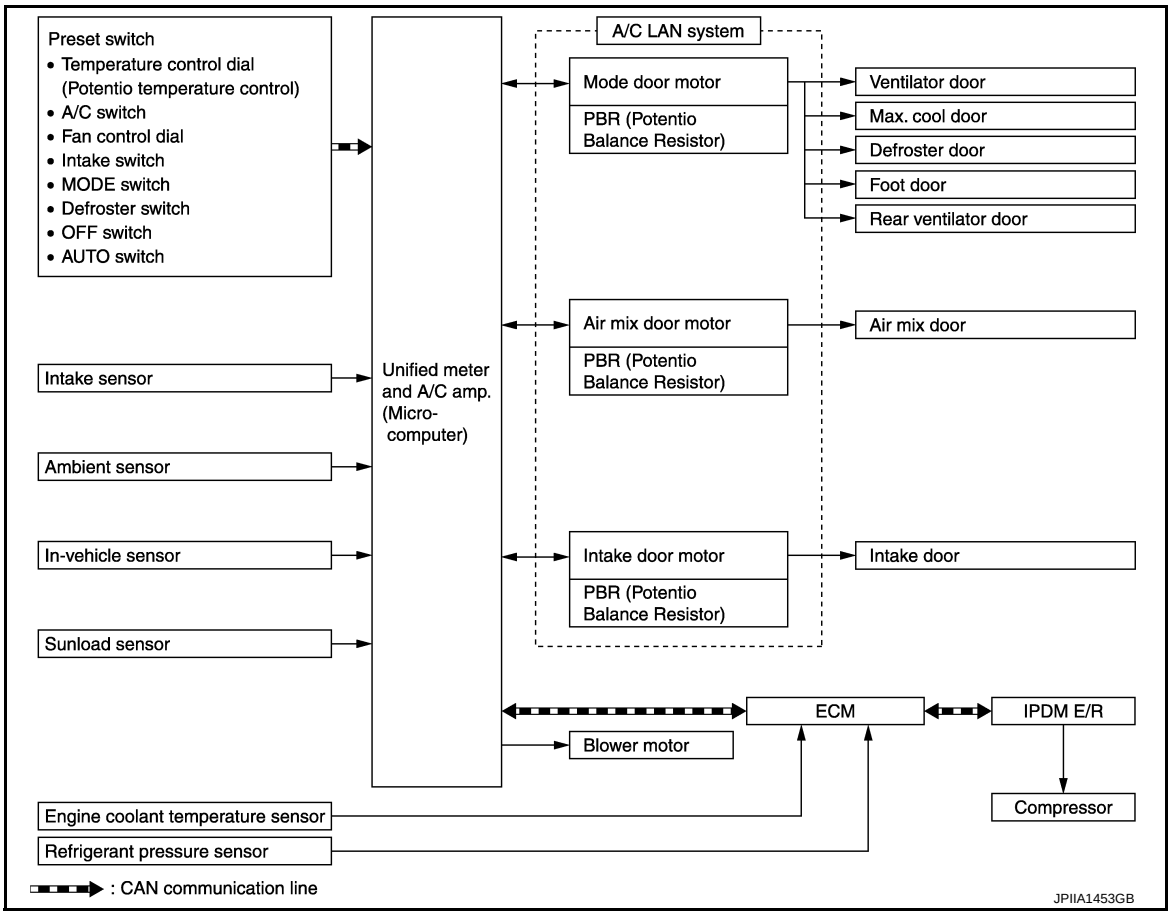
### CONTROL SYSTEM

The control system consists of input sensors, switches, unified meter and A/C amp. (microcomputer) and outputs. The relationship of these components is as shown in the figure below:

Without rear ventilation



With rear ventilation



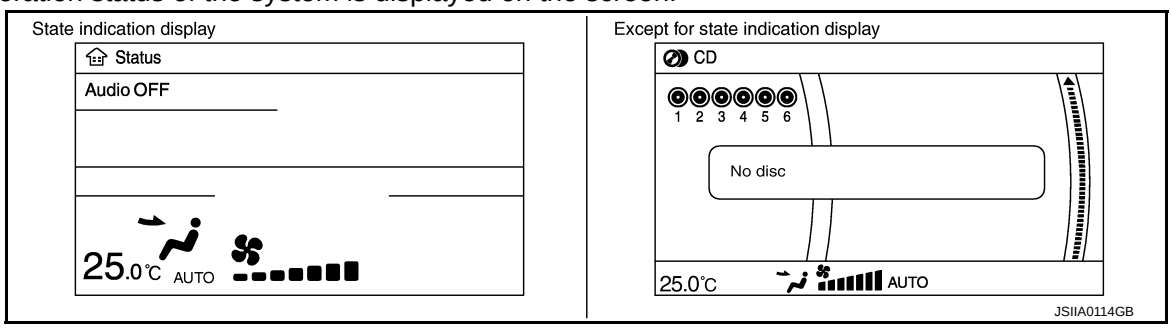

# WITHOUT LEFT AND RIGHT VENTILATION TEMPERATURE SEPARATELY CONTROL SYSTEM : System Description

INFOID:0000000008293190

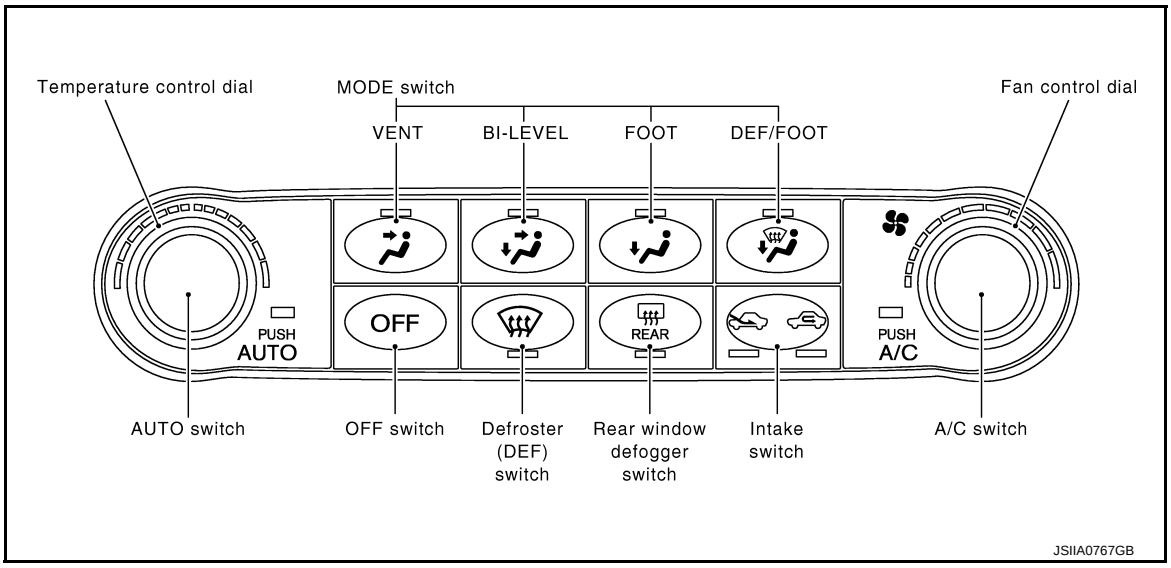
## CONTROL OPERATION

Display Screen

The operation status of the system is displayed on the screen.



Preset Switch




MODE Switch

The air discharge outlets is controlled with this switch.

Temperature Control Dial (Potentio Temperature Control)

The set temperature is increased or decreased with this dial.

AUTO Switch

- The compressor, intake doors, air mix doors, mode doors and fan 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.

Defroster (DEF) Switch

Mode doors are set to the defrost position with this switch. Also, intake doors are set to the outside air position, and compressor turns ON.

A/C Switch

Compressor is ON or OFF with this switch.
(Pressing the A/C switch when the A/C switch is ON turns OFF the A/C switch and compressor.)

FAN Control Dial

The fan speed is manually controlled with this switch. Seven speeds are available for manual control (as shown on the display screen).

OFF Switch

Compressor and blower are OFF, air inlet is set to FRE, and mode position is set to foot position.

Rear Window Defogger Switch

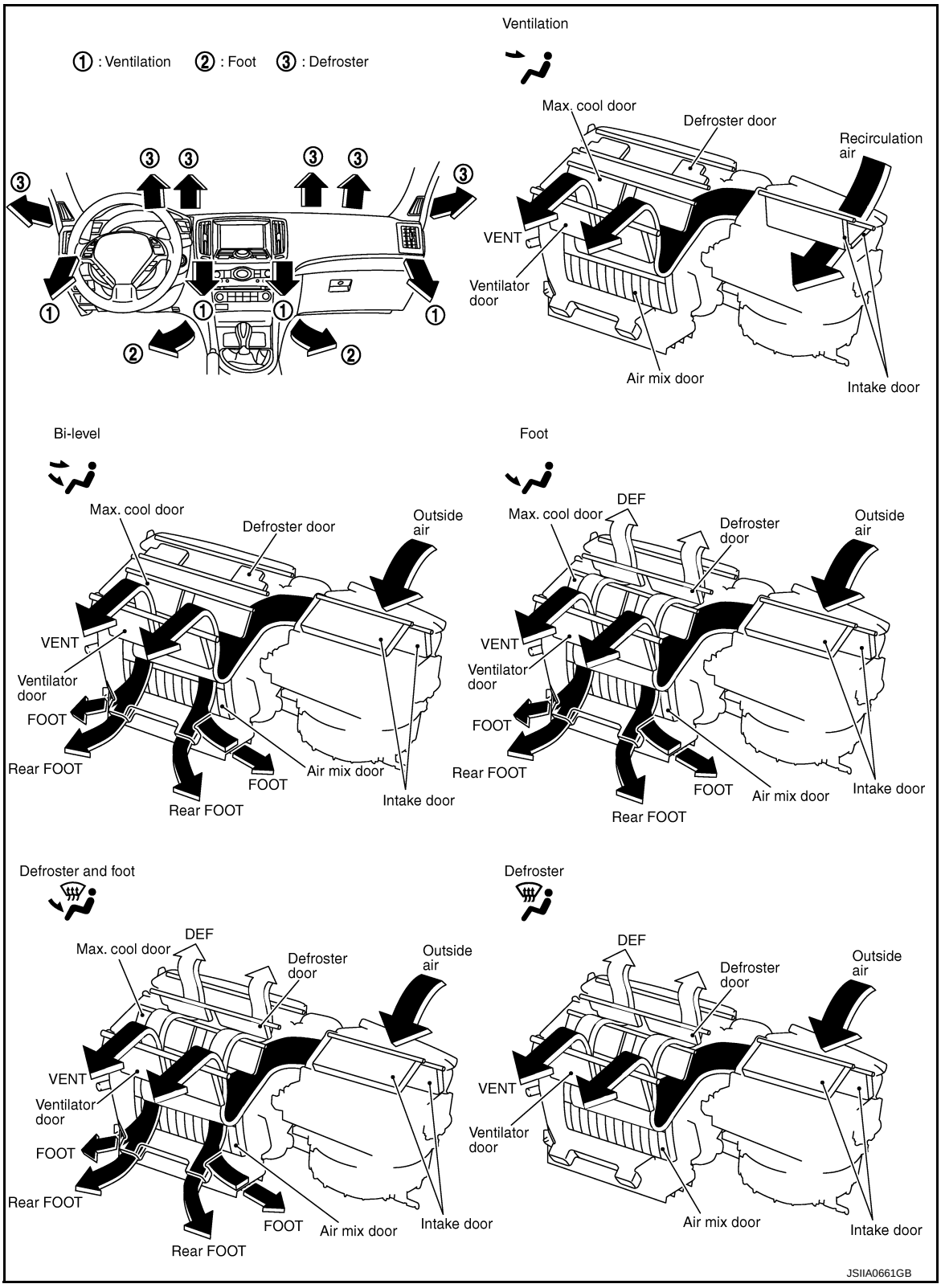
When indicator is ON, rear window is defogged.

Intake Switch

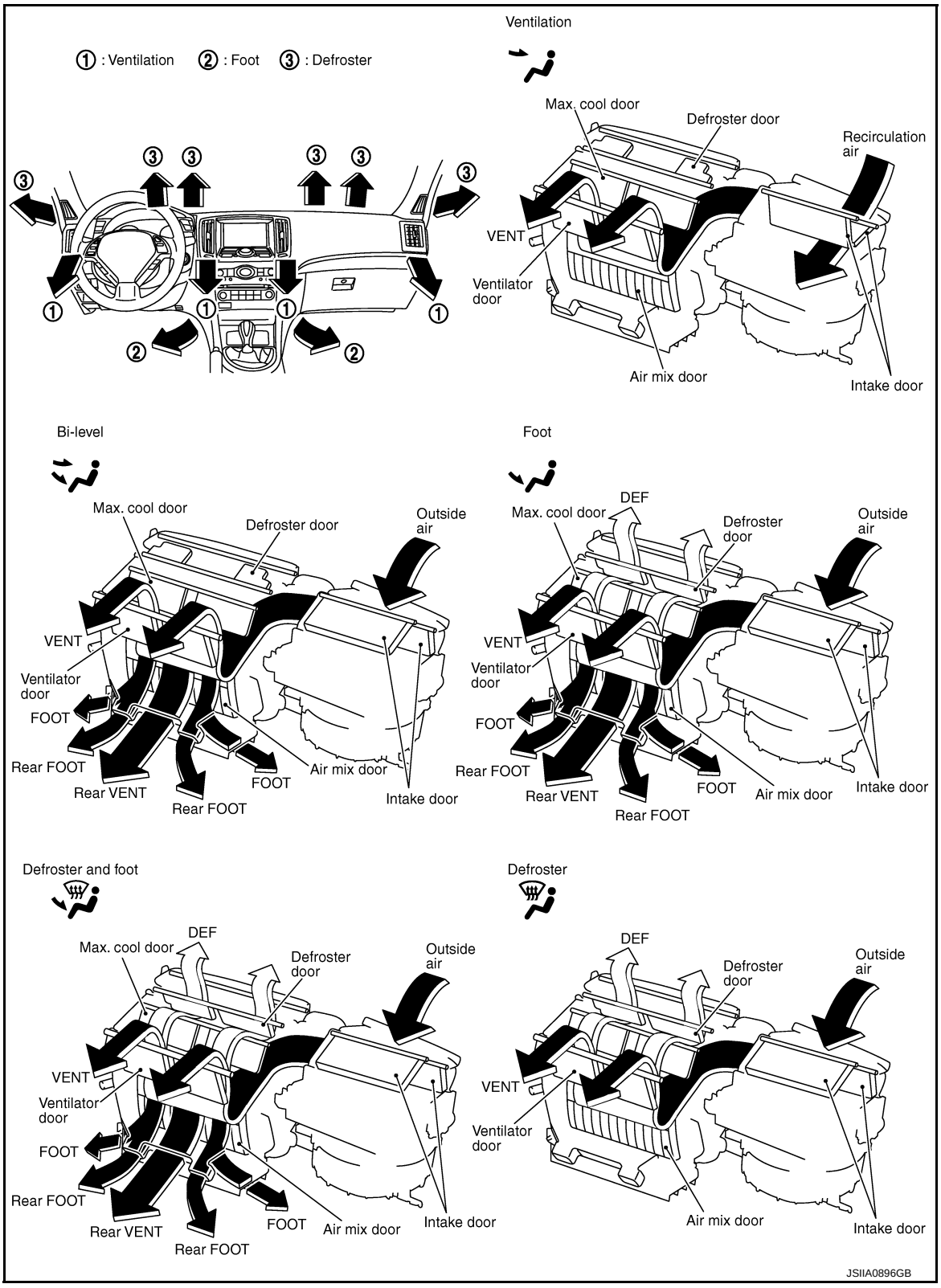
- When intake switch is ON, FRE indicator turns ON, and air inlet is fixed to FRE.
- When intake switch is pressed again, REC indicator turns ON, and air inlet is fixed to REC.
- When intake switch is pressed for approximately 1.5 seconds or longer, FRE and REC indicators blink twice. Then, automatic control mode is entered. Inlet status is displayed by indicator even during automatic controlled.
- When FRE indicator is turned ON, shifting mode position to D/F or DEF, or when compressor is turned from ON to OFF, intake switch is automatically turned OFF (fixed to FRE mode). REC mode can be re-entered by pressing intake switch again, and then compressor is turned ON. (Except D/F or DEF position)

DISCHARGE AIR FLOW

Without Rear Ventilation

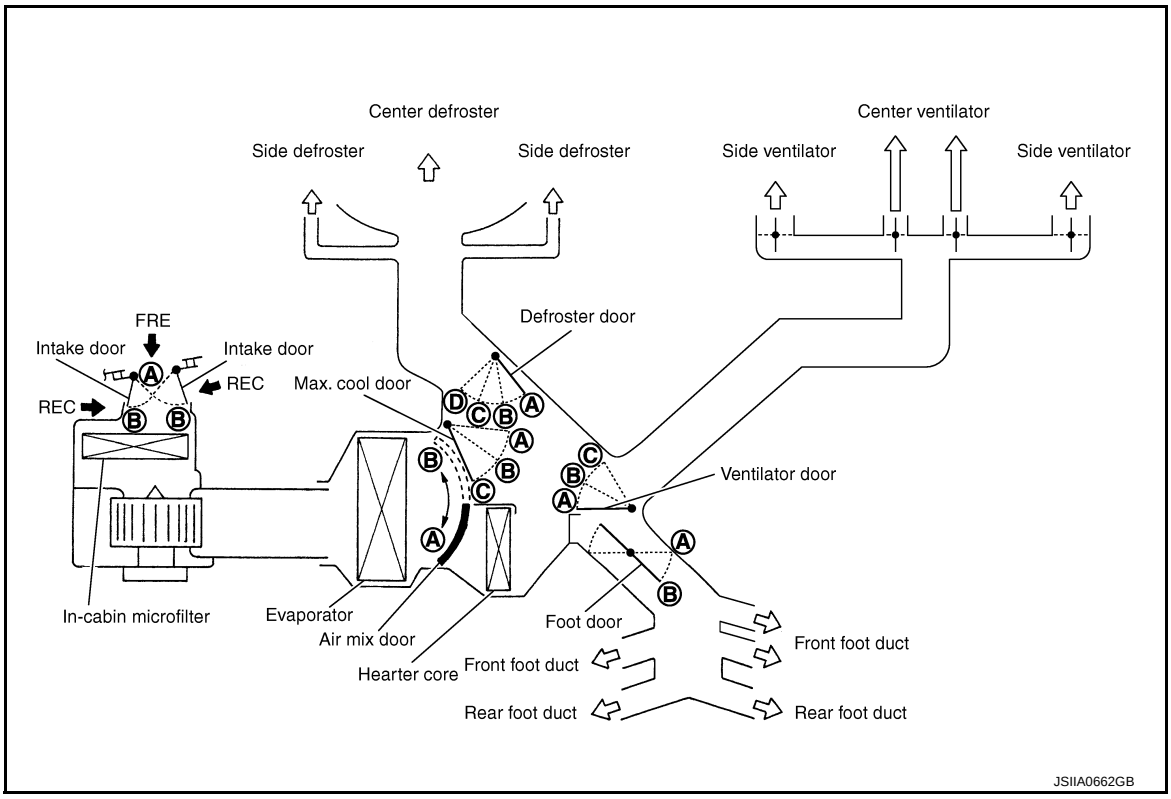


With Rear Ventilation




SWITCHES AND THEIR CONTROL FUNCTION

Without Rear Ventilation

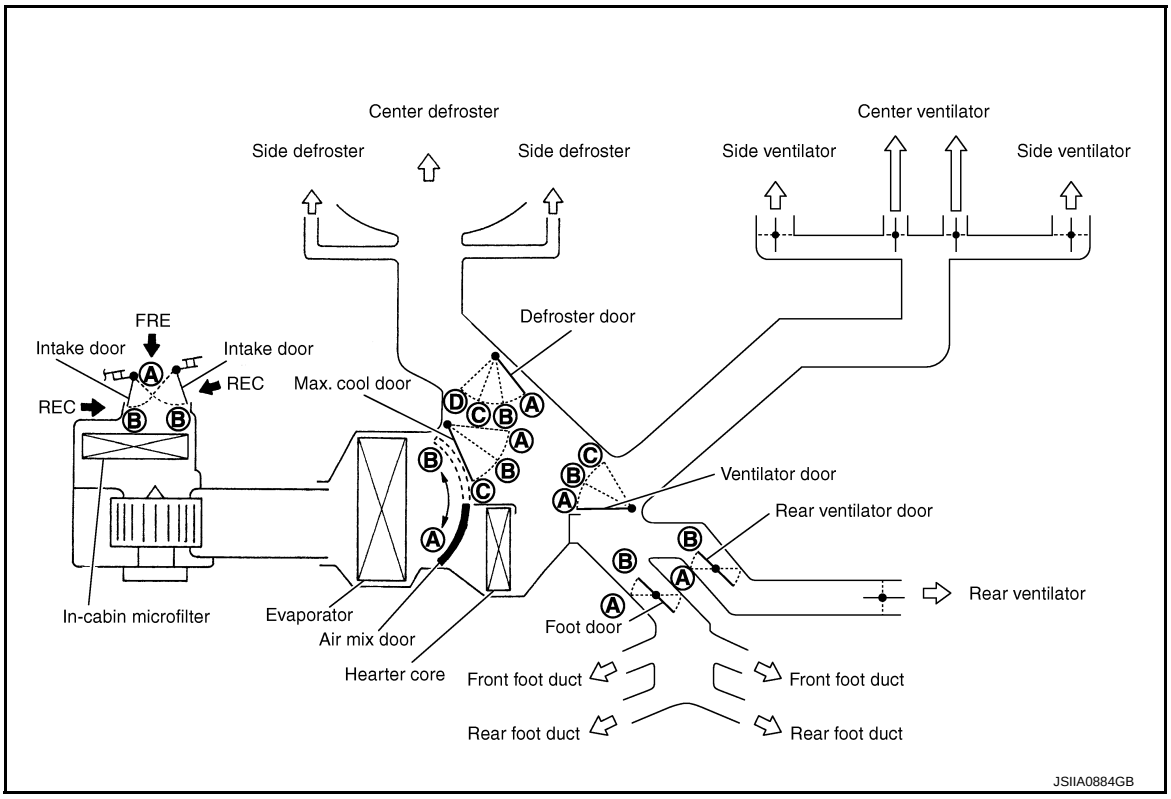



| Position or switch / Door | MODE switch | | | | DEF switch | | AUTO switch | Intake switch | | Temperature control dial | | | OFF switch |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | VENT | B/L | FOOT | D/F | ON | OFF | | FRE | REC | | | | |
| | | | | | | | | | | | | | OFF |
| | | | | | | | | | | 18℃ (60°F) | ⇔ | 32℃ (90°F) | |
| Ventilator door | Ⓐ | Ⓑ | Ⓒ | Ⓒ | Ⓒ | —— | AUTO | —— | | —— | | | Ⓒ |
| Max.cool door | Ⓐ | Ⓑ | Ⓒ | Ⓒ | Ⓒ | | | —— | | —— | | | Ⓒ |
| Defroster door | Ⓓ | Ⓓ | Ⓒ | Ⓑ | Ⓐ | | | —— | | —— | | | Ⓒ |
| Foot door | Ⓑ | Ⓑ | Ⓑ | Ⓑ | Ⓐ | | | —— | | —— | | | Ⓑ |
| Intake door | —— | | | Ⓑ | Ⓑ | | | Ⓑ* | Ⓐ* | —— | | | Ⓑ |
| Air mix door | —— | | | | —— | | | —— | | Ⓐ | AUTO | Ⓑ | —— |

*:Inlet status is displayed by LED when activating automatic control.

JSIIA1104GB

With Rear Ventilation




| Door \ Position or switch | MODE switch | | | | DEF switch | | AUTO switch | Intake switch | | Temperature control dial | | | OFF switch |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | VENT | B/L | FOOT | D/F | ON | OFF | | FRE | REC | | | | |
| | | | | | | | | | | | | | OFF |
| | | | | | | | | | | 18°C (60°F) | ⇔ | 32°C (90°F) | |
| Ventilator door | Ⓐ | Ⓑ | Ⓒ | Ⓒ | Ⓒ | | | — | | — | | | |
| Max.cool door | Ⓐ | Ⓑ | Ⓒ | Ⓒ | Ⓒ | | | — | | — | | | |
| Defroster door | Ⓓ | Ⓓ | Ⓒ | Ⓑ | Ⓐ | | | — | | — | | | AUTO |
| Foot door | Ⓑ | Ⓑ | Ⓑ | Ⓑ | Ⓐ | — | AUTO | — | | — | | | |
| Rear ventilator door | Ⓑ | Ⓑ | Ⓑ | Ⓑ | Ⓐ | | | — | | — | | | |
| Intake door | — | | | Ⓑ | Ⓑ | | | Ⓑ* | Ⓐ* | — | | | |
| Air mix door | — | | | | — | | | — | | Ⓐ | AUTO | Ⓑ | — |

*:Inlet status is displayed by LED when activating automatic control.

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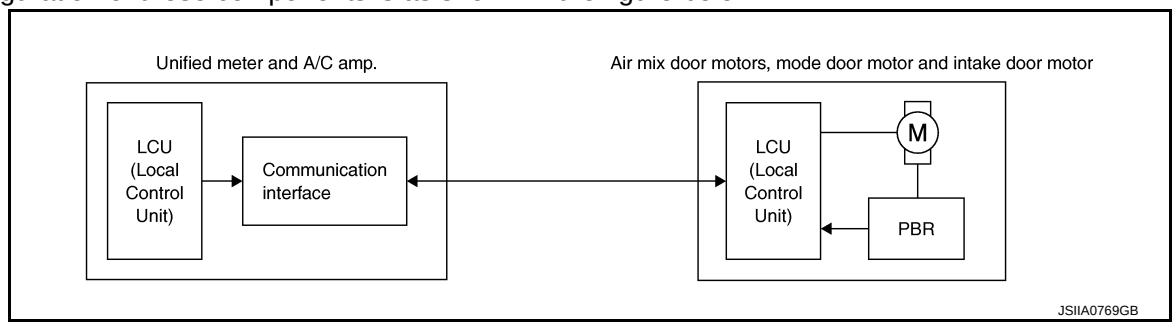
## AIR CONDITIONING LAN CONTROL SYSTEM

The LAN (Local Area Network) system consists of unified meter and A/C amp., mode door motor, air mix door motors and intake door motor.

A configuration of these components is as shown in the figure below.



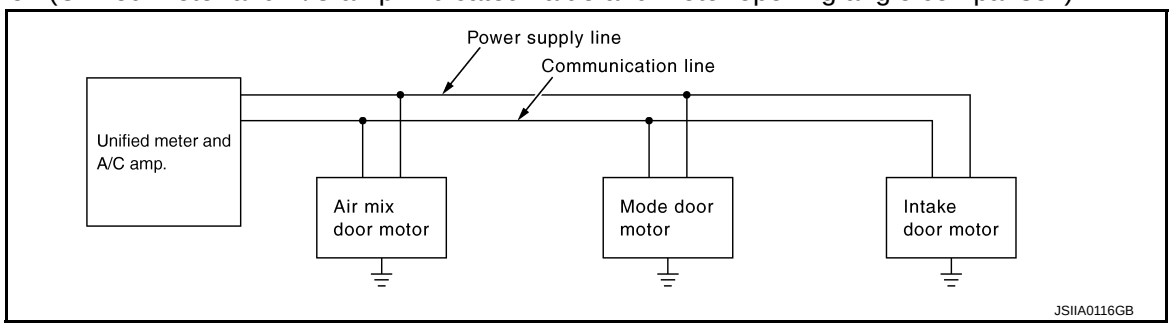
## SYSTEM CONSTRUCTION

A small network is constructed between the unified meter and A/C amp., mode door motor, air mix door motors and intake door motor. The unified meter and A/C amp. and motors are connected by data transmission lines and motor power supply lines. The LAN network is built through the ground circuits of each door motor.

Addresses, motor opening angle signals, motor stop signals and error checking messages are all transmitted through the data transmission lines connecting the unified meter and A/C amp. and each door motor.

The following functions are contained in LCUs built into the mode door motor, the air mix door motors and the intake door motor.

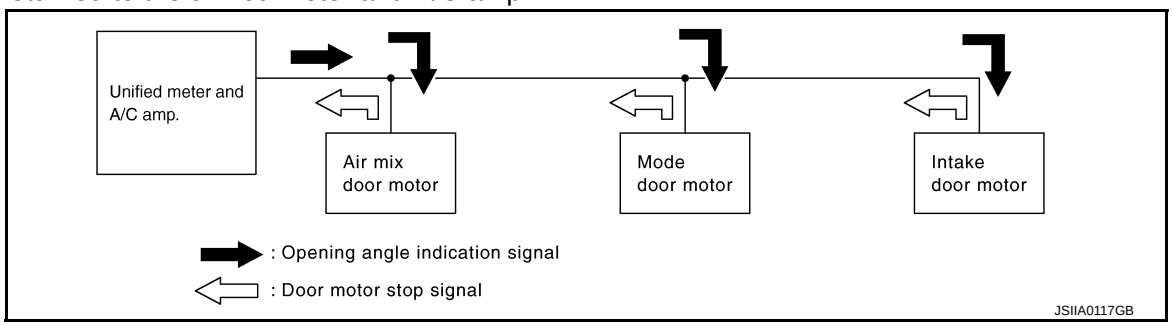
- Address
- Motor opening angle signals
- Data transmission
- Motor stop and drive decision
- Opening angle sensor (PBR function)
- Comparison
- Decision (Unified meter and A/C amp. indicated value and motor opening angle comparison)




Operation

The unified meter and A/C amp. receives data from each of the sensors. The unified meter and A/C amp. sends mode door, air mix door and intake door opening angle data to the mode door motor LCU, air mix door motor LCUs and intake door motor LCU.

The mode door motor, air mix door motors and intake door motor read their respective signals according to the address signal. Opening angle indication signals received from the unified meter and A/C amp. and each of the motor position sensors is compared by the LCUs in each door motor with the existing decision and opening angles. Subsequently, HOT/COLD, DEF/VENT and FRE/REC operation is selected. The new selection data is returned to the unified meter and A/C amp.




Transmission Data and Transmission Order

Unified meter and A/C amp. data is transmitted consecutively to each of the doors motor following the form as shown in the figure below.

START:

- Initial compulsory signal is sent to each of the door motors.

ADDRESS:

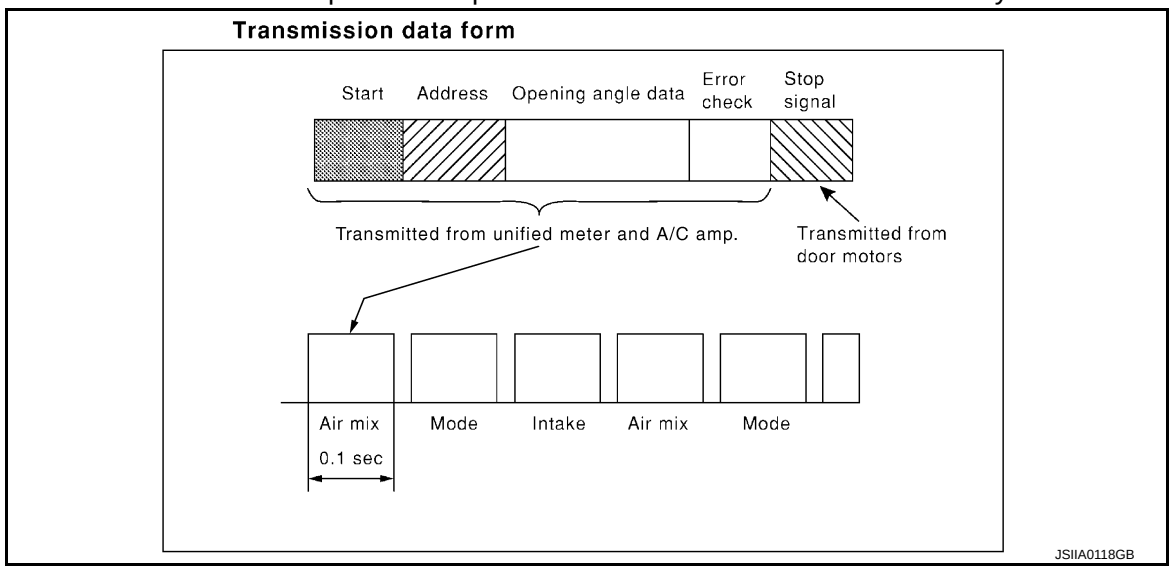
- Data sent from the unified meter and A/C amp. are selected according to data-based decisions made by the mode door motor, air mix door motors and intake door motor.
- If the addresses are identical, the opening angle data and error check signals are received by the door motor LCUs. The LCUs then make the appropriate error decision. If the opening angle data have no error, door control begins.
- If an error exists, the received data are rejected and corrected data received. Finally, door control is based upon the corrected opening angle data.

OPENING ANGLE:
- Data that shows the indicated door opening angle of each door motor.

ERROR CHECK:
- In this procedure, transmitted and received data is checked for errors. Error data are then compiled. The error check prevents corrupted data from being used by the mode door motor, the air mix door motors and the intake door motor. Error data can be related to the following symptoms.

- Malfunction of electrical frequency
- Poor electrical connections
- Signal leakage from transmission lines
- Signal level fluctuation

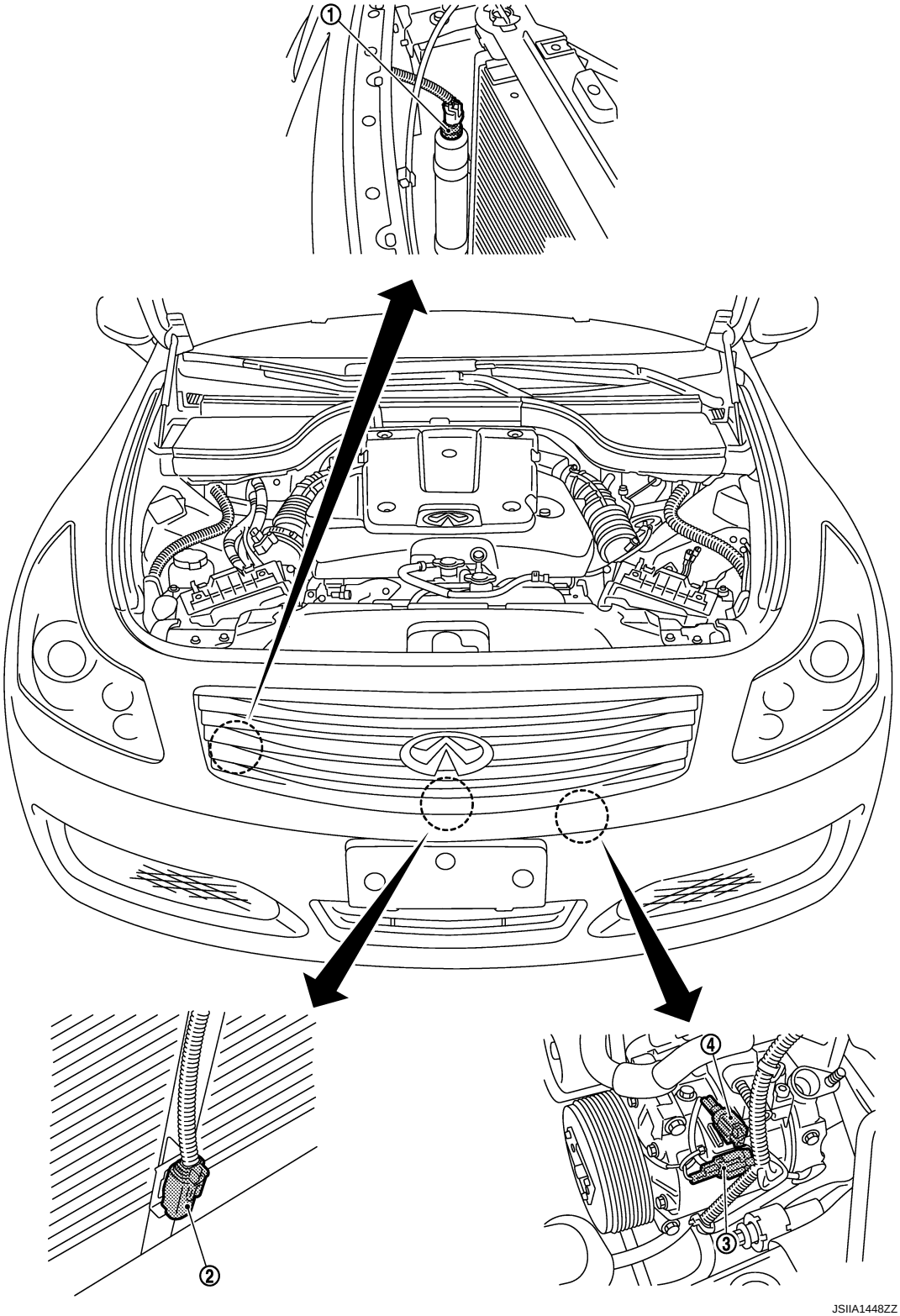
STOP SIGNAL:
- At the end of each transmission, a stop operation, in-operation, or internal malfunction message is delivered to the unified meter and A/C amp. This completes one data transmission and control cycle.




## WITHOUT LEFT AND RIGHT VENTILATION TEMPERATURE SEPARATELY CONTROL SYSTEM : Component Part Location

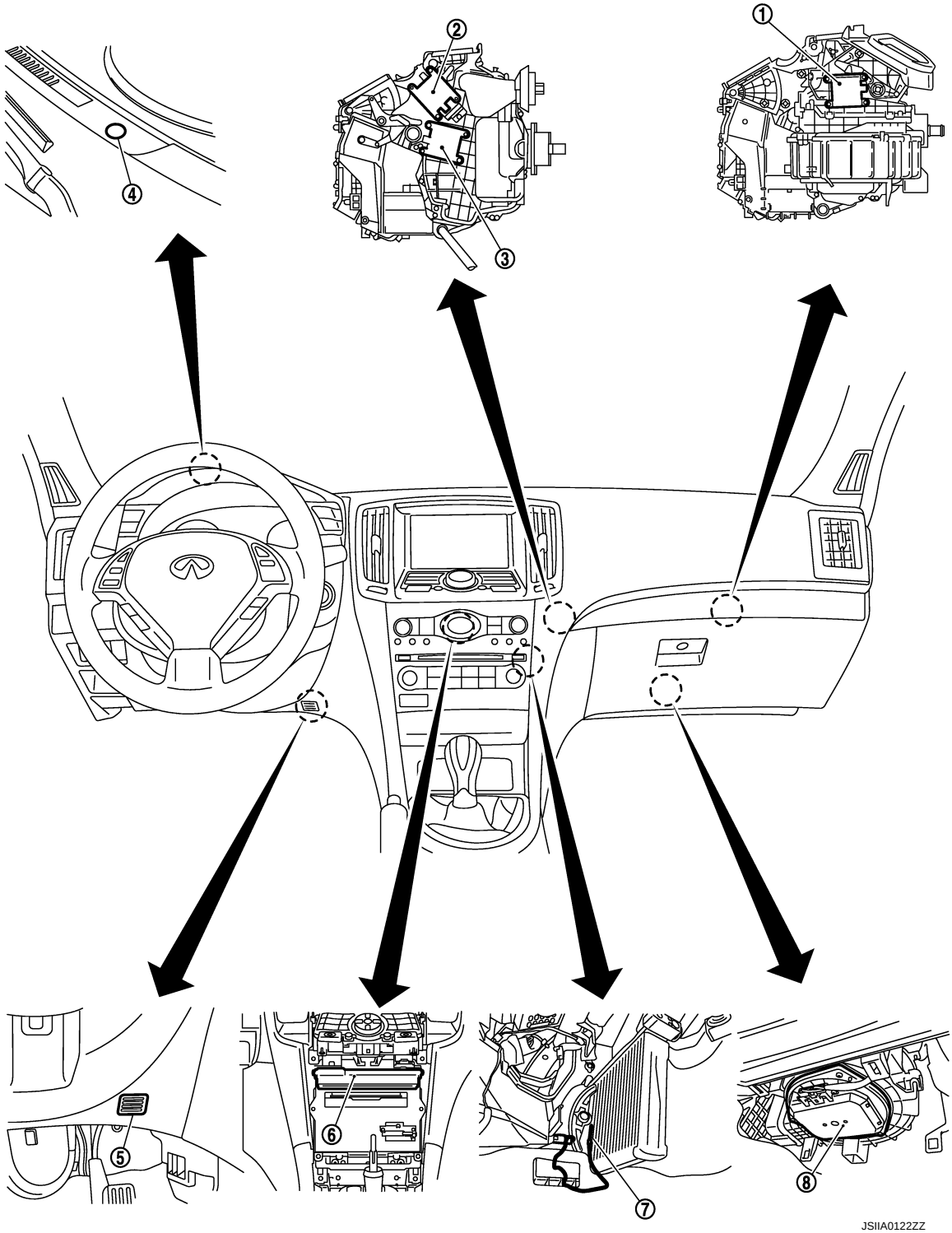
INFOID:0000000008293191

ENGINE COMPARTMENT




1. Refrigerant pressure sensor
2. Ambient sensor
3. Compressor (magnet clutch)
4. Compressor (ECV)

PASSENGER COMPARTMENT




1. Intake door motor
2. Mode door motor
3. Air mix door motor
4. Sunload sensor
5. In-vehicle sensor
6. Unified meter and A/C amp.
7. Intake sensor
8. Blower motor

WITHOUT LEFT AND RIGHT VENTILATION TEMPERATURE SEPARATELY CON-

## TROL SYSTEM : Component Description

INFOID:0000000008293192

| Component | Reference |
|---|---|
| Air mix door motor | HAC-84, "WITHOUT LEFT AND RIGHT VENTILATION TEMPERATURE SEPARATELY CONTROL SYSTEM : Description" |
| Ambient sensor | HAC-99, "Description" |
| Blower motor | HAC-91, "Description" |
| Compressor (Magnet clutch) | HAC-95, "Description" |
| Compressor (ECV) | HAC-97, "Description" |
| Intake door motor | HAC-89, "Description" |
| Intake sensor | HAC-108, "Description" |
| In-vehicle sensor | HAC-102, "Description" |
| Mode door motor | HAC-82, "Description" |
| Refrigerant pressure sensor | EC-547, "Description" |
| Sunload sensor | HAC-105, "Description" |
| Unified meter and A/C amp. | HAC-81, "Description" |

# WITH LEFT AND RIGHT VENTILATION TEMPERATURE SEPARATELY CONTROL SYSTEM

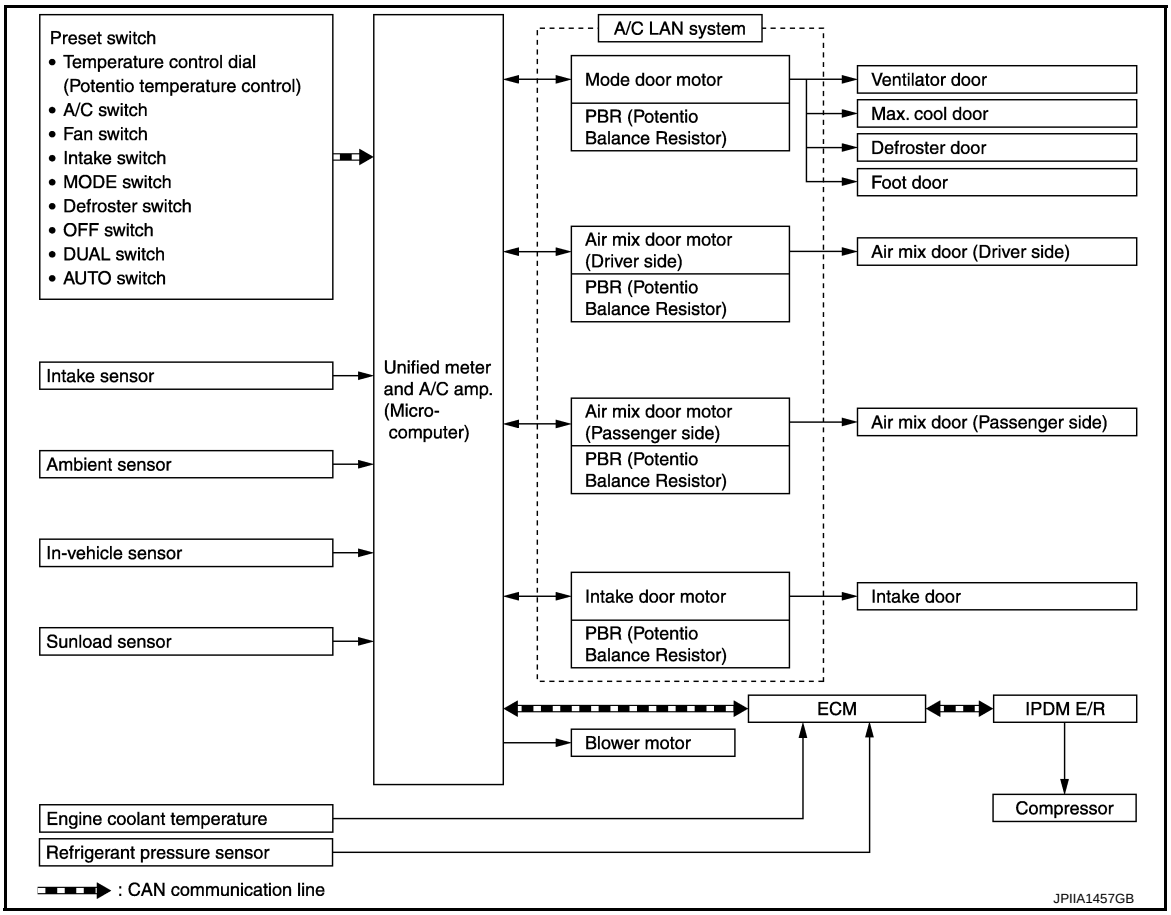
## WITH LEFT AND RIGHT VENTILATION TEMPERATURE SEPARATELY CONTROL SYSTEM : System Diagram

INFOID:0000000008293193

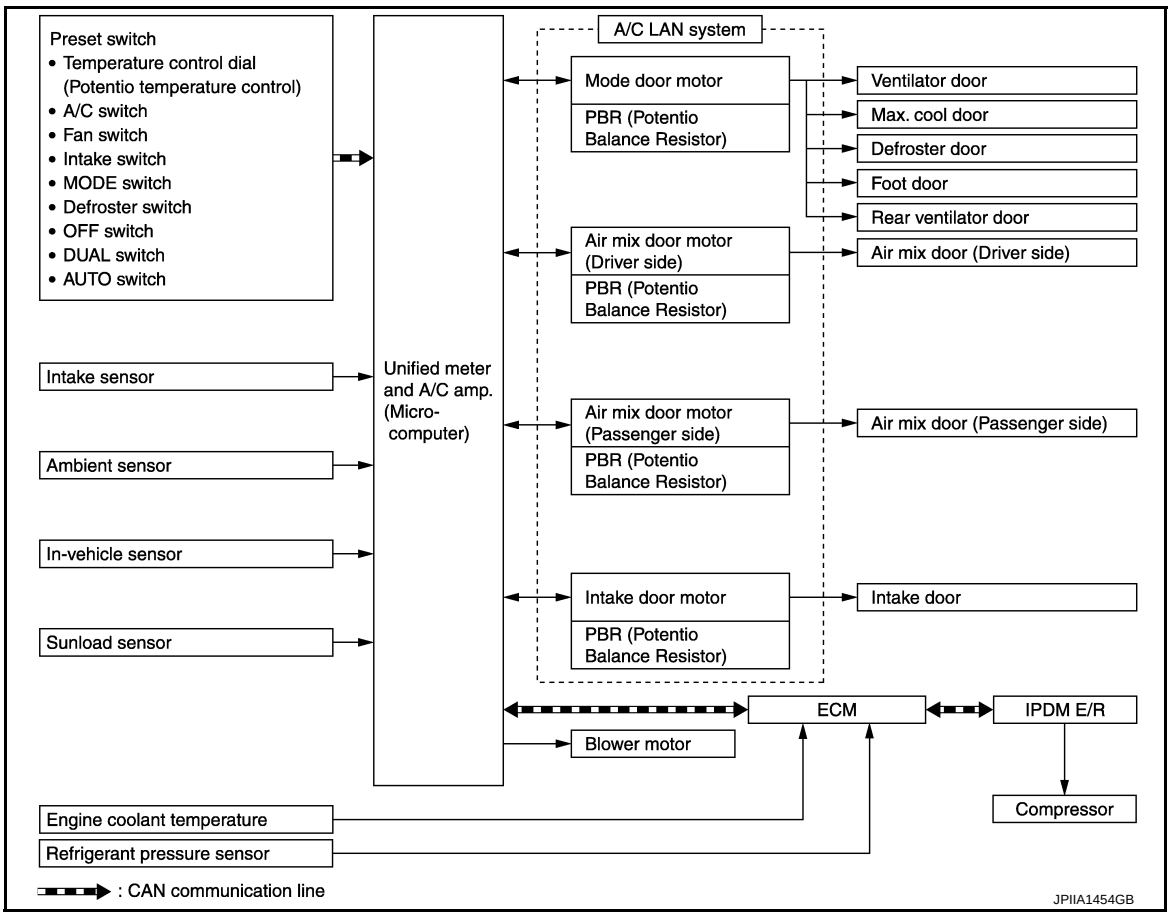
### CONTROL SYSTEM

The control system consists of input sensors, switches, unified meter and A/C amp. (microcomputer) and outputs. The relationship of these components is as shown in the figure below:

Without rear ventilation




With rear ventilation



# WITH LEFT AND RIGHT VENTILATION TEMPERATURE SEPARATELY CONTROL SYSTEM : System Description

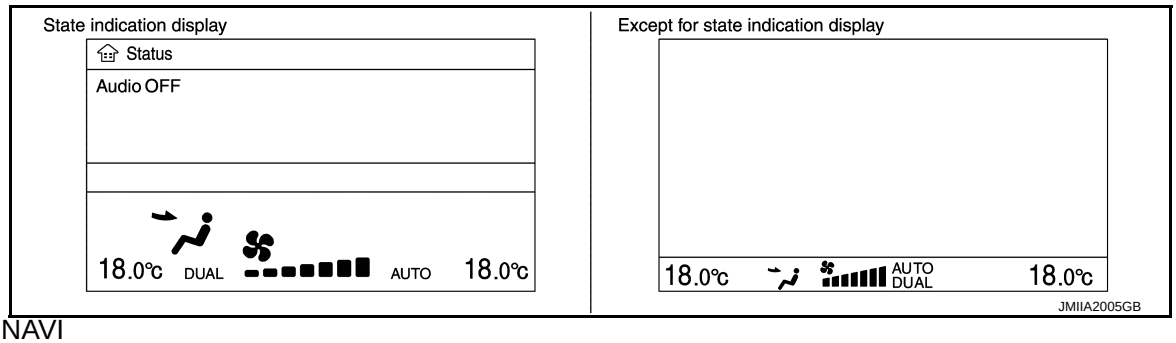
INFOID:0000000008293194

## CONTROL OPERATION

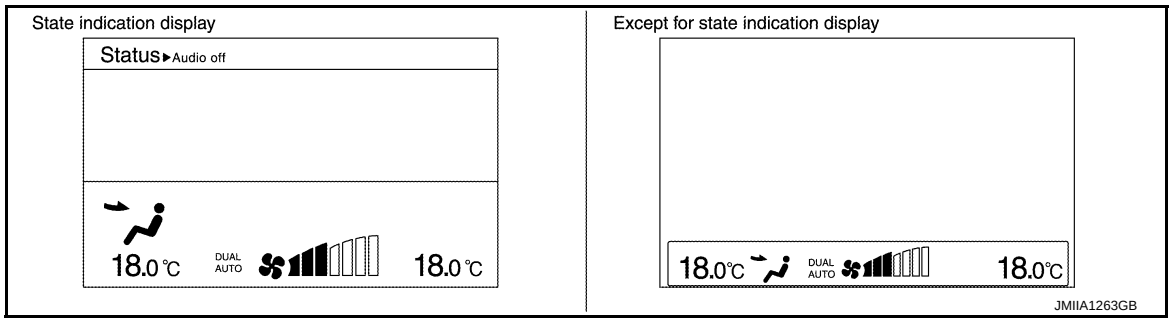
Display Screen

The operation status of the system is displayed on the screen.

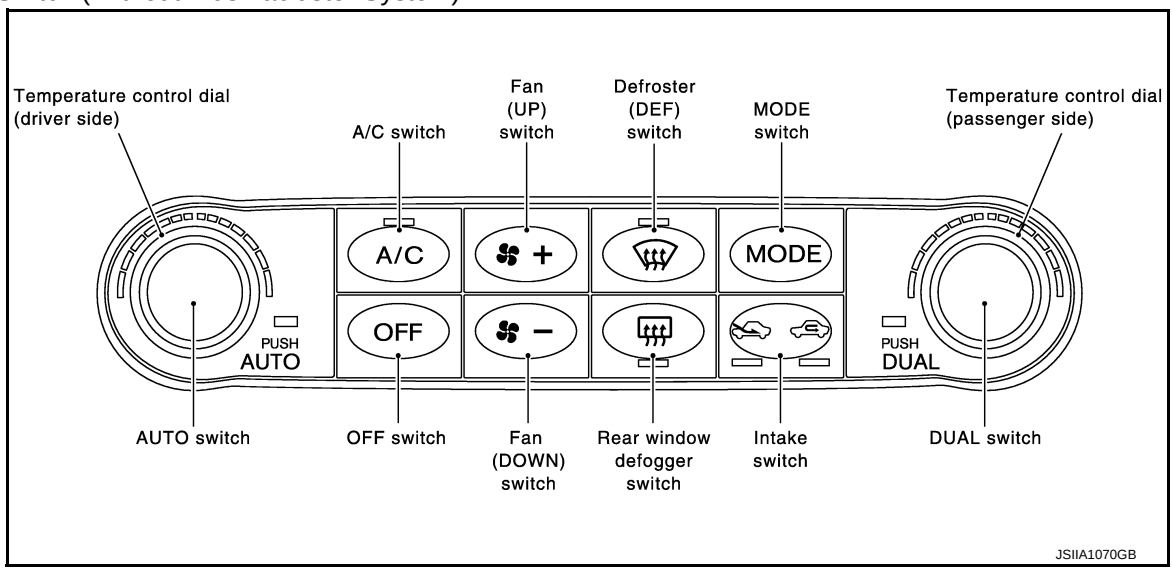
- Without NAVI



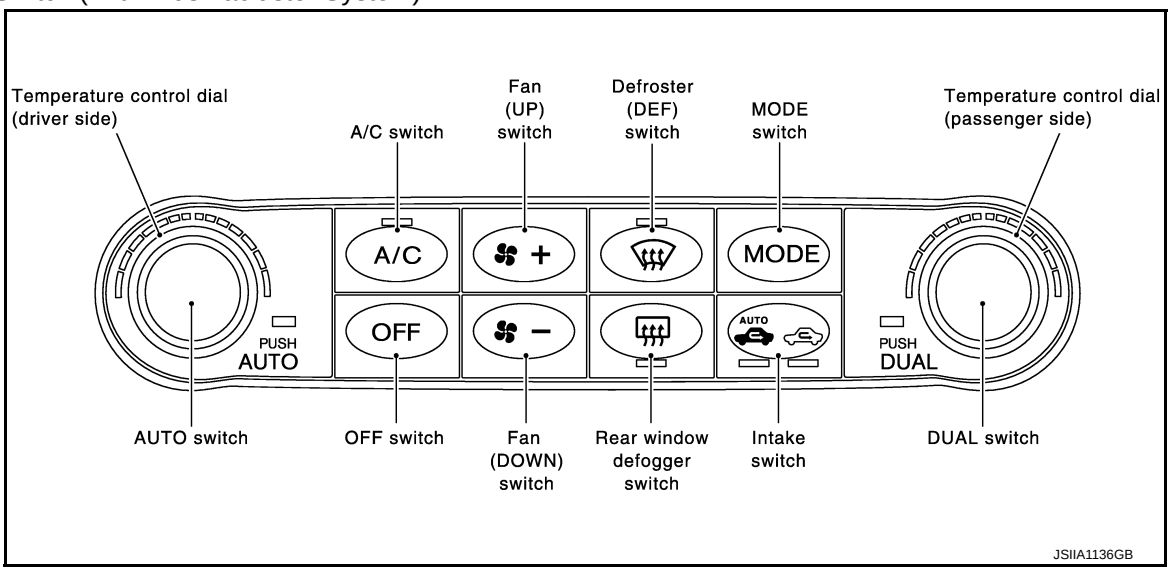

- With NAVI




Preset Switch (Without Plusmacluster System)



Preset Switch (With Plusmacluster System)




MODE Switch

The air discharge outlets is controlled with this switch.

Temperature Control Dial (Potentio Temperature Control) (Driver Side)

The set temperature is increased or decreased with this dial.

Temperature Control Dial (Potentio Temperature Control) (Passenger Side)

- The set temperature is increased or decreased with this dial.
- When the temperature control dial is turned, DUAL switch indicator turns ON.

AUTO Switch

- The compressor, intake doors, air mix doors, mode doors and fan 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.

Defroster (DEF) Switch

Mode doors are set to the defrost position with this switch. Also, intake doors are set to the outside air position, and compressor turns ON.

A/C Switch

Compressor is ON or OFF with this switch.
(Pressing the A/C switch when the A/C switch is ON turns OFF the A/C switch and compressor.)

FAN Switches

The fan speed is manually controlled with this switch. Seven speeds are available for manual control (as shown on the display screen).

OFF Switch

Compressor and blower are OFF, air inlet is set to FRE, and mode position is set to foot position.

Rear Window Defogger Switch

When indicator is ON, rear window is defogged.

Intake Switch (Without Plasmacluster System)

- When intake switch is ON, FRE indicator turns ON, and air inlet is fixed to FRE.
- When intake switch is pressed again, REC indicator turns ON, and air inlet is fixed to REC.
- When intake switch is pressed for approximately 1.5 seconds or longer, FRE and REC indicators blink twice. Then, automatic control mode is entered. Inlet status is displayed by indicator even during automatic controlled.
- When FRE indicator is turned ON, shifting mode position to D/F or DEF, or when compressor is turned from ON to OFF, intake switch is automatically turned OFF (fixed to FRE mode). REC mode can be re-entered by pressing intake switch again, and then compressor is turned ON. (Except D/F or DEF position)

Intake Switch (With Plasmacluster System)

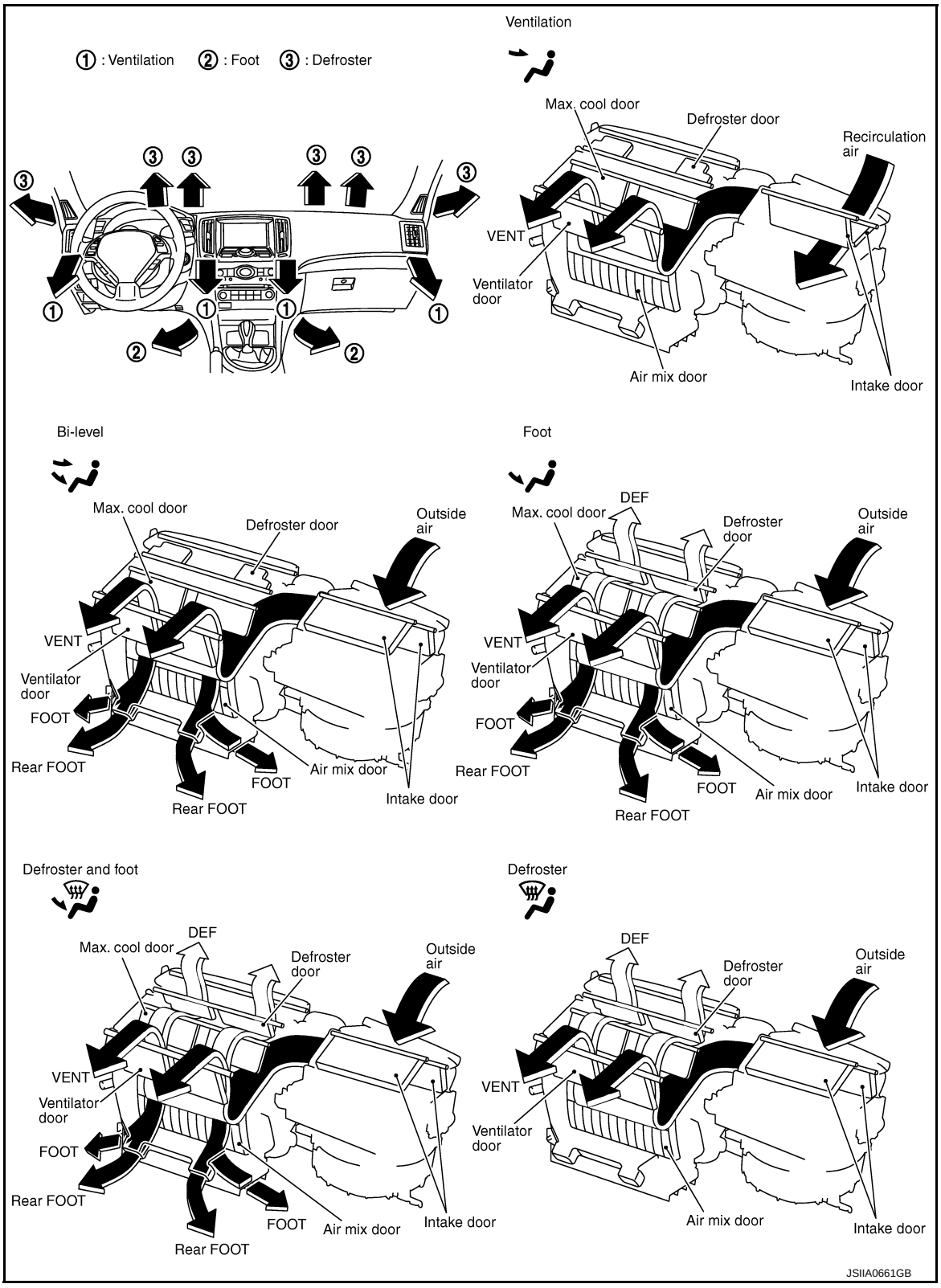
- When AUTO switch is pressed, AUTO intake indicator and REC indicator turns ON, and air inlet is automatic control.
- When intake switch is pressed, AUTO intake indicator and REC indicator turns OFF, and air inlet is fixed to FRE.
- When intake switch is pressed again, REC indicator turns ON, and air inlet is fixed to REC.
- Then auto intake mode is entered, inlet status is displayed by REC indicator even during automatic controlled.
- When REC indicator is turned OFF, shifting mode position to D/F or DEF or when compressor is turned from ON to OFF, intake mode position is fixed to FRE mode. REC mode can be re-entered by pressing intake switch again, and then compressor is turned ON. (Except D/F or DEF position)

DUAL Switch

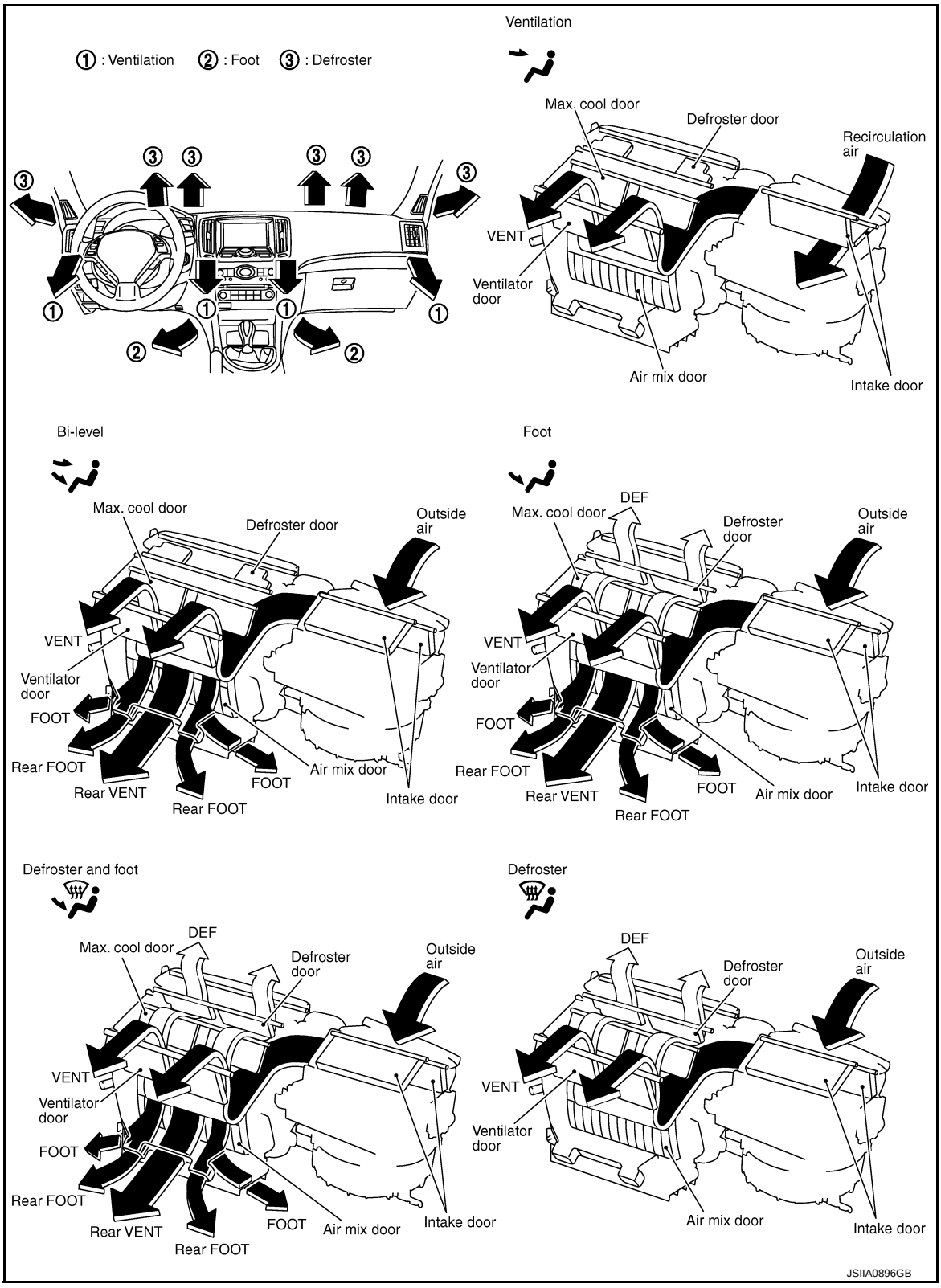
- When the DUAL switch indicator is ON, the driver side and passenger side, temperature can each be set independently.
- When the DUAL switch indicator is OFF, the driver side outlet and setting temperature is applied to both sides.

DISCHARGE AIR FLOW

Without Rear Ventilation

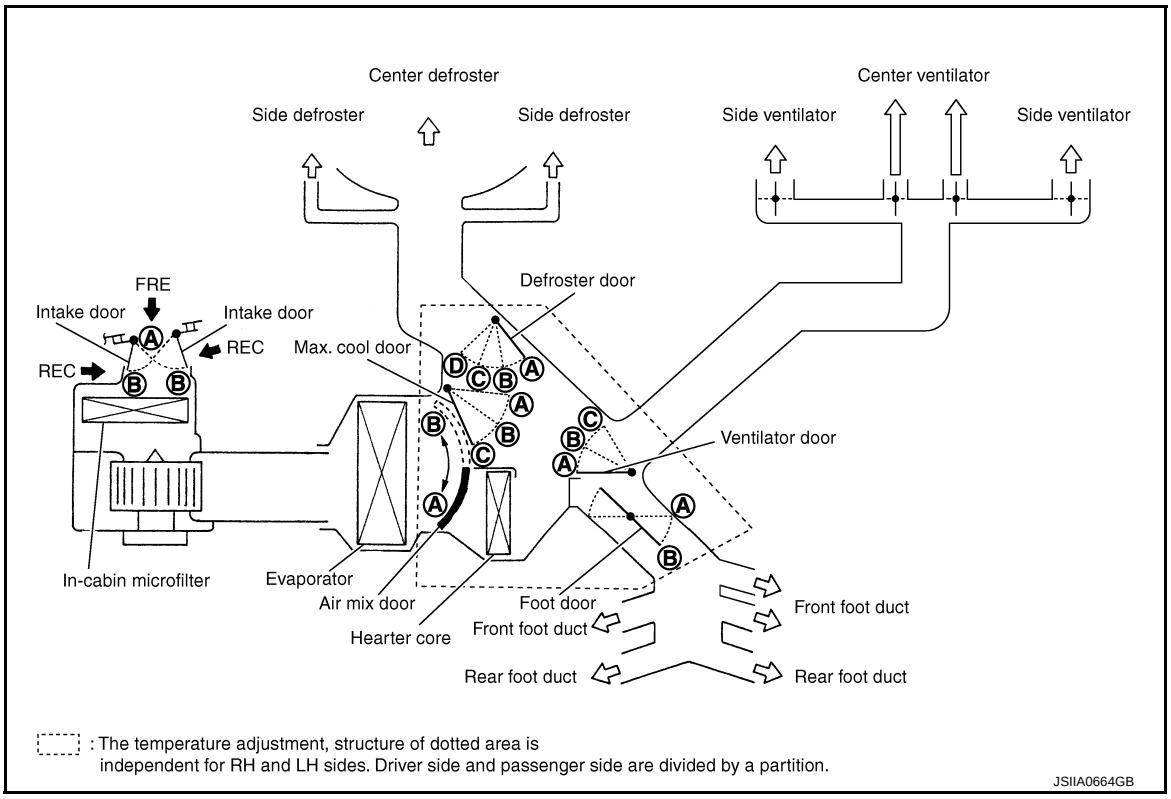


With Rear Ventilation




SWITCHES AND THEIR CONTROL FUNCTION

Without Rear Ventilation

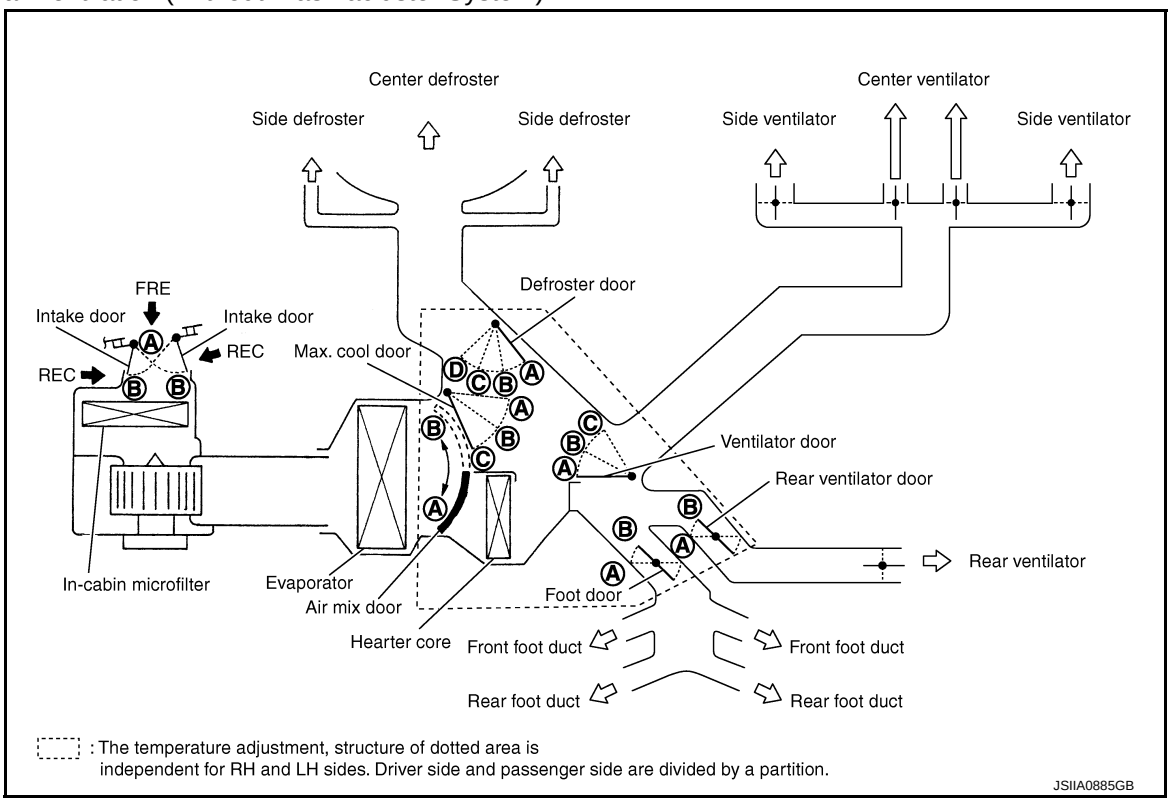



| Switch position | | Door position | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | Ventilator door | Max. cool door | Defroster door | Foot door | Intake door | Air mix door (Driver side) | Air mix door (Passenger side) |
| AUTO switch | ☀ | AUTO | | | | | | |

| Switch position | | | Door position | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | Ventilator door | Max. cool door | Defroster door | Foot door | Intake door | Air mix door (Driver side) | Air mix door (Passenger side) |
| MODE switch | VENT | | A | A | D | B | — | — | — |
| | B/L | | B | B | D | B | | | |
| | FOOT | | C | C | C | B | | | |
| | D/F | | | | B | B | B | | |
| DEF switch | | | | | A | A | B | | |
| Intake switch | FRE | | — | — | — | — | B* | | |
| | REC | | | | | | A* | | |
| DUAL switch | DUAL | | | | | | — | | ON |
| | OFF | | | | | | | | OFF |
| Temperature control dial (Driver side) | DUAL switch: OFF | 18.0°C (60°F) | | | | | | A | |
| | | 18.5°C ⇔ 31.5°C (61°F ⇔ 89°F) | | | | | | AUTO | |
| | | 32.0°C (90°F) | | | | | | B | |
| Temperature control dial (Driver side) | DUAL switch: ON | 18.0°C (60°F) | | | | | | A | — |
| | | 18.5°C ⇔ 31.5°C (61°F ⇔ 89°F) | | | | | | AUTO | |
| | | 32.0°C (90°F) | | | | | | B | |
| Temperature control dial (Passenger side) | | 18.0°C (60°F) | | | | | | — | A |
| | | 18.5°C ⇔ 31.5°C (61°F ⇔ 89°F) | | | | | | | AUTO |
| | | 32.0°C (90°F) | | | | | | | B |
| OFF switch | | | C | C | C | B | B | — | — |

*: Inlet status is displayed by indicator when activating automatic control

With Rear Ventilation (Without Plasmacluster System)

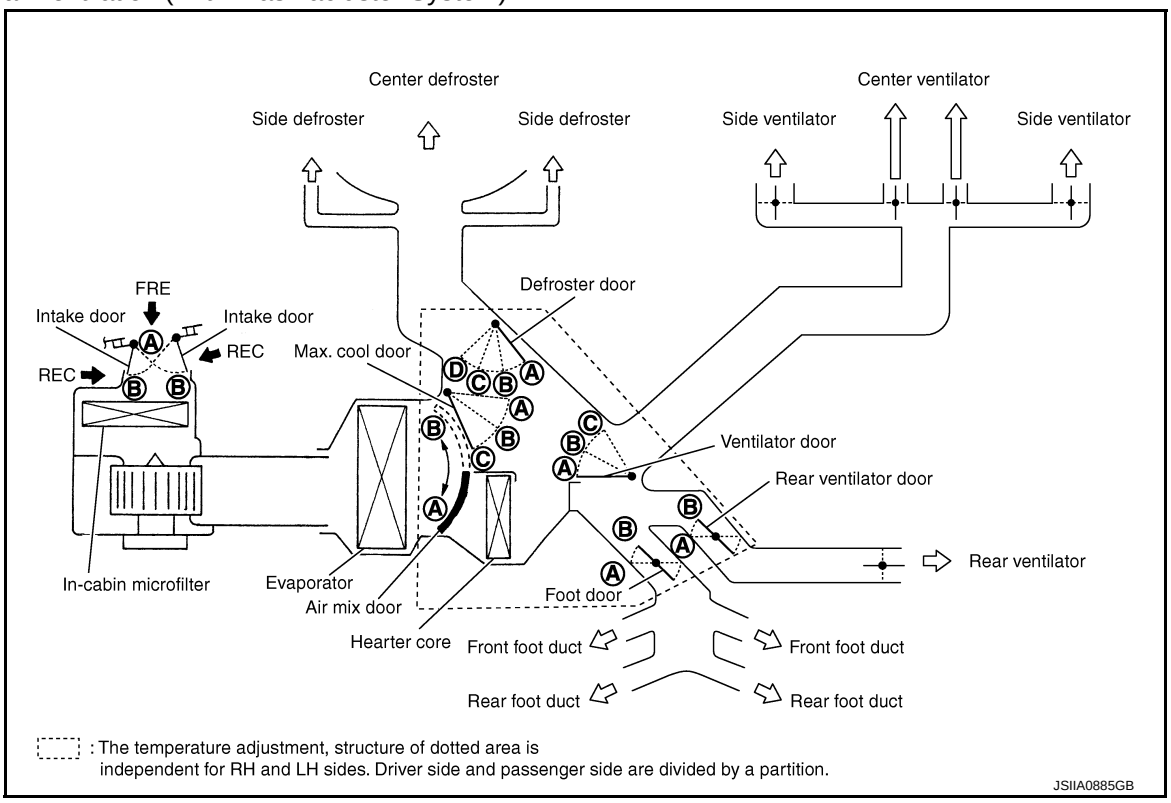



| Switch position | | Door position | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | Ventilator door | Max. cool door | Defroster door | Foot door | Rear ventilator door | Intake door | Air mix door (Driver side) | Air mix door (Passenger side) |
| AUTO switch | | AUTO | | | | | | | |

| Switch position | | | Door position | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | Ventilator door | Max. cool door | Defroster door | Foot door | Rear ventilator door | Intake door | Air mix door (Driver side) | Air mix door (Passenger side) |
| MODE switch | VENT | | A | A | D | B | B | — | — | — |
| | B/L | | B | B | D | B | B | | | |
| | FOOT | | C | C | C | B | B | | | |
| | D/F | | | | B | B | B | B | | |
| DEF switch | | | | | A | A | A | B | | |
| Intake switch | FRE | | — | — | — | — | — | B* | | |
| | REC | | | | | | | A* | | |
| DUAL switch | DUAL | | | | | | | — | | ON |
| | OFF | | | | | | | | | OFF |
| Temperature control dial (Driver side) | DUAL switch: OFF | 18.0°C (60°F) | | | | | | | A | |
| | | 18.5°C ⇔ 31.5°C (61°F ⇔ 89°F) | | | | | | | AUTO | |
| | | 32.0°C (90°F) | | | | | | | B | |
| Temperature control dial (Driver side) | DUAL switch: ON | 18.0°C (60°F) | | | | | | | A | — |
| | | 18.5°C ⇔ 31.5°C (61°F ⇔ 89°F) | | | | | | | AUTO | |
| | | 32.0°C (90°F) | | | | | | | B | |
| Temperature control dial (Passenger side) | | 18.0°C (60°F) | | | | | | | — | A |
| | | 18.5°C ⇔ 31.5°C (61°F ⇔ 89°F) | | | | | | | | AUTO |
| | | 32.0°C (90°F) | | | | | | | | B |
| OFF switch | | | C | C | C | B | B | B | — | — |

*: Inlet status is displayed by indicator when activating automatic control

With Rear Ventilation (With Plasmacluster System)




| Switch position | | Door position | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | Ventilator door | Max. cool door | Defroster door | Foot door | Rear ventilator door | Intake door | Air mix door (Driver side) | Air mix door (Passenger side) |
| AUTO switch | | AUTO | | | | | | | |

| Switch position | | | Door position | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | Ventilator door | Max. cool door | Defroster door | Foot door | Rear ventilator door | Intake door | Air mix door (Driver side) | Air mix door (Passenger side) |
| MODE switch | VENT | | A | A | D | B | B | | — | — |
| | B/L | | B | B | D | B | B | — | | |
| | FOOT | | C | C | C | B | B | | | |
| | D/F | | | | B | B | B | B | | |
| DEF switch | | | | | A | A | A | B | | |
| Intake switch | AUTO | | — | — | — | — | — | AUTO*2 | | |
| | REC | | | | | | | A*1 | | |
| | FRE | | | | | | | B*1 | | |
| DUAL switch | DUAL | | | | | | | — | | ON |
| | OFF | | | | | | | | | OFF |
| Temperature control dial (Driver side) | DUAL switch: OFF | 18.0°C (60°F) | | | | | | | A | |
| | | 18.5°C ⇔ 31.5°C (61°F ⇔ 89°F) | | | | | | | AUTO | |
| | | 32.0°C (90°F) | | | | | | | B | |
| Temperature control dial (Driver side) | DUAL switch: ON | 18.0°C (60°F) | | | | | | | A | — |
| | | 18.5°C ⇔ 31.5°C (61°F ⇔ 89°F) | | | | | | | AUTO | |
| | | 32.0°C (90°F) | | | | | | | B | |
| Temperature control dial (Passenger side) | | 18.0°C (60°F) | | | | | | | — | A |
| | | 18.5°C ⇔ 31.5°C (61°F ⇔ 89°F) | | | | | | | | AUTO |
| | | 32.0°C (90°F) | | | | | | | | B |
| OFF switch | | | C | C | C | B | B | B | — | — |

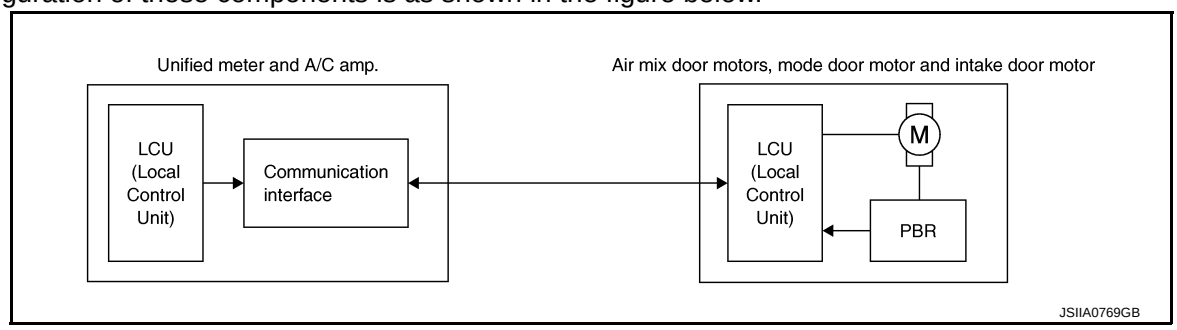
*1: Inlet status is displayed by indicator when activating automatic control

*2: Intake door control applies a exhaust gas/outside odor detecting sensor

## AIR CONDITIONING LAN CONTROL SYSTEM

The LAN (Local Area Network) system consists of unified meter and A/C amp., mode door motor, air mix door motors and intake door motor.

A configuration of these components is as shown in the figure below.



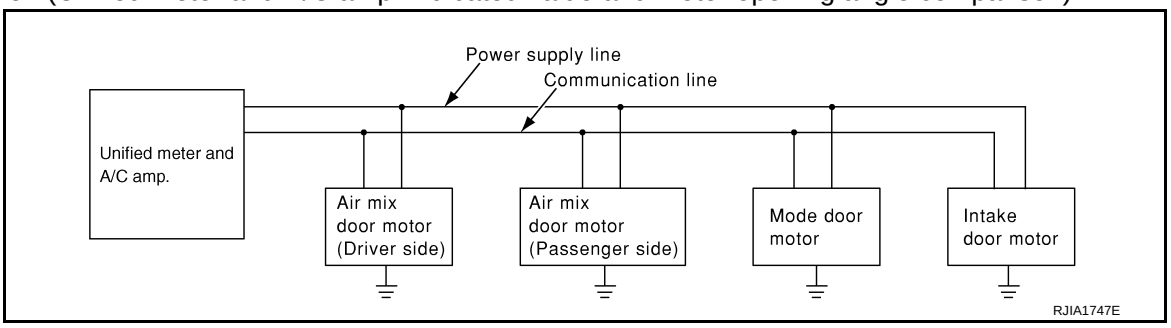
## SYSTEM CONSTRUCTION

A small network is constructed between the unified meter and A/C amp., mode door motor, air mix door motors and intake door motor. The unified meter and A/C amp. and motors are connected by data transmission lines and motor power supply lines. The LAN network is built through the ground circuits of each door motor.

Addresses, motor opening angle signals, motor stop signals and error checking messages are all transmitted through the data transmission lines connecting the unified meter and A/C amp. and each door motor.

The following functions are contained in LCUs built into the mode door motor, the air mix door motors and the intake door motor.

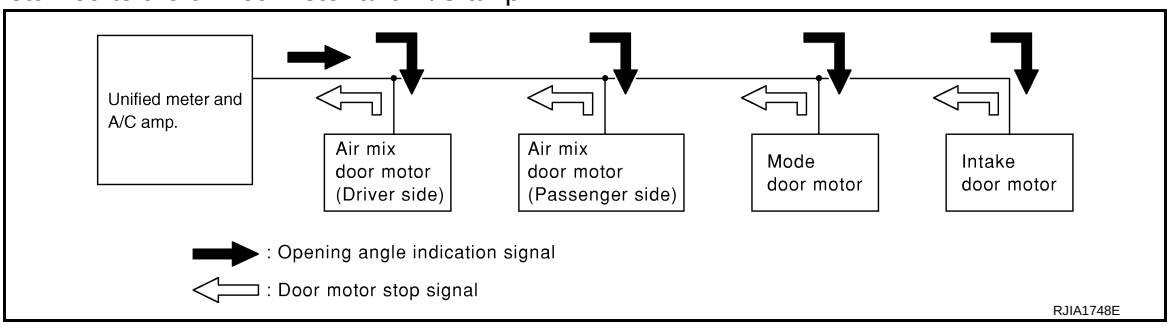
- Address
- Motor opening angle signals
- Data transmission
- Motor stop and drive decision
- Opening angle sensor (PBR function)
- Comparison
- Decision (Unified meter and A/C amp. indicated value and motor opening angle comparison)




### Operation

The unified meter and A/C amp. receives data from each of the sensors. The unified meter and A/C amp. sends mode door, air mix door and intake door opening angle data to the mode door motor LCU, air mix door motor LCUs and intake door motor LCU.

The mode door motor, air mix door motors and intake door motor read their respective signals according to the address signal. Opening angle indication signals received from the unified meter and A/C amp. and each of the motor position sensors is compared by the LCUs in each door motor with the existing decision and opening angles. Subsequently, HOT/COLD, DEF/VENT and FRE/REC operation is selected. The new selection data is returned to the unified meter and A/C amp.




### Transmission Data and Transmission Order

Unified meter and A/C amp. data is transmitted consecutively to each of the doors motor following the form as shown in the figure below.

START:

- Initial compulsory signal is sent to each of the door motors.

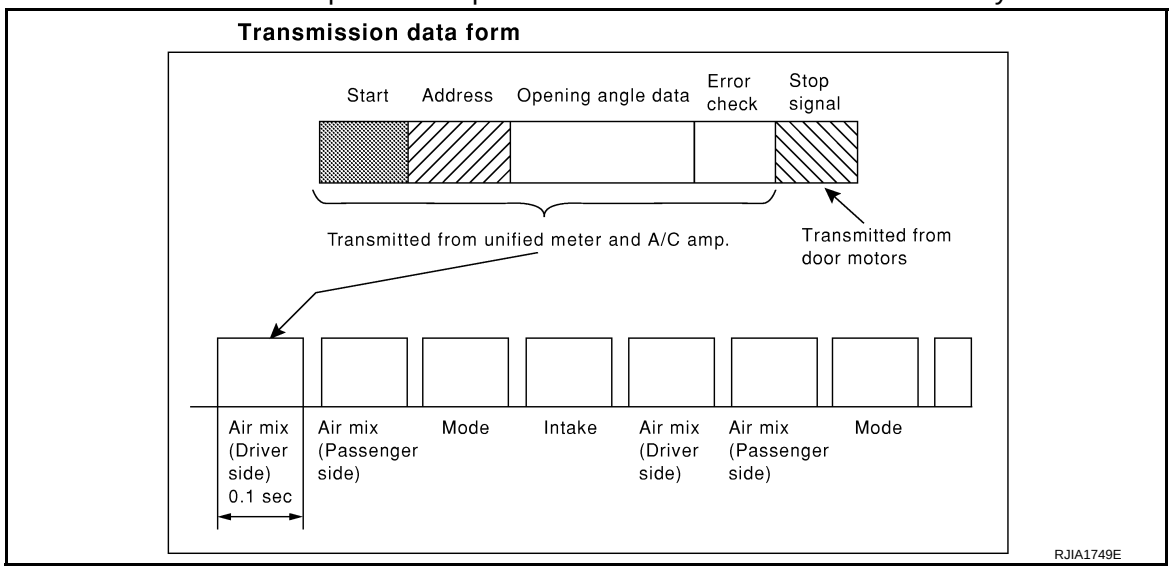
ADDRESS:

- Data sent from the unified meter and A/C amp. are selected according to data-based decisions made by the mode door motor, air mix door motors and intake door motor.
- If the addresses are identical, the opening angle data and error check signals are received by the door motor LCUs. The LCUs then make the appropriate error decision. If the opening angle data have no error, door control begins.
- If an error exists, the received data are rejected and corrected data received. Finally, door control is based upon the corrected opening angle data.

OPENING ANGLE:
• Data that shows the indicated door opening angle of each door motor.

ERROR CHECK:
• In this procedure, transmitted and received data is checked for errors. Error data are then compiled. The error check prevents corrupted data from being used by the mode door motor, the air mix door motors and the intake door motor. Error data can be related to the following symptoms.
- Malfunction of electrical frequency
- Poor electrical connections
- Signal leakage from transmission lines
- Signal level fluctuation

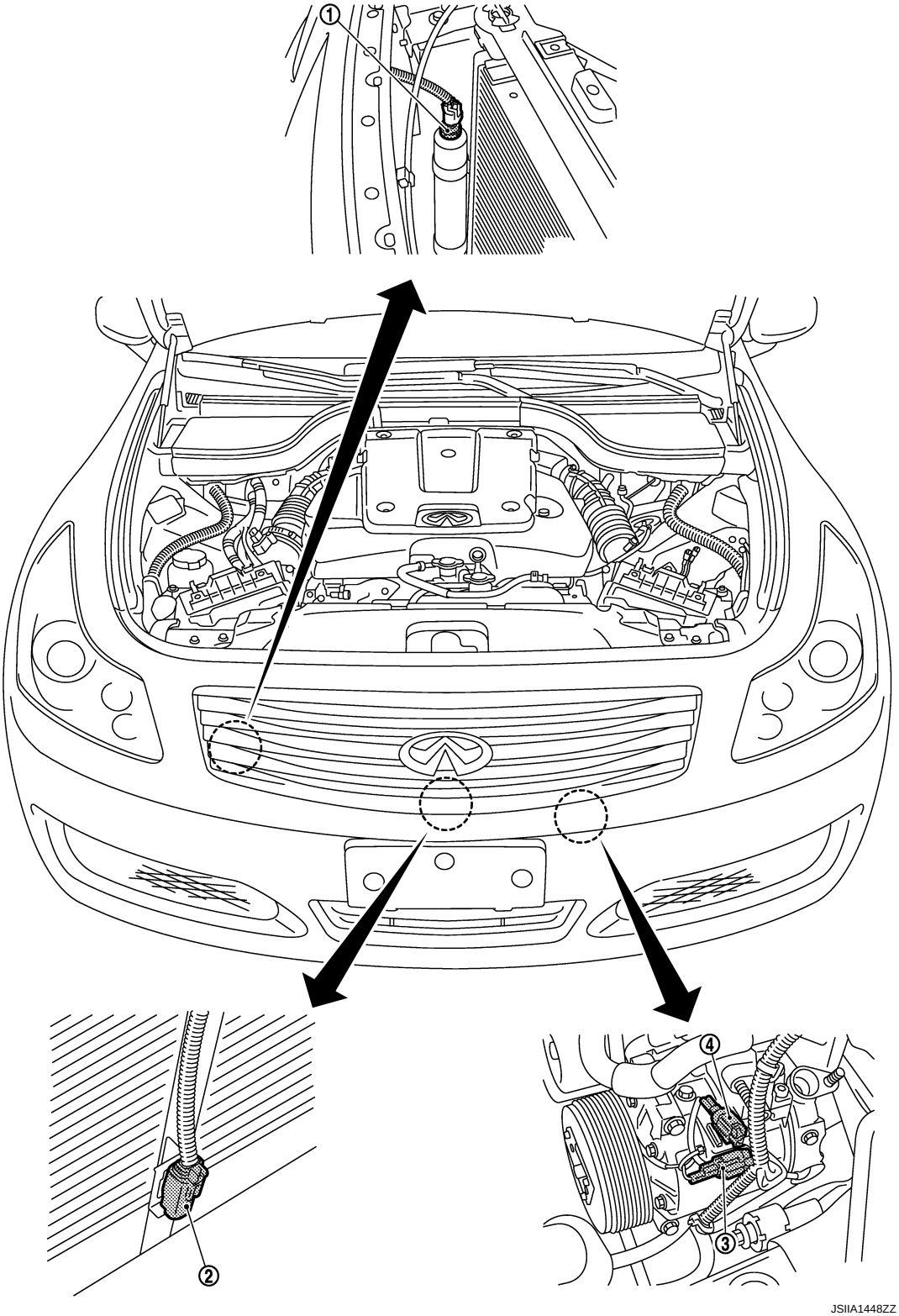
STOP SIGNAL:
• At the end of each transmission, a stop operation, in-operation, or internal malfunction message is delivered to the unified meter and A/C amp. This completes one data transmission and control cycle.




## WITH LEFT AND RIGHT VENTILATION TEMPERATURE SEPARATELY CONTROL SYSTEM : Component Part Location

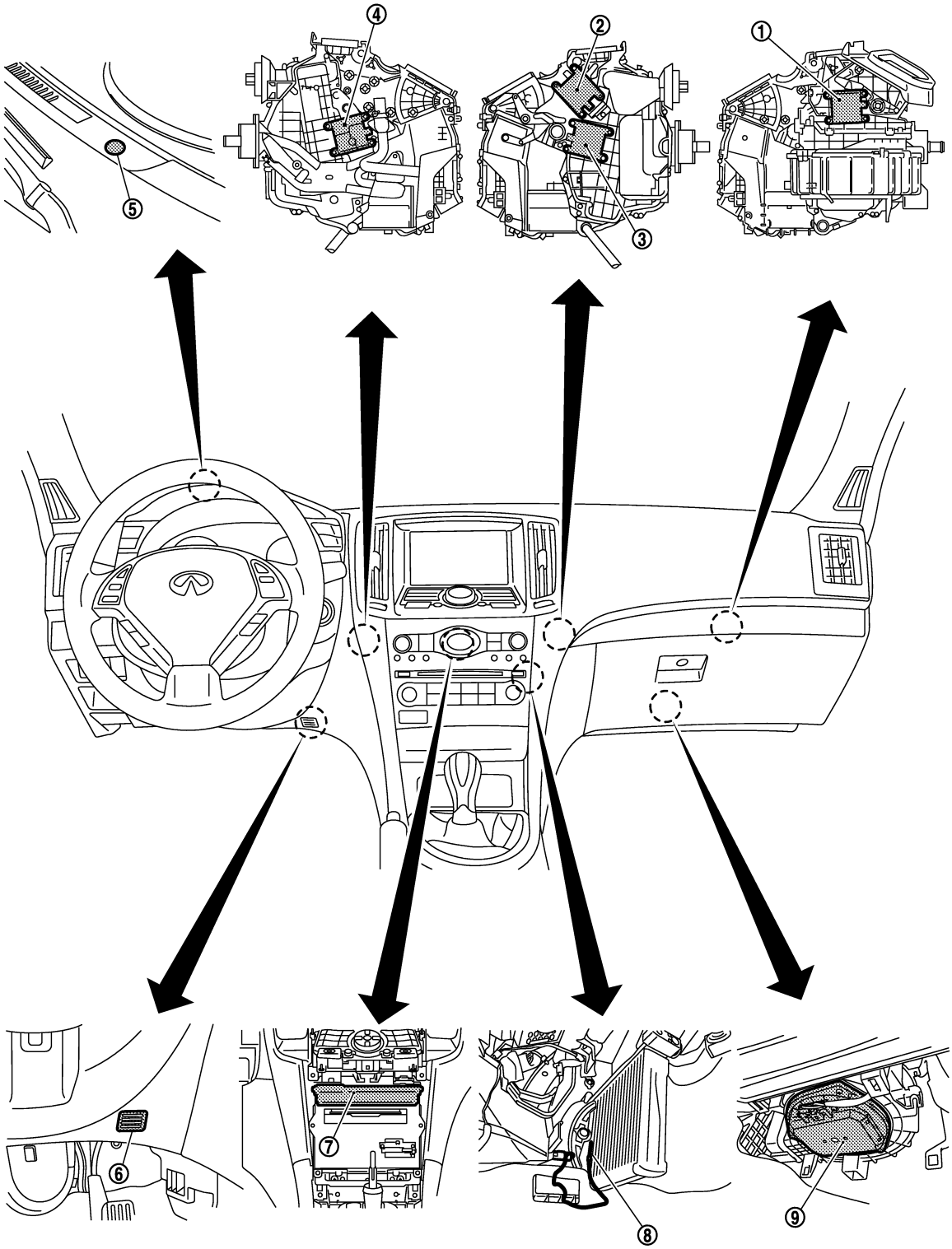
INFOID:0000000008293195

ENGINE COMPARTMENT




1. Refrigerant pressure sensor
2. Ambient sensor
3. Compressor (magnet clutch)
4. Compressor (ECV)

PASSENGER COMPARTMENT




1. Intake door motor
2. Mode door motor
3. Air mix door motor (passenger side)
4. Air mix door motor (driver side)
5. Sunload sensor
6. In-vehicle sensor
7. Unified meter and A/C amp.
8. Intake sensor
9. Blower motor

WITH LEFT AND RIGHT VENTILATION TEMPERATURE SEPARATELY CONTROL

## SYSTEM : Component Description

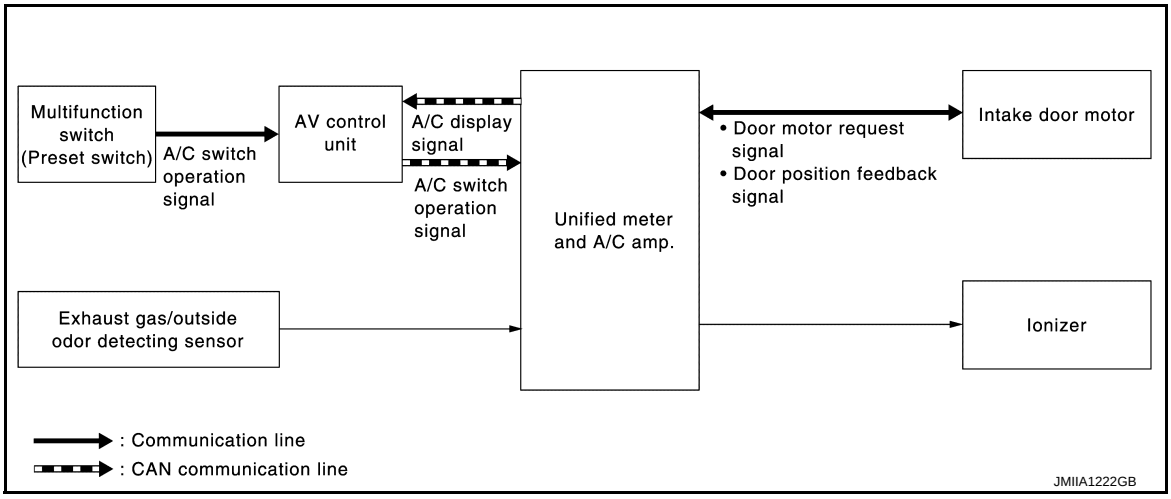
INFOID:0000000008293196

| Component | Reference |
|---|---|
| Air mix door motor (driver side) | HAC-85, "WITH LEFT AND RIGHT VENTILATION TEMPERATURE SEPARATELY CONTROL SYSTEM : Description" |
| Air mix door motor (passenger side) | |
| Ambient sensor | HAC-99, "Description" |
| Blower motor | HAC-91, "Description" |
| Compressor (Magnet clutch) | HAC-95, "Description" |
| Compressor (ECV) | HAC-97, "Description" |
| Intake door motor | HAC-89, "Description" |
| Intake sensor | HAC-108, "Description" |
| In-vehicle sensor | HAC-102, "Description" |
| Mode door motor | HAC-82, "Description" |
| Refrigerant pressure sensor | EC-547, "Description" |
| Sunload sensor | HAC-105, "Description" |
| Unified meter and A/C amp. | HAC-81, "Description" |

# ACCS (ADVANCE CLIMATE CONTROL SYSTEM)

## System Diagram

INFOID:0000000008293197




## System Description

INFOID:0000000008293198

- ACCS (advanced climate control system) controls passenger room air. It maintains the cleanliness of the passenger room air using an in-cabin microfilter and a combination of each of the following functions.

- Automatic intake control (exhaust gas / outside odor detecting mechanism)
- Plasmacluster™ control

**NOTE:**

- Plasmacluster™ ion technology developed by Sharp Corporation is installed in this item.
- Plasmacluster™ is a trademark of Sharp Corporation.

- Various operations of ACCS (advanced climate control system) are transmitted from preset switch to AV control unit via communication line and from AV control unit to unified meter and A/C amp. via CAN communication. unified meter and A/C amp. sends each indication information to AV control unit via CAN communication. AV control unit displays each indication information that is received.

### AUTOMATIC INTAKE CONTROL (EXHAUST GAS / OUTSIDE ODOR DETECTING MECHANISM)

#### Description

In addition to air inlet automatic control of automatic air conditioning system, unified meter and A/C amp. controls automatically air inlet according to signal from exhaust gas / outside odor detecting sensor, so that unpleasant outside odor does not enter in passenger room.

#### Operation Description

- When pressing auto intake switch while blower motor is operated and DEF switch is OFF, auto intake switch indicator lamp and intake switch indicator lamp turn ON. Air inlet is fixed to recirculation for approximately 5 minutes, and then is switched to automatic intake control (exhaust gas / outside odor detecting mechanism).
- Air inlet switches to recirculation when exhaust gas or outside odor is detected while automatic intake control (exhaust gas / outside odor detecting mechanism) is operated. After that, air inlet switches to fresh air intake when exhaust gas or outside odor becomes not detectable.

**NOTE:**

- Sensitivity of exhaust gas / outside odor detecting sensor can be changed. Refer to HAC-18, "WITH PLASMACLUSTER SYSTEM : Exhaust Gas/Outside Odor Detecting Sensor Sensitivity Adjustment Function".
- Automatic intake control (exhaust gas / outside odor detecting mechanism) does not operate when ambient temperature is –2°C (28°F) or less. In this case, control is only for control of automatic air inlet of automatic air conditioning system.

### PLASMACLUSTER™ CONTROL

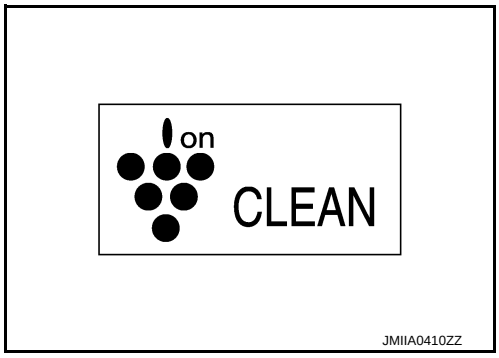
#### Description

Plasmacluster™ control eliminates microbes and reduces odor on interior surface by including high density Plasmacluster™ ion in air conditioning outlet air flow.

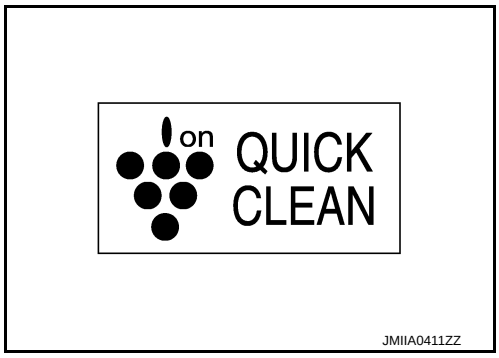
Operation Description

- Plasmacluster™ control operates by interlocking to blower motor. Plasmacluster™ control operates when blower motor operates.
- Control status is displayed on air conditioning system display screen.
- Plasmacluster™ system switches display according to air flow volume as shown in the following figure.

- When air flow is low.

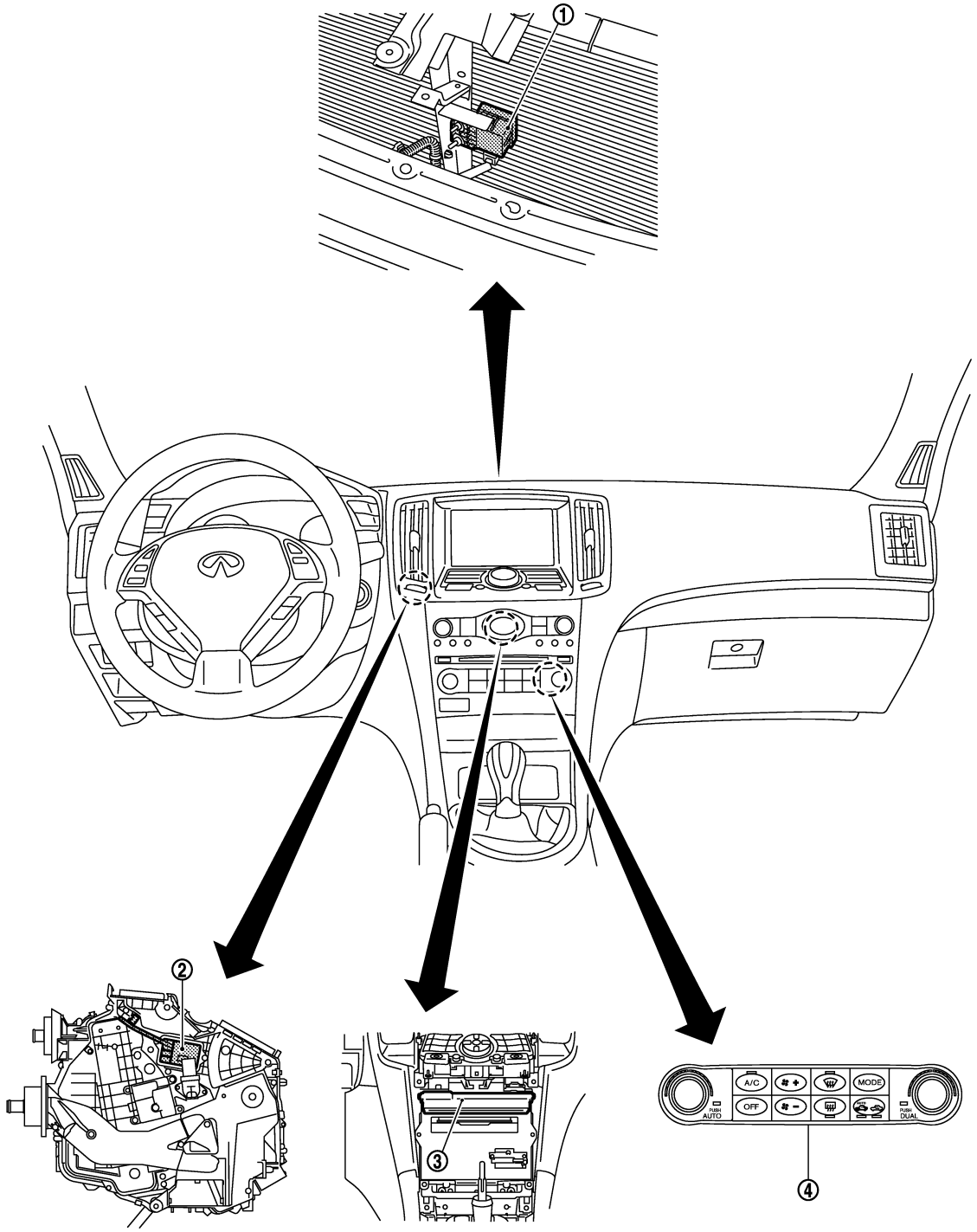



- When air flow is high.



## Component Part Location

INFOID:0000000008293199




JMIIA0566ZZ

1. Exhaust gas/outside odor detecting sensor
2. Ionizer
3. Unified meter and A/C amp.
4. Preset switch

## Component Description

INFOID:0000000008293200

| Component | Description |
|---|---|
| Ion indicator | Plasmacluster ion generation function operating condition is displayed in the ion indicator in the display. |
| Exhaust gas/outside odor detecting sensor | HAC-110, "Description" |
| Ionizer | HAC-113, "Description" |
| Unified meter and A/C amp. | The unified meter and A/C amp. controls ionizer ON/OFF and shifts an ion generation function. |
| Preset switch (AUTO inteke indicator) | The auto intake control system is ON or OFF by the AUTO intake indicator is turned ON. |

# CAN COMMUNICATION SYSTEM

## System Description

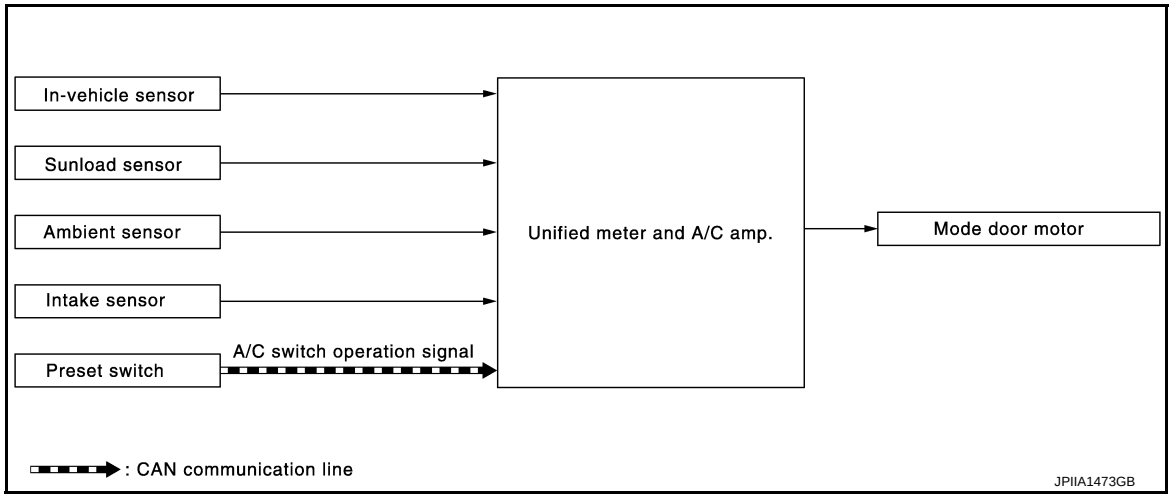
INFOID:0000000008293201

CAN (Controller Area Network) is a serial communication line for real time application. It is an on-vehicle multiplex communication line with high data communication speed and excellent error detection ability. Many electronic control units are equipped onto a vehicle, and each control unit shares information and links with other control units during operation (not independent). In CAN communication, control units are connected with 2 communication lines (CAN-H line, CAN-L line) allowing a high rate of information transmission with less wiring. Each control unit transmits/receives data but selectively reads required data only. For details, refer to LAN-25, "CAN System Specification Chart".

# MODE DOOR CONTROL SYSTEM

## System Diagram

INFOID:0000000008293202




## System Description

INFOID:0000000008293203

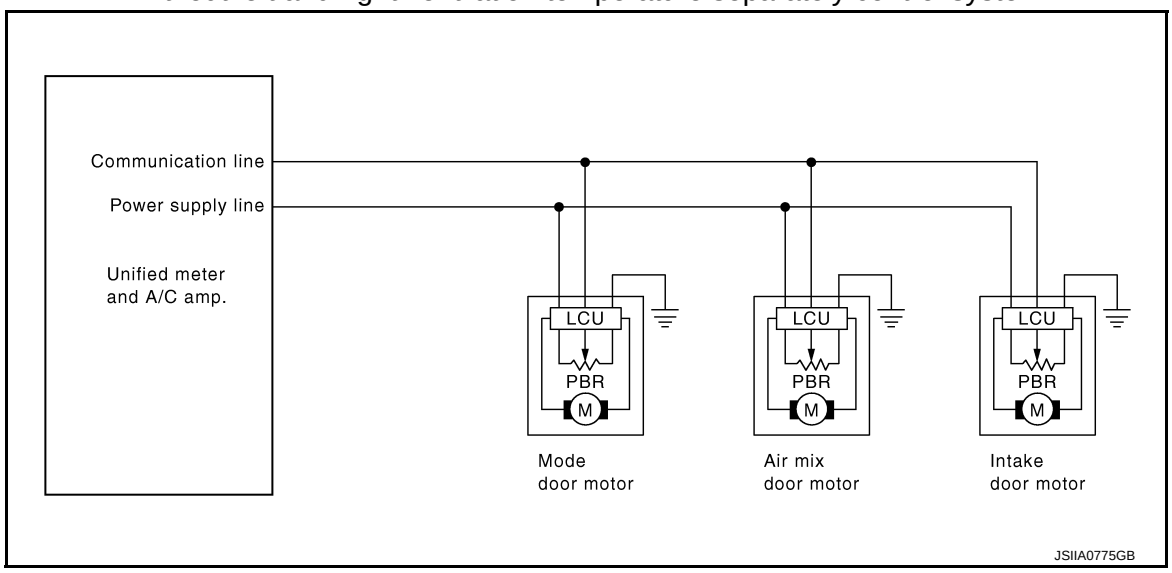
The mode door is automatically controlled by the temperature setting, ambient temperature, in-vehicle temperature, intake temperature and amount of sunload.

### SYSTEM OPERATION

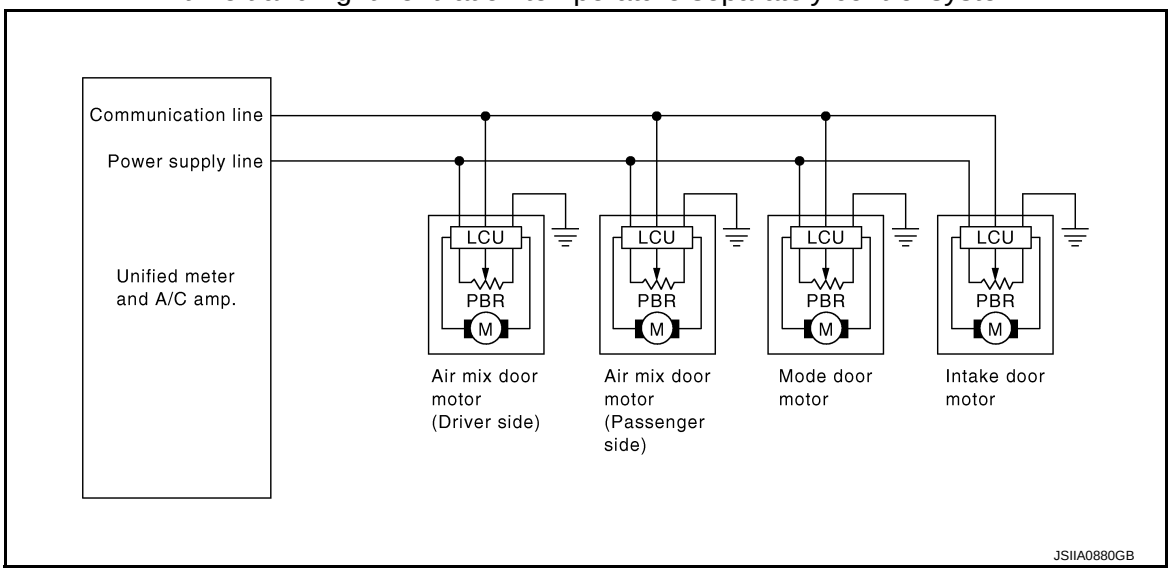
- The unified meter and A/C amp. receives data from each of the sensors.
- The unified meter and A/C amp. sends air mix door, mode door and intake door opening angle data to the air mix door motor LCUs, mode door motor LCU and intake door motor LCU.
- The air mix door motors, mode door motor and intake door motor read their respective signals according to the address signal. Opening angle indication signals received from the unified meter and A/C amp. and each of the motor position sensors are compared by the LCUs in each door motor with the existing decision and opening angles.
- Subsequently, HOT/COLD, DEF/VENT and FRE/REC operation is selected. The new selection data are returned to the unified meter and A/C amp.

Door Motor Circuit

Without left and right ventilation temperature separately control system

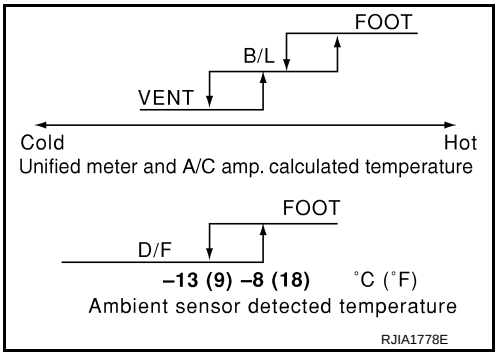


With left and right ventilation temperature separately control system




Mode Door Control Specification

Mode position can be selected manually by pressing MODE switch or DEF switch of the preset switch. This enables to fix a mode position. Automatic control by unified meter and A/C amp. Pressing AUTO switch allows automatic control by unified meter and A/C amp. During the automatic control of mode position, a mode door position (VENT, B/L, FOOT, or D/F) is selected based on a target air mix door opening angle and sunload depending on a temperature calculated by unified meter and A/C amp. In addition, D/F is selected to prevent windshield fogging only when ambient temperature is extremely low with mode position FOOT.

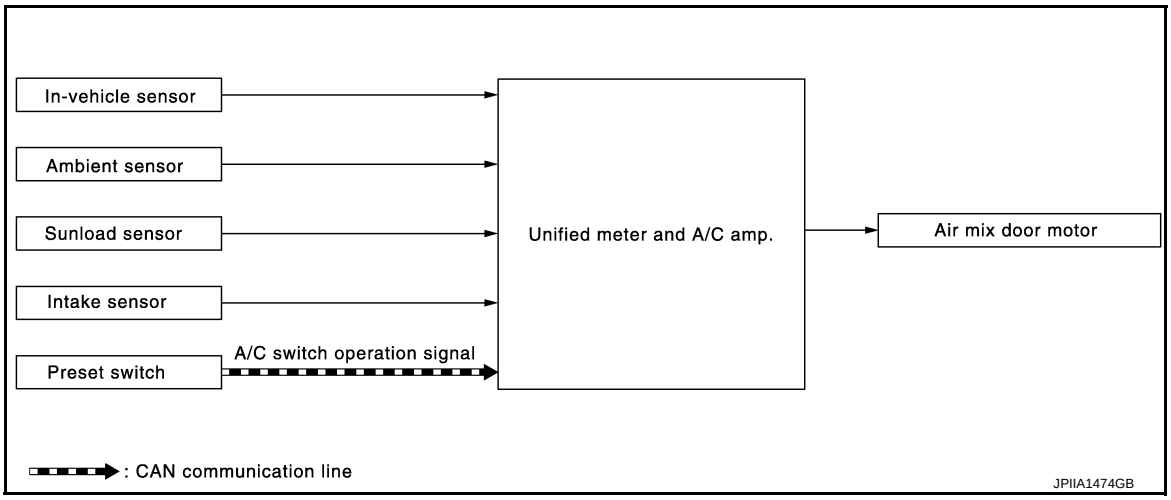


# AIR MIX DOOR CONTROL SYSTEM

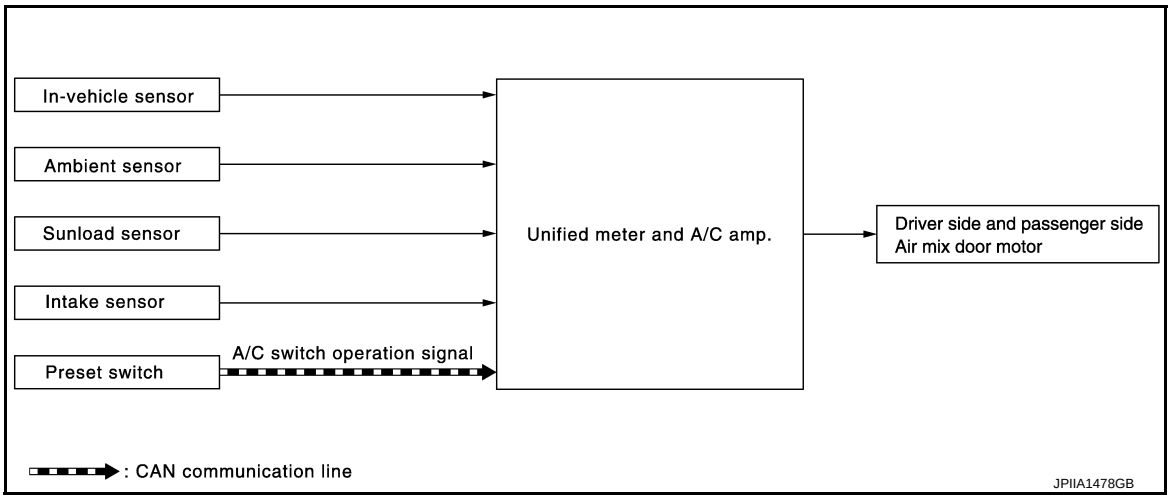
## System Diagram

INFOID:0000000008293204

### WITHOUT LEFT AND RIGHT VENTILATION TEMPERATURE SEPARATELY CONTROL SYSTEM




### WITH LEFT AND RIGHT VENTILATION TEMPERATURE SEPARATELY CONTORL SYSTEM




## System Description

INFOID:0000000008293205

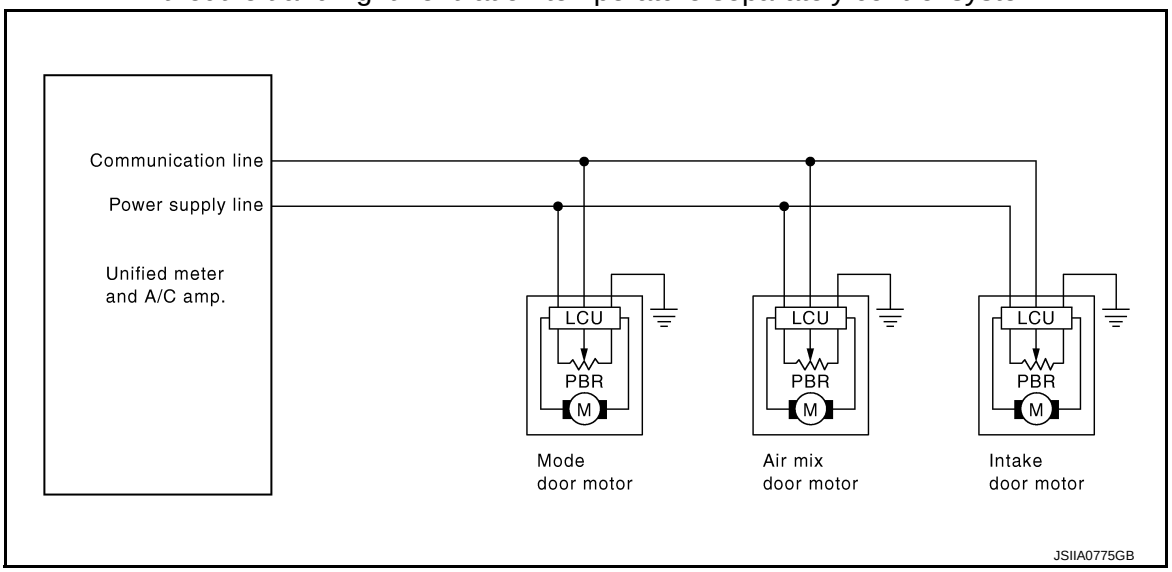
The air mix doors are automatically controlled so that in-vehicle temperature is maintained at a predetermined value by the temperature setting, ambient temperature, in-vehicle temperature and amount of sunload.

### SYSTEM OPERATION

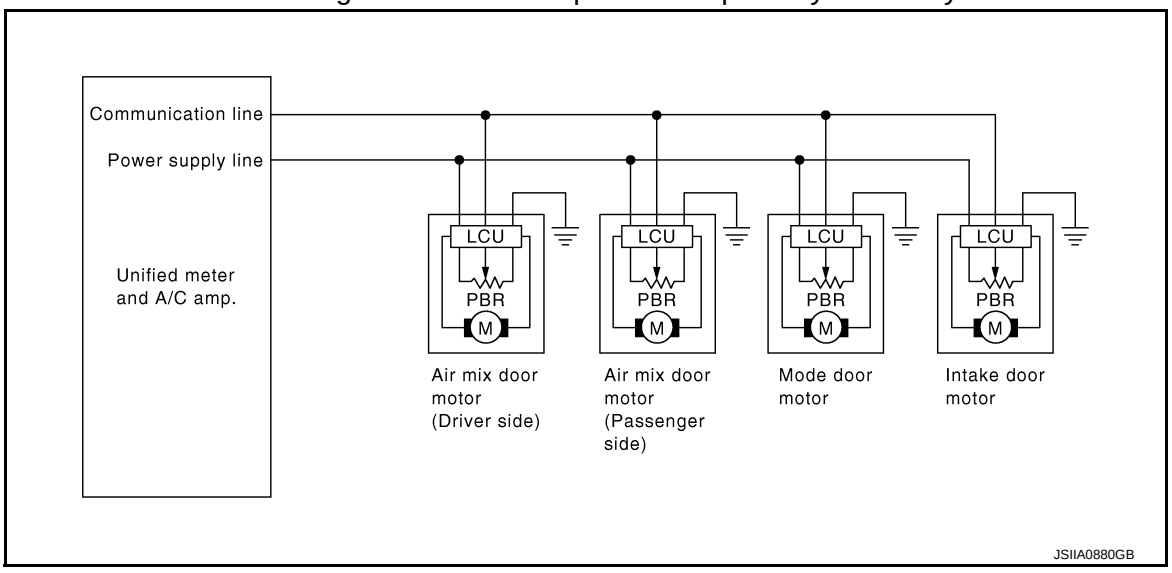
- The unified meter and A/C amp. receives data from each of the sensors. The unified meter and A/C amp. sends air mix doors, mode door and intake door opening angle data to the air mix door motor LCUs, mode door motor LCU and intake door motor LCU.
- The air mix door motors, mode door motor and intake door motor read their respective signals according to the address signal. Opening angle indication signals received from the unified meter and A/C amp. and each of the motor position sensors are compared by the LCUs in each door motor with the existing decision and opening angles. Subsequently, HOT/COLD, DEF/VENT and FRE/REC operation is selected. The new selection data are returned to the unified meter and A/C amp.

Door Motor Circuit

Without left and right ventilation temperature separately control system

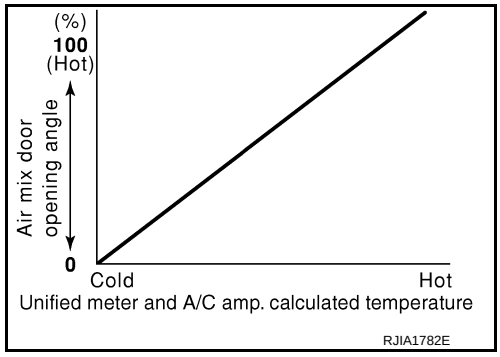



With left and right ventilation temperature separately control system




Air Mix Door Control Specification

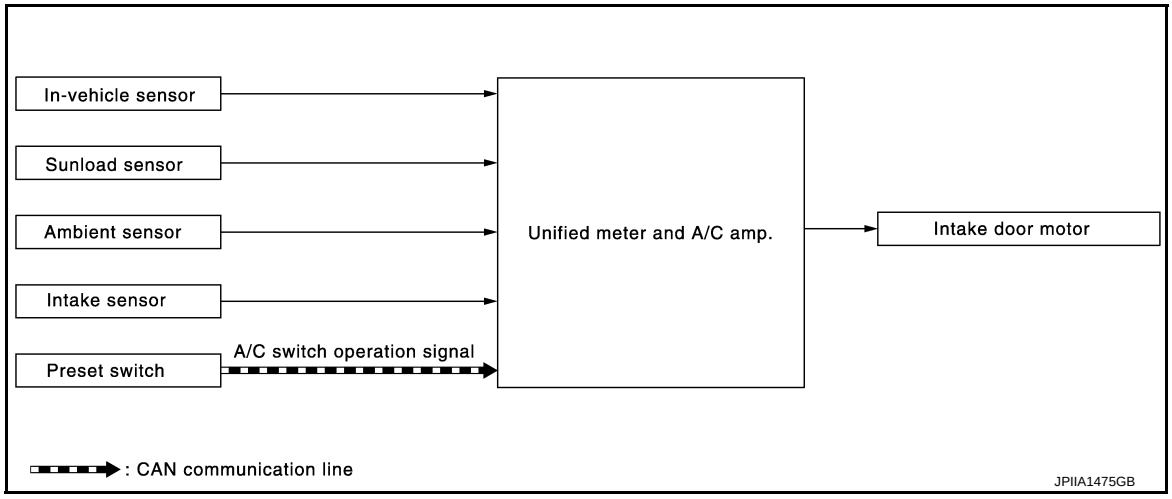
When ignition switch is ON, unified meter and A/C amp. continuously and automatically controls temperatures regardless of air conditioning operational condition. When setting a target temperature with temperature control dial, unified meter and A/C amp. corrects the set temperature and decides a target air mix door opening angle. Unified meter and A/C amp. controls air mix door according to the target air mix door opening angle and current air mix door opening angle for keeping an optimum air mix door opening angle. When a temperature is set at 18°C (64°F), air mix door is fixed at full cold, and when a temperature is set at 32°C (90°F), it is set at full hot.



# INTAKE DOOR CONTROL SYSTEM

## System Diagram

INFOID:0000000008293206




## System Description

INFOID:0000000008293207

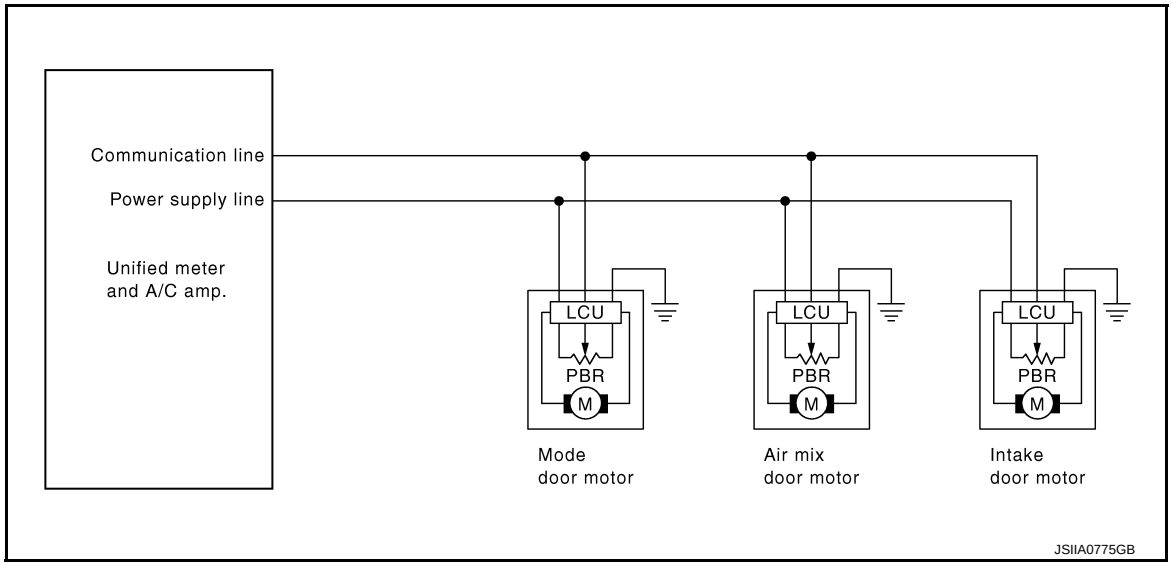
The intake door is automatically controlled by the temperature setting, ambient temperature, in-vehicle temperature, intake temperature, amount of sunload and ON/OFF operation of the compressor.

### SYSTEM OPERATION

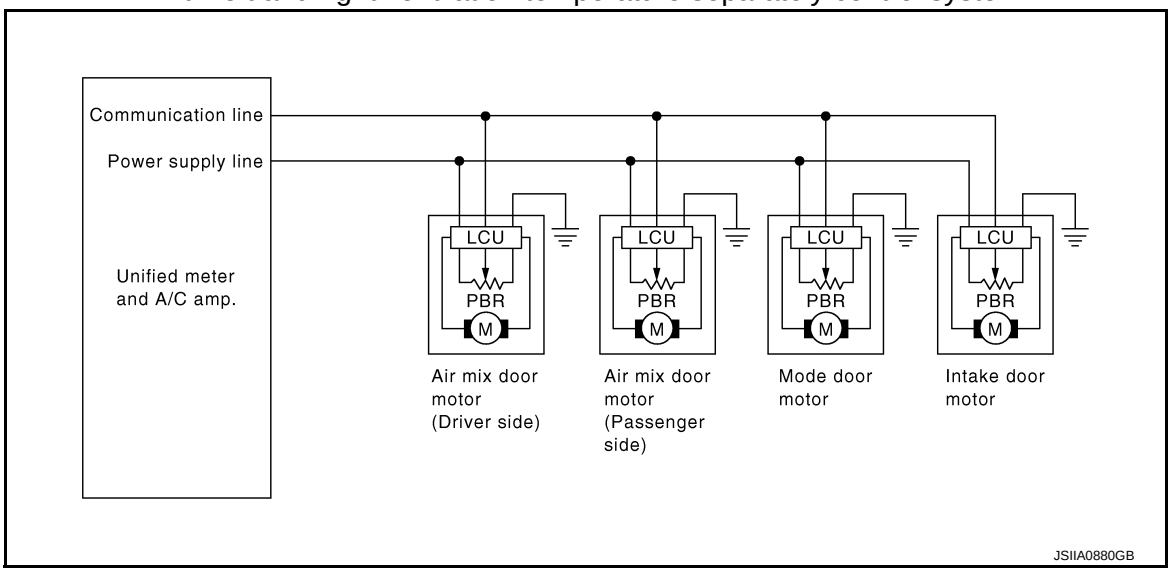
The intake door control judges intake door position based on the ambient temperature, the intake air temperature and the in-vehicle temperature. When shifting mode position D/F, when the DEF or OFF switches are pressed, or when A/C switch is OFF, the unified meter and A/C amp. sets the intake door at the FRE position.

Door Motor Circuit

Without left and right ventilation temperature separately control system

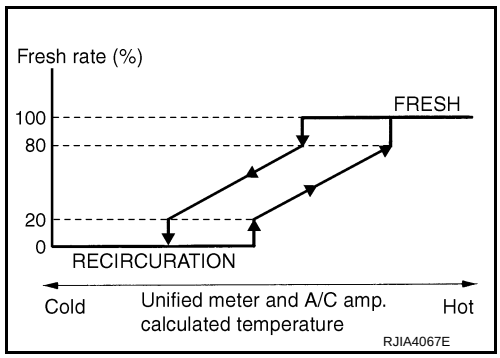


With left and right ventilation temperature separately control system




Intake Door Control Specification

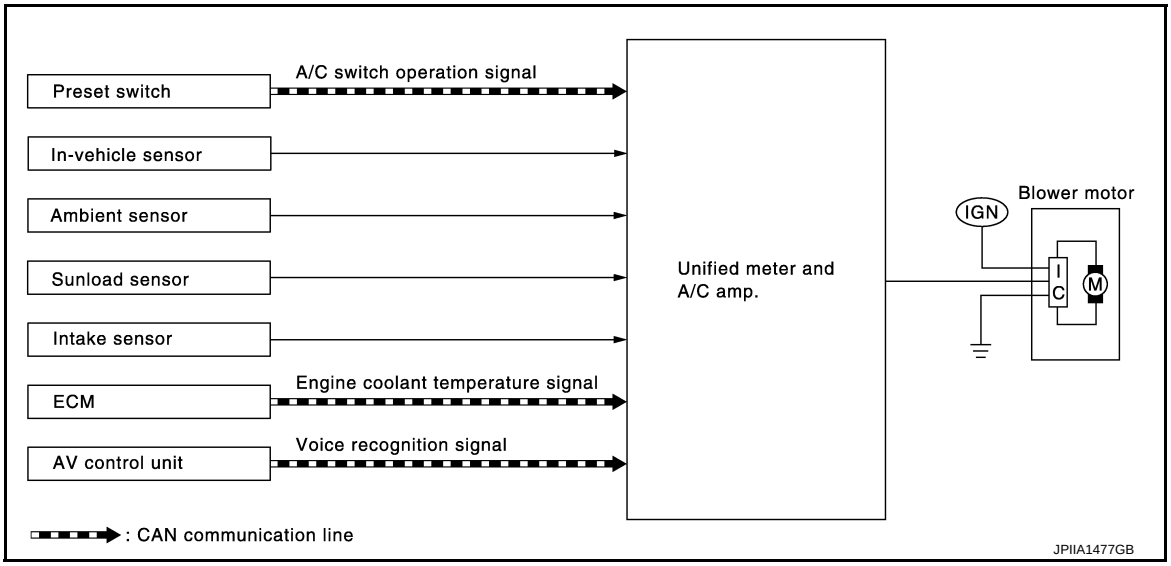
- Intake door position is basically fixed at FRE when FRE indicator of intake switch is ON or DEF switch is ON.
- Intake door position is basically fixed at REC when REC indicator of intake switch is ON.
- Intake door automatic control selects FRE, 20 - 80% FRE, or REC depending on a target air mix door opening angle, based on in-vehicle temperature, ambient temperature, and sunload.



# BLOWER MOTOR CONTROL SYSTEM

## System Diagram

INFOID:0000000008293208




## System Description

INFOID:0000000008293209

Fan speed is automatically controlled by the temperature setting, ambient temperature, in-vehicle temperature, intake temperature, amount of sunload and air mix door position.
With pressing AUTO switch, the blower motor starts to gradually increase air flow volume.
When engine coolant temperature is low, the blower motor operation is delayed to prevent cool air from flowing.

### SYSTEM OPERATION

#### Automatic Mode

In the automatic mode, the blower motor speed is calculated by the unified meter and A/C amp. based on the input from the PBR, in-vehicle sensor, sunload sensor, intake sensor and ambient sensor.
When the air flow is increased, the duty ratio of the blower motor control signal is changed at 4%/sec. to prevent a sudden increase in air flow.
In addition to manual air flow control and the usual automatic air flow control, starting air flow control, low water temperature starting control and high passenger compartment temperature starting control are available.

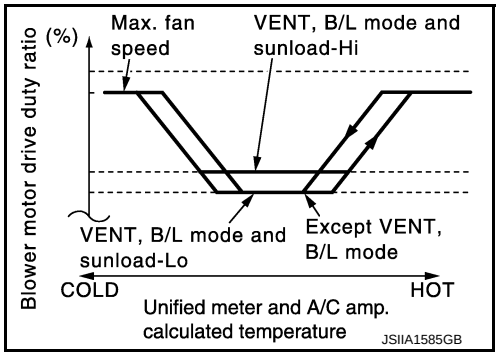
#### Starting Fan Speed Control

Start up from COLD SOAK Condition (Automatic mode)
In a cold start up condition where the engine coolant temperature is below 56°C (133°F), the blower does 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 start delay is 150 seconds as described above. After this delay, the blower will operate at low speed until the engine coolant temperature rises above 56°C (133°F), and then the fan speed increases to the objective speed.
Start up from usual or HOT SOAK Condition (Automatic mode)
The blower will begin operation momentarily after the AUTO switch is pressed. The fan speed rises gradually to the objective speed over a time period of 3 seconds or less (actual time depends on the objective fan speed).

#### Fan speed Compensation

Sunload
When the in-vehicle temperature and the set temperature are very close, the blower operates at low speed. The low speed varies depending on the sunload. During conditions of low or no sunload, the fan speed is at duty ratio 25%. During high sunload conditions, the unified meter and A/C amp. raise the fan speed (duty ratio 49%).

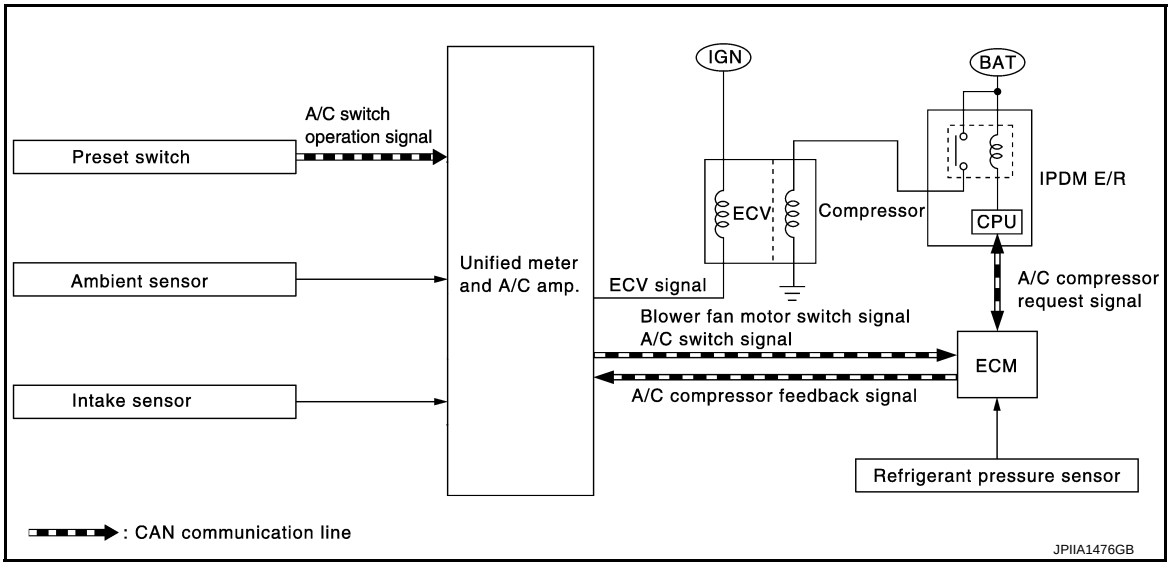
Fan Speed Control Specification



# MAGNET CLUTCH CONTROL SYSTEM

## System Diagram

INFOID:0000000008293210




## System Description

INFOID:0000000008293211

Unified meter and A/C amp. controls compressor operation by ambient temperature, intake air temperature and signal from ECM.

### SYSTEM OPERATION

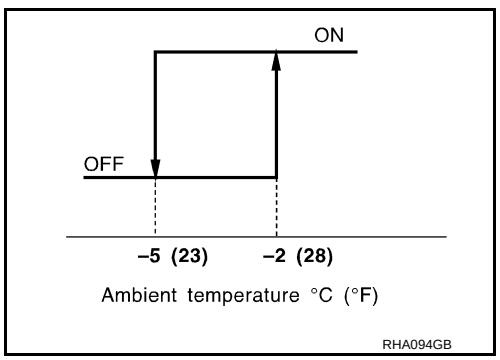
When A/C switch, AUTO switch, DEF switch is pressed or when shifting mode position D/F, unified meter and A/C amp. transmits A/C switch signal and blower fan motor switch signal to ECM, via CAN communication.
ECM judges whether compressor can be turned ON, based on each sensor status (refrigerant-pressure sensor signal, throttle angle, etc.). If it judges compressor can be turned ON, it sends A/C compressor request signal to IPDM E/R, via CAN communication.
Upon receipt of A/C compressor request signal from ECM, IPDM E/R turns A/C relay ON to operate compressor.
When sending A/C compressor request signal to IPDM E/R via CAN communication line, ECM simultaneously sends A/C compressor feedback signal to unified meter and A/C amp. via CAN communication line.
ECM sends A/C compressor feedback signal to unified meter and A/C amp., then, uses input A/C compressor feedback signal to control air inlet.

#### Compressor Protection Control

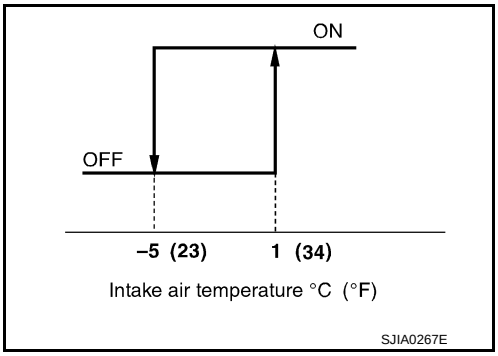
ECM makes the A/C relay go OFF and stops the compressor when pressure on the high-pressure side detected by refrigerant pressure sensor is over approximately 3,119 kPa (31.8 kg/cm$^2$, 452 psi), or below approximately 118 kPa (1.2 kg/cm$^2$, 17 psi).

#### Low Temperature Protection Control

Unified meter and A/C amp. turns compressor ON or OFF as judged by a signal detected by ambient sensor and intake sensor.
When ambient temperature is higher than –2°C (28°F), the compressor turns ON. The compressor turns OFF when ambient temperature is lower than –5°C (23°F).



When intake air temperature is higher than 1°C (34°F), the compressor turns ON. The compressor turns OFF when intake air temperature is lower than –5°C (23°F).



# DIAGNOSIS SYSTEM (UNIFIED METER & A/C AMP.) WITHOUT PLASMACLUSTER SYSTEM

## WITHOUT PLASMACLUSTER SYSTEM : Diagnosis Description

INFOID:0000000008293212

### SELF-DIAGNOSIS SYSTEM

The self-diagnosis system is built into the unified meter and A/C amp. to quickly locate the cause of malfunctions. The self-diagnosis system diagnoses sensors, door motors, blower motor, etc. by system line. Refer to applicable sections (items) for details.

### OPERATION PROCEDURE

1. Start the engine (turn ignition switch ON).
   **NOTE:**
   When checking the procedure except step-4, it is possible to perform in the state of ignition switch ON.
2. Press the OFF switch at 5 seconds or more (within 10 seconds after ignition switch is turned ON).
3. Unified meter and A/C amp. self diagnosis mode starts.
4. “Test item” are changed by the following operation.

| Test item | | Operation | | |
|---|---|---|---|---|
| STEP-1 | Indicator and display screen are checked. | Former STEP-1 does not exist in this self-diagnosis function. | | |
| STEP-2 | Input signals from each sensor are checked. | Turn temperature control dial (driver side) clockwise | ⇒ | STEP-3 |
| STEP-3 | Mode and intake door motor positions are checked. | Turn temperature control dial (driver side) clockwise | ⇒ | STEP-4 |
| | | Turn temperature control dial (driver side) counterclockwise | ⇒ | STEP-2 |
| STEP-4*1 | Motors are checked. | Turn temperature control dial (driver side) clockwise | ⇒ | STEP-5 (1) |
| | | Turn temperature control dial (driver side) counterclockwise | ⇒ | STEP-3 |
| STEP-5 (1) | Temperature detected by each sensor is checked. | Turn temperature control dial (driver side) counterclockwise | ⇒ | STEP-4 |
| | | Press intake switch | ⇒ | STEP-5 (2) |
| | | Press fan (UP:+) switch*2<br>Turn fan control dial clockwise*3 | ⇒ | AUXILIARY MECHANISM |
| STEP-5 (2) | Communication error. | Turn temperature control dial (driver side) counterclockwise | ⇒ | STEP-4 |
| | | Press intake switch | ⇒ | STEP-5 (1) |
| | | Press fan (UP:+) switch*2<br>Turn fan control dial clockwise*3 | ⇒ | AUXILIARY MECHANISM |
| AUXILIARY MECHANISM | Temperature setting trimmer.<br>Foot position setting trimmer.<br>Inlet port memory function. | Press fan (DOWN:–) switch*2<br>Turn fan control dial counterclockwise*3 | ⇒ | STEP-5 (1) |

*1: Engine must be running for compressor to operate.

*2: With left and right ventilation temperature separately control system.

*3: Without left and right ventilation temperature separately control system.

5. Self-diagnosis mode is canceled by either pressing AUTO switch or turning the ignition switch OFF.

### CONFORMATION METHOD

#### 1. SET IN SELF-DIAGNOSIS MODE

1. Turn ignition switch ON.
2. Set in self-diagnosis mode as per the following. Press OFF switch for at least 5 seconds Within 10 seconds after starting engine (ignition switch is turned ON).

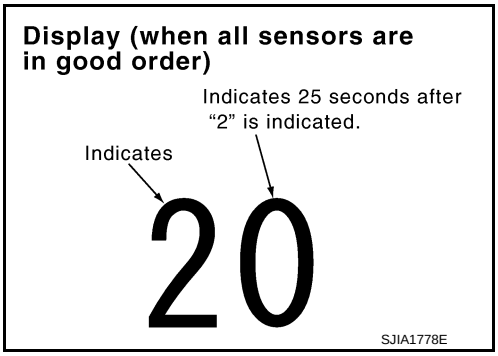
**NOTE:**
- If battery voltage drops below 12 V during diagnosis STEP-3, door motor speed becomes slower and as a result, the system may generate an error even when operation is normal. Start engine before performing this diagnosis to avoid this.
- Former STEP-1 (indicators and display screen are checked) does not exist in this self-diagnosis function.
- OFF switch may not be recognized according to the timing of pressing it. Operate OFF switch after the intake switch indicators are turned ON.

>> GO TO 2.

## 2. STEP-2: SENSOR AND DOOR MOTOR CIRCUITS ARE CHECKED FOR OPEN OR SHORT CIRCUIT

Does code No. 20 appear on the display?

YES >> GO TO 3.
NO >> GO TO 11.

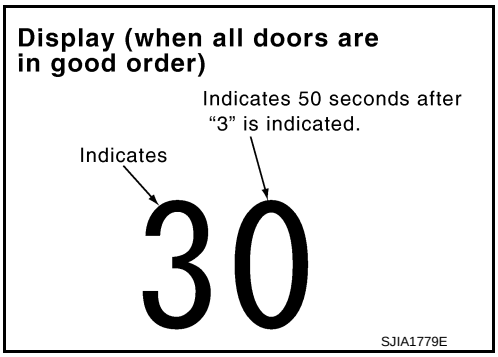



## 3. STEP-3: MODE DOOR AND INTAKE DOOR POSITIONS ARE CHECKED

Turn temperature control dial (driver side) clockwise.

Does code No. 30 appear on the display?

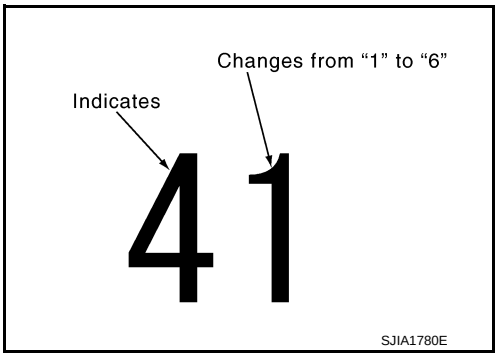
YES >> GO TO 4.
NO >> GO TO 12.




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

1. Turn temperature control dial (driver side) clockwise.
2. Press DEF ( ) switch. Code No. of each door motor test is indicated on the display.

>> GO TO 5.




## 5. CHECK MOTORS

Refer to the following chart and check discharge air flow, air temperature, blower motor duty ratio 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 | FRE | FRE | FRE |
| Air mix door position | FULL COLD | FULL COLD | FULL HOT | FULL HOT | FULL HOT | FULL HOT |

| Code No. | 41 | 42 | 43 | 44 | 45 | 46 |
|---|---|---|---|---|---|---|
| Mode door position | VENT | B/L 1 | B/L 2 | FOOT* | D/F | DEF |
| Blower motor duty ratio | 37% | 91% | 65% | 65% | 65% | 91% |
| Compressor (Magnet clutch) | ON | ON | OFF | OFF | ON | ON |
| Electronic control valve (ECV) duty ratio | 100% | 100% | 0% | 0% | 50% | 100% |

*:Mode door position is in a condition of FOOT mode setting trimmer (automatic control).

Checks must be made visually, by listening the sound, or by touching air outlets with hand, etc. for improper operation.

Without rear ventilation

| Discharge air flow | | | | | |
|---|---|---|---|---|---|
| Mode position indication | Condition | Air outlet/distribution | | | |
| | | VENT | FOOT | | DEF |
| | | | Front | Rear | |
| | DUAL switch: OFF* | 100% | — | — | — |
| | | 53% | 29% | 18% | — |
| | | 11% | 39% | 24% | 26% |
| | | 9% | 33% | 21% | 37% |
| | | 16% | — | — | 84% |

*: With left and right ventilation temperature separately control system.

With rear ventilation

| Discharge air flow | | | | | | |
|---|---|---|---|---|---|---|
| Mode position indication | Condition | Air outlet/distribution | | | | |
| | | VENT | | FOOT | | DEF |
| | | Front | Rear | Front | Rear | |
| | DUAL switch: OFF* Rear ventilator: OPEN | 88% | 12% | — | — | — |
| | | 49% | 10% | 25% | 16% | — |
| | | 10% | 12% | 33% | 22% | 23% |
| | | 9% | 11% | 29% | 18% | 33% |
| | | 15% | — | — | — | 85% |

*: With left and right ventilation temperature separately control system.

Is this inspection result normal?

YES >> GO TO 6.
NO-1 >> Air outlet does not change. Refer to HAC-82, "Diagnosis Procedure".
NO-2 >> Intake door does not change. Refer to HAC-89, "Diagnosis Procedure".
NO-3 >>
- Discharge air temperature does not change.*1 Refer to HAC-84, "WITHOUT LEFT AND RIGHT VENTILATION TEMPERATURE SEPARATELY CONTROL SYSTEM : Diagnosis Procedure".
- Discharge air temperature (driver side) does not change.*2 Refer to HAC-86, "WITH LEFT AND RIGHT VENTILATION TEMPERATURE SEPARATELY CONTROL SYSTEM : Diagnosis Procedure".
- Discharge air temperature (passenger side) does not change.*2 Refer to HAC-86, "WITH LEFT AND RIGHT VENTILATION TEMPERATURE SEPARATELY CONTROL SYSTEM : Diagnosis Procedure".

**NOTE:**
*1: Without left and right ventilation temperature separately control system.
*2: With left and right ventilation temperature separately control system.

NO-5 >> Blower motor operation is malfunctioning. Refer to HAC-91, "Diagnosis Procedure".

NO-6 >> Magnet clutch does not engage. Refer to HAC-95, "Diagnosis Procedure".

## 6. STEP-5: TEMPERATURE OF EACH SENSOR IS CHECKED

1. Turn temperature control dial (driver side) clockwise.
2. Code No. 51 appears on the display.

>> GO TO 7.

## 7. CHECK AMBIENT SENSOR

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

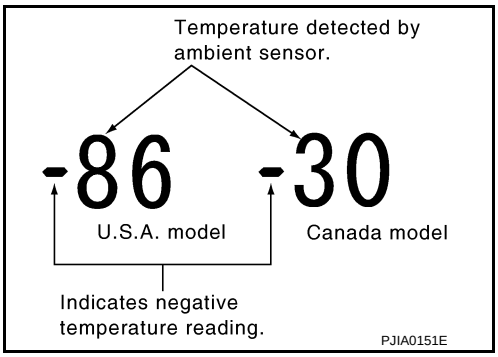
**NOTE:**

Check sensor circuit first if the temperature indicated on the display greatly differs from the actual temperature, and then check sensor.

Is this inspection result normal?

YES >> GO TO 8.

NO >> Go to Ambient Sensor Circuit. Refer to HAC-99, "Diagnosis Procedure".




## 8. CHECK IN-VEHICLE SENSOR

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

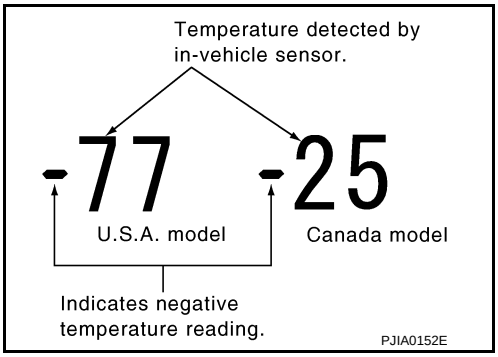
**NOTE:**

Check sensor circuit first if the temperature indicated on the display greatly differs from the actual temperature, and then check sensor.

Is this inspection result normal?

YES >> GO TO 9.

NO >> Go to In-vehicle Sensor Circuit. Refer to HAC-102, "Diagnosis Procedure".




## 9. CHECK INTAKE SENSOR

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

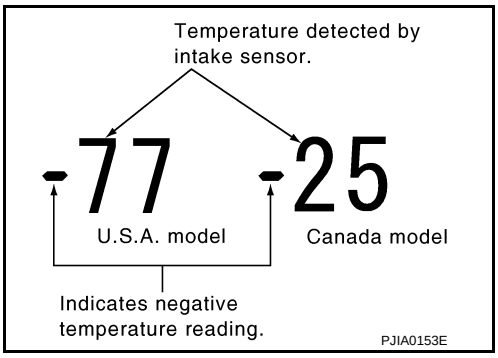
**NOTE:**

Check sensor circuit first if the temperature indicated on the display greatly differs from the actual temperature, and then check sensor.

Is this inspection result normal?

YES >> GO TO 10.

NO >> Go to Intake Sensor Circuit. Refer to HAC-108, "Diagnosis Procedure".



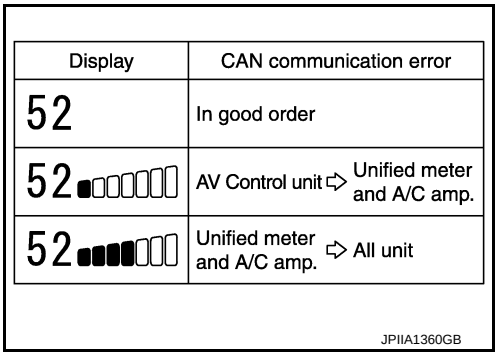

## 10. CHECK CAN COMMUNICATION ERROR

1. Press intake switch.
2. CAN communication error between each unit that uses the unified meter and A/C amp. can be detected as self-diagnosis results. (The display of each error will blink twice for 0.5 second intervals if plural errors occur.)

Is the inspection result normal?

YES >> INSPECTION END

NO >> Go to CAN communication (Unified meter and A/C amp. - AV control unit). Refer to MWI-42, "Diagnosis Procedure".



## 11. CHECK MALFUNCTIONING SENSOR AND DOOR MOTOR

Refer to the following chart for malfunctioning code No.
(Corresponding code Nos. indicates 1 second each if two or more sensors and door motors malfunction.)
(Corresponding code Nos. indicates 0.5 second each if two door motors malfunction.)

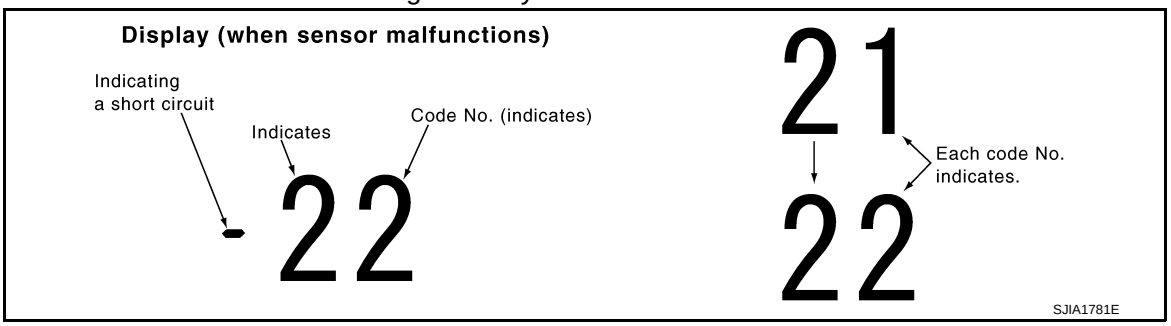
| Code No. | Malfunctioning sensor and door motor (Including circuits) | Reference |
|---|---|---|
| 21 / –21 | Ambient sensor | HAC-99, "Diagnosis Procedure" |
| 22 / –22 | In-vehicle sensor | HAC-102, "Diagnosis Procedure" |
| 24 / –24 | Intake sensor | HAC-108, "Diagnosis Procedure" |
| 25 / –25 | Sunload sensor *1 | HAC-105, "Diagnosis Procedure" |
| 26 / –26 | Air mix door motor PBR*2 | HAC-84, "WITHOUT LEFT AND RIGHT VENTILATION TEMPERATURE SEPARATELY CONTROL SYSTEM : Diagnosis Procedure" |
| | Air mix door motor PBR (driver side)*3 | HAC-86, "WITH LEFT AND RIGHT VENTILATION TEMPERATURE SEPARATELY CONTROL SYSTEM : Diagnosis Procedure" |
| 27 / –27 | Air mix door motor PBR (passenger side)*3 | HAC-86, "WITH LEFT AND RIGHT VENTILATION TEMPERATURE SEPARATELY CONTROL SYSTEM : Diagnosis Procedure" |

*1: Perform self-diagnosis STEP-2 under sunshine.

*2: Without left and right ventilation temperature separately control system.

*3: With left and right ventilation temperature separately control system.

When performing indoors, aim a light (more than 60 W) at sunload sensor, otherwise code No. 25 indicates despite that sunload sensor is functioning normally.




>> INSPECTION END

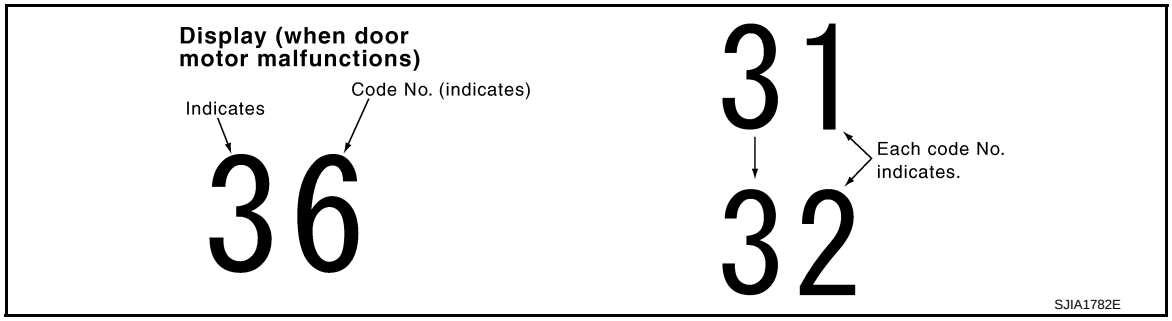
## 12. CHECK MALFUNCTIONING DOOR MOTOR POSITION SWITCH

Mode and/or intake door motor PBR (s) is/are malfunctioning.

| Code No. *1 *2 | Mode or intake door position | | Reference |
|---|---|---|---|
| 31 | VENT | Mode door motor | HAC-82, "Diagnosis Procedure" |
| 32 | DEF | | |
| 37 | FRE | Intake door motor | HAC-89, "Diagnosis Procedure" |
| 38 | 20% FRE | | |
| 39 | REC | | |

(Corresponding code Nos. indicates 1 second each if two or more mode or intake door motor malfunction.)
*1: The following display pattern will appear if mode door motor harness connector is disconnected.
31→32→Return to 31
*2: The following display pattern will appear if intake door motor harness connector is disconnected.

37→38→39→Return to 37




>> INSPECTION END

## WITH PLASMACLUSTER SYSTEM

## WITH PLASMACLUSTER SYSTEM : Diagnosis Description

INFOID:0000000008293213

### SELF-DIAGNOSIS SYSTEM

The self-diagnosis system is built into the unified meter and A/C amp. to quickly locate the cause of malfunctions. The self-diagnosis system diagnoses sensors, door motors, blower motor, etc. by system line. Refer to applicable sections (items) for details.

### OPERATION PROCEDURE

1. Start the engine (turn ignition switch ON).
   **NOTE:**
   When checking the procedure except step-4, it is possible to perform in the state of ignition switch ON.
2. Press the OFF switch at 5 seconds or more (within 10 seconds after ignition switch is turned ON).
3. Unified meter and A/C amp. self diagnosis mode starts.
4. “Test item” are changed by the following operation.

| Test item | | Operation | | |
|---|---|---|---|---|
| STEP-1 | Indicator and display screen are checked. | Former STEP-1 does not exist in this self-diagnosis function. | | |
| STEP-2 | Input signals from each sensor are checked. | Turn temperature control dial (driver side) clockwise | ⇒ | STEP-3 |
| STEP-3 | Mode and intake door motor positions are checked. | Turn temperature control dial (driver side) clockwise | ⇒ | STEP-4 |
| | | Turn temperature control dial (driver side) counterclockwise | ⇒ | STEP-2 |
| STEP-4* | Motors are checked. | Turn temperature control dial (driver side) clockwise | ⇒ | STEP-5 (1) |
| | | Turn temperature control dial (driver side) counterclockwise | ⇒ | STEP-3 |
| STEP-5 (1) | Temperature detected by each sensor is checked. | Turn temperature control dial (driver side) counterclockwise | ⇒ | STEP-4 |
| | | Press intake switch | ⇒ | STEP-5 (2) |
| | | Press fan (UP:+) switch | ⇒ | AUXILIARY MECHANISM |
| STEP-5 (2) | Communication error. | Turn temperature control dial (driver side) counterclockwise | ⇒ | STEP-4 |
| | | Press intake switch | ⇒ | STEP-5 (1) |
| | | Press fan (UP:+) switch | ⇒ | AUXILIARY MECHANISM |

| Test item | | Operation | | |
|---|---|---|---|---|
| AUXILIARY MECHANISM | Temperature setting trimmer. | Press fan (DOWN:–) switch | ⇒ | STEP-5 (1) |
| | Foot position setting trimmer. | | | |
| | Inlet port memory function. | | | |
| | Exhaust gas/outside odor detecting sensor sensitivity adjustment function | | | |
| | Auto intake interlocking movement change function | | | |

*: Engine must be running for compressor to operate.

5. Self-diagnosis mode is canceled by either pressing AUTO switch or turning the ignition switch OFF.

CONFORMATION METHOD

## 1.SET IN SELF-DIAGNOSIS MODE

1. Turn ignition switch ON.
2. Set in self-diagnosis mode as per the following. Press OFF switch for at least 5 seconds Within 10 seconds after starting engine (ignition switch is turned ON).

**NOTE:**

- If battery voltage drops below 12 V during diagnosis STEP-3, door motor speed becomes slower and as a result, the system may generate an error even when operation is normal. Start engine before performing this diagnosis to avoid this.
- Former STEP-1 (indicators and display screen are checked) does not exist in this self-diagnosis function.
- OFF switch may not be recognized according to the timing of pressing it. Operate OFF switch after the intake switch indicators are turned ON.

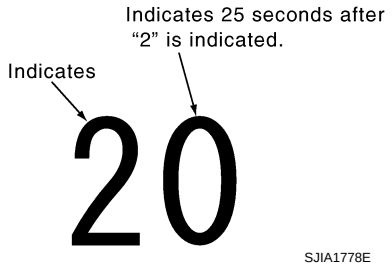
>> GO TO 2.

## 2.STEP-2: SENSOR AND DOOR MOTOR CIRCUITS ARE CHECKED FOR OPEN OR SHORT CIRCUIT

Does code No. 20 appear on the display?

YES >> GO TO 3.
NO >> GO TO 11.

**Display (when all sensors are in good order)**



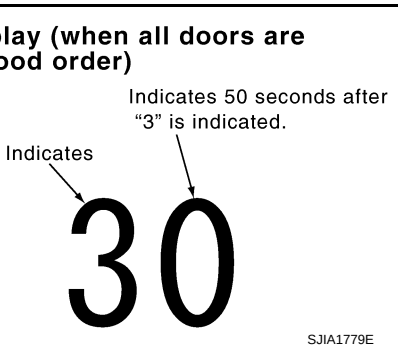

## 3.STEP-3: MODE DOOR AND INTAKE DOOR POSITIONS ARE CHECKED

Turn temperature control dial (driver side) clockwise.

Does code No. 30 appear on the display?

YES >> GO TO 4.
NO >> GO TO 12.

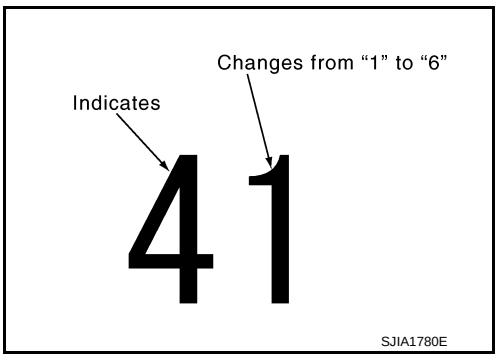
**Display (when all doors are in good order)**




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

1. Turn temperature control dial (driver side) clockwise.
2. Press DEF ( ) switch. Code No. of each door motor test is indicated on the display.

>> GO TO 5.




## 5. CHECK MOTORS

Refer to the following chart and check discharge air flow, air temperature, blower motor duty ratio 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 | FRE | FRE | FRE |
| Air mix door position | FULL COLD | FULL COLD | FULL HOT | FULL HOT | FULL HOT | FULL HOT |
| Blower motor duty ratio | 37% | 91% | 65% | 65% | 65% | 91% |
| Compressor (Magnet clutch) | ON | ON | OFF | OFF | ON | ON |
| Electronic control valve (ECV) duty ratio | 100% | 100% | 0% | 0% | 50% | 100% |
| Ionizer | ON | ON | ON | ON | ON | OFF |
| Ion mode | CLEAN | QUICK CLEAN | QUICK CLEAN | QUICK CLEAN | QUICK CLEAN | OFF |

*:Mode door position is in a condition of FOOT mode setting trimmer (automatic control).

Checks must be made visually, by listening the sound, or by touching air outlets with hand, etc. for improper operation.

Without rear ventilation

| Discharge air flow | | | | | |
|---|---|---|---|---|---|
| Mode position indication | Condition | Air outlet/distribution | | | |
| | | VENT | FOOT | | DEF |
| | | | Front | Rear | |
| | DUAL switch: OFF | 100% | — | — | — |
| | | 53% | 29% | 18% | — |
| | | 11% | 39% | 24% | 26% |
| | | 9% | 33% | 21% | 37% |
| | | 16% | — | — | 84% |

With rear ventilation

| Discharge air flow | | | | | | | |
|---|---|---|---|---|---|---|---|
| Mode position indication | Condition | Air outlet/distribution | | | | | |
| | | VENT | | FOOT | | DEF | |
| | | Front | Rear | Front | Rear | |
| | DUAL switch: OFF<br>Rear ventilator: OPEN | 88% | 12% | — | — | — |
| | | 49% | 10% | 25% | 16% | — |
| | | 10% | 12% | 33% | 22% | 23% |
| | | 9% | 11% | 29% | 18% | 33% |
| | | 15% | — | — | — | 85% |

Is this inspection result normal?

YES >> GO TO 6.
NO-1 >> Air outlet does not change. Refer to HAC-82, "Diagnosis Procedure".
NO-2 >> Intake door does not change. Refer to HAC-89, "Diagnosis Procedure".
NO-3 >>
- Discharge air temperature (driver side) does not change. Refer to HAC-86, "WITH LEFT AND RIGHT VENTILATION TEMPERATURE SEPARATELY CONTROL SYSTEM : Diagnosis Procedure".
- Discharge air temperature (passenger side) does not change. Refer to HAC-86, "WITH LEFT AND RIGHT VENTILATION TEMPERATURE SEPARATELY CONTROL SYSTEM : Diagnosis Procedure".

NO-5 >> Blower motor operation is malfunctioning. Refer to HAC-91, "Diagnosis Procedure".
NO-6 >> Magnet clutch does not engage. Refer to HAC-95, "Diagnosis Procedure".

## 6. STEP-5: TEMPERATURE OF EACH SENSOR IS CHECKED

1. Turn temperature control dial (driver side) clockwise.
2. Code No. 51 appears on the display.

>> GO TO 7.

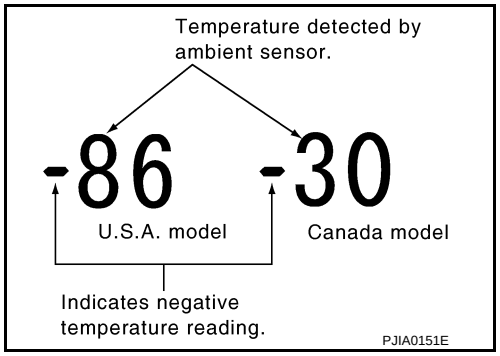
## 7. CHECK AMBIENT SENSOR

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

**NOTE:**
Check sensor circuit first if the temperature indicated on the display greatly differs from the actual temperature, and then check sensor.

Is this inspection result normal?

YES >> GO TO 8.
NO >> Go to Ambient Sensor Circuit. Refer to HAC-99, "Diagnosis Procedure".



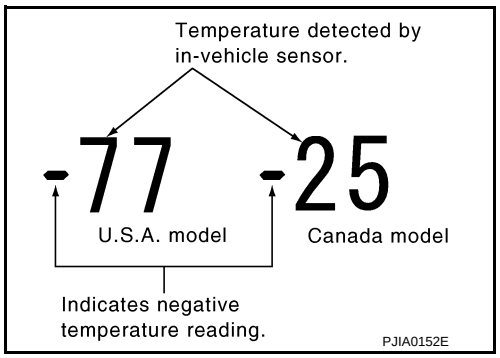

## 8. CHECK IN-VEHICLE SENSOR

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

**NOTE:**
Check sensor circuit first if the temperature indicated on the display greatly differs from the actual temperature, and then check sensor.

Is this inspection result normal?

YES >> GO TO 9.
NO >> Go to In-vehicle Sensor Circuit. Refer to HAC-102, "Diagnosis Procedure".



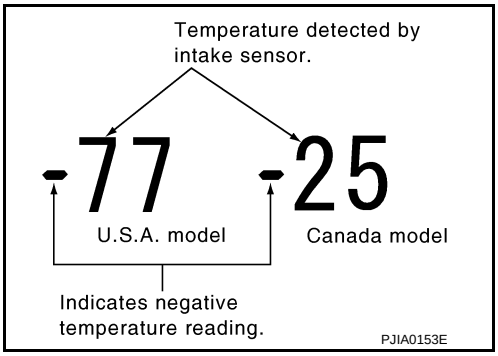
## 9. CHECK INTAKE SENSOR

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

**NOTE:**
Check sensor circuit first if the temperature indicated on the display greatly differs from the actual temperature, and then check sensor.

Is this inspection result normal?

YES >> GO TO 10.
NO >> Go to Intake Sensor Circuit. Refer to HAC-108, "Diagnosis Procedure".




## 10. CHECK CAN COMMUNICATION ERROR

1. Press intake switch.
2. CAN communication error between each unit that uses the unified meter and A/C amp. can be detected as self-diagnosis results. (The display of each error will blink twice for 0.5 second intervals if plural errors occur.)

Is the inspection result normal?

YES >> INSPECTION END
NO >> Go to CAN communication (Unified meter and A/C amp. - AV control unit). Refer to MWI-42, "Diagnosis Procedure".

| Display | CAN communication error |
|---|---|
| 52 | In good order |
| 52 | AV Control unit ⇨ Unified meter and A/C amp. |
| 52 | Unified meter and A/C amp. ⇨ All unit |

JPIIA1360GB

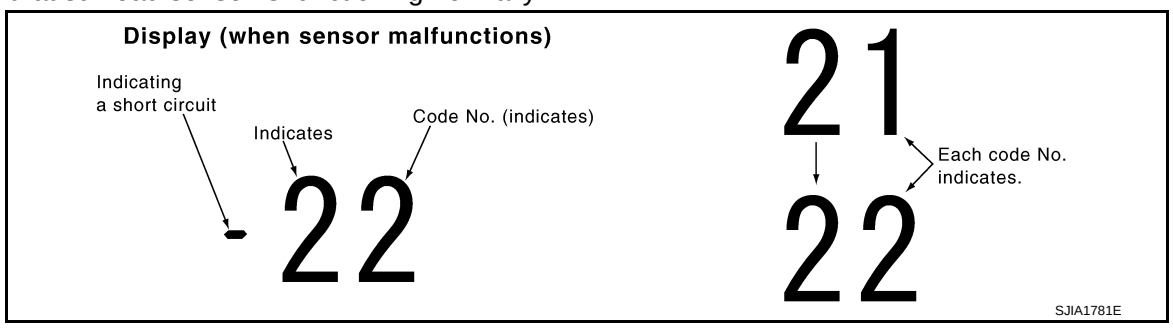
## 11. CHECK MALFUNCTIONING SENSOR AND DOOR MOTOR

Refer to the following chart for malfunctioning code No.
(Corresponding code Nos. indicates 1 second each if two or more sensors and door motors malfunction.)
(Corresponding code Nos. indicates 0.5 second each if two door motors malfunction.)

| Code No. | Malfunctioning sensor and door motor (Including circuits) | Reference |
|---|---|---|
| 21 / –21 | Ambient sensor | HAC-99, "Diagnosis Procedure" |
| 22 / –22 | In-vehicle sensor | HAC-102, "Diagnosis Procedure" |
| 24 / –24 | Intake sensor | HAC-108, "Diagnosis Procedure" |
| 25 / –25 | Sunload sensor * | HAC-105, "Diagnosis Procedure" |
| 26 / –26 | Air mix door motor PBR* | HAC-84, "WITHOUT LEFT AND RIGHT VENTILATION TEMPERATURE SEPARATELY CONTROL SYSTEM : Diagnosis Procedure" |
| | Air mix door motor PBR (driver side)* | HAC-86, "WITH LEFT AND RIGHT VENTILATION TEMPERATURE SEPARATELY CONTROL SYSTEM : Diagnosis Procedure" |
| 27 / –27 | Air mix door motor PBR (passenger side)* | HAC-86, "WITH LEFT AND RIGHT VENTILATION TEMPERATURE SEPARATELY CONTROL SYSTEM : Diagnosis Procedure" |
| 28 / –28 | Exhaust gas/outside odor detecting sensor* | HAC-110, "Diagnosis Procedure" |
| 29 / –29 | Harness of exhaust gas/outside odor detecting sensor* | |

*1: Perform self-diagnosis STEP-2 under sunshine.
*2: Without left and right ventilation temperature separately control system.
*3: With left and right ventilation temperature separately control system.

When performing indoors, aim a light (more than 60 W) at sunload sensor, otherwise code No. 25 indicates despite that sunload sensor is functioning normally.



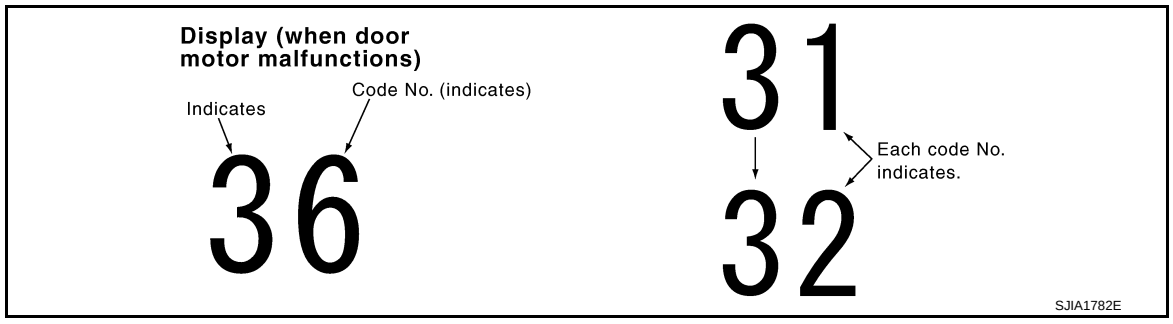

>> INSPECTION END

## 12. CHECK MALFUNCTIONING DOOR MOTOR POSITION SWITCH

Mode and/or intake door motor PBR (s) is/are malfunctioning.

| Code No. *1 *2 | Mode or intake door position | | Reference |
|---|---|---|---|
| 31 | VENT | Mode door motor | HAC-82, "Diagnosis Procedure" |
| 32 | DEF | | |
| 37 | FRE | Intake door motor | HAC-89, "Diagnosis Procedure" |
| 38 | 20% FRE | | |
| 39 | REC | | |

(Corresponding code Nos. indicates 1 second each if two or more mode or intake door motor malfunction.)
*1: The following display pattern will appear if mode door motor harness connector is disconnected.
31→32→Return to 31
*2: The following display pattern will appear if intake door motor harness connector is disconnected.
37→38→39→Return to 37




>> INSPECTION END

# DTC/CIRCUIT DIAGNOSIS

## POWER SUPPLY AND GROUND CIRCUIT
## UNIFIED METER AND A/C AMP.

### UNIFIED METER AND A/C AMP. : Diagnosis Procedure

INFOID:0000000008293214

### 1.CHECK FUSE

Check 10A fuses [Nos. 3, 11 and 19, located in the fuse block (J/B)].

**NOTE:**

Refer to PG-114, "Fuse, Connector and Terminal Arrangement".

Is the inspection result normal?

YES >> GO TO 2.
NO >> Check harness for short circuit and replace fuse.

### 2.CHECK POWER SUPPLY CIRCUIT FOR UNIFIED METER AND A/C AMP.

1. Disconnect unified meter and A/C amp. connector.
2. Check voltage between unified meter and A/C amp. harness connector and ground.

| (+) | | (–) | Voltage | | |
|---|---|---|---|---|---|
| Unified meter and A/C amp. | | — | Ignition switch position | | |
| Connector | Terminal | | OFF | ACC | ON |
| M67 | 41 | Ground | Approx. 0 V | Battery voltage | Battery voltage |
| | 53 | | Approx. 0 V | Approx. 0 V | Battery voltage |
| | 54 | | Battery voltage | Battery voltage | Battery voltage |

Is the inspection result normal?

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

### 3.CHECK GROUND CIRCUIT FOR UNIFIED METER AND A/C AMP.

1. Turn ignition switch OFF.
2. Check continuity between unified meter and A/C amp. harness connector and ground.

| Unified meter and A/C amp. | | — | Continuity |
|---|---|---|---|
| Connector | Terminal | | |
| M67 | 55 | Ground | Existed |
| | 71 | | |

Is the inspection result normal?

YES >> INSPECTION END
NO >> Repair harness or connector.

# UNIFIED METER AND A/C AMP.

## Description

INFOID:0000000008293215

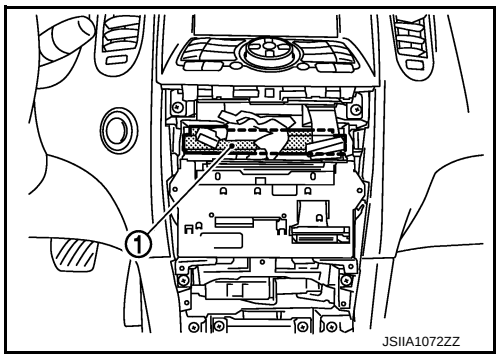
### COMPONENT DESCRIPTION

Unified Meter and A/C Amp. (Automatic Amplifier)

The unified meter and A/C amp. (1) has a built-in microcomputer which processes information sent from various sensors needed for air conditioning operation. The air mix door motors, mode door motor, intake door motor, blower motor and compressor are then controlled.

When the various switches and temperature control dial are operated, data is input to the unified meter and A/C amp. from the AV control unit using CAN communication.

Self-diagnosis functions are also built into unified meter and A/C amp. to provide quick check of malfunctions in the automatic air conditioning system.




## Component Function Check

INFOID:0000000008293216

### 1. CONFIRM SYMPTOM BY PERFORMING THE FOLLOWING OPERATIONAL CHECK

1. Press AUTO switch.
2. Display should indicate AUTO. Confirm that the compressor clutch engages (sound or visual inspection). (Discharge air and fan speed depend on ambient, in-vehicle and set temperatures.)

Does magnet clutch engaged?

YES >> INSPECTION END
NO >> Go to Diagnosis Procedure. Refer to HAC-81, "Diagnosis Procedure".

## Diagnosis Procedure

INFOID:0000000008293217

### 1. INSPECTION BY FAIL-SAFE FUNCTION

1. Turn the ignition switch ON.
2. After approximately 30 seconds, check that the air conditioning is operated by the fail-safe function (the operation display of air conditioning is not performed). Refer to HAC-118, "Fail-safe".

Is the fail-safe function operated?

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

### 2. CHECK UNIFIED METER AND A/C AMP. POWER SUPPLY CIRCUIT AND GROUND

Check unified meter and A/C amp. power supply circuit and ground circuit. Refer to HAC-80, "UNIFIED METER AND A/C AMP. : Diagnosis Procedure".

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair or replace parts according to the inspection results.

### 3. CHECK PRESET SWITCH

Check preset switch. Refer to AV-68, "Symptom Table" (BASE AUDIO WITHOUT REAR VIEW VAMERA), AV-168, "Symptom Table" (BOSE AUDIO WITH REAR VIEW CAMERA), AV-283, "Symptom Table" (BOSE AUDIO WITHOUT NAVIGATION) or AV-416, "Symptom Table" (BOSE AUDIO WITH NAVIGATION).

Is the inspection result normal?

YES >> Replace unified meter and A/C amp.
NO >> Repair or replace malfunctioning part.

# MODE DOOR MOTOR

## Description

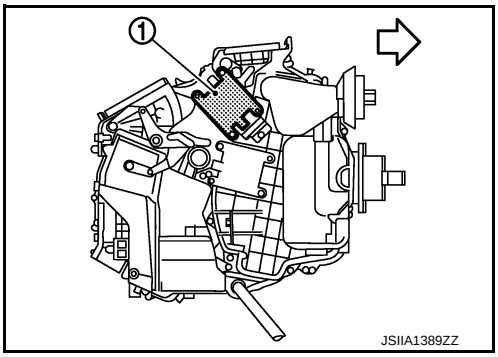
INFOID:0000000008293218

### COMPONENT DESCRIPTION

Mode Door Motor

The mode door motor (1) is attached to the heater & cooling unit assembly. It rotates so that air is discharged from the outlet set by the unified meter and A/C amp. Motor rotation is conveyed to a link which activates the mode door.

⇦: Vehicle front




## Component Function Check

INFOID:0000000008293219

### 1. CONFIRM SYMPTOM BY PERFORMING THE FOLLOWING OPERATIONAL CHECK

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 VTL-5, "System Description".

**NOTE:**

Confirm that the compressor clutch is engaged (Sound or visual inspection) and intake door position is at FRE when D/F or DEF is selected.

Is the inspection result normal?

YES >> INSPECTION END
NO >> Go to diagnosis procedure. Refer to HAC-82, "Diagnosis Procedure".

## Diagnosis Procedure

INFOID:0000000008293220

### 1. PERFORM SELF-DIAGNOSIS

Perform self-diagnosis function. Refer to HAC-69, "WITHOUT PLASMACLUSTER SYSTEM : Diagnosis Description".

Is the inspection result normal?

YES >> GO TO 5.
NO >> GO TO 2.

### 2. CHECK POWER SUPPLY FOR MODE DOOR MOTOR

Check voltage between mode door motor harness connector and ground.

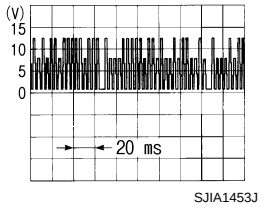
| (+) | | (–) | Voltage (Approx.) |
|---|---|---|---|
| Mode door motor | | — | |
| Connector | Terminal | | |
| M253 | 1 | Ground | 12 V |

Is the inspection result normal?

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

### 3. CHECK SIGNAL FOR MODE DOOR MOTOR

Confirm A/C LAN signal between mode door motor harness connector and ground using an oscilloscope.

| (+) | | (–) | Voltage |
|---|---|---|---|
| Mode door motor | | — | |
| Connector | Terminal | | |
| M253 | 3 | Ground |  SJIA1453J |

Is the inspection result normal?

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

## 4. CHECK MODE DOOR MOTOR GROUND CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect mode door motor connector.
3. Check continuity between mode door motor harness connector and ground.

| Mode door motor | | — | Continuity |
|---|---|---|---|
| Connector | Terminal | | |
| M253 | 2 | Ground | Existed |

Is the inspection result normal?

YES >> Replace mode door motor.
NO >> Repair harness or connector.

## 5. CHECK MODE DOOR CONTROL LINKAGE

Check mode door control linkage is properly installed. Refer to HAC-171, "Exploded View".

Is it installed normally?

YES >> INSPECTION END
NO >> Repair or adjust control linkage.

# AIR MIX DOOR MOTOR

## WITHOUT LEFT AND RIGHT VENTILATION TEMPERATURE SEPARATELY CONTROL SYSTEM

### WITHOUT LEFT AND RIGHT VENTILATION TEMPERATURE SEPARATELY CONTROL SYSTEM : Description

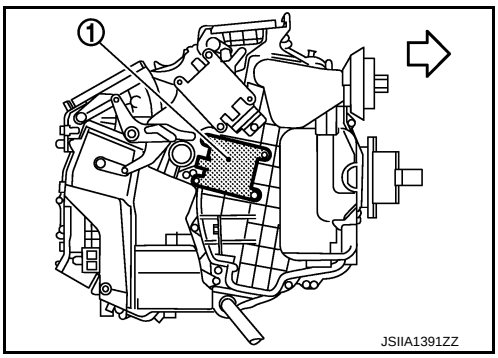
INFOID:0000000008293221

#### COMPONENT DESCRIPTION

Air Mix Door Motor

The air mix door motor (1) is attached to the heater & cooling unit assembly. It rotates so that the air mix door is opened or closed to a position set by the unified meter and A/C amp. Motor rotation is then conveyed through a shaft and the air mix door position feedback is then sent to the unified meter and A/C amp. by PBR built-in air mix door motors.

⇦: Vehicle front




### WITHOUT LEFT AND RIGHT VENTILATION TEMPERATURE SEPARATELY CONTROL SYSTEM : Component Function Check

INFOID:0000000008293222

#### 1.CONFIRM SYMPTOM BY PERFORMING THE FOLLOWING OPERATIONAL CHECK

1. Turn temperature control dial clockwise until 32°C (90°F) is displayed.
2. Check for warm air at discharge air outlets.
3. Turn temperature control dial counterclockwise until 18°C (64°F) is displayed.
4. Check for cool air at discharge air outlets.

Is the inspection result normal?

YES >> INSPECTION END
NO >> Go to diagnosis procedure. Refer to HAC-84, "WITHOUT LEFT AND RIGHT VENTILATION TEMPERATURE SEPARATELY CONTROL SYSTEM : Diagnosis Procedure".

### WITHOUT LEFT AND RIGHT VENTILATION TEMPERATURE SEPARATELY CONTROL SYSTEM : Diagnosis Procedure

INFOID:0000000008293223

#### 1.PERFORM SELF-DIAGNOSIS

Perform self-diagnosis function. Refer to HAC-69, "WITHOUT PLASMACLUSTER SYSTEM : Diagnosis Description".

Is the inspection result normal?

YES >> GO TO 5.
NO >> GO TO 2.

#### 2.CHECK POWER SUPPLY FOR AIR MIX DOOR MOTOR

Check voltage between air mix door motor harness connector and ground.

| (+) | | (–) | Voltage (Approx.) |
|---|---|---|---|
| Air mix door motor | | — | |
| Connector | Terminal | | |
| M255 | 1 | Ground | 12 V |

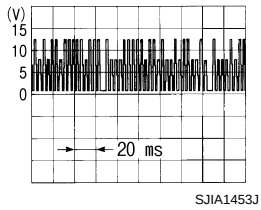
Is the inspection result normal?

YES >> GO TO 3.

NO >> Repair harness or connector.

## 3.CHECK SIGNAL FOR AIR MIX DOOR MOTOR

Confirm A/C LAN signal between air mix door motor harness connector and ground using an oscilloscope.

| (+) | | (–) | Voltage |
|---|---|---|---|
| Air mix door motor | | — | |
| Connector | Terminal | | |
| M255 | 3 | Ground |  |



SJIA1453J

Is the inspection result normal?

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

## 4.CHECK AIR MIX DOOR MOTOR GROUND CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect air mix door motor connector.
3. Check continuity between air mix door motor harness connector and ground.

| Air mix door motor | | — | Continuity |
|---|---|---|---|
| Connector | Terminal | | |
| M255 | 2 | Ground | Existed |

Is the inspection result normal?

YES >> Replace air mix door motor.
NO >> Repair harness or connector.

## 5.CHECK INSTALLATION OF AIR MIX DOOR MOTOR

Check air mix door motor is properly installed. Refer to HAC-171, "Exploded View".

Is it installed normally?

YES >> INSPECTION END
NO >> Repair or replace air mix door motor.

# WITH LEFT AND RIGHT VENTILATION TEMPERATURE SEPARATELY CONTROL SYSTEM

## WITH LEFT AND RIGHT VENTILATION TEMPERATURE SEPARATELY CONTROL SYSTEM : Description

INFOID:0000000008293224

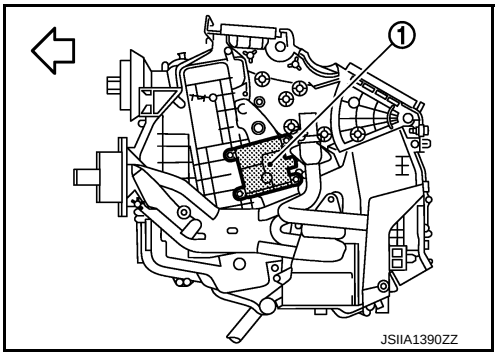
### COMPONENT DESCRIPTION

Air Mix Door Motor

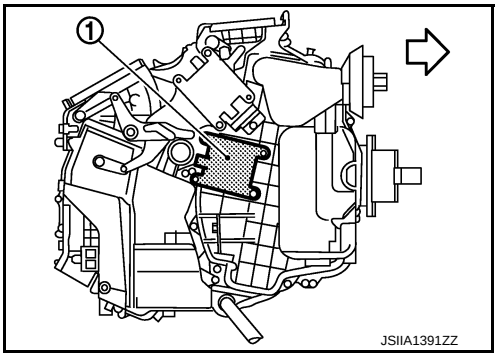
The air mix door motor (1) is attached to the heater & cooling unit assembly. It rotates so that the air mix door is opened or closed to a position set by the unified meter and A/C amp. Motor rotation is then conveyed through a shaft and the air mix door position feedback is then sent to the unified meter and A/C amp. by PBR built-in air mix door motors.

⇦: Vehicle front

Driver side (LH)




Passenger side (RH)




## WITH LEFT AND RIGHT VENTILATION TEMPERATURE SEPARATELY CONTROL SYSTEM : Component Function Check

INFOID:0000000008293225

DRIVER SIDE

### 1. CONFIRM SYMPTOM BY PERFORMING THE FOLLOWING OPERATIONAL CHECK

1. Turn temperature control dial (driver side) clockwise until 32°C (90°F) is displayed.
2. Check for warm air at discharge air outlets.
3. Turn temperature control dial (driver side) counterclockwise until 18°C (64°F) is displayed.
4. Check for cool air at discharge air outlets.

Is the inspection result normal?

YES >> INSPECTION END
NO >> Go to diagnosis procedure. Refer to HAC-86, "WITH LEFT AND RIGHT VENTILATION TEMPERATURE SEPARATELY CONTROL SYSTEM : Diagnosis Procedure".

PASSENGER SIDE

### 1. CONFIRM SYMPTOM BY PERFORMING THE FOLLOWING OPERATIONAL CHECK

1. Turn temperature control dial (passenger side) clockwise until 32°C (90°F) is displayed.
2. Check for warm air at discharge air outlets.
3. Turn temperature control dial (passenger side) counterclockwise until 18°C (64°F) is displayed.
4. Check for cool air at discharge air outlets.

Is the inspection result normal?

YES >> INSPECTION END
NO >> Go to diagnosis procedure. Refer to HAC-86, "WITH LEFT AND RIGHT VENTILATION TEMPERATURE SEPARATELY CONTROL SYSTEM : Diagnosis Procedure".

## WITH LEFT AND RIGHT VENTILATION TEMPERATURE SEPARATELY CONTROL SYSTEM : Diagnosis Procedure

INFOID:0000000008293226

### 1. PERFORM SELF-DIAGNOSIS

Perform self-diagnosis function. Refer to HAC-69, "WITHOUT PLASMACLUSTER SYSTEM : Diagnosis Description" (without Plasmacluster system) or HAC-74, "WITH PLASMACLUSTER SYSTEM : Diagnosis Description" (with Plasmacluster system).

Is the inspection result normal?

YES >> GO TO 5.
NO >> GO TO 2.

## 2. CHECK POWER SUPPLY FOR AIR MIX DOOR MOTOR

Check voltage between air mix door motor harness connector and ground.

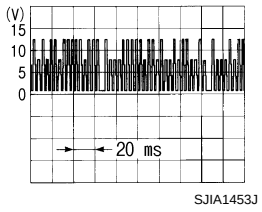
| (+) | | (–) | Voltage (Approx.) |
|---|---|---|---|
| Air mix door motor | | — | |
| Connector | Terminal | | |
| M255 (RH)<br>M252 (LH) | 1 | Ground | 12 V |

Is the inspection result normal?

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

## 3. CHECK SIGNAL FOR AIR MIX DOOR MOTOR

Confirm A/C LAN signal between air mix door motor harness connector and ground using an oscilloscope.

| (+) | | (–) | Voltage |
|---|---|---|---|
| Air mix door motor | | — | |
| Connector | Terminal | | |
| M255 (RH)<br>M252 (LH) | 3 | Ground |  SJIA1453J |

Is the inspection result normal?

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

## 4. CHECK AIR MIX DOOR MOTOR GROUND CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect air mix door motor connector.
3. Check continuity between air mix door motor harness connector and ground.

| Air mix door motor | | — | Continuity |
|---|---|---|---|
| Connector | Terminal | | |
| M255 (RH)<br>M252 (LH) | 2 | Ground | Existed |

Is the inspection result normal?

YES >> Replace air mix door motor.
NO >> Repair harness or connector.

## 5. CHECK INSTALLATION OF AIR MIX DOOR MOTOR

Check air mix door motor is properly installed. Refer to HAC-171, "Exploded View".

Is it installed normally?

YES >> INSPECTION END

NO >> Repair or replace air mix door motor.

# INTAKE DOOR MOTOR

## Description

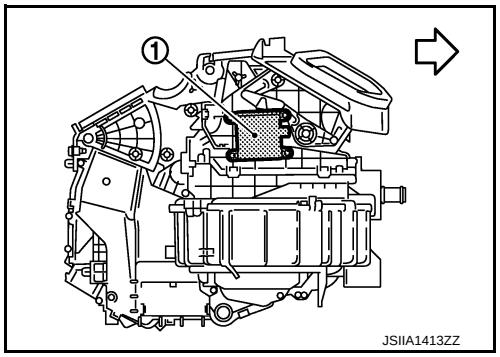
INFOID:0000000008293227

### COMPONENT DESCRIPTION

Intake Door Motor

The intake door motor (1) is attached to the blower unit. It rotates so that air is drawn from inlets set by the unified meter and A/C amp. Motor rotation is conveyed to a lever which activates the intake door.

⇦: Vehicle front




## Component Function Check

INFOID:0000000008293228

### 1.CONFIRM SYMPTOM BY PERFORMING THE FOLLOWING OPERATIONAL CHECK

1. Press intake switch.
2. REC indicator turns ON.
3. Listen for intake door position change (Slight change of blower sound can be heard.).
4. Press intake switch again.
5. FRE indicator turns ON.

Is the inspection result normal?

YES >> INSPECTION END
NO >> Go to diagnosis procedure. Refer to HAC-89, "Diagnosis Procedure".

## Diagnosis Procedure

INFOID:0000000008293229

### 1.PERFORM SELF-DIAGNOSIS

Perform self-diagnosis function. Refer to HAC-69, "WITHOUT PLASMACLUSTER SYSTEM : Diagnosis Description" (without Plasmacluster system) or HAC-74, "WITH PLASMACLUSTER SYSTEM : Diagnosis Description" (with Plusmacluster system).

Is the inspection result normal?

YES >> GO TO 5.
NO >> GO TO 2.

### 2.CHECK POWER SUPPLY FOR INTAKE DOOR MOTOR

Check voltage between intake door motor harness connector and ground.

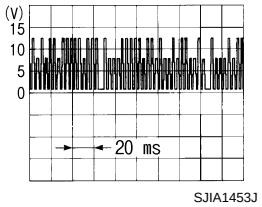
| (+) | | (–) | Voltage (Approx.) |
|---|---|---|---|
| Intake door motor | | — | |
| Connector | Terminal | | |
| M254 | 1 | Ground | 12 V |

Is the inspection result normal?

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

### 3.CHECK SIGNAL FOR INTAKE DOOR MOTOR

Confirm A/C LAN signal between intake door motor harness connector and ground using an oscilloscope.

| (+) | | (–) | Voltage |
|---|---|---|---|
| Intake door motor | | — | |
| Connector | Terminal | | |
| M254 | 3 | Ground |  SJIA1453J |

Is the inspection result normal?

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

## 4. CHECK INTAKE DOOR MOTOR GROUND CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect intake door motor connector.
3. Check continuity between intake door motor harness connector and ground.

| Intake door motor | | — | Continuity |
|---|---|---|---|
| Connector | Terminal | | |
| M254 | 2 | Ground | Existed |

Is the inspection result normal?

YES >> Replace intake door motor.
NO >> Repair harness or connector.

## 5. CHECK INTAKE DOOR CONTROL LINKAGE

Check intake door control linkage is properly installed. Refer to HAC-171, "Exploded View".

Is it installed normally?

YES >> INSPECTION END
NO >> Repair or adjust control linkage.

# BLOWER MOTOR

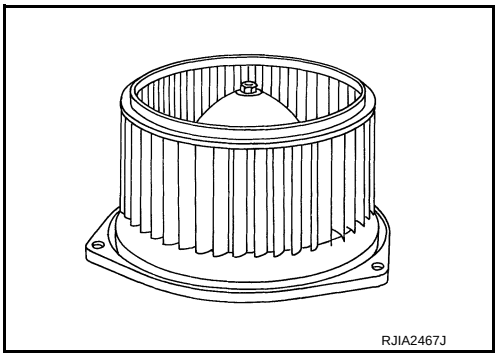
## Description

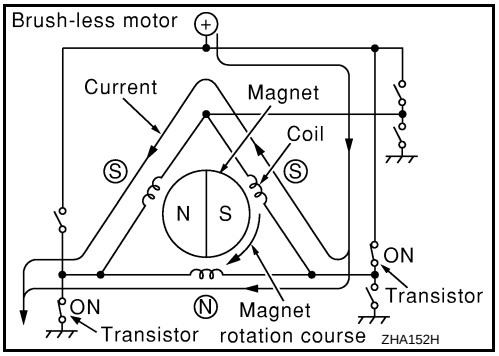
INFOID:0000000008293230

### COMPONENT DESCRIPTION

Brush-less Motor

The blower motor utilizes a brush-less motor with a rotating magnet. Quietness is improved over previous motors where the brush was the point of contact and the coil rotated.




## Component Function Check

INFOID:0000000008293231

### 1. CONFIRM SYMPTOM BY PERFORMING THE FOLLOWING OPERATIONAL CHECK

1. Press fan (UP: +) switch*1 (turn fan control dial clockwise*2). Blower should operate on low speed.
   **NOTE:**
   *1: With left and right ventilation temperature separately control system.
   *2: Without left and right ventilation temperature separately control system.
2. Press fan (UP: +) switch*1 (turn control dial clockwise*2), and continue checking fan speed and fan symbol until all speeds checked.
   **NOTE:**
   *1: With left and right ventilation temperature separately control system.
   *2: Without left and right ventilation temperature separately control system.

Is the inspection result normal?

YES >> INSPECTION END
NO >> Go to diagnosis procedure. Refer to HAC-91, "Diagnosis Procedure".

## Diagnosis Procedure

INFOID:0000000008293232

### 1. PERFORM SELF-DIAGNOSIS STEP-4

Perform self-diagnosis STEP-4. Refer to HAC-69, "WITHOUT PLASMACLUSTER SYSTEM : Diagnosis Description" (without Plasmacluster system) or HAC-74, "WITH PLASMACLUSTER SYSTEM : Diagnosis Description" (with Plasmacluster system), see Nos. 1 to 5.

| Code No. | 41 | 42 | 43 | 44 | 45 | 46 |
|---|---|---|---|---|---|---|
| Blower motor duty ratio | 37% | 91% | 65% | 65% | 65% | 91% |

Does blower motor speed change according to each code No.?

YES >> INSPECTION END
NO >> GO TO 2.

## 2.CHECK POWER SUPPLY FOR BLOWER MOTOR

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

| (+) | | (–) | Voltage |
|---|---|---|---|
| Blower motor | | — | |
| Connector | Terminal | | |
| M109 | 1 | Ground | Battery voltage |

Is the inspection result normal?

YES >> GO TO 3.
NO >> GO TO 6.

## 3.CHECK BLOWER MOTOR GROUND CIRCUIT

1. Turn ignition switch OFF.
2. Check continuity between blower motor harness connector and ground.

| Blower motor | | — | Continuity |
|---|---|---|---|
| Connector | Terminal | | |
| M109 | 3 | Ground | Existed |

Is the inspection result normal?

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

## 4.CHECK CIRCUIT CONTINUITY BETWEEN BLOWER MOTOR AND UNIFIED METER AND A/C AMP.

1. Disconnect unified meter and A/C amp. connector.
2. Check continuity between blower motor harness connector and unified meter and A/C amp. harness connector.

| Blower motor | | Unified meter and A/C amp. | | Continuity |
|---|---|---|---|---|
| Connector | Terminal | Connector | Terminal | |
| M109 | 2 | M66 | 38 | Existed |

3. Check continuity between blower motor harness connector and ground.

| Blower motor | | — | Continuity |
|---|---|---|---|
| Connector | Terminal | | |
| M109 | 2 | ground | Not existed |

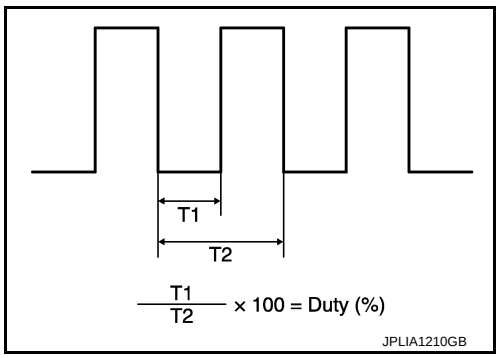
Is the inspection result normal?

YES >> GO TO 5.
NO >> Repair harness or connector.

## 5.CHECK UNIFIED METER AND A/C AMP. OUTPUT SIGNAL

1. Reconnect blower motor connector and unified meter and A/C amp. connector.
2. Turn ignition switch ON.
3. Set MODE switch to VENT position.
4. Change fan speed from Lo to Hi, and check duty ratios between blower motor harness connector and ground by using an oscilloscope.
   **NOTE:**
   Calculate the drive signal duty ratio as shown in the figure.

T2 = 1.6 ms




| Blower motor | | Condition | Duty ratio (Approx.) |
|---|---|---|---|
| Connector | Terminal | • fan speed: manual<br>• Vent mode | |
| M109 | 2 | 1st | 25 % |
| | | 2nd | 33 % |
| | | 3rd | 41 % |
| | | 4th | 51 % |
| | | 5th | 61 % |
| | | 6th | 71 % |
| | | 7th | 83 % |

Is the inspection result normal?

YES >> Replace blower motor after confirming the fan air flow does not change.
NO >> Replace unified meter and A/C amp.

## 6.CHECK POWER VOLTAGE OF BLOWER RELAY

1. Turn ignition switch OFF.
2. Remove blower relay. Refer to PG-114, "Fuse, Connector and Terminal Arrangement".
3. Turn ignition switch ON.
4. Check the voltage between blower relay fuse block terminals and ground. Refer to PG-114, "Fuse, Connector and Terminal Arrangement" for relay terminal assignment.

| (+) | (–) | Voltage |
|---|---|---|
| Blower relay | — | |
| 1 | Ground | Battery voltage |
| 3 | | |

Is the inspection result normal?

YES >> GO TO 7.
NO >> Check ignition power supply circuit. Refer to PG-22, "Wiring Diagram - IGNITION POWER SUPPLY -".

## 7.CHECK BLOWER RELAY

1. Turn ignition switch OFF.
2. Install blower relay. Refer to PG-114, "Fuse, Connector and Terminal Arrangement".
3. Check operation sound of the blower relay after switching ignition switch ON.

Is the inspection result normal?

YES >> GO TO 8.
NO >> Replace blower relay.

## 8.CHECK FUSE

Check fuse 15A [Nos 21 and 22, located in the fuse block (J/B). Refer to PG-114, "Fuse, Connector and Terminal Arrangement".

Is the inspection result normal?

YES >> Repair harness or connector.
NO >> Be sure to eliminate cause of malfunction before installing new fuse.

# Component Inspection

INFOID:0000000008293233

## 1.CHECK BLOWER MOTOR

1. Remove blower motor. Refer to VTL-16, "Exploded View".
2. Confirm smooth rotation of the blower motor.

Is the inspection result normal?

YES >> INSPECTION END
NO >> Replace blower motor.

# MAGNET CLUTCH

## Description

INFOID:0000000008293234

Magnet clutch drives a compressor, by a signal of IPDM E/R.

## Component Function Check

INFOID:0000000008293235

### 1.CONFIRM SYMPTOM BY PERFORMING THE FOLLOWING OPERATIONAL CHECK

1. Press AUTO switch.
2. Display should indicate AUTO. Confirm that the magnet clutch engages (sound or visual inspection). (Discharge air and fan speed depend on ambient, in-vehicle and set temperatures.)

Does the magnet clutch operate?

YES >> INSPECTION END
NO >> Go to Diagnosis Procedure. Refer to HAC-95, "Diagnosis Procedure".

## Diagnosis Procedure

INFOID:0000000008293236

### 1.PERFORM SELF-DIAGNOSIS

Perform self-diagnosis function. Refer to HAC-69, "WITHOUT PLASMACLUSTER SYSTEM : Diagnosis Description" (without Plasmacluster system) or HAC-74, "WITH PLASMACLUSTER SYSTEM : Diagnosis Description" (with plasmacluster system).

Is the inspection result normal?

YES >> INSPECTION END
NO >> GO TO 2.

### 2.PERFORM IPDM E/R AUTO ACTIVE TEST

Perform IPDM E/R auto active test. Refer to PCS-9, "Diagnosis Description".

Does the magnet clutch operate?

YES-1 >> With CONSULT: GO TO 6.
YES-2 >> Without CONSULT: GO TO 5.
NO >> Check 10A fuse (No. 49, located in IPDM E/R), and GO TO 3.

### 3.CHECK CIRCUIT CONTINUITY BETWEEN IPDM E/R AND COMPRESSOR

1. Turn ignition switch OFF.
2. Disconnect IPDM E/R connector and compressor connector.
3. Check continuity between IPDM E/R harness connector and compressor harness connector.

| IPDM E/R | | Compressor | | Continuity |
|---|---|---|---|---|
| Connector | Terminal | Connector | Terminal | |
| E7 | 48 | F43 | 1 | Existed |

Is the inspection result normal?

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

### 4.CHECK MAGNET CLUTCH CIRCUIT

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

Is the inspection result normal?

YES >> Replace IPDM E/R.
NO >> Replace magnet clutch. Refer to HA-40, "MAGNET CLUTCH : Removal and Installation of Compressor Clutch".

### 5.CHECK REFRIGERANT PRESSURE SENSOR (WITHOUT CONSULT)

1. Start the engine.
2. Check voltage between ECM harness connector and ground.

| (+) | | (–) | Condition | Voltage (Approx.) |
|---|---|---|---|---|
| ECM | | — | | |
| connector | Terminal | | | |
| M107 | 105 | Ground | A/C switch: ON (Blower motor operates.) | 1.0 - 4.0 V |

Is the inspection result normal?

YES >> Repair harness or connector.
NO >> Refer to EC-547, "Diagnosis Procedure" (VQ37VHR) or EC-988, "Diagnosis Procedure" (VQ25HR).

## 6. CHECK ECM INPUT SIGNAL-1

Check A/C switch signal in “Data monitor”.

| Monitor item | Condition | Status |
|---|---|---|
| AIR COND SIG | A/C switch: OFF | Off |
| | A/C switch: ON | On |

Is the inspection result normal?

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

## 7. CHECK REFRIGERANT PRESSURE SENSOR (WITH CONSULT)

1. Start the engine.
2. Check voltage of refrigerant pressure sensor in “Data monitor”.

Is the inspection result normal?

YES >> GO TO 8.
NO >> Refer to EC-547, "Diagnosis Procedure" (VQ37VHR) or EC-988, "Diagnosis Procedure" (VQ25HR).

## 8. CHECK ECM INPUT SIGNAL-2

Check blower fan motor switch signal in “Data monitor”.

| Monitor item | Condition | Status |
|---|---|---|
| HEATER FAN SW | Fan switch: OFF | Off |
| | Fan switch: ON | On |

Is the inspection result normal?

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

## 9. CHECK CAN COMMUNICATION

Check CAN communication. Refer to LAN-16, "Trouble Diagnosis Flow Chart".

- ECM – IPDM E/R
- ECM – Unified meter and A/C amp.

Is the inspection result normal?

YES >> Replace ECM.
NO >> Repair or replace malfunctioning part.

# ECV (ELECTRICAL CONTROL VALVE)

## Description

INFOID:0000000008293237

The ECV (electrical control valve) is installed in the compressor and controls it for emitting appropriate amount of refrigerant when necessary.

## Diagnosis Procedure

INFOID:0000000008293238

### 1.CHECK POWER SUPPLY FOR ECV (ELECTRIC CONTROL VALVE)

1. Disconnect compressor (ECV) connector.
2. Turn ignition switch ON.
3. Check voltage between compressor (ECV) harness connector and ground.

| (+) | | (–) | Voltage |
|---|---|---|---|
| Compressor (ECV) | | — | |
| Connector | Terminal | | |
| F44 | 2 | Ground | Battery voltage |

Is the inspection result normal?

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

### 2.CHECK FUSE

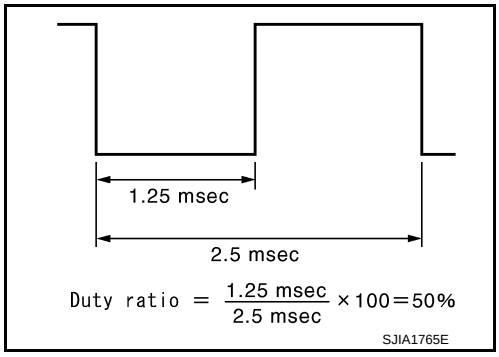
Check power supply circuit and 10A fuse [No. 3, located in the fuse block (J/B)]. Refer to PG-114, "Fuse, Connector and Terminal Arrangement".

Is the inspection result normal?

YES >> Check harness for open circuit. Repair or replace if necessary.
NO >> Replace fuse and check harness for short circuit. Repair or replace if necessary.

### 3.CHECK ECV CONTROL SIGNAL

1. Turn ignition switch OFF.
2. Reconnect compressor (ECV) connector.
3. Perform self-diagnosis. Refer to HAC-69, "WITHOUT PLASMACLUSTER SYSTEM : Diagnosis Description".
4. Set in self-diagnosis STEP-4 (Code No. 45).
5. Confirm ECV control signal between unified meter and A/C amp harness connector M67 terminal 65 and ground using an oscilloscope.




Is the inspection result normal?

YES >> Replace compressor.
NO >> GO TO 4

### 4.CHECK CIRCUIT CONTINUITY BETWEEN ECV AND UNIFIED METER AND A/C AMP.

1. Turn ignition switch OFF.
2. Disconnect compressor (ECV) connector and unified meter and A/C amp. connector.
3. Check continuity between compressor (ECV) harness connector and unified meter and A/C amp harness connector.

| Compressor (ECV) | | Unified meter and A/C amp. | | Continuity |
|---|---|---|---|---|
| Connector | Terminal | Connector | Terminal | |
| F44 | 3 | M67 | 65 | Existed |

Is the inspection result normal?

YES >> GO TO 5
NO >> Repair the harnesses or connectors.

## 5. CHECK ECV

Check continuity between compressor (ECV) connector.

| Compressor (ECV) | | | | Continuity |
|---|---|---|---|---|
| Connector | Terminal | Connector | Terminal | |
| F44 | 2 | F44 | 3 | Existed |

Is the inspection result normal?

YES >> Replace the unified meter and A/C amp.
NO >> Replace the compressor.

# AMBIENT SENSOR

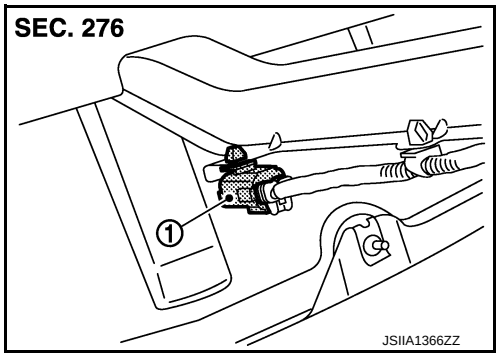
## Description

INFOID:0000000008293239

### COMPONENT DESCRIPTION

Ambient Sensor

The ambient sensor (1) is attached on hood lock stay assembly. It detects ambient temperature and converts it into a resistance value which is then input into the unified meter and A/C amp.




### AMBIENT TEMPERATURE INPUT PROCESS

The unified meter and A/C amp. equips a processing circuit for the ambient sensor input. However, when the temperature detected by the ambient sensor increases quickly, the processing circuit retards the unified meter and A/C amp. function. It only allows the unified meter and A/C amp. 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 increases. This is because the heat from the engine compartment can radiate to the front bumper area, location of the ambient sensor.

## Component Function Check

INFOID:0000000008293240

### 1. PERFORM SELF-DIAGNOSIS

Perform self-diagnosis function STEP-2. Refer to HAC-69, "WITHOUT PLASMACLUSTER SYSTEM : Diagnosis Description" (without Plasmacluster system) or HAC-74, "WITH PLASMACLUSTER SYSTEM : Diagnosis Description" (with Plasmacluster system).

21 or –21 is displayed.

YES >> Go to Diagnosis Procedure. Refer to HAC-99, "Diagnosis Procedure".
NO >> INSPECTION END

## Diagnosis Procedure

INFOID:0000000008293241

### 1. CHECK VOLTAGE BETWEEN AMBIENT SENSOR AND GROUND

1. Disconnect ambient sensor connector.
2. Turn ignition switch ON.
3. Check voltage between ambient sensor harness connector and ground.

| (+) | | (–) | Voltage (Approx.) |
|---|---|---|---|
| Ambient sensor | | — | |
| Connector | Terminal | | |
| E76 | 1 | Ground | 5 V |

Is the inspection result normal?

YES >> GO TO 2.
NO >> GO TO 4.

### 2. CHECK CIRCUIT CONTINUITY BETWEEN AMBIENT SENSOR AND UNIFIED METER AND A/C AMP.

1. Turn ignition switch OFF.
2. Disconnect unified meter and A/C amp. connector.

3. Check continuity between ambient sensor harness connector and unified meter and A/C amp. harness connector.

| Ambient sensor | | Unified meter and A/C amp. | | Continuity |
|---|---|---|---|---|
| Connector | Terminal | Connector | Terminal | |
| E76 | 2 | M67 | 61 | Existed |

Is the inspection result normal?

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

## 3.CHECK AMBIENT SENSOR

Check ambient sensor. Refer to HAC-100, "Component Inspection".

Is the inspection result normal?

YES >> Replace unified meter and A/C amp.
NO >> Replace ambient sensor.

## 4.CHECK CIRCUIT CONTINUITY BETWEEN AMBIENT SENSOR AND UNIFIED METER AND A/C AMP.

1. Turn ignition switch OFF.
2. Disconnect unified meter and A/C amp. connector.
3. Check continuity between ambient sensor harness connector and unified meter and A/C amp. harness connector.

| Ambient sensor | | Unified meter and A/C amp. | | Continuity |
|---|---|---|---|---|
| Connector | Terminal | Connector | Terminal | |
| E76 | 1 | M67 | 45 | Existed |

4. Check continuity between ambient sensor harness connector and ground.

| Ambient sensor | | — | Continuity |
|---|---|---|---|
| Connector | Terminal | | |
| E76 | 1 | Ground | Not existed |

Is the inspection result normal?

YES >> Replace unified meter and A/C amp.
NO >> Repair harness or connector.

# Component Inspection

INFOID:0000000008293242

## 1.CHECK AMBIENT SENSOR

1. Turn ignition switch OFF.
2. Disconnect ambient sensor connector. Refer to HAC-166, "Exploded View".
3. Check resistance between ambient sensor terminals.

| Terminal | | Condition | Resistance kΩ |
|---|---|---|---|
| | | Temperature °C (°F) | |
| 1 | 2 | –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 |

Is the inspection result normal?

YES >> INSPECTION END
NO >> Replace ambient sensor.

# IN-VEHICLE SENSOR

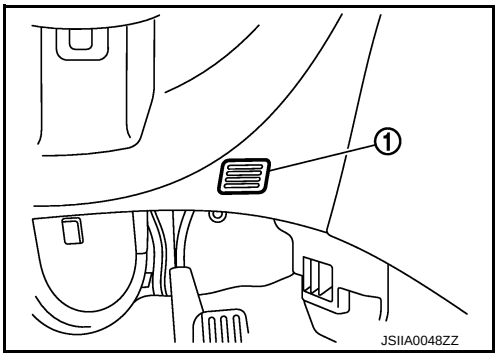
## Description

INFOID:0000000008293243

### COMPONENT DESCRIPTION

In-vehicle Sensor

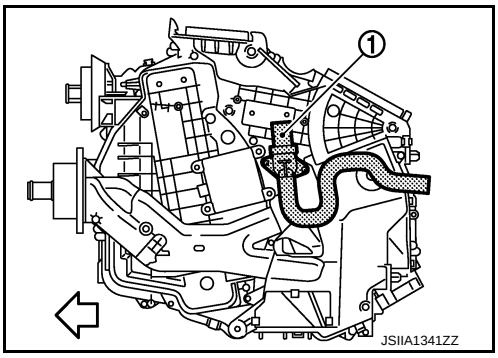
The in-vehicle sensor (1) is located on instrument driver lower panel. It converts variations in compartment air temperature drawn from the aspirator into a resistance value. It is then input into the unified meter and A/C amp.

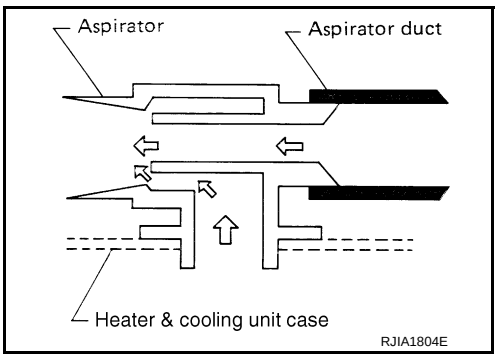



Aspirator

The aspirator (1) is located on driver's side of heater & cooling unit assembly. It produces vacuum pressure due to air discharged from the heater & cooling unit assembly, continuously taking compartment air in the aspirator.

⇦: Vehicle front




## Component Function Check

INFOID:0000000008293244

### 1. PERFORM SELF-DIAGNOSIS

Perform self-diagnosis function STEP-2. Refer to HAC-69, "WITHOUT PLASMACLUSTER SYSTEM : Diagnosis Description" (without Plasmacluster system) or HAC-74, "WITH PLASMACLUSTER SYSTEM : Diagnosis Description" (without Plasmacluster system).

22 or –22 is displayed.

YES >> Go to Diagnosis Procedure. Refer to HAC-102, "Diagnosis Procedure".
NO >> INSPECTION END

## Diagnosis Procedure

INFOID:0000000008293245

### 1. CHECK VOLTAGE BETWEEN IN-VEHICLE SENSOR AND GROUND

1. Disconnect in-vehicle sensor connector.
2. Turn ignition switch ON.

3. Check voltage between in-vehicle sensor harness connector and ground.

| (+) | | (–) | Voltage (Approx.) |
|---|---|---|---|
| In-vehicle sensor | | — | |
| Connector | Terminal | | |
| M61 | 1 | Ground | 5 V |

Is the inspection result normal?

YES >> GO TO 2.
NO >> GO TO 4.

## 2. CHECK CIRCUIT CONTINUITY BETWEEN IN-VEHICLE SENSOR AND UNIFIED METER AND A/C AMP.

1. Turn ignition switch OFF.
2. Disconnect unified meter and A/C amp. connector.
3. Check continuity between in-vehicle sensor harness connector and unified meter and A/C amp. harness connector.

| In-vehicle sensor | | Unified meter and A/C amp. | | Continuity |
|---|---|---|---|---|
| Connector | Terminal | Connector | Terminal | |
| M61 | 2 | M67 | 60 | Existed |

Is the inspection result normal?

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

## 3. CHECK IN-VEHICLE SENSOR

Check in-vehicle sensor. Refer to HAC-103, "Component Inspection".

Is the inspection result normal?

YES >> Replace unified meter and A/C amp.
NO >> Replace in-vehicle sensor.

## 4. CHECK CIRCUIT CONTINUITY BETWEEN IN-VEHICLE SENSOR AND UNIFIED METER AND A/C AMP.

1. Turn ignition switch OFF.
2. Disconnect unified meter and A/C amp. connector.
3. Check continuity between in-vehicle sensor harness connector and unified meter and A/C amp. harness connector.

| In-vehicle sensor | | Unified meter and A/C amp. | | Continuity |
|---|---|---|---|---|
| Connector | Terminal | Connector | Terminal | |
| M61 | 1 | M67 | 44 | Existed |

4. Check continuity between in-vehicle sensor harness connector and ground.

| In-vehicle sensor | | — | Continuity |
|---|---|---|---|
| Connector | Terminal | | |
| M61 | 1 | Ground | Not existed |

Is the inspection result normal?

YES >> Replace unified meter and A/C amp.
NO >> Repair harness or connector.

# Component Inspection

INFOID:0000000008293246

## 1. CHECK IN-VEHICLE SENSOR

1. Turn ignition switch OFF.
2. Disconnect in-vehicle sensor connector. Refer to HAC-167, "Exploded View".
3. Check resistance between in-vehicle sensor terminals.

| Terminal | | Condition | Resistance kΩ |
|---|---|---|---|
| | | Temperature °C (°F) | |
| 1 | 2 | –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 |

Is the inspection result normal?

YES >> INSPECTION END
NO >> Replace in-vehicle sensor.

# SUNLOAD SENSOR

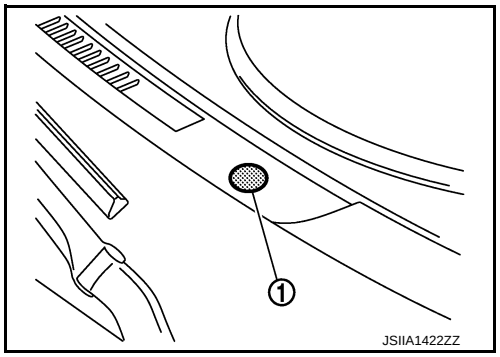
## Description

INFOID:0000000008293247

### COMPONENT DESCRIPTION

Sunload Sensor

The sunload sensor (1) is located on the front defroster grille LH. 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 unified meter and A/C amp.




### SUNLOAD INPUT PROCESS

The unified meter and A/C amp. also equips a processing circuit which averages the variations in detected sunload over a period of time. This prevents drastic swings in the air temperature control 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 varies 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 air temperature control system operation. On the other hand, shortly after entering a long tunnel, the system recognizes the change in sunload, and the system reacts accordingly.

## Component Function Check

INFOID:0000000008293248

### 1. PERFORM SELF-DIAGNOSIS

Perform self-diagnosis function STEP-2. Refer to HAC-69, "WITHOUT PLASMACLUSTER SYSTEM : Diagnosis Description" (without Plasmacluster system) or HAC-74, "WITH PLASMACLUSTER SYSTEM : Diagnosis Description" (with plasmacluster system).

25 or –25 is displayed.

YES >> Go to Diagnosis Procedure. Refer to HAC-105, "Diagnosis Procedure".
NO >> INSPECTION END

## Diagnosis Procedure

INFOID:0000000008293249

### 1. CHECK VOLTAGE BETWEEN SUNLOAD SENSOR AND GROUND

1. Disconnect sunload sensor connector.
2. Turn ignition switch ON.
3. Check voltage between sunload sensor harness connector and ground.

| (+) | | (–) | Voltage (Approx.) |
|---|---|---|---|
| Sunload sensor | | — | |
| Connector | Terminal | | |
| M46 | 1 | Ground | 5 V |

Is the inspection result normal?

YES >> GO TO 2.
NO >> GO TO 4.

### 2. CHECK CIRCUIT CONTINUITY BETWEEN SUNLOAD SENSOR AND UNIFIED METER AND A/C AMP.

1. Turn ignition switch OFF.

2. Disconnect unified meter and A/C amp. connector.
3. Check continuity between sunload sensor harness connector and unified meter and A/C amp. harness connector.

| Sunload sensor | | Unified meter and A/C amp. | | Continuity |
|---|---|---|---|---|
| Connector | Terminal | Connector | Terminal | |
| M46 | 2 | M67 | 62 | Existed |

Is the inspection result normal?

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

## 3.CHECK SUNLOAD SENSOR

1. Reconnect sunload sensor connector and unified meter and A/C amp. connector.
2. Check sunload sensor. Refer to HAC-106, "Component Inspection".

Is the inspection result normal?

YES >> Replace unified meter and A/C amp.
NO >> Replace sunload sensor.

## 4.CHECK CIRCUIT CONTINUITY BETWEEN SUNLOAD SENSOR AND UNIFIED METER AND A/C AMP.

1. Turn ignition switch OFF.
2. Disconnect unified meter and A/C amp. connector.
3. Check continuity between sunload sensor harness connector and unified meter and A/C amp. harness connector.

| Sunload sensor | | Unified meter and A/C amp. | | Continuity |
|---|---|---|---|---|
| Connector | Terminal | Connector | Terminal | |
| M46 | 1 | M67 | 46 | Existed |

4. Check continuity between sunload sensor harness connector and ground.

| Sunload sensor | | — | Continuity |
|---|---|---|---|
| Connector | Terminal | | |
| M46 | 1 | Ground | Not existed |

Is the inspection result normal?

YES >> Replace unified meter and A/C amp.
NO >> Repair harness or connector.

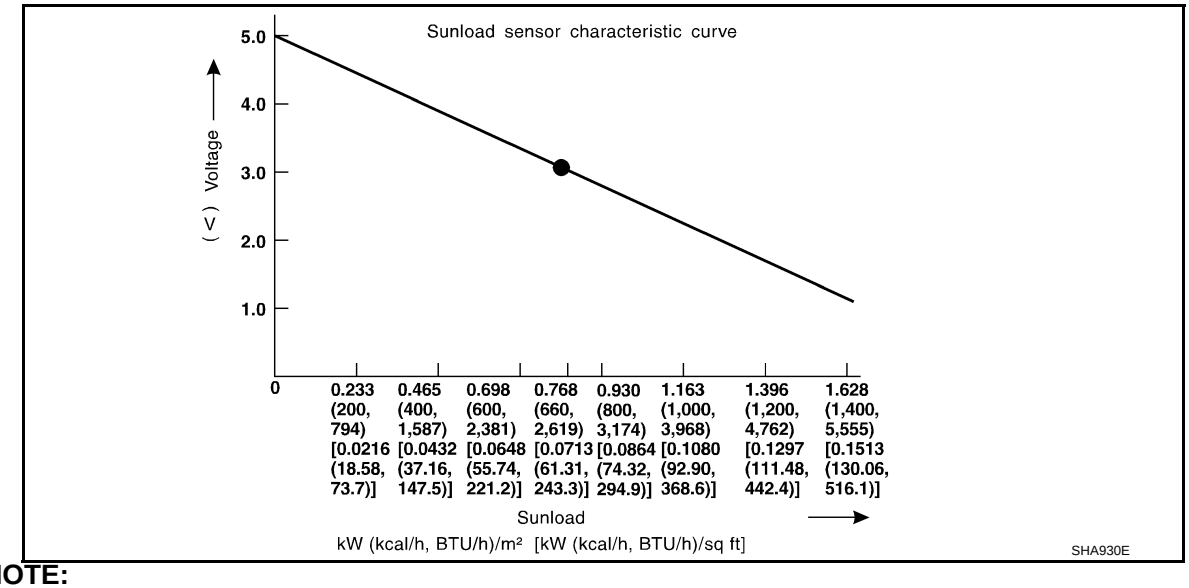
# Component Inspection

INFOID:0000000008293250

## 1.CHECK SUNLOAD SENSOR

1. Turn ignition switch ON.
2. Check voltage between unified meter and A/C amp. harness connector and ground.

| (+) | | (–) |
|---|---|---|
| Unified meter and A/C amp. | | — |
| Connector | Terminal | |
| M67 | 46 | Ground |




**NOTE:**

Select a place where sunshine directly on it when checking sunload sensor.

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace sunload sensor.

# INTAKE SENSOR

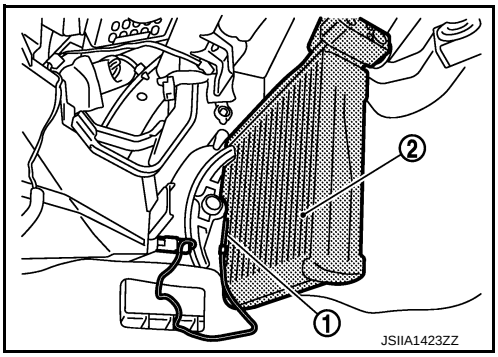
## Description

INFOID:0000000008293251

### COMPONENT DESCRIPTION

Intake Sensor

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




## Component Function Check

INFOID:0000000008293252

### 1. PERFORM SELF-DIAGNOSIS

Perform self-diagnosis function STEP-2. Refer to HAC-69, "WITHOUT PLASMACLUSTER SYSTEM : Diagnosis Description" (without Plasmacluster system) or HAC-74, "WITH PLASMACLUSTER SYSTEM : Diagnosis Description" (with Plasmacluster system).

24 or −24 is displayed.

YES >> Go to Diagnosis Procedure. Refer to HAC-108, "Diagnosis Procedure".
NO >> INSPECTION END

## Diagnosis Procedure

INFOID:0000000008293253

### 1. CHECK VOLTAGE BETWEEN INTAKE SENSOR AND GROUND

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

| (+) | | (–) | Voltage (Approx.) |
|---|---|---|---|
| Intake sensor | | — | |
| Connector | Terminal | | |
| M77 | 1 | Ground | 5 V |

Is the inspection result normal?

YES >> GO TO 2.
NO >> GO TO 4.

### 2. CHECK CIRCUIT CONTINUITY BETWEEN INTAKE SENSOR AND UNIFIED METER AND A/C AMP.

1. Turn ignition switch OFF.
2. Disconnect unified meter and A/C amp. connector.
3. Check continuity between intake sensor harness connector and unified meter and A/C amp. harness connector.

| Intake sensor | | Unified meter and A/C amp. | | Continuity |
|---|---|---|---|---|
| Connector | Terminal | Connector | Terminal | |
| M77 | 2 | M67 | 59 | Existed |

Is the inspection result normal?

YES >> GO TO 3.

NO >> Repair harness or connector.

## 3. CHECK INTAKE SENSOR

Check intake sensor. Refer to HAC-109, "Component Inspection".

Is the inspection result normal?

YES >> Replace unified meter and A/C amp.
NO >> Replace intake sensor.

## 4. CHECK CIRCUIT CONTINUITY BETWEEN INTAKE SENSOR AND UNIFIED METER AND A/C AMP.

1. Turn ignition switch OFF.
2. Disconnect unified meter and A/C amp. connector.
3. Check continuity between intake sensor harness connector and unified meter and A/C amp. harness connector.

| Intake sensor | | Unified meter and A/C amp. | | Continuity |
|---|---|---|---|---|
| Connector | Terminal | Connector | Terminal | |
| M77 | 1 | M67 | 43 | Existed |

4. Check continuity between intake sensor harness connector and ground.

| Intake sensor | | — | Continuity |
|---|---|---|---|
| Connector | Terminal | | |
| M77 | 1 | Ground | Not existed |

Is the inspection result normal?

YES >> Replace unified meter and A/C amp.
NO >> Repair harness or connector.

# Component Inspection

INFOID:0000000008293254

## 1. CHECK INTAKE SENSOR

1. Turn ignition switch OFF.
2. Disconnect intake sensor connector.
3. Check resistance between intake sensor terminals.

| Terminal | | Condition | Resistance kΩ |
|---|---|---|---|
| | | Temperature °C (°F) | |
| 1 | 2 | –15 (5) | 12.28 |
| | | –10 (14) | 9.58 |
| | | –5 (23) | 7.55 |
| | | 0 (32) | 6.00 |
| | | 5 (41) | 4.81 |
| | | 10 (50) | 3.88 |
| | | 15 (59) | 3.16 |
| | | 20 (68) | 2.59 |
| | | 25 (77) | 2.14 |
| | | 30 (86) | 1.77 |
| | | 35 (95) | 1.48 |
| | | 40 (104) | 1.24 |
| | | 45 (113) | 1.05 |

Is the inspection result normal?

YES >> INSPECTION END
NO >> Replace intake sensor.

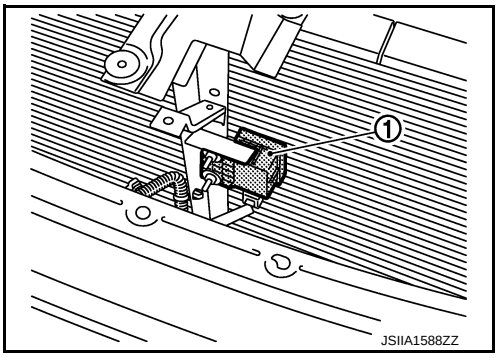
# EXHAUST GAS/OUTSIDE ODOR DETECTING SENSOR

## Description

INFOID:0000000008293255

### COMPONENT DESCRIPTION

The exhaust gas/outside odor detecting sensor (1) is attached on the radiator core support. It detects smell of exhaust gas and unpleasant odor, and converts it into a duty ratio which is then input into the unified meter and A/C amp.




### STRUCTURE AND OPERATION

Exhaust gas/outside odor detecting sensor detects ambient atmospheric CO, $NO_2$ and unpleasant odor, and converts them to values of resistance. The values are converted to signals with the exhaust gas/outside odor detecting sensor internal circuit, then the unified meter and A/C amp. inputs the signals.
Exhaust gas/outside odor detecting sensor has a construction that detects CO, $NO_2$ and unpleasant odor by exhaust gas/outside odor detecting sensor element from the air intake of the case through a filter (waterproof sheet). It sends output signals to the unified meter and A/C amp. in response to a resistance value conversion by exhaust gas/outside odor detecting sensor elements. Unified meter and A/C amp. prevent a smell of exhaust gas and ambient atmospheric unpleasant odor from getting into vehicle by performing corrections according to various driving conditions.

## Component Function Check

INFOID:0000000008293256

### 1. PERFORM SELF-DIAGNOSIS STEP-2

Perform self-diagnosis STEP-2. Refer to HAC-74, "WITH PLASMACLUSTER SYSTEM : Diagnosis Description", see Nos. 1 to 2.

28, –28, 29 or –29 is displayed.

YES >> Go to Diagnosis Procedure. Refer to HAC-110, "Diagnosis Procedure".
NO >> INSPECTION END

## Diagnosis Procedure

INFOID:0000000008293257

### 1. ADJUST EXHAUST GAS / OUTSIDE ODOR DETECTING SENSOR SENSITIVITY

1. Turn ignition switch ON.
2. Adjust the exhaust gas / outside odor detecting sensor sensitivity. Refer to HAC-18, "WITH PLASMACLUSTER SYSTEM : Exhaust Gas/Outside Odor Detecting Sensor Sensitivity Adjustment Function".

Are the symptoms solved?

YES >> INSPECTION END
NO >> GO TO 2.

### 2. CHECK EXHAUST GAS / OUTSIDE ODOR DETECTING SENSOR POWER SUPPLY

1. Turn ignition switch OFF.
2. Disconnect exhaust gas / outside odor detecting sensor connector.
3. Turn ignition switch ON.
4. Check voltage between exhaust gas / outside odor detecting sensor harness connector and ground.

| (+) | | (–) | Voltage |
|---|---|---|---|
| Exhaust gas / outside odor detecting sensor | | — | |
| Connector | Terminal | | |
| E75 | 1 | Ground | Battery voltage |

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair harness or connector between exhaust gas / outside odor detecting sensor and fuse.

## 3. CHECK EXHAUST GAS / OUTSIDE ODOR DETECTING SENSOR GROUND CIRCUIT FOR OPEN

1. Turn ignition switch OFF.
2. Disconnect unified meter and A/C amp. connector.
3. Check continuity between exhaust gas / outside odor detecting sensor harness connector and unified meter and A/C amp. harness connector.

| Exhaust gas / outside odor detecting sensor | | Unified meter and A/C amp. | | Continuity |
|---|---|---|---|---|
| Connector | Terminal | Connector | Terminal | |
| E75 | 2 | M67 | 61 | Existed |

Is the inspection result normal?

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

## 4. CHECK EXHAUST GAS / OUTSIDE ODOR DETECTING SENSOR SIGNAL CIRCUIT

1. Reconnect unified meter and A/C amp. connector.
2. Turn ignition switch ON.
3. Check voltage between exhaust gas / outside odor detecting sensor harness connector and ground using an oscilloscope.

| (+) | | (–) | Voltage (Approx.) |
|---|---|---|---|
| Exhaust gas / outside odor detecting sensor | | — | |
| Connector | Terminal | | |
| E75 | 3 | Ground | 5 V |

Is the inspection result normal?

YES >> Replace exhaust gas / outside odor detecting sensor. Refer to HAC-173, "Removal and Installation".
NO >> GO TO 5.

## 5. CHECK EXHAUST GAS / OUTSIDE ODOR DETECTING SENSOR SIGNAL CIRCUIT FOR OPEN

1. Turn ignition switch OFF.
2. Disconnect unified meter and A/C amp. connector.
3. Check continuity between exhaust gas / outside odor detecting sensor harness connector and unified meter and A/C amp. harness connector.

| Exhaust gas / outside odor detecting sensor | | Unified meter and A/C amp. | | Continuity |
|---|---|---|---|---|
| Connector | Terminal | Connector | Terminal | |
| E75 | 3 | M67 | 47 | Existed |

Is the inspection result normal?

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

## 6. CHECK EXHAUST GAS / OUTSIDE ODOR DETECTING SENSOR SIGNAL CIRCUIT FOR SHORT

Check continuity between exhaust gas / outside odor detecting sensor harness connector and ground.

| Exhaust gas / outside odor detecting sensor | | — | Continuity |
|---|---|---|---|
| Connector | Terminal | | |
| E75 | 3 | Ground | Not existed |

Is the inspection result normal?

YES >> Replace unified meter and A/C amp. Refer to HAC-165, "Removal and Installation".
NO >> Repair harness or connector.

# IONIZER

## Description

INFOID:0000000008293258

Ionizer generates an approximately equal proportional amount of positive and negative ions in the air.

## Component Function Check

INFOID:0000000008293259

### 1.CHECK IONIZER OPERATION SOUND

1. Turn ignition switch ON.
2. Press AUTO switch.
3. Ion indicator is shown on the display.
4. Check the ionizer operation sound (whirring sound) in the duct by putting an ear to the center ventilator grille (LH) outlet.

Is the inspection result normal?

YES >> INSPECTION END
NO >> Go to Diagnosis Procedure. Refer to HAC-113, "Diagnosis Procedure".

## Diagnosis Procedure

INFOID:0000000008293260

### 1.CHECK POWER SUPPLY FOR IONIZER

1. Turn ignition switch OFF.
2. Disconnect ionizer connector.
3. Turn ignition switch ON.
4. Press fan (UP:+) switch.
5. Check voltage between ionizer harness connector and ground.

| (+) | | (–) | Voltage |
|---|---|---|---|
| Ionizer | | — | |
| Connector | Terminal | | |
| M98 | 1 | Ground | Battery voltage |

Is the inspection result normal?

YES >> GO TO 2.
NO >> Check 10A fuse (No. 3, located in the fuse block). Refer to PG-114, "Fuse, Connector and Terminal Arrangement".
- If fuse is OK, check harness for open circuit. Repair or replace if necessary.
- If fuse is NG, replace fuse and check for short circuit. Repair or replace if necessary.

### 2.CHECK CIRCUIT CONTINUITY BETWEEN IONIZER AND GROUND

1. Turn ignition switch OFF.
2. Check continuity between ionizer harness connector and ground.

| Ionizer | | — | Continuity |
|---|---|---|---|
| Connector | Terminal | | |
| M98 | 3 | Ground | Existed |

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair harnesses or connectors.

### 3.CHECK ION ON/OFF SIGNAL

Check voltage between ionizer harness connector and ground.

| (+) | | (–) | Condition | Voltage |
|---|---|---|---|---|
| Ionizer | | | | |
| Connector | Terminal | | | |
| M98 | 4 | Ground | Blower motor: OFF | 12 V |
| | | | Blower motor: ON | 0 V |

Is the inspection result normal?

YES >> Replace ionizer.
NO >> GO TO 4.

## 4. CHECK CIRCUIT CONTINUITY BETWEEN UNIFIED METER AND A/C AMP. AND IONIZER

1. Turn ignition switch OFF.
2. Disconnect unified meter and A/C amp. connector.
3. Check continuity between unified meter and A/C amp. harness connector and ionizer harness connector.

| Ionizer | | Unified meter and A/C amp. | | Continuity |
|---|---|---|---|---|
| Connector | Terminal | Connector | Terminal | |
| M98 | 4 | M66 | 20 | Existed |

4. Check continuity between ionizer harness connector and ground.

| Ionizer | | — | Continuity |
|---|---|---|---|
| Connector | Terminal | | |
| M98 | 4 | Ground | Not existed |

Is the inspection result normal?

YES >> Replace unified meter and A/C amp.
NO >> Repair harnesses or connectors.

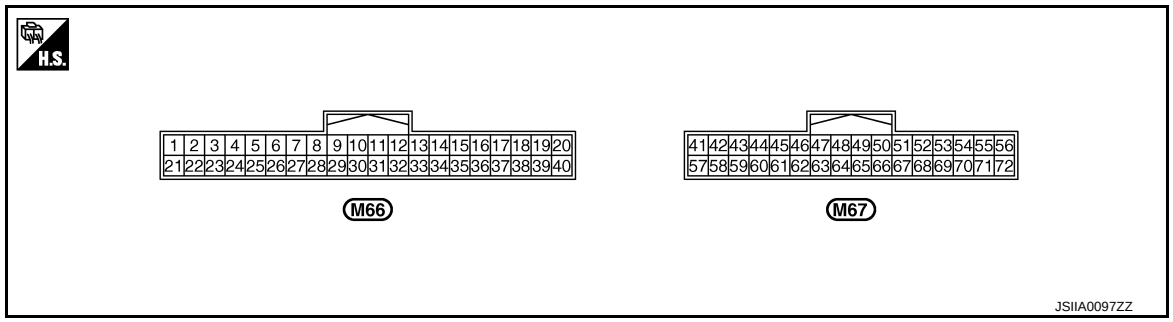
# ECU DIAGNOSIS INFORMATION

## UNIFIED METER AND A/C AMP.

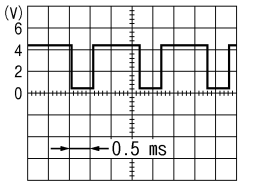
### Reference Value

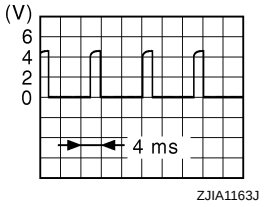
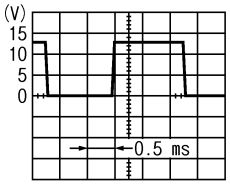
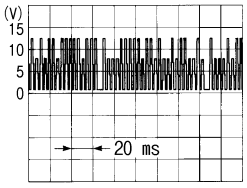
INFOID:0000000008293261

#### TERMINAL LAYOUT




#### PHYSICAL VALUES

| Terminal No. (Wire color) | | Description | | Condition | Value (Approx.) |
|---|---|---|---|---|---|
| + | – | Signal name | Input/ Output | | |
| 20*1 (BR) | Ground | ION ON/OFF signal | Output | • Ignition switch ON<br>• Blower motor: ON | 0 V |
| | | | | • Ignition switch ON<br>• Blower motor: OFF | 12V |
| 38 (P) | Ground | Blower motor control signal | Output | • Ignition switch ON<br>• Fan speed: 1st speed (manual) |  JSIIA0096ZZ |
| 41 (L) | Ground | ACC power supply | — | Ignition switch ACC | Battery voltage |
| 43 (BR) | Ground | Intake sensor signal | Input | Ignition switch ON | 0 – 4.8 V<br>Output voltage varies with intake temperature. |
| 44 (LG) | Ground | In-vehicle sensor signal | Input | Ignition switch ON | 0 – 4.8 V<br>Output voltage varies with intake temperature. |
| 45 (V) | Ground | Ambient sensor signal | Input | Ignition switch ON | 0 – 4.8 V<br>Output voltage varies with intake temperature. |
| 46 (Y) | Ground | Sunload sensor signal | Input | Ignition switch ON | 0 – 4.8 V<br>Output voltage varies with intake temperature. |

| Terminal No. (Wire color) | | Description | | Condition | Value (Approx.) |
|---|---|---|---|---|---|
| + | – | Signal name | Input/ Output | | |
| 47*1 (G) | Ground | Exhaust gas/outside odor detecting sensor signal | Input | Ignition switch ON<br>**NOTE:**<br>The signal is different by measurement environment of a vehicle |  ZJIA1163J |
| 53 (W) | Ground | Ignition power supply | — | Ignition switch ON | Battery voltage |
| 54 (SB) | Ground | Battery power supply | — | Ignition switch OFF | Battery voltage |
| 55 (B) | Ground | Ground | — | Ignition switch ON | 0 V |
| 56 (L) | Ground | CAN-H | — | — | — |
| 59 (GR) | Ground | Intake sensor ground | — | — | 0 V |
| 60 (W) | Ground | In-vehicle sensor ground | — | Ignition switch ON | 0 V |
| 61 (B) | Ground | Ambient sensor ground | — | Ignition switch ON | 0 V |
| 62 (SB) | Ground | Sunload sensor ground | — | Ignition switch ON | 0 V |
| 63 (L) | — | — | — | — | — |
| 65 (BG) | Ground | ECV (Electrical Control Valve) signal | Output | • Ignition switch ON<br>• Self-diagnosis. STEP-4 (Code No. 45) |  SJIA1607E |
| 69 (P) | Ground | A/C LAN signal | Input/ Output | Ignition switch ON |  SJIA1453J |
| 70 (R) | Ground | Each door motor power supply | Output | Ignition switch ON | 12 V |
| 71 (GR) | Ground | Ground | — | Ignition switch ON | 0 V |
| 72 (P) | Ground | CAN-L | — | — | — |

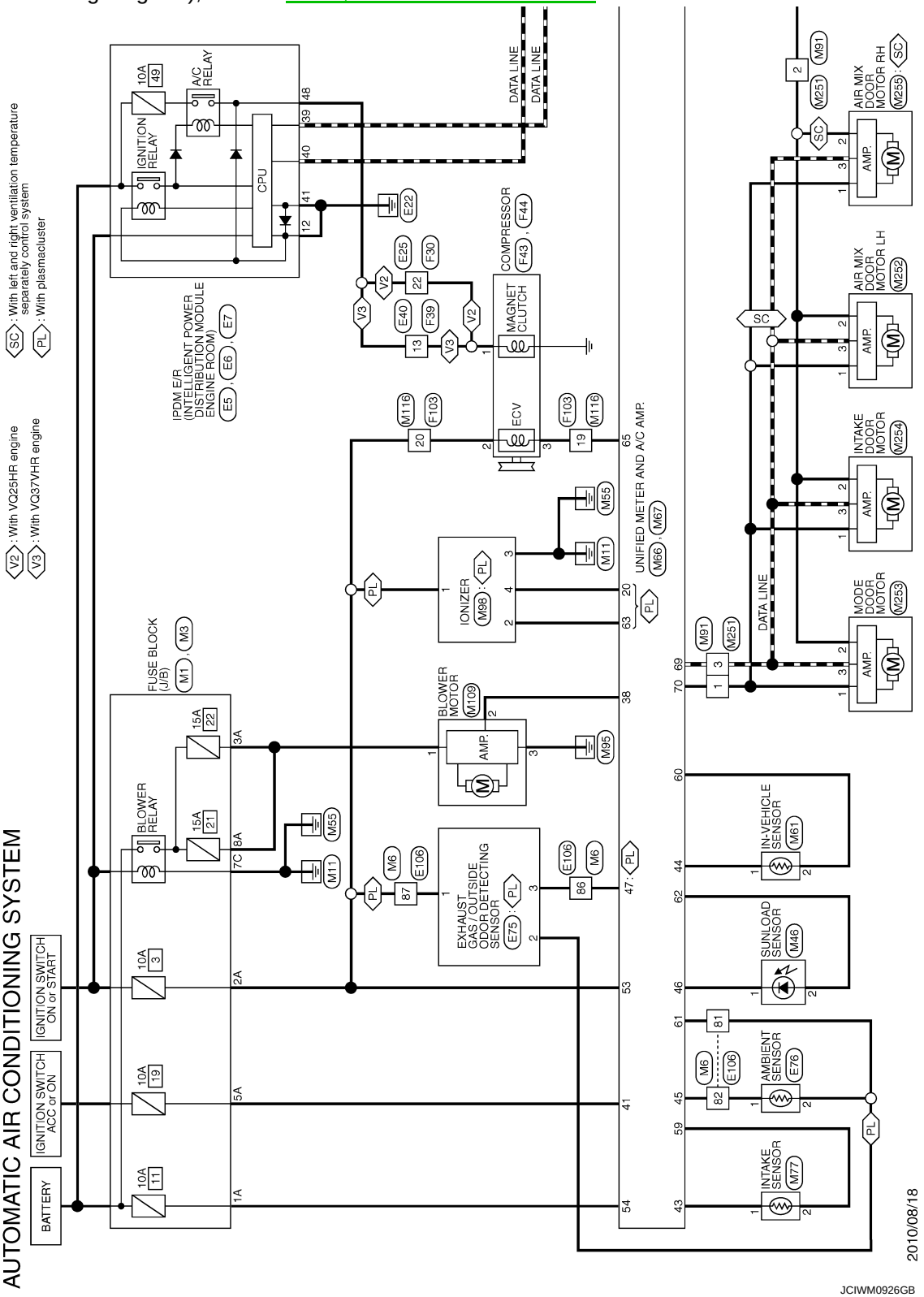
*1: With ACCS.

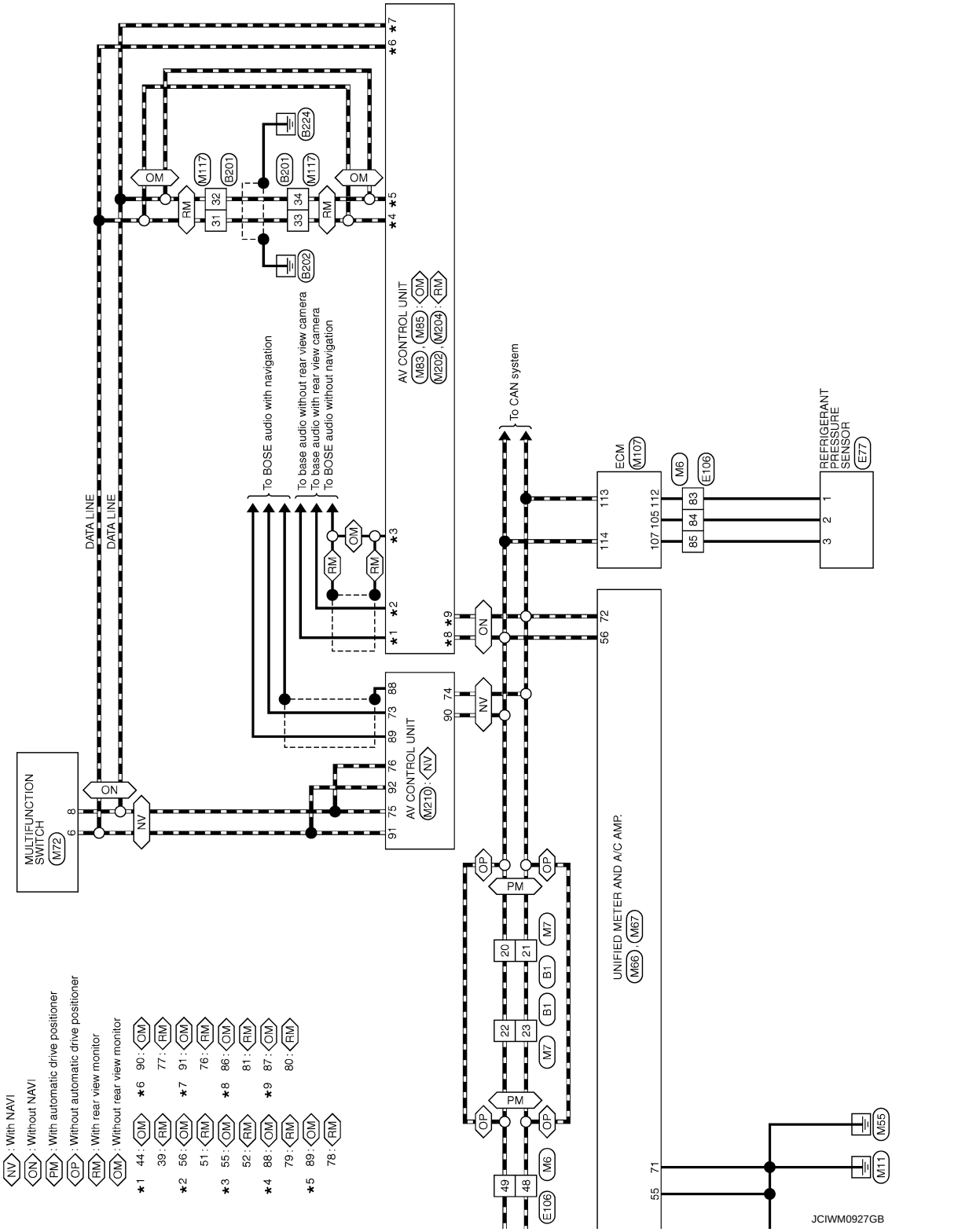
*2: Unified meter and A/C amp. does not use this terminal for control.

# Wiring Diagram - AUTOMATIC AIR CONDITIONING SYSTEM -

INFOID:0000000008293262

For connector terminal arrangements, harness layouts, and alphabets in a ⬡ (option abbreviation; if not described in wiring diagram), refer to GI-12, "Connector Information".






## Fail-safe

INFOID:0000000008293263

FAIL-SAFE FUNCTION

- If a communication error exists between the unified meter and A/C amp., and the AV control unit and preset switch for 30 seconds or longer, air conditioning system is controlled under the following conditions:

| | |
|---|---|
| **Compressor** | **: ON** |
| **Air outlet** | **: AUTO** |
| **Air inlet** | **: FRE (Fresh)** |
| **Fan speed** | **: AUTO** |
| **Set temperature** | **: Setting before communication error occurs** |

# ECM
## VQ37VHR
### VQ37VHR : Reference Value

INFOID:0000000008293264

VALUES ON THE DIAGNOSIS TOOL

**NOTE:**

- Specification data are reference values.
- Specification data are output/input values which are detected or supplied by the ECM at the connector.
  * Specification data may not be directly related to their components signals/values/operations.
  i.e. Adjust ignition timing with a timing light before monitoring IGN TIMING, because the monitor may show the specification data in spite of the ignition timing not being adjusted to the specification data. This IGN TIMING monitors the data calculated by the ECM according to the signals input from the camshaft position sensor and other ignition timing related sensors.

CONSULT MONITOR ITEM

| Monitor Item | Condition | | Values/Status |
|---|---|---|---|
| ENG SPEED | • Run engine and compare CONSULT value with the tachometer indication. | | Almost the same speed as the tachometer indication |
| MAS A/F SE-B1 | See EC-166, "Description". | | |
| MAS A/F SE-B2 | See EC-166, "Description". | | |
| B/FUEL SCHDL | See EC-166, "Description". | | |
| A/F ALPHA-B1 | See EC-166, "Description". | | |
| A/F ALPHA-B2 | See EC-166, "Description". | | |
| COOLAN TEMP/S | • Ignition switch: ON | | Indicates engine coolant temperature |
| A/F SEN1 (B1) | • Engine: After warming up | Maintaining engine speed at 2,000 rpm | Fluctuates around 2.2 V |
| A/F SEN1 (B2) | • Engine: After warming up | Maintaining engine speed at 2,000 rpm | Fluctuates around 2.2 V |
| HO2S2 (B1) | • Revving engine from idle up to 3,000 rpm quickly after the following conditions are met.<br>- Engine: After warming up<br>- After keeping engine speed between 3,500 and 4,000 rpm for 1 minute and at idle for 1 minute under no load | | 0 - 0.3 V ←→ Approx. 0.6 - 1.0 V |
| HO2S2 (B2) | • Revving engine from idle up to 3,000 rpm quickly after the following conditions are met.<br>- Engine: After warming up<br>- After keeping engine speed between 3,500 and 4,000 rpm for 1 minute and at idle for 1 minute under no load | | 0 - 0.3 V ←→ Approx. 0.6 - 1.0 V |
| HO2S2 MNTR (B1) | • Revving engine from idle up to 3,000 rpm quickly after the following conditions are met.<br>- Engine: After warming up<br>- After keeping engine speed between 3,500 and 4,000 rpm for 1 minute and at idle for 1 minute under no load | | LEAN ←→ RICH |
| HO2S2 MNTR (B2) | • Revving engine from idle up to 3,000 rpm quickly after the following conditions are met.<br>- Engine: After warming up<br>- After keeping engine speed between 3,500 and 4,000 rpm for 1 minute and at idle for 1 minute under no load | | LEAN ←→ RICH |
| VHCL SPEED SE | • Turn drive wheels and compare CONSULT value with the speedometer indication. | | Almost the same speed as speedometer indication |
| BATTERY VOLT | • Ignition switch: ON (Engine stopped) | | 11 - 14 V |
| ACCEL SEN 1 | • Ignition switch: ON (Engine stopped) | Accelerator pedal: Fully released | 0.45 - 1.00 V |
| | | Accelerator pedal: Fully depressed | 4.4 - 4.8 V |
| ACCEL SEN 2*1 | • Ignition switch: ON (Engine stopped) | Accelerator pedal: Fully released | 0.45 - 1.00 V |
| | | Accelerator pedal: Fully depressed | 4.3 - 4.8 V |

| Monitor Item | Condition | | Values/Status |
|---|---|---|---|
| TP SEN 1-B1 | • Ignition switch: ON (Engine stopped)<br>• Selector lever: D (A/T) or 1st (M/T) | Accelerator pedal: Fully released | More than 0.36 V |
| | | Accelerator pedal: Fully depressed | Less than 4.75 V |
| TP SEN 2-B1*1 | • Ignition switch: ON (Engine stopped)<br>• Selector lever: D (A/T) or 1st (M/T) | Accelerator pedal: Fully released | More than 0.36 V |
| | | Accelerator pedal: Fully depressed | Less than 4.75 V |
| FUEL T/TMP SE | • Ignition switch: ON | | Indicates fuel tank temperature |
| INT/A TEMP SE | • Ignition switch: ON | | Indicates intake air temperature |
| EVAP SYS PRES*3 | • Ignition switch: ON | | Approx. 1.8 - 4.8 V |
| FUEL LEVEL SE | • Ignition switch: ON | | Depending on fuel level of fuel tank |
| START SIGNAL | • Ignition switch: ON → START → ON | | OFF → ON → OFF |
| CLSD THL POS | • Ignition switch: ON (Engine stopped) | Accelerator pedal: Fully released | ON |
| | | Accelerator pedal: Slightly depressed | OFF |
| AIR COND SIG | • Engine: After warming up, idle the engine | Air conditioner switch: OFF | OFF |
| | | Air conditioner switch: ON (Compressor operates.) | ON |
| P/N POSI SW | • Ignition switch: ON | Selector lever: P or N (A/T), Neutral (M/T) | ON |
| | | Selector lever: Except above | OFF |
| PW/ST SIGNAL | • Engine: After warming up, idle the engine | Steering wheel: Not being turned | OFF |
| | | Steering wheel: Being turned | ON |
| LOAD SIGNAL | • Ignition switch: ON | Rear window defogger switch: ON and/or Lighting switch: 2nd position | ON |
| | | Rear window defogger switch and lighting switch: OFF | OFF |
| IGNITION SW | • Ignition switch: ON → OFF → ON | | ON → OFF → ON |
| HEATER FAN SW | • Engine: After warming up, idle the engine | Heater fan switch: ON | ON |
| | | Heater fan switch: OFF | OFF |
| BOOST VCUM SW | • This item is displayed but is not applicable to this model. | | |
| BRAKE SW | • Ignition switch: ON | Brake pedal: Fully released | OFF |
| | | Brake pedal: Slightly depressed | ON |
| INJ PULSE-B1 | • Engine: After warming up<br>• Selector lever: P or N (A/T), Neutral (M/T)<br>• Air conditioner switch: OFF<br>• No load | Idle | 2.0 - 3.0 msec |
| | | 2,000 rpm | 1.9 - 2.9 msec |
| INJ PULSE-B2 | • Engine: After warming up<br>• Selector lever: P or N (A/T), Neutral (M/T)<br>• Air conditioner switch: OFF<br>• No load | Idle | 2.0 - 3.0 msec |
| | | 2,000 rpm | 1.9 - 2.9 msec |
| IGN TIMING | • Engine: After warming up<br>• Selector lever: P or N (A/T), Neutral (M/T)<br>• Air conditioner switch: OFF<br>• No load | Idle | 7° BTDC |
| | | 2,000 rpm | 25° - 45° BTDC |

| Monitor Item | Condition | | Values/Status |
|---|---|---|---|
| CAL/LD VALUE | • Engine: After warming up<br>• Selector lever: P or N (A/T), Neutral (M/T)<br>• Air conditioner switch: OFF<br>• No load | Idle | 5% - 35% |
| | | 2,500 rpm | 5% - 35% |
| MASS AIRFLOW | • Engine: After warming up<br>• Selector lever: P or N (A/T), Neutral (M/T)<br>• Air conditioner switch: OFF<br>• No load | Idle | 2.0 - 6.0 g/s |
| | | 2,500 rpm | 7.0 - 20.0 g/s |
| PURG VOL C/V | • Engine: After warming up<br>• Selector lever: P or N (A/T), Neutral (M/T)<br>• Air conditioner switch: OFF<br>• No load | Idle<br>(Accelerator pedal: Not depressed even slightly, after engine starting.) | 0% |
| | | 2,000 rpm | — |
| INT/V TIM (B1) | • Engine: After warming up<br>• Selector lever: P or N (A/T), Neutral (M/T)<br>• Air conditioner switch: OFF<br>• No load | Idle | –5°CA - 5°CA |
| | | 2,000 rpm | Approx. 0°CA - 30°CA |
| INT/V TIM (B2) | • Engine: After warming up<br>• Selector lever: P or N (A/T), Neutral (M/T)<br>• Air conditioner switch: OFF<br>• No load | Idle | –5°CA - 5°CA |
| | | 2,000 rpm | Approx. 0°CA - 30°CA |
| INT/V SOL (B1) | • Engine: After warming up<br>• Selector lever: P or N (A/T), Neutral (M/T)<br>• Air conditioner switch: OFF<br>• No load | Idle | 0% - 2% |
| | | 2,000 rpm | Approx. 0% - 50% |
| INT/V SOL (B2) | • Engine: After warming up<br>• Selector lever: P or N (A/T), Neutral (M/T)<br>• Air conditioner switch: OFF<br>• No load | Idle | 0% - 2% |
| | | 2,000 rpm | Approx. 0% - 50% |
| TP SEN 1-B2 | • Ignition switch: ON (Engine stopped)<br>• Selector lever: D (A/T) or 1st (M/T) | Accelerator pedal: Fully released | More than 0.36 V |
| | | Accelerator pedal: Fully depressed | Less than 4.75 V |
| TP SEN 2-B2*1 | • Ignition switch: ON (Engine stopped)<br>• Selector lever: D (A/T) or 1st (M/T) | Accelerator pedal: Fully released | More than 0.36 V |
| | | Accelerator pedal: Fully depressed | Less than 4.75 V |
| AIR COND RLY | • Engine: After warming up, idle the engine | Air conditioner switch: OFF | OFF |
| | | Air conditioner switch: ON<br>(Compressor operates) | ON |
| FUEL PUMP RLY | • For 1 second after turning ignition switch: ON<br>• Engine running or cranking | | ON |
| | • Except above | | OFF |
| VENT CONT/V | • Ignition switch: ON | | OFF |
| THRTL RELAY | • Ignition switch: ON | | ON |
| HO2S2 HTR (B1) | • Engine speed: Below 3,600 rpm after the following conditions are met.<br>- Engine: After warming up<br>- Keeping the engine speed between 3,500 and 4,000 rpm for 1 minute and at idle for 1 minute under no load | | ON |
| | • Engine speed: Above 3,600 rpm | | OFF |

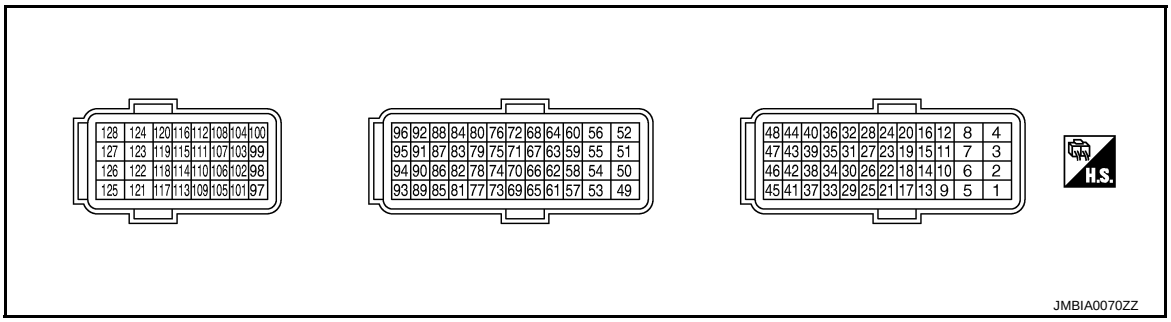
| Monitor Item | Condition | | Values/Status |
|---|---|---|---|
| HO2S2 HTR (B2) | • Engine speed: Below 3,600 rpm after the following conditions are met.<br>- Engine: After warming up<br>- Keeping the engine speed between 3,500 and 4,000 rpm for 1 minute and at idle for 1 minute under no load | | ON |
| | • Engine speed: Above 3,600 rpm | | OFF |
| I/P PULLY SPD | • Vehicle speed: More than 20 km/h (12 MPH) | | Almost the same speed as the tachometer indication |
| VEHICLE SPEED | • Turn drive wheels and compare CONSULT value with the speedometer indication. | | Almost the same speed as the speedometer indication |
| IDL A/V LEARN | • Engine: Running | Idle air volume learning has not been performed yet. | YET |
| | | Idle air volume learning has already been performed successfully. | CMPLT |
| SNOW MODE SW | • Ignition switch: ON | Snow mode switch: ON | ON |
| | | Snow mode switch: OFF | OFF |
| ENG OIL TEMP | • Engine: After warming up | | More than 70°C (158°F) |
| TRVL AFTER MIL | • Ignition switch: ON | Vehicle has traveled after MIL has illuminated. | 0 - 65,535 km<br>(0 - 40,723 miles) |
| A/F S1 HTR (B1) | • Engine: After warming up, idle the engine<br>(More than 140 seconds after starting engine) | | 4 - 100% |
| A/F S1 HTR (B2) | • Engine: After warming up, idle the engine<br>(More than 140 seconds after starting engine) | | 4 - 100% |
| AC PRESS SEN | • Engine: Idle<br>• Both A/C switch and blower fan switch: ON (Compressor operates) | | 1.0 - 4.0 V |
| VHCL SPEED SE | • Turn drive wheels and compare CONSULT value with the speedometer indication. | | Almost the same speed as the speedometer indication |
| MAIN SW | • Ignition switch: ON | MAIN switch: Pressed | ON |
| | | MAIN switch: Released | OFF |
| CANCEL SW | • Ignition switch: ON | CANCEL switch: Pressed | ON |
| | | CANCEL switch: Released | OFF |
| RESUME/ACC SW | • Ignition switch: ON | RESUME/ACCELERATE switch: Pressed | ON |
| | | RESUME/ACCELERATE switch: Released | OFF |
| SET SW | • Ignition switch: ON | SET/COAST switch: Pressed | ON |
| | | SET/COAST switch: Released | OFF |
| BRAKE SW1<br>(ICC/ASCD brake switch) | • Ignition switch: ON | Brake pedal: Fully released | ON |
| | | Brake pedal: Slightly depressed | OFF |
| BRAKE SW2<br>(Stop lamp switch) | • Ignition switch: ON | Brake pedal: Fully released | OFF |
| | | Brake pedal: Slightly depressed | ON |
| DIST SW | • Ignition switch: ON | DISTANCE switch: Pressed | ON |
| | | DISTANCE switch: Released | OFF |
| CRUISE LAMP | • Ignition switch: ON | MAIN switch: Pressed at the 1st time → at the 2nd time | ON → OFF |
| BAT CUR SEN | • Engine speed: Idle<br>• Battery: Fully charged*2<br>• Selector lever: P or N (A/T), Neutral (M/T)<br>• Air conditioner switch: OFF<br>• No load | | Approx. 2,600 - 3,500 mV |
| ALT DUTY | • Engine: Idle | | 0 - 80% |
| ATOM PRES SEN | • This item is displayed but is not applicable to this model. | | |

| Monitor Item | Condition | | Values/Status |
|---|---|---|---|
| BRAKE BST PRES SE | • This item is displayed but is not applicable to this model. | | |
| VVEL POSITION SEN-B1 | • Engine: After warming up<br>• Selector lever: P or N (A/T), Neutral (M/T)<br>• Air conditioner switch: OFF<br>• No load | Idle | Approx. 0.25 - 1.40 V |
| | | When revving engine up to 2,000 rpm quickly | Approx. 0.25 - 4.75 V |
| VVEL POSITION SEN-B2 | • Engine: After warming up<br>• Selector lever: P or N (A/T), Neutral (M/T)<br>• Air conditioner switch: OFF<br>• No load | Idle | Approx. 0.25 - 1.40 V |
| | | When revving engine up to 2,000 rpm quickly | Approx. 0.25 - 4.75 V |
| VVEL TIM-B1 | • Engine: After warming up<br>• Selector lever: P or N (A/T), Neutral (M/T)<br>• Air conditioner switch: OFF<br>• No load | Idle | Approx. 0 - 20 deg |
| | | When revving engine up to 2,000 rpm quickly | Approx. 0 - 90 deg |
| VVEL TIM-B2 | • Engine: After warming up<br>• Selector lever: P or N (A/T), Neutral (M/T)<br>• Air conditioner switch: OFF<br>• No load | Idle | Approx. 0 - 20 deg |
| | | When revving engine up to 2,000 rpm quickly | Approx. 0 - 90 deg |
| VVEL LEARN | • Ignition switch: OFF → ON (After warming up) | VVEL learning has not been performed yet. | YET |
| | | VVEL learning has already been performed successfully. | DONE |
| VVEL SEN LEARN-B1 | • VVEL learning has already been performed successfully | | Approx. 0.30 - 0.80 V |
| VVEL SEN LEARN-B2 | • VVEL learning has already been performed successfully | | Approx. 0.30 - 0.80 V |
| ALT DUTY | • Engine: Idle | | 0 - 80% |
| A/F ADJ-B1 | • Engine: Running | | –0.330 - 0.330 |
| A/F ADJ-B2 | • Engine: Running | | –0.330 - 0.330 |
| FAN DUTY | • Engine: Running | | 0 - 100% |
| ALT DUTY SIG | • Power generation voltage variable control: Operating | | ON |
| | • Power generation voltage variable control: Not operating | | OFF |
| EVAP LEAK DIAG*3 | • Ignition switch: ON | | Depending on condition of EVAP leak diagnosis |
| EVAP DIAG READY*3 | • Ignition switch: ON (READY) | | Depending on ready condition of EVAP leak diagnosis |
| HO2 S2 DIAG1 (B1) | • DTC P0139 self-diagnosis (delayed response) has not been performed yet. | | INCMP |
| | • DTC P0139 self-diagnosis (delayed response) has already been performed successfully. | | CMPLT |
| HO2 S2 DIAG1 (B2) | • DTC P0159 self-diagnosis (delayed response) has not been performed yet. | | INCMP |
| | • DTC P0159 self-diagnosis (delayed response) has already been performed successfully. | | CMPLT |
| HO2 S2 DIAG2 (B1) | • DTC P0139 self-diagnosis (slow response) has not been performed yet. | | INCMP |
| | • DTC P0139 self-diagnosis (slow response) has already been performed successfully. | | CMPLT |
| HO2 S2 DIAG2 (B2) | • DTC P0159 self-diagnosis (slow response) has not been performed yet. | | INCMP |
| | • DTC P0159 self-diagnosis (slow response) has already been performed successfully. | | CMPLT |
| A/F SEN1 DIAG2 (B1) | • This item is displayed but is not applicable to this model. | | |
| A/F SEN1 DIAG2 (B2) | • This item is displayed but is not applicable to this model. | | |

*1: Accelerator pedal position sensor 2 signal and throttle position sensor 2 signal are converted by ECM internally. Thus, they differ from ECM terminals voltage signal.

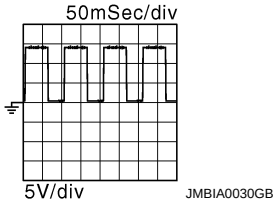
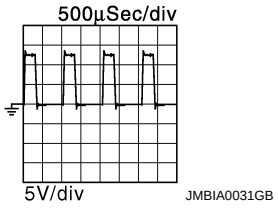
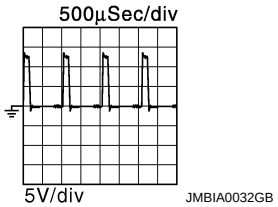
*2: Before measuring the terminal voltage, confirm that the battery is fully charged. Refer to PG-3, "How to Handle Battery".
*3: Except for Mexico

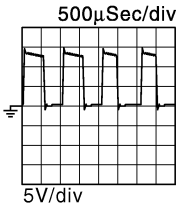
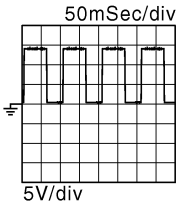
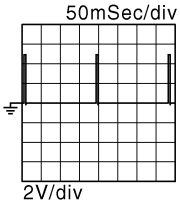
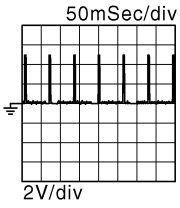
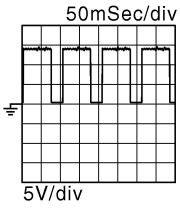
TERMINAL LAYOUT

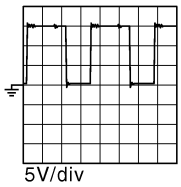
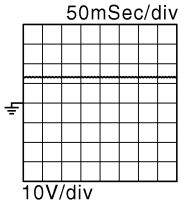
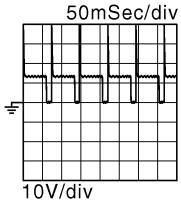


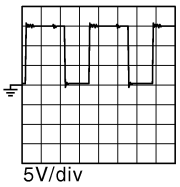
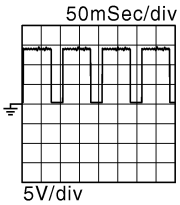

PHYSICAL VALUES

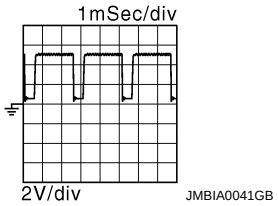
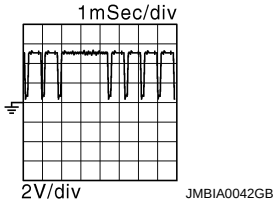
**NOTE:**
- ECM is located behind the instrument assist lower panel. For this inspection, remove passenger side instrument lower panel.
- Specification data are reference values and are measured between each terminal and ground.
- Pulse signal is measured by CONSULT.

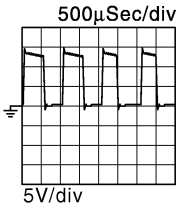
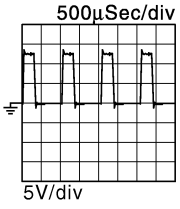
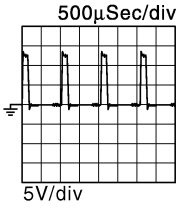
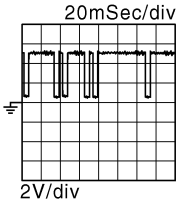
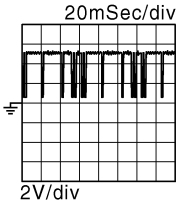
| Terminal No. (Wire color) | | Description | | Condition | Value (Approx.) |
|---|---|---|---|---|---|
| + | – | Signal name | Input/ Output | | |
| 1 (W) | 128 (B) | A/F sensor 1 heater (bank 1) | Output | [Engine is running]<br>• Warm-up condition<br>• Idle speed<br>(More than 140 seconds after starting engine) | 2.9 - 8.8 V★<br>  |
| 2 (G) | 128 (B) | Throttle control motor (Open) (bank 1) | Output | [Ignition switch: ON]<br>• Engine stopped<br>• Selector lever: D (A/T) or 1st (M/T)<br>• Accelerator pedal: Fully depressed | 0 - 14 V★<br>  |
| | | | | [Ignition switch: ON]<br>• Engine stopped<br>• Selector lever: D (A/T) or 1st (M/T)<br>• Accelerator pedal: Fully released | 0 - 14 V★<br>  |
| 3 (R) | 128 (B) | Throttle control motor power supply (bank 1) | Input | [Ignition switch: ON] | BATTERY VOLTAGE (11 - 14 V) |

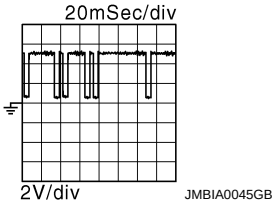
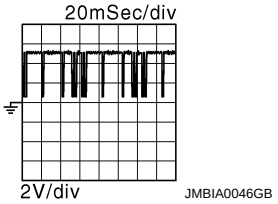
| Terminal No. (Wire color) | | Description | | Condition | Value (Approx.) |
|---|---|---|---|---|---|
| + | – | Signal name | Input/ Output | | |
| 4 (BR) | 128 (B) | Throttle control motor (Close) (bank 1) | Output | [Ignition switch: ON]<br>• Engine stopped<br>• Selector lever: D (A/T) or 1st (M/T)<br>• Accelerator pedal: In the middle of releasing operation | 0 - 14 V★<br>  <br> |
| 5 (W)*3 (SB)*4 | 128 (B) | A/F sensor 1 heater (bank 2) | Output | [Engine is running]<br>• Warm-up condition<br>• Idle speed<br>(More than 140 seconds after starting engine) | 2.9 - 8.8 V★<br>  <br> |
| 8 (B) | — | ECM ground | — | — | — |
| 11 (GR)<br>12 (L)<br>15 (V)<br>16 (G)<br>19 (SB)<br>20 (Y) | 128 (B) | Ignition signal No. 4<br>Ignition signal No. 3<br>Ignition signal No. 5<br>Ignition signal No. 2<br>Ignition signal No. 6<br>Ignition signal No. 1 | Output | [Engine is running]<br>• Warm-up condition<br>• Idle speed<br>**NOTE:**<br>The pulse cycle changes depending on rpm at idle | 0 - 0.2 V★<br>  <br> |
| | | | | [Engine is running]<br>• Warm-up condition<br>• Engine speed: 2,000 rpm | 0.1 - 0.4 V★<br>  <br> |
| 17 (P) | 128 (B) | Heated oxygen sensor 2 heater (bank 1) | Output | [Engine is running]<br>• Engine speed: Below 3,600 rpm after the following conditions are met<br>- Engine: after warming up<br>- Keeping the engine speed between 3,500 and 4,000 rpm for 1 minute and at idle for 1 minute under no load | 10 V★<br>  <br> |
| | | | | [Ignition switch: ON]<br>• Engine stopped<br>[Engine is running]<br>• Engine speed: Above 3,600 rpm | BATTERY VOLTAGE<br>(11 - 14 V) |

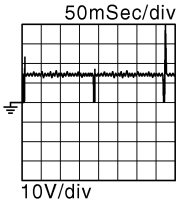
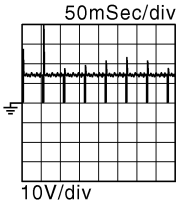
| Terminal No. (Wire color) | | Description | | Condition | Value (Approx.) |
|---|---|---|---|---|---|
| + | – | Signal name | Input/ Output | | |
| 18 (W) | 128 (B) | Intake valve timing control solenoid valve (bank 1) | Output | [Engine is running]<br>• Warm-up condition<br>• Idle speed | BATTERY VOLTAGE (11 - 14 V) |
| | | | | [Engine is running]<br>• Warm-up condition<br>• Engine speed: 2,000rpm | 7 - 12 V★<br>  <br><br>JMBIA0038GB |
| 21 (GR) | 128 (B) | EVAP canister purge volume control solenoid valve | Output | [Engine is running]<br>• Idle speed<br>• Accelerator pedal: Not depressed even slightly, after engine starting | BATTERY VOLTAGE (11 - 14 V)★<br>  <br><br>JMBIA0039GB |
| | | | | [Engine is running]<br>• Engine speed: About 2,000 rpm (More than 100 seconds after starting engine) | BATTERY VOLTAGE (11 - 14 V)★<br>  <br><br>JMBIA0040GB |
| 22 (R) | 128 (B) | Fuel pump relay | Output | [Ignition switch: ON]<br>• For 1 second after turning ignition switch ON<br>[Engine is running] | 0 - 1.5 V |
| | | | | [Ignition switch: ON]<br>• More than 1 second after turning ignition switch ON | BATTERY VOLTAGE (11 - 14 V) |
| 24 (P) | 128 (B) | ECM relay (Self shut-off) | Output | [Engine is running]<br>[Ignition switch: OFF]<br>• A few seconds after turning ignition switch OFF | 0 - 1.5 V |
| | | | | [Ignition switch: OFF]<br>• More than a few seconds after turning ignition switch OFF | BATTERY VOLTAGE (11 - 14 V) |
| 25 (O)*3 (BR)*4 | 128 (B) | Throttle control motor relay | Output | [Ignition switch: ON → OFF] | 0 - 1.0 V<br>↓<br>BATTERY VOLTAGE (11 - 14 V)<br>↓<br>0 V |
| | | | | [Ignition switch: ON] | 0 - 1.0 V |
| 28 (BR) | 128 (B) | VVEL actuator motor relay abort signal [VVEL control module] | Output | [Engine is running]<br>• Warm-up condition<br>• Idle speed | 0 V |

| Terminal No. (Wire color) | | Description | | Condition | Value (Approx.) |
|---|---|---|---|---|---|
| + | – | Signal name | Input/ Output | | |
| 29 (G) | 128 (B) | Intake valve timing control solenoid valve (bank 2) | Output | [Engine is running]<br>• Warm-up condition<br>• Idle speed | BATTERY VOLTAGE (11 - 14 V) |
| | | | | [Engine is running]<br>• Warm-up condition<br>• Engine speed: 2,000rpm | 7 - 12 V★<br>  <br><br>JMBIA0038GB |
| 30 (Y) | 40 (R) | Throttle position sensor 1 (bank 1) | Input | [Ignition switch: ON]<br>• Engine stopped<br>• Selector lever: D (A/T) or 1st (M/T)<br>• Accelerator pedal: Fully released | More than 0.36 V |
| | | | | [Ignition switch: ON]<br>• Engine stopped<br>• Selector lever: D (A/T) or 1st (M/T)<br>• Accelerator pedal: Fully depressed | Less than 4.75 V |
| 31 (R) | 48 (B) | Throttle position sensor 1 (bank 2) | Input | [Ignition switch: ON]<br>• Engine stopped<br>• Selector lever: D (A/T) or 1st (M/T)<br>• Accelerator pedal: Fully released | More than 0.36 V |
| | | | | [Ignition switch: ON]<br>• Engine stopped<br>• Selector lever: D (A/T) or 1st (M/T)<br>• Accelerator pedal: Fully depressed | Less than 4.75 V |
| 33 (SB) | 128 (B) | Heated oxygen sensor 2 heater (bank 2) | Output | [Engine is running]<br>• Engine speed: Below 3,600 rpm after the following conditions are met<br>- Engine: after warming up<br>- Keeping the engine speed between 3,500 and 4,000 rpm for 1 minute and at idle for 1 minute under no load | 10 V★<br>  <br><br>JMBIA0037GB |
| | | | | [Ignition switch: ON]<br>• Engine stopped<br>[Engine is running]<br>• Engine speed: Above 3,600 rpm | BATTERY VOLTAGE (11 - 14 V) |
| 34 (B) | 40 (R) | Throttle position sensor 2 (bank 1) | Input | [Ignition switch: ON]<br>• Engine stopped<br>• Selector lever: D (A/T) or 1st (M/T)<br>• Accelerator pedal: Fully released | Less than 4.75 V |
| | | | | [Ignition switch: ON]<br>• Engine stopped<br>• Selector lever: D (A/T) or 1st (M/T)<br>• Accelerator pedal: Fully depressed | More than 0.36 V |
| 35 (W) | 48 (B) | Throttle position sensor 2 (bank 2) | Input | [Ignition switch: ON]<br>• Engine stopped<br>• Selector lever: D (A/T) or 1st (M/T)<br>• Accelerator pedal: Fully released | Less than 4.75 V |
| | | | | [Ignition switch: ON]<br>• Engine stopped<br>• Selector lever: D (A/T) or 1st (M/T)<br>• Accelerator pedal: Fully depressed | More than 0.36 V |

| Terminal No. (Wire color) | | Description | | Condition | Value (Approx.) |
|---|---|---|---|---|---|
| + | – | Signal name | Input/ Output | | |
| 36 (O) | — | Sensor ground [Brake booster pressure sensor] | — | — | — |
| 37 (W) | 128 (B) | Crankshaft position sensor (POS) | Input | [Engine is running]<br>• Warm-up condition<br>• Idle speed<br>**NOTE:**<br>The pulse cycle changes depending on rpm at idle | 4.0 - 5.0 V★<br>  <br> |
| | | | | [Engine is running]<br>• Engine speed: 2,000 rpm | 4.0 - 5.0 V★<br>  <br> |
| 38 (O) | 96 (P)*3 (BR)*4 | Manifold absolute pressure (MAP) sensor | Input | [Engine is running]<br>• Warm-up condition<br>• Idle speed | 1.2 V |
| | | | | [Engine is running]<br>• Warm-up condition<br>• Engine speed: 2,000 rpm | 1.5 V |
| 39 (P) | 36 (O) | Brake booster pressure sensor | Input | [Engine is running]<br>• Warm-up condition<br>• Idle speed<br>• Brake pedal: Fully released | 1.2 V |
| | | | | [Engine is running]<br>• Warm-up condition<br>• Idle speed<br>• Brake pedal: Fully depressed | 3.0 V |
| 40 (R) | — | Sensor ground [Throttle position sensor (bank 1)] | — | — | — |
| 43 (G) | 48 (B) | Sensor power supply [Throttle position sensor (bank 2)] | — | [Ignition switch: ON] | 5 V |
| 44 (L) | 40 (R) | Sensor power supply [Throttle position sensor (bank 1)] | — | [Ignition switch: ON] | 5 V |
| 45 (LG) | 36 (O) | Sensor power supply [Brake booster pressure sensor] | — | [Ignition switch: ON] | 5 V |
| 46 (R) | 128 (B) | Sensor power supply [Crankshaft position sensor (POS)] | — | [Ignition switch: ON] | 5 V |
| 47 (Y) | — | Sensor ground [Crankshaft position sensor (POS)] | — | — | — |
| 48 (B) | — | Sensor ground [Throttle position sensor (bank 2)] | — | — | — |

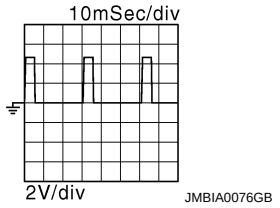
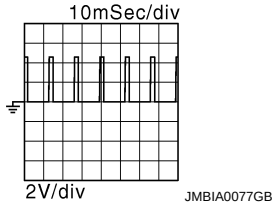
| Terminal No. (Wire color) | | Description | | Condition | Value (Approx.) |
|---|---|---|---|---|---|
| + | – | Signal name | Input/ Output | | |
| 49 (GR) | 128 (B) | Throttle control motor (Close) (bank 2) | Output | [Ignition switch: ON]<br>• Engine stopped<br>• Selector lever: D (A/T) or 1st (M/T)<br>• Accelerator pedal: In the middle of releasing operation | 0 - 14 V★<br>  <br> |
| 50 (V) | 128 (B) | Throttle control motor (Open) (bank 2) | Output | [Ignition switch: ON]<br>• Engine stopped<br>• Selector lever: D (A/T) or 1st (M/T)<br>• Accelerator pedal: Fully depressed | 0 - 14 V★<br>  <br> |
| | | | | [Ignition switch: ON]<br>• Engine stopped<br>• Selector lever: D (A/T) or 1st (M/T)<br>• Accelerator pedal: Fully released | 0 - 14 V★<br>  <br> |
| 52 (R) | 128 (B) | Throttle control motor power supply (bank 2) | Input | [Ignition switch: ON] | BATTERY VOLTAGE (11 - 14 V) |
| 53 (W) | 128 (B) | Ignition switch | Input | [Ignition switch: OFF] | 0 V |
| | | | | [Ignition switch: ON] | BATTERY VOLTAGE (11 - 14 V) |
| 54 (Y) | — | CAN communication line [VVEL control module] | Input/ output | — | — |
| 55 (LG) | — | CAN communication line [VVEL control module] | Input/ output | — | — |
| 57 (L) | 128 (B) | A/F sensor 1 (bank 1) | Input | [Ignition switch: ON] | 2.2 V |
| 59 (O)*3 (L)*4 | 128 (B) | Camshaft position sensor (PHASE) (bank 1) | Input | [Engine is running]<br>• Warm-up condition<br>• Idle speed<br>**NOTE:**<br>The pulse cycle changes depending on rpm at idle | 3.0 - 5.0 V★<br>  <br> |
| | | | | [Engine is running]<br>• Engine speed: 2,000 rpm | 3.0 - 5.0 V★<br>  <br> |

| Terminal No. (Wire color) | | Description | | Condition | Value (Approx.) |
|---|---|---|---|---|---|
| + | – | Signal name | Input/ Output | | |
| 60 (G) | 128 (B) | Sensor power supply [Camshaft position sensor (PHASE) (bank 1), Manifold absolute pressure (MAP) sensor, Power steering pressure sensor] | — | [Ignition switch: ON] | 5 V |
| 61 (R) | 128 (B) | A/F sensor 1 (bank 1) | Input | [Engine is running]<br>• Warm-up condition<br>• Engine speed: 2,000 rpm | 1.8 V<br>Output voltage varies with air fuel ratio. |
| 63 (L) | 128 (B) | Camshaft position sensor (PHASE) (bank 2) | Input | [Engine is running]<br>• Warm-up condition<br>• Idle speed<br>**NOTE:**<br>The pulse cycle changes depending on rpm at idle | 3.0 - 5.0 V★<br>  <br> |
| | | | | [Engine is running]<br>• Engine speed: 2,000 rpm | 3.0 - 5.0 V★<br>  <br> |
| 64 (SB) | 128 (B) | Sensor power supply [Camshaft position sensor (PHASE) (bank 2), Battery current sensor] | — | [Ignition switch: ON] | 5 V |
| 65 (LG) | 128 (B) | A/F sensor 1 (bank 2) | Input | [Ignition switch: ON] | 2.2 V |
| 66 (V) | 128 (B) | A/F sensor 1 (bank 2) | Input | [Engine is running]<br>• Warm-up condition<br>• Engine speed: 2,000 rpm | 1.8 V<br>Output voltage varies with air fuel ratio. |
| 67 (P) | 128 (B) | Intake air temperature sensor | Input | [Engine is running] | 0 - 4.8 V<br>Output voltage varies with intake air temperature. |
| 68 (LG) | — | Sensor ground [Mass air flow sensor (bank 1), Intake air temperature sensor] | — | — | — |
| 69 (W) | 128 (B) | Knock sensor (bank 2) | Input | [Engine is running]<br>• Idle speed | 2.5 V*1 |
| 71 (Y) | 128 (B) | Engine coolant temperature sensor | Input | [Engine is running] | 0 - 4.8 V<br>Output voltage varies with engine coolant temperature. |
| 72 (—) | — | Sensor ground (Knock sensor) | — | — | — |
| 73 (W) | 128 (B) | Knock sensor (bank 1) | Input | [Engine is running]<br>• Idle speed | 2.5 V*1 |

| Terminal No. (Wire color) | | Description | | Condition | Value (Approx.) |
|---|---|---|---|---|---|
| + | – | Signal name | Input/ Output | | |
| 76 (W) | 84 (B) | Heated oxygen sensor 2 (bank 1) | Input | [Engine is running]<br>• Revving engine from idle to 3,000 rpm quickly after the following conditions are met<br>- Engine: after warming up<br>- Keeping the engine speed between 3,500 and 4,000 rpm for 1 minute and at idle for 1 minute under no load | 0 - 1.0 V |
| 77 (SB) | 68 (LG) | Mass air flow sensor (bank 1) | Input | [Engine is running]<br>• Warm-up condition<br>• Idle speed | 0.7 - 1.2 V |
| | | | | [Engine is running]<br>• Warm-up condition<br>• Engine speed: 2,500 rpm | 1.3 - 1.7 V |
| 78 (G) | 84 (B) | Engine oil temperature sensor | Input | [Engine is running] | 0 - 4.8 V<br>Output voltage varies with engine oil temperature. |
| 79 (BR) | 94 (Y) | Mass air flow sensor (bank 2) | Input | [Engine is running]<br>• Warm-up condition<br>• Idle speed | 0.7 - 1.2 V |
| | | | | [Engine is running]<br>• Warm-up condition<br>• Engine speed: 2,500 rpm | 1.3 - 1.7 V |
| 80 (O) | 84 (B) | Heated oxygen sensor 2 (bank 2) | Input | [Engine is running]<br>• Revving engine from idle to 3,000 rpm quickly after the following conditions are met<br>- Engine: after warming up<br>- Keeping the engine speed between 3,500 and 4,000 rpm for 1 minute and at idle for 1 minute under no load | 0 - 1.0 V |
| 81 (R)<br>82 (V)<br>85 (BR)<br>86 (W)<br>89 (GR)<br>90 (O) | 128 (B) | Fuel injector No. 3<br>Fuel injector No. 6<br>Fuel injector No. 2<br>Fuel injector No. 5<br>Fuel injector No. 1<br>Fuel injector No. 4 | Output | [Engine is running]<br>• Warm-up condition<br>• Idle speed<br>**NOTE:**<br>The pulse cycle changes depending on rpm at idle | BATTERY VOLTAGE<br>(11 - 14 V)★<br>  <br><br>JMBIA0047GB |
| | | | | [Engine is running]<br>• Warm-up condition<br>• Engine speed: 2,000 rpm | BATTERY VOLTAGE<br>(11 - 14 V)★<br>  <br><br>JMBIA0048GB |
| 84 (B) | — | Sensor ground (Heated oxygen sensor 2, Engine coolant temperature sensor, Engine oil temperature sensor) | — | — | — |

| Terminal No. (Wire color) | | Description | | Condition | Value (Approx.) |
|---|---|---|---|---|---|
| + | – | Signal name | Input/ Output | | |
| 87 (Y) | 96 (P)*3 (BR)*4 | Power steering pressure sensor | Output | [Engine is running]<br>• Steering wheel: Being turned | 0.5 - 4.5 V |
| | | | | [Engine is running]<br>• Steering wheel: Not being turned | 0.4 - 0.8 V |
| 91 (SB) | 95 (G) | Battery current sensor | Input | [Engine is running]<br>• Battery: Fully charged*2<br>• Idle speed | 2.6 - 3.5 V |
| 92 (G) | — | Sensor ground [Camshaft position sensor (PHASE) (bank 2)] | — | — | — |
| 93 (P) | 128 (B) | Power supply for ECM (Back-up) | Input | [Ignition switch: OFF] | BATTERY VOLTAGE (11 - 14 V) |
| 94 (Y) | — | Sensor ground [Mass air flow sensor (bank 2)] | — | — | — |
| 95 (G) | — | Sensor ground (Battery current sensor) | — | — | — |
| 96 (P)*3 (BR)*4 | — | Sensor ground [Camshaft position sensor (PHASE) (bank 1),Manifold absolute pressure (MAP) sensor, Power steering pressure sensor] | — | — | — |
| 97 (R) | 100 (W) | Accelerator pedal position sensor 1 | Input | [Ignition switch: ON]<br>• Engine stopped<br>• Accelerator pedal: Fully released | 0.45 - 1.00 V |
| | | | | [Ignition switch: ON]<br>• Engine stopped<br>• Accelerator pedal: Fully depressed | 4.2 - 4.8 V |
| 98 (P) | 104 (V) | Accelerator pedal position sensor 2 | Input | [Ignition switch: ON]<br>• Engine stopped<br>• Accelerator pedal: Fully released | 0.22 - 0.50 V |
| | | | | [Ignition switch: ON]<br>• Engine stopped<br>• Accelerator pedal: Fully depressed | 2.1 - 2.5 V |
| 99 (L) | 100 (W) | Sensor power supply (Accelerator pedal position sensor 1) | — | [Ignition switch: ON] | 5 V |
| 100 (W) | — | Sensor ground (Accelerator pedal position sensor 1) | — | — | — |

| Terminal No. (Wire color) | | Description | | Condition | Value (Approx.) |
|---|---|---|---|---|---|
| + | – | Signal name | Input/ Output | | |
| 101 (SB) | 108 (Y) | ICC steering switch (models with ICC system) | Input | [Ignition switch: ON]<br>• ICC steering switch: OFF | 4.3 V |
| | | | | [Ignition switch: ON]<br>• MAIN switch: Pressed | 0 V |
| | | | | [Ignition switch: ON]<br>• CANCEL switch: Pressed | 1.3 V |
| | | | | [Ignition switch: ON]<br>• RESUME/ACCELERATE switch: Pressed | 3.7 V |
| | | | | [Ignition switch: ON]<br>• SET/COAST switch: Pressed | 3 V |
| | | | | [Ignition switch: ON]<br>• DISTANCE switch: Pressed | 2.2 V |
| 101 (SB) | 108 (Y) | ASCD steering switch (models with ASCD system) | Input | [Ignition switch: ON]<br>• ASCD steering switch: OFF | 4 V |
| | | | | [Ignition switch: ON]<br>• MAIN switch: Pressed | 0 V |
| | | | | [Ignition switch: ON]<br>• CANCEL switch: Pressed | 1 V |
| | | | | [Ignition switch: ON]<br>• RESUME/ACCELERATE switch: Pressed | 3 V |
| | | | | [Ignition switch: ON]<br>• SET/COAST switch: Pressed | 2 V |
| 102 (LG) | 112 (V) | EVAP control system pressure sensor*5 | Input | [Ignition switch: ON] | 1.8 - 4.8 V |
| 103 (GR) | 104 (V) | Sensor power supply (Accelerator pedal position sensor 2) | — | [Ignition switch: ON] | 5 V |
| 104 (V) | — | Sensor ground (Accelerator pedal position sensor 2) | — | — | — |
| 105 (L) | 112 (V) | Refrigerant pressure sensor | Input | [Engine is running]<br>• Warm-up condition<br>• Both A/C switch and blower fan motor switch: ON (Compressor operates) | 1.0 - 4.0 V |
| 106 (W) | 128 (B) | Fuel tank temperature sensor | Input | [Engine is running] | 0 - 4.8 V<br>Output voltage varies with fuel tank temperature. |
| 107 (GR) | 112 (V) | Sensor power supply (EVAP control system pressure sensor*5, Refrigerant pressure sensor) | — | [Ignition switch: ON] | 5 V |
| 108 (Y) | — | Sensor ground (ASCD/ICC steering switch) | — | — | — |
| 109 (G) | 128 (B) | PNP signal | Input | [Ignition switch: ON]<br>• Selector lever: P or N (A/T), Neutral (M/T) | BATTERY VOLTAGE (11 - 14 V) |
| | | | | [Ignition switch: ON]<br>• Selector lever: Except above | 0 V |

| Terminal No. (Wire color) | | Description | | Condition | Value (Approx.) |
|---|---|---|---|---|---|
| + | – | Signal name | Input/ Output | | |
| 110 (R) | 128 (B) | Engine speed output signal | Output | [Engine is running]<br>• Warm-up condition<br>• Idle speed<br>**NOTE:**<br>The pulse cycle changes depending on rpm at idle | 1 V★<br>  <br> |
| | | | | [Engine is running]<br>• Engine speed is 2,000 rpm | 1 V★<br>  <br> |
| 112 (V) | — | Sensor ground (EVAP control system pressure sensor*5, Refrigerant pressure sensor) | — | — | — |
| 113 (P) | — | CAN communication line | Input/ Output | — | — |
| 114 (L) | — | CAN communication line | Input/ Output | — | — |
| 117 (V) | 128 (B) | Data link connector | Input/ Output | — | — |
| 121 (LG) | 128 (B) | EVAP canister vent control valve*5 | Output | [Ignition switch: ON] | BATTERY VOLTAGE (11 - 14 V) |
| 122 (P) | 128 (B) | Stop lamp switch | Input | [Ignition switch: OFF]<br>• Brake pedal: Fully released | 0 V |
| | | | | [Ignition switch: OFF]<br>• Brake pedal: Slightly depressed | BATTERY VOLTAGE (11 - 14 V) |
| 123 (B) 124 (B) | — | ECM ground | — | — | — |
| 125 (R) | 128 (B) | Power supply for ECM | Input | [Ignition switch: ON] | BATTERY VOLTAGE (11 - 14 V) |
| 126 (BR) | 128 (B) | ICC brake switch (models with ICC system)<br>ASCD brake switch (models with ASCD system) | Input | [Ignition switch: ON]<br>• Brake pedal: Slightly depressed | 0 V |
| | | | | [Ignition switch: ON]<br>• Brake pedal: Fully released | BATTERY VOLTAGE (11 - 14 V) |
| 127 (B) 128 (B) | — | ECM ground | — | — | — |

★: Average voltage for pulse signal (Actual pulse signal can be confirmed by oscilloscope.)
*1: This may vary depending on internal resistance of the tester.
*2: Before measuring the terminal voltage, confirm that the battery is fully charged. Refer to PG-3, "How to Handle Battery".
*3: With 2WD models
*4: With AWD models

*5: Except for Mexico

# VQ25HR

## VQ25HR : Reference Value

INFOID:0000000008837740

### VALUES ON THE DIAGNOSIS TOOL

**NOTE:**

- Specification data are reference values.
- Specification data are output/input values which are detected or supplied by the ECM at the connector.
  * Specification data may not be directly related to their components signals/values/operations.
  i.e. Adjust ignition timing with a timing light before monitoring IGN TIMING, because the monitor may show the specification data in spite of the ignition timing not being adjusted to the specification data. this IGN TIMING monitors the data calculated by the ECM according to the signals input from the camshaft position sensor and other ignition timing related sensors.

CONSULT MONITOR ITEM

| Monitor Item | Condition | | Values/Status |
|---|---|---|---|
| ENG SPEED | • Run engine and compare CONSULT value with the tachometer indication. | | Almost the same speed as the tachometer indication |
| MAS A/F SE-B1 | See EC-740, "Description". | | |
| MAS A/F SE-B2 | See EC-740, "Description". | | |
| B/FUEL SCHDL | See EC-740, "Description". | | |
| A/F ALPHA-B1 | See EC-740, "Description". | | |
| A/F ALPHA-B2 | See EC-740, "Description". | | |
| COOLAN TEMP/S | • Ignition switch: ON | | Indicates engine coolant temperature |
| A/F SEN1 (B1) | • Engine: After warming up | Maintaining engine speed at 2,000 rpm | Fluctuates around 2.2 V |
| A/F SEN1 (B2) | • Engine: After warming up | Maintaining engine speed at 2,000 rpm | Fluctuates around 2.2 V |
| HO2S2 (B1) | • Revving engine from idle to 3,000 rpm quickly after the following conditions are met.<br>- Engine: After warming up<br>- After keeping engine speed between 3,500 and 4,000 rpm for 1 minute and at idle for 1 minute under no load | | 0 - 0.3 V ←→ Approx. 0.6 - 1.0 V |
| HO2S2 (B2) | • Revving engine from idle to 3,000 rpm quickly after the following conditions are met.<br>- Engine: After warming up<br>- After keeping engine speed between 3,500 and 4,000 rpm for 1 minute and at idle for 1 minute under no load | | 0 - 0.3 V ←→ Approx. 0.6 - 1.0 V |
| HO2S2 MNTR (B1) | • Revving engine from idle to 3,000 rpm quickly after the following conditions are met.<br>- Engine: After warming up<br>- After keeping engine speed between 3,500 and 4,000 rpm for 1 minute and at idle for 1 minute under no load | | LEAN ←→ RICH |
| HO2S2 MNTR (B2) | • Revving engine from idle to 3,000 rpm quickly after the following conditions are met.<br>- Engine: After warming up<br>- After keeping engine speed between 3,500 and 4,000 rpm for 1 minute and at idle for 1 minute under no load | | LEAN ←→ RICH |
| VHCL SPEED SE | • Turn drive wheels and compare CONSULT value with the speedometer indication. | | Almost the same speed as speedometer indication |
| BATTERY VOLT | • Ignition switch: ON (Engine stopped) | | 11 - 14 V |
| ACCEL SEN 1 | • Ignition switch: ON (Engine stopped) | Accelerator pedal: Fully released | 0.45 - 1.0 V |
| | | Accelerator pedal: Fully depressed | 4.4 - 4.8 V |
| ACCEL SEN 2*1 | • Ignition switch: ON (Engine stopped) | Accelerator pedal: Fully released | 0.45 - 1.0 V |
| | | Accelerator pedal: Fully depressed | 4.4 - 4.8 V |

| Monitor Item | Condition | | Values/Status |
|---|---|---|---|
| TP SEN 1-B1 | • Ignition switch: ON (Engine stopped)<br>• Selector lever: D | Accelerator pedal: Fully released | More than 0.36 V |
| | | Accelerator pedal: Fully depressed | Less than 4.75 V |
| TP SEN 2-B1*1 | • Ignition switch: ON (Engine stopped)<br>• Selector lever: D | Accelerator pedal: Fully released | More than 0.36 V |
| | | Accelerator pedal: Fully depressed | Less than 4.75 V |
| FUEL T/TMP SE | • Ignition switch: ON | | Indicates fuel tank temperature |
| INT/A TEMP SE | • Ignition switch: ON | | Indicates intake air temperature |
| START SIGNAL | • Ignition switch: ON → START → ON | | OFF → ON → OFF |
| CLSD THL POS | • Ignition switch: ON (Engine stopped) | Accelerator pedal: Fully released | ON |
| | | Accelerator pedal: Slightly depressed | OFF |
| AIR COND SIG | • Engine: After warming up, idle the engine | Air conditioner switch: OFF | OFF |
| | | Air conditioner switch: ON (Compressor operates.) | ON |
| P/N POSI SW | • Ignition switch: ON | Selector lever: P or N | ON |
| | | Selector lever: Except above | OFF |
| PW/ST SIGNAL | • Engine: After warming up, idle the engine | Steering wheel: Not being turned | OFF |
| | | Steering wheel: Being turned | ON |
| LOAD SIGNAL | • Ignition switch: ON | Rear window defogger switch: ON and/or Lighting switch: 2nd position | ON |
| | | Rear window defogger switch and lighting switch: OFF | OFF |
| IGNITION SW | • Ignition switch: ON → OFF → ON | | ON → OFF → ON |
| HEATER FAN SW | • Engine: After warming up, idle the engine | Heater fan switch: ON | ON |
| | | Heater fan switch: OFF | OFF |
| BRAKE SW | • Ignition switch: ON | Brake pedal: Fully released | OFF |
| | | Brake pedal: Slightly depressed | ON |
| INJ PULSE-B1 | • Engine: After warming up<br>• Selector lever: P or N<br>• Air conditioner switch: OFF<br>• No load | Idle | 2.0 - 3.0 msec |
| | | 2,000 rpm | 1.9 - 2.9 msec |
| INJ PULSE-B2 | • Engine: After warming up<br>• Selector lever: P or N<br>• Air conditioner switch: OFF<br>• No load | Idle | 2.0 - 3.0 msec |
| | | 2,000 rpm | 1.9 - 2.9 msec |
| IGN TIMING | • Engine: After warming up<br>• Selector lever: P or N<br>• Air conditioner switch: OFF<br>• No load | Idle | 12° - 16° BTDC |
| | | 2,000 rpm | 25° - 45° BTDC |
| CAL/LD VALUE | • Engine: After warming up<br>• Selector lever: P or N<br>• Air conditioner switch: OFF<br>• No load | Idle | 5% - 35% |
| | | 2,500 rpm | 5% - 35% |
| MASS AIRFLOW | • Engine: After warming up<br>• Selector lever: P or N<br>• Air conditioner switch: OFF<br>• No load | Idle | 2.0 - 6.0 g/s |
| | | 2,500 rpm | 7.0 - 20.0 g/s |

| Monitor Item | Condition | | Values/Status |
|---|---|---|---|
| PURG VOL C/V | • Engine: After warming up<br>• Selector lever: P or N<br>• Air conditioner switch: OFF<br>• No load | Idle<br>(Accelerator pedal: Not depressed even slightly, after engine starting.) | 0% |
| | | 2,000 rpm | — |
| INT/V TIM (B1) | • Engine: After warming up<br>• Selector lever: P or N<br>• Air conditioner switch: OFF<br>• No load | Idle | –5° - 5°CA |
| | | 2,000 rpm | Approx. 0° - 30°CA |
| INT/V TIM (B2) | • Engine: After warming up<br>• Selector lever: P or N<br>• Air conditioner switch: OFF<br>• No load | Idle | –5° - 5°CA |
| | | 2,000 rpm | Approx. 0° - 30°CA |
| EXH/V TIM B1 | • Engine: After warming up<br>• Selector lever: P or N<br>• Air conditioner switch: OFF<br>• No load | Idle | –5° - 5°CA |
| | | Around 2,500 rpm while the engine speed is rising | Approx. 0° - 30°CA |
| EXH/V TIM B2 | • Engine: After warming up<br>• Selector lever: P or N<br>• Air conditioner switch: OFF<br>• No load | Idle | –5° - 5°CA |
| | | Around 2,500 rpm while the engine speed is rising | Approx. 0° - 30°CA |
| INT/V SOL (B1) | • Engine: After warming up<br>• Selector lever: P or N<br>• Air conditioner switch: OFF<br>• No load | Idle | 0% - 2% |
| | | 2,000 rpm | Approx. 0% - 50% |
| INT/V SOL (B2) | • Engine: After warming up<br>• Selector lever: P or N<br>• Air conditioner switch: OFF<br>• No load | Idle | 0% - 2% |
| | | 2,000 rpm | Approx. 0% - 50% |
| VTC DTY EX B1 | • Engine: After warming up<br>• Selector lever: P or N<br>• Air conditioner switch: OFF<br>• No load | Idle | 0% - 2% |
| | | Around 2,500 rpm while the engine speed is rising | Approx. 0% - 70% |
| VTC DTY EX B2 | • Engine: After warming up<br>• Selector lever: P or N<br>• Air conditioner switch: OFF<br>• No load | Idle | 0% - 2% |
| | | Around 2,500 rpm while the engine speed is rising | Approx. 0% - 70% |
| TP SEN 1-B2 | • Ignition switch: ON<br>(Engine stopped)<br>• Selector lever: D | Accelerator pedal: Fully released | More than 0.36 V |
| | | Accelerator pedal: Fully depressed | Less than 4.75 V |
| TP SEN 2-B2*1 | • Ignition switch: ON<br>(Engine stopped)<br>• Selector lever: D | Accelerator pedal: Fully released | More than 0.36 V |
| | | Accelerator pedal: Fully depressed | Less than 4.75 V |
| AIR COND RLY | • Engine: After warming up, idle the engine | Air conditioner switch: OFF | OFF |
| | | Air conditioner switch: ON<br>(Compressor operates) | ON |
| FUEL PUMP RLY | • For 1 seconds after turning ignition switch: ON<br>• Engine running or cranking | | ON |
| | • Except above | | OFF |
| THRTL RELAY | • Ignition switch: ON | | ON |
| HO2S2 HTR (B1) | • Engine speed: Below 3,600 rpm after the following conditions are met.<br>- Engine: After warming up<br>- Keeping the engine speed between 3,500 and 4,000 rpm for 1 minute and at idle for 1 minute under no load | | ON |
| | • Engine speed: Above 3,600 rpm | | OFF |

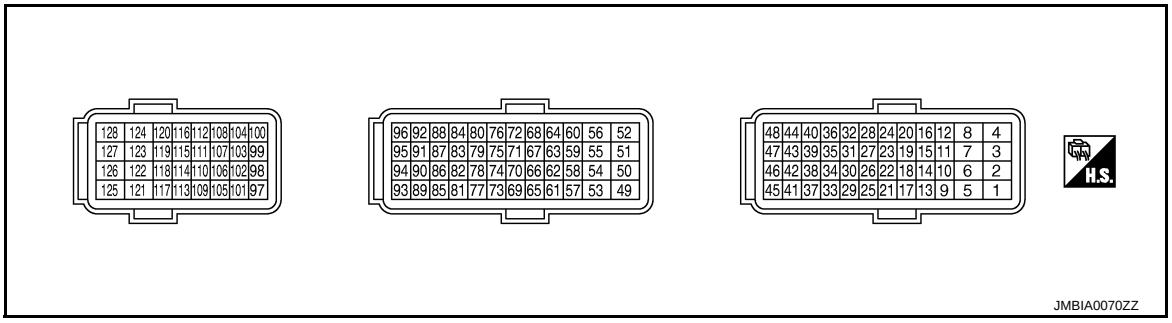
| Monitor Item | Condition | | Values/Status |
|---|---|---|---|
| HO2S2 HTR (B2) | • Engine speed: Below 3,600 rpm after the following conditions are met.<br>- Engine: After warming up<br>- Keeping the engine speed between 3,500 and 4,000 rpm for 1 minute and at idle for 1 minute under no load | | ON |
| | • Engine speed: Above 3,600 rpm | | OFF |
| I/P PULLY SPD | • Vehicle speed: More than 20 km/h (12 MPH) | | Almost the same speed as the tachometer indication |
| VEHICLE SPEED | • Turn drive wheels and compare CONSULT value with the speedometer indication. | | Almost the same speed as the speedometer indication |
| IDL A/V LEARN | • Engine: Running | Idle air volume learning has not been performed yet. | YET |
| | | Idle air volume learning has already been performed successfully. | CMPLT |
| ENG OIL TEMP | • Engine: After warming up | | More than 70°C (158°F) |
| TRVL AFTER MIL | • Ignition switch: ON | Vehicle has traveled after MIL has turned ON. | 0 - 65,535 km<br>(0 - 40,723 miles) |
| A/F S1 HTR (B1) | • Engine: After warming up, idle the engine<br>(More than 140 seconds after starting engine) | | 4 - 100% |
| A/F S1 HTR (B2) | • Engine: After warming up, idle the engine<br>(More than 140 seconds after starting engine) | | 4 - 100% |
| AC PRESS SEN | • Engine: Idle<br>• Both A/C switch and blower fan switch: ON (Compressor operates) | | 1.0 - 4.0 V |
| VHCL SPEED SE | • Turn drive wheels and compare CONSULT value with the speedometer indication. | | Almost the same speed as the speedometer indication |
| SET VHCL SPD | • Engine: Running | ASCD: Operating | The preset vehicle speed is displayed |
| MAIN SW | • Ignition switch: ON | MAIN switch: Pressed | ON |
| | | MAIN switch: Released | OFF |
| CANCEL SW | • Ignition switch: ON | CANCEL switch: Pressed | ON |
| | | CANCEL switch: Released | OFF |
| RESUME/ACC SW | • Ignition switch: ON | RESUME/ACCELERATE switch: Pressed | ON |
| | | RESUME/ACCELERATE switch: Released | OFF |
| SET SW | • Ignition switch: ON | SET/COAST switch: Pressed | ON |
| | | SET/COAST switch: Released | OFF |
| BRAKE SW1 | • Ignition switch: ON | Brake pedal: Fully released | ON |
| | | Brake pedal: Slightly depressed | OFF |
| BRAKE SW2<br>(Stop lamp switch) | • Ignition switch: ON | Brake pedal: Fully released | OFF |
| | | Brake pedal: Slightly depressed | ON |
| DIST SW | • Ignition switch: ON | DISTANCE switch: Pressed | ON |
| | | DISTANCE switch: Released | OFF |
| VHCL SPD CUT | • Ignition switch: ON | | NON |
| LO SPEED CUT | • Ignition switch: ON | | NON |
| AT OD MONITOR | • Ignition switch: ON | | OFF |
| AT OD CANCEL | • Ignition switch: ON | | OFF |
| CRUISE LAMP | • Ignition switch: ON | MAIN switch: Pressed at the 1st time → at the 2nd time | ON → OFF |

| Monitor Item | Condition | | Values/Status |
|---|---|---|---|
| SET LAMP | • MAIN switch: ON<br>• When vehicle speed is between 40 km/h (25 MPH) and 144 km/h (89 MPH) | ASCD: Operating | ON |
| | | ASCD: Not operating | OFF |
| EXH V/T LEARN | • Engine: Running | Exhaust Valve Timing Control Learning has not been performed yet. | YET |
| | | Exhaust Valve Timing Control Learning has not been performed yet. | CMPLT |
| BAT CUR SEN | • Engine speed: Idle<br>• Battery: Fully charged*2<br>• Selector lever: P or N<br>• Air conditioner switch: OFF<br>• No load | | Approx. 2,600 - 3,500 mV |
| AC EVA TEMP | • Engine: Idle<br>• Both A/C switch and blower fan switch: ON (compressor operates) | | Changes according to instructed value from Unified meter and A/C amp. |
| AC EVA TARGET | • Engine: Idle<br>• Both A/C switch and blower fan switch: ON (compressor operates) | | Changes according to instructed value from Unified meter and A/C amp. |
| ALT DUTY | • Engine: Idle | | 0 - 80% |
| A/F ADJ-B1 | • Engine: Running | | –0.330 - 0.330 |
| A/F ADJ-B2 | • Engine: Running | | –0.330 - 0.330 |
| FAN DUTY | • Engine: Running | | 0 - 100% |
| ALT DUTY SIG | • Power generation voltage variable control: Operating | | ON |
| | • Power generation voltage variable control: Not operating | | OFF |
| THRTL STK CNT B1 | • This item is displayed but is not applicable to this model. | | |

*1: Accelerator pedal position sensor 2 signal and throttle position sensor 2 signal are converted by ECM internally. Thus, they differ from ECM terminals voltage signal.

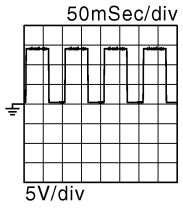
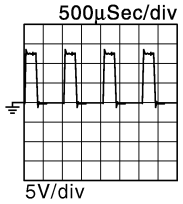
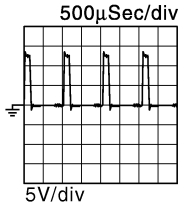
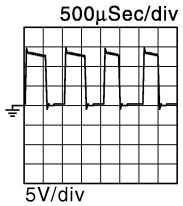
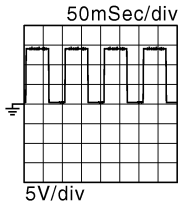
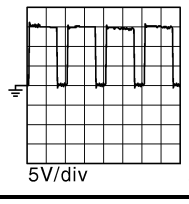
*2: Before measuring the terminal voltage, confirm that the battery is fully charged. Refer to PG-3, "How to Handle Battery".

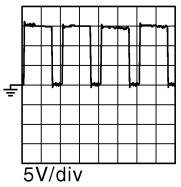
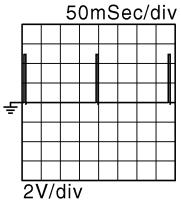
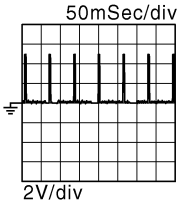
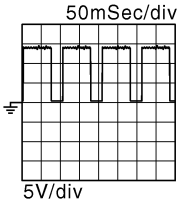
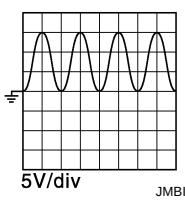
## TERMINAL LAYOUT

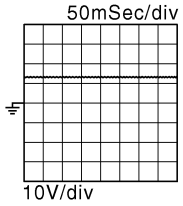
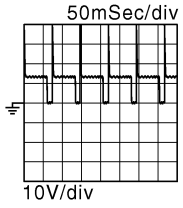
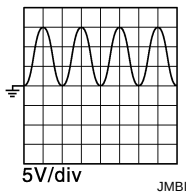


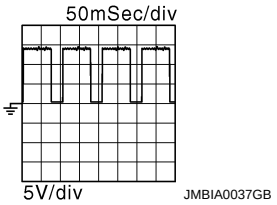

## PHYSICAL VALUES

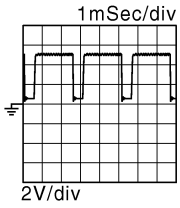
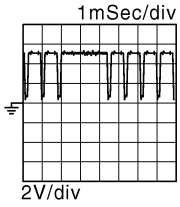
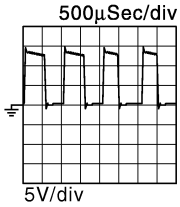
**NOTE:**
- ECM is located behind the instrument assist lower panel. For this inspection, remove passenger side instrument lower panel.
- Specification data are reference values and are measured between each terminal and ground.
- Pulse signal is measured by CONSULT.

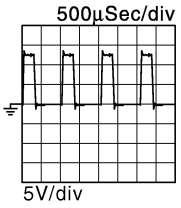
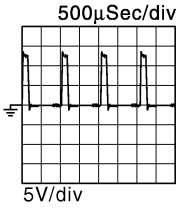
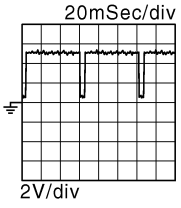
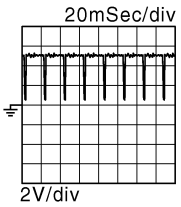
| Terminal No. (Wire color) | | Description | | Condition | Value (Approx.) |
|---|---|---|---|---|---|
| + | – | Signal name | Input/ Output | | |
| 1 (G) | 128 (B) | A/F sensor 1 heater (bank 1) | Output | [Engine is running]<br>• Warm-up condition<br>• Idle speed (More than 140 seconds after starting engine) | 2.9 - 8.8 V★<br>  <br>JMBIA0030GB |
| 2 (P) | 4 (V) | Throttle control motor (Open) (bank 1) | Output | [Ignition switch: ON]<br>• Engine stopped<br>• Selector lever: D<br>• Accelerator pedal: Fully depressed | 0 - 14 V★<br>  <br>JMBIA0031GB |
| | | | | [Ignition switch: ON]<br>• Engine stopped<br>• Selector lever: D<br>• Accelerator pedal: Fully released | 0 - 14 V★<br>  <br>JMBIA0032GB |
| 3 (R) | 128 (B) | Throttle control motor relay power supply (bank 1) | Input | [Ignition switch: ON] | BATTERY VOLTAGE (11 - 14 V) |
| 4 (V) | 128 (B) | Throttle control motor (Close) (bank 1) | Output | [Ignition switch: ON]<br>• Engine stopped<br>• Selector lever: D<br>• Accelerator pedal: In the middle of releasing operation | 0 - 14 V★<br>  <br>JMBIA0033GB |
| 5 (W) | 128 (B) | A/F sensor 1 heater (bank 2) | Output | [Engine is running]<br>• Warm-up condition<br>• Idle speed (More than 140 seconds after starting engine) | 2.9 - 8.8 V★<br>  <br>JMBIA0030GB |
| 6 (SB) | 128 (B) | Exhaust valve timing control magnet retarder (bank 1) | Output | [Engine is running]<br>• Warm-up condition<br>• Idle speed | BATTERY VOLTAGE (11 - 14 V) |
| | | | | [Engine is running]<br>• Warm-up condition<br>• Around 2,500 rpm while the engine speed is rising | 7 - 12 V★<br>  <br>JMBIA0034GB |

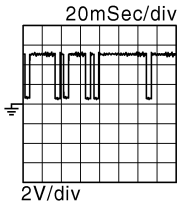
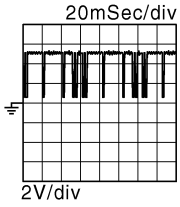
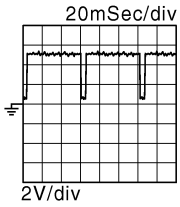
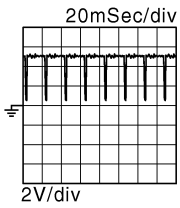
| Terminal No. (Wire color) | | Description | | Condition | Value (Approx.) |
|---|---|---|---|---|---|
| + | – | Signal name | Input/ Output | | |
| 7 (Y) | 128 (B) | Exhaust valve timing control magnet retarder (bank 2) | Output | [Engine is running]<br>• Warm-up condition<br>• Idle speed | BATTERY VOLTAGE (11 - 14 V) |
| | | | | [Engine is running]<br>• Warm-up condition<br>• Around 2,500 rpm while the engine speed is rising | 7 - 12 V★<br>  <br><br>JMBIA0034GB |
| 8 (B) | — | ECM ground | — | — | — |
| 11 (GR) | 128 (B) | Ignition signal No. 4 | Output | [Engine is running]<br>• Warm-up condition<br>• Idle speed<br>**NOTE:**<br>The pulse cycle changes depending on rpm at idle | 0 - 0.2 V★<br>  <br><br>JMBIA0035GB |
| 12 (L) | | Ignition signal No. 3 | | | |
| 15 (LG) | | Ignition signal No. 5 | | | |
| 16 (G) | | Ignition signal No. 2 | | [Engine is running]<br>• Warm-up condition<br>• Engine speed: 2,000 rpm | 0.1 - 0.4 V★<br>  <br><br>JMBIA0036GB |
| 19 (BR) | | Ignition signal No. 6 | | | |
| 20 (Y) | | Ignition signal No. 1 | | | |
| 17 (P) | 84 (B) | Heated oxygen sensor 2 heater (bank 1) | Output | [Engine is running]<br>• Engine speed: Below 3,600 rpm after the following conditions are met<br>- Engine: after warming up<br>- Keeping the engine speed between 3,500 and 4,000 rpm for 1 minute and at idle for 1 minute under no load | 10 V★<br>  <br><br>JMBIA0037GB |
| | | | | [Ignition switch: ON]<br>• Engine stopped<br>[Engine is running]<br>• Engine speed: Above 3,600 rpm | BATTERY VOLTAGE (11 - 14 V) |
| 18 (W) | 128 (B) | Intake valve timing control solenoid valve (bank 1) | Output | [Engine is running]<br>• Warm-up condition<br>• Idle speed | BATTERY VOLTAGE (11 - 14 V) |
| | | | | [Engine is running]<br>• Warm-up condition<br>• Engine speed: 2,000 rpm | 7 - 12 V★<br>  <br><br>JMBIA1638GB |

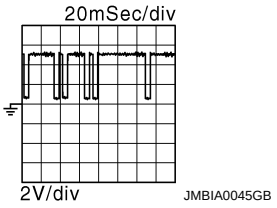
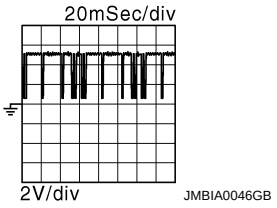
| Terminal No. (Wire color) | | Description | | Condition | Value (Approx.) |
|---|---|---|---|---|---|
| + | – | Signal name | Input/ Output | | |
| 21 (V) | 128 (B) | EVAP canister purge volume control solenoid valve | Output | [Engine is running]<br>• Idle speed<br>• Accelerator pedal: Not depressed even slightly, after engine starting | BATTERY VOLTAGE (11 - 14 V)★<br>  <br><br>JMBIA0039GB |
| | | | | [Engine is running]<br>• Engine speed: About 2,000 rpm (More than 100 seconds after starting engine) | BATTERY VOLTAGE (11 - 14 V)★<br>  <br><br>JMBIA0040GB |
| 22 (R) | 128 (B) | Fuel pump relay | Output | [Ignition switch: ON]<br>• For 1 second after turning ignition switch ON<br>[Engine is running] | 0 - 1.5 V |
| | | | | [Ignition switch: ON]<br>• More than 1 second after turning ignition switch ON | BATTERY VOLTAGE (11 - 14 V) |
| 24 (SB) | 128 (B) | ECM relay (Self shut-off) | Output | [Engine is running]<br>[Ignition switch: OFF]<br>• A few seconds after turning ignition switch OFF | 0 - 1.5 V |
| | | | | [Ignition switch: OFF]<br>• More than a few seconds after turning ignition switch OFF | BATTERY VOLTAGE (11 - 14 V) |
| 25 (BG) | 128 (B) | Throttle control motor relay | Output | [Ignition switch: ON → OFF] | 0 - 1.0 V<br>↓<br>BATTERY VOLTAGE (11 - 14 V)<br>↓<br>0 V |
| | | | | [Ignition switch: ON] | 0 - 1.0 V |
| 29 (GR) | 128 (B) | Intake valve timing control solenoid valve (bank 2) | Output | [Engine is running]<br>• Warm-up condition<br>• Idle speed | BATTERY VOLTAGE (11 - 14 V) |
| | | | | [Engine is running]<br>• Warm-up condition<br>• Engine speed: 2,000 rpm | 7 - 12 V★<br>  <br><br>JMBIA1638GB |

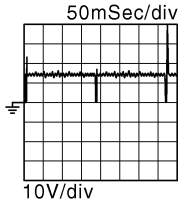
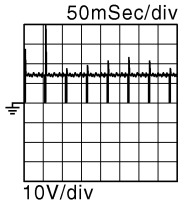
| Terminal No. (Wire color) | | Description | | Condition | Value (Approx.) |
|---|---|---|---|---|---|
| + | – | Signal name | Input/ Output | | |
| 30 (B) | 40 (R) | Throttle position sensor 1 (bank 1) | Input | [Ignition switch: ON]<br>• Engine stopped<br>• Selector lever: D<br>• Accelerator pedal: Fully released | More than 0.36 V |
| | | | | [Ignition switch: ON]<br>• Engine stopped<br>• Selector lever: D<br>• Accelerator pedal: Fully depressed | Less than 4.75 V |
| 31 (R) | 48 (B) | Throttle position sensor 1 (bank 2) | Input | [Ignition switch: ON]<br>• Engine stopped<br>• Selector lever: D<br>• Accelerator pedal: Fully released | More than 0.36 V |
| | | | | [Ignition switch: ON]<br>• Engine stopped<br>• Selector lever: D<br>• Accelerator pedal: Fully depressed | Less than 4.75 V |
| 33 (LG) | 84 (B) | Heated oxygen sensor 2 heater (bank 2) | Output | [Engine is running]<br>• Engine speed: Below 3,600 rpm after the following conditions are met<br>- Engine: after warming up<br>- Keeping the engine speed between 3,500 and 4,000 rpm for 1 minute and at idle for 1 minute under no load | 10 V★<br>  <br> |
| | | | | [Ignition switch: ON]<br>• Engine stopped<br>[Engine is running]<br>• Engine speed: Above 3,600 rpm | BATTERY VOLTAGE<br>(11 - 14 V) |
| 34 (G) | 40 (R) | Throttle position sensor 2 (bank 1) | Input | [Ignition switch: ON]<br>• Engine stopped<br>• Selector lever: D<br>• Accelerator pedal: Fully released | Less than 4.75 V |
| | | | | [Ignition switch: ON]<br>• Engine stopped<br>• Selector lever: D<br>• Accelerator pedal: Fully depressed | More than 0.36 V |
| 35 (W) | 48 (B) | Throttle position sensor 2 (bank 2) | Input | [Ignition switch: ON]<br>• Engine stopped<br>• Selector lever: D<br>• Accelerator pedal: Fully released | Less than 4.75 V |
| | | | | [Ignition switch: ON]<br>• Engine stopped<br>• Selector lever: D<br>• Accelerator pedal: Fully depressed | More than 0.36 V |

| Terminal No. (Wire color) | | Description | | Condition | Value (Approx.) |
|---|---|---|---|---|---|
| + | – | Signal name | Input/ Output | | |
| 37 (W) | 47 (Y) | Crankshaft position sensor (POS) | Input | [Engine is running]<br>• Warm-up condition<br>• Idle speed<br>**NOTE:**<br>The pulse cycle changes depending on rpm at idle | 4.0 - 5.0 V★<br>  <br><br>JMBIA0041GB |
| | | | | [Engine is running]<br>• Engine speed: 2,000 rpm | 4.0 - 5.0 V★<br>  <br><br>JMBIA0042GB |
| 40 (R) | — | Sensor ground [Throttle position sensor (bank 1)] | — | — | — |
| 43 (G) | 48 (B) | Sensor power supply [Throttle position sensor (bank 2)] | — | [Ignition switch: ON] | 5 V |
| 44 (W) | 40 (R) | Sensor power supply [Throttle position sensor (bank 1)] | — | [Ignition switch: ON] | 5 V |
| 46 (R) | 47 (Y) | Sensor power supply [Crankshaft position sensor (POS)] | — | [Ignition switch: ON] | 5 V |
| 47 (Y) | — | Sensor ground [Crankshaft position sensor (POS)] | — | — | — |
| 48 (B) | — | Sensor ground [Throttle position sensor (bank 2)] | — | — | — |
| 49 (P) | 128 (B) | Throttle control motor (Close) (bank 2) | Output | [Ignition switch: ON]<br>• Engine stopped<br>• Selector lever: D<br>• Accelerator pedal: In the middle of releasing operation | 0 - 14 V★<br>  <br><br>JMBIA0033GB |

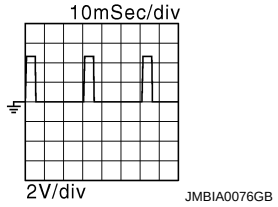
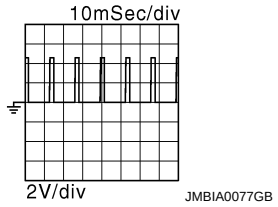
| Terminal No. (Wire color) | | Description | | Condition | Value (Approx.) |
|---|---|---|---|---|---|
| + | – | Signal name | Input/ Output | | |
| 50 (L) | 128 (B) | Throttle control motor (Open) (bank 2) | Output | [Ignition switch: ON]<br>• Engine stopped<br>• Selector lever: D<br>• Accelerator pedal: Fully depressed | 0 - 14 V★<br>  <br><br>JMBIA0031GB |
| | | | | [Ignition switch: ON]<br>• Engine stopped<br>• Selector lever: D<br>• Accelerator pedal: Fully released | 0 - 14 V★<br>  <br><br>JMBIA0032GB |
| 52 (R) | 128 (B) | Throttle control motor relay power supply (bank 2) | Input | [Ignition switch: ON] | BATTERY VOLTAGE (11 - 14 V) |
| 53 (W) | 128 (B) | Ignition switch | Input | [Ignition switch: OFF] | 0 V |
| | | | | [Ignition switch: ON] | BATTERY VOLTAGE (11 - 14 V) |
| 57 (L) | 128 (B) | A/F sensor 1 (bank 1) | Input | [Ignition switch: ON] | 2.2 V |
| 58 (GR) | 88 (LG) | Exhaust valve timing control position sensor (bank 1) | Input | [Engine is running]<br>• Warm-up condition<br>• Idle speed<br>**NOTE:**<br>The pulse cycle changes depending on rpm at idle | 4.0 - 5.0 V★<br>  <br><br>JMBIA0043GB |
| | | | | [Engine is running]<br>• Warm-up condition<br>• Engine speed: 2,000 rpm | 4.0 - 5.0 V★<br>  <br><br>JMBIA0044GB |

| Terminal No. (Wire color) | | Description | | Condition | Value (Approx.) |
|---|---|---|---|---|---|
| + | – | Signal name | Input/ Output | | |
| 59 (LG) | 96 (P) | Camshaft position sensor (PHASE) (bank 1) | Input | [Engine is running]<br>• Warm-up condition<br>• Idle speed<br>**NOTE:**<br>The pulse cycle changes depending on rpm at idle | 3.0 - 5.0 V★<br>  <br><br>JMBIA0045GB |
| | | | | [Engine is running]<br>• Engine speed: 2,000 rpm | 3.0 - 5.0 V★<br>  <br><br>JMBIA0046GB |
| 60 (R) | 96 (P) | Sensor power supply [Camshaft position sensor (PHASE) (bank 1), Exhaust valve timing control position sensor (bank 1), Power steering pressure sensor] | — | [Ignition switch: ON] | 5 V |
| 61 (P) | 128 (B) | A/F sensor 1 (bank 1) | Input | [Engine is running]<br>• Warm-up condition<br>• Engine speed: 2,000 rpm | 1.8 V<br>Output voltage varies with air fuel ratio. |
| 62 (G) | 88 (LG) | Exhaust valve timing control position sensor (bank 2) | Input | [Engine is running]<br>• Warm-up condition<br>• Idle speed<br>**NOTE:**<br>The pulse cycle changes depending on rpm at idle | 4.0 - 5.0 V★<br>  <br><br>JMBIA0043GB |
| | | | | [Engine is running]<br>• Warm-up condition<br>• Engine speed: 2,000 rpm | 4.0 - 5.0 V★<br>  <br><br>JMBIA0044GB |

| Terminal No. (Wire color) | | Description | | Condition | Value (Approx.) |
|---|---|---|---|---|---|
| + | – | Signal name | Input/ Output | | |
| 63 (L) | 92 (R) | Camshaft position sensor (PHASE) (bank 2) | Input | [Engine is running]<br>• Warm-up condition<br>• Idle speed<br>**NOTE:**<br>The pulse cycle changes depending on rpm at idle | 3.0 - 5.0 V★<br>  <br> |
| | | | | [Engine is running]<br>• Engine speed: 2,000 rpm | 3.0 - 5.0 V★<br>  <br> |
| 64 (BR) | 92 (R) | Sensor power supply [Camshaft position sensor (PHASE) (bank 2), Exhaust valve timing control position sensor (bank 2), Battery current sensor] | — | [Ignition switch: ON] | 5 V |
| 65 (V) | 128 (B) | A/F sensor 1 (bank 2) | Input | [Ignition switch: ON] | 2.2 V |
| 66 (LG) | 128 (B) | A/F sensor 1 (bank 2) | Input | [Engine is running]<br>• Warm-up condition<br>• Engine speed: 2,000 rpm | 1.8 V<br>Output voltage varies with air fuel ratio. |
| 67 (Y) | 68 (P) | Intake air temperature sensor (bank 1) | Input | [Engine is running] | 0 - 4.8 V<br>Output voltage varies with intake air temperature. |
| 68 (P) | — | Sensor ground [Mass air flow sensor (bank 1), Intake air temperature sensor (bank 1)] | — | — | — |
| 71 (BG) | 84 (B) | Engine coolant temperature sensor | Input | [Engine is running] | 0 - 4.8 V<br>Output voltage varies with engine coolant temperature. |
| 72 (—) | — | Sensor ground (Knock sensor) | — | — | — |
| 73 (W) | 72 (—) | Knock sensor | Input | [Engine is running]<br>• Idle speed | 2.5 V*1 |
| 76 (GR) | 84 (B) | Heated oxygen sensor 2 (bank 1) | Input | [Engine is running]<br>• Revving engine from idle to 3,000 rpm quickly after the following conditions are met<br>- Engine: after warming up<br>- Keeping the engine speed between 3,500 and 4,000 rpm for 1 minute and at idle for 1 minute under no load | 0 - 1.0 V |

| Terminal No. (Wire color) | | Description | | Condition | Value (Approx.) |
|---|---|---|---|---|---|
| + | − | Signal name | Input/ Output | | |
| 77 (L) | 68 (P) | Mass air flow sensor (bank 1) | Input | [Engine is running]<br>• Warm-up condition<br>• Idle speed | 0.8 - 1.1 V |
| | | | | [Engine is running]<br>• Warm-up condition<br>• Engine speed: 2,500 rpm | 1.4 - 1.7 V |
| 78 (G) | 84 (B) | Engine oil temperature sensor | Input | [Engine is running] | 0 - 4.8 V<br>Output voltage varies with engine oil temperature. |
| 79 (W) | 94 (B) | Mass air flow sensor (bank 2) | Input | [Engine is running]<br>• Warm-up condition<br>• Idle speed | 0.8 - 1.1 V |
| | | | | [Engine is running]<br>• Warm-up condition<br>• Engine speed: 2,500 rpm | 1.4 - 1.7 V |
| 80 (BR) | 84 (B) | Heated oxygen sensor 2 (bank 2) | Input | [Engine is running]<br>• Revving engine from idle to 3,000 rpm quickly after the following conditions are met<br>- Engine: after warming up<br>- Keeping the engine speed between 3,500 and 4,000 rpm for 1 minute and at idle for 1 minute under no load | 0 - 1.0 V |
| 81 (P)<br>82 (V)<br>85 (GR)<br>86 (BG)<br>89 (L)<br>90 (BR) | 128 (B) | Fuel injector No. 3<br>Fuel injector No. 6<br>Fuel injector No. 2<br>Fuel injector No. 5<br>Fuel injector No. 1<br>Fuel injector No. 4 | Output | [Engine is running]<br>• Warm-up condition<br>• Idle speed<br>**NOTE:**<br>The pulse cycle changes depending on rpm at idle | BATTERY VOLTAGE<br>(11 - 14 V)★<br>  <br><br>JMBIA0047GB |
| | | | | [Engine is running]<br>• Warm-up condition<br>• Engine speed: 2,000 rpm | BATTERY VOLTAGE<br>(11 - 14 V)★<br>  <br><br>JMBIA0048GB |
| 83 (Y) | 94 (B) | Intake air temperature sensor (bank 2) | Input | [Engine is running] | 0 - 4.8 V<br>Output voltage varies with intake air temperature. |
| 84 (B) | — | Sensor ground (Heated oxygen sensor 2, Engine coolant temperature sensor, Engine oil temperature sensor) | — | — | — |
| 87 (SB) | 96 (P) | Power steering pressure sensor | Output | [Engine is running]<br>• Steering wheel: Being turned | 0.5 - 4.5 V |
| | | | | [Engine is running]<br>• Steering wheel: Not being turned | 0.4 - 0.8 V |

| Terminal No. (Wire color) | | Description | | Condition | Value (Approx.) |
|---|---|---|---|---|---|
| + | – | Signal name | Input/ Output | | |
| 88 (LG) | — | Sensor ground [Exhaust valve timing control position sensor (bank 1), Exhaust valve timing control position sensor (bank 2)] | — | — | — |
| 91 (G) | 95 (W) | Battery current sensor | Input | [Engine is running]<br>• Battery: Fully charged*2<br>• Idle speed | 2.6 - 3.5 V |
| 92 (R) | — | Sensor ground [Camshaft position sensor (PHASE) (bank 2)] | — | [Engine is running]<br>• Warm-up condition<br>• Idle speed | 0 V |
| 93 (R) | 128 (B) | Power supply for ECM (Back-up) | Input | [Ignition switch: OFF] | BATTERY VOLTAGE (11 - 14 V) |
| 94 (B) | — | Sensor ground [Mass air flow sensor (bank 2), Intake air temperature sensor (bank 2)] | — | — | — |
| 95 (W) | — | Sensor ground (Battery current sensor) | — | — | — |
| 96 (P) | — | Sensor ground [Camshaft position sensor (PHASE) (bank 1), Power steering pressure sensor] | — | — | — |
| 97 (R) | 100 (W) | Accelerator pedal position sensor 1 | Input | [Ignition switch: ON]<br>• Engine stopped<br>• Accelerator pedal: Fully released | 0.45 - 1.0 V |
| | | | | [Ignition switch: ON]<br>• Engine stopped<br>• Accelerator pedal: Fully depressed | 4.4 - 4.8 V |
| 98 (P) | 104 (V) | Accelerator pedal position sensor 2 | Input | [Ignition switch: ON]<br>• Engine stopped<br>• Accelerator pedal: Fully released | 0.22 - 0.50 V |
| | | | | [Ignition switch: ON]<br>• Engine stopped<br>• Accelerator pedal: Fully depressed | 2.1 - 2.5 V |
| 99 (L) | 100 (W) | Sensor power supply (Accelerator pedal position sensor 1) | — | [Ignition switch: ON] | 5 V |
| 100 (W) | — | Sensor ground (Accelerator pedal position sensor 1) | — | — | — |
| 101 (SB) | 108 (Y) | ASCD steering switch | Input | [Ignition switch: ON]<br>• ASCD steering switch: OFF | 4 V |
| | | | | [Ignition switch: ON]<br>• MAIN switch: Pressed | 0 V |
| | | | | [Ignition switch: ON]<br>• CANCEL switch: Pressed | 1 V |
| | | | | [Ignition switch: ON]<br>• RESUME/ACCELERATE switch: Pressed | 3 V |
| | | | | [Ignition switch: ON]<br>• SET/COAST switch: Pressed | 2 V |

| Terminal No. (Wire color) | | Description | | Condition | Value (Approx.) |
|---|---|---|---|---|---|
| + | − | Signal name | Input/ Output | | |
| 103 (GR) | 104 (V) | Sensor power supply (Accelerator pedal position sensor 2) | — | [Ignition switch: ON] | 5 V |
| 104 (V) | — | Sensor ground (Accelerator pedal position sensor 2) | — | — | — |
| 105 (L) | 112 (V) | Refrigerant pressure sensor | Input | [Engine is running]<br>• Warm-up condition<br>• Both A/C switch and blower fan motor switch: ON (Compressor operates) | 1.0 - 4.0 V |
| 106 (W) | 128 (B) | Fuel tank temperature sensor | Input | [Engine is running] | 0 - 4.8 V<br>Output voltage varies with fuel tank temperature. |
| 107 (GR) | 112 (V) | Sensor power supply (Refrigerant pressure sensor) | — | [Ignition switch: ON] | 5 V |
| 108 (Y) | — | Sensor ground (ASCD steering switch) | — | — | — |
| 109 (G) | 128 (B) | PNP signal | Input | [Ignition switch: ON]<br>• Selector lever: P or N | BATTERY VOLTAGE (11 - 14 V) |
| | | | | [Ignition switch: ON]<br>• Selector lever: Except above | 0 V |
| 110 (R) | 128 (B) | Engine speed signal output | Output | [Engine is running]<br>• Warm-up condition<br>• Idle speed<br>**NOTE:**<br>The pulse cycle changes depending on rpm at idle | 1 V★<br>  <br> |
| | | | | [Engine is running]<br>• Engine speed is 2,000 rpm | 1 V★<br>  <br> |
| 112 (V) | — | Sensor ground (Refrigerant pressure sensor) | — | — | — |
| 113 (P) | — | CAN communication line | Input/ Output | — | — |
| 114 (L) | — | CAN communication line | Input/ Output | — | — |
| 117 (V) | — | Data link connector | Input/ Output | — | — |
| 122 (P) | 128 (B) | Stop lamp switch | Input | [Ignition switch: OFF]<br>• Brake pedal: Fully released | 0 V |
| | | | | [Ignition switch: OFF]<br>• Brake pedal: Slightly depressed | BATTERY VOLTAGE (11 - 14 V) |

| Terminal No. (Wire color) | | Description | | Condition | Value (Approx.) |
|---|---|---|---|---|---|
| + | -– | Signal name | Input/ Output | | |
| 123 (B) 124 (B) | — | ECM ground | — | [Engine is running]<br>• Idle speed | Body ground |
| 125 (R) | 128 (B) | Power supply for ECM | Input | [Ignition switch: ON] | BATTERY VOLTAGE (11 - 14 V) |
| 126 (BR) | 128 (B) | ASCD brake switch | Input | [Ignition switch: ON]<br>• Brake pedal: Slightly depressed | 0 V |
| | | | | [Ignition switch: ON]<br>• Brake pedal: Fully released | BATTERY VOLTAGE (11 - 14 V) |
| 127 (B) 128 (B) | — | ECM ground | — | — | — |

★: Average voltage for pulse signal (Actual pulse signal can be confirmed by oscilloscope.)

*1: This may vary depending on internal resistance of the tester.

*2: Before measuring the terminal voltage, confirm that the battery is fully charged. Refer to PG-3, "How to Handle Battery".

# SYMPTOM DIAGNOSIS

## AUTOMATIC AIR CONDITIONING SYSTEM

### Diagnosis Chart By Symptom

INFOID:0000000008293267

| Symptom | Reference | |
|---|---|---|
| A/C system does not activate. | Go to Trouble Diagnosis Procedure for A/C System. | HAC-81, "Diagnosis Procedure" |
| A/C system cannot be controlled. | Go to Preset Switch System. | AV-68, "Symptom Table" (BASE AUDIO WITHOUT REAR VIEW CAMERA), AV-168, "Symptom Table" (BASE AUDIO WITH REAR VIEW CAMERA), AV-283, "Symptom Table" (BOSE AUDIO WITHOUT NAVIGATION) or AV-416, "Symptom Table" (BOSE AUDIO WITH NAVIGATION) |
| Air outlet does not change.<br>Mode door motor does not operate normally. | Go to Trouble Diagnosis Procedure for Mode Door Motor. (LAN) | HAC-82, "Diagnosis Procedure" |
| Discharge air temperature does not change.*1<br>Air mix door motor does not operate normally.*1 | Go to Trouble Diagnosis Procedure for Air Mix Door Motor. (LAN) | HAC-84, "WITHOUT LEFT AND RIGHT VENTILATION TEMPERATURE SEPARATELY CONTROL SYSTEM : Diagnosis Procedure" |
| Discharge air temperature (driver side) does not change.*2<br>Air mix door motor (driver side) does not operate normally.*2 | Go to Trouble Diagnosis Procedure for Air Mix Door Motor (driver side). (LAN) | HAC-86, "WITH LEFT AND RIGHT VENTILATION TEMPERATURE SEPARATELY CONTROL SYSTEM : Diagnosis Procedure" |
| Discharge air temperature (passenger side) does not change.*2<br>Air mix door motor (passenger side) does not operate normally.*2 | Go to Trouble Diagnosis Procedure for Air Mix Door Motor (passenger side). (LAN) | |
| Intake door does not change.<br>Intake door motor does not operate normally. | Go to Trouble Diagnosis Procedure for Intake Door Motor. (LAN) | HAC-89, "Diagnosis Procedure" |
| Blower motor operation is malfunctioning. | Go to Trouble Diagnosis Procedure for Blower Motor. | HAC-91, "Diagnosis Procedure" |
| Magnet clutch does not engage. | Go to Trouble Diagnosis Procedure for Magnet Clutch. | HAC-95, "Diagnosis Procedure" |
| Insufficient cooling<br>No cool air comes out. (Air flow volume is normal.) | Go to Trouble Diagnosis Procedure for Insufficient Cooling. | HAC-155, "Inspection procedure" |
| Insufficient heating<br>No warm air comes out. (Air flow volume is normal.) | Go to Trouble Diagnosis Procedure for Insufficient Heating. | HAC-157, "Inspection procedure" |
| Noise | Go to Trouble Diagnosis Procedure for Noise. | HAC-159, "Inspection procedure" |
| Self-diagnosis function cannot be performed normally. | Go to Trouble Diagnosis Procedure for Self-diagnosis. | HAC-161, "Inspection procedure" |
| Memory function does not operate normally. | Go to Trouble Diagnosis Procedure for Memory Function. | HAC-162, "Inspection procedure" |
| Plasmacluster system does not operate.*3 | Go to Trouble Diagnosis Procedure for Plasmacluster system. | HAC-113, "Diagnosis Procedure" |

*1: Without left and right ventilation temperature separately control system.

*2: With left and right ventilation temperature separately control system.

*3: With Plasmacluster system.

# INSUFFICIENT COOLING

## Description

INFOID:0000000008293268

Symptom
- Insufficient cooling
- No cool air comes out. (Air flow volume is normal.)

## Inspection procedure

INFOID:0000000008293269

### 1. CHECK WITH A GAUGE OF RECOVERY/RECYCLING RECHARGING EQUIPMENT

Connect the recovery/recycling recharging equipment to the vehicle and perform the pressure inspection with the gauge.

Is there refrigerant?

YES >> GO TO 2.
NO-1 >> Check for refrigerant leakages with the refrigerant leakage detecting fluorescent leak detector. Refer to HA-34, "Inspection".
NO-2 >> GO TO 2 after repairing or replacing the parts according to the inspection results.

### 2. CHECK CHARGED REFRIGERANT AMOUNT

1. Connect recovery/recycling recharging equipment to the vehicle and discharge the refrigerant. Refer to HA-25, "Collection and Charge".
2. Recharge with the proper amount of refrigerant. Refer to HA-25, "Collection and Charge".
3. Perform the inspection with the refrigerant leakage detecting fluorescent leak detector. Refer to HA-34, "Inspection".

Is the inspection result normal?

YES >> GO TO 3.
NO >> Refill the refrigerant and repair or replace the parts according to the inspection results.

### 3. PERFORM THE PERFORMANCE TEST

Connect recovery/recycling recharging equipment to the vehicle and perform the performance test. Refer to HA-32, "Performance Chart".

Is the inspection result normal?

YES >> GO TO 4.
NO >> Perform the diagnosis with the gauge pressure. Refer to HA-7, "Trouble Diagnosis For Unusual Pressure".

### 4. CHECK SETTING OF TEMPERATURE SETTING TRIMMER

Check the setting of temperature setting trimmer. Refer to HAC-9, "WITHOUT PLASMACLUSTER SYSTEM : Temperature Setting Trimmer".

1. Check that the temperature setting trimmer is set to “+ direction”.
   **NOTE:**
   The control temperature can be set with the setting of temperature setting trimmer.
2. Set temperature control dial to “0”.

Are the symptoms solved?

YES >> INSPECTION END
NO >> GO TO 5.

### 5. PERFORM SELF-DIAGNOSIS

Perform self-diagnosis function. Refer to HAC-69, "WITHOUT PLASMACLUSTER SYSTEM : Diagnosis Description".

Is the inspection result normal?

YES >> GO TO 6.
NO >> Repair or replace parts according to the inspection results.

### 6. CHECK DRIVE BELT

Check tension of the drive belt. Refer to EM-163, "Checking" (VQ37VHR) or EM-21, "Inspection" (VQ25HR).

Is the inspection result normal?

YES >> GO TO 7.
NO >> Adjust or replace drive belt.

## 7. CHECK AIR LEAKAGE FROM DUCT

Check duct and nozzle, etc. of A/C system for air leakage.

Is the inspection result normal?

YES >> GO TO 8.
NO >> Repair or replace parts according to the inspection results.

## 8. CHECK ECV

Perform the ECV diagnosis procedure. Refer to HAC-97, "Diagnosis Procedure".

Is the inspection result normal?

YES >> Replace the unified meter and A/C amp.
NO >> Replace the compressor.

# INSUFFICIENT HEATING

## Description

INFOID:0000000008293270

Symptom
- Insufficient heating
- No warm air comes out. (Air flow volume is normal.)

## Inspection procedure

INFOID:0000000008293271

### 1.CHECK COOLING SYSTEM

1. Check engine coolant level and check for leakage. Refer to CO-9, "Inspection".
2. Check radiator cap. Refer to CO-13, "RADIATOR CAP : Inspection".
3. Check water flow sounds of engine coolant. Refer to CO-10, "Refilling".

Is the inspection result normal?

YES >> GO TO 2.
NO >> Refill the engine coolant and repair or replace the parts according to the inspection results.

### 2.CHECK SETTING OF TEMPERATURE SETTING TRIMMER

1. Check the setting of temperature setting trimmer. Refer to HAC-9, "WITHOUT PLASMACLUSTER SYSTEM : Temperature Setting Trimmer".
2. Check that the temperature setting trimmer is set to “– direction”.
   **NOTE:**
   The control temperature can be set with the setting of temperature setting trimmer.
3. Set temperature control dial to “0”.

Are the symptoms solved?

YES >> INSPECTION END
NO >> GO TO 3.

### 3.CHECK OPERATION

1. Turn temperature dial (driver side) and raise temperature setting to 32°C (90°F) after warming up the engine.
2. Check that warm air blows from outlets.

Is the inspection result normal?

YES >> INSPECTION END
NO >> GO TO 4.

### 4.PERFORM SELF-DIAGNOSIS

Perform self-diagnosis function. Refer to HAC-69, "WITHOUT PLASMACLUSTER SYSTEM : Diagnosis Description".

Is the inspection result normal?

YES >> GO TO 5.
NO >> Repair or replace parts according to the inspection results.

### 5.CHECK AIR LEAKAGE FROM DUCT

Check duct and nozzle, etc. of A/C system for air leakage.

Is the inspection result normal?

YES >> GO TO 6.
NO >> Repair or replace parts according to the inspection results.

### 6.CHECK HEATER HOSE INSTALLATION CONDITION

Check the heater hose installation condition visually (for twist, crush, etc.).

Is the inspection result normal?

YES >> GO TO 7.
NO >> Repair or replace parts according to the inspection results.

### 7.CHECK TEMPERATURE OF HEATER HOSE

1. Check the temperature of inlet hose and outlet hose of heater core.
2. Check that the inlet side of heater core is hot and the outlet side is slightly lower than/almost equal to the inlet side.

**CAUTION:**

**The temperature inspection should be performed in a short time because the engine coolant temperature is too hot.**

Is the inspection result normal?

YES >> GO TO 8.
NO >> Replace the heater core after performing the procedures after the cooling system inspection again. GO TO 1.

## 8. REPLACE HEATER CORE

Replace the heater core. Refer to heater core. Refer to HA-51, "Exploded View".

Are the symptoms solved?

YES >> INSPECTION END
NO >> Perform the procedures after the cooling system inspection again. GO TO 1.

# NOISE

## Description

INFOID:0000000008293272

Symptom
- Noise
- Noise is heard when the A/C system operates.

## Inspection procedure

INFOID:0000000008293273

### 1.CHECK OPERATION

1. Operate the A/C system and check the operation. Refer to HAC-7, "WITHOUT PLASMACLUSTER SYSTEM : Description & Inspection".
2. Check the parts where noise is occurring.

Can the parts where noise is occurring be checked?

YES-1 >> Noise from blower motor: GO TO 2.
YES-2 >> Noise from compressor: GO TO 3.
YES-3 >> Noise from expansion valve: GO TO 4.
YES-4 >> Noise from A/C piping (pipe, flexible hose): GO TO 6.
YES-5 >> Noise from drive belt: GO TO 7.
NO >> INSPECTION END

### 2.CHECK BLOWER MOTOR

1. Remove blower motor.
2. Remove in-cabin microfilter.
3. Remove foreign materials that are in the blower unit.
4. Check the noise from blower motor again.

Is the inspection result normal?

YES >> INSPECTION END
NO >> Replace blower motor.

### 3.REPLACE COMPRESSOR

1. Correct the refrigerant with recovery/recycling recharging equipment.
2. Recharge with the proper amount of the collected refrigerant after recycling or new refrigerant.
3. Check for the noise from compressor again.

Is the inspection result normal?

YES >> INSPECTION END
NO >> Replace compressor.

### 4.CHECK WITH GAUGE PRESSURE

Perform the diagnosis with the gauge pressure. Refer to HA-7, "Trouble Diagnosis For Unusual Pressure".

Is the inspection result normal?

YES >> GO TO 5.
NO >> Repair or replace malfunctioning part.

### 5.REPLACE EXPANSION VALVE

1. Correct the refrigerant with recovery/recycling recharging equipment.
2. Recharge with the proper amount of the collected refrigerant after recycling or new refrigerant.
3. Check for the noise from expansion valve again.

Are the symptoms solved?

YES >> INSPECTION END
NO >> Replace expansion valve.

### 6.CHECK A/C PIPING (PIPE, FLEXIBLE HOSE)

1. Check A/C piping (pipe, flexible hose) (for deformation and damage, etc.).
2. Check the installation condition of clips and brackets, etc. of A/C piping (pipe, flexible hose).

Is the inspection result normal?

YES >> Fix the line with rubber or come vibration absorbing material.
NO >> Repair or replace parts according to the inspection results.

## 7. CHECK DRIVE BELT

Check tension of the drive belt. Refer to EM-163, "Checking" (VQ37VHR) or EM-21, "Inspection" (VQ25HR).

Is the inspection result normal?

YES >> Check the noise from compressor: GO TO 3.
NO >> Adjust or replace drive belt according to the inspection results.

# SELF-DIAGNOSIS CANNOT BE PERFORMED

## Description

INFOID:0000000008293274

Symptom: Self-diagnosis function does not operate normally.

## Inspection procedure

INFOID:0000000008293275

### 1. CHECK SELF-DIAGNOSIS FUNCTION

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

**NOTE:**

- If battery voltage drops below 12 V during diagnosis STEP-3, door motor speed becomes slower and as a result, the system may generate an error even when operation is normal. Start engine before performing this diagnosis to avoid this.
- Former STEP-1 (indicators and display screen are checked) does not exist in this self-diagnosis function.
- OFF switch may not be recognized according to the timing of pressing it. Operate OFF switch after the intake switch indicators are turned ON.

Does self-diagnosis function operate?

YES >> INSPECTION END
NO >> GO TO 2.

### 2. CHECK POWER SUPPLY AND GROUND CIRCUIT OF UNIFIED METER AND A/C AMP.

Check power supply and ground circuit of unified meter and A/C amp. Refer to HAC-80, "UNIFIED METER AND A/C AMP. : Diagnosis Procedure".

Is the inspection result normal?

YES >> Replace unified meter and A/C amp.
NO >> Repair or replace malfunctioning part.

# MEMORY FUNCTION DOES NOT OPERATE

## Description

INFOID:0000000008293276

Symptom
- Memory function does not operate normally.
- The setting is not maintained. (It returns to the initial condition.)

## Inspection procedure

INFOID:0000000008293277

### 1.CHECK OPERATION

1. Set temperature control dial to 32°C (90°F).
2. Press OFF switch.
3. Turn ignition switch OFF.
4. Turn ignition switch ON.
5. Press AUTO switch.
6. Check that the set temperature is maintained.

Is the inspection result normal?

YES >> INSPECTION END
NO >> GO TO 2.

### 2.CHECK POWER SUPPLY AND GROUND CIRCUIT OF UNIFIED METER AND A/C AMP

Check power supply and ground circuit of unified meter and A/C amp. Refer to HAC-80, "UNIFIED METER AND A/C AMP. : Diagnosis Procedure".

Is the inspection result normal?

YES >> Replace unified meter and A/C amp.
NO >> Repair or replace malfunctioning part.

# PRECAUTION

## PRECAUTIONS

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

INFOID:0000000008293278

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. This system includes seat belt switch inputs and dual stage front air bag modules. The SRS system uses the seat belt switches to determine the front air bag deployment, and may only deploy one front air bag, depending on the severity of a collision and whether the front occupants are belted or unbelted. Information necessary to service the system safely is included in the “SRS AIR BAG” and “SEAT BELT” of this Service Manual.

**WARNING:**

**Always observe the following items for preventing accidental activation.**

- **To avoid rendering the SRS inoperative, which could increase the risk of personal injury or death in the event of a collision that 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 “SRS AIR BAG”.**
- **Never 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.**

### PRECAUTIONS WHEN USING POWER TOOLS (AIR OR ELECTRIC) AND HAMMERS

**WARNING:**

**Always observe the following items for preventing accidental activation.**

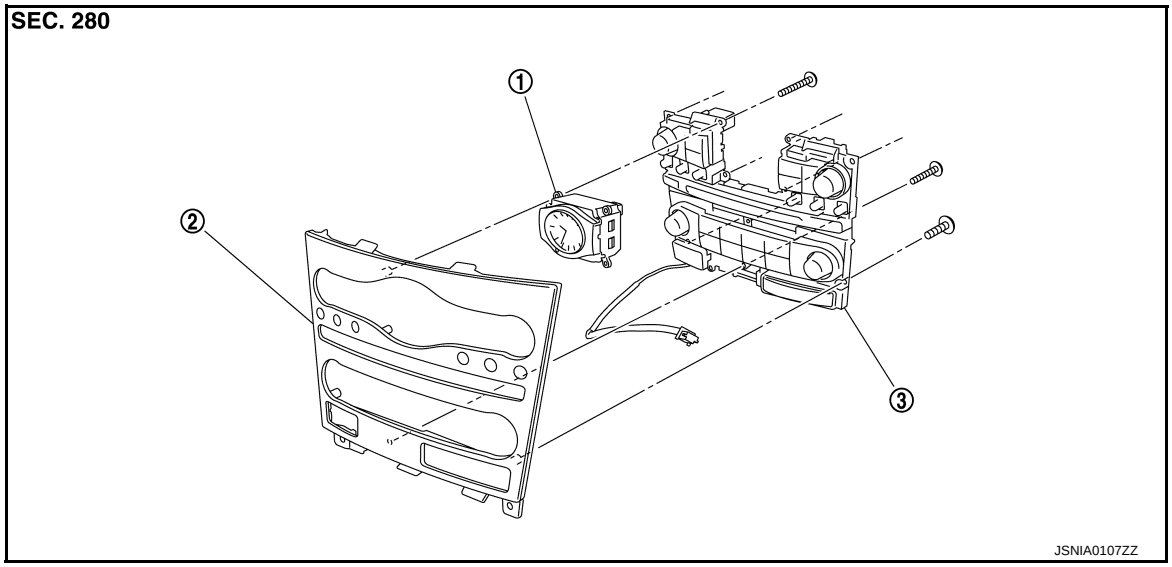
- **When working near the Air Bag Diagnosis Sensor Unit or other Air Bag System sensors with the ignition ON or engine running, never use air or electric power tools or strike near the sensor(s) with a hammer. Heavy vibration could activate the sensor(s) and deploy the air bag(s), possibly causing serious injury.**
- **When using air or electric power tools or hammers, always switch the ignition OFF, disconnect the battery, and wait at least 3 minutes before performing any service.**

# REMOVAL AND INSTALLATION

## PRESET SWITCH

### Exploded View

INFOID:0000000008293279




1. Clock
2. Cluster lid C
3. Preset switch

### Removal and Installation

INFOID:0000000008293280

#### REMOVAL

Remove preset switch. Refer to the following.

- Refer to AV-82, "Exploded View". (BASE AUDIO WITHOUT REAR VIEW CAMERA)
- Refer to AV-185, "Exploded View". (BASE WITH REAR VIEW CAMERA)
- Refer to AV-304, "Exploded View". (BOSE AUDIO WITHOUT NAVIGATION)
- Refer to AV-441, "Exploded View". (BOSE AUDIO WITH NAVIGATION)

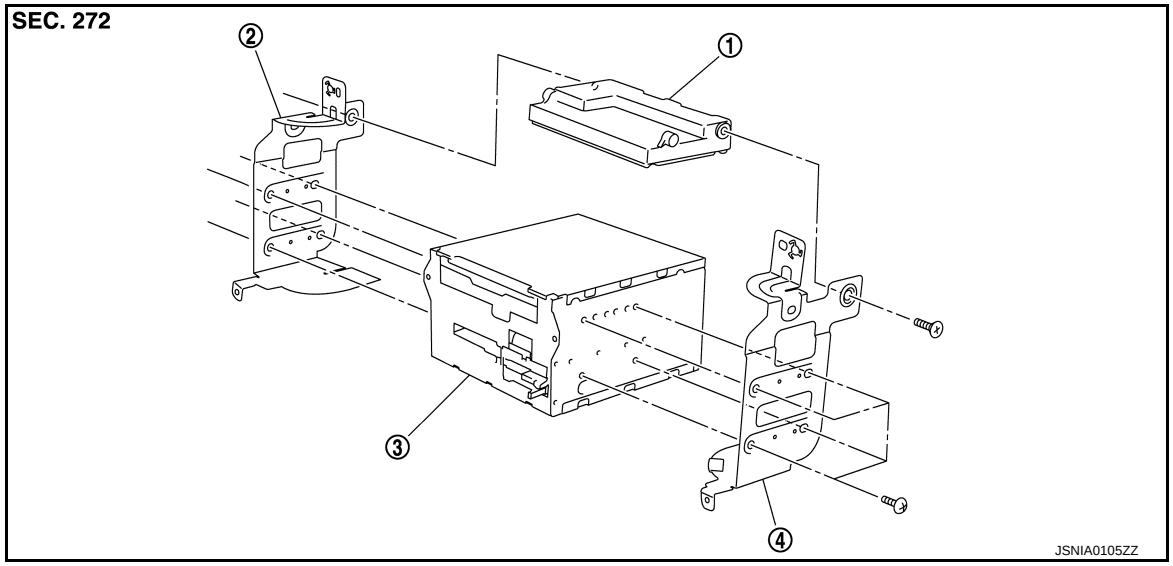
#### INSTALLATION

Install in the reverse order of removal.

# UNIFIED METER AND A/C AMP.

## Exploded View

INFOID:0000000008293281




1. Unified meter and A/C amp.
2. Bracket LH
3. Audio unit
4. Bracket RH

## Removal and Installation

INFOID:0000000008293282

### REMOVAL

1. Remove AV control unit. Refer to the following.
   - Refer to AV-75, "Exploded View". (BASE AUDIO WITHOUT REAR VIEW CAMERA)
   - Refer to AV-175, "Exploded View". (BASE AUDIO WITH REAR VIEW CAMERA)
   - Refer to AV-290, "Exploded View". (BOSE AUDIO WITHOUT NAVIGATION)
   - Refer to AV-428, "Exploded View". (BOSE AUDIO WITH NAVIGATION)
2. Remove fixing screws, and then remove unified meter and A/C amp..

### INSTALLATION

Note the following item, and then install in the reverse order of removal.

**CAUTION:**

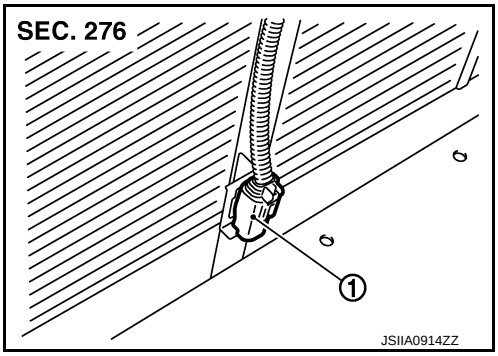
**Since unified meter and A/C amp. connector and AV control unit connector have the same form, be careful not to insert them wrongly.**

# AMBIENT SENSOR

## Exploded View

INFOID:0000000008293283

1. Ambient sensor




## Removal and Installation

INFOID:0000000008293284

### REMOVAL

1. Remove front grille. Refer to EXT-22, "Exploded View".
2. Disconnect ambient sensor connector, and then remove ambient sensor.

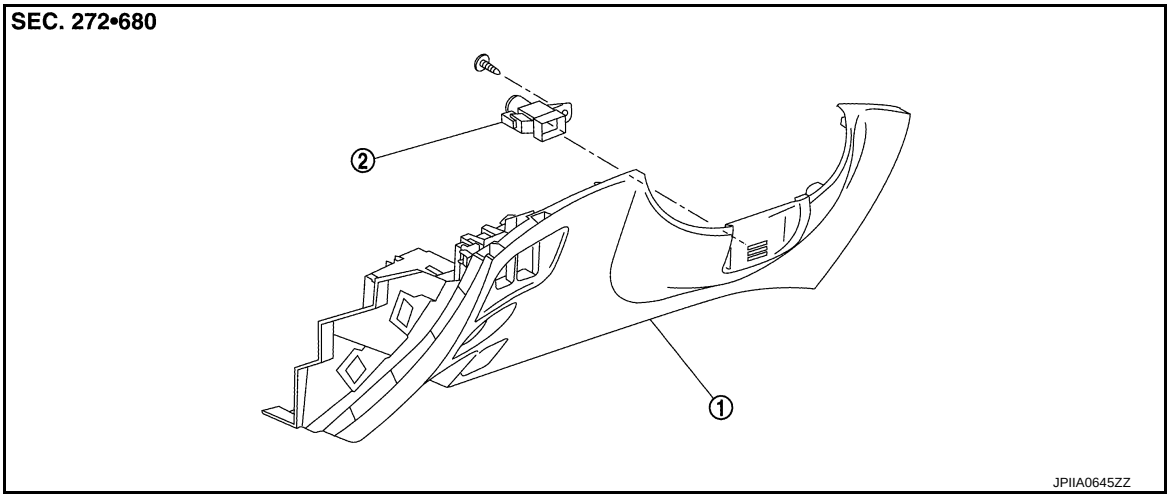
### INSTALLATION

Install in the reverse order of removal.

# IN-VEHICLE SENSOR

## Exploded View

INFOID:0000000008293285




1. Instrument lower panel LH
2. In-vehicle sensor

## Removal and Installation

INFOID:0000000008293286

### REMOVAL

1. Remove instrument lower panel LH. Refer to IP-11, "A/T MODELS : Exploded View".
2. Remove fixing screw, and then remove in-vehicle sensor.

### INSTALLATION

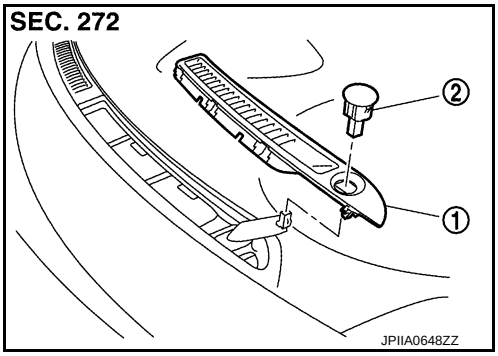
Install in the reverse order of removal.

# SUNLOAD SENSOR

## Exploded View

INFOID:0000000008293287

1. Front defroster grille LH
2. Sunload sensor




## Removal and Installation

INFOID:0000000008293288

### REMOVAL

1. Remove front defroster grille LH. Refer to VTL-9, "Exploded View".
2. Disconnect sunload sensor connector, and then remove sunload sensor.

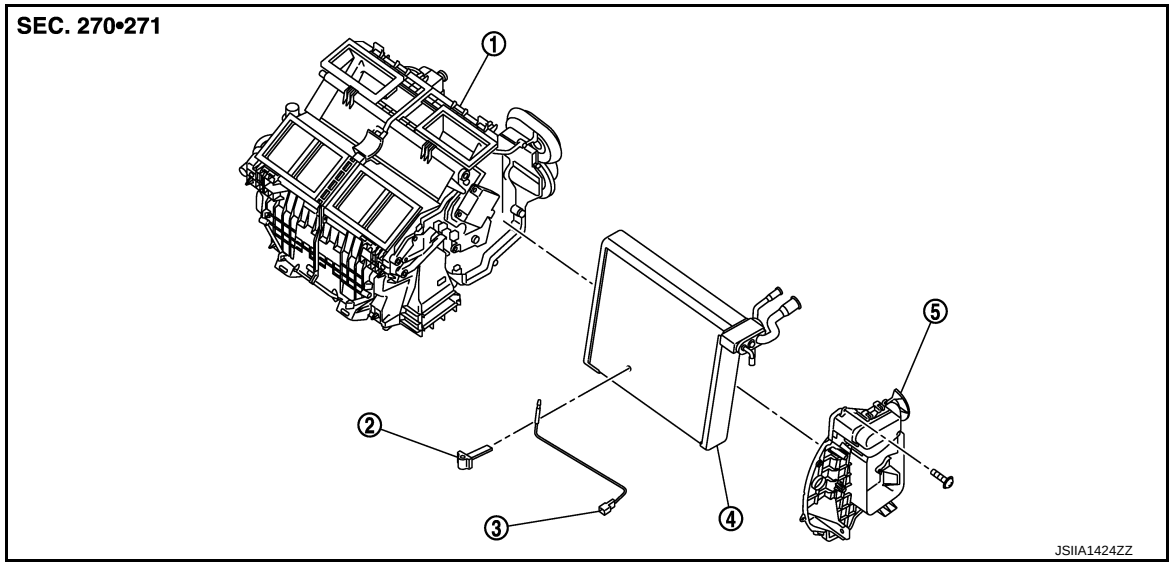
### INSTALLATION

Install in the reverse order of removal.

# INTAKE SENSOR

## Exploded View

INFOID:0000000008293289




1. Heater & cooling unit assembly
2. Intake sensor bracket
3. Intake sensor
4. Evaporator assembly
5. Evaporator cover

## Removal and Installation

INFOID:0000000008293290

### REMOVAL

1. Remove low-pressure pipe 1 and high-pressure pipe 2. Refer to HA-42, "Exploded View".
   **CAUTION:**
   **Cap or wrap the joint of the A/C piping with suitable material such as vinyl tape to avoid the entry of air.**
2. Slide evaporator to passenger side, and then remove intake sensor.

### INSTALLATION

Note the following items, and then install in the reverse order of removal.

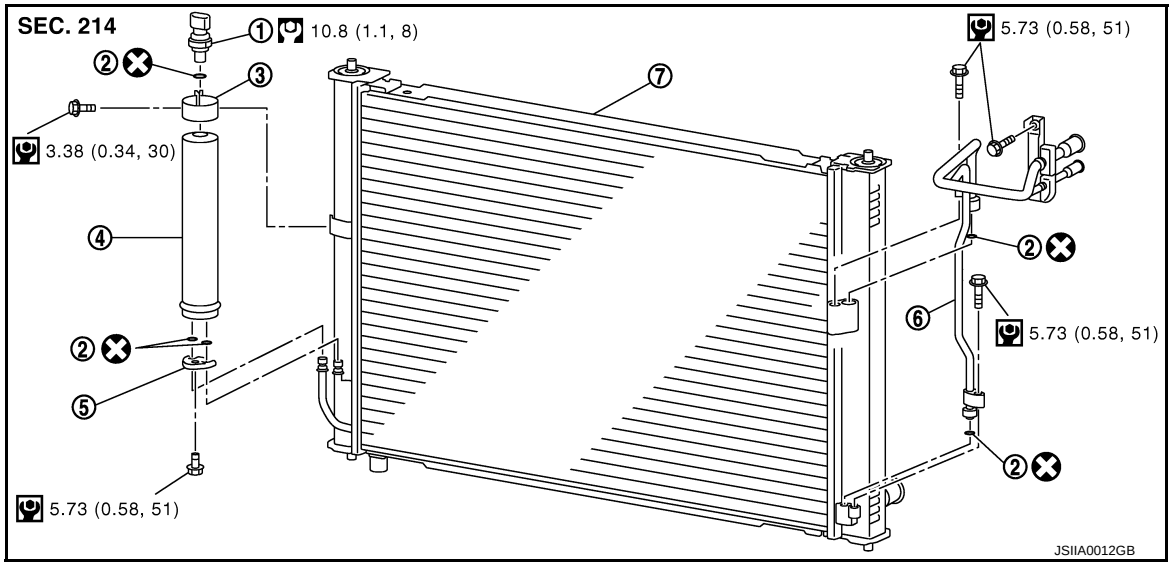
**CAUTION:**

- **Replace O-rings with new ones. Then apply compressor oil to them when installing.**
- **Mark the mounting position of intake sensor bracket prior to removal so that the reinstalled sensor can be located in the same position.**
- **Female-side piping connection is thin and easy to deform. Slowly insert the male-side piping straight in axial direction.**
- **Insert piping securely until a click is heard.**
- **After piping connection is completed, pull male-side piping by hand to make sure that connection does not come loose.**
- **Check for leakages when recharging refrigerant.**

# REFRIGERANT PRESSURE SENSOR

## Exploded View

INFOID:0000000008293291




1. Refrigerant pressure sensor
2. O-ring
3. Liquid tank bracket
4. Liquid tank
5. Bracket
6. Condenser pipe assembly
7. Radiator & condenser assembly

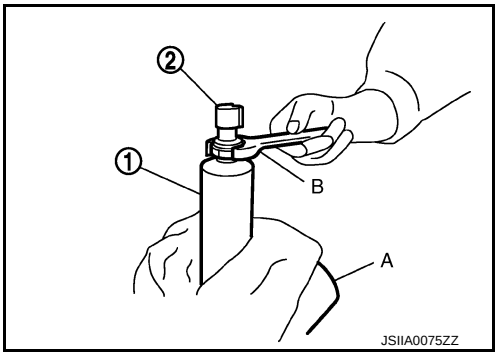
Refer to GI-4, "Components" for symbols in the figure.

## Removal and Installation

INFOID:0000000008293292

### REMOVAL

1. Remove liquid tank. Refer to HA-48, "Exploded View".
2. Fix the liquid tank (1) using a vise (A). Remove the refrigerant pressure sensor (2) using a wrench (B).
   **CAUTION:**
   **Be careful not to damage liquid tank.**




### INSTALLATION

Note the following items, and then install in the reverse order of removal.

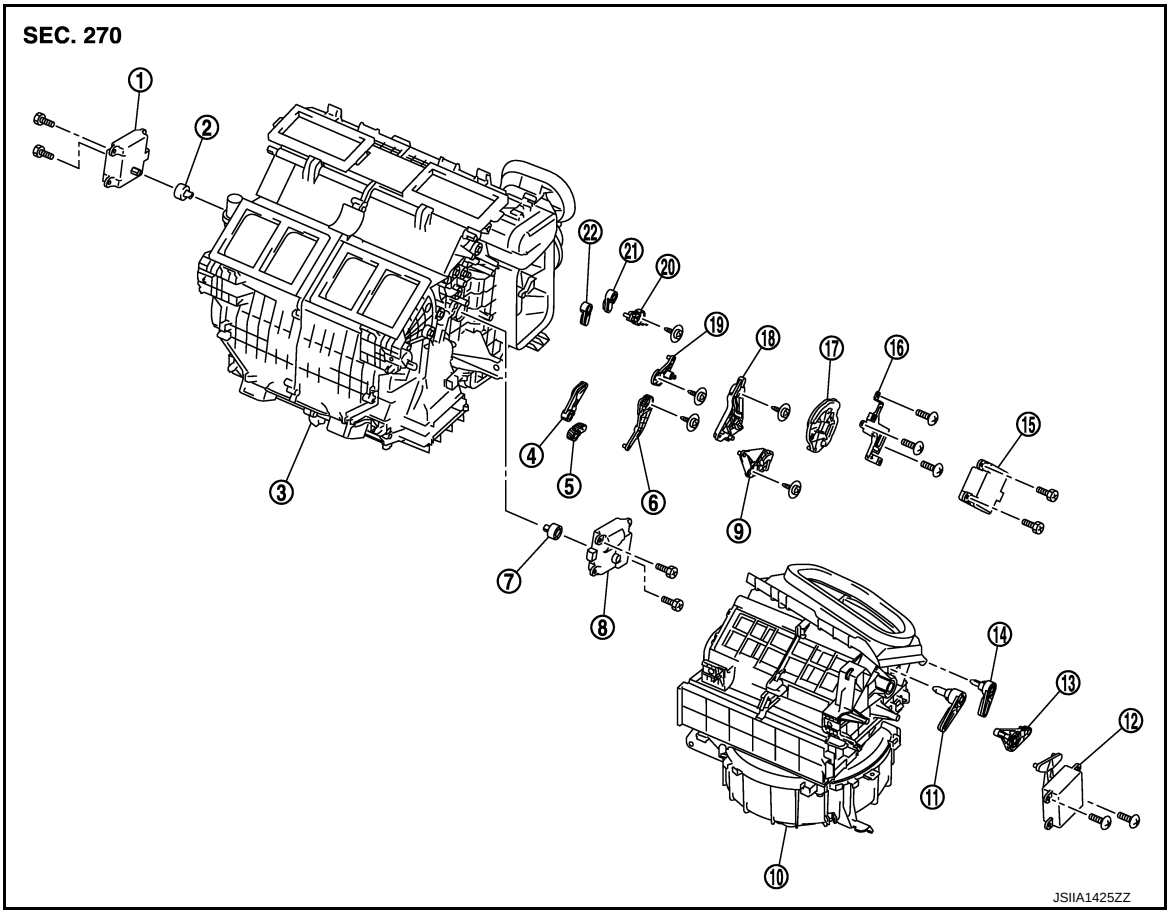
**CAUTION:**

- **Replace O-ring with new one. Then apply compressor oil to them when installing.**
- **Check for leakages when recharging refrigerant.**

# DOOR MOTOR

## Exploded View

INFOID:0000000008293293




| | | |
|---|---|---|
| 1. Air mix door motor (Driver side)* | 2. Air mix door motor adapter | 3. Heater & cooling unit assembly |
| 4. Ventilator door lever | 5. Foot door lever | 6. Foot door link |
| 7. Air mix door motor adapter | 8. Air mix door motor (Passenger side) | 9. Ventilator door link |
| 10. Blower unit | 11. Intake door lever 2 | 12. Intake door motor |
| 13. Intake door link | 14. Intake door lever 1 | 15. Mode door motor |
| 16. Mode door motor bracket | 17. Main link | 18. Main link sub |
| 19. Max.cool door link | 20. Defroster door link | 21. Max.cool door lever |
| 22. Defroster door lever | | |

*: With left and right ventilation temperature separately control system.

# MODE DOOR MOTOR

## MODE DOOR MOTOR : Removal and Installation

INFOID:0000000008293294

### REMOVAL

1. Remove blower unit. Refer to VTL-16, "Exploded View".
2. Disconnect mode door motor connector.
3. Remove fixing screws, and then remove mode door motor.

### INSTALLATION

install in the reverse order of removal.

# AIR MIX DOOR MOTOR

## AIR MIX DOOR MOTOR : Removal and Installation

INFOID:0000000008293295

### REMOVAL

Driver Side (with left and right ventilation temperature separately control system)

1. Set the temperature at 18°C (64°F).
   **CAUTION:**
   **The angle may be out, when installing the air mix door motor to the air mix door, unless the above procedure is performed.**
2. Disconnect the battery cable from the negative terminal.
3. Remove instrument lower panel LH. Refer to IP-11, "A/T MODELS : Exploded View".
4. Remove accelerator pedal bracket and lever assembly. Refer to ACC-3, "Exploded View".
5. Disconnect air mix door motor connector.
6. Remove fixing screws, and then remove air mix door motor.

Passenger Side

1. Set the temperature at 18°C (64°F).
   **CAUTION:**
   **The angle may be out, when installing the air mix door motor to the air mix door, unless the above procedure is performed.**
2. Disconnect the battery cable from the negative terminal.
3. Remove blower unit. Refer to VTL-16, "Exploded View".
4. Disconnect air mix door motor connector.
5. Remove fixing screws, and then remove air mix door motor.

### INSTALLATION

Install in the reverse order of removal.

# INTAKE DOOR MOTOR

## INTAKE DOOR MOTOR : Removal and Installation

INFOID:0000000008293296

### REMOVAL

1. Remove ECM and power steering control unit with bracket attached. Refer to VTL-17, "BLOWER UNIT : Removal and Installation".
2. Disconnect intake door motor connector.
3. Remove fixing screws, and then remove intake door motor from blower unit.

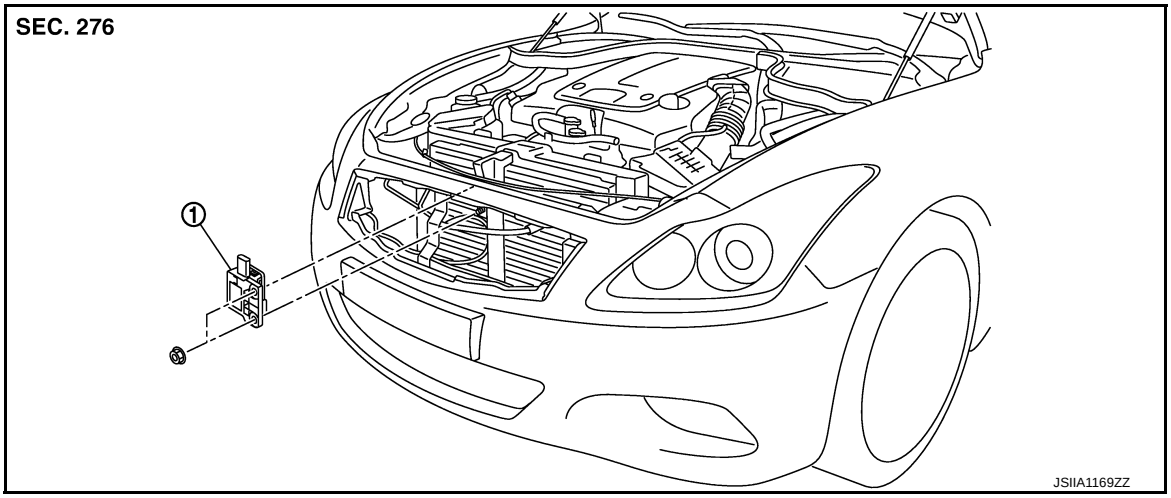
### INSTALLATION

Install in the reverse order of removal.

# EXHAUST GAS/OUTSIDE ODOR DETECTING SENSOR

## Exploded View

INFOID:0000000008293297



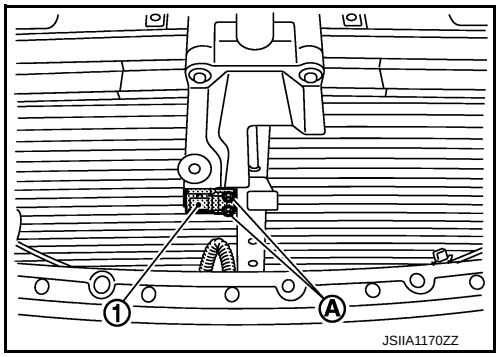

1. Exhaust gas / outside odor detecting sensor

## Removal and Installation

INFOID:0000000008293298

### REMOVAL

1. Remove radiator core support ornament. Refer to DLK-203, "Removal and Installation".
2. Disconnect exhaust gas / outside odor detecting sensor connector.
3. Remove mounting nuts (A), and then remove exhaoust gas / outside odor detecting sensor (1).



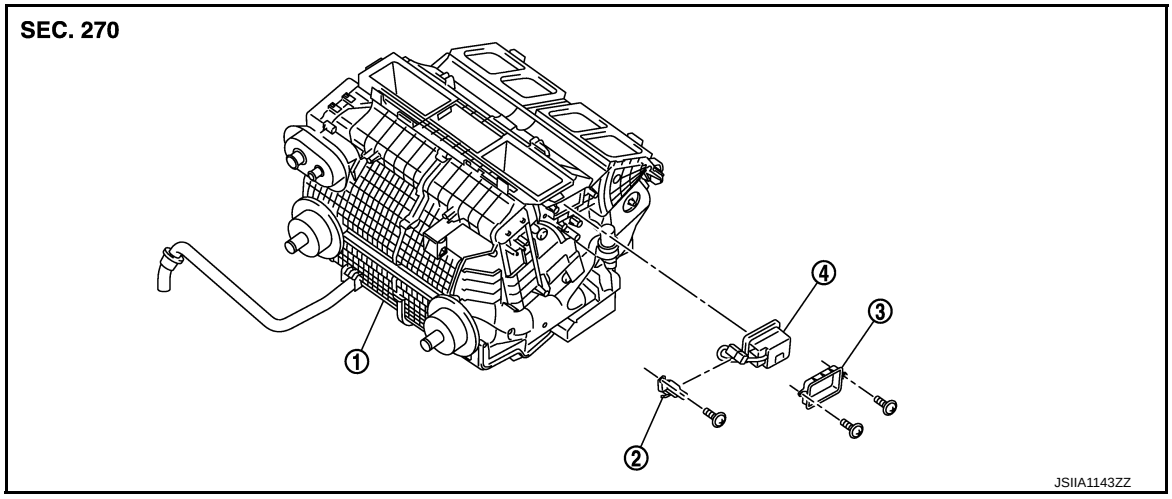

### INSTALLATION

Install in the reverse order of removal.

# IONIZER

## Exploded View

INFOID:0000000008293299




1. Heater & cooling unit assembly
2. Ionizer harness bracket
3. Ionizer bracket
4. Ionizer

## Removal and Installation

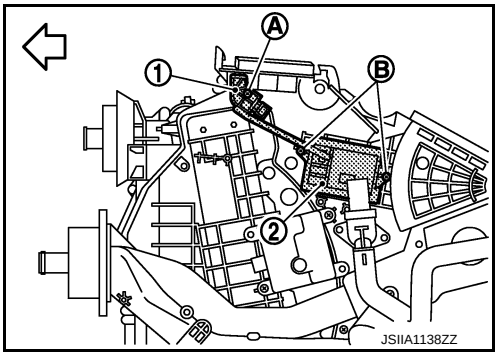
INFOID:0000000008293300

### REMOVAL

1. Remove instrument panel assembly. Refer to the following.
   - Refer to IP-12, "A/T MODELS : Removal and Installation". (A/T models)
   - Refer to IP-23, "M/T MODELS : Removal and Installation". (M/T models)
2. Remove fixing screw (A), and then remove ionizer harness bracket (1) from heater & cooling unit assembly.
3. Remove fixing screws (B), and then remove ionizer (2).

**CAUTION:**
**Never touch the surface (ceramic part) of the ionizer. It is the discharge electrode**

⇦ : Vehicle front




### INSTALLATION

Note the following item, and then install in the reverse order of removal.

**CAUTION:**
**If there is dirt, use a clean cloth and clean the discharge electrode (ceramic part) of the ionizer.**